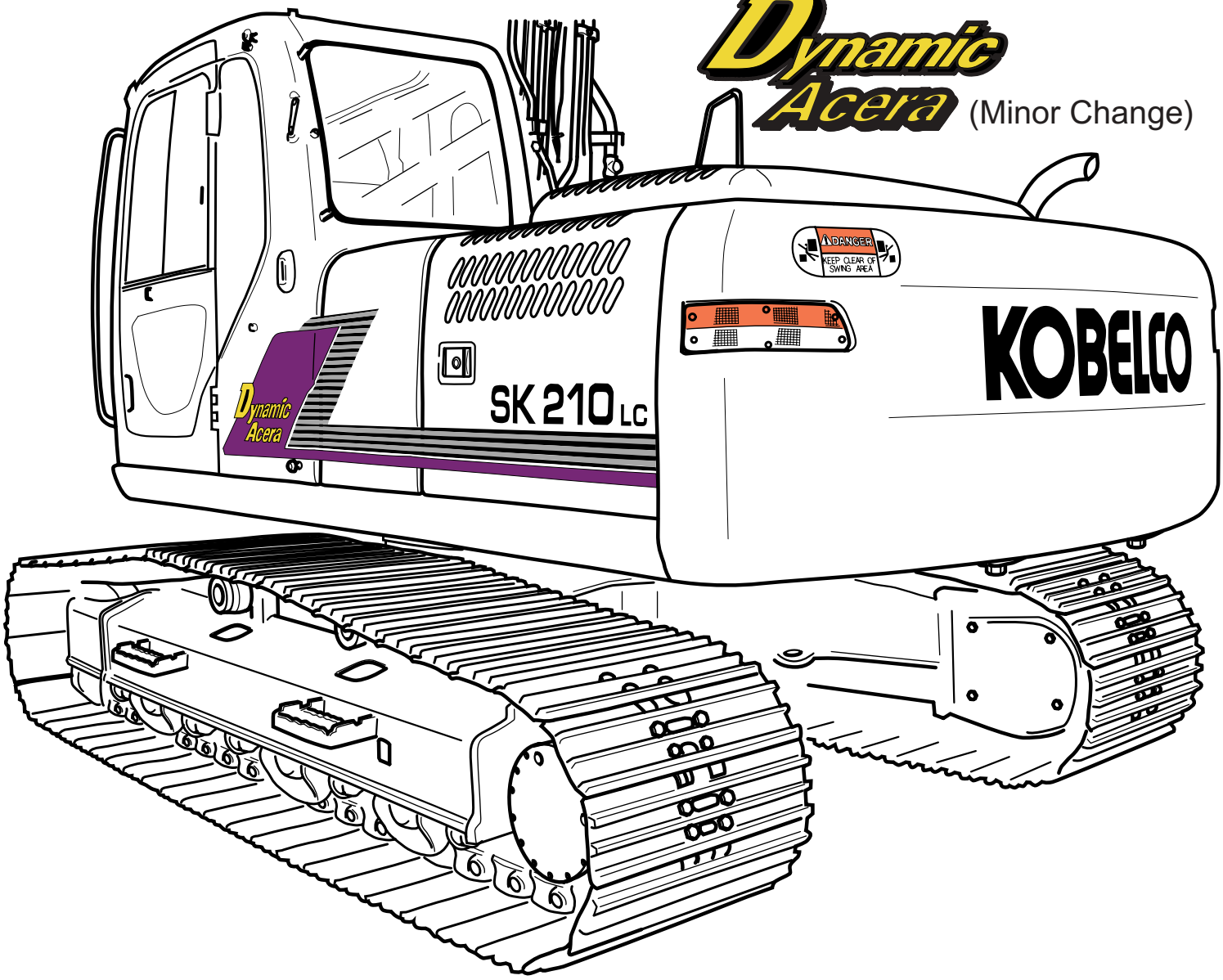
https://truckmanualshub.com/

Dynamic Acera (Minor Change)



TRAINING MATERIAL

SK160LC–6E	**YM03U0522 ~**
ED190 –6E	**YL03U0136 ~**
SK210LC–6E	**YQ08U0969 ~**
SK250LC–6E	**LL09U0575 ~**
SK290LC–6E	**LB04U0298 ~**
SK330LC–6E	**YC07U0623 ~**

© **2002 KOBELCO CONSTRUCTION MACHINERY AMERICA LLC, Calhoun, Georgia / Stafford, Texas USA.** All rights reserved. Any use of editorial or pictorial content is strictly prohibited without express written permission from **KCMA LLC** Calhoun, Georgia / Stafford, Texas USA. Printed in USA. (11/02)

ISSUED: 11/02; REV. 0

https://truckmanualshub.com/

Certificate No. CERT-02455-99-AQ-HOU-RAB

This is to certify that the Quality System
of

KOBELCO CONSTRUCTION MACHINERY AMERICA LLC

at
501 Richardson Road, Calhoun, GA 30701 USA
12755 S. Kirkwood, Stafford, TX 77477 USA

Has been found to conform to Quality Standard:

ISO 9001, 1994

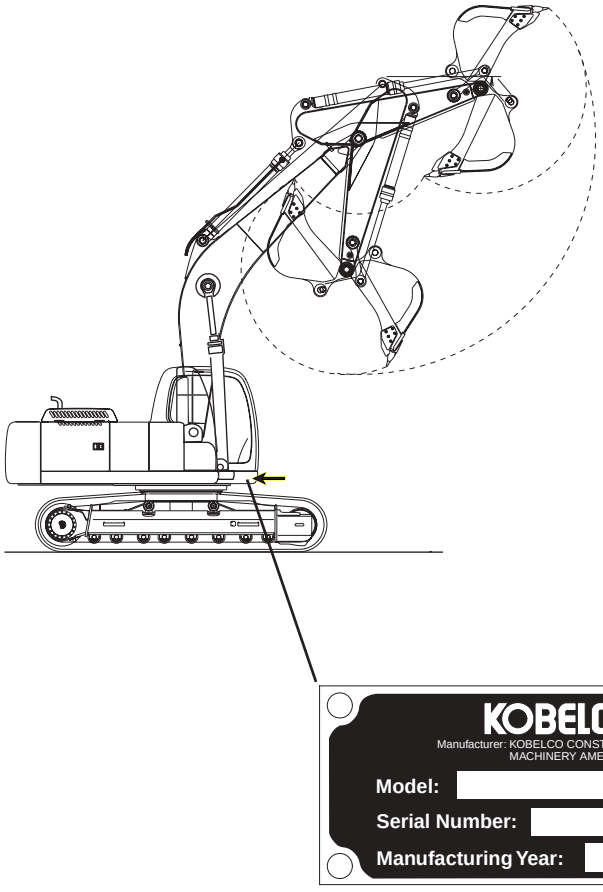
This Certificate is valid for the following products/service ranges:

THE DESIGN, MANUFACTURE AND DISTRIBUTION OF CONSTRUCTION EQUIPMENT

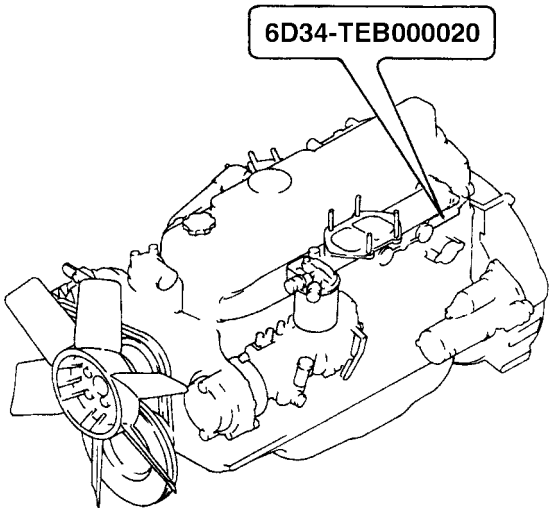
https://truckmanualshub.com/

MINOR CHANGE TRAINING MANUAL

- **LOCATION OF MACHINE'S SERIAL NUMBER**



- **LOCATION OF ENGINE'S SERIAL NUMBER**



NOTE: The numbers in the illustrations are for explanation only and differ from actual numbers

https://truckmanualshub.com/

KOBELCO/MMC WARRANTY STANDARD WARRANTY COVERAGE (ENGINE):

- One (1) year, unlimited hours.
- Two (2) years, two thousand (2,000) hours, whichever occurs first.
- Three (3) years, ten thousand (10,000) hours, whichever occurs first, for major components (cylinder block, cylinder head, connecting rods, crankshaft, camshaft, and cam gear)

OWNER'S WARRANTY RESPONSIBILITIES:

- As the Kobelco excavator owner, you are responsible for the performance of the required maintenance listed in this operator's manual. Kobelco Construction Machinery America Inc., recommends that you retain all receipts covering maintenance on your excavator.
- As the Kobelco excavator owner, you should however be aware that Kobelco Construction Machinery America LLC, may deny you warranty coverage if your machine's engine has failed due to abuse, neglect, improper maintenance or unaproved modifications.
- Your Kobelco excavator's engine is designed to operate on commercially available Diesel fuel only.
- You are responsible for initiating the warranty process. The California Air Resources Board suggests that you present your engine to an authorized Kobelco dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact Kobelco America Inc. at the office shown below:

Kobelco Construction Machinery America LLC
12755 South Kirkwood Rd
Stafford, Texas 77477

Tel: (281) 240-4800
Fax: (281) 240-5026
www.kobelcoamerica.com

https://truckmanualshub.com/

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

YOUR WARRANTY RIGHT AND OBLIGATIONS:

The California Air Resources Board and Mitsubishi Motors Corporation (hereinafter referred to as ARB and MMC) is pleased to explain the emission control system warranty on your 1996 and later heavy-duty off-road engines. In California, new heavy duty off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. MMC must warrant the emission control system on your engine for the periods of time listed below, provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, MMC will repair your Kobelco excavator's engine at no cost to you including diagnosis, parts and labor.

MANUFACTURE'S WARRANTY COVERAGE:

The 1996 and later heavy-duty off-road engines are warranted for a period of five years or 3,000 hours of operation, whichever occurs first on emission related components. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years. If any emission-related part on your engine is defective, the part will be repaired or replaced by MMC.

OWNER'S WARRANY RESPONSIBLITIES:

As the heavy-duty off road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. MMC recommends that you retain all receipts covering maintenance on your heavy-duty off-road engine.

As the heavy-duty off-road engine owner, you should however be aware that MMC may deny you warranty coverage if your heavy-duty off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

Your engine is designed to operate on commercially available diesel fuel only.

You are responsible for initiating the warranty process. The ARB suggests that you present your heavy-dutty off-road engine to a MMC dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact at the office shown below.

Mitsubishi Engine North America, Inc.
1250 Greenbriar Drive, Suite E
Addison, Illinois 60101-1065 U.S.A.

Tel. No. : (708) 268-0750
Fax. No. : (708) 268-9293

or

California Air Resource Board
9528 Telstar Avenue
El Monte, CA 91731

Tel. No. : (818) 575-6800
Fax. No. : (818) 575-6685

https://truckmanualshub.com/

WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND PROCEDURES FOUND IN THIS MANUAL BEFORE ATTEMPTING ANY OPERATION, INSPECTION OR MAINTENANCE OF THIS MACHINE, ATTACHMENT OR SYSTEMS OPERATION. KOBELCO CANNOT ANTICIPATE EVERY POSSIBLE CIRCUMSTANCE THAT MIGHT INVOLVE A POTENTIAL HAZARD. THE WARNINGS IN THIS PUBLICATION AND ON THE PRODUCT ARE THEREFORE NOT ALL INCLUSIVE. IF A TOOL, PROCEDURE, WORK METHOD OR OPERATING TECHNIQUE NOT SPECIFICALLY RECOMMENDED BY KOBELCO IS USED, YOU MUST SATISFY YOURSELF THAT IT IS SAFE FOR YOU AND OTHERS. YOU SHOULD ALSO ENSURE THAT THE PRODUCT WILL NOT BE DAMAGED OR MADE UNSAFE BY THE OPERATION, LUBRICATION, MAINTENANCE AND/OR REPAIR PROCEDURES YOU CHOOSE.

https://truckmanualshub.com/

TABLE OF CONTENTS

Safety Precautions 1

Machine Familiarization 2

Mechatronics 3

Maintenance 4

Cycle Times 5

Hydraulic Motors 6

Pressure Adjustment 7

Schematics 8

Transportation 9

General Specifications 10

Optional Equipment 11

Special Procedures 12

https://truckmanualshub.com/

Kobelco

Dynamic Acera



Kobelco Construction Machinery America LLC
Service Support

KOBELCO

Kobelco Construction
Machinery America LLC.

https://truckmanualshub.com/

Kobelco Construction Mchinery America LLC.
12755 S Kirkwood
Stafford, TX. 77477 U.S.A.
Phone: 281.240.4876 / 281.240.4800 / Fax: 281.240.5026

Service Support Staff-2002

Howard Schilling
NATIONAL SERVICE MANAGER
Stafford, TX (Ext. 220)

Brook See
ADMINISTRATIVE ASSISTANT
Stafford, TX (Ext. 227)

Larry Stultz
ASSISTANT SERVICE MANAGER
Stafford, TX (Ext. 300)

Donna England
FILE / PHONE CLERK - Service
Stafford, TX (Ext. 294)

Ernest Alvarado
SERVICE TECHNICIAN
Stafford, TX (Ext. 291)

Warranty

Dan Collins
WARRANTY MANAGER
Stafford, TX (Ext. 279)

Richard Cotten
WARRANTY ANALYST
Stafford, TX (Ext. 218)

Kim Fowler
WARRANTY ADMINISTRATOR
Stafford, TX (Ext. 226)

Todd White
WARRANTY COORDINATOR
Stafford, TX (Ext. 287)

Training Department

Training Department

Michael Watt
TRAINING MANAGER – SERVICE
Stafford, TX (Ext. 276)

Stephen Causby
ASSISTANT TRAINER - SERVICE
Calhoun, GA 706.629.5572 (Ext.#179)

Publications

Chris Lee
MANAGER - TECHNICAL PUBLICATIONS
Stafford, TX (Ext.223)

John Kuhn
ASST. MANAGER - TECHNICAL PUBLICATIONS
Stafford, TX (Ext. 211)

Joan Morris
SERVICE-TECHNICAL PUBLICATIONS
Calhoun, GA 706.629.5572 (Ext.#162)

https://truckmanualshub.com/

National Accounts

S. Warren White
NATIONAL ACCOUNTS MANAGER
Stafford, TX (Ext. 222)

Bill Barton
NATIONAL ACCOUNTS PARTS
Stafford, TX (233)

Chris Donnelly
SERVICE SUPPORT - NATIONAL ACCOUNTS
Stafford, TX (Ext. 285)

Terry Ficken
SERVICE SUPPORT – NATIONAL ACCOUNTS
Stafford, TX. (Ext. 297)

FIELD SERVICE:

Scott Emmans
SERVICE SUPPORT MANAGER
Gorham, ME
PHONE:207.839.0437
FAX: 207.839.0464

John Adams
SERVICE SUPPORT MANAGER
Reynoldsburg, OH
PHONE: 614.864.5863
FAX: 614.864.7661

John Duff
SERVICE SUPPORT MANAGER
Cape Coral, FL
PHONE: 941.772.5709
FAX: 941-772-7359

Troy Hitchcoc
SERVICE SUPPORT MANAGER
Stafford, TX. (Ext. 264)

Butch Hurst
SERVICE SUPPORT MANAGER
Knoxville, TN
PHONE: 865.980.9537
FAX: 865.982.3087

Tayne Ivie
SERVICE SUPPORT MANAGER
Lehi, UT
PHONE: 801.766.8593
FAX: 801.766.8594

Rich Archibald
SERVICE SUPPORT MANAGER
Spokane, WA.
PHONE: 509.325.6363
FAX: 509.325.7171

George Limpkins
Technical Support Manager
Stafford, TX. (Ext. 255)

Joel Escalante
MANAGER OF SALES &
PRODUCT SUPPORT - LATIN AMERICA
Stafford, TX. (Ext. 279)

https://truckmanualshub.com/

http://truckmanualshub.com/

Table of contents

Page

2.1 FAMILIARIZATION 2-2
2.2 GENERAL MACHINE NOMENCLATURE 2-2
2.3 OPERATOR CAB NOMENCLATURE 2-3
2.4 COMPONENT & CONTROLS NOMENCLATURE 2-4
A. RIGHT HAND OPERATOR CONSOLE AND MONITOR 2-4
A1. Key Switch– FIGURE 2.4A 2-4
A2. Throttle Potentiometer– FIGURE 2.4B 2-4
A3. Monitor – FIGURE 2.5A 2-5
1. KPSS Mode Switch– FIGURE 2.5B 2-5
2. Buzzer Stop Switch – FIGURE 2.5C 2-6
3. Screen Change Switch – FIGURE 2.7A 2-7
4. Wiper & Washer Switch– FIGURE 2.7B 2-7
5. Auto Accel Switch– FIGURE 2.7D 2-7
6. Working Light Selector Switch — FIGURE 2.8A 2-8
7. Travel speed select switch – FIGURE 2.8B 2-8
8. L.C.D. Display– FIGURE 2.29 2-9
9. Preventive Maintenance Program – FIGURE 2.12A 2-12
10. Monitor Time Adjustment – FIGURE 2.13A 2-13
11. LCD Contrast Adjustment – FIGURE 2.13B 2-13
12. Changing Warning Display Language – FIGURE 2.13C 2-13
13. Operability fine adjustment function for Dynamic Acera minor change (SK160LC~SK330LC-6E) 2-14
14. Draining Hydraulic System Pressure – FIGURE 2.15A 2-15
A4. Power Boost Switch – FIGURE 2.15D 2-15
A5. 24 Volt Cigarette Lighter – FIGURE 2.16A 2-16
A6. Location for Optional Switches – FIGURE 2-16B 2-16
A7. Cup Holder and Ashtray – FIGURE 2.16C 2-16
A8. Radio – FIGURE 2.17A 2-17
B. LEFT HAND OPERATOR CONSOLE 2-18
B1. Climate Control Air Conditioner – FIGURE 2.18A and 2.18B 2-18
I. Control Panel Description 2-18
II. Fundamental Use – FIGURE 2.18B 2-18
III. Control Panel Functions 2-19
B2. Horn switch – FIGURE 2.21C 2-21
B3. Safety Lever – FIGURE 2.21D 2-21
B4. Auto Warm Up Selector Switch – FIGURE 2.22A 2-22
B5. Independent Travel Select Switch – FIGURE 2.23A 2-23
B6. Heavy Lift Switch – FIGURE 2.23B 2-23
B7. Swing Flasher Switch – FIGURE 2.23C 2-23
B8. Double Pump Flow Selector Switch– FIGURE 2.23D (Optional for SK290LC/SK330LC-6E) 2-23
C. REAR PANEL AND OTHERS 2-24
C1. Swing Parking Brake Release Switch and Hydraulic Back Up System 2-24
C2. 12 Volt Power Supply – FIGURE 2.25A 2-25
C3. Fuse Box – FIGURE 2.25B 2-25
C4. Hour Meter – FIGURE 2.25C 2-25
D. OPERATING LEVERS AND CONTROLS 2-26
D1. Engine Emergency Stop Control – FIGURE 2.26A 2-26
D2. Left Hand Operator Control Lever – FIGURE 2.26B 2-26
D3. Right Hand Operator Control Lever – FIGURE 2.26C 2-26
D4. Left and Right Travel Levers and Pedals –FIGURE 2.27A 2-27
D5. Removing the Travel Control Levers 2-27
E. OPERATOR CAB AND OPERATOR SEAT 2-28
2.5. MACHINE ACCESS COMPARTMENTS AND DOORS 2-34

http://truckmanuals.blogspot/

2.1 FAMILIARIZATION

All operators, service mechanics and personnel responsible for operation, inspection and maintenance of the machine should become thoroughly familiar with the controls and components and their functions before working with or on this equipment.

Study the information in this section to become familiar with the controls and components of this machine.

2.2 GENERAL MACHINE NOMENCLATURE

The Nomenclature drawing below (FIGURE 2.2), points out locations of major components of the KOBELCO Dynamic Acera Hydraulic Excavators.

Study these areas and locate these components on the machine. Specific information regarding these components are explained on the following pages of this section.

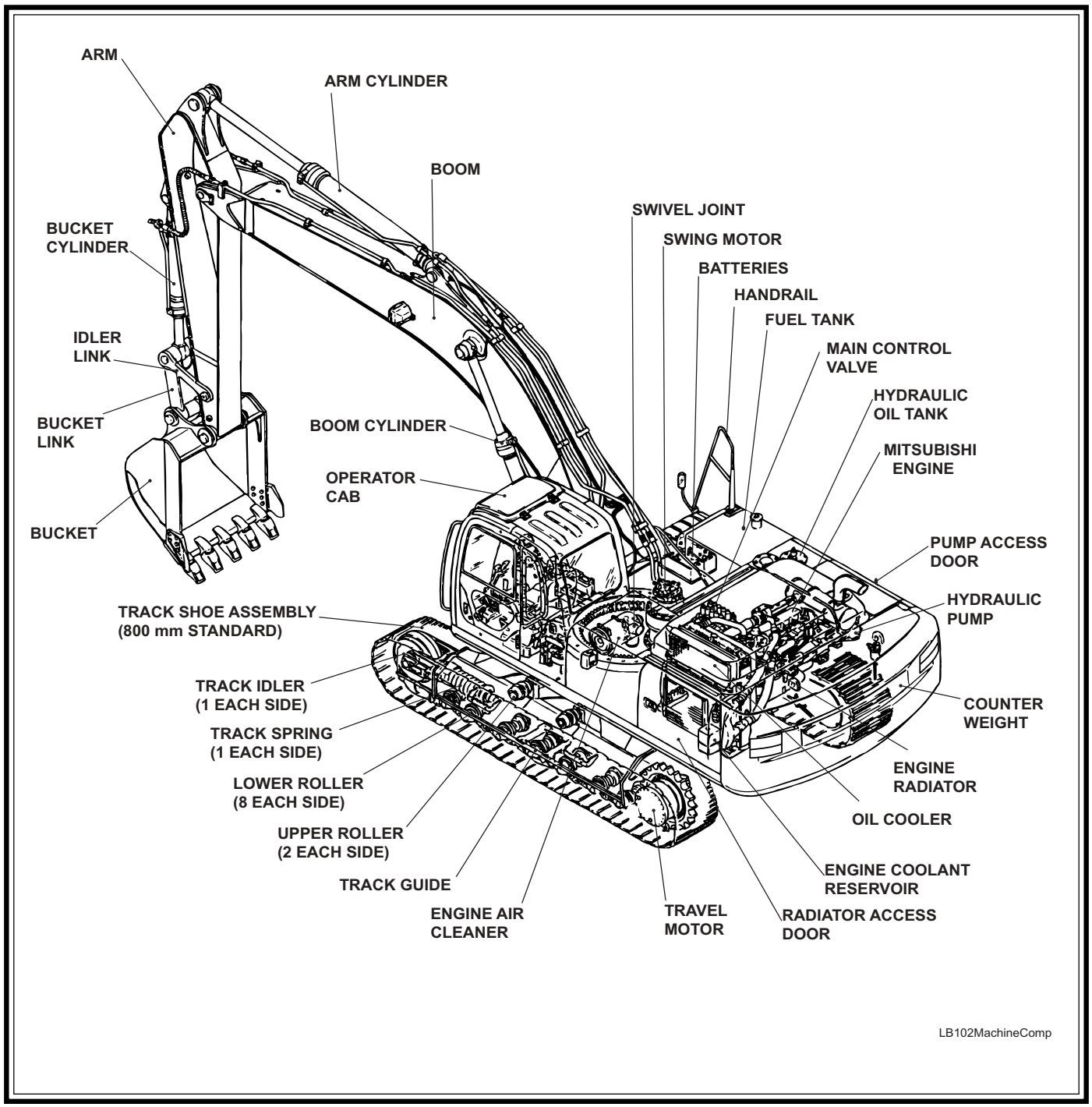


FIGURE 2.2

http://truckmanualshub.com/

2.3 OPERATOR CAB NOMENCLATURE

The operator cab nomenclature (FIGURE 2.3), points out locations of operator controls of the

KOBELCO DYNAMIC ACERA Minor Change

hydraulic excavators operator cab. Study these areas and locate these components on the machine. Specific information regarding these components are explained on the following pages of this section.

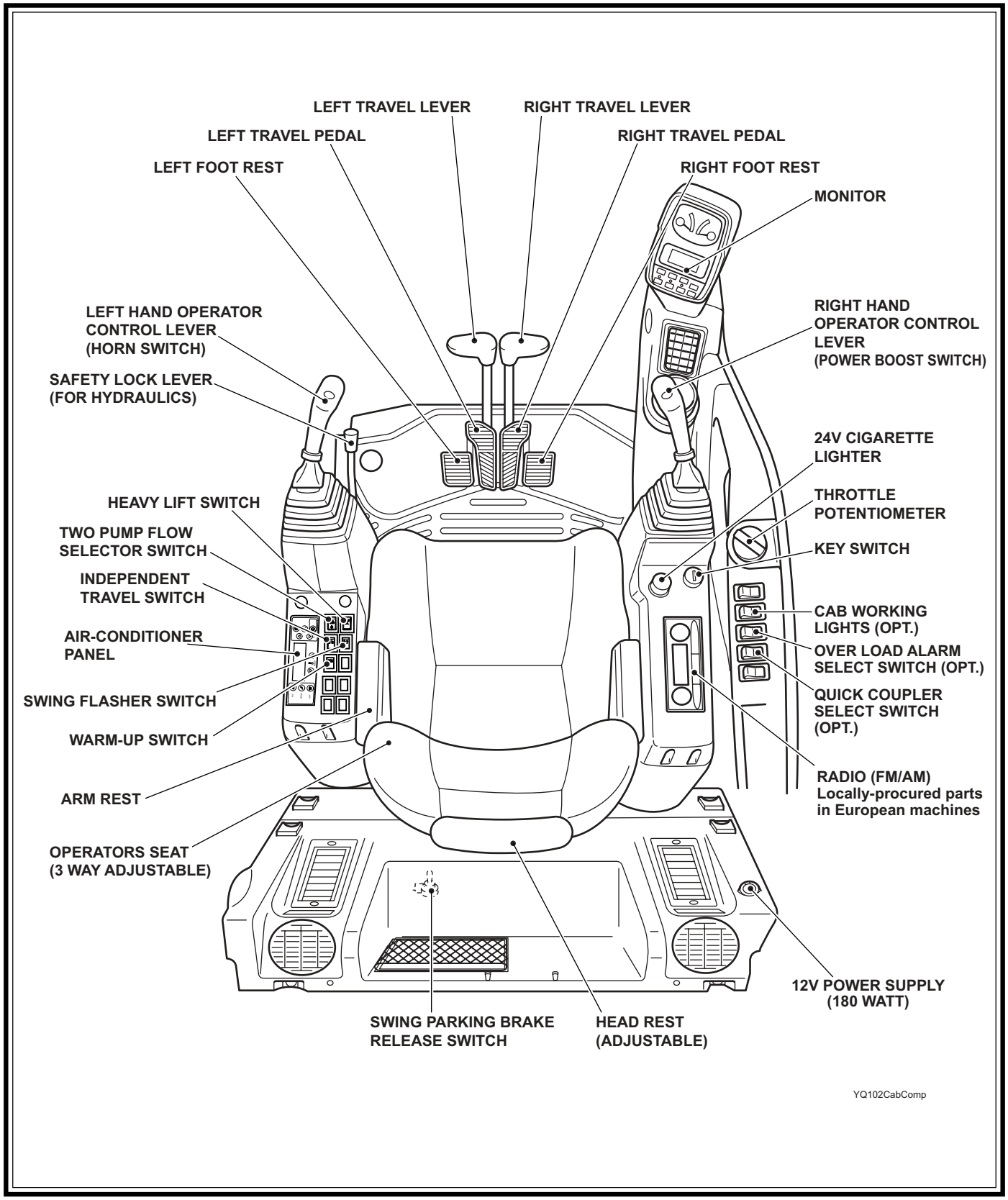


FIGURE 2.3

http://tractormanuals.blogspot/

2.4 COMPONENT & CONTROLS NOMENCLATURE

The following information provides a brief description and function of the components and controls of the KOBELCO Dynamic Acera Hydraulic Excavators.

All personnel associated with this machine should read and understand this information BEFORE beginning any work with or on this equipment.

2

A. RIGHT HAND OPERATOR CONSOLE AND MONITOR

A1. Key Switch– FIGURE 2.4A

The Key Switch is located on the right hand operator console and has 5 operating functions.

a. "HEAT"– This position is used for starting the engine in cold climates. See Section III.

"OFF"– When Key is turned to this position, the engine stops and electrical power to the machine's electrical systems is stopped after approximately 4 seconds.

"ACC"– With key in the "ACC" position only the cigarette lighter, tuner and horn will have power.

"ON"– When Key is in the ON position, electrical power is supplied to all the machine's electrical systems.

"START"– When key is turned to this position electrical power is supplied to the starter solenoid causing the starter to start the engine. After engine starts key should be released to go back to the "ON" position.

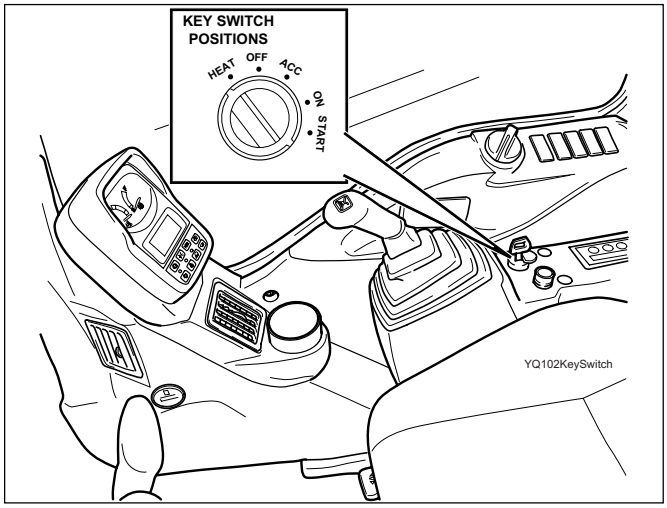


FIGURE 2.4A

A2. Throttle Potentiometer– FIGURE 2.4B

The throttle potentiometer is located on the right hand operator console and controls engine RPM. When the throttle potentiometer is rotated to any position it increases or decreases engine rpm and maintains engine at the programed RPM for that particular position on the dial.

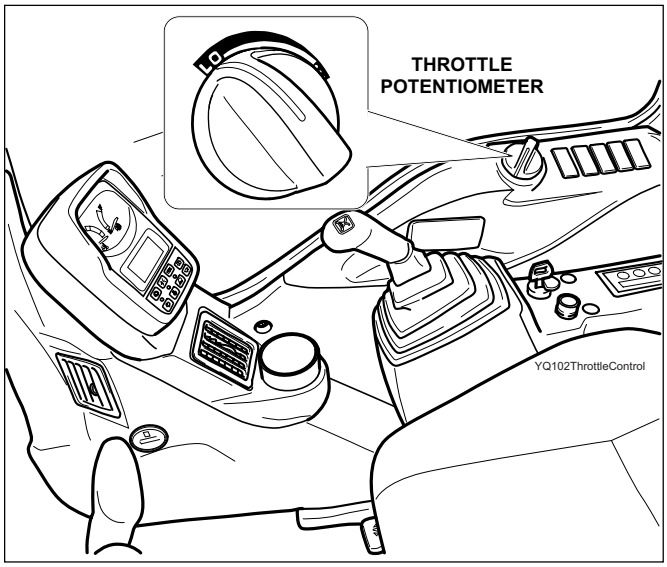


FIGURE 2.4B

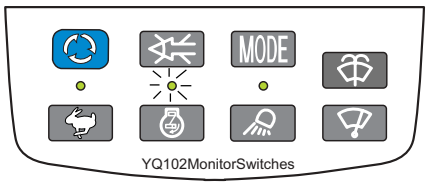
NOTE

1. In operation, when the pilot pressure from the hand and pedal control levers does not act for 1 sec, if the position of the throttle potentiometer is higher than 1050 rpm, the auto accel actuates automatically and the engine speed returns to 1050 rpm.
2. When the throttle potentiometer is positioned lower than the auto accel speed, the engine speed is maintained to the throttle potentiometer position.

Proportional auto acceleration function:
With the attachment, swing, travel control lever or control pedal operation, the engine speed returns to the accel dial set position gradually according to the respective operating pilot valve movement.

NOTE

The proportional auto acceleration function can be activated by pressing the auto accel switch ( ) located on the monitor panel. When the proportional auto acceleration function is active, the red light indicator above this switch is turned ON.



Press the auto accel switch to cancel the proportional auto acceleration function and the light indicator will turn OFF.

https://truckmanualshub.com/

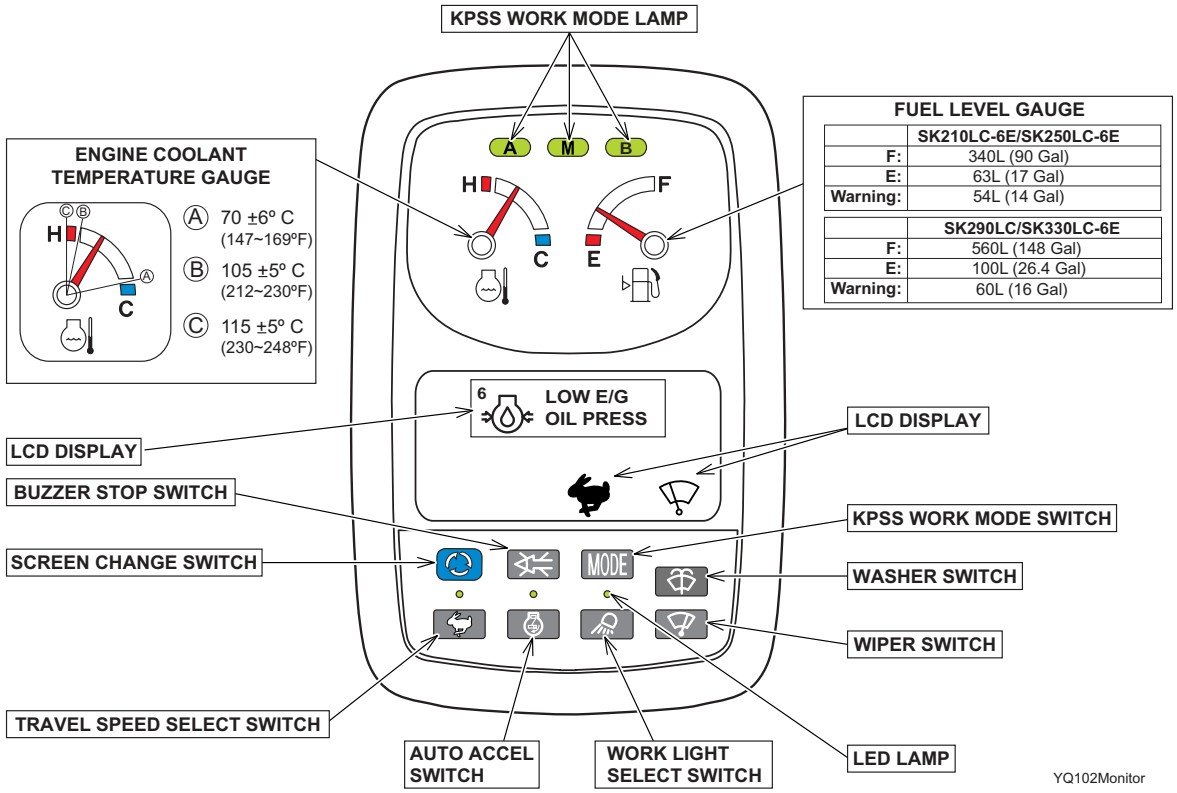


FIGURE 2.5A

A3. Monitor – FIGURE 2.5A

1. KPSS Mode Switch– FIGURE 2.5B

MODE

The KPSS Mode Switch is located on the lower side of the monitor and has 3 operating functions.

After starting the engine, the mode switch defaults to the M mode.

Select an effective work mode complying with the working condition and working target from 3 modes.

Each time the work mode switch is pressed, the work mode indicator lamp is switched to M, A and B in order.

A

a. A (assist) mode

The controller analyzes the operator's control pattern of joystick lever movement, and uses "fuzzy logic" to set the machine operating mode: digging, leveling, spreading, slope finishing, tamping etc. automatically, and displays the results on the multi display, see Fig. 2.5C. The necessary power and engine speed is automatically set to match the work load. This mode utilizes 90% of the machine's available power to allow the operator to be more efficient in standard repetitive applications, and obtain better fuel economy.

NOTE

By default, all Dynamic Acera minor change standard excavators, manufactured by KCMA LLC, start in "M" Mode; and by default, all Dynamic Acera excavators equipped with long reach attachment start in "A" mode.

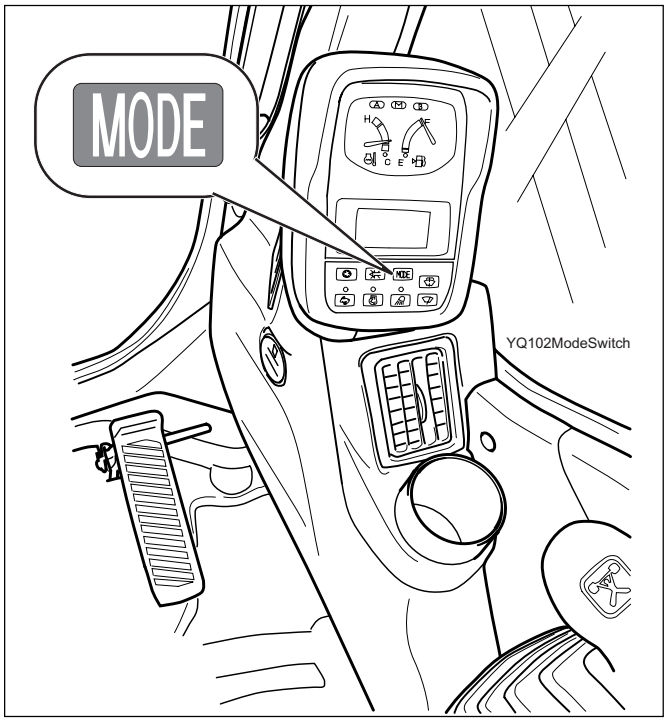


FIGURE 2.5B

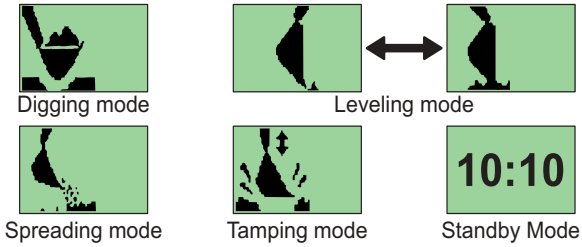


FIGURE 2.5C

http://tractormanuals.blogspot/

b. M (manual) mode

This mode senses the movement of control lever and is suitable for the heavy load digging work giving priority to the work load at high speed. It is selected upon startup by default. While it does engage computer control to obtain maximum pump efficiency, it does not utilize “fuzy logic” software to switch between working modes. It provide the greatest power and speed that the excavator has to offer.

c. B (breaker) mode

This mode allows the operator to control the maximum flow rate for the auxiliary attachment (Breaker) only. The arm, boom, swing, etc, get 100% flow regardles of this setting.

c1. Adjustment of max. flow rate

-Turn ignition key on, **do not start engine**.

- Select the B (Breaker) Mode.
- Press the Screen Change switch ( ) for 3 ~ 10 sec and release it.

The LCD screen displays the flow rate settings.

c2. Flow rate display

The last flow rate stored is displayed. Maximum flow rate is displayed as standard value.

-Press the mode switch, see Figure 2.5B, to increase the flow rate setting or press the buzzer stop switch to decrease the flow rate setting.

Note: If the switches are depressed for more than 2 sec., the flow rate increases or decreases by 10 Lit/min.

The flow rate can be adjusted from the Maximum up to Minimum range.

Press the switch for screen change again ( ) to store the desired flow rate value, and the adjust mode is canceled.

Buzzer Stop Switch – FIGURE 2.5C

When the engine coolant temperature is too high, or various sensors of mechatro controller (self-diagnosis) fail, the alarm sounds intermittently. To stop the sound, press the buzzer stop button.

NOTE

- Buzzer sounding due to engine overheating can not be stopped.
- The buzzer sounding, because the preheat complete and E/G oil pressure are displayed, stops by turning the key switch OFF.

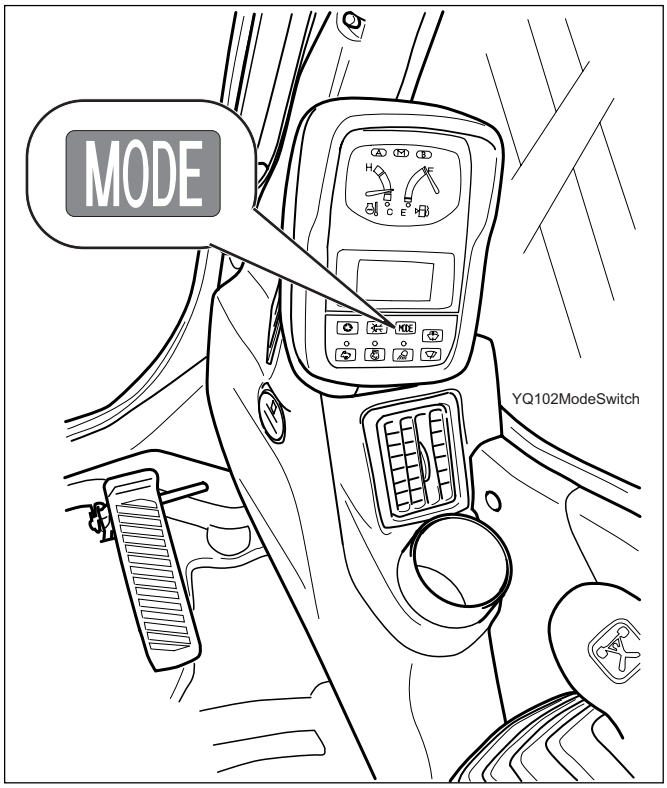


FIGURE 2.5A



FIGURE 2.5B

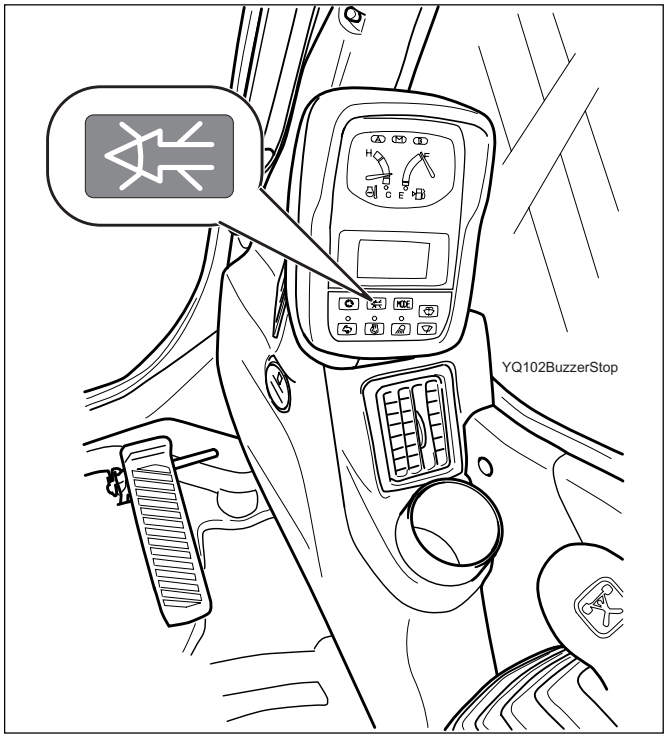


FIGURE 2.5C

http://truckmanualshub.com/

3. Screen Change Switch – FIGURE 2.7A

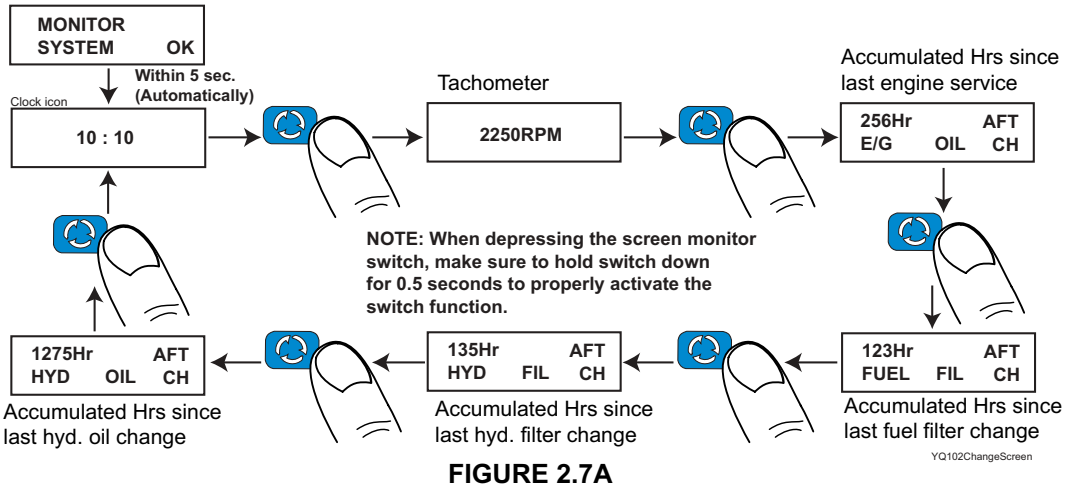


FIGURE 2.7A

4. Wiper & Washer Switch– FIGURE 2.7B



a. Press it once : Wiper moves intermittently
b. Press it again : Wiper moves continuously
c. Press it once more : Wiper stops moving



– Press this switch, and washer fluid is sprayed while it is depressed.
The washer fluid reservoir is located behind the cab, in the air cleaner compartment. See Figure 2.7C.

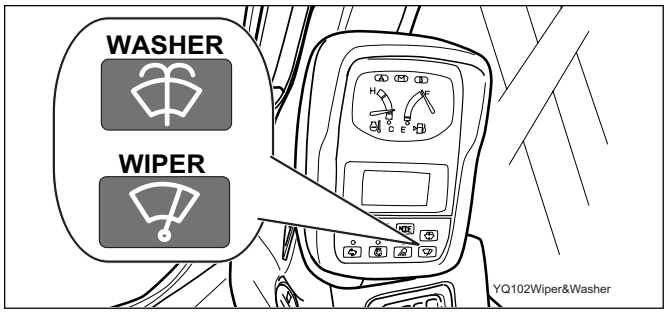


FIGURE 2.7B

CAUTION

Make certain the Washer reservoir has washer fluid before operating washer.

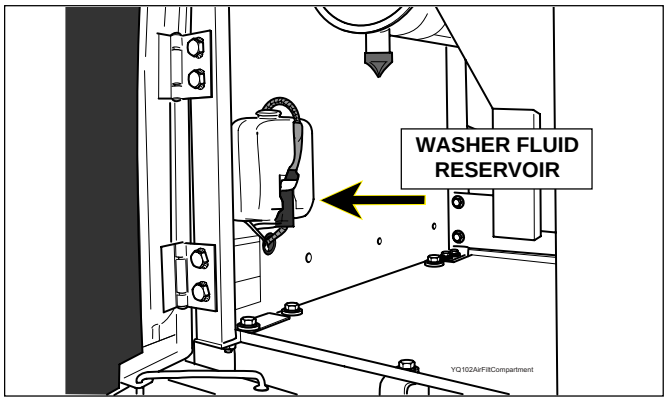


FIGURE 2.7C

5. Auto Accel Switch– FIGURE 2.7D

This switch is used to activate and cancel the auto accel function.

a. Press it once : The proportional auto accel function activates and the light indicator above the switch is turned ON.
b. Press it again : The proportional auto accel function is cancelled and the light indicator is turned OFF.

⚠ DANGER

NEVER ATTEMPT TO LOAD OR UNLOAD MACHINE WITH THE AUTO ACCELERATION FUNCTION ACTIVATED. SUDDEN CHANGE OF ENGINE SPEED COULD BE EXPERIENCED CAUSING POSSIBLE DAMAGE, SERIOUS INJURY OR DEATH.

NOTE

All Dynamic Acera minor change excavators will default to the proportional auto acceleration function when the ignition key is turned to the OFF position.

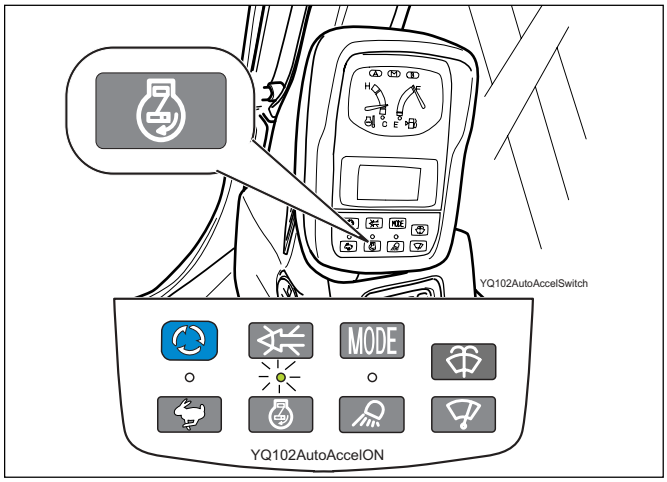


FIGURE 2.7D

http://tractormanuals.blogspot/

6. Working Light Selector Switch — FIGURE 2.8A

This light selector switch is located on the lower side of the monitor as shown in Fig. 2-8A.

1. Press the switch once: The frame and boom working lights come on and the symbol "F" displays on the lower side of the LCD screen and the light indicator above the switch is turned ON..

2. Press the switch a second time: The rear working lights come on and the symbol "R" displays on the lower side of the LCD screen.

3. Press the switch a third time: the frame, boom, the rear working lights, and the light indicator on the monitor panel will turn OFF.

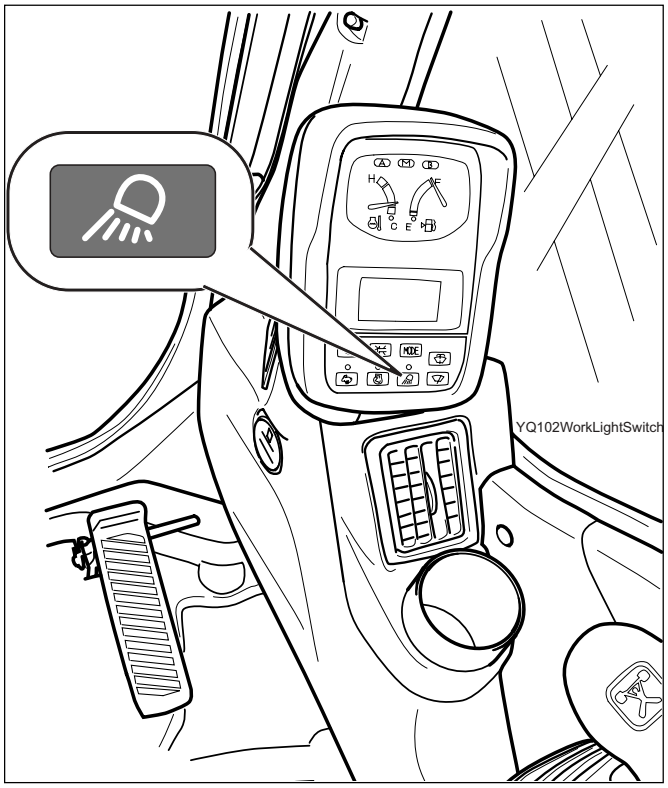


FIGURE 2.8A

7. Travel speed select switch – FIGURE 2.8B

The travel speed select switch is located on the gauge cluster switch panel. Each time engine is started, travel speed is automatically set to LOW 1st (turtle) speed. Press the travel speed (rabbit) switch on the gauge cluster, the speed is changed to the HIGH 2nd, the fast travel speed icon (rabbit) is indicated on the multidisplay, and the light indicator above the switch is turned ON.

turtle ..... Set to LOW when moving the machine on a rough or soft road, slope, or in a narrow place, or when powerful tractive force is required.

rabbit ..... Set to HIGH when moving the machine on flat, hard ground.

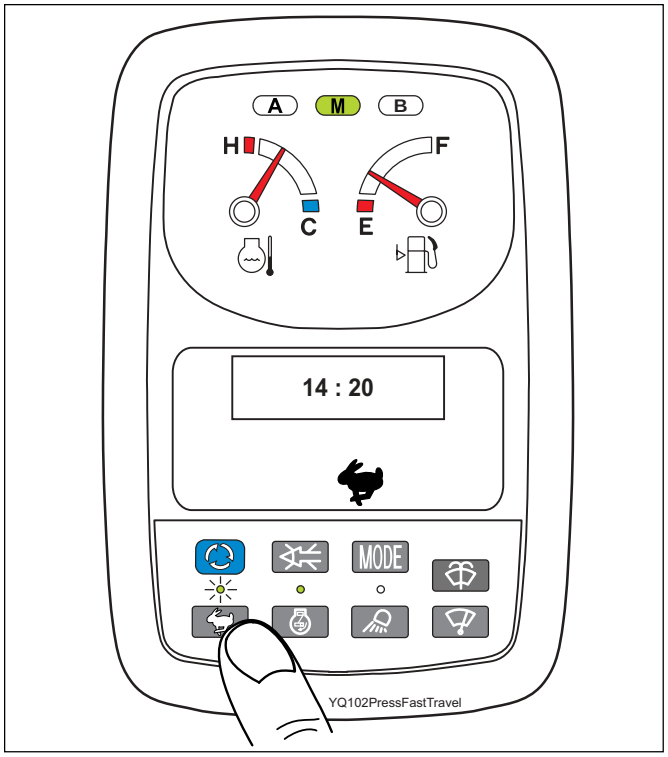


FIGURE 2.8B

⚠ DANGER

DO NOT USE HIGH (rabbit) SPEED WHEN PERFORMING DELICATE OPERATIONS SUCH AS PIPE LAYING, FINE GRADING OR LOADING MACHINE ONTO A TRAILER.
DO NOT CHANGE TRAVEL SPEED WHILE LOADING, MACHINE COULD BECOME UNSTABLE AND CAUSE SERIOUS INJURY, EQUIPMENT DAMAGE AND/OR DEATH.

http://truckmanualshub.com/

8. L.C.D. Display– FIGURE 2.29

The L.C.D. Display is illustrated below and will display the Icons listed in this section. Study these icons and their definitions so that possible problems will be quickly recognized and repairs made in a timely fashion.

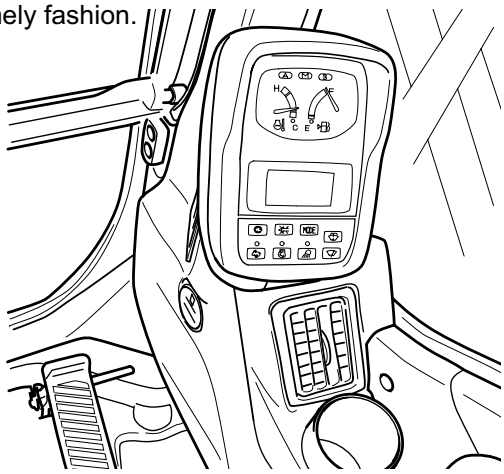


FIGURE 2.29

a. Normal displays

a1. SYSTEM STATUS DISPLAY

MONITOR SYSTEM OK

This icon will display after key switch is turned “ON” and all machine systems and components are checked by CPU and found to be in good working order.

a2. DAY TIME DISPLAY

10 : 10

Five seconds after the system status is shown on the LCD, the time will be displayed on the monitor. See “Monitor Time Adjustment” in this section for details on how to set this feature.

a3. ENGINE R.P.M. DISPLAY

2250RPM

Actual engine speed. When auto-accel. is deactivated, RPM shown correspondes to the throttle potentiometer position.

a4. ENGINE LUBRICATION CUMULATIVE TIME

256Hr AFT E/G OIL CH

256 hours have elapsed since the change of engine oil.
This icon shows the total cumulative time since the last time the engine oil was changed.

a5. FUEL FILTER CUMULATIVE TIME

256Hr AFT FUEL FIL CH

256 hours have elapsed since the change of fuel filter.
This icon shows the total cumulative time since the last time the fuel filter was changed.

a6. HYDRAULIC FILTER CUMULATIVE TIME

256Hr AFT HYD FIL CH

256 hours have elapsed since the change of hydraulic oil filter.
This icon shows the total cumulative time since the last time the hydraulic oil filter was changed.

a7. HYDRAULIC OIL CUMULATIVE TIME

256Hr AFT HYD OIL CH

256 hours have elapsed since the change of hydraulic oil.
This icon shows the total cumulative time since the last time the hydraulic oil was changed.

a8. TRAVEL INDEPENDENT MODE DISPLAY

TRAVEL INDEP. MODE

This icon will be displayed every time the independent travel mode is activated (Only on Dynamic Acera excavators manufactured by KCMALLC).

b. Warning Displays

WARNING DISPLAYS

The monitor alarm will sound the instant #2, #5, #6, #7, #10 and #28 warning icons are displayed.

b1. I.T.C.S. CONTROLLER- CPU DISPLAY

1 CPU MECHATRO CONT. FAIL

This icon will display when a problem exists in the I.T.C.S. (Intelligent Total Control System).
Turn Key switch “OFF”, wait for 4 seconds until the system shuts down completely, then turn the switch back to “ON” to reset the CPU program. Should this icon remain on display, stop operation, shut down the engine, and refer to part “C1” (Swing parking brake release and hydraulic back up system) in this section for temporary operation. Contact a Kobelco technician for repairs.

b2. SWING PARKING BRAKE RELEASE DISPLAY

2 SWINGBRAKE DISENGAGED

Turn the “Slewing Parking Brake Release Switch” on the rear side of operator’s seat to the “RELEASE” position, and this warning is displayed.
While this warning is displayed, the swing parking brake does not actuate. This switch should be used only in the event of emergency. Refer to part “C1” (Swing parking brake release and hydraulic back up system) in this section for temporary operation. Contact a Kobelco technician for repairs.

b3. ENGINE PRE-HEATING DISPLAY

4 E/G PREHEAT

This symbol is displayed when key switch is turned to heat position and the engine preheat circuit is activated.
This display goes out at completion of pre-heating, at which time FINISH PREHEAT is displayed.

b4. ENGINE PRE-HEAT COMPLETE DISPLAY

5 FINISH PREHEAT

This icon is displayed when the PREHEAT is completed. The monitor alarm will sound continuously.
If alarm can’t be cancelled by the buzzer stop switch, turn the ignition key to the OFF position, wait for 4 sec’s until the electrical system is turned off completely. Then start the engine. Continuous preheat after this icon is displayed could cause damage to the engine.

NOTE

Do not operate the preheat position of the key switch for more than 20 seconds at one time.

http://tractormanuals.blogspot/

b5. ENGINE OIL PRESSURE DISPLAY



This icon will display and the alarm will sound should the Engine Oil Pressure drop below a safe operating pressure. Stop the engine immediately and check engine oil level. Fill engine to proper level with approved motor oil. **If engine has LOW OIL PRESSURE, it will automatically go to "LO" Idle, and immediately shut down.**

This icon will Display only if alternator is charging.

b6. ENGINE COOLANT TEMPERATURE DISPLAY



This icon will display and the alarm will sound should the Engine Coolant Temperature rise above safe operating temperature.

Reduce engine RPM to idle and stop operation until engine coolant temperature reaches a safe operating temperature range.

b7. ENGINE AIR CLEANER DISPLAY



This icon will display should the Engine Air Cleaner Element(s) (FILTERS) become too dirty to allow proper air flow to the engine.

Should this icon display stop engine immediately and clean or replace Engine Air Cleaner Element(s) as required. This icon will Display only if alternator is charging.

b8. OVER LOAD ALARM DISPLAY (Europe only)



This icon will display and the Buzzer will sound should the Boom Cylinder Circuit Pressure exceed the set, specified pressure.

Should this icon display and the buzzer sound, immediately stop all operation, stop engine and contact an authorized KOBELCO Service dealer for service assistance.

b9. BATTERY CHARGING SYSTEM DISPLAY



This icon will display the electrical charging system not function properly. Should this icon display, have the electrical charging system repaired immediately.

Icon displays only when engine is running with normal oil pressure and a problem occurs in the charging system.

b10. FUEL LEVEL DISPLAY



This icon will display should the Fuel Level in Fuel Tank reaches 54 L (14 Gal) on SK210LC-6E and 60 L (16 Gal) or less for the SK250LC/SK290LC/SK330LC-6E. Should this icon display refill fuel tank immediately using approved diesel fuel.

b11. HYDRAULIC OIL LEVEL DISPLAY



This icon will display should the Hydraulic Oil Level in hydraulic oil reservoir fall below safe operating level.

Should this icon display before starting engine, place machine in Hydraulic Oil Check position and check hydraulic oil level. Refer to Section 4 for proper instructions to fill hydraulic reservoir to proper level using approved hydraulic oil. **This icon will not display during machine operaton and a loss of hydraulic oil is experienced.**

b12. ENGINE COOLANT LEVEL DISPLAY



This icon will display should the Engine Coolant Level fall below safe operating level.

Should this icon display before starting the engine, check and fill coolant level in the radiator and coolant reservoir. Icon will not display if alternator is charging and a sudden loss of coolant is experienced.

b13. ENGINE OIL LEVEL DISPLAY



This icon is displayed when the engine oil level of the engine oil pan is low. Check the engine oil level immediately and make up the shortage of the engine oil.

This icon will not display with engine running and a loss of engine oil is experienced.

b14. ATTACHMENT BOOST PRESSURE DISPLAY



This icon will display when the Power Boost Switch is depressed. This icon is displayed only when this system is activated during operation.

b15. HEAVY LIFT PRESSURE DISPLAY



This icon will display when the Heavy Lift Switch is in the "ON" position. This icon is displayed only when this system is activated during operation.

b16. AUTO WARMING UP DISPLAY



This icon is displayed to indicate the warming up operation of the engine and hydraulic oil when this system is activated.

Turn off the auto warm up switch, or the key switch OFF to cancel the warm up system and the display disappears.

SUPPLEMENTARY EXPLANATION

The LCD of gauge cluster on the machines for Europe displays only the ISO STD warning icons (Codes No. 1 to 19).

b17. AUTO WARMING UP FINISH DISPLAY



This icon is displayed when the warming up of the engine and hydraulic oil is finished or when the warming up system is forced to stop.

The monitor alarm will sound continuously for 5 seconds.

b18. REPLACE ENGINE OIL DISPLAY



This icon will display every 500 hours of machine operation to remind operator of scheduled engine oil change.

The recommended oil change interval for MITSUBISHI engines is every 500 hours of operation. Proceed with engine oil change and make sure to recalibrate the engine oil change interval.

b19. HYDRAULIC PRESSURE DRAIN DISPLAY



This icon will display when the hydraulic system pressure drain is activated. The alarm will sound intermitently during the draining process.

b20. HYD. PRESSURE DRAIN FAIL DISPLAY



This icon will display when the hydraulic system pressure drain process fails. The alarm will sound continuously.

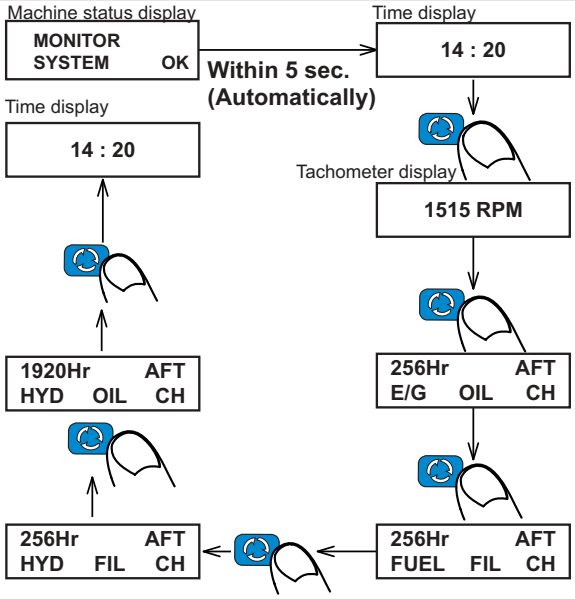
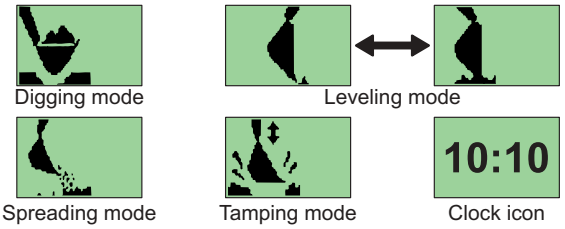
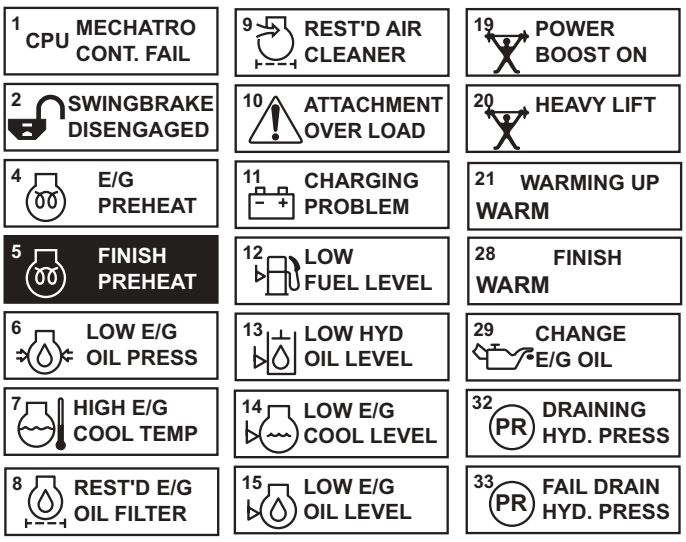
Turn the ignition key OFF to cancel the alarm and repeat hydraulic pressure drain procedure before servicing the machine.

http://truckmanualshub.com/

The following chart is provided to familiarize personnel with the priority of the Monitor Display Icons. Pay close attention to these icons as they can help in avoiding unnecessary repairs and expense.

The icons in the chart below are listed in priority from the most serious to least serious.

EXAMPLE: If the engine oil pressure is abnormal and Fuel level is low, the engine oil pressure Icon will display and buzzer will sound. After the oil pressure is back to safe operating pressure, the low fuel Icon will display.

LCD DISPLAY	SERVICE FUNCTION ICON SEQUENCE	MONITOR ALARM
Normal Display		**ALARM NOT ACTIVE** Use to ensure the time of the replacement for the inspection, service, etc. When pressing the screen change switch, make sure to hold switch down for 0.5 sec. to properly change the screen display. Machine normally starts in M mode, except the long reach option machine. Long reach machine starts in A mode.
Asist Mode Display		**ALARM NOT ACTIVE** • For the description of display of the work mode, refer to Section 3. Each display flickers during this mode.
B (Breaker) Mode Display		Flow rate can be adjusted. Double pump flow can be selected.
Independent Travel Mode Display		**ALARM NOT ACTIVE** Travel control pedals must be in neutral before activating function
Warning		• Alarm activates when icons #2, #5, #6, #7, #10, #28, #32, and # 33 display. **Supplementary Explanation:** • Icons #5 and #6 are displayed and the monitor alarm does not stop even if the buzzer stop switch is pressed. When icon #6 is displayed, the engine RPM will idle immediately and the engine will shut down after 5 seconds. •When icon #7 is displayed the alarm activates and can be de-activated by pressing the buzzer stop switch. •Icons #2, #3, #10, and #28 are displayed and alarm activates intermittently and stop sounding after 5 seconds.

YQ102MonitorDisplayIcons

http://truckmanualshub.com/

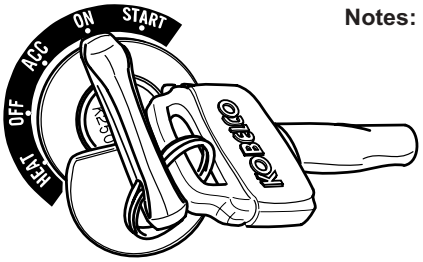
9. Preventive Maintenance Program – FIGURE 2.12A

Notes: **1.** The engine oil change warning display default setting is 500 hours, but no alarm sounds.

2. The ITCS system does not have warning display icons nor alarm sound for fuel filter, hydraulic oil filter, and hydraulic oil. **Press the Screen Change switch to obtain the hours elapsed since the last maintenance.** The display hours on the LCD are set to 4 digits for hydraulic oil, and 3 digits for all others.

3. The display time on the LCD can be returned to zero by simultaneously pressing and holding the " MODE " selector switch and " ⚡ " switch for 5 seconds.

Note: If **CONTRAST 50** is displayed on the screen, press " ↻ " to cancel Contrast adjustment mode and continue normal PM adjustment.



MONITOR SYSTEM OK

Within 5 sec. (Automatically)

10 : 10

Note 1: For viewing

2250RPM

Note 2: Press the Screen Change switch to get to the item for calibration.

256Hr E/G OIL AFT CH

123Hr FUEL FIL AFT CH

135Hr HYD FIL AFT CH

1275Hr HYD OIL AFT CH

Note 3: For adjusting

Note 4: Once the item to be adjusted is shown on the LCD press Screen Change switch continuously for 5 to 10 seconds and release it.

256Hr E/G OIL AFT CH

123Hr FUEL FIL AFT CH

135Hr HYD FIL AFT CH

1275Hr HYD OIL AFT CH

NOTE 5: System must be in "A" or "M" mode for calibration to take place. If System is in "B" mode, flow setting will display and calibration will not take place.

After setting the desired hours, press the screen change switch continuously for 5 ~ 10 seconds to calibrate the next item for schedule maintenance (*). (The system will record the hours instantly when pressing the Screen Change switch).

Press to record

If no more items are to be calibrated, after setting the desired hours on the last item, press and release the screen change switch to record them in the system.

MODE

Press mode switch to increase the number on the LCD

Press the buzzer stop switch to decrease the number on the LCD

Note 6: If the Mode or Buzzer Stop switch is depressed continuously, hours will change rapidly

Once the hours are recorded into the system, the LCD will show the next item accordingly. Simply scroll through each one of the items, by pressing the Screen Change switch until the screen shows the time :

10 : 10

(*) Since the **Fuel Fil**ter **Ch**ange, **Hyd**raulic **Fil**ter **Ch**ange, and **Hyd**raulic **Oil Ch**ange icons keep record of hours elapsed from maintenance, it is best to set them to Zero accordingly by simultaneusly pressing the "Mode" and "Buzzer Stop" switches.

YQ102ProgramPM

FIGURE 2.12A

http://truckmanualshub.com/

10. Monitor Time Adjustment – FIGURE 2.13A

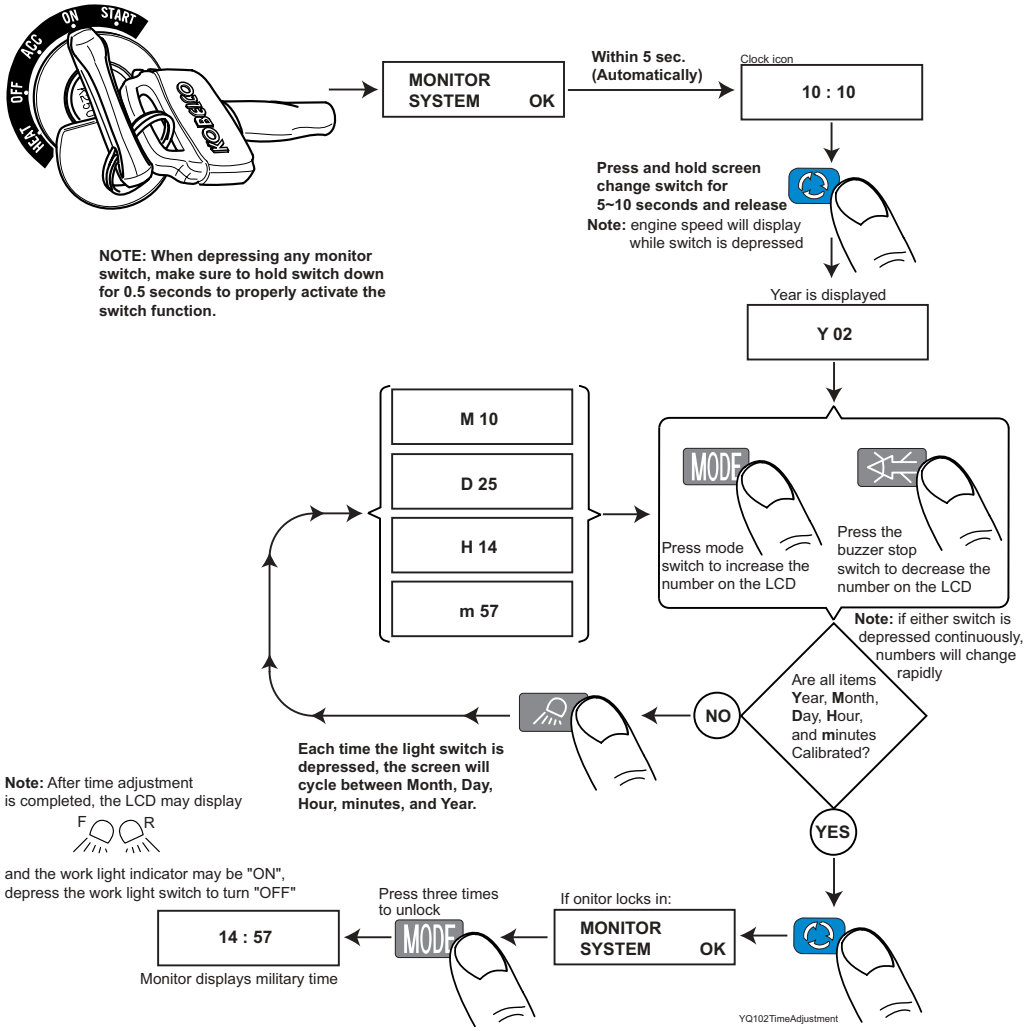


FIGURE 2.13A

11. LCD Contrast Adjustment – FIGURE 2.13B

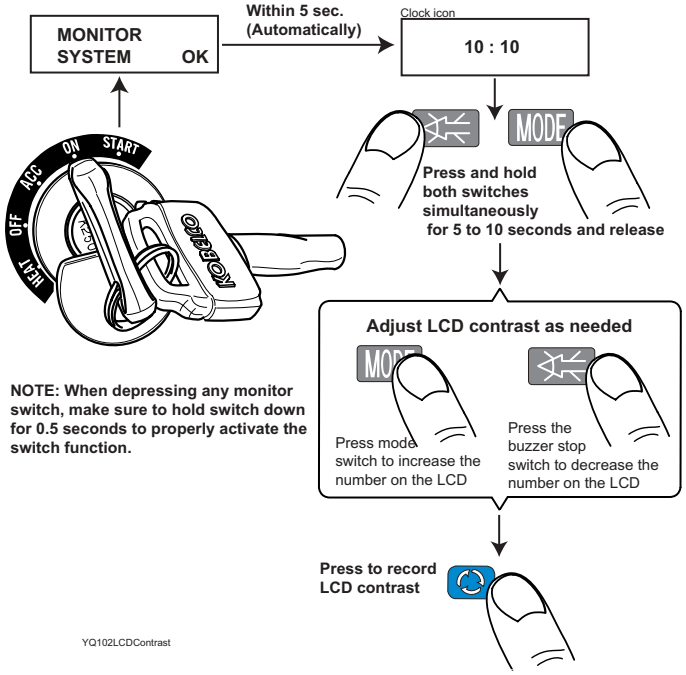


FIGURE 2.13B

12. Changing Warning Display Language – FIGURE 2.13C

NOTE: Language selected in system can be checked by turning key switch to “HEAT” position.

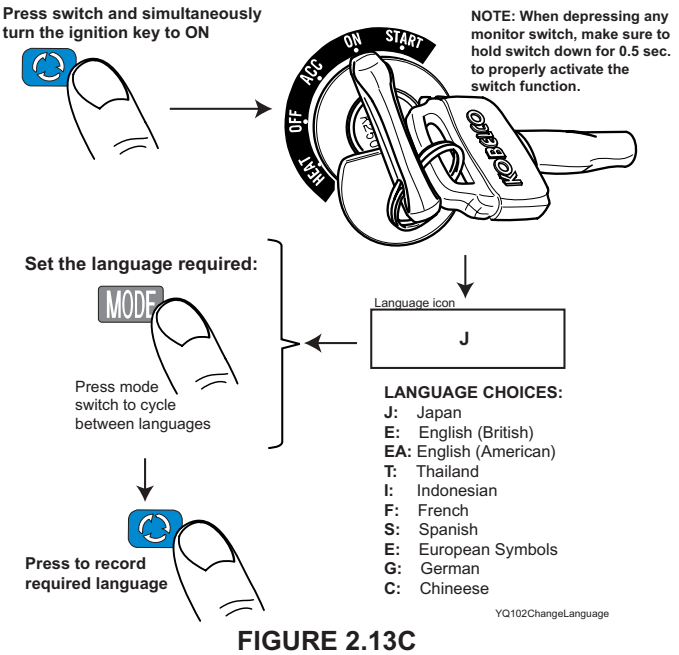


FIGURE 2.13C

http://truckmanualshub.com/

13. Operability fine adjustment function for Dynamic Acera minor change (SK160LC~SK330LC-6E)

1) Boom-up speed
2) Travel speed change at travel straight
3) Auto accel speed return time
4) Arm-out speed
5) Rising (Start up) mode setting change
6) Manual operation time is released at code mode (Complied with hunting of arm in/out)
7) Swing priority at arm in and swing simultaneously performed by recirculation
8) Power shift setting change by manual operation
9) Maximum pump flow setting for auxiliary system
10) Change of high-reach crane load setting adjustment

Adjustment procedure

1) Make sure safety lever is up (Locked up position)
2) Display " Service Diagnosis " screen by pressing the Buzzer Stop ( ) switch and simultaneously **start the engine.**
3) Press the Screen Change ( ) switch or the Buzzer Stop ( ) switch to select the Service Diagnosis Screen of the function to be adjusted, see table below for better reference.
4) Press the Work Mode (MODE) switch and while holding it, press the Working Light switch ( ) 3 times. The "Adjustment mode" is displayed on the monitor screen (Adjustment values will display on the last row (VER___)).
5) Press the Work Mode (MODE) switch to increase value, and press the Buzzer Stop ( ) switch to decrease value.
6) Press the Screen Change ( ) switch to record and terminate adjusment procedure. The monitor display will default to service diagnosis screen No.1.

No.1
MECHATRO CONTROLLER P/N
YN22E00123F1 ← Adjustment contents are displayed.
PROGRAM VERSION
VER 04.00 ← Set value display.

SK160LC~SK330LC-6E

	Service diagnosis screen	Adjustment contents display	MIN	Initial value	MAX
1) Boom-up speed	No.2	BOOM PIC ADJ VER 04. 04	404 (slow)	404mA	632 (fast)
2) Speed change at travel straight	No.3	ST TRVL ADJ VER 05. 13	465 (little change)	513mA	561 (large change)
3) Auto accel speed return time	No.5	DECEL PI ADJ VER 00. 18	6 (fast startup)	18k	18 (slow startup)
4) Arm-out speed	No.6	ARM P2C ADJ VER 04. 04	404 (slow)	404mA	632 (fast)
* 5) Cold mode time adjustment	No.7	LOW TEMP ADJ VER 00. 05	0~4 (cold mode)	5	5 (normal mode)
6) Start up mode	No.9	MODE ADJ VER 00. 01	1 (M mode),	1 (M) 2 (A mode),	3 (B mode)
7) Swing priority arm recirculation	No.10	PIS SW ADJ VER 06. 47	583 (slow)	647mA	711 (fast)
8) Power shift manual setting	No.25	P SHIFT ADJ VER 00. 00	0 (little)	0	30 (large)
9) Pump flow manual setting	No.32	QMAX ADJ VER 00. 30	30 (low flow)	210	210 (high flow)
* 10) High-reach crane load adjustment	No.39	HI REACE ADJ VER 00. 50	0 (alarm slow)	50	100 (alarm fast)

* Do not set No.7 and No.39 in principle.

* No.7 : If measurement of arm working speed is needed unavoidably when hydraulic oil is at low temperature, set initial value to 5 and measure the arm speed.

* No.39 : Alarm point of 90% loaded, and 100% loaded alarm is not changed.

To return all values to initial values: Display " Service Diagnosis Screen " No.40, and press " Working light switch " 10 times, and turn the ignition key to the OFF position.

http://truckmanualshub.com/

14. Draining Hydraulic System Pressure – FIGURE 2.15A

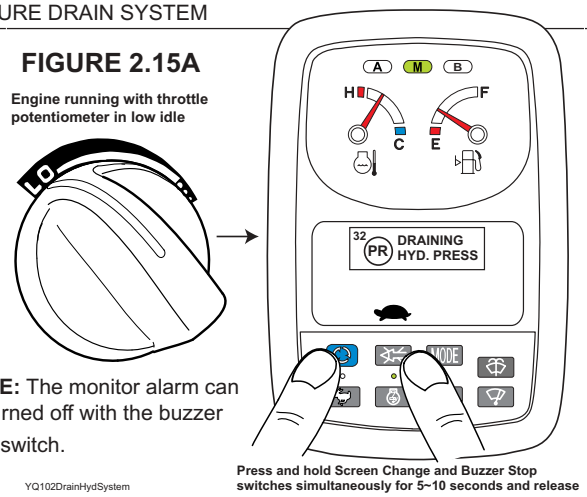
A new convenient feature is now incorporated in the electro-hydraulic system of the Dynamic Acera minor change excavators to help the operator release the pressure in the hydraulic system directly from the operator's cab for machine service or to switch auxiliary attachments. Proceed as follows to release hydraulic system pressure:

a. With the engine running and the throttle positioned in low idle, press and hold the screen change switch ( ) and the buzzer stop switch ( ) simultaneously for at least 5 seconds. See Figure 2.15A for better reference. The engine speed will switch to low idle and the monitor display will show "32 PR DRAINING HYD. PRESS", and the monitor alarm will sound intermittently.

⚠ WARNING

MAKE SURE TO STABILIZE THE ATTACHMENT ON THE GROUND BEFORE ACTIVATING THE HYDRAULIC PRESSURE DRAIN SYSTEM

FIGURE 2.15A



NOTE: The monitor alarm can be turned off with the buzzer stop switch.

b. Operate the control lever, corresponding to the circuit required, several times to release the system pressure.

c. Turn the ignition switch to the OFF position to shut down the engine. The alarm will quit sounding and the monitor display will disappear 4 seconds after the key switch is turned OFF.

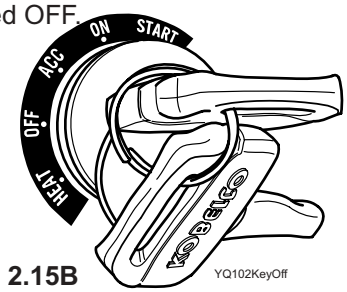


FIGURE 2.15B

d. Press the hydraulic tank pressure relief valve and proceed to service or change auxiliary attachments.

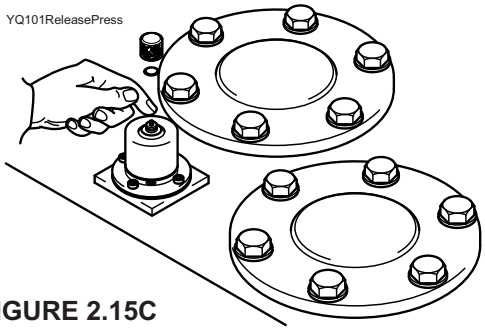


FIGURE 2.15C

⚠ WARNING

While releasing the hydraulic system pressure, if the monitor displays:

33 PR FAIL DRAIN HYD. PRESS

and the monitor alarm sounds continuously, turn the ignition switch to the OFF position to shut down the engine. The alarm will quit sounding and the monitor display will disappear 4 seconds after the key switch is turned OFF. Repeat the process again starting from step **a**.

Do not attempt to service the machine or switch auxiliary attachments without releasing the hydraulic system pressure.

A4. Power Boost Switch – FIGURE 2.15D

Located on the right hand control lever, this switch should only be used for increased break out force during digging.

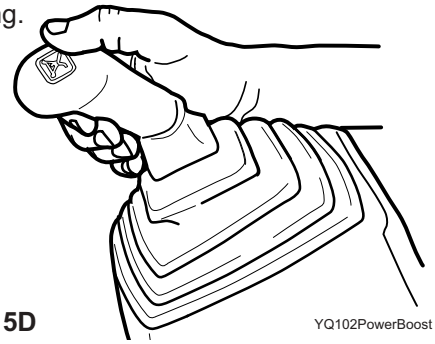


FIGURE 2.15D

NOTE

Use of power boost is prohibited when arms longer than standard are installed.

⚠ WARNING

DO NOT USE POWER BOOST FOR LIFTING OPERATIONS. INSTEAD, USE THE HEAVY LIFT SWITCH

http://truckmanualshub.com/

A5. 24 Volt Cigarette Lighter – FIGURE 2.16A

The cigarette lighter is located on the right side control panel, next to ignition switch. To use the cigarette lighter the key switch must be in the ON position. Push the lighter in and wait approximately 30 seconds for it to “POP” out. Pull lighter from the socket to use. Replace lighter back into its socket after use.

⚠ CAUTION

Do not use the cigarette lighter as a power source for 12 volt accessories. It is 24 volt outlet. Plugging a 12 volt accessory into a 24 volt connector may result in shorting and/or Fire.

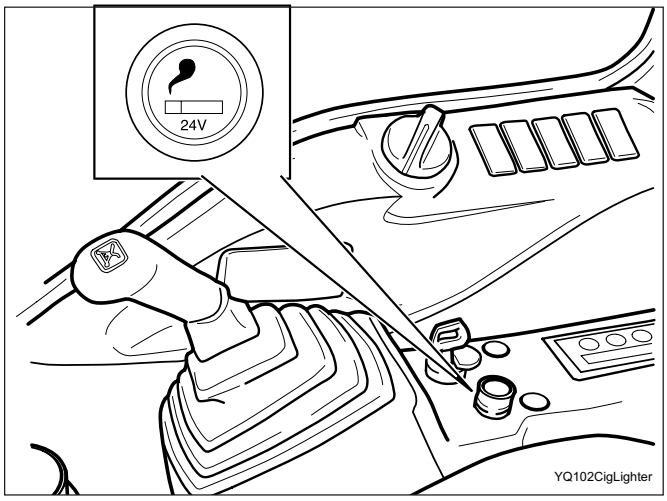


FIGURE 2.16A

A6. Location for Optional Switches – FIGURE 2-16B

This additional switch panel is provided on the right side console for any machine customizaton if desired.

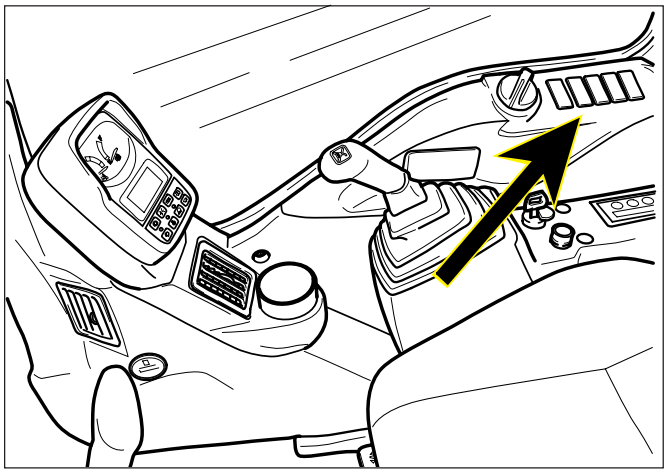


FIGURE 2.16B

A7. Cup Holder and Ashtray – FIGURE 2.16C

A cup holder is provided on the right side panel, below the monitor, and the ashtray is located on right side console, as shown in the figure.

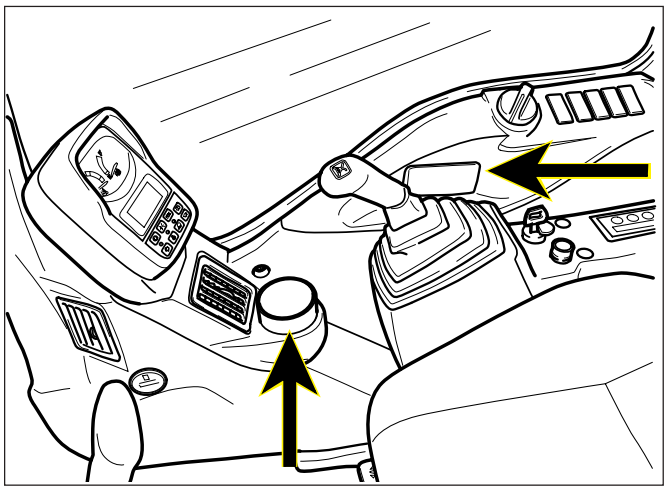


FIGURE 2.16C

http://truckmanualshub.com/

A8. Radio – FIGURE 2.17A

The radio is located on the right side control panel as indicated in Figure 2.17A. The LCD Display shows the radio station selected as well as its frequency band.

1. Control Switches

The following table describes the different functions available to use the radio:

SWITCH	FUNCTION AND USAGE
1	Power switch and volume control
2	Tone control
3	FM & AM selector
4	Time set button
5	Station selector
6	Preset selector buttons
7	LCD display
8	Time adjusting buttons

2. How to select stations – FIGURE 2.17B

a. How to select the radio station manually:

Press the Power switch to turn on the radio and press the station selector buttons up or down to select the desired radio station. This radio functions in two main frequency bands: AM and FM. When the frequency band reaches the upper or lower limit, the radio automatically switches to the opposite limit, that is: from the upper to the lower or vice versa.

b. How to preset the radio stations:

Once the desired radio station is selected manually, press any of the preset station buttons (1 ~ 6) for more than 1.5 sec to record it in its respective memory. The reception is temporarily lost during the memorization process. Once the reception is recovered, the station is preset on the desired preset station button. Repeat this procedure to preset a total of 6 different radio stations.

NOTE

The preset stations are canceled when the radio is removed for maintenance or the batteries are disconnected.

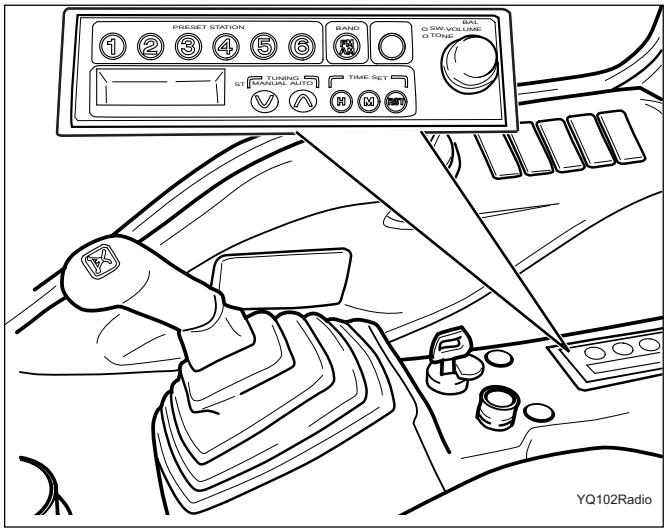


FIGURE 2-17A

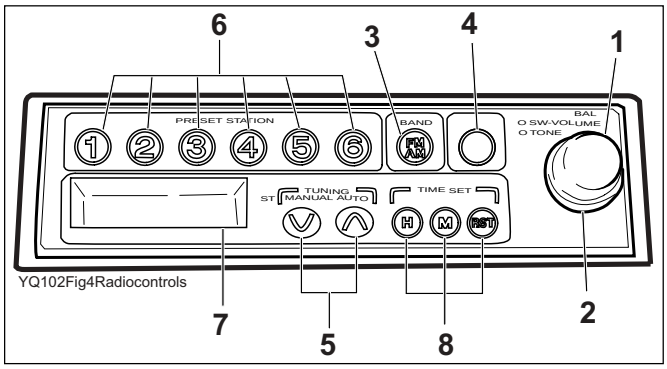


FIGURE 2-17B

3. How to adjust the clock

a. After the radio is turned on, press button (4) to activate the time function. Then press buttons (8): H, M, and RST to set the time accordingly. Use H to set the hour and M to set the minutes.

NOTE

The radio LCD screen will return to normal functioning after 5 seconds of inactivity on the time control buttons.

b. The RST button works as follows: (If trying to adjust time to 10:00 hours)

b1. If minutes are within 0 and 29: when pressing RST button, minutes will be taken to “10:00”. Then press (M) to set the proper minutes.

b2. If minutes are within 30 and 59: when pressing RST button, minutes will be taken to “10:30”. Then press (M) to set the proper minutes.

http://tractormanuals.blogspot/

B. LEFT HAND OPERATOR CONSOLE

B1. Climate Control Air Conditioner – FIGURE 2.18A and 2.18B

The climate control-AC provides a comfortable indoor environment and adjustable control of cab temperature. It removes moisture from humid air and reduces window glass fogging.

The climate control-AC is installed behind operator's seat and sends cold air or hot air into cab.

Air Outlet Selector

Select a preferable air diffuser direction that is most comfortable moving the grill by hand.

Ⓐ, Ⓑ, Ⓒ, Ⓓ ••• Air outlet

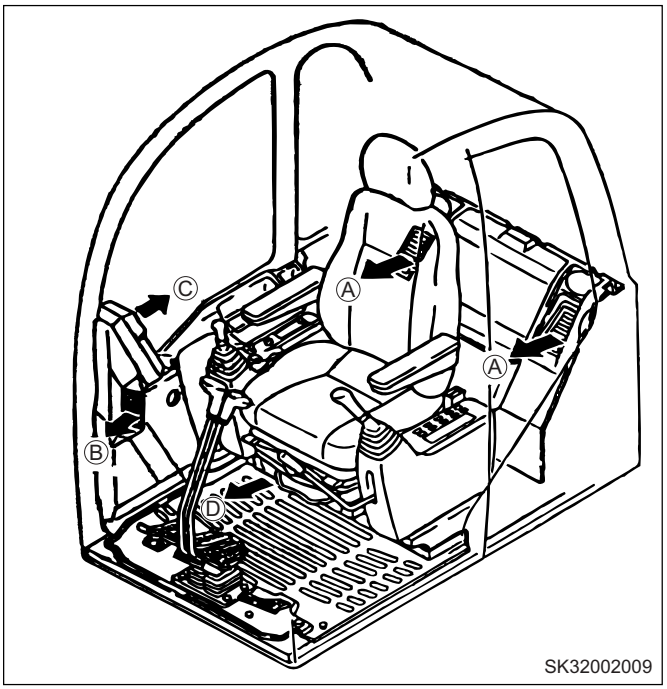


FIGURE 2.18A

I. Control Panel Description

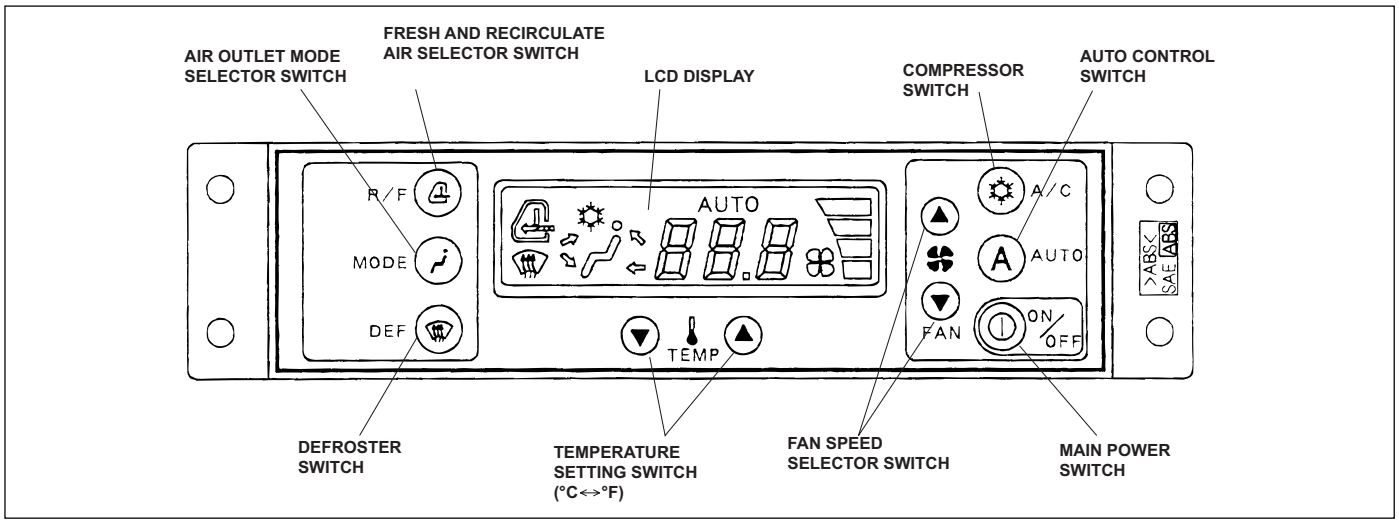


FIGURE 2.18B

SUPPLEMENTARY EXPLANATION

The LCD display indicates temperature, air outlet mode, compressor ON – OFF, AUTO, recirculate, fresh air, and fan speed.

The background of the control panel is illuminated when ever the A/C system is activated.

II. Fundamental Use – FIGURE 2.18B

Before turning the air conditioner on, close the door and windows to achieve the best performance.

1. Press the "AUTO" control switch to control air capacity and blower outlet automatically, and set the temperature in the range from 18.5°C (65.3°F) to 31.5°C (88.7°F). The AUTO indicator in the LCD display will come on. The outlet temperature, outlet opening and fan speed are adjusted automatically so that indoor temperature of the cab comes closer to the set temperature.
2. Select proper mode manually through recirculate and fresh air capacity selector switch and compressor switch ON – OFF.
3. Select preferable fan speed manually through fan speed selector switch when fan speed, selected through auto control, is not preferable. The "AUTO" indicator in the LCD display goes out. Press "AUTO" switch to return to automatic climate control.

http://truckmanualshub.com/

III. Control Panel Functions

1. **Main Power Switch and Display – FIGURE 2.19A**
   - **a.** LCD display is illuminated when the climate control-AC is operating.
     When the climate control-AC is stopped, LCD will be turned off.
   - **b.** Press main power switch, and all functions for the climate control-AC switch ON or OFF. Each time when this switch is pressed, the function switches ON and OFF. When switched ON, the climate control-AC starts operating at the point set before switching OFF (When it is set to AUTO, in auto mode; if NORMAL is selected, then in normal mode).

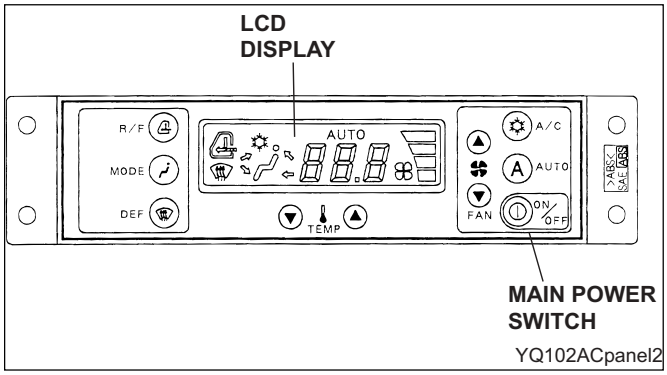


FIGURE 2.19A

NOTE

The key switch will switch air-conditioner OFF, but the operating condition just before switching off may not be restored when the key switch is turned ON again.

2. **Auto Control Switch and Display – FIGURE 2.19B**
   - **a.** Press the main power switch to activate the climate control-AC and the LCD display will illuminate.
   - **b.** Press control switch AUTO, and fan speed and air outlet are automatically controlled, and “AUTO” indicator lamp on LCD display is illuminated.
   - **c.** When the main power switch is OFF, the system will retain the previous setting in memory. Therefore, when the main power switch is pressed again, the climate control AC will come on in the auto control mode. In the Auto mode, the fan speed and air outlet openings are operated automatically.

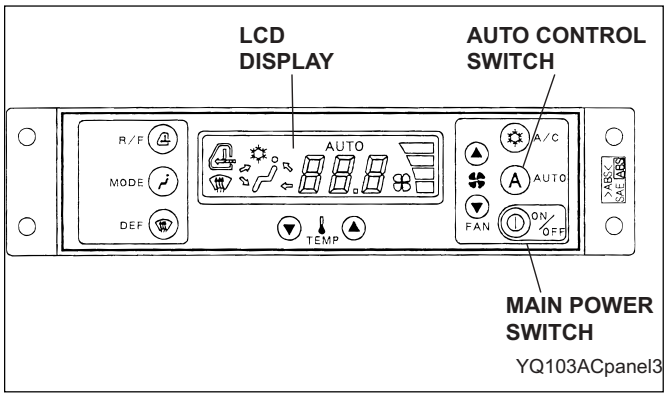


FIGURE 2.19B

3. **Temperature Setting Switch and Display – FIGURE 2.19C**
   - **a.** The set temperature is indicated in digits on LCD display. Temperature set range is 18.5℃ (65.3℉) to 31.5℃ (88.7℉).
   - **b.** Press the two temperature set switches simultaneously for 5 seconds to change the display from Centigrade (C) to Fahrenheit (F) or viceversa in the LCD display.
     (Eg.) 25℃ → 77℉ or 77℉ → 25℃
   - **c.** Press temperature set switch DOWN or UP to change the set temperature.
     The temperature goes up or down by 0.5℃ (0.9℉) in graduation.
     The set temperature may be raised or lowered by continued pressing of the switch.

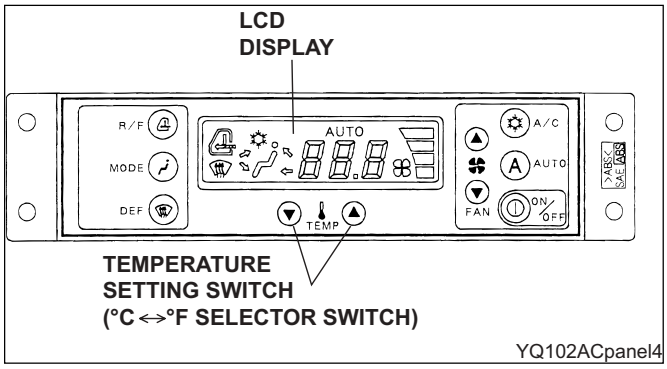


FIGURE 2.19C

http://truckmanuals.blogspot/

d. The set temperature 18°C (64.4°F) is the lowest cooling temperature, and 32°C (89.6°F) is the highest heating temperature. Control beyond either of these limits is not possible.

4. Air Outlet Mode Selector Switch and Display – FIGURE 2.20A

a. Air outlet position is indicated by the arrow on LCD display.

b. Press Air Outlet Mode Switch in the condition where auto display light is on, and the display mode is fixed. "AUTO" indicator lamp on LCD display goes out, and "AUTO" control of air outlet opening is released.
Press it again, and the level is changed to VENT → BI-LEVEL → FOOT → FACE.

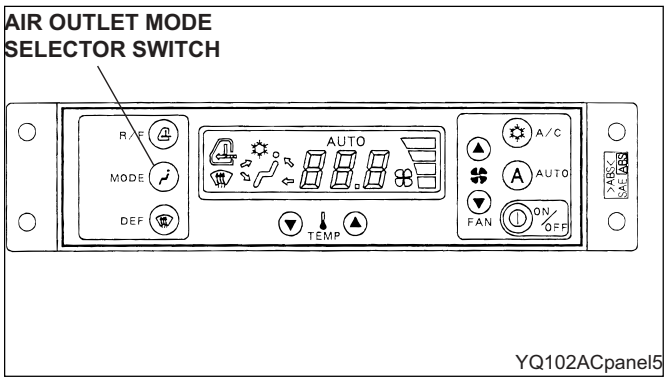


FIGURE 2.20A

LCD display				
Air outlet opening	Vent	Bi-level	Foot	Face
Air outlet direction	Upper half of body	Upper half of body, foot	Foot, front glass	Upper half of body (Front)

5. Defroster Switch and Display – FIGURE 2.20B

a. Press Defroster Switch, the defroster indicator will be displayed.

b. Press Air Outlet Mode Selector Switch, and it returns to air outlet mode just before pressing defroster switch.

c. Press Defroster Switch in the condition where AUTO display is indicated, "AUTO" indicator lamp on LCD display goes out and the auto control of air outlet opening is released.

6. Recirculate and Fresh air Selector Switch and Display – FIGURE 2.20B

a. Suction (fresh air intake) mode is indicated on LCD display

b. Each time recirculate and fresh air capacity selector switch is pressed, the mode is switched to air recirculate or fresh air intake.

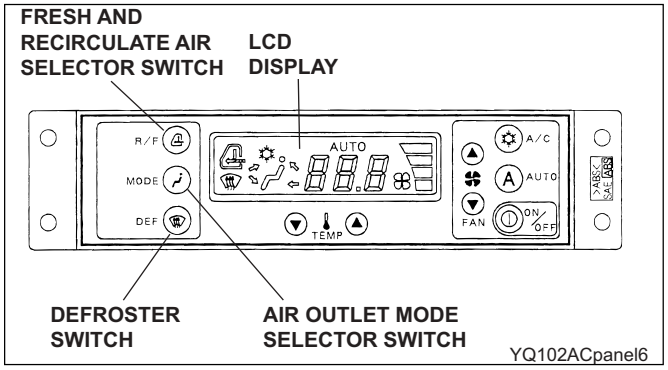


FIGURE 2.20B

http://truckmanualshub.com/

7. Compressor Switch and Display – FIGURE 2.21A

Press the compressor switch, marked with the snow flake, and the snow flake ikon will be indicated on the LCD display.

Press it again, the compressor turns off, and its indicator icon on the LCD display goes out.

8. Air Capacity Selector Switch and Display – FIGURE 2.21B

When it is set to MANUAL mode, fan speed on LCD display is as follows.

Display	Fan speed
LCD 4 bars are lit up.	MAX.
LCD 3 bars are lit up.	HIGH
LCD 2 bars are lit up.	MEDIUM
LCD 1 bar is lit up.	LOW

Press UP or DOWN of fan speed selector switch, and auto control of fan speed is released, and “AUTO” indicator lamp on LCD display goes out.

B2. Horn switch – FIGURE 2.21C

The horn switch is a momentary push button located on the operator’s left control handle, see Fig. 2.21C for better reference.

NOTE

ALWAYS SOUND HORN BEFORE STARTING ENGINE TO ALERT PERSONNEL THAT THE MACHINE IS GOING TO BE OPERATED.

B3. Safety Lever – FIGURE 2.21D

A hydraulic safety lever lock is provided on the left control console to avoid activation of any unwanted hydraulic function. When the safety lever is placed in the unlocked (down) position, the alarm will sound intermittently for one (1) second and the hydraulic system becomes active. Always, before leaving the cab, shut down the engine, and place the safety lever in the locked (up) position.

⚠ WARNING

ALWAYS PLACE THE SAFETY LOCK LEVER INTHE LOCKED (UP) POSITION BEFORE LEAVING THE CAB. NEVER LEAVE THE MACHINE UNATTENDED WITH ENGINE RUNNING.

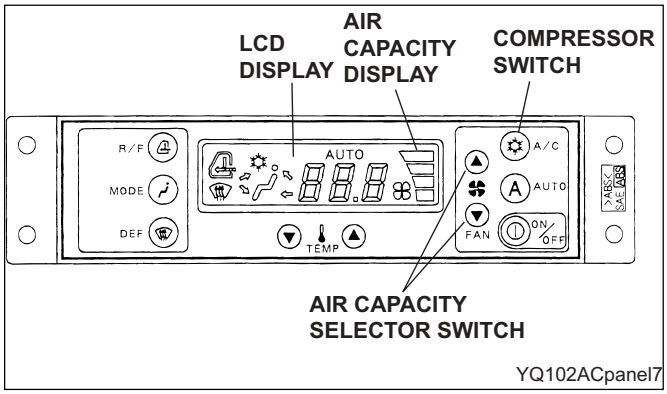


FIGURE 2.21A

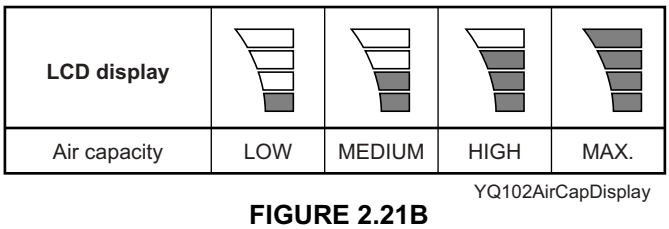


FIGURE 2.21B

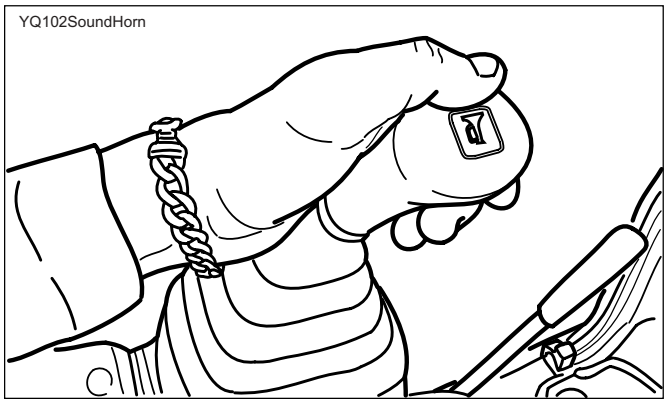


FIGURE 2.21C

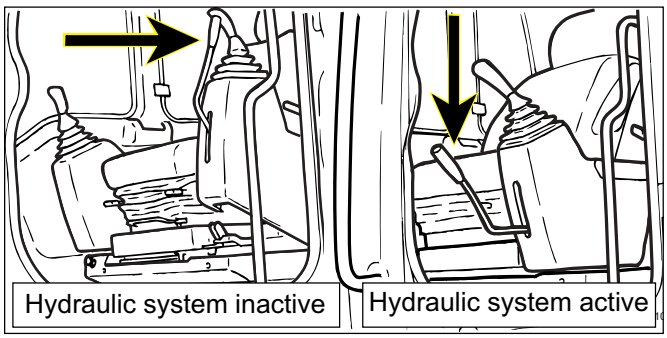


FIGURE 2.21D

http://tractormanuals.blogspot/

B4. Auto Warm Up Selector Switch – FIGURE 2.22A

Before turning the ignition switch to the ON postion, turn on the warm up switch located on the left panel and then start the engine.

NOTE

The Auto Warm Up System will not activate if the Ambient temperature is above 10 ºC (50 ºF).

1. **Warming up of engine**
   The “WARMING UP” is displayed on the multi display after operating the engine for 3 minutes at auto accel speed (1050 rpm.) when the accel dial set value is the value for deceleration or lower, the engine speed returns to the speed set by the the throttle potentiometer.
2. **Warming of hydraulic oil**
   The warm up operation will be done as follows: pump max. flow rate at the engine speed (1050 rpm) for 3 minutes → pump max. flow rate (control valve closed) at the engine speed (1600 rpm) for 5 minutes → pump max. flow rate and control valve fully open at the engine speed (1600 rpm) for 5 minutes → max. flow rate at the engine auto accel speed (1050 rpm) for 10 minutes, “WARMING UP” is displayed on the multidisplay.
3. **Warming up complete**
   After an elapsed time of about 26 minutes of warming of hydraulic oil, or when the hydraulic oil temperature switch turns OFF, The WARMING UP indication(“WARMING UP”) on the multidisplay disappears and the buzzer sounds for 5 seconds. Turn the auto warm up switch OFF.

NOTE

1. If a pilot control lever is activated while the warm up system is active, the warm up system is disconnected. The warm up system will restart after 10 sec. of neutral condition in the pilot control system.

2. If the Auto warm up switch is pressed to the OFF position, the warm up system is disconnected.

3. In climates below -18 ºC (0 ºF) it may be necessary to use a coolant heater, fuel heater, engine heater jacket and/or additional battery power to aid in starting the engine.

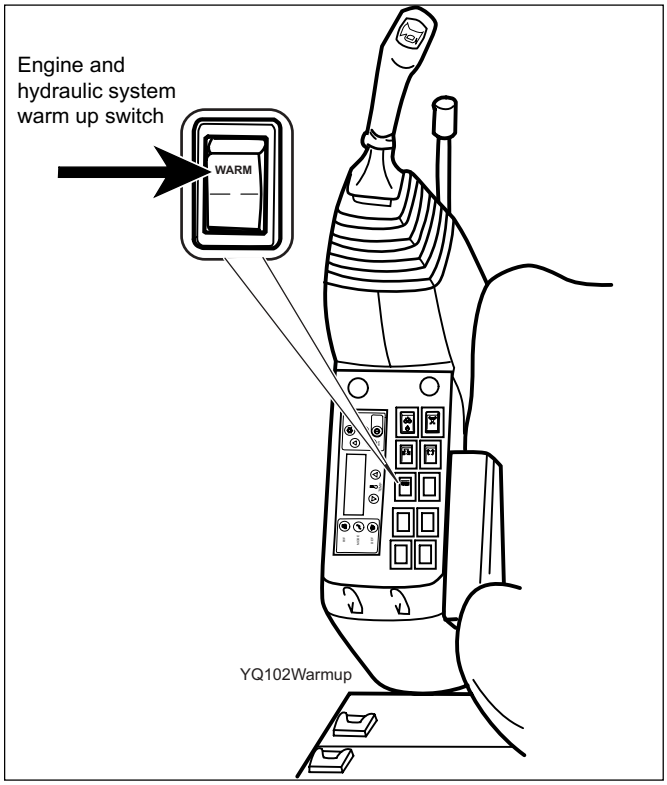


FIGURE 2.22A

⚠ CAUTION

AUTO WARM-UP SHOULD BE UTILIZED ANYTIME MACHINE IS STARTED IN CLIMATE TEMPERATURES BELOW 10 ºC (50 ºF) TO STABILIZE MACHINE CONTROL RESPONSE. COLD OIL CAN CAUSE ERRATIC MACHINE OPERATION.

http://truckmanualshub.com/

B5. Independent Travel Select Switch – FIGURE 2.23A

The independent travel select switch is located on the left hand control console. Use this function where fine metering of simultaneous travel and attachment operations are required. Travel control levers/pedals must be in the neutral position before activating this switch.

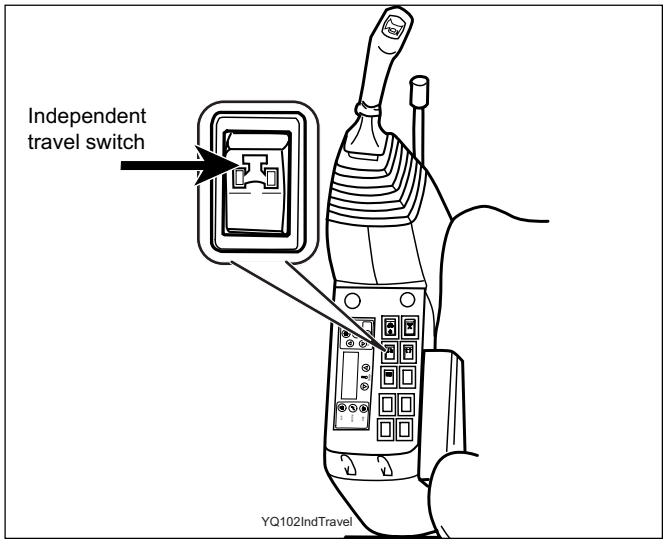


FIGURE 2.23A

B6. Heavy Lift Switch – FIGURE 2.23B

The heavy kift switch is located on the left hand control console. The heavy lift switch has 2 operating positions. The heavy lift function is used when precision control of heavy lifting operations are required.

1. "ON" – Push the symbol side of switch down to turn heavy lift function on.
2. "OFF" – Push back of switch down to turn heavy lift function Off.

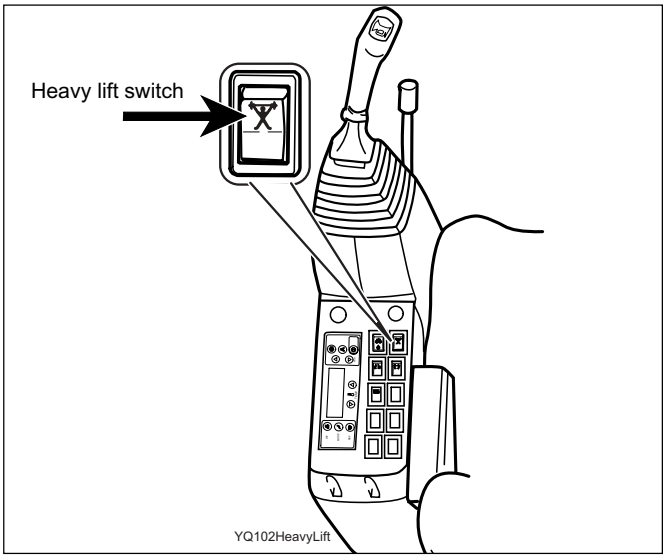


FIGURE 2.23B

DANGER

NEVER TURN OFF HEAVY LIFT SWITCH DURING ANY HEAVY LIFTING OPERATION.
SUDDEN OR UNEXPECTED LOAD MOVEMENT COULD RESULT IN SERIOUS INJURY OR DEATH.

B7. Swing Flasher Switch – FIGURE 2.23C

The swing flasher switch is located on the right hand operator console. The swing flasher is a 2 position rocker switch which is used to turn on the swing flashers.

"ON" – Push the symbol side of switch down to turn the swing flashers ON.

"OFF" – Push the empty side of switch down to turn the swing flashers OFF.

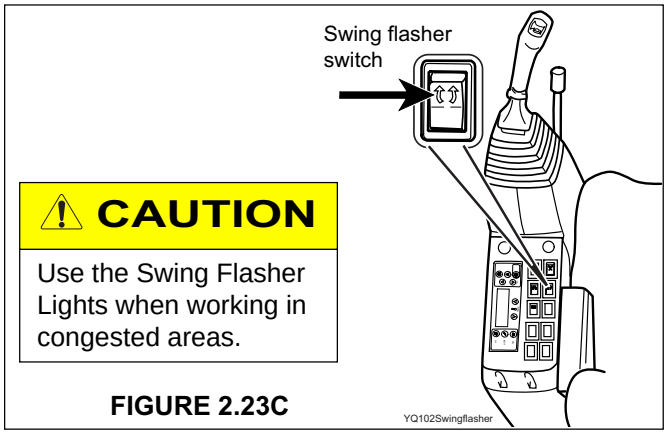


FIGURE 2.23C

B8. Double Pump Flow Selector Switch– FIGURE 2.23D (Optional for SK290LC/SK330LC-6E)

Use this switch, provided on the left side control panel, to select a single or double pump flow to the auxiliary system.

a. Press it forward to activate the double pump flow for the auxiliary system.

b. Press it backward to cancel the double pump flow and activate the single pump flow for the auxiliary system.

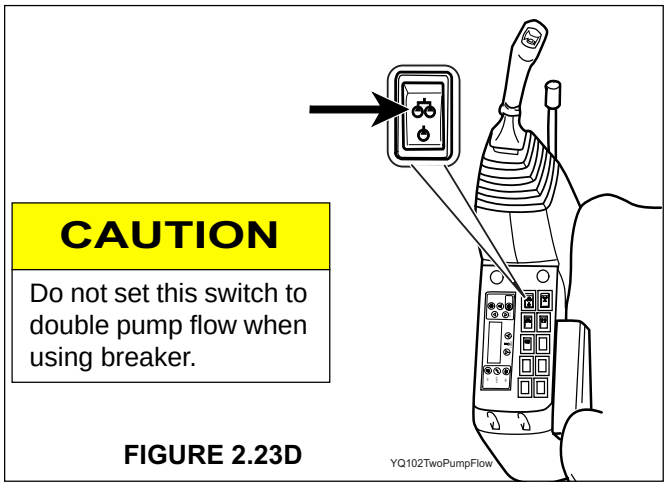


FIGURE 2.23D

http://tractormanuals.blogspot/

C. REAR PANEL AND OTHERS

C1. Swing Parking Brake Release Switch and Hydraulic Back Up System

When ever the “CPU MECHATRO CONT. FAIL” is displayed on the LCD screen, use the swing parking brake release switch to release the swing parking brake while the machine is running. To release the swing parking brake, proceed as follows:

1. Stop the engine, see Figure 2.24A.

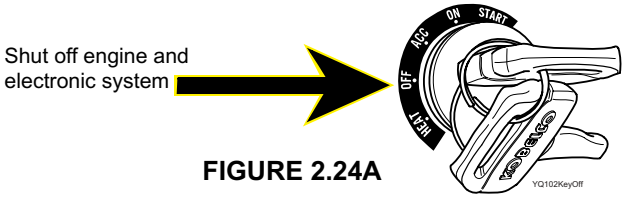


FIGURE 2.24A

2. Remove the covers for the control panel located behind the operator’s seat, see Fig. 2.24B:

› Remove the rear panel upper cover screws (4) and press the lower locks to release the cover. Tilt cover forward to disconnect the speaker wires and 12V adapter wires, see Figure 2.24C, and remove the top cover.

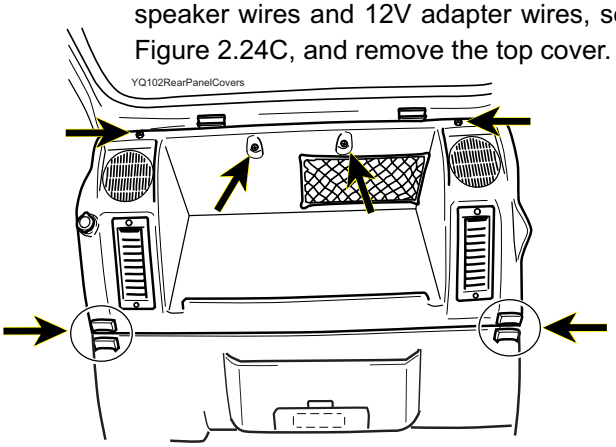


FIGURE 2.24B

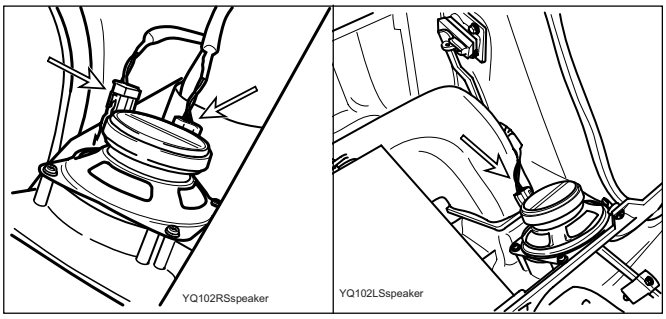


FIGURE 2.24C

› Press the upper locks to release the top side of the lower cover. Then press the lower locks to release the bottom side of the cover to remove it.

3. Locate the switch to release the swing parking brake and flip it to its release position, see Fig. 2.24D.

4. Install the rear panel covers.

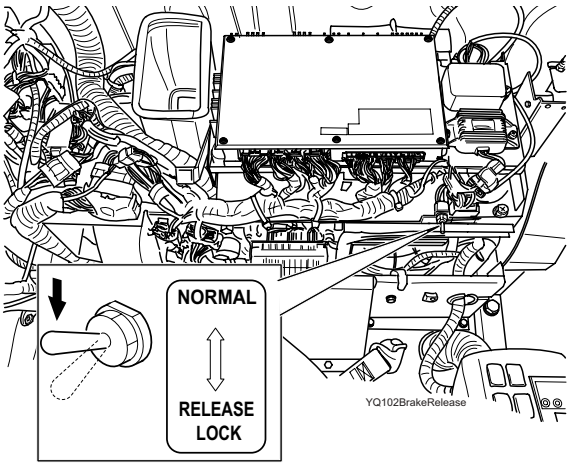


FIGURE 2.24D

5. Use a 13 mm and a 5 mm wrench to back out completely, to stop position, a special screw located on the pump regulators. See Figure 2.24E.

6. Start the engine.

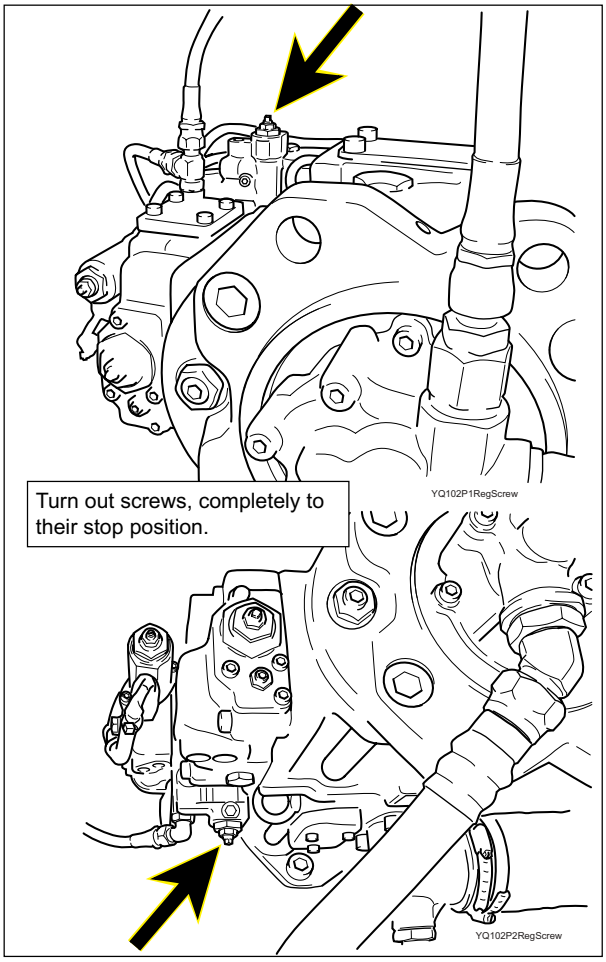


FIGURE 2.24E

NOTE

MACHINE EFFICIENCY WILL BE APPROXIMATELY 85%. Make sure to return these switches to their “normal” position after repairing the Mechatronic System.

http://truckmanualshub.com/

C2. 12 Volt Power Supply – FIGURE 2.25A

The 12 volt power supply is located beside the right side switch panel.

For use of common auto accessories such as a fan or other accessories requiring 12 volt(DC) power, pull cover away from 12 volt power supply and insert 12 volt male socket into power supply. Replace cover after use.

⚠ CAUTION

Do not use the cigarette lighter as a power source for 12 volt accessories. It is a 24 volt outlet. Plugging a 12 volt accessory into a 24 volt connector may result in shorting and/or Fire.

MAXIMUM CONTINUOUS OUTPUT – 180 Watt

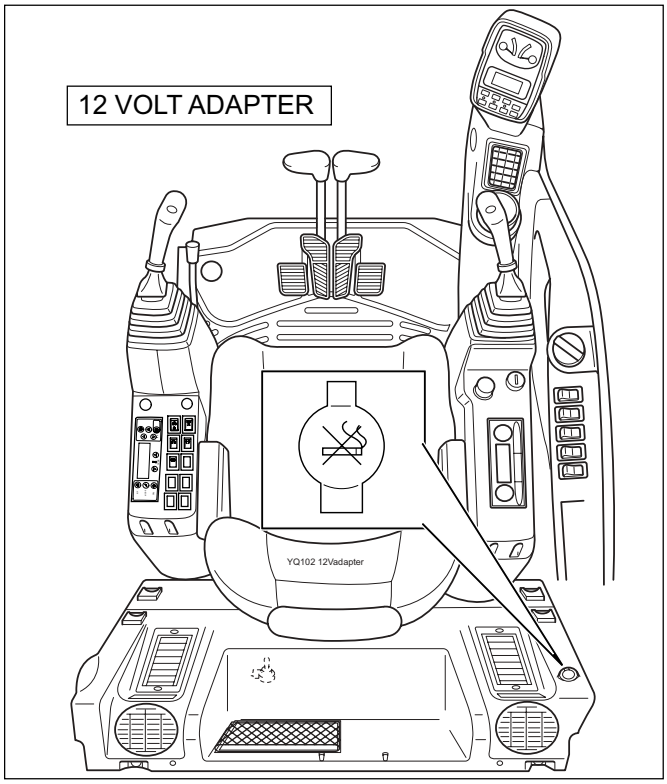


FIGURE 2.25A

C3. Fuse Box – FIGURE 2.25B

The fuse box is located behind the operators seat. It contains all necessary fuses for the electrical circuits of the machine. Should it become necessary to inspect or change a fuse, remove the fuse box cover by gently pulling each end away from the box. Should a fuse require replacement, use a replacement fuse of the same type and amperage. Turn key switch to “OFF” and wait approximately 4 seconds for all electrical power to stop before removing or replacing a bad or blown fuse. The fuse cover incorporates a fuse puller to remove fuses. Refer to the Maintenance Section of this manual for a detailed diagram and description of fuse box.

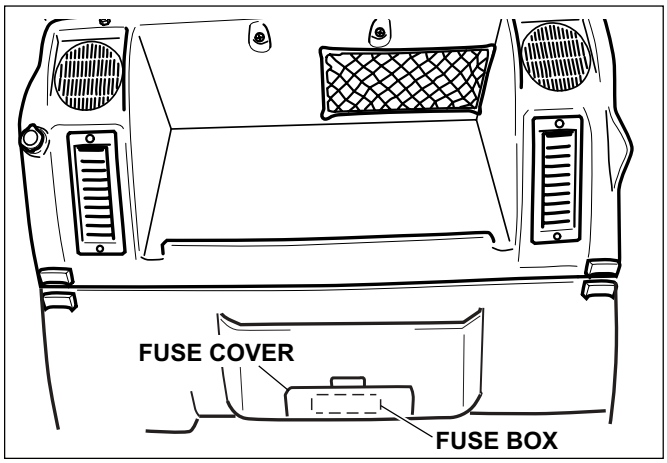


FIGURE 2.25B

C4. Hour Meter – FIGURE 2.25C



– The hour meter indicates the total time that the engine has run. It meters the time continuously as long as the engine is running.

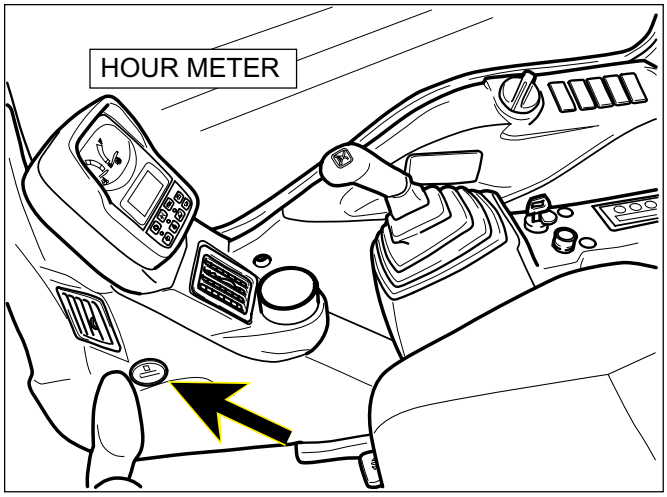


FIGURE 2.25C

http://tractormanuals.blogspot/

D. OPERATING LEVERS AND CONTROLS

D1. Engine Emergency Stop Control – FIGURE 2.26A

The engine emergency stop control cable is located at the lower right hand side of the operator's seat. It is used only in an emergency situation to stop the engine quickly. It has 2 operating positions.

1. "IN"-Releases the fuel stop lever on the governor to allow normal starting of the engine.
2. "OUT"-Activates the fuel stop lever on the engine governor to immediately stop the engine.

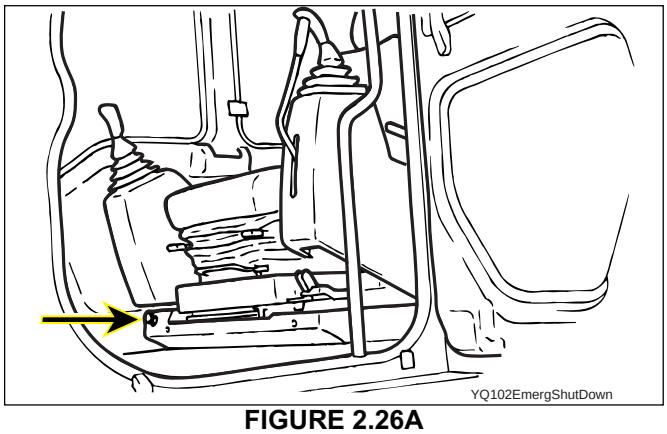


FIGURE 2.26A

CAUTION

Do Not suddenly stop the engine when operating at high RPM. Doing so may damage the turbo or engine.

D2. Left Hand Operator Control Lever – FIGURE 2.26B

⚠ CAUTION

Hydraulic controls are designed for and set to ISO operating pattern for optimum machine performance and safety. Changing the control pattern will effect the performance of the machine.

The left hand operator control lever is located at the top front of the L.H. operator console. Its purpose is to allow the operator to control operations of the swing and arm. Operating speed of function is variable from stop to full stroke depending on how far lever is operated. The left hand operator control lever has 4 basic operational functions.

1. "FORWARD"– Variable speed arm out.
2. "BACKWARD"– Variable speed arm in.
3. "LEFT"– Variable speed left swing.
4. "RIGHT"– Variable speed right swing.
5. "CENTER"– Neutral position.

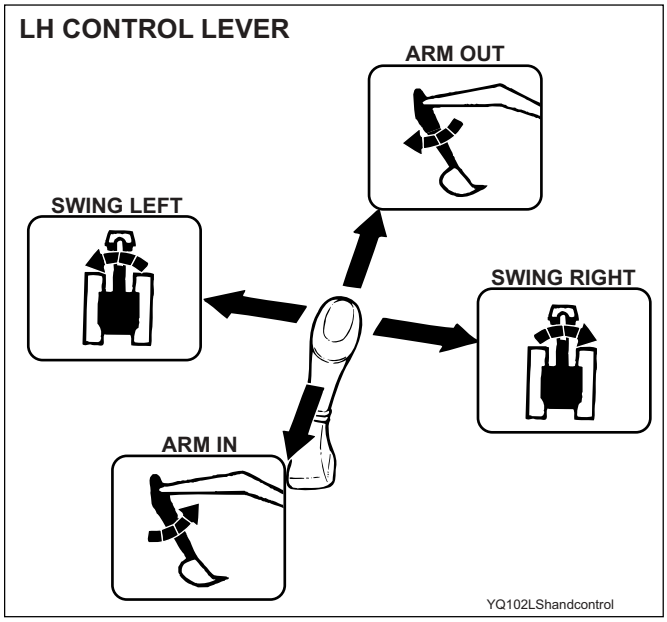


FIGURE 2.26B

D3. Right Hand Operator Control Lever – FIGURE 2.26C

The right hand operator control lever is located at the top front of the R.H. operator console. Its purpose is to allow the operator to control operations of the boom and bucket. Operating speed of function is variable from stop to full stroke depending on how far lever is operated. The right hand operator control has 4 basic operational functions.

1. "FORWARD"– Variable speed boom down.
2. "BACKWARD"– Variable speed boom up.
3. "LEFT"– Variable speed bucket in (digging).
4. "RIGHT"– Variable speed bucket out (Dump).
5. "CENTER"– Neutral position.

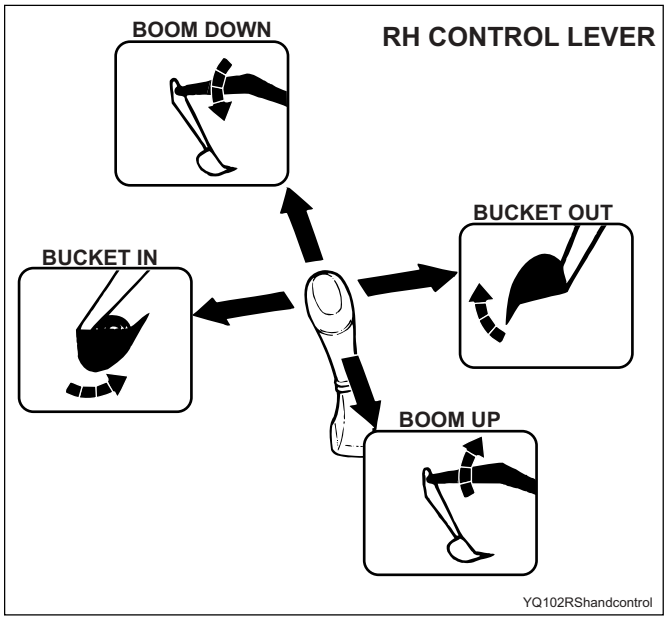


FIGURE 2.26C

http://truckmanualshub.com/

D4. Left and Right Travel Levers and Pedals –FIGURE 2.27A

The travel levers and pedals are located in front of operator seat. They are used to move the left or right track of the machine either forward or backward:

1. "FORWARD"– Variable speed forward track movement.
2. "BACKWARD"– Variable speed reverse track movement.
3. "CENTER"– Neutral position.

THESE OPERATIONS ARE WITH TRAVEL MOTORS POSITIONED BEHIND THE OPERATOR'S CAB.

NOTE

See "Machine Travel Controls" in Section-03 for details on travel operation.

D5. Removing the Travel Control Levers

1. Use a 13 mm wrench to remove the travel control levers from the travel pedals, see Figure 2.27B.
2. Use a 17 mm wrench to remove the support brackets located in the air cleaner compartment, see Figure 2.27C.
3. Store the travel control levers properly in the air cleaner compartment and securely tighten the brackets.

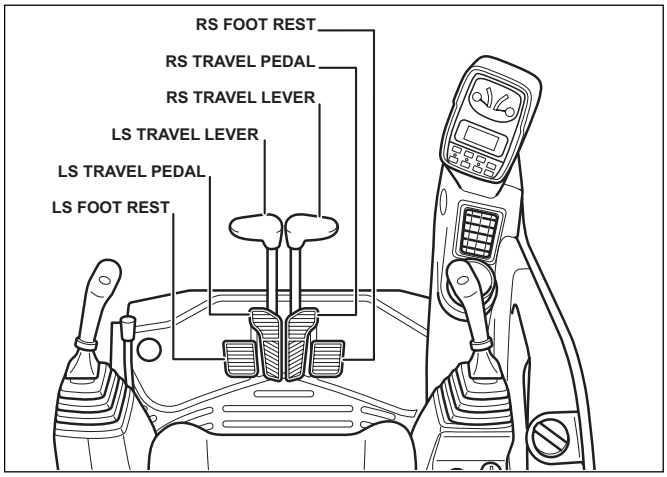


FIGURE 2.27A

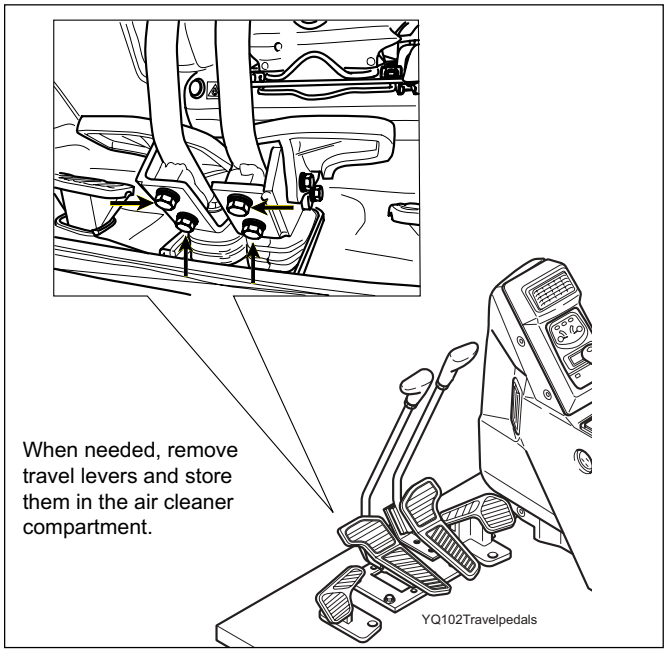


FIGURE 2.27B

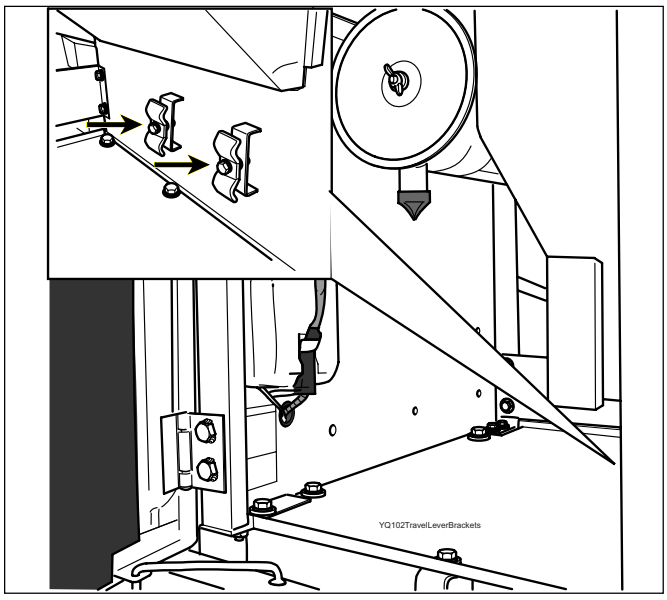


FIGURE 2.27C

http://tractormanuals.blogspot/

E. OPERATOR CAB AND OPERATOR SEAT

1. Locking/Unlocking Cab Door

Use the key switch key to lock or unlock cab door. Insert key into door lock and turn clockwise to unlock or turn counterclockwise to lock cab door. See FIGURE 2.28A.

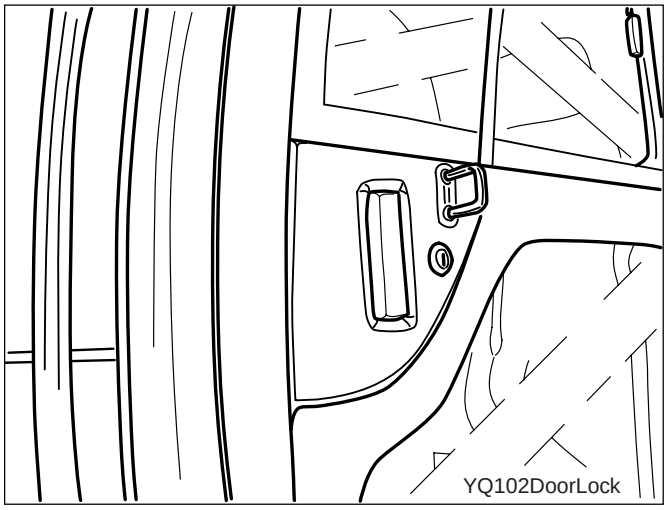


FIGURE 2.28A

2. Cab Door Latch

a. The cab door can be latched in an open position by opening door until it is locked open by the door latch located on the cab. See FIGURE 2.28B.

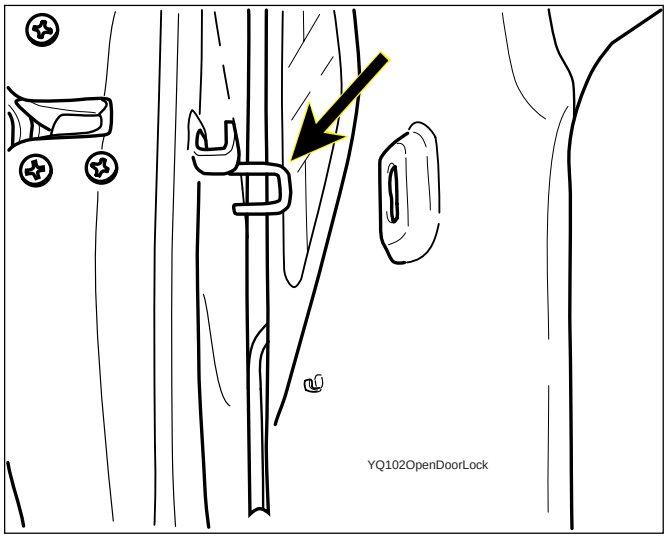


FIGURE 2.28B

b. Release door latch by pushing release lever down to release door from latch. See FIGURE 2.28C.

⚠ WARNING

NEVER USE THE LEVER FOR DOOR LATCH RELEASE AS A HANDLE TO MOUNT AND/OR DISMOUNT FROM THE MACHINE.

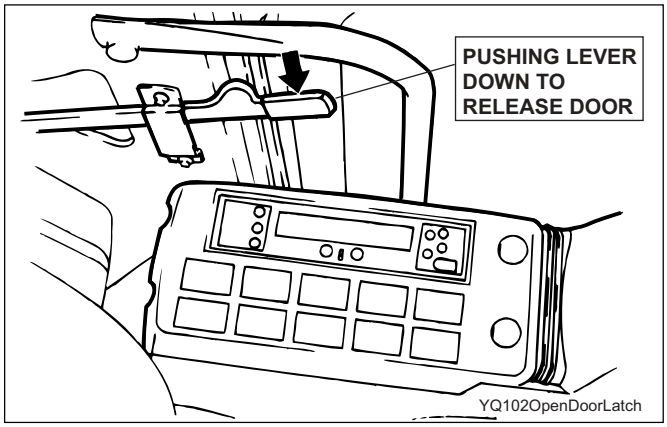


FIGURE 2.28C

http://truckmanualshub.com/

c. Pull release lever located inside the door, and door opens from the inside of cab. – FIGURE 2.29A.

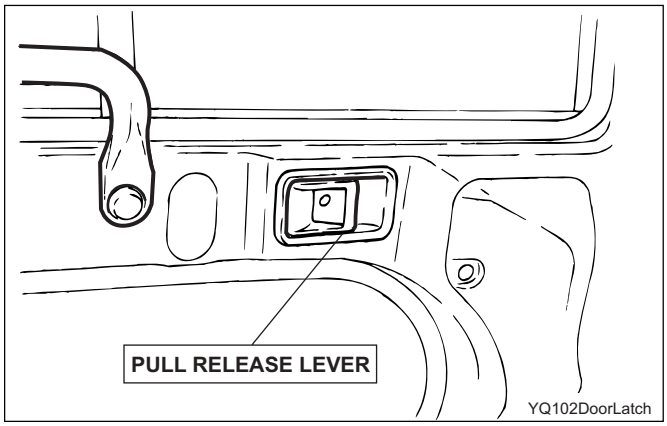


FIGURE 2.29A

3. Opening & Closing Windshield

Front window (upper) can be stored in ceiling.

⚠ CAUTION

Make sure to properly lock the window frame in place, or the wiper lock does not function, and consequently the wiper may be damaged because the wiper moves at the time when the wiper motor switch is turned on.

a. Pull levers on the right and left sides of front window upper section and levers are unlocked. See FIGURE 2.29B.

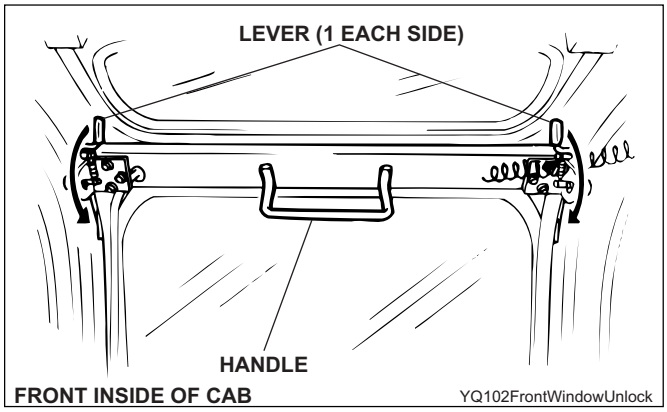


FIGURE 2.29B

b. Hold handles on upper central and lower left sides of the front window. Lift the front window up and slide overhead all the way to the back end. Pull down on handles to lock the window in place. See FIGURE 2.29C.

⚠ WARNING

Special attention must be paid not to injure hands and others when the front window is closed.
Always, make sure to properly lock the front window in place to avoid injury.

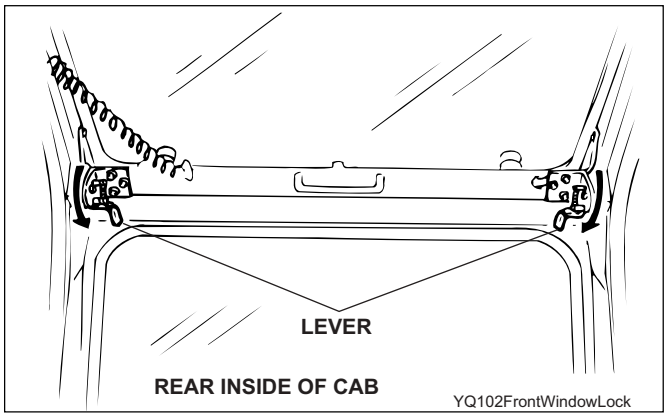


FIGURE 2.29C

http://truckmanuals.bz.com/

4. **Removing and Storing Lower Front Window**
   - **a.** After placing upper front window in ceiling, and locking it in place, remove front window by hand from window frame, see FIGURE 2.30A.
   - **b.** Securely store the removed lower front window in holder in the rear of cab, behind the operator's seat.
   - **c.** To store it, insert the right and left sides of glass in holder, and support it with holder on the lower section of window frame. See FIGURE 2.30B.

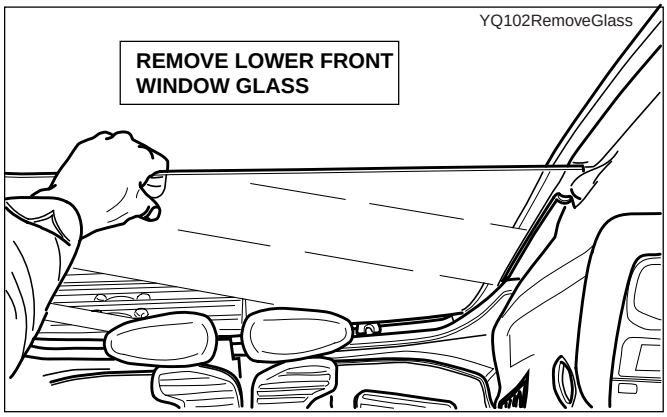


FIGURE 2.30A

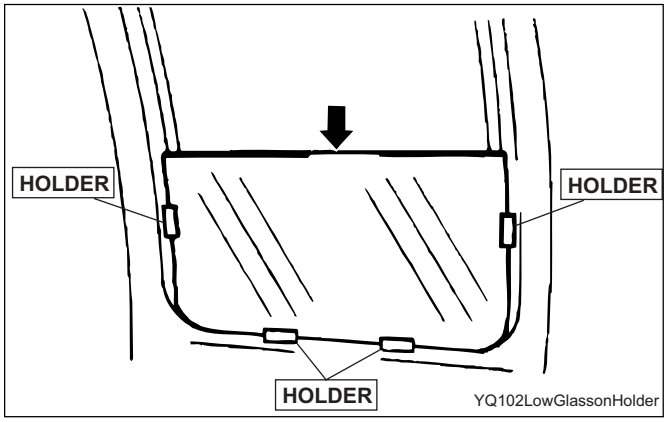


FIGURE 2.30B

5. **Opening and Closing Door Glass**
   - **a.** Open cab door glass (upper) sliding it to front side after unlocking it.
   - **b.** Close the door glass sliding it to LOCK position, then lock it. See FIGURE 2.30C.

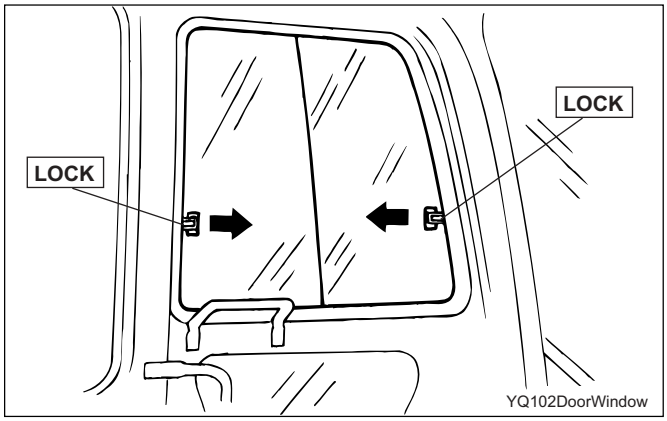


FIGURE 2.30C

http://truckmanualshub.com/

6. Opening and Closing Sunroof

a. Slide the sun visor backward as shwon in FIGURE 2.31A.

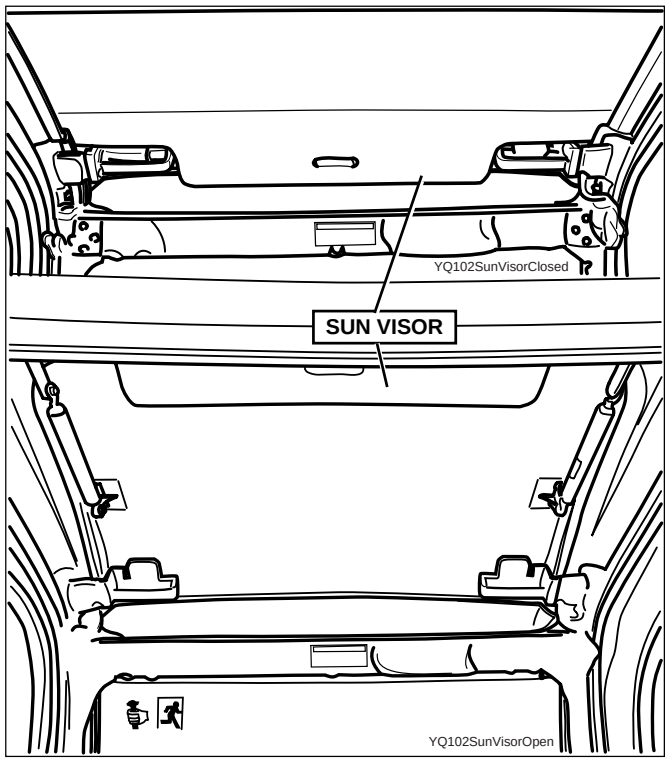


FIGURE 2.31A

⚠ WARNING

MAKE SURE TO SECURE FRONT WINDOW WITH LOCKS WHEN PLACED IN THE UPPER POSITION

b. Pull locks on right and left sides inward, and sunroof opens through the aid of gas spring. Close sunroof pulling locks inward, and lock it. Also the roof can be left slightly open to ventilate air in cab by placing lock Ⓐ section on Ⓑ section. See FIGURE 2.31B.

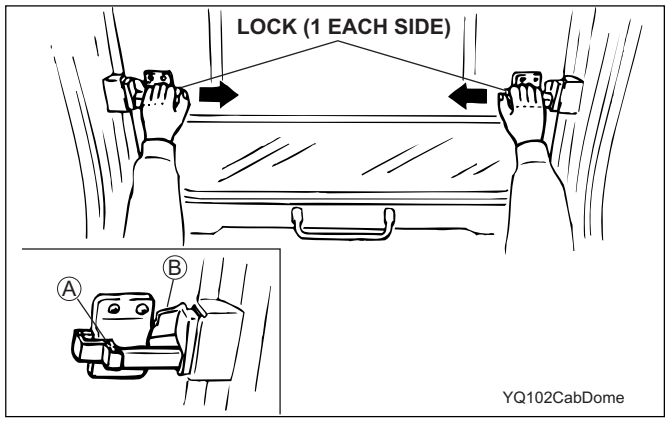


FIGURE 2.31B

7. Cab Dome Light

a. Turn Cab Dome Light “ON” by pushing the Dome Light Switch downward.

b. Turn “OFF” by pushing switch all the way up. See FIGURE 2.31C.

c. Place Dome Light Switch in the “CENTER” position and the light will be operated by the door switch. When door is opened the light will come “ON” and when the door is closed the light will turn “OFF”.

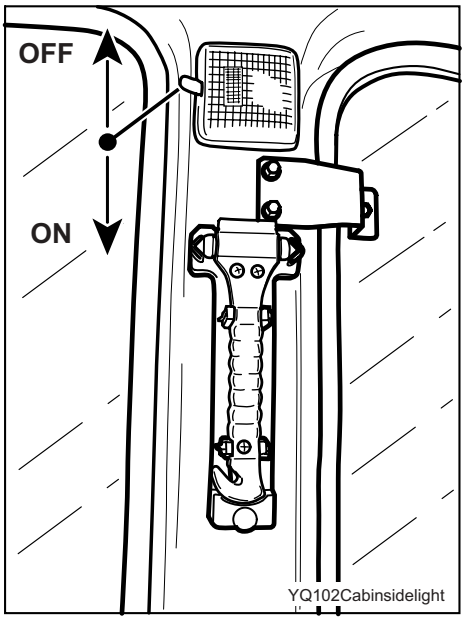


FIGURE 2.31C

8. Storage Compartment

The Operator and Parts Manual storage compartment is a pouch located on the back of the operators seat. Keep the Operator and Parts Manual for this machine in this location at all times for quick, easy reference. See FIGURE 2.31D.

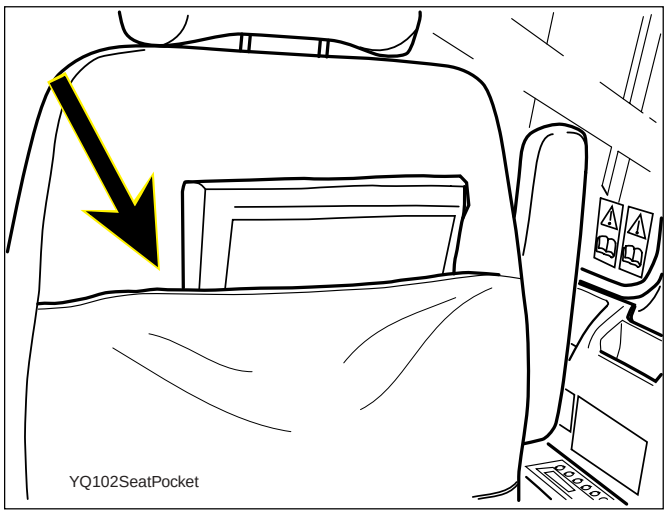


FIGURE 2.31D

http://tractormanuals.blogspot/

9. Operator Seat Adjustments

The operator seat incorporates several adjustment mechanisms to insure operator comfort, ease of operation and operator safety.

The adjustment areas are as follows:

a. Operator Weight Adjustment – FIGURE 2.32A

1. Rotate the adjustment knob until weight read out is close to the operator's weight at the top end of the dial.

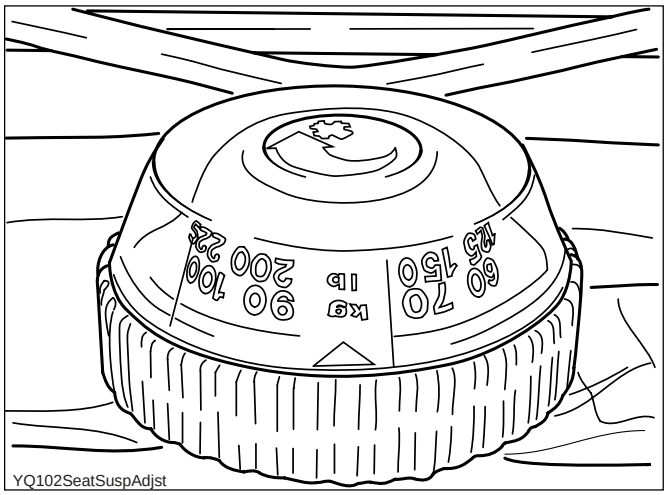


FIGURE 2.32A

b. Seat Height Adjustment – FIGURE 2.32B

1. Pull height adjustment lever up to raise or lower rear of seat.
2. Push height adjustment lever down to raise or lower front of seat.

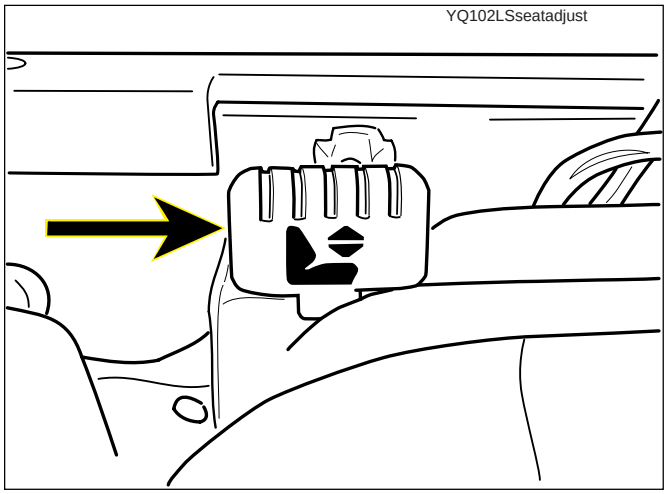


FIGURE 2.32B

c. Seat Reclining Adjustment – FIGURE 2.32C

1. Pull reclining adjustment lever up to set desired reclining angle.
2. Release reclining adjustment lever to lock seat in position.

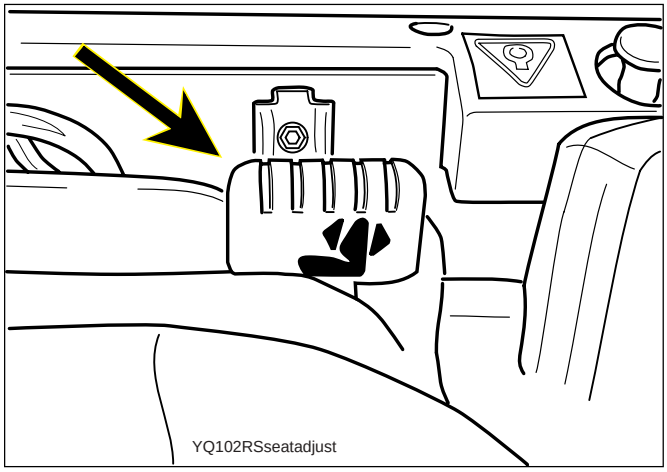


FIGURE 2.32C

http://truckmanualshub.com/

d. Seat Front to Back Adjustment – FIGURE 2.33A

1. Pull up on top bail for seat adjustment and move seat forward or backward to desired position.
2. Release bail to lock seat in position.

e. Control Stand Front to Back Adjustment – FIGURE 2.33A

1. Pull up on bottom bail for control stand adjustment and move entire frame forward or backward to desired position.
2. Release bail to lock the control stand in position.

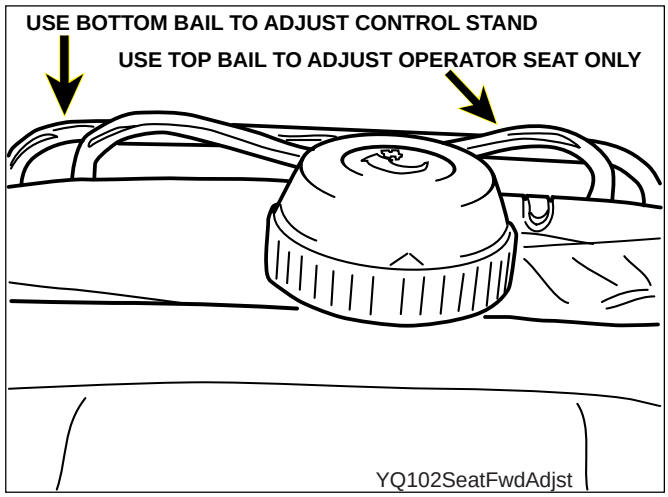


FIGURE 2.33A

f. Arm Rest Adjustment – FIGURE 2.33B

1. Lower arm rest and with finger, turn adjustment wheel until arm rest is in desired position.

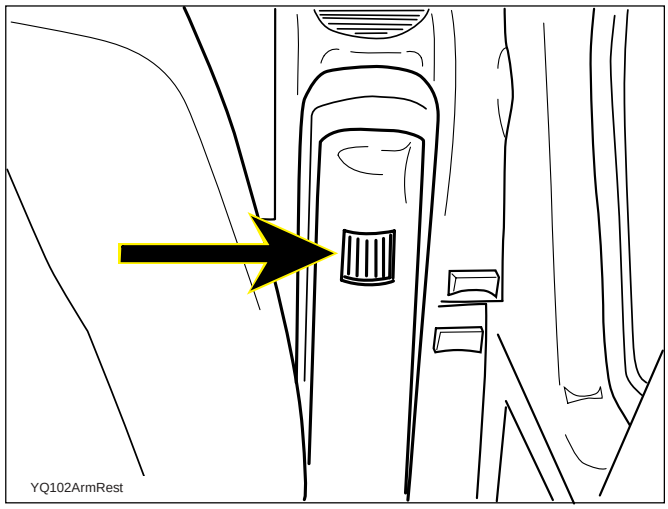


FIGURE 2.32B

g. Head Rest Adjustment – FIGURE 2.33C

1. Move head rest forward or backward to desired reclining angle.
2. Raise or lower head rest to desired height.

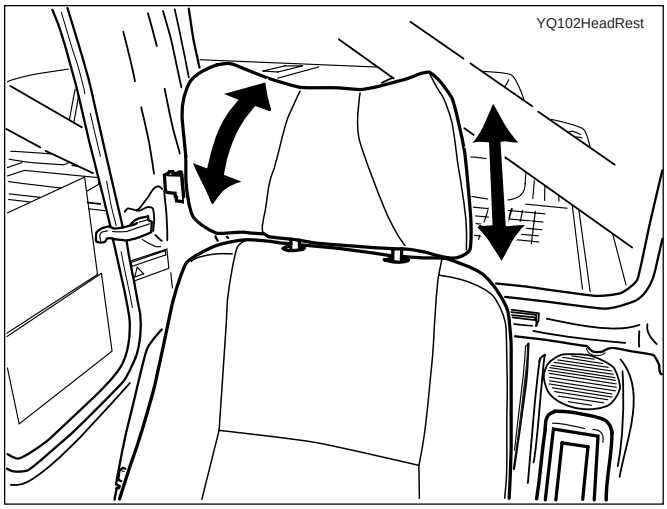


FIGURE 2.33C

h. Adjustment of Control Stand Height – FIGURE 2.33D

To adjust the height of the control stand, use a 17 mm wrench to remove the capscrew (M10) under the operator's left side console. The 3-stage setting position is as follows:

1. From Factory, the height is set to the medium position (H1), 10 mm (0.4").
2. In the lowest position (H2), the height is raised to 20 mm (0.8").

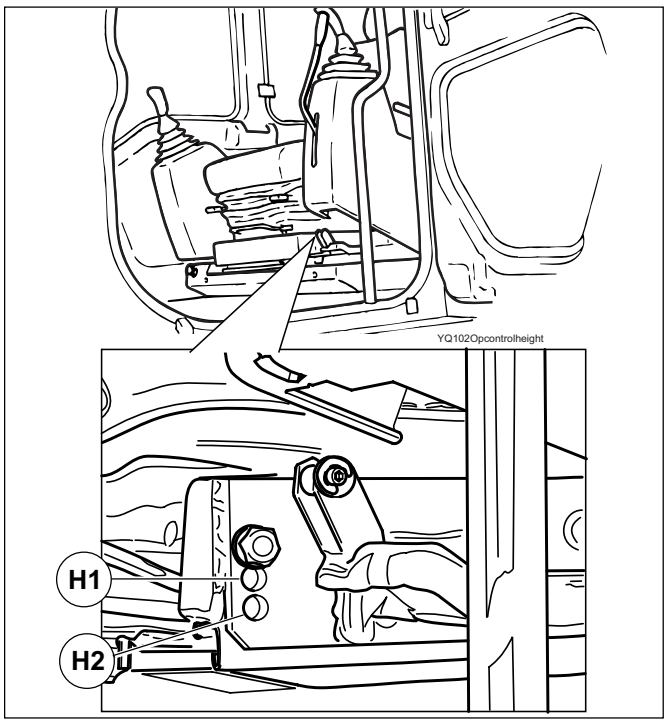


FIGURE 2.33D

http://tractormanuals.blogspot.com/

i. Seat Belts – FIGURE 2.34A

1. Sit on the operator's seat and adjust the seat position so that the operator's back closely contacts with the seat back.
2. Draw out the right side seat belt and fasten it to the buckle located on the left side.

NOTE

If the belt stops while you're pulling it out, release the tension and continue pulling it out.

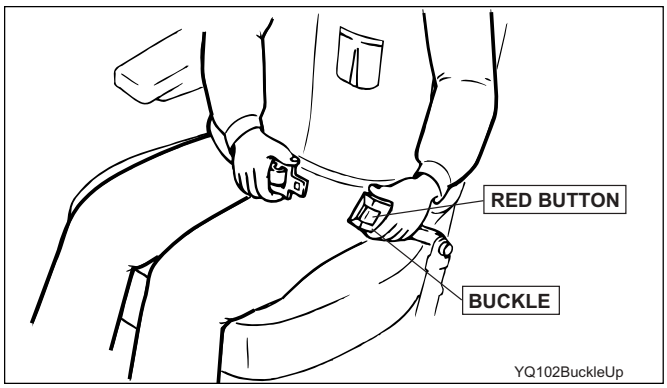


FIGURE 2.34A

3. When the seat belt is used, draw it out moderately long and insert it in the buckle until rattling sound is heard.
   Release hands, and the length is automatically adjusted and the belt is locked.
4. After locking, the belt can be adjusted about 25 mm (1 in) to fit comfortably.
5. Press the red button of the buckle, and the belt is unfastened.

⚠ WARNING

ALWAYS WEAR SEAT BELT WHILE SITTING IN OPERATOR SEAT. ALWAYS CHECK CONDITION OF SEAT BELT AND SEAT BELT MOUNTING HARDWARE TO MAKE CERTAIN SEAT BELT IS IN GOOD CONDITION AND PROPERLY SECURE.

⚠ CAUTION

Replace the seat belt every three years regardless of appearence, and tag date of replacement on its support mount for reference.

2.5. MACHINE ACCESS COMPARTMENTS AND DOORS

A. Engine Coolant Tank & Engine Air Cleaner Access Doors – FIGURE 2.34B

Located on the left side of the machine the engine coolant tank access door allows access to the engine coolant tank. It also holds the engine air cleaner access door closed.

Use the key switch key to lock and unlock the Engine coolant tank access door.

⚠ CAUTION

ALWAYS, MAKE SURE TO USE THE DOOR STAYS TO LOCK THEM OPEN WHILE PERFORMING INSPECTION AND/OR MAINTENANCE.

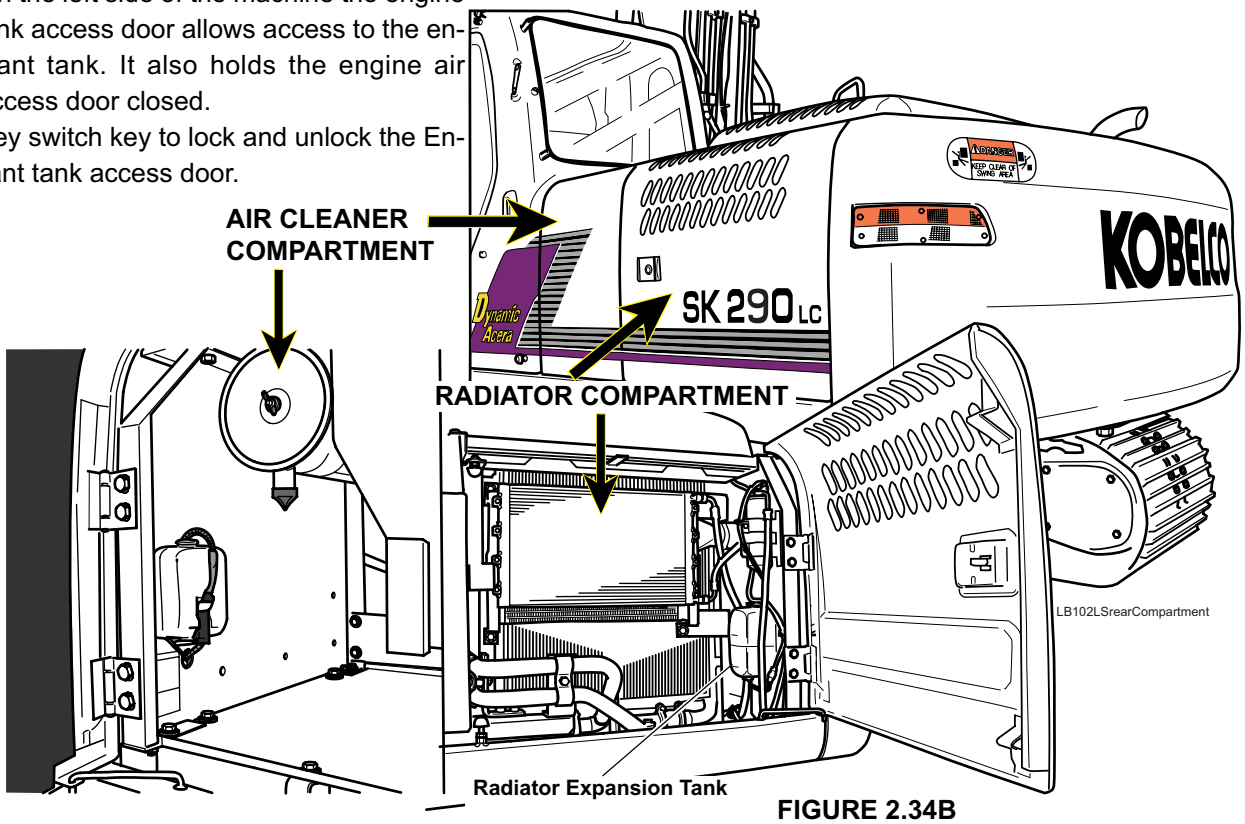


FIGURE 2.34B

https://truckmanualshub.com/

B. Main Pump Access Door – FIGURE 2.35A

Locate on the right side of the machine this door allows access to the main pump.

⚠ CAUTION

ALWAYS, MAKE SURE TO USE THE DOOR STAYS TO LOCK THEM OPEN WHILE PERFORMING INSPECTION AND/OR MAINTENANCE.

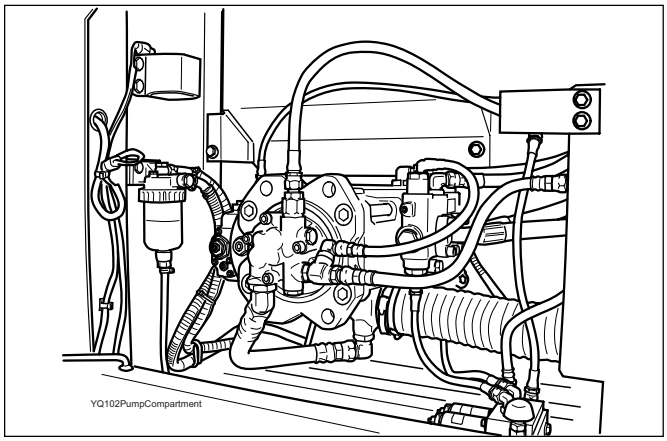


FIGURE 2.35A

C. Battery Box Access Cover – FIGURE 2.35B

Located on the right front of the upper frame. This cover allows access to the batteries and battery relay. This access cover is also locked and unlocked using the ignition key.

Use stay to lock the cover open.

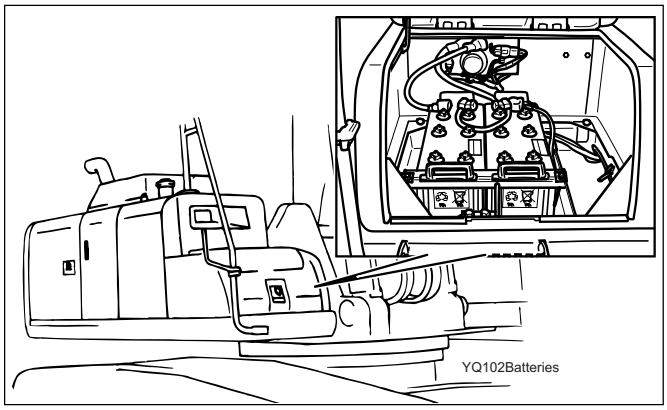


FIGURE 2.35B

D. Fuel Cap – FIGURE 2.35C

Stop engine and remove cap on fuel tank. Fill to desired level or to full capacity. See Section 4 for proper tank capacity.

⚠ WARNING

MAKE SURE ENGINE IS OFF AND KEEP BATTERY COVER AND ENGINE HOOD CLOSED WHEN FUELING.

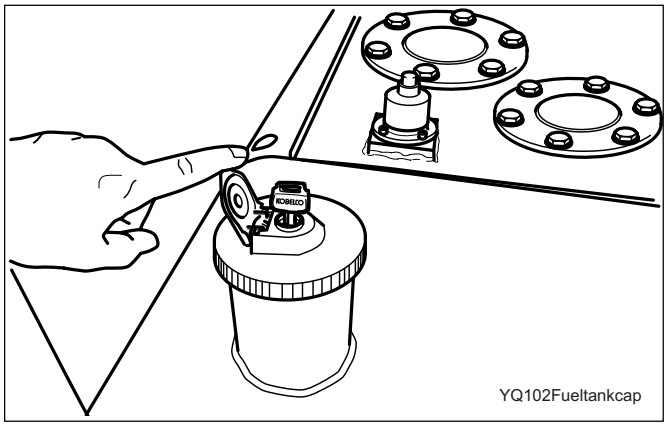


FIGURE 2.35C

E. Engine Cover – FIGURE 2.35D

Open engine cover with ignition key (if locked) after stopping engine.

Use stay to support it.

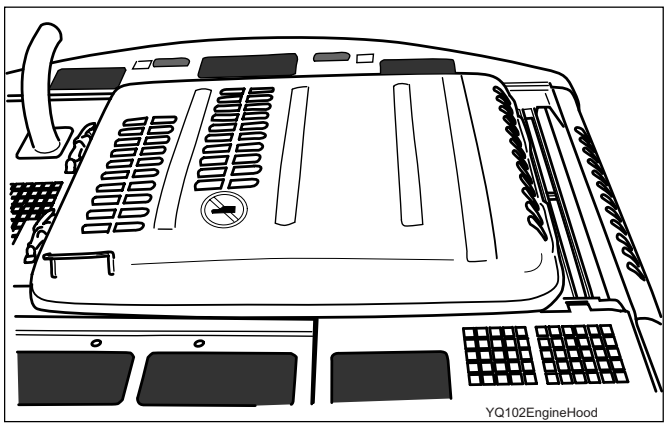


FIGURE 2.35D

Kobelco

Dynamic Acera



Kobelco Construction Machinery America LLC

Safety

KOBELCO

Kobelco Construction
Machinery America LLC

https://truckmanualshub.com/

1.1 GENERAL SAFETY INFORMATION

WARNING

Do Not operate or perform any maintenance on this machine until all instructions found in this manual have been thoroughly read and understood. Improper operation or maintenance of this machine may cause accidents and could result in serious injury or death.
Always keep this manual in the operators seat pocket.
If it is missing or damaged, place an order with an authorized KOBELCO distributor for a replacement.
If you have any questions, please consult an authorized KOBELCO distributor.

1. Most accidents, which occur during operation, are due to neglect of precautionary measures and safety rules. Sufficient care should be taken to avoid these accidents. Erroneous operation, lubrication or maintenance services are very dangerous and may cause injury or death of personnel. Therefore all precautionary measures, NOTES, DANGERS, WARNINGS and CAUTIONS contained in this manual and on the machine should be read and understood by all personnel before starting any work with or on the machine.

2. Operation, inspection, and maintenance should be carefully carried out, and safety must be given the first priority. Messages of safety are indicated with marks. The safety information contained in this manual is intended only to supplement safety codes, insurance requirements, local laws, rules and regulations.

3. Messages of safety appear in this manual and on the machine. All messages of safety are identified by the words “DANGER”, “WARNING” and “CAUTION” .
   a. **DANGER** – Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury and is represented as follows:

DANGER

   b. **WARNING** – Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury and is represented as follows:

WARNING

   c. **CAUTION** – Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against possible damage to the machine and its components and is represented as follows:

CAUTION

4. It is very difficult to forecast every danger that may occur during operation. However, safety can be ensured by fully understanding proper operating procedures for this machine according to methods recommended by KOBELCO.

5. While operating the machine, be sure to perform work with great care, so as not to damage the machine, or allow accidents to occur.

6. Continue studying this manual until all Safety, Operation and Maintenance procedures are completely understood by all persons working with the machine.

1.2 SAFETY PRECAUTIONS

WARNING

The proper and safe lubrication and maintenance for this machine, recommended by KOBELCO, is outlined in the OPERATORS MANUAL for this machine.

Improper performance of lubrication or maintenance procedures are dangerous and could result in injury or death. Read and understand the OPERATORS MANUAL before performing any lubrication or maintenance.

The serviceman or mechanic may be unfamiliar with many of the systems on this machine. This makes it important to use caution when performing service work. A knowledge of the system and or components is important before the removal or disassembly of any component.

Because of the size of some of the machine components, the serviceman or mechanic should check the weights noted in this manual. Use proper lifting procedures when removing any components. Weight of components table for SK210(LC)-VI is shown in Page 6-5 and for SK250(LC)-VI in page 6-23 of Section VI - SPECIFICATIONS.

https://truckmanualshub.com/

The following is a list of basic precautions that must always be observed.

1. Read and understand all Warning plates and decals on the machine before Operating, Maintaining or Repairing this machine.

2. Always wear protective glasses and protective shoes when working around machines. In particular, wear protective glasses when using hammers, punches or drifts on any part of the machine or attachments. Use welders gloves, hood/goggles, apron and the protective clothing appropriate to the welding job being performed. Do not wear loose fitting or torn clothing. Remove all rings from fingers, loose jewelry, confine long hair and loose clothing before working on this machinery.

3. Disconnect the battery and hang a “Do Not Operate” tag in the Operators Compartment. Remove ignition keys.

4. If possible, make all repairs with the machine parked on a level, hard surface. Block the machine so it does not roll while working on or under the machine. Hang a “Do Not Operate” tag in the Operators Compartment.

5. Do not work on any machine that is supported only by lift, jacks or a hoist. Always use blocks or jack stands, capable of supporting the machine, before performing any disassembly.

WARNING

Do not operate this machine unless you have read and understand the instructions in the OPERATORS MANUAL. Improper machine operation is dangerous and could result in injury or death.

6. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.

7. Lower the bucket, blade, or other attachments to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, blade, ripper or other attachment is blocked correctly to prevent it from dropping unexpectedly.

8. Use steps and grab handles when mounting or dismounting a machine. Clean any mud, grease, oil, or debris from steps, walkways or work platforms before using. Always face the machine when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations. *Refer to item M on page 1-3.*

9. To avoid back injury, use a hoist when lifting components which weigh 23 kg (50 lbs) or more. Make sure all chains, hooks, slings, etc., are in good condition and are the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.

10. To avoid burns, be alert for hot parts on machines which have just been stopped and hot fluids in lines, tubes and compartments.

11. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device and carefully pry cover loose to relieve any spring or other pressure, before removing the last two bolts or nuts completely.

12. Be careful when removing filler caps, breathers and plugs on the machine. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.

13. Always use the proper tools that are in good condition and that are suited for the job at hand. Be sure you understand how to use them before performing any service work.

14. Reinstall all fasteners with the same part number. Do not use a lesser quality fastener if replacements are necessary.

15. Repairs which require welding should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine type of metal being welded and select correct welding procedure and electrodes, rods or wire to provide a weld metal strength equivalent at least to that of the parent metal. Make sure to disconnect battery before any welding procedures are attempted.

https://truckmanualshub.com/

16. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will be damaged in operation of the machine by contacting sharp corners, or by rubbing against some object or hot surface. Do not connect wiring to a line containing fluid.

17. Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution and replace the guard or shield after repair is complete.

18. The maintenance and repair work while holding the bucket raised is dangerous due to the possibility of a falling attachment. Don't fail to lower the attachment and place the bucket to the ground before starting the work.

19. Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Do not check for leaks with your hands. Very small (pinhole) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use cardboard or paper to locate pin hole leaks.

20. Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure must be installed correctly.

21. Do not operate a machine if any rotating part is damaged or contacts any other part during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing.

22. Be careful when servicing or separating the tracks. Chips can fly when removing or installing a track pin. Wear safety glasses and long sleeve protective clothing. Tracks can unroll very quickly when separated. Keep away from front and rear of machine. The machine can move unexpectedly when both tracks are disengaged from the sprockets. Block the machine to prevent it from moving.

23. Caution should be used to avoid breathing dust that may be generated when handling components containing asbestos fibers. If this dust is inhaled, it can be hazardous to your health. Components in KOBELCO products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates and some gaskets. The asbestos used in these components is usually bound in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust which contains asbestos is not generated.

If dust which may contain asbestos is present, there are several common sense guidelines that should be followed.

- **a.** Never use compressed air for cleaning.
- **b.** Avoid brushing or grinding of asbestos containing materials.
- **c.** For clean up, use wet methods or a vacuum equipped with a high efficiency particulate air (HEPA) filter.
- **d.** Use exhaust ventilation on permanent machining jobs.
- **e.** Wear an approved respirator if there is no other way to control the dust.
- **f.** Comply with applicable rules and regulations for the work place.
- **g.** Follow environmental rules and regulations for disposal of asbestos.
- **h.** Avoid areas where asbestos particles may be in the air.

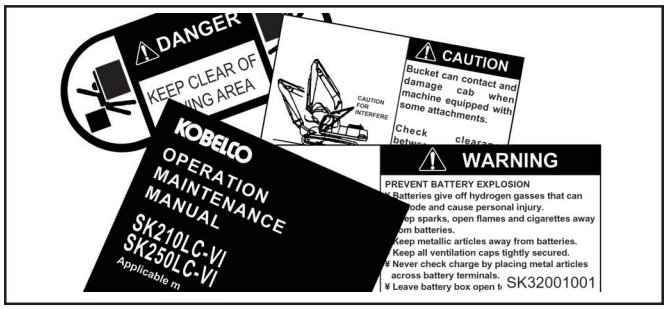
https://truckmanualshub.com/

1.3 PRE-START SAFETY

Many failures that occur during machine operation or servicing result from neglecting fundamental safety precautions. The following safety precautions are given to prevent such failures, but they are only a part of what you must follow. Read, understand and follow all safety precautions found in this manual and on the machine thoroughly before operating the machine.

A. OBSERVE SAFETY PRECAUTIONS

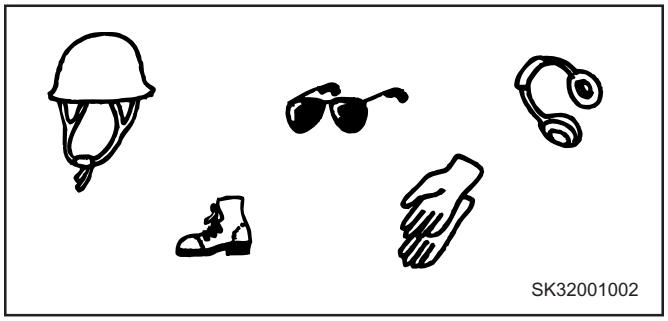
Follow all safety rules, precautions, and operating procedures.If there are other personnel and flagmen working in the area, have them observe the specified signs.



OBSERVE ALL SAFETY PRECAUTIONS

B. WEAR PROTECTIVE CLOTHING

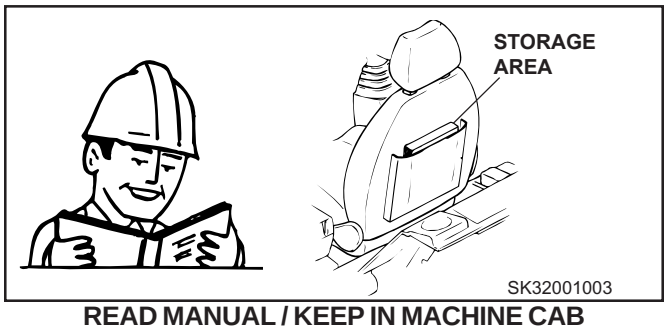
Wear well fitting safety shoes, hard hat, and working clothes, and put on protective glasses, face shield, ear protection and gloves. When necessary, wear reflective vest.



WEAR PROTECTIVE CLOTHING

C. READ and UNDERSTAND THE OPERATORS MANUAL

Before operating the machine, read and understand this operators manual thoroughly in order to use the mchine effectively and safely.



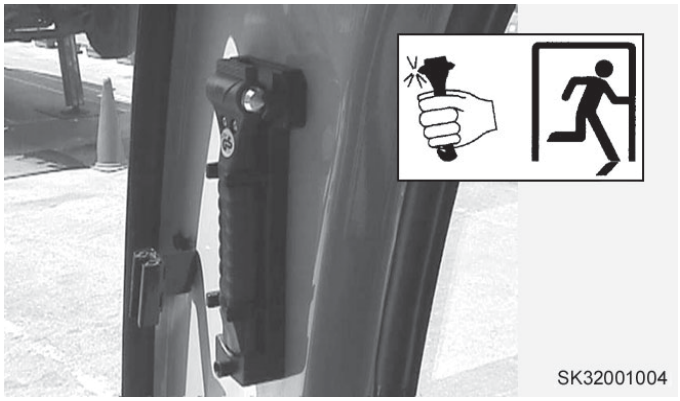
READ MANUAL / KEEP IN MACHINE CAB

D. KEEP OPERATORS MANUAL IN MACHINE CAB

Keep this manual in the specified storage area located behind the operators seat for quick reference. Should the operators manual become lost or damaged, contact an authorized KOBELCO distributor to order the operators Manual.

E. HOW TO HANDLE LIFE HAMMER

A life hammer is provided on the right side of cab. In case of emergency, take the life hammer, break the cab glass, and escape from the cab. In addition, the life hammer is equipped with a cutter on the lever side to cut the seat belt, etc.



HOW TO HANDLE LIFE HAMMER

F. PREPARE FOR EMERGENCIES

Have a fire extinguisher and first aid kit ready for emergencies. Know how to operate the fire extinguisher and know where the First Aid Kit is located for easy access in case of emergency.



PREPARE FOR EMERGENCIES

https://truckmanualshub.com/

G. ENSURE SAFETY AT THE WORK SITE

Know the work area! Before operating the machine, carefully survey and record the land and worksite features to prevent the machine from falling or the soil from caving in.

H. PERFORM PRE-START INSPECTION

Before starting the machine, perform a PRESTART inspection of the machine. If any problems are found, repair or replace defective components immediately. ***DO NOT OPERATE THE MACHINE*** until all problem areas are properly repaired. Always keep the windshield, working lamps, and mirrors clean for good visibility.

I. ENGAGE SAFETY LOCK LEVER BEFORE LEAVING MACHINE

Before leaving the operator's seat, move the safety lock lever to the "LOCKED" (Up) position. This will not allow operation of any hydraulic controls should they be accidentally moved. If the lever is not set to the "LOCKED" position and hydraulic controls are touched accidentally, the machine may move suddenly resulting in serious injury. Also before leaving the machine, lower the bucket to the ground, place the safety lock lever in the "LOCKED" (Up) position, stop the engine and remove the starter switch key.

J. SIGNS, SIGNALS & FLAGMEN

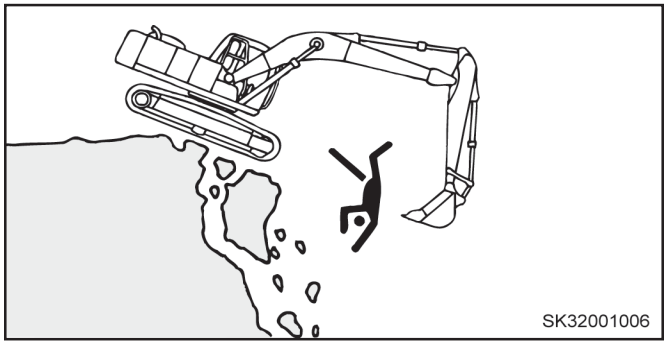
Install signs on soft shoulders and ground areas, have a flagman direct the operation if necessary. The operator should note marks and follow signals from the flagman. All personnel should know the meaning of the signs, marks, and signals. Only one flagman should give the signs and signals.

K. KEEP FIRE AWAY FROM FUEL AND OIL

Oil, antifreeze, and especially fuel are highly flammable. Never use fire near the machine. Securely tighten all fuel and oil caps. Keep fuel and oil in the designated storage areas. Promptly clean up any all spills and dispose of waste properly.

L. USE CAUTION NEAR NOISE

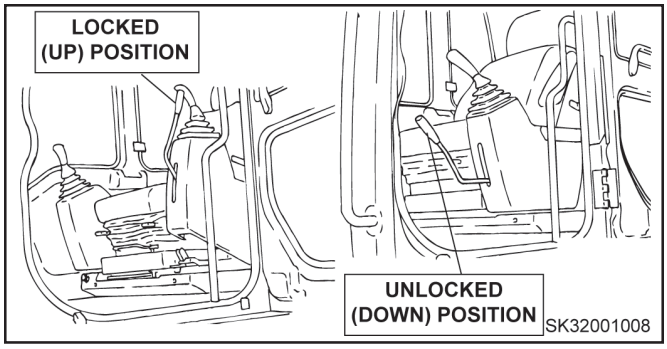
If noise is high during operation, hearing loss may result. Approved hearing protection should be used if personnel will be exposed to high noise levels for a long period of time.



WORKSITE SAFETY– KNOW THE AREA



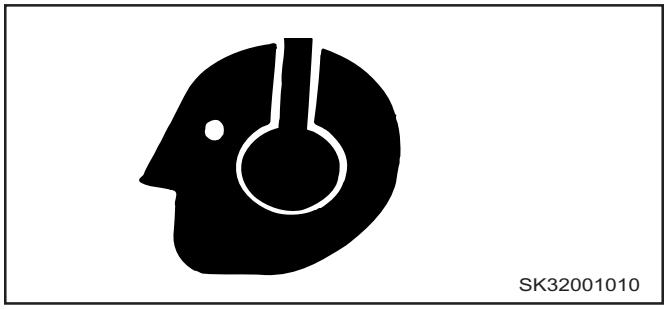
PRE-START INSPECTION OF MACHINE



SAFETY LOCK LEVER



KEEP FIRE AWAY FROM FUEL & OIL



USE CAUTION NEAR NOISE

M. MOUNTING & DISMOUNTING MACHINE

When getting on and off the machine, always maintain three point contact by using the handrails and step. Inspect and clean handrails, step, and mounting parts. Remove slippery materials, such as lubricants, and mud. Always place the cab door entrance parallel to the tracks before stopping the engine for dismounting.

N. AVOID HOT SURFACES & AREAS

Immediately after the machine is operated, the temperature and pressure of the engine coolant, engine oil, and hydraulic oil are very high. Burns may result if caps are removed, or oil, water, or filters are changed under these conditions. Wait until the temperature goes down, before attempting to check fluids or change filters.

O. USE THE PROPER OPTIONAL ATTACHMENT

Use only optional attachments designed for and approved by KOBELCO. Read, understand and follow all instructions in the manual accompanying the optional attachment. Use of any optional attachment not approved by KOBELCO in writing, can cause serious injury to personnel, damage to the machine and its components and shorten the life of the machine. Contact an authorized KOBELCO Dealer for optional attachments available for the machine.

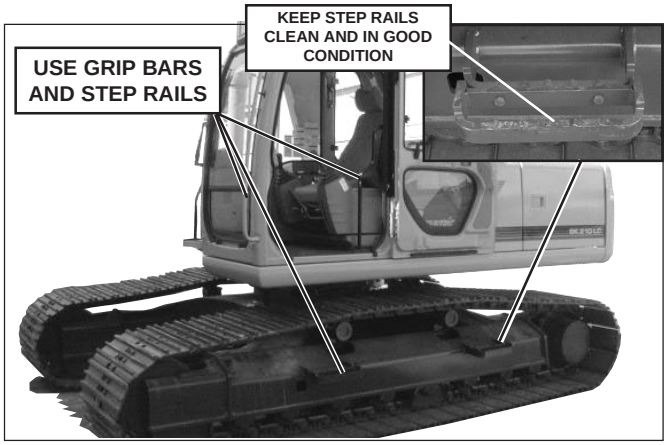
P. PREVENT FIRES

Leaking or spilled fuel, lubricants and hydraulic oil are fire hazards. Clean and properly dispose of spills as they occur. Repair or replace all leaking components to prevent fire. Also, clean the machine regularly removing all debris to help prevent fires, pay particular attention to removal of leaves, sticks, paper etc. Keep fire extinguisher in an accessible area and know how to use the fire extinguisher should a fire occur.

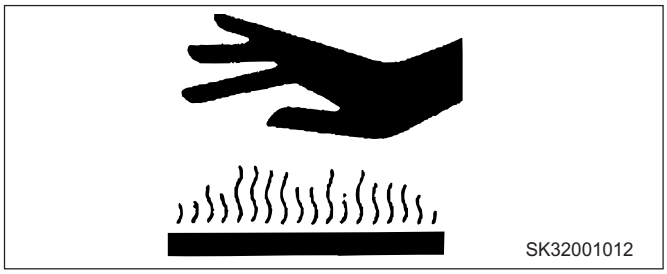
1.4 SAFETY DURING OPERATION

A. STARTING ENGINE

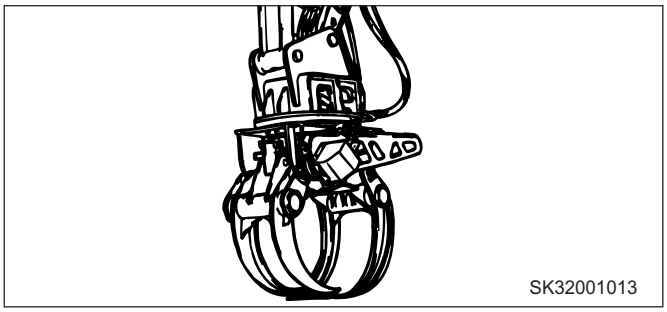
Sit in the operator's seat. Sound the horn before starting the engine to alert people the machine is being started. Make sure no one is near the machine. Do not short circuit the starter circuit or battery to start the engine. This may cause serious injury or cause damage the electrical system.



MOUNTING/DISMOUNTING MACHINE



HOT SURFACES



USE PROPER ATTACHMENT



PREVENT FIRES– CLEAN UP SPILLS



SOUND HORN BEFORE STARTING

MOUNTING/DISMOUNTING MACHINE

https://truckmanualshub.com/

B. PASSENGERS

This equipment is not intended or designed for the transportation of persons. Never allow persons to ride on the machine. Serious injury or death can result from allowing passengers on or in the machine.

C. TRAVEL

Make certain of the location of the travel motors before operating travel controls. Sound horn before mov ing the machine to inform persons that the machine is travelling. Position the attachment as shown in-illustration before beginning travel. Move the machine at slow speeds. Do not turn suddenly on rough terrain. Avoid travelling over obstacles. Should it become necessary to travel over an obstacle, keep the attachment low to the ground and travel at extremely slow speed.

D. SWING

Make certain the swing area of machine is clear of all persons and obstacles before operating swing controls. Sound horn before swinging machine. If necessary, have a flagman signal operator during operation to help prevent injury to persons or damage to obstacles and equipment.

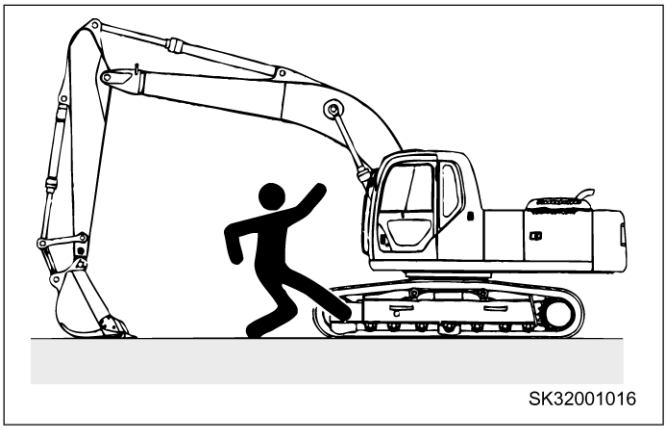
E. BOOM, ARM & ATTACHMENTS

Give the work you are doing your undivided attention. Make certain the attachment being used is suited for the job at hand. Make certain of obstacles in the work area and operate the machine within those limits. If necessary have a flagman signal the operator to prevent injury to persons or damage to the machine or obstacles in the work area.

ALWAYS PLACE ATTACHMENTS ON THE GROUND AND RAISE THE SAFETY LOCK LEVER BEFORE LEAVING THE CAB.

F. OPERATING ON INCLINES OR SLOPES

Operation of this machine on an incline or slop may cause the machine to become unstable or unbalanced. Work up and down inclines or slopes never across. Never Swing or turn machine around on slopes. Build a level area for the machine to operate. Operate controls carefully to prevent sud den movements which may cause the machine to slide or tip over. Use a flagman to direct the operator.



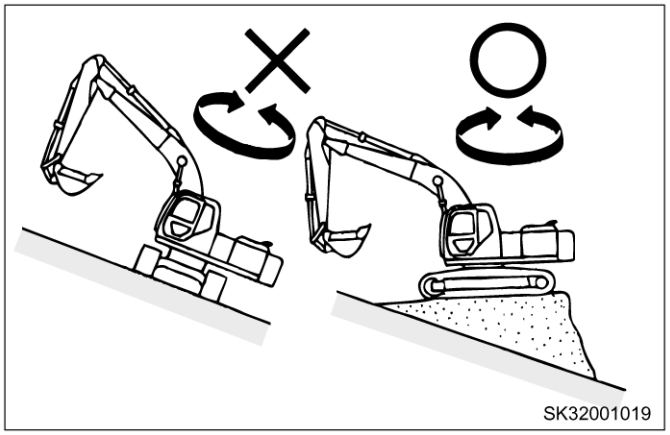
NO PASSENGERS



KNOW TRAVEL MOTOR POSITION



SWING SAFETY / USE SWING FLASHERS



BUILD BANKING FOR SLOPE OPERATION

https://truckmanualshub.com/

G. WORKING AROUND UTILITIES

If it is suspected that utility lines such as, gas, water, phone or electrical power are in the work area, contact the local utility authority for line location BEFORE beginning work in the area.Use extreme caution around electrical power lines. Keep a sufficient distance away from electrical lines during operation. See chart below for minimum distances.

LINE VOLTAGE	MINIMUM DISTANCE-M (FEET)
0 ~50,000	3.0M (10)OR MORE
50,000 ~200,000	4.5M (15)OR MORE
200,000 ~350,000	6.0M (20)OR MORE
350,000 ~500,000	7.5M (25)OR MORE
500,000 ~750,000	10.5M (35)OR MORE
750,000 ~1,000,000	13.5M (45)OR MORE

H. LIFTING

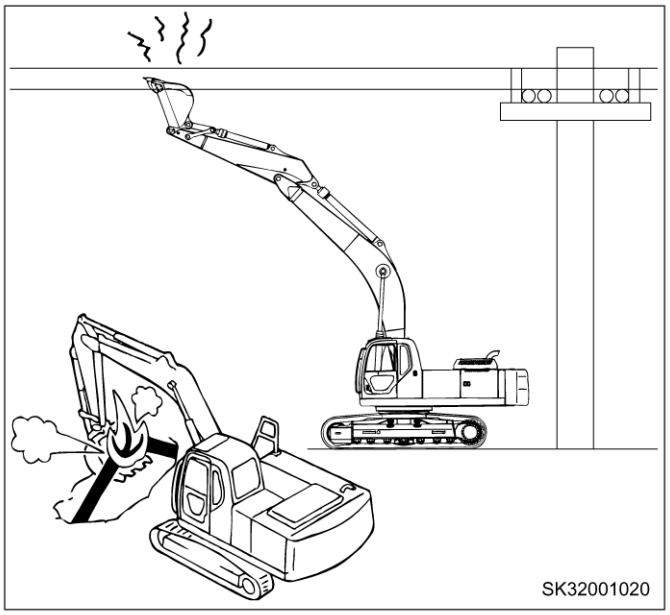
This machine is an excavator.Use extreme caution when lifting or moving heavy loads.Use proper lifting equipment rated at a capacity to handle the load. ***NEVER USE BUCKET TEETH TO LIFT OR MOVE HEAVY LOADS.***

I. FROZEN & SNOW COVERED WORK SITES

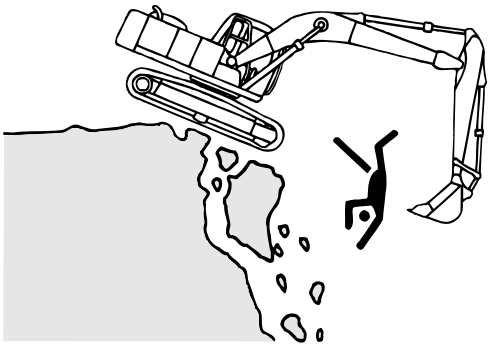
Use extreme caution when operating the machine on frozen or snow covered work sites.Operate all controls slowly and cautiously to prevent sudden movements that may cause the machine to unexpectedly shift, slide or move.Even on the slightest slope, when snow is present or work area is frozen can allow a machine to unexpectedly move. Snow on shoulders or snow drifts can be much deeper than expected.The machine can easily become buried under such conditions.Use extreme caution while operating the machine around or in snow.

J. FILLED OR UNSTABLE GROUND

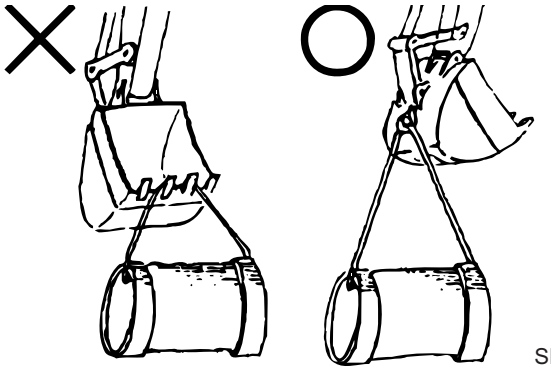
Be certain the condition of the work site is stable and capable of supporting the machine during operation. Do not operate attachment too close to the machine. Operation of the machine on shoulders or filled areas could cause the machine to become unstable presenting a work hazard.Position the travel motors to the rear of the machine, allowing for quick reversal, should the work area become un stable.



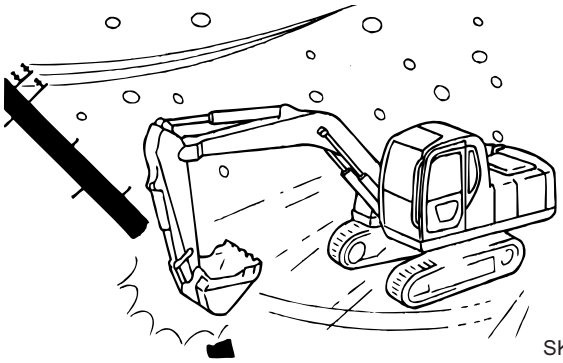
KEEP A SAFE DISTANCE FROM UTILITIES



USE EXTREME CAUTION ON FROZEN OR SNOW



USE PROPER LIFTING DEVICES



WORK ON STABLE GROUND

https://truckmanualshub.com/

K. RESTRICTED WORK AREAS

In work sites with limited height and swing areas such as tunnels,bridges,around electrical power lines, other utilities,or inside structures,use extreme caution in keeping the machine and its attachment a safe distance away to prevent personal injury and / or equipment or structure damage.Use a flagman to direct the operator.

L. PARKING THE MACHINE

Always park the machine on a firm,level surface. If no firm level surface is available,block the tracks and lower attachment to the ground to help prevent machine movement. Should the machine be parked on a roadway, move the machine to the shoulder to allow passing of traffic. Also post reflective warning signs and markers at a distance from the machine to safely warn motorists. Refer to local code and regulations regarding the posting of work area warnings and markers.

M. STABILIZE ATTACHMENTS

Stabilize all attachments removed from the machine to prevent the attachment falling over.

1.5 INSPECTION &MAINTENANCE SAFETY

A. "TAG-OUT " MACHINE

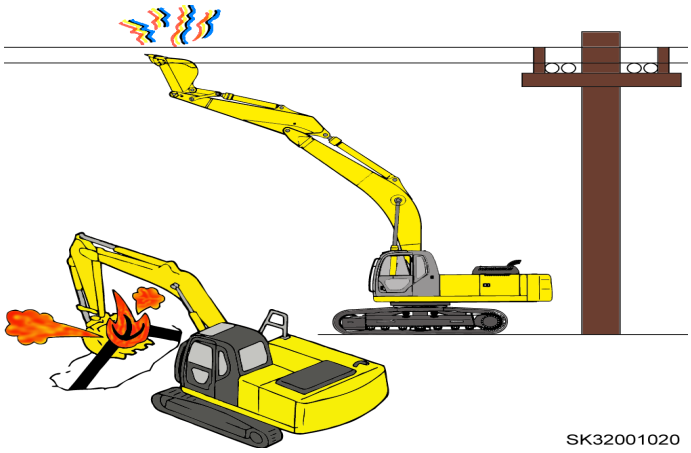
Before performing any inspection or maintenance procedures to the machine,fill out and post to the operators controls a "DO NOT OPERATE " tag to warn persons not to start the machine.Also inform the supervisor and all operators that the machine is under inspection or maintenance and they will be informed when the machine is ready for normal operation.

B. TOOLS &EQUIPMENT

Use the proper tools and equipment for the task at hand. Know the proper use of the tools and equipment before starting any inspection or maintenance procedures.

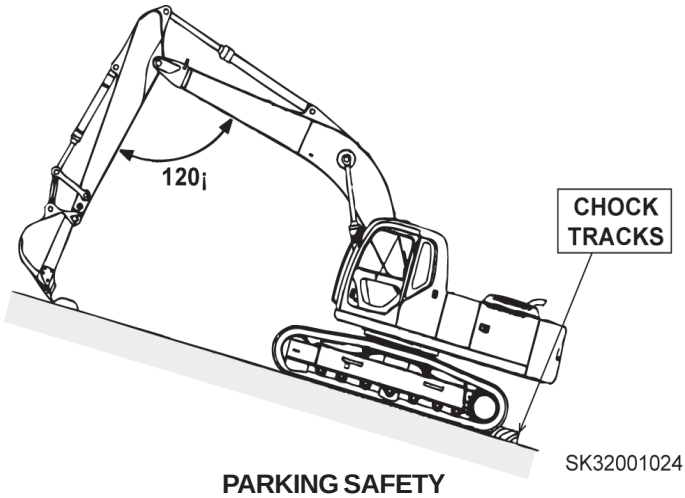
C. PERSONAL EQUIPMENT

Wear well fitting work clothes,hard hat,safety shoes and gloves. Confine long hair,loose clothing and remove all jewelry before attempting any inspection or maintenance procedures to this machine or attachments.



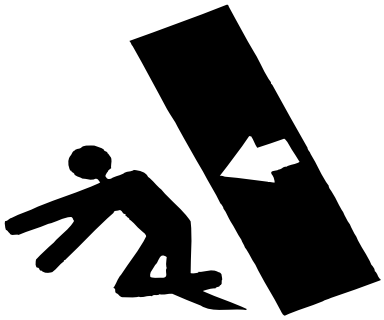
SK32001020

BE AWARE OF OBSTACLES



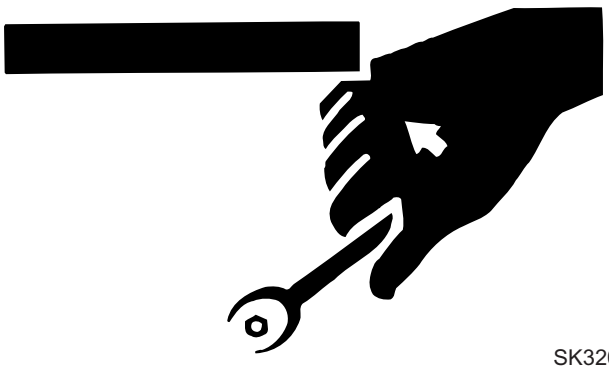
SK32001024

PARKING SAFETY



SK32001025

STABILIZE ATTACHMENTS WHEN REMOVED

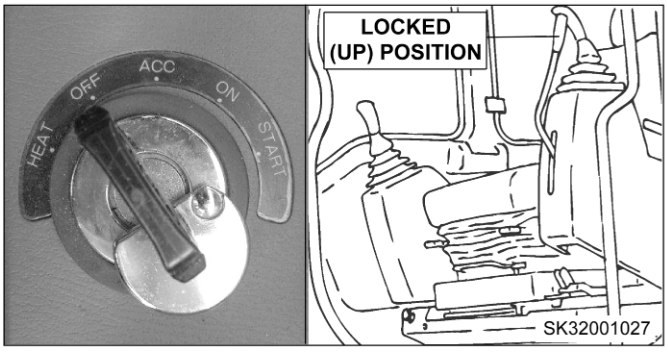


SK32001026

USE PROPER TOOLS

D. STOP THE ENGINE

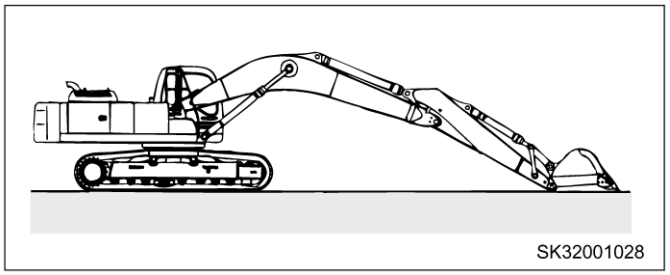
BE CERTAIN TO TURN ENGINE OFF AND LACE THE SAFETY LOCK LEVER IN THE "LOCKED" (UP) POSITION before attempting any inspection or maintenance procedures to the machine. Failure to stop engine could result in serous bodily injury or death.



STOP ENGINE/ENGAGE SAFETY LOCK LEVER

E. SET THE ATTACHMENT

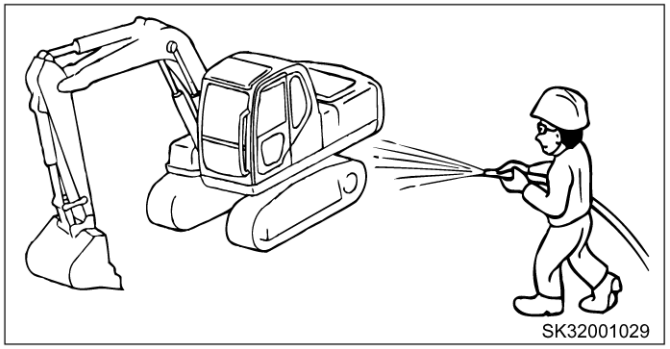
Always set the machine in the hydraulic oil check position on firm level ground before attempting any in spection or maintenance procedures to the machine. If it is not possible to put the machine in this position, secure the boom, arm and attacment to help prevent sudden movement. ***ALWAYS PLACE ATTACHMENTS ON THE GROUND AND RAISE THE SAFETY LOCK LEVER BEFORE LEAVING THE CAB.***



HYDRAULIC OIL CHECK POSITION

F. CLEAN THE MACHINE

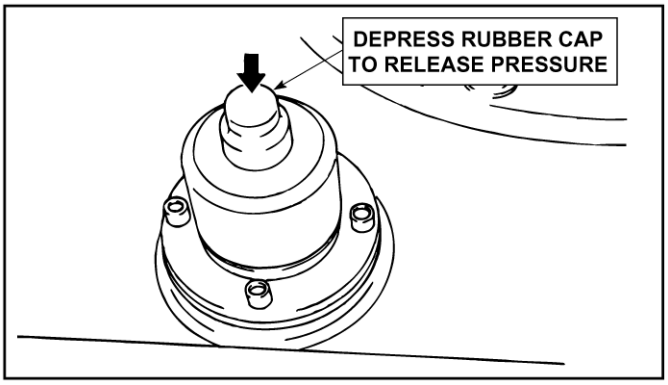
Keep the machine clean and free of debris, excess or spilled lubricants, fuel and fluids. Use aproved solvents, detergents and water to clean the machine and its components on a regular basis. Be careful not to allow water to reach electri cal components. Serious damage can occur to the electrical system by allowing water to reach the electrical components. Never clean inside of cab, or electrical components with pressurized water or steam.



KEEP MACHINE CLEAN

G. PRESSURIZED FLUIDS & LUBRICANTS

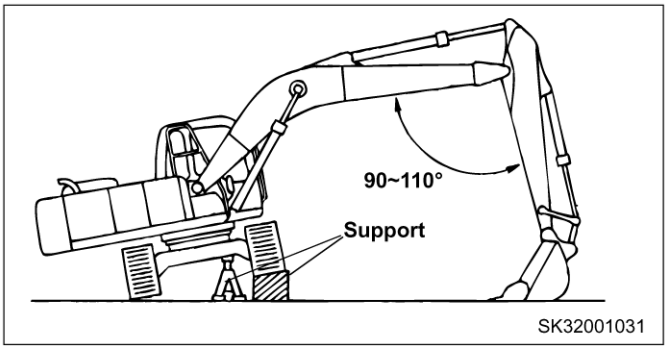
Always release pressure from hydraulic reservoir, engine coolant, fuel system and all systems cotaining pressure before removing any caps or components **BE CAUTIOUS OF HOT FLUIDS AND GASSES FROM SYSTEMS ON MACHINES THAT HAVE JUST BEEN STOPPED. ALLOW SUFFICIENT TIME FOR SYSTEMS TO COOL BEFORE PERFORMING ANY INSPECTION OR MAINTENANCE PROCEDURES.**



RELEASE HYDRAULIC TANK PRESSURE

H. SUPPORT THE MACHINE

If it becomes necessary to raise the machine for inspection or maintenance, always support the machine by positioning the machine as shown in the illustration and use safety supports or blocks, with a sufficient capacity rating to support the machine, under the tracks. ***NEVER INSPECT OR PERFORM MAINTENANCE PROCEDURES UNDER A RAISED MACHINE THAT IS NOT SUFFICIENTLY SUPPORTED.***



SUPPORT THE MACHINE

https://truckmanualshub.com/

I. REFUELING

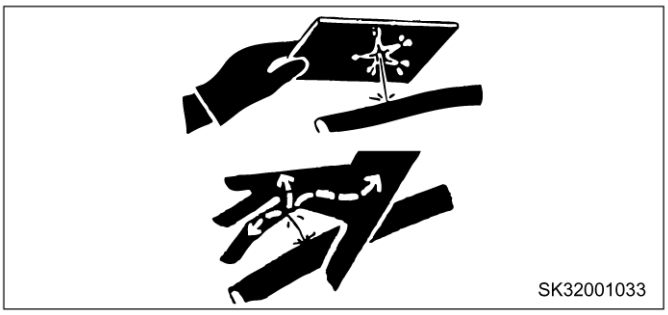
Move the machine to a well ventilated area for refueling. Use only specified fuel as described in the MAINTENANCE section of this operators manual. Immediately clean up all spilled fuel and dispose of properly. After refueling is complete, securely tighten fuel cap.



REFUELING

J. HYDRAULIC PRESSURE

Under normal conditions,all circuits of the hydraulic system are under extreme pressure.When inspecting for leaks, use a small piece of cardboard, wood or metal to locate leaks.**SMALL (PINHOLE) LEAKS CAN BE DANGEROUS IF CONTACT WITH SKIN OR EYES IS MADE.**Wear approved safety glasses or face shield,gloves, hard hat, safety shoes and work clothes during all inspection and maintenance pro - cedures.

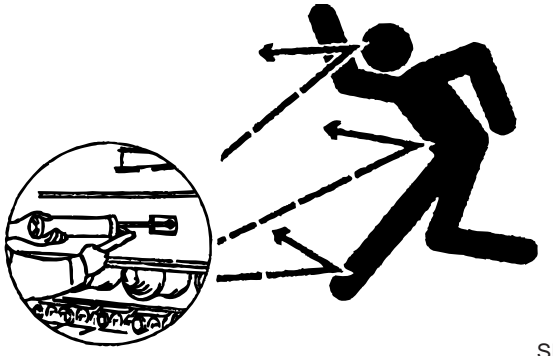


CHECKING FOR HIGH PRESSURE LEAKS

K. TRACK SHOE TENSION

The grease used to adjust the track shoe tension is under extreme pressure in the cylinder.Use ex-treme caution when adjusting track shoe tension.

KEEP FACE,HANDS AND LEGS AWAY FROM THE GREASE NIPPLE AREA. Carefully and slowly loosen the grease nipple when lessening track shoe tension. Never loosen grease nipple more than one complete turn.

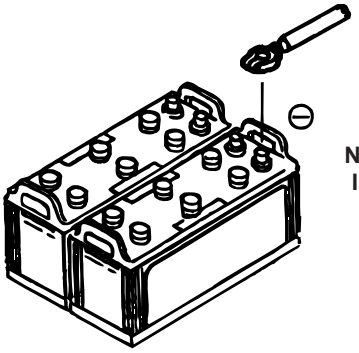


SK32001034

USE CAUTION WHEN ADJUSTING TRACKS

L. ELECTRICAL SYSTEM

Before performing any inspection or maintenance to the electrical system,or performing any welding procedures, disconnect the negative(–)cables from the battery terminals.Not disconnecting the negative (–) cable could cause extensive damage to the electrical system.



DISCONNECT BATTERY NEGATIVE (-) CABLE WHEN INSPECTING ELECTRICAL OR WELDING

SK32001035

ELECTRICAL SYSTEM PRECAUTION

M. USE APPROVED WORK LIGHTS

Use only approved work lights when performing inspection and maintenance procedures to prevent possible fire or explosion.Certain types of work lights should not be used due to the possibility of ignition of certain flammable gasses and fluids from the machine.

N. DISPOSE OF WASTE PROPERLY

Dispose of oils,fuel,coolant,solvents, filters, batter - ies etc. according to federal,state and local codes and regulations regarding hazardous waste disposal. Contact Local authorities for proper disposal methods of such materials.



SK32001036

USE PROPER LIGHTING

1.6 BATTERY SAFETY

A. WEAR PROPER PROTECTIVE CLOTHES

Wear long sleeve shirt,gloves and approved safety glasses or face shield when working with or around batteries.Battery electrolyte (acid)ill cause severe burns if allowed to make contact the clothing, skin or eyes. Should electrolyte (acid) come in contact with clothes, skin or eyes,immediately remove effected clothing, flush area with clean water for 15 minutes and get prompt medical attention.



WEAR PROTECTIVE CLOTHES

B. KEEP AWAY FROM FIRE OR FLAMES

Never allow batteries in the vicinity of fire or flames and do not smoke when working with batteries. Explosive hydrogen gas is produced by the electrolyte (acid) in the batteries.Always work with batteries in a well ventilated area.



KEEP AWAY FROM FIRE OR FLAMES

C. CHARGING BATTERY

Charge battery off of and away from machine in a well ventilated area. When charging battery, remove cell covers to allow gasses to escape. Avoid breathing gasses from battery.Wear approved Safety equipment when working with batteries.

D. USING BOOSTER CABLES

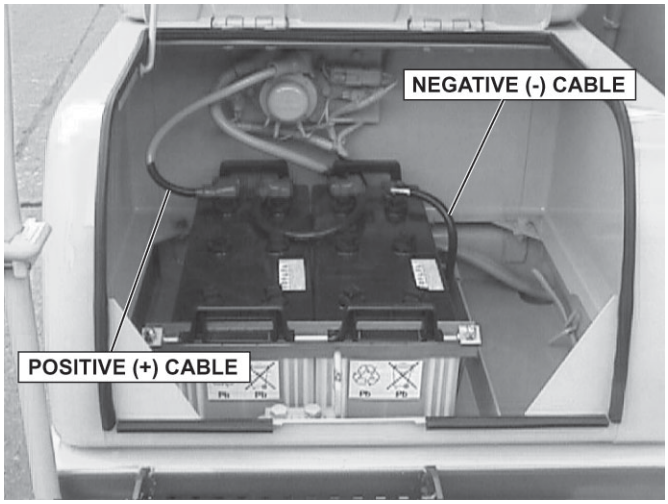
Wear proper safety equipment when working with batteries.

If using another machine or vehicle to boost batteries, make certain the machine or vehicle DOES NOT touch the disabled machine.

Make certain of the positive (+) and negative (–) terminals on the booster battery and the disabled machine before connecting booster cables.

Connect the positive (+) cable first,then connect negative (–).

When disconnecting,disconnect the negative (–) cable first, then disconnect the positive (+) cable. Refer to BASIC MACHINE OPERATION Section of this manual for proper procedures for use of booster cables.



MAKE CERTAIN OF THE POSITIVE (+) AND NEGATIVE (–) TERMINALS

⚠ WARNING

Improper booster cable connections can cause an explosion resulting in personal injury.

Connect booster cables using following procedure.

1. **Connect booster cable to positive (+) battery terminal of discharge battery. Connect other end of booster cable to positive battery ter minal of normal battery.**
2. **Connect other booster cable to negative (-) battery terminal of normal battery. Connect other end of booster cable to upper frame of troubled machine.**
3. **Start engine and remove booster cables on reverse order.**

https://truckmanualshub.com/

1.7 WARNING LABELS & DECALS

Warning labels and decals are affixed to the machine to remind operators and personnel specific safety precautions in certain areas of the machine. The following are illustrated examples of all warning labels and decals along with their locations.

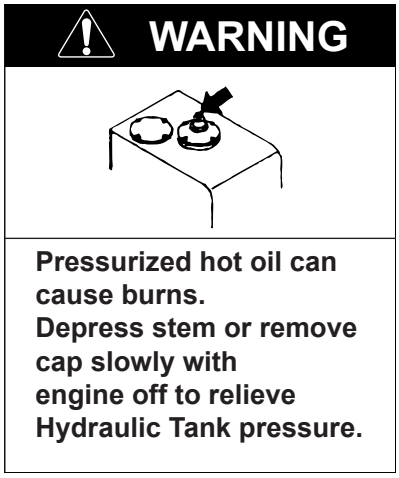
1. SWING–DANGER

Located on each side of the rear counterweight.
Part Number – YN20T01003P2 (2REQ'D)



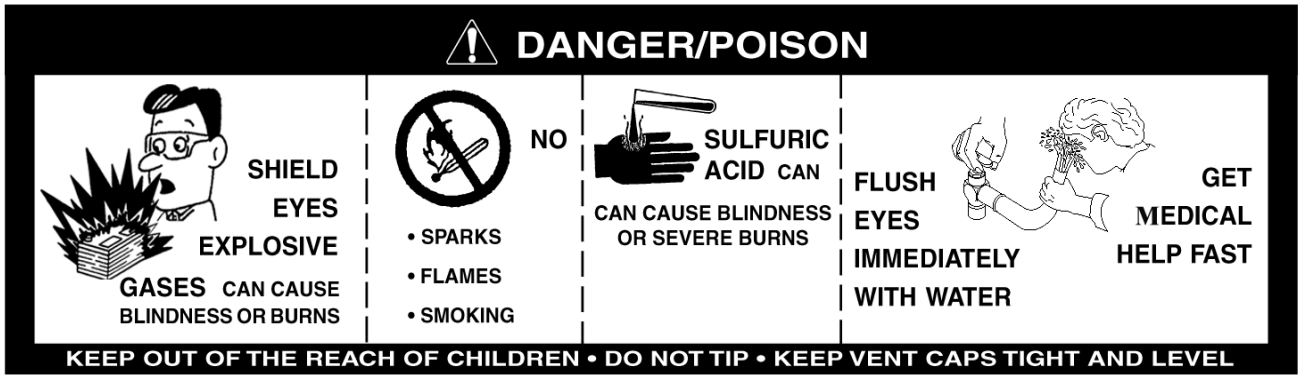
2. PRESSURIZED HOT OIL – WARNING

Located on top of Hydraulic Tank.
Part Number – YN20T01289P1



3. BATTERY – DANGER /POISON

Located on Battery



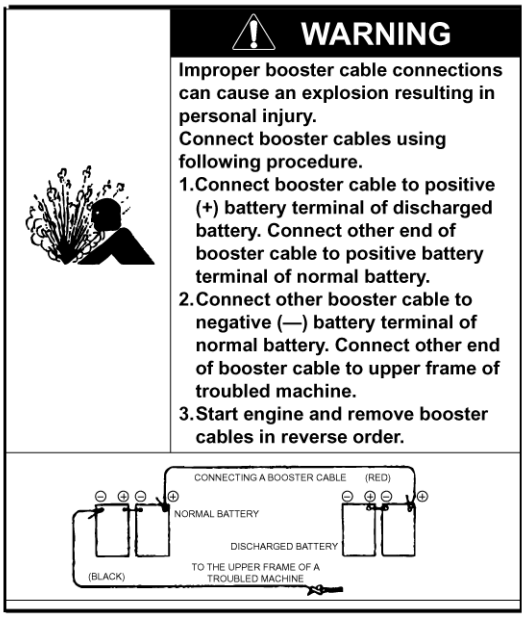
4. STOP ENGINE– WARNING

Located on top of engine fan shroud.
Part Number– YN20T01009P1



5. BOOSTER CABLE– WARNING

Located on battery box compartment.
Part Number– YN20T01015P2



https://truckmanualshub.com/

6. **ACCUMULATOR CONTAINS PRESSURIZED GAS– WARNING**
   Located on side of nitrogen accumulator
   Part Number– YN20T01216P1

⚠ WARNING

ACCUMULATOR CONTAINS PRESSURIZED GAS.

- **Do not disassemble.**
- **Do not remove plug in service.**
- **Do not dispose without relieving gas loosening plug.**

YN20T01216P1

7. **BOOSTER CABLE – WARNING**
   Located on battery box access compartment.
   Part Number – YN20T01338P1

⚠ WARNING



Electric hazard may cause injury when mishandling the cable. Read operator manual for safe and proper handling.

8. **POWER BOOST SWITCH– WARNING**
   Located inside cab on R.H. Window.
   Part Number– YN20T01004P1



⚠ WARNING

Releasing power boost switch while lifting a load can cause unexpected lowering of load, resulting severe injury of death. Never use power boost switch of lifting a load.

9. **HEAVY LIFT SWITCH– WARNING**
   Located inside cab on R.H. Window.
   Part Number– YN20T01340P1



⚠ WARNING

Turning off heavy lift switch while lifting a load can cause unexpected lowering of load, resulting in severe injury or death.

Never turn off heavy lift switch while lifting a load.

YN20T01340P1

10. **ELECTRICAL POWER LINES– WARNING**
    Located inside cab on R.H. Panel.
    Part Number– YN20T01006P1



⚠ WARNING

Contact with electrical power lines will result in severe injury or death.

Keep machine and attachment a safe distance from electrical power lines as per following instruction.

VOLTAGE (Volts)	SAFETY DISTANCE
50K OR LESS	3.0M (10FT)
50K TO 200K	4.5M (15FT)
200K TO 350K	6.0M (20FT)
350K TO 500K	7.5M (25FT)
500K TO 750K	10.5M (35FT)
750K OR OVER	13.5M (45FT)

YN20T01006P1

11. **DO NOT LIFT MACHINE THROUGH COUNTERWEIGHT LIFTING EYES - DANGER**
    Located on top of counterweight. (2 Required)
    Part Number– YN20T01221P1

⚠ DANGER

Do not use counterweight lifting eyes to lift whole machine.
Lifting eyes can fall under this load resulting in personal injury.

Refer to operators manual for proper way of lifting machine.

YN20T01221P1

12. **DO NOT STEP ON – WARNING**
    Located on top of engine cover.
    Part Number– 2432P3055



https://truckmanualshub.com/

13. HOT COOLANT – WARNING
Located on top of engine fan shroud.
Part Number– YN20T01010P1

⚠ WARNING

Steam of hot coolant can cause injury or blindness.
Never loosen or open radiator cap when coolant is hot and under pressure.
Before opening radiator cap:
- **Cool Down engine completely.**
- **Cover radiator with cloth rag.**
- **Loosen cap slowly to reliever pressure.**

YN20T01010P1

14. HOT PARTS – CAUTION
Located on top of engine cover.
Part Number– YN20T01220P1

⚠ CAUTION



Engine may be hot which could cause burns.
Do not touch engine until it cools down.

YN20T01220P1

15. ROTATING PARTS - CAUTION
Located on top of engine cover
Part Number– YN20T01012P1

⚠ CAUTION

Rotating engine fan, hot engine parts and drive belt can cause severe injury.
Do not open engine cover with engine running.

YN20T01012P1

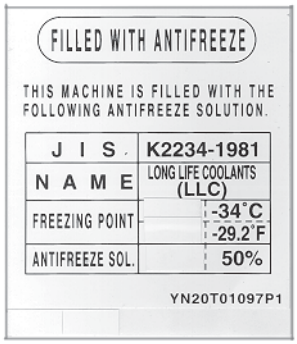
16. USE DIESEL FUEL
Located on side of fuel tank opening.
Part Number– YN20T01213P1



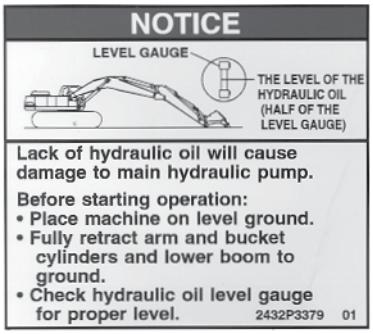
17. GREASE SWING BEARING
Located on upper frame lower right corner - Below cab. Part Number– 2432P2689



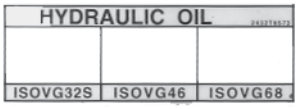
18. ANTIFREEZE SOLUTION
Located on back side of radiator compartment door.
Part Number– YN20T01097P1



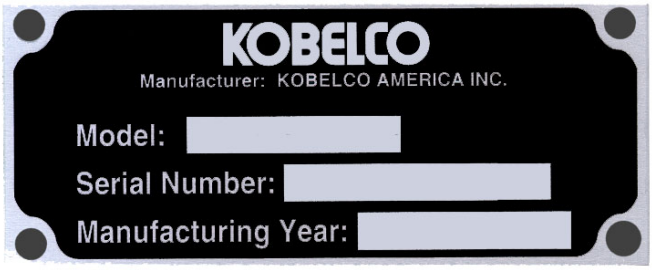
19. HYDRAULIC OIL CHECK POSITION
Located on back side of pump compartment door.
Part Number– 2432P3379



20. HYDRAULIC OIL USED
Located on the back side of hydraulic tank.
Part Number– 2432T6573



21. SERIAL NUMBER PLATE
Located on upper frame lower right corner - Below cab. Part Number– 2432T5613



https://truckmanualshub.com/

22. KPSS &SWING BRAKE RELEASE – CAUTION
Located inside cab rear panel cover.
Part Number –YN20T01237P1

⚠ CAUTION

The KPSS work mode releases switch and swing parking brake release switch are installed on the rear side this cover.

Swing parking brake release switch	KPSS work mode release switch
• While operating swing action when the parking brake can not be released set the toggle switch to "RELEASE " position, and the parking brake si released. Usually, this toggle switch should be sent to norma position and contact our service department immediately.	• When the CPU error is displayed on the multidisplay, set the toggle swith to "RELEASE " position and contact our service department immediately.

YN20T01010P1

23. LIFTING FUEL TANK – WARNING
Located on top of fuel tank.
Part Number –YN20T01028P1

⚠ WARNING

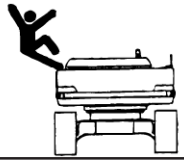
Lift eyes or tank can fail when lifting tank containing fluids and cause possible personal injury.

Drain all fluids from tank before lifting.

YN20T01028P1

24. KEEP SURFACE CLEAN – WARNING
Located on top of fuel tank (front left corner).
Part Number – 2432T6111

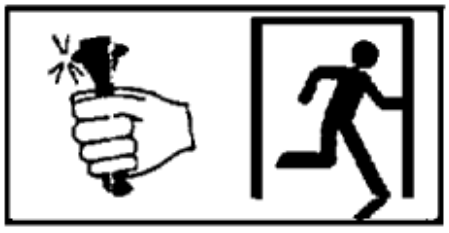
⚠ WARNING



When servicing or repairing machine, keep surfaces free of oil, water, grease, tools, etc. to avoid possible slipping and / or falling from machine, which can cause personal injury.

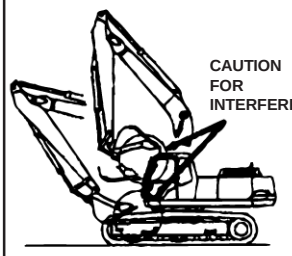
2432T6111

25. BREAK GLASS IN CASE OF EMERGENCY
Located inside cab,on back window glass.
Part Number –YN20T01178P1



26. BUCKET CAB INTERFERENCE -CAUTION
Located inside cab,on right indow glass lower corner.
Part Number – 2432P3380

⚠ CAUTION



Bucket can contact and damage cab when machine equipped with some attachments.

Check clearance between bucket and cab before operation. Exercise care when operation a bucket near cab.

YN20T01012P1

27. READ OPERATOR MANUAL -WARNING
Located inside cab,on right indow glass lower corner.
Part Number –YN20T01016P1

⚠ WARNING

Read and understand the operators manual before operating or performing maintenance on this machine.
Failure to follow or pay attention to instructions in operators manual can result in injury or death.
It is your responsibility to be aware of and follow all local laws and regulations.
Before starting machine, make sure hydraulic control lever is in lockout position and all control levers are in neutral.
Sound horn to alert people.
Ensure bystanders and obstacles are clear of machine before moving machine or its attachments.
Do not carry riders or machine.
Before leaving operators compartment, park on level ground, lower attachments to ground, make sure hydraulic control lever is in lockout position and stop engine.

YN20T01016P1

https://truckmanualshub.com/

28. DO NOT INSTALL ANY OBJECT ON THE HAND-RAIL - WARNING
Located inside cab,on right window glass lower corner.Part Number – 2432T6109

⚠ WARNING

DO NOT INSTALL ANY OBJECT ON THE HANDRAIL

This can cause the welds that fasten the handrail to the operator's cab to fatigue and crack to excessive vibration during machine operation.

Injury to the operator may result if he falls to ground because of the unexpected brakage of the welds.

2432T6109

29. NIBBLER &BREAKER OPERATION - CAUTION
Located on Left Hand operator console.(OPT)
Part Number –YT20T01054P1

⚠ CAUTION

Do not set this switch to nibbler combined flow operation position when using breaker.

YY20T01039P1

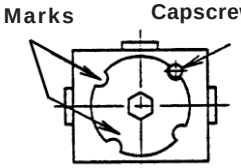
30. NIBBLER &BREAKER SELECTOR VALVE – CAUTION
Located inside cab,on right window glass lower corner (OPT).
Part Number –YY20T01039P1

⚠ CAUTION

Procedure to change selector valve:

MARK	SELECTION
N	Nibbler
B	Breaker
E	Extra

Please adjust suitable notch to capscrew. (Some mark may not be indicated)



MAINTENANCE
(When using nibbler or breaker)

Contamination and deterioration of hydraulic oil may develop malfunctioning of control valves, early wear, and seizure of hydraulic pumps, and consequential damage of entire hydraulic circuit.
Replace filters and hydraulic oil, referring to the following table:

1.- Hydraulic oil change: every 600 hours.

2.- Hydraulic return filter change:
First: 50 hours
Second: 250 hours
Regular: Every 250 hours

YY20T01039P1

31. SAFETY LOCK LEVER – WARNING
Located on right side of operator's right console.
Part Number – PY20T01073P1

⚠ WARNING

Machine may move suddenly and cause serious personal injury if a control lever is accidentally touched be sure the safety lever is disengaged and in the locked position before exiting the cab.

PY20T01073P1

32. DO NOT PINCH YOUR HAND(S)– CAUTION
Located left side of left console and on floor -left side of left console.
Part Number –YN20T01339P1 (2Req'd)

⚠ CAUTION



Be careful not to pinch your hand(s) when operating the lever.

YN20T01339P1

33. KEEP CLEAR OF MACHINE – DANGER
Located on both sides of the arm
Part Number –YN20T01337P1 (2 required)



34. FALLING FRONT WINDOW -CAUTION
Located on upper frame of front window
Part Number – LE20T01019P1

⚠ CAUTION

Falling front window can cause injury.
Always lock securely in place with lock pins on both sides.

LE20T01019P1

https://truckmanualshub.com/

35. TWO SPEED TRAVEL -WARNING
Located inside cab,on right window glass lower corner Part Number – LE20T01019P1

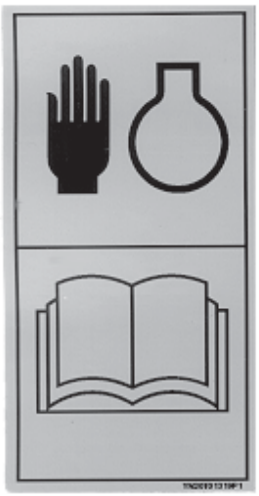
WARNING

Automatic two speed travel system changes travel speed automatically and can adversely affect machine control when descending a slope and loading or unloading on a trailer.
Personal injury can occur from sudden change in machine control.
Put travel speed select switch in low speed position when descending a slope and loading or unloading on a trailer.

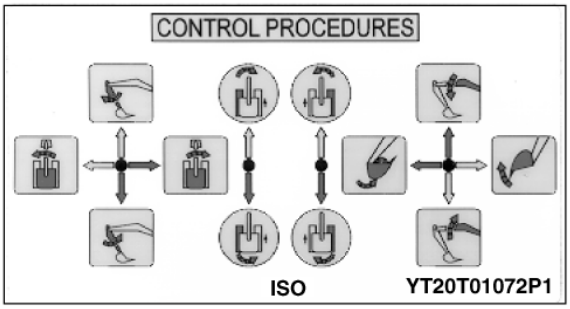
LE20T01019P1

36. STOP AND READ OPERATORS MANUAL BEFORE USING -WARNING
Located inside cab,on right side wall,behind the right control console (For manual throttle control).
Part Number –YN20T01319P1

(23) YN20T01319P1



37. OPERATOR'S CONTROL PATTERN
Located inside of cab door
Part Number –YT20T01072P1



38. HYDRAULIC WARM UP -CAUTION
Located inside cab right window glass.
Part Number –YN20T01263P1

CAUTION

Slow or unexpected movement of the hydraulic functions may result when the hydraulic oil is cold.

Always perform the hydraulic oil warm up procedure before attempting normal machine operations.

Always keep personnel away from the area around the machine during the warm up procedure.

YN20T012663P1

38. HYDRAULIC WARM UP -CAUTION
Located inside cab right window glass.
Part Number –YN20T01263P1

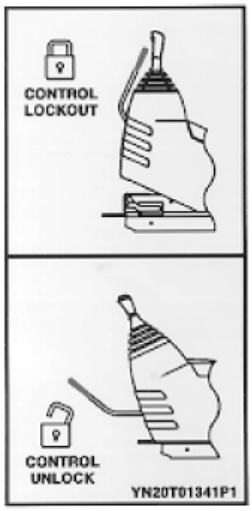
NOTICE

Stopping engine without allowing it to cool can result in overheatting and a shortened engine life.
Before stopping engine, run at low idle for at least 5 minutes to allow engine and turbo charger to gradally cool down.

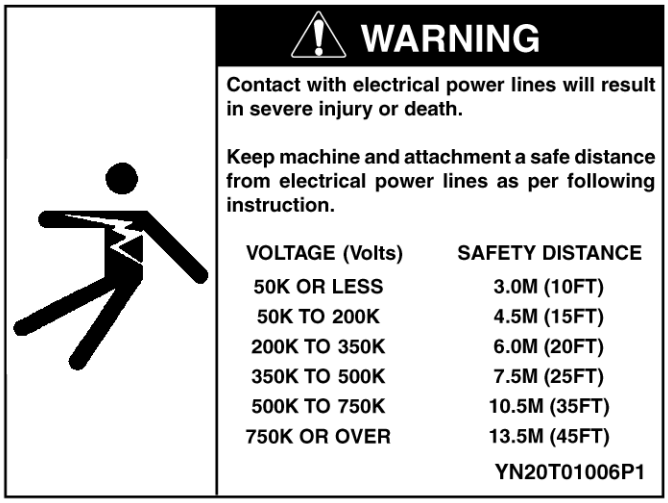
YN20T01007P1

https://truckmanualshub.com/

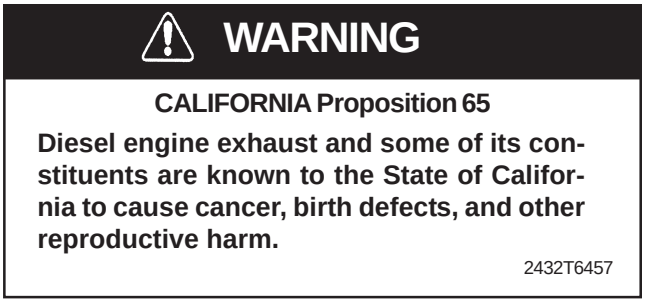
39. CONTROL LEVER LOCK AND UNLOCK
Located inside cab on left control console.
Part Number –YN20T01341P1



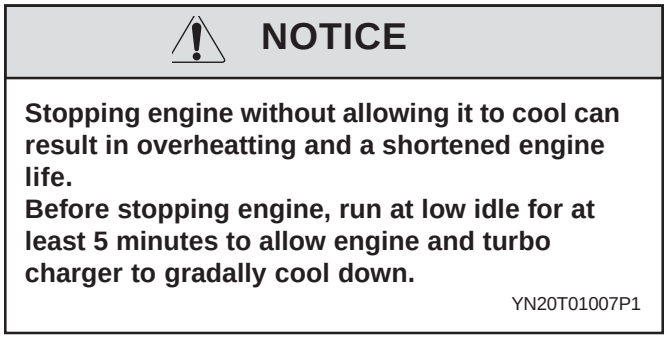
40. ELECTRICAL POWER LINES – WARNING
Located inside cab right window glass.
Part Number –YN20T01007P1



41.CALIFORNIA PROPOSITION 65 – WARNING
Located inside cab,on right window glass.
Part Number – 2432T6457



42.NOTICE FOR STOPPING ENGINE – NOTICE
Located inside cab,on right window glass.
Part Number – YN20T01007P1



https://truckmanualshub.com/

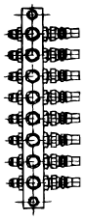
42. HANDLING PILOT HOSES WARNING –CAUTION

Located on front panel inside the air cleaner compartment.
Part Number –YN20T01290P1

⚠ CAUTION

PILOT VALVE SIDE

1
2
3
4
5
6
7
8



CONTROL VALVE SIDE

1.BUCKET (H)
2.BUCKET (R)
3.BOOM (H)
4.BOOM (R)
5.SWING (LH)
6.SWING (RH)
7.ARM (H)
8.ARM (R)

- **HYDRAULIC OIL CAN BE HOT AFTER MACHINE PERATION. ALLOW OIL TO COOL BEFORE STARTING MAINTENANCE WORK.**
- **BEFORE DISCONNECTING THE HYDRAULIC HOSES..LOOSEN THE AIR BREATHER ON THE HYDRAULIC OIL TANK AND BLEED OFF THE REMAINING PRESSURE LEFT IN THE HY DRAULIC SYSTEM.**
- **CONTROL PATTERN FUNCTIONS MUST CORRESPOND TO BLACK AND WHITE DECAL LOCATED ON THE CONTROL CONSOLE.**

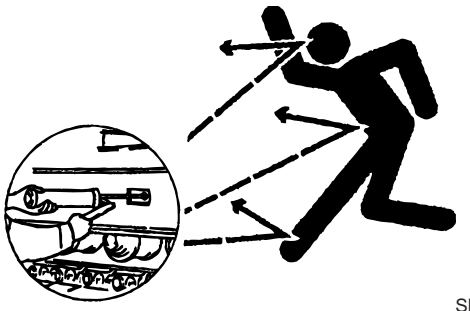
YN20T01290P1

WARNING

GREASE IN TRACK TENSIONING MECHANISM IS UNDER EXTREME PRESSURE AND CAN PENETRATE SKIN CAUSING SEVERE INJURY. KEEP FACE AND BODY AWAY FROM GREASE FITTING AREA. NEVER LOOSEN GREASE FITTING MORE THAN ONE (1) COMPLETE TURN. IF GREASE DOES NOT RELEASE AFTER ONE TURN OF THE FITTING, CALL AN AUTHORIZED KOBELCO SERVICE DEALER FOR ASSISTANCE.

USE CAUTION WHEN ADJUSTING TRACKS

TORQUE GREASE FITTING TO 6 kgf-m (45 lbs-ft)

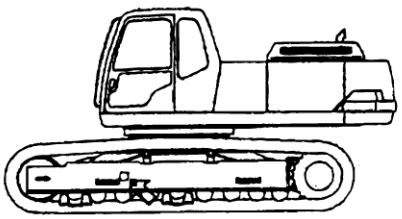


SK32001034

43. ADJUSTING TRACK TENSION – WARNING

Located inside cab,on right window glass lower corner. Part Number – 2432T6110

⚠ WARNING

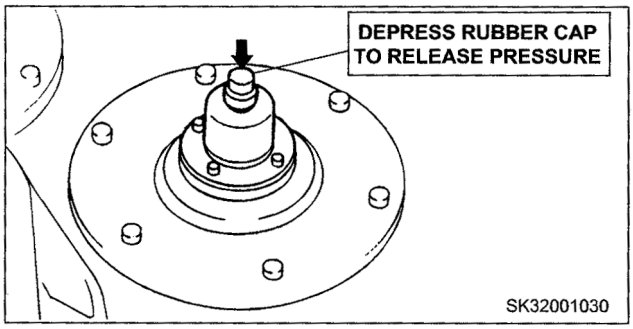


Extreme high pressure in track adjustment cylinder can cause personal injury when adjusting crawler tension. Loosen grease nipple with care to relieve pressure gradually.

2432T6110

44. RELEASE HYD.TANK PRESSURE – CAUTION

Located on hydraulic reservoir air breather valve.
Part Number –YN57V00002S007



SK32001030

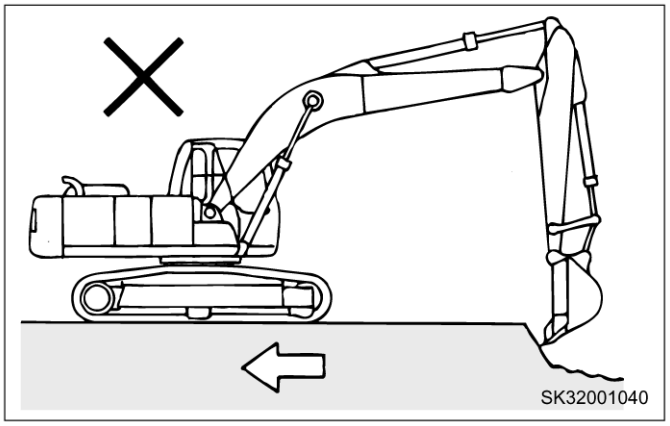
https://truckmanualshub.com/

PROHIBITED MACHINE OPERATION

The following examples of machine abuse and misuse should never be attempted by even the most experienced operator. Such abuse and misuse of this machine and its attachments can result in serious bodily injury, death, severe equipment damage and shortened service life of the machine. Under no circumstance should any of these operations be attempted. Use common sense and follow proper operation procedures found in this Operators Manual while operating this equipment.

A. DO NOT USE TRACTIVE FORCE OF THE MACHINE FOR LOADING THE BUCKET ATTACHMENT.

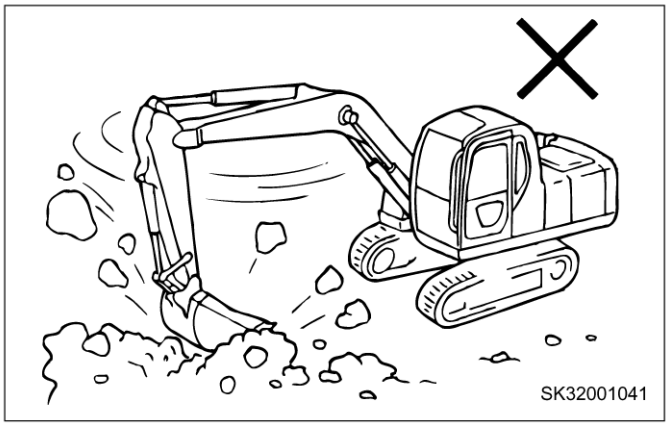
Doing so will exert excessive force on the machine structure, front end attachments and could cause severe equipment damage. Use tracks for normal travel operations only.



DO NOT USE TRACTIVE FORCE

B. DO NOT USE SWINGING FORCE OF THE MACHINE FOR OPERATIONS.

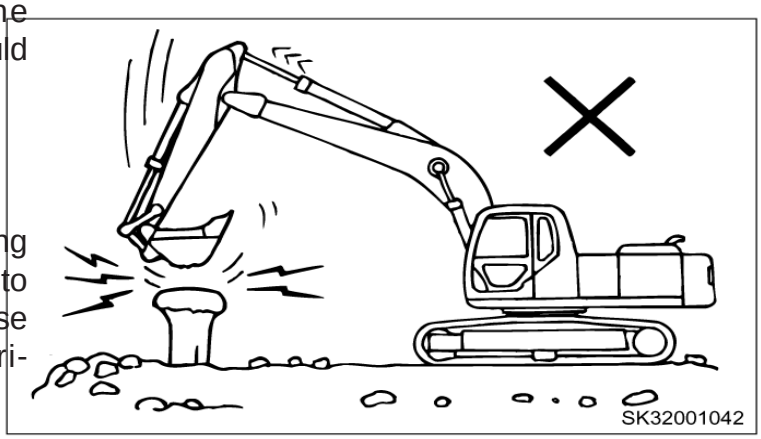
Doing so will exert excessive force to the machine structure, front end attachments and shorten life of the swinging system of the machine. Also, serious injury or death could result from such operations.



DO NOT USE SWINGING FORCE

C. DO NOT PERFORM "HAMMERING" OPERATIONS WITH THE BUCKET.

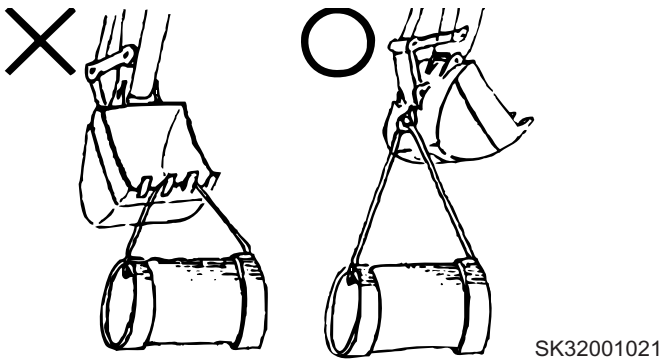
Performing operations such as hammering and piling will cause extensive damage to the machine and its components. These types of operations can also result in serious injury or death.



DO NOT HAMMER WITH ATTACHMENT

D. DO NOT USE THIS MACHINE FOR ANYTHING OTHER THAN ITS IN TENDED PURPOSE.

This machine is designed and manufacture used for digging and loading operations only. Any other use can exert excessive force to the machine, its components, its systems and result in serious bodily injury or death to the operators and other personnel working in the vicinity of or with the machine.



USE ONLY FOR INTENDED PURPOSE

https://truckmanualshub.com/

E. DO NOT OPERATE BUCKET AND ARM CYLINDERS TO STROKE END REPEATEDLY.

Extending the bucket and arm cylinders to stroke end to clean debris from the bucket, will cause impact to the bucket cylinder causing cylinder damage. Use high pressure water or manually remove stubborn material from the bucket.

F. DO NOT OVER EXERT THE MACHINE'S CAPACITIES.

Know the limitations of the machine and its attachments and operate the machine within those specifications. Do not exceed lift charts. Never tip or raise the machine to obtain power to move material.This could cause extensive damage to the machine and its components as well as result in serious bodily injury or death.

END OF WORK SHIFT SAFETY

Perform all of the following procedures af ter each shift is complete to insure the ma chine is in optimal operating condition for the next shift or job site.

A. Move the machine to a firm, level sur face.

B. Lower attachment to the ground.

C. Refill fuel tank to full mark to reduce air volume and condensation (moisture). This will decrease the possibility of freezing in the fuel tank, rusting due to moisture and other problems associ ated with start up and operation.

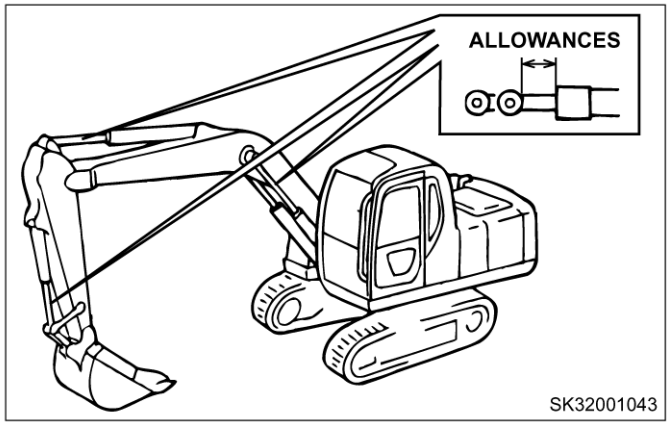
D. Close and secure all windows in placeto prevent water or moisture reaching the electrical components of the machine.

E. Thoroughly clean and inspect the machine. Perform lubrication mainte nance and repair or replace any problem areas found before restarting the machine.

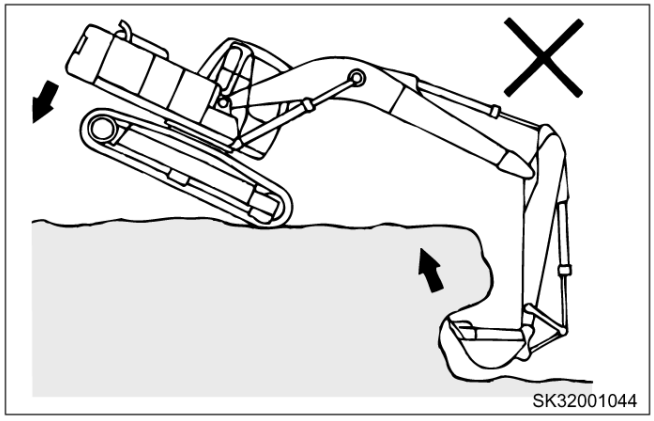
F. If operating the machine in cold climates, it may be necessary to remove the batteries from the machine and store in a warm well ventilated area.Install the batteries in the machine before next start up. This will help prevent premature battery deterioration.

G. Remove key from key switch and lock all doors and access panels.

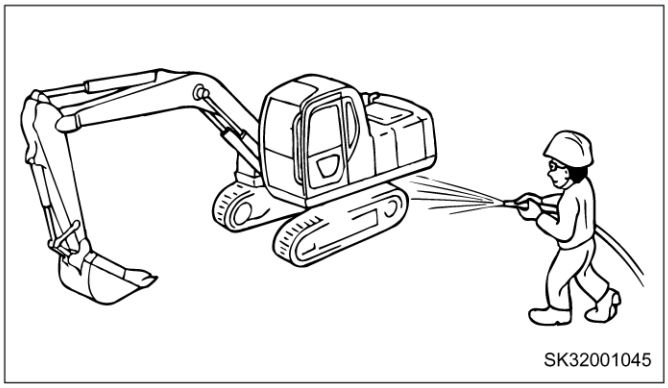
H. Install vandalism guards if necessary.



DO NOT OPERATE CYLINDER TO STROKE END



DO NOT OVER EXERT THE MACHINE

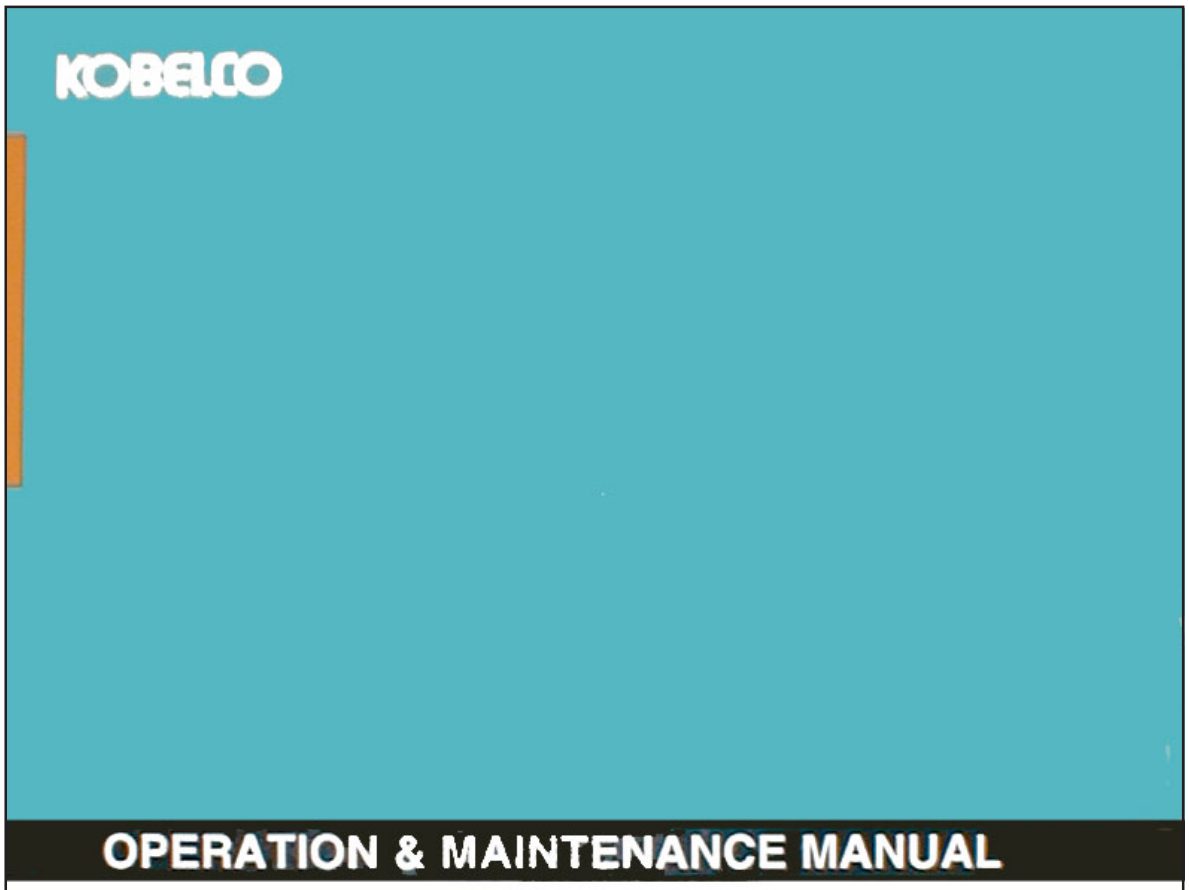


END OF WORK SHIFT SAFETY

https://truckmanualshub.com/

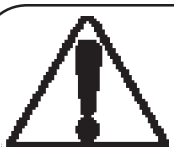
Always read your operators manual carefully before operating or repairing the excavator.

***** Important safety & operation information can be found in this Manual. *****



SK 210 (LC)-VI YY07U0101~
SK 250 (LC)-VI LL08U0101~

PART NUMBER: YN91Z00009D2
ISSUED: 11/99



READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND INSTRUCTIONS FOUND IN THIS MANUAL BEFORE OPERATING THE MACHINE.

https://truckmanualshub.com/

Kobelco
Dynamic
Acera



Kobelco Construction Machinery America LLC
Machine Familiarization

KOBELCO

Kobelco Construction
Machinery America LLC

https://truckmanualshub.com/

MACHINE SERIAL NUMBER RANGE

SK160LC	YM02U0101 ~
ED190LC	YL02U0101 ~
SK210LC	YQ07U0101 ~
SK250LC	LL08U0101 ~
SK290LC	LB03U0101 ~
SK330LC	YC06U0101 ~
SK480LC	YS06U0101 ~



KOBELCO

Kobelco Construction
Machinery America LLC

https://truckmanualshub.com/

KOBELCO

COMPACT, SR, & DYNAMIC ACERA PRE-DELIVERY INSPECTION

Dealer Name	Dlr. Code	Model No.	
Address		Serial No.	
City	State Zip Code:	Hr. Meter	

Engine Model _____ Engine S/N _____ Bkt. Mfg. _____ S/N _____

Attachment Type _____ Make _____ S/N _____ Arm Length _____ Boom Length _____

Arm Cyl. S/N _____ Bkt. Cyl. S/N _____ Boom Cyl. (L.H.) S/N_____ Boom Cyl. (R.H.) S/N_____

Place a "C" in the column if the item is CORRECT. Place a "I" in the column if the item is INCORRECT, and explain by item number under the comments section. Fill in the blanks provided beside each item.

	Visual Checks	C/I
1	**Appearance (Overall)**	
	Good	
2	**Glass**	
	Dirty	
	Broken	
3	**Paint Defects**	
	Cab	
	Upper Frame	
	Lower Frame	
	Attachments	
	Counterweight	
4	**Cab**	
	Appearance (Good)	
	Cab Mounting	
	Instrument panels	
	Seat assembly	
	Cab operation levers	
	Switches / Controls	
	Radio/Speakers	
	Air Cond. / Heating Unit	
	Gauge / Warning Lamps	
5	**Decals**	
	Misapplied / Damaged	
	Wrong/Missing Decal	
6	**Hoses,Tubes, Fittings**	
	Powertrain components	
	Upper - Loose/Routing	
	Lower - Loose/Routing	
	Attach.- Loose/ Routing	
7	**All Bolts & Fasteners**	
	Powertrain components	
	Upper	
	Lower	
	Attach.	
8	**Wiring Harness**	
	Routing / Misassembly	
	Connections loose	
9	**Component Fluid Leakage**	
	Engine Assembly	
	Hyd. Control Valve	
	Hyd. Main Pump	
	Hyd. Travel Motor/Red.	
	Hyd. Swing Motor/Red.	
10	**Track Adjustment**	
	Proper Tension	

	Miscellaneous		C/I
11	Basic Machine Operation Proper		
12	**Support Packages**		
	Manual Missing		
	Parts Missing		
	Fluid Levels / Lubrication		C/I
13	Engine Oil Level		
14	Engine Coolant	°F	
15	Engine Coolant level		
16	Hydraulic Oil Level		
17	Swing Gear Bath		
18	Swing Reduction Unit		
19	Travel Reduction Unit - L.H		
20	Travel Reduction Unit - R.H		
21	Lubricate Attachments		
22	Check Fuel Water Sep.		
23	Check Pilot Filter		
	Engine Checks		C/I
24	**Air Intake/Exhaust Connections**		
	Loose/Misassemble - Connectors		
	Leaking - Hoses/Tubes/Fittings		
25	**Exhaust Connections**		
	Loose/Misassemble - Connectors		
	Leaking - Hoses/Tubes/Fittings		
26	**Fuel System Connections**		
	Loose/Misassemble Connectors		
	Hoses/Tube/Fitting Leaking		
27	**Oil & Fuel Filters**		
	Loose / Leaking		
28	**Fan Belt Adjustment**		
29	**Air Cleaner Elements**		
	Missing		
	Damaged		
	Hyd. System.Press. (SK70 ~330)		C/I
30	Pilot System Pressure	psi	
31	Main Relief w/H.L. *	psi	
32	Main Relief	psi	
33	Dozer Main Relief *	psi	
34	Swing Port Relief - L	psi	
35	Swing Port Relief - R	psi	
	(*) Note: If applicable for specific machine		
	Hyd. System Press. (Compact Exc.)		C/I
36	P1 Main	psi	
37	P2 Main	psi	
38	P3 Main	psi	
39	P4 Main	psi	

	Service Diagnostic Check		C/I
40	**Condition M/H- Mode**		
	*** Display Number**		
*** No. 1**	Main Cont. P/No.		
	Program Version		
*** No. 2**	**Eng.Speed Rpm**		
	Low Idle (Set Val.)	rpm	
	Low Idle (Meas. Val)	rpm	
	High Idle (Set Val.)	rpm	
	High Idle (Meas. Val)	rpm	
	Auto Accel	rpm	
	A/S-Mode High Idle	rpm	
	B/FC-Mode High Idle	rpm	
*** No. 14**	C-1 Pump P-1 w/H.L.	V	
	C-1 Pump P-1 w/H.L.	K	
	C-1 Pump P-1	V	
	C-1 Pump P-1	K	
	C-2 Pump P-2 w/H.L.	V	
	C-2 Pump P-2 w/H.L.	K	
	C-2 Pump P-2.	V	
	C-2 Pump P-2	K	
	Cylinder Cycle Times, M/H-Mode		C/I
41	Boom Cyl - Out	Sec	
42	Boom Cyl. - In	Sec	
43	Arm Cyl. - Out	Sec	
44	Arm Cyl. - In	Sec	
45	Bucket Cyl. - Out	Sec	
46	Bucket Cyl. - In	Sec	
	Swing System Performance		C/I
47	Swing Speed - LH	Sec	
48	Swing Speed - RH	Sec	
	Electrical System		C/I
49	**Work & Cab Lights**		
	Inoperable		
50	**Swing Flashers**		
	Inoperable		
51	**Horn**		
	Inoperable		
52	Pilot Lever Lock Switch		
	Inoperable		
53	**Travel Alarm**		
	Inoperable		
54	**Battery**		
	Electrolyte Level		
	Charge (Low)		

Comments: (Please enter line item # and Description)

Completed By:_____ **Completed Date:**_____

Note: Please promptly submit this form to the Kobelco Service Department via mail or the Kobelco Internet System. For assistance please contact the Kobelco Service Dept. at (281) 240-4876

Rev. # 2.0 Form# 00020MIVALL

https://truckmanualshub.com/

NOTES



https://truckmanualshub.com/

SK160LC-VI - PERFORMANCE SPECIFICATIONS

The following performance specifications are based on the standard machine with standard attachment.

1. Travel Speed, Swing Speed & Gradeability

DESCRIPTION	SPECIFICATION
TRAVEL SPEED	6.0 km per hr (3.7 mph) in mode. 4.0 km per hr (2.5 mph) in mode.
SWING SPEED	11 RPM IN M-Mode / "HI" Idle.
GRADEABILITY	70% (35°) {Limited by engine lubrication}
DRAWBAR FORCE	156 KN (35,100 lbs)

2. Engine

Engine Maker	Mitsubishi
Model	4D34-TEG
Type	4-Cycle, Water Cooled, Direct Injection with Turbocharger, Diesel
Number of Cylinders– Bore X Stroke	4–104 mm X 115 mm (4.09" X 4.53")
Displacement	3.91 liter (238 cu in.)
Compression Ratio	16.5 : 1
Output Rating	82 kW (111 HP) / 2,200 rpm
Maximum Torque	382 N•m (283 lb-ft)/ 1,800 rpm
Ignition Order	1–3–4–2 CCW Viewed from Flywheel
Injection Timing	16° Before Top Dead Point
Intake Valve Clearance Cold	0.4 mm (0.0157")
Exhaust Valve Clearance Cold	0.4 mm (0.0157")
Electrical System	D.C. 24 V
Starting Motor	24 V–5.0 kW
Alternator	24 V–35 A
Batteries	2– 12 V- (136 Ah)
Engine Dry Weight*	403 kg (888 lbs)
Thermostat	Begin to open at 76.4°C (169°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø545mm (Ø21.5") Suction Type Belt Drive Pulley Ratio : 0.85
Air Cleaner	Dry Type with Safety Elements

*Less flywheel and electrics.

3. Hydraulic Components

COMPONENT	TYPE
HYDRAULIC PUMPS 2X143 L/min (2x37.9 Gal/min)	Tandem, Variable Displacement, Axial Piston with Pilot Gear Pump.
SWING MOTOR	Axial Piston
TRAVEL MOTOR	Axial Piston
CONTROL VALVES	6 Spool Multiple Control
CYLINDERS (ALL)	Double Acting
RETURN FILTER	Safety Valve containing Filter Type
OIL COOLER	Air Cooled

4. Operating Pressures — Kgf/cm² (psi)

PILOT SYSTEM	50 (710)
IMPLEMENT	350 (4980)
SWING	285 (4050)
TRAVEL	350 (4980)
POWER BOOST/HEAVY LIFT	385 (5470)

MACHINE & COMPONENT WEIGHTS

The following weight specifications are based on the standard machine with standard attachment.

Unit: Kg (lb)

COMPONENT	SK160LC-VI
COMPLETE MACHINE (STANDARD)	16,700 (36,800)
UPPER FRAME ASSEMBLY	6,852 (15,106)
UPPER FRAME + COV & GUARDS	1,831 (4,037)
COUNTERWEIGH	3,007 (6,629)
CAB + ELECT + PANEL + SEAT + AC	415 (915)
*BOOM CYLINDER + lower pins	165 (322) X 2
*ENGINE + MUFFLER + ACCESS	431 (950)
RADIATOR & OIL COOLER	75 (165)
PUMP ASSEMBLY + COUPLER	108 (198)
CONTROL VAVE	250 (551)
*FUEL TANK	99 (218)
*HYDRAULIC TANK	102 (225)
SWING MOTOR & REDUCTION UNIT	204 (450)
HYDRAULIC PIPES & HOSES	316 (697)
LOWER FRAME ASSEMBLY	6,608 (14,568)
FRAME + Guides + Covers + Piping	2,162 (4,766)
SLEWING RING ASSY	218 (481)
TRAVEL MOTOR & REDUCTION UNIT	217 (478) X2
TRACK TENSION + IDLERS	210 (463) X2
LOWER ROLLER ASSEMBLY	35 (77) X14
UPPER ROLLER ASSEMBLY	17 (37) X4
SPROCKET	72 (159) X2
SWIVEL JOINT	30 (66)
TRACK LINK W/ 600mm (23.6") SHOES	1,321 (2,912) X2
ATTACHMENT (STANDARD)	2,638 (5,816)
BUCKET ASSEMBLY [0.52m³ (0.68 yd³)]	370 (816)
ARM ASSEMBLY [3.10 m (10'-2")]	857 (1,889)
ARM [3.10 m (10'-2")]	564 (1,340)
*BUCKET CYL + 2 PINS	142 (313)
IDLER LINKS	32 (71)
BUCKET LINK	65 (143)
PINS (4- for bucket, & links)	54 (119)
BOOM ASSEMBLY	1,411 (3,111)
BOOM + Cyl. pin + Foot pin	1,176 (2,593)
*ARM CYLINDER + 2 PINS	215 (474)
PIN (Mounting the Arm)	20 (44)
FLUIDS	311 (686)
HYD OIL	139 (306)
ENG OIL	14 (31)
FUEL	139 (306)
WATER	19 (42)
BOLTS & OTHEER	291 (642)

* DRY WEIGHT

⚠ WARNING ⚠

USE ONLY LIFTING DEVICES AND EQUIPMENT WITH RATED CAPACITIES SUFFICIENT TO LIFT THE SPECIFIC COMPONENT(S) BEING REMOVED OR INSTALLED.

https://truckmanualshub.com/

ED190 - PERFORMANCE SPECIFICATIONS

The following performance specifications are based on the standard machine with standard attachment.

1. Travel Speed, Swing Speed & Gradeability

DESCRIPTION	SPECIFICATION
TRAVEL SPEED	6.0 km per hr (3.7 mph) in rabbit mode. 3.6 km per hr (2.2 mph) in turtle mode.
SWING SPEED	11 RPM IN M-Mode / "HI" Idle.
GRADEABILITY	70% (35°) Limited by engine lubrication
DRAWBAR FORCE	189 KN (42,556 lbs)

2. Engine

Engine Maker	Mitsubishi
Model	4D34-TEG
Type	4-Cycle, Water Cooled, Direct Injection with Turbocharger, Diesel
Number of Cylinders : 4 – Bore X Stroke	104mm X 115mm (4.09" X 4.53")
Displacement	3.91 liter (238 cu in.)
Compression Ratio	16.5 : 1
Output Rating	82 kW (111 HP) / 2,200 rpm
Maximum Torque	382 N•m (283 lb-ft)/ 1,800 rpm
Ignition Order	1–3–4–2 CCW Viewed from Flywheel
Injection Timing	16° Before Top Dead Point
Intake Valve Clearance Cold	0.4 mm (0.0157")
Exhaust Valve Clearance Cold	0.4 mm (0.0157")
Electrical System	D.C. 24 V
Starting Motor	24 V–5.0 kW
Alternator	24 V–35 A
Batteries	2– 12 V- (136 Ah)
Engine Dry Weight*	403 kg (888 lbs)
Thermostat	Begin to open at 76.4°C (169°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø545mm (Ø21.5") Suction Type Belt Drive Pulley Ratio : 0.85
Air Cleaner	Dry Type with Safety Elements

*Less flywheel and electrics.

3. Hydraulic Components

COMPONENT	TYPE
HYDRAULIC PUMPS 2X143 L/min (2x37.9 Gal/min)	Tandem, Variable Displacement, Axial Piston with Pilot Gear Pump.
DOZER PUMP	Gear Pump 61.6 L/Min (16.3/Gal/min
SWING MOTOR	Axial Piston
TRAVEL MOTOR	Axial Piston
CONTROL VALVES	7 Spool Multiple Control
CYLINDERS (ALL)	Double Acting
RETURN FILTER	Safety Valve containing Filter Type
OIL COOLER	Air Cooled

4. Operating Pressures

PILOT SYSTEM	50 (710)	Kgf/cm² (psi)
IMPLEMENT	350 (4980)	
SWING	285 (4050)	
TRAVEL	350 (4980)	
POWER BOOST/HEAVY LIFT	385 (5470)	

MACHINE & COMPONENT WEIGHTS

The following weight specifications are based on the standard machine with standard attachment.

Unit: Kg (lb)

COMPONENT	ED190-VI
COMPLETE MACHINE (STANDARD)	19,820 (43,704)
UPPER FRAME ASSEMBLY	6,928 (15,242)
UPPER FRAME + COV & GUARDS	1,405 (3.091)
COUNTERWEIGHT	3,007 (6,615)
CAB + ELECT + PANEL + SEAT + AC	415 (915)
*BOOM CYLINDER + lower pins	165 (322) X 2
*ENGINE + MUFFLER + ACCESS.	431 (950)
RADIATOR & OIL COOLER	75 (165)
PUMP ASSEMBLY + COUPLER	108 (238)
CONTROL VALVE	250 (551)
*FUEL TANK	99 (218)
*HYDRAULIC TANK	102 (225)
SWING MOTOR & REDUCTION UNIT	204 (450)
HYDRAULIC PIPES & HOSES	316 (697)
LOWER FRAME ASSEMBLY	9,728 (21,402)
FRAME + Guides + Covers + Piping	2,162 (4,766)
SLEWING RING ASSY	218 (481)
TRAVEL MOTOR & REDUCTION UNIT	217 (478) X2
TRACK TENSION + IDLERS	210 (463) X2
LOWER ROLLER ASSEMBLY	35 (77) X14
UPPER ROLLER ASSEMBLY	17 (37) X4
SPROCKET	72 (159) X2
SWIVEL JOINT	30 (66)
TRACK LINK W/ 600mm (23.6") SHOES	1,321 (2,912) X2
ATTACHMENT (STANDARD)	2,638 (5,816)
BUCKET ASSEMBLY [0.52m³ (0.68 yd³)]	370 (816)
ARM ASSEMBLY [3.10 m (10'-2")]	857 (1,889)
ARM [3.10 m (10'-2")]	564 (1,340)
*BUCKET CYL + 2 PINS	142 (313)
IDLER LINKS	32 (71)
BUCKET LINK	65 (143)
PINS (4- for bucket, & links)	54 (119)
BOOM ASSEMBLY	1,411 (3,111)
BOOM + Cyl. pin + Foot pin	1,176 (2,593)
*ARM CYLINDER + 2 PINS	215 (474)
PIN (Mounting the Arm)	20 (44)
FLUIDS	311 (686)
HYD OIL	139 (306)
ENG OIL	14 (31)
FUEL	139 (306)
WATER	19 (42)
BOLTS & OTHERS	291 (642)

*** DRY WEIGHT**

⚠ WARNING ⚠

USE ONLY LIFTING DEVICES AND EQUIPMENT WITH RATED CAPACITIES SUFFICIENT TO LIFT THE SPECIFIC COMPONENT(S) BEING REMOVED OR INSTALLED.

https://truckmanualshub.com/

SK210LC-VI - PERFORMANCE SPECIFICATIONS

The following performance specifications are based on the standard machine with standard attachment.

1. Travel Speed, Swing Speed & Gradeability

DESCRIPTION	SPECIFICATION
TRAVEL SPEED	6.0 km per hr (3.7 mph) in rabbit mode. 4.0 km per hr (2.5 mph) in turtle mode.
SWING SPEED	11 RPM IN M-Mode / "HI" Idle.
GRADEABILITY	70% (35°) {Limited by engine lubrication}
DRAWBAR FORCE	20,190 Kgf (44,512 lbs)

2. Engine

Engine Maker	Mitsubishi
Model	6D34-TEB
Type	4-Cycle, Water Cooled, Direct Injection with Turbocharger, Diesel
Number of Cylinders– Bore X Stroke	6–104 mm X 115 mm (4.09" X 4.53")
Displacement	5,861 liter (358 cu in.)
Compression Ratio	16.5 : 1
Output Rating	107 kW (144 HP) / 2,000 rpm
Maximum Torque	519 N•m (383 lb-ft)/ 1,600 rpm
Ignition Order	1–5–3–6–2–4 Clockwise Rotation
Injection Timing	15° Before Top Dead Point
Intake Valve Clearance Cold	0.4 mm (0.0157")
Exhaust Valve Clearance Cold	0.4 mm (0.0157")
Electrical System	D.C. 24 V
Starting Motor	24 V–5.0 kW
Alternator	24 V–35 A
Batteries	2– 12 V- (136 Ah)
Engine Dry Weight*	470 kg (1,040 lbs)
Thermostat	Begin to open at 76.5°C (170°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø600 (Ø24") Suction Type Belt Drive Pulley Ratio : 1.00
Air Cleaner	Dry Type with Safety Elements

*Less flywheel and electrics.

3. Hydraulic Components

COMPONENT	TYPE
HYDRAULIC PUMPS 2X210 L/min (55.5 Gal/min)	Tandem, Variable Displacement, Axial Piston with Pilot Gear Pump.
SWING MOTOR	Axial Piston
TRAVEL MOTOR	Axial Piston
CONTROL VALVES	6 Spool Multiple Control
CYLINDERS (ALL)	Double Acting
RETURN FILTER	Safety Valve containing Filter Type
OIL COOLER	Air Cooled

4. Operating Pressures — Kgf/cm² (psi)

PILOT SYSTEM	50 (710)
IMPLEMENT	350 (4980)
SWING	285 (4050)
TRAVEL	350 (4980)
POWER BOOST/HEAVY LIFT	385 (5470)

1A. MACHINE & COMPONENT WEIGHTS

The following weight specifications are based on the standard machine with standard attachment.

Unit: Kg (lb)

COMPONENT	SK210LC-VI
COMPLETE MACHINE (STANDARD)	20,500 (45,200)
UPPER FRAME ASSEMBLY	9,400 (20,720)
COUNTERWEIGHT	4,500 (9,920)
CAB	260 (570)
BOOM CYLINDER*	168 (370) X 2
ENGINE*	470 (1,040)
RADIATOR & OIL COOLER	97 (210)
PUMP ASSEMBLY	142 (310)
CONTROL VALVE	280 (620)
FUEL TANK*	91 (200)
HYDRAULIC TANK*	143 (320)
SWING MOTOR & REDUCTION UNIT	235 (520)
LOWER FRAME ASSEMBLY	7,500 (16,530)
SLEWING RING	245 (540)
TRAVEL MOTOR & REDUCTION UNIT	250 (550) X2
IDLER ASSEMBLY	106 (230) X2
LOWER ROLLER ASSEMBLY	35 (77) X16
UPPER ROLLER ASSEMBLY	22 (48) X4
TRACK TENSION ASSEMBLY	104 (230) X2
SPROCKET	54 (120) X2
SWIVEL JOINT	30 (66)
TRACK LINK W/ 800mm (31.5") SHOES	1,720 (3,784) X2
TRACK LINK	540 (1,190) X2
ATTACHMENT (STANDARD)	3,600 (7,930)
BUCKET ASSEMBLY [0.81m³ (1.06 cu yd)]	650 (1,430)
ARM ASSEMBLY [2.94 m (9'-8")]	980 (2,160)
ARM [2.94 m (9'-8")]	610 (1,340)
BUCKET CYLINDER*	135 (300)
IDLER LINK	21 (46) X2
BUCKET LINK	91 (200)
PIN (2 PCS for mtg bucket cyl & bucket)	65 (140)
BOOM ASSEMBLY	1,650 (3,640)
BOOM	1,320 (2,910)
ARM CYLINDER*	230 (510)
PIN (Mounting the Arm)	27 (59)
FLUIDS	540 (1,190)
HYD OIL	215 (470)
ENG OIL	20 (44)
FUEL	285 (630)
WATER	20 (44)

*** DRY WEIGHT**

⚠ WARNING ⚠

USE ONLY LIFTING DEVICES AND EQUIPMENT WITH RATED CAPACITIES SUFFICIENT TO LIFT THE SPECIFIC COMPONENT(S) BEING REMOVED OR INSTALLED.

https://truckmanualshub.com/

SK250LC-VI - PERFORMANCE SPECIFICATIONS

The following performance specifications are based on the standard machine with standard attachment.

1. Travel Speed, Swing Speed & Gradeability

DESCRIPTION	SPECIFICATION
TRAVEL SPEED	6.0 km per hr (3.7 mph) in rabbit mode. 4.0 km per hr (2.5 mph) in turtle mode.
SWING SPEED	11 RPM IN M-Mode / "HI" Idle.
GRADEABILITY	70% (35°) {Limited by engine lubrication}
DRAWBAR FORCE	20,190 Kgf (44,512 lbs)

2. Engine

Engine Maker	Mitsubishi
Model	6D34-TLEB
Type	4-Cycle, Water Cooled, Direct Injection with Turbocharger, Diesel
Number of Cylinders– Bore X Stroke	6–104 mm X 115 mm (4.09" X 4.53")
Displacement	5,861 liter (358 cu in.)
Compression Ratio	18.2 : 1
Output Rating	125 kW (168 HP) / 2,100 rpm
Maximum Torque	590 N•m (435 lb-ft)/ 1,600 rpm
Ignition Order	1–5–3–6–2–4 Clockwise Rotation
Injection Timing	17° Before Top Dead Point
Intake Valve Clearance Cold	0.4 mm (0.0157")
Exhaust Valve Clearance Cold	0.4 mm (0.0157")
Electrical System	D.C. 24 V
Starting Motor	24 V–5.0 kW
Alternator	24 V–35 A
Batteries	2– 12 V- (136 Ah)
Engine Dry Weight*	470 kg (1,040 lbs)
Thermostat	Begin to open at 76.5°C (170°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø600 (Ø24") Suction Type Belt Drive Pulley Ratio : 1.00
Air Cleaner	Dry Type with Safety Elements

*Less flywheel and electrics.

3. Hydraulic Components

COMPONENT	TYPE
HYDRAULIC PUMPS 2X240 L/min (63.4 Gal/min)	Tandem, Variable Displacement, Axial Piston with Pilot Gear Pump.
SWING MOTOR	Axial Piston
TRAVEL MOTOR	Axial Piston
CONTROL VALVES	6 Spool Multiple Control
CYLINDERS (ALL)	Double Acting
RETURN FILTER	Safety Valve containing Filter Type
OIL COOLER	Air Cooled

4. Operating Pressures Kgf/cm² (psi)

PILOT SYSTEM	50 (710)
IMPLEMENT	350 (4980)
SWING	285 (4050)
TRAVEL	350 (4980)
POWER BOOST/HEAVY LIFT	385 (5470)

1A. MACHINE & COMPONENT WEIGHTS

The following weight specifications are based on the standard machine with standard attachment.

Unit: Kg (lb)

COMPONENT	SK250LC-VI
COMPLETE MACHINE (STANDARD)	24,100 (53,130)
UPPER FRAME ASSEMBLY	11,400 (25,130)
COUNTERWEIGHT	5,510 (12,150)
CAB	260 (570)
BOOM CYLINDER*	220 (490) X 2
ENGINE*	480 (1,060)
RADIATOR & OIL COOLER	97 (210)
PUMP ASSEMBLY	142 (310)
CONTROL VALVE	280 (620)
FUEL TANK*	91 (200)
HYDRAULIC TANK*	143 (320)
SWING MOTOR & REDUCTION UNIT	290 (640)
LOWER FRAME ASSEMBLY	8,800 (19,400)
SLEWING RING	364 (800)
TRAVEL MOTOR & REDUCTION UNIT	300 (660) X2
IDLER ASSEMBLY	106 (230) X2
LOWER ROLLER ASSEMBLY	35 (77) X16
UPPER ROLLER ASSEMBLY	22 (48) X4
TRACK TENSION ASSEMBLY	94 (210) X2
SPROCKET	54 (120) X2
SWIVEL JOINT	30 (66)
TRACK LINK W/ 800mm (31.5") SHOES	1,490 (3,280) X2
TRACK LINK	580 (1,276) X2
ATTACHMENT (STANDARD)	3,900 (8,600)
BUCKET ASSEMBLY [0.81m³ (1.06 cu yd)]	780 (1,720)
ARM ASSEMBLY [2.94 m (9'-8")]	1,150 (2,540)
ARM [2.94 m (9'-8")]	710 (1,570)
BUCKET CYLINDER*	177 (390)
IDLER LINK	25 (55) X2
BUCKET LINK	98 (220)
PIN (2 PCS for mtg bucket cyl & bucket)	80 (180)
BOOM ASSEMBLY	2.140 (4,720)
BOOM	1,670 (3,680)
ARM CYLINDER*	300 (660)
PIN (Mounting the Arm)	28 (62)
FLUIDS	550 (1,210)
HYD OIL	225 (500)
ENG OIL	20 (44)
FUEL	285 (630)
WATER	22 (48)

*** DRY WEIGHT**

⚠ WARNING ⚠

USE ONLY LIFTING DEVICES AND EQUIPMENT WITH RATED CAPACITIES SUFFICIENT TO LIFT THE SPECIFIC COMPONENT(S) BEING REMOVED OR INSTALLED.

https://truckmanualshub.com/

SK290LC-VI - PERFORMANCE SPECIFICATIONS

The following performance specifications are based on the standard machine with standard attachment.

1. Travel Speed, Swing Speed & Gradeability

DESCRIPTION	SPECIFICATION
TRAVEL SPEED	5.6 km per hr (3.5 mph) in rabbit mode. 3.5 km per hr (2.2 mph) in turtle mode.
SWING SPEED	11 RPM IN M-Mode / "HI" Idle.
GRADEABILITY	70% (35°) {Limited by engine lubrication}
DRAWBAR FORCE	26,218 Kgf (57,800 lbs)

2. Engine

Engine Maker	Mitsubishi
Model	6D16-TLEC
Type	4-Cycle, Water Cooled, Direct Injection with Turbo & Inner cooler
Number of Cylinders– Bore X Stroke	6–118 mm X 115 mm (4.65" X 4.53")
Displacement	7,545 liter (460 cu in.)
Compression Ratio	17.5 : 1
Output Rating	138 kW (185 HP) / 2,100 rpm
Maximum Torque	726 N•m (534 lb-ft)/ 1,600 rpm
Ignition Order	1–5–3–6–2–4 Clockwise Rotation
Injection Timing	15° Before Top Dead Point
Intake Valve Clearance Cold	0.4 mm (0.0157")
Exhaust Valve Clearance Cold	0.4 mm (0.0157")
Electrical System	D.C. 24 V
Starting Motor	24 V–5.0 kW
Alternator	24 V–35 A
Batteries	2– 12 V- (136 Ah)
Engine Dry Weight*	580 kg (1,280 lbs)
Thermostat	Begin to open at 76.5°C (170°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø620 (Ø24.2") Suction Type Belt Drive Pulley Ratio : 0.90
Air Cleaner	Dry Type with Safety Elements

*Less flywheel and electrics.

3. Hydraulic Components

COMPONENT	TYPE
HYDRAULIC PUMPS 2X210 L/min (55.5 Gal/min)	Tandem, Variable Displacement, Axial Piston with Pilot Gear Pump.
SWING MOTOR	Axial Piston
TRAVEL MOTOR	Axial Piston
CONTROL VALVES	6 Spool Multiple Control
CYLINDERS (ALL)	Double Acting
RETURN FILTER	Safety Valve containing Filter Type
OIL COOLER	Air Cooled

4. Operating Pressures

	Kgf/cm² (psi)
PILOT SYSTEM	50 (710)
IMPLEMENT	350 (4980)
SWING	280 (3980)
TRAVEL	350 (4980)
POWER BOOST/HEAVY LIFT	385 (5470)

1A. MACHINE & COMPONENT WEIGHTS

The following weight specifications are based on the standard machine with standard attachment.

Unit: Kg (lb)

COMPONENT	SK290LC-VI
COMPLETE MACHINE (STANDARD)	30,000 (66,100)
UPPER FRAME ASSEMBLY	12,937 (28,513)
COUNTERWEIGHT	6,118 (13,484)
CAB + CONTROLS + A/C + SEAT	836 (1,843)
BOOM CYLINDER*	270 (595) X 2
ENGINE + MUFFLER + MINOR ITEMS	716 (1,578)
RADIATOR & OIL COOLER	175 (386)
PUMP ASSEMBLY + COUPLING	148 (326)
CONTROL VALVE	441 (972)
FUEL TANK*	170 (375)
HYDRAULIC TANK*	173 (381)
SWING MOTOR & REDUCTION UNIT	511 (1,126)
UPPER FRAME + GUARDS & COVERS	3,109 (6,852)
LOWER FRAME ASSEMBLY	11,232 (24,755)
CAR BODY	3,618 (7,974)
SLEWING RING	586 (1,292)
TRAVEL MOTOR + RED. UNIT	309 (697) X2
IDLER ASSEMBLY	170 (370) X2
LOWER ROLLER ASSEMBLY	45 (77) X18
UPPER ROLLER ASSEMBLY	26 (57) X4
TRACK TENSION ASSEMBLY	127 (280) X2
SPROCKET + BOLTS	76 (168) X2
SWIVEL JOINT + LOWER LINES	74 (163)
TRACK CHAINS W/800mm (31.5") SHOES	2,338 (5,153) X2
TRACK GUIDES + GREASE BATH + MOTOR COVERS	90 (198)
ATTACHMENT (STANDARD)	5,136 (11,320)
BUCKET ASSEMBLY [1.20M³ (1.57 CU YD)]	954 (2,100)
ARM ASSEMBLY [3.2 m (10'- 6")	1,485 (3,273)
ARM	952 (2,098)
BUCKET CYLINDER	220 (485)
IDLER LINK	27 (60) X2
BUCKET LINK	130 (290)
PIN (6 PCS for mtg bucket cyl, links, bckt &arm cyl rod)	139 (306)
BOOM ASSEMBLY	2,697 (5,944)
BOOM	2,116 (4,664)
ARM CYLINDER*	370 (816)
PINS (4 PCS for mtg arm cyl, boom cyl's & boom)	211 (465)
FLUIDS	554 (1,221)
HYD OIL	171 (377)
FUEL	348 (767)
WATER	35 (77)

* DRY WEIGHT

WARNING

USE ONLY LIFTING DEVICES AND EQUIPMENT WITH RATED CAPACITIES SUFFICIENT TO LIFT THE SPECIFIC COMPONENT(S) BEING REMOVED OR INSTALLED.

https://truckmanualshub.com/

SK330LC-VI - PERFORMANCE SPECIFICATIONS

The following performance specifications are based on the standard machine with standard attachment.

1. Travel Speed, Swing Speed & Gradeability

DESCRIPTION	SPECIFICATION
TRAVEL SPEED	5.8 km per hr (3.6 mph) in rabbit mode. 3.4 km per hr (2.1 mph) in turtle mode.
SWING SPEED	11 RPM IN M-Mode / "HI" Idle.
GRADEABILITY	70% (35°) {Limited by engine lubrication}
DRAWBAR FORCE	28,950 Kgf (63,800 lbf)

2. Engine

Engine Maker	Mitsubishi
Model	6D16-TLEB
Type	4-Cycle, Water Cooled, Direct Injection with Turbo & Innercooler
Number of Cylinders– Bore X Stroke	6–118 mm X 115 mm (4.65" X 4.53")
Displacement	7,545 liter (460 cu in.)
Compression Ratio	17.5 : 1
Output Rating	177 kW (238 Hp) / 2,200 rpm
Maximum Torque	824 N•m (608 lb-ft)/ 1,800 rpm
Ignition Order	1–5–3–6–2–4 Clockwise Rotation
Injection Timing	14° Before Top Dead Point
Intake Valve Clearance Cold	0.4 mm (0.0157")
Exhaust Valve Clearance Cold	0.4 mm (0.0157")
Electrical System	D.C. 24 V
Starting Motor	24 V–5.0 KW
Alternator	24 V–35 A
Batteries	2– 12 V- (136 Ah)
Engine Dry Weight*	580 kg (1,280 lbs)
Thermostat	Begin to open at 76.5°C (170°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø620 (Ø24.2") Suction Type Belt Drive Pulley Ratio : 0.90
Air Cleaner	Dry Type with Safety Elements

*Less flywheel and electrics.

3. Hydraulic Components

COMPONENT	TYPE
HYDRAULIC PUMPS 2X242 L/min (63.4 Gal/min)	**Tandem, Variable Displacement, Axial Piston with Pilot Gear Pump.**
SWING MOTOR	**Axial Piston**
TRAVEL MOTOR	**Axial Piston**
CONTROL VALVES	**6 Spool Multiple Control**
CYLINDERS (ALL)	**Double Acting**
RETURN FILTER	**Safety Valve containing Filter Type**
OIL COOLER	**Air Cooled**

4. Operating Pressures

	Kgf/cm² (psi)
PILOT SYSTEM	**50 (710)**
IMPLEMENT	**350 (4980)**
SWING	**280 (3980)**
TRAVEL	**350 (4980)**
POWER BOOST/HEAVY LIFT	**385 (5470)**

1A. MACHINE & COMPONENT WEIGHTS

The following weight specifications are based on the standard machine with standard attachment.

Unit: Kg (lb)

COMPONENT	SK330LC-VI
COMPLETE MACHINE (STANDARD)	35,300 (77,800)
UPPER FRAME ASSEMBLY	15,998 (35,260)
COUNTERWEIGHT	8,420 (18,558)
CAB + CONTROLS + A/C + SEAT	836 (1,843)
BOOM CYLINDER*	270 (595) X 2
ENGINE + MUFFLER + MINOR ITEMS	716 (1,578)
RADIATOR & OIL COOLER	175 (386)
PUMP ASSEMBLY + COUPLING	148 (326)
CONTROL VALVE	475 (1,047)
FUEL TANK*	204 (450)
HYDRAULIC TANK*	173 (381)
SWING MOTOR & REDUCTION UNIT	511 (1,126)
UPPER FRAME + GUARDS & COVERS	3,800 (8,375)
LOWER FRAME ASSEMBLY	12,362 (27,167)
CARBODY	3,990 (8,794)
SLEWING RING	586 (1,292)
TRAVEL MOTOR + RED. UNIT	360 (790) X2
IDLER ASSEMBLY	170 (370) X2
LOWER ROLLER ASSEMBLY	58 (130) X18
UPPER ROLLER ASSEMBLY	30 (66) X4
TRACK TENSION ASSEMBLY	190 (420) X2
SPROCKET + BOLTS	88 (190) X2
SWIVEL JOINT + LOWER LINES	85 (187)
TRACK CHAINS W/800mm (31.5") SHOES	2,390 (5,286) X2
TRACK GUIDES + GREASE NBATH + MOTOR COVERS	105 (231)
ATTACHMENT (STANDARD)	6,134 (13,519)
BUCKET ASSEMBLY [1.20M³ (1.57 CU YD)]	1,040 (2,290)
ARM ASSEMBLY [3.2 m (10'- 6")	1,785 (3,875)
ARM	1,160 (2,560)
BUCKET CYLINDER	260 (570)
IDLER LINK	27 (60) X2
BUCKET LINK	130 (290)
PIN (6 PCS for mtg bucket cyl, links, bckt &arm cyl rod)	139 (306)
BOOM ASSEMBLY	3,336 (7,353)
BOOM	2,580 (5,690)
ARM CYLINDER*	500 (1,100)
PINS (4 PCS for mtg arm cyl, boom cyl's & boom)	256 (485)
FLUIDS	805 (1,774)
HYD OIL	304 (670)
FUEL	466 (1,030)
WATER	35 (77)

*** DRY WEIGHT**

⚠ WARNING ⚠

USE ONLY LIFTING DEVICES AND EQUIPMENT WITH RATED CAPACITIES SUFFICIENT TO LIFT THE SPECIFIC COMPONENT(S) BEING REMOVED OR INSTALLED.

https://truckmanualshub.com/

SK480 - PERFORMANCE SPECIFICATIONS

The following performance specifications are based on the standard machine with standard attachment.

1. Travel Speed, Swing Speed & Gradeability

DESCRIPTION	SPECIFICATION
TRAVEL SPEED	5.6 km per hr (3.5 mph) in rabbit mode. 3.5 km per hr (2.2 mph) in turtle mode.
SWING SPEED	9 RPM IN M-Mode / "HI" Idle.
GRADEABILITY	70% (35°) {Limited by engine lubrication}
DRAWBAR FORCE	26,218 Kgf (57,800 lbs)

2. Engine

Engine Maker	Mitsubishi
Model	6D24-TLA2B
Type	4-Cycle, Water Cooled, Direct Injection with Turb & Inner cooler
Number of Cylinders– Bore X Stroke	6–130 mm X 150 mm (5.12" X 5.91")
Displacement	11.950 Liter (729 cu in.)
Compression Ratio	17.5 : 1
Output Rating	250kW (335 HP) / 2,130 rpm
Maximum Torque	1,275 N•m (940 lb-ft)/ 1,600 rpm
Ignition Order	1–5–3–6–2–4 Clockwise Rotation
Injection Timing	2° Before Top Dead Point
Intake Valve Clearance Cold	0.4 mm (0.0157")
Exhaust Valve Clearance Cold	0.6 mm (0.0236")
Electrical System	D.C. 24 V
Starting Motor	24 V–5.0 KW
Alternator	24 V–35 A
Batteries	2– 12 V- (136 Ah)
Engine Dry Weight*	580 kg (1,280 lbs)
Thermostat	Begin to open at 76.5°C (170°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø620 (Ø24.2") Suction Type Belt Drive Pulley Ratio : 0.90
Air Cleaner	Dry Type with Safety Elements

*Less flywheel and electrics.

3. Hydraulic Components

COMPONENT	TYPE
HYDRAULIC PUMPS 2X210 L/min (55.5 Gal/min)	Tandem, Variable Displacement, Axial Piston with Pilot Gear Pump.
SWING MOTOR	Axial Piston
TRAVEL MOTOR	Axial Piston
CONTROL VALVES	6 Spool Multiple Control
CYLINDERS (ALL)	Double Acting
RETURN FILTER	Safety Valve containing Filter Type
OIL COOLER	Air Cooled

4. Operating Pressures

Kgf/cm² / (psi) / [MPa]

PILOT SYSTEM	49.9 / (710) / [4.9 MPa]
IMPLEMENT	320 / (4554) / [31.4 MPa]
SWING	260 / (3698) / [25.5 MPa]
TRAVEL	349 / (4974) / [34.3 MPa]
POWER BOOST/HEAVY LIFT	349 / (4974) / [34.3 MPa]

1A. MACHINE & COMPONENT WEIGHTS

The following weight specifications are based on the standard machine with standard attachment.

Unit: Kg (lb)

COMPONENT	SK480LC-VI
COMPLETE MACHINE (STANDARD)	49,100 (108,000)
UPPER FRAME ASSEMBLY	20,800 (45,760)
COUNTERWEIGHT	10,027 (22,059)
CAB	260 (570)
BOOM CYLINDER*	422 (928) X 2
ENGINE + MUFFLER + MINOR ITEMS	1,100 (2,420)
RADIATOR & OIL COOLER	186 (410)
PUMP ASSEMBLY	187 (420)
CONTROL VALVE	380 (840)
FUEL TANK*	230 (510)
HYDRAULIC TANK*	360 (790)
SWING MOTOR & REDUCTION UNIT	722 (1,590)
LOWER FRAME ASSEMBLY	19,000 (41,800)
SLEWING RING	700 (1,540)
TRAVEL MOTOR + RED. UNIT	650 (1,430) X2
IDLER ASSEMBLY	270 (600) X2
LOWER ROLLER ASSEMBLY	98 (220) X18
UPPER ROLLER ASSEMBLY	30 (66) X4
TRACK TENSION ASSEMBLY	325 (720) X2
SPROCKET + BOLTS	100 (220) X2
SWIVEL JOINT	58 (130)
TRACK GUIDE	50 (110) X 4
TRACK CHAINS W/900mm (35.4") SHOES	2,730 (6,006) X2
TRACK LINK	1,160 (2,560) X2
ATTACHMENT (STANDARD)	8,100 (17,860)
BUCKET ASSEMBLY [1.80M³ (2.35 CU YD)]	1,440 (3,170)
ARM ASSEMBLY [3.45m (11'- 4")	2,380 (5,250)
ARM [3.45 11' - 4"]	1,450 (3,200)
BUCKET CYLINDER*	360 (790)
IDLER LINK	56 (120) X2
BUCKET LINK	150 (330)
PIN (2 PCS for mtg bucket cyl, & bucket	155 (340)
BOOM ASSEMBLY	4,240 (9,350)
BOOM	3,330 (7,280)
ARM CYLINDER*	590 (1,300)
PINS (mounting for arm)	124 (270)
FLUIDS	1,200 (2,650)
HYD OIL	570 (1,260)
ENG OIL	42 (90)
FUEL	540 (1,190)
WATER	48 (105)

*** DRY WEIGHT**

WARNING

USE ONLY LIFTING DEVICES AND EQUIPMENT WITH RATED CAPACITIES SUFFICIENT TO LIFT THE SPECIFIC COMPONENT(S) BEING REMOVED OR INSTALLED.

https://truckmanualshub.com/

FAMILIARIZATION

All operators,service mechanics and personnel responsible for operation,inspection and maintenance of the machine should become thoroughly familiar with the controls and components and their functions before working with or on this equipment.

Study the information in this section to become familiar With the controls and components of this machine.

GENERAL MACHINE NOMENCLATURE

The Nomenclature drawing below (FIGURE 3.12),points out locations of major components of the KOBELCO SK210(LC)-VI Hydraulic Excavator. Study these areas and locate these components on the machine.Specific information regarding these components are explained on the following pages of this section.

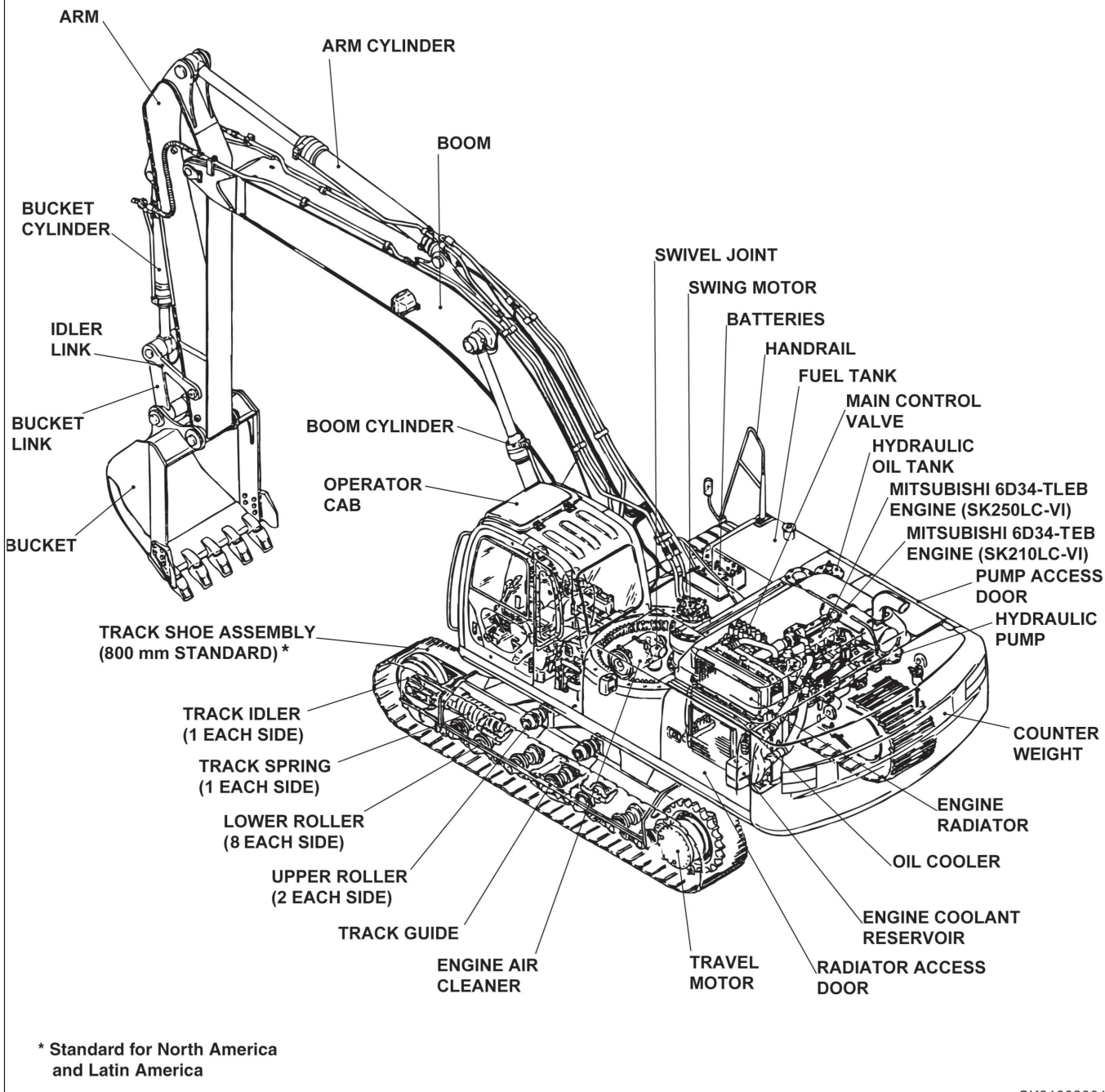


Figure 3.12 SK210 VI

https://truckmanualshub.com/

OPERATOR CAB NOMENCLATURE

The operator cab nomenclature (FIGURE 3.13), points out the locations of operator controls of the KOBELCO ED190-VI Hydraulic Excavator operator cab.

Study these areas and locate these components on the machine.Specific information regarding these components are explained on the following pages of this section.

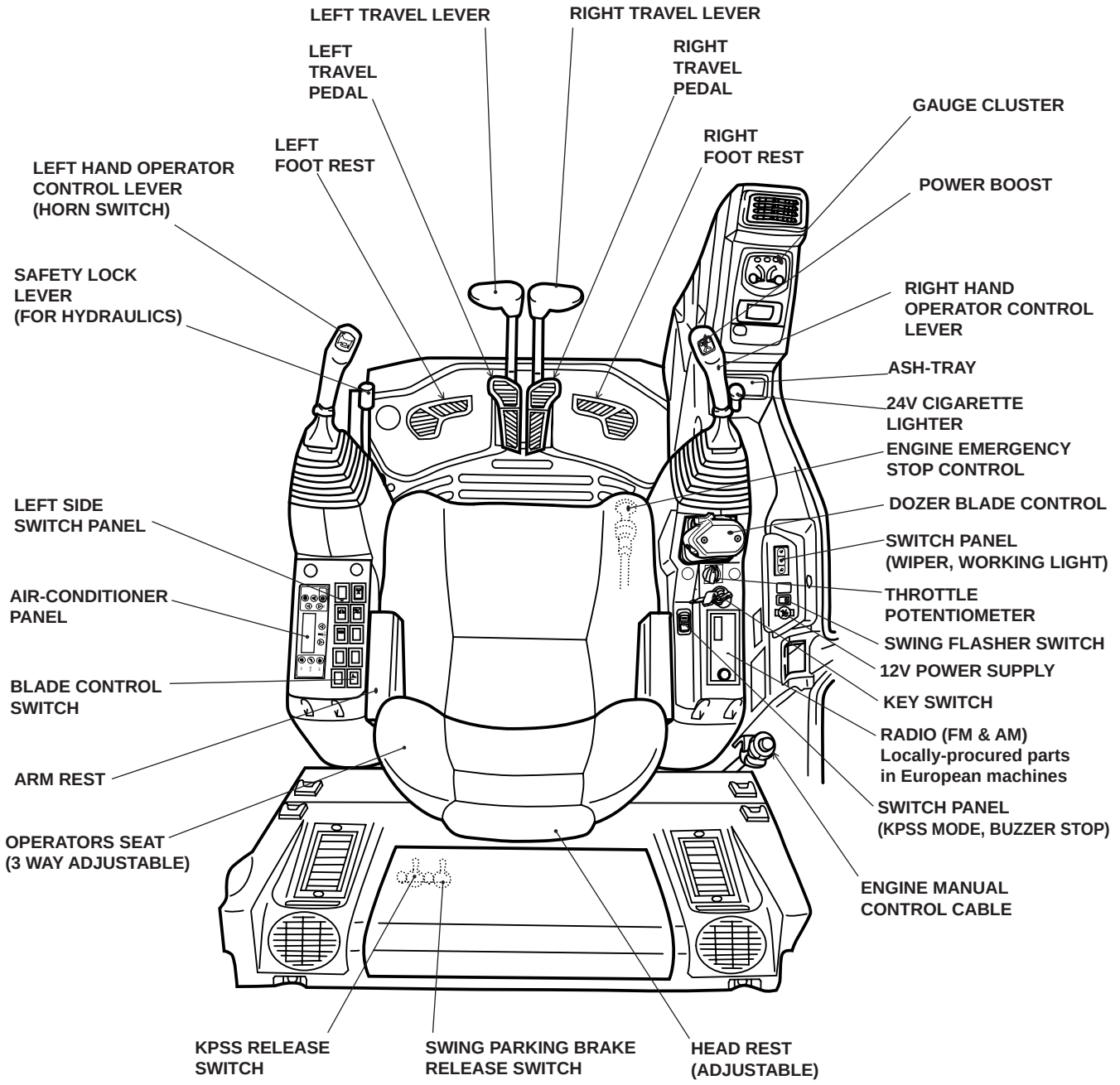


Figure 3.13 ED190 VI

https://truckmanualshub.com/

COMPONENT & CONTROLS NOMENCLATURE

The following information provides a brief description and function of the components and controls of the KOBELCO SK210(LC)-VI Hydraulic Excavator.

All personnel associated with this machine should read and understand this information BEFORE beginning any work with or on this equipment.

RIGHT HAND OPERATOR CONSOLE

1. Key Switch – FIGURE 3.14.a

The Key Switch is located on the right hand operator console and has 5 operating functions.

a. "HEAT "–This position is used for starting the engine in cold climates.

b. "OFF "–When Key is turned to this position, the engine stops and electrical power to the machine's electrical systems is stopped after approximately 4 seconds.

c. "ACC "–With key in the "ACC "position only the cigarette lighter, tuner and horn will have power.

d. "ON"– When Key is in the ON position, electrical power is supplied to all the machine 's electrical systems.

e. "START "–When key is turned to this position electrical power is supplied to the starter solenoid causing the starter to start the engine. After engine starts key should be released to go back to the "ON " position.

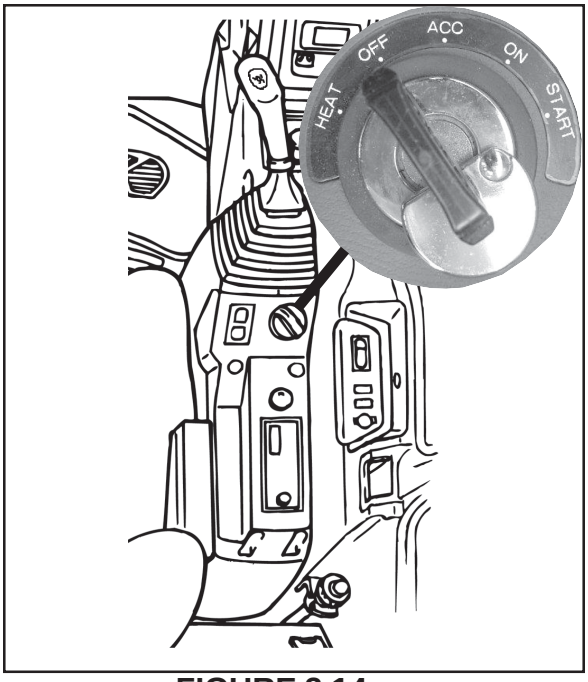


FIGURE 3.14.a

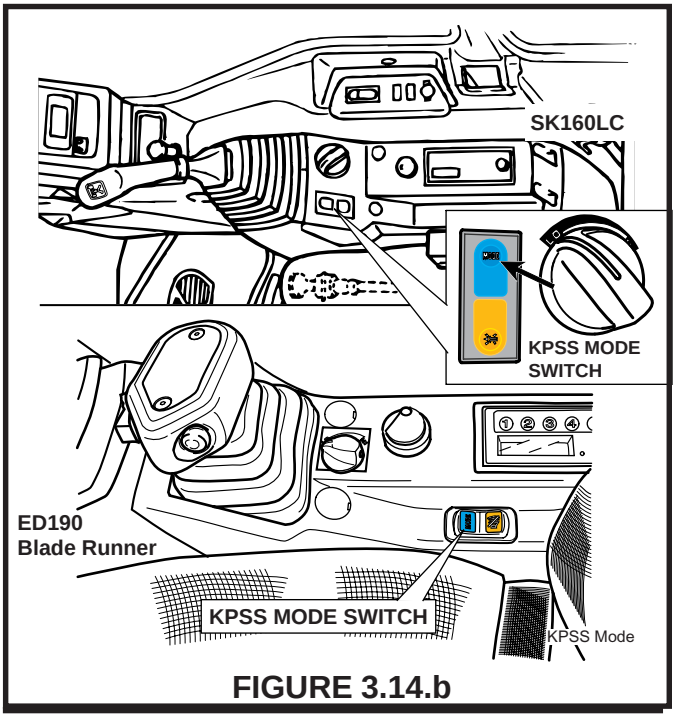


FIGURE 3.14.b

2 . KPSS Mode Switch – FIGURE 3.14.b

The KPSS Mode Switch SK160~SK480 is located on the right hand operator console and has 3 operating functions. After starting the engine, the mode switch defaults to the **M** for maximum power. The operator can select an effective work mode complying with the working conditions and working target from 3 modes. Each time the work mode switch is pressed, the work mode indicator lamp is switched from **M,** to **A,** then to **B** in that order.

NOTE

SK480 **A** Assist mode reduces engine and pump yield to approximately 90% of maximum output.

NOTE

To clear fault codes on the ED190 press the travel speed change switch and the buzzer stop switch at the same time. The new rocker switch for the Mode/Buzzer Stop switch makes it impossible to press both switches at the same time.

a. M (Manual) mode



This mode senses the movement of control lever and is suitable for the heavy load digging work giving priority to the work load at high speed.

http://truckmanuals.blogspot.com/

b. A (Assist) mode SK160~SK330

Pressing the work mode selector switch once changes to “A” or assist mode, located on the left of the three indicator lamps. The mechatro controller analyzes the operator’s pattern of joystick lever movement, and uses “fuzzy logic” to set one of five machine operating parameters FIGURE 3.15.a

Results	Control Mode (Contents on multidisplay
Simple digging, ditch digging, trench box digging	DIGGING
Leveling, slope finishing	LEVELING
Spreading	SPREADING
Tamping	TAMPING
Traveling, waiting time	OK STANDBY

FIGURE 3.15.a

Once the mechatro has analyzed the operators joystick pattern, a moving graphic FIGURE 3.11.b (icon) flashes on the message display of the monitor screen to show the operator which assist mode is selected. Control is made easier as the machine uses this pattern to “ASSIST” in setting adequate pump and engine operation. Operating efficiency increases FIGURE 3.15.c without the operator even noticing.



LEVELING SCATTERING COMPACTING

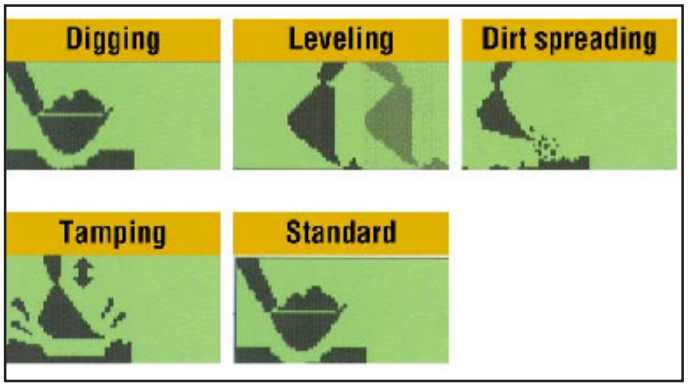


FIGURE 3.15.b

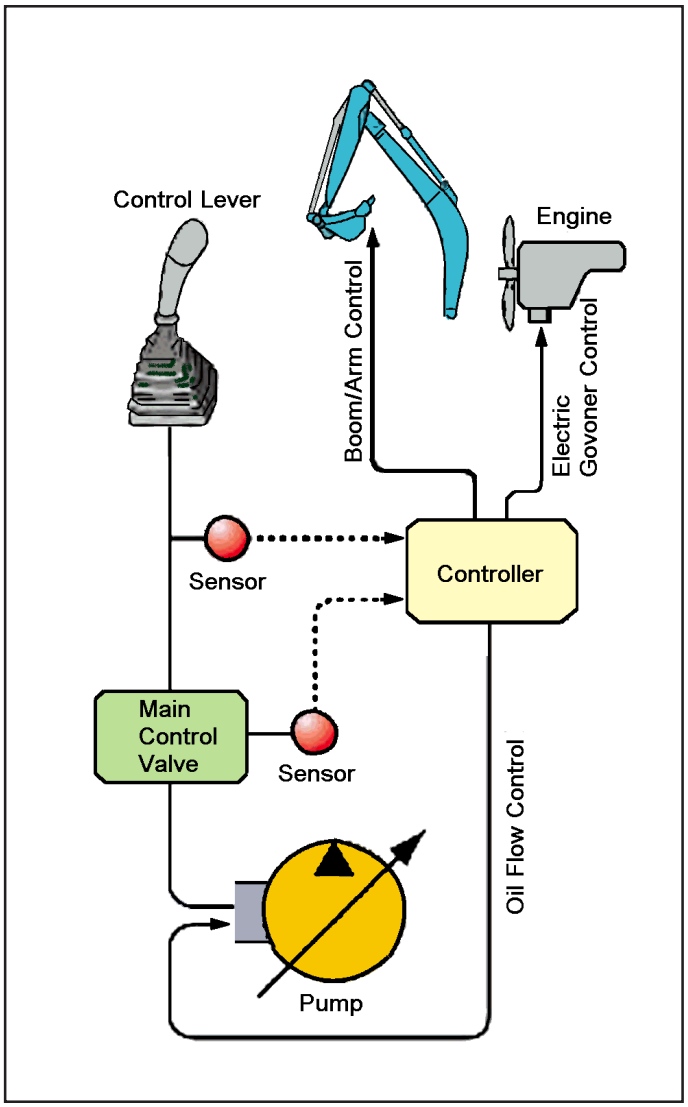


FIGURE 3.15.c

https://truckmanualshub.com/

c. Breaker mode (new function)

Pressing the work mode selector twice from “M” mode, changes the machine to “B” or breaker mode. Located on the right of M mode. See FIGURE 3.16.a. The purpose of this mode is to allow the operator to quickly adjust the pump flow rates for various attachments while sitting in the cab. When the breaker or attachment is in operation the flow volume is switched automatically to the operators preset pump flow. The flow returns to normal setting when the breaker or attachment is not being used.

NOTE

The breaker flow is set at the factory to deliver maximum pump flow. To change the flow rate to a lower setting see the following information. “Gauge cluster will display pump flow in metric units only.”

WARNING

Do not operate this machine unless you have read and understand the instructions in the OPERATORS MANUAL. Improper machine operation is dangerous and could result in injury or death.

1. With Safety Lock in the up or lock position, place keyswitch to on position, do not start engine. See FIGURE 3.16.b
2. Press the mode switch two times, the LCD screen will display the set flow rate of the breaker circuit. See FIGURE 3.17.c.
3. To change the pump flow (both pumps are changed SK160 and up) move machine to safe work area and turn keyswitch to off. Wait ten seconds then procede.

Minimum / Max flow rate preparation procedure

1. Preparation
   a. Keyswitch must be in off position for ten seconds.
   b. Turn keyswitch to on position do not start engine, place safety lock in up position.
   c. Press mode switch twice to Breaker mode, porcede to **Step A**.

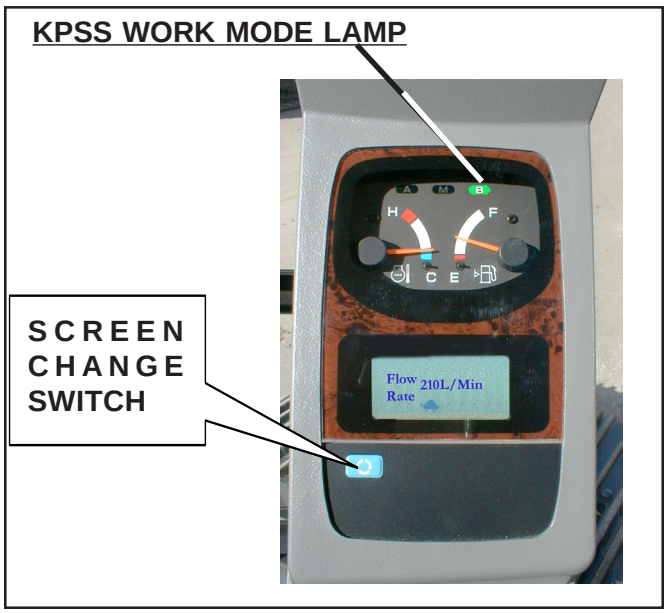


FIGURE 3.16.a

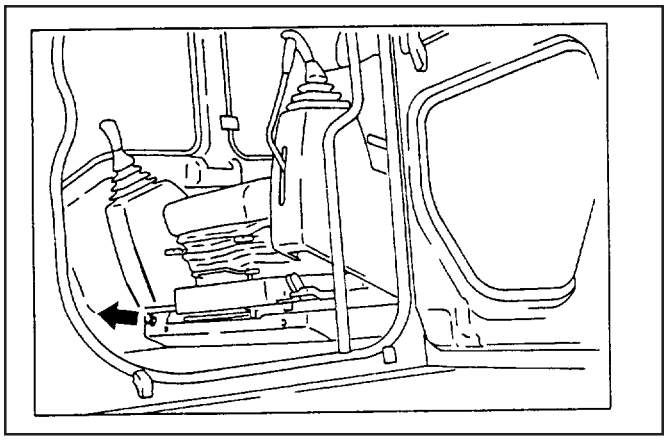


FIGURE 3.16.b

NOTE

It is impossible to adjust flow rate after starting of engine.

Step A-Minimum flow rate adjusting procedure

a. Press the screen change switch for 3 ~ 10 seconds and release. See FIGURE 3.16.a The LCD screen displays the flow rate stored in memory.

b. Press the buzzer stop switch once, see FIGURE 3.17.c. flow rate value will decrease in 10L/min. increments. If buzzer stop switch is held down for more than five seconds, flow rate will decrease rapidly. Release buzzer stop switch when you have reached your desired value.

c. Press the screen change switch to: “MONITOR SYSTEM OK”

https://truckmanualshub.com/

Step B-Maximum flow rate adjusting procedure

a. Press the screen change switch for 3 ~ 10 seconds and release. See FIGURE 3.16.a The LCD screen displays the flow rate stored in memory.

b. Press the mode switch once, see FIGURE 3.17.b flow rate value will increase in 10L/min. increments. If mode switch is held down for more than five seconds, flow rate will increase rapidly. Release mode switch when you have reached your desired value.

c. Press the screen change switch to: "MONITOR SYSTEM OK". See FIGURE 3.16.a

NOTE

If keyswitch is turned off before returning LCD screen to "MONITOR SYSTEM OK" new values will not be saved.

Press buzzer switch in breaker flow rate adjustment will decrease flow.

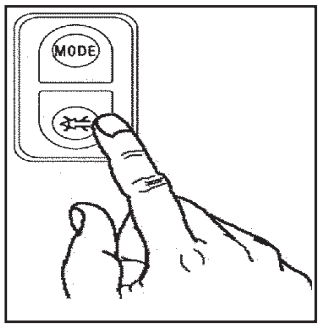


FIGURE 3.17.a

Press mode switch in breaker flow rate adjustment will increase flow.

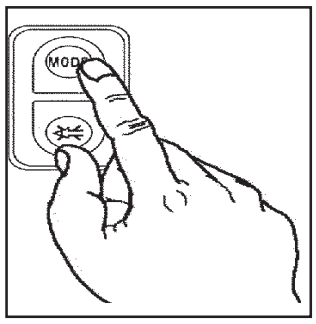


FIGURE 3.17.b

Maximum / Minimum overide

located inside the mechantro controller is a trimmer dial VR1 which will override the above flow setting procedures. Not only will this feature provide protection for equipment in "A" or "M" modes, it can also be used to dial in flows less than which is stored in memory of "B" mode. The lower limit of about 30 liters per minute. See FIGURE 3.17.d.

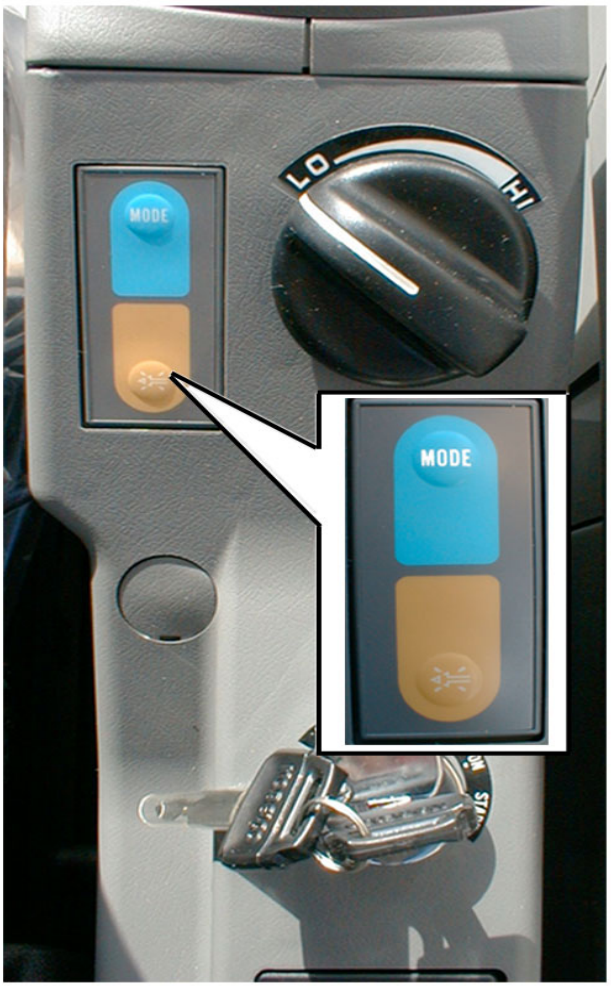


FIGURE 3.17.c

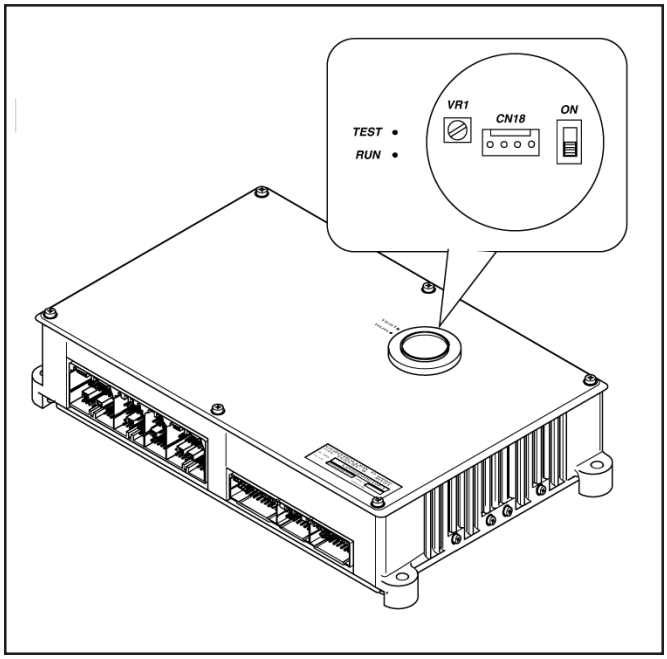


FIGURE 3.17.d

https://truckmanuals.hubpages/

3. Buzzer Stop Switch – FIGURE 3.18.a



When the engine coolant temperature is too high, or various sensors of mechatro controller (self-diagnosis) fail, the alarm sounds intermittently. To stop the sound, press the buzzer stop button.

NOTE

• Buzzer sounding due to engine cooling water temperature rise can not be stopped.

• The buzzer sounding, because the preheat complete and E/G oil pressure are displayed, stops by turning the key switch OFF.

4. Throttle Potentiometer – FIGURE 3.18.A

The throttle potentiometer's located on the right hand operator console and controls engine RPM. When the throttle potentiometer is rotated to right or left position it increases or decreases engine rpm and maintains engine at the programed RPM for that particular position on the dial.

NOTE

In operation, when all pilot controls are in the nuetral position for more than three seconds, and the engine RPM is above 1050, the auto excel reduces the engine speed to 1050.

Auto accel release condition

1. Place the safety lever in the up and lock position.

2. Located the one pin connector for the auto acceleration function behind the operators right hand console see FIGURE 3.18.b.

3. Change the position of the connector as in indicated in FIGURE 3.18.b.

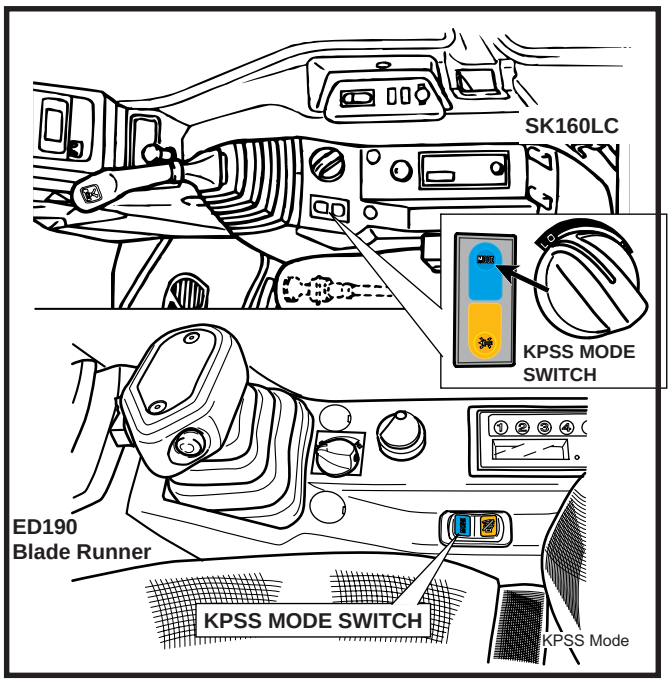


FIGURE 3.18.a

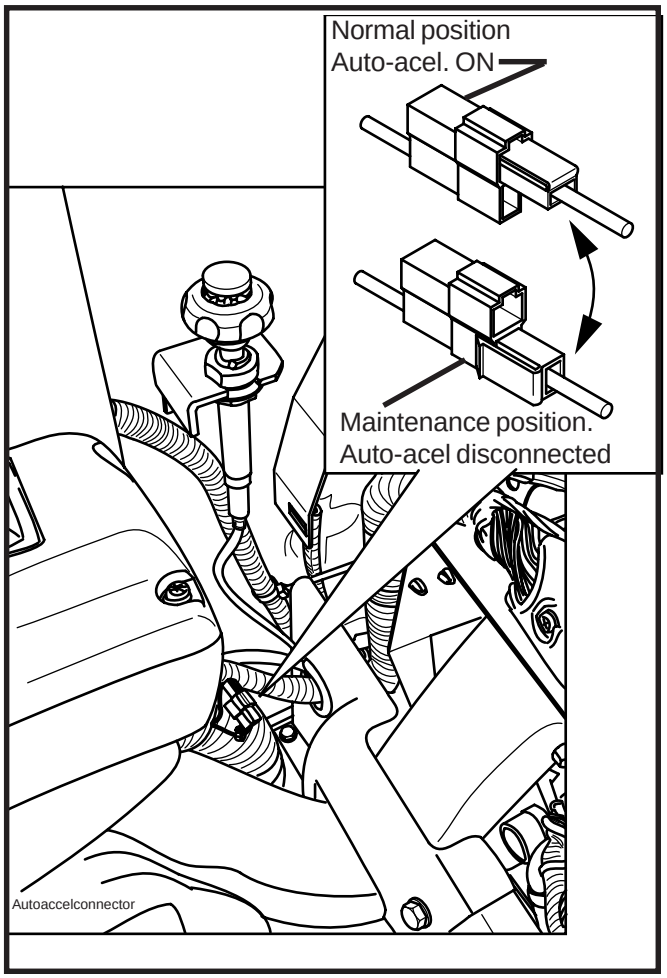
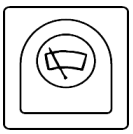


FIGURE 3.18.b

https://truckmanualshub.com/

5. Wiper & Washer Switch - FIGURE 3.19.a



Press this switch, and the front widow wiper starts moving.

- **a.** Press it once : Wiper moves intermittently.
- **b.** Press it again : Wiper moves continuously.
- **c.** Press it once more : Wiper stops moving.

CAUTION

Make certain the washer reservoir has washer fluid before operation washer.
See FIGURE 3.15.c



Press this switch,and washer fluid is sprayed while it is pushed. The washer fluid reservoir is located behind the cab, in the air cleaner compartment. See FIGURE 3.19.b

6. Working Lights Select Switch – FIGURE 3.19.c



– This light selector switch illuminates whenever the ignition switch is placed in the “ON ”position and the working lights are activated.

- **a.** Press switch once:The frame and boom working lights come on and the symbol “F “ displays on the lower side of the LCD screen.
- **b.** Press it again:The rear working lights come on and the symbol “R “ displays on the lower side of the LCD screen.
- **c.** Press light selector switch again and the frame, boom and rear work lights go out.

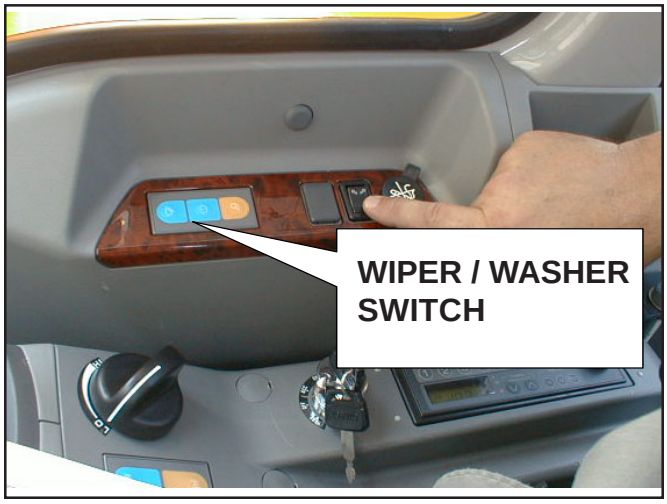


FIGURE 3.19.a

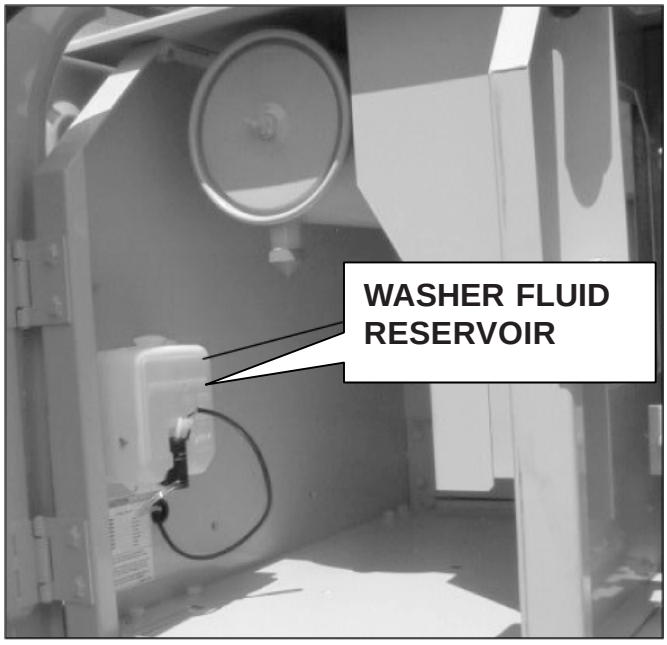


FIGURE 3.19.b



FIGURE 3.19.c

https://truckmanualshub.com/

D8. Dozer Control Lever (ED190-VI)

The dozer control lever (1) is located on the operator's right side console, See Fig. 20.a.

To operate the dozer, it is necessary to activate the dozer circuit by pressing the Dozer Switch located on the operator's left side console, See Fig. 20.b

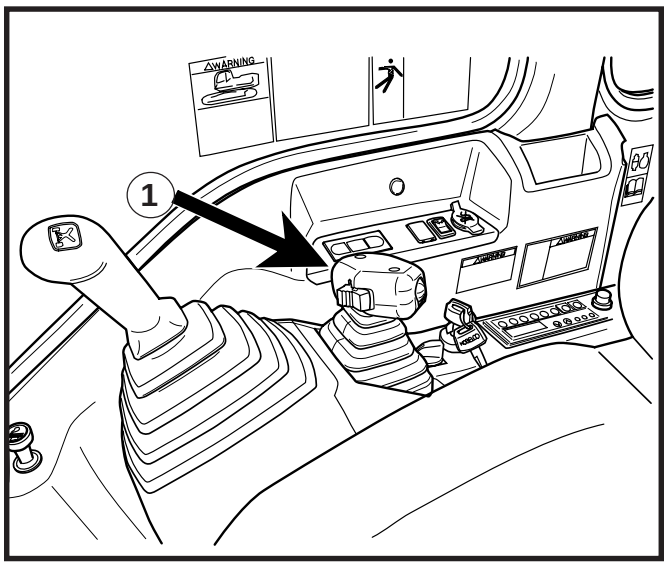


FIGURE 20.a

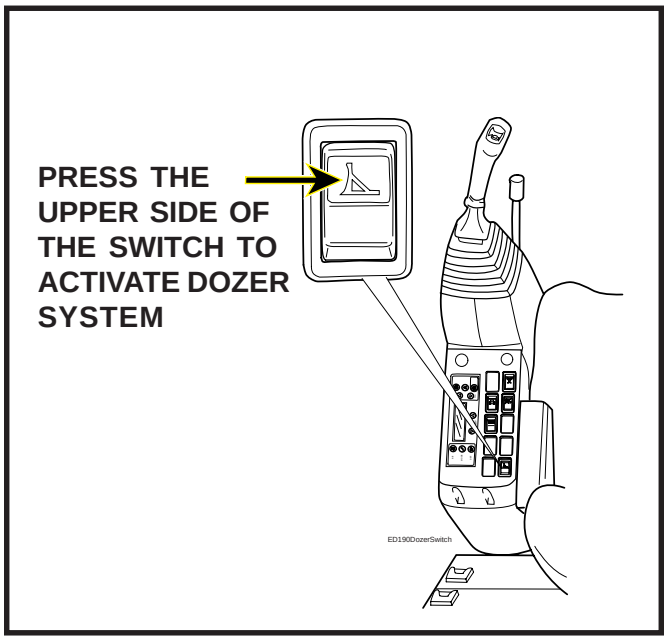


FIGURE 20.b

The dozer control lever is multifunctional, See Fig. 20.c

a. "FORWARD"– Variable speed for blade lowering.
b. "BACKWARD"– Variable speed for blade raising.
c. "CENTER"– Hold position.
d. "LEFT"– Variable speed for blade right tilt.
e. "RIGHT"– Variable speed for blade left tilt.

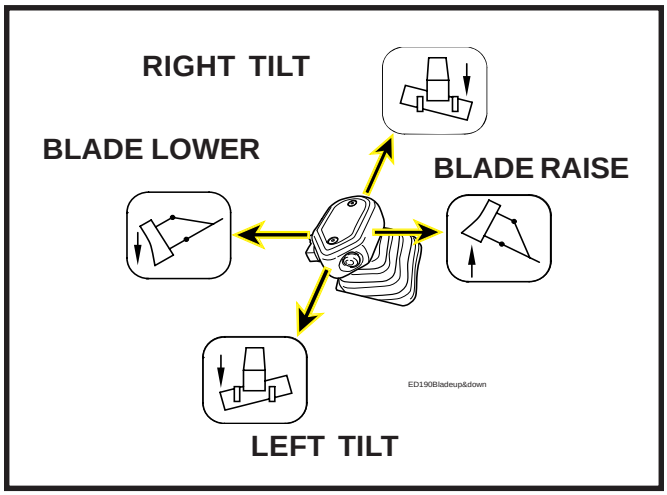
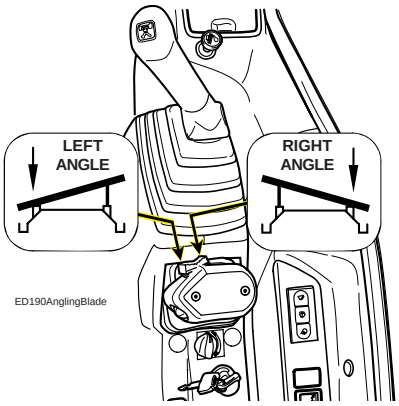


FIGURE 20.c

https://truckmanualshub.com/

Two switches are located on the dozer control handle:



1. Angle Blade Control Switch: It is located in front of the dozer control handle. Depress this switch on its left corner to angle the blade toward the left, or depress it on its right corner to angle the blade toward the right. See Fig. 21.a

FIGURE 21.a

2. Dozer Blade Float Control Switch: It is located on the left side of the dozer control handle. Depress this switch to make the blade float, See Fig. 21.b. Pull back the dozer control lever to disengage the float function.

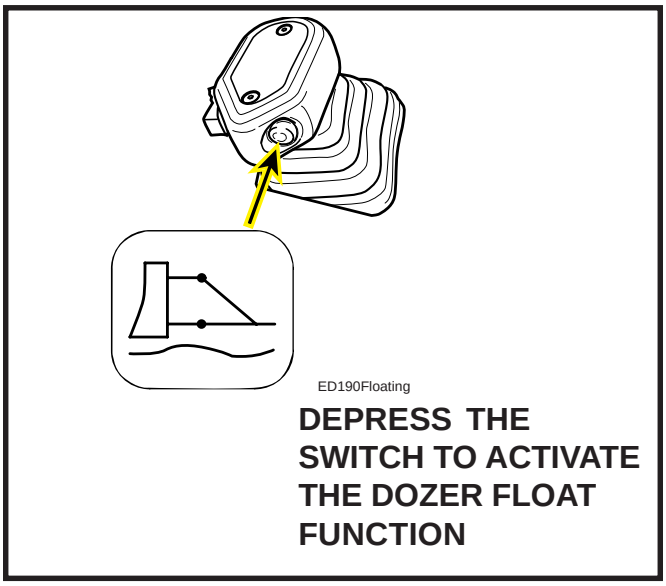


FIGURE 21.c

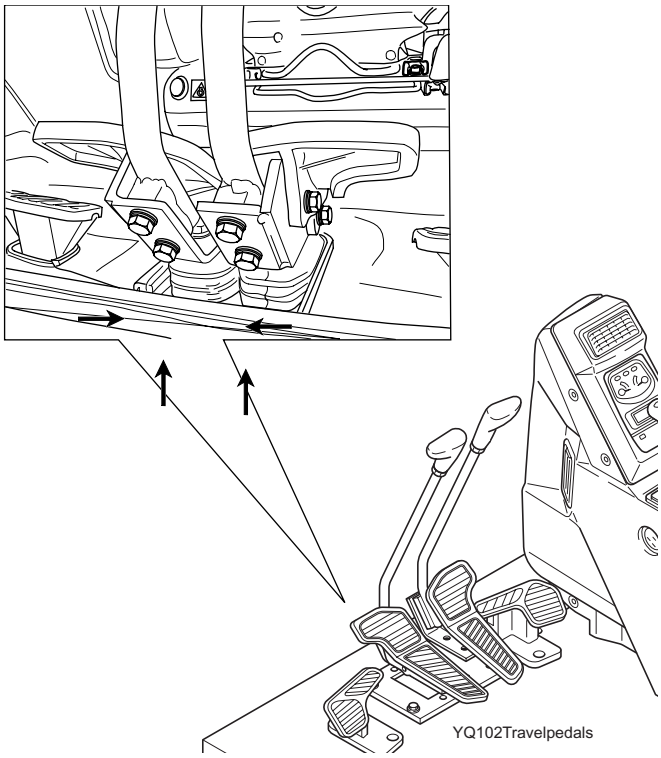


FIGURE 21.d

D9. Removing the Travel Control Levers

a. Use a 13 mm wrench to remove the travel control levers from the travel pedals, See Figure 21.d.

b. Use a 17 mm wrench to remove the support brackets located in the air cleaner compartment, See Figure 21.e.

c. Store the travel control levers properly in the air cleaner compartment and securely tighten the brackets.

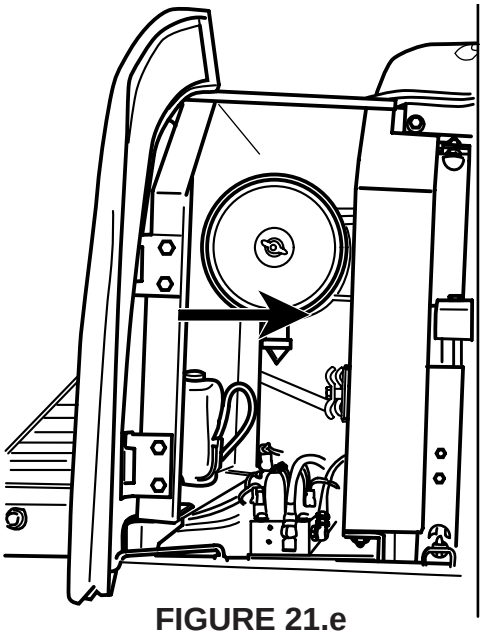


FIGURE 21.e

https://truckmanualshub.com/

7. Radio – FIGURE 2.7C

The radio is located on the right side control panel as indicated in FIGURE3.16.a. The LCD Display shows the radio station selected as well as its frequency band.

a. Control Switches

The following table describes the different functions available to use the radio:

Switch	FUNCTION AND USAGE
1	Power switch and volume
2	Control
3	Tone control
4	FM & AM selector
5	Station selection
6	Preset Selector buttons
7	LCD display
8	Time adjusting buttons

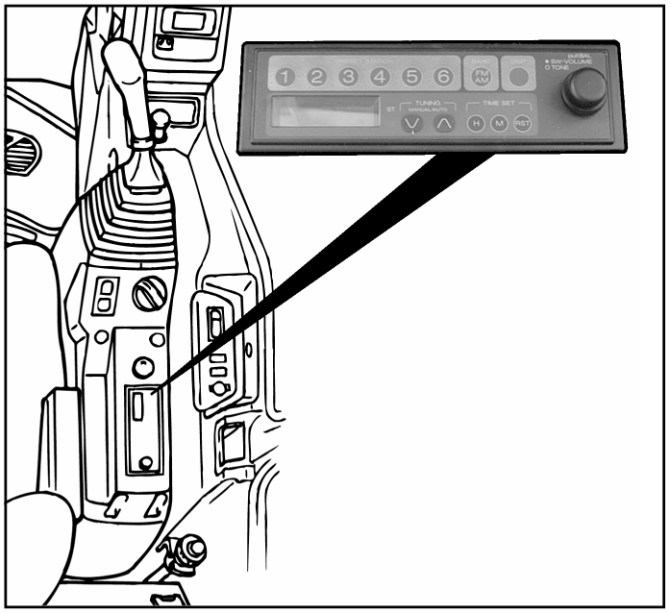


FIGURE 3.16.a

b. How to select stations Figure 3.16.b

1. How to select a radio station manually: Press the Power switch to turn on the radio and press the station selector buttons up or down to select the desired radio station.This radio functions on two main frequency bands: AM and FM. When the frequency band reaches the upper or lower limit, the radio automatically switches to the opposite limit, thats: from the upper to the lower or vice versa.

2. How to preset the radio stations: Once the desired radio station is selected manually,press any of the preset station buttons (1~6) for more than 1.5 sec to record it in its respective memory. The reception is temporarily lost during the memorization process. Once the reception is recovered, the station is preset on the desired preset station button. Repeat this procedure to preset a total of 6 different radio stations.

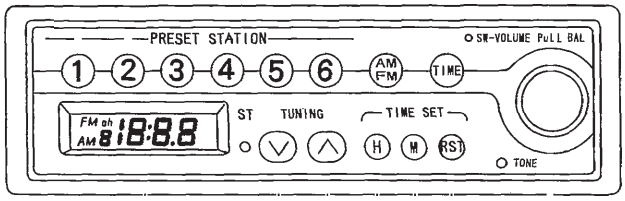


FIGURE 3.16.b

NOTE

The preset stations are canceled when the radio is removed for maintenance.

https://truckmanualshub.com/

8. 24 Volt Cigarette Lighter – FIGURE 3.17.a

The cigarette lighter is located on the right wall of cab. To use the cigarette lighter the key switch must be in the ON position. Push the lighter in and wait approximately 30 seconds for it to “POP ” out. Pull lighter from the socket to use. Replace lighter back into its socket after use.

Do not use the cigarette lighter as a power source for 12 volt accessories. It is 24 volt outlet. Plugging a 12 volt accessory into a 24 volt connector may result in shorting & or Fire.

CAUTION

Do not use the cigerette lighter as a power source for 12 volt accessories. It is a 24 volt outlet. Plugging a 12 volt accessory into a 24 volt connector may result in shorting or fire.

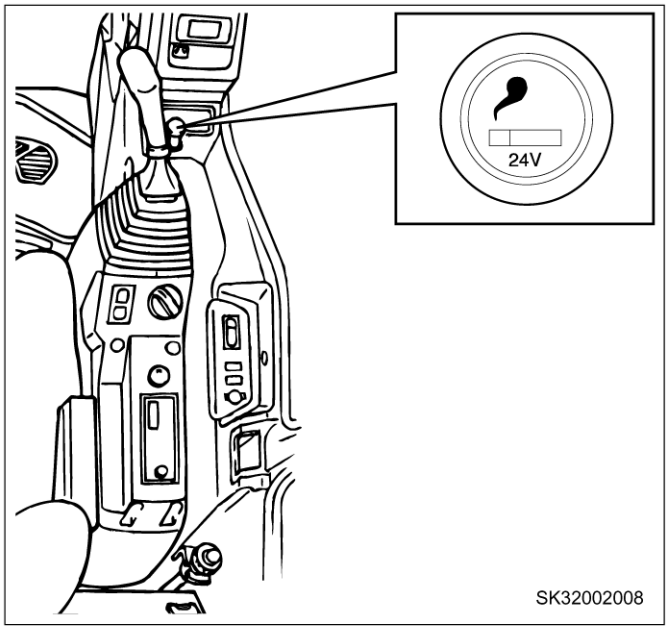


FIGURE 3.17.a

9. Swing Flasher Switch – FIGURE 3.17.b

The swing flasher switch is located on the right hand operator console. The swing flasher is a 2 position rocker switch which is used to turn on the swing flashers.

“ON ” – Push the symbol side of switch down t o turn swing flashers ON.

“OFF ” – Push the empty side of switch down to turn swing flashers OFF.



FIGURE 3.17.b

https://truckmanualshub.com/

LEFT HAND OPERATOR CONSOLE

1. Climate Control Air Conditioner FIGURE 3.17a and 3.17.b

The climate control-AC provides a comfortable indoor environment and adjustable control of cab temperature. It removes moisture from humid air and reducing window glass fogging. The climate control-AC is installed behind operator 's seat and sends cold air or hot air into cab.

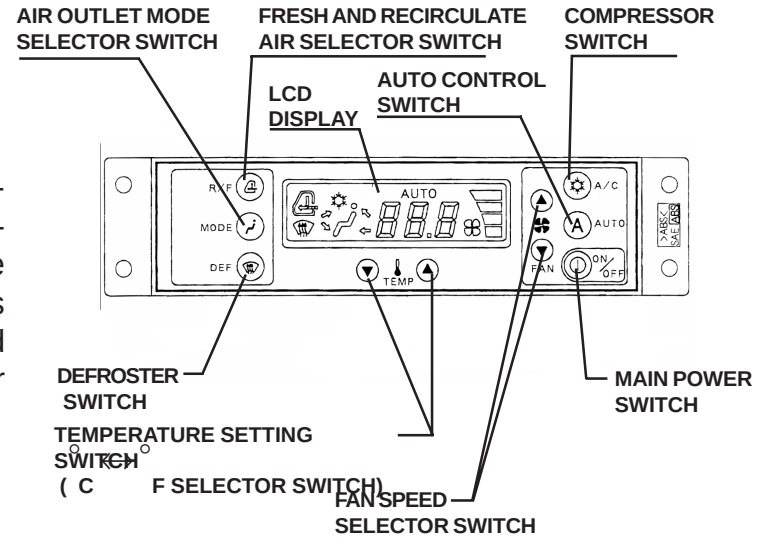


FIGURE 3.18.a

SUPPLEMENTARY EXPLANATION

The LCD display indicates temperature, air outlet mode, compressor ON – OFF, AUTO recirculate and fresh air and fan speed. Each switch, fan mark of blower, and TEMP mark are illuminated green at night.

AC - Fundamental Use – FIGURE 3.18.b
Before turning air-conditioner on, close doors of cab and windows to achieve the best perormance.

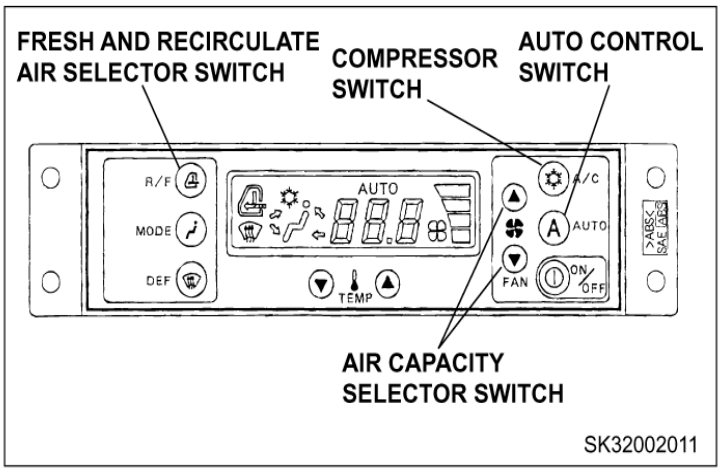


FIGURE 3.18.b

a. Press control switch AUTO to control air capacity and blower outlet atomatically, and set the temperature in the range from 18.5 °C (65.3 °F) to 31.5 °C (88.7°F). The outlet temperature, outlet opening and fan speed are adjusted automatically so that indoor temperature of cab comes closer to the set temperature.

b. Select proper mode manually through recirculate and fresh air capacity selector switch and compressor switch ON – OFF.

c. Select preferable fan speed manually through fan speed selector switch when fan speed,selected through auto control, isnot preferable. The indicator lamp of AUTO " n LCD display goes out. Press "AUTO "switch to return to automatic climate control.

Control Panel Functions

Main Power Switch and Display FIGURE 3.18.a

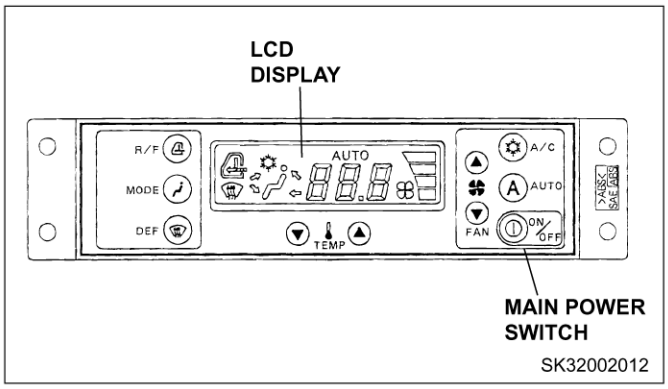


FIGURE 3.19.a

a. LCD display is illuminated when the climate control-AC is operating. When the climate control-AC is stopped, LCD will be turned off.

b. Press main power switch,and all functions for the climate control-AC switch ON or OFF.
Each time when this switch is pressed, the function switches ON and OFF. When switched ON,the climate control-AC starts operating at the point set before switching OFF (When it is set to AUTO, auto mode; if NORMAL is selected, then in normal mode).

NOTE

The key switch will switch air-conditioner OFF, but the operating condition just before switching off may not be restored when the key switch is turned ON again.

Auto Control Switch and Display FIGURE 3.19.b

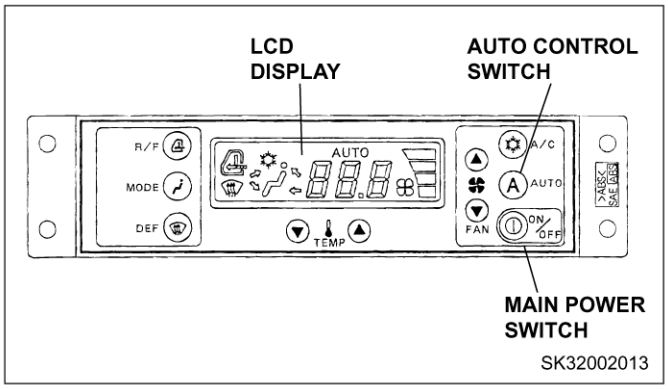


FIGURE 3.19.b

a. Press the main power switch to activate the climate control-AC and the LCD display will illuminate.

b. Press control switch AUTO, and fan speed and air outlet are automatically controlled, and “AUTO ” indicator lamp on LCD display is illuminated.

c. When the main power switch is OFF, the system will retain the previous setting in memory. Therefore, when the main power switch is pressed again, the climate control AC will come on in the auto control mode. In the Auto mode, the fan speed and air outlet openings are operated automatically.

https://truckmanualshub.com/

Temperature Setting Switch and Display FIGURE 3.20.a

a. The set temperature is ndicated indigits on LCD display.Temperature set range is 18.5 °C (65.3 °F) to 31.5 °C (88.7 °F).

b. Press the two temperature set switches simultaneously for 5 seconds to change the display from Centigrade (°C) to Fahrenheit (°F) or viceversa in the LCD display. (Eg.) 5°C (77 °F) or (77 °F) 25 °C.

c. Press temperature set switch DOWN or UP to change the set temperature. The temerature goes up or down by 0.5 °C (0.9 °F) in graduation.

d. The set temperature 18 °C (64.4 °F) is the lowest cooling temperature, and 32 °C (89.6°F) is the highest heating temperature. Control beyond either of these limits is not possible.

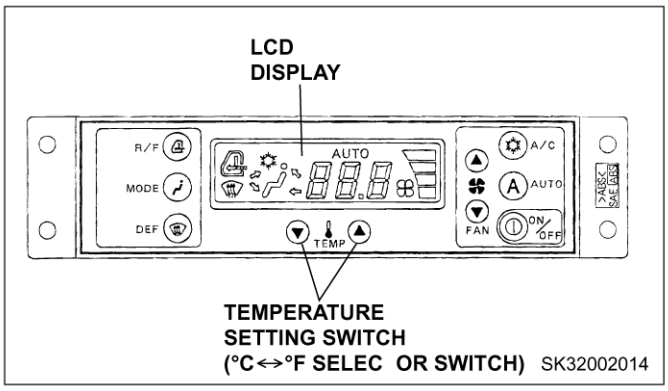


FIGURE 3.20.a

Air Outlet Mode Selector Switch and Display FIGURE 3.20.b

a. Air outlet position is indicated by the arrow on LCD display.

b. Press Air Outlet Mode Switch in the condition where auto display light is on, and the display mode is fixed. “AUTO ”indicator lamp on LCD display goes out, and “AUTO ” control of air outlet opening is released. Press it again, and the level s changed to:
VENT → BI-LEVEL → FOOT → FACE.

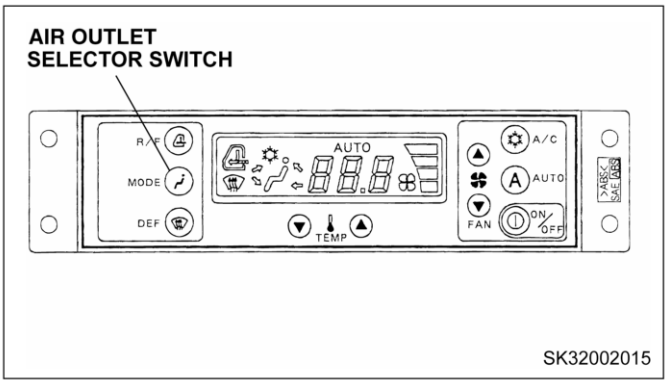


FIGURE 3.20.b

LCD display				
Air outlet opening	Vent	Bi-level	Foot	Face
Air outlet direction	Upper half of body	Upper half of body, foot	Foot, front glass	Upper half of body (Front)

https://truckmanualshub.com/

Defroster Switch and Display FIGURE 3.21.a

a. Press Defroster Switch, defroster indicator lamp will be displayed.

b. Press Air Outlet Mode Selector Switch, and it returns to air outlet mode just before pressing defroster switch.

c. Press Defroster Switch in the condition where AUTO display is lighting up, “AUTO ” indicator lamp on LCD display goes out and the auto control of air outlet opening is released.

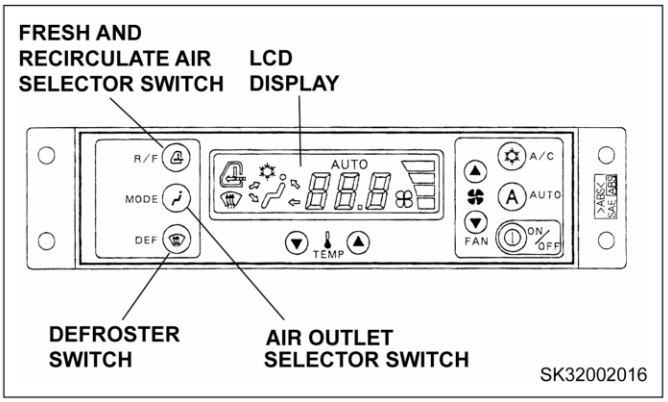


FIGURE 3.21.a

Recirculate and Fresh air Selector Switch and Display – FIGURE 3.21.a

a. Suction (fresh air intake) mode is indicated on LCD display.

b. Each time recirculate and fresh air capacity selector switch is pressed, the mode is switched to air recirculate or fresh air intake.

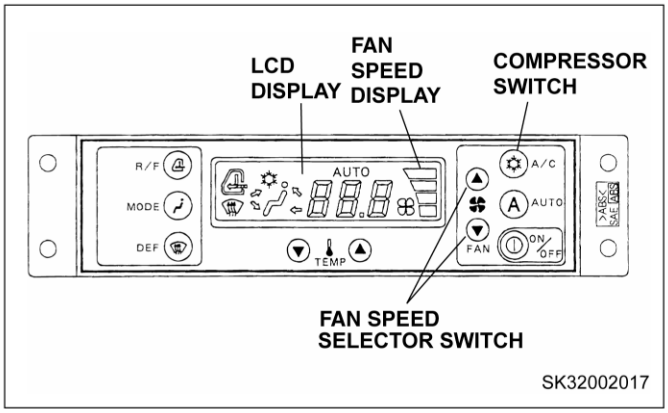


FIGURE 3.21.b

Compressor Switch and Display –FIGURE 3.21.b

Press compressor switch in the condition where mark on LCD display is unlit, compressor starts operating and indicat - or lamp of mark on LCD display goes on.
Press it again, and compressor turns off, and indicator lamp of mark on LCD display goes out.

Air Capacity Selector Switch and Display FIGURE 3.21.c

When it is set to MANUAL mode, fan speed on LCD display is as follows.

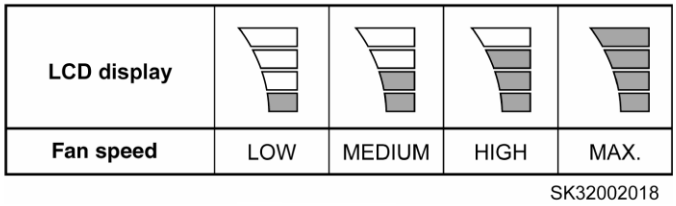


FIGURE 3.21.c

Display	Fan speed
LCD 4 lamps are lit up.	MAX.
LCD 3 lamps are lit up.	HIGH
LCD 2 lamps are lit up.	MEDIUM
LCD 1 lamp is lit up.	LOW

Press UP or DOWN of fan speed selector switch,and auto control of fan speed is released,and “AUTO ”indicator lamp on LCD display goes out.

2. Auto Warm Up System-FIGURE 3.28.a

To activate warm up mode:



- Keyswitch must be in the off position
- Activate warm up switch
- Start engine

Once engine is started mechatrol sets engine RPM to (1050) and "WARMING UP" is displayed.

NOTE

When the accel dial set value is set lower that 1050 RPM engine speed returns to the speed set by the throttle potentiometer

Warming up of hydraulic oil

In this operation, "WARMING UP" is displayed on the multidisplay.

a. After warming up the engine, the computer sets the pump flow rate at a fixed flow for 3 minutes at E/G speed 1,050 rpm.
b. Next the flow rate is increased for 5 minutes at E/G speed 1,600 rpm.
c. The neutral cut valve is closed, engine RPM is increased to 1,600 and flow is set for 5 minutes.
d. Hydraulic pumps are set to maximum flow, for 10 minutes at E/G speed at auto accel speed.

Finishing warming up

a. Auto warming up is competed after about 26 minutes.
b. Or in case where the pilot hydraulic oil temperature switch (installed on the tank port of solenoid proportional valve block senses the temperature of 50 °F (10 °C) or higher.
c. Once the computer program is stopped "WARM FINISH" is displayed on L C D buzzer stops 5 seconds later.

NOTE

Auto warming up can be stopped at anytime by turning switch to off position



FIGURE-3.28.a

SK210 Shown for Reference

CAUTION

Auto warm-up should be utilized anytime machine is started in climate temperatures below 10 °C (50 °F) to stabilize machine control response. Cold oil can cause erratic machine operation.

https://truckmanualshub.com/

3. Travel Speed Select Switch FIGURE 3.29.a



The travel speed select switch is located on the left hand control console. The travel speed select switch is a single position, dual function rocker switch and is used to increase or decrease travel speed. Each time engine is started, travel speed is automatically set to 1 ( ) speed.



.....Low First Speed

Set to LOW when moving the machine on a rough or soft road, slope, or in a narrow place, or when powerful tractive force is required, or loading or unloading from a truck trailer.



..... High 2nd Speed

Set to HIGH when moving the machine on flat, hard ground.

WARNING

DO NOT USE HIGH ( ) SPEED WHEN PERFORMING DELICATE OPERATIONS SUCH AS PIPE LAYING, FINE GRADING OR LOADING MACHINE ONTO A RAILER.
DO NOT CHANGE TRAVEL SPEED WHILE LOADING,MACHINE COULD BECOME UNSTABLE AND CAUSE SERIOUS INJURY, EQUIPMENT DAMAGE AND/OR DEATH.



FIGURE-3.29.a

SK210 Shown for Reference

4. Independent Travel Switch - FIGURE 3.29.a



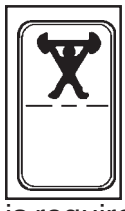
The independent travel select switch is located on the left hand control console. See Figure 03-27.a Use the function where fine metering of attachment operations and travel operations are required. Travel control levers /pedals must be in the neutral position before activation switch.

NOTE

The ED190 uses the travel speed change switch with the new rocker switch for the Mode/Buzzer Stop switch to clear fault codes.

https://truckmanualshub.com/

5. Heavy Lift Switch – FIGURE 2.30.a



The heavy kift switch is located on the left hand control console. The heavy lift switch has 2 operating functions. The heavy lift function is used when precision control of heavy lifting operations is required.

a. "ON "– Push the symbol side of switch down to turn heavy lift function on.

b. "OFF "–Push back of switch down to turn heavy lift function Off.

⚠ DANGER ⚠

NEVER TURN OFF HEAVY LIFT SWITCH DURING ANY HEAVY LIFTING OPERATION. SUDDEN OR UNEXPECTED LOAD MOVEMENT COULD RESULT IN SERIOUS INJURY OR DEATH.



FIGURE 3.30.a

SK210 Shown for Reference

REAR PANEL AND OTHERS

1. Swing Parking Brake Release Switch FIGURE 3.30.b

After removing 4 cover set screws on the rear side of operator seat, release the locks (5 places) of cover section, and remove the upper and lower covers. Swing parking brake is normaly locked. The swing parking brake is released in swing and arm in operation. When the swing function becomes inoperable due toa malfunction, turn toggle switch to "RELEASE LOCK" position, and the parking brake is released. Move machine to a safe area immediately and contact an authorized Kobelco Dealer 's Service Department for assistance. Return the toggle switch to "NORMAL" position after repairs are completed.

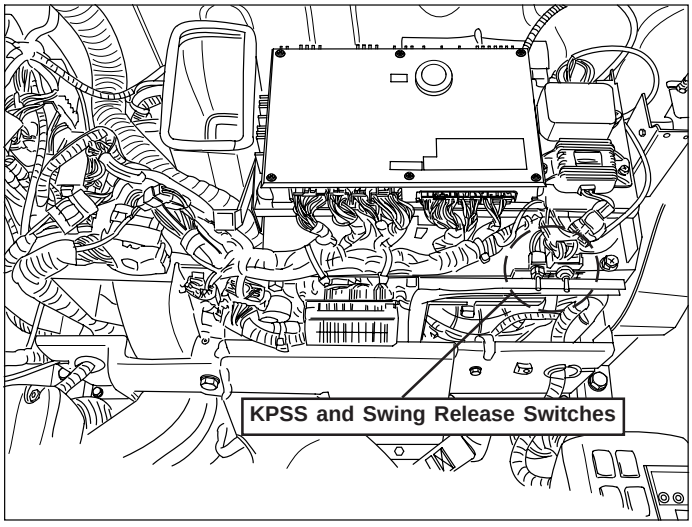


FIGURE 3.30.b

https://truckmanualshub.com/

SK480 Engine Diagnosis Lamps

(Red and Amber) – FIGURE 2.29.A, 2.29.B

Two diagnosis lamps are installed on the left side control panel as indicated in the figure. These lamps will indicate any abnormality in the engine. Refer to the following tables for normal and abnormal condition of the engine:

Normal engine condition

	Key Switch "ON"	Key Switch "During and after Starting engine"
Red lamp	**ON**	OFF
Amber lamp	**ON**	OFF
Condition	Normal	Normal

NOTE 1

During normal conditions, both lamps will illuminate as soon as the key switch is turned to the “ON” postion, and will stay illuminated until the engine is started. Lamps will turn Off, and will stay Off after starting the engine.

Abnormal engine condition

	Key Switch "ON"	Key Switch "ON"	Key Switch "START"
Red lamp	ON (Flashing)	OFF or ON (Flashing)	OFF or ON (Flashing)
Amber lamp	OFF	OFF or ON (Flashing)	OFF or ON (Flashing)
Condition	Engine does not start	Engine starts	Engine starts

NOTE 2

There exists two different abnormal conditions:

- » The red and/or amber lamps will illuminate and flash the engine failure code(s) (See Figure 2.29.B for details on flashing codes). Engine not running mode.
- » The red and/or amber lamps will illuminate and flash the engine failure code(s) (See Figure 2.29.B for details on flashing codes). Engine running mode.

If abnormal conditions appear on engine, refer to Chapter 10 Mechatronics Section for more details on Engine Failure Codes.

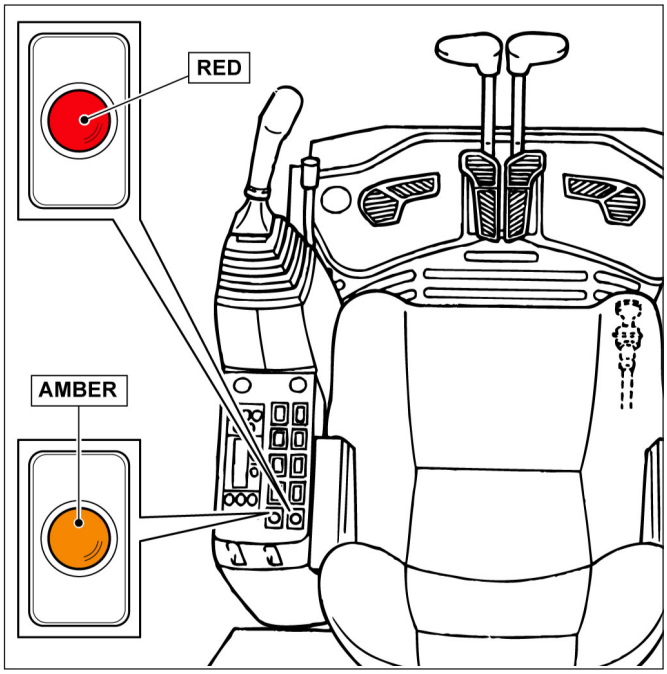
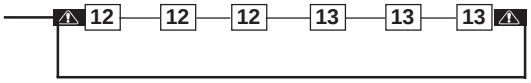


FIGURE 2.29.A

NOTE 3

The code is indicated by a 2 figure number: the code’s first figure lights on for 1.2 seconds and off for 1.2 seconds, and the code’s second figure lights on for 0.4 seconds and off for 0.4 second, as shown inFig. 2.16B. Every code is displayed three times repeatedly, and where there is no more code, the display will return to the first code.

Therefore, in the case where codes 12 and 13 are present:



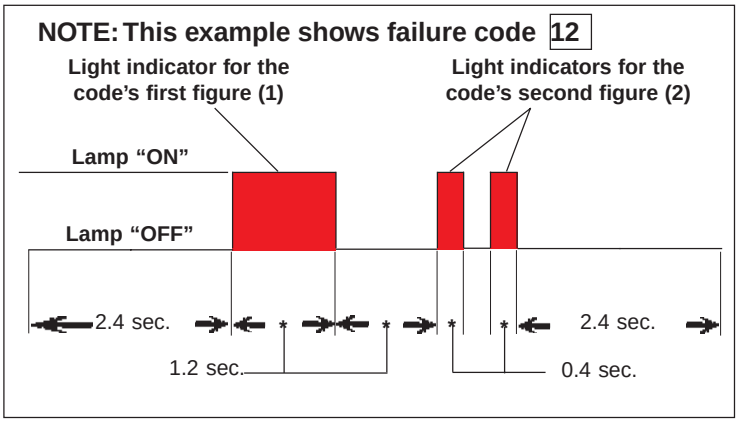


FIGURE 2.29B

NOTE 4

If one of the engine diagnosis lamps (Red or amber) does not illuminate as soon as the key switch is set to the ON position, check for defective light bulb.

https://truckmanualshub.com/

2. KPSS Release Switch – FIGURE 3.32.a

When the LCD screen displays"CPU MECHATRO CONT.FAIL", proceed as follows:

a. Stop the engine.

b. Remove the covers for the control panel located behind the operator's seat:

c. Turn the top 4 screws CCW 90 º to unlock them, press the lower locks to release the cover. Disconnect the speaker wires and remove the top cover.

d. Press the upper locks to release the top side of the lower cover.Then press the lower locks to release the bottom side of the cover to remove it.

e. Locate the switches for the KPSS release and the swing parking brake release switch and flip them to their release position.

f. Install the covers.

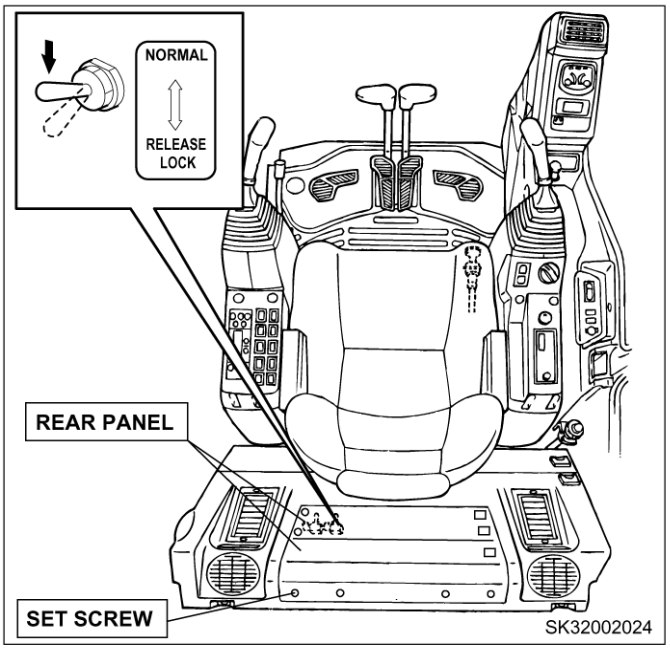


FIGURE 3.32.a

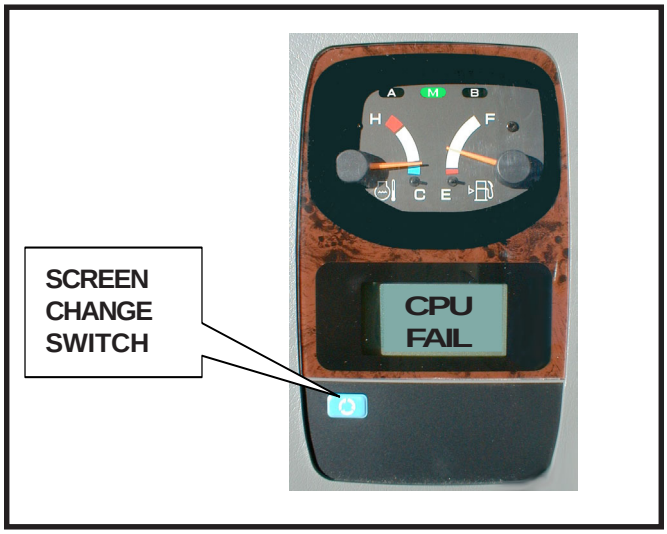


FIGURE 3.32.b

NOTE
The SK480 uses the Mitsubishi 6D24-TLAB Electronic Controlled Injection system. There is no manual throttle control cable available for this model.

3. Installation of Manual Throttle Cable SK160 through SK330 Only.

If the governor motor is damaged or has lost communication to the CPU, it is possible to have manually control of the diesel injection pump from the operators cab.

a. Stop Engine

b. Go to the engine compartment

c. Remove the linkage between the stepping motor and injection pump.

d. Install the manual throttle cable which is standard on most Dynamic Acera excavators. See FIGURE 3.32.c.

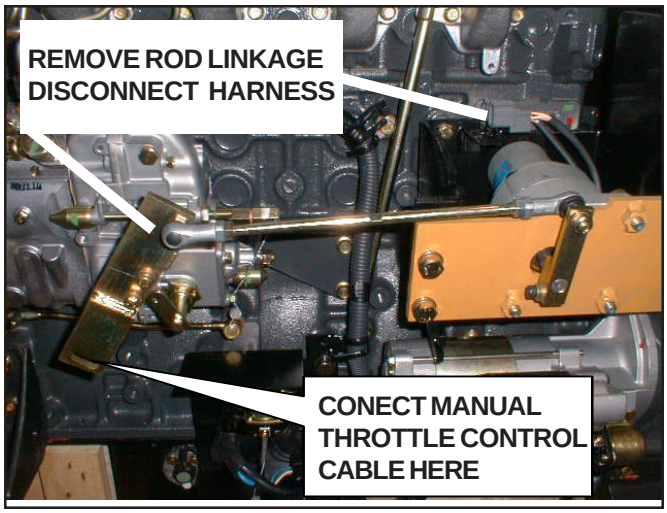


FIGURE 3.32.c

https://truckmanualshub.com/

2. Engine Speed Control Cable – FIGURE 2.33.a

This mechanical system is used to control the engine speed manually if the electronic system fails to operate properly.

a. When the LCD screen displays “STEP MOTOR S/PT ERROR ” and the engine speed can ’t be controlled normally, press the button at the center of the knob and simultaneously pull the cable control to raise the engine speed to high idle conditon.

b. When the LCD screen displays “CPU MECHATRO CONT.FAIL.” and the engine speed can’t be controlled nomally, proceed as follows:

1. Stop the engine.

2. Remove the covers for the control panel located behind the operator ’s seat:

2.1 Turn the top 4 screws CCW 90 º to unlock them and press the lower locks to release the cover.Disconnect the speaker wires and remove the top cover.

2.2 Press the upper locks to release the top side of the lower cover.Then press the lower locks to release the bottom side of the cover to remove it.

3. Locate the switches for the KPSS release and the swing parking brake release and flip them to their release position.

4. Release Back-Up screws on both regulators. See Figure 3.33.b

5. Install rear panel covers.

6. Start the engine.

7. Press the button at the center of the knob and simultaneously pull the cable control to raise the engine speed to high idle condition.

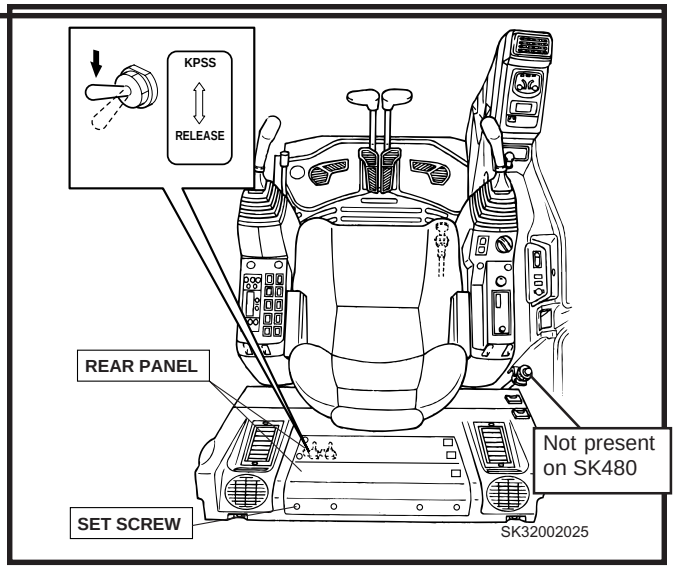


FIGURE 3.33.a

NOTE

Manual throttle control cable is not present on the SK480 Dynamic Acera with Mitsubishi 6D24-TLAB

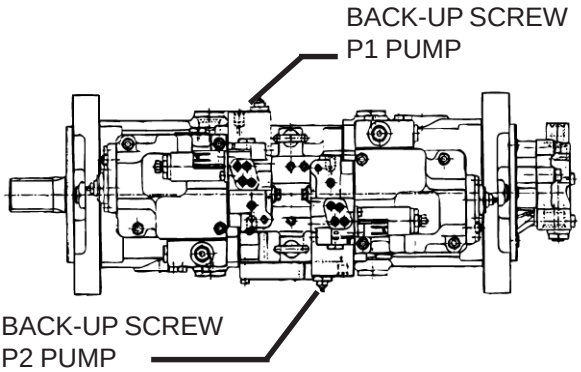


Figure 3.33.b.

NOTE

If the mechanical throttle is pulled (used) when the machine ’s electronic system has no problem, then the Kobelco’s mechatronic system will automatically shut off the stepping motor, and the machine ’s performance will be very erratic. The error code 31 will show on the panel and the machine will not shut down through the ignition key. Set the ignition key to the OFF position and pull the engine emergency stop control to shut off the engine. Make sure the mechanical throttle is pushed in all the way before restarting the machine.

https://truckmanualshub.com/

Pump Regulator Back-up Function

(Except SK160/ED190)

Hydraulic Back-up

- If “MECHATRO CONT. FAIL” and “STEP MOTOR S/PT. ERROR” are displayed on the gauge cluster multidisplay, the machine cannot be operated normally.
- The machine is equipped with back-up function to actuate the Throttle and hydraulic pumps. The following procedure will allow the hydraulic pump to operate at 90% capacity enabling continuous work.
- Procedure to have back-up function of pump regulator.

1. Stop the engine.

2. Change hydraulic pumps to **Manual Control** back-up Mode:
   Loosen the lock nuts of two back-up screws. See Figure 3.34.a & Fig. 3.34.c

3. Turn the back-up screws counterclockwise out until they stop.

4. Retighten the lock nuts.

NOTE
Not Available on SK160/ED190

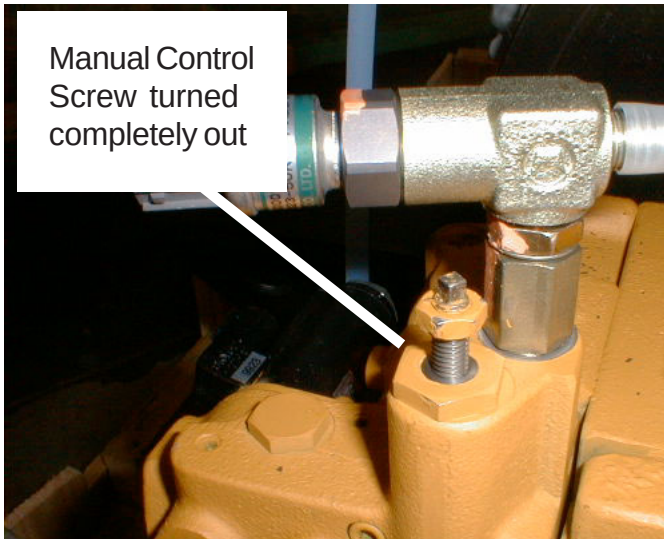


Figure 3.34.a.

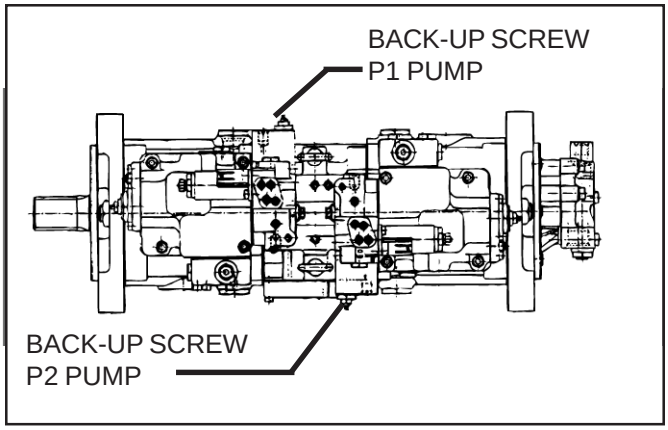


Figure 3.34.b.

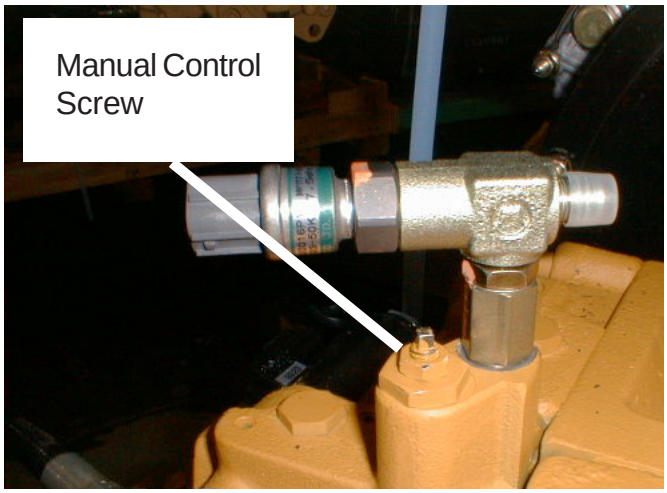


Figure 3.32.c.

https://truckmanualshub.com/

Back-up function - cont.
Engine Speed Control Cable

4. Place throttle at low idle. Start the engine.
5. To increase engine speed, press the center button of engine control knob, and simultaneously pull cable control to raise the engine speed to to be maintained.

   (See Figure 3.35.a)
6. Resume working
7. After finishing the work, press the center button of engine control cable and concurrently push down the knob, and the engine speed returns to low idling.
8. Stop the engine by pulling the emergency stop cable, then turn off the keyswitch.

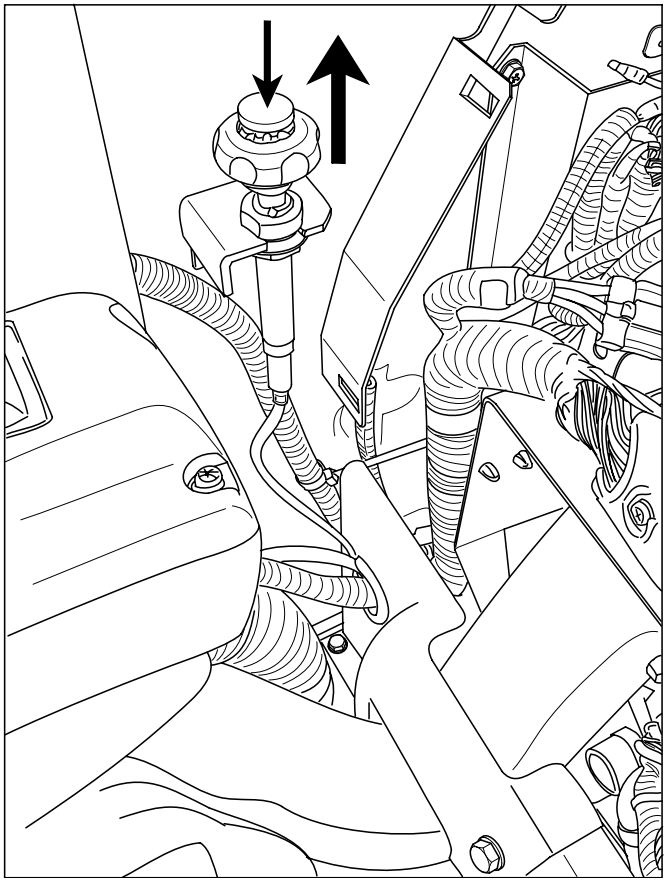


Figure 3.35.a.

NOTE

1. The fuel level and engine water, work lights, wiper, air-con, radio, etc. on the cluster gauge function the same as when in the normal condition.
2. Machine function is performed at almost the same level as when in the normal condition.
3. The backup functioning time has only slight effect on the performance of the machine, but inspection and repair are required to correct the trouble.
4. Should gauge cluster display fail, the fuel level and E/G water temperature are not indicated, also other cluster gauge function are not possible.
5. Also, for the failure shown in Item 4, it may cause trouble with daily operation, so immediate inspection and repair are required.
6. When the hydraulic pump is set to the backup function, the control of KPSS work mode switch is not required.

NOTE

The above manual throttle assembly is not available on the SK480.



3. Power Boost Switch – FIGURE 3.36.a

Located on the right hand control lever,this switch should only be used for increased break out force during digging.

DANGER

DO NOT USE POWER BOOST FOR LIFTING OPERATIONS. INSTEAD, USE THE HEAVY LIFT SWITCH.

NOTE

Use of power boost is prohibited with arms longer than 2.94 M (9 ’8 ”) {SK210(LC)–VI},and 2.98 M (9 ’9 ”) {SK250(LC)–VI} is installed. Contact your Kobelco dealer for instructions on how to disconnect the power boost function.

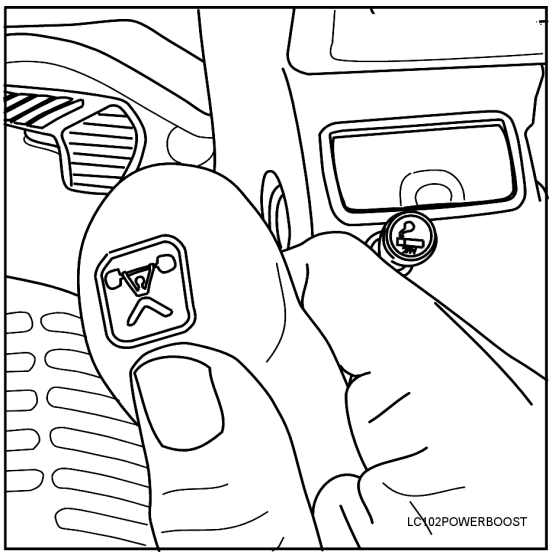


FIGURE 3.36.a

4. Fuse Box – FIGURE 3.36.b

The fuse box is located behind the operators seat. It contains all necessary fuses for the electrical circuits of the machine. Should it become necessary to inspect or change a fuse,remove the fuse box cover by gently pulling each end away from the box.Should a fuse require replacement,use a replacement fuse of the same type and amperage. Turn key switch to “ OFF ”and wait approximately 4 seconds for all electrical power to stop before removing or replacing a bad or blown fuse.The fuse cover incorporates a fuse puller to remove fuses.

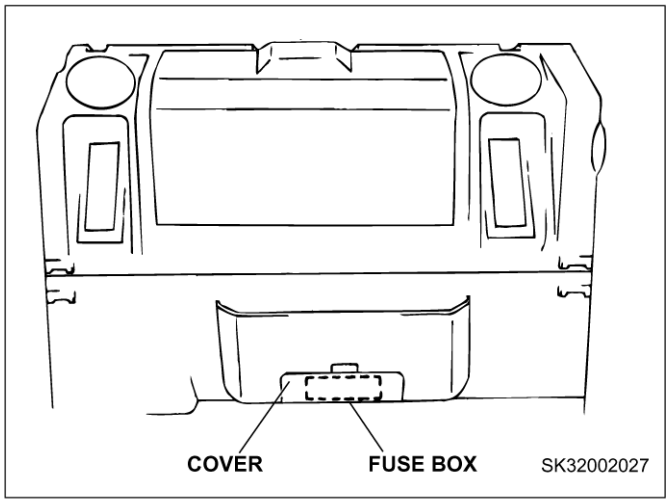
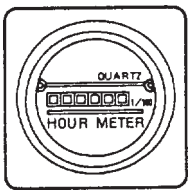


FIGURE 3.36.b

5. Hour meter



The numbers on the digital hour meter are visible even when the keyswitch is in the off position! See Figure 3.36.c The meter records the total engine operating time. If the engine is rotated the hour meter advances. The graduation runs in 1 step to 1 hour of operating time regardless of the engine speed. The indicated figures on the hour meter can be used as a guide line to understand the interval for inspection and maintenance.

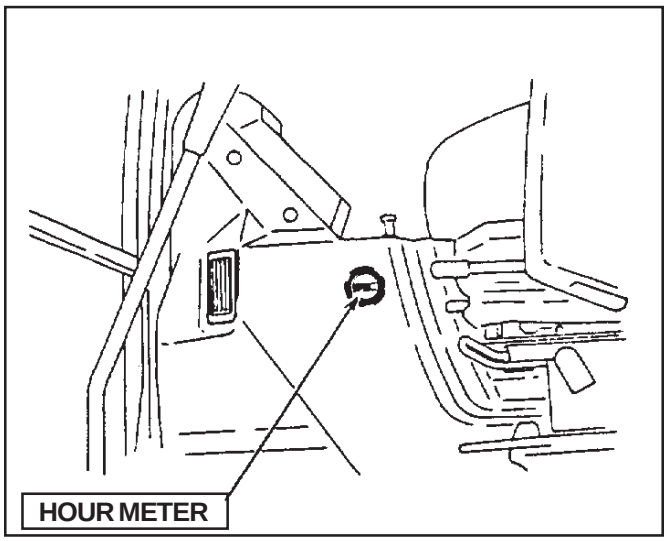


FIGURE 3.36.c

https://truckmanualshub.com/

6. 12 Volt Power Supply – FIGURE 3.37.a

The 12 volt power supply is located beside the right side switch panel. For use of common auto accessories such as a fan or other accessories requiring 12 volt (DC) power, pull cover away from 12 volt power supply and insert 12 volt male socket into power supply. Replace cover after use.

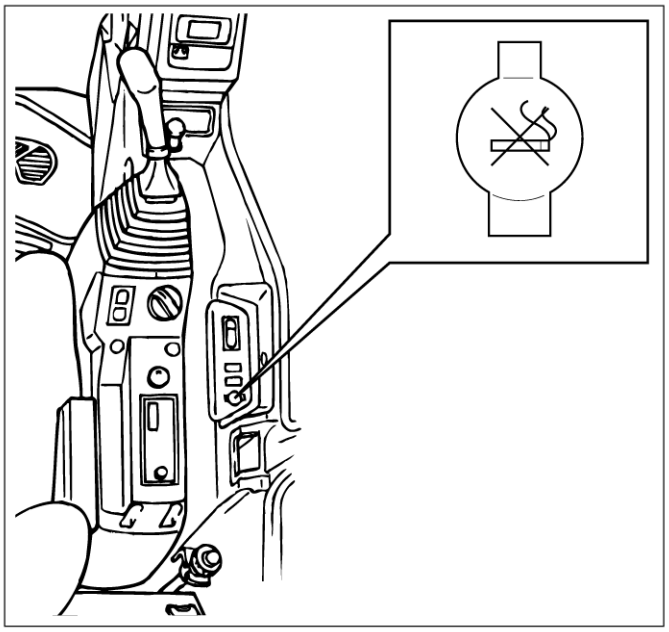


FIGURE 3.37.a

Operating Levers & Controls

1. Engine emergency stop knob – FIGURE 3.37.b



When the engine does not stop when the keyswitch is turned to Accesory or off position, pull the emergency stop knob on the lower right hand side of the seat fully out. See Figure 3.37.c This will disrupt the fuel to the injection pump and engine stops.

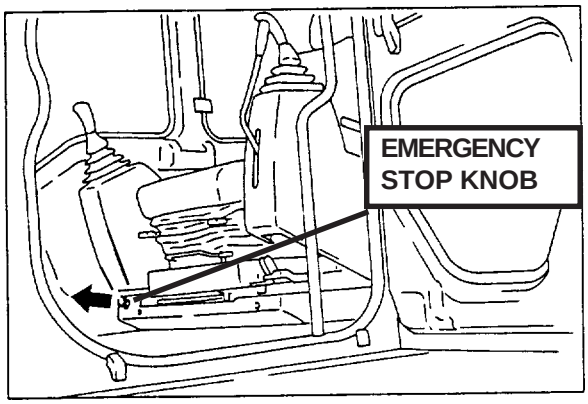


FIGURE 3.37.b

NOTE

1. Not returning the emergency knob completely in may make engine restarting impossible or cause poor engine performance. Be sure to return the knob completely in after usage.

2. Since the engine speed cannot be adjusted correctly during mechatronic A adjustment, be sure to return the emergency stop cableknob completely in.

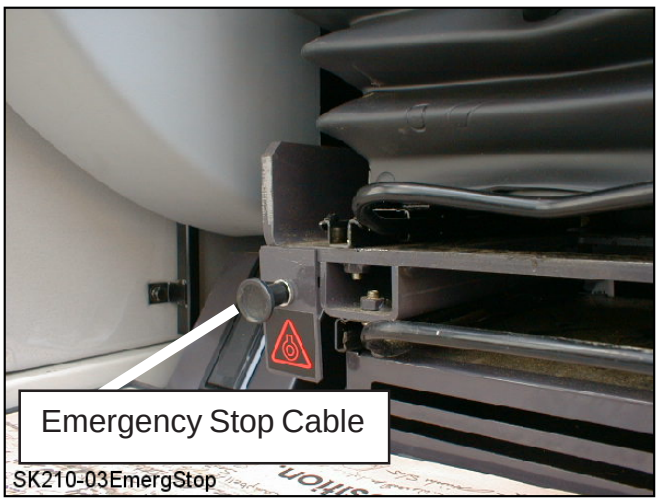


FIGURE 3.37.c

CAUTION

Do Not suddenly stop the engine when operating at high RPM. Doing so may damage turbo or engine.

https://truckmanualshub.com/

3. Safety Lock Lever – FIGURE 2.38.a

The safety lock lever is located on the front outside of the left hand operator console and is red in color. The safety lock Lever is used to lock out the hydraulic controls disallowing the use of any hydraulic function. The safety lock Lever has 2 operating positions.

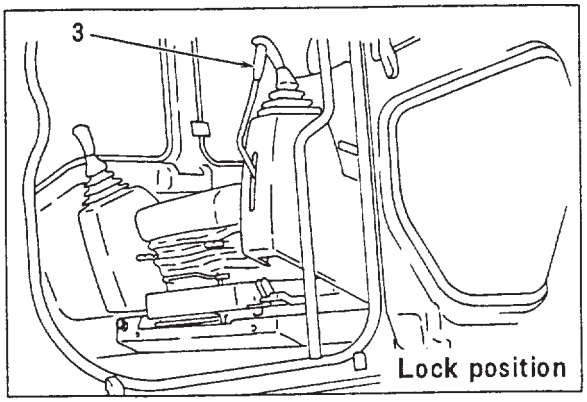


"UP "- When placed in the up position the safety lock lever stops all hydraulic controls from functioning and allows the operator to enter and exit the operator seat.

"DOWN "- When placed in the down position,



the safety lock lever allows all operating functions of the hydraulic controls to resume and also locks the left hand operating console in operating position.



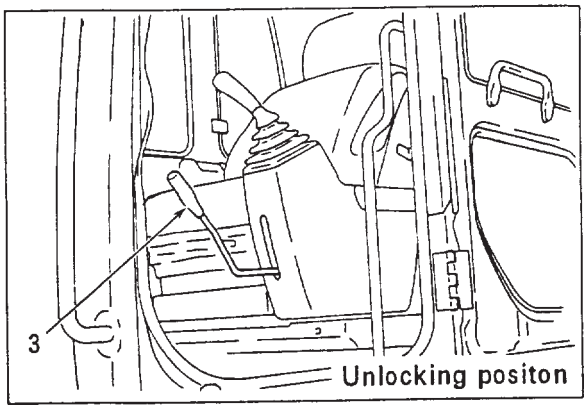


FIGURE 3.38.a

CAUTION

ALWAYS PLACE THE SAFETY LOCK LEVER IN THE LOCKED (UP)POSITION BEFORE LEAVING THE OPERATOR'S CAB.
NEVER LEAVE THE MACHINE UNATTENDED WITH ENGINE RUNNING OR LEVER IN THE DOWN POSITION.

4. Adjustment of Pilot Control Levers Height –FIGURE 2.38.b

To adjust the height of the pilot control levers, use a 17 mm wrench and remove capscrew (M10)under the operator console. The 3-stage setting hole position is as follows:

a. From factory,the hole is set to the medium position (H1).

b. If it is set to the medium position (H1), the valve height is raised 10mm (0.4").

c. When it is set to the lowest position (H2), the height is raised max.20mm (0.8 ").

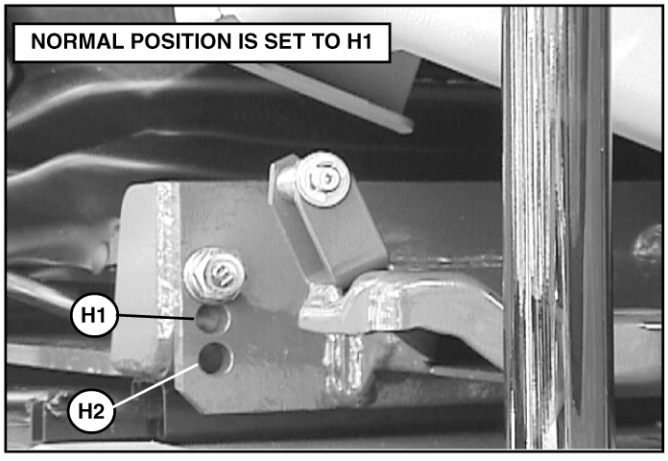


FIGURE 3.38.b

https://truckmanualshub.com/

CAUTION

Hydraulic controls are designed for and set to ISO operating pattern for optimum machine performance and safety. Changing the control pattern will effect the performance of the machine.

5. **Left Hand Operator Control Lever – FIGURE 2.39.a**
   The left hand operator control lever is located at the top front of the L.H.operator console. Its purpose is to allow the operator to control operations of the swing and arm. Operating speed of function is variable from stop to full stroke operational functions depending on how far levers operated. The left hand operator control lever has four basic operational functions.
   a. "FORWARD "– Variable speed arm out.
   b. "BACKWARD "– Variable speed arm in.
   c. "LEFT "– Variable speed left swing.
   d. "RIGHT "– Variable speed right
   e. "CENTER "– Neutral position.

6. **Right Hand Operator Control Lever – FIGURE 2.39.b**
   The right hand operator control lever is located at the top front of the R.H. operator console. Its purpose is to allow the operator to control operations of the boom and bucket. Operating speed of function is variable from stop to full stroke depending on how far lever is operated. The right hand operator control has four basic operational functions.
   a. "FORWARD "– Variable speed boom down.
   b. "BACKWARD "– Variable speed boom up..
   c. "LEFT "– Variable speed bucket in (digging).
   d. **.** "RIGHT "– Variable speed bucket out (Dump).
   e. "CENTER "– Neutral position.

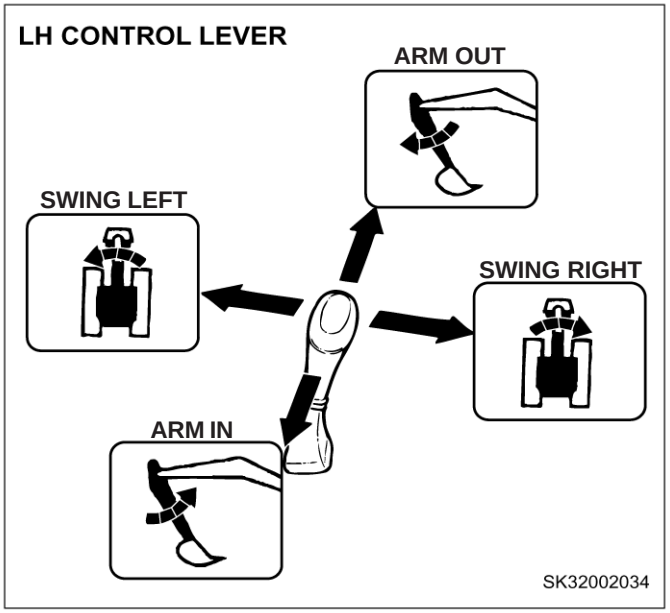
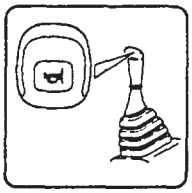


FIGURE 3.39.a

Horn Switch



Horn sounds while the switch on the grip upper section is pressed. See Figure 3.37.a

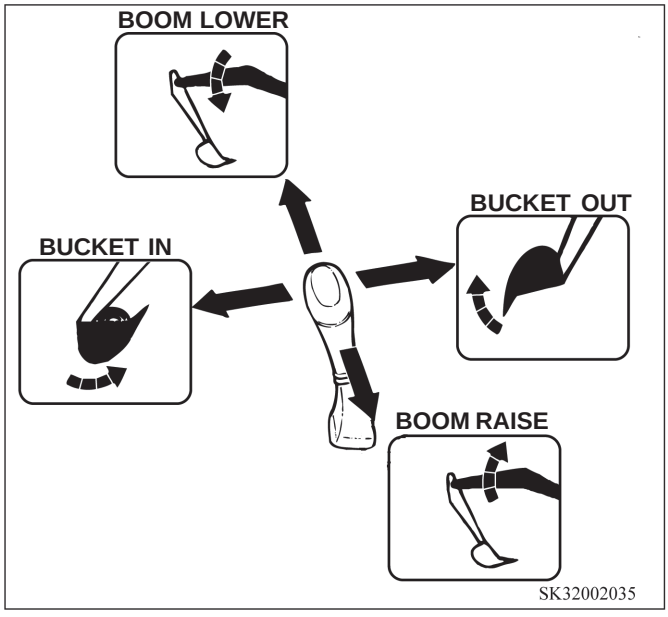
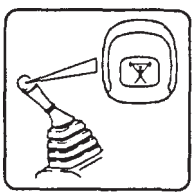


FIGURE 3.39.b

Power Boost Switch



When boost power is required for the remove an obstruction, press the switch on the grip upper section, the hydraulic system will provide a stronger digging force. See Figure 3.39.b.

https://truckmanualshub.com/

THESE OPERATIONS ARE WITH TRAVEL MOTORS POSITIONED BEHIND THE OPERAOR 'S CAB.

7. **Left and Right ravel Levers & Pedals –FIGURE 2.40.a**
   The travel lever & pedal are located in front of operator seat. They are used to move the left or right track of the machine either forward or backward. These controls have 2 basic operational functions.
   a. "FORWARD "–Variable speed forward track movement.
   b. "BACKWARD "–Variable speed r e - verse track movement.
   c. "CENTER "–Neutral position.

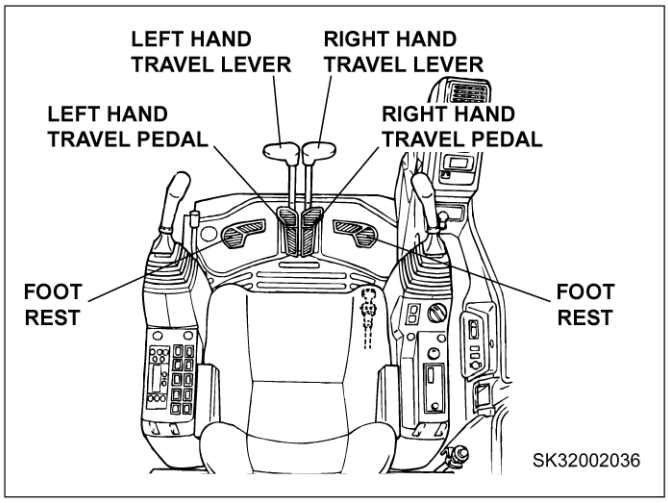


FIGURE 3.40.a

8. **Removing the Travel Control Levers**
   a. Use a 13 mm wrench to remove the travel control levers from the travel pedals, see Figure 2.40.b.
   b. Use a 17 mm wrench to remove the support brackets located in the air cleaner compartment, see Figure 2.40.b.
   c. Store the travel control levers properly in the air cleaner compartment and securely tighten the brackets.

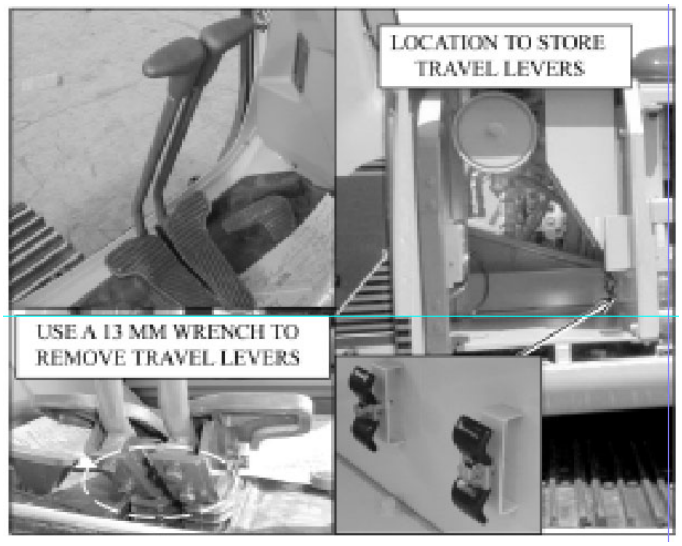
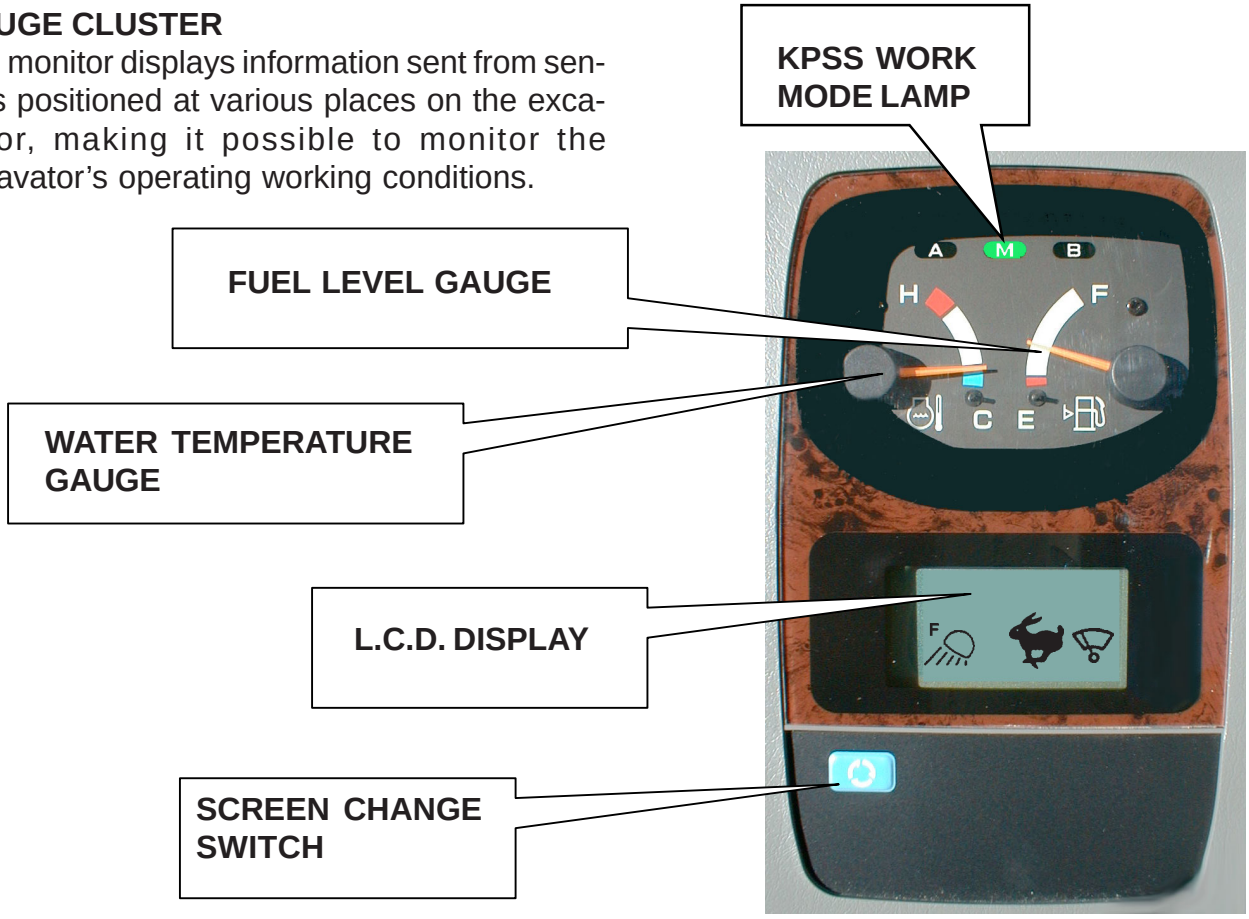


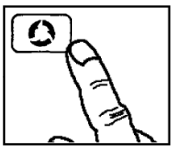
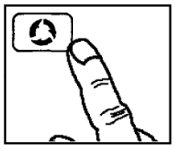
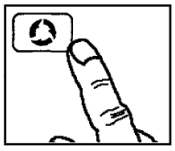
FIGURE 3.40.b

https://truckmanualshub.com/

GAUGE CLUSTER

The monitor displays information sent from sensors positioned at various places on the excavator, making it possible to monitor the excavator's operating working conditions.



START THE ENGINE	OK	
PRESS THE SCREEN CHANGE BUTTON 	2250 RPM	ENGINE RPM
PRESS THE SCREEN CHANGE BUTTON 	256 Hr ATF E/G OIL CH	ACCUMULATED HRS SINCE LAST ENGINE SERVICE
PRESS THE SCREEN CHANGE BUTTON 	OK	

https://truckmanualshub.com/

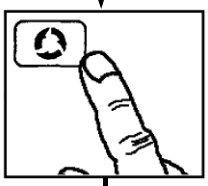
5.How to Calibrate the Engine Oil Change Interval.

TURN ON THE IGNITION SWITCH.



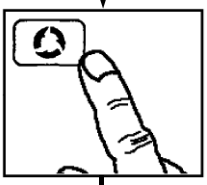
OK

PRESS THE GAUGE CLUSTER SCREEN CHANGE SWITCH ONCE.



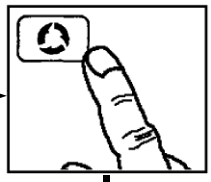
2250 RPM

PRESS THE GAUGE CLUSTER SCREEN CHANGE SWITCH AGAIN, AND THE ACCUMULATED HOURS SINCE THE LAST ENGINE SERVICE IS DISPLAYED.



256 Hr ATF
E/G OIL CH

PRESS THE GAUGE CLUSTER SCREEN CHANGE SWITCH FOR 5 TO 10 SEC. AND RELEASE IT.



OK

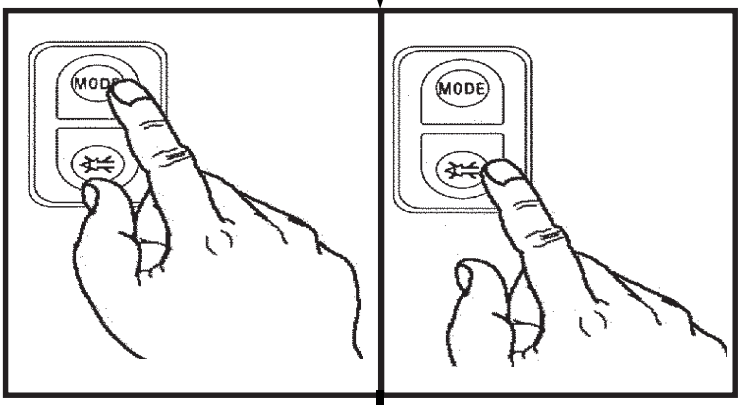
THIS SIGNAL APPEARS ON THE SCREEN AS LONG AS YOU DEPRESS THE SCREEN CHANGE SWITCH. IT WILL CHANGE AS SOON AS THE SWITCH IS RELEASED

THIS SIGNAL DOES NOT FLICKER

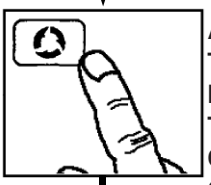
256 Hr ATF
E/G OIL CH

PRESS THE MODE SWITCH TO INCREASE THE HOURS

PRESS THE BUZZER SWITCH TO DECREASE THE HOURS



NOTE: IF SWITCH IS DEPRESSED CONTINUOUSLY, HOURS WILL CHANGE RAPIDLY



AFTER SETTING THE DESIRED HOURS, PRESS THE GAUGE CLUSTER SCREEN CHANGE SWITCH TO RECORD THEM IN THE SYSTEM

OK

https://truckmanualshub.com/

L.C.D.Display

The L.C.D.Display is illustrated below and will display the Icons listed on this page. Study these icons and their definitions so that possible problems will be quickly recognized and repairs made in a timely fashion.

Normal displays

1. SYSTEM STATUS ICON



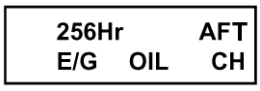
This icon will display after key switch is turned “ON” and all machine systems and components are checked by CPU and found to be in good working order.

2. ENGINE R.P.M.ICON



The engine speed (output) corresponding to the throttle potentiometer position is displayed.

3. ENGINE LUBRICATION CUMULATIVE TIME



256 hours has elapsed since the change of engine oil. This mark shows the total cumulative time on and after the time when the engine oil has been changed.

B. Warning Displays

WARNING DISPLAYS

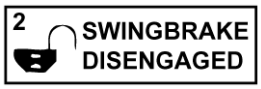
The Buzzer will sound the instant #2,#3,#5,#6,#7, #9 and #28 warning icons are displayed.

1. I.T.C.S.CONTROLLER-CPU ICON



This icon will display when a problem exists in the I.T..C.S. (Intelligent Total Control System). Turn Key switch “OFF ”,wait for 4 seconds until the system shuts down completely, then turn the switch back to “ON ”to reset the CPU program.Should this icon remain on display, stop operation, stop engine call KOBELCO Service Technician for temporary CPU bypass procedures.

2. SWING PARKING BRAKE RELEASE ICON



Turn the “Slewing Parking Brake Release Switch ”on the rear side of operator ’s seat to the “RELEASE ”position,and this warning is displayed. While this warning is displayed, the swing parking brake does not actuates. This switch should be used only in the event of emergency.Call KOBELCO service.

3. KPSS RELEASE ICON



Turn the “KPSS Work Mode Release Switch ”on the rear side of operator ’s seat to the “RELEASE ”position,and this warning is displayed.While this warning is displayed,the normal electric and hydraulic controls are impossible.This switch should be used only in the event of emergency.Call KOBELCO Service for assistance

4. ENGINE PRE-HEATING ICON



This symbol is displayed when key switch is turned to heat position and the engine preheat circuit is activated. This display goes out at completion of pre-heating,at which time FINISH PREHEAT is displayed.

5. ENGINE PRE-HEAT COMPLETE ICON



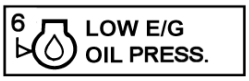
This icon is displayed when the PREHEAT is completed.If the buzzer sounds and can ’t be stopped,turn key switch to the OFF position and wait for 4 sec ’s until the electrical system is turned off.Then start engine.Continuous preheat after this icon is displayed could cause damage to the engine.

NOTE

Do not operate the preheat position of the key switch for more than 20 seconds at one time.

https://truckmanualshub.com/

6. ENGINE OIL PRESSURE ICON



This icon will display and the Buzzer will sound should the Engine Oil Pressure drop below a safe operating pressure.If this icon is on the display and Buzzer is sounding,stop the engine immediately and check engine oil level. Fill engine to proper level with approved motor oil.

If computer sences engine LOW OIL PRESSURE, engine speed will automatically go to "Lo idle", then immediately shut down.

This icon will Display only if alternator is charging.

7. ENGINE COOLANT TEMPERATURE ICON



This icon will display and the Buzzer will sound should the Engine Coolant Temperature rise above safe operating temperature.Should this icon display and Buzzer sound,reduce engine RPM to idle and stop operation until engine coolant temperature reaches a safe operating temperature range

9. ENGINE AIR CLEANER ICON



This icon will display should the Engine Air Cleaner Element(s)(FILTERS) become too dirty to allow proper air flow to the engine. Should this icon display stop engine immediately and clean or replace Engine Air Cleaner Element(s) as required. This icon will Display only if alternator is charging.

10. OVER LOAD ALARM ICON (Europe only)



This icon will display and the Buzzer will sound should the Boom Cylinder Circuit Pressure exceed the set, specified pressure. Should this icon display and the buzzer sound,immediately stop all operation, stop engine and contact an authorized KOBELCO Service dealer for service assistance.

11. BATTERY CHARGING SYSTEM ICON



This icon will display the electrical charging system not function properly. Should this icon display,have the electrical charging system repaired immediately.Icon displays only when engine is running with normal oil pressure and a problem occurs in the charging system.

12. FUEL LEVEL ICON



This icon will display should the Fuel Level in Fuel Tank reaches 54 liters (14 Gal.)or less.Should this icon display refill fuel tank immediately using approved fuel oil.

13. HYDRAULIC OIL LEVEL ICON (PreStart Icon)



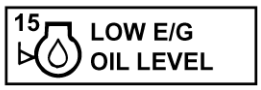
This icon will display should the Hydraulic Oil Level in hydraulic oil reservoir fall below safe operating level. Should this icon display before starting engine,position machine in Hydraulic Oil Check position and check sight gauge for oil level. Fill hydraulic reservoir to proper level using approved hydraulic oil.This icon will not display with engine running and a loss of hydraulic oil is experienced.

14. ENGINE COOLANT LEVEL ICON (PreStart Icon)



This icon will display should the Engine Coolant Level fall below safe operating level.Should this icon display before starting the engine,check and fill coolant level in the radiator and coolant reservoir.Icon will not display if alternator is charging and a sudden loss of coolant is experienced.

15. ENGINE OIL LEVEL ICON (PreStart Icon)



This icon is displayed when the engine oil level of the engine oil pan is low. Check the engine oil level mmediately and make up the shortage of the engine oil.

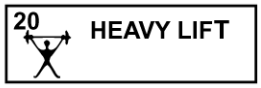
https://truckmanualshub.com/

19. ATTACHMENT BOOST PRESSURE ICON



This icon will display when the Power Boost Switch is depressed.This icon is displayed only when this system is activated during operation.

20. HEAVY LIFT PRESSURE ICON



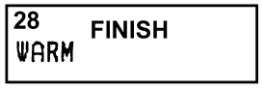
This icon will display when the Heavy Lift Switch is in the “ON ”position.This icon is displayed only when this system is activated during operation.

21. AUTO WARMING UP ICON



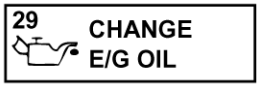
This icon is displayed to indicate the warming up operation of the engine and hydraulic oil when the engine runs in decel condition after the key switch is turned on and the auto warm up selector switch on the left console is set to “ON ” position. Turn off the auto warm up select switch,and the key switch OFF,to forcibly stop the auto warm up system and the display disappears.

28. AUTO WARMING UP FINISH ICON



This icon is displayed when the warming up of the engine or hydraulic oil is finished or the warming up is stopped forcibly by operating the lever or turning the auto warm-up switch OFF forcibly,and concurrently the buzzer sounds continuously for about 5 seconds.

29. REPLACE ENGINE OIL ICON



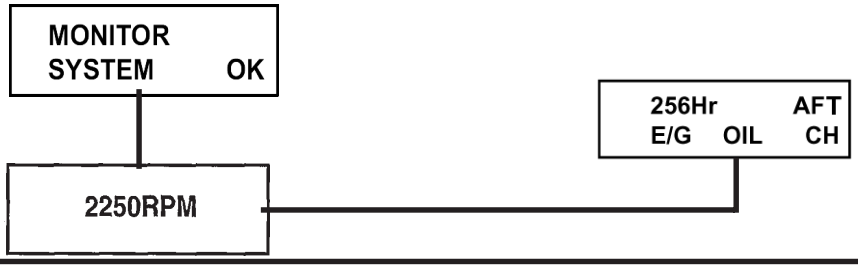
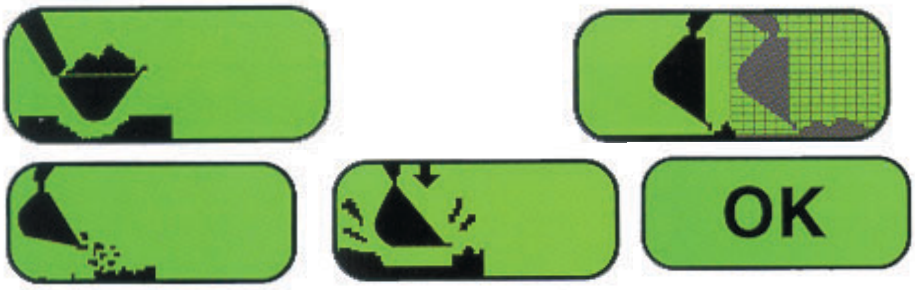
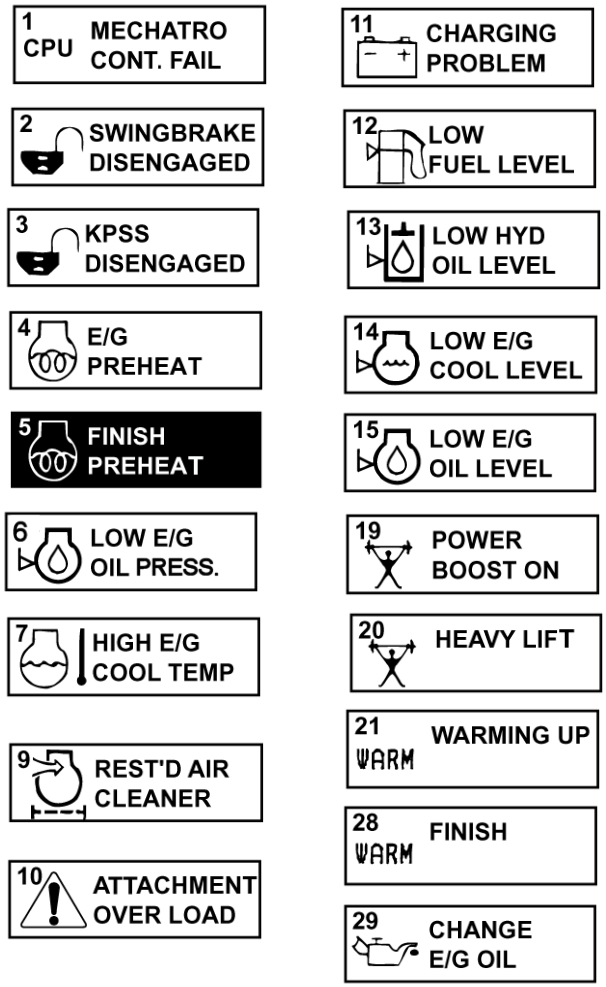
This icon will display at every 500 hours of machine operation to remind operator of scheduled engine oil change.The recommended oil change interval for MITSUBISHI engines is every 500 hours of operation.

When this icon is displayed and the buzzer sounds,press the buzzer stop switch once to stop the buzzer sound, and a second time to reset the oil change interval to Zero.Make sure to recalibrate the engine oil change intervals.

https://truckmanualshub.com/

The following chart s aimed at familiarizing personnel with the priority of the Gauge Cluster Display Icons.Pay close attention to these icons as they can aid in avoiding unnecessary repairs and expense.

The icons in the chart below are listed in priority from the most serious to least serious. EXAMPLE:If the engine oil pressure is abnormal and Fuel level s low, the engine oil pressure Icon will display and buzzer will sound. After the oil pressure is back to safe operating pressure, the low fuel Icon will display.

LCD display	SERVICE FUNCTION ICON SEQUENCE	BUZZER SOUNDING
NORMAL DISPLAY		No sounding
Note: Assist mode not available on SK480 ASSIST MODE DISPLAY	 Supplementary Explanation : The screen can be switched into three images by pressing the screen change switch.	No sounding •For the description of display of the assist mode. •Each display flickers during operation.
WARNING		•#2,#3,#5,#6, #7,#10,#28 Buzzer sounds. Supplementary Explanation : Icons #5 and #6 are displayed and buzzers do not stop sounding even if the buzzer stop switch is pressed. When icon 6 is displayed,the engine RPM will idle immediately and the engine will shut down after 15 seconds. Icon #7 is displayed and buzzer stops sounding when the buzzer stop switch is pressed. Icons #2,#3,#10 and #28 are displayed and buzzers sound intermittently and stop sounding after 5 seconds.

https://truckmanualshub.com/

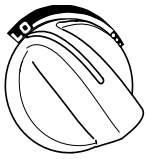
⚠ DANGER ⚠

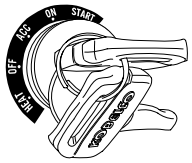
DO NOT OPERATE MACHINE UNLESS YOU HAVE READ AND UNDERSTOOD THE INSTRUCTIONS IN THE OPERATOR'S MANUAL. IMPROPER MACHINE OPERATION IS DANGEROUS AND COULD RESULT IN INJURY OR DEATH.

PATTERN CONTROL CHANGE

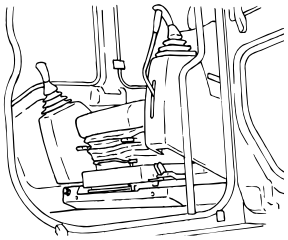
A. To change the machine's control pattern from SAE to Back Hoe Loader pattern, proceed as follows:

1. Place the attachment on the ground, throttle control in low idle, and turn the ignition key off.



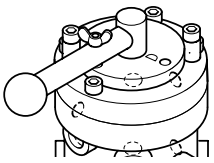


2. Place the safety lever in the lock and up position before leaving the cab.

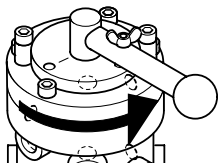


3. Open the air cleaner compartment door, locate the pattern changer valve and change valve's handle postion from "I" (SAE) to "D" (Back Hoe Loader).

SAE PATTERN



BHL PATTERN



⚠ WARNING ⚠

CHECK MACHINE'S CONTROL PATTERN FOR CONFORMANCE TO PATTERN ON DECAL-CARD IN CAB. IF PATTERN DOES NOT MATCH DECAL-CARD ON CAB DOOR HOLDER, FLIP DECAL-CARD ON HOLDER TO MATCH THE MACHINE'S CONTROL PATTERN BEFORE OPERATING MACHINE. FAILURE TO DO SO COULD RESULT IN INJURY.

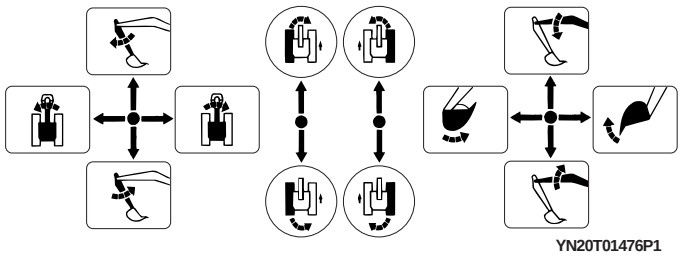
⚠ WARNING ⚠

SHOULD THE CONTROL PATTERN DECAL-CARD IS LOST, ORDER P/N: YN20T01476P1.

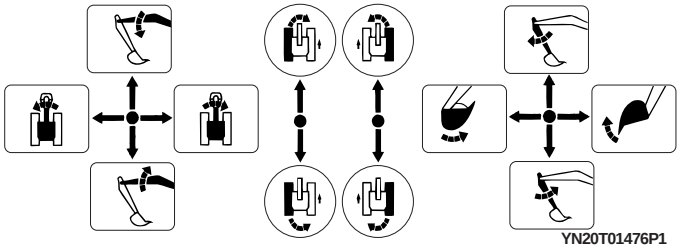
⚠ WARNING ⚠

WHENEVER A CHANGE IS MADE TO THE MACHINE'S CONTROL PATTERN, ALSO EXCHANGE THE PATTERN DECAL IN THE CAB TO MATCH THE NEW PATTERN.

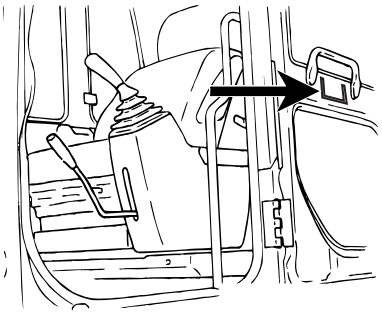
SAE PATTERN

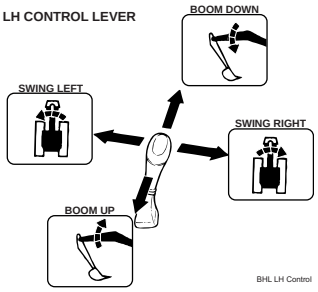


BHL PATTERN



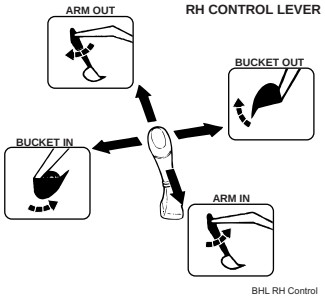
B. Make sure to place the BHL pattern plate in its respective holder, located below the cab door handle. Make sure BHL pattern is showing.





C. Slowly operate Left Hand control to make sure it matches BHL pattern and to familiarize yourself with the new control pattern.

D. Slowly operate Right Hand control to make sure it matches BHL pattern and to familiarize yourself with the new control pattern.



https://truckmanualshub.com/

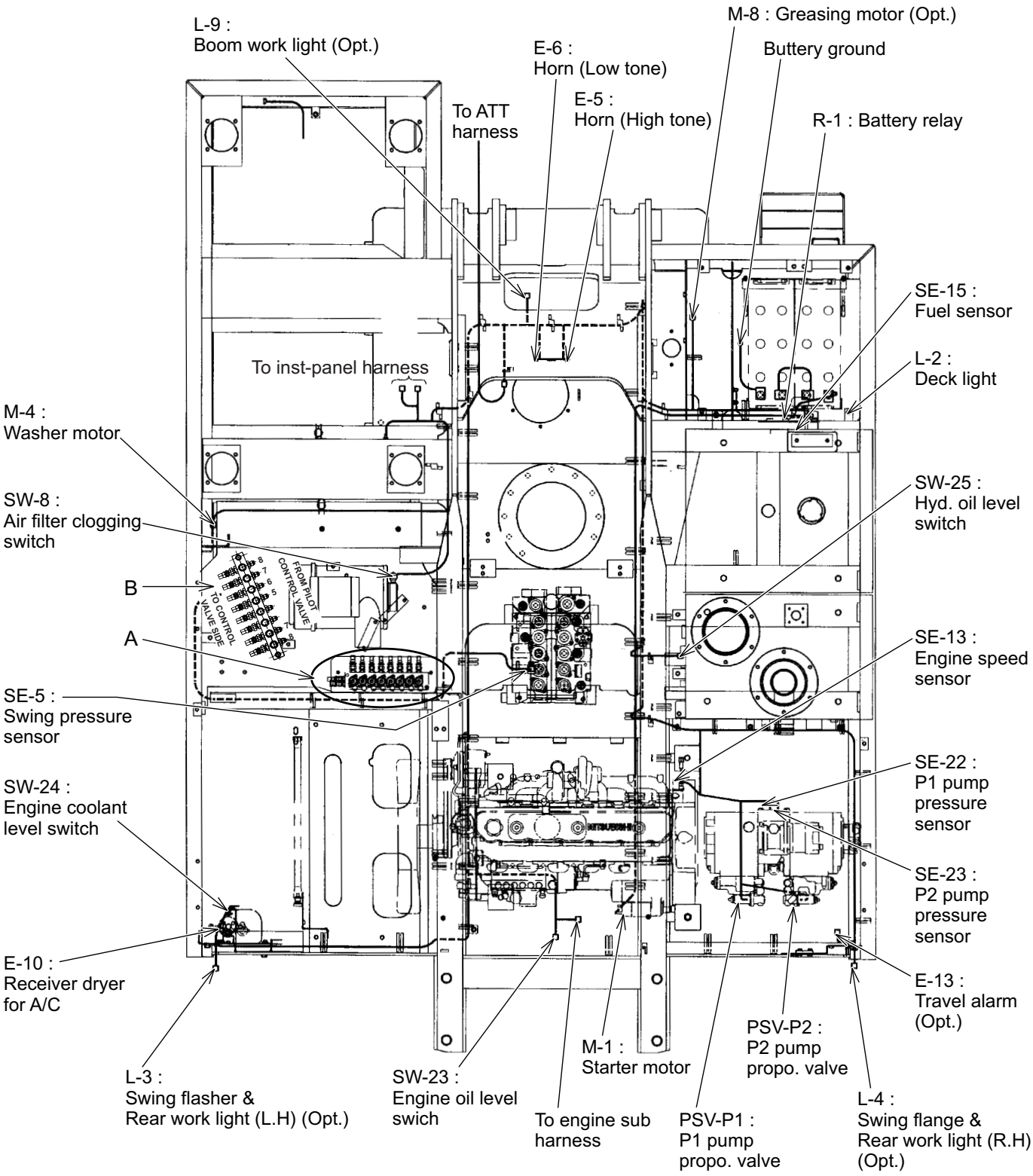
Table of contents

Page

3.1 LAYOUT OF ELECTRIC COMPONENTS 3-2
A. Parts related to upper frame 3-2
B. Harness grounding locations 3-3
C. Parts related to operator's cab 3-4
D. Parts related to frame 3-7
E. Parts related to engine 3-8
F. Mechatronic controller connectors 3-9
3.2 LOCATION OF SOLENOID BLOCK AND SENSOR BLOCK 3-10
A. Solenoid block 3-11
B. Pump proportional solenoid valves (PSV-P1 and PSV-P2) 3-12
C. Pressure sensors 3-13
3.3 GOVERNOR MOTOR (M-2) 3-15
3.4 ENGINE SPEED SENSOR (SE-15) 3-17
3.5 ACCEL POTENTIOMETER (SE-16) 3-18
3.6 REAR CONTROL PANEL 3-19
3.7 OUTLINE OF MECHATRONIC CONTROL SYSTEM 3-26
3.8 MACHINE OPERATION 3-27
3.9 MULITDISPLAY SELF DIAGNOSIS 3-28
3.10 TROUBLE HYSTORY DIAGNOSIS 3-30
3.11 MECHATRONIC CONTROLLER "A" AND "B" ADJUSTMENT 3-31
3.12 SERVICE DIAGNOSIS 3-34
3.13 GENERAL TROUBLESHOOTING 3-38

3.1 LAYOUT OF ELECTRIC COMPONENTS

A. Parts related to upper frame



A: Solenoid block

B: The sensor block for KCMA machines is the same as before minor changed machine, but only one sensor is used for the swing system and it is located at main control valve

https://truckmanuals.com/

B. Harness grounding locations

Note : Ⓑ are connected with Ⓔ by harness
Ⓒ is attached to upper frame
Ⓓ is attached to floor plate
Ⓔ to Ⓗ are connected with controller box
Ⓙ is attached to E/G
Ⓚ is connected whth E/G

Ⓕ
Lever lock SOL
ATT boost SOL
Travel 1, 2 Speed SOL
Swing parking SOL
Air filter clogging SW
Washer motor
E/G coolant level SW
Governor motor
E/G oil level SW
Swing flasher & Rear work light (L.H)
Hyd. oil temp. SW (Opt.)

GND between Upper frame and Floor

Ⓘ
GND of travel 1, 2 speed SW at under floor plate

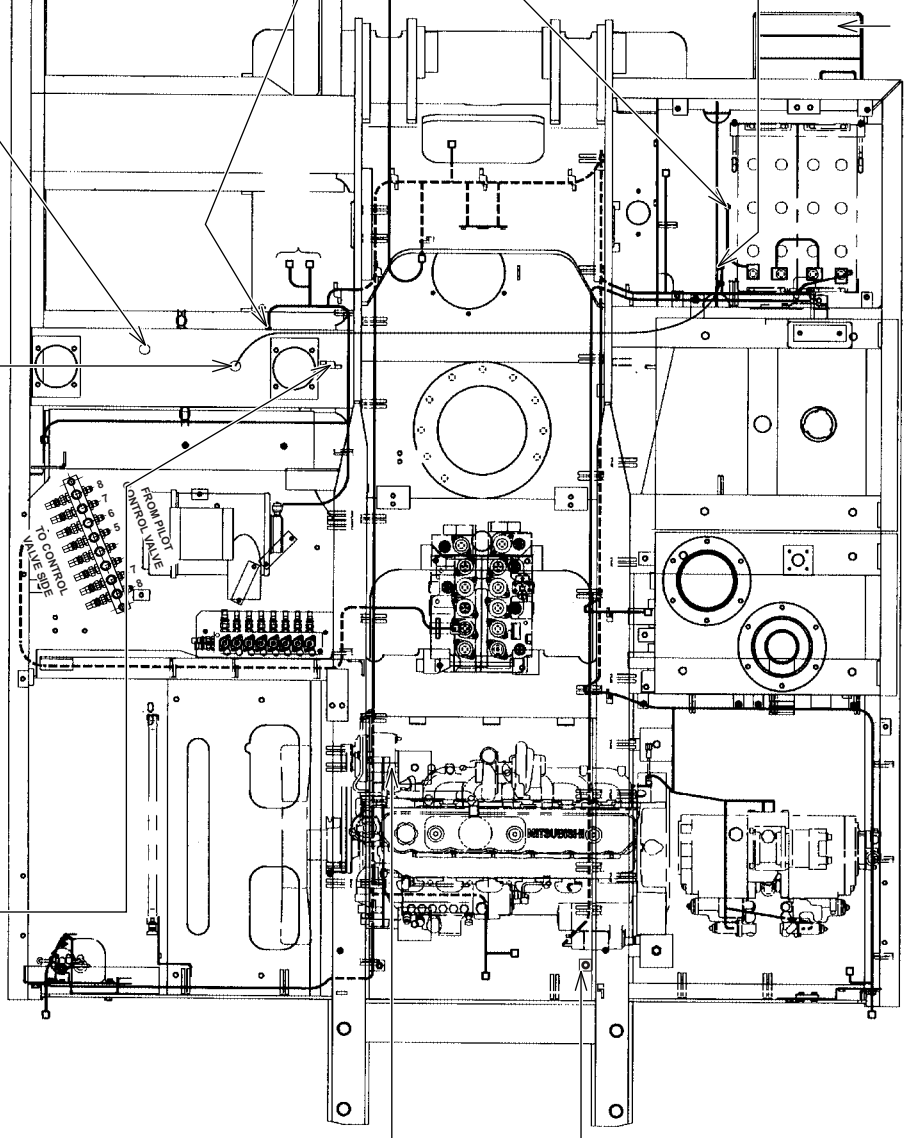
Ⓒ

Ⓓ

Ⓑ
Fuel sensor
Work light
Horn (High)
Horn (Low)
Battery relay
Travel alarm (Opt.)
Boom cylinder work light
Swing flasher & Rear work light (R.H)

Ⓗ
GND between Cab and Controller (In control box)

Ⓐ
Battery GND.



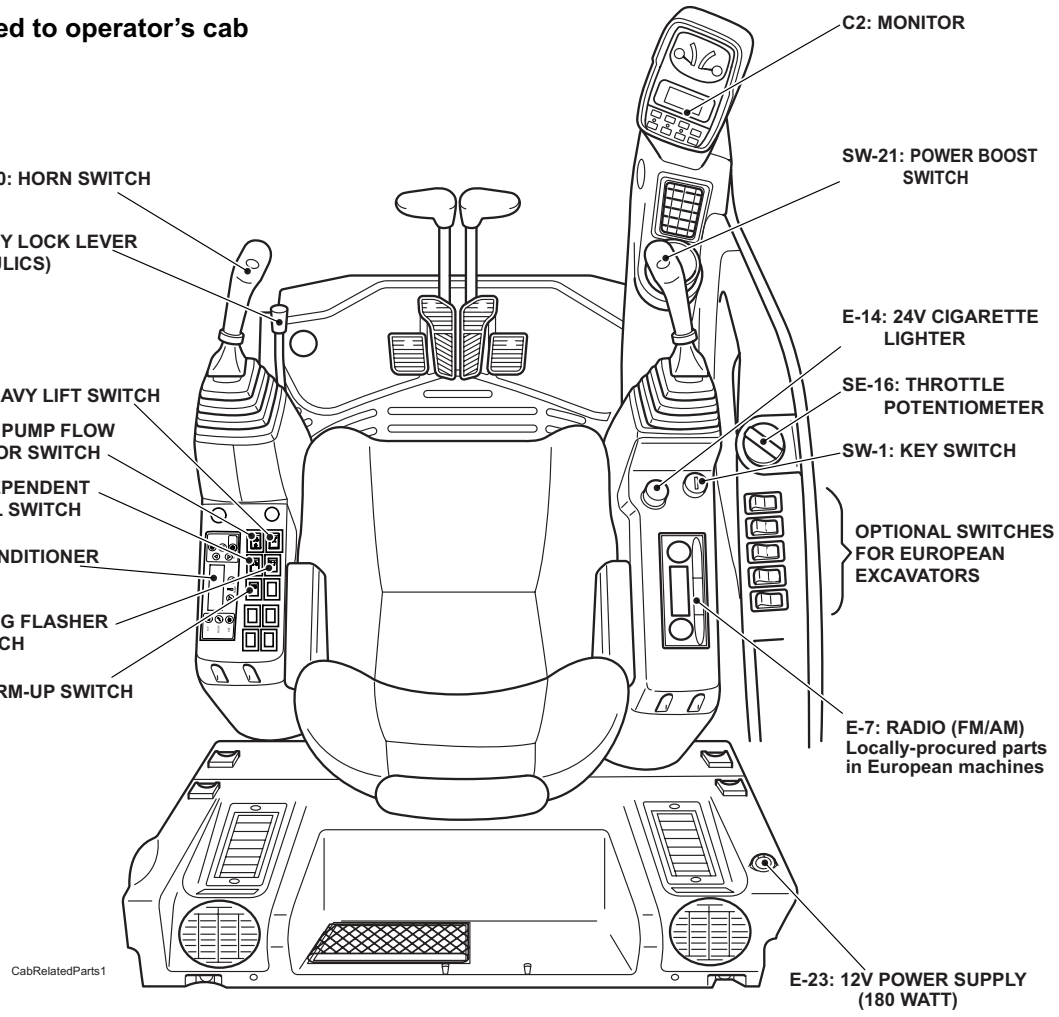
Ⓔ
In control box
Wiper inter lock SW
Mechatro controller
ATT boost SW
Horn SW
Tuner
R.H rotation SW (Opt.)
L.H rotation SW (Opt.)
Travel alarm SW
Opt. work light SW (Opt.)
Lever lock delay timer
Safety relay
Auto greasing contoroller (Opt.)
Wiper relay assy
Air-con amplifier
Cab work light R.H (Opt.)
Cab work light L.H (Opt.)
24V power source
Roof wipermotor
Machine management system (Opt.)

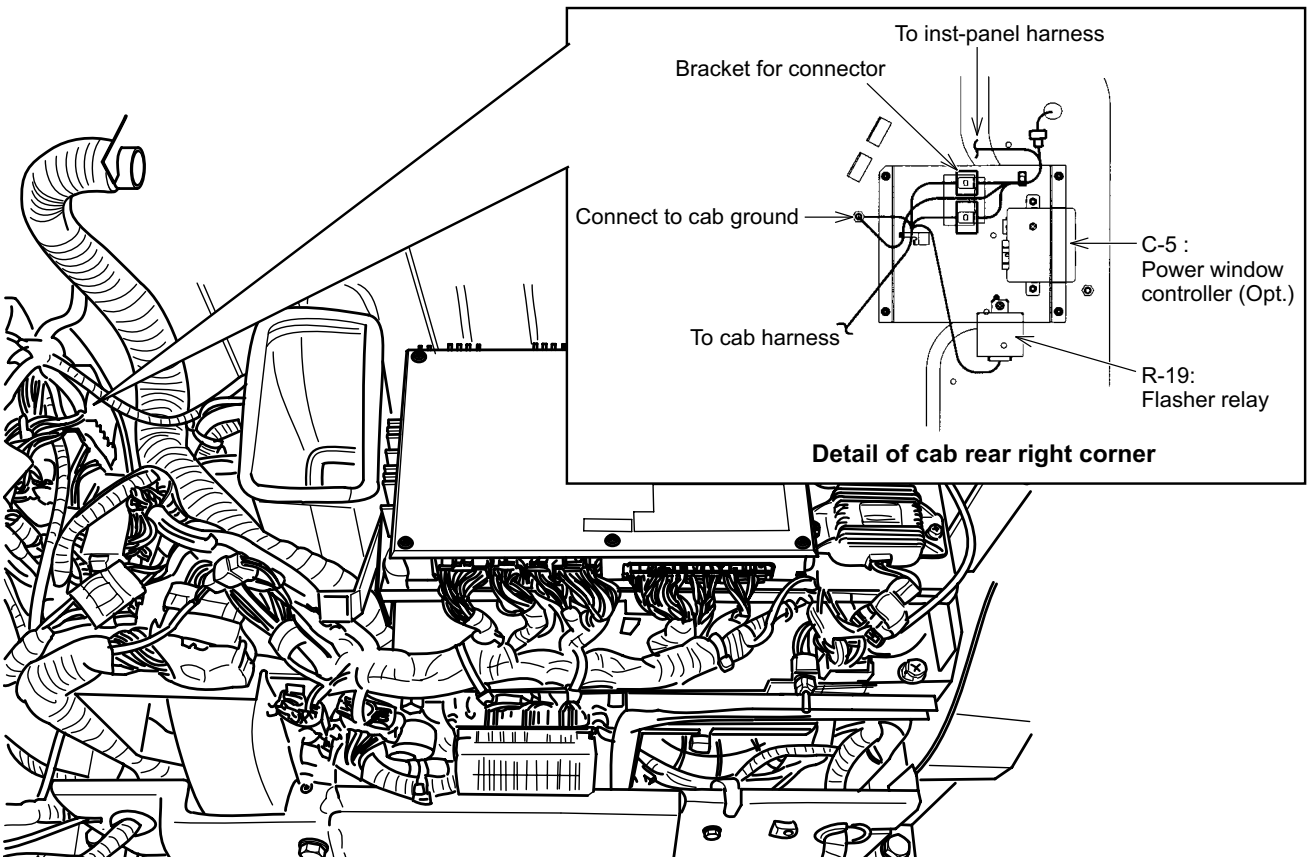
Ⓖ
Cab GND. at rear right of Cab
Gauge cluster
Hour meter
Swing flasher SW. (Opt.)
Power window SW. (Opt.)
Cigar lighter
Wiper motor
Flasher relay

Ⓙ
Alternator GND.

Ⓚ
Engine GND.

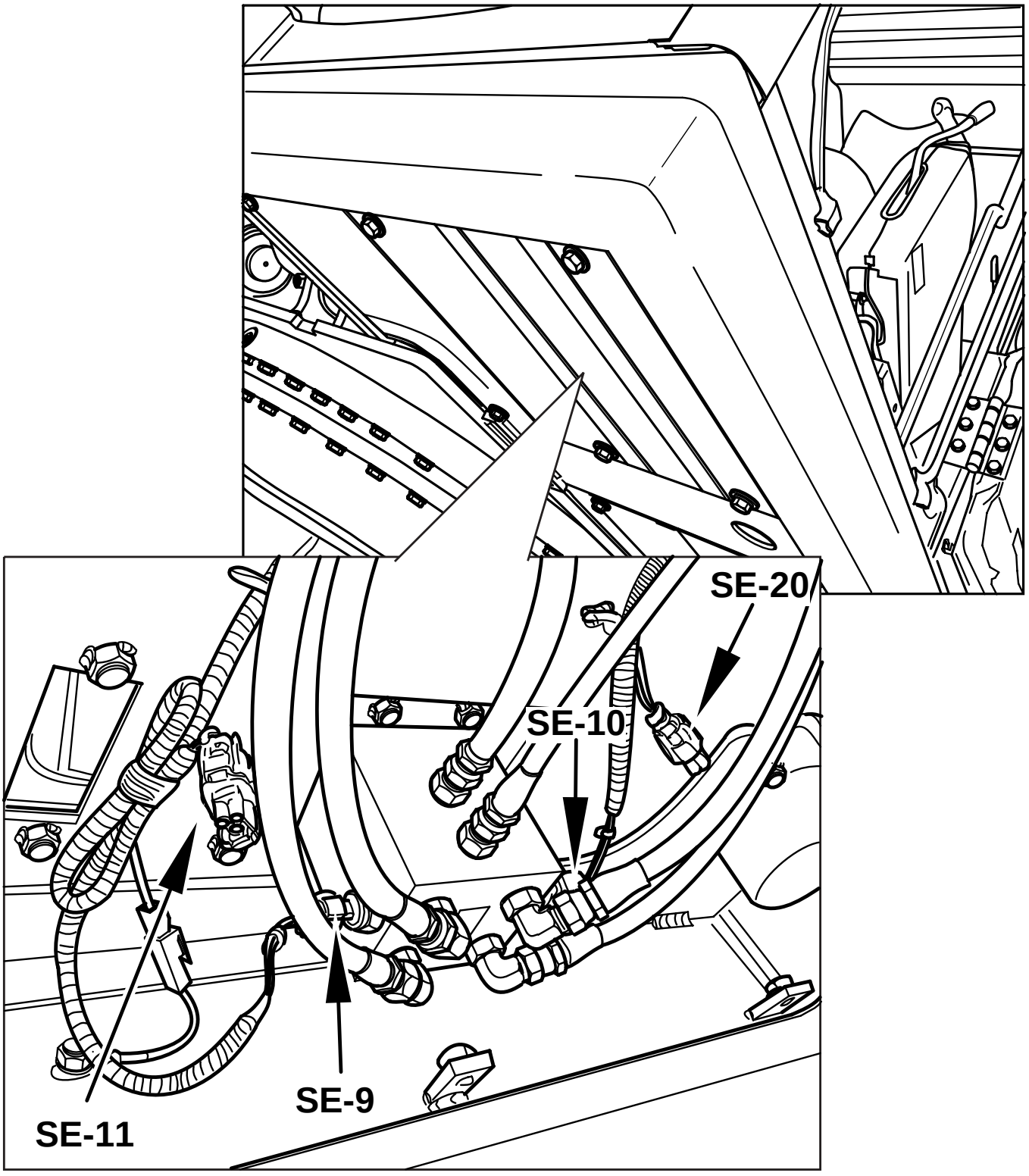
C. Parts related to operator's cab

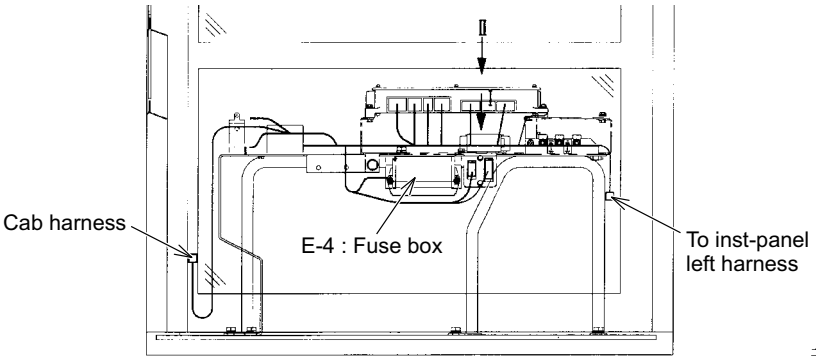


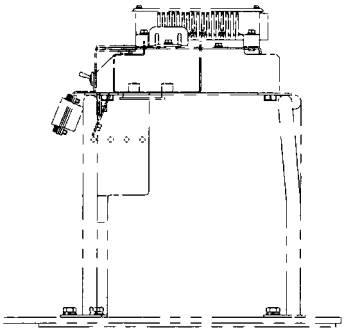


https://truckmanualshub.com/

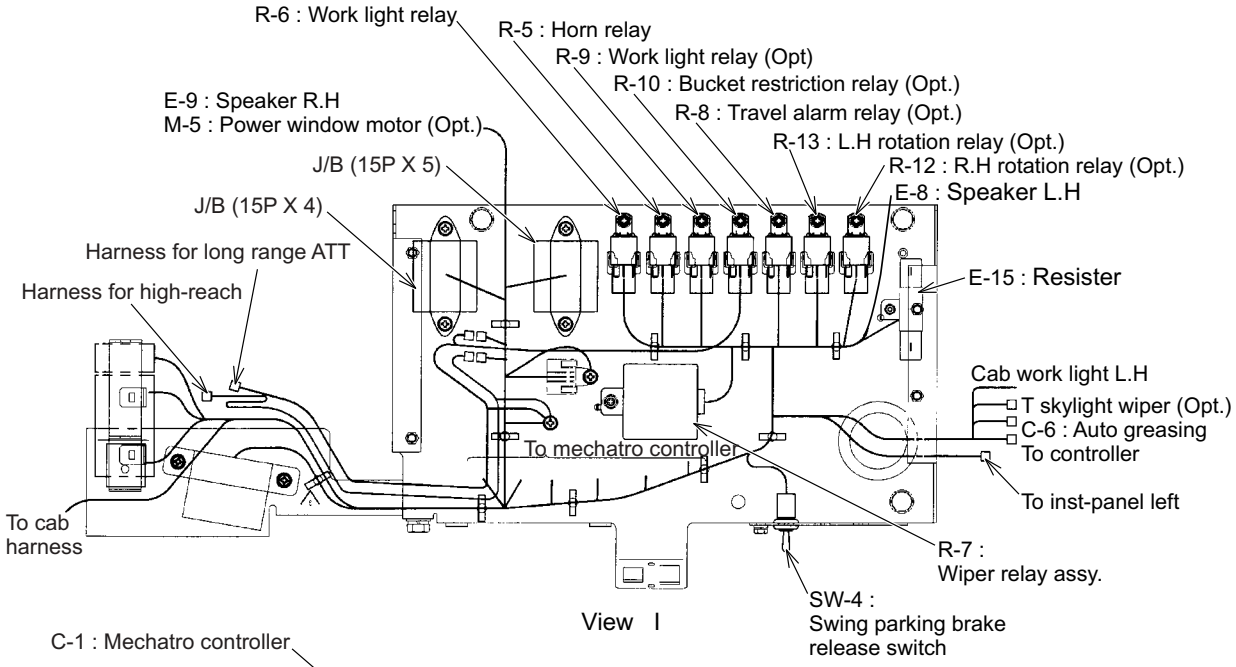
Sensors for travel and optional valves



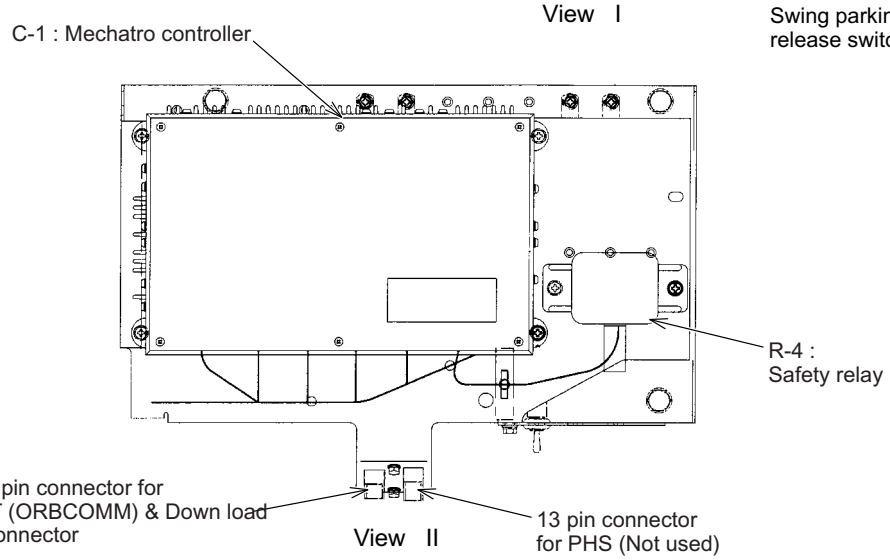




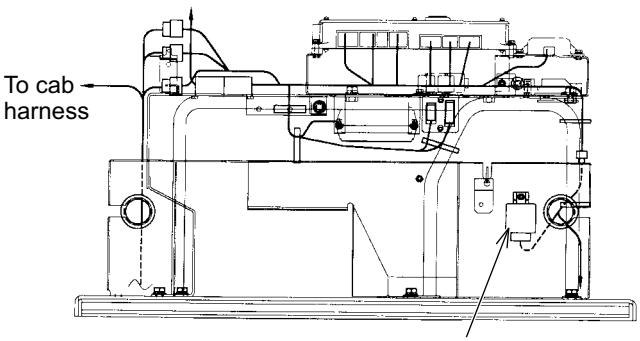
Note : Fuse box is attached to harness.



View I

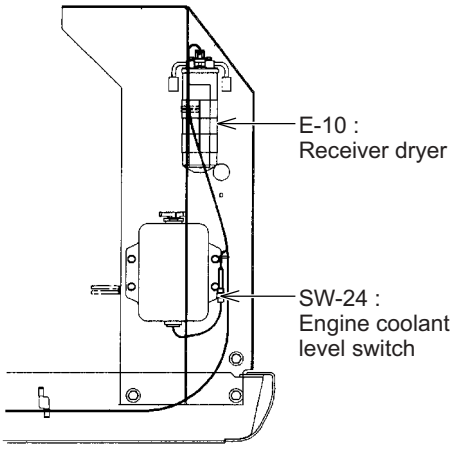


View II

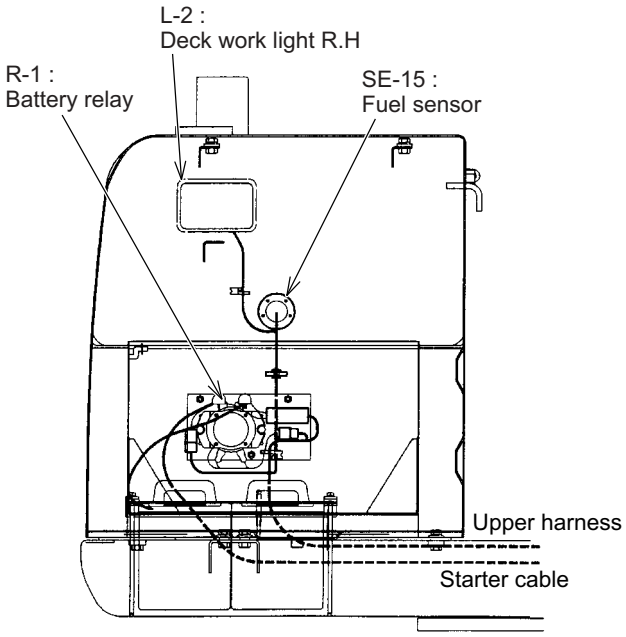


https://truckmanualshub.com/

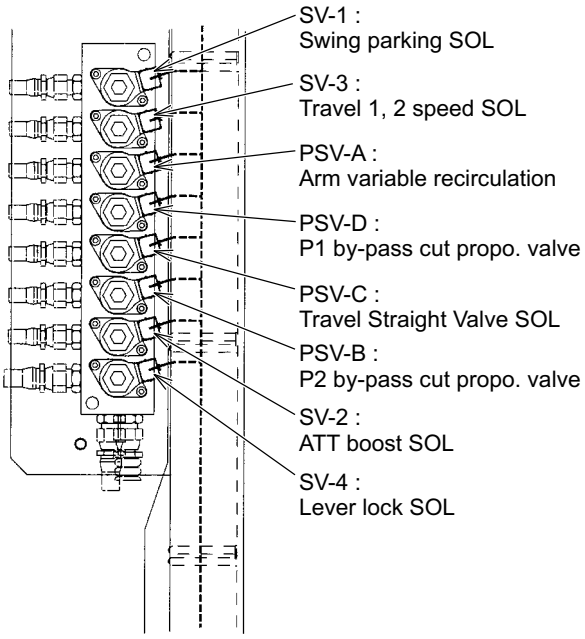
D. Parts related to frame



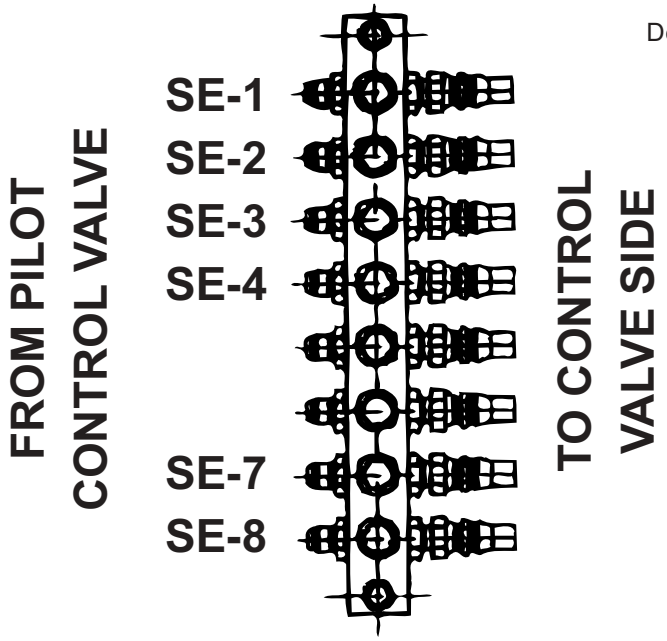
View II



View I

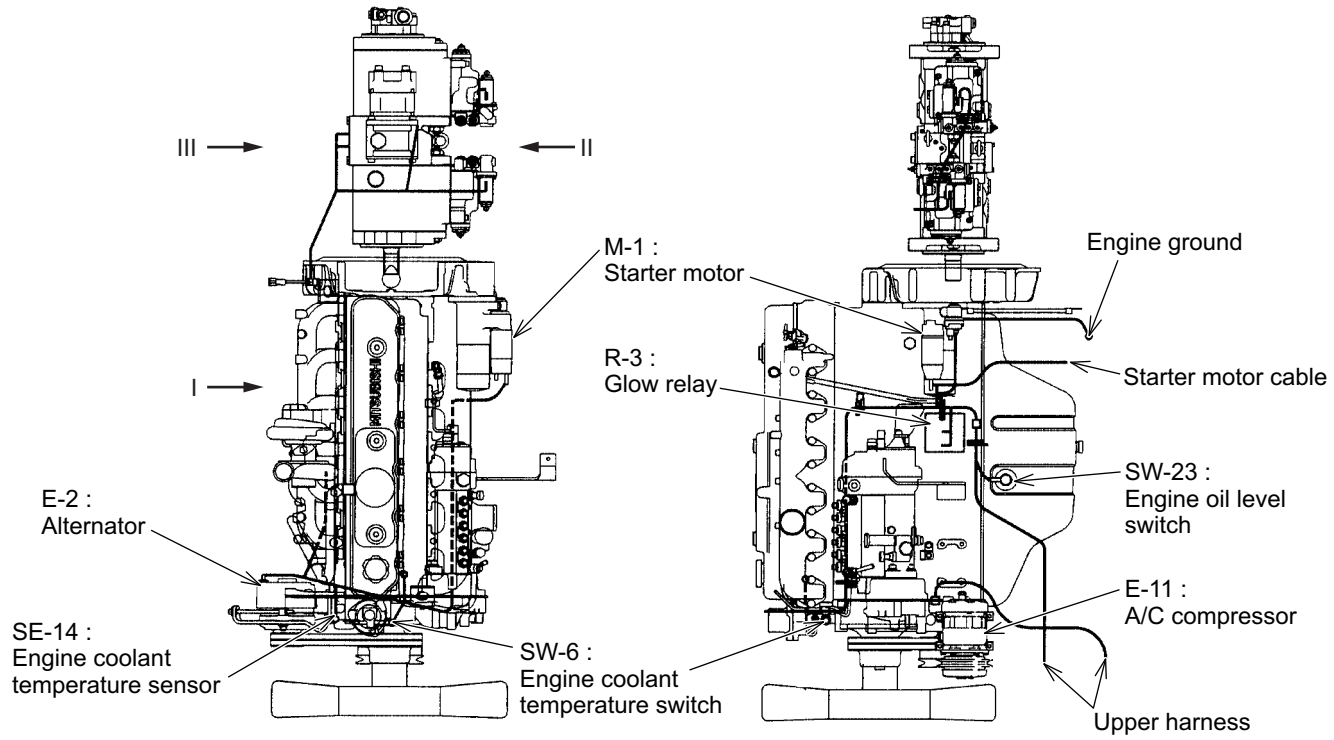


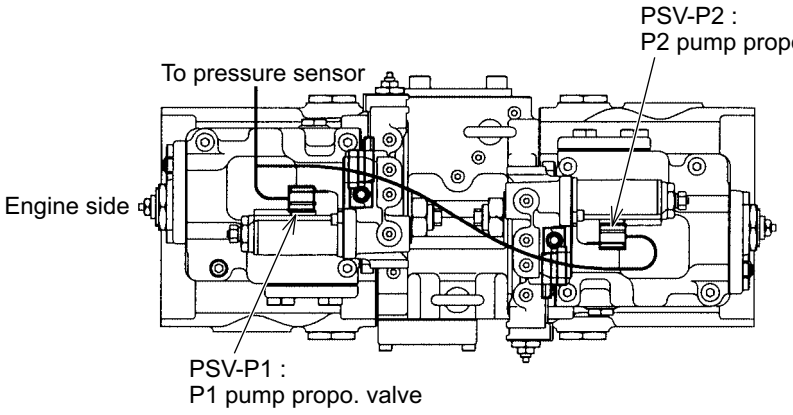
Detail A (Proportional valve block)



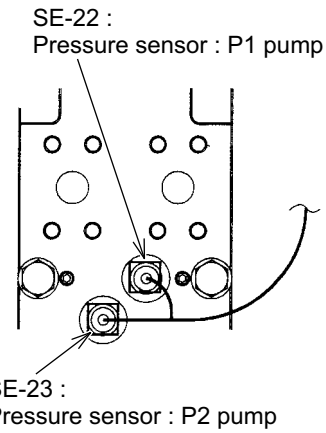
SE-1. BUCKET (H)
SE-2. BUCKET (R)
SE-3. BOOM (H)
SE-4. BOOM (R)
SE-5. SWING (L/R) is located at C/V
SE-7. ARM (H)
SE-8. ARM (R)

E. Parts related to engine

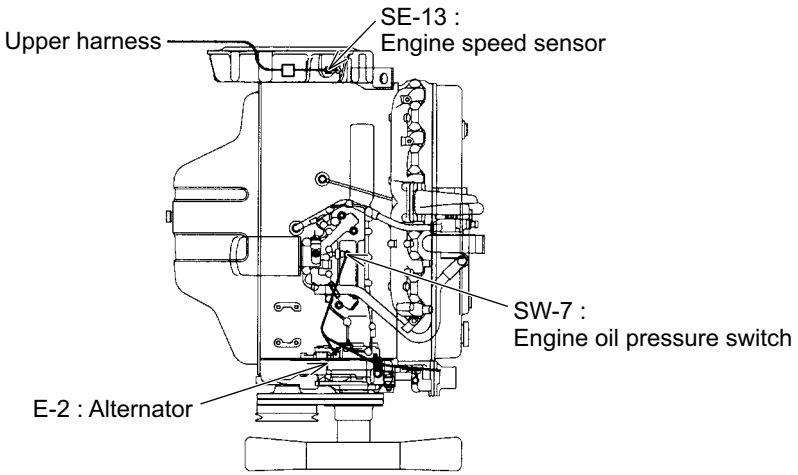




View II (Pump)



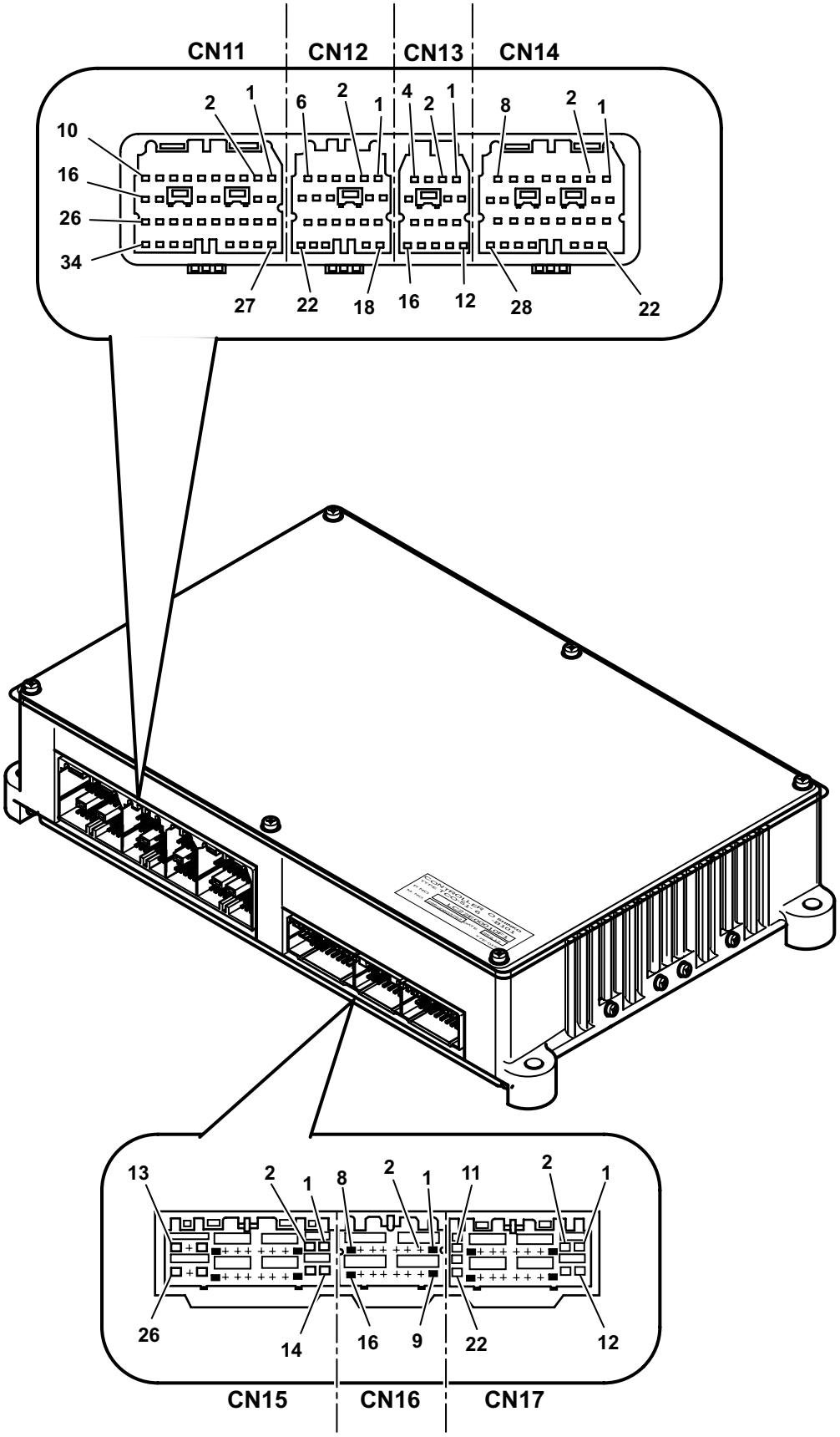
View III



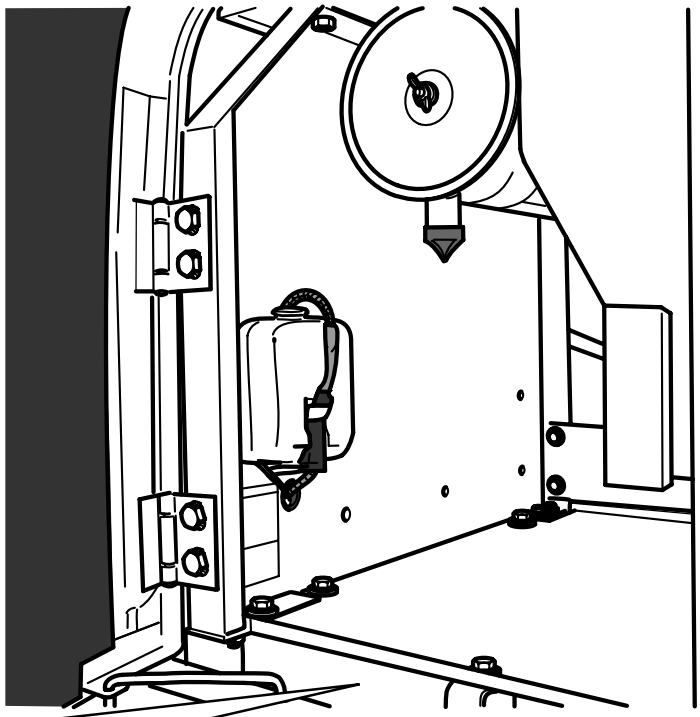
View I

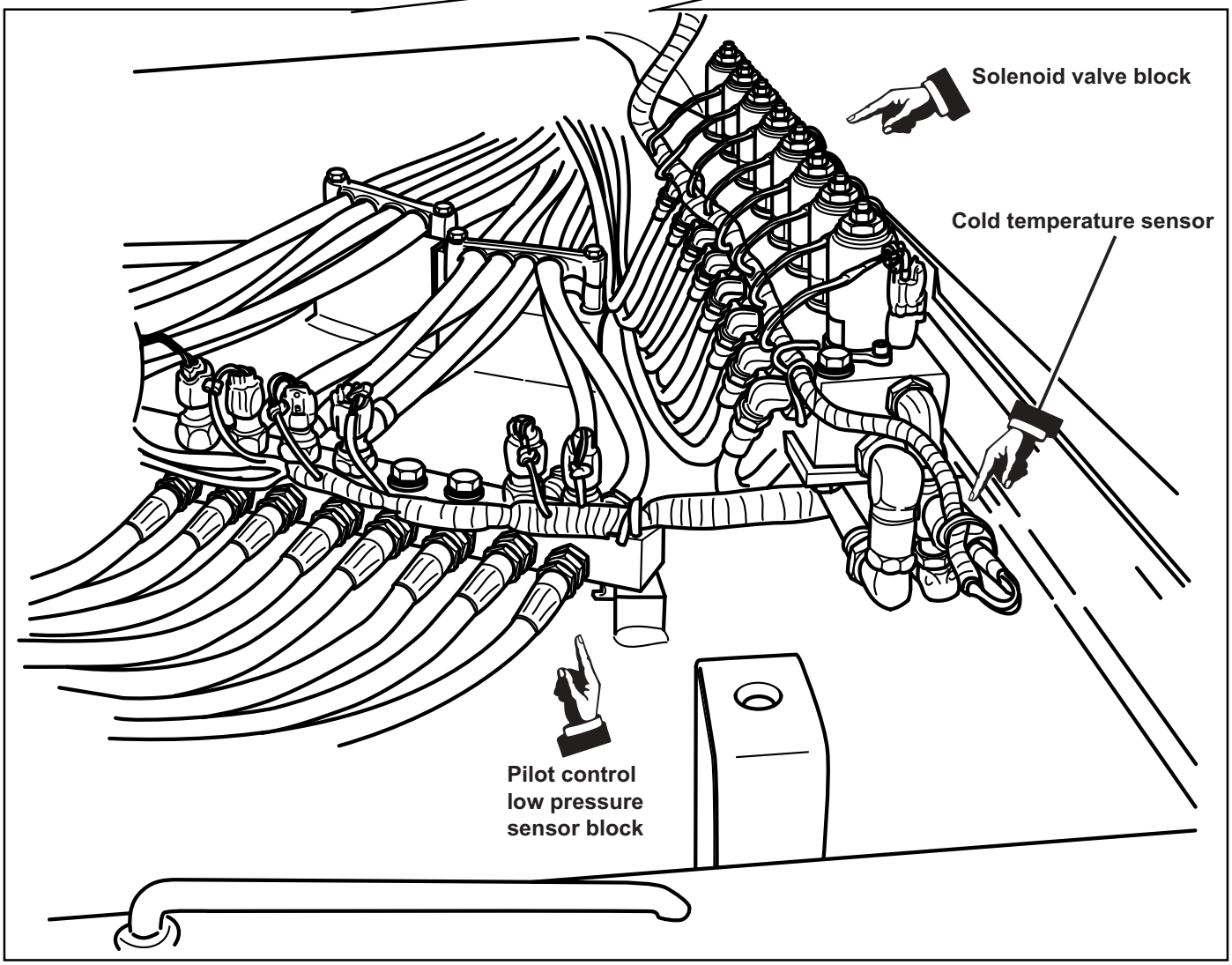
https://truckmanualshub.com/

F. Mechatronic controller connectors



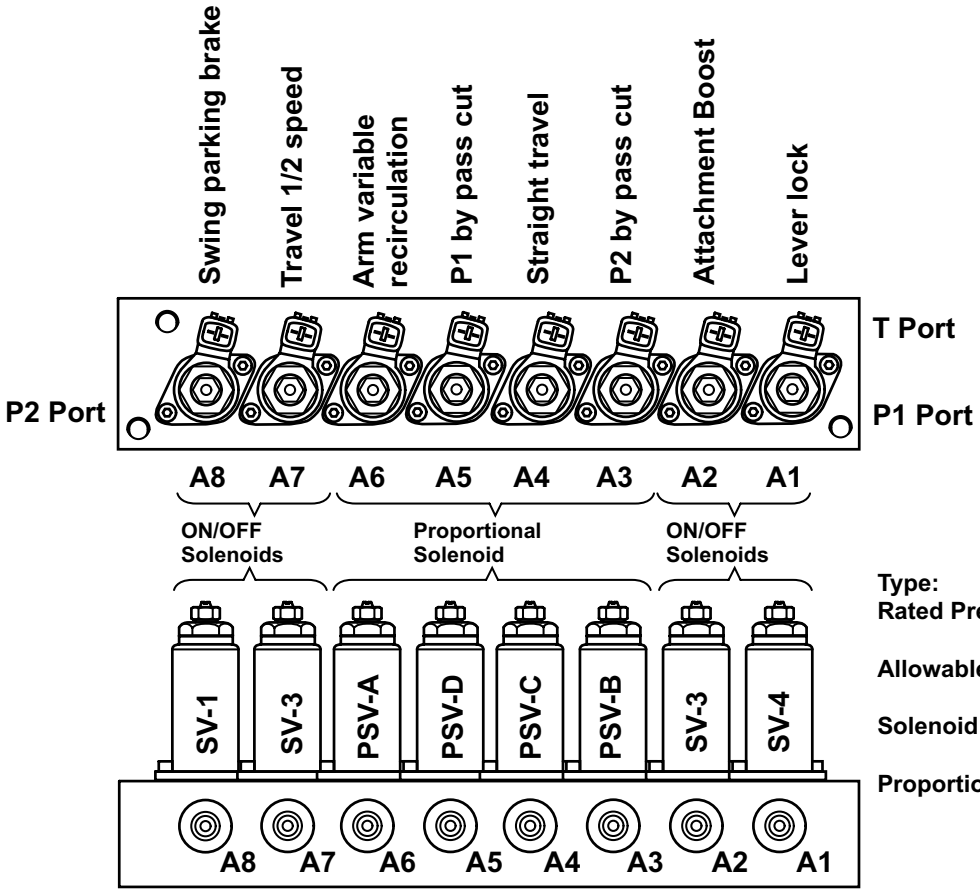
3.2 LOCATION OF SOLENOID BLOCK AND SENSOR BLOCK



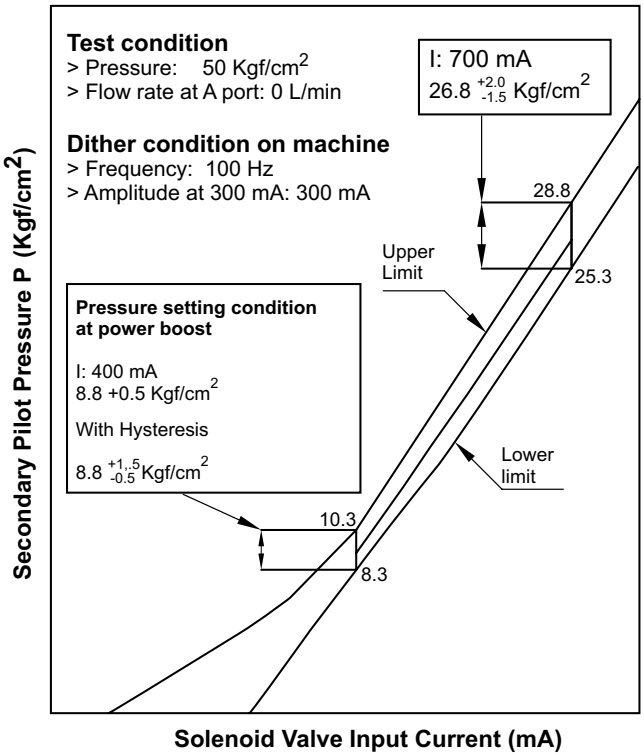


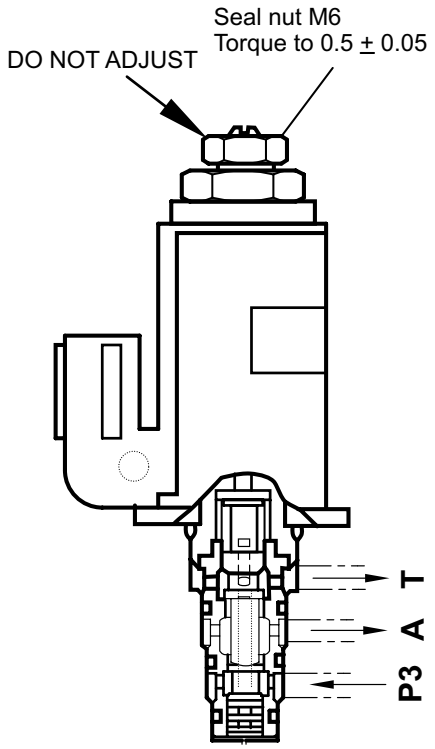
https://truckmanuals.com/

A. Solenoid block



Type: 8KWE5G-30/G24WR-804 B
Rated Press at P port: 0~50 Kgf/cm^2 (0~711 psi)
Allowable back press: 0~10 Kgf/cm^2 (0~140 psi)
Solenoid valve: rated voltage 20.4~30 VDC
coil resitance 34~40 Ω
Proportional valve: rated volts 20.4~30 VDC
coil resistance 17~25 Ω

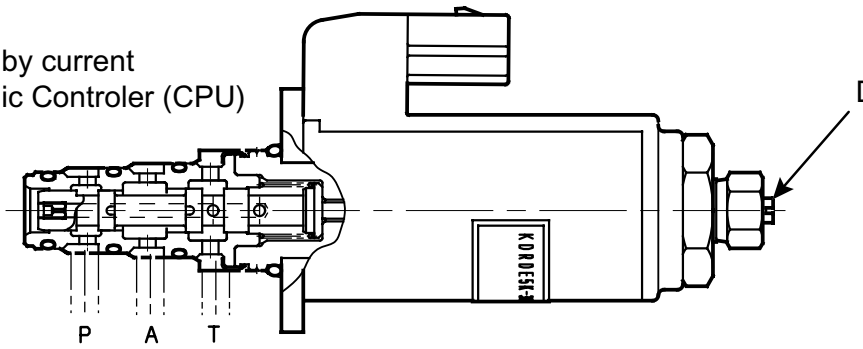




Resistance: 17 to 25 Ω

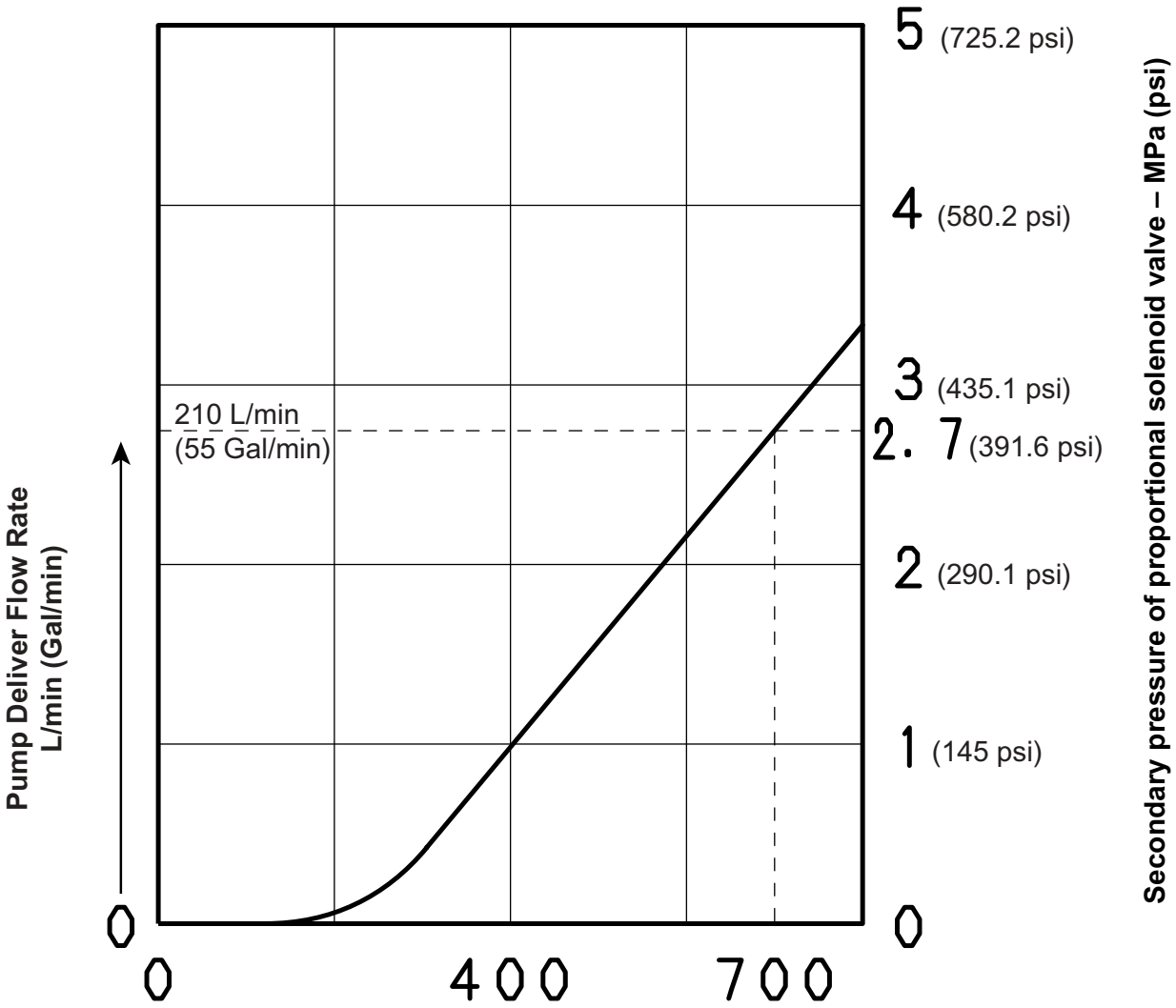
B. Pump proportional solenoid valves (PSV-P1 and PSV-P2)

This valve is actuated by current sent by the Mechatronic Controler (CPU)



3

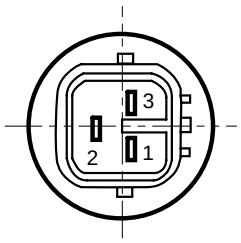
Resistance: 17 to 25 Ω

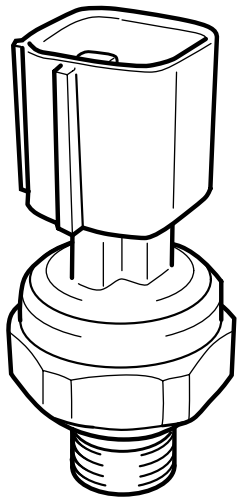


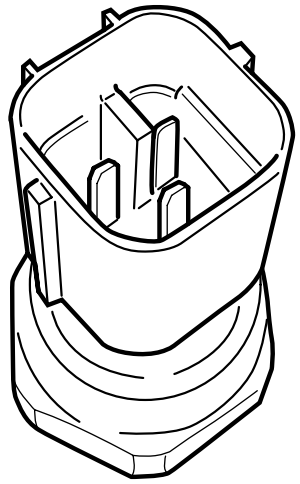
https://truckmanuals.com/

C. Pressure sensors

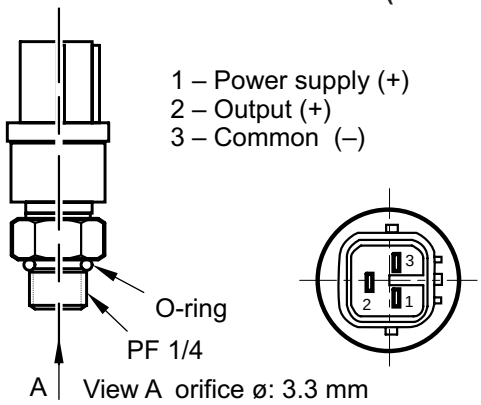
Terminal	Connector
1	Power supply (+)
2	Output (+)
3	Common



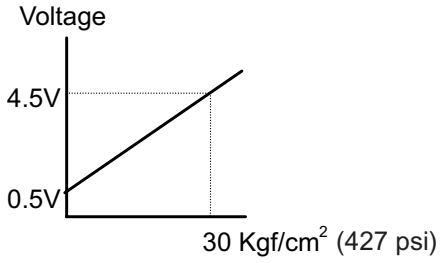




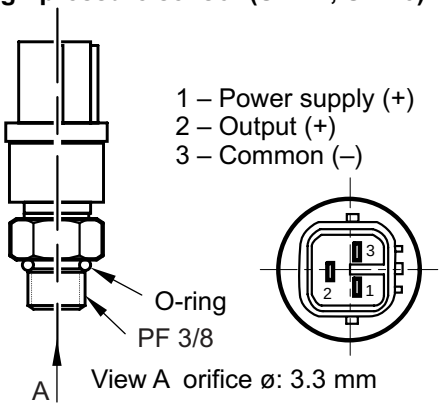
Low pressure sensors for attachment and travel (SE-1~SE-10)



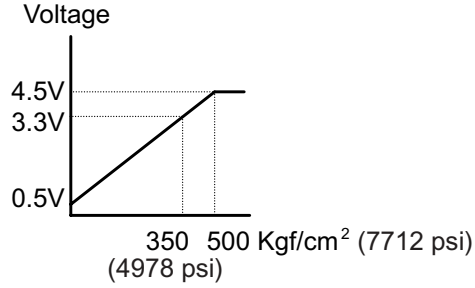
Pressure range	0 ~ 30 Kgf/cm ^{2} (427 psi)
Voltage range	5 ± 0.5 V DC



High pressure sensor (SE-22, SE-23)

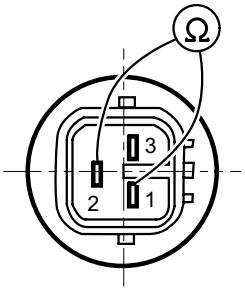


Pressure range	0 ~ 500 Kgf/cm ^{2} (7712 psi)
Voltage range	5 ± 0.5 V DC



Checking resistance on pressure sensors:

Check the resistance between connector pins 1 and 2 with a multimeter.



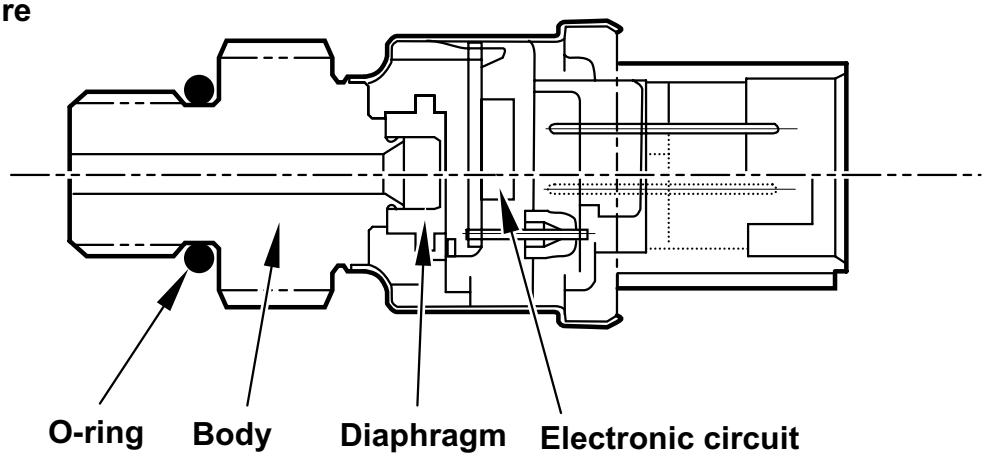
Terminal	Connector
1	Power Supply (+)
2	Output (+)
3	Common

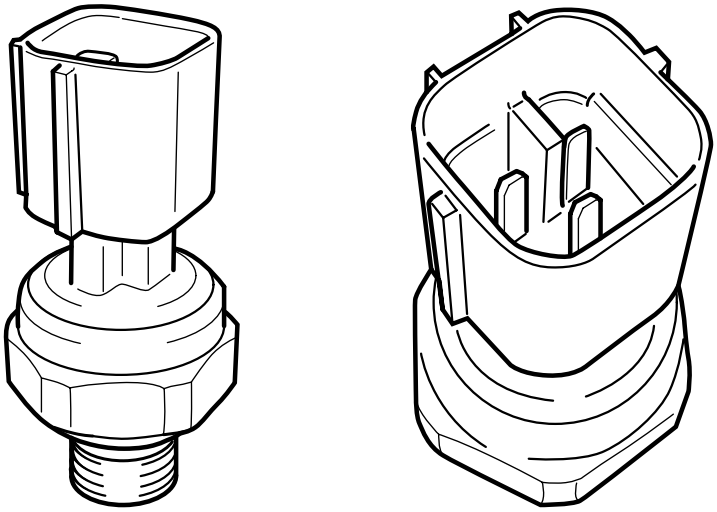
100 M Ω or more is normal for all pressure sensors

High pressure sensors and Low pressure sensors

3

Structure



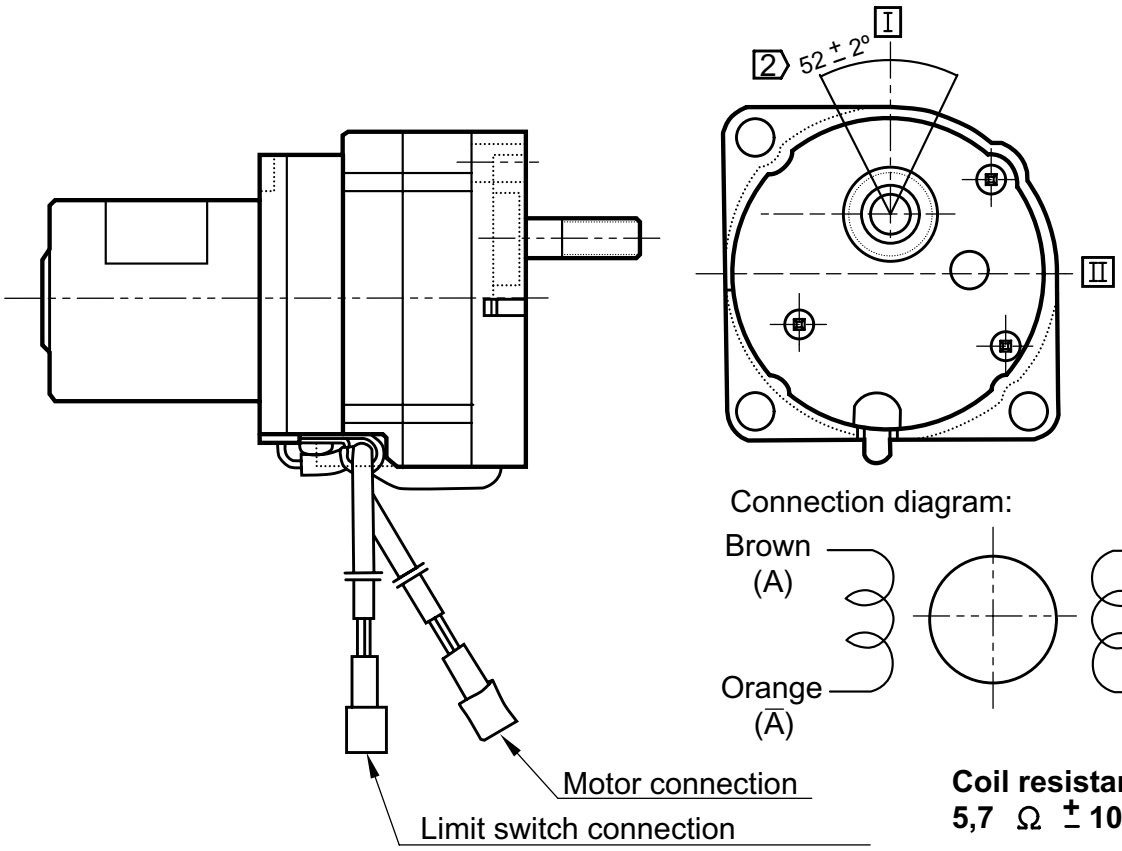


Typical low pressure sensor

https://truckmanuals.com/

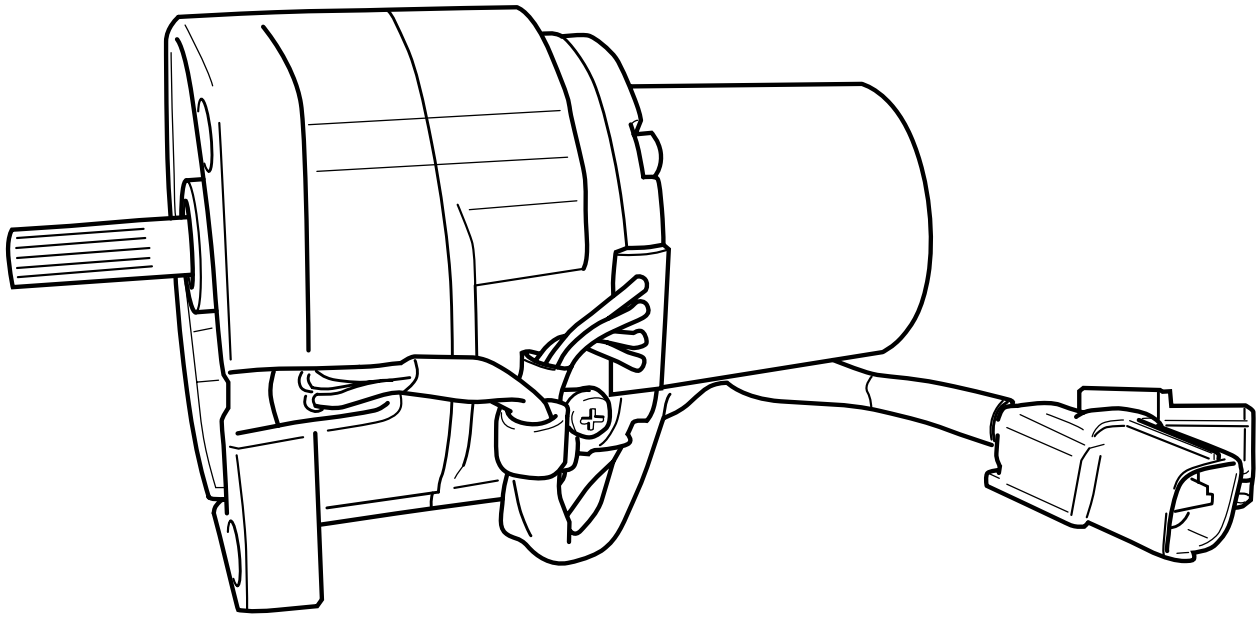
3.3 GOVERNOR MOTOR (M-2)

Note:
1. Install motor so that surface Ⅰ or Ⅱ faces upward
2. 〈2〉 52º shows the operating range.



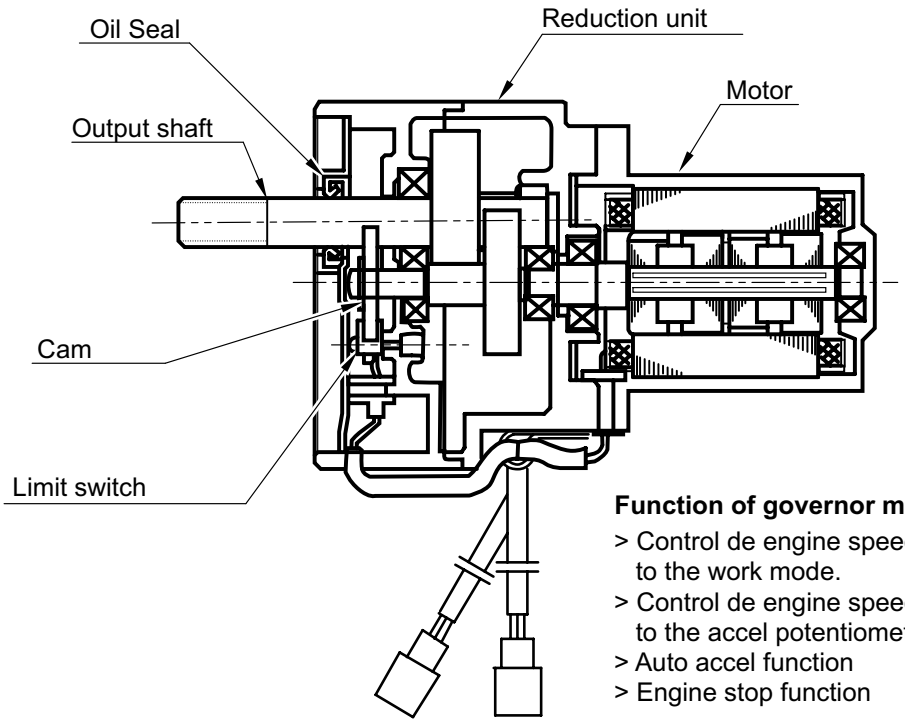
Coil resistance:
5,7 Ω ± 10%

Appearance of stepping motor



3

Internal construction

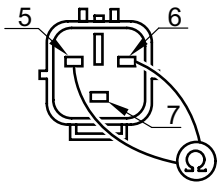


Function of governor motor

> Control de engine speed according to the work mode.
> Control de engine speed according to the accel potentiometer
> Auto accel function
> Engine stop function

Check the resitance of each pin of limit switch and motor connector with tester

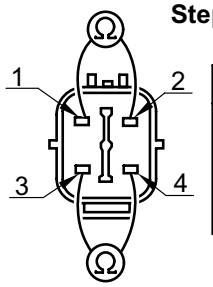
Limit switch connector



No.	Lead color	Terminal
5	White	Common
6	Red	NO
7	Amarillo	NC

NO: Normally open
NC: Normally closed

Stepping motor connector



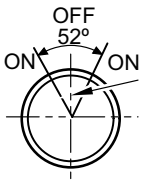
No.	Lead color	Terminal
1	Brown	A
2	Orange	$\overline{A}$
3	Red	B
4	Yellow	$\overline{B}$

How to check limit switch

Turn ignition key switch OFF, disconnect the stepping motor and connect tester to pins 5 and 6, and turn the output shaft.

Limit switch is normal when:

> The resistance is infinitive (∞) within the range of 52º, limit switch is open.
> The resistance is ≥ zero (0) over the 52˚ range, the limit switch is closed.



Front view of motor shaft

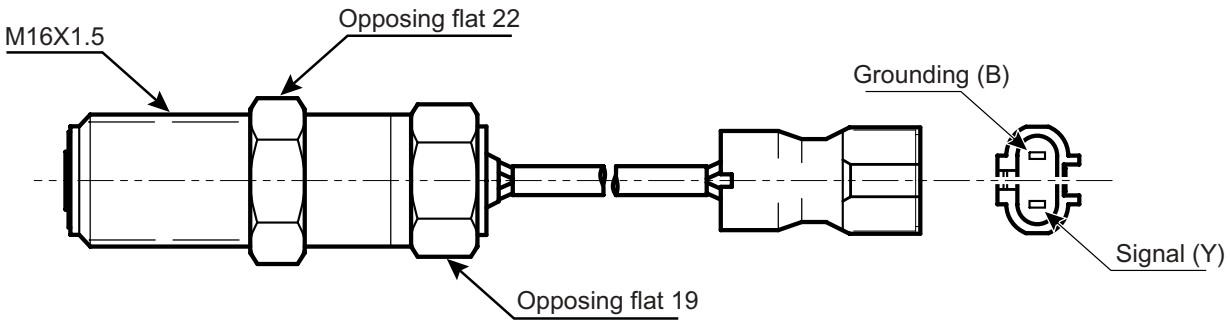
How to check motor

Make sure the ignition key switch is in the OFF position. Disconnect the stepping motor and connect tester to pins 1/2, and 3/4.

> The resistance should be 5.7 Ω ± 10%

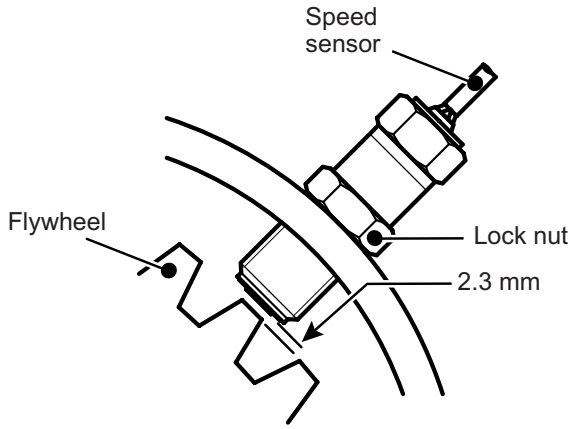
https://truckmanualshub.com/

3.4 ENGINE SPEED SENSOR (SE-15)



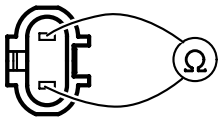
1. Function:

The engine speed sensor is used to detect the actual engine speed. It is installed on the flywheel housing and electrically counts the number of gear teeth passing through in front of the sensor. The signal is picked up by a magnetic force and a coil placed inside the sensor. The engine speed is computed by the mechatronic controller and indicated on the monitor display.



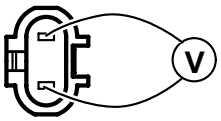
2. How to measure:

a. Resistance



2.3 kΩ +/- 0.2 kΩ

b. Voltage



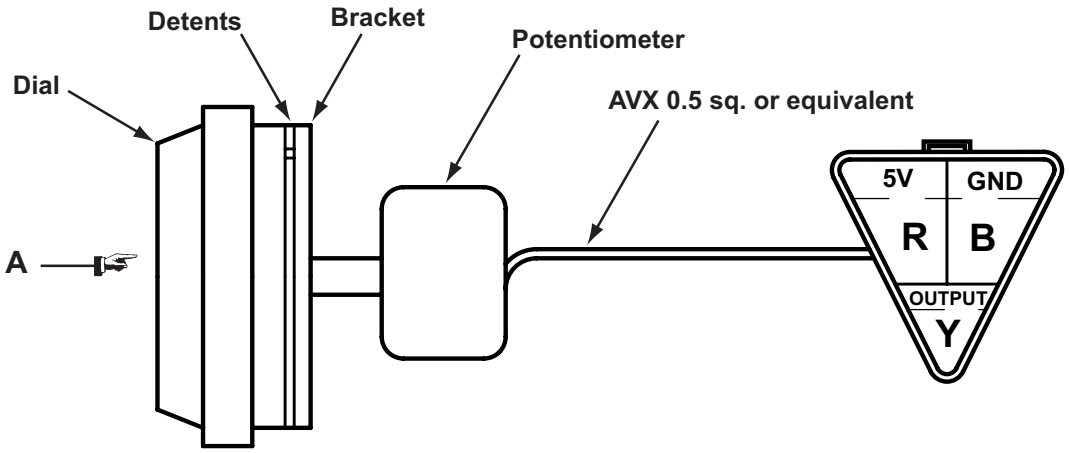
1.4 VAC ~ 6 VAC

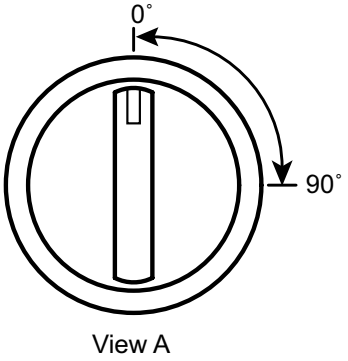
Disconnect the speed sensor. Measure the voltage across the pins located inside the connector with the engine in high idle. The voltage should be ≥ 3 VAC. The voltage is set to 4 VAC or more from factory.

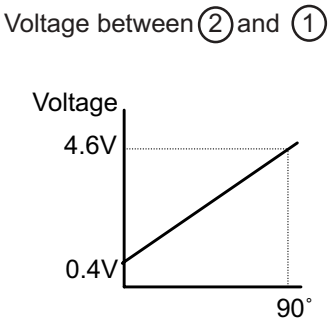
3. How to adjust the speed sensor:

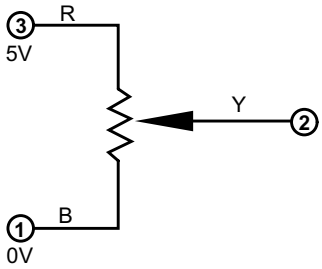
a. Remove the speed sensor for inspection and clean it (do not apply any type of cleaner such as brake cleaner, ether, or degreaser to the speed sensor).
b. With the engine stopped, install the sensor into the engine flywheel housing and tighten, lightly by hand, until the tip of the speed sensor makes contact with the flywheel. Then backout sensor 1.5 turns. The gap between the speed sensor tip and the flywheel should be 2.3 mm.
c. Tighten the speed sensor lock nut to 24.5 to 34.3 Nm (9.2 ~ 25.3 Lbs-ft)
d. Start the engine and verify with an external tachometer that the engine speed is 850 ~ 900 rpm. Also verify that the speed sensor voltage is within specifications.
Note: if needed, turn the sensor in to increase the voltage.

3.5 ACCEL POTENTIOMETER (SE-16)







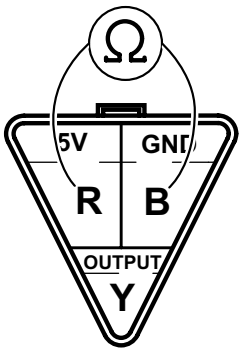


1. Function:

The accel potentiometer is used to control the engine governor speed via the stepping motor, which is mounted to the engine. The accel potentiometer is powered by 5 VDC from the main mechatronic controller on terminal B. The position of the potentiometer dial between 0 and 90˚ indicates the acceleration of the engine. The voltage (between 0.4 to 4.6) will signal the main controller to increase or decrease the stepping motor position to increase or decrease the engine rpm.

3. Testing the accel potentiometer:

Disconnect the potentiometer and measure the voltage across the terminals B and Y. The power supply should be 5 V.
Measure the resistance between terminals R and B. The resistance should be 2kΩ.

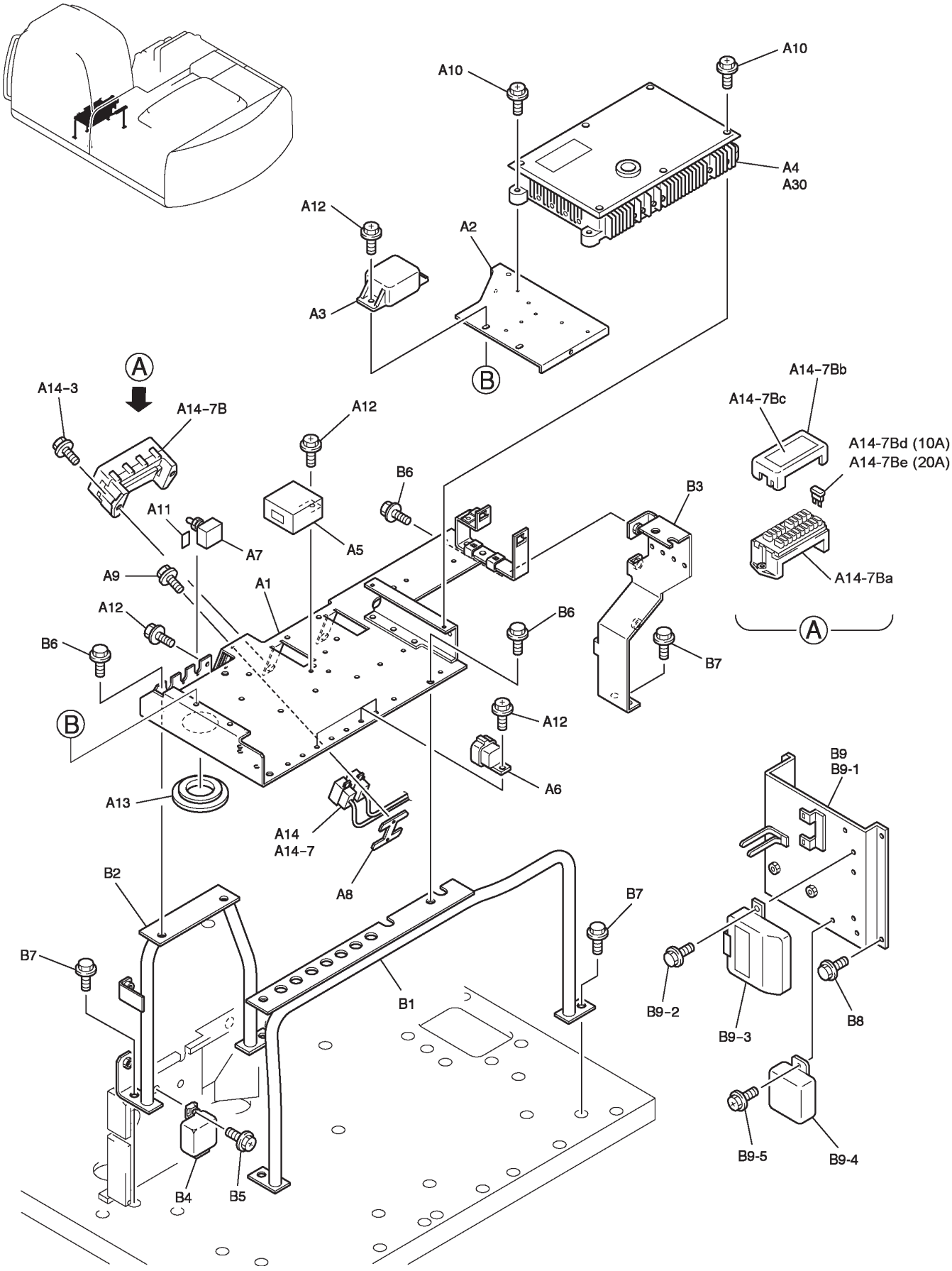


https://truckmanualshub.com/

https://truckmanualshub.com/

CONTROLLER GROUP

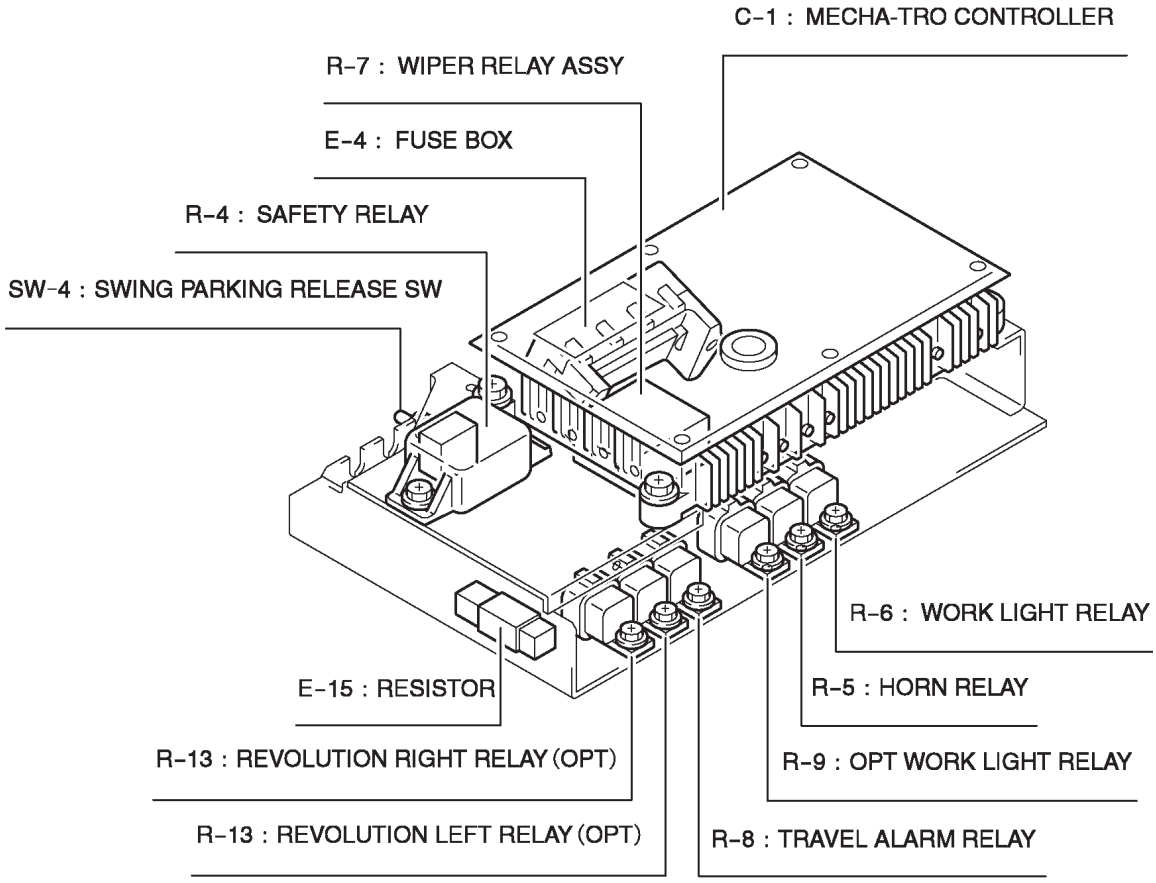
YQ08U0969~

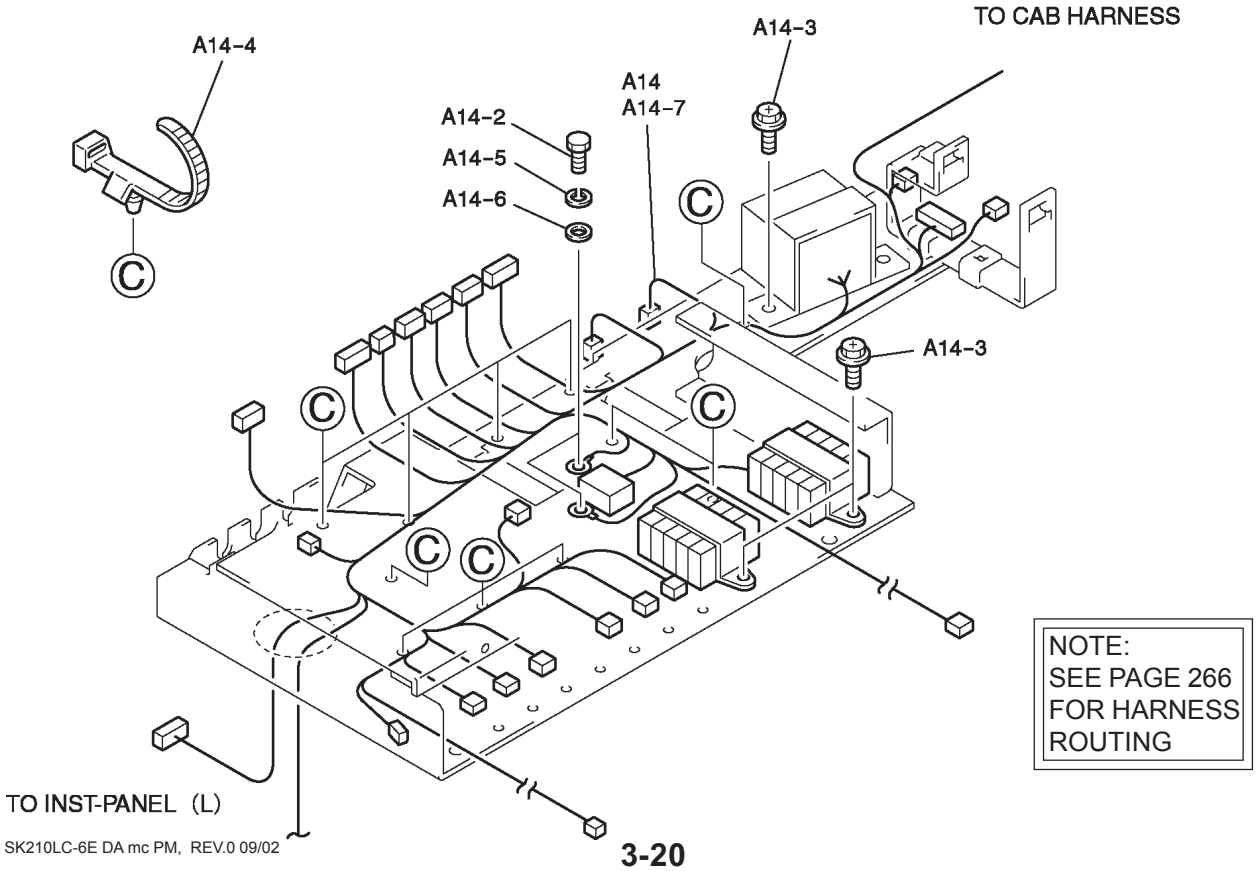


https://truckmanualshub.com/

CONTROLLER GROUP

YQ08U0969~

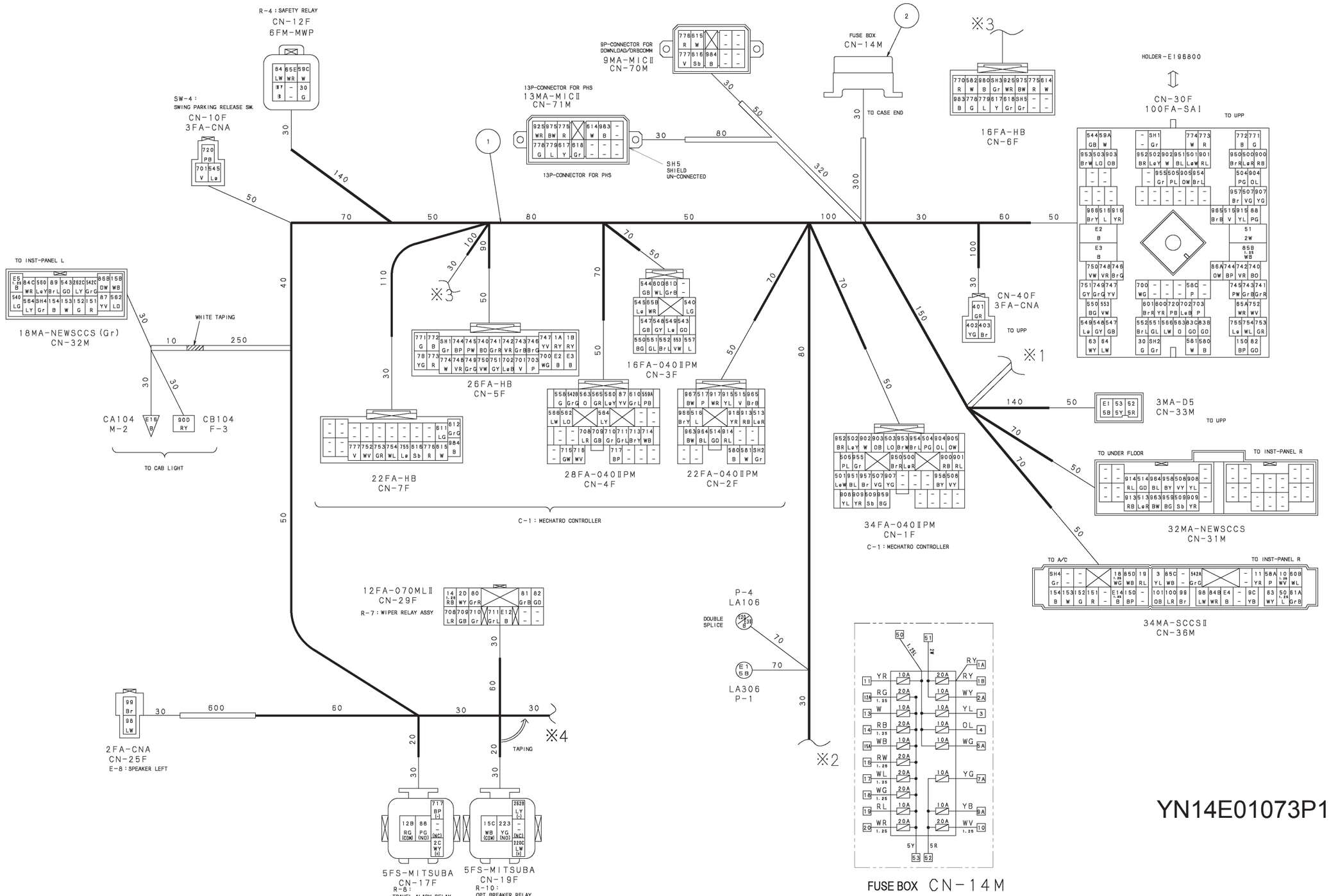




NOTE:
SEE PAGE 266
FOR HARNESS
ROUTING

https://truckmanualshub.com/

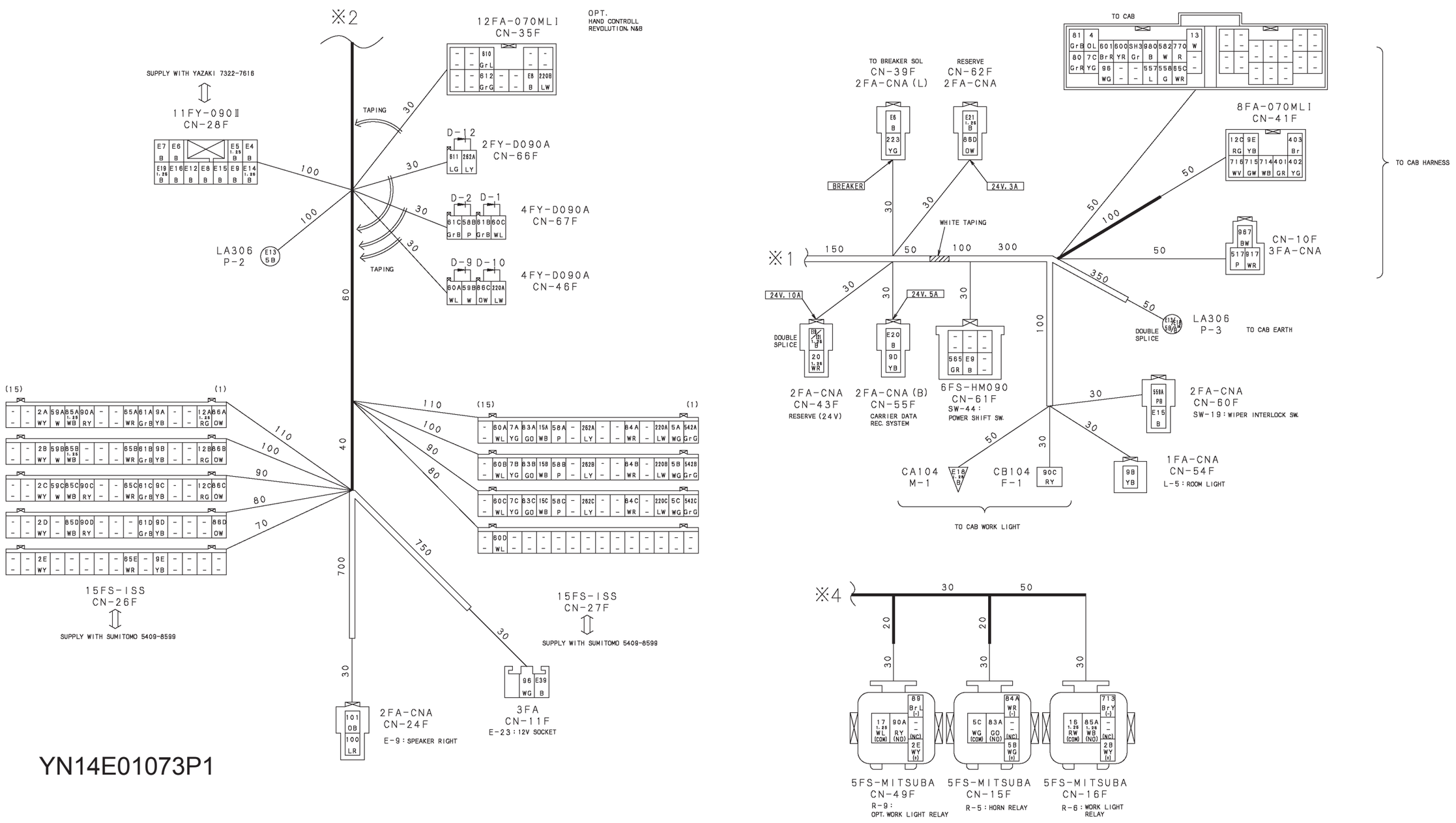
CONTROLLER GROUP



YN14E01073P1

https://truckmanualshub.com/

CONTROLLER GROUP



YN14E01073P1

https://truckmanualshub.com/

CONTROLLER GROUP

YQ08U0969~

CONNECTORS SELECTION TABLE

CONNECTOR NAME (PIN NUM.)	MANUFUC.	PART. NUMBER					
		HOUSING	TERMINAL	HARNESS SEAL	RETAINER LOCK PLATE	SEALING PLUG	CLIP
3FA-CNA	AMP	172132-1	170032-2				
2FA-CNA	AMP	172130-1	170032-2				
2FA-CNA(B)	AMP	172130-2	170032-2				
1FA-CNA	AMP	172030-5	170032-2				
CA104	AMP	170002-5	170887-1				
CB104	AMP	170003-5	170889-1				
3MA-D5	AMP	1-353046-3	917803-2				
100FA-SAI	AMP	179216-6	175266-2				
			175269-1				
	YAZAKI		7116-2871				
34MA-SCCSII	AMP	177511-2	175272-1				
			175273-1				
32MA-NEWSCCS	AMP	178688-1	917067-5				
			175273-1				
18MA-NEWSCCS(Gr)	AMP	6-178692-6	917067-5				
			175273-1				
12FA-070MLII	AMP	176116-6	173631-1				
12FA-070MLI	AMP	173851-1	173631-1				
8FA-070MLI	AMP	173850-1	173631-1				
34FA-040IIPM	AMP	316022-6	175266-2				
28FA-040IIPM	AMP	316019-6	175266-2				
22FA-040IIPM	AMP	316016-6	175266-2				
16FA-040IIPM	AMP	316013-6	175266-2				
26FA-HB	AMP	917992-6	175266-2				
			175269-1				
22FA-HB	AMP	917989-6	175266-2				
			175269-1				
16FA-HB	AMP	917981-6	175266-2				
5FS-MITSUBA	SUMITOMO	6098-1493	1500-0207				
			8240-4242				
15FS-ISS	SUMITOMO	6441-6695	8169-6485				
		5409-8599					
6FM-MWP	MITSUBISHI	PF805-06020	MT095-27250	RS220-04100	PH815-02910		
11FY-090II	YAZAKI	7283-1110	7116-4021				
		7322-7616					
4FY-D090A	YAZAKI	7123-7144	7116-1181P				
2FY-D090A	YAZAKI	7123-7729-40	7116-1181P				
9MA-MICII	AMP	172506-1	172779-1				
13MA-MICII	AMP	172515-1	172779-1				
6FS-HM090	SUMITOMO	6090-1218	8240-4422				
3FA	AMP	281872-1	282308-1				
2FA-CNA(L)	AMP	172130-5	170032-2				

WIRE NO	WIRE COLOR	WIRE SIZE	FROM	CONNECTION	TO
1A	RY	AVSS0.75sq	CN-5F		CN-14M
1B	RY	AVSS0.75sq	CN-5F		CN-14M
2A	WY	AVSS0.75sq	CN-26F		CN-14M
2B	WY	AVSS0.75sq	CN-26F		CN-16F
2C	WY	AVSS0.75sq	CN-26F		CN-17F
2D	WY	AVSS0.75sq	CN-26F		CN-29F
2E	WY	AVSS0.75sq	CN-26F		CN-49F
3	YL	AVSS0.75sq	CN-14M		CN-36M
4	OL	AVSS0.75sq	CN-14M		CN-38M
5A	WG	AVSS0.75sq	CN-14M		CN-27F
5B	WG	AVSS0.75sq	CN-15F		CN-27F
5C	WG	AVSS0.75sq	CN-15F		CN-27F
7A	YG	AVSS0.75sq	CN-14M		CN-27F
7B	YG	AVSS0.75sq	CN-5F		CN-27F
7C	YG	AVSS0.75sq	CN-38M		CN-27F
9A	YB	AVSS0.75sq	CN-14M		CN-26F
9B	YB	AVSS0.75sq	CN-54F		CN-26F
9C	YB	AVSS0.75sq	CN-36M		CN-26F
9D	YB	AVSS0.75sq	CN-55F		CN-26F
9E	YB	AVSS0.75sq	CN-41F		CN-26F
10	WV	AVSS1.25sq	CN-14M		CN-36M
11	YR	AVSS0.75sq	CN-14M		CN-36M
12A	RG	AVSS1.25sq	CN-14M		CN-26F
12B	RG	AVSS0.75sq	CN-17F		CN-26F
12C	RG	AVSS0.75sq	CN-41F		CN-26F
13	W	AVSS0.75sq	CN-14M		CN-38M
14	RB	AVSS1.25sq	CN-14M		CN-29F
15A	WB	AVSS0.75sq	CN-14M		CN-27F
15B	WB	AVSS0.75sq	CN-32M		CN-27F
15C	WB	AVSS0.75sq	CN-19F		CN-27F
16	RW	AVSS1.25sq	CN-14M		CN-16F
17	WL	AVSS1.25sq	CN-14M		CN-49F
18	WG	AVSS1.25sq	CN-14M		CN-36M
19	RL	AVSS0.75sq	CN-14M		CN-36M
20	WR	AVSS1.25sq	CN-14M		CN-43F
30	G	AVSS0.75sq	CN-12F		CN-30F
50	L	AVSS1.25sq	CN-14M		CN-36M
51	W	AVS2sq	CN-14M		CN-30F
52	R	AVS5sq	CN-14M		CN-33M
53	Y	AVS5sq	CN-14M		CN-33M

WIRE NO	WIRE COLOR	WIRE SIZE	FROM	CONNECTION	TO
58A	P	AVSS0.75sq	CN-27F		CN-36M
58B	P	AVSS0.75sq	CN-27F		CN-67F
58C	P	AVSS0.75sq	CN-27F		CN-30F
59A	W	AVSS0.75sq	CN-30F		CN-26F
59B	W	AVSS0.75sq	CN-46F		CN-26F
59C	W	AVSS0.75sq	CN-12F		CN-26F
60A	WL	AVSS0.75sq	CN-27F		CN-46F
60B	WL	AVSS0.75sq	CN-27F		CN-36M
60C	WL	AVSS0.75sq	CN-27F		CN-67F
60D	WL	AVSS0.75sq	CN-27F		CN-3F
61A	GrB	AVSS0.75sq	CN-26F		CN-36M
61B	GrB	AVSS0.75sq	CN-26F		CN-67F
61C	GrB	AVSS0.75sq	CN-26F		CN-67F
61D	GrB	AVSS0.75sq	CN-26F		CN-3F
63	WY	AVSS0.75sq	CN-36M		CN-30F
64	LW	AVSS0.75sq	CN-12F		CN-30F
65A	WR	AVSS0.75sq	CN-26F		CN-30F
65B	WR	AVSS0.75sq	CN-26F		CN-3F
65C	WR	AVSS0.75sq	CN-26F		CN-38M
65E	WR	AVSS0.75sq	CN-26F		CN-12F
80	GrR	AVSS0.75sq	CN-29F		CN-38M
81	GrB	AVSS0.75sq	CN-29F		CN-38M
82	GO	AVSS0.75sq	CN-29F		CN-30F
83A	GO	AVSS0.75sq	CN-27F		CN-15F
83B	GO	AVSS0.75sq	CN-27F		CN-30F
83C	GO	AVSS0.75sq	CN-27F		CN-30F
84A	WR	AVSS0.75sq	CN-15F		CN-27F
84B	WR	AVSS0.75sq	CN-36M		CN-27F
84C	WR	AVSS0.75sq	CN-32M		CN-27F
85A	WB	AVSS1.25sq	CN-26F		CN-16F
85B	WB	AVSS1.25sq	CN-26F		CN-30F
85C	WB	AVSS0.75sq	CN-26F		CN-36M
85D	WB	AVSS0.75sq	CN-26F		CN-36M
86A	OW	AVSS0.75sq	CN-30F		CN-26F
86B	OW	AVSS0.75sq	CN-32M		CN-26F
86C	OW	AVSS0.75sq	CN-46F		CN-26F
86D	OW	AVSS0.75sq	CN-62F		CN-26F
87	YV	AVSS0.75sq	CN-4F		CN-32M
88	PG	AVSS0.75sq	CN-30F		CN-17F
89	BrL	AVSS0.75sq	CN-49F		CN-32M

YN14E01073P1

https://truckmanualshub.com/

YQ08U0969~

CONTROLLER GROUP

WIRE NO	WIRE COLOR	WIRE SIZE	FROM	CONNECTION	TO
89	BrL	AVSS0.75sq	CN-49F		CN-32M
90A	RY	AVSS0.75sq	CN-26F		CN-49F
90C	RY	AVSS0.75sq	CN-26F		F-1
90D	RY	AVSS0.75sq	CN-26F		F-3
96	WG	AVSS0.75sq	CN-11F		CN-38M
98	LW	AVSS0.75sq	CN-36M		CN-25F
99	Br	AVSS0.75sq	CN-36M		CN-25F
100	LR	AVSS0.75sq	CN-24F		CN-36M
101	OB	AVSS0.75sq	CN-24F		CN-36M
150	BP	AVSS0.75sq	CN-36M		CN-30F
151	R	MVVS0.75sq	CN-36M		CN-32M
152	G		CN-36M		CN-32M
153	W		CN-36M		CN-32M
154	B		CN-36M		CN-32M
SH4	Gr		CN-36M		CN-32M
220A	LW	AVSS0.75sq	CN-46F		CN-27F
220B	LW	AVSS0.75sq	CN-35F		CN-27F
220C	LW	AVSS0.75sq	CN-19F		CN-27F
223	YG	AVSS0.75sq	CN-19F		CN-39F
230	VR	AVSS0.75sq	CN-42F		CN-30F
262A	LY	AVSS0.75sq	CN-66F		CN-27F
262B	LY	AVSS0.75sq	CN-19F		CN-27F
262C	LY	AVSS0.75sq	CN-32M		CN-27F
401	GR	AVSS0.75sq	CN-40F		CN-41F
402	YG	AVSS0.75sq	CN-40F		CN-41F
403	Br	AVSS0.75sq	CN-40F		CN-41F
500	LgR	AVSS0.75sq	CN-1F		CN-30F
501	LgW	AVSS0.75sq	CN-1F		CN-30F
502	LgY	AVSS0.75sq	CN-1F		CN-30F
503	LO	AVSS0.75sq	CN-1F		CN-30F
504	PG	AVSS0.75sq	CN-1F		CN-30F
505	PL	AVSS0.75sq	CN-1F		CN-30F
507	VG	AVSS0.75sq	CN-1F		CN-30F
508	VY	AVSS0.75sq	CN-1F		CN-31M
509	Sb	AVSS0.75sq	CN-1F		CN-31M
513	LgR	AVSS0.75sq	CN-2F		CN-31M
514	GO	AVSS0.75sq	CN-2F		CN-31M
515	V	AVSS0.75sq	CN-2F		CN-30F
516	L	AVSS0.75sq	CN-2F		CN-30F
517	P	AVSS0.75sq	CN-2F		CN-10F
540	LG	AVSS0.75sq	CN-3F		CN-32M

WIRE NO	WIRE COLOR	WIRE SIZE	FROM	CONNECTION	TO
542A	GrG	AVSS0.75sq	CN-36M		CN-27F
542B	GrG	AVSS0.75sq	CN-4F		CN-27F
542C	GrG	AVSS0.75sq	CN-32M		CN-27F
543	GO	AVSS0.75sq	CN-3F		CN-32M
544	GB	AVSS0.75sq	CN-3F		CN-30F
545	Lg	AVSS0.75sq	CN-3F		CN-10F
547	GB	AVSS0.75sq	CN-3F		CN-30F
548	GY	AVSS0.75sq	CN-3F		CN-30F
549	Lg	AVSS0.75sq	CN-3F		CN-30F
550	BG	AVSS0.75sq	CN-3F		CN-30F
551	GL	AVSS0.75sq	CN-3F		CN-30F
552	BrL	AVSS0.75sq	CN-3F		CN-30F
553	VW	AVSS0.75sq	CN-3F		CN-30F
557	L	AVSS0.75sq	CN-3F		CN-38M
558	G	AVSS0.75sq	CN-4F		CN-38M
559A	PB	AVSS0.75sq	CN-60F		CN-4F
560	LgY	AVSS0.75sq	CN-4F		CN-32M
562	LO	AVSS0.75sq	CN-32M		CN-4F
563	O	AVSS0.75sq	CN-4F		CN-30F
564	LY	AVSS0.75sq	CN-4F		CN-32M
565	GR	AVSS0.75sq	CN-4F		CN-61F
566	LW	AVSS0.75sq	CN-4F		CN-30F
580	B	MVVS0.75sq	CN-2F		CN-30F
581	W		CN-2F		CN-30F
SH2	Gr		CN-2F		CN-30F
582	W	MVVS0.75sq	CN-6F		CN-38M
770	R		CN-6F		CN-38M
980	B		CN-6F		CN-38M
SH3	Gr		CN-6F		CN-38M
600	YR	AVSS0.75sq	CN-38M		CN-30F
601	BrR	AVSS0.75sq	CN-38M		CN-30F
610	GrL	AVSS0.75sq	CN-35F		CN-4F
611	LG	AVSS0.75sq	CN-66F		CN-7F
612	GrG	AVSS0.75sq	CN-35F		CN-7F
614	W	MVVS0.75sq	CN-6F		CN-71M
617	Y		CN-6F		CN-71M
618	Gr		CN-6F		CN-71M
775	R		CN-6F		CN-71M
778	G		CN-6F		CN-71M
779	L		CN-6F		CN-71M
983	B		CN-6F		CN-71M
SH5	Gr		CN-6F		UNCONNECTED

WIRE NO	WIRE COLOR	WIRE SIZE	FROM	CONNECTION	TO
615	W	VCTF0.75sq	CN-7F		CN-70M
776	R		CN-7F		CN-70M
984	B		CN-7F		CN-70M
616	Sb	AVSS0.75sq	CN-7F		CN-70M
700	WG	AVSS0.75sq	CN-5F		CN-30F
701	V	AVSS0.75sq	CN-5F		CN-10F
702	LgB	AVSS0.75sq	CN-5F		CN-30F
703	P	AVSS0.75sq	CN-5F		CN-30F
708	LR	AVSS0.75sq	CN-4F		CN-29F
709	GB	AVSS0.75sq	CN-4F		CN-29F
710	Gr	AVSS0.75sq	CN-4F		CN-29F
711	GrL	AVSS0.75sq	CN-4F		CN-29F
713	BrY	AVSS0.75sq	CN-4F		CN-16F
714	WB	AVSS0.75sq	CN-41F		CN-4F
715	GW	AVSS0.75sq	CN-41F		CN-4F
716	WV	AVSS0.75sq	CN-41F		CN-4F
717	BP	AVSS0.75sq	CN-17F		CN-4F
720	PB	AVSS0.75sq	CN-10F		CN-30F
740	BO	AVSS0.75sq	CN-5F		CN-30F
741	GrR	AVSS0.75sq	CN-5F		CN-30F
742	VR	AVSS0.75sq	CN-5F		CN-30F
743	GrB	AVSS0.75sq	CN-5F		CN-30F
744	BP	AVSS0.75sq	CN-5F		CN-30F
745	PW	AVSS0.75sq	CN-5F		CN-30F
746	BrG	AVSS0.75sq	CN-5F		CN-30F
747	YV	AVSS0.75sq	CN-5F		CN-30F
748	VR	AVSS0.75sq	CN-5F		CN-30F
749	GrG	AVSS0.75sq	CN-5F		CN-30F
750	VW	AVSS0.75sq	CN-5F		CN-30F
751	GY	AVSS0.75sq	CN-5F		CN-30F
752	WV	AVSS0.75sq	CN-7F		CN-30F
753	GR	AVSS0.75sq	CN-7F		CN-30F
754	WL	AVSS0.75sq	CN-7F		CN-30F
755	Lg	AVSS0.75sq	CN-7F		CN-30F
771	G		CN-5F		CN-30F
772	B	MVVS0.75sq	CN-5F		CN-30F
773	R		CN-5F		CN-30F
774	W		CN-5F		CN-30F
SH1	Gr		CN-5F		CN-30F
777	V	AVSS0.75sq	CN-7F		CN-70M
900	RB	AVSS0.75sq	CN-1F		CN-30F
901	RL	AVSS0.75sq	CN-1F		CN-30F
902	W	AVSS0.75sq	CN-1F		CN-30F
903	OB	AVSS0.75sq	CN-1F		CN-30F

WIRE NO	WIRE COLOR	WIRE SIZE	FROM	CONNECTION	TO
904	OL	AVSS0.75sq	CN-1F		CN-30F
905	OW	AVSS0.75sq	CN-1F		CN-30F
907	YG	AVSS0.75sq	CN-1F		CN-30F
908	YL	AVSS0.75sq	CN-1F		CN-31M
909	YR	AVSS0.75sq	CN-1F		CN-31M
913	RB	AVSS0.75sq	CN-2F		CN-31M
914	RL	AVSS0.75sq	CN-2F		CN-31M
915	YL	AVSS0.75sq	CN-2F		CN-30F
916	YR	AVSS0.75sq	CN-2F		CN-30F
917	WR	AVSS0.75sq	CN-2F		CN-10F
925	WR	AVSS0.75sq	CN-71M		CN-6F
950	BrR	AVSS0.75sq	CN-1F		CN-30F
951	BL	AVSS0.75sq	CN-1F		CN-30F
952	BR	AVSS0.75sq	CN-1F		CN-30F
953	BrW	AVSS0.75sq	CN-1F		CN-30F
954	BrL	AVSS0.75sq	CN-1F		CN-30F
955	Gr	AVSS0.75sq	CN-1F		CN-30F
957	Br	AVSS0.75sq	CN-1F		CN-30F
958	BY	AVSS0.75sq	CN-1F		CN-31M
959	BG	AVSS0.75sq	CN-1F		CN-31M
963	BW	AVSS0.75sq	CN-2F		CN-31M
964	BL	AVSS0.75sq	CN-2F		CN-31M
965	BrB	AVSS0.75sq	CN-2F		CN-30F
966	BrY	AVSS0.75sq	CN-2F		CN-30F
967	BW	AVSS0.75sq	CN-2F		CN-10F
975	BW	AVSS0.75sq	CN-6F		CN-71M
E1	B	AVS5sq	P-1		CN-33M
E2	B	AVSS0.75sq	CN-5F		CN-30F
E3	B	AVSS0.75sq	CN-5F		CN-30F
E4	B	AVSS0.75sq	CN-36M		CN-28F
E5	B	AVSS1.25sq	CN-32M		CN-28F
E6	B	AVSS0.75sq	CN-39F		CN-28F
E7	B	AVSS0.75sq	CN-12F		CN-28F
E8	B	AVSS0.75sq	CN-35F		CN-28F
E9	B	AVSS0.75sq	CN-61F		CN-28F
E12	B	AVSS0.75sq	CN-29F		CN-28F
E14	B	AVSS1.25sq	CN-36M		CN-28F
E15	B	AVSS0.75sq	CN-60F		CN-28F
E16	B	AVSS0.75sq	M-2		CN-28F
E19	B	AVSS1.25sq	CN-43F	DOUBLE SPLICE	CN-28F
E21	B	AVSS1.25sq	CN-43F		CN-62F
E13	B	AVS5sq	P-3	DOUBLE SPLICE	P-2
E18	B	AVSS1.25sq	P-3		M-1
E20	B	AVSS0.75sq	CN-55F	DOUBLE SPLICE	P-4
E39	B	AVSS0.75sq	CN-11F		P-4

YN14E01073P1

https://truckmanualshub.com/

CONTROLLER GROUP

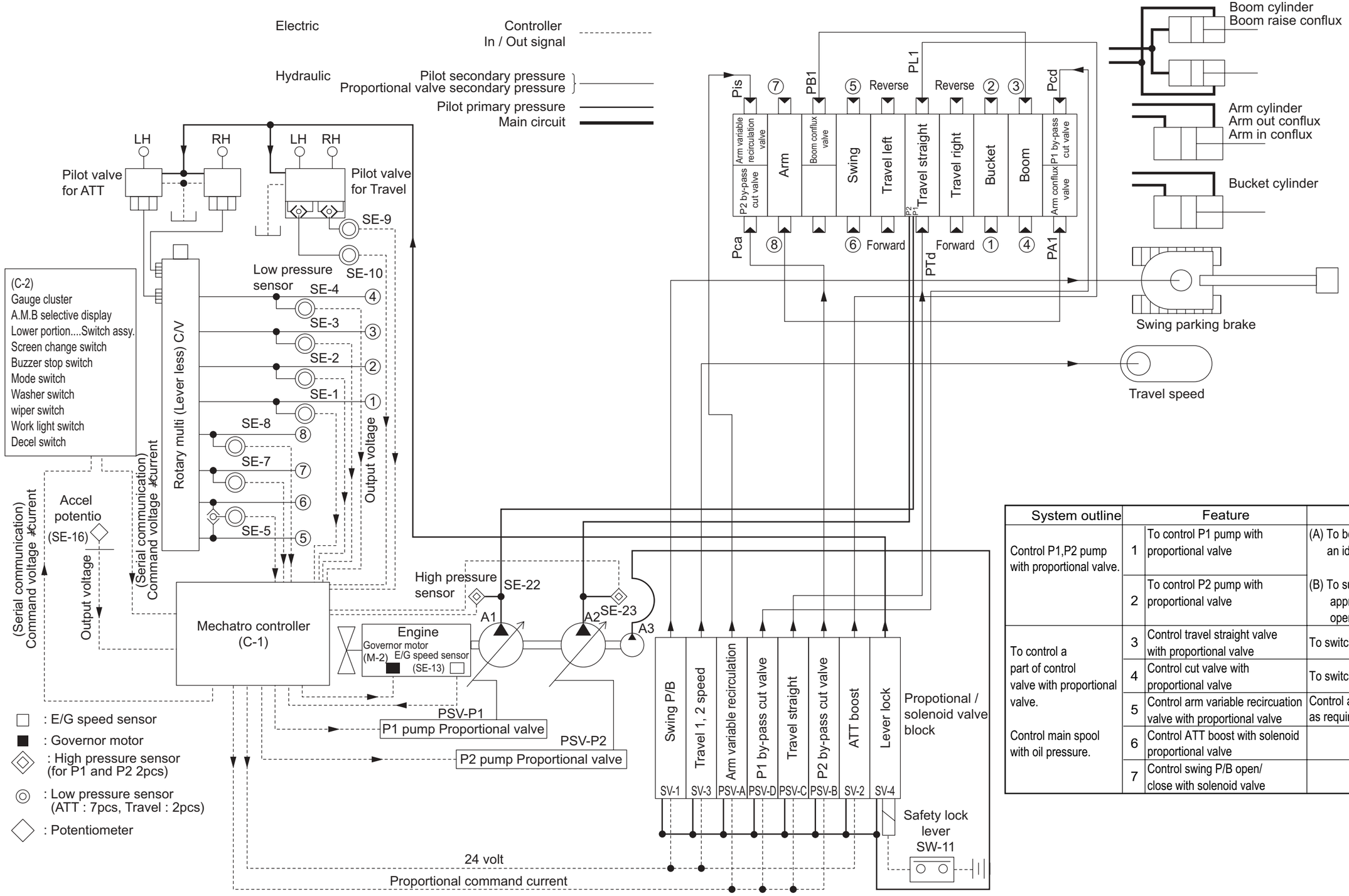
ITEM	PART NUMBER	DESCRIPTION	QTY	
		CONTROLLER ASSY		
	YN22E00162F1	**CONTROLLER GROUP**		
A1	**YN22E01147P2**	**BOX**	**1**	
A2	**YN22E01141P1**	**PLATE**	**1**	
A4	**YN22E00146F1**	**CONTROLLER** (C-1)	**1**	(Mechatronic)
A5	**YT24E00001F1**	**RELAY ASSY**(Wiper) (R-7)	**1**	
A6	**EN24S00008P1**	**RELAY** (Travel Alarm:R-8; Horn:R-5; Work Light:R-6)	**3**	
A7	**YX50E00002F1**	**SWITCH** (Swing Parking Release) (SW-4)	**1**	
A8	**YN22E01139P1**	**PLATE**	**1**	
A9	**ZM66C05016**	**SEMS-BOLT** (M5X16mm)	**2**	
A10	**ZM61C06030**	**SEMS-BOLT** (M6X20mm)	**4**	
A11	**YN22M01014P1**	**LABEL**	**1**	
A12	**ZM61C06016**	**SEMS-BOLT** (M6X16mm)	**8**	
A13	**2420Z699**	**GROMMET**	**1**	
A14	**YN14E00040F2**	**HARNESS ASSY, CAB**	**1**	
A14-2	**ZS18C06016**	**CAPSCREW** (M6X16mm)	**2**	
A14-3	**ZM61C06020**	**SEMS-BOLT** (M6X20mm)	**8**	
A14-4	**YN03E01001D5**	**CLIP**	**11**	
A14-5	**ZW26X06000**	**LOCK WASHER** (M6)	**2**	
A14-6	**ZW16X06000**	**WASHER** (M6)	**2**	
A14-7	**YN14E01073P1**	**HARNESS**	**1**	
A14-7B	**YN73E00015F1**	**BOX ASSY, FUSE** (E-4)	**1**	
A14-7Ba	**YN73E00001S001**	**BASE**	**1**	
A14-7Bb	**YN73E00001S002**	**COVER**	**1**	
A14-7Bc	**YN73E01020P1**	**LABEL**	**1**	
A14-7Bd	**2479R655S8**	**FUSE, 10AMP**	**11**	
A14-7Be	**2479R655S9**	**FUSE, 20AMP**	**9**	
	YN22E00145F1	**CONTROLLER INSTAL**		
B1	**YN22E01121P1**	**SUPPORT**	**1**	
B2	**YN22E01145P1**	**SUPPORT**	**1**	
B3	**YN22E01149P2**	**BRACKET**	**1**	
B4	**YN25S00001P1**	**TIMER** (R-20)	**1**	
B5	**ZM66C06025**	**SEMS-BOLT** (M6X25mm)	**1**	
B6	**ZM32C10025**	**BOLT** (M10X25mm)	**5**	
B7	**ZM22C10030**	**SEMS-BOLT** (M10X30mm)	**6**	
B8	**ZM66C06016**	**SEMS-BOLT** (M6X16mm)	**4**	
B9	**YN24E00010F1**	**RELAY ASSY**	**1**	
B9-1	**YN24E01007P1**	**PLATE**	**1**	
B9-2	**ZM61C06016**	**SEMS-BOLT** (M6X16mm)	**1**	
B9-3	**YN77S00017P1**	**CONVERTER, DC-DC** (E-22)	**1**	(24v-12v)
B9-4	**YY24S00001P1**	**RELAY, FLASHER** (R-19)	**1**	
B9-5	**ZM61C05016**	**SEMS-BOLT** (M5X16mm)	**2**	
	MITSUBISHI COMPONENT(S)			
A3	**VAME077148**	**RELAY, SAFETY** (R-4)	**1**	

https://truckmanualshub.com/

www.trucksmanuals.com

www.tradesmanualshub.com

3.7 OUTLINE OF MECHATRONIC CONTROL SYSTEM



System outline		Feature	Purpose
Control P1,P2 pump with proportional valve.	1	To control P1 pump with proportional valve	(A) To be power curve as an ideal curve
	2	To control P2 pump with proportional valve	(B) To supply flow rate appropriate to every operation
To control a part of control valve with proportional valve.	3	Control travel straight valve with proportional valve	To switch softly
	4	Control cut valve with proportional valve	To switch softly
	5	Control arm variable recircuation valve with proportional valve	Control arm speed as required
Control main spool with oil pressure.	6	Control ATT boost with solenoid proportional valve	
	7	Control swing P/B open/ close with solenoid valve	

Note : Pressure sensor SE-5 is attached to swing section of control valve

www.trucksmanuals.com

3.8 MACHINE OPERATION

Actuator / Opeating condition	Electric														Hydraulic																							
															Pump				Control valve																Motor			Cylinder			
	Low pressure sensor	High pressure sensor	P1 pump propo. valve	P2 pump propo. valve	Arm variable recirculation propo. valve	P2 bypass cut propo. valve	Travel straight valve	P1 bypass cut propo. valve	P1 ind. travel propo. valve	P2 ind. travel propo. valve	Swing P / B solenoid valve	Travel 1-2speed solenoid valve	ATT boost solenoid valve	Lever lock solenoid valve	P1 pump	P2 Pump	P1 ind. travel valve	P2 ind. travel valve	Boom	Arm	Bucket	Swing	Travel right	Travel left	P1 bypass cut valve	P2 bypass cut valve	Straight travel valve	Boom conflux valve	Arm conflux valve	Arm variable recirculation	Boom holding valve	Arm holding valve	Swing priority valve	Travel right motor	Travel left motor	Swing motor	Boom	Arm	Bucket	Nibbler/breaker
	SE1 ~ SE10	SE22 • • SE23	PSV P1	PSV P2	A6 PSV A	A3 PSV B	A4 PSV C	A5 PSV D	PSV E	PSV F	A8 SV-1	A7 SV-3	A2 SV-2	A1 SV-4																									
Travel fwd left/right operation (slow)	●	●	●	●		●		●						●	●	●							●	●	●	●							●	●					
Travel fwd left/right operation (fast)	○	○	○	○		○		○				○		○	○	○							○	○	○	○							○	○					
Boom up inching operation	●	●	●			●		●						●	●				●						●	●		●								●			
Boom up full lever operation (no load)	○	○	○	○		○		○						○	○	○			○						○	○		○								○			
Boom up and arm in operation	●	●	●	●	●	●		●			●			●		●			●	●		●			●	●		●		●		●				●	●		
Boom up with HL and swing	○	○	○	○		○		○			○		○	○		○			○			○			○	○		○							○	○				
Travel fwd, boom up with HL and swing	●	●	●	●		●	●	●			●		●	●	●	●			●			●	●	●	●	●	●	●					●	●	●	●			
Arm out inching operation	○	○		○	○	○								○		○				○					○	○			○	○							○		
Arm out full lever operation	●	●	●	●	●	●		●						●	●	●				●					●	●			●	●							●		
Arm out full lever and swing	○	○	○	○	○	○		○			○			○	○	○				○		○			○	○			○	○					○		○		
Arm in inching operation	●	●		●	●	●		●			●			●		●				●					●	●			●		●						●		
Arm in full lever operation (light digging)	○	○		○	○	○		○			○			○		○				○					○	○				○	○						○		
Arm in heavy digging (two pumps)	●	●	●	●		●	●	●			●			●	●	●				●					●	●	●				●						●		
Arm in and swing (heavy digging)	○	○	○	○		○	○	○			○			○	○	○				○		○			○	○	○					○					○		
Bucket in (dig) inching operation	●	●	●			●		●						●	●						●				●	●												●	
Bucket in (heavy dig) full lever operation	○	○	○	○		○	○	○						○	○	○					○				○	○	○											○	
Bucket out (dump) inching operation	●	●	●			●		●						●	●						●				●	●												●	
Bucket out (dump) full lever operation	○	○	○	○		○	○	○						○	○	○					○				○	○	○											○	
Swing operation	●	●		●		●		●			●			●		●						●			●	●										●			
Nibbler/Breaker one pump flow	○	○		○		○		○						○		○									○	○													○
Nibbler/Breaker two pump flow	●	●	●	●		●	●	●						●		●									●	●	●													●
Ind. Travel: Neutral	○	○				○	○	○	○	○				○	○	○	○	○							○	○	○													
Ind. Travel: Travel fwd left/right operation	●	●		●		●	●	●	●	◐				●		●	●	◐					●	●	●	●	●							●	●					
Ind. Travel: Boom up with HL and swing	○	○	○	○		○	○	○	◐	○	○		○	○	○		◐	○	○			○			○	○	○	○						○	○	○	○			
Ind. Travel: Travel fwd, boom up and swing	●	●	●	●		●	●	●	◐	◐	●			●	●	●	◐	◐	●			●	●	●	●	●	●	●						●	●	●	●			
Hydraulic system pressure draining	○	○	○	○		○	○	○						○	○	○	○	○																					

Note : 1. In Boom, arm and bucket digging operation, ATT function through solenoid valve only when ATT boost switch is pressed.
2. ATT boost function does not actuate at P2 side option nibbler operated.
3. Press screen change switch and buzzer stop switch at the same time for 5 seconds or more, the pressure release can be performed form actuator corresponding to pressure releasing.

ACTUATOR / FUNCTION	(20)PSV-D P1-ByPassCut	(21)PSV-B P2-ByPassCut	(22)PSV-C Travel Straight	(23)PSV-A ArmRegen	(24)PSV-P1	(25)PSV-P2	(32)PSV-E P1 IndTravel	(33)PSV-F P2 IndTravel
Operator's Control in neutral	200/221 mA 0/0 psi	200/220 mA 0/0 psi	350/350 mA 100/100 psi	404/405 mA 148/148 psi	350/347 mA 91/88 psi PS 0 mA	350/348 mA 91/90 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Travel Fwd/Back (Slow)	560/560 mA 284/284 psi	560/560 mA 284/284 psi	350/350 mA 100/100 psi	404/405 mA 148/148 psi	492/489 mA 216/216 psi PS 15~4 mA	495/492 mA 495/493 psi PS 15~4 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Travel Fwd/Back (Fast)	560/560 mA 284/284 psi	560/560 mA 284/284 psi	350/350 mA 100/100 psi	404/405 mA 148/148 psi	492/489 mA 216/216 psi PS 50 to 3 mA	495/492 mA 495/493 psi PS 50 to 3 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up inching	404/402 mA 148/146 psi	565/565 mA 289/289 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	410/408 mA 142/139 psi PS 0 mA	350/347 mA 91/88 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up/Arm in inching	397 mA 141 psi	560mA 280psi	340mA 92psi	612mA 330psi	456mA 180psi	480mA 207psi	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up/Arm in inching (stall)	695mA 403psi	695mA 403psi	501mA 232psi	472mA 200psi	473mA 200psi	477mA 203psi	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up full lever (no load)	404/402 mA 148/146 psi	706/700 mA 413/406 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	680/680 mA 380/380 psi PS 30~2 mA	680/680 mA 380/380 psi PS 30~2 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up full lever (stall)	404/402 mA 148/146 psi	706/700 mA 413/406 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	476/471 mA 200/197 psi PS 0 mA	476/473 mA 200/199 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up full lever (stall-HL)	404/402 mA 148/146 psi	706/700 mA 413/406 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	469/466 mA 196/191 psi PS 0 mA Note: Increased value of PS to max=30: 435/430 mA 165/162 psi PS 0 mA	469/467 mA 196/194 psi PS 0 mA Note: Increased value of PS to max=30: 435/432 mA 165/162 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up/Arm in full lever	404/402 mA 148/146 psi When stalling: 706/704 mA 413/410 psi	706/700 mA 413/406 psi When stalling: 706/700 mA 413/406 psi	350/348 mA 100/99 psi When stalling: 513/512 mA 244/242 psi	538/539 mA 265/265 psi When stalling: 200/220 mA 0/0 psi	600/595 mA 305/305 psi When stalling: 476/471 mA 202/197 psi PS 0 mA	690/690 mA 307/305 psi When stalling: 476/473 mA 202/199 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up/Arm in (stall)	706/691 mA 413/400 psi	706/692 mA 413/400 psi	513/514 mA 244/244 psi	200/214 mA 0/0 psi	472/470 mA 201/199 psi PS 0 mA	472/471 mA 202/200 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Boom up-HL/Swing	404/402 mA 148/146 psi	706/700 mA 413/406 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	600/595 mA 305/305 psi	590/589 mA 300/300 psi	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Travel Fwd/Boom up-HL/Swing	560/560 mA 284/284 psi	560/560 mA 284/284 psi	650/650 mA 361/361 psi	404/405 mA 148/148 psi	485/480 mA 210/201 psi PS 3~7 mA	485/480 mA 210/201 psi PS 3~5 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Arm out inching	404/402 mA 148/146 psi	404/405 mA 148/149 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	350/347 mA 91/88 psi PS 0mA	400/395 mA 129/125 psi	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Arm out full lever (no load)	706/704 mA 413/412 psi	404/406 mA 148/149 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	590/590 mA 300/300 psi PS 5~40	590/590 mA 300/300 psi PS 5~40	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Arm out full lever (Stall)	706/704 mA 413/412 psi	404/406 mA 148/149 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	477/471 mA 202/197 psi PS 0 mA	477/473 mA 202/199 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Arm out/Swing full lever	706/704 mA 413/412 psi	404/406 mA 148/149 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	555/550 mA 273/270 psi PS 0~40 mA	690/690 mA 307/305 psi PS 0~40 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Arm in inching	404/402 mA 148/145 psi	404/405 mA 148/148 psi	350/348 mA 100/99 psi	706/700 mA 413/407 psi	350/346 mA 91/87 psi PS 0 mA	400/395 mA 136/136 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Arm in (light digging) full lever	404/402 mA 148/145 psi	404/405 mA 148/148 psi	350/348 mA 100/99 psi	538/539 mA 265/267 psi	350/346 mA 91/87 psi PS 0 mA	750/739 mA 442/434 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Arm in (stall-heavy dig) full lever	706/705 mA 413/410 psi	404/405 mA 148/148 psi	513/511 mA 244/242 psi	200/221 mA 0/0 psi	475/471 mA 199/197 psi PS 0 mA	477/473 mA 203/199 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Arm in/Swing (heavy digging)	706/699 mA 413/406 psi	404/405 mA 148/148 psi	647/646 mA 361/360 psi	623/620 mA 339/336 psi	488/485 mA 213/210 psi PS 0 mA	489/484 mA 213/210 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Bucket in (Dig) inching	404/402 mA 148/145 psi	404/405 mA 148/148 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	400/397 mA 135/132 psi PS 0 mA	350/347 mA 91/88 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Bucket in (Dig) full lever	404/402 mA 148/145 psi	706/700 mA 413/409 psi	647/645 mA 361/360 psi	404/405 mA 148/148 psi	640/634 mA 338/339 psi PS 0~22 mA	540/540 mA 265/265 psi PS 0~25 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Bucket in (Dig) full lever (Stall)	404/402 mA 148/145 psi	706/700 mA 413/409 psi	647/646 mA 361/360 psi	404/405 mA 148/148 psi	475/471 mA 200/197 psi PS 0 mA	475/482 mA 200/199 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Bucket out (Dump) inching	404/402 mA 148/145 psi	404/407 mA 148/149 psi	350/348 mA 100/99 psi	404/405 mA 148/148 psi	410/407 mA 135/132 psi PS 0 mA	350/347 mA 91/88 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Bucket out (Dump) full lever	404/402 mA 148/145 psi	706/700 mA 413/407 psi	647/646 mA 361/360 psi	404/402 mA 148/148 psi	650/648 mA 348/346 psi PS 0 mA	422/418 mA 154/151 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Bucket out (Dump) full lever-Stall	404/402 mA 148/145 psi	706/700 mA 413/407 psi	647/646 mA 361/360 psi	404/402 mA 148/148 psi	475/475 mA 203/202 psi PS 0 mA	422/418 mA 154/152 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Swing operation	404/402 mA 148/145 psi	404/405 mA 148/148 psi	350/348 mA 100/99 psi	404/402 mA 148/148 psi	350/346 mA 91/87 psi PS 0 mA	623/621 mA 331/329 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Nibbler/Breaker (1 pump)	404/402 mA 148/145 psi	706/701 mA 413/409 psi	350/348 mA 100/99 psi	404/402 mA 148/148 psi	350/346 mA 91/87 psi PS 0 mA	350/347 mA 91/88 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Nibbler/Breaker (2 pump)	706/698 mA 413/406 psi	706/701 mA 413/409 psi	513/513 mA 244/244 psi	404/402 mA 148/148 psi	350/346 mA 91/87 psi PS 0 mA	350/347 mA 91/88 psi PS 0 mA	200/218 mA 0/0 psi	200/215 mA 0/0 psi
Ind. Travel — Neutral	706/698 mA 413/406 psi	706/700 mA 413/407 psi	668/666 mA 380/377 psi	404/402 mA 148/148 psi	350/345 mA 91/87 psi PS 0 mA	350/346 mA 91/88 psi PS 0 mA	481/475 mA 206/202 psi	481/472 mA 206/199 psi
Ind. Travel — Travel Fwd L/R	706/698 mA 413/406 psi	706/700 mA 413/407 psi	668/666 mA 380/377 psi	404/403 mA 148/145 psi	350/345 mA 91/87 psi PS 1 mA	620/615 mA 325/323 psi PS 1 mA	481/476 mA 206/202	665/654 mA 368/360 psi
Ind. Travel — Boom Up-HL/Swing	706/698 mA 413/405 psi	706/700 mA 413/407 psi	668/666 mA 380/377 psi	404/403 mA 148/145 psi	677/677 mA 375/376 psi PS 0 mA	350/346 mA 91/88 psi PS 0 mA	665/658 mA 368/361 psi	481/472 mA 206/199 psi
Ind. Travel — Travel Fwd+Boomup&Swing	706/698 mA 413/405 psi	706/700 mA 413/407 psi	668/666 mA 380/377 psi	404/403 mA 148/145 psi	499/498 mA 222/222 psi PS 0 mA	499/497 mA 222/220 psi PS 0 mA	665/658 mA 368/361 psi	665/654 mA 368/360 psi
Hydraulic System Pressure Drainining	404/404 mA 148/148 psi	404/405 mA 148/148 psi	350/348 mA 100/99 psi	404/403 mA 148/145 psi	350/345 mA 91/87 psi PS 0 mA	350/346 mA 91/88 psi PS 0 mA	438/437 mA 168/167 psi	438/433 mA 168/164 psi

www.trucksmanuals.com

https://truckmanualshub.com/

3.9 MULTIDISPLAY SELF DIAGNOSIS

The error of the control I/O signal of the pressure sensor and the proportional valve, etc. is detected and the error item is displayed on the monitor.

1. Indication item

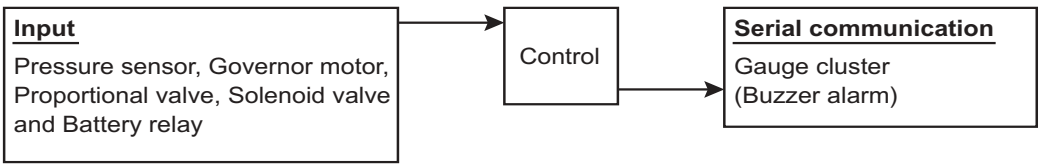
No.	Contents	Display of monitor	Connector No. Pin No.	Wire No.	Wire Color
1	Mechatro controller error	1 CPU MECHATRO CONTR.FAIL	CN16-1	770	R
2	Gauge cluster → Mechatro controller communication failure	I-1 RECEIVE ERROR	CN16-2	582	W
3	Battery relay fail	I-2 BAT RELAY	CN15-24	700	WG
4	ROM data	A-1 CPU ROM DATA FAILURE			
5	Mechatro set error	A-2 CPU MECHATRO SET ERROR			
6	Boom raise pressure sensor fail	B-1 SE BOOM RAISE SENSOR	CN11-2 CN11-1	502 952	LgY BR
7	Boom lower pressure sensor fail	B-2 SE BOOM LOWER SENSOR	CN11-5 CN11-6	503 953	LO BrW
8	Arm in pressure sensor fail	B-3 SE ARM IN SENSOR	CN11-8 CN11-7	504 954	PG BrL
9	Arm out pressure sensor fail	B-4 SE ARM OUT SENSOR	CN11-11 CN11-12	505 955	PL Gr
10	Bucket dig pressure sensor fail	B-5 SE BUCKET DIG SENSOR	CN11-14 CN11-13	500 950	LgR BrR
11	Bucket dump pressure sensor fail	B-6 SE BUCKET DUMP SENSOR	CN11-17 CN11-18	501 951	LgW BL
12	Swing pressure sensor Fail	B-7 SE SWING SENSOR	CN11-20 CN11-19	507 957	VG Br
13	Travel (R.H) Pressure sensor fail	B-9 SE TRAVEL (R) SENSOR	CN11-26 CN11-25	508 958	VY BY
14	Travel (L.H) Pressure sensor fail	B-10 SE TRAVEL (L) SENSOR	CN11-29 CN11-30	509 959	Sb BG
15	Pump P1 pressure sensor fail	C-1 SE PUMP P1□ SENSOR	CN12-4 CN12-5 CN12-6	915 515 965	YL V BrB
16	Pump P2 pressure sensor fail	C-2 SE PUMP P2□ SENSOR	CN12-9 CN12-8 CN12-7	916 516 966	YR L BrY

https://truckmanualshub.com/

No.	Contents	Display of monitor	Connector No. Pin No.	Wire No.	Wire Color
17	P1 By-pass cut propo-valve fail	D-1 PSV P1 BY-PASS□ PROPO-VALVE	CN15-4 CN15-5	744 745	BP PW
18	P2 By-pass cut propo-valve fail	D-2 PSV P2 BY-PASS□ PROPO-VALVE	CN15-6 CN15-7	740 741	BO GrR
19	Travel straight propo-valve fail	D-3 PSV TRAVEL PROPO-VALV	CN15-8 CN15-9	742 743	VR GrB
20	Arm variable recirculation propo-valve fail	D-6 PSV RECIRCULAT PROPO-VALV	CN15-10 CN15-11	746 747	BrG YV
21	P1 pump propo. valve fail	E-1 PSV PUMP P1 PROPO-VALV	CN15-17 CN15-18	748 749	VR GrG
22	P2 pump propo. valve fail	E-2 PSV PUMP P2 PROPO-VALV	CN15-19 CN15-20	750 751	VW GY
23	ATT boost solenoid fail	F-1 SV POWERBOOST SOLENOID	CN15-23	703	P
24	Swing parking brake solenoid valve fail	F-2 SV SWING BRAKE SOLENOID	CN15-22	701	V
25	Travel two-speed solenoid valve fail	F-3 SV TWO-SPEED SOLENOID	CN15-21	702	LgB
26	Gover nor motor current fail	G-1 M STEP MOTOR CURRENT-NG	CN-15-1 CN-15-2 CN-15-15 CN-15-16	771 772 773 774	G B R W
27	Governor motor starting point indexing fail	G-2 M STEP MOTOR S/PT. ERROR	CN-13-1	544	BG
28	Engine speed sensor fail	G-3 RPM E/G REV. SENSOR	CN-12-20 CN-12-21	580 581	R W
29	Accel potentio meter fail	H-1 POT ACCELERATR□ POTENTIO	CN-12-1 CN-12-2 CN-12-3	917 517 967	BW P WR
30	Hydraulic pressure release stand by	32 PR DRAINING HYD. PRESS	—	—	—
31	Hydraulic pressure release fail	33 PR FAIL DRAIN HYD. PRESS	—	—	—
35	Prop-Valve P1 I-Travel fail	D-11 PSV-E PUMP P-1 I-TRAVEL	CN-17-15 CN-17-16		WV GR
36	Prop-Valve P2 I-Travel fail	D-12 PSV-F PUMP P-2 I-TRAVEL	CN-17-17 CN-17-18		WL GR

Note : 1. Refer to electric diagram about number of connector, number of pin, wire number and wire color.
2. When the pressure release operation (Hidden mode) is performed, this condition is indicated on multi-display.

2. In/Output flow



https://truckmanualshub.com/

3.10 TROUBLE HISTORY DIAGNOSIS

The error item detected by the self diagnosis is stored in the mechatro controller as a history and is displayed on the multidisplay.

1. How to display

1. Turn the starter switch ON.
2. Press the buzzer stop switch 5 times in sequence for 10 seconds.
   (Example)

No errors	NO ERROR
Error detected in the past	00025H B-1 Boom raise D-1 P1 BY-PASS F-3 TWO SPEED

3. Trouble history are displayed in order of the old one.
4. Transmits the error data (one or many) and hour meter to the gauge cluster.
   - Hour meter and 3 error data are displayed in the screen.
   - If three error data or more exist, display the data three by three in order for every 5 seconds.
5. To scroll the page, use the work mode and the buzzer stop switch.
   - Press the work mode switch, page up.
   - Press the buzzer stop switch, page down.

Note : All the error items are stored by hourmeter, when the hourmeter is differed, press the work mode and the buzzer stop switch, and displays all items and make sure that they are right.

6. Turn the starter switch off, and the display is disappeared.

2. How to cancel the contents of the trouble history

1. Display the trouble history mode.
2. Press the work mode switch and the buzzer stop switch for 10 seconds or more concurrentry.
3. When the deletion is completed, the " NO ERROR " is displayed.
4. Turn the starter switch OFF.

Note : All the stored item are erased.
It is impossible to erase data partially

3. Trouble history contents

Symbol	Display	
A	Controller relation	A-1 ROM DATA FAILURE A-2 MECHATRO SET ERROR
B	Low pressure sensor	B-1 BOOM RAISE SENSOR B-2 BOOM LOWER SENSOR B-3 ARM OUT SENSOR B-4 ARM IN SENSOR B-5 BUCKET DIG SENSOR B-6 BUCKET DUMP SENSOR B-7 SWING (R) SENSOR B-9 TRAVEL (R)SENSOR B-10 TRAVEL (L) SENSOR
C	High pressure sensor (Hydraulic pump)	C-1 PUMP P1 SENSOR C-2 PUMP P2 SENSPR
D	Proportional valve (Control valve)	D-1 P1 BYPASS PROPO VALVE D-2 P2 BYPASS PROPO VALVE D-3 TRAVEL PROPO VALVE D-6 RECIRCULAT PROPO VALVE D-11 PSV P1 I-TRAVEL D-12 PSV P2 I-TRAVEL
E	Proportional valve (Hydraulic pump)	E-1 PUMP P1 PROPO VALVE E-2 PUMP P2 PROPO VALVE
F	Solenoid valve	F-1 POWERBOOST SOLENOID F-2 SWINGBRAKE SOLENOID F-3 TWO-SPEED SOLENOID
G	E/G Accessory	G-1 CURRENT-NG G-2 S/PT.ERROR G-3 E/G REV **G-4 E/G COOL** **G-5 E/G OIL PRS**
H	Potentio relation	H-1 ACCELERATR POTENTIO **H-4 AIR CLEANER RESTRICT**
I		I-1 RECEIVE ERROR I-2 BAT.RELAY
		NO ERROR

Note : G-4 and G-5 are newly added

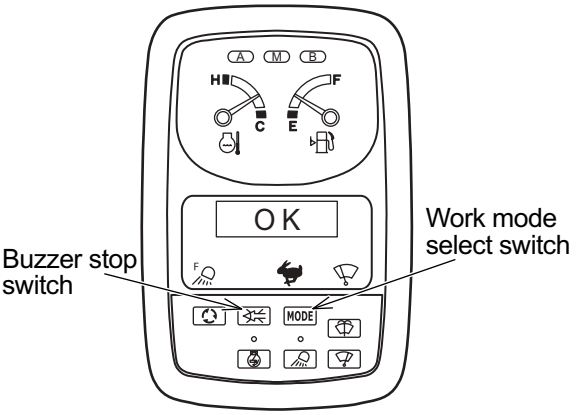
https://truckmanualshub.com/

3.11 MECHATRO CONTROLLER "A" and "B" ADJUSTMENT

1. When the mechatro controller requires adjustment,

After replacement of the following parts, if following display appears on the multidisplay, the adjustment of the mechatro controller is performed.

Gauge cluster



When the mechatro controller is required to adjust,

1. When the mechatro controller is replaced,
2. When the governor motor is replaced,
3. When the ROM DATA FAILURE is displayed on the multidisplay,
4. When the ROM DATA FAILURE and MECHATRO SET ERROR are displayed alternately on the multidisplay,

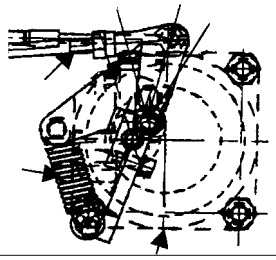
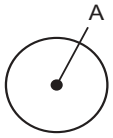
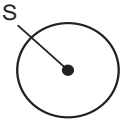
2. Preparation

1. Warm up the engine.
2. Turn the air-con switch off.
3. Turn the starter switch off to stop the engine.

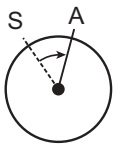
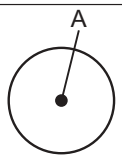
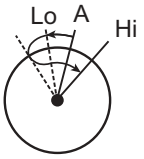
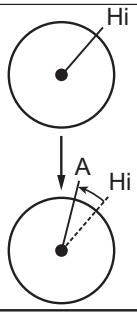
Note : Make sure that the knob for the engine emergency stop pushed in.If the adjustment is done while the knob is pulled out, the engine speed can not be set correctly.

3. Adjustment

A adjustment

Procedure	Multidisplay	Movement of governor motor
1 While keeping the work mode selector switch on the cluster gauge pressed, turn the starter switch ON, hold it in this condition for 5 to 10 seconds, and release it.	10 : 05	
2 The governor motor returns it to the starting point, and it stops at the point corresponding to the accel dial set position.	10 : 05	 Stop at the position set by accel dial
3 Keep the buzzer stop switch on the gauge cluster pressed for 5 to 10 seconds and release it, and STEP 1 is displayed on the multidisplay, then wait until the next display STEP 2 appears.	CPU STEP 1 START CPU step 1 start CPU STEP 2 GAP (STOP)	 Automatically run to engine stop position (S)
4 After verification of the STEP 2 display, go to the engine room and adjust the rod Assy standard length to Bmm in order to have the clearance "A 0.1mm" between the governor lever and the engine stop set bolt. If governor motor was replaced, indicate STEP 2 display and insert rod assy. • **Dimension B:** **186 mm (SK160LC-6E),** **288~304 mm (SK210LC-6E),** **165 mm (SK250LC-6E),** **210~213 mm (SK290LC-6E),**	CPU STEP 2 GAP (STOP)	 Stop at S position [TOOLS] • Spanner 13 mm X 14mm • Spanner 6 mm • Thickness gauge

https://truckmanualshub.com/

Procedure	Multidisplay	Movement of governor motor
5. Press the buzzer stop switch once, and wait until the STEP 3 is displayed.	CPU STEP 3 START (E/G)	 Automatically run to the engine available position A
6. After verification of STEP 3 display, starts the engine. Then, it is unaffected by the actual accel dial position.	CPU STEP 3 START E/G	 Stop at A position
7. Press the buzzer stop switch once, and the STEP 4 is displayed and the controller returns from the A position of governor to the low idling position once, and then reads the engine rpm to the high idling automatically. (Required time : about 2 minutes.)	CPU STEP 4 MEMORY	 Move from A position to Lo idling position, and self-travels from Lo position to high idling (H) position
8. After completion of the read out, wait until the "CPU FINISH 2220RPM" is displayed on the multidisplay. After the "CPU FINISH 2220RPM" is displayed, the controller returns to the actual dial initial optional position automatically. **Note : If the "CPU FINISH 2220RPM" is not displayed, the adjustment has failed. Turn the starter switch off, and perform the adjustment again.**	CPU FINISH 2220RPM	

B adjustment

9. When the screen "CPU FINISH 2220RPM" is displayed after adjustment of engine, the "CPU STEP 5 MEMORY" is displayed automatically, the engine speed changes into high idling and the pump is loaded, and then "CPU FINISH ORPM" is displayed after 1 minute in high idling condition and adjustment is terminated.	CPU STEP 5 MEMORY CPU FINISH ORPM	

Note :

1. **The B adjustment is carried out by mechatro controller after completion of A adjustment automatically.**
2. **The temperature control of hydraulic oil is necessary to adjust it to the correct output, so special attention must be paid to the hydraulic oil temperature.**
3. **When the adjustment failed, start it from A adjustment after checking the relief pressure.**
4. **Usually the A adjustment and B adjustment must be carried out sequentially.**

4. Adjustment End (Rechecking E/G speed)

1) Place starter switch to “START” position, and rise the engine speed to the high idling.
2) Press screen change switch on gauge cluster once, press engine speed display and auto accel release switch, and the auto accel function is released.
3) By switching the work mode selector switch on gauge cluster, the mode display changes, then check that the engine speed indicated on multi display changes.
4) Press auto accel release switch on gauge cluster to have auto accel, and check the decel speed.
5) Press screen change switch on gauge cluster 4 times to have “Time Display” and stop the engine.

https://truckmanualshub.com/

5. When the mechatro controller can not be adjusted,

1. The **CPU STEP 4 MEMORY** to **CPU CONDITION ERROR** is displayed, making the adjustment impossible.

A. (Display condition) - While reading the engine speed, in the condition of the engine revolution, 850 rpm or higher, for the engine rpm before and after the steps of the governor, the revolution at rear step is 10 rpm lower than that before step.

(Cause) - The engine speed sensor has failed to read the engine speed.

(Corrective action) - After measurement and adjustment of the voltage of speed sensor, carry out the "A" adjustment. (Disconnect the sensor connector and measure the voltage.)

3V (AC) or more at high idling condition (Voltage available for controller to read) [4V (AC) or more at high idling condition set in the factory].

Specified value
Voltage 1.4 to 6V (AC)
Resistance 2.3 ± 0.2 Ω

B. (Display condition) - Where the abnormal rotation (step out) in high idling condition.

(Cause) - Governor motor link rod connection error. (Corrective action)

(Corrective action) {Link rod length : 288~304 mm (SK200-6E), 336~348 mm (SK230-6E), }

- **If it is stepped out even after the adjustment, press the buzzer stop once just before the stepping out as an emergency measure, and the speed changes to the high idling position temporarily and the CPU FINISH 2200RPM is displayed.**
- **Minor changed machine is added spring to link mechanism.**

2. The **CPU CONDITION ERROR** , **CPU MECHATRO CONT FAIL** and **CPU ROM DATE** are displayed by turn, making the adjustment impossible.

(Display condition)
- When the engine speed is 300 rpm or lower, or 3,000 rpm or higher,
  ..... The **CPU MECHATRO CONT FAIL** is displayed
- When the engine speed is 0 rpm,
  ..... The **CPU ROM DATA** is displayed.

(Cause)
- The engine sensor has failed to read the engine speed.
- The harness of the engine speed sensor is broken.

(Corrective action)
- After measurement and adjustment of the voltage of speed sensor, carry out “A” adjustment.
  3V (AC) or more in high idling condition.

3. The **CPU ROM DATE FAILURE** is displayed.

A. (Display condition)
- When the mechatro controller fails,

(Cause)
- There is the suspicion of breakage inside of the mechatro controller.

(Corrective action)
- If the failure is not recovered after the adjustment, replace the mechatro controller with new one.

B. (Display condition)
- After the mechatro controller is replaced,

(Cause)
- The mechatro controller is not adjusted yet.

(Corrective action)
- Adjust the mechatro controller.

4. The display does not go from the **STEP 1 CPU START** to **STEP 2 CPU GAP (STOP)** .

(Display condition)
- The limit switch signal (grounding) in the governor motor is not input to the mechatro controller.

(Cause)
- Failure of the limit switch in the governor motor.
- Insufficient contact of connector on the governor motor or breakage of the harness.

(Corrective action)
- Check that the limit switch of the governor motor goes on or off.
- Check connector and harness for possible damage, and adjust it if necessary.

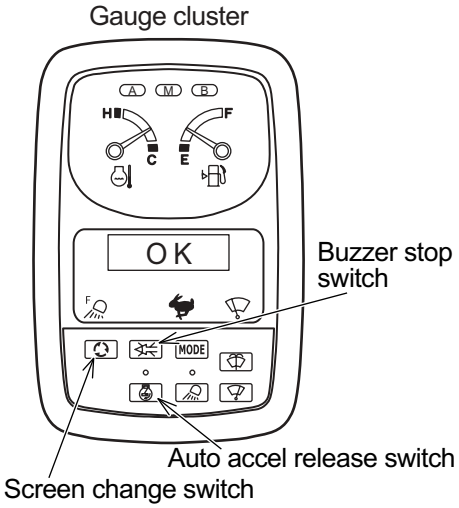
5. Others

The engine oil pressure is displayed on the gauge cluster, and the engine stops. It may be caused by the failure of the engine oil pressure switch and short-circuit of the harness.

https://truckmanualshub.com/

3.12 SERVICE DIAGNOSIS

The present service diagnosis in 23 items is displayed on the multidisplay according to the data received from the mechatro controller.



How to display

1. Keep the buzzer stop switch pressing, turn the starter switch “ON” and starts the engine.
2. Place safety lock lever to unlocked (down) position.
3. The 1st item Parts No. of Mechatro controller and program version are displayed.
4. Each time the screen change switch on the gauge cluster is pressed, the number runs like No. 2, No. 3,…in order.
5. Each time the buzzer stop switch on the switch panel is pressed, the number returns like No. 25, No.24 …in order.
6. If mode indication is not in remarks column, diagnose by M mode.
7. The display disappears only when the starter switch is turned OFF.

Note : 1. The scrolling of service diagnosis to see variation by the work mode with the work mode selector switch may cause the change of the mode, so use the screen change switch on the gauge cluster for scrolling.

2. Press the auto accel release switch according to the check item.

3. When starter switch is pressed, the start-up mode is “ M ” but the change of start-up mode is possible.

Service diagnosis display

No.	Display		Operation procedure	SK210LC-6E		SK250LC-6E		Remarks
Mechatro controller	**No.1** (Screen No.) Main cont P/No. YN22E00123F1 Program version VER 08.00			Main cont P/No. YN22E00146F1 Program version VER 02.00				
	No.2		The set value varies according to the accel dial position and work mode selector operation.	Low	Hi	Low	Hi	M mode at Hi position
	E/G SET	1000		1000	2220	1000	2300	
				1950		2100		A mode
	MEAS	1019		2220		2300		B mode
	Aut accel			Auto accel function active : 1050				System starts in "M" mode by default. A and B mode can be selected after ignition key is turned to ON.
	E/G PRS.	LIVE		Engine running : LIVE. When engine is stopped : DEAD				
	Mode select	M	Press the work mode selector switch	At M mode : M, At A mode : A. At B mode : B, indicator illuminates.				
	No.3							
	H-1		Voltage value varies while turning throttle potentiometer from Low to Hi. The step number varies a little after A adjustment.	Low	Hi	Low	Hi	
	ACCEL VOLT.	0.3V		0.3~0.4V	4.4~4.5V			
	POS.	0%		0%	100%			
	MOTOR STEP	312		312	500			
	POS.	0%		0%	100%			
	No.4			At the moment when the starter switch turns OFF, ON				
	STEP. MOTOR							
	G-1 COIL A	1.5A						
	G-1 COIL B	1.5A						
	G-2 LIMIT	OFF						

https://truckmanualshub.com/

No.	Display	Operation procedure	SK210LC-6E	SK250LC-6E	Remarks
Control valve solenoid valve 34±2Ω	**No.5** SOL. VALVE F-2 SWING-BRAKE COMP. ON MEAS. ON RELEASE SW	***SV–1** Operate swing lever in left or right or arm-in action. Operate swing brake switch.	At swing and arm in operation OFF (ON 5sec. after swing lever neutral position) OFF (ON simultaneous arm lever neutral position) ON, at swing brake release side.		• COMP. Instructed by mechatro controller • MEAS. Error is displayed by Feed back COMP. OFF MEAS. ON (Even if in disconnection, displayed.) Voltage of connectors Measure the voltage of connectors. Measure resistance of solenoid valve. Perform checking changing the connector positions each other
	No.6 SOL. VALVE F-3 1/2-TRAVEL COMP. OFF MEAS. OFF SWITCH OFF	***SV–3** Operate travel speed change switch.	1st speed 2nd speed OFF ON OFF ON OFF OFF (ON while SW is active)		
	No.7 SOL. VALVE F-1 POWER BOOST COMP. OFF MEAS. OFF SWITCH OFF	***SV–2** Operate ATT boost switch. Boom up Arm in Bucket dig } Operation only	ATT boost SW/Heavy Lift Switch Not operated OFF OFF□ OFF	SW is ON and control lever is operated ON□ ON□ ON	
Mechatro controller	**No.8** RELAY I-2 BAT. RELAY COMP. ON MEAS. ON KEY SWITCH ON	***E–1** Operate starter switch	Starter SW ON ON ON ON	Starter SW OFF ON□ ON□ OFF	
Low pressure sensor	**No.9** PRESS. SENSOR B-1 BOOM RAISE ***SE–3** 0.5V 0P B-2 BOOM LOWER ***SE–4** 0.5V 0P	Control levers in neutral E/G speed Low/Hi	0.5V 0P		In neutral, values are minimum. Values go up proportionally with control lever movement. If it is not varied, change the connector position, and check it again. After changing the position, If the display changes → failure of sensor. If the display does not change → failure of harness. * B-7 varies proportionally with control lever movement. * B-8 does not vary.
		E/G speed High idle Boom over relief	4.7~5.0V 435P		
	No.10 PRESS. SENSOR B-3 ARM OUT ***SE–8** 0.5V 0P B-4 ARM IN ***SE–7** 0.5V 0P	Control levers in neutral E/G speed Low/Hi	0.5V 0P		
		E/G speed High idle Arm over relief	4.7~5.0V 435P		
	No.11 PRESS. SENSOR B-5 BUCKET DIG ***SE–1** 0.5V 0P B-6 BUCKET DUMP ***SE–2** 0.5V 0P	Control lever at neutral position E/G speed Low/Hi	0.5V 0P		
		E/G speed High idle Bucket over relief	4.7~5.0V 435P		
	No.12 PRESS. SENSOR B-7 SWING (R) ***SE–5** 0.5V 0P B-8 SWING (L) 0.0V 0P	Control lever at neutral position E/G speed Low/Hi	0.5V 0P		
		E/G speed High idle Attachment blocked and swing over relief.	4.7~5.0V 435P		
	No.13 PRESS. SENSOR B-9 TRAVEL (R) ***SE–9** 0.5V 0P B-10 TRAVEL (L) ***SE–10** 0.5V 0P	Control lever at neutral position E/G speed Low/Hi	0.5V 0P		
		E/G speed High idle Travel locked and travel function over relief	3.7~4.2V 406P		

https://truckmanualshub.com/

No.	Display	Operation procedure	SK210LC-6E SK250LC-6E	Remarks
High pressure sensor	**No.14** PRESS. SENSOR C-1 PUMP P1 ***SE–22** 0.6V 203P C-2 PUMP P2 ***SE–23** 0.5V 87P	Control lever at neutral position E/G speed Low/Hi	COMP: 0.5~0.6V 188P MEAS: 0.5V 87P	Neutral position, or operating it at full stroke if it is varied, it's acceptable. If it is not varied, change the connector position, and check it. After changing the position, If the display changes → failure of sensor. If the display does not change → failure of harness.
		E/G speed High idle, Boom over relief	3.7~3.8V 6030P	
		E/G speed High idle Boom up over relief+ Power Boost/Heavy Lift	3.7~4.1V 6554P	
Low pressure sensor	**No.15** PRESS. SENSOR B-16 P1 OPT. ***SE–20** 0.5V 0P B-17 P2 OPT ***SE–11** 0.5V 0P	Without N&B Piping	0.0V 0P	
		With N&B Piping	0.5V 0P	
		With N&B Piping When control pedal is depressed fully	3.7~4.2V 406P	
Control valve proportional valve 17.5±1Ω	**No.20** PROPO-VALVE D-1 P1 BY-PASS COMP. 200mA 0P MEAS. 217mA 0P ***PSV–D**	Control lever at neutral position, E/G speed Low and High common	COMP: 200mA 0P MEAS: 217mA 0P	• COMP. Instructed by mechatro controller • MEAS. Error is displayed by Feed back When the measured value varies according to the variation of the indication, it is acceptable. Measure the current on the connections of connector with clamp meter. Proportional valve Measure the resistance. Checking after replacing the connector position is possible.
		E/G speed High idle position, arm out function over relief	COMP: 706mA 413P MEAS: 702mA 409P	
	No.21 PROPO-VALVE D-2 P2 BY-PASS COMP. 200mA 0P MEAS. 216mA 0P ***PSV–B**	Control lever at neutral position, E/G speed Low and High common	COMP: 200mA 0P MEAS: 216mA 0P	
		E/G speed High idle boom up over relief	COMP: 706mA 413P MEAS: 697mA 405P	
	No.22 PROPO-VALVE D-3 S-TRAVEL COMP. 350mA 100P MEAS. 348mA 99P ***PSV–C**	Control lever at neutral position, E/G speed Low and High common	COMP: 350mA 100P MEAS: 348mA 99P	
		E/G speed High idle Arm in function over relief	COMP: 513mA 244P MEAS: 516mA 247P	
	No.23 PROPO-VALVE D-6 A-RECIRCULATE COMP. 404mA 148P MEAS. 407mA 149P ***PSV–A**	Control lever at neutral position, E/G speed Low and High common	COMP: 404mA 148P MEAS: 407mA 149P	
		E/G speed High idle Arm in function over relief	COMP: 200mA 0P MEAS: 417mA 0P	

https://truckmanualshub.com/

No.	Display	Operation procedure	SK210;C-6E SK250LC-6E	Remarks
Pump propo.valve 17.5±1Ω	**No.24** PROPO-VALVE E-1 P1 PUMP COMP. 417mA 149P MEAS. 415mA 148P POWER SHIFT 0mA ***PSV–1**	Control lever at neutral position, E/G speed Low idle	COMP: 417mA 149P MEAS: 415mA 148P	• COMP Instructed by mechatro controller • MEAS Error is displayed by Feed back When the measured value varies according to the variation of the indication, it is acceptable. Measure the current on the connections of connector with clamp meter. For proportional valve, measure the resistance. Checking after replacing the connector position is possible.
		Control lever at neutral position, E/G speed High idle	COMP: 350mA 91P MEAS: 349mA 90P	
		E/G speed High idle and RH travel function activated	COMP: 750mA 442P MEAS: 735mA 430P	
	No.25 PROPO-VALVE E-2 P2 PUMP COMP. 430mA 1.1M MEAS. 420mA 1.1M POWER SHIFT 0mA ***PSV–2**	Control lever at neutral position, E/G speed Low idle	COMP: 417mA 149P MEAS: 414mA 148P	
		Control lever at neutral position, E/G speed High idle	COMP: 350mA 91P MEAS: 345mA 87P	
		E/G speed High idle and LH travel function activated	COMP: 750mA 442P MEAS: 738mA 432P	
Independent travel propo.valve 34±2Ω	**No.32** PROPO-VALVE D–11 P1 I–TRAVEL COMP. 481mA 206P MEAS. 475mA 200P ***PSV–E**	Control lever at neutral position, E/G speed Low/Hi idle		
		Independent travel switch ON	COMP: 481mA 206P MEAS: 475mA 200P	
		Independent travel switch OFF	COMP: 200mA 0P MEAS: 217mA 0P	
	No.33 PROPO-VALVE D–12 P2 I–TRAVEL COMP. 481mA 206P MEAS. 473mA 199P ***PSV–F**	Control lever at neutral position, E/G speed Low/Hi idle		
		Independent travel switch ON	COMP: 481mA 206P MEAS: 473mA 199P	
		Independent travel switch OFF	COMP: 200mA 0P MEAS: 217mA 0P	
Mechatro controller	**No.39** MECHATRO ADJT. CONT. SW TEST CONT. SW 100% PROG. SW OFF		Fixed indication at RUN Fixed indication at 50% Fixed indication at OFF	
	No.40 RELEASE SW. KPSS OFF SWING BRAKE OFF		Fixed indication at OFF ON : When swing parking brake released	

*Screens No. 9-15 The pressure sensors show only the reference value of the indicator voltage.

Screens No. 20-25 The proportional valves show only the reference value of indicator current.

Screens No. 20-25 For the proportional valves, if the difference between the indicated value and the measured value is 20% or less, the proportional valve is in good condition.

Note : No. 39 Mechatro adjustment

1. **For the internal switch RUN, it is fixed at RUN position because the RUN and TEST switch is cancelled.**
2. **For the internal trimmer 50%, the service diagnosis can not be functioned during downloading, therefore it is fixed at 50% position. (Without trimmer function)**
3. **For program switch OFF, it is fixed OFF position because the downloading cable is removed when executing the service diagnosis.**

https://truckmanualshub.com/

3.13 GENERAL TROUBLESHOOTING

This troubleshooting information covers the components and systems as described in this operators manual. Should in depth troubleshooting, repair or replacement of components or adjustment of valves be required, contact an authorized KOBELCO Service dealer for assistance.

SYSTEM	PROBLEM	PROBABLE CAUSE	POSIBLE REMEDY
OPERATION	1. All operating speeds are slow or power is lost.	a. Low hydraulic oil level	a. Level hydraulic oil
		b. Air leaking into suction hose	a. Tighten suction hose clamps or replace suction hose
		c. Hydraulic pump damaged	a. Repair or replace
		d. Pilot pump damaged	a. Repair or replace
		e. Main relief valve is not adjusted properly	a. Adjust or replace
		f. Pilot relief valve is not adjusted properly	a. Adjust or replace
		g. Air inside pilot system	a. Bleed air from pilot system
	2. A sepecific cylinder functions improperly or loses power.	a. Cylinder seals are damaged	a. Repair or replace
		b. Control valve or overload valve functions incorrectly or air inside cylinder	a. Repair or replace b. Bleed air from cylinders
		c. Pilot valve is damaged	a. Repair or replace
		d. Pilot valve piping is loose	a. Tighten conecitons
	3. The cylinder position will not hold with operating lever in neutral.	a. Cylinder seal is scored	a. Repair or replace
		b. Control valve or overload valve is damaged	a. Repair or replace
		c. Overload valve is defective	a. Repair or replace
		d. Pilot valve is damaged	a. Repair or replace
	4. Machine does not swing.	a. Brake valve is not working	a. Repair or replace
		b. Swing motor not working or swing gear is damaged	a. Repair or replace
		c. Swing bearing is damaged	a. Repair or replace
		d. Pilot valve is not working	a. Repair or replace
		e. Swing reduction unit is damaged	a. Repair or replace
	5. Swing speed is slow.	a. Brake valve is defective	a. Repair or replace
		b. Control valve is not working	a. Repair or replace
		c. Swing motor not working	a. Repair or replace
		d. Swing pilot pressure sensor defective	a. Repair or replace
		e. Possible problem in regulator or hyd. pump	a. Repair or replace
	6. Abnormal sound while swinging.	a. Poor lubrication of swing gear and bearings	a. Lubricate as needed
		b. Low oil level in swing reduction unit	a. Level oil in reduction unit
	7. Upper structor continues revolving after stopping swinging operation.	a. Brake valve malfunctions	a. Repair or replace
		b. Brake valve pressure is incorrect	a. Adjust or replace
		c. Brake lining is worn	a. Repair or replace
TRAVEL	1. Machine does not travel smoothly.	a. Too much track tension	a. Adjust track tension to specs
		b. Dirty track links and shoes	a. Clean track links and shoes
		c. Brake valve malfunctions	a. Repair or replace
		d. Travel reduction unit is defective	a. Repair or replace
	2. Traveling power is insufficient	a. Hydraulic pump is defective	a. Repair or replace
		b. Travel motor is defective	a. Repair or replace
		c. Brake valve is defective	a. Repair or replace
		d. Low hydraulic oil level	a. Level hydraulic oil
		e. Poor engine performance	a. Repair or replace
		f. Main relief valve adjusted incorrectly	a. Repair or replace
		g. Swivel valve is leaking	a. Repair or replace

https://truckmanualshub.com/

SYSTEM	PROBLEM	PROBABLE CAUSE	POSIBLE REMEDY
TRAVEL	3. Machine does not travel in a straight line	a. Unequal tension on tracks	a. Adjust tension to specs
		b. Main relief valve not adjusted correctly	a. Adjust or replace
		c. Wear in travel motor(s)	a. Repair or replace
		d. Internal leakage of regulator or main pump, or in travel motor brake valve	a. Repair or replace
		e. Problem in straight travel valve or its proportional solenoid valve (PSV-C)	a. Repair or replace
		f. Problem in pilot pressure sensor	a. Repair or replace
HYDRAULIC	1. Excessive high temperature on hyd. oil	a. Hyd. oil cooler obstructed	a. Clean as needed
		b. Engine fan belt slipping	a. Adjust or replace
		c. Low hyd. oil level	a. Level oil to specs.
		d. Hyd. oil viscosity incorrect or oil is deteriorated	a. Change hydraulic oil
		e. Check valve in hyd. return line is blocked open	a. Repair or replace
		f. Obstruction in hyd. return filter	a. Replace filter
		g. Foam seals around coolers are not in place or deteriorated	b. Repair or replace
MONITOR DISPLAY	1. Engine oil pressure is too low; buzzer sounds, and icon displays; and engine shuts down.	a. Engine oil level low or deteriorated	a. Repair or replace
		b. Engine oil leaking	a. Repair
		c. Wrong oil viscosity	a. Change oil to specs
	2. Abnormal high temperature in engine, buzzer sounds and icon displays.	a. Low coolant level	a. Level to specs
		b. Inappropriate coolant mixture	a. Repair mixture or replace
		c. Coolant leakage	a. Repair
		d. Radiator cap malfunctioning	a. Repair or replace
		e. Obstructed radiator	a. Clean radiator and/or system
		f. Engine fan belt slipping or deteriorated	a. Adjust or replace
		g. Foam seals around coolers are not in place or deteriorated	a. Repair or replace
		h. Thermostat is malfunctioning	a. Replace
	3. Clogged air filter, buzzer sounds and icon displays	a. Obstructed elements	a. Clean or replace
		b. Obstruction in air intake duct system	a. Repair or replace
		c. System sensor is malfunctioning	a. Repair or replace
ENGINE	1. Starter does not turn or turns slowly; engine does not start	a. Batteries disconnected or low charge	a. Repair or replace
		b. Battery terminals disconnected, loose, or corroded.	a. Clean and/or connect terminals
		c. Defective ground cable	a. Repair or replace
		d. Problem in battery relay	a. Repair or replace
		e. Problem in fuses	a. Repair or replace
		f. Engine oil viscosity too high (Cold weather)	a. Change oil to specs
		g. Problem in starter relay or starter motor	a. Repair or replace

https://truckmanualshub.com/

SYSTEM	PROBLEM	PROBABLE CAUSE	POSIBLE REMEDY
ENGINE	**2.** Starter motor turns, but engine does not start	**a.** Low fuel level	**a.** Refuel as needed
		b. Engine emergency stop is activated	**a.** Repair
		c. Improper starting procedure (cold weather)	**a.** See Section 03 (Operation and Maintenance Manual)
		d. Air inside fuel system	**a.** Repair and bleed air out
		e. Obstructed fuel filter	**a.** Reeplace element
		f. Obstructed strainer in priming pump	**a.** Clean or replace bolt
		g. Engine pre-heat system malfunctions	**a.** Repair system or replace heating element
	3. Engine tends to stop at low speed	**a.** Excessively low idle RPM	**a.** Consult with Kobelco's dealer technician
		b. Obstructed fuel filter	**a.** Replace filter element
		c. Obstructed air filter	**a.** Clean or replace element(s)
		d. Improper valve clearance	**a.** Consult with Kobelco's dealer technician
	4. Low power	**a.** Obstructed air filter	**a.** Clean or replace element(s)
		b. Obstructed fuel filter	**a.** Replace filter element
		c. Improper valve clearance	**a.** Consult with Kobelco's dealer technician
		d. Loose clamps in turbo air inlet hose	**a.** Tighten clamps or replace hose
		e. Obstruction in exhaust system	**a.** Repair or replace
	5. Engine exhaust is excessively black	**a.** Obstruction in air filter	**a.** Clean or replace filter element
		b. Improper valve clearance	**a.** Consult with Kobelco's dealer technician
		c. Excessive fuel in combustion chamber	**a.** Consult with Kobelco's dealer technician
	6. Excessive fuel consumption	**a.** Fuel is leaking	**a.** Repair
		b. Obstruction in air filter	**a.** Clean or replace element
		c. Turbo air inlet hose is loose or deteriorated	**a.** Tighten or replace hose
	7. Excessive oil consumption	**a.** Inappropriate oil viscosity	**a.** Change oil
		b. Oil is deteriorated	**a.** Change oil - Reduce maintenance schedule
		c. Improper warm-up operation	**a.** See Section 03 (Operation and Maintenance Manual)
	8. Engine oil pressure does not rise	**a.** Engine oil level is low	**a.** Level to specs
		b. Engine oil leaking	**a.** Repair
		c. Inappropriate oil viscosity or oil is deteriorated	**a.** Change oil
	9. Battery charge is regularly weak.	**a.** Battery terminals are loose, corroded or disconnected	**a.** Clean and tighten conections
		b. Ground cable is loose, teriorated or damaged	**a.** Repair or replace
		c. Low level of battery electrolyte	**a.** Level cells with distilled water
		d. Alternator belt is loose or deteriorated	**a.** Adjust or replace belts
		e. Defective battery	**a.** Replace

https://truckmanualshub.com/

Kobelco

Dynamic Acera



Kobelco Construction Machinery America LLC
Cylinder & Motor
Cycle Times

KOBELCO

Kobelco Construction
Machinery America LLC

https://truckmanualshub.com/

TABLE OF CONTENTS

CYLINDER CYCLE TIME TESTS ..... **4 ~ 8**
A. Tools & Equipment 4
B. Machine Settings & Site Condition 4
C. Boom Cylinder 4
D. Arm Cylinder 5
E. Bucket Cylinder 6

CYLINDER DRIFT **7**
A. Tools & Equipment 7
B. Machine Settings & Site Condition 7
C. Test Procedure 7

SWING SPEED **8**
A. Tools & Equipment 8
B. Machine Settings & Site Condition 8
C. Test Procedure 8
SWING STOPPING **9**
A. Tools & Equipment 9
B. Machine Settings & Site Condition 9
C. Test Procedure 9
SWING DRIFT **10**
A. Tools & Equipment 10
B. Machine Settings & Site Condition 10
C. Test Procedure 10

SWING BEARING UP-DOWN (VERTICAL) MOVEMENT **11**
A. Tools & Equipment 11
B. Machine Settings & Site Condition 11
C. Test Procedure 11
SWING BEARING SIDE TO SIDE (HORIZONTAL) MOVEMENT **12**
A. Tools & Equipment 12
B. Machine Settings & Site Condition 12
C. Test Procedure 12

SWING MOTOR OIL CASE DRAIN ..... **13 ~ 15**
A. Tools & Equipment 13
B. Machine Settings & Site Condition 13
C. Test Procedure ..... 13 ~ 14
TRAVEL MOTOR OIL CASE DRAIN ..... **15 ~ 16**
A. Tools & Equipment 15
B. Machine Settings & Site Condition 15
C. Test Procedure ..... 15 ~ 16

TRAVEL PERFORMANCE ..... **17 ~19**
A. Tools & Equipment 17
B. Machine Settings & Site Condition 17
C. Test Procedure 17

TRAVEL SPEED **18**
TRAVEL DEVIATION **19**

https://truckmanualshub.com/

BUCKET SELECTION GUIDE

Bucket selection is extremely important to a machine's productivity, durability and stability.

Choosing an excessively large bucket can reduce productivity due to slower than normal cycle times.

Using an oversized or overly wide bucket, in severe conditions, such as mining, will lead to durability problems for both the machine and bucket involved.

Stability will be adversely affected using a bucket that is unnecessarily large.

The Bucket Selection Charts listed in the Specification's Section (6) are to be used as general guidelines.

If the buckets used locally vary in weight from these sample buckets, it will be necessary to adjust the bucket capacity accordingly. A heavier bucket must correspond to a reduced capacity.

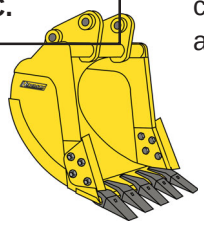
If the material density (weight) exceeds guideline specifications then the bucket capacity must be reduced.

If the machine is to continuously dig rock, wasted shale, river cobbel or other severe applications the narrowest bucket possible should be utilized. This will allow the greatest possible penetration and minimal twisting of the attachment (boom and stick). Bucket capacity is not to be the prime consideration for severe applications.

If a machine is to exclusively load trucks at close radius then the bucket loads can be adjusted up 5% to 7 % from the Lift Chart values listed in the Specification's Section, due to a close in dump radius.

If a machine is to be utilized exclusively to spoil pile, which causes a large radius dump cycle, applicable loads may have to be adjusted down by 5% from the Lift Chart Values (Section VI) or stability complaints may occur.

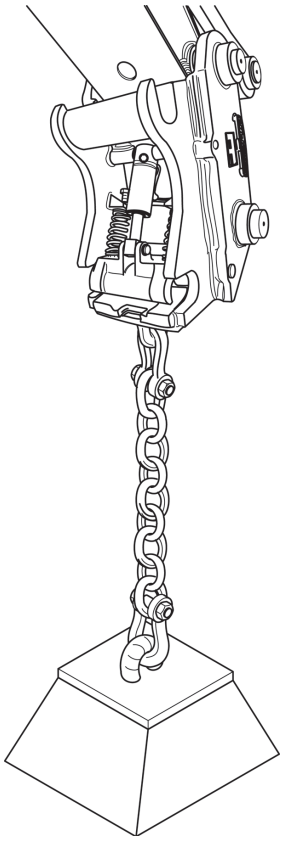
See the Specification's Section (6), - "Bucket Selection Charts" to select the appropiate bucket size according to the application for the SK480LC.



USE OF OPTIONAL ATTACHMENTS

If a machine is equipped with optional attachments such as a bucket quick coupler, and/or thumbs, (either hydraulic or mechanical) applicable bucket sizes and suspended loads must be reduced in direct porportion to the weight or combined weight of these attachments. Failure to consider the added weight of such attachments will cause stability complaints. Additionally these weights of such attachments must be considered when the lift chart is referred to before lifting a load. The additional weight of heavy buckets, couplers, and thumbs, must be deducted from allowable lift capacities. See Lift Charts - Section VI.

Use of quick couplers for bucket interchangeability will reduce effective arm digging force and particularly bucket breakout force due to an increase of tooth tip radius. Example: Some couplers can increase tooth tip radius up to 12 inches. If this is used with a 48" tooth tip radius, effective bucket breakout force can be reduced 25%, a 5% reduction in effective arm force, a reduction in lift capacities of up to 1000 lbs (for SK480LC-VI). It is, also, important to mention that some quick couplers offer a great advantage, particularly when lifting loads. A good example is the Hendrix JB Quick Coupler. This high strength low profile coupler allows the operator to quickly remove the bucket for lifting purposes; therefore, increasing lifting capacity, height, and visibility.



To obtain the proper lifting capacity when a quick coupler is used, proceed as follows: deduct the weight of the standard bucket from the lifting chart, add the weight of the quick coupler plus the weight of the attachment to be coupled. Consideration of the Center of Gravity of the new attachment + coupler may be necessary.

https://truckmanualshub.com/

CYLINDER CYCLE TIME TEST

NOTE

The measuring time of the cylinder cycle does not include the cushion stroke times. Only measure time up to the beginning of the cushion stroke.

A. Tools & Equipment

The following tools and equipment will be required to perform the cylinder cycle time test:

1. Stopwatch.
2. Thermometer to read Hydraulic Oil Temperature.

B. Machine Settings & Site Conditions

1. Machine throttle in "High" idle position.
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
3. Firm, level testing site.
4. Verify that engine RPM's are correct to specifications.

C. Boom Cylinder Cycle Time Test

1. Move the machine to a firm, level testing area.
2. Place the machine throttle control to "HIGH" idle and the KPSS Work Mode Switch to "M" Mode. See Figure 3.1
3. Fully extend the Bucket Cylinder. See Figure 3.2.
4. Fully retract the Arm Cylinder. See Figure 3.2.
5. Lower Boom until bucket rests on the ground.
6. Raise Boom (extending the cylinders) at full stroke of the control and measure the time for the boom cylinder to reach the cushion stroke. Record the time. See Figure 3.3.
7. Lower the boom (retracting cylinders) at full stroke and measure the time for the bucket to reach ground level. Record the time. See Figure 3.3.
8. Repeat steps 5 and 6 two more times and record the stopwatch readings. Average the readings and compare the average to the Boom Cylinder Cycle Time Specification Chart.

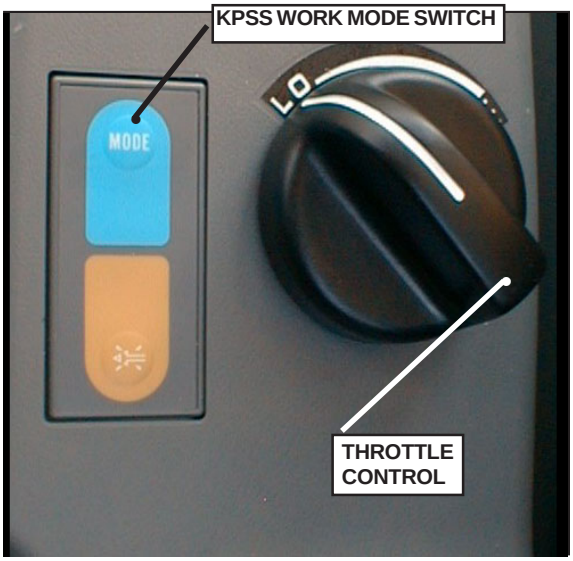
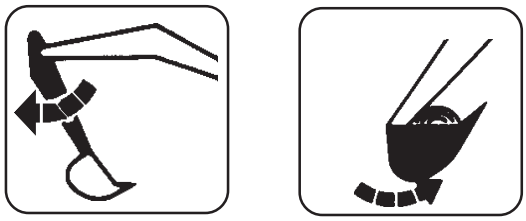


FIGURE 3.1



ARM OUT CYLINDER RETRACTED

BUCKET IN CYLINDER EXTENDED

FIGURE 3.2

DO NOT TIME CUSHION STROKE OF CYLINDER DURING TEST

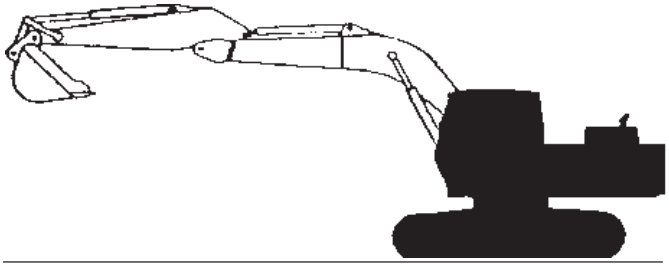


FIGURE 3.3

BOOM CYLINDER CYCLE TIME SPECIFICATIONS

MODEL	CYLINDER POSITION	M-MODE
*SK160	EXTENSION	2.6 - 3.2
*SK160	RETRACTION	2.3 - 2.9
SK210	EXTENSION	2.9 - 3.5
SK210	RETRACTION	2.5 - 3.1
SK250	EXTENSION	2.8 - 3.4
SK250	RETRACTION	2.5 - 3.1
SK290	EXTENSION	2.9 - 3.4
SK290	RETRACTION	2.6 - 3.1
SK330	EXTENSION	3.1 - 3.6
SK330	RETRACTION	2.7 - 3.3
SK480	EXTENSION	3.1 - 3.7
SK480	RETRACTION	2.8 - 3.4

*SK160 and ED190 same

Unit: Seconds

https://truckmanualshub.com/

CAUTION

THIS TEST IS DESIGNED FOR STANDARD BOOM, ARM AND BUCKET. IF THE MACHINE BEING TESTED HAS ANY OPTIONAL EQUIPMENT, CHECK TO MAKE CERTAIN THERE WILL BE NO INTERFERENCE WITH THE CAB BEFORE PERFORMING THE TEST !!

D. Arm Cylinder Cycle Time Test

NOTE

The measuring time of the cylinder cycle does not include the cushion stroke times. Only measure time up to the beginning of the cushion stroke.

1. Move the machine to a firm, level testing area.
2. Place the machine throttle control to "HIGH" idle and The KPSS Work Mode Switch to "M" Mode. See Figure 3.4.
3. Fully extend Boom Cylinder. See Figure 3.5.
4. Fully retract Bucket Cylinder. See Figure 3.5.
5. Fully extend the Arm (retracting cylinder).
6. At full stroke of the control, bring the arm all the way in (extending cylinder) and measure the time it takes for the arm cylinder to reach the cushion stroke. Record the time. See Figure 3.6.
7. At full stroke of the control, fully extend the arm (retracting cylinder) and measure the time it takes until the cylinder reaches the cushion stroke. Record the time. See Figure 3.6.
8. Repeat steps 6 and 7 two more times. Average the recorded times and compare the average to the Arm Cylinder Cycle Time Specification Chart.

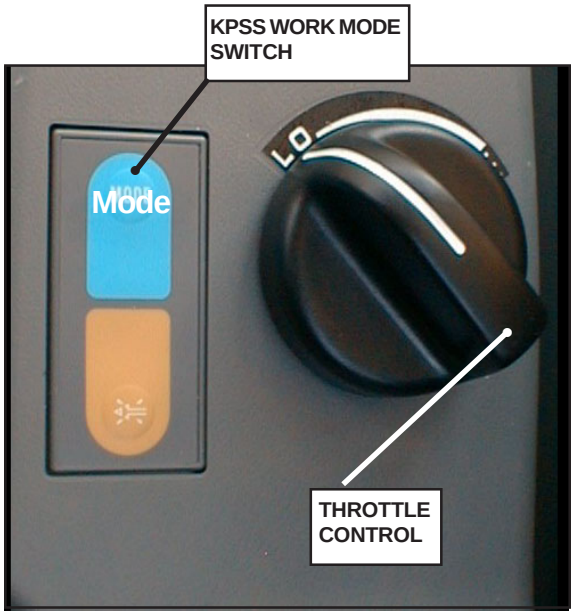
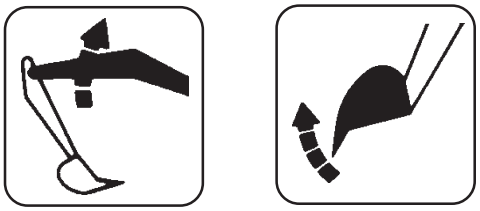


FIGURE 3.4



BOOM UP CYLINDER EXTENDED

BUCKET OUT CYLINDER RETRACTED

FIGURE 3.5

DO NOT TIME CUSHION STROKE OF CYLINDER DURING TEST

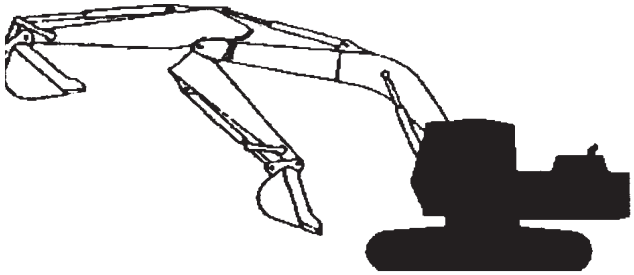


FIGURE 3.6

ARM CYLINDER CYCLE TIME SPECIFICATIONS

MODEL	CYLINDER POSITION	M-MODE
*SK160	EXTENSION	3.1 - 3.7
*SK160	RETRACTION	2.4 - 3.0
SK210	EXTENSION	3.1 - 3.7
SK210	RETRACTION	2.4 - 3.0
SK250	EXTENSION	3.3 - 3.9
SK250	RETRACTION	2.5 - 3.1
SK290	EXTENSION	3.6 - 4.2
SK290	RETRACTION	2.7 - 3.3
SK330	EXTENSION	4.1 - 5.1
SK330	RETRACTION	3.1 - 3.7
SK480	EXTENSION	4.1 - 4.9
SK480	RETRACTION	2.9 - 3.5

*SK160 and ED190 same

Unit: Seconds

https://truckmanualshub.com/

E. Bucket Cylinder Cycle Time Test

NOTE

The measuring time of the cylinder cycle does not include the cushion stroke times. Only measure time up to the beginning of the cushion stroke.

1. Move the machine to a firm, level testing area.
2. Place the machine throttle control to "HIGH" idle and The KPSS Work Mode Switch to "M" Mode. See Figure 3.7.
3. Raise Boom to full height using "Boom Up" control.
4. Adjust the arm until the arm is at 90° to arm cylinder. See Figure 3.8.
5. Lower boom until the arm tip is parallel with the boom foot. See Figure 3.8.
6. Bring bucket all the way in.
7. Operate bucket out (retracting cylinder) at full stroke of control and measure the time it takes for the bucket cylinder to reach the cushion stroke (if equipped). Record the time. See figure 3.9.
8. Operate the bucket in (extending cylinder) at full stroke of control and measure the time it takes for the bucket cylinder to reach the cushion stroke (if equipped). Record the time. See Figure 3.9.
9. Repeat steps 7 and 8 two more times. Average the readings and compare to the Bucket Cylinder Cycle Time Specification Chart.

BUCKET CYLINDER CYCLE TIME SPECIFICATIONS

MODEL	CYLINDER POSITION	M-MODE
*SK160	EXTENSION	3.5 - 4.1
*SK160	RETRACTION	1.9 - 2.5
SK210	EXTENSION	2.3 - 2.9
SK210	RETRACTION	1.7 - 2.3
SK250	EXTENSION	2.4 - 3.0
SK250	RETRACTION	1.8 - 2.4
SK290	EXTENSION	2.6 - 3.2
SK290	RETRACTION	2.3 - 2.9
SK330	EXTENSION	2.7 - 3.3
SK330	RETRACTION	2.1 - 2.7
SK480	EXTENSION	2.7 - 3.3
SK480	RETRACTION	2.1 - 2.7

*SK160 and ED190 same

Unit: Seconds

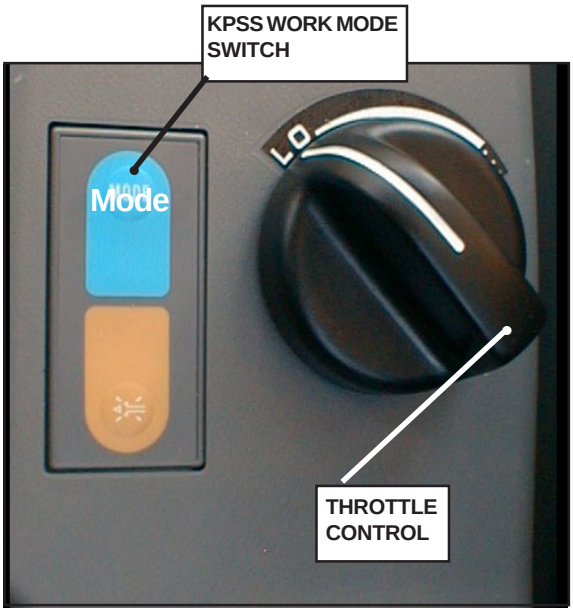


FIGURE 3.7

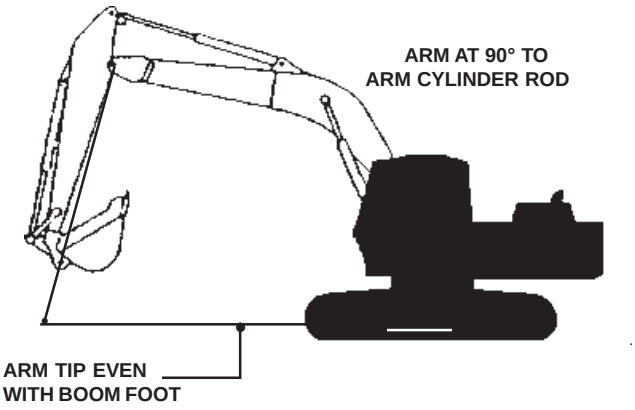


FIGURE 3.8

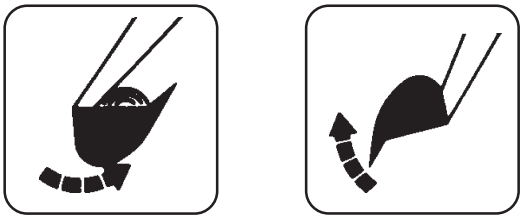


FIGURE 3.9

https://truckmanualshub.com/

CYLINDER DRIFT

A. Tools & Equipment

The following tools and equipment will be required to perform the cylinder drift test:

1. Measuring tape.
2. Stopwatch.
3. Device for marking starting points.
4. Thermometer for hydraulic oil temperature.

B. Machine Settings & Site Conditions

1. Machine engine "OFF".
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
3. Firm, level testing site.

C. Cylinder Drift Test

1. Move the machine to a firm, level test site and allow the hydraulic oil temperature to reach 45°C to 55°C (113°F to 131°F).
2. Operate the arm out control until arm is completely out (retract cylinder completely).
3. Operate the bucket in control until bucket is completely in (extend cylinder completely).
4. Adjust the boom up or down with control until bucket is 1.5m (4'-11") from ground level to tip of teeth. See Figure 3.11.
5. Turn engine "OFF" and allow machine to sit for five minutes.
6. Repeat steps 4 through 6 two more times and average the measurements. Compare the average to the Cylinder Drift Specification Chart.

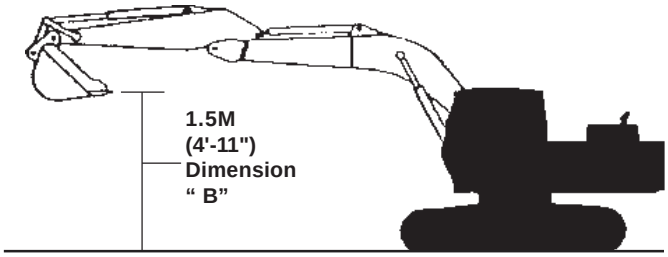


FIGURE 3.11

CYLINDER DRIFT SPECIFICATION CHART

MODEL	BOOM DOWN (RETRACT)	ARM DOWN (EXTEND)	BUCKET IN (EXTEND)	BUCKET FALL (TOP END)
*SK160	MAXIMUM	MAXIMUM	MAXIMUM	MAXIMUM
*SK160	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK210	MAXIMUM	MAXIMUM	MAXIMUM	MAX./10MIN
SK210	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK250	MAXIMUM	MAXIMUM	MAXIMUM	MAX./10MIN
SK250	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK290	MAXIMUM	MAXIMUM	MAXIMUM	MAX/10MIN
SK290	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK330	MAXIMUM	MAXIMUM	MAXIMUM	MAX/10MIN
SK330	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK480	MAXIMUM	MAXIMUM	MAXIMUM	MAX/10MIN
SK480	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
Unit: mm (inches)				Dimension " B"

*SK160 and ED190 same

https://truckmanualshub.com/

SWING SPEED

A. Tools & Equipment.

1. Stopwatch
2. Device for Marking Starting Point
3. Measuring Tape

B. Machine Settings & Site Condition

1. Machine throttle in "High" Idle position.
2. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
3. Firm, level testing site.
4. Verify that engine RPM's are to correct specification.

C. Swing Speed Test

1. Move the machine to a firm, level testing area.

WARNING

• MAKE CERTAIN THE TEST AREA WILL ALLOW 360° SWING OF THE MACHINE.
• MAKE CERTAIN NO PERSONS OR OTHER EQUIPMENT ARE WITHIN 10 FEET OF THE SWING AREA.

2. Move throttle to High Idle and place KPSS switch in "M" mode.
3. Operate the Arm Out Control until arm is completely out (retracting cylinder). See Figure 4.2.
4. Operate the Bucket Out Control until bucket is completely out (retracting cylinder). See Figure 4.1.
5. Adjust boom up or down until bucket teeth are 1.5m (4'-11") from ground level. See Figure 4.2.

CAUTION

*Turn on Swing Flasher and sound horn **BEFORE** starting swing motion. See Figure 4.3.*

6. After sounding horn and with swing flashers on, operate swing control at full stroke for two complete rotations clockwise. Time the last rotation and record the reading. Bring swing to a complete stop.
7. Repeat steps 3 through 5 two more times and average the readings. Compare the average to the Swing Speed Specification Chart.
8. Repeat steps 2 through 7 swinging counterclockwise.

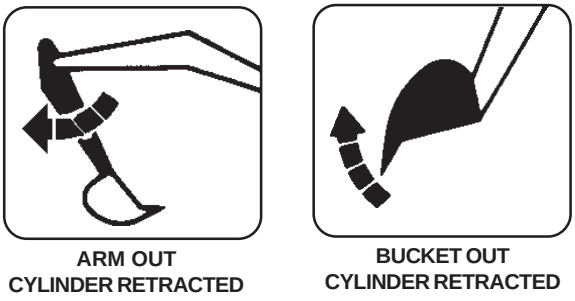


FIGURE 4.1

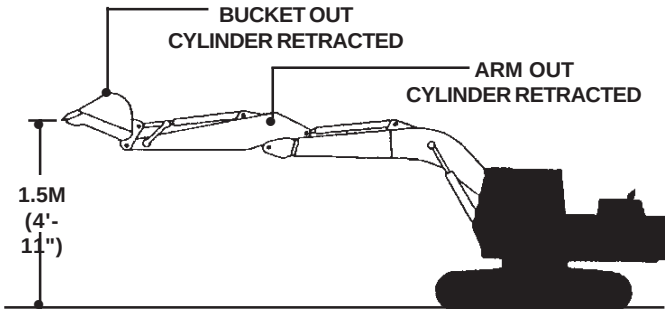


FIGURE 4.2

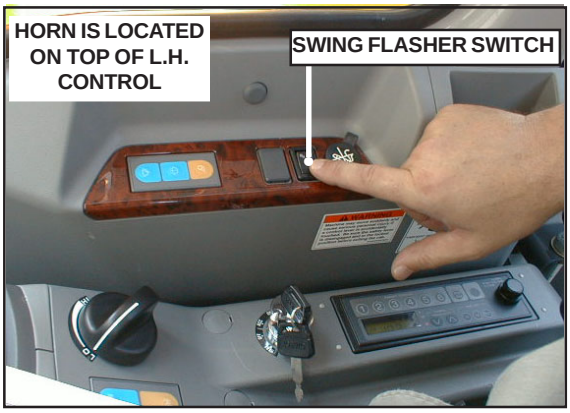


FIGURE 4.3

SWING SPEED SPECIFICATIONS

MODEL	CLOCKWISE / COUNTERCLOCKWISE
*SK160	4.8 - 5.6
*SK160	4.8 - 5.6
SK210	4.9 - 5.3
SK210	4.9 - 5.3
SK250	5.2 - 5.8
SK250	5.2 - 5.8
SK290	5.5 - 6.1
SK290	5.5 - 6.1
SK330	6.4 - 7.0
SK330	6.4 - 7.0
SK480	6.6 - 7.2
SK480	6.6 - 7.2

*SK160 and ED190 same

Unit: Seconds per Revolution

https://truckmanualshub.com/

SWING STOPPING

A. Tools & Equipment.
1. Device for Marking Starting Point

B. Machine Settings & Site Condition
1. Machine throttle in "High" Idle position.
2. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
3. Firm, level testing site.

C. Swing Stopping Test
1. Move the machine to a firm, level testing area.

WARNING

• MAKE CERTAIN THE TEST AREA WILL ALLOW 360° SWING OF THE MACHINE.
• MAKE CERTAIN NO PERSONS OR OTHER EQUIPMENT ARE WITHIN 10 FEET OF THE SWING AREA.

2. Move throttle to High Idle and place KPSS switch in "M" mode.
3. Operate the Arm Out Control until arm is completely out (retracting cylinder). See Figure 4.4.
4. Operate the Bucket In Control until bucket is completely in (extending cylinder). See Figure 4.4.
5. Adjust boom up or down until bucket teeth are 1.5mm (4'-11") from ground level. See Figure 4.5.

CAUTION

*Turn on Swing Flasher and sound horn **BEFORE** starting swing motion. See Figure 4.6.*

6. After sounding horn and with swing flashers on, operate swing control at full stroke for one complete rotation clockwise. When bucket reaches starting point, release the swing control and allow rotation to completely stop.
7. Measure the degree of angle from the starting point to the stopping point of the bucket. Record the angle degree. Repeat step 6 two more times and average the readings. Compare to Swing Stop Specification Chart. See Figure 4.7.
8. Repeat steps 2 ~ 7 swinging counterclockwise.

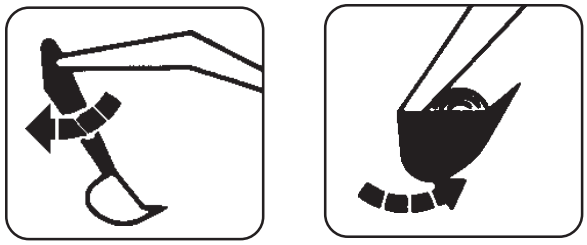


FIGURE 4.4

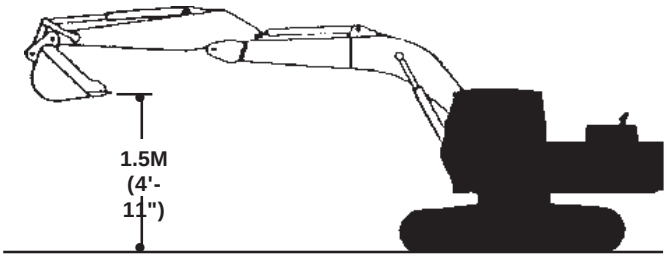


FIGURE 4.5

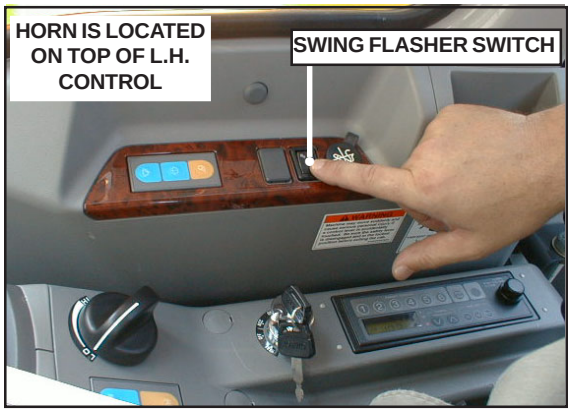


FIGURE 4.6

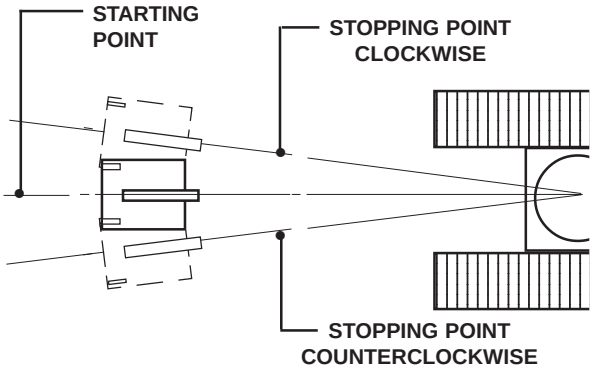


FIGURE 4.7

SWING STOPPING SPECIFICATIONS

MODEL	CLOCKWISE / COUNTERCLOCKWISE
*SK160	75°-90°
SK210	75°-90°
SK250	75°-90°
SK290	75°-90°
SK330	75°-90°
SK480	75°-90°

*SK160 and ED190 same

Unit: degree of angle

https://truckmanualshub.com/

SWING DRIFT

A. Tools & Equipment.

1. Device for Marking Starting Point
2. Stopwatch

B. Machine Settings & Site Condition

1. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
2. Firm testing area with 10° slope.

C. Swing Drift Test

1. Move the machine to a firm testing area with 10° slope as shown in Figure 4.8.
2. Operate the Bucket In Control until bucket is completely in (extending cylinder). See Figure 4.9.
3. Operate the Arm Out Control until the arm is completely out (retracting cylinder). See Figure 4.9.
4. Adjust the boom up or down until bucket teeth are 1.5m (4'-11") from ground level. See Figure 4.10.
5. Stop engine and allow the machine to sit for 20 seconds.
6. Measure the distance the swing drifted, down grade, while sitting. Record the distance. See Figure 4.11.
7. Repeat steps 2 through 6 two more times. Average the distances and compare average to the Swing Drift Specification Chart.
8. Start engine and swing machine 180°. Repeat steps 2 through 7.

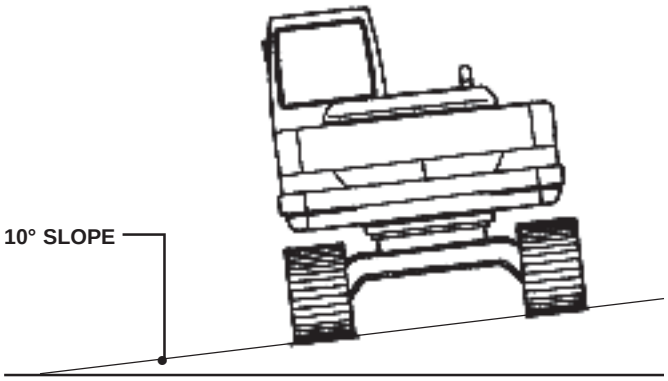


FIGURE 4.8

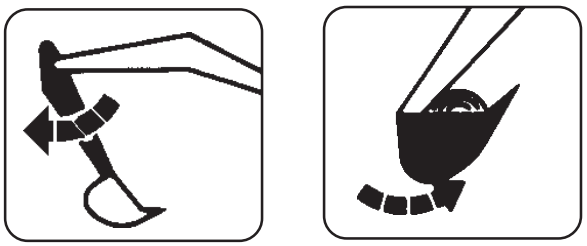


FIGURE 4.9

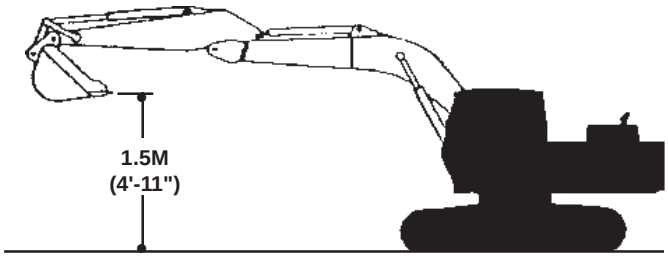


FIGURE 4.10

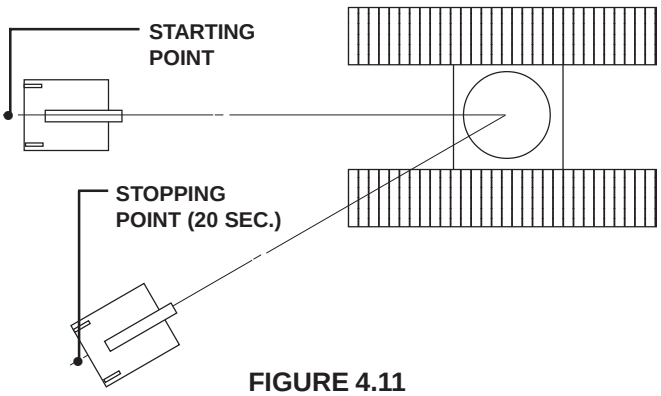


FIGURE 4.11

SWING DRIFT SPECIFICATIONS

MODEL	SPECIFICATION
SK160 ~ SK480	10mm (0.393") / 20 Seconds

https://truckmanualshub.com/

SWING BEARING UP-DOWN (VERTICAL) MOVEMENT

A. Tools & Equipment.

1. Dial Indicator
2. Magnetic Base Assembly

B. Machine Settings & Site Condition

1. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
2. Firm, level testing area.

WARNING

• BE EXTREMELY CAUTIOUS WHILE TAKING READINGS FROM DIAL INDICATOR.
• WEAR APPROVED SAFETY CLOTHES, SHOES AND HARD HAT WHEN PERFORMING MAINTENANCE OR TEST PROCEDURES.

C. Swing Bearing Up-Down (Vertical) Movement Test

1. Move the machine to a firm, level testing area.
2. Attach the Dial indicator to the mounting area of the swing bearing at the location of a swing bearing mouning bolt. See Figure 4.12.
3. Operate the Arm Control until the arm is approximately at 90° with boom. See Figure 4.13.
4. Operate the Bucket Control until bottom of bucket is even with ground level. See Figure 4.13.
5. Adjust the boom up or down until bucket is resting on the ground. With Boom Control, raise the machine until tracks are 450mm (17.75") off the ground. See Figure 4.13.
6. Set Dial Indicator to "0".
7. Operate Boom Up and Arm Out Controls until arm is completely out. See Figure 4.14.
8. Operate Bucket Control until bucket is completely out and operate boom until bucket teeth are 450mm (17.75") from ground. See Figure 4.14.
9. Record reading from dial indicator and repeat steps 3 through 9 two more times. Compare reading to Up-Down Movement Specification Chart.
10. Swing Machine 180° and repeat steps 2 through 9.

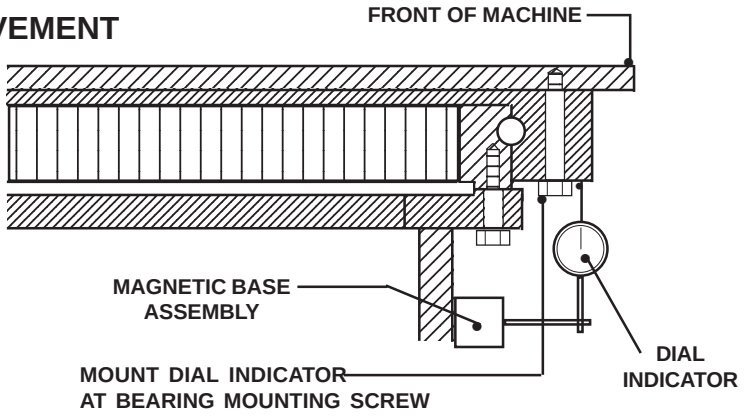


FIGURE 4.12

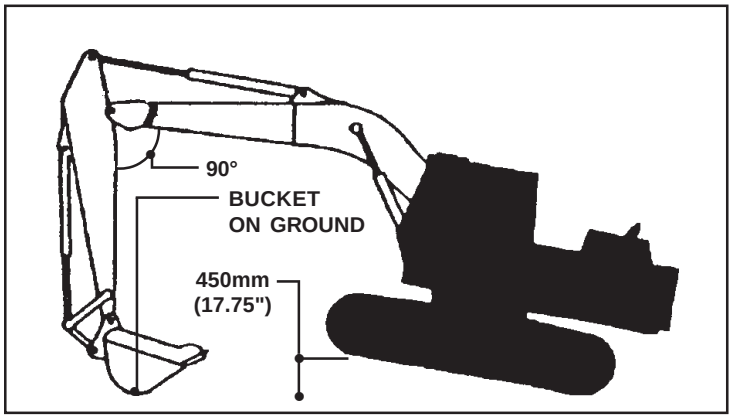


FIGURE 4.13

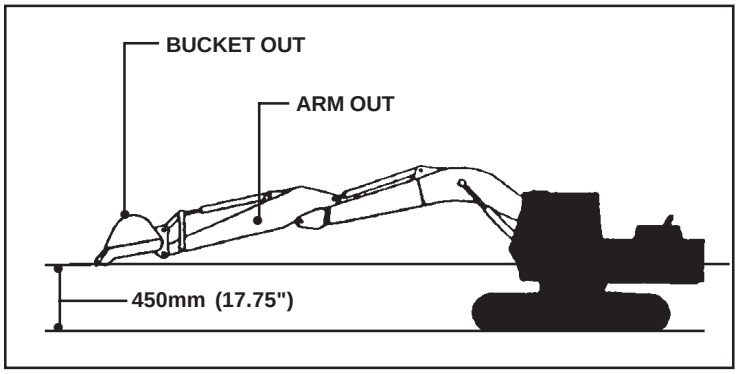


FIGURE 4.14

SWING BEARING UP-DOWN MOVEMENT SPECIFICATIONS

MODEL	STANDARD	MAX. MOVEMENT
*SK160	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK210	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK250	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK290	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK330	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK480	0.8 ~ 1.8 (.030~.070)	3.6 (.140)

*SK160 and ED190 same

Unit: mm (inches)

https://truckmanualshub.com/

SWING BEARING SIDE TO SIDE (HORIZONTAL) MOVEMENT

A. Tools & Equipment.

1. Measuring Tape
2. Device for marking starting point.

B. Machine Settings & Site Condition

1. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
2. Firm, level testing area.

WARNING

- **BE EXTREMELY CAUTIOUS WHILE MOVING THE BUCKET FROM SIDE TO SIDE.**
- **WEAR APPROVED SAFETY CLOTHES, SHOES AND HARD HAT WHEN PERFORMING MAINTENANCE OR TEST PROCEDURES.**

C. Swing Bearing Side To Side (Horizontal) Movement Test

1. Move the machine to a firm testing area.
2. Operate the Bucket Control until bucket is completely out (retracting cylinder). See Figure 4.15.
3. Operate the Arm Control until arm is completely out (retracting cylinder). See Figure 4.15.
4. Operate boom up or down until bucket teeth are 10mm (0.04") from ground level. See Figure 4.16.
5. Mark center of bucket with marking device.
6. Make a mark on ground in line with mark on bucket. See Figure 4.17.
7. Manually move bucket to the left and record distance the center of bucket moved to the left of the mark on ground. See Figure 4.17.
8. Move bucket to the right and record the distance the center of the bucket moved to the right of mark on ground.
9. Repeat steps 7 and 8 two more times.
10. Average the readings and compare to the Side To Side (Horizontal) Movement Specification Chart.
11. Swing Machine 180° and repeat steps 1 through 10.

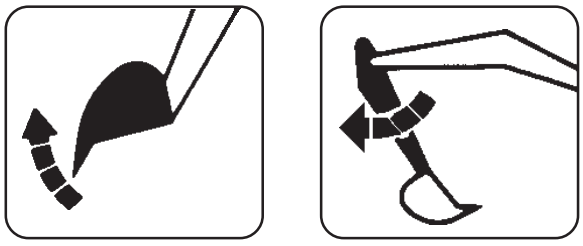


FIGURE 4.15

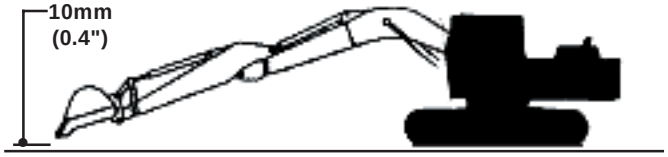


FIGURE 4.16

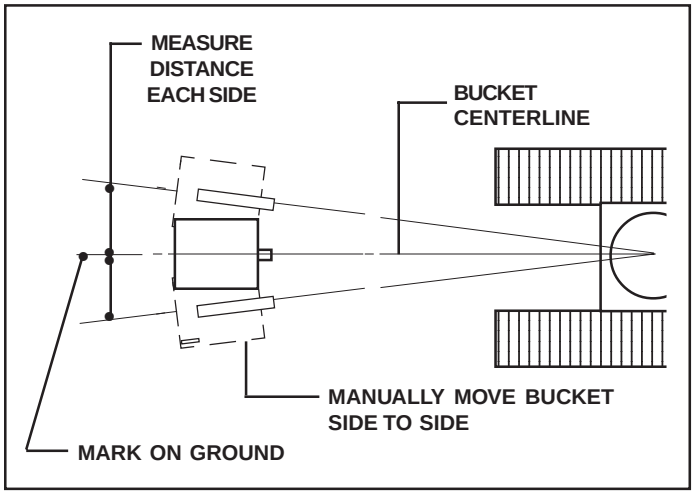


FIGURE 4.17

SWING BEARING SIDE TO SIDE (HORIZONTAL) MOVEMENT SPECIFICATIONS

MODEL	STANDARD	MAX. MOVEMENT
*SK160	60 (2.36)	120 (4.72)
SK210	60 (2.36)	120 (4.72)
SK250	60 (2.36)	120 (4.72)
SK290	60 (2.36)	120 (4.72)
SK330	60 (2.36)	120 (4.72)
SK480	50 (1.97)	120 (4.72)

*SK160 and ED190 same

Unit: mm (inches)

https://truckmanualshub.com/

SWING MOTOR OIL CASE DRAIN

A. Tools & Equipment

1. 38 Liter (10 U.S. Gal.) graduated bucket.
2. Hydraulic line wrenches
3. Hydraulic line plugs
4. Hydraulic fitting caps
5. Stopwatch
6. Thermometer

B. Machine Settings & Site Condition

1. Machine throttle in "High" idle position.
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F)
3. Firm, level testing area.
4. Verify that engine RPM's are at correct specification

C. Swing Motor Oil Case Drain Test

1. Move machine to a firm, level testing area.

2. Allow the hydraulic oil to reach a temperature of 45°C to 55°C (113°F to 131°F).

3. Operate the Arm Out Control until the arm is completely out. See Figure 5.1.

4. Operate the Bucket Out Control until bucket teeth are positioned to go into ground See Figure 5.1.

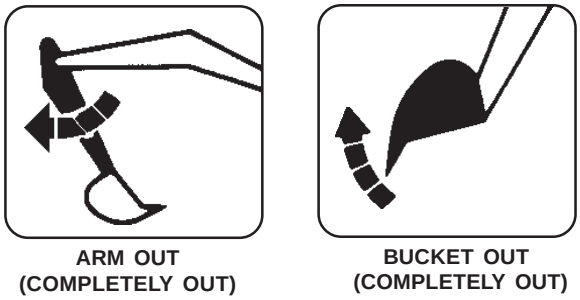
5. Lower the boom until bucket teeth are in ground. See Figure 5.2.

6. Operate Swing Control in both directions to make certain bucket teeth are in the ground deep enough to stall swing. It May be necessary to set bucket teeth deeper to stall swing.

7. Turn engine "OFF" .

8. Release hydraulic tank pressure by removing cap from pressure relief valve and depressing relief valve stem. See Figure 5.3.

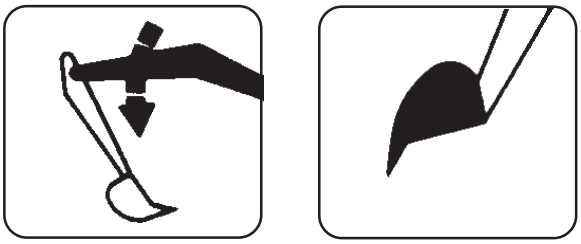
9. After cleaning away all dirt and debris, remove hydraulic line routed from "Tee" on top of swing motor to center port on Swivel Joint at swing motor "Tee". See Figure 5.4.



ARM OUT (COMPLETELY OUT)

BUCKET OUT (COMPLETELY OUT)

FIGURE 5.1



BOOM DOWN (BUCKET TEETH IN GROUND)

BUCKET

FIGURE 5.2

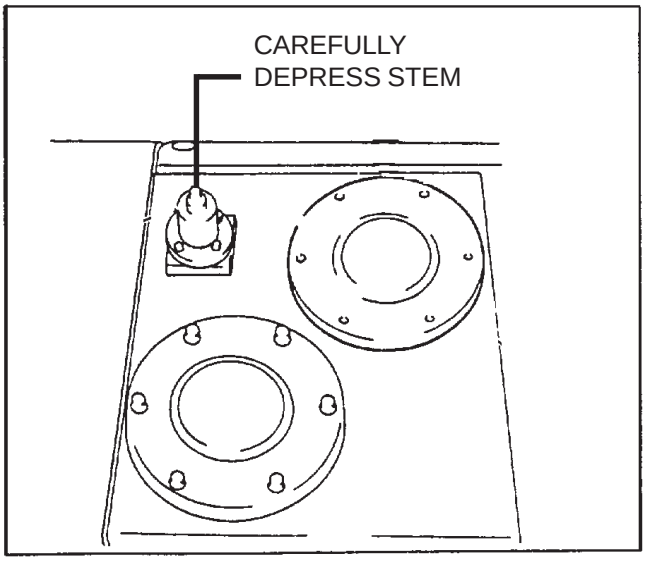


FIGURE 5.3

WARNING

• BE EXTREMELY CAUTIOUS WHILE RELEASING HYDRAULIC TANK PRESSURE. VAPORS MAY BE EXTREMELY HOT.

• WEAR APPROVED SAFETY CLOTHES, SHOES, GLOVES AND HARD HAT WHEN PERFORMING ANY MAINTENANCE OR TEST PROCEDURES.

https://truckmanualshub.com/

SWING MOTOR TEST CONTINUED

CAUTION

• Thoroughly clean all hydraulic lines and fittings before removal. Do not allow any dirt or debris to enter the open lines or fittings.
• Thoroughly clean the bucket that the oil is to be drained into.

10. Install one hydraulic line plug into line and one hydraulic fitting cap onto "Tee". See Figure 5.4. Torque to proper value.
11. Remove line routed between "Tee" on top of swing motor to hydraulic tank at the hydraulic tank. See Figure 5.5.
12. Install one hydraulic fitting cap onto fitting at Hydraulic Tank and torque. See Figure 5.5.
13. Place loose end of line into a clean 38 liter (10 gal.) capacity bucket.
14. Start engine and place throttle control in the "High" idle position.
Do not operate Travel!!
15. Operate the Swing Control to the ***LEFT***, stalling swing for one minute. Record amount of oil in bucket.
16. Operate Swing Control to the ***RIGHT***, stalling swing for one minute. Record the amount of oil in bucket.

NOTE

If it seems the flow of oil will be high, perform the test for 15 seconds and multiply amount of oil by 4 to compare to chart.

EXAMPLE: 19liters(5 U.S. Gal) X 4= 76liters(20 Gal)

17. Compare readings to Swing Motor Oil Case Drain Specification Chart.
18. If readings are greater than values in chart, refer to Shop Manual for additional instrucs.
19. Remove hydraulic fitting caps and plugs. Install hydraulic lines back to their original fittings and torque to the proper value.
20. Check hydraulic oil level. Refer to Operators Manual for hydraulic oil level check procedures.

CAUTION

•Fill Hydraulic tank to proper level using only approved new hydraulic oil as listed in the List of Oils, Greases, Filters and Elements Chart on Page 1-8 of this manual.

SK150 ILLUSTRATED

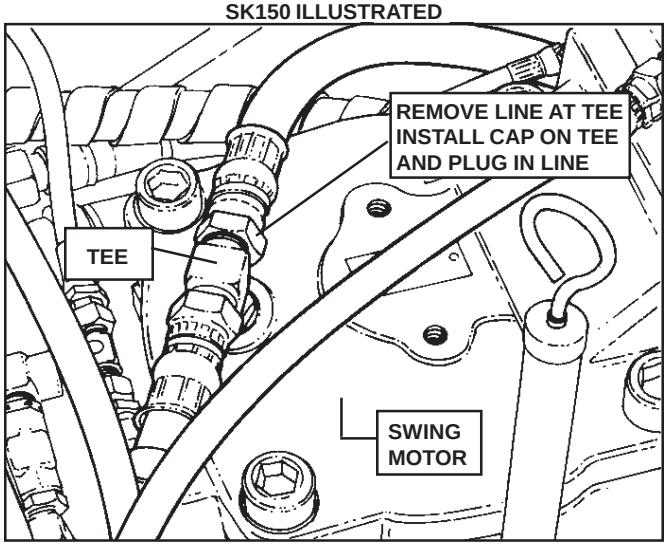


FIGURE 5.4

SK150 ILLUSTRATED

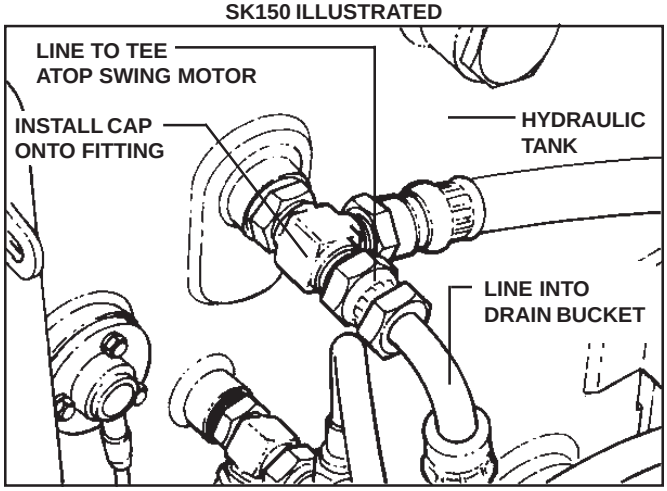


FIGURE 5.5

SWING MOTOR OIL CASE DRAIN SPECIFICATIONS

MODEL	LEFT/RIGHT SWING
*SK160	STANDARD- 7(1.8)
*SK160	MAXIMUM- 20(5.3)
SK210	STANDARD- 7(1.8)
SK210	MAXIMUM- 20(5.3)
SK250	STANDARD- 7 (1.8)
SK250	MAXIMUM- 20 (5.3)
SK290	STANDARD- 7 (1.8)
SK290	MAXIMUM- 20 (5.3)
SK330	STANDARD- 11 (2.9)
SK330	MAXIMUM- 30 (7.9)
SK480	STANDARD - 9 (2.4)
SK480	MAXIMUM - 27 (7.1)

*SK160 and ED190 same

Unit: Liter per Minute (Gallon per Minute)

https://truckmanualshub.com/

TRAVEL MOTOR OIL CASE DRAIN

A. Tools & Equipment

1. 38 Liter (10 U.S. Gal.) graduated bucket.
2. Hydraulic line wrenches.
3. Hydraulic fitting cap.
4. Stopwatch
5. Thermometer
6. Special Tool to Lock Sprockets (2-Required)

B. Machine Settings & Site Condition

1. Machine throttle in "High" idle position.
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F)
3. Firm, level testing area.

C. Travel Motor Oil Case Drain Test

1. Move machine to a firm, level testing area.
2. Allow the hydraulic oil to reach a temperature of 45°C to 55°C (113°F to 131°F).
3. Install Special Tool into each Sprocket. See Figure 5.6.

CAUTION

*• When placing Special Tool into sprockets, have machine in **"LOW IDLE"** and operate travel controls cautiously until tool is in position*

4. Operate Travel Controls in forward until machine tracks stall.

NOTE

Use the Sprocket Special Tool that fits the sprocket of the particular machine being tested. See Figure 5.7.

5. Operate the Arm In Control until the arm is completely in. See Figure 5.8.
6. Operate the Bucket In Control until bucket is completely in. See Figure 5.8.
7. Operate the Boom Down Control until boom is completely down. See Figure 5.8.
8. Turn engine "OFF".
9. Release hydraulic tank pressure by remoing cap from pressure relief valve and depressing relief valve stem. See Figure 5.9.
10. After cleaning away all dirt and debris, remove hydraulic line routed from "Tee" on top of Swing Motor to center port on Swivel Joint at swing motor "Tee". See Figure 5.10.

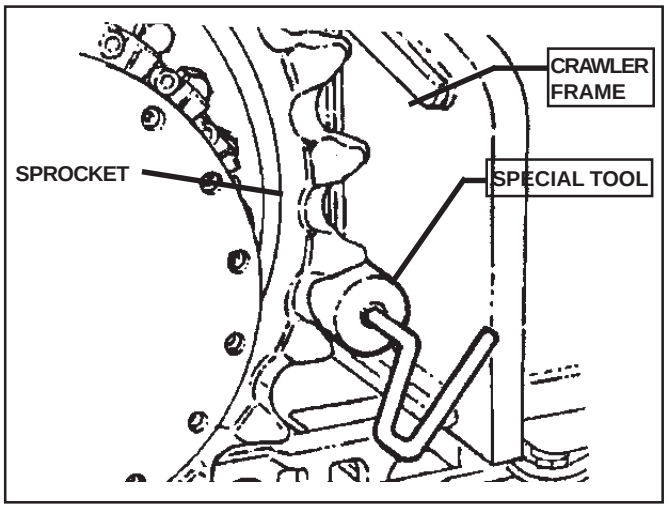
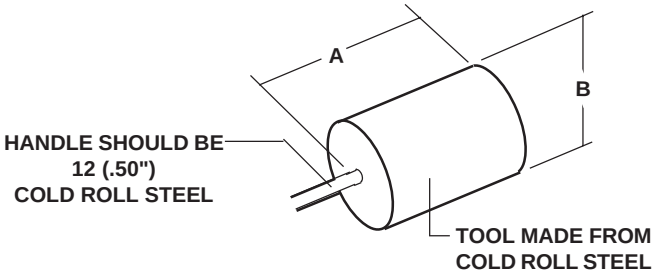


FIGURE 5.6



MODEL	A (LENGTH)	B (DIAMETER)
SK210~SK250	150 (5.91")	80 (3.15")
SK290~SK330	150 (5.91")	80 (3.15")
SK480	150 (5.91)	90 (3.54)

Unit: mm (Inches)

FIGURE 5.7



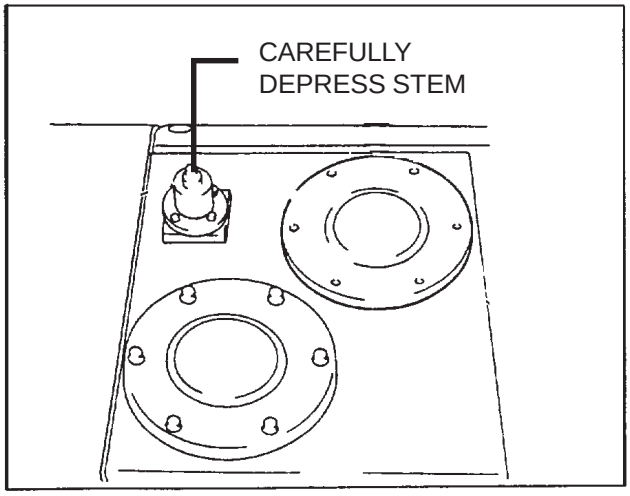


FIGURE 5.9

https://truckmanualshub.com/

CAUTION

• Thoroughly clean all hydraulic lines and fittings before removal. Do not allow any dirt or debris to enter the open lines or fittings.
• Thoroughly clean the bucket that the oil is to be drained into.

11. Install one hydraulic fitting cap onto "Tee". See Figure 5.10. Torque to proper value.
12. Place loose end of line into a clean 38 liter (10 gal.) capacity bucket.
13. Start engine, raise boom a little and place throttle control in the "High" idle position.
14. With special tool installed in each travel motor sprocket, operate the left travel control at full stroke forward for one minute. Measure the amount of oil in bucket and record.

NOTE

If flow of oil will be high, perform the test for 15 seconds and multiply amount of oil by 4 to compare to chart.

EXAMPLE: 19 liters (5 U.S. Gal) X 4 = 76 liters (20 Gal)

15. Repeat step 14 with right control at full stroke forward for one minute. Record amount of oil in bucket.
16. Remove special tool and place into sprocket to stall reverse movement. See Figure 5.11.
17. Repeat steps 14 and 15 with control to reverse movement.
18. Compare readings for each travel motor to Travel Motor Oil Case Drain Specification Chart.
19. If readings are greater than values in chart, refer to shop manual for additional instructions.
20. Remove hydraulic fitting cap. Install hydraulic lines back to the original fitting and torque to the proper value.
21. Check Hydraulic Oil level. Refer to Operators Manual for hydraulic oil level check procedures.

CAUTION

• Fill Hydraulic tank to proper level using only approved new hydraulic oil as listed in the List of Oils, Greases, Filters and Elements Chart in Operators Manual.

SK150 ILLUSTRATED

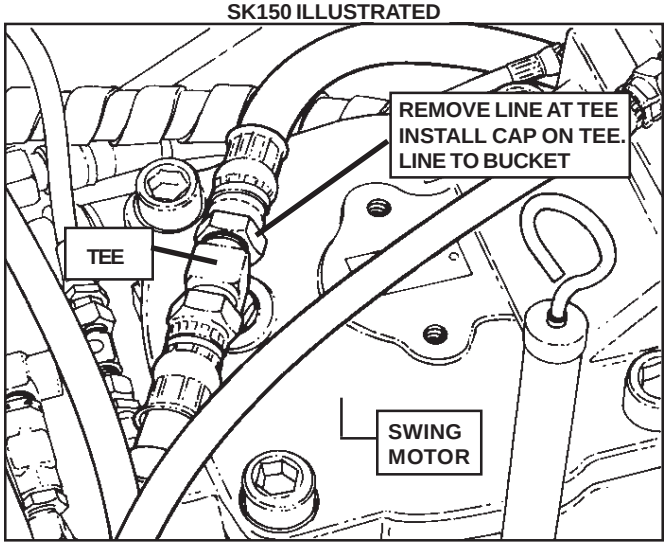


FIGURE 5.10

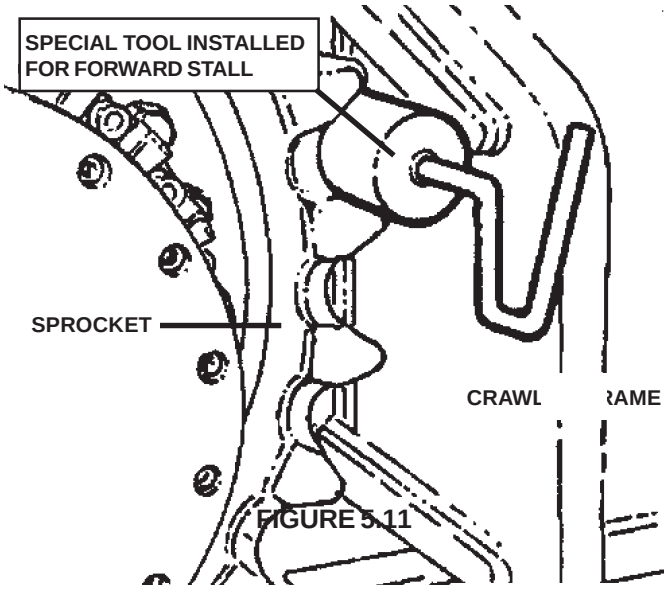


FIGURE 5.11

TRAVEL MOTOR OIL CASE DRAIN SPECIFICATIONS

MODEL	FORWARD/REVERSE TRAVEL
*SK160	STANDARD - 7 (1.8)
*SK160	MAXIMUM - 21 (5.5)
SK210	STANDARD - 7 (1.8)
SK210	MAXIMUM - 21 (5.5)
SK250	STANDARD - 7 (1.8)
SK250	MAXIMUM - 21 (5.5)
SK290	STANDARD - 6 (1.6)
SK290	MAXIMUM - 15 (4.0)
SK330	STANDARD - 8 (2.1)
SK330	MAXIMUM - 20 (5.3)
SK480	STANDARD - 6.5 (1.7)
SK480	MAXIMUM - 19.5 (5.1)

*SK160 and ED190 same

Unit: Liters per Minute (Gallons per Minute)

https://truckmanualshub.com/

TRAVEL SPEED

A. Tools & Equipment

1. Stopwatch
2. Device to mark starting point of tracks.

B. Machine Settings & Site Condition

1. Machine throttle in "High" idle position.
2. Test will be performed with KPSS Mode Switch in "M".
3. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
4. Firm, level testing area.
5. Verify that engine RPM's are at correct specification.

C. Travel Speed Test

1. Move machine to a firm, level testing area.
2. Allow the hydraulic oil to reach a te perature of 45°C to 55°C (113°F to 131°F).
3. Operate Swing Right Control until mchine is sitting across (perpendicular) tracks.
4. Operate the Boom, Arm and Bucket Controls until bucket is on ground. See Figure 7.4.
5. Operate Boom Control until bottom of right track is approximately 300mm (12") off ground. See Figure 7.4. Make reference mark on track.
6. Place Throttle Control in "HI-IDLE" position and KPSS Switch in "M" Mode. See Figure 7.5.
7. Place Travel Speed Select Switch in 1( ) Speed. See Figure 7.6.
8. Operate the Right Travel Control full forward and measure the time it takes for track to make three complete revolutions. Record the time.
9. Repeat Step 7 ands 8 two more times. Averagethe readings and compare to Travel Speed Specification Chart.
10. Place Travel Speed Select Switch in 2( ) speed and repeat steps 8 and 9.
11. Repeat steps 4 through 13 with Left Track approximately 300mm (12") off ground.

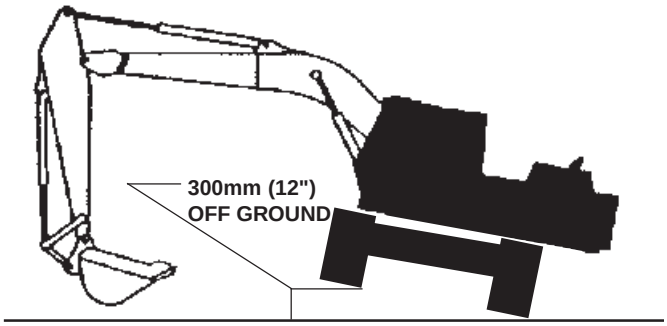


FIGURE 7.4
SK210 ~ SK400 ILLUSTRATED

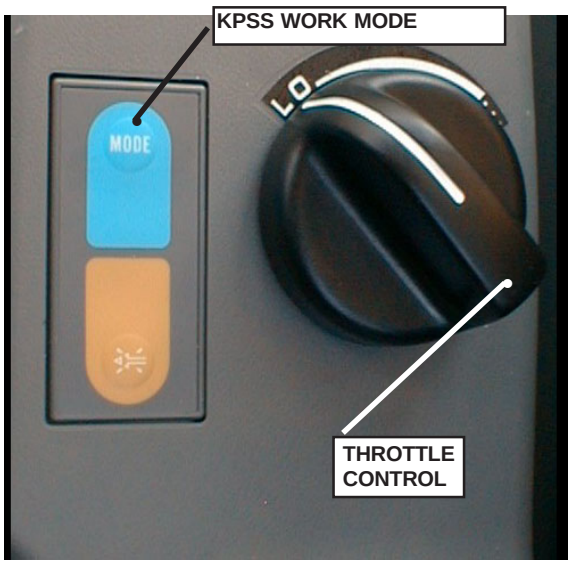


Figure 7.5



Figure 7.6

Unit: Seconds

https://truckmanualshub.com/

TRAVEL SPEED SPECIFICATION CHART

MODEL	MODE	DIRECTION	SPEED	STANDARD 3 REV
SK160	M	FORWARD	1ST	27.6 ~ 30.5
	M	FORWARD	2ND	16.2~ 19.9
	M	REVERSE	2ND	16.9~ 18.7
SK210	M	FORWARD	1ST	23.5 ~ 25.9
	M	FORWARD	2ND	15.8 ~ 17.4
	M	REVERSE	2ND	17.2 ~ 19.0
SK250	M	FORWARD	1ST	25.1 ~ 27.7
	M	FORWARD	2ND	16.2 ~ 18.0
	M	REVERSE	2ND	17.7 ~ 19.5
SK290	M	FORWARD	1ST	29.4 ~ 32.6
	M	FORWARD	2ND	18.0 ~ 20.0
	M	REVERSE	2ND	19.5 ~ 21.5
SK330	M	FORWARD	1ST	32.2 ~ 35.4
	M	FORWARD	2ND	18.4 ~ 20.4
	M	REVERSE	2ND	20.0 ~ 22.0
SK480	M	FORWARD	1ST	32.1 ~ 35.3
	M	FORWARD	2ND	19.7 ~ 21.7
	M	REVERSE	2ND	22.6 ~ 24.6

*SK160 and ED190 same

Revised 06/2002

Speed Selection 1ST ( )

2ND ()

https://truckmanualshub.com/

TRAVEL DEVIATION

A. Tools & Equipment

1. Measuring Tape 30M (100') Capacity
2. Line Parallel to Machine in soil

B. Machine Settings & Site Condition

1. Machine throttle in "High" idle position.
2. KPSS Mode Switch in "M" Mode Position.
3. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
4. Firm, level testing area.
5. Verify that engine RPM's are at correct specification.

C. Travel Deviation Test

1. Move machine to a firm, level testing area.

2. Allow the hydraulic oil to reach a temperature of 45°C to 55°C (113°F to 131°F).

3. Operate the Boom, Arm and Bucket Controls until attachment is in a transport position. See Figure 7.1.

4. Scribe (draw) a line parallel to machine in the soil for a distance of 20M (65'-7") from front of machine tracks. See Figure 7.2.

5. Move Throttle Control to "HI-IDLE" Position and place KPSS Switch in "M" Mode. See Figure 7.3.

6. Operate both travel controls together at full forward speed for the 20M (65'-7") Distance. See Figure 7.2.

7. Measure and record dimension "A". See Figure 7.2.

8. Repeat steps 6 and 7 two more times. Average the readings and compare to Travel Deviation Specification Chart.

9. Repeat steps 1 through 8 with undercarriage turned 180°.

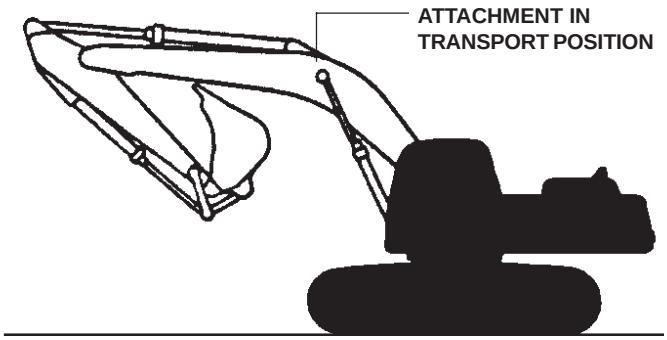


FIGURE 7.1

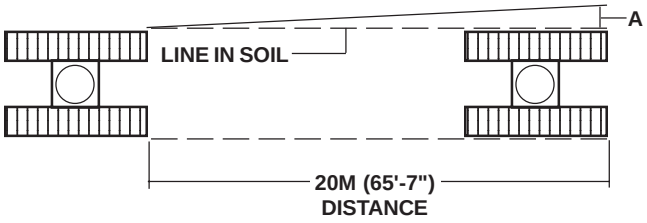


FIGURE 7.2



FIGURE 7.3

TRAVEL DEVIATION SPECIFICATION CHART

MODEL	STANDARD "A"
SK160 SK480	0mm to 1200mm (0'-0" to 3'-9")

Unit: mm (Inches)

https://truckmanualshub.com/

NOTES

https://truckmanualshub.com/

Table of contents

Page

4.1 GENERAL INFORMATION 4-3
4.2 GENERAL SAFETY 4-3
4.3 INSPECTION & MAINTENANCE CHART 4-8
4.5 PRE-START (EVERY 8 HRS) INSPECTION & MAINTENANCE 4-11
A. Engine Oil Level 4-11
B. Engine Coolant Level 4-11
C. Engine Fluid Leaks 4-12
D. Air Cleaner 4-12
E. Engine Electrical 4-13
F. Fuel Level 4-14
G. Hydraulic Oil Level 4-15
H. Hydraulic Functions 4-16
I. Hydraulic Oil Leaks 4-16
J. Machine Electrical 4-16
K. Steps and Handrails 4-17
L. Frame Structure 4-17
M. Tracks and Components 4-17
N. Track Tension 4-19
O. Boom & Arm 4-20
P. Bucket Cutting Edge and Bucket Teeth 4-20
Q. Attachment Lubrication 4-21
4.6 50 HOUR (WEEKLY) & NEW MACHINE BREAK–IN INSPECTION & MAINTENANCE PROCEDURES. 4-22
A. Engine Oil and Filter Element 4-22
B. Water Pump Bearing Lubrication 4-23
C. Fuel Tank Drain 4-24
D. Water Separator 4-24
E. Air Intake System 4-24
F. Radiator, Oil Cooler & Debris Screen 4-25
G. Fuel Filters 4-26
1. Replacing Fuel Filter 4-26
2. Cleaning Priming Pump Strainer 4-26
3. Bleeding Air From Fuel System 4-27
H. Hydraulic Return Filter 4-28
I. Pilot Line Filter 4-29
J. Batteries 4-30
K. Fan and A/C Belt Wear and Tension 4-31
L. Slewing Ring and Swing Bearing Lubrication 4-32
1. Slewing Ring 4-32
2. Swing Bearing Lubrication 4-32
M. Checking Slewing Ring Attaching Bolts For Proper Torque 4-33
N. Check Swivel Valve for Leakage 4-33
O. Oil level in Swing and Travel Reduction Units 4-33
P. Inspecting Counterweight Attaching Bolts for Proper Torque 4-33
4.7 120 HOUR INSPECTION & MAINTENANCE PROCEDURES. 4-34
A. Control Lever Joint Lubrication 4-34
B. Swing Motor Reduction Oil 4-34
C. Travel Motors Reduction Oil 4-35

https://truckmanualshub.com/

Table of Contents (Continued)

Page

4.8 250 HOUR (3-MONTH) INSPECTION & MAINTENANCE PROCEDURES. 4-36
A. Fan and A/C Belt Wear and Tension 4-36
1. Fan Belts 4-36
2. Air Conditioning Compressor Belt 4-36
B. Climatizer — AC Unit Filter Inspection 4-37
1. Fresh Air Filter 4-37
2. Recirculate Air Filter 4-37
C. Checking the Radiator Cap & Hoses 4-38
4.9 500 HOUR (6-MONTH) INSPECTION & MAINTENANCE PROCEDURES. 4-39
A. Change Oil in Travel Motor Reduction Units 4-39
B. Change Oil in Swing Reduction Unit 4-40
C. Checking and Cleaning Fuel Tank and Strainer 4-40
D. Checking the engine R.P.M. 4-41
E. Checking the Air Conditioning Refrigerant 4-41
F. Fuel System Injection Pressure and Nozzle Condition (Atomization) 4-42
4.10 1000 HOUR (12-MONTH) INSPECTION & MAINTENANCE PROCEDURES. 4-42
A. Engine Valve Clearance 4-42
B. Engine Compression Pressure 4-42
C. Inspection of Starter and Alternator 4-42
D. Engine Fuel Injection Timing 4-42
4.11 2000 HOUR INSPECTION & MAINTENANCE PROCEDURES 4-43
A. ENGINE COOLANT CHANGE 4-43
B. Removal and Installation of Radiator 4-45
C. Change Hydraulic Oil 4-46
D. Hydraulic Tank Breather 4-49
E. Maintenance on Rollers and Idlers 4-50
F. Change Slewing Ring Grease Bath 4-50
4.12 PERIODICAL INSPECTION ITEMS 4-51
A. Dust Seals 4-51
B. Bucket 4-52
1. Bucket/Arm & Link Clearance 4-52
2. Reversing Bucket 4-53
3. Removing the Bucket 4-54
4. Installing the Bucket 4-54
5. Bucket Teeth and Side Cutters 4-55
C. Windshield Washer Fluid Reservoir 4-56
D. Fuses 4-56
E. Hydraulic Lines, Tubes and Hoses 4-57
F. Rear View Mirrors 4-58
4.13 MACHINE STORAGE 4-59
A. Prepare Machine 4-59
B. Care During Storage 4-59
C. Removing Machine From Storage 4-59
4.14 Inspection Maintenance Check List 4-60

https://truckmanualshub.com/

4.1 GENERAL INFORMATION

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS CONTAINED IN THIS MANUAL BEFORE PERFORMING ANY INSPECTION OR MAINTENANCE PROCEDURES ON THIS MACHINE, ITS SYSTEMS OR COMPONENTS.

A. It is recommended by KOBELCO CONSTRUCTION MACHINERY AMERICA LLC that an inspection and maintenance schedule be developed and maintained on a regular basis for this machine. Developing and maintaining such a schedule, helps to keep the machine in optimum operating condition. See Figure 4.3A.

B. The information contained in this section gives the proper procedures for performing inspection and maintenance functions for this machine. Use these procedures when performing inspection and maintenance as they will guide the technician step by step for each procedure. Also, refer to the Inspection and maintenance charts for general service interval recommendations.

NOTE

The inspection and maintenance charts provided in this section give only general time intervals. It may be necessary to develope a custom schedule to perform machine maintenance at more frequent intervals based on the work conditions.

C. Use only KOBELCO oils, fluids, lubricants, filters and replacement parts to keep machine in optimum operating condition. See Figure 4.3B.

4.2 GENERAL SAFETY

A. Disposal of Hazardous Waste– FIGURE 4.3C

Dispose of waste oils, fluids, lubricants, filters and other hazardous waste properly.

⚠ CAUTION

Dispose of all hazardous waste in accordance with government environmental regulations, laws and codes.

B. Keep Machine Clean– FIGURE 4.3D

Thoroughly clean machine before performing Inspection and maintenance procedures. It is easier and safer to locate problems, perform maintenance and also reduce the risk of hydraulic system contamination when machine is clean.

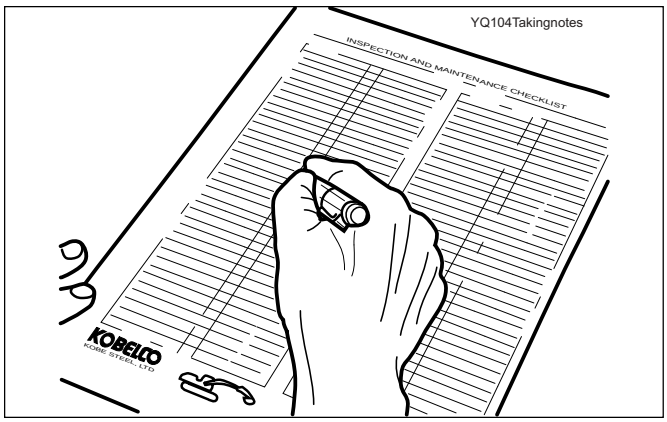


FIGURE 4.3A



FIGURE 4.3B



FIGURE 4.3C

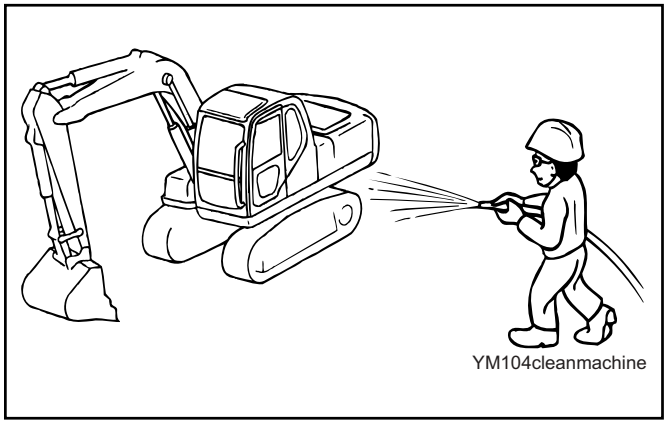


FIGURE 4.3D

https://truckmanualshub.com/

C. Hot Surfaces & Fluids– FIGURE 4.4A

Use caution and wear the proper safety equipment when working around hot areas. Never change oils, engine coolant or filters immediately after a machine has been stopped. Allow machine to cool down before performing maintenance procedures.

D. Warm Engine Oil

Engine oil should have a temperature should be between 20°C ~ 40°C (68°F ~ 104°F) before the oil is changed. If necessary run engine until the oil is warm within the recommended oil change temperature.

E. "Tag-Out" Machine– FIGURE 4.4B

Before beginning any inspection or maintenance procedures, secure a "DO NOT OPERATE" tag to the operators console to inform the operator that the machine will be inoperable for inspection and maintenance. This tag will help prevent accidental starting of the machine. Order tag P/N: YN20T01320P1

F. Inspect Waste Oils and Filters– FIGURE 4.4C

Before disposal, inspect all waste oils, fluids and filters for debris and foreign material. It is recommended to cut open the oil filters to determine any abnormal wear.

G. Prevent Contamination– FIGURE 4.4D

Always cap or plug lines when hydraulic components are removed to help prevent hydraulic system contamination that can be caused by dirt, dust and debris entering a line or port.

CAUTION

Never allow a hydraulic line or component to become contaminated. This could cause severe system damage. Contact an authorized KOBELCO dealer to obtain the proper caps and plugs to be used on this machine. Refer to Specification's Section, for proper part numbers.

H. Seals & "O"-Rings

Always replace seals and "O"-Rings with new parts. Never reuse a seal or "O"-Ring during reassembly of components. Make sure to lubricate all new seals with the appropiate oil before installation.



FIGURE 4.4A



FIGURE 4.4B

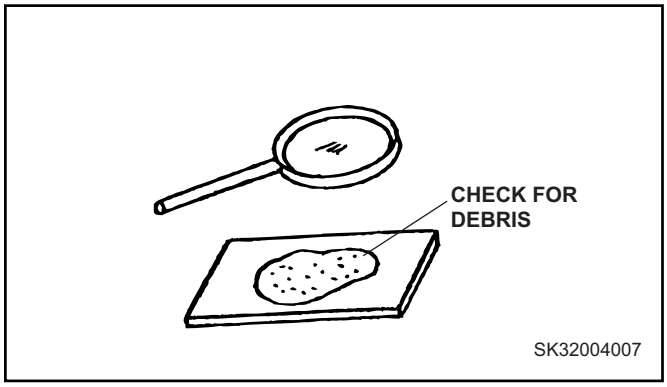


FIGURE 4.4C

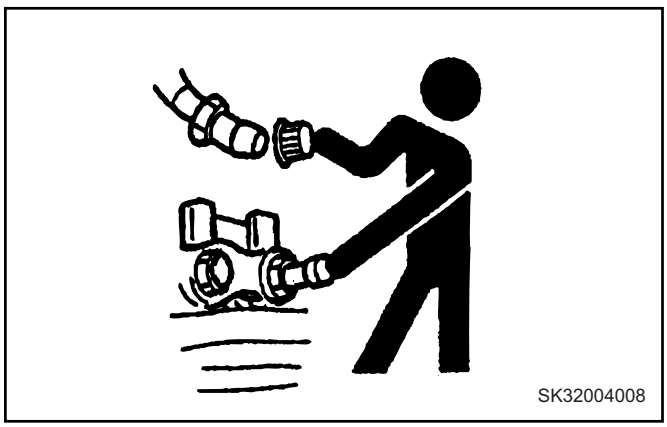


FIGURE 4.4D

https://truckmanualshub.com/

I. Stop Engine

Never attempt any MAINTENANCE with engine running. Always stop the engine and allow machine to cool .

J. Wear Safety Equipment– FIGURE 4.5A

Wear hard hat, safety goggles or face shield, work gloves, safety shoes and well fitting work clothes when performing inspection and maintenance procedures on this machine.

K. Cleaning Parts

Use only approved cleaning solvents and proper equipment to clean parts.

⚠ WARNING

NEVER USE GASOLINE, DIESEL FUEL OR OTHER FLAMMABLE SOLVENTS TO CLEAN PARTS. ALWAYS CLEAN PARTS IN A WELL VENTILATED AREA.

L. Hydraulic Tank Pressure

Always release the internal pressure of the hydraulic tank before performing inspection or maintenance procedures.

1. Remove cap and depress valve to release air pressure from the reservoir. See Figure 4.5B.

⚠ CAUTION

Gasses from hydraulic tank may be hot. Wear safety equipment.

M. Welding Safety

1. Turn key switch to “OFF” position. Wait 4 seconds for electrical power to disconnect. See Figure 4.5C.
2. Remove negative (-) cable from battery terminal. See Figure 4.5D.
3. Attach the welder ground cable within 1 M (3’-3”) away from component being welded.
4. Make certain that the welder ground is not located at a seal or bearing.
5. Make certain that no bearings nor seals separates the welder ground and the weld area.

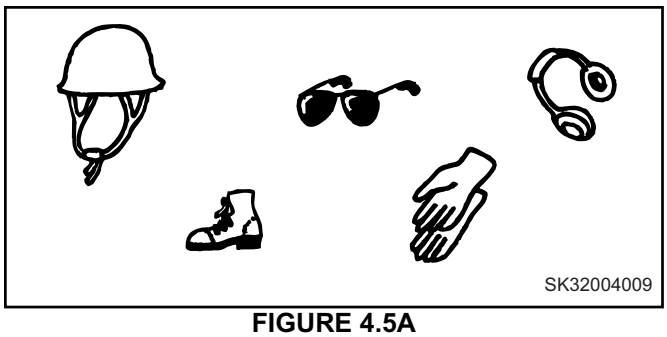


FIGURE 4.5A

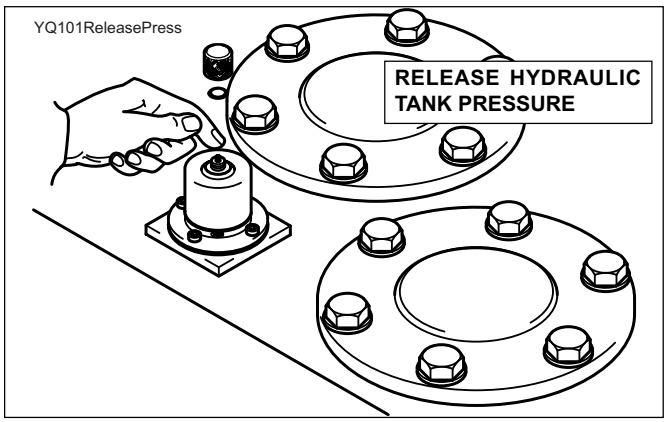


FIGURE 4.5B

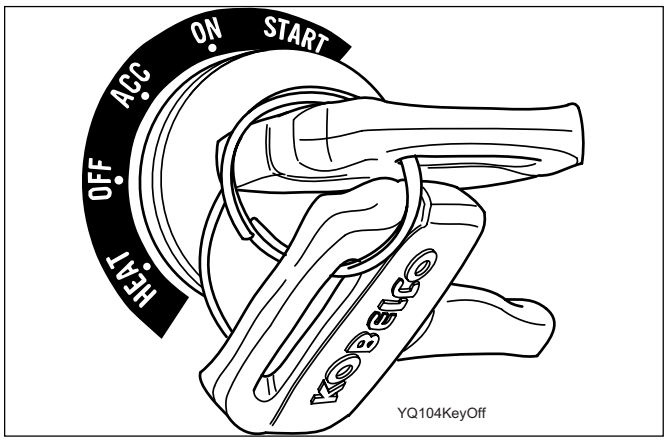


FIGURE 4.5C

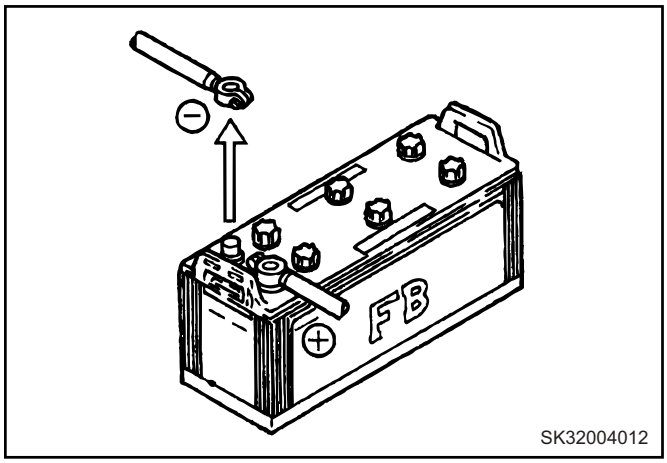


FIGURE 4.5D

https://truckmanualshub.com/

N. Releasing Hydraulic System and Tank Pressure.

⚠ WARNING

NEVER CHANGE OILS OR FILTERS ON A MACHINE THAT HAS JUST FINISHED WORKING. ALLOW MACHINE TO COOL FIRST UNTIL OILS AND FLUIDS ARE WARM, NOT HOT.
RELEASE HYDRAULIC TANK PRESSURE BEFORE WORKING WITH ANY HYDRAULIC COMPONENT.

1. Move the machine to firm level ground and place the attachments on the ground in the oil check position as shown in Figure 4.6A.

2. Stop the engine. Make sure to place the ignition key in “ON” postion and the safety lever is in the unlocked (down) position, ver Fig. 4.6B.

3. Lower the safety lever to unlock the hydraulic system.

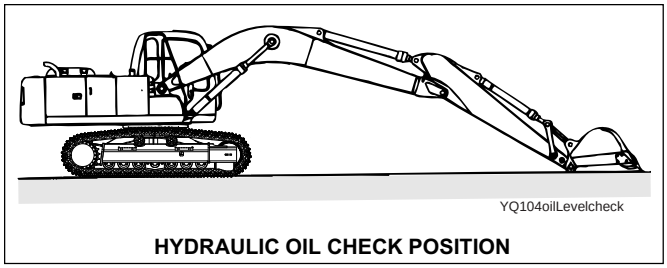
4. Shift the right and left travel control levers forward and backward, also operate the right and left control levers to full strokes several times, see Fig. 4.6C.

5. Remove cap and depress hydraulic relief valve located on the upper surface of hydraulic tank to release the pressure in the hydraulic tank. See Figure 4.6B.

6. Carry out the inspection and/or maintenance of hydraulic system.

⚠ WARNING

WHEN REPLACING ANY HOSE OR SEALS, MAKE SURE THE ATTACHMENTS ARE WELL SECURED TO AVOID SUDDEN MOVEMENT OF ATTACHMENT. REFER TO SECTION 02 “DRAINING HYDRAULIC SYSTEM PRESSURE” FOR PROPER PROCEDURE TO RELEASE HYDRAULIC SYSTEM PRESSURE. FURTHERMORE, SLOWLY REMOVE BOLTS TO RELEASE ANY REMAINING HYDRAULIC PRESSURE DURING DISASSEMBLY.



HYDRAULIC OIL CHECK POSITION

FIGURE 4.6A

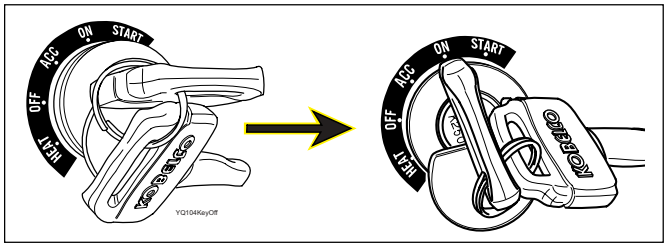


FIGURE 4.6B

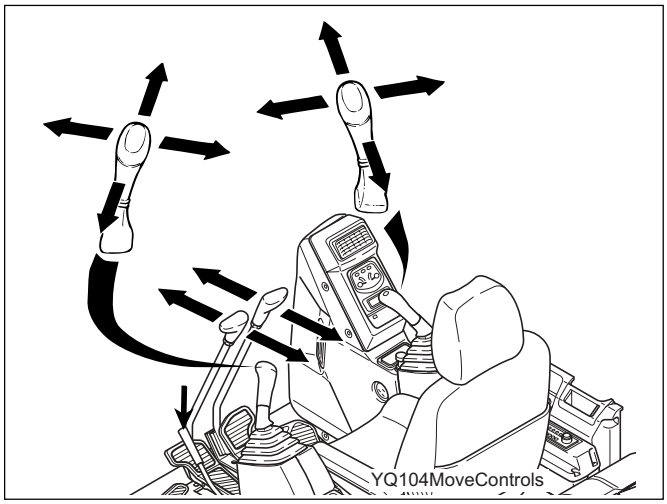


FIGURE 4.6C

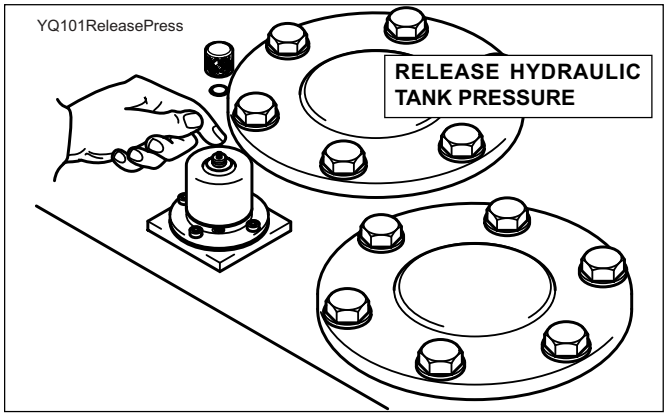


FIGURE 4.6D

https://truckmanualshub.com/

O. Guidelines to replace ground tools.

It is very important to keep bucket teeth & side cutters properly tighten. Loose or missing bolts will increase loads and eventually cause tool failure. Furthermore, extended operation with loose hardware can cause the bolts to stretch and wear on the support mounting holes. Also, heating of hardware and support mounting holes will cause the same effect. All these factors will lead to more expensive corrective maintenance. Follow these general guidelines to insure proper tightness of hardware on bucket teeth & side cutters, and dozer cutting edges:

— When installing new cutting edges, end bits, side cutters and bucket teeth, make sure that all supporting surfaces are free of dirt, paint, debris, rust, scale or weld splatter. All mating surfaces must be clean and flat to insure that maximum clamping force is obtained.

— Make sure that all bolts and nut threads are clean and dry. DO NOT APPLY ANY TYPE OF LUBRICANT.

— When installing end bits, start at the center and work toward the outside edges. Finish installation by torquing from the center toward edges.

— Always, torque bolts according to specifications.

— For best results, strike all head bolts with a heavy hammer to seat them properly before final torque.

⚠ WARNING

WEAR SAFETY GLASSES WHENEVER STRIKING METAL OBJECTS WITH A HAMMER.

— When new parts are used, the mating surfaces will seat more uniformly and the bolts torque will be less than the standard value, after a short period of operation. Make sure to check all bolts for proper tightness on new parts after eight (8) hours of operation.

— Lower maintenance costs by replacing, turning, or rotating cutting edges before they reach their wear limits.

— When finding loose bolts, check bolts for elongation and support mount holes for wear. Replace bolts and repair any wear on support mount hole if needed. Torque bolts according to specs.

P. Guidelines for Attachment Lubrication

Lubricate attachment pins according to the intervals indicated in page 4-10. Use extreme pressure multipurpose grease No 2 EP Type. Lubricate all points until grease purges. The lubrication intervals are based on a standard excavator, see Section 6 of this manual for Kobelco definition of a standard excavator, working in an ***average duty cycle***. Average duty cycle is defined as “Most typical digging application, road construction in natural bed clay, digging 50 ~ 60 % of the daily work schedule”.

New pins and bushings, including new machines and repairs require special break-in procedures. While both pin and bushing have a special ground finish, they still have to be mated to each other to eliminate the machining high points, see Fig. 4.7A.

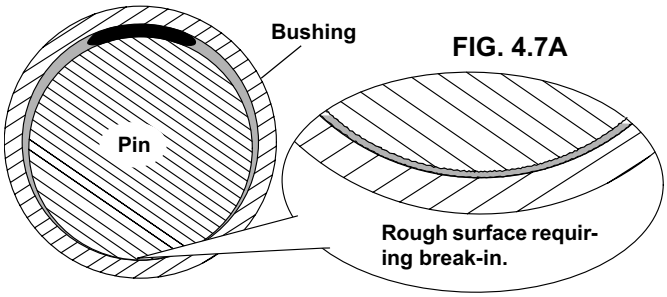


FIG. 4.7A

Because of these high spots, it is recommended that the front attachment or the repaired area be lubricated a minimum of once every eight (8) hours for the first one hundred (100) hours for a standard machine working in an average duty cycle. All other machines should be lubricated every 4 hours for the first twenty (20) hours and every eight (8) hours for the next eighty (80) hours of operation. This lubrication procedure will reduce the possibility of a premature pin or bushing failure during the break-in process.

SPECIAL CONSIDERATIONS FOR HAND LUBRICATION: While grease grooves in the bushings allow grease to move around the bushing, it does not insure that grease gets on all of the bushing surfaces. Any load on the joint will prevent the grease from getting to the wear surface in the loaded area. Due to the fact that a hand greaser does not provide the volume of grease that a power system does, there is a greater possibility of bushing galling, unless the standard lubrication procedure is modified. Fig. 4.7B illustrates the pin load and grease cavity discussed above. No matter how much grease is pumped into the pin bushing cavity with a hand grease gun, the grease will tend to escape to the outside before filling the grease cavity. Therefore, to avoid this situation, the front attachment has to be repositioned during the lubrication process, to move the load area and allow the grease to cover the entire grease cavity between the pin and bushing.

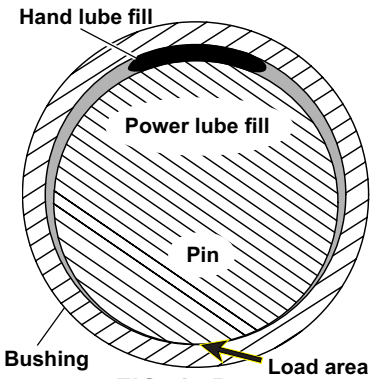


FIG. 4.7B

https://truckmanualshub.com/

4.3 INSPECTION & MAINTENANCE CHART

Follow the chart below for recommended intervals of regular inspection and maintenance procedures.

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS FOUND IN THIS MANUAL BEFORE PERFORMING INSPECTION & MAINTENANCE.

SYSTEM	MAINTENANCE TO PERFORM	LOCATION	INTERVAL (Working Hours)							
			8	50	120	250	500	1000	2000	Page
ENGINE	Check oil level	Eng. left side	X							4-11
	Check coolant level	Rear left compartment	X							4-11
	Check for fluid leaks	Complete engine	X							4-12
	Check belt tension	Front of engine	X							4-31, 4-36
	Check air cleaner	Air cleaner compartment	X							4-12
	Check engine electrical	Complete engine	X							4-13
	Change engine oil	Oil pan		O			X			4-22
	Change oil filter	Bottom RH side of engine		O			X			4-22
	Change fuel filter & clean priming pump gauze filter	Engine LH side		O			X			4-26
	Check air intake system	Hoses and clamps		O			X			4-24
	Check fan assembly	Front of engine		O				X		
	Check radiator cap and hoses	Radiator				X				4-38
	Check belt tensioner & adjust belts	Front of engine		O		X				4-36
	Clean debris screen	Front of radiator or front of oil cooler		OX						4-25
	Clean radiator core and compartment	Radiator and LH compartment		OX						4-25
	Check foam seals	Engine & radiator compartments		OX						4-25
	Change engine coolant	Radiator and engine							X	4-43
	Change air cleaner elements	Air cleaner compartment						X		4-12
	Adjust valve clearence	Engine top						OX		4-42
	Check engine compression	Engine						X		4-42
	Check engine RPM	Monitor					X			4-41
	Lubricate water pump bearing	Engine		O			X			4-23
	Check injection timing	Engine						X		4-42
	Check injection pressure	Engine					X			4-42
	Check injection nozzle atomization	Engine					X			4-42
	Check starter and alternator	Engine						X		4-42
FUEL SYSTEM	Check fuel level	Gauge cluster	X							4-14
	Drain water and deposits from fuel tank	Fuel tank bottom		X						4-24
	Drain water separator	Hyd. pump compartment		OX						4-24
	Check and clean water separator, fuel tank cap & strainer	Hyd. pump & Fuel tank					X			4-40

O - Break in (After first 50 Hrs) Inspection & Maintenance Required.
X - Regular Inspection & Maintenance Required.

https://truckmanualshub.com/

SYSTEM	MAINTENANCE TO PERFORM	LOCATION	INTERVAL (Working Hours)							
			8	50	120	250	500	1000	2000	Page
HYDRAULIC SYSTEM	Hydraulic oil level	RH side of hyd. tank	X							4-15
	Check hydraulic functions	Operator's controls	X							4-16
	Check for oil leaks	Hoses and components	X							4-16
	Check hoses and lines	Complete machine	X							4-57
	Clean suction screen	Hydraulic tank							X	4-46~4-48
	Change return filter	Hydraulic tank		O			X			4-28
	Clean pilot system filter	Pilot valve on side of hydraulic tank		O			X			4-29
	Hydraulic oil change	Hydraulic tank							X	4-46~4-48
	Clean hydraulic oil tank	Hydraulic tank							X	4-46~4-48
	Change hydraulic tank breather	Hydraulic tank							X	4-49
UPPER FRAME	Check swing reduction unit oil level	Swing reduction unit	X	O						4-34
	Change swing reduction oil	Swing motor red. unit					O		X	4-40
	Lubricate swing bearing	Swing bearing housing		O			X			4-32
	Check swing bearing seal	Swing bearing seal		O			X			4-33
	Check torque on slewing ring bolts	Slewing ring		O			X			4-33
	Check slewing ring pinion, gear, and grease bath	Inspection plate next to boom foot area		O			X			4-32
	Drain water from slewing ring grease bath	Lower frame cavity - drain port		O			X			4-32
	Change grease in slewing ring bath	Remove upper body							X	4-50
	Check swivel joint seal	Swivel valve in front of swing motor		O			X			4-33
	Check counterweight bolts	Counterweight		O		X				4-33
	Inspect and clean steps and handrails		X							4-17
	Check bolts/torque	Upper structure		O		X				
OPERATOR'S CONTROLS	Check hydraulic functions and switches	Operator's control & control panels	X							4-16
	Check travel alarm	Operator's control panel	X							-
	Check lights	Boom, front & back	X							Sect. 2
	Check monitor alarm (buzzer)	Operator's control panel	X							Sect. 2
	Check gauge cluster and indicators	Cluster gauge	X							Sect. 2
	Check horn	LH side control	X							Sect. 2
	Lubricate control lever joints	Control levers			X					4-34

O - Break in (After first 50 Hrs) Inspection & Maintenance Required.
X - Regular Inspection & Maintenance Required.

https://truckmanualshub.com/

SYSTEM	MAINTENANCE TO PERFORM	LOCATION	INTERVAL (Working Hours)							
			8	50	120	250	500	1000	2000	Page
ELECTRICAL	Inspect all wiring	Complete machine	X							4-13, 4-16
	Battery electrolyte	Batteries		O	X					4-30
	Battery maintenance	Batteries		O		X				4-30
LOWER FRAME	Check for oil leaks	Complete system	X							
	Check hoses and lines	Frame cavity	X							
	Check step rails	Frame rails	X							4-17
	Check frame structure and welds	Entire frame	X							4-17
	Check tracks and links	Undercarriage	X							4-17, 4-18
	Check sprockets	Undercarriage	X							4-18
	Check idlers	Undercarriage	X							4-18
	Check rollers	Undercarriage	X							4-18
	Check track tension and adjust	Undercarriage		OX						4-19
	Check travel red. unit oil level	Travel motor red. unit		O	X					4-33
	Change travel reduction unit oil	Travel motor red. unit					O		X	4-39
	Check bolts/hardware	Entire lower structure		O	X					
ATTACHMENTS	Check structure	Boom, arm, and bucket	X							4-17, 3-20
	Check bucket teeth and side cutters	Bucket	X							4-55
	[1]Lubricate boom foot pin and boom cylinder connections	Boom	O	O			X			4-21
	[1]Lubricate arm pin and arm cylinder connections	Arm	O	O		X				4-21
	[1]Lubricate bucket pins and bucket cylinder connections	Arm and bucket links	O	OX						4-21
	Check bolts/torque	Hoses and lines supports, bucket		X						
ACCESSORIES	Check A/C refrigerant	Climatizer-A/C					X			4-41~4-42
	Check A/C compressor belt & adjust	Engine				X				4-31, 4-36
	Check A/C condenser and clean	Radiator compartment	X							4-41~4-42
	Check A/C fresh air filter	Cab				X				4-37
	Check A/C recirculate air filter	Cab					X			4-37
	Check wiper washer fluid level	Air cleaner compartment	X							4-56
	Check bolts/torque	Climatizer-A/C system		X						

[1] - The lubrication interval outlined in this table is for a standard excavator (See section 6 for definition of a standard machine) working in an average duty cycle (Most typical digging application, road construction in natural bed clay, digging 50~60% of the daily work schedule). During the break in period, a new pin and bushing connection has to be lubricated every eight (8) hours for the first one hundred (100) hours of operation for a standard machine working in an average duty cycle; all other machines should be lubricated every four (4) hours for the first twenty (20) hours and every eight (8) hours for the next eighty (80) hours of operation. Refer to page 4-7 for more details in regards to the guidelines for reduced lubrication intervals.

O - Break in (After first 50 Hrs) Inspection & Maintenance Required.

X - Regular Inspection & Maintenance Required.

https://truckmanualshub.com/

4.5 PRE-START (EVERY 8 HRS) INSPECTION & MAINTENANCE

The following procedures are to be performed every 8 hours or daily, before starting the machine.

WARNING

BE CAUTIOUS OF HOT FLUIDS AND SURFACES. WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES, AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE.

A. Engine Oil Level

1. Stop engine and raise the engine cover.
2. Locate and pull engine dipstick, clean it with a clean, dry, lint free cloth. Reinsert into engine. Pull out again to visually inspect the engine oil level on dipstick. See Figure 4.11A.
3. If necessary to add oil, remove oil filler cap and fill engine oil to proper level. See Figure 4.11A.

NOTE

After adding oil, check oil level again, replace oil filler cap and dipstick and close engine cover.

B. Engine Coolant Level

1. Open left rear compartment cover and inspect coolant level in engine coolant reservoir. See Figure 4.11B.
2. Proper coolant level is between “FULL” and “LOW” marks. See Figure 4.11B.
3. If necessary to add coolant, remove reservoir cap and fill to proper level with fresh coolant mixture. See Figure 4.11B.
4. If no coolant is shown in reservoir, check coolant level in radiator. Fill radiator with proper coolant mixture and replace cap. See Figure 4.11C. Then refill reservoir to proper level.

WARNING

NEVER REMOVE RADIATOR CAP WHEN ENGINE IS HOT. ALLOW ENGINE TO COOL DOWN BEFORE REMOVING RADIATOR CAP.

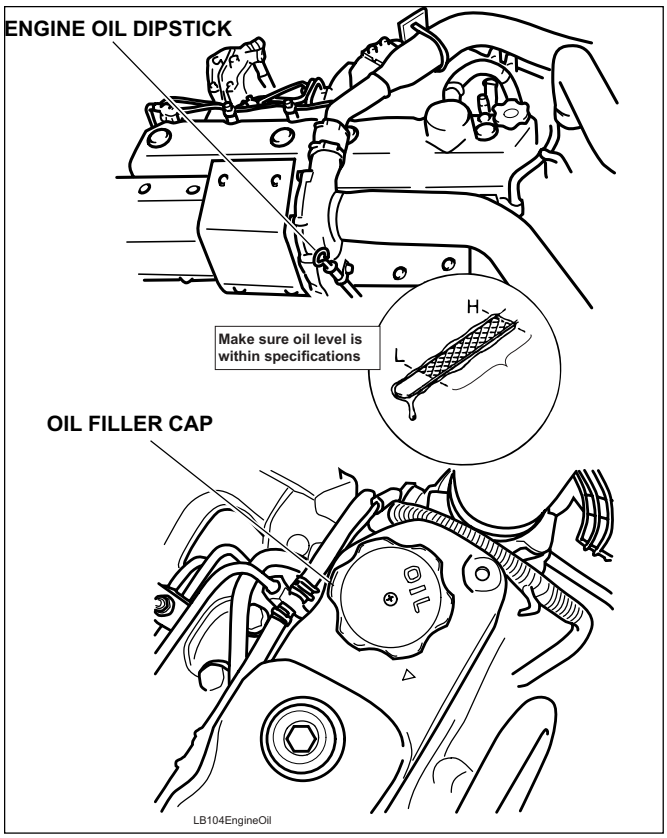


FIGURE 4.11A

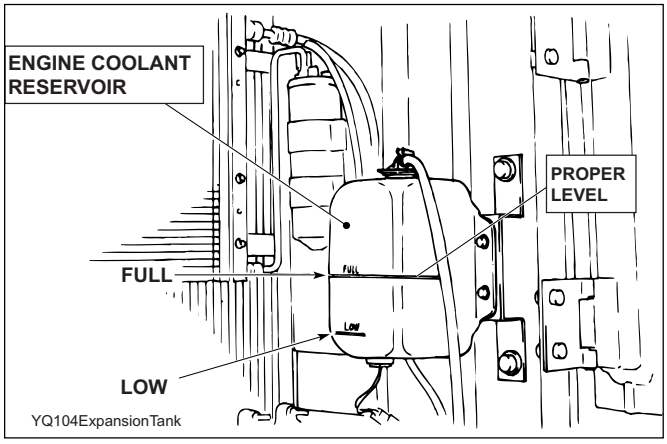


FIGURE 4.11B

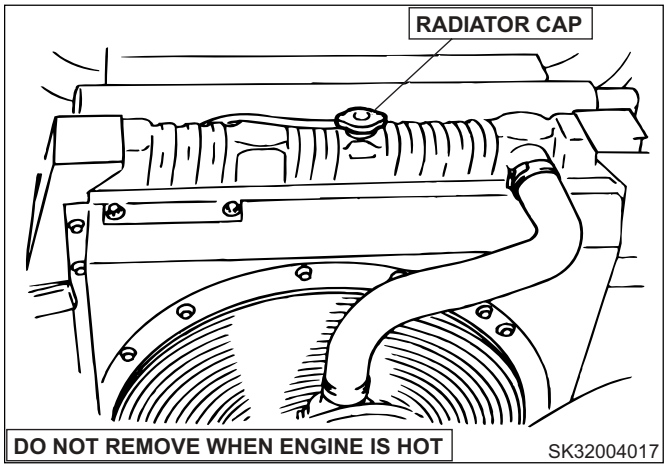


FIGURE 4.11C

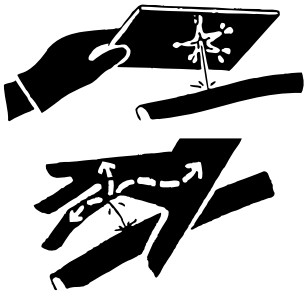
https://truckmanualshub.com/

C. Engine Fluid Leaks

1. Inspect complete engine for signs of fluid leaks.
2. When inspecting around pressure lines and hoses use a stiff piece of cardboard. See Figure 4.12A.

⚠ CAUTION

Never use hands to check for leaks. High pressure fluid leaks will penetrate the skin and cause severe injury.



SK32001033

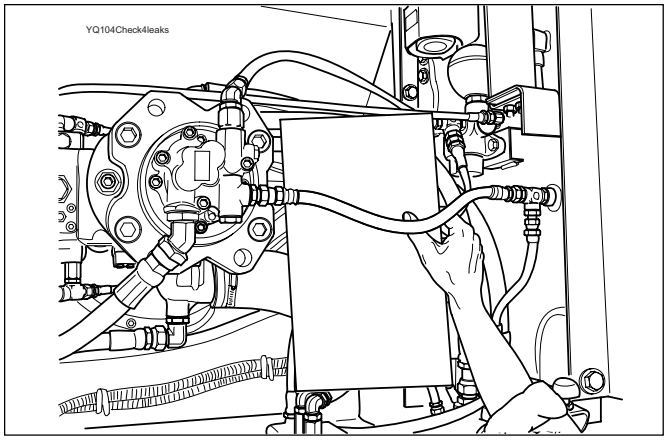


FIGURE 4.12A

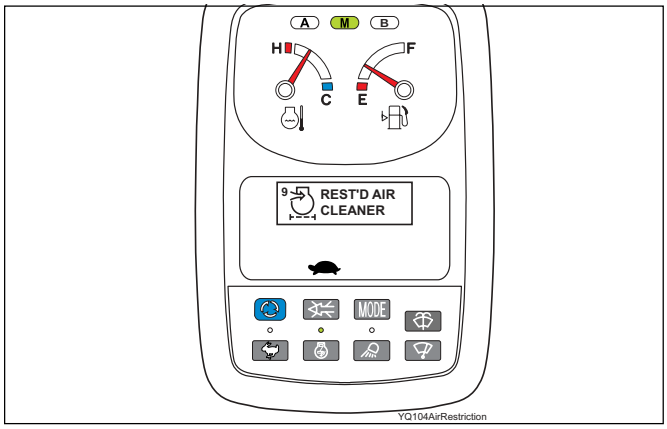


FIGURE 4.12B

D. Air Cleaner

⚠ CAUTION

Wear protective glasses or goggles when using compressed air.

NOTE

The air restriction indicator will not signal if the element is torn or if the air cleaner compartment is not sealed properly. If "REST'D AIR CLEANER" icon is displayed, as indicated in Figure 4.12B, inspect, clean, and/or replace the air cleaner elements.

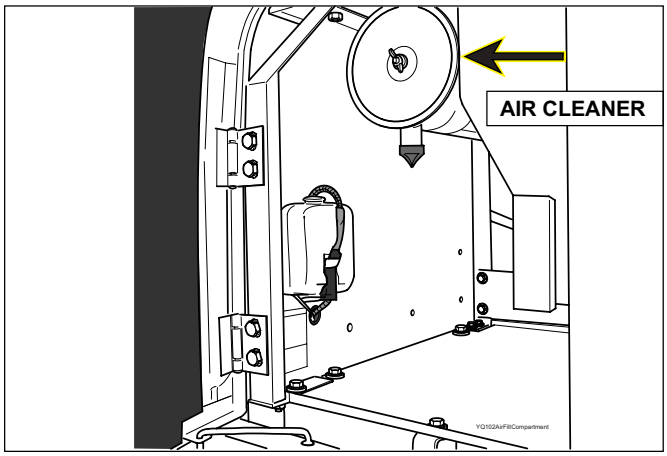


FIGURE 4.12C

1. Open engine air cleaner access door and lock open. Use ignition key if door is locked to unlock it.
2. Remove air cleaner cover. See Figure 4.12C.
3. Remove the air cleaner outer element from the housing. See Figure 4.12D.

NOTE

Replace the Air Filter elements every 1000 hours or when the restricted icon appears on the cluster gauge, which ever comes first.

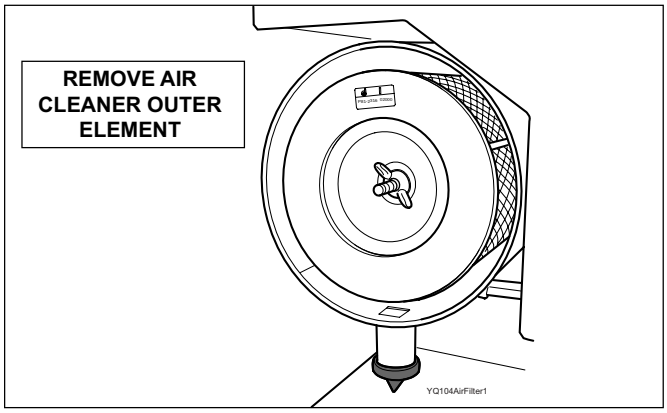


FIGURE 4.12D

https://truckmanualshub.com/

4. Remove the wing nut and air cleaner inner element from the housing. See Figure 4.13A.

5. To clean the outer element, blow compressed air {less than 2.8 bar (40 psi)} up and down along the folds of the filter element interior to remove clogged dust or other contaminants. See Figure 4.13B.

6. After cleaning, use a light to check the inside of the element for tearing, pinholes, or packing damage. Replace with a new element if necessasry.

CAUTION

Make sure to properly place the O-ring seal on the wing nut sleeve for the outer filter element. Failure to do so could cause engine failure.

7. Assemble elements in the reverse order of disassembling.

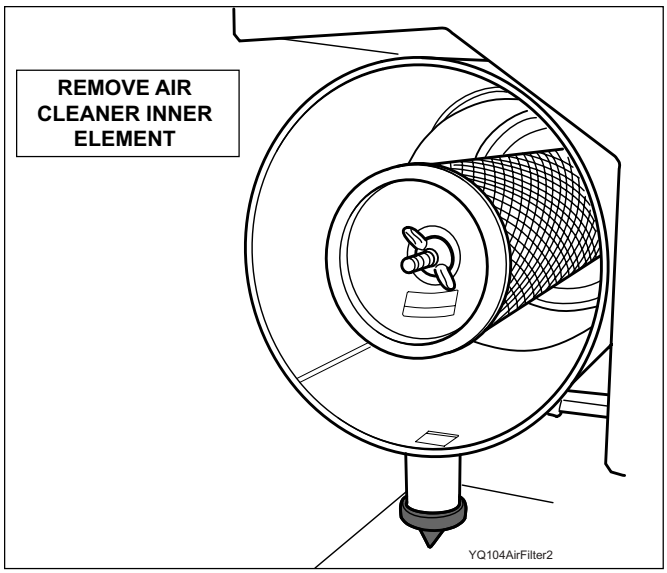


FIGURE 4.13A

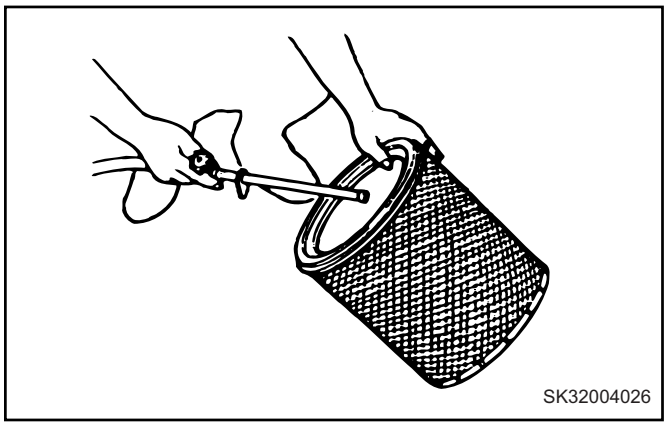


FIGURE 4.13B

E. Engine Electrical

1. Visually and manually inspect all engine electrical wiring, connectors and components for signs of damage and malfunction. See Figure 4.13C.

2. Repair or replace all damaged or malfunctioning wiring, connectors and components before resuming operation of the machine.

⚠ WARNING

OPERATING THE MACHINE WITH DAMAGED OR MALFUNCTIONING ELECTRICAL COMPONENTS CAN CAUSE SERIOUS DAMAGE TO THE MACHINE AND SERIOUS INJURY TO PERSONNEL. REPAIR OR REPLACE FAULTY COMPONENTS IMMEDIATELY.

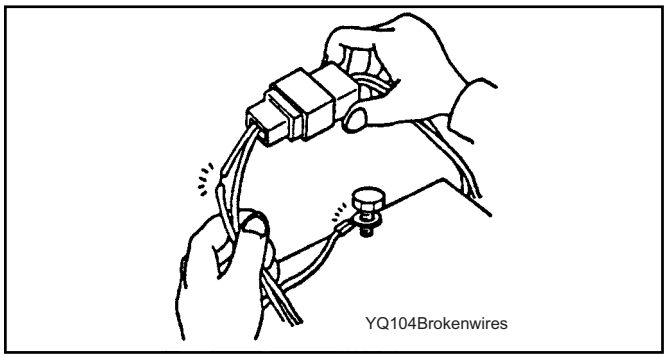


FIGURE 4.13C

https://truckmanualshub.com/

F. Fuel Level

1. Turn “ON” the ignition key and the fuel level gauge in the cluster gauge will indicate the fuel tank level. See Figure 4.14A.

2. To refuel the machine, use the ignition key to remove the fuel tank cap. Do not remove the fuel screen for fueling. Refill fuel tank to full mark to reduce air volume (condensation). Failure to do so could create problems such as rusting and fuel freezing, as well as other associated problems.

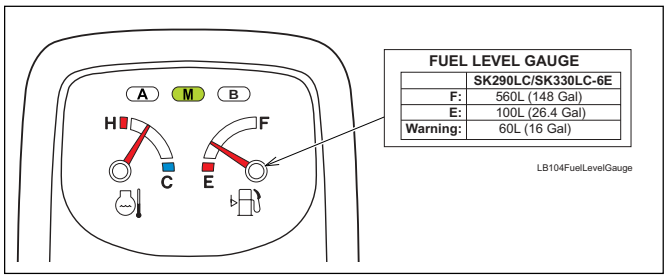


FIGURE 4.14A

NOTE

If refilling is done by means of the optional auxiliary fuel pump (standard for european machines only), proceed as follows:

a. Use the ignition key to remove the fuel tank cap.

b. Open battery access cover, remove the filter end of the fuel pump suction hose from its storage housing and insert the fuel suction hose into fuel supply reservoir. See Figure4.14B.

c. Locate the auxilliary fuel pump switch inside the storage box access door. Place the switch in the “ON” position. See Figure 4.14C. Place pump switch in the “OFF” position when fuel tank is full.

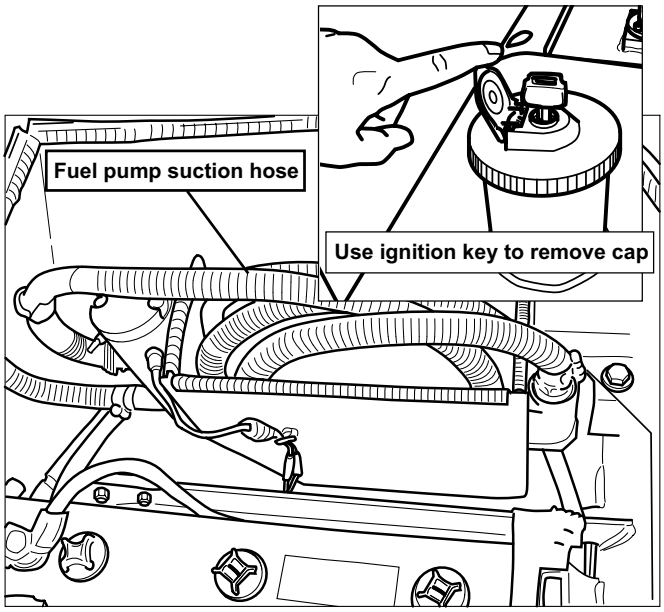


FIGURE 4.14B

NOTE

Delivery rate of the auxilliary fuel pump is 30 liters per minute (7.9 U.S. Gal per minute).

d. After removing fuel suction hose from fuel supply reservoir, coil hose and place filter into its storage housing. Replace fuel strainer and fuel filler cap.

NOTE

Optional fuel pump P/N: YT22P00001F5
Flow: 35 L/min
V= 24 Volts
Amps: 7 A
Fuse: 10 Amps
Filter: 250 µmesh

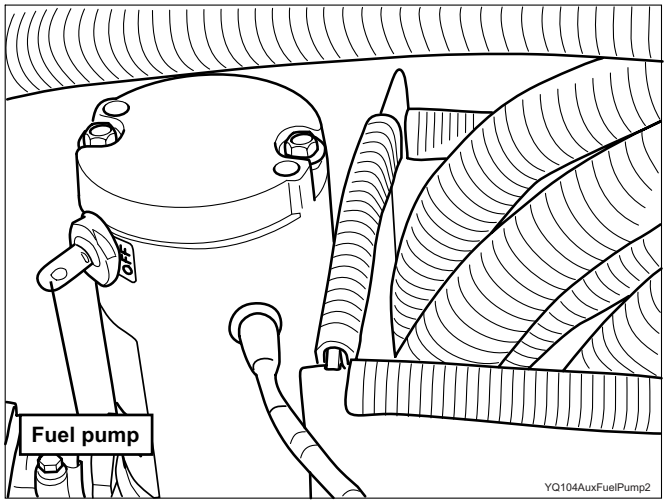


FIGURE 4.14C

https://truckmanualshub.com/

G. Hydraulic Oil Level

1. Place the machine in the oil check position on a firm level surface as shown in Figure 4.15A.
2. Check the sight glass through the openning of the hydraulic tank side cover, as shown in Figure 4.15B.

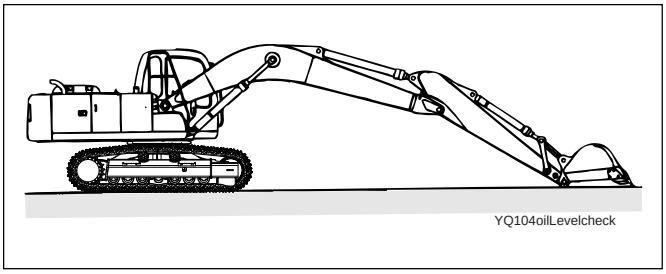


FIGURE 4.15A

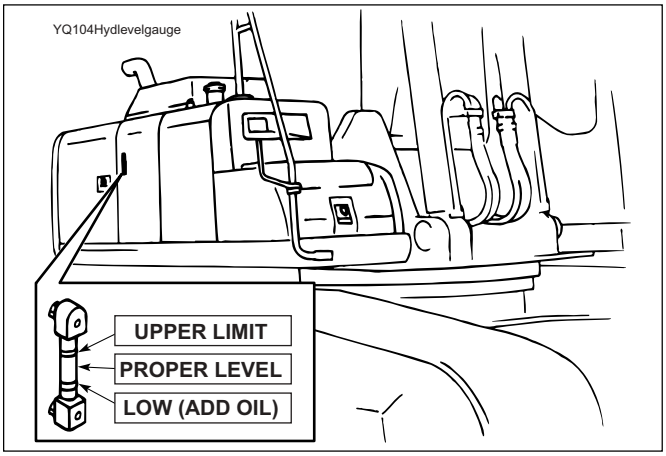


FIGURE 4.15B

⚠ WARNING

FOR SAFE OPERATION ON INCLINES, THE HYDRAULIC OIL LEVEL MUST BE MAINTAINED BETWEEN "PROPER LEVEL" AND "UPPER LIMIT" MARK. DO NOT OPERATE MACHINES ON INCLINED SURFACES WITH A SLOPE GREATER THAN 35º.

3. To add hydraulic oil, proceed as follows:
   - **a.** Release hydraulic tank pressure. See Figure 4.15C.

⚠ CAUTION

Gasses from hydraulic tank may be hot. Wear safety equipment.

- **b.** Slowly remove the six mounting bolts from the hydraulic suction filter cover plate. See Figure 4.15D.
- **c.** Add hydraulic oil filling hydraulic tank to the proper level. See Figure 4.15B.
- **d.** Before replacing filter cover, replace "O"Ring. See Figure 4.15D.
- **e.** Lubricate the new "O"-Ring and place it properly in seat. Place cover over opening and install mounting bolts with lockwashers.
- **f.** Torque mounting bolts to proper value. Refer to Torque Specifications Table.

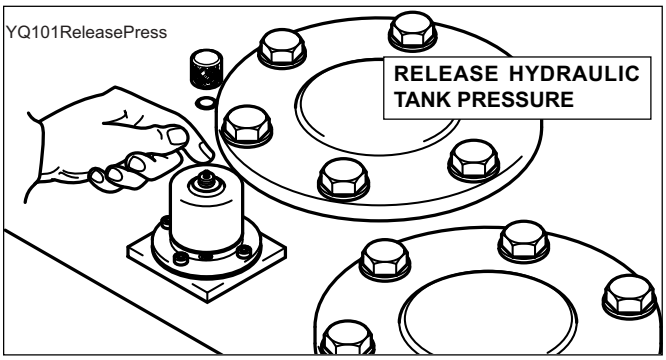


FIGURE 4.15C

⚠ WARNING

CLEAN UP ALL SPILLED OIL TO PREVENT FIRES. DISPOSE OF HAZARDOUS WASTE ACCORDING TO ENVIRONMENTAL LAWS AND REGULATIONS.

NOTE

Machine is shipped from factory with **SHELL TELLUS 46** Hydraulic oil, unless other equivalent requested. Refer to oil specification decal on hydraulic tank.

CAUTION

ALWAYS USE CLEAN HYDRAULIC OIL. USE CAUTION TO AVOID CONTAMINATION DURING FILLING

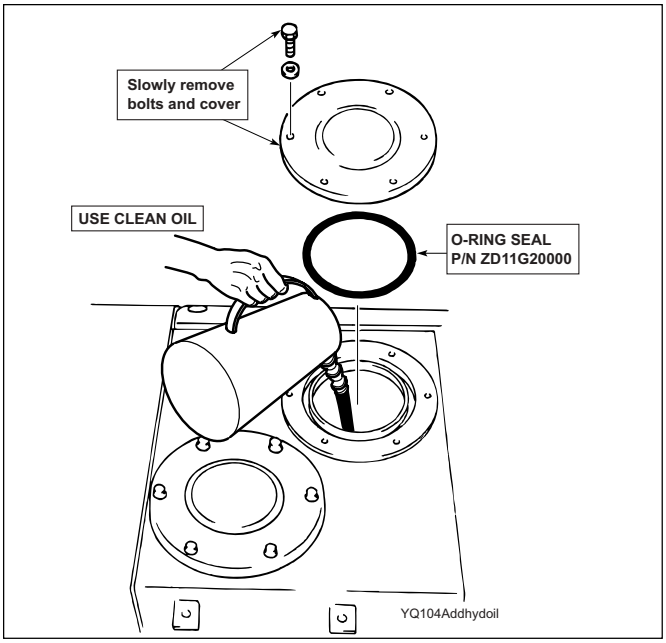


FIGURE 4.15D

4

https://truckmanualshub.com/

H. Hydraulic Functions

1. Check all hydraulic controls for proper functionality before operating the machine. See Figure 4.16A.

⚠ WARNING

NEVER OPERATE THE MACHINE WITH A FAULTY CONTROL OR FUNCTION. MAKE ALL NECESSARY REPAIRS BEFORE ALLOWING ANY OPERATION.

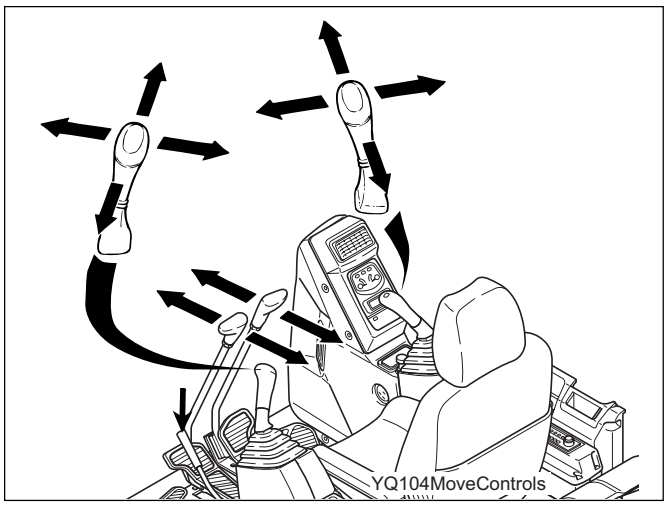


FIGURE 4.16A

I. Hydraulic Oil Leaks

1. Check complete hydraulic system for leaks. Use a small piece of cardboard when checking areas with high pressure. See Figure 4.16B.

⚠ CAUTION

Never use hands to check for leaks. High pressure fluid leaks will penetrate the skin and cause severe injury.

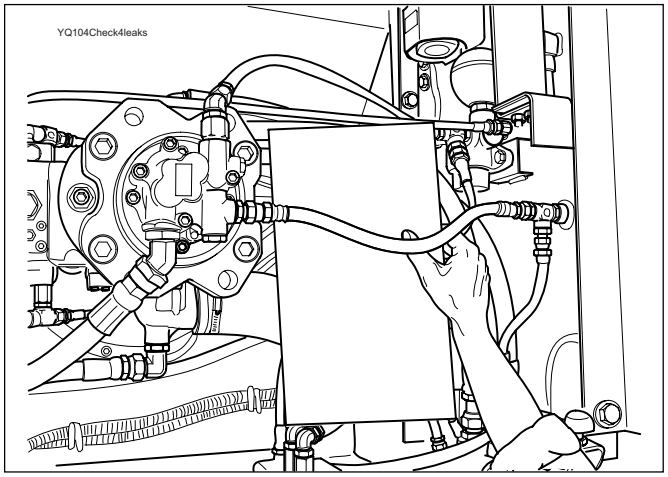


FIGURE 4.16B

2. Check all hoses and lines for signs of damage.
3. Repair or replace damaged hoses and lines before allowing any operation.

⚠ WARNING

CLEAN UP ALL SPILLED OIL TO PREVENT FIRES. DISPOSE OF HAZARDOUS WASTE ACCORDING TO ENVIRONMENTAL LAWS AND REGULATIONS.

J. Machine Electrical

1. Check all switches for proper operation.
2. Visually check all wiring and connectors for signs of damage, corrosion etc..
3. Repair or replace all damaged or faulty electrical components before allowing any operation of the machine.
4. Check all gauges and L.C.D. Display on the gauge cluster display for proper operation. See Figure 3.16C.

⚠ DANGER ⚠

DAMAGED OR FAULTY ELECTRICAL COMPONENTS CAN CAUSE SEVERE DAMAGE TO THE MACHINE AND CAUSE SERIOUS PERSONAL INJURY OR DEATH.

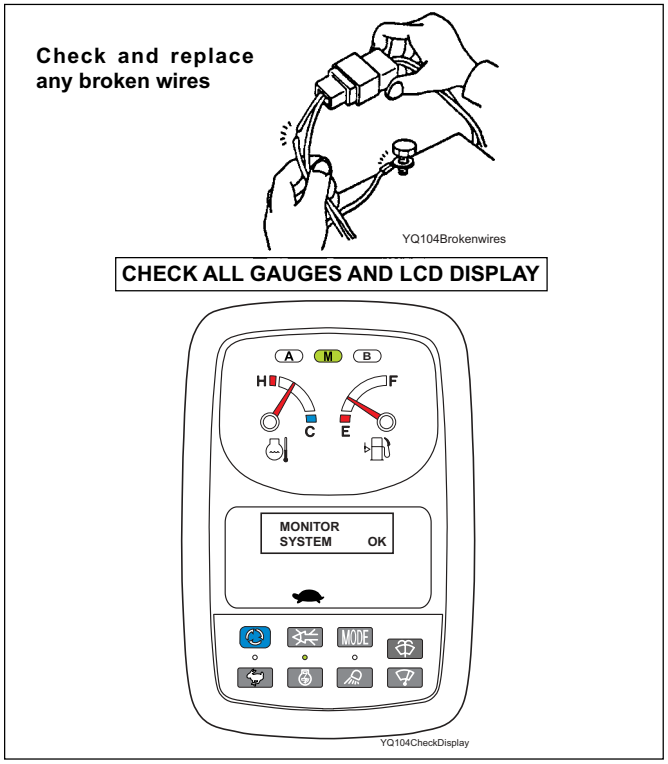


FIGURE 4.16C

https://truckmanualshub.com/

K. Steps and Handrails

1. Inspect daily all mounting steps and handrails on the machine to make sure they are clean and in safe working condition. See Figure 4.17A.

2. Repair or replace all areas before allowing any operation of the machine.

⚠ CAUTION

Use steps, and handrails when mounting and dismounting the machine. Keep steps, handrails and step rails clean and in safe working condition.

L. Frame Structure

1. Carefully inspect the entire frame structure for signs of damage, broken welds etc..

NOTE

Remove any excessive grease form the attachment pin connecting areas to inspect welding. See Figure 4.17C.

2. Repair or replace all frame components found to be damaged before allowing any operation of the machine.
3. In cases where welding repair is required, consult an authorized KOBELCO Service Dealer for proper procedures concerning weld repairs. Use only certified welding personnel familiar with structural welding methods to perform repairs requiring welding. Never allow current to flow through a joint such as between a pin and bushing and/or between upper and lower structures.

⚠ WARNING

DISCONNECT BATTERIES BEFORE WELDING ON THIS MACHINE. SEE FIGURE 4.17B. CONNECT WELDER GROUND CABLE WITHIN 1M (3'-3") AWAY FROM AREA TO BE WELDED

M. Tracks and Components

1. **Track Shoes**
   - **a.** Visually inspect track shoes for signs of excessive wear or damage. See Figure 4.17D.
   - **b.** Have all repair or replacement work done by an authorized KOBELCO Service Dealer.
   - **c.** Check tightness of shoe mounting bolts and nuts. If loose, remove bolt, clean thread, apply engine oil and torque to 853±27 N-m (628±36 ft•lbs). See Figure 4.17D.

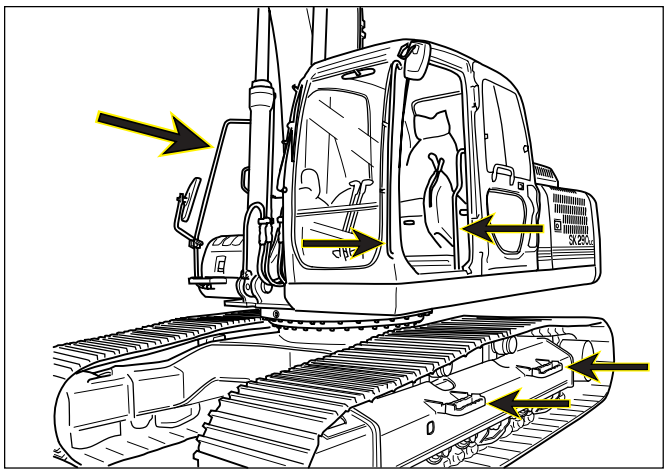


FIGURE 4.17A

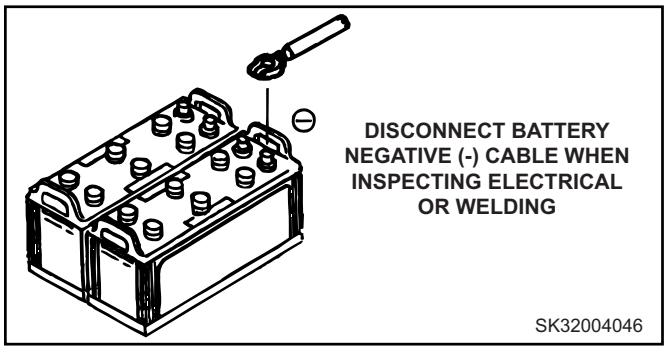


FIGURE 4.17B

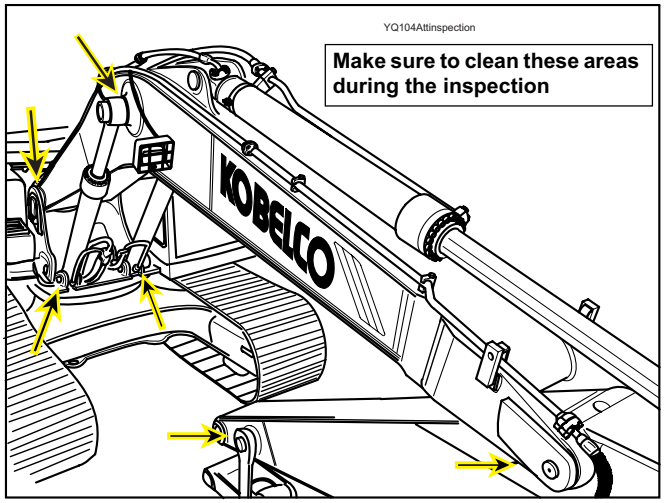


FIGURE 4.17C

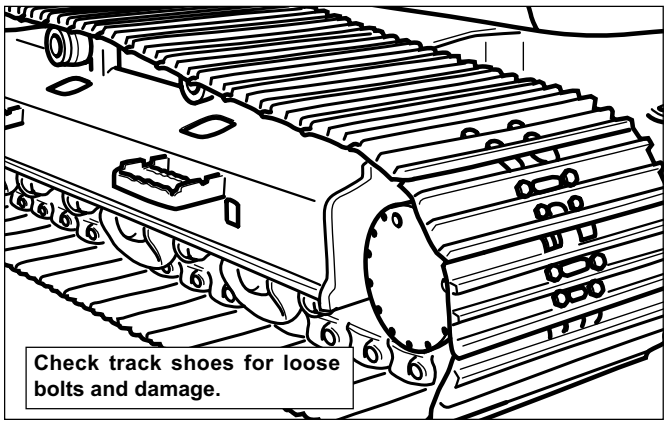


FIGURE 4.17D

4

https://truckmanualshub.com/

2. Track Links

a. Inspect links for signs of excessive wear or damage. See Figure 4.18A.

b. Have all repair or replacement work done by an authorized KOBELCO Service Dealer.

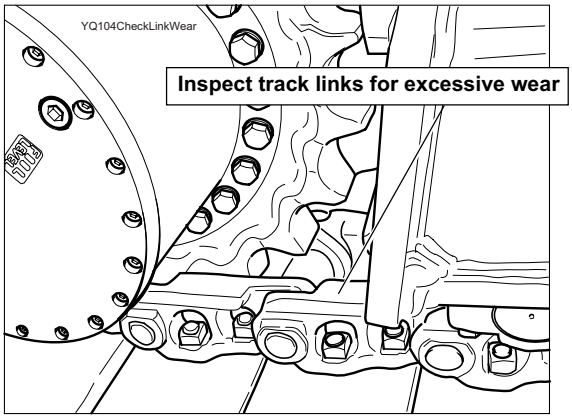


FIGURE 4.18A

3. Sprockets

a. Inspect sprockets for excessive wear and damage. See Figure 4.18B.

b. Should the sprockets require service, contact an authorized KOBELCO Service Dealer for assistance.

c. Check and make sure all sprocket bolts are properly torqued.

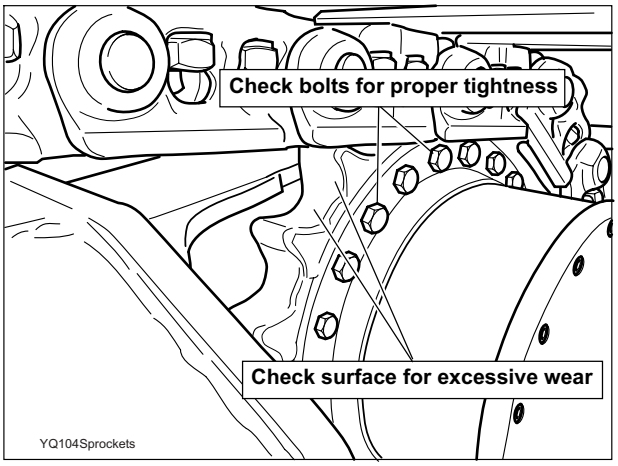


FIGURE 4.18B

NOTE

If any sprocket bolt is loose, preceed as follows:

c.1- Remove bolt and clean threads.

c.2- Apply locktite # 262 to the bolt.

c.3- Torque to 55 Kgf-m {397 lbs-ft}

4. Idlers

a. Inspect Idlers for excessive wear and damage. See Figure 4.18C.

b. Should the Idlers require service, contact an authorized KOBELCO Service Dealer for assistance.

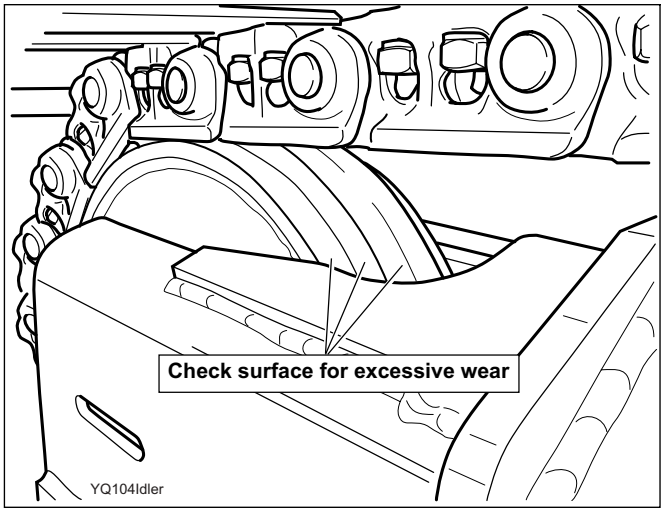


FIGURE 4.18C

NOTE

Every 8 hours of operation, make sure to check idlers and rollers for leakage and repair as needed. Contact your Kobelco dealer's Service Department for any assistance.

Change oil in idlers and rollers every 2000 hours of operation. See 2000 hour maintenance in this section for specific details.

5. Rollers

a. Inspect rollers for excessive wear and damage. See Figure 4.18D.

b. Should the rollers require service, contact an authorized KOBELCO Service Dealer for assistance.

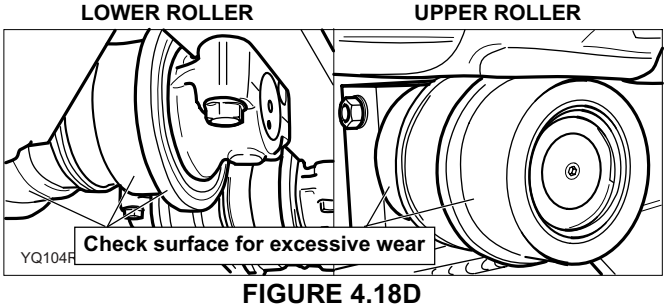


FIGURE 4.18D

https://truckmanualshub.com/

N. Track Tension

1. Operate swing, arm, bucket and boom controls until machine is set up as shown in Figure 4.19A.

⚠ WARNING

SUPPORT LOWER FRAME WITH SUITABLE BLOCKS.

2. Measure the sag in the center of the track, between the bottom of the track frame and the track shoe surface. See Figure 4.19A.
3. To increase track tension, set machine as shown in Figure 4.19A and with grease gun inject extreme pressure No. 2 grease into idler adjustment grease fitting until proper tension is reached. See Figure 4.19B. Perform this procedure on both tracks.
4. To decrease track tension, carefully loosen grease fitting to allow grease to scape.
5. Tighten grease fitting.

⚠ WARNING

GREASE IN TRACK TENSIONING MECHANISM IS UNDER EXTREME PRESSURE AND CAN PENETRATE SKIN CAUSING SEVERE INJURY. KEEP FACE AND BODY AWAY FROM GREASE FITTING AREA. NEVER LOOSEN GREASE FITTING MORE THAN ONE (1) COMPLETE TURN. IF GREASE DOES NOT RELEASE AFTER ONE TURN OF THE FITTING, CALL AN AUTHORIZED KOBELCO SERVICE DEALER FOR ASSISTANCE.

6. Start engine and operate the travel motor for the track being adjusted, back and forth. Recheck track tension and adjust if needed.
7. Perform steps 1 through 6 on the opposite track if needed.

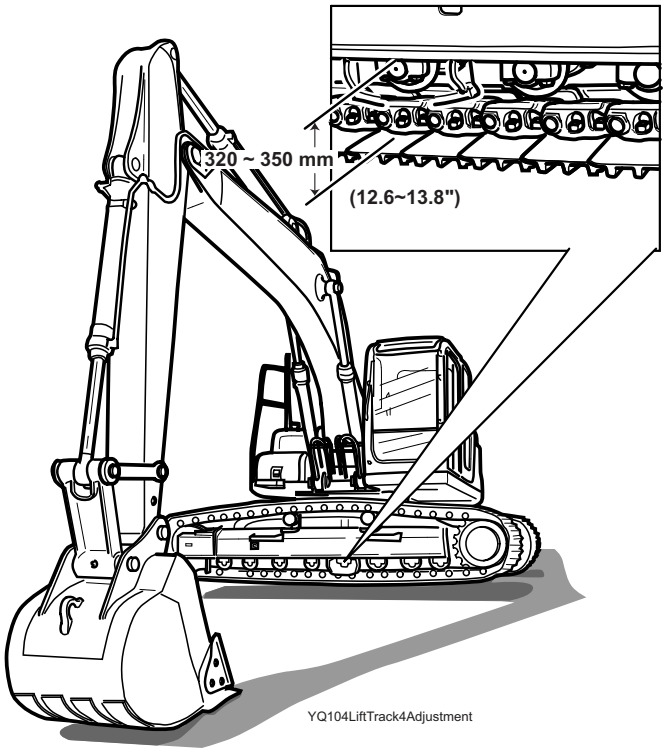
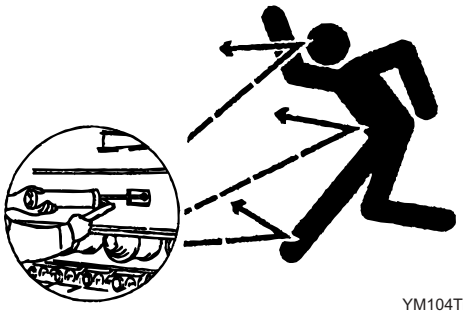


FIGURE 4.19A

USE CAUTION WHEN ADJUSTING TRACKS



TORQUE GREASE FITTING TO 45 lbs-ft (6 kgf-m)

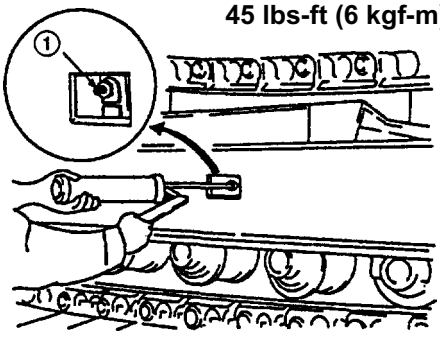


FIGURE 4.19B

https://truckmanualshub.com/

O. Boom & Arm

1. Inspect Boom and Arm structures for signs of excessive wear and damage. See Figure 4.20A. Install shims as needed to correct any excessive play. Refer to the shop manual for details.
2. Should repair or replacement be necessary, contact an authorized KOBELCO Service Dealer for assistance.

NOTE

Remove any excessive grease form the attachment pin connecting areas for inspection. See Figure 4.20A.

⚠ WARNING

DISCONNECT BATTERIES BEFORE WELDING ON THIS MACHINE. SEE FIGURE 4.20B. CONNECT WELDER GROUND CABLE WITHIN 1M (3'-3") AWAY FROM AREA TO BE WELDED.

VERY IMPORTANT NOTE

VISUALLY CHECK, EVERY EIGHT (8) HOURS, FOR EXCESSIVE LATERAL PLAY BETWEEN BOOM AND ARM, AND ARM AND BUCKET CONECTIONS. MEASURE CLEARANCES EVERY FIFTY (50) HOURS. **REFER TO SHOP MANUAL FOR DETAILS REGARDING ATTACHMENT LATERAL CLEARANCE.**

P. Bucket Cutting Edge and Bucket Teeth

1. Inspect bucket teeth and side cutters for signs of excessive wear and damage. See Figure 4.20C.
2. Should repair or replacement be required, follow instructions given on 4.12 Periodical Inspection Items: B and C, and/or consult with attachment manufacturer if needed.

⚠ CAUTION

Wear goggles, safety shoes, hard hat, work clothes and work gloves to perform inspection and maintenance on this machine.

NOTE

Make sure that bolts on cutting edges are properly tighten. If bucket bolts are loose, remove bolts, clean threads on bolts and nuts, apply locktite #262 and torque them to specs. Refer to the Specifications Section in this book.

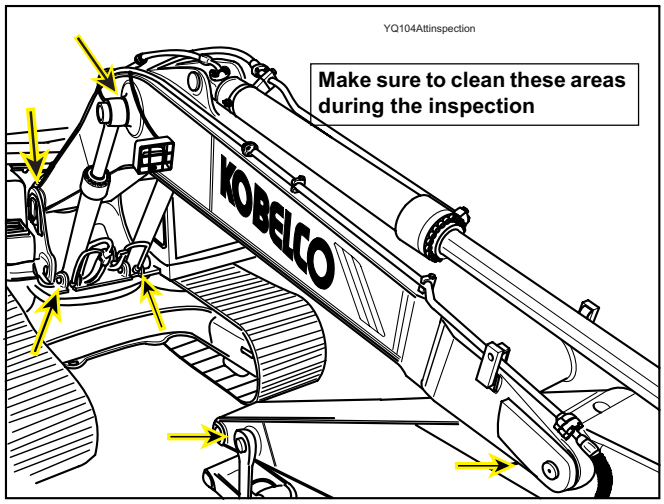


FIGURE 4.20A

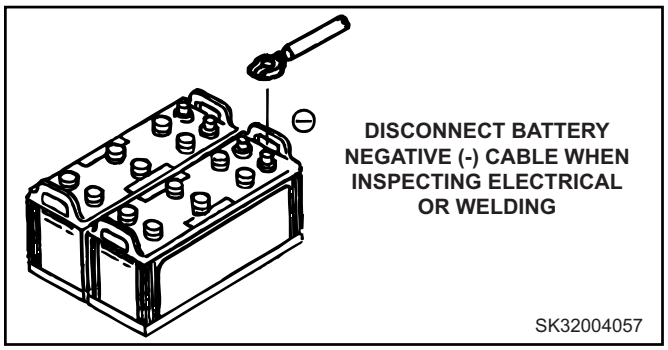


FIGURE 4.20B

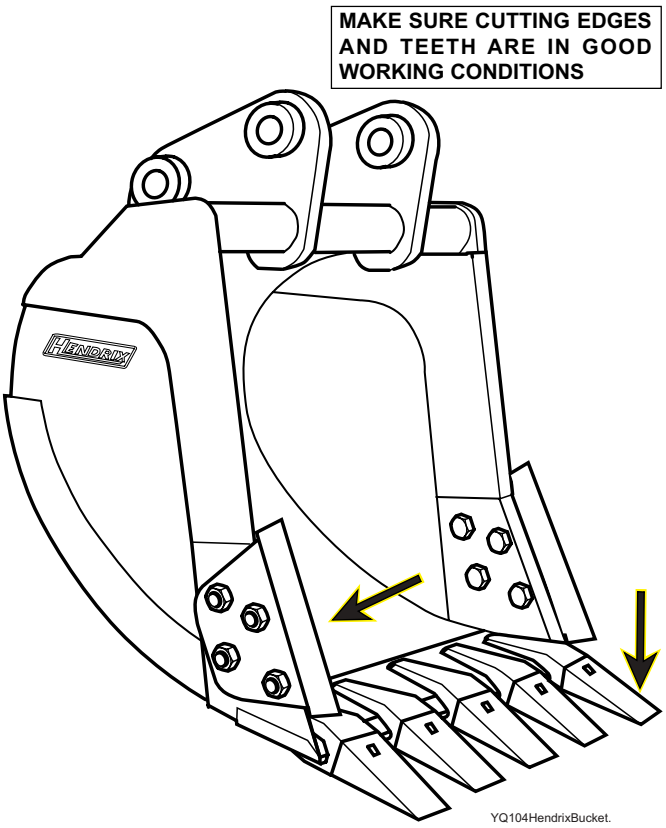


FIGURE 4.20C

https://truckmanualshub.com/

Q. Attachment Lubrication

1. Boom cylinder head pins. See Figure 4.21A.
2. Boom foot pin. See Figure 4.21B.
3. Boom cylinder rod pins. See Figure 4.21B.
4. Arm cylinder head pin. See Figure 4.21B.
5. Arm cylinder rod pin. See Figure 4.21C.
6. Arm to boom pin. See Figure 4.21C.
7. Bucket cylinder head pin. See Figure 4.21C.
8. Bucket link pins. See Figure 4.21D.
9. Idler pink to arm pin and arm to bucket pin. See Figure 4.21D.
10. Bucket cylinder rod pin. See Figure 4.21D.

⚠ WARNING

MOVING THE ATTACHMENT OR MACHINE WHILE GREASING IS NOT RECOMMENDED. PESONAL INJURY MAY RESULT. MOVE THE ATTACHMENT TO A DIFFERENT POSITION, STOP THE ENGINE AND LUBRICATE THE ATTACHMENT AGAIN. REPEAT THIS PROCEDURE UNTIL THE FRONT ATTACHMENT IS COMPLETELY LUBRICATED.

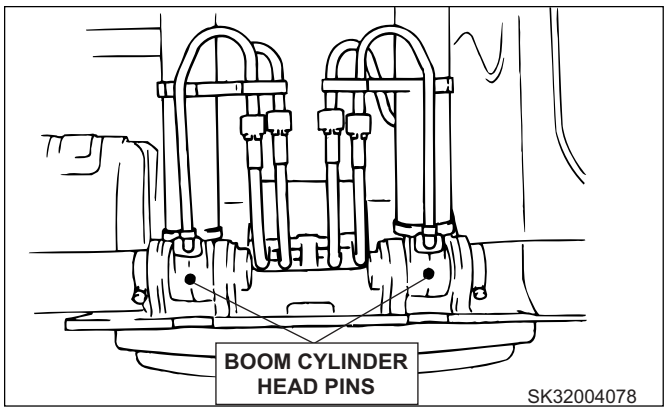


FIGURE 4.21A

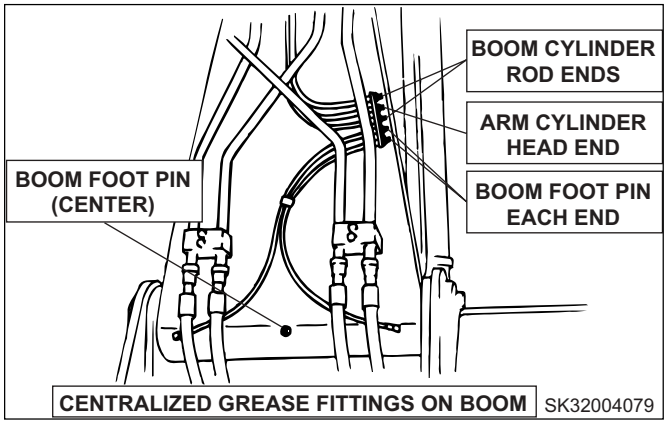


FIGURE 4.21B

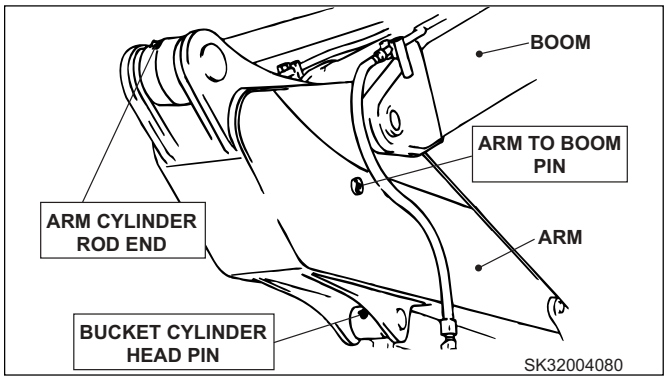


FIGURE 4.21C

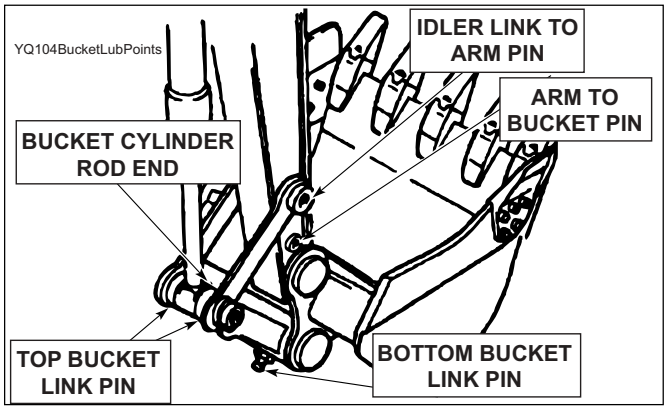


FIGURE 4.21D

https://truckmanualshub.com/

4.6 50 HOUR (WEEKLY) & NEW MACHINE BREAK–IN INSPECTION & MAINTENANCE PROCEDURES.

Change the engine oil and filter on a new machine after the first 50 hours of operation. Then change the engine oil at every 500 hours of operation.

NOTE

One new oil filter is shipped with the machine in the support kit. This is to be used at the 50 hour oil & filter change.

A. Engine Oil and Filter Element

1. Move the machine to a firm, level surface and run engine for 5 minutes to warm the oil.

⚠ WARNING

DO NOT CHANGE OIL ON A MACHINE THAT HAS JUST STOPPED WORKING. THE OIL WILL BE EXTREMELY HOT. ALLOW THE ENGINE TO COOL UNTIL OIL IS JUST WARM BEFORE CHANGING.

NOTE

- Check the waste oil. If there are metal chips or powder mixed in the oil, contact your KOBELCO distributor. Do not reuse the oil filter.

2. Raise the engine cover, lock it open, and remove the oil cap. See Figure 4.22A.
3. Remove bolts and engine lower covers. See Figure 4.22B.
4. Locate the engine oil filter on its right side and place an empty oil container {32 L (8.5 Gal) capacity} under the engine.
5. Remove the oil filter by turning counterclockwise. See Figure 4.22C.
6. To install the oil filter, apply a thin coat of engine oil to the gasket of the new oil filter, fill filter (partially) with engine oil and then secure the filter by tightening 3/4 ~ 1 complete turn (by hand) after the gasket comes in contact with the oil filter head. See Figure 4.22C. {The amount of oil to be added into the filter is approximately 0.8 Liter (0.2 Gal).

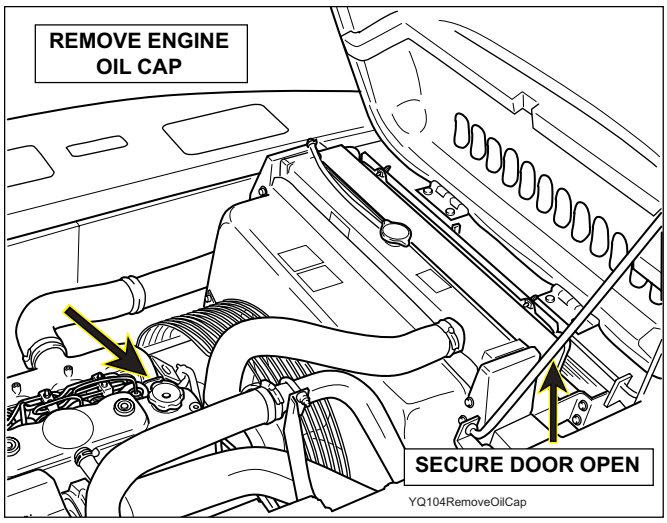


FIGURE 4.22A

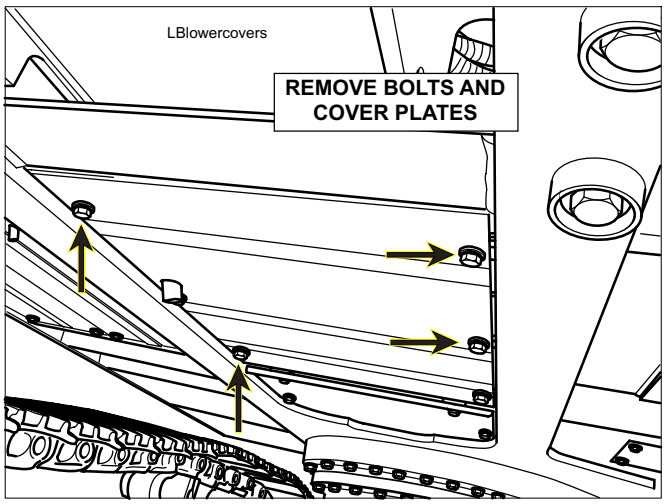


FIGURE 4.22B

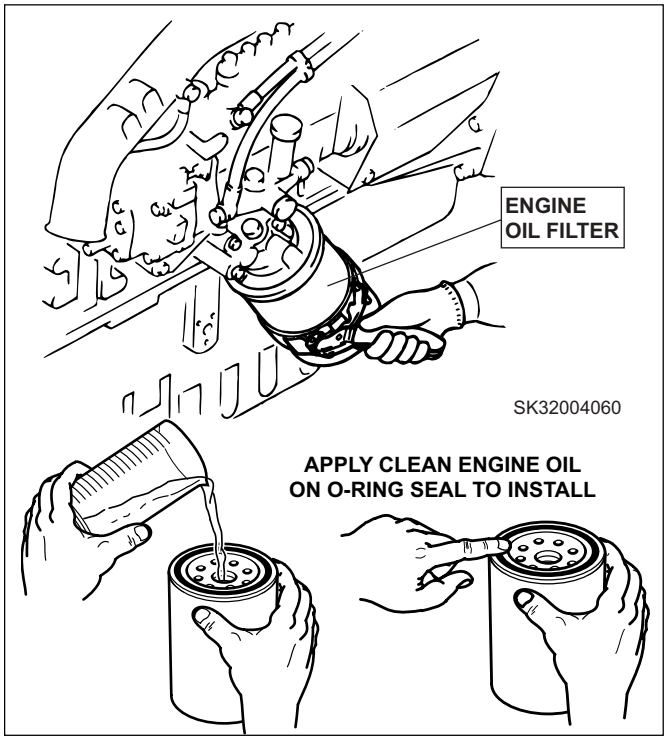


FIGURE 4.22C

https://truckmanualshub.com/

⚠ WARNING

DO NOT CHANGE OIL ON A MACHINE THAT HAS JUST STOPPED WORKING. THE OIL WILL BE EXTREMELY HOT. ALLOW THE ENGINE TO COOL UNTIL OIL IS JUST WARM BEFORE CHANGING.

7. Remove engine oil drain plug and let the engine oil drain out completely. See Figure 4.23A.
8. Clean oil drain plug an install it. Tighten securely.
9. Refer to Specification's Section for the proper oil to use and fill engine oil to proper level.
10. Add oil and install oil filler cap. Clean up all spilled oil, see Fig. 4.23B.
11. Start engine, run for 5 minutes. While running, check for oil leaks.
12. Should any oil leaks be found, stop engine, check for the soruce of leakage, and repair immediately and refill with proper oil.
13. Check Oil Level, see Fig. 4.23B, and close engine cover.
14. Reinstall engine lower covers and tighten bolts to 83.3 N-m (38 Ft-lbs).

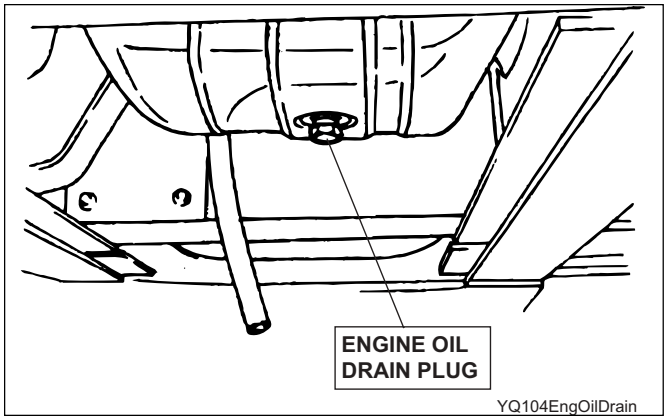


FIGURE 4.23A

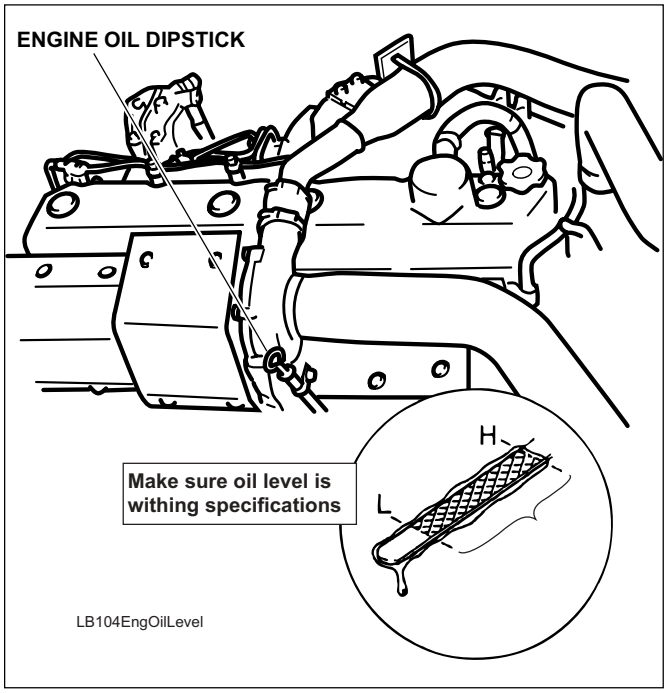


FIGURE 4.23B

⚠ CAUTION

Dispose of all hazadous waste in accordance with government environmental regulations.

B. Water Pump Bearing Lubrication

Lubricate the water pump bearing on a new machine after the first 50 hours of engine operation. Then check and lubricate every 500 hours.

1. Open the engine cover, lock it open, and locate grease fitting for the water pump bearing, in front of the engine. See Figure 4.23C.
2. Wipe all dust and mud off the grease nipple.
3. Use N.L.G.I. Nº 2 (Lithium soap) wheel bearing grease to lubricate the bearing.
4. Close engine cover.

NOTE

Do not over grease the water pump bearing. It only requires about one shot of a manual grease gun, which is equivalent to aprox. 6.1 cc. NEVER USE A PNEUMATIC GREASE GUN.

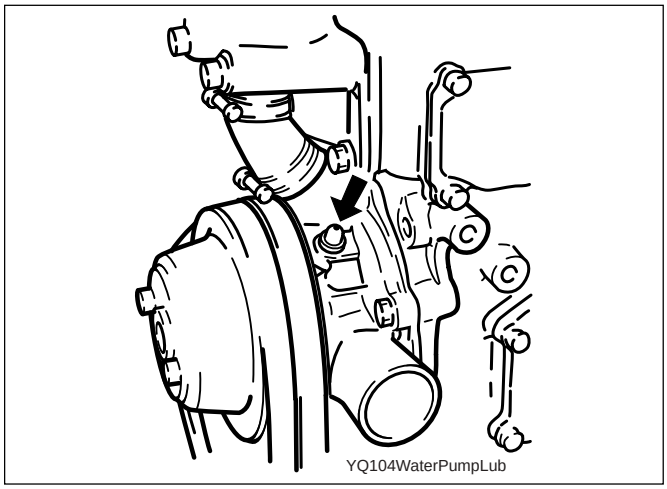


FIGURE 4.23C

https://truckmanualshub.com/

C. Fuel Tank Drain

Drain the fuel tank every 50 hours or weekly. See Figure 4.24A.

1. Place an empty container below the fuel tank drain valve.
2. Locate and open fuel tank drain valve on bottom of fuel tank. See Figure 4.24A.
3. Allow all water and sediment to drain from fuel tank into a waste container, then close the drain valve.

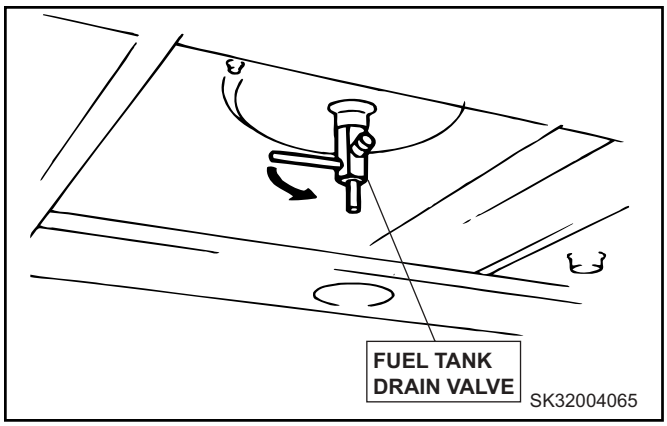


FIGURE 4.24A

D. Water Separator

The water separator isolates water that mixes in with the fuel. The water separator assembly is equipped with a float. When water accumulates, the float rises. Drain the water separator every 50 hours or weekly. See Figure 4.24B.

1. Open the pump compartment door, lock it open, locate the water separator, place an empty container below its drain hose, and loosen the drain plug to drain the water.
2. Close the drain plug when the float comes down to the bottom.
3. Check and make sure fuel is not leaking.

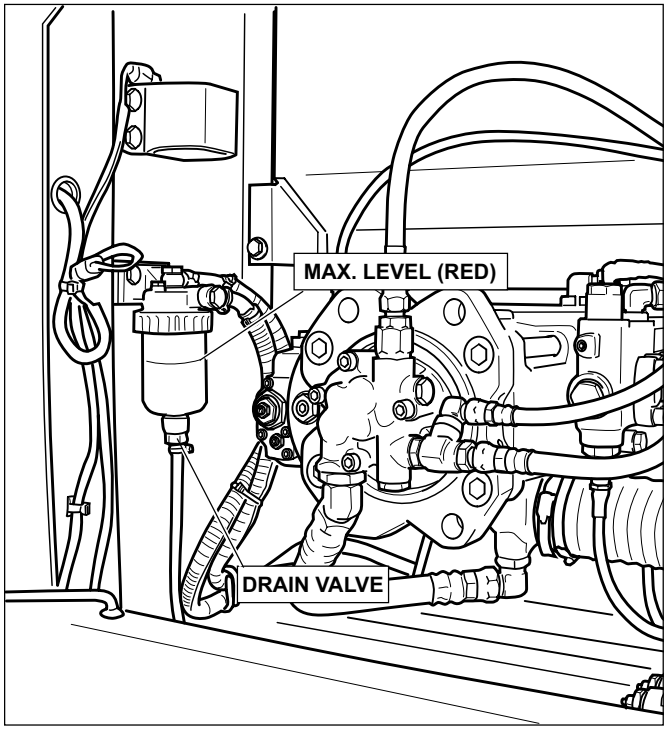


FIGURE 4.24B

NOTE

Clean water separator every 500 hours

Drain water whenever the float rises to the level line, regardless of inspection time.

If air contaminates the fuel system, proceed with instructions for bleeding as described in page 4-27.

⚠ CAUTION

Clean up all spilled fuel to avoid a fire. Dispose of all hazardous waste in accordance with government environmental regulations.

E. Air Intake System

Inspect all hoses and clamps of the air intake system, including turbo charger and intercooler, on a new machine after the first 50 hours of operation. Then at every 500 hours of engine operation.

1. Open the engine cover, lock it open, and inspect all hoses for damage. Tighten all hose clamps. See Figure 4.24C.
2. Replace any damaged hose before allowing any operation of the machine.

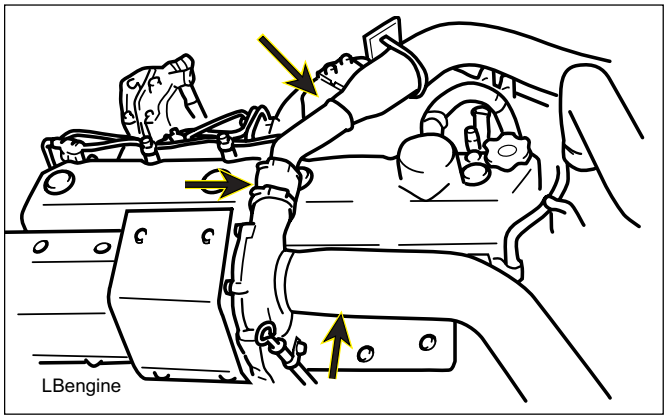


FIGURE 4.24C

https://truckmanualshub.com/

F. Radiator, Oil Cooler & Debris Screen

Clean radiator after every 50 hours of operation using pressurized air.

1. Open radiator compartment door and engine cover to clean the radiator and oil cooler. See Figure 4.25A. Make sure to lock doors open.

NOTE

When working in extremely dusting environments, it is recommended to check the radiator, oil cooler, and A/C condenser at the end of the working shift and clean regardless of working hours.

2. Remove the wing nuts retaining the debris screen. See Figure 4.25B. Carefully remove debris screen and clean with pressurized air .

3. Remove radiator lower access cover from bottom of machine. See Figure 4.25C.

4. Rinse all dirt and debris from engine compartment. Reinstall debris screen and radiator lower access cover.

CAUTION

Be careful not to bend or damage cooling fins of the radiator, A/C condenser, or oil cooler. Replace debris screen if damage is found. Repair damaged cooling fins of radiator, oil cooler, and A/C condenser.

5. Check and make sure all foam seals around radiator and engine compartment are in good condition and in place, seeFig. 4.25D. Repair or replace as needed.

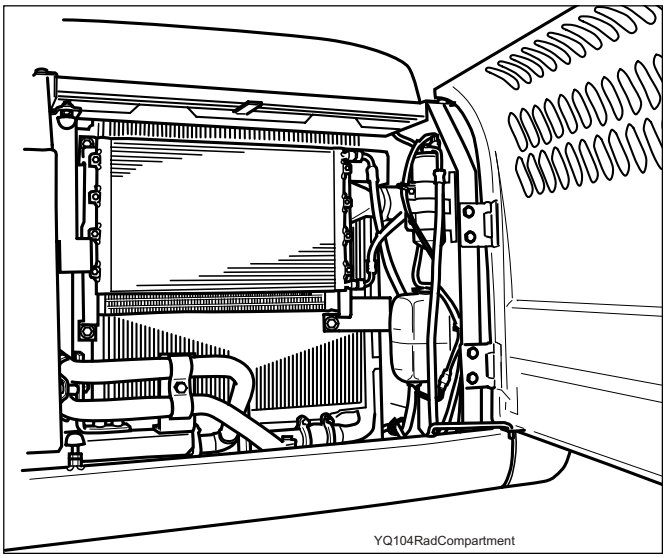


FIGURE 4.25A

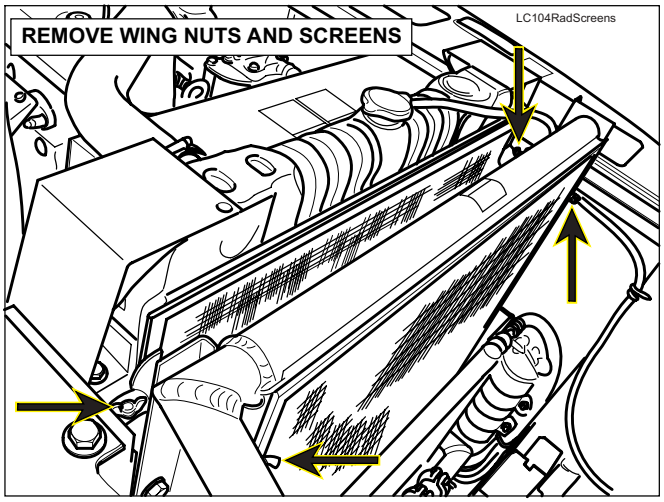


FIGURE 4.25B

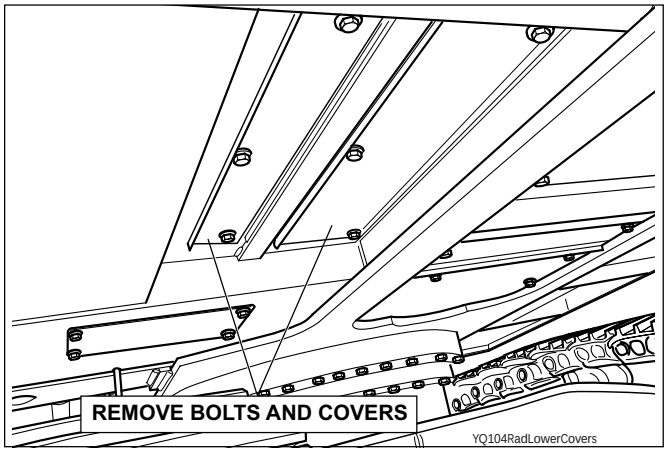
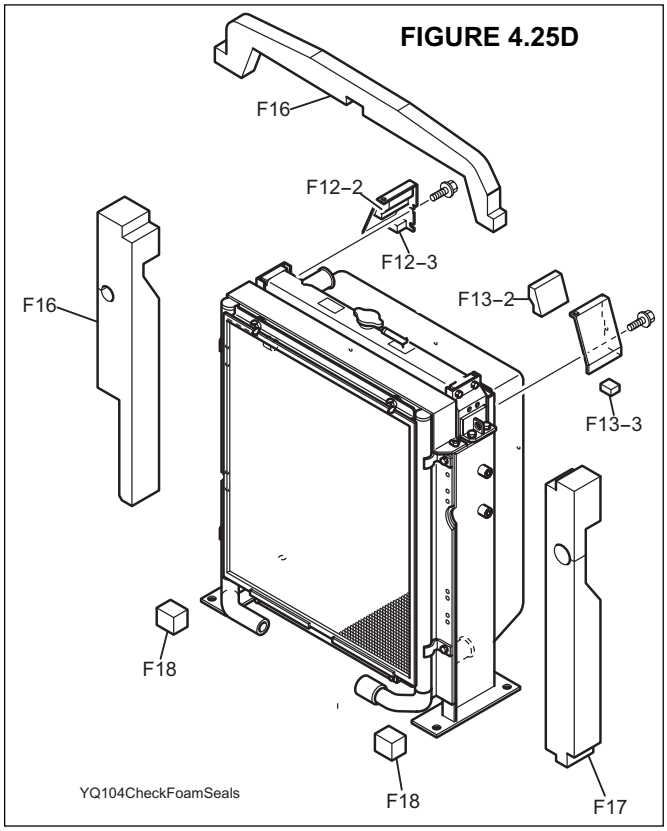


FIGURE 4.25C

FIGURE 4.25D



https://truckmanualshub.com/

G. Fuel Filters

Change the fuel filter and clean the priming pump filter on a new machine after the first 50 hours of operation. Then change the fuel filter and clean the priming pump filter every 500 hours of operation.

NOTE

One new fuel filter is shipped with the machine in the support kit. This is to be used at the 50 hour maintenance.

⚠ WARNING

DO NOT PERFORM MAINTENANCE ON A MACHINE THAT HAS JUST STOPPED WORKING. ALLOW SUFFICIENT TIME FOR THE ENGINE TO COOL BEFORE WORKING ON IT.

1. Replacing Fuel Filter

a. Open engine cover and make sure to lock it open.

b. Locate the fuel filter on engine right side. See Figure 4.26A.

c. Place an empty container below fuel filter.

d. Use a filter wrench and turn counter clockwise to remove the fuel filter. See Figure 4.26B.

e. Make sure to remove O-ring seal from the filter suport mount.

f. With a clean, dry cloth, clean the filter support mount surface.

g. Lubricate the O-ring seal with diesel fuel and install filter by hand (Do not use wrench), and tighten 3/4 to 1 turn after the O-ring seal has made contact with support mount surface.

h. Open air bleed plug on top of filter support housing and use priming to fill filter (See next page for better reference).

2. Cleaning Priming Pump Strainer

a. Remove the eyebolt, which contains gauze filter (strainer) 4. See Fig. 4.26C.

b. Remove the gauze filter and clean it. Replace the gauze filter if damaged. Refer to specification's section for part number.

c. Install gauze filter and eybolt in reverse order and torque the eybolt accordingly.

TORQUE FOR EYEBOLT

•Zexel pump: tightening torque 1.75 Kgf-m (12.7 lbs-ft)

⚠ WARNING

CLEAN UP ALL SPILLED FUEL TO PREVENT FIRES. DISPOSE OF HAZARDOUS WASTE ACCORDING TO ENVIRONMENTAL LAWS AND REGULATIONS.

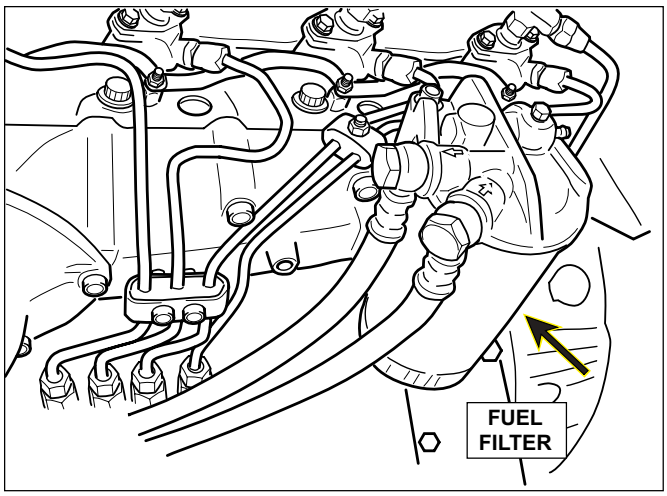


FIGURE 4.26A

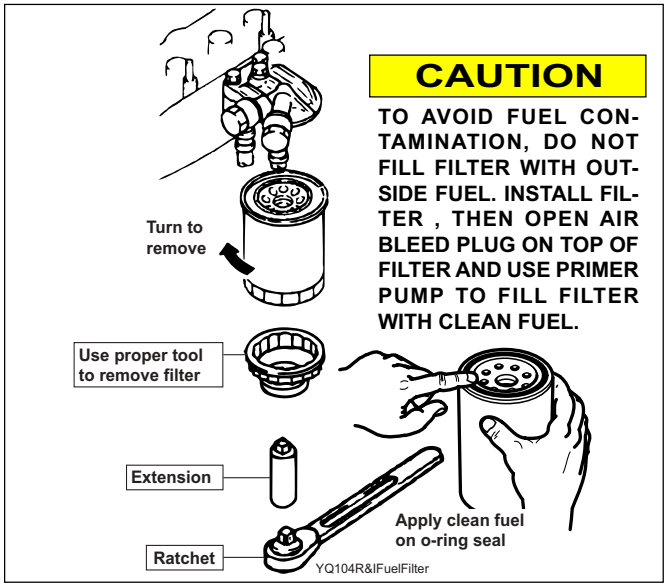


FIGURE 4.26B

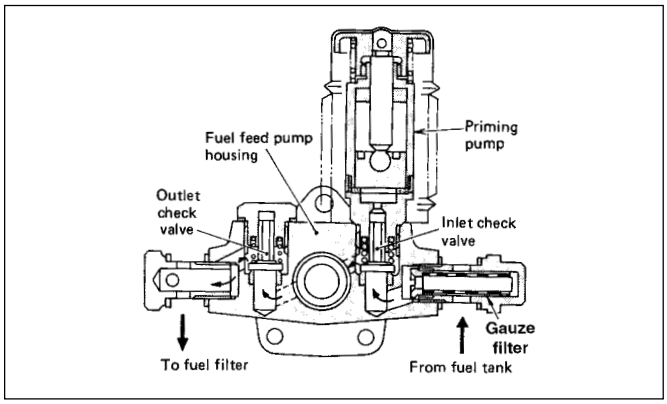


FIGURE 4.26C

https://truckmanualshub.com/

3. Bleeding Air From Fuel System

⚠ WARNING

CLEAN UP ALL SPILLED FUEL TO PREVENT FIRES. DISPOSE OF HAZARDOUS WASTE ACCORDING TO ENVIRONMENTAL LAWS AND REGULATIONS.

If air contaminates the fuel system, the engine may become hard to start or it malfunction. Bleed the air whenever the fuel tank is empty, the water separator is drained, or the fuel filter element is replaced. See Figure 4.27.

a. Loosen the priming pump knob.

b. Loosen the air plug located on top of the fuel filter support mount.

c. Pump by hand to supply fuel until air bubbles stop coming out of the air plug.

NOTE

Use paper towels or rags to contain any fuel spills.

d. Tighten the air plug when no more air bubbles are present.

e. Continue pumping, even after tightening the air plug. Stop pumping with the handle in the lower position and tighten the knob completely.

NOTE

The air in the injection pump will automatically be forced out when the engine starts.

f. Run engine at low idle for 5 minutes to check and make sure there isn't any fuel leakage. Repair if needed.

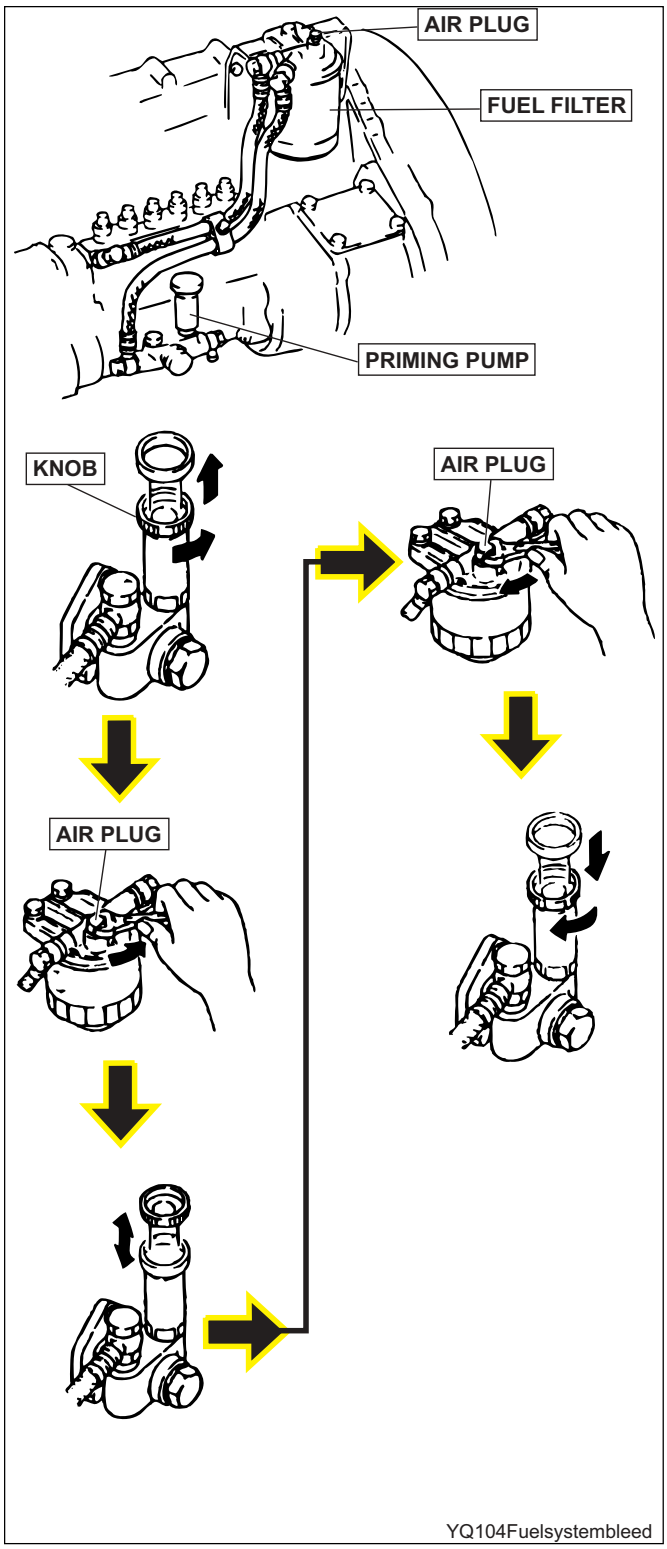


FIGURE 4.27

4

https://tractormanualshub.com/

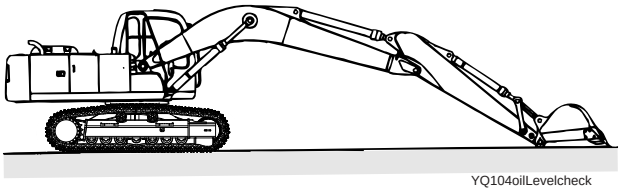
H. Hydraulic Return Filter

Change the hydraulic tank return filter on a new machine after the first 50 hours of engine operation then change every 500 hours.

NOTE

One new hydraulic return filter is shipped with the machine in the support kit. This is to be used at the 50 hours filter change.

Move machine to firm level ground and place attachment in hydraulic oil check position.



4

1. Release hydraulic tank pressure. See Figure 4.28A.

⚠ WARNING

NEVER CHANGE OILS OR FILTERS ON A MACHINE THAT HAS JUST FINISHED WORKING. ALLOW MACHINE TO COOL FIRST UNTIL OILS AND FLUIDS ARE WARM NOT HOT. RELEASE HYDRAULIC TANK PRESSURE BEFORE WORKING WITH ANY HYDRAULIC COMPONENT.

2. Remove the six mounting bolts from the hydraulic return cover plate. See Figure 4.28B.

⚠ CAUTION

Slowly remove the mounting bolts. The filter cover plate is under spring tension.

3. Remove “O”-Rings, filter springs and bypass valves. See Figure 4.28C.
4. Remove the filter from the housing. See Figure 4.28C.
5. Install new filter, bypass valve and spring into housing.
6. Install New “O”-Ring.
   Lubricate “O”-Ring before installing.
7. Install cover plates and torque mounting bolts to proper value. Refer to Specifications Section for torque value.

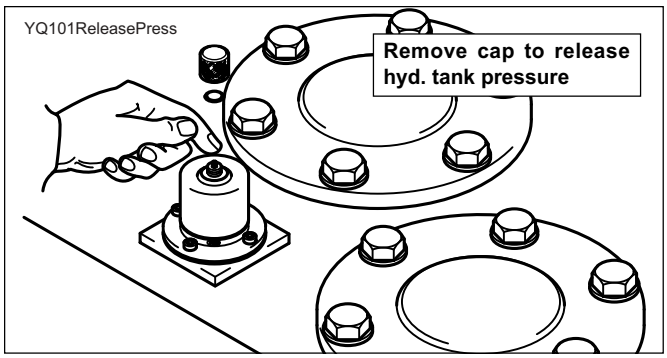


FIGURE 4.28A

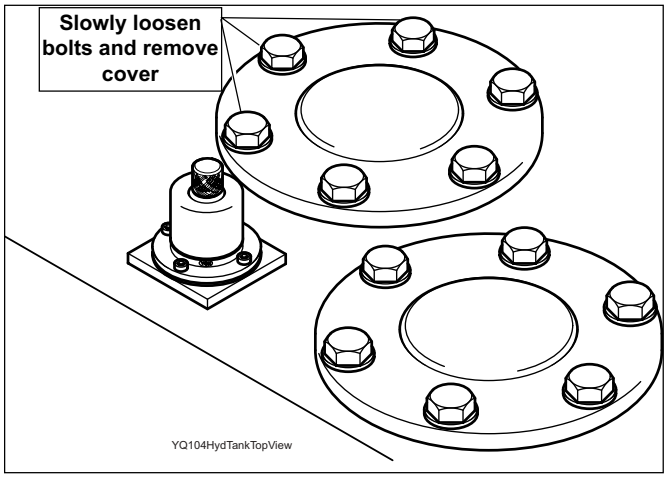


FIGURE 4.28B

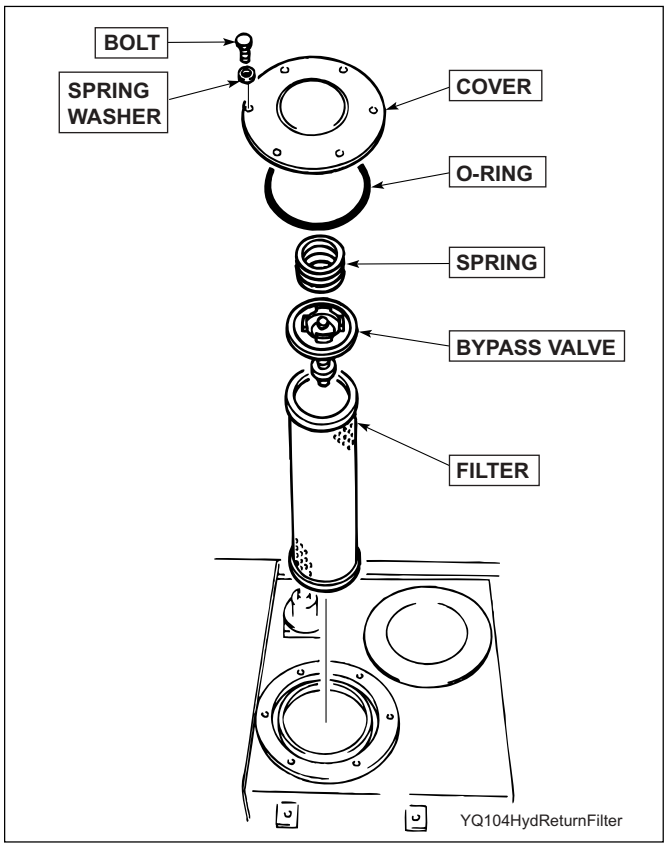


FIGURE 4.28C

https://tractormanualshub.com/

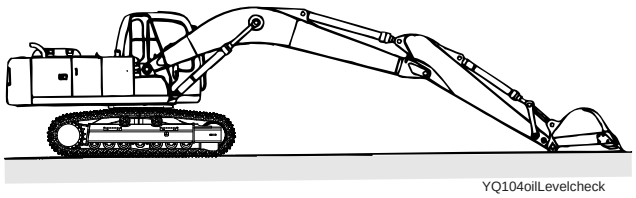
I. Pilot Line Filter

Clean the pilot system filter/screen on a new machine after the first 50 hours of engine operation, then clean it every 500 hours.

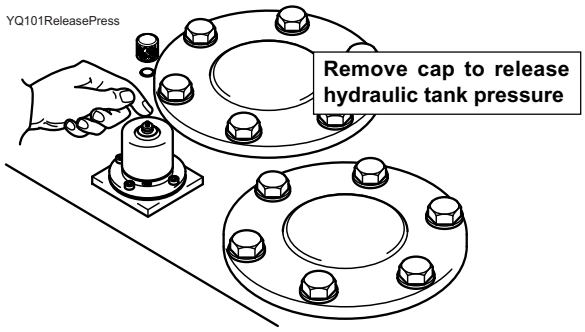
⚠ WARNING

NEVER CHANGE OILS OR FILTERS ON A MACHINE THAT HAS JUST FINISHED WORKING. ALLOW MACHINE TO COOL FIRST UNTIL OILS AND FLUIDS ARE WARM NOT HOT.
RELEASE HYDRAULIC TANK PRESSURE BEFORE WORKING WITH ANY HYDRAULIC COMPONENT.

1. Move the machine to a firm level surface, place the attachment on the ground in the hydrauilic oil check position, and release the tank pressure.



YQ104oilLevelcheck



2. Open the main pump access door, lock it open, and locate the pilot manifold mounted to the side of the hydraulic tank. See Figure 4.29A.

3. Loosen the manifold block case with spanner 24mm(0.94"). See Figure 4.29B.

4. Clean the removed parts and fit new element and O-ring in the case.

5. After the case is installed on the filter base, tighten it with spanner 24mm(0.94").
Tightening torque: 2.5 to 3.5kgf.m(18 to 25ft.lbs)

6. Close & lock the main pump access door.

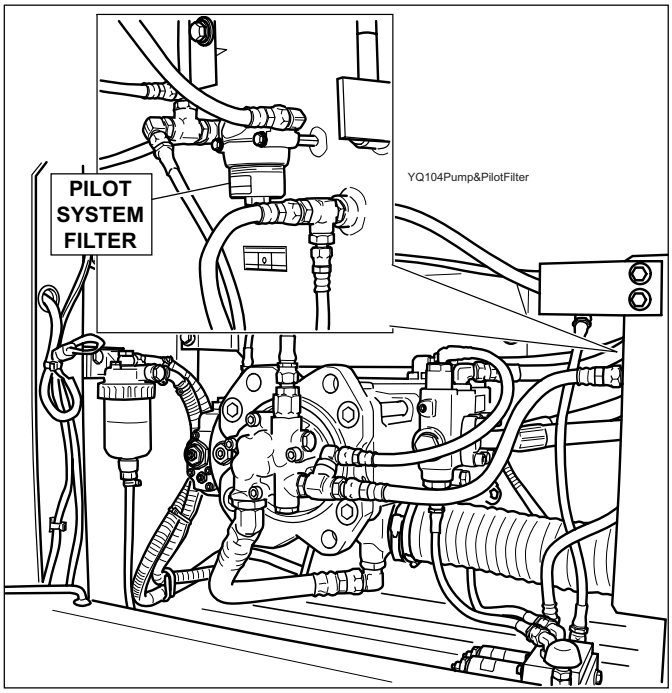


FIGURE 4.29A

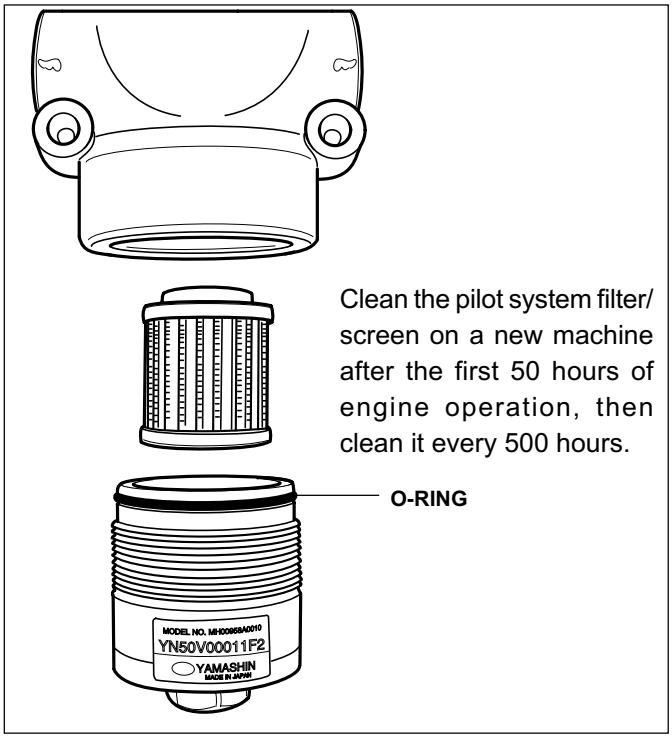


FIGURE 4.29B

NOTE
PILOT LINE FILTER "O-RING" P/N: YN50V01001S005

https://truckmanualshub.com/

J. Batteries

Perform complete battery service on a new machine after the first 50 hours of engine operation. Then, check electrolyte (acid) every 50 hours and perform maintenance every 250 hours.

⚠ WARNING

1. **WEAR SAFETY CLOTHES, GOGGLES OR FACE SHIELD, GLOVES AND SAFETY SHOES WHEN WORKING WITH BATTERIES.**
2. **WORK IN A WELL VENTILATED AREA.**
3. **BATTERY ELECTROLYTE (ACID) IS CORROSIVE. IF IT COMES IN CONTACT WITH SKIN, EYES OR CLOTHING, FLUSH WITH LARGE AMOUNTS OF WATER AND SEEK IMMEDIATE MEDICAL ATTENTION. SEE FIGURE 4.30A.**
4. **BATTERY ELECTROLYTE (ACID) PRODUCES HYDROGEN GAS THAT IS HIGHLY EXPLOSIVE. DO NOT ALLOW NEAR SPARKS, FIRE OR FLAMES AND DO NOT SMOKE WHEN WORKING WITH BATTERIES. SEE FIGURE 4.30A.**

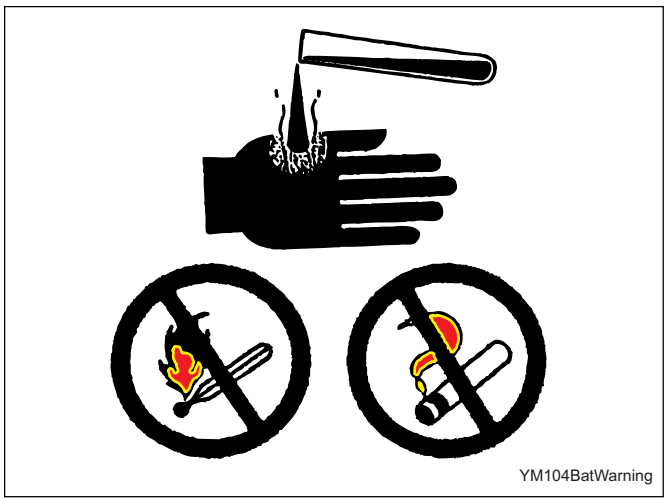


FIGURE 4.30A

1. Open the battery access door. See Figure 4.30B.
2. Remove battery cell caps and visually inspect electrolyte (acid) level. Proper level is 10~15 mm (0.4” ~ 0.6”) above cell plates. See Figure 4.30C.
3. If necessary, fill each cell to proper level with **DISTILLED WATER ONLY.**
4. Remove cables from terminals and clean with hot water. Coat each terminal with a thin layer of petroleum jelly. Clean cables in the same manner and reinstall onto battery.
5. If cables are found to be in poor condition, replace with new parts immediately.

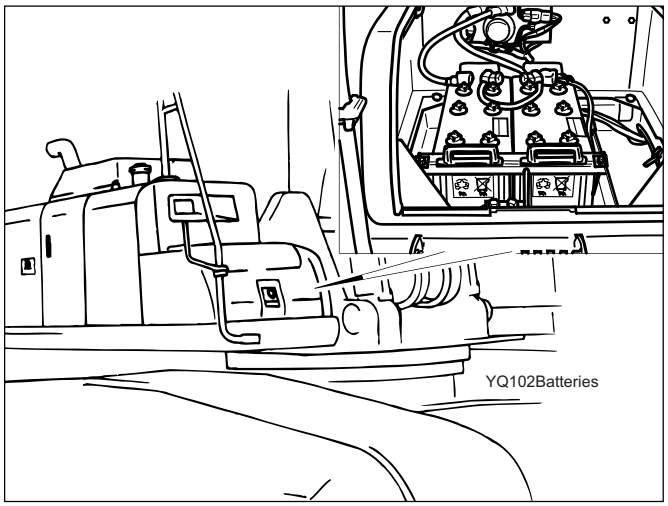


FIGURE 4.30B

⚠ WARNING

PREVENT BATTERY EXPLOSION

- **Batteries give off hydrogen gasses that can explode and cause personal injury.**
- **Keep sparks, open flames and cigarettes away from batteries.**
- **Keep metallic articles away from batteries.**
- **Keep all ventilation caps tightly secured.**
- **Never check charge by placing metal articles across battery terminals.**
- **Leave battery box open to improve ventilation when charging.**

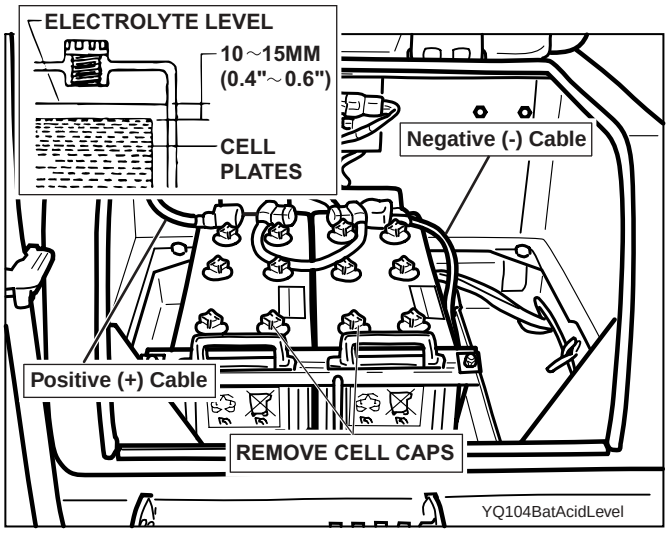


FIGURE 4.30C

https://truckmanualshub.com/

6. Use a hydrometer to check the specific gravity of each cell. Compare readings to the chart below.

NOTE

Use hydrometer according to its manufacturer's instructions.

CHARGE %	ATMOSPHERIC TEMPERATURE		
	20°C (68°F)	0°C (32°F)	–10°C (14°F)
100%	**1.26**	**1.27**	**1.28**
90%	**1.24**	**1.25**	**1.26**
80%	**1.22**	**1.23**	**1.24**
75%	**1.21**	**1.22**	**1.23**

7. When disconnecting batteries, remove the negative(–) cable first. When connecting batteries, connect the negative(–) cable last. See Figure 4.31A.
8. When the battery requires charging;
   - **a.** Disconnect battery cables from terminals.
   - **b.** Remove all cell caps.
   - **c.** Check for proper electrolyte (acid) level.
   - **d.** Connect charger leads to the proper battery terminals.

Make certain not to cross Positive and Negative terminals when connecting charger.

   - **e.** Stop charge if battery overheats.
   - **f.** Periodically check the specific gravity of the batteries with a hydrometer. Stop charging batteries when 100% charged.

NOTE

Battery life can be shortened by over charging and over discharging of the battery. Replace any battery that will not hold charge or is difficult to charge.

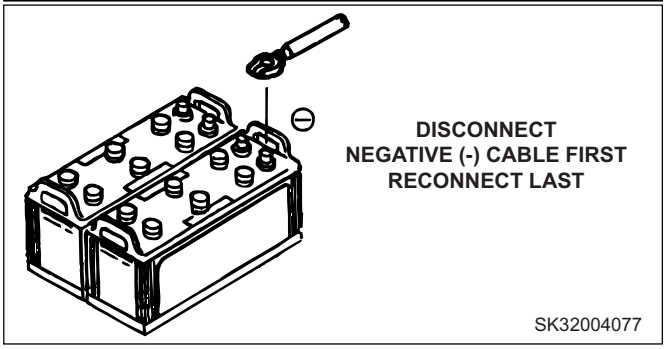


FIGURE 4.31A

K. Fan and A/C Belt Wear and Tension

Inspect belt wear and tension on a new machine after the first 50 hours of operation. Then at every 250 hours of engine operation.

Measure belt tension on longest span of belt. Apply a 10 kgf (22 lbf) on the belts as indicated in Figure 4.31B, and measure the belt deflection. Compare to the following table:

BELT	DEFLECTION
FAN BELT	**10 mm ~ 15 mm (0.4"~ 0.6")**
AIR CONDITIONER	**7 mm ~ 10 mm (0.3"~ 0.4")**

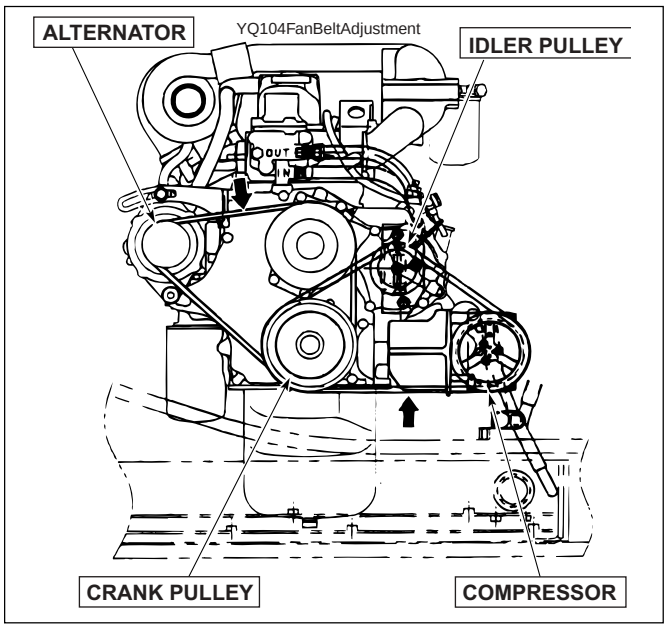


FIGURE 4.31B

Should the fan and/or AC compressor belts need adjustment, please refer to detailed instructions in 250 hour maintenance, item A, in this section.

NOTE

Be very careful when moving the alternator. Do not damage the stator coil section located beween the alternator's front and rear housing.

4

https://truckmanualshub.com/

L. Slewing Ring and Swing Bearing Lubrication

1. Slewing Ring

Check the grease level and condition of the slewing ring gear grease bath on a new machine after the first 50 hours of engine operation. Then check every 120 hours. Replace the grease in the slewing ring gear bath every 2,000 hours (See 2,000 hour maintenance in this section for details)

a. Locate the slewing ring grease inspection cover (SK290LC/SK330LC-6E through the battery compartment. See Figure 4.32A).

b. Remove bolts and rectangular cover plate to locate the grease bath inspection plate. See Figure 4.32A.

c. Remove grease bath cover. Start the engine and slowly rotate the upper structure to inspect the slewing gear. Should you need to drain water from the grease bath, remove drain plate from the bottom of the center opening of the lower frame, see Figure 4.32B.

d. Should any grease be needed, add N.L.G.I. Nº 2 Lithium base with MOS_2 grease only.

CAUTION

DO NOT OVERFILL SUMP BATH. IF OVERFILLED, SUMP BATH GREASE COULD BE PUMPED INTO SWING MOTOR REDUCTION UNIT AND CAUSE SEVERE DAMAGE. USE ONLY N.L.G.I. LITHIUM BASE WITH MOS2 GREASE IN SLEWING RING GEAR SUMP BATH.
IF THE SLEWING RING EVER BECOMES SUBMERGED IN WATER, IT IS MANDATORY THAT THE SUMP BATH GREASE BE CHANGED. REFER TO 2,000 HOUR MAINTENANCE FOR SPECIFIC INSTRUCTIONS.

2. Swing Bearing Lubrication

Lubricate the swing bearing on a new machine after the first 50 hours of engine operation. Then lubricate every 500 hours, or as conditions dictate.

a. Locate the grease fitting at the front of the swing bearing. See Figure 4.32C.

b. Using a grease gun filled with general purpose EP Grease, lubricate swing bearing with several shots from grease gun.

c. Swing machine 90° right, and repeat step 2. See label on frame.

d. Continue to swing machine at 90° increments and lubricating swing bearing until ring has been completely greased.

SK290LC/SK330LC-6E

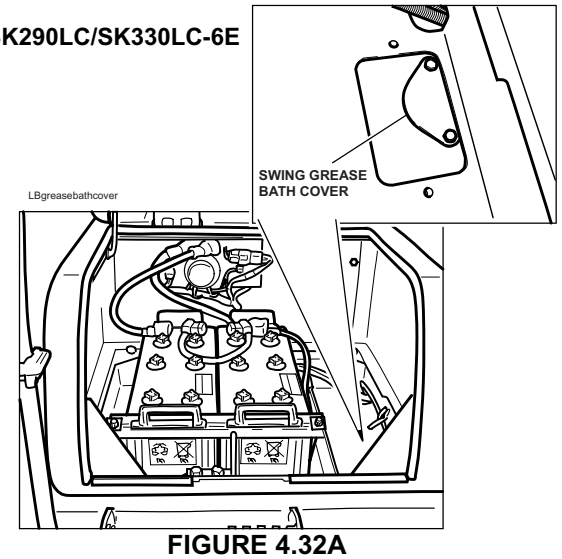


FIGURE 4.32A

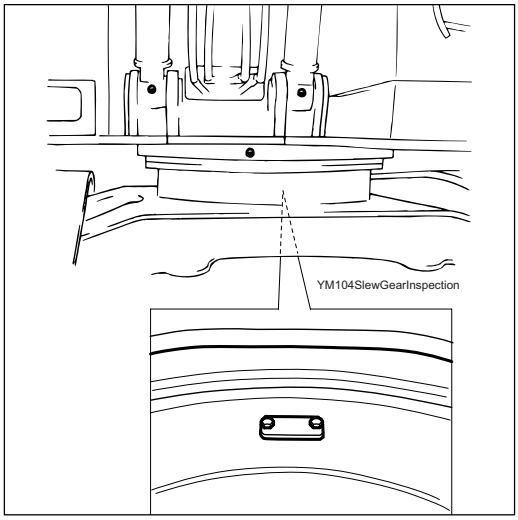


FIGURE 4.32B

NOTE

Make sure to inspect the Upper and Lower Side of Swivel Valve for leakage. Repair any leakage as needed.

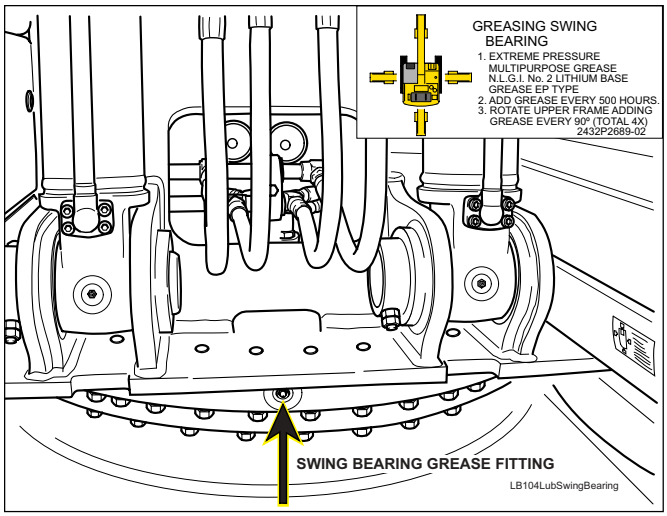


FIGURE 4.32C

https://truckmanualshub.com/

e. Check and make sure the swing bearing seal is in good condition. It is normal to see the excessive grease come out of the seal. See Figure 4.33A.

M. Checking Slewing Ring Attaching Bolts For Proper Torque

Check the slewing ring bolts torque on a new machine after the first 50 hours of engine operation. Then check every 500 hours. Check the slewing ring bolts for proper torque across each other and in sequence, see Figure 4.33A. If bolts are loose, remove one bolt at the time, clean it and apply locktite #262 and torque accordingly. See Specification's Section for torque reference.

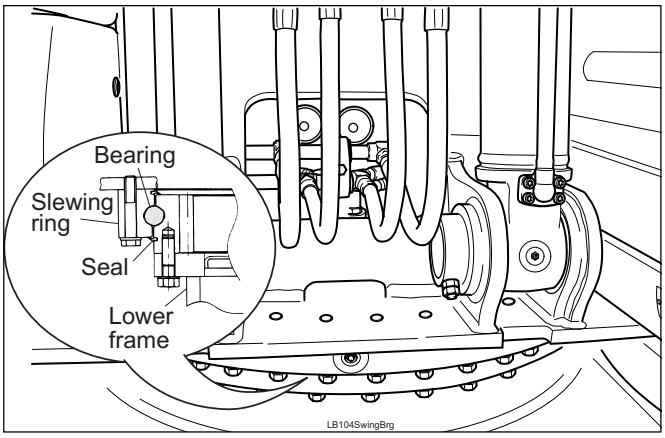


FIGURE 4.33A

N. Check Swivel Valve for Leakage

Check the swivel valve for leakage, see Fig. 4.33B, on a new machine after the first 50 hours of engine operation and then every 500 hours of operation. If needed, contact your Kobelco representative's service department.

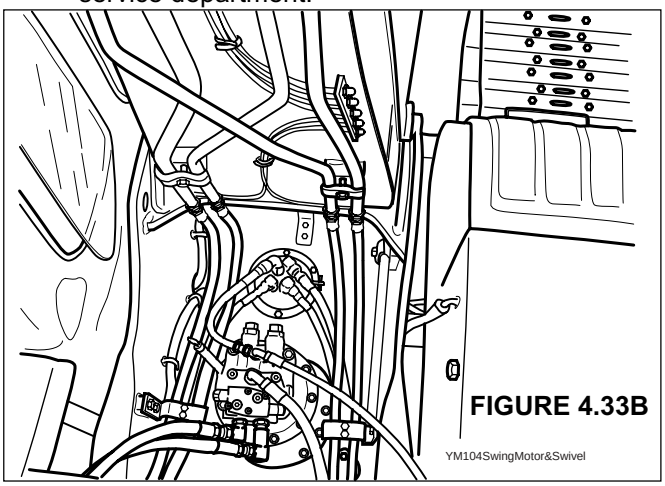


FIGURE 4.33B

O. Oil level in Swing and Travel Reduction Units

Check the oil level on swing motor reduction unit and travel reduction units on a new machine after the first 50 hours of engine operation, see Fig. 4.33C. Then check every 120 hours. See detailed instructions in 120 hour maintenance in this section (items B, C, and D).

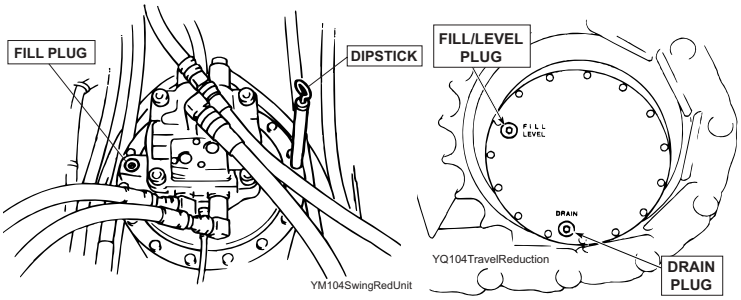


FIGURE 4.33C

P. Inspecting Counterweight Attaching Bolts for Proper Torque

Check bolts and nuts for proper torque. See Figure 4.33B.

CAUTION

Striking counterweight against obstruction may cause loosening of bolts. Check bolts for loosening after 50 hours the first time, and every 250 hours after that.

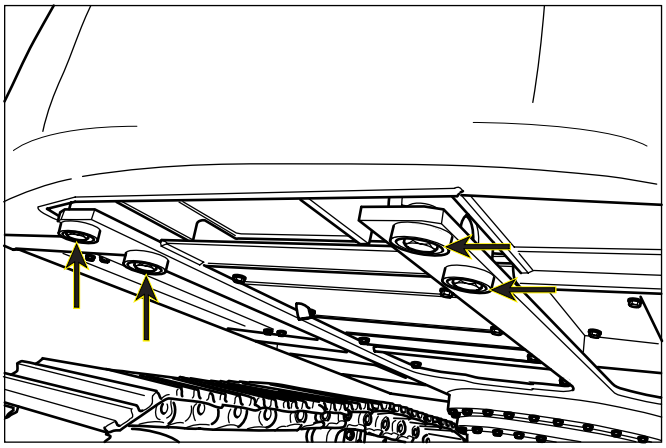


FIGURE 4.33D

NOTE

If a counterweight bolt is found loose, remove it, clean threads, apply loctite # 242 before installing it. See Specification's Section for torque reference.

4

https://truckmanualshub.com/

⚠ WARNING

WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE.

4.7 120 HOUR INSPECTION & MAINTENANCE PROCEDURES.

A. Control Lever Joint Lubrication

Remove the rubber boots from control levers and lubricate the universal joint (1) and the top of the sliding area (2) every 120 hours. See Figure 4.34A.

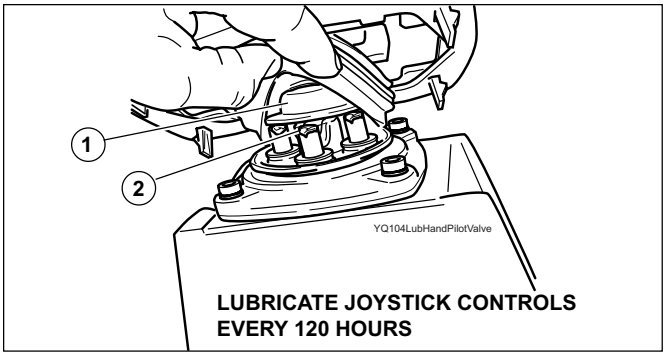


FIGURE 4.34A

B. Swing Motor Reduction Oil

Check the oil level of the swing motor reduction unit on a new machine after the first 50 hours of engine operation. Then check every 120 hours.

1. Locate the dipstick on the side of the swing motor. See Figure 4.34B. Pull dipstick, wipe clean and reinsert all the way in.
2. Pull dipstick and read oil level.
3. If necessary to add oil, remove plug from oil fill port and fill to full level with proper oil. See Figure 4.34B and refer to spec's section for oil specifications.
4. Check and make sure the vent hole on dipstick is clean. See Figure 4.34C.

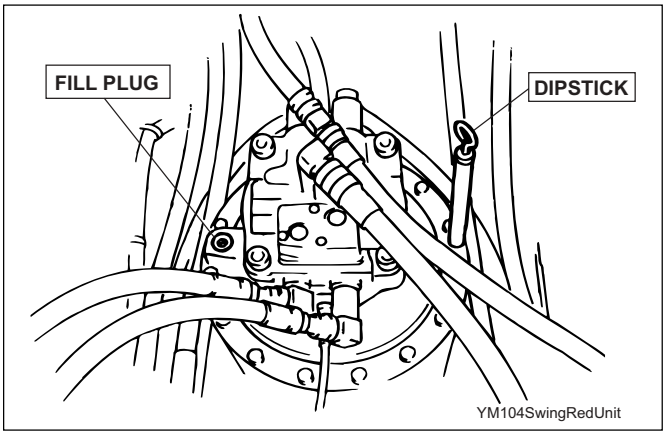


FIGURE 4.34B

⚠ CAUTION

Reduction unit may be under pressure.
Remove plug slowly.

5. To drain any excess oil from swing motor reduction Unit:
   a. Locate drain port under the center opening of the lower frame. See Figure 4.34D.
   b. Place an empty container under drain port and remove plug allowing excess oil to drain into container.

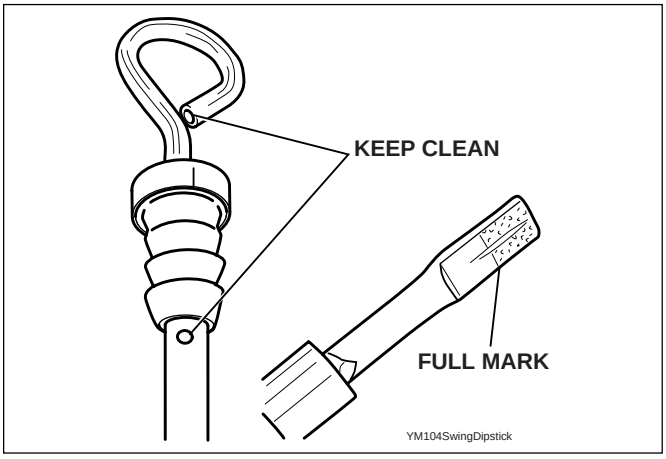


FIGURE 4.34C

NOTE

See Specification's Section for proper capacities and oil specification.

   c. Replace plug and tighten securely after all oil is drained.
   d. Fill through fill port using proper oil. See Figure 4.34B.
   e. Recheck oil level and make sure it is within specifications.

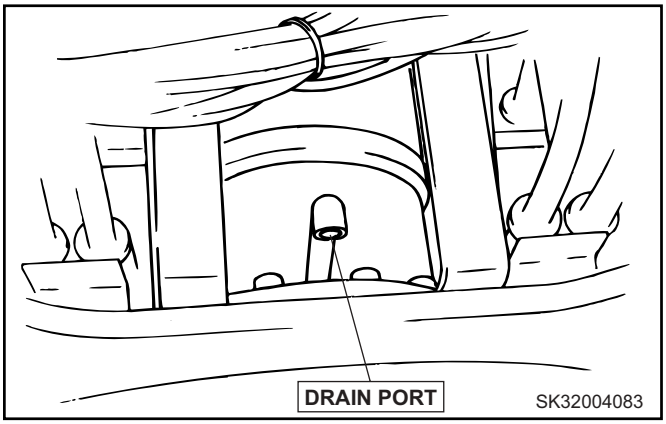


FIGURE 4.34D

⚠ WARNING

NEVER PERFORM MAINTENANCE ON A MACHINE THAT HAS JUST FINISHED WORKING. ALLOW SUFFICIENT TIME FOR MACHINE TO COOL DOWN.

https://truckmanualshub.com/

C. Travel Motors Reduction Oil

Inspect oil level of travel motor reduction unit on a new machine after the first 50 hours of engine operation. Then check every 120 hours.

1. Move machine to a firm, level surface. Operate travel until “DRAIN” plug is positioned at 6:00 o’clock. See Figure 4.35A.
2. Stop engine and remove the travel motor reduction unit oil level plug. See Figure 4.35B. If oil just seeps from the port, oil level is correct.

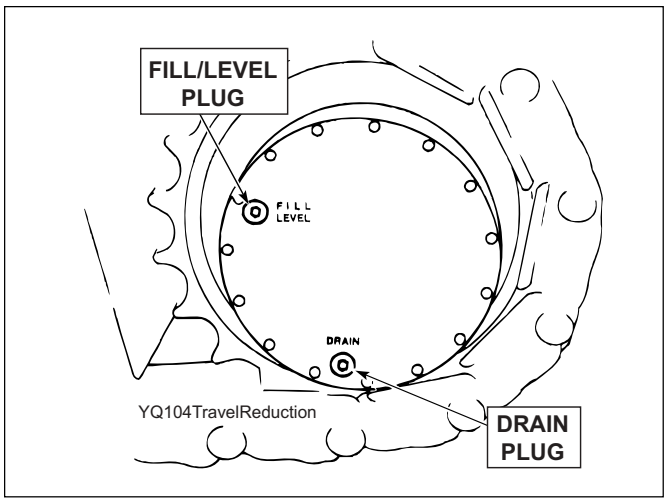


FIGURE 4.35A

⚠ CAUTION

Reduction unit may be under pressure. Remove plug slowly.

3. To add oil, remove the oil FILL plug and add Oil until it just begins to flow out from the orifice.
4. Use teflon tape on the plug for better sealing. Install plug and tighten securely.

NOTE

See Specification’s Section for proper capacities and oil specification.

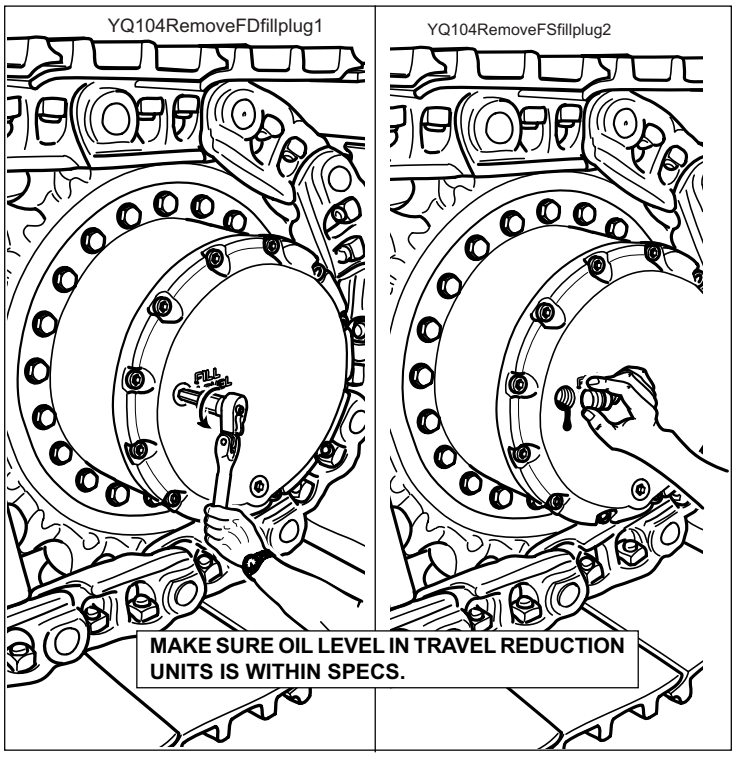


FIGURE 4.35B

⚠ CAUTION

Clean up all spilled oil. Dispose of all hazardous waste in accordance with government environmental regulations.

NOTE

To replace oil in travel motors, please refer to 500 hour maintenance in this section.

https://truckmanualshub.com/

4.8 250 HOUR (3-MONTH) INSPECTION & MAINTENANCE PROCEDURES.

NOTE

Perform all pre-start (every 8-Hour and 50-Hour) inspection & maintenance procedures along with the 120 Hour inspection and maintenance procedures.

A. Fan and A/C Belt Wear and Tension

Inspect belts and tensioner assembly on a new machine after the first 50 hours of operation. Then at every 250 hours of engine operation.

Measure belt tension on longest span of belt. Apply a 10 kgf (22 lbf) on the belts as indicated in Figure 4.36A and measure the belt deflection. Compare to the following table:

BELT	DEFLECTION
FAN BELT	10 mm ~ 15 mm (0.4"~ 0.6")
AIR CONDITIONER	7 mm ~ 10 mm (0.3"~ 0.4")

1. Fan Belts

Check fan belts for excessive wear and cracks and replace them if needed. ***When replacing a twin type V-belt, replace them both.*** If only one belt is replaced, it may fail due to the excessive loading. To adjust the fan belts, proceed as follows:

a. Loosen mounting cap screw and adjusting nut on the alternator. See Figure 4.36B.

b. Loosen or tighten adjusting bolt to adjust fan belt to the specified tension, and tighten mounting nut and adjusting nut properly. See Figure 4.36B.

TIGHTENING TORQUES

Mounting cap screw: 8.4 ±1.0 Kgf-m (61 ±7 lbs-ft)

Adjusting nut: 7.7 ±1.5 Kgf-m (56 ±11 lbs-ft)

c. After adjustment, start engine and run it at low idle for about 5 minutes. Then recheck belt tension.

2. Air Conditioning Compressor Belt

Check belt for excessive wear and cracks and replace if needed. To adjust the AC compressor belt, proceed as follows:

a. Loosen the idler pulley nut. See Figure 4.36C.

b. Loosen or tighten adjusting bolt.

c. Tighten idler pulley nut to 4.0 ~ 5.5 Kgf-m (29 ~ 40 lb-ft)

d. After adjustment, start engine and run it at low idle for about 5 minutes with AC turned on. Then recheck belt tension.

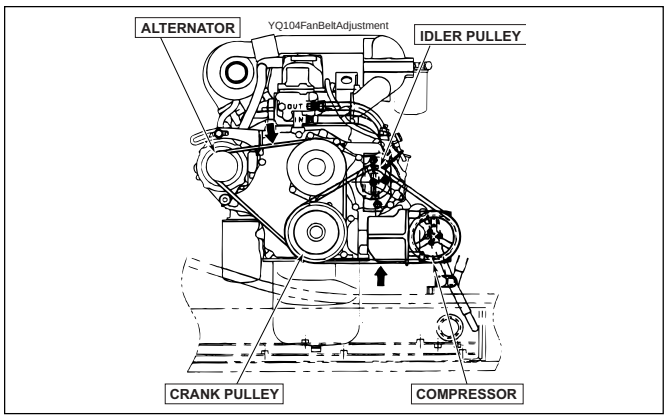


FIGURE 4.36A

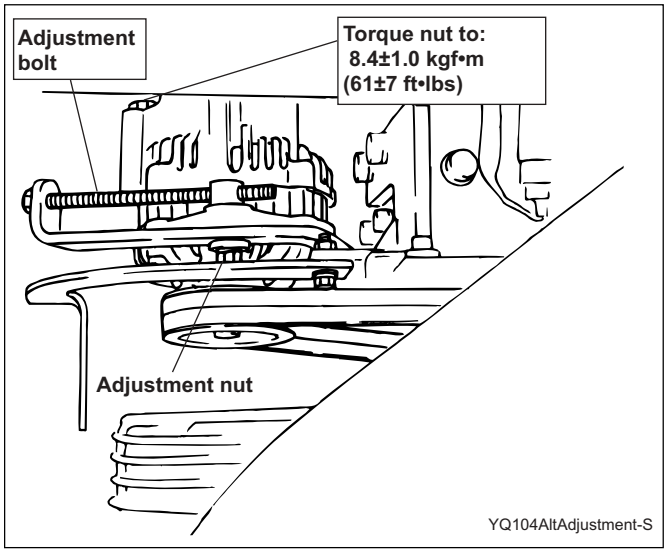


FIGURE 4.36B

NOTE

Be very careful when moving the alternator. Do not damage the stator coil section located beween the alternator's front and rear housing.

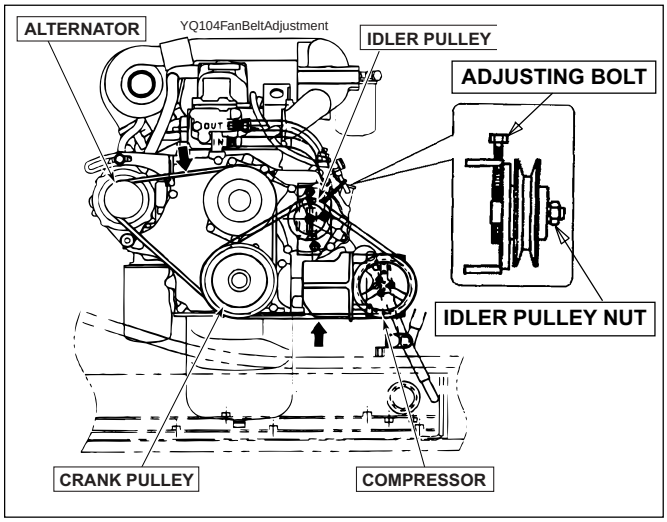


FIGURE 4.36C

https://truckmanualshub.com/

B. Climatizer — AC Unit Filter Inspection

Inspect the fresh air filter every 250 hours of engine operation and the recirculate air filter every 500 hours of engine operation.

NOTES

• If the working environment is extremely dusty, it is recommended to reduce the inspection schedule to at least half of the above specified working hours.

• The fresh air filter is a paper filter. DO NOT WASH. Clean with air only. Do not clean more than 10 times, or replace it every 2 years.

• Clean the recirculate air filter with compressed air or by washing and rinsing.

• Do not wash recirculate air filter with any organic solvent, such as: gasoline, trichlene, thinner, etc.

Removing the climitizer-AC unit filters:

1. Fresh Air Filter

a. Move the seat back forward for easy access to the rear panel.

b. Remove the 4 top screws from the rear panel top cover (behind the operator's seat), see Figure 4.37A, and press the lower locks to release cover and remove it. Tilt the cover towards the seat to obtain access to the fresh filter. See Figure 4.37B.

c. Remove the fresh air filter for inspection and cleaning, or replacement. See Figure 4.37B.

d. After cleaning or replacement, use this procedure in reverse for assembling.

2. Recirculate Air Filter

a. Repeat above steps a, and b.

b. Pull out the speaker wires and carefully remove the top cover from the cab.

c. Press the locks on the lower cover to release it and remove it to obtain access to the recirculate air filter. See Figure 4.37A.

d. Raise recirculate air filter slightly and pull it out for inspection and cleaning, or replacement. See Figure 4.37C.

e. After cleaning or replacement, use this procedure in reverse for assembling.

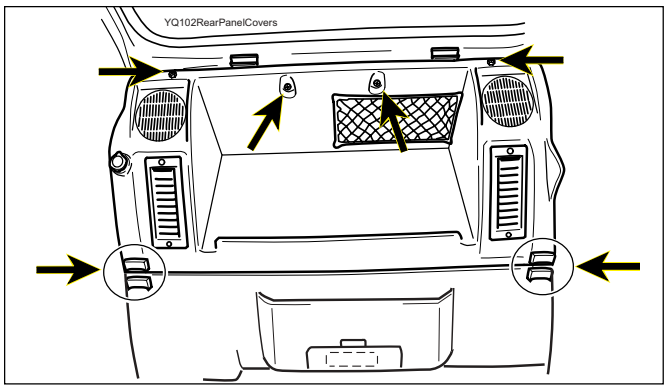


FIGURE 4.37A

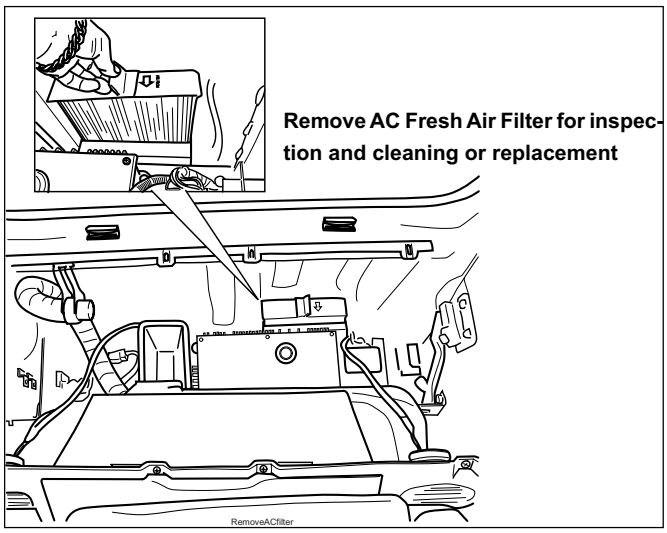


FIGURE 4.37B

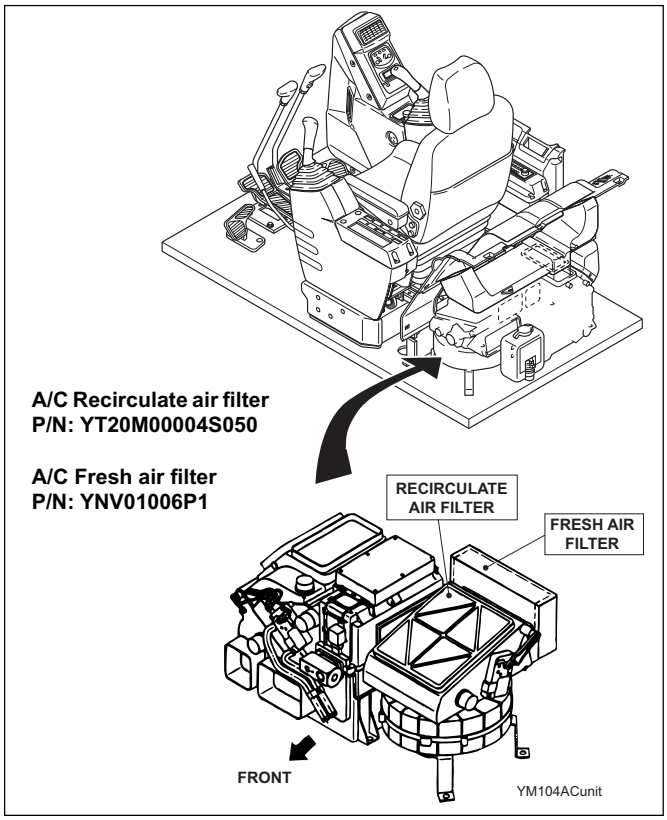


FIGURE 4.37C

https://truckmanualshub.com/

C. Checking the Radiator Cap & Hoses

Inspect the radiator cap and hoses every 250 hours of engine operation.

1. Raise the engine cover and make sure to lock it open. See Figure 4.38A.
2. Check the hoses for coolant leakage due to loose clamps, or cracked and worn hoses.
3. Tighten any loose clamps.
4. Should you need to replace any cracked or worn hoses, proceed as follows:

⚠ WARNING

USE EXTREME CAUTION WHEN REMOVING THE RADIATOR CAP. THE COOLANT IS UNDER HIGH PRESSURE WHEN HOT. NEVER REMOVE THE RADIATOR CAP WHEN THE SYSTEM IS HOT. ALLOW SUFFICIENT TIME FOR MACHINE TO COOL DOWN.

4

a. Place a rag or paper towel on the radiator cap and slowly remove it to release the pressure. See Figure 4.38A.
b. Locate the radiator lower cover, remove bolts and cover to obtain access to the radiator drain hose and lower hose. See Figure 4.38B
c. Place an empty clean container under the radiator drain hose. Do not contaminate coolant mixture drained, since it can be reused.

NOTE

Refer to Specification's Section for proper engine coolant and capacity.

d. Turn drain valve counter clockwise to drain coolant. See Figure 4.38B.
e. Loosen the hose clamp and remove radiator hose.
f. Make sure to clean the areas where the new hose will be connected.
g. Remove the clamps from the old hose and install them on the new hose.
h. Coat the inside ends of the new radiator hose with grease and install it. Tighten clamps properly.
i. Fill radiator with the coolant drained in step c.
j. Install radiator cap, start engine, and bring engine temperature to about 90 ºC (194 ºF).
k. Run engine at low idle, check for leakages and repair as needed.
l. Install radiator lower cover and close engine cover.

5. Inspect radiator cap for proper operation and replace if needed.

⚠ WARNING

WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHS AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE.

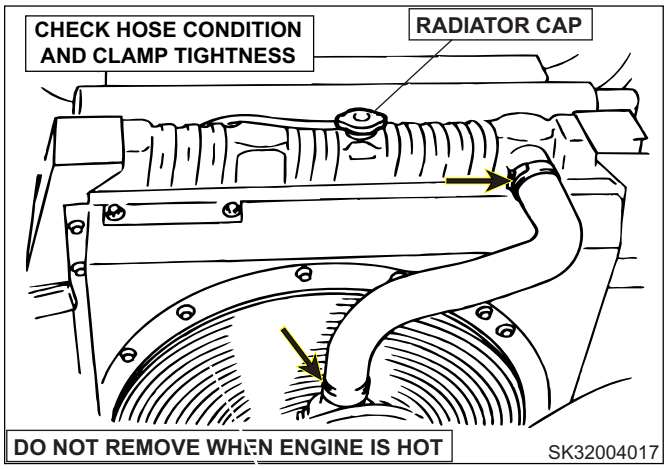


FIGURE 4.38A

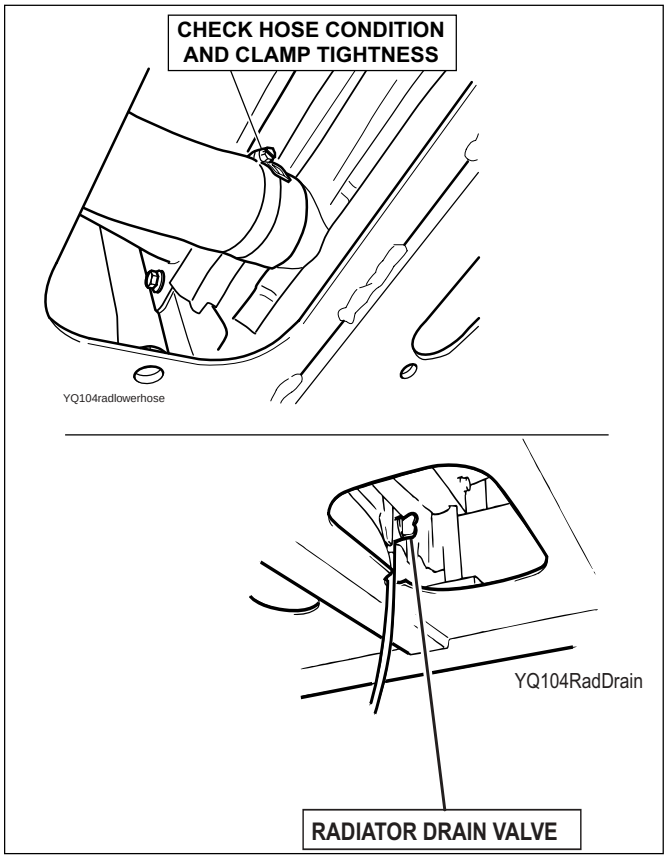


FIGURE 4.38B

https://truckmanualshub.com/

4.9 500 HOUR (6-MONTH) INSPECTION & MAINTENANCE PROCEDURES.

A. Change Oil in Travel Motor Reduction Units

Change the travel reduction units oil on a new machine after the first 500 hours of engine operation then change every 2000 hours.

WARNING

NEVER CHANGE OILS OR FILTERS ON A MACHINE THAT HAS JUST FINISHED WORKING. ALLOW SUFFICIENT TIME FOR THE MACHINE TO COOL DOWN BEFORE PERFORMING ANY MAINTENANCE.

1. Move machine to a firm, level surface and place the attachments on the ground. Operate travel until “DRAIN” plug is positioned at 6:00 o’clock. “OIL LEVEL” plug should be on the top left side. See Figure 4.39A.
2. Stop engine and place an empty container under the drain plug.

NOTE

See Specification’s Section for proper capacities and oil specification.

3. Remove “OIL LEVEL” and drain plugs to drain oil into the container, see Fig. 4.39B.
4. After oil has been drained out completely, clean drain plug. Use teflon tape on drain plug for additional sealing and install plug. Tighten securely.
5. Add engine oil through the OIL FILL opening until oil starts flowing out of the OIL LEVEL openning, see Fig. 4.39C.
6. Clean FILL/LEVEL plug. Use teflon tape on plug for additional sealing and install it. Tighten securely.

WARNING

WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE.

CAUTION

Clean up all spilled oil. Dispose of all hazardous waste in accordance with government environmental regulations.

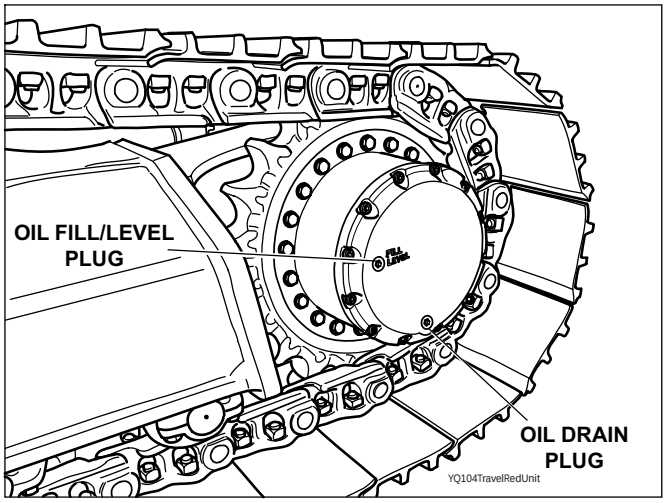


FIGURE 4.39A

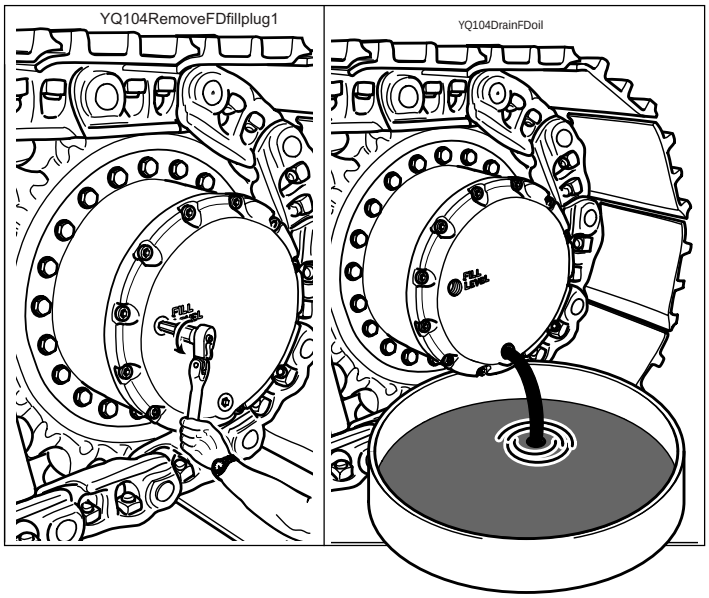


FIGURE 4.39B

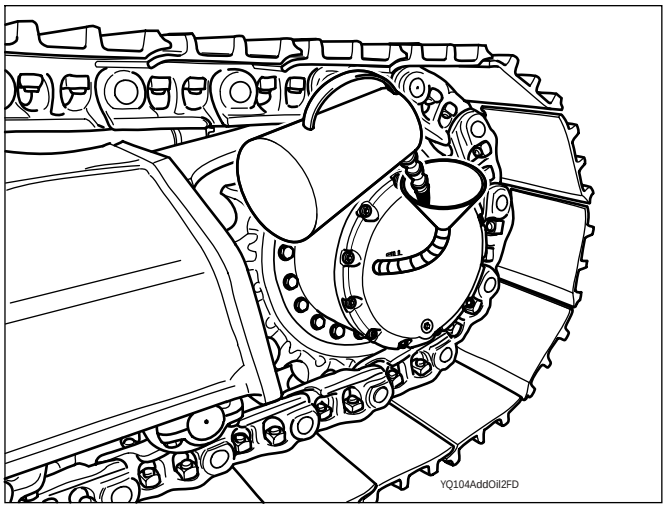


FIGURE 4.39C

https://truckmanualshub.com/

B. Change Oil in Swing Reduction Unit

Change the swing reduction unit oil on a new machine after the first 500 hours of engine operation then change every 2000 hours.

⚠ WARNING

NEVER CHANGE OILS OR FILTERS ON A MACHINE THAT HAS JUST FINISHED WORKING. ALLOW SUFFICIENT TIME FOR THE MACHINE TO COOL DOWN BEFORE PERFORMING ANY MAINTENANCE.

1. Move machine to a firm, level surface and place the attachments on the ground.
2. Locate drain port under the center opening of the lower frame. Place a an empty container under drain port and remove plug allowing oil to drain into container. See Figure 4.40B.

4

NOTE

See Specification's Section for proper capacities and oil specification.

3. Clean the drain plug and seal it with teflon tape. Install plug and tighten securely.
4. Remove the oil filler plug, see Fig. 4.40A, and fill with engine oil.
5. Using the dipstick, confirm that the oil level is within the designated range. See Figure 4.40C.
6. Clean the fill plug. Use teflon tape on plug and install. Tighten securely.

C. Checking and Cleaning Fuel Tank and Strainer

1. Use the ignition key and remove the fuel tank cap. See Figure 4.40D.
2. Check the cap seal and replace it if needed.
3. Remove the fuel tank strainer and clean it. See Figure 4.40D. Replace the strainer if it is damaged.
4. Install fuel tank strainer and use the ignition key to install the cap.

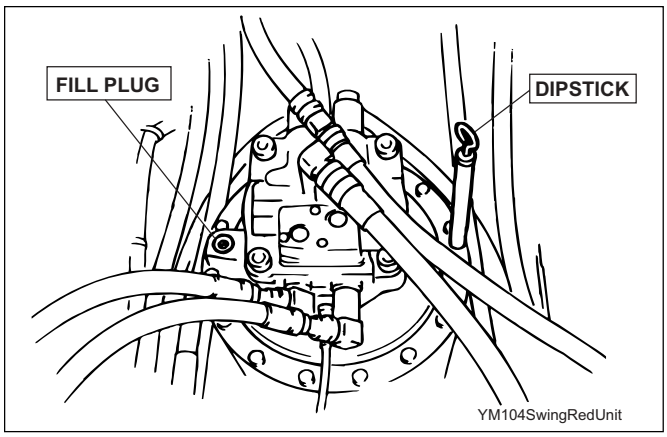


FIGURE 4.40A

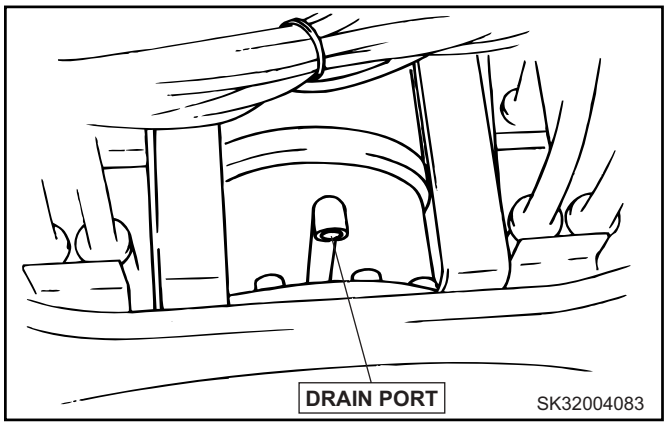


FIGURE 4.40B

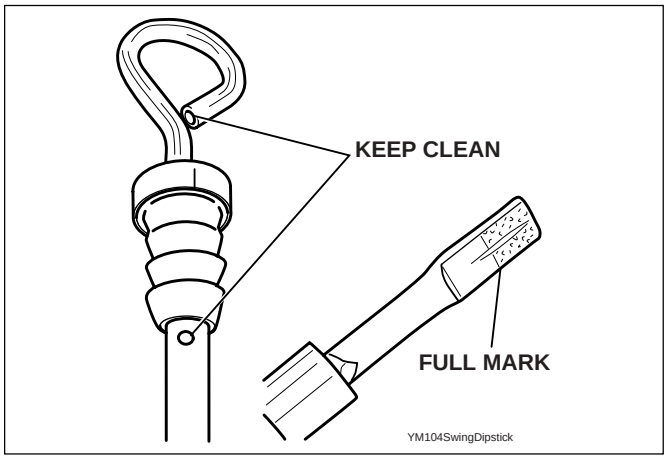


FIGURE 4.40C

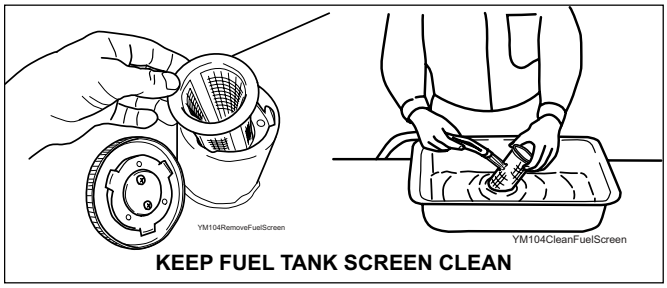


FIGURE 4.40D

https://truckmanualshub.com/

D. Checking the engine R.P.M.

1. Turn the key switch to ON, do not start the engine, and deactivate the auto accel system by pressing the switch located on the monitor, see Figure 4.41A.
2. Start the engine and set the engine speed to the high idle position.
3. Press the Monitor's display screen change switch once to switch to the Tachometer Mode display.

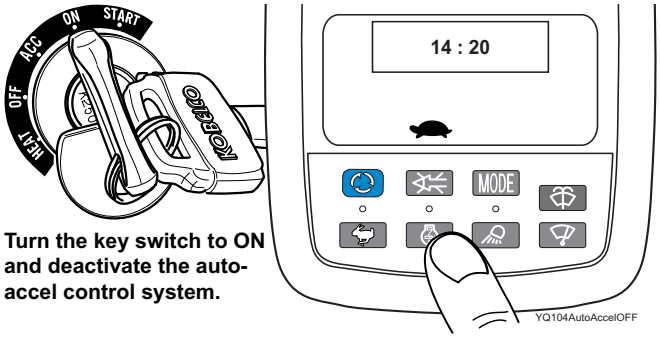
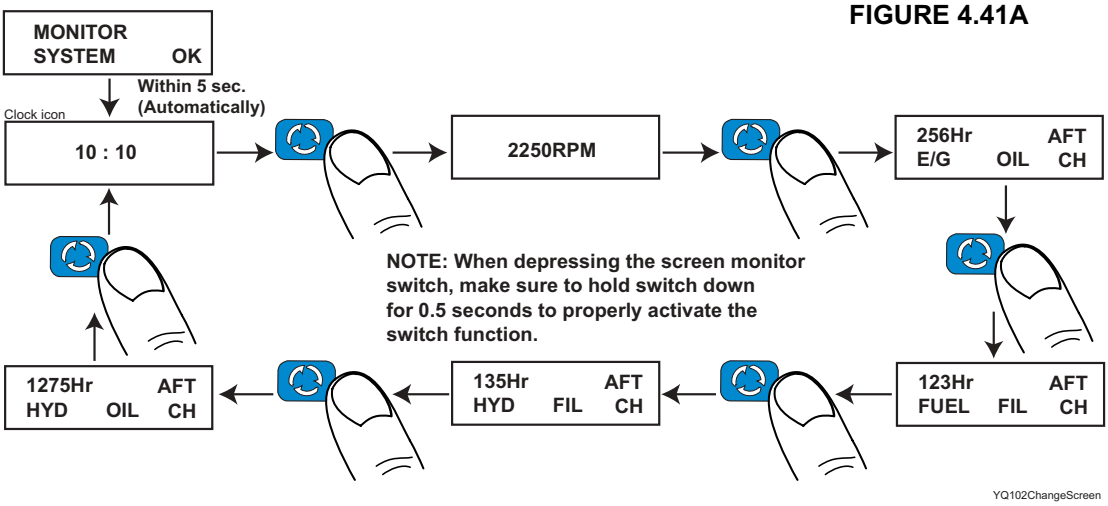


FIGURE 4.41A



4. Compare the RPM value displayed on the LCD to the machine specifications. If RPM value differs from specification, contact your Kobelco Dealer's Service Department for assistance.
5. Make sure to change the position of the auto accel connector to activate the auto accel function for normal machine operation.

NOTE

See Specification's Section for proper engine RPM specifications.

E. Checking the Air Conditioning Refrigerant

1. Locate the one pin connector for the auto-acceleration function behind the operator's right hand console and change the position of the connector as indicated in Figure 4.41A.
2. Start the engine. Set the engine speed to the middle speed position. See Figure 4.41B
3. Set the machine to the conditions shown below when checking the refrigerant. See Figure 4.41C.

- Air conditioner switch :ON
- Fan switch :HI position (Maximum/ ▲)
- Temp. adjustment switch :Lower temp position (▼)
- Door / Window :Close
- Compressor switch :ON (The ⚙ lamp lit up)

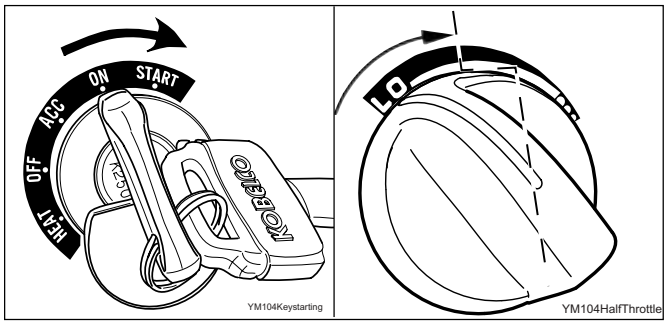


FIGURE 4.41B

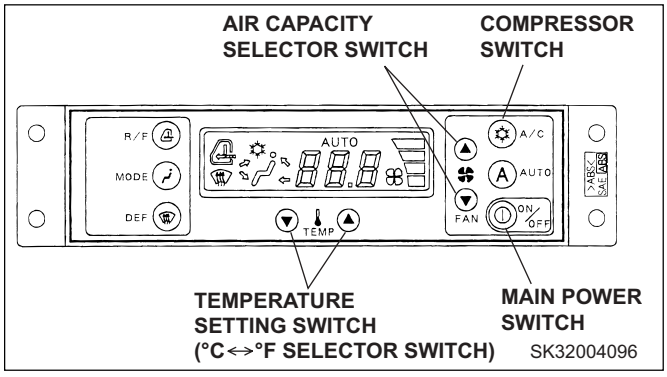
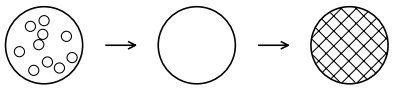
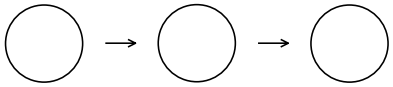
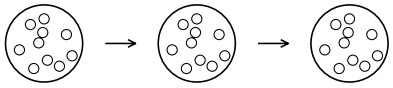


FIGURE 4.41C

https://truckmanualshub.com/

4. Follow the procedure below and check the refrigerant volume by looking thorough the sight glass (inspection window) on the upper part of the receiver dryer. See table below for better reference.
   a. Figure Ⓐ shows that the refrigerant volume is proper.
   b. Figure Ⓑ shows that the refrigerant is over charged. This will make both high and low pressure extreme and exert a bad influence on the pressure switch operation and the air conditioning system.
   c. Figure Ⓒ shows that the refrigerant is insufficient. Have the refrigerant recharged at your KOBELCO distributor.

Refrigerant volume	Description
Ⓐ Proper 	 After the air conditioner is turned ON, little bubbles appear. The refrigerant becomes transparent, then turns a light milky white.
Ⓑ Overcharged 	 After the air conditioner is turned ON, no bubbles appear.
Ⓒ Insufficient 	 After the air conditioner is turned ON, bubbles appear continuously.

NOTE

- New refrigerant (HFC-134a), whose characteristics are different from conventional CFC-12, is used in this machine. Do not mix HFC-134a with CFC-12.
- Operate the air conditioner at least once every week for several minutes to rotate the compressor regardless of the season. This will prevent the refrigerant gas from leaking from the compressor sealing.



Bubbles: Refrigerant gas is mixed with refrigerant fluid.



No Bubbles: Whole refrigerant becomes fluid and transparent.



Cloudy: Refrigerant is separated from oil. The fluid becomes a light milky white.

NOTE

Sight glass inspection is only for quick reference. Before any repairs are made or any freon added, consult with an A/C technitian.

5. Make sure to change the position of the auto accel connector to activate the auto accel function for normal machine operation. See Figure 4.43A (previous page) for better reference.

F. Fuel System Injection Pressure and Nozzle Condition (Atomization)

Perform this inspection and adjustment every 500 hours of engine operation. Contact your Kobelco dealer's Service Department for assistance.

Initial injection pressure: 17.7 MPa (2567 psi)

4.10 1000 HOUR (12-MONTH) INSPECTION & MAINTENANCE PROCEDURES.

A. Engine Valve Clearance

Check and adjust the engine valve clearance every 1000 hours of engine operation. Contact your Kobelco dealer's Service Department for assistance.

Refer to Specification's Section for proper valve clearence value.

B. Engine Compression Pressure

Check Engine Compression every 1000 hours of engine operation. Contact your Kobelco dealer's Service Department for assistance.

Refer to Specification's Section for proper valve compression pressure value.

C. Inspection of Starter and Alternator

Check Starter and Alternator every 1000 hours of engine operation. Contact your Kobelco dealer's Service Department for assistance. It is necessary to disassemble these components for proper cleaning and inspection.

D. Engine Fuel Injection Timing

Check Engine Fuel Injection timing every 1000 hours of engine operation. Contact your Kobelco dealer's Service Departement for assistance.

Refer to Specification's Section for proper fuel injection timing.

https://truckmanualshub.com/

4.11 2000 HOUR INSPECTION & MAINTENANCE PROCEDURES

Perform all other Inspection & Maintenance Procedures as previously described in this section.

A. ENGINE COOLANT CHANGE

⚠ WARNING

BE CAUTIOUS OF HOT FLUIDS AND SURFACES. WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE. ALLOW SUFFICIENT TIME FOR THE ENGINE TO COOL BEFORE CHANGING FLUIDS.

1. Move the machine to a firm level area, place the attachement on the ground and shut off the engine, see Fig. 4.43A.

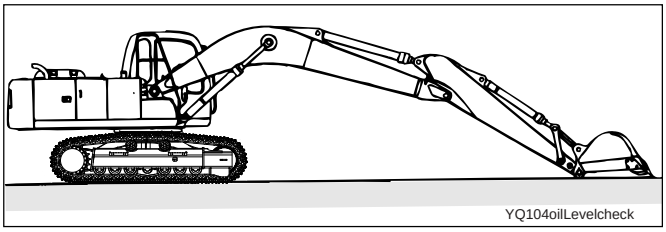


FIGURE 4.43A

2. Raise the engine cover, secure it open, and place a rag or paper towel on the radiator cap. Slowly remove the cap. The system could be under pressure. See Figure 4.43B

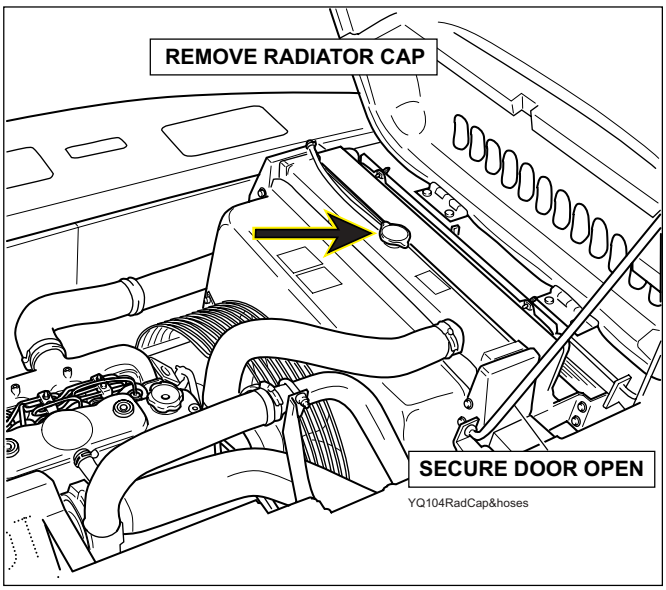


FIGURE 4.43B

4. Locate the lower cover beneath the radiator. See Figure 4.43C. Remove bolts and cover to obtain access to the radiator drain hose. Place an empty container, with sufficient capacity for engine system coolant, below the radiator drain hose. Refer to spec's section for proper system capacity. Turn valve counter clock wise to open drain.

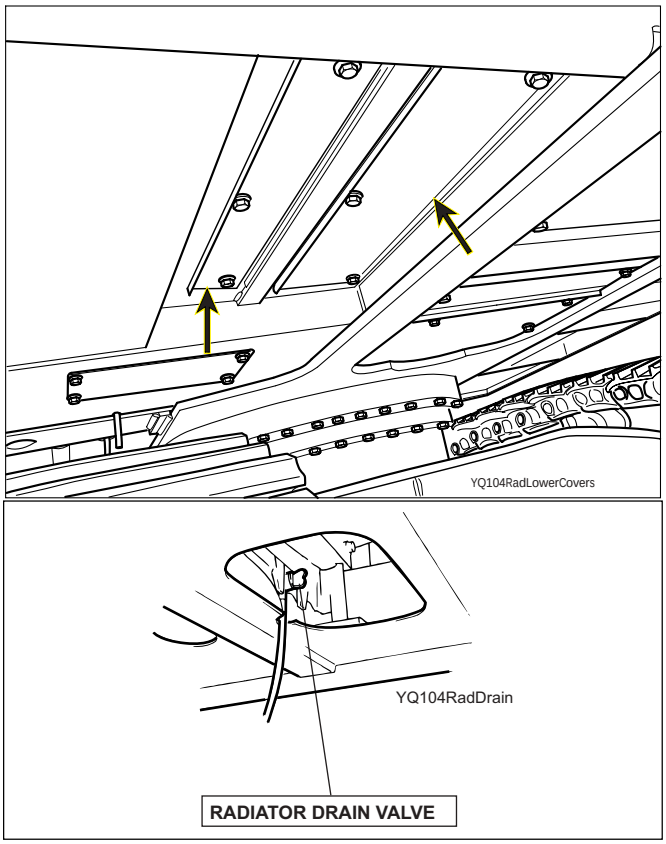


FIGURE 4.43C

5. Remove the engine lower cover. See Figure 3.43D. Use a funnel with hose attached to direct the drained coolant toward the container.

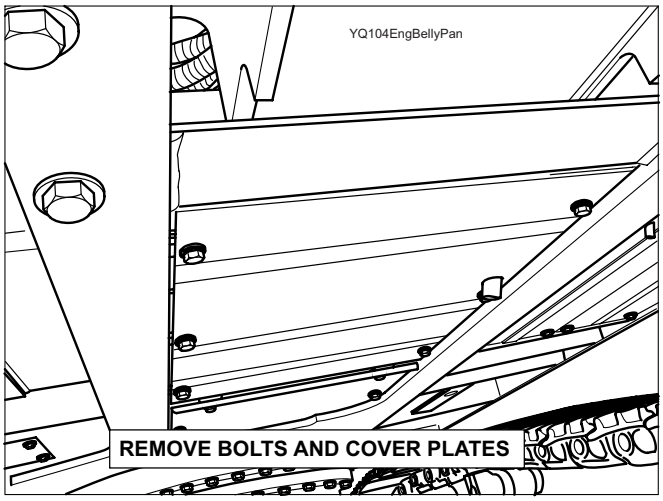


FIGURE 4.43D

https://truckmanualshub.com/

6. Locate the engine coolant drain plug on the left side of the engine block. Remove it to drain coolant. See Figure 4.44A.

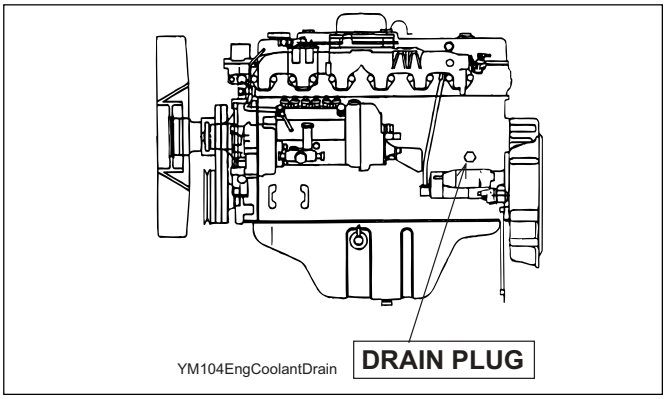


FIGURE 4.44A

7. After draining, close the drain valve and install the drain plug. Fill cooling system with with fresh water, preferable with hot water.

8. Turn the key switch to ON, do not start the engine, and deactivate the auto accel system by pressing the switch located on the lower side of the monitor. See Figure 4.44B.

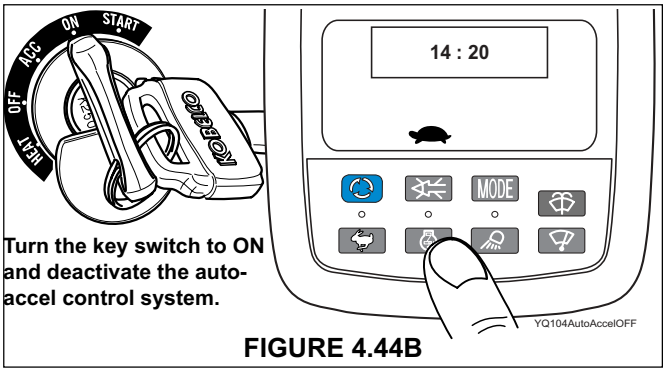
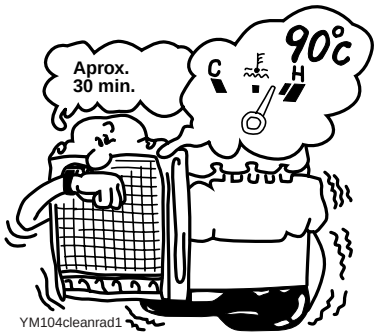
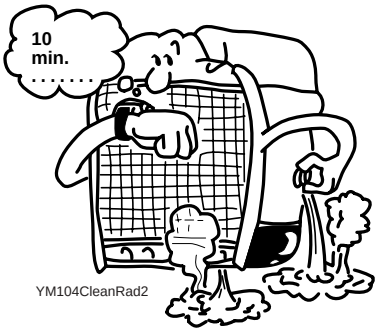


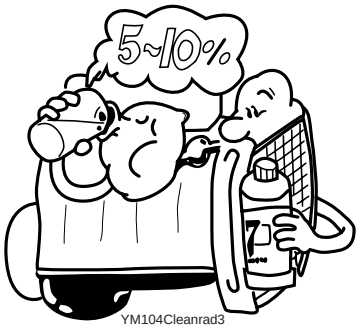
FIGURE 4.44B





9. Start engine and bring engine cooling temperature to about 90 ºC (194 ºF). Then run engine at low idle. Remove engine drain plug, open radiator drain valve, and simultaneously feed fresh water into radiator until draining water comes out clear (About 10 min. flushing should be sufficient).

10. When flushing is completed, stop engine and also stop water feeding. Drain engine cooling system completely. Close drain valve and install plug.



11. Prepare a mixture of radiator detergent according to the detergent manufacturing specs and pour the solution into the radiator.

12. Repeat step 8 and start the engine, but run it at low idle for 30 minutes before draining and flushing.

13. After flushing is completed, use teflon tape on the engine drain plug for additional sealing. Install plug and tighten securely.

14. Close the radiator drain valve.

15. Add a mixture of engine coolant according to specifications. indicated in the table below. Refer to spec's section for proper system capacity.

NOTE

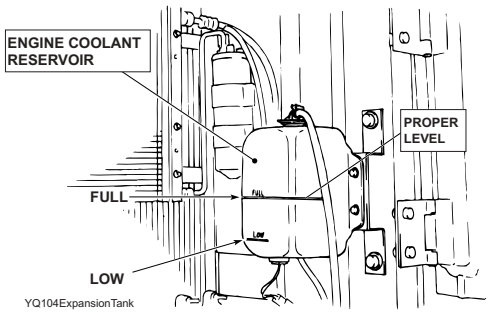
Expected minimum temperature	Long life coolant
-14.5°C (5.9°F)	30% mixed
- 34°C (-29.2°F)	50% mixed

Change contaminated and foamy coolant with new coolant mixture as soon as possible.
Cooling water other than long life coolant should be changed two times a year, in autumn and spring.

16. Install radiator cap. Start engine and run it at low idle for 5 minutes. Check and make sure there isn't any leakage.

17. Install engine and radiator lower covers. See Specifications section for proper torque values.

18. Repeat step 8, start engine and run engine at high idle for 5 minutes to bleed out any air from the cooling system.



19. Return throttle to low idle and stop engine. Wait about 3 minutes and check engine coolant reservoir for proper level. See Fig. 4.44C.

FIGURE 4.44C

https://truckmanualshub.com/

B. Removal and Installation of Radiator

⚠ WARNING

BE CAUTIOUS OF HOT FLUIDS AND SURFACES. WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE. ALLOW SUFFICIENT TIME FOR THE ENGINE TO COOL BEFORE CHANGING FLUIDS.

1. Move the machine to a firm level area, place the attachments on the ground, and shut off the engine.
2. Raise the engine hood and make sure to lock it open. See Figure 4.45A. Place a rag or paper towel on the radiator cap and slowly open it to release any pressure.
3. Remove the two wing nuts ① and the radiator top cover (between the radiator and the oil cooler, see Fig. 4.45B).
4. Locate the lower cover beneath the radiator. See Figure 4.45A. Remove bolts and cover to obtain access to the radiator drain hose. Place an empty container, with sufficient capacity for engine system coolant, below the radiator drain hose. Refer to spec's section for proper system capacity. Turn valve counter clock wise to open drain.
5. Loosen four M8 cap screws ② and remove side pads ③ from the R.H. and L.H. sides of the radiator shoulders. See Fig. 4.45C.
6. Remove four M10 capscrews ④ from the top of radiator, two from each side.
7. Remove two M8 capscrews ⑤ from the lower side of radiator. See Fig. 4.45C.
8. After making sure that the cooling mixture is completely drained out, loosen the radiator hose clamps ⑥, and remove hoses from the radiator side only. See Fig. 4.45C.
9. Move the radiator toward the oil cooler side, and remove it paying attention not to damage the insulation. See Fig. 4.45C.
   Refer to spec's section for oil cooler weight.
10. After cleaning the radiator, install it by following the reverse procedure described above.

NOTE

See Specification's Section for proper capacities and coolant mixture information.

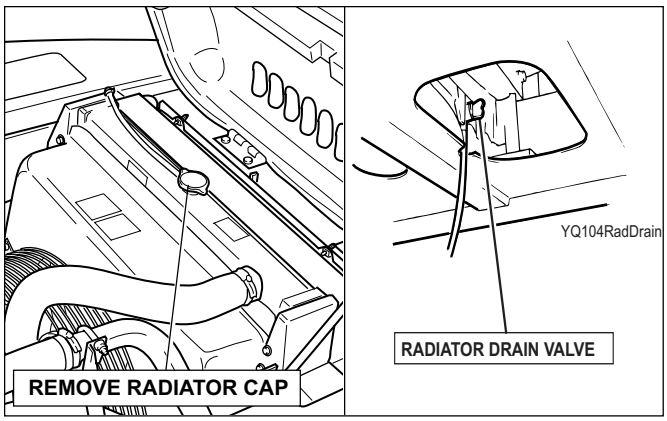


FIGURE 4.45A

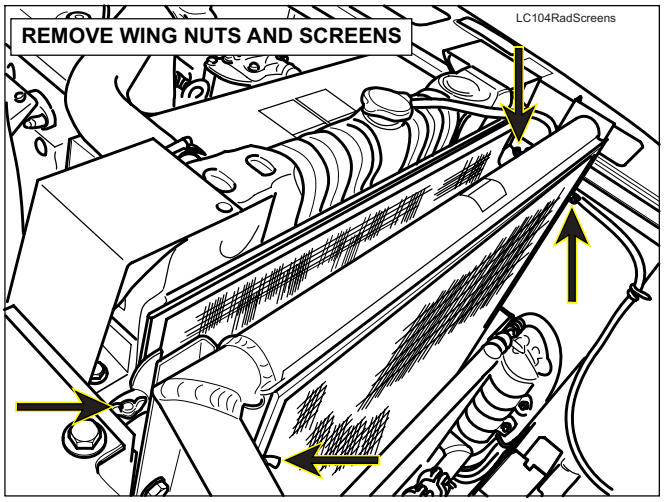


FIGURE 4.45B

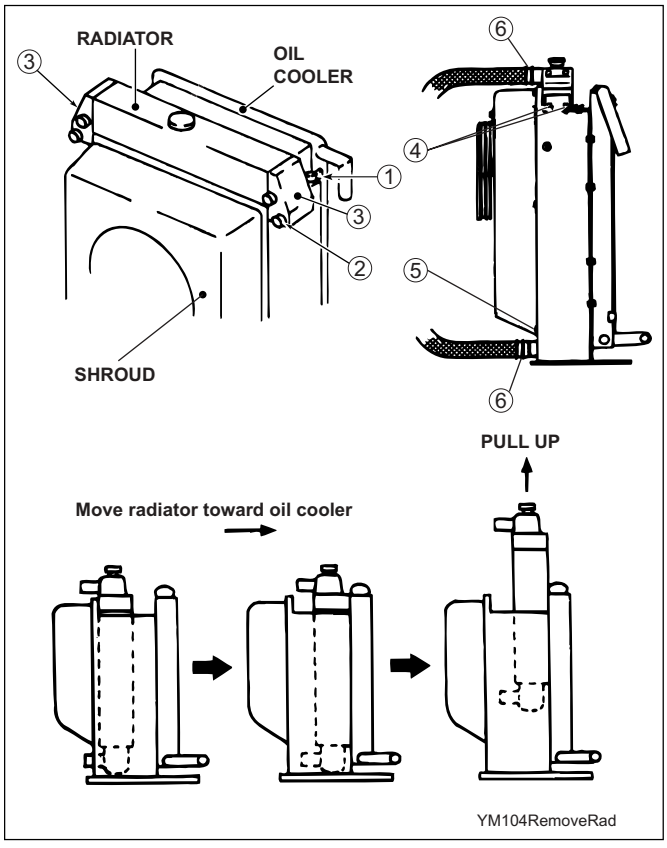


FIGURE 4.45C

https://truckmanualshub.com/

C. Change Hydraulic Oil

NOTE

The following procedures are to be used for a normal oil change of the hydraulic tank oil only.

If it is necessary to change the hydraulic oil viscosity, change hydraulic oil due to hydraulic component failure or change main pump, contact an authorized KOBELCO Dealer Service Department for assistance.

⚠ WARNING

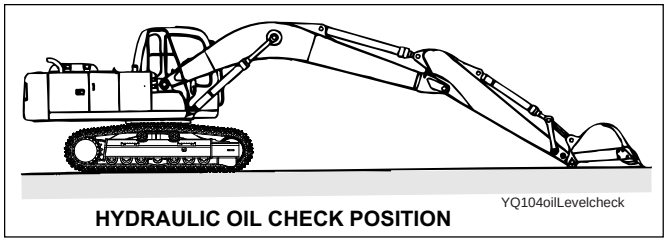
BE CAUTIOUS OF HOT FLUIDS AND SURFACES. WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE. ALLOW HYDRAULIC OIL TO COOL BEFORE CHANGING.

1. Move the machine to a firm, level surface with the attachment in the hydraulic oil check position. See Figure 4.46A. Make sure the attachments are resting on the ground.

NOTE

Make sure to warm up hydraulic system before changing hydraulic oil.

2. Shut off the engine.
3. Turn the ignition key to the “ON” position - DO NOT START THE ENGINE.
4. Make sure the safety lever is in the unlocked (down) position.
5. Move the attachment control levers, several times in all directions.
6. Release hydraulic tank pressure. See Fig. 4.46B.
7. Slowly remove the six retaining bolts from the suction strainer cover plate. See Fig. 4.46C.
8. Remove cover, “O”-ring, and strainer from hydraulic tank. See Figure 4.46D.
9. Remove the “O”-ring from the bottom of the strainer. See Figure 4.46D.



HYDRAULIC OIL CHECK POSITION

FIGURE 4.46A

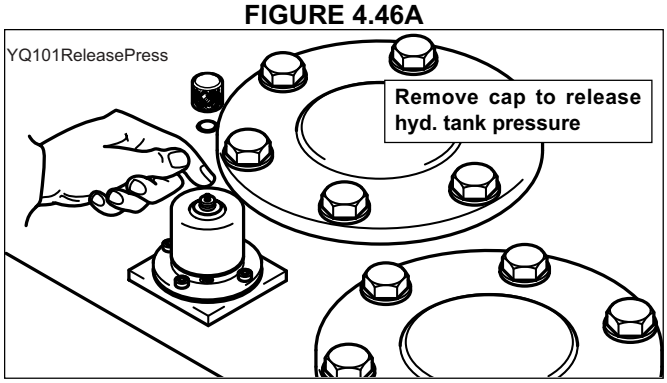


FIGURE 4.46B

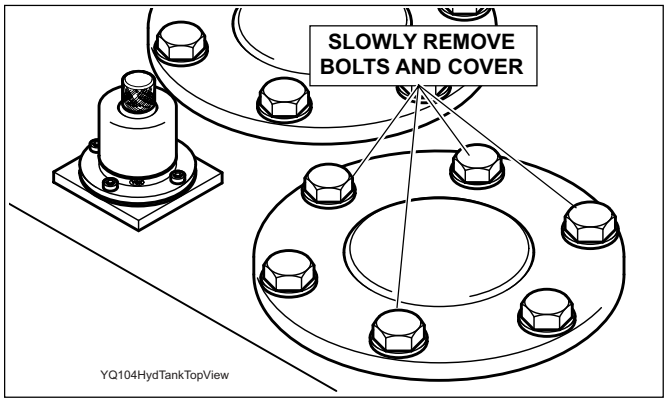


FIGURE 4.46C

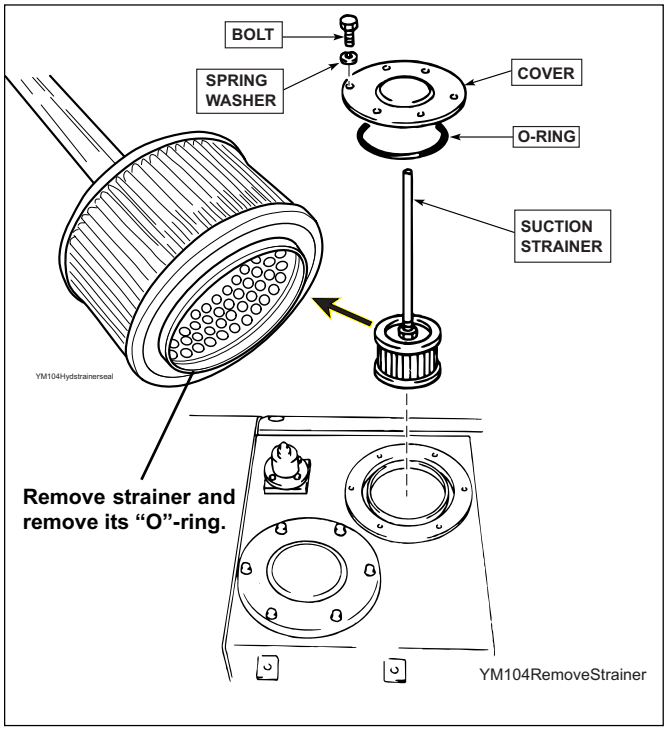


FIGURE 4.46D

https://truckmanualshub.com/

10. Install special suction stopper Part Number 24100P978F2 over suction tube inside hydraulic tank. See Figure 4.47A.

11. Slowly remove the six retaining bolts from the hydraulic return filter cover plate. See Figure 4.47B.

12. Remove “O”-Ring, bypass valve, and filter element from hydraulic tank. See Figure 4.47B

13. Place an empty container under drain plug. See specification section for capacity. Remove plug and allow all oil from hydraulic tank to drain into container. See Figure 4.47C.

14. After all oil has drained, carefully and thoroughly clean inside of hydraulic tank.

15. Replace hydraulic tank drain plug and tighten securely.

16. Inspect return filter and oil for signs of abnormal wear.

17. Clean hydraulic tank covers, spring, and bypass valve.

18. Install a new return filter element along with the Bypass Valve and spring, as shown in Figure 4.47B.

19. Remove special suction stopper from suction tube.

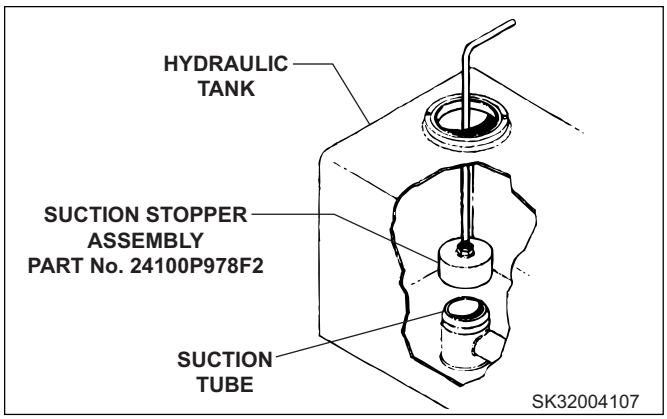


FIGURE 4.47A

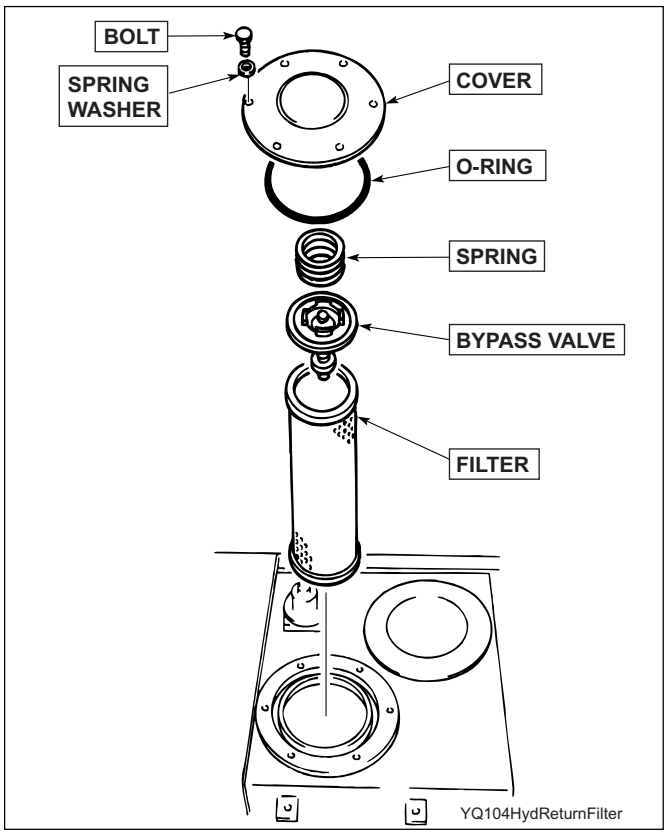


FIGURE 4.47B

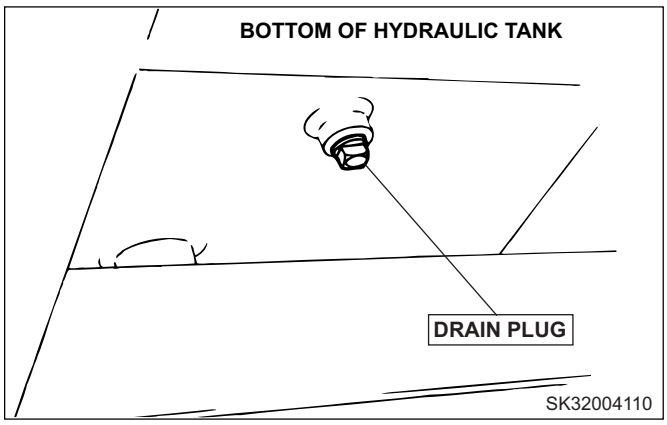


FIGURE 4.47C

⚠ CAUTION

Clean up all spilled oil. Dispose of all hazardous waste in accordance with government environmental regulations.

https://truckmanualshub.com/

20. Clean and inspect suction strainer for damage. See Figure 4.48A. Replace strainer, if needed.

21. Make sure to install a new “O”-Ring seal on the strainer. Lubricate seal with hydraulic oil and install strainer assembly onto suction tube. See Figure 4.48B.

22. Make sure to install spring on strainer guide. See Figure 4.48B.

23. Install a new “O”-ring on cover plate mount surface groove, lubricate seal with hydraulic oil.

24. Fill hydraulic tank to proper level with fresh clean hydraulic oil through strainer cavity. See Figure 4.48C.

25. Install suction strainer cover. Make sure to properly tighten the bolts. Refer to Specifications Section in this manual for proper torque values.

26. Install new “O”-ring seal, lubricate it with hydraulic oil and install cover for hydraulic tank return filter element. Make sure to properly tighten the bolts. Refer to Specifications Section in this manual for proper torque values.

⚠ CAUTION

Make sure to use the same viscosity oil in the hydraulic tank as it was drained. Refer to specification’s section for proper hydraulic oil.

NOTE

This machine was shipped from the factory with **SHELL TELLUS 46** hydraulic oil in the hydraulic system.

CAUTION

ALWAYS USE CLEAN HYDRAULIC OIL. USE CAUTION TO AVOID CONTAMINATION DURING FILLING

⚠ CAUTION

Clean up all spilled oil. Dispose of all hazardous waste in accordance with government environmental regulations.

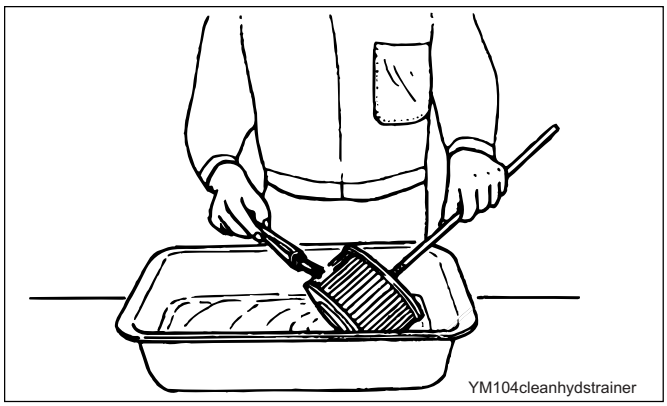


FIGURE 4.48A

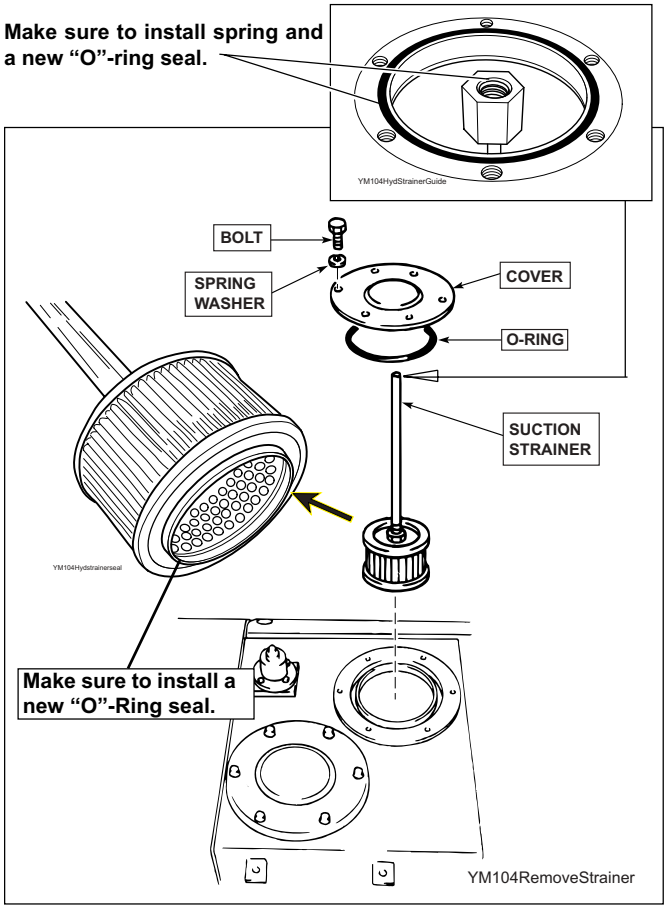


FIGURE 4.48B

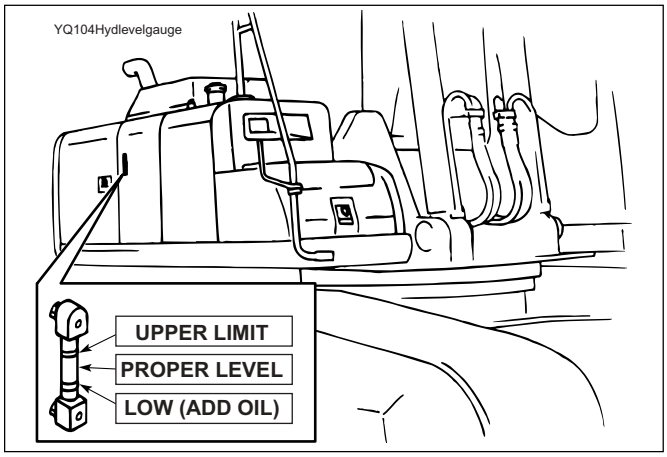


FIGURE 4.48C

https://truckmanualshub.com/

D. Hydraulic Tank Breather

1.Release hydraulic tank pressure. See Figure 4.49A.

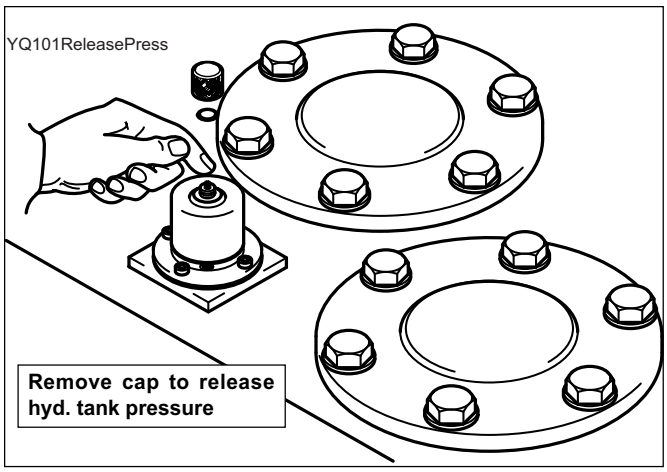


FIGURE 4.49A

2.Remove cap. See Figure 4.49B

3.Remove breather filter cover. See Figure 4.49B.

4.Remove old filter, clean mounting surfaces and install new filter. See Figure 4.49B. Order Part Number YN57V00002S010.

5.Install breather filter cover.

6.Install cap and tighten securely

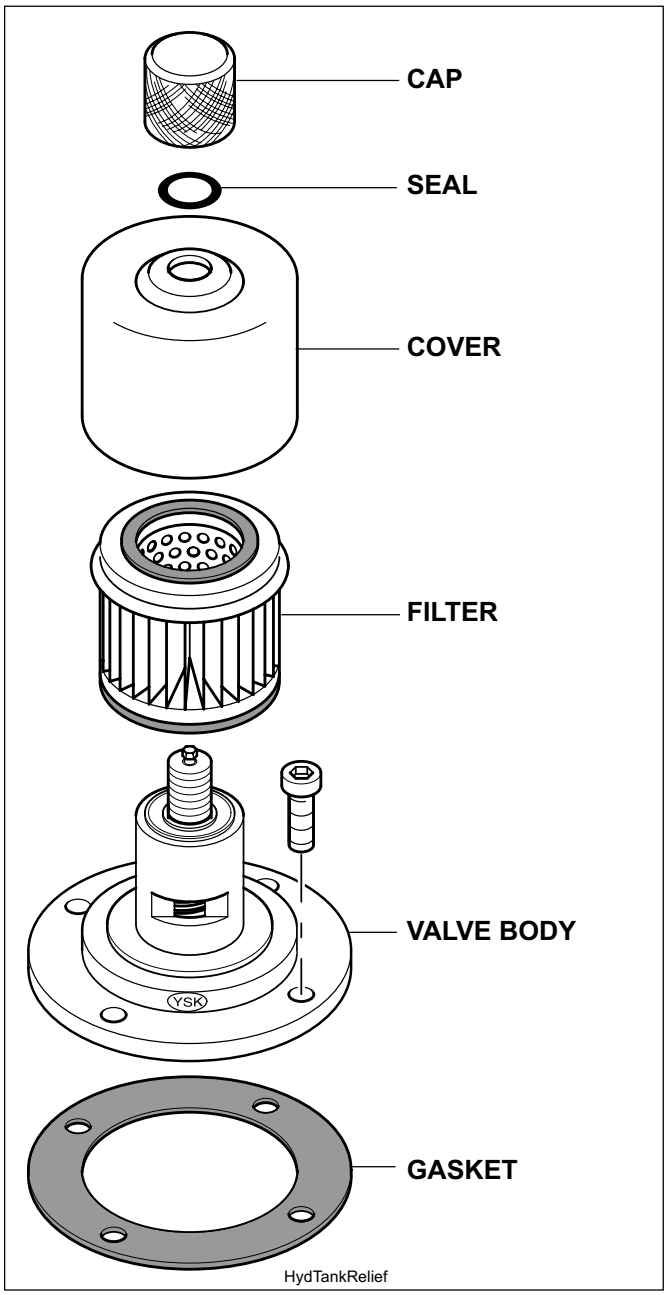


FIGURE 4.49B

4

https://truckmanualshub.com/

E. Maintenance on Rollers and Idlers

Change the oil in all rollers and idlers every 2,000 hours of machine operation.

NOTE

Refer to the machine's Service Manual for specific instructions regarding removing and installing the undercarriage rollers and idlers. Contact your Kobelco dealer's Service Department for assistance if necessary.

1. Remove rollers and idlers as indicated in the Service Manual, see Figure 4.50A.

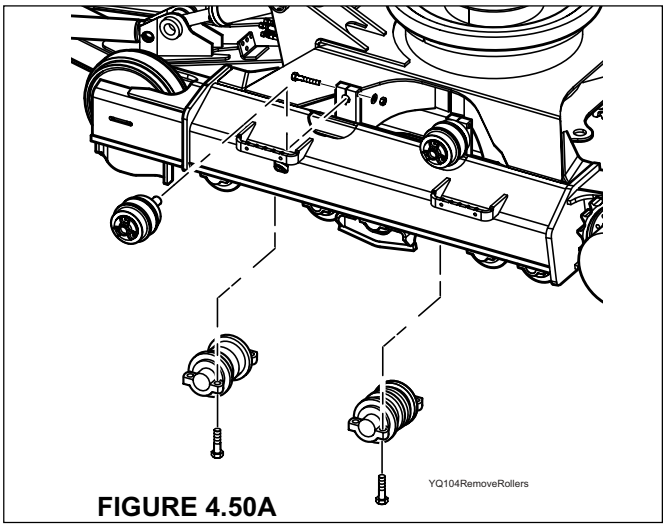


FIGURE 4.50A

2. Remove side plugs from upper rollers cover plate and drain the oil out into an empty container.
3. Remove plugs from track rollers center flanges and drain the oil out into an empty container.
4. Remove Idlers and remove side plugs from idler housing. Drain the oil out into an empty container.

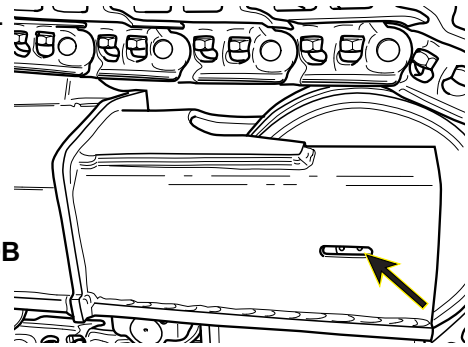


FIGURE 3.50B

5. Install rollers and idlers and torque properly. Refer to Sepecifications Section for proper torque values.

NOTE

Refer to Specification's Section for proper oil and capacity information.

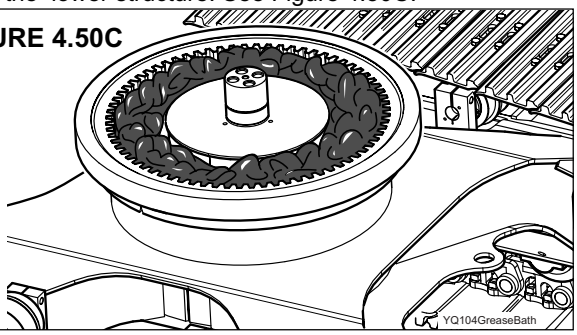
⚠ CAUTION

Clean up all spilled oil. Dispose of all hazardous waste in accordance with government environmental regulations.

F. Change Slewing Ring Grease Bath

Change the slewing ring grease bath every 2000 hours of machine operation. To properly replace the grease, it is necessary to remove the upper frame. Refer to the machine's shop manual and/or contact your Kobelco dealer's Service Department for assistance. Proper tools have to be used and specific instructions must be followed to undeck the machine upper structure from the lower structure. See Figure 4.50C.

FIGURE 4.50C



CAUTION

If the slewing ring ever becomes submerged in water, it is mandatory that the sump bath grease be changed.

REFER TO SPECIFICATION'S SECTION FOR PROPER GREASE AND CAPACITY INFORMATION

If the machine is in the field and can't be brought to a shop to replace the slewing ring grease bath, proceed to remove the swing motor assembly. Use eye bolts Part No. ZS91C01200 on top cover of the swing motor and a proper lifting device to remove the swing motor assembly. Refer to the end of Section 6 to obtain the proper caps and plugs for lines and hoses that need to be removed during this process, see Fig. 4.50D.

⚠ WARNING

Block attachments properly before removing swing red. unit.

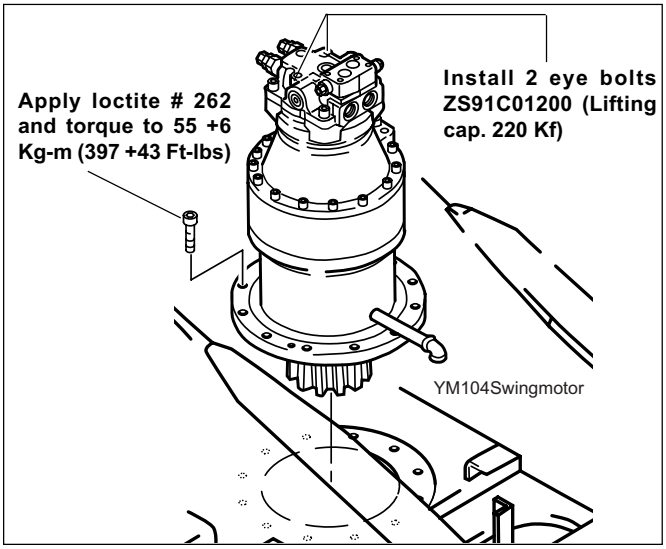


FIGURE 4.50D

https://truckmanualshub.com/

4.12 PERIODICAL INSPECTION ITEMS

A. Dust Seals

Inspect dust seals in all pin connections frequently. The attachment incorporates several dust seals that should be periodically checked for damage and excessive wear. See Figure 4.51A and 4.51B. If excessive wear is found, refer to the machine's Shop Manual for specific instructions in regards to disassembly and assembly. Contact your Kobelco dealer's Service Department for assistance if necessary. Refer to parts book for the proper part numbers for the replacement seals

⚠ WARNING

WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE.

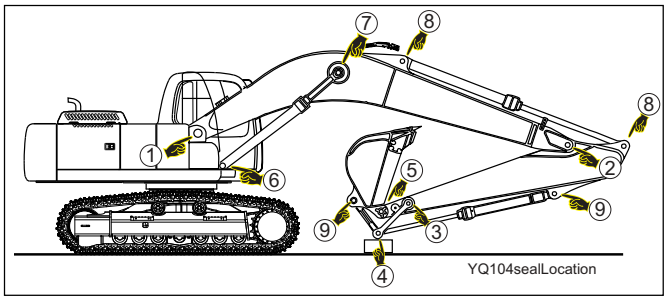


FIGURE 4.51A

Use Figure 4.51B as reference to install the seals. Make certain that the pin surface and tapered end are smooth and free from burrs or imperfections that could cause damage to the new seals.

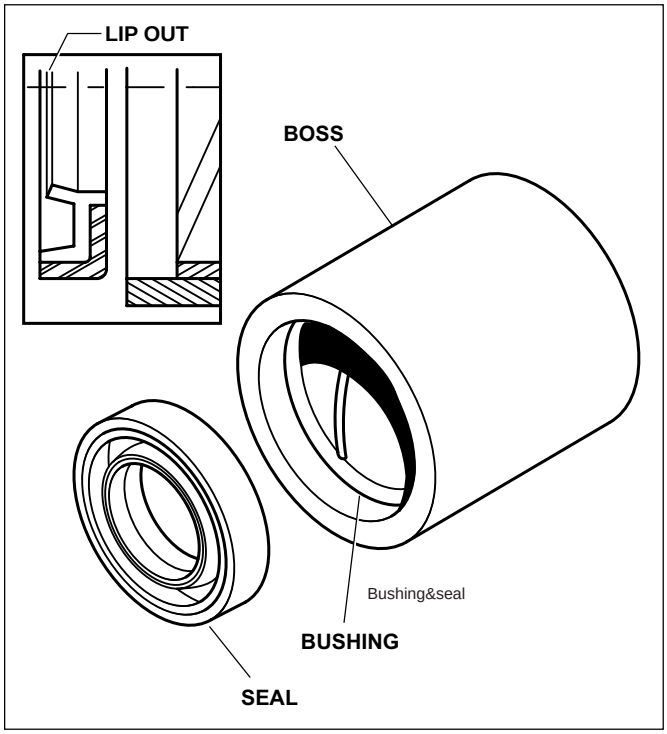


FIGURE 4.51B

https://truckmanualshub.com/

B. Bucket

⚠ WARNING

WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE.

1. Bucket/Arm & Link Clearance

Frequently, check clearance between bucket and bucket link and/or between arm and bucket to make sure it is within specifications. If clearance is greater than 1.2 mm (0.05") adjust clearance. Proceed as follows to correct excessive play:

a. Move the machine to a firm level surface and place the bucket on the ground, making certain that the bucket is stable. See Figure 4.52A.

b. Roll "O"-Rings onto the bucket bosses. See Figure 4.52B.

c. Remove jam nuts, nuts, and retaining bolt. See Figure 4.52B.

d. Carefully slide out, partially, main pins mounting arm and bucket link to bucket. You may have to start the engine and slightly operate the boom and arm to remove load from pins. See Figure 4.52C.

e. Insert shims as needed to correct any excessive play. Refer to parts book for proper part numbers.

f. Align the shims with pin holes and insert pins into position. Be careful not to damage seals.

g. Install retaining bolt with nut and jam nut. See Figure 4.52B.

h. Roll "O"-Rings onto the grooves between bucket/arm, and bucket/bucket link. See Figure 4.52D.

NOTE

Inspect "O"-Rings for damage or excessive wear. If worn or damaged replace with new parts to protect seals, pins and surfaces from dirt and debris which can cause premature failure.

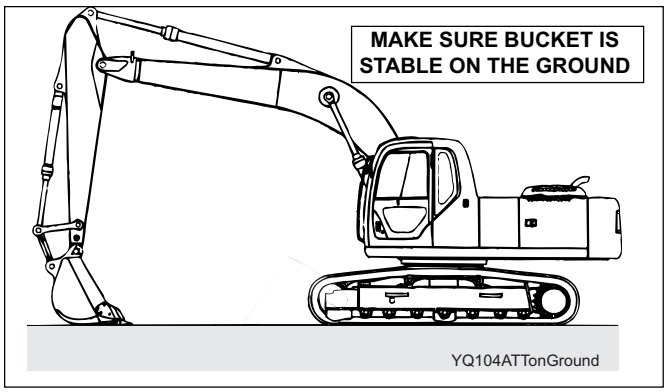


FIGURE 4.52A

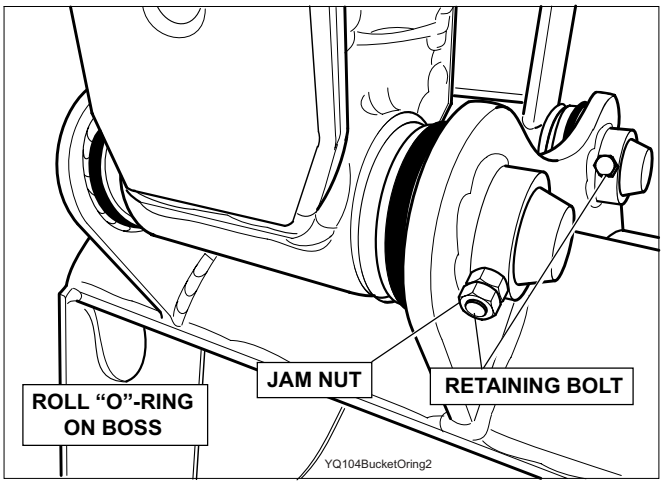


FIGURE 4.52B

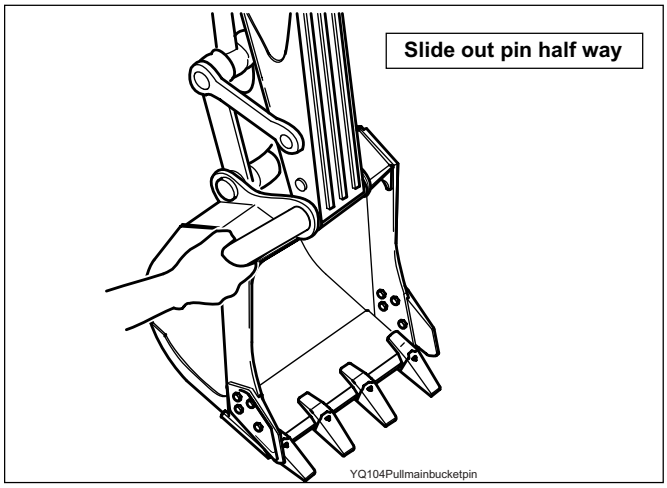


FIGURE 4.52C

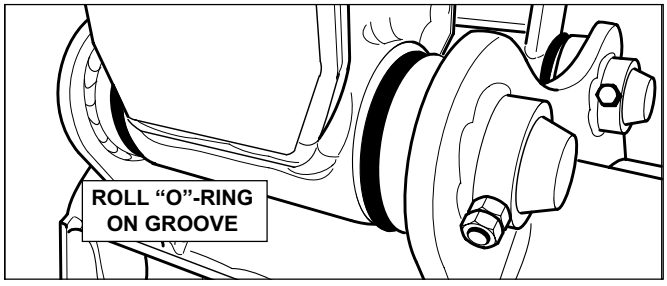


FIGURE 4.52D

https://truckmanualshub.com/

2. Reversing Bucket

a. Move the machine to a firm level surface and place the bucket on the ground, making certain that the bucket is stable. See Figure 4.53A.

b. Roll "O"-Rings onto the bucket bosses. See Figure 4.53B.

c. Remove jam nuts, nuts, and retaining bolts from both pins. See Figure 4.53B.

d. Carefully slide out main pins mounting arm and bucket link to bucket.

NOTE

You may have to start the engine and slightly operate the boom and arm to remove load from pins.

e. Clean pins and pin holes, and apply grease on pin and holes surfaces.

f. Rotate bucket 180º or move machine. Install arm and bucket link in their respective positions. See Figure 4.53C.

g. Move the bucket cylinder to match the bucket pin holes with the bucket link hole. Insert pin. Becareful not to damage seals.

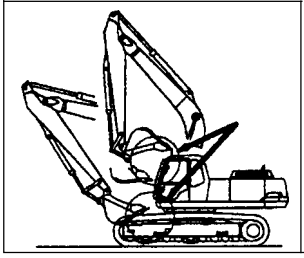
h. Operate the boom and arm to match the bucket pin holes with the arm hole connection. Insert pin carefully to avoid damaging the seals.

i. Install retaining bolts with nuts and jam nuts on both pins. See Figure 4.53B.

j. Roll "O"-Rings onto the grooves between bucket/arm, and bucket/bucket link. See Figure 4.53B.

CAUTION

Slowly cycle bucket, check for interference with arm, particularly if a lifting eye is welded on bucket bottom. Be careful not to confuse the bucket shoveling operation with that of the backhoe.



Check clearance between bucket and cab before operation. Exercise care when operating the bucket near the cab.

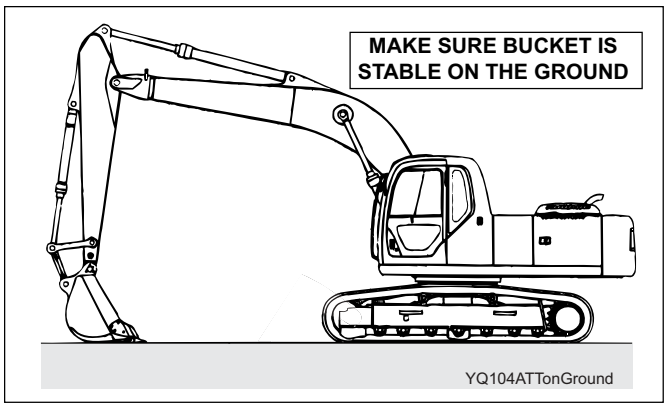


FIGURE 4.53A

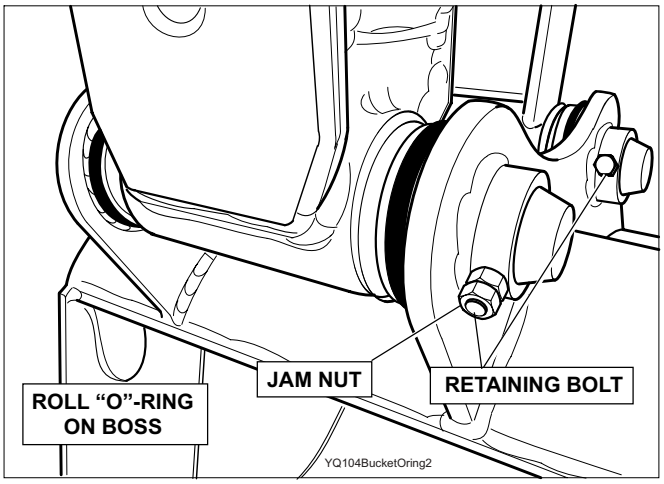


FIGURE 4.53B

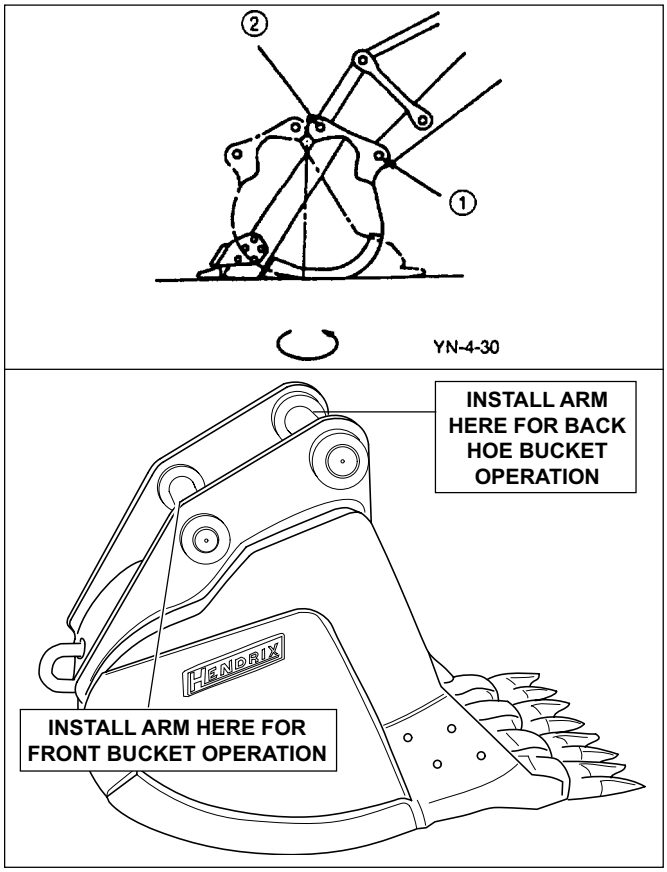


FIGURE 4.53C

https://truckmanualshub.com/

3. Removing the Bucket

a. Move the machine to a firm level surface and place the bucket on the ground, making certain that the bucket is stable. See Figure 4.54A.

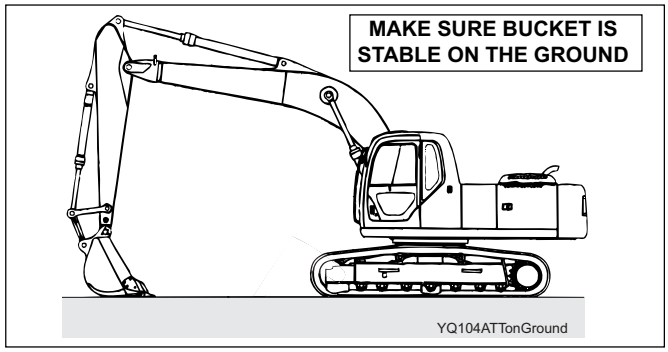


FIGURE 4.54A

b. Roll "O"-Rings onto the bucket bosses. See Figure 4.54B.

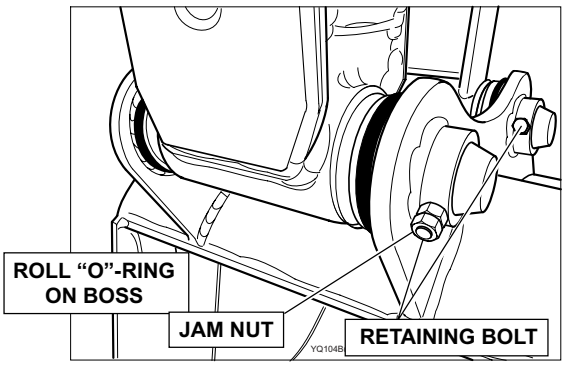


FIGURE 4.54B

c. Remove jam nuts, nuts, and retaining bolt. See Figure 3.54B.

d. Carefully remove main pins mounting arm and bucket link to bucket. You may have to start the engine and slightly operate the boom and arm to remove load from pins. See Figure 4.54C. Be careful not to damage dust seals.

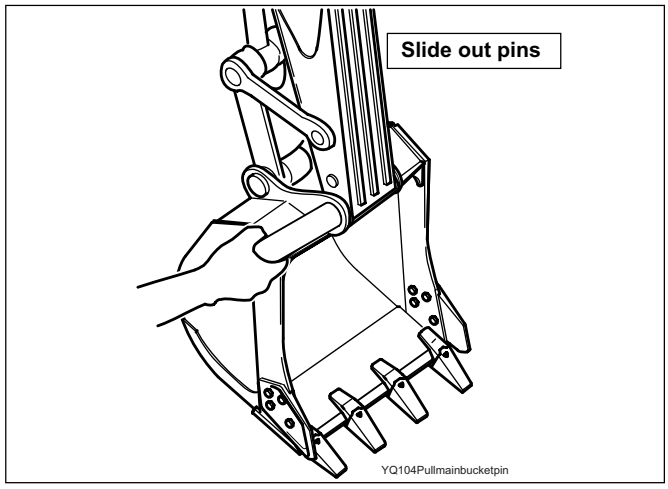


FIGURE 4.54C

4. Installing the Bucket

a. Make certain that the bucket is stable on firm level ground.

b. Install "O"-Rings onto the bucket bosses.

c. Clean pins and pin holes, and apply grease on pin and holes surfaces.

d. Move the bucket cylinder to match the bucket pin holes with the bucket link hole. Insert pin. Be careful not to damage seals. See Figure 4.54D

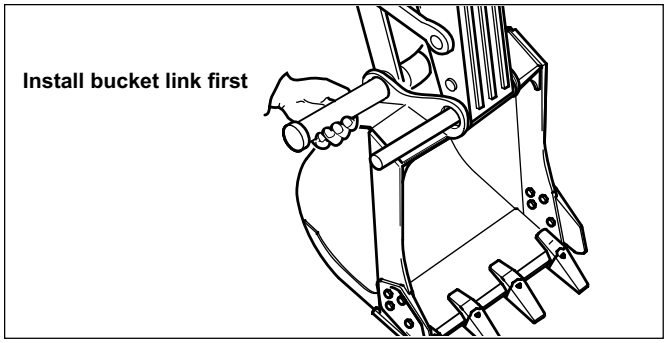


FIGURE 4.54D

e. Operate the boom and arm (7) to match the bucket (6) pin holes with the arm hole connection. Insert pin (5) carefully to avoid damaging the seals. See Figure 4.54E

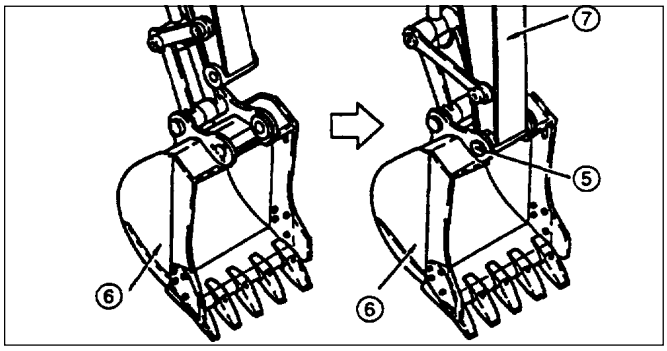


FIGURE 4.54E

f. Install retaining bolts with nuts and jam nuts on both pins, leaving 1 mm gap between jam nut and pin boss. See Figure 4.54F.

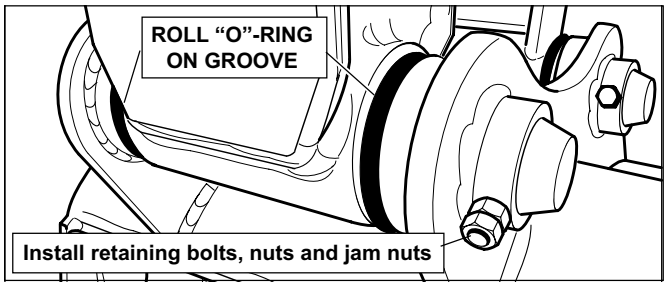


FIGURE 4.54F

g. Roll "O"-Rings onto the grooves between bucket/arm, and bucket/bucket link. See Figure 4.54F.

h. Apply sufficient grease to the bucket pin connections.

https://truckmanualshub.com/

5. Bucket Teeth and Side Cutters

Frequently, check bucket tooth points and side cutters for wear and looseness. The life of the bucket teeth and side cutters can not be determined by working hours, but rather by application and operating conditions.

a. Parts description, see Figure 4.55A:
(1) adapter nose, (2) tooth point, (3) rubber lock pin, (4) locking pin, (5) side cutter, (6) cap screw, (7) Nut.

NOTE

Contact your Kobelco dealer for assistance in regards to parts for the specific bucket installed on your machine.

b. Replace the bucket teeth when their cutting edge and/or when hole for retaining pin on tooth are excessively worn.

b.1- Place a wood block under the bucket teeth support lip, as indicated in Figure 4.55B, and remove all sand and soil adhered to the teeth pin connection areas.

b.2- Use a hammer and a punching tool to hammer out the locking pin. Be careful not to damage the rubber lock.

b.3- Inspect the lock pin (4) and rubber lock (3). Replace them if the lock pin (4) is too short or the rubber lock (3) is in poor condition.

b.4- Clean the surface of the adapter nose (1) with putt knife.

b.5- Fit the tooth point (2) onto the adapter nose (1).

b.6- Push the rubber lock pin (3) into the hole of the adapter nose (1).

b.7- Hammer the locking pin (4) until it is aligned with the point surface.

c. Replacing the side cutters

c.1- Remove all sand and soil adhered around the side cutters capscrews.

c.2- Use an impact wrench to remove the cap screws, then remove the side cutters. See Figure 4.55C.

c.3- Clean the mounting surface and install a new side cutter with new cap screws and nuts. See Figure 4.55D.

c.4- Torque the cap screw with nuts to 100 ± 5 Kgf-m (722 ± 36 lbs-ft).

⚠ WARNING

WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHES AND WORK GLOVES TO PERFORM INSPECTION AND MAINTENANCE ON THIS MACHINE.

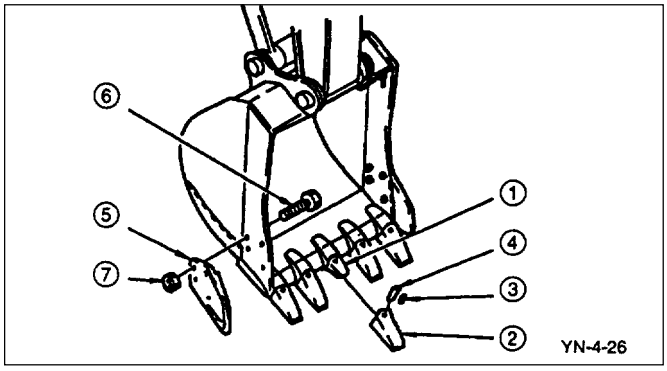
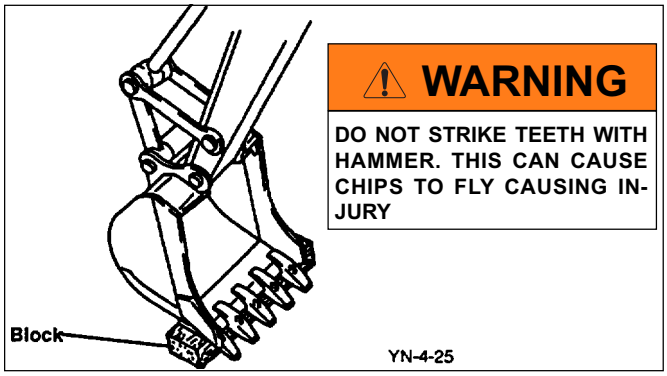


FIGURE 4.55A



⚠ WARNING

DO NOT STRIKE TEETH WITH HAMMER. THIS CAN CAUSE CHIPS TO FLY CAUSING INJURY

FIGURE 4.55B

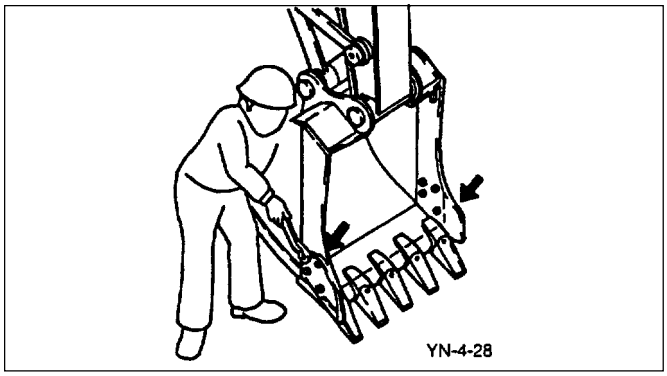


FIGURE 4.55C

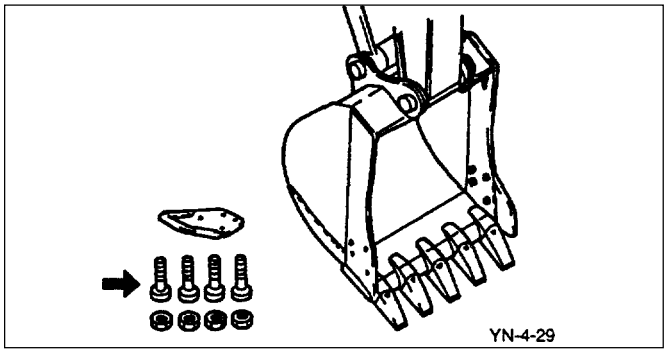


FIGURE 4.55D

4

https://truckmanualshub.com/

C. Windshield Washer Fluid Reservoir

Fill the windshield washer fluid reservoir as required using approved windshield washing fluid.

1. Open engine air cleaner access door to locate washer fluid reservoir. See Figure 4.56C.
2. Pull cap off and fill with proper windshield washing fluid.
3. Replace cap and reposition engine air cleaner access door.

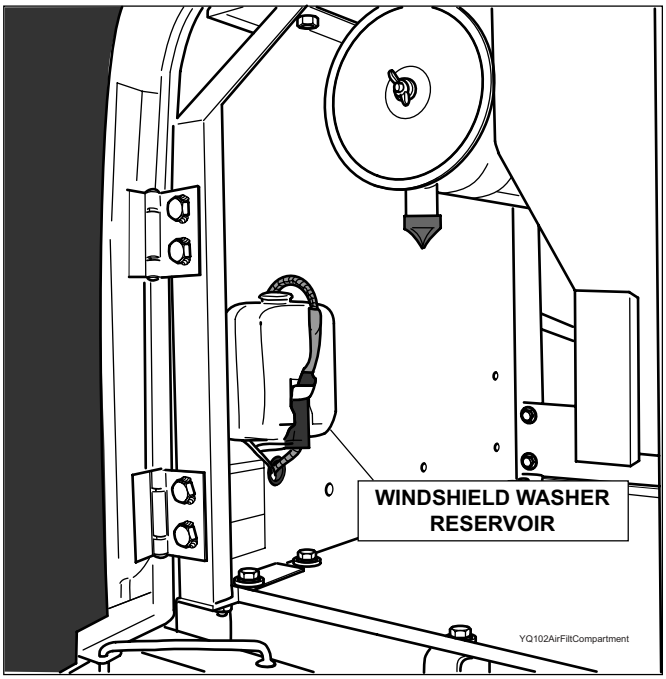


FIGURE 4.56A

D. Fuses

Follow the procedures below to replace "blown" or faulty fuses.

1. Move seat and seat base completely forward.
2. Open the fuse compartment and remove fuse box cover from fuse box. See Figure 4.56B.

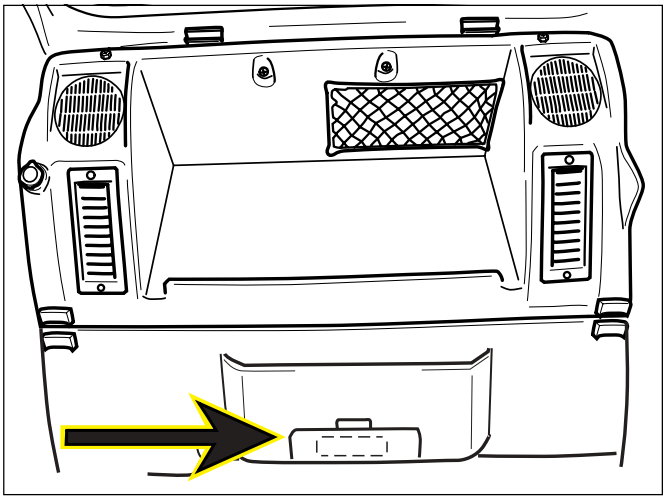


FIGURE 4.56B

3. Locate and remove faulty fuses. Replace any fuse needed with same amperage fuse as removed.

⚠ WARNING

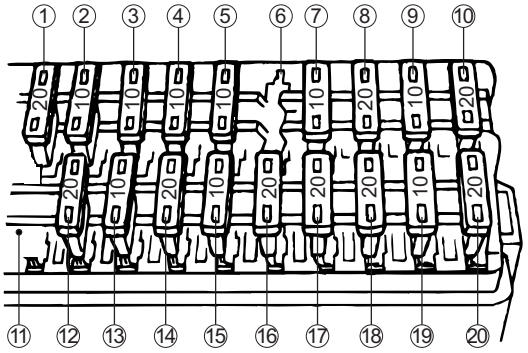
NEVER REPLACE A FAULTY FUSE WITH A HIGHER AMPERAGE FUSE. NEVER USE A "JUMPER" IN PLACE OF A FUSE. NEVER SPLICE ACCESSORIES DIRECTLY INTO FUSE TERMINALS.

4. Refer to fuse box cover or Figure 4.56C for Fuse amperage and their functions.

NOTE

When ordering replacement fuses, order the following part numbers:

10 AMP– Part Number 2479R655S8
15 AMP– Part Number 2479R655S3
20 AMP– Part Number 2479R655S9



No.	AMPS	FUNCTION
1A/1B	20A	Mechatro Controller (CPU)
2	10A	Wiper, Washer Relay
3	10A	Cigarette Lighter 24V
4	10A	DC-DC Converter
5	10A	Horn
6	NONE	None
7	10A	Mechatro Controller & Hr meter (Back up)
8	20A	Fuel Supply Pump
9	10A	Engine comp. Lamp, DC-DC Converter (Back up)
10	20A	Starter Switch
11	10A	Radio
12	20A	Swing Flashers, Rear Working Lights, Alarm
13	10A	Gauge Cluster (Monitor)
14	20A	Wiper, Washer
15	10A	Solenoid Valve (Lever lock)
16	20A	Working Light (FRONT)
17	20A	Working Light (CAB) (Optional)
18	20A	Air Conditioner
19	10A	Controller (A/C)
20	20A	Spare 24V

FIGURE 4.56C YQ104FuseBox

https://truckmanualshub.com/

E. Hydraulic Lines, Tubes and Hoses

Since there is no definite time table for the replacement of hydraulic lines, tubes and hoses, inspect the following periodically for tightness and signs of damage. Replace all damaged lines, tubes and hoses with new parts. Refer to the parts manual for correct part numbers when ordering.

⚠ WARNING

DO NOT BEND, STRIKE OR DAMAGE HIGH PRESSURE LINES. DO NOT INSTALL BENT OR DAMAGED LINES, TUBES OR HOSES.
REPLACE ALL DAMAGED LINES, TUBES AND HOSES IMMEDIATELY TO AVOID ANY FIRE HAZARD.
TIGHTEN ALL LOOSE FITTINGS AND CONNECTIONS TO THE PROPER TORQUE VALUE.
CLEAN UP ALL FUEL AND OIL SPILLS IMMEDIATELY TO HELP PREVENT FIRES, SLIPPING, ACCIDENTS, ATTACHEMENT DROPPING, ETC.
NEVER USE HANDS TO CHECK FOR LEAKS
CAREFULLY INSPECT ALL LINES, TUBES AND HOSES FOR:
1. **FITTINGS & CONNECTIONS DAMAGED OR LEAKING.**
2. **OUTER COVERING OF HOSES WORN, CUT OR DAMAGED EXPOSING WIRE REINFORCEMENT.**
3. **HOSE SWELLING OR "BALLOONING".**
4. **EVIDENCE OF HOSE BEING KINKED OR COLLAPSED.**
5. **STEEL PROTECTIVE COVERING WORN OR DAMAGED.**
6. **LOOSE FITTINGS AND CONNECTIONS.**

MAKE CERTAIN ALL CLAMPS, GUARDS AND HEAT SHIELDS ARE IN PLACE AND SECURE. THIS WILL HELP PREVENT VIBRATION, EXCESSIVE WEAR OF COMPONENTS AND EXCESSIVE HEAT DURING OPERATION.

1. Heater Hoses

Inspect the heater hoses between heater and engine for signs of damage and wear. See Figure 4.57A.

2. Boom Cylinder Hoses & Tubes

Inspect boom head and rod hoses and tubes for damage, wear and loose connections. See Figure 4.57B.

3. Arm Cylinder Hoses & Tubes

Inspect arm head and rod hoses and tubes for damage, wear and loose connections. See Figure 4.57C.

4. Bucket Cylinder and Nibbler/Breaker Hoses & Tubes

Inspect bucket head and rod hoses and tubes for damage, wear and loose connections. See Figure 4.57D.

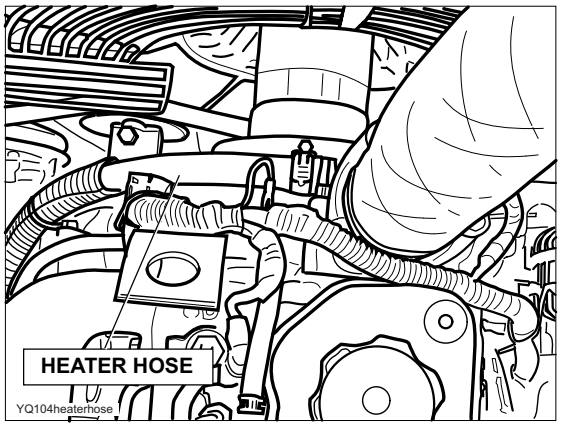


FIGURE 4.57A

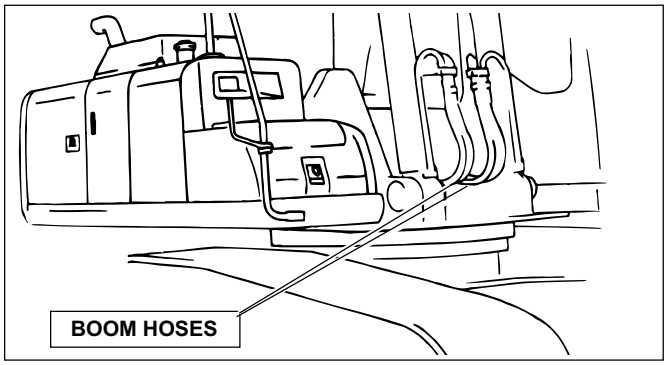


FIGURE 4.57B

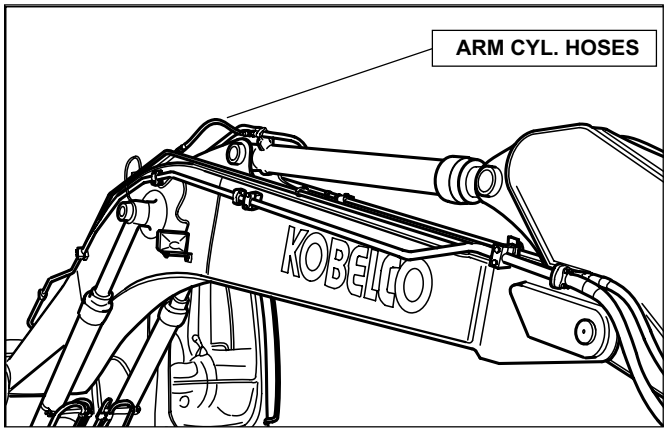


FIGURE 4.57C

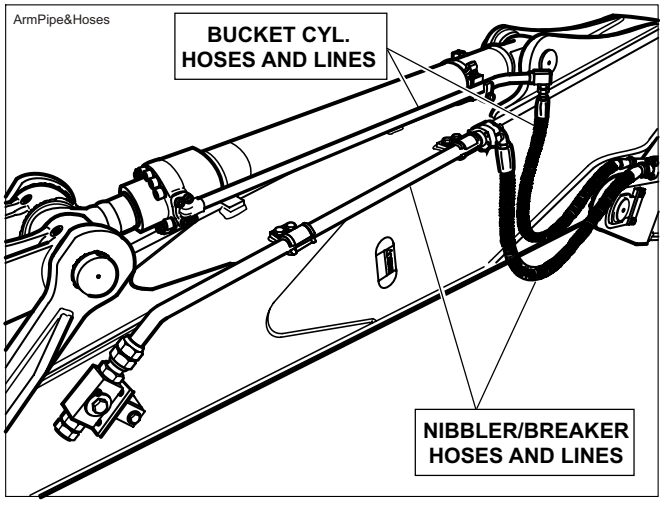


FIGURE 4.57D

4

https://truckmanualshub.com/

5. Fuel Lines and Hoses

Inspect fuel lines and hoses for damage, wear and loose connections. Repair or replace fuel lines and hoses before operating the machine. See Figure 4.58A.

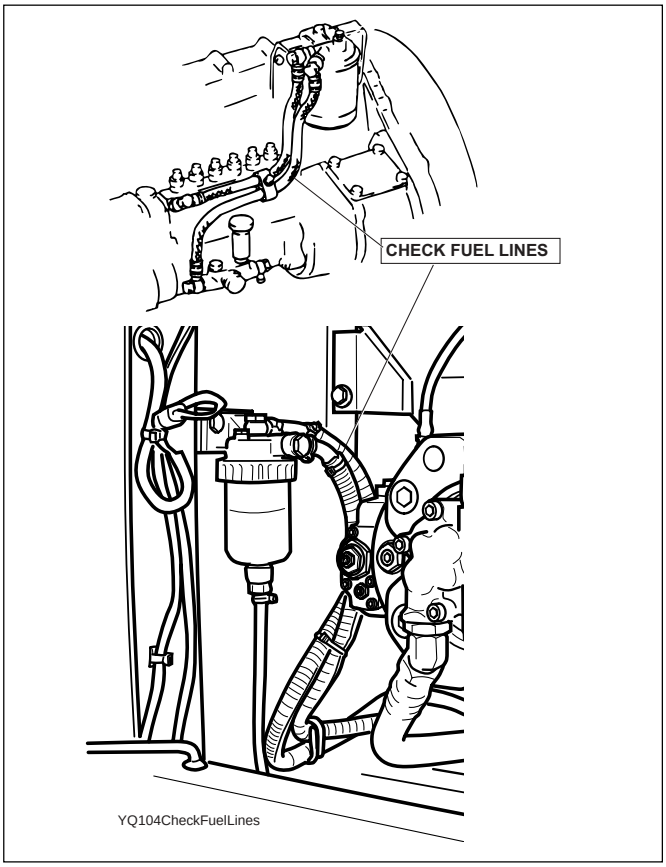


FIGURE 4.58A

6. Hydraulic Suction Tubes & Hoses

Inspect all hydraulic tubes and hoses for damage, wear and loose connections. See Figure 4.58B.

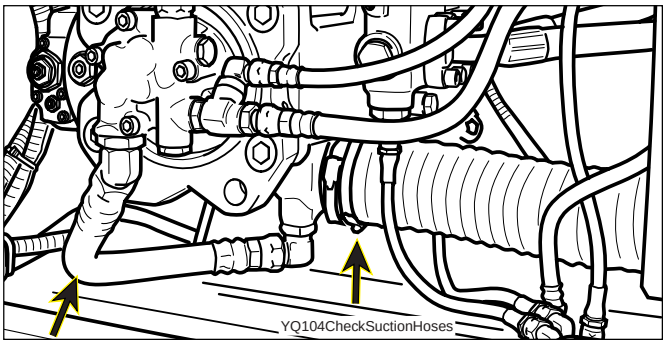


FIGURE 4.58B

F. Rear View Mirrors

Inspect the rear view mirrors. Make certain both sides rear view mirrors and internal rear view mirror are in place, properly adjusted, clean, and in good condition. Secure them tight to prevent them from breaking. See Figure 4.58C.

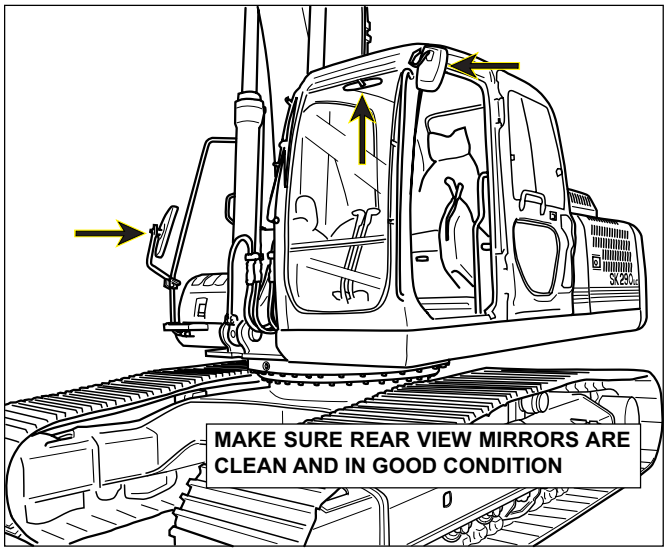


FIGURE 4.58C

https://truckmanualshub.com/

4.13 MACHINE STORAGE

A. Prepare Machine

Perform the following procedure to prepare the machine for long term storage.

1. Perform all inspection and maintenance procedures as previously described in this section.
2. Thoroughly clean the machine, inspect for damaged or worn parts and components and replace or repair all damaged or worn parts.

CAUTION

Protect CPU and all electrical components from water and steam when cleaning the machine.

3. Completely fill fuel tank with fresh, clean fuel to aid in preventing condensation of moisture inside the fuel tank. Make sure to use an anti-algae additive in the fuel tank.
4. Move machine to an indoor location for storage.
5. Operate bucket and arm completely “IN” extending cylinders. Then lower boom until attachment is resting on the floor. See Figure 4.59.
6. Coat cylinder rods with a heavy coat of grease to prevent corrosion during storage.
7. Remove batteries and store in a well ventilated, warm area.

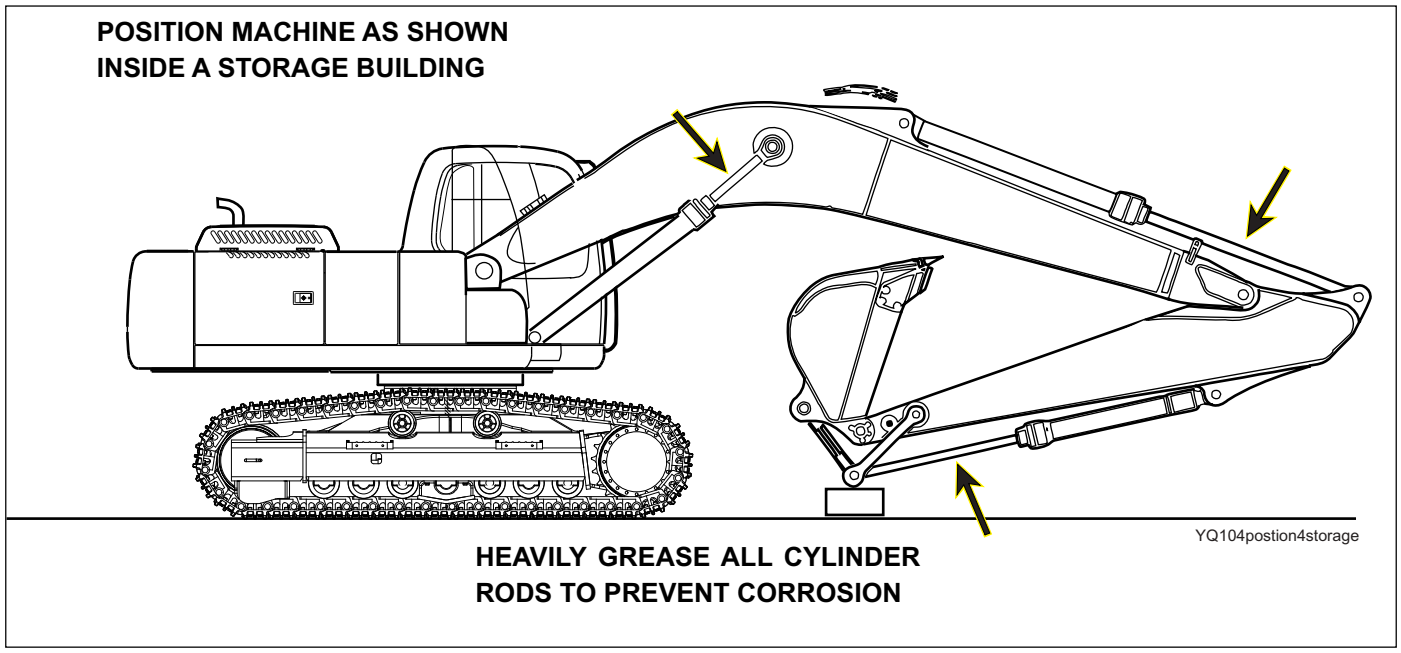


FIGURE 4.59

B. Care During Storage

1. Every 30 days during storage, it will be necessary to start and run the machine to circulate the fluids through the systems. Before starting clean cylinder rods and after running re-grease cylinder rods.

NOTE

Run and operate machine for approximately 1 hour to allow all fluids to circulate well and reach normal operating temperatures.

C. Removing Machine From Storage

1. Perform all inspection and maintenance procedures as described in this section before bringing machine out of storage for normal operation.
2. Remove drain plugs from travel motor and swing gear reduction units to drain off any moisture which may have accumulated during storage.
3. Carefully and closely inspect all hydraulic hoses after long periods of storage for signs of deterioration. Replace all hoses showing these signs.

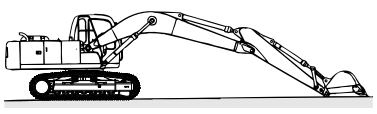
https://truckmanualshub.com/

MACHINE MODEL: SK_____ SERIAL NO.: _____ MACHINE HOURS:_____

ITEM	OK	MAINT. PERFORMED
ENGINE OIL LEVEL		
ENGINE COOLANT LEVEL		
CHECK FOR FLUID LEAKS		
CHECK BELT TENSION		
CHECK FUEL LEVEL		
DRAIN WATER SEPARATOR		
CHECK AIR CLEANER		
CHECK ENGINE ELECTRICAL		
DRAIN WATER FROM FUEL		
CLEAN PRE-FILTER BOWL		
CHANGE ENGINE OIL		
CHANGE OIL FILTER		
CHANGE FUEL FILTER		
CHANGE WATER SEPARATOR		
CHANGE COOLANT FILTER		
CHECK AIR INTAKE SYSTEM		
CHECK FAN ASSEMBLY		
CHECK BELT TENSIONER		
CHECK VIBRATION DAMPER		
CLEAN RADIATOR		
CLEAN DEBRIS SCREEN		
CHANGE ENGINE COOLANT		
AIR CLEANER ELEMENTS		
ADJUST VALVE CLEARANCE		
CHANGE ETHER CYLINDER		
HYDRAULIC OIL LEVEL		
CHECK HYD FUNCTIONS		
CHECK FOR OIL LEAKS		
CHECK HOSES/LINES		
CLEAN SUCTION SCREEN		
CHANGE RETURN FILTER		
PILOT MANIFOLD FILTER		
CHANGE HYDRAULIC OIL		
CLEAN HYDRAULIC TANK		
INSPECT ALL WIRING		
INSPECT REARVIEW MIRRORS		
BATTERY SERVICE		

ITEM	OK	MAINT. PERFORMED
HYD. FUNCTION OPERATION		
CHECK SWITCHES		
CHECK TRAVEL ALARM		
CHECK SWING BRAKE		
CHECK WARNING LIGHTS		
CHECK BUZZER		
CHECK GAUGES		
CHECK HORN		
CHECK DISPLAY MONITOR		
SWING REDUCTION OIL		
SLEWING RING GEAR		
GREASE BATH LEVEL		
SLEWING RING PINION		
SLEWING RING SEAL		
SWIVEL JOINT SEALS		
DRAIN WATER FROM BATH		
GREASE SLEWING RING		
CHANGE GREASE BATH		
CHECK BOLTS/HARDWARE		
CHECK FOR OIL LEAKS		
CHECK LINES FOR DAMAGE		
CHECK STEPS		
CHECK FRAME STRUCTURE		
CHECK TRACKS & LINKS		
CHECK SPROCKET WEAR		
CHECK IDLER WEAR		
CHECK ROLLER WEAR		
CHECK TRACK TENSION		
ADJUST TRACK TENSION		
TRAVEL REDUCTION OIL		
CHECK BOOM & ARM		
BUCKET TEETH		
SIDE CUTTERS		
GREASE BOOM PINS		
GREASE ARM PINS		
GREASE BUCKET PINS		
CHECK COOLANT ADDITIVE		

KOBELCO CONSTRUCTION MACHINERY AMERICA LLC



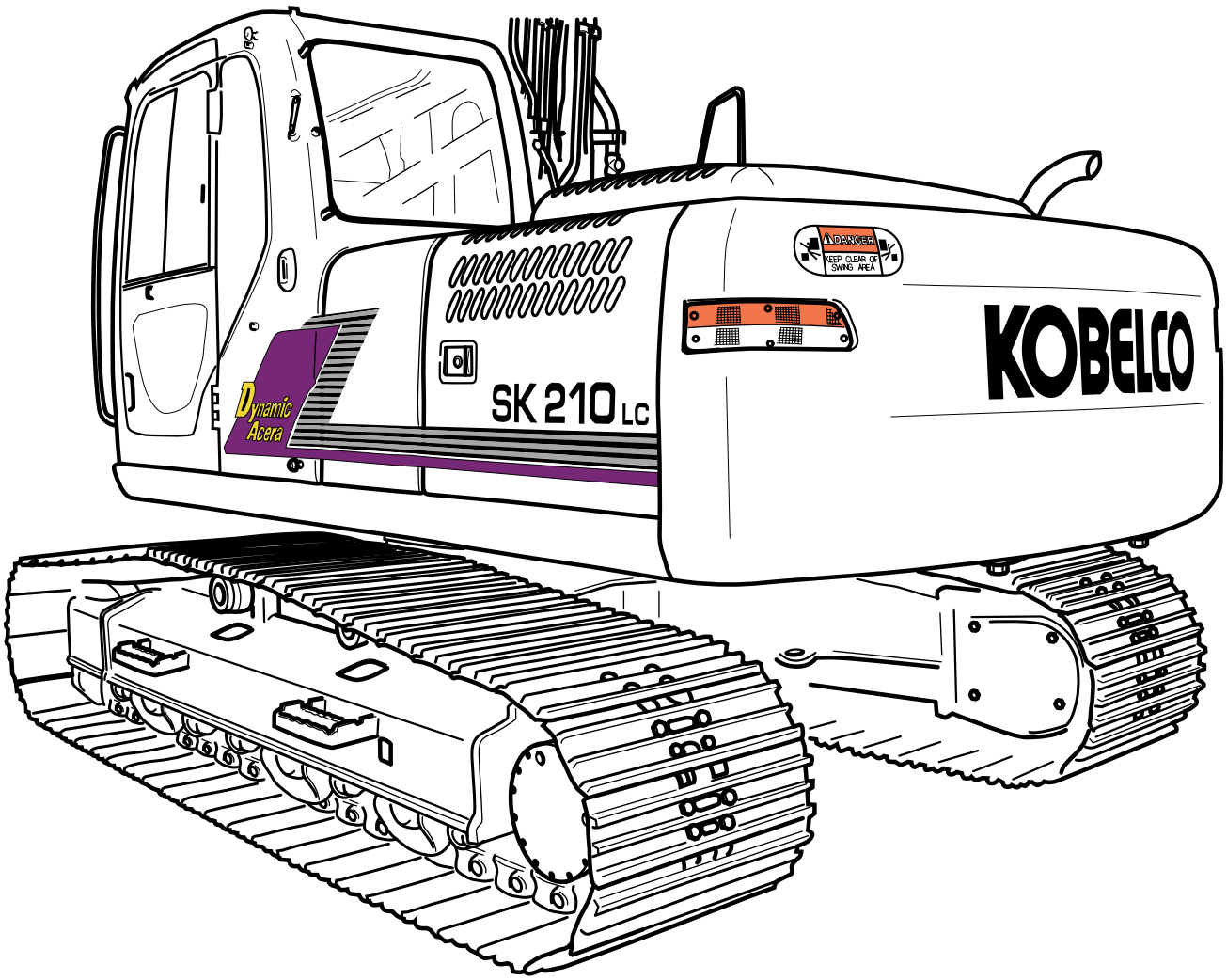
CALHOUN, GEORGIA • HOUSTON, TEXAS

These item include non-equipped parts by the machine specification.

MECHANIC:

SIGNATURE: DATE:

https://truckmanualshub.com/



Kobelco Construction Machinery America LLC
Cylinder & Motor
Cycle Times

KOBELCO

Kobelco Construction Machinery America LLC

https://truckmanualshub.com/

TABLE OF CONTENTS

CYLINDER CYCLE TIME TESTS ..... **4 ~ 8**
A. Tools & Equipment 4
B. Machine Settings & Site Condition 4
C. Boom Cylinder 4
D. Arm Cylinder 5
E. Bucket Cylinder 6

CYLINDER DRIFT **7**
A. Tools & Equipment 7
B. Machine Settings & Site Condition 7
C. Test Procedure 7

SWING SPEED **8**
A. Tools & Equipment 8
B. Machine Settings & Site Condition 8
C. Test Procedure 8
SWING STOPPING **9**
A. Tools & Equipment 9
B. Machine Settings & Site Condition 9
C. Test Procedure 9
SWING DRIFT **10**
A. Tools & Equipment 10
B. Machine Settings & Site Condition 10
C. Test Procedure 10

SWING BEARING UP-DOWN (VERTICAL) MOVEMENT **11**
A. Tools & Equipment 11
B. Machine Settings & Site Condition 11
C. Test Procedure 11
SWING BEARING SIDE TO SIDE (HORIZONTAL) MOVEMENT **12**
A. Tools & Equipment 12
B. Machine Settings & Site Condition 12
C. Test Procedure 12

SWING MOTOR OIL CASE DRAIN ..... **13 ~ 15**
A. Tools & Equipment 13
B. Machine Settings & Site Condition 13
C. Test Procedure ..... 13 ~ 14
TRAVEL MOTOR OIL CASE DRAIN ..... **15 ~ 16**
A. Tools & Equipment 15
B. Machine Settings & Site Condition 15
C. Test Procedure ..... 15 ~ 16

TRAVEL PERFORMANCE ..... **17 ~19**
A. Tools & Equipment 17
B. Machine Settings & Site Condition 17
C. Test Procedure 17

TRAVEL SPEED **18**
TRAVEL DEVIATION **19**

https://truckmanualshub.com/

BUCKET SELECTION GUIDE

Bucket selection is extremely important to a machine's productivity, durability and stability.

Choosing an excessively large bucket can reduce productivity due to slower than normal cycle times.

Using an oversized or overly wide bucket, in severe conditions, such as mining, will lead to durability problems for both the machine and bucket involved.

Stability will be adversely affected using a bucket that is unnecessarily large.

The Bucket Selection Charts listed in the Specification's Section (6) are to be used as general guidelines.

If the buckets used locally vary in weight from these sample buckets, it will be necessary to adjust the bucket capacity accordingly. A heavier bucket must correspond to a reduced capacity.

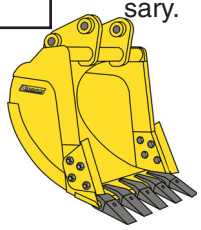
If the material density (weight) exceeds guideline specifications then the bucket capacity must be reduced.

If the machine is to continuously dig rock, wasted shale, river cobbel or other severe applications the narrowest bucket possible should be utilized. This will allow the greatest possible penetration and minimal twisting of the attachment (boom and stick). Bucket capacity is not to be the prime consideration for severe applications.

If a machine is to exclusively load trucks at close radius then the bucket loads can be adjusted up 5% to 7 % from the Lift Chart values listed in the Specification's Section, due to a close in dump radius.

If a machine is to be utilized exclusively to spoil pile, which causes a large radius dump cycle, applicable loads may have to be adjusted down by 5% from the Lift Chart Values (Section VI) or stability complaints may occur.

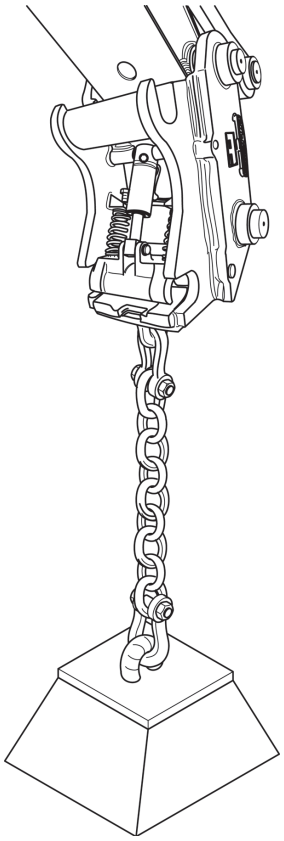
See the General Specification Section, - "Bucket Selection Charts" to select the appropiate bucket size according to the application.



USE OF OPTIONAL ATTACHMENTS

If a machine is equipped with optional attachments such as a bucket quick coupler, and/or thumbs, (either hydraulic or mechanical) applicable bucket sizes and suspended loads must be reduced in direct porportion to the weight or combined weight of these attachments. Failure to consider the added weight of such attachments will cause stability complaints. Additionally these weights of such attachments must be considered when the lift chart is referred to before lifting a load. The additional weight of heavy buckets, couplers, and thumbs, must be deducted from allowable lift capacities. See Lift Charts - Section VI.

Use of quick couplers for bucket interchangeability will reduce effective arm digging force and particularly bucket breakout force due to an increase of tooth tip radius. Example: Some couplers can increase tooth tip radius up to 12 inches. If this is used with a 48" tooth tip radius, effective bucket breakout force can be reduced 25%, a 5% reduction in effective arm force, a reduction in lift capacities of up to 600 lbs. It is, also, important to mention that some quick couplers offer a great advantage, particularly when lifting loads. Some quick couplers allow the operator to quickly remove the bucket for lifting purposes; therefore, increasing lifting capacity, height, and visibility.



To obtain the proper lifting capacity when a quick coupler is used, proceed as follows: deduct the weight of the standard bucket from the lifting chart, add the weight of the quick coupler plus the weight of the attachment to be coupled. Consideration of the Center of Gravity of the new attachment + coupler may be necessary.

https://truckmanualshub.com/

CYLINDER CYCLE TIME TEST

NOTE

The measuring time of the cylinder cycle does not include the cushion stroke times. Only measure time up to the beginning of the cushion stroke.

A. Tools & Equipment

The following tools and equipment will be required to perform the cylinder cycle time test:

1. Stopwatch.
2. Thermometer to read Hydraulic Oil Temperature.

B. Machine Settings & Site Conditions

1. Machine throttle in "High" idle position.
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
3. Firm, level testing site.
4. Verify that engine RPM's are correct to specifications.

C. Boom Cylinder Cycle Time Test

1. Move the machine to a firm, level testing area.
2. Place the machine throttle control to "HIGH" idle and the KPSS Work Mode Switch to "M" Mode. See Figure 3.1
3. Fully extend the Bucket Cylinder. See Figure 3.2.
4. Fully retract the Arm Cylinder. See Figure 3.2.
5. Lower Boom until bucket rests on the ground.
6. Raise Boom (extending the cylinders) at full stroke of the control and measure the time for the boom cylinder to reach the cushion stroke. Record the time. See Figure 3.3.
7. Lower the boom (retracting cylinders) at full stroke and measure the time for the bucket to reach ground level. Record the time. See Figure 3.3.
8. Repeat steps 5 and 6 two more times and record the stopwatch readings. Average the readings and compare the average to the Boom Cylinder Cycle Time Specification Chart.

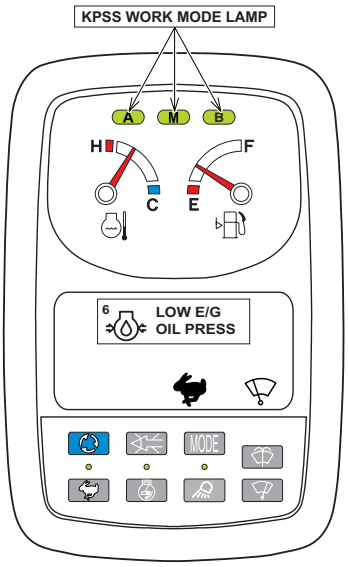
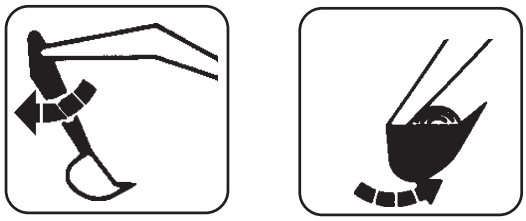


FIGURE 3.1



ARM OUT
CYLINDER RETRACTED

BUCKET IN
CYLINDER EXTENDED

FIGURE 3.2

DO NOT TIME CUSHION STROKE OF CYLINDER DURING TEST

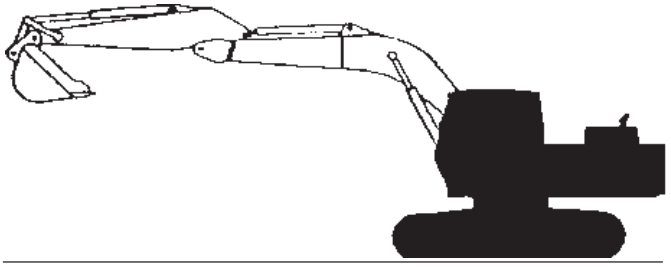


FIGURE 3.3

BOOM CYLINDER CYCLE TIME SPECIFICATIONS

MODEL	CYLINDER POSITION	M-MODE
*SK160	EXTENSION	2.6 - 3.2
*SK160	RETRACTION	2.3 - 2.9
SK210	EXTENSION	2.9 - 3.5
SK210	RETRACTION	2.5 - 3.1
SK250	EXTENSION	2.8 - 3.4
SK250	RETRACTION	2.5 - 3.1
SK290	EXTENSION	2.9 - 3.4
SK290	RETRACTION	2.6 - 3.1
SK330	EXTENSION	3.1 - 3.6
SK330	RETRACTION	2.7 - 3.3
SK480	EXTENSION	3.1 - 3.7
SK480	RETRACTION	2.8 - 3.4

*SK160 and ED190 same

Unit: Seconds

https://truckmanualshub.com/

CAUTION

THIS TEST IS DESIGNED FOR STANDARD BOOM, ARM AND BUCKET. IF THE MACHINE BEING TESTED HAS ANY OPTIONAL EQUIPMENT, CHECK TO MAKE CERTAIN THERE WILL BE NO INTERFERENCE WITH THE CAB BEFORE PERFORMING THE TEST !!

D. Arm Cylinder Cycle Time Test

NOTE

The measuring time of the cylinder cycle does not include the cushion stroke times. Only measure time up to the beginning of the cushion stroke.

1. Move the machine to a firm, level testing area.
2. Place the machine throttle control to "HIGH" idle and The KPSS Work Mode Switch to "M" Mode. See Figure 3.4.
3. Fully extend Boom Cylinder. See Figure 3.5.
4. Fully retract Bucket Cylinder. See Figure 3.5.
5. Fully extend the Arm (retracting cylinder).
6. At full stroke of the control, bring the arm all the way in (extending cylinder) and measure the time it takes for the arm cylinder to reach the cushion stroke. Record the time. See Figure 3.6.
7. At full stroke of the control, fully extend the arm (retracting cylinder) and measure the time it takes until the cylinder reaches the cushion stroke. Record the time. See Figure 3.6.
8. Repeat steps 6 and 7 two more times. Average the recorded times and compare the average to the Arm Cylinder Cycle Time Specification Chart.

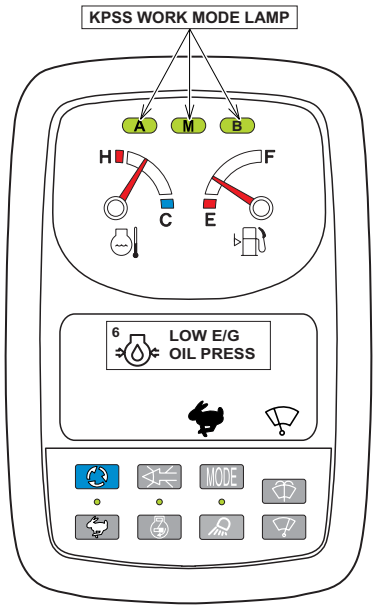
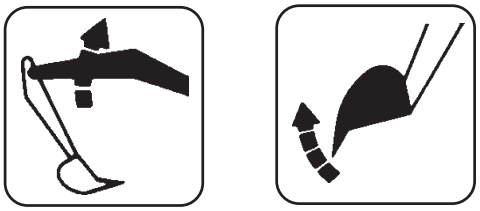


FIGURE 3.4



BOOM UP
CYLINDER EXTENDED

BUCKET OUT
CYLINDER RETRACTED

FIGURE 3.5

DO NOT TIME CUSHION STROKE OF CYLINDER DURING TEST

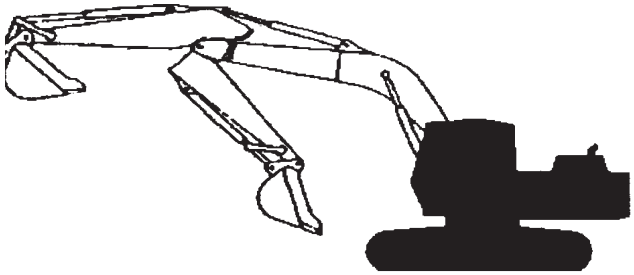


FIGURE 3.6

ARM CYLINDER CYCLE TIME SPECIFICATIONS

MODEL	CYLINDER POSITION	M-MODE
*SK160	EXTENSION	3.1 - 3.7
*SK160	RETRACTION	2.4 - 3.0
SK210	EXTENSION	3.1 - 3.7
SK210	RETRACTION	2.4 - 3.0
SK250	EXTENSION	3.3 - 3.9
SK250	RETRACTION	2.5 - 3.1
SK290	EXTENSION	3.6 - 4.2
SK290	RETRACTION	2.7 - 3.3
SK330	EXTENSION	4.1 - 5.1
SK330	RETRACTION	3.1 - 3.7
SK480	EXTENSION	4.1 - 4.9
SK480	RETRACTION	2.9 - 3.5

*SK160 and ED190 same

Unit: Seconds

https://truckmanualshub.com/

E. Bucket Cylinder Cycle Time Test

NOTE

The measuring time of the cylinder cycle does not include the cushion stroke times. Only measure time up to the beginning of the cushion stroke.

1. Move the machine to a firm, level testing area.
2. Place the machine throttle control to "HIGH" idle and The KPSS Work Mode Switch to "M" Mode. See Figure 3.7.
3. Raise Boom to full height using "Boom Up" control.
4. Adjust the arm until the arm is at 90° to arm cylinder. See Figure 3.8.
5. Lower boom until the arm tip is parallel with the boom foot. See Figure 3.8.
6. Bring bucket all the way in.
7. Operate bucket out (retracting cylinder) at full stroke of control and measure the time it takes for the bucket cylinder to reach the cushion stroke (if equipped). Record the time. See figure 3.9.
8. Operate the bucket in (extending cylinder) at full stroke of control and measure the time it takes for the bucket cylinder to reach the cushion stroke (if equipped). Record the time. See Figure 3.9.
9. Repeat steps 7 and 8 two more times. Average the readings and compare to the Bucket Cylinder Cycle Time Specification Chart.

BUCKET CYLINDER CYCLE TIME SPECIFICATIONS

MODEL	CYLINDER POSITION	M-MODE
*SK160	EXTENSION	3.5 - 4.1
*SK160	RETRACTION	1.9 - 2.5
SK210	EXTENSION	2.3 - 2.9
SK210	RETRACTION	1.7 - 2.3
SK250	EXTENSION	2.4 - 3.0
SK250	RETRACTION	1.8 - 2.4
SK290	EXTENSION	2.6 - 3.2
SK290	RETRACTION	2.3 - 2.9
SK330	EXTENSION	2.7 - 3.3
SK330	RETRACTION	2.1 - 2.7
SK480	EXTENSION	2.7 - 3.3
SK480	RETRACTION	2.1 - 2.7

*SK160 and ED190 same

Unit: Seconds

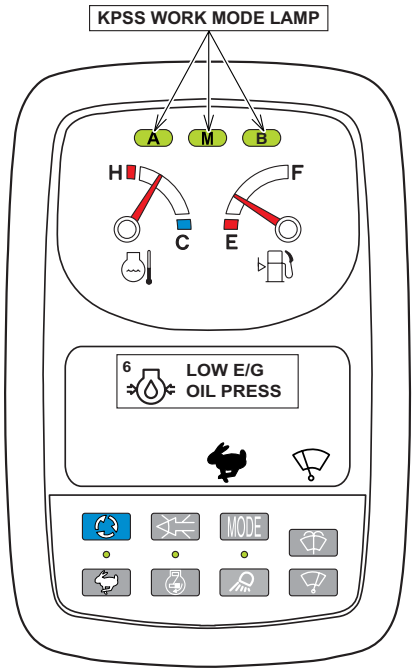


FIGURE 3.7

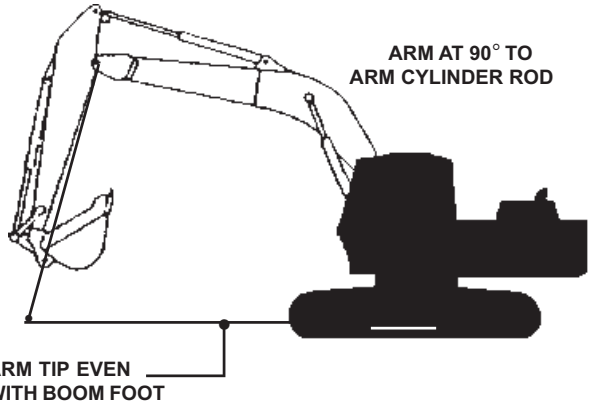


FIGURE 3.8

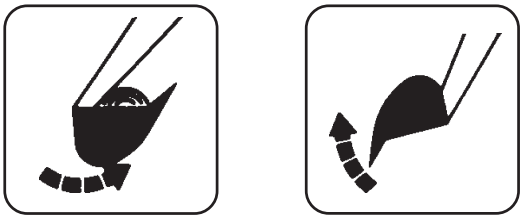


FIGURE 3.9

https://truckmanualshub.com/

CYLINDER DRIFT

A. Tools & Equipment

The following tools and equipment will be required to perform the cylinder drift test:

1. Measuring tape.
2. Stopwatch.
3. Device for marking starting points.
4. Thermometer for hydraulic oil temperature.

B. Machine Settings & Site Conditions

1. Machine engine "OFF".
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
3. Firm, level testing site.

C. Cylinder Drift Test

1. Move the machine to a firm, level test site and allow the hydraulic oil temperature to reach 45°C to 55°C (113°F to 131°F).
2. Operate the arm out control until arm is completely out (retract cylinder completely).
3. Operate the bucket in control until bucket is completely in (extend cylinder completely).
4. Adjust the boom up or down with control until bucket is 1.5m (4'-11") from ground level to tip of teeth. See Figure 3.11.
5. Turn engine "OFF" and allow machine to sit for five minutes.
6. Repeat steps 4 through 6 two more times and average the measurements. Compare the average to the Cylinder Drift Specification Chart.

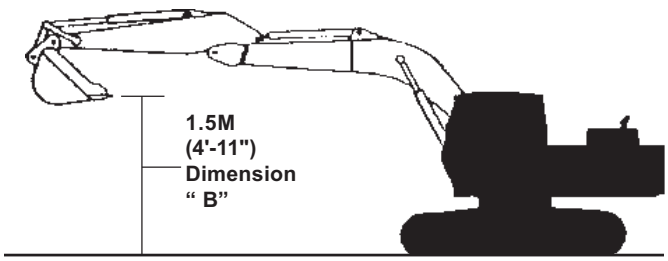


FIGURE 3.11

CYLINDER DRIFT SPECIFICATION CHART

MODEL	BOOM DOWN (RETRACT)	ARM DOWN (EXTEND)	BUCKET IN (EXTEND)	BUCKET FALL (TOP END)
*SK160	MAXIMUM	MAXIMUM	MAXIMUM	MAXIMUM
*SK160	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK210	MAXIMUM	MAXIMUM	MAXIMUM	MAX./10MIN
SK210	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK250	MAXIMUM	MAXIMUM	MAXIMUM	MAX./10MIN
SK250	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK290	MAXIMUM	MAXIMUM	MAXIMUM	MAX/10MIN
SK290	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK330	MAXIMUM	MAXIMUM	MAXIMUM	MAX/10MIN
SK330	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
SK480	MAXIMUM	MAXIMUM	MAXIMUM	MAX/10MIN
SK480	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
Unit: mm (inches)				Dimension " B"

*SK160 and ED190 same

https://truckmanualshub.com/

SWING SPEED

A. Tools & Equipment.

1. Stopwatch
2. Device for Marking Starting Point
3. Measuring Tape

B. Machine Settings & Site Condition

1. Machine throttle in "High" Idle position.
2. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
3. Firm, level testing site.
4. Verify that engine RPM's are to correct specification.

C. Swing Speed Test

1. Move the machine to a firm, level testing area.

WARNING

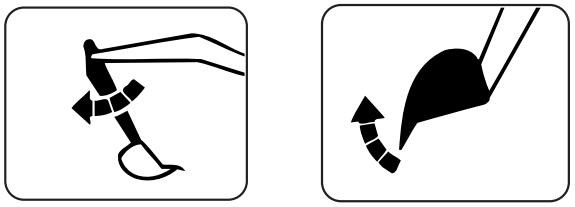
• MAKE CERTAIN THE TEST AREA WILL ALLOW 360° SWING OF THE MACHINE.
• MAKE CERTAIN NO PERSONS OR OTHER EQUIPMENT ARE WITHIN 10 FEET OF THE SWING AREA.

2. Move throttle to High Idle and place KPSS switch in "M" mode.
3. Operate the Arm Out Control until arm is completely out (retracting cylinder). See Figure 4.2.
4. Operate the Bucket Out Control until bucket is completely out (retracting cylinder). See Figure 4.1.
5. Adjust boom up or down until bucket teeth are 1.5m (4'-11") from ground level. See Figure 4.2.

CAUTION

*Turn on Swing Flasher and sound horn **BEFORE** starting swing motion. See Figure 4.3.*

6. After sounding horn and with swing flashers on, operate swing control at full stroke for two complete rotations clockwise. Time the last rotation and record the reading. Bring swing to a complete stop.
7. Repeat steps 3 through 5 two more times and average the readings. Compare the average to the Swing Speed Specification Chart.
8. Repeat steps 2 through 7 swinging counterclockwise.



ARM OUT CYLINDER RETRACTED — BUCKET OUT CYLINDER RETRACTED

FIGURE 4.1

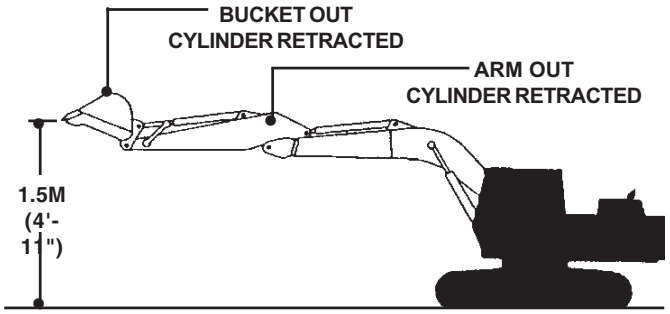


FIGURE 4.2

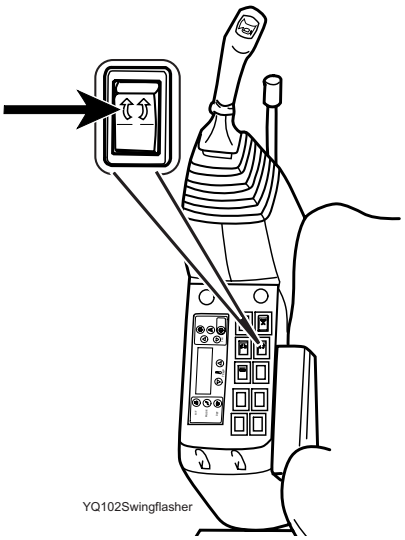


FIGURE 4.3

SWING SPEED SPECIFICATIONS

MODEL	CLOCKWISE / COUNTERCLOCKWISE
*SK160	4.8 - 5.6
*SK160	4.8 - 5.6
SK210	4.9 - 5.3
SK210	4.9 - 5.3
SK250	5.2 - 5.8
SK250	5.2 - 5.8
SK290	5.5 - 6.1
SK290	5.5 - 6.1
SK330	6.4 - 7.0
SK330	6.4 - 7.0
SK480	6.6 - 7.2
SK480	6.6 - 7.2

*SK160 and ED190 same

Unit: Seconds per Revolution

https://truckmanualshub.com/

SWING STOPPING

A. Tools & Equipment.
1. Device for Marking Starting Point

B. Machine Settings & Site Condition
1. Machine throttle in "High" Idle position.
2. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
3. Firm, level testing site.

C. Swing Stopping Test
1. Move the machine to a firm, level testing area.

WARNING

• MAKE CERTAIN THE TEST AREA WILL ALLOW 360° SWING OF THE MACHINE.
• MAKE CERTAIN NO PERSONS OR OTHER EQUIPMENT ARE WITHIN 10 FEET OF THE SWING AREA.

2. Move throttle to High Idle and place KPSS switch in "M" mode.
3. Operate the Arm Out Control until arm is completely out (retracting cylinder). See Figure 4.4.
4. Operate the Bucket In Control until bucket is completely in (extending cylinder). See Figure 4.4.
5. Adjust boom up or down until bucket teeth are 1.5mm (4'-11") from ground level. See Figure 4.5.

CAUTION

*Turn on Swing Flasher and sound horn **BEFORE** starting swing motion. See Figure 4.6.*

6. After sounding horn and with swing flashers on, operate swing control at full stroke for one complete rotation clockwise. When bucket reaches starting point, release the swing control and allow rotation to completely stop.
7. Measure the degree of angle from the starting point to the stopping point of the bucket. Record the angle degree. Repeat step 6 two more times and average the readings. Compare to Swing Stop Specification Chart. See Figure 4.7.
8. Repeat steps 2 ~ 7 swinging counterclockwise.

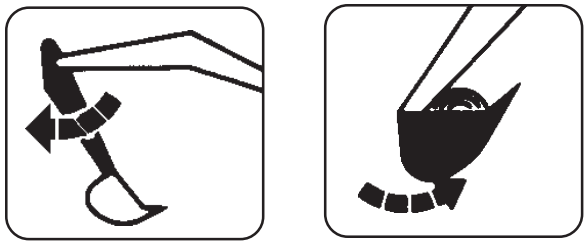


FIGURE 4.4

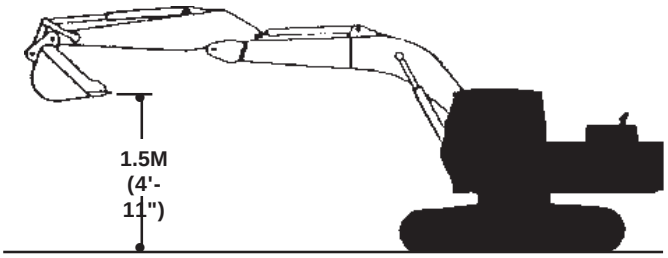


FIGURE 4.5

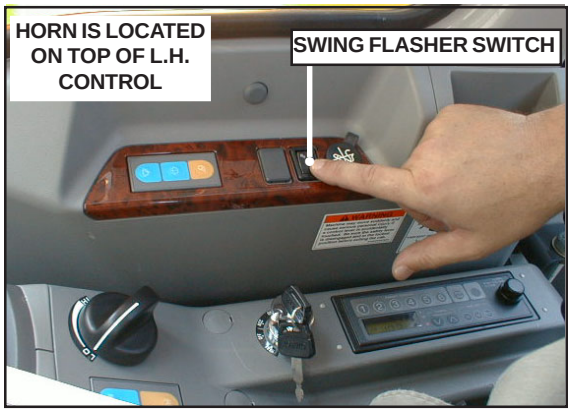


FIGURE 4.6

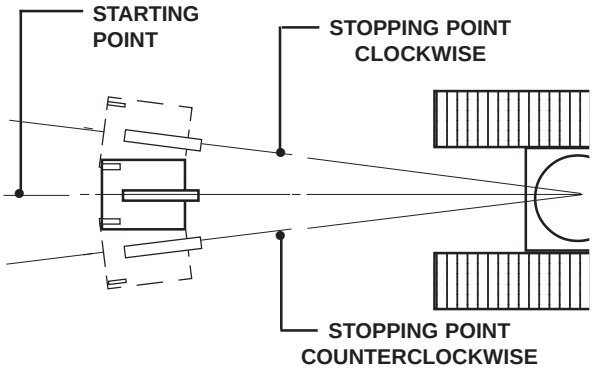


FIGURE 4.7

SWING STOPPING SPECIFICATIONS

MODEL	CLOCKWISE / COUNTERCLOCKWISE
*SK160	75°-90°
SK210	75°-90°
SK250	75°-90°
SK290	75°-90°
SK330	75°-90°
SK480	75°-90°

*SK160 and ED190 same

Unit: degree of angle

https://truckmanualshub.com/

SWING DRIFT

A. Tools & Equipment.

1. Device for Marking Starting Point
2. Stopwatch

B. Machine Settings & Site Condition

1. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
2. Firm testing area with 10° slope.

C. Swing Drift Test

1. Move the machine to a firm testing area with 10° slope as shown in Figure 4.8.
2. Operate the Bucket In Control until bucket is completely in (extending cylinder). See Figure 4.9.
3. Operate the Arm Out Control until the arm is completely out (retracting cylinder). See Figure 4.9.
4. Adjust the boom up or down until bucket teeth are 1.5m (4'-11") from ground level. See Figure 4.10.
5. Stop engine and allow the machine to sit for 20 seconds.
6. Measure the distance the swing drifted, down grade, while sitting. Record the distance. See Figure 4.11.
7. Repeat steps 2 through 6 two more times. Average the distances and compare average to the Swing Drift Specification Chart.
8. Start engine and swing machine 180°. Repeat steps 2 through 7.

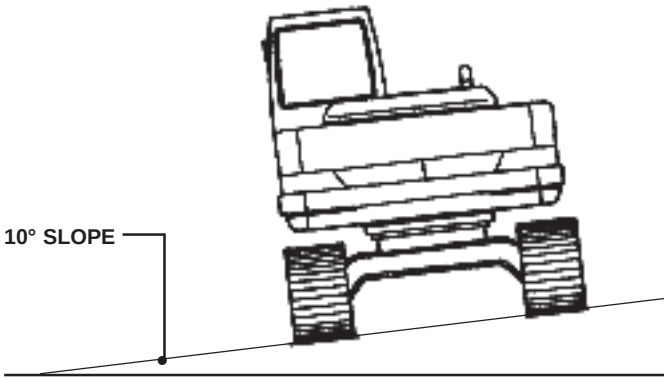


FIGURE 4.8

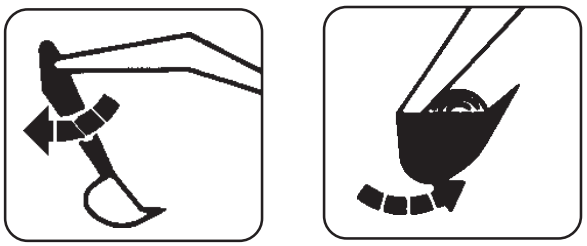


FIGURE 4.9

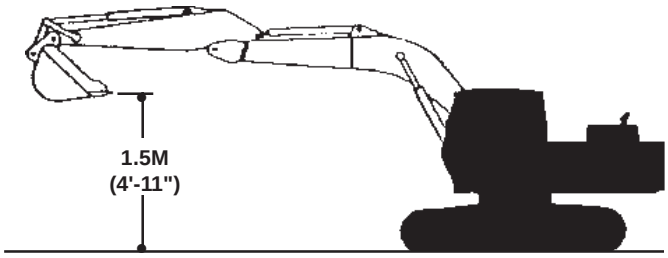


FIGURE 4.10

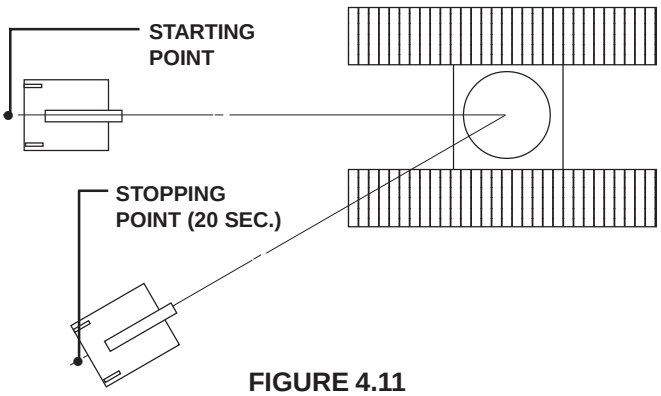


FIGURE 4.11

SWING DRIFT SPECIFICATIONS

MODEL	SPECIFICATION
SK160 ~ SK480	10mm (0.393") / 20 Seconds

https://truckmanualshub.com/

SWING BEARING UP-DOWN (VERTICAL) MOVEMENT

A. Tools & Equipment.

1. Dial Indicator
2. Magnetic Base Assembly

B. Machine Settings & Site Condition

1. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
2. Firm, level testing area.

WARNING

• BE EXTREMELY CAUTIOUS WHILE TAKING READINGS FROM DIAL INDICATOR.
• WEAR APPROVED SAFETY CLOTHES, SHOES AND HARD HAT WHEN PERFORMING MAINTENANCE OR TEST PROCEDURES.

C. Swing Bearing Up-Down (Vertical) Movement Test

1. Move the machine to a firm, level testing area.
2. Attach the Dial indicator to the mounting area of the swing bearing at the location of a swing bearing mouning bolt. See Figure 4.12.
3. Operate the Arm Control until the arm is approximately at 90° with boom. See Figure 4.13.
4. Operate the Bucket Control until bottom of bucket is even with ground level. See Figure 4.13.
5. Adjust the boom up or down until bucket is resting on the ground. With Boom Control, raise the machine until tracks are 450mm (17.75") off the ground. See Figure 4.13.
6. Set Dial Indicator to "0".
7. Operate Boom Up and Arm Out Controls until arm is completely out. See Figure 4.14.
8. Operate Bucket Control until bucket is completely out and operate boom until bucket teeth are 450mm (17.75") from ground. See Figure 4.14.
9. Record reading from dial indicator and repeat steps 3 through 9 two more times. Compare reading to Up-Down Movement Specification Chart.
10. Swing Machine 180° and repeat steps 2 through 9.

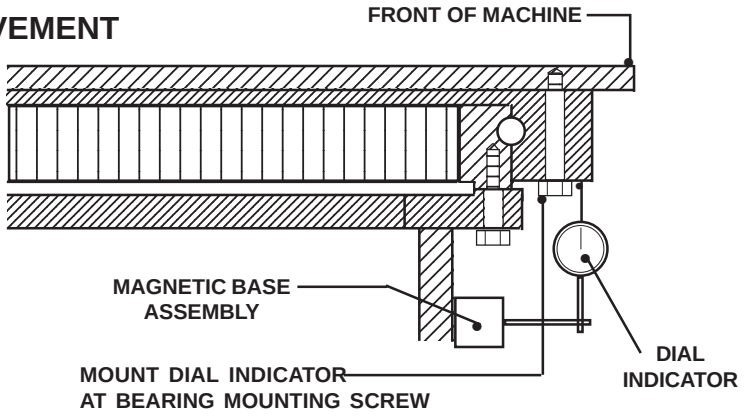


FIGURE 4.12

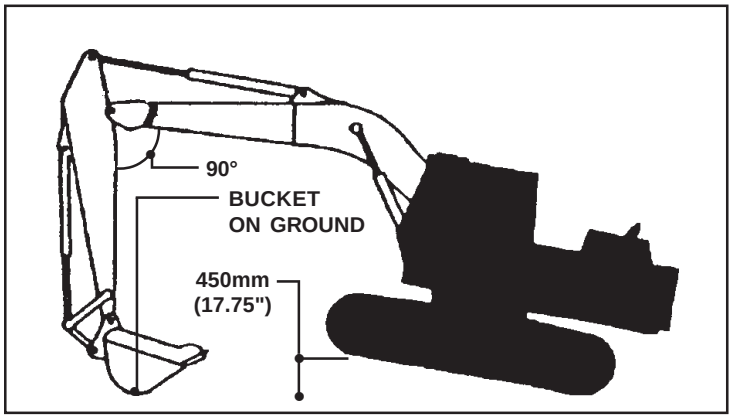


FIGURE 4.13

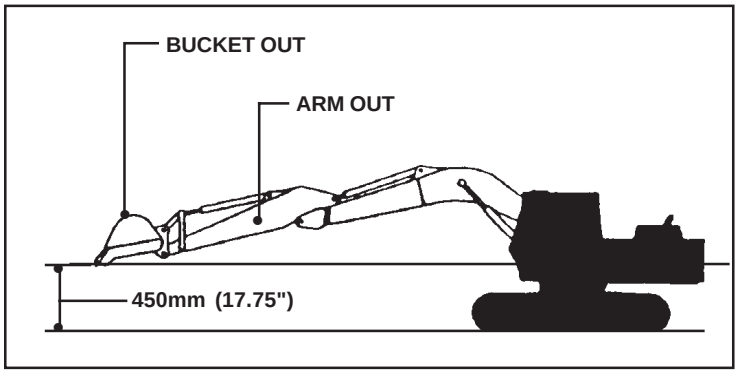


FIGURE 4.14

SWING BEARING UP-DOWN MOVEMENT SPECIFICATIONS

MODEL	STANDARD	MAX. MOVEMENT
*SK160	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK210	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK250	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK290	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK330	0.8 ~ 1.8 (.030~.070)	3.6 (.140)
SK480	0.8 ~ 1.8 (.030~.070)	3.6 (.140)

*SK160 and ED190 same

Unit: mm (inches)

https://truckmanualshub.com/

SWING BEARING SIDE TO SIDE (HORIZONTAL) MOVEMENT

A. Tools & Equipment.

1. Measuring Tape
2. Device for marking starting point.

B. Machine Settings & Site Condition

1. Hydraulic oil temperature at 45°C to 55° (113°F to 131°F).
2. Firm, level testing area.

WARNING

• BE EXTREMELY CAUTIOUS WHILE MOVING THE BUCKET FROM SIDE TO SIDE.
• WEAR APPROVED SAFETY CLOTHES, SHOES AND HARD HAT WHEN PERFORMING MAINTENANCE OR TEST PROCEDURES.

C. Swing Bearing Side To Side (Horizontal) Movement Test

1. Move the machine to a firm testing area.
2. Operate the Bucket Control until bucket is completely out (retracting cylinder). See Figure 4.15.
3. Operate the Arm Control until arm is completely out (retracting cylinder). See Figure 4.15.
4. Operate boom up or down until bucket teeth are 10mm (0.04") from ground level. See Figure 4.16.
5. Mark center of bucket with marking device.
6. Make a mark on ground in line with mark on bucket. See Figure 4.17.
7. Manually move bucket to the left and record distance the center of bucket moved to the left of the mark on ground. See Figure 4.17.
8. Move bucket to the right and record the distance the center of the bucket moved to the right of mark on ground.
9. Repeat steps 7 and 8 two more times.
10. Average the readings and compare to the Side To Side (Horizontal) Movement Specification Chart.
11. Swing Machine 180° and repeat steps 1 through 10.

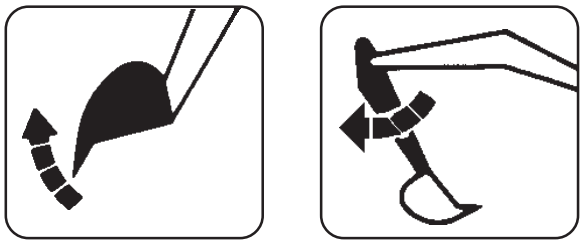


FIGURE 4.15

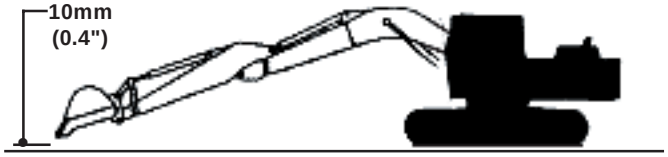


FIGURE 4.16

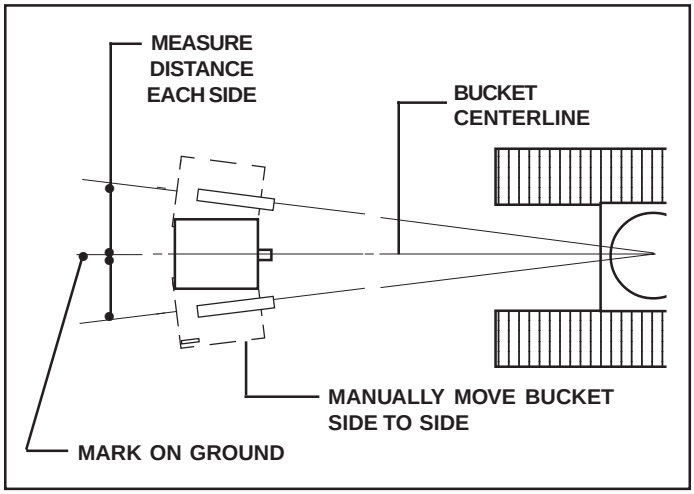


FIGURE 4.17

SWING BEARING SIDE TO SIDE (HORIZONTAL) MOVEMENT SPECIFICATIONS

MODEL	STANDARD	MAX. MOVEMENT
*SK160	60 (2.36)	120 (4.72)
SK210	60 (2.36)	120 (4.72)
SK250	60 (2.36)	120 (4.72)
SK290	60 (2.36)	120 (4.72)
SK330	60 (2.36)	120 (4.72)
SK480	50 (1.97)	120 (4.72)

*SK160 and ED190 same

Unit: mm (inches)

https://truckmanualshub.com/

SWING MOTOR OIL CASE DRAIN

A. Tools & Equipment

1. 38 Liter (10 U.S. Gal.) graduated bucket.
2. Hydraulic line wrenches
3. Hydraulic line plugs
4. Hydraulic fitting caps
5. Stopwatch
6. Thermometer

B. Machine Settings & Site Condition

1. Machine throttle in "High" idle position.
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F)
3. Firm, level testing area.
4. Verify that engine RPM's are at correct specification

C. Swing Motor Oil Case Drain Test

1. Move machine to a firm, level testing area.

2. Allow the hydraulic oil to reach a temperature of 45°C to 55°C (113°F to 131°F).

3. Operate the Arm Out Control until the arm is completely out. See Figure 5.1.

4. Operate the Bucket Out Control until bucket teeth are positioned to go into ground See Figure 5.1.

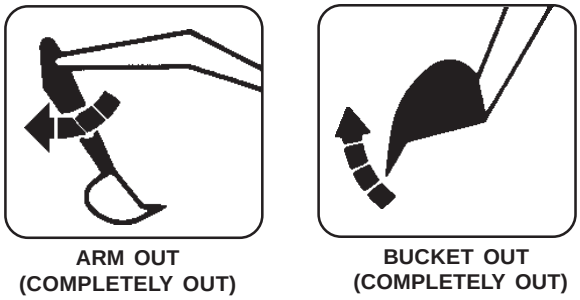
5. Lower the boom until bucket teeth are in ground. See Figure 5.2.

6. Operate Swing Control in both directions to make certain bucket teeth are in the ground deep enough to stall swing. It May be necessary to set bucket teeth deeper to stall swing.

7. Turn engine "OFF" .

8. Release hydraulic tank pressure by removing cap from pressure relief valve and depressing relief valve stem. See Figure 5.3.

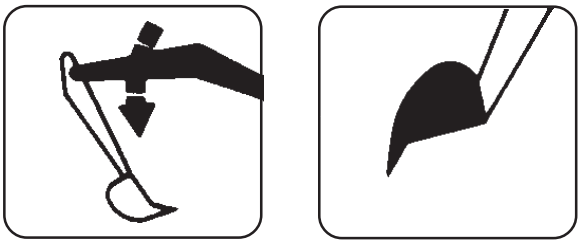
9. After cleaning away all dirt and debris, remove hydraulic line routed from "Tee" on top of swing motor to center port on Swivel Joint at swing motor "Tee". See Figure 5.4.



ARM OUT (COMPLETELY OUT)

BUCKET OUT (COMPLETELY OUT)

FIGURE 5.1



BOOM DOWN (BUCKET TEETH IN GROUND)

BUCKET

FIGURE 5.2

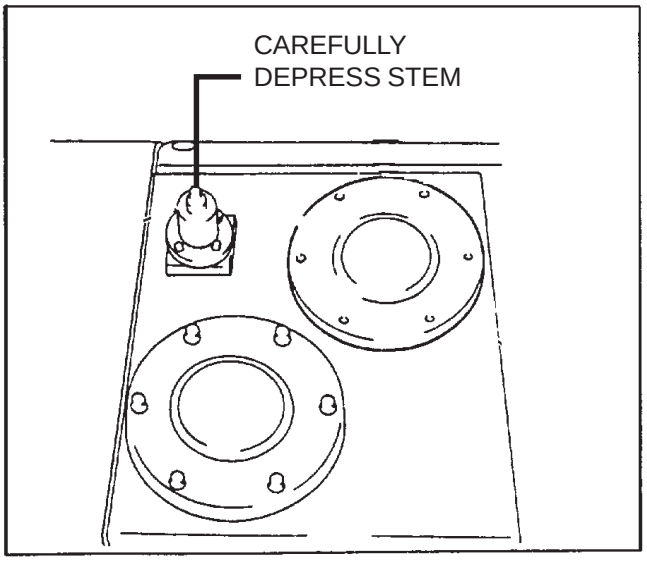


FIGURE 5.3

WARNING

• BE EXTREMELY CAUTIOUS WHILE RELEASING HYDRAULIC TANK PRESSURE. VAPORS MAY BE EXTREMELY HOT.

• WEAR APPROVED SAFETY CLOTHES, SHOES, GLOVES AND HARD HAT WHEN PERFORMING ANY MAINTENANCE OR TEST PROCEDURES.

https://truckmanualshub.com/

SWING MOTOR TEST CONTINUED

CAUTION

• Thoroughly clean all hydraulic lines and fittings before removal. Do not allow any dirt or debris to enter the open lines or fittings.
• Thoroughly clean the bucket that the oil is to be drained into.

10. Install one hydraulic line plug into line and one hydraulic fitting cap onto "Tee". See Figure 5.4. Torque to proper value.
11. Remove line routed between "Tee" on top of swing motor to hydraulic tank at the hydraulic tank. See Figure 5.5.
12. Install one hydraulic fitting cap onto fitting at Hydraulic Tank and torque. See Figure 5.5.
13. Place loose end of line into a clean 38 liter (10 gal.) capacity bucket.
14. Start engine and place throttle control in the "High" idle position.
Do not operate Travel!!
15. Operate the Swing Control to the ***LEFT***, stalling swing for one minute. Record amount of oil in bucket.
16. Operate Swing Control to the ***RIGHT***, stalling swing for one minute. Record the amount of oil in bucket.

NOTE

If it seems the flow of oil will be high, perform the test for 15 seconds and multiply amount of oil by 4 to compare to chart.

EXAMPLE: 19liters(5 U.S. Gal) X 4= 76liters(20 Gal)

17. Compare readings to Swing Motor Oil Case Drain Specification Chart.
18. If readings are greater than values in chart, refer to Shop Manual for additional instrucs.
19. Remove hydraulic fitting caps and plugs. Install hydraulic lines back to their original fittings and torque to the proper value.
20. Check hydraulic oil level. Refer to Operators Manual for hydraulic oil level check procedures.

CAUTION

•Fill Hydraulic tank to proper level using only approved new hydraulic oil as listed in the List of Oils, Greases, Filters and Elements Chart on Page 1-8 of this manual.

SK150 ILLUSTRATED

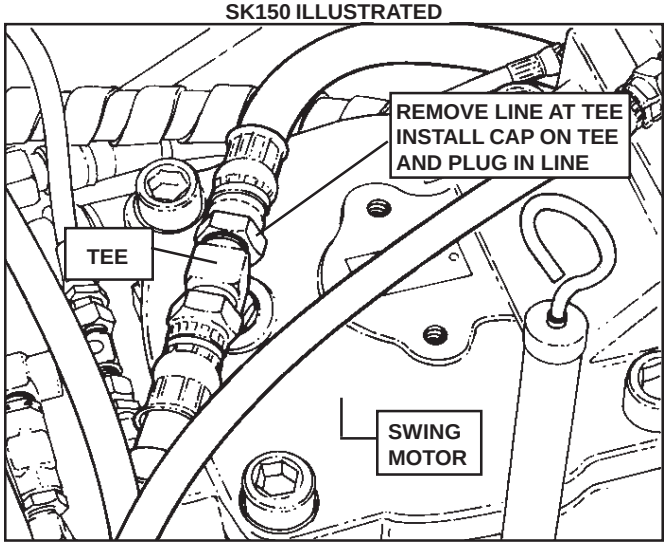


FIGURE 5.4

SK150 ILLUSTRATED

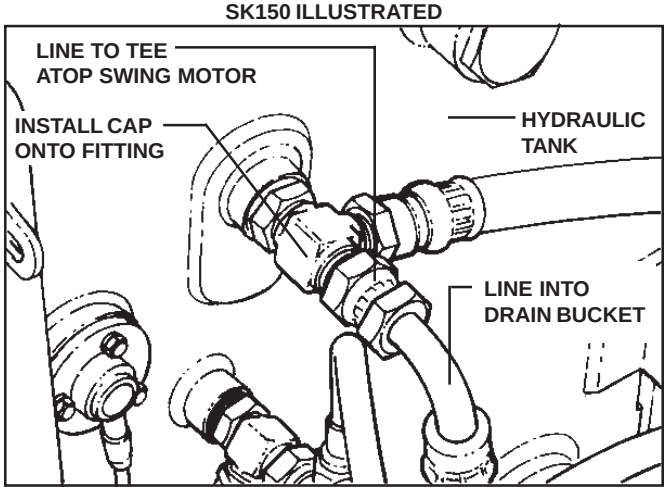


FIGURE 5.5

SWING MOTOR OIL CASE DRAIN SPECIFICATIONS

MODEL	LEFT/RIGHT SWING
*SK160	STANDARD- 7(1.8)
*SK160	MAXIMUM- 20(5.3)
SK210	STANDARD- 7(1.8)
SK210	MAXIMUM- 20(5.3)
SK250	STANDARD- 7 (1.8)
SK250	MAXIMUM- 20 (5.3)
SK290	STANDARD- 7 (1.8)
SK290	MAXIMUM- 20 (5.3)
SK330	STANDARD- 11 (2.9)
SK330	MAXIMUM- 30 (7.9)
SK480	STANDARD - 9 (2.4)
SK480	MAXIMUM - 27 (7.1)

*SK160 and ED190 same

Unit: Liter per Minute (Gallon per Minute)

https://truckmanualshub.com/

TRAVEL MOTOR OIL CASE DRAIN

A. Tools & Equipment

1. 38 Liter (10 U.S. Gal.) graduated bucket.
2. Hydraulic line wrenches.
3. Hydraulic fitting cap.
4. Stopwatch
5. Thermometer
6. Special Tool to Lock Sprockets (2-Required)

B. Machine Settings & Site Condition

1. Machine throttle in "High" idle position.
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F)
3. Firm, level testing area.

C. Travel Motor Oil Case Drain Test

1. Move machine to a firm, level testing area.
2. Allow the hydraulic oil to reach a temperature of 45°C to 55°C (113°F to 131°F).
3. Install Special Tool into each Sprocket. See Figure 5.6.

CAUTION

*• When placing Special Tool into sprockets, have machine in **"LOW IDLE"** and operate travel controls cautiously until tool is in position*

4. Operate Travel Controls in forward until machine tracks stall.

NOTE

Use the Sprocket Special Tool that fits the sprocket of the particular machine being tested. See Figure 5.7.

5. Operate the Arm In Control until the arm is completely in. See Figure 5.8.
6. Operate the Bucket In Control until bucket is completely in. See Figure 5.8.
7. Operate the Boom Down Control until boom is completely down. See Figure 5.8.
8. Turn engine "OFF".
9. Release hydraulic tank pressure by remoing cap from pressure relief valve and depressing relief valve stem. See Figure 5.9.
10. After cleaning away all dirt and debris, remove hydraulic line routed from "Tee" on top of Swing Motor to center port on Swivel Joint at swing motor "Tee". See Figure 5.10.

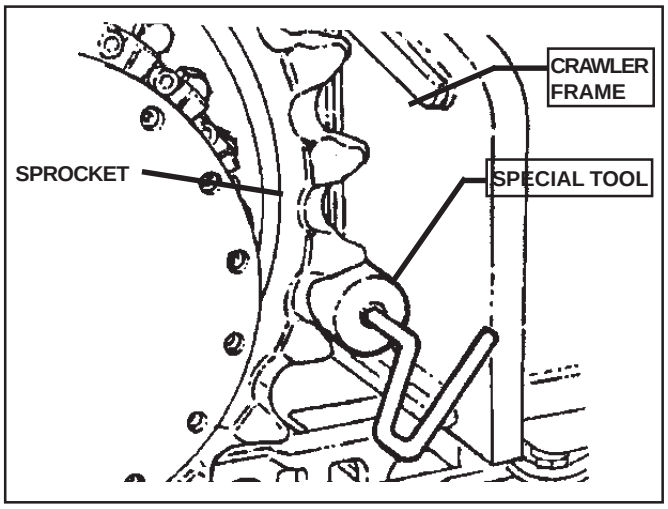
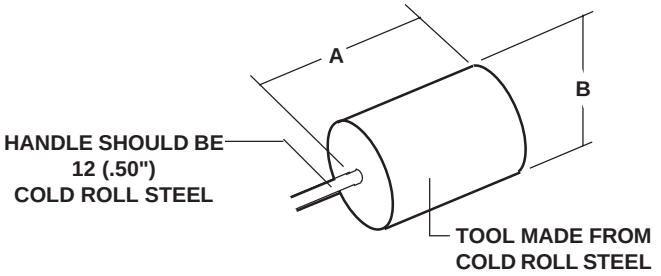


FIGURE 5.6



MODEL	A (LENGTH)	B (DIAMETER)
SK210~SK250	150 (5.91")	80 (3.15")
SK290~SK330	150 (5.91")	80 (3.15")
SK480	150 (5.91)	90 (3.54)

Unit: mm (Inches)

FIGURE 5.7



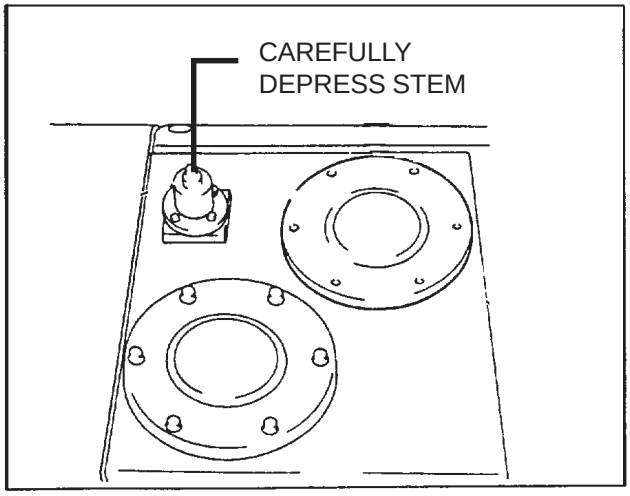


FIGURE 5.9

https://truckmanualshub.com/

CAUTION

• Thoroughly clean all hydraulic lines and fittings before removal. Do not allow any dirt or debris to enter the open lines or fittings.
• Thoroughly clean the bucket that the oil is to be drained into.

11. Install one hydraulic fitting cap onto "Tee". See Figure 5.10. Torque to proper value.
12. Place loose end of line into a clean 38 liter (10 gal.) capacity bucket.
13. Start engine, raise boom a little and place throttle control in the "High" idle position.
14. With special tool installed in each travel motor sprocket, operate the left travel control at full stroke forward for one minute. Measure the amount of oil in bucket and record.

NOTE

If flow of oil will be high, perform the test for 15 seconds and multiply amount of oil by 4 to compare to chart.

EXAMPLE: 19 liters (5 U.S. Gal) X 4 = 76 liters (20 Gal)

15. Repeat step 14 with right control at full stroke forward for one minute. Record amount of oil in bucket.
16. Remove special tool and place into sprocket to stall reverse movement. See Figure 5.11.
17. Repeat steps 14 and 15 with control to reverse movement.
18. Compare readings for each travel motor to Travel Motor Oil Case Drain Specification Chart.
19. If readings are greater than values in chart, refer to shop manual for additional instructions.
20. Remove hydraulic fitting cap. Install hydraulic lines back to the original fitting and torque to the proper value.
21. Check Hydraulic Oil level. Refer to Operators Manual for hydraulic oil level check procedures.

CAUTION

• Fill Hydraulic tank to proper level using only approved new hydraulic oil as listed in the List of Oils, Greases, Filters and Elements Chart in Operators Manual.

SK150 ILLUSTRATED

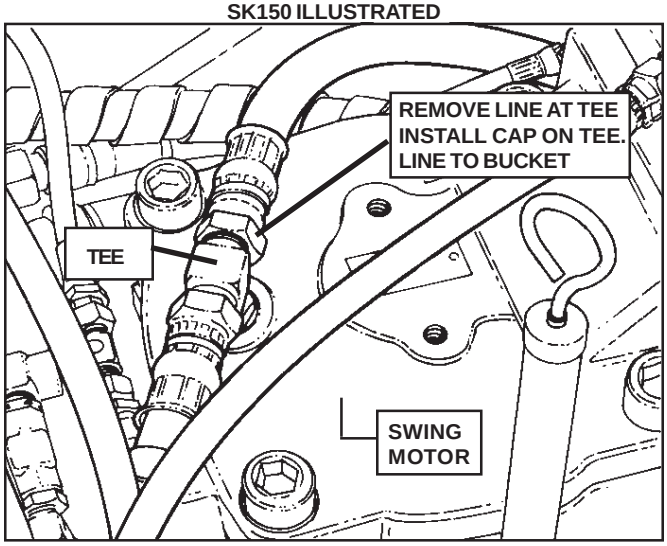


FIGURE 5.10

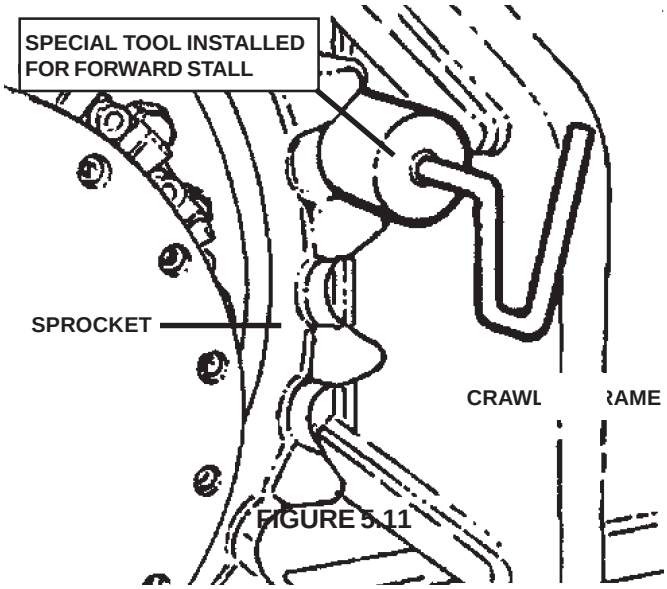


FIGURE 5.11

TRAVEL MOTOR OIL CASE DRAIN SPECIFICATIONS

MODEL	FORWARD/REVERSE TRAVEL
*SK160	STANDARD - 7 (1.8)
*SK160	MAXIMUM - 21 (5.5)
SK210	STANDARD - 7 (1.8)
SK210	MAXIMUM - 21 (5.5)
SK250	STANDARD - 7 (1.8)
SK250	MAXIMUM - 21 (5.5)
SK290	STANDARD - 6 (1.6)
SK290	MAXIMUM - 15 (4.0)
SK330	STANDARD - 8 (2.1)
SK330	MAXIMUM - 20 (5.3)
SK480	STANDARD - 6.5 (1.7)
SK480	MAXIMUM - 19.5 (5.1)

*SK160 and ED190 same

Unit: Liters per Minute (Gallons per Minute)

https://truckmanualshub.com/

TRAVEL SPEED

A. Tools & Equipment

1. Stopwatch
2. Device to mark starting point of tracks.

B. Machine Settings & Site Condition

1. Machine throttle in "High" idle position.
2. Test will be performed with KPSS Mode Switch in "M".
3. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
4. Firm, level testing area.
5. Verify that engine RPM's are at correct specification.

C. Travel Speed Test

1. Move machine to a firm, level testing area.
2. Allow the hydraulic oil to reach a te perature of 45°C to 55°C (113°F to 131°F).
3. Operate Swing Right Control until mchine is sitting across (perpendicular) tracks.
4. Operate the Boom, Arm and Bucket Controls until bucket is on ground. See Figure 7.4.
5. Operate Boom Control until bottom of right track is approximately 300mm (12") off ground. See Figure 7.4. Make reference mark on track.
6. Place Throttle Control in "HI-IDLE" position and KPSS Switch in "M" Mode. See Figure 7.5.
7. Place Travel Speed Select Switch in 1( ) Speed. See Figure 7.6.
8. Operate the Right Travel Control full forward and measure the time it takes for track to make three complete revolutions. Record the time.
9. Repeat Step 7 ands 8 two more times. Averagethe readings and compare to Travel Speed Specification Chart.
10. Place Travel Speed Select Switch in 2( ) speed and repeat steps 8 and 9.
11. Repeat steps 4 through 13 with Left Track approximately 300mm (12") off ground.

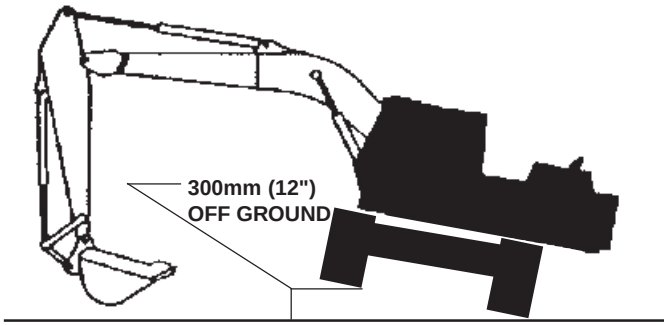


FIGURE 7.4
SK210 ~ SK400 ILLUSTRATED

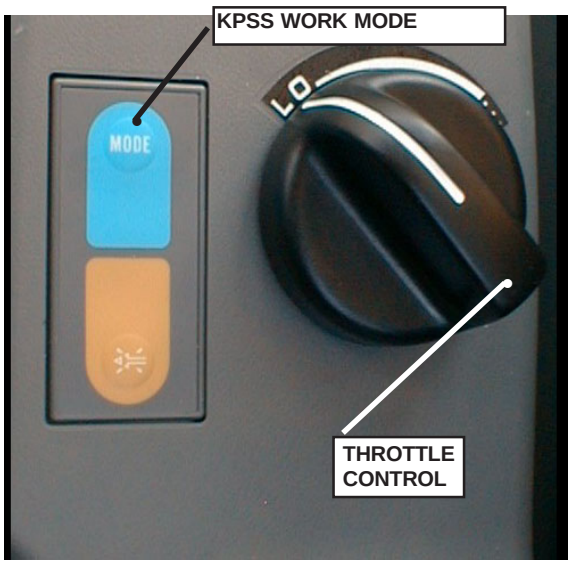


Figure 7.5



Figure 7.6

Unit: Seconds

https://truckmanualshub.com/

TRAVEL SPEED SPECIFICATION CHART

MODEL	MODE	DIRECTION	SPEED	STANDARD 3 REV
SK160	M	FORWARD	1ST	27.6 ~ 30.5
	M	FORWARD	2ND	16.2~ 19.9
	M	REVERSE	2ND	16.9~ 18.7
SK210	M	FORWARD	1ST	23.5 ~ 25.9
	M	FORWARD	2ND	15.8 ~ 17.4
	M	REVERSE	2ND	17.2 ~ 19.0
SK250	M	FORWARD	1ST	25.1 ~ 27.7
	M	FORWARD	2ND	16.2 ~ 18.0
	M	REVERSE	2ND	17.7 ~ 19.5
SK290	M	FORWARD	1ST	29.4 ~ 32.6
	M	FORWARD	2ND	18.0 ~ 20.0
	M	REVERSE	2ND	19.5 ~ 21.5
SK330	M	FORWARD	1ST	32.2 ~ 35.4
	M	FORWARD	2ND	18.4 ~ 20.4
	M	REVERSE	2ND	20.0 ~ 22.0
SK480	M	FORWARD	1ST	32.1 ~ 35.3
	M	FORWARD	2ND	19.7 ~ 21.7
	M	REVERSE	2ND	22.6 ~ 24.6

*SK160 and ED190 same

Revised 06/2002

Speed Selection 1ST ( )

2ND ()

https://truckmanualshub.com/

TRAVEL DEVIATION

A. Tools & Equipment

1. Measuring Tape 30M (100') Capacity
2. Line Parallel to Machine in soil

B. Machine Settings & Site Condition

1. Machine throttle in "High" idle position.
2. KPSS Mode Switch in "M" Mode Position.
3. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
4. Firm, level testing area.
5. Verify that engine RPM's are at correct specification.

C. Travel Deviation Test

1. Move machine to a firm, level testing area.

2. Allow the hydraulic oil to reach a temperature of 45°C to 55°C (113°F to 131°F).

3. Operate the Boom, Arm and Bucket Controls until attachment is in a transport position. See Figure 7.1.

4. Scribe (draw) a line parallel to machine in the soil for a distance of 20M (65'-7") from front of machine tracks. See Figure 7.2.

5. Move Throttle Control to "HI-IDLE" Position and place KPSS Switch in "M" Mode. See Figure 7.3.

6. Operate both travel controls together at full forward speed for the 20M (65'-7") Distance. See Figure 7.2.

7. Measure and record dimension "A". See Figure 7.2.

8. Repeat steps 6 and 7 two more times. Average the readings and compare to Travel Deviation Specification Chart.

9. Repeat steps 1 through 8 with undercarriage turned 180°.

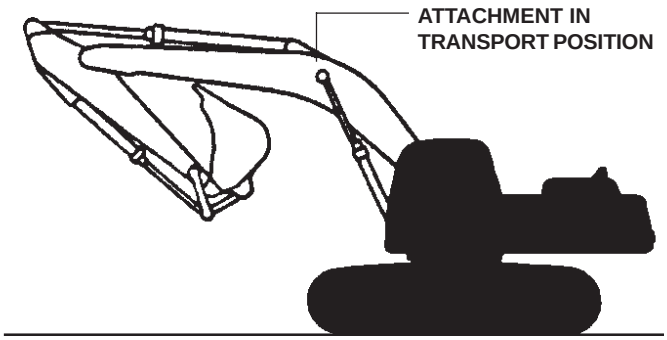


FIGURE 7.1

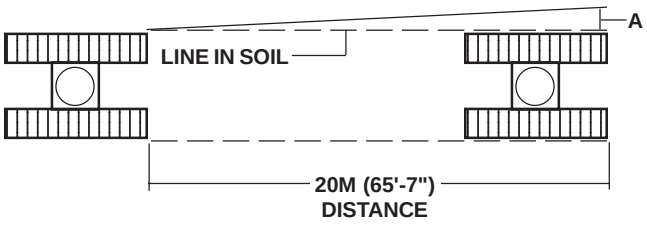


FIGURE 7.2



FIGURE 7.3

TRAVEL DEVIATION SPECIFICATION CHART

MODEL	STANDARD "A"
SK160 SK480	0mm to 1200mm (0'-0" to 3'-9")

Unit: mm (Inches)

https://truckmanualshub.com/

NOTES

Kobelco

Dynamic Acera



Kobelco Construction Machinery America LLC
Hydraulic Components

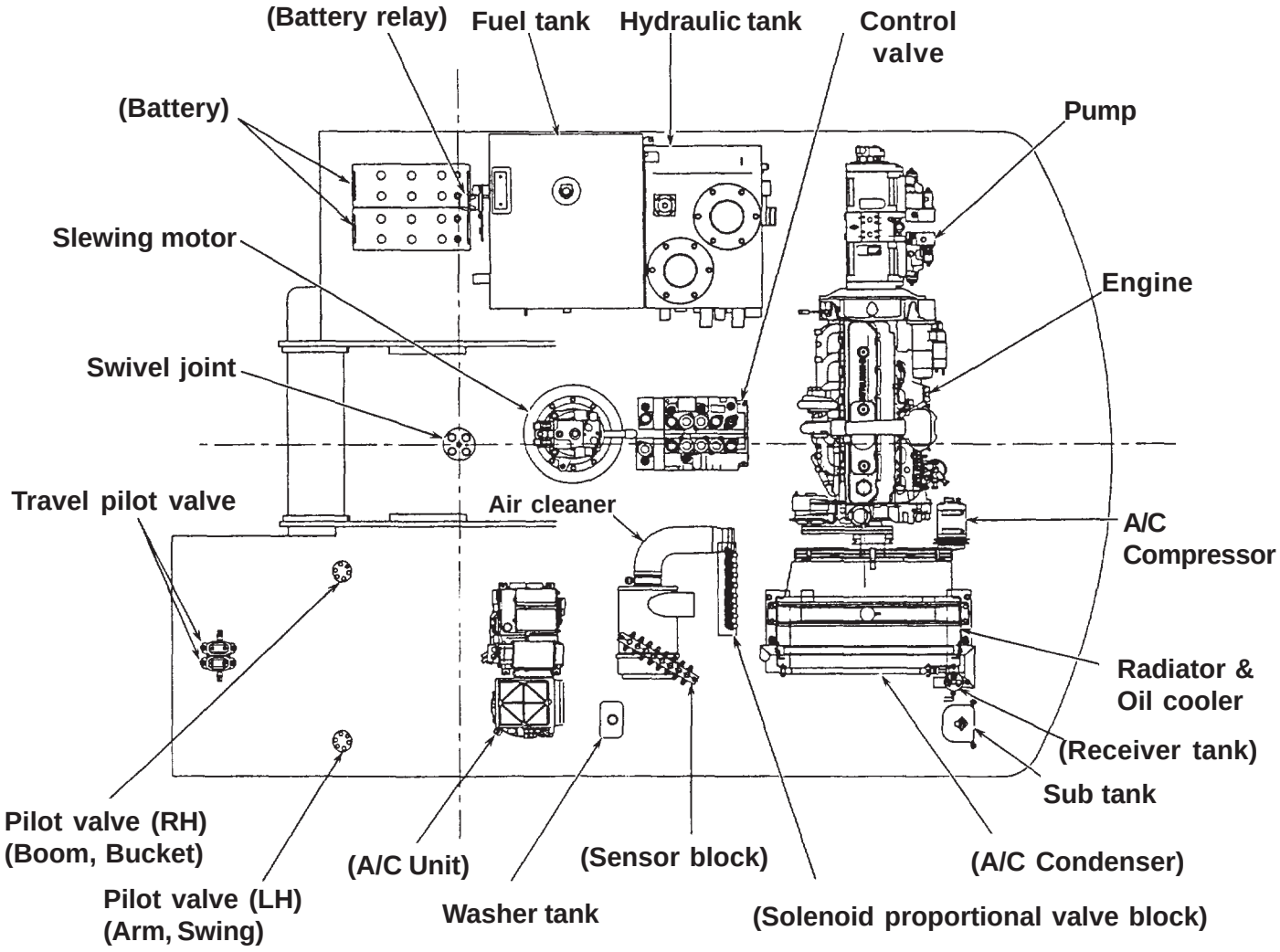
KOBELCO

Kobelco Construction
Machinery America LLC

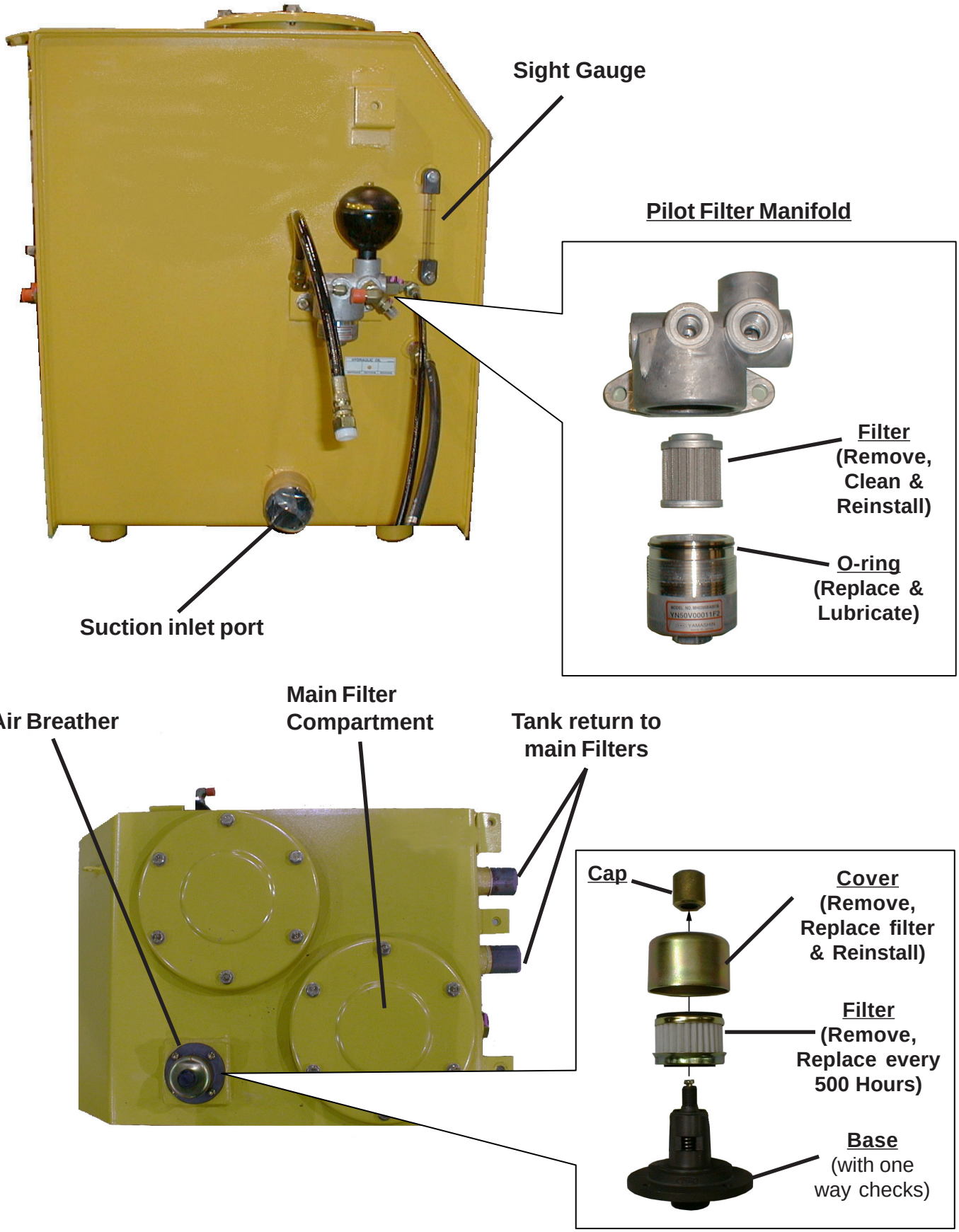
https://truckmanualshub.com/

4. COMPONENTS AND CIRCUIT DIAGRAM

4-1 Layout of Hydraulic components (SK210)

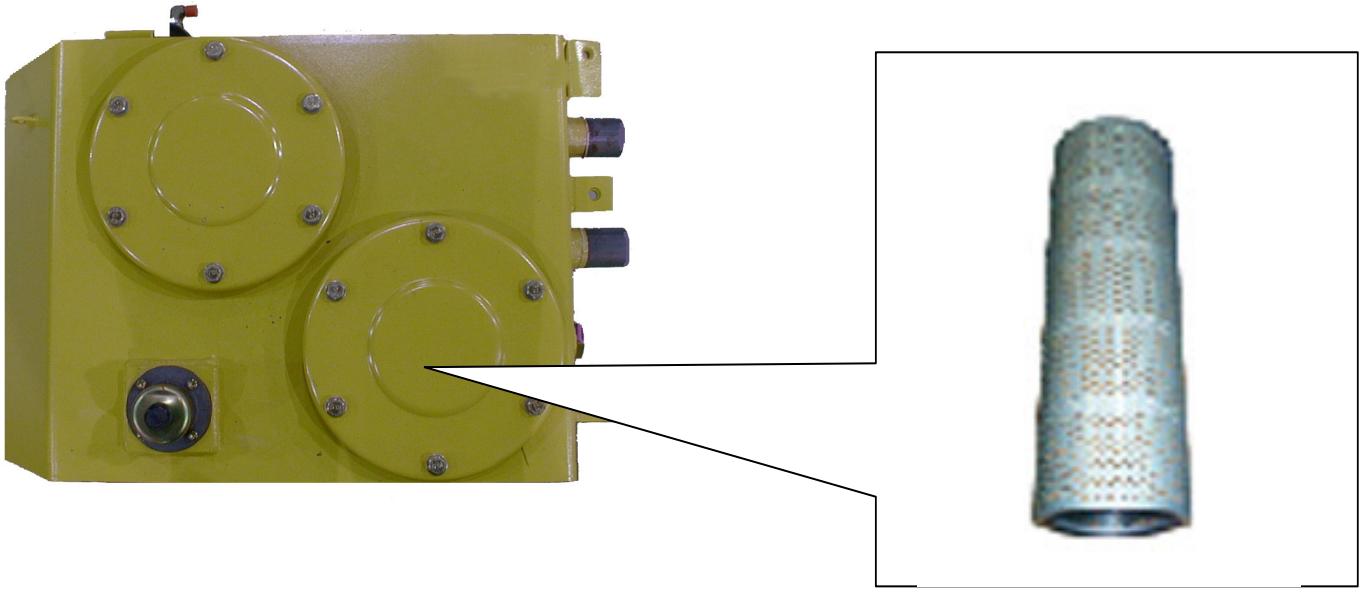


https://truckmanualshub.com/



Typical of SK210 SK250

https://truckmanualshub.com/



Main Return Filter

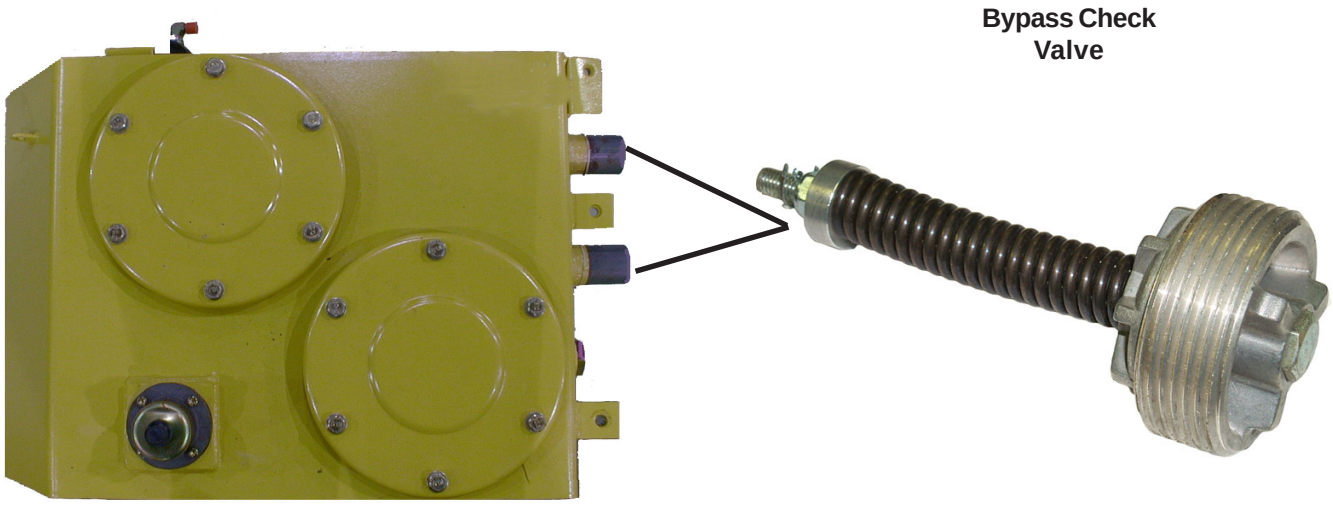
Service Interval : 500 hrs - Normal Conditions
Option/Breaker Filter : 250 hrs.
Note: Always consult you operation manual for proper maintenance intervals.

Main Return Filter Bypass Check Valve

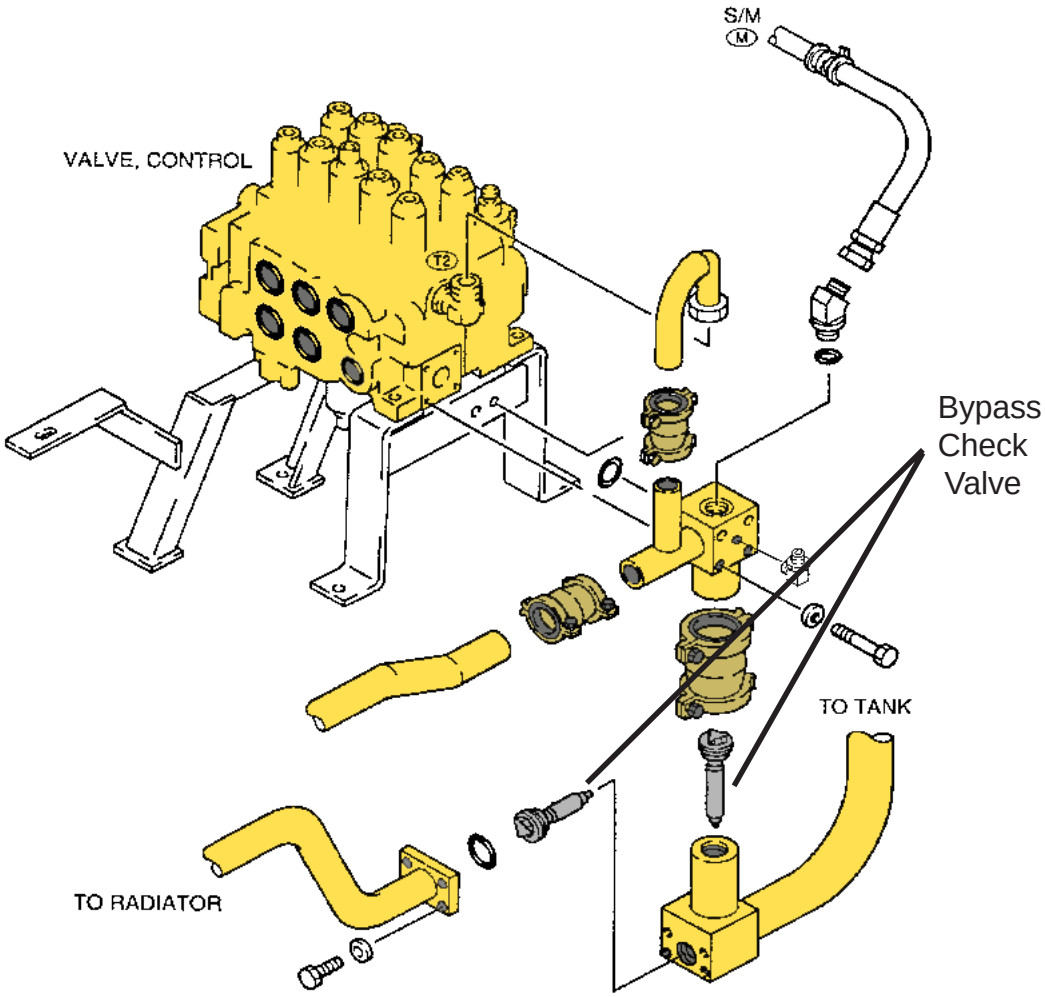


If the main return filter plugs due to excessive contamination then unfiltered oil will bypass the filter thru this check valve and continue to supply the main pump with lubrication oil

https://truckmanualshub.com/

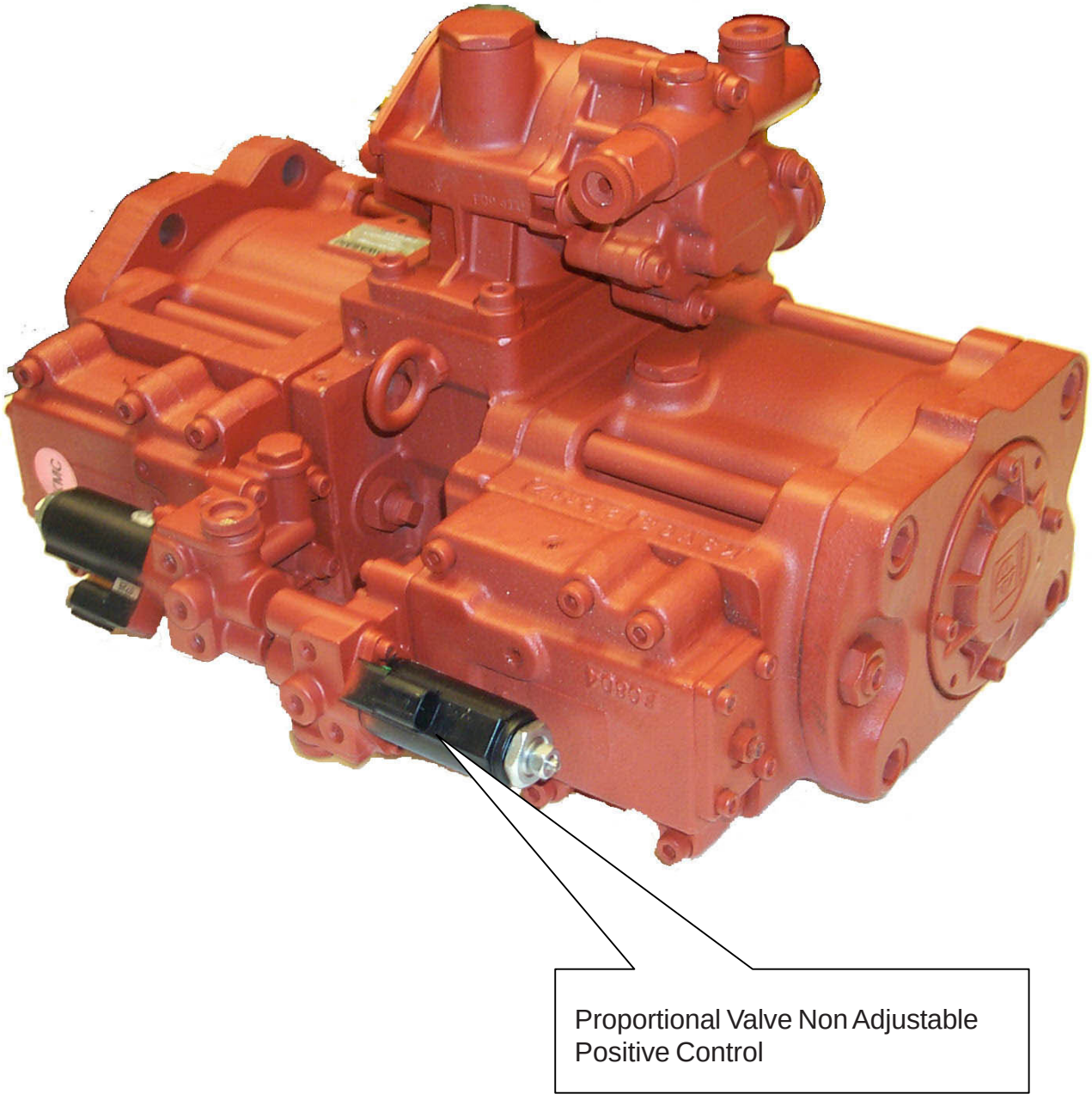


Typical Location of SK210 SK250



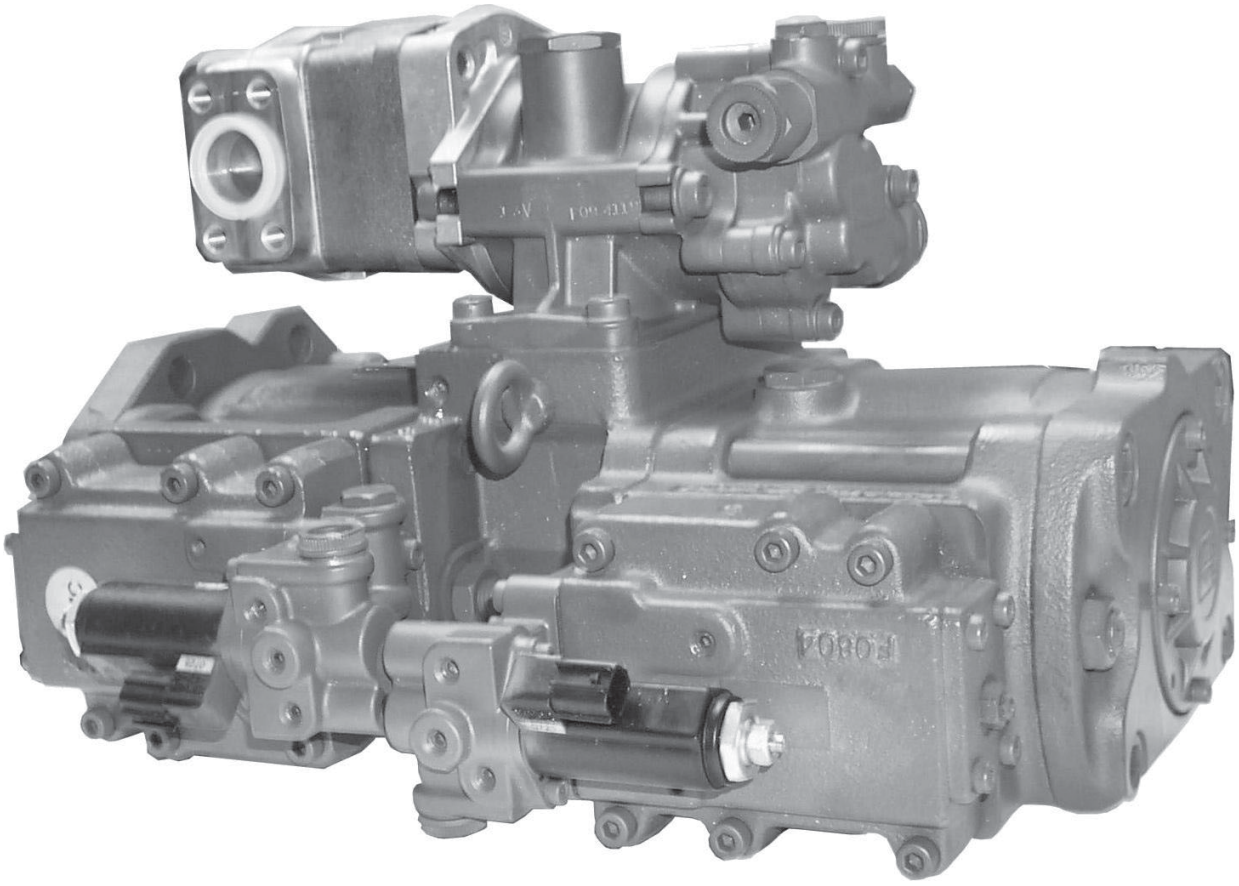
Typical Location of SK290 SK330

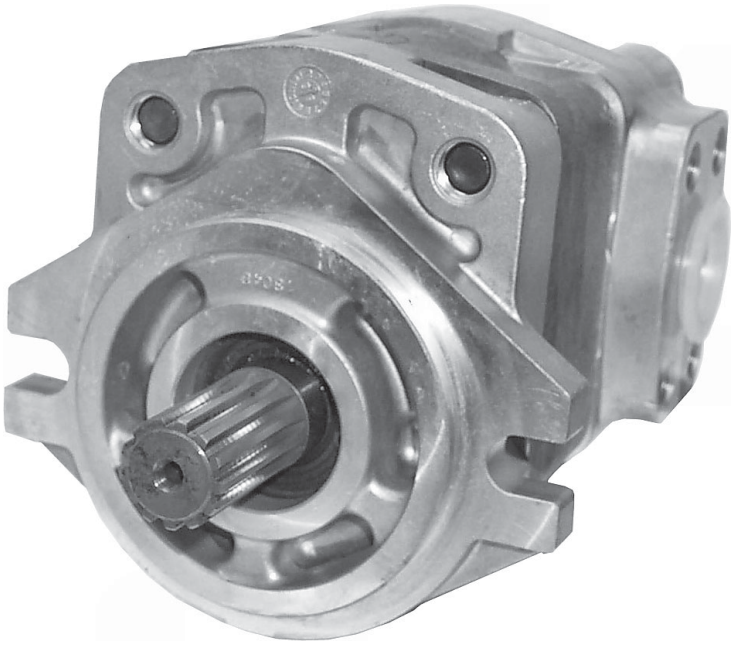
https://truckmanualshub.com/



Typical of SK160

https://truckmanualshub.com/

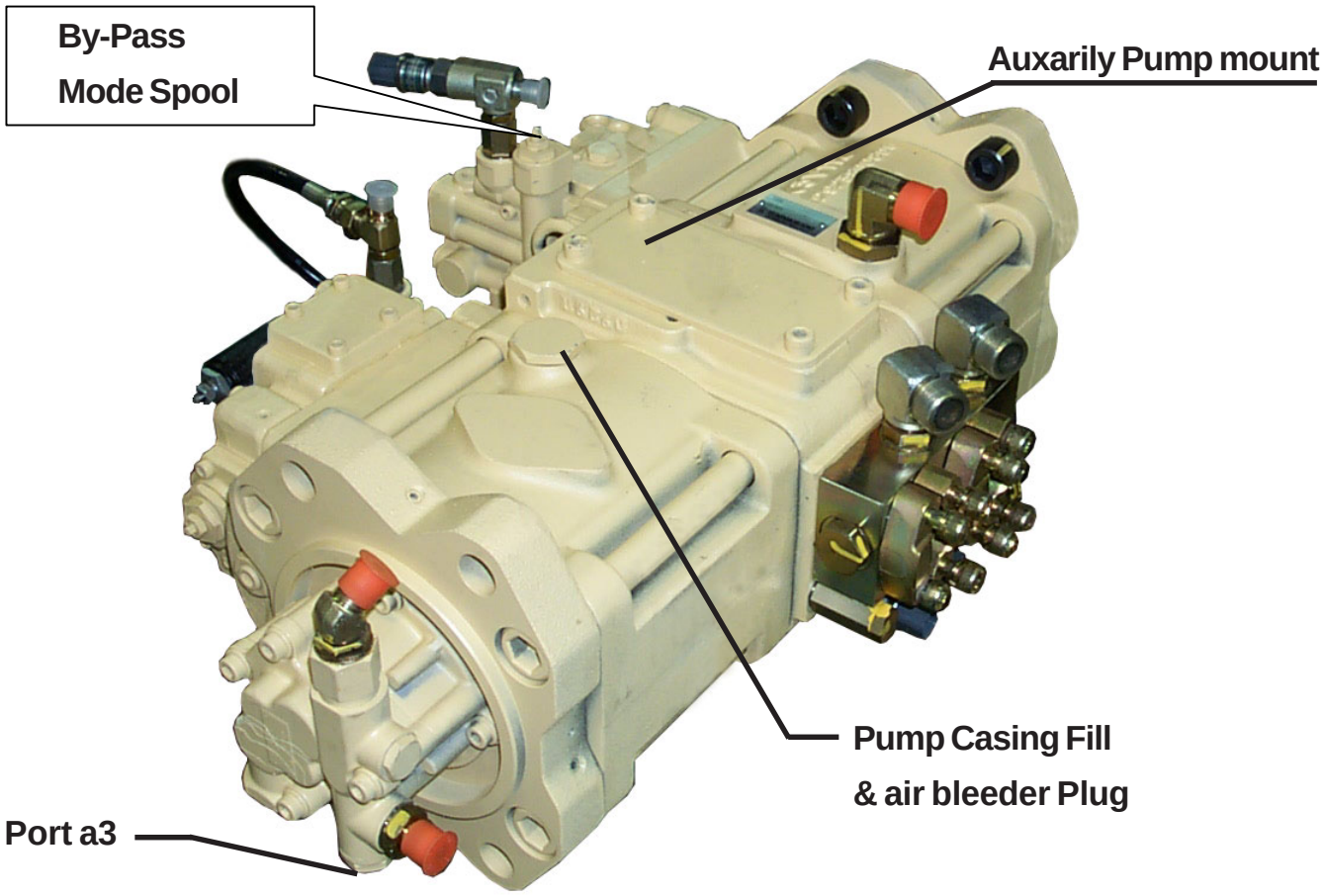


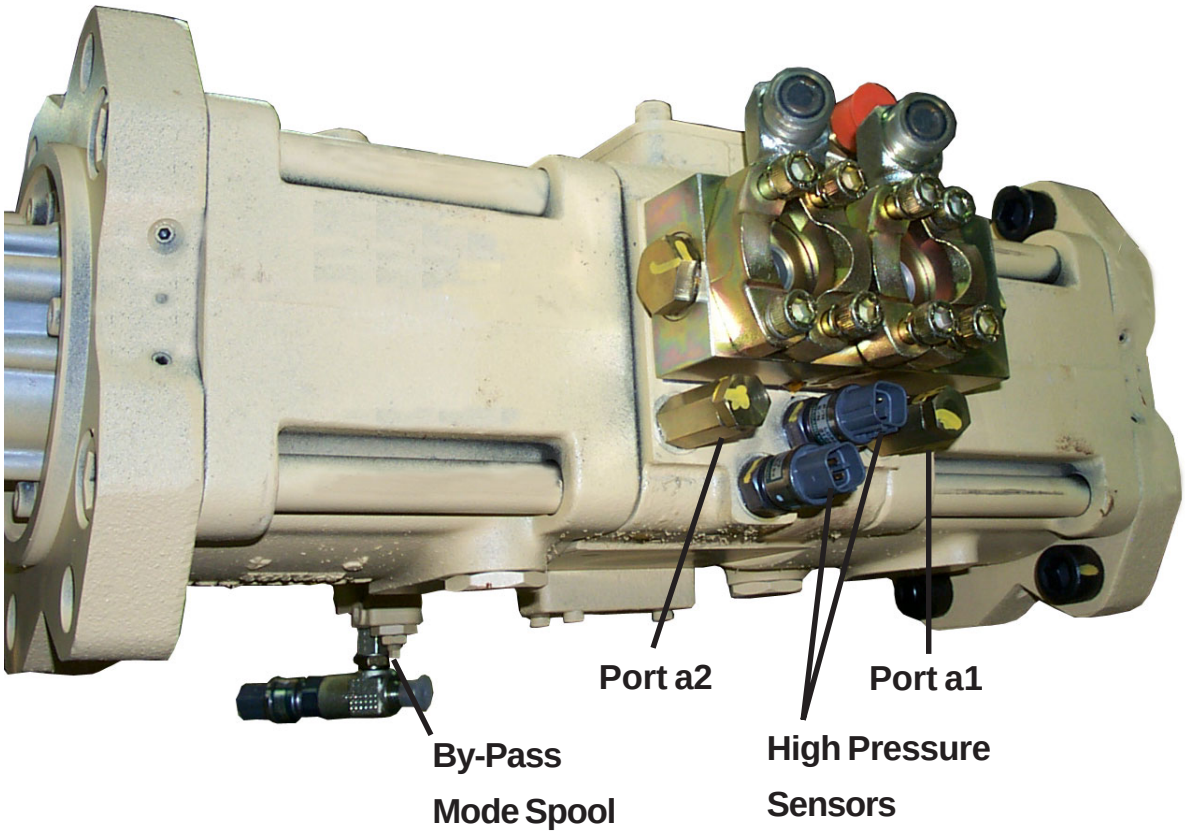


Dozer Gear pump

Typical of ED190

https://truckmanualshub.com/



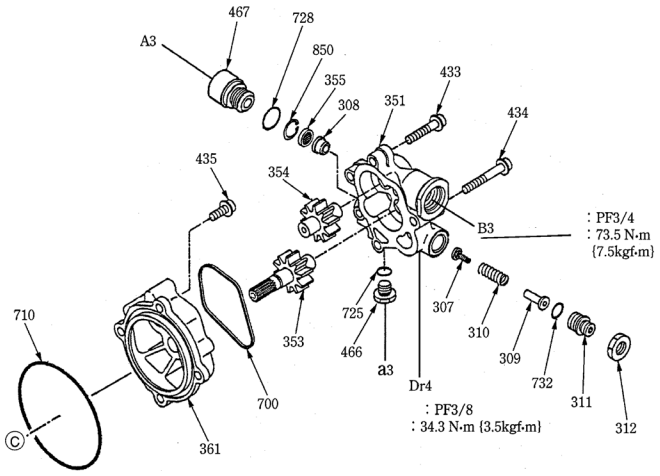


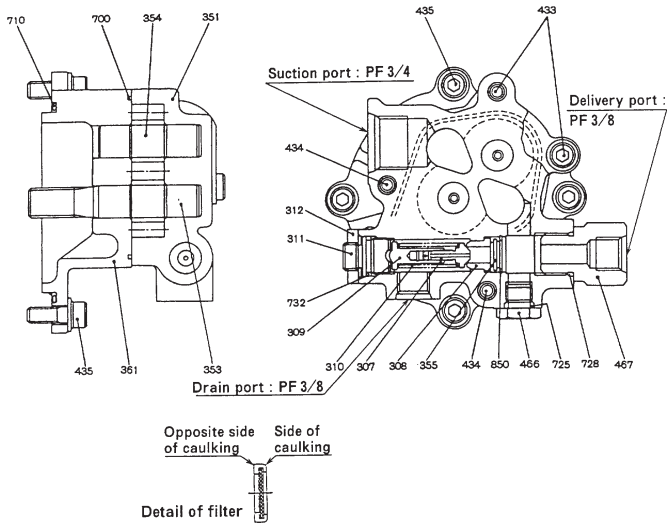
NEW STYLE Pump of SK210 ~330

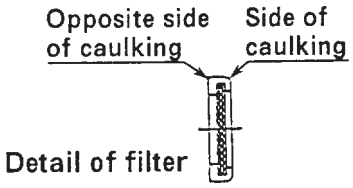
https://truckmanualshub.com/

Pilot Pump - Specified as P3

3) Gear pump (For pilot control)



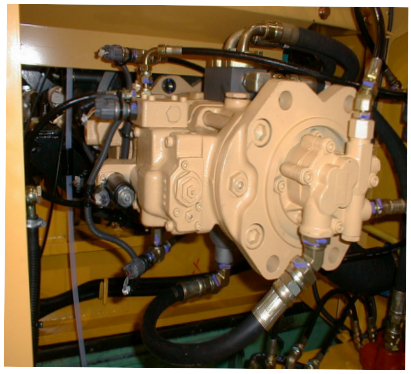




Note:

1. **After assembly of gear pump, check that the drive gear rotates smoothly at 0.1 N•m {1.0 kgf•m} or less.**
2. **After assembly of gear pump, apply sufficient oil in the gear section.**
3. **Bring the opposite side of caulking of the filter shown in the left figure into contact with the insert end face, paying attention to the installing direction.**

Code	Name	Qty.
307	Poppet	1
308	Seat	1
309	Spring seat	1
310	Spring	1
311	Adjust screw	1
312	Lock nut	1
351	Gear case	1
353	Drive gear	1
354	Driven gear	1
355	Filter	1
361	Front case	1
433	Socket bolt (M8 x 40)	2
434	Socket bolt (M8 x 55)	2
435	Socket bolt (M8 x 20)	4
466	Plug (PF 1/4)	1
467	Adapter (PF 1/2–PF 3/8)	1
700	Square ring	1
710	O-ring (JIS B2401-G95)	1
725	O-ring (JIS B2401-P11)	1
728	O-ring (JIS B2401-P18)	1
732	O-ring (JIS B2401-P16)	1
850	Locking ring (JIS B2804-RR-18)	1

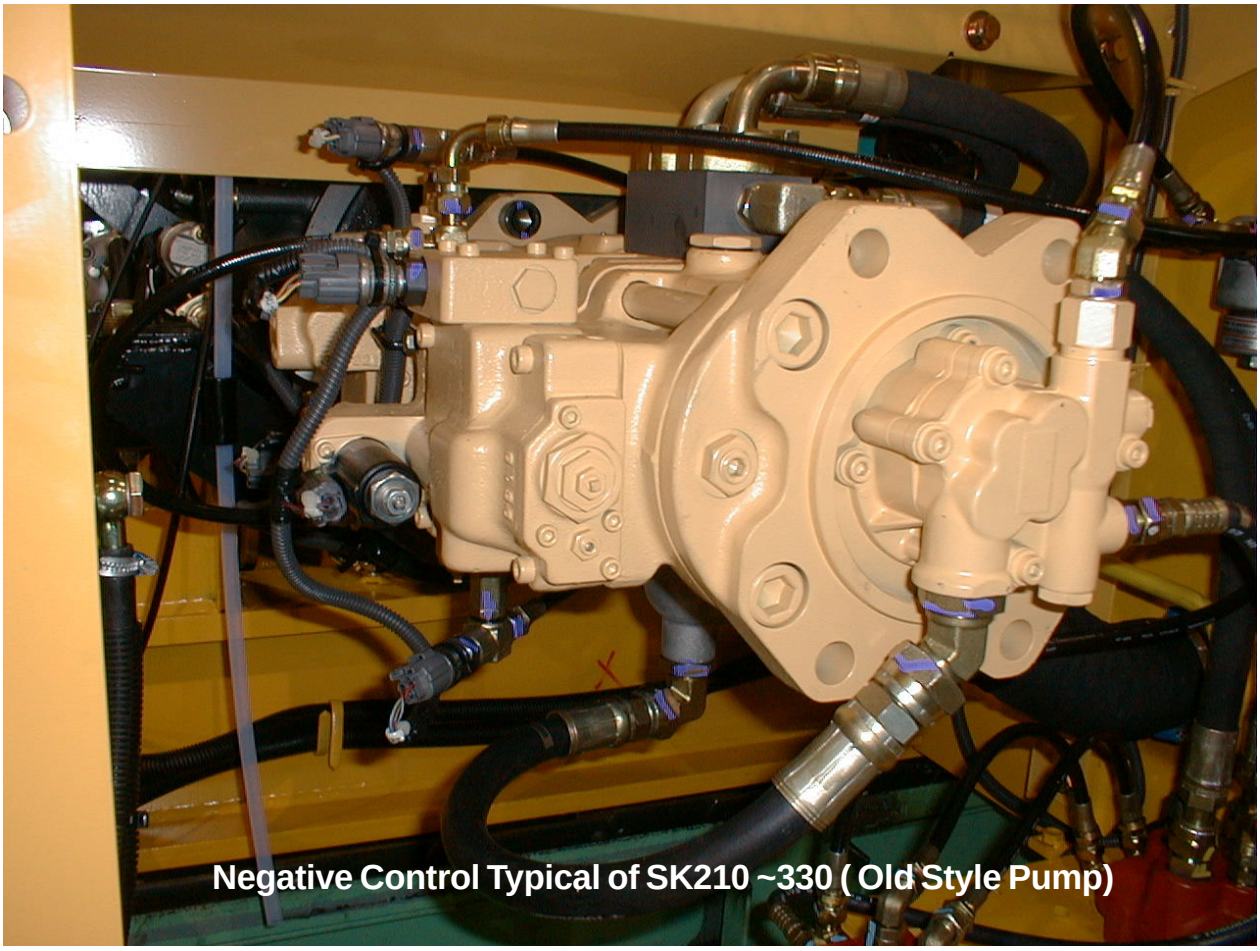


Hydraulic circuit

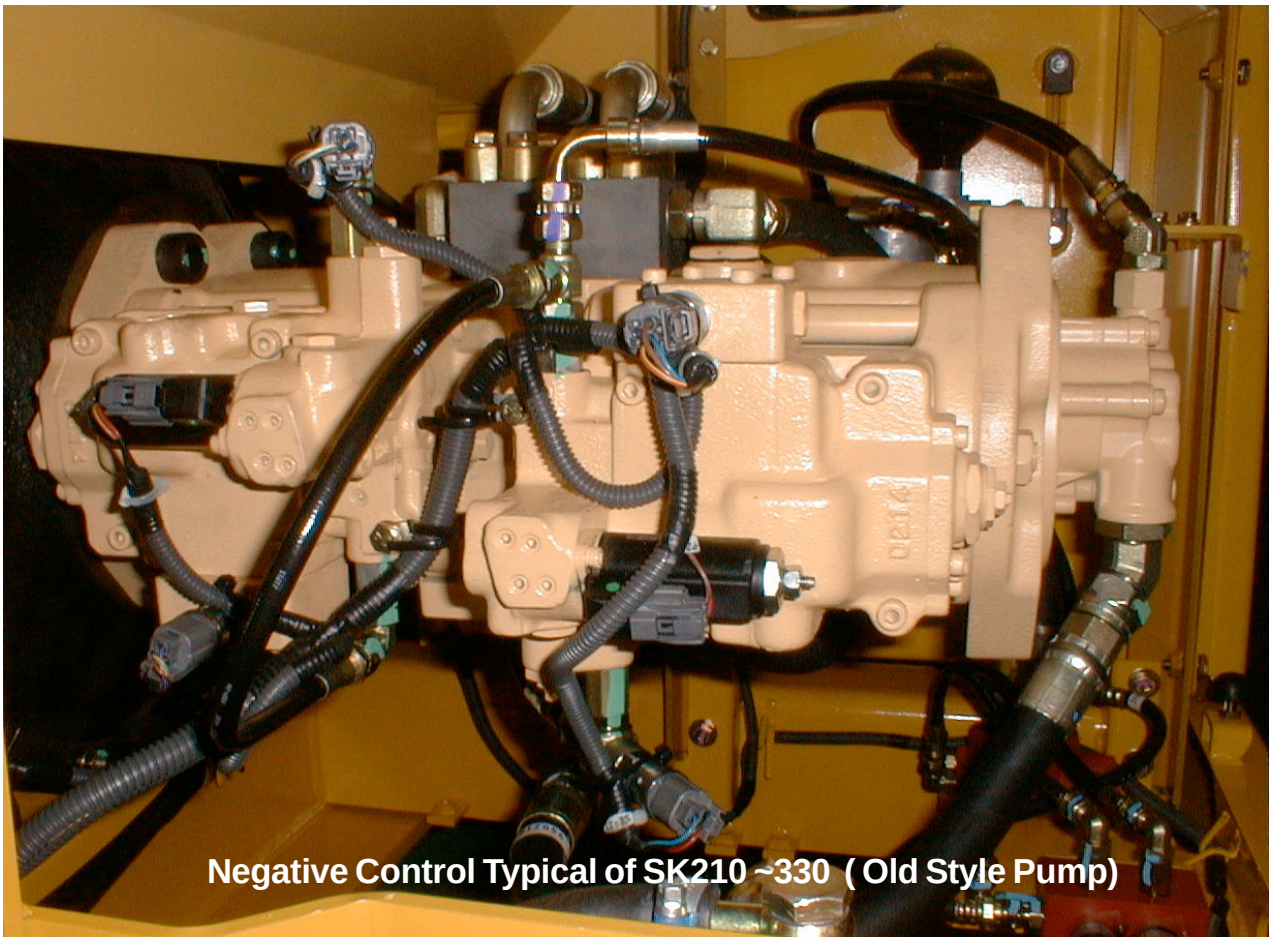
Tightening torque

Code	Thread size	Torque N•m {kgf•m}
312	M14 x 1.5	29.4 {3.0}
433, 434	M8	16.7 {1.7}
435		
466	PF 1/4	15.7 {1.6}

https://truckmanualshub.com/

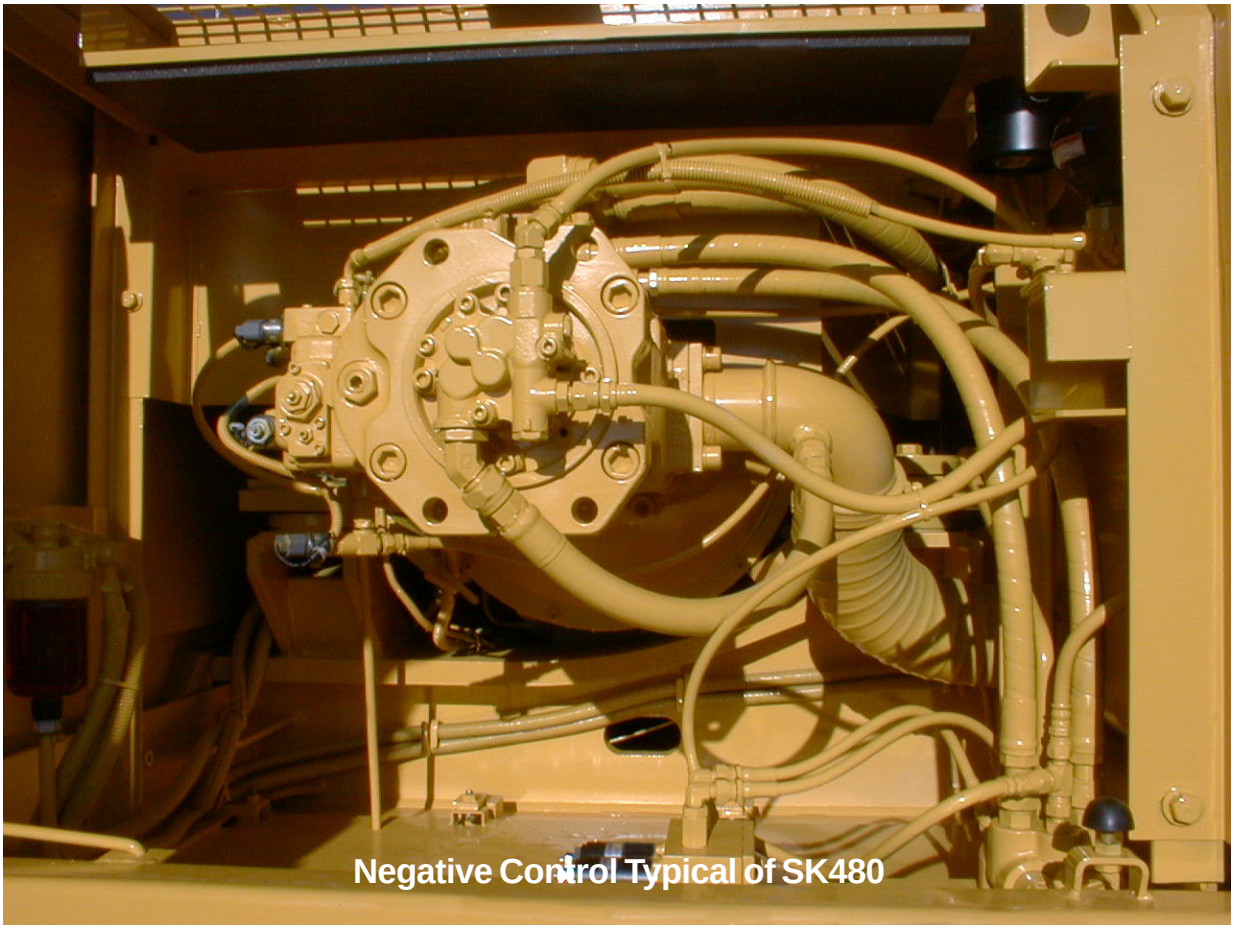


Negative Control Typical of SK210 ~330 (Old Style Pump)



Negative Control Typical of SK210 ~330 (Old Style Pump)

https://truckmanualshub.com/



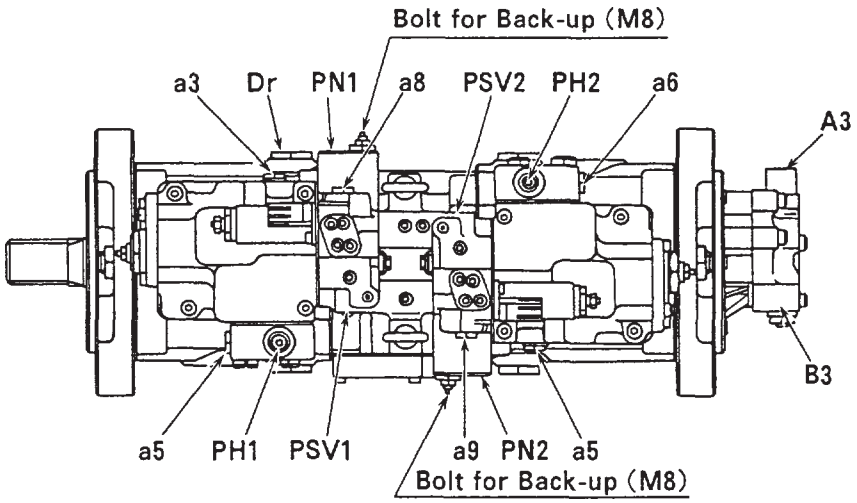
Negative Control Typical of SK480

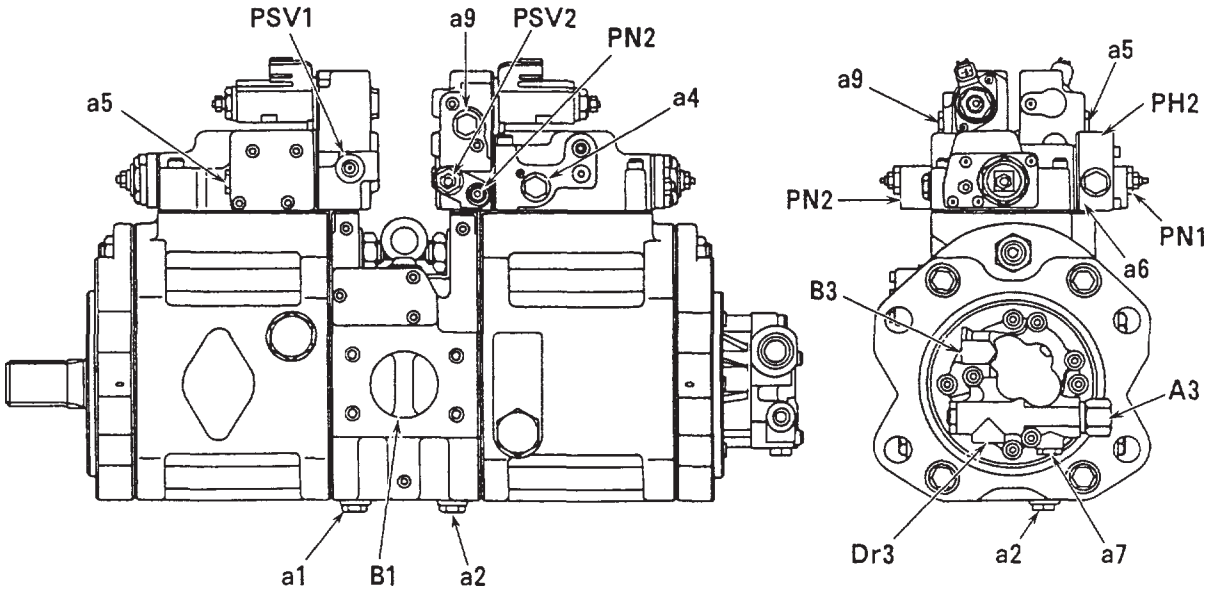


Negative Control Typical of SK480

https://truckmanualshub.com/

Typical of SK210 ~330





Note: GPM given are Approximate
GPM = RPM X C.C. X .00026
1 Ounce U.S. = 29.5 C.C.

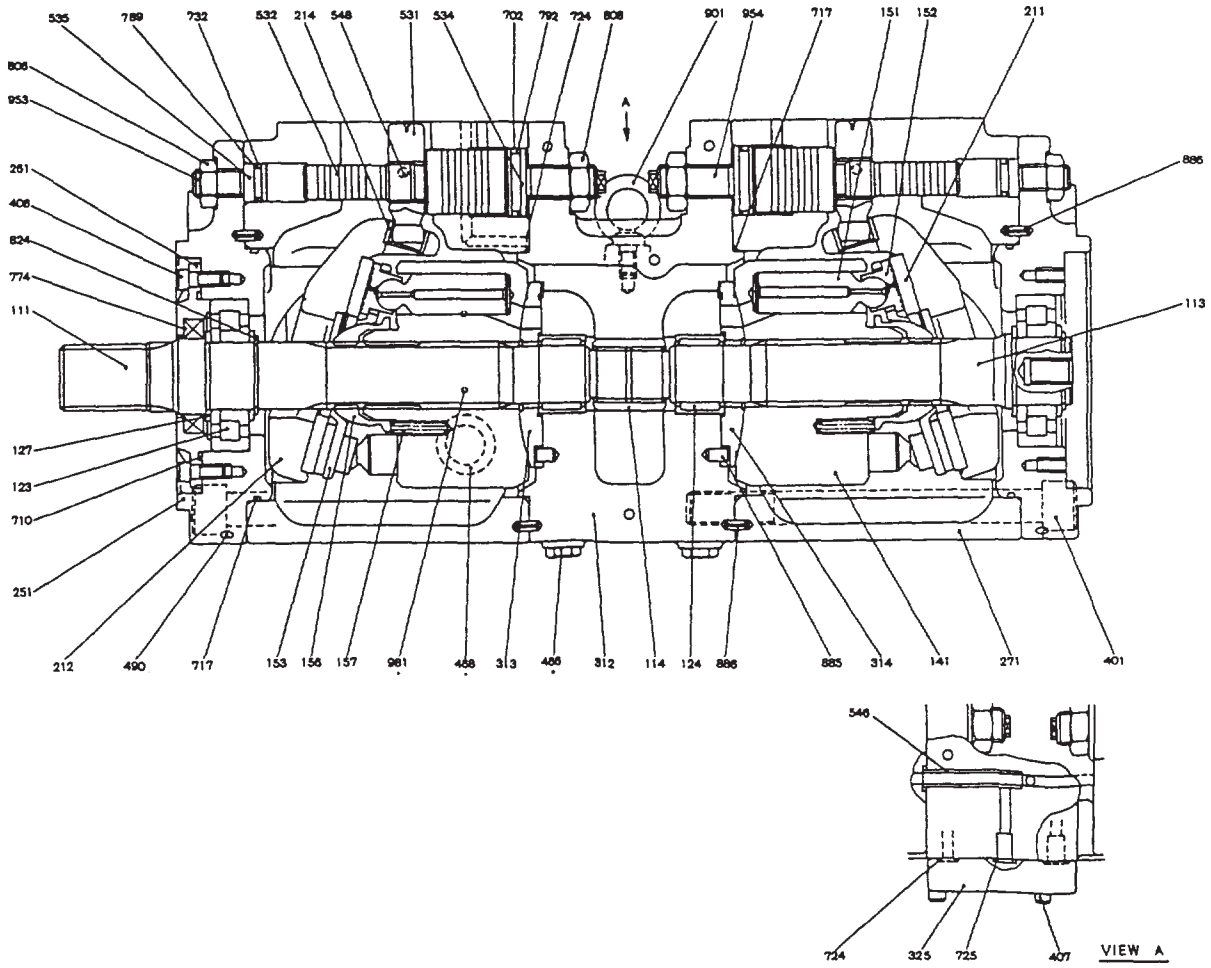
PUMP FLOW:

SK160/ED190:
MAX GPM: 37.9 X 2 PUMPS
SK 210:
MAX GPM: 55.5 X 2 PUMPS
SK250:
MAX GPM: 63.4 X 2 PUMPS
SK290:
MAX GPM: 63.4 X 2 PUMPS
SK330:
MAX GPM: 66.8 X 2 Pumps
SK480:
MAX GPM: 97.7 X 2 Pumps

https://truckmanualshub.com/

3. Structure

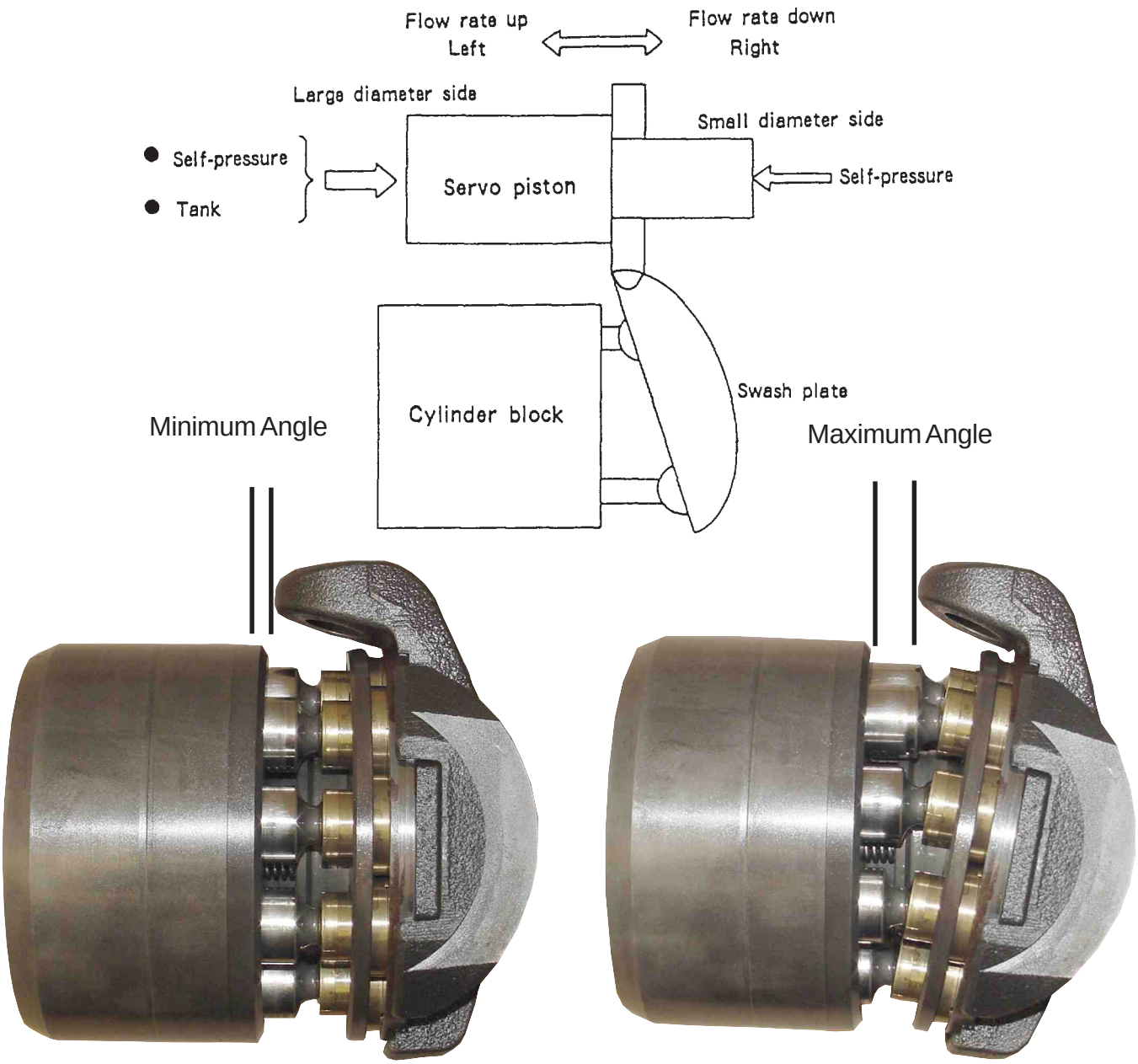
1) Main pump



Typical of SK210 ~330

Code	Name	Qty.	Code	Name	Qty.	Code	Name	Qty.
111	Shaft (Front)	1	313	Valve plate (R)	1	725	O-ring (JIS B2401-P11)	7
113	Shaft (Rear)	1	314	Valve plate (L)	1	728	O-ring (JIS B2401-P24)	4
114	Spline joint	1	325	Cover	1	732	O-ring	2
123	Roller bearing	2	401	Socket bolt (M20 x 210)	8	774	Oil seal	1
124	Needle bearing	2	406	Socket bolt (M8 x 20)	4	789	Back-up ring (JIS B2407-P18)	2
127	Bearing spacer	4	407	Socket bolt (M6 x 30)	3			
141	Cylinder block	2	466	VP plug (PF 1/4)	2	792	Back-up ring (JIS B2407-G35)	2
151	Piston	18	468	VP plug (PF 3/4)	4			
152	Shoe	18	490	Plug (Meck)	20	806	Nut (M16)	2
153	Retainer	2	531	Tilting pin	2	808	Nut (M20)	2
156	Spherical bushing	2	532	Servo piston	2	824	Snap ring	2
157	Cylinder spring	18	534	Stopper (L)	2	885	Pin (ϕ 8 x 12L)	2
211	Shoe plate	2	535	Stopper (S)	2	886	Spring pin	4
212	Swash plate	2	546	Spacer	2	901	Eye bolt (M10)	2
214	Tilting bushing	2	548	Feed back pin	2	953	Set screw	2
251	Support	2	702	O-ring	2	954	Set screw	2
261	Seal cover	1	710	O-ring (JIS B2401-G95)	1	981	Name plate	1
271	Pump casing	2	717	O-ring (JIS B2401-G145)	4	983	Rivet	2
312	Valve block	1	724	O-ring (JIS B2401-P8)	16			

https://truckmanualshub.com/



Minumn Stroke Angle

Maxumn Stroke Angle

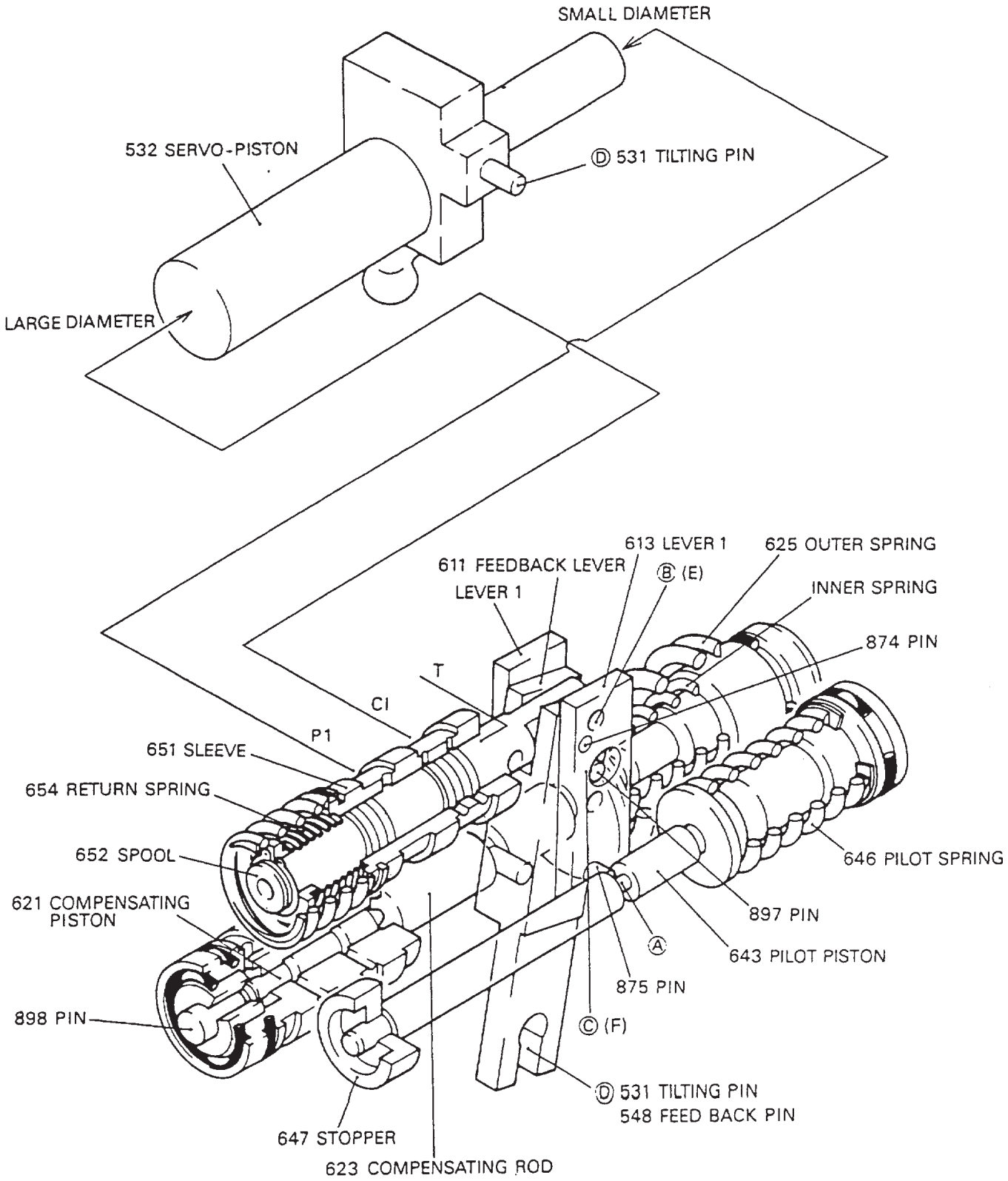
Internal Pump Control:

Internal pressure is applied on the small side of the Servo piston to maintain positon when the pump flow rate is increased this is accomplished by two things.

1. PSV pressure enters the requlator on the large side of the servo piston to position the pump swash plate angle to minumn.
2. The PSV pressure is reduced on the large side of the servo piston which allows pressure on the large piston side of the servo piston to be redirected to tank allowing the pump to come on stroke and increase the pump flow.

This internal differential pressureization allow variable control and also a more smooth control on the pump flow output.

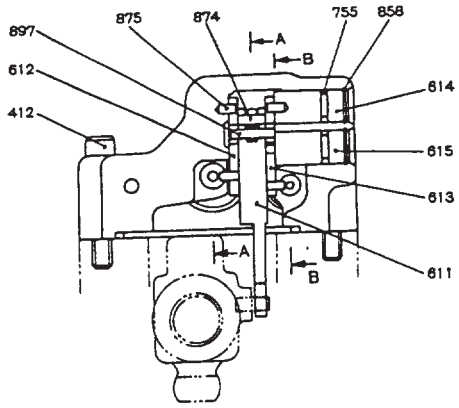
https://truckmanualshub.com/

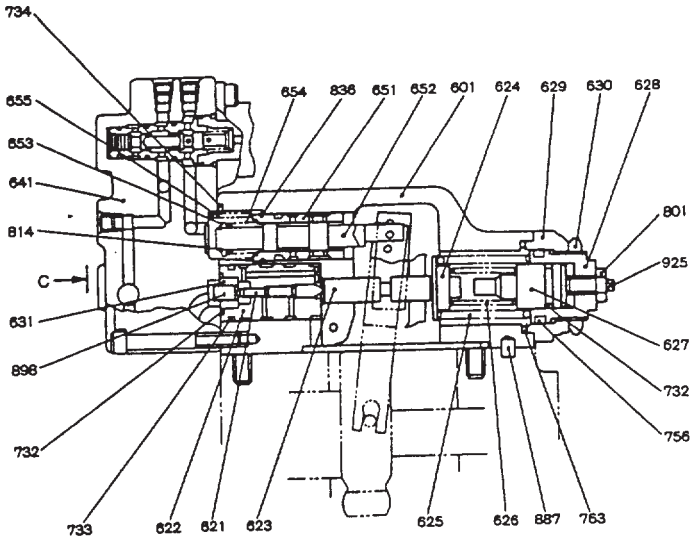


https://truckmanualshub.com/

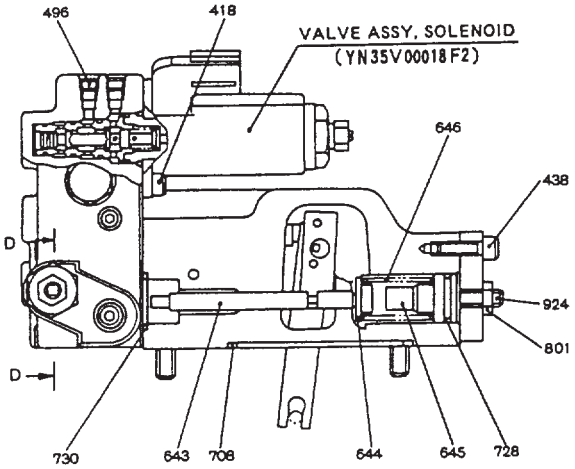
2) Regulator

① Structure of regulator

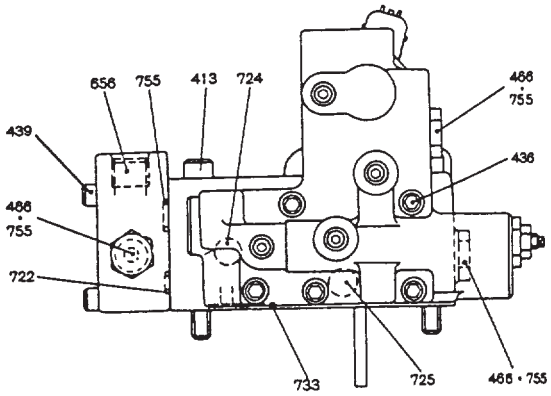




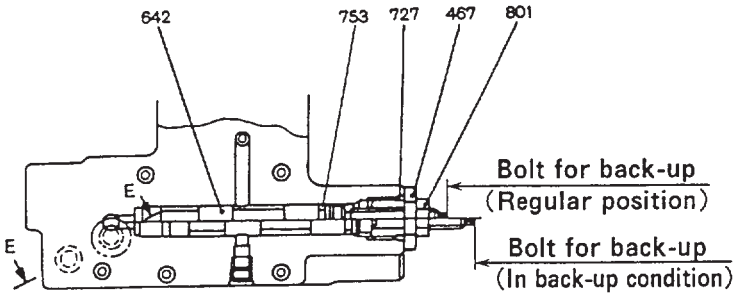
Section AA



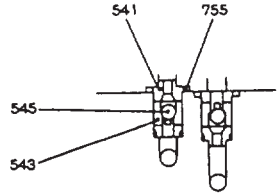
Section BB



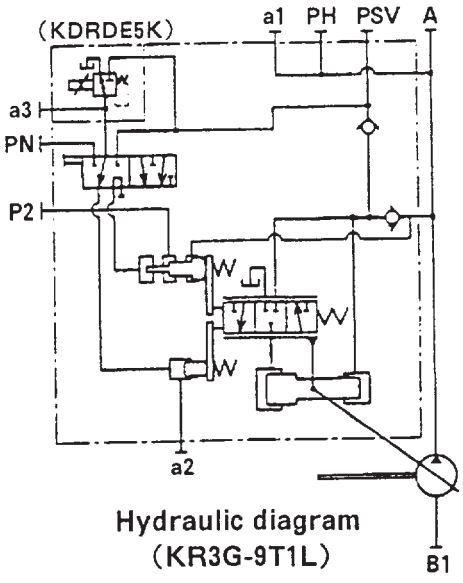
View C



Section DD



Section EE



Hydraulic diagram
(KR3G-9T1L)

https://truckmanualshub.com/

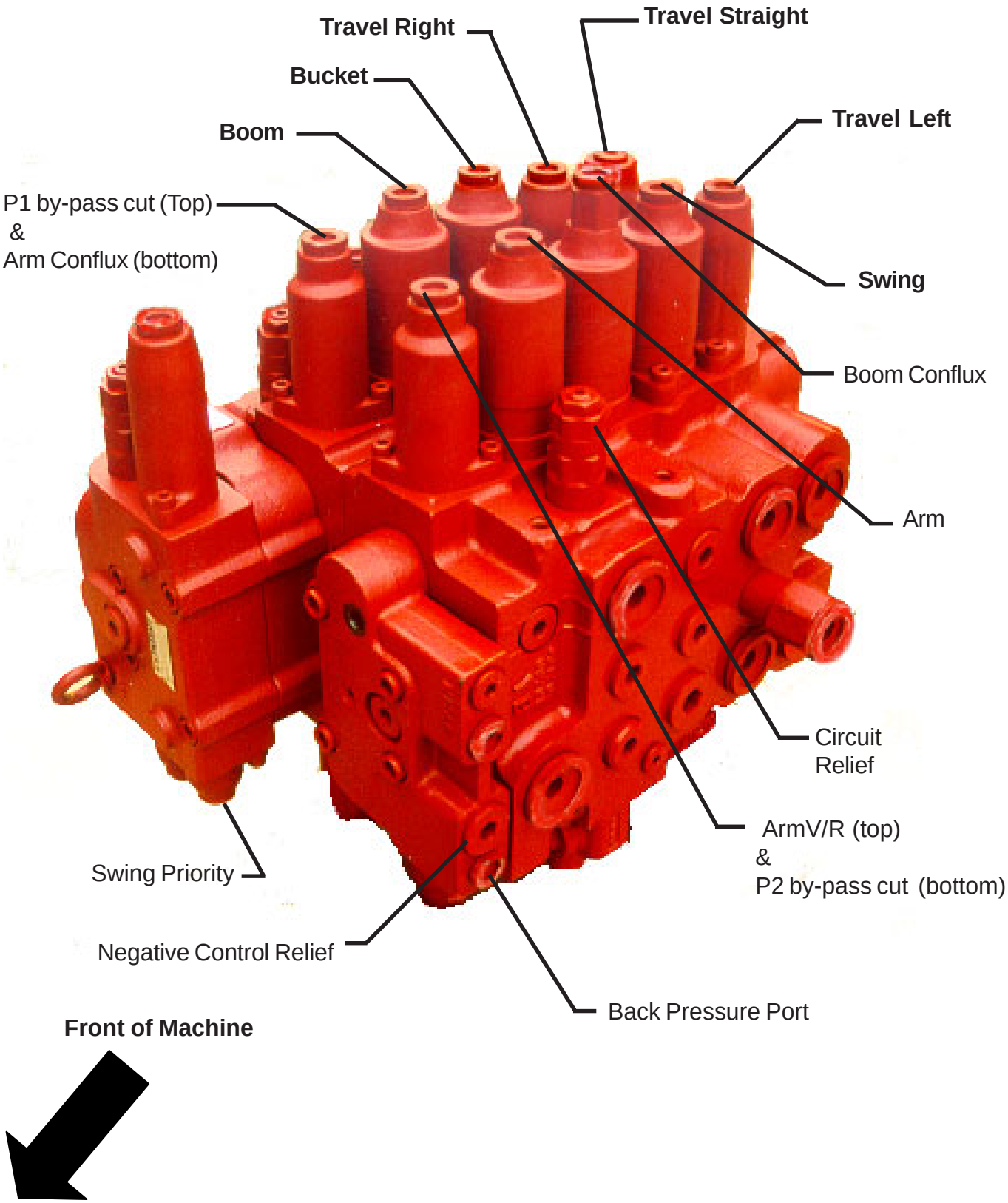
Code	Name	Qty.
412	Socket bolt (M8 x 50)	2
413	Socket bolt (M8 x 70)	2
418	Socket bolt (M5 x 12)	2
436	Socket bolt (M6 x 50)	5
438	Socket bolt (M6 x 20)	4
439	Socket bolt (M6 x 40)	4
466	VP plug (PF 1/4)	3
467	Plug (PF 3/8 x M8)	1
496	Plug	18
541	Seat	2
543	Stopper 1	2
545	Ball	2
601	Casing	1
611	Feed back lever	1
612	Lever (1)	1
613	Lever (2)	1
614	Fulcram plug	1
615	Adjust plug	1
621	Compensating piston	1
622	Piston casing	1
623	Compensating rod	1
624	Spring seat (C)	1
625	Outer spring	1
626	Inner spring	1
627	Plunger (C)	1
628	Adjust screw (C)	1
629	Cover (C)	1
630	Lock nut	1
631	Pf sleeve	1
641	Pilot cover	1
642	rod	1
643	Pilot piston	1
644	Spring seat (Q)	1
645	Plunger (Q)	1
646	Pilot spring	1
651	sleeve	1
652	spool	1
653	spring seat	1
654	Return spring	1
655	Set spring	1
656	Port plate	1
708	O-ring (JIS B2401-G75)	1
722	O-ring (JIS B2401-P6)	2
724	O-ring (JIS B2401-P8)	12
725	O-ring (JIS B2401-P10)	1
727	O-ring (JIS B2401-P14)	1
728	O-ring (JIS B2401-P18)	1

Code	Name	Qty.
730	O-ring (JIS B2401-P22)	1
732	O-ring (JIS B2401-P16)	2
733	O-ring (JIS B2401-P20)	2
734	O-ring (JIS B2401-G25)	1
753	O-ring (JIS B2401-P9)	1
755	O-ring (JIS B2401-P11)	6
756	O-ring (JIS B2401-P26)	2
763	O-ring (JIS B2401-G35)	1
801	Lock nut (M8)	3
814	Snap ring (JIS B2804 SR-15)	1
836	Snap ring	1
858	Locking ring (JIS B2804 RR-15)	2
874	Pin (ϕ 4 x 11.7L)	1
875	Pin (ϕ 4 x 8L)	4
887	Pin	1
897	Pin (ϕ 4 x 19L)	1
898	Pin (ϕ 6.5 x 9L)	1
924	Set screw	1
925	Set screw (Q1)	1
079	Solenoid valve	1

Tightening torque

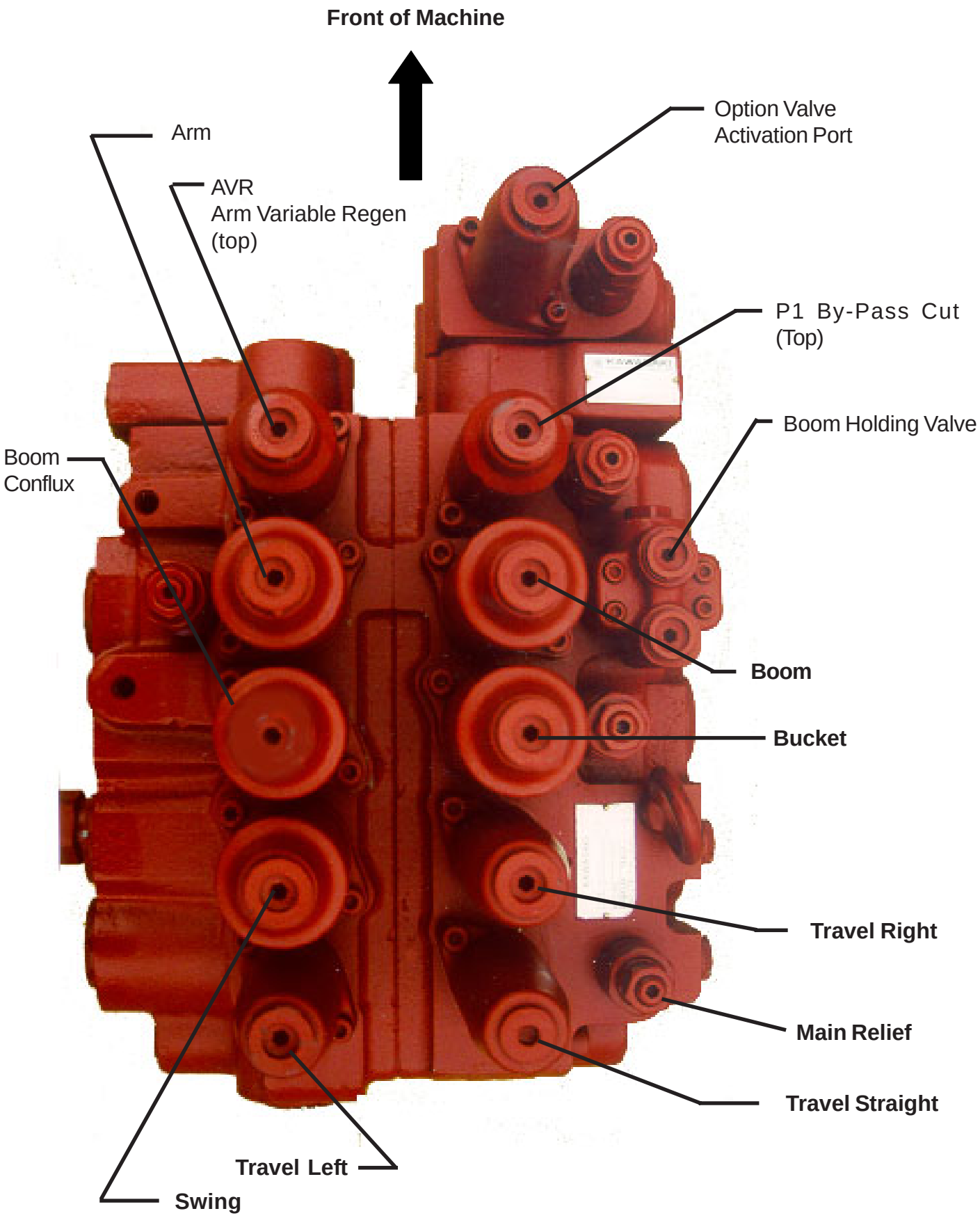
Code	Size	Torque
412, 413	M8	29.4 {3}
436, 438, 439	M6	11.8 {1.2}
466	PF 1/4	36.3 {3.7}
467	PF 3/8	73.5 {7.5}
496	PTF 1/	8.8 {0.9}
630	30 X 1	156.8 {16}
801	M8	15.7 {1.6}

https://truckmanualshub.com/



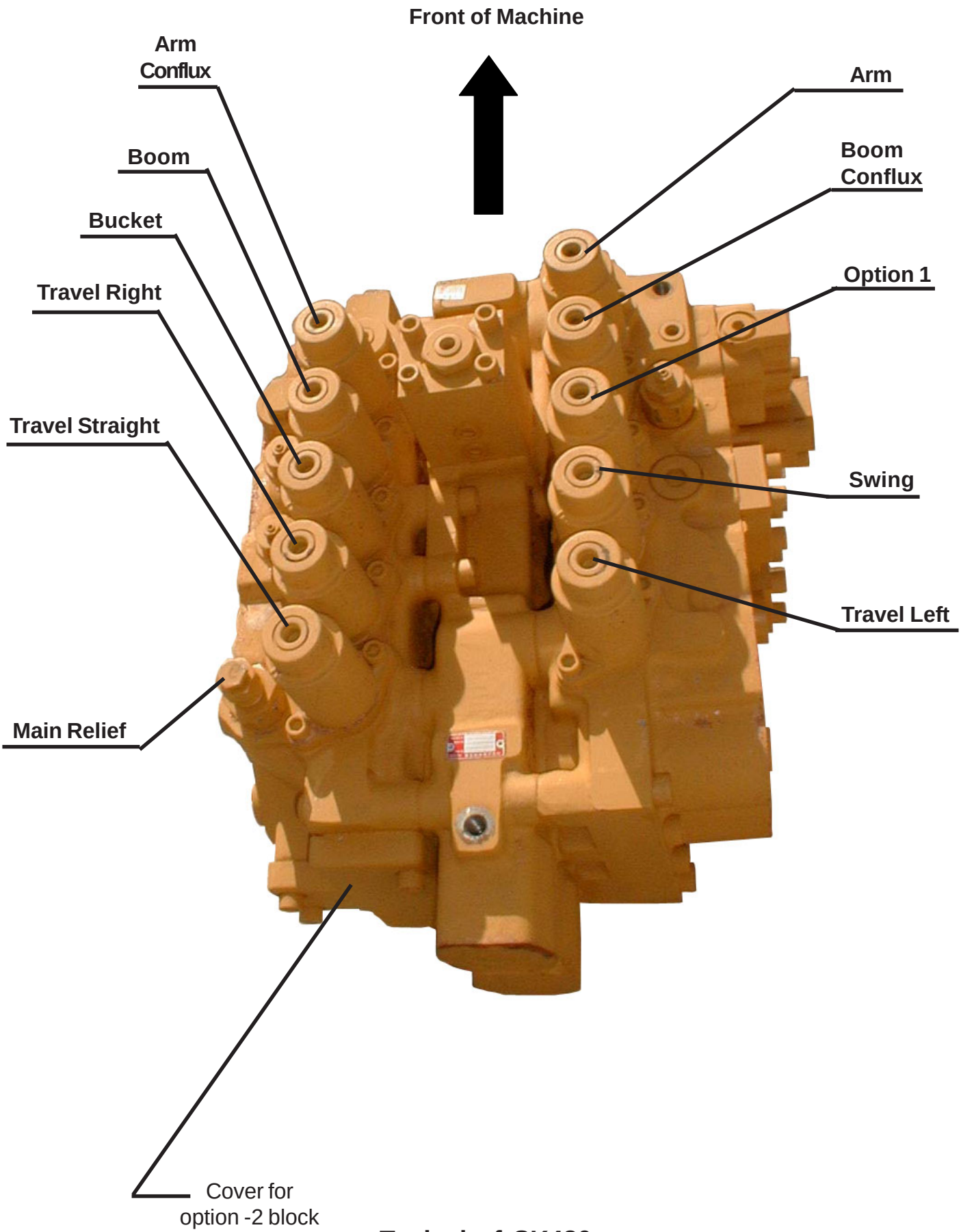
Typical of SK210 SK250

https://truckmanualshub.com/



Typical of SK210 SK250

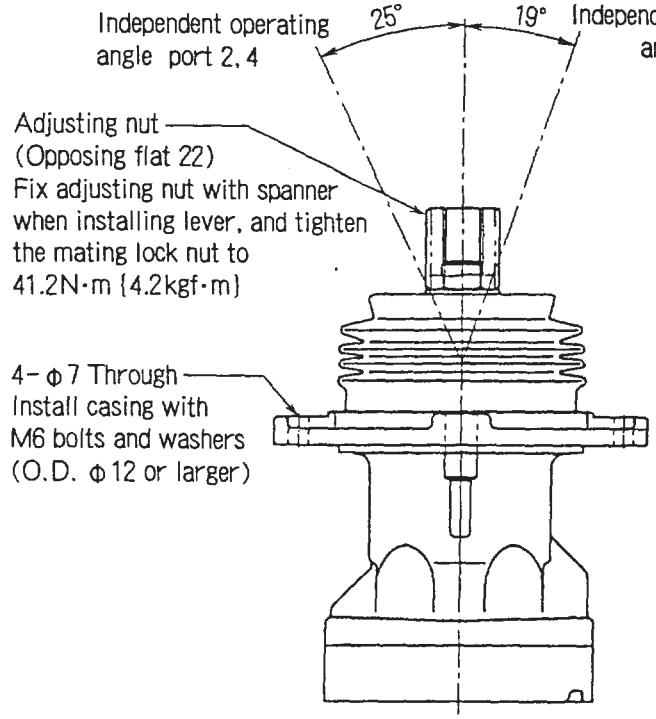
https://truckmanualshub.com/

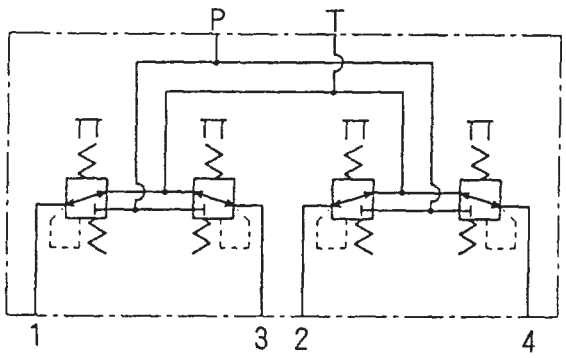


Typical of SK480

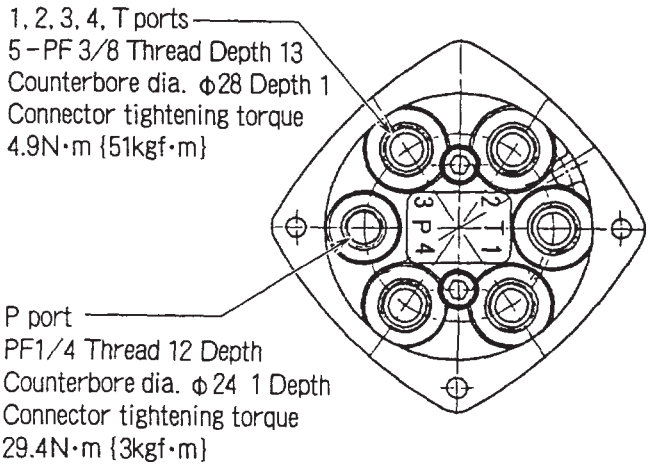
https://truckmanualshub.com/

7-7 Pilot valve (for Attachment)





Symbols for hydraulics



2. **Before tightening adjusting nut of pilot valve, apply Locktite #277 on joint thread section.**
3. **Apply grease on rotating and sliding sections of joint, and give attention to the assembling direction.**
4. **Apply grease on push rod top end.**
5. **Thickness of washer 2 (shim) for regulating secondary pressure is t = 0.4.**
6. **Not allowed to use seal washer again.**

Type	PV48K1008
Max. primary pressure	50 kgf/cm², (711 PSI)
Max. back pressure	3 kgf/cm², (42 PSI)
Rated flow rate	20 L/min
Weight	1.9 kg

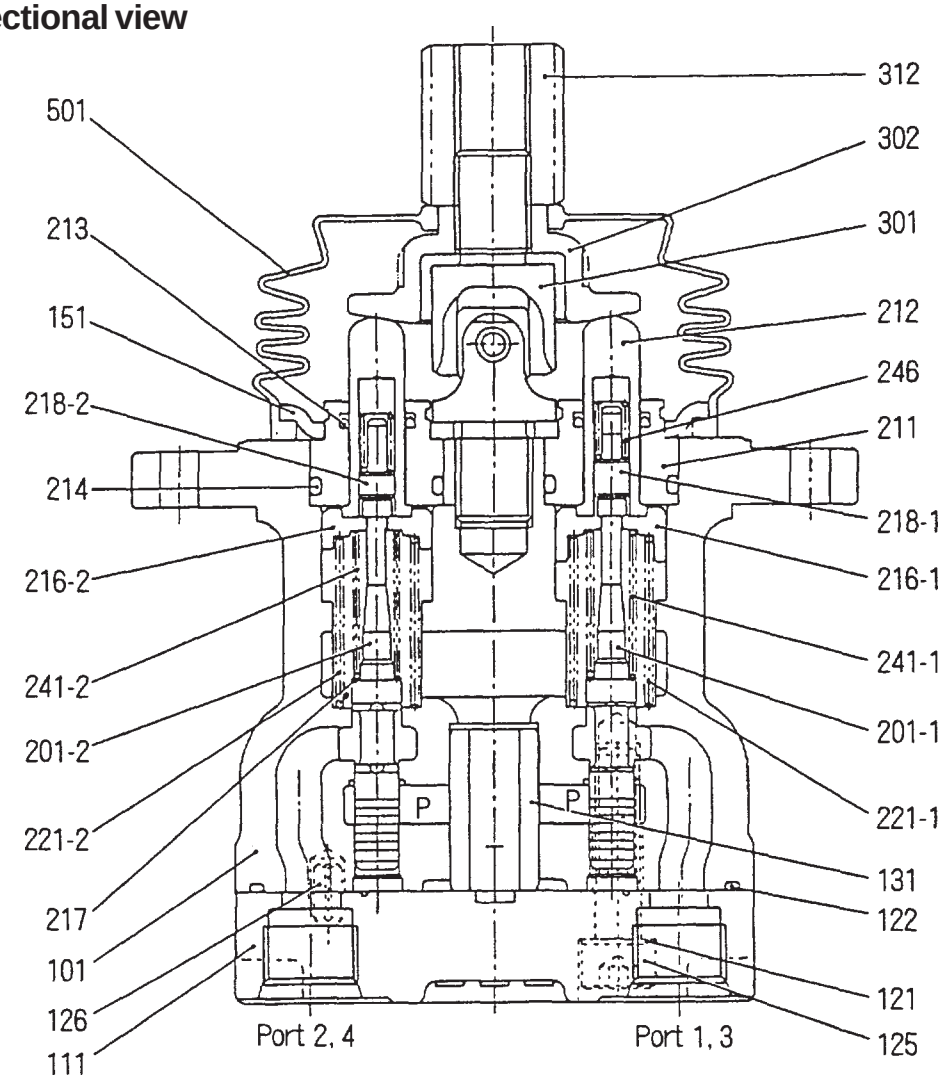
1. **The material of casing has changed from casting iron to aluminum alloy to make lighter weight .**
2. **Shuttle block on lower part is canceled, and low pressure sensor is used to send pilot secondary pressure signal to controller.**

Note: 1. P port inlet has a filter of 40 mesh or more to protect spool from foreign matter.

https://truckmanualshub.com/

3. Construction

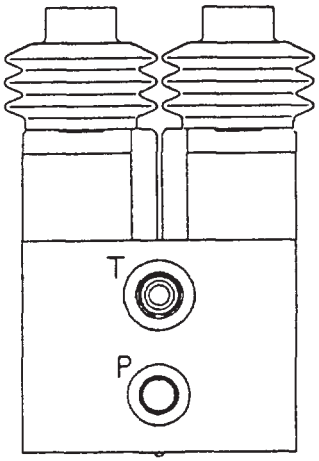
Cross sectional view

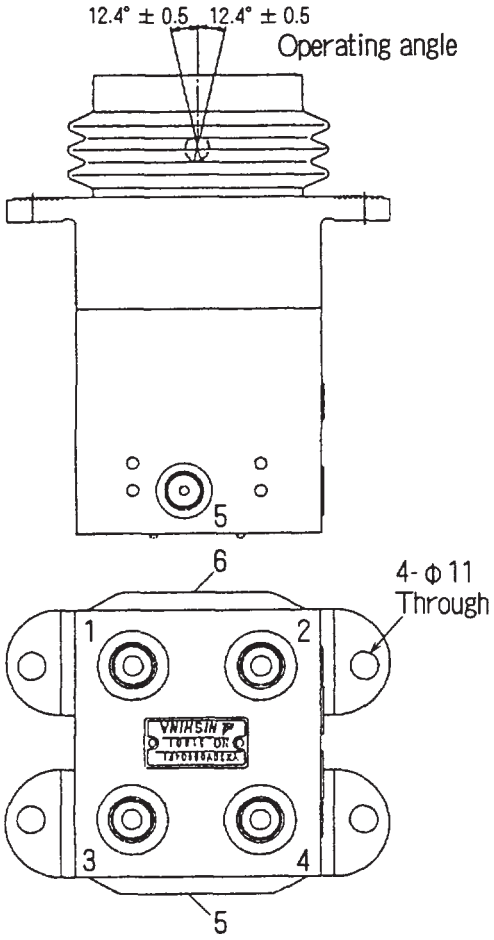


Code	Name	Qty.	Torque N•m {kgf•m}	Code	Name	Qty.	Torque N•m {kgf•m}
101	Casing	1		216-1	Spring seat 1	2	
111	Port plate	1		216-2	Spring seat 2	2	
121	Seal washer	2		217	Washer 2 (shim)	4	
122	O-ring	1		218-1	Spring seat 1	2	
125	Socket bolt (M8 x 35)	2	20.6 {2.1}	218-2	Spring seat 2	2	
126	Spring pin	1		221-1	Spring	2	
131	Bushing	1		221-2	Spring	2	
151	Plate	1		241-1	Spring	2	
201-1	Spool	2		241-2	Spring	2	
201-2	Spool	2		246	Spring	4	
211	Plug	4		301	Joing (M14)	1	47 {4.8}
212	Push rod	4		302	Plate	1	
213	Seal	4		312	Adjusting nut (M14)	1	69 {7}
214	O-ring (1B P20)	4		501	Boot	1	

7-8 Pilot valve (for traveling)

1. Appearance



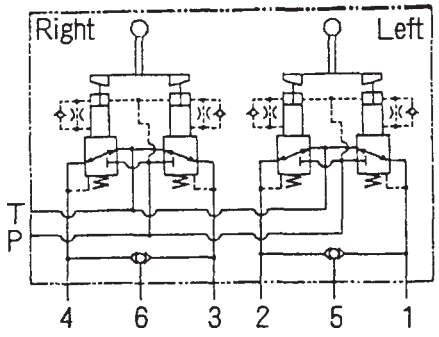


Code	Port name	Size	Torque N•m {kgf•m}
1	Left travel forward port	PF 3/8	73.5 ± 5 {7.5 ± 0.5}
2	Left travel reverse port		
3	Right travel forward port		
4	Right travel reverse port		
T	Tank port		
5	Travel pressure sensor port	PF 1/4	36.3 ± 2 {3.7 ± 0.2}
6	Travel pressure sensor port		
P	Pilot primary pressure port		

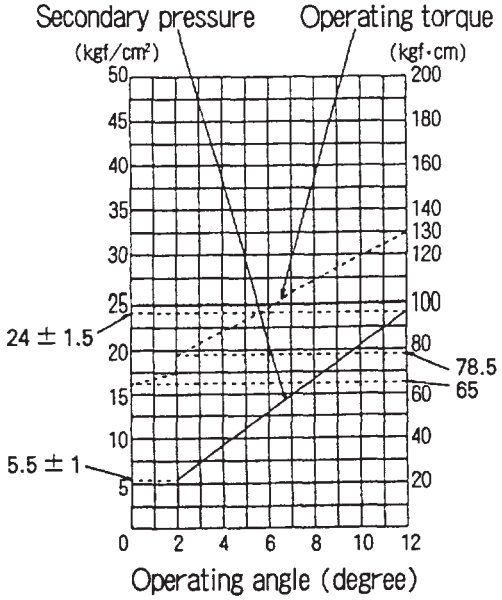
2. Specifications

Model	07291-0000
Primary pressure	50kgf/cm², (711 PSI)
Secondary pressure	5.5 ~ 24 kgf/cm², (78 ~ 341 PSI)
Rated flow	10 L/min
Weight	Approx. 11 kg

3. Hydraulic diagram

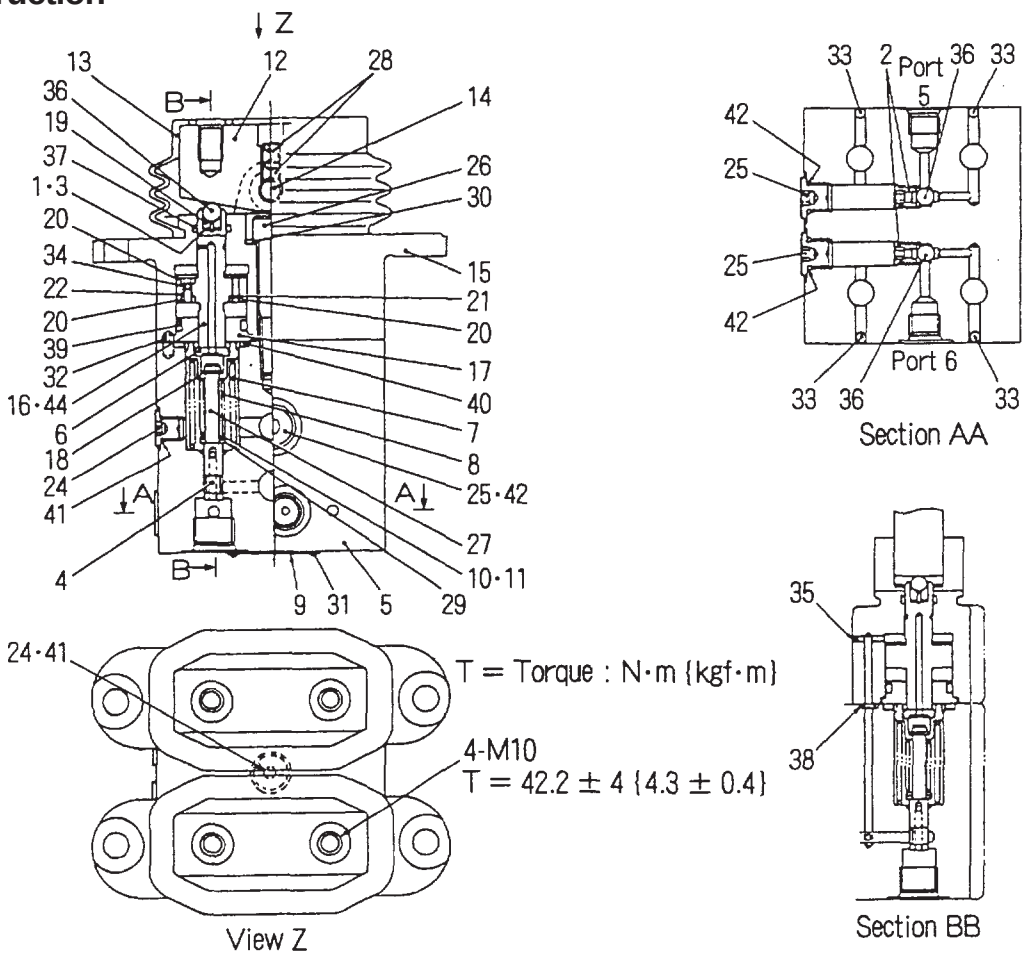


4. Control curve



https://truckmanualshub.com/

5. Construction



Travel pilot valve

Code	Name	Qty.	Torque N•m {kgf•m}	Code	Name	Qty.	Torque N•m {kgf•m}
1	Orifice (Shim)	4		22	Spring	4	
2	Seat	2	☆15 {1.5}	24	Plug (PF 1/8)	3	9.8 {1.0}
3	Orifice (Shim)	4		25	Plug (PF 1/4)	3	25 {2.5}
4	Spool	4		26	Socket bolt (M10 x 60)	2	59 {60}
5	Body	1		27	Flange bolt	4	5 {0.5}
6	Stopper	4		28	Setscrew (M8)	4	15 {1.5}
7	Spring	4		29	Washer	4	
8	Spring	4		30	Washer	2	
9	Name plate	1		31	Rivet	2	
10	Shim (t = 0.2)	4		32	Pin (ϕ 5)	4	
11	Shim (t = 0.1)	4		33	Ball	6	
12	Cam	2		34	Ball	4	
13	Boot	2		35	Ball	4	
14	Pin	2		36	Ball	6	
15	Cover	2		37	U-packing	4	
16	Piston	4		38	O-ring (1A P5)	4	
17	Guide	4		39	O-ring (1A P24)	4	
18	Sleeve	4		40	O-ring (1A P26)	4	
19	Holder	4		41	O-ring (1B P8)	3	
20	Ring	12		42	O-ring (1B P11)	3	
21	Orifice (Shim)	4		44	Piston Assy	4	

Apply Locktite #262 to ☆

https://truckmanualshub.com/

6. Operations

The pilot valve is made up of the following sections in the functions.

A. Damper section
B. Reducing valve section
C. Shuttle section

A. Damper section

① The primary pressure is fed through the P port, and flows into the damper chamber through passages (D) and (E).

② In addition, the primary pressure is stored in the damper chamber through the orifice and check valve.

③ Then, the air stored in the damper chamber is discharged to T port through passages (F) and (G) to prevent the damper performance from instability due to the entry of air.

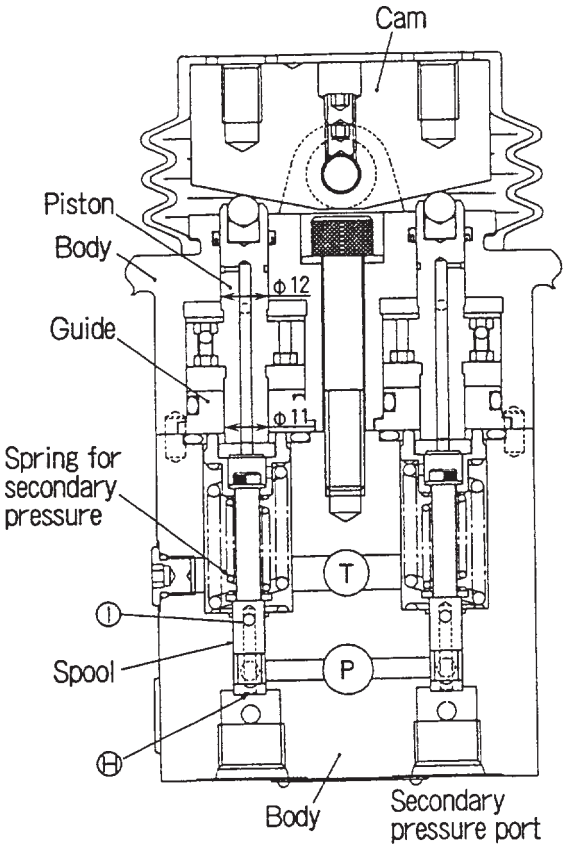
④ If the cam actuates while traveling because the oil in the damper chamber is prevented from reversing with the check valve, the oil flows to passage (E) through only the orifice section.

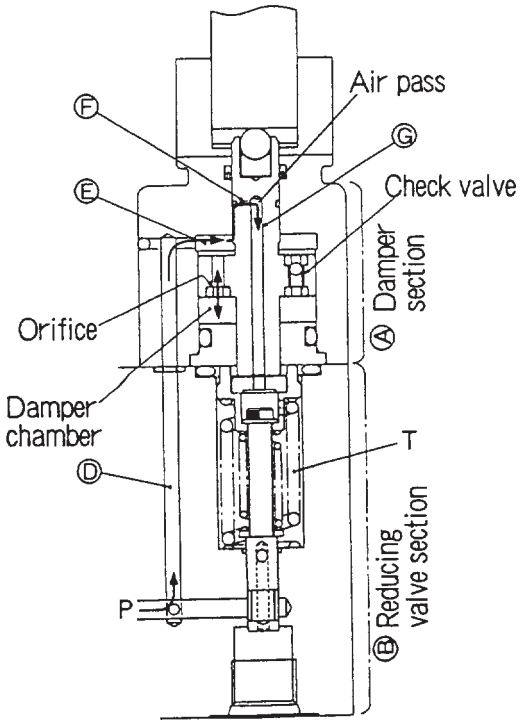
⑤ The damping operation is performed by the resistance generated when the oil passes through the orifice.

⑥ The upper and lower bores of piston are 12 and 11 respectively, causing the difference of area, therefore the upward moving force always acts on the piston.

⑦ Consequently, the cam operation and the piston on the other side rise due to the pressure caused by the difference of area, resulting in the condition where it follows the cam operation.

⑧ Therefore, the damper operation is constant even the cam is located on any position.





https://truckmanualshub.com/

B. Reducing valve

(1) At neutral position

① The primary pressure fed through P port is blocked by the sealing function on the outside of spool and the hole on the body.

② And, since the secondary pressure port is connected to the T port through vertical hole (H) at the center section and side hole (I), the pressure is zero.

(2) In operation

① If the cam inclines in the operating direction, the piston lowers.

② Since the cutout (J) on the outside of spool is connected with the secondary pressure port, the primary pressure fed through P port flows to the secondary pressure port.

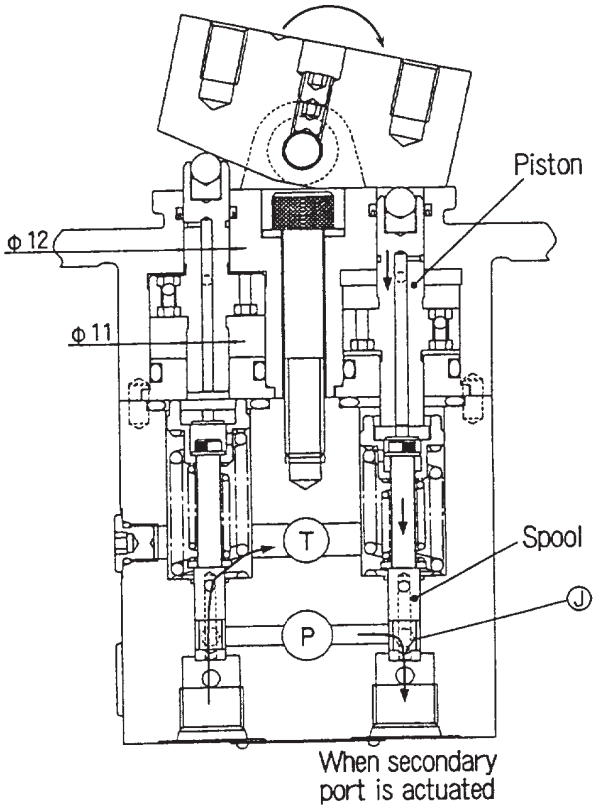
③ Then, the side hole (I) goes in the hole on the body and is sealed, and the circuit from the secondary pressure port to the T port is blocked.

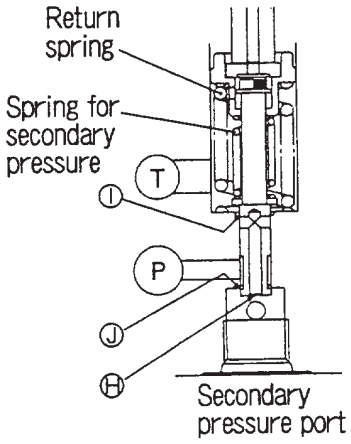
④ When the pressure at the secondary pressure port rises higher than the force of spring for the secondary pressure, the spool is pushed up and the cutout (J) goes in the hole on the body and the passage between the primary pressure port and the secondary pressure port is blocked.

⑤ And, side hole (I) is connected with the T port to release the pressure at the secondary pressure port to the T port.

⑥ By repeating the above procedures, it is possible to obtain the pressure at the secondary pressure port which is well-balanced against the load of spring for the secondary pressure corresponding to the cam operation.

⑦ The return spring acts to maintain the proper operating reaction force and to securely return the pressure reducing valve to the neutral position.



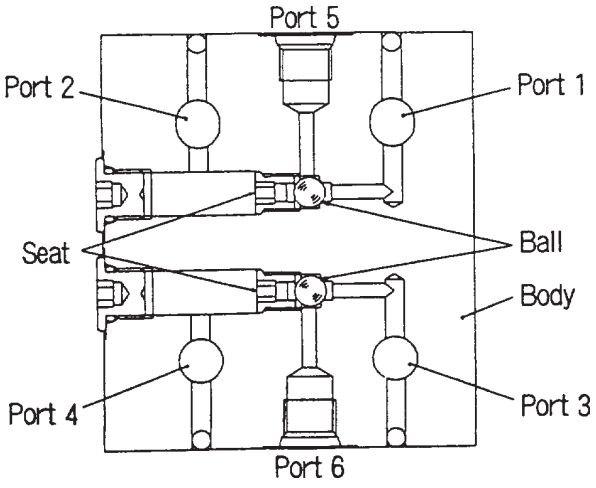


C. Shuttle section

① If the pressure is produced on the ports 1 and 3, the ball is pressed against the seat.

② And, the pressure flows from the port 1 to the port 5 or port 3 to port 6.

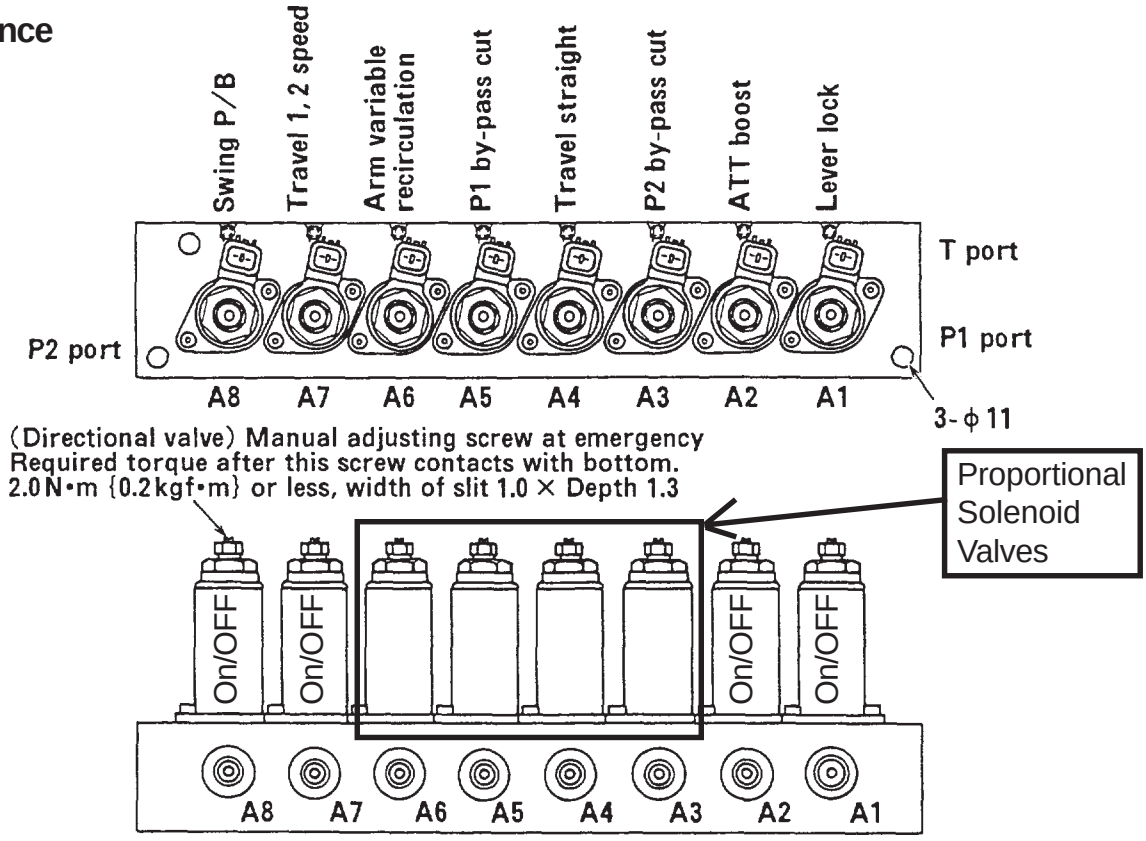
③ Only a little pressure leaks from the ports



https://truckmanualshub.com/

7-10 Solenoid/Proportional valve block

1. Appearance



Note : A1 ~ A8 are Non - Adjustable

Port

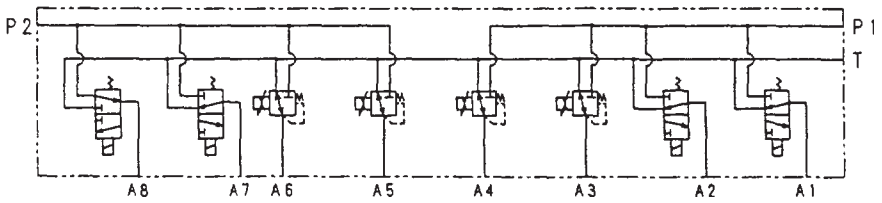
Code	Size	Torque: N•m {kgf•m}
P1, P2, T A1	PF 3/8	74 ± 5 { 7.5 ± 0.5}
A2 ~ A8	PF 1/4	36 ± 2 {3.7 ± 0.2}

2. Specifications

Item		Specifications
Type		8KWE5G–30 / G24WR–804 B
Rated pressure (P port)		0 ~ 50 kgf/cm² {0~711 psi}
Allowable back press. (T port)		10 kgf/cm² {142 psi} or lower
Max. flow rate		Sol. valve: 16 L/min, Propo. valve: 10 L/min (per one spool)
Solenoid valve - ON/OFF	Rated voltage	DC24V
	Range of allowable voltage	20.4 ~ 30V
	Rated power consumption	17W or less (at 24V, 20°C)
	Duty	29V continuous (with surge killer)
	Coil resistance	34 ~ 40 Ω
Proportional valve - Variable	Rated current	700mA
	Coil resistance	17.5 Ω (at 20°C)
	Range of secondary press	0 ~ 2.9 MPa {0 ~ 30 kgf/cm²}
	Dither in use	100 Hz/300mA$_{P-P}$ {at 300mA}

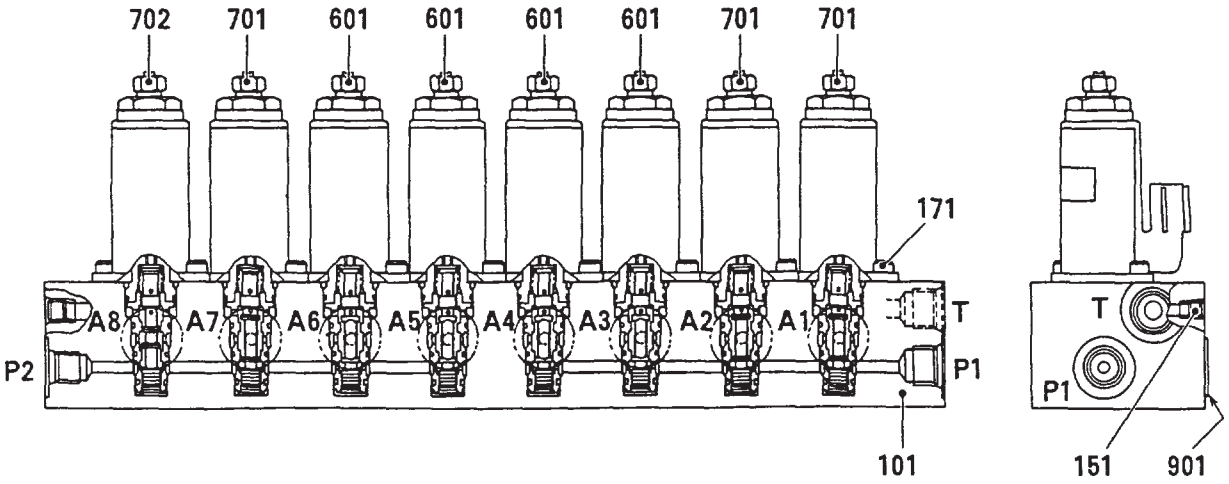
https://truckmanualshub.com/

2. Structure



Code	Name	Qty.	Code	Name	Qty.
101	Casing	1	601	Propo. valve (KDRDE5K-31/30C40-101)	4
151	Plug BP–1/16 (Meck)	8	701	Sol. valve (KWE5K-31/G24D40)	3
153	Plug BP–1/8 (Meck)	1	702	Sol. valve (KWE5K-31/G24Y40)	1
171	Socket bolt (M5 x 12)	16	901	Name plate	1

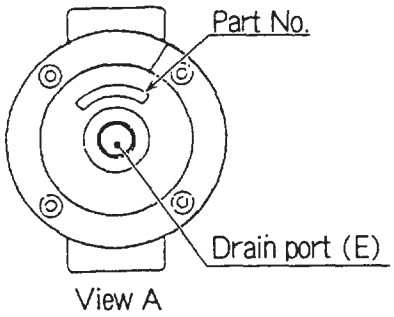
3. Hydraulic diagram A1 ~ A8 are Non - Adjustable

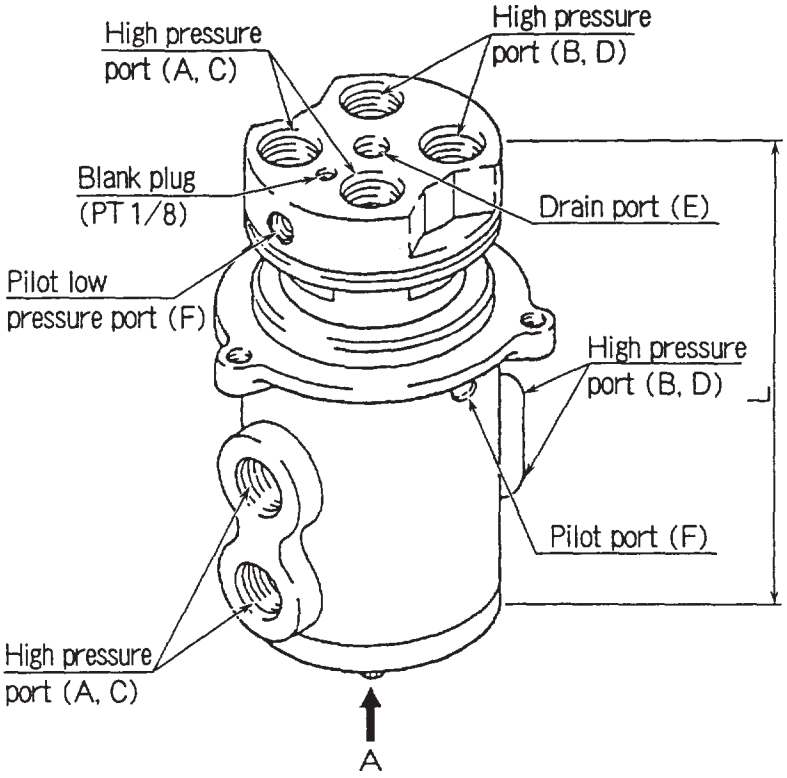


https://truckmanualshub.com/

7-9 Swivel joint

1. Appearance



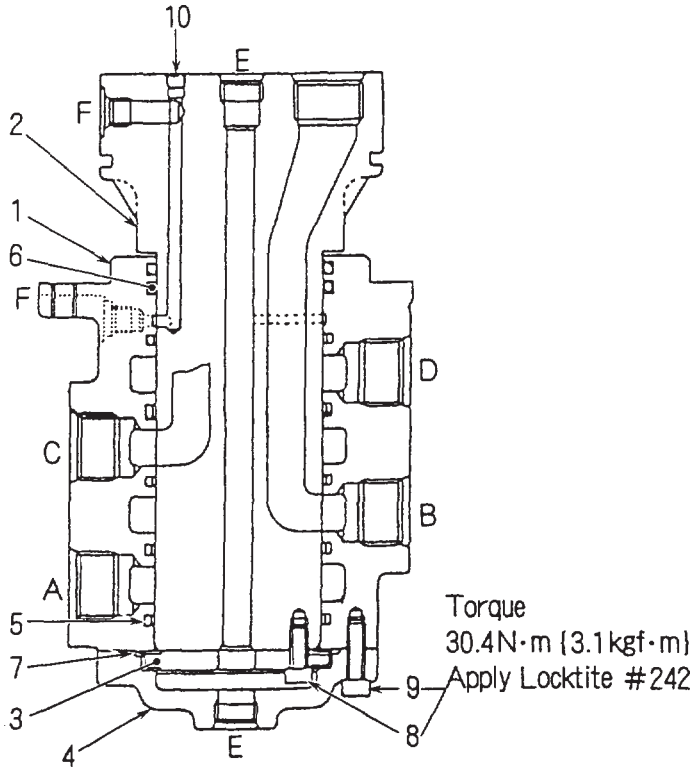


2. Specifications

Rotating speed: 15 min^{-1} {rpm}, Weight: 30kg

Port	Size	Circuit	Pressure MPa {kgf/cm²}	Rated flow L/min
A ~ D	PF 1	High pressure port	343 {350}	255
E	PF 1/2	Low pressure port	0.5 {5}	50
F	PF 1/4	Low pressure port	4.9 {50}	30

3. Construction



Code	Name	Qty.
1	Body	1
2	Stem	1
3	Thrust plate	1
4	Cover	1
5	Seal assy	5
6	O-ring	2
7	O-ring	1
8	Socket bolt	2
9	Socket bolt	4
10	Blank plug	1

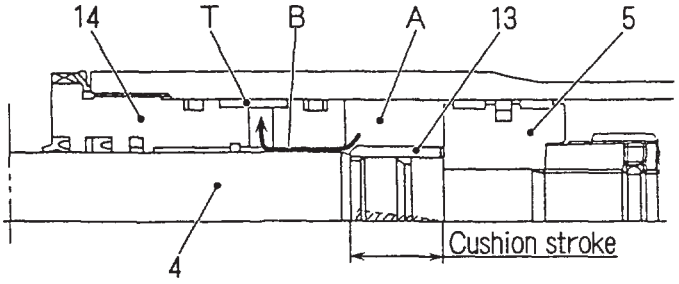
https://truckmanualshub.com/

7-6 Cushioning Mechanism of Cylinder

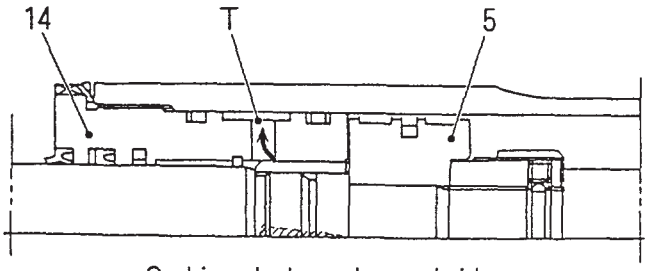
1) Cushioned cylinder

Cushion mechanism is provided so that earth and sand in the bucket does not fall down due to shock produced when extending and retracting piston rod strikes rod cover and cylinder tube without reducing the speed.

① Boom cylinder Rod side
② Arm cylinder Rod and head side
③ Bucket cylinder Rod side



Cushion begins getting into on rod side



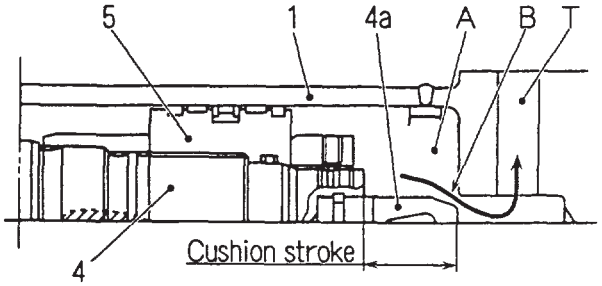
Cushion stroke end on rod side

• Operation of cushion mechanism on rod side.

① When reaching close to cylinder stroke end, oil in A chamber passes through passage B, and flows into tank port (T) at constant speed.

② In addition, after piston rod (4) is extended, cushion ring (13) gets into rod cover (14), oil in A chamber is restricted and passes through passage B and flows into tank port (T) resulting in reduction of piston speed.

③ After piston rod (4) extends further, cushion ring (13) gets into rod cover (14) completely, piston speed is reduced when oil in a chamber passes through and piston (5) strikes rod cover (14) that is, stroke end.



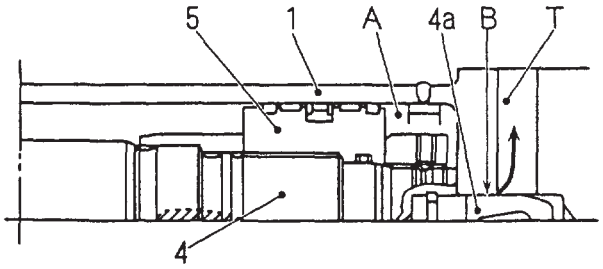
Cushion begins getting into on head side

• Operation of cushion mechanism on head side.

① When reaching close to cylinder stroke end, oil in a chamber passes through passage B, and flows into tank port (T) at constant speed.

② In addition, after piston rod (4) is retracted, plunger (4a) gets into cylinder tube (1), oil in A chamber is restricted and passes through passage B and flows into tank port (T) resulting in reduction of speed.

③ After piston rod (4) retracts further, plunger (4a) gets into cylinder tube (1) completely, piston speed is reduced when oil in A chamber passes through, then piston (5) strikes cylinder tube (1), that is, stroke end.



Cushion stroke end on head side

https://truckmanualshub.com/

7-6 Cushioning Mechanism of Cylinder - Cont.

8.2.2 OPERATION

If pressurized oil is fed alternatively to the oil inlet and outlet provided in the cylinder, force acts on the piston which in turn causes the piston rod (4) to extend and retract.

(1) Operation of cylinder with cushion
(Cushion on rod side)
The cushion mechanism is provided to prevent the generation of shock when the moving speed of piston (5) is not reduced and strikes rod cover(14).
An oil in chamber "A" returns to the tank by passing through paths "B" and "C" at a fixed flow rate in a intermediate stroke state (Fig. 8-5) of pressing bottom side. Next, in a state of just before stroke end (Fig. 8-6), cushion ring (13) plunges into path "B".
At this time, an oil in chamber "A" passes clearance "D" and restricted path "C", an oil flow volume returning to tank suddenly drops and the piston part movement slows down.

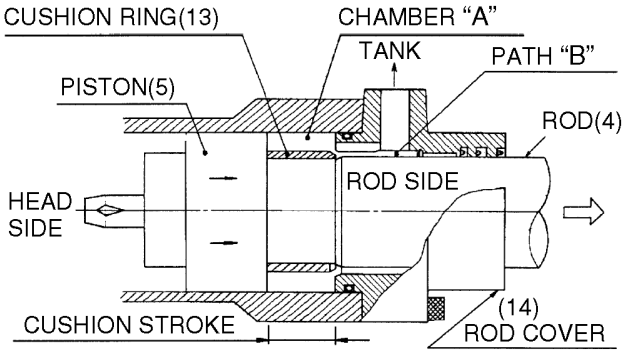


Fig. 8-5 Cushion mechanism on the rod side

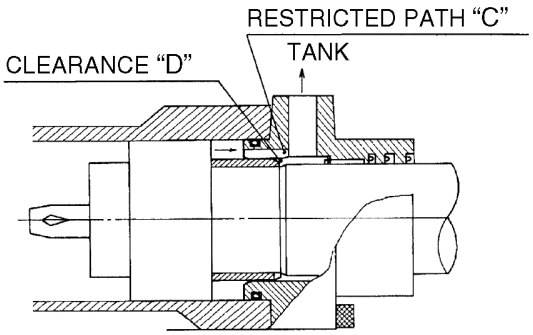


Fig. 8-6 Cushioning action on the rod side

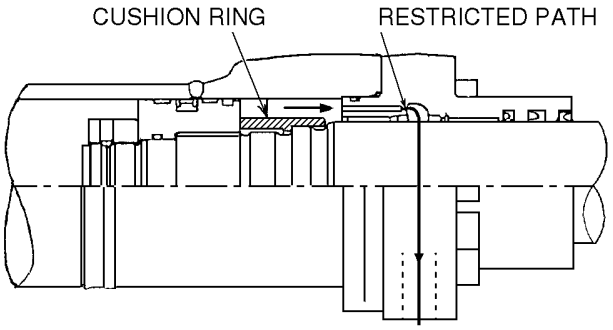


Fig. 8-7 Cushioning action on the rod side

https://truckmanualshub.com/

7-6 Cushioning Mechanism of Cylinder - Cont.

(Cushion on head side)

This construction is similar to the one of cushion on rod side. In a state of intermediate stroke pressing rod side, an oil in chamber "A" returns to tank by passing through paths "B" and "C" at a fixed flow rate.

Next, in a state of just before stroke end, plunger plunges into path "B". At this time, an oil in chamber "A" path clearance "D" and restricted path "C", an oil flow volume returning to tank suddenly drops and the piston part movement slows down.

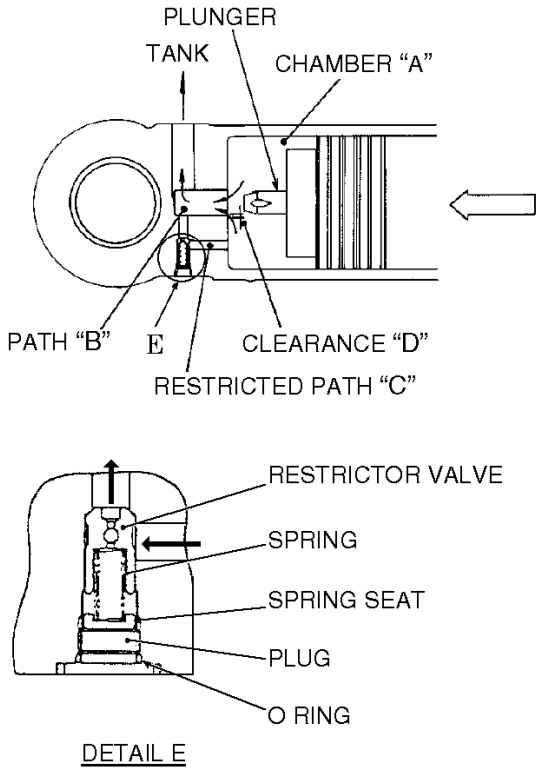


Fig. 8-8 Cushioning action on the head side

https://truckmanualshub.com/

Kobelco

Dynamic Acera



Kobelco Construction Machinery America LLC
Hydraulic Motors
(Swing & Travel)

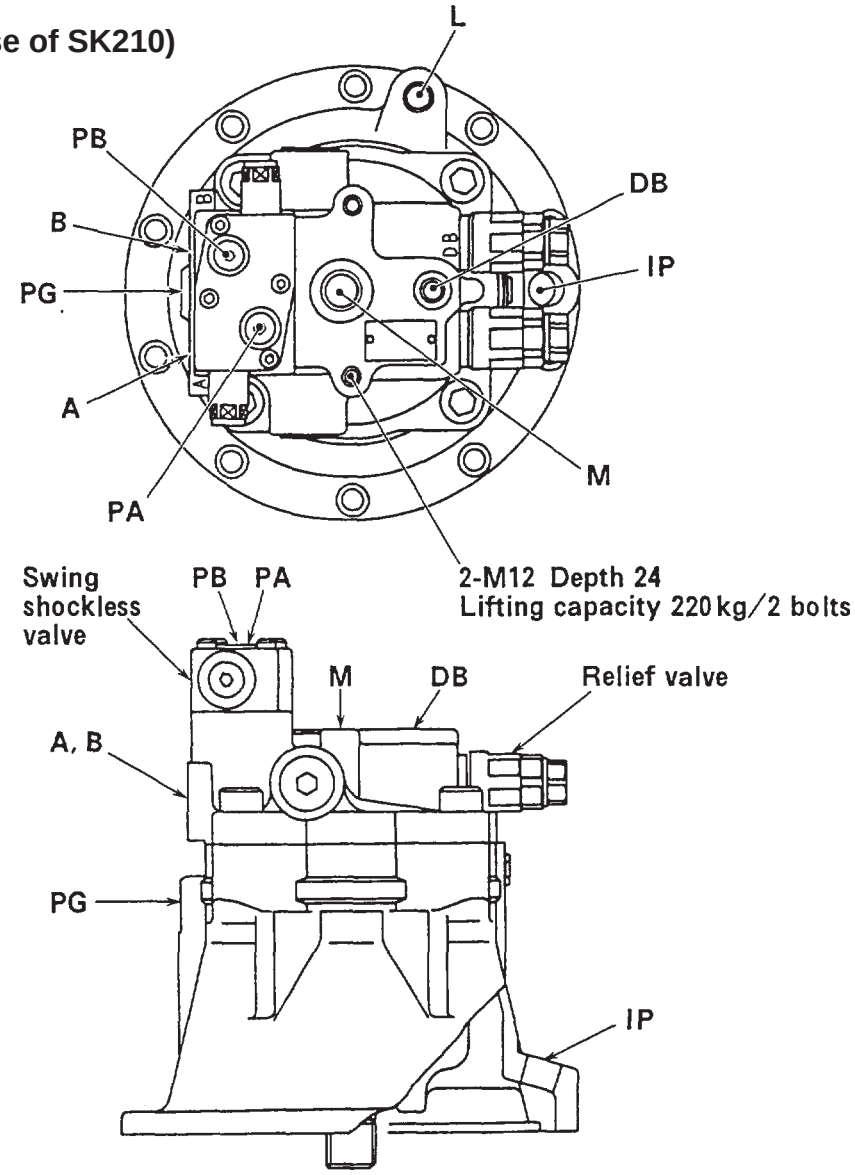
KOBELCO

Kobelco Construction
Machinery America Inc.

https://truckmanualshub.com/

7-4 Swing motor

1. Appearance (In case of SK210)



- **Rotation direction (SK210 · SK250)**
  (Viewed from shaft end)
  Oil inlet A ····· Clockwise
  Oil inlet B ····· Counterclockwise

- **Rotation direction (SK330)**
  (Viewed from shaft end)
  Oil inlet A ····· Counterclockwise
  Oil inlet B ····· Clockwise

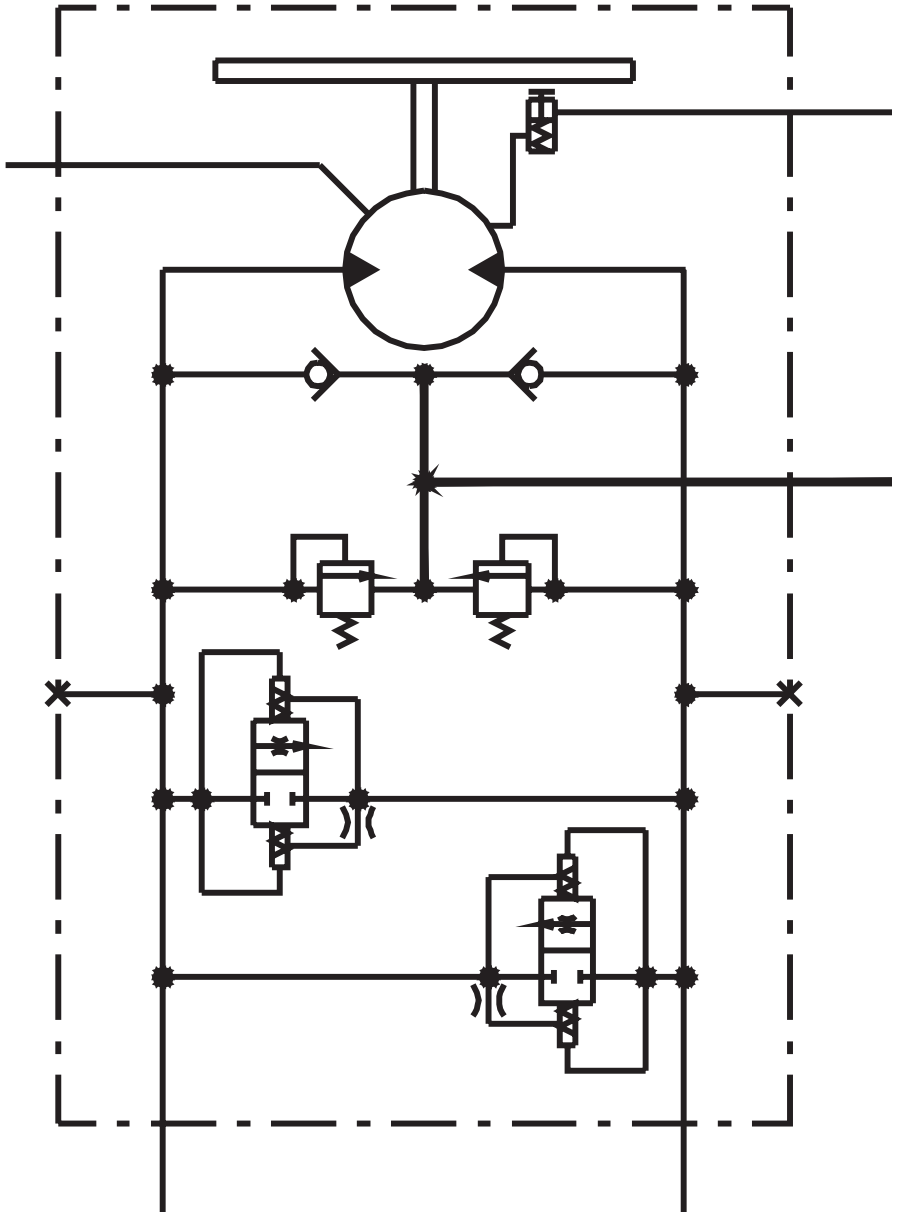
Code	Name	Size	Torque Kgf/cm^2 (lb/ft)
A,B	Main port	2-PF 3/4	17 (122)
M	Make-up port	PF 3/4	17 (122)
		PF1	22 (159)
DB	Drain port	PF 3/8	7.5 (54)
		PF 1/2	10 (72)
PA, PB	Gauge port	PF 1/4	3.7 (26)
PG	Brake release port	PF 1/4	3.7 (26)
L	Gear oil level port	PF 1/2	6.6 (47)
IP	Gear oil filling port	PF 3/4	10 (72)

https://truckmanualshub.com/

2. Specifications

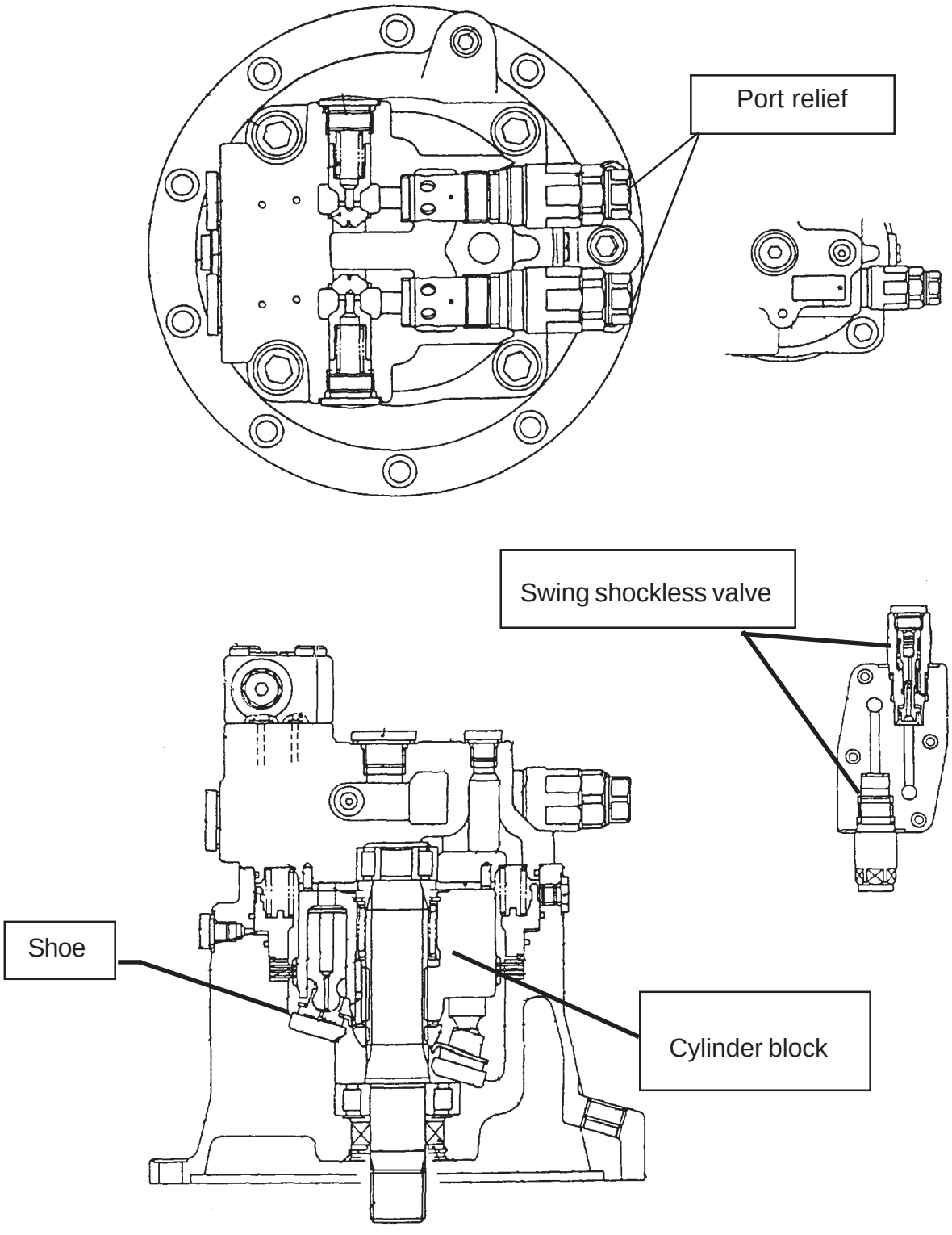
Specifications Swing Motor						
Model	SK160	ED190	SK210	SK250	SK290	SK330
Type	Axial piston type					
Parking brake	Oil type disk brake, spring applied hydraulic release					
Working pressure Kgf/cm^2 (psi)	350 (4980)	365 (5193)	280 (3990)	280 (3990)	280 (3990)	280 (3990)
Swing speed M-Mode/ high idle	11 RPM	11 RPM	11 RPM	11 RPM	11 RPM	9.1 RPM
Weight hydraulic motor & gear	223 (491)	223 (491)	235 (520)	235 (520)	511 (1,126)	511 (1,126)

3. Hydraulic diagram



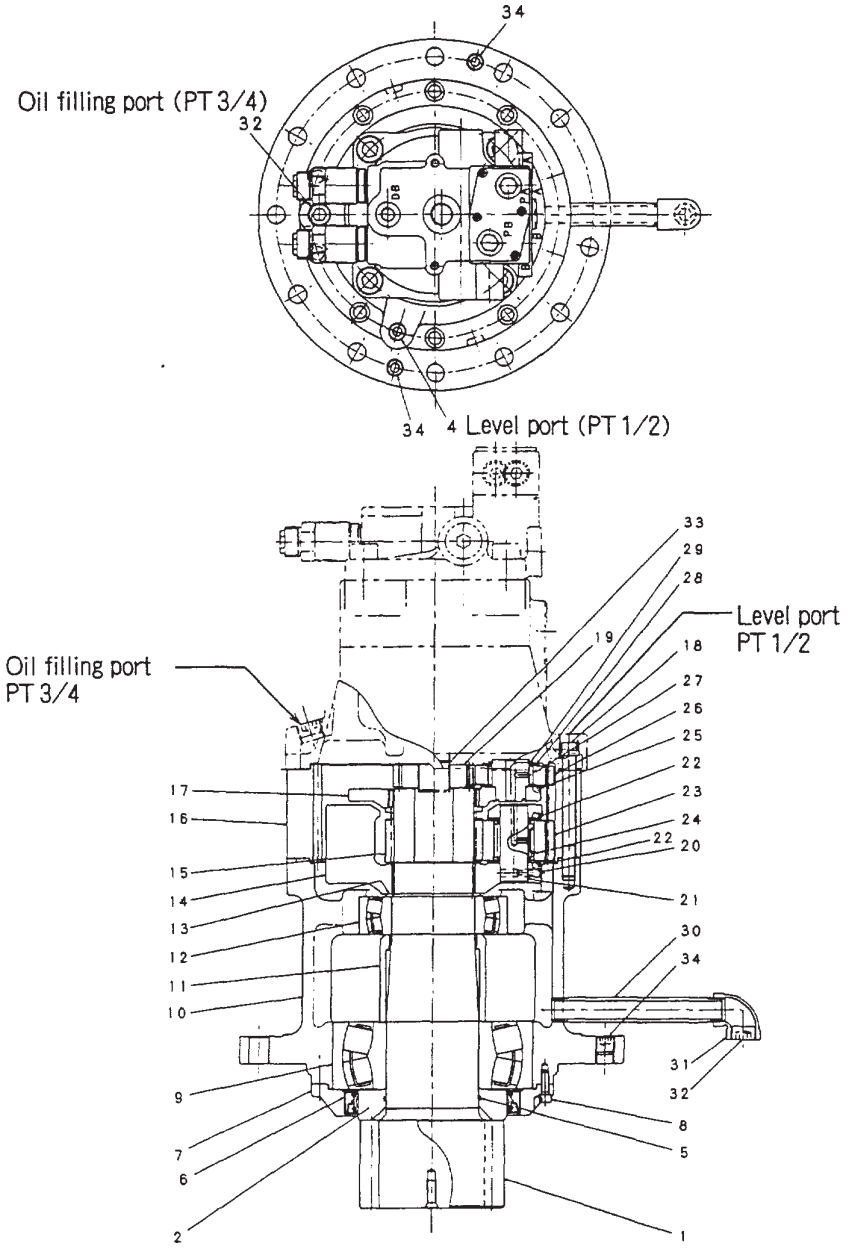
https://truckmanualshub.com/

4. Structure



https://truckmanualshub.com/

② Reduction unit (Swing)

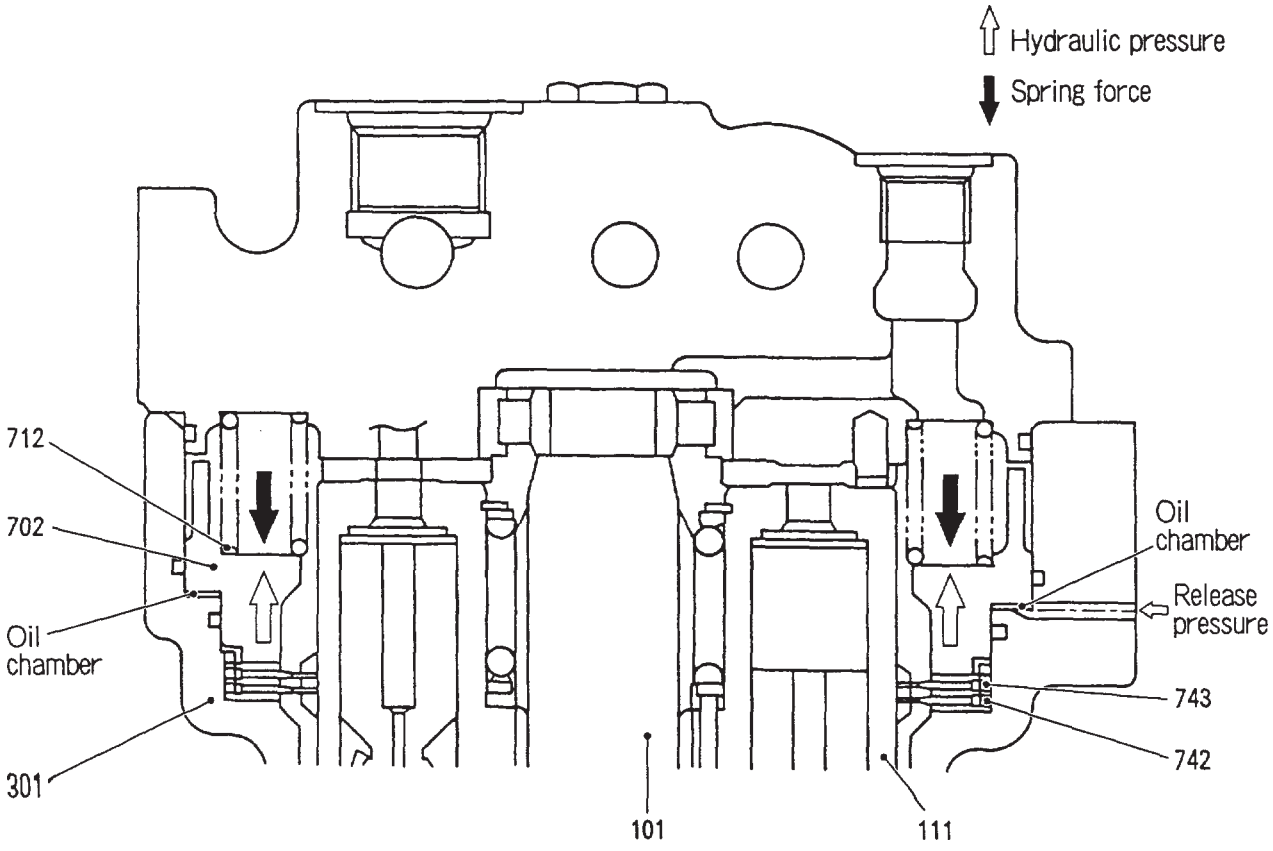


Code	Name	Qty.	Code	Name	Qty.	Code	Name	Qty.
1	Pinion shaft	1	12	Taper roller bearing (22218RH x 90 x 160 x 40)	1	24	Needle bearing (28 x 43 x 43)	4
2	Sleeve	1						
4	Plug (PT 1/2)	1	13	Retaining ring	1	25	Thrust washer	3
5	O-ring (JIS B2401 G100 1A)	1	14	Spider	1	26	Pinion	3
			15	Sun gear	1	27	Roller	102
6	Oil seal (160 x 190 x 13)	1	16	Ring gear	1	28	Thrust washer	3
7	Retainer	1	17	Spider assy	1	29	Retaining ring	3
8	Socket bolt (M8 x 25)	12	18	Socket bolt (M14 x 130)	10	30	Pipe	1
9	Taper roller bearing (22320RH 100 x 215 x 73)	1	19	Sun gear	1	31	Elbow	1
			20	Spring pin (ϕ 8 x 25)	4	32	Plug (PT 3/4)	2
10	Housing	1	21	Shaft	4	33	Retaining ring	1
11	Spacer	1	22	Thrust washer	8	34	Set screw	2
			23	Pinion	4			

https://truckmanualshub.com/

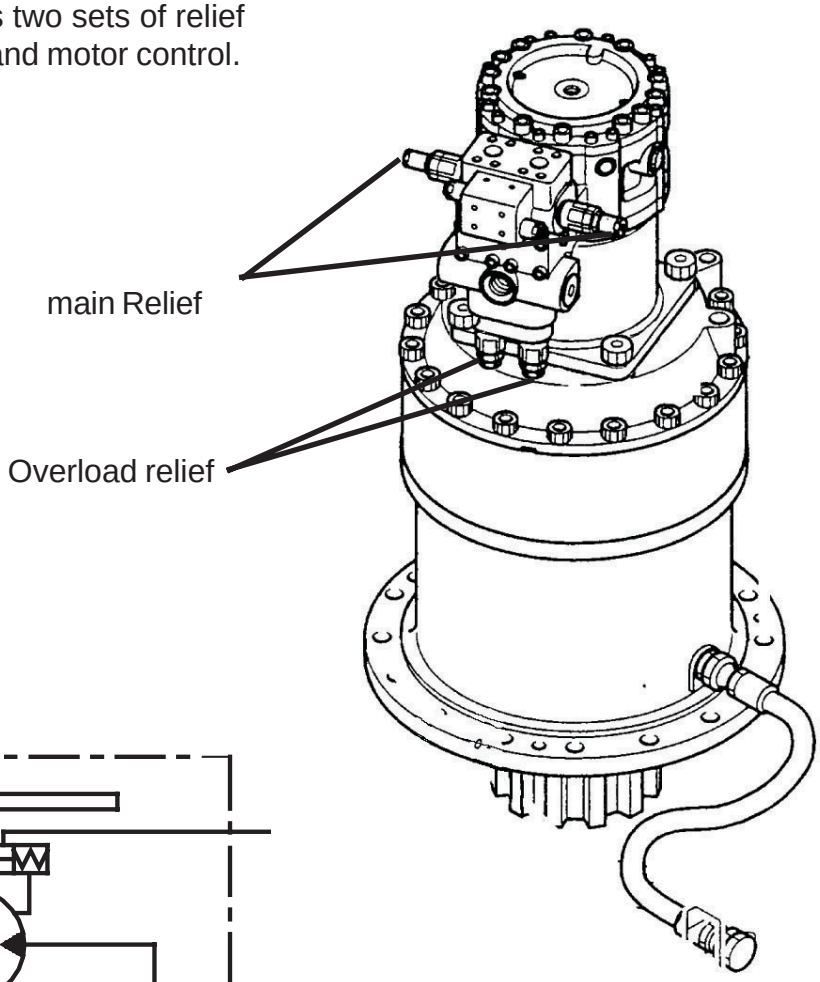
3. Parking brake

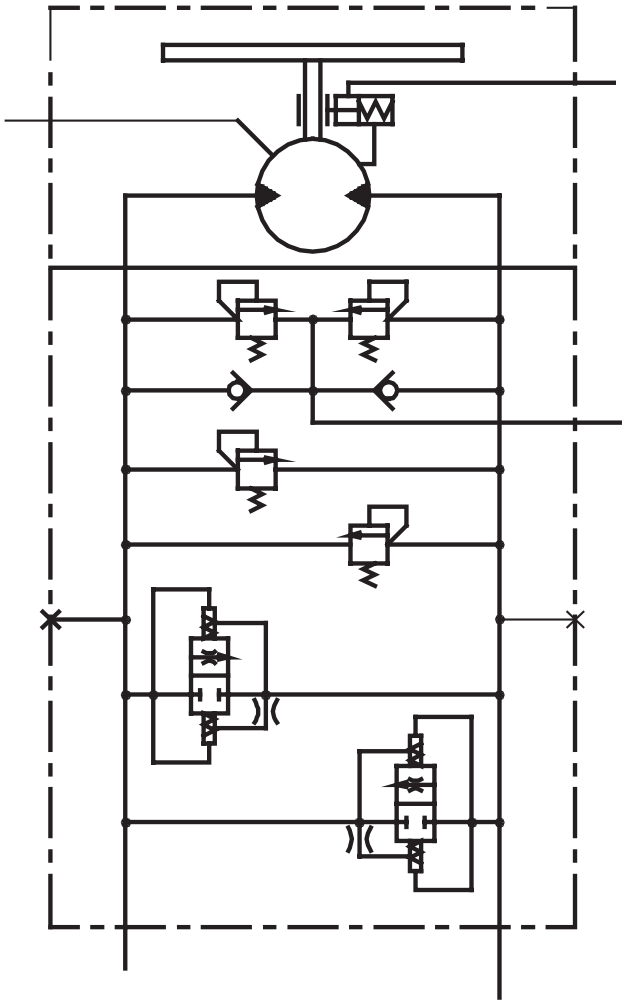
1) Cylinder block (111) is engaged with shaft (101) and spline.
2) And, the rotation in round direction of separator plate (743) is restricted by circular grooves cut on the surface of the casing.
3) When friction plate (742) engaged with cylinder block (111) at the outside with the spline is pressed against casing (301) by brake spring (712) through separator plate (743) and brake piston (702), the frictional force is generated between friction plate (742) and casing (301), and also separator plate (743) and brake piston (702).
4) This frictional force restricts the rotation of the shaft, resulting in the braking force.
5) On the other hand, after application of the release pressure to the oil chamber formed between brake piston (702) and casing (301), if the oil pressure becomes higher than brake spring (712) force, brake piston (702) moves and friction plate (742) separates from casing (301), and finally the brake is released.

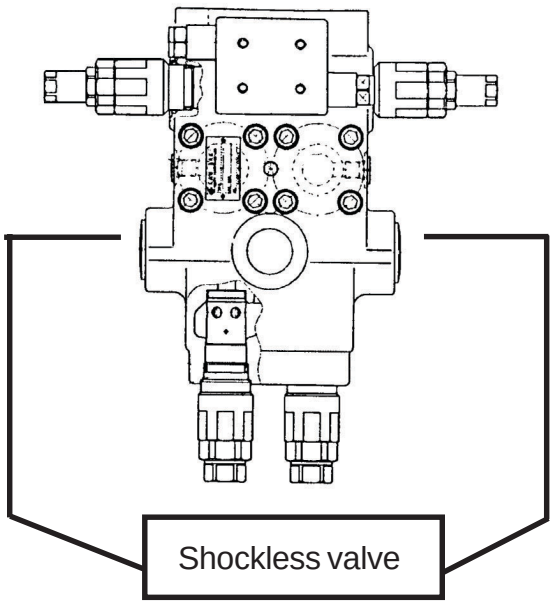


https://truckmanualshub.com/

The SK480 swing motor uses two sets of relief valves for hydrauic breaking and motor control.





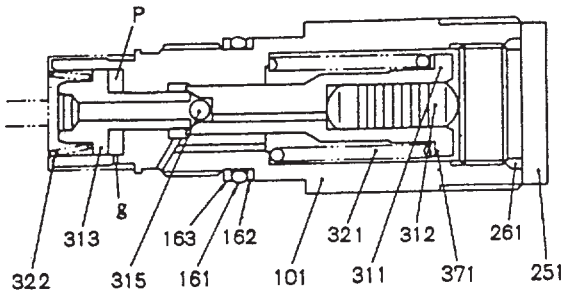


https://truckmanualshub.com/

5. Shockless valve

Structure

161.	**O-ring**	**312.**	**Piston**
162.	**Ring**	**313.**	**Seat**
163.	**Backup ring**	**315.**	**Ball**
251.	**Plug**	**321.**	**Spring**
261.	**O-ring**	**322.**	**Spring**
311.	**Plunger**	**371.**	**Shim**



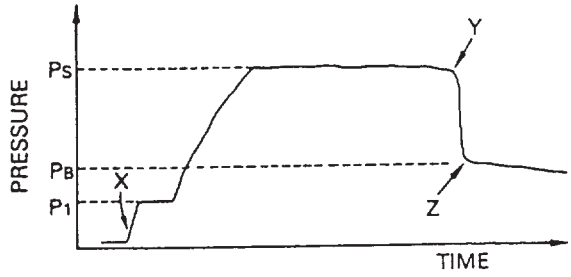
Shockless valve

- **Operation of shockless valve**
  This graph shows the relation between the pressure on shockless valve and the rising process. The actuation on each part is described below.

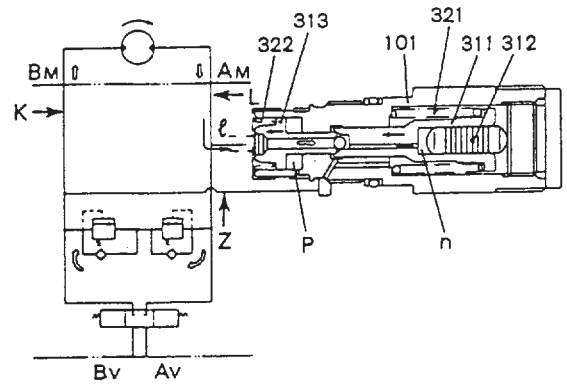
a. Operation on the state of P = PS

Considering the state where the brake pressure generates on port AM side, the pressure at port AM is conducted to chamber n through passage ℓ, axis hole on seat (313), and passage m on plunger (311).

If pressure P is over the specified pressure of spring (321), then the spring is pushed, and the plunger is moved to left. Seat (313) also moves to left deflecting spring (322) pushed by plunger (311).



Control pressure of shockless valve

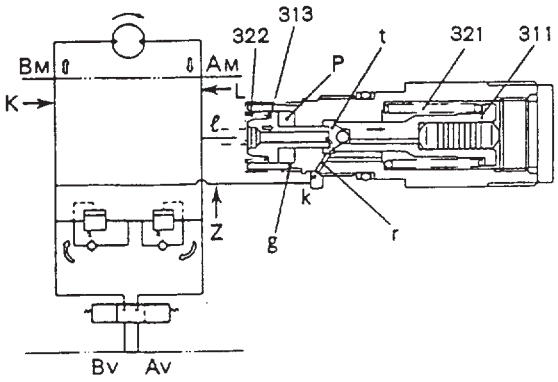


In the condition of P = PS

b. Operation on the sate of P < PS

The brake pressure may be decreased by the stop of slewing (Y point), arriving to the state P < PS, the plunger (311) is moved to the right by the force of spring (321), simultaneously the seat (313) is also moved to right by the force of spring (322), as the chamber P contains damping actuations caused by (g), the return of seat (313) is late comparing it with that of plunger (311), and the seat part t is left away. Then the pressure oil flows in sequence such as ℓ → t → r → K proportionately to the return of plunger, finally the passage connecting to AM and BM ports is formed.

As a result, the pressures at both AM and BM ports are quickly equal, and return to the state of Z point, and then the hydraulic motor is protected from in version caused by the confined pressure at AM port.

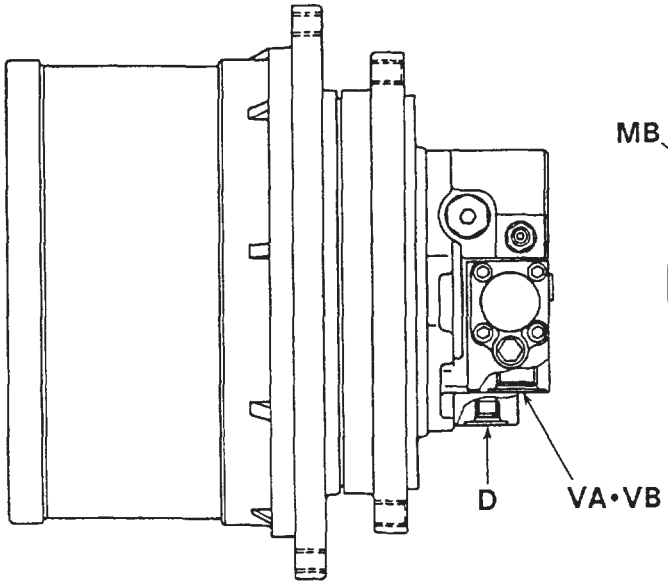


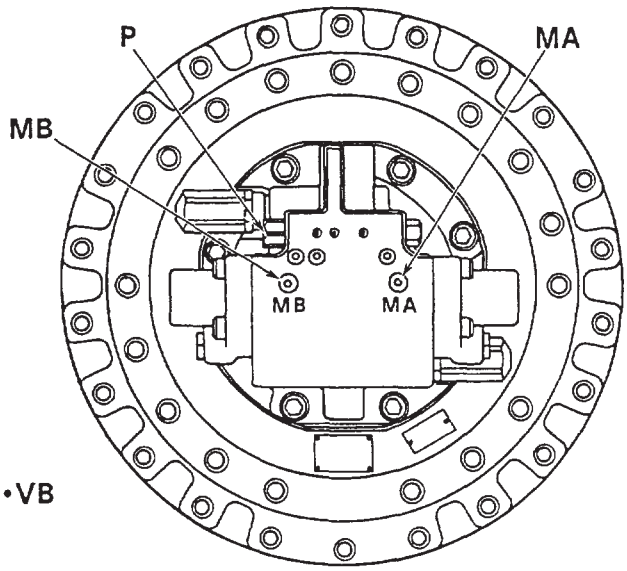
In the condition of P < PS

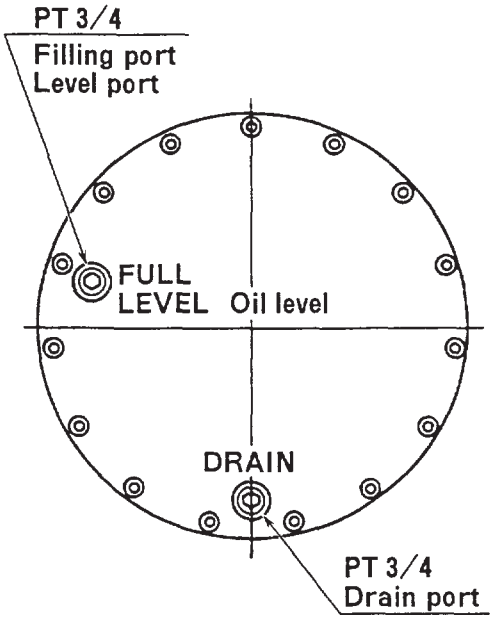
https://truckmanualshub.com/

7-5 Travel motor

1. Appearance







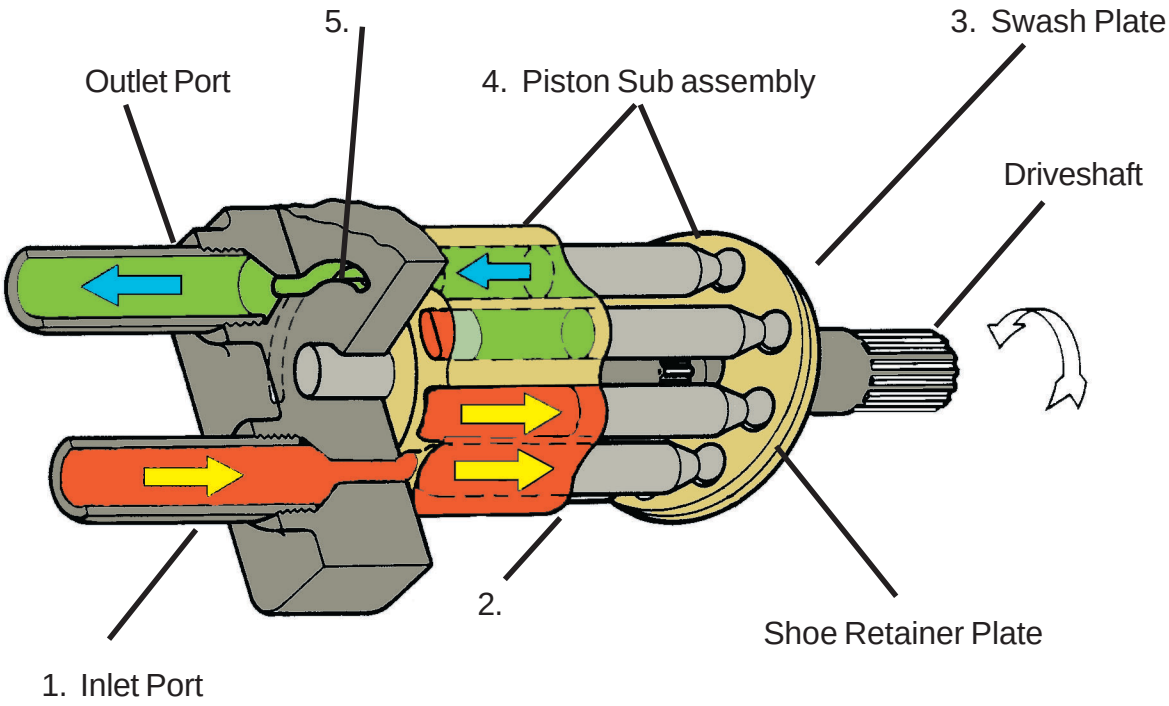
Note:

1. **When overhauling the travel motor or replacing the assy., fill hydraulic oil 1.2L through the drain port (D).**
2. **When overhauling the reduction unit, fill the approved gear 2.5L oil through the drain port.**
   In addition, when replacing the assy., as the oil is already filled, check that the filled oil quantity is enough for the proper operation.

Code	Name	Size	Torque N•m {kgf•m}	Remarks
VA, VB	Main port	PF 1	255 ± 10 {26 ± 1}	SK210 • SK330
P1, P2	Main port	PF 1	255 ± 10 {26 ± 1}	SK250
D	Drain port	PF 1/2	108 ± 10 {11 ± 1}	SK210 • SK330
T	Drain port	PF 1/2	108 ± 10 {11 ± 1}	SK250
MA, MB	Gauge port	PF 1/4	29.4 {3}	SK210 • SK330
Pm1, Pm2	Gauge port	PF 1/4	29.4 {3}	SK250
P	Travel 1st/2nd speed change port	PF 1/4	29.4 {3}	SK210 • SK330
Ps	Travel 1st/2nd speed change port	PF 1/4	29.4 {3}	SK250
Pp	Parking brake release port	PF 1/4	29.4 {3}	SK250
Tin	Casing filling oil port	PF 1/4	29.4 {3}	SK250
Drain port, Filling port, Level port		PF 3/4	98 {10}	Wind seal tape

https://truckmanualshub.com/

Hydraulic In-Line Piston Motor Operation



1. Oil is delivered under pressure at inlet port.

2. Oil exerts a force on pistons, forcing them out of the cylinder block.

3. The piston thrust is transmitted to the angled swash plate causing rotation.

4. The pistons, shoe plate, and cylinder block rotate together. The driveshaft is splined to the cylinder block.

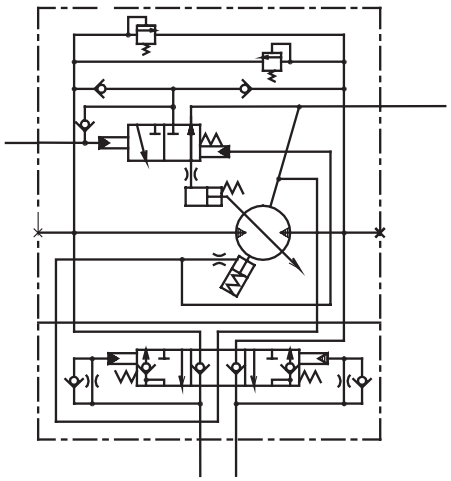
5. The piston passes the inlet port, and begins to return into its bore because of the swash plate angle. Exhaust oil is pushed into the outlet port.

Typical Piston Motor

https://truckmanualshub.com/

Item \ Model		SK210	SK250	SK330
Type		M4V150/ 100-RC3.5B	MAG-170VP- 3600E-2	M3V260/ 150A-RG5.5C
Displacement 1st/2nd speed	cc/rev	103.7 / 154.4	109.9 / 170.0	150.5 / 262.6
Working pressure	MPa {kgf/cm²}	34.3 {350}	←	←
Max. flow	L/min	210	240	250
Over load cracking press.	MPa {kgf/cm²}	35.8 {365} or more	31.1 {317} or more	35.8 ~ 37.2 {365 ~ 380}
Tilting control pilot press.	MPa {kgf/cm²}	4.9 {50}	←	←
Drain allowable press. MPa {kgf/cm²}	Normal	0.2 {2}	0.2 {2}	0.2 {2}
	Surge	1 {10}	0.5 {5}	1 {10}
Parking brake torque	N•m {kgf•m}	441 ~ 686 {45 ~ 70}	22.5 kN•m {2292}	902 {92} or more
Parking brake release press.	MPa {kgf/cm²}	1.57 {16}	1.1 {11}	1.54 {15.7}
Parking brake chamber allowable press.	MPa {kgf/cm²}	41.2 {420}	4.9 {50}	41.2 {420}
Set press. of auto speed select	MPa {kgf/cm²}	Approx. 27.4 {280} Pilot press. 4.9 {50}	0.4 {4} or less 1.5 {15} or more	Approx. 27.4 {280} Pilot press. 4.9 {50}
Brake valve spool switch press.	MPa {kgf/cm²}	0.59 ~ 0.95 {6 ~ 9.7}	0.48 ~ 0.88 {4.9 ~ 9}	0.59 ~ 0.98 {6 ~ 10}
Check valve cracking press.	MPa {kgf/cm²}	0.018 {0.18}	0.03 {0.3}	0.01 {0.1}
Oil qty. in casing	L	0.7	0.5	1.5
Reduction ratio		41.46	43.246	39.875
Output torque of 1st speed	kN•m {kgf•m}	35.0 {3570}	40.2 {4100}	57.2 {5830}
Output torque of 2nd speed	kN•m {kgf•m}	23.5 {2400}	25.0 {2550}	32.8 {3350}
Revolution at 1st speed	min^{-1} {rpm}	32.81 at 210 L/min	32.6 at 240 L/min	24.83 at 260 L/min
Revolution at 2nd speed	min^{-1} {rpm}	48.84 at 210L/min	50.5 at 240 L/min	43.32 at 260 L/min
Oil qty. in reduction	L	5.5	3.5	10.5
Rotating direction (Viewed from valve side)		VA Port inlet: RH VB port inlet: LH	P1 Port inlet: RH P2 Port inlet: LH	VA Port inlet: RH VB Port inlet: LH
Weight	Approx. kg	238	290	360

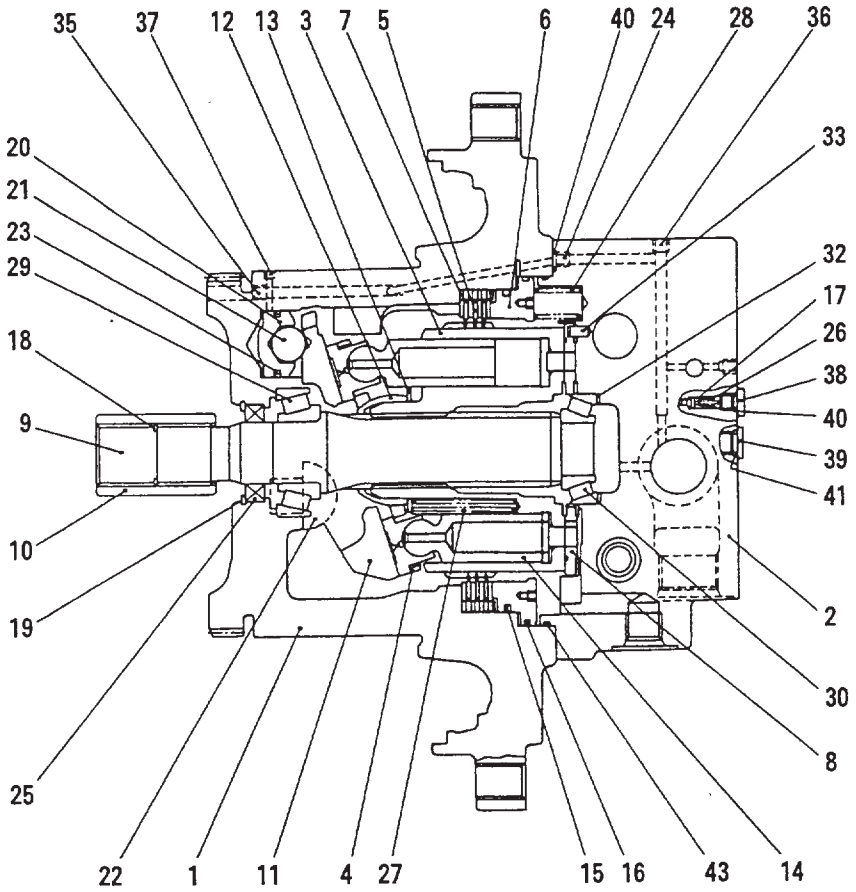
3. Hydraulic diagram

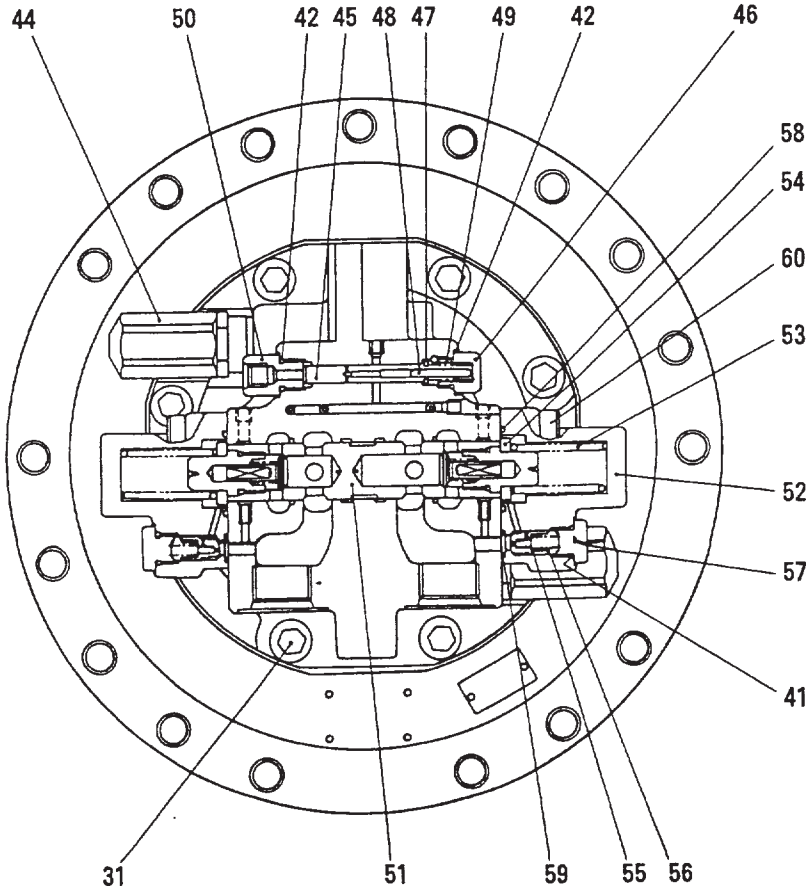


https://truckmanualshub.com/

4. Structure

① Travel motor





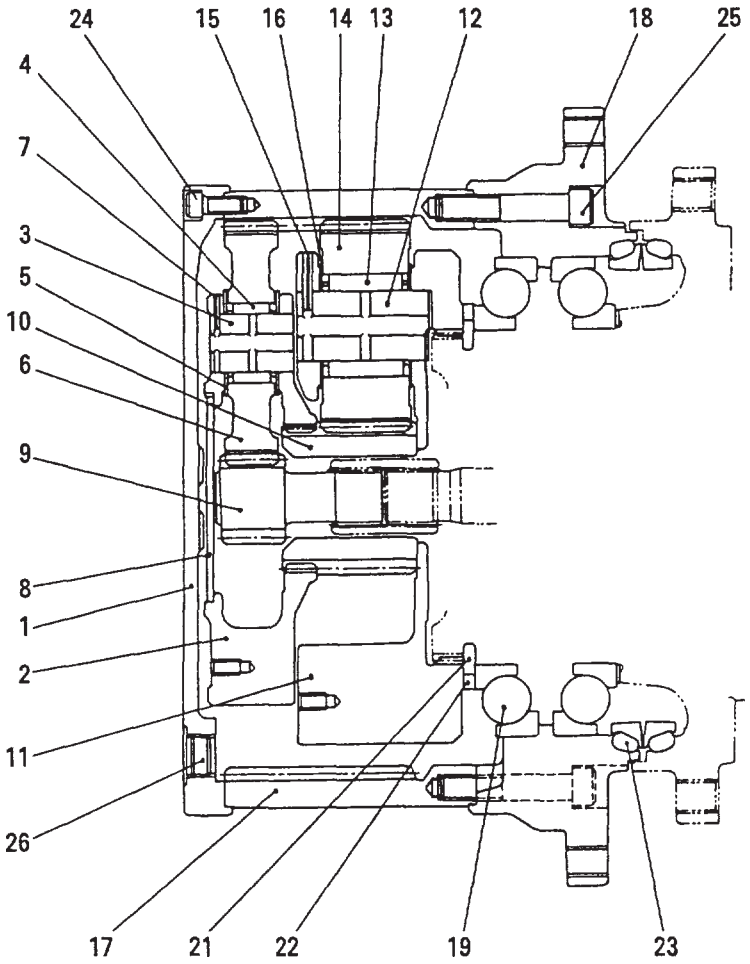
https://truckmanualshub.com/

Code	Name	Qty.
1	Case	1
2	Cover	1
3	Cylinder block	1
4	Shoe retainer	1
5	Friction plate	3
6	Brake piston	1
7	Separator plate	4
8	Valve plate	1
9	Shaft	1
10	Coupling	1
11	Shoe plate	1
12	Ball joint	1
13	Spring seat	1
14	Piston assy	9
15	Ring	1
16	Ring	1
17	Check valve	3
18	Retaining ring	1
19	Retaining ring	1
20	Piston	1
21	Ball	1
22	Pivot	2
23	Piston seal	1
24	Orifice	2
25	Oil seal	1
26	Spring	3
27	Spring	9
28	Spring	12
29	Bearing	1
30	Bearing	1
31	Socket bolt	8
32	Shim	2
33	Pin	1
35	Plug	1
36	Plug	10
37	Plug	1
38	Plug	3
39	Plug	2
40	O-ring	5
41	O-ring	4
42	O-ring	2
43	O-ring	1
44	Overload relief valve assy	2
45	Spool	1
46	Plug	1
47	Spring seat	1
48	Pin	1

Code	Name	Qty.
49	Spring	1
50	Connector	1
51	Spool assy	1
52	Cover	2
53	Spring	2
54	Spring seat	2
55	Valve	2
56	Spring	2
57	Plug	2
58	O-ring	2
59	O-ring	2
60	Socket bolt	8

https://truckmanualshub.com/

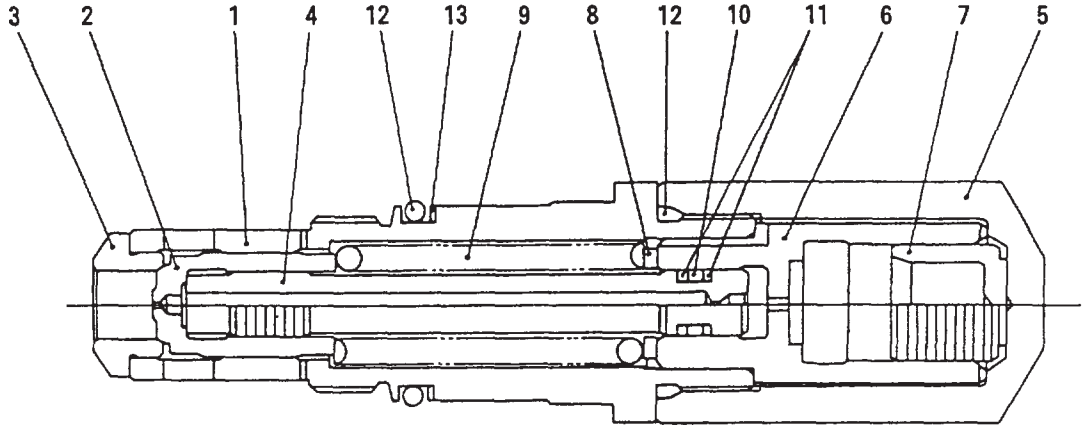
② Reduction assy



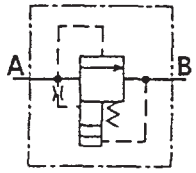
Item \ Model		SK210	SK250	SK330
Type		M2X120B-CHB-10A-37/285	M2X146B-CHB-10A-15/300	M2X210CHB-10A-39M/280-197
Displacement	cc/rev	121.6	145.9	197
Working pressure	MPa {kgf/cm²}	27.9 {285} at 179 L/min	29.4 {300} at 207 L/min	27.4 {280} at 235 L/min
Max. flow rate	L/min	179	207	235
Rated speed	min^{-1} {rpm}	1,400 {1,400}	1,600 {1,600}	1,284 {1,284}
Output torque	N•m {kgf•m}	665 {67.8} at 350 kgf/cm²	767 {81.3} at 350 kgf/cm²	859 {87.8} at 280 kgf/cm²
Brake torque	N•m {kgf•m}	540^{+110}_{0} {55^{+11}_{0}}	776 {79.2}	875^{+245}_{0} {89^{+25}_{0}}
Brake release pressure MPa {kgf/cm²}	Cracking	$2.5^{+0.4}_{0}$ {25^{+4}_{0}}	2.3 {23.7}	$2.3^{+0.5}_{0}$ {23^{+5}_{0}}
	Stroke end	2.8 {29}	2.5 {25.8}	$2.8^{+0.5}_{0}$ {29^{+5}_{0}}
Inner press. of casing	MPa {kgf/cm²}	0.29 {3} or low	←	0.2 {2} or low
Oil quantity in casing	L	0.8	0.9	1.5
Weight	kg	54	66.5	74.5
Type of swing shockless valve		2KAR6P72 / 240-712	2KAR6P72 / 250-712	2KAR6P72 / 240-712
Weight of swing shockless valve		2.5	←	←
Weight (Total)	kg	56.5	69	77

https://truckmanualshub.com/

5. Over load relief valve (Code 70)



Code	Name	Qty.	Code	Name	Qty.
1	Socket	1	8	Shim	1
2	Valve	1	9	Spring	1
3	Valve seat	1	10	O-ring	1
4	Piston	1	11	Back up ring	2
5	Cap	1	12	O-ring	2
6	Plunger	1	13	Back up ring	1
7	Piston	1			

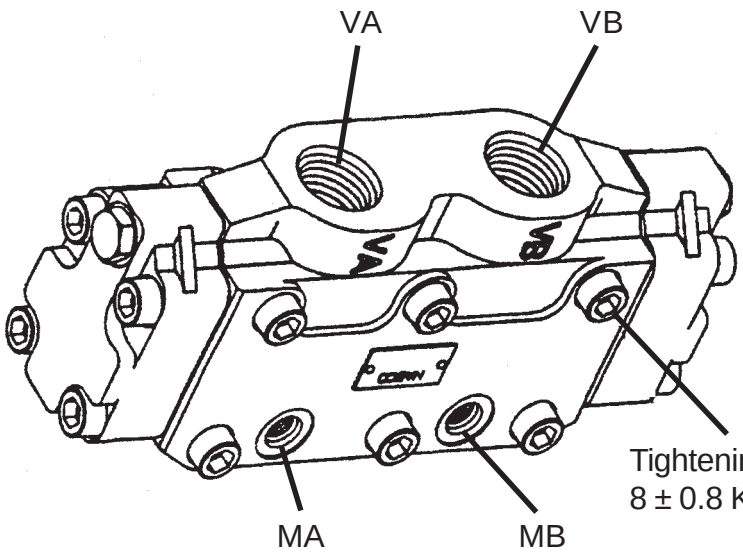


Hydraulic diagram

Item	Unit	Specifications
Type		ORV-240L3
Max. working press.	MPa {kgf/cm²}	41.2 {420}
Setting pressure	MPa {kgf/cm²}	40.7 {415} or low at 50 L/min
Cracking rpessure	MPa {kgf/cm²}	35.8 ~ 37.3 {365 ~ 380} at 1 L/min
Boosting initial pressure	MPa {kgf/cm²}	9.8 ~ 24.5 {100 ~ 250}
Max. flow rate	L/min	240
Boosting time	sec	Max. 0.28

Note: Standard thickness of the shim is 2mm in condition of cracking pressure.
This illustration shows the case of SK210. Refer to the Parts Manual for other machine models.

https://truckmanualshub.com/



Port Name	Port Diameter	Tightening Torque Kgf-m (Ft. Lbs)	Function
VA	PF1	25 ± 2 (180 +14 -0)	Drive pressure circuit port
VB	PF1	25 ± 2 (180 +14 -0)	Drive pressure circuit port
MA	PF 1/4	3.7 ± 2 (27 ± 1)	Pressure measuring port
MB	PF 1/4	3.7 ± 2 (27 ± 1)	Pressure measuring port

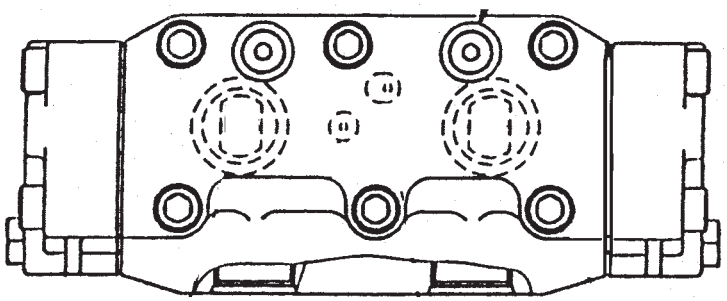
Major Specifications

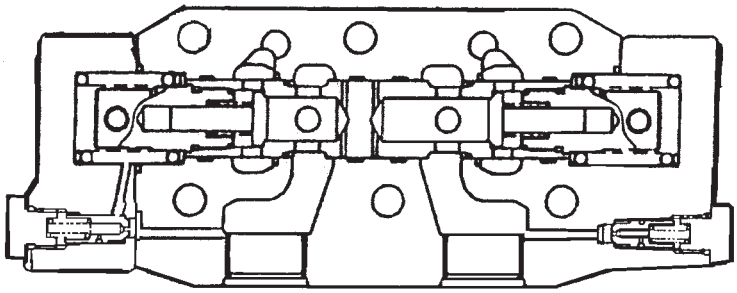
Item	Model	RBV - 24D
Rated Pressure	Kgf/cm (psi)	355 (5050)
Rated Flow	L/min (gal/min)	240 (63)
Spool Switching Pressure	Kgf/cm (psi)	6 - 10 (85~140)
Check Valve Cracking Pressure	Kgf/cm (psi)	0.3 (4.0)
Weight	Kg (Lbs)	11Kg (24 Lbs)

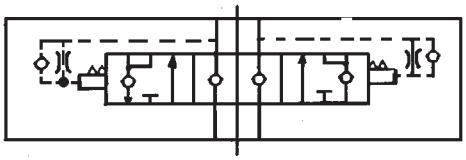
Typical of SK210

https://truckmanualshub.com/

Brake Valve Construction







1	Body
2	Spool
3	Spring Seat
4	Spring
7	Cover
8	Restrictor
9	Spring
10	Plug
12	Socket Bolt
14	Socket Bolt
MB	Pressure Measuring Port
MA	Pressure Measuring Port
VA	Drive Pressure Circuit Port
VB	Drive Pressure Circuit Port
T	Open to Hydraulic Tank
P	Parking Brake

T

Typical of SK210

https://truckmanualshub.com/

Brake Valve Function

The Brake Valve controls the flow of oil into and out of the hydraulic travel motor in the following conditions:

Brake Holding: in neutral position the brake valve function is to keep the hydraulic motor from turning.

Motor Acceleration: when the brake valve is not in the neutral position the motor is able to turn.

Stopping the motor: when brake valve is brought to neutral the flow of oil to the motor is shut off and the motor is no longer able to turn.

Counter balancing: to slowly de-celerate the hydraulic motor that is rotating by external forces applied to the motor, causing the motor to become a pump.

Three major components to safeguard the hydraulic motor:

Break Spool

Shifting of brake spool to allows the brake valve to:

a. Supply oil to the hydraulic motor
b. Shut off the flow of oil to the hydraulic motor
c. Restrict the flow of oil discharged to the hydraulic motor

This allows the hydraulic motor to:

a. Accelerate
b. Stop, hold
c. Counterbalance

Check Valve (built in the brake spool)

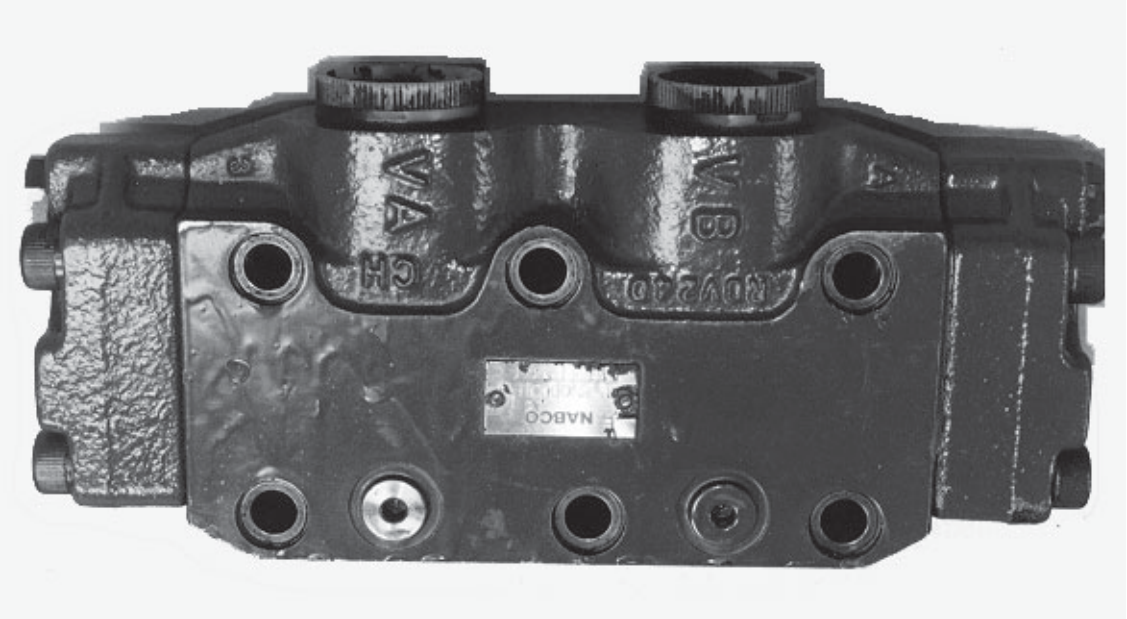
The check valve serves as an oil feeding path to the hydraulic motor, stops the oil discharged from the hydraulic motor, acts as a suction (anti-cavitation) valve for the hydraulic motor, and a holding valve.

Relief Valve (located in the hydraulic motor)

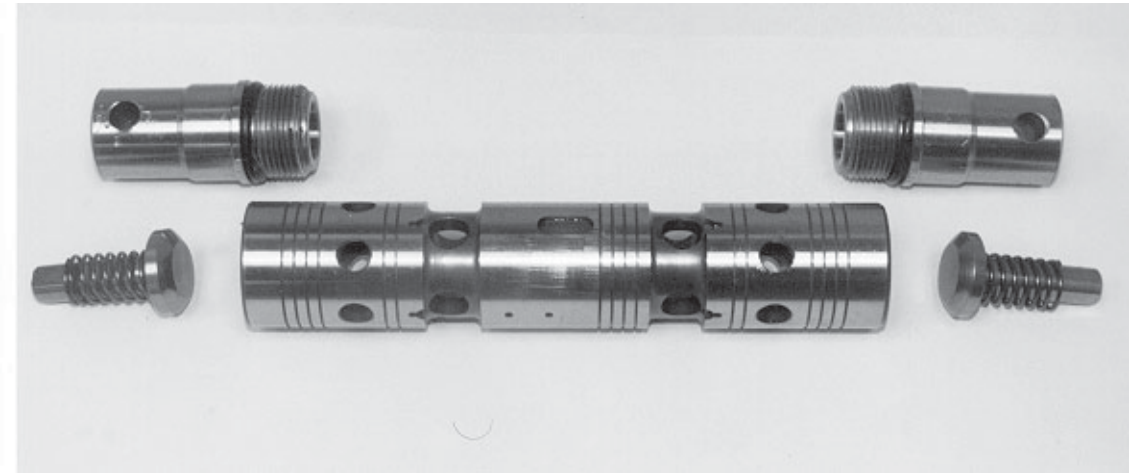
Each motor assembly has two relief valves which work with the brake valve to protect the motor. When oil under pressure at the discharge path of the hydraulic motor reaches a set point, the relief valve bypasses high pressure oil to either of the low pressure paths to safeguard the circuit.

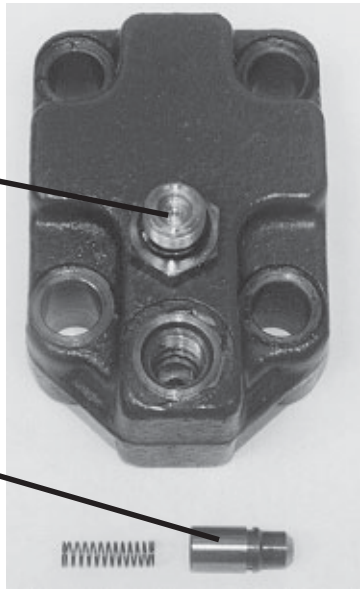
Typical of SK210

https://truckmanualshub.com/



Brake Valve Assembly





2	Brake Valve Spool	
2a	Check Valve	
4a	VA	Drive Pressure Circuit Port
4b	VB	Drive Pressure Circuit Port
3a	MA	Pressure Measuring Port
3b	MB	Pressure Measuring Port
8	Restrictor & Check Valve	

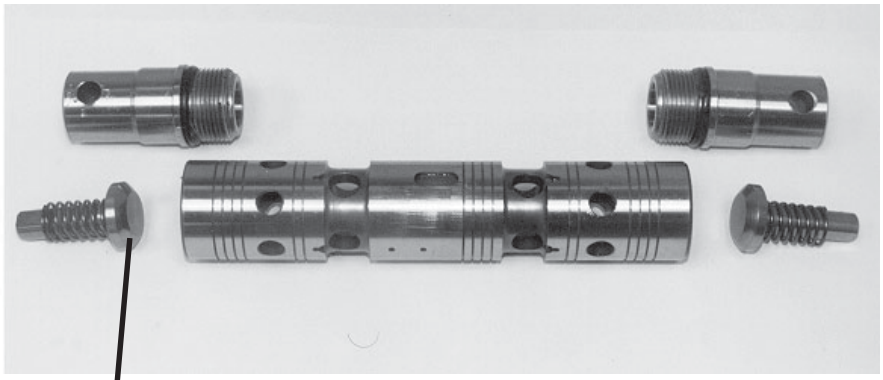
Typical of SK210

https://truckmanualshub.com/

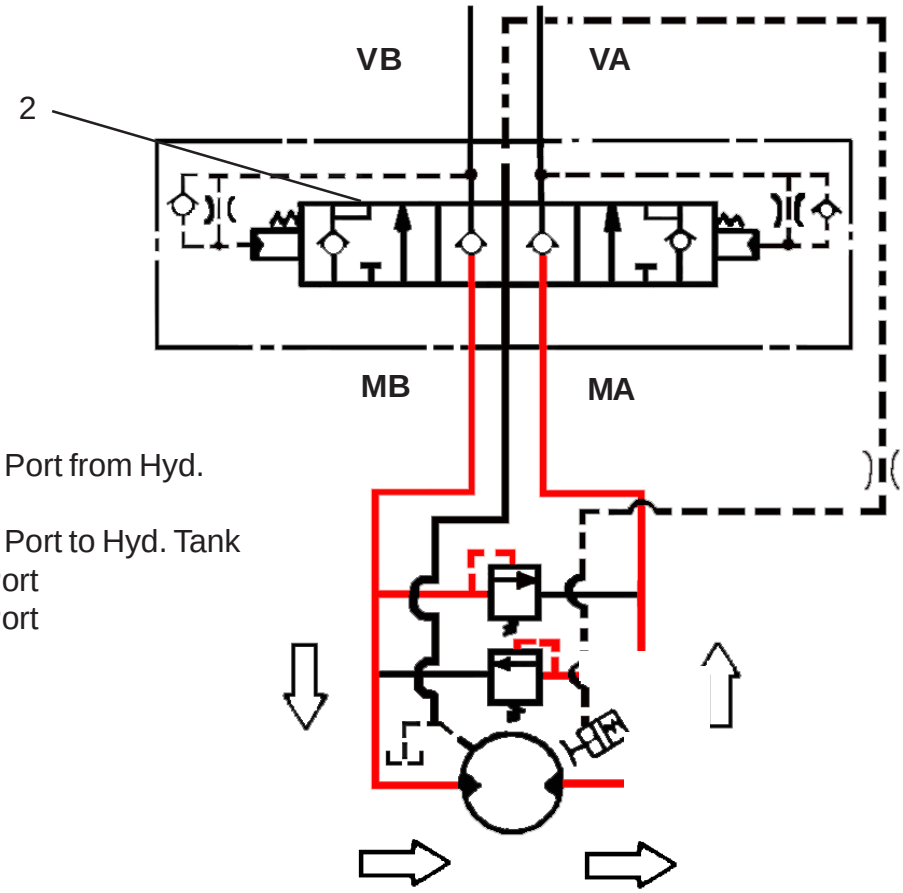
Brake Valve (Stop Operation)

When the flow of oil to the brake valve is shut off, oil pressure in the pilot chambers on both sides of the brake valve spool are equalized, causing brake spool (2) to return to its neutral position by the action of return springs (4). The hydraulic tank will supply oil to both ports VA and VB with the brake valve spool in neutral.

With brake valve spool in neutral, oil path MA→VA is shut off, and oil flow to port P (travel motor parking brake) is shut off. The spring applied hydraulic release travel motor parking brake mechanically stops the travel motor from turning. Movement of the excavator (inertia) will attempt to rotate the hydraulic motor. The hydraulic motor turned by inertia continues to discharge oil from the hydraulic motor to port MB. The trapped oil at port MB will restrict the movement of the hydraulic motor until the oil at port MB actuates the MB port relief valve.



Check Valve in Spool 2



VA	Drive Pressure Circuit Port from Hyd. Pump
VB	Drive Pressure Circuit Port to Hyd. Tank
MA	Pressure Measuring Port
MB	Pressure Measuring Port
2	Brake Valve Spool

https://truckmanualshub.com/

Brake Valve (Counterbalancing)

Counterbalancing action is required to keep a positive pressure at the inlet of the hydraulic motor by restricting the oil discharged from the hydraulic motor.

Counterbalancing prevents over-speeding of the hydraulic motor, example; The excavator is traveling downhill, the weight of the machine on an incline removes the positive pressure at the inlet of the motor. The hydraulic motor is in an over-speed or run-a-way condition.

Note: The hydraulic motor will loose the positive pressure at the inlet in a **slow turn**.

To stop the hydraulic motor from cavitating, the brake valve spool will shift, restricting the flow of oil from the hydraulic motor. Pressure in the pilot chamber on the path MA→VA (inlet) drops, and brake valve spool (2) is pushed to the right (restricted position) by the action of spring (4). As a result, pressure at MB (outlet) increases, thus the hydraulic motor is subjected to a braking action.

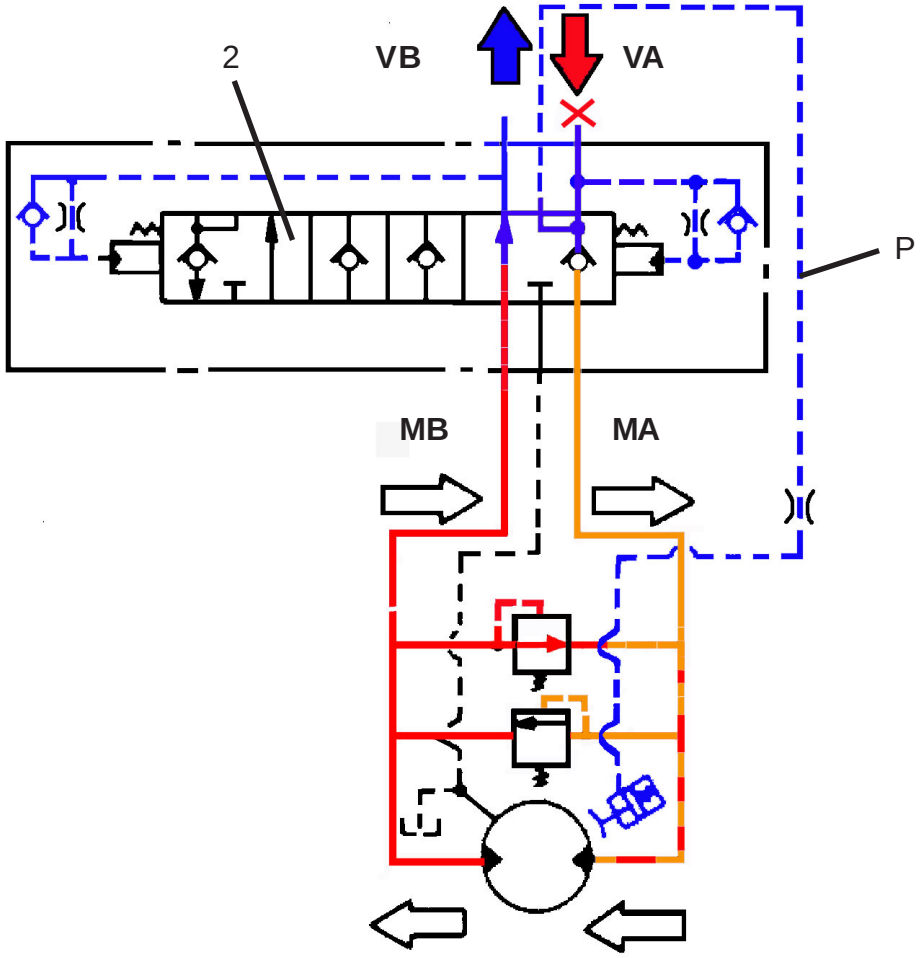
If the volume of oil supplied to hydraulic motor is reduced below the amount of oil the hydraulic motor can displace, the pressure in the pilot chamber on the VA (inlet) port drops, causing spool (2) to move right due to spring action on the left hand side of the spool.

The result is that the braking action of the counterbalance valve is increased, and the revolution of the hydraulic motor is regulated to a level equal to the oil supply at path MA→VA (inlet).

To dampen the movement of brake spool (2), two restrictor's (8) are built in the pilot chamber of the brake valve assembly . This restrictor is located in each of the brake valve caps to provide steady counterbalancing action.

https://truckmanualshub.com/

Brake Valve (Counterbalance)



VA	Drive Pressure Circuit Port from Hyd. Pump
VB	Drive Pressure Circuit Port to Hyd. Tank
MA	Pressure Measuring Port
MB	Pressure Measuring Port
2	Brake Valve Spool

Typical of SK210

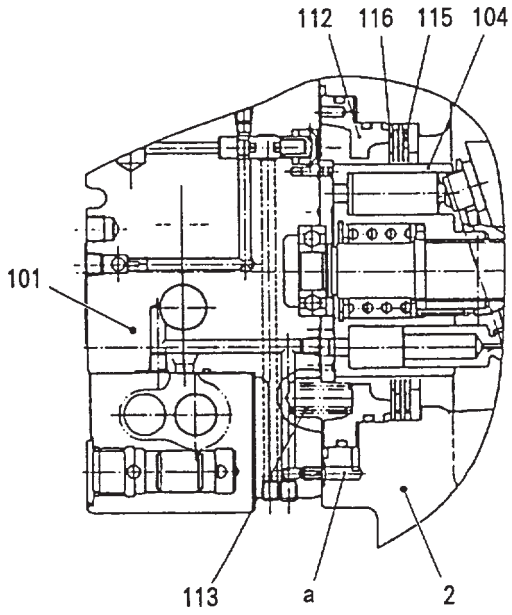
https://truckmanualshub.com/

6. Operation of travel motor

(1) Parking brake

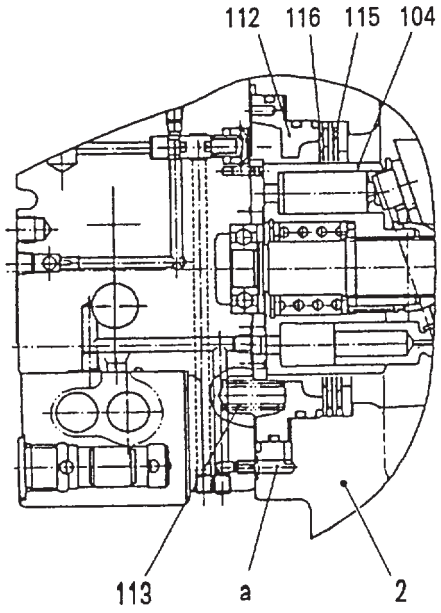
1) When traveling (when brake is released)

1. After pressure oil has been feed into from brake valve, spool (123) of brake valve in hydraulic motor section starts operating, the passage to parking brake opens, and the oil flows into cylinder chamber (a) made up of spindle (2) and piston (112).
2. When the oil pressure is increased 8 kgf/cm² or higher, the pressure rises higher than the force of spring, and moves piston (112) to rear flange (101) side.
3. With movement of piston (112), the pushing force to separator plate (116) and friction plate (115) dies out, the friction plate (115) which is placed in cylinder block of hydraulic motor section can be freely moved, and braking force to cylinder block is released.



2) When Stopping (when brake is operated)

1. Pressure oil from brake valve is cut off, and when the pressure in cylinder chamber (a) is 8 kgf/cm² or lower, piston (112) tends to return due to the force of spring (113).
2. The piston (112) is pushed by the force of spring (113), and pushes the separator plate (116) and friction plate (115) in free condition to spindle (2) on reduction unit.
3. The frictional force caused by the pushing force stops rotating force of cylinder block (104), and transmits braking torque (18.2 kgf·m) to hydraulic motor shaft.
4. This braking torque stops rotation of hydraulic motor.
5. In addition, the flow rate of oil is regulated with appropriate oil passage, enabling the smooth operation.

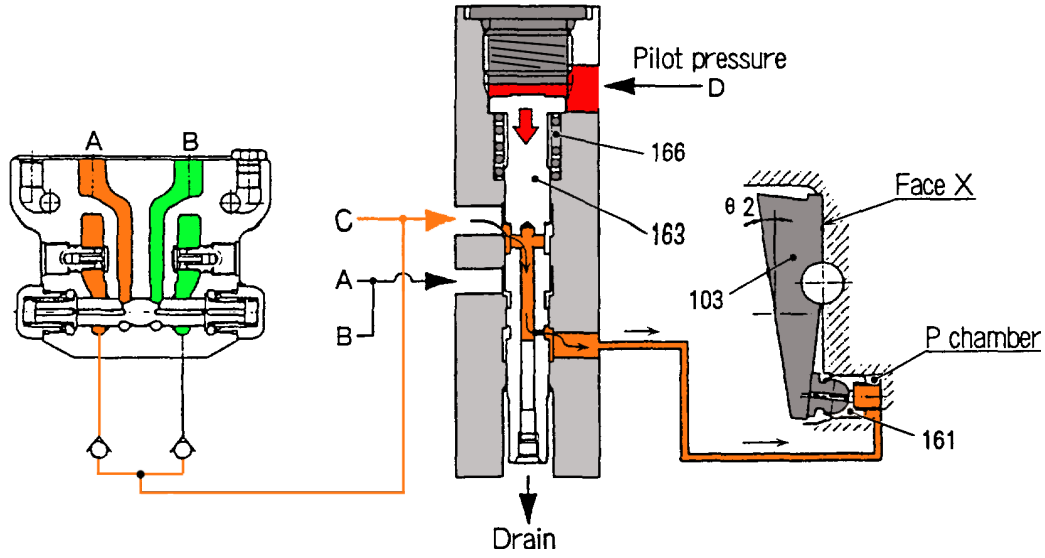


https://truckmanualshub.com/

(2) Auto two (High/Low) speed change mechanism

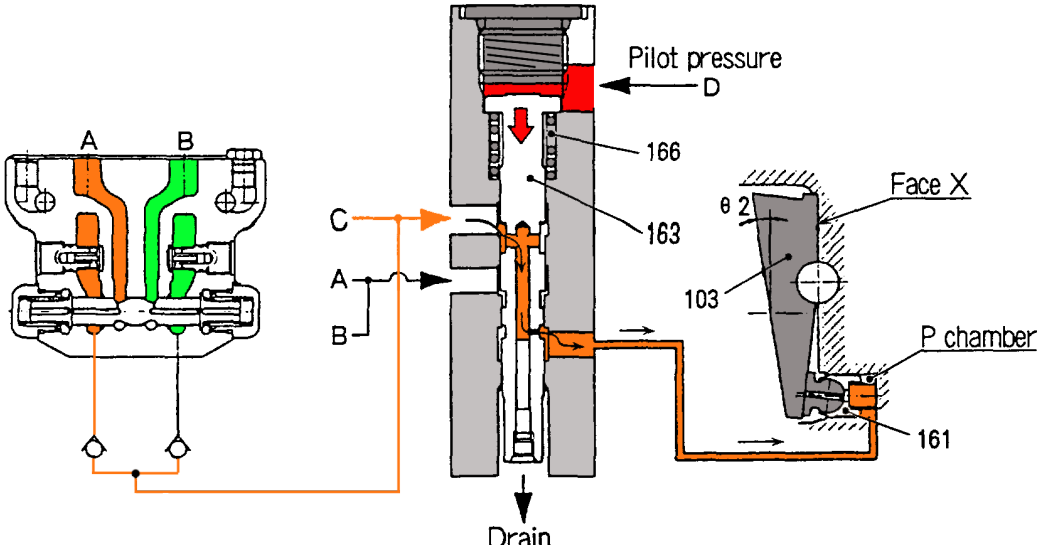
1) At low speed

1. When the pilot pressure is not supplied through port (D), spool (163) is pushed up by spring (166) force or the oil pressure through port (A) or (B), the pressure oil through port (C) is cut, and the oil in P chamber flows into the drain (motor case) through spool (163).
2. Consequently, the tilting angle of swash plate (103) increases to the maximum, and the motor speed slows down.



2) At high speed

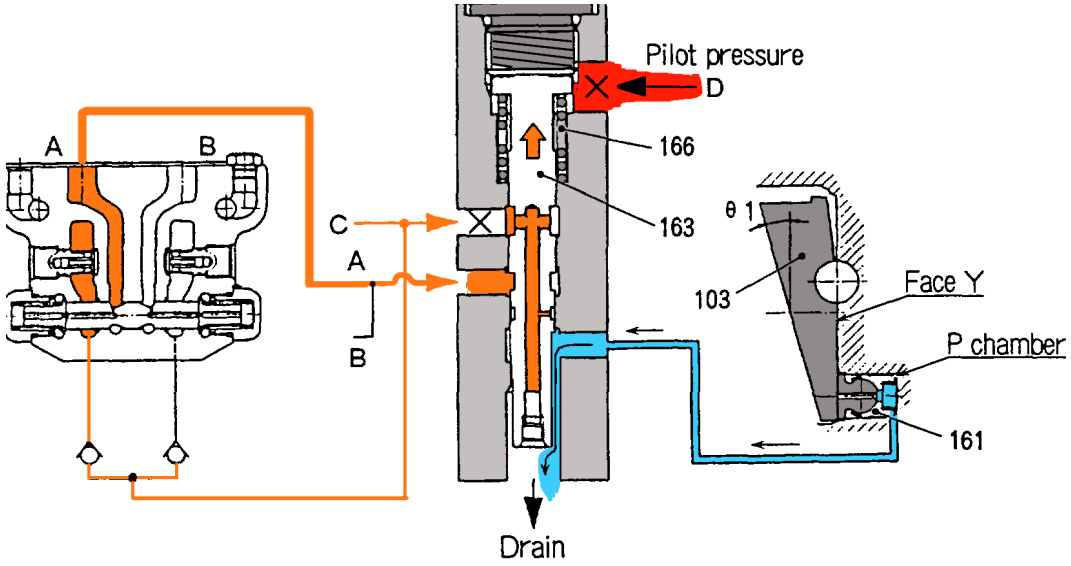
1. When the pilot pressure (50 kgf/cm²) is supplied through port (D), spool (163) is pushed down by spring (166) force or the oil pressure through port (A) or (B), the pressure oil through port (C) is led into (P) chamber, and the piston (161) is pushed up to the position where swash plate (103) is brought in contact with the face X and maintained.
2. Then the tilting angle of swash plate (103) is of the minimum, and the stroke capacity of

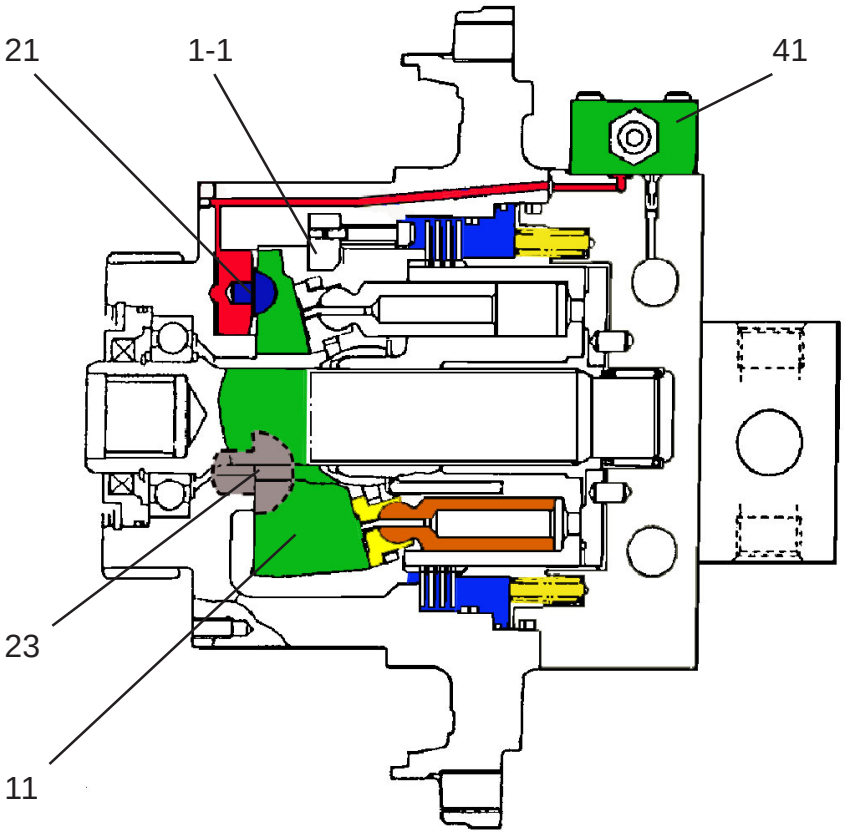


https://truckmanualshub.com/

3) Auto speed change from high speed to low speed

1. As the load rises while traveling at high speed, the quantity of oil pressure at (A) and (B) ports is also raised, and if the pressure reaches 290 kgf/cm², the pressure rises higher than the pilot pressure (50 kfg/cm²) at (D) port ;and spool (163) is pushed up, and the oil in P chamber flows into the drain (motor case) through spool (163).
2. Then, swash plate (103) comes into contact with the face Y of spindle (2), the max. tilting angle is maintained, and consequently the motor speed reduces.





1-1 Stopper
11 Swash Plate
21 Piston
23 Pivot Balls
41 Pilot Selector Valve

https://truckmanualshub.com/

https://truckmanualshub.com/

Kobelco

Dynamic Acera



Kobelco America Inc.
Hydraulic Schematics

KOBELCO
Kobelco America Inc.

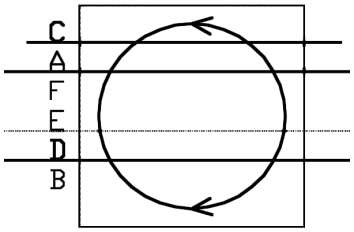
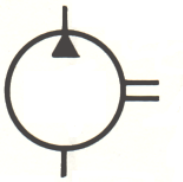
https://truckmanualshub.com/

Number	Symbols	Main matters indicated	Remarks
1.13		Unit assembly	
1.14		In case adjustment is possible	

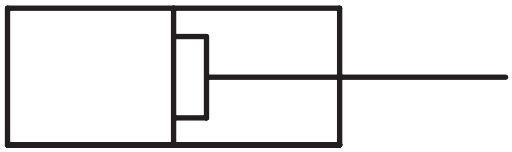
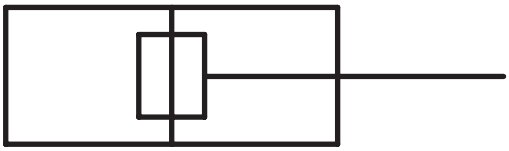
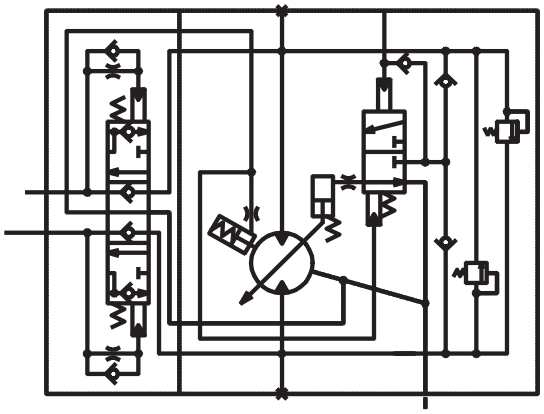
Chart 1Line and Connection

Name	Symbols	Remarks
Main line		The main line is the suction line, pressure line and return line.
Pilot line		Used for all pilot circuits.
Drain line		Short dashed lines
Connection of line		Dot represents connection
Bent line		
Line intersecting		Without connection point.

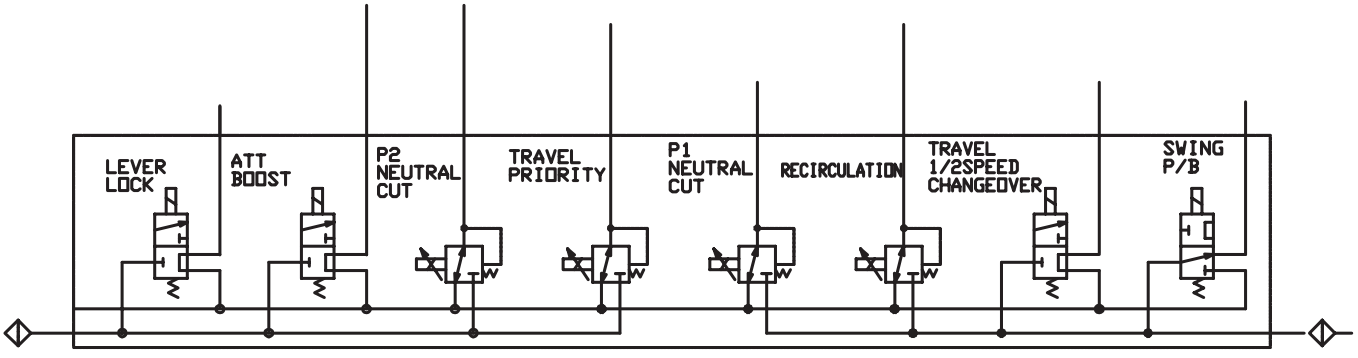
https://truckmanualshub.com/

Name	Symbol	Remarks
One way check valve		
Swivel Joint		Example: swivel for excavators
Fixed displacement hydraulic pump		Example: hydraulic gear pump for pilot system
Variable displacement hydraulic pump		Example: main hydraulic pump

https://truckmanualshub.com/

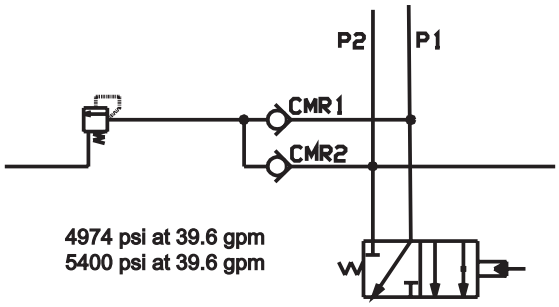
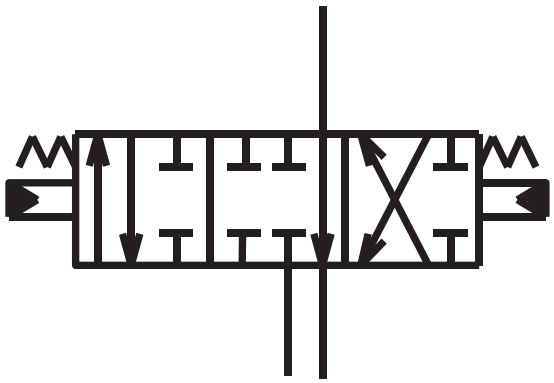
Name	Symbol	Remarks
Single cushioned cylinder		Cushion cylinders helps prevent damage to circuits and cylinder.
Double cushioned cylinder		Cushion cylinders helps prevent damage to circuits and cylinder.
Bi-directional motor (Variable speed)		Typical of the travel motors used on the excavators

Electromagnetic Solenoids

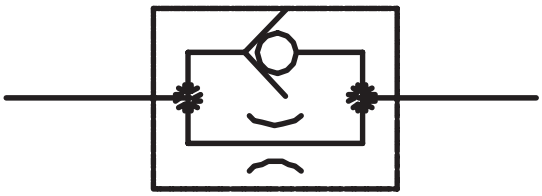
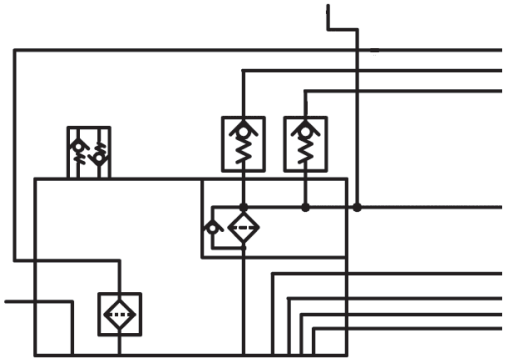


Normally Open: Swing P/B
Normally closed: Lever Lock, Att boost, 1/2 speed travel
Proportional: P2 neutral cut, Travel priority, P1 neutral cut,

https://truckmanualshub.com/

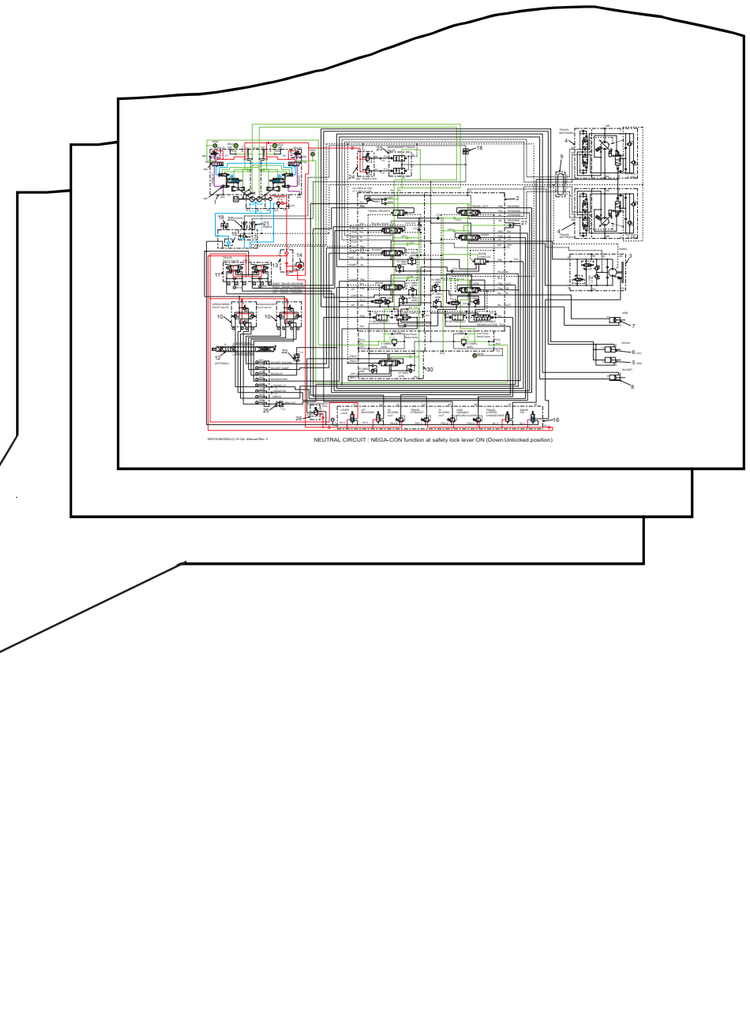
Name	Symbol	Remarks
Two stage main relief with check valves		Compound main relief Potential two stage relief when pilot oil is added to spring to increase pressure. Used on excavators with power boost heavy lift.
Pilot operated, open center work spool	 Springs drawn on each end of the spool assembly will return the spool to the drawn position in the circuit, when not activated by pilot oil. Triangles drawn on the end of the spool and filled (colored) indicate pilot oil will shift the spool.	The number of the continuous squares (rectangle) will indicate the numbers of the valve selecting position. As a general rule, the SPOOL will be shown in the neutral position. Neutral is described as the following the hydraulic pump is producing flow and the operator has not activated a function. The arrow entered in each of the squares (rectangle) will indicate flow direction at one of the selecting position.

https://truckmanualshub.com/

Name	Symbol	Remarks
Slow return check valve		Used in pilot systems to allow quick response in one direction of movement of a work spool. While slowing down the movement of a work spool in the opposite direction.
Hydraulic tank and components		Hydraulic tanks are used for a number of functions. Contain oil, clean oil, pressurize the supply oil to the hydraulic pump.

Kobelco Hydraulic Schematic Section





https://truckmanualshub.com/

NOTE:
The information listed in the troubleshooting table is for reference only. The troubleshooting table was developed around the SK210 and SK250 Negative Control Dynamic Acera.

https://truckmanualshub.com/

Troubleshooting Table SK210 and SK250 Negative Control

	Electrical circuit																	Hydraulic Device																												
																				Control valve																Motor			Cylinder			Other	
	Low pressure sensor	High pressure sensor	Nega-Con sensor	Back pressure sensor	P1 pump propo. valve	P2 pump propo. valve	Arm variable recirculation propo. valve	P2 by- pass cut propo. valve	Travel Straight propo. valve	P1 by-pass cut propo. valve	Ind. Travel propo. Valve	Ind. Travel propo. Valve	Swing priority propo. Valve	Swing parking brake solenoid valve	Att boost sol. Valve	Travel 2-speed solenoid valve	Lever lock	P1 pump	P2 pump	Boom	Arm	Bucket	Swing	Travel right	Travel left	P1 by-pass cut valve	P2 by-pass cut valve	Travel straight valve	Boom conflux valve	Arm conflux valve	Arm variable recirculation	Arm T2 valve	P1 Neg - Con valve	P2 Neg - Con valve	Nega-Con back pressure valve	RH Travel motor	LH travel Motor	Swing motor	Boom cylinder	Arm Cylinder	Bucket Cylinder	Boom lock valve	Arm lock valve
Code	SE1 ~ SE10	SE22 ~ SE23	SE26 ~ SE27	SE28	PSV P1	PSV P2	A6 PSV A	A3 PSV B	A4 PSV C	A5 PSV D	A6 PSV E	A7 PSV F	A8 PSV H	A8 SV-1	A7 SV 3	A2 SV-2	A1 SV 4																												
Boom raise inching	O	O	O	O	O												O	O		O												O		O				O				
Boom raise full lever	O	O	O	O	O	O		O									O	O	O	O						O		O				O	O	O				O				
Boom lower	O	O	O	O	O												O	O		O												O		O				O			O	
Arm out inching	O	O	O	O		O											O		O		O												O	O				O				
Arm out full lever	O	O	O	O	O	O				O							O	O	O		O										O	O	O	O				O				
Arm in inching	O	O	O	O		O	O							O			O		O		O												O	O				O			O	
Arm in full lever	O	O	O	O		O	O			O			O				O	O	O		O				O		O			O		O	O	O				O			O	
Arm in heavy digging (Full lever, sequence conflux)	O	O	O	O	O	O	O		O	O				O			O	O	O		O				O		O			O		O	O	O				O			O	
Bucket digging	O	O	O	O	O												O	O				O										O		O						O		
Bucket dump	O	O	O	O	O												O	O				O										O		O						O		
Bucket digging (Full lever, conflux)	O	O	O	O	O	O		O	O								O	O	O			O				O	O					O	O	O						O		
Bucket dump (full lever, conflux)	O		O	O	O	O		O	O								O	O	O			O				O	O					O	O	O						O		
Swing	O	O	O	O		O							O				O		O				O										O	O			O					
Travel RH and LH (1st speed)	O	O	O	O	O	O											O	O	O					O	O							O	O	O	O	O					
Travel RH and LH (2nd speed)	O	O	O	O	O	O										O	O	O	O					O	O							O	O	O	O	O					
Travel right + Boom	O	O	O	O	O	O		O	O								O	O	O	O				O			O	O	O			O	O	O	O			O			O	
Travel right + Bucket	O	O	O	O	O	O		O	O								O	O	O			O		O			O	O				O	O	O	O					O		
Travel right + Arm	O	O	O	O	O	O	O			O				O			O	O	O		O			O		O				O	O	O	O	O				O			O	
Travel right + Swing	O	O	O	O	O	O				O				O			O	O	O				O	O								O	O	O	O		O					
Travel left + Boom	O	O	O	O	O	O		O									O	O	O	O				O			O		O			O	O	O		O		O			O	
Travel left + Bucket	O	O	O	O	O	O		O									O	O	O			O			O		O					O	O	O		O			O		
Travel left + Arm	O	O	O	O	O	O	O		O	O							O	O	O		O				O	O		O		O	O	O	O	O		O			O		O
Travel left + Swing	O	O	O	O	O	O			O	O				O			O	O	O				O		O	O		O				O	O	O		O	O				
Travel RH and LH + Boom raise	O	O	O	O	O	O		O	O	O							O	O	O	O				O	O		O	O	O			O	O	O	O	O		O				
Arm in + Swing (Swing priority)	O	O	O	O	O	O	O		O	O			O	O			O	O	O		O		O			O		O			O		O	O	O			O		O		
Independent Travel Travel and Boom up	O	O	O	O	O	O		O	O	O	O	O					O	O	O	O			O	O	O	O	O	O				O	O	O	O	O		O			O	
Independent Travel Travel / Boom up & Swing	O	O	O	O	O	O		O	O	O	O	O		O			O	O	O	O			O	O	O	O	O	O				O	O	O	O	O	O	O			O	

https://truckmanualshub.com/

SK160 Schematic Section

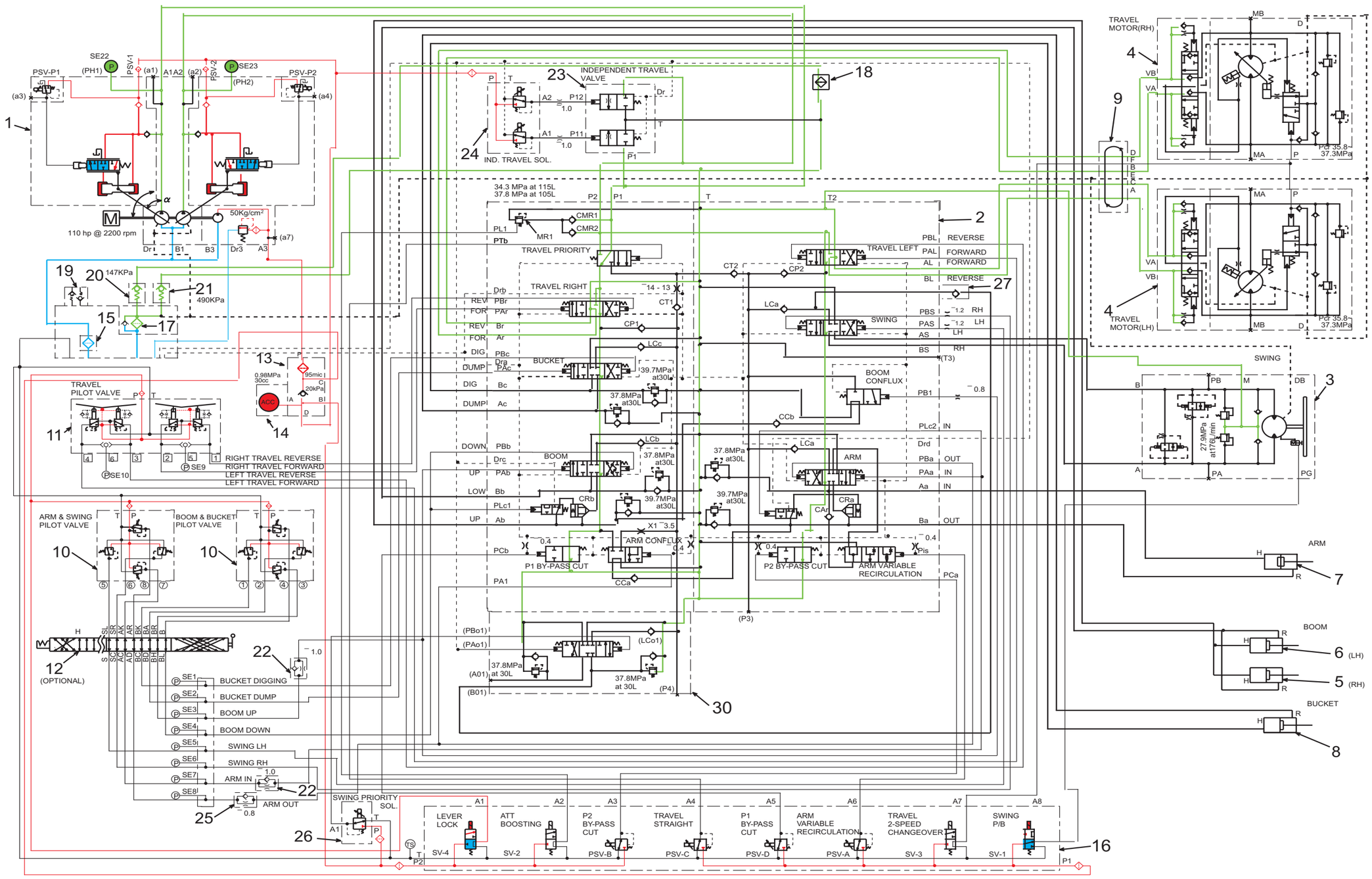
Hydraulic Pump Schematic Legend	
Item #	Description
a1	Test port P1 pump High Pressure
a2	Test port P2 pump High Pressure
a3	Test port P1 proportional solenoid valve (PSV 1)
a4	Test port P2 proportional solenoid valve (PSV2)
a5	
a6	
a7	Test port P3 Pilot Pressure
a8	
a9	
A1	Delivery port P1 pump
A2	Delivery port P2 pump
A3	Delivery port P3 pump
A4	
PSV-P1	proportional solenoid valve P1 pump
PSV-P2	proportional solenoid valve P2 pump
PH1	Pump high pressure port P1
PH2	Pump high pressure port P2
SE-22	High pressure sensor P1 pump
SE-23	High pressure sensor P2 pump
B1	Supply oil for P1 and P2 pump
B3	Supply oil for P3 pump
Dr3	Drain for pilot pump P3
P3	Pilot pump

Conversion Chart	
50 kg/cm^2	711 psi
0.98 Mpa	140 psi
4.9 Mpa	710 psi
34.3 Mpa	4974 psi
37.8 Mpa	5482 psi
39.7 Mpa	5757 psi
105 L	27.7 gpm
115 L	30 gpm
147 Kpa	21 psi
490 Kpa	71 psi

Kobelco Hydraulic Schematic Legend	
Item #	Description
1	Main Hydraulic pump
2	Main Control Valve
3	Swing Motor
4	Travel Motor Assy.
5	Boom Cylinders
6	
7	Arm Cylinder
8	Bucket Cylinder
9	Swivel Joint
10	Left hand pilot valve
	Right hand pilot valve
11	Travel pilot valve
12	Pattern Changer (Option)
13	Pilot filter manifold
14	Accumulator
15	Suction strainer
16	8 Solenoid block
17	Return filter
18	By-pass check valve
19	Tank breather
20	Return check valve
21	Return check valve (oil cooler)
22	Slow return check assy.
23	Independent by-pass valve
24	Independent by-pass solenoid
25	Slow return check assy.
26	Swing priority solenoid
27	One way check for swing priority
28	
30	Swing priority/Breaker Option Valve

https://truckmanualshub.com/

SK160 - Neutral Circuit *Positive Control*



NEUTRAL CIRCUIT : POS-CON function at safety lock lever ON (Down:Unlocked position)

https://truckmanualshub.com/

ED190 Hydraulic Schematic

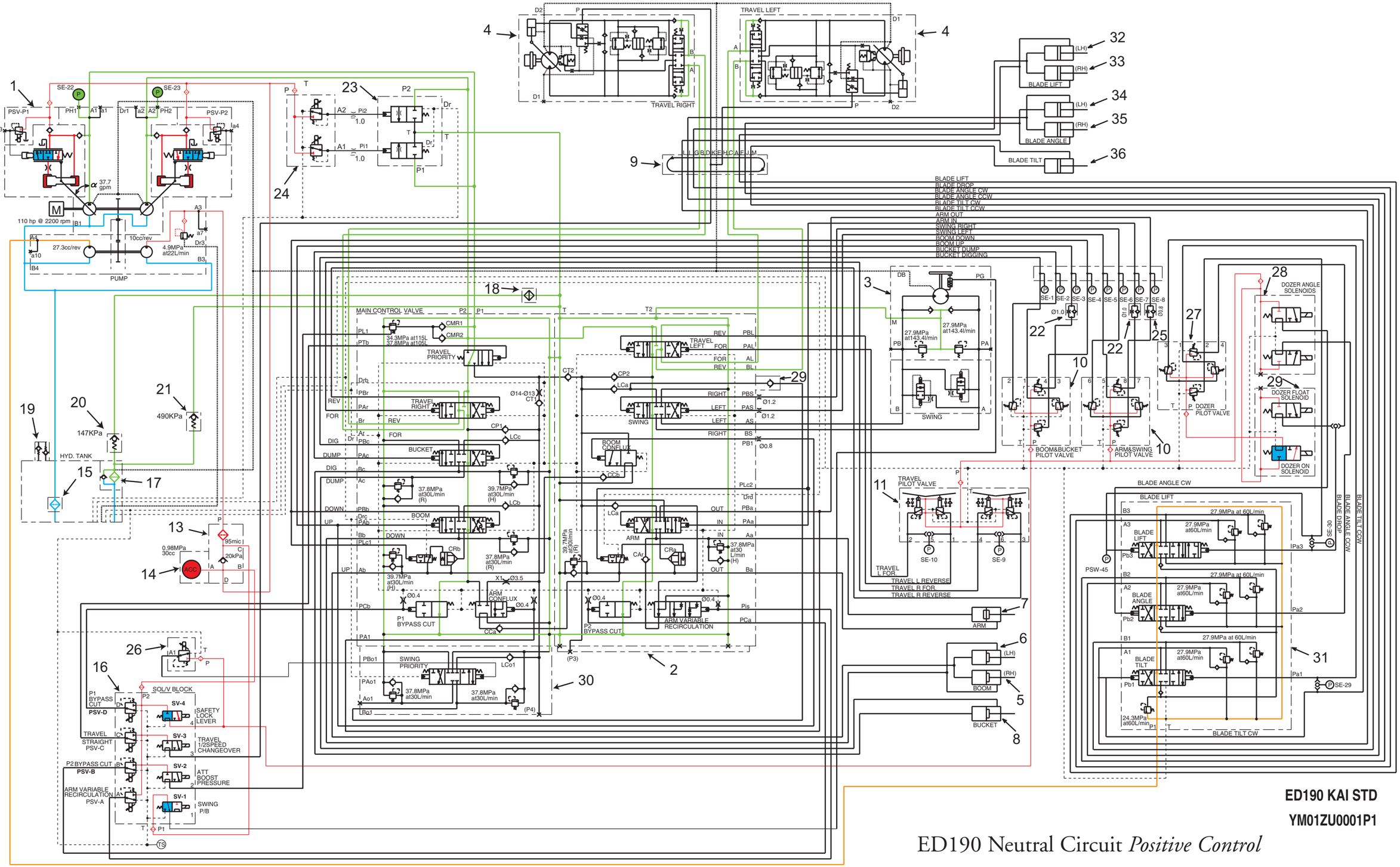
Hydraulic Pump Schematic Legend	
Item #	Description
a1	Test port P1 pump High Pressure
a2	Test port P2 pump High Pressure
a3	Test port P1 proportional solenoid valve (PSV-1)
a4	Test port P2 proportional solenoid valve (PSV-2)
a5	
a6	Test port P4 Dozer pump
a7	Test port P3 Pilot Pressure
a8	
a9	
A1	Delivery port P1 pump
A2	Delivery port P2 pump
A3	Delivery port P3 pump
A4	Delivery port P4 pump
PSV-P1	proportional solenoid valve P1 pump
PSV-P2	proportional solenoid valve P2 pump
PH1	Pump high pressure port P1
PH2	Pump high pressure port P2
SE-22	High pressure sensor P1 pump
SE-23	High pressure sensor P2 pump
B1	Supply oil for P1 and P2 pump
B3	Supply oil for P3 pump
B4	Supply oil for P4 pump
Dr3	Drain for pilot pump P3
P3	Pilot pump

Conversion Chart	
50 kg/cm^2	711 psi
0.98 Mpa	140 psi
4.9 Mpa	710 psi
34.3 Mpa	4974 psi
37.8 Mpa	5482 psi
39.7 Mpa	5757 psi
105 L	27.7 gpm
115 L	30 gpm
147 Kpa	21 psi
490 Kpa	71 psi

Kobelco Hydraulic Schematic Legend	
Item #	Description
1	Main Hydraulic pump
2	Main Control Valve
3	Swing Motor
4	Travel Motor Assy.
5	Boom Cylinders
6	
7	Arm Cylinder
8	Bucket Cylinder
9	Swivel Joint
10	Left hand pilot valve
	Right hand pilot valve
11	Travel pilot valve
12	
13	Pilot filter manifold
14	Accumulator
15	Suction strainer
16	8 Solenoid block
17	Return filter
18	Oil cooler
19	Tank breather
20	Return check valve
21	Return check valve (oil cooler)
22	Slow return check
23	Independent by-pass valve
24	Independent by-pass solenoid
25	Slow return check
26	Swing priority solenoid
27	Dozer pilot control
28	Dozer solenoid valve
29	One way check swing
30	Swing priority / breaker valve
31	Dozer control valve
32	Blade lift cylinder L.H.
33	Blade lift cylinder R.H.
34	Blade angle L.H.
35	Blade angle R.H.
36	Blade Tilt

https://truckmanualshub.com/

ED190 - Neutral Circuit *Positive Control*



ED190 KAI STD

YM01ZU0001P1

ED190 Neutral Circuit *Positive Control*

NEUTRAL CIRCUIT : POS-CON function at safety lock lever ON (Down:Unlocked position) and Dozer Pilot Circuit activated

1H-2

https://truckmanualshub.com/

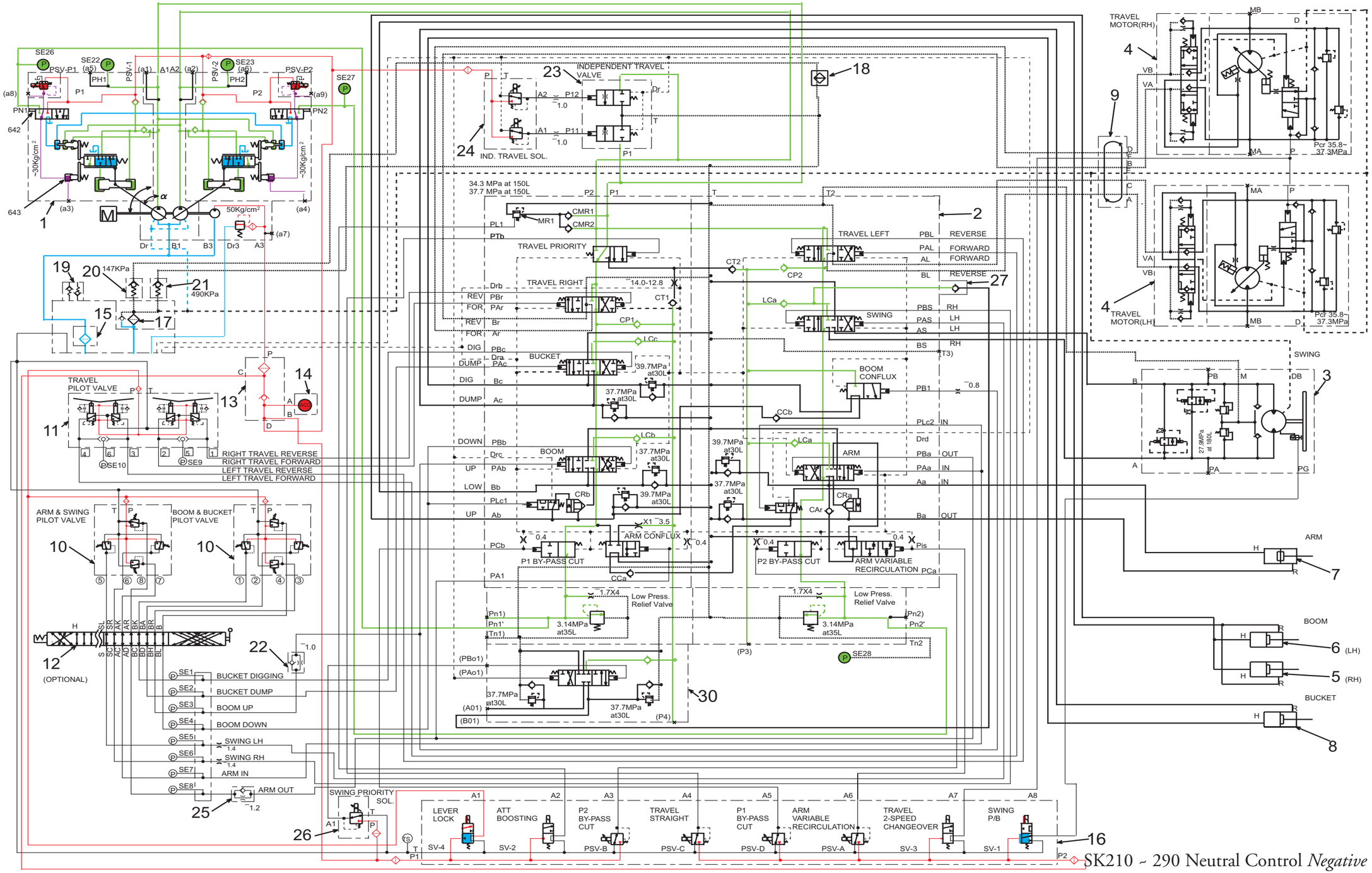
SK210~290 Schematic Section

Hydraulic Pump Schematic Legend	
Item #	Description
a1	Test port P1 pump High Pressure
a2	Test port P2 pump High Pressure
a3	Test port P1 proportional solenoid valve (PSV-1)
a4	Test port P2 proportional solenoid valve (PSV-2)
a5	Test port P1 pump High Pressure
a6	Test port P2 pump High Pressure
a7	Test port P3 Pilot Pressure
a8	Test port P1 proportional solenoid valve (PSV-1)
a9	Test port P2 proportional solenoid valve (PSV-2)
A1	Delivery port P1 pump
A2	Delivery port P2 pump
A3	Delivery port P3 pump
A4	
PSV-P1	proportional solenoid valve P1 pump
PSV-P2	proportional solenoid valve P2 pump
PH1	Pump high pressure port P1
PH2	Pump high pressure port P2
SE-22	High pressure sensor P1 pump
SE-23	High pressure sensor P2 pump
SE 26	Low pressure sensor Negative control P1
SE27	Low pressure sensor Negative control P2
B1	Supply oil for P1 and P2 pump
B3	Supply oil for P3 pump
Dr3	Drain for pilot pump P3
P3	Pilot pump
PN1	Signal line from P1 section of main control valve
PN2	Signal line from P2 section of main control valve

50 kg/cm2	711 psi
0.98 Mpa	140 psi
4.9 Mpa	710 psi
34.3 Mpa	4974 psi
37.8 Mpa	5482 psi
39.7 Mpa	5757 psi
105 L	27.7 gpm
115 L	30 gpm
147 Kpa	21 psi
490 Kpa	71 psi

Kobelco Hydraulic Schematic Legend	
Item #	Description
1	Main Hydraulic pump
2	Main Control Valve
3	Swing Motor
4	Travel Motor Assy.
5	Boom Cylinders
6	
7	Arm Cylinder
8	Bucket Cylinder
9	Swivel Joint
10	Left hand pilot valve
	Right hand pilot valve
11	Travel pilot valve
12	Pattern Changer (Option)
13	Pilot filter manifold
14	Accumulator
15	Suction strainer
16	8 Solenoid block
17	Return filter
18	Oil Cooler
19	Tank breather
20	Return check valve
21	Return check valve
22	Slow return check valve
23	Independent travel bypass valve
24	Independent travel solenoid valve
25	Slow return check valve
26	Swing priority solenoid
27	One way check for swing priority
30	Swing priority/Breaker Option Valve
T.S.	Temperature sensor

https://truckmanualshub.com/



NEUTRAL CIRCUIT : NEGA-CON function at safety lock lever ON (Down:Unlocked position)

https://truckmanualshub.com/

SK330 Schematic Section

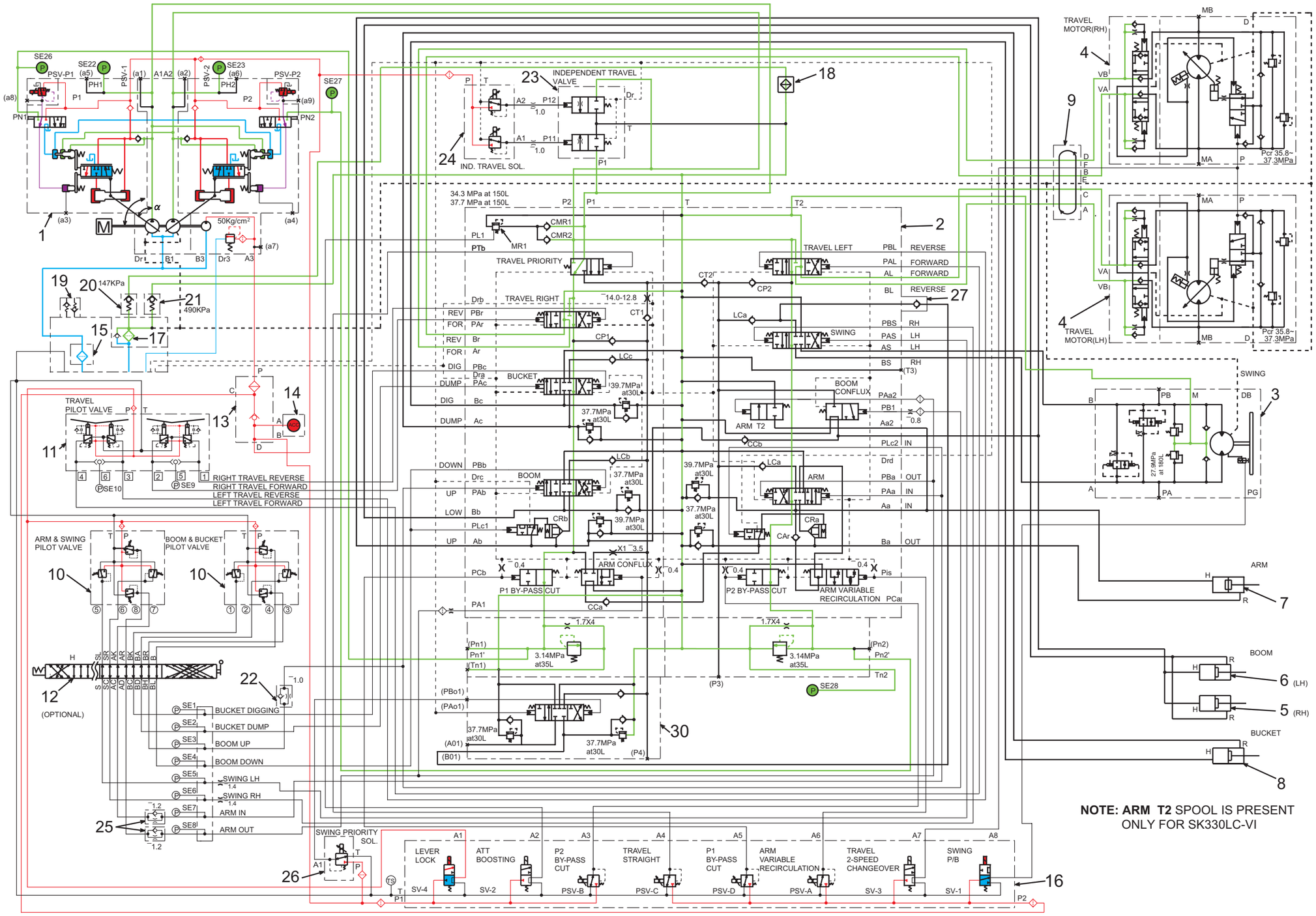
Hydraulic Pump Schematic Legend	
Item #	Description
a1	Test port P1 pump High Pressure
a2	Test port P2 pump High Pressure
a3	Test port P1 proportional solenoid valve (PSV-1)
a4	Test port P2 proportional solenoid valve (PSV-2)
a5	Test port P1 pump High Pressure
a6	Test port P2 pump High Pressure
a7	Test port P3 Pilot Pressure
a8	Test port P1 proportional solenoid valve (PSV-1)
a9	Test port P2 proportional solenoid valve (PSV-2)
A1	Delivery port P1 pump
A2	Delivery port P2 pump
A3	Delivery port P3 pump
A4	
PSV-P1	proportional solenoid valve P1 pump
PSV-P2	proportional solenoid valve P2 pump
PH1	Pump high pressure port P1
PH2	Pump high pressure port P2
SE-22	High pressure sensor P1 pump
SE-23	High pressure sensor P2 pump
SE 26	Low pressure sensor Negative control P1
SE27	Low pressure sensor Negative control P2
B1	Supply oil for P1 and P2 pump
B3	Supply oil for P3 pump
Dr3	Drain for pilot pump P3
P3	Pilot pump
PN1	Signal line from P1 section of main control valve
PN2	Signal line from P2 section of main control valve

Conversion Chart	
50 kg/cm2	711 psi
0.98 Mpa	140 psi
4.9 Mpa	710 psi
34.3 Mpa	4974 psi
37.8 Mpa	5482 psi
39.7 Mpa	5757 psi
105 L	27.7 gpm
115 L	30 gpm
147 Kpa	21 psi
490 Kpa	71 psi

Kobelco Hydraulic Schematic Legend	
Item #	Description
1	Main Hydraulic pump
2	Main Control Valve
3	Swing Motor
4	Travel Motor Assy.
5	Boom Cylinders
6	
7	Arm Cylinder
8	Bucket Cylinder
9	Swivel Joint
10	Left hand pilot Valve
	Right hand pilot valve
11	Travel pilot valve
12	Pattern Changer (Option)
13	Pilot filter manifold
14	Accumulator
15	Suction strainer
16	8 Solenoid block
17	Return filter
18	Oil Cooler
19	Tank breather
20	Return check valve
21	Return check valve
22	Slow return check valve
23	Independent travel bypass valve
24	Independent travel solenoid valve
25	Slow return check valve
26	Swing priority solenoid
27	One way check for swing priority
30	Swing priority/Breaker Option Valve
T.S.	Temperature sensor

https://truckmanualshub.com/

SK330 - Neutral Circuit *Neagtive Control*



NOTE: ARM T2 SPOOL IS PRESENT ONLY FOR SK330LC-VI

SK330 T2 spool

NEUTRAL CIRCUIT : NEGA-CON function at safety lock lever ON (Down:Unlocked position)

https://truckmanualshub.com/

SK480 Hydraulic Schematic

Hydraulic Pump Schematic Legend	
Item #	Description
a1	Test port P1 pump High Pressure
a2	Test port P2 pump High Pressure
a3	Test port P1 proportional solenoid valve (PSV-1)
a4	Test port P2 proportional solenoid valve (PSV-2)
a5	Test port P1 pump High Pressure
a6	Test port P2 pump High Pressure
a7	Test port P3 Pilot Pressure
a8	Test port P1 proportional solenoid valve (PSV-1)
a9	Test port P2 proportional solenoid valve (PSV-2)
A1	Delivery port P1 pump
A2	Delivery port P2 pump
A3	Delivery port P3 pump
A4	
PSV1	proportional solenoid valve P1 pump
PSV2	proportional solenoid valve P2 pump
PH1	Pump high pressure port P1
PH2	Pump high pressure port P2
SE-22	High pressure sensor P1 pump
SE-23	High pressure sensor P2 pump
B1	Supply oil for P1 and P2 pump
B3	Supply oil for P3 pump
Dr3	Drain for pilot pump P3
P3	Pilot pump
PN1	Signal line from P1 section of main control valve
PN2	Signal line from P2 section of main control valve

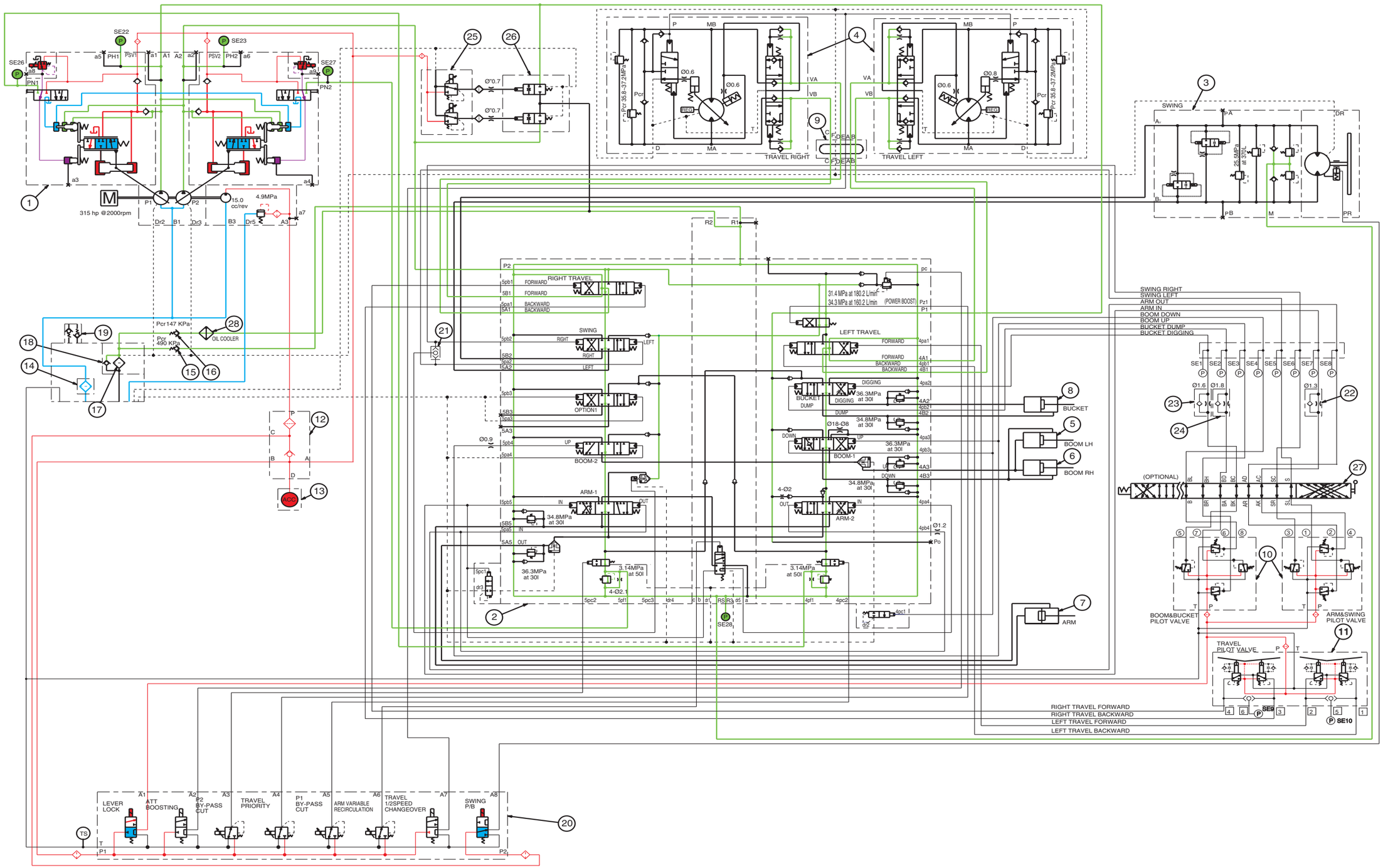
Conversion Chart	
50 kg/cm2	711 psi
0.98 Mpa	140 psi
4.9 Mpa	710 psi
31.4 Mpa	4554 psi
34.3 Mpa	4974 psi
34.8 Mpa	5264 psi
36.3 Mpa	5264 psi
105 L	27.7 gpm
115 L	30 gpm
147 Kpa	21 psi
490 Kpa	71 psi

Kobelco Hydraulic Schematic Legend	
Item #	Description
1	Main Hydraulic pump
2	Main Control Valve
3	Swing Motor
4	Travel Motor Assy.
5	Boom Cylinders
6	
7	Arm Cylinder
8	Bucket Cylinder
9	Swivel Joint
10	Left hand pilot Valve
	Right hand pilot valve
11	Travel pilot valve
12	Pilot filter manifold
13	Accumulator
14	Return filter
15	Return check valve
16	Return check valve
17	Return filter
18	Bypass check valve
19	Tank breather
20	8 Solenoid block
21	Shuttle valve
22	Slow return check valve
23	Slow return check valve
24	Slow return check valve
25	Independent travel bypass valve
26	Independent travel solenoid valve
27	Pattern Changer (Option)
T.S.	Temperature sensor

https://truckmanualshub.com/

SK480 - Neutral Circuit *Negative Control*

SK480LC-VIKAI STD **LS01Z00002P1**



NEUTRAL CIRCUIT : NEGA-CON function at safety lock lever ON (Down:Unlocked position)

https://truckmanualshub.com/

HYDRAULIC CIRCUIT DIAGRAM IN OPTION

Fig. 6-1 SWING PRIORITY / Breaker (Option)

A. Pilot circuit — FIG. 3

1. The pilot gear pump delivery oil flows into P1 port of solenoids' block (18).

2. The lever lock solenoid is actuated (Operator's safety lock lever in the unlocked–down position) and the oil flows through port (A1) into pilot valve (53) for breaker.

3. When pedal valve (53) is operated, pilot oil flows trhough port (A) into port (PAo1) located on the upper side of the swing priority/breaker valve to switch the spool.

4. Concurrently, the voltage output by low pressure sensor (SE20), negative control sensors (SE26, and 27) and back pressure (SE28) is sent to the mechatronic controller.

5. The command current from the mechatronic controller acts on P1 cut proportional valve (PSV-D), located on the proportional solenoid valve block (18) and switches the P1 cut spool.

6. The command current from the mechatronic controller acts on P2 pump proportional valve (PSV-P2) and negative control sensor (SE27) to reduce the pump flow to its minimum, when no other function (example: boom function) is required.

7. The command current from the mechatronic controller acts on travel straight proportional valve A4 (PSV-C), located on the proportional solenoid block (18) and switches the straight travel valve.

8. The command current from the mechatronic controller acts on P1 pump proportional valve (PSV-P1) and negative control sensor (SE26) and back pressure sensor (SE28) to increase the pump P1 flow.

8. When boom raise and breaker operation are carried out concurrently, P2 pump acts on boom raise operation, since the straight travel spool is shifted, making the boom raise operation possible.

B. Main circuit — FIG. 3 *(Circuito principal)*

1. P1 pump delivery oil flows through port (P1) of main control valve (50), passes through the straight travel spool, opens load check valve (CT1), and flows into P1 parallel circuit on the upper stream of the travel straight section.

2. And the delivery oil opens load check valve (LCo1) and flows into the add on swing priority/breaker valve.

3. Because the swing priority/breaker valve is shifted, the delivery oil flows through the spool and is fed into the breaker through (Ao1) port of main control valve (50) and stop valve (52), located on the arm side.

4. The return oil from attachment returns through stop valve (52) and flows directly into filter (50), used directly and specially for the breaker application, located inside the hydraulic tank.

NOTE

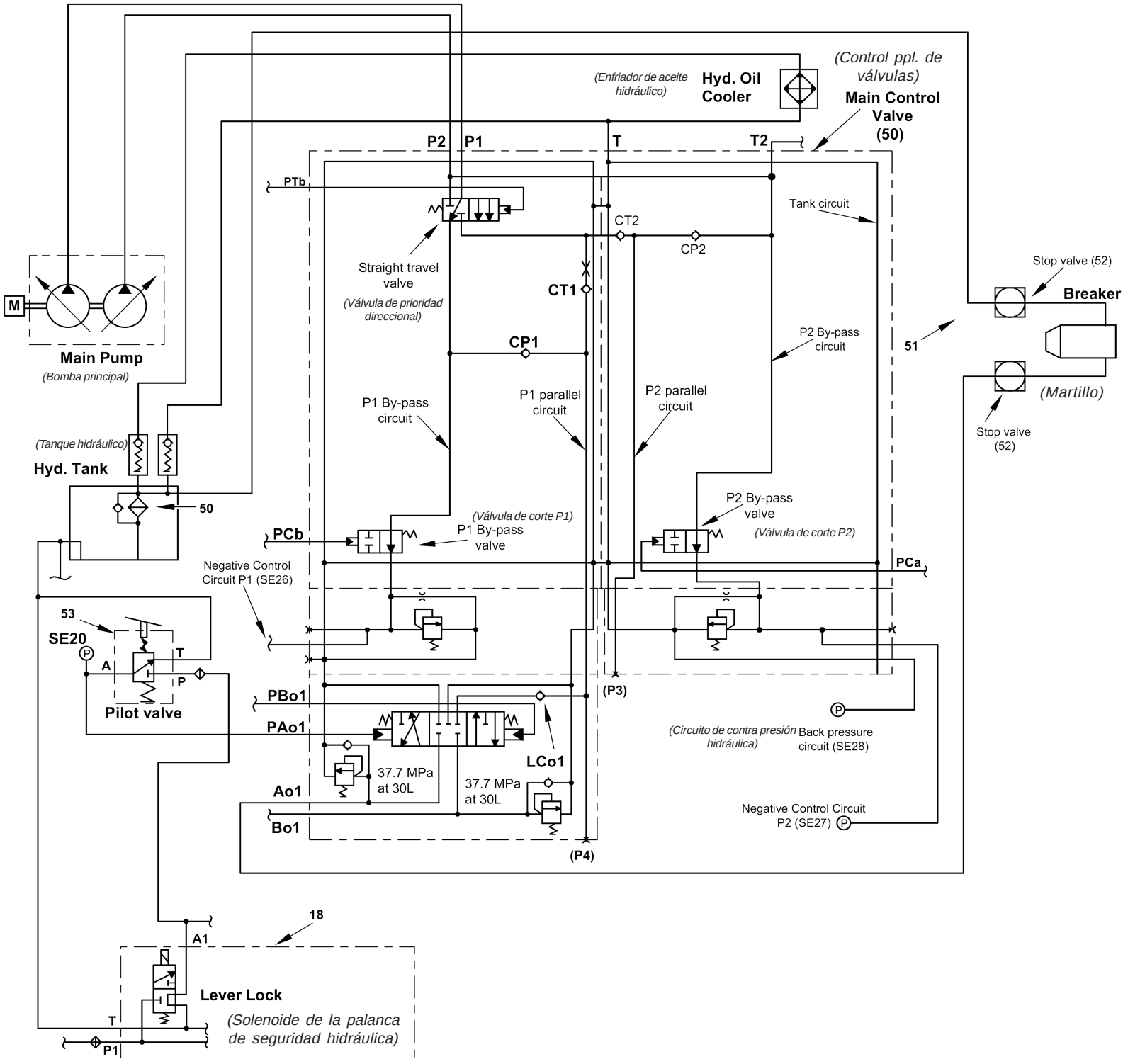
Flow rate specifications for proper hammer operation vary upon hammer manufacturer. Refer to the hammer specifications and to section 2: Operation and Maintenance to set the appropiate flow rate for the specific hammer used.

---

https://truckmanualshub.com/

SWING PRIORITY / Breaker (Option)

FIG. 3



https://truckmanualshub.com/

NIBBLER/BREAKER VALVE – NIBBLER FUNCTION

A. Pilot circuit — FIG. 5

1. The pilot gear pump delivery oil flows into P1 port of solenoids' block (18). *es).*

2. The lever lock solenoid is actuated (Operator's safety lock lever in the unlocked–down position) and the oil flows through port (A1) into pilot valve (53) for nibbler/breaker.

3. When pedal valve (53) is operated, pilot oil flows trhough port (A or B) into port (PBo2 or PAo2, respectively) located on the lower side of the nibbler/breaker valve to switch the spool.

4. Concurrently, the voltage output by low pressure sensor (SE11), negative control sensors (SE26, and 27) and back pressure (SE28) is sent to the mechatronic controller.

5. The command current from the mechatronic controller acts on P1 and P2 cut proportional valves (PSV-D) and (PSV-B), located on the proportional solenoid valve block (18) to switche P1 and P2 cut spools.

6. The command current from the mechatronic controller acts on travel straight proportional valve A4 (PSV-C), located on the proportional solenoid block (18) and switches the straight travel valve. *(*

7. The command current from the mechatronic controller acts on P1 and P2 pump proportional valves (PSV-P1) and (PSV-P2), negative control sensors (SE26) and (SE27) and back pressure sensor (SE28) to increase pumps P1 and P2 flow.

8. When boom raise and nibbler operation are carried out concurrently, P1 pump acts on boom raise operation, making the boom raise operation possible.

B. Main circuit (Combined flow) — FIG. 5

1. P1 and P2 pump delivery oil flows through ports (P1) and (P2) of main control valve (50), flows into P2 by-pass parallel circuit on the upper stream of the travel straight section, since the travel straight spool is shifted.

2. P1 and P2 by-pass circuits are closed because P1 and P2 cut spools are shifted. Therefore, the delivery oil from P1 opens load check valve (CT2), and the delivery oil from P2 opens load check valve (CP2); thus, the combined oil delivery flows into P2 parallel circuit.

3. And the delivery oil opens load check valve (LCo2) on the serial add–on valve and flows into nibbler/breaker spool.

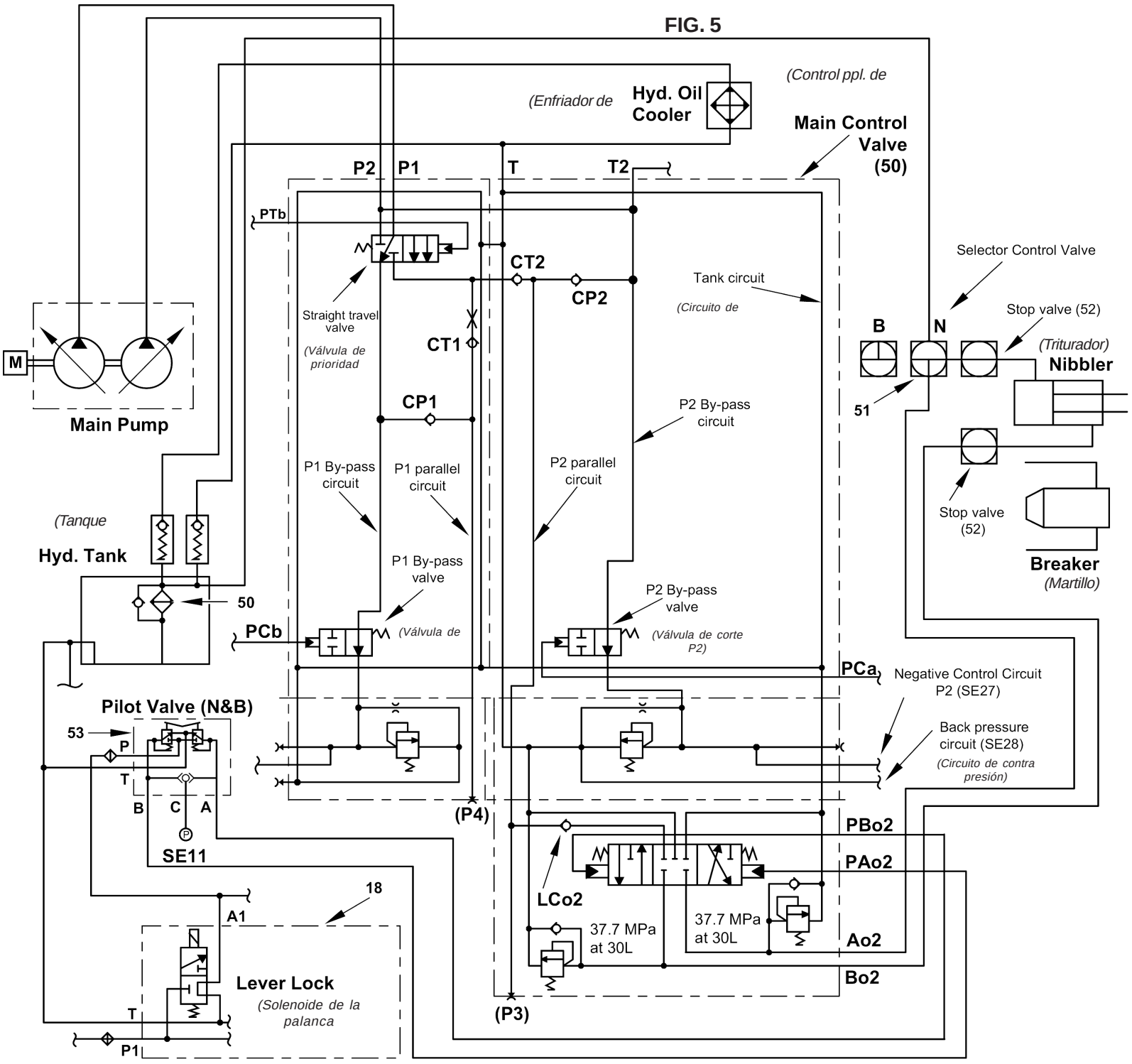
4. Because the nibbler/breaker spool is shifted, the delivery oil flows through the spool and is fed into the breaker through (Bo2 or Ao2) port of main control valve (50) and stop valve (52), located on the arm side.

5. The return oil from attachment returns through stop valve (52), through selector control valve (51), through nibbler/breaker valve, through oil cooler, and into filter (50), used directly and specially for the nibbler/breaker application, located inside the hydraulic tank.

https://truckmanualshub.com/

NIBBLER/BREAKER VALVE – Nibbler Function

FIG. 5



	Selector switch *(Interruptor)*	Hyd. return control valve *(Valvula control de retorno hid.)*	P1	P2	Straight travel valve *(Valvula de marcha recta)*	P1 cut valve *(Valvula de corte P1)*	P2 cut valve *(Valvula de corte P2)*
Nibbler (Conflux) *(Triturador– 2 bombas)*	**N**	**O**	**O**	**O**	**O**	**O**	**O**
Nibbler (Single pump) *(Triturador– 1 bomba)*	**N**	**–**	**–**	**O**	**–**	**–**	**O**
Breaker (Martillo)	**B**	**–**	**–**	**O**	**–**	**–**	**O**

With *(Activado)* **: O** **Without** *(Desactivado)* **: –**

https://truckmanualshub.com/

Kobelco

Dynamic



Kobelco Construction Machinery America LLC
Pressure Adjustments
SK160 through SK330

KOBELCO

Kobelco Construction
Machinery America LLC

https://truckmanualshub.com/

TABLE OF CONTENTS

1. VERIFICATION OF ENGINE RPM 3
A. Machine Preparation Procedures 3

2. ENGINE SPEED MEASURED WITH SERVICE DIAGNOSTICS (28 ITEM CHECK) 3

3. HYDRAULIC OIL CAUTIONS 4
A. Checking the Main Relief Setting Using Service Diagnostics (28 Item Check) 4
B. Tools & Equipment Required for Checking and Adjusting of Pilot and Main Relief Valves 4

4. PILOT CIRCUIT 5
A. Machine Preparation Procedures 5
B. Pilot Relief Valve Pressure Measurement Procedures 5
C. Pilot Relief Valve Adjustment Procedures 5

5. MAIN RELIEF PRESSURE ADJUSTMENT 6
A. Machine Preparation Procedures 6
B. Measurement of Attachment Main Relief Valve “HEAVY LIFT SWITCH ON” 6

6. ADJUSTMENT 2nd STAGE MAIN RELIEF WITH “HEAVY LIFT SWITCH ON” 7
A. Machine Preparation Procedures 7
B. 2nd Stage Main Relief Valve Adjustment 7

7. ADJUSTMENT MAIN RELIEF WITH “HEAVY LIFT SWITCH OFF” 8
A. Machine Preparation Procedures 8
B. Main Relief Valve Adjustment 8

8. SWING CIRCUIT 9
A. Machine Preparation Procedures 9
B. Swing Port Relief Valve Pressure Measurement 9
C. Swing Port Relief Valve Procedures 10

9. OVER LOAD RELIEF VALVES 11
A. Machine Preparation Procedures 11
B. Tools & Equipment Required for Checking and Adjusting of Over Load Relief Valves 11
C. Over Load Relief Pressure Measurement 11
D. OR3 Boom Up Over Load Relief 12
E. OR4 Boom Down Over Load Relief 12
F. OR1 Bucket In (Dig) Over Load 12
G. OR2 Bucket Out Over Load 13
H. OR7 Arm In (Dig) Over Load 13
I. OR8 Arm Out Over Load 13
J. Travel Motor Port Reliefs 14

10. MEASUREMENT OF ADDITIONAL CIRCUIT PRESSURE PORTS 15

PERFORMANCE INSPECTION SPECIFICATION CHARTS ..... 16 ~ 19
A. SK160 16
B. ED190 17
C. SK210 18
D. SK250 19
E. SK290 20
F. SK330 21
G. SK480 22

https://truckmanualshub.com/

1. VERIFICATION OF ENGINE RPM

A. Machine Preparation Procedures

1. With safety lock in the lock (up) position. See Figure 5.1.
2. Place the maintenance connector in the release position.See Figure 5.2
3. Place front attachment to hydraulic oil check position. See Figure 5.4.
4. Place throttle potentiometer to low idle position ; start engine, allow engine to achieve normal operating temperature^{O}C 45~55 (^{O}F113~145)
5. Check the gauge cluster and confirm that the machine is in the default “M” mode. See Figure 5.3.
6. Locate the screen change switch, depress the switch once to select RPM. Check that engine low and hi RPM are at the proper adjustment. See Figure 5.3.
   (Refer to chart by model and serial number for specifications.)
7. Return Throttle potentiometer to low idle position. Press screen change switch two times to return screen to Monitor System OK.
8. Allow engine to idle for two minutes and shut off engine.

2.ENGINE SPEED MEASURED WITH SERVICE DIAGNOSTICS (28 ITEM CHECK)

1. With machine turned off, hold buzzer stop switch.
2. Turn key switch to on position.
3. Screen Change Switch advances the display each time the screen change switch is pushed.
4. Press the Screen change switch once, diagnostic check of computer will be at screen No. 2. Below.

2	No. 2		
	E/G SET	2200	No load set rpm
	MEAS	2201	Actual rpm
	E/G PRS.	LIVE	LIVE/DEAD indication
	KPSS SW	M	A/M/B indication

5. Buzzer Stop Switch returns display to previous screen each time switch is pushed.
6. Screen will stay in diagnostic mode until key switch is turned off.

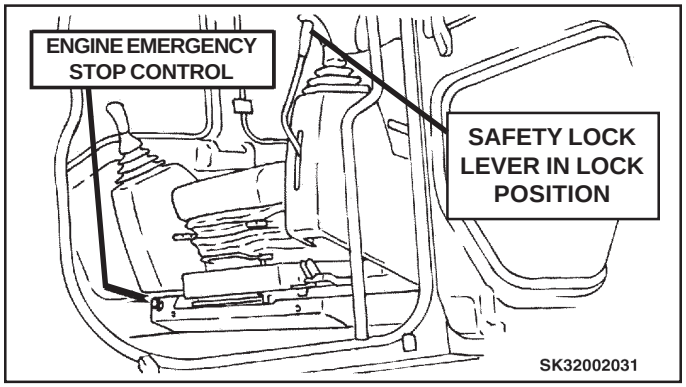


FIGURE 5.1

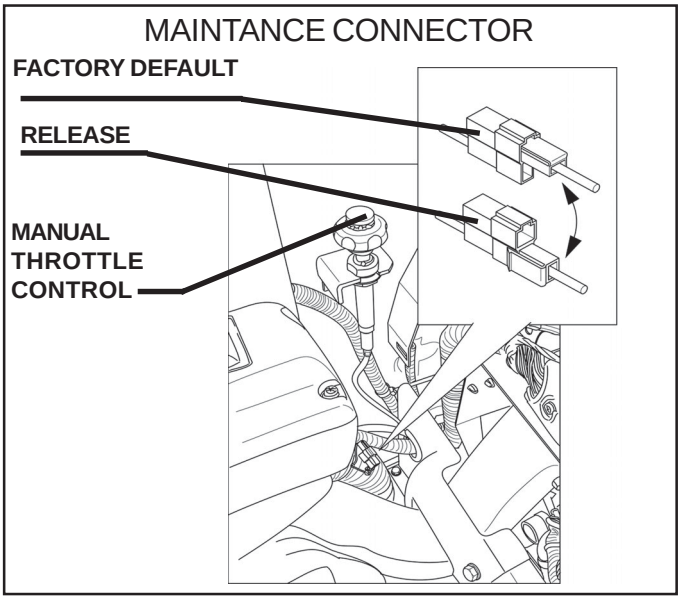


FIGURE 5.2

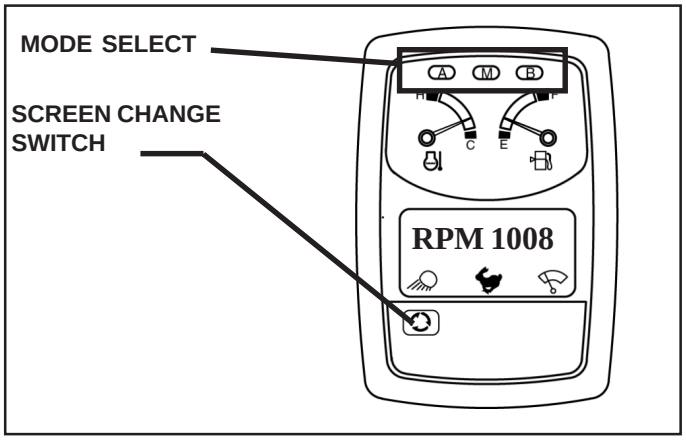


FIGURE 5.3

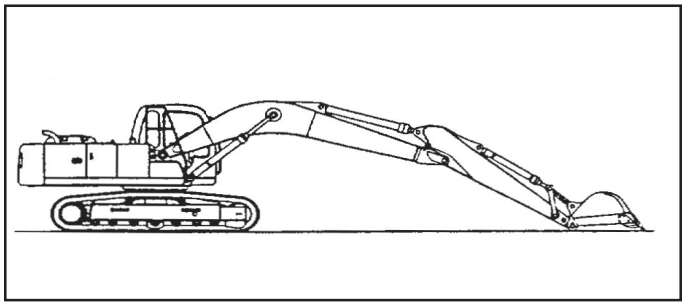


FIGURE 5.4

https://truckmanualshub.com/

3. HYDRAULIC CAUTIONS

Kobelco Excavators are set to ISO pilot controls at the factory. It is up to you to read and understand the Operators & Maintenance Manual before attempting any service or maintenance procedures.

⚠ WARNING ⚠

• BE EXTREMELY CAUTIOUS WHILE RELEASING HYDRAULIC TANK PRESSURE OR REMOVING LINES AND FITTINGS, VAPORS AND OIL MAY BE EXTREMELY HOT.

• WEAR APPROVED SAFETY CLOTHES, SHOES, GLOVES AND HARD HAT WHEN PERFORMING ANY MAINTENANCE OR TEST PROCEDURES.

A. Checking the Main Relief Setting Using Service Diagnostics (28 ITEM CHECK)

1. With key in OFF position, gauge cluster blank, press and hold buzzer stop switch.
2. Turn key switch to ON position. See Figure 6.1.
3. With key switch in on position release buzzer stop switch. See Figure 6.1.
4. By pressing the screen change switch the service diagnostics is advanced forward. See Figure 6.2.
5. By pressing the buzzer stop switch the screen is returned to the last screen.
6. Advance the service diagnostics to screen No.14. See Figure 6.3.
7. Screen No.14 will display the voltage of high pressure sensor, and the computer generated oil pressure at P1 and P2 pump. Use this for checking pump and machine performance. See Figure 6.3.

B. Tools & Equipment Required for Checking and Adjusting of Pilot and Main Relief Valves

1. Two 700kg/cm^2 (10,000psi) Gauges.
2. One 70kg/cm^2 (1,000 psi) Gauges.
3. 
   32 mm spaner wrench
   22 mm spaner wrench
   19 mm spaner wrench
   6 mm allen wrench
4. General hand or power tools to remove and replace hydraulic fittings and components.
5. Thermometer to read hydraulic oil temperature.

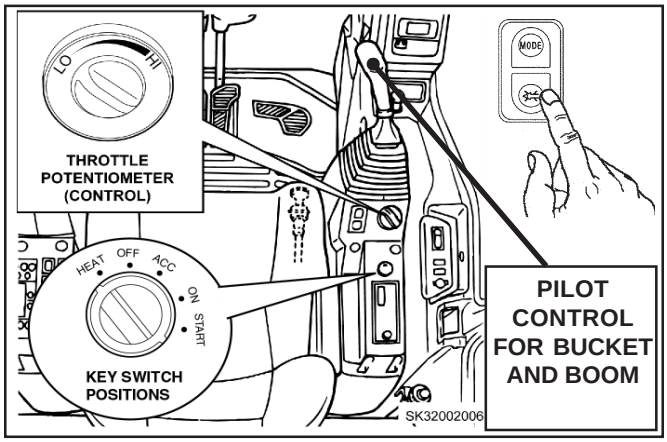


FIGURE 6.1

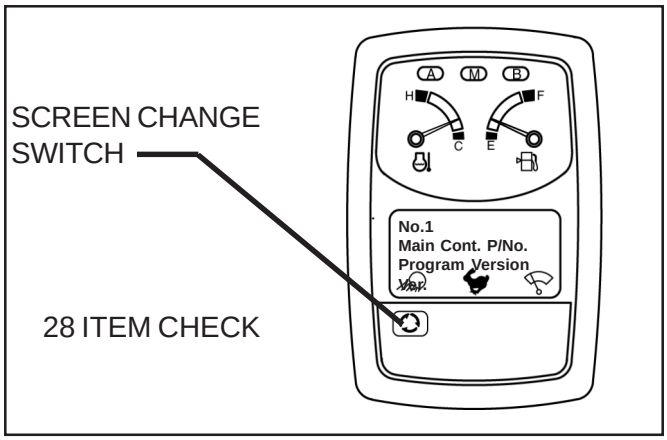


FIGURE6.2

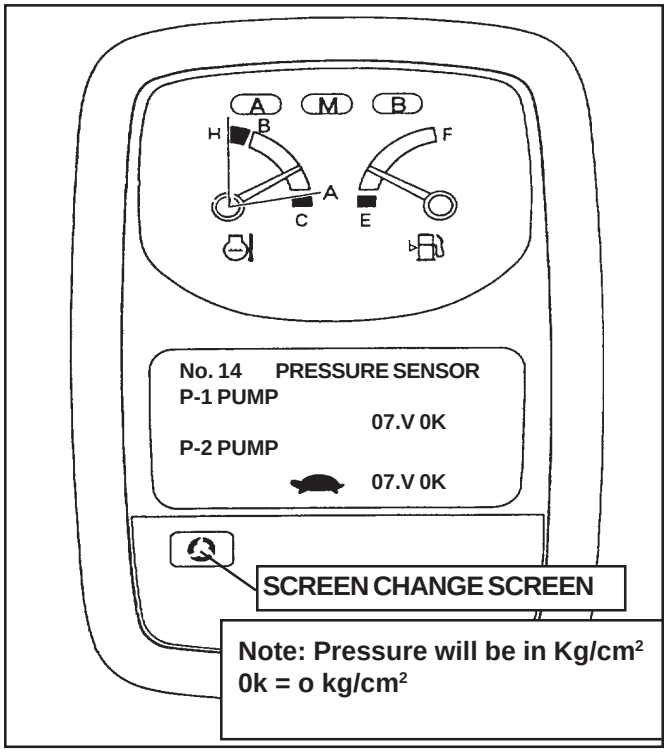


FIGURE 6.3

https://truckmanualshub.com/

4. PILOT CIRCUIT

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 7.1.
3. Release hydraulic tank pressure by depressing relief valve stem item ① on the pressure relief valve. See Figure 7.2.
4. Open Main Pump Access Door and remove the PF1/4 test Port Plug (A7) from Output Port on Pilot System Gear Pump and install 105kg/cm² (1,000 psi) Pressure Gauge. See Figure 7.3.

B. Pilot Relief Valve Pressure Measurement Procedures

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.
2. Start engine and place throttle control in Hi Idle position.
3. Place KPSS Mode Switch in "M" Mode.
4. Confirm that the hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145). Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212)
5. Place all pilot controls in neutral, read and record the 70kgf/cm^2 (1000 psi) pressure gauge at the P3 pump, a7 pressure test port. See Figure 7.3. Compare to chart for specific model being tested.

C. Pilot Relief Valve Adjustment Procedures

1. Locate the Pilot Relief Valve mounted on the bottom of the P3 Pilot Pump Assembly. See Figure 7.4.
2. Loosen the adjusting screw locknut with a 24mm spaner. See Figure 7.4.
3. Adjust using a 6mm allen until specified pressure according to proper chart for specific machine being adjusted is achieved.
4. After correct pressure is obtained, tighten adjusting screw locknut, tightening torque 3.0 kgfm^2 (22ft.lb). See Figure 7.4.
5. Verify pressure after tightening locknut.

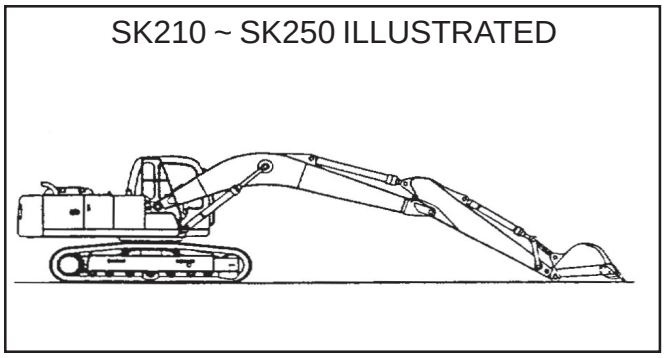


FIGURE 7.1

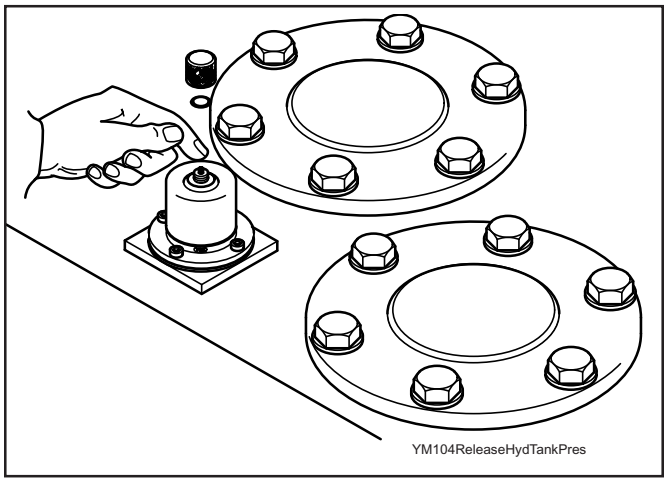


FIGURE 7.2

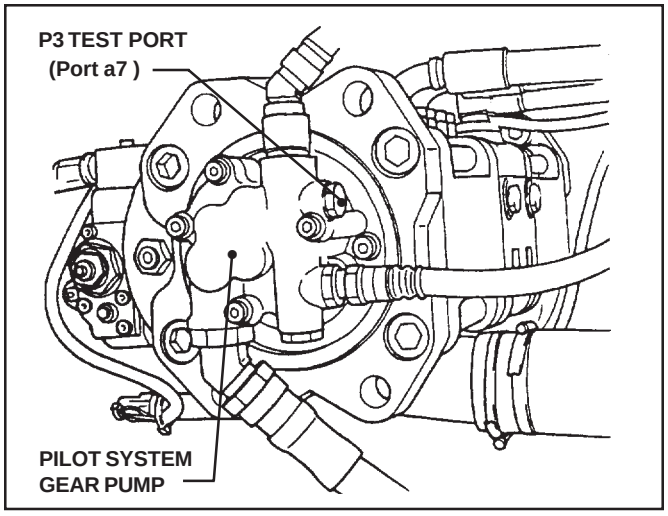


FIGURE 7.3

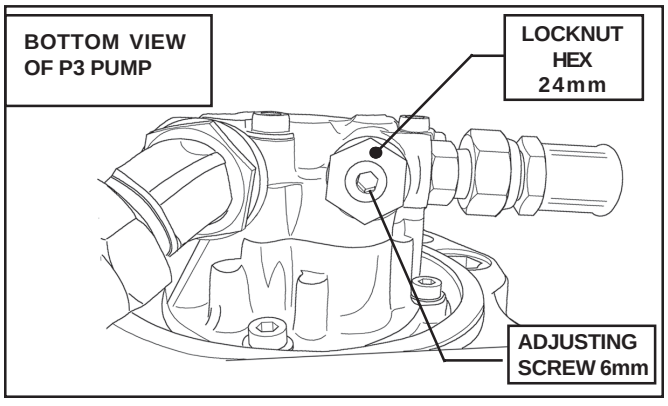


FIGURE 7.4

https://truckmanualshub.com/

MAIN RELIEF PRESSURE ADJUSTMENT

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

5. MAIN RELIEF PRESSURE ADJUSTMENT

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 8.1.
3. Release hydraulic tank pressure by depressing relief valve stem item ① on the pressure relief valve. See Figure 8.2.
4. Open Main Pump Access Door and remove two (2) PF1/4 test Port Plugs (a1) P1 pump and (a2) Pump install 700kg/cm² (10,000 psi) Pressure Gauges. See Figure 8.3.

B. Measurement of Attachment Main Relief Valve "HEAVY LIFT SWITCH ON"

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.
2. Place "Heavy Lift" Switch in the "ON" position. See Figure 8.4.
3. Place KPSS Mode Switch in "M" Mode.
4. Start engine and place throttle control in Low Idle position.
5. Confirm that the hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145). Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
6. Move throttle control to "HI-IDLE".
7. Operate Boom Raise control until boom is completely up, then hold over relief.
8. Record readings from 700kg/cm^2 (10,000 psi) Pressure Gauges at a1 port on P1 Main Pump and a2 port at P2 pump.
9. If pressure gauge readings are within specifications for the particular machine being tested, it is not necessary to adjust Relief Valve Pressure. Refer to chart for machine and model being tested.

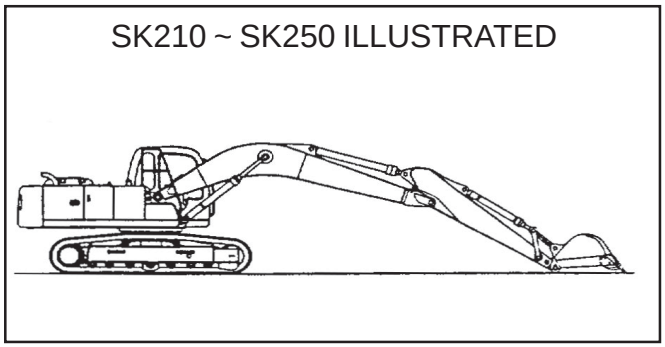


FIGURE 8.1

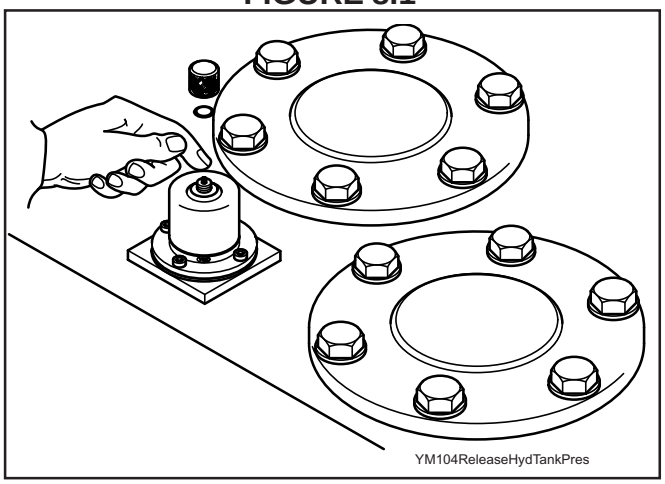


FIGURE 8.2

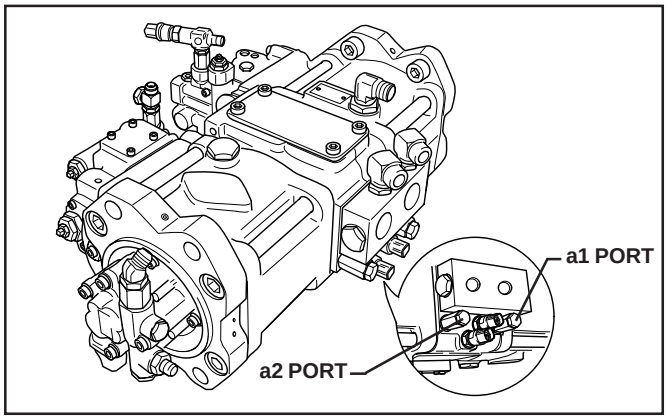


FIGURE 8.3

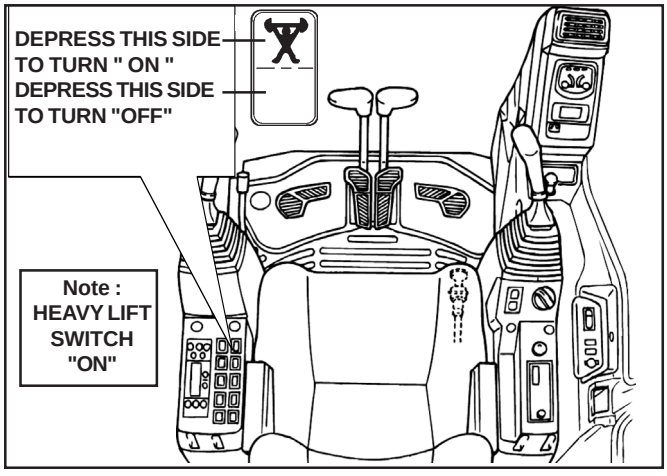


FIGURE 8.4

https://truckmanualshub.com/

ADJUSTMENT 2nd STAGE MAIN RELIEF WITH "HEAVY LIFT SWITCH ON"

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

6. ADJUSTMENT 2nd STAGE MAIN RELIEF WITH "HEAVY LIFT SWITCH ON"

A. Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in “M” mode. See Figure 9.1.
   b. Heavy lift switch on. See Figure 9.2
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. Maintenance connector is in the release position.
   f. High Idle RPM is proper per machine being tested.

B. 2nd Stage Main Relief Valve Adjustment

1. Locate Main Relief Valve (MR1) on the main control valve. See Figure 9.3.
2. Loosen second stage locknut with 32mm wrench See Figure 9.4.
3. With engine at full RPM, raise boom up and over relief. Adjust heavy lift, power boost screw with 19mm wrench, until proper pressure is achieved at pump P1 a1 test port, and pump P2 a2 test port with 700kg/cm² (10,000 psi) pressure gauges.
4. After correct pressure is obtained tighten adjusting screw locknut to 2.8 ~3.2 kgfm² (20~30 ft.lb). Verify pressure after tightening locknut.

NOTE

Turning Heavy lift Power Boost Adjusting Screw Clockwise One turn
Increases Pressure Approximately
108 kgf/cm² 180 (2560 psi)

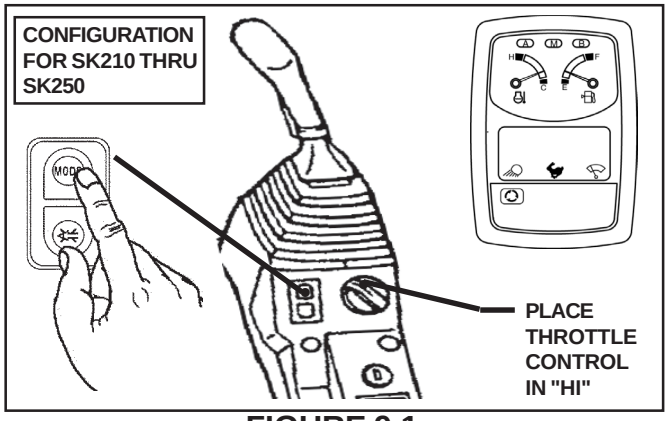


FIGURE 9.1

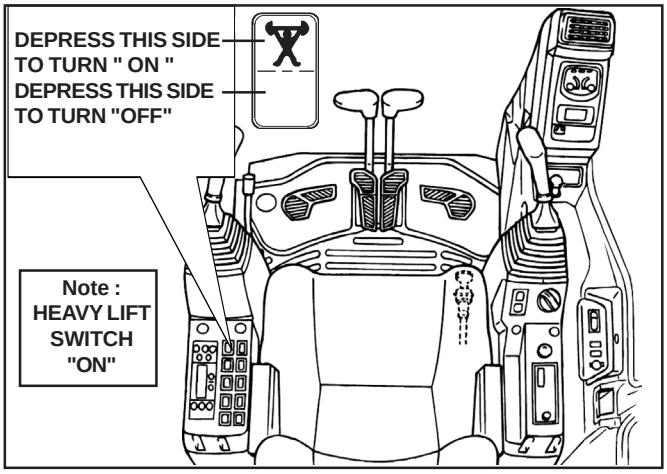


FIGURE 9.2

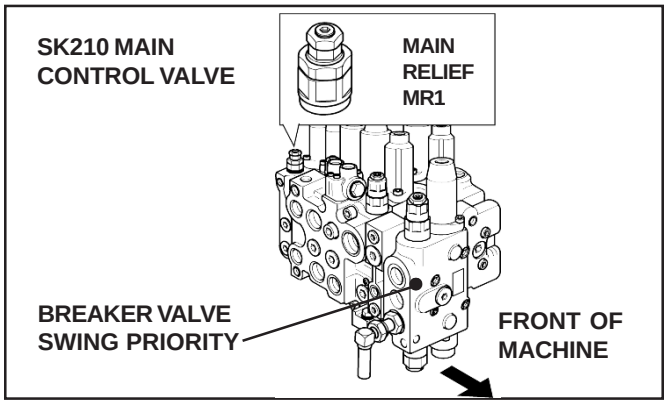


FIGURE 9.3

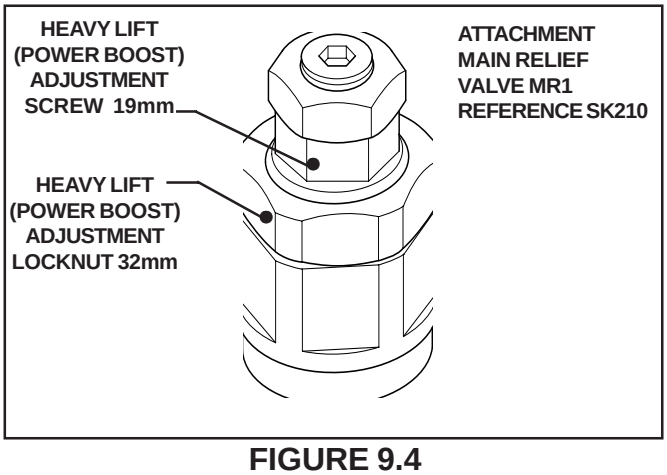


FIGURE 9.4

https://truckmanualshub.com/

ADJUSTMENT MAIN RELIEF WITH "HEAVY LIFT SWITCH OFF"

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

7. ADJUSTMENT MAIN RELIEF WITH "HEAVY LIFT SWITCH OFF"

A. Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in “M” mode. See Figure 10.1.
   b. Heavy lift switch off. See Figure 10.2.
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. Maintenance connector is in the release position.
   f. High Idle RPM is proper per machine being tested.

B. Main Relief Valve Adjustment

1. Locate Main Relief Valve (MR1) on the main control valve. See Figure 10.3.
2. Loosen locknut with 22mm wrench See Figure 10.4.
3. With engine at full RPM, raise boom up and over relief. Adjust screw with 6mm allen wrench, until proper pressure is achieved at pump P1 a1 test port, and pump P2 a2 test port with 700kg/cm² (10,000 psi) pressure gauges.
4. After correct pressure is obtained tighten adjusting screw locknut to ; 2.8 ~3.2 kgfm² (20~30 ft.lb). Verify pressure after tightening locknut.

NOTE

Turning Normal Adjusting Screw Clockwise One turn
Increases Pressure Approximately
108 kgf/cm² 180 (2560 psi)

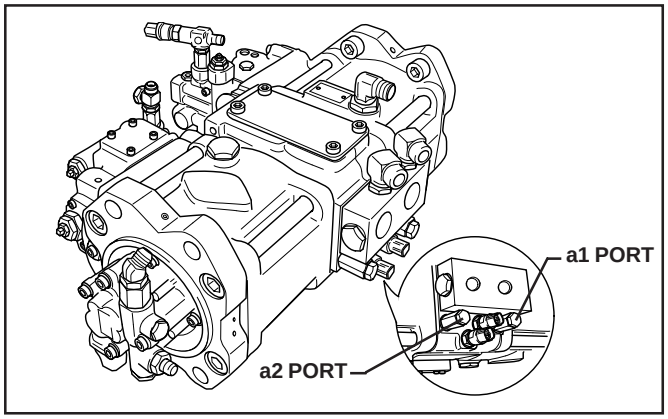


FIGURE 10.1

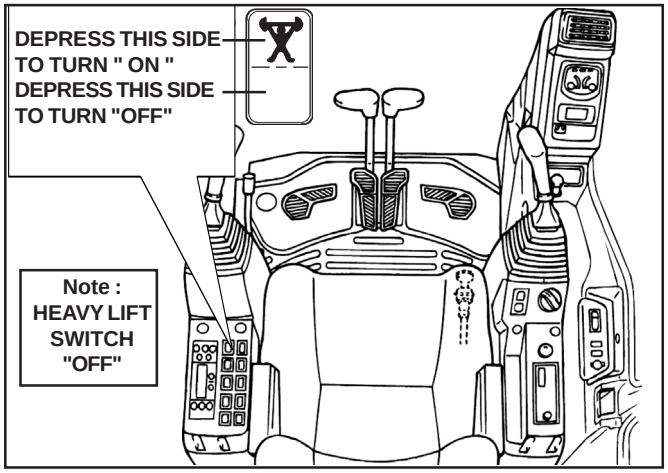


FIGURE 10.2

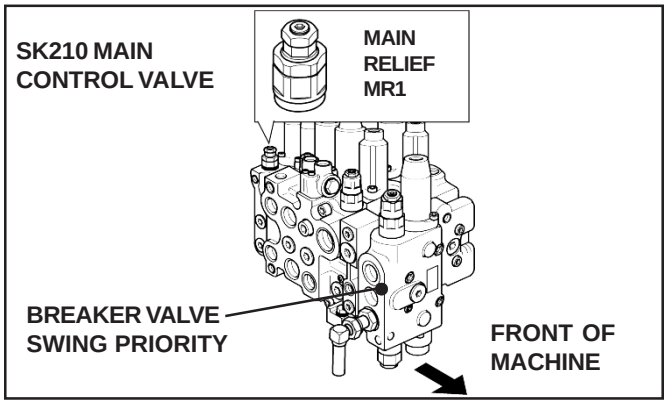


FIGURE 10.3

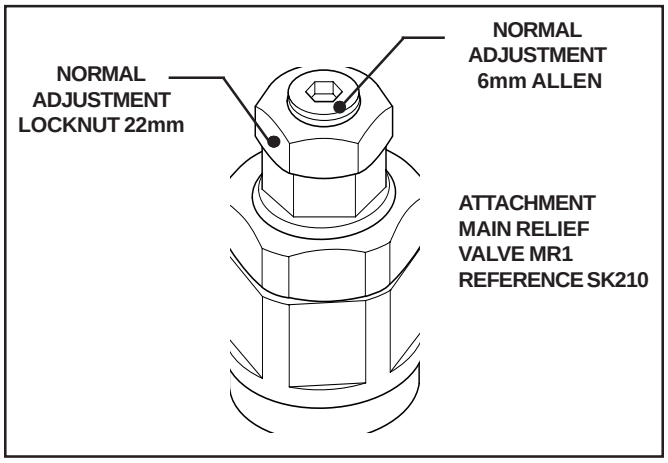


FIGURE10.4

https://truckmanualshub.com/

8. SWING CIRCUIT

NOTE

The following procedures are provided for reference only. Attachment Port Relief Valves are factory preset and should not be field adjusted.

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 11.1.
3. Release hydraulic tank pressure by depressing relief valve stem item ① on the pressure relief valve.
4. Open Main Pump Access Door and remove the PF1/4 test Port Plug (a7) from Output Port on Pilot System Gear Pump and install 105kg/cm² (1,000 psi) Pressure Gauge. See Figure 11.2.

B. Swing Over Load Relief Valve Pressure Measurement

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.
2. Move throttle control to "HI-IDLE," place KPSS Mode Switch in "M" Mode.
3. Operate boom down control until bucket teeth penetrate soil approximately 305mm (12"). See Figure 11.3.
4. Operate swing control to the left and hold, stalling swing. Record reading from 700kg/cm² (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump. See Figure 11.2.
   Or compare reading in Diagnostic Check No.14. See Figure 11.4.
5. Operate swing control to the right and hold, stalling swing. Record reading from 700kg/cm² (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump.
   Or compare reading in Diagnostic Check No.14. See Figure 11.4.

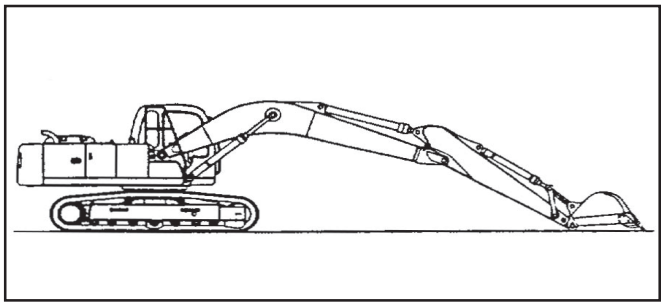


FIGURE 11.1

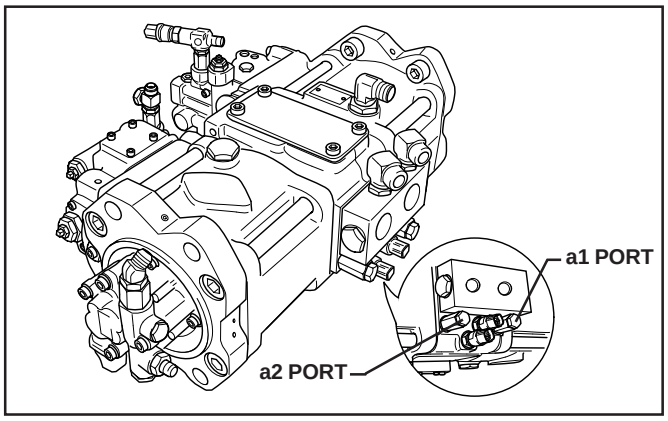


FIGURE 11.2

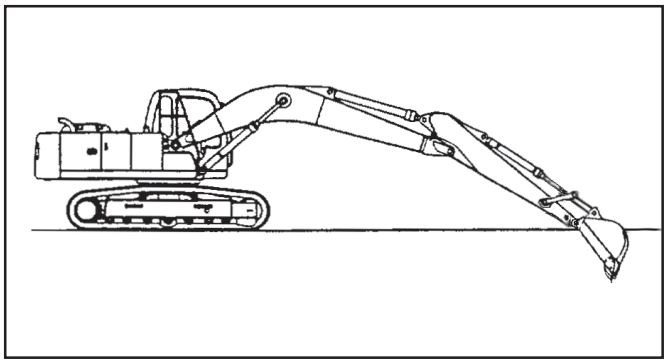


FIGURE 11.3

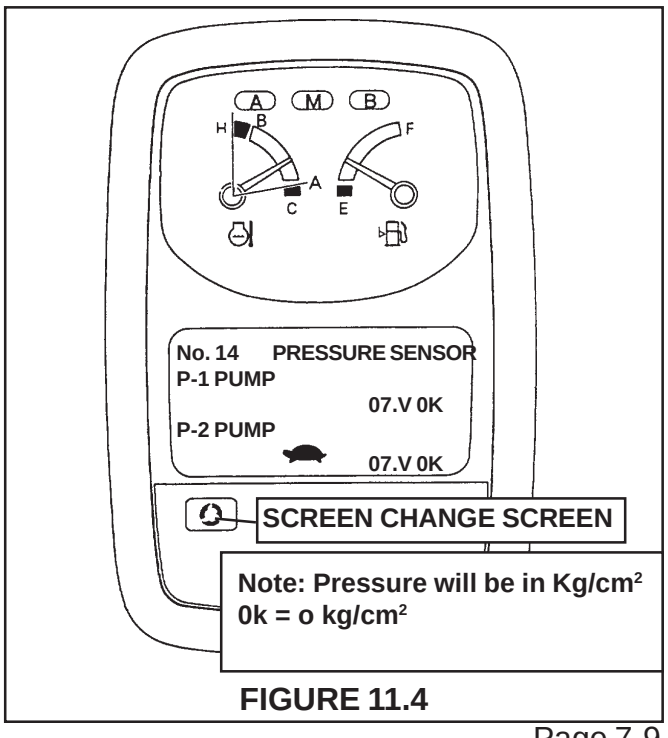


FIGURE 11.4

https://truckmanualshub.com/

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S ATTACHMENT PORT RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE ATTACHMENT PORT RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY ATTACHMENT PORT RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

C. Swing Over Load Relief Valve Pressure Adjustment

Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in “M” mode
   b. Heavy lift switch off.
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. Maintenance connector is in the release position.
   f. High Idle RPM is proper per machine being tested.
   g. Bucket teeth penetrate soil approximately 305mm (12"). Figure 12.1.
2. Locate Swing Left overload relief OR5, loosen 24mm locknut.See Figure12.2
3. Operate swing control to the left and hold, stalling swing. Adjust pressure to specific machine using 700kg/cm^2 (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump. See Figure 12.3
4. After correct pressure is obtained tighten adjusting screw locknut to ; 2.8 ~3.2 kgfm^2 (20~30 ft.lb). Verify pressure after tightening locknut.
5. Locate Swing Right overload relief OR6, loosen 24mm locknut. Operate swing control to the right and hold, stalling swing. Adjust pressure to specific machine using 700kg/cm^2 (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump.
6. After correct pressure is obtained tighten adjusting screw locknut to ; 2.8 ~3.2 kgfm^2 (20~30 ft.lb). Verify pressure after tightening locknut.

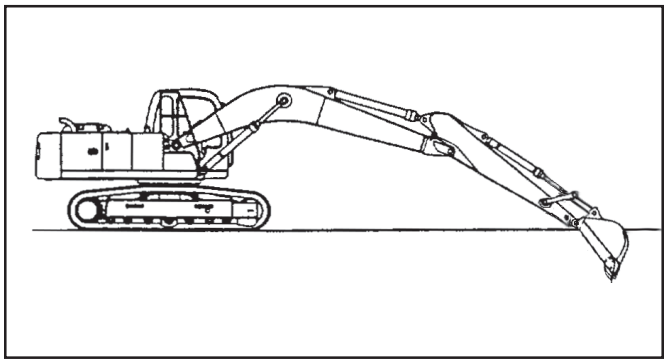


FIGURE 12.1

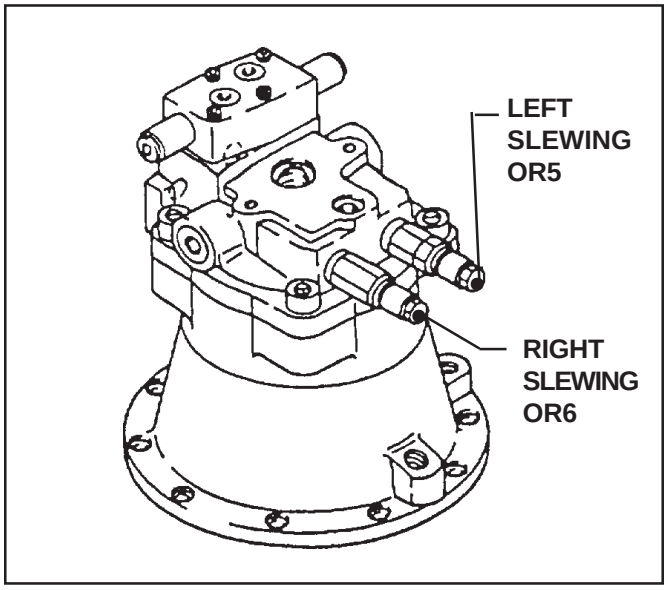


FIGURE 12.2

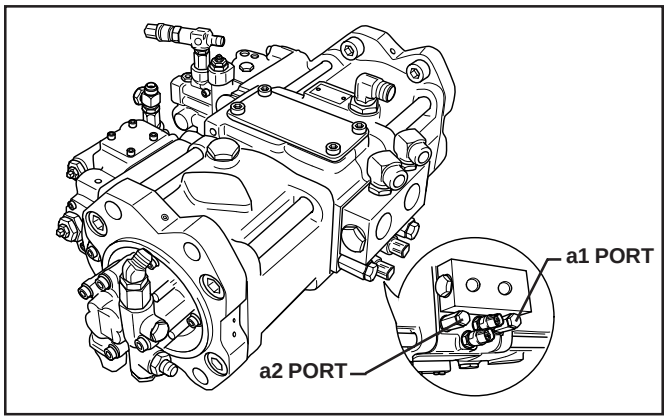


FIGURE 12.3

NOTE

Turning Normal Adjusting Screw Clockwise One turn
Increases Pressure Approximately
108 kgf/cm^2 21 (300 psi)

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

WARNING

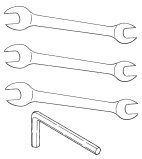
• PRECISE ADJUSTMENT OF THE MACHINE'S OVER LOAD RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE OVER LOAD RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

9. OVER LOAD RELIEF VALVES

A. Machine Preparation Procedures

a. Machine in the oil check position. See Figure 13.1
a. KPSS is in “A” mode.
b. Heavy lift switch on.See Figure13.2
c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
e. Maintenance connector is in the release position.
f. Low Idle RPM is proper per machine being tested.

B. Tools & Equipment Required for Checking and Adjusting of Over load Relief Valves

1. Two 700kg/cm^2 (10,000psi) Gauges.
2. 
   32 mm spaner wrench
   22 mm spaner wrench
   19 mm spaner wrench
   6 mm allen wrench

C. Over Load Releif Pressure Measurement

1. Move throttle control to "LO-IDLE," place KPSS Mode Switch in "A" - Mode.
2. Place "HEAVY LIFT" Switch in "ON" position. See Figure 13.2.
3. Locate MR1 on Main Control Valve and adjust main relief valve 14kg/cm^2 (200 psi) above port relief value pressure. See Figure 13.3.
4. Record reading from 700kg/cm^2 (10,000psi) Pressure Gauges at a1 or a2 test port on P1 or P2 main hydraulic pump. see Figure 13.4.
5. Compare readings to chart for specific model being tested.

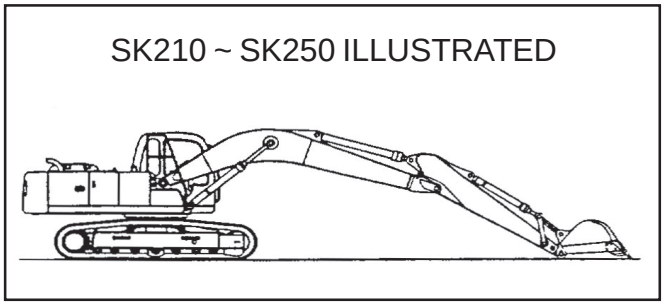


FIGURE 13.1

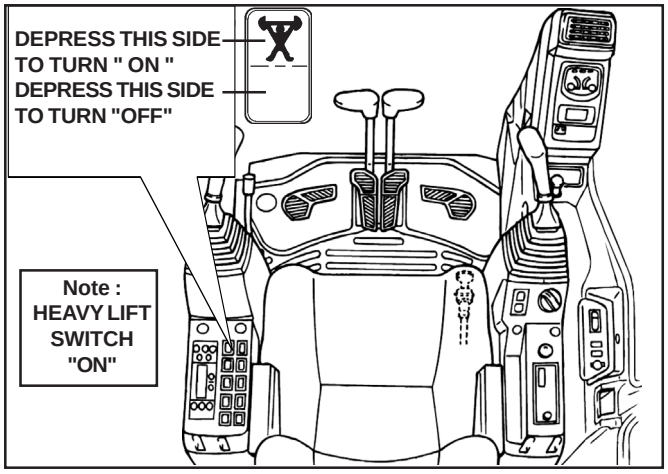


FIGURE 13.2

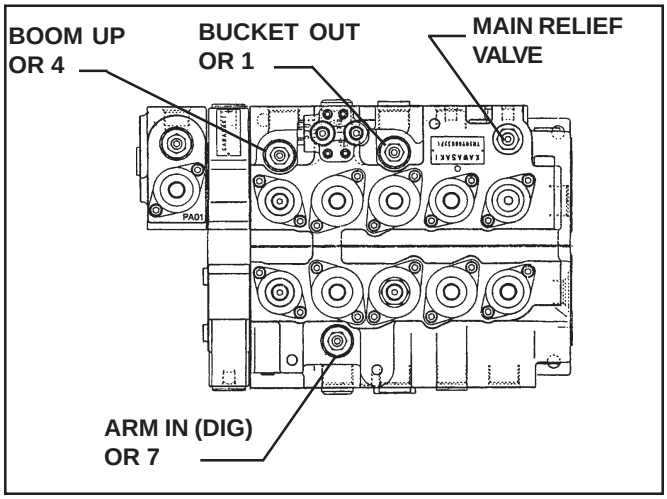


FIGURE 13.3

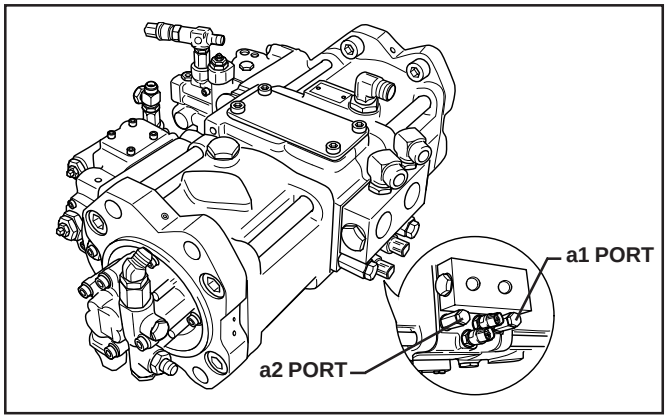


FIGURE 13.4

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

D. OR3 Boom Up Over load Relief

1. Operate Boom Up Control until boom is completely up and hold.
2. Record reading from Pressure Gauge at a1 or a2 test port on P1 or P2 Main Pump. Compare reading to proper chart for specific machin being tested.
3. Locate OR3 on Main Control Valve, loosen locknut and adjust OR3 to test bench pressure. See Figure 14.27.
4. Secure locknut TO 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

E. OR4 Boom Down over Load Relief

1. Operate Boom Down Control until boom is completely down and hold.
2. Record reading from Pressure Gauge at a test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR4 on Main Control Valve, loosen locknut and adjust OR4 to test bench pressure. See Figure 14.27.
4. Secure locknut, 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

F. OR1 Bucket In (DIG) Over Load Relief

1. Operate bucket in control until bucket is completely in, then hold.
2. Record reading from Pressure Gauge at a1 test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR1 on Main Control Valve, loosen locknut and adjust OR1 to test bench pressure. See Figure 14.27.
4. Secure locknut, 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

NOTE

Turning Over Load Adjusting Screw
Clockwise One turn
Increases Pressure Approximately
108 kgf/cm^2 180 (2560 psi)

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S OVER LOAD RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE OVER LOAD RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

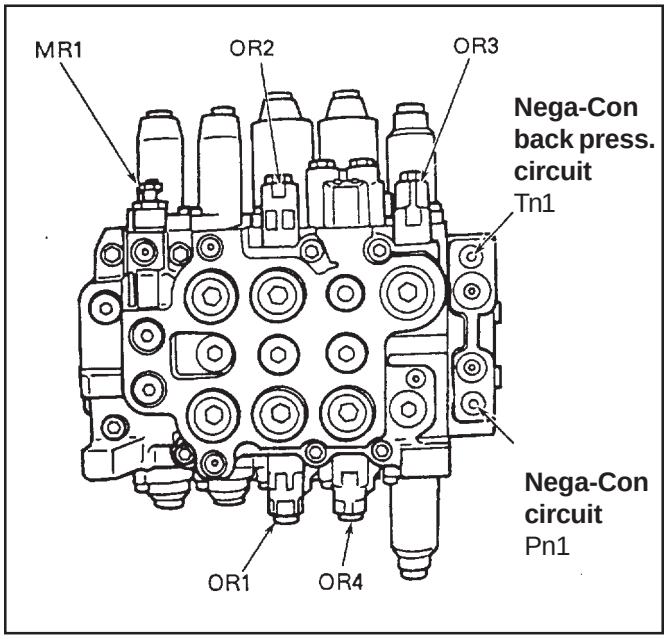


Figure 14.27 *

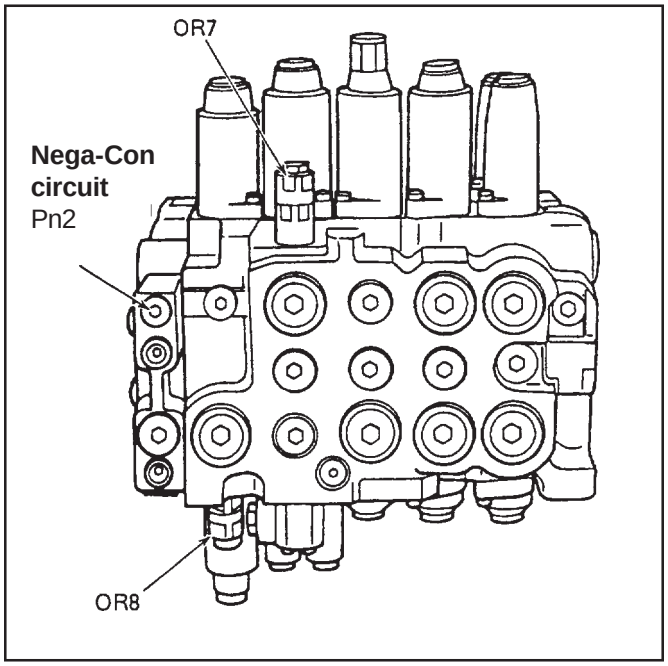


Figure 14.28 *

* Note: Swing Priority not shown

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S OVER LOAD RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE OVER LOAD RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

G. OR2 Bucket Out Over Load Relief

1. Operate Bucket Out Control until bucket is completely out and hold.
2. Record reading from Pressure Gauge at a1 test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR2 on Main Control Valve, loosen locknut and adjust OR1 to test bench pressure. See Figure 15.27.
4. Secure locknut 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

H. OR7 Arm In (DIG) Over Load Relief

1. Operate arm in control until arm is com pletely in and hold.
2. Record reading from Pressure Gauge at a2 test port on P2 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR7 on Main Control Valve, loosen locknut and adjust OR7 to test bench pressure. See Figure 15.28.
4. Secure locknut, 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

I. OR8 Arm Out Over Load Relief

1. Operate arm out control until arm is completely out, then hold.
2. Record reading from Pressure Gauge at a2 test port on P2 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR8 on Main Control Valve, loosen locknut and adjust OR8 to test bench pressure. See Figure 15.28.
4. Secure locknut, 2.8 ~3.2 kgfm^2 (20~30 ft.lb).
5. Adjust MR - 1 back to specified settings. Verify pressures and that machine operation is correct.

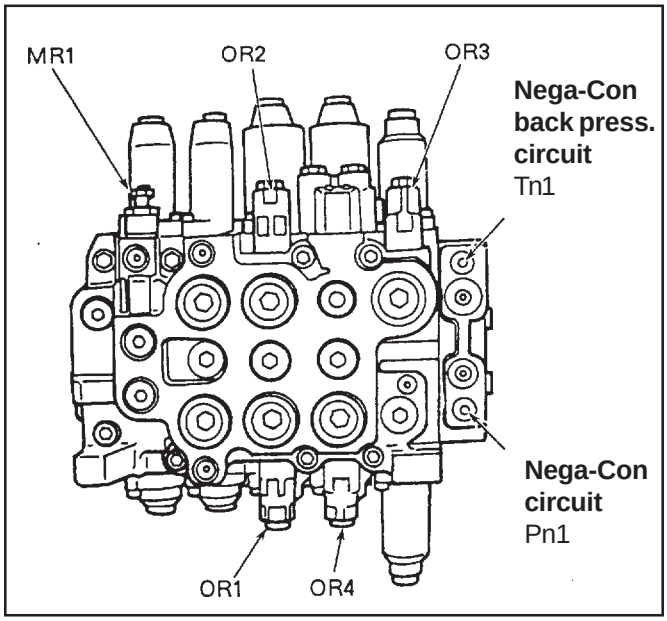


Figure 15.27 *

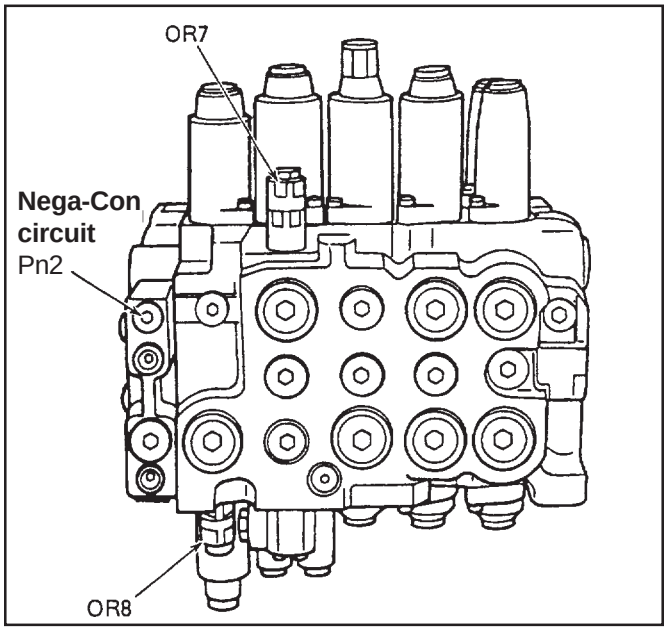


Figure 15.28 *

* Note: Swing Priority not shown

NOTE

Turning Over Load Adjusting Screw
Clockwise One turn
Increases Pressure Approximately
108 kgf/cm^2 180 (2560 psi)

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

WARNING

• MAKE CERTAIN SPECIAL TOOL IS SEATED AGAINST CRAWLER FRAME AND BETWEEN SPROCKET TEETH. NEVER ALLOW SPECIAL TOOL TO REST AGAINST CRAWLER FRAME CORNER RE-INFORCEMENTS. ENGAGE TRAVEL SLOWLY & CAREFULLY UNTIL TOOL IS POSITIONED COR-RECTLY

J. Travel Motor Port Reliefs

1. Perform MACHINE PREPARATION PROCEDURES before continuing to next step.
2. Move throttle control to "LO-IDLE," place KPSS Mode Switch in "M" - Mode. See Figure 16.22.
3. Install special tool pin size101mm (4.0in) into sprocket on each side of machine for stalling travel. See Figure 16.23.
4. Place travel speed select switch in 2nd (🐇) speed position. See Figure 16.24.
5. Place "HEAVY LIFT" Switch in "ON" position. See Figure 16.24.
6. Operate both travel controls together to full forward and hold. See Figure 16.25
7. Locate MR1 on Main Control Valve and adjust main relief valve 14kg/cm^2 (200 psi) above travel motor port relief value.
8. Record reading from 700kg/cm^2 (10,000psi) Pressure Gauges at a1 or a2 test port on P1 or P2 main hydraulic pump. Or compare reading in diagnostic check item #14.
9. Compare readings to chart for specific model being tested.

WARNING

• PRECISE ADJUSTMENT OF THE TRAVEL MOTOR *RELIEF VALVE IS NOT POSSIBLE.*
IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.

1. Travel motor port reliefs are set by the manufacture before shipment. When adjustment is required, loosen 19mm nut and adjust the pressure with 6mm adjusting screw to specification.

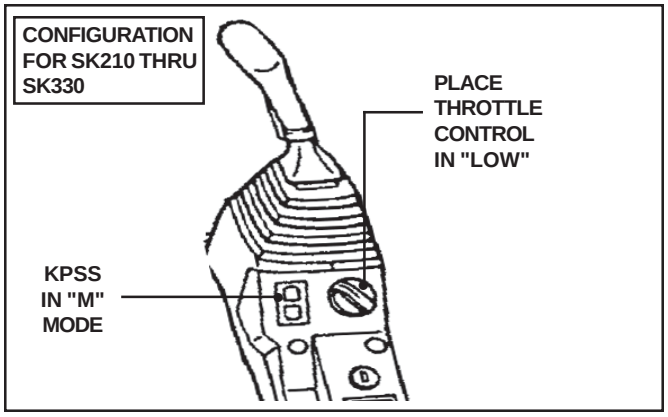


FIGURE 16.22

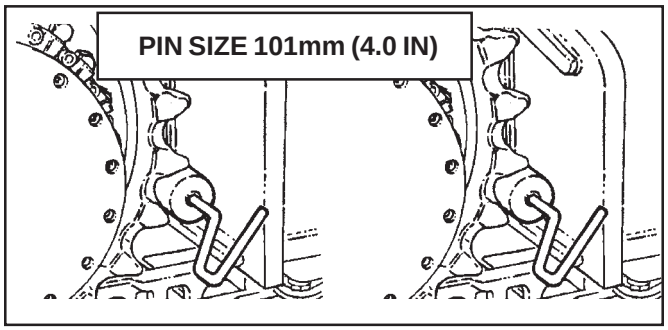


FIGURE 16.23

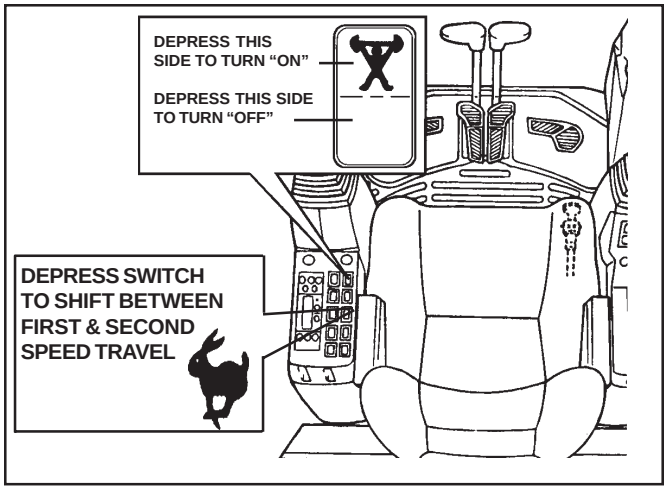


FIGURE16.24

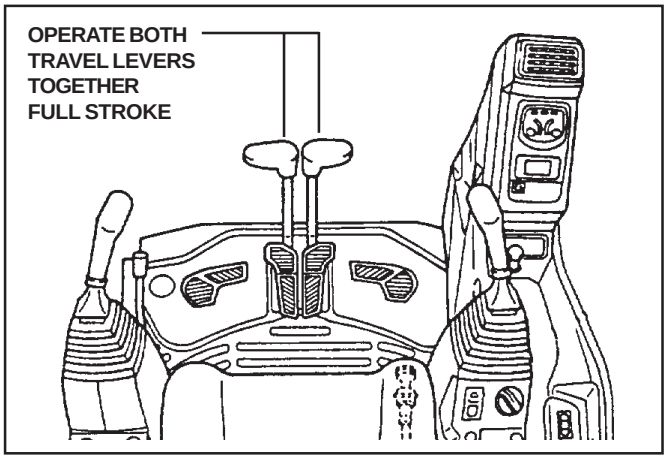
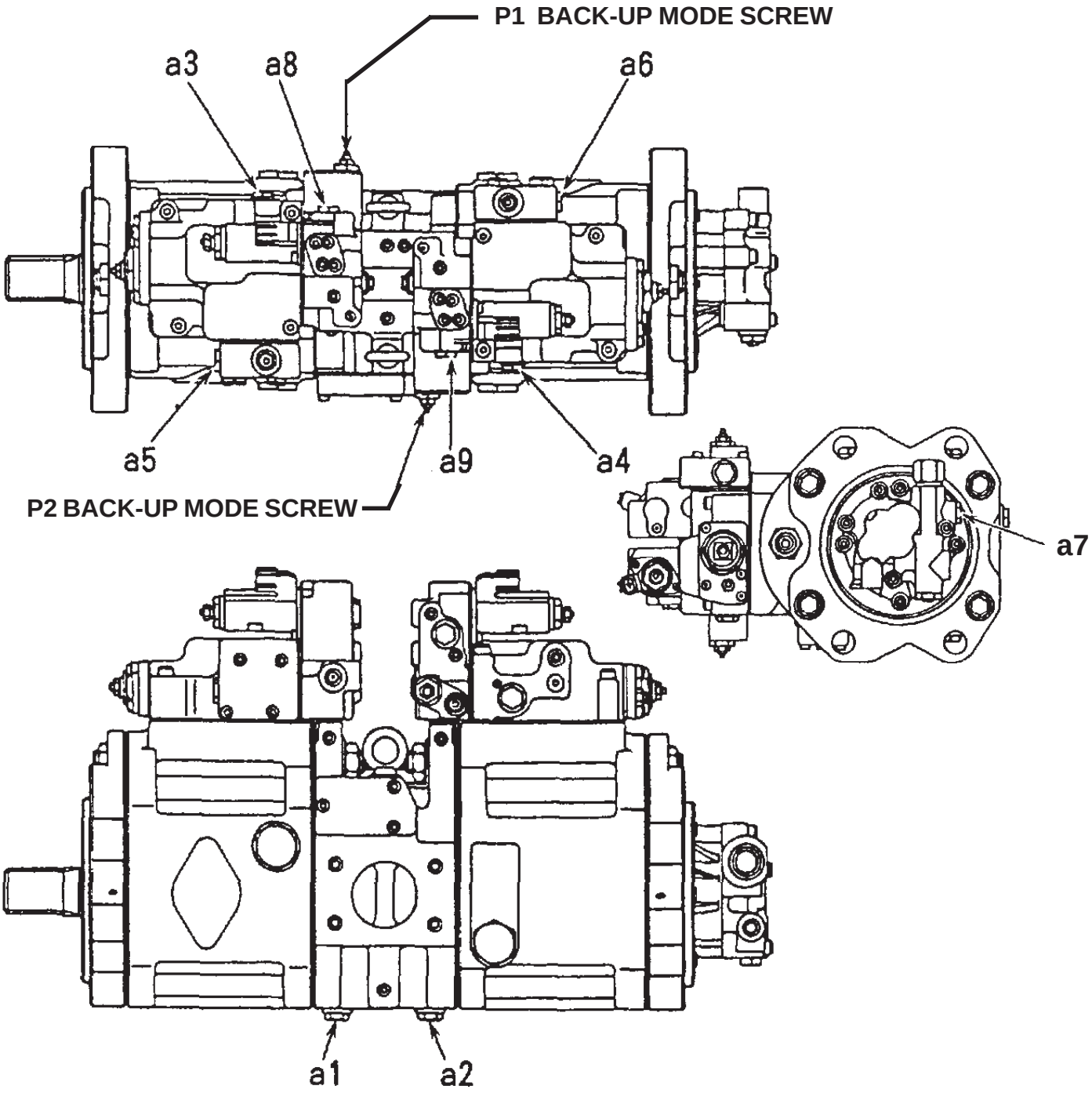


FIGURE 16.25

https://truckmanualshub.com/

10. MEASUREMENT OF ADDITIONAL CIRCUIT PRESSURE PORTS

1. High pressure sensor circuit
   Remove a5, a6 port plugs PF 1/4 of main pump and attach pressure gauge of 700 kgf/cm² (10,000 psi).
2. Pump proportional valve secondary pressure circuit Remove a8, a9 port plugs PF 1/4 of main pump and attach pressure gauge of 70 kgf/cm² (1000 psi).
3. Pilot piston circuit
   Remove a3, a4 port plugs PF 1/4 of main pump and attach pressure gauge of 70 kgf/cm² (1000 psi).
4. Negative control pressure
   When operating in backup mode.
   Remove a3, a4 port plugs PF 1/4 of main pump and attach pressure gauge of 70 kgf/cm² (1000 psi).



https://truckmanualshub.com/

Kobelco

Dynamic Acera



Kobelco Construction Machinery America LLC
Control Valve

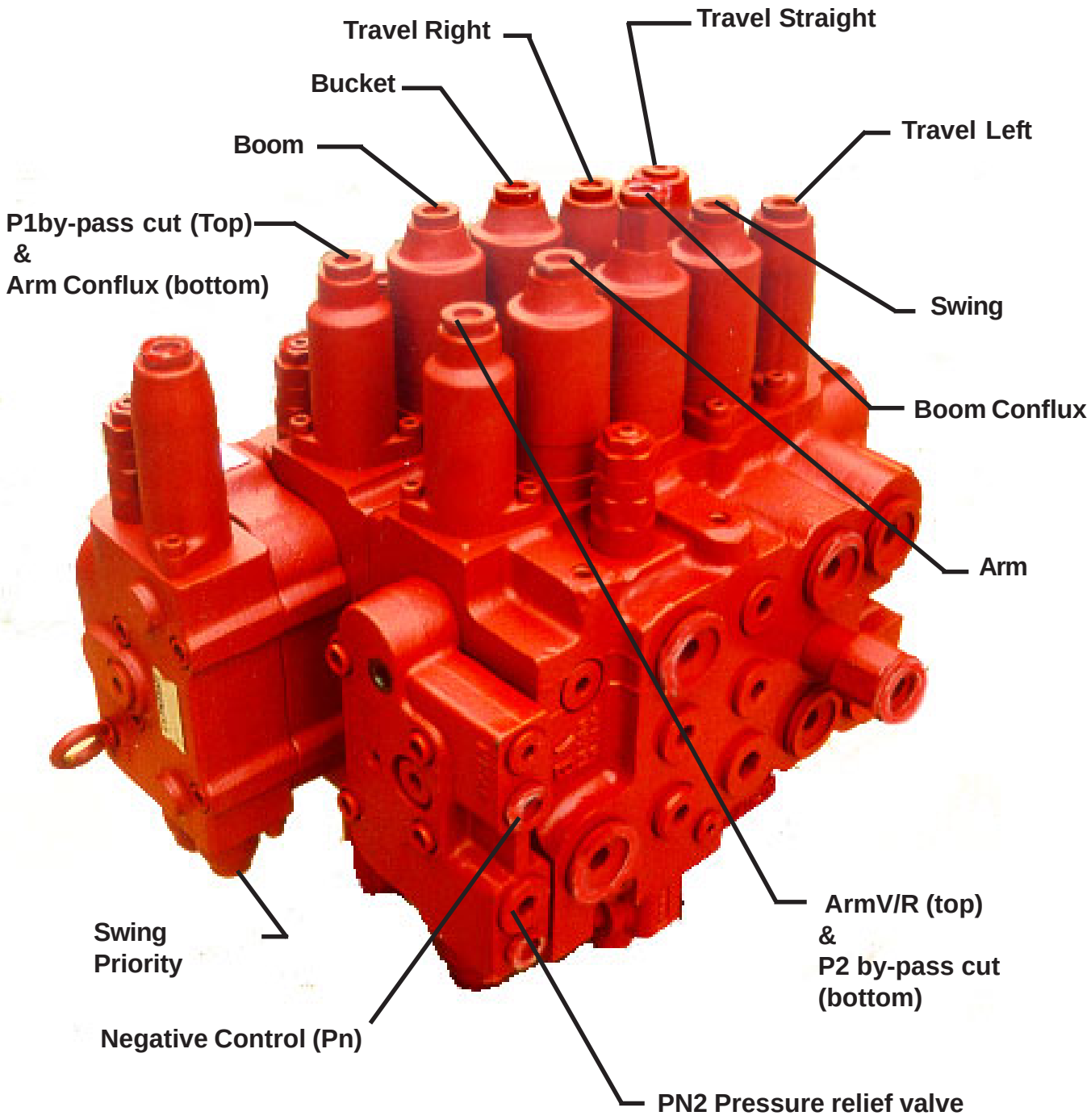
KOBELCO

Kobelco Construction
Machinery America LLC.

https://truckmanualshub.com/

7-2 Main control valve (SK210 • SK290)

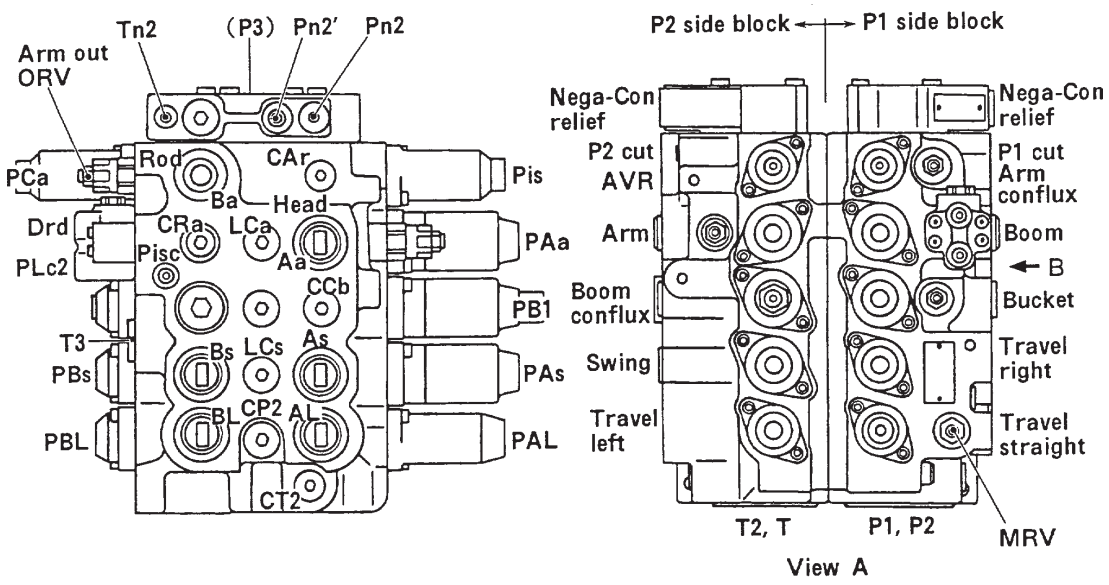
1. Appearance & specifications

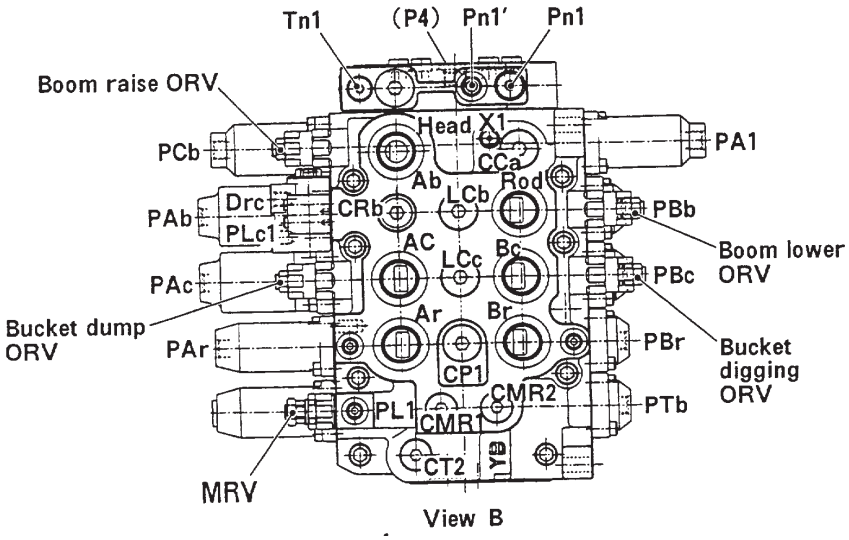


Note:

ORV ····· Over load relief valve
MRV ····· Main relief valve
AVR ····· Arm variable recirculation

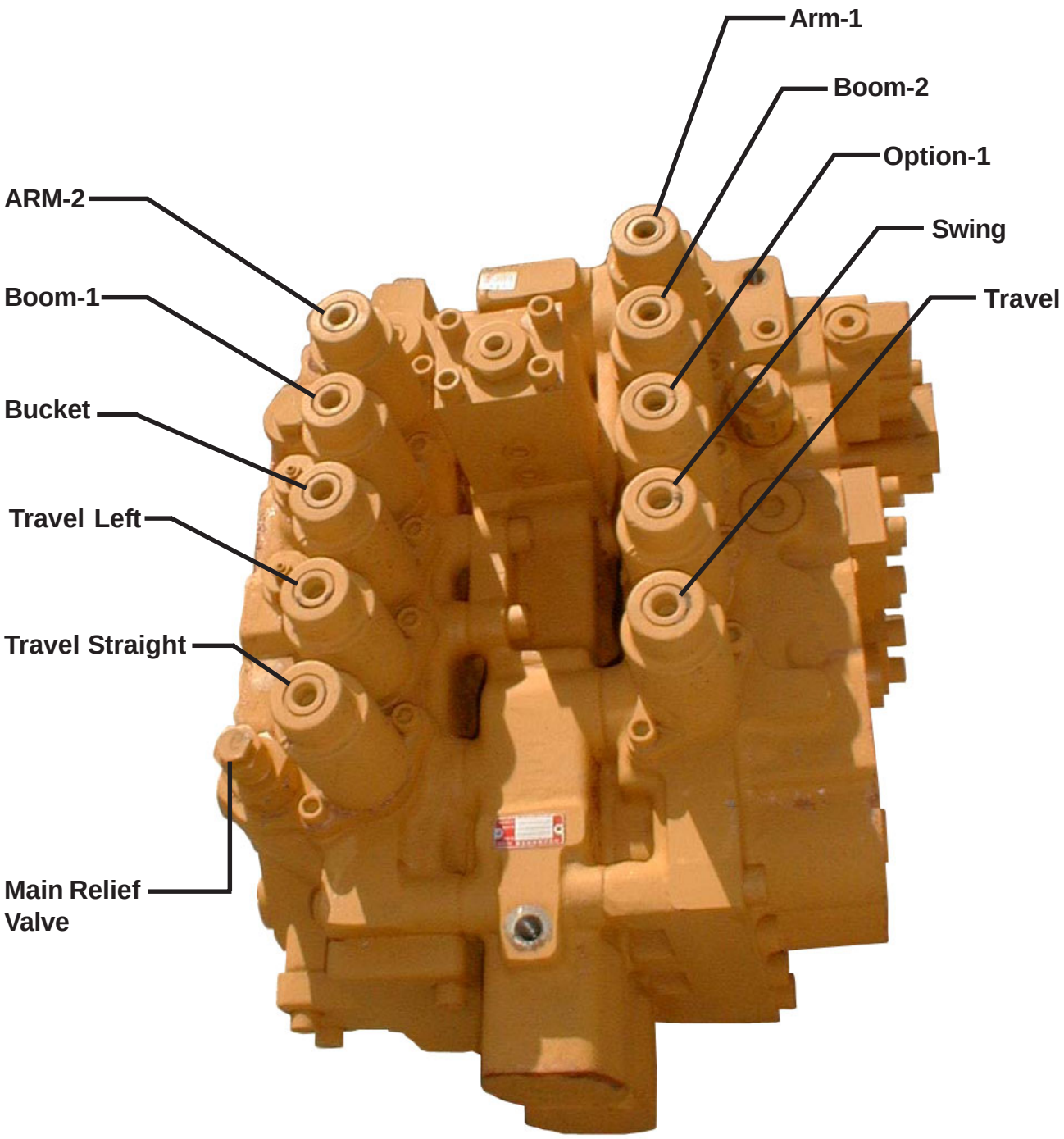
https://truckmanualshub.com/



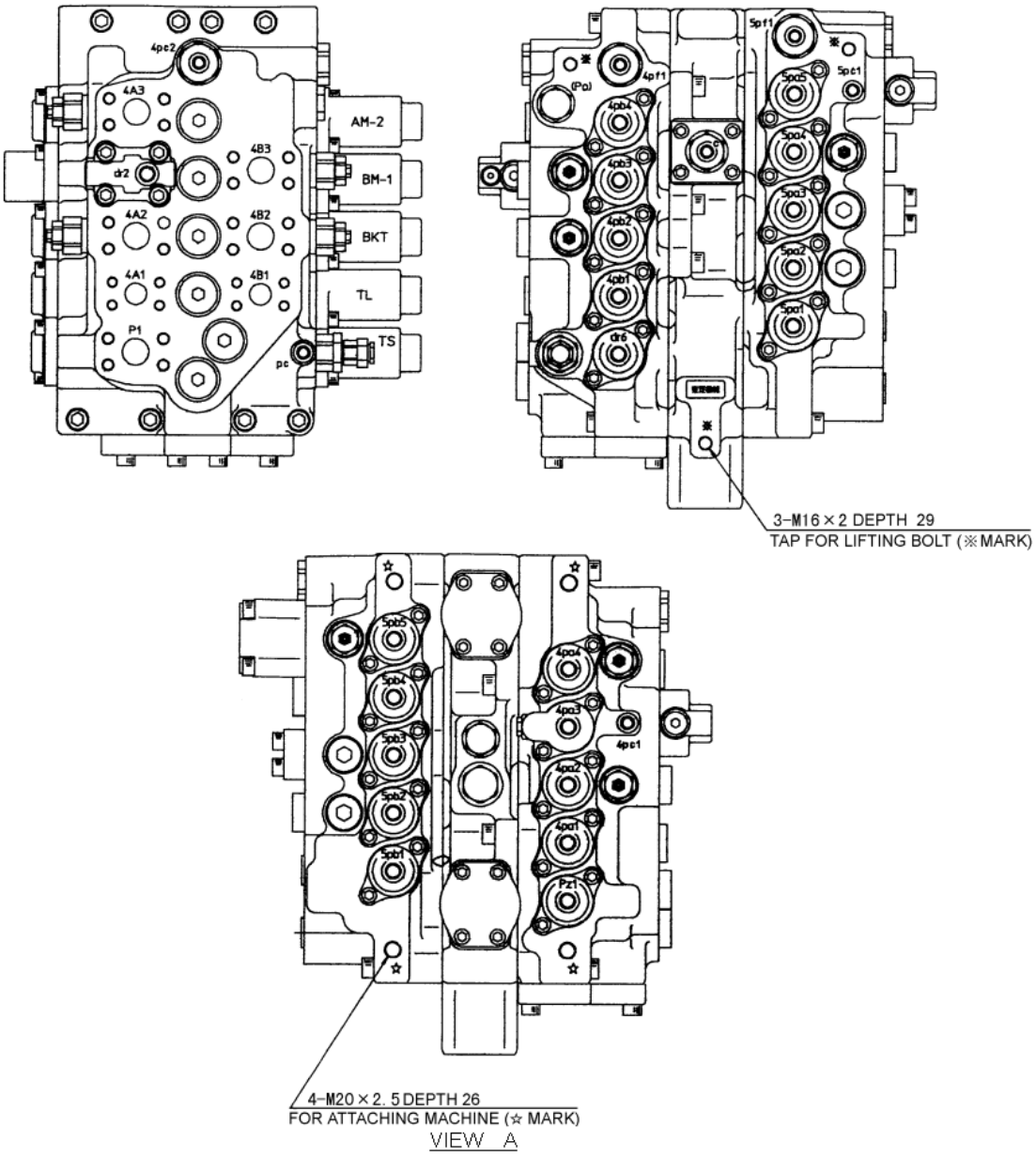


Item		Specifications
Model		KMX15YB
Max pressure	Mpa (psi)	37.7 (5467 psi)
Max flow rate	L/min (gpm)	SK210 210 x 2 (55 gpm)
		SK250 238 X2 (62 gpm)
		SK290 238 X 2 (62 gpm)
		SK330 235 X 2 (62 gpm)
Set pressure of Over load relief valve	Mpa (psi)	Boom H Bucket H Arm R:
		39.7 +/- 0.5 (5757 psi) at 30 l/min (7.9gpm)
		Other three placed :
		37.7 +/- 0.5 (5757 psi) at 40 L/min (10.5 gpm)
Set pressure of Neg-Con relief valve	Mpa (psi)	2.4 +/- 0.3 (348 psi) at 30 L/min (7.9 gpm)
		2.4 +/- 0.3 (348 psi) at 30 L/min (7.9 gpm)
Pilot Pressure (Max)	Mpa (psi)	2.4 +/- 0.3 (348 psi) at 30 L/min (7.9 gpm)
Spool Stroke	mm (in)	Cut Recirculation 8.5 (0.334 in) other 10.5 (0.413 in)

Main control valve (SK480)



Toshiba

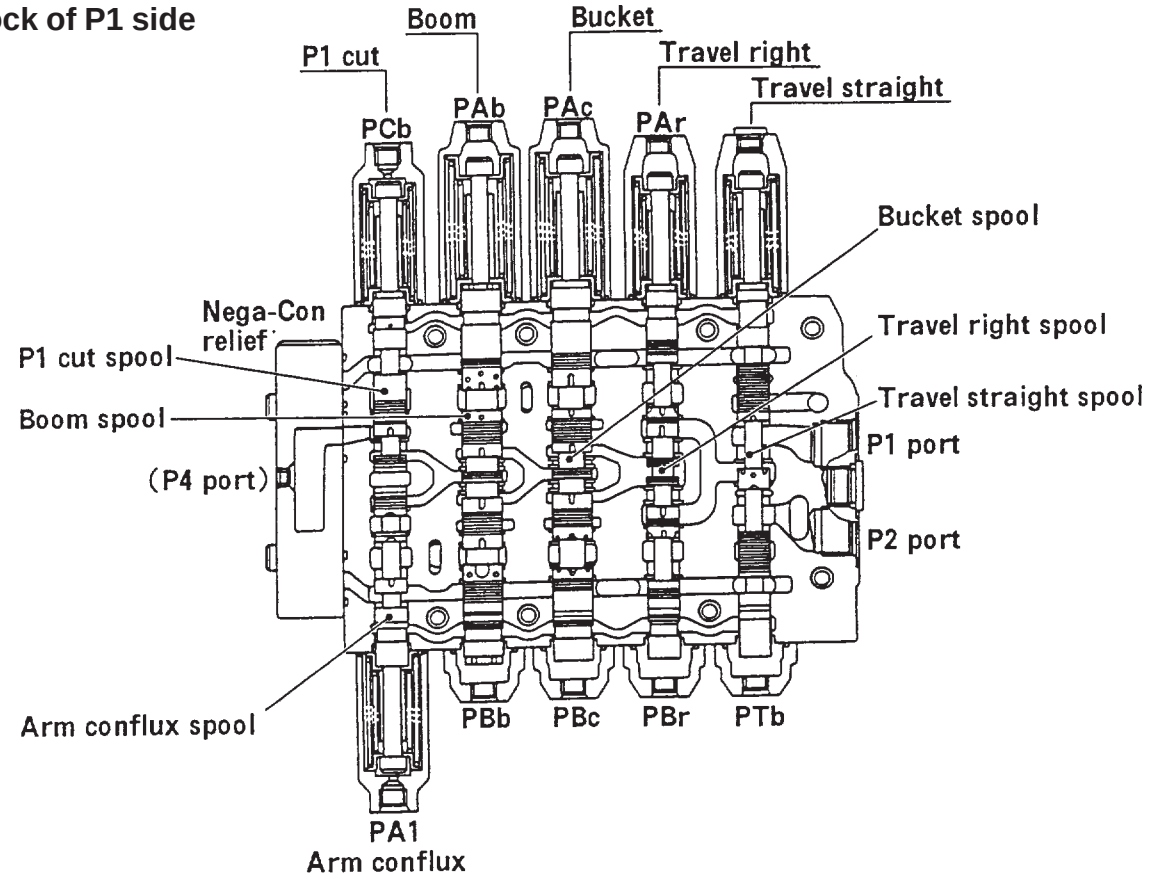


Item		Specifications
Part No.		LS30V00002F1
Model	Mpa (psi)	UY36-105
Rated flow	L/min (gpm)	370 X2 (98 X 2)
Main relief valve set pressure	Mpa (psi)	31.7 (4550 psi)
When power boost pressure		34.3 (4980 psi)
Over load relief valve set pressure	Mpa (psi)	
Boom H. Bucket H, Arm R		36.2 (5260 psi) at 30L/min (7.9 gal/min)
Boom R. Bucket R, Arm H		34.8 (5050 psi) at 30L/min (7.9 gal/min)
Swing		26.4 (3840 psi) at 30L/min (7.9 gal/min)
Foot relief valve set pressure	Mpa (psi)	3.2 (460 psi) 50L/min (13 gal/min)

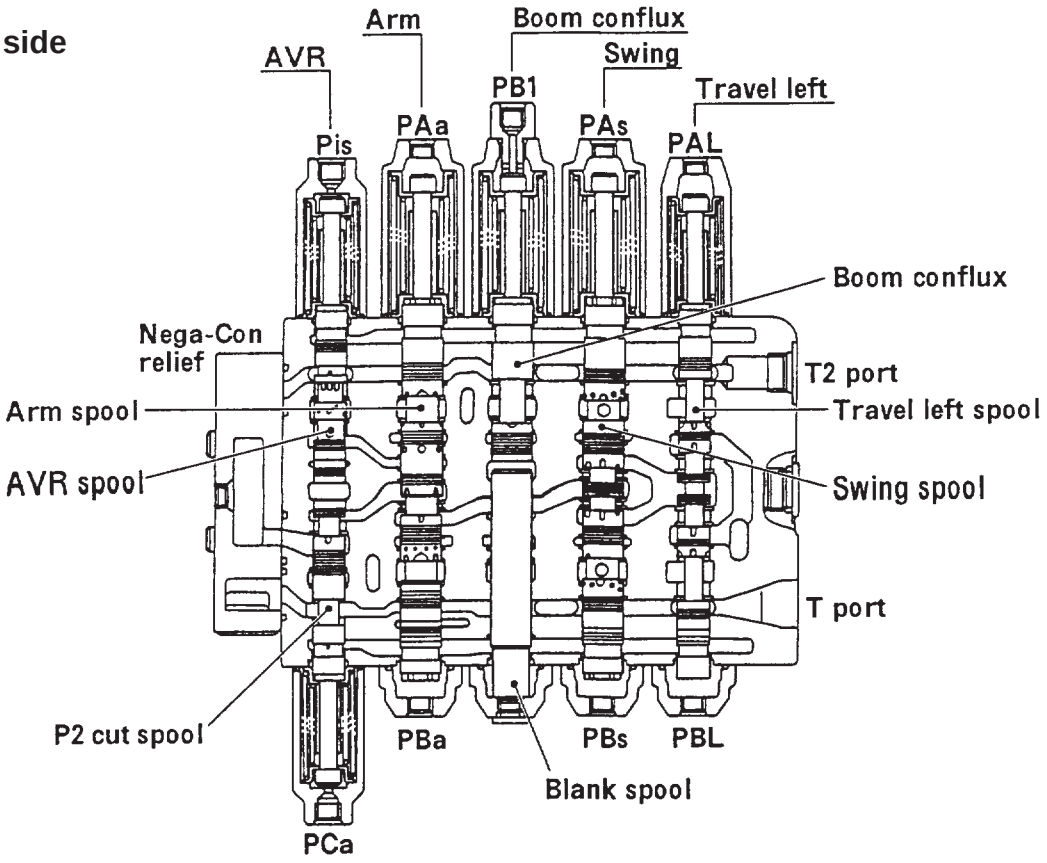
https://truckmanualshub.com/

2. Cross-sectional view

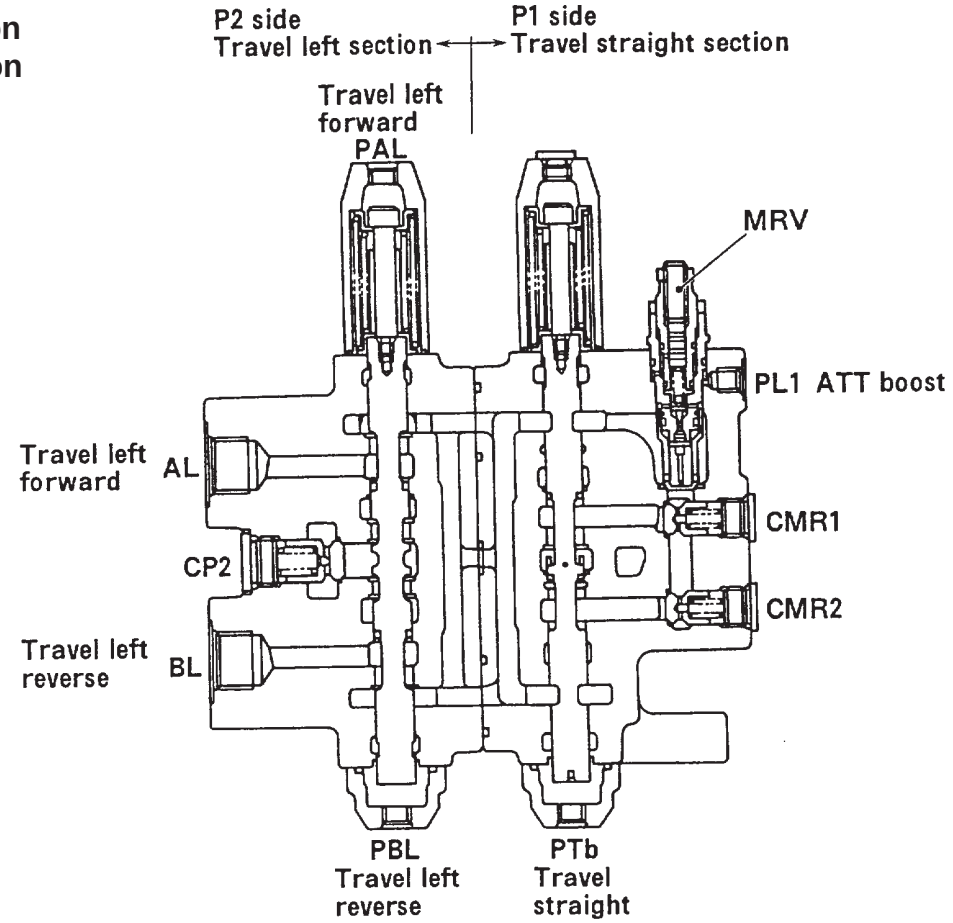
1. Block of P1 side



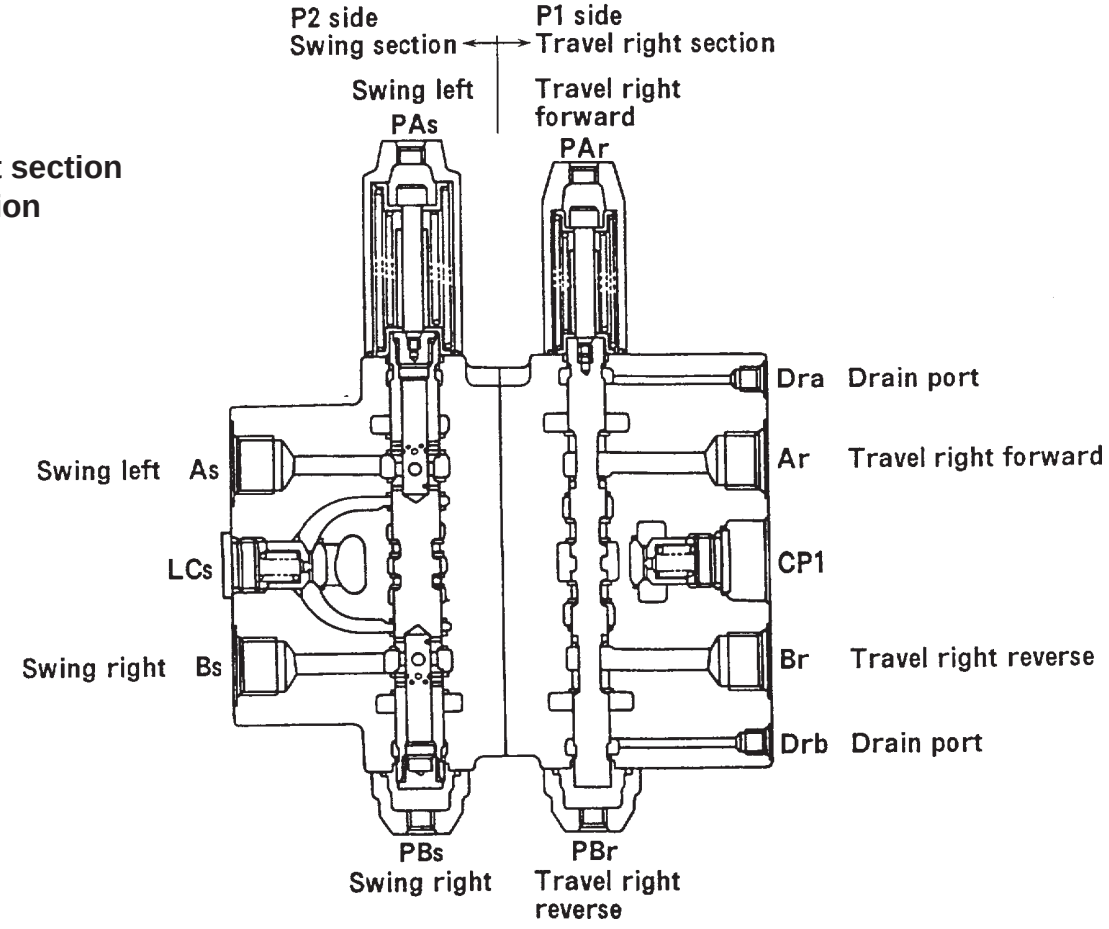
2. Block of P2 side



3. Travel straight section
Travel left section



4. Travel right section
Swing section



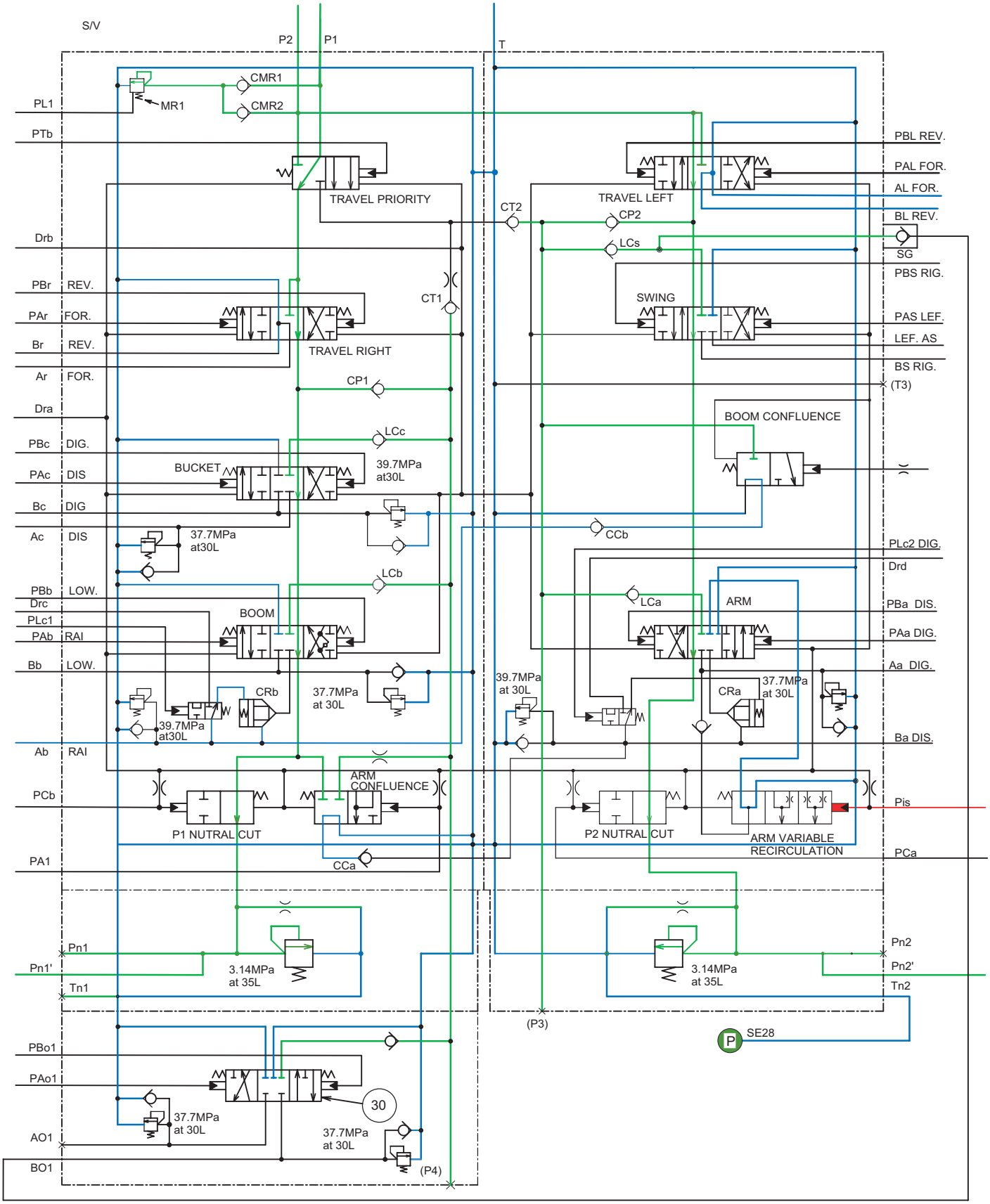
https://truckmanualshub.com/

Neutral

P1 pump delivers oil through P1 port of main control valve. Oil flows through travel priority, work spools for travel right, bucket, boom and P1 neutral cut spool. Pressurized oil from P1 Pump is regulated by the low pressure relief valve. Pn1 port delivers oil to Pn1 port at pump regulator keeping P1 pump at minimum flow.

P2 pump delivers oil to P2 port of main control valve. Oil flows to travel priority valve were the oil flow is stopped, and to travel left spool, work spools for swing, arm and through P2 neutral cut spool. P2 Pump is regulated by the low pressure relief valve. Pressurized oil from P2 Pump is regulated by the low pressure relief valve. Pn2 port delivers oil to Pn2 port at pump regulator keeping P2 pump at minimum flow.

https://truckmanualshub.com/



https://truckmanualshub.com/

Neutral

P1 pump delivers oil through P1 port of main control valve. Oil flows through travel straight, work spools for bucket and boom, neutral cut spool, to low pressure relief valve and Pn1 port keeping P1 pump at minimum flow.

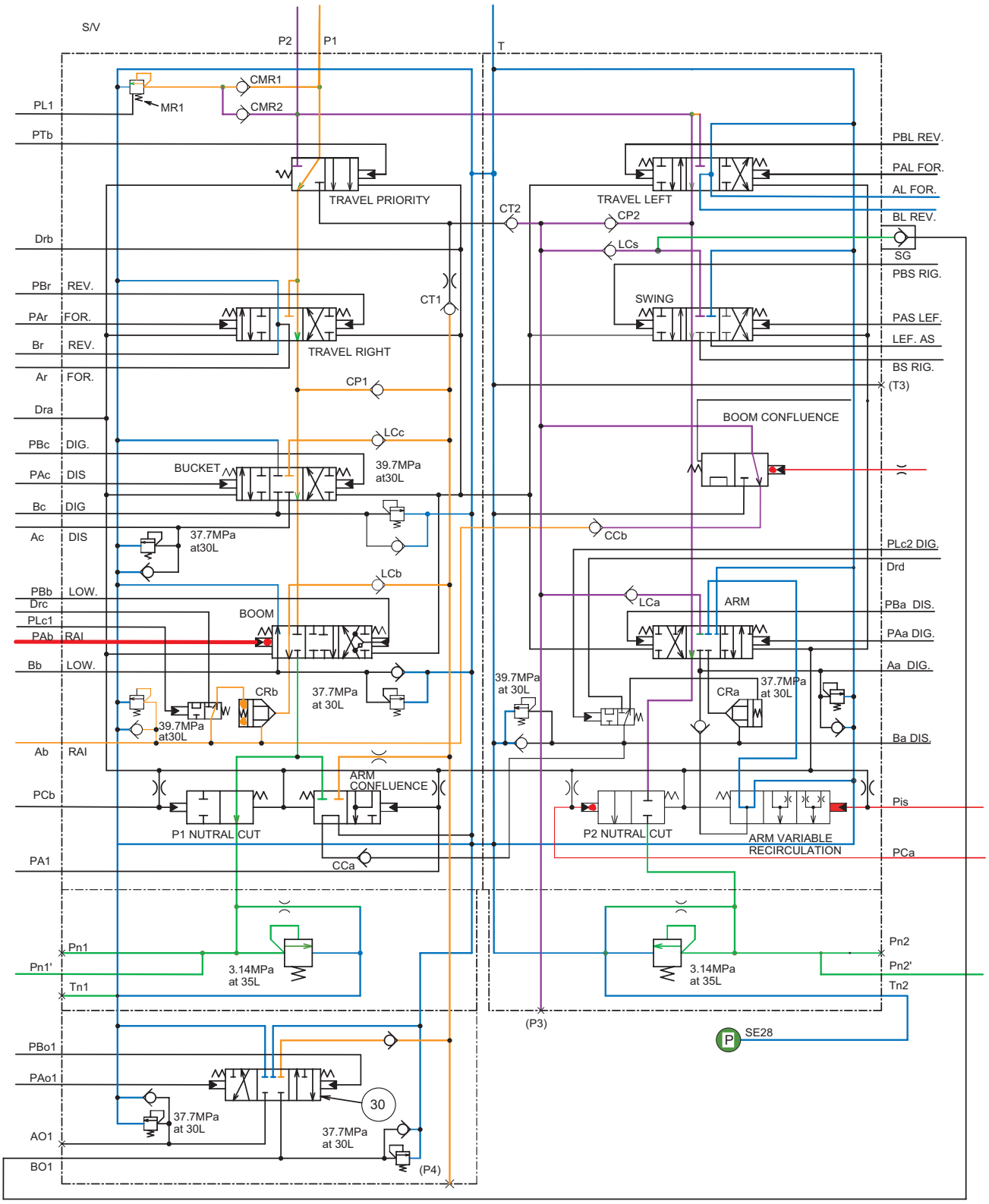
P2 pump delivers oil through P2 port of main control valve. Oil flows through work spools travel left, swing, arm and neutral cut to low pressure relief valve and Pn2 port keeping P2 pump at minimum flow.

Boom raise operation (Conflux circuit)

1. Secondary pilot oil from the operators joystick acts on boom spool, and the boom conflux spool.
   a. Secondary pilot oil from the operators joystick enters port PAb of the boom spool located on the top of the P1 section of the main control valve pushing the boom spool down.
   b. Secondary pilot oil from the operators joystick enters port PB1 of the boom conflux spool located on the P2 section of main control valve and moves the boom conflux spool (7) down.
2. The CPU outputs a command current (milliampere) to P2 neutral cut proportional solenoid valve (PSV-B) located on the solenoid proportional valve block. The amount of current is determined from information given to the CPU from low pressure sensor (SE3).
   a. The PSV-B secondary pilot oil acts on the neutral cut spool port PCa located on the bottom of the P2 section of the main control valve block. Pilot oil acts upon the P2 neutral cut spool and moves P2 cut spool closed.
3. With boom spool (8) shifted, P1 oil flow is diverted from work spools, neutral cut spool, low pressure relief and Pn1 port. ***P1 pump is now considered on line.***
   a. Oil flow from P1 pump opens load check valve (21) CP1, downstream of travel right spool.
   b. P1 pump, flows into parallel circuit (P4) and closes CT1 check valve.
4. P1 pump oil reaches boom spool (8) through LCb load check valve (21).
5. The pressure oil from P1 pump passes through and around boom spool (8), out port Ab of main control valve to boom cylinder piston side.
6. With the boom confluence valve shifted a one way check valve allows oil from P2 section of the control valve to join with the oil from the P1 Section of the control valve through CCb load check. ***Pump 2 is not on.***
   a. With P2 Neutral cut spool closed by the PSV-B solenoid valve oil is removed from low pressure relief and Pn2 port. ***P2 pump is now considered on line.***
   b. Oil flow from P2 pump opens Cp2 load check valve located below travel left spool, and flow from P2 pump is directed to parallel port P3.
   c. Oil flow from P2 pump is now availabel for work spools swing, arm and boom confluence spool.
   d. Secondary pilot oil from operators joystick has shifted boom confluence spool allowing oil from main control valve P2 to join with control valve P1at one way check valve CCb.

https://truckmanualshub.com/

CONTROL VALVE BOOM CIRCUIT UP



https://truckmanualshub.com/

Neutral

P1 pump delivers oil through P1 port of main control valve. Oil flows through travel straight, work spools for bucket and boom, neutral cut spool, to low pressure relief valve and Pn1 port keeping P1 pump at minimum flow.

P2 pump delivers oil through P2 port of main control valve. Oil flows through work spools travel left, swing, arm and neutral cut to low pressure relief valve and Pn2 port keeping P2 pump at minimum flow.

Boom lower operation (Recirculation circuit)

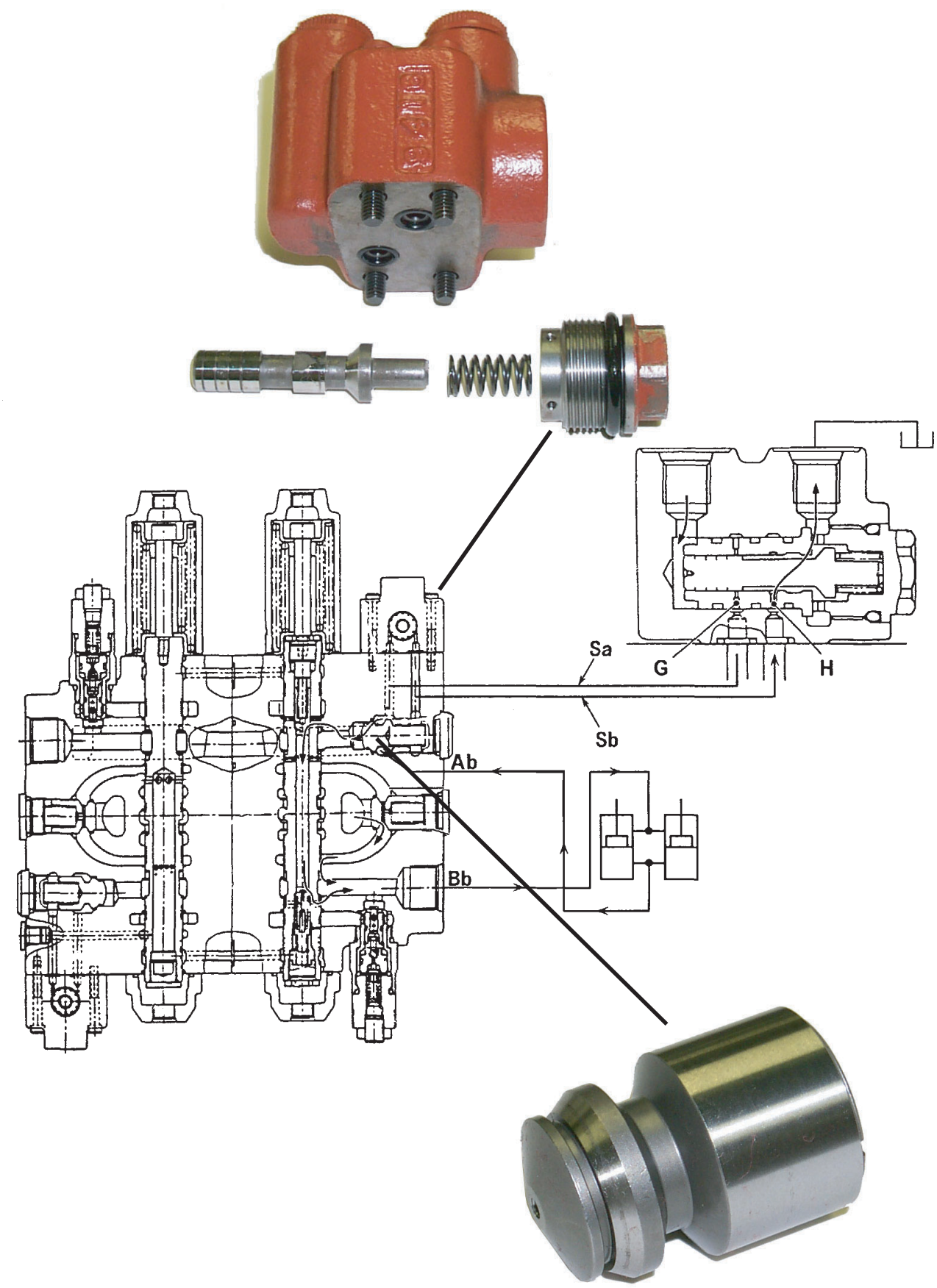
1. Secondary pilot oil from operators joystick acts on the boom spool (8) moving spool up.
   a. Port PBb is located on the bottom of main control valve P1 section.
   b. Secondary pilot oil from joystick enters boom spool port PBb, and boom lock port PLc1 of the boom lock selector valve (19). The boom lock selector valve spool (23) is moved to the right, releasing the boom lock poppet (17).
2. With boom spool (8) shifted, P1 oil flow is diverted from work spools, neutral cut spool, low pressure relief and Pn1 port. ***P1 pump is now considered on line.***
   a. Oil flow from P1 pump opens load check valve (21) CP1, downstream of travel right spool.
   b. P1 pump, flows into parallel circuit (P4) and closes CT1 check valve.
3. P1 pump oil reaches boom spool (8) through LCb load check valve (21).
4. The pressure oil from P1 pump passes through and around boom spool (8), out port Bb of main control valve to boom cylinder rod side.
5. With boom lock valve (17) CRb port open, return oil from the boom cylinder head flows through main control valve Ab port to boom spool.
6. A part of the return oil flow from boom cylinder head end flows into recirculation chamber in the boom spool (8), which directs the oil to the rod end of the boom cyliner to prevent cylinder cavation. The remaining oil flows into the tank or return oil circuit.

Operation of boom lock valve (CRb)

1. With the movement of spool (23), the orifice G of bushing (79) closes, and the continuity between passages (Sa) and (Sb) is cut. The holding pressure from the boom cylinder head side stops acting on spring chamber (J) of boom lock valve (17).
   a. Orifice (H) of bushing (79) is connected to drain port (Drc), spring chamber (J) of boom lock valve (17) is connected to drain port (Drc) through passage (SB).
   b. Since boom lock valve (17) is connected to drain port (Drc), the holding pressure on the boom cylinder head side acts on it and moves rightward, and releases the locking.

https://truckmanualshub.com/

CONTROL VALVE BOOM CIRCUIT DOWN



https://truckmanualshub.com/

Neutral

P1 pump delivers oil through P1 port of main control valve. Oil flows through travel straight, work spools for bucket and boom, neutral cut spool, to low pressure relief valve and Pn1 port keeping P1 pump at minimum flow.

P2 pump delivers oil through P2 port of main control valve. Oil flows through work spools travel left, swing, arm and neutral cut to low pressure relief valve and Pn2 port keeping P2 pump at minimum flow.

The arm variable recirculation spool is in the full stroke condition after the engine starts and is in the forced recirculation condition pilot pressure at PSV-A is 25 kg/cm^2 (355 psi).

CPU supplies 24 volts of power to swing parking brake solenoid SV-1, blocking pilot oil to Swing parking brake, brake is on.

Arm-in operation (Normal recirculation)

1. Secondary pilot oil from operators joystick acts on the arm spool pushing the arm spool down. The arm spool is located in the P2 section of the main control valve. CPU releases power to swing parking brake, brake is released. CPU activates straight travel spool, straight travel soool is shifted.
   a. Port PBb is located on the top of main control valve P2 section, port PLc2 is on the bottom of main control valve P2.
   b. Secondary pilot oil from joystick enters boom spool port PAa, and boom lock port PLc2 of the arm lock selector valve (19). The arm lock selector valve spool (23) is moved to the right, releasing the arm lock poppet (17)
2. The CPU outputs a command current,
   a. The arm variable recirculation proportional valve (PSV-A) located on the solenoid proportional valve block through the mechatro controller from low pressure sensor (SE7).
   b. Swing parking brake is released by the mechatro controller from low pressure sensor (SE7).
   c. Power from CPU to swing parking brake solenoid (SV-1) is removed swing parking brake is released.
   d. The PSV-C proportional valve secondary pressure acts on Pis arm variable recirculation spool (13) starts returning from the full stroke to the regular recirculation condition.Pro
3. The PSV-A proportional valve secondary pressure acts on Pis arm variable recirculation spool (13) starts returning from the full stroke to the regular recirculation condition.
4. P2 pump delivers oil through P2 port of main control valve. Oil flows through work spools travel left, swing, arm and neutral cut to low pressure relief valve and Pn2 port keeping P2 pump at minimum flow.
   a. With arm spool shifted P2 oil flow from P2 pump is stopped at the arm spool and diverted to CP2 load check valve located below travel left spool opening valve.
   b. P2 pump oil is stopped at CT2 one way check valve closing valve oil can not enter P1 port of main control valve.
   c. P2 pump flow is now in the P3 parallel port and available for swing circuit boom confluence circuit and arm circuit.
   d. With the arm spool shifted oil is removed from low pressure relief and Pn2 port. ***P2 pump is now considered on line.***

https://truckmanualshub.com/

5. P2 pump flow reaches arm spool through LCa one way check valve.Oil flow from P2 flow travels around arm spool out Aa port located in P2 main control valve to arm cylinder piston side.

   cylinder (***arm regeneration***)

   3. Return oil from Rod end is restricted for regeneration and return to Hydraulic tank.

6. Return oil form arm cylinder rod side is delevered to P2 main control valve port Ba.

   a. Return oil from arm cylinder passes over arm holding valve which is in release condition, to arm spool.

   b. After the oil passes around arm spool oil is diverted to the arm variable recirculation valve.

   c. The arm recirculation valve will then make a determination from infromation from the CPU controller as to the three paths for the return oil to take.

   1. Return oil is ou restricted and allowed to return to hydraulic tank.

   2. Oil is restricted from retuning to hydraulic tank and is allowed to help P2 oil feeding piston end of arm

https://truckmanualshub.com/

Neutral

P1 pump delivers oil through P1 port of main control valve. Oil flows through travel straight, work spools for bucket and boom, neutral cut spool, to low pressure relief valve and Pn1 port keeping P1 pump at minimum flow.

P2 pump delivers oil through P2 port of main control valve. Oil flows through work spools travel left, swing, arm and neutral cut to low pressure relief valve and Pn2 port keeping P2 pump at minimum flow.

The arm variable recirculation spool is in the full stroke condition after the engine starts and is in the forced recirculation condition pilot pressure at PSV-A is 25 kg/cm^2 (355 psi).

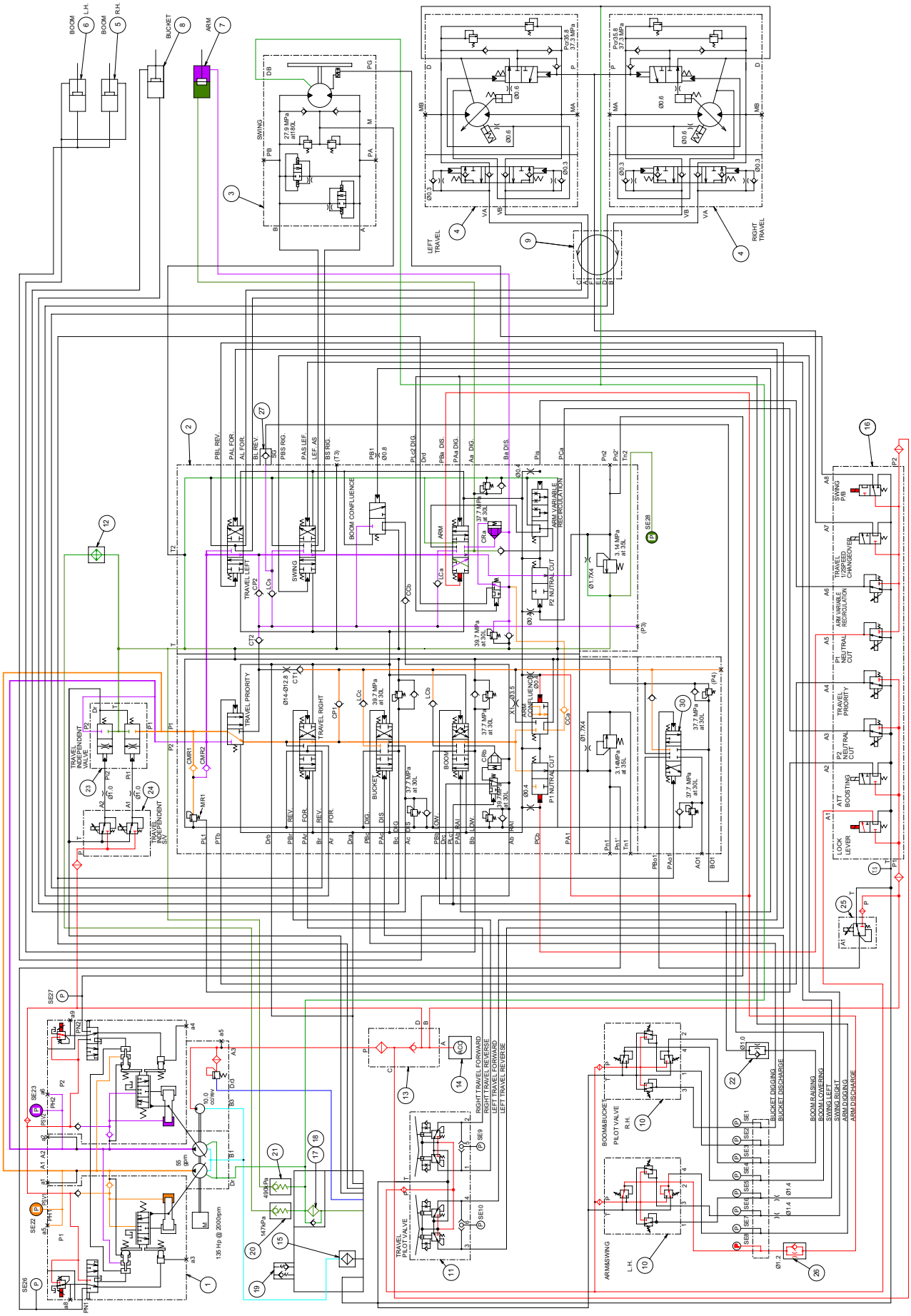
Swing Parking brake applied.

Arm-out operation (two pump flow)

1. Secondary pilot oil from operators joystick acts on the arm spool pushing the arm spool up, and arm confluence spool, pushing arm confluence spool up. P1 Neutral cut is shifted by CPU.
   a. Secondary pilot oil from joystick enters arm spool port PBa spool located in the P2 section of the main control valve.
   b. Secondary pilot oil from joystick enters arm confluence spool port PA1pushing the spool up located in the P1 section of the main control valve.
   c. The CPU outputs a command current into P1 bypass circuit (PSV-D) located on the solenoid proportional valve block through the mechatro controller from low pressure sensor (SE-8).
2. P2 pump delivers oil through P2 port of main control valve. Oil flows through work spools travel left, swing, arm and neutral cut to low pressure relief valve and Pn2 port keeping P2 pump at minimum flow.
   a. With arm spool shifted P2 oil flow from P2 pump is stopped at the arm spool and diverted to CP2 load check valve located below travel left spool opening valve.
   b. P2 pump oil is stopped at CT2 one way check valve closing valve oil can not enter P1 port of main control valve.
   c. P2 pump flow is now in the P3 parallel port and available for swing circuit boom confluence circuit and arm circuit.
   d. With the arm spool shifted oil is removed from low pressure relief and Pn2 port. ***P2 pump is now considered on line.***
3. P2 pump flow reaches arm spool through LCa one way check valve.Oil flow from P2 flow travels around arm spool out Aa port located in P2 main control valve to arm cylinder piston side.
4. Return oil form arm cylinder rod side is delevered to P2 main control valve port Ba.
   a. Return oil from arm cylinder passes over arm holding valve which is in release condition, to arm spool.
   b. After the oil passes around arm spool oil is diverted to the arm variable recirculation valve.
   c. The arm recirculation valve will then make a determination from infromation from the CPU controller as to the three paths for the return oil to take.
      1. Return oil is ou restricted and allowed to return to hydraulic tank.
      2. Oil is restricted from retuning to hydraulic tank and is allowed to help P2 oil feeding piston end of arm cylinder (***arm regeneration***)
      3. Return oil from Rod end is restricted for regeneration and return to Hydraulic tank.

https://truckmanualshub.com/

CONTROL VALVE ARM CIRCUIT OUT



https://truckmanualshub.com/

Neutral

P1 pump delivers oil through P1 port of main control valve. Oil flows through travel straight, work spools for bucket and boom, neutral cut spool, to low pressure relief valve and Pn1 port keeping P1 pump at minimum flow.

P2 pump delivers oil through P2 port of main control valve. Oil flows through work spools travel left, swing, arm and neutral cut to low pressure relief valve and Pn2 port keeping P2 pump at minimum flow.

Bucket digging operation single pump flow (voltage at SE-1 less than 2.5 volts)

1. Secondary pilot oil from the operators joystick acts on bucket spool moving the bucket spool up.
   a. Port PBc is located on the bottom of main control valve P1 Section.
   b. Secondary pilot oil form joystick enters boom spool port PBc, bucket spool is moved upward. Flow and pressure in circuit is proportional the movement of joystick effecting SE-1 sensor.
2. With the bucket spool shifted P1 oil flow is diverted from the boom work spool, P1 neutral cut spool, low pressure relief valve and Pn1 port. **P1 pump is now considered on line.**
   a. Oil flow from P1 opens load check valve CP1 downstream of travel right spool.
   b. P1 pump oil flow in to parallel circuit (P4) and closes CT1 check valve.
3. P1 pump oil flow reaches bucket spool through LCc check valve.
4. The pressure oil from P1 pump passes around bucket spool, out port Bc of main control valve to bucket cylinder piston end.
5. Return oil from rod end of bucket cylinder is deleverd to bucket spool through Ac port located in the P1 section of main control valve.

https://truckmanualshub.com/

https://truckmanualshub.com/

Neutral

P1 pump delivers oil through P1 port of main control valve. Oil flows through travel straight, work spools for bucket and boom, neutral cut spool, to low pressure relief valve and Pn1 port keeping P1 pump at minimum flow.

P2 pump delivers oil through P2 port of main control valve. Oil flows through work spools travel left, swing, arm and neutral cut to low pressure relief valve and Pn2 port keeping P2 pump at minimum flow.

Bucket digging operation two pump flow (voltage at SE-1 greater than 2.5 volts)

1. Secondary pilot oil from the operators joystick acts on bucket spool moving the bucket spool up.
   a. Port PBc is located on the bottom of main control valve P1 Section.
   b. Secondary pilot oil form joystick enters boom spool port PBc, bucket spool is moved upward. Flow and pressure in circuit is proportional the movement of joystick effecting SE-1 sensor.
2. With the bucket spool shifted P1 oil flow is diverted from the boom work spool, P1 neutral cut spool, low pressure relief valve and Pn1 port. **P1 pump is now considered on line.**
   a. Oil flow from P1 opens load check valve CP1 downstream of travel right spool.
   b. P1 pump oil flow in to parallel circuit (P4) and closes CT1 check valve.
   c. P1 pump oil flow reaches bucket spool through LCc check valve.
3. The CPU outputs a command current (milliampere) to P2 neutral cut proportional solenoid valve (PSV-B) and the travel priority proportional solenoid valve (PSV-C). The amount of current is determined from information given to the CPU from low pressure sensor (SE-1).
   a. The PSV-B secondary pilot oil acts on the neutral cut spool port PCa located on the bottom of the P2 section of the main control valve block. Pilot oil acts upon the P2 neutral cut spool and moves P2 cut spool closed.
   b. The PSV-C secondary pilot oil acts on the travel priority spool port PTa located on the top of the P1 section of the main control valve block. Pilot oil acts upon the travel priority spool and moves the travel priority spool closed.

https://truckmanualshub.com/

Travel Priority Spool Active (shifted)

With the travel spool active oil flow from P2 and P1 pump is redirected.

1. P1 pump oil enters the main control valve P1 section, oil flows through travel priority spool and is directed away from the center section of P1 main control valve.

   a. Oil from P1 pump enters P4 parallel gallery through CT1 one way check valve, with no passage to oil cooler or hydraulic tank.

   b. Oil from P1 pump is directed through CT2 one way check valve and enters P3 gallery located in the P2 section of the main control valve, with no passage to oil cooler of hydraulic tank.

   c. P1 pump oil closes one way check valve CP2, stopping the P1 pump oil from entering the center section of P2 main control valve.

2. P2 pump oil enters the P1 section of the main control valve and is directed by the travel priority valve.

   a. P2 pump oil now enters P1 main control valve center section, and flows to cooler and tank.

   b. P2 pump oil enters P2 main control valve center section, and flows to cooler and tank.

https://truckmanualshub.com/

- **Bucket digging operation (Conflux circuit) (SK330)**

1. With bucket digging operation, the pilot secondary pressure acts on PBc port on the bucket section of block on P1 side and moves bucket spool (5) upward.
2. Concurrently, low pressure sensor (SE1) senses and outputs the command current into P2 cut (PSV-B) and travel straight (PSV-C) valves on the solenoid/proportional valve block command current through mechatro controller.
3. The proportional valve secondary pressure from P2 cut proportional valve (PSV-B) acts on PCa port on arm variable recirculation & P1 cut section of block on P2 side and moves P2 cut spool (12) upward.
4. And the proportional valve secondary pressure acts on PTb on the travel straight section of the block on P1 side and moves travel straight spool (1) upward.

   Note: 1. For items ③ and ④, with the bucket digging operation, P2 cut spool (12) is switched in proportion to the pilot secondary pressure, and by-pass circuit (52) on P2 side starts closing, and travel straight spool (1) is switched, and finally by-pass circuits (50, 52) on P1 and P2 sides, and parallel circuits (51, 53) on P1 and P2 sides are connected.

   2. The reason why arm conflux variable recirculation and P2 cut on P2 cut section actuate is that the oil in A chamber flows into drain circuit (57) through passage B at the center of spool (12), moving respective spool.

5. P1 pump delivery oil flows into by-pass circuit (51) on P1 side and parallel circuit (51) on P1 side through P1 port of block on C/V P1 side, because the travel straight spool (1) on the travel straight section.
6. The delivery oil opens load check valve (21) CT1 through parallel circuit (51) on P1 side and flows into the downstream. Concurrently, the delivery oil opens load check valve (21) CT2 on the block on P2 side and flows into parallel circuit (53) on P2 side, but it comes to a stop.
7. P2 pump delivery oil flows into by-pass circuit (52) on P2 side on the upperstream of travel straight section through P2 port of the block on C/V P1 side, but it comes to a stop because P2 cut spool (12) on the arm variable recirculation & P2 cut section of block on P2 side is moved.
8. On the other hand, the delivery oil flows into by-pass circuit (50) because travel straight spool is moved.
9. Because bucket spool (5) on the bucket section of is moved, the pressure oil opens load check valve (21) CP1 on the donwstream of travel right section and flows into parallel circuit (51) on P1 side.
10. The P1 and P2 delivery oil is confluxed in parallel circuit (51) on P1 side, opens load check valve (21) LCc, and flows into bucket spool (5) through U-shaped passage.
11. The delivery oil passes through around bucket spool (5), and fed into the bucket cylinder head side through C/V BC port and bucket digging circuit (60).
12. On the other hand, the return oil from the bucket cylinder rod side flows through bucket dumping circuit (61) and C/V Ac port, and is led into bucket spool (5).
13. The delivery oil passes through around the bucket spool, and finally returns into hydraulic tank through tank circuit (56).

    Note: 1. For the bucket dumping operation, the operation is the reverse of the bucket section, and for others the operation is the same as the digging operation.

    2. The bucket conflux circuit functions only when the independent operation, but not confluxed in the combined operation.

https://truckmanualshub.com/

6. Slewing right operation

1. With slewing right operation, the pilot secondary pressure acts on PBs port on the slewing section of block on P2 side and moves bucket spool (4) upward.
2. P2 pump delivery oil flows through the travel straight section through the P2 port of block on C/V P1 side from by-pass circuit (52) on P2 side on the upperstream of the travel straight section, and is led into by-pass circuit (52) on P2 side.
3. Because slewing spool (4) of the slewing section is moved, and by-pass circuit (52) on P2 side closes, load check valve (21) CP1 on the downstream of travel left section opens, and finally the delivery oil flows into parallel circuit (53) on P2 side.
4. And the pressure oil opens load check valve (21) LCs through parallel circuit (53) on P2 side and reaches to slewing spool (4) through U-shaped passage (75).
5. The pressure oil flows into P chamber in the inside of spool through perforation around slewing spool (4) and passes through perforation again, and flows into slewing left rotation circuit (67) and is led into slewing spool (4).
6. On the other hand, the return oil from the slewing motor B port flows through C/V As port from slewing left circuit (67) and is led into slewing spool (4).
7. The pressure oil passes through perforation around slewing spool (4), flows into Q chamber in the inside of spool and passes through perforation again, and finally returns into hydraulic tank through tank circuit (56).

https://truckmanualshub.com/

9. Arm-in and slewing simultaneous operation (Slewing priority circuit)

1. With arm-in and slewing right simultaneous operation, arm spool (9) and arm variable recirculation spool (13) move down and slewing spool (4) moves up the same as in respective independent operation.

   Note: For details of for each operation, see Articles for arm-in and slewing right operation.

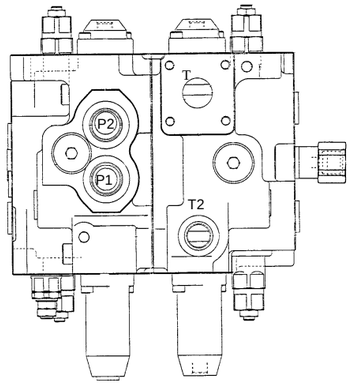
2. Then, the arm variable recirculation control command varies according to the slewing right operation pilot pressure, and arm variable recirculation spool (13) is switched forcedly to the recirculation condition, therefore the return oil from the rod side is used in precedence to others, resulting in the high working pressure. And the P2 pump delivery oil flows into the slewing section as the working pressure is low in precedence to others.
3. And, the slewing operation is allowed even under the conditions such as push-on digging, slant digging, etc., where the slewing load is higher than the arm operating load, securing the arm operating speed at the same time.
4. Usually, when the pumping load becomes high (P2 pressure: 200 kgf/cm² or more), arm variable recirculation spool (13) is switched in the recirculation cut condition, but when it is operated concurrently with slewing operation, the slewing priority control functions, consequently the recirculation cut and sequence confluxing operation are not performed.

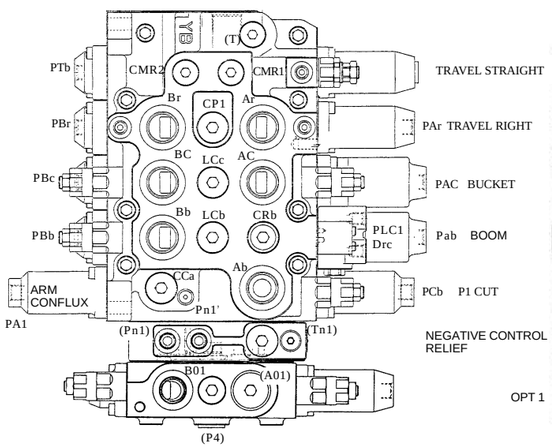
SK210 through SK290 CONTROL VALVE

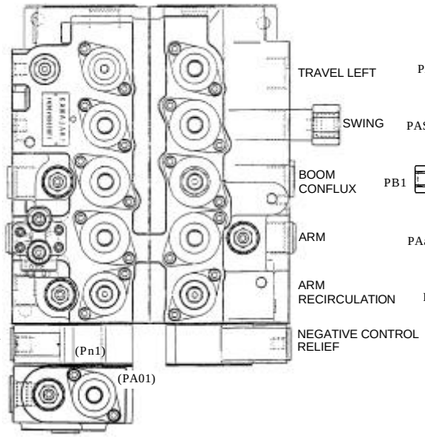
SPECIFICATION

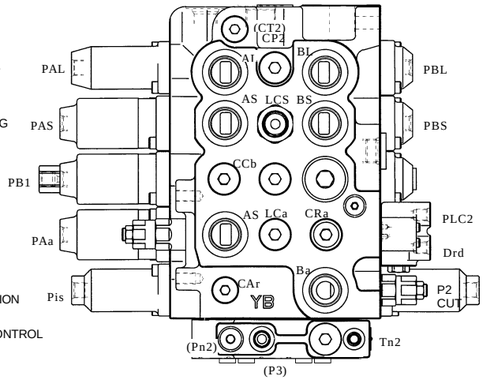
Shown with swing Priority and Breaker

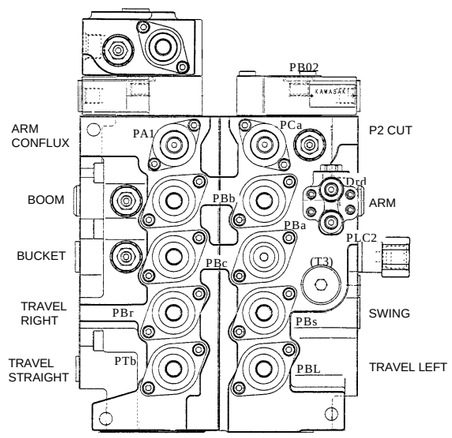
(1) Outside view and hydraulic ports











VIEW A

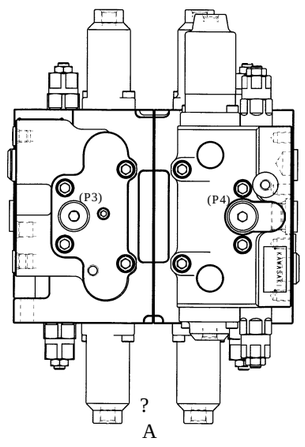


Fig. 4-1 Control valve outside view and hydraulic port

Table 4-1

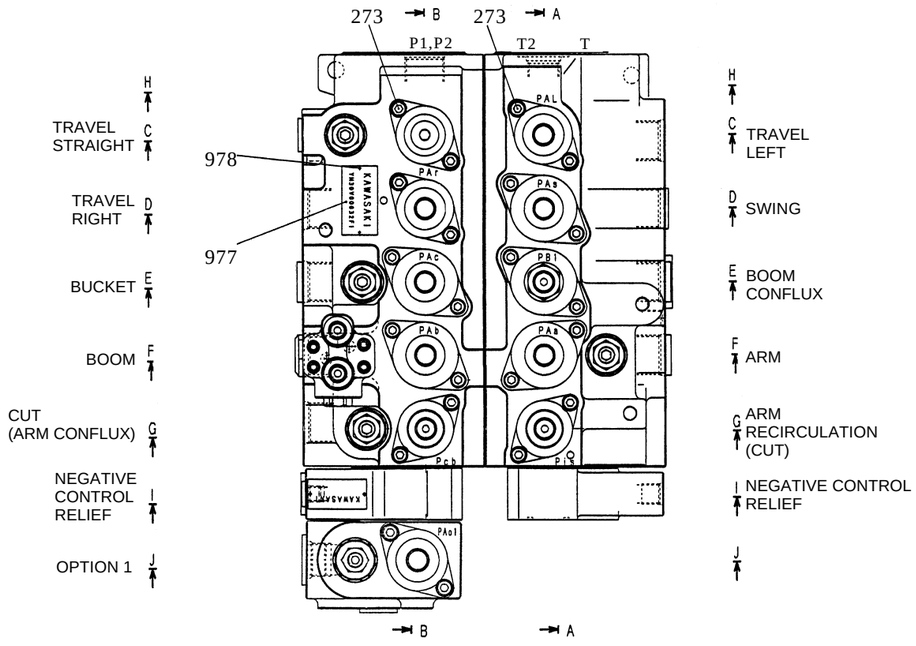
Port size	Tightening torque kgf·m (ft·lbs)	Port name	Description
		P1	Pump P1 port
		P2	Pump P2 port
		Ab	Boom up port
		Bb	Boom down port
		Ac	Bucket dump port
		Bc	Bucket digging port
		Ar	Travel right port (forward)
		Br	Travel right port (reverse)
		AL	Travel left port (forward)
		BL	Travel left port (reverse)
		Aa	Arm in port
		Ba	Arm out port
		As	Swing port (right)
		Bs	Swing port (left)
PF3/4	(110~ 130)	T2	Tank port
		(T3)	Tank port
		(Ao1)	Option 1 port (A)
		(Bo1)	Option 1 port (B)
		PAa	Arm in pilot port
		PBa	Arm out pilot port
		PAb	Boom up pilot port
		PBb	Boom down pilot port
		PAc	Bucket dump pilot port
		PBc	Bucket digging pilot port
		PAr	Travel right pilot port (forward)
		PBr	Travel right pilot port (reverse)
		PAL	Travel left pilot port (forward)
		PBL	Travel left pilot port (reverse)
		PAs	Swing right pilot port
		PBs	Swing left pilot port
		PA1	Arm conflux pilot port
		PB1	Boom conflux pilot port
		PTb	Travel straight pilot port
		PCa	P2 bypass pilot port
		PCb	P1 bypass pilot port
		Pis	Arm recirculation pilot port
		(Pn1)	Negative control port (P1 side)
		(Pn2)	Negative control port (P2 side)
		Pn1'	Negative control port (P1 side)
		Pn2'	Negative control port (P2 side)
		(PAo1)	Option 1 pilot port (A)
		(PBo1)	Option 1 pilot port (B)
PF1/2	11~ 13 (80~ 94)	(P3)	Option port
		(P4)	Option port
		PL1	ATT power boost pressure port
		Dra	Drain port
		Drb	Drain port
		Drc	Drain port
		Drd	Drain port
		PLc1	Boom lock valve release pilot port
		PLc2	Arm lock valve release pilot port
		(Tn1)	Negative control port (Tank press)
		Tn2	Negative control port (Tank press)
M 10	5.0~ 6.6 (36~ 48)	T	Tank port
M 12	8.5~ 11.5 (61~ 83)	Ao1	Option 1 port (A)
		Bo1	Option 1 port (B)

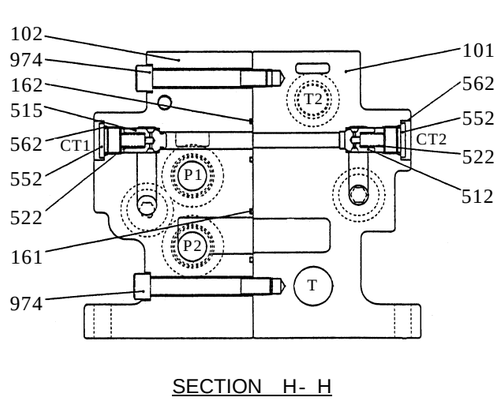
(2) Machine specification

Item		SK210(LC)? With OPT1	
Max. flow	ℓ/min (gal/min)	210(55) × 2	
Main relief valve set pressure	kgf/cm² (psi)	350(4980) at 140 ℓ/min(37gal/min)	
With power boost pressure		385(5470) at 120 ℓ/min(32gal/min)	
Over load relief valve set pressure	kgf/cm² (psi)		
Boom H, Bucket H, Arm R		405(5760) at 30 ℓ/min(7.9gal/min)	
Boom R, Bucket R, Arm H		385(5470) at 30 ℓ/min(7.9gal/min)	
OPT2 H&R		385(5470) at 30 /min(7.9gal/min	ℓ

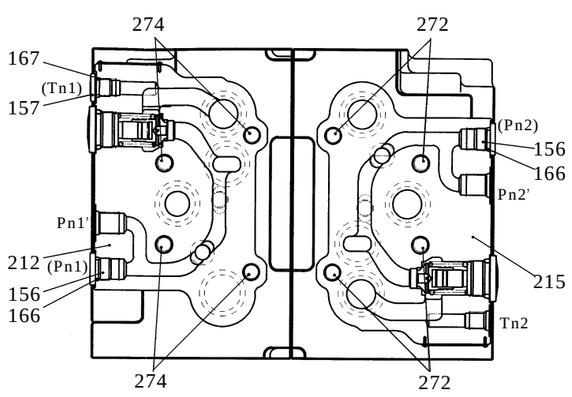
https://truckmanualshub.com/

SK210 ~ SK290 Control Valve CONSTRUCTION

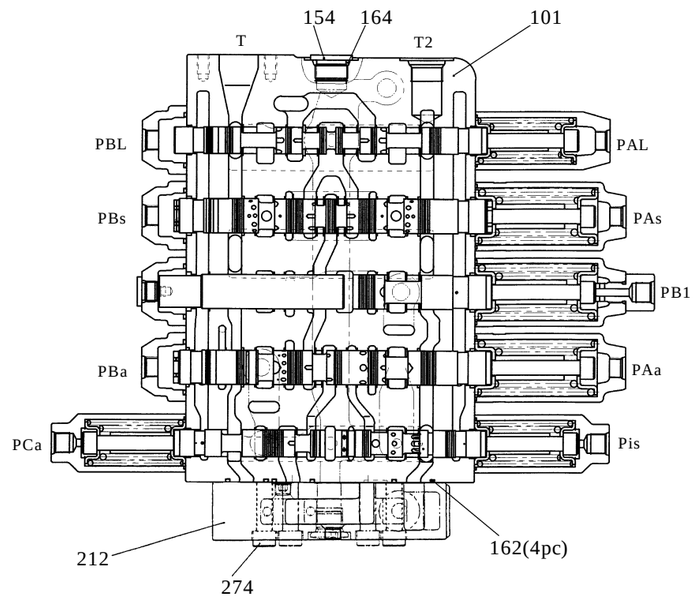




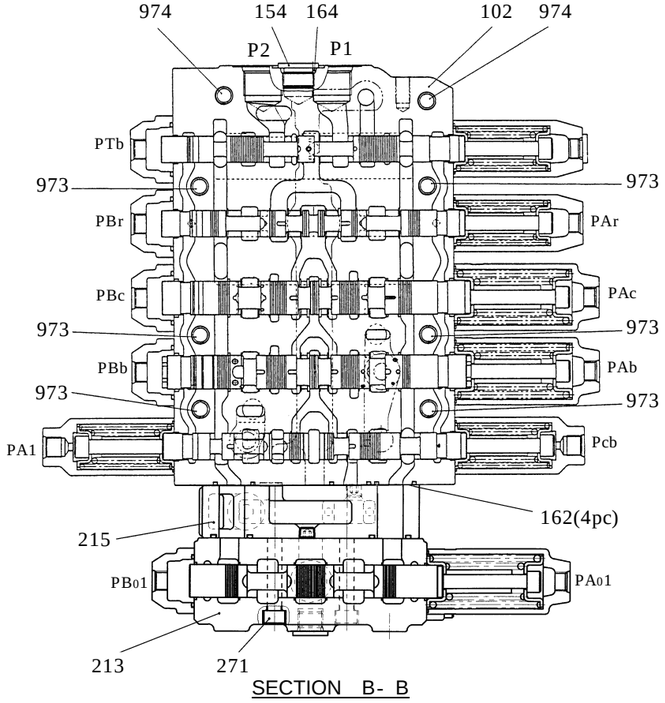
SECTION H- H



SECTION I- I



SECTION A- A



SECTION B- B

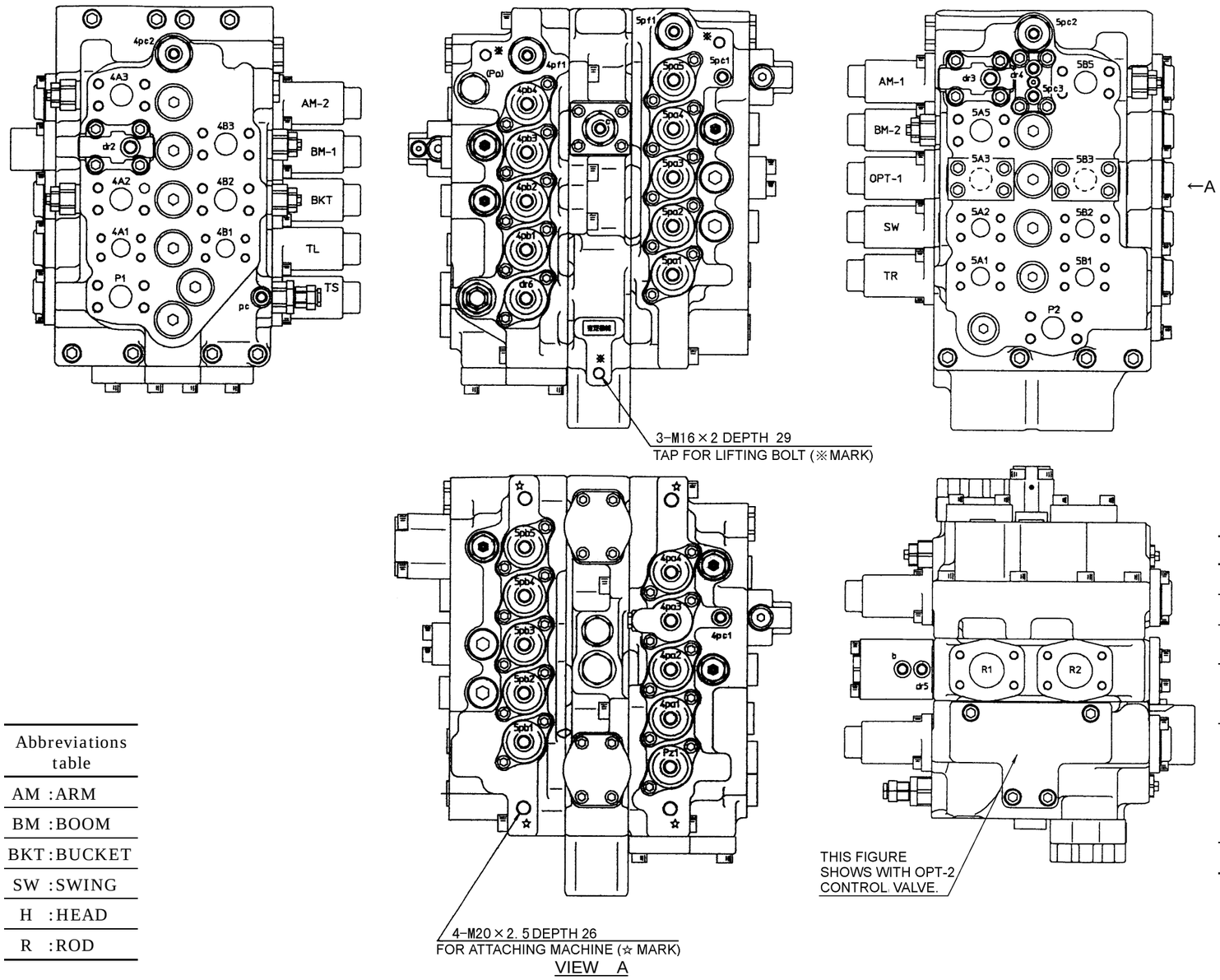
Fig. 4-2 (1/3) Construction of control valve

https://truckmanualshub.com/

2. SK480 CONTROL VALVE

2.1 SPECIFICATION

(1) General view and hydraulic ports



Abbreviations table	
AM	:ARM
BM	:BOOM
BKT	:BUCKET
SW	:SWING
H	:HEAD
R	:ROD

Fig. 2-1 Control valve outside view and hydraulic port

Table 2-1

Group	Port size	Tightening torque kgf·m (lbf·ft)	Port name	Description
Flange port	∅32 (M14)	15 (110)	P1	Pump P1 port
			P2	Pump P2 port
			4A2	Bucket digging port
			4B2	Bucket dump port
			4A3	Boom up side port
			4B3	Boom down side port
			5A3	Option 1 port
			5B3	Option 1 port
			5A5	Arm out port
			5B5	Arm in port
	∅26 (M12)	10 (72)	4A1	Travel left forward port
			4B1	Travel left reverse port
			5A1	Travel right reverse port
			5B1	Travel right forward port
			5A2	Swing right port
			5B2	Swing left port
O ring port	PF1/4	3.7 (27)	4PC1	Boom down lock valve release pilot port
			4PC2	P1 bypass cut select port
			4pf1	P1 pump negative control pressure port
			5pc1	Arm in lock valve release pilot port
			5pc2	P2 bypass cut valve select port
			5pc3	Lock valve pilot port for swing priority
			5pf1	P2 pump negative control pressure port
			a	Arm 2 spool select comand port at arm in
			b	Sequence pilot secondary pressure port at arm in
			c	Arm variable recirculation cut comand port at arm in
			dr1	Drain port
			dr4	Drain port
			dr5	Drain port
			Pc	ATT power boost pressure port
			R3	Drain back pressure port
	PF3/8	7.5 (54)	4pa1～4	Travel left, Bucket, Boom 1, Arm 2 pilot port
			4pb1～4	Travel left, Bucket, Boom 1, Arm 2 pilot port
			PZ1	Travel straight pilot port
			dr5	Drain port
			dr6	Drain port
			5pa1～5	Travel right, Swing, OPT1, Boom 2, Arm 1 pilot port
			5pb1～5	Travel right, Swing, OPT1, Boom 2, Arm 1 pilot port
			dr3	Drain port
	G1	26 (190)	RS	Swing motor boost circuit port

(2) Machine specification

Item		SK480VI
Part No.		LS30V00002F1
Model		UY36-105
Rated flow	ℓ/min (gal/min)	370×2 (98×2)
Main relief valve set pressure	kgf/cm² (psi)	320 (4550) at 320ℓ/min (84gal/min)
When power boost pressure		350 (4980) at 320ℓ/min (84gal/min)
Over load relief valve set pressure	kgf/cm² (psi)	
Boom H, Bucket H, Arm R		370 (5260) at 30ℓ/min (7.9gal/min)
Boom R, Bucket R, Arm H		355 (5050) at 30ℓ/min (7.9gal/min)
Swing		270 (3840) at 30ℓ/min (7.9gal/min)
Foot relief valve set pressure	kgf/cm² (psi)	32 (460) at 50ℓ/min (13gal/min)

https://truckmanualshub.com/

2.2 SK480 CONSTRUCTION

(1) Control valve

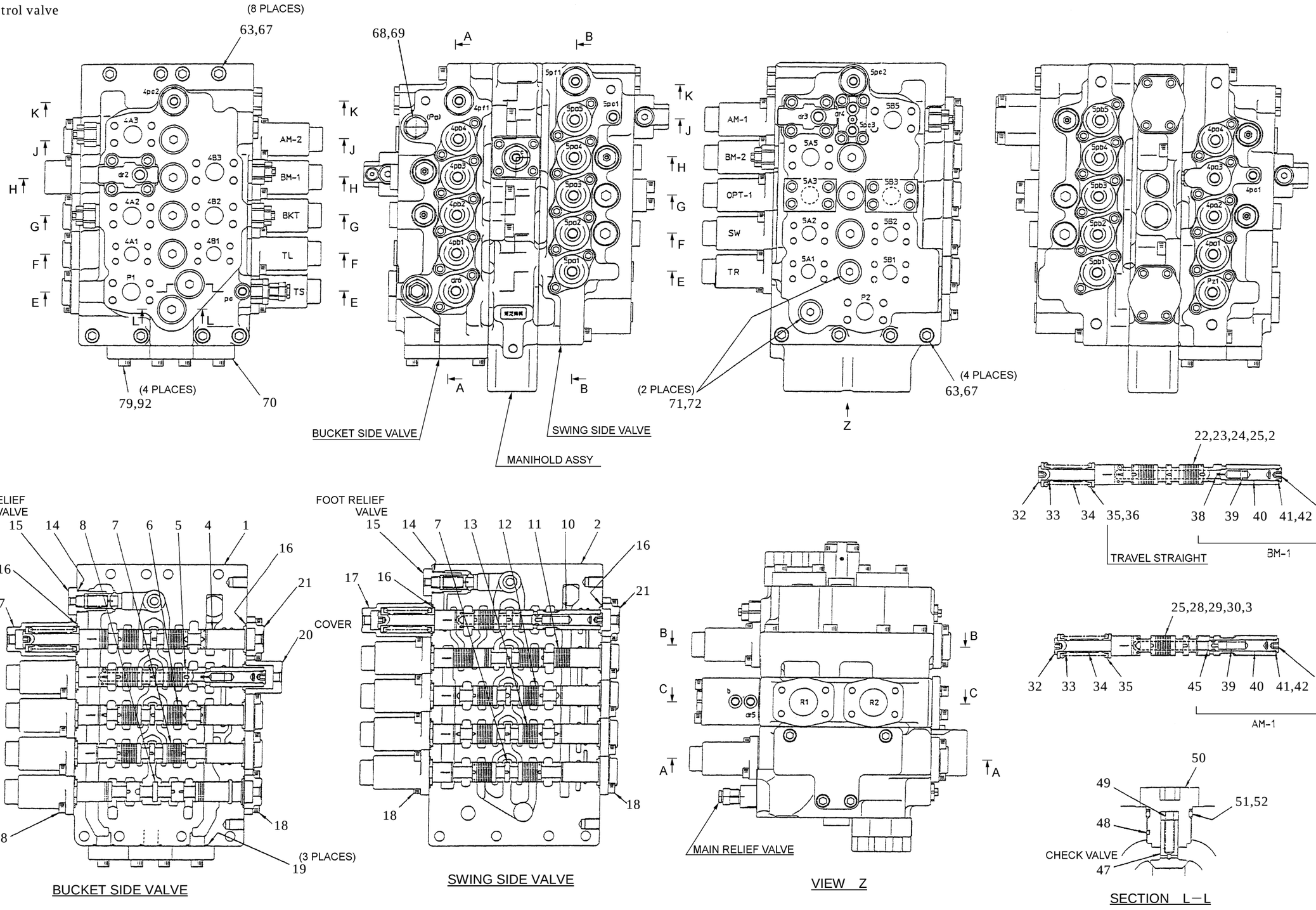


Fig. 2(1/4) Construction of control (Bucket side, Swing side valve)

https://truckmanualshub.com/

Kobelco

Dynamic Acera



Kobelco Construction Machinery America LLC
Hydraulic Motors
(Swing & Travel)

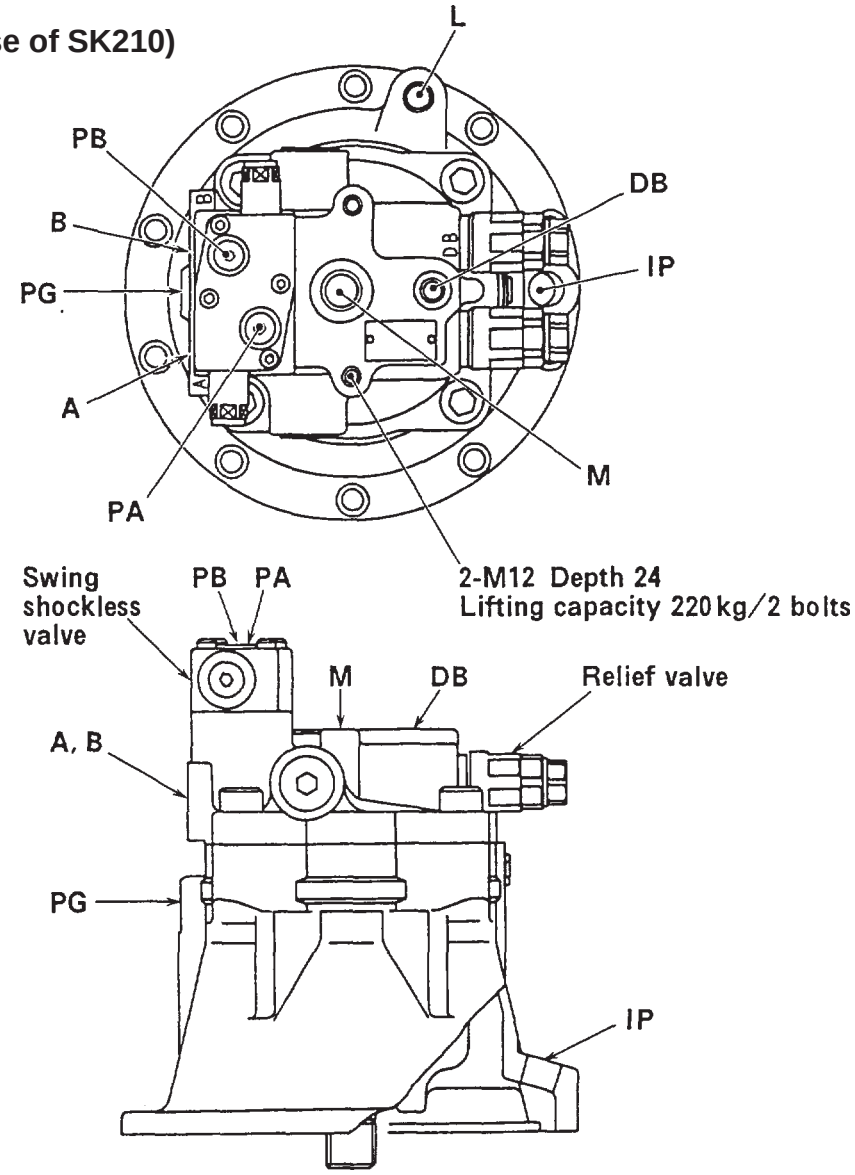
KOBELCO

Kobelco Construction
Machinery America Inc.

https://truckmanualshub.com/

7-4 Swing motor

1. Appearance (In case of SK210)



- **Rotation direction (SK210 · SK250)**
  (Viewed from shaft end)
  Oil inlet A ····· Clockwise
  Oil inlet B ····· Counterclockwise

- **Rotation direction (SK330)**
  (Viewed from shaft end)
  Oil inlet A ····· Counterclockwise
  Oil inlet B ····· Clockwise

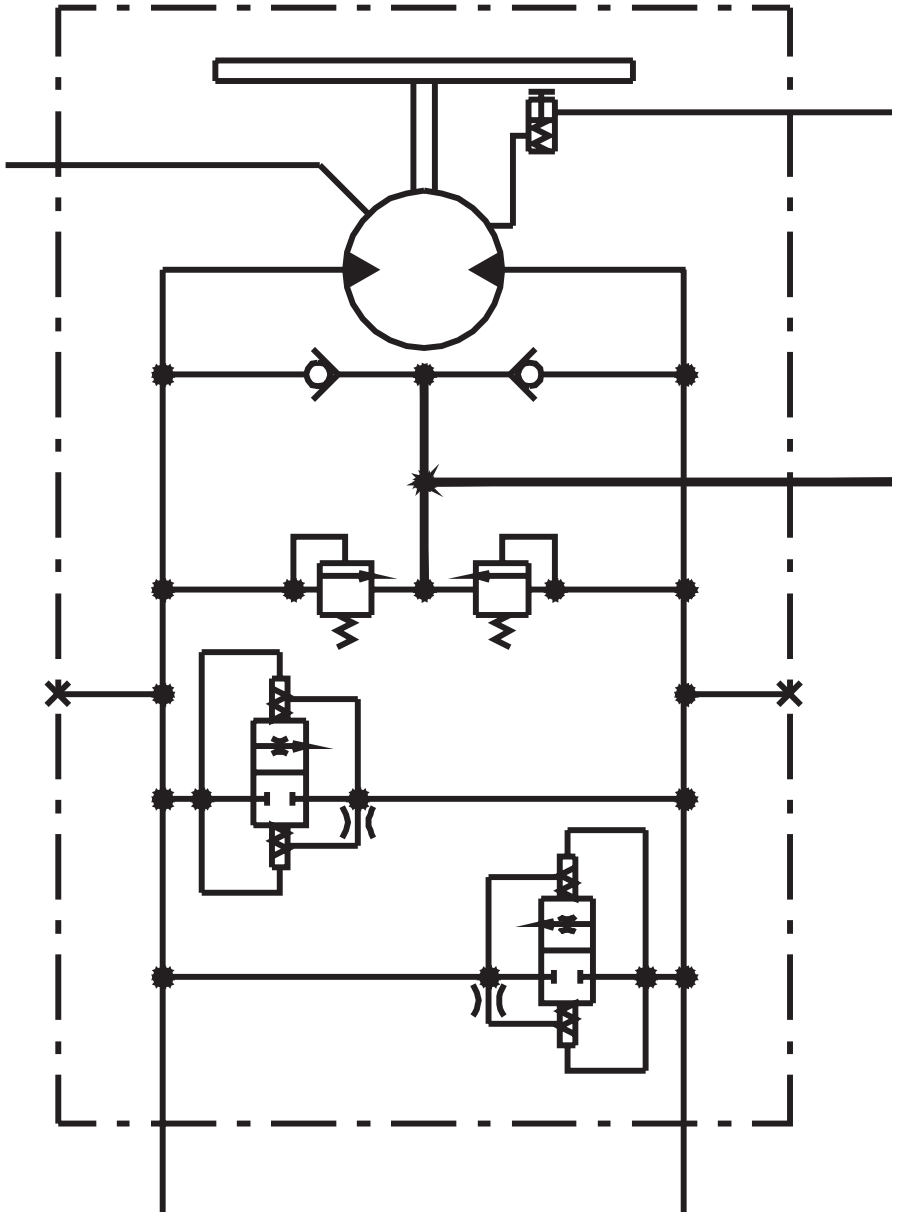
Code	Name	Size	Torque Kgf/cm^2 (lb/ft)
A,B	Main port	2-PF 3/4	17 (122)
M	Make-up port	PF 3/4	17 (122)
		PF1	22 (159)
DB	Drain port	PF 3/8	7.5 (54)
		PF 1/2	10 (72)
PA, PB	Gauge port	PF 1/4	3.7 (26)
PG	Brake release port	PF 1/4	3.7 (26)
L	Gear oil level port	PF 1/2	6.6 (47)
IP	Gear oil filling port	PF 3/4	10 (72)

https://truckmanualshub.com/

2. Specifications

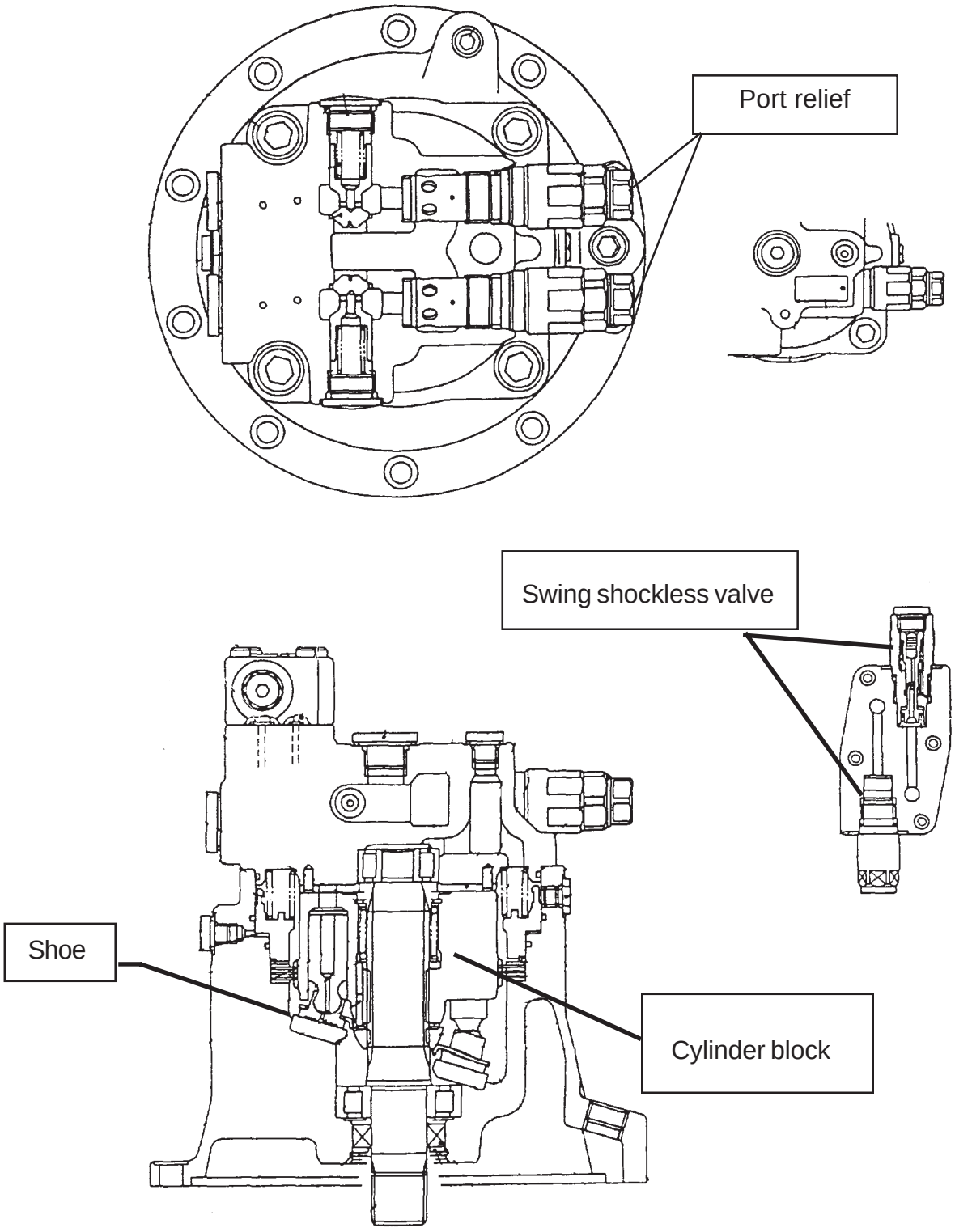
Specifications Swing Motor						
Model	SK160	ED190	SK210	SK250	SK290	SK330
Type	Axial piston type					
Parking brake	Oil type disk brake, spring applied hydraulic release					
Working pressure Kgf/cm^2 (psi)	350 (4980)	365 (5193)	280 (3990)	280 (3990)	280 (3990)	280 (3990)
Swing speed M-Mode/ high idle	11 RPM	11 RPM	11 RPM	11 RPM	11 RPM	9.1 RPM
Weight hydraulic motor & gear	223 (491)	223 (491)	235 (520)	235 (520)	511 (1,126)	511 (1,126)

3. Hydraulic diagram



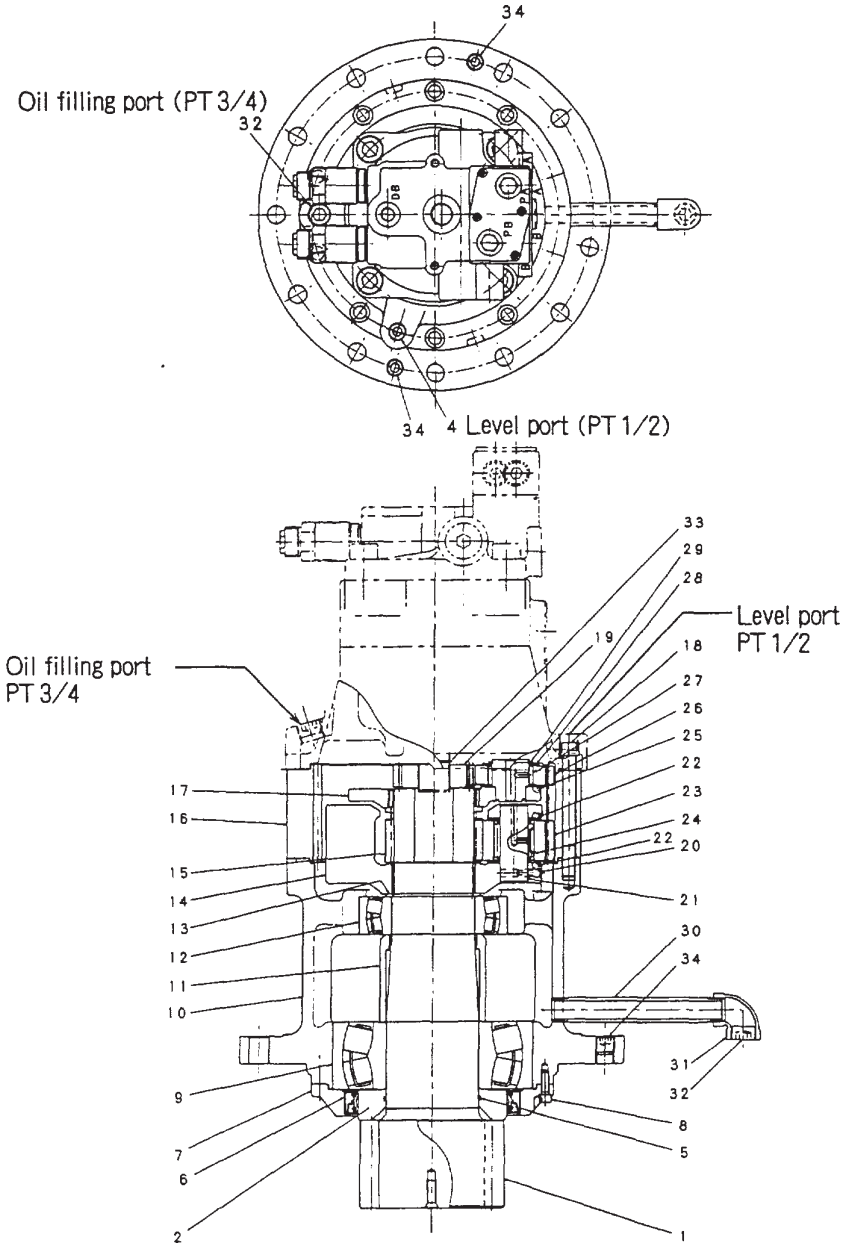
https://truckmanualshub.com/

4. Structure



https://truckmanualshub.com/

② Reduction unit (Swing)

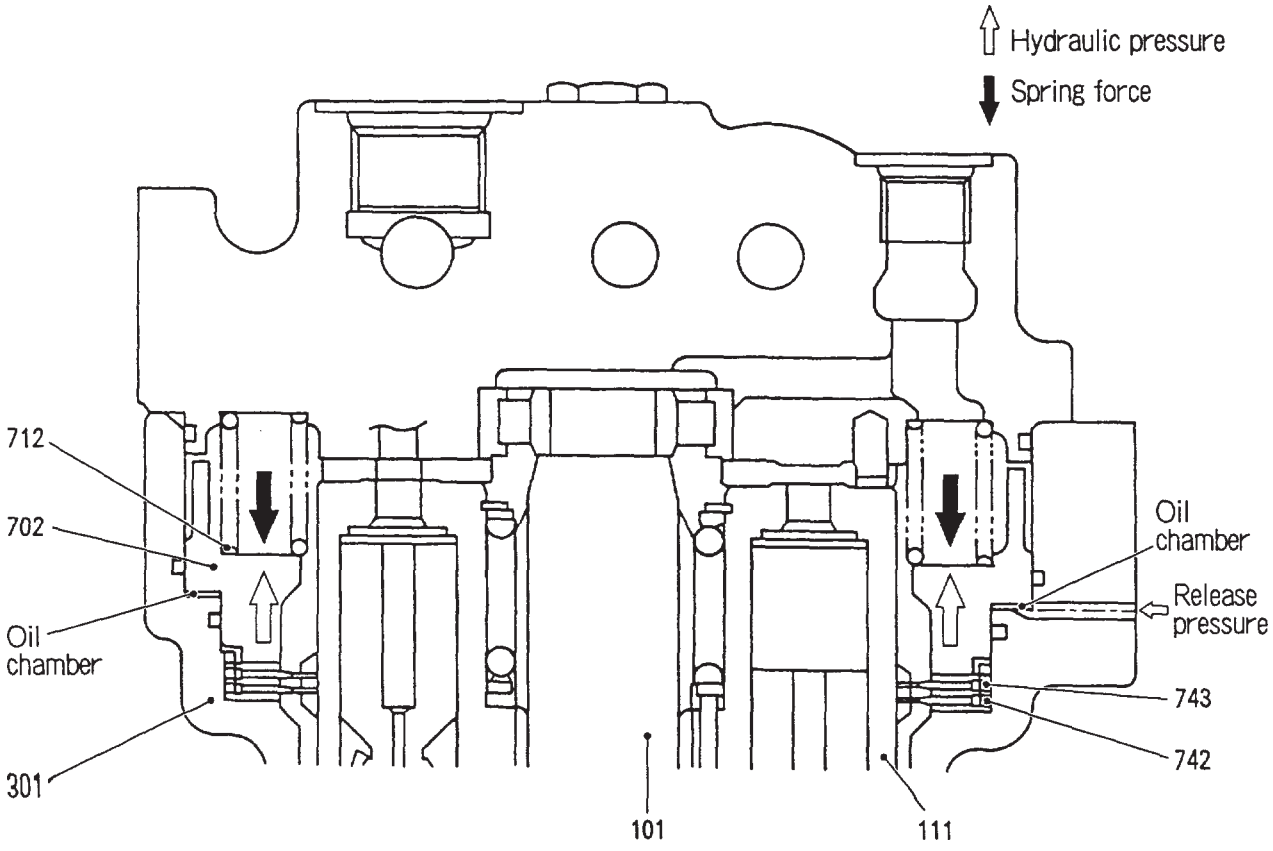


Code	Name	Qty.	Code	Name	Qty.	Code	Name	Qty.
1	Pinion shaft	1	12	Taper roller bearing (22218RH x 90 x 160 x 40)	1	24	Needle bearing (28 x 43 x 43)	4
2	Sleeve	1						
4	Plug (PT 1/2)	1	13	Retaining ring	1	25	Thrust washer	3
5	O-ring (JIS B2401 G100 1A)	1	14	Spider	1	26	Pinion	3
			15	Sun gear	1	27	Roller	102
6	Oil seal (160 x 190 x 13)	1	16	Ring gear	1	28	Thrust washer	3
7	Retainer	1	17	Spider assy	1	29	Retaining ring	3
8	Socket bolt (M8 x 25)	12	18	Socket bolt (M14 x 130)	10	30	Pipe	1
9	Taper roller bearing (22320RH 100 x 215 x 73)	1	19	Sun gear	1	31	Elbow	1
			20	Spring pin (ϕ 8 x 25)	4	32	Plug (PT 3/4)	2
10	Housing	1	21	Shaft	4	33	Retaining ring	1
11	Spacer	1	22	Thrust washer	8	34	Set screw	2
			23	Pinion	4			

https://truckmanualshub.com/

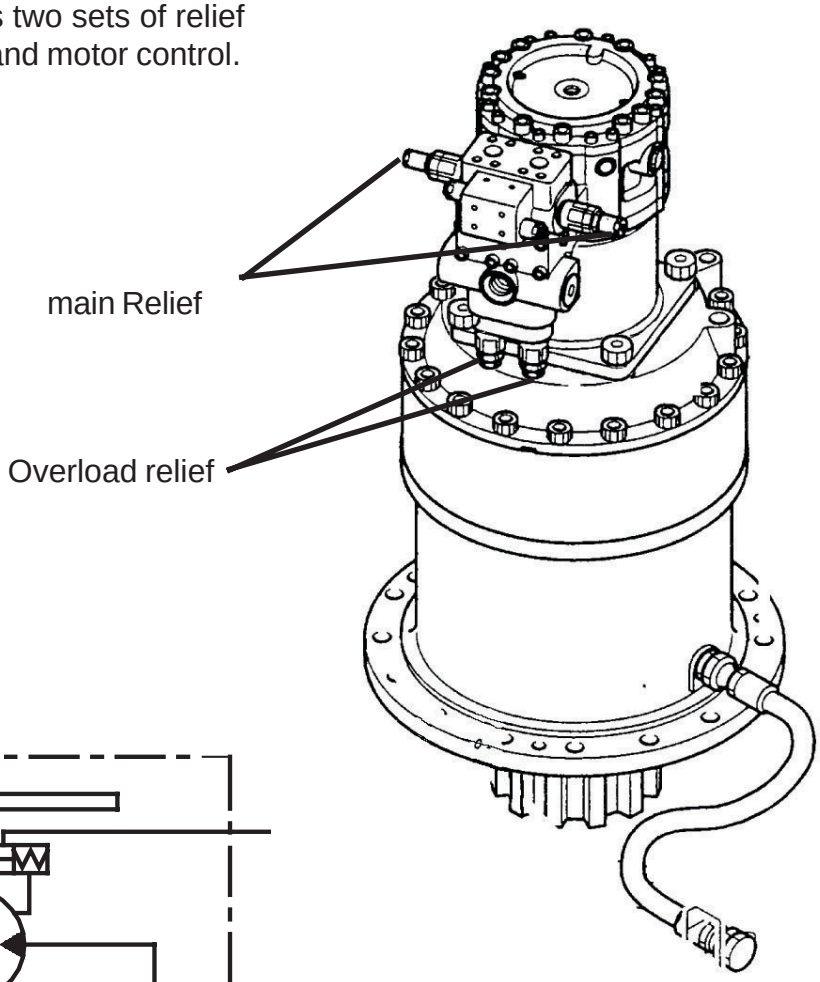
3. Parking brake

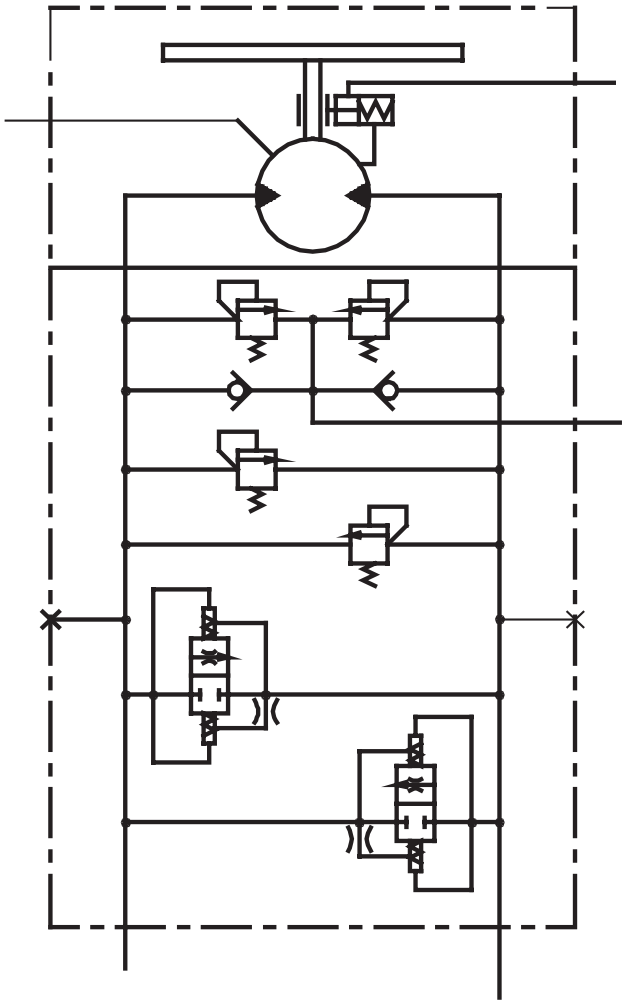
1) Cylinder block (111) is engaged with shaft (101) and spline.
2) And, the rotation in round direction of separator plate (743) is restricted by circular grooves cut on the surface of the casing.
3) When friction plate (742) engaged with cylinder block (111) at the outside with the spline is pressed against casing (301) by brake spring (712) through separator plate (743) and brake piston (702), the frictional force is generated between friction plate (742) and casing (301), and also separator plate (743) and brake piston (702).
4) This frictional force restricts the rotation of the shaft, resulting in the braking force.
5) On the other hand, after application of the release pressure to the oil chamber formed between brake piston (702) and casing (301), if the oil pressure becomes higher than brake spring (712) force, brake piston (702) moves and friction plate (742) separates from casing (301), and finally the brake is released.

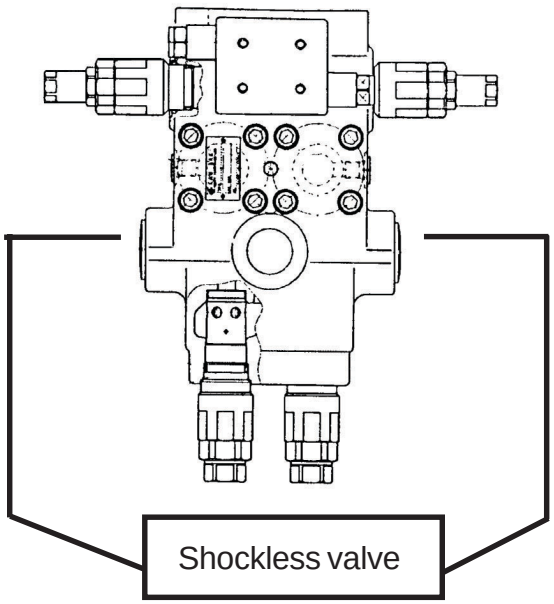


https://truckmanualshub.com/

The SK480 swing motor uses two sets of relief valves for hydrauic breaking and motor control.





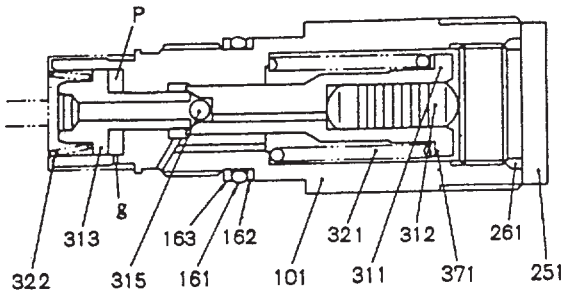


https://truckmanualshub.com/

5. Shockless valve

Structure

161.	**O-ring**	**312.**	**Piston**
162.	**Ring**	**313.**	**Seat**
163.	**Backup ring**	**315.**	**Ball**
251.	**Plug**	**321.**	**Spring**
261.	**O-ring**	**322.**	**Spring**
311.	**Plunger**	**371.**	**Shim**



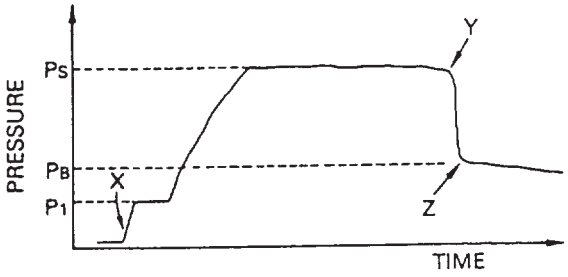
Shockless valve

- **Operation of shockless valve**
  This graph shows the relation between the pressure on shockless valve and the rising process. The actuation on each part is described below.

a. Operation on the state of P = PS

Considering the state where the brake pressure generates on port AM side, the pressure at port AM is conducted to chamber n through passage ℓ, axis hole on seat (313), and passage m on plunger (311).

If pressure P is over the specified pressure of spring (321), then the spring is pushed, and the plunger is moved to left. Seat (313) also moves to left deflecting spring (322) pushed by plunger (311).

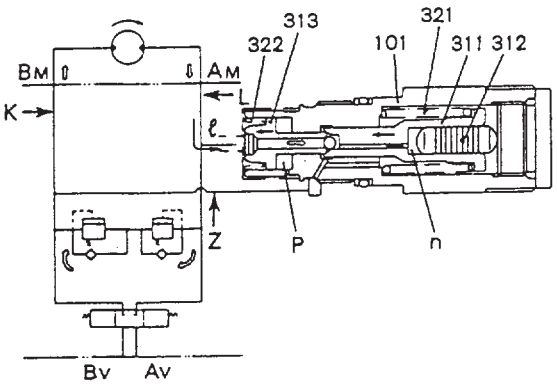


Control pressure of shockless valve

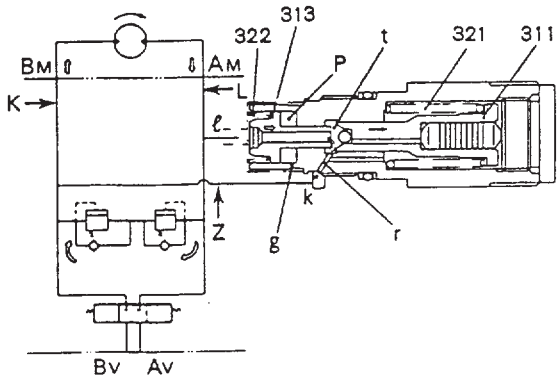
b. Operation on the sate of P < PS

The brake pressure may be decreased by the stop of slewing (Y point), arriving to the state P < PS, the plunger (311) is moved to the right by the force of spring (321), simultaneously the seat (313) is also moved to right by the force of spring (322), as the chamber P contains damping actuations caused by (g), the return of seat (313) is late comparing it with that of plunger (311), and the seat part t is left away. Then the pressure oil flows in sequence such as ℓ → t → r → K proportionately to the return of plunger, finally the passage connecting to AM and BM ports is formed.

As a result, the pressures at both AM and BM ports are quickly equal, and return to the state of Z point, and then the hydraulic motor is protected from in version caused by the confined pressure at AM port.



In the condition of P = PS

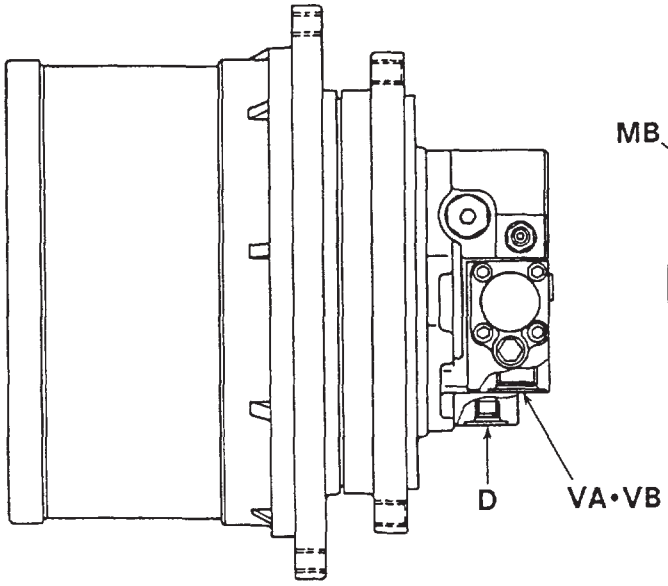


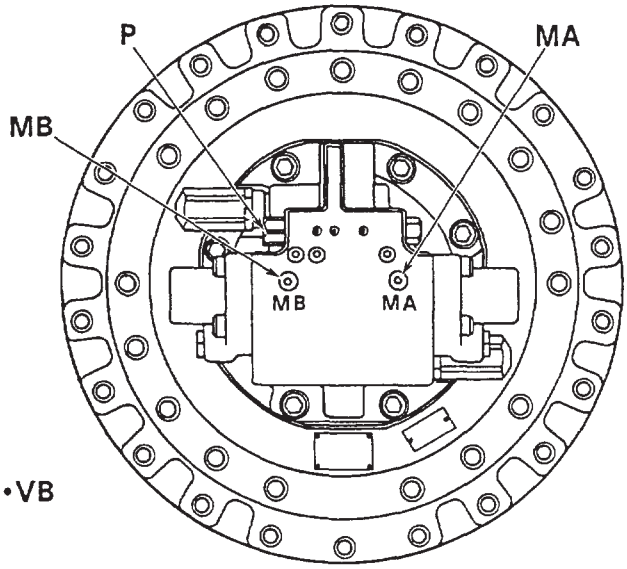
In the condition of P < PS

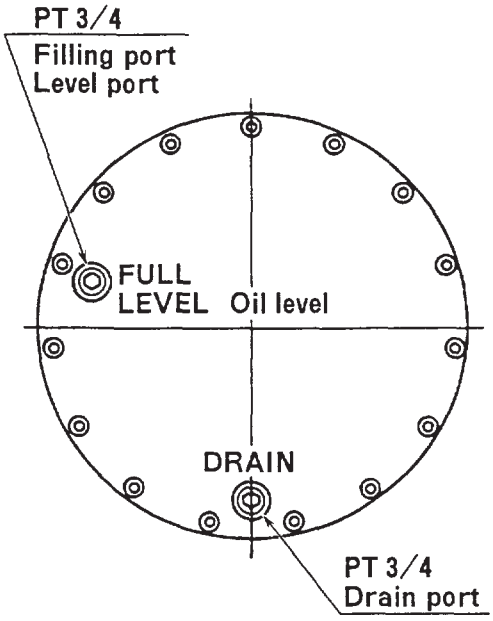
https://truckmanualshub.com/

7-5 Travel motor

1. Appearance







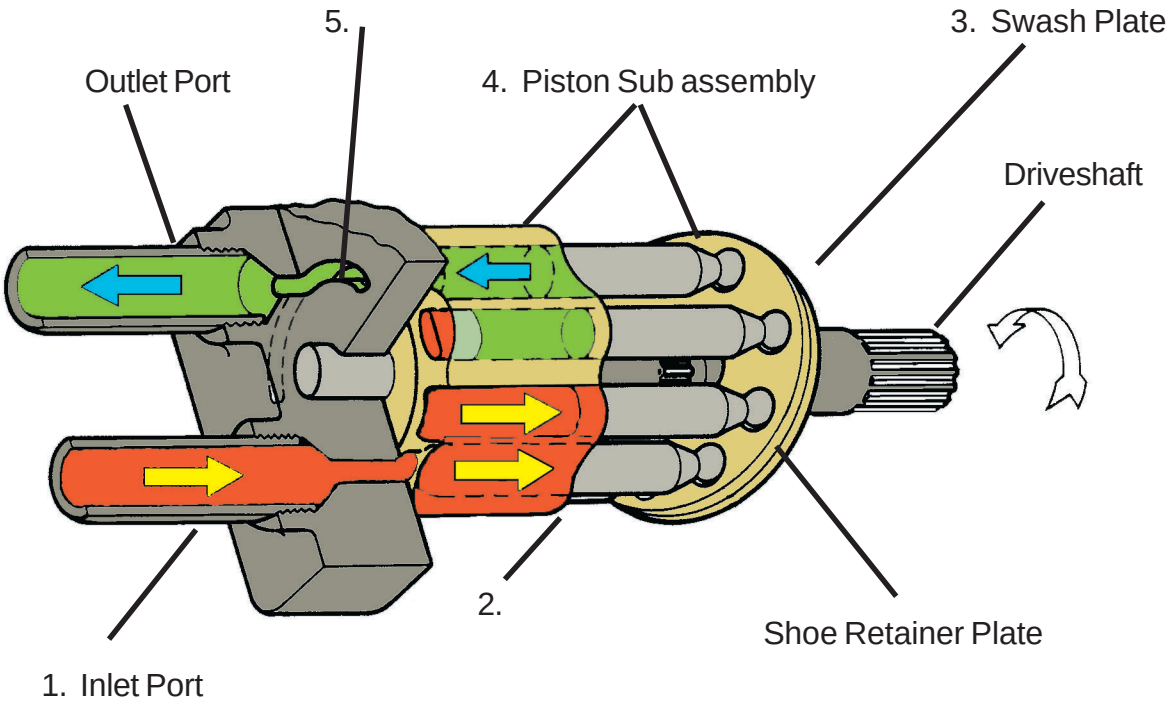
Note:

1. **When overhauling the travel motor or replacing the assy., fill hydraulic oil 1.2L through the drain port (D).**
2. **When overhauling the reduction unit, fill the approved gear 2.5L oil through the drain port.**
   In addition, when replacing the assy., as the oil is already filled, check that the filled oil quantity is enough for the proper operation.

Code	Name	Size	Torque N•m {kgf•m}	Remarks
VA, VB	Main port	PF 1	255 ± 10 {26 ± 1}	SK210 • SK330
P1, P2	Main port	PF 1	255 ± 10 {26 ± 1}	SK250
D	Drain port	PF 1/2	108 ± 10 {11 ± 1}	SK210 • SK330
T	Drain port	PF 1/2	108 ± 10 {11 ± 1}	SK250
MA, MB	Gauge port	PF 1/4	29.4 {3}	SK210 • SK330
Pm1, Pm2	Gauge port	PF 1/4	29.4 {3}	SK250
P	Travel 1st/2nd speed change port	PF 1/4	29.4 {3}	SK210 • SK330
Ps	Travel 1st/2nd speed change port	PF 1/4	29.4 {3}	SK250
Pp	Parking brake release port	PF 1/4	29.4 {3}	SK250
Tin	Casing filling oil port	PF 1/4	29.4 {3}	SK250
Drain port, Filling port, Level port		PF 3/4	98 {10}	Wind seal tape

https://truckmanualshub.com/

Hydraulic In-Line Piston Motor Operation



1. Oil is delivered under pressure at inlet port.

2. Oil exerts a force on pistons, forcing them out of the cylinder block.

3. The piston thrust is transmitted to the angled swash plate causing rotation.

4. The pistons, shoe plate, and cylinder block rotate together. The driveshaft is splined to the cylinder block.

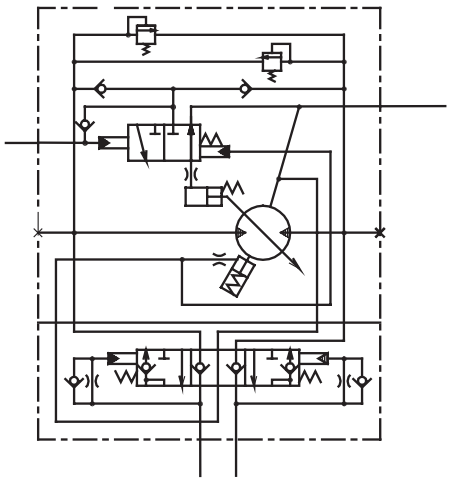
5. The piston passes the inlet port, and begins to return into its bore because of the swash plate angle. Exhaust oil is pushed into the outlet port.

Typical Piston Motor

https://truckmanualshub.com/

Item \ Model		SK210	SK250	SK330
Type		M4V150/ 100-RC3.5B	MAG-170VP- 3600E-2	M3V260/ 150A-RG5.5C
Displacement 1st/2nd speed	cc/rev	103.7 / 154.4	109.9 / 170.0	150.5 / 262.6
Working pressure	MPa {kgf/cm²}	34.3 {350}	←	←
Max. flow	L/min	210	240	250
Over load cracking press.	MPa {kgf/cm²}	35.8 {365} or more	31.1 {317} or more	35.8 ~ 37.2 {365 ~ 380}
Tilting control pilot press.	MPa {kgf/cm²}	4.9 {50}	←	←
Drain allowable press. MPa {kgf/cm²}	Normal	0.2 {2}	0.2 {2}	0.2 {2}
	Surge	1 {10}	0.5 {5}	1 {10}
Parking brake torque	N•m {kgf•m}	441 ~ 686 {45 ~ 70}	22.5 kN•m {2292}	902 {92} or more
Parking brake release press.	MPa {kgf/cm²}	1.57 {16}	1.1 {11}	1.54 {15.7}
Parking brake chamber allowable press.	MPa {kgf/cm²}	41.2 {420}	4.9 {50}	41.2 {420}
Set press. of auto speed select	MPa {kgf/cm²}	Approx. 27.4 {280} Pilot press. 4.9 {50}	0.4 {4} or less 1.5 {15} or more	Approx. 27.4 {280} Pilot press. 4.9 {50}
Brake valve spool switch press.	MPa {kgf/cm²}	0.59 ~ 0.95 {6 ~ 9.7}	0.48 ~ 0.88 {4.9 ~ 9}	0.59 ~ 0.98 {6 ~ 10}
Check valve cracking press.	MPa {kgf/cm²}	0.018 {0.18}	0.03 {0.3}	0.01 {0.1}
Oil qty. in casing	L	0.7	0.5	1.5
Reduction ratio		41.46	43.246	39.875
Output torque of 1st speed	kN•m {kgf•m}	35.0 {3570}	40.2 {4100}	57.2 {5830}
Output torque of 2nd speed	kN•m {kgf•m}	23.5 {2400}	25.0 {2550}	32.8 {3350}
Revolution at 1st speed	min^{-1} {rpm}	32.81 at 210 L/min	32.6 at 240 L/min	24.83 at 260 L/min
Revolution at 2nd speed	min^{-1} {rpm}	48.84 at 210L/min	50.5 at 240 L/min	43.32 at 260 L/min
Oil qty. in reduction	L	5.5	3.5	10.5
Rotating direction (Viewed from valve side)		VA Port inlet: RH VB port inlet: LH	P1 Port inlet: RH P2 Port inlet: LH	VA Port inlet: RH VB Port inlet: LH
Weight	Approx. kg	238	290	360

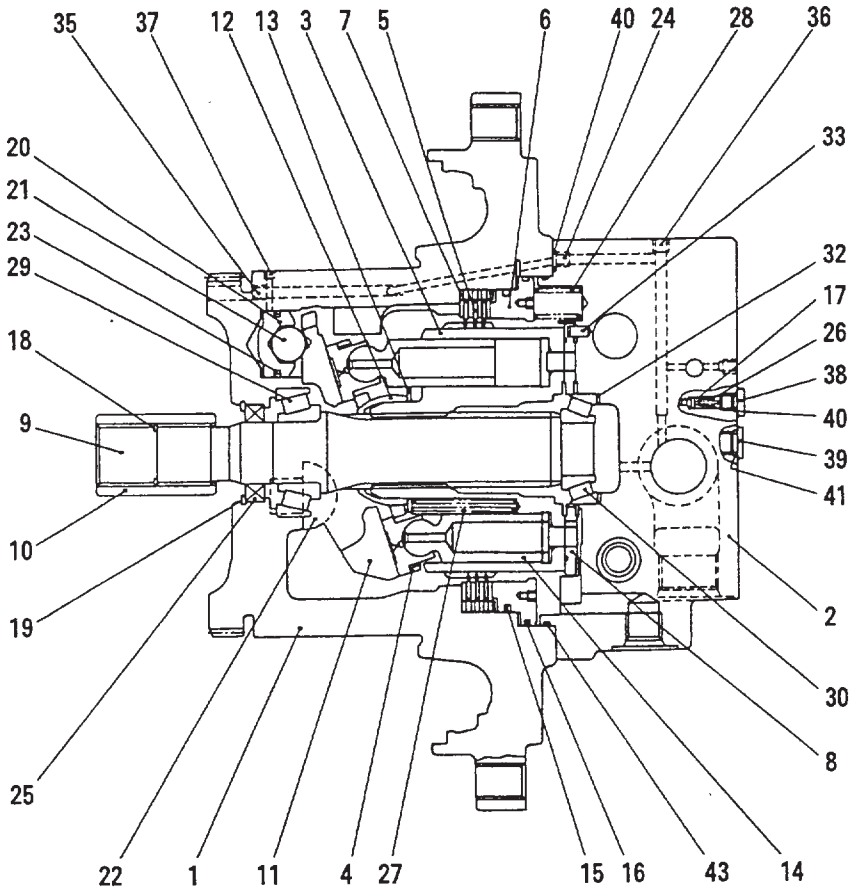
3. Hydraulic diagram

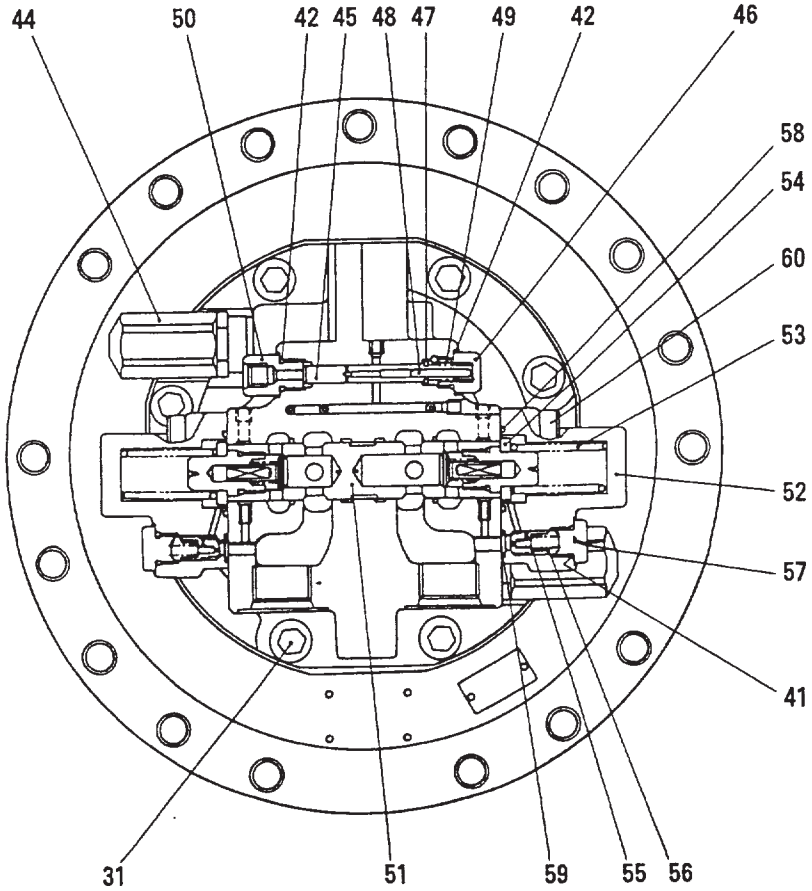


https://truckmanualshub.com/

4. Structure

① Travel motor





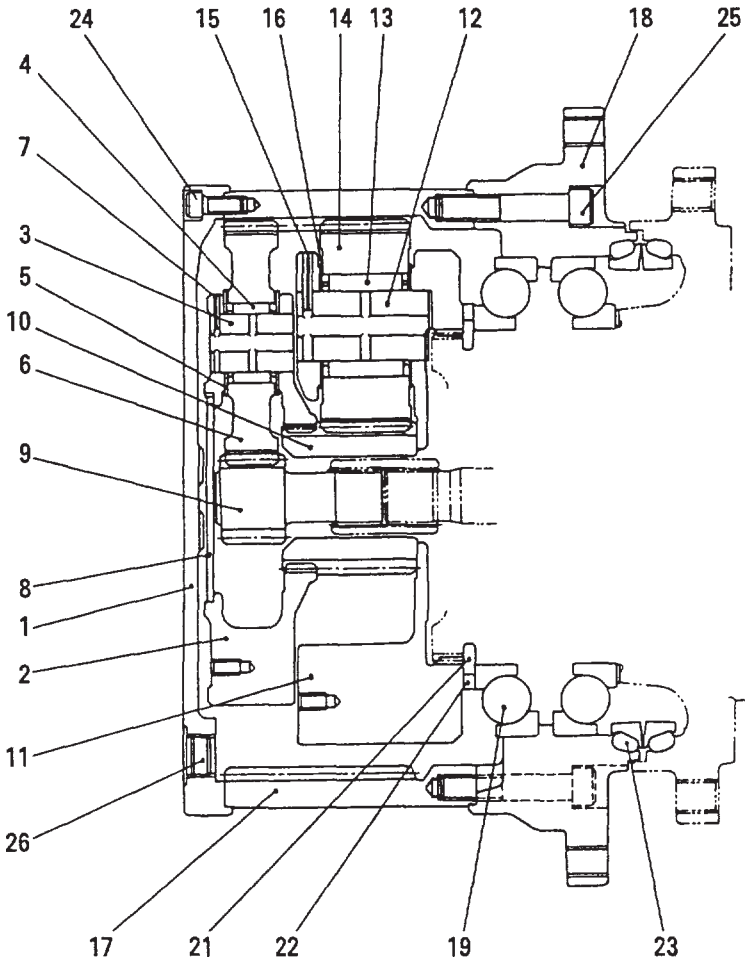
https://truckmanualshub.com/

Code	Name	Qty.
1	Case	1
2	Cover	1
3	Cylinder block	1
4	Shoe retainer	1
5	Friction plate	3
6	Brake piston	1
7	Separator plate	4
8	Valve plate	1
9	Shaft	1
10	Coupling	1
11	Shoe plate	1
12	Ball joint	1
13	Spring seat	1
14	Piston assy	9
15	Ring	1
16	Ring	1
17	Check valve	3
18	Retaining ring	1
19	Retaining ring	1
20	Piston	1
21	Ball	1
22	Pivot	2
23	Piston seal	1
24	Orifice	2
25	Oil seal	1
26	Spring	3
27	Spring	9
28	Spring	12
29	Bearing	1
30	Bearing	1
31	Socket bolt	8
32	Shim	2
33	Pin	1
35	Plug	1
36	Plug	10
37	Plug	1
38	Plug	3
39	Plug	2
40	O-ring	5
41	O-ring	4
42	O-ring	2
43	O-ring	1
44	Overload relief valve assy	2
45	Spool	1
46	Plug	1
47	Spring seat	1
48	Pin	1

Code	Name	Qty.
49	Spring	1
50	Connector	1
51	Spool assy	1
52	Cover	2
53	Spring	2
54	Spring seat	2
55	Valve	2
56	Spring	2
57	Plug	2
58	O-ring	2
59	O-ring	2
60	Socket bolt	8

https://truckmanualshub.com/

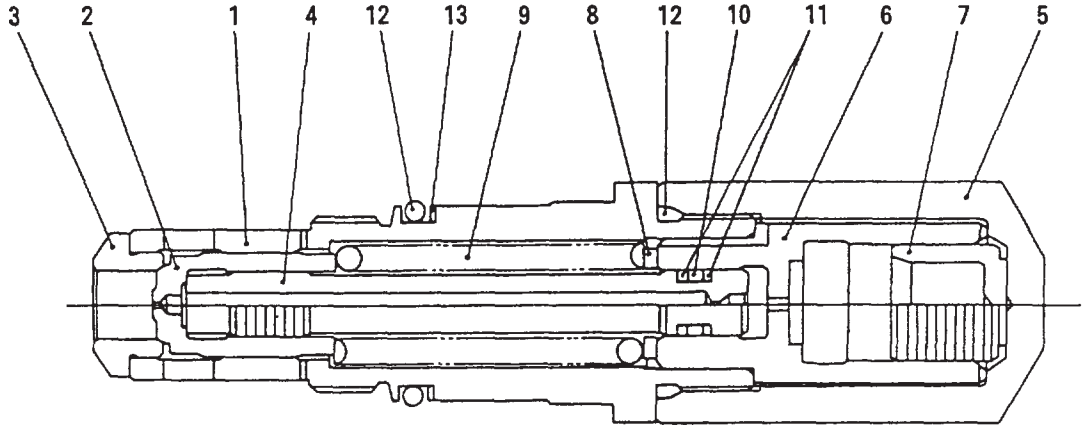
② Reduction assy



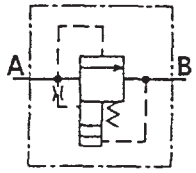
Item \ Model		SK210	SK250	SK330
Type		M2X120B-CHB-10A-37/285	M2X146B-CHB-10A-15/300	M2X210CHB-10A-39M/280-197
Displacement	cc/rev	121.6	145.9	197
Working pressure	MPa {kgf/cm²}	27.9 {285} at 179 L/min	29.4 {300} at 207 L/min	27.4 {280} at 235 L/min
Max. flow rate	L/min	179	207	235
Rated speed	min^{-1} {rpm}	1,400 {1,400}	1,600 {1,600}	1,284 {1,284}
Output torque	N•m {kgf•m}	665 {67.8} at 350 kgf/cm²	767 {81.3} at 350 kgf/cm²	859 {87.8} at 280 kgf/cm²
Brake torque	N•m {kgf•m}	540^{+110}_{0} {55^{+11}_{0}}	776 {79.2}	875^{+245}_{0} {89^{+25}_{0}}
Brake release pressure MPa {kgf/cm²}	Cracking	$2.5^{+0.4}_{0}$ {25^{+4}_{0}}	2.3 {23.7}	$2.3^{+0.5}_{0}$ {23^{+5}_{0}}
	Stroke end	2.8 {29}	2.5 {25.8}	$2.8^{+0.5}_{0}$ {29^{+5}_{0}}
Inner press. of casing	MPa {kgf/cm²}	0.29 {3} or low	←	0.2 {2} or low
Oil quantity in casing	L	0.8	0.9	1.5
Weight	kg	54	66.5	74.5
Type of swing shockless valve		2KAR6P72 / 240-712	2KAR6P72 / 250-712	2KAR6P72 / 240-712
Weight of swing shockless valve		2.5	←	←
Weight (Total)	kg	56.5	69	77

https://truckmanualshub.com/

5. Over load relief valve (Code 70)



Code	Name	Qty.	Code	Name	Qty.
1	Socket	1	8	Shim	1
2	Valve	1	9	Spring	1
3	Valve seat	1	10	O-ring	1
4	Piston	1	11	Back up ring	2
5	Cap	1	12	O-ring	2
6	Plunger	1	13	Back up ring	1
7	Piston	1			

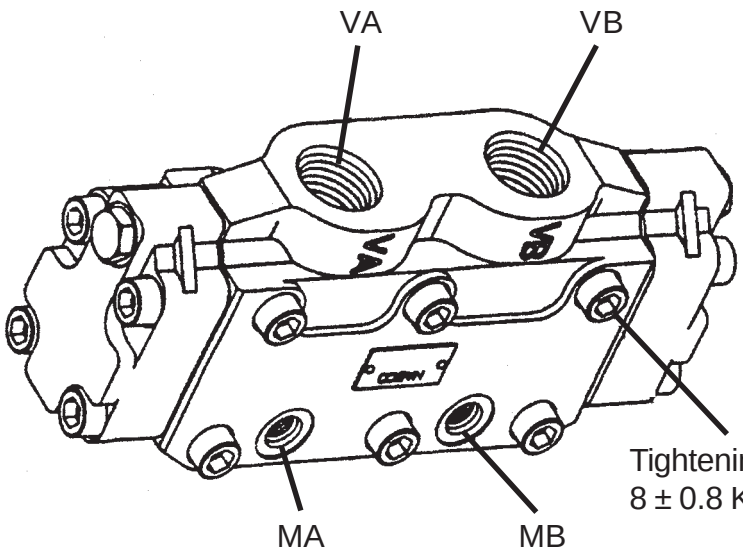


Hydraulic diagram

Item	Unit	Specifications
Type		ORV-240L3
Max. working press.	MPa {kgf/cm²}	41.2 {420}
Setting pressure	MPa {kgf/cm²}	40.7 {415} or low at 50 L/min
Cracking rpessure	MPa {kgf/cm²}	35.8 ~ 37.3 {365 ~ 380} at 1 L/min
Boosting initial pressure	MPa {kgf/cm²}	9.8 ~ 24.5 {100 ~ 250}
Max. flow rate	L/min	240
Boosting time	sec	Max. 0.28

Note: Standard thickness of the shim is 2mm in condition of cracking pressure.
This illustration shows the case of SK210. Refer to the Parts Manual for other machine models.

https://truckmanualshub.com/



Port Name	Port Diameter	Tightening Torque Kgf-m (Ft. Lbs)	Function
VA	PF1	25 ± 2 (180 +14 -0)	Drive pressure circuit port
VB	PF1	25 ± 2 (180 +14 -0)	Drive pressure circuit port
MA	PF 1/4	3.7 ± 2 (27 ± 1)	Pressure measuring port
MB	PF 1/4	3.7 ± 2 (27 ± 1)	Pressure measuring port

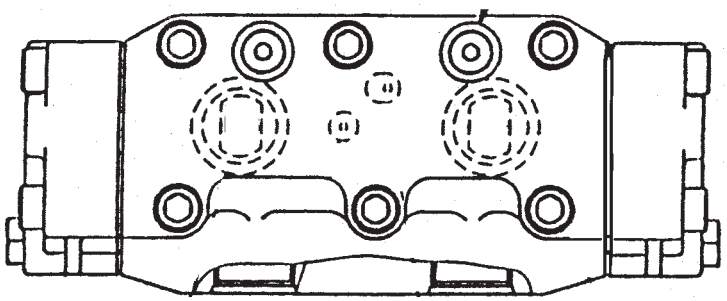
Major Specifications

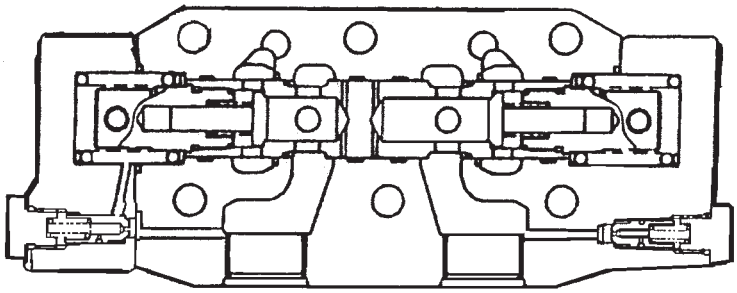
Item	Model	RBV - 24D
Rated Pressure	Kgf/cm (psi)	355 (5050)
Rated Flow	L/min (gal/min)	240 (63)
Spool Switching Pressure	Kgf/cm (psi)	6 - 10 (85~140)
Check Valve Cracking Pressure	Kgf/cm (psi)	0.3 (4.0)
Weight	Kg (Lbs)	11Kg (24 Lbs)

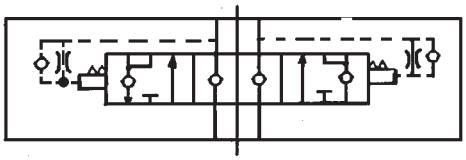
Typical of SK210

https://truckmanualshub.com/

Brake Valve Construction







1	Body
2	Spool
3	Spring Seat
4	Spring
7	Cover
8	Restrictor
9	Spring
10	Plug
12	Socket Bolt
14	Socket Bolt
MB	Pressure Measuring Port
MA	Pressure Measuring Port
VA	Drive Pressure Circuit Port
VB	Drive Pressure Circuit Port
T	Open to Hydraulic Tank
P	Parking Brake

T

Typical of SK210

https://truckmanualshub.com/

Brake Valve Function

The Brake Valve controls the flow of oil into and out of the hydraulic travel motor in the following conditions:

Brake Holding: in neutral position the brake valve function is to keep the hydraulic motor from turning.

Motor Acceleration: when the brake valve is not in the neutral position the motor is able to turn.

Stopping the motor: when brake valve is brought to neutral the flow of oil to the motor is shut off and the motor is no longer able to turn.

Counter balancing: to slowly de-celerate the hydraulic motor that is rotating by external forces applied to the motor, causing the motor to become a pump.

Three major components to safeguard the hydraulic motor:

Break Spool

Shifting of brake spool to allows the brake valve to:

a. Supply oil to the hydraulic motor
b. Shut off the flow of oil to the hydraulic motor
c. Restrict the flow of oil discharged to the hydraulic motor

This allows the hydraulic motor to:

a. Accelerate
b. Stop, hold
c. Counterbalance

Check Valve (built in the brake spool)

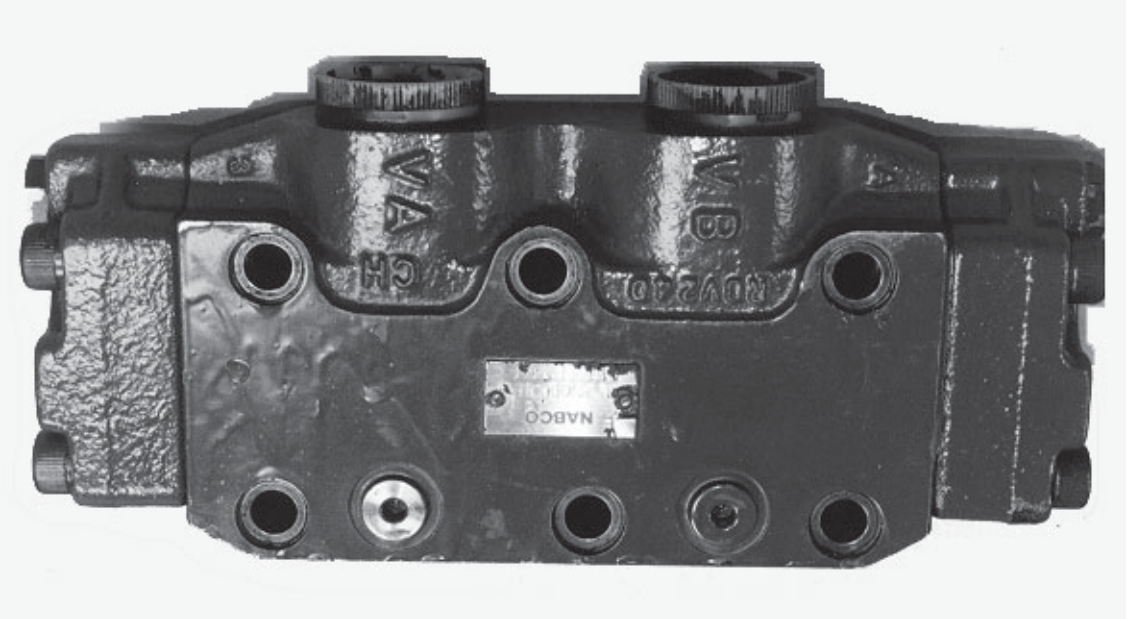
The check valve serves as an oil feeding path to the hydraulic motor, stops the oil discharged from the hydraulic motor, acts as a suction (anti-cavitation) valve for the hydraulic motor, and a holding valve.

Relief Valve (located in the hydraulic motor)

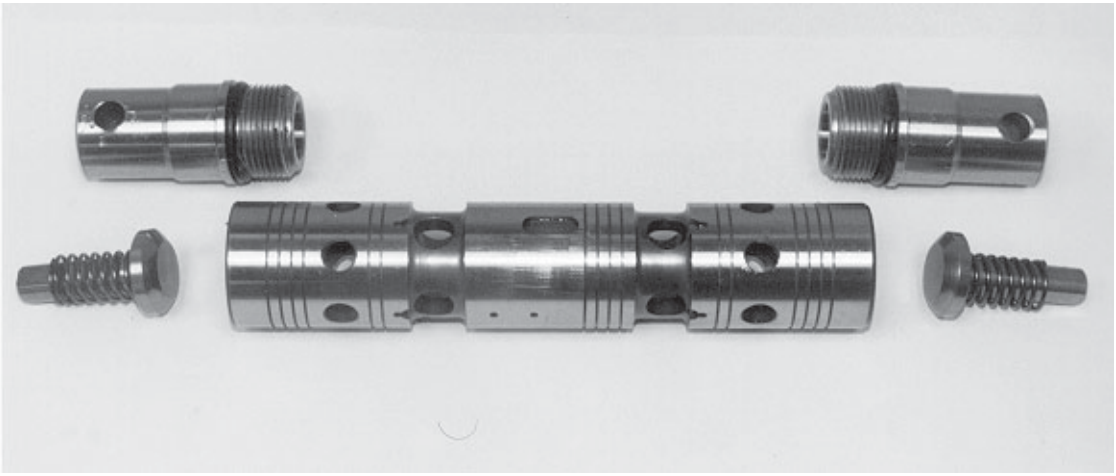
Each motor assembly has two relief valves which work with the brake valve to protect the motor. When oil under pressure at the discharge path of the hydraulic motor reaches a set point, the relief valve bypasses high pressure oil to either of the low pressure paths to safeguard the circuit.

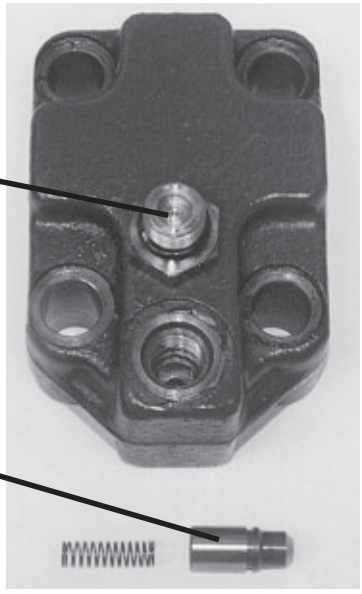
Typical of SK210

https://truckmanualshub.com/



Brake Valve Assembly





2		Brake Valve Spool
2a		Check Valve
4a	VA	Drive Pressure Circuit Port
4b	VB	Drive Pressure Circuit Port
3a	MA	Pressure Measuring Port
3b	MB	Pressure Measuring Port
8		Restrictor & Check Valve

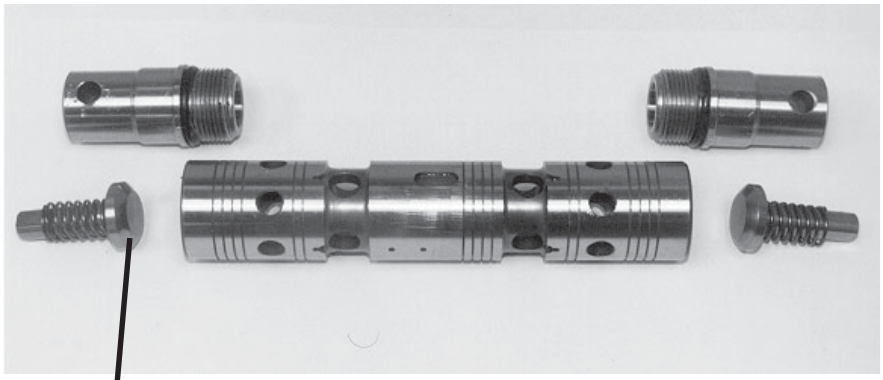
Typical of SK210

https://truckmanualshub.com/

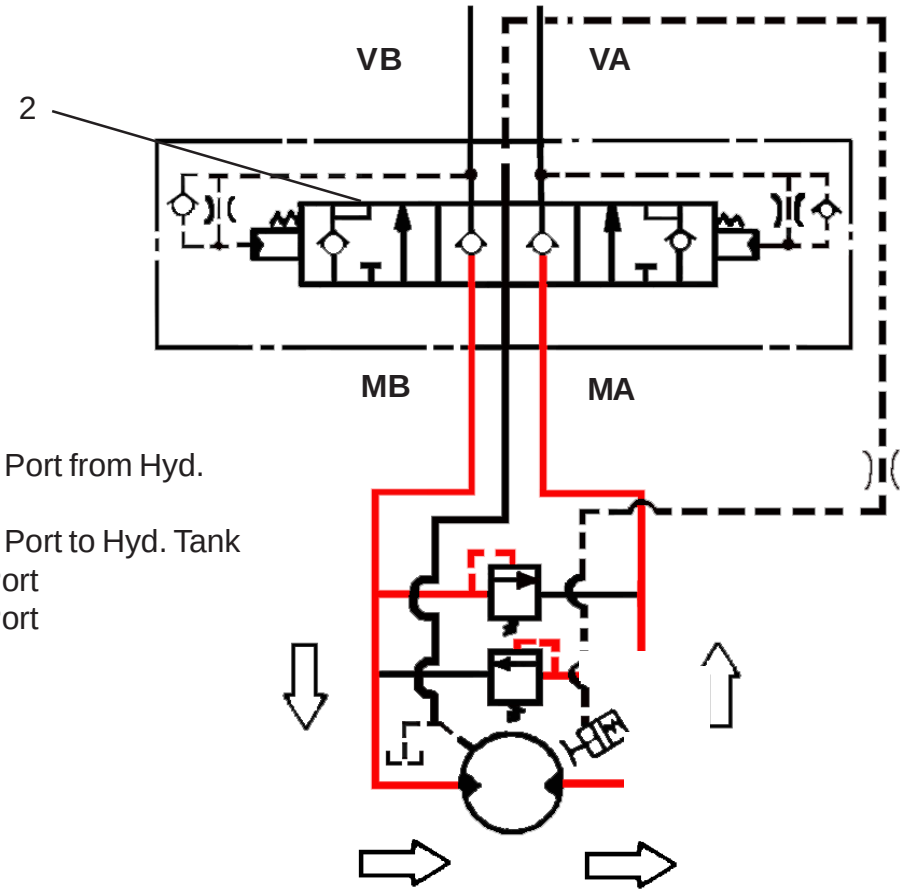
Brake Valve (Stop Operation)

When the flow of oil to the brake valve is shut off, oil pressure in the pilot chambers on both sides of the brake valve spool are equalized, causing brake spool (2) to return to its neutral position by the action of return springs (4). The hydraulic tank will supply oil to both ports VA and VB with the brake valve spool in neutral.

With brake valve spool in neutral, oil path MA→VA is shut off, and oil flow to port P (travel motor parking brake) is shut off. The spring applied hydraulic release travel motor parking brake mechanically stops the travel motor from turning. Movement of the excavator (inertia) will attempt to rotate the hydraulic motor. The hydraulic motor turned by inertia continues to discharge oil from the hydraulic motor to port MB. The trapped oil at port MB will restrict the movement of the hydraulic motor until the oil at port MB actuates the MB port relief valve.



Check Valve in Spool 2



VA	Drive Pressure Circuit Port from Hyd. Pump
VB	Drive Pressure Circuit Port to Hyd. Tank
MA	Pressure Measuring Port
MB	Pressure Measuring Port
2	Brake Valve Spool

https://truckmanualshub.com/

Brake Valve (Counterbalancing)

Counterbalancing action is required to keep a positive pressure at the inlet of the hydraulic motor by restricting the oil discharged from the hydraulic motor.

Counterbalancing prevents over-speeding of the hydraulic motor, example; The excavator is traveling downhill, the weight of the machine on an incline removes the positive pressure at the inlet of the motor. The hydraulic motor is in an over-speed or run-a-way condition.

Note: The hydraulic motor will loose the positive pressure at the inlet in a **slow turn**.

To stop the hydraulic motor from cavitating, the brake valve spool will shift, restricting the flow of oil from the hydraulic motor. Pressure in the pilot chamber on the path MA→VA (inlet) drops, and brake valve spool (2) is pushed to the right (restricted position) by the action of spring (4). As a result, pressure at MB (outlet) increases, thus the hydraulic motor is subjected to a braking action.

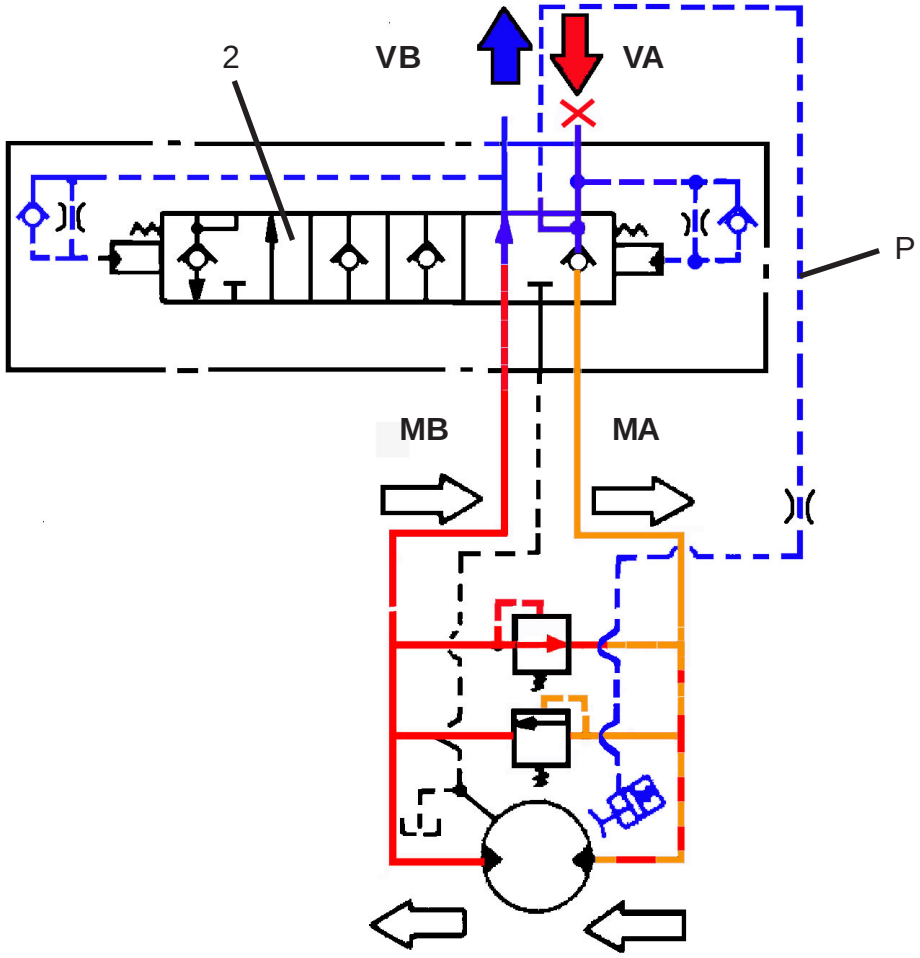
If the volume of oil supplied to hydraulic motor is reduced below the amount of oil the hydraulic motor can displace, the pressure in the pilot chamber on the VA (inlet) port drops, causing spool (2) to move right due to spring action on the left hand side of the spool.

The result is that the braking action of the counterbalance valve is increased, and the revolution of the hydraulic motor is regulated to a level equal to the oil supply at path MA→VA (inlet).

To dampen the movement of brake spool (2), two restrictor's (8) are built in the pilot chamber of the brake valve assembly . This restrictor is located in each of the brake valve caps to provide steady counterbalancing action.

https://truckmanualshub.com/

Brake Valve (Counterbalance)



VA	Drive Pressure Circuit Port from Hyd. Pump
VB	Drive Pressure Circuit Port to Hyd. Tank
MA	Pressure Measuring Port
MB	Pressure Measuring Port
2	Brake Valve Spool

Typical of SK210

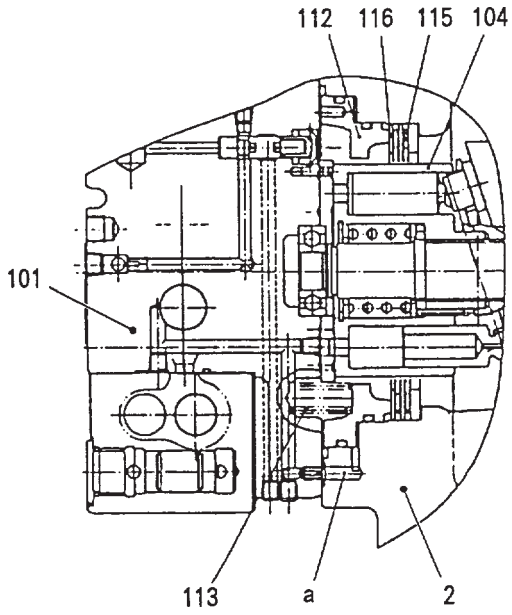
https://truckmanualshub.com/

6. Operation of travel motor

(1) Parking brake

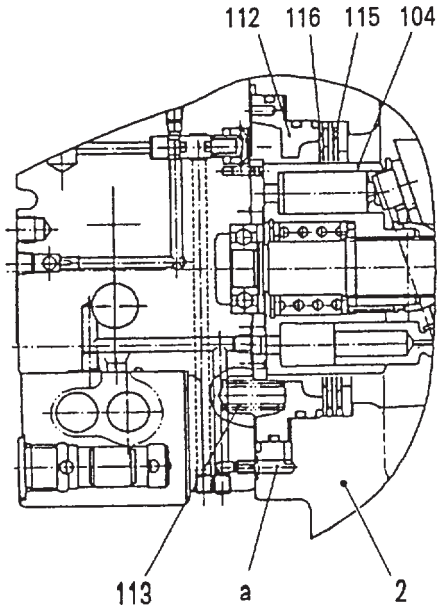
1) When traveling (when brake is released)

1. After pressure oil has been feed into from brake valve, spool (123) of brake valve in hydraulic motor section starts operating, the passage to parking brake opens, and the oil flows into cylinder chamber (a) made up of spindle (2) and piston (112).
2. When the oil pressure is increased 8 kgf/cm² or higher, the pressure rises higher than the force of spring, and moves piston (112) to rear flange (101) side.
3. With movement of piston (112), the pushing force to separator plate (116) and friction plate (115) dies out, the friction plate (115) which is placed in cylinder block of hydraulic motor section can be freely moved, and braking force to cylinder block is released.



2) When Stopping (when brake is operated)

1. Pressure oil from brake valve is cut off, and when the pressure in cylinder chamber (a) is 8 kgf/cm² or lower, piston (112) tends to return due to the force of spring (113).
2. The piston (112) is pushed by the force of spring (113), and pushes the separator plate (116) and friction plate (115) in free condition to spindle (2) on reduction unit.
3. The frictional force caused by the pushing force stops rotating force of cylinder block (104), and transmits braking torque (18.2 kgf·m) to hydraulic motor shaft.
4. This braking torque stops rotation of hydraulic motor.
5. In addition, the flow rate of oil is regulated with appropriate oil passage, enabling the smooth operation.

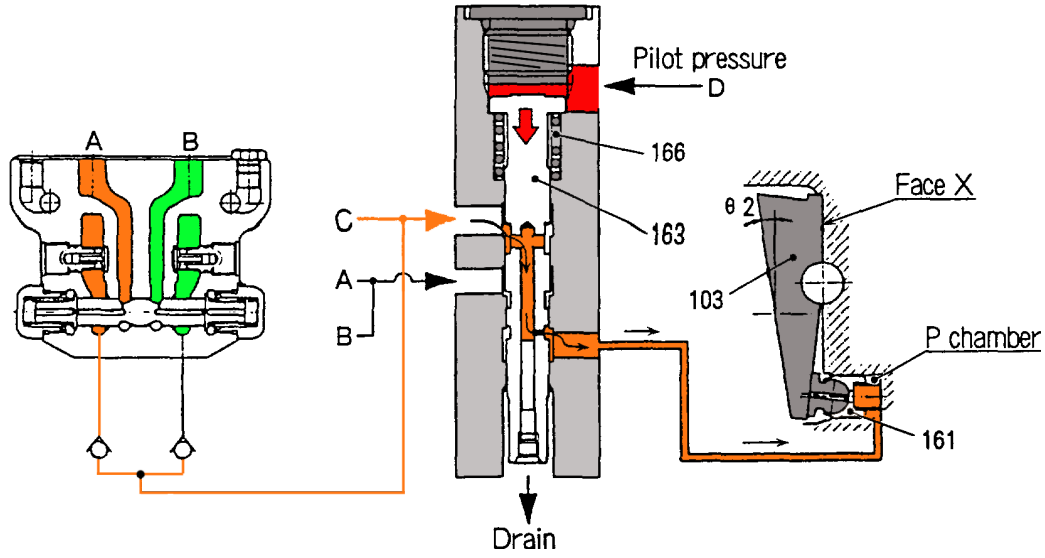


https://truckmanualshub.com/

(2) Auto two (High/Low) speed change mechanism

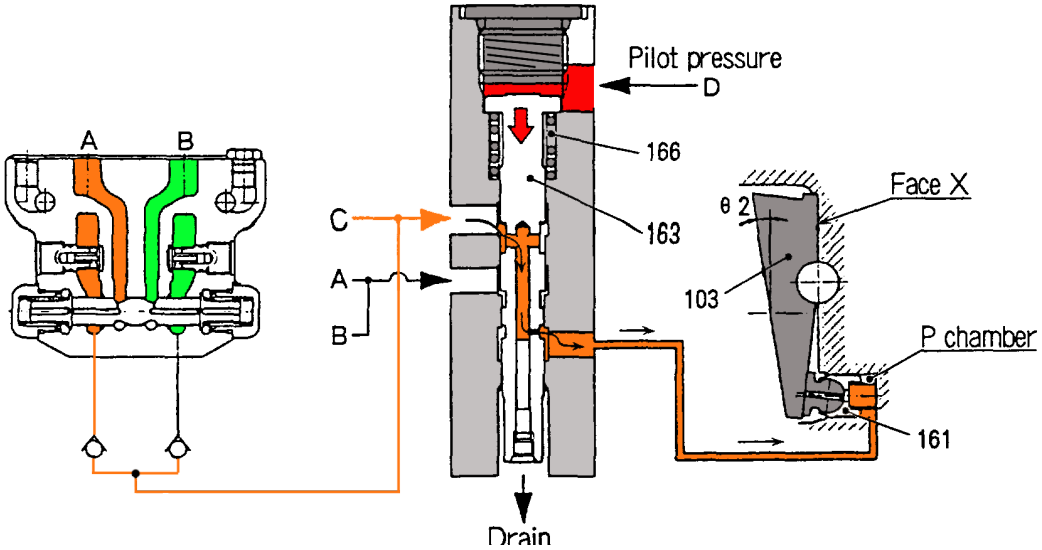
1) At low speed

1. When the pilot pressure is not supplied through port (D), spool (163) is pushed up by spring (166) force or the oil pressure through port (A) or (B), the pressure oil through port (C) is cut, and the oil in P chamber flows into the drain (motor case) through spool (163).
2. Consequently, the tilting angle of swash plate (103) increases to the maximum, and the motor speed slows down.



2) At high speed

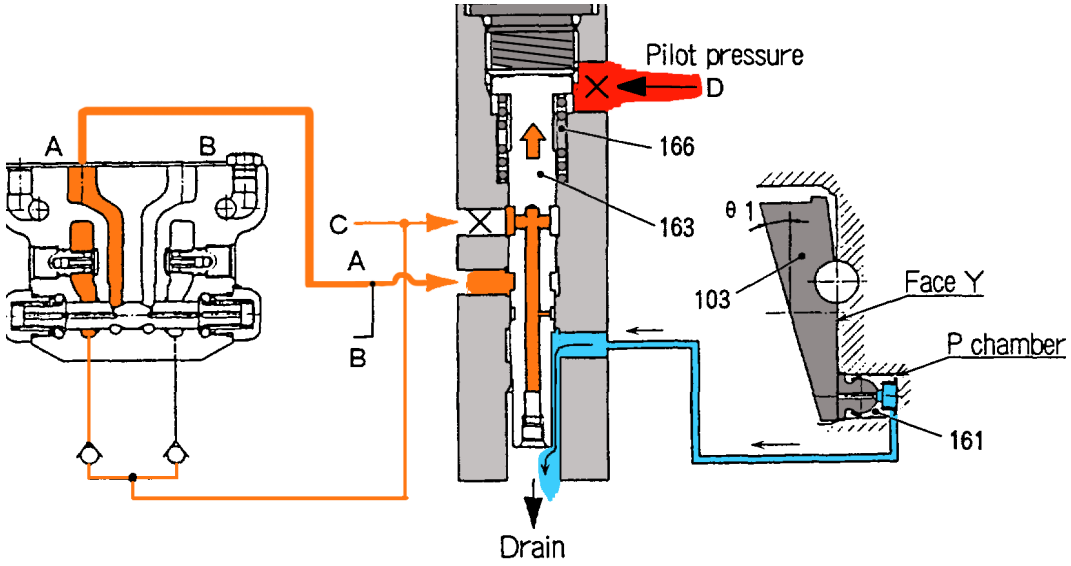
1. When the pilot pressure (50 kgf/cm²) is supplied through port (D), spool (163) is pushed down by spring (166) force or the oil pressure through port (A) or (B), the pressure oil through port (C) is led into (P) chamber, and the piston (161) is pushed up to the position where swash plate (103) is brought in contact with the face X and maintained.
2. Then the tilting angle of swash plate (103) is of the minimum, and the stroke capacity of

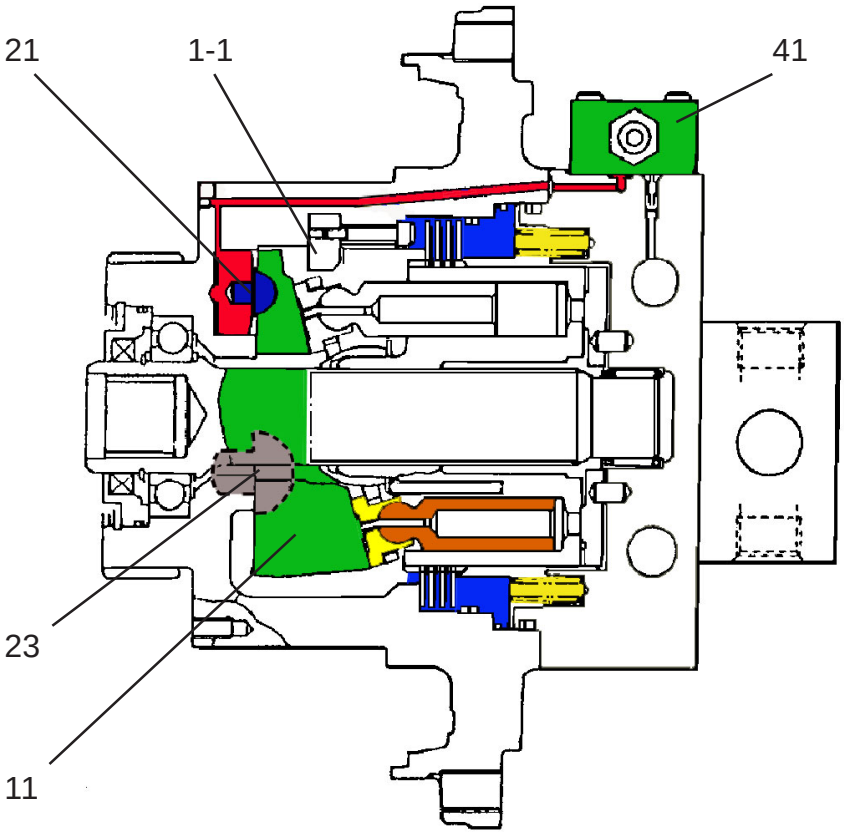


https://truckmanualshub.com/

3) Auto speed change from high speed to low speed

1. As the load rises while traveling at high speed, the quantity of oil pressure at (A) and (B) ports is also raised, and if the pressure reaches 290 kgf/cm², the pressure rises higher than the pilot pressure (50 kfg/cm²) at (D) port ;and spool (163) is pushed up, and the oil in P chamber flows into the drain (motor case) through spool (163).
2. Then, swash plate (103) comes into contact with the face Y of spindle (2), the max. tilting angle is maintained, and consequently the motor speed reduces.





1-1 Stopper
11 Swash Plate
21 Piston
23 Pivot Balls
41 Pilot Selector Valve

https://truckmanualshub.com/

https://truckmanualshub.com/

Table of contents

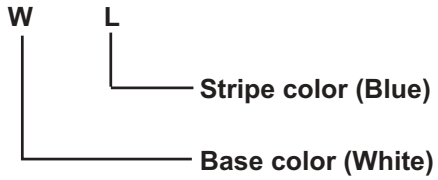
Page

A. SK160LC/ED190 ELECTRICAL SCHEMATICS.....4Pages
B. SK210LC~SK330LC-6E ELECTRICAL SCHEMATICS.....3Pages

SCHEMATIC NOMENCLATURE

SYMBOL	COLOR
B	Black
G	Green
L	Blue
R	Red
W	White
Y	Yellow
P	Pink
O	Orange
Br	Brown
Lg	Light Green
Gr	Gray
Sb	Sky blue
V	Violet

Example of wire color:



Abreviations:

BZ: Buzzer
SV: Solenoid valve
SW: Switch
SE: Sensor
M: Motor
R: Relay
L: Light
PSV: Proportional solenoid valve
D: Diode
E: Electrical fitting

C. SK160LC-6E HYDRAULIC CIRCUIT DIAGRAM.....1Page
D. SK210LC/SK250LC-6E HYDRAULIC CIRCUIT DIAGRAMs.....23Pages
E. SK290LC/-6E NEUTRAL HYDRAULIC CIRCUIT DIAGRAM.....1Page
F. SK330LC/-6E NEUTRAL HYDRAULIC CIRCUIT DIAGRAM.....1Page

HYDRAULIC SCHEMATIC LEGEND	
ITEM #	DESCRIPTION
1	Main Hydraulic Pump
2	Main Control Valve
3	Swing Motor
4	Travel Motor Assy.
5	Boom Cylinder (LH)
6	Boom Cylinder (RH)
7	Arm Cylinder
8	Bucket Cylinder
9	Swivel Joint
10	Left and Right Hand Pilot Control Valves
11	Travel Pilot Control Valve
12	Pilot Filter
13	Hyd. Tank Suction Strainer
14	8 Solenoid Block
15	Hydraulic Return Filter and By-pass Valve
16	
17	Air Breather Valve
18	Hydraulic Return Check Valve

HYDRAULIC SCHEMATIC LEGEND	
ITEM #	DESCRIPTION
19	Hydraulic Return Check Valve
20	Fixed Restrictor Check Valve
21	Fixed Restrictor Check Valve
22	Independent Travel Valve
23	Independent Travel Solenoids
24	Oil Cooler
25	Swing Priority Solenoid Valve
51	Breaker Valve

https://truckmanualshub.com/

https://truckmanualshub.com/

CIRCUITO ELECTRICO — DIAGRAMA (A)

KAI

APLICABLE: YM02U0101~
YL02U0101~
(Before minor change)

E-1:Fusiblera

Control Mecatrónico 1A
Control Mecatrónico 1B
Relé 2
Encendedor de cigarrillos 3
Convertidor (24V-12V) 4
Bocina 5
Respaldo para Control Mecatrónico 7
Luz interna de cabina Respaldo del convertidor 8 9
Interruptor de encendido. 10

50 1.25L
51 2W
52 5R
53 5Y

Control Mecatrónico
C-1 15-26
C-1 15-25

11 YR 1.25 Radio
12 RG 1.25 Luces intermitentes de giro y trabajo (der.), alarma
13 W Monitor, Ventana automática (opcional)
14 RB 1.25 Limpiaparabrisas, Rociador
15 WB Solenoide
16 RW 1.25 Luz de trabajo frontal
17 WL 1.25 Luces de trabajo (Opcional)
18 WG 1.25 Aire Acondicionado
19 RL Aire Acondicionado
20 WR 1.25 Reserva (Usado para la pala)

51 G
E2 B
51 R
E3 B
Protector aislante

B1 A1 60A 60A
B A L B B2
Batería 60B 60B Batería 60B
700 WG

R-1: Relé de baterías

SW-1: Interruptor de encendido
10 10 1.25WV
TERMINAL POSICION PRECALENT. OFF ACC ON START
B ACC M G1 G2 ST

60 WL
D-9
59 W
D-1
D-2
61 GrB
58 P
63 WY

60B

R-3: Relé de pre-encendido
33 2OB
34 5W GLOW
D-4

M-1: Motor de arranque
B M E

R-2: Relé de arranque
B S S
SW 64 LW
D-3
59 W

S E B
R P L
30 GY
65 WR

66 5L
66 L

E-2: Alternador
B E 5B
R P L

R-4: Relé de seguridad

E-3: Horómetro
65 WR H·M B

C-2: Monitor
21-7 Indicador de temp. del motor
21-3
21-4 Nivel de combustible
21-6 B
21-2
21-1
21-8
A M B
LCD
Luz de la pantalla del monitor

SE-14: Sensor de temp. del refrigerante
13 W
600 YR
553 VW 5 C-1 14-8
601 BrR
SE-15: Sensor del nivel de combustible B

R-6: Relé de luces de trabajo
8 85 1.25WB

SENSORES DE PRESION:

SE-16: Potenciómetro acelerador
917 WR(5V) 11-33
517 P 11-32
967 BW(Tierra) 11-31

SE-1: Balde cargando
900 RB (5V) 11-15
500 LgR 11-14
950 BrR (Tierra) 11-13

SE-2: Balde descargando
901 RL (5V) 11-16
501 LgW 11-17
951 BL (Tierra) 11-18

SE-3: Levantamiento de la pluma
902 W (5V) 11-3
502 LgY 11-2
952 BR (Tierra) 11-1

SE-4: Bajado de la pluma
903 OB (5V) 11-4
503 LO 11-5
953 BrW (Tierra) 11-6

SE-7: Retracción del brazo
904 OL (5V) 11-9
504 PG 11-8
954 BrL (Tierra) 11-7

SE-8: Extensión del brazo
905 OW (5V) 11-10
505 PL 11-11
955 Gr (Tierra) 11-12

SE-6: Giro derecho
906 YB (5V) 11-21
506 VY 11-20
956 GrL (Tierra) 11-19

SE-5: Giro izquierdo
907 YG (5V) 11-22
507 VG 11-23
957 Br (Tierra) 11-24

SE-9: Traslación derecha
908 YL (5V) 11-27
508 VY 11-26
958 BY (Tierra) 11-25

SE-10: Traslación izquierda
909 YR (5V) 11-28
509 Sb 11-29
959 BG (Tierra) 11-30

SE-22: Bomba (P1)
915 YL (5V) 12-3
515 V 12-2
965 BrB (Tierra) 12-1

SE-23: Bomba (P2)
916 YR (5V) 12-4
516 L 12-5
966 BrY (Tierra) 12-6

SE-11: P2 Opcional
914 RL (5V) 13-3
514 GO 13-2
964 BL (Tierra) 13-1

SE-20: P1 Opcional
913 RB (5V) 12-9
513 LgR 12-8
963 BW(Tierra) 12-7

15-24
Sistema de carga 65 WR 12-13
Interruptor de encendido activado (ON) 60 WL 12-15
Pre-encendido 61 GrB 12-16

SW-36: Interruptor para la traslación independiente B 540 LG 13-16
SW-3: Interruptor selector de doble velocidad B 541 PL 12-17
SW-21: Interruptor para la potencia auxiliar B 542 GrG 14-11
SW-35: Interruptor de potencia auxiliar para izamiento de cargas B 543 GO 17-9

SE-13: Sensor de RPM del motor
580 R 12-20
581 W 12-21
Protector aislante 12-22

770 R 14-25
582 W 14-26
980 B 14-27
Protector aislante 14-28

hacia 1E-2

C-1: Control mecatrónico

15-1 771 G Fase A
15-2 772 B
15-15 773 R Fase B
15-16 774 W
Protector aislante
15-3 544 GB B
11-34

M-2: Motor de aceleración

TERMINAL POSICION NORMAL LIBERADO
SW-4: Interruptor para liberar el giro
12-18 545 Lg
720 PB B
SV-1: Solenoide para freno de giro
15-22 701 V
15-21 702 LgB B **SV-3:** Solenoide selector de doble velocidad
15-23 703 P B **SV-2:** Solenoide para la potencia auxiliar

15-6 740 BO
15-7 741 GrR
PSV-B: Solenoide proporcional de corte para la segunda bomba (P2)
15-8 742 VR
15-9 743 GrB
PSV-C: Solenoide proporcional para la prioridad de marcha
15-4 744 BP
15-5 745 PW
PSV-D: Solenoide proporcional de corte para la primera bomba (P1)
15-10 746 BrG
15-11 747 YV
PSV-A: Solenoide proporcional para la recirculación variable del brazo

12-19 546 PG

E-4: Resistencia
15 WB

TERMINAL POSICION NORMAL LIBERADO
SW-5: Interruptor para liberar el KPSS
B
756 BrY
15-18 749 GrG
15-17 748 VR
PSV-P1: Solenoide proporcional para la primera bomba (P1)
B
758 BrB
15-20 751 GY
15-19 750 VW
759 RL
PSV-P2: Solenoide proporcional para la primera bomba (P1)

16-1 752 WV
16-2 753 GR
PSV-E: Solenoide proporcional para la traslación independiente
16-3 754 WL
16-4 755 GR
PSV-F: Solenoide proporcional para la traslación independiente

16-7 738 WG
16-8 739 G
PSV-H: Solenoide proporcional para la prioridad de giro

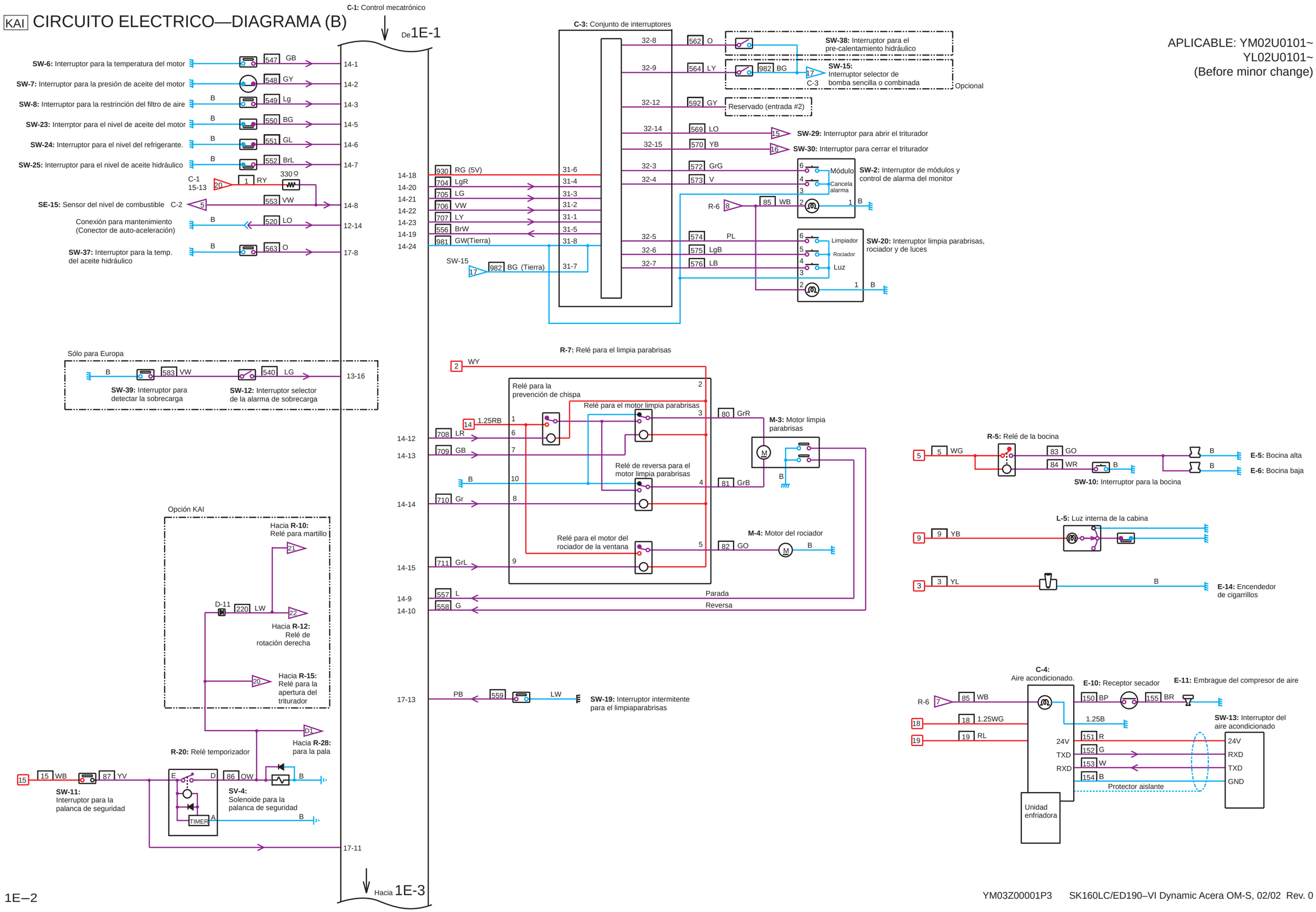
15-12 RY 1A
15-25 E2 B (Tierra) 3
15-13 RY 1B
20 **C-1:** Control mecatrónico (resistencia)

15-26 E3 (Tierra) B 4
15-14 YG 7

https://truckmanualshub.com/

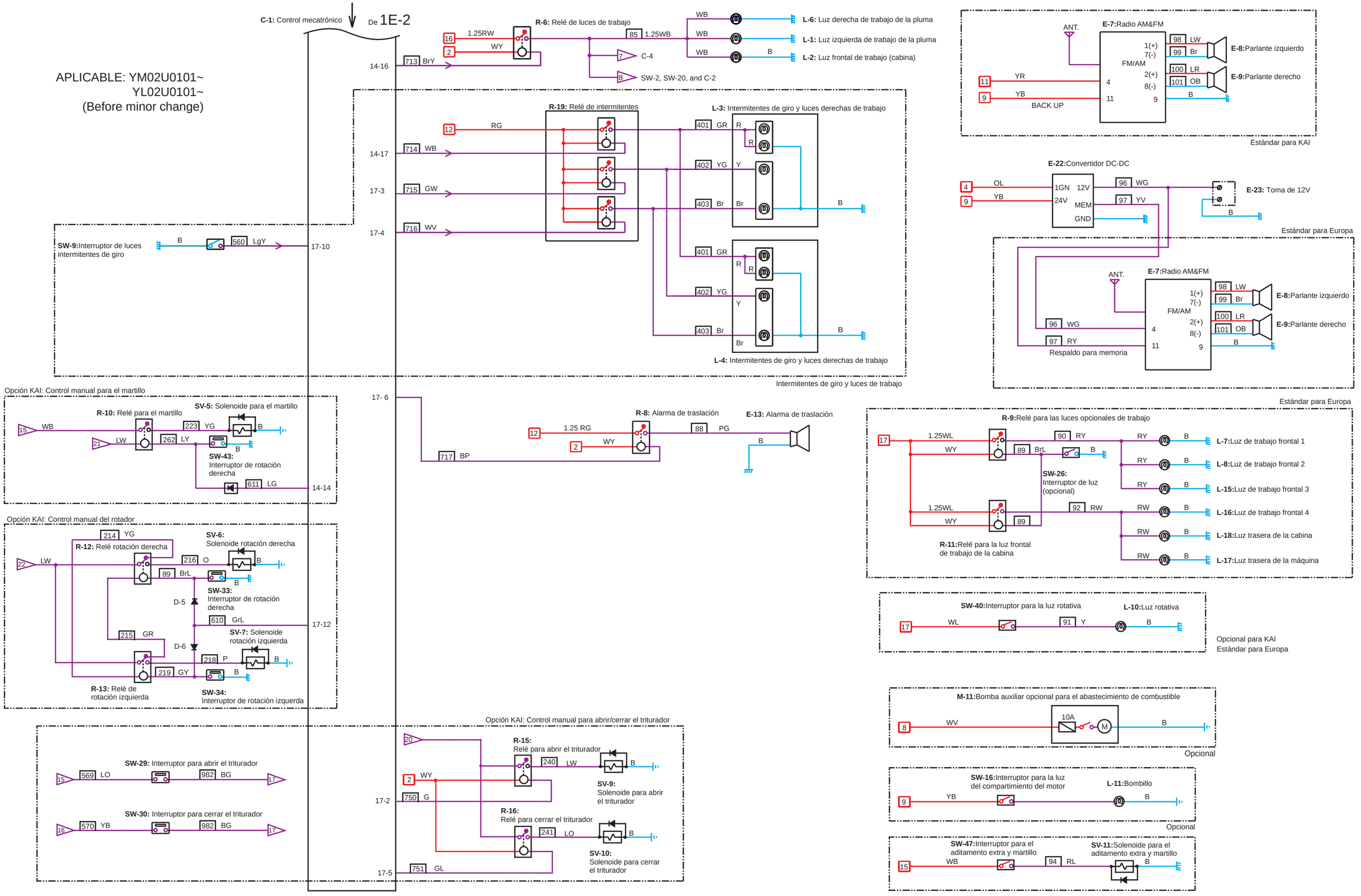
KAI CIRCUITO ELECTRICO—DIAGRAMA (B)

APLICABLE: YM02U0101~
YL02U0101~
(Before minor change)



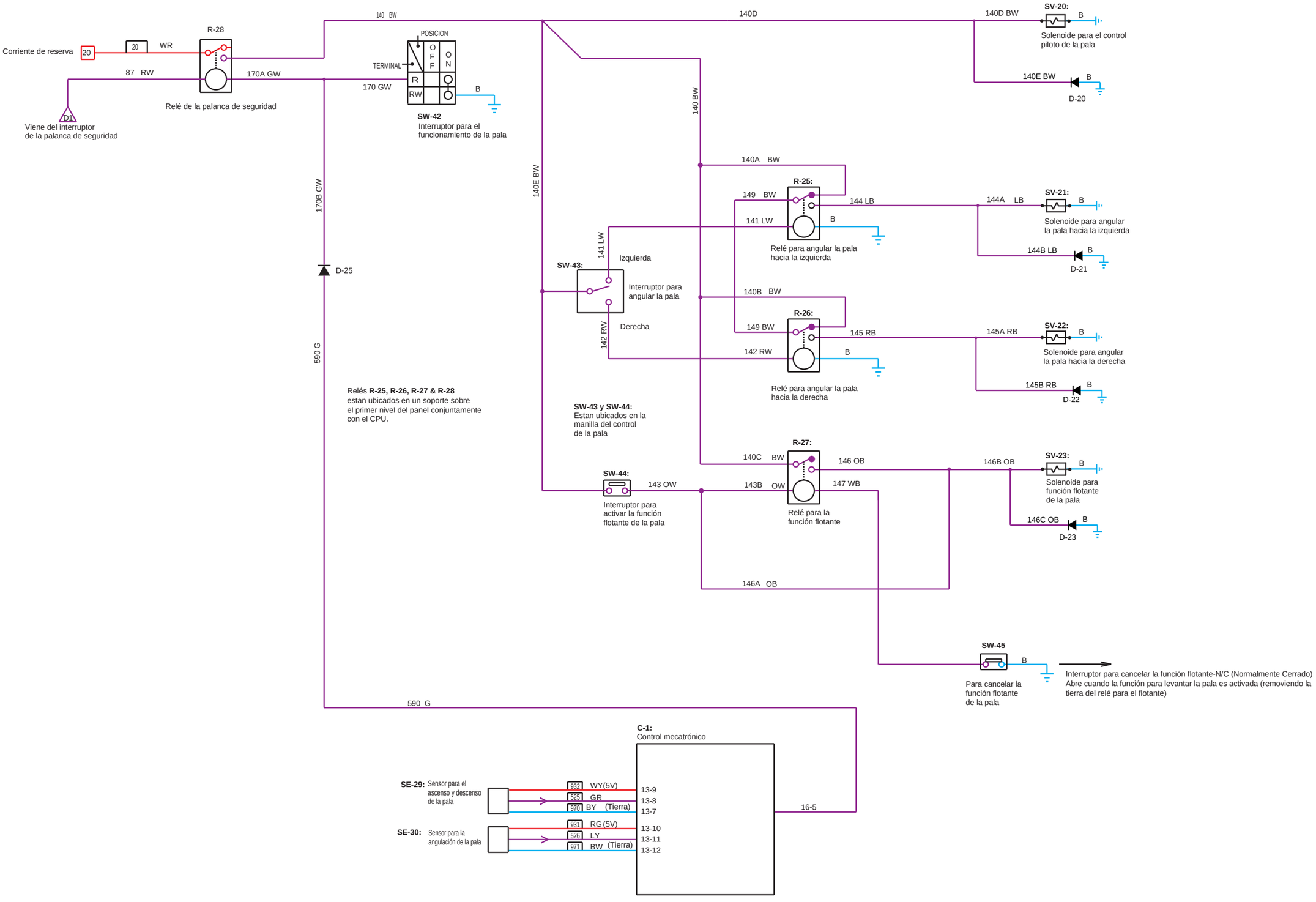
https://truckmanualshub.com/

APLICABLE: YM02U0101~
YL02U0101~
(Before minor change)



APLICABLE: YM02U0101~
YL02U0101
(Before minor change)

https://truckmanualshub.com/



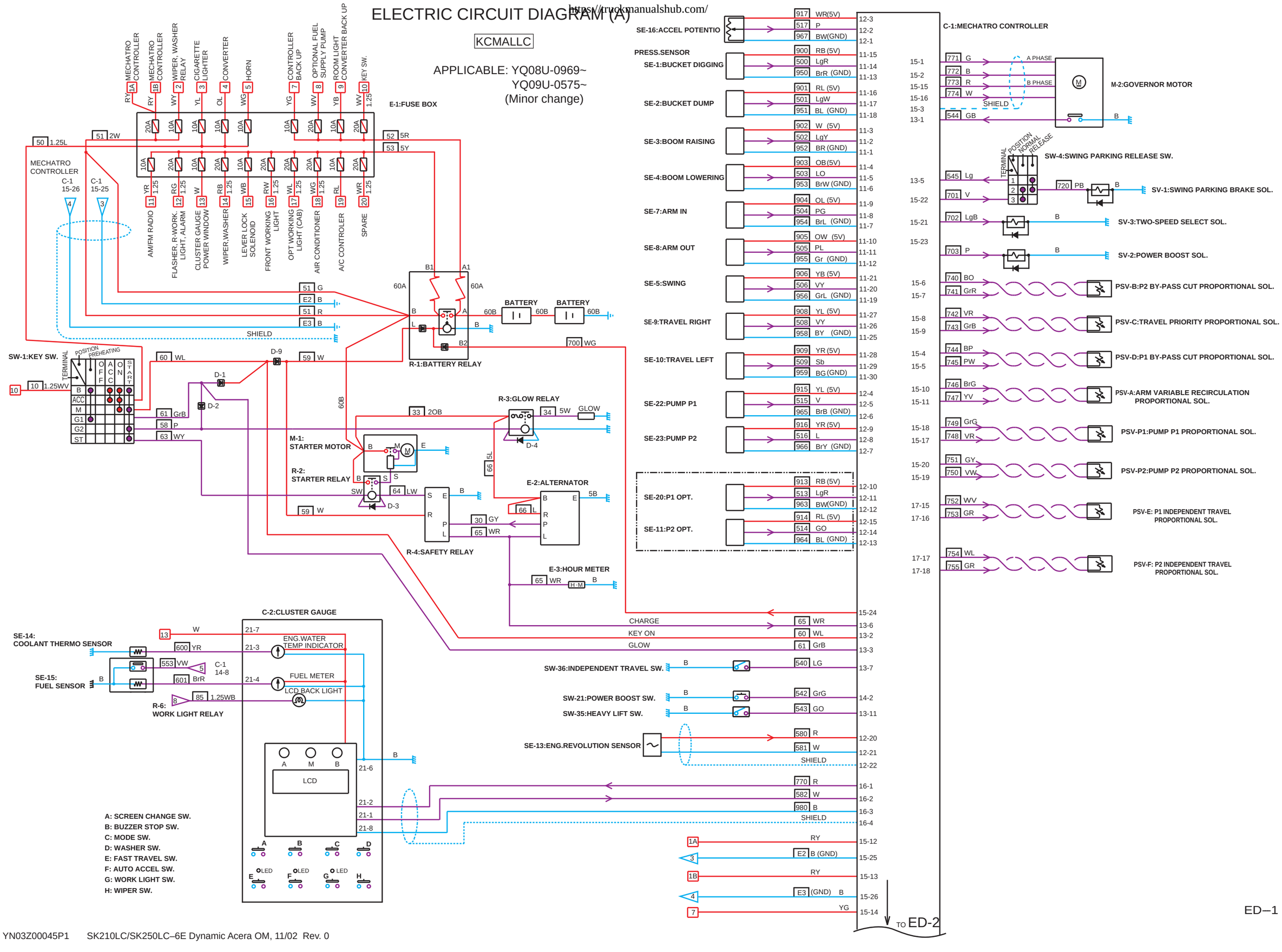
8

https://truckmanualshub.com/

ELECTRIC CIRCUIT DIAGRAM (A)

KCMALLC

APPLICABLE: YQ08U-0969~
YQ09U-0575~
(Minor change)

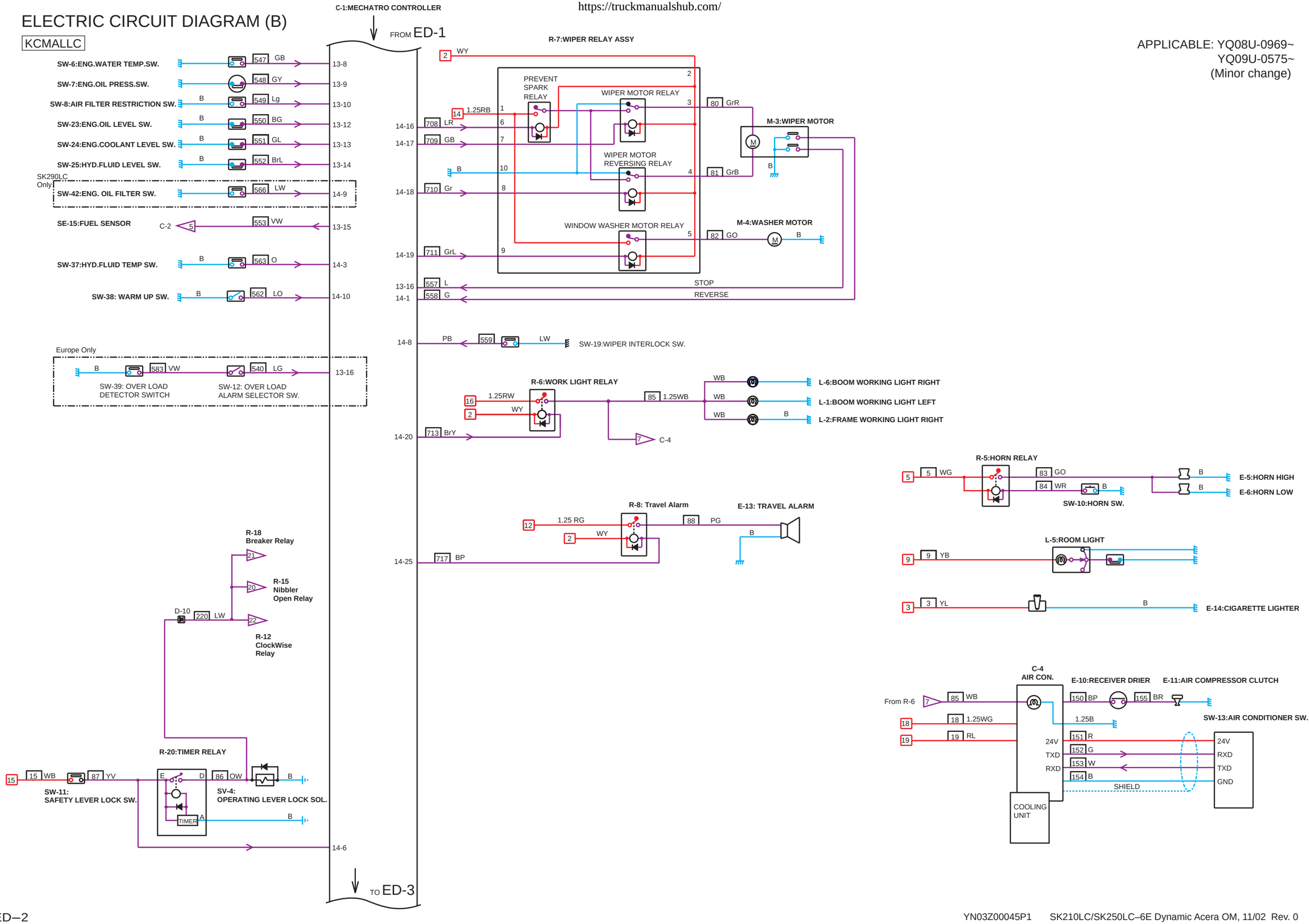


https://truckmanualshub.com/

ELECTRIC CIRCUIT DIAGRAM (B)

KCMALLC

APPLICABLE: YQ08U-0969~
YQ09U-0575~
(Minor change)

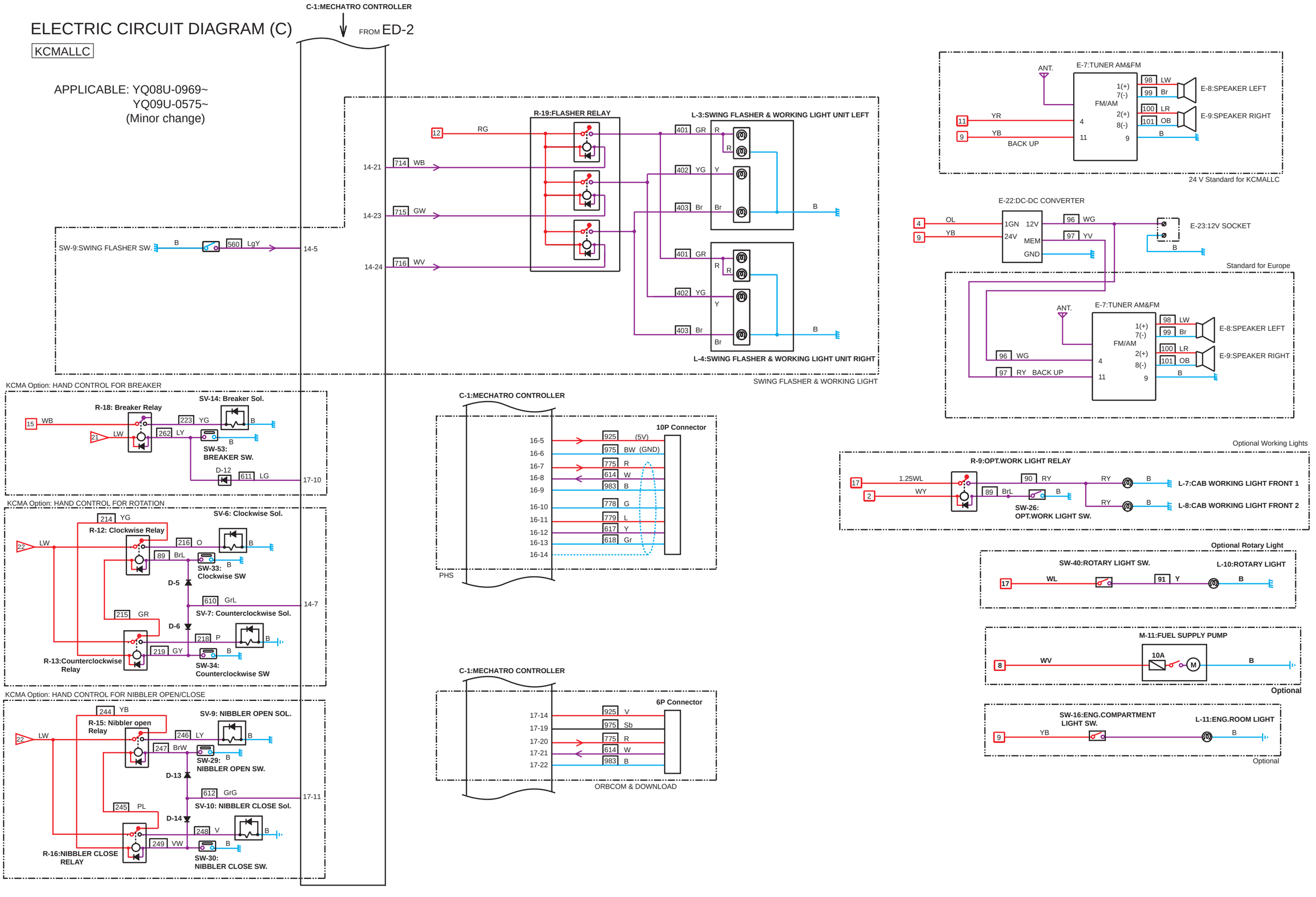


https://truckmanualshub.com/

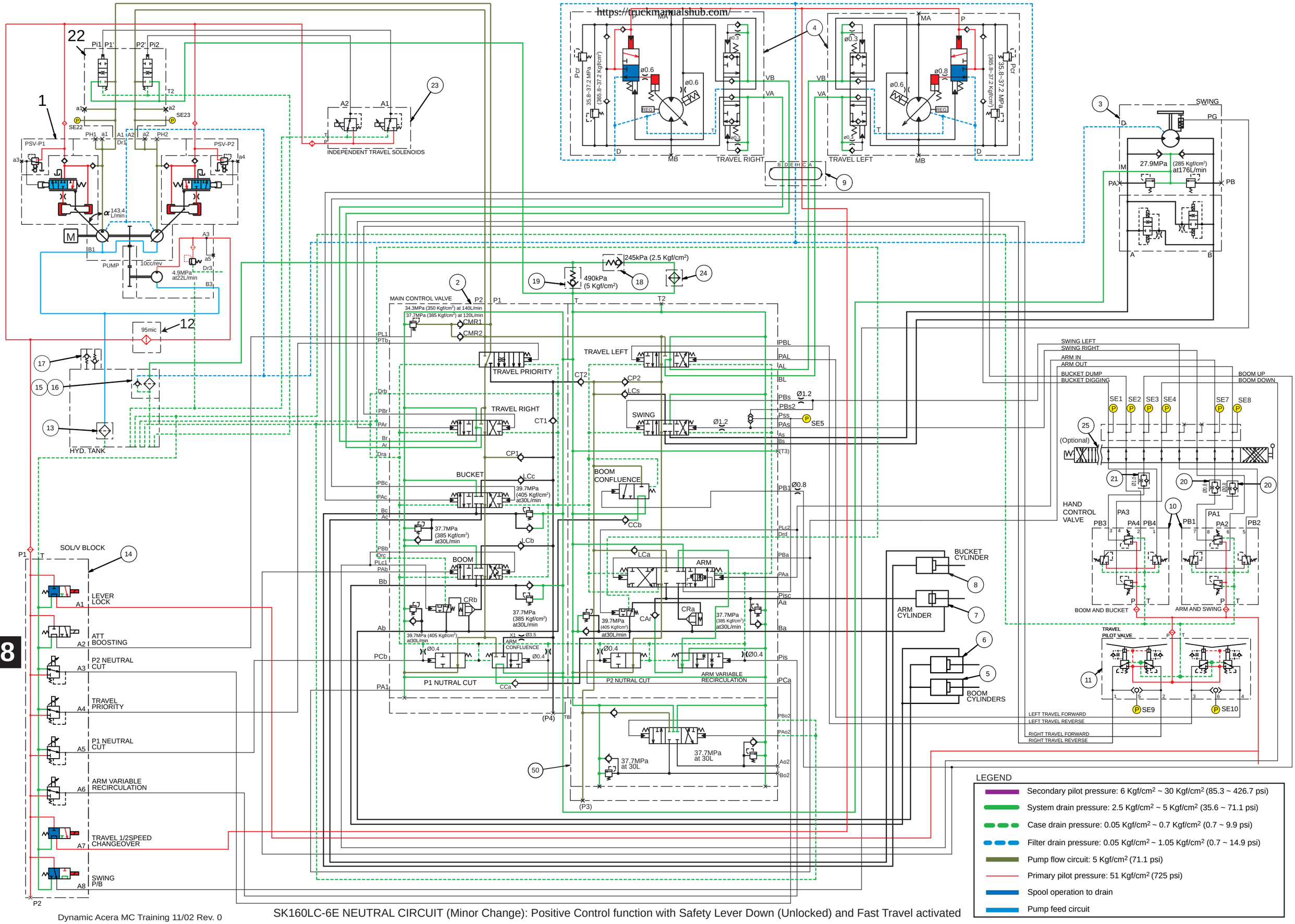
ELECTRIC CIRCUIT DIAGRAM (C)

KCMALLC

APPLICABLE: YQ08U-0969~
YQ09U-0575~
(Minor change)



https://truckmanualshub.com/



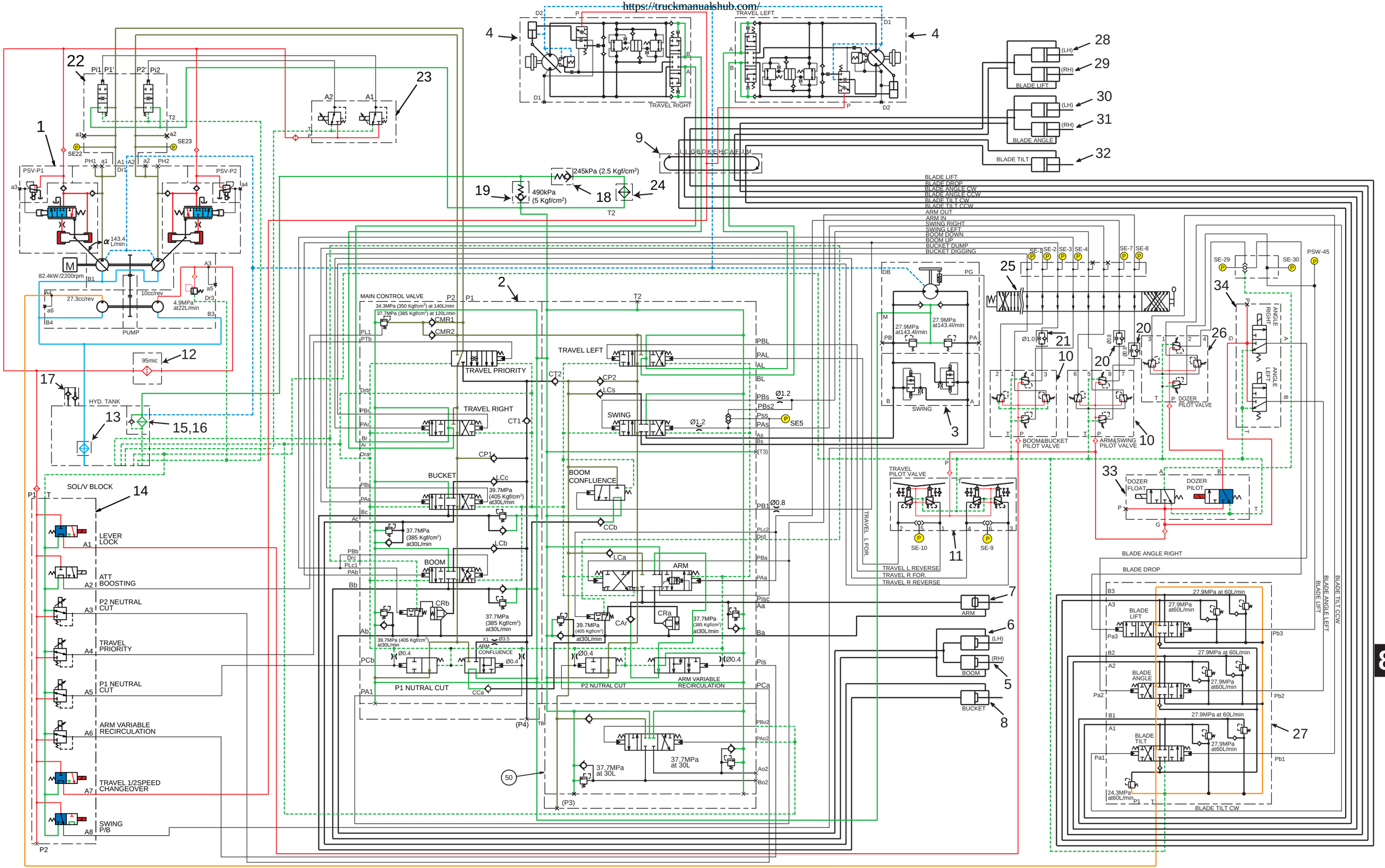
8

LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: 5 Kgf/cm² (71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

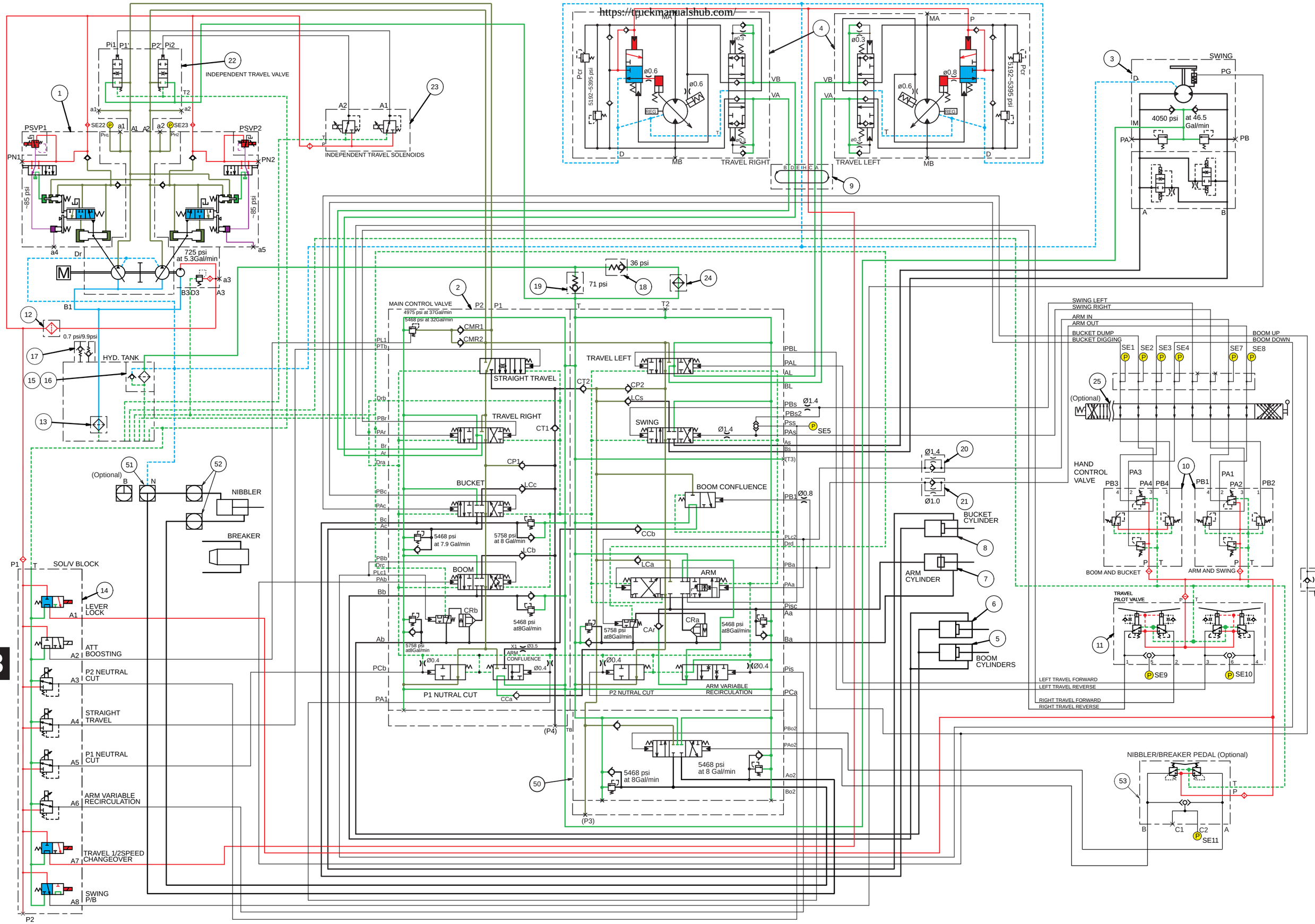
SK160LC-6E NEUTRAL CIRCUIT (Minor Change): Positive Control function with Safety Lever Down (Unlocked) and Fast Travel activated

https://truckmanualshub.com/



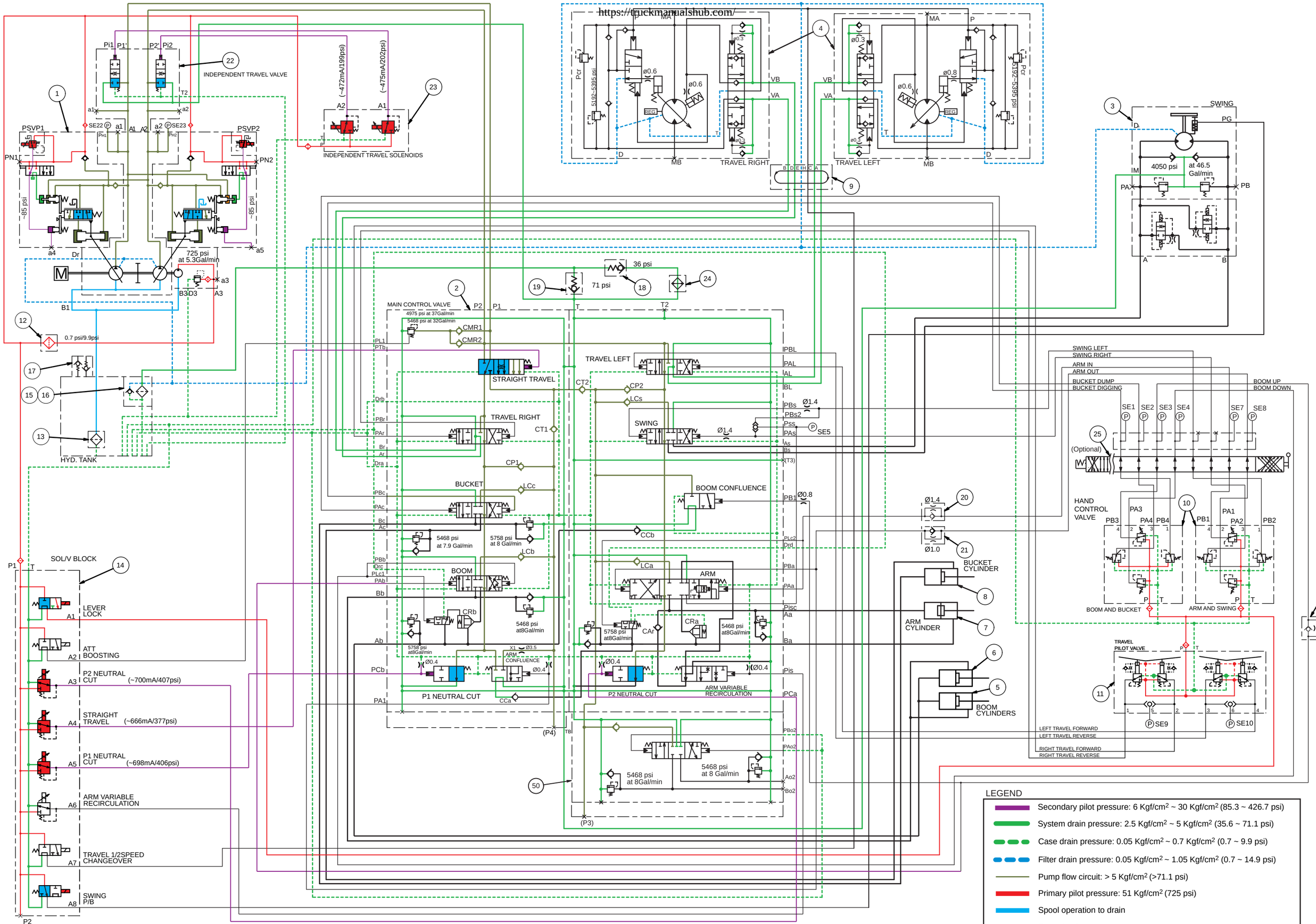
ED190-6E NEUTRAL CIRCUIT (MC) : POS-CON function at safety lock lever ON (Down:Unlocked position) and Dozer Pilot Circuit activated

https://truckmanualshub.com/



SK210LC/SK250LC-6E NEUTRAL CIRCUIT: Positive Control function with Safety Lever Down (Unlocked) and Fast Travel activated

https://truckmanualshub.com/

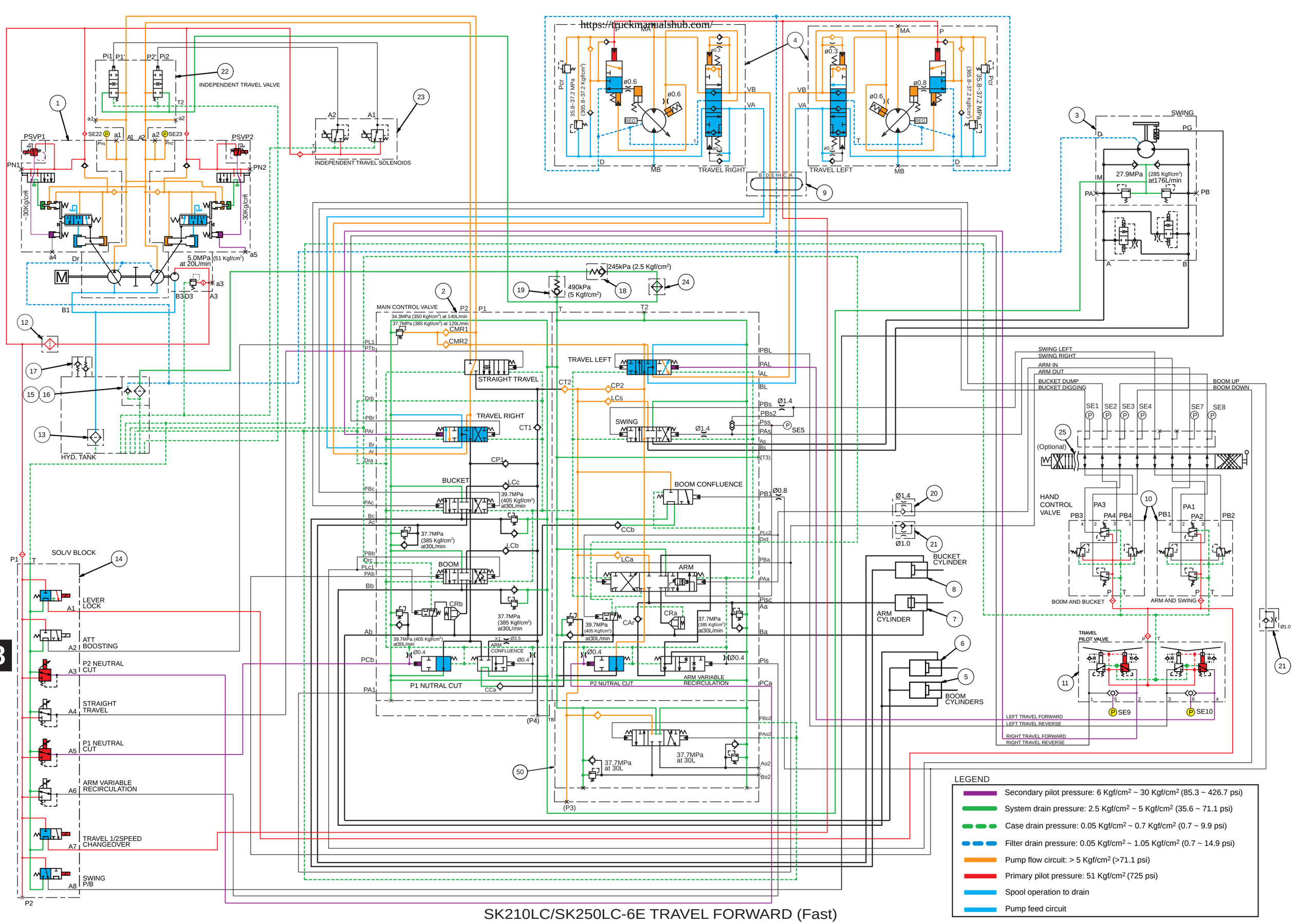


LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

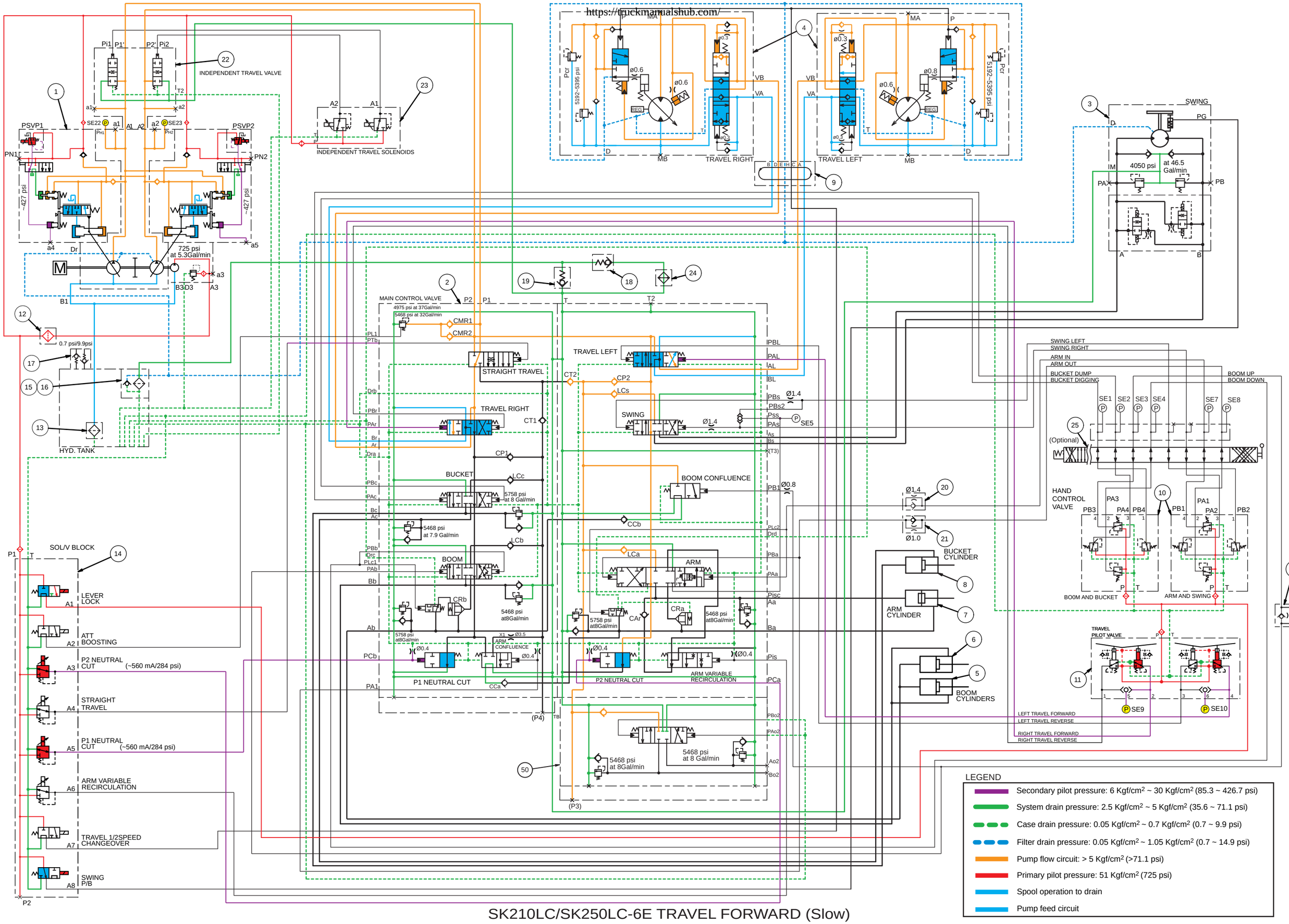
SK210LC/SK250LC-6E INDEPENDENT TRAVEL IN NEUTRAL with Safety Lever Down

https://truckmanualshub.com/



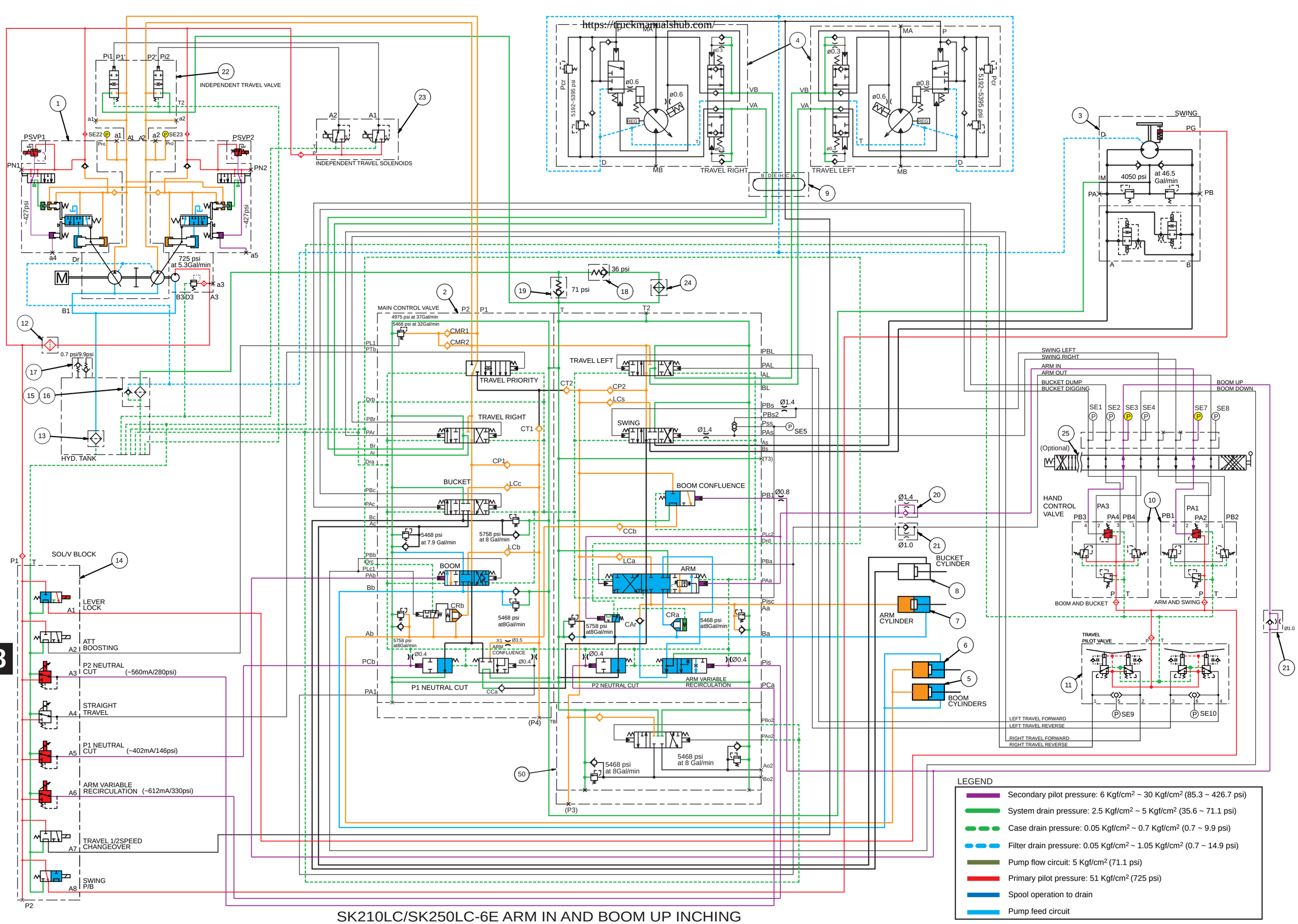
SK210LC/SK250LC-6E TRAVEL FORWARD (Fast)

https://truckmanualshub.com/



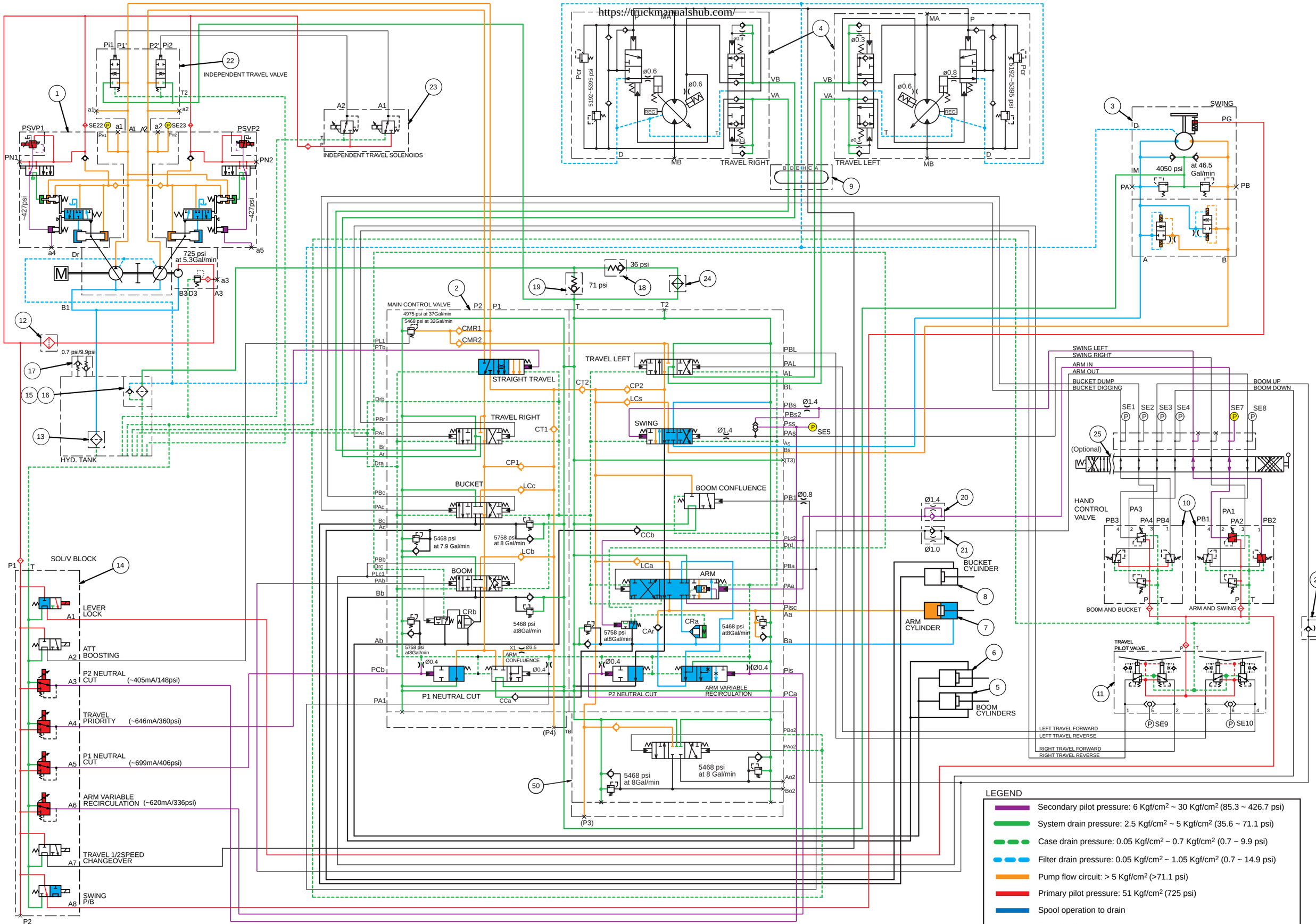
SK210LC/SK250LC-6E TRAVEL FORWARD (Slow)

https://truckmanualshub.com/



SK210LC/SK250LC-6E ARM IN AND BOOM UP INCHING

https://truckmanualshub.com/



LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

SK210LC/SK250LC-6E ARM IN (Heavy digging) COMBINED WITH LEFT SWING

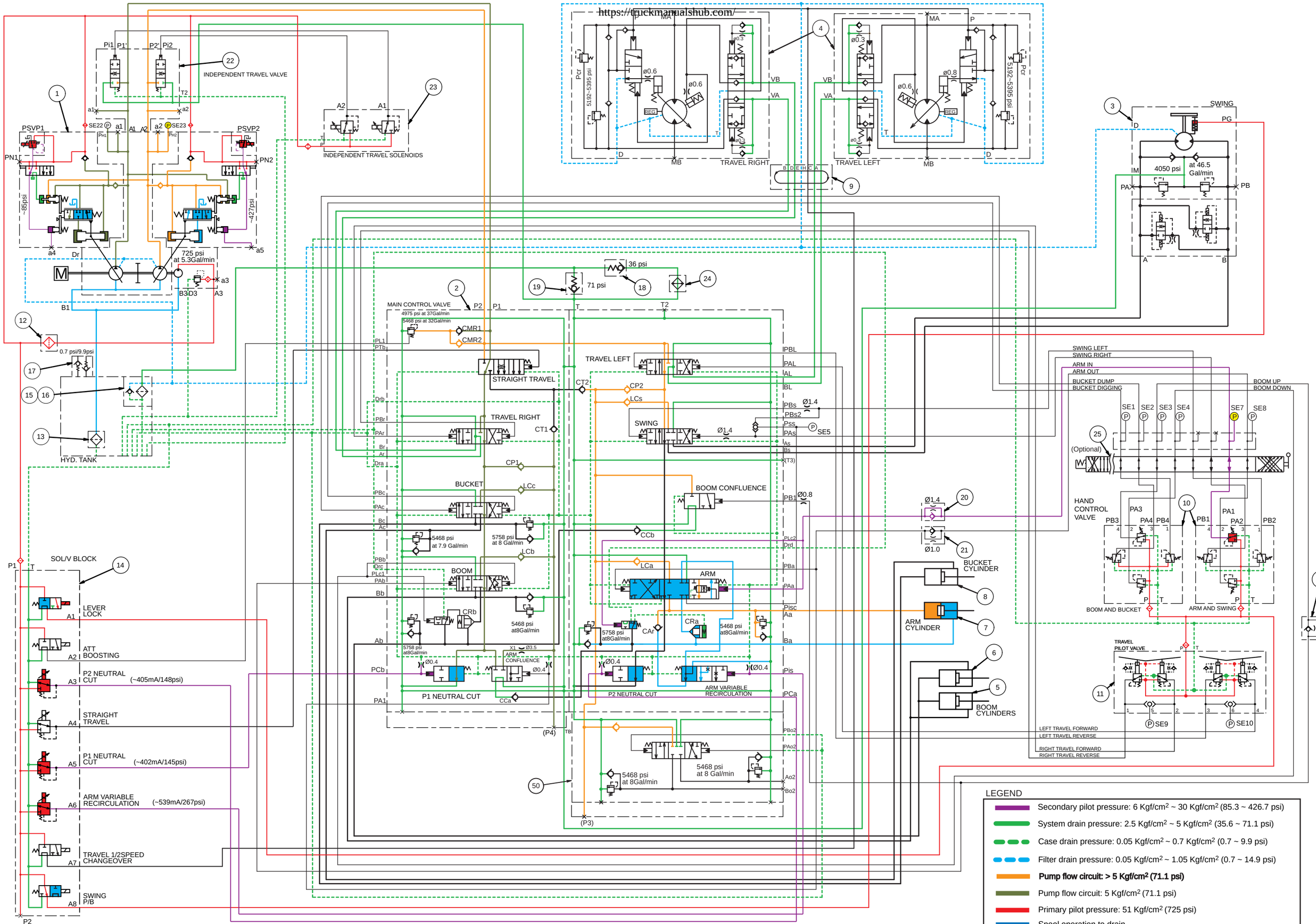
https://truckmanualshub.com/

SK210LC/SK250LC-6E ARM IN (Heavy digging) COMBINED WITH RIGHT SWING

LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (71.1 psi)
- Pump flow circuit: 5 Kgf/cm² (71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

https://truckmanualshub.com/

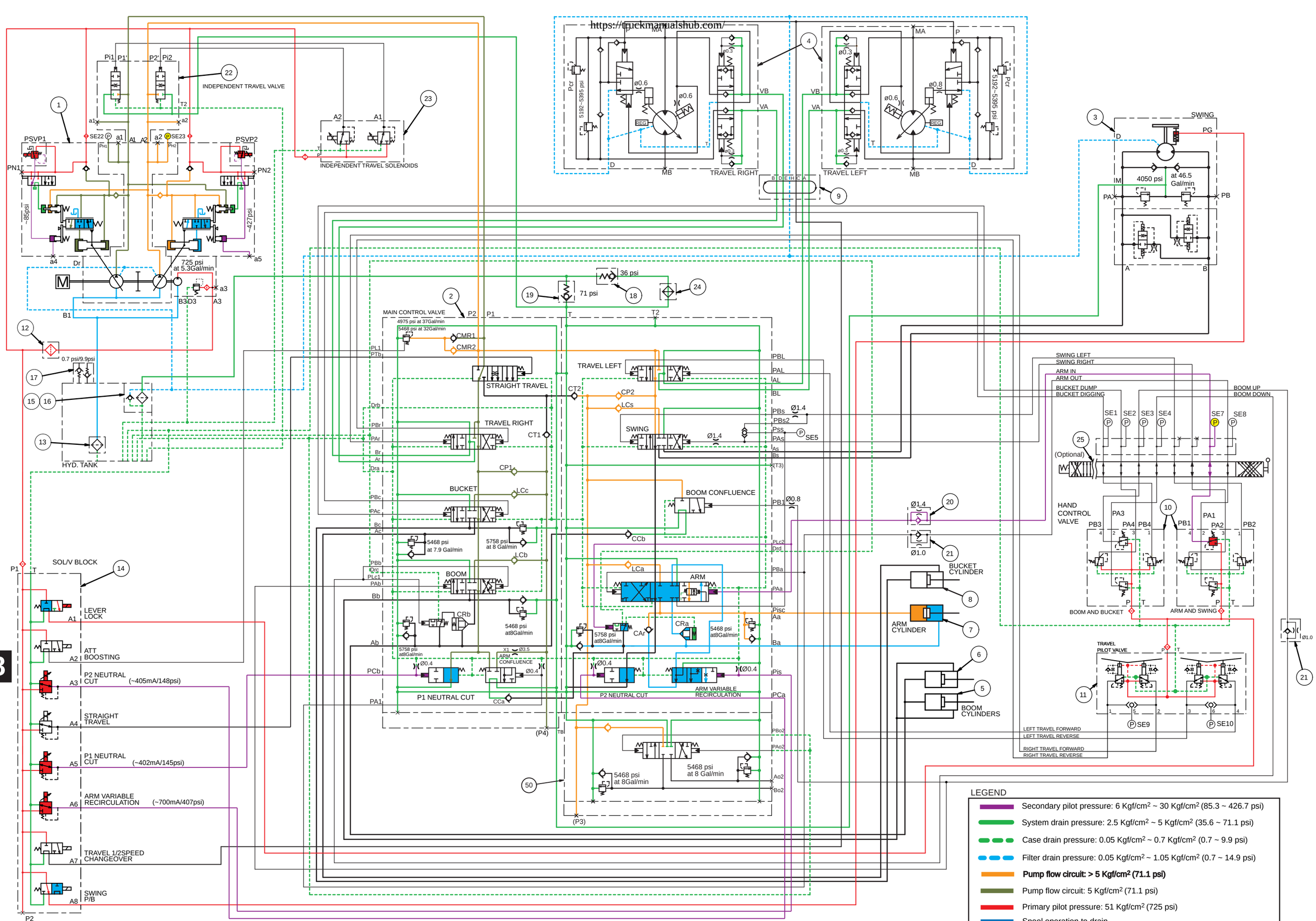


SK210LC/SK250LC-6E ARM IN FULL LEVER CONTROL (Light digging)

LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- **Pump flow circuit: > 5 Kgf/cm² (71.1 psi)**
- Pump flow circuit: 5 Kgf/cm² (71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

https://truckmanualshub.com/

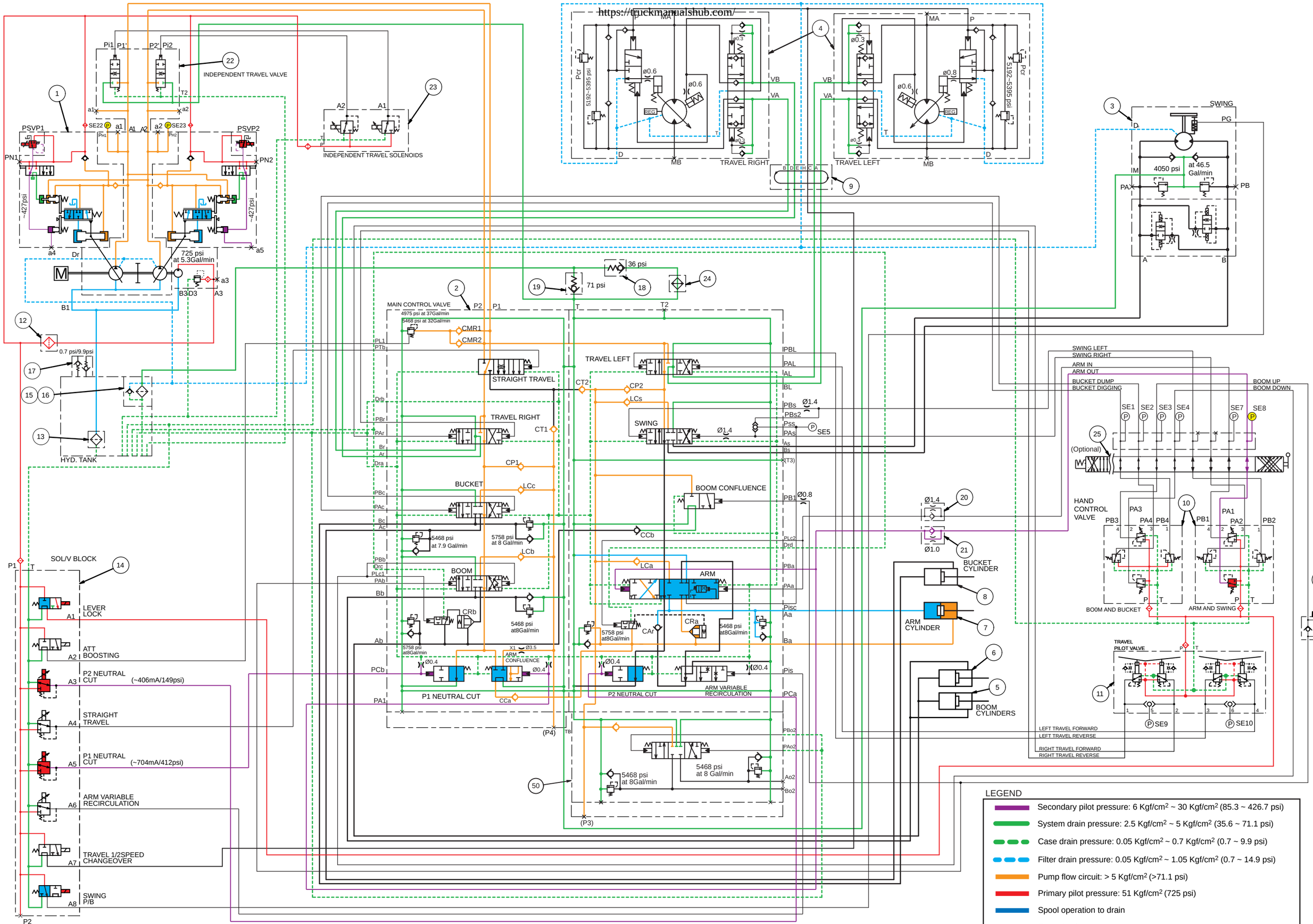


SK210LC/SK250LC-6E ARM IN INCHING (Full regeneration)

LEGEND

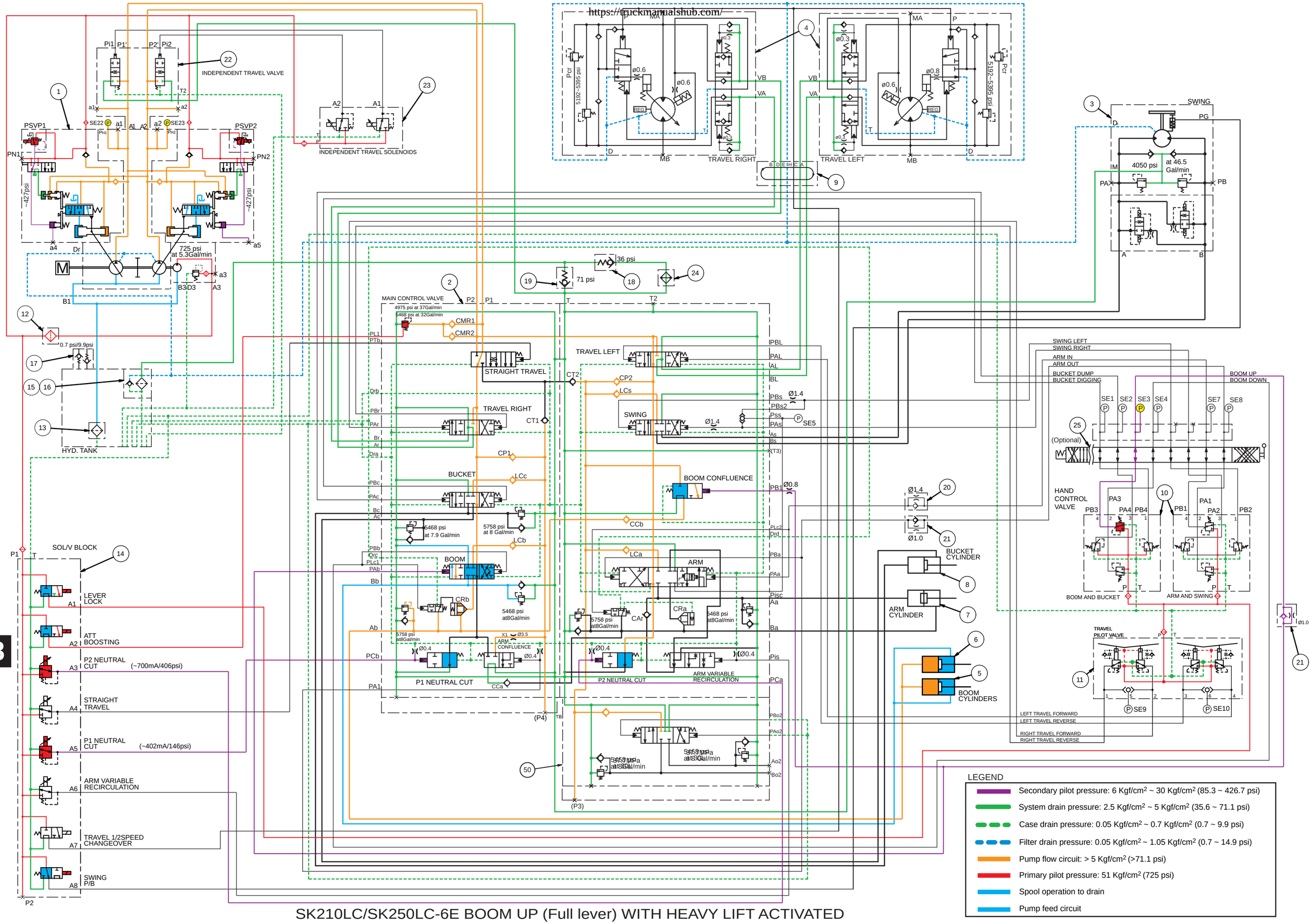
- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- **Pump flow circuit: > 5 Kgf/cm² (71.1 psi)**
- Pump flow circuit: 5 Kgf/cm² (71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

https://truckmanualshub.com/



SK210LC/SK250LC-6E ARM OUT (Full lever)

https://truckmanualshub.com/



LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

SK210LC/SK250LC-6E BOOM UP (Full lever) WITH HEAVY LIFT ACTIVATED

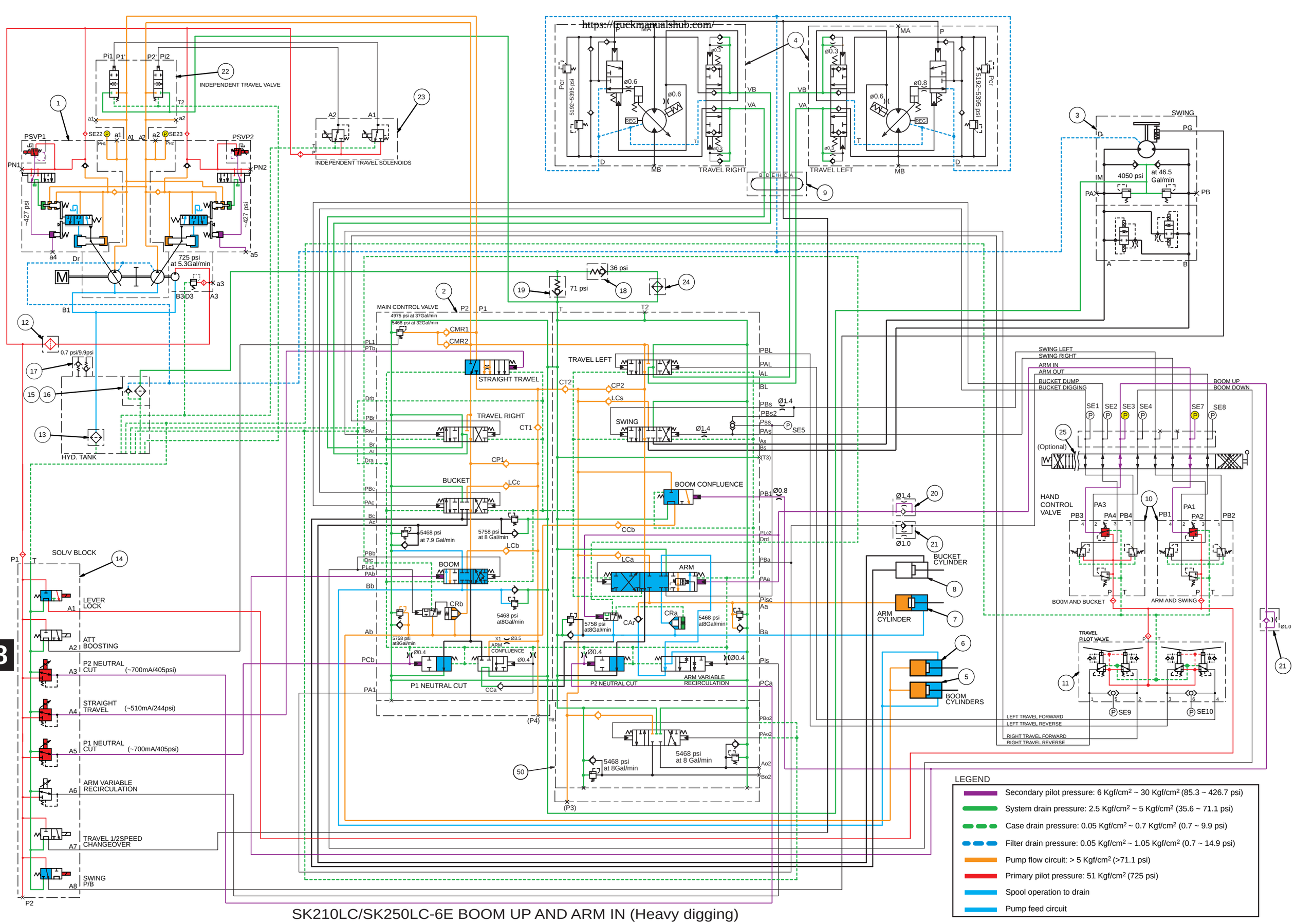
https://truckmanualshub.com/

SK210LC/SK250LC-6E BOOM UP + HEAVY LIFT + RH SWING

LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

https://truckmanualshub.com/



SK210LC/SK250LC-6E BOOM UP AND ARM IN (Heavy digging)

LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

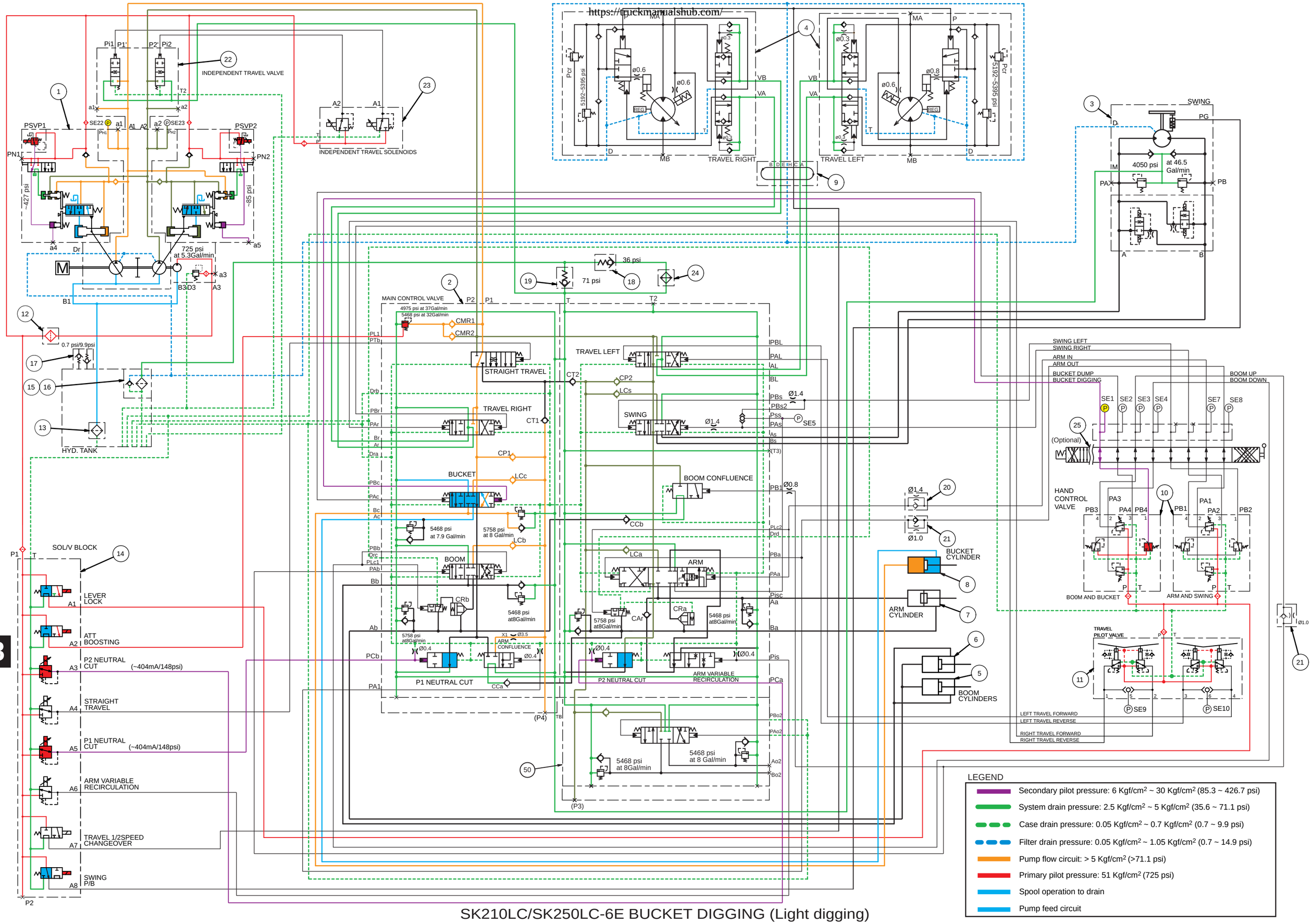
https://truckmanualshub.com/

SK210LC/SK250LC-6E BOOM UP (One pump flow-inching) WITH HEAVY LIFT ACTIVATED

LEGEND

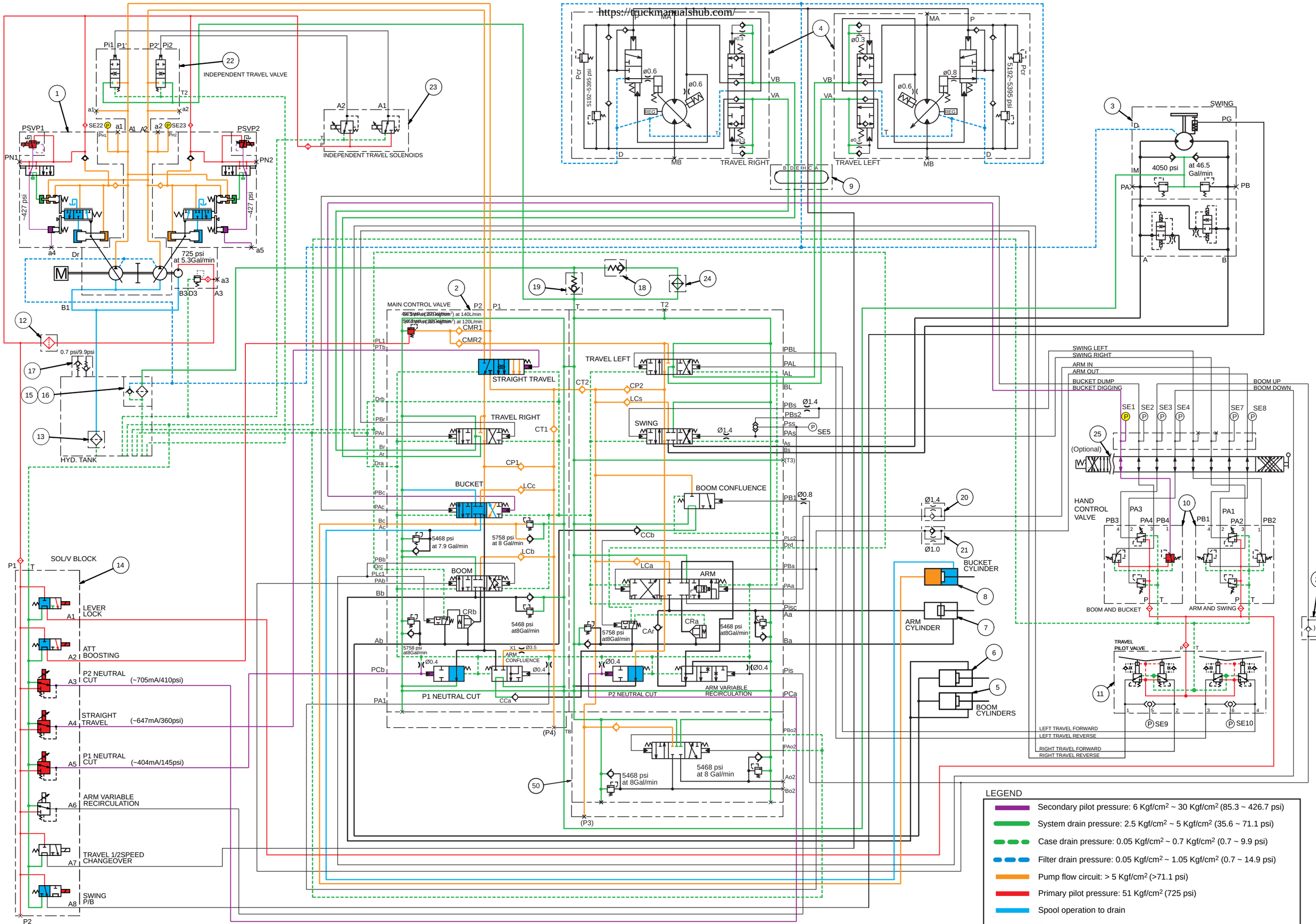
- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

https://truckmanualshub.com/



SK210LC/SK250LC-6E BUCKET DIGGING (Light digging)

https://truckmanualshub.com/



LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

SK210LC/SK250LC-6E BUCKET DIGGING (Heavy digging) WITH POWER BOOST

https://truckmanualshub.com/

SK210LC/SK250LC-6E IND. TRAVEL + BOOM UP WITH HEAVY LIFT + RH SWING

LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

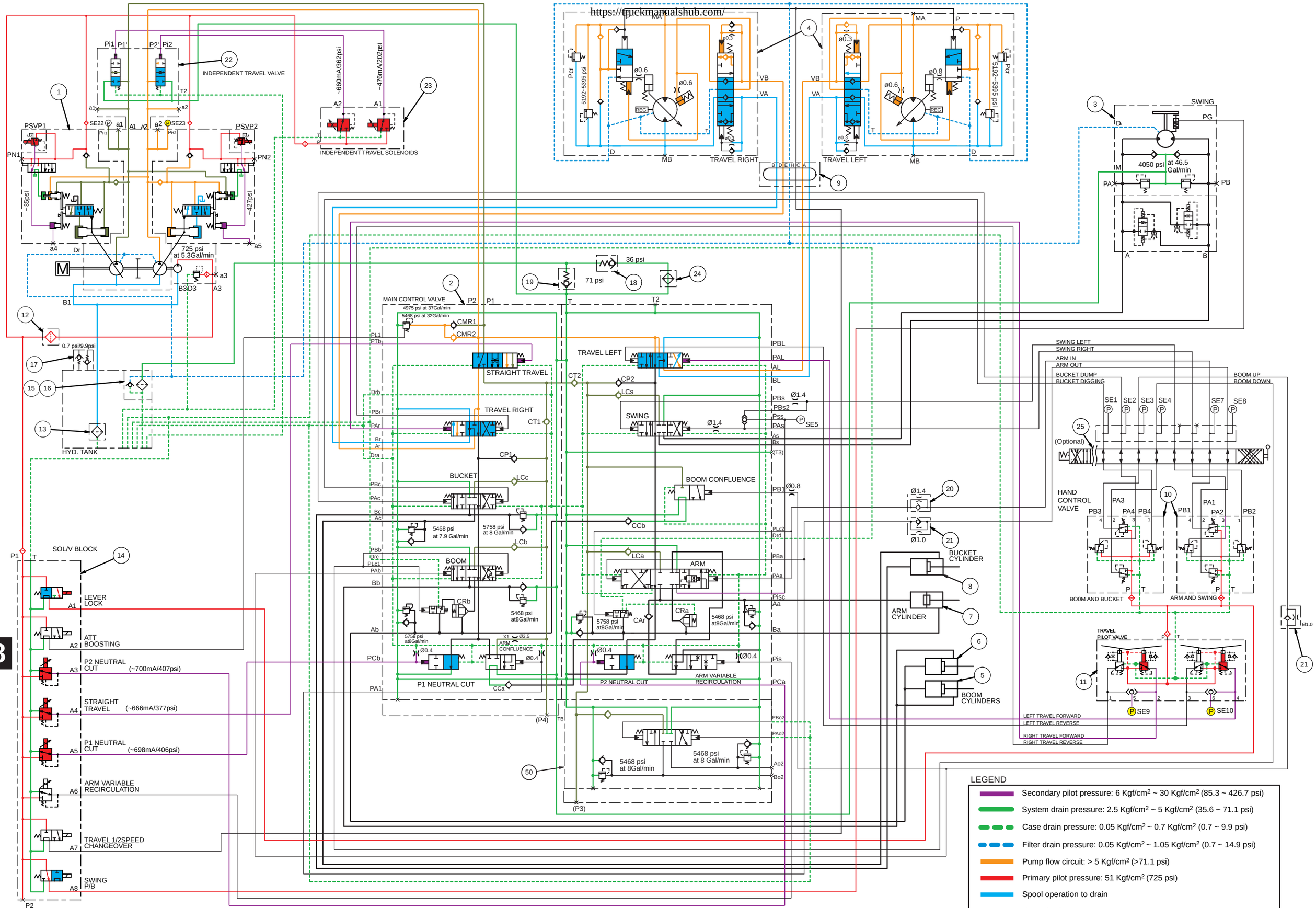
https://truckmanualshub.com/

SK210LC/SK250LC-6E IND. TRAVEL + FWD TRAVEL + BOOM UP + HEAVY LIFT + RH SWING

LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

https://truckmanualshub.com/

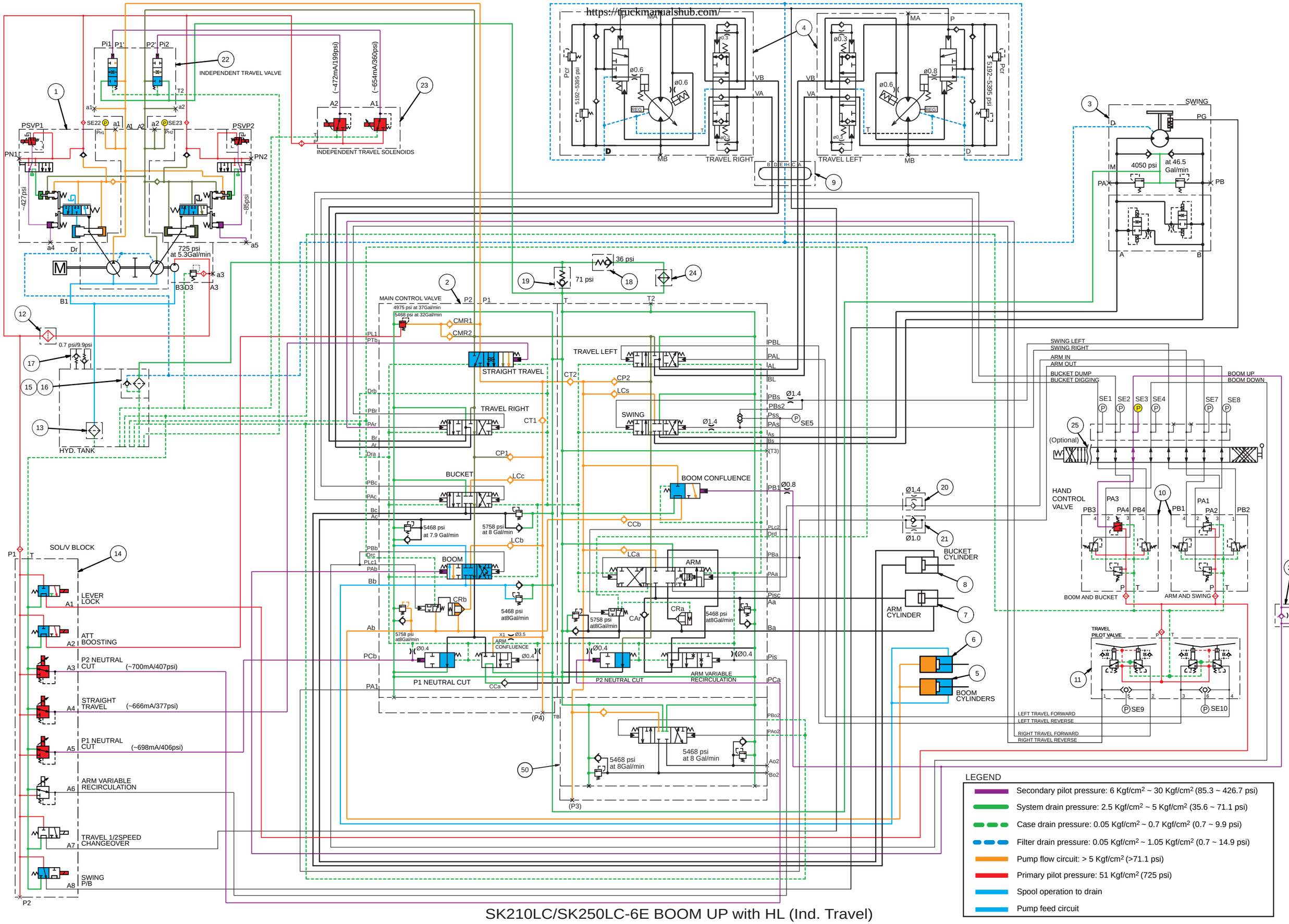


SK210LC/SK250LC-6E INDEPENDENT TRAVEL + FORWARD TRAVEL

LEGEND

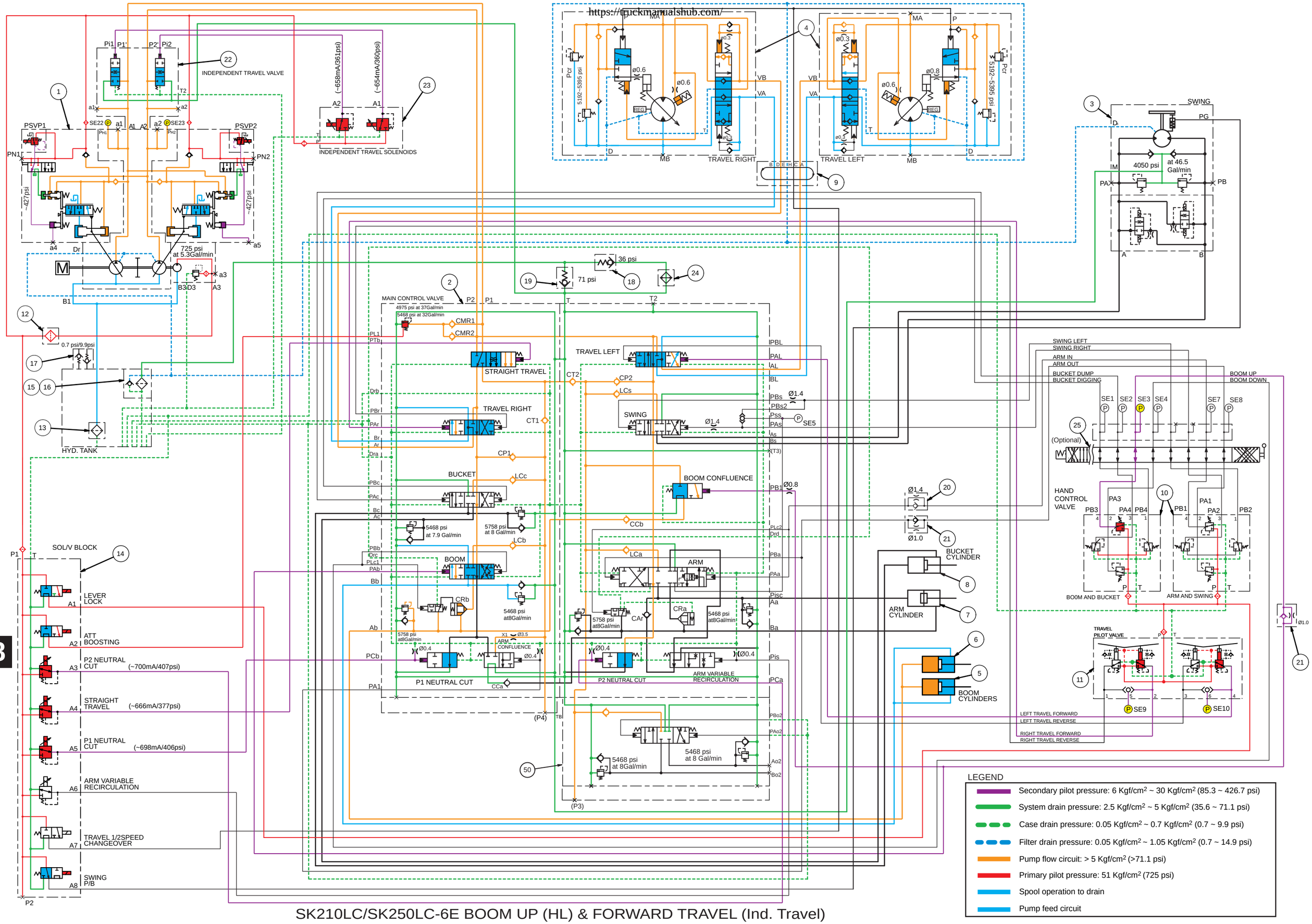
- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

https://truckmanualshub.com/



SK210LC/SK250LC-6E BOOM UP with HL (Ind. Travel)

https://truckmanualshub.com/

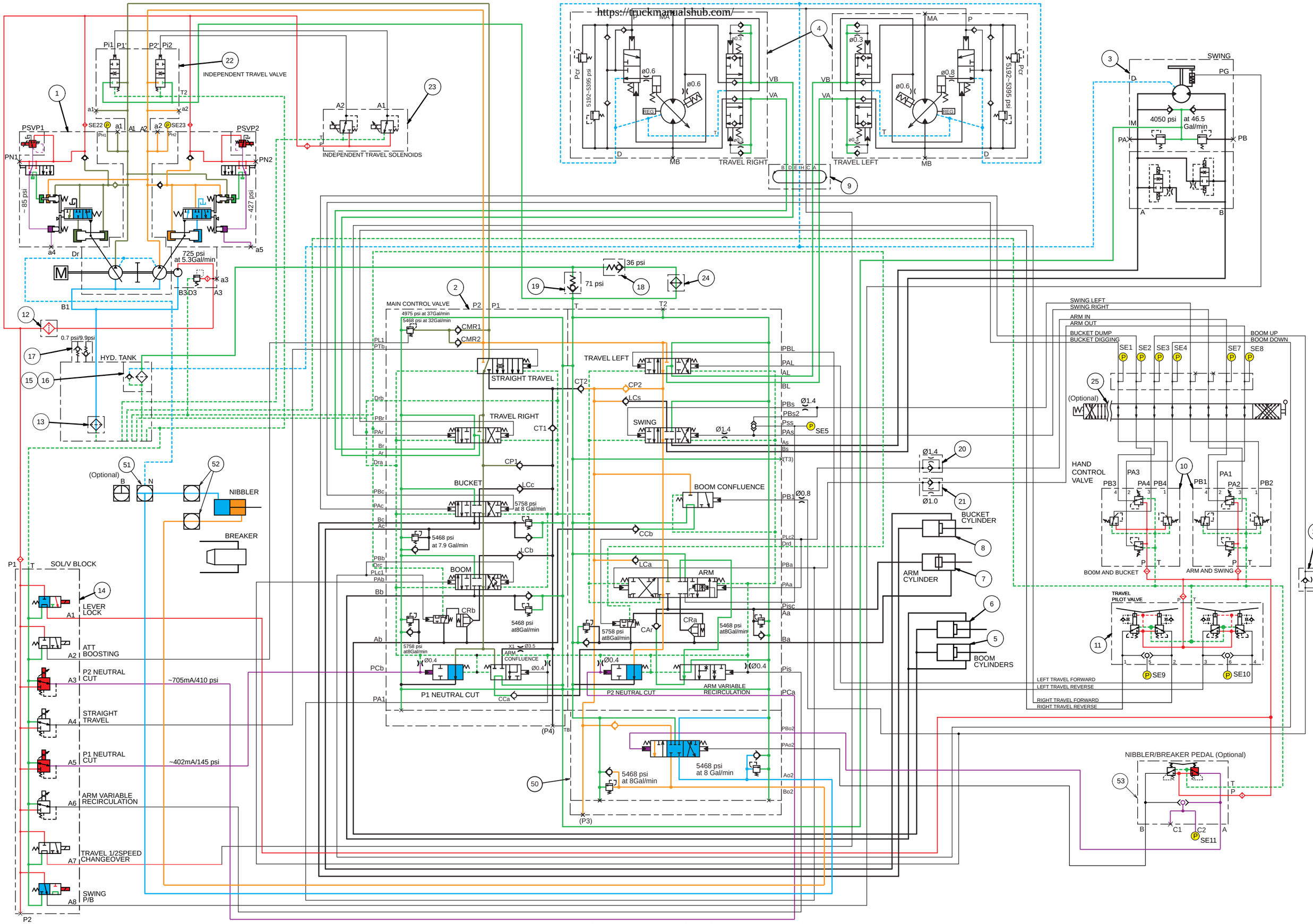


LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: > 5 Kgf/cm² (>71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

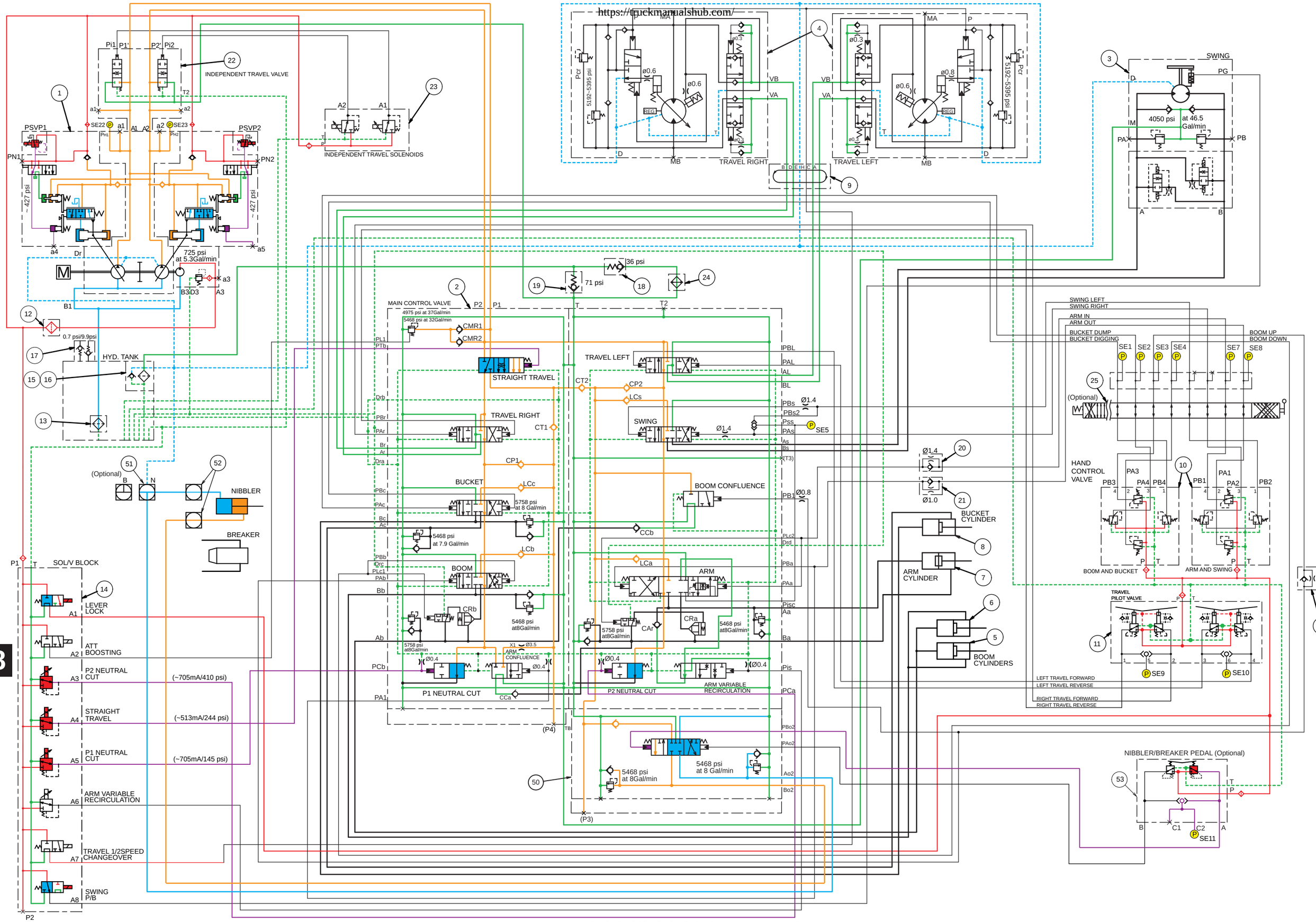
SK210LC/SK250LC-6E BOOM UP (HL) & FORWARD TRAVEL (Ind. Travel)

https://truckmanualshub.com/



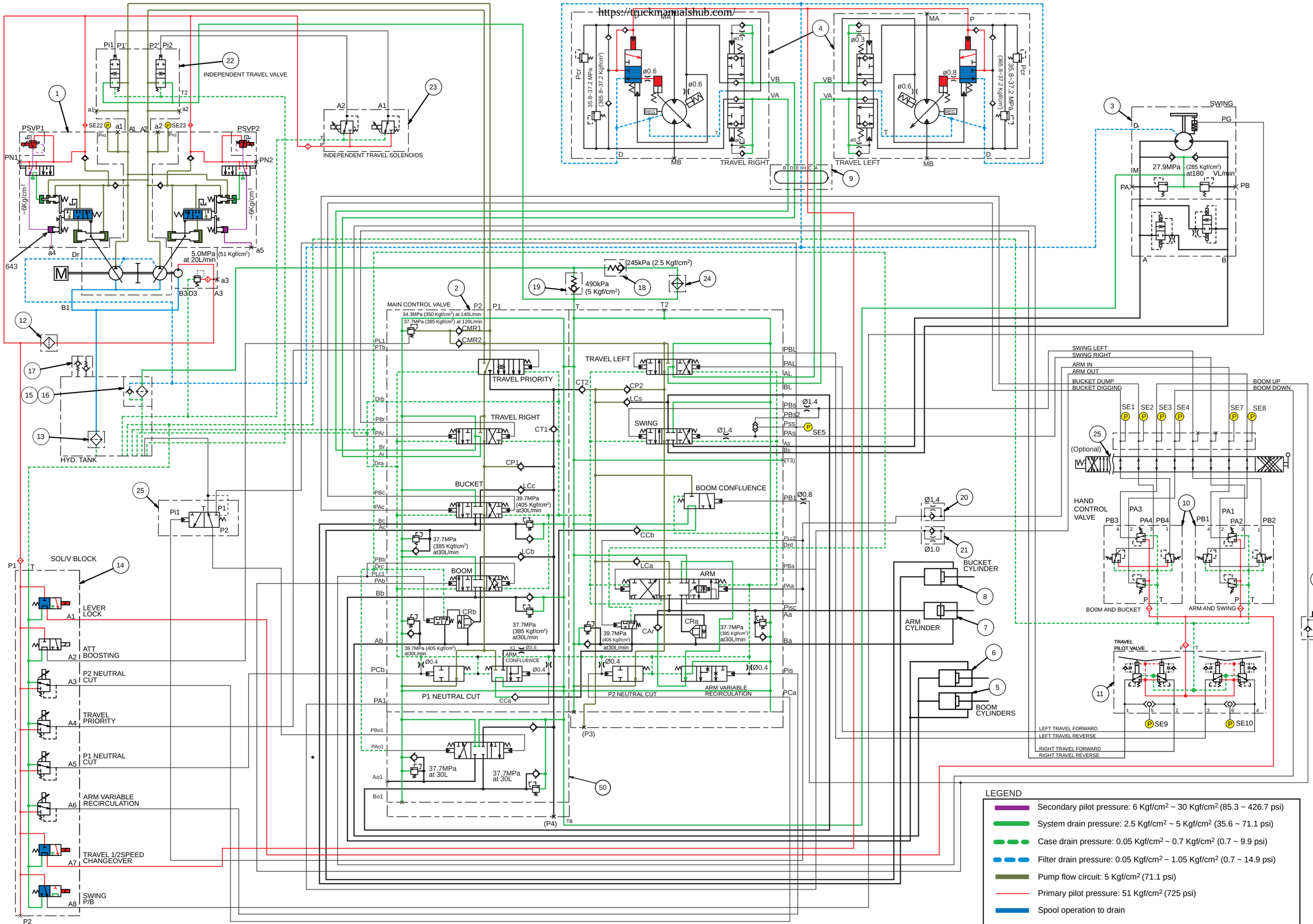
SK210LC/SK250LC-6E Nibbler Breaker Circuit One Pump Flow

https://truckmanualshub.com/



SK210LC/SK250LC-6E Nibbler Breaker Circuit Two Pump Flow

https://truckmanualshub.com/

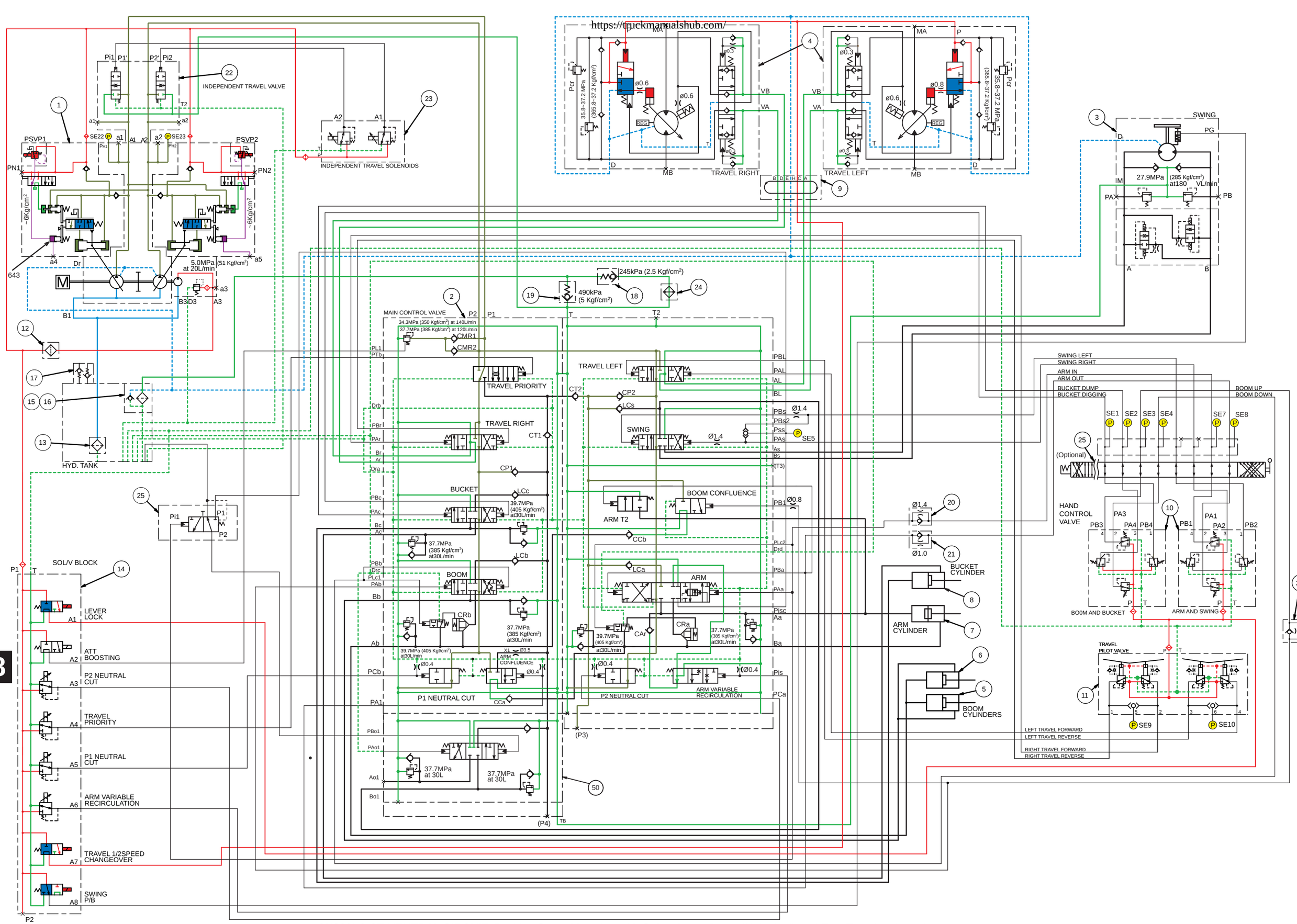


LEGEND

- Secondary pilot pressure: 6 Kgf/cm² ~ 30 Kgf/cm² (85.3 ~ 426.7 psi)
- System drain pressure: 2.5 Kgf/cm² ~ 5 Kgf/cm² (35.6 ~ 71.1 psi)
- Case drain pressure: 0.05 Kgf/cm² ~ 0.7 Kgf/cm² (0.7 ~ 9.9 psi)
- Filter drain pressure: 0.05 Kgf/cm² ~ 1.05 Kgf/cm² (0.7 ~ 14.9 psi)
- Pump flow circuit: 5 Kgf/cm² (71.1 psi)
- Primary pilot pressure: 51 Kgf/cm² (725 psi)
- Spool operation to drain
- Pump feed circuit

SK290LC-6E NEUTRAL CIRCUIT: Positive Control function with Safety Lever Down (Unlocked) and Fast Travel activated

https://truckmanualshub.com/



SK330LC-6E NEUTRAL CIRCUIT: Positive Control function with Safety Lever Down (Unlocked) and Fast Travel activated

https://truckmanualshub.com/

Kobelco

Dynamic



Kobelco Construction Machinery America LLC
Pressure Adjustments
SK160 through SK330

KOBELCO

Kobelco Construction
Machinery America LLC

https://truckmanualshub.com/

TABLE OF CONTENTS

1. VERIFICATION OF ENGINE RPM 3
A. Machine Preparation Procedures 3

2. ENGINE SPEED MEASURED WITH SERVICE DIAGNOSTICS (28 ITEM CHECK) 3

3. HYDRAULIC OIL CAUTIONS 4
A. Checking the Main Relief Setting Using Service Diagnostics (28 Item Check) 4
B. Tools & Equipment Required for Checking and Adjusting of Pilot and Main Relief Valves 4

4. PILOT CIRCUIT 5
A. Machine Preparation Procedures 5
B. Pilot Relief Valve Pressure Measurement Procedures 5
C. Pilot Relief Valve Adjustment Procedures 5

5. MAIN RELIEF PRESSURE ADJUSTMENT 6
A. Machine Preparation Procedures 6
B. Measurement of Attachment Main Relief Valve “HEAVY LIFT SWITCH ON” 6

6. ADJUSTMENT 2nd STAGE MAIN RELIEF WITH “HEAVY LIFT SWITCH ON” 7
A. Machine Preparation Procedures 7
B. 2nd Stage Main Relief Valve Adjustment 7

7. ADJUSTMENT MAIN RELIEF WITH “HEAVY LIFT SWITCH OFF” 8
A. Machine Preparation Procedures 8
B. Main Relief Valve Adjustment 8
8. SWING CIRCUIT 9
A. Machine Preparation Procedures 9
B. Swing Port Relief Valve Pressure Measurement 9
C. Swing Port Relief Valve Procedures 10
9. OVER LOAD RELIEF VALVES 11
A. Machine Preparation Procedures 11
B. Tools & Equipment Required for Checking and Adjusting of Over Load Relief Valves 11
C. Over Load Relief Pressure Measurement 11
D. OR3 Boom Up Over Load Relief 12
E. OR4 Boom Down Over Load Relief 12
F. OR1 Bucket In (Dig) Over Load 12
G. OR2 Bucket Out Over Load 13
H. OR7 Arm In (Dig) Over Load 13
I. OR8 Arm Out Over Load 13
J. Travel Motor Port Reliefs 14
10. MEASUREMENT OF ADDITIONAL CIRCUIT PRESSURE PORTS 15
PERFORMANCE INSPECTION SPECIFICATION CHARTS ..... 16 ~ 19
A. SK160 16
B. ED190 17
C. SK210 18
D. SK250 19
E. SK290 20
F. SK330 21
G. SK480 22

https://truckmanualshub.com/

1. VERIFICATION OF ENGINE RPM

A. Machine Preparation Procedures

1. With safety lock in the lock (up) position. See Figure 5.1.
2. Place the maintenance connector in the release position.See Figure 5.2
3. Place front attachment to hydraulic oil check position. See Figure 5.4.
4. Place throttle potentiometer to low idle position ; start engine, allow engine to achieve normal operating temperature^{O}C 45~55 (^{O}F113~145)
5. Check the gauge cluster and confirm that the machine is in the default “M” mode. See Figure 5.3.
6. Locate the screen change switch, depress the switch once to select RPM. Check that engine low and hi RPM are at the proper adjustment. See Figure 5.3.
   (Refer to chart by model and serial number for specifications.)
7. Return Throttle potentiometer to low idle position. Press screen change switch two times to return screen to Monitor System OK.
8. Allow engine to idle for two minutes and shut off engine.

2.ENGINE SPEED MEASURED WITH SERVICE DIAGNOSTICS (28 ITEM CHECK)

1. With machine turned off, hold buzzer stop switch.
2. Turn key switch to on position.
3. Screen Change Switch advances the display each time the screen change switch is pushed.
4. Press the Screen change switch once, diagnostic check of computer will be at screen No. 2. Below.

2	No. 2		
	E/G SET	2200	No load set rpm
	MEAS	2201	Actual rpm
	E/G PRS.	LIVE	LIVE/DEAD indication
	KPSS SW	M	A/M/B indication

5. Buzzer Stop Switch returns display to previous screen each time switch is pushed.
6. Screen will stay in diagnostic mode until key switch is turned off.

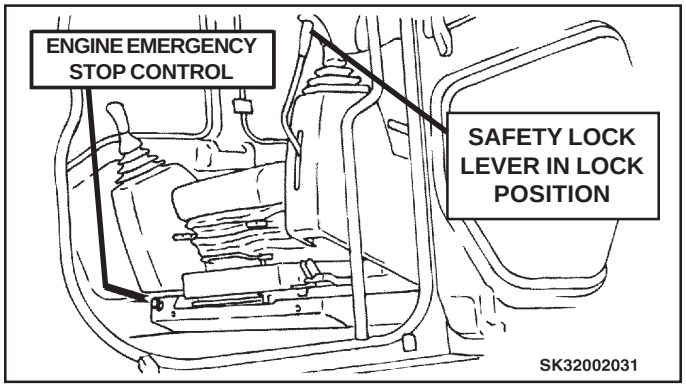


FIGURE 5.1

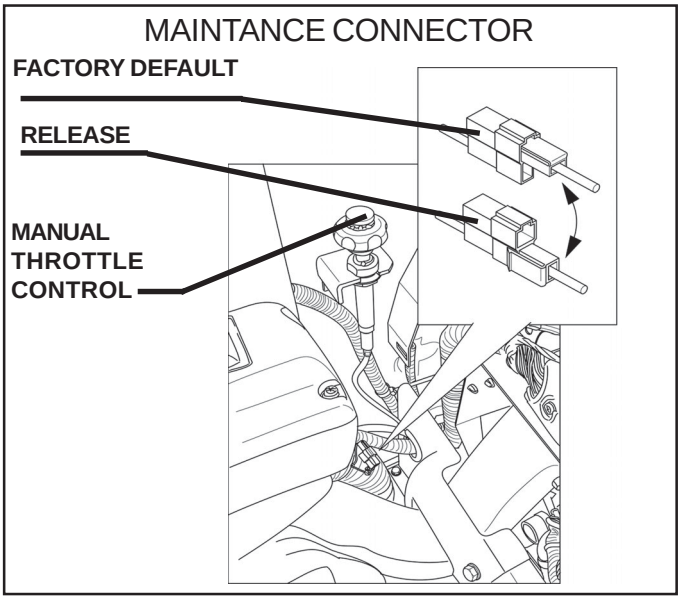


FIGURE 5.2

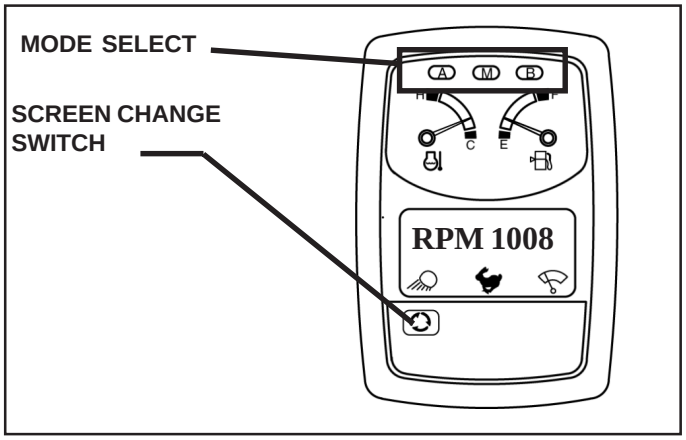


FIGURE 5.3

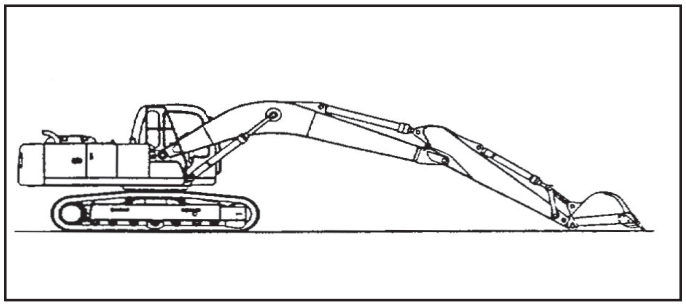


FIGURE 5.4

https://truckmanualshub.com/

3. HYDRAULIC CAUTIONS

Kobelco Excavators are set to ISO pilot controls at the factory. It is up to you to read and understand the Operators & Maintenance Manual before attempting any service or maintenance procedures.

⚠ WARNING ⚠

• BE EXTREMELY CAUTIOUS WHILE RELEASING HYDRAULIC TANK PRESSURE OR REMOVING LINES AND FITTINGS, VAPORS AND OIL MAY BE EXTREMELY HOT.

• WEAR APPROVED SAFETY CLOTHES, SHOES, GLOVES AND HARD HAT WHEN PERFORMING ANY MAINTENANCE OR TEST PROCEDURES.

A. Checking the Main Relief Setting Using Service Diagnostics (28 ITEM CHECK)

1. With key in OFF position, gauge cluster blank, press and hold buzzer stop switch.
2. Turn key switch to ON position. See Figure 6.1.
3. With key switch in on position release buzzer stop switch. See Figure 6.1.
4. By pressing the screen change switch the service diagnostics is advanced forward. See Figure 6.2.
5. By pressing the buzzer stop switch the screen is returned to the last screen.
6. Advance the service diagnostics to screen No.14. See Figure 6.3.
7. Screen No.14 will display the voltage of high pressure sensor, and the computer generated oil pressure at P1 and P2 pump. Use this for checking pump and machine performance. See Figure 6.3.

B. Tools & Equipment Required for Checking and Adjusting of Pilot and Main Relief Valves

1. Two 700kg/cm^2 (10,000psi) Gauges.
2. One 70kg/cm^2 (1,000 psi) Gauges.
3. 
   32 mm spaner wrench
   22 mm spaner wrench
   19 mm spaner wrench
   6 mm allen wrench
4. General hand or power tools to remove and replace hydraulic fittings and components.
5. Thermometer to read hydraulic oil temperature.

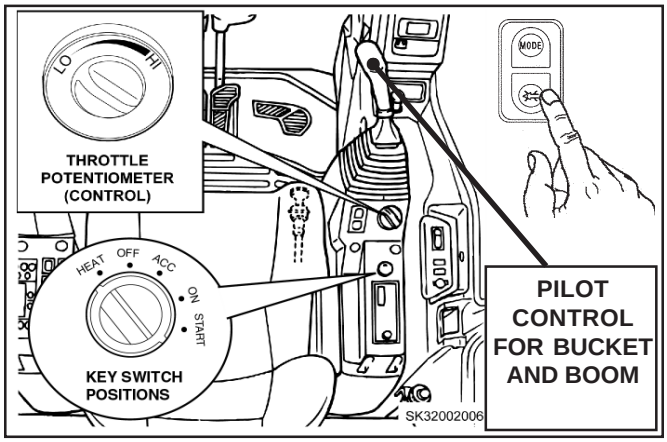
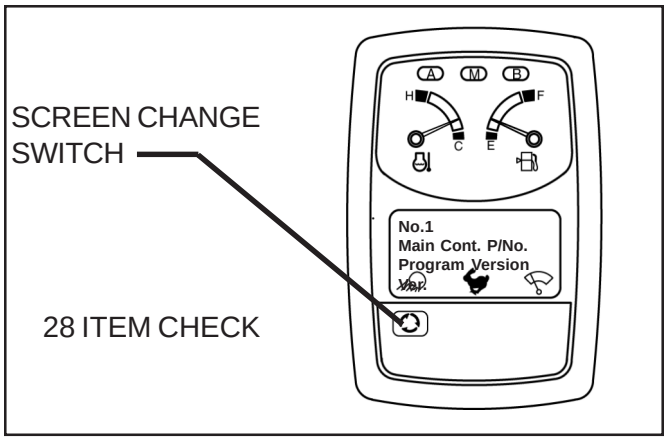


FIGURE 6.1



FIGUREG6.2

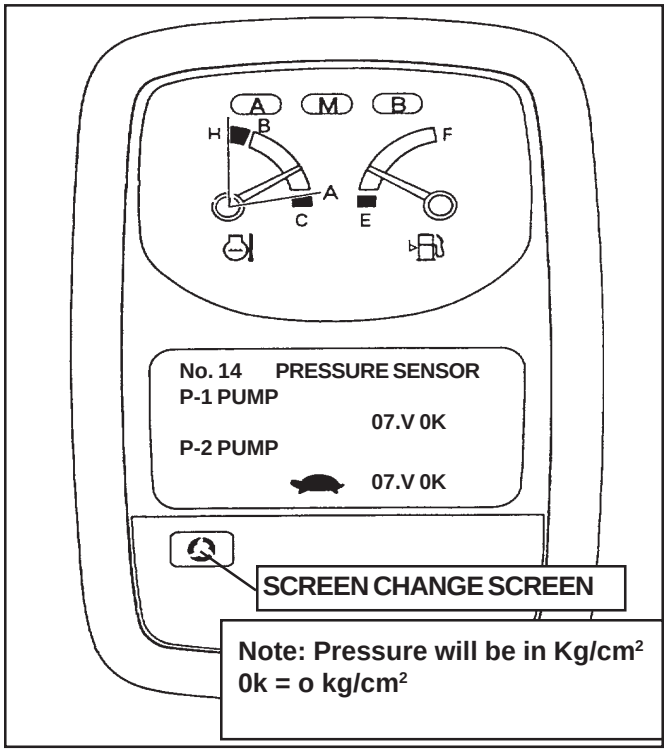


FIGURE 6.3

https://truckmanualshub.com/

4. PILOT CIRCUIT

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 7.1.
3. Release hydraulic tank pressure by depressing relief valve stem item ① on the pressure relief valve. See Figure 7.2.
4. Open Main Pump Access Door and remove the PF1/4 test Port Plug (A7) from Output Port on Pilot System Gear Pump and install 105kg/cm² (1,000 psi) Pressure Gauge. See Figure 7.3.

B. Pilot Relief Valve Pressure Measurement Procedures

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.
2. Start engine and place throttle control in Hi Idle position.
3. Place KPSS Mode Switch in "M" Mode.
4. Confirm that the hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145). Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212)
5. Place all pilot controls in neutral, read and record the 70kgf/cm^2 (1000 psi) pressure gauge at the P3 pump, a7 pressure test port. See Figure 7.3. Compare to chart for specific model being tested.

C. Pilot Relief Valve Adjustment Procedures

1. Locate the Pilot Relief Valve mounted on the bottom of the P3 Pilot Pump Assembly. See Figure 7.4.
2. Loosen the adjusting screw locknut with a 24mm spaner. See Figure 7.4.
3. Adjust using a 6mm allen until specified pressure according to proper chart for specific machine being adjusted is achieved.
4. After correct pressure is obtained, tighten adjusting screw locknut, tightening torque 3.0 kgfm^2 (22ft.lb). See Figure 7.4.
5. Verify pressure after tightening locknut.

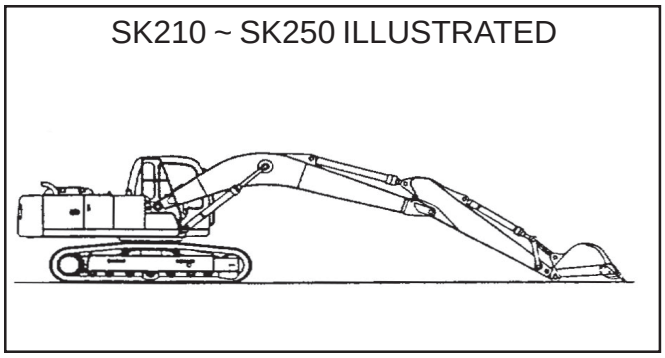


FIGURE 7.1

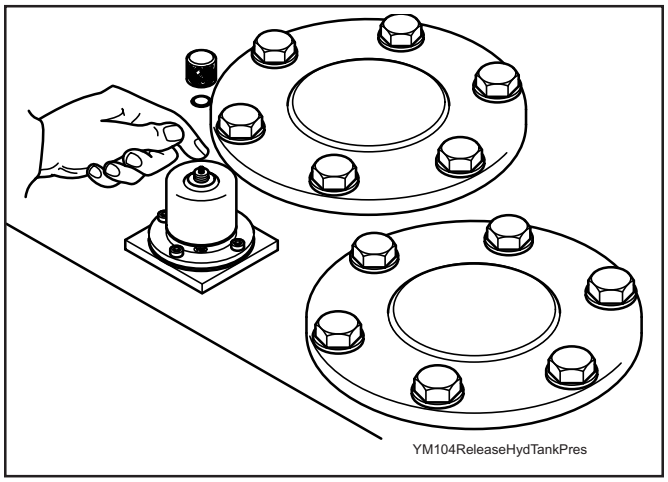


FIGURE 7.2

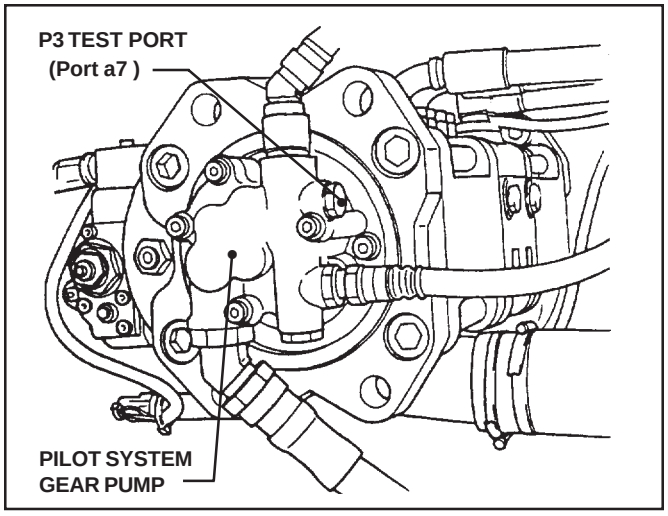


FIGURE 7.3

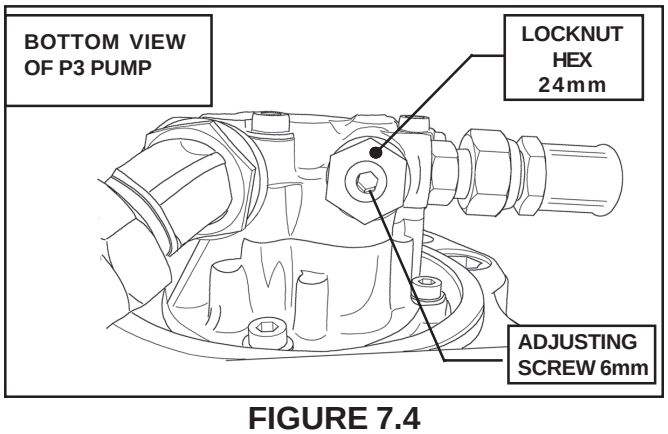


FIGURE 7.4

https://truckmanualshub.com/

MAIN RELIEF PRESSURE ADJUSTMENT

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

5. MAIN RELIEF PRESSURE ADJUSTMENT

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 8.1.
3. Release hydraulic tank pressure by depressing relief valve stem item ① on the pressure relief valve. See Figure 8.2.
4. Open Main Pump Access Door and remove two (2) PF1/4 test Port Plugs (a1) P1 pump and (a2) Pump install 700kg/cm² (10,000 psi) Pressure Gauges. See Figure 8.3.

B. Measurement of Attachment Main Relief Valve "HEAVY LIFT SWITCH ON"

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.
2. Place "Heavy Lift" Switch in the "ON" position. See Figure 8.4.
3. Place KPSS Mode Switch in "M" Mode.
4. Start engine and place throttle control in Low Idle position.
5. Confirm that the hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145). Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
6. Move throttle control to "HI-IDLE".
7. Operate Boom Raise control until boom is completely up, then hold over relief.
8. Record readings from 700kg/cm^2 (10,000 psi) Pressure Gauges at a1 port on P1 Main Pump and a2 port at P2 pump.
9. If pressure gauge readings are within specifications for the particular machine being tested, it is not necessary to adjust Relief Valve Pressure. Refer to chart for machine and model being tested.

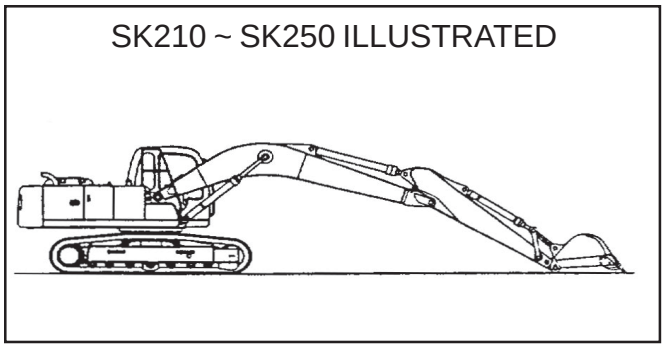


FIGURE 8.1

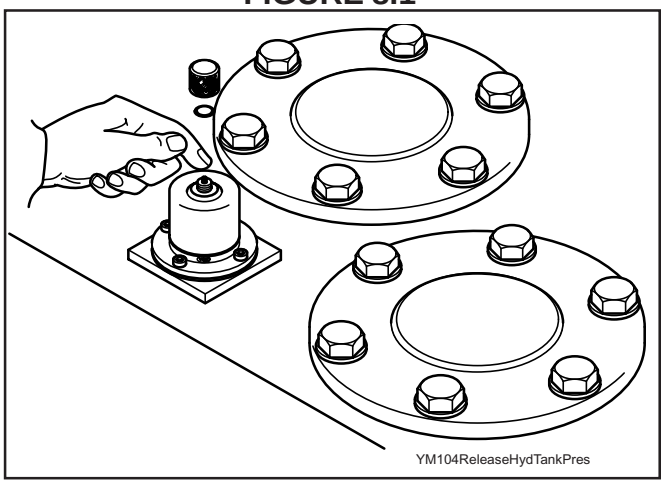


FIGURE 8.2

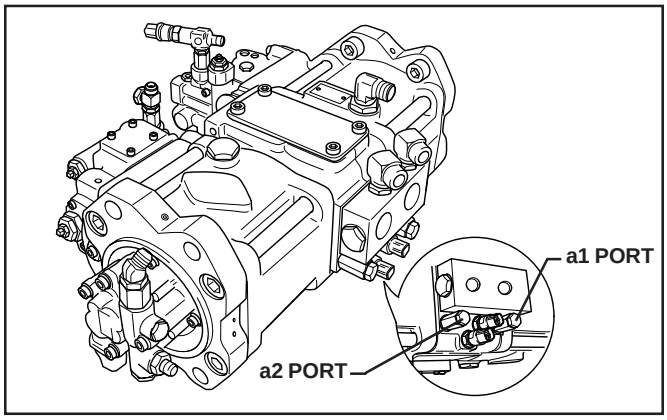


FIGURE 8.3

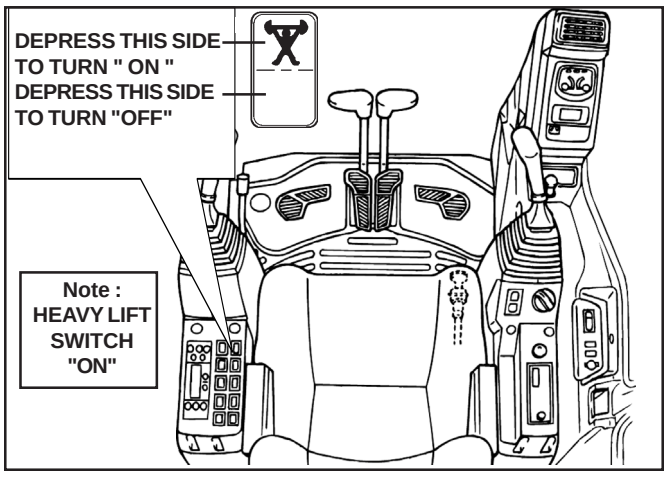


FIGURE 8.4

https://truckmanualshub.com/

ADJUSTMENT 2nd STAGE MAIN RELIEF WITH "HEAVY LIFT SWITCH ON"

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

6. ADJUSTMENT 2nd STAGE MAIN RELIEF WITH "HEAVY LIFT SWITCH ON"

A. Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in “M” mode. See Figure 9.1.
   b. Heavy lift switch on. See Figure 9.2
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. Maintenance connector is in the release position.
   f. High Idle RPM is proper per machine being tested.

B. 2nd Stage Main Relief Valve Adjustment

1. Locate Main Relief Valve (MR1) on the main control valve. See Figure 9.3.
2. Loosen second stage locknut with 32mm wrench See Figure 9.4.
3. With engine at full RPM, raise boom up and over relief. Adjust heavy lift, power boost screw with 19mm wrench, until proper pressure is achieved at pump P1 a1 test port, and pump P2 a2 test port with 700kg/cm² (10,000 psi) pressure gauges.
4. After correct pressure is obtained tighten adjusting screw locknut to 2.8 ~3.2 kgfm² (20~30 ft.lb). Verify pressure after tightening locknut.

NOTE

Turning Heavy lift Power Boost Adjusting Screw Clockwise One turn
Increases Pressure Approximately
108 kgf/cm² 180 (2560 psi)

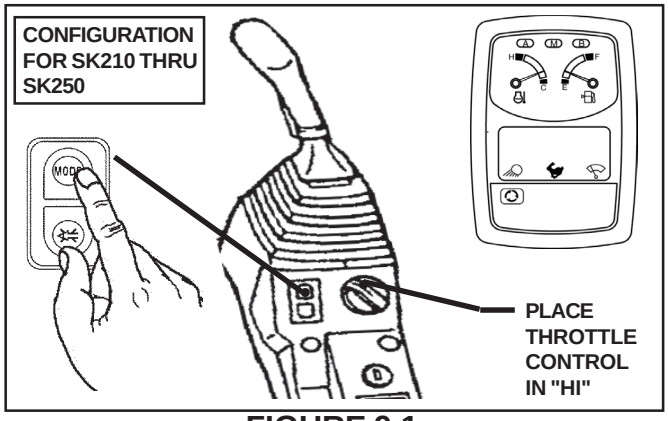


FIGURE 9.1

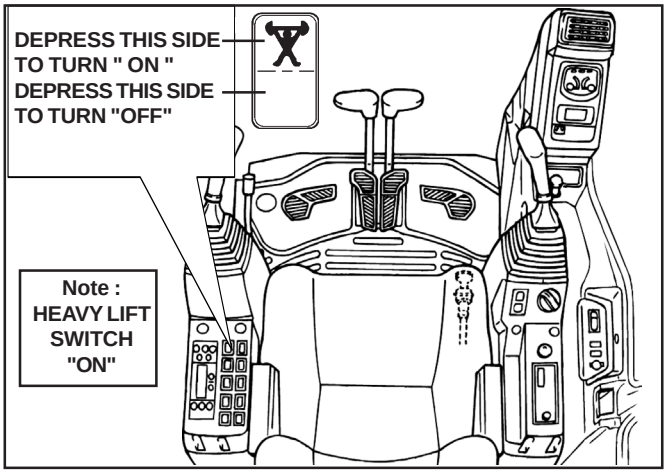


FIGURE 9.2

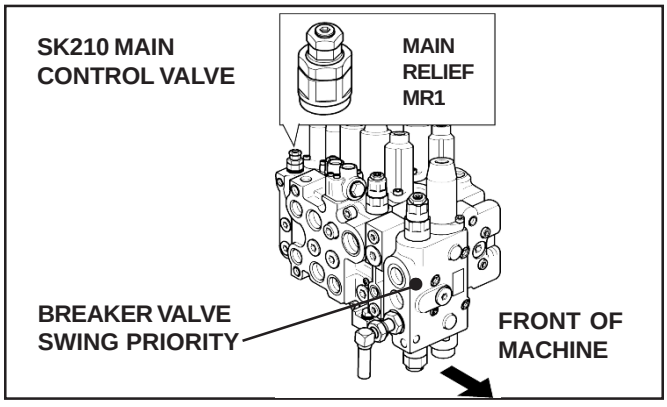


FIGURE 9.3

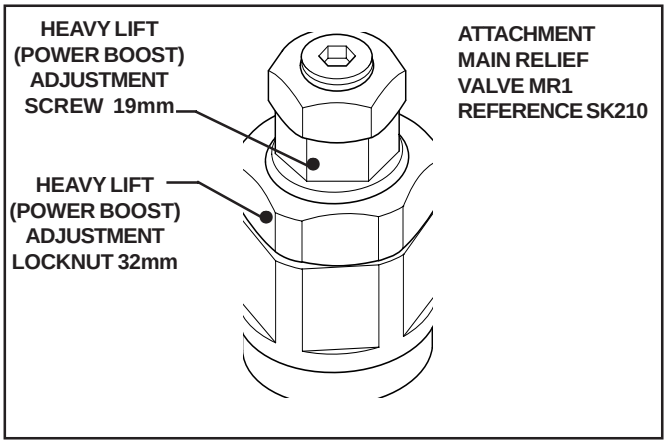


FIGURE 9.4

https://truckmanualshub.com/

ADJUSTMENT MAIN RELIEF WITH "HEAVY LIFT SWITCH OFF"

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

7. ADJUSTMENT MAIN RELIEF WITH "HEAVY LIFT SWITCH OFF"

A. Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in “M” mode. See Figure 10.1.
   b. Heavy lift switch off. See Figure 10.2.
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. Maintenance connector is in the release position.
   f. High Idle RPM is proper per machine being tested.

B. Main Relief Valve Adjustment

1. Locate Main Relief Valve (MR1) on the main control valve. See Figure 10.3.
2. Loosen locknut with 22mm wrench See Figure 10.4.
3. With engine at full RPM, raise boom up and over relief. Adjust screw with 6mm allen wrench, until proper pressure is achieved at pump P1 a1 test port, and pump P2 a2 test port with 700kg/cm² (10,000 psi) pressure gauges.
4. After correct pressure is obtained tighten adjusting screw locknut to ; 2.8 ~3.2 kgfm² (20~30 ft.lb). Verify pressure after tightening locknut.

NOTE

Turning Normal Adjusting Screw Clockwise One turn
Increases Pressure Approximately
108 kgf/cm² 180 (2560 psi)

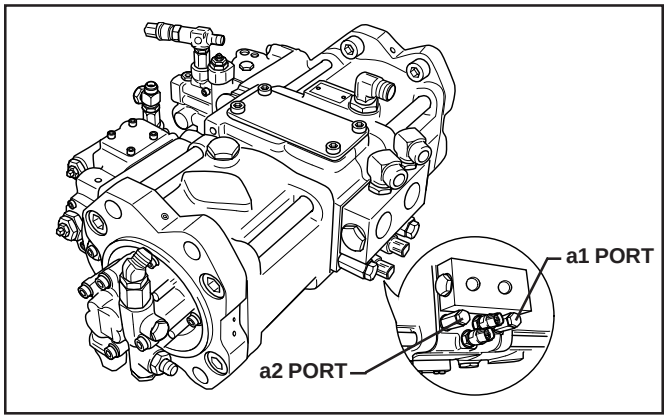


FIGURE 10.1

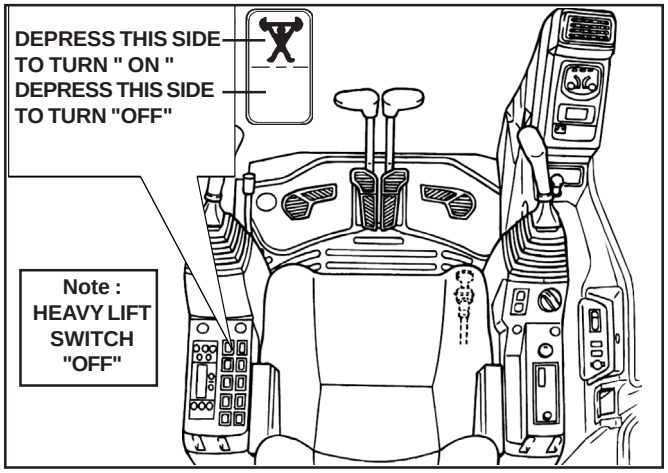


FIGURE 10.2

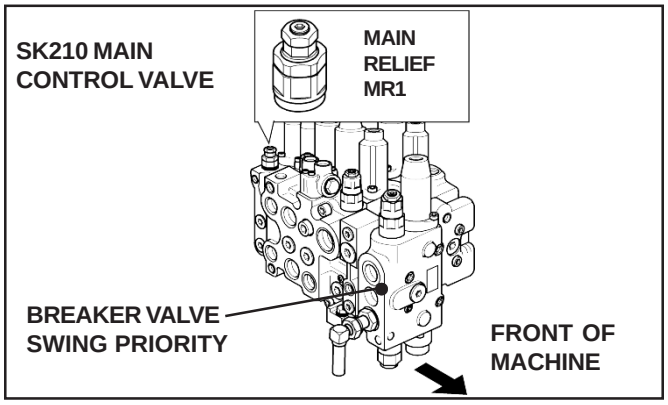


FIGURE 10.3

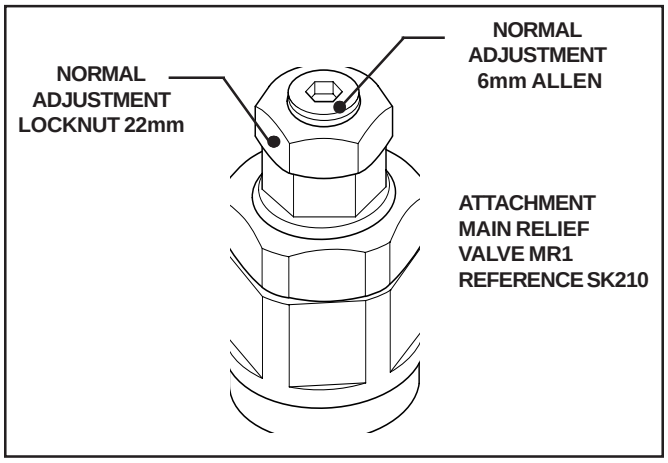


FIGURE10.4

https://truckmanualshub.com/

8. SWING CIRCUIT

NOTE

The following procedures are provided for reference only. Attachment Port Relief Valves are factory preset and should not be field adjusted.

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 11.1.
3. Release hydraulic tank pressure by depressing relief valve stem item ① on the pressure relief valve.
4. Open Main Pump Access Door and remove the PF1/4 test Port Plug (a7) from Output Port on Pilot System Gear Pump and install 105kg/cm² (1,000 psi) Pressure Gauge. See Figure 11.2.

B. Swing Over Load Relief Valve Pressure Measurement

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.
2. Move throttle control to "HI-IDLE," place KPSS Mode Switch in "M" Mode.
3. Operate boom down control until bucket teeth penetrate soil approximately 305mm (12"). See Figure 11.3.
4. Operate swing control to the left and hold, stalling swing. Record reading from 700kg/cm² (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump. See Figure 11.2.
   Or compare reading in Diagnostic Check No.14. See Figure 11.4.
5. Operate swing control to the right and hold, stalling swing. Record reading from 700kg/cm² (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump.
   Or compare reading in Diagnostic Check No.14. See Figure 11.4.

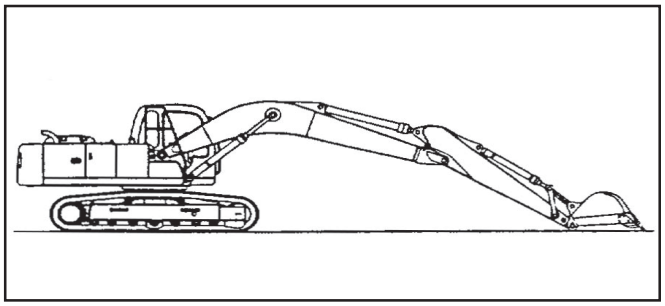


FIGURE 11.1

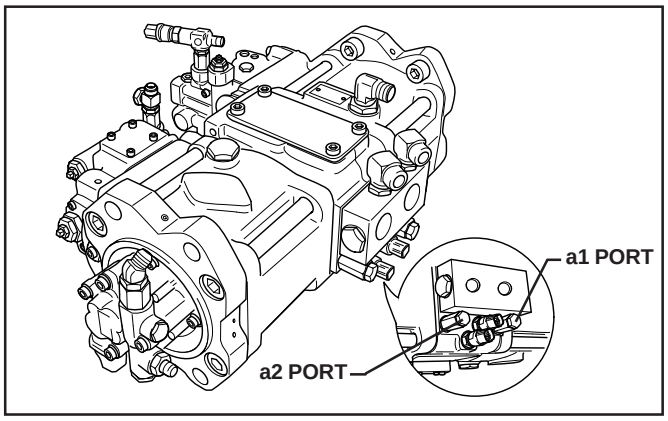


FIGURE 11.2

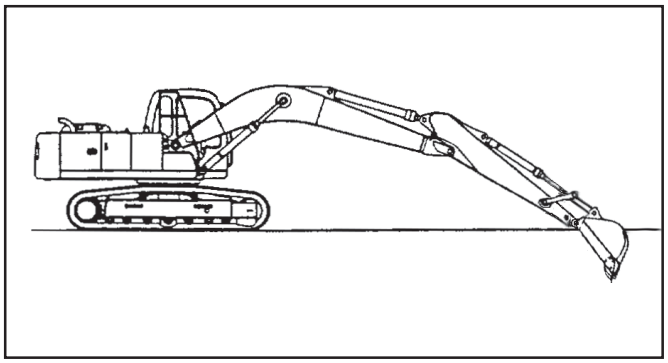


FIGURE 11.3

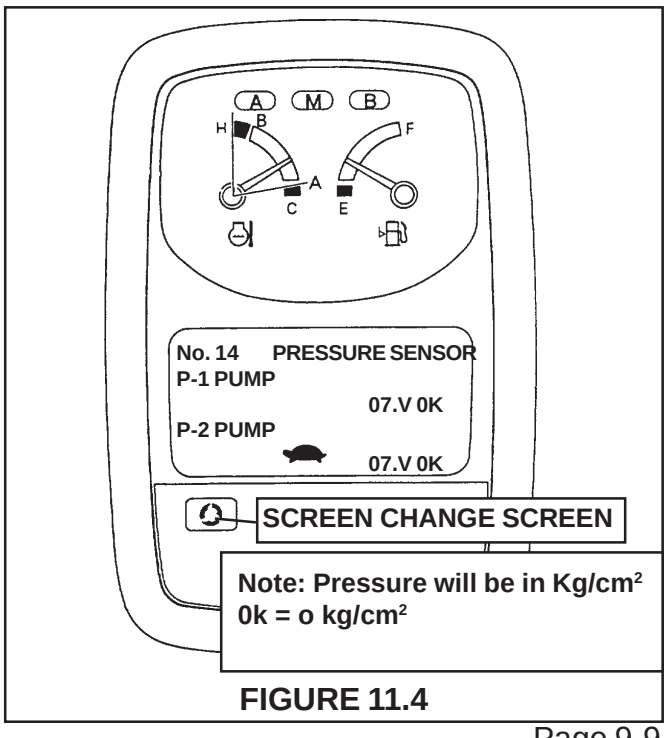


FIGURE 11.4

https://truckmanualshub.com/

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S ATTACHMENT PORT RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE ATTACHMENT PORT RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY ATTACHMENT PORT RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

C. Swing Over Load Relief Valve Pressure Adjustment

Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in “M” mode
   b. Heavy lift switch off.
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. Maintenance connector is in the release position.
   f. High Idle RPM is proper per machine being tested.
   g. Bucket teeth penetrate soil approximately 305mm (12"). Figure 12.1.
2. Locate Swing Left overload relief OR5, loosen 24mm locknut.See Figure12.2
3. Operate swing control to the left and hold, stalling swing. Adjust pressure to specific machine using 700kg/cm^2 (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump. See Figure 12.3
4. After correct pressure is obtained tighten adjusting screw locknut to ; 2.8 ~3.2 kgfm^2 (20~30 ft.lb). Verify pressure after tightening locknut.
5. Locate Swing Right overload relief OR6, loosen 24mm locknut. Operate swing control to the right and hold, stalling swing. Adjust pressure to specific machine using 700kg/cm^2 (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump.
6. After correct pressure is obtained tighten adjusting screw locknut to ; 2.8 ~3.2 kgfm^2 (20~30 ft.lb). Verify pressure after tightening locknut.

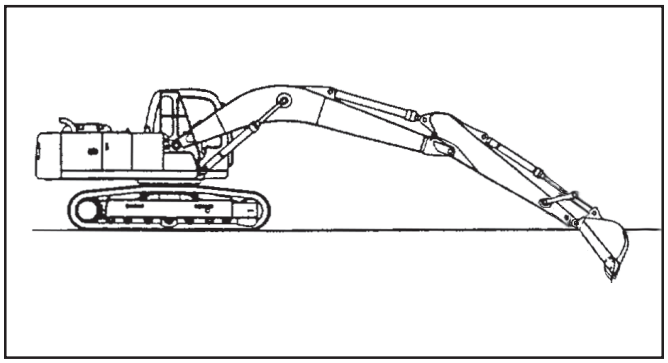


FIGURE 12.1

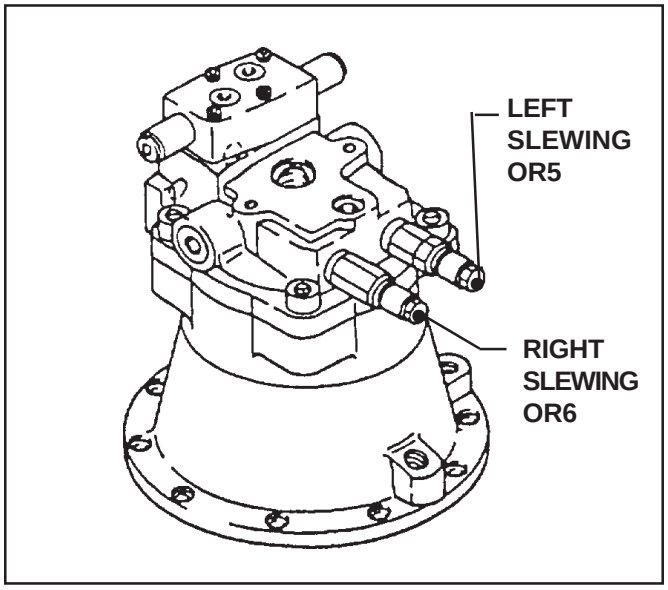


FIGURE 12.2

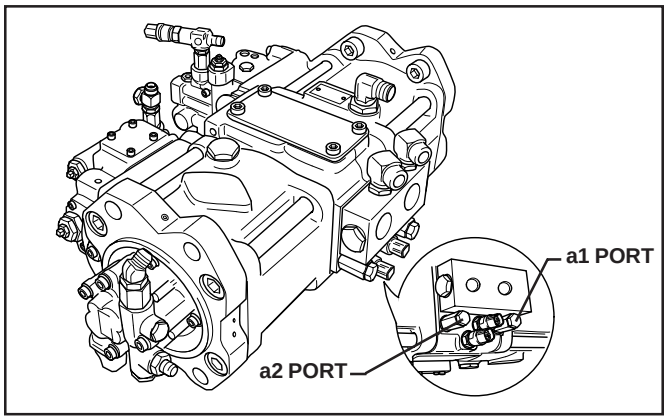


FIGURE 12.3

NOTE

Turning Normal Adjusting Screw Clockwise One turn
Increases Pressure Approximately
108 kgf/cm^2 21 (300 psi)

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

⚠ WARNING ⚠

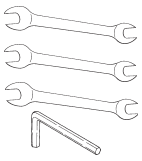
• PRECISE ADJUSTMENT OF THE MACHINE'S OVER LOAD RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE OVER LOAD RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

9. OVER LOAD RELIEF VALVES

A. Machine Preparation Procedures

a. Machine in the oil check position. See Figure 13.1
a. KPSS is in “A” mode.
b. Heavy lift switch on.See Figure13.2
c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
e. Maintenance connector is in the release position.
f. Low Idle RPM is proper per machine being tested.

B. Tools & Equipment Required for Checking and Adjusting of Over load Relief Valves

1. Two 700kg/cm^2 (10,000psi) Gauges.
2. 
   32 mm spaner wrench
   22 mm spaner wrench
   19 mm spaner wrench
   6 mm allen wrench

C. Over Load Releif Pressure Measurement

1. Move throttle control to "LO-IDLE," place KPSS Mode Switch in "A" - Mode.
2. Place "HEAVY LIFT" Switch in "ON" position. See Figure 13.2.
3. Locate MR1 on Main Control Valve and adjust main relief valve 14kg/cm^2 (200 psi) above port relief value pressure. See Figure 13.3.
4. Record reading from 700kg/cm^2 (10,000psi) Pressure Gauges at a1 or a2 test port on P1 or P2 main hydraulic pump. see Figure 13.4.
5. Compare readings to chart for specific model being tested.

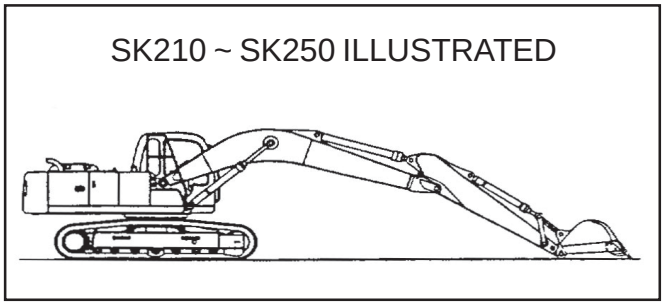


FIGURE 13.1

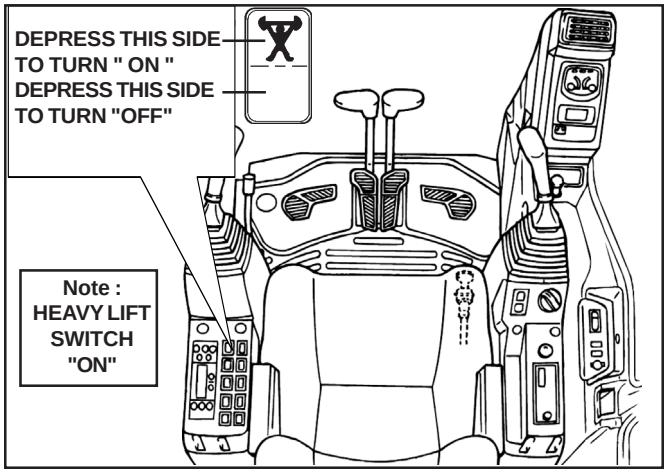


FIGURE 13.2

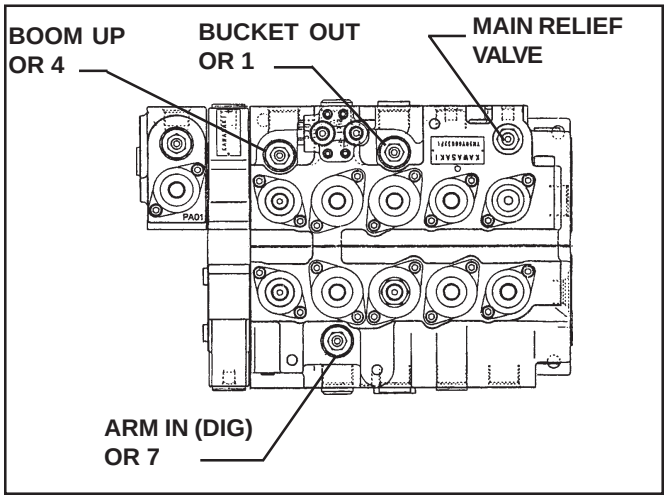


FIGURE 13.3

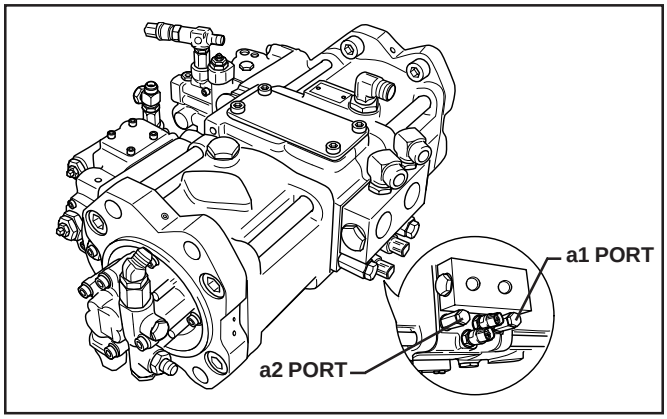


FIGURE 13.4

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

D. OR3 Boom Up Over load Relief

1. Operate Boom Up Control until boom is completely up and hold.
2. Record reading from Pressure Gauge at a1 or a2 test port on P1 or P2 Main Pump. Compare reading to proper chart for specific machin being tested.
3. Locate OR3 on Main Control Valve, loosen locknut and adjust OR3 to test bench pressure. See Figure 14.27.
4. Secure locknut TO 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

E. OR4 Boom Down over Load Relief

1. Operate Boom Down Control until boom is completely down and hold.
2. Record reading from Pressure Gauge at a test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR4 on Main Control Valve, loosen locknut and adjust OR4 to test bench pressure. See Figure 14.27.
4. Secure locknut, 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

F. OR1 Bucket In (DIG) Over Load Relief

1. Operate bucket in control until bucket is completely in, then hold.
2. Record reading from Pressure Gauge at a1 test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR1 on Main Control Valve, loosen locknut and adjust OR1 to test bench pressure. See Figure 14.27.
4. Secure locknut, 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

NOTE

Turning Over Load Adjusting Screw
Clockwise One turn
Increases Pressure Approximately
108 kgf/cm^2 180 (2560 psi)

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S OVER LOAD RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE OVER LOAD RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

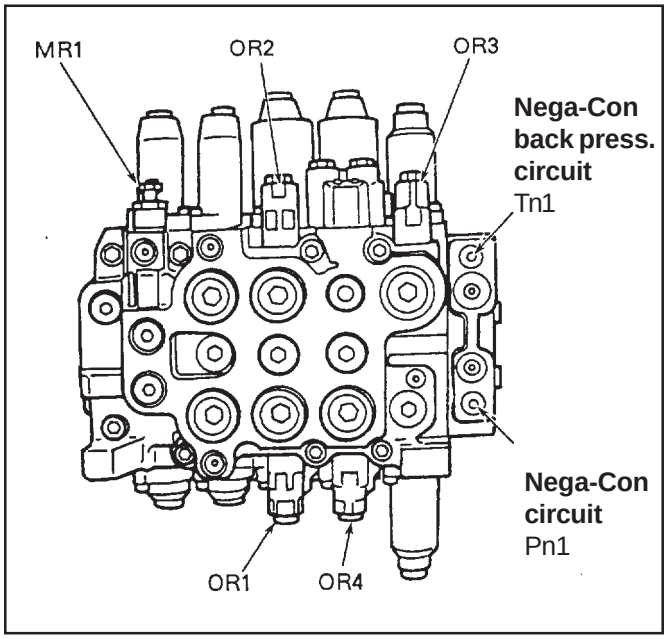


Figure 14.27 *

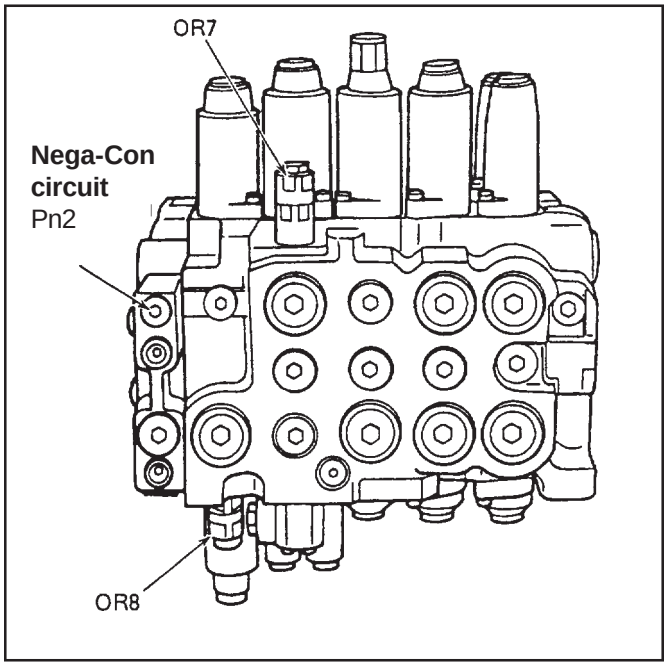


Figure 14.28 *

* Note: Swing Priority not shown

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S OVER LOAD RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE OVER LOAD RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

G. OR2 Bucket Out Over Load Relief

1. Operate Bucket Out Control until bucket is completely out and hold.
2. Record reading from Pressure Gauge at a1 test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR2 on Main Control Valve, loosen locknut and adjust OR1 to test bench pressure. See Figure 15.27.
4. Secure locknut 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

H. OR7 Arm In (DIG) Over Load Relief

1. Operate arm in control until arm is com pletely in and hold.
2. Record reading from Pressure Gauge at a2 test port on P2 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR7 on Main Control Valve, loosen locknut and adjust OR7 to test bench pressure. See Figure 15.28.
4. Secure locknut, 2.8 ~3.2 kgfm^2 (20~30 ft.lb).

I. OR8 Arm Out Over Load Relief

1. Operate arm out control until arm is completely out, then hold.
2. Record reading from Pressure Gauge at a2 test port on P2 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR8 on Main Control Valve, loosen locknut and adjust OR8 to test bench pressure. See Figure 15.28.
4. Secure locknut, 2.8 ~3.2 kgfm^2 (20~30 ft.lb).
5. Adjust MR - 1 back to specified settings. Verify pressures and that machine operation is correct.

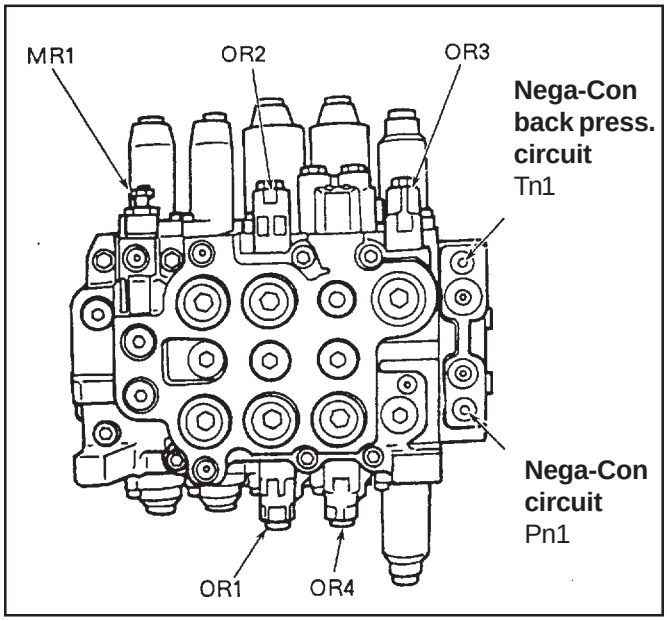


Figure 15.27 *

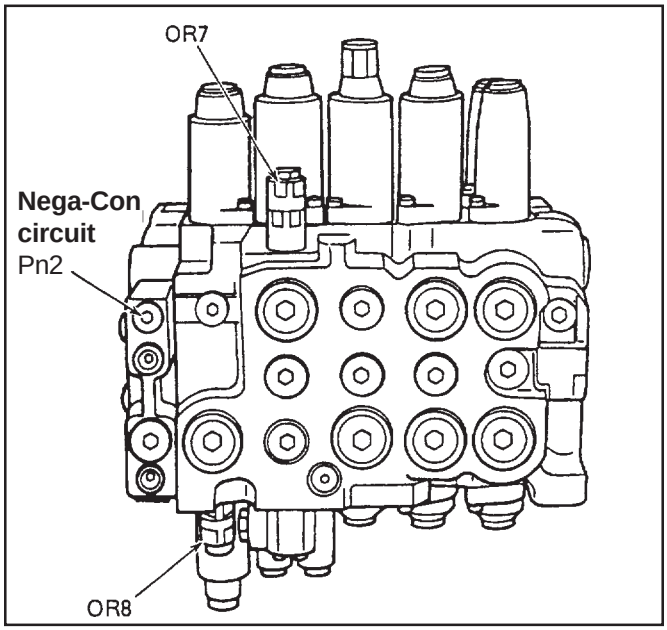


Figure 15.28 *

* Note: Swing Priority not shown

NOTE

Turning Over Load Adjusting Screw
Clockwise One turn
Increases Pressure Approximately
108 kgf/cm^2 180 (2560 psi)

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

WARNING

• MAKE CERTAIN SPECIAL TOOL IS SEATED AGAINST CRAWLER FRAME AND BETWEEN SPROCKET TEETH. NEVER ALLOW SPECIAL TOOL TO REST AGAINST CRAWLER FRAME CORNER RE-INFORCEMENTS. ENGAGE TRAVEL SLOWLY & CAREFULLY UNTIL TOOL IS POSITIONED COR-RECTLY

J. Travel Motor Port Reliefs

1. Perform MACHINE PREPARATION PROCEDURES before continuing to next step.
2. Move throttle control to "LO-IDLE," place KPSS Mode Switch in "M" - Mode. See Figure 16.22.
3. Install special tool pin size101mm (4.0in) into sprocket on each side of machine for stalling travel. See Figure 16.23.
4. Place travel speed select switch in 2nd (🐇) speed position. See Figure 16.24.
5. Place "HEAVY LIFT" Switch in "ON" position. See Figure 16.24.
6. Operate both travel controls together to full forward and hold. See Figure 16.25
7. Locate MR1 on Main Control Valve and adjust main relief valve 14kg/cm^2 (200 psi) above travel motor port relief value.
8. Record reading from 700kg/cm^2 (10,000psi) Pressure Gauges at a1 or a2 test port on P1 or P2 main hydraulic pump. Or compare reading in diagnostic check item #14.
9. Compare readings to chart for specific model being tested.

WARNING

• PRECISE ADJUSTMENT OF THE TRAVEL MOTOR *RELIEF VALVE IS NOT POSSIBLE.*
IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.

1. Travel motor port reliefs are set by the manufacture before shipment. When adjustment is required, loosen 19mm nut and adjust the pressure with 6mm adjusting screw to specification.

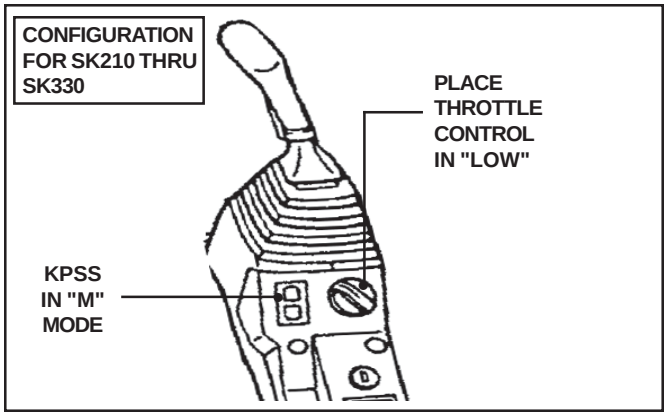


FIGURE 16.22

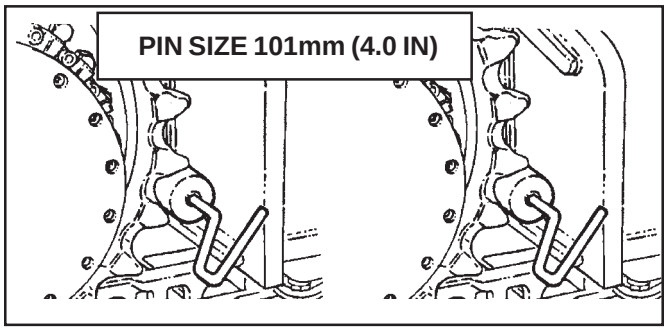


FIGURE 16.23

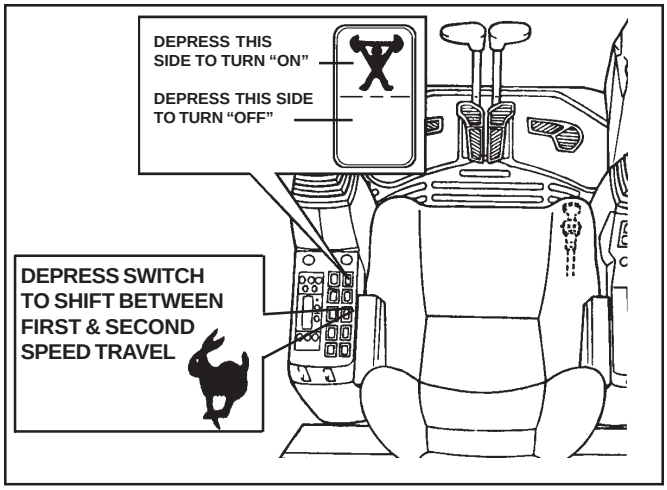


FIGURE16.24

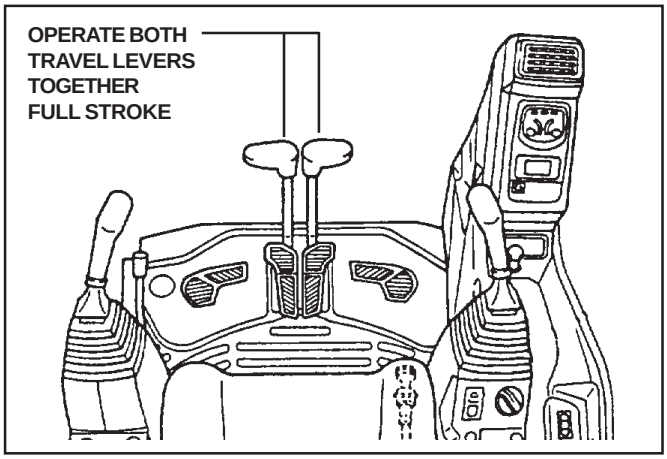
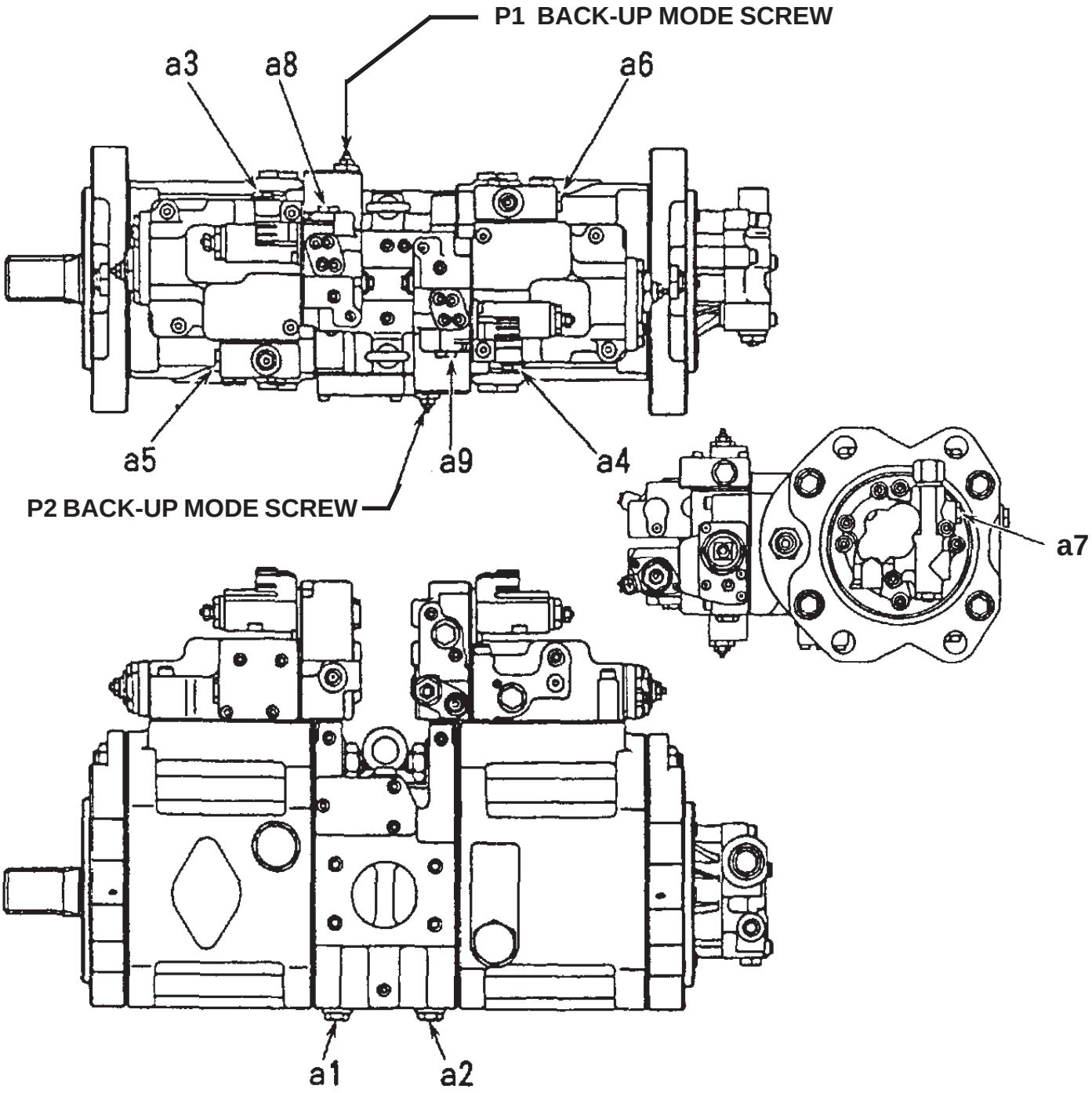


FIGURE 16.25

https://truckmanualshub.com/

10. MEASUREMENT OF ADDITIONAL CIRCUIT PRESSURE PORTS

1. High pressure sensor circuit
   Remove a5, a6 port plugs PF 1/4 of main pump and attach pressure gauge of 700 kgf/cm² (10,000 psi).
2. Pump proportional valve secondary pressure circuit Remove a8, a9 port plugs PF 1/4 of main pump and attach pressure gauge of 70 kgf/cm² (1000 psi).
3. Pilot piston circuit
   Remove a3, a4 port plugs PF 1/4 of main pump and attach pressure gauge of 70 kgf/cm² (1000 psi).
4. Negative control pressure
   When operating in backup mode.
   Remove a3, a4 port plugs PF 1/4 of main pump and attach pressure gauge of 70 kgf/cm² (1000 psi).

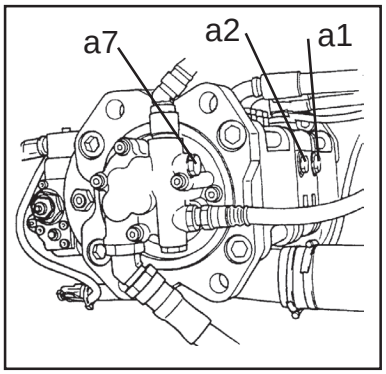


https://truckmanualshub.com/

MEASURING & ADJUSTING PRESSURES SK160

YM02U101~

INSPECTION ITEM			PRESSURE					Adjustment Point	MEASURING CONDITION, FUNCTION
			READING FROM		SPECIFICATION				
STANDARDS FOR TESTING	Cleanliness of Hydraulic Oil		Hydraulic Oil Tank		Class: NAS 7–9			N/A	Take Sample
	Temperature of Hydraulic Oil		Hydraulic Oil Tank Surface		°C- 45~55	°F-113~131		N/A	Ambient Temperature -10°C ~ 50°C (14°F ~ 122°F)
	Engine Coolant Temperature		Radiator Surface		°C- 60~90	°F-140~194		N/A	
	ENGINE RPM	Low Idle	Display change switch on gauge cluster		975~1025 RPM			Service Connector Installed	Throttle @ "LO"- Idle
		M- Mode			2405~2455 RPM				Throttle @ "HI"- Idle
		A- Mode			2175~2225				Throttle @ "HI"- Idle
		B- Mode			2405~2455				Throttle @ "HI"- Idle
SYSTEM	**COMPONENT**		**GAUGE @**	**SIZE**	**PORT**	**Kgf/cm²**	**PSI**	**Adj point**	**Measuring Condition**
PILOT CIRCUIT	PRIMARY PRESSURE		Gear Pump		a7	50~55	711~782	P3	Engine - Hi Idle
MAIN RELIEF	HEAVY LIFT		Main Pump		a1 a2	380~395	5405~5618	MR1	Boom Raising
	ATTACHMENT		Main Pump		a1 a2	350~355	4978~5049	MR1	Boom Raising
NOTE:	Port relief valves are set at a precise flow rate and cannot be adjusted on the machine. Port relief valves can be checked for excessive leakage by increasing the value of main relief valve. (turn main relief clockwise one complete turn). Check at low idle, heavy lift on (if Applicable). Refer to chart below for port relief valve.								
PORT RELIEFS	BOOM (DO NOT ADJUST)	ROD	Main Pump	PF 1/4	a1	350~385	4977~5474	OR4	Boom Down
		HEAD			a2	380~405	5405~5760	OR3	Boom Up
	ARM (DO NOT ADJUST)	ROD	Main Pump		a1	380~405	5405~5760	OR8	Arm Out (Cylinder In)
		HEAD			a2	350~385	4978~5476	OR7	Arm In (Cylinder Out)
	BUCKET (DO NOT ADJUST)	ROD	Main Pump		a1	350~385	4978~5476	OR1	Bucket Out
		HEAD			a2	380~405	5405~5760	OR2	Bucket In
	SWING	Left	Main Pump		a2	290~320	4125~4551	OR5	Bucket Lock, Stall Swing
		Right			a2	290~320	4125~4551	OR6	Bucket Lock, Stall Swing
	AUXILIARY */**	All	Main Pump		a1a2	N/A	N/A		Auxiliary Attachment Stalled
	TRAVEL (DO NOT ADJUST)	Forward	Main Pump		a1	350~360	4978~5120		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~360	4978~5120		
		Forward			a1	350~360	4978~5120		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~360	4978~5120		
SYSTEM	**COMPONENT**		**GAUGE @**		**PORT**	**Kgf/cm²**	**mA**	**Adj point**	**Measuring Condition**
PROPORTIONAL VALVE BLOCK	P1 by-pass cut valve	D	Multi display on C2 Gauge cluster	Display on service diagnostics	No.20	6~8	340~355	Neutral	Arm out
						23~26	635~650	activated	
	P2 by-pass cut valve	B			No.21	6~8	340~355	Neutral	Boom up
						23~26	635~650	activated	
	Travel Straight valve	C			No.22	6~8	340~355	Neutral	Arm in
						23~26	635~645	activated	
	Arm variable recirculation	A			No.23	23~26	635~645	Neutral	Arm in
						4~6	300~320	activated	
Pump Regulation	P1 pump proportional valve	a8			No.24	6~8	340~355	Neutral	Power Shift *** / ** / *
						10~20	450~480	activated	
	P2 pump proportional valve	a9			No.25	6~8	340~355	Neutral	Power Shift *** / ** / *
						10~20	450~480	activated	



Power Shift:

*** ...All controls in neutral 0~10 mA

** ....Front attachment stalled 0~10 mA

* .....Both travel motors stalled 10~30 mA

Auxiliary */

Auxilary port relief are as follows:
Swing priority, Breaker, Nibler Breaker

NOTE :
Take Measurements
M-Mode Engine at "HI" Idle.
Levers in neutral for neutral reading,
then activate circuit to take activated readings

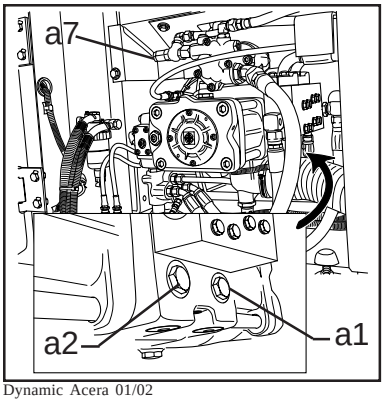
https://truckmanualshub.com/

MEASURING & ADJUSTING PRESSURES ED190

INSPECTION ITEM			PRESSURE READING FROM	PRESSURE SPECIFICATION		Adjustment Point	MEASURING CONDITION, FUNCTION
STANDARDS FOR TESTING	Cleanliness of Hydraulic Oil		Hydraulic Oil Tank	Class: NAS 7–9		N/A	Take Sample
	Temperature of Hydraulic Oil		Hydraulic Oil Tank Surface	°C- 45~55	°F- 113~131	N/A	Ambient Temperature -10°C ~ 50°C (14°F ~ 122°F)
	Engine Coolant Temperature		Radiator Surface	°C- 60~90	°F- 140~194	N/A	
	ENGINE RPM	Low Idle	Externally Mounted Tachometer or Cluster Gauge	975~1025 RPM		External Calbe and Linkage adjustment	Throttle @ "LO"- Idle
		M - Mode		2405~2455 RPM			Throttle @ "HI"- Idle
		A - Mode		2175~2225			Throttle @ "HI"- Idle
		B - Mode		2405~2455			Throttle @ "HI"- Idle
		Auto Accel "Connected"		950 ~1100 RPM			Throttle @ "HI"- Idle

SYSTEM	COMPONENT		GAUGE @	SIZE	PORT	Kgf/cm²	PSI		
PILOT CIRCUIT	PRIMARY PRESSURE		Gear Pump	PF1/4	a7	50~55	711~782	P3	Engine - Hi Idle
MAIN RELIEFS	HEAVY LIFT		Main Pump		a1 a2	380~395	5405~5618	MR1	Bucket Digging Boom Raising
	ATTACHMENT		Main Pump		a1 a2	350~355	4978~5049	MR1	Bucket Digging Boom Raising
	DOZER	U	Gear Pump		a8	250	3550	DRV1	Blade Up and Stall
PORT RELIEFS	BOOM (DO NOT ADJUST)	ROD	Main Pump		a1	350~385	4978~5475	OR4	Boom Lowering
		HEAD			a2	380~405	5405~5760	OR3	Boom Raising
	ARM (DO NOT ADJUST)	ROD	Main Pump		a1	380~405	5405~5760	OR8	Arm Out (Cylinder IN)
		HEAD			a2	350~385	4978~5475	OR7	Arm In (Cylinder OUT)
	BUCKET (DO NOT ADJUST)	ROD	Main Pump		a1	350~385	4978~5475	OR1	Bucket Dump
		HEAD			a2	380~405	5405~5760	OR2	Bucket Digging
	SWING		Main Pump		a2	290~320	4125~4551	OR5	Bucket Lock,Stall Swing
					a2	290~320	4125~4551	OR6	Bucket Lock,Stall Swing
	AUXILIARY */**	All	Main Pump		a1 a2	N/A	N/A		Auxilary Attachment Stalled
	TRAVEL (DO NOT ADJUST)	Forward	Main Pump		a1	350~360	4978~5120		"M"- Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~360	4978~5120		
		Forward			a1	350~360	4978~5120	RV15	"M"- Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~360	4978~5120	RV16	

SYSTEM	COMPONENT		GAUGE @		PORT	Kgf/cm²	mA	Adj point	Measuring Condition
PROPORTIONAL VALVE BLOCK	P1 by-pass cut valve	D	Multi display on C2 Gauge cluster	Display on service diagnostics	No.20	6~8	340~355	Neutral	Arm out
						23~26	635~650	activated	
	P2 by-pass cut valve	B			No.21	6~8	340~355	Neutral	Boom up
						23~26	635~650	activated	
	Travel Straight valve	C			No.22	6~8	340~355	Neutral	Arm in
						23~26	635~645	activated	
	Arm variable recirculation	A			No.23	23~26	635~645	Neutral	Arm in
						4~6	300~320	activated	
Pump Regulation	P1 pump proportional valve	a8			No.24	6~8	340~355	Neutral	Power Shift *** / ** / *
						10~20	450~480	activated	
	P2 pump proportional valve	a9			No.25	6~8	340~355	Neutral	Power Shift *** / ** / *
						10~20	450~480	activated	



Power Shift:

*** ...All controls in neutral 0~10 mA
** ....Front attachment stalled 0~10 mA
* .....Both travel motors stalled 10~30 mA

Auxiliary */

Auxilary port relief are as follows:
Swing priority, Breaker, Nibler Breaker

NOTE :
Take Measurements
M-Mode Engine at "HI" Idle.
Levers in neutral for neutral reading,
then activate circuit to take activated readings

https://truckmanualshub.com/

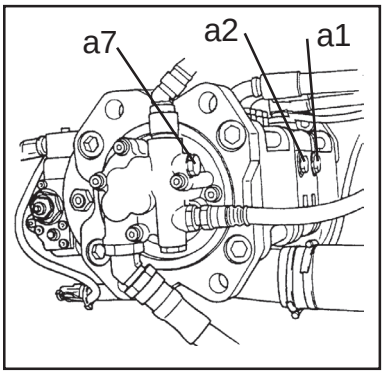
MEASURING & ADJUSTING PRESSURES SK210

YQU7U100~

INSPECTION ITEM			PRESSURE					Adjustment Point	MEASURING CONDITION, FUNCTION
			READING FROM	SPECIFICATION					
STANDARDS FOR TESTING	Cleanliness of Hydraulic Oil		Hydraulic Oil Tank	Class: NAS 7–9				N/A	Take Sample
	Temperature of Hydraulic Oil		Hydraulic Oil Tank Surface	°C- 45~55	°F-113~131			N/A	Ambient Temperature -10°C ~ 50°C (14°F ~ 122°F)
	Engine Coolant Temperature		Radiator Surface	°C- 60~90	°F-140~194			N/A	
	ENGINE RPM	Low Idle	Display change switch on gauge cluster	950~1025 RPM				Service Connector Installed	Throttle @ "LO"- Idle
		M- Mode		2195~2245 RPM					Throttle @ "HI"- Idle
		A- Mode		1925~1975					Throttle @ "HI"- Idle
		B- Mode		2195~2245					Throttle @ "HI"- Idle

SYSTEM	COMPONENT		GAUGE @	SIZE	PORT	Kgf/cm²	PSI	Adj point	Measuring Condition
PILOT CIRCUIT	PRIMARY PRESSURE		Gear Pump		a7	50~55	710~780	P3	Engine - Hi Idle
MAIN RELIEF	HEAVY LIFT		Main Pump		a1	380~395	5400~5616	MR1	Boom Raising
					a2				
	ATTACHMENT		Main Pump		a1	350~355	4977~5048	MR1	Boom Raising
					a2				
NOTE:	Port relief valves are set at a precise flow rate and cannot be adjusted on the machine. Port relief valves can be checked for excessive leakage by increasing the value of main relief valve. (turn main relief clockwise one complete turn). Check at low idle, heavy lift on (if Applicable). Refer to chart below for port relief valve.								
PORT RELIEFS	BOOM (DO NOT ADJUST)	ROD	Main Pump	PF1/4	a1	350~385	4977~5474	OR4	Boom Down
		HEAD			a2	350~405	4977~5760	OR3	Boom Up
	ARM (DO NOT ADJUST)	ROD	Main Pump		a1	350~405	4977~5760	OR8	Arm Out (Cylinder In)
		HEAD			a2	350~385	4977~5474	OR7	Arm In (Cylinder Out)
	BUCKET (DO NOT ADJUST)	ROD	Main Pump		a1	350~385	4977~5474	OR1	Bucket Out
		HEAD			a2	350~405	4977~5760	OR2	Bucket In
	SWING	Left	Main Pump		a2	327~355	4653~5050	OR5	Bucket Lock, Stall Swing
		Right			a2	327~355	4653~5050	OR6	Bucket Lock, Stall Swing
	AUXILIARY */**	All	Main Pump		a1a2	350~365	4977~5190		Auxiliary Attachment Stalled
	TRAVEL (DO NOT ADJUST)	Forward	Main Pump		a1	350~365	4977~5190		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~365	4977~5190		
		Forward			a1	350~365	4977~5190		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~365	4977~5190		

SYSTEM	COMPONENT		GAUGE @		PORT	Kgf/cm²	mA	Adj point	Measuring Condition
PROPORTIONAL VALVE BLOCK	P1 by-pass cut valve	D	Multi display on C2 Gauge cluster	Display on service diagnostics	No.20	5.5~ 6.5	330~360	Neutral	Arm out
						23~26	634~660	activated	
	P2 by-pass cut valve	B			No.21	5.5~6.5	330~360	Neutral	Boom up or Bucket dig
						23~26	634~660	activated	
	Travel Straight valve	C			No.22	5.5~6.5	330~360	Neutral	Arm in or Bucket dig
						24~28	345~680	activated	
	Arm variable recirculation	A			No.23	23~25	633~650	Neutral	Arm in
						24~0	450~200	activated	
Pump Regulation	P1 pump proportional valve	a8			No.24	28~30	730~760	Neutral	Power Shift *** / ** / *
						10~24	350~680	activated	
	P2 pump proportional valve	a9			No.25	28~30	730~760	Neutral	Power Shift *** / ** / *
						10~24	350~680	activated	



Power Shift:

*** ...All controls in neutral 0~10 mA
** ....Front attachment stalled 0~10 mA
* .....Both travel motors stalled 10~30 mA

Auxiliary */

Auxilary port relief are as follows:
Swing priority, Breaker, Nibler Breaker

NOTE :
Take Measurements
M-Mode Engine at "HI" Idle.
Levers in neutral for neutral reading,
then activate circuit to take activated readings

https://truckmanualshub.com/

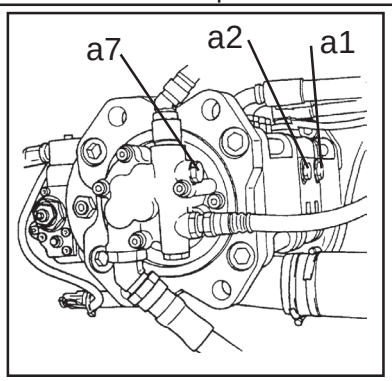
MEASURING & ADJUSTING PRESSURES SK250

LLO8U0101~

INSPECTION ITEM			PRESSURE					Adjustment Point	MEASURING CONDITION, FUNCTION
			READING FROM			SPECIFICATION			
STANDARDS FOR TESTING	Cleanliness of Hydraulic Oil		Hydraulic Oil Tank			Class: NAS 7–9		N/A	Take Sample
	Temperature of Hydraulic Oil		Hydraulic Oil Tank Surface			°C- 45~55	°F-113~131	N/A	Ambient Temperature -10°C ~ 50°C (14°F ~ 122°F)
	Engine Coolant Temperature		Radiator Surface			°C- 60~90	°F-140~194	N/A	
	ENGINE RPM	Low Idle	Display change switch on gauge cluster			950~1025 RPM		Service Connector Installed	Throttle @ "LO"- Idle
		M- Mode				2290~2345 RPM			Throttle @ "HI"- Idle
		A- Mode				1925~1975			Throttle @ "HI"- Idle
		B- Mode				2290~2345			Throttle @ "HI"- Idle

SYSTEM	COMPONENT		GAUGE @	SIZE	PORT	Kgf/cm²	PSI	Adj point	Measuring Condition
PILOT CIRCUIT	PRIMARY PRESSURE		Gear Pump		a7	50~55	710~780	P3	Engine - Hi Idle
MAIN RELIEF	HEAVY LIFT		Main Pump		a1	380~395	5400~5616	MR1	Boom Raising
					a2				
	ATTACHMENT		Main Pump		a1	350~355	4977~5048	MR1	Boom Raising
					a2				
NOTE:	Port relief valves are set at a precise flow rate and cannot be adjusted on the machine. Port relief valves can be checked for excessive leakage by increasing the value of main relief valve. (turn main relief clockwise one complete turn). Check at low idle, heavy lift on (if Applicable). Refer to chart below for port relief valve.								
PORT RELIEFS	BOOM (DO NOT ADJUST)	ROD	Main Pump	PF1/4	a1	350~385	4977~5474	OR4	Boom Down
		HEAD			a2	350~405	4977~5760	OR3	Boom Up
	ARM (DO NOT ADJUST)	ROD	Main Pump		a1	350~405	4977~5760	OR8	Arm Out (Cylinder In)
		HEAD			a2	350~385	4977~5474	OR7	Arm In (Cylinder Out)
	BUCKET (DO NOT ADJUST)	ROD	Main Pump		a1	350~385	4977~5474	OR1	Bucket Out
		HEAD			a2	350~405	4977~5760	OR2	Bucket In
	SWING	Left	Main Pump		a2	327~335	4653~5050	OR5	Bucket Lock, Stall Swing
		Right			a2	327~335	4653~5050	OR6	Bucket Lock, Stall Swing
	AUXILIARY */**	All	Main Pump		a1a2	350~365	4977~5190		Auxiliary Attachment Stalled
	TRAVEL (DO NOT ADJUST)	Forward	Main Pump		a1	350~365	4977~5190		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~365	4977~5190		
		Forward			a1	350~365	4977~5190		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~365	4977~5190		

SYSTEM	COMPONENT		GAUGE @		PORT	Kgf/cm²	mA	Adj point	Measuring Condition
PROPORTIONAL VALVE BLOCK	P1 by-pass cut valve	D	Multi display on C2 Gauge cluster	Display on service diagnostics	No.20	5.5~ 6.5	330~360	Neutral	Arm out
						23~26	634~660	activated	
	P2 by-pass cut valve	B			No.21	5.5~6.5	330~360	Neutral	Boom up or Bucket dig
						23~26	634~660	activated	
	Travel Straight valve	C			No.22	5.5~6.5	330~360	Neutral	Arm in or Bucket dig
						24~28	345~680	activated	
	Arm variable recirculation	A			No.23	23~25	633~650	Neutral	Arm in
						24~0	450~200	activated	
Pump Regulation	P1 pump proportional valve	a8			No.24	28~30	730~760	Neutral	Power Shift *** / ** / *
						10~24	350~680	activated	
	P2 pump proportional valve	a9			No.25	28~30	730~760	Neutral	Power Shift *** / ** / *
						10~24	350~680	activated	



Power Shift:

*** ...All controls in neutral 0~10 mA
** ....Front attachment stalled 0~10 mA
* .....Both travel motors stalled 10~30 mA

Auxiliary */

Auxilary port relief are as follows:
Swing priority, Breaker, Nibler Breaker

NOTE :
Take Measurements
M-Mode Engine at "HI" Idle.
Levers in neutral for neutral reading,
then activate circuit to take activated readings

https://truckmanualshub.com/

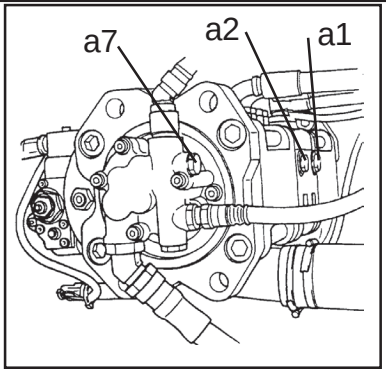
MEASURING & ADJUSTING PRESSURES SK290

LB03U0101~

INSPECTION ITEM			PRESSURE					Adjustment Point	MEASURING CONDITION, FUNCTION
			READING FROM	SPECIFICATION					
STANDARDS FOR TESTING	Cleanliness of Hydraulic Oil		Hydraulic Oil Tank	Class: NAS 7–9				N/A	Take Sample
	Temperature of Hydraulic Oil		Hydraulic Oil Tank Surface	°C- 45~55	°F- 113~131			N/A	Ambient Temperature -10°C ~ 50°C (14°F ~ 122°F)
	Engine Coolant Temperature		Radiator Surface	°C- 60~90	°F- 140~194			N/A	
	ENGINE RPM	Low Idle	Display change switch on gauge cluster	950~1025 RPM				Service Connector Installed	Throttle @ "LO"- Idle
		M- Mode		2315~2365 RPM					Throttle @ "HI"- Idle
		A- Mode		1925~1975					Throttle @ "HI"- Idle
		B- Mode		2315~2365					Throttle @ "HI"- Idle

SYSTEM	COMPONENT		GAUGE @	SIZE	PORT	Kgf/cm²	PSI	Adj point	Measuring Condition
PILOT CIRCUIT	PRIMARY PRESSURE		Gear Pump		a7	50~55	710~780	P3	Engine - Hi Idle
MAIN RELIEF	HEAVY LIFT		Main Pump		a1	380~395	5400~5616	MR1	Boom Raising
					a2				
	ATTACHMENT		Main Pump		a1	350~355	4977~5048	MR1	Boom Raising
					a2				
NOTE:	Port relief valves are set at a precise flow rate and cannot be adjusted on the machine. Port relief valves can be checked for excessive leakage by increasing the value of main relief valve. (turn main relief clockwise one complete turn). Check at low idle, heavy lift on (if Applicable). Refer to chart below for port relief valve.								
PORT RELIEFS	BOOM (DO NOT ADJUST)	ROD	Main Pump	PF1/4	a1	350~385	4977~5474	OR4	Boom Down
		HEAD			a2	350~405	4977~5760	OR3	Boom Up
	ARM (DO NOT ADJUST)	ROD	Main Pump		a1	350~405	4977~5760	OR8	Arm Out (Cylinder In)
		HEAD			a2	350~385	4977~5474	OR7	Arm In (Cylinder Out)
	BUCKET (DO NOT ADJUST)	ROD	Main Pump		a1	350~385	4977~5474	OR1	Bucket Out
		HEAD			a2	350~405	4977~5760	OR2	Bucket In
	SWING	Left	Main Pump		a2	327~335	4653~5050	OR5	Bucket Lock, Stall Swing
		Right			a2	327~335	4653~5050	OR6	Bucket Lock, Stall Swing
	AUXILIARY */**	All	Main Pump		a1a2	350~365	4977~5190		Auxiliary Attachment Stalled
	TRAVEL (DO NOT ADJUST)	Forward	Main Pump		a1	350~365	4977~5190		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~365	4977~5190		
		Forward			a1	350~365	4977~5190		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~365	4977~5190		

SYSTEM	COMPONENT		GAUGE @		PORT	Kgf/cm²	mA	Adj point	Measuring Condition
PROPORTIONAL VALVE BLOCK	P1 by-pass cut valve	D	Multi display on C2 Gauge cluster	Display on service diagnostics	No.20	5.5~ 6.5	330~360	Neutral	Arm out
						23~26	634~660	activated	
	P2 by-pass cut valve	B			No.21	5.5~6.5	330~360	Neutral	Boom up or Bucket dig
						23~26	634~660	activated	
	Travel Straight valve	C			No.22	5.5~6.5	330~360	Neutral	Arm in or Bucket dig
						24~28	345~680	activated	
	Arm variable recirculation	A			No.23	23~25	633~650	Neutral	Arm in
						24~0	450~200	activated	
Pump Regulation	P1 pump proportional valve	a8			No.24	28~30	730~760	Neutral	Power Shift *** / ** / *
						10~24	350~680	activated	
	P2 pump proportional valve	a9			No.25	28~30	730~760	Neutral	Power Shift *** / ** / *
						10~24	350~680	activated	



Power Shift:

*** ...All controls in neutral 0~10 mA

** ....Front attachment stalled 0~10 mA

* .....Both travel motors stalled 10~30 mA

Auxiliary */

Auxilary port relief are as follows:
Swing priority, Breaker, Nibler Breaker

NOTE :
Take Measurements
M-Mode Engine at "HI" Idle.
Levers in neutral for neutral reading,
then activate circuit to take activated readings

https://truckmanualshub.com/

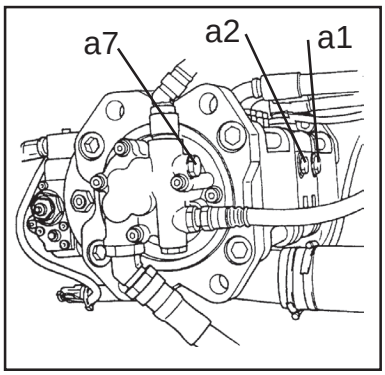
MEASURING & ADJUSTING PRESSURES SK330

YC06U101~

INSPECTION ITEM			PRESSURE					Adjustment Point	MEASURING CONDITION, FUNCTION
			READING FROM		SPECIFICATION				
STANDARDS FOR TESTING	Cleanliness of Hydraulic Oil		Hydraulic Oil Tank		Class: NAS 7–9			N/A	Take Sample
	Temperature of Hydraulic Oil		Hydraulic Oil Tank Surface		°C- 45~55	°F- 113~131		N/A	Ambient Temperature -10°C ~ 50°C (14°F ~ 122°F)
	Engine Coolant Temperature		Radiator Surface		°C- 60~90	°F- 140~194		N/A	
	ENGINE RPM	Low Idle	Display change switch on gauge cluster		950~1025 RPM			Service Connector Installed	Throttle @ "LO"- Idle
		M- Mode			2360~2430 RPM				Throttle @ "HI"- Idle
		A- Mode			1925~1975				Throttle @ "HI"- Idle
		B- Mode			2360~2430				Throttle @ "HI"- Idle

SYSTEM	COMPONENT		GAUGE @	SIZE	PORT	Kgf/cm²	PSI	Adj point	Measuring Condition
PILOT CIRCUIT	PRIMARY PRESSURE		Gear Pump		a7	50~55	710~780	P3	Engine - Hi Idle
MAIN RELIEF	HEAVY LIFT		Main Pump		a1	380~395	5400~5616	MR1	Boom Raising
					a2				
	ATTACHMENT		Main Pump		a1	350~355	4977~5048	MR1	Boom Raising
					a2				
NOTE:	Port relief valves are set at a precise flow rate and cannot be adjusted on the machine. Port relief valves can be checked for excessive leakage by increasing the value of main relief valve. (turn main relief clockwise one complete turn). Check at low idle, heavy lift on (if Applicable). Refer to chart below for port relief valve.								
PORT RELIEFS	BOOM (DO NOT ADJUST)	ROD	Main Pump	PF 1/4	a1	350~385	4977~5474	OR4	Boom Down
		HEAD			a2	350~405	4977~5760	OR3	Boom Up
	ARM (DO NOT ADJUST)	ROD	Main Pump		a1	350~405	4977~5760	OR8	Arm Out (Cylinder In)
		HEAD			a2	350~385	4977~5474	OR7	Arm In (Cylinder Out)
	BUCKET (DO NOT ADJUST)	ROD	Main Pump		a1	350~385	4977~5474	OR1	Bucket Out
		HEAD			a2	350~405	4977~5760	OR2	Bucket In
	SWING	Left	Main Pump		a2	324~355	4622~5050	OR5	Bucket Lock, Stall Swing
		Right			a2	324~355	4622~5050	OR6	Bucket Lock, Stall Swing
	AUXILIARY */**	All	Main Pump		a1a2	350~365	4977~5190		Auxiliary Attachment Stalled
	TRAVEL (DO NOT ADJUST)	Forward	Main Pump		a1	350~365	4977~5190		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~365	4977~5190		
		Forward			a1	350~365	4977~5190		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	350~365	4977~5190		

SYSTEM	COMPONENT		GAUGE @		PORT	Kgf/cm²	mA	Adj point	Measuring Condition
PROPORTIONAL VALVE BLOCK	P1 by-pass cut valve	D	Multi display on C2 Gauge cluster	Display on service diagnostics	No.20	5.5~ 6.5	330~360	Neutral	Arm out
						23~26	634~660	activated	
	P2 by-pass cut valve	B			No.21	5.5~6.5	330~360	Neutral	Boom up or Bucket dig
						23~26	634~660	activated	
	Travel Straight valve	C			No.22	5.5~6.5	330~360	Neutral	Arm in or Bucket dig
						24~28	345~680	activated	
	Arm variable recirculation	A			No.23	23~25	633~650	Neutral	Arm in
						24~0	450~200	activated	
Pump Regulation	P1 pump proportional valve	a8			No.24	28~30	730~760	Neutral	Power Shift *** / ** / *
						10~24	350~680	activated	
	P2 pump proportional valve	a9			No.25	28~30	730~760	Neutral	Power Shift *** / ** / *
						10~24	350~680	activated	



Power Shift:

*** ...All controls in neutral 0~10 mA

** ....Front attachment stalled 0~10 mA

* .....Both travel motors stalled 10~30 mA

Auxiliary */

Auxilary port relief are as follows:
Swing priority, Breaker, Nibler Breaker

NOTE :
Take Measurements
M-Mode Engine at "HI" Idle.
Levers in neutral for neutral reading,
then activate circuit to take activated readings

https://truckmanualshub.com/

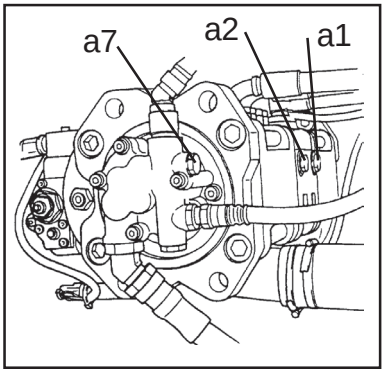
MEASURING & ADJUSTING PRESSURES SK480

YS06U101~

INSPECTION ITEM			PRESSURE					Adjustment Point	MEASURING CONDITION, FUNCTION
			READING FROM		SPECIFICATION				
STANDARDS FOR TESTING	Cleanliness of Hydraulic Oil		Hydraulic Oil Tank		Class: NAS 7–9			N/A	Take Sample
	Temperature of Hydraulic Oil		Hydraulic Oil Tank Surface		°C- 45~55	°F-113~131		N/A	Ambient Temperature -10°C ~ 50°C (14°F ~ 122°F)
	Engine Coolant Temperature		Radiator Surface		°C- 60~90	°F-140~194		N/A	
	ENGINE RPM	Low Idle	Display change switch on gauge cluster		970~1030 RPM			Service Connector Installed	Throttle @ "LO"- Idle
		M- Mode			2170~2230 RPM				Throttle @ "HI"- Idle
		A- Mode			1870~1930				Throttle @ "HI"- Idle
		B- Mode			2170~2230				Throttle @ "HI"- Idle

SYSTEM	COMPONENT	GAUGE @	SIZE	PORT	Kgf/cm²	PSI	Adj point	Measuring Condition
PILOT CIRCUIT	PRIMARY PRESSURE	Gear Pump		a7	50~53	711~754	P3	Engine - Hi Idle
MAIN RELIEF	HEAVY LIFT	Main Pump		a1	345~360	4907~5120	MR1	Boom Raising
				a2				
	ATTACHMENT	Main Pump		a1	320~325	4551~4622	MR1	Boom Raising
				a2				
NOTE:	Port relief valves are set at a precise flow rate and cannot be adjusted on the machine. Port relief valves can be checked for excessive leakage by increasing the value of main relief valve. (turn main relief clockwise one complete turn). Check at low idle, heavy lift on (if Applicable). Refer to chart below for port relief valve.							
PORT RELIEFS	BOOM (DO NOT ADJUST) ROD	Main Pump	PF1/4	a1	350~355	4977~5050	OR4	Boom Down
	BOOM (DO NOT ADJUST) HEAD	Main Pump		a2	320~375	4551~5334	OR3	Boom Up
	ARM (DO NOT ADJUST) ROD	Main Pump		a1	320~375	4551~5334	OR8	Arm Out (Cylinder In)
	ARM (DO NOT ADJUST) HEAD	Main Pump		a2	320~355	4551~5049	OR7	Arm In (Cylinder Out)
	BUCKET (DO NOT ADJUST) ROD	Main Pump		a1	320~355	4551~5050	OR1	Bucket Out
	BUCKET (DO NOT ADJUST) HEAD	Main Pump		a2	320~375	4551~5334	OR2	Bucket In
	SWING Left	Main Pump		a2	260~320	3698~4551	OR5	Bucket Lock, Stall Swing
	SWING Right	Main Pump		a2	260~320	3698~4551	OR6	Bucket Lock, Stall Swing
	AUXILIARY */**	Main Pump		a1a2	N/A	N/A		Auxiliary Attachment Stalled
	TRAVEL (DO NOT ADJUST) Forward	Main Pump		a1	335~350	4765~4977		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
	TRAVEL (DO NOT ADJUST) Reverse	Main Pump		a2	335~350	4765~4977		
	TRAVEL (DO NOT ADJUST) Forward	Main Pump		a1	335~350	4765~4977		"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
	TRAVEL (DO NOT ADJUST) Reverse	Main Pump		a2	335~350	4765~4977		

SYSTEM	COMPONENT		GAUGE @		PORT	Kgf/cm²	mA	Adj point	Measuring Condition
PROPORTIONAL VALVE BLOCK	P1 by-pass cut valve	D	Multi display on C2 Gauge cluster	Display on service diagnostics	No.20	3~8	300~330	Neutral	Independant Travel
						25~28	690~710	activated	
	P2 by-pass cut valve	B			No.21	3~8	300~330	Neutral	Bucket Dig
						25~30	345~350	activated	
	Travel Straight valve	C			No.22	5~7	340~355	Neutral	Independant Travel
						24~28	660~670	activated	
	Arm variable recirculation	A			No.23	4~6	340~350	Neutral	Arm in
						24~26	640~650	activated	
Pump Regulation	P1 pump proportional valve	a8			No.24	28~30	730~760	Neutral	Power Shift *** / ** / *
						15~25	540~560	activated	
	P2 pump proportional valve	a9			No.25	28~30	730~760	Neutral	Power Shift *** / ** / *
						15~25	540~560	activated	



Power Shift:

*** ...All controls in neutral 0~10 mA
** ....Front attachment stalled 0~10 mA
* .....Both travel motors stalled 10~30 mA

Auxiliary */

Auxilary port relief are as follows:
Swing priority, Breaker, Nibler Breaker

NOTE :
Take Measurements
M-Mode Engine at "HI" Idle.
Levers in neutral for neutral reading,
then activate circuit to take activated readings

https://truckmanualshub.com/

Kobelco

Dynamic



Kobelco Construction Machinery America LLC
Pressure Adjustments
SK480

KOBELCO

Kobelco Construction
Machinery America LLC

https://truckmanualshub.com/

TABLE OF CONTENTS

NOTES **3**
PERFORMANCE INSPECTION SPECIFICATION CHART **4**
A. SK480 4

1. VERIFICATION OF ENGINE RPM **5**
A. Machine Preparation Procedures 5

2. ENGINE SPEED MEASURED WITH SERVICE DIAGNOSTICS (28 ITEM CHECK) **5**

3. HYDRAULIC OIL CAUTIONS **6**
A. Checking the Main Relief Setting Using Service Diagnostics (28 Item Check) 6
B. Tools & Equipment Required for Checking and Adjusting of Pilot and Main Relief Valves 6

4. PILOT CIRCUIT **7**
A. Machine Preparation Procedures 7
B. Pilot Relief Valve Pressure Measurement Procedures 7
C. Pilot Relief Valve Adjustment Procedures 7

5. MAIN RELIEF PRESSURE MEASURREMENT **8**
A. Machine Preparation Procedures 8
B. Measurement of Attachment Main Relief Valve “HEAVY LIFT SWITCH ON” 8

6. MAIN REILEF ADJUSTMENT 2nd STAGE “HEAVY LIFT SWITCH ON” **9**
A. Machine Preparation Procedures 9
B. 2nd Stage Main Relief Valve Adjustment 9

7. ADJUSTMENT MAIN RELIEF WITH “HEAVY LIFT SWITCH OFF” **10**
A. Machine Preparation Procedures 10
B. Main Relief Valve Adjustment 10

8. SWING CIRCUIT **11**
A. Machine Preparation Procedures 11
B. Swing Port Relief Valve Pressure Measurement 11
C. Swing Port Relief Valve Procedures ..... 12~13

9. OVERLOAD RELIEF VALVES ..... **14~17**
A. Machine Preparation Procedures 14
B. Tools & Equipment Required for Checking and Adjusting of Overload Relief Valves 14
C. Overload Relief Pressure Measurement 14
D. OR3 Boom Up Overload Relief 15
E. OR4 Boom Down Overload Relief 15
F. OR1 Bucket In (Dig) Overload 15
G. OR2 Bucket Out Overoad 15
H. OR7 Arm In (Dig) Overload 16
I. OR8 Arm Out Overload 17
J. Travel Motor Port Reliefs 18

10. SK480 PUMP LOCATION OF PARTS **19**

https://truckmanualshub.com/

NOTES

https://truckmanualshub.com/

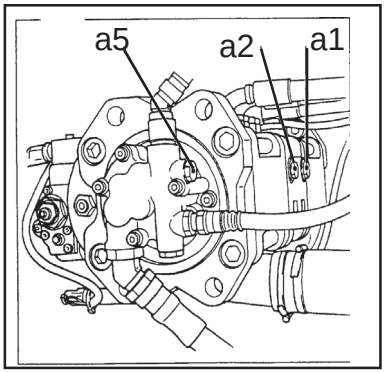
PERFORMANCE INSPECTION SPECIFICATION CHART SK480

YS06U101~

INSPECTION ITEM			PRESSURE					Adjustment Point	MEASURING CONDITION, FUNCTION
			READING FROM			SPECIFICATION			
STANDARDS FOR TESTING	Cleanliness of Hydraulic Oil		Hydraulic Oil Tank			Class: NAS 7–9		N/A	Take Sample
	Temperature of Hydraulic Oil		Hydraulic Oil Tank Surface			°C- 45~55	°F-113~131	N/A	Ambient Temperature -10°C ~ 50°C (14°F ~ 122°F)
	Engine Coolant Temperature		Radiator Surface			°C- 60~90	°F-140~194	N/A	
	ENGINE RPM	Low Idle	Display change switch on gauge cluster			970~1030 RPM		Service Connector Installed	Throttle @ "LO"- Idle
		M- Mode				2170~22230 RPM			Throttle @ "HI"- Idle
		A- Mode				1870~1930			Throttle @ "HI"- Idle
		B- Mode				2170~2230			Throttle @ "HI"- Idle

SYSTEM	COMPONENT		GAUGE @	SIZE	PORT	Kgf/cm²	PSI	Adj point	Measuring Condition
PILOT CIRCUIT	PRIMARY PRESSURE		Gear Pump		a5	50~55	711~782	P3	Engine - Hi Idle
MAIN RELIEF	HEAVY LIFT		Main Pump		a1 a2	345~360	4970~5120	MR1	Boom Raising
	ATTACHMENT		Main Pump		a1 a2	320~325	4551~4622	MR1	Boom Raising
NOTE:	Port relief valves are set at a precise flow rate and cannot be adjusted on the machine. Port relief valves can be checked for excessive leakage by increasing the value of main relief valve. (turn main relief clockwise one complete turn). Check at low idle, heavy lift on (if Applicable). Refer to chart below for port relief valve.								
PORT RELIEFS	BOOM (DO NOT ADJUST)	ROD	Main Pump	PF 1/4	a1	350~385	4977~5474	OR 4	Boom Down
		HEAD			a2	320~375	4551~5334	OR 3	Boom Up
	ARM (DO NOT ADJUST)	ROD	Main Pump		a1	320~355	4551~5049	OR 8	Arm Out (Cylinder In)
		HEAD			a2	320~375	4551~5334	OR 7	Arm In (Cylinder Out)
	BUCKET (DO NOT ADJUST)	ROD	Main Pump		a1	320~355	4551~5049	OR 2	Bucket Out
		HEAD			a2	320~375	4551~5334	OR 1	Bucket In
	SWING 4 Port reliefs	Left	Main Pump		a2	295~320	4200~4551	OR 5	Bucket Lock, Stall Swing
		Right			a2	295~320	4200~4551	OR 6	Bucket Lock, Stall Swing
	AUXILIARY */**	All	Main Pump		a1a2	N/A	N/A		Auxiliary Attachment Stalled
	TRAVEL (DO NOT ADJUST)	Forward	Main Pump		a1	335~350	4765~4978	OT 1	"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	335~350	4765~4978	OT 2	
		Forward			a1	335~350	4765~4978	OT 3	"M"-Mode, Engine at Hi Idle. Simultaneous LH/RH Travel Engaged
		Reverse			a2	335~350	4765~4978	OT 4	

SYSTEM	COMPONENT		GAUGE @		PORT	Kgf/cm²	mA	Adj point	Measuring Condition
PROPORTIONAL VALVE BLOCK	P1 by-pass cut valve	D	Multi display on C2 Gauge cluster	Display on service diagnostics	No.20	3~8	300~330	Neutral	Arm out
						42~113	690~710	activated	
	P2 by-pass cut valve	B			No.21	3~8	300~330	Neutral	Boom up
						42~113	690~710	activated	
	Travel Straight valve	C			No.22	5~7	340~355	Neutral	Arm in
						71~100	640~650	activated	
	Arm variable recirculation	A			No.23	4~6	635~645	Neutral	Arm in
						56~85	300~320	activated	
Pump Regulation	P1 pump proportional valve	a8			No.24	28~30	730~760	Neutral	Power Shift *** / ** / *
						398~426	540~560	activated	
	P2 pump proportional valve	a9			No.25	28~30	340~355	Neutral	Power Shift *** / ** / *
						398~426	540~560	activated	



Power Shift:

*** ... All controls in neutral 0~10 mA

** .... Front attachment stalled 0~10 mA

* .... Both travel motors stalled 10~30 mA

Auxiliary */

Auxilary port relief are as follows:
Swing priority, Breaker, Nibler Breaker

NOTE :
Take Measurements M-Mode Engine at "HI" Idle.
Levers in neutral for neutral reading,
then activate circuit to take activated readings

https://truckmanualshub.com/

VERIFICATION OF ENGINE RPM

1. VERIFICATION OF ENGINE RPM

A. Machine Preparation Procedures

1. With safety lock in the lock (up) position. See Figure 4.1.
2. Place throttle potentiometer to low idle position; start engine, allow engine to achieve normal operating temperature °C 45~55 (°F113~145)
3. Check the gauge cluster and confirm that the machine is in the default “M” mode. See Figure 4.3.
4. Locate the screen change switch, depress the switch once to select RPM. Check that engine low and hi RPM are at the proper adjustment. See Figure 4.3.
   Refer to chart by model and serial number for specifications.
5. Return Throttle potentiometer to low idle position. Press screen change switch two times to return screen to Monitor System OK.
6. Place front attachment to hydraulic oil check position. See Figure 4.4.
7. Allow engine to idle for two minutes and shut off engine.

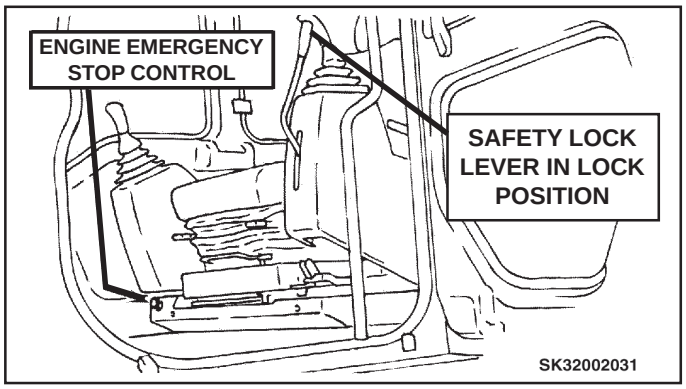


FIGURE 4.1

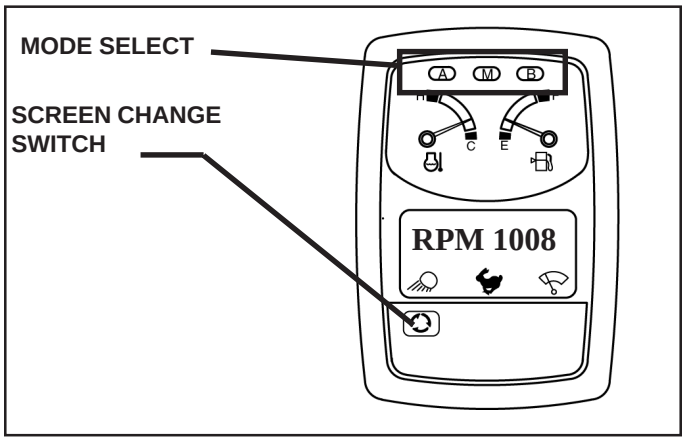


FIGURE 4.3

2. ENGINE SPEED MEASURED WITH SERVICE DIAGNOSTICS (28 ITEM CHECK)

1. With gauge cluster blank press and hold buzzer stop switch.
2. Turn key switch to on position.
3. Screen Change Switch advances the display each time the screen change switch is pushed.
4. Press the Screen change switch once, diagnostic check of computer will be at screen No. 2. Below.

2	No. 2		
	E/G SET	2200	No load set rpm
	MEAS	2201	Actual rpm
	E/G PRS.	LIVE	LIVE/DEAD indication
	KPSS SW	M	A/M/B indication

5. Buzzer Stop Switch returns display to previous screen each time switch is pushed.
6. Screen will stay in diagnostic mode until key switch is turned off.

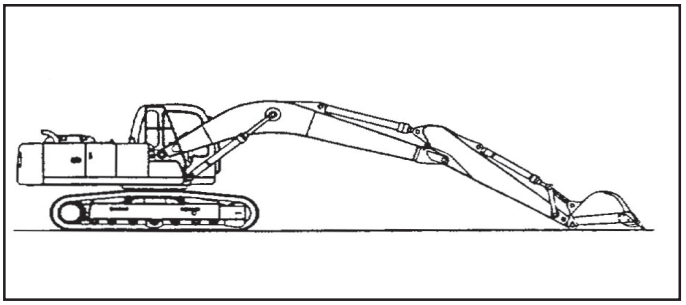


FIGURE 4.4

https://truckmanualshub.com/

3. HYDRAULIC OIL CAUTIONS

Kobelco Excavators are set to ISO pilot controls at the factory. It is up to you to read and understand the Operators & Maintenance Manual before attempting any service or maintenance procedures.

WARNING

• BE EXTREMELY CAUTIOUS WHILE RELEASING HYDRAULIC TANK PRESSURE OR REMOVING LINES AND FITTINGS, VAPORS AND OIL MAY BE EXTREMELY HOT.

• WEAR APPROVED SAFETY CLOTHES, SHOES, GLOVES AND HARD HAT WHEN PERFORMING ANY MAINTENANCE OR TEST PROCEDURES.

A. Checking the Main Relief Setting Using Service Diagnostics (28 ITEM CHECK)

1. With key in OFF position, gauge cluster blank, press and hold buzzer stop switch.
2. Turn key switch to ON position. See Figure 5.1.
3. With key switch in on position release buzzer stop switch. See Figure 5.1.
4. By pressing the screen change switch the service diagnostics is advanced forward. See Figure 5.2.
5. By pressing the buzzer stop switch the screen is returned to the last screen.
6. Advance the service diagnostics to screen No.14. See Figure 5.3.
7. Screen No.14 will display the voltage of high pressure sensor, and the computer generated oil pressure at P1 and P2 pump. Use this for checking pump and machine performance. See Figure 5.3.

B. Tools & Equipment Required for Checking and Adjusting of Pilot and Main Relief Valves

1. Two 700kg/cm^2 (10,000psi) Gauges.
2. One 70kg/cm^2 (1,000 psi) Gauges.
3. 41 mm spaner wrench
   30 mm spaner wrench
   22 mm spaner wrench
   27 mm spaner wrench
4. General hand or power tools to remove and replace hydraulic fittings and components.
5. Thermometer to read hydraulic oil temperature.

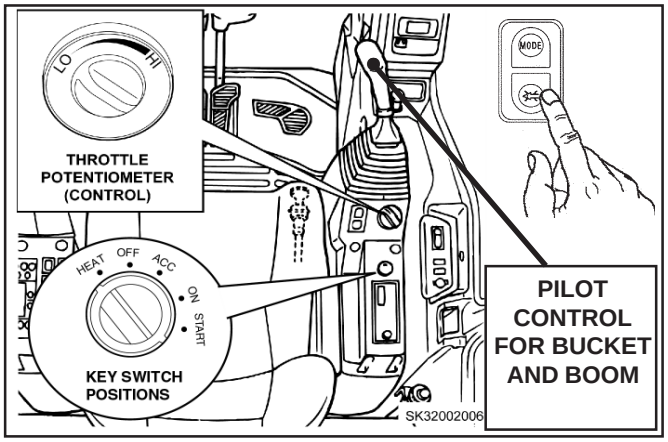


FIGURE 5.1

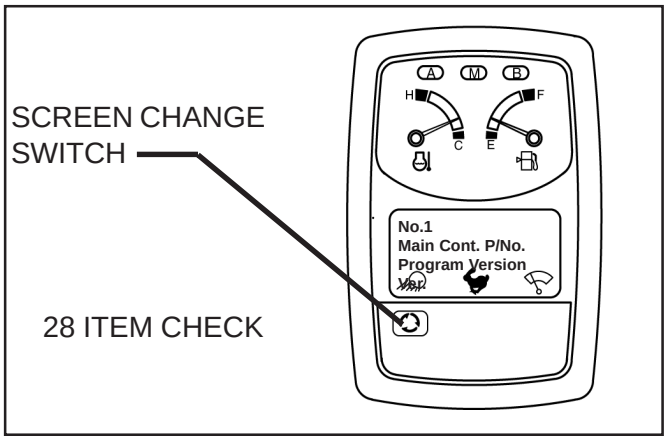


FIGURE 5.2

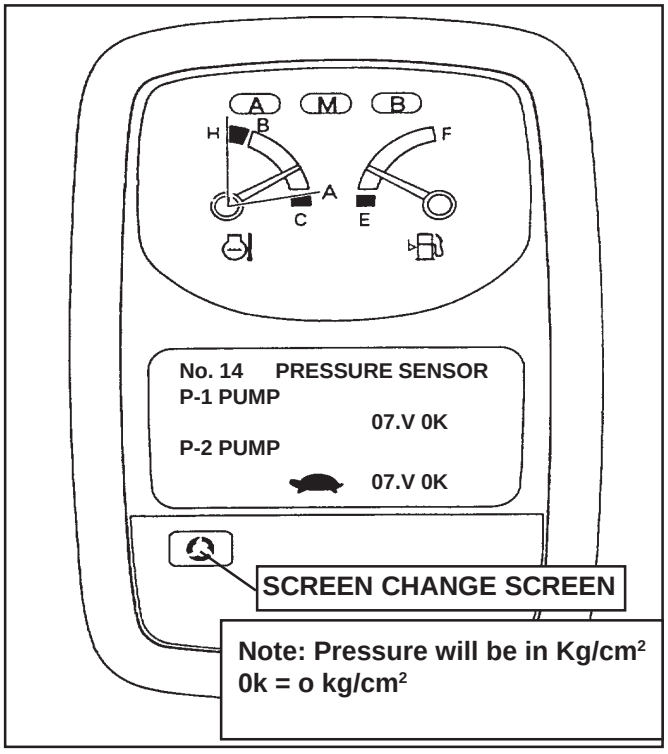


FIGURE 5.3

https://truckmanualshub.com/

4. PILOT CIRCUIT

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 6.1.
3. Release hydraulic tank pressure by Installing a 4mm Allen wrench and turning cap in a counterclockwise direction. See Figure 6.2.
4. Open Main Pump Access Door, and remove the PF1/4 test Port Plug (A5) from Output Port on Pilot System Gear Pump. Install 105kg/cm² (1,000 psi) Pressure Gauge. See Figure 6.3.

B. Pilot Relief Valve Pressure Measurement Procedures

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.
2. Start engine, place throttle control in Hi Idle position.
3. Place KPSS Mode Switch in "M" Mode.
4. Confirm that the hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145). Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212)
5. Place all pilot controls in neutral, read and record the 70kgf/cm^2 (1000 psi) pressure gauge at the P3 pump, a5 pressure test port. See Figure 6.3. Compare to chart for specific model being tested.

C. Pilot Relief Valve Adjustment Procedures

1. Locate the Pilot Relief Valve mounted on P3 Pilot Pump Assembly. See Figure 6.4.
2. Loosen the adjusting screw locknut with a 24mm spaner. See Figure 6.4.
3. Adjust using a 6mm allen until specified pressure according to proper chart for specific machine being adjusted is achieved.
4. After correct pressure is obtained, tighten adjusting screw locknut, tightening torque 3.0 kgfm^2 (22ft.lb). See Figure 6.4.
5. Verify pressure after tightening locknut.

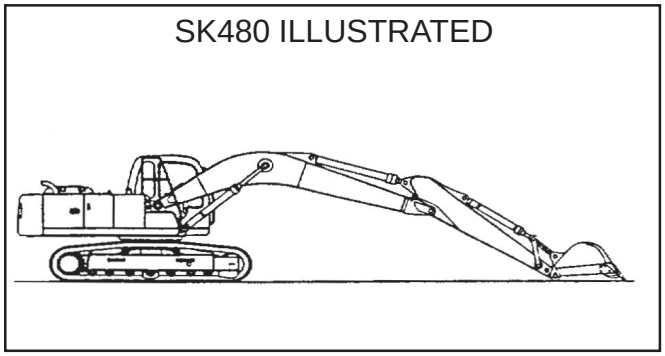


FIGURE 6.1

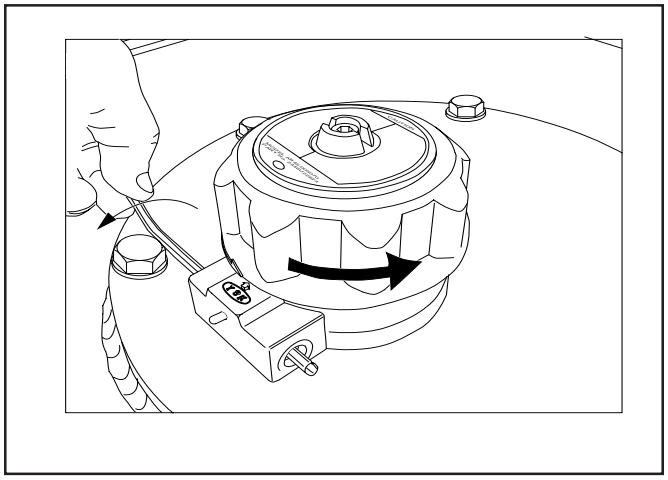


FIGURE 6.2

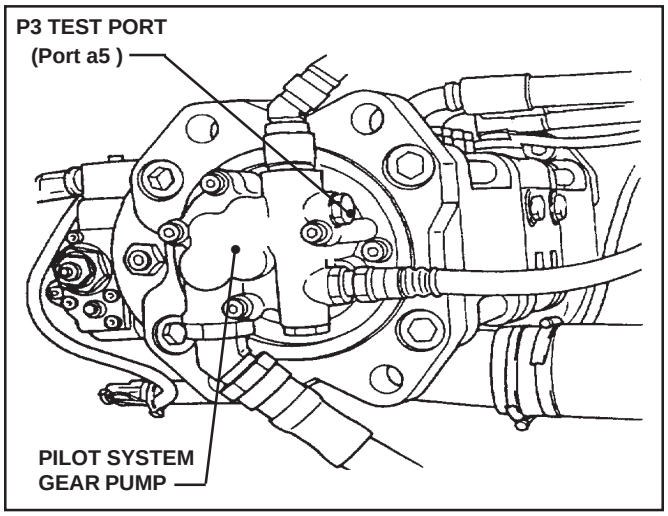


FIGURE 6.3

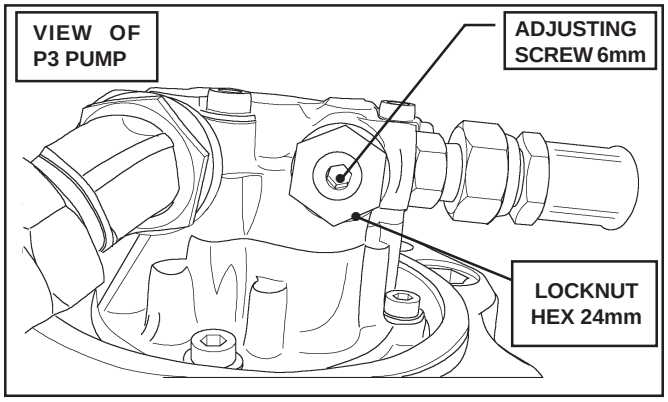


FIGURE 6.4

https://truckmanualshub.com/

MAIN RELIEF PRESSURE ADJUSTMENT

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

5. MAIN RELIEF PRESSURE MEASUREMENT

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 7.1.
3. Release hydraulic tank pressure by Installing a 4mm Allen wrench and turning cap in a counterclockwise direction. See Figure 7.2.
4. Open Main Pump Access Door, remove the two (2) PF1/4 test Port Plugs (a1) P1 pump and (a2) Pump install 700kg/cm² (10,000 psi) Pressure Gauges. See Figure 7.3.

B. Measurement of Attachment Main Relief Valve "HEAVY LIFT SWITCH ON"

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.
2. Place "Heavy Lift" Switch in the "ON" position. See Figure 7.4.
3. Place KPSS Mode Switch in "M" Mode.
4. Start engine and place throttle control in Low Idle position.
5. Confirm that the hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145). Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
6. Move throttle control to "HI-IDLE".
7. Operate Boom Raise control until boom is completely up, then hold over relief.
8. Record readings from 700kg/cm^2 (10,000 psi) Pressure Gauges at a1 port on P1 Main Pump and a2 port at P2 pump.
9. If pressure gauge readings are within specifications for the particular machine being tested, it is not necessary to adjust Relief Valve Pressure. Refer to chart for machine and model being tested.

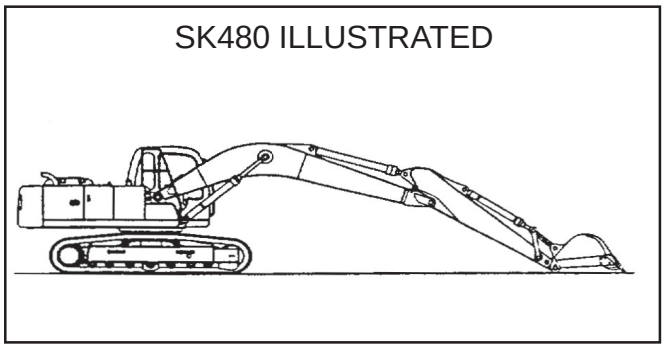


FIGURE 7.1

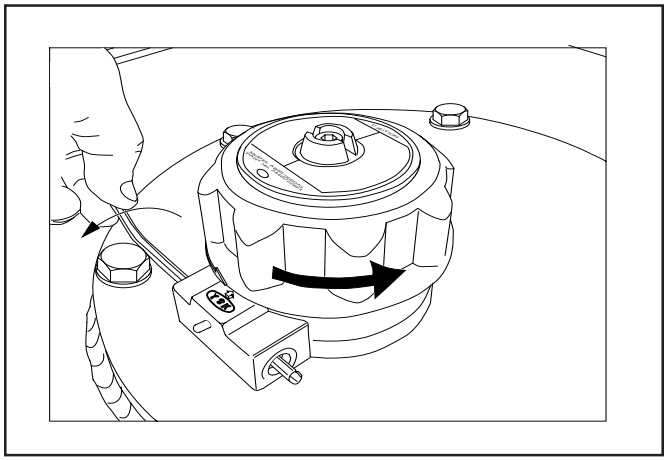


FIGURE 7.2

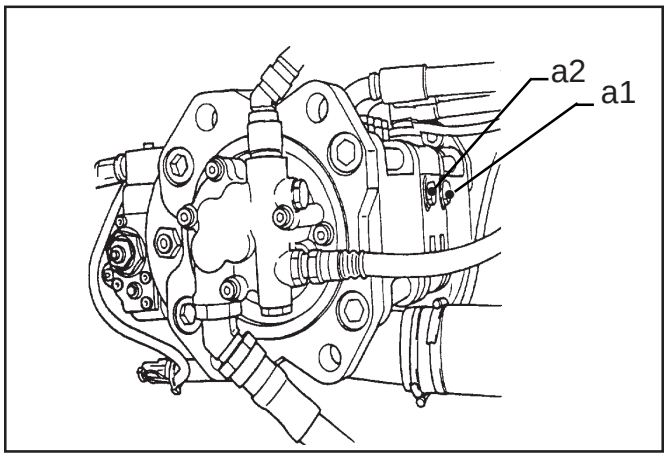


FIGURE 7.3

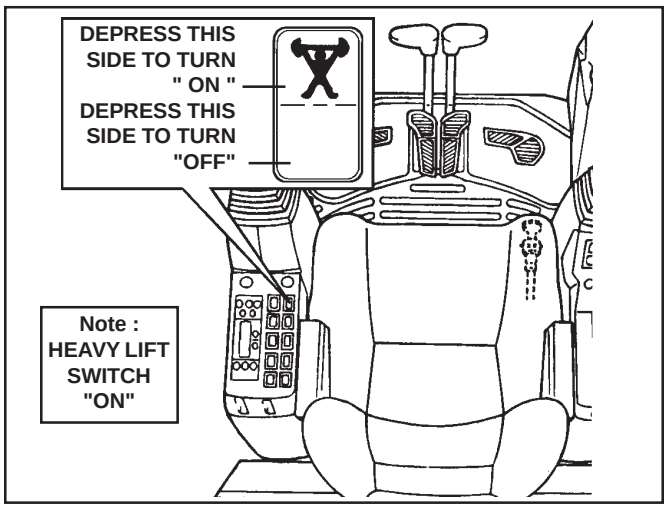


FIGURE 7.4

https://truckmanualshub.com/

ADJUSTMENT 2nd STAGE MAIN RELIEF WITH "HEAVY LIFT SWITCH ON"

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

6. ADJUSTMENT 2nd STAGE MAIN RELIEF WITH "HEAVY LIFT SWITCH ON"

A. Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in “M” mode. See Figure 8.1.
   b. Heavy lift switch on. See Figure 8.2
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. High Idle RPM is proper per machine being tested.

B. 2nd Stage Main Relief Valve Adjustment

1. Locate Main Relief Valve (MR1) on the main control valve. See Figure 8.3.
2. Loosen second stage locknut with 41mm wrench See Figure 8.4.
3. With engine at full RPM, raise boom up and over relief. Adjust heavy lift, power boost screw with 27mm wrench, until proper pressure is achieved at pump P1 a1 test port, and pump P2 a2 test port with 700kg/cm² (10,000 psi) pressure gauges.
4. After correct pressure is obtained tighten adjusting screw locknut to 2.8 ~3.2 kgfm² (20~30 ft.lb). Verify pressure after tightening locknut.

NOTE

Turning Heavy lift Power Boost Adjusting Screw Clockwise One turn Increases Pressure Approximately 108 kgf/cm² 180 (2560 psi)

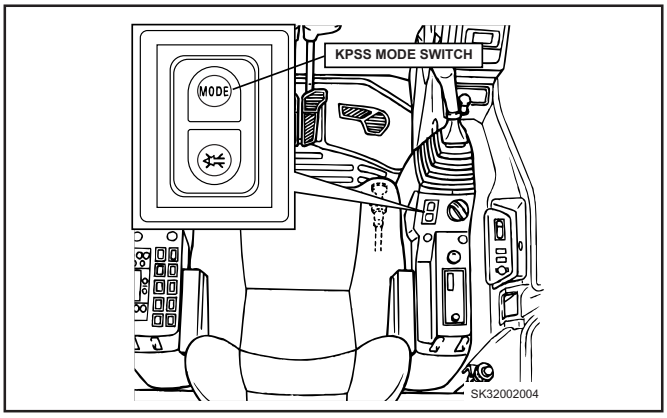


FIGURE 8.1

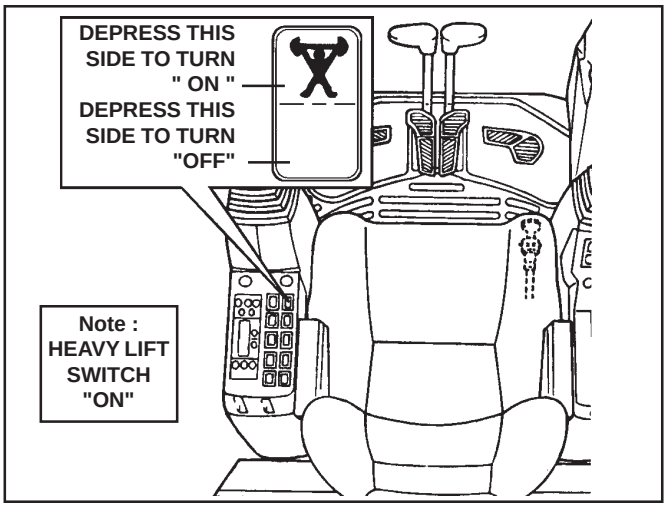


FIGURE 8.2

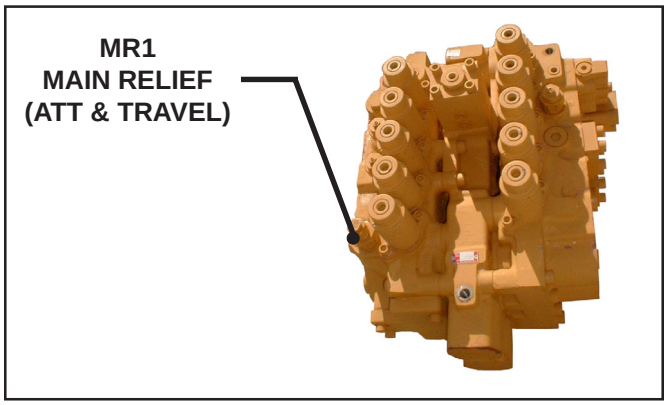


FIGURE 8.3

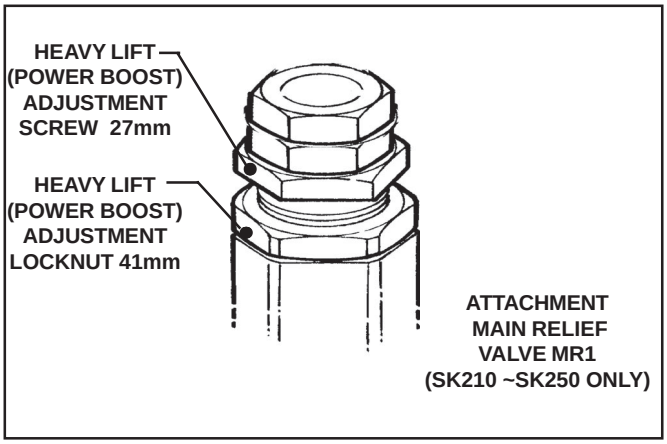


FIGURE 8.4

https://truckmanualshub.com/

ADJUSTMENT MAIN RELIEF WITH "HEAVY LIFT SWITCH OFF"

WARNING

• MAKE CERTAIN THERE ARE NO OBJECTS IN THE PATH OF THE BOOM

7. ADJUSTMENT MAIN RELIEF WITH "HEAVY LIFT SWITCH OFF"

A. Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in "M" mode. See Figure 9.1.
   b. Heavy lift switch off. See Figure 9.2.
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. High Idle RPM is proper per machine being tested.

B. Main Relief Valve Adjustment

1. Locate Main Relief Valve (MR1) on the main control valve. See Figure 9.3.
2. Loosen locknut with 27mm wrench See Figure 9.4.
3. With engine at full RPM, raise boom up and over relief. Adjust screw with 22mm wrench, until proper pressure is achieved at pump P1 a1 test port, and pump P2 a2 test port with 700kg/cm² (10,000 psi) pressure gauges.
4. After correct pressure is obtained tighten adjusting screw locknut to ; 2.8 ~3.2 kgfm^{2} (20~30 ft.lb). Verify pressure after tightening locknut.

NOTE

Turning Normal Adjusting Screw Clockwise
One turn
Increases Pressure Approximately
108 kgf/cm^{2} 180 (2560 psi)

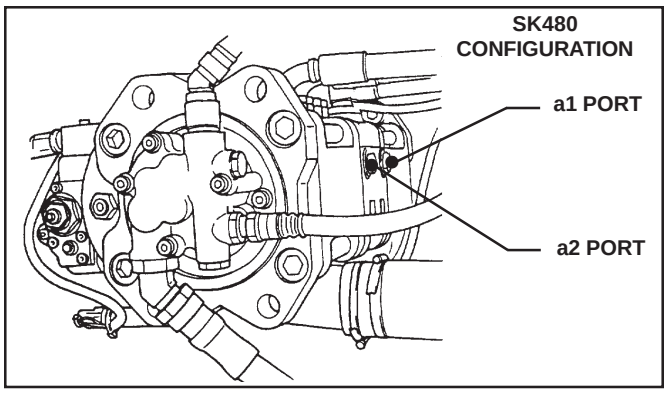


FIGURE 9.1

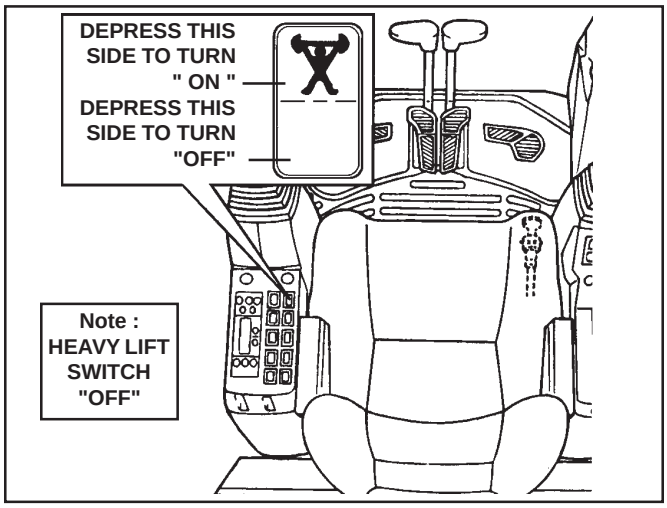


FIGURE 9.2

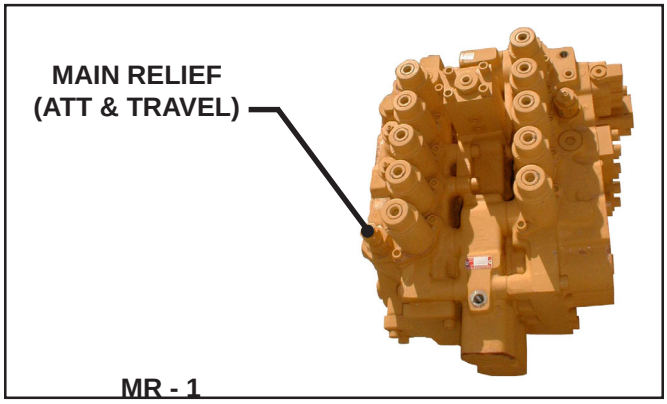


FIGURE 9.3

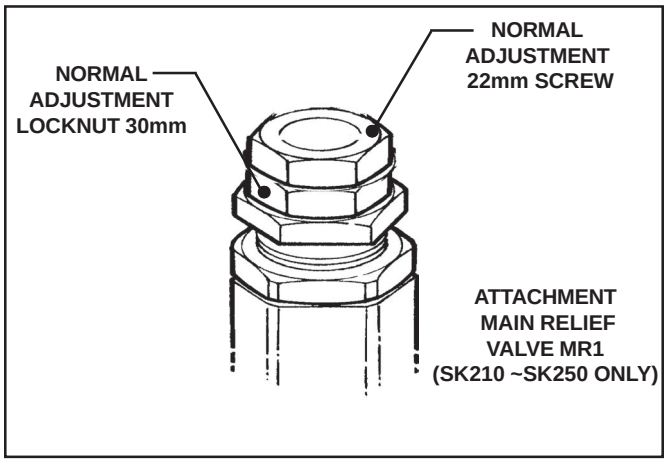


FIGURE 9.4

https://truckmanualshub.com/

8. SWING CIRCUIT

NOTE

The following procedures are provided for reference only. Attachment Port Relief Valves are factory preset and should not be field adjusted.

A. Machine Preparation Procedures

1. **Note:** Refer to Verification of Engine RPM before proceeding.
2. Confirm that the machine front attachment is in the oil check position. See Figure 10.1.
3. Release hydraulic tank pressure by Installing a 4mm Allen wrench and turning cap in a counterclockwise direction. PAGE 6 Figure 6.2.
4. Open Main Pump Access Door and remove the PF1/4 test Port Plug (a2) from Output Port on P2 Piston Pump. Install 700 kg/cm² (10,000 psi) Pressure Gauge. See Figure 10.2.

B. Swing Over Load Relief Valve Pressure Measurement

1. Perform machine preparation procedures as described in MACHINE PREPARATION PROCEDURES.

2. Move throttle control to "HI-IDLE," place KPSS Mode Switch in "M" Mode.

3. Operate boom down control until bucket teeth penetrate soil approximately 305mm (12"). See Figure 10.3.

4. Operate swing control to the left and hold, stalling swing. Record reading from 700kg/cm² (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump. See Figure 10.2.
   Or compare reading in Diagnostic Check No.14. See Figure 10.4.

5. Operate swing control to the right and hold, stalling swing. Record reading from 700kg/cm² (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump.
   Or compare reading in Diagnostic Check No.14. See Figure 10.4.

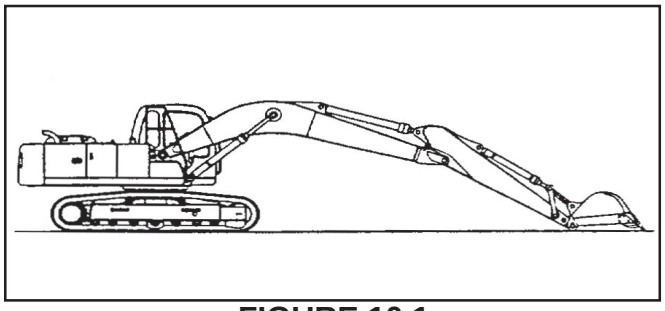


FIGURE 10.1

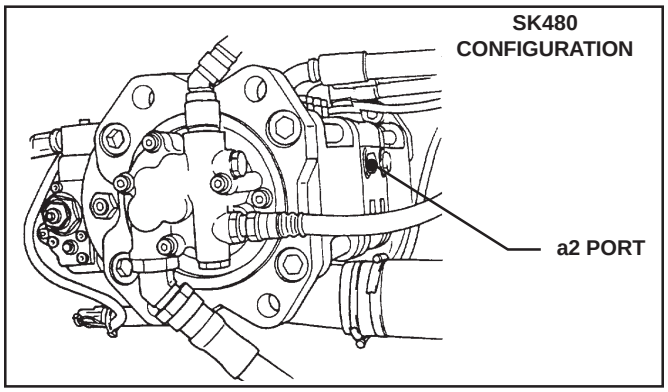


FIGURE 10.2

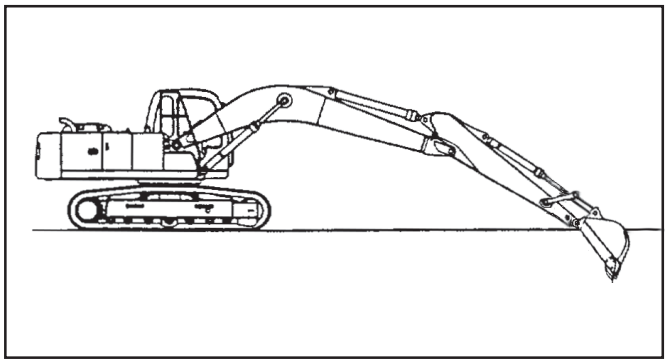


FIGURE 10.3

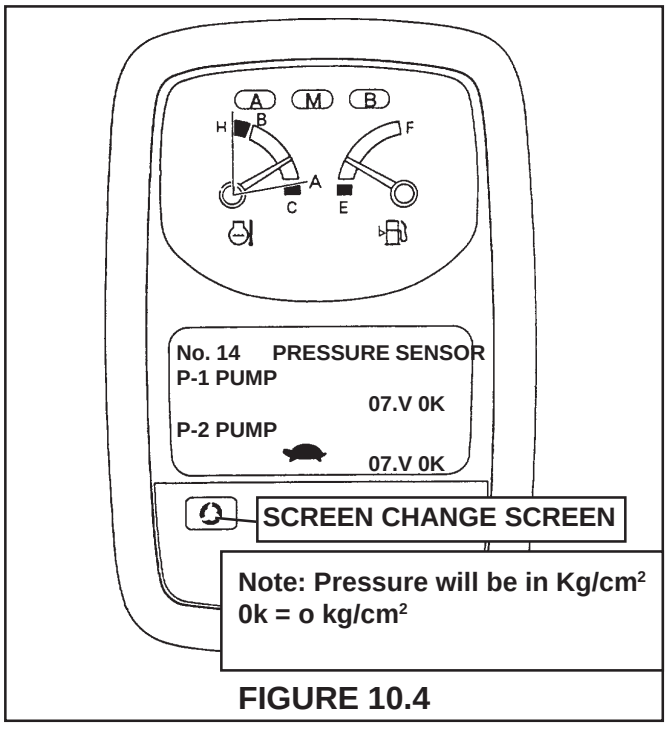


FIGURE 10.4

https://truckmanualshub.com/

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S SWING MOTOR PORT RELIEF VALVES IS *POSSIBLE ON THE DYNAMIC ACER SK480*.
• SHOULD A PROBLEM BE FOUND WITH THE ATTACHMENT PORT RELIEF VALVES, CONTACT YOUR KOBELCO SERVICE DEPARTMENT.

C. Swing Over Load Relief Valve Pressure Adjustment.
Machine Preparation Procedures

1. Confirm that the following is proper before proceeding to step 2.
   a. KPSS is in “M” mode
   b. Heavy lift switch off.
   c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
   d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
   e. Maintenance connector is in the release position.
   f. High Idle RPM is proper per machine being tested.
   g. Main relief pressure is set to Performance Specifications Chart.
   h. Bucket teeth penetrate soil approximately 305mm (12"). Figure 11.1.
2. Locate Main Releif valve’s (a port and b port). Loosen 41mm lock nut, With 27mm wrench, turn both relief valves three turns clockwise or until relief valve has bottomed out. See Figure 11.2
3. Loosen Overload Relief locknut with a 38mm wrench. Operate swing control to the left and hold, stalling swing. With a 30mm wrench,adjust **b-port** overload relief pressure to specific machine being tested. Using a 700kg/cm^2 (10,000 psi) pressure gauge, installed at test port a2 on P2 Main Pump. See Figure 11.3
4. After correct pressure is obtained tighten adjusting screw locknut to; 12 kgfm^2 (87 ft.lb). Verify pressure after tightening locknut.

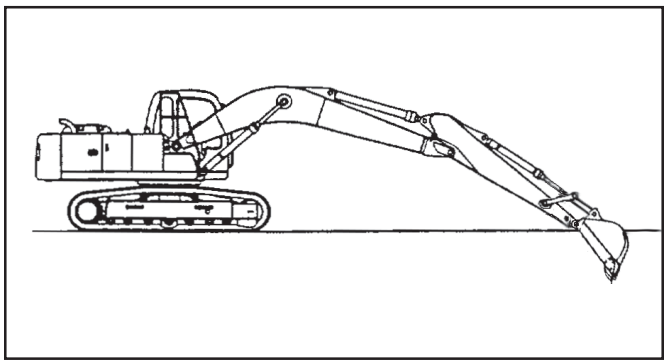


FIGURE 11.1

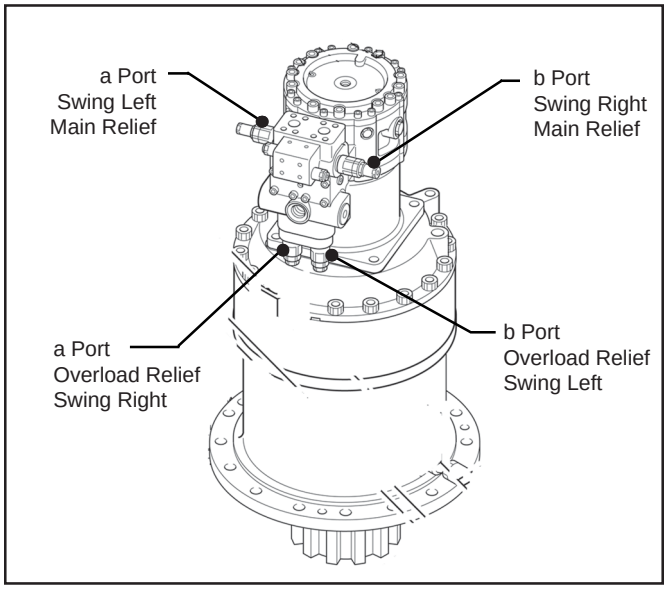


FIGURE 11.2

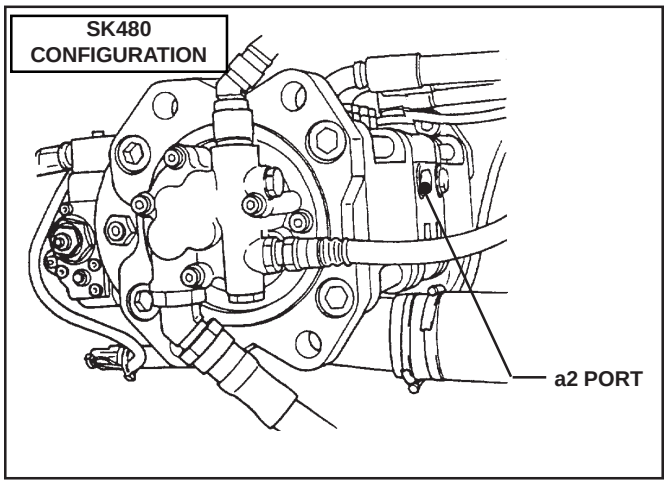


FIGURE 11.3

NOTE
Turning Main Relief Adjusting Screw
Clockwise One turn
Increases Pressure Approximately
102kgf/cm^2 (1450 psi)

https://truckmanualshub.com/

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S SWING MOTOR PORT RELIEF VALVES IS *POSSIBLE ON THE DYNAMIC ACER SK480*.

• SHOULD A PROBLEM BE FOUND WITH THE ATTACHMENT PORT RELIEF VALVES, CONTACT YOUR KOBELCO SERVICE DEPARTMENT.

5. Locate Swing Right overload relief valve, loosen 38mm locknut. See Figure 12.2. With a 30mm wrench,adjust **a-port** overload relief pressure to specific machine being tested. Using a 700kg/cm^2 (10,000 psi) pressure gauge, installed at test port a2 on P2 Main Pump. See Figure 12.3
6. After correct pressure is obtained tighten adjusting screw locknut to; 2.8 ~3.2 kgfm^2 (20~30 ft.lb). Verify pressure after tightening locknut.

NOTE

Secondary Port Relief valves must now be adjusted to the proper setting.

7. Locate Swing Right Main relief valve, loosen 41mm locknut. See Figure 12.2. Operate swing control to the right and hold, stalling swing. With a 27mm wrench, turn adjusting screw counterclockwise until pressure starts to: FALL BELOW pressure that was set in Step 5 & 6, using 700kg/cm^2 (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump. See Figure 12.3
8. Locate Swing Left main relief relief valve, See Figure 12.2 loosen 41mm locknut. Operate swing control to the left and hold, stalling swing. Using a 27mm wrench turn adjusting screw counterclockwise until pressure starts to: FALL BELOW pressure that was set in Step 3 & 4, using 700kg/cm^2 (10,000 psi) Pressure Gauge installed to test port a2 on P2 Main Pump.

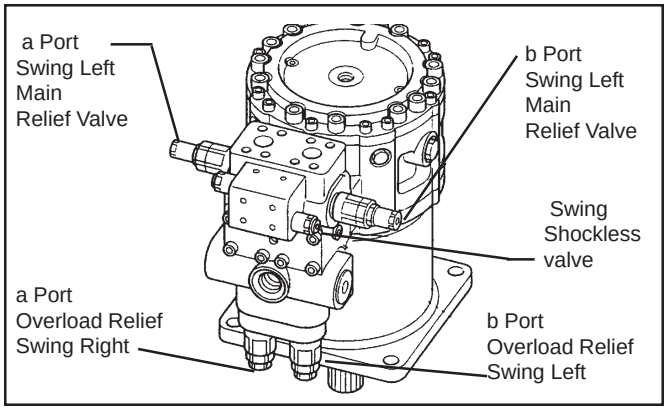


FIGURE 12.1

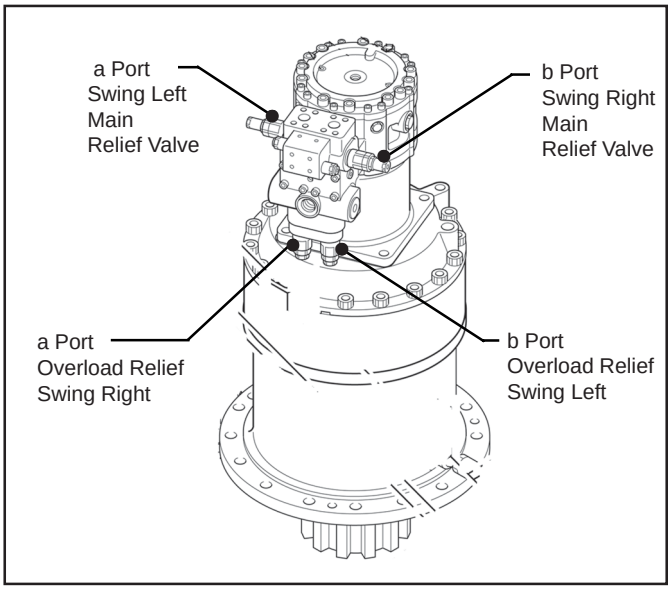


FIGURE 12.2

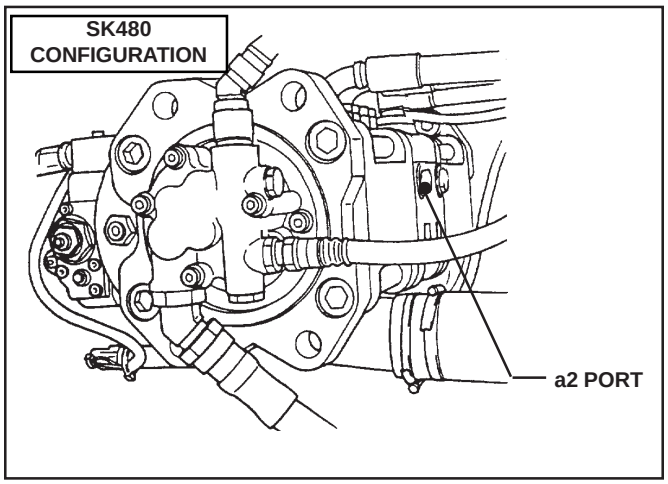


FIGURE 12.3

NOTE

Turning Overload Relief djusting Screw Clockwise One turn Increases Pressure Approximately 69.4 kgf/cm^2 (990 psi)

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S OVER LOAD RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE OVER LOAD RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

9. OVERLOAD RELIEF VALVES

A. Machine Preparation Procedures

a. Machine in the oil check position. See Figure 13.1
a. KPSS is in “A” mode.
b. Heavy lift switch on.See Figure13.2
c. Hydraulic oil is approximately ^{O}C 45~55 (^{O}F113~145).
d. Engine water temperature is approximately ^{O}C 40~100 (^{O}F104~212).
e. Maintenance connector is in the release position.
f. Low Idle RPM is proper per machine being tested.

B. Tools & Equipment Required for Checking and Adjusting of Overload Relief Valves

1. Two 700kg/cm^2 (10,000psi) Gauges.
2. 13 mm spaner wrench
   19 mm spaner wrench
   4 mm allen wrench

C. Overload Releif Pressure Measurement

1. Move throttle control to "LO-IDLE," place KPSS Mode Switch in "A" - Mode.
2. Place "HEAVY LIFT" Switch in "ON" position. See Figure 13.2.
3. Locate MR1 on Main Control Valve, adjust main relief valve 14kg/cm^2 (200 psi) above port relief value pressure. See Figure 13.3.
4. Record reading from 700kg/cm^2 (10,000psi) Pressure Gauges at a1 or a2 test port on P1 or P2 main hydraulic pump. See Figure 13.4.
5. Compare readings to chart for specific model being tested.

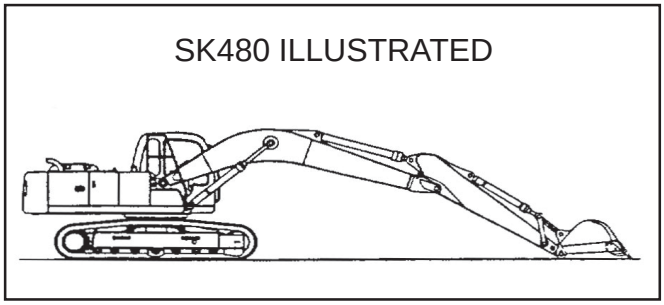


FIGURE 13.1

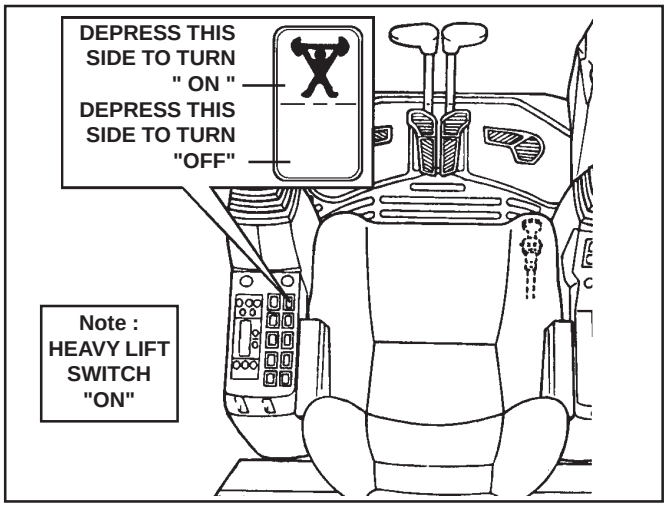


FIGURE 13.2

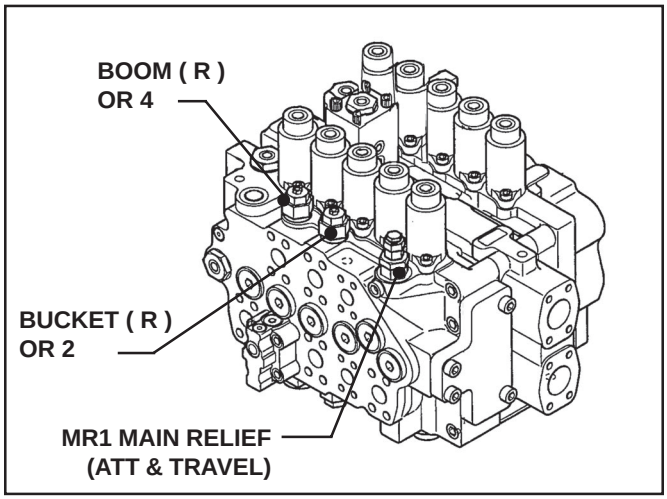


FIGURE 13.3

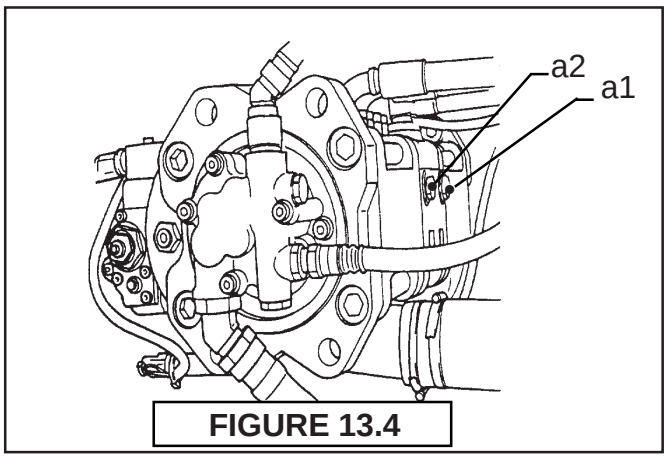


FIGURE 13.4

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

D. OR3 Boom Up Over load Relief

1. Operate Boom Up Control until boom is completely up and hold.
2. Record reading from Pressure Gauge at a1 or a2 test port on P1 or P2 Main Pump. Compare reading to proper chart for specific machine that is being tested.
3. Locate OR3 (Bottom) Main Control Valve, loosen locknut and adjust OR3 to test bench pressure. See Figure 14.1.
4. Secure locknut TO 0.31 kgfm^2 (2.2 ft.lb).

E. OR4 Boom Down over Load Relief

1. Operate Boom Down Control until boom is completely down and hold.
2. Record reading from Pressure Gauge at a test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR4 (Top) Main Control Valve, loosen locknut and adjust OR4 to test bench pressure. See Figure 14.2.
4. Secure locknut, 0.31kgfm^2 (2.2 ft.lb).

F. OR1 Bucket In (DIG) Over Load Relief

1. Operate bucket in control until bucket is completely in, then hold.
2. Record reading from Pressure Gauge at a1 test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR1(Bottom) Main Control Valve, loosen locknut and adjust OR1 to test bench pressure. See Figure 14.1.
4. Secure locknut, 0.31kgfm^2 (2.2 ft.lb).

NOTE

Turning Over Load Adjusting Screw
Clockwise One turn
Increases Pressure Approximately
108 kgf/cm^2 180 (2560 psi)

WARNING

• PRECISE ADJUSTMENT OF THE MACHINE'S OVER LOAD RELIEF VALVES IS *NOT POSSIBLE ON THE MACHINE*.
• SHOULD A PROBLEM BE FOUND WITH THE OVER LOAD RELIEF VALVES, IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.
SUCH ADJUSTMENT COULD VOID WARRANTY.

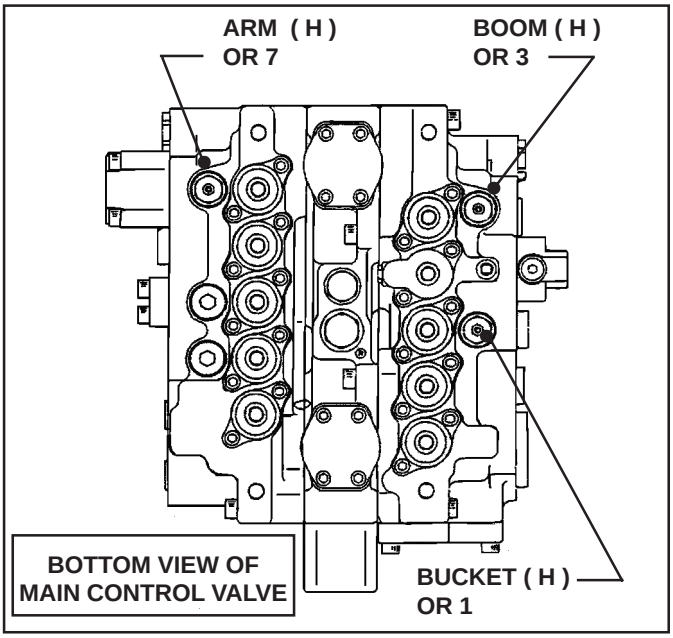


FIGURE 14.1

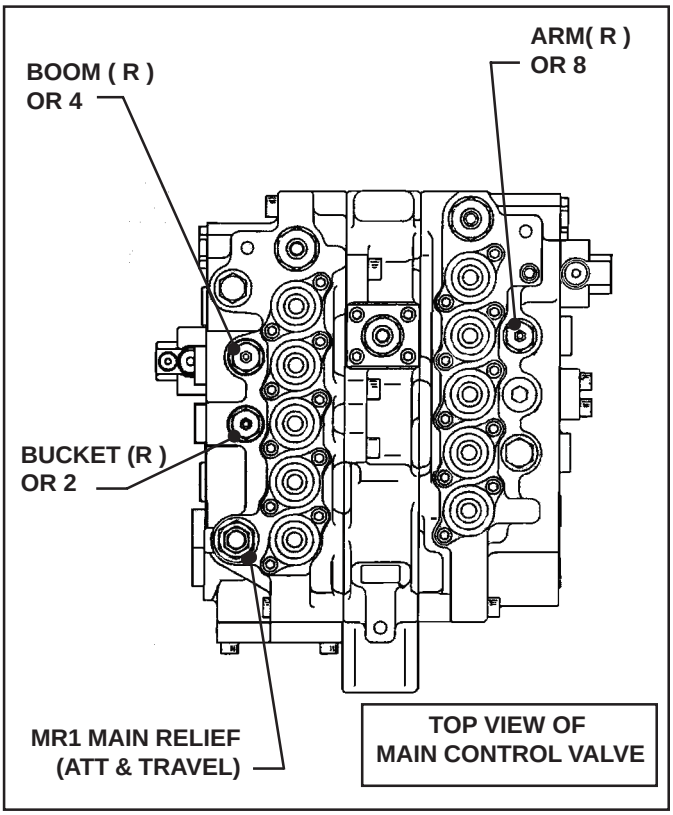


FIGURE 14.2

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

G. OR2 Bucket Out Over Load Relief

1. Operate Bucket Out Control until bucket is completely out and hold.
2. Record reading from Pressure Gauge at a1 test port on P1 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR2 on Main Control Valve, loosen locknut and adjust OR1 to test bench pressure. See Figure 15.1.
4. Secure locknut 0.31kgfm^2 (2.2 ft.lb).

H. OR7 Arm In (DIG) Over Load Relief

1. Operate arm in control, until arm is completely in and hold.
2. Record reading from Pressure Gauge at a2 test port on P2 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR7 (Bottom) Main Control Valve, loosen locknut and adjust OR7 to test bench pressure. See Figure 15.2.
4. Secure locknut, 0.31kgfm^2 (2.2 ft.lb).

I. OR8 Arm Out Over Load Relief

1. Operate arm out control, until arm is completely out, then hold.
2. Record reading from Pressure Gauge at a2 test port on P2 Main Pump. Compare reading to proper chart for specific machine being tested.
3. Locate OR8 (Top) Main Control Valve, loosen locknut and adjust OR8 to test bench pressure. See Figure 15.3.
4. Secure locknut, 0.31kgfm^2 (2.2 ft.lb).
5. Adjust MR - 1 back to specified settings. Verify pressures and that machine operation is correct.

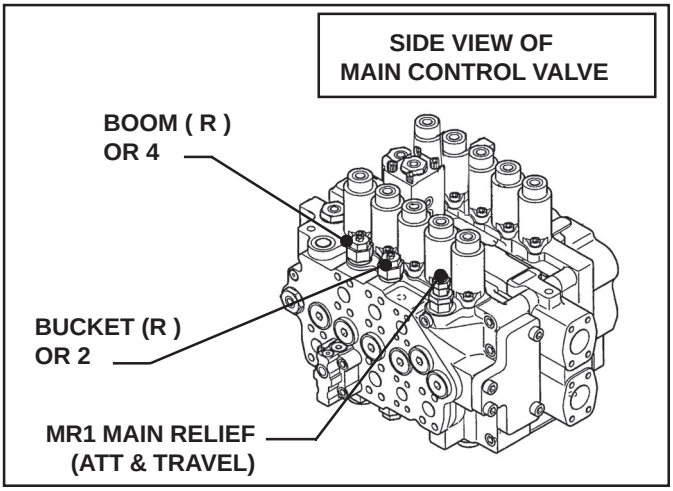


FIGURE 15.1

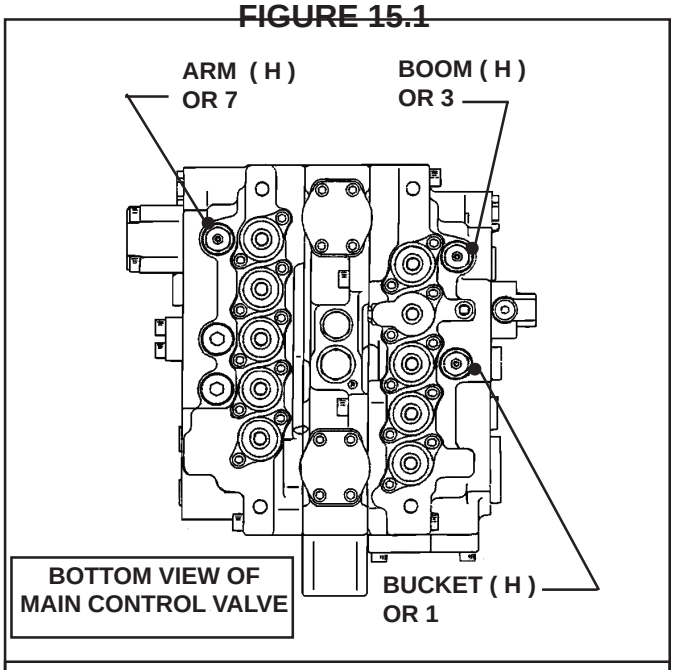


FIGURE 15.2

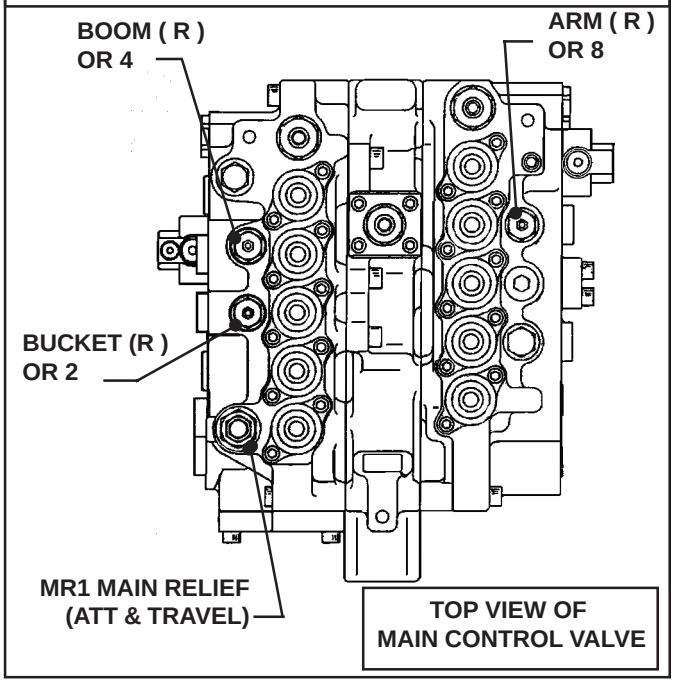


FIGURE 15.3

https://truckmanualshub.com/

OVER LOAD RELIEF VALVES

WARNING

• MAKE CERTAIN SPECIAL TOOL IS SEATED AGAINST CRAWLER FRAME AND BETWEEN SPROCKET TEETH. NEVER ALLOW SPECIAL TOOL TO REST AGAINST CRAWLER FRAME CORNER RE-INFORCEMENTS. ENGAGE TRAVEL SLOWLY & CAREFULLY UNTIL TOOL IS POSITIONED COR-RECTLY

J. Travel Motor Port Reliefs

1. Perform MACHINE PREPARATION PROCEDURES before continuing to next step.
2. Move throttle control to "LO-IDLE," place KPSS Mode Switch in "M" - Mode. See Figure 16.1.
3. Install special tool pin size101mm (4.0in) into sprocket on each side of machine for stalling travel. See Figure 16.2.
4. Place travel speed select switch in 2nd (🐇) speed position. See Figure 16.3.
5. Place "HEAVY LIFT" Switch in "ON" position. See Figure 16.3.
6. Operate both travel controls together to full forward and hold. See Figure 16.4
7. Locate MR1 on Main Control Valve and adjust main relief valve 14kg/cm^2 (200 psi) above travel motor port relief value.
8. Record reading from 700kg/cm^2 (10,000psi) Pressure Gauges at a1 or a2 test port on P1 or P2 main hydraulic pump. Or compare reading in diagnostic check item #14.
9. Compare readings to chart for specific model being tested.

WARNING

• PRECISE ADJUSTMENT OF THE TRAVEL MOTOR *RELIEF VALVE IS NOT POSSIBLE.*
IT IS RECOMMENDED TO REPLACE FAULTY OVER LOAD RELIEF VALVES.

1. Travel motor port reliefs are set by the manufacture before shipment. When adjustment is required, loosen 19mm nut and adjust the pressure with 6mm adjusting screw to specification.

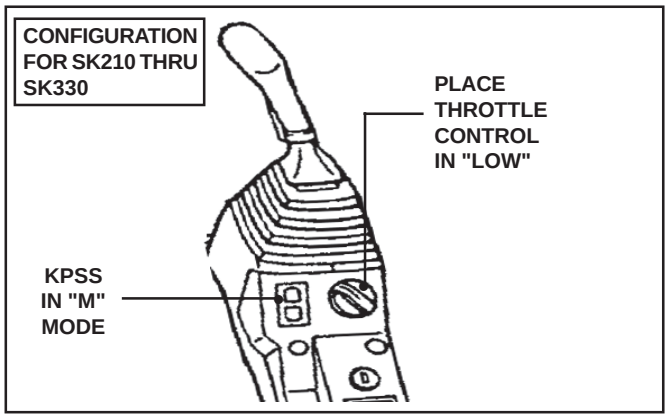


FIGURE 16.1

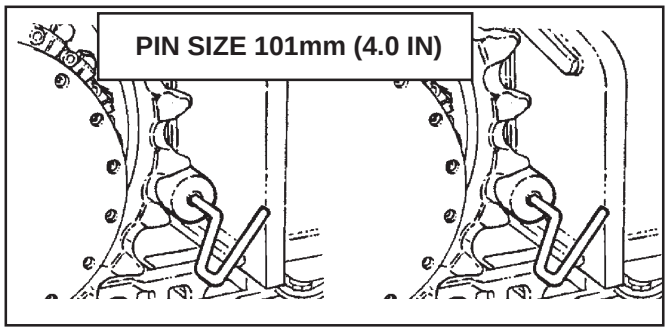


FIGURE 16.2

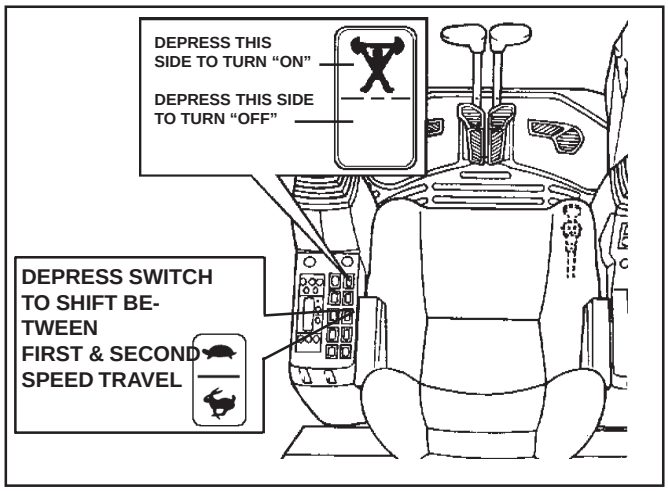


FIGURE16.3

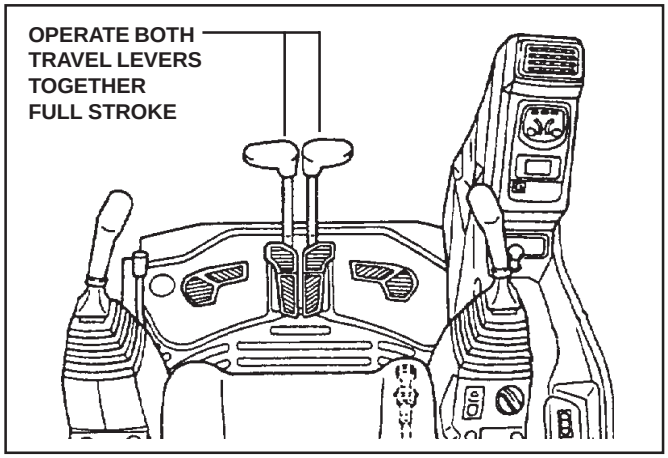
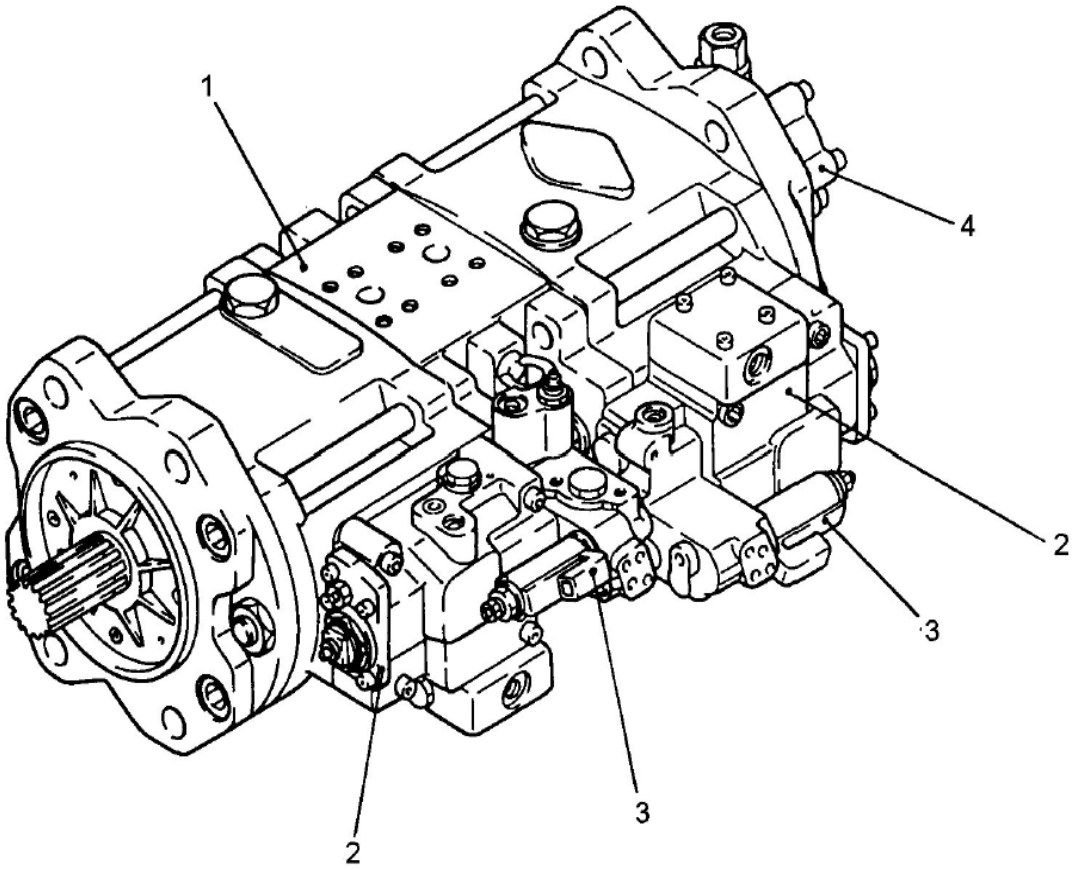


FIGURE 16.4

https://truckmanualshub.com/

11. LOCATION OF PARTS



1. High Pressure Ports
2. Pump Regulator
3. Proportional Valve
4. Pilot Pump P5

https://tractormanuals.hub.com/

Table of Contents

Page

I. SK160LC/ED190 -6E 9-2
A. GROUND TRANSPORTATION 9-2
B. LIFTING MACHINE 9-5
C. ATTACHMENT SHIPPING DIMENSIONS 9-9
II. SK210LC/SK250LC-6E 9-10
A. GROUND TRANSPORTATION 9-10
B. LIFTING MACHINE 9-12
C. SHIPPING DIMENSIONS 9-15
III. SK290LC/SK330LC-6E 9-19
A. GROUND TRANSPORTATION 9-19
B. LIFTING MACHINE 9-22
C. SHIPPING DIMENSIONS 9-24

https://truckmanualshub.com/

I. SK160LC/ED190 -6E

A. GROUND TRANSPORTATION

1. Machine Preparation

a. Know the total weight, length, width and height of the machine being transported. See Figures 4.2A ~4.2B.

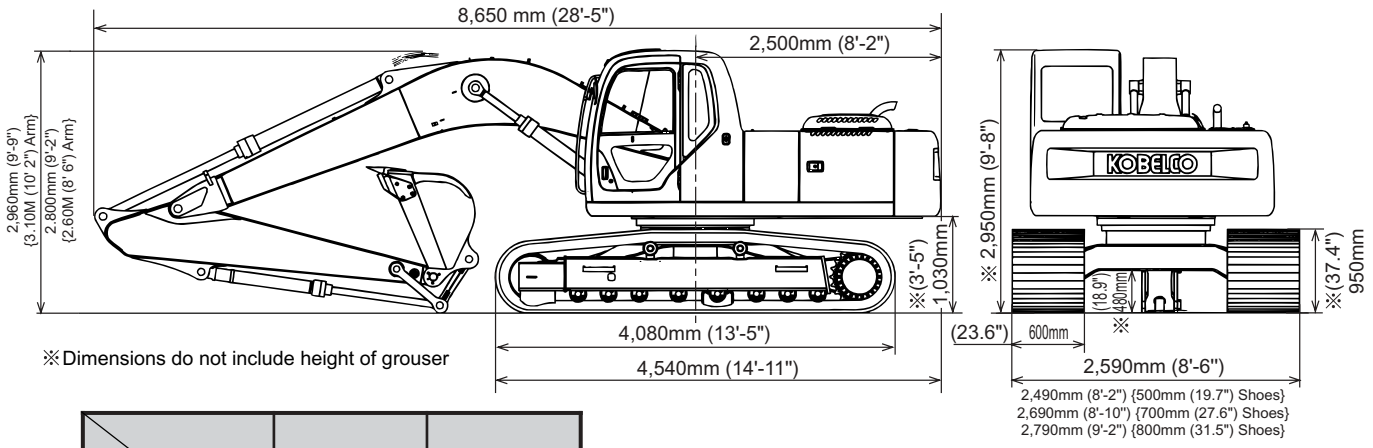
b. Know route to be traveled. Investigate bridges, overpasses, height of road signs on route.

c. Obtain any permits required from proper government agencies for machine transportation.

d. Use only a trailer with a rated capacity sufficient to transport the machine.

e. Make certain trailer has ramps or a ramp is available for loading and unloading the machine.

SK160LC-VI

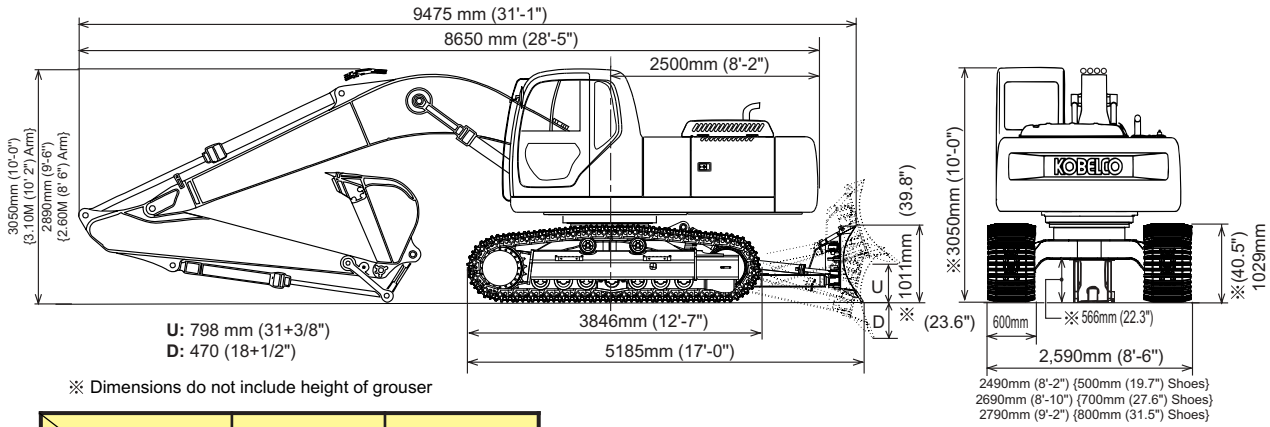


MODEL \ SHOES	600 mm (23.6")	800 mm (31.5")
SK160LC-VI	16,700 (36,800)	17,300 (38,140)

Dimensions and weights are with 3.10 m (10'-2") arm, 0.52 m³ (0.68 yrd³) bucket and 5.20 m (16'-1") boom.

FIGURE 4.2A

ED190-VI *Blade Runner*



MODEL \ SHOES	600 mm (23.6")	800 mm (31.5")
ED190-VI	19,820 (43,704)	20,588 (45,294)

Dimensions and weights are with 3.10 m (10'-2") arm, 0.52 m³ (0.68 yrd³) bucket and 5.20 m (16'-1") boom.

FIGURE 4.2B

https://tractormanuals.com/

2. Loading the Machine

WARNING

NEVER ATTEMPT TO LOAD OR UNLOAD MACHINE WITHOUT RAMPS.

a. Apply parking brakes on tractor and trailer and chock trailer wheels before attempting to load or unload machine.

b. Lower ramps of trailer.

c. Place travel speed select switch on travel lever in 1st (🐢) speed position and move throttle control to the “LOW” idle position. See Figure 4.3A.

CAUTION

Do not fold the blade wings on the ED190, before loading, to avoid contact between the blade wings and the counterweight. Unfold balde wings and lock them in position before unloading machine.

d. Raise the attachments and slowly travel machine up trailer ramps and over rear axles of trailer, see Fig. 4.3B.

WARNING

TO PREVENT THE ARM AND BUCKET CYLINDER (S) FROM ANY DAMAGE, YOU ARE ADVISED TO FOLLOW THE FOLLOWING INSTRUCTIONS. DO NOT HAVE THE ARM AND/OR BUCKET CYLINDER FULLY EXTENDED TO A “RAMP OVER CENTER” SITUATION. THIS ALLOWS SUDDEN AND ABRUPT CONTACT OF THE ARM OR BUCKET TO A TRAILER DECK, RAMP OR THE GROUND. THIS CAN RESULT IN INTERNAL MECHANICAL CONTACT, WHICH CAN STRETCH THE CYLINDER ROD(S).

e. Slowly travel machine completely onto trailer until in proper transport position.

Follow steps f ~ i for ED190(LC)-VI:

f. Place a wood blocks below the blade, equally separated (about one meter (3 ft)) from the center of the blade, and slowly lower the blade onto the wood blocks. See Fig. 4.3C as reference.

WARNING

MAKE SURE TO PLACE THE SAFETY LOCK LEVER IN THE LOCKED (UP) POSITION BEFORE LEAVING THE CAB

CAUTION

DO NOT LOAD/UNLOAD THE ED190LC-VI WITH THE DOZER BLADE WINGS IN THE TRANSPORT POSITION (FOLDED IN). LOAD AND UNLOAD THE MACHINE WITH THE WINGS UNFOLDED AND LOCKED IN THE DOZING POSITION TO AVOID CONTACT BETWEEN THE BLADE WINGS AND THE COUNTERWEIGHT.

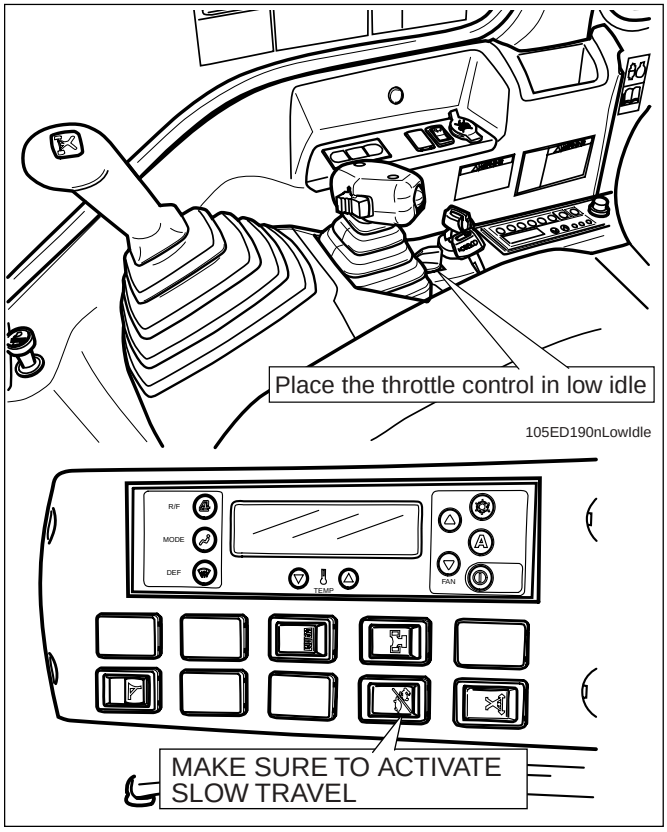


FIGURE 4.3A

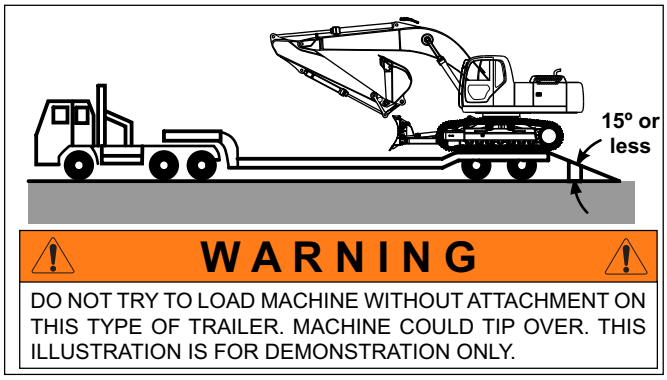


FIGURE 4.3B

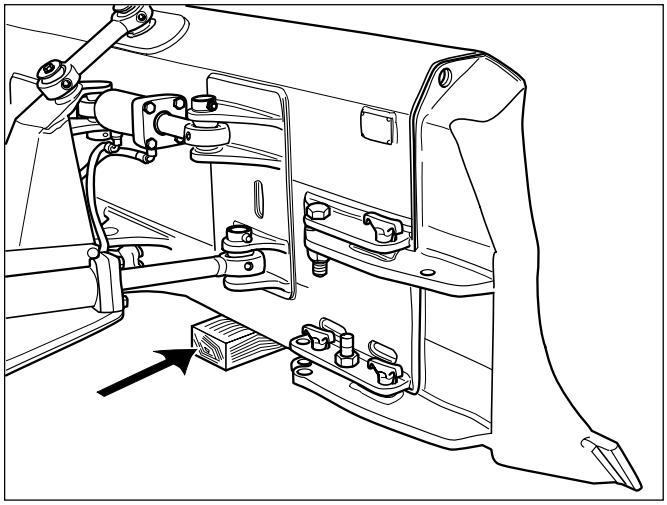
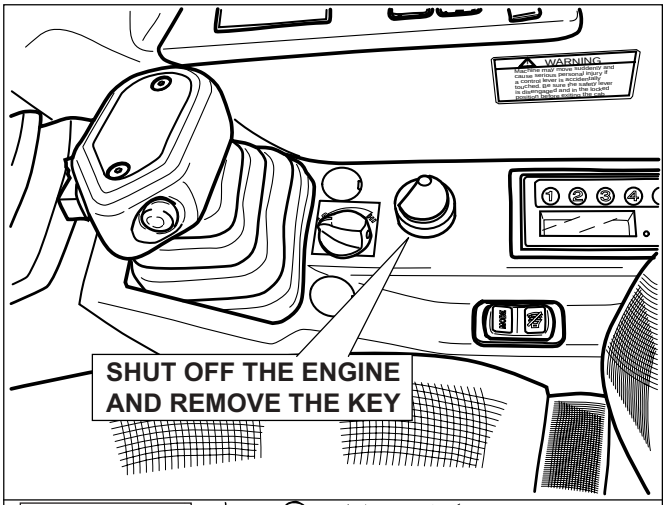
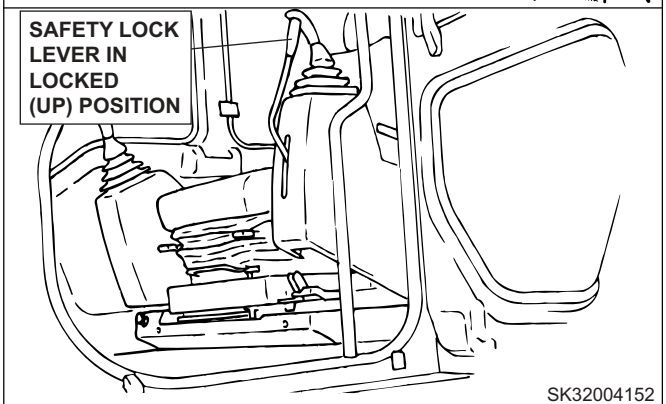


FIGURE 4.3C

https://truckmanualshub.com/

g. Shut off the engine and remove all three pins A, B, and C from blade wings, see Fig. 4.4A, and 4.4B as reference.





WARNING

MAKE SURE TO PLACE THE SAFETY LOCK LEVER IN THE LOCKED (UP) POSITION BEFORE LEAVING THE CAB

FIGURE 4.4A

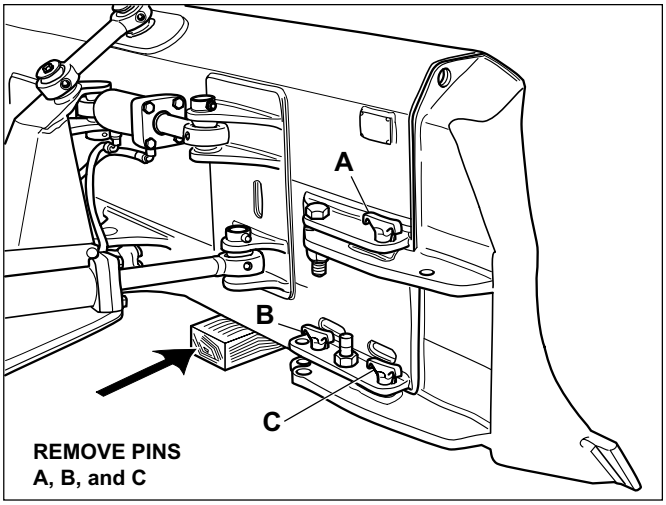


FIGURE 4.4B

h. Proceed to fold and lock the blade wings, as shown in Fig. 4.4C. Make sure to place pins A, B, and C into the holes as indicated in the figure.

WARNING

MAKE SURE TO LOCK THE BLADE WINGS WITH PIN **B** ON BLADE LOWER BRACKETS AS SHWON IN FIG. 5.4C

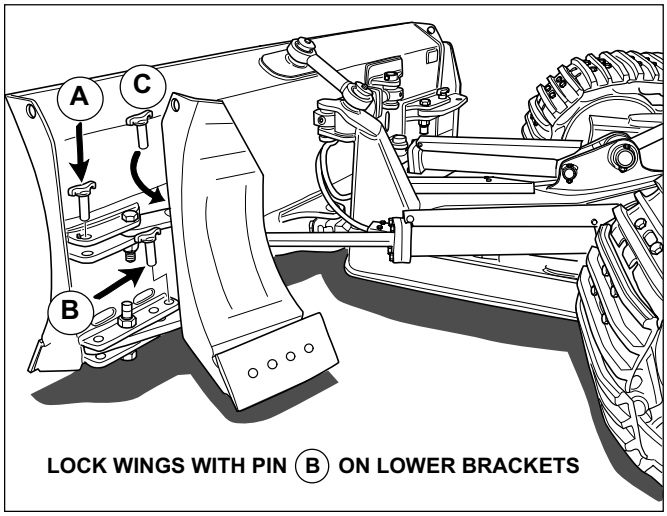


FIGURE 4.4C

i. Start the engine, lower the safety lever to activate all hydraulic functions, raise the blade and remove the wood blocks. **Make sure to lift the safety lever before leaving the cab.**

j. With blade wings folded and blade lowered, slowly swing machine 180° until attachment is toward rear of trailer.

k. Slowly lower boom until attachment rests on trailer bed.

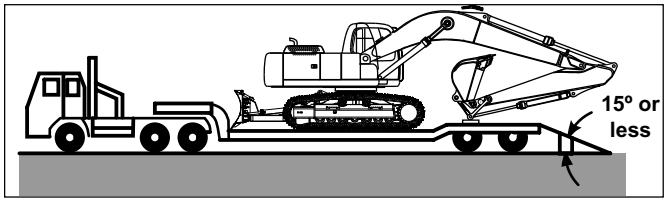


FIGURE 4.4D

l. Place safety lock lever in the up “LOCKED” position.

m. Turn machine “OFF”, remove key and lock all doors, filler caps and access panels.

CAUTION

Place a cover over the exhaust pipe of the machine and secure to avoid water entering the engine, and possible turbo damage.

9

https://tractormanuals.com/

3. Securing Machine to Trailer

a. Use cable or wire rope with sufficient capacity to secure front and rear of the machine to trailer. See Figure 4.5A. Chock the tracks, use the lower frame front and rear brackets to secure machine to trailer. Also, make sure to secure front and rear of each track.

b. Securely fasten all loose parts, as well as removed parts to trailer or transporting platform.

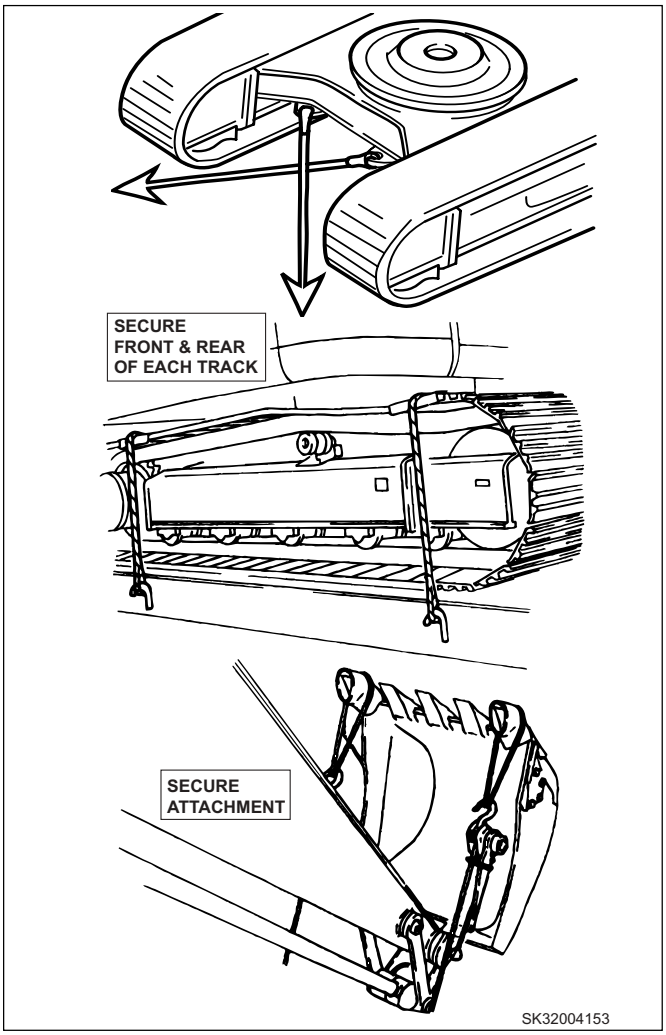


FIGURE 4.5A

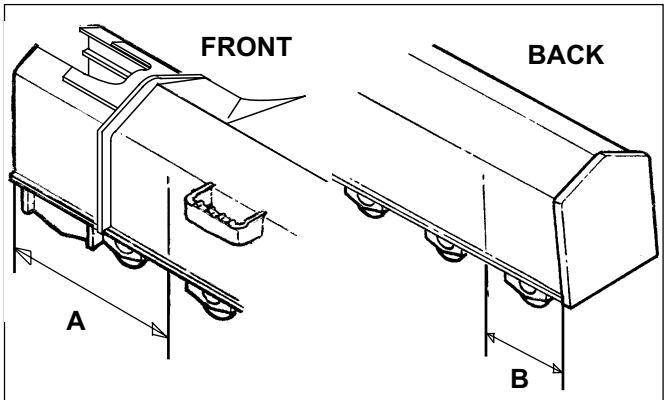
B. LIFTING MACHINE

The following procedures are for lifting the machine, as built by KOBELCO. These procedure do not take into account modifications made to the machine that affect machine weight or center of gravity.

1. Lifting Machine With Attachment Installed

a. Locate lifting locations at the front and rear of each crawler frame. See Figure 4.5B.

b. Attach cables or wire rope with a capacity rating sufficient to lift the machine, at lifting locations.



	A (Between crawler frame tip edge & center of first two rollers)	B (Between front edge of vertical rear plate & center of last two rollers)
SK160LC-VI	795 mm (31.3”)	300 mm (11.8”)
ED190-VI	879 mm (34.6”)	266.5 mm (10.5”)

FIGURE 4.5B

WARNING

Place a hardwood or steel block between cables and crawler frame to prevent damage to the tracks from cables during lifting. See Figure 4.5C.

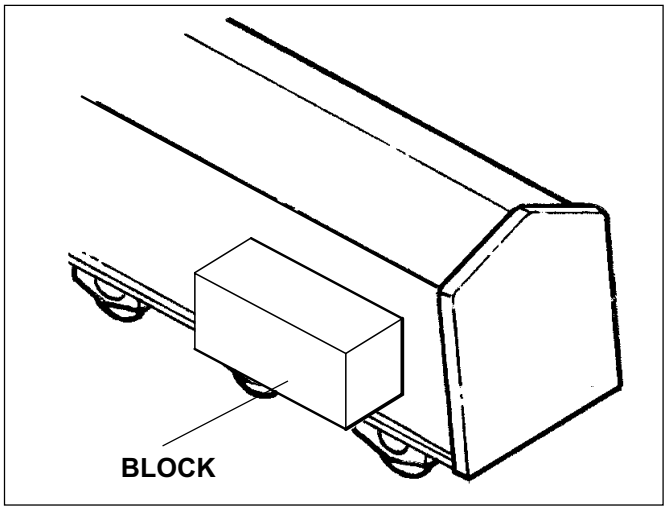


FIGURE 4.5C

WARNING

ALWAYS USE PROPER LIFTING EQUIPMENT AND DEVICES. USE OF IMPROPER LIFTING EQUIPMENT COULD ALLOW THE LOAD TO SHIFT OR FALL CAUSING SEVERE DAMAGE, SERIOUS INJURY OR DEATH.

9

https://truckmanualshub.com/

c. Bring loose ends of cables together at machine center of gravity and attach to an overhead lifting device with a rated lifting capacity sufficient to lift the machine. See Figures 4.6A, and 4.6B.

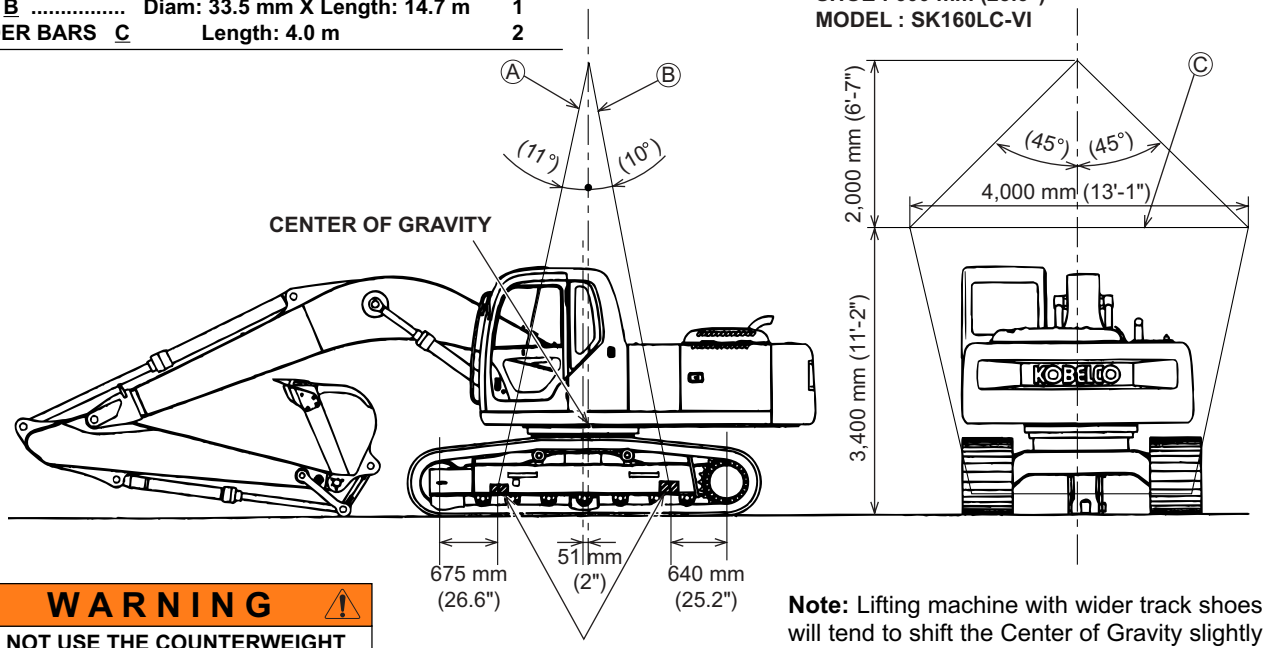
NOTE

It may be necessary to place reinforced spreader bars between lifting cables to prevent damage to the machine during lifting. See Figure 4.6A, and 4.6B.

TOOLS NEEDED {SK160LC with 3.1m Arm/600mm Shoes}:

ITEM	SIZE	QTY
CABLE A	Diam: 33.5 mm X Length: 14.9 m	1
CABLE B	Diam: 33.5 mm X Length: 14.7 m	1
SPREADER BARS C	Length: 4.0 m	2

WEIGHT : 16,700 kg (36,800 lbs)
ARM : 3.1 M (10'-2")
SHOE : 600 mm (23.6")
MODEL : SK160LC-VI



⚠ WARNING ⚠
DO NOT USE THE COUNTERWEIGHT LIFTING EYES TO LIFT MACHINE

PLACE BLOCK BETWEEN EACH CABLE AND FRAME

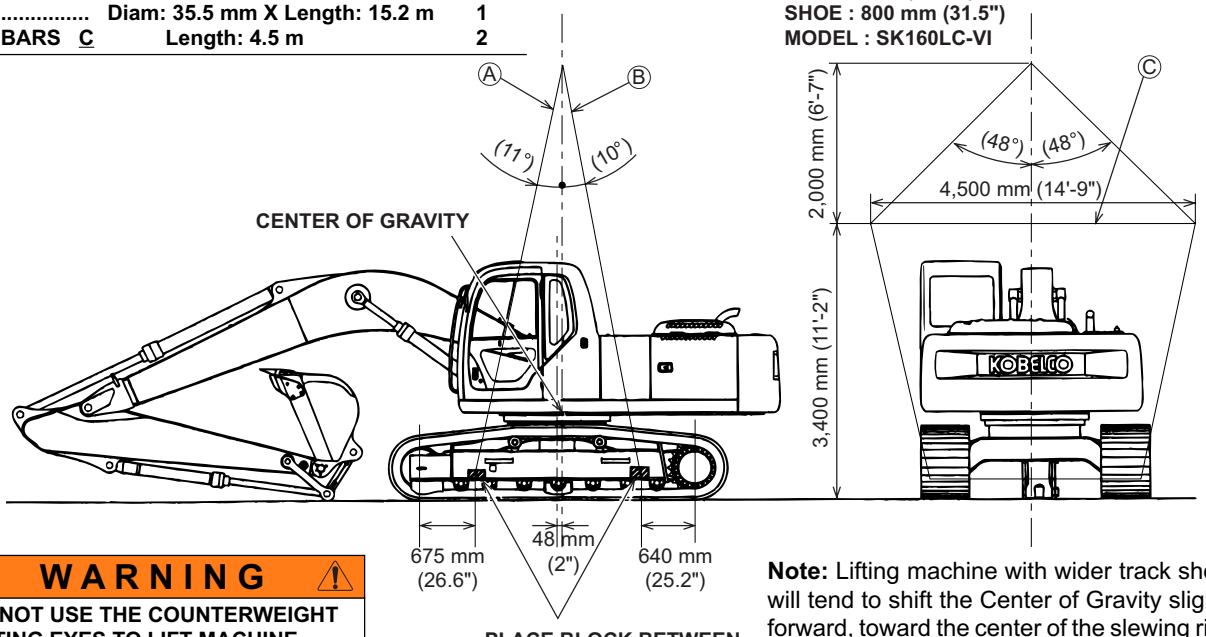
Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

FIGURE 4.6A

TOOLS NEEDED {SK160LC with 3.1m Arm/800mm Shoes}:

ITEM	SIZE	QTY
CABLE A	Diam: 35.5 mm X Length: 15.2 m	1
CABLE B	Diam: 35.5 mm X Length: 15.2 m	1
SPREADER BARS C	Length: 4.5 m	2

WEIGHT : 17,300 kg (38,140 lbs)
ARM : 3.1 M (10'-2")
SHOE : 800 mm (31.5")
MODEL : SK160LC-VI



⚠ WARNING ⚠
DO NOT USE THE COUNTERWEIGHT LIFTING EYES TO LIFT MACHINE

PLACE BLOCK BETWEEN EACH CABLE AND FRAME

Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

FIGURE 4.6B

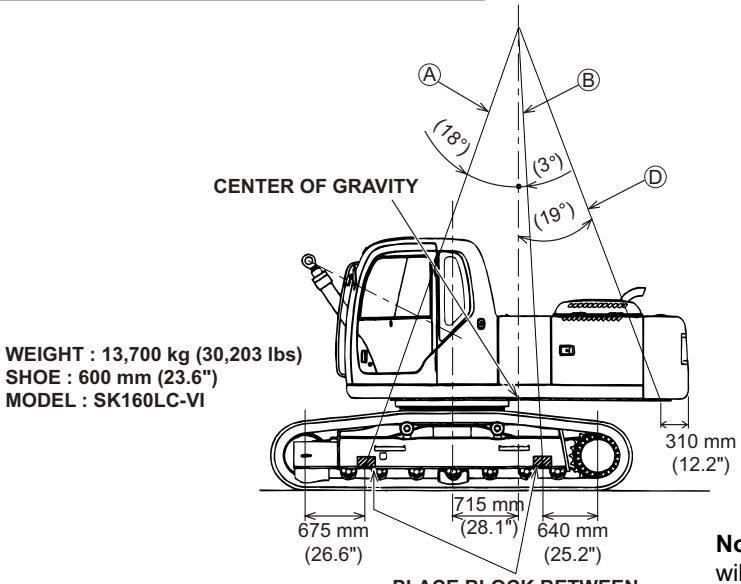
2. Lifting Machine Without Attachment

Pass the cables through the lifting points on the crawlers as indicated in page 4-5 and bring loose ends of cables together at machine center of gravity and attach to an overhead lifting device with a rated lifting capacity sufficient to lift the machine. See Figures 4.7A, 4.7B, and 4.8A (next page) for better reference.

TOOLS NEEDED {SK160LC/600mm Shoes/no attachments}:

ITEM	SIZE	QTY
CABLE A	Diam: 33.5 mm X Length: 15.0 m	1
CABLE B	Diam: 33.5 mm X Length: 14.6 m	1
CABLE D	Diam: 33.5 mm X Length: 13.5 m	1
SPREADER BARS C	Length: 4.0 m	3

⚠ WARNING ⚠
DO NOT USE THE COUNTERWEIGHT LIFTING EYES TO LIFT MACHINE



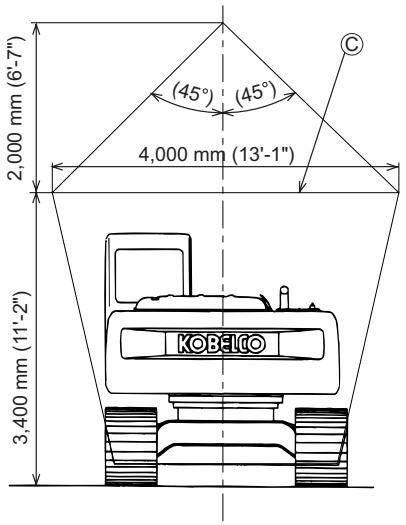


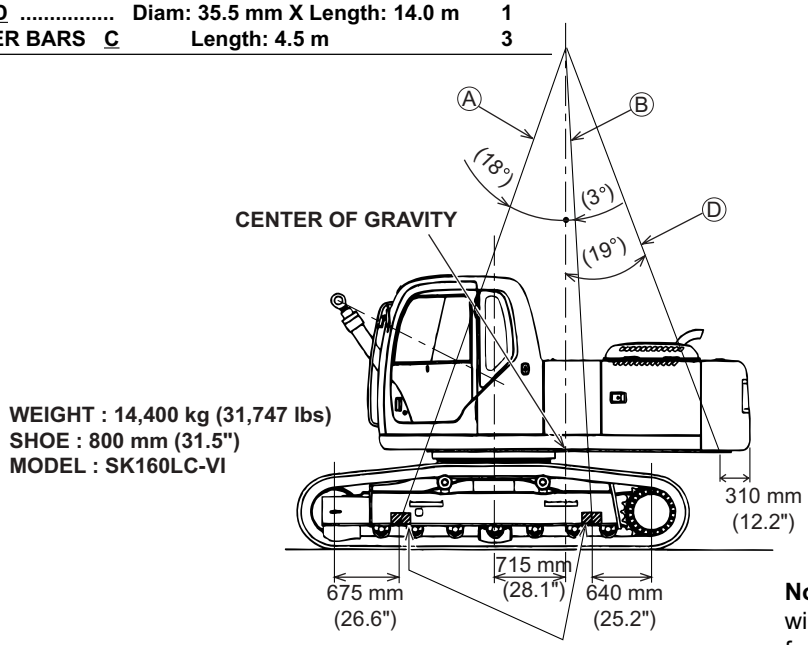
FIGURE 4.7A

Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

TOOLS NEEDED {SK160LC/800mm Shoes/no attachments}:

ITEM	SIZE	QTY
CABLE A	Diam: 35.5 mm X Length: 15.5 m	1
CABLE B	Diam: 35.5 mm X Length: 15.1 m	1
CABLE D	Diam: 35.5 mm X Length: 14.0 m	1
SPREADER BARS C	Length: 4.5 m	3

⚠ WARNING ⚠
DO NOT USE THE COUNTERWEIGHT LIFTING EYES TO LIFT MACHINE



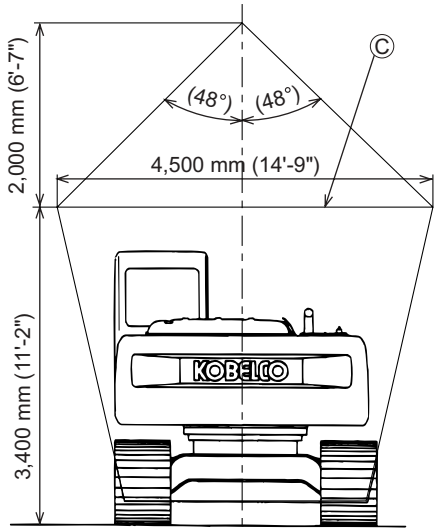


FIGURE 4.7B

Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

9

https://truckmanualshub.com/

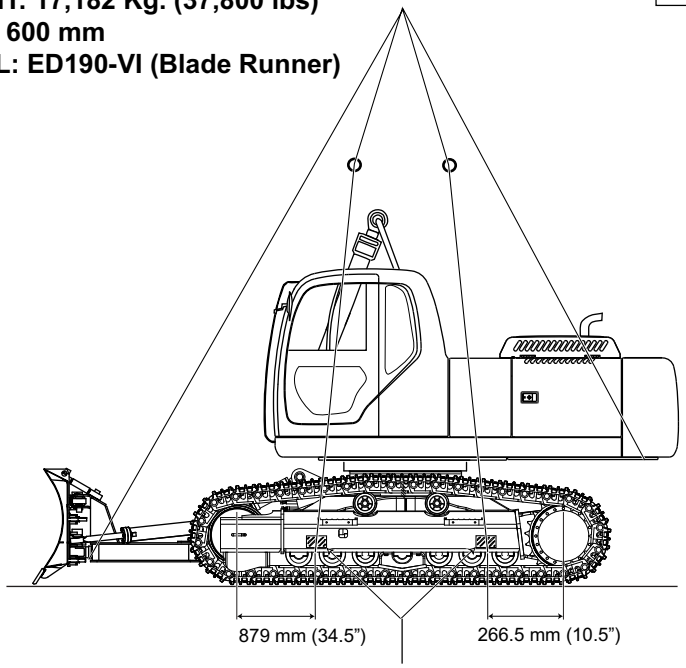
⚠ WARNING ⚠

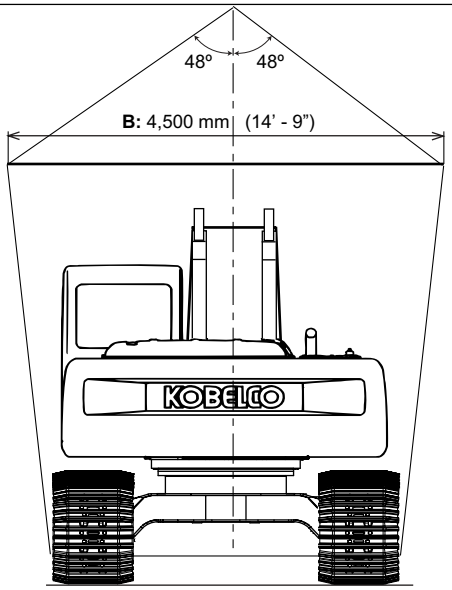
DO NOT USE THE COUNTERWEIGHT LIFTING EYES TO LIFT MACHINE

CAUTION

USE CABLES WITH DIAMETER OF 41.5 MM (1.63”) AND REINFORCED SPREADER BARS

WEIGHT: 17,182 Kg. (37,800 lbs)
SHOE: 600 mm
MODEL: ED190-VI (Blade Runner)





Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

CAUTION

IT IS NOT RECOMMENDED TO LIFT THE ED190 WITH THE FRONT ATTACHMENT INSTALLED. THE ADDITIONAL WEIGHT OF THE DOZER BLADE MAKES THE MACHINE UNSTABLE DURING LIFTING DURING LIFITNG WITH THE FRONT ATTACHMENTS INSTALLED.

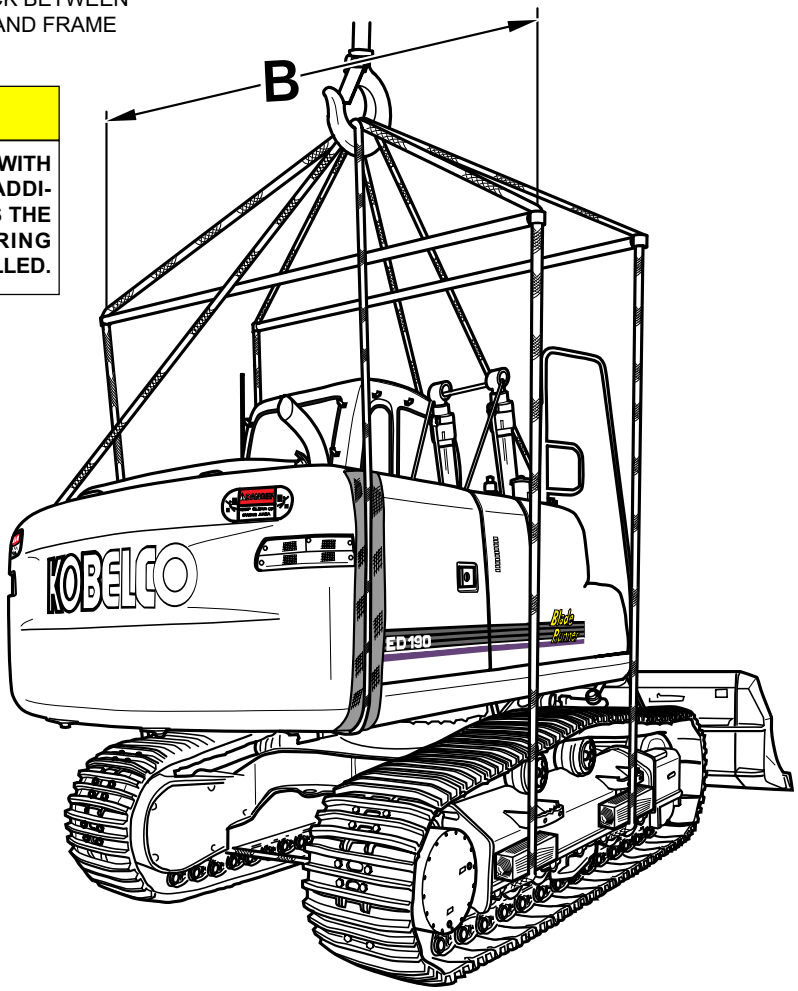


FIGURE 4.8A

https://tractormanuals.com/

C. ATTACHMENT SHIPPING DIMENSIONS

The SK160LC-VI and ED190 Blade Runner, as manufactured by KOBELCO, are shipped with standard attachments:

C1- Standard Boom - 5.20 m (16'-1")
C2- Standard Arm - 3.10 m (10'-2")
C3- Bucket - 0.52 m^3 (0.68 $yard^3$)

CAUTION

ALLOWANCES MUST BE CONSIDERED FOR ADDITIONAL ATTACHMENTS SUCH AS: THUMBS, COUPLERS, OVER SIZED BUCKETS, ETC.

1. Boom With Arm Cylinder - Figure 4.9A

Boom mm (ft-in)	5650 (18' - 6")
L X H X W mm (ft-in)	5380 X 1400 X 620 (17' 8" X 4' 7" X 2' 0")
Weight w/Arm Cylinder Kg (lbs)	1325 (2921)

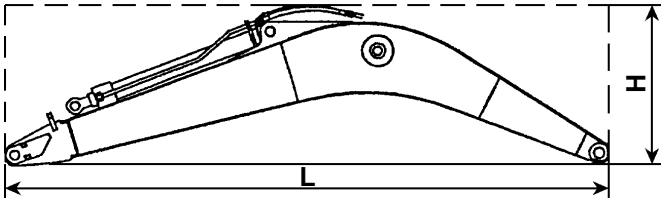


FIGURE 4.9A

2. Arm With Bucket Cylinder - Figure 4.9B

Arm	2600 mm (8' 6")	3100 mm (10' 2")
LxHxW mm (ft-in)	3520 x 735 x 300 (11' 7"x2' 5"x11.8")	3820 x 735 x 300 (12' 6"x2' 5"x11.8")
Weight w/Bucket Cyl. Kg (lbs)	770 (1700)	833 (1836)

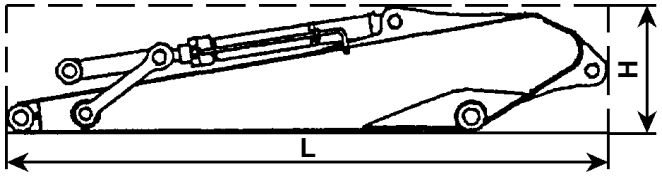


FIGURE 4.9B

3. Arm With Bucket Cylinder and Bucket - Figure 4.9C

Combination	Arm 2.6 m (8' 6") Bucket 0.63 m^3 (0.82 yrd^3)	Arm 3.1 m (10' 2") Bucket 0.52 m^3 (0.68 yrd^3)
LxHxW mm (ft-in)	4790 x 830 x 1080 (15' 9"x2' 9"x3' 7")	5250 x 830 x 950 (17' 3"x2' 9"x3' 1)
Weight Kg (lbs)	1210 (2670)	1230 (2710)

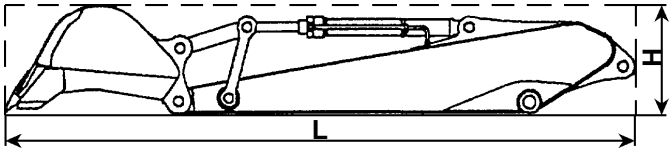


FIGURE 4.9C

4. Bucket - Figure 4.9D

Standard bucket is **0.52 m^3 (0.68 yd^3)**
A– Length is 1.30 m (4'-3")
B– Height is 1.16 m (3'-10")
C– Width without side cutters is 0.854 m (33.7")
D– Width with side cutters– 0.954 m (37.6")
E– Bucket weight is 370 kg (816 lbs)

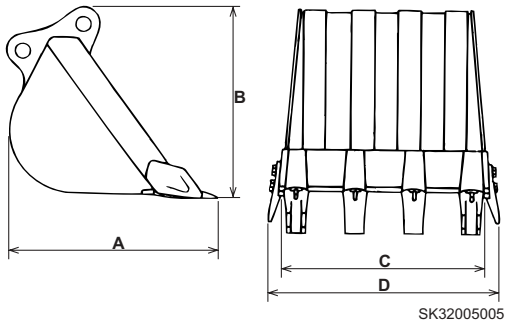


FIGURE 4.9D

5. ED190-VI Blade - Figure 4.9E

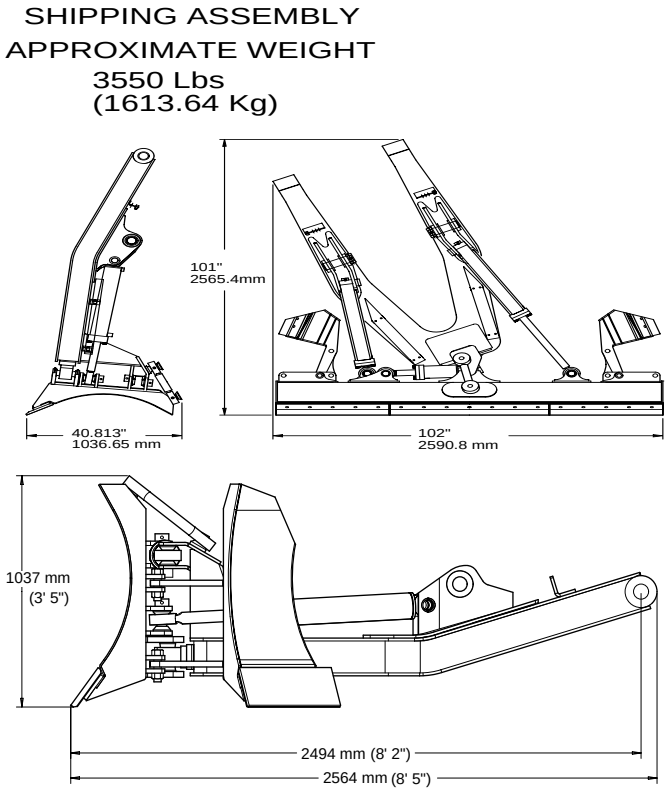


FIGURE 4.9E

https://truckmanualshub.com/

II. SK210LC/SK250LC-6E

A. GROUND TRANSPORTATION

1. Machine Preparation

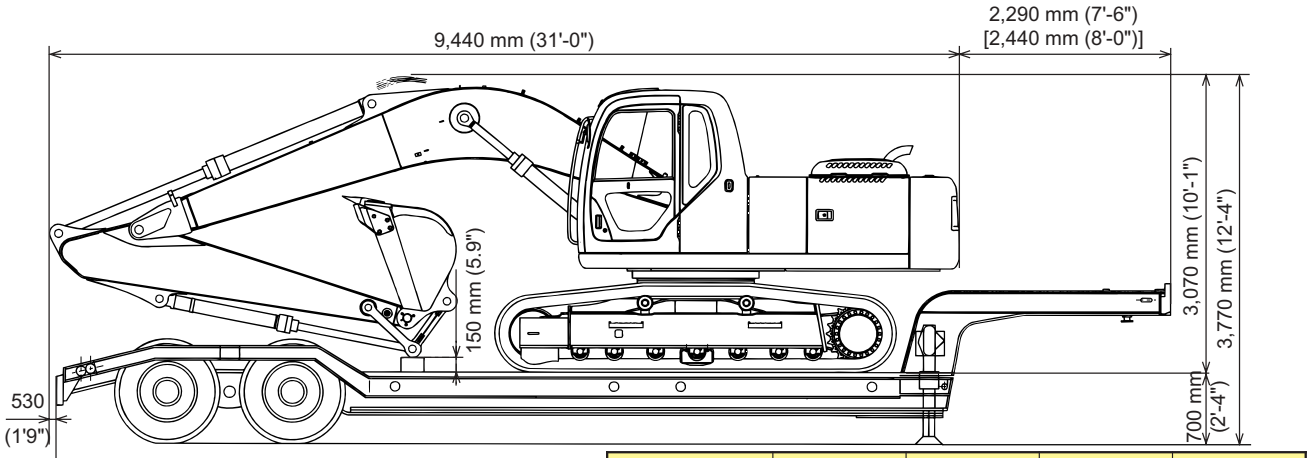
a. Know the total weight, length, width and height of the machine being transported. See Figure 4.10A and 4.10B.

b. Know route to be traveled. Investigate bridges, overpasses, height of road signs on route.

c. Obtain any permits required from proper government agencies for machine transportation.

d. Use only a trailer with a rated capacity sufficient to transport the machine.

e. Make certain trailer has ramps or a ramp is available for loading and unloading the machine.



Dimensions and weights are with 2.94 m (9'-8") arm, 0.81 m³ (1.06 yrd³) bucket and 5.65 m (18'-6") boom.

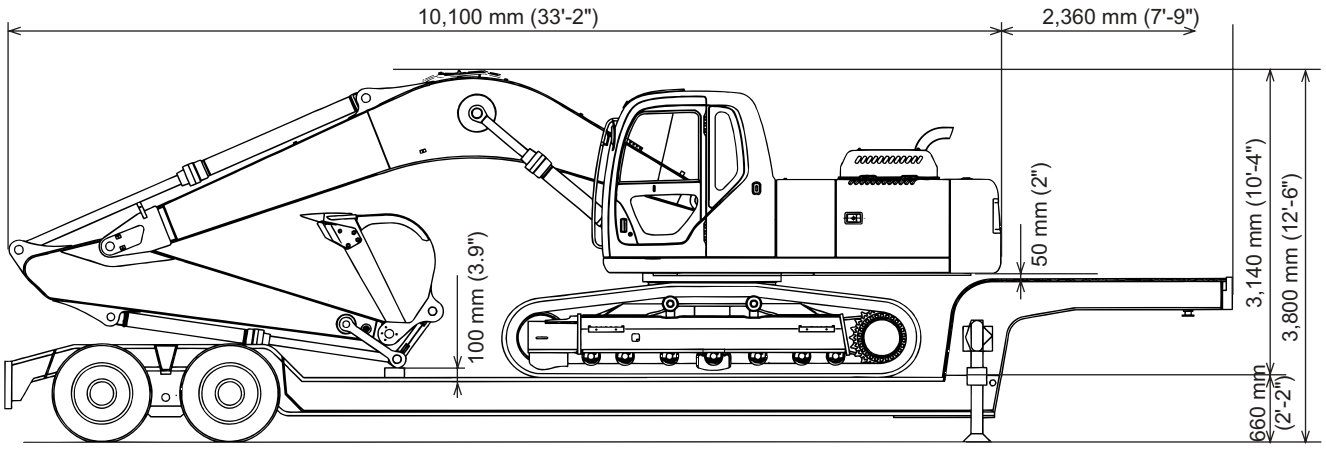
Note: This illustration is for demonstration purposes only. Always, make sure to check actual dimensions after machine is loaded on trailer.

SHOES / MODEL	600 mm (23.6")	700 mm (27.6")	800 mm (31.5")	900 mm (35.4")
SK210LC-6E	20,400 (45,000)	20,900 (46,100)	21,200 (46,700)	21,400 (47,200)

Units: Kg (Lbs) YQ WorkingWt

Bucket Weight: 650 Kg (1,430 Lbs)

FIGURE 4.10A



Dimensions and weights are with 2.98 m (9'-9") arm, 1.04 m³ (1.36 yrd³) bucket and 6.02 m (19'-9") boom.

Note: This illustration is for demonstration purposes only. Always, make sure to check actual dimensions after machine is loaded on trailer.

SHOES / MODEL	600 mm (23.6")	800 mm (31.5")	900 mm (35.4")
SK250LC-6E	24,200 (53,400)	24,700 (54,500)	25,000 (55,100)

Units: Kg (Lbs) LL WorkingWt

Bucket Weight: 650 Kg (1,430 lbs)

FIGURE 4.10B

2. Loading the Machine

⚠ WARNING

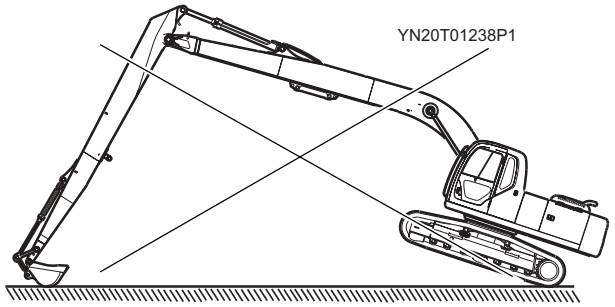
NEVER ATTEMPT TO LOAD OR UNLOAD MACHINE WITHOUT RAMPS.

a. Apply parking brakes on tractor and trailer and chock trailer wheels before attempting to load or unload machine.
b. Lower ramps of trailer.
c. Place travel speed select switch on travel lever in 1st (🐢) speed position and move throttle control to the "LO" idle position. See Figure 4.11A.
d. Slowly travel machine up trailer ramps and over rear axles of trailer.
e. Slowly travel machine completely onto trailer until in proper transport position.
f. Slowly swing machine 180° until attachment is toward rear of trailer.
g. Slowly lower boom until attachment rests on trailer bed.
h. Place safety lock lever in the up "LOCKED" position. See Figure 4.11C.
i. Turn machine "OFF", remove key and lock all doors, filler caps and access panels.

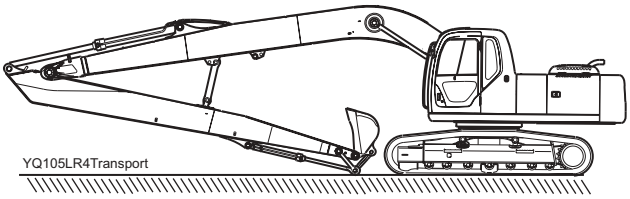
CAUTION

Place a cover over the exhaust pipe of the machine and secure to avoid water entering the engine, and possible turbo damage.

CAUTION



Prior to transporting a long reach attachment equipped machine, the arm must be fully retracted and attachment lowered. Make sure the link between the boom and arm is properly installed to prevent damaging the arm and the arm cylinder during transportation.



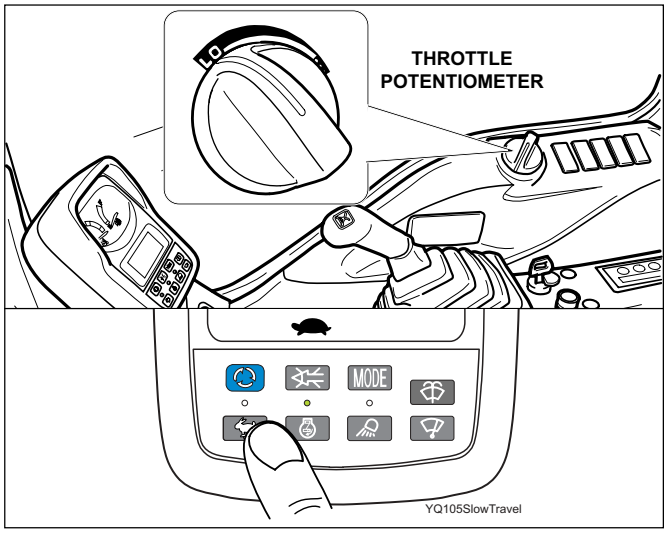
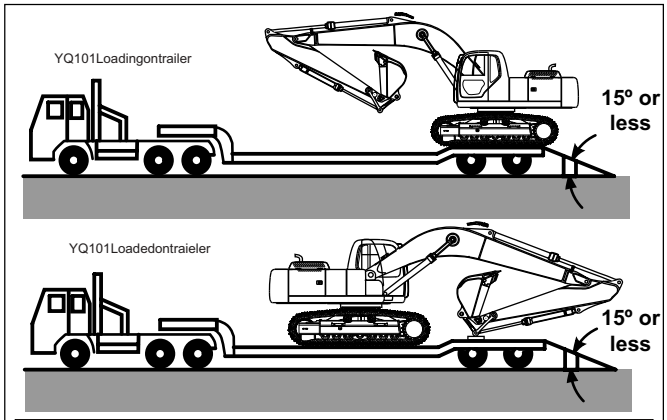


FIGURE 4.11A



⚠ WARNING

DO NOT TRY TO LOAD MACHINE WITHOUT ATTACHMENT IN THIS TYPE OF TRAILER. MACHINE COULD TIP OVER. THIS ILLUSTRATION IS FOR DEMONSTRATION ONLY.

FIGURE 4.11B

⚠ WARNING

TO PREVENT ARM AND BUCKET CYLINDER DAMAGE, DO NOT HAVE THE CYLINDER RODS FULLY EXTENDED DURING LOADING AND UNLOADING OPERATIONS. THIS WILL AVOID SUDDEN AND ABRUPT CONTACT OF THE ARM OR BUCKET WITH A TRAILER DECK, RAMP OR THE GROUND; WHICH COULD RESULT IN STRETCHING THE CYLINDER ROD(S).
DO NOT CHAIN THE ATTACHMENTS WITH THE ARM AND/OR BUCKET CYLINDER ROD(S) FULLY EXTENDED. THIS WILL AVOID DAMAGE CAUSED BY ABRUPT MOVEMENTS DURING TRANSPORTATION.

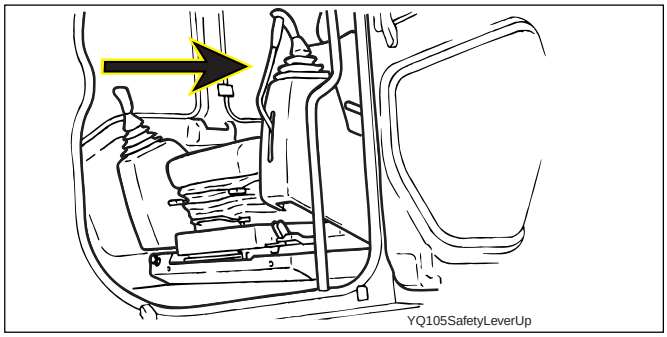


FIGURE 4.11C

9

https://truckmanualshub.com/

3. Securing Machine to Trailer

a. Use cable or wire rope with sufficient capacity to secure front and rear of the machine to trailer. See Figure 4.12A. Chock the tracks, use the lower frame front and rear brackets to secure machine to trailer. Also, make sure to secure front and rear of each track.

b. Securely fasten all loose parts, as well as removed parts to trailer or transporting platform.

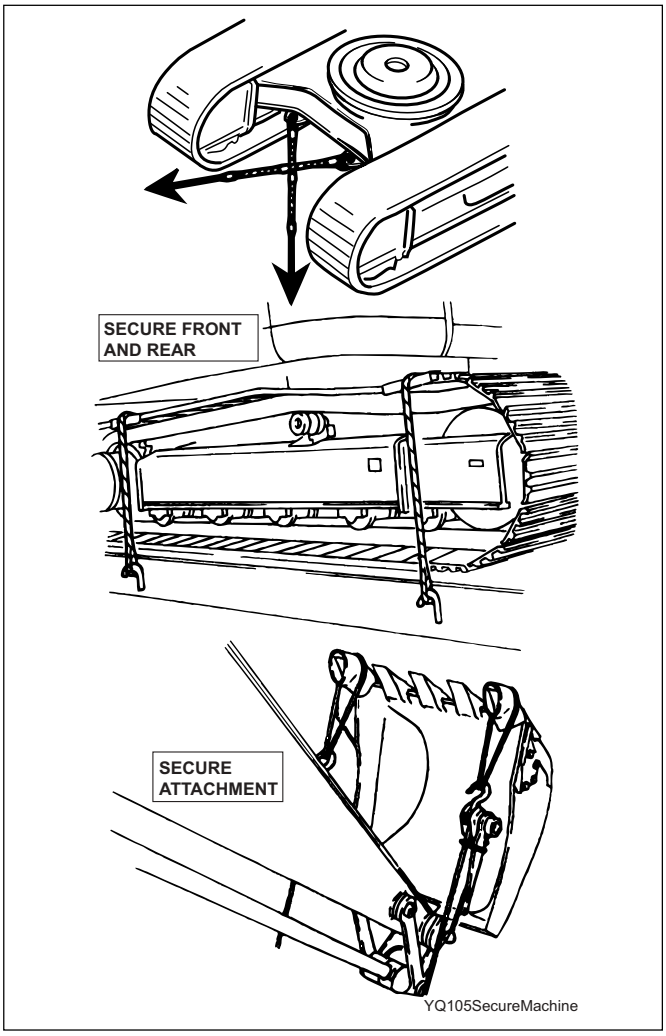


FIGURE 4.12A

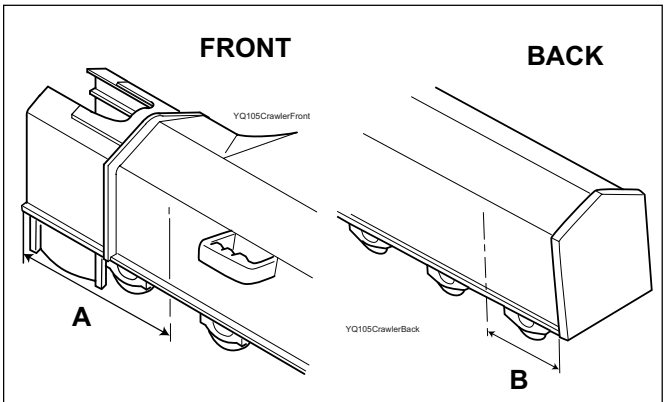
B. LIFTING MACHINE

The following procedures are for lifting the machine, as built by KOBELCO. These procedure do not take into account modifications made to the machine that affect machine weight or center of gravity.

1. Lifting Machine With Attachment Installed

a. Locate lifting locations at the front and rear of each crawler frame. See Figure 4.12B.

b. Attach cables or wire rope with a capacity rating sufficient to lift the machine, at lifting locations.



	A (Between 1st & 2nd front roller)	B (Between the last two rollers)
SK210LC-6E	802 mm (31.6”)	267 mm (10.5”)
SK250LC-6E	843 mm (33.2”)	307 mm (12.1”)

FIGURE 4.12B

CAUTION

Place a hardwood or steel block between cables and crawler frame to prevent damage to the tracks from cables during lifting. See Figure 4.12C.

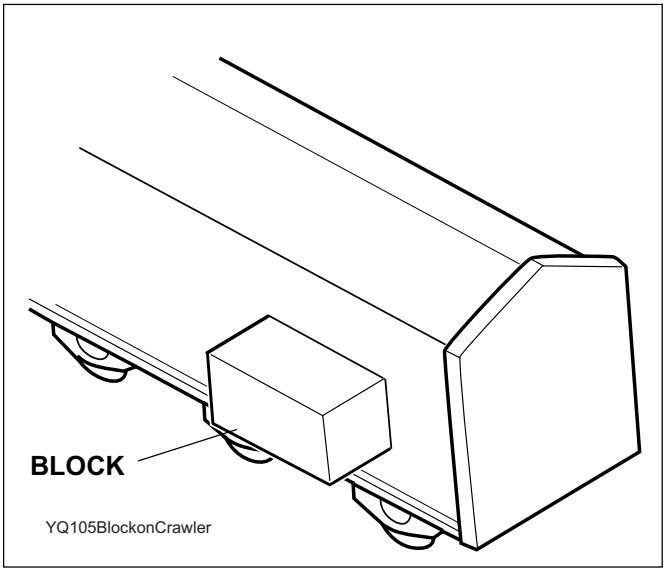


FIGURE 4.12C

⚠ WARNING

ALWAYS USE PROPER LIFTING EQUIPMENT AND DEVICES. USE OF IMPROPER LIFTING EQUIPMENT COULD ALLOW THE LOAD TO SHIFT OR FALL CAUSING SEVERE DAMAGE, SERIOUS INJURY OR DEATH.

https://tractormanuals.com/

c. Bring loose ends of cables together at machine center of gravity and attach to an overhead lifting device with a rated lifting capacity sufficient to lift the machine. See Figure 4.13A to 4.13A.

NOTE

It may be necessary to place reinforced spreader bars between lifting cables to prevent damage to the machine during lifting. See Figure 4.13A to 4.13A.

TOOLS {SK210LC-6E}

ITEM	SIZE	Q'TY
CABLE Ⓐ	∅ 33.5 X 15.2 m	1
CABLE Ⓑ	∅ 33.5 X 15.1 m	1
SPREADER BARS Ⓒ	4.0 m	2

TOOLS {SK250LC-6E}

ITEM	SIZE	Q'TY
CABLE Ⓐ	∅ 37.5 X 15.5 m	1
CABLE Ⓑ	∅ 37.5 X 15.3 m	1
SPREADER BARS Ⓒ	4.0 m	2

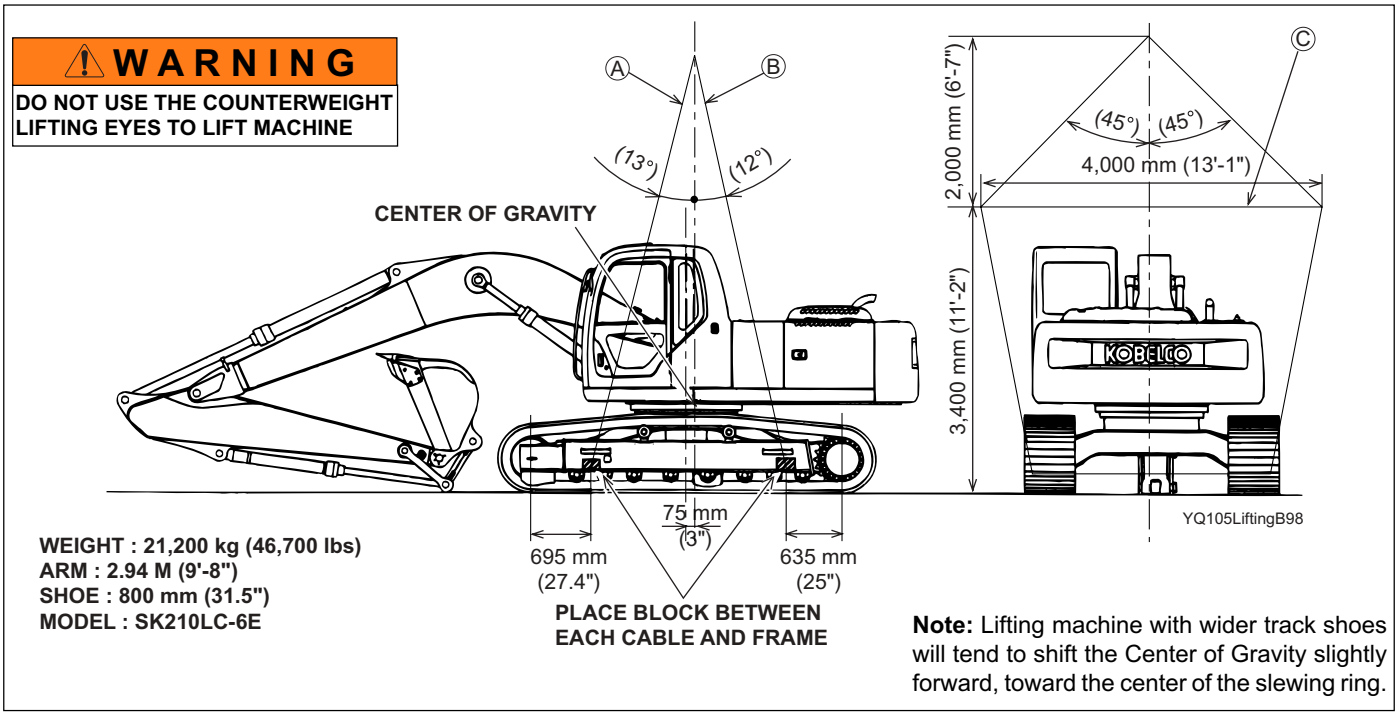


FIGURE 4.13A

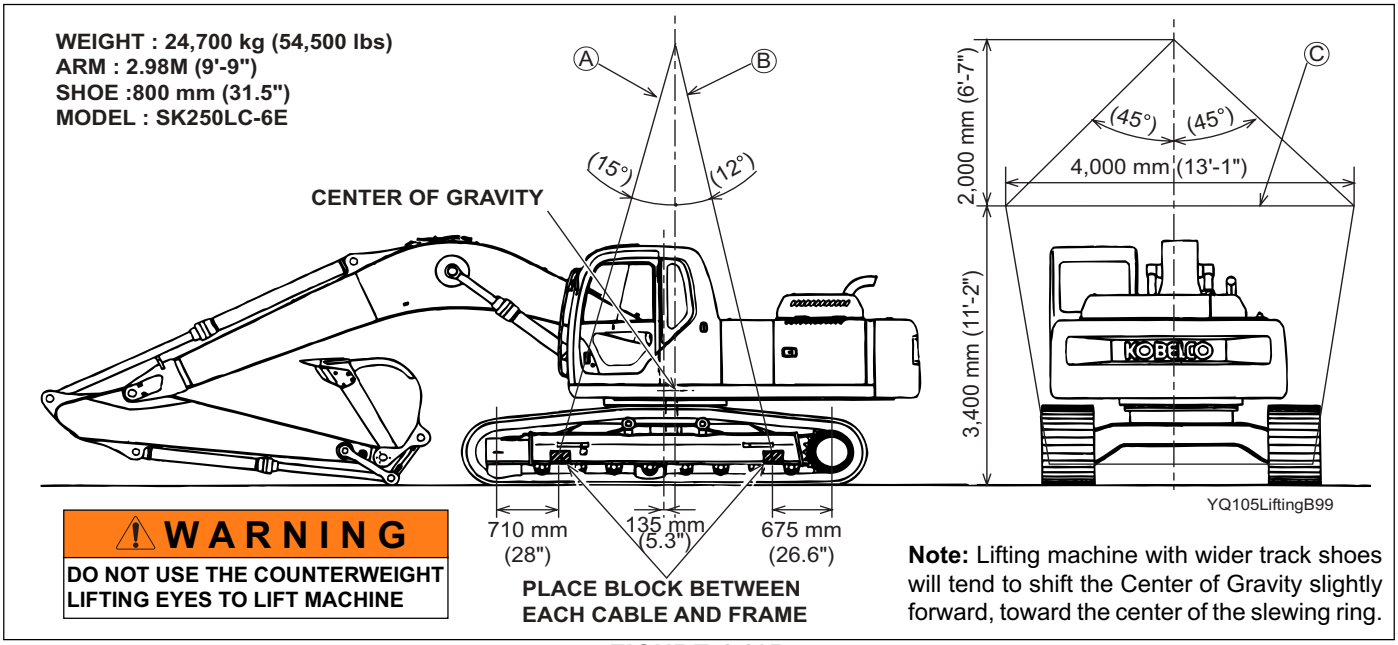


FIGURE 4.13B

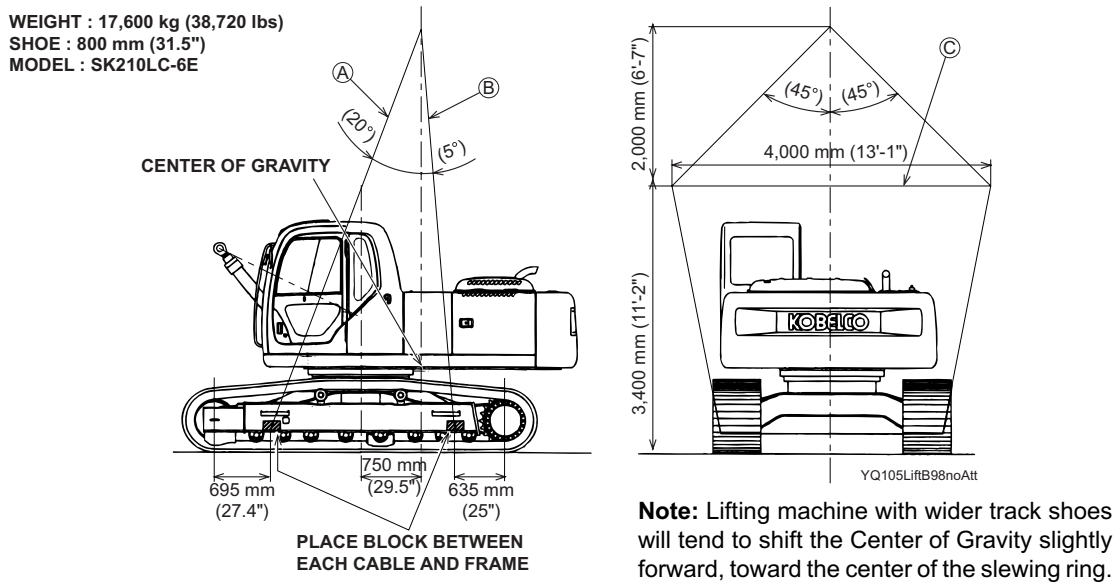
https://truckmanualshub.com/

2. Lifting Machine Without Attachment

Pass the cables through the lifting points on the crawlers as indicated in page 4-12 and bring loose ends of cables together at machine center of gravity and attach to an overhead lifting device with a rated lifting capacity sufficient to lift the machine. See Figures 4.14A to 4.14B for better reference.

TOOLS {SK210LC-6E}

ITEM	SIZE	Q'TY
CABLE Ⓐ	∅ 33.5 X 15.6 m	1
CABLE Ⓑ	∅ 33.5 X 14.9 m	1
SPREADER BARS Ⓒ	4.0 m	2



Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

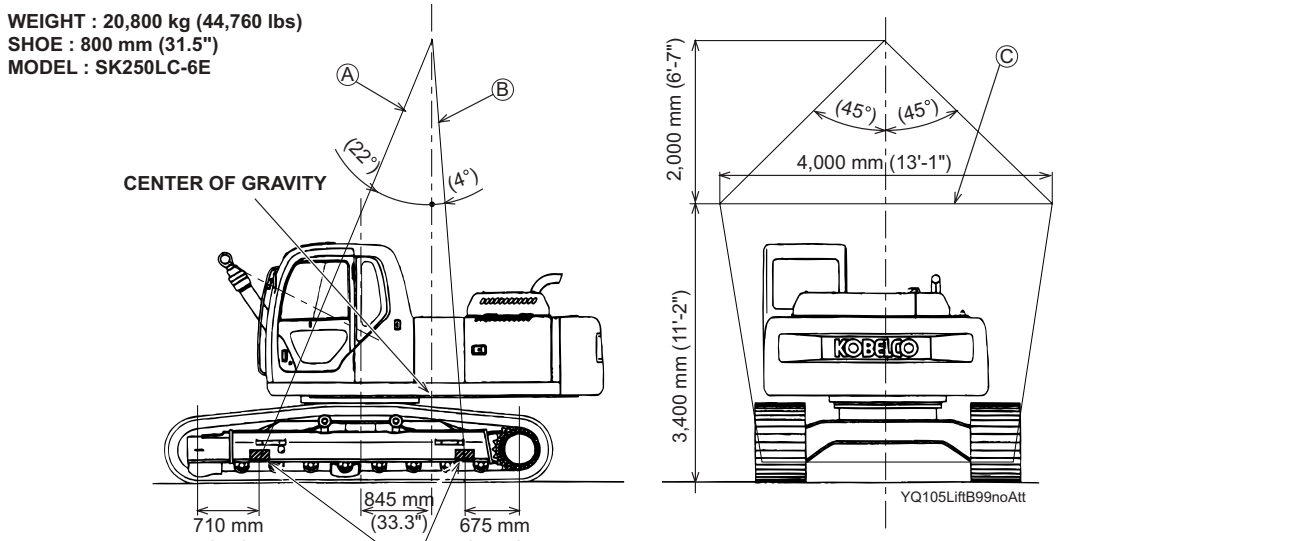
FIGURE 4.14A

TOOLS {SK250LC-6E}

⚠ WARNING

DO NOT USE THE COUNTERWEIGHT LIFTING EYES TO LIFT MACHINE

ITEM	SIZE	Q'TY
CABLE Ⓐ	∅ 37.5 X 16.0 m	1
CABLE Ⓑ	∅ 37.5 X 15.1 m	1
SPREADER BARS Ⓒ	4.0 m	2



Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

FIGURE 4.14B

9

https://manuals.hub.com/

C. SHIPPING DIMENSIONS

1. SK210LC-6E - Figure 4.15A

a. Machine With Standard Attachments

Refer to Figure 4.15A for reference in regards to the machine basic dimensions, as manufactured by KOBELCO, with standard attachments:

a.1- Standard Boom - 5.65 m (18'-6")
a.2- Standard Arm - 2.94 m (9'-8")
a.3- Bucket - 0.80 m³ (1.05 yard³)

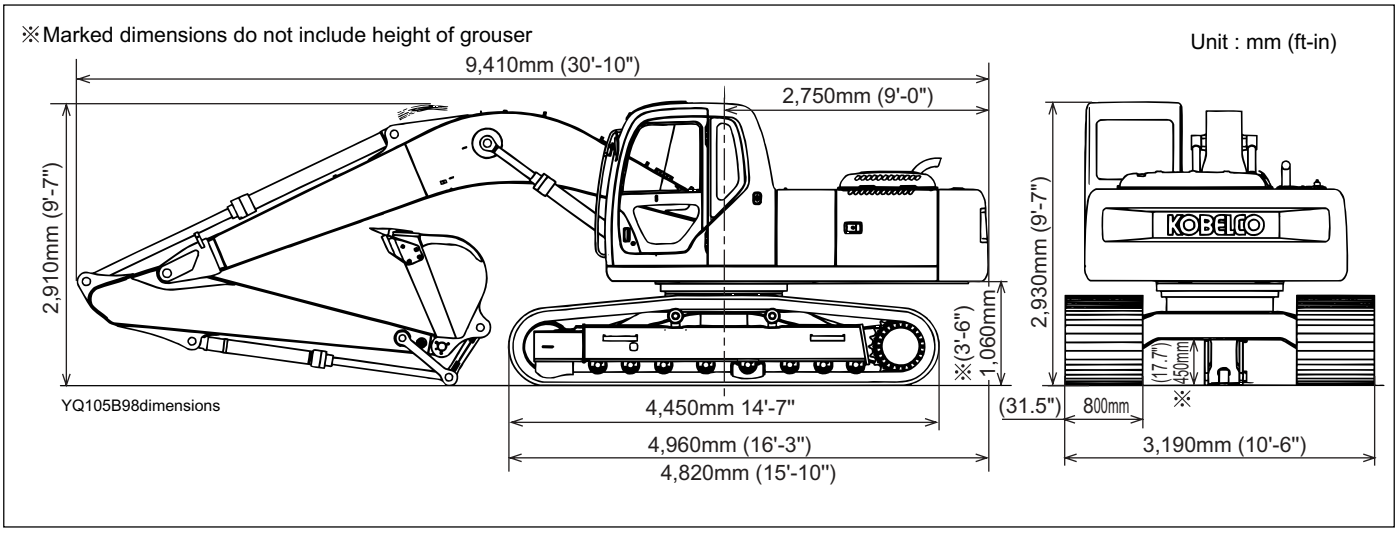


FIGURE 4.15A

b. Machine With Long Reach Attachments

Refer to Figure 4.15B for reference in regards to the machine basic dimensions, as manufactured by KOBELCO, with long reach attachments:

b.4- Long Reach Boom - 8.75 m (28'-8")
b.5- Long Reach Arm - 6.35 m (20'-10")
b.6- Bucket - 0.45 m³ (0.59 yard³)

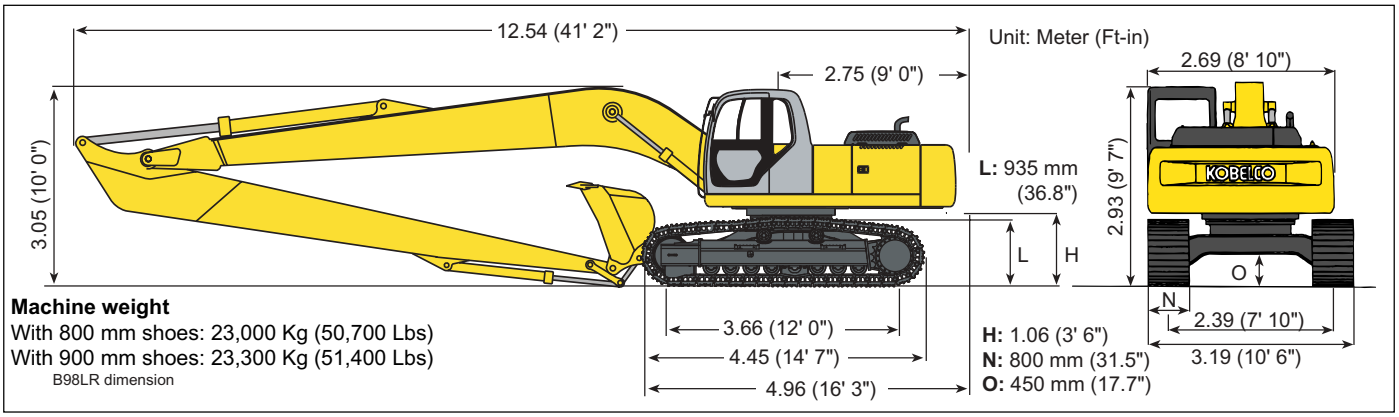


FIGURE 4.15B

c. Std. Boom With Arm Cylinder - Figure 4.15C

Boom mm (ft-in)	5650 (18' - 6")
L X H X W mm (ft-in)	5850 X 1390 X 678 (19' 2" X 4' 7" X 2' 3")
Weight w/Arm Cylinder Kg (lbs)	1570 (3454)

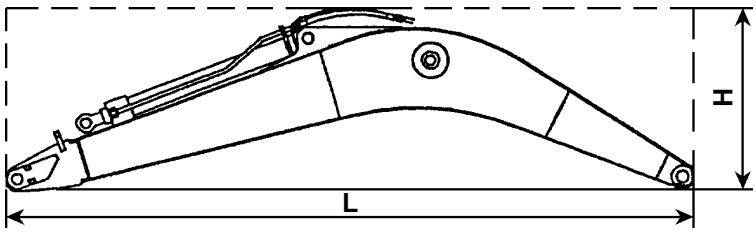


FIGURE 4.15C

https://truckmanualshub.com/

d. Arm With Bucket Cylinder - Figure 4.16A

Arm	2400 mm (7' 10")	2940 mm (9' 8")	3330 mm (10' 10")
LxHxW mm (ft-in)	3380 x 828 x 348 (11' 1"x2' 7"x1' 2")	3901 x 821 x 348 (12' 10"x2' 8"x1' 2")	4310 x 821 x 348 (14' 2"x2' 8"x1' 2")
Weight w/Bucket Cyl. Kg (lbs)	880 (1936)	980 (2156)	1050 (2310)

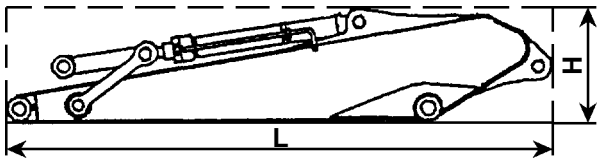


FIGURE 4.16A

e. Arm With Bucket Cylinder and Bucket - Figure 4.16B

Combination	Arm 2.4 m (7' 10") Bucket 0.93 m^3 (1.22 yrd^3)	Arm 2.94 m (9' 8") Bucket 0.81 m^3 (1.06 yrd^3)	Arm 3.3 m (10' 10") Bucket 0.70 m^3 (0.92 yrd^3)
LxHxW mm (ft-in)	4733 x 890 x 1330 (15' 7"x2' 11"x4' 4")	5254 x 890 x 1160 (17' 3"x2' 11"x3'10")	5663 x 890 x 1080 (18' 6"x2' 11"x3' 7")
Weight Kg (lbs)	1520 (3344)	1620 (3570)	1650 (3640)

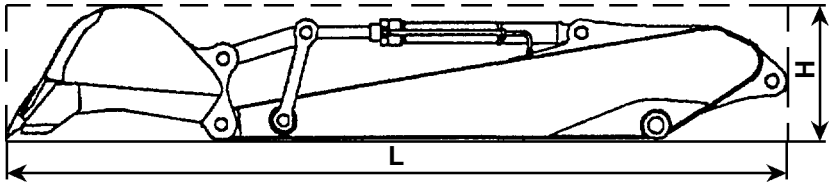


FIGURE 4.16B

f. Bucket - Figure 4.16C

Standard bucket is 0.81 m^3 (1.06 $yard^3$)

A - Length is 1,370 mm (4'-6")

B - Height is 1,260 mm (4'-2")

C - Width without side cutters is 1,050 mm (3'-5")

D - Width with side cutters is 1,160 mm (3'-10")

E - Bucket weight is 650 kg (1,430 lbs)

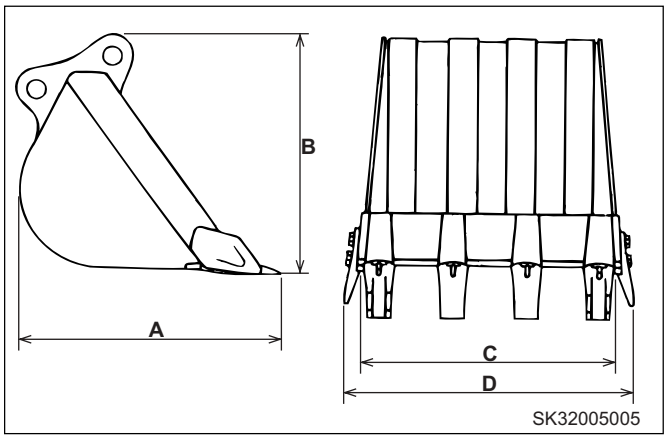


FIGURE 4.16C

9

https://tractormanuals.com/

2. SK250LC-6E - Figure 4.17A & 4.17B

a. Machine With Standard Attachments

Refer to Figure 4.17A for reference in regards to the machine basic dimensions, as manufactured by KOBELCO, with standard attachments:

a.1- Standard Boom - 6.02 m (19'-9")
a.2- Standard Arm - 2.98 m (9'-9")
a.3- Bucket - 1.00 m³ (1.31 yard³)

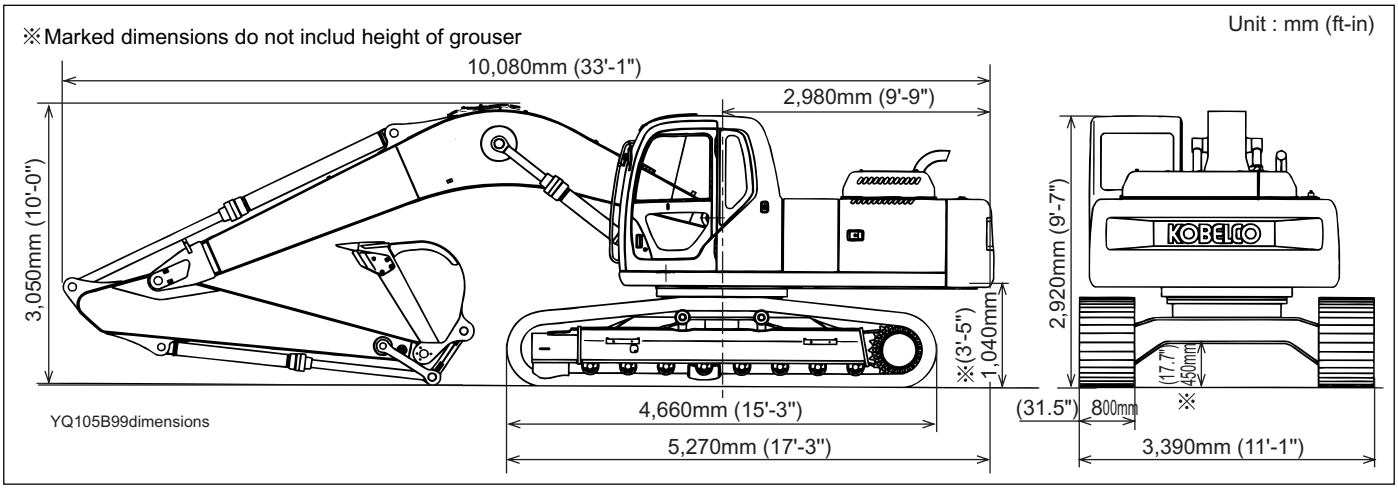


FIGURE 4.17A

b. Machine With Long Reach Attachments

Refer to Figure 4.17B for reference in regards to the machine basic dimensions, as manufactured by KOBELCO, with long reach attachments:

b.1- Long Reach Boom - 10.35 m (33'-11")
b.2- Long Reach Arm - 8.25 m (27'-1")
b.3- Bucket - 0.40 m³ (0.52 yard³)

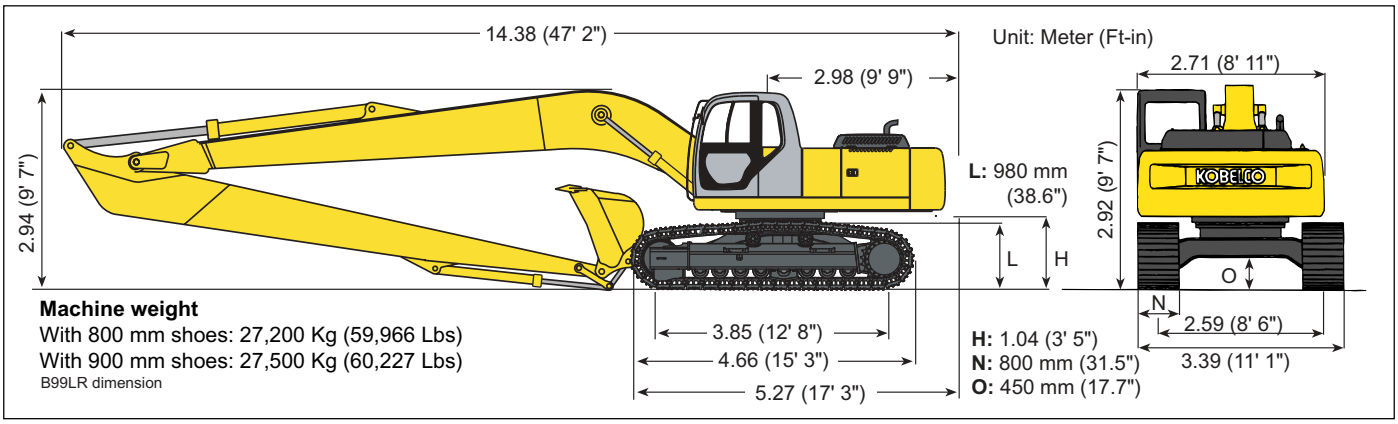


FIGURE 4.17B

c. Std. Boom With Arm Cylinder - Figure 4.17C

Boom mm (ft-in)	6020 (19' - 9")
L X H X W mm (ft-in)	6234 X 1515 X 760 (20' 5" X 5' 0" X 2' 6")
Weight w/Arm Cylinder Kg (lbs)	1970 (4334)

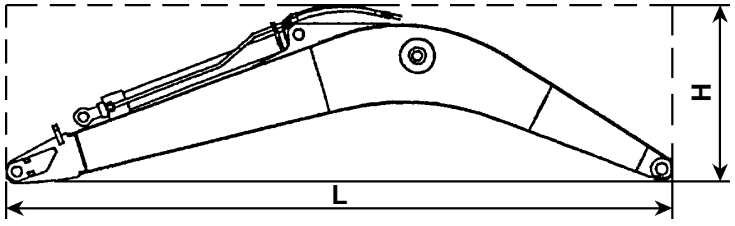


FIGURE 4.17C

9

https://truckmanualshub.com/

d. Arm With Bucket Cylinder - Figure 4.18A

Arm	2500 mm (8' 2")	2980 mm (9' 9")	3660 mm (12' 0")
LxHxW mm (ft-in)	3590 x 901 x 352 (11' 9"x3' 0"x1' 2")	4048 x 896 x 352 (13' 3"x2' 11"x1' 2")	4800 x 896 x 352 (15' 9"x2' 11"x1' 2")
Weight w/Bucket Cyl. Kg (lbs)	1060 (2340)	1110 (2450)	1270 (2800)

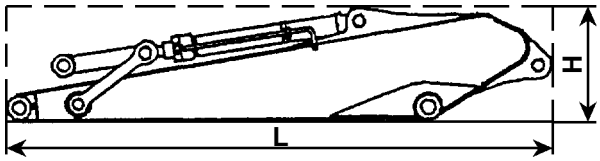


FIGURE 4.18A

e. Arm With Bucket Cylinder and Bucket - Figure 4.18B

Combination	Arm 2.50 m (8' 2") Bucket 1.20 m^3 (1.57 yrd^3)	Arm 2.98 m (9' 9") Bucket 1.00 m^3 (1.31 yrd^3)	Arm 3.66 m (12' 0") Bucket 0.81 m^3 (1.06 yrd^3)
LxHxW mm (ft-in)	4733 x 890 x 1440 (15' 7"x2' 11"x4' 9")	5254 x 890 x 1160 (17' 3"x2' 11"x3'10")	5663 x 890 x 1060 (18' 6"x2' 11"x3' 6")
Weight Kg (lbs)	1940 (4280)	1940 (4280)	2010 (4400)

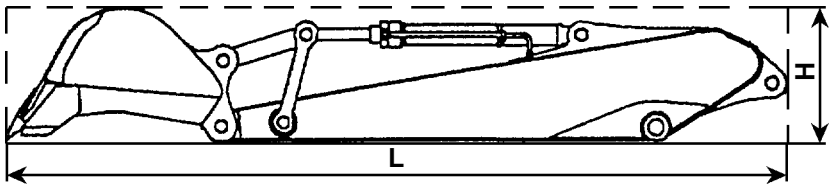


FIGURE 4.18B

f. Bucket - Figure 4.18C

Standard bucket is 1.04 m^3 (1.36 $yard^3$)

A - Length is 1,470 mm (4'-10")

B - Height is 1,340 mm (4'-5")

C - Width without side cutters is 1,180 mm (3'-10")

D - Width with side cutters is 1,280 mm (4'-2")

E - Bucket weight is 780 kg (1,720 lbs)

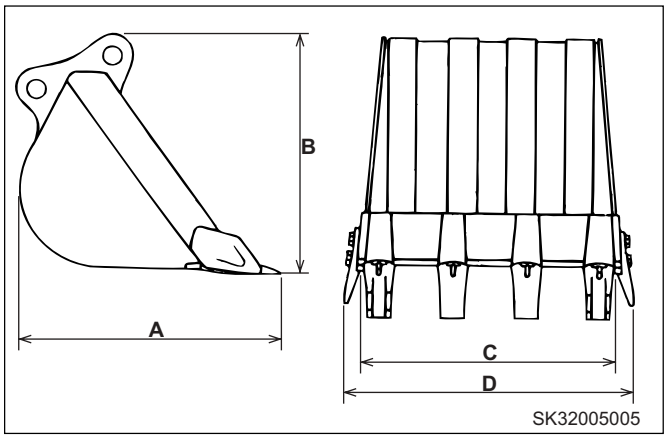


FIGURE 4.18C

9

https://tractormanuals.com/

III. SK290LC/SK330LC-6E

A. GROUND TRANSPORTATION

1. Machine Preparation

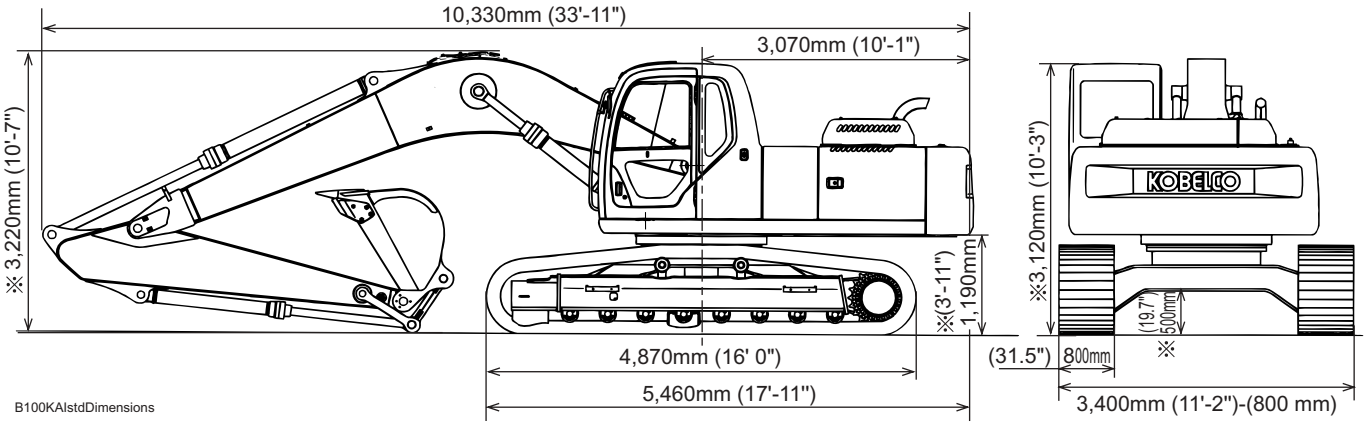
a. Know the total weight, length, width and height of the machine being transported. See Figure 4.19A and 4.19B.

b. Know route to be traveled. Investigate bridges, overpasses, height of road signs on route.

c. Obtain any permits required from proper government agencies for machine transportation.

d. Use only a trailer with a rated capacity sufficient to transport the machine.

e. Make certain trailer has ramps or a ramp is available for loading and unloading the machine.



Dimensions and weights are with 3.2 m (10'-6") arm, 1.20 m³ (1.57 yrd³) bucket and 6.20 m (20'-4") boom.

Note: This illustration is for demonstration purposes only. Always, make sure to check actual dimensions after machine is loaded on trailer.

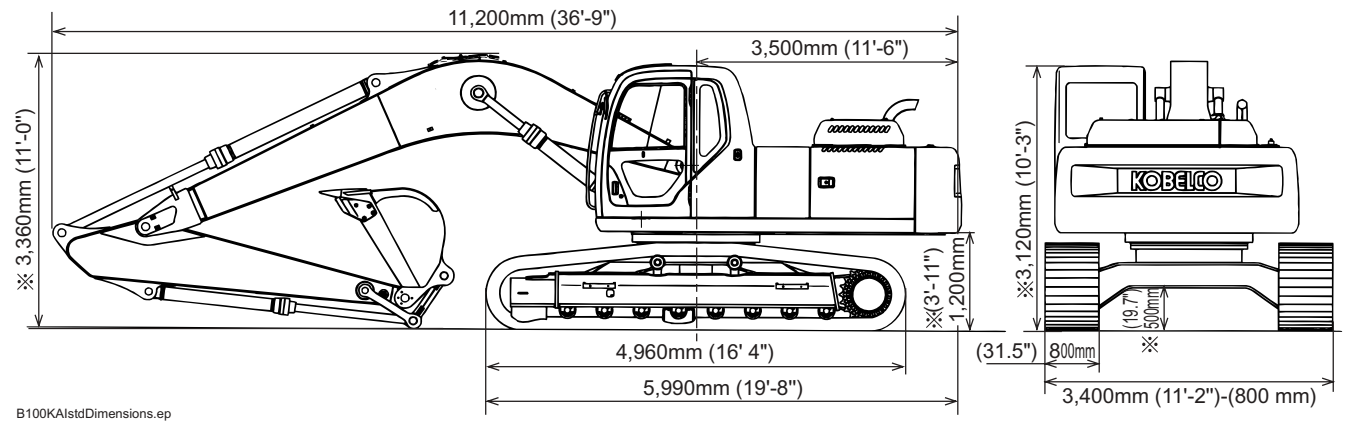
MODEL \ SHOES	600 mm (23.6")	800 mm (31.5")	900 mm (35.4")
SK290LC-6E	29,300 (64,600)	30,000 (66,100)	30,400 (67,000)

Units: Kg (Lbs)

LB WorkingWt

Bucket Weight: 954 Kg (2,100 Lbs)

FIGURE 4.19A



Dimensions and weights are with 3.30 m (10'-10") arm, 1.40 m³ (1.83 yrd³) bucket and 6.50 m (21'-4") boom.

Note: This illustration is for demonstration purposes only. Always, make sure to check actual dimensions after machine is loaded on trailer.

MODEL \ SHOES	600 mm (23.6")	800 mm (31.5")	900 mm (35.4")
SK330LC-6E	34,100 (75,200)	35,300 (77,800)	35,700 (78,700)

Units: Kg (Lbs)

LL WorkingWt

Bucket Weight: 1,040 Kg (2,290 lbs)

FIGURE 4.19B

https://truckmanualshub.com/

2. Loading the Machine

WARNING

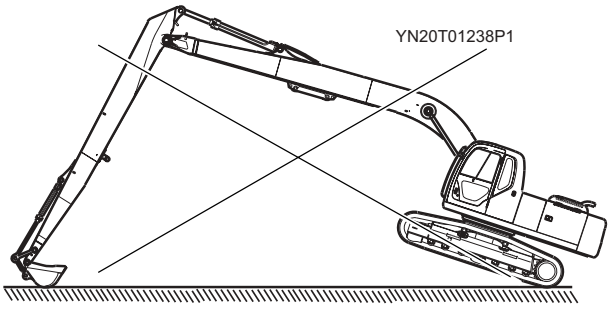
NEVER ATTEMPT TO LOAD OR UNLOAD MACHINE WITHOUT RAMPS.

a. Apply parking brakes on tractor and trailer and chock trailer wheels before attempting to load or unload machine.
b. Lower ramps of trailer.
c. Place travel speed select switch on travel lever in 1st (🐢) speed position and move throttle control to the “LO” idle position. See Figure 4.20A.
d. Slowly travel machine up trailer ramps and over rear axles of trailer.
e. Slowly travel machine completely onto trailer until in proper transport position.
f. Slowly swing machine 180° until attachment is toward rear of trailer.
g. Slowly lower boom until attachment rests on trailer bed.
h. Place safety lock lever in the up “LOCKED” position. See Figure 4.20C.
i. Turn machine “OFF”, remove key and lock all doors, filler caps and access panels.

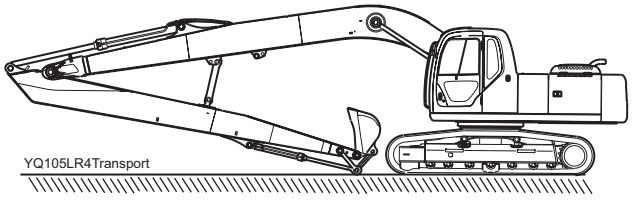
CAUTION

Place a cover over the exhaust pipe of the machine and secure to avoid water entering the engine, and possible turbo damage.

CAUTION



Prior to transporting a long reach attachment equipped machine, the arm must be fully retracted and attachment lowered. Make sure the link between the boom and arm is properly installed to prevent damaging the arm and the arm cylinder during transportation.



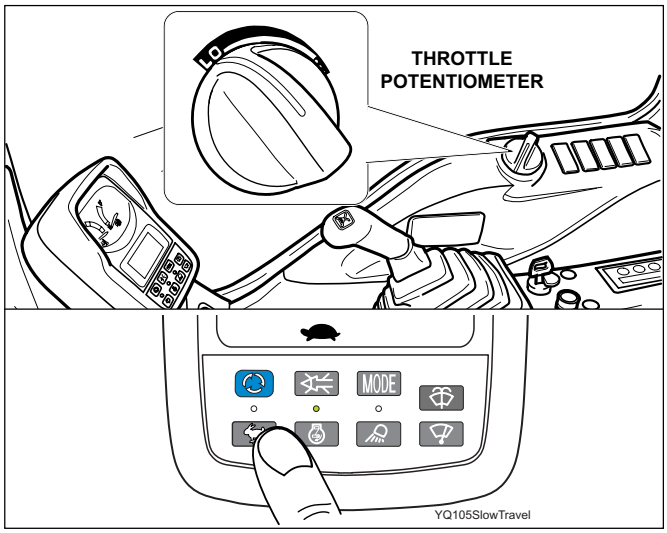
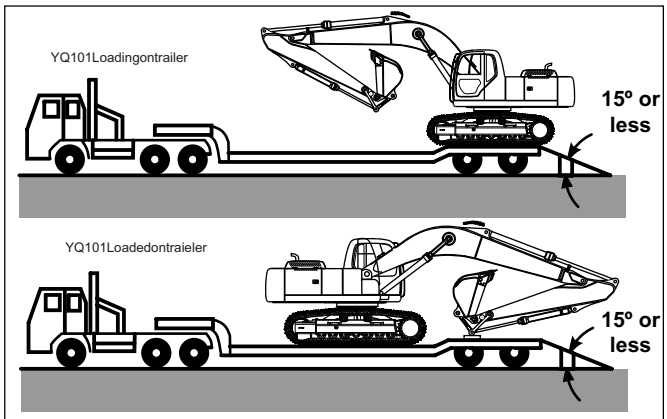


FIGURE 4.20A



WARNING

DO NOT TRY TO LOAD MACHINE WITHOUT ATTACHMENT IN THIS TYPE OF TRAILER. MACHINE COULD TIP OVER. THIS ILLUSTRATION IS FOR DEMONSTRATION ONLY.

FIGURE 4.20B

WARNING

TO PREVENT ARM AND BUCKET CYLINDER DAMAGE, DO NOT HAVE THE CYLINDER RODS FULLY EXTENDED DURING LOADING AND UNLOADING OPERATIONS. THIS WILL AVOID SUDDEN AND ABRUPT CONTACT OF THE ARM OR BUCKET WITH A TRAILER DECK, RAMP OR THE GROUND; WHICH COULD RESULT IN STRETCHING THE CYLINDER ROD(S).
DO NOT CHAIN THE ATTACHMENTS WITH THE ARM AND/OR BUCKET CYLINDER ROD(S) FULLY EXTENDED. THIS WILL AVOID DAMAGE CAUSED BY ABRUPT MOVEMENTS DURING TRANSPORTATION.

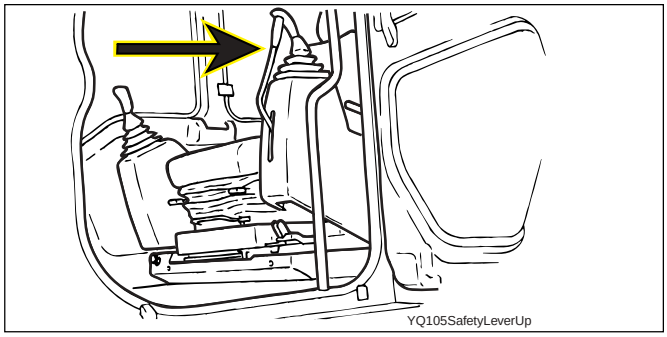


FIGURE 4.20C

https://tractormanuals.com/

3. Loading the Machine on a Detachable Trailer

a. Apply parking brakes on tractor and trailer and chock trailer wheels before attempting to load or unload machine.

b. Set up and detach trailer from hitch mechanism according to the trailer manufacturer's instructions.

c. Adjust width of trailer for wide loads by means of the trailer outriggers and additional planking to support the machine. See Fig. 4.21A.

d. Place wooden blocks in front of the loading area of the trailer to allow smooth travel of the machine onto the trailer. See Fig. 4.21B.

⚠ WARNING

MAKE CERTAIN THE CENTER OF EACH TRACK OF MACHINE IS SUPPORTED BY THE OUT-RIGGERS AND ADDITIONAL PLANKING USED FOR WIDE LOADS. SEE FIGURE 4.21D.

e. Place travel speed select switch on travel lever in 1st (🐢) speed position and move throttle control to the "LO" idle position. See Figure 4.21C.

f. Slowly travel machine completely onto trailer until in proper transport position.

g. Place safety lock lever in the up "LOCKED" position. See Figure 4.21E.

h. Turn machine "OFF", remove key and lock all doors, filler caps and access panels.

CAUTION

Place a cover over the exhaust pipe of the machine and secure to avoid water entering the engine, and possible turbo damage.

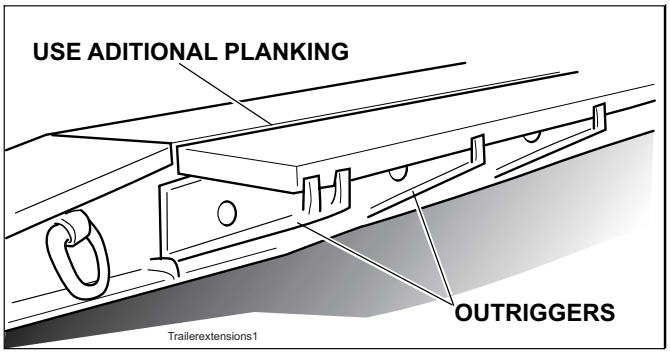


FIGURE 4.21A



FIGURE 4.21B

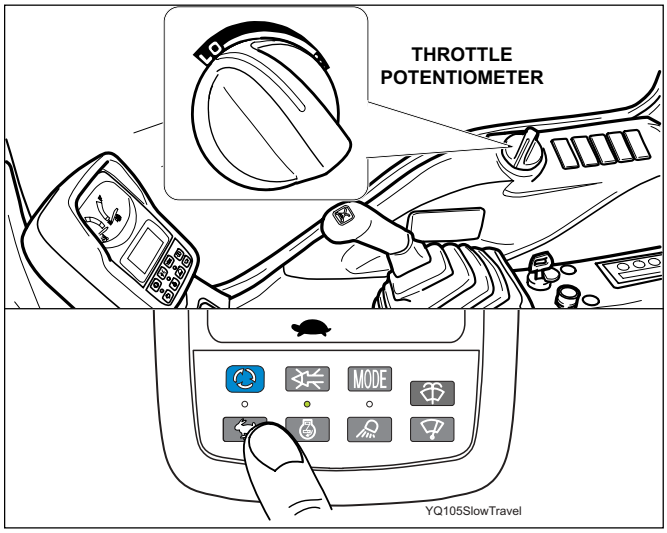


FIGURE 4.21C

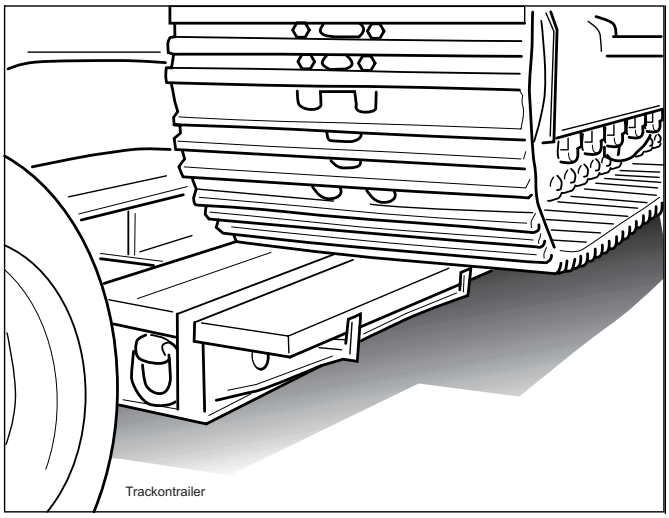


FIGURE 4.21D

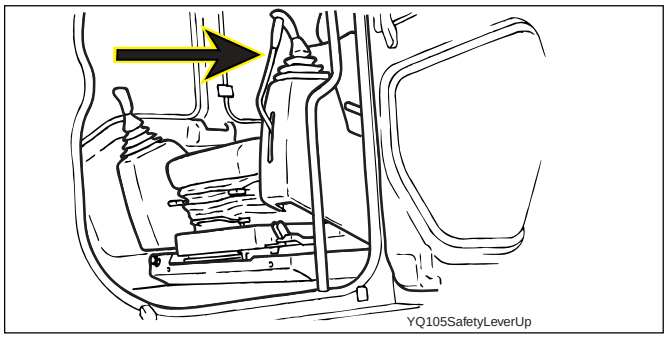


FIGURE 4.21E

9

https://truckmanualshub.com/

4. Securing Machine to Trailer

a. Use cable or wire rope with sufficient capacity to secure front and rear of the machine to trailer. See Figure 4.22A. Chock the tracks, use the lower frame front and rear brackets to secure machine to trailer. Also, make sure to secure front and rear of each track.

b. Securely fasten all loose parts, as well as removed parts to trailer or transporting platform.

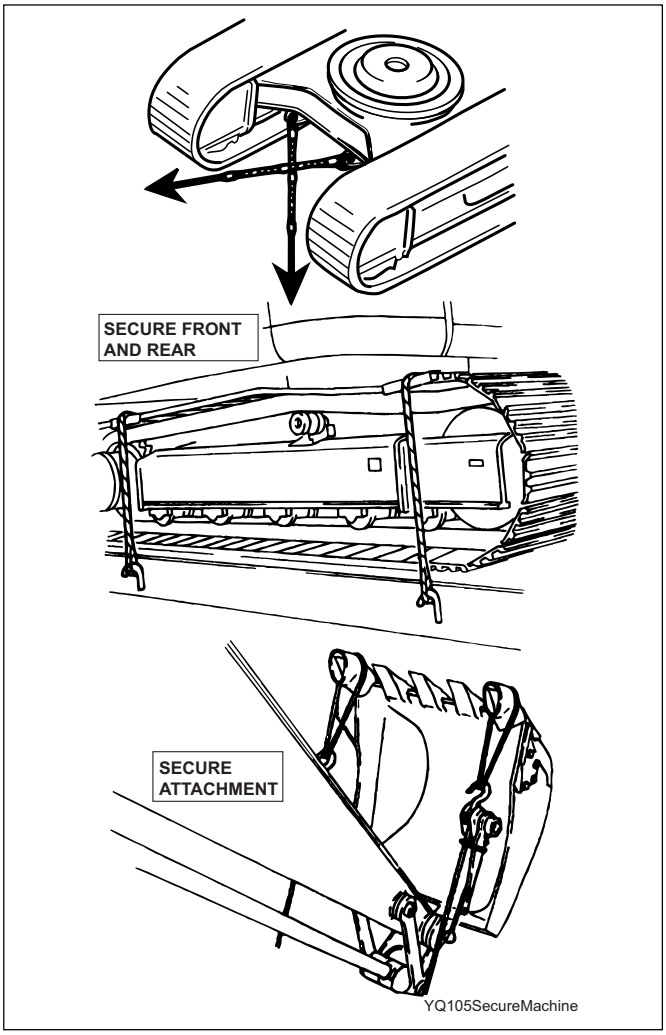


FIGURE 4.22A

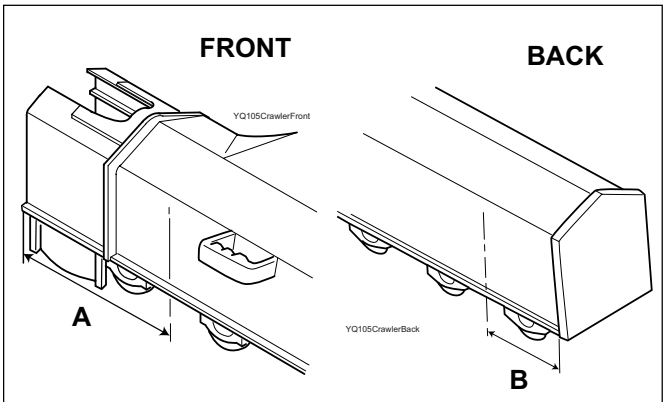
B. LIFTING MACHINE

The following procedures are for lifting the machine, as built by KOBELCO. These procedure do not take into account modifications made to the machine that affect machine weight or center of gravity.

1. Lifting Machine With Attachment Installed

a. Locate lifting locations at the front and rear of each crawler frame. See Figure 4.22B.

b. Attach cables or wire rope with a capacity rating sufficient to lift the machine, at lifting locations.



	A (Between 1st & 2nd front roller)	B (Between the last two rollers)
SK290LC-VI	873 mm (34.4”)	290 mm (11.4”)
SK330LC-VI	960 mm (37.8”)	310 mm (12.2”)

FIGURE 4.22B

CAUTION

Place a hardwood or steel block between cables and crawler frame to prevent damage to the tracks from cables during lifting. See Figure 4.22C.

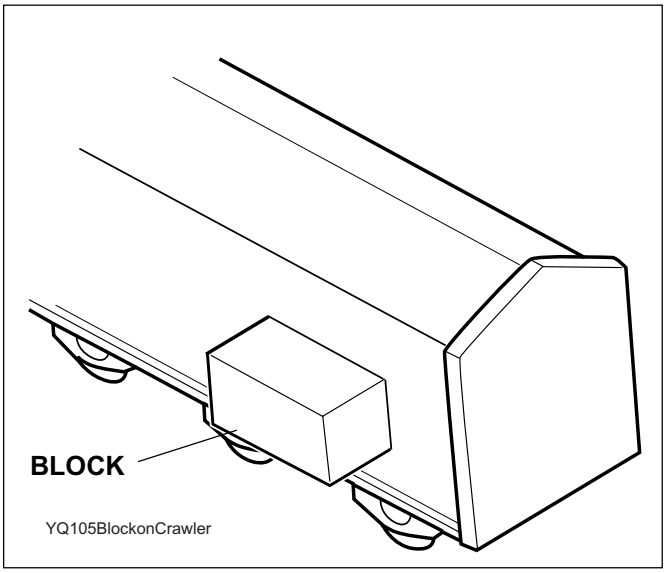


FIGURE 4.22C

DANGER

ALWAYS USE PROPER LIFTING EQUIPMENT AND DEVICES. USE OF IMPROPER LIFTING EQUIPMENT COULD ALLOW THE LOAD TO SHIFT OR FALL CAUSING SEVERE DAMAGE, SERIOUS INJURY OR DEATH.

https://tractormanuals.com/

c. Bring loose ends of cables together at machine center of gravity and attach to an overhead lifting device with a rated lifting capacity sufficient to lift the machine. See Figure 4.23A.

NOTE

It may be necessary to place reinforced spreader bars between lifting cables to prevent damage to the machine during lifting.

TOOLS {SK290LC/SK330LC-6E}

ITEM	SIZE	Q'TY
CABLE Ⓐ	∅ 45.0 X 15.7 m	1
CABLE Ⓑ	∅ 45.0 X 15.6 m	1
SPREADER BARS Ⓒ	4.0 m	2

CAUTION

Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

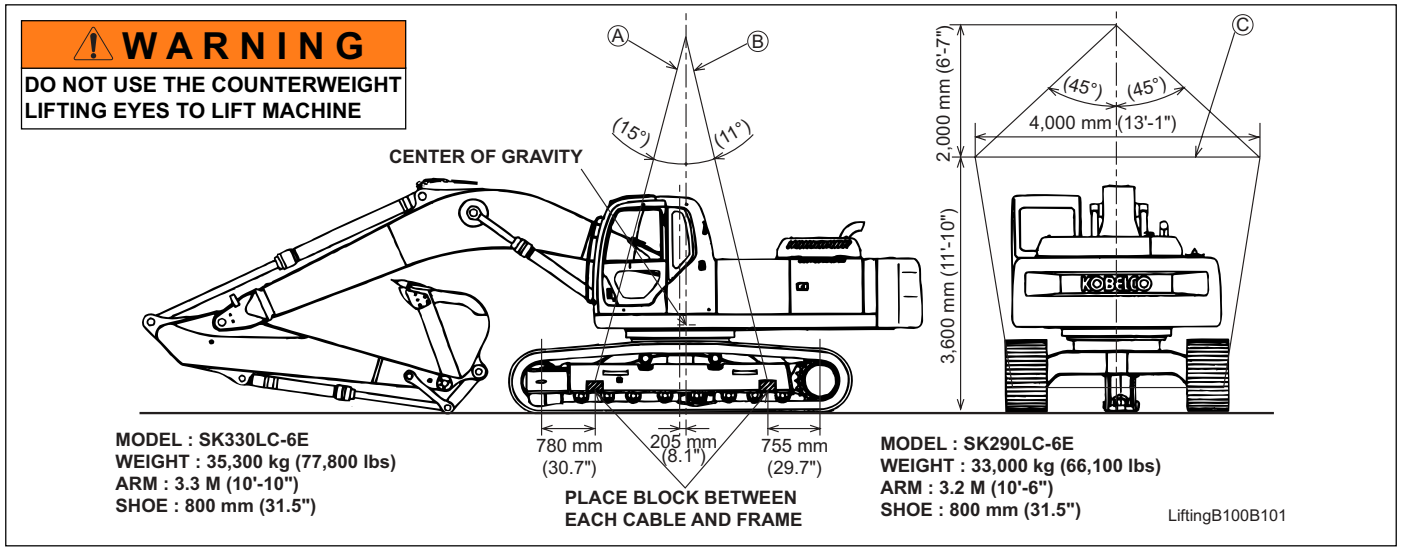


FIGURE 4.23A

2. Lifting Machine Without Attachment

Pass the cables through the lifting points on the crawlers as indicated in page 4-22 and bring loose ends of cables together at machine center of gravity and attach to an overhead lifting device with a rated lifting capacity sufficient to lift the machine. See Figures 4.23B for better reference.

TOOLS {SK290LC/SK330LC-6E}

ITEM	SIZE	Q'TY
CABLE Ⓐ	∅ 33.5 X 15.4 m	1
CABLE Ⓑ	∅ 33.5 X 14.7 m	1
SPREADER BARS Ⓒ	4.0 m	2

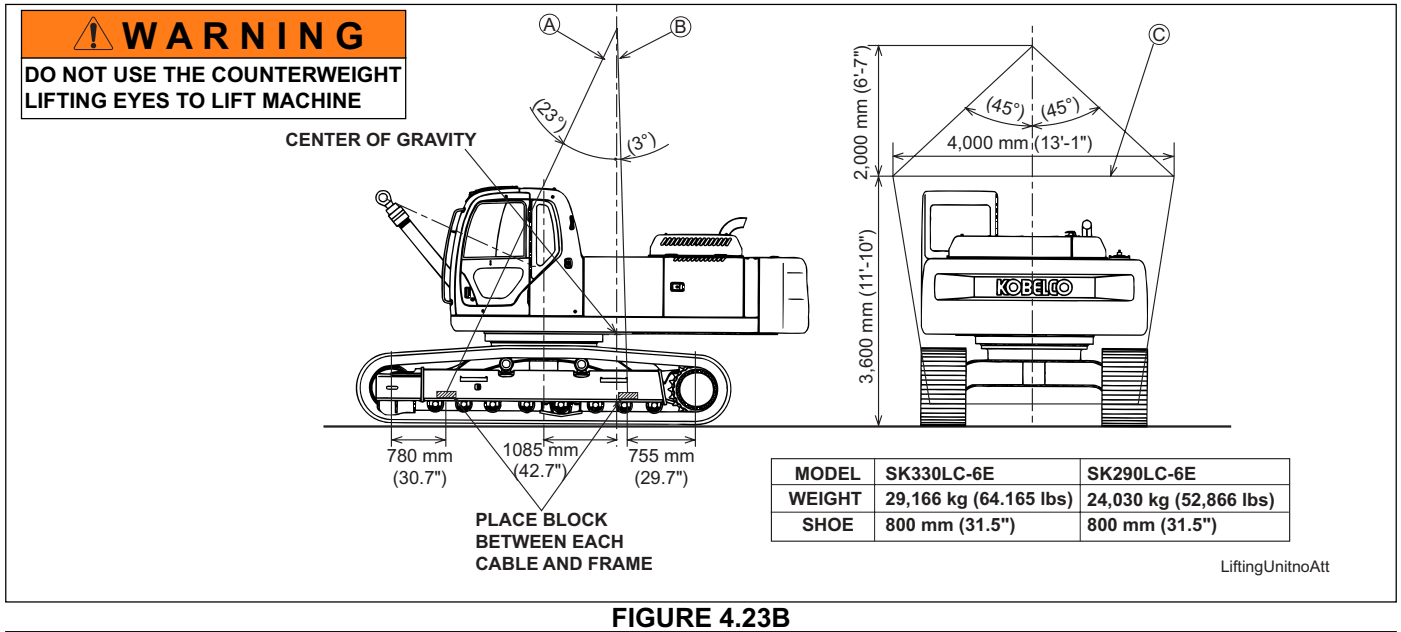


FIGURE 4.23B

https://truckmanualshub.com/

C. SHIPPING DIMENSIONS

1. SK290LC-6E - Figure 4.24A

a. Machine With Standard Attachments

Refer to Figure 4.24A for reference in regards to the machine basic dimensions, as manufactured by KOBELCO, with standard attachments:

a.1- Standard Boom - 6.20 m (20'-4")
a.2- Standard Arm - 3.20 m (10'-6")
a.3- Bucket - 1.20 m^3 (1.57 $yard^3$)

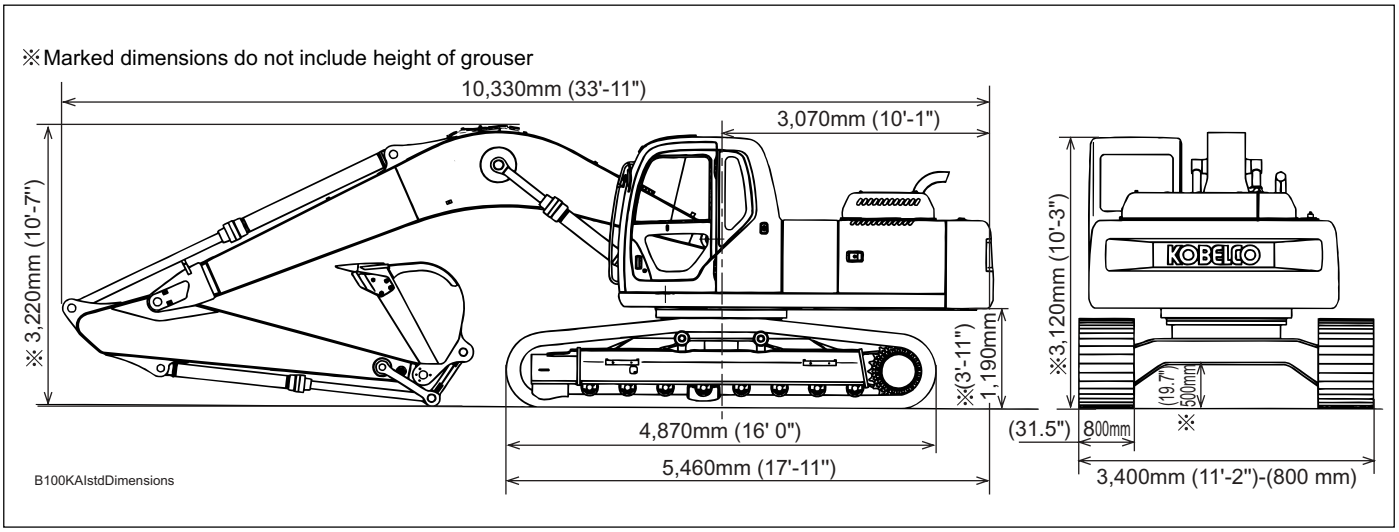


FIGURE 4.24A

b. Machine With Long Reach {18.9M (62 Ft)} Attachments

Refer to Figure 4.24B for reference in regards to the machine basic dimensions, as manufactured by KOBELCO, with {18.9M (62 Ft.)} long reach attachments:

b.4- Long Reach Boom - 8.75 m (28'-8")
b.5- Long Reach Arm - 6.35 m (20'-10")
b.6- Bucket - 0.45 m^3 (0.59 $yard^3$)

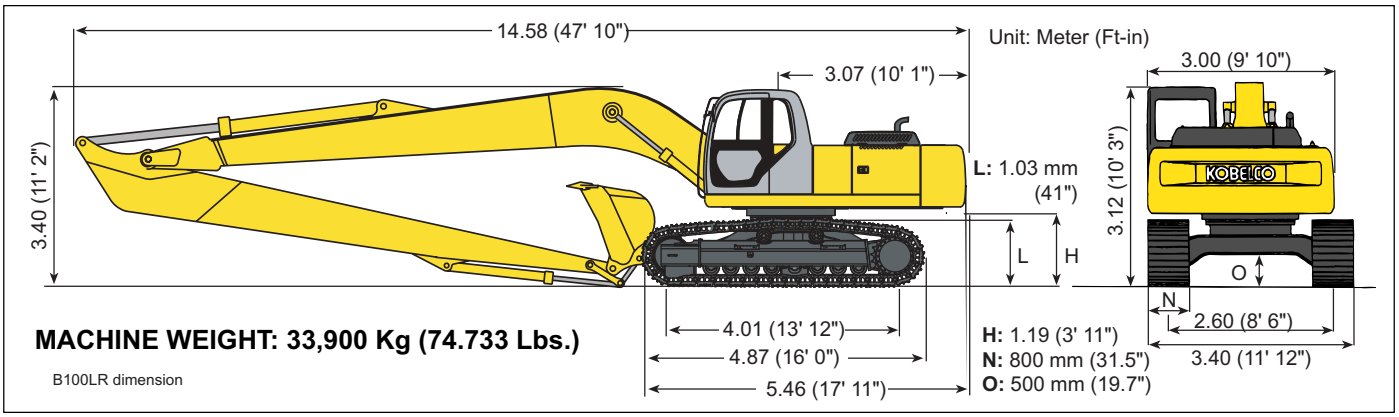


FIGURE 4.24B

c. Std. Boom With Arm Cylinder - Figure 4.24C

Boom mm (ft-in)	6,200 (20' 4")
L X H X W mm (ft-in)	6,485 X 1,505 X 835 (21' 3" X 4' 11" X 2' 9")
Weight w/Arm Cylinder Kg (lbs)	2,700 (5,940 lbs)

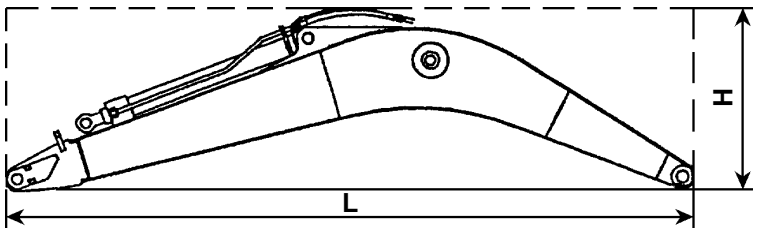


FIGURE 4.24C

d. Arm With Bucket Cylinder - Figure 4.25A

Arm	3200 mm (10' 6")
LxHxW mm (ft-in)	4,228 X 875 X 405 (13' 11" X 2' 11" X 1' 4")
Weight w/Bucket Cyl. Kg (lbs)	1,485 (3,267)

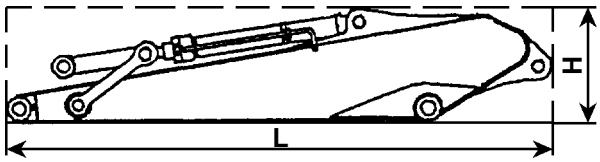


FIGURE 4.25A

e. Arm With Bucket Cylinder and Bucket - Figure 4.25B

Combination	Arm 3.2 m (10' 6") Bucket 1.20 m^3 (1.57 yrd^3)
LxHxW mm (ft-in)	5,680 X 875 X1,421
Weight Kg (lbs)	2,439 (5,366)

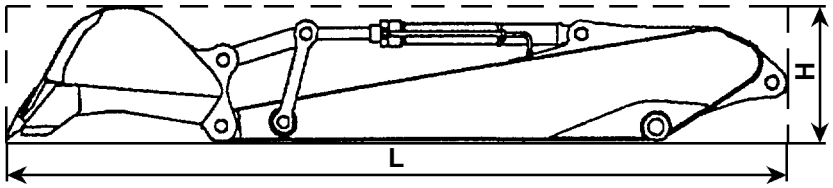


FIGURE 4.25B

f. Bucket - Figure 4.25C

Standard bucket is 1.20 m^3 (1.57 $yard^3$)

A - Length is 1,490 mm (4'-11")

B - Height is 1,340 mm (4'-5")

C - Width without side cutters is 1,300 mm (4'-8")

D - Width with side cutters is 1,420 mm (4'-3")

E - Bucket weight is 954 kg (2,100 lbs)

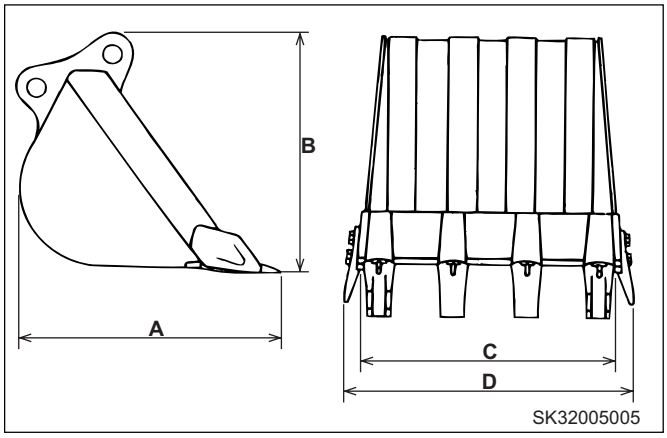


FIGURE 4.25C

9

https://truckmanualshub.com/

2. SK330LC-6E - Figure 4.26A

a. Machine With Standard Attachments

Refer to Figure 4.26A for reference in regards to the machine basic dimensions, as manufactured by KOBELCO, with standard attachments:

a.1- Standard Boom - 6.50 m (21'-4")
a.2- Standard Arm - 3.30 m (10'-10")
a.3- Bucket - 1.40 m^3 (1.83 $yard^3$)

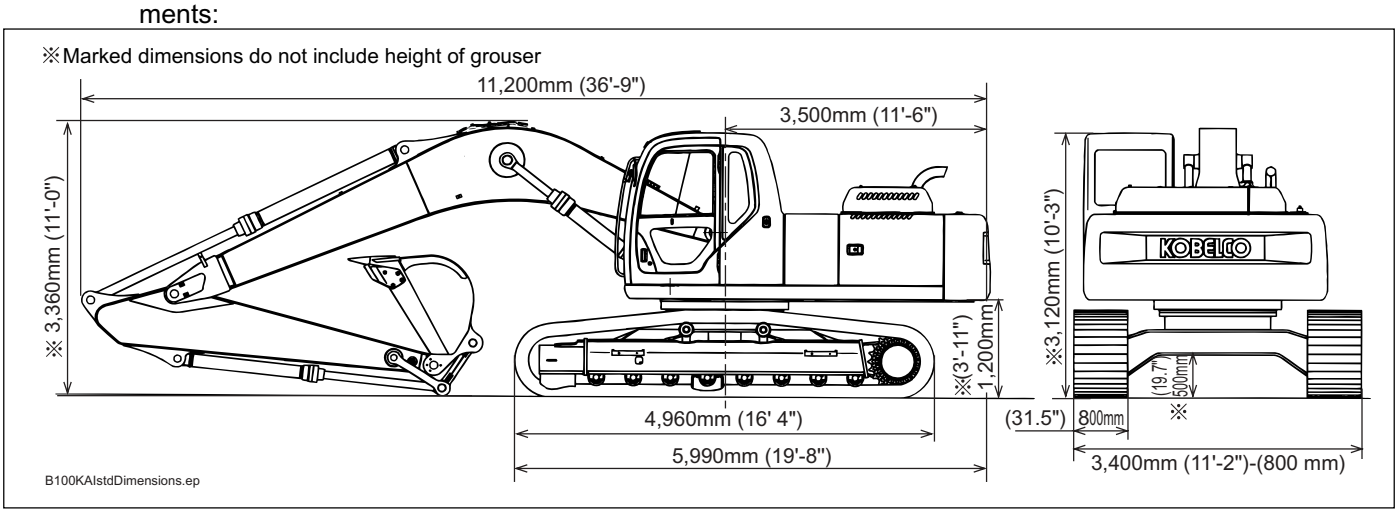


FIGURE 4.26A

b. SK330LC-6E Mass Excavator

Refer to Figure 4.26B for reference in regards to the mass excavator basic dimensions, as manufactured by KOBELCO.

b.1- Mass Boom - 5.99 m (19'-8")
b.2- Mass Arm - 2.20 m (7'-3")

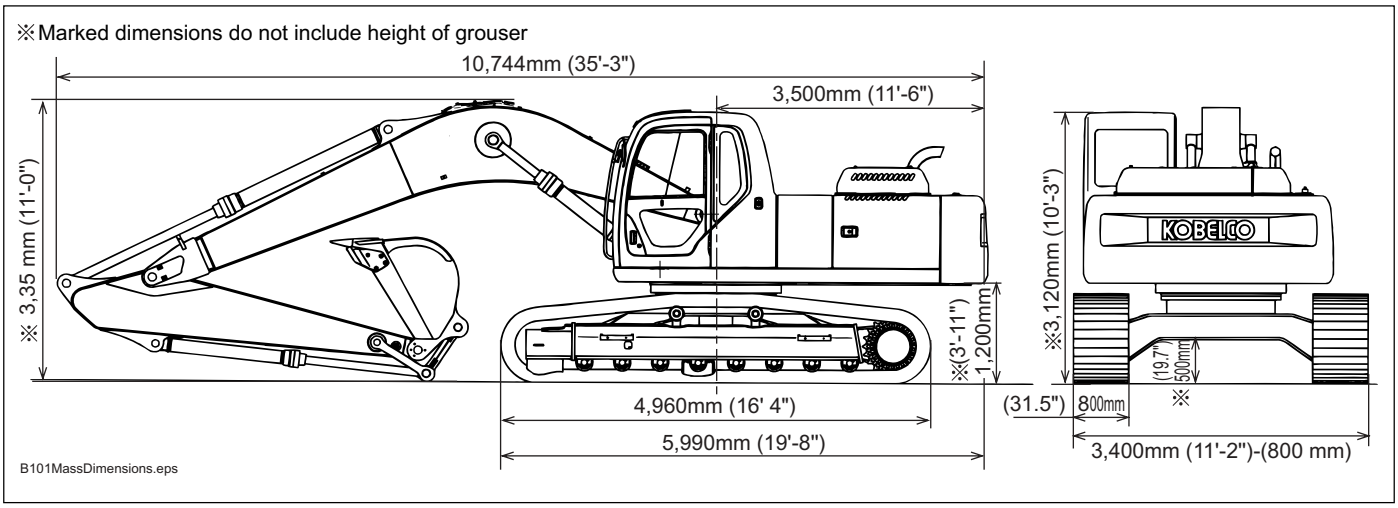


FIGURE 4.26B

9

c. Std. Boom With Arm Cylinder - Figure 5.9C

Boom mm (ft-in)	6,500 (21' - 4")
L X H X W mm (ft-in)	6,750 X 1,720 X 835 (22' 2" X 5' 8" X 2' 9")
Weight w/Arm Cylinder Kg (lbs)	3,180 (7,010)

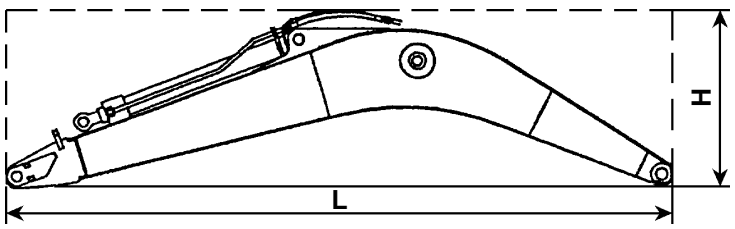


FIGURE 4.26C

d. Arm With Bucket Cylinder - Figure 4.27A

Arm	2600 mm (8' 6")	3300 mm (10' 10")	4150 mm (13' 7")
LxHxW mm (ft-in)	3,805 X 1,120 X 405 (12' 6" X 3' 8" X 1' 4")	4,495 X 1,010 X 405 (14' 9" X 3' 4" X 1' 4")	5,350 X 1,010 X 405 (17' 7" X 3' 4" X 1' 4")
Weight w/Bucket Cyl. Kg (lbs)	1,680 (3,703)	1,770 (3,900)	1,840 (4,055)

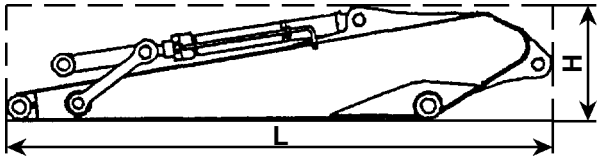


FIGURE 4.27A

e. Arm With Bucket Cylinder and Bucket - Figure 5.10B

Combination	Arm 2.60 m (8' 6") Bucket 1.60 m^3 (2.09 yrd^3)	Arm 3.30 m (10' 10") Bucket 1.40 m^3 (1.83 yrd^3)	Arm 4.15 m (13' 7") Bucket 1.20 m^3 (1.57 yrd^3)
LxHxW mm (ft-in)	5,380 X 1,130 X 1,610 (17' 8" X 3' 8" X 5' 3")	6,080 X 1,130 X 1,430 (19' 11" X 3' 8" X 4' 8")	6,940 X 1,120 X 1,240 (22' 9" X 3' 8" X 4' 1")
Weight Kg (lbs)	2,810 (6,193)	2,810 (6,193)	2,770 (6,105)

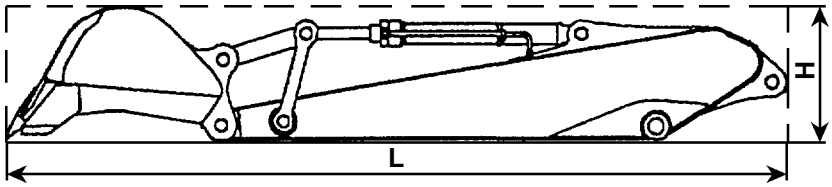


FIGURE 4.27B

f. Bucket - Figure 4.27C

Standard bucket is 1.40 m^3 (1.83 $yard^3$)

A - Length is 1,640 mm (5'-5")

B - Height is 1,460 mm (4'-9")

C - Width without side cutters is 1,300 mm (4'-3")

D - Width with side cutters is 1,430 mm (4'-8")

E - Bucket weight is 1,040 kg (1,290 lbs)

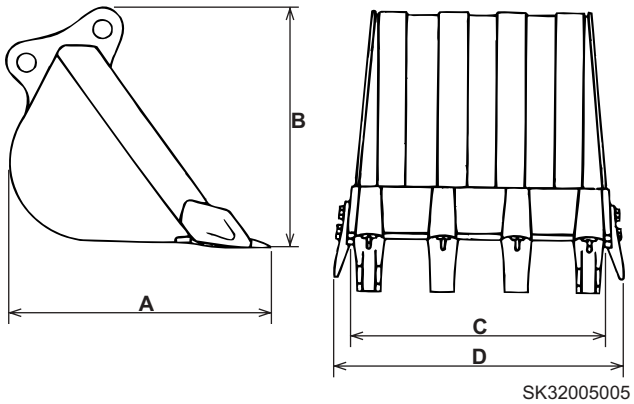


FIGURE 4.27C

9

https://truckmanualshub.com/

Table of contents

	Page
10.1 ENGINE SPECIFICATIONS	10-2
10.2 MACHINE AND COMPONENT WEIGHTS	10-3
10.3 MACHINE DIMENSIONS	10-3
10.4 FUEL CONSUMPTION	10-3
10.5 WORKING RANGES	10-4
10.6 TRAVEL AND SWING PERFORMANCE	10-4
10.7 HYDRAULIC COMPONENTS	10-4
10.8 SK160LC/ED190 TECHNICAL SPECIFICATIONS	10-5
10.9 SK210LC/SK250LC-6E TECHNICAL SPECIFICATIONS	10-7
10.10 SK290LC/SK330LC-E TECHNICAL SPECIFICATIONS	10-9
10.11 SK160LC/ED190 LUBRICATION AND MAINTENANCE	10-11
10.12 SK210LC/SK250LC-6E LUBRICATION AND MAINTENANCE	10-12
10.13 SK290LC/SK330LC-6E LUBRICATION AND MAINTENANCE	10.13
10.14 SK160LC/ED190 LIFTING CAPACITIES	10-14
10.15 SK210LC LIFTING CAPACITIES	10-27
10.16 SK250LC LIFTING CAPACITIES	10-32
10.17 SK290LC LIFTING CAPACITIES	10-39
10-18 SK330LC LIFTING CAPACITIES	10-43
10.19 TORQUE SPECIFICATIONS	10-51
10-20 MISCELLANEOUS INFORMATION	10-56

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND PROCEDURES FOUND IN THIS MANUAL BEFORE ATTEMPTING ANY OPERATION, INSPECTION OR MAINTENANCE OF THIS MACHINE, ATTACHMENT OR SYSTEMS. KOBELCO CANNOT ANTICIPATE EVERY POSSIBLE CIRCUMSTANCE THAT MIGHT INVOLVE A POTENTIAL HAZARD. THE WARNINGS IN THIS PUBLICATION AND ON THE PRODUCT ARE THEREFORE NOT ALL INCLUSIVE. IF A TOOL, PROCEDURE, WORK METHOD OR OPERATING TECHNIQUE NOT SPECIFICALLY RECOMMENDED BY KOBELCO IS USED, YOU MUST SATISFY YOURSELF THAT IT IS SAFE FOR YOU AND OTHERS. YOU SHOULD ALSO ENSURE THAT THE PRODUCT WILL NOT BE DAMAGED OR MADE UNSAFE BY THE OPERATION, LUBRICATION, MAINTENANCE AND/OR REPAIR PROCEDURES YOU CHOOSE.

https://truckmanualshub.com/

10.1 ENGINE SPECIFICATIONS

	SK160LC/ED190-6E	SK210LC-6E	SK250LC-6E	SK290LC-6E	SK330LC-6E	SK480(LC)-VI
Engine Manufacturer:	Mitsubishi	←	←	←	←	←
Model:	4D34-TEG	6D34-TLED	6D34-TLA2A	6D16-TLEG	6D16-TLA2A	6D24-TLA2B
Type:	Diesel - 4 cycle, water cooled, direct injection and turbocharged.	Diesel - 4 cycle, water cooled, direct injection with intercooler & turbocharger.	←	←	←	←
No. of Cyl.– Bore X Stroke:	4 X {104 mm X 115 mm (4.09" X 4.53")}	6-104 mm X 115 mm (4.09" X 4.53")	←	6-118 mm X 115 mm (4.65" X 4.53")	←	6 X 130 mm X 150 mm (5.12" X 5.91")
Displacement:	3.91 Liter (238 in^3)	5.861 Liters (358 in^3)	←	7.545 Liters (460 in^3)		11,950 Liters (792 in^3)
Compression ratio:	16.5:1	18.2:1	←	17.5:1	←	←
Output rating:	82 KW (111 HP)/2,000 rpm	110 KW (148 HP)/2,000 rpm	131 KW (176 HP)/2,100 rpm	142 KW (193 HP)/2,100 rpm	184 KW (247 HP)/2,200 rpm	250 KW (335 HP)/2,130 rpm
Maximum torque:	382 N-m (283 Lb-ft)/1,800 rpm	580 N-m (428 Lb-ft)/1,500 rpm	650 N-m (479 Lb-ft)/1,800 rpm	735 N-m (540 Lb-ft)/1,600 rpm	834 N-m (615 Lb-ft)/1,800 rpm	1,275 N-m (940 Lb-ft)/1,200 rpm
Firing order: (Engine rotation)	1-3-4-2 (CCW) Viewed from flywheel	1-5-3-6-2-4 (CCW) Viewed from flywheel	←	←	←	←
Injection timing:	16º Before Top Dead Center	14º Before Top Dead Center	17º Before Top Dead Center	8º Before Top Dead Center	←	2º Before Top Dead Center
Valve adjustment (cold):	0.4 mm (0.0157") for intake & exhaust	←	←	←	←	0.4 mm (0.0157") for intake 0.6 mm (0.236") for exhaust
Compression pressure:	2.6 MPa (377 psi) @ 200 rpm at engine temperature between 75~85 ℃ (167~185 ℉)	2.5 MPa (362.5 psi) @ 200 rpm at engine temperature between 75~85 ℃ (167~185 ℉)	←	←	←	2.7 MPa (377 psi) @ 200 rpm at engine temperature between 75~85 ℃ (167~185 ℉)
Cooling system:	Pressurized water circulated by a centrifugal pump.	←	←	←	←	←
Lubrication system:	Pressurized oil fed by a gear pump through full flow spin-on filter.	←	←	←	←	←
Air cleaner:	Dry type with a safety element.	←	←	←	←	←
Electric system:	D.C. 24 V	←	←	←	←	←
Starting motor:	24 V — 5.0 KW	←	←	←	←	24 V — 5.5 KW
Alternator:	24 V — 35 Amps	←	←	←	←	←
Batteries:	2 X 12 V (136 Amp-Hr)	←	←	←	←	←
Pre-ignition:	Electric type	←	←	←	←	←
***Engine dry weight:**	403 Kg (888 lbs)	480 Kg (1056 lbs)	←	580 Kg (1280 lbs)	←	1,020 Kg (2,250 lbs)
Thermostat:	Begin openning at 76.5 ℃ (170℉) Fully open at 90 ℃ (194℉)	←	←	←	←	←
Cooling fan drive method:	Belt suction type. 6-blade Ø545mm (21.5") Drive pulley ration: 0.85	Suction type-6 blades. Ø600 mm (Ø24"). Drive pulley ratio: 1.0	←	Suction type-6 blades. Ø700 mm (Ø27.6"). Drive pulley ratio: 1.03	Suction type-9 blades. Ø620 mm (Ø24.4"). Drive pulley ratio: 1.03	Suction type-9 blades. Ø720 mm (28.3"). Drive pulley ratio: 0.90

(*) No flywheel, nor electric system.

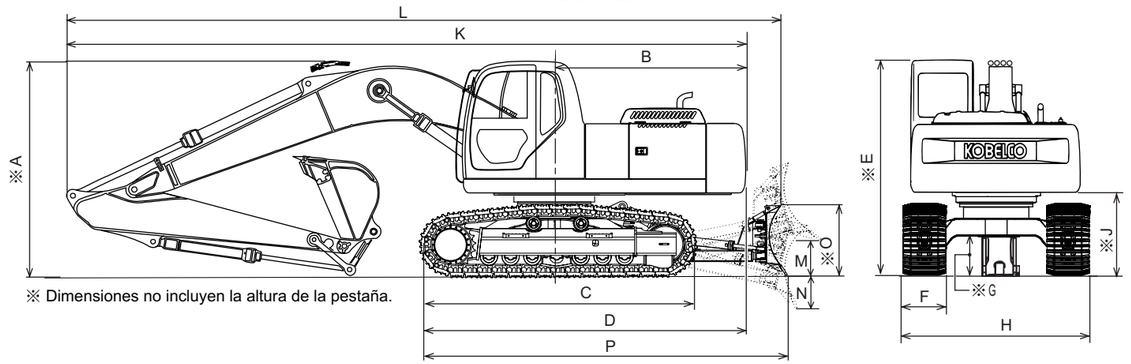
https://truckmanualshub.com/

10.2 MACHINE AND COMPONENT WEIGHTS

COMPONENT	SK160LC-6E	ED190-6E	SK210-6E	SK210LC-6E	SK250LC-6E	SK290LC-6E	SK330LC-6E	SK480LC-6E
Complete machine (Standard)	**16592 (36502)**	**19588 (43094)**	**20156 (44343)**	**21200 (46700)**	**24700 (54500)**	**30000 (66100)**	**35300 (77800)**	**48332 (106330)**
Upper frame asesembly	**6910 (15202)**	**6910 (15202)**	**9100 (20020)**	**9100 (20020)**	**10483 (23063)**	**12547 (27603)**	**15125 (33275)**	**19753 (43457)**
Upper chasis	1405 (3091)	1405 (3091)	1703 (3747)	1703 (3747)	2000 (4400)	2800 (6160)	3013 (6629)	4628 (10182)
Swing motor assembly*	204 (449)	204 (449)	215 (473)	215 (473)	322 (708)	494 (1087)	494 (1087)	691 (1520)
Swing motor*	57 (125)	57 (125)	60 (132)	60 (132)	60 (132)	95 (209)	95 (209)	171 (376)
Swing reduction unit*	147 (323)	147 (323)	155 (341)	155 (341)	262 (576)	399 (878)	399 (878)	520 (1144)
Guards and covers	255 (561)	255 (561)	299 (658)	299 (658)	300 (660)	367 (807)	404 (889)	411 (904)
Lower covers	42 (92)	42 (92)	42 (92)	42 (92)	42 (92)	43 (95)	45 (99)	89 (196)
Cab floor plate	129 (284)	129 (284)	129 (284)	129 (284)	129 (284)	129 (284)	129 (284)	129 (284)
Cab	259 (570)	259 (570)	259 (570)	259 (570)	259 (570)	259 (570)	259 (570)	259 (570)
Operator's control panel	19 (42)	19 (42)	19 (42)	19 (42)	19 (42)	19 (42)	19 (42)	19 (42)
Climatizer assembly	39 (86)	39 (86)	39 (86)	39 (86)	39 (86)	39 (86)	39 (86)	39 (86)
Rear control panel	22 (48)	22 (48)	22 (48)	22 (48)	22 (48)	22 (48)	22 (48)	22 (48)
Operator's seat	62 (136)	62 (136)	62 (136)	62 (136)	62 (136)	62 (136)	62 (136)	62 (136)
Hydraulic tank*	102 (224)	102 (224)	143 (315)	143 (315)	144 (317)	173 (381)	173 (381)	358 (788)
Fuel tank*	99 (218)	99 (218)	92 (218)	92 (218)	92 (202)	170 (374)	205 (451)	231 (508)
Hydraulic lines (Main and pilot)	316 (695)	316 (695)	388 (854)	388 (854)	367 (807)	442 (972)	439 (966)	804 (1769)
Engine*	403 (887)	403 (887)	525 (1155)	525 (1155)	527 (1159)	655 (1441)	655 (1441)	1100 (2420)
Engine control accessories (Step motor, etc.)	5 (11)	5 (11)	5 (11)	5 (11)	5 (11)	5 (11)	5 (11)	5 (11)
Muffler	19 (42)	19 (42)	23 (51)	23 (51)	27 (59)	29 (64)	29 (64)	34 (75)
Radiator* + oil cooler*	75 (165)	75 (165)	97 (210)	97 (210)	98 (216)	175 (385)	169 (372)	186 (409)
Hydraulic pump coupling assembly	18 (40)	18 (40)	17 (37)	17 (37)	17 (37)	23 (51)	23 (51)	45 (99)
Hydraulic pump assembly (Main + pilot)	90 (154)	90 (154)	142 (312)	142 (312)	142 (312)	155 (341)	155 (341)	187 (411)
Bateries	70 (154)	70 (154)	70 (154)	70 (154)	70 (154)	70 (154)	70 (154)	70 (154)
Harness + lights	20 (44)	20 (44)	20 (44)	20 (44)	20 (44)	16 (35)	16 (35)	22 (48)
Counterweight	3007 (6615)	3007 (6615)	4509 (9920)	4509 (9920)	5500 (12100)	6120 (13464)	8420 (18524)	10027 (22059)
Main control valve	250 (550)	250 (550)	280 (616)	280 (616)	280 (616)	280 (616)	280 (616)	335 (737)
Lower frame assembly	**6628 (14582)**	**8010 (17622)**	**7195 (15829)**	**8142 (17912)**	**9347 (20563)**	**11195 (24629)**	**11964 (26321)**	**19000 (41800)**
Frame+track guides+covers+piping	2162 (4766)	2593 (5705)	2580 (5676)	2646 (5821)	3583 (7883)	3620 (7964)	3999 (8798)	8345 (18359)
Slewing ring assembly	218 (481)	218 (480)	245 (539)	245 (539)	350 (770)	586 (1289)	586 (1289)	704 (1549)
Travel motor + reduction unit	217 (478) x 2	300 (660) x 2	250 (550) x 2	250 (550) x 2	299 (658) x 2	309 (680) x 2	360 (792) x 2	650 (1430) x 2
Tensores de cadenas + ruedas guías	210 (463) x 2	200 (442) x 2	210 (462) x 2	210 (462) x 2	250 (550) x 2	298 (656) x 2	367 (807) x 2	325 (720) x 2
Lower rollers (Single flange)	35 (77) x 14	53 (118) x 8	37 (77) x 14	37 (77) x 16	37 (77) x 14	45 (77) x 18	45 (77) x 18	98 (220) x 18
Lower rollers (Double flange)	—	60 (132) x 6	—	—	—	—		
Upper rollers	17 (37) x 4	33 (73) x 4	22 (48) x 4	22 (48) x 4	22 (48) x 4	26 (57) x 4	31 (68) x 4	30 (66) x 4
Sprockets + bolts	72 (159) x 2	64 (141) x 2	60 (132) x 2	60 (132) x 2	54 (120) x 2	76 (168) x 2	89 (196) x 2	100 (220) x 2
Slewing valve	30 (66)	83 (183)	31 (68)	31 (68)	31 (68)	31 (68)	31 (68)	68 (130)
Track assembly - 600 mm (23.6")	1321 (2912) x 2	1588 (3494) x 2	1347 (2964) X 2					2540 (5600) x 2
Track assembly - 800 mm (31.5")				1750 (3850) X 2	1890 (4158) x 2	2338 (5143) x 2	2390 (5258) x 2	
Track link assembly					580 (1276) x 2			2730 (6006) x 2
Dozer assembly	—	1614 (3551)	—	—	—	—	—	—
Dozer frame	—	562 (1236)	—	—	—	—	—	—
Tilt cylinder*	—	27 (59)	—	—	—	—	—	—
Angle cylinder*	—	40 (88) x 2	—	—	—	—	—	—
Lifting cylinder*	—	45 (98) x 2	—	—	—	—	—	—
Blade assembly (Including wings)	—	855 (1880)	—	—	—	—	—	—
Wings	—	100 (200) x 2	—	—	—	—	—	—
Standard attachment	**2638 (5804)**	**2638 (5804)**	**3317 (7297)**	**3317 (7297)**	**5020 (11044)**	**5260 (11572)**	**6127 (13479)**	**8264 (18181)**
Bucket	370 (816)	370 (816)	647 (1423)	647 (1423)	780 (1716)	954 (2099)	1040 (2280)	1140 (3170)
Arm assembly	857 (1889)	857 (1889)	981 (2158)	981 (2158)	1172 (2578)	1647 (3623)	1777 (3909)	2400 (5280)
Arm	564 (1340)	564 (1340)	612 (1346)	612 (1346)	730 (1606)	964 (2121)	1160 (2552)	1528 (3362)
Bucket cylinder* + 2 pins	142 (313)	142 (313)	170 (374)	170 (374)	230 (506)	410 (902	323 (711)	477 (1049)
Idler links	32 (76)	32 (76)	42 (92)	42 (92)	45 (99)	53 (117)	54 (119)	113 (249)
Bucket link	65 (143)	65 (143)	91 (200)	91 (200)	97 (213)	120 (264)	130 (286)	154 (339)
Pins (4 for bucket, & links)	54 (119)	54 (119)	66 (145)	66 (145)	70 (154)	100 (220)	110 (242)	128 (282)
Boom assembly	1411 (3111)	1411 (3111)	1689 (3716)	1689 (3716)	3068 (6750)	2659 (5850)	3310 (7282)	4424 (9733)
Boom + cylinder pins + boom base pin	1176 (2593)	1176 (2593)	1395 (3069)	1395 (3069)	2700 (5940)	2224 (4893)	2689 (5916)	3685 (8107)
Arm cylinder* + 2 pins	215 (474)	215 (474)	266 (585)	266 (585)	340 (748)	397 (873)	574 (1263)	678 (1492)
Pin - arm/boom conection	20 (44)	20 (44)	28 (62)	28 (62)	28 (62)	38 (84)	47 (103)	61 (134)
Fluids y Miscellaneous	**416 (915)**	**416 (915)**	**634 (1395)**	**634 (1395)**	**654 (1439)**	**781 (1718)**	**934 (2055)**	**1315 (2893)**
Hydraulic oil	139 (306)	139 (306)	214 (471)	214 (471)	226 (497)	283 (623)	304 (669)	572 (1258)
Engine oil	130 (285)	130 (285)	20 (44)	20 (44)	20 (44)	21 (46)	24 (53)	42 (92)
Grease	9 (19)	9 (19)	8 (18)	8 (18)	11 (24)	16 (35)	16 (35)	22 (48)
Fuel	139 (306)	139 (306)	283 (623)	283 (623)	285 (627)	348 (766)	466 (1025)	541 (1190)
Engine coolant	19 (42)	19 (42)	19 (42)	19 (42)	22 (48)	23 (51)	34 (75)	48 (106)
Bolts and other miscellaneous	90 (199)	90 (199)	90 (199)	90 (199)	90 (199)	90 (199)	90 (199)	90 (198)

*Dry weight

10.3 MACHINE DIMENSIONS



※ Dimensiones no incluyen la altura de la pestaña.

	SK160LC	ED190	SK210LC	SK210LC	SK250LC	SK250LC	SK290LC	SK330LC	SK480LC
A	2960 (9-9)	3050 (10-0)	2910 (9-7)	2910 (9-7)	3050 (10-0)	3050 (10-0)	3220 (10-7)	3360 (11-0)	3510 (11-6)
B	2500 (8-2)	2500 (8-2)	2750 (9-0)	2750 (9-0)	2980 (9-9)	2980 (9-9)	3070 (10-1)	3500 (11-6)	3650 (12-0)
C	4080 (13-5)	3846 (12-7)	4170 (13-8)	4450 (14-7)	4260 (14-0)	4660 (15-3)	4870 (16-0)	4960 (16-4)	5460 (17-11)
D	4540 (14-11)	4423 (14-6)	4820 (15-10)	4960 (16-3)	5080 (16-8)	5270 (17-3)	5460 (17-11)	5990 (19-8)	6380 (20-11)
E	2950 (9-8)	3050 (10-0)	2930 (9-7)	2930 (9-7)	2920 (9-7)	2920 (9-7)	3120 (10-3)	3120 (10-3)	3320 (10-11)
F	600 (23.6")	600 (23.6")	600 (23.6")	800 (31.5)	600 (23.6)	800 (31.5)	800 (31.5)	800 (31.5)	900 (35.4")
G	480 (18.9")	566 (22.3")	450 (17.7")	450 (17.7")	450 (17.7")	450 (17.7")	500 (19-7)	500 (19-7)	515 (20.3")
H	2590 (8-6)	2590 (8-6)	2990 (9-10)	3190 (10-6)	3190 (10-6)	3390 (11-1)	3400 (11-2)	3400 (11-2)	3650 (12-0)
J	1030 (3-5)	1060 (3-6)	1060 (3-6)	1060 (3-6)	1040 (3-5)	1040 (3-5)	1190 (3-11)	1200 (3-11)	1350 (4-5)
K	8650 (28-5)	8650 (28-5)	9410 (30-10)	9410 (30-10)	10080 (33-1)	10080 (33-1)	10330 (33-11)	11200 (36-9)	11980 (39-4)
L	—	9475 (31-1)	—	—	—	—	—	—	—
M	—	798 (31,125")	—	—	—	—	—	—	—
N	—	470 (18.5")	—	—	—	—	—	—	—
O	—	1011 (39.8")	—	—	—	—	—	—	—

Units: mm (Feet-inches)

ED190 BLADE SPECIFICATIONS:

TYPE:.....Power Angle Tilt (PAT)
TOTAL WIDTH:.....11' 4" (3.45 m)
MAX. ANGLE:.....+/- 25º
MAX. LIFT ABOVE GROUND:.....31+3/8" (0.80 m)
CAPACITY:.....3.26 cu. yrd. (2.5 cu. m)
HEIGHT:.....38" (0.97 m)
MAX. TILT:.....17.7" (0.45 m)
MAX. DROP BELOW GROUND:.....18+1/2" (0.47 m)

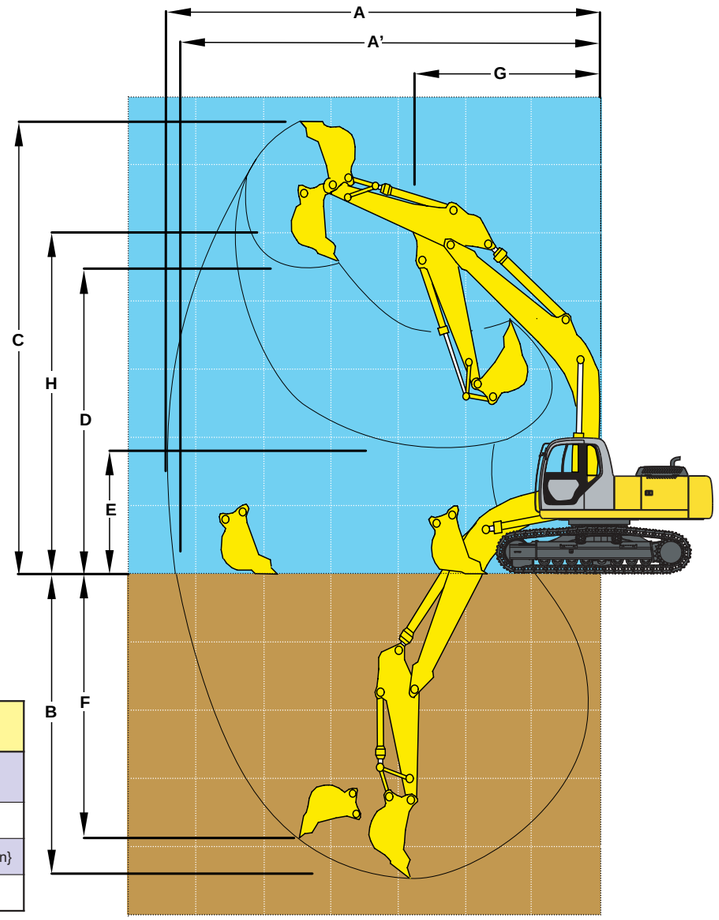
10.4 FUEL CONSUMPTION

MODEL	MODE	SEVERE APPLICATION Lit/min (Gal/hr)	GENERAL APPLICATION Lit/min (Gal/hr)	LIGHT APPLICATION Lit/min (Gal/hr)
SK160LC ED190	M	22.0 (5.8)	14.0 (3.7)	11.4 (3.0)
	A	21.2 (5.6)	10.2 (2.7)	9.5 (2.5)
SK210LC	M	24.6 (6.5)	14.8 (3.9)	12.1 (3.2)
	A	22.7 (6.0)	11.4 (3.0)	10.6 (2.8)
SK250LC	M	26.5 (7.0)	24.3 (6.4)	14.4 (3.8)
	A	24.3 (6.4)	22.4 (5.9)	12.9 (3.4)
SK290LC	M	34.1 (9.0)	30.3 (8.0)	22.0 (5.8)
	A	30.7 (8.1)	27.3 (7.2)	20.1 (5.3)
SK330LC	M	37.1 (9.8)	33.4 (8.8)	29.2 (7.7)
	A	33.4 (8.8)	31.1 (8.2)	27.3 (7.2)
SK480LC	M	54.6 (14.4)	47.4 (12.5)	41.7 (11.0)
	A	53.1 (14.0)	45.5 (12.0)	39.8 (10.5)

https://truckmanualshub.com/

10.5 WORKING RANGES

WORKING RANGE / ARM		SK160(LC)-6E		ED190-6E	SK210LC-6E				SK250LC-6E				SK290LC-6E		SK330LC-6E		
		2.60 M (8' 6")	3.10 M (10' 2")	3.10 M (10' 2")	2.40 M (7' 10")	2.94 M (9' 8")	3.30 M (10' 11")	6.35 M (20' 10")	2.50 M (8' 2")	2.98 M (9' 9")	3.66 M (12' 0")	8.25 M (27' 1")	3.20 M (10' 6")	8.046 M (26' 4.75")	2.60 M (8' 6")	3.30 M (10' 10")	4.15 M (13' 7")
A	Max. digging reach	8.980 (29' 6")	9.500 (31' 2")	9.500 (31' 2")	9.420 (30' 11")	9.900 (32' 6")	10.260 (33' 8")	15.820 (51' 11")	9.890 (32' 5")	10.310 (33' 10")	10.970 (35' 12")	18.540 (60' 10")	10.76 (35' 4")	19.150 (62' 10")	10.64 (34' 11")	11.22 (36' 10")	11.98 (39' 4")
A'	Max. dig. reach at ground level	8.810 (28' 11")	9.330 (30' 7")	9.330 (30' 7")	9250 (30' 4")	9750 (32' 0")	10100 (33' 2")	15.720 (51' 7")	9.730 (31' 11")	10.140 (33' 3")	10.820 (35' 6")	18.450 (60' 6")	10.57 (34' 8")	19.050 (62' 6")	10.43 (34' 3")	11.03 (36' 2")	11.80 (38' 9")
B	Max. digging depth	6.070 (19' 11")	6.570 (21' 7")	6.520 (21' 5")	6.160 (20' 3")	6.700 (22' 0")	7.090 (23' 3")	12.010 (39' 5")	6.570 (21' 7")	7.030 (23' 1")	7.730 (25' 4")	14.780 (48' 6")	7.23 (23' 9")	15.036 (49' 4")	6.79 (22' 3")	7.49 (24' 7")	8.34 (27' 4")
C	Max. digging height	9.200 (30' 2")	9.620 (31' 7")	9.670 (31' 9")	9.380 (30' 9")	9.600 (31' 6")	9.760 (32' 0")	13.660 (44' 10")	9.600 (31' 6")	9.770 (32' 1")	10.150 (33' 4")	14.580 (47' 10")	10.06 (33' 0")	14.835 (48' 8")	10.33 (33' 11")	10.49 (34' 5")	10.75 (35' 3")
D	Max. dumping clearance	6.570 (21' 7")	6.960 (22' 10")	7.010 (23' 0")	6.560 (21' 6")	6.790 (22' 3")	6.950 (22' 10")	11.300 (37' 1")	6.670 (21' 11")	6.850 (22' 6")	7.210 (23' 8")	12.280 (40' 3")	7.15 (23' 6")	12.550 (41' 2")	7.12 (23' 4")	7.29 (23' 11")	7.57 (24' 10")
E	Min. dumping clearance	2.570 (8' 5")	2.070 (6' 9")	2.120 (6' 11,5")	2.870 (9' 5")	2.330 (7' 8")	1.940 (6' 4")	1.930 (6' 4")	2.980 (9' 9")	2.520 (8' 3")	1.820 (5' 12")	1.520 (5' 0")	2.54 (8' 4")	1.520 (5' 0")	3.32 (10' 11")	2.62 (8' 7")	1.77 (5' 10")
F	Max. vertical wall digging depth	5.180 (16' 12")	6.020 (19' 9")	5.970 (19' 7")	5.500 (18' 1")	6.040 (19' 10")	6.440 (21' 2")	11.030 (36' 2")	5.880 (19' 3")	6.210 (20' 4")	7.010 (22' 12")	13.160 (43' 2")	6.35 (20' 10")	13.411 (44' 0")	5.94 (19' 6")	6.57 (21' 7")	7.29 (23' 11")
G	Min. front swing radius	2.830 (9' 3")	2.830 (9' 3")	2.830 (9' 3")	3.550 (11' 8")	3.560 (11' 8")	3.560 (11' 8")	4.840 (15' 11")	3.910 (12' 10")	3.880 (12' 9")	3.910 (12' 10")	5.600 (18' 4")	4.05 (13' 3")	6.629 (21' 9")	4.38 (14' 4")	4.29 (14' 1")	4.37 (14' 4")
H	Height at min. swing radius	7.340 (24' 1")	7.320 (24' 0")	7.370 (24' 2")	7.600 (24' 11")	7.540 (24' 9")	7.650 (25' 1")	10.370 (34' 0")	7.980 (26' 2")	7.940 (26' 1")	7.880 (25' 10")	12.000 (39' 4")	8.19 (26' 10")	11.710 (38' 5")	8.74 (28' 8")	8.65 (28' 5")	8.65 (28' 5")



10.6 TRAVEL AND SWING PERFORMANCE

	SK160LC-VI	ED190-VI	SK210LC-6E	SK250LC-6E	SK290LC-6E	SK330LC-6E
Travel Speed:	6.0 Km/hr in high speed 4.0 Km/hr in low speed	6.0 Km/hr (3.7 mph) in high speed 3.6 Km/hr (2.2 mph) in low speed	6.0 Km/hr (3.7 mph) in high speed 3.6 Km/hr (2.2 mph) in low speed	6.0 Km/hr (3.7 mph) in high speed 3.6 Km/hr (2.2 mph) in low speed	5.6 Km/hr (3.5 mph) in high speed 3.5 Km/hr (2.2 mph) in low speed	5.7 Km/hr (3.5 mph) in high speed 3.3 Km/hr (2.1 mph) in low speed
Swing Speed:	11 RPM in M-Mode/High Idle		11 RPM in M-Mode/High Idle	11 RPM in M-Mode/High Idle	11 RPM in M-Mode/High Idle	8.6 RPM in M-Mode/High Idle
Gradeability:	70% (35º) {Limited by engine lubrication}		70% (35º) {Limited by engine lubrication}	70% (35º) {Limited by engine lubrication}	70% (35º) {Limited by engine lubrication}	70% (35º) {Limited by engine lubrication}
Drawbar Force:	156 KN (35,100 Lbf)	189 KN (42,556 Lbf)	199 KN (44,700 Lbf)	229 KN (51,500 Lbf)	26,218 Kgf (57,800 Lbf)	28,950 Kgf (63,800 Lbf)

10.7 HYDRAULIC COMPONENTS

		SK160LC/ED190-6E	SK210LC/SK250LC-6E	SK290LC-6E	SK330LC-6E
HYDRAULIC PUMPS:		2X143 L/min (2X37.9 Gal/min) Tandem, variable displacement axial piston pump with 20.5 L/min (5.4 Gal/min) Pilot Gear Pump. {61.6 L/min (16.3 Gal/min) Dozer Pump on ED190-VI	2X210 L/min (2X55.5 Gal/min) Tandem, variable displacement axial piston pump with 20.5 L/min (5.4 Gal/min) Pilot Gear Pump at 4.9 MPa (710 psi)	2X242 L/min (2X64 Gal/min) Tandem, variable displacement axial piston pump with 20.5 L/min (5.4 Gal/min) Pilot Gear Pump at 4.9 MPa (710 psi)	2X253 L/min (2X66.8 Gal/min) Tandem, variable displacement axial piston pump with 20.5 L/min (5.4 Gal/min) Pilot Gear Pump at 4.9 MPa (710 psi)
SWING MOTOR:		Axial piston, fixed displacement {176 L/min (46 Gal/min) @ 27,9 MPa (4.050 psi)}	Axial piston, fixed displacement {179 L/min (47 Gal/min) @ 27,9 MPa (4.050 psi)}	Axial piston, fixed displacement {180 L/min (46 Gal/min) @ 34.3 MPa (4,980 psi)}	Axial piston, fixed displacement {180 L/min (46 Gal/min) @ 34.3 MPa (4,980 psi)}
TRAVEL MOTORS	SK160LC-VI:	Axial piston, variable displacement. Max. disp: 99.6 cc/rev (26.5 in^3/rev); Min disp: 56.5 cc/rev (14.7 in^3/rev) @ 350 Kg/cm^2 (4980 psi)}	Axial piston, variable displacement. 210 L/min (55 iGal/min) at 35.8 MPa (5,200 psi); 32.8 rpm in high speed and 48.8 rpm in low speed.	Axial piston, variable displacement. 242 L/min (2x64 Gal/min) at 34.3 MPa (4,980 psi); 262.6 cm^3/rev (8.88 Oz/rev) in high speed and 160.6 cm^3/rev (5.43 Oz/rev) in low speed.	Axial piston, variable displacement. 242 L/min (2x64 Gal/min) at 34.3 MPa (4,980 psi); 262.6 cm^3/rev (8.88 Oz/rev) in high speed and 160.6 cm^3/rev (5.43 Oz/rev) in low speed.
	ED190-VI:	Axial piston, variable displacement. Max. disp: 131.1 cc/rev (34.9 in^3/rev); Min disp: 63.2 cc/rev (16.8 in^3/rev) @ 365 Kg/cm^2 (5193 psi)}			
CONTROL VALVE:		7 spools in the main control valve	7 spools in the main control valve	7 spools in the main control valve	7 spools in the main control valve
CYLINDERS (ALL):		Double action	Double action	Double action	Double action
OIL FILTRATION:		Hydraulic oil filtration is performed through a replaceable element and a suction strainer	Hydraulic oil filtration is performed through a replaceable element and a suction strainer	Hydraulic oil filtration is performed through a replaceable element and a suction strainer	Hydraulic oil filtration is performed through a replaceable element and a suction strainer
OIL COOLER:		Air forced ventilation through finned tubbing.	Air forced ventilation through finned tubbing.	Air forced ventilation through finned tubbing.	Air forced ventilation through finned tubbing.

10

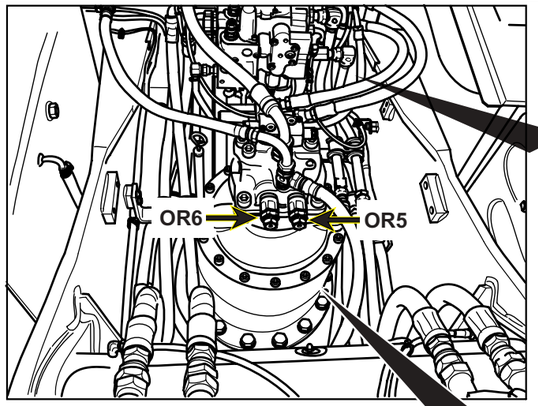
10.8 SK160LC/ED190 TECHNICAL SPECIFICATIONS

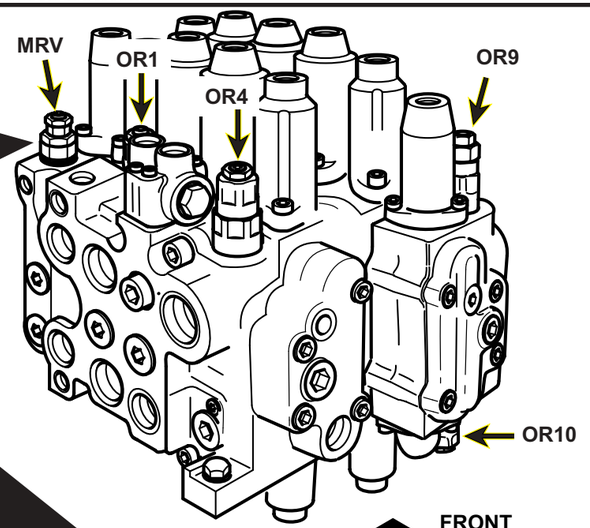
SK160LC/ED190 Item or component				Reading from: Location	Size	Port	Pressures & Current Specifications	Unit	Adjustment point	Testing condition
Standards for testing	Cleanlliness of hydraulic oil			Hydraulic oil tank			Class NAS 7-9	-----	-----	Take sample
	Temperature of hydraulic oil			Hydraulic oil tank surface			45 ~ 55 (113 ~ 131)	℃ (℉)	-----	Ambient temperature -10 ℃ ~ 50 ℃ (14 ℉ ~ °122 ℉)
	Engine coolant temperature			Radiator surface			60 ~ 90 (140 ~ 194)		-----	
	Engine RPM	Low idle		Monitor display or tachometer			975 ~ 1025	RPM	CPU and stepping motor linkage.	Throttle in low idle, A/C off and auto accel system inactive.
		High RPM	M-mode				2405 ~ 2455			Throttle in high idle, A/C off, and auto accel system inactive.
			A-mode				2175 ~ 2225			
			B-mode				2405 ~ 2455			
		Auto-decel					950 ~ 1100			Throttle in high idle, A/C off and auto accel system active.
Pilot circuit	Primary pressure	P3		Pilot pump (Gear)	PF 1/4	a7	50 ~ 55 (711 ~ 782)	Kg/cm² (Psi)	PR1	Throttle in high idle.
Main relief valve	Travel	RS (P1)		Main hyd. pump		a1	350~355 (4978~5049)		MR1	Stall travel function in high idle.
		LS (P2)				a2				
	Attachment (Power boost)	P1				a1	380~395 (5405~5618)			Stall boom up function with heavy lift active in high idle.
		P2				a2				
	Attachment (Standard)	P1				a1	350~355 (4978~5049)			Stall boom up function in high idle.
		P2				a2				
Dozer circuit	Dozer	P4		Gear pump		a10	250 (3550)		DRV1	Stall dozer up function in high idle.
Port relief valves	Boom	Rod		Main hyd. pumps		a1	350~385 (4977~5475)		OR4	Stall boom down function in high idle.
		Head				a1+a2	380~405 (5405~5760)		OR3	Stall boom up function in high idle.
	Arm	Rod				a1+a2	380~405 (5405~5760)		OR8	Stall arm out function in high idle.
		Head				a1+a2	350~385 (4977~5475)		OR7	Stall arm in function in high idle.
	Bucket	Rod				a1	350~385 (4977~5475)		OR1	Stall bucket dump function in high idle.
		Head				a1+a2	380~405 (5405~5760)		OR2	Stall bucket dig function in high idle.
	Swing	Right				a1+a2	290~320 (4125~4551)		OR5	Bucket locked and left swing function activated in high idle.
		Left				a1+a2			OR6	Bucket locked and right swing function activated in high idle.
	Auxiliary system (Breaker)	P1				a1	385 (5475)		OR9	Stall auxiliary system with throttle at high idle position.
	Swing priority system	P1				a1	385 (5475)		OR10	Bucket locked, arm in and swing functions simultaneously activated with throttle at high idle position.
		P2				a2				
	Travel	P1				a1	380 (5410)		TOR1, TOR2	Stall travel function with throttle at high idle position.
		P2				a2			TOR3, TOR4	
Proportional solenoid valves	P1 neutral cut	PSV-D D-1		Monitor display active in troubleshooting code system.		Nº 20	Neutral: 0~100 psi (200~220 mA) Active: 400~420 Kg/cm² (700~710 mA)	Note: pressure readings indicated in monitor display are calculated values by the ITCS. For any troubleshooting analysis, it is necessary a comparison between real pressure gauge readings and monitor display readings.		Stall arm out function with throttle at high idle position.
	P2 neutral cut	PSV-B D-2				Nº 21				Stall boom up function with throttle at high idle position.
	Travel priority	PSV-C D-3				Nº 22				Stall arm in function with throttle at high idle position.
	Arm variable recirculation	PSV-A D-6				Nº 23	Active: 140~150 psi (400~420 mA) Neutral: 4~6 Kg/cm² (300~320 mA)			
	Prop. solenoid valve pump 1	PSVP1				Nº 24	Neutral: 0~100 psi (200~220 mA) Active: 140~285 psi (450~480 mA)			RS track turning
	Prop. solenoid valve pump2	PSVP2				Nº 25	Neutral: 0~100 psi (340~355 mA) Active: 140~285 psi (450~480 mA)			LS track turning
	Independent travel valve pump 1	PSV-E D-11				Nº 32	Inactive: 0~100 psi (340~355 mA) Active: 327~370 Kg/cm² (635~650 mA)			Travel locked, travel and boom up functions simultaneously activated with throttle at high idle position.
	Independent travel valve pump 2	PSV-F D-12				Nº 33				

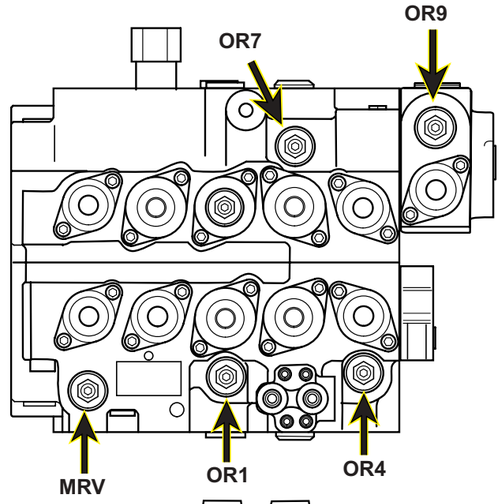
https://truckmanualshub.com/

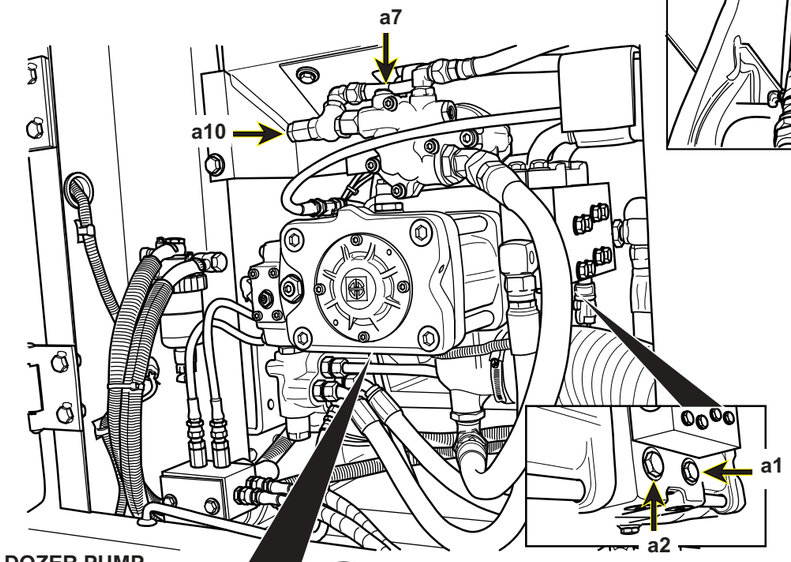
https://truckmanualshub.com/

SK160LC/ED190-6E DYNAMIC ACERA (MINOR CHANGE)

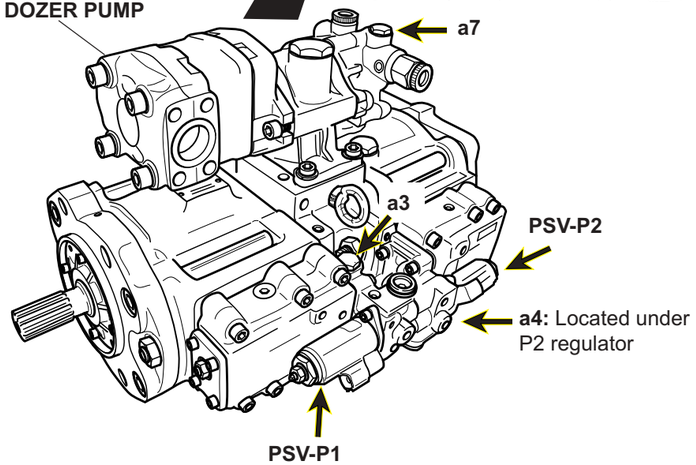


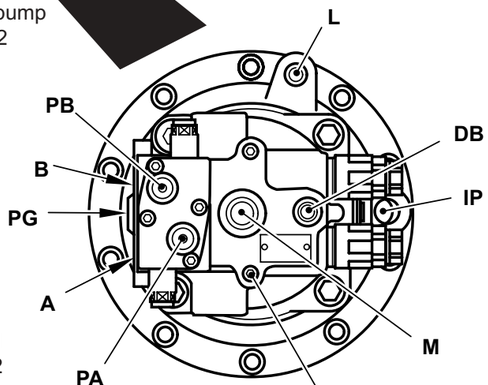


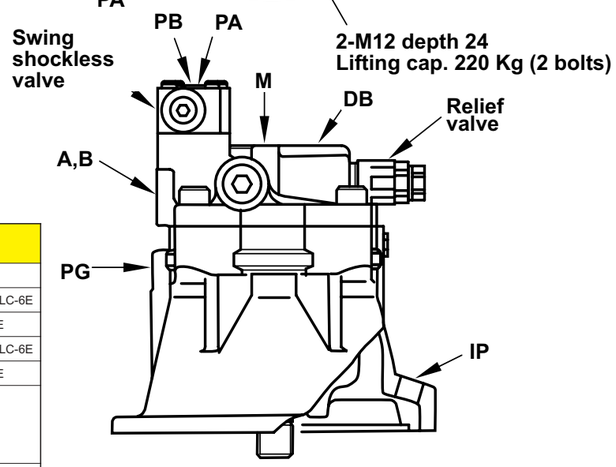




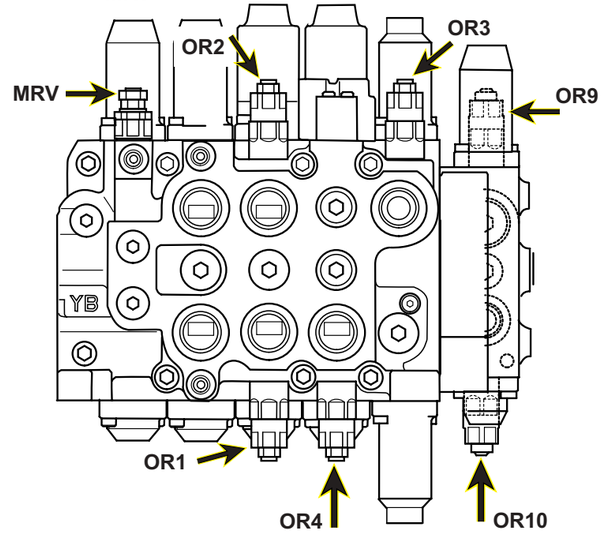
a1: P1 high pressure port
a2: P2 high pressure port
a3, a4: Secundary pilot pressure ports on pump proportional solenoids PSV-P1 and PSV-P2
a7: Primary pilot pressure port
a10: Main pressure port for dozer circuit
MRV: Main relief valve
OR1: Port relief for bucket dig function
OR2: Port relief for bucket dump function
OR3: Port relief for boom up function
OR4: Port relief for boom down function
OR7: Port relief for arm in function
OR8: Port relief for arm out function
OR9: Port relief for nibbler close function
OR10: Port relief for nibbler open function
PSV-P1: Proportional solenoid valve for P1
PSV-P2: Proportional solenoid valve for P2

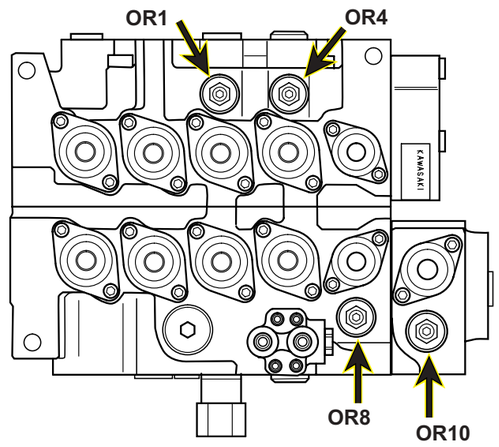






2-M12 depth 24
Lifting cap. 220 Kg (2 bolts)





Code	Name	Size	Torque N-m (Kgf-m)	Model
A, B	Main port	2-PF 3/4	167 (17)	
M	Make-up port	PF 3/4		SK160LC~SK210LC-6E
		PF 1	216 (22)	SK250LC-6E
DB	Drain port	PF 3/8	74 (7.5)	SK160LC~SK210LC-6E
		PF 1/2	98 (10)	SK330LC-6E
PA, PB	Gauge port	PF 1/4	36 (3.7)	
PG	Brake release port			
L	Gear oil level port	PT 1/2	65 (6.6)	
IP	Gear oil level port	PT 3/4	98 (10)	

Rotation direction (Viewed from shaft end)
Oil inlet A ..... Clockwise (CW)
Oil inlet B ..... Counterclockwise (CCW)

10

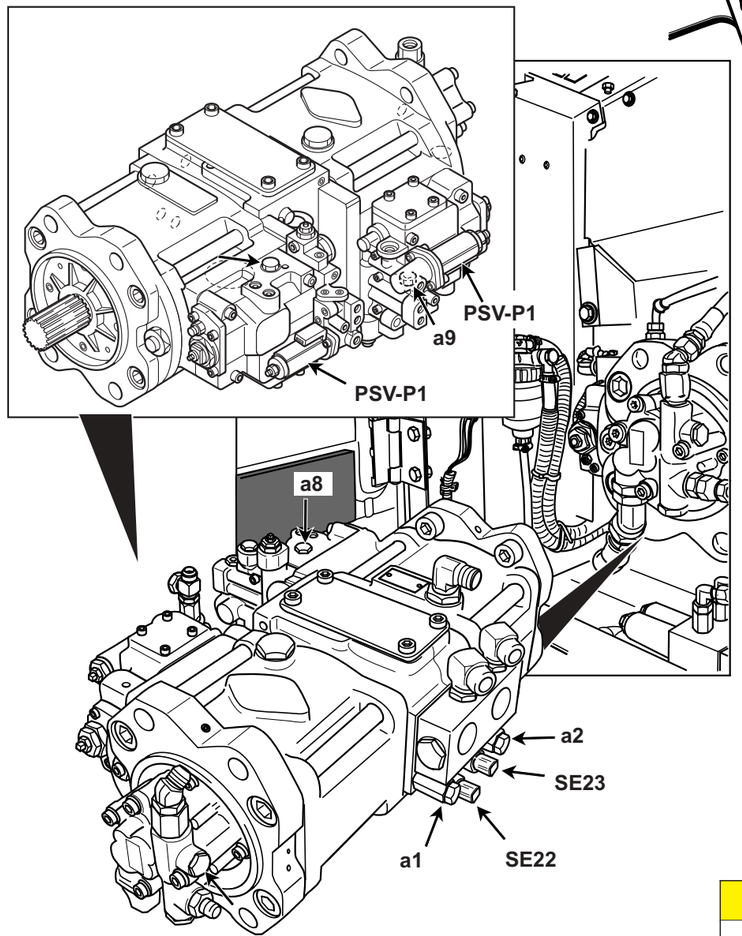
10.9 SK210LC/SK250LC-6E TECHNICAL SPECIFICATIONS

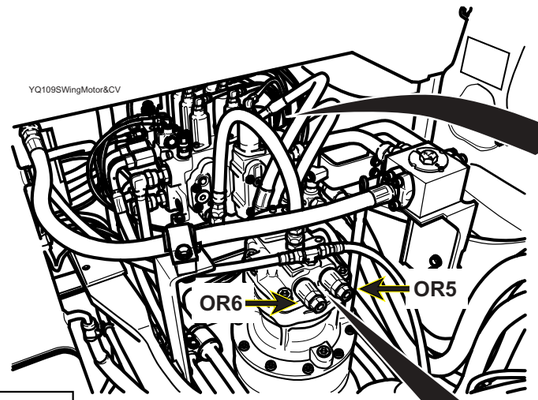
SK210LC/SK250LC-6E Item or component				Reading from: Location	Size	Port	Pressures & Current Specifications	Unit	Adjustment point	Testing condition
Standards for testing	Cleanlliness of hydraulic oil			Hydraulic oil tank			Class NAS 7-9	-----	-----	Take sample
	Temperature of hydraulic oil			Hydraulic oil tank surface			45 ~ 55 (113 ~ 131)	℃ (℉)	-----	Ambient temperature -10 ℃ ~ 50 ℃ (14 ℉ ~ 122 ℉)
	Engine coolant temperature			Radiator surface			60 ~ 90 (140 ~ 194)		-----	
	Engine RPM	Low idle		Monitor display or tachometer			950~ 1025	RPM	CPU and stepping motor linkage.	Throttle in low idle, A/C off and auto accel system inactive.
		High RPM	M-mode				2195 ~ 2245			Throttle in high idle, A/C off, and auto accel system inactive.
			A-mode				1925 ~ 1975			
			B-mode				2195 ~ 2245			
		Auto-decel					950 ~ 1100			Throttle in high idle, A/C off and auto accel system active.
Pilot circuit		Primary pressure	P3	Pilot pump (Gear)	PF 1/4	a7	50 ~ 55 (711 ~ 782)	Kg/cm² (Psi)	PR1	Throttle in high idle.
Main relief valve		Travel	RS (P1)	Main hyd. pump		a1	350~355 (4978~5049)		MR1	Stall travel function in high idle.
			LS (P2)			a2				
		Attachment (Power boost)	P1			a1	380~395 (5405~5618)			Stall boom up function with heavy lift active in high idle.
			P2			a2				
		Attachment (Standard)	P1			a1	350~355 (4978~5049)			Stall boom up function in high idle.
			P2			a2				
Port relief valves		Boom	Rod	Main hyd. pumps		a1	350~385 (4977~5475)		OR4	Stall boom down function in high idle.
			Head			a1+a2	350~405 (4977~5760)		OR3	Stall boom up function in high idle.
		Arm	Rod			a1+a2	350~405 (4977~5760)		OR8	Stall arm out function in high idle.
			Head			a1+a2	350~385 (4977~5475)		OR7	Stall arm in function in high idle.
		Bucket	Rod			a1	350~385 (4977~5475)		OR1	Stall bucket dump function in high idle.
			Head			a1+a2	350~405 (4977~5760)		OR2	Stall bucket dig function in high idle.
		Swing	Right			a1+a2	327~355 (4653~5050)		OR5	Bucket locked and left swing function activated in high idle.
			Left			a1+a2			OR6	Bucket locked and right swing function activated in high idle.
		Auxiliary system (Breaker)	P1			a1	385 (5475)		OR9	Stall auxiliary system with throttle at high idle position.
		Swing priority system	P1			a1	385 (5475)		OR10	Bucket locked, arm in and swing functions simultaneously activated with throttle at high idle position.
			P2			a2				
		Travel	P1			a1	415 (5903)		TOR1, TOR2	Stall travel function with throttle at high idle position.
			P2			a2			TOR3, TOR4	
Proportional solenoid valves		P1 neutral cut	PSV-D D-1	Monitor display active in troubleshooting code system.		Nº 20	Neutral: 0~100 psi (200~220 mA) Active: 400~420 psi (700~710 mA)	Note: pressure readings indicated in monitor display are calculated values by the ITCS. For any troubleshooting analysis, it is necessary a comparison between real pressure gauge readings and monitor display readings.		Stall arm out function with throttle at high idle position.
		P2 neutral cut	PSV-B D-2			Nº 21				Stall boom up function with throttle at high idle position.
		Travel priority	PSV-C D-3			Nº 22	Neutral: 95~110 psi (340~360 mA) Active: 240~250 psi (500~520 mA)			Stall arm in function with throttle at high idle position.
		Arm variable recirculation	PSV-A D-6			Nº 23	Neutral: 140~150 psi (400~420 mA) Active: 370~380 psi (670~680 mA)			
		Prop. solenoid valve pump 1	PSV-1 E-1			Nº 24	Neutral: 90~100psi (340~350 mA) Active: 440~450 psi (740~750 mA)			RS track turning
		Prop. solenoid valve pump2	PSV-2 E-2			Nº 25				LS track turning
		Independent travel valve pump 1	PSV-E D-11			Nº 32	Inactive: 180~210 psi (470~480 mA) Active: 350~370 Kg/cm² (650~670 mA)			Indep. travel ON; travel locked, travel and boom up functions simultaneously activated with throttle at high idle position.
		Independent travel valve pump 2	PSV-F D-12			Nº 33				

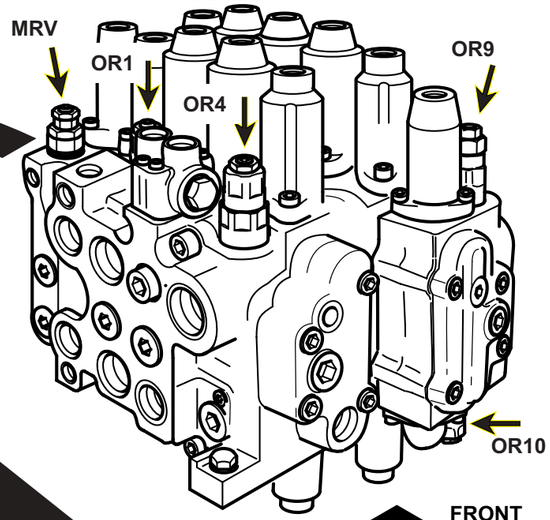
https://truckmanualshub.com/

https://truckmanualshub.com/

SK210LC/SK250LC-6E DYNAMIC ACERA (MINOR CHANGE)

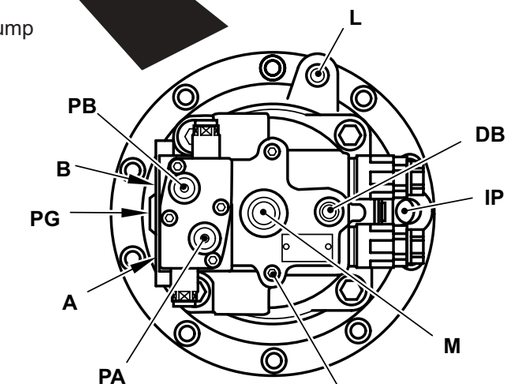


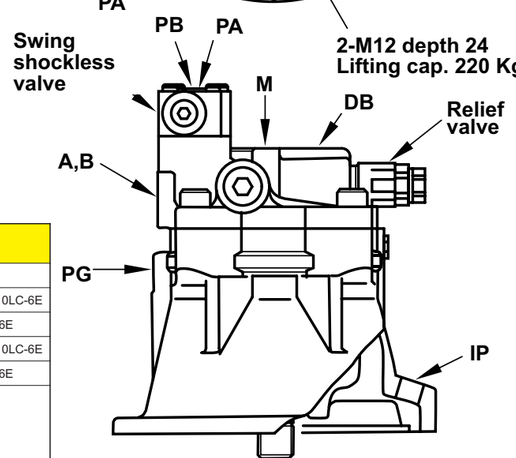




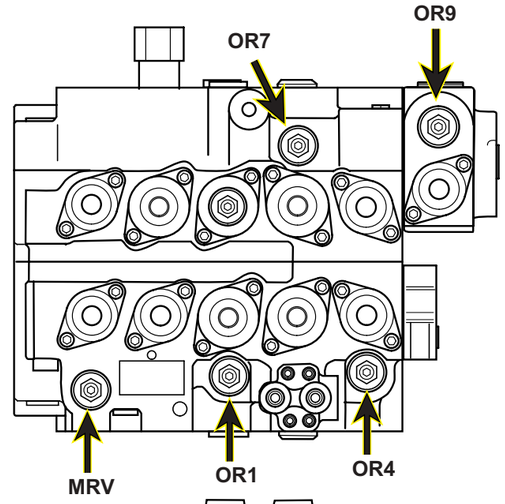
FRONT

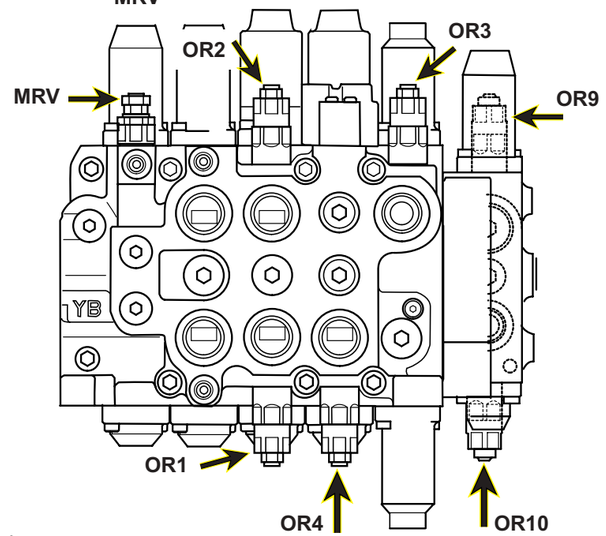
a1: P1 high pressure port
a2: P2 high pressure port
a3, a4: Secundary pilot pressure ports on pump proportional solenoids PSV-P1 and PSV-P2
a7: Primary pilot pressure port
a10: Main pressure port for dozer circuit
MRV: Main relief valve
OR1: Port relief for bucket dig function
OR2: Port relief for bucket dump function
OR3: Port relief for boom up function
OR4: Port relief for boom down function
OR7: Port relief for arm in function
OR8: Port relief for arm out function
OR9: Port relief for nibbler close function
OR10: Port relief for nibbler open function
PSV-P1: Proportional solenoid valve for P1
PSV-P2: Proportional solenoid valve for P2
SE22: High pressure sensor for P2 circuit
SE23: High pressure sensor for P1 circuit

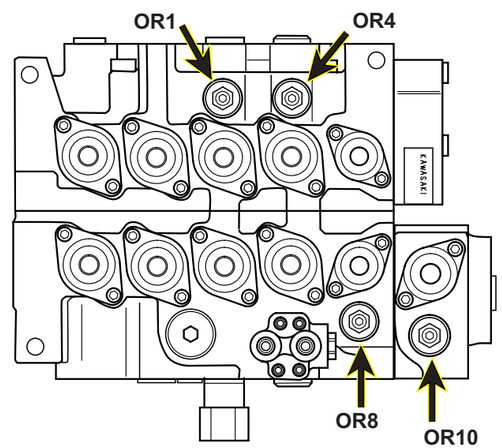




2-M12 depth 24
Lifting cap. 220 Kg (2 bolts)







Code	Name	Size	Torque N-m (Kgf-m)	Model
A, B	Main port	2-PF 3/4	167 (17)	
M	Make-up port	PF 3/4		SK160LC~SK210LC-6E
		PF 1	216 (22)	SK250LC-6E
DB	Drain port	PF 3/8	74 (7.5)	SK160LC~SK210LC-6E
		PF 1/2	98 (10)	SK330LC-6E
PA, PB	Gauge port	PF 1/4	36 (3.7)	
PG	Brake release port			
L	Gear oil level port	PT 1/2	65 (6.6)	
IP	Gear oil level port	PT 3/4	98 (10)	

Rotation direction (Viewed from shaft end)
Oil inlet A ..... Clockwise (CW)
Oil inlet B ..... Counterclockwise (CCW)

10

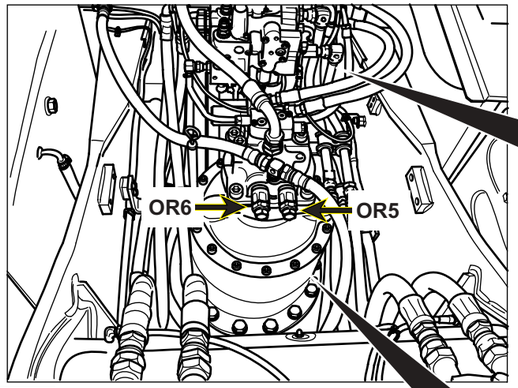
10.10 SK290LC/SK330LC TECHNICAL SPECIFICATIONS

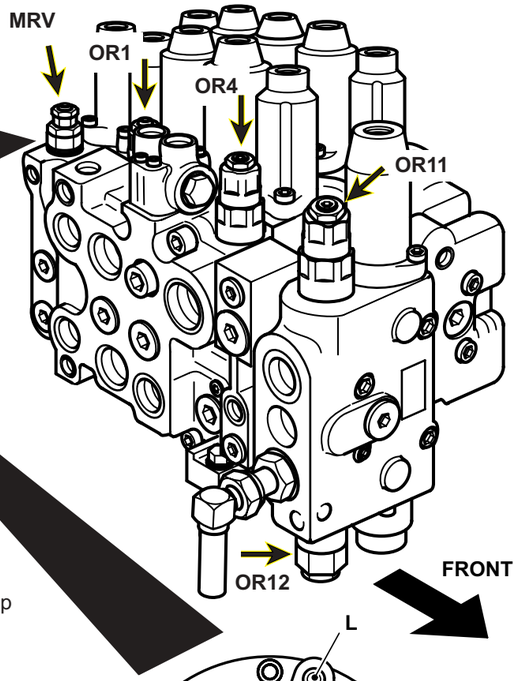
SK290LC/SK330LC-6E Item or component				Reading from: Location	Size	Port	Pressures & Current Specifications	Unit	Adjustment point	Testing condition
Standards for testing	Cleanlliness of hydraulic oil			Hydraulic oil tank			Class NAS 7-9	-----	-----	Take sample
	Temperature of hydraulic oil			Hydraulic oil tank surface			45 ~ 55 (113 ~ 131)	℃ (℉)	-----	Ambient temperature -10 ℃ ~ 50 ℃ (14 ℉ ~ °122 ℉)
	Engine coolant temperature			Radiator surface			60 ~ 90 (140 ~ 194)		-----	
	Engine RPM	Low idle		Monitor display or tachometer			950~ 1025	RPM	CPU and stepping motor linkage.	Throttle in low idle, A/C off and auto accel system inactive.
		High RPM	M-mode				2315 ~ 2365			Throttle in high idle, A/C off, and auto accel system inactive.
			A-mode				1925 ~ 1975			
			B-mode				2315 ~ 2365			
		Auto-decel					950 ~ 1100			Throttle in high idle, A/C off and auto accel system active.
Pilot circuit		Primary pressure	P3	Pilot pump (Gear)	PF 1/4	a7	50 ~ 55 (711 ~ 782)	Kg/cm² (Psi)	PR1	Throttle in high idle.
Main relief valve		Travel	RS (P1)	Main hyd. pump		a1	350~355 (4978~5049)		MR1	Stall travel function in high idle.
			LS (P2)			a2				
		Attachment (Power boost)	P1			a1	380~395 (5405~5618)			Stall boom up function with heavy lift active in high idle.
			P2			a2				
		Attachment (Standard)	P1			a1	350~355 (4978~5049)			Stall boom up function in high idle.
			P2			a2				
Port relief valves		Boom	Rod	Main hyd. pumps		a1	350~385 (4977~5475)		OR4	Stall boom down function in high idle.
			Head			a1+a2	350~405 (4977~5760)		OR3	Stall boom up function in high idle.
		Arm	Rod			a1+a2	350~405 (4977~5760)		OR8	Stall arm out function in high idle.
			Head			a1+a2	350~385 (4977~5475)		OR7	Stall arm in function in high idle.
		Bucket	Rod			a1	350~385 (4977~5475)		OR1	Stall bucket dump function in high idle.
			Head			a1+a2	350~405 (4977~5760)		OR2	Stall bucket dig function in high idle.
		Swing	Right			a1+a2	327~355 (4653~5050)		OR5	Bucket locked and left swing function activated in high idle.
			Left			a1+a2			OR6	Bucket locked and right swing function activated in high idle.
		Auxiliary system (Breaker)	P1			a1	385 (5475)		OR9	Stall auxiliary system with throttle at high idle position.
		Swing priority system	P1			a1	385 (5475)		OR10	Bucket locked, arm in and swing functions simultaneously activated with throttle at high idle position.
			P2			a2				
		Travel	P1			a1	420 (5974)		TOR1, TOR2	Stall travel function with throttle at high idle position.
			P2			a2			TOR3, TOR4	
Proportional solenoid valves		P1 neutral cut	PSV-D D-1	Monitor display active in troubleshooting code system.		Nº 20	Neutral: 0~100 psi (200~220 mA) Active: 400~405 psi (700~710 mA)	Note: pressure readings indicated in monitor display are calculated values by the ITCS. For any troubleshooting analysis, it is necessary a comparison between real pressure gauge readings and monitor display readings.		Stall arm out function with throttle at high idle position.
		P2 neutral cut	PSV-B D-2			Nº 21				Stall boom up function with throttle at high idle position.
		Travel priority	PSV-C D-3			Nº 22	Neutral: 90~100 psi (340~350 mA) Active: 220~240 psi (500~510 mA)			Stall arm in function with throttle at high idle position.
		Arm variable recirculation	PSV-A D-6			Nº 23	Neutral: 400~450 psi (700~720 mA) Active: 110~120 psi (360~370 mA)			
		Prop. solenoid valve pump 1	PSV-1 E-1			Nº 24	Neutral: 270~280 psi (560~580 mA) Active: 440~460 psi (760~770 mA)			RS travel turning
		Prop. solenoid valve pump2	PSV-2 E-2			Nº 25				LS travel turning
		Independent travel valve pump 1	PSV-E D-11			Nº 32	Inactive: 80~90 psi (350~360 mA) Active: 360~370 psi (670~680 mA)			Travel locked, travel and boom up functions simultaneously activated with throttle at high idle position.
		Independent travel valve pump 2	PSV-F D-12			Nº 33				

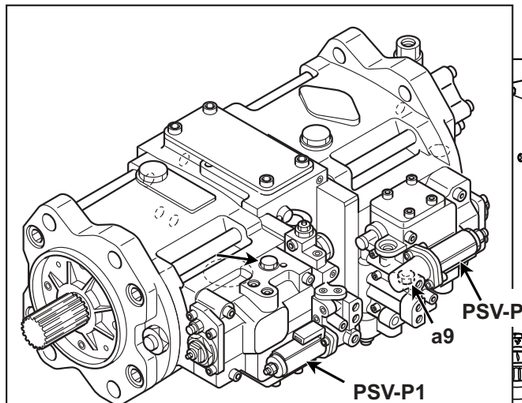
https://truckmanualshub.com/

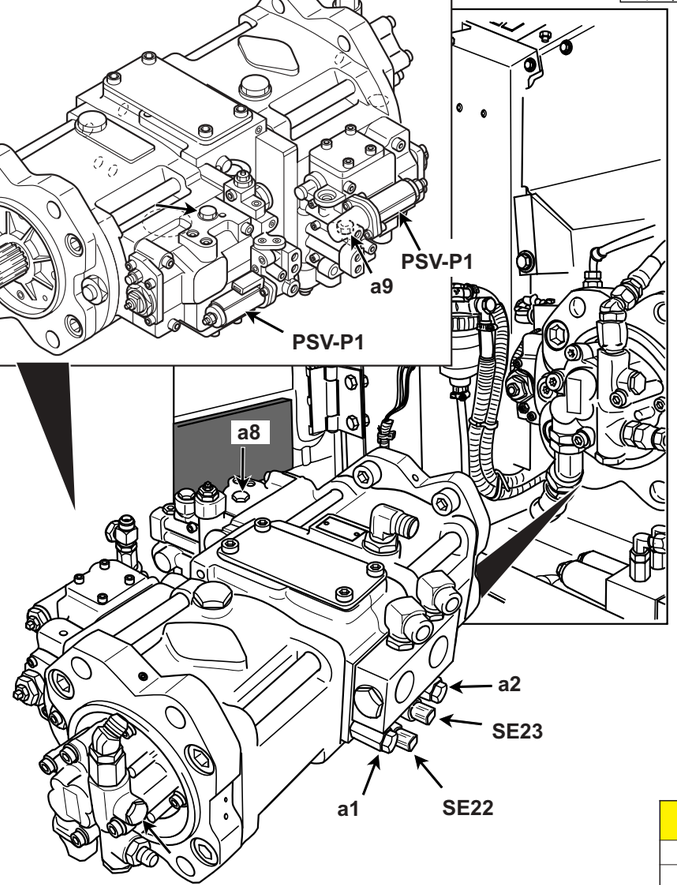
https://truckmanualshub.com/

SK290LC/SK330LC-6E DYNAMIC ACERA (MINOR CHANGE)

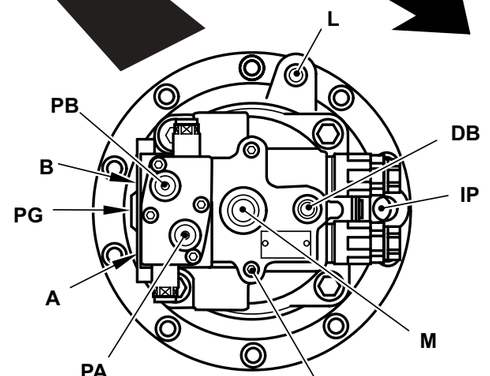


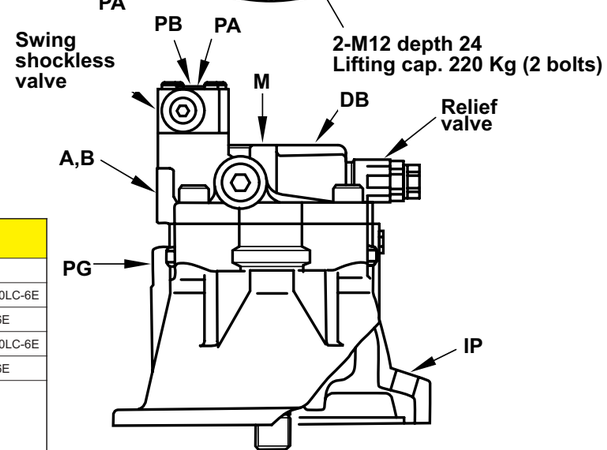






a1: P1 high pressure port
a2: P2 high pressure port
a3, a4: Secundary pilot pressure ports on pump proportional solenoids PSV-P1 and PSV-P2
a7: Primary pilot pressure port
a10: Main pressure port for dozer circuit
MRV: Main relief valve
OR1: Port relief for bucket dig function
OR2: Port relief for bucket dump function
OR3: Port relief for boom up function
OR4: Port relief for boom down function
OR7: Port relief for arm in function
OR8: Port relief for arm out function
OR11: Braker function relief valve
OR12: Port relief for swing priority function
PSV-P1: Proportional solenoid valve for P1
PSV-P2: Proportional solenoid valve for P2
SE22: High pressure sensor for P2 circuit
SE23: High pressure sensor for P1 circuit

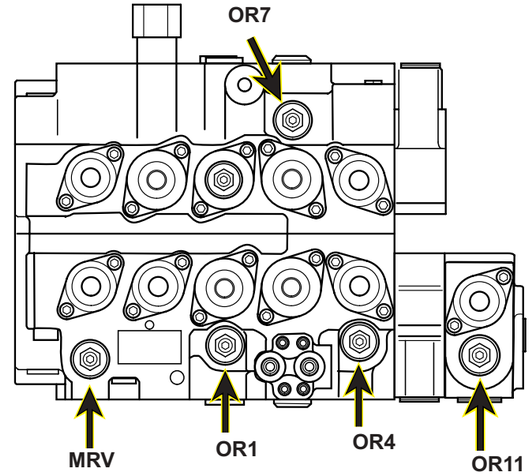


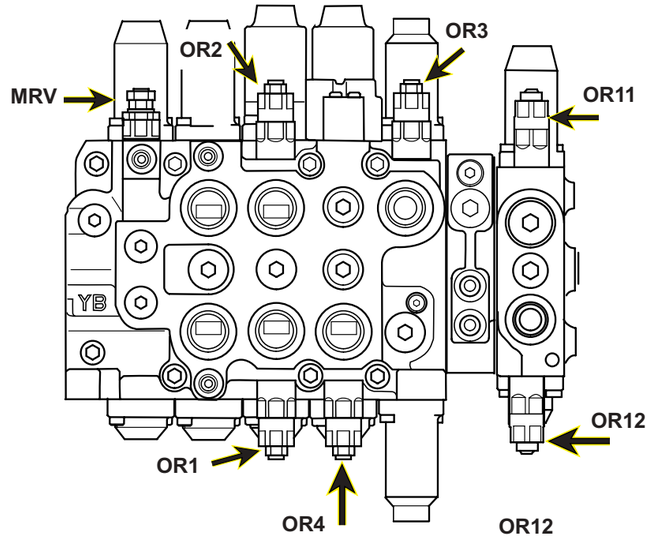


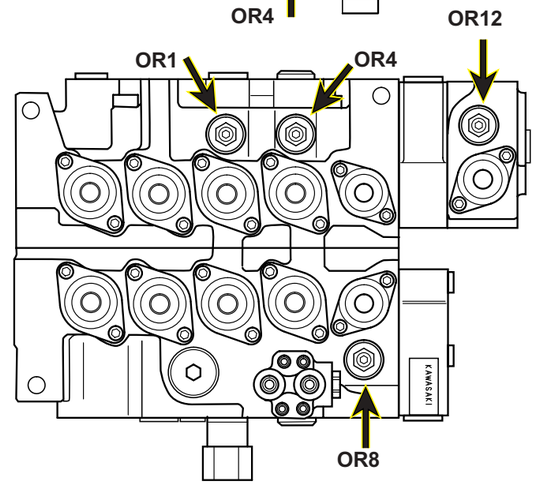
2-M12 depth 24
Lifting cap. 220 Kg (2 bolts)

Code	Name	Size	Torque N-m (Kgf-m)	Model
A, B	Main port	2-PF 3/4	167 (17)	
M	Make-up port	PF 3/4		SK160LC~SK210LC-6E
		PF 1	216 (22)	SK250LC-6E
DB	Drain port	PF 3/8	74 (7.5)	SK160LC~SK210LC-6E
		PF 1/2	98 (10)	SK330LC-6E
PA, PB	Gauge port	PF 1/4	36 (3.7)	
PG	Brake release port			
L	Gear oil level port	PT 1/2	65 (6.6)	
IP	Gear oil level port	PT 3/4	98 (10)	

Rotation direction (Viewed from shaft end)
Oil inlet A ..... Clockwise (CW)
Oil inlet B ..... Counterclockwise (CCW)

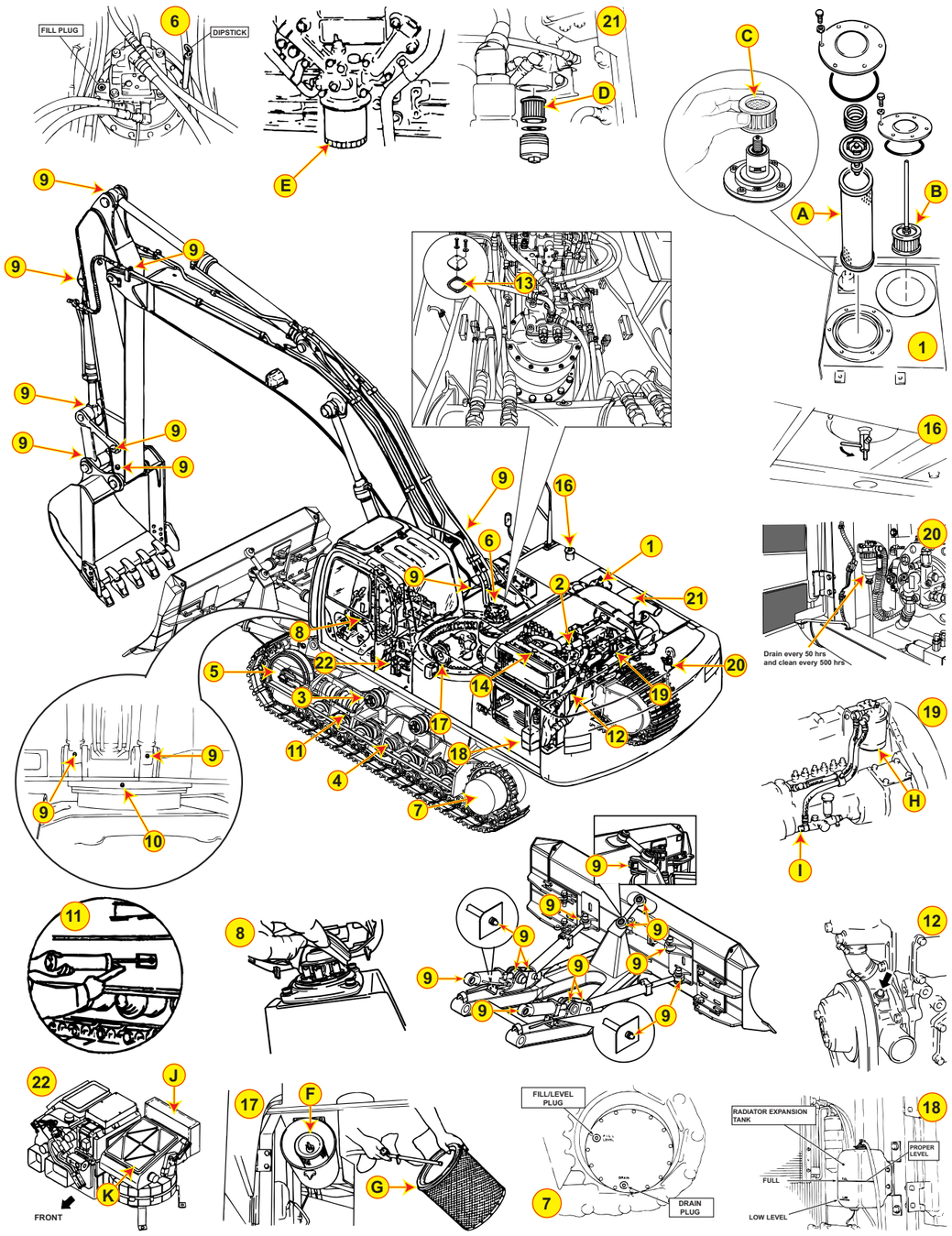






https://truckmanualshub.com/

10.11 SK160LC/ED190 LUBRICATION AND MAINTENANCE



REF.	COMPONENT (Location)	CAPACITIES SK160LC-6E	CAPACITIES ED190-6E	FLUID TYPE LUBRICANT; PART NUMBER	INSPECTION INTERVAL	FIRST MAINTENANCE	NORMAL MAINTENANCE INTERVAL
1	Hydraulic tank	91 L (24 Gal)		**HYDRAULIC OIL (Anti-wear, antioxidant and non-foaming)** *Machines are shipped from factory with SHELL TELLUS 46 oil	8 Hrs	—	2000 Hrs
	Hydraulic system	159 L (42.0 Gal)		FRIGID -30° C ~ 15° C (-22° F ~ 59° F) ISOVG22 / FRIGID -20° C ~ 30° C (-4° F ~ 86° F) ISOVG32 / FRIGID-WARM -25° C ~ 40° C (-13° F ~ 104° F) ISOVG32S / WARM -5° C ~ 40° C (23° F ~ 104° F) ISOVG46* / VERY HOT 5° C ~ 55° C (41° F ~ 131° F) ISOVG68			
2	Engine oil pan (H-level)	15 L (4 Gal)		**ENGINE OIL (A.P.I. clasification for "Service CD")** *All engines are shipped from factory with SAE 15W40 oil. FRIGID -30° C ~ 30° C (-22° F ~ 86° F) SAE 10W30 / WARM -5° C ~ 40° C (23° F ~ 104° F) SAE 15W40* / VERY HOT 30° C and above (86° F and above) SAE 15W50	8 Hrs	50 Hrs	500 Hrs
	Engine oil pan (L-level)	13 L (3.4 Gal)					
3	Upper rollers	50 cc (1.69 Fluid Oz) X 4		**ENGINE OIL (A.P.I. clasification for "Service CD")** These components are shipped from factory with SAE 15W40 oil	—	—	2000 Hrs
4	Lower rollers	160 cc X 14 (5.41 Fl. Oz)X14	220 cc X 14 (7.44 Fl. Oz)X14		—	—	2000 Hrs
5	Idlers	200 cc (6.76 Fluid Oz) X 2			—	—	2000 Hrs
6	Swing reduction unit	7.5 L (2.0 Gal)			120 Hrs	500 Hrs	2000 Hrs
7	Travel reduction unit	4.7 L X 2 (1.24 Gal X 2)	9 L X 2 (2.4 Gal X 2)		120 Hrs	500 Hrs	2000 Hrs
8	Operating lever joint	As required in each joint		**EP2 GREASE** (Extreme pressure multipurpose No. 2 EP type grease)	120 Hrs	—	—
9	Attachment pins	16 Places 14 Places (Dozer)			50 Hrs	—	—
10	Swing bearing	1 Place (90º X 4)			500 Hrs	—	—
11	Track tension adjustment	2 Places			50 Hrs	—	—
12	Water pump bearing	6.1 cc (Aprox. one grease gun shot)		**GRASA N.L.G.I. Nº 2** (Lithium base for bearing)	500 Hrs	—	—
13	Slewing ring grease bath	8.7 Kg (19.2 lbs)		N.L.G.I. Nº 2 lithium base grease with MOS_2	500 Hrs	—	2000 Hrs
14	Radiator	11 L (2.9 Gal)		**ANTIFREEZE (LLC) -34ºC (-29.2ºF)** Mixture ratio should protect to 5ºC (9ºF) lower than the coldest temperature the machine will experience. Take into consideration wind chill factors. Follow antifreeze manufacturer instructions to obtain proper mixture.	8 Hrs	—	2000 Hrs
15	Cooling system total volume	19 L (5 Gal)					
16	Fuel tank	281 L (74.2 Gal)		**DIESEL FUEL** FRIGID -15° C ~ -25° C (-5° F ~ -13°) Winterized DIESEL ASTM D975 Nº 1 / WARM -1° C ~ -15° C (5ºF ~ 23ºF) DIESEL ASTM D975 Nº 2 / VERY HOT -5ºC (23º F) and above DIESEL ASTM D975 Nº 2	—	—	—

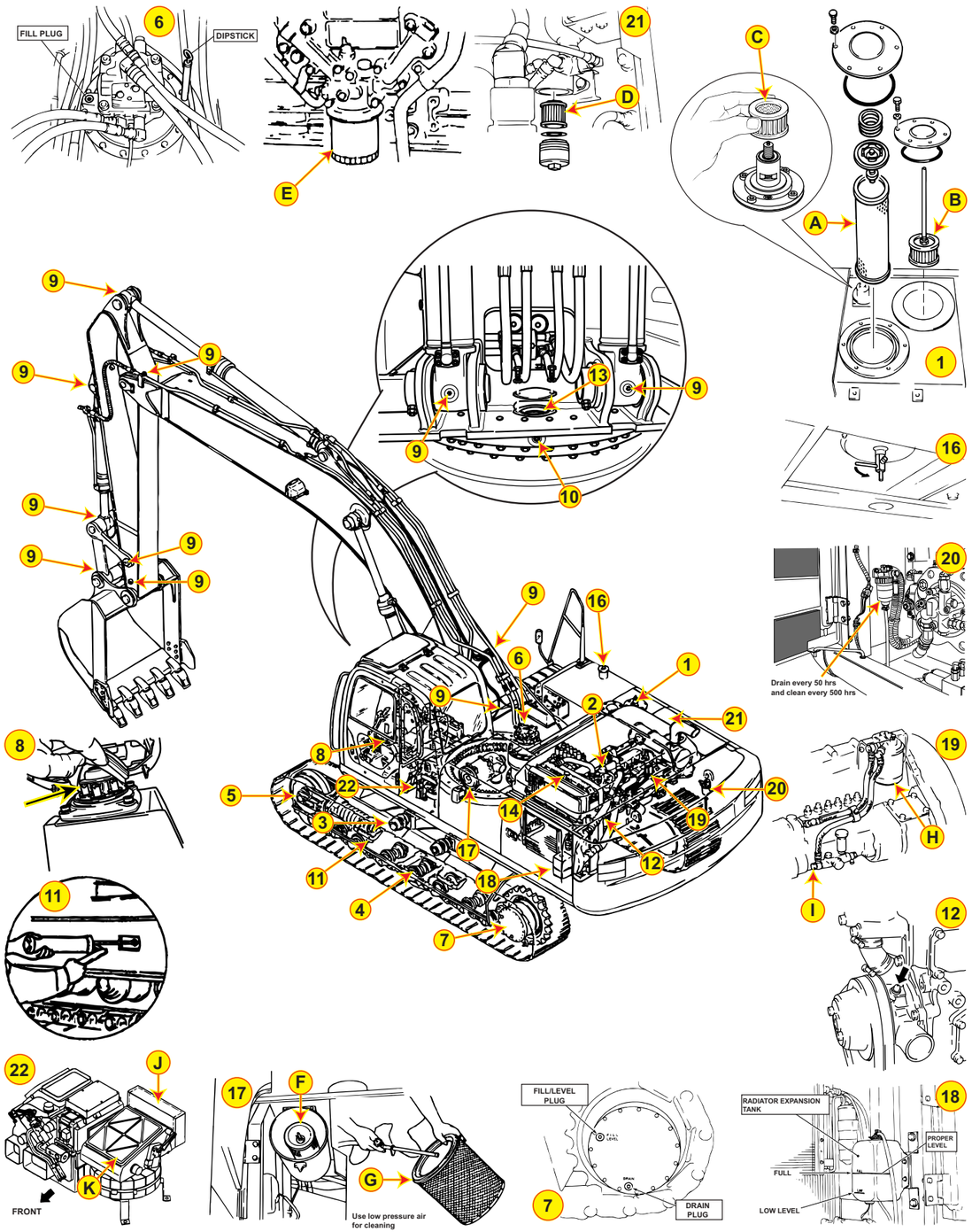
A	Hydraulic system return filter	**Element:** YR50V00004P1 (1) **Kit:** YV30T00002F4	—	50 Hrs	500 Hrs
	Return filter (For machines equipped with breaker)	**Element:** YN50V00001P1 (1) **Kit:** YV30T00002F4	—	50 Hrs	500 Hrs
B	Hydraulic suction strainer	YN50V00002S001 (1) (Includes seal P/N: 45Z91D6)			2000 Hrs
C	Hydraulic tank breather valve filter	YN57V00002S010 (1)			2000 Hrs
D	Pilot system filter	YN50V01001S005 (1)			500 Hrs
E	Engine oil filter	*VAME215002 (1)		50 Hrs	500 Hrs
F	Air cleaner inner element	2446R277S6 (1)	8 Hrs		As required
G	Air cleaner outer element	2446R277S5 (1)	8 Hrs		As required
H	Engine fuel filter	2451R124-2A (*VAME016823) (1)		50 Hrs	500 Hrs
I	Priming pump gauze filter	*VAME717651 (1)			500 Hrs
J	A/C fresh air filter	YN50V01006P1 (1)			250 Hrs
K	A/C recirculate air filter	YT20M00004S050 (1)			500 Hrs

***Available only at Kobelco dealers**

10

https://truckmanualshub.com/

10.12 SK210LC/SK250LC-6E LUBRICATION AND MAINTENANCE



REF.	COMPONENT (Location)	CAPACITIES SK210LC-6E	CAPACITIES SK250LC-6E	FLUID TYPE LUBRICANT; PART NUMBER	INSPECTION INTERVAL	FIRST MAINTENANCE	NORMAL MAINTENANCE INTERVAL
1	Hydraulic tank	156 L (41 Gal)		**HYDRAULIC OIL (Anti-wear, antioxidant and non-foaming)** *Machines are shipped from factory with SHELL TELLUS 46 oil	8 Hrs	—	2000 Hrs
	Hydraulic system	246 L (65 Gal)	260 L (69 Gal)	FRIGID -30° C ~ 15° C (-22° F ~ 59° F) ISOVG22 / FRIGID -20° C ~ 30° C (-4° F ~ 86° F) ISOVG32 / FRIGID-WARM -25° C ~ 40° C (-13° F ~ 104° F) ISOVG32S / WARM -5° C ~ 40° C (23° F ~ 104° F) ISOVG46* / VERY HOT 5° C ~ 55° C (41° F ~ 131° F) ISOVG68			
2	Engine oil pan* (H-level)	18 L (4.8 Gal)		**ENGINE OIL (A.P.I. clasification for "Service CD")** *All engines are shipped from factory with SAE 15W40 oil. FRIGID -30° C ~ 30° C (-22° F ~ 86° F) SAE 10W30 / WARM -5° C ~ 40° C (23° F ~ 104° F) SAE 15W40* / VERY HOT 30° C and above (86° F and above) SAE 15W50	8 Hrs	50 Hrs	500 Hrs
	Engine oil pan* (L-level)	15.5 L (4.1 Gal)					
3	Upper rollers	50 cc (1.69 Fluid Oz.) X 4		**ENGINE OIL (A.P.I. clasification for "Service CD")** These components are shipped from factory with SAE 15W40 oil	—	—	2000 Hrs
4	Lower rollers	160 cc (5.41 Fluid Oz.) X 14 160 cc (5.41 Fluid Oz.) X 16 - LC			—	—	2000 Hrs
5	Idlers	200 cc (6.76 Fluid Oz.) X 2			—	—	2000 Hrs
6	Swing reduction unit	7.5 L (2.0 Gal)	15.3 L (4.0 Gal)		120 Hrs	500 Hrs	2000 Hrs
7	Travel reduction unit	5.5 L X 2 (1.5 Gal X 2)	4.7 L X 2 (1.2 Gal X 2)		120 Hrs	500 Hrs	2000 Hrs
8	Operating lever joint	As required in each joint		**EP2 GREASE** (Extreme pressure multipurpose No. 2 EP type grease)	120 Hrs	—	—
9	Attachment pins	16 Places			50 Hrs	—	—
10	Swing bearing	1 Place (90º X 4)			500 Hrs	—	—
11	Track tension adjustment	2 places			50 Hrs	—	—
12	Water pump bearing	6.1 cc (Aprox. one grease gun shot)		**GRASA N.L.G.I. Nº 2** (Lithium base for bearing)	500 Hrs	—	—
13	Slewing ring grease bath	8.3 Kg (18.3 lbs)	11.3 Kg (24.9 lbs)	N.L.G.I. Nº 2 lithium base grease with MOS_2	500 Hrs	—	2000 Hrs
14	Radiator	9.5 L (2.5 Gal)		**ANTIFREEZE (LLC) -34ºC (-29.2ºF)** Mixture ratio should protect to 5ºC (9ºF) lower than the coldest temperature the machine will experience. Take into consideration wind chill factors. Follow antifreeze manufacturer instructions to obtain proper mixture.	8 Hrs	—	2000 Hrs
15	Cooling system total volume	19 L (5 Gal)	22 L (5.8 Gal)				
16	Fuel tank	340 L (90 Gal)		**DIESEL FUEL** FRIGID -15° C ~ -25° C (-5° F ~ -13°) Winterized DIESEL ASTM D975 Nº 1 / WARM -1° C ~ -15° C (5ºF ~ 23ºF) DIESEL ASTM D975 Nº 2 / VERY HOT -5ºC (23ºF) and above DIESEL ASTM D975 Nº 2	—	—	500 Hrs

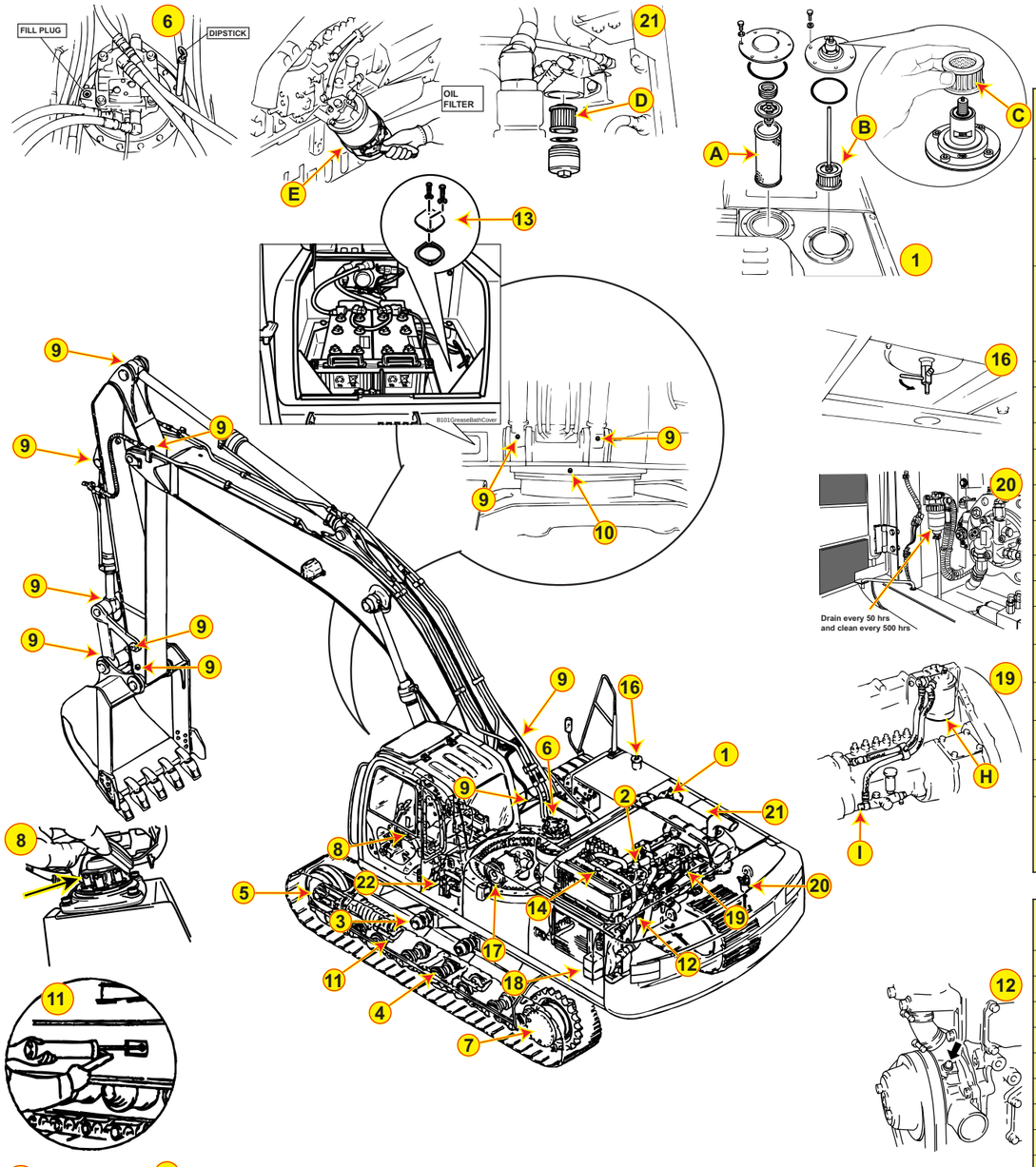
*Filter capacity: 1.1 L (0.3 Gal); 4.9 L (1.3 Gal) residual; Total engine oil volume: 24 L (6.3 Gal)

A	Hydraulic system return filter	**Element:** YR50V00001P1 (1) **Kit:** YN30T00007F1	—	50 Hrs	500 Hrs
	Return filter (For machines equipped with breaker)	**Element:** YN50V00009P1 (1) **Kit:** YN30T00007F2	—	50 Hrs	500 Hrs
B	Hydraulic suction strainer	YN50V00002S001 (1) (Includes seal P/N: 45Z91D6)			2000 Hrs
C	Hydraulic tank breather valve filter	YN57V00002S010 (1)			2000 Hrs
D	Pilot system filter	YN50V01001S005 (1) (Includes O-ring seal P/N: YN50V01001S005)			500 Hrs
E	Engine oil filter	*VAME215002 (1)		50 Hrs	500 Hrs
F	Air cleaner inner element	2446R255S6 (1)	8 Hrs		As required
G	Air cleaner outer element	2446R255S5 (1)	8 Hrs		As required
H	Engine fuel filter	*VAME015254 (1)		50 Hrs	500 Hrs
I	Priming pump gauze filter	*VAME717651 (1)			500 Hrs
J	A/C fresh air filter	YN50V01006P1 (1)			250 Hrs
K	A/C recirculate air filter	YT20M00004S050 (1)			500 Hrs

***Available only at KOBELCO dealers**

https://truckmanualshub.com/

10.13 SK290LC/SK330LC-6E LUBRICATION AND MAINTENANCE



REF.	COMPONENT (Location)	CAPACITIES SK290LC-6E	CAPACITIES SK330LC-6E	FLUID TYPE LUBRICANT; PART NUMBER	INSPECTION INTERVAL	FIRST MAINTENANCE	NORMAL MAINTENANCE INTERVAL
1	Hydraulic tank	197 L (52.5 Gal)	206 L (54 Gal)	**HYDRAULIC OIL (Anti-wear, antioxidant and non-foaming)** *Machines are shipped from factory with SHELL TELLUS 46 oil	8 Hrs	—	2000 Hrs
	Hydraulic system	351 L (93.0 Gal)		FRIGID -30° C ~ 15° C (-22° F ~ 59° F) ISOVG22 / FRIGID -20° C ~ 30° C (-4° F ~ 86° F) ISOVG32 / FRIGID-WARM -25° C ~ 40° C (-13° F ~ 104° F) ISOVG32S / WARM -5° C ~ 40° C (23° F ~ 104° F) ISOVG46* / VERY HOT 5° C ~ 55° C (41° F ~ 131° F) ISOVG68			
2	Engine oil pan* (H-level)	*28 L (7.4 Gal)		**ENGINE OIL (A.P.I. clasification for "Service CD")** *All engines are shipped from factory with SAE 15W40 oil. FRIGID -30° C ~ 30° C (-22° F ~ 86° F) SAE 10W30 / WARM -5° C ~ 40° C (23° F ~ 104° F) SAE 15W40* / VERY HOT 30° C and above (86° F and above) SAE 15W50	8 Hrs	50 Hrs	500 Hrs
	Engine oil pan* (L-level)	*23 L (6.1 Gal)					
3	Upper rollers	50 cc (1.69 Fl.Oz) X 4	100 cc (3.4 Fl. Oz) X 4	**ENGINE OIL (A.P.I. clasification for "Service CD")** These components are shipped from factory with SAE 15W40 oil	—	—	2000 Hrs
4	Lower rollers	300 cc (10.1 Fl. Oz) X 18	430 cc (14.1 Fl. Oz) X 16		—	—	2000 Hrs
5	Idlers	250 cc (8.5 Fl. Oz) X 2	350 cc (11.1 Fl. Oz) X 2		—	—	2000 Hrs
6	Swing reduction unit	21.5 L (5.7 Gal)		**GEAR OIL (Grade GL-4 by A.P.I. clasification)** Extreme pressure gear oil # 90	120 Hrs	500 Hrs	2000 Hrs
7	Travel reduction unit	10.5 L (2.8 Gal) X 2			120 Hrs	500 Hrs	2000 Hrs
8	Operating lever joint	As required		**EP2 GREASE** (Extreme pressure multipurpose No. 2 EP type grease)	120 Hrs	—	—
9	Attachment pins	16 Places			50 Hrs	—	—
10	Swing bearing	1 Place (90º X 4)			500 Hrs	—	—
11	Track tension adjustment	2 places			50 Hrs	—	—
12	Water pump bearing	6.1 cc (Aprox. one grease gun shot)		**GRASA N.L.G.I. Nº 2** (Lithium base for bearing)	500 Hrs	—	—
13	Slewing ring grease bath	15.7 Kg (34.6 lbs)		N.L.G.I. Nº 2 lithium base grease with MOS_2	500 Hrs	—	2000 Hrs
14	Radiator	15 L (4 Gal)		**ANTIFREEZE (LLC) -34ºC (-29.2ºF)** Mixture ratio should protect to 5ºC (9ºF) lower than the coldest temperature the machine will experience. Take into consideration wind chill factors. Follow antifreeze manufacturer instructions to obtain proper mixture.	8 Hrs	—	2000 Hrs
15	Cooling system total volume	34 L (9 Gal)					
16	Fuel tank	420 L (112 Gal)	560 L (148 Gal)	**DIESEL FUEL** FRIGID -15° C ~ -25° C (-5° F ~ -13°) Winterized DIESEL ASTM D975 Nº 1 / WARM -1° C ~ -15° C (5ºF ~ 23ºF) DIESEL ASTM D975 Nº 2 / VERY HOT -5ºC (23º F) and above DIESEL ASTM D975 Nº 2	—	—	—

*Total engine oil volume (including filter): 32 L (8.5 Gal)

A	Hydraulic system return filter	**Element kit:** YN50V00004F3 (1)	—	50 Hrs	500 Hrs
	Return filter (For machines equipped with breaker)	**Element:** YN50V00009P1 (1) **Seal:** ZD11G20000	—	50 Hrs	500 Hrs
B	Hydraulic suction strainer	LC50V00001F1 (1) (Includes seal P/N: 45Z91D6)			2000 Hrs
C	Hydraulic tank breather valve filter	YN57V00002S010 (1)			2000 Hrs
D	Pilot system filter	YN50V01001S005 (1)			500 Hrs
E	Engine oil filter	*VAME130968 (1)		50 Hrs	500 Hrs
F	Air cleaner inner element	YN11P01013P1 (1)	8 Hrs		As required
G	Air cleaner outer element	YN11P00001S002 (1)	8 Hrs		Ar required
H	Engine fuel filter	*VAME055670 (1)		50 Hrs	500 Hrs
I	Priming pump gauze filter	*VAME717659 (1)			500 Hrs
J	A/C fresh air filter	YN50V01006P1 (1)			250 Hrs
K	A/C recirculate air filter	YT20M00004S050 (1)			500 Hrs

***Available only at KOBELCO dealers**

10

https://truckmanualshub.com/

https://truckmanualshub.com/

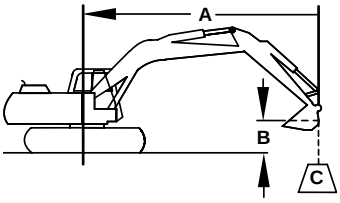
SK160LC/ED190 LIFTING CAPACITIES

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.
2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.
3. Ratings at bucket lift hook.
4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.
6. Capacities apply to the machine as originally manufactured and normally equipped by KCMA LLC.

CAUTION

THE OPERATOR MUST CONSIDER THE WEIGHT OF ANY DEVICE UTILIZED FOR LIFTING TO PROPERLY CALCULATE THE TOTAL LIFTING CAPACITY OF THE MACHINE, EXAMPLE:

1. **If the excavator uses the same bucket size indicated in the lifting table, and a lifting cable, etc. weighing 100 kg (220 lbs) is used for lifting, then you have to subtract this additional 100 kg (220 lbs) from every value indicated in the lifting table accordingly.**
2. **If a bucket is changed for a larger bucket, which weight is 350 Kg (770 lbs) more than the bucket indicated in the lifting chart, then you have to subtract this additional weight from every value indicated in the lifting table accordingly.**
3. **If a bucket is changed for a smaller bucket, which weight is 350 Kg (770 lbs) less than the bucket indicated in lifting chart, then you can safely add 350 kg (770 lbs) to every value indicated in the lifting table accordingly.**

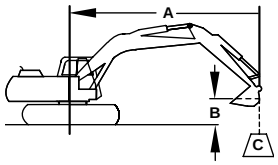


SK160LC-VI LIFTING CAPACITIES

Based on a machine equipped with 5.20 m boom (16' 1"), 2.60 m (8' 6") arm, 0.63 m³ (0.82 yrd³) bucket, and 600 mm (23.6") shoes.

SK160LC	Boom: 5.20 m (16' 1")		Arm: 2.60 m (8' 6")		Bucket: 0.63 m³ (0.82 yd³) SAE/PCSA 450 Kg (992 lbs)					
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0") lb							*5510	*5510		
6.1 m (20' 0") kg							*2500	*2500		
4.6 m (15' 0") lb					*9310	*9310	*8300	6290		
4.6 m (15' 0") kg					*4220	*4220	*3760	2850		
3.0 m (10' 0") lb			*17360	*17360	*11590	9430	*9260	5930	*4270	4000
3.0 m (10' 0") kg			*7870	*7870	*5250	4270	*4200	2690	*1940	1810
1.5 m (5' 0") lb			*19730	15620	*13900	8570	9840	5540	*5870	3830
1.5 m (5' 0") kg			*8940	7080	*6300	3880	4460	2510	*2660	1730
Ground Level lb			*18570	14860	15020	8010	9500	5240		
Ground Level kg			*8420	6740	6810	3630	4310	2370		
-1.5 m (-5' 0") lb	*14690	*14690	*22220	14820	14780	7820	9360	5110		
-1.5 m (-5' 0") kg	*6660	*6660	*10070	6720	6700	3540	4240	2310		
-3.0 m (-10' 0") lb	*21550	*21550	*18750	15130	*13060	7910				
-3.0 m (-10' 0") kg	*9770	*9770	*8500	6860	*5920	3590				
-4.6 m (-15' 0") lb			*12290	*12290						
-4.6 m (-15' 0") kg			*5570	*5570						

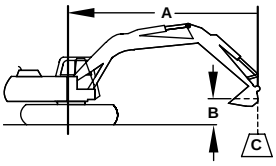
https://truckmanualshub.com/



SK160LC-VI LIFTING CAPACITIES (HEAVY LIFT)

Based on a machine equipped with 5.20 m boom (16' 1"), 2.60 m (8' 6") arm, 0.63 m³ (0.82 yrd³) bucket, and 600 mm (23.6") shoes.

SK160LC	Boom: 5.20 m (16' 1")		Arm: 2.60 m (8' 6")		Bucket: 0.63 m³ (0.82 yd³) SAE/PCSA 450 Kg (992 lbs)					
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0")	lb						*6190	*6190		
	kg						*2800	*2800		
4.6 m (15' 0")	lb				*10470	10260	*9380	6290		
	kg				*4750	4650	*4250	2850		
3.0 m (10' 0")	lb			*19470	17960	*13060	9430	10280	5930	*4830	4000
	kg			*8830	8140	*5920	4270	4660	2690	*2190	1810
1.5 m (5' 0")	lb			*21800	15620	15670	8570	9840	5540	*6600	3830
	kg			*9890	7080	7110	3880	4460	2510	*2990	1730
Ground Level	lb			*20530	14860	15020	8010	9500	5240		
	kg			*9310	6740	6810	3630	4310	2370		
-1.5 m (-5' 0")	lb	*16290	*16290	*25060	14820	14780	7820	9360	5110		
	kg	*7380	*7380	*11360	6720	6700	3540	4240	2310		
-3.0 m (-10' 0")	lb	*23830	*23830	*21220	15130	14800	7910				
	kg	*10800	*10800	*9620	6860	6710	3590				
-4.6 m (-15' 0")	lb			*14050	*14050						
	kg			*6370	*6370						



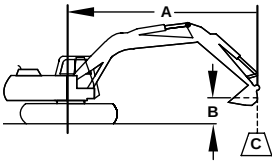
SK160LC-VI LIFTING CAPACITIES

Based on a machine equipped with 5.20 m boom (16' 1"), 2.60 m (8' 6") arm, 0.63 m³ (0.82 yrd³) bucket, and 800 mm (31.5") shoes.

SK160LC	Boom: 5.20 m (16' 1")		Arm: 2.60 m (8' 6")		Bucket: 0.63 m³ (0.82 yd³) SAE/PCSA 450 Kg (992 lbs)					
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0")	lb						*5510	*5510		
	kg						*2500	*2500		
4.6 m (15' 0")	lb				*9310	*9310	*8300	6530		
	kg				*4220	*4220	*3760	2960		
3.0 m (10' 0")	lb			*17360	*17360	*11590	9780	*9260	6180	*4270	4190
	kg			*7870	*7870	*5250	4430	*4200	2800	*1940	1900
1.5 m (5' 0")	lb			*19730	16240	*13900	8920	10270	5780	*5870	4020
	kg			*8940	7360	*6300	4040	4660	2620	*2660	1820
Ground Level	lb			*18570	15490	*15140	8370	9940	5480		
	kg			*8420	7020	*6860	3790	4500	2480		
-1.5 m (-5' 0")	lb	*14690	*14690	*22220	15450	*14920	8170	9790	5350		
	kg	*6660	*6660	*10070	7000	*6760	3700	4440	2430		
-3.0 m (-10' 0")	lb	*21550	*21550	*18750	15760	*13060	8270				
	kg	*9770	*9770	*8500	7140	*5920	3750				
-4.6 m (-15' 0")	lb			*12290	*12290						
	kg			*5570	*5570						

10

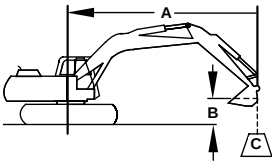
https://truckmanualshub.com/



SK160LC-VI LIFTING CAPACITIES (HEAVY LIFT)

Based on a machine equipped with 5.20 m boom (16' 1"), 2.60 m (8' 6") arm, 0.63 m³ (0.82 yrd³) bucket, and 800 mm (31.5") shoes.

SK160LC	Boom: 5.20 m (16' 1")		Arm: 2.60 m (8' 6")		Bucket: 0.63 m³ (0.82 yd³) SAE/PCSA 450 Kg (992 lbs)					
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0")	lb kg						*6190 *2800	*6190 *2800		
4.6 m (15' 0")	lb kg				*10470 *4750	*10470 *4750	*9380 *4250	6530 2960		
3.0 m (10' 0")	lb kg			*19470 *8830	18590 8430	*13060 *5920	9780 4430	*10470 *4750	6180 2800	*4830 *2190	4190 1900
1.5 m (5' 0")	lb kg			*21800 *9890	16240 7360	*15680 *7110	8920 4040	10270 4660	5780 2620	*6600 *2990	4020 1820
Ground Level	lb kg			*20530 *9310	15490 7020	15680 7110	8370 3790	9940 4500	5480 2480		
-1.5 m (-5' 0")	lb kg	*16290 *7380	*16290 *7380	*25060 *11360	15450 7000	15440 7000	8170 3700	9790 4440	5350 2430		
-3.0 m (-10' 0")	lb kg	*23830 *10800	*23830 *10800	*21220 *9620	15760 7140	*14800 *6710	8270 3750				
-4.6 m (-15' 0")	lb kg			*14050 *6370	*14050 *6370						

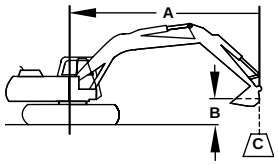


SK160LC-VI LIFTING CAPACITIES

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") shoes.

SK160LC	Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0")	lb kg						*6030 *2730	*6030 *2730		
4.6 m (15' 0")	lb kg						*7650 *3470	6470 2930	*3860 *1750	*3860 *1750
3.0 m (10' 0")	lb kg			*15000 *6800	*15000 *6800	*10620 *4810	9710 4400	*8710 *3950	6080 2750	*6130 *2780	4100 1860
1.5 m (5' 0")	lb kg			*21300 *9690	16180 7340	*13180 *5970	8770 3980	*9900 *4490	5640 2550	6950 3150	3890 1760
Ground Level	lb kg	*7390 *3350	*7390 *3350	*18840 *8540	14960 6780	*14840 *6730	8100 3670	9550 4330	5280 2390	6750 3060	3720 1680
-1.5 m (-5' 0")	lb kg	*12560 *5690	*12560 *5690	*22290 *10110	14690 6660	14760 6690	7790 3530	9340 4230	5090 2390		
-3.0 m (-10' 0")	lb kg	*18260 *8280	*18260 *8280	*20330 *9220	14870 6740	*13830 *6270	7800 3530	9350 4240	5100 2310		
-4.6 m (-15' 0")	lb kg	*23770 *10780	*23770 *10780	*14990 *6790	*14990 *6790	*10280 *4660	8120 3680				

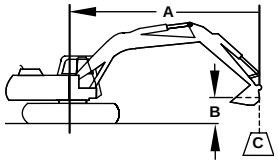
https://truckmanualshub.com/



SK160LC-VI LIFTING CAPACITIES (HEAVY LIFT)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") shoes.

SK160LC	Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA		370 Kg (816 lbs)			
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0")	lb kg						*6760 *3060	6680 3030		
4.6 m (15' 0")	lb kg						*8660 *3920	6470 2930	*4380 *1980	4260 1930
3.0 m (10' 0")	lb kg			*16810 *7620	*16810 *7620	*11960 *5420	9710 4400	*9850 *4460	6080 2750	*6880 *3120	4100 1860
1.5 m (5' 0")	lb kg			*24010 *10890	16180 7340	*14860 *6740	8770 3980	9950 4510	5640 2550	6950 3150	3890 1760
Ground Level	lb kg	*8260 *3740	*8260 *3740	*20830 *9440	14960 6780	15120 6850	8100 3670	9550 4330	5280 2390	6750 3060	3720 1680
-1.5 m (-5' 0")	lb kg	*13940 *6320	*13940 *6320	*24630 *11170	14690 6660	14760 6690	7790 3530	9340 4230	5090 2390		
-3.0 m (-10' 0")	lb kg	*20200 *9160	*20200 *9160	*22970 *10410	14870 6740	14760 6690	7800 3530	9350 4240	5100 2310		
-4.6 m (-15' 0")	lb kg	*27100 *12290	*27100 *12290	*17050 *7730	15450 7000	*11730 *5320	8120 3680				

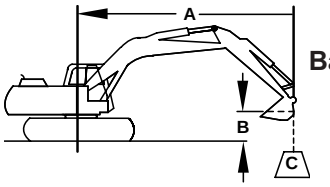


SK160LC-VI LIFTING CAPACITIES

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") shoes.

SK160LC	Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA		370 Kg (816 lbs)			
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0")	lb kg						*6030 *2730	*6030 *2730		
4.6 m (15' 0")	lb kg						*7650 *3470	6710 3040	*3860 *1750	*3860 *1750
3.0 m (10' 0")	lb kg			*15000 *6800	*15000 *6800	*10620 *4810	10070 4560	*8710 *3950	6320 2860	*6130 *2780	4290 1940
1.5 m (5' 0")	lb kg			*21360 *9690	16810 7620	*13180 *5970	9130 4140	*9900 *4490	5880 2670	7270 3290	4080 1850
Ground Level	lb kg	*7390 *3350	*7390 *3350	*18840 *8540	15580 7060	*14840 *6730	8450 3830	9990 4530	5530 2500	7080 3210	3910 1770
-1.5 m (-5' 0")	lb kg	*12560 *5690	*12560 *5690	*22290 *10110	15310 6940	*15100 *6850	8140 3690	9770 4430	5330 2420		
-3.0 m (-10' 0")	lb kg	*18260 *8280	*18260 *8280	*20330 *9220	15500 7030	*13830 *6270	8150 3690	9780 4430	5350 2420		
-4.6 m (-15' 0")	lb kg	*23770 *10780	*23770 *10780	*14990 *6790	*14990 *6790	*10280 *4660	8470 3840				

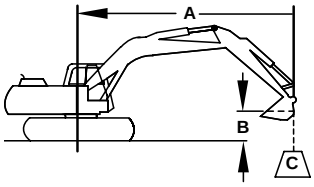
https://truckmanualshub.com/



SK160LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") triple grouser shoes.

SK160LC	Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0")	lb kg							*6760 *3060	6680 3030		
4.6 m (15' 0")	lb kg							*8660 *3920	6470 2930	*4380 *1980	4260 1930
3.0 m (10' 0")	lb kg			*16810 *7620	*16810 *7620	*11960 *5420	9710 4400	*9850 *4460	6080 2750	*6880 *3120	4100 1860
1.5 m (5' 0")	lb kg			*24010 *10890	16180 7340	*14860 *6740	8770 3980	9950 4510	5640 2550	6950 3150	3890 1760
Ground Level	lb kg	*8260 *3740	*8260 *3740	*20830 *9440	14960 6780	15120 6850	8100 3670	9550 4330	5280 2390	6750 3060	3720 1680
-1.5 m (-5' 0")	lb kg	*13940 *6320	*13940 *6320	*24630 *11170	14690 6660	14760 6690	7790 3530	9340 4230	5090 2390		
-3.0 m (-10' 0")	lb kg	*20200 *9160	*20200 *9160	*22970 *10410	14870 6740	14760 6690	7800 3530	9350 4240	5100 2310		
-4.6 m (-15' 0")	lb kg	*27100 *12290	*27100 *12290	*17050 *7730	15450 7000	*11730 *5320	8120 3680				

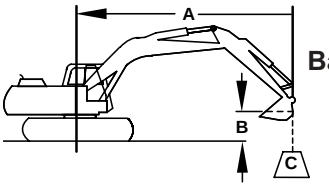


ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes.

ED190LC Blade Runner	Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
6.1 m (20' 0")	kg lb							*2810 *6200	*2810 *6200		
4.6 m (15' 0")	kg lb							*3530 *7780	3490 7700	*1850 *4080	*1850 *4080
3.0 m (10' 0")	kg lb			*7000 *15440	*7000 *15440	*4920 *10840	*4920 *10840	*4010 *8850	3320 7310	*2850 *6290	2300 5070
1.5 m (5' 0")	kg lb			*9830 *21680	8720 19220	*6070 *13370	4770 10510	4190 9230	3120 6870	2940 6480	2200 4860
Ground Level	kg lb	*3510 *7740	*3510 *7740	*8610 *18970	8190 18060	6270 13820	4470 9850	4010 8840	2960 6520	2850 6290	4690 2130
-1.5 m (-5' 0")	kg lb	*5860 *12910	*5860 *12910	*10280 *22670	8080 17820	6120 13490	4340 9560	3920 8640	2880 6340		
-3.0 m (-10' 0")	kg lb	*8460 *18660	*8460 *18660	*9170 *20200	8170 18020	6130 13510	4350 9580	3930 8670	2890 6360		
-4.6 m (-15' 0")	kg lb	*10490 *23120	*10490 *23120	*6670 *14700	*6670 *14700	*4570 *10070	4500 9920				

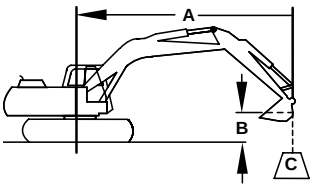
https://truckmanualshub.com/



ED190-VI LIFTING CAPACITIES (Blade Down in Rear)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes.

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*2810 *6200	*2810 *6200		
4.6 m (15' 0")	kg lb							*3530 *7780	3490 7700		
3.0 m (10' 0")	kg lb			*7000 *15440	*7000 *15440	*4920 *10840	*4920 *10840	*4010 *8850	3320 7310	*1850 *4080	*1850 *4080
1.5 m (5' 0")	kg lb			*9830 *21680	8720 19220	*6070 *13370	4770 10510	*4550 *10040	3120 6870	*2850 *6290	2300 5070
Ground Level	kg lb	*3510 *7740	*3510 *7740	*8610 *18970	8190 18060	*6790 *14970	4470 9850	*4940 *10880	2960 6520	*3540 *7800	2200 4860
-1.5 m (-5' 0")	kg lb	*5860 *12910	*5860 *12910	*10280 *22670	8080 17820	6880 15160	4340 9560	4850 10690	2880 6340	3570 7870	2130 4690
-3.0 m (-10' 0")	kg lb	*8460 *18660	*8460 *18660	*9170 *20220	8170 18020	*6260 *13800	4350 9580	*4460 *9840	2890 6360		
-4.6 m (-15' 0")	kg lb	*10490 *23120	*10490 *23120	*6670 *14700	*6670 *14700	*4570 *10070	4500 9920				

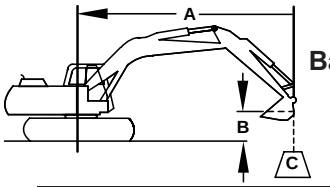


ED190LC-VI LIFTING CAPACITIES (Blade Up in Front)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes.

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*2810 *6200	*2810 *6200		
4.6 m (15' 0")	kg lb							*3530 *7780	3490 7700	*1850 *4080	*1850 *4080
3.0 m (10' 0")	kg lb			*7000 *15440	*7000 *15440	*4920 *10840	*4920 *10840	*4010 *8850	3320 7310	*2850 *6290	2300 5070
1.5 m (5' 0")	kg lb			*9830 *21680	8720 19220	*6070 *13370	4770 10510	4190 9240	3120 6870	2940 6490	2200 4860
Ground Level	kg lb	*3510 *7740	*3510 *7740	*8610 *18970	8190 18060	6280 13840	4470 9850	4010 8850	2960 6520	2860 6300	2130 4690
-1.5 m (-5' 0")	kg lb	*5860 *12910	*5860 *12910	*10280 *22670	8080 17820	6130 13510	4340 9560	3920 8650	2880 6340		
-3.0 m (-10' 0")	kg lb	*8460 *18660	*8460 *18660	*9170 *20200	8170 18020	6140 13530	4350 9580	3940 8680	2890 6360		
-4.6 m (-15' 0")	kg lb	*10490 *23120	*10490 *23120	*6670 *14700	*6670 *14700	*4570 *10070	4500 9920				

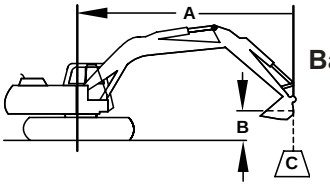
https://truckmanualshub.com/



ED190-VI LIFTING CAPACITIES (Blade Up in Rear)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes.

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*2810 *6200	*2810 *6200		
4.6 m (15' 0")	kg lb							*3530 *7780	3490 7700	*1850 *4080	*1850 *4080
3.0 m (10' 0")	kg lb			*7000 *15440	*7000 *15440	*4920 *10840	*4920 *10840	*4010 *8850	3320 7310	*2850 *6290	2300 5070
1.5 m (5' 0")	kg lb			*9830 *21680	8720 19220	*6070 *13370	4770 10510	*4550 *10040	3120 6870	*3540 *7800	2200 4860
Ground Level	kg lb	*3510 *7740	*3510 *7740	*18970 *8610	8190 18060	*6790 *14970	4470 9850	4930 10870	2960 6520	3570 7860	2130 4690
-1.5 m (-5' 0")	kg lb	*5860 *12910	*5860 *12910	*10280 *22670	8080 17820	*6880 *15160	4340 9560	4840 10670	2880 6340		
-3.0 m (-10' 0")	kg lb	*8460 *18660	*8460 *18660	*9170 *20200	8170 18020	*6260 *13800	4350 9580	*4460 *9840	2890 6360		
-4.6 m (-15' 0")	kg lb	*10490 *23120	*10490 *23120	*6670 *14700	*6670 *14700	*4570 *10070	4500 9920				

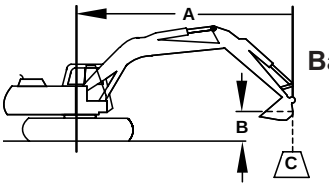


ED190-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") double grouser shoes. (Blade up in front)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3460 7620	*2100 *4620	*2100 *4620
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	5130 11320	4360 9620	3270 7220	*3010 *6640	2270 5000
1.5 m (5' 0")	kg lb			*11040 *24350	8620 19000	6550 14440	4710 10380	4150 9140	3080 6790	2910 6410	2170 4790
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8090 17840	6210 13690	4410 9730	3970 8760	2920 6440	2830 6230	2100 4620
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	7980 17600	6060 13360	4280 9440	3880 8560	2830 6250		
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	*10360 *22840	8070 17800	6070 13380	4290 9460	3890 8580	2840 6270		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	4450 9800				

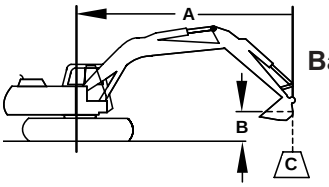
https://truckmanualshub.com/



ED190-VI LIFTING CAPACITIES (Heavy lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") double grouser shoes. (Blade down in front)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3460 7620	*2100 *4620	*2100 *4620
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	5130 11320	4360 9620	3270 7220	3010 6630	2270 5000
1.5 m (5' 0")	kg lb			*11040 *24350	8620 19000	6550 14430	4710 10380	4150 9140	3080 6790	2900 6400	2170 4790
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8090 17840	6210 13680	4410 9730	3970 8760	2920 6440	2820 6220	2100 4620
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	7980 17600	6050 13340	4280 9440	3880 8560	2830 6250		
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	*10360 *22840	8070 17800	6060 13360	4290 9460	3890 8580	2840 6270		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	4450 9800				



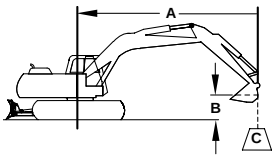
ED190-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") double grouser shoes. (Blade up in rear)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							3990 8790	3460 7620	*2100 *4620	*2100 *4620
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	5530 12190	5130 11320	4540 10000	3270 7220	3200 7050	2270 5000
1.5 m (5' 0")	kg lb			11040 24350	8620 19000	6840 15070	4710 10380	5030 11090	3080 6790	3590 7920	2170 4790
Ground Level	kg lb	*3910 *8630	*3910 *8630	9510 20970	8090 17840	7460 16450	4410 9730	4860 10710	2920 6440	3510 7740	2100 4620
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	11350 25030	7980 17600	7310 16120	4280 9440	4770 10520	2830 6250		
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	10360 22840	8070 17800	*7090 *15630	4290 9460	4780 10540	2830 6250		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	4450 9800				

10

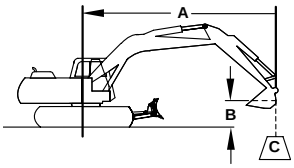
https://truckmanualshub.com/



ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") double grouser shoes. (Blade down in rear)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3460 7620		
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	5130 11320	*4540 *10000	3270 7220	*2100 *4620	*2100 *4620
1.5 m (5' 0")	kg lb			*11040 *24350	8620 19000	*6840 *15070	4710 10380	5030 11100	3080 6790	*3200 *7050	2270 5000
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8090 17840	7470 16460	4410 9730	4870 10730	2920 6440	3600 7930	2170 4790
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	7980 17600	7320 16140	4280 9440	4780 10550	2830 6250	3520 7750	2100 4620
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	*10360 *22840	8070 17800	*7090 *15630	4290 9460	4790 10550	2830 6270		
-4.6 m (-15' 0")	kg lb			*7590 *16730	*7590 *16730	*5220 *11500	4450 9800				

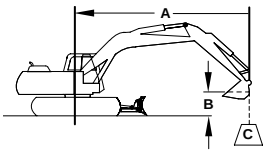


ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes. (Blade up in front)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3490 7700	*2100 *4620	*2100 *4620
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	*5190 *11440	4410 9720	3320 7310	3040 6710	2300 5070
1.5 m (5' 0")	kg lb			*11040 *24350	8720 19220	6620 14590	4770 10510	4190 9240	3120 6870	2940 6490	2200 4860
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8190 18060	6280 13840	4470 9850	4010 8850	2960 6520	2860 6300	2130 4690
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	8080 17820	6130 13510	4340 9560	3920 8650	2880 6340		
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	*10360 *22840	8170 18020	6140 13530	4350 9580	3940 8680	2880 6360		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	4500 9920				

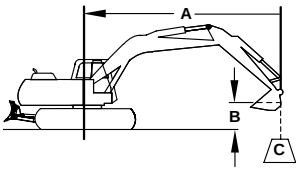
https://truckmanualshub.com/



ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes. (Blade down in front)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3490 7700	*2100 *4620	*2100 *4620
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	5190 11440	4400 9710	3320 7310	3040 6700	2300 5070
1.5 m (5' 0")	kg lb			*11040 *24350	8720 19220	6610 14570	4770 10510	4190 9230	3120 6870	2940 6480	2200 4860
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8190 18060	6270 13820	4470 9850	4010 8840	2960 6520	2850 6290	2130 4690
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	8080 17820	6120 13490	4340 9560	3920 8640	2880 6340		
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	*10360 *22840	8170 18020	6130 13510	4350 9580	3930 8670	2890 6360		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	450 9920				



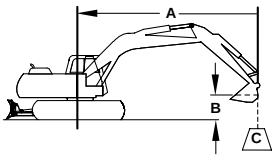
ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes. (Blade up in rear)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3490 7700	*2100 *4620	*2100 *4620
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	5190 11440	*4540 *10000	3320 7310	*3200 *7050	2300 5070
1.5 m (5' 0")	kg lb			*11040 *24350	8720 19220	*6840 *15070	4770 10510	5100 11250	3120 6870	3650 8040	2200 4860
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8190 18060	7570 16680	4470 9850	4930 10870	2960 6520	3570 7860	2130 4690
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	8080 17820	7420 16360	4340 9560	4840 10670	2880 6340		
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	10360 22840	8170 18020	*7090 *15630	4350 9580	4850 10700	2880 6360		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	4500 9920				

10

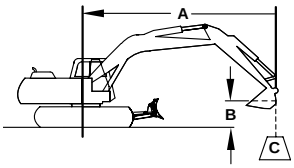
https://truckmanualshub.com/



ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes. (Blade down in rear)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3490 7700		
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	5190 11440	*4540 *10000	3320 7310	*2100 *4620	*2100 *4620
1.5 m (5' 0")	kg lb			*11040 *24350	8720 19220	*6840 *15070	4770 10510	5110 11260	3120 6870	*3200 *7050	2300 5070
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8190 18060	7570 16700	4470 9850	4940 10880	2960 6520	3650 8050	2200 4860
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	8080 17820	7430 16380	4340 9560	4850 10690	2880 6340	3570 7870	2130 4690
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	*10360 *22840	8170 18020	*7090 *15630	4350 9580	4860 10710	2890 6360		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	4500 9920				

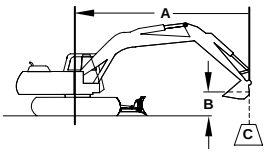


ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") triple grouser shoes. (Blade up in front)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3620 7980	*2100 *4620	*2100 *4620
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	5370 11840	*4540 *10000	3440 7580	3150 6940	2390 5280
1.5 m (5' 0")	kg lb			*11040 *24350	8720 19220	6830 15050	4940 10900	4330 9550	3240 7150	3050 6720	2300 5070
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8510 18760	6490 14300	4650 10250	4150 9160	3080 6800	2960 6530	2220 4900
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	8400 18520	6340 13970	4520 9960	4060 8960	3000 6610		
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	*10360 *22840	8490 18720	6350 13990	4530 9980	4080 8990	3010 6640		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	4680 10320				

https://truckmanualshub.com/

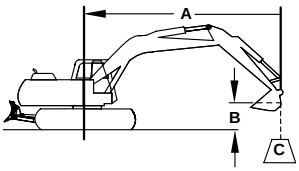


ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") triple grouser shoes. (Blade down in front)

ED190LC Blade Runner	Boom: 5.20 m (16' 1")	Arm: 3.10 m (10' 2")	Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)

A / B	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
6.1 m (20' 0")	kg							*3150	*3150		
	lb							*6940	*6940		
4.6 m (15' 0")	kg							*3990	3620	*2100	*2100
	lb							*8790	7980	*4620	*4620
3.0 m (10' 0")	kg			*7840	*7840	*5530	5370	*4540	3440	3140	2390
	lb			*17290	*17290	*12190	11840	*10000	7580	6930	5280
1.5 m (5' 0")	kg			*11040	8720	6820	4940	4330	3240	3040	2300
	lb			*24350	19220	15030	10900	9540	7150	6710	5070
Ground Level	kg	*3910	*3910	*9510	8510	6480	4650	4150	3080	2960	2220
	lb	*8630	*8630	*20970	18760	14280	10250	9150	6800	6520	4900
-1.5 m (-5' 0")	kg	*6490	*6490	*11350	8400	6330	4520	4060	3000		
	lb	*14310	*14310	*25030	18520	13950	9960	8950	6610		
-3.0 m (-10' 0")	kg	*9360	*9360	*10360	8490	6340	4530	4070	3010		
	lb	*20630	*20630	*22840	18720	13970	9980	8980	6640		
-4.6 m (-15' 0")	kg	*11960	*11960	*7590	*7590	*5220	4680				
	lb	*26360	*26360	*16730	*16730	*11500	10320				



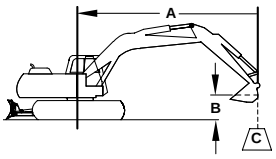
ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") triple grouser shoes. (Blade up in rear)

ED190LC Blade Runner	Boom: 5.20 m (16' 1")	Arm: 3.10 m (10' 2")	Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)

A / B	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
6.1 m (20' 0")	kg							*3150	*3150		
	lb							*6940	*6940		
4.6 m (15' 0")	kg							*3990	3620	*2100	*2100
	lb							*8790	7980	*4620	*4620
3.0 m (10' 0")	kg			*7840	*7840	*5530	5370	*4540	3440	*3200	2390
	lb			*17290	*17290	*12190	11840	*10000	7580	*7050	5280
1.5 m (5' 0")	kg			*11040	8720	*6840	4940	*5150	3240	3820	2300
	lb			*24350	19220	*15070	10900	*11350	7150	8420	5070
Ground Level	kg	*3910	*3910	*9510	8510	*7660	4650	5170	3080	3740	2220
	lb	*8630	*8630	*20970	18760	*16890	10250	11390	6800	8240	4900
-1.5 m (-5' 0")	kg	*6490	*6490	*11350	8400	7770	4520	5080	3000		
	lb	*14310	*14310	*25030	18520	17120	9960	11190	6610		
-3.0 m (-10' 0")	kg	*9360	*9360	*10360	8490	*7090	4530	5080	3010		
	lb	*20630	*20630	*22840	18720	*15630	9980	11190	6640		
-4.6 m (-15' 0")	kg	*11960	*11960	*7590	*7590	*5220	4680				
	lb	*26360	*26360	*16730	*16730	*11500	10320				

https://truckmanualshub.com/



ED190LC-VI LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") triple grouser shoes. (Blade down in rear)

ED190LC Blade Runner		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B	C										
6.1 m (20' 0")	kg lb							*3150 *6940	*3150 *6940		
4.6 m (15' 0")	kg lb							*3990 *8790	3620 7980	*2100 *4620	*2100 *4620
3.0 m (10' 0")	kg lb			*7840 *17290	*7840 *17290	*5530 *12190	5370 11840	*4540 *10000	3440 7580	*3200 *7050	2390 5280
1.5 m (5' 0")	kg lb			*11040 *24350	9040 19920	*6840 *15070	4940 10900	*5150 *11350	3240 7150	3820 8430	2300 5070
Ground Level	kg lb	*3910 *8630	*3910 *8630	*9510 *20970	8510 18760	*7660 *16890	4650 10250	5170 11390	3080 6800	3740 8250	2220 4900
-1.5 m (-5' 0")	kg lb	*6490 *14310	*6490 *14310	*11350 *25030	8400 18520	*7770 *17120	4520 9960	5080 11190	3000 6610		
-3.0 m (-10' 0")	kg lb	*9360 *20630	*9360 *20630	*10360 *22840	8490 18720	*7090 *15630	4530 9980	*5080 *11190	3010 6640		
-4.6 m (-15' 0")	kg lb	*11960 *26360	*11960 *26360	*7590 *16730	*7590 *16730	*5220 *11500	4680 10320				

https://truckmanualshub.com/

SK210LC-6E LIFTING CAPACITIES KCMALLC SPEC'S

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.

2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.

3. Ratings at bucket lift hook.

4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.

5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.

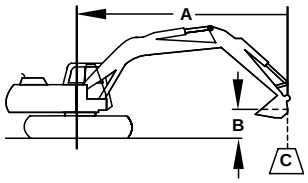
6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO Construction Machinery America LLC.

CAUTION

THE OPERATOR MUST CONSIDER THE WEIGHT OF ANY DEVICE UTILIZED FOR LIFTING TO PROPERLY CALCULATE THE TOTAL LIFTING CAPACITY OF THE MACHINE, EXAMPLE:

1. **If the excavator uses the same bucket size indicated in the lifting table, and a lifting cable, etc. weighing 100 kg (220 lbs) is used for lifting, then you have to subtract this additional 100 kg (220 lbs) from every value indicated in the lifting table accordingly.**
2. **If a bucket is changed for a larger bucket, which weight is 350 Kg (770 lbs) more than the bucket indicated in the lifting chart, then you have to subtract this additional weight from every value indicated in the lifting table accordingly.**
3. **If a bucket is changed for a smaller bucket, which weight is 350 Kg (770 lbs) less than the bucket indicated in lifting chart, then you can safely add 350 kg (770 lbs) to every value indicated in the lifting table accordingly.**

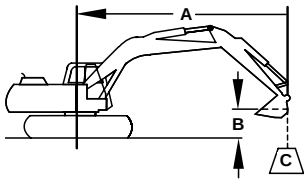
SK210LC-6E LIFTING CAPACITIES



SK210LC Boom: 5.65 M (18' 6") Arm: 2.40 M (7' 10"0 Bucket: 0.93 m³ (1.22 yd³) SAE/PCSA 660 Kg (1,460 lbs) Shoes: 800 mm (31.5")

B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb										
	kg										
6.1 m (20' 0")	lb							*10800	10790		
	kg							*4900	4890		
4.6 m (15' 0")	lb							*11730	10470		
	kg							*5320	4750		
3.0 m (10' 0")	lb			*26030	*26030	*17310	15630	*13400	9970	11050	6910
	kg			*11800	*11800	*7850	7090	*6070	4520	5010	3130
1.5 m (5' 0")	lb					*20820	14540	*15130	9450	10790	6680
	kg					*9440	6590	*6860	4280	4890	3030
Ground Level	lb			*14520	*14520	*22570	13950	14980	9100	10600	6510
	kg			*6580	*6580	*10230	6320	6790	4120	4810	2950
-1.5 m (-5' 0")	lb	*15480	*15480	*24530	*24530	*22410	13800	14830	8960		
	kg	*7020	*7020	*11120	*11120	*10160	6260	6720	4060		
-3.0 m (-10' 0")	lb	*25470	*25470	*28810.	27780	*20350	13970	*14750	9080		
	kg	*11550	*11550	*13060	12600	*9230	6330	*6690	4110		
-4.6 m (-15' 0")	lb			*21380	*21380	*15140	14520				
	kg			*9700	*9700	*6860	6580				

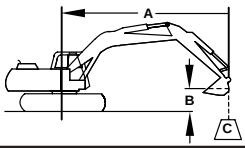
SK210LC-6E LIFTING CAPACITIES (Heavy Lift)



SK210LC Boom: 5.65 M (18' 6") Arm: 2.40 M (7' 10"0 Bucket: 0.93 m³ (1.22 yd³) SAE/PCSA 660 Kg (1,460 lbs) Shoes: 800 mm (31.5") {HL}

B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb										
	kg										
6.1 m (20' 0")	lb							*12200	10790		
	kg							*5530	4890		
4.6 m (15' 0")	lb							*13250	10470		
	kg							*6010	4750		
3.0 m (10' 0")	lb			*28760	*28760	*19480	15630	*15130	9970	11050	6910
	kg			*13040	*13040	*8830	7090	*6860	4520	5010	3130
1.5 m (5' 0")	lb					*23430	14540	15390	9450	10790	6680
	kg					*10620	6590	6980	4280	4890	3030
Ground Level	lb			*16140	*16140	24070	13950	14980	9100	10600	6510
	kg			*7320	*7320	10910	6320	6790	4120	4810	2950
-1.5 m (-5' 0")	lb	*17210	*17210	*27140	*27140	23890	13800	14830	8960		
	kg	*7800	*7800	*12300	*12300	10830	6260	6720	4060		
-3.0 m (-10' 0")	lb	*28180	*28180	*32440	27780	*22970	13970	14960	9080		
	kg	*12780	*12780	*14710	12600	*10410	6330	6780	4110		
-4.6 m (-15' 0")	lb			*24210	*24210	*17180	14520				
	kg			*10980	*10980	*7790	6580				

https://truckmanualshub.com/

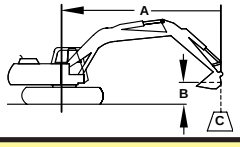


SK210LC-6E LIFTING CAPACITIES

Based on a machine equipped with 5.65 m boom (18’ 6”), 2.94 m (9’ 8”) arm, 0.80 m³ (1.05 yrd³) bucket, and 800 mm (31.5”) shoes.

SK210LC Boom: 5.65 M (18' 6") Arm: 2.94 M (9' 8") Bucket: 0.80 m³ (1.05 yd³) SAE/PCSA 620 Kg (1,370 lbs) Shoes: 800 mm (31.5")

B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb							*6540	*6540		
	kg							*2960	*2960		
6.1 m (20' 0")	lb										
	kg										
4.6 m (15' 0")	lb							*10690	10630	*8540	7210
	kg							*4840	4820	*3870	3270
3.0 m (10' 0")	lb			*24210	*24210	*15730	*15730	*12470	10090	*10860	6970
	kg			*10970	*10970	*7130	*7130	*5650	4570	*4920	3160
1.5 m (5' 0")	lb			*15790	*15790	*19630	14760	*14400	9520	10810	6690
	kg			*7160	*7160	*8900	6690	*6530	4320	4900	3030
Ground Level	lb			*16380	*16380	*22040	14000	14990	9090	10560	6460
	kg			*7430	*7430	*9990	6350	6800	4120	4790	2930
-1.5 m (-5' 0")	lb	*13900	*13900	*22760	*22760	*22560	13710	14740	8870	10450	6360
	kg	*6300	*6300	*10320	*10320	*10230	6210	6680	4020	4740	2880
-3.0 m (-10' 0")	lb	*21370	*21370	*31030	27360	*21240	13760	14770	8890		
	kg	*9690	*9690	*14070	12410	*9630	6240	6690	4030		
-4.6 m (-15' 0")	lb			*24850	*24850	*17410	14150				
	kg			*11270	*11270	*7890	6420				



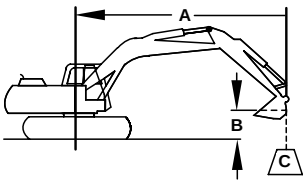
SK210LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 5.65 m boom (18’ 6”), 2.94 m (9’ 8”) arm, 0.80 m³ (1.05 yrd³) bucket, and 800 mm (31.5”) shoes.

SK210LC Boom: 5.65 M (18' 6") Arm: 2.94 M (9' 8") Bucket: 0.80 m³ (1.05 yd³) SAE/PCSA 620 Kg (1,370 lbs) Shoes: 800 mm (31.5") {HL}

B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb							*7370	*7370		
	kg							*3340	*3340		
6.1 m (20' 0")	lb										
	kg										
4.6 m (15' 0")	lb							*12090	10630	*9580	7210
	kg							*5480	4820	*4340	3270
3.0 m (10' 0")	lb			*27130	*27130	*17710	15960	*14100	10090	11110	6970
	kg			*12300	*12300	*8030	7240	*6390	4570	5040	3160
1.5 m (5' 0")	lb			*17530	*17530	*22100	14760	15480	9520	10810	6690
	kg			*7950	*7950	*10020	6690	7020	4320	4900	3030
Ground Level	lb			*18180	*18180	24140	14000	14990	9090	10560	6460
	kg			*8240	*8240	10950	6350	6800	4120	4790	2930
-1.5 m (-5' 0")	lb	*15470	*15470	*25200	*25200	23800	13710	14740	8870	10450	6360
	kg	*7010	*7010	*11420	*11420	10790	6210	6680	4020	4740	2880
-3.0 m (-10' 0")	lb	*23680	*23680	*34920	27360	23860	13760	14770	8890		
	kg	*10740	*10740	*15830	12410	10820	6240	6690	4030		
-4.6 m (-15' 0")	lb			*28080	*28080	*19720	14150				
	kg			*12730	*12730	*8940	6420				

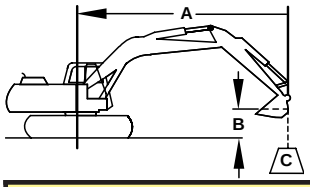
https://truckmanualshub.com/



SK210LC-6E LIFTING CAPACITIES

Based on a machine equipped with 5.65 m boom (18' 6"), 3.33 m (10' 10") arm, 0.68 m³ (0.89 yrd³) bucket, and 800 mm (31.5") shoes.

SK210LC Boom: 5.65 M (18' 6") Arm: 3.30 M (10' 10") Bucket: 0.68 m³ (0.89 yd³) SAE/PCSA 590 Kg (1,300 lbs) Shoes: 800 mm (31.5")											
B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb kg										
6.1 m (20' 0")	lb kg									*6600 *2990	*6600 *2990
4.6 m (15' 0")	lb kg							*9890 *4480	*9890 *4480	*9340 *4230	7280 3300
3.0 m (10' 0")	lb kg					*14470 *6560	*14470 *6560	*11730 *5320	10180 4610	*10320 *4680	7000 3170
1.5 m (5' 0")	lb kg			*20540 *9310	*20540 *9310	*18580 *8420	14880 6740	*13770 *6240	9550 4330	10810 4900	6680 3030
Ground Level	lb kg			*17010 *7710	*17010 *7710	*21410 *9710	13970 6330	14960 6780	9060 4100	10520 4770	6420 2910
-1.5 m (-5' 0")	lb kg	*12620 *5720	*12620 *5720	*21890 *9920	*21890 *9920	*22410 *10160	13560 6150	14650 6640	8780 3980	10360 4700	6270 2840
-3.0 m (-10' 0")	lb kg	*19500 *8840	*19500 *8840	*30370 *13770	*30370 *13770	*21600 *9790	13540 6140	14600 6620	8730 3960		
-4.6 m (-15' 0")	lb kg	*28180 *12780	*28180 *12780	*26830 *12170	*26830 *12170	*18550 *8410	13850 6280	*13070 *5920	8990 4070		



SK210LC-6E LIFTING CAPACITIES (Heavy Lift)

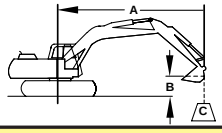
Based on a machine equipped with 5.65 m boom (18' 6"), 3.33 m (10' 10") arm, 0.68 m³ (0.89 yrd³) bucket, and 800 mm (31.5") shoes.

SK210LC Boom: 5.65 M (18' 6") Arm: 3.30 M (10' 10") Bucket: 0.68 m³ (0.89 yd³) SAE/PCSA 590 Kg (1,300 lbs) Shoes: 800 mm (31.5") {HL}											
B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb kg										
6.1 m (20' 0")	lb kg									*7440 *3370	7430 3360
4.6 m (15' 0")	lb kg							*11200 *5080	10760 4880	*10470 *4740	7280 3300
3.0 m (10' 0")	lb kg					*16310 *7390	16200 7340	*13270 *6020	10180 4610	11160 5060	7000 3170
1.5 m (5' 0")	lb kg			*22740 *10310	*22740 *10310	*20940 *9490	14880 6740	15530 7040	9550 4330	10810 4900	6680 3030
Ground Level	lb kg			*18880 *8560	*18880 *8560	24130 10940	13970 6330	14960 6780	9060 4100	10520 4770	6420 2910
-1.5 m (-5' 0")	lb kg	*14060 *6370	*14060 *6370	*24240 *10990	*24240 *10990	23650 10720	13560 6150	14650 6640	8780 3980	10360 4700	6270 2840
-3.0 m (-10' 0")	lb kg	*21630 *9810	*21630 *9810	*33570 *15220	26890 12190	23620 10710	13540 6140	14600 6620	8730 3960		
-4.6 m (-15' 0")	lb kg	*31160 *14130	*31160 *14130	*30290 *13740	27560 12500	*21000 *9520	13850 6280	*14860 *6740	8990 4070		

10

https://truckmanualshub.com/

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.
2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.
3. Ratings at bucket lift hook.
4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.
6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO Construction Machinery America LLC.

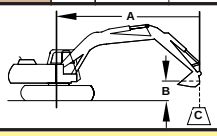


SK210LC-6E (Long Reach) LIFTING CAPACITIES

Based on a machine equipped with 8.75 m boom (28' 8"), 6.35 m (20' 10") arm, 0.45 m³ (0.59 yrd³) bucket, and 800 mm (31.5") shoes.

SK210LC Long Reach Boom: 8.75 M (28' 8") Arm: 6.35 M (20' 10") Bucket: 0.45 m³ (0.59 yd³) SAE/PCSA 370 Kg (815 lbs) Shoes: 800 mm (31.5")

B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')		9.1 m (30' 0')		10.7 m (35' 0')		12.2 m (40' 0')		13.7 m (45' 0')	
9.1 m (30' 0")	lb															*2400	*2400		
	kg															*1080	*1080		
7.6 m (25' 0")	lb													*4390	*4390	*3510	*3510		
	kg													*1990	*1990	*1590	*1590		
6.1 m (20' 0")	lb													*4670	*4670	*4270	3860	*2140	*2140
	kg													*2120	*2120	*1930	1750	*970	*970
4.6 m (15' 0")	lb											*5520	*5520	*5070	4860	*4750	3690	*3040	2780
	kg											*2500	*2500	*2300	2200	*2150	1670	*1380	1260
3.0 m (10' 0")	lb			*19430	*19430			*8930	*8930	*7270	*7270	*6240	6000	*5540	4550	*5050	3480	*3680	2660
	kg			*8810	*8810			*4050	*4050	*3290	*3290	*2830	2720	*2510	2060	*2290	1580	*1660	1200
1.5 m (5' 0")	lb			*5530	*5530	*15460	15230	*10810	10190	*8410	7350	*6980	5510	*6040	4220	*5380	3270	*4130	2530
	kg			*2510	*2510	*7010	6900	*4900	4620	*3810	3330	*3160	2500	*2730	1910	*2440	1480	*1870	1140
Ground Level	lb			*5070	*5070	*12890	*12890	*12330	9120	*9410	6670	*7650	5060	*6490	3920	5350	3070	*4320	2410
	kg			*2300	*2300	*5840	*5840	*5590	4130	*4270	3020	*3470	2290	*2940	1780	2420	1390	*1960	1090
-1.5 m (-5' 0")	lb	*4390	*4390	*6390	*6390	*11780	*11780	*13320	8420	*10150	6170	8060	4710	6390	3680	5170	2900	*4020	2310
	kg	*1990	*1990	*2900	*2900	*5340	*5340	*6040	3820	*4600	2790	3650	2130	2890	1660	2340	1310	*1820	1040
-3.0 m (-10' 0")	lb	*6290	*6290	*8190	*8190	*12770	12250	*13760	8040	10190	5850	7800	4470	6200	3500	5060	2790	*2820	2260
	kg	*2850	*2850	*3710	*3710	*5790	5550	*6240	3650	4620	2650	3540	2020	2810	1590	2290	1260	*1280	1020
-4.6 m (-15' 0")	lb	*8250	*8250	*10290	*10290	*14730	12240	*13720	7910	10030	5700	7670	4340	6110	3420	5010	2750		
	kg	*3740	*3740	*4660	*4660	*6680	5550	*6220	3580	4520	2580	3470	1970	2770	1550	2270	1240		
-6.1 m (-20' 0")	lb	*10350	*10350	*12700	*12700	*17480	124440	*13190	7960	10020	5700	7660	4330	6120	3420	*4290	2810		
	kg	*4690	*4690	*5750	*5750	*7920	5640	*5980	3610	4540	2580	3470	1960	2770	1550	*1940	1270		
-7.6 m (-25' 0")	lb	*12670	*12670	*15520	*15520	*15880	12830	*12120	8180	*9590	5840	*7710	4450	*6140	3560				
	kg	*5740	*5740	*7040	*7040	*7200	5810	*5490	3710	*4340	2640	*3490	2010	*2780	1610				
-9.1 m (-30' 0")	lb			*18260	*18260	*13310	*13310	*10310	8570	*8140	6140	*6310	4730						
	kg			*8280	*8280	*6030	*6030	*4670	3890	*3690	2780	*2860	2140						
-10.7 m (-35' 0")	lb					*9390	*9390	*7290	*7290										
	kg					*4260	*4260	*3300	*3300										



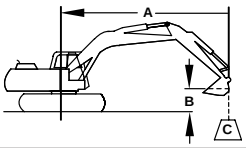
SK210LC-6E (Long Reach) LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 8.75 m boom (28' 8"), 6.35 m (20' 10") arm, 0.45 m³ (0.59 yrd³) bucket, and 800 mm (31.5") shoes.

SK210LC Long Reach Boom: 8.75 M (28' 8") Arm: 6.35 M (20' 10") Bucket: 0.45 m³ (0.59 yd³) SAE/PCSA 370 Kg (815 lbs) Shoes: 800 mm (31.5") Heavy Lift

B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')		9.1 m (30' 0')		10.7 m (35' 0')		12.2 m (40' 0')		13.7 m (45' 0')	
9.1 m (30' 0")	lb															*2790	*2790		
	kg															*1260	*1260		
7.6 m (25' 0")	lb													*5120	*5120	*4010	3970		
	kg													*2320	*2320	*1820	1800		
6.1 m (20' 0")	lb													*5450	5140	*4860	3860	*2510	*2510
	kg													*2470	2330	*2200	1750	*1130	*1130
4.6 m (15' 0")	lb											*6400	*6400	*5920	4860	*5570	3690	*3500	2780
	kg											*2900	*2900	*2680	2200	*2520	1670	*1580	1260
3.0 m (10' 0")	lb			*22020	*22020			*10230	*10230	*8390	8130	*7240	6000	*6470	4550	5780	3480	*4200	2660
	kg			*9980	*9980			*4640	*4640	*3800	3680	*3280	2720	*2930	2060	2620	1580	*1900	1200
1.5 m (5' 0")	lb			*6230	*6230	*17700	15230	*12430	10190	*9720	7350	*8100	5510	6970	4220	5560	3270	4490	2530
	kg			*2820	*2820	*8030	6900	*5630	4620	*4400	3330	*3670	2500	3160	1910	2520	1480	2030	1140
Ground Level	lb			*5720	*5720	*14310	13460	*14200	9120	*10890	6670	8440	5060	6650	3920	5350	3070	4360	2410
	kg			*2590	*2590	*6490	6100	*6440	4130	*4930	3020	3830	2290	3010	1780	2420	1390	1980	1090
-1.5 m (-5' 0")	lb	*4990	*4990	*7180	*7180	*13100	12580	14640	8420	10540	6170	8060	4710	6390	3680	5170	2900	4260	2310
	kg	*2260	*2260	*3250	*3250	*5940	5700	6640	3820	4780	2790	3650	2130	2890	1660	2340	1310	1930	1040
-3.0 m (-10' 0")	lb	*7070	*7070	*9160	*9160	*14190	12250	14220	8040	10190	5850	7800	4470	6200	3500	5060	2790	*3260	2260
	kg	*3200	*3200	*4150	*4150	*6430	5550	6440	3650	4620	2650	3540	2020	2810	1590	2290	1260	*1480	1020
-4.6 m (-15' 0")	lb	*9220	*9220	*11460	*11460	*16350	12240	14070	7910	10030	5700	7670	4340	6110	3420	5010	2750		
	kg	*4180	*4180	*5200	*5200	*7410	5550	6380	3580	4540	2580	3470	1970	2770	1550	2270	1240		
-6.1 m (-20' 0")	lb	*11530	*11530	*14110	*14110	*19360	12440	14120	7960	10020	5700	7660	4330	6120	3420	*4890	2810		
	kg	*5230	*5230	*6400	*6400	*8780	5640	6400	3610	4540	2580	3470	1960	2770	1550	*2210	1270		
-7.6 m (-25' 0")	lb	*14080	*14080	*17220	*17220	*18370	12830	*14060	8180	10180	5840	7780	4450	6260	3560				
	kg	*6380	*6380	*7810	*7810	*8330	5810	*6370	3710	4610	2640	3530	2010	2840	1610				
-9.1 m (-30' 0")	lb			*21020	*21020	*15500	13430	*12040	8570	*9540	6140	*7450	4730						
	kg			*9530	*9530	*7020	6090	*5460	3890	*4320	2780	*3380	2140						
-10.7 m (-35' 0")	lb					*11100	*11100	*8640	*8640										
	kg					*5030	*5030	*3920	*3920										

https://truckmanualshub.com/

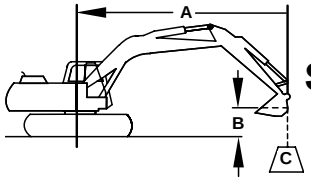


SK210LC-6E (Long Reach) LIFTING CAPACITIES

Based on a machine equipped with 8.75 m boom (28’ 8”), 6.35 m (20’ 10”) arm, 0.45 m³ (0.59 yrd³) bucket, and 900 mm (35.4”) shoes.

SK210LC Long Reach Boom: 8.75 M (28' 8") Arm: 6.35 M (20' 10") Bucket: 0.45 m³ (0.59 yd³) SAE/PCSA 370 Kg (815 lbs) Shoes: 900 mm (35.4")

A → / B ↓	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0")		9.1 m (30' 0")		10.7 m (35' 0')		12.2 m (40' 0')		13.7 m (45' 0')	
9.1 m (30' 0")	lb															*2400	*2400		
	kg															*1080	*1080		
7.6 m (25' 0")	lb													*4390	*4390	*3510	*3510		
	kg													*1990	*1990	*1590	*1590		
6.1 m (20' 0")	lb													*4670	*4670	*4270	3910	*2140	*2140
	kg													*2120	*2120	*1930	1770	*970	*970
4.6 m (15' 0")	lb											*5520	*5520	*5070	4920	*4750	3740	*3040	2830
	kg											*2500	*2500	*2300	2230	*2150	1690	*1380	1280
3.0 m (10' 0")	lb			*19430	*19430			*8930	*8930	*7270	*7270	*6240	6080	*5540	4610	*5050	3530	*3680	2710
	kg			*8810	*8810			*4050	*4050	*3290	*3290	*2830	2750	*2510	2090	*2290	1600	*1660	1230
1.5 m (5' 0")	lb			*5530	*5530	*15460	15400	*10810	10310	*8410	7440	*6980	5580	*6040	4280	*5380	3320	*4130	2570
	kg			*2510	*2510	*7010	6980	*4900	4670	*3810	3370	*3160	2530	*2730	1940	*2440	1500	*1870	1160
Ground Level	lb			*5070	*5070	*12890	*12890	*12330	9240	*9410	6760	*7650	5140	*6490	3980	5430	3120	*4320	2450
	kg			*2300	*2300	*5840	*5840	*5590	4190	*4270	3060	*3470	2330	*2940	1800	2460	1410	*1960	1110
-1.5 m (-5' 0")	lb	*4390	*4390	*6390	*6390	*11780	*11780	*13320	8540	*10150	6260	8180	4780	6480	3740	5260	2950	*4020	2350
	kg	*1990	*1990	*2900	*2900	*5340	*5340	*6040	3870	*4600	2830	3710	2170	2940	1690	2380	1340	*1820	1070
-3.0 m (-10' 0")	lb	*6290	*6290	*8190	*8190	*12770	12420	*13760	8160	10330	5940	7920	4540	6300	3560	5140	2840	*2820	2310
	kg	*2850	*2850	*3710	*3710	*5790	5630	*6240	3700	4680	2690	3590	2060	2850	1610	2330	1290	*1280	1040
-4.6 m (-15' 0")	lb	*8250	*8250	*10290	*10290	*14730	12410	*13720	8030	10170	5790	7780	4410	6200	3480	5100	2800		
	kg	*3740	*3740	*4660	*4660	*6680	5620	*6220	3640	4610	2620	3530	2000	2810	1570	2310	1270		
-6.1 m (-20' 0")	lb	*10350	*10350	*12700	*12700	*17480	12610	*13190	8080	10170	5790	7770	4400	6210	3480	*4290	2860		
	kg	*4690	*4690	*5750	*5750	*7920	5710	*5980	3660	4610	2620	3520	1990	2820	1580	*1940	1290		
-7.6 m (-25' 0")	lb	*12670	*12670	*15520	*15520	*15880	13000	*12120	8300	*9590	5930	*7710	4520	*6140	3620				
	kg	*5740	*5740	*7040	*7040	*7200	5890	*5490	3760	*4340	2680	*3490	2050	*2780	1640				
-9.1 m (-30' 0")	lb			*18260	*18260	*13310	*13310	*10310	8690	*8140	6230	*6310	4810						
	kg			*8280	*8280	*6030	*6030	*4670	3940	*3690	2820	*2860	2180						
-10.7 m (-35' 0")	lb					*9390	*9390	*7290	*7290										
	kg					*4260	*4260	*3300	*3300										



SK210LC-6E (Long Reach) LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 8.75 m boom (28’ 8”), 6.35 m (20’ 10”) arm, 0.45 m³ (0.59 yrd³) bucket, and 900 mm (35.4”) shoes.

SK210LC Long Reach Boom: 8.75 M (28' 8") Arm: 6.35 M (20' 10") Bucket: 0.45 m³ (0.59 yd³) SAE/PCSA 370 Kg (815 lbs) Shoes: 900 mm (35.4") Heavy Lift

A → / B ↓	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0")		9.1 m (30' 0")		10.7 m (35' 0')		12.2 m (40' 0')		13.7 m (45' 0')	
9.1 m (30' 0")	lb															*2790	*2790		
	kg															*1260	*1260		
7.6 m (25' 0")	lb													*5120	*5120	*4010	*4010		
	kg													*2320	*2320	*1820	*1820		
6.1 m (20' 0")	lb													*5450	5200	*4860	3910	*2510	*2510
	kg													*2470	2350	*2200	1770	*1130	*1130
4.6 m (15' 0")	lb											*6400	*6400	*5920	4920	*5570	3740	*3500	2830
	kg											*2900	*2900	*2680	2230	*2520	1690	*1580	1280
3.0 m (10' 0")	lb			*22020	*22020			*10230	*10230	*8390	8220	*7240	6080	*6470	4610	5860	3530	*4200	2710
	kg			*9980	*9980			*4640	*4640	*3800	3720	*3280	2750	*2930	2090	2660	1600	*1900	1230
1.5 m (5' 0")	lb			*6230	*6230	*1770	15400	*12430	10310	*9720	7440	*8100	5580	*7050	4280	5640	3320	4560	2570
	kg			*2820	*2820	*8030	6980	*5630	4670	*4400	3370	*3670	2530	*3190	1940	2550	1500	2070	1160
Ground Level	lb			*5720	*5720	*14310	13630	*14200	9240	*10890	6760	8560	5140	6740	3980	5430	3120	4430	2450
	kg			*2590	*2590	*6490	6180	*6440	4190	*4930	3060	3880	2330	3060	1800	2460	1410	2010	1110
-1.5 m (-5' 0")	lb	*4990	*4990	*7180	*7180	*13100	12750	14840	8540	10680	6260	8180	4780	6480	3740	5260	2950	4330	2350
	kg	*2260	*2260	*3250	*3250	*5940	5780	6730	3870	4840	2830	3710	2170	2940	1690	2380	1340	1960	1070
-3.0 m (-10' 0")	lb	*7070	*7070	*9160	*9160	*14190	12420	14410	8160	10330	5940	7920	4540	6300	3560	5140	2840	*3260	2310
	kg	*3200	*3200	*4150	*4150	*6430	5630	6530	3700	4680	2690	3590	2060	2850	1610	2330	1290	*1480	1040
-4.6 m (-15' 0")	lb	*9220	*9220	*11460	*11460	*16350	12410	14260	8030	10170	5790	7780	4410	6200	3480	5100	2800		
	kg	*4180	*4180	*5200	*5200	*7410	5620	6470	3640	4610	2620	3530	2000	2810	1570	2310	1270		
-6.1 m (-20' 0")	lb	*11530	*11530	*14110	*14110	*19360	12610	14320.	8080	10170	5790	7770	4400	6210	3480	*4890	2860		
	kg	*5230	*5230	*6400	*6400	*8780	5710	6490	3660	4610	2620	3520	1990	2820	1580	*2210	1290		
-7.6 m (-25' 0")	lb	*14080	*14080	*17220	*17220	*18370	13000	*14060	8300	10320	5930	7890	4520	6360	3620				
	kg	*6380	*6380	*7810	*7810	*8330	5890	*6370	3760	4680	2680	3580	2050	2880	1640				
-9.1 m (-30' 0")	lb			*21020	*21020	*15500	13600	*12040	8690	*9540	6230	*7450	4810						
	kg			*9530	*9530	*7020	6170	*5460	3940	*4320	2820	*3380	2180						
-10.7 m (-35' 0")	lb					*11100	*11100	*8640	*8640										
	kg					*5030	*5030	*3920	*3920										

https://truckmanualshub.com/

SK250LC-6E LIFTING CAPACITIES KCMA SPEC'S

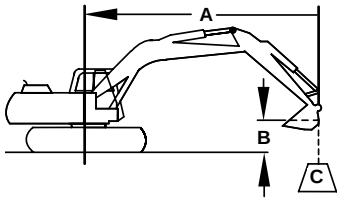
1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.
2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.
3. Ratings at bucket lift hook.
4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.
6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO America Inc.

CAUTION

THE OPERATOR MUST CONSIDER THE WEIGHT OF ANY DEVICE UTILIZED FOR LIFTING TO PROPERLY CALCULATE THE TOTAL LIFTING CAPACITY OF THE MACHINE, EXAMPLE:

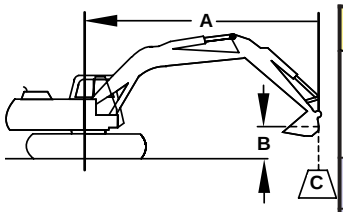
1. **If the excavator uses the same bucket size indicated in the lifting table, and a lifting cable, etc. weighing 100 kg (220 lbs) is used for lifting, then you have to subtract this additional 100 kg (220 lbs) from every value indicated in the lifting table accordingly.**
2. **If a bucket is changed for a larger bucket, which weight is 350 Kg (770 lbs) more than the bucket indicated in the lifting chart, then you have to subtract this additional weight from every value indicated in the lifting table accordingly.**
3. **If a bucket is changed for a smaller bucket, which weight is 350 Kg (770 lbs) less than the bucket indicated in lifting chart, then you can safely add 350 kg (770 lbs) to every value indicated in the lifting table accordingly.**

SK250LC-6E LIFTING CAPACITIES



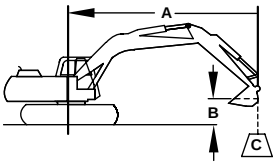
SK250LC-6E	Boom: 6.02 M (19' 9")	Arm: 2.50 M (8' 2")	Bucket: 1.20 m³ (1.57 yd³) SAE/PCSA	Shoes: 800 mm (31.5")							
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
7.6 m (25' 0")	lb kg							*10230 *4640	*10230 *4640		
6.1 m (20' 0")	lb kg							*10400 *4710	*10400 *4710		
4.6 m (15' 0")	lb kg							*11900 *5390	*11900 *5390	*11060 *5010	9460 4290
3.0 m (10' 0")	lb kg					*18590 *8430	*18590 *8430	*14130 *6410	13110 5940	*12110 *5490	9140 4140
1.5 m (5' 0")	lb kg					*22980 *10420	19090 8650	*16420 *7450	12410 5620	*13310 *6040	8790 3980
Ground Level	lb kg			*13350 *6050	*13350 *6050	*25410 *11520	18330 8310	*18110 *8210	11920 5400	13440 6090	8520 3860
-1.5 m (-5' 0")	lb kg	*15750 *7140	*15750 *7140	*23930 *10850	*23930 *10850	*25910 *11750	18130 8220	*18810 *8530	11710 5310	13340 6050	8430 3820
-3.0 m (-10' 0")	lb kg	*25950 *11770	*25950 *11770	*35750 *16210	*35750 *16210	*24710 *11200	18320 8300	*18150 *8230	11790 5340		
-4.6 m (-15' 0")	lb kg			*29990 *13600	*29990 *13600	*21130 *9580	18890 8560				

SK250LC-6E LIFTING CAPACITIES (Heavy Lift)



SK250LC-6E	Boom: 6.02 M (19' 9")	Arm: 2.50 M (8' 2")	Bucket: 1.20 m³ (1.57 yd³) SAE/PCSA	Shoes: 800 mm (31.5") {HL}							
A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
B / C										
7.6 m (25' 0")	lb kg							*11620 *5270	*11620 *5270		
6.1 m (20' 0")	lb kg							*11800 *5350	*11800 *5350		
4.6 m (15' 0")	lb kg							*13500 *6120	*13500 *6120	*12590 *5710	9460 4290
3.0 m (10' 0")	lb kg					*21000 *9520	20560 9320	*16030 *7270	13110 5940	*13780 *6250	9140 4140
1.5 m (5' 0")	lb kg					*25950 *11770	19090 8650	*18610 *8440	12410 5620	13730 6230	8790 3980
Ground Level	lb kg			*14890 *6750	*14890 *6750	*28690 *13010	18330 8310	19070 8650	11920 5400	13440 6090	8520 3860
-1.5 m (-5' 0")	lb kg	*17520 *7950	*17520 *7950	*26510 *12020	*26510 *12020	*29260 *13260	18130 8220	18840 8540	11710 5310	13340 6050	8430 3820
-3.0 m (-10' 0")	lb kg	*28740 *13030	*28740 *13030	*40290 *18270	37330 16930	*27910 *12660	18320 8300	18930 8580	11790 5340		
-4.6 m (-15' 0")	lb kg			*33890 *15370	*33890 *15370	*23940 *10850	18890 8560				

https://truckmanualshub.com/

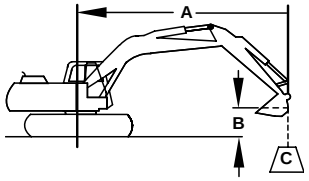


SK250LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.02 m boom (19' 9"), 2.98 m (9' 9") arm, 1.00 m³ (1.31 yrd³) bucket, and 800 mm (31.5") shoes.

SK250LC-6E Boom: 6.02 M (19' 9") Arm: 2.98 M (9' 9") Bucket: 1.00 m³ (1.31 yd³) SAE/PCSA Shoes: 800 mm (31.5")												
B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb kg										
6.1 m (20' 0")	lb kg									*8320 *3770	*8320 *3770
4.6 m (15' 0")	lb kg							*10900 *4940	*10900 *4940	*10290 *4660	9650 4370
3.0 m (10' 0")	lb kg			*27490 *12460	*27490 *12460	*16960 *7690	*16960 *7690	*13220 *5990	*13220 *5990	*11460 *5190	9280 4210
1.5 m (5' 0")	lb kg			*12790 *5800	*12790 *5800	*21730 *9850	19470 8830	*15690 *7110	12590 5710	*12810 *5800	8890 4030
Ground Level	lb kg			*15690 *7110	*15690 *7110	*24810 *11250	18510 8390	*17660 *8010	12020 5450	13500 6120	8580 3890
-1.5 m (-5' 0")	lb kg	*14720 *6670	*14720 *6670	*22870 *10370	*22870 *10370	*25930 *11760	18150 8230	*18700 *8480	11720 5310	13320 6040	8410 3810
-3.0 m (-10' 0")	lb kg	*22600 *10250	*22600 *10250	*32710 *14830	*32710 *14830	*25330 *11480	18200 8250	*18520 *8400	11710 5310		
-4.6 m (-15' 0")	lb kg	*32080 *14540	*32080 *14540	*32710 *14830	*32710 *14830	*22650 *10270	18630 8450	*16340 *7410	12030 5450		

LQ20TU1068P1



SK250LC-6E LIFTING CAPACITIES (Heavy Lift)

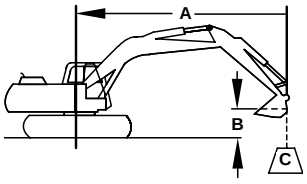
Based on a machine equipped with 6.02 m boom (19' 9"), 2.98 m (9' 9") arm, 1.00 m³ (1.31 yrd³) bucket, and 800 mm (31.5") shoes.

SK250LC-6E Boom: 6.02 M (19' 9") Arm: 2.98 M (9' 9") Bucket: 1.00 m³ (1.31 yd³) SAE/PCSA Shoes: 800 mm (31.5") Heavy Lift											
B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb kg										
6.1 m (20' 0")	lb kg									*9360 *4240	*9360 *4240
4.6 m (15' 0")	lb kg							*12380 *5610	*12380 *5610	*11730 *5320	9650 4370
3.0 m (10' 0")	lb kg			*30920 *14020	*30920 *14020	*19160 *8690	*19160 *8690	*15010 *6800	13350 6050	*13050 *5920	9280 4210
1.5 m (5' 0")	lb kg			*14260 *6470	*14260 *6470	*24540 *11130	19470 8830	*17790 *8070	12590 5710	13850 6280	8890 4030
Ground Level	lb kg			*17460 *7910	*17460 *7910	*28010 *12700	18510 8390	19180 8700	12020 5450	13500 6120	8580 3890
-1.5 m (-5' 0")	lb kg	*16400 *7430	*16400 *7430	*25350 *11490	*25350 *11490	*29270 *13270	18150 8230	18850 8550	11720 5310	13320 6040	8410 3810
-3.0 m (-10' 0")	lb kg	*25060 *11360	*25060 *11360	*36170 *16400	*36170 *16400	*28600 *12970	18200 8250	18830 8540	11720 5310		
-4.6 m (-15' 0")	lb kg	*35480 *16090	*35480 *16090	*36920 *16740	*36920 *16740	*25620 *11620	18630 8450	*18560 *8410	12030 5450		

LQ20TU1069P1

10

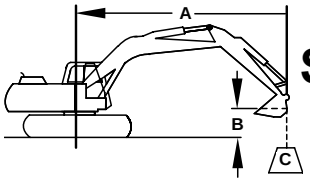
https://truckmanualshub.com/



SK250LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.02 m boom (19’ 9”), 3.66 m (12’ 0”) arm, 0.81 m³ (1.06 yrd³) bucket, and 800 mm (31.5”) shoes.

SK250LC -6E Boom: 6.02 M (19' 9") Arm: 3.66 M (12' 0") Bucket: 0.81 m³ (1.06 yd³) SAE/PCSA 700 Kg (1540 lbs) Shoes: 800 mm (31.5")															
A / B	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')		9.1 m (30' 0')	
7.6 m (25' 0")	lb kg									*5390 *2440	*5390 *2440		
6.1 m (20' 0")	lb kg									*8270 *3750	*8270 *3750		
4.6 m (15' 0")	lb kg									*9100 *4120	*9100 *4120	*5510 *2500	*5510 *2500
3.0 m (10' 0")	lb kg					*14420 *6540	*14420 *6540	*11740 *5320	*11740 *5320	*10390 *4710	9420 4270	*7710 *3500	6830 3090
1.5 m (5' 0")	lb kg			*20760 *9410	*20760 *9410	*19570 *8870	*19570 *8870	*14410 *6530	12770 5790	*11890 *5390	8970 4060	*9130 *4140	6590 2990
Ground Level	lb kg	*6640 *3010	*6640 *3010	*16910 *7670	*16910 *7670	*23430 *10620	18660 8460	*16710 *7570	12070 5470	*13270 *6010	8570 3890	*9330 *4140	6390 2900
-1.5 m (-5' 0")	lb kg	*12520 *5680	*12520 *5680	*21000 *9520	*21000 *9520	*25400 *11520	18050 8180	*18190 *8250	11650 5280	13230 6000	8320 3770	*9330 *4230	
-3.0 m (-10' 0")	lb kg	*18690 *8470	*18690 *8470	*28010 *12700	*28010 *12700	*25610 *11610	17930 8130	*18590 *8430	11510 5220	13180 5970	8260 3740		
-4.6 m (-15' 0")	lb kg	*26020 *11800	*26020 *11800	*35510 *16100	*35510 *16100	*23980 *10870	18180 8240	*17490 *7930	11670 5290				
-6.1 m (-20' 0")	lb kg			*28330 *12850	*28330 *12850	*19380 *8790	18900 8570						



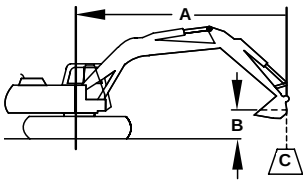
SK250LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.02 m boom (19’ 9”), 3.66 m (12’ 0”) arm, 0.81 m³ (1.06 yrd³) bucket, and 800 mm (31.5”) shoes.

SK250LC-6E Boom: 6.02 M (19' 9") Arm: 3.66 M (12' 0") Bucket: 0.81 m³ (1.06 yd³) SAE/PCSA 700 Kg (1540 lbs) Shoes: 800 mm (31.5") Heavy Lift													
A / B	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')		9.1 m (30' 0')	
7.6 m (25' 0")	lb kg									*6140 *2780	*6140 *2780		
6.1 m (20' 0")	lb kg									*9310 *4220	*9310 *4220		
4.6 m (15' 0")	lb kg									*10400 *4710	9840 4460	*6280 *2850	*6280 *2850
3.0 m (10' 0")	lb kg					*16320 *7400	*16320 *7400	*13350 *6050	*13350 *6050	*11870 *5380	9420 4270	*8710 *3950	6830 3090
1.5 m (5' 0")	lb kg			*23020 *10440	*23020 *10440	*22140 *10040	19920 9030	*16360 *7420	12770 5790	*13560 *6150	8970 4060	*10270 *4660	6590 2990
Ground Level	lb kg	*7530 *3410	*7530 *3410	*18800 *8520	*18800 *8520	*26490 *12010	18660 8460	*18960 *8600	12070 5470	13510 6120	8570 3890	10120 4590	6390 2900
-1.5 m (-5' 0")	lb kg	*13990 *6340	*13990 *6340	*23300 *10560	*23300 *10560	*28700 *13010	18050 8180	18790 8520	11650 5280	13230 6000	8320 3770		
-3.0 m (-10' 0")	lb kg	*20760 *9410	*20760 *9410	*31010 *14060	*31010 *14060	*28950 *13130	17930 8130	18630 8450	11510 5220	13160 5970	8260 3740		
-4.6 m (-15' 0")	lb kg	*28820 *13070	*28820 *13070	*40050 *18160	37030 16790	*27130 *12300	18180 8240	18810 8530	11670 5290				
-6.1 m (-20' 0")	lb kg			*32070 *14540	*32070 *14540	*22010 *9980	18900 8570						

10

https://truckmanualshub.com/

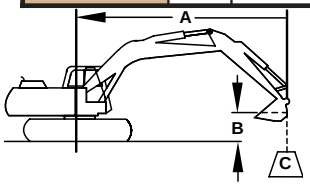


SK250LC-6E HD UNDER CARRIAGE LIFTING CAPACITIES

Based on a machine equipped with 6.02 m boom (19’ 9”), 2.98 m (9’ 9”) arm, 1.00 m³ (1.31 yrd³) bucket, and 700 mm (27.5”) shoes.

SK250LC-6E HD-uc Boom: 6.02 M (19' 9") Arm: 2.98 M (9' 9") Bucket: 1.00 m³ (1.31 yd³) SAE/PCSA Shoes: 700 mm (27.5")											
B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb kg									*7100 *3220	*7100 *3220
6.1 m (20' 0")	lb kg							*10120 *4590	*10120 *4590	*10840 *4920	9730 4410
4.6 m (15' 0")	lb kg							*11770 *5340	*11770 *5340	*11960 *5420	9500 4310
3.0 m (10' 0")	lb kg					*18880 *8560	*18880 *8560	*14140 *6410	13790 6260	*13220 *6000	9200 4170
1.5 m (5' 0")	lb kg					*23460 *10640	20650 9370	*16520 *7490	13190 5980	13680 6210	8950 4060
Ground Level	lb kg			*9290 *4210	*9290 *4210	*25900 *11750	19940 9040	*18230 *8270	12740 5780	13520 6130	8800 3990
-1.5 m (-5' 0")	lb kg	*11730 *5320	*11730 *5320	*19950 *9050	*19950 *9050	*26290 *11920	19650 8910	*18870 *8560	12490 5670		
-3.0 m (-10' 0")	lb kg	*22460 *10190	*22460 *10190	*33420 *15160	*33420 *15160	*24910 *11300	19650 8910	*18080 *8200	12450 5650		
-4.6 m (-15' 0")	lb kg			*30200 *13700	*30200 *13700	*21060 *9550	19940 9040				

LQ22TU1001P1



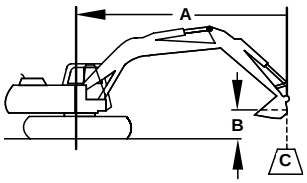
SK250LC-6E HD UNDER CARRIAGE LIFTING CAPACITIES

Based on a machine equipped with 6.02 m boom (19’ 9”), 2.98 m (9’ 9”) arm, 1.00 m³ (1.31 yrd³) bucket, and 800 mm (31.5”) shoes.

SK250LC-6E HD-uc Boom: 6.02 M (19' 9") Arm: 2.98 M (9' 9") Bucket: 1.00 m³ (1.31 yd³) SAE/PCSA Shoes: 800 mm (31.5")											
B \ A	C	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
7.6 m (25' 0")	lb kg										
6.1 m (20' 0")	lb kg							*10120 *4590	*10120 *4590	*7100 *3220	*7100 *3220
4.6 m (15' 0")	lb kg							*11770 *5340	*11770 *5340	*10840 *4920	9910 4500
3.0 m (10' 0")	lb kg					*18880 *8560	*18880 *8560	*14140 *6410	14030 6360	*11960 *5420	9670 4390
1.5 m (5' 0")	lb kg					*23460 *10640	20990 9520	*16520 *7490	13430 6090	*13220 *6000	9380 4250
Ground Level	lb kg			*9290 *4210	*9290 *4210	*25900 *11750	20280 9200	*18230 *8270	12970 5880	13940 6320	9120 4140
-1.5 m (-5' 0")	lb kg	*11730 *5320	*11730 *5320	*19950 *9050	*19950 *9050	*26290 *11920	20000 9070	*18870 *8560	12720 5770	13780 6250	8980 4070
-3.0 m (-10' 0")	lb kg	*22460 *10190	*22460 *10190	*33420 *15160	*33420 *15160	*24910 *11300	20000 9070	*18080 *8200	12680 5750		
-4.6 m (-15' 0")	lb kg			*30200 *13700	*30200 *13700	*21060 *9550	20290 9200				

LQ22TU1002P1

https://truckmanualshub.com/



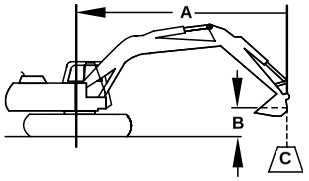
SK250LC-6E HD UNDER CARRIAGE LIFTING CAPACITIES

Based on a machine equipped with 6.02 m boom (19’ 9”), 2.98 m (9’ 9”) arm, 1.00 m³ (1.31 yrd³) bucket, and 900 mm (35.4”) shoes.

SK250LC-6E HD-uc Boom: 6.02 M (19' 9") Arm: 2.98 M (9' 9") Bucket: 1.00 m³ (1.31 yd³) SAE/PCSA Shoes: 900 mm (35.4")											
B \ A		1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
C											
7.6 m (25' 0")	lb kg										
6.1 m (20' 0")	lb kg							*10120 *4590	*10120 *4590	*7100 *3220	*7100 *3220
4.6 m (15' 0")	lb kg							*11770 *5340	*11770 *5340	*10840 *4920	10040 4550
3.0 m (10' 0")	lb kg					*18880 *8560	*18880 *8560	*14140 *6410	*14140 *6410	*11960 *5420	9810 4450
1.5 m (5' 0")	lb kg					*23460 *10640	21260 9640	*16520 *7490	13610 6170	*13220 *6000	9520 4320
Ground Level	lb kg			*9290 *4210	*9290 *4210	*25900 *11750	20550 9320	*18230 *8270	13160 5970	14140 6410	9260 4200
-1.5 m (-5' 0")	lb kg	*11730 *5320	*11730 *5320	*19950 *9050	*19950 *9050	*26290 *11920	20270 9190	*18870 *8560	12910 5860	13980 6340	9120 4140
-3.0 m (-10' 0")	lb kg	*22460 *10190	*22460 *10190	*33420 *15160	*33420 *15160	*24910 *11300	20270 9190	*18080 *8200	12870 5840		
-4.6 m (-15' 0")	lb kg			*30200 *13700	*30200 *13700	*21060 *9550	20560 9330				

LQ22TU1003P1

10



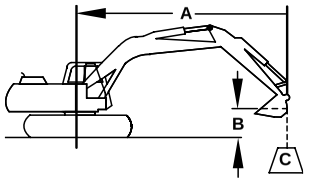
SK250LC-6E 60 Ft. LONG REACH LIFTING CAPACITIES

Based on a machine equipped with 10.35 m boom (33' 11"), 8.25 m (27' 1") arm, 0.40 m³ (0.52 yrd³) bucket, and 800 mm (31.5") shoes.

SK250LC-6E Long Reach Boom: 10.35 M (33' 11") Arm: 8.25 M (27' 1") Bucket: 0.40 m³ (0.52 yd³) SAE/PCSA 350 Kg (772 lbs) Shoes: 800 mm (31.5")

A / B	C	1.5 m (5' 0")		3.0 (10' 0")		4.5 m (14.8')		6.0 m (19.7')		7.5 m (24.6')		9.0 m (29.5')		10.5 m (34.4')		12.0 m (39.4')		13.5 m (44.3')		15.0 m (49.2')		16.5 m (54.1')	
12.0 m (39.4')	lb																	*2230	*2230				
	kg																	*1010	*1010				
10.5 m (34.4')	lb																	*2950	*2950	*1660	*1660		
	kg																	*1340	*1340	*750	*750		
9.0 m (29.5')	lb																	*3020	*3020	*2500	*2500		
	kg																	*1370	*1370	*1130	*1130		
7.5 m (24.6')	lb																	*3170	*3170	*3110	*3110	*1480	*1480
	kg																	*1440	*1440	*1410	*1410	*670	*670
6.0 m (19.7')	lb															*3540	*3540	*3400	*3400	*3290	*3290	*2180	*2180
	kg															*1600	*1600	*1540	*1540	*1490	*1490	*990	*990
4.5 m (14.8')	lb													*4240	*4240	*3920	*3920	*3670	*3670	*3490	3320	*2710	2570
	kg													*1920	*1920	*1780	*1780	*1660	*1660	*1580	1500	*1220	1160
3.0 m (9.8')	lb											*5520	*5520	*4840	*4840	*4350	*4350	*3990	3970	*3720	3130	*3130	2440
	kg											*2500	*2500	*2190	*2190	*1970	*1970	*1810	1800	*1680	1410	*1420	1100
1.5 m (4.9')	lb			*6480	*6480	*14870	*14870	*10240	*10240	*7840	*7840	*6410	*6410	*5460	*5460	*4800	4660	*4320	3690	*3970	2920	*3460	2300
	kg			*2930	*2930	*6740	*6740	*4640	*4640	*3550	*3550	*2900	*2900	*2470	*2470	*2180	2110	*1960	1670	*1800	1320	*1560	1040
Ground Level	lb			*5080	*5080	*11480	*11480	*12060	*12060	*9050	8940	*7240	6860	*6070	5390	*5250	4280	*4650	3420	*4210	2730	*3650	2160
	kg			*2300	*2300	*5210	*5210	*5470	*5470	*4100	4050	*3280	3110	*2750	2440	*2380	1940	*2110	1550	*1910	1230	*1650	980
-1.5 m (-4.9')	lb	*4030	*4030	*5750	*5750	*9920	*9920	*13400	10900	*10040	8080	*7970	6250	*6610	4940	*5660	3950	*4960	3180	*4440	2560	*3610	2050
	kg	*1830	*1830	*2600	*2600	*4500	*4500	*6070	4940	*4550	3660	*3610	2830	*2990	2240	*2560	1790	*2250	1440	*2010	1160	*1630	930
-3.0 m (-9.8')	lb	*5400	*5400	*6900	*6900	*10220	*10220	*14260	10180	*10760	7490	*8550	5780	*7060	4590	*6000	3690	*5220	2980	4470	2420	*3180	1960
	kg	*2440	*2440	*3130	*3130	*4630	*4630	*6460	4610	*4880	3390	*3870	2620	*3200	2080	*2720	1670	*2370	1350	2020	1090	*1440	890
-4.5 m (-14.8')	lb	*6780	*6780	*8260	*8260	*11230	*11230	*14690	9810	*11220	7130	*8950	5480	*7390	4340	6210	3490	5180	2840	4370	2320		
	kg	*3070	*3070	*3740	*3740	*5090	*5090	*6660	4450	*5080	3230	*4060	2480	*3350	1960	2820	1580	2350	1290	1980	1050		
-6.0 m (-19.7')	lb	*8220	*8220	*9770	*9770	*12670	*12670	*14770	9700	*11410	6960	*9160	5310	7440	4190	6100	3380	5100	2760	4340	2290		
	kg	*3730	*3730	*4430	*4430	*5750	*5750	*6700	4400	*5170	3150	*4150	2410	3370	1900	2760	1530	2310	1250	1960	1030		
-7.5 m (-24.6')	lb	*9740	*9740	*11440	*11440	*14450	*14450	*14510	9770	*11330	6950	*9150	5270	7390	4150	6070	3350	5100	2760				
	kg	*4410	*4410	*5190	*5190	*6550	*6550	*6580	4430	*5140	3150	*4150	2390	3350	1880	2750	1520	2310	1250				
-9.0 m (-29.5')	lb	*11340	*11340	*13280	*13280	*16590	15890	*13900	10000	*10960	7080	*8900	5350	*7380	4210	6140	3420	*6180	2850				
	kg	*5140	*5140	*6020	*6020	*7520	7210	*6300	4530	*4970	3210	*4030	2420	*3340	1910	2780	1550	*2350	1290				
-10.5 m (-34.4')	lb	*13060	*13060	*15330	*15330	*16900	16540	*12860	10390	*10220	7350	*8330	5550	*6870	4390	*5850	3600						
	kg	*5920	*5920	*6950	*6950	*7660	7500	*5830	4710	*4630	3330	*3780	2520	*3110	1990	*2560	1630						
-12.0 m (-39.4')	lb			*17620	*17620	*14580	*14580	*11250	10960	*9000	7770	*7290	5900	*5860	4720								
	kg			*7990	*7990	*6610	*6610	*5100	4970	*4080	3520	*3300	2670	*2660	2140								
-13.5 m (-44.3')	lb							*8790	*8790	*6960	*6960												
	kg							*3980	*3980	*3160	*3160												

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.
2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.
3. Ratings at bucket lift hook.
4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.
6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO Construction Machinery America LLC.



SK250LC-6E 60 Ft. LONG REACH LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 10.35 m boom (33' 11"), 8.25 m (27' 1") arm, 0.40 m³ (0.52 yrd³) bucket, and 800 mm (31.5") shoes.

SK250LC-6E Long Reach Boom: 10.35 M (33' 11") Arm: 8.25 M (27' 1") Bucket: 0.40 m³ (0.52 yd³) SAE/PCSA 350 Kg (772 lbs) Shoes: 800 mm (31.5") Heavy Lift

A / B	C	1.5 m (5' 0")		3.0 (10' 0")		4.5 m (14.8')		6.0 m (19.7')		7.5 m (24.6')		9.0 m (29.5')		10.5 m (34.4')		12.0 m (39.4')		13.5 m (44.3')		15.0 m (49.2')		16.5 m (54.1')	
12.0 m (39.4')	lb																						
	kg																						
10.5 m (34.4')	lb																	*2630	*2630				
	kg																	*1190	*1190				
9.0 m (29.5')	lb																	*3420	*3420	*2000	*2000		
	kg																	*1550	*1550	*900	*900		
7.5 m (24.6')	lb																	*3660	*3660	*2930	*2930		
	kg																	*1660	*1660	*1330	*1330		
6.0 m (19.7')	lb																	*3850	*3850	*3600	*3600	*1800	*1800
	kg																	*1740	*1740	*1630	*1630	*820	*820
4.5 m (14.8')	lb															*4250	*4250	*4120	*4120	*4020	3500	*2570	*2570
	kg															*1930	*1930	*1860	*1860	*1820	1580	*1160	*1160
3.0 m (9.8')	lb													*5050	*5050	*4710	*4710	*4450	4250	*4250	3320	*3160	2570
	kg													*2290	*2290	*2130	*2130	*2010	1930	*1930	1500	*1430	1160
1.5 m (4.9')	lb			*7270	*7270	*17250	*17250	*11940	*11940	*9210	*9210	*6520	*6520	*5760	*5760	*5220	5050	*4820	3970	*4530	3130	*3620	2440
	kg			*3300	*3300	*7820	*7820	*5410	*5410	*4170	*4170	*2950	*2950	*2610	*2610	*2370	2290	*2180	1800	*2050	1410	*1640	1100
Ground Level	lb			*5750	*5750	*12790	*12790	*14100	12100	*10640	8940	*7570	*7570	*6500	5910	*5760	4660	*5220	3690	*4820	2920	*3980	2300
	kg			*2600	*2600	*5800	*5800	*6390	5490	*4820	4050	*3430	*3430	*2950	2680	*2610	2110	*2360	1670	*2180	1320	*1800	1040
-1.5 m (-4.9')	lb	*4610	*4610	*6490	*6490	*11080	*11080	*15690	10900	*11810	8080	*8570	6860	*7220	5390	*6290	4280	*5610	3420.	4790	2730	4000	2160
	kg	*2090	*2090	*2940	*2940	*5020	*5020	*7110	4940	*5350	3660	*3880	3110	*3270	2440	*2850	1940	*2540	1550	2170	1230	1810	980
-3.0 m (-9.8')	lb	*6110	*6110	*7760	*7760	*11400	*11400	*16690	10180	*12660	7490	*9430	6250	*7860	4940	6700	3950	5530	3180	4610	2560	3880	2050
	kg	*2770	*2770	*3520	*3520	*5170	*5170	*7570	4610	*5740	3390	*4280	2830	*3560	2240	3030	1790	2510	1440	2090	1160	1750	930
-4.5 m (-14.8')	lb	*7630	*7630	*9250	*9250	*12520	*12520	*17210	9810	12400	7130	9830	5780	7850	4590	6420	3690	5330	2980	4470	2420	*3680	1960
	kg	*3460	*3460	*4190	*4190	*5680	*5680	*7800	4450	5620	3230	4460	2620	3560	2080	2910	1670	2410	1350	2020	1090	*1670	890
-6.0 m (-19.7')	lb	*9220	*9220	*10920	*10920	*14110	*14110	17240	9700	12210	6960	9500	5480	7590	4340	6210	3490	5180	2840	4370	2320		
	kg	*4180	*4180	*4950	*4950	*6400	*6400	7820	4400	5540	3150	4310	2480	3440	1960	2820	1580	2350	1290	1980	1050		
-7.5 m (-24.6')	lb	*10880	*10880	*12750	*12750	*16060	15440	*17010	9770	12200	6960	9320	5310	7440	4190	6100	3380	5100	2760	4340	2290		
	kg	*4930	*4930	*5780	*5780	*7280	7000	*7710	4430	5530	3150	4230	2410	3370	1900	2760	1530	2310	1250	1960	1030		
-9.0 m (-29.5')	lb	*12650	*12650	*14780	*14780	*18410	15890	*16320	10000	12340	7080	9280	5270	7390	4150	6070	3350	5100	2760				
	kg	*5740	*5740	*6700	*6700	*8350	7210	*7400	4530	5600	3210	4210	2390	3350	1880	2750	1520	2310	1250				
-10.5 m (-34.4')	lb	*14530	*14530	*17030	*17030	*19820	16540	*15140	10390	*12090	7350	9370	5350	7460	4210.	6140	3420	5190	2850				
	kg	*6590	*6590	*7720	*7720	*8990	7500	*6870	4710	*5480	3330	4250	2420	3380	1910	2780	1550	2350	1290				
-12.0 m (-39.4')	lb			*19550	*19550	*17210	*17210	*13320	10960	*10690	7770	9580	5550	7640	4390	6330	3600						
	kg			*8860	*8860	*7800	*7800	*6040	4970	*4850	3520	4340	2520	3460	1990	2870	1630						
-13.5 m (-44.3')	lb							*10530	*10530	*8400	*8400	*8720	5900	*7070	4720								
	kg							*4770	*4770	*3810	*3810	*3950	2680	*3200	2140								

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.
2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.
3. Ratings at bucket lift hook.
4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.
6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO Construction Machinery America LLC.

https://truckmanualshub.com/

SK290LC-6E LIFTING CAPACITIES KCMALLC SPEC'S

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.

2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.

3. Ratings at bucket lift hook.

4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.

5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.

6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO Construction Machinery America LLC.

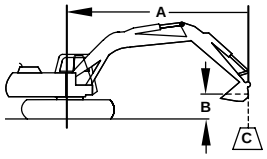
CAUTION

THE OPERATOR MUST CONSIDER THE WEIGHT OF ANY DEVICE UTILIZED FOR LIFTING TO PROPERLY CALCULATE THE TOTAL LIFTING CAPACITY OF THE MACHINE, EXAMPLE:

1. **If the excavator uses the same bucket size indicated in the lifting table, and a lifting cable, etc. weighing 100 kg (220 lbs) is used for lifting, then you have to subtract this additional 100 kg (220 lbs) from every value indicated in the lifting table accordingly.**
2. **If a bucket is changed for a larger bucket, which weight is 350 Kg (770 lbs) more than the bucket indicated in the lifting chart, then you have to subtract this additional weight from every value indicated in the lifting table accordingly.**
3. **If a bucket is changed for a smaller bucket, which weight is 350 Kg (770 lbs) less than the bucket indicated in lifting chart, then you can safely add 350 kg (770 lbs) to every value indicated in the lifting table accordingly.**

SK290LC-6E LIFTING CAPACITIES

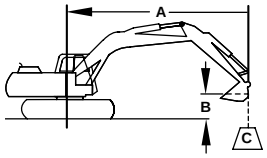
Based on a machine equipped with 6.20 m boom (20' 4"), 3.20 m (10' 6") arm, 1.20 m³ (1.57 yrd³) bucket, and 600 mm (23.6") shoes.



SK290LC-6E	Boom: 6.20 M (20' 4")	Arm: 3.20 M (10' 6")	Bucket: 1.20 m³ (1.57 yd³) SAE/PCSA 954 Kg (2100 lbs)	Shoes: 600 mm (23.6")										
B \ A	C	5' 0" (1.5 m)		10' 0" (3.0)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0" (7.6 m)		30' 0" (9.1 m)	
20' 0" (6.1 m)	lb									*11030	*11030		
	kg									*5000	*5000		
15' 0" (4.6 m)	lb							*15040	*15040	*13500	10950		
	kg							*6820	*6820	*6120	4960		
10' 0" (3.0 m)	lb			*25770	*25770	*23520	*23520	*17780	15080	*14900	10440	*9060	7530
	kg			*11680	*11680	*10670	*10670	*8060	6840	*6760	4730	*4100	3410
5' 0" (1.5 m)	lb			*10140	*10140	*28570	21840	*20440	14100	16310	9920	*10630	7280
	kg			*4590	*4590	*12960	9900	*9270	6390	7390	4500	*4820	3300
Ground Level	lb			*14590	*14590	*31230	20730	*22280	13400	15860	9520		
	kg			*6620	*6620	*14160	9400	*10100	6070	7190	4310		
-5' 0" (-1.5 m)	lb	*14500	*14500	*22290	*22290	*31480	20360	22290	13050	15640	9310		
	kg	*6570	*6570	*10110	*10110	*14270	9230	10100	5920	7090	4220		
-10' 0" (-3.0 m)	lb	*22690	*22690	*32420	*32420	*29640	20470	*21870	13060	15700	9370		
	kg	*10290	*10290	*14700	*14700	*13440	9280	*9920	5920	7120	4250		
-15' 0" (-4.6 m)	lb			*35230	*35230	*25290	21030	*18390	13450				
	kg			*15980	*15980	*11430	9530	*8340	6100				

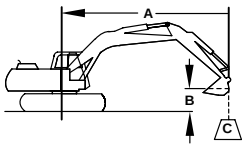
SK290LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.20 m boom (20' 4"), 3.20 m (10' 6") arm, 1.20 m³ (1.57 yrd³) bucket, and 600 mm (23.6") shoes.



SK290LC-6E	Boom: 6.20 M (20' 4")	Arm: 3.20 M (10' 6")	Bucket: 1.20 m³ (1.57 yd³) SAE/PCSA 954 Kg (2100 lbs)	Shoes: 600 mm (23.6")	HL									
B \ A	C	5' 0" (1.5 m)		10' 0" (3.0)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0" (7.6 m)		30' 0" (9.1 m)	
20' 0" (6.1 m)	lb									*12390	11310		
	kg									*5620	5130		
15' 0" (4.6 m)	lb							*17040	16100	*15370	10950		
	kg							*7730	7300	*6970	4960		
10' 0" (3.0 m)	lb			*28550	*28550	*26550	23840	*20150	15080	16890	10440	*10230	7530
	kg			*12950	*12950	*12040	10810	*9130	6840	7660	4730	*4630	3410
5' 0" (1.5 m)	lb			*11390	*11390	*32270	21840	*23170	14100	16310	9920	*11960	7280
	kg			*5160	*5160	*14630	9900	*10510	6390	7390	4500	*5420	3300
Ground Level	lb			*16300	*16300	*35280	20730	22680	13400	15860	9520		
	kg			*7390	*7390	*16000	9400	10280	6070	7190	4310		
-5' 0" (-1.5 m)	lb	*16210	*16210	*24760	*24760	*35590	20360	22290	13050	15640	9310		
	kg	*7350	*7350	*11230	*11230	*16140	9230	10110	5920	70990	4220		
-10' 0" (-3.0 m)	lb	*25210	*25210	*35900	*35900	*33560	20470	22290	13060	15700	9370		
	kg	*11430	*11430	*16280	*16280	*15220	9280	10110	5920	7120	4250		
-15' 0" (-4.6 m)	lb			*39950	*39950	*28650	21030	*20970	13450				
	kg			*18120	*18120	*12990	9530	*9510	6100				

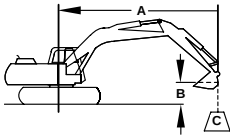
https://truckmanualshub.com/



SK290LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.20 m boom (20’ 4”), 3.20 m (10’ 6”) arm, 1.20 m³ (1.57 yrd³) bucket, and 800 mm (31.5”) shoes.

SK290LC-6E Boom: 6.20 M (20' 4") Arm: 3.20 M (10' 6") Bucket: 1.20 m³ (1.57 yd³) SAE/PCSA 954 Kg (2100 lbs) Shoes: 800 mm (31.5")													
A		5' 0" (1.5 m)		10' 0" (3.0)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
B	C												
20' 0" (6.1 m)	lb kg									*11030 *5000	*11030 *5000		
15' 0" (4.6 m)	lb kg							*15040 *6820	*15040 *6820	*13500 *6120	11230 5090		
10' 0" (3.0 m)	lb kg			*25770 *11680	*25770 *11680	*23520 *10670	*23520 *10670	*17780 *8060	15450 7000	*14900 *6760	10720 4860	*9060 *4100	7750 3510
5' 0" (1.5 m)	lb kg			*10140 *4590	*10140 *4590	*28570 *12960	22390 10150	*20440 *9270	14470 6560	*16340 *7410	10200 4620	*10630 *4820	7510 3400
Ground Level	lb kg			*14590 *6620	*14590 *6620	*31230 *14160	21270 9640	*22280 *10100	13770 6240	16310 7390	9790 4440		
-5' 0" (-1.5 m)	lb kg	*14500 *6570	*14500 *6570	*22290 *10110	*22290 *10110	*31480 *14270	20900 9480	*22860 *10370	13420 6080	16080 7290	9590 4350		
-10' 0" (-3.0 m)	lb kg	*22690 *10290	*22690 *10290	*32420 *14700	*32420 *14700	*29640 *13440	21020 9530	*21870 *9920	13430 6090	16140 7320	9650 4370		
-15' 0" (-4.6 m)	lb kg			*35230 *15980	*35230 *15980	*25220 *11430	21570 9780	*18390 *8340	13820 6270				

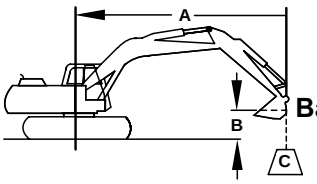


SK290LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.20 m boom (20’ 4”), 3.20 m (10’ 6”) arm, 1.20 m³ (1.57 yrd³) bucket, and 800 mm (31.5”) shoes.

SK290LC-6E Boom: 6.20 M (20' 4") Arm: 3.20 M (10' 6") Bucket: 1.20 m³ (1.57 yd³) SAE/PCSA 954 Kg (2100 lbs) Shoes: 800 mm (31.5") HL													
A		5' 0" (1.5 m)		10' 0" (3.0)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
B	C												
20' 0" (6.1 m)	lb kg									*12390 *5620	11590 5250		
15' 0" (4.6 m)	lb kg							*17040 *7730	16470 7470	*15370 *6970	11230 5090		
10' 0" (3.0 m)	lb kg			*28550 *12950	*28550 *12950	*26550 *12040	24390 11060	*20150 *9130	15450 7000	*16960 *7690	10720 4860	*10230 *4630	7750 3510
5' 0" (1.5 m)	lb kg			*11390 *5160	*11390 *5160	*32270 *14630	22390 10150	*23170 *10510	14470 6560	16750 7590	10200 4620	*11960 *5420	7510 3400
Ground Level	lb kg			*16300 *7390	*16300 *7390	*35280 *16000	21270 9640	23290 10560	13770 6240	16310 7390	9790 4440		
-5' 0" (-1.5 m)	lb kg	*16210 *7350	*16210 *7350	*24760 *11230	*24760 *11230	*35590 *16140	20900 9480	22890 10380	13420 6080	16080 7290	9590 4350		
-10' 0" (-3.0 m)	lb kg	*25210 *11430	*25210 *11430	*35900 *16280	*35900 *16280	*33560 *15220	21020 9530	22900 10380	13430 6090	16140 7320	9650 4370		
-15' 0" (-4.6 m)	lb kg			*39950 *18120	*39950 *18120	*28650 *12990	21570 9780	*20970 *9510	13820 6270				

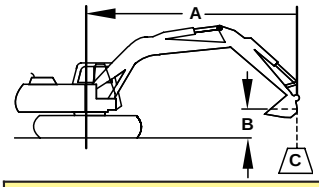
https://truckmanualshub.com/



SK290LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.20 m boom (20’ 4”), 3.20 m (10’ 6”) arm, 1.20 m³ (1.57 yrd³) bucket, and 900 mm (35.4”) shoes.

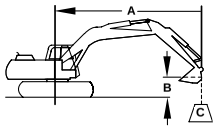
SK290LC-6E Boom: 6.20 M (20' 4") Arm: 3.20 M (10' 6") Bucket: 1.20 m³ (1.57 yd³) SAE/PCSA 954 Kg (2100 lbs) Shoes: 900 mm (35.4")													
B \ A	C	5' 0" (1.5 m)		10' 0" (3.0)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb kg									*11030 *5000	*11030 *5000		
15' 0" (4.6 m)	lb kg							*15040 *6820	*15040 *6820	*13500 *6120	11370 5150		
10' 0" (3.0 m)	lb kg			*25770 *11680	*25770 *11680	*23520 *10670	*23520 *10670	*17780 *8060	15630 7090	*14900 *6760	10860 4920	*9060 *4100	7870 3560
5' 0" (1.5 m)	lb kg			*10140 *4590	*10140 *4590	*28570 *12960	22660 10270	*20440 *9270	14650 6640	*16340 *7410	10340 4680	*10630 *4820	7620 3450
Ground Level	lb kg			*14590 *6620	*14590 *6620	*31230 *14160	21540 9770	*22280 *10100	13950 6320	16530 7490	9930 4500		
-5' 0" (-1.5 m)	lb kg	*14500 *6570	*14500 *6570	*22290 *10110	*22290 *10110	*31480 *14270	21170 9600	*22860 *10370	13610 6170	16300 7390	9730 4410		
-10' 0" (-3.0 m)	lb kg	*22690 *10290	*22690 *10290	*32420 *14700	*32420 *14700	*29640 *13440	21290 9650	*21870 *9920	13610 6170	16360 7420	9790 4440		
-15' 0" (-4.6 m)	lb kg			*35230 *15980	*35230 *15980	*25220 *11430	21840 9900	*18390 *8340	14010 6350				



SK290LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.20 m boom (20’ 4”), 3.20 m (10’ 6”) arm, 1.20 m³ (1.57 yrd³) bucket, and 900 mm (35.4”) shoes.

SK290LC-6E Boom: 6.20 M (20' 4") Arm: 3.20 M (10' 6") Bucket: 1.20 m³ (1.57 yd³) SAE/PCSA 954 Kg (2100 lbs) Shoes: 900 mm (35.4") HL													
B \ A	C	5' 0" (1.5 m)		10' 0" (3.0)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb kg									*12390 *5620	11730 5310		
15' 0" (4.6 m)	lb kg							*17040 *7730	16650 7550	*15370 *6970	11370 5150		
10' 0" (3.0 m)	lb kg			*28550 *12950	*28550 *12950	*26550 *12040	24660 11180	*20150 *9130	15630 7090	*16960 *7690	10860 4920	*10230 *4630	7870 3550
5' 0" (1.5 m)	lb kg			*11390 *5160	*11390 *5160	*32270 *14630	22660 10270	*23170 *10510	14650 6640	16970 7690	10340 4680	*11960 *5420	7620 3450
Ground Level	lb kg			*16300 *7390	*16300 *7390	*35280 *16000	21540 9770	23590 10700	13950 6320	16530 7490	9930 4500		
-5' 0" (-1.5 m)	lb kg	*16210 *7350	*16210 *7350	*24760 *11230	*24760 *11230	*35590 *16140	21170 9600	23200 10520	13610 6170	16300 7390	9730 4410		
-10' 0" (-3.0 m)	lb kg	*25210 *11430	*25210 *11430	*35900 *16280	*35900 *16280	*33560 *15220	21290 9650	23200 10520	13610 6170	16360 7420	9790 4440		
-15' 0" (-4.6 m)	lb kg			*39950 *18120	*39950 *18120	*28650 *12990	21840 9900	*20970 *9510	14010 6350				



SK290LC-6E (Long Reach) LIFTING CAPACITIES

Based on a machine equipped with 10.79 m boom (35' 5"), 8.046 m (26' 4.75") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") shoes.

SK290LC-6E Long Reach Boom: 10.79 M (35' 5") Arm: 8.046 M (26' 4.75") Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 331 Kg (730 lbs) Shoes: 800 mm (31.5")

	A	5' 0" (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)		30' (9.1 m)		35' (10.7 m)		40' (12.2 m)		45' (13.7 m)		50' (15.2 m)		55' (16.8 m)	
B	C																						
45' (13.7 m)	lb kg																						
40' (12.2 m)	lb kg																						
35' (10.7 m)	lb kg																			*1310 *590	*1310 *590		
30' (9.1 m)	lb kg																	*3400 *1540	*3400 *1540	*2240 *1020	*2240 *1020		
25' (7.6 m)	lb kg																	*3990 *1810	*3990 *1810	*2950 *1340	*2950 *1340	*1090 *490	*1090 *490
20' (6.1 m)	lb kg															*4600 *2090	*4600 *2090	*4290 *1950	3890 1760	*3570 *1620	2840 1290	*1840 *830	*1840 *830
15' (4.6 m)	lb kg													*5560 *2520	*5560 *2520	*5000 *2270	4760 2160	*4580 *2080	3550 1610	*4200 *1910	2610 1180	*2420 *1100	1830 830
10' (3.0 m)	lb kg			*12100 *5490	*12100 *5490					*8720 *3960	*8720 *3960	*7200 *3270	*7200 *3270	*6180 *2800	5630 2550	*5450 *2470	4250 1930	*4900 *2220	3180 1440	*4490 *2040	2340 1060	*2870 *1300	1650 750
5' (1.5 m)	lb kg			*4470 *2030	*4470 *2030	*14440 *6550	*14440 *6550	*13330 *6050	11850 5380	*10070 *4570	8630 3910	*8110 *3680	6460 2930	*6810 *3090	4910 2230	*5900 *2680	3730 1690	*5240 *2380	2810 1270	4570 2070	2080 940	*3210 *1450	1470 670
Ground Level	lb kg			*4620 *2100	*4620 *2100	*9860 *4470	*9860 *4470	*15040 *6820	9800 4450	*11240 *5100	7280 3300	*8930 *4050	5530 2510	*7410 *3360	4250 1930	*6340 *2880	3260 1480	5310 2410	2470 1120	4310 1950	1830 830	*3370 *1530	1300 590
-5' (-1.5 m)	lb kg	*4400 *2000	*4400 *2000	*5730 *2600	*5730 *2600	*9370 *4250	*9370 *4250	*16160 *7330	8490 3850	*12130 *5500	6280 2850	*9610 *4360	4790 2170	7620 3460	3700 1680	6130 2780	2850 1290	4990 2260	2170 980	4080 1850	1610 730	*3250 *1470	1150 520
-10' (-3.0 m)	lb kg	*5780 *2620	*5780 *2620	*7060 *3200	*7060 *3200	*10060 *4560	*10060 *4560	*15920 *7220	7760 3520	11880 5390	5620 2550	9070 4110	4260 1930	7170 3250	3280 1490	5790 2630	2530 1150	4740 2150	1930 880	3910 1770	1440 650	*2670 *1210	1050 480
-15' (-4.6 m)	lb kg	*7170 *3250	*7170 *3250	*8500 *3860	*8500 *3860	*11250 *5100	*11250 *5100	16290 7390	7430 3370	11470 5200	5250 2380	8700 3950	3920 1780	6870 3120	2990 1360	5560 2520	2300 1040	4560 2070	1760 800	3790 1720	1330 600	*1420 *640	1000 450
-20' (-6.1 m)	lb kg	*8600 *3900	*8600 *3900	*10040 *4550	*10040 *4550	*12750 *5780	12040 5460	16230 7360	7380 3350	11310 5130	5110 2320	8520 3860	3750 1700	6710 3040	2840 1290	5430 2460	2180 990	4480 2030	1680 760	3750 1700	1300 590		
-25' (-7.6 m)	lb kg	*10070 *4570	*10070 *4570	*11670 *5290	*11670 *5290	*14500 *6580	12460 5650	*16060 *7280	7540 3420	11360 5150	5150 2340	8510 3860	3740 1700	6680 3030	2820 1280	5410 2450	2170 990	4490 2040	1690 770	*2220 *1000	1360 620		
-30' (-9.1 m)	lb kg	*11570 *5250	*11570 *5250	*13410 *6080	*13410 *6080	*16510 *7490	13100 5940	*15030 *6820	7900 3580	11590 5260	5360 2430	8650 3920	3880 1760	6790 3080	2920 1320	5530 2510	2270 1030	4630 2100	1830 830				
-35' (-10.7 m)	lb kg	*13100 *5940	*13100 *5940	*15250 *6920	*15250 *6920	*17410 *7900	13960 6330	*13490 *6120	8440 3830	*10830 *4910	5730 2600	*8860 *4020	4170 1890	7060 3200	3180 1440	5800 2630	2530 1150						
-40' (-12.2 m)	lb kg			*17130 *7770	*17130 *7770	*14280 *6480	*14280 *6480	*11270 *5110	9200 4170	*9110 *4130	6310 2860	*7390 *3350	4650 2110	*5870 *2660	3630 1650								

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.

2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.

3. Ratings at bucket lift hook.

4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.

5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.

6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO Construction Machinery America LLC.

https://truckmanualshub.com/

SK330LC-6E LIFTING CAPACITIES KCMA SPEC'S

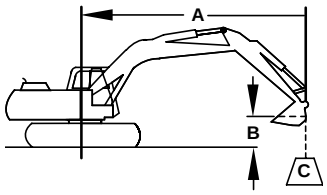
1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.
2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.
3. Ratings at bucket lift hook.
4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.
6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO Construction Machinery America LLC.

CAUTION

THE OPERATOR MUST CONSIDER THE WEIGHT OF ANY DEVICE UTILIZED FOR LIFTING TO PROPERLY CALCULATE THE TOTAL LIFTING CAPACITY OF THE MACHINE, EXAMPLE:

1. **If the excavator uses the same bucket size indicated in the lifting table, and a lifting cable, etc. weighing 100 kg (220 lbs) is used for lifting, then you have to subtract this additional 100 kg (220 lbs) from every value indicated in the lifting table accordingly.**
2. **If a bucket is changed for a larger bucket, which weight is 350 Kg (770 lbs) more than the bucket indicated in the lifting chart, then you have to subtract this additional weight from every value indicated in the lifting table accordingly.**
3. **If a bucket is changed for a smaller bucket, which weight is 350 Kg (770 lbs) less than the bucket indicated in lifting chart, then you can safely add 350 kg (770 lbs) to every value indicated in the lifting table accordingly.**

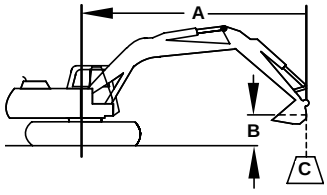
SK330LC-6E LIFTING CAPACITIES



SK330LC-6E Boom: 6.50 M (21' 3") Arm: 2.60 M (8' 6") Bucket: 1.6 m³ (2.09 yd³) SAE/PCSA 1130 Kg (2490 lbs) Shoes 800 mm (31.5")

B \ A	C	10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb kg							*14480 * 6570	*14480 * 6570		
15' 0" (4.6 m)	lb kg	*35440 *16070	*35440 *16070	*22710 *10300	*22710 *10300	*17850 * 8090	*17850 * 8090	*15400 * 6980	14610 6620		
10' 0" (3.0 m)	lb kg			*28460 *12900	*28460 *12900	*20540 * 9310	19720 8940	*16730 * 7590	13950 6330		
5' 0" (1.5 m)	lb kg			*32470 *14720	*32470 *14720	*22870 *10370	18590 8430	*18000 * 8160	13350 6050		
Ground Level	lb kg			*33560 *15220	*33560 *15220	*24140 *10950	17900 8120	*18750 * 8500	12930 5860		
-5' 0" (-1.5 m)	lb kg	*36880 *16720	*36880 *16720	*32520 *14740	*32520 *14740	*24050 *10900	17670 8010	*18550 * 8410	12780 5790		
-10' 0" (-3.0 m)	lb kg	*39980 *18130	*39980 *18130	*29560 *13400	*29560 *13400	*22230 *10080	17850 8090				
-15' 0" (-4.6 m)	lb kg	*31320 *14200	*31320 *14200	*23780 *10780	*23780 *10780						

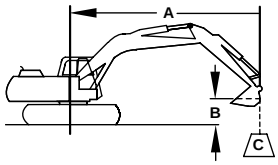
SK330LC-6E LIFTING CAPACITIES (Heavy Lift)



SK330LC-6E Boom: 6.50 M (21' 3") Arm: 2.60 M (8' 6") Bucket: 1.6 m³ (2.09 yd³) SAE/PCSA 1130 Kg (2490 lbs) Shoes 800 mm (31.5") HEAVY LIFT

B \ A	C	10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb kg							*16540 * 7500	*15100 * 6840		
15' 0" (4.6 m)	lb kg	*39930 *18110	*39930 *18110	*25700 *11650	*25700 *11650	*20310 * 9210	*20310 * 9210	*17600 * 7980	14610 6620		
10' 0" (3.0 m)	lb kg			*32280 *14640	*32280 *14640	*23390 *10600	19720 8940	*19130 * 8670	13950 6330		
5' 0" (1.5 m)	lb kg			*36860 *16710	*36860 *16710	*26050 *11810	18590 8430	*20580 * 9330	13350 6050		
Ground Level	lb kg			*38120 *17290	*38120 *17290	*27520 *12480	17900 8120	20970 9510	12930 5860		
-5' 0" (-1.5 m)	lb kg	*40820 *18510	*40820 *18510	*36980 *16770	*36980 *16770	*27430 *12440	17670 8010	20810 9440	12780 5790		
-10' 0" (-3.0 m)	lb kg	*45530 *20650	*45530 *20650	*33690 *15280	*33690 *15280	*25420 *11520	17850 8090				
-15' 0" (-4.6 m)	lb kg	*35900 *16280	*35900 *16280	*27260 *12360	*27260 *12360						

https://truckmanualshub.com/

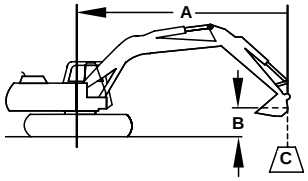


SK330LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.50 m boom (21’ 3”), 2.60 m (8’ 6”) arm, 1.60 m³ (2.09 yrd³) bucket, and 900 mm (35.4”) shoes.

SK330LC-6E Boom: 6.50 M (21' 3") Arm: 2.60 M (8' 6") Bucket: 1.6 m³ (2.09 yd³) SAE/PCSA 1130 Kg (2490 lbs) Shoes 900 mm (35.4")

B \ A	C	10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
											
20' 0" (6.1 m)	lb kg							*14480 * 6570	*14480 * 6570		
15' 0" (4.6 m)	lb kg	*35440 *16070	*35440 *16070	*22710 *10300	*22710 *10300	*17850 * 8090	*17850 * 8090	*15400 * 6980	14760 6690		
10' 0" (3.0 m)	lb kg			*28460 *12900	*28460 *12900	*20540 * 9310	19920 9030	*16730 * 7590	14110 6400		
5' 0" (1.5 m)	lb kg			*32470 *14720	*32470 *14720	*22870 *10370	18790 8520	*18000 * 8160	13500 6120		
Ground Level	lb kg			*33560 *15220	*33560 *15220	*24140 *10950	18110 8210	*18750 * 8500	13080 5930		
-5' 0" (-1.5 m)	lb kg	*36880 *16720	*36880 *16720	*32520 *14740	*32520 *14740	*24050 *10900	17870 8100	*18550 * 8410	12930 5860		
-10' 0" (-3.0 m)	lb kg	*39980 *18130	*39980 *18130	*29560 *13400	*29560 *13400	*22230 *10080	18060 8190				
-15' 0" (-4.6 m)	lb kg	*31320 *14200	*31320 *14200	*23780 *10780	*23780 *10780						



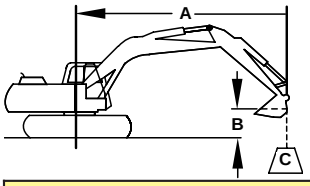
SK330LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.50 m boom (21’ 3”), 2.60 m (8’ 6”) arm, 1.60 m³ (2.09 yrd³) bucket, and 900 mm (35.4”) shoes.

SK330LC-6E Boom: 6.50 M (21' 3") Arm: 2.60 M (8' 6") Bucket:1.6 m³ (2.09yd³) SAE/PCSA 1130 Kg (2490 lbs) Shoes 900 mm (35.4") HL

B \ A	C	10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
											
20' 0" (6.1 m)	lb kg							*16540 * 7500	15250 6910		
15' 0" (4.6 m)	lb kg	*39930 *18110	*39930 *18110	*25700 *11650	*25700 *11650	*20310 * 9210	*20310 * 9210	*17600 * 7980	14760 6690		
10' 0" (3.0 m)	lb kg			*32280 *14640	*32280 *14640	*23390 *10600	19920 9030	*19130 * 8670	14110 6400		
5' 0" (1.5 m)	lb kg			*36860 *16710	*36860 *16710	*26050 *11810	18790 8520	*20580 * 9330	13500 6120		
Ground Level	lb kg			*38120 *17290	*38120 *17290	*27520 *12480	18110 8210	21220 9620	13080 5930		
-5' 0" (-1.5 m)	lb kg	*40820 *18510	*40820 *18510	*36980 *16770	*36980 *16770	*27430 *12440	17870 8100	21050 9550	12930 5860		
-10' 0" (-3.0 m)	lb kg	*45530 *20650	*45530 *20650	*33690 *15280	*33690 *15280	*25420 *11520	18060 8190				
-15' 0" (-4.6 m)	lb kg	*35900 *16280	*35900 *16280	*27260 *12360	*27260 *12360						

https://truckmanualshub.com/

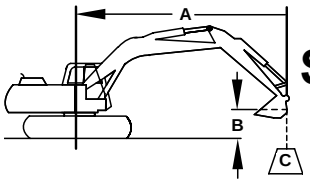


SK330LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.50 m boom (21' 3"), 3.30 m (10' 10") arm, 1.40 m³ (1.83 yrd³) bucket, and 600 mm (23.6") shoes.

SK330LC-6E	Boom: 6.50 M (21' 3")	Arm: 3.30 M (10' 10")	Bucket: 1.4 m³ (1.83 yd³)	SAE/PCSA 1040 Kg (2290 lbs)	Shoes: 600 mm (23.6")

B \ A	C	5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
25' 0" (7.6 m)	lb kg									*10790 * 4890	*10790 * 4890		
20' 0" (6.1 m)	lb kg									*13070 * 5920	*13070 * 5920		
15' 0" (4.6 m)	lb kg							*16170 * 7330	*16170 * 7330	*14190 * 6430	*14190 * 6430	*10760 * 4880	10450 4740
10' 0" (3.0 m)	lb kg			*31090 *14100	*31090 *14100	*25750 *11680	*25750 *11680	*19070 * 8650	*19070 * 8650	*15720 * 7130	13780 6250	*13820 * 6270	10100 4580
5' 0" (1.5 m)	lb kg			*16800 * 7820	*16800 * 7820	*30760 *13950	28160 12770	*21800 * 9880	18370 8330	*17250 * 7820	13080 5930	*14590 * 6610	9740 4410
Ground Level	lb kg			*24210 *10980	*24210 *10980	*33210 *15060	26840 12170	*23640 *10720	17480 7920	*18360 * 8330	12540 5680	*15070 * 6830	9460 4290
-5' 0" (-1.5 m)	lb kg	*24890 *11280	*24890 *11280	*34470 *15630	*34470 *15630	*33300 *15100	26420 11980	*24200 *10970	17050 7730	*18700 * 8480	12250 5550		
-10' 0" (-3.0 m)	lb kg	*34940 *15850	*34940 *15850	*44830 *20330	*44830 *20330	*31380 *14230	26570 12050	*23250 *10540	17030 7720	*17760 * 8050	12280 5570		
-15' 0" (-4.6 m)	lb kg			*37440 *16970	*37440 *16970	*27050 *12270	*27050 *12270	*20090 * 9110	17460 7910				
-20' 0" (-6.1 m)	lb kg					*18320 * 8310	*18320 * 8310						



SK330LC-6E LIFTING CAPACITIES (Heavy Lift)

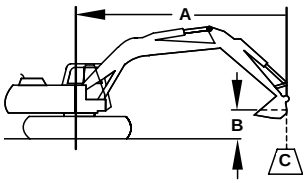
Based on a machine equipped with 6.50 m boom (21' 3"), 3.30 m (10' 10") arm, 1.40 m³ (1.83 yrd³) bucket, and 600 mm (23.6") shoes.

SK330LC-6E	Boom: 6.50 M (21' 3")	Arm: 3.30 M (10' 10")	Bucket: 1.4 m³ (1.83 yd³)	SAE/PCSA 1040 Kg (2290 lbs)	Shoes: 600 mm (23.6")	HEAVY LIFT

B \ A	C	5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
25' 0" (7.6 m)	lb kg									*12150 * 5510	*12150 * 5510		
20' 0" (6.1 m)	lb kg									*14950 * 6780	*14950 * 6780		
15' 0" (4.6 m)	lb kg							*18410 * 8350	*18410 * 8350	*16240 * 7360	*14490 * 6570	*12140 * 5550	10450 4750
10' 0" (3.0 m)	lb kg			*34440 *15620	*34440 *15620	*29190 *13240	*29190 *13240	*21720 * 9850	19650 8910	*17990 * 8160	13780 6250	*15880 * 7200	10100 4580
5' 0" (1.5 m)	lb kg			*18760 * 8500	*18760 * 8500	*34910 *15830	28160 12770	*24840 *11260	18370 8330	*19740 * 8950	13080 5930	15610 7080	9740 4410
Ground Level	lb kg			*25900 *12200	*25900 *12200	*37720 *17100	26840 12170	*26940 *12220	17480 7920	*20320 * 9210	12540 5680	15310 6940	9460 4290
-5' 0" (-1.5 m)	lb kg	*27670 *12540	*27670 *12540	*38180 *17310	*38180 *17310	*37850 *17160	26420 11980	*27600 *12520	17050 7730	*20000 * 9070	12250 5550		
-10' 0" (-3.0 m)	lb kg	*38720 *17560	*38720 *17560	*50930 *23090	*50930 *23090	*35720 *16200	26570 12050	*26560 *12040	17030 7720	*20030 * 9080	12280 5570		
-15' 0" (-4.6 m)	lb kg			*42710 *19370	*42710 *19370	*30920 *14020	27210 12340	*23040 *10450	17460 7910				
-20' 0" (-6.1 m)	lb kg					*21200 * 9610	*21200 * 9610						

10

https://truckmanualshub.com/

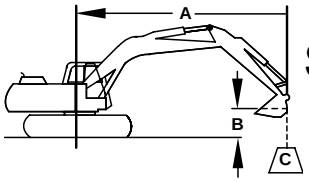


SK330LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.50 m boom (21' 3"), 3.30 m (10' 10") arm, 1.40 m³ (1.83 yrd³) bucket, and 800 mm (31.5") shoes.

SK330LC-6E	Boom: 6.50 M (21' 3")	Arm: 3.30 M (10' 10")	Bucket: 1.4 m³ (1.83 yd³)	SAE/PCSA 1040 Kg (2290 lbs)	Shoes: 800 mm (31.5")

A		5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
B	C												
25' 0" (7.6 m)	lb kg									*10790 * 4890	*10790 * 4890		
20' 0" (6.1 m)	lb kg									*13070 * 5920	*13070 * 5920		
15' 0" (4.6 m)	lb kg							*16170 * 7330	*16170 * 7330	*14190 * 6430	*14190 * 6430	*10760 * 4880	*10760 * 4880
10' 0" (3.0 m)	lb kg			*31090 *14100	*31090 *14100	*25750 *11680	*25750 *11680	*19070 * 8650	*19070 * 8650	*15720 * 7130	14240 6460	*13820 * 6270	10480 4750
5' 0" (1.5 m)	lb kg			*16800 * 7820	*16800 * 7820	*30760 *13950	29070 13180	*21800 * 9880	18980 8600	*17250 * 7820	13540 6140	*14590 * 6610	10110 4580
Ground Level	lb kg			*24210 *10980	*24210 *10980	*33210 *15060	27750 12580	*23630 *10720	18090 8200	*18360 * 8330	13000 5890	*15070 * 6830	9830 4460
-5' 0" (-1.5 m)	lb kg	*24890 *11280	*24890 *11280	*34470 *15630	*34470 *15630	*33300 *15100	27330 12390	*24200 *10970	17660 8010	*18700 * 8480	12720 5760		
-10' 0" (-3.0 m)	lb kg	*34940 *15850	*34940 *15850	*44830 *20330	*44830 *20330	*31380 *14230	27480 12460	*23250 *10540	17650 8000	*17760 * 8050	12740 5780		
-15' 0" (-4.6 m)	lb kg			*37430 *16970	*37430 *16970	*27050 *12270	*27050 *12270	*20090 * 9110	18070 8190				
-20' 0" (-6.1 m)	lb kg					*18320 * 8310	*18320 * 8310						



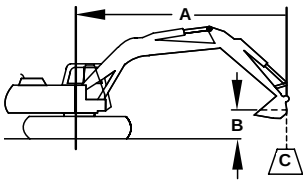
SK330LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.50 m boom (21' 3"), 3.30 m (10' 10") arm, 1.40 m³ (1.83 yrd³) bucket, and 800 mm (31.5") shoes.

SK330LC-6E	Boom: 6.50 M (21' 3")	Arm: 3.30 M (10' 10")	Bucket: 1.4 m³ (1.83 yd³)	SAE/PCSA 1040 Kg (2290 lbs)	Shoes: 800 mm (31.5")	HEAVY LIFT

A		5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
B	C												
25' 0" (7.6 m)	lb kg									*12150 * 5510	*12150 * 5510		
20' 0" (6.1 m)	lb kg									*14950 * 6780	*14950 * 6780		
15' 0" (4.6 m)	lb kg							*18410 * 8350	*18410 * 8350	*16240 * 7360	14960 6780	*12140 * 5500	*10820 * 4910
10' 0" (3.0 m)	lb kg			*34440 *15620	*34440 *15620	*29190 *13240	*29190 *13240	*21720 * 9850	20260 9180	*17990 * 8160	14240 6460	*15880 * 7200	*10480 * 4750
5' 0" (1.5 m)	lb kg			*18760 * 8500	*18760 * 8500	*34910 *15830	29070 13180	*24840 *11260	18980 8600	*19740 * 8950	13540 6140	16190 7340	10110 4580
Ground Level	lb kg			*26900 *12200	*26900 *12200	*37720 *17100	27750 12580	*26940 *12210	*18090 * 8200	*21010 * 9530	13000 5890	15890 7200	9830 4460
-5' 0" (-1.5 m)	lb kg	*27670 *12540	*27670 *12540	*38180 *17310	*38180 *17310	*37850 *17160	27330 12390	*27600 *12520	17660 8010	*20750 * 9410	*12720 * 5760		
-10' 0" (-3.0 m)	lb kg	*38720 *17560	*38720 *17560	*50930 *23090	*50930 *23090	*35720 *16200	27480 12460	*26560 *12040	17650 8000	*20380 * 9240	*12740 * 5780		
-15' 0" (-4.6 m)	lb kg			*42710 *19370	*42710 *19370	*30910 *14020	28120 12750	*23040 *10450	18070 8190				
-20' 0" (-6.1 m)	lb kg					*21200 * 9610	*21200 * 9610						

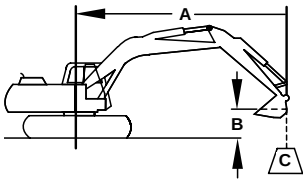
https://truckmanualshub.com/



SK330LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.50 m boom (21' 3"), 4.15 m (13' 7") arm, 1.20 m³ (1.57 yrd³) bucket, and 600 mm (23.6") shoes.

SK330LC-6E Boom: 6.50 M (21' 3") Arm: 4.15 M (13' 7") Bucket: 1.2 m³ (1.57 yd³) SAE/PCSA 930 Kg (2050 lbs) Shoes: 600 mm (23.6")													
A / B	C	5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb kg											* 9430 * 4270	* 9430 * 4270
15' 0" (4.6 m)	lb kg									*12450 * 5650	*12450 * 5650	*11650 * 5280	10630 4820
10' 0" (3.0 m)	lb kg			*34330 *15570	*34330 *15570	*21860 * 9910	*21860 * 9910	*16800 * 7620	*16800 * 7620	*14130 * 6400	13990 6340	*12550 * 5690	10180 4620
5' 0" (1.5 m)	lb kg			*28750 *13040	*28750 *13040	*27680 *12550	*27680 *12550	*19880 * 9010	18650 8450	*15890 * 7200	13150 5960	*13540 * 6140	9710 4400
Ground Level	lb kg	*13440 * 6090	*13440 * 6090	*26360 *11950	*26360 *11950	*31480 *14270	26940 12210	*22290 *10100	17480 7920	*17350 * 7870	12450 5650	14360 6510	9310 4220
-5' 0" (-1.5 m)	lb kg	*21080 * 9560	*21080 * 9560	*32010 *14520	*32010 *14520	*32900 *14920	26020 11800	*23570 *10690	16790 7610	*18190 * 8250	12000 5440	*14700 * 6660	9060 4100
-10' 0" (-3.0 m)	lb kg	*29000 *13150	*29000 *13150	*40670 *18440	*40670 *18440	*32230 *14610	25840 11720	*23500 *10660	16540 7500	*18060 * 8190	11840 5370		
-15' 0" (-4.6 m)	lb kg	*37860 *17170	*37860 *17170	*42580 *19310	*42580 *19310	*29410 *13340	26210 11880	*21710 * 9840	16720 7580	*16310 * 7400	12030 5450		
-20' 0" (-6.1 m)	lb kg			*33020 *14970	*33020 *14970	*23500 *10660	*23500 *10660	*16940 * 7680	*16940 * 7680				



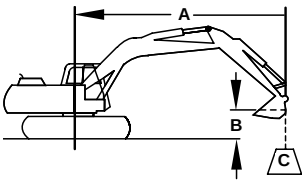
SK330LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.50 m boom (21' 3"), 4.15 m (13' 7") arm, 1.20 m³ (1.57 yrd³) bucket, and 600 mm (23.6") shoes.

SK330LC -6E Boom: 6.50 M (21' 3") Arm: 4.15 M (13' 7") Bucket: 1.2 m³ (1.57 yd³) SAE/PCSA 930 Kg (2050 lbs) Shoes: 600 mm (23.6") HEAVY LIFT													
A / B	C	5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb kg											*10690 * 4840	*10690 * 4840
15' 0" (4.6 m)	lb kg									*14300 * 6480	*14300 * 6480	*13440 * 6090	10630 4820
10' 0" (3.0 m)	lb kg			*38750 *17570	*38750 *17570	*24820 *11250	*24820 *11250	*19190 * 8700	*19190 * 8700	*16220 * 7350	13990 6340	*14470 * 6560	10180 4620
5' 0" (1.5 m)	lb kg			*31890 *14460	*31890 *14460	*31480 *14270	28920 13110	*22710 *10300	18650 8450	*18240 * 8270	13150 5960	15610 7080	9710 4400
Ground Level	lb kg	*15090 * 6840	*15090 * 6840	*29280 *13270	*29280 *13270	*35820 *16240	26940 12210	*25460 *11550	17480 7920	*19920 * 9030	12450 5650	15170 6880	9310 4220
-5' 0" (-1.5 m)	lb kg	*23490 *10650	*23490 *10650	*35490 *16090	*35490 *16090	*37450 *16980	26020 11800	*26940 *12210	16790 7610	19760 8960	12000 5440	14900 6750	9060 4100
-10' 0" (-3.0 m)	lb kg	*32190 *14600	*32190 *14600	*45010 *20410	*45010 *20410	*36730 *16660	25840 11720	*26890 *12190	16540 7500	19580 8880	11840 5370		
-15' 0" (-4.6 m)	lb kg	*41930 *19010	*41930 *19010	*48520 *22000	*48520 *22000	*33600 *15240	26210 11880	*24900 *11290	16720 7580	*18810 * 8530	12030 5450		
-20' 0" (-6.1 m)	lb kg			*37880 *17170	*37880 *17170	*27020 *12250	*23500 *10660	*19580 * 8880	17440 7910				

10

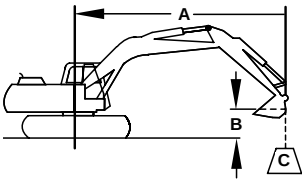
https://truckmanualshub.com/



SK330LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.50 m boom (21' 3"), 4.15 m (13' 7") arm, 1.20 m³ (1.57 yrd³) bucket, and 800 mm (31.5") shoes.

SK330LC-6E Boom: 6.50 M (21' 3") Arm: 4.15 M (13' 7") Bucket: 1.2 m³ (1.57 yd³) SAE/PCSA 930 Kg (2050 lbs) Shoes: 800 mm (31.5")													
B \ A	C	5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb kg											* 9430 * 4270	* 9430 * 4270
15' 0" (4.6 m)	lb kg									*12450 * 5650	*12450 * 5650	*11650 * 5280	11000 4990
10' 0" (3.0 m)	lb kg			*34330 *15570	*34330 *15570	*21860 * 9910	*21860 * 9910	*16800 * 7620	*16800 * 7620	*14130 * 6400	*14130 * 6400	*12550 * 5690	10550 4780
5' 0" (1.5 m)	lb kg			*28750 *13040	*28750 *13040	*27680 *12550	*27680 *12550	*19880 * 9010	19260 8820	*15890 * 7200	13610 6170	*13540 * 6140	10080 4570
Ground Level	lb kg	*13440 * 8090	*13440 * 8090	*26360 *11950	*26360 *11950	*31480 *14270	*31480 *14270	*22290 *10100	18090 8200	*17350 * 7870	12920 5860	14360 6510	9680 4390
-5' 0" (-1.5 m)	lb kg	*21080 * 9560	*21080 * 9560	*32010 *14520	*32010 *14520	*32900 *14920	*32900 *14920	*23570 *10690	17400 7890	*18190 * 8250	12460 5650	14700 6660	9430 4270
-10' 0" (-3.0 m)	lb kg	*29000 *13150	*29000 *13150	*40670 *18440	*40670 *18440	*32230 *14610	*32230 *14610	*23500 *10660	17160 7780	*18060 * 8190	12300 5580		
-15' 0" (-4.6 m)	lb kg	*37860 *17170	*37860 *17170	*42580 *19310	*42580 *19310	*29410 *13340	*29410 *13340	*21710 * 9840	17340 7860	*16310 * 7400	12500 5660		
-20' 0" (-6.1 m)	lb kg			*33020 *14970	*33020 *14970	*23500 *10660	*23500 *10660	*16940 *7680	*16940 *7680				

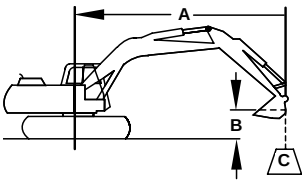


SK330LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.50 m boom (21' 3"), 4.15 m (13' 7") arm, 1.20 m³ (1.57 yrd³) bucket, and 800 mm (31.5") shoes.

SK330LC-6E Boom: 6.50 M (21' 3") Arm: 4.15 M (13' 7") Bucket: 1.2 m³ (1.57 yd³) SAE/PCSA 930 Kg (2050 lbs) Shoes: 800 mm (31.5") HEAVY LIFT													
B \ A	C	5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb kg											*10690 * 4840	*10690 *4840
15' 0" (4.6 m)	lb kg									*14300 *6480	*14300 * 6480	*13440 * 6090	11000 4990
10' 0" (3.0 m)	lb kg			*38750 *17570	*38750 *17570	*24820 *11250	*24820 *11250	*19190 *8700	*19190 * 8700	*16220 *7350	14450 6550	*14470 * 6560	10550 4780
5' 0" (1.5 m)	lb kg			*31890 *14660	*31890 *14660	*31480 *14270	29830 13530	*22710 *10300	19260 8730	*18240 * 8270	13610 6170	*15610 * 7080	10080 4570
Ground Level	lb kg	*15090 * 6840	*15090 * 6840	*29280 *13270	*29280 *13270	*35820 *16240	27650 12630	*25460 *11550	18090 8200	*19920 * 9030	12920 5860	15750 7140	9680 4390
-5' 0" (-1.5 m)	lb kg	*23490 *10650	*23490 *10650	*35490 *16090	*35490 *16090	*37450 *16980	26930 12210	*26940 *12210	17400 7890	20500 9290	12460 5650	15480 7020	9430 4270
-10' 0" (-3.0 m)	lb kg	*32190 *14600	*32190 *14600	*45010 *20410	*45010 *20410	*36730 *16660	26750 12130	*26890 *12190	17160 7780	20320 9210	12300 5580		
-15' 0" (-4.6 m)	lb kg	*41930 *19010	*41930 *19010	*48520 *22000	*48520 *22000	*33600 *15240	27120 12300	*24900 *11290	17340 7860	*18810 * 8530	12500 5660		
-20' 0" (-6.1 m)	lb kg			*37880 *17170	*37880 *17170	*27020 *12250	*27020 *12250	*19580 *8880	*18050 * 8180				

https://truckmanualshub.com/

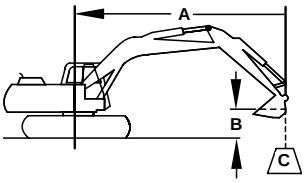


SK330LC-6E LIFTING CAPACITIES

Based on a machine equipped with 6.50 m boom (21’ 3”), 4.15 m (13’ 7”) arm, 1.20 m³ (1.57 yrd³) bucket, and 900 mm (35.4”) shoes.

SK330LC-6E Boom: 6.50 M (21' 3") Arm: 4.15 M (13' 7") Bucket: 1.2 m³ (1.57 yd³) SAE/PCSA 930 Kg (2050 lbs) Shoes: 900 mm (35.4")

B \ A	C	5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb											* 9430	* 9430
	kg											* 4270	* 4270
15' 0" (4.6 m)	lb									*12450	*12450	*11650	11130
	kg									*5650	*5650	* 5280	5040
10' 0" (3.0 m)	lb			*34330	*34330	*21860	*21860	*16800	*16800	*14130	*14130	*12550	10680
	kg			*15570	*15570	* 9910	* 9910	* 7620	* 7620	*6400	*6400	* 5690	4840
5' 0" (1.5 m)	lb			*28750	*28750	*27680	*27680	*19880	*19460	*15890	13760	*13540	10200
	kg			*13040	*13040	*12550	*12550	* 9010	* 8820	*7200	6240	* 6140	4620
Ground Level	lb	*13440	*13440	*26360	*26360	*31480	28140	*22290	*18300	*17350	13070	14360	9800
	kg	*6090	*6090	*11950	*11950	*14270	12760	*10100	* 8200	*7870	5920	6510	4440
-5' 0" (-1.5 m)	lb	*21080	*21080	*32010	*32010	*32900	27230	*23570	*17600	*18190	12620	14700	9550
	kg	*9560	*9560	*14520	*14520	*14920	12350	*10690	* 7980	*8250	5720	6660	4330
-10' 0" (-3.0 m)	lb	*29000	*29000	*40670	*40670	*32230	27050	*23500	*17360	*18060	12450		
	kg	*13150	*13150	*18440	*18440	*14610	12270	*10660	*7870	* 8190	5650		
-15' 0" (-4.6 m)	lb	*37860	*37860	*42580	*42580	*29410	27420	*21710	*17540	*16310	12650		
	kg	*17170	*17170	*19310	*19310	*13340	12430	* 9840	*7950	*7400	5730		
-20' 0" (-6.1 m)	lb			*33020	*33020	*23500	*23500	*16940	*16940				
	kg			*14970	*14970	*10660	*10660	* 7680	*7680				



SK330LC-6E LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.50 m boom (21’ 3”), 4.15 m (13’ 7”) arm, 1.20 m³ (1.57 yrd³) bucket, and 900 mm (35.4”) shoes.

SK330LC-6E Boom: 6.50 M (21' 3") Arm: 4.15 M (13' 7") Bucket: 1.2 m³ (1.57 yd³) SAE/PCSA 930 Kg (2050 lbs) Shoes: 900 mm (35.4") HEAVY LIFT

B \ A	C	5' 0" (1.5 m)		10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)		30' 0' (9.1 m)	
20' 0" (6.1 m)	lb											*10690	*10690
	kg											*4840	*4840
15' 0" (4.6 m)	lb									*14300	*14300	*13440	11130
	kg									*6480	*6480	* 6090	5040
10' 0" (3.0 m)	lb			*38750	*38750	*24820	*24820	*19190	*19190	*16220	14600	*14470	10680
	kg			*17570	*17570	*11250	*11250	*8700	*8700	*7350	6620	*6560	4840
5' 0" (1.5 m)	lb			*31890	*31890	*31480	30130	*22710	19460	*18240	13760	*15610	10200
	kg			*14460	*14460	*14270	13660	*10300	8820	*8270	6240	*7080	4620
Ground Level	lb	*15090	*15090	*29280	*29280	*35820	28140	*25460	18300	*19920	13070	15940	9800
	kg	*6840	*6840	*13270	*13270	*16240	12760	*11550	8290	*9030	5920	7230	4440
-5' 0" (-1.5 m)	lb	*23490	*23490	*35490	*35490	*37450	27230	*26940	17600	20750	12620	15670	9550
	kg	*10650	*10650	*16090	*16090	*16980	12350	*12210	7980	9410	5720	7110	4330
-10' 0" (-3.0 m)	lb	*32190	*32190	*45010	*45010	*36730	27050	*26890	17360	20570	12450		
	kg	*14600	*14600	*20410	*20410	*16660	12270	*12190	7870	9320	5650		
-15' 0" (-4.6 m)	lb	*41930	*41930	*48520	*48520	*33600	27420	*24900	17540	*18810	12650		
	kg	*19010	*19010	*22000	*22000	*15240	12430	*11290	7950	*8530	5730		
-20' 0" (-6.1 m)	lb			*37880	*37880	*27020	*27020	*19580	*18250				
	kg			*17170	*17170	*12250	*12250	*8880	*8280				

10

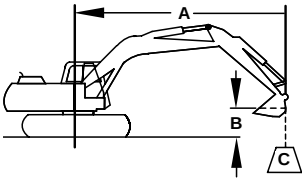
https://truckmanualshub.com/

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.
2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.
3. Ratings at bucket lift hook.
4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with and asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.
6. Capacities apply to the machine as originally manufactured and normally equipped by KOBELCO Construction Machinery America LLC.

CAUTION

THE OPERATOR MUST CONSIDER THE WEIGHT OF ANY DEVICE UTILIZED FOR LIFTING TO PROPERLY CALCULATE THE TOTAL LIFTING CAPACITY OF THE MACHINE, EXAMPLE:

1. **If the excavator uses the same bucket size indicated in the lifting table, and a lifting cable, etc. weighing 100 kg (220 lbs) is used for lifting, then you have to subtract this additional 100 kg (220 lbs) from every value indicated in the lifting table accordingly.**
2. **If a bucket is changed for a larger bucket, which weight is 350 Kg (770 lbs) more than the bucket indicated in the lifting chart, then you have to subtract this additional weight from every value indicated in the lifting table accordingly.**
3. **If a bucket is changed for a smaller bucket, which weight is 350 Kg (770 lbs) less than the bucket indicated in lifting chart, then you can safely add 350 kg (770 lbs) to every value indicated in the lifting table accordingly.**



SK330LC-6E ME LIFTING CAPACITIES (Heavy Lift)

Based on a machine equipped with 6.00 m boom (19' 8"), 2,20 m (7' 2.5") arm, 2.91 m³ (3.80 yrd³) bucket, and 800 mm (31.5") shoes.

SK330LC-6E Boom: 6,00 M (19' 8") Arm: 2.2 M (7' 2.5")
Bucket: 2.91 m³ (3.80 yd³) SAE/PCSA 1,991 Kg (4,391 lbs) Shoes 800 mm (31.5") Heavy Lift

A → / B ↓	C	10' 0" (3.0 m)		15' 0" (4.6 m)		20' 0" (6.1 m)		25' 0' (7.6 m)	
20' 0" (6.1 m)	lb kg					*25,670 *11,664	17,320 7,855		
15' 0" (4.6 m)	lb kg			*35,440 *16,075	*28,190 *12,787	*25,180 *11,421	17,440 7,911	*19,810 *8,986	11,790 5,348
10' 0" (3.0 m)	lb kg					*25,000 *11,340	17,490 7,933	*19,560 *8,872	11,850 5,375
5' 0" (1.5 m)	lb kg					*24,980 *11,330	17,490 7,933	*19,530 *8,859	11,860 5,380
Ground Level	lb kg			*36,250 *16,440	*28,150 *12,769	*25,090 *11,380	17,470 7,924	*19,710 *8,940	11,820 5,361
-5' 0" (-1.5 m)	lb kg	*58,710 *26,630	*58,510 *26,540	*35,340 *16,030	*28,220 *12,800	*25,460 *11,548	17,370 7,879		
-10' 0" (-3.0 m)	lb kg	*58,780 *26,662	*58,780 *26,662	28,070 12,732	28,070 12,732	*26,200 *11,884	17,180 7,793		

https://truckmanualshub.com/

TORQUE SPECIFICATIONS

The following Torque Specifications are provided for use when actual torque value of a fastener is not known.

A. CAPSCREWS & NUTS

1. Metric Coarse Thread Standard Tightening Torque Values. Make certain to tighten all Capscrews & Nuts to proper torque values.

Classification		4.8 T		7 T		10.9 T	
NOMINAL SIZE		NO LUBRICATION	OIL LUBRICATION	NO LUBRICATION	OIL LUBRICATION	NO LUBRICATION	OIL LUBRICATION
M6	P=1	0.45±0.05 (3.2±0.4)	0.38±0.04(2.7±0.3)	0.98±0.1 (7.1±0.7)	0.83±0.08 (6.0±0.6)	1.77±0.18 (12.8±1.3)	1.5±0.15 (10.8±1.1)
M8	P=1.25	1.09±0.11 (7.9±0.8)	0.92±0.09 (6.6±0.7)	2.4±0.2 (17.3±1.4)	2.0±0.2 (14.4±1.4)	4.3±0.4 (31.0±2.9)	3.6±0.4 (26.0±2.9)
M10	P=1.5	2.2±0.2 (15.9±1.4)	1.83±0.18 (13.2±1.3)	4.7±0.5 (33.9±3.6)	4.0±0.4 (28.9±2.9)	8.5±0.9 (61.3±6.5)	7.2±0.7 (52.0±5.1)
M12	P=1.75	3.7±0.4 (26.7±2.9)	3.2±0.3 (23.1±2.2)	8.1±0.8 (58.5±5.8)	6.8±0.7 (49.1±5.1)	14.6±1.5 (105±10.8)	12.3±1.2 (88.8±8.7)
M14	P=2	5.9±0.6 (42.6±4.3)	5.0±0.5 (36.1±3.6)	12.8±1.3 (92.5±9.4)	10.8±1.1 (78.0±7.9)	23±2 (166±14)	19.5±1.9 (140±14)
M16	P=2	9.0±.09 (64.9±6.5)	7.6±0.7 (54.8±5.1)	19.5±2.0 (140±14.4)	16.4±1.6 (118±11.5)	35±4 (252±28.9)	29±3 (209±21.6)
M18	P=2.5	12.4±1.2 (89.6±8.7)	10.5±1.0 (75.8±7.2)	27±3 (195±22)	23±2 (166±14)	49±5 (354±36)	41±4 (296±29)
M20	P=2.5	17.5±1.7 (126±12.3)	14.7±1.4 (106±10.1)	38±4 (274±29)	32±3 (231±22)	68±7 (491±51)	57±6 (412±43)
M22	P=2.5	23±2 (166±14)	19.6±2.0 (142±14)	51±5 (368±36)	43±4 (310±29)	92±9 (663±65)	77±7 (555±58)
M24	P=3	30±3 (217±22)	24±3 (173±22)	65±7 (469±51)	53±5 (383±36)	118±12 (852±87)	96±10 (693±72)
M27	P=3	44±4 (318±29)	36±3 (260±22)	96±10 (693±72)	78±8 (563±58)	173±17 (1250±120)	140±14 (1010±100)
M30	P=3.5	60±6 (433±43)	50±5 (361±36)	131±13 (946±94)	110±11 (794±79)	235±24 (1700±170)	198±20 (1430±140)
M33	P=3.5	81±8 (585±58)	68±7 (491±51)	176±18 (1270±130)	148±15 (1070±110)	317±32 (2290±200)	266±27 (1920±200)
M36	P=4	105±10 (758±72)	88±9 (636±65)	227±23 (1640±170)	190±19 (1370±140)	409±41 (2960±300)	343±34 (2480±250)

TORQUE VALUE UNIT– kgf-m (ft. lbs.)

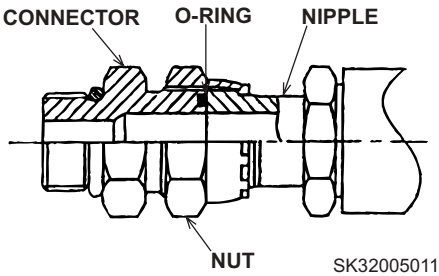
2. Metric Fine Thread Standard Tightening Torque Values. Make certain to tighten all Capscrews & Nuts to proper torque values.

Classification		4.8 T		7 T		10.9 T	
NOMINAL SIZE		NO LUBRICATION	OIL LUBRICATION	NO LUBRICATION	OIL LUBRICATION	NO LUBRICATION	OIL LUBRICATION
M8	P=1.0	1.15±0.11 (8.3±0.8)	0.97±0.1 (7.0±0.7)	2.5±0.2 (18.0±1.4)	2.1±0.2 (15.2±1.4)	4.5±0.4 (32.5±2.9)	3.8±0.4 (27.4±2.9)
M10	P=1.25	2.3±0.2 (16.6±1.4)	1.91±0.19 (13.8±1.4)	4.9±0.5 (35.4±3.6)	4.2±0.4 (30.3±2.9)	8.9±0.9 (64.2±6.5)	7.5±0.7 (54.2±5.1)
M12	P=1.25	4.0±0.4 (28.9±2.9)	3.4±0.3 (24.5±2.2)	8.7±0.9 (62.8±6.5)	7.3±0.7 (52.7±5.1)	15.7±1.6 (113±13)	13.2±1.3 (95.3±9.4)
M16	P=1.5	9.4±0.9 (67.9±6.5)	7.9±0.8 (57.0±5.8)	20±2 (144±14)	17.2±1.7 (124±12)	37±4 (267±29)	31±3 (224±22)
M20	P=1.5	19±9 (137±14)	15.8±1.6 (114±14)	41±4 (296±29)	34±3 (246±22)	74±7 (535±51)	62±6 (448±43)
M24	P=2	32±3 (231±22)	27±3 (195±22)	70±7 (506±51)	58±6 (419±43)	126±12 (910±87)	105±10 (758±72)
M30	P=2	65±6 (469±43)	54±5 (390±36)	142±14 (1030±100)	118±12 (852±87)	255±26 (1840±190)	212±21 (1530±150)
M36	P=3	109±11 (787±79)	91±9 (657±65)	238±23 (1720±170)	198±20 (1430±140)	428±43 (3090±310)	357±36 (2580±260)

TORQUE VALUE UNIT – kgf-m (ft. lbs.)

B. ORS JOINT (O-RING SEALING TYPE)

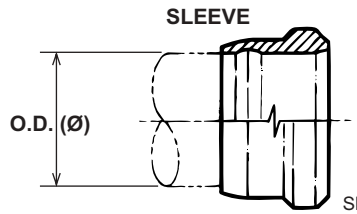
	NOMINAL SIZE	OPPOSING FLATS mm	TORQUE VALUE kgf•m (ft. lbs.)	WORKING PRESSURE kgf/cm² (psi)
Hose mouth ring and Coupling	1 - 14 UNS	30 • 32	14 ± 1.4 (101 ± 10)	350 (4980)
	1 - 3/16 12 UN	36 • 41	18 ± 1.8 (130 ± 13)	385 (5475) (POWER BOOST)
	1 - 7/16 12 UN	41 • 46	21 ± 2.1 (152 ± 15)	



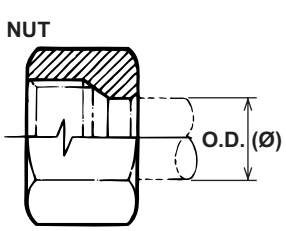
SK32005011

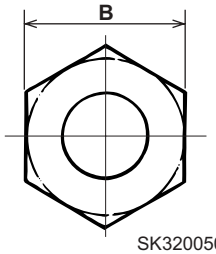
https://truckmanualshub.com/

C. NUTS & SLEEVES



SK32005008





SK32005009

MANUFACTURER'S NAME	WORKING PRESSURE kgf/cm² (psi)	TUBE SIZE O.D. X THICKNESS mm (in)	OPPOSING FLATS mm Dimension B	TORQUE VALUE kgf•m (ft. lbs.)
NIPPON A.M.C.	350 (4980) Travel line only	10 X 1.5 (0.394 X 0.059)	19	4.5±0.5 (33±4)
		15 X 2.0 (0.591 X 0.079)	27	15±2 (108±14)
		18 X 2.5 (0.709 X 0.098)	32	18±2 (130±14)
		22 X 3.0 (0.866 X 0.118)	36	22±2 (159±14)
		28 X 4.0 (1.10 X 0.157)	41	28±3 (203±22)
IHARA KOATSU	350 (4980) Travel line only	35 X 5.0 (1.38 X 0.20)	55	35±4.5 (253±29)

D. FLARE TYPE FITTING JOINTS

Overtightening of flare type (Union Nut Type) metal joints may cause damage to nuts, seat surfaces and prevent optimum sealing resulting in oil leaks.

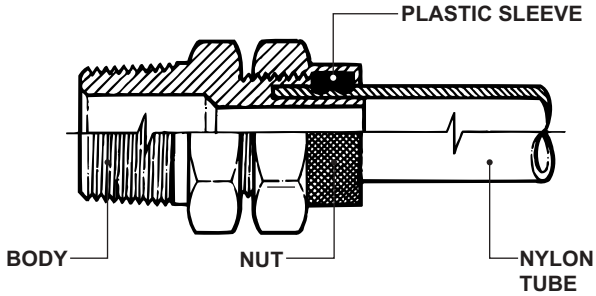
1. PIPE THREADS

Unit: kg-m (ft. lbs.)

NOMINAL SIZE	TORQUE VALUE
1/4"	2.5±0.3 (18.1±1.8)
3/8"	5±0.5 (36.2±3.6)
1/2"	6±0.6 (43.4±4.3)
3/4"	12±1.2 (86.8±8.7)
1"	14±1.4 (101±10)
1-1/4"	17±1.7 (123±12)
1-1/2"	21±2.1 (152±15)
2"	42±4.2 (304±30)

E. N_2 (NYLON) TUBE FITTING JOINTS

1. Clean tube and make certain tube end is trimmed smooth.
2. Insert tube into fitting until tube end is securely seated in fitting body.
3. Tighten the nut by hand.
4. Use a spanner wrench, securily tighten nut by turning 1-1/4 turns.



SK32005010

https://truckmanualshub.com/

TORQUE VALUES FOR MOST COMMON BOLTS

{Bolt Size} Units: N-m (Ft-lbs)

Qty	Location	SK160LC-VI	ED190 Blade Runner
5	-Fuel tank sending unit mounting	{M5} 1.96 ±0.2 (1.4 ±0.1)	⟶
6	-A/C Condenser mounting	{M6 X 50} 4.41 (3.3)	⟶
1	-Hyd. tank sending unit mounting	147 ±15 (108 ±14)	⟶
6	-A/C pulley mounting on damper	{M8 X 16} 39 (29)	⟶
4	-Coolant reservoir mounting	10.8 ±1 (8 ±0.7)	⟶
4	-A/C compressor mounting	{M8 X 100} 10.8 ±1 (8 ±0.7)	⟶
1	-A/C idler pulley nut	{M10} 39~54 (29~40)	⟶
2	-Pilot pump mount bolts	{M10} 39 ±4 (29 ±3) Apply locktite # 262	⟶
8	-Hydraulic oil tank cover mounting	{M10} 46.1 ±4.6 (34 ±4)	⟶
2	-Swing grease bath inspection cover mounting	{M10} 29.4 ±2.9 (22 ±4)	⟶
8	-Swivel joint dust cover mounting	{M10} 14.7 ±1.5 (11 ±2)	⟶
6	-Muffler support bracket mounting	{M10} 39.2 ±3.5 (30 ±3)	⟶
16	-Engine mounting (engine body side)	{M10} 64.7 ±6.5 (48 ±3) Apply locktite # 262	⟶
4	-Travel lever mounting	{M10} 23.5 ±2 (17 ±2)	⟶
3	-Stepping motor mounting	{M10} 19.6 (14) Apply locktite # 242	⟶
12	-Hyd. pump housing to engine block mounting	{M10} 64.7 ±6 (48 ±4) Apply locktite # 262	⟶
39	-Lower cover mounting (all)	{M10} 83.3 ±8 (38 ±4)	⟶
2	-A/C Compressor support bracket	{M10 X 45} 64.7 (45)	⟶
5	-Travel motor cover mounting	83.4 ±4.9 (61 ±6) Apply locktite # 262	⟶
16	-Cab support mounting bolts	46 (34)	⟶
3	-Swivel joint mounting	108 ±10.8 (79 ±7) Apply locktite # 262	⟶
4	-Nuts for cab mounts	186 (137)	⟶
4	-Idler and idler adjuster connection	{M16} 279.5 ±28 (206 ±22) Apply locktite # 262	⟶
4	-Hydraulic oil tand and fuel tank mounting	{M16} 216 ±19.6 (159 ±14) Apply locktite # 262	⟶
4	-Radiator bottom support mounting	{M12} 120 ±12.1 (89 ±9)	⟶
1	-Swivel joint locking nut	{M16} 157 ±20 (115 ±14)	⟶
8	-Hydraulic pump coupling mounting	{M16} 216 ±9.8 (159 ±7)	⟶
8	-Track guide mounting	{M18} 397 ±39 (292 ±29) Apply locktite # 262	⟶
4	-Engine mounting (upper frame side)	{M18} 225 ±20 (166 ±14) Apply locktite # 271	⟶
21X2 (SK160) 20X2 (ED190)	-Sprocket mounting	{M18} 397 ±39 (292 ±29) Apply locktite # 262	539 ±50 (398 ±37) Apply locktite # 262
28X2	-Lower roller caps	{M18} 397 ±39 (292 ±29) Apply locktite # 262	⟶
4	-Hydraulic pump mounting	{M20} 191 ±19.5 (318 ±29) Apply locktite # 262	⟶
12	-Swing reduction unit mounting	{M20} 539 ±54 (397 ±43) Apply locktite # 262	⟶
36	-Swing bearing inner race mounting	{M20} 563 ±56 (415 ±42) Apply locktite # 262	⟶
28	-Swing bearing outer race mounting	{M20} 181 ±20 (133 ±15) Apply locktite # 262	⟶
(45X4)X2	-Shoe bolt mounting	{M20} 853 ±49 (628 ±36)	⟶
4	-Upper roller mounting	{M20} 539 ±54 (397 ±40) Apply locktite # 262	588 ±59 (434 ±43) Apply locktite # 262
30X2	-Travel motor mounting	{M20} 539 ±54 (397 ±40) Apply locktite # 262	⟶
4	-Counterweight mounting	873 ±49 (644 ±36) Apply locktite # 242	⟶
8	-Side cutter mounting	{M24} 95~105 Kgf-m (686~758)	⟶
4	-Blade Trunnion Cap Bolts	7/8"-9UNC GR8 70 kgf-m (500) Apply locktite # 262	⟶
2	-Idler adjuster grease fitting mounting	{5/8-18 UNF} 59 ±6 (43 ±7)	⟶
2	-Connector for heater hoses	24.5 (18) Apply three bond #1110B	⟶
1	-Nut on breather valve	9.8~13.7 (7 ±10)	⟶
4	-Breather mounting bolts	4.4 (3.5)	⟶
1	-Hydraulic tank plug	161.8 ±16.7 (119 ±12) Apply teflon tape	⟶
4	-Top nuts for U-bolts muffler mounting	10.8 ±1 (8 ±1)	⟶
4	-Bottom nuts for U-bolts muffler mounting	8.8 ±0.8 (6.5 ±1)	⟶
1	-Engine temperature sensor	24.5 ±5 (18 ±4) Apply three bond 1110B	⟶
2	-A/C hose connection on compressor	22.6 ±2 (17 ±1.4)	⟶
2	-A/C hose connection on condenser	9.8 ±13.7 (7.2 ±0.72)	⟶
4	-Cover mounting on swing motor	{M20} 430 (317)	⟶
1	-Swing reduction unit oil plug	54.9 (41) Apply teflon tape	⟶
2	-Oil plugs on travel reduction unit cover	54.9 (41) Apply teflon tape	⟶

https://truckmanualshub.com/

TORQUE VALUES FOR MOST COMMON BOLTS

{Bolt Size} Units: kgf-m (ft-lbs)

Qty	Location	SK210(LC)-VI	SK250(LC)-VI
5	-Fuel tank sending unit mounting	{M5} 0.2 ±0.02 (1.4 ±0.1)	
6	-A/C Condenser mounting	{M6 X 50} 0.45 (3.3)	
1	-Hyd. tank sending unit mounting	15 ±2 (108 ±14)	
6	-A/C pulley mounting on damper	{M8 X 16} 4 (29)	
4	-Coolant reservoir mounting	1.1 ±0.1 (8 ±0.7)	
4	-A/C compressor mounting	{M8 X 100} 1.1 ±0.1 (8 ±0.72)	
1	-A/C idler pulley nut	{M10} 4~5.5 ±0.4 (29~40 ±3)	
2	-Pilot pump mount bolts	{M10} 4 ±0.4 (29 ±3) Apply locktite # 262	
8	-Hydraulic oil tank cover mounting	{M10} 4.7 ±0.5 (34 ±4)	
2	-Swing grease bath inspection cover mounting	{M10} 3 ±0.5 (22 ±4)	
8	-Swivel joint dust cover mounting	{M10} 1.5 ±0.2 (11 ±2)	
6	-Muffler support bracket mounting	{M10} 4 ±0.4 (30 ±3)	
16	-Engine mounting (engine body side)	{M10} 6.6 ±0.4 (48 ±3) Apply locktite # 262	
4	-Travel lever mounting	{M10} 2.4 ±0.2 (17 ±2)	
3	-Stepping motor mounting	{M10} 2 (14) Apply locktite # 242	
12	-Hyd. pump housing to engine block mounting	{M10} 6.6 ±0.6 (48 ±4) Apply locktite # 262	{M10} 4 ±0.4 (29 ±3) Apply locktite # 262
35	-Lower cover mounting (all)	{M10} 5.3 ±0.5 (38 ±4)	
2	-A/C Compressor support bracket	{M10 X 45} 6.6 (45)	
10	-Travel motor cover mounting	8.5 ±0.8 (61 ±6) Apply locktite # 262	
16	-Cab support mounting bolts	4.7 (34)	
3	-Swivel joint mounting	11 ±1 (79 ±7) Apply locktite # 262	
4	-Nuts for cab mounts	19 (137)	
4	-Idler and idler adjuster connection	{M16} 28.5 ±3 (206 ±22) Apply locktite # 262	{M20} 55 ±5.5 (397 ±40) Apply locktite # 262
4	-Hydraulic oil tand and fuel tank mounting	{M16} 22 ±2 (159 ±14) Apply locktite # 262	
4	-Radiator bottom support mounting	{M16} 12.3 ±1.2 (89 ±9)	
1	-Swivel joint locking nut	{M16} 16 ±2 (115 ±14)	
8	-Hydraulic pump coupling mounting	{M16} 22 ±1 (159 ±7) Apply locktite # 262	{M18} 33 ±3 (238 ±22) Apply locktite # 262
8	-Track guide mounting	{M18} 40.5 ±4 (292 ±29) Apply locktite # 262	{M18} 57.5 ±5.8 (415 ±42) Apply locktite # 262
4	-Engine mounting (upper frame side)	{M18} 23 ±2 (166 ±14) Apply locktite # 271	
44	-Sprocket mounting	{M18} 40.5 ±4 (292 ±29) Apply locktite # 262	{M20} 55 ±5.5 (397 ±40) Apply locktite # 262
56 (64)	-Lower roller caps	{M18} 40.5 ±4 (292 ±29) Apply locktite # 262	
4	-Hydraulic pump mounting	{M20} 44 ±4 (318 ±29) Apply locktite # 262	
12	-Swing reduction unit mounting	{M20} 55 ±6 (397 ±43) Apply locktite # 262	
36	-Swing bearing inner race mounting	{M20} 57.5 ±5.8 (415 ±42) Apply locktite # 262	
33	-Swing bearing outer race mounting	{M20} 40 ±4 (289 ±29) Apply locktite # 262	{M20} 50 ±5 (361 ±36) Apply locktite # 262
SK210: 184 (196) SK250: 192 (208)	-Shoe bolt mounting	{M20} 87 ±5 (628 ±36)	
4	-Upper roller mounting	{M20} 55 ±5.5 (397 ±40) Apply locktite # 262	
34	-Travel motor mounting	{M20} 55 ±5.5 (397 ±40) Apply locktite # 262	
4	-Counterweight mounting	{M24} 130 ±13 (939 ±94) Apply locktite # 242	{M24} 170 ±15 (1228 ±36) Apply locktite # 242
8	-Side cutter mounting	{M24} 95~105 (686~758)	
2	-Idler adjuster grease fitting mounting	{5/8-18 UNF} 6 ±1 (43 ±7)	
2	-Connector for heater hoses	2.5 (18) Apply three bond #1110B	
1	-Nut on breather valve	1.0~1.4 (7 ±10)	
4	-Breather mounting bolts	0.45 (3.5)	
1	-Hydraulic tank plug	16.5 (119) Apply teflon tape	
4	-Top nuts for U-bolts muffler mounting	1.1 ±0.1 (8 ±1)	
4	-Bottom nuts for U-bolts muffler mounting	0.9 ±0.1 (6.5 ±1)	
1	-Engine temperature sensor	2.5 ±0.5 (18 ±4) Apply three bond 1110B	
2	-A/C hose connection on compressor	2.3 ±0.2 (17 ±1.4)	
2	-A/C hose connection on condenser	1.0 ±0.1 (7.2 ±0.72)	
4	-Cover mounting on swing motor	{M20} 43.8 (317)	
1	-Swing reduction unit oil plug	5.6 (41) Apply teflon tape	
SK210: 2 SK250: 3	-Oil plugs on travel reduction unit cover	5.6 (41) Apply teflon tape	

https://truckmanualshub.com/

TORQUE VALUES FOR MOST COMMON BOLTS

{Bolt Size} Units: kgf-m (ft-lbs)

Qty	Location	SK290(LC)-VI	SK330(LC)-VI
5	-Fuel tank sending unit mounting	{M5} 0.2 ±0.02 (1.4 ±0.1)	
6	-A/C Condenser mounting	{M6 X 50} 0.45 (3.3)	
1	-Hyd. tank sending unit mounting	15 ±2 (108 ±14)	
6	-A/C pulley mounting on damper	{M8 X 16} 4 (29)	
4	-Coolant reservoir mounting	1.1 ±0.1 (8 ±0.7)	
4	-A/C compressor mounting	{M8 X 100} 1.1 ±0.1 (8 ±0.72)	
1	-A/C idler pulley nut	{M10} 4~5.5 ±0.4 (29~40 ±3)	
2	-Pilot pump mount bolts	{M10} 4 ±0.4 (29 ±3) Apply locktite # 262	
8	-Hydraulic oil tank cover mounting	{M10} 4.7 ±0.5 (34 ±4)	
2	-Swing grease bath inspection cover mounting	{M10} 3 ±0.5 (22 ±4)	
8	-Swivel joint dust cover mounting	{M10} 1.5 ±0.2 (11 ±2)	
6	-Muffler support bracket mounting	{M10} 4 ±0.4 (30 ±3)	
8	-Engine mounting (engine body side - rear)	{M10} 7.5 ±0.4 (54 ±3) Apply loctite # 262	
8	-Engine mounting (engine body side - front)	{M10} 10 ±1 (72 ±7) Apply loctite # 262	
4	-Travel lever mounting	{M10} 2.4 ±0.2 (17 ±2)	
3	-Stepping motor mounting	{M10} 2 (14) Apply loctite # 242	
12	-Hyd. pump housing to engine block mounting	{M10} 4.0 ±0.4 (29 ±3) Apply loctite # 262	
35	-Lower cover mounting (all)	{M10} 5.3 ±0.5 (38 ±4)	
2	-A/C Compressor support bracket	{M10 X 45} 6.6 (45)	
10	-Travel motor cover mounting	8.5 ±0.8 (61 ±6) Apply loctite # 262	
16	-Cab support mounting bolts	4.7 (34)	
3	-Swivel joint mounting	{M12}11 ±1 (79 ±7) Apply loctite # 262	
4	-Nuts for cab mounts	19 (137)	
4	-Idler and idler adjuster connection	{M20} 55 ±5.5 (397 ±40) Apply loctite # 262	
4	-Hydraulic oil tank and fuel tank mounting	{M16} 22 ±2 (159 ±14) Apply loctite # 262	
4	-Radiator bottom support mounting	{M20} 57 ±6 (412 ±43) Apply loctite # 262	
4	-Radiator shroud mounting	4.7 ±0.5 (34 +4)	
1	-Swivel joint locking nut	{M16} 16 ±2 (115 ±14)	
8	-Hydraulic pump coupling mounting	{M18} 33 ±3 (238 ±22) Apply loctite # 262	
8	-Track guide mounting	{M18} 40.5 ±4 (292 ±29) Apply loctite # 262	{M24} 95 ±8.5 (687 ±62) Apply loctite # 262
4	-Engine mounting (upper frame side)	{M18} 39 ±4 (282 ±29) Apply loctite # 271	
SK290 (44) SK330 (52)	-Sprocket mounting	{M20} 55 ±5.5 (397 ±40) Apply loctite # 262	
SK290 (72) SK330 (64)	-Lower roller caps	{M18} 57.5 ±6 (415 ±42) Apply loctite # 262	{M22} 74.5 +7.5 (539 +54) Apply loctite # 262
4	-Hydraulic pump mounting	{M20} 44 ±4 (318 ±29) Apply loctite # 262	
14	-Swing reduction unit mounting	95 ±9.5 (687 ±69) Apply loctite # 262	
36	-Swing bearing inner race mounting	95 ±9.5 (886 ±69) Apply loctite # 262 (Same torque for inner & outer race mounts)	
35	-Swing bearing outer race mounting		
SK290: (200) SK330: (180)	-Shoe bolt mounting	91.9 ±6 (665 ±30) {Apply oil on threads}	120 ±12 kgf-m (868 ±87) {dry torque}
4	-Upper roller mounting	{M20} 55 ±5.5 (397 ±40) Apply loctite # 262	
36	-Travel motor mounting	95 ±9.5 (687 ±69) Apply loctite # 262	
4	-Counterweight mounting	300 ±30 (2167 ±217) Apply loctite # 242	
8	-Side cutter mounting	100~110 (723~796)	
2	-Idler adjuster grease fitting mounting	{5/8-18 UNF} 6 ±1 (43 ±7)	
2	-Connector for heater hoses	2.5 (18) Apply three bond #1110B	
1	-Nut on breather valve	1.0~1.4 (7 ±10)	
4	-Breather mounting bolts	0.45 (3.5)	
1	-Hydraulic tank plug	16.5 (119) Apply teflon tape	
4	-Top nuts for U-bolts muffler mounting	1.1 ±0.1 (8 ±1)	
4	-Bottom nuts for U-bolts muffler mounting	0.9 ±0.1 (6.5 ±1)	
1	-Engine temperature sensor	2.5 ±0.5 (18 ±4) Apply three bond 1110B	
2	-A/C hose connection on compressor	2.3 ±0.2 (17 ±1.4)	
2	-A/C hose connection on condenser	1.0 ±0.1 (7.2 ±0.72)	
4	-Cover mounting on swing motor	{M20} 43.8 (317)	
1	-Swing reduction unit oil plug	5.6 (41) Apply teflon tape	
2	-Oil plugs on travel reduction unit cover	5.6 (41) Apply teflon tape	

https://truckmanualshub.com/

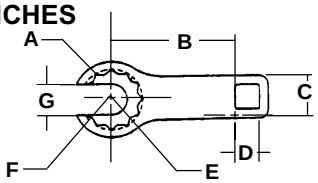
MISCELLANEOUS INFORMATION

A. TEMPERATURE TABLE

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-10	14	55	131	120	248	185	365	250	482	315	599
-5	23	60	140	125	257	190	374	255	491	320	608
0	32	65	149	130	266	195	383	260	500	325	617
5	41	70	158	135	275	200	392	265	509	330	626
10	50	75	167	140	284	205	401	270	518	335	635
15	59	80	176	145	293	210	410	275	527	340	644
20	68	85	185	150	302	215	419	280	536	345	653
25	77	90	194	155	311	220	428	285	545	350	662
30	86	95	203	160	320	225	437	290	554	355	671
35	95	100	212	165	329	230	446	295	563	360	680
40	104	105	221	170	338	235	456	300	572	365	689
45	113	110	230	175	347	240	464	305	581	370	698
50	122	115	239	180	356	245	473	310	590	375	707

Example of how to convert 45 °C to °F:
°F = 1,8 X °C + 32 Ë °F = 1,8 X 45 + 32 = 81 + 32 = 113 °F
Example of how to convert 122 °F en °C :
°C = 0,56 (°F – 32) Ë °C = 0,56 (122 – 32) = 0,56 X 90 = 50 °F

B. SPECIAL PIPE WRENCHES



TUBE DIA.	PART No.	A		B		C	D	E	F	G
15 (0, 591)	2421T160	27 (1, 06)	70 (2, 76)	22 (0, 87)	12, 7 (0, 50)	8 (0, 32)	40 (1, 57)	16 (0, 63)		
18 (0, 709)	2421T138	32 (1, 26)	70 (2, 76)	22 (0, 87)	12, 7 (0, 50)	11 (0, 43)	42 (1, 65)	19 (0, 75)		
22 (0, 866)	2421T130	36 (1, 42)	70 (2, 76)	22 (0, 87)	12, 7 (0, 50)	11, 5 (0, 45)	48 (1, 89)	23 (0, 91)		
28 (1, 10)	2421T115	41 (1, 614)	109 (4, 29)	22 (0, 87)	12, 7 (0, 50)	14, 5 (0, 57)	60 (2, 36)	29 (1, 14)		
35 (1, 38)	2421T314	55 (2, 17)	90 (3, 54)	45 (1, 77)	20 (0, 79)	20, 5 (0, 81)	81 (3, 19)	41 (1, 61)		

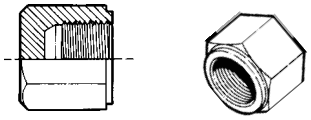
Uni dad: mm (i nches)

C. WEIGHT OF MATERIALS TABLE

Lb/yrd³	Kg/m³	Material (loose weight)
700	420	Wood chips
750	440	Peat, dry
950	560	Cinders
1170	690	Peat, wet
1600	950	Topsoil
1780	1050	Coal
2100	1250	Caliche
2100	1250	Earth, loam
2250	1330	Shale
2400	1420	Sand, dry
2500	1480	Clay, dry
2550	1510	Earth, dry
2600	1540	Limestone, broken or crushed
2700	1600	Earth, wet
2800	1660	Clay, wet
2800	1660	Rock, granite, blasted & broken
2850	1690	Sand, moist
2900	1720	Sand and gravel, dry
3100	1840	Sand, wet
3400	2020	Sand and gravel, wet

D. CAPS AND PLUGS FOR TUBES AND HOSE FITTINGS

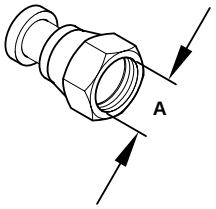
FEMALE PF CAPS



SIZE	PART NUMBER
PF 1/4	2444Z2729D1
PF 3/8	2444Z2729D2
PF 1/2	2444Z2729D3
PF 3/4	2444Z2729D4
PF 1	2444Z2729D5

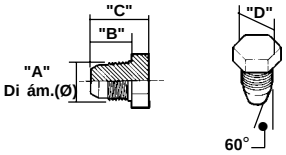
Uni t: mm

FEMALE CAPS FOR ORFS FITTINGS



PLUG SIZE (A)	PART NUMBER
5/8”	YN01H01004P1
3/4”	YN01H01005P1
1”	YN01H01006P1

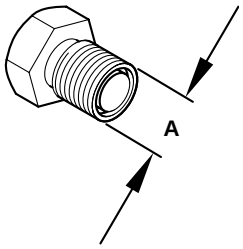
MALE PF PLUGS



PLUG SIZE	PART NUMBER	"A" O. D. (Ø)	"B" LENGTH	LENGTH	"C" FLATS
PF 1/4	2444Z2728D1	13.5	16.5	24.5	14
PF 3/8	2444Z2728D2	16.6	17.5	25.5	17
PF 1/2	2444Z2728D3	20.6	20.0	31.0	22
PF 3/4	2444Z2728D4	26.2	21.5	34.0	27
PF 1	2444Z2728D5	33.3	23.5	36.0	36

Uni t: mm

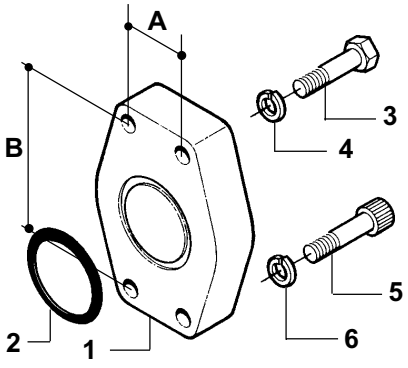
MALE PLUGS FOR ORFS FITTINGS



PLUG SIZE (A)	PART NUMBER	O-RING PART NUMBER
5/8”	YN01H01001P1	ZD12A01600
3/4”	YN01H01002P1	ZD12A01800
1”	YN01H01003P1	ZD12A02100

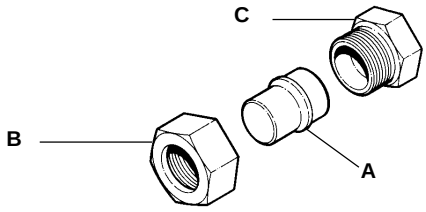
https://truckmanualshub.com/

4 BOLT FLANGE CAPS



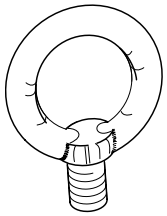
ITEM 1 (Nom. Size)		ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	DIM A	DIM B
ZE13Q08000	12.7 (1/2")	2445Z831D1	ZS18C08030	ZW26X08000	ZS23C08030	ZW26K08000	18.24 (0.72")	40.49 (1.59")
ZE13Q12000	19.1 (3/4")	ZD12P02600	ZS18C10035	ZW26X10000	ZS23C10035	ZW26K10000	23.80 (0.94")	50.80 (2.00")
ZE13Q16000	25.4 (1.0")	ZD12P03400	ZS18C12040	ZW26X12000	ZS23C12040	ZW26K12000	27.76 (1.09")	57.15 (2.25")
ZE13Q20000	31.8 (1.25")	ZD12P03800	ZS18C14045	ZW26X14000	ZS23C14045	ZW26K14000	31.75 (1.25")	66.68 (2.62")
ZE13Q24000	38.1 (1.50")	ZD12P04800	ZS18C16050	ZW26X16000	ZS23C16050	ZW26K16000	36.50 (1.44")	79.38 (3.12")
ZE13Q32000	50.8 (2.0")	2445Z831D2	ZS18C20065	ZW26X20000	ZS23C20065	ZW26K20000	44.45 (1.75")	96.82 (3.81")

TUBE & HOSE PLUGS



TUBE DI A.	"A" INTERNAL (For hose end)	"B" NUT (Use with "A")
10mm	ZF83P10000	ZF93N10000	ZF83H10000
15mm	ZF83P15000	ZF93N15000	ZF83H15000
18mm	ZF83P18000	ZF93N18000	ZF83H18000
22mm	2444T1338D4	ZF93N22000	2444T1329D4
28mm	ZF83P28000	ZF93N28000	2444T1329D5
35mm	ZF83P35000	ZF93N35000	ZF83H35000

EYEBOLTS



"C" EXTERNAL (For tube end)

BOLT Ø (mm)	THREAD TYPE	PART NUMBER
10	M10	ZS91C01000
12	M12	ZS91C01200
16	M16	ZS91C01600
20	M20	ZS91C02000
30	M30	ZS91C03000
36	M36	ZS91C03600
48	M48	ZS91C04800

10

https://truckmanualshub.com/

E. SOME CONVERSI ON UNI TS

Units of weight:

From	Into	Multiply by
Kg	lb	2.2
Lb	Kg	0.454

Units of length:

From	Into	Multiply by	Divide by
meters	feet	3.28	
mm	inches		25.4
inches	mm	25.4	

Units of power:

From	Into	Multiply by
Hp	KW	0.7457
KW	Hp	1.341

Units of flow:

From	Into	Multiply by
Gal/min (US liq.)	Lit/min	3.79
	Lit/sec	0.0631
	cm^3/min	3785.4
	ft^3/min	0.1337
Lit/min	ft^3/min	0.0353
	Gal/min	0.264
	Gal/sec	0.004403
	$yard^3$/min	0.001308

Units of torque:

From	Into	Multiply by
N-m	Lbf-ft	0.738
	Kgf-m	0.1019716
	Lbf-ft	0.737561
	Lbf-in	8.85075
Lbf-ft	Kgf-m	0.1382552
	N-m	1.35582
	Lbf-in	12

Units of pressure:

From	Into	Multiply by
Kg/cm^2	psi	14.223
	Pa (Pascal)	9.807
psi	Atm	0.06805
	Bars	0.06895
	Kg/cm^2	0.0703
	Pa (Pascal)	6894.76
MPa (MegaPascal)	psi	145.04

Units of volume:

From	Into	Multiply by
Liters	Gal (US liq)	0.264
	in^3	61.02
	$yard^3$	0.00131
	quarts	1.0567
	ounces (US)	33.81
$Yard^3$	m^3	0.765
	in^3	46656
	ft^3	27
	cm^3	764554.9
	liters	764.555

10

Kobelco

Dynamic Acera



Kobelco Construction Machinery America LLC
Mechatronics

KOBELCO

Kobelco Construction Machinery America LLC

https://truckmanualshub.com/

TABLE OF CONTENTS

1. Layout of Electrical Components 4
A. Components related to the Upper Frame 4
B. Components related to the Pump & Battery Compartments 5
C. Pilot Low Pressure Sensors & 8 Solenoid Block 6
2. Solenoid / Proportional Valve Block 7
A. Appearance 7
B. Specifications 7
C. Construction of On/Off Solenoids 8
D. Construction of Proportional Solenoids 9
3. Pressure Sensors 10
A. Appearance 10
B. Specifications 10
C. Resistance Checks 11
4. Layout of Electrical Components - Engine Related 12
A. Components related to the Engine Block 12
B. Components related to the Pumps 12
C. Pump sensor line drawings and actual pictures 13
5. Main Pump Proportional Solenoids PSV-1; PSV-2 14
A. Appearance 14
B. Specifications 14
6. Location of Auto Accel Service Connector 15
A. Location 15
7. Left Hand Console 16
A. Switch Description and locations 16
8. Right Hand Console 17
A. Switch Description and locations 17
B. Work Mode Switch & Buzzer Stop Locations 17
9. Right Side of Operator Cab 18
A. Switch Description and locations 18
B. Wiper Motor Location 18
10. Floorplate Wiring Harness - Underneath Side 19
A. Sensor Description and locations 19
B. Actual View 19
11. Rear of Operator Cab 20
A. Fuse Box Location 20
B. DC-DC Converter (24Vdc~12Vdc) Location 20
12. Ground Cable Attachment Locations 21
A. Cable Description and Locations 21
13. C-1 Main Controller 22
A. Controller Location 22
B. Controller Breakdown 23
14. C-1 Main Controller 24
A. Test/Run Switch Internal Location 24
B. VR1-MAX Flow Limiter Location 24

https://truckmanualshub.com/

TABLE OF CONTENTS - Continued

15. C-1 Main Controller 25
A. Wiring Harness Connection Location 25
B. Pin-Out Location on Controller 25
C. Wiring Information for Pin-Out Location on Controller ..... **26~31**
16. Stepping Motor (M-2) 32
A. Appearance 32
B. Coil Resistance & Information 32
C. Internal Construction 33
D. Electrical Connector & Motor Check Information 33
17. Gauge Cluster (C-2) 34
A. Appearance 34
B. Screen Change Button Location 35
C. Internal Construction 35
D. Electrical Connector & Check Information 35
E. Contrast and Dip Switch Information 35
18. Service Icon Sequence 36
A. Multidisplay self diagnnostic ..... 36~39
19. Engine Speed Sensor (SE-15) 40
A. Appearance 40
B. Resistance Checks & Adjustment 40
20. Throttle Potentiometer (SE-16) 41
A. Appearance 41
B. Resistance Checks & Adjustment 41
21. Error Code History Diagnosis 42
A. How to Display 42
B. How to Cancel Contents 42
C. Error Code History Contents 43
22. Service Diagnosis Functions 45
A. How to Display 45
B. Service Diagnosis Check Chart SK210 ~ SK330 ..... 46~52

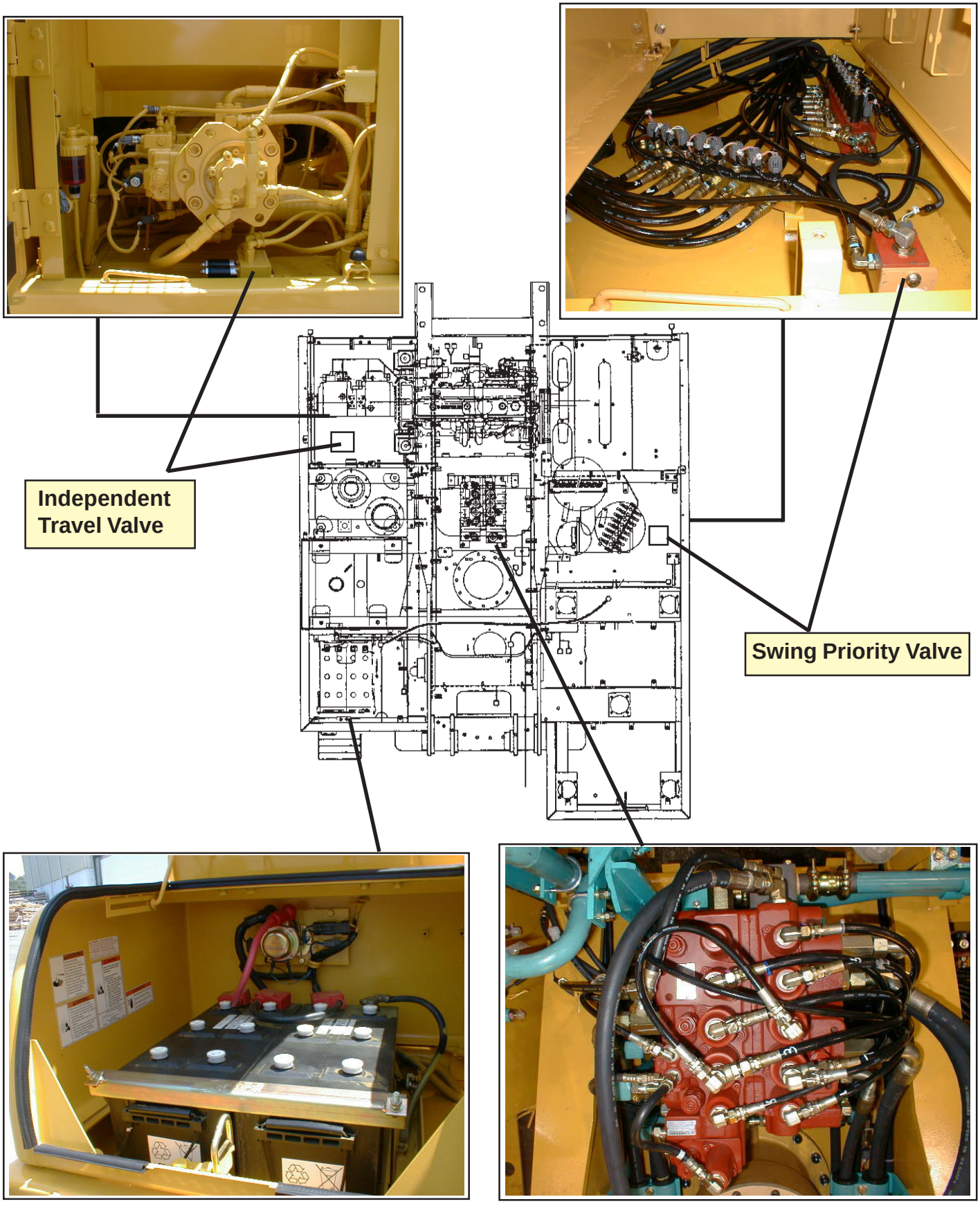
28 Item Check ..... 53~57

23. Procedure “A” Adjustment 58
A. Pre-Checks prior to Adjustment “A” 58
B. Adjustment “A” Procedure ..... 59~66
C. Post-Adjustment Checks 67
24. SK480 Engine Diagnostics Lamps 68
A. Method of Confirming Errors 68
B. SK480 Engnie Diagnosis Lamps 69
C. Location of Engine Controller ..... 70~71
D. Engine Electronics Troubleshooting Chart ..... 72~73
E. Legend Electrical Schematics 74
F. Electrical Schematics ..... 75~

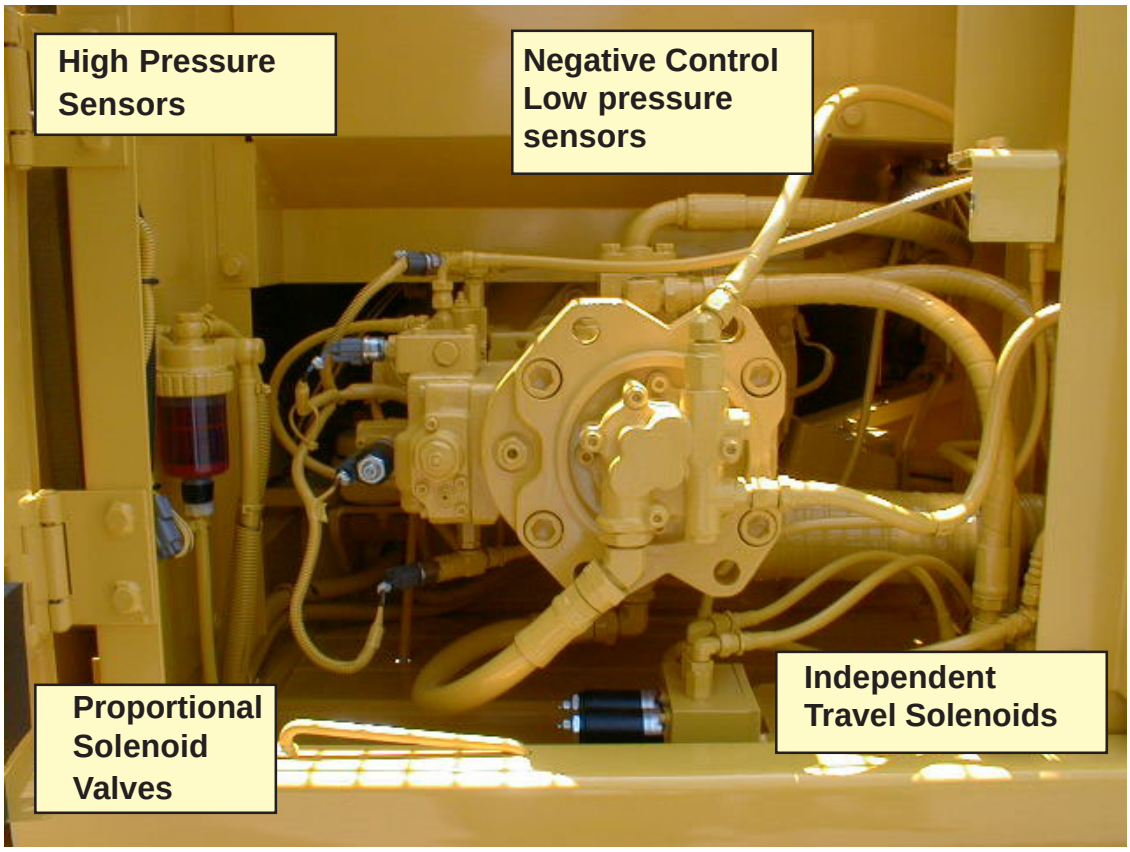
https://truckmanualshub.com/

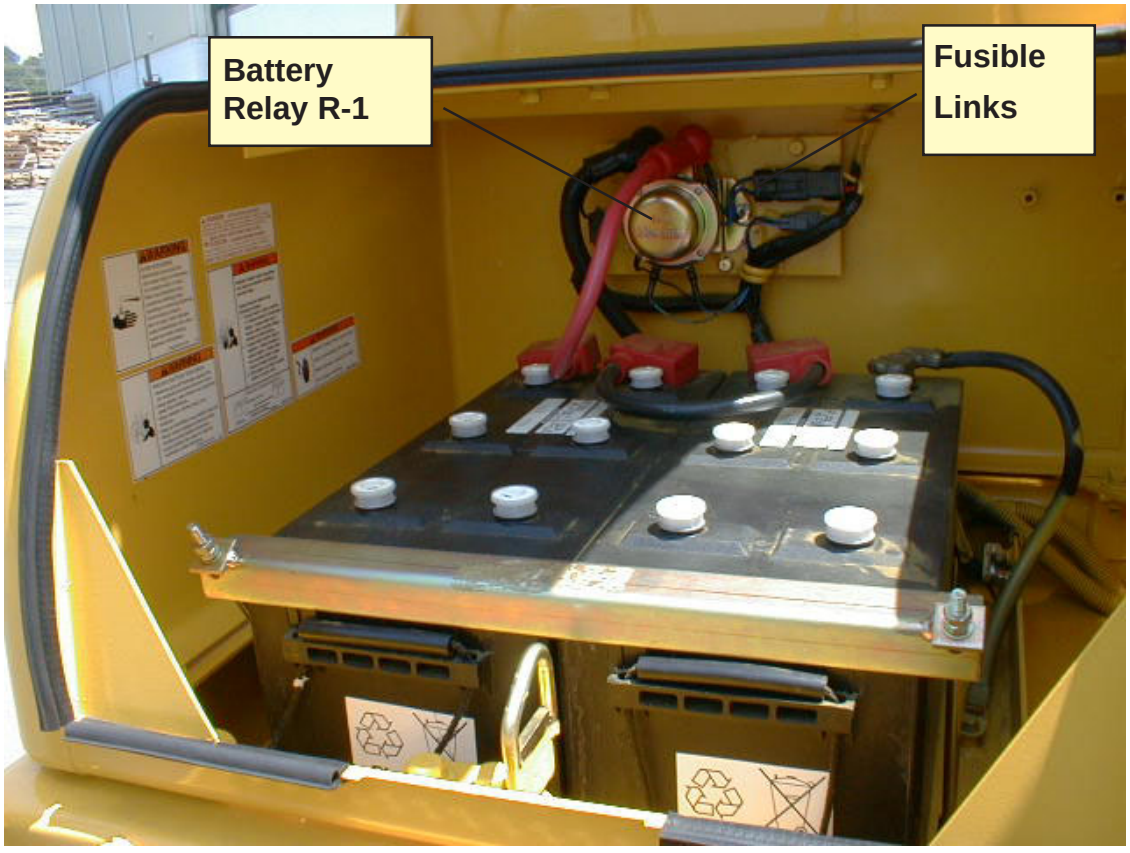
Layout of Electric components

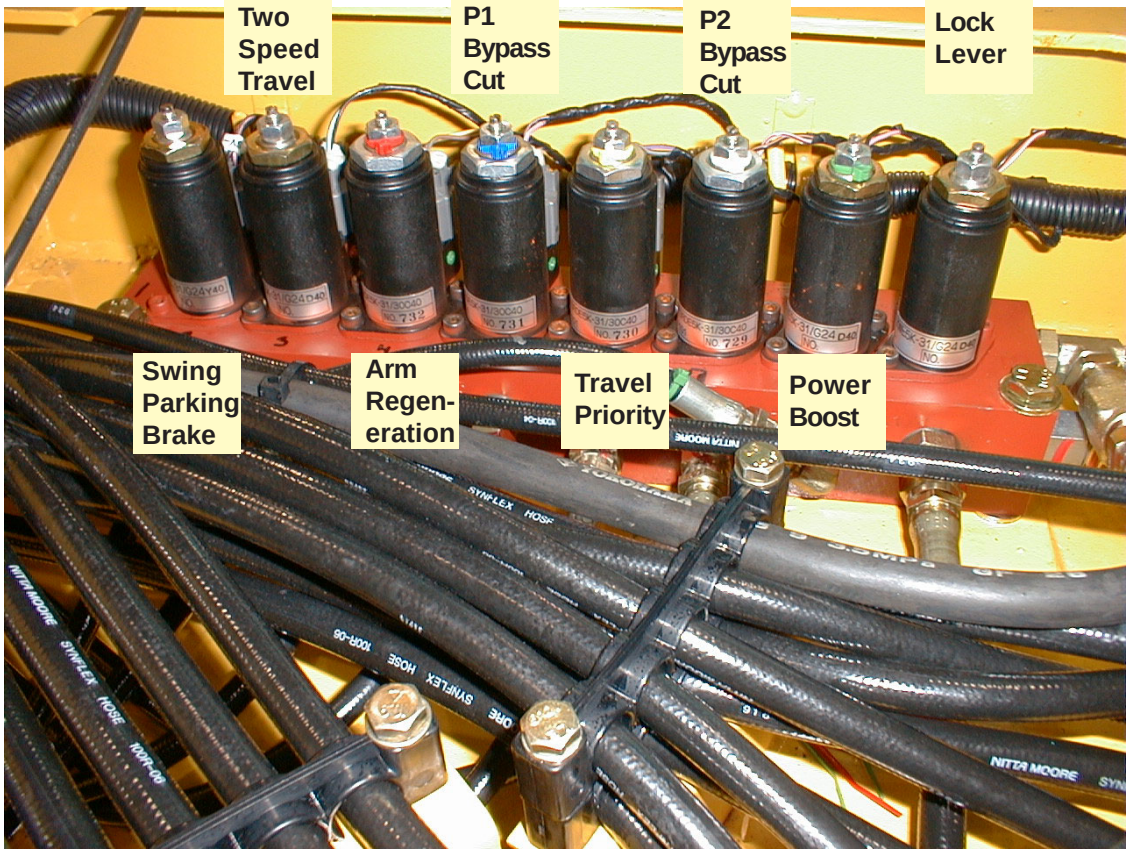
1. Components related to Upper frame (SK210 • SK250)

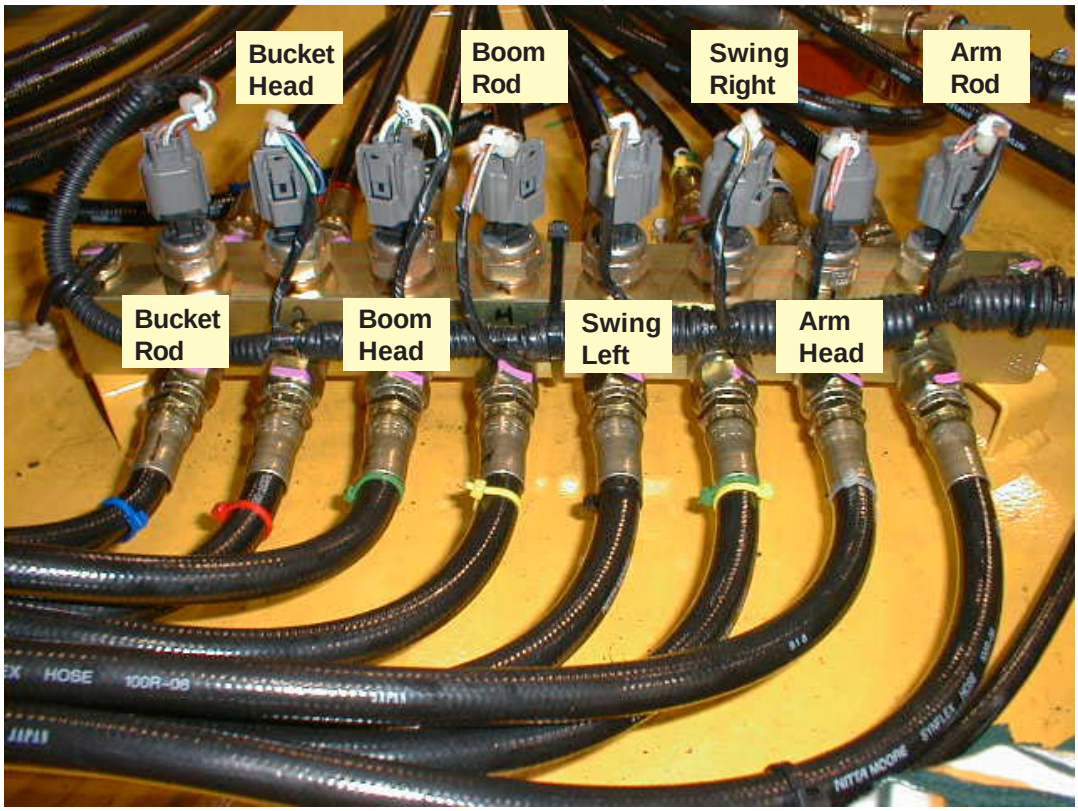


https://truckmanualshub.com/





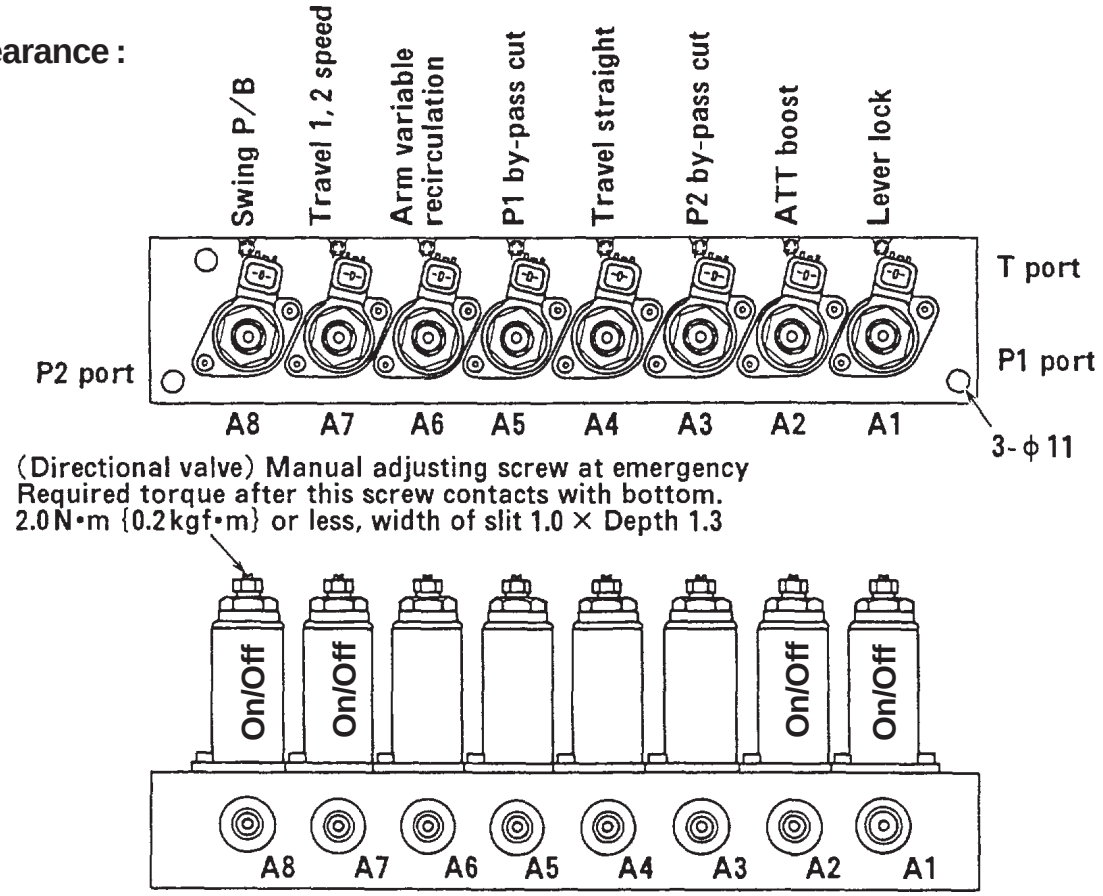

Two Speed Travel
P1 Bypass Cut
P2 Bypass Cut
Lock Lever
Swing Parking Brake
Arm Regen-eration
Travel Priority
Power Boost


Bucket Head
Boom Rod
Swing Right
Arm Rod
Bucket Rod
Boom Head
Swing Left
Arm Head

https://truckmanualshub.com/

SK210 Solenoid/Proportional valve block

1. Appearance :



2. Specifications :

Code	Size	Torque N·m (lbf/ft)
P1, P2, TA1	PF 3/8	74 ± 5 (54 ± 3)
A2~A8	PF 1/4	36 ± 2 (26 ± 1)

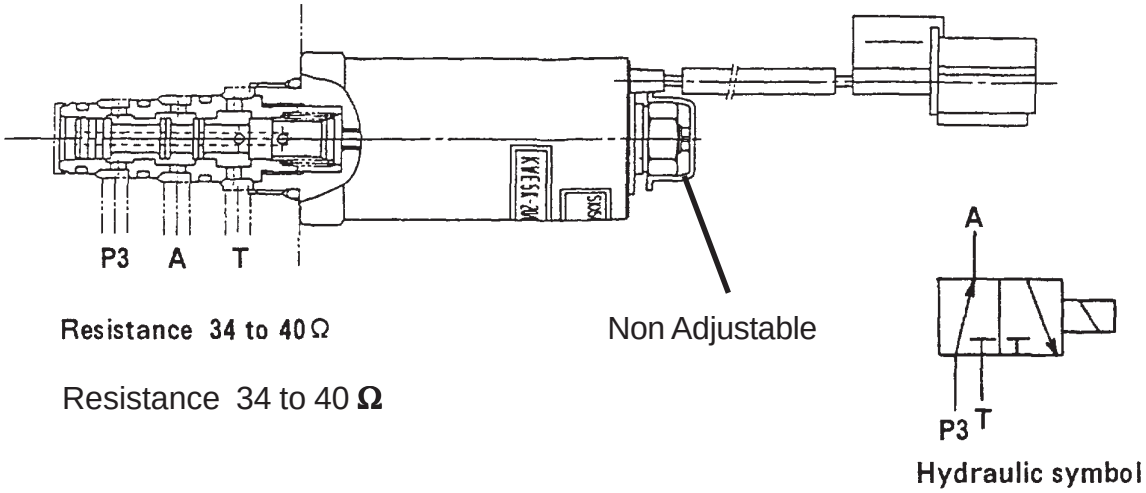
Item		Specifications
Type		8KWE5G-30 / G24WR-804 B
Rated Pressure (P port)		0~50 kgf/cm^2 (0~711 psi)
Allowable Back pressure (T port)		0~10 kgf/cm^2 (0~140 psi)
Solenoid Valve	Rated Voltage	20.4 ~ 30 VDC
	Coil Resistance	34 ~ 40 Ω
Proportional Valve	Rated Voltage	20.4 ~ 30 VDC
	Coil Resistance	17 ~ 25 Ω

https://truckmanualshub.com/

Construction of solenoid valve

The command to activate the 2 speed travel , ATT boost, slewing P/B solenoid valve is controlled by the mechatro controller.
The lever lock solenoid valve is activated through a limit switch with a two second delay on the left hand control box.

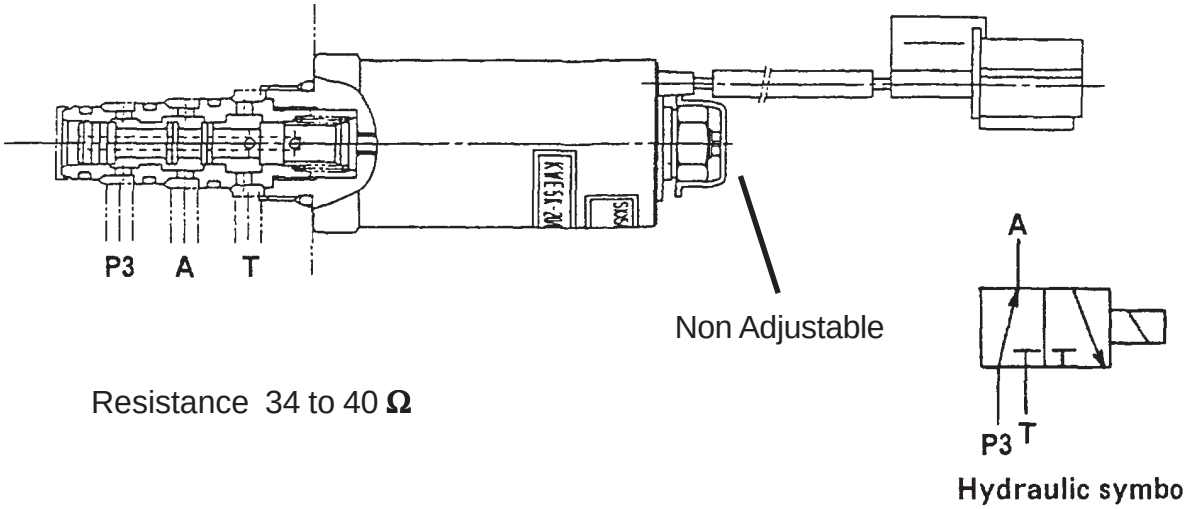
① Travel 2nd speed, ATT boost, Lever lock solenoid valve normally closed.



Resistance 34 to 40 **Ω**

② Slewing P/B solenoid valve normally open.

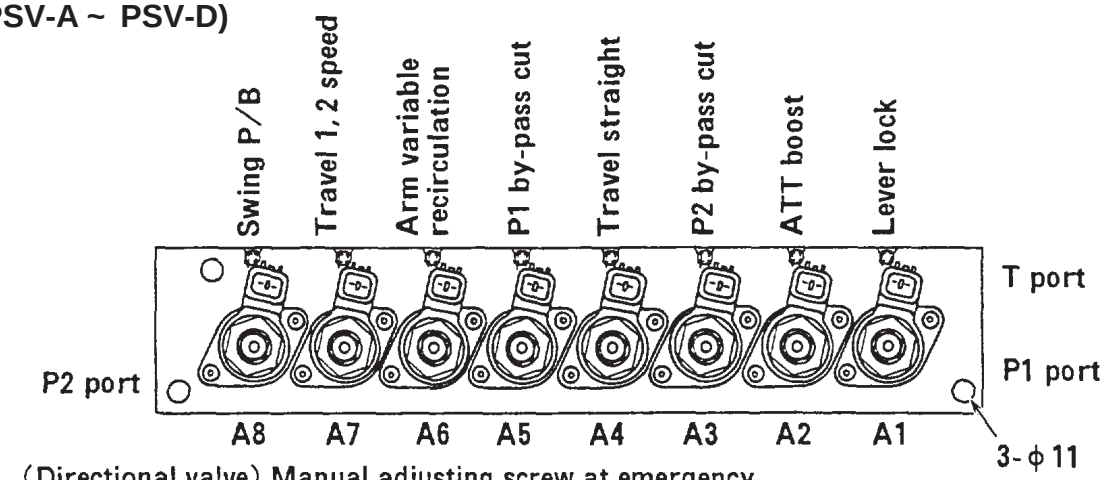
With the key switch turned to the on position, the slewing parking brake solenoid valve is activated. Because the Slewing parking brake is normally open when activated no pilot oil can pass through the solenoid and parking brake is applied.



Resistance 34 to 40 **Ω**

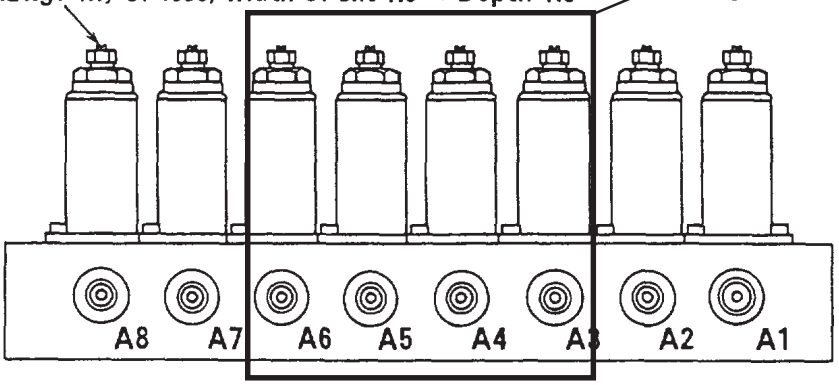
https://truckmanualshub.com/

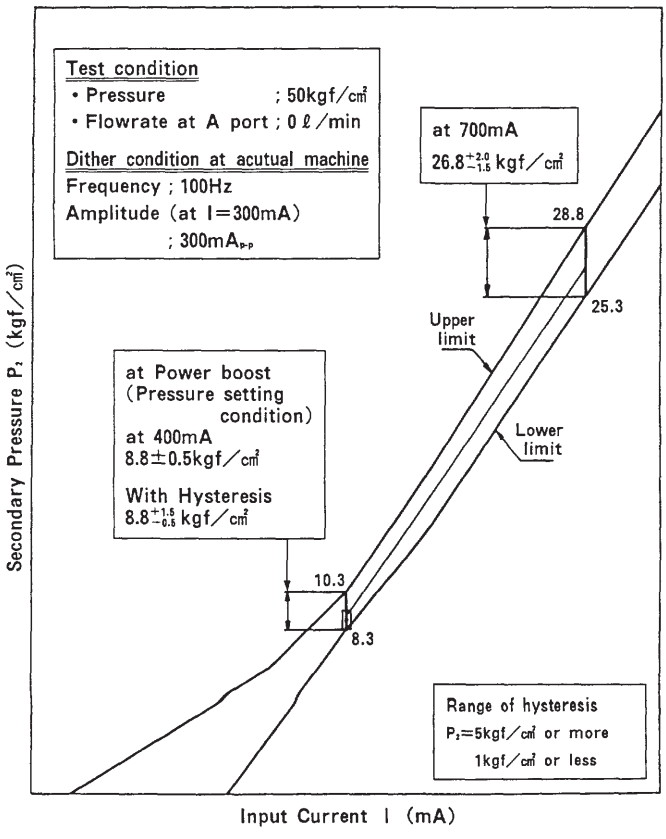
SK210 Proportional valve for control valve (PSV-A ~ PSV-D)

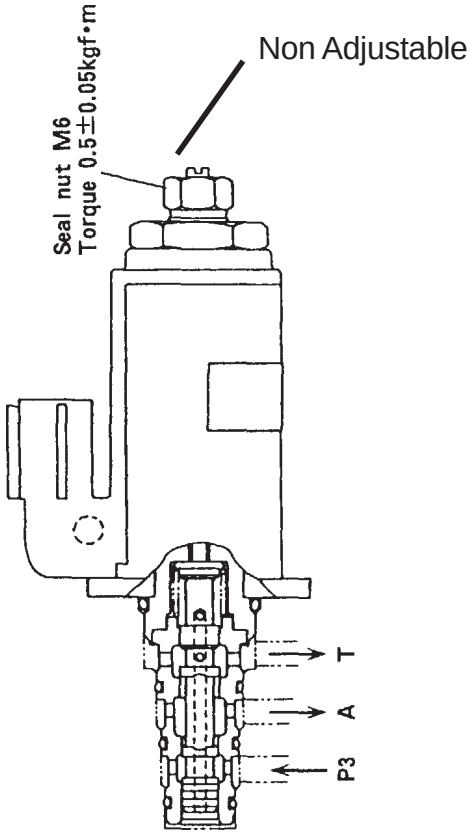


(Directional valve) Manual adjusting screw at emergency
Required torque after this screw contacts with bottom.
2.0 N•m {0.2 kgf•m} or less, width of slit 1.0 × Depth 1.3

Proportional Solenoids x 4







Resistance 17 to 25 Ω

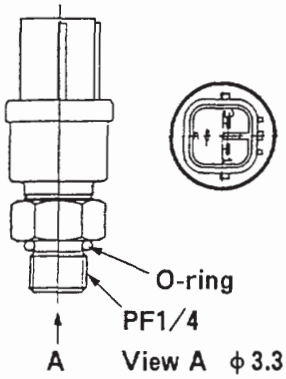
Pressure sensors

1. Appearance and specifications



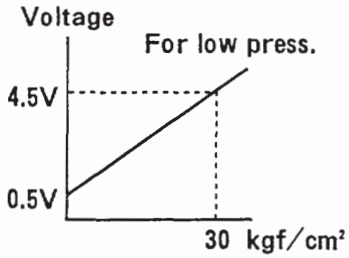


Low pressure (For ATT • Travel) SE-1~SE-10, (For Back pressure) SE-8



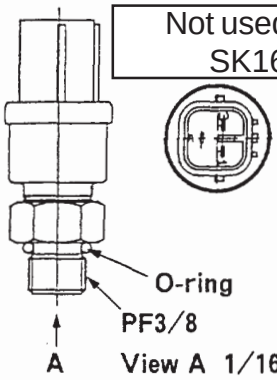
Connector terminal layout
Terminal No.
1 —— Power supply (+)
2 —— Output (+)
3 —— Common (−)

Pressure range	0~30 kgf/cm²
Power supply voltage in use	5±0.5V DC



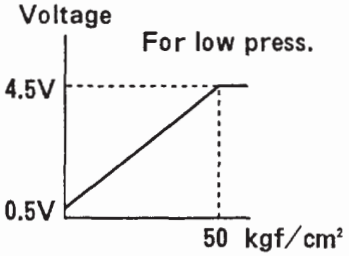
Low pressure (For Nega-Con) SE-26, SE-27

Not used on (Pos-con)
SK160 / ED190

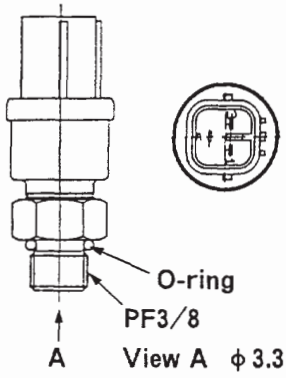


Connector terminal layout
Terminal No.
1 —— Power supply (+)
2 —— Output (+)
3 —— Common (−)

Pressure range	0~50 kgf/cm²
Power supply voltage in use	5±0.5V DC

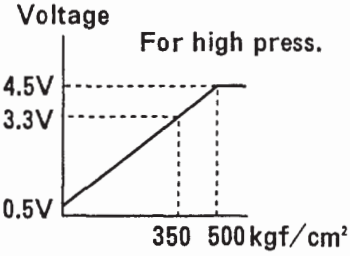


For high pressure SE-22, SE-23



Connector terminal layout
Terminal No.
1 —— Power supply (+)
2 —— Output (+)
3 —— Common (−)

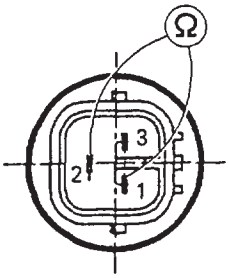
Pressure range	0~500 kgf/cm²
Power supply voltage in use	5±0.5V DC



Checking resistance on pressure sensors :

Check the resistance between connector pin 1 and 2 with multimeter.

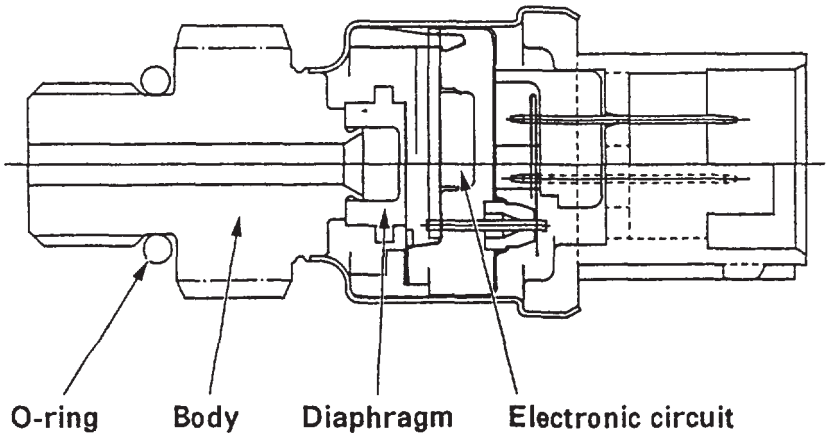
100 M Ω or more is normal for all sensors



Terminal No.	Connector terminal layout
1	Power supply (+)
2	Output (+)
3	Common

High pressure sensor
Low pressure sensor
Back pressure sensor
Negative control sensor

Structure

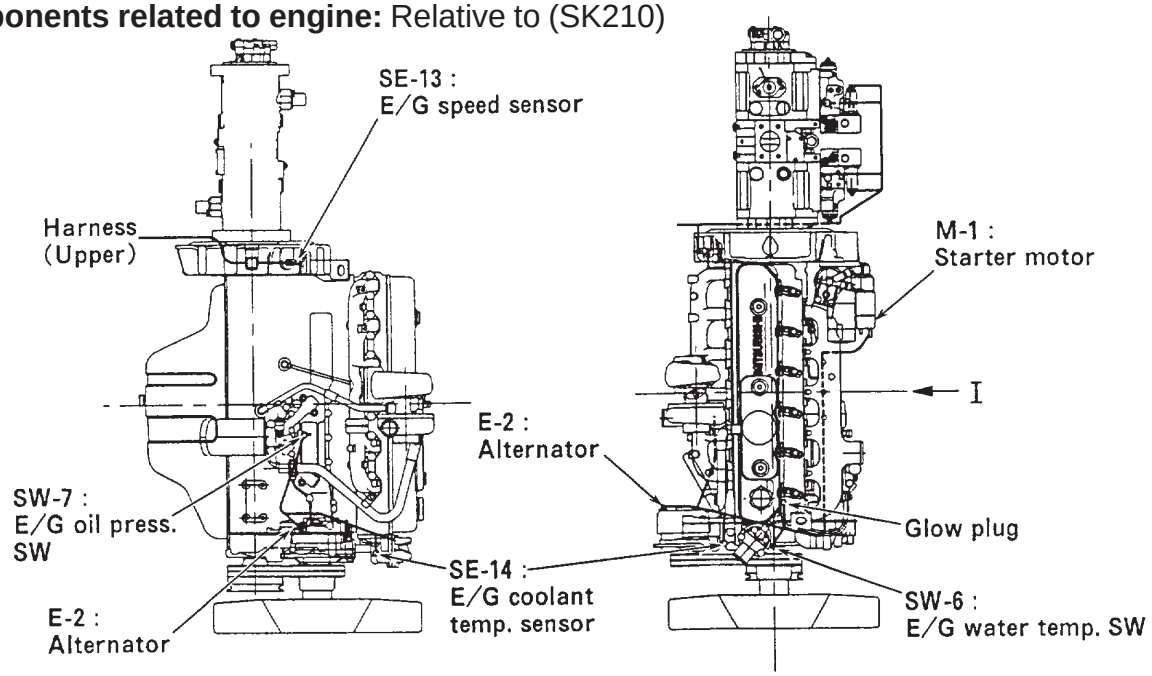


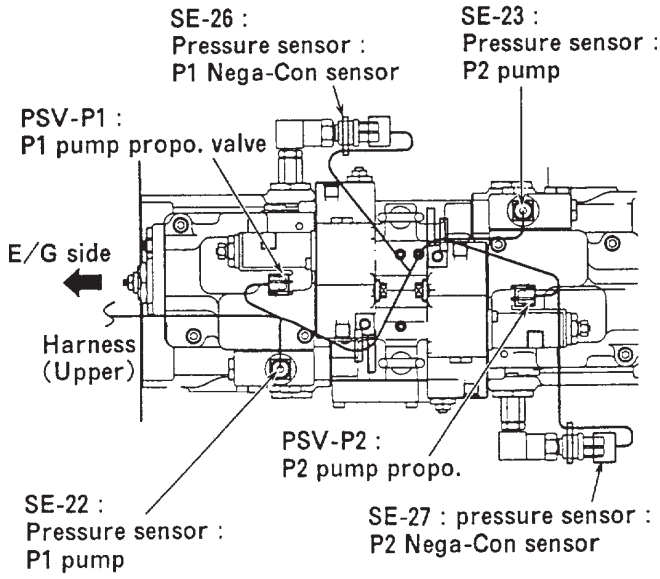


Typical low pressure sensor

https://truckmanualshub.com/

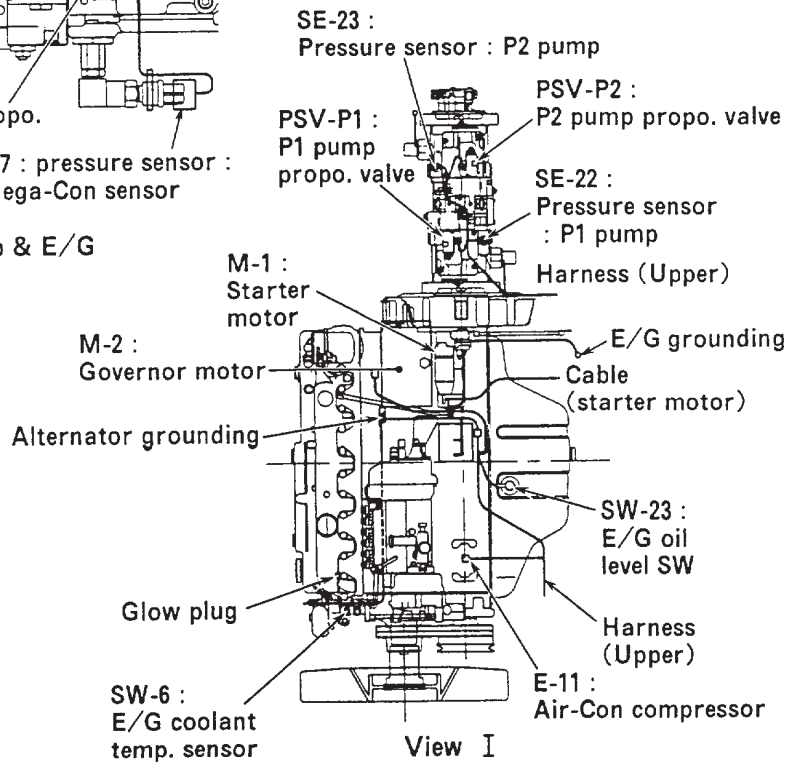
Components related to engine: Relative to (SK210)





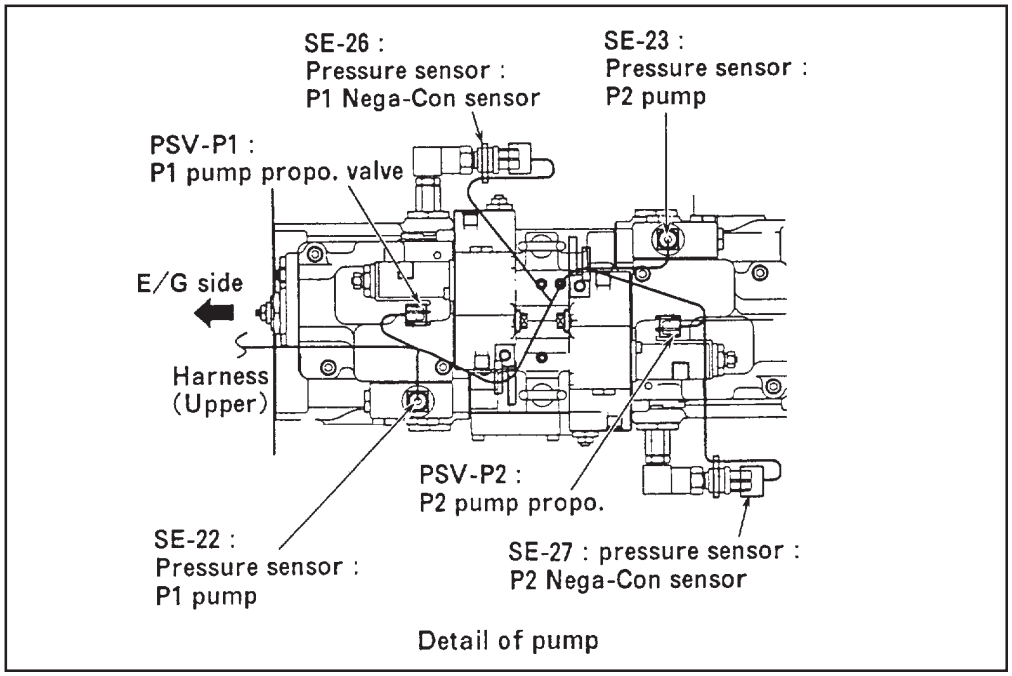
Detail of pump & E/G

Note: See next page for Pump Details

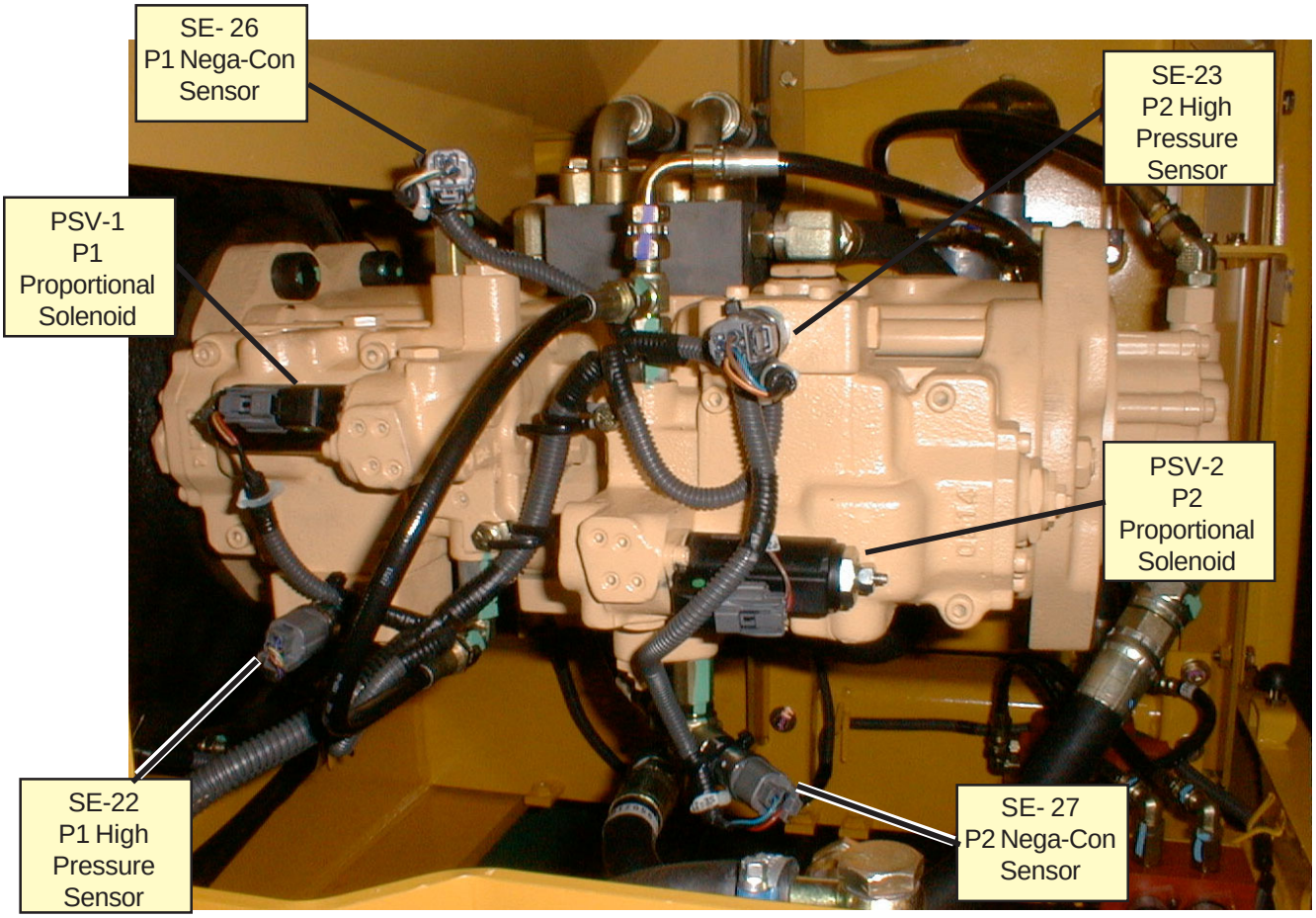


https://truckmanualshub.com/

Hyd. Pump Sensors & Solenoids :



Detail of pump

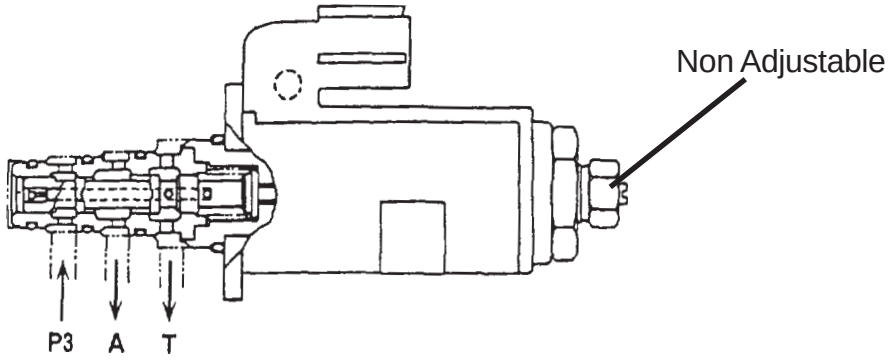


https://truckmanualshub.com/

Proportional valve for main pump (PSV-P1, PSV-P2)

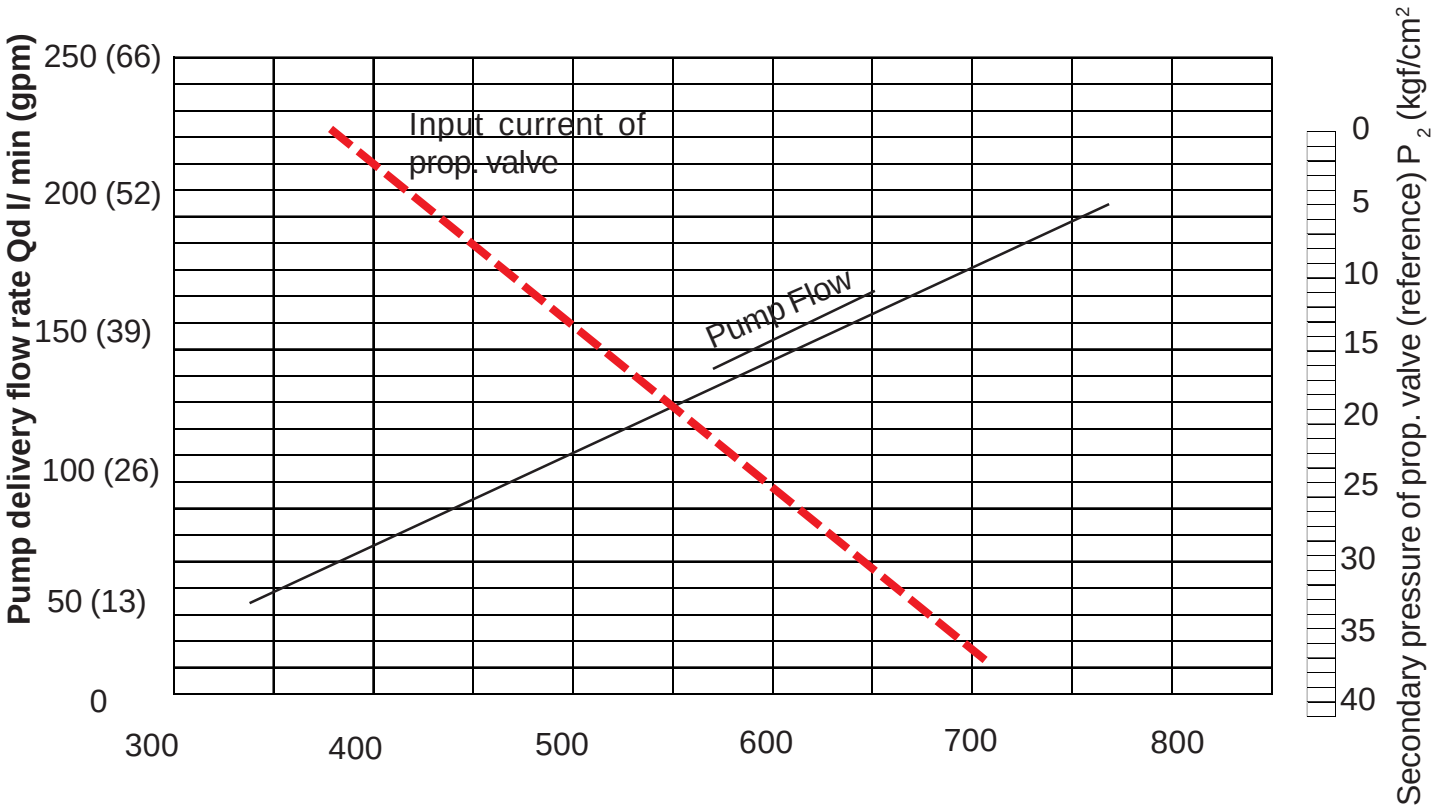
Construction of proportional valve :
This valve is actuated by a command current from the mechatronics controller.

1. Appearance



Resistance 17 to 25 Ω

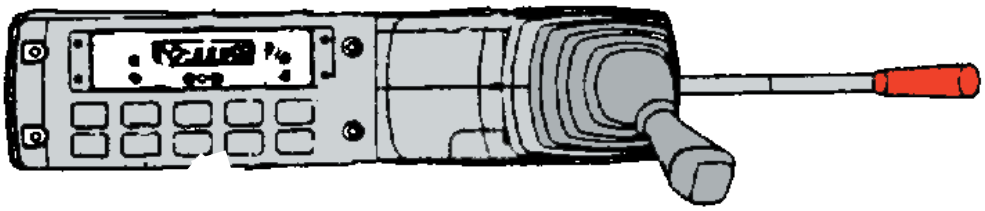
Negative Control

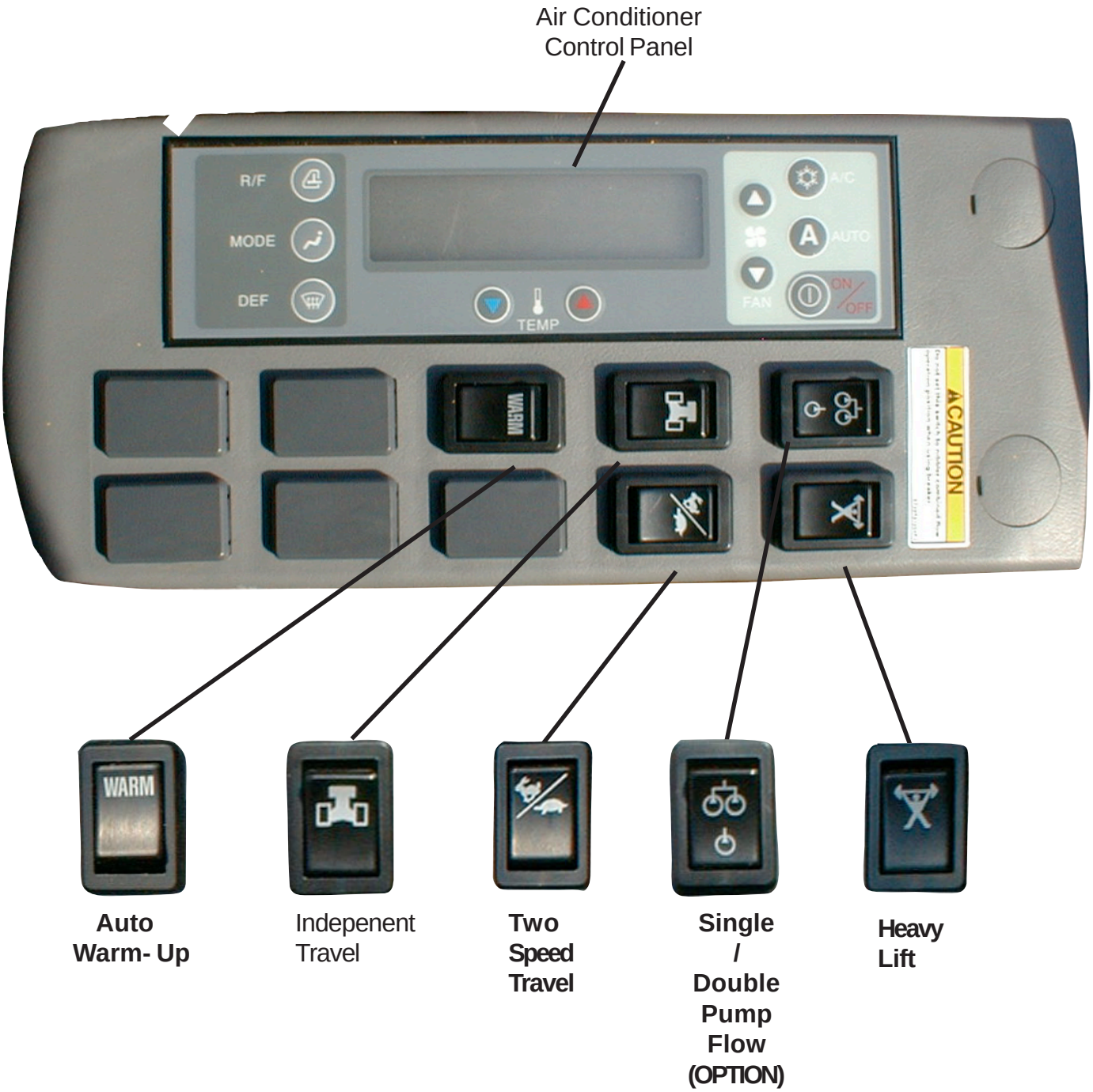


https://truckmanualshub.com/

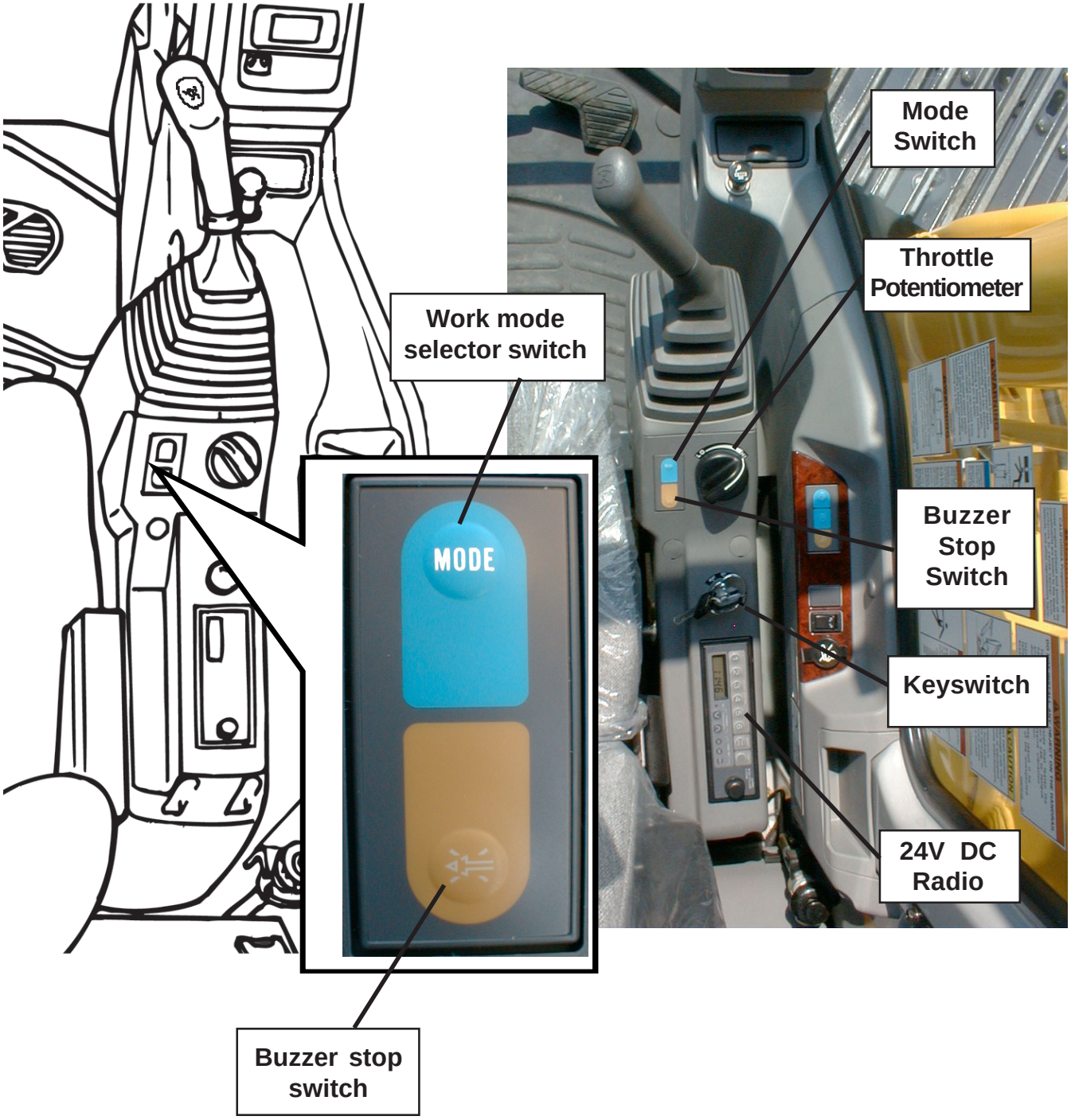


Left Hand Console :

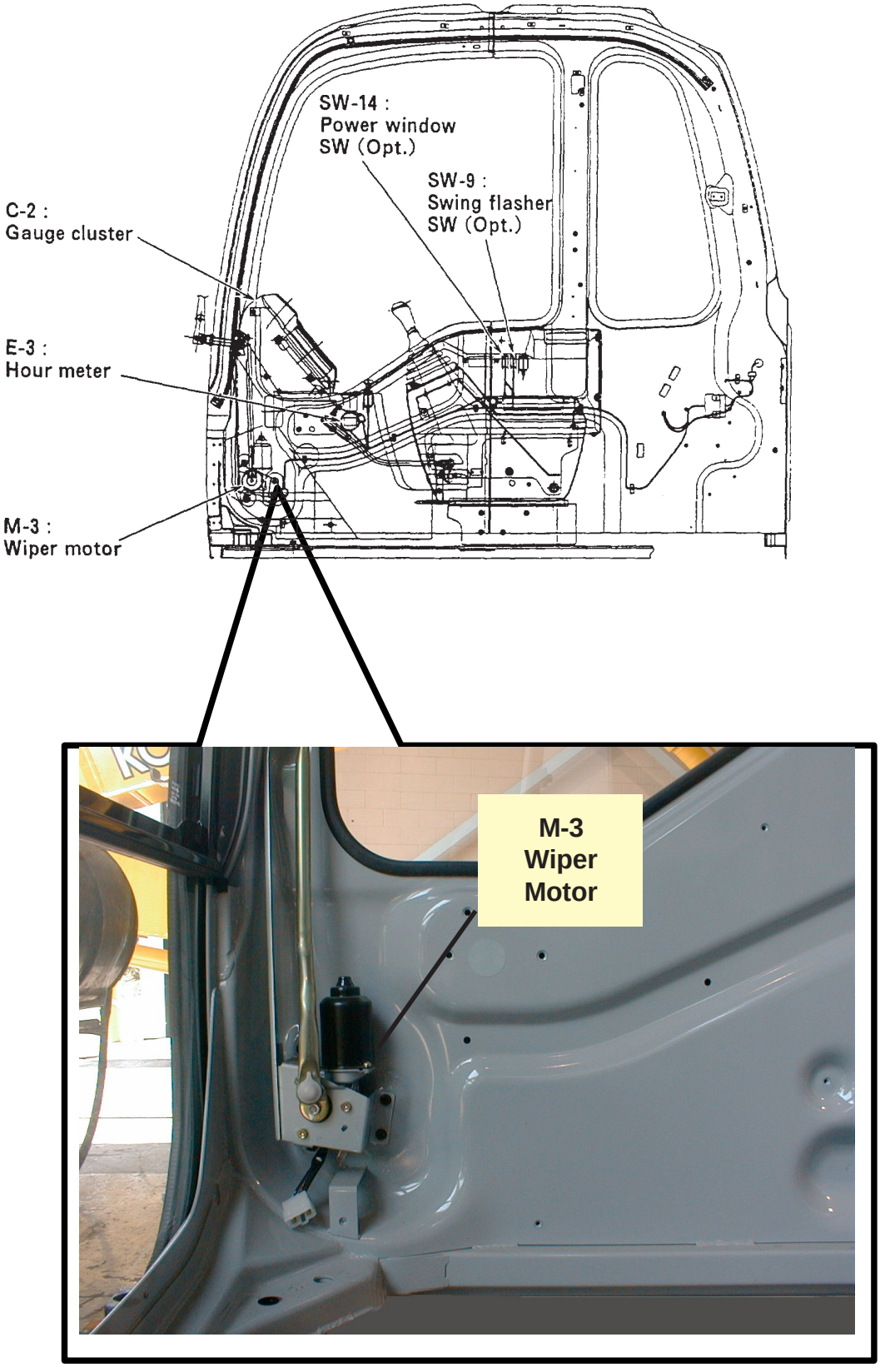




Right Hand Console :

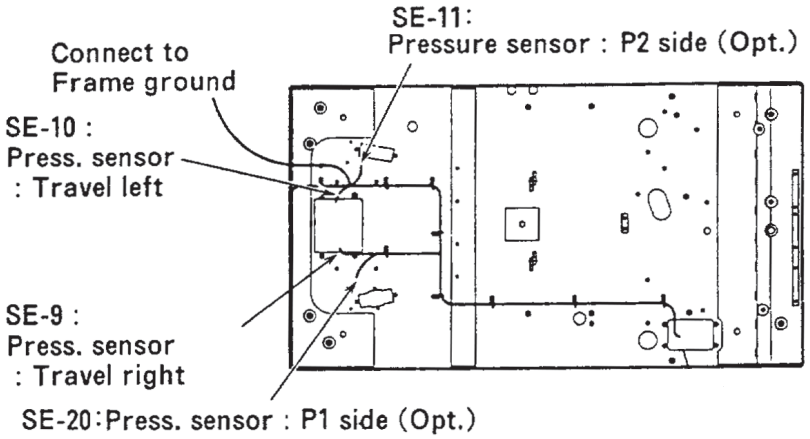


https://truckmanualshub.com/



https://truckmanualshub.com/

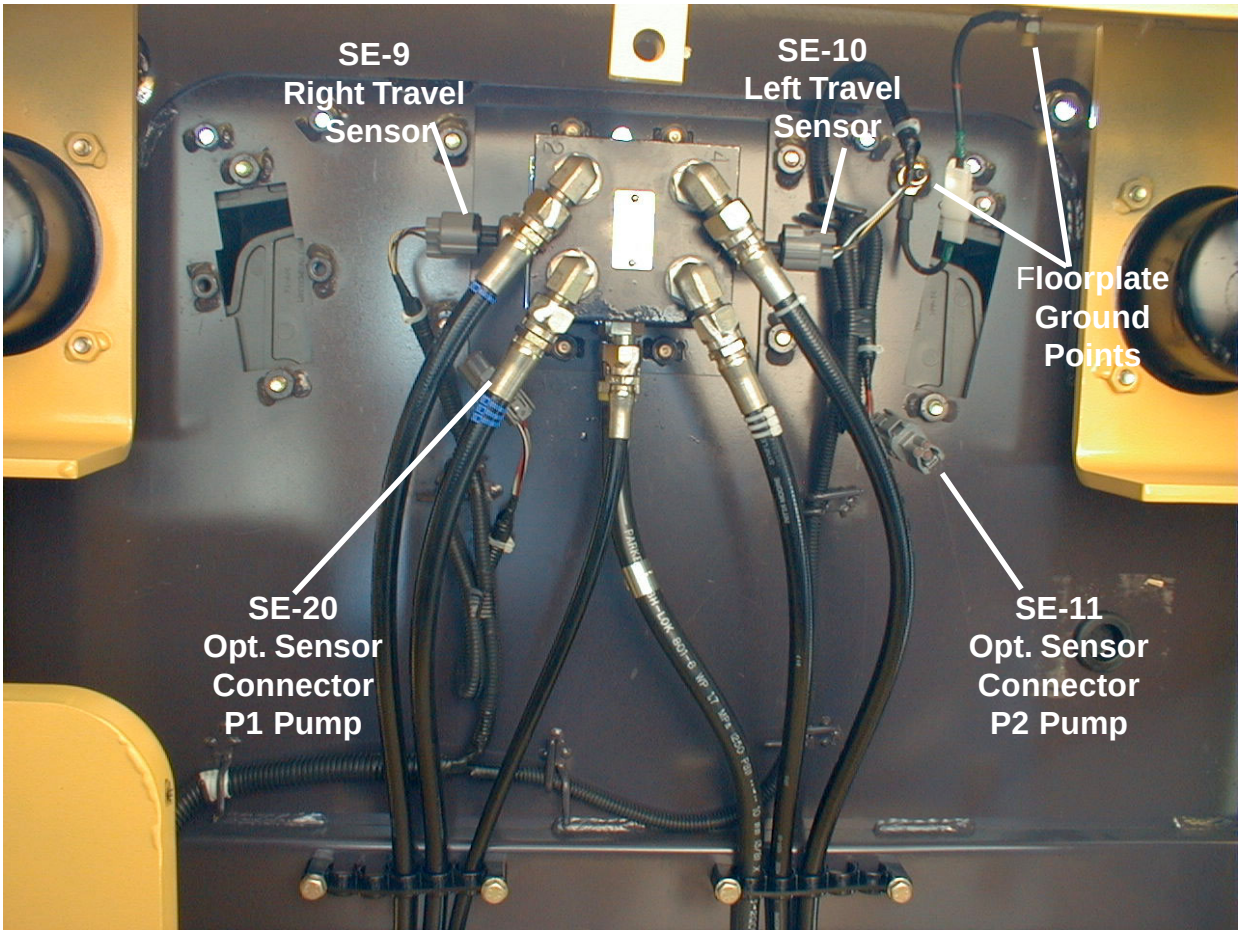
Floorplate Wiring Info.



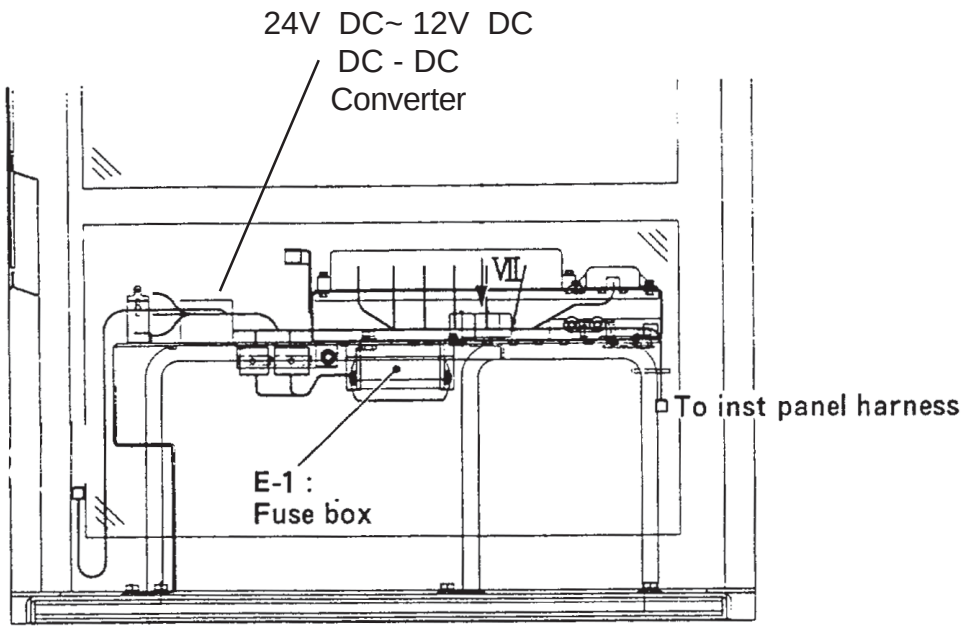
View is UNDERNEATH of Floorplate

Actual View :

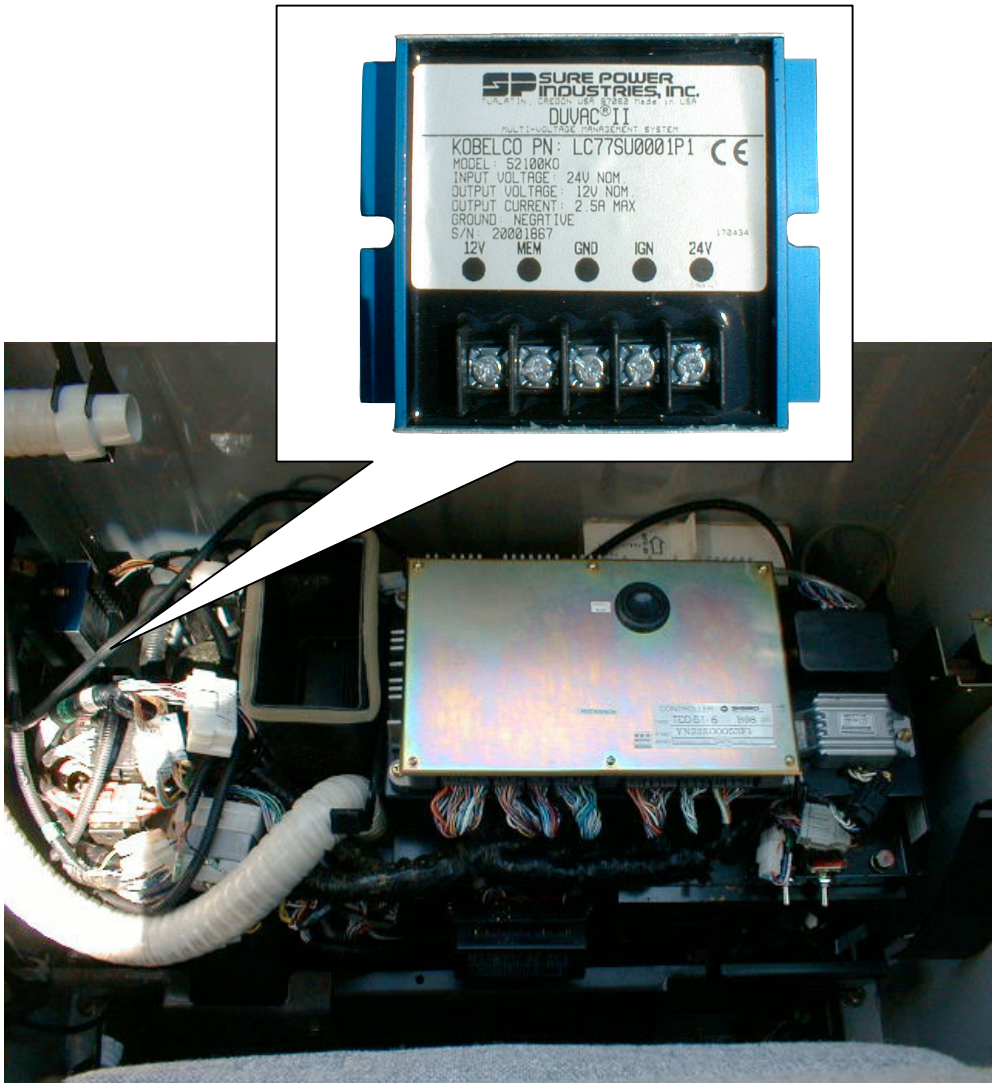
Front of Machine



https://truckmanualshub.com/

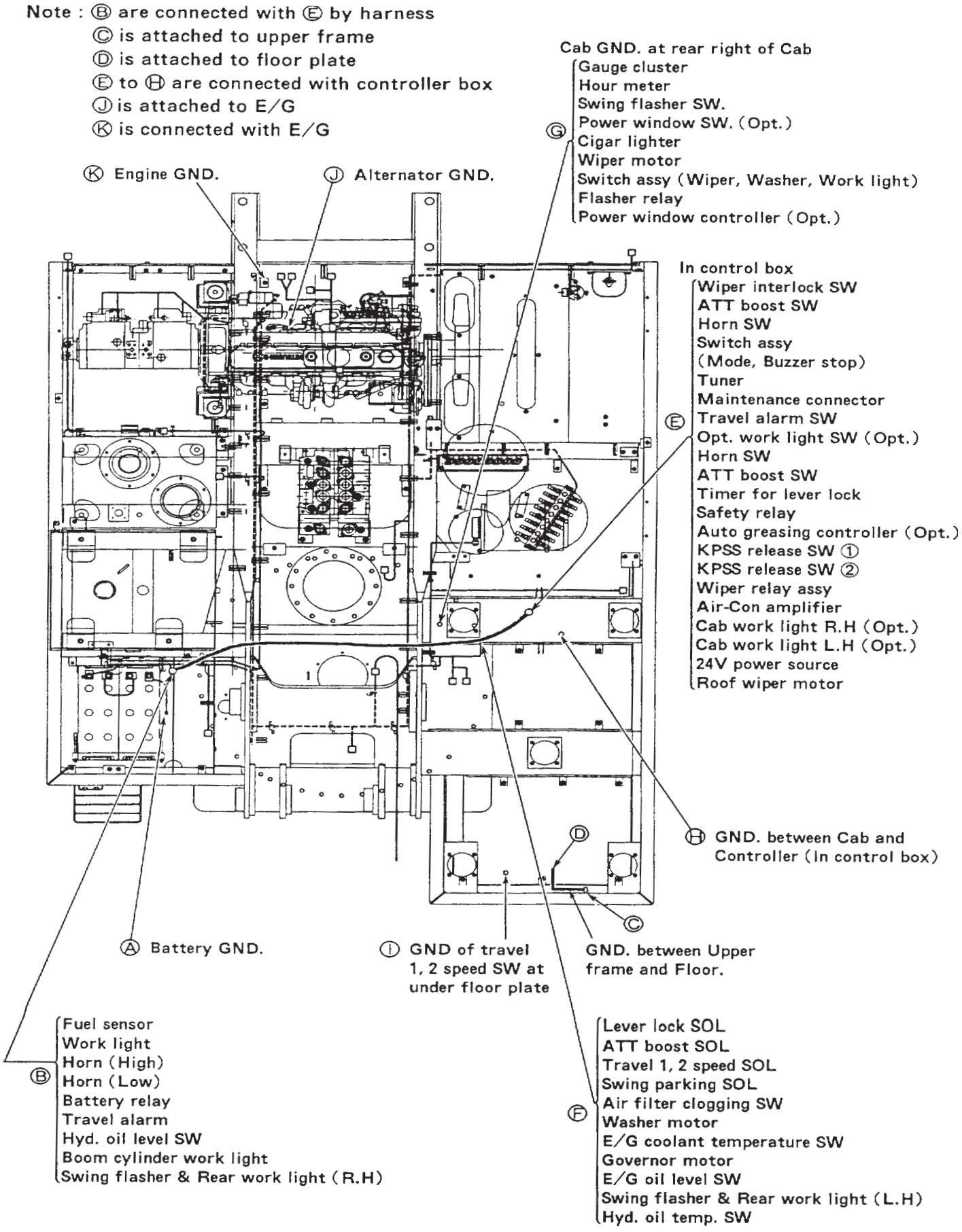


Back of Cab View (Behind operator's seat)



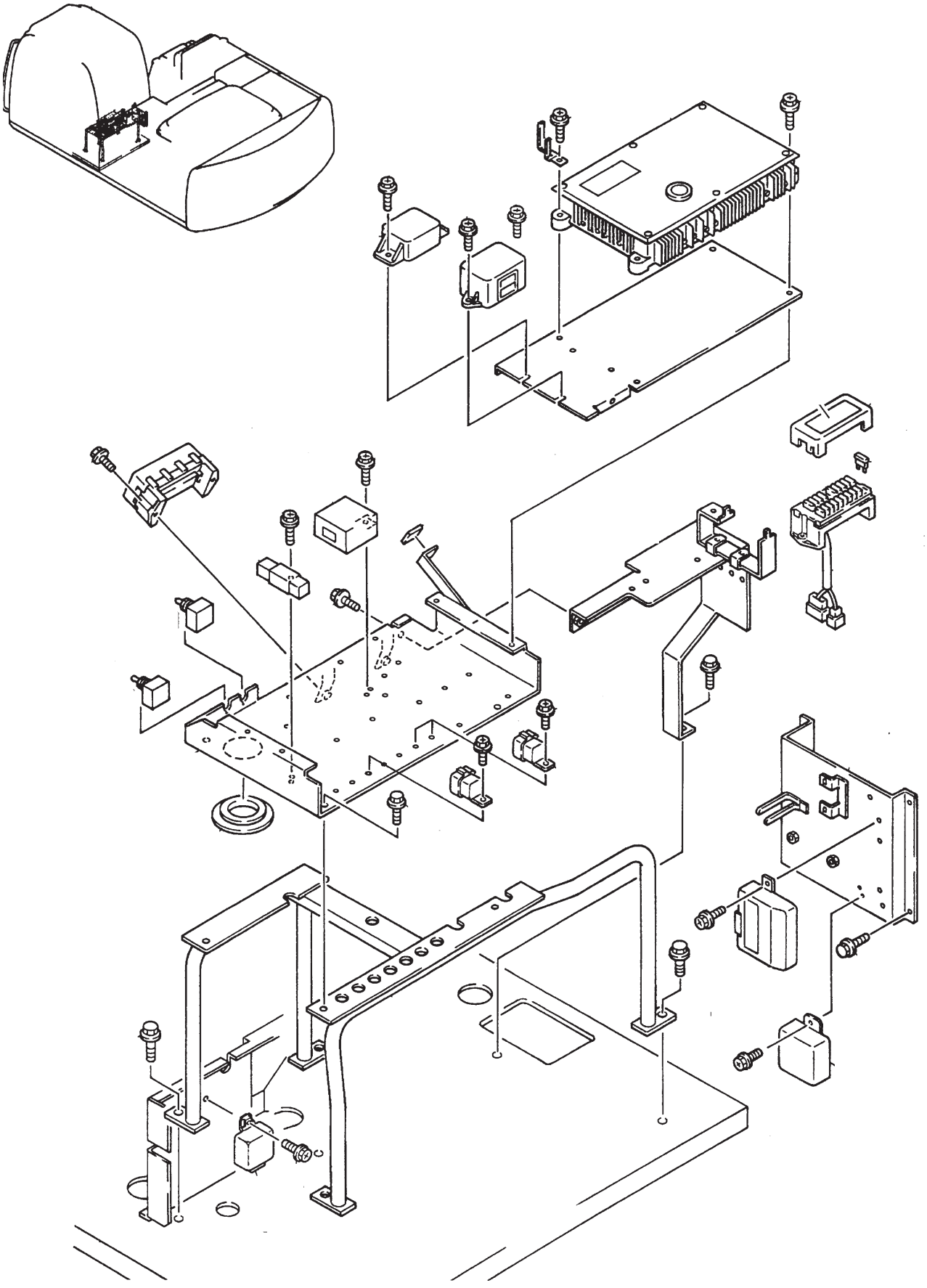
24V DC ~ 12V DC to DC-DC Converter

4. Grounding cable attaching position (SK210)

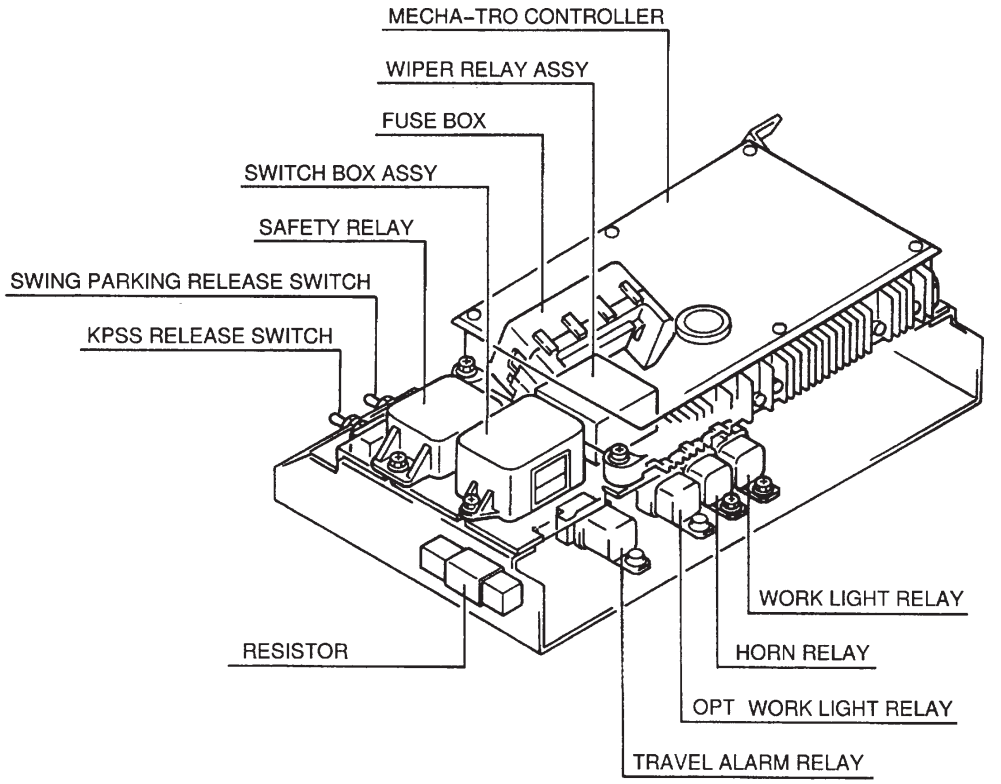


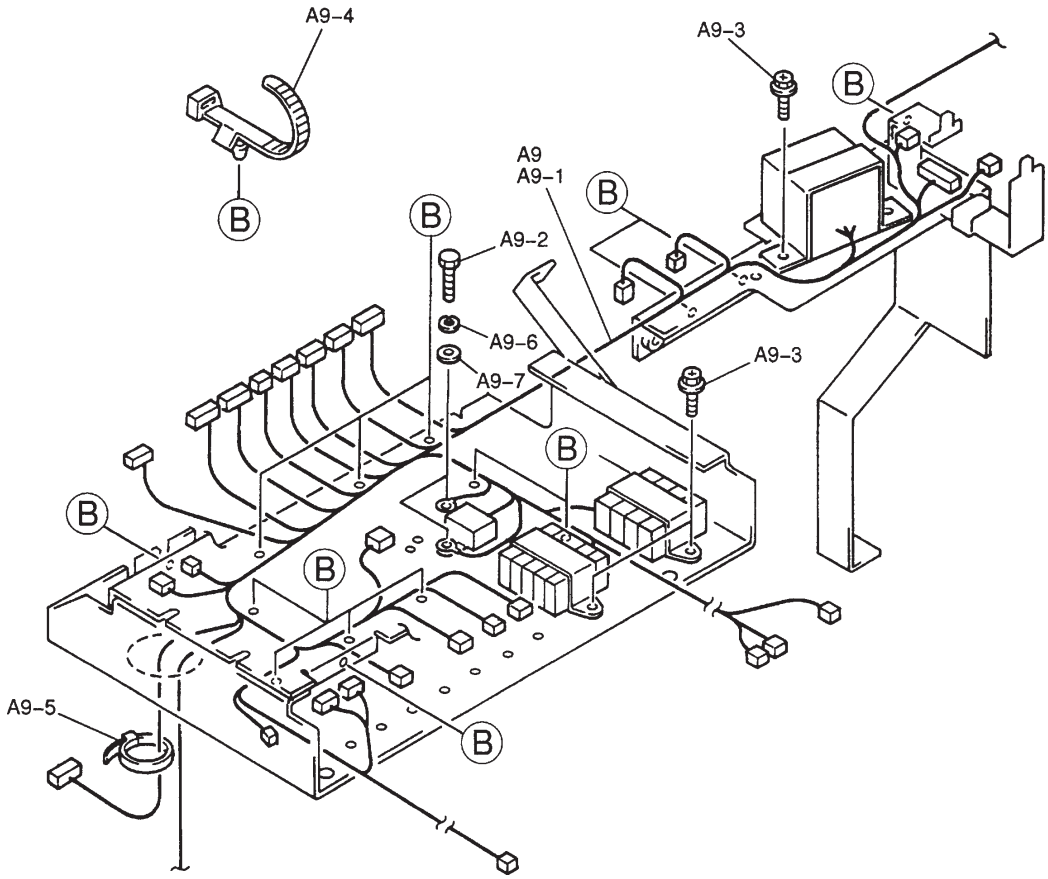
https://truckmanualshub.com/

C-1 MAIN CONTROLLER



C-1 MAIN CONTROLLER



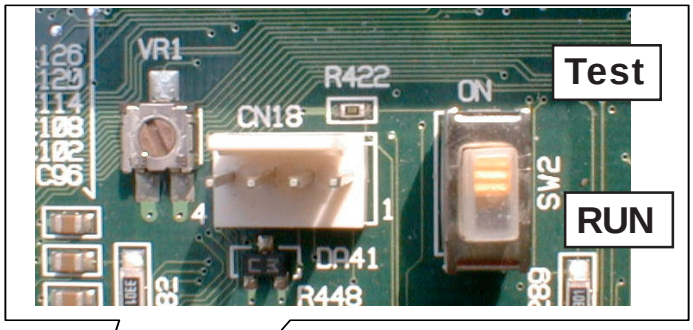


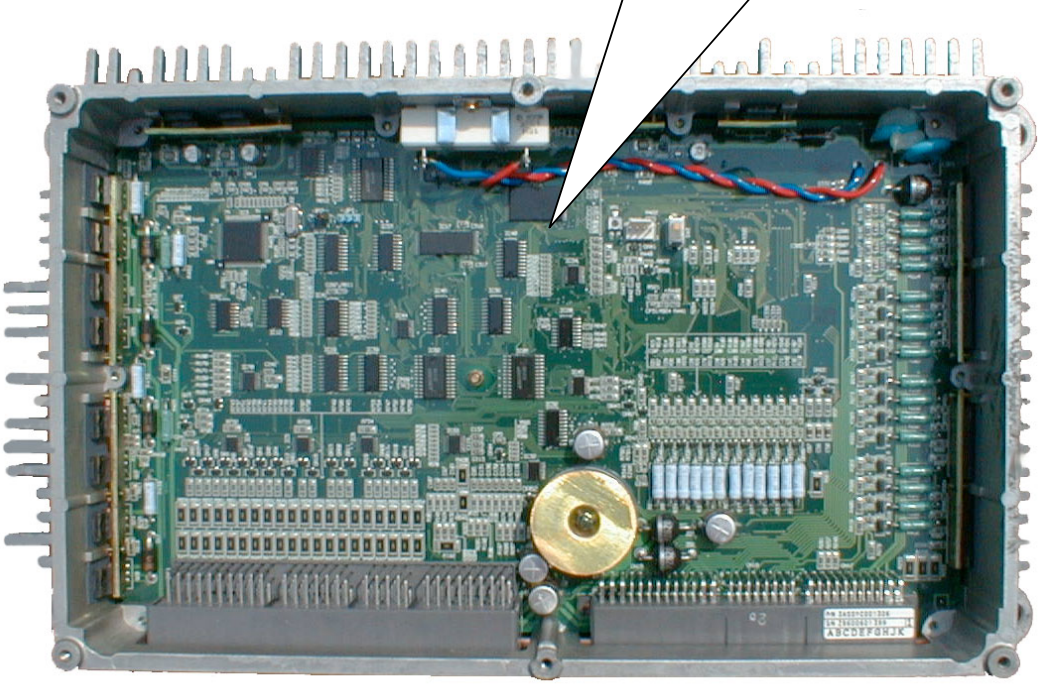
https://truckmanualshub.com/

Mechatro controller (C-1)



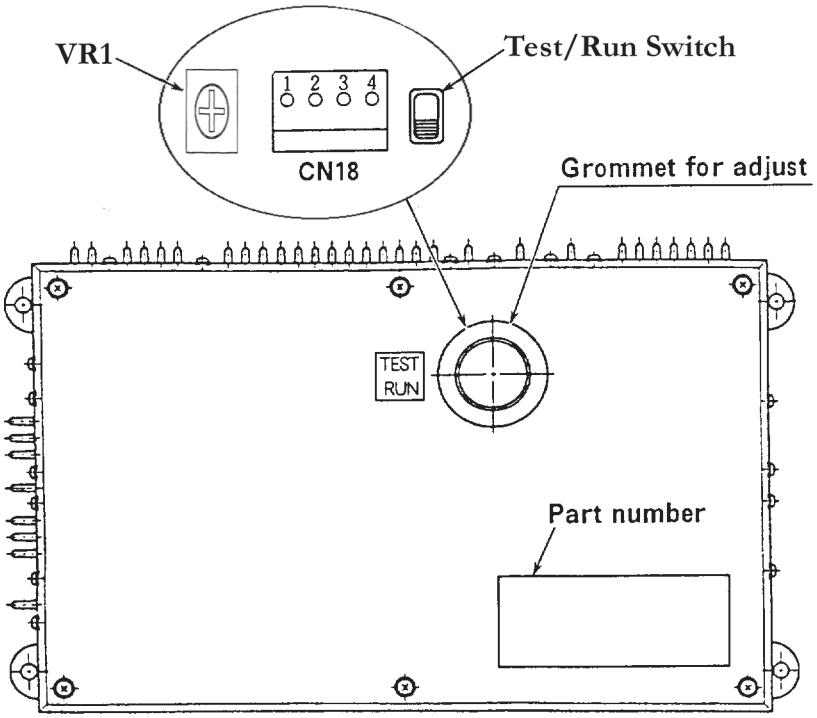
VR1 - Max. Flow Limiter- aux. Hyd. circuits
CN18 - Factory Use Only
SW2 - Test/Run Switch (see page 10-49)

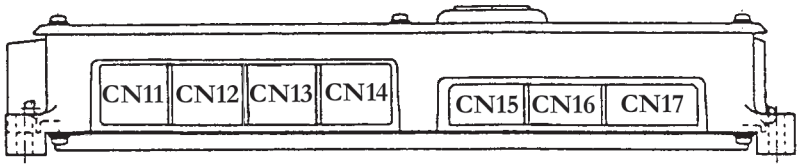


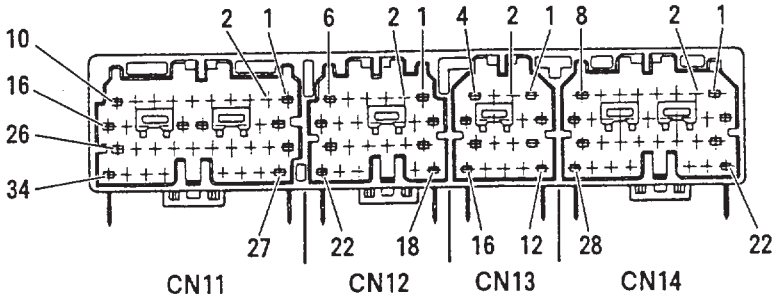


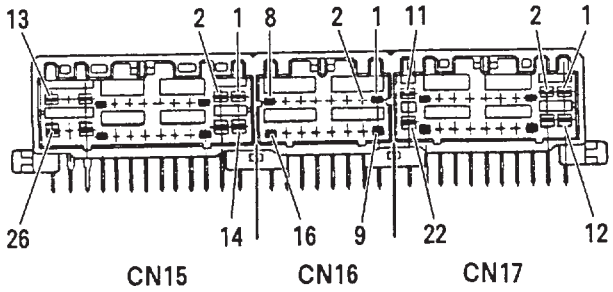
https://truckmanualshub.com/

Mechatro controller (C-1)









Note: A commn mechatro controller is used for SK210 to SK330.
But the software differs, so a controller has to be ordered by machine size.

https://truckmanualshub.com/

4.5a Pin out of Connectors CN11~CN17

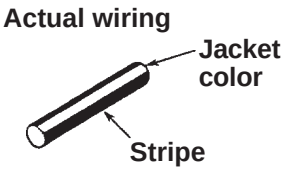
CN-11

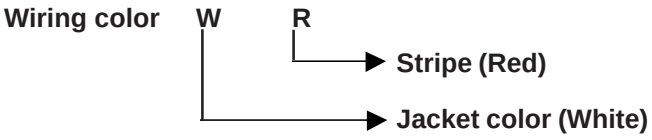
Pin No.	Component			In - Out	Wire Color	Remarks
11-1	Boom raise press. sensor	(GND)	(SE-3)	In	BR	
11-2	"		(SE-3)	"	LgY	
11-3	"	(5V)	(SE-3)	"	W	
11-4	Boom lower press. sensor	(5V)	(SE-4)	"	OB	
11-5	"		(SE-4)	"	LO	
11-6	"	(GND)	(SE-4)	"	BrW	
11-7	Arm in press. sensor	(GND)	(SE-7)	"	BrL	
11-8	"		(SE-7)	"	PG	
11-9	"	(5V)	(SE-7)	"	OL	
11-10	Arm out press. sensor	(5V)	(SE-8)	"	OW	
11-11	"		(SE-8)	"	PL	
11-12	"	(GND)	(SE-8)	"	Gr	
11-13	Bucket digging press. sensor	(GND)	(SE-1)	"	BrR	
11-14	"		(SE-1)	"	LgR	
11-15	"	(5V)	(SE-1)	"	RB	
11-16	Bucket dump press. sensor	(5V)	(SE-2)	"	RL	
11-17	"		(SE-2)	"	LgW	
11-18	"	(GND)	(SE-2)	"	BL	
11-19	Swing right press. sensor	(GND)	(SE-6)	"	GrL	
11-20	"		(SE-6)	"	VY	
11-21	"	(5V)	(SE-6)	"	YB	
11-22	Swing left press. sensor	(5V)	(SE-5)	"	YG	
11-23	"		(SE-5)	"	VG	
11-24	"	(GND)	(SE-5)	"	Br	
11-25	Travel right press. sensor	(GND)	(SE-9)	"	BY	
11-26	"		(SE-9)	"	VY	
11-27	"	(5V)	(SE-9)	"	YL	
11-28	Travel left press. sensor	(5V)	(SE-10)	"	YR	
11-29	"		(SE-10)	"	Sb	
11-30	"	(GND)	(SE-10)	"	BG	
11-31	Accel potentio	(GND)	(SE-16)	"	BW	
11-32	"		(SE-16)	"	P	
11-33	"	(5V)	(SE-16)	"	WR	
11-34	Governor motor		(M-2)	"	GB	

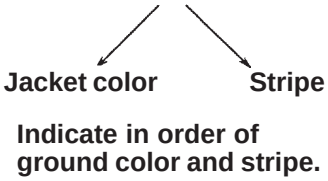
https://truckmanualshub.com/

Cont. - Pin out of Connectors CN11~CN17

Wire color list							
Symbol	Color	Symbol	Color	Symbol	Color	Symbol	Color
B	Black	W	White	Br	Brown	V	Violet
G	Green	Y	Yellow	Lg	Light Green		
L	Blue	P	Pink	Gr	Gray		
R	Red	O	Orange	Sb	Sky Blue		







CN-12

Pin No.	Component			In - Out	Wire Color	Remarks
12-1	P1 pump press. sensor	(GND)	(SE-22)	In	BrB	
12-2	"		(SE-22)	"	V	
12-3	"	(5V)	(SE-22)	"	YL	
12-4	P2 pump press. sensor	(5V)	(SE-23)	"	YR	
12-5	"		(SE-23)	"	L	
12-6	"	(GND)	(SE-23)	"	BrY	
12-7	P1 Nega-Con sensor	(GND)	(SE-26)	"	BY	
12-8	"		(SE-26)	"	GR	
12-9	"	(5V)	(SE-26)	"	WY	
12-10	P2 Nega-Con sensor	(GND)	(SE-27)	"	RG	
12-11	"		(SE-27)	"	LY	
12-12	"	(GND)	(SE-27)	"	BW	
12-13	Charge			"	WR	
12-14	Connector for maintenance			"	LO	Release with
12-15	Starter key ON			"	WL	
12-16	Glow			"	GrB	
12-17	Travel two-speed switch		(SW-3)	"	PL	
12-18	Swing parking brake release switch		(SW-4)	"	Lg	
12-19	KPSS release switch		(SW-5)	"	PG	
12-20	Engine speed sensor		(SE-13)	"	R	
12-21	"		(SE-13)	"	W	
12-22	"	shield	(SE-13)	"	——	

https://truckmanualshub.com/

Cont. - Pin out of Connectors CN11~CN17

CN-13

Pin - No.	Component			In-Out	Wire Color	Remarks
13-1	Opt. press. sensor P2 side	(GND)	(SE-11)	In	BL	Opt.
13-2	"		(SE-11)	"	GO	"
13-3	"	(5V)	(SE-11)	"	RL	"
13-4	Opt press. sensor P1 side	(5V)	(SE-20)	"	RB	"
13-5	"		(SE-20)	"	LgR	"
13-6	"	(GND)	(SE-20)	"	BW	"
13-7	Opt. boom rod press. sensor	(GND)	(SE-25)	"	BP	"
13-8	"		(SE-25)	"	WY	"
13-9	"	(5V)	(SE-25)	"	RL	"
13-10	Opt. boom head press. sensor	(5V)	(SE-24)	"	RL	"
13-11	"		(SE-24)	"	LgY	"
13-12	"	(GND)	(SE-24)	"	BP	"
13-13	Back press. sensor	(GND)	(SE-28)	"	GrG	
13-14	"		(SE-28)	"	Sb	
13-15	"	(5V)	(SE-28)	"	RW	
13-16	Opt. High-reach crane S/W		(SE-41)	"	GY	Opt.

CN-13 If clinometer equipped

Pin - No.	Component			In-Out	Wire Color	Remarks
13-7	Opt. F/R & RH/LH clinometer potentio	(GND)	(SE-29)	In	BP	Opt.
13-8	"		(SE-29)	"	WY	"
13-9	"	(5V)	(SE-29)	"	RL	"
13-11	"		(SE-29)	"	LgY	"

https://truckmanualshub.com/

Cont. - Pin out of Connectors CN11~CN17

CN-14

Pin - No.	Component	In - Out	Wire Color	Remarks
14-1	E/G coolant switch (SW-6)	In	GB	
14-2	E/G Oil press. switch (SW-7)	"	BY	
14-3	Air filter clogging switch (SW-8)	"	Lg	
14-4	Stroke-end proximity SW (SW-32)	"	Br	Opt.
14-5	E/G oil level SW (SW-23)	"	BG	
14-6	E/G coolant level SW (SW-24)	"	GL	
14-7	Hyd. oil level SW (SW-25)	"	RrL	
14-8	Fuel sensor (SE-15)	"	VW	
14-9	Wiper motor (Rise-up) Stop (M-3)	"	L	
14-10	Wiper motor (Rise-up) Reverse (M-3)	"	G	
14-11	ATT boost SW (SW-21)	"	GrG	
14-12	Wiper motor (Arc prevention) (M-3)	Out	LR	
14-13	Wiper motor (Forward relay) (M-3)	"	GB	
14-14	Wiper motor (Reverse relay) (M-3)	"	Gr	
14-15	Wash motor (M-4)	"	GrL	
14-16	Work light relay (R-6)	"	BrY	
14-17	Swing flasher & work light unit (R-19)	"	WB	Opt.
14-18	Switch box assy. (5V) (C-3)	"	RG	
14-19	" (C-3)	In	BrW	
14-20	" (C-3)	Out	LgR	
14-21	" (C-3)	"	LG	
14-22	" (C-3)	"	VW	
14-23	" (C-3)	"	LY	
14-24	" (GND) (C-3)	"	GW	
14-25	Serial communication to gauge cluster	In/Out	R	
14-26	" (C-2)	In/Out	W	
14-27	" Ground (C-2)	——	B	
14-28	" Shield (C-2)	——	——	

Cont. - Pin out of Connectors CN11~CN17

CN-15

Pin - No.	Component		In - Out	Wire Color	Remarks
15-1	Governor motor	Phase A (M-2)	Out	G	
15-2	"	(M-2)	"	B	
15-3	"	Shield (M-2)	"	——	
15-4	P1 by-pass cut propo. valve	(PSV-D)	"	BP	
15-5	"	(PSV-D)	"	PW	
15-6	P2 by-pass cut propo. valve	(PSV-B)	"	BO	
15-7	"	(PSV-B)	"	GrR	
15-8	Travel straight propo. valve	(PSV-C)	"	VR	
15-9	"	(PSV-C)	"	GrB	
15-10	Arm variable recirculation valve	(PSV-A)	"	BrG	
15-11	"	(PSV-A)	"	YV	
15-12	Mechatro controller back-up	(C-1)	In	RY	
15-13	"	(C-1)	"	RY	
15-14	Mechatro controller back-up	(C-1)	"	YG	
15-15	Governor motor	Phase B (M-2)	Out	R	
15-16	"	(M-2)	"	W	
15-17	P1 pump propo. valve	(PSV-P1)	"	VR	
15-18	"	(PSV-P1)	"	GrG	
15-19	P2 pump propo. valve	(PSV-P2)	"	VW	
15-20	"	(PSV-P2)	"	GY	
15-21	Travel 2-speed solenoid valve	(SV-3)	"	LgB	
15-22	Swing parking brake solenoid valve	(SV-1)	"	V	
15-23	Power boost sol. valve	(SV-2)	"	P	
15-24	Battery relay	(R-1)	"	WG	
15-25	Mechatro controller	Ground (C-1)	——	B	
15-26	"	(C-1)	——	B	

CN-16

Pin No.	Component		In - Out	Wire Color	Remarks
16-1	——				
16-2	——				
16-3	——				
16-4	——				
16-5	——				
16-6	——				
16-7	——				
16-8	——				
16-9	——				
16-10	——				
16-11	——				
16-15	Press. switch (Clamp)	(SW-50)	λ	LW	Opt.

https://truckmanualshub.com/

Cont. - Pin out of Connectors CN11~CN17

CN-17

Pin No.	Component			In - Out	Wire Color	Remarks
17-1	Bucket control relay		(R-10)	In	OL	Opt.
17-2	Nibbler open relay		(R-15)	Out	G	"
17-3	Swing flasher relay		(R-19)	"	GW	"
17-4	"		(R-19)	"	WV	"
17-5	Nibbler close relay		(R-16)	"	GL	"
17-6	Travel alarm relay		(R-8)	"	BP	"
17-7	Power window controller		(C-5)	"	YB	"
17-8	Hyd. oil temp. SW		(SW-37)	In	O	
17-9	Travel alarm SW		(SW-22)	"	WY	Opt.
17-10	Swing flasher SW		(SW-9)	"	LgY	"
17-11	Lever lock SW		(SW-11)	Out	YV	
17-12	Rotary N & B			In	GrL	Opt.
17-13	Wiper intelrock SW		(SW-19)	"	PB	
17-18	Boom potentio	(5V)	(SE-17)	In	RB	Opt.
17-19	"		(SE-17)	"	L	"
17-20						
17-21	Arm potentio		(SE-19)	In	V	Opt.
17-22	Grounding	(GND)	(SE-17·19)	"	BG	"

CN-17 Opt. Multi demolition equipped

Pin No.	Component			In - Out	Wire Color	Remarks
17-18	Nibbler rotation	(5V)	(SE-30)	In	RG	Opt.
17-19						
17-20	Nibbler rotation		(SE-30)	In	WR	Opt.
17-21						
17-22	Nibbler rotation	(GND)	(SE-30)	In	BG	Opt.

CN-18

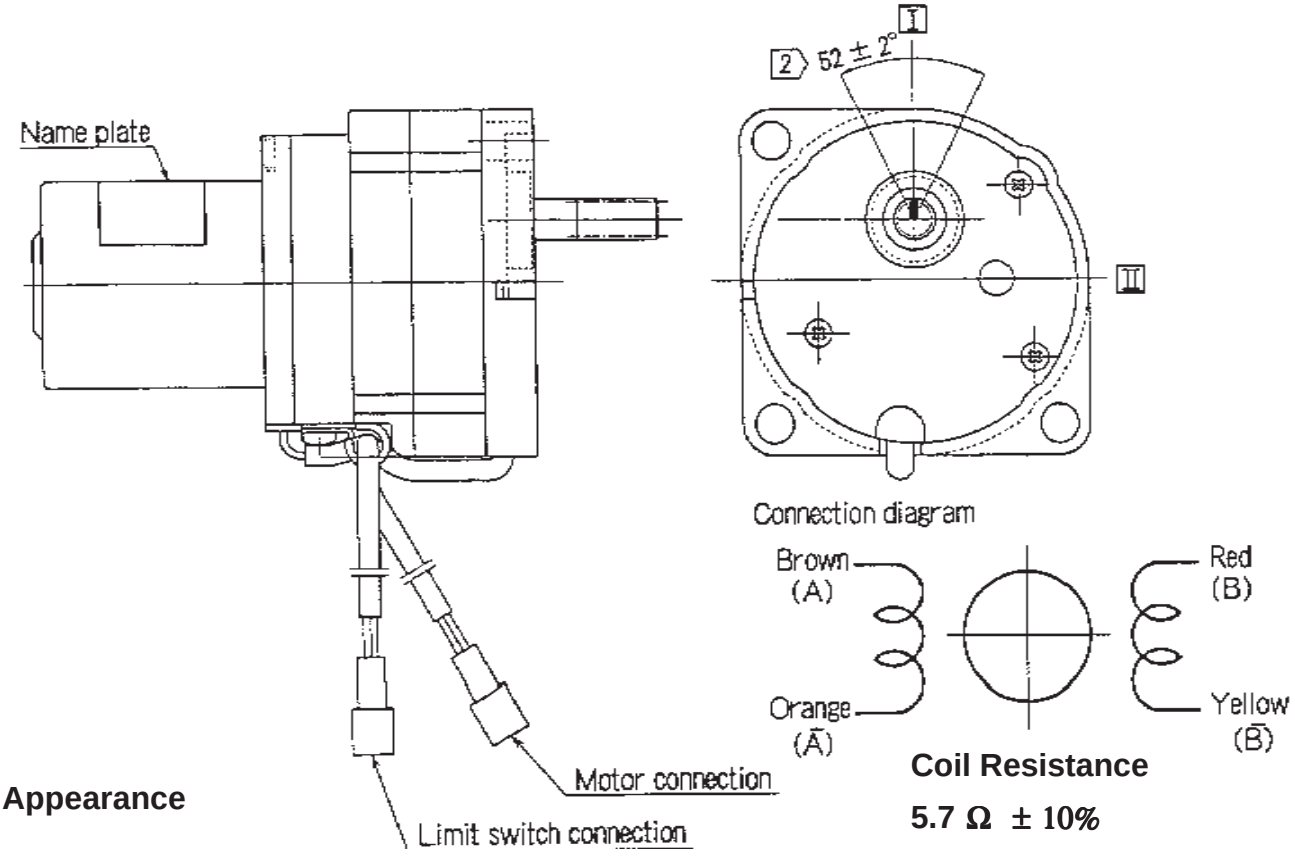
Pin - No.	Component		In- Out	Wire Color	Remarks
18-1	Personal computer for ROM programming		In/Out	——	
18-2			"	——	
18-3			"	——	
18-4		(GND)	——	——	

Governor motor (M2)

(Stepping motor)

Note:

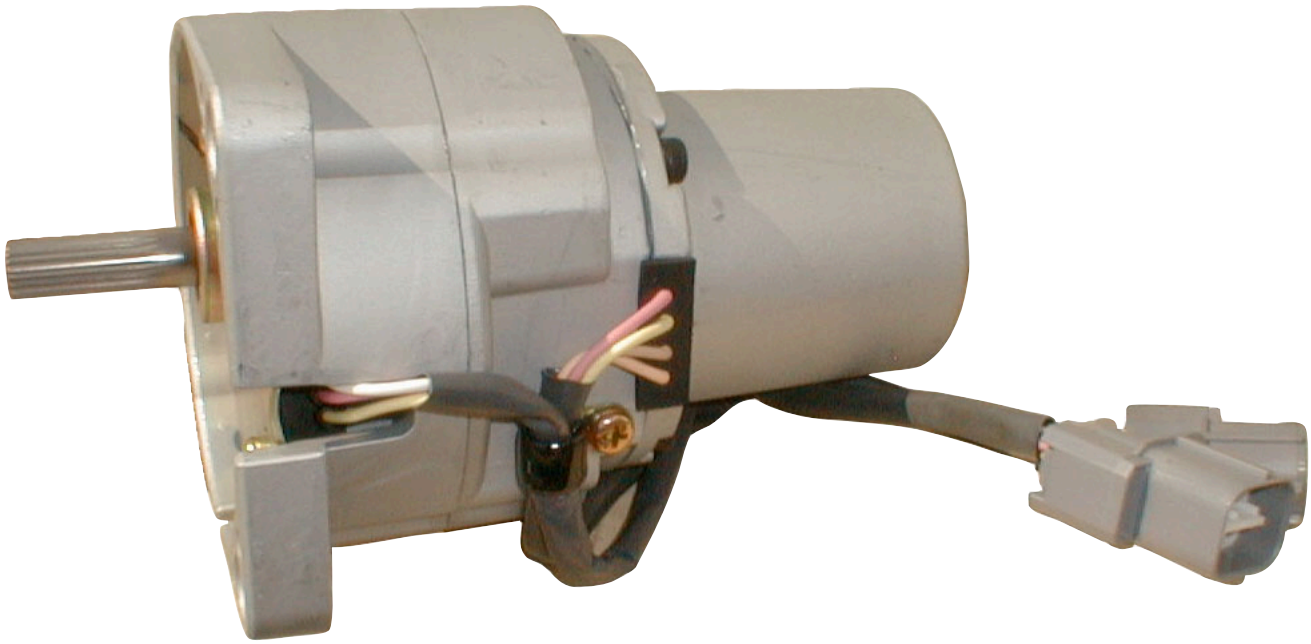
1. **Install motor so that surface I [I] or [II] faces upward.**
2. **[2] 52° (degree) shows the operating range.**



Coil Resistance

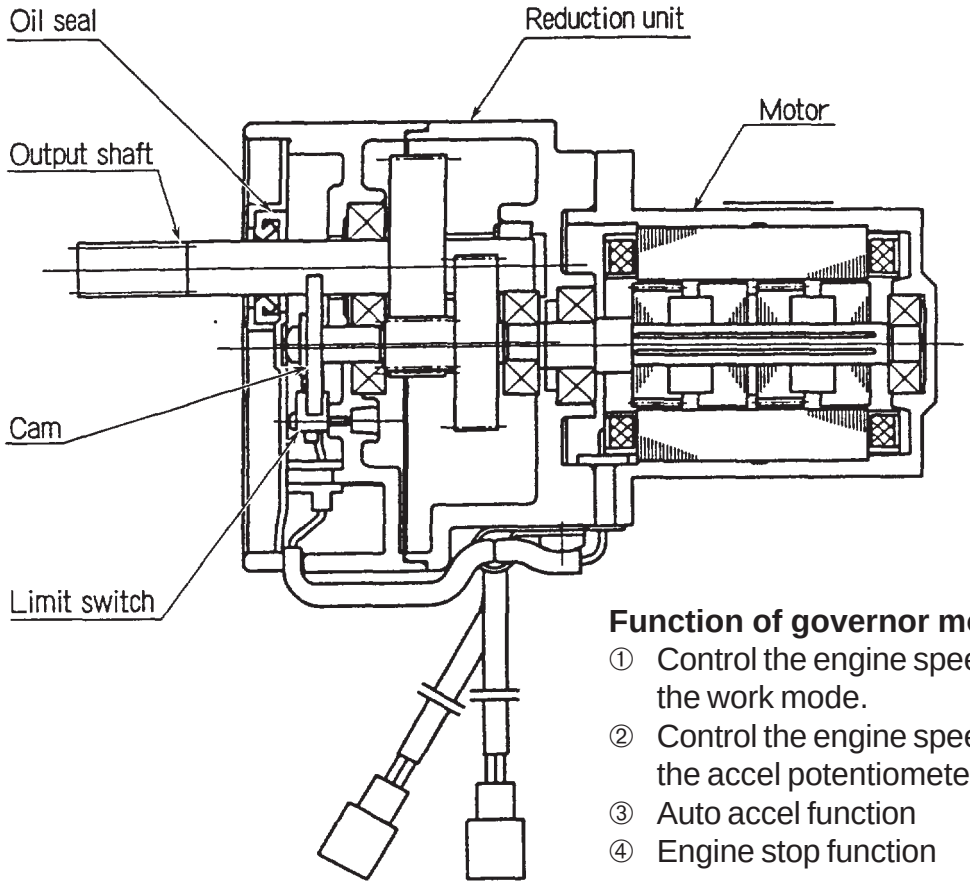
5.7 Ω ± 10%

1. Appearance



https://truckmanualshub.com/

Internal construction



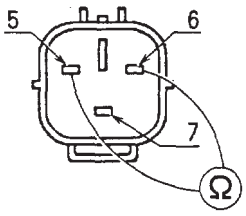
Function of governor motor

① Control the engine speed according to the work mode.
② Control the engine speed according to the accel potentiometer
③ Auto accel function
④ Engine stop function

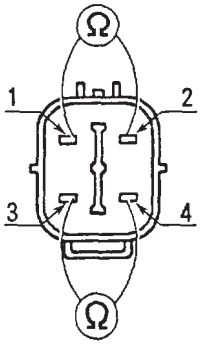
5. Governor motor

Check the resistance of each pin of limit switch and motor connector with tester

Limit switch connector



No.	Lead color	Terminal
5	White	COM
6	Red	NO
7	Yellow	NC



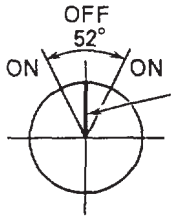
No.	Lead color	Terminal
1	Brown	A
2	Orange	$\overline{A}$
3	Red	B
4	Yellow	$\overline{B}$

How to check limit switch

Turn starter switch OFF, apply tester to pins 5 and 6 and turn the output shaft. And if it is "OFF" when the resistance is ∞ Ω in the range of 52 degree, and if it is "ON" when the resistance is 0 Ω or over when turning angle is over 52 degrees, the limit is normal.

How to check motor

Apply tester on connector pins 1 and 2, and 3 and 4, and the resistance is 5.7 Ω ± 10%, the connectors are normal.

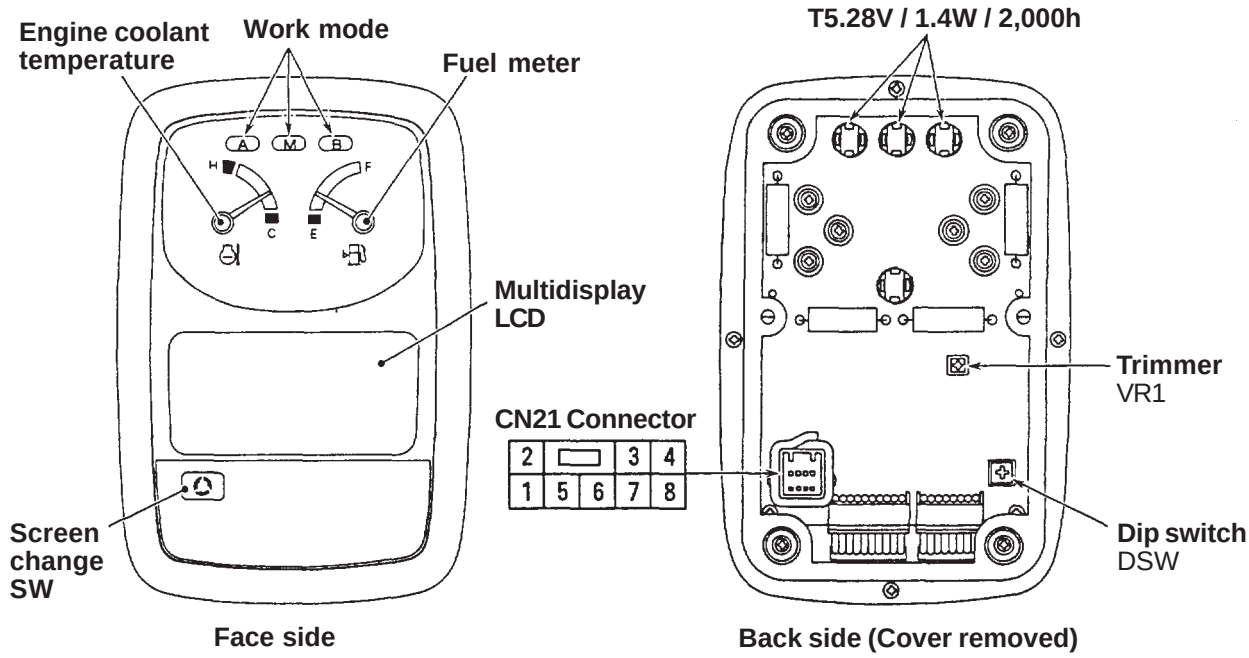


Detail of output shaft

https://truckmanualshub.com/

Gauge cluster (C-2)

1. Appearance

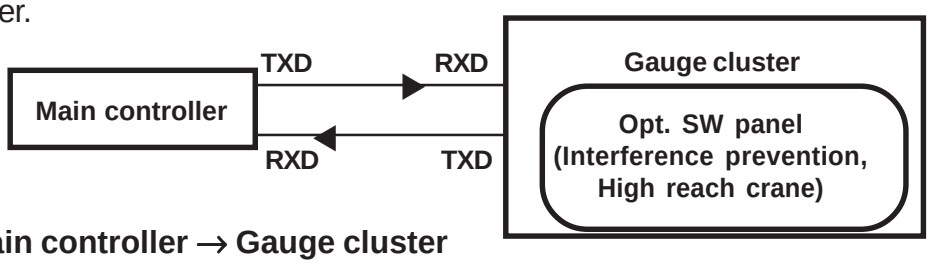


Connector CN21

No.	Name	Wire color	No.	Name	Wire color
	Fuel sensor	BrR	5	GND	B
1	E/G coolant sensor	YR	6	GND	B
2	RXD (Serail communication) Receive	R	7	Power Source (+24V)	W
3	TXD (Serial communication) Transmi	W	8	(Shield)	-

3. Serial communication

Serial communication (various information) are transmitted between main controller and gauge cluster.



(a) Main controller → Gauge cluster

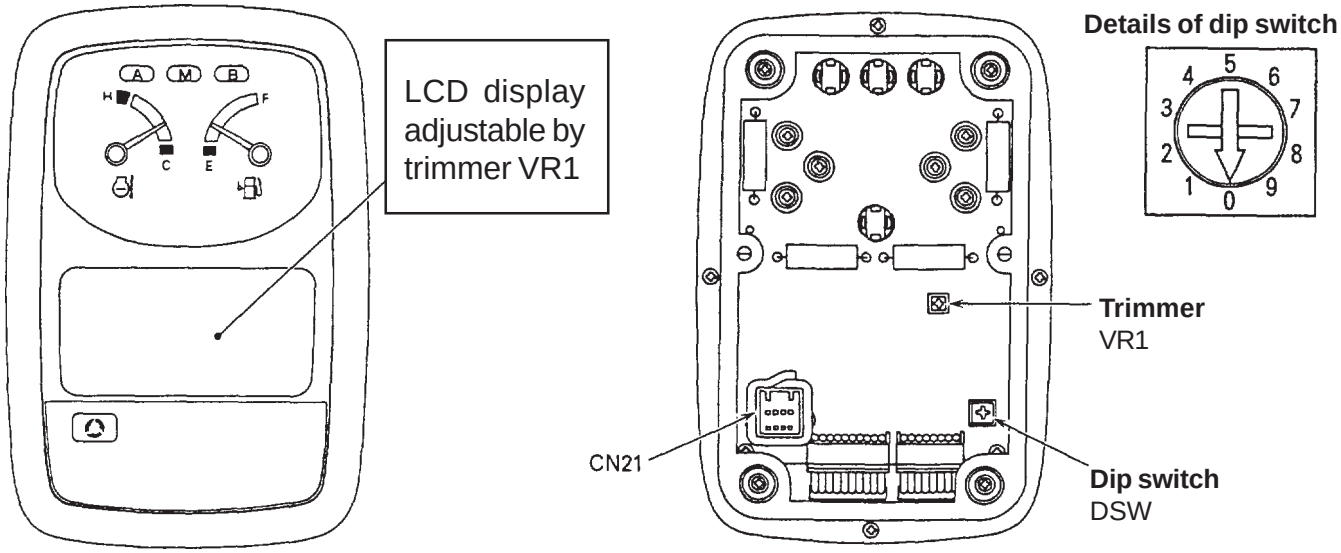
① Switches data: Condition of mode select switches
② E/G revolution: E/G Speed
③ E/G oil replacing time: E/G oil replacing time
④ Warning: Failure of Machine (e.g., E/G oil press, E/G coolant temp.)
⑤ Self diagnosis: Output signal failure of press. sensor, propo. valve, etc.
⑥ Service diagnosis: Output signal failure of press. sensor, propo. valve, etc.
⑦ Trouble history: Trouble data
⑧ Opt. indicator: Data of UR, High reach, etc.
⑨ Others: Initial adjustment data, etc.

(b) Gauge cluster → Main controller

① Screen change signal: Switch signal of gauge cluster
② Opt. switches signal: Condition of interference prevention on High reach crane
③ Gauge data: E/G coolant and Fuel level signal

Gauge cluster

① Adjustment of brightness and language of the multidisplay
(Perform when the starter switch is turned ON.)



Adjusting brightness of multidisplay
Adjust brightness by turning the driver (+) inserted trimmer VR1 clockwise and counterclockwise.

② Resistance measured between case and CN21 each terminal with 500V mega tester. } 3 M Ω or more



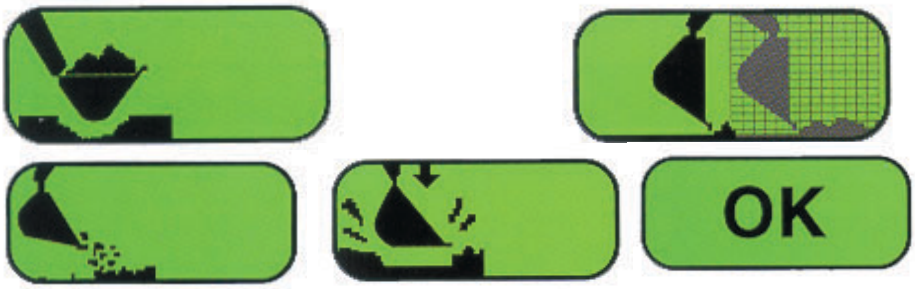
Back side of gauge cluster (remove cover)
Select the language by setting the figure to the required one while turning the driver (+) inserted in dip switch DSW.

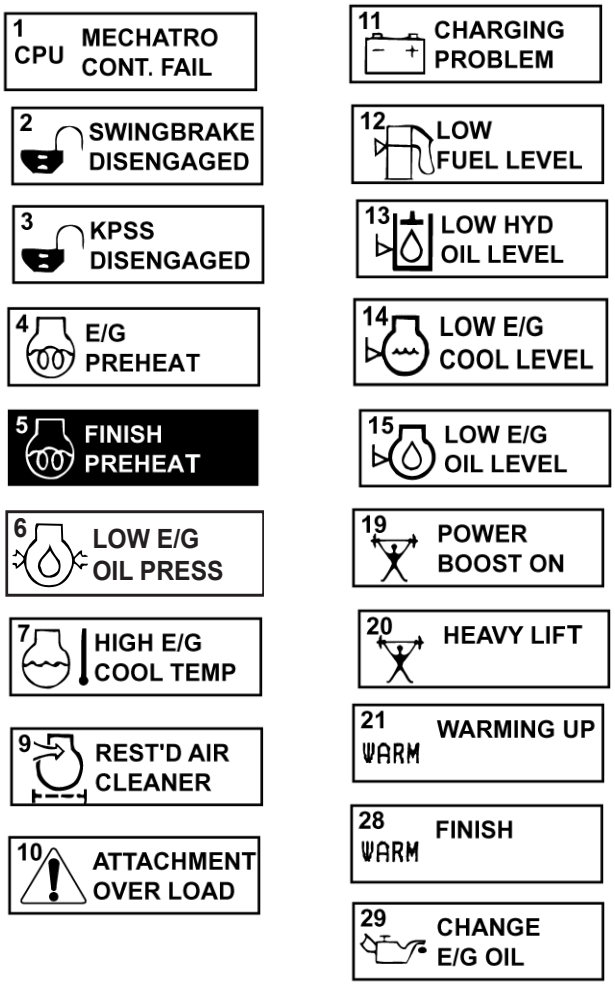
Position (Figure)	Language
0	Japanese
1	English
2	Thai
3	Indonesian
4	French
5	Spanish
6	Europe

https://truckmanualshub.com/

The following chart s aimed at familiarizing personnel with the priority of the Gauge Cluster Display Icons.Pay close attention to these icons as they can aid in avoiding unnecessary repairs and expense.

The icons in the chart below are listed in priority from the most serious to least serious. EXAMPLE:If the engine oil pressure is abnormal and Fuel level s low, the engine oil pressure Icon will display and buzzer will sound. After the oil pressure is back to safe operating pressure, the low fuel Icon will display.

<table>
<tr><th>LCD display</th><th>SERVICE FUNCTION ICON SEQUENCE</th><th>BUZZER SOUNDING</th></tr>
<tr><td>NORMAL DISPLAY</td><td> 
</td><td>No sounding</td></tr>
<tr><td>ASSIST MODE DISPLAY</td><td> 

Supplementary Explanation :
The screen can be switched into three images by pressing the screen change switch.</td><td>No sounding
•For the description of display of the assist mode.
•Each display flickers during operation.</td></tr>
<tr><td>WARNING</td><td> 
</td><td>•#2,#3,#5,#6, #7,#10,#28
Buzzer sounds.

Supplementary Explanation :

Icons #5 and #6 are displayed and buzzers do not stop sounding even if the buzzer stop switch is pressed. When icon 6 is displayed,the engine RPM will idle immediately and the engine will shut down after 15 seconds.

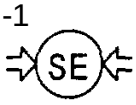
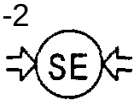
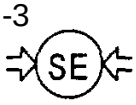
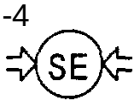
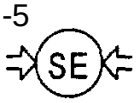
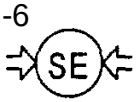
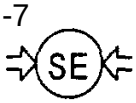
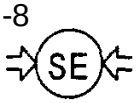
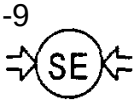
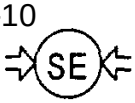
Icon #7 is displayed and buzzer stops sounding when the buzzer stop switch is pressed.

Icons #2,#3,#10 and #28 are displayed and buzzers sound intermittently and stop sounding after 5 seconds.</td></tr>
</table>

Multidisplay self diagnostics

the error of the I/Q signal of the pressure sensor and the proportional valve

1. Indication item

No.	Contents	Display of monitor	Connector No. – Pin No.	Wire or ID No.	Wire color
1	Mechatro controller error	1 CPU MECHATRO CONTR. FAIL	CN14-25	770	R
2	Gauge cluster → Mechatro controller communication	I-1  RECEIVE ERROR	CN14-26	582	W
3	Battery relay fail	I-2  BAT RELAY	CN15-24	857	WG
4	ROM data	A-1 CP ROM DATA FAILURE			
5	Mechatro set error	A-2 CP MECHATRO SET ERROR			
6	Boom raise pressure sensor fail	B-1  BOOM RAISE SENSOR	CN11-2 CN11-1	SE-3	LgY BR
7	Boom lower pressure sensor fail	B-2  BOOM LOWER SENSOR	CN11-5 CN11-6	SE-4	LO BrW
8	Arm in pressure sensor fail	B-3  ARM OUT SENSOR	CN11-8 CN11-7	SE-7	PG BrY
9	Arm out pressure sensor fail	B-4  ARM IN SENSOR	CN11-11 CN11-12	SE-8	PL Gr
10	Bucket dig pressure sensor fail	B-5  BUCKET DIG SENSOR	CN11-14 CN11-13	SE-1	LgR BrR
11	Bucket dump pressure sensor fail	B-6  BUCKET DUMP SENSOR	CN11-17 CN11-18	SE-2	LgW BL
12	Swing (RH) pressure sensor fail	B-7  SWING (R) SENSOR	CN11-20 CN11-19	SE-6	V GrL
13	Swing (LH) pressure sensor fail	B-8  SWING (L) SENSOR	CN11-23 CN11-24	SE-5	VG Br
14	Travel (RH) pressure sensor fail	B-9  TRAVEL (R) SENSOR	CN11-26 CN11-25	SE-9	VY BY
15	Travel LH pressure sensor fail	B-10  TRAVEL (L) SENSOR	CN11-29 CN11-30	SE-10	Sb BG

https://truckmanualshub.com/

1. Indication item

No.	Contents	Display of monitor	Connector No. – Pin No	Wire or ID No	Wire color
16	P1 Nega-Con pressure sensor fail	B-11 SE P1NEGA-CON SENSOR	CN12-8 CN12-7	SE-26	GR BY
17	P2 Nega-Con pressure sensor fail	B-12 SE P2NEGA-CON SENSOR	CN12-11 CN12-12	SE-27	LY BW
18	Back pressure sensor fail	B-15 SE BACK PRESS SENSOR	CN13-14 CN13-13	SE-28	Sb GrG
19	Pump P1 pressure sensor fail	C-1 SE PUMP P1 SENSOR	CN12-1 CN12-2 CN12-3	SE-22	BrB VY YL
20	Pump P2 pressure sensor fail	C-2 SE PUMP P2 SENSOR	CN12-4 CN12-5 CN12-6	SE-23	YR Sb BrL
21	P1 By-pass cut propo-valve fail	D-1 PSV P1 BY-PASS PROPO-VALV	CN15-4 CN15-5	PSV-D	BP PW
22	P2 By-pass cut propo-valve fail	D-2 PSV P2 BY-PASS PROPO-VALV	CN15-6 CN15-7	PSV-B	BO GrR
23	Travel straight propo-valve fail	D-3 PSV TRAVEL PROPO-VALV	CN15-8 CN15-9	PSV-C	BG BrB
24	Arm variable recirculation propo-valve fail	D-6 PSV RECIRCULAT PROPO-VALV	CN15-10 CN15-11	PSV-A	BrG YV
25	Pump P1 propo-valve fail	E-1 PSV PUMP P1 PROPO-VALV	CN15-17 CN15-18	PSV-P1	VR GrG
26	Pump P2 propo-valve fail	E-2 PSV PUMP P2 PROPO-VALV	CN15-19 CN15-20	PSV-P2	VW GY
27	ATT boost solenoid fail	F-1 SV POWERBOOST SOLENOID	CN15-23	SV-2	P
28	Swing parking brake solenoid valve fail	F-2 SV SWING BRAKE SOLENOID	CN15-22	SV-1	V
29	Travel two-speed solenoid valve fail	F-3 SV TWO-SPEED SOLENOID	CN15-21	SV-3	LgB

https://truckmanualshub.com/

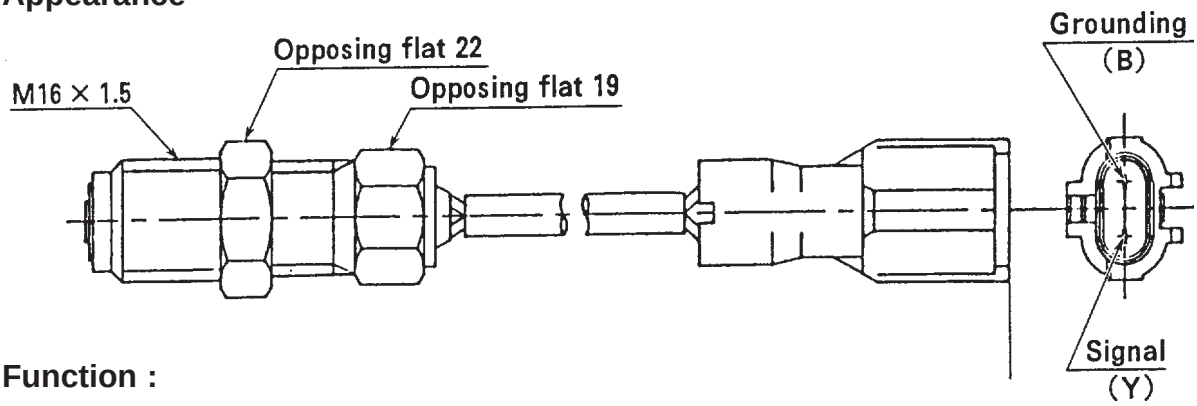
1. Indication item

No.	Contents	Display of monitor	Connector No. – Pin No.	Wire or ID No.	Wire color
30	Governor motor current fail	G-1 (M) STEP MOTOR CURRENT-NG	CN15-1 CN15-2 CN15-15 CN15-16	771 772 773 774	G B R W
31	Governor motor starting point indexing fail	G-2 (M) STEP MOTOR S/PT. ERROR	CN11-34	544	GB
32	Engine speed sensor fail	G-3 [RPM] E/G REV. SENSOR	CN12-20 CN12-21	580 581	R W
33	Accel potentio motor fail	H-1 (POT) ACCELERATR POTENTIO	CN11-33 CN11-32 CN11-31	917 517 967	WR P BW
34	Arm variable recirculation propo-valve fail	D-6 [PSV] RECIRCULAT PROPO-VALV	CN15-10 CN15-11	PSV-A	BrG YV
35	Prop-Valve P1 - I-Trave fail	D-11 [PSV] PUMP P-1 I-TRAVEL	CN16-1 CN16-2	PSV-E	WV GR
36	Prop-Valve P2 -I- Trave fail	D-12 [PSV] PUMP P-2 I-TRAVEL	CN16-3 CN16-4	PSV-F	WL GR
37	Prop-Valve SW. Priority fail	D-13 [PSV] SWING PRIORITY	CN16-7 CN16-8	PSV-H	WG G

https://truckmanualshub.com/

Engine speed sensor (SE15)

1. Appearance



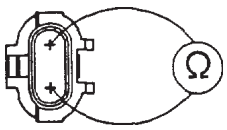
2. Function :

The engine speed sensor used to detect the actual engine speed is installed on ring gear section of engine flywheel, and electrically counts the number of gear teeth passing through in front of the sensor. And the detection is performed by magnetic force, and magnets and coils are placed in the sensor. Also, the engine speed which is computed by the signal from the sensor by mechatronics controller is indicated on the cluster gauge display.

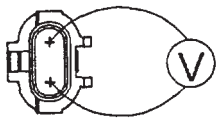
3) Voltage :

How to measure

1) Resistance



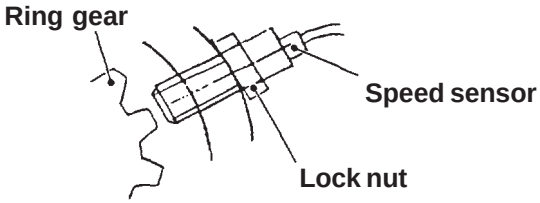
2.3 k Ω ± 0.2 k Ω



AC range
1.4V ~ 6V

Disconnect the connector of speed sensor, and measure the voltage between pins on the sensor side. When the measured voltage at high idling in the AC range is 3V or more, it is acceptable. (The voltage is set to 4V or more before shipment.)

How to adjust speed sensor



Tighten, voltage rises.
Loosen it, voltage drops.

① Remove Sensor and inspect and clean tip with clean cloth (Note: Do not apply any type of cleaner such as brake clean, ether or degreaser to RPM Sensor).

② Reinstall sensor into bell housing of engine and tighten it until the end of speed sensor comes into contact with the ring gear lightly, then backout sesnor one and a half turns. (Space between ring gear and sensor top end is approx. 2.3mm.)

③ After turning it out one and a half turns, tighten lock nut to the torque specified below.

Tightening torque:
24.5 to 34.3N•m {2.5 to 3.5 kgf • m}

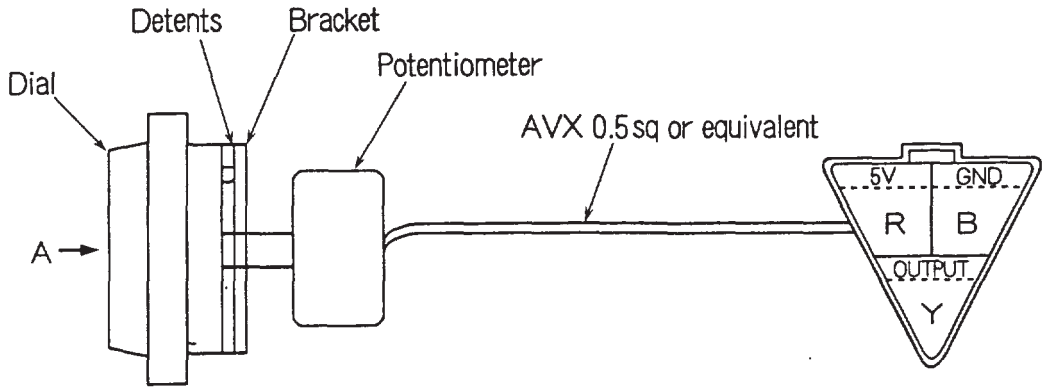
④ Start engine and verify with and external tachometer that the low idle is 850~900 rpms and verfy that voltage is 1.4 VAC ~ 3.0 VAC at low idle and is 6 VAC or higher at High idle.

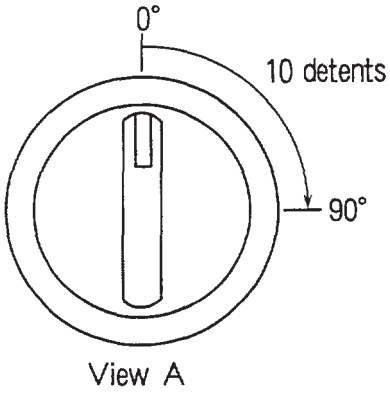
Note: If voltage is low turn sensor in.
If voltage is High turn sensor out.

https://truckmanualshub.com/

Potentiometer (for accel dial, SE-16)

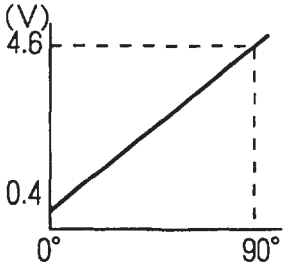
1. Appearance



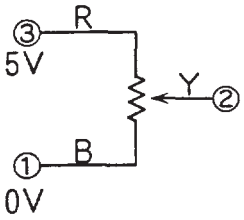


Characteristic curve

Voltage between ② – ①



Electric diagram

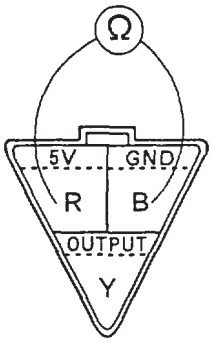


2. Function :

The accel potiometer is used to control engine governor speed via the stepping motor mounted to the engine. The accel potiometer has 5 VDC applied to it from the main mechatronics controller on terminal B and dependant on the position of the potiometer in the 90° the output to the main mechatronics controller will be between .4 VDC to 4.5 VDC and this voltage change will signal the main controller to increase or decrease stepping motor position to increase or decrease the engine rpm.

3. Testing Accel potentiometer :

Apply multimeter test leads to terminal B - power supply (5V) of connector and terminal R- ground and measure the resistance.



Resistance: The resistance 2 k Ω is normal

https://truckmanualshub.com/

Error Code History diagnosis

The error code detected by the self diagnosis of the main controller is stored in the mechatro controller as a history and can displayed on the multidisplay.

1. How to display

① Turn the Key switch ON.

② Press the buzzer stop switch 5 times in sequence within a 10 second period.

(See Figure 10.42a)

(Example)

No errors	NO ERROR	
Error detected in the past	00025H	
	B-1	BOOM RAISE
	D-1	P1 BY-PASS
	F-3	TWO SPEED

③ There are 20 pages of Error History and are displayed in order from newest to oldest.

④ The error data (one or more) and hour the error happened are displayed on the gauge cluster.

- Hour meter data and 3 errors are displayed on the screen all at one time.
- If more than three error data exist, the data is displayed three errors per page and the display scrolls between pages in order every 5 seconds.

⑤ To scroll the page manually, use the work mode and the buzzer stop switch.

- Press the work mode switch for page up.
- Press the buzzer stop switch for page down.

Note: All the error items are stored in sequence by hourmeter, if old codes are present see below for procedure on how to clear codes.

⑥ Turn the Key switch off, and the Error history mode is exited.

2. How to cancel the contents of the Trouble History

① Display the trouble history mode.

② Press the work mode switch and the buzzer stop switch for 10 seconds or more concurrently.

③ When the deletion is completed, the “NO ERROR” is displayed.

④ Turn the starter switch OFF.

Note: All the stored Error Codes are permanently erased and cannot be restored.

3. Error Code History Contents (See Chart on next page for Codes)



Figure 10.42a

NOTE

To clear fault codes on the ED190 press the travel speed change switch and the buzzer stop switch at the same time. The new rocker switch for the Mode/Buzzer Stop switch makes it impossible to press both switches at the same time.

https://truckmanualshub.com/

3. Error Code History Contents

Symbol	Display		Symbol	Display		
A	Controller	A-1	ROM DATA FAILURE	D	Proportional Solenid Valves	D-1	P1 BY-PASS PROPO-VALVI
		A-2	MECHATRO SET ERROR			D-2	P2 BY-PASS PROPO-VALVI
B	Low pressure sensors	B-1	BOOM RAISE SENSOR			D-3	TRAVEL PROPO-VALVE
		B-2	BOOM LOWER SENSOR			D-6	RECURCULAT PROPO-VAL
		B-3	ARM OUT SENSOR			D-11	P1 I-TRAVEL PROPO-VALV
		B-4	ARM IN SENSOR			D-12	P2 I-TRAVEL PROPO-VALV
		B-5	BUCKET DIG SENSOR			D-13	SW. PRIOR PROPO-VALVE
		B-6	BUCKET DUMP SENSOR				
		B-7	SWING (R) SENSOR	E		E-1	PUMP P1 PROPO-VALVE
		B-8	SWING (L) SENSOR			E-2	PUMP P2 PROPO-VALVE
		B-9	TRAVEL (R) SENSOR				
		B-10	TRAVEL (L) SENSOR	F	Solenoid valve	F-1	POWERBOOST SOLENOID
		B-11	P1NEGA-CON SENSOR			F-2	SWINGBRAKE SOLENOID
		B-12	P2NEGA-CON SENSOR			F-3	TWO-SPEED SOLENOID
		B-15	BACK PRESS SENSOR	G	E/G Accessory	G-1	STEP MOTOR CURRENT-N(
		B-16	OPT P1 SENSOR			G-2	STEP MOTOR S/PT. ERROR
		B-17	OPT P2 SENSOR			G-3	E/G REV. SENSOR
C	High pressure sensors (Hydraulic pump)			H	Potentiometer	H-1	ACCELERATR POTENTIO
				I	Relay	I-1	BAT. RELAY
		C-1	PUMP P1 SENSOR			I-2	RECEIVE ERROR
		C-2	PUMP P2 SENSOR				
							MONITOR SYSTEM OK

https://truckmanualshub.com/

https://truckmanualshub.com/

Service diagnosis

The service diagnosis can check multi items that are displayed on the gauge cluster according to the data received from the mechatro controller.

How to display

① Press the buzzer stop switch while turning the starter switch to “ON” will activate the service diagnostics. Start the engine and preform the checks listed on the following pages.

② The first item displayed will be Part No. of mechatro controller and the program version. **Example: SK210**

No.1 MAIN CONT. P/NO. YN22E00037F1 PROGRAM VERSION VER 7.00

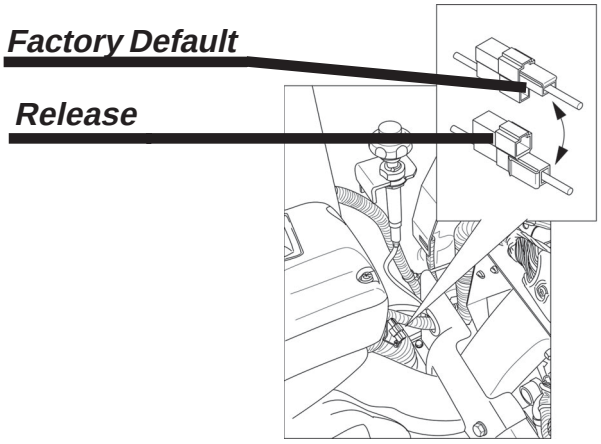
③ Each time the screen change switch on the gauge cluster is pressed, the number advances forward (Ex. No. 2, No. 3 ⋯).

④ Each time the buzzer stop switch on the right console is pressed, the number descends (Ex. No. 25, No. 24 ⋯).

⑤ For training purposes, after service diagnosis No. 1, release the auto accel function. For procedure, ***See Note below.***

⑥ The display disappears only when the starter switch is turned OFF.

Note:



⑦ After completion of service diagnosis restore the auto accel to factory default.

Service diagnosis display

Gauge cluster



Example: SK210



https://truckmanualshub.com/

	Display	Operation procedures	SK210	SK250	SK290	SK330	Remarks
Mechatronic Controller	No. 1 (Screen No.) Main Cont. P/No. Program Version Ver 7.00	Refer to How to Display	YN22E..... Ver.	LQ22E..... Ver.	LB22E..... Ver.	LC22E..... Ver.	Part Number and version of software
	No. 2 (Screen No.) E/GSET 1000 MEAS 1007 E/G PRS LIVE KPSS SW M	The set value varies according to the accel dial position and work mode selector operation.	Low / Hi	Low / Hi	Low / Hi	Low / Hi	
			1000 / 2220	1050 / 2320	1000 / 2340	1050 / 2430	M mode Hi Idle
			1950	2050	2100	2050	A mode
			2220	2320	2340	2385	B mode
							LIVE - Engine Running Dead - Engine Stopped
	Auto accel.	Control lever in neutral position, in 4 seconds	In auto accel operation : 1050				
	E/G PRS. LIVE		When engine is running : LIVE When Engine is stopped: DEAD				Mode lamp in gauge cluster changes from M (default) to A to B when mode switch is pushed.
	KPSS S.W.		M — A — B				
	No. 3 (Screen No.) H-1 ACCEL VOLT. 0.0 V Pos. 0 % Motor Step POS.	By operating the accel dial from low to high, the voltage varies. The step number may vary a little after "A" adjustment.	Low	Hi			For full stepping motor position auto accel must be in release position.
			0.3V	4.4V			
			0%	100%			
			283	549			
			8%	100%			
	No. 4 (Screen No.) STEP. MOTOR	G-1Coil A	0.9 ~ 1.1 A				At the moment when the key switch turns OFF, ON
		G-1Coil B	0.9 ~ 1.1 A				
		G-2 Limit	OFF				

https://truckmanualshub.com/

		Display	Operation procedures	SK210	SK250	SK290	SK330	Remarks
Multi Solenoid Valve Block		No. 5 (Screen No.) SOL. VALVE. F-2 SWING - BRAKE *SV - 1 COMP. ON MEAS. ON RELEASE SW OFF	Operate swing lever in clockwise or counterclockwise, or arm-in action.	At swing and arm in operation OFF OFF [ON 5 sec. after swing lever neutral position ON simultaneous arm lever neutral position] OFF				Controlled by Mechatronic Controller.
		No. 6 (Screen No.) SOL. VALVE. F-3 1~2 TRAVEL *SV - 3 COMP.OFF MEAS. OFF SWITCH OFF	Operate travel speed change switch	1st Speed OFF OFF OFF	2nd Speed ON ON OFF (ON during SW actuated)			Instruction: OFF Measured: ON (even if in disconnection, displayed) Voltage of connectors ON: 24V OFF: 10V
		No. 7 (Screen No.) SOL. VALVE. F-1 POWER BOOST *SV - 2	Operate Boost / Heavy Lift switch	P. Boost SW Heavy Lift	P. Boost SW	Heavy Lift SW		Measure the voltage of connectors. Measure resistance of solenoid valve. Perform checking changing the connector positions
				ON/ON	ON	ON		
		COMP. OFF		ON	OFF	ON		
		MEAS. OFF		ON	OFF	ON		
		SWITCH OFF		ON	ON	OFF		
Mechatronic Controller		No. 8 (Screen No.) RELAY 1-2 BAT. RELAY *E-1	Operate Starter Switch	Starter SW ON		Starter SW OFF		* I.D. Number
		COMP. ON		ON		ON		
		MEAS. ON		ON		ON		
		KEY SWITCH ON		ON		OFF		

	Display	Operation procedures	SK210	SK250	SK290	SK330	Remarks
Low Pressure Sensor	No. 9 (Screen No.) PRESS. SENSOR B-1 BOOM RAISE *SE - 3 0.5V 0k	Control lever at neutral position E/G speed LOW and HIGH common	0.5V / 0k	←	←	←	Note: 0k = 0 kg/cm^2 Note: V = Volts When control lever is in neutral position you will have minimum values. As you increase the angle of the control lever, the values will increase proportionally. If values do not change while operating the control lever, remove connector on the failed low pressure sensor. Then install connector on pressure sensor which is known to work. If display does not change: FAILURE OF HARNESS If display changes: FAILURE of SENSOR * I.D. Number
	B-2 BOOM LOWER *SE - 4 .5V 0k	E/G speed High idile Down/ Up to over relief	5.0V / 30k	←	←	←	
	No. 10 (Screen No.) PRESS. SENSOR B-3 ARM OUT *SE - 8 0.5V 0k	Control lever at neutral position E/G speed LOW and HIGH common	0.5V / 0k	←	←	←	
	B-4 ARM IN *SE - 7 0.5V 0k	E/G speed High idile In/Out to over relief	5.0V / 30k	←	←	←	
	No. 11 (Screen No.) PRESS. SENSOR B-5 BUCKET DIG *SE - 1 0.5V 0k	Control lever at neutral position E/G speed LOW and HIGH common	0.5V / 0k	←	←	←	
	B-6 BUCKET DUMP *SE - 2 0.5V 0k	E/G speed High idile In/out to over relief	5.0V / 30k	←	←	←	
	No. 12 (Screen No.) PRESS. SENSOR B-7 SWING (R) *SE - 6 0.5V 0k	Control lever at neutral position E/G speed LOW and HIGH common	0.5V / 0k	←	←	←	
	B-8 SWING (L) *SE - 5 0.5V 0k	E/G speed High idile Block to hyd. stall	5.0V / 30k	←	←	←	
	No. 13 (Screen No.) PRESS. SENSOR B-9 TRAVEL (R) *SE - 9 0.5V 0k	Control lever at neutral position E/G speed LOW and HIGH common	0.5V / 0k	←	←	←	
	B-10 TRAVEL (L) *SE - 10 0.5V 0k	E/G speed High idile Block sprocket Hyd.stall	5.0V / 30k	←	←	←	

https://tractormanuals.blogspot.com/

		Display	Operation procedures	SK210	SK250	SK290	SK330	Remarks
High Press. Sensor		No. 14 (Screen No.) PRESS. SENSOR C-1 PUMP P1 *SE - 22 0.7V 20k C-2 PUMP P2 *SE - 23 0.7V 20k	Control lever at neutral position E/G speed LOW and HIGH common	0.7V / 20k	←	←	←	Note: 0k = 0 kg/cm² Note: V = Volts When control lever is in neutral position you will have minimum values. As you increase the angle of the control lever, the values will increase proportionally. If values do not change while operating the control lever, remove connector on the failed low pressure sensor. Then install connector on pressure sensor which is known to work. If display does not change: FAILURE OF HARNESS If display changes: FAILURE of SENSOR * I.D. Number
			E/G speed High idile Boom up and over relief	3.3V / 350k	←	←	←	
			E/G speed High idle plus boost	3.5V / 400k	←	←	←	
Low Press. Sensor		No. 15 (Screen No.) PRESS. SENSOR B-16 P1 OPT. *SE - 20 0.5V 0k B-17 P2 OPT. *SE-11 0.5V 0k	Without N & B Piping	0.0V / 0k	←	←	←	
			With N & B Piping	0.5V / 0k	←	←	←	
			WIth N & B piping when control pedal is depressed fully	5.0V / 30k	←	←	←	
		No. 16 (Screen No.) PRESS. SENSOR B-11 P1 NEGA-CON *SE - 26 2.2V 21k B-12 P2 NEG-CON *SE - 27 2.2V 21k	Control lever neutral position, E/G speed LOW	2.2V / 21k	←	←	←	
			Control lever neutral position, E/G speed HIGH	3.0V / 31k	←	←	←	
			Control lever at full stroke, E/G speed HIGH	0.5V / 4k or less	←	←	←	
		No. 19 (Screen No.) PRESS. SENSOR B-15 BACK RESS. *SE - 28 0.5V 3k	Control lever neutral position, E/G speed LOW	0.7V / 2k	←	←	←	
			Control lever neutral position, E/G speed HIGH	0.8V / 2k	←	←	←	
			Control lever at full stroke, E/G speed HIGH	1.9V /3k	←	←	←	

http://excavatorpdf.com/

		Display	Operation procedures	SK210	SK250	SK290	SK330	Remarks
Multi proportional Solenoid Valve 17.5 ± 1 Ω		No. 20 (Screen No.) PROP VALVE D-1 P1 BY-PASS *PSV - D COMP. 350 mA 6k MEAS. 345 mA 6k	Control lever neutral position, E/G speed LOW and HIGH common	350mA / 6k	←	←	←	Note: 0k = 0 kg/cm² Note: V = Volts When control lever is in neutral position you will have minimum values. As you increase the angle of the control lever, the values will increase proportionally. If values do not change while operating the control lever, remove connector on the failed low pressure sensor. Then install connector on pressure sensor which is known to work. If display does not change: FAILURE OF HARNESS If display changes: FAILURE of SENSOR * I.D. Number
			Engine speed High idle position, with arm out operation over relief.	647mA / 25k	←	←	←	
		No. 21 (Screen No.) PROP VALVE D-2 P2 BY-PASS *PSV - B COMP. 350 mA 6k MEAS. 345mA 6k	Control lever neutral position, E/G speed LOW and HIGH common	350mA / 6k	←	←	←	
			Engine speed High idle position, with boom raise operation over relief.	647mA / 25k	←	←	←	
		No. 22 (Screen No.) PROP VALVE D-3 S-TRAVEL *PSV - C COMP. 350 mA 6k MEAS. 345mA 6k	Control lever neutral position, E/G speed LOW and HIGH common	350mA / 6k	←	←	←	
			Engine speed High idle position, with arm in operation over relief.	647mA / 25k	←	←	←	
		No. 23 (Screen No.) PROP VALVE D-6A-RECIRCULATE *PSV - A COMP. 350 mA 6k MEAS. 345mA 6k	Control lever neutral position, E/G speed LOW and HIGH common	750mA / 30k	←	←	←	
			Engine speed High idle position, with arm in operation over relief.	200mA / 0k	←	←	←	

https://truckmanualshub.com/

https://tractormanuals.com/

		Display	Operation procedures	SK210	SK250	SK290	SK330	Remarks
Pump Proportional Valve 17.5 ± 1 Ω		No. 24 (Screen No.) PROP VALVE E-1 P1 PUMP *PSV - 1 COMP 750 mA 30k MEAS 745 mA 30 k POWERSHIFT 0mA	Control lever neutral position, E/G speed LOW idle.	700 mA/27k	720 mA/28k	700 mA/27k	700 mA/27k	Note: 0k = 0 kg/cm^2 Note: V = Volts When control lever is in neutral position you will have minimum values. As you increase the angle of the control lever, the values will increase proportionally. If values do not change while operating the control lever, remove connector on the failed low pressure sensor. Then install connector on pressure sensor which is known to work.
			Control lever neutral position, E/G speed HIGH idle.	750 mA/30k	770 mA/31k	770 mA/32k	770 mA/32k	
			E/G speed HIGH idle, With RH track off ground,(cycle time position) travel motor rotating.	350 mA/6k	←	←	←	
		No. 25 (Screen No.) PROP VALVE E-2 P2 PUMP *PSV - 2 COMP 750 mA 30k MEAS 745 mA 30 k POWERSHIFT 0mA	Control lever neutral position, E/G speed LOW idle.	700 mA/27k	720 mA/28k	700 mA/27k	700 mA/27k	
			Control lever neutral position, E/G speed HIGH idle.	750 mA/30k	770 mA/31k	770 mA/32k	770 mA/32k	
			E/G speed HIGH idle, With LH track off ground,(cycle time position) travel motor rotating.	350 mA/6k	←	←	←	
		No. 32 (Screen No.) PROPO-VALVE D-11 P1 I - TRAVEL *PSV - E COMP 350 mA 6k MEAS 331 mA 6k	Control lever neutral position, E/G speed LOW or HIGH idle .					If display does not change: FAILURE OF HARNESS
			Independent Travel Switch ON	700mA/30K	←	←	←	If display changes: FAILURE of SENSOR
			Independent Travel Switch OFF	350mA / 6k	←	←	←	

* I.D. Number

https://tractormanuals.shop/

		Display	Operation procedures	SK210	SK250	SK290	SK330	Remarks
Solenoid Valve 34 ± 2 Ω		No. 33 (Screen No.) PROPO-VALVE D-12 P2 I - TRAVEL *PSV - F COMP 350 mA 0 k MEAS 331 mA 0 k	Control lever neutral position, E/G speed LOW or HIGH idle irrelevant.					Note: 0k = 0 kg/cm^2 Note: V = Volts
			Switch ON	700mA/30K	←	←	←	
			Switch OFF	350mA / 6k	←	←	←	
Mechatronic Switches		No. 39 (Screen No.) MECHATRO ADJT. CONTROL SW RUN CONTROL VOL 100% PROG SW OFF	⚠ Caution ⚠ It is strictly prohibited to move the Switch from **RUN** to **TEST** when the Keyswitch is in the "**ON**" position.	RUN= RUN TEST = TEST				As you increase the angle of the control lever, the values will increase proportionally.
		No. 40 (Screen No.) RELEASE SWITCH KPSS OFF SWING BRAKE OFF	Control lever neutral position, E/G speed LOW or HIGH idle irrelevant.					
			Switch ON	←	←	←	←	If display does not change: FAILURE OF HARNESS
			Switch OFF	←	←	←	←	
Prop. Valve 17.5 ± 1 Ω		No. 42 (Screen No.) PROPO-VALVE D-13 SW. PRIORITY *PSV - H COMP 360 mA 0 k MEAS 351 mA 0 k	Control lever neutral position, E/G speed LOW or HIGH idle irrelevant.					
			Arm In & Swing	670mA /25k	←	←	←	If display changes: FAILURE of SENSOR
			Swing Only	350mA / 6k	←	←	←	* I.D. Number

https://truckmanualshub.com/

28 ITEM CHECK LIST

MODEL No. _____ SERIAL NUMBER _____

Hours. _____

No. 1
Main Cont. P/no. _____

Program Version
VER. No. _____

No. 2

	M Mode Low Idle	M Mode High Idle	A Mode Low Idle	A Mode High Idle	
E/GSET RPM	_____	_____	_____	_____	_____
MEAS.	_____	_____	_____	_____	_____

Auto Accel. _____

E/G PRS. _____
KPSS SW. _____

No. 3
H-1

			Low	High
ACCEL VOLT.	_____	V	_____	_____
POS.	_____	%	_____	_____
MOTOR STEP	_____		_____	_____
POS.	_____		_____	_____

No. 4
STEP. MOTOR

G-1 Coil A	_____	A
G-1 Coil B	_____	A
G-2 Limit	_____	

No. 5
SOL. VALVE
F-2 SWING - BRAKE

		At swing and arm in operation.	
COMP.	_____	COMP.	_____
MEAS.	_____	MEAS.	_____
RELEASE SW.	_____		

https://truckmanualshub.com/

28 ITEM CHECK LIST

No. 6 SOL. VALVE F-3 1/2 TRAVEL COMP. MEAS. SWITCH		1 St Speed _____ _____ _____	2nd Speed _____ _____ _____		REMARKS
No. 7 SOL. VALVE F-1 POWER BOOST COMP. MEAS. SWITCH	_____ _____ _____	**P. Boost Switch & Heavy Lift** _____ _____ _____	**P. Boost Switch** _____ _____ _____	**Heavy Lift Switch** _____ _____ _____	Operate Att. Boost switch. Operate heavy lift Switch.
No. 8 RELAY 1-2 BAT. RELAY COMP. MEAS. KEY SWITCH		With Key On _____ _____ _____			
No. 9 PRESS. SENSOR B-1 BOOM RAISE (Over relief) _____ V _____ Kg B-2 BOOM LOWER _____ V _____ Kg		Controls in neutral High Idle _____ V _____ Kg _____ V _____ Kg			With control lever in neutral position you will have minimum values. As you increase the angle of control lever the valuse will increase proportionally.
No. 10 PRESS.SENSOR B-3 ARM OUT (Over relief) _____ V _____ Kg B-4 ARM IN (Over relief) _____ V _____ Kg		Controls in neutral High Idle _____ V _____ Kg _____ V _____ Kg			If values do not change while operation the control lever , remove connector on the failed low pressure sensor.
No. 11 PRESS. SENSOR B-5 BUCKET DIG (Over relief) _____ V _____ Kg B-4 BUCKET DUMP (Over relief) _____ V _____ Kg		Controls in neutral High Idle _____ V _____ Kg _____ V _____ Kg			Then install connector pressure sensor which is known to work.

https://truckmanualshub.com/

No. 12 PRESS. SENSOR B-7 SWING (R) (Over relief) _____V _____ Kg _____ V _____Kg B-8 SWING (L) (Over Relief) _____V _____ Kg _____ V _____Kg	Controls in neutral High Idle	REMARKS Place bucket in ground. With throttle at high Idle, swing left check pressure, then swing right check pressure.
No. 13 PRESS. SENSOR B-9 TRAVEL (R) (Over relief) _____V _____ Kg _____ V _____Kg B-10 TRAVEL (L) (Over relief) _____V _____ Kg _____ V _____Kg	Controls in neutral High Idle	Engine speed high idle block sprocket Hyd. Stall.
No. 14 PRESS. SENSOR Neutral C-1 PUMP P1 _____V _____ Kg _____ V _____Kg C-2 PUMP P2 _____V _____ Kg _____ V _____Kg	Boom Over Relief High Idle	Neutral: Controls at neutral position E/G speed measure Low and High Idle. Boom Over Relief: E/G speed high Idle boom up and over relief.
No. 15 PRESS. SENSOR Neutral B-16 P1 OPT. _____ V _____ Kg _____ V _____ Kg B-17 P2 OPT. _____ V _____ Kg _____ V _____ Kg	Controls in neutral High Idle	With N&B piping: With control pedal depressed fully E/G Hi Idle.
No. 16 Not Available on SK160 ED190 PRESS. SENSOR B-11 P1 NEGA-CON Neutral Hi Idle _____ V _____ Kg _____ V _____ Kg P2 NEGA-CON _____ V _____ Kg _____ V _____ Kg	Controls in neutral High Idle	Neutral: Control lever neutral position, Boom Over Relief: Control lever at full stroke, E/G speed Hi.
No. 19 PRESS. SENSOR B-15 BACK PRESS. _____ V _____ Kg		Control lever neutral position, E/G speed Hi.

https://truckmanualshub.com/

No. 20 PROP VALVE D-1 P1 BY PASS Neutral Hi Idle Arm Over Relief COMP. _____ mA _____ Kg _____ mA _____ Kg MEAS. _____ mA _____ Kg _____ mA _____ Kg		REMARKS Engine speed high idle position, with arm out operation over relief.
No. 21 PROP VALVE D-2 P2 BY PASS Neutral Hi Idle Boom Over Relief COMP. _____ mA _____ Kg _____ mA _____ Kg MEAS. _____ mA _____ Kg _____ mA _____ Kg		Engine speed high idle position, with boom raise operation over relief.
No. 22 PROP VALVE D-3 S-TRAVEL Neutral Hi Idle Boom Over Relief COMP. _____ _____ _____ mA _____ Kg MEAS. _____ _____ _____ mA _____ Kg		Engine speed high idle position, with arm in operation over relief.
No. 23 PROP VALVE D-6 A-RECIRCULATE Arm In Over Relief COMP. _____ _____ _____ mA _____ Kg MEAS. _____ _____ _____ mA _____ Kg		
No. 24 PROP VALVE E-P1 PUMP Neutral COMP. _____ mA _____ Kg MEAS. _____ mA _____ Kg Powershift _____	Track Moving Over Relief _____ mA _____ Kg _____ mA _____ Kg Powershift _____	Engine speed high idle position, with RH track off ground travel motor rotating.
No. 25 PROP VALVE E-P2 PUMP Neutral COMP. _____ mA _____ Kg MEAS. _____ mA _____ Kg Powershift _____ mA	Track Moving Over Relief _____ mA _____ Kg _____ mA _____ Kg Powershift _____ ma	Engine speed high idle position, with LH track off ground travel motor rotating.

https://truckmanualshub.com/

No. 32 PROP VALVE D-11 P1 I - TRAVEL COMP. _____ mA _____ Kg MEAS. _____ mA _____ Kg	REMARKS Control lever neutral position, E/G speed low or high idle. Independent travel switch ON.
No. 33 PROP VALVE D-12 P2 I - TRAVEL Switch on COMP. _____ mA _____ Kg MEAS. _____ mA _____ Kg Switch off COMP. _____ mA _____ Kg MEAS. _____ mA _____ Kg	Control lever neutral position, E/G speed low or high idle.
No. 39 MECHATRO ADJT. CONTROL SW _____ CONTROL VOL _____ PROG SW _____	Do not change switch with key in the on position
No. 40 RELEASE SWITCHES KPSS _____ SWING BRAKE _____	
No. 42 SWING & ARM IN PROP-VALVE D-13 SW PRIORITY SWING ONLY COMP_____ mA Kg _____ mA _____ Kg MEAS_____ mA _____ Kg _____ mA _____ Kg	

https://truckmanualshub.com/

NOTE

With key in the "ON" position and engine not running, Gauge cluster display must read "MONITOR SYSTEM OK". If any warning Icons are visible in gauge cluster display, preform the proper maintenance or repairs to correct the problem. Then proceed to Adjustment "A". See Figure 10.29 A.

A. Emergency Stop Control, and Manual Throttle Cable

1. Check the operation of Emergency Stop control, confirm that cable moves freely both in and out, and does not bind.
2. Emergency stop cable must be pushed in to obtain proper engine performance.
3. Confirm that the Manual Throttle Control Cable is disconnected and tagged properly for operator.

B. Verify engine RPM

1. If possible start engine, run excavator hydraulic system until water temperature is at normal operating range.
2. Verify engine RPM in "M" mode, "A" mode, and in "B"mode by pushing screen change switch once. Record engine RPM readings for later verification. See Figure 10.29 B.

C. RPM Sensor Test

Proper adjustment of the RPM sensor is critical to a successful Adjustment "A" Procedure. With engine running press screen change switch one time, will RPM appear on screen?

1. If screen shows 0 RPM check the following:
   a. With engine OFF (not running) disconnect the RPM sensor from the machine electrical harness. Check the resistance value of RPM sensor. Value must be 2.3k V 6 0.2 k V .
   b. Connect the speed sensor, to a multi meter. With engine running at low idle, measure the voltage AC. voltage must be 4 V or more. See Figure 10.29 C.

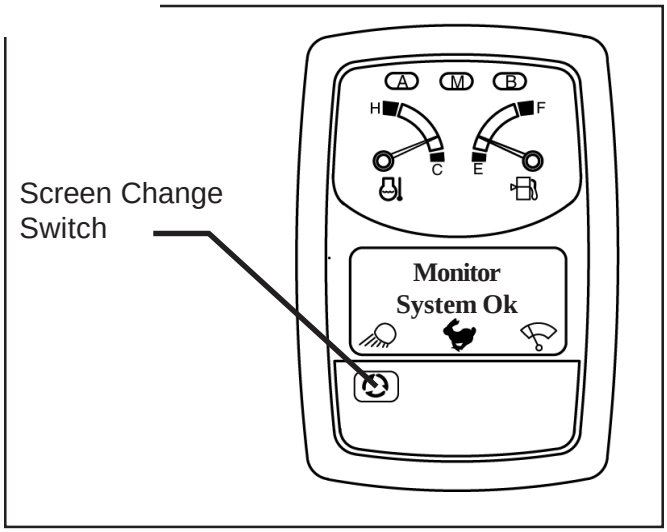


FIGURE 10.29 A

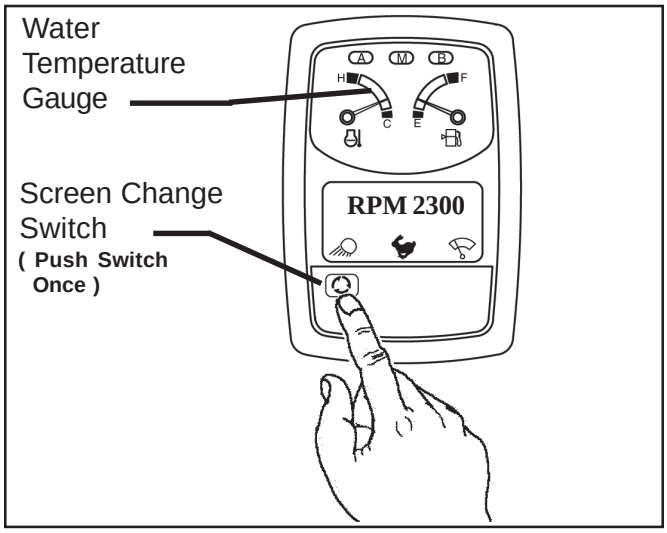


FIGURE 10.29 B

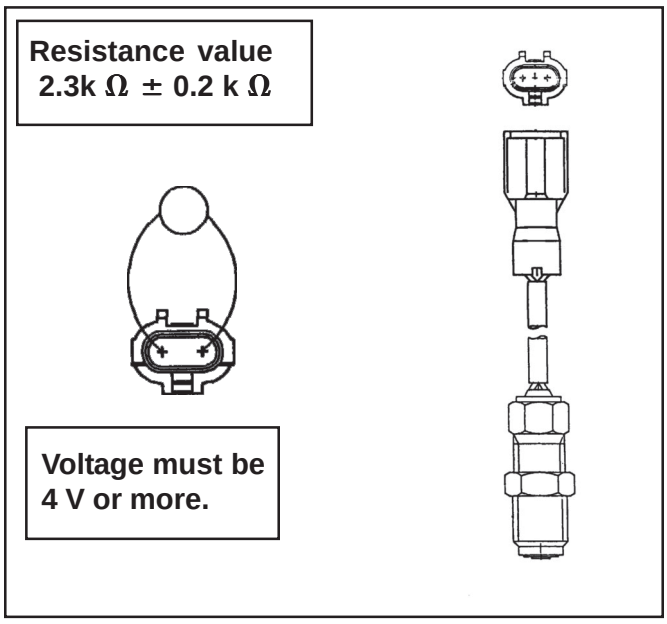


FIGURE 10.29 C

https://truckmanualshub.com/

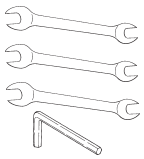
Adjustment "A"- Mechatronic Controller SK210 ~ SK250

A. Conditions to use Adjustment "A"

Adjustment "A" procedure must be preformed when one or more of the following components have been removed, repaired, adjusted or replaced.

1. Mechatronics Controller (CPU)
2. Stepping Motor Assembly
3. Linkage between Stepping Motor and Engine Fuel Pump Assembly.
4. Engine or Injection pump
5. When the ROM DATA FAILURE is displayed on the multidisplay.
6. When the ROM DATA FAILURE and or MECHATRO SET ERROR are displayed alternately on the multidisplay.
7. Incorrect High or Low idle Rpm.

B. Tools & Equipment Required for Check and adjusting of Adjustment "A"



14 mm spaner wrench
13 mm spaner wrench
10 mm spaner wrench
5 mm allen wrench
0.1mm (.004") Feeler gauge

1. General hand tools to remove and replace stepping motor linkage and components.
2. Thermometer to read hydraulic oil temperature.

C. Machine Settings and Site condition

1. Attachment in the Hydraulic Oil Check Position. See Figure 10.30 A.
2. Engine Emergency Stop Knob pushed completely "IN". See Figure 10.30 B.
3. Maintenance Connector placed in the "Release Condition". See Figure 10.30 C.
4. Manual Throttle Control Cable is disconnected and tagged properly for operator.
5. With safety lock in the lock (up) position, See Figure 10.30 B.
6. Firm level test site.

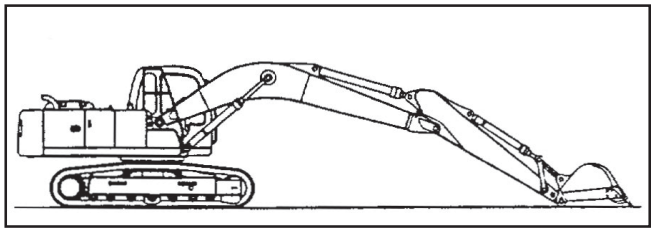


FIGURE 10.30 A

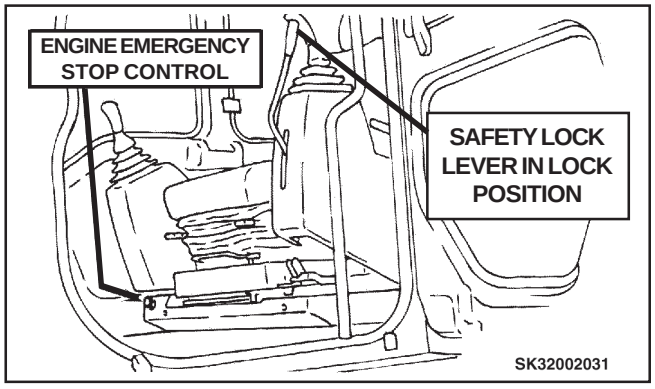


FIGURE 10.30 B

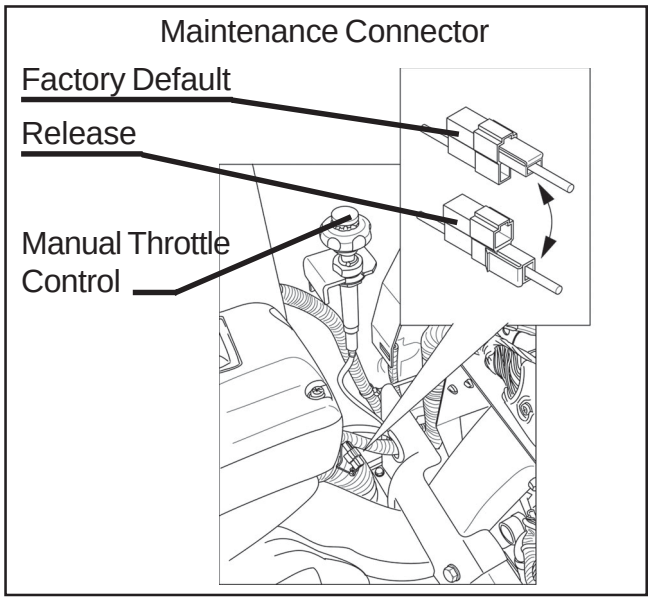


FIGURE 10.30 C

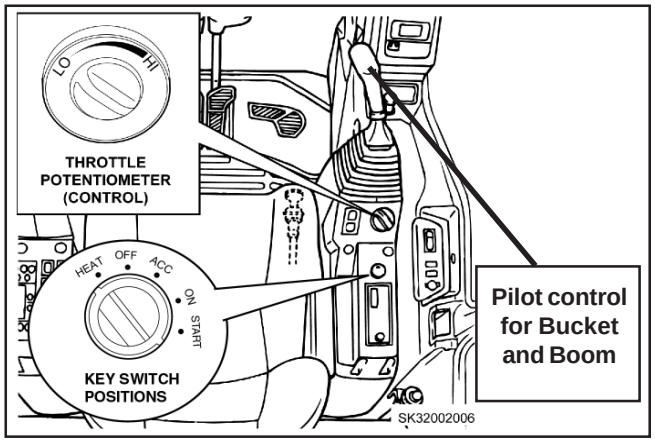


FIGURE 10.30 D

https://truckmanualshub.com/

D. Verification of Engine Low RPM

1. With safety lock in the lock (up) position, See Figure 10.30 B.
   a. Place the maintenance connector in the release position. See Figure 10.30 C.
   b. Turn key switch to start position and start engine. See Figure 10.31 A.
   c. Place throttle potentiometer to low idle position. See Figure 10.31 A.
   d. Locate the screen change switch, depress the switch once to select RPM. See Figure 10.31 B.
   e. Verify engine Rpm.
   f. Press screen change switch two times to retun screen to Monitor System Ok. See Figure 10.31 B.

E. Verification of auto accel RPM

1. With safety lock in the lock (up) position, See Figure 10.31 C.
2. Maintance Connector in the factory default position. See Figure 10.30 C.
   a. Turn key switch to start position and start engine. See Figure10.31 A
   b. Place throttle potentiometer to high idle position. See Figure 10.31 A.
   c. Locate the screen change switch, depress the switch once to select RPM. See Figure 10.31 B.
   d. Place Safety lock lever in the unlock (down) position.See Figure 10.31 C.
   e. Fully activate pilot control for bucket dig then release pilot control, wait three seconds and check engine RPM. See Figure 10.31 A.

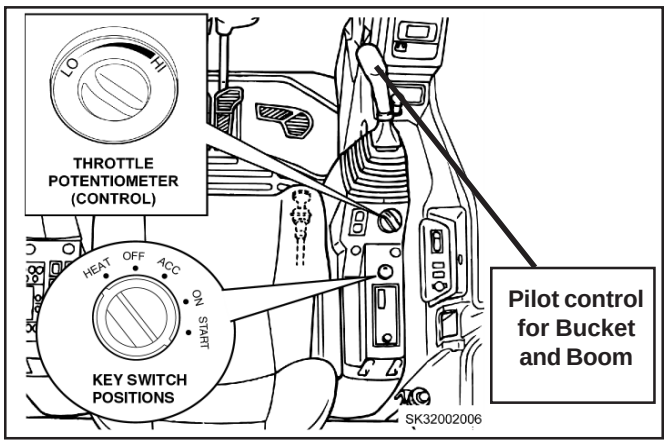


FIGURE 10.31 A

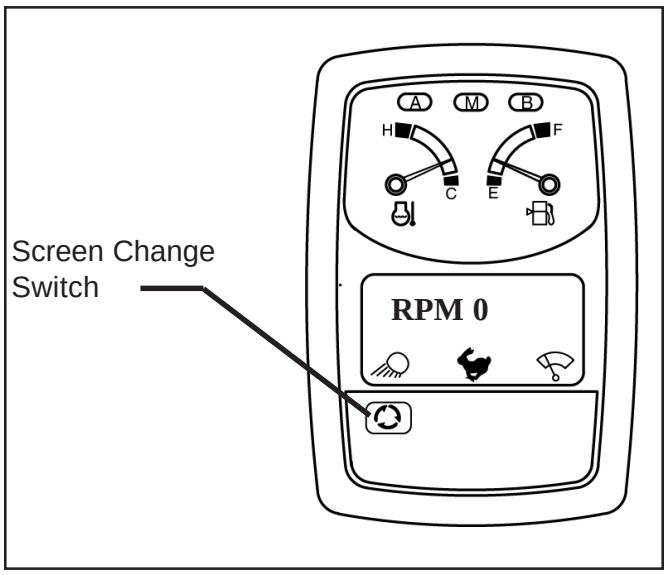


FIGURE 10.31 B

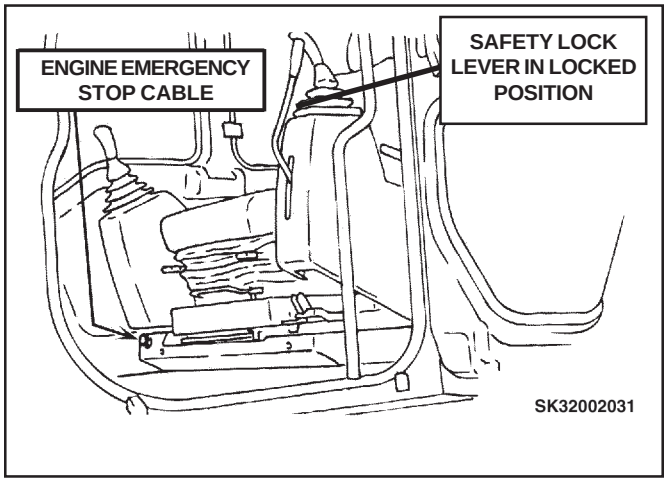


FIGURE 10.31 C

https://truckmanuals.blogspot.com/

F. Removal of CPU Access Panel

1. Pull up on the top bail for seat adjustment and move seat fully forward. See Figure 10.32 A.
2. Pull reclining adjustment lever up and move seat back forward. See Figure 10.32 B.
3. Release the 4 top screws from rear panel top cover (behind the operator's seat) by turning 90 degrees. See Figure 10.32 C.

NOTE

Screws are quick release type not threaded type.

4. Press the panel locks to release panel, tilt the cover towards the operators seat to obtain access to the speaker wires, remove wires. See Figure 10.32 C.
5. With speaker wires removed carefully remove CPU access panel from cab and place in safe area. See Figure 10.32 C

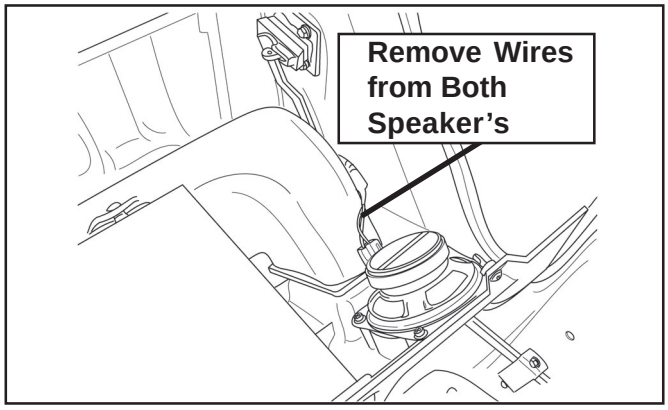


FIGURE 10.32 D

G. Removal of Rod linkage and Lever from Stepping Motor.

1. Move to the engine compartment and locate the injection pump and stepping motor. See Figure 10.32 E.
2. With a 13 and 14 mm spanner wrench loosen the ball joint end jam nuts on the rod linkage of the stepping motor, be sure to use a holding wrench on the opposite side of the nut to avoid linkage damage.

NOTE

Threads are R.H and LH on opposite ends.

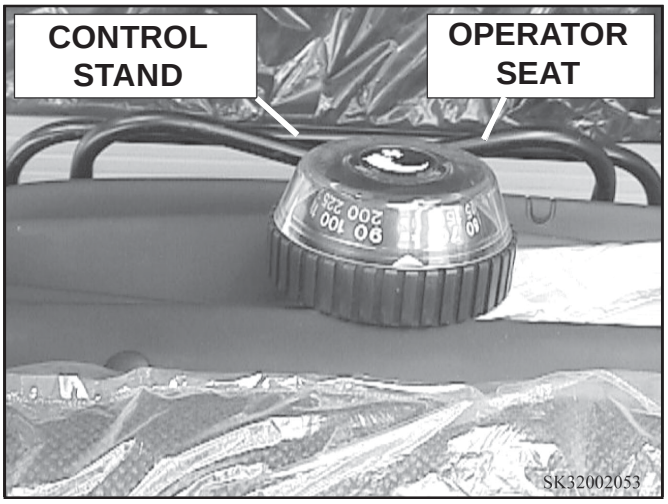


FIGURE 10.32 A

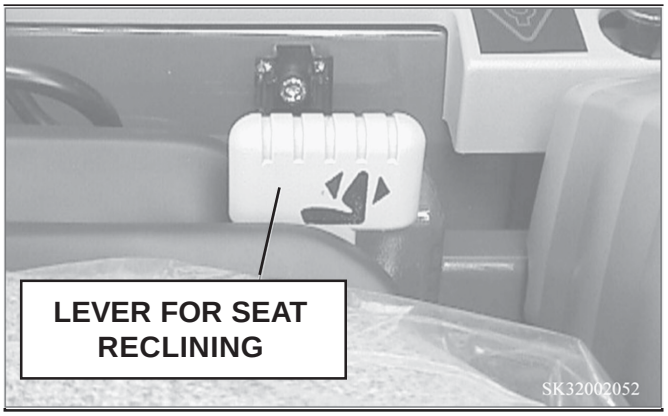


FIGURE 10.32 B

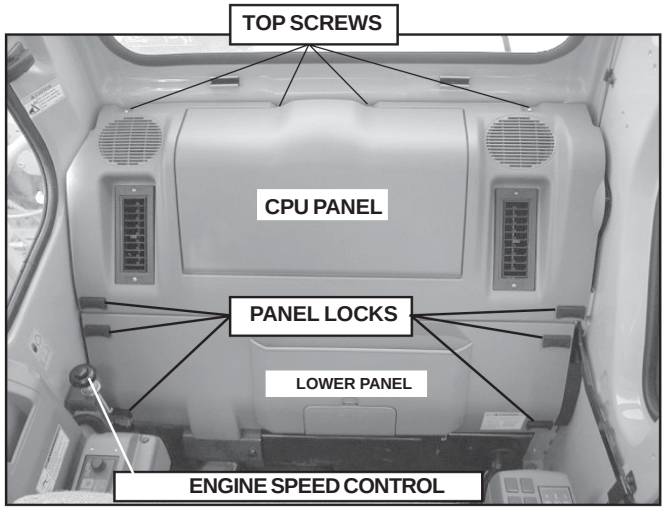


FIGURE 10.32 C

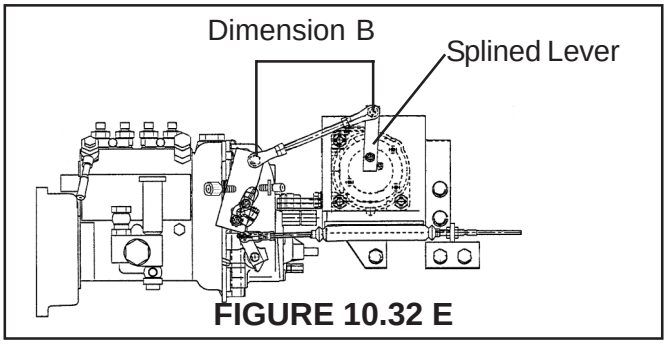


FIGURE 10.32 E

https://truckmanualshub.com/

3. Using a 5 mm allen wrench wrench remove the splined lever from stepping motor shaft. See Figure 10.56D.

4. Place a holding wrench on the shoulder side of the ball joint. Loosen nut and remove it and lock washer from the ball joint end connected to the Fuel Rack lever. This allows the complete linkage to be removed now. See Figure 10.56 F.

NOTE

If a holding wrench is not used while removing this linkage damage to the stepping motor can occur.

5. Set the linkage aside for now

6. Return to cab and :
   a. Place Safety lock lever in the lock (UP) position.See Figure 10.31 C.
   b. Place throttle potentiometer to LOW idle position. See Figure 10.31 A.
   c. Turn key switch to start position and start engine. See Figure10.31A
   d. Locate the screen change switch, depress the switch once to select RPM. See Figure 10.31 B.

7. Return to engine compartment and carefully manually move Fuel Rack lever over to the High Idle Stop Bolt.

CAUTION

Make certain to use proper safety procedures in and around running engine; wear proper work clothing, use safety glasses and utilize all proper safety devices.

8. Verify on the Cluster Gauge or with an external photo tach what the max. achievable high engine rpm against the high stop. See Figure 10.56 G.

9. Verify High Stop bolt rpms against Machine Performance specs in this training manual. If rpms are within tolerance continue onward with this procedure, if not stop and repair engine or fuel rack to allow proper engine rpm.

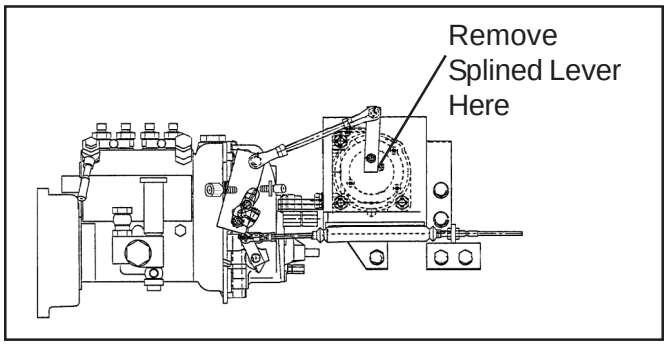


FIGURE 10.56 D

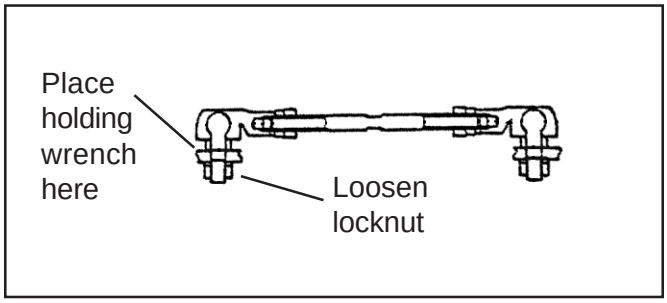


FIGURE 10.56 E

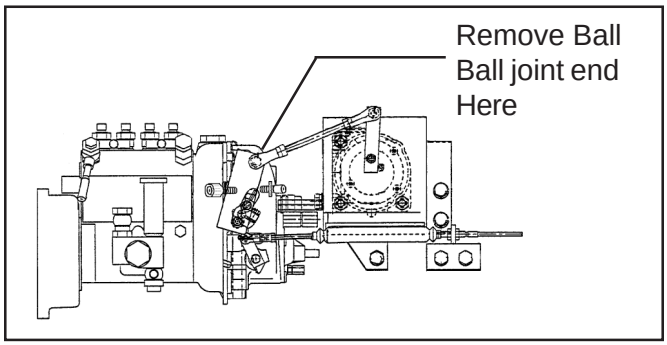


FIGURE 10.56 F

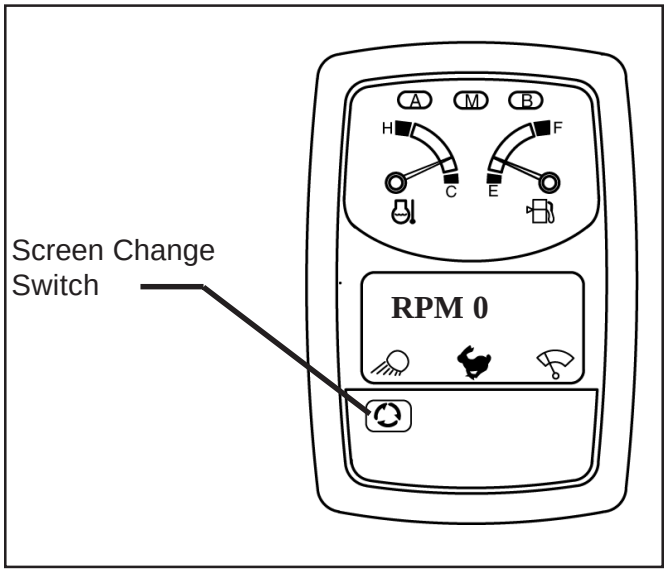


FIGURE 10.56 G

https://truckmanualshub.com/

10. Return to cab and shut engine off and return keyswitch to the off position.

11. Loosen the left and right hand thread jam nuts on rod linkage and inspect the heads of linkage for excessive wear.

12. Set the rod length to the specific dimension per machine model number listed below. See Figure 10.33 A.

NOTE

Dimension B is the starting dimension of fuel injection rod assembly. Final dimension of rod will be determined when rod and lever is installed on engine and engine stop gap is set.

Dimension B: See Figure 10.33 A

170 mm (6.69") SK160 ~ SK190
288 mm (11.34") SK210
304 mm (11.97") SK250
198 mm (7.80") SK290 ~ SK330

Note: MM=Millimeters, " = Inches

NOTE

Dimension "B"is only a starting point, ***NOT THE FINAL DIMENSION***. The final length or the rod will be determened in the next step.

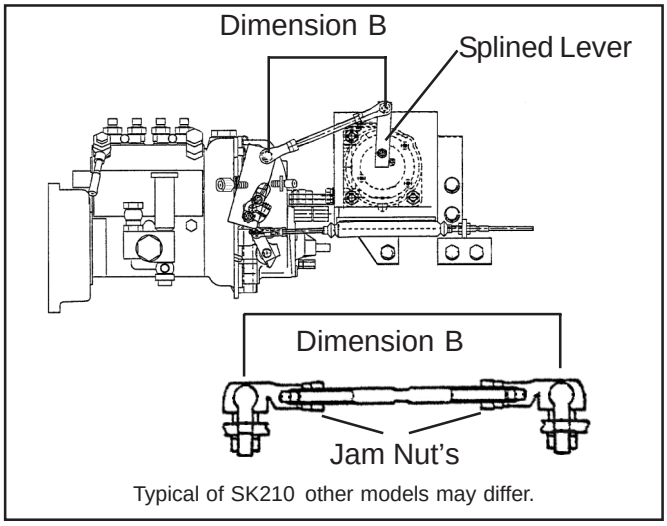
Adjustment "A" Procedure

1. Remove the key from key switch. See Figure 10.33 B.

2. Locate the CPU behind operators seat. Remove grommet located on the top of CPU. Carefully move the test run switch to test position. See Figure 10.33 C.

3. Insert key in key switch, turn key to the "ON" position, **do not start engine**. Gauge Cluster must display "Monitor System Ok" . If not preform maintenance or repairs to correct problem. Proceed to next Step.

4. Turn accel dial to the low idle position. See Figure 10.33 B.



Typical of SK210 other models may differ.

FIGURE 10.33 A

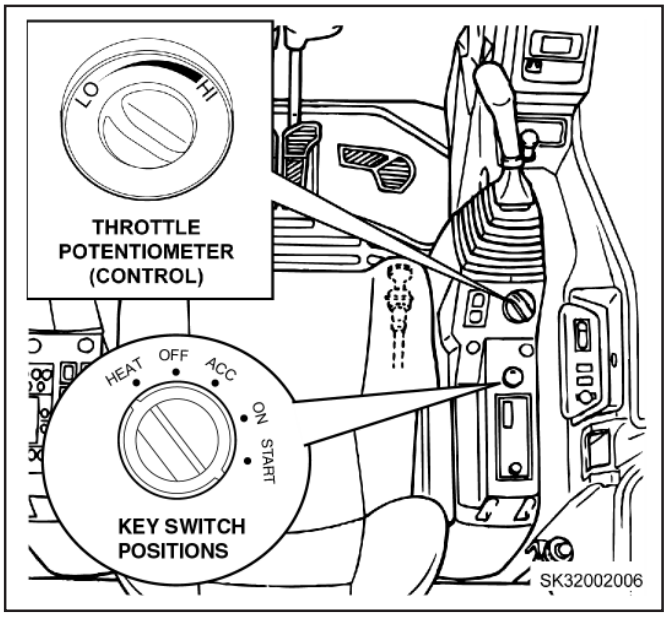


FIGURE 10.33 B

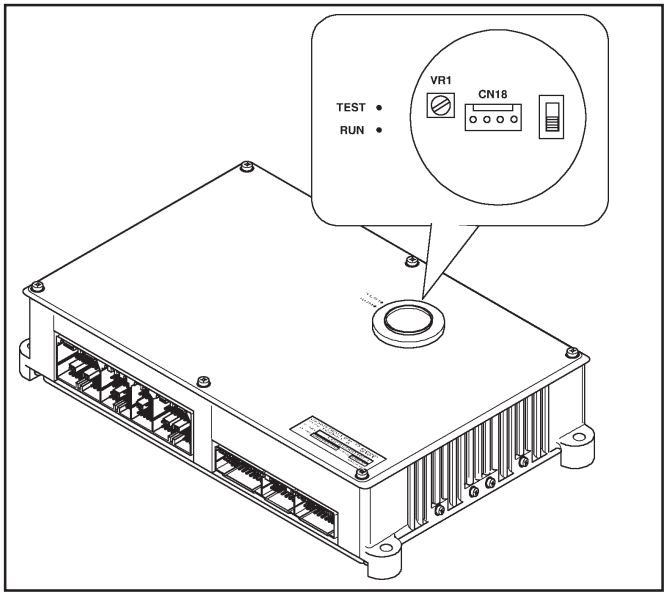


FIGURE 10.33 C

https://truckmanualshub.com/

5. Press the buzzer stop switch for 5 to 10 seconds and release. Step 1 will not apear until buzzer stop switch is released. See Figure 10.34 D.

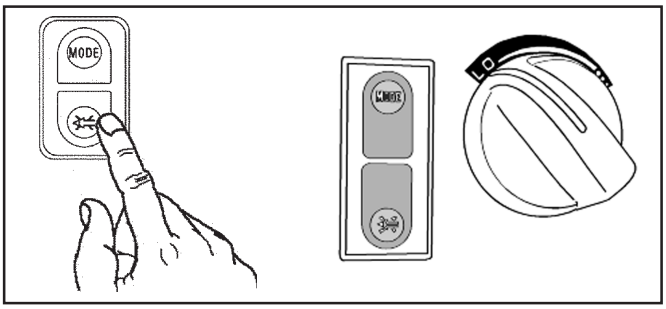


FIGURE 10-34 D

6. When STEP 1 is displayed on the gauge cluster, wait until STEP 2 is displayed on gauge cluster. See Figure 10.34 A.

7. After verification that CPU STEP 2 GAP STOP is displayed on the gauge cluster, you will notice that the controller has moved the stepping motor to the LOW STOP position.
   See Figure 10.34 A.

8. While holding the fuel rack lever against the low stop bolt reinstall the linkage assembly between the stepping motor and injection pump. See Figure 10.34 B.

Note: If the splined shaft lever will not align while other ball joint end is inserted into the fuel lever remove that end from the fuel rack, retain position move splined lever one spline forward or backward on the stepper motor shaft to allow splines to align. Then adjust the intermediate rod so the ball joint end can not be installed on the fuel lever.

Warning: Make sure to insert the ball joint end of the rod linkage in the proper bolt hole of the fuel lever bracket - Do Not install in the slot for the manual override cable. See Figure 10.34 B & 10.34 C

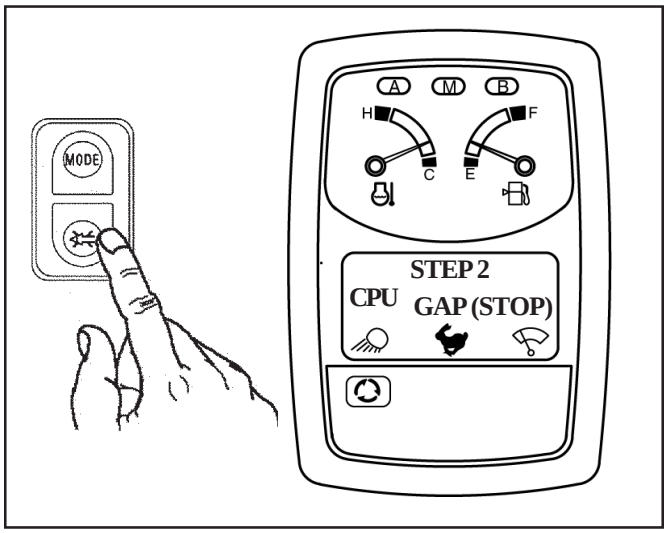


FIGURE 10.34 A

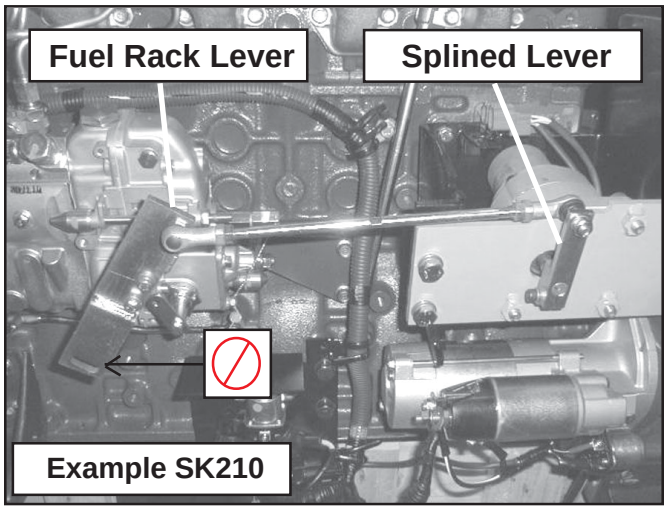


FIGURE 10.34 B

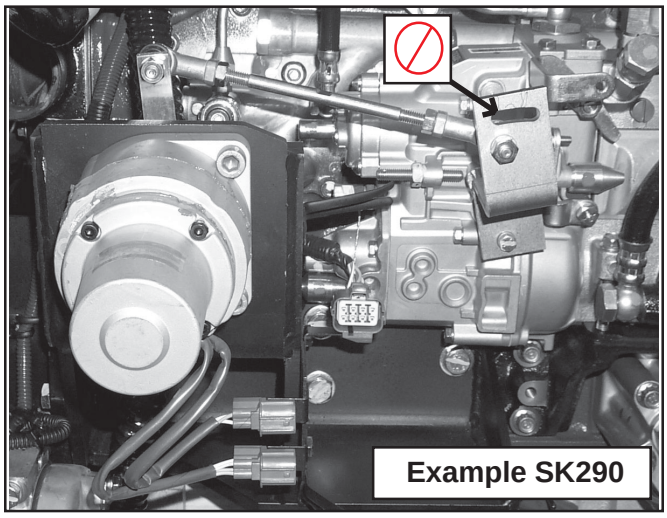


FIGURE 10.34 C

https://truckmanualshub.com/

NOTE

Dimension "B"is only a starting point, ***NOT THE FINAL DIMENSION***. The final length of the rod will be determened in the next step.

9. Confirm that the spline on the stepping motor is protruding approximately 3mm (.125") past the lever assembly. Secure the lever to stepping motor with the 5mm allen wrench.
   See Figure 10.59 A.

10. With a feeler gauge inserted between the fuel shut off stop bolt and the fuel injection pump lever adjust the clearance to 0.1mm (.004 "). See Figure 10.59 B.

11. Once clearance has been reached with only slight resistance on the feeler gauge tighten both rod linkage jam nuts with 13 and 14 mm wrenches. Do not over tighten max. torque is 1.84 kgf•m, (13.27 ft•lbs)
    See Figure 10.34 C.

12. Recheck all linkage fastners and make sure everything is tight. also make sure ball joint linkage ends are equally aligned and not twisted. Afterwards return to the operator's cab for the next step.

Note: Remove all tools and wrenches in and around engine compartment to prepare for the starting of the engine in the next process.

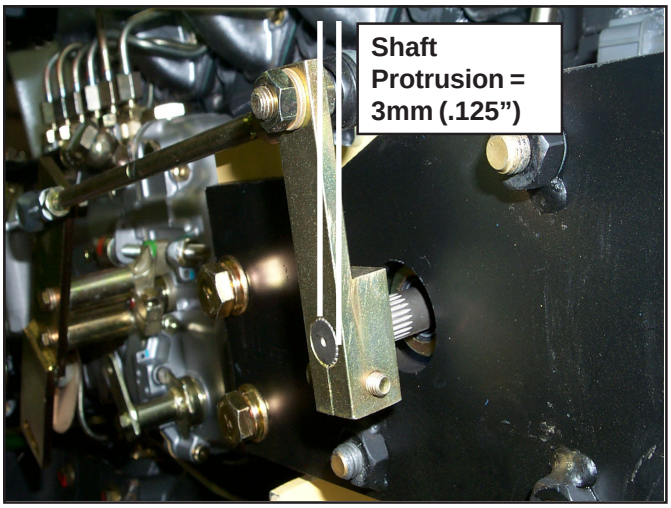


FIGURE 10.59 A

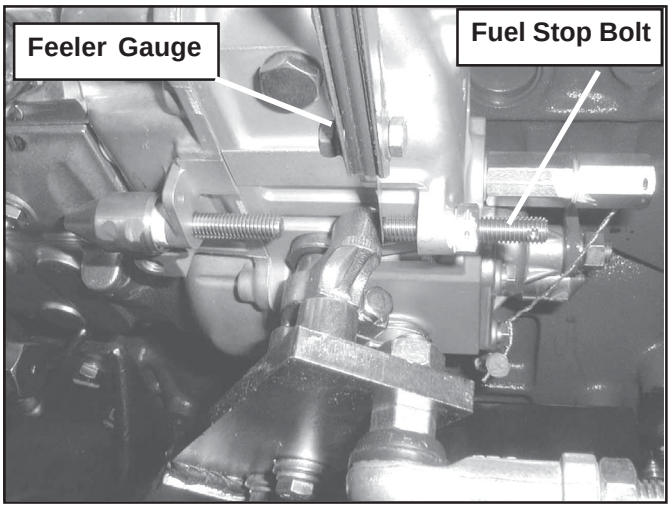


FIGURE 10.59 B

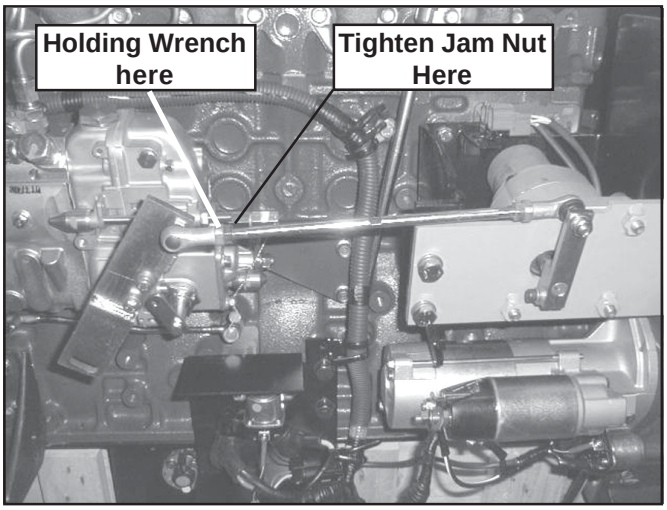


FIGURE 10.59 C

https://truckmanualshub.com/

13. Press buzz start switch once and CPU STEP 3 Start E/G will appear in gauge Cluster. You will notice that the controller will move the stepping motor to a position higher than the normal RPM starting range. See Figure 10.35 A.

14. Start engine and wait until engine reaches normal operating temperature range. **Note:** Hydraulics system maybe functioned to warm engine and hydraulic system up.

15. With engine running, press the buzzer stop switch once, the gauge cluster will read CPU STEP 4 MEMORY. The controller will take control of the stepping motor and bring the engine from:
    a. Mid range.
    b. Below Low Idle.
    c. High Idle.
    d. Low Idle.
    See Figure 10.35 B.

NOTE
Required time for computer to memorize total engine steps is about 3 minutes.

16. CPU STEP 4 MEMORY will take approximately three minutes to cycle the stepping motor and record the data in the controller.

17. After completion of the above, the gauge cluster display will read the following: CPU FINISHED **** RPM (****) will represent the highest RPM which was read by the controller during Step 4. See Figure 10.35 C.

Please refer to the Measuring & Adjusting Pressures chapter in this manual for the proper RPM reading for your machine by Model and Serial Number.

NOTE
The finished RPM in step 4 may show higher than Actual High Idle RPM.

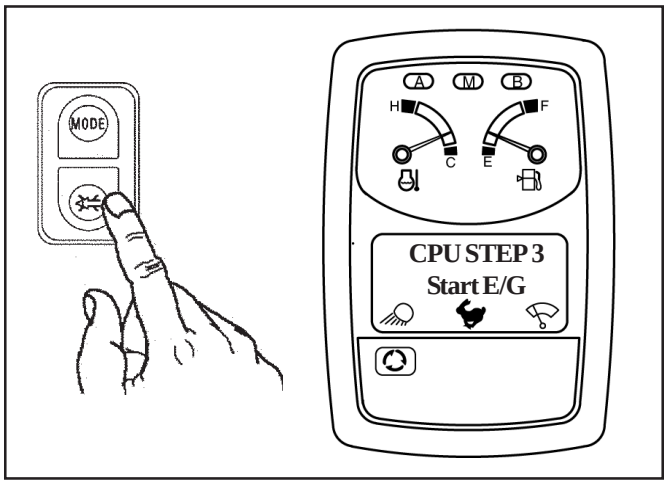


FIGURE 10.35 A

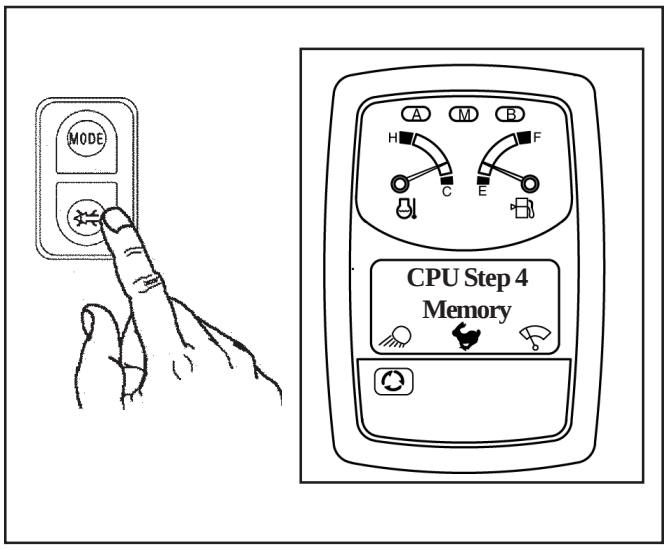


FIGURE 10.35 B

Note
"Finished CPU (****) RPM" represents the highest RPM whichwas recorded by the controller during Step 4.

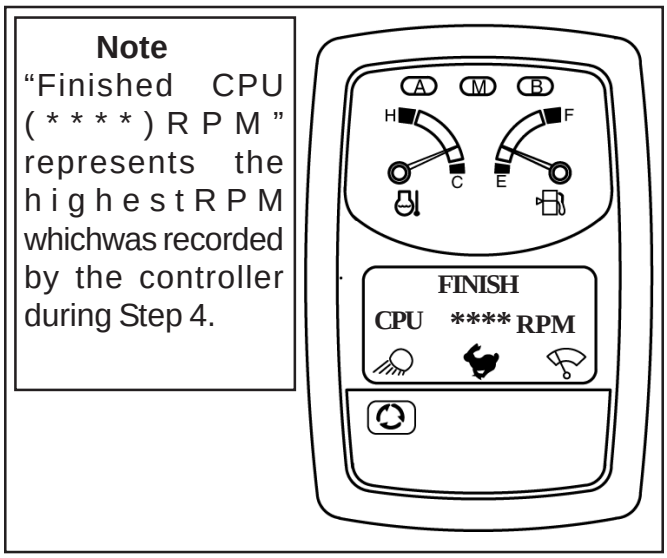


FIGURE 10.35 C

https://truckmanualshub.com/

E. After completion of "A " Adjustment

1. Turn key switch to Off position, stop engine and allow the battery relay to shut off (approximately 4 seconds).

2. Return the CPU controller adjustment switch from the TEST to RUN position. Reinstall protective grommet in the controller cover.

3. If not already changed, change maintenance connector from the Factory Default to accel release position. Start the engine, raise the engine speed to the high idle RPM.
   Change back to factory when finished See 10.36 A.

4. Press the screen change switch once to bring up RPM. Verify engine speed changes on the multidisplay in accordance with the set values which is listed in the Measuring & Adjusting Pressures chapter of this manual

5. If all engine RPM's are correct reinstall the CPU access cover and return operators seat to the original position.

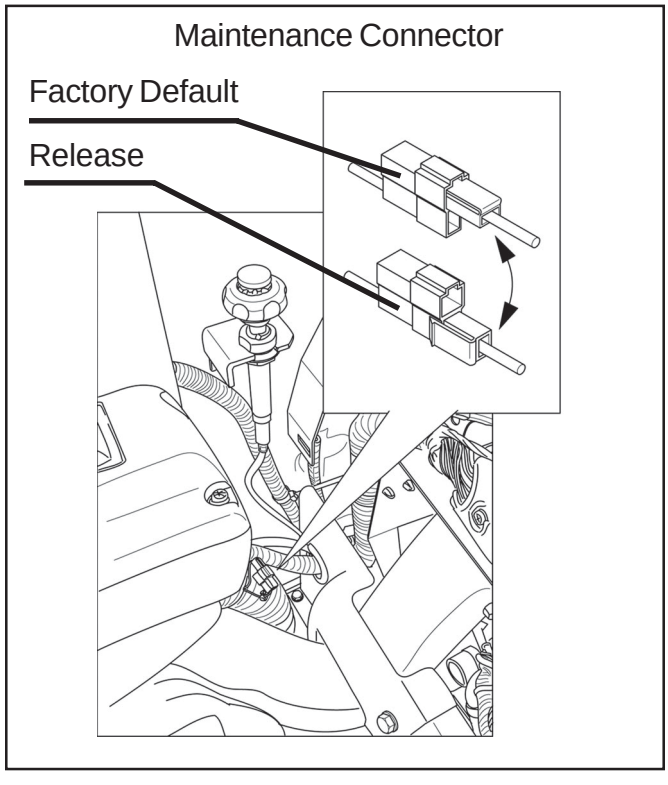


FIGURE 10-36 A

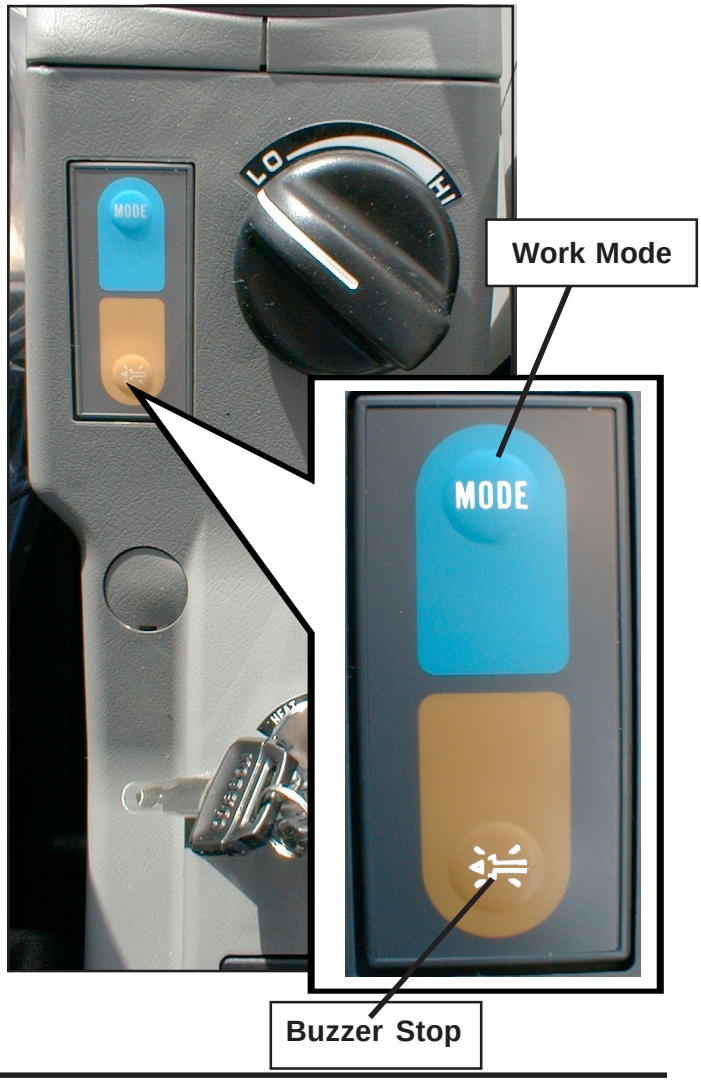
Service diagnosis display

Gauge cluster



Screen change switch

Example: SK210



https://truckmanualshub.com/

METHOD OF CONFIRMING ERRORS:

Troubles can be confirmed with two error lamps located on the operator's left console. See Figure 4.



FIGURE 4

(1) Confirming the engine condition by lamp lighting patterns

Table 1

Key ON only	Red (lamp 1)	☼	●	☼
	Orange (lamp 2)	☼	☼	●
	Status	Normal	Engine start enable	Engine start disable
Engine start	Red (lamp 1)	●	●	
	Orange (lamp 2)	●	☼	
	Status	Normal	Engine start enable	

Note ; ☼ On
● Off

Troubles codes will flash on lamps one at a time a total of three times and then repeat if multiple codes are present. See Table 1.

https://truckmanualshub.com/

SK480 Engine diagnosis lamps

(Red and Amber) – FIGURE 2.16A, 2.16B

Two diagnosis lamps are installed on the left side control panel as indicated in the figure. These lamps will indicate any abnormality in the engine. Refer to the following tables for normal and abnormal condition of the engine:

Normal engine condition

	Key Switch "ON"	Key Switch "During and after Starting engine"
Red lamp	**ON**	OFF
Amber lamp	**ON**	OFF
Condition	Normal	Normal

NOTE 1

During normal conditions, both lamps will illuminate as soon as the key switch is turned to the “ON” postion, and will stay illuminated until the engine is started. Lamps will turn Off, and will stay Off after starting the engine.

Abnormal engine condition

	Key Switch "ON"	Key Switch "ON"	Key Switch "START"
Red lamp	ON (Flashing)	OFF or ON (Flashing)	OFF or ON (Flashing)
Amber lamp	OFF	OFF or ON (Flashing)	OFF or ON (Flashing)
Condition	Engine does not start	Engine starts	Engine starts

NOTE 2

There exists two different abnormal conditions:

» The red and/or amber lamps will illuminate and flash the engine failure code(s) (See Figure 2.16B for details on flashing codes). Engine not running mode.

» The red and/or amber lamps will illuminate and flash the engine failure code(s) (See Figure 2.16B for details on flashing codes). Engine running mode.

If abnormal conditions appear on engine, refer to Page 10-71~10-72 Engine Electronics Troubleshooting chart Engine Failure Codes. Contact your closest Kobelco’s Service Department for assistance and repairs if required.

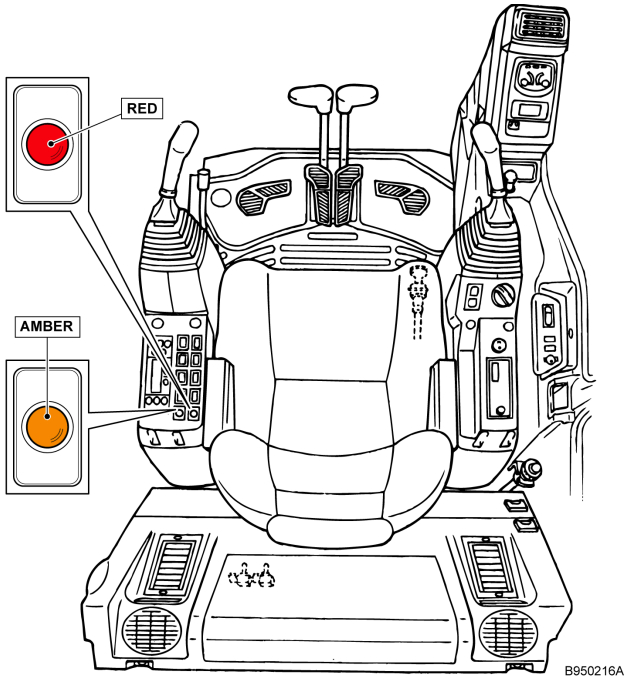
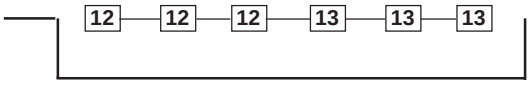


FIGURE 2.16A

NOTE 3

The code is indicated by a 2 figure number: the code’s first figure lights on for 1.2 seconds and off for 1.2 seconds, and the code’s second figure lights on for 0.4 seconds and off for 0.4 second, as shown inFig. 2.16B. Every code is displayed three times repeatedly, and where there is no more code, the display will return to the first code.

Therefore, in the case where codes 12 and 13 are present:



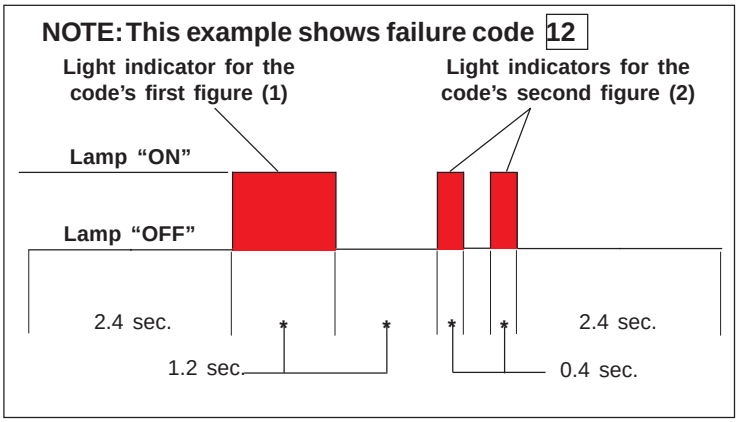


FIGURE 2.16B

NOTE 4

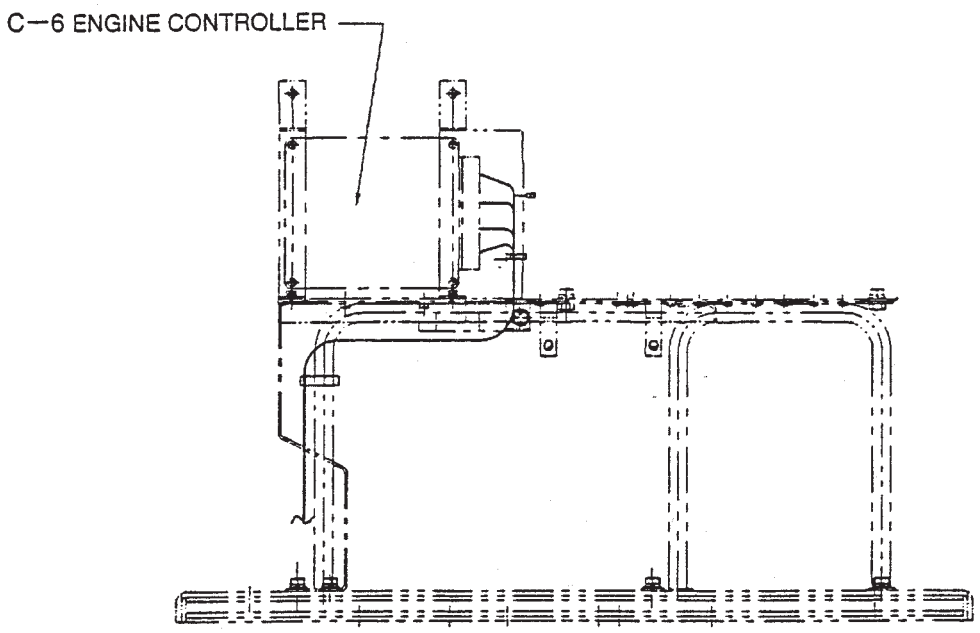
If one of the engine diagnosis lamps (Red or amber) does not illuminate as soon as the key switch is set to the ON position, check for defective light bulb.

https://truckmanualshub.com/

Location of Engine Controller:

(3) Location of diagnosis indicating connector and memory clear connector

1) Location of C-6 engine controller

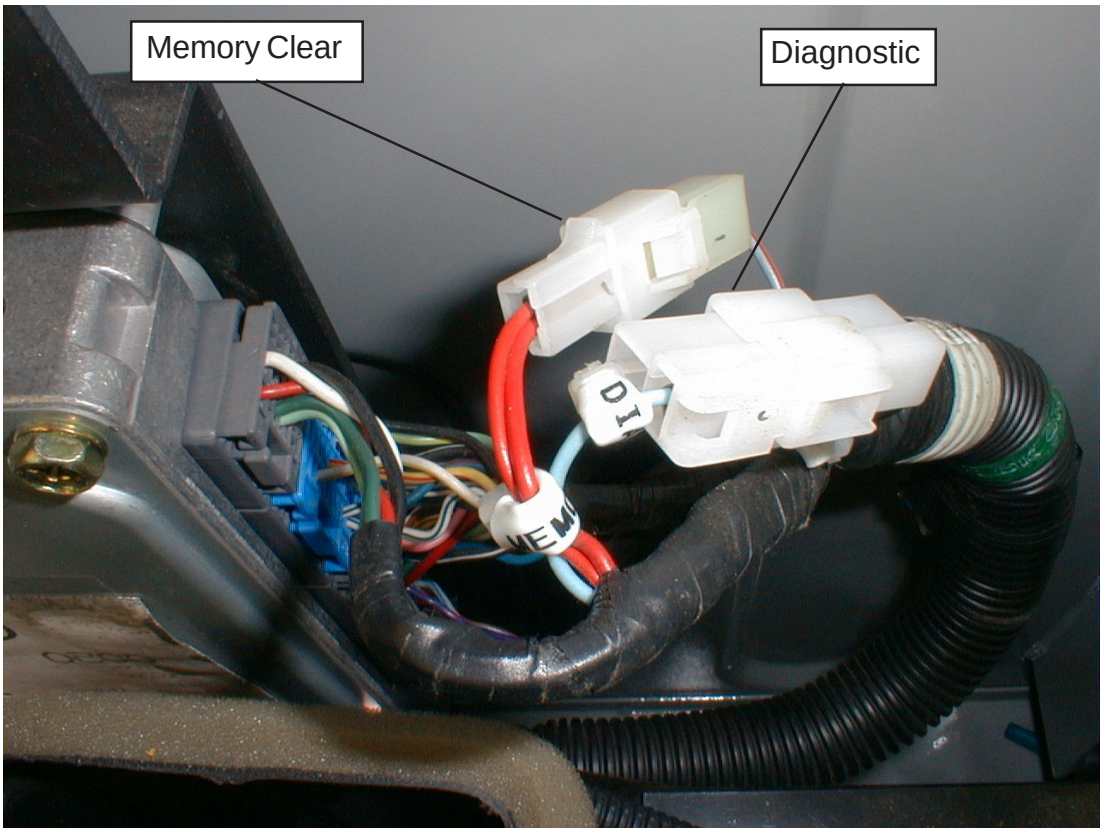


Detail of engine controller (behind the operator's seat)



https://truckmanualshub.com/

Location of Memory Clear & Diagnostic Connectors



(2) Method of calling a trouble

In the above Table 1, the contents of trouble may be checked for both the past and the present in engine error patterns. The present and the past patterns (Table 2) can be switched over by operating the diagnosis indicating connector and the memory clear connector (open or connect). The location of the diagnosis indicating connector and the memory clear connector is shown on next page. Trouble code numbers (Refer to Table 3. Diagnosis code). are displayed if the diagnosis lamp 1 (red) is turned on.

Table 2

		Result of diagnosis					
Memory clear connector	Diagnosis indicating connector	Normal	Normal	Fault	Fault	Past	History of trouble
		Normal	Fault	Normal	Fault	Present	History of trouble
※ Connect	※ Open	Code at normal (01) flickers	Code for past trouble (07～78) flickers	Code at normal (01) flickers	Code for past trouble (07～78) flickers		
※ Open	※ Open	↑	↑	Code for past trouble (07～78) flickers	Code for present + past (07～78) troubles flickers.		

※ mark represents a normal connection.

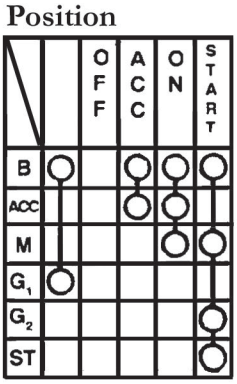
https://truckmanualshub.com/

DIAGNOSIS CODE	FAILURE LOCATION	CONDITION	DIAGNOSIS LAMP	OBSERVATIONS
01	Normal	---	---	Engine is operable
07	Engine overrun	Eng. Speed ⩾ Eng. overrun condition	Red	Engine not operable. Use emergency shut down function to stop it.
45	Engine reverse rotation	Reverse rotation of the engine.	Red	Engine not operable. Use emergency shut down function to stop it.
11	Governor servo system	Difference of ECU command value and feedback value.	Red	ECU power is OFF. Use emergency shut down function to stop it. Engine will run in backup mode and the amber lamp indicator will be illuminated. Operable only for repairs.
22	Rack sensor	0.5V ⩾ Rack sensor ⩾ 4.4V	Red	ECU power is OFF. Use emergency shut down function to stop it. Engine will run in backup mode and the amber lamp indicator will be illuminated. Operable only for repairs. 0.5V ⩽ Rack sensor ⩽ 4.4V.
17	Electronic timer control system	Difference of ECU command value and feedback value.	Amber	ECU power is Off. Engine runs at constant fuel injection and will run in backup mode (amber lamp on). Operable only for repairs.
23	Timer control valve	»Disconnection detected. »Short-circuit detected.	Amber	»Disconnection not detected. Operable only for repairs. »ECU power is Off. Engine runs at constant fuel injection and will run in backup mode (amber lamp on). Operable only for repairs.
14	Timing sensor	Cross checking to NE sensor.	Amber	Engine runs at constant fuel injection and will run in backup mode (amber lamp on). Return of timing sensor pulse. Operable only for repairs.
15	NE sensor	Cross checking to timing sensor.	Amber	Engine runs at constant fuel injection and will run in backup mode (amber lamp on). Operable only for repairs. Return of NE sensor pulse.

https://truckmanualshub.com/

DIAGNOSIS CODE	FAILURE LOCATION	CONDITION	DIAGNOSIS LAMP	OBSERVATIONS
14 + 15	Speed sensor in both directions	When key switch is ON, both speed sensors have no pulse.	Red	Use emergency shut down function to stop it. Key switch is Off or return of either of both sensors. Engine not operable.
24	Accel sensor 1	0.2V > Accel sensor 1 > 4.8V	--	Engine operable. Control done with Accel sensor 2. Engine is operable. 0.2V ⩽ Accel sensor1 ⩽ 4.8V.
16	Accel sensor 2	0.2V > Accel sensor 2 > 4.8V	--	Control done with Accel sensor 1. Engine is operable. 0.2V ⩽ Accel sensor2 ⩽ 4.8V.
24 + 16	Simultaneous failure of sensors 1 and 2	0.2V > Accel sensors 1&2 > 4.8V	Amber	Engine controlled by Accel switch (Accel SW Off: 100%, Accel SW ON: 0%). Operable only for repairs in backup mode (amber lamp On). 0.2V ⩽ Accel sensors 1&2 ⩽ 4.8V.
65	Accel SW	Accel openning ⩾ 30%, Accel SW On.	--	Engine operable (Normal). Accel opens > 30%, Accel SW Off.
32	Boost sensor	0.5V ⩾ Boost sensor ⩾ 4.8V	Amber	Operable only for repairs in backup mode (amber lamp On). 0.5V < Boost sensor < 4.8V. Set boost pressure to 0 Kpa (Relative pressure).
21	Coolant temp. sensor	Coolant temp. sensor ⩾ 4.9V	--	Engine is operable. Coolant temp. < 4.9V. Set coolant temp. to 80° C (When engine is started, temp. is set to -20° C).
19	Atmospheric pressure sensor	1.89V ⩾ Atm. press. sensor ⩾ 5.0V	--	Engine is operable. Set atmospheric press. to 101 KPa. 1.89V < Atm. press. sensor < 5.0V.
34	Q-regulation resistance	0.1V < Q-reg. resistance < 4.6V	--	Engine is operable. Set injection correction value to lower limit.
78	Heater relay	»Disconnection detected. »Short-circuit detected.	Amber	»Disconnection not detected. »ECU power is off. Air heating control stops. Engine may not start in cold conditions.
33	Systeme error	»Micron checking error. »CPU mutual checking error. »Interrupt processing error.	Red	Engine not operable. ECU power Off. Use emergency shut down function to stop engine.

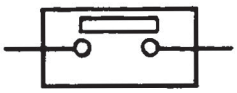
https://truckmanualshub.com/



KEYSWITCH–
The Keyswitch is a 6 position Key activated switch



2-POSITION ROCKER SWITCH



NORMALLY OPEN SWITCH
Often shown with N.O. listed around switch.



NORMALLY CLOSED SWITCH
Often shown with N.C. listed around switch.



MOMENTARY PUSH SWITCH



DIODE
Commonly shown with a number.



RESISTOR
Commonly shown with a number.



GROUND



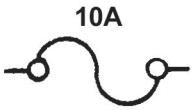
SOLENOID VALVE
Open/Close - Type



SOLENOID VALVE
PROPORTIONAL - Type



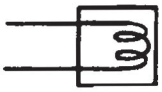
MOTOR
Commonly has what motor listed around symbol.



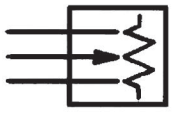
FUSE
Commonly has what AMP fuse being used around symbol



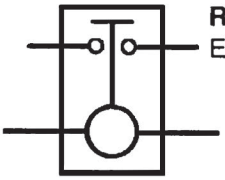
LAMP
Commonly has what lamp being used around symbol



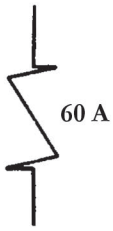
SENSOR
EXAMPLE: RPM Sensor



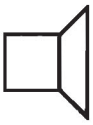
POTENTIOMETER
EXAMPLE: Throttle Control



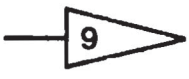
RELAY
EXAMPLE: Battery Relay



FUSABLE LINK
Commonly has what AMP fuse being used around symbol



ALARM
EXAMPLE: Travel Alarm



CIRCUIT OUT
Will house a number that will match a number in a Circuit In symbol



CIRCUIT IN
Will house a number that will match a number in a Circuit Out symbol



FUSE NUMBER
Will house a number that will match a number in another Fuse Number symbol

Kobelco

Dynamic Acera



Dynamic Acera Miscellaneous Specifications

KOBELCO
Kobelco America Inc.

https://truckmanualshub.com/

TABLE OF CONTENTS

1. Dynamic Acera Bucket Interchangability 11-3

2. Bucket and pin Specifications ..... 11-4~11
- **A.** Bucket and Pin Specifications SR70 ..... 11-4~5
- **B.** Bucket and Pin Specifications 115SR 135SR 235SR ..... 11-6~7
- **C.** Bucket and Pin Specifications SK160 SK210 SK250 ..... 11-8~9
- **D.** Bucket and Pin Specifications SK290 SK330 SK480 ..... 11-10~11

3. Hydraulic System Maintenance SK210 ~SK250 ..... 11-12~13

4. Fuel System Maintenance 11-14

5. AC Unit Filter Maintenance 11-15

4. Inspection and Maintenance Chart SK210 ~SK250 ..... 11-16~18

5. Fluids and Filter SK210 11-19

6. Lubrication Specifications SK210 ~ SK250 11-20

https://truckmanualshub.com/

Dynamic Acera Bucket Interchangability

The followiing buckets are interchangable:

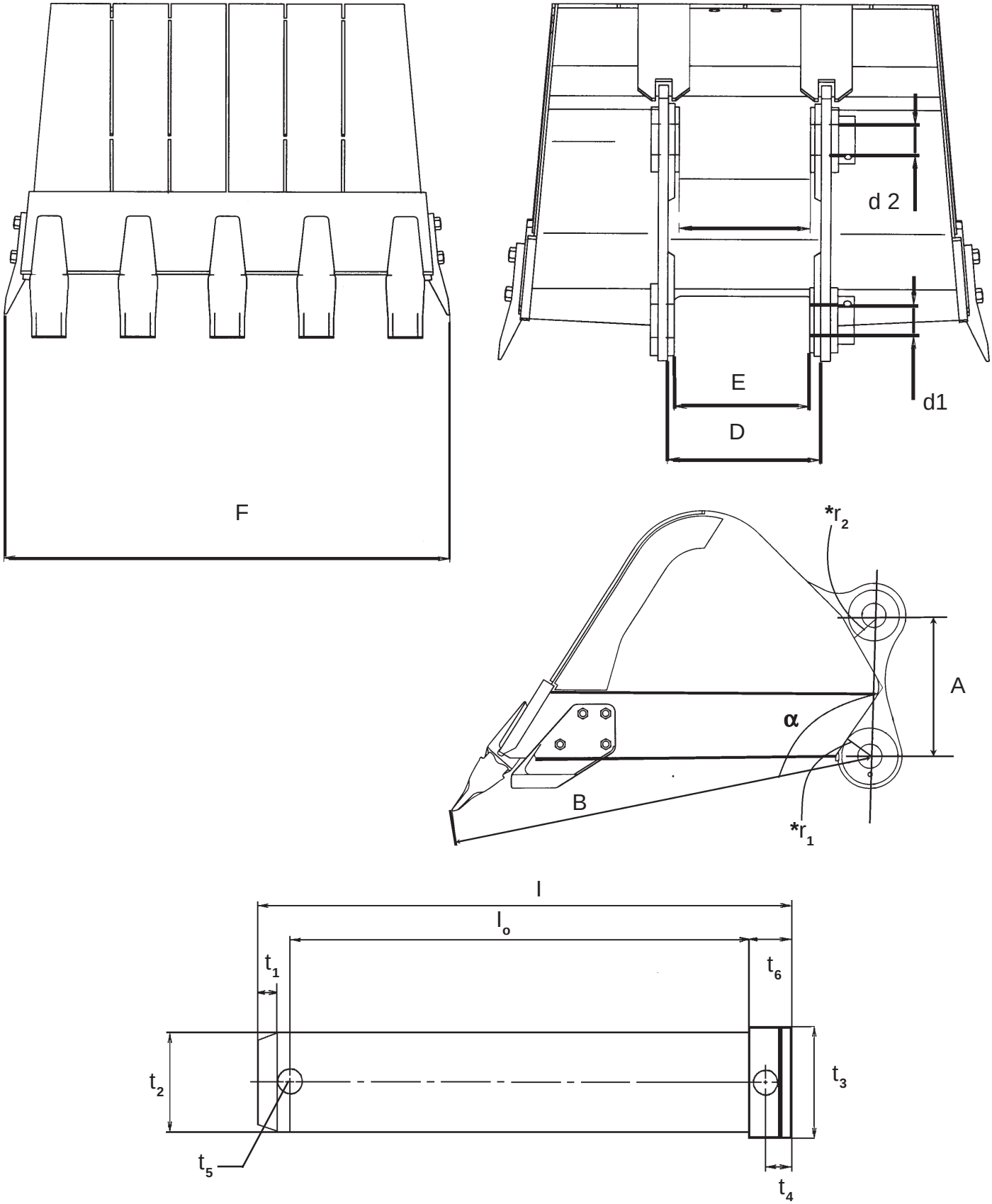
SK60 Mark IV	70SR Dynamic Acera
SK130 Mark IV(not SK120MK4)	115SR & 135SR
SK150 Mark IV	SK160 Dynamic Acera
SK200 Mark IV	SK210 Dynamic Acera
SK200 Mark IV	235SR
SK220 Mark IV	SK250 Dynamic Acera
SK300 Mark IV	SK330 Dynamic Acera
SK400 Mark IV	SK480 Dynamic Acera

Bucket information was taken from Service Bulletin HE-256A 04/20/1995

https://truckmanualshub.com/

SR Series

BUCKET and BUCKET PIN



***** Individual bucket designs could effect this clearance.

https://truckmanualshub.com/

SR Series Unit mm (ft-in.)

BUCKET and BUCKET PIN

	70SR		
A	298mm (11.732'')		
B	R 1040mm (40.944'')		
D	238mm (9.370")		
d_1	Ø 50mm (1.968")		
d_2	Ø 50mm (1.968")		
E	182mm (7.165")		
F	400mm (15.747")		
r_1	128mm (5.039")		
r_2	113mm (4.448")		
α	101.75^{o}		
I	361mm (14.212")		
I_0	301mm (11.850")		
t_1	30mm (1.181")		
t_2	Ø 50mm $^{+.150}_{-.210}$ (1.968" $^{+.006}_{-.0082}$)		
t_3	Ø 55mm (2.165")		
t_4	13mm (.511")		
t_5	Ø 13mm (.511")		
t_6	23mm (.905")		

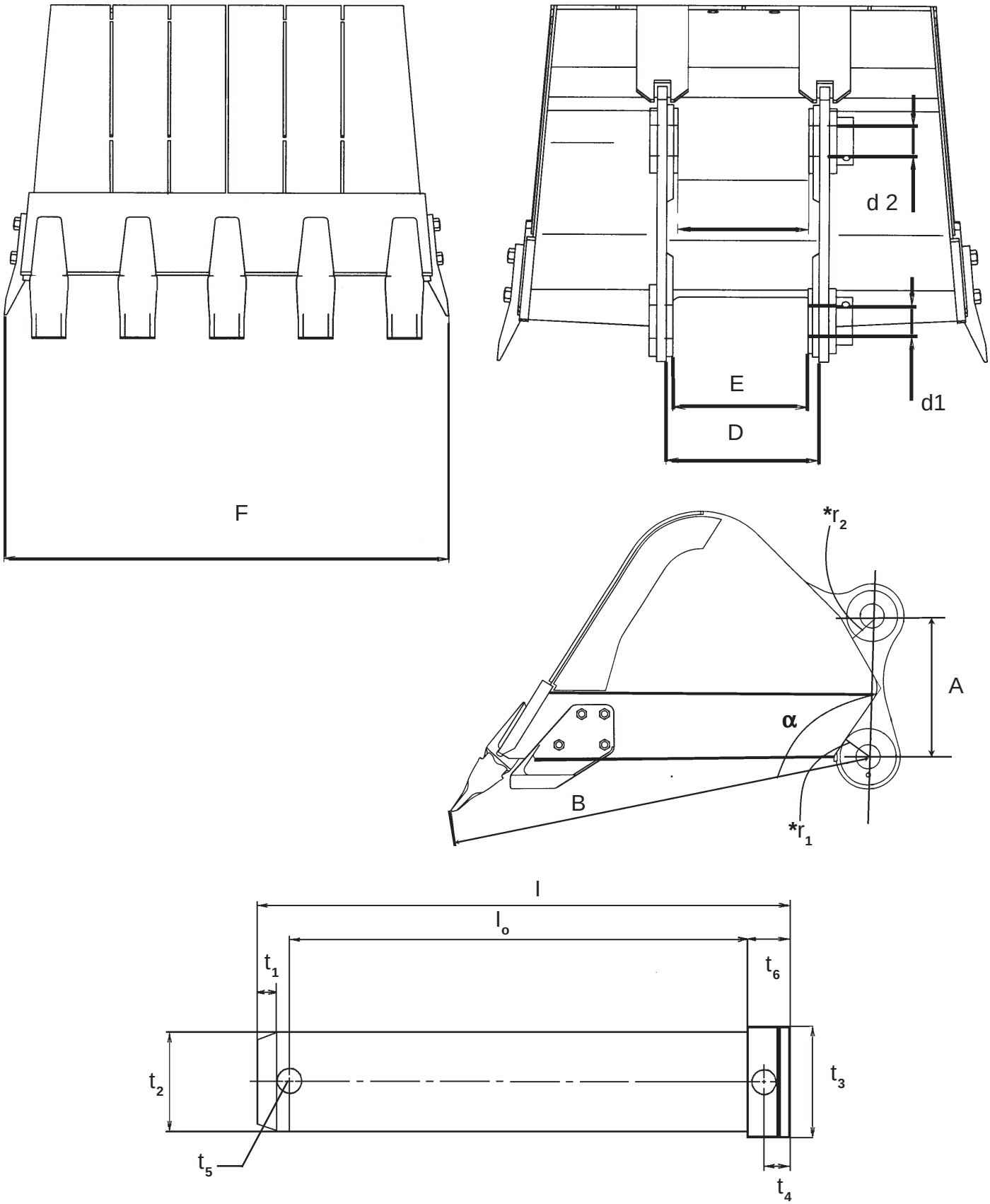
LEGEND BUCKET and BUCKET PIN

BUCKET	BUCKET PIN
A: Distance between pins of bracket	l: Overall length of pin
B: Distance from bucket pin to tooth tip	$l_{0:}$ Length under head to center line of retainer hole
D: Bracket inside width	$t_{1:}$ Length of taper
d1: Diameter of pin	$t_{2:}$ Diameter of pin
d2: Diameter of pin	$t_{3:}$ Diameter of head
E: Bracket inside width	$t_{4:}$ Center line of alignment hole
F: Side cutter outside width	$t_{5:}$ Diameter of retainer and alignment hole (2 Places)
r_1: Clearance radious of arm (*for reference only)	$t_{6:}$ Lenght of pin head
$r_{2:}$ Clearance fo linkage (*for reference only)	
α: Alpha angle	

https://truckmanualshub.com/

SR Series

BUCKET and BUCKET PIN



***** Individual bucket designs could effect this clearance.

https://truckmanualshub.com/

Attachment Specifications
SR Series

Unit mm (ft-in.)

BUCKET and BUCKET PIN

	115SR DZ	135SR	235SR
A	420mm (16.535'')	420mm (16.535'')	442mm (17.401'')
B	R 1,241.3mm (R 48.869'')	R 1,241.3mm (R 48.869'')	R 1,450mm (R 57.086'')
D	324mm (12.755")	324mm (12.755")	399mm (15.708")
d_1	Ø 65mm (2.559")	Ø 65mm (2.559")	Ø 80mm (3.149")
d_2	Ø 65mm (2.559")	Ø 65mm (2.559")	Ø 80mm (3.149")
E	252mm (9.921")	252mm (9.921")	327mm (12.873")
F	735mm (28.936")	735mm (28.936")	837mm (32.952")
r_1	127mm (4.999")	127mm (4.999")	150mm (5.905")
r_2	120mm (4.724")	120mm (4.724")	130mm (5.118")
α	103°	103°	96.75^{o}
l	450mm (17.716")	450mm (17.716")	542mm (21.338")
l_0	390mm (15.354")	390mm (15.354")	480mm (18.897")
t_1	30mm (1.181")	30mm (1.181")	30mm (1.181")
t_2	Ø 65mm $^{+.150}_{-.210}$ (2.559" $^{+.006}_{-.0082}$)	Ø 65mm $^{+.150}_{-.210}$ (2.559" $^{+.006}_{-.0082}$)	Ø 80mm $^{+.05}_{-.110}$ (3.149" $^{+.0019}_{-.004}$)
t_3	Ø 70mm (2.755")	Ø 70mm (2.755")	Ø 85mm (3.346")
t_4	13mm (.314")	13mm (.314")	15mm (.590")
t_5	15mm (.590")	15mm (.590")	17mm (.669")
t_6	23mm (.905")	23mm (.905")	27mm (1.062")

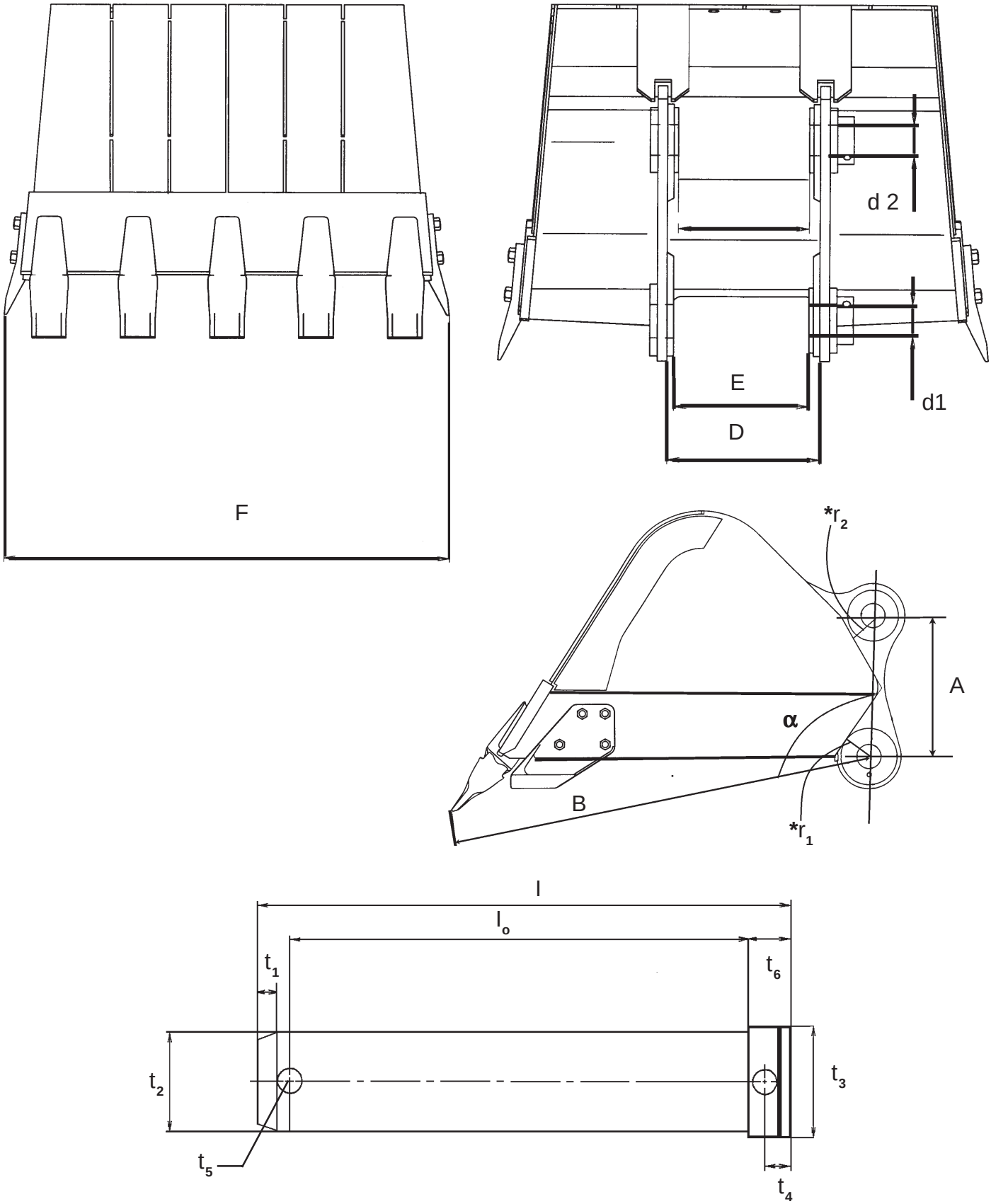
LEGEND BUCKET and BUCKET PIN

BUCKET		BUCKET PIN	
A:	Distance between pins of bracket	l:	Overall length of pin
B:	Distance from bucket pin to tooth tip	$l_{0:}$	Length under head to center line of retainer hole
D:	Bracket inside width	$t_{1:}$	Length of taper
d1:	Diameter of pin	$t_{2:}$	Diameter of pin
d2:	Diameter of pin	$t_{3:}$	Diameter of head
E:	Bracket inside width	$t_{4:}$	Center line of alignment hole
F:	Side cutter outside width	$t_{5:}$	Diameter of retainer and alignment hole (2 Places)
r_1:	Clearance radious of arm (*for reference only)	$t_{6:}$	Lenght of pin head
$r_{2:}$	Clearance fo linkage (*for reference only)		
α:	Alpha angle		

https://truckmanualshub.com/

Dynamic Acera

BUCKET and BUCKET PIN



***** Individual bucket designs could effect this clearance.

https://truckmanualshub.com/

Attachment Specifications
Dynamic Acera

Unit mm (ft-in.)

BUCKET and BUCKET PIN

	SK160	SK210	SK250
A	411mm (16.18'')	442mm (17.401'')	514mm (20.236'')
B	R 1,350mm (R 4' 5.1")	R 1,450mm (R 57.086'')	R 1,515mm (R 59.645'')
D	374mm (14.7")	399mm (15.708")	399mm (15.708")
d_1	Ø 70mm (2.7")	Ø 80mm (3.149")	Ø 90mm (3.543")
d_2	Ø 70mm (2.7")	Ø 80mm (3.149")	Ø 90mm (3.453")
E	302mm (11.8")	327mm (12.873")	327mm (12.873")
F	954mm (3' 1.5"")	837mm (32.952")	1060mm (41.732")
r_1	140mm (5.5")	150mm (5.905")	145mm (5.708")
r_2	115mm (4.5")	130mm (5.118")	133mm (5.236")
α	99.4^{o}	96.75^{o}	102.86^{o}
l	511mm (20.12")	542mm (21.338")	532mm (20.944")
l_0	449mm (17.667")	480mm (18.897")	470mm (18.503")
t_1	30mm (1.181")	30mm (1.181")	30mm (1.181")
t_2	Ø 70mm $^{-.153}_{-.223}$ (2.7559" $^{-.006}_{-.0087}$)	Ø 80mm $^{+.05}_{-.110}$ (3.149" $^{+.0019}_{-.004}$)	Ø 90mm $^{+.070}_{-.130}$ (2.559" $^{+.002}_{-.005}$)
t_3	75mm (2.953")	Ø 85mm (3.346")	Ø 95mm (3.740")
t_4	15 (.590")	15mm (.590")	15mm (.590")
t_5	17 (.6693")	17mm (.669")	17mm (.669")
t_6	27 (1.06")	27mm (.669")	27mm (1.062")

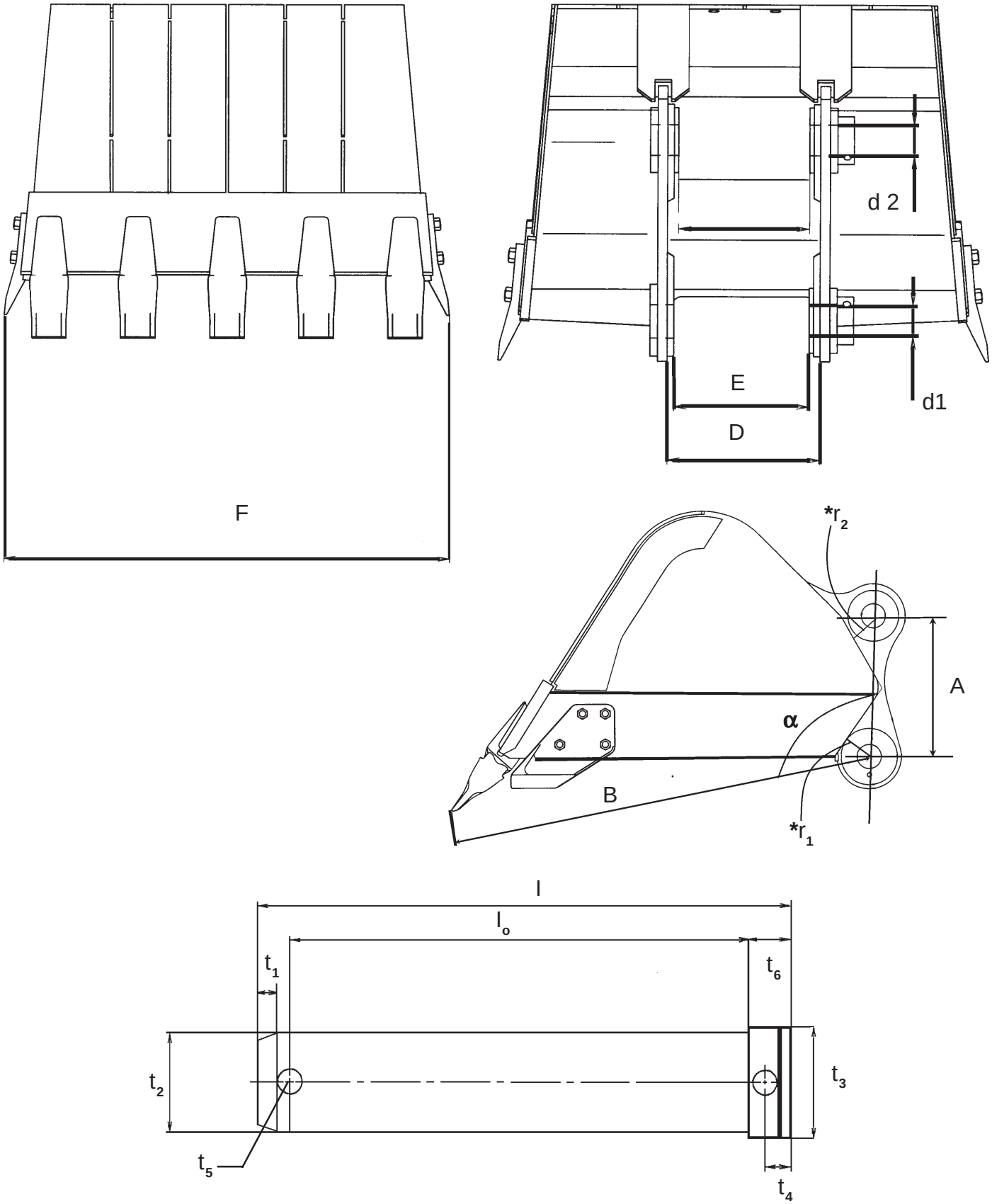
LEGEND BUCKET and BUCKET PIN

BUCKET		BUCKET PIN	
A:	Distance between pins of bracket	l:	Overall length of pin
B:	Distance from bucket pin to tooth tip	$l_{0:}$	Length under head to center line of retainer hole
D:	Bracket inside width	$t_{1:}$	Length of taper
d1:	Diameter of pin	$t_{2:}$	Diameter of pin
d2:	Diameter of pin	$t_{3:}$	Diameter of head
E:	Bracket inside width	$t_{4:}$	Center line of alignment hole
F:	Side cutter outside width	$t_{5:}$	Diameter of retainer and alignment hole (2 Places)
r_1:	Clearance radious of arm (*for reference only)	$t_{6:}$	Lenght of pin head
$r_{2:}$	Clearance fo linkage (*for reference only)		
α:	Alpha angle		

https://truckmanualshub.com/

Dynamic Acera

BUCKET and BUCKET PIN



***** Individual bucket designs could effect this clearance.

https://truckmanualshub.com/

Attachment Specifications
Dynamic Acera

Unit mm (ft-in.)

BUCKET and BUCKET PIN

	SK290	SK330	SK480
A	527mm (20.748'')	534mm (21.023'')	630mm (24.803'')
B	R 1,565mm (R 61.613'')	R 1,690mm (R 66.535'')	R 1,780mm (R 70.078'')
D	446mm (17.559")	466mm (18.346")	552mm (21.732")
d_1	Ø 90mm (3.542")	Ø 90mm (3.542")	Ø100mm $^{+0.22}$ (3.937" $^{+0.009}$)
d_2	Ø 90mm (3.542")	Ø 90mm (3.542")	Ø 100mm $^{+0.22}$ (3.937" $^{+0.009}$)
E	382mm (15.039")	382mm (15.039")	452mm (17.795")
F	1418mm (55.827")	1242mm (48.897")	1330mm (52..362")
r_1	115mm (4.527")	190mm (7.480")	140mm (5.511")
r_2	140mm (5.511")	160mm (6.299")	173mm (6.811")
α	103°	100.56°	100.50°
l	653mm (25.708")	653mm (25.708")	779mm (30.669")
l_0	576mm (22.677")	576mm (22.677")	714mm (28.110")
t_1	30mm (1.181")	30mm (1.181")	30mm (1.181")
t_2	Ø 90mm $^{+.02}_{-.06}$ (3.543" $^{+.0007}_{-.002}$)	Ø 90mm $^{+.070}_{-.130}$ (3.543" $^{+.0027}_{-.005}$)	Ø100mm $^{-0.070}_{-0.130}$ (3.937" $^{-.003}_{-.005}$)
t_3	Ø 93mm (3.661")	Ø 95mm (3.740")	Ø 105mm (4.134")
t_4	20mm (.787")	20mm (.787")	20mm (.787")
t_5	21mm (.826")	21mm (.826")	42mm (1.654")
t_6	35mm (1.377")	35mm (1.377")	35mm (1.377")

LEGEND BUCKET and BUCKET PIN

BUCKET

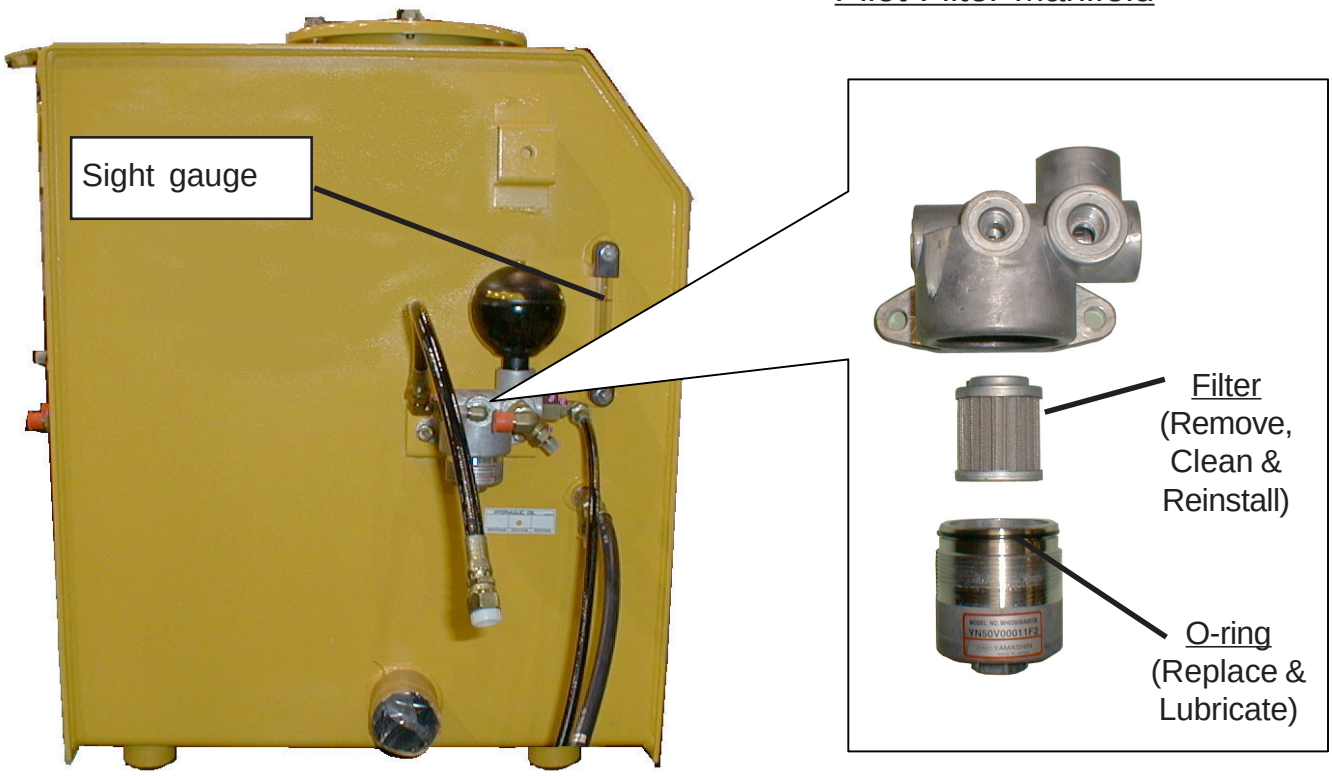
- A: Distance between pins of bracket
- B: Distance from bucket pin to tooth tip
- D: Bracket inside width
- d1: Diameter of pin
- d2: Diameter of pin
- E: Bracket inside width
- F: Side cutter outside width
- r_1: Clearance radious of arm (*for reference only)
- $r_{2:}$ Clearance fo linkage (*for reference only)
- α: Alpha angle

BUCKET PIN

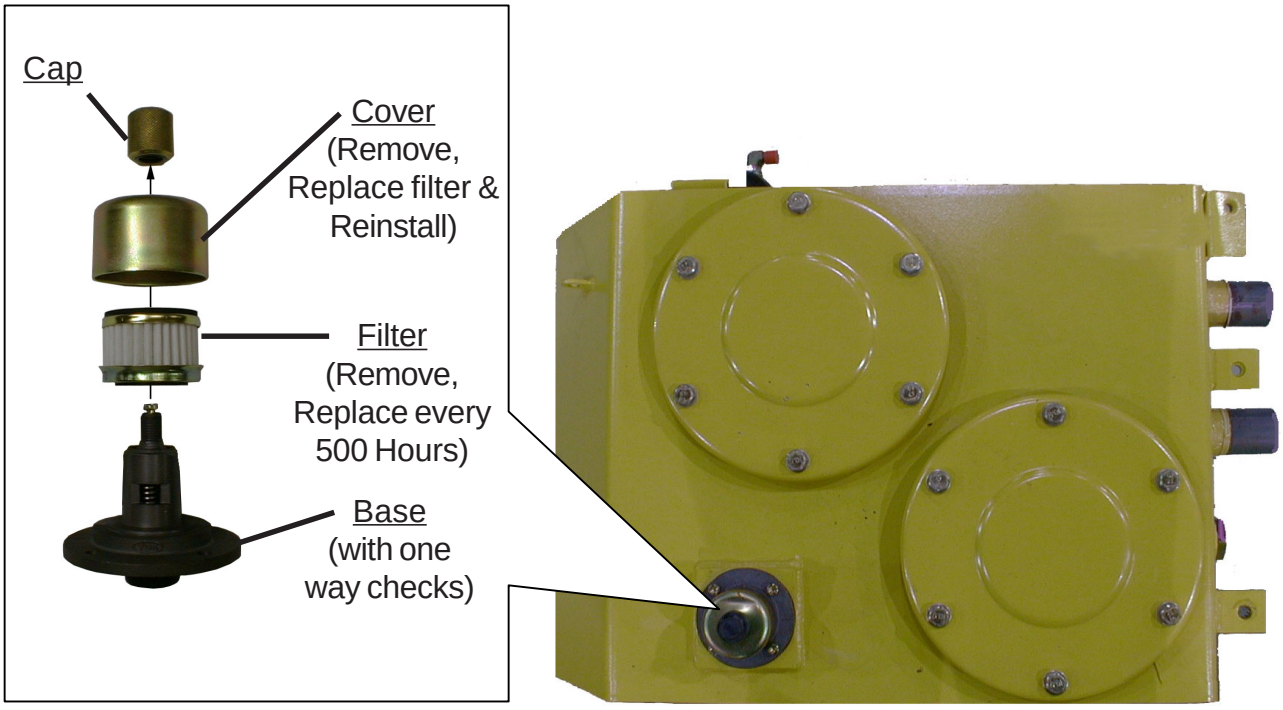
- l: Overall length of pin
- $l_{0:}$ Length under head to center line of retainer hole
- $t_{1:}$ Length of taper
- $t_{2:}$ Diameter of pin
- $t_{3:}$ Diameter of head
- $t_{4:}$ Center line of alignment hole
- $t_{5:}$ Diameter of retainer and alignment hole (2 Places)
- $t_{6:}$ Lenght of pin head

https://truckmanualshub.com/

HYDRAULIC TANK



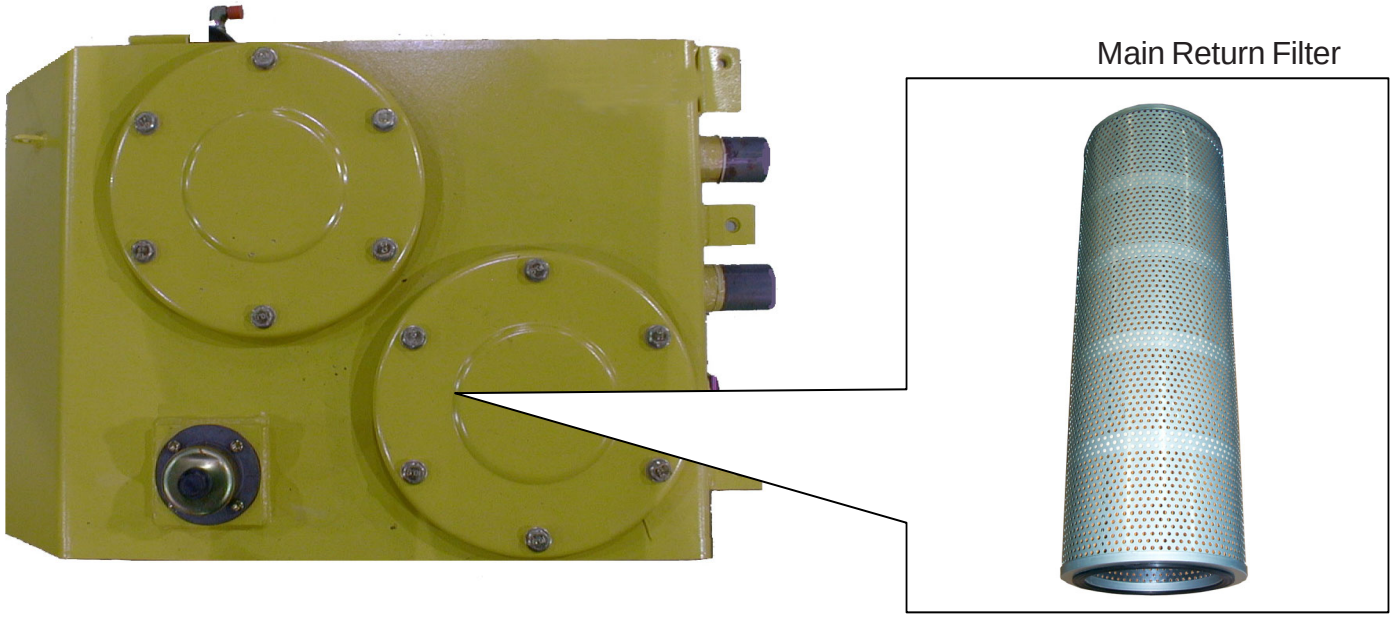
Torque 18~25 lbf-ft (2.5~3.5 Kgf-m)



Typical of SK210 SK250

https://truckmanualshub.com/

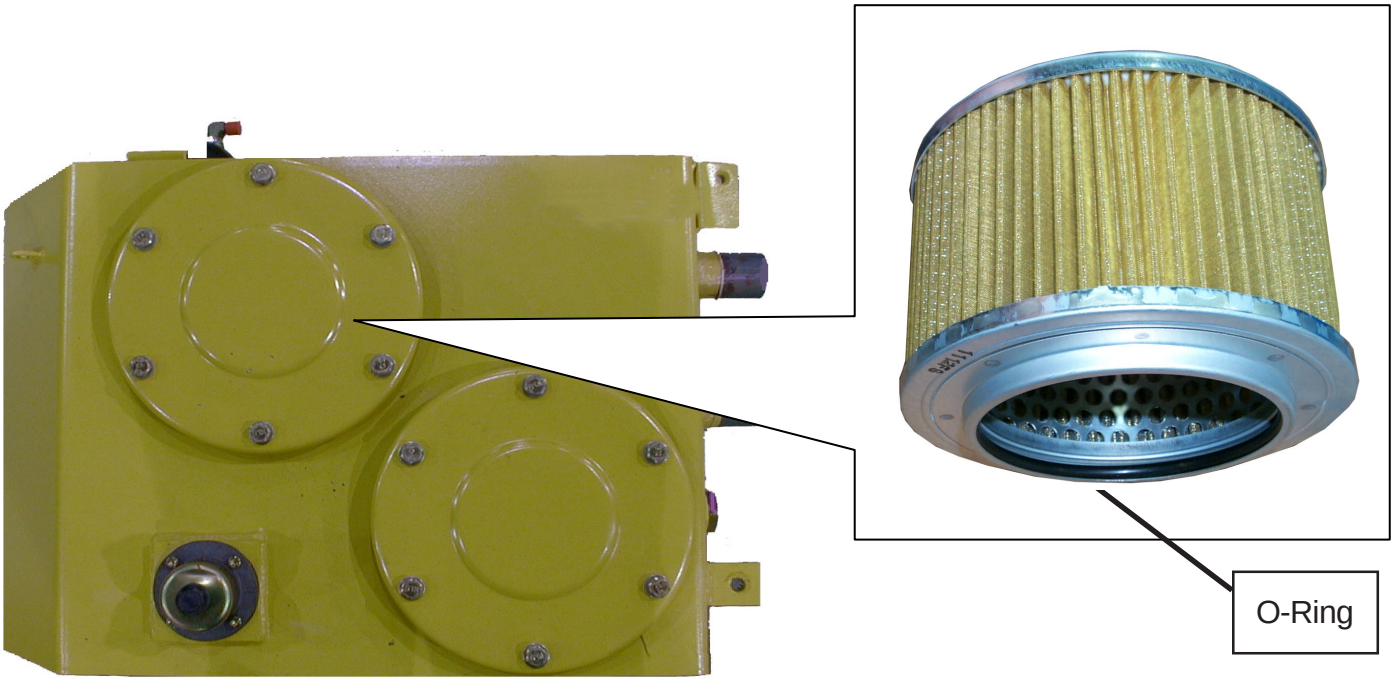
HYDRAULIC TANK



NOTE

Always consult you operation manual for proper maintenance intervals.

Service Interval : 500 hrs - Normal Conditions
Option/Breaker Filter : 250 hrs.

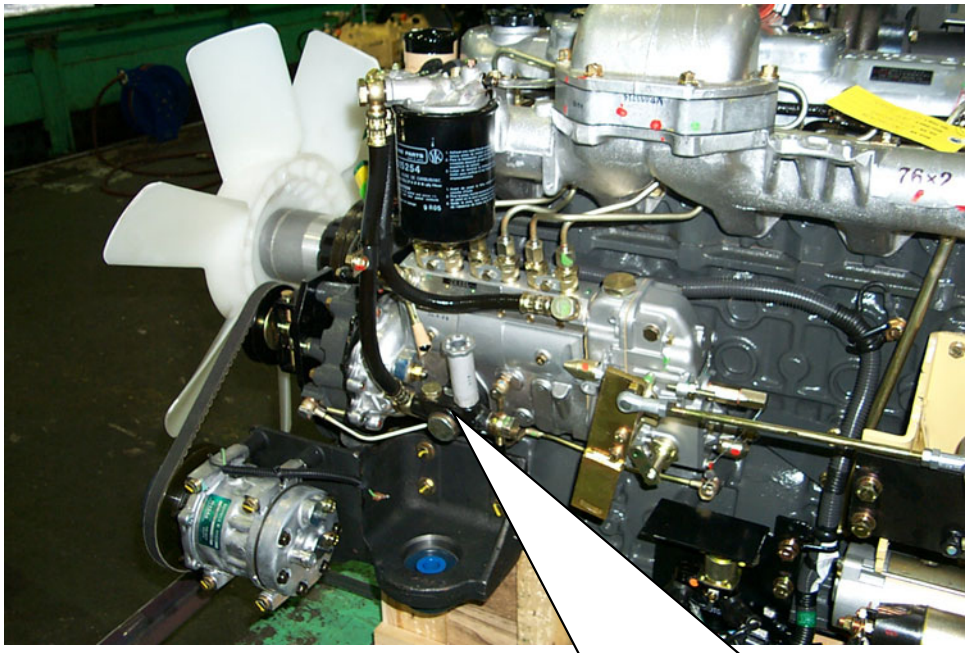


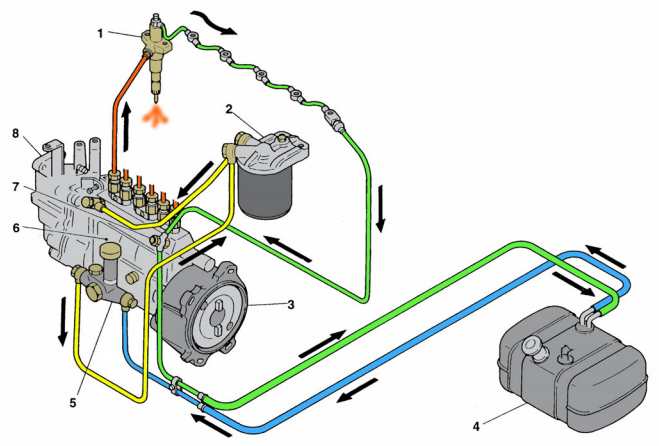
Service Interval : 2000 hrs - Normal Conditions

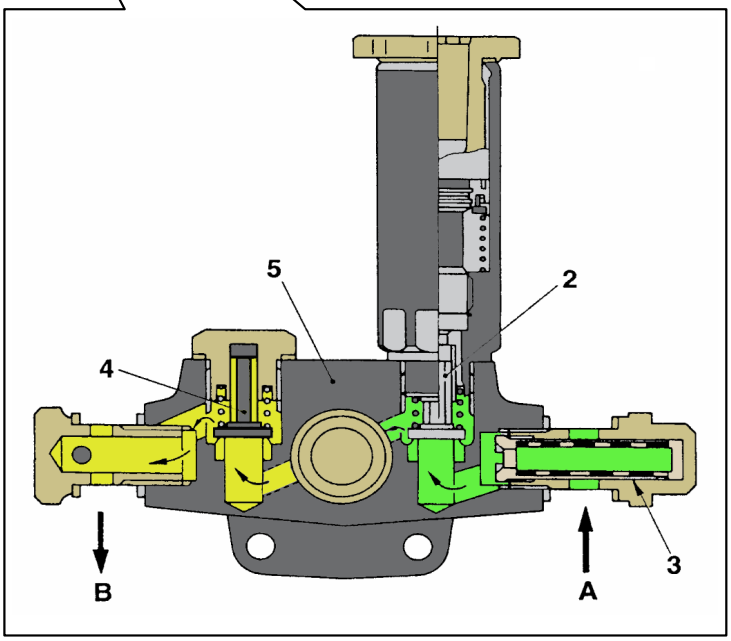
Typical of SK210 SK250

https://truckmanualshub.com/

FUEL SYSTEM

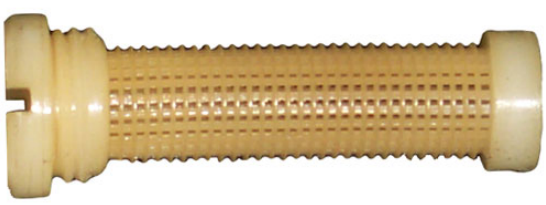




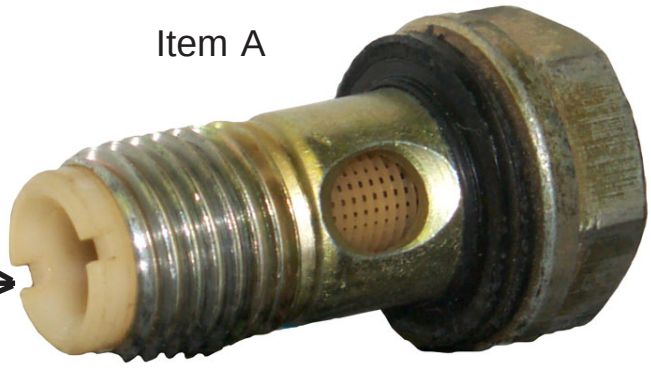


Lift Pump filter:
Lift pump inlet filter protects the lift pump from contamination and debris and should be removed and cleaned or replaced every time the main fuel filters are changed. If not cleaned or replaced it can create fuel starvation and power complaints.

Item 3



Item A



https://truckmanualshub.com/

AC Unit Filter Inspection

Inspect the fresh air filter every 250 hours of engine operation and the recirculate air filter every 500 hours of engine operation.

NOTE

- If the working environment is extremely dusty, it is recommended to reduce the inspection schedule to at least half of the above spefied working hours.
- The fresh air filter is a paper filter. DO NOT WASH. Clean with air only. Do not clean more than 10 times, or replace it every 2 years.
- Clean the recirculate air filter with compressed air or by washing and rinsing.
- Do not wash recirculate air filter with any organic solvent, such as: gasoline, trichlene, thinner, etc.

Removing the climitizer-AC unit filters:

1. Fresh Air Filter

a. Move the seat back forward for easy access to the rear panel.

b. Release the 4 top screws from the rear panel top cover (behind the operator's seat), see Figure 4.39A, and press the lower locks to release cover and remove it. Tilt the cover towards the seat to obtain access to the fresh filter. See Figure 4.39B.

NOTE

To release the 4 top screws, turn them counterclockwise 1/4 of a turn (90º).

c. Remove the fresh air filter for inspection and cleaning, or replacement. See Figure 4.39B.

d. After cleaning or replacement, use this procedure in reverse for assembling.

2. Recirculate Air Filter

a. Repeat above steps a, and b.

b. Pull out the speaker wires and carefully remove the top cover from the cab.

c. Press the locks on the lower cover to release it and remove it to obtain access to the recirculate air filter. See Figure 4.39A.

d. Raise recirculate air filter slightly and pull it out for inspection and cleaning, or replacement. See Figure 4.39C.

e. After cleaning or replacement, use this procedure in reverse for assembling.

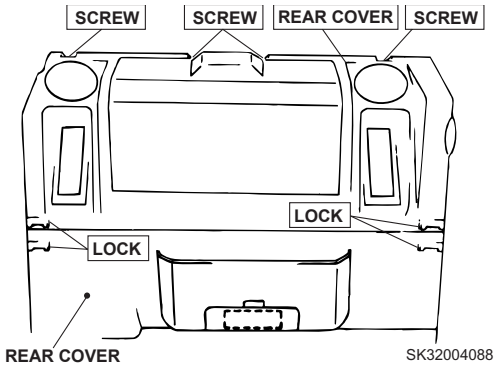
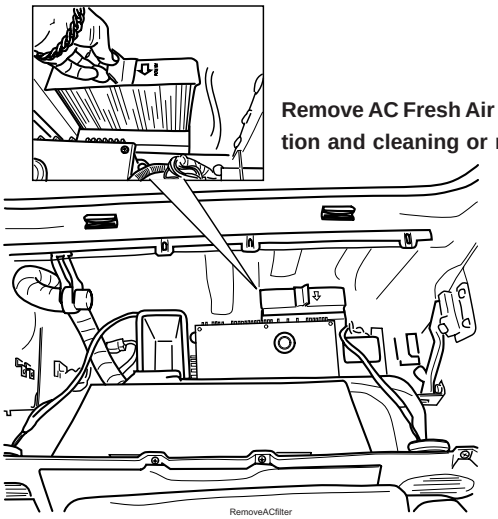


FIGURE 4.39A



Remove AC Fresh Air Filter for inspection and cleaning or replacement

FIGURE 4.39B

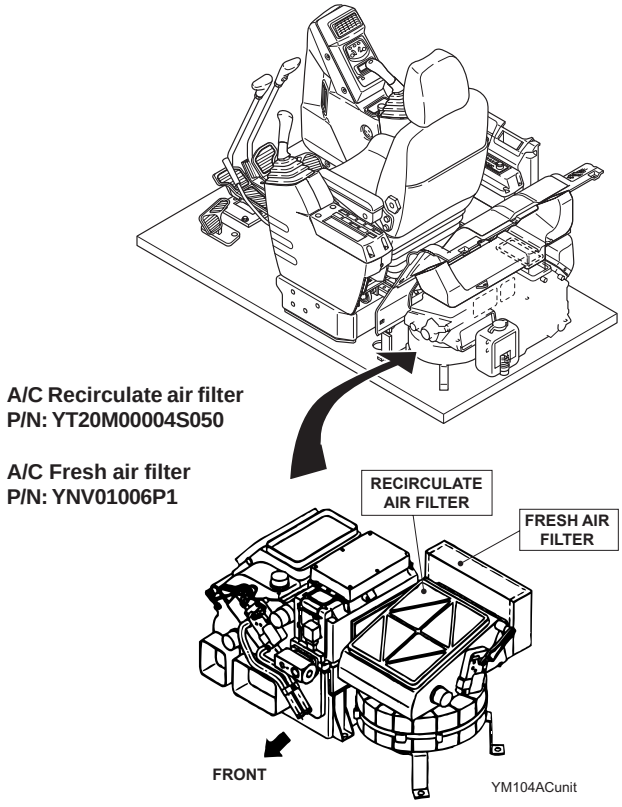


FIGURE 4.39C

https://truckmanualshub.com/

INSPECTION & MAINTENANCE CHART SK210

Follow the chart below for recommended intervals of regular inspection and maintenance procedures.

WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS FOUND IN THIS MANUAL BEFORE PERFORMING INSPECTION & MAINTENANCE.

SYSTEM	MAINTENANCE TO PERFORM	LOCATION	INTERVAL (Working Hours)							
			8	50	120	250	500	1000	2000	Page
ENGINE	Check oil level	Eng. left side	X							4-12
	Check coolant level	Rear left compartment	X							4-12
	Check for fluid leaks	Complete engine	X							4-13
	Check belt tension	Front of engine	X							4-33, 4-38
	Check air cleaner	Air cleaner compartment	X							4-13
	Check engine electrical	Complete engine	X							4-14
	Change engine oil	Oil pan		O			X			4-24
	Change oil filter	Bottom RH side of engine		O			X			4-24
	Change fuel filter & clean priming pump gauze filter	Engine LH side		O			X			4-28
	Check air intake system	Hoses and clamps		O			X			4-26
	Check fan assembly	Front of engine		O				X		
	Check radiator cap and hoses	Radiator				X				4-40
	Check belt tensioner & adjust belts	Front of engine		O		X				4-38
	Clean debris screen	Front of radiator or front of oil cooler		OX						4-27
	Clean radiator core and compartment	Radiator and LH compartment		OX						4-27
	Check foam seals	Engine & radiator compartments		OX						4-27, 4-61
	Change engine coolant	Radiator and engine							X	4-45
	Change air cleaner elements	Air cleaner compartment						X		4-13
	Adjust valve clearence	Engine top						OX		4-44
	Check engine compression	Engine						X		4-44
	Lubricate water pump bearing	Engine		O			X			4-25
	Check injection timing	Engine						X		4-44
	Check injection pressure	Engine					X			4-44
	Check injection nozzle atomization	Engine					X			4-44
	Check starter and alternator	Engine						X		4-44
FUEL SYSTEM	Check fuel level	Gauge cluster	X							4-15
	Drain water and deposits from fuel tank	Fuel tank bottom		X						4-26
	Drain water separator	Hyd. pump compartment		OX						4-26
	Check and clean fuel tank cap & strainer	Fuel tank					X			4-42

O - Break in (After first 50 Hrs) Inspection & Maintenance Required.

X - Regular Inspection & Maintenance Required.

https://truckmanualshub.com/

INSPECTION & MAINTENANCE CHART SK210

SYSTEM	MAINTENANCE TO PERFORM	LOCATION	INTERVAL (Working Hours)							
			8	50	120	250	500	1000	2000	Page
HYDRAULIC SYSTEM	Hydraulic oil level	RH side of hyd. tank	X							4-16
	Check hydraulic functions	Operator's controls	X							4-17
	Check for oil leaks	Hoses and components	X							4-17
	Check hoses and lines	Complete machine	X							4-60
	Clean suction screen	Hydraulic tank							X	4-48~4-50
	Change return filters	Hydraulic tank		O			X			4-30
	Clean pilot system filter	Pilot valve on side of hydraulic tank		O			X			4-31
	Hydraulic oil change	Hydraulic tank							X	4-48~4-50
	Clean hydraulic oil tank	Hydraulic tank							X	4-48~4-50
	Change hydraulic tank breather	Hydraulic tank							X	4-51
UPPER FRAME	Check swing reduction unit oil level	Swing reduction unit		O	X					4-35, 4-36
	Change swing reduction oil	Swing motor red. unit					O		X	4-42
	Lubricate swing bearing	Swing bearing housing		O			X			4-34
	Check swing bearing seal	Swing bearing seal		O			X			4-35
	Check torque on slewing ring bolts	Slewing ring		O			X			4-35
	Check slewing ring pinion, gear, and grease bath	Inspection plate next to boom foot area		O			X			4-34
	Drain water from slewing ring grease bath	Lower frame cavity - drain port		O			X			4-34
	Change grease in slewing ring bath	Remove upper body							X	4-58
	Check swivel joint seal	Swivel valve in front of swing motor		O			X			4-34
	Check counterweight bolts	Counterweight		O		X				4-35
	Inspect and clean steps and handrails		X							4-18
	Check bolts/torque	Upper structure		O		X				
OPERATOR'S CONTROLS	Check hydraulic functions and switches	Operator's control & control panels	X							4-17
	Check travel alarm	Operator's control panel	X							Sect. 2
	Check lights	Boom, front & back	X							Sect. 2
	Check monitor alarm (buzzer)	Operator's control panel	X							Sect. 2
	Check gauge cluster and indicators	Cluster gauge	X							Sect. 2
	Check horn	LH side control	X							Sect. 2
	Lubricate control lever joints	Control levers			X					4-36

O - Break in (After first 50 Hrs) Inspection & Maintenance Required.
X - Regular Inspection & Maintenance Required.

https://truckmanualshub.com/

INSPECTION & MAINTENANCE CHART SK210

SYSTEM	MAINTENANCE TO PERFORM	LOCATION	INTERVAL (Working Hours)							
			8	50	120	250	500	1000	2000	Page
ELECTRICAL	Inspect all wiring	Complete machine	X							4-14, 4-17
	Battery electrolyte	Batteries		O	X					4-32
	Battery maintenance	Batteries		O		X				4-32
LOWER FRAME	Check for oil leaks	Complete system	X							
	Check hoses and lines	Frame cavity	X							
	Check step rails	Frame rails	X							4-18
	Check frame structure and welds	Entire frame	X							4-18
	Check tracks and links	Undercarriage	X							4-19
	Check sprockets	Undercarriage	X							4-19
	Check idlers	Undercarriage	X							4-19
	Check rollers	Undercarriage	X							4-19
	Check track tension and adjust	Undercarriage		OX						4-20
	Check travel red. unit oil level	Travel motor red. unit		O	X					4-35, 4-37
	Change travel reduction unit oil	Travel motor red. unit					O		X	4-41
	Check bolts/hardware	Entire lower structure		O	X					
ATTACHMENTS	Check structure	Boom, arm, and bucket	X							4-21
	Check bucket teeth and side cutters	Bucket	X							4-57
	[1]Lubricate boom foot pin and boom cylinder connections	Boom	O	O	X					4-23
	[1]Lubricate arm pin and arm cylinder connections	Arm	O	OX						4-23
	[1]Lubricate bucket pins and bucket cylinder connections	Arm and bucket links	O	OX						4-23
	Check bolts/torque	Hoses and lines supports, bucket		X						
ACCESSORIES	Check A/C refrigerant	Climatizer-A/C					X			4-23~4-44
	Check A/C compressor belt & adjust	Engine				X				4-33, 4-38
	Check A/C condenser and clean	Radiator compartment	X							4-43~4-44
	Check A/C fresh air filter	Cab				X				4-39
	Check A/C recirculate air filter	Cab					X			4-39
	Check wiper washer fluid level	Air cleaner compartment	X							4-58
	Check bolts/torque	Climatizer-A/C system		X						

[1] - The lubrication interval outlined in this table is for a standard excavator (See section 6 for definition of a standard machine) working in an average duty cycle (Most typical digging application, road construction in natural bed clay, digging 50~60% of the daily work schedule). During the break in period, a new pin and bushing connection has to be lubricated every eight (8) hours for the first one hundred (100) hours of operation for a standard machine working in an average duty cycle; all other machines should be lubricated every four (4) hours for the first twenty (20) hours and every eight (8) hours for the next eighty (80) hours of operation. Refer to page 4-22 for more details in regards to the guidelines for reduced lubrication intervals.

O - Break in (After first 50 Hrs) Inspection & Maintenance Required.

X - Regular Inspection & Maintenance Required.

https://truckmanualshub.com/

4.4 FLUIDS & FILTERS

The following charts list all the necessary lubricants, oils, greases, fuels, coolants and filters required for the KOBELCO SK210 (LC) -VI and SK250LC-VI, SK250NLC-VI Hydraulic Excavator. Also a chart is provided giving specific information for the proper lubricants, oils, greases, fuels and coolants to be used in certain climates. Contact an authorized KOBELCO dealer to order the required filters, fluids and lubricants.

TYPE OF FLUID	COMPONENT (LOCATION)	CAPACITIES	
		SK210-VI SK210LC-VI	SK250-VI SK250LC-VI
HYDRAULIC	Hydraulic Tank	156 Liters (41 Gal)	
	Hydraulic System	246 Liters (65.0 Gal)	260 Liters (69.0 Gal)
ENGINE OIL	Engine Oil Pan (H Level)	18 Liters (4.8 Gal)	
	Engine Oil Pan (L Level)	15.5 Liters (4.1 Gal)	
	Upper Rollers	50 cc (1.69 Fluid oz) X 4	
	Lower Rollers	160 cc (5.41 Fluid oz) X 14 160 cc (5.41 Fluid oz) X 16 - LC	
	Idler	200 cc (6.76 Fluid oz) X 2	
Gear Oil	Swing Reduction Unit	7.5 Liters (2.0 Gal)	15.3 Liters (4.0 Gal)
	Travel Reduction Unit	5.5 Liters X 2 (1.5 Gal X 2)	4.7 Liters X 2 (1.2 Gal X 2)
EP GREASE	Operating Lever Joint	As required in each joint	
	Attachment Pins	16 Places	
	Swing Bearing	1 Place (90½X 4)	
	Track Tension Adjustment	2 Places as required	
N.L.G.I. N½2 (Lithium soap)	Water Pump Brg.	6.1 cc (Aprox. one grease gun shot)	
LITHIUM BASE GREASE WITH MOS_2	Slewing Ring Gear Bath	8.3 Kg (18.3 lbs)	11.3 Kg (24.9 lbs)
ENGINE COOLANT	Radiator	9.5 Liters (2.5 Gal)	
	Cooling System Total Volume	19 Liters (5 Gal)	22 Liters (5.8 Gal)
DIESEL FUEL	Fuel Tank	340 Liters (90 Gal)	

A. Required Fluids & Capacities

SYSTEM	DESCRIPTION	PART NUMBER (SK210-VI ~ SK250LC-VI)
HYDRAULIC	Return Filter	**Element:** YN50V00001P1 **Kit:** YN50V00004F3
	Return Filter Element (Breaker only)	**Element:** YN50V00009P1 **Kit:** YN30T00007F2
	Tank Suction Strainer	YN50V00001P1 (Includes o-ring P/N: 45Z91D6)
	Tank Breather Filter Element	YN57V00002S010
	Pilot Line Filter	YN50V01001S005
ENGINE	Engine Oil Filter	*VAME088532
	Air Cleaner Inner Element	2446R255S6
	Air Cleaner Outer Element	2446R255S5
FUEL	Engine Fuel Filter	*VAME015254
	Priming Pump Gauze Filter	*VAME717659
OPERATOR CAB	A/C Fresh Air filter	YN50V01006P1
	A/C Recirculate Air filter	YT20M00004S050

***Available from a KOBELCO dealer only.**

B. Required Filters

C. Kobelco Fluids and Lubricants

PART NUMBER	DESCRIPTION
KSP1000-1001	Engine oil - SAE 15W/40 (1 Gal)
KSP1000-1005	Engine oil - SAE 15W/40 (5 Gal)
KSP1000-1055	Engine oil - SAE 15W/40 (55 Gal)
KSP1000-2005	Hydraulic oil - AW 46 (5 Gal)
KSP1000-2055	Hydraulic oil - AW 46 (55 Gal)
KSP1000-4014	Grease EP/2 - 14 Ounce
KSP1000-4035	Grease EP/2 - 35 Pounds
KSP1000-120	Grease EP/2 - 120 Pounds
KSP1000-3035	Gear oil 80W90 - 5 Gal

https://truckmanualshub.com/

D. Lubricant Specifications

The following information is designed to allow usage of the proper oils, greases, fuels and coolants in various climates and certain working conditions.

LUBRICANT	CLIMATE ZONE				
HYDRAULIC OIL (ANTI-WEAR, ANTIOXIDANT AND NON-FOAMING) (SHELL TELLUS)	FRIGID -30°C ~ 15°C (-22°F ~ 59°F) ISOVG22	FRIGID -20°C ~ 30°C (-4°F ~ 86°F) ISOVG32	FRIGID~WARM -25°C ~ 40°C (-13°F ~ 104°F) ISOVG32S	WARM -5°C ~ 40°C (23°F ~ 104°F) ISOVG46*	VERY HOT 5°C ~ 55°C (41°F ~ 131°F) ISOVG68

*Note: Machines are shipped from factory with SHELL TELLUS 46 hydraulic oil

LUBRICANT	CLIMATE ZONE		
ENGINE OIL* A.P.I. CLASSIFICATION FOR "SERVICE CD" * ALL ENGINES SHIPPED FROM FACTORY WITH SAE15W40 OIL	FRIGID -30°C ~ 30°C (-22°F ~ 86°F) SAE10W30	WARM -5°C ~ 40°C (23°F ~ 104°F) SAE15W40	VERY HOT 30°C and Above (86°F and Above) SAE15W50

LUBRICANT	CLIMATE ZONE		
FUEL	FRIGID -15°C ~ -25°C (5°F ~ -13°F) WINTERIZED ASTM D975 No.1	WARM -5°C ~ -15°C (23°F ~ 5°F) ASTM D975 No.2	VERY HOT -5°C and Above (23°F and Above) ASTM D975 No.2

LUBRICANT	FOR ROLLERS AND IDLERS ON ALL MODELS.
ENGINE OIL (FOR GENERAL PURPOSE LUBRICATION)	A.P.I. Classification for "Service CD" – SAE30

LUBRICANT	FOR SWING MOTOR REDUCTION UNIT AND TRAVEL MOTOR REDUCTION UNITS ON THE FOLLOWING MODELS : SK210 (LC) -VI, SK250LC-VI, SK250NLC-VI
ENGINE OIL	A.P.I. Classification for "Service CD" – SAE30

LUBRICANT	GENERAL LUBRICATION	SWING GEAR SUMP (BATH)
GREASE (FOR GENERAL PURPOSE LUBRICATION)	EXTREME PRESSURE MULTIPURPOSE GREASE No.2 EP TYPE GREASE	N.L.G.I. No.2 LITHIUM BASE WITH MoS 2 GREASE

FLUID	ANTIFREEZE (LLC) -34°C (-29.2°F) Mixture ratio should protect to 5°C (9°F) lower than the coldest temperature the machine will experience. Take into consideration Wind Chill Factors.
ENGINE COOLANT (50% MIXTURE)	

NOTE: USE OF BIO-DEGRADABLE OILS

When you use Bio-degradable Oil (BIO OIL), refer to the following information.

1. **There are two types of BIO OIL available; vegetable-based and synthetic-based. You are recommended to use the synthetic-based type, because the vegetable-based oil has a maximum usage temperature of 80°C (176°F). Because of this, the degradation of vegetable-based oil occurs more rapidly, and causes reduced service life.**
2. **Do not mix either type of BIO OIL with the original factory-filled mineral oil. In the case that you do use BIO OIL. It is required to flush the hydraulic system that was filled with mineral oil two times.**
3. **If you use BIO OIL, swing and propel parking brake performance will be reduced, because of the lower friction factor of BIO OIL compared to that of mineral oil.**
4. **For further information about recommended Bio-degradable oil, please contact local dealer.**

https://truckmanualshub.com/

Table of contents

Page

8.1 HYDRAULIC BREAKER 11-2
A. SELECTION OF THE HYDRAULIC BREAKER 11-2
B. BEFORE OPERATING THE HYDRAULIC BREAKER 11-2
C. HYDRAULIC OIL LEVEL CHECK AND CONTAMINATION PREVENTION 11-2
D. BASIC OPERATION 11-2
8.2 NIBBLER/BREAKER 11-3
A. MACHINE SET-UP 11-3
B. BASIC MACHINE OPERATION 11-4
1. B (Breaker) Mode – See Figure 8.8 11-4
2. Control Pedal 11-5
a. Hydraulic breaker single circuit 11-5
b. Nibbler and breaker combined (conflux) circuit. 11-5
8.3 SAFETY PRECAUTIONS 11-6
A. USE FOR INTENDED PURPOSE– FIGURE 8.11 11-6
B. PASSENGERS 11-6
C. PROTECTIVE EQUIPMENT– FIGURE 8.12 11-6
D. CYLINDERS– FIGURE 8.13 11-6
E. AVOID CONTINUOUS OPERATION – FIGURE 8.14 11-6
F. HOSE SURGE– FIGURE 8.15 11-7
G. DO NOT USE DROPPING FORCE– FIGURE 8.16 11-7
H. DO NOT USE SWING FORCE– FIGURE 8.17 11-7
I. DO NOT LIFT– FIGURE 8.18 11-7
J. WORKING RANGES– FIGURE 8.19 11-7
8.4 GETTING THE MOST OUT OF YOUR BREAKER 11-8
A. BREAKER PROPER POSITIONING 11-8
B. APPLIED PRESSURE ON BREAKER 11-8
C. BREAKING OVERSIZE ROCKS 11-8
D. SURFACE ROCK DEMOLITION 11-9
E. EXCAVATING AND TRENCHING 11-9
F. RULES TO REMEMBER 11-9
8.5 MAINTENANCE FOR NIBBLER/BREAKER 11-10
8.6 EXTRA (GRAPPLE, CLAMSHELL, ETC) AND EXTRA & BREAKER 11-11
A. MACHINE SET-UP 11-11
1. Setting Boom Selector Valves - Figure 8.26 11-11
2. Setting Arm Selector Valves - Figure 8.27 11-11
B. BASIC OPERATION 11-12
8.7 PATTERN CONTROL CHANGE 11-13
8.8 INSTALLATION OF VANDALISM GUARDS 11-14

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND PROCEDURES FOUND IN THIS MANUAL BEFORE ATTEMPTING ANY OPERATION, INSPECTION OR MAINTENANCE OF THIS MACHINE, ATTACHMENT OR SYSTEMS. KOBELCO CANNOT ANTICIPATE EVERY POSSIBLE CIRCUMSTANCE THAT MIGHT INVOLVE A POTENTIAL HAZARD. THE WARNINGS IN THIS PUBLICATION AND ON THE PRODUCT ARE THEREFORE NOT ALL INCLUSIVE. IF A TOOL, PROCEDURE, WORK METHOD OR OPERATING TECHNIQUE NOT SPECIFICALLY RECOMMENDED BY KOBELCO IS USED, YOU MUST SATISFY YOURSELF THAT IT IS SAFE FOR YOU AND OTHERS. YOU SHOULD ALSO ENSURE THAT THE PRODUCT WILL NOT BE DAMAGED OR MADE UNSAFE BY THE OPERATION, LUBRICATION, MAINTENANCE AND/OR REPAIR PROCEDURES YOU CHOOSE.

https://truckmanualshub.com/

8.1 HYDRAULIC BREAKER

A. SELECTION OF THE HYDRAULIC BREAKER

When mounting a breaker on the hydraulic excavator, it is necessary to match stability, hydraulic pressure, and the oil flow for each breaker. To select hydraulic breakers, contact your Kobelco dealer or vendor source.

B. BEFORE OPERATING THE HYDRAULIC BREAKER

Consult your KOBELCO Dealer for the piping needed for the Boom and Arm when installing a hydraulic breaker. **Replace the hydraulic return filter according to the replacement schedule table listed on page 8-10**. Thoroughly read the Hydraulic Breaker Operation Manual and SAFETY PRECAUTIONS from this section, as well as the Safety Precaution's Section on this manual to avoid damaging the machine or hydraulic breaker during operation. **Select the apropiate hydraulic flow for the breaker by following the instructions detailed in page 8-4.**

C. HYDRAULIC OIL LEVEL CHECK AND CONTAMINATION PREVENTION

When the hydraulic breaker is not installed on the machine, attach the blank plugs to the tube end on the arm-bucket end and the hose end on the hydraulic breaker side to prevent dust and water from entering into the piping.

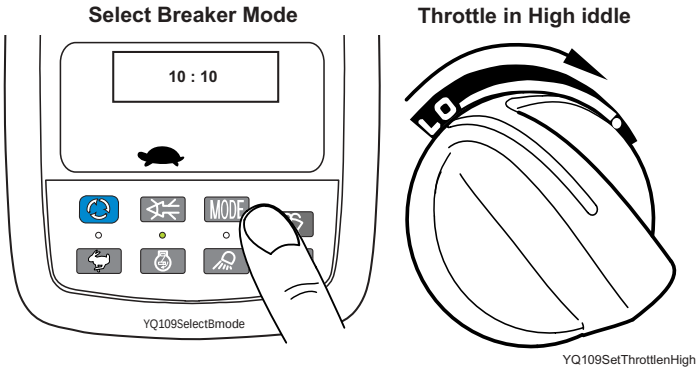
Before starting operation, check the capscrews on the tube fixing clamps for looseness, and the connections of the tubes and hoses for oil leakage.

D. BASIC OPERATION

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND OPERATION PROCEDURES FOUND IN THIS MANUAL BEFORE OPERATING THE MACHINE OR ANY ATTACHMENT.

1. Start Machine and place the safety lock lever in the "UNLOCKED" (down) position. See Figure 8.1.
2. Make sure to select the breaker mode and move throttle control to the "HI" idle position.



3. Using boom, arm and bucket controls set the breaker or nibbler to desired position.
4. Release control pedal lock rod. See Figure 8.2.
5. Make certain breaker or nibbler is in desired position and against material to be broken.
6. Place right foot on pedal and depress with toe to activate breaker or nibbler. See Figure 8.2.
7. Operate breaker or nibbler at one (1) minute intervals.

CAUTION

OPERATION OF BREAKER OR NIBBLER LONGER THAN ONE (1) MINUTE INTERVALS COULD CAUSE PREMATURE WEAR OR DAMAGE TO THE ATTACHMENT AND THE MACHINE. IF MATERIAL IS NOT BREAKING, REPOSITION BREAKER OR NIBBLER AND REPEAT OPERATION IN ONE (1) MINUTE INTERVALS.
NEVER LEAVE THE OPERATOR CAB WITH ENGINE RUNNING.

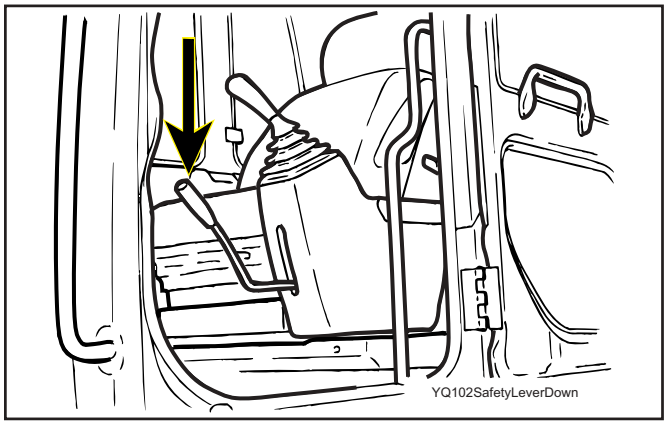


FIGURE 8.1

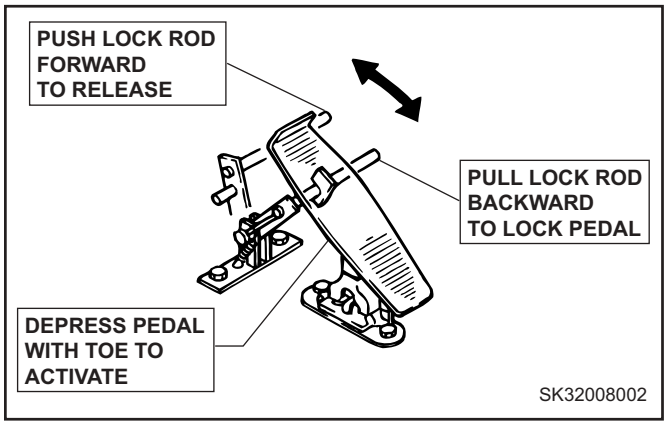


FIGURE 8.2

https://truckmanualshub.com/

8.2 NIBBLER/BREAKER

⚠ WARNING

WEAR GOGGLES, SAFETY SHOES, HARD HAT, WORK CLOTHS, AND WORK GLOVES TO PERFORM ANY INSPECTION OR MAINTENANCE ON THIS MACHINE.

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND OPERATION PROCEDURES FOUND ON THIS MANUAL BEFORE OPERATING THE MACHINE OR ANY ATTACHMENTS.

A. MACHINE SET-UP

For machines provided with the nibbler/breaker system, a selector valve is installed on the main control valve to select the path of the return flow accordingly. See Figure 8.3.

NOTE

- Inappropiate switching of the selector valve may cause decrease of work efficiency and machine damage.
- Be sure to switch selector valve once or twice a month to avoid valve from sticking.

1. Setting return flow selector valve - Figure 8.4 ~ 8.5
   a. Use a 5 mm Allen type wrench to loosen and remove the socket bolt.
   b. Use a 24 mm spanner wrench to turn the selector valve to the proper position.
   c. After the valve is set in the proper position, install the 5 mm socket valve and tighten it.

NOTE

Markings on the selector valve determine the Nibbler or Breaker functions:

B: Breaker **N: Nibbler**

2. Setting stop valve - Figure 8.6

   Make sure to relieve hydraulic system and tank pressure as instructed in page 2-14 (Machine Familiarization) before connecting the attachment hydraulic lines to stop valves.

   a. Locate the stop valves on both sides of the arm, as shown in Figure 8.6.
   b. Use a 24 mm spanner wrench to turn the stop valve to the proper position.

   Make sure to switch the position of the stop valves to the "CLOSED" position before removing the attachment lines.

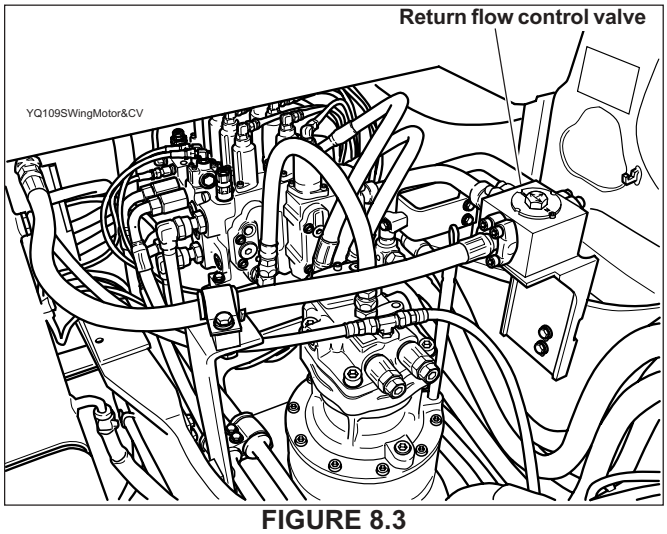


FIGURE 8.3

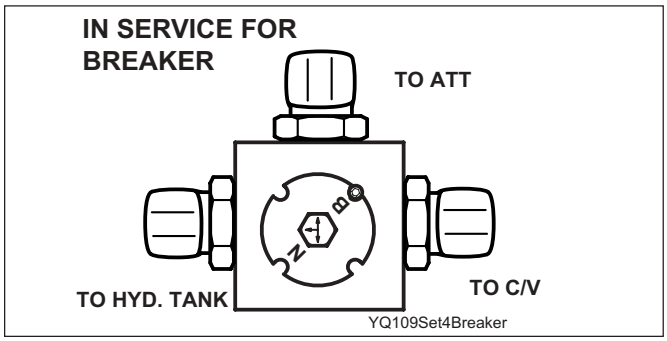


FIGURE 8.4

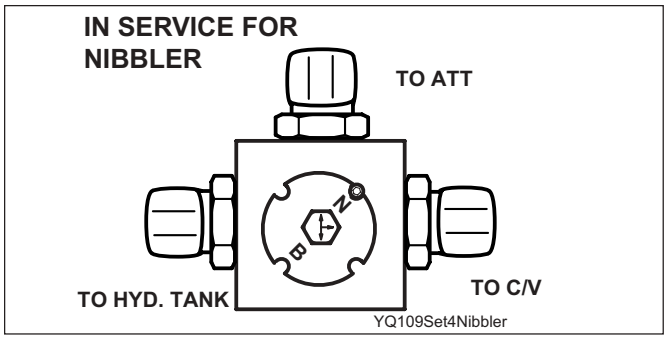


FIGURE 8.5

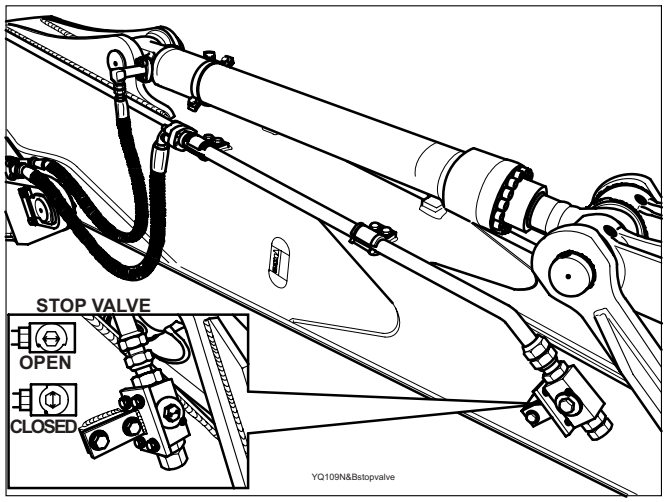


FIGURE 8.6

https://truckmanualshub.com/

B. BASIC MACHINE OPERATION

These instructions are for Dynamic Acera excavators equipped with a bi-directional auxiliary hydraulic valve. This switch is provided on the left side control panel to select a single or double pump flow to the auxiliary system.

a. Press it forward to activate the double pump flow for the auxiliary system.

b. Press it backward to cancel the double pump flow and activate the single pump flow for the auxiliary system.

CAUTION

Never turn switch on bi-directional flow to operate breaker. It may cause damage to machine.

1. B (Breaker) Mode – See Figure 8.8

In case of optional attachments such as breaker, etc. are used, the flow rate can be automatically controlled.

Adjust the max. flow rate by the following procedure:

Each time the work mode is pressed, the work mode indicator lamp is switched to M • A or B in order.

a. Adjustment of max. flow rate

-Turn ignition key on, don't start the engine.

- Select the B (Breaker) mode.

- Press the screen change switch ( ) for 3 ~ 10 sec and release it. The LCD screen displays the flow rate settings.

b. Flow rate display

The flow rate stored last time is displayed. maximum flow rate is displayed as standard value.

-Press the mode switch, see Figure 8.8, to increase the flow rate setting or press the buzzer stop switch to decrease the flow rate setting.

Note: If the switches are depressed for more than 2 sec., the flow rate increases or decreases by 10 Lit/min.

The flow rate can be adjusted from the maximum up to minimum range.

Press the switch for screen change again ( ) to store the desired flow rate value, and the adjust mode is canceled.

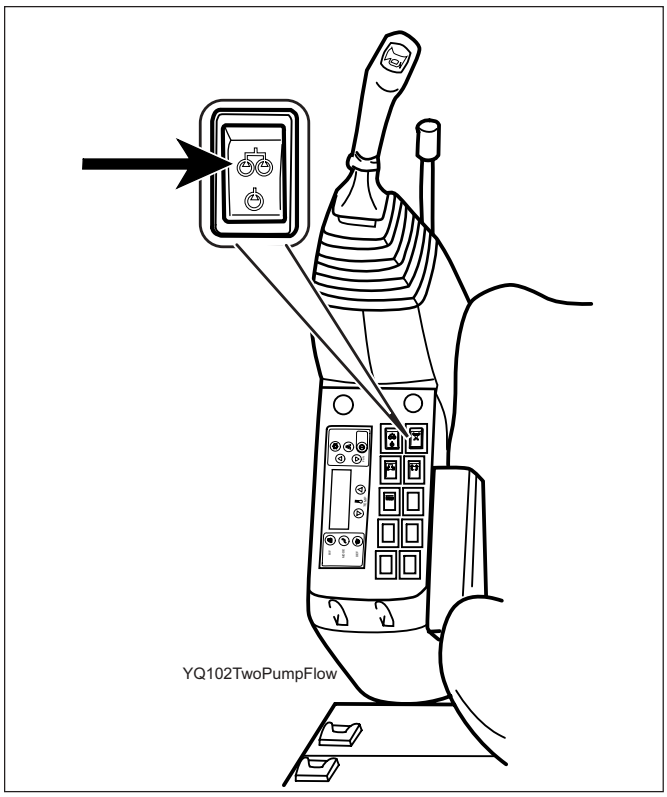


FIGURE 8.7

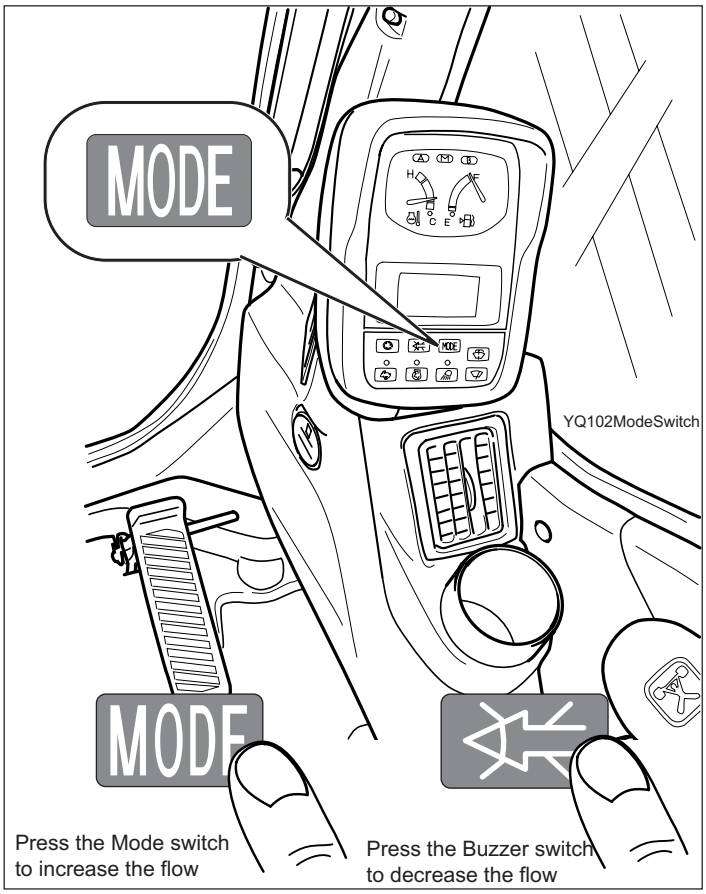


FIGURE 8.8

https://truckmanualshub.com/

2. Control Pedal

a. Hydraulic breaker single circuit

Release pedal lock on the right front side of driver's seat to operate pedal. See Figure 8.10.

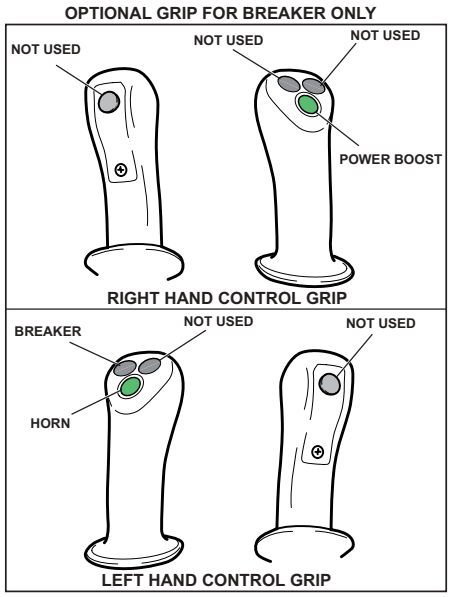
CAUTION

Pedal operation varies upon specifications. Make sure to read the operator's manual carefully before operating optional attachments.

Foot pedal depressing section	Operating condition.
Depress toe section.	Breaker starts operation.
Pedal in neutral position.	Breaker stops operating.

NOTE

If the machine is equipped with optional hand control grip levers, please refer to the figure below to operate breaker.



b. Nibbler and breaker combined (conflux) circuit.

Release pedal lock on the right front side of driver's seat to operate pedal. See Figure 8.10.

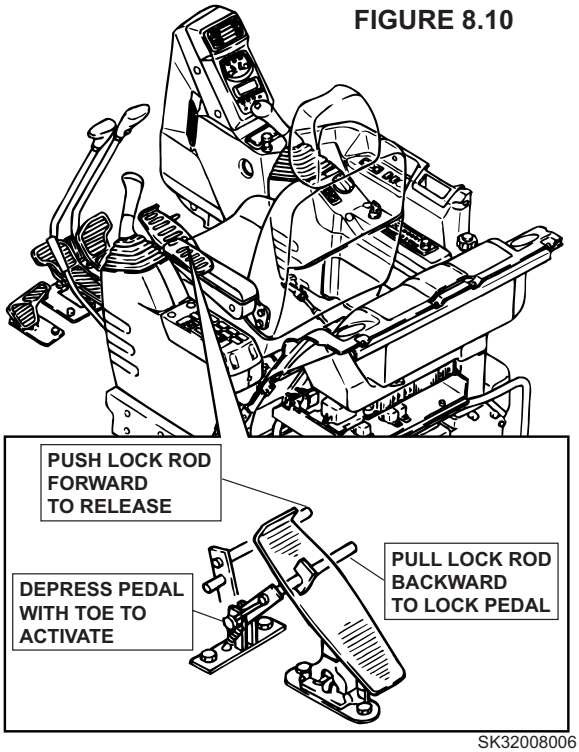
Hydraulic breaker

Foot pedal depressing section	Operating condition.
Pedal in neutral position.	Breaker stops operating.
Depress heel section.	Breaker starts operation.

Nibbler

Foot pedal depressing section	Operating condition.
Depress toe section.	Nibbler close
Depress heel section.	Nibbler open

FIGURE 8.10



SK32008006

⚠ WARNING

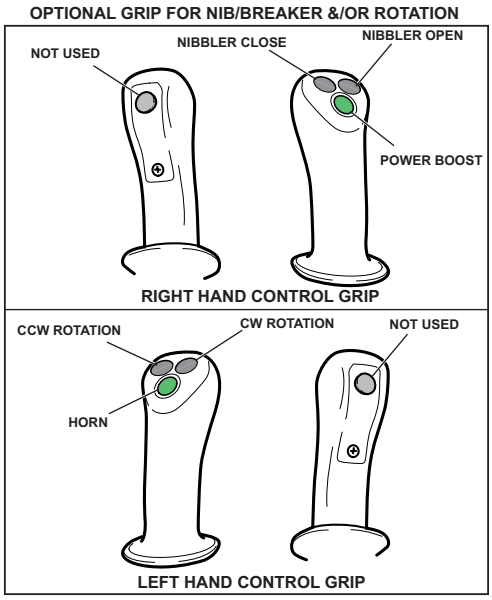
NEVER LEAVE THE OPERATOR CAB WITH ENGINE RUNNING.

CAUTION

OPERATION OF BREAKER OR NIBBLER LONGER THAN ONE (1) MINUTE INTERVALS COULD CAUSE PREMATURE WEAR OR DAMAGE TO THE ATTACHMENT AND THE MACHINE. IF MATERIAL IS NOT BREAKING, REPOSITION BREAKER OR NIBBLER AND REPEAT OPERATION IN ONE (1) MINUTE INTERVALS.

NOTE

If the machine is equipped with optional hand control grip levers, please refer to the figure below to operate Nibbler/Breaker.



11

https://truckmanualshub.com/

8.3 SAFETY PRECAUTIONS

The following safety precautions should be used in conjunction with all other safety precautions found in this manual.

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND OPERATING PROCEDURES FOUND IN THIS MANUAL BEFORE OPERATING THE MACHINE OR ANY ATTACHMENT.

A. USE FOR INTENDED PURPOSE– FIGURE 8.11

Use the attachment only for its intended purpose. If not used in accordance with the manufactures instructions, the excessive pressure exerted on the boom, arm and frame structure of the machine will cause premature failure of the components.

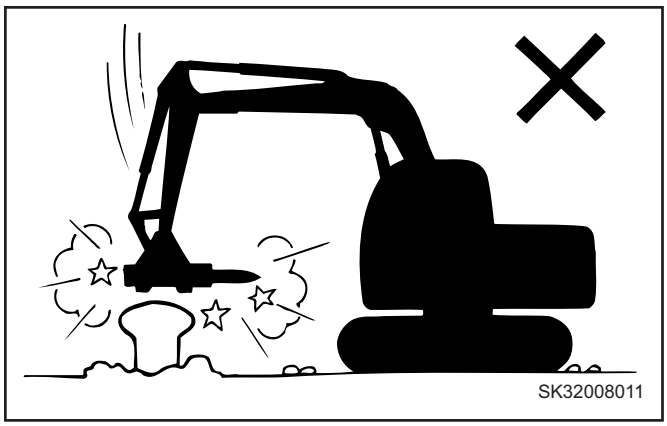


FIGURE 8.11

B. PASSENGERS

Never allow passengers on the attachment or machine.

C. PROTECTIVE EQUIPMENT– FIGURE 8.12

When operating attachments that produce flying debris, it is highly recommended to procure and install protective guards on the machine and close the all window to protect the operator from flying debris. Also the operator and all personnel in the vicinity of the machine should wear protective gear such as safety shoes, hard hat, gloves and face shield or goggles.

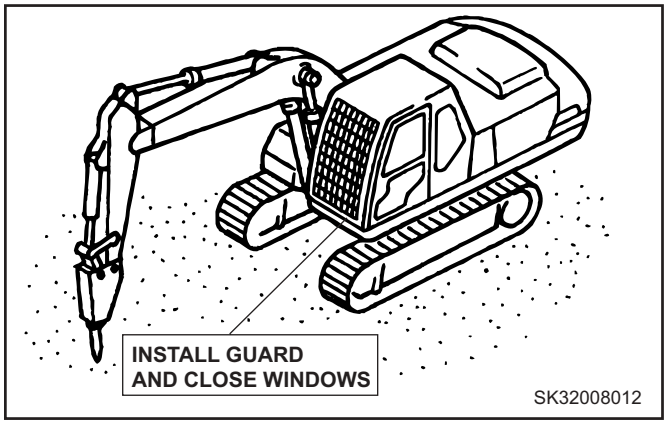


FIGURE 8.12

D. CYLINDERS– FIGURE 8.13

Do not operate boom, arm or bucket cylinders at stroke ends when using a breaker attachment. Doing this can cause undue stress on the cylinder rods and result in damage.

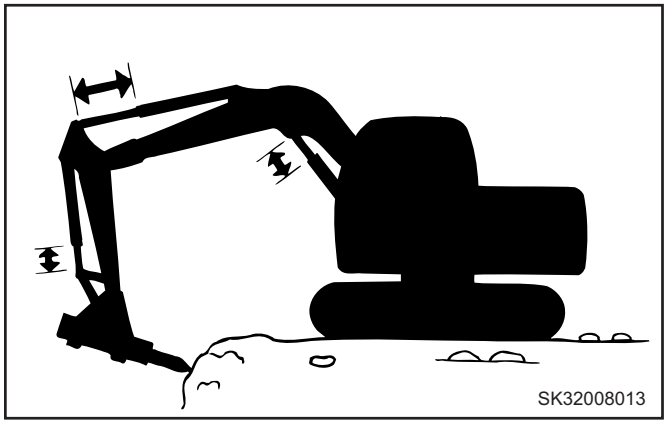


FIGURE 8.13

E. AVOID CONTINUOUS OPERATION – FIGURE 8.14

Operate the nibbler/breaker in one (1) minute intervals. Operation for longer than one (1) minute at a time can cause high oil temperatures and damage the accumulators, cylinder seals and possibly pump damage.

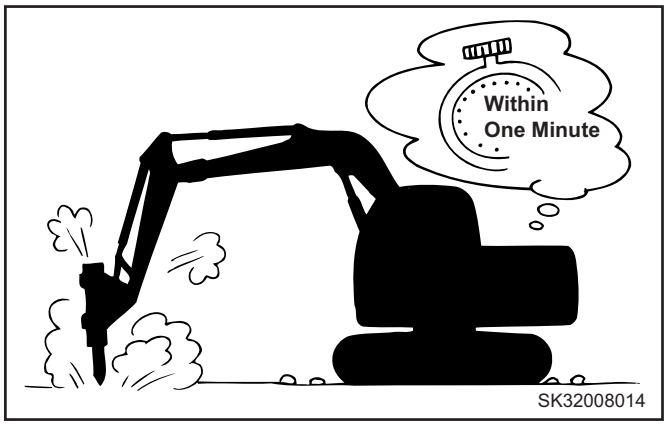


FIGURE 8.14

11

https://truckmanualshub.com/

F. HOSE SURGE– FIGURE 8.15

Should the hydraulic hoses begin to surge or vibrate abnormally during operation of a Breaker or Nibbler, immediately stop operation and contact an Authorized KOBELCO Service dealer for assistance. This problem often is a result of damaged accumulators and can also result in valve failure.

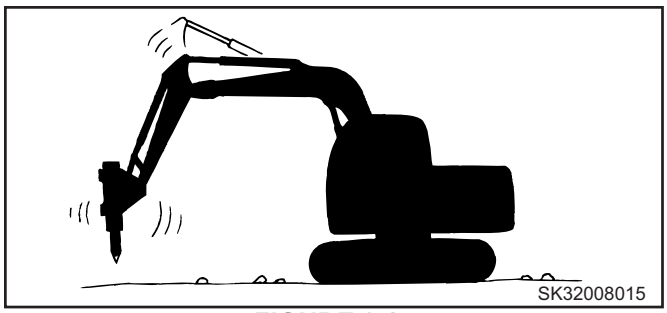


FIGURE 8.15

G. DO NOT USE DROPPING FORCE– FIGURE 8.16

Never use the dropping force of the attachment to break or drive objects. This will cause extensive damage to the attachment and machine structure.

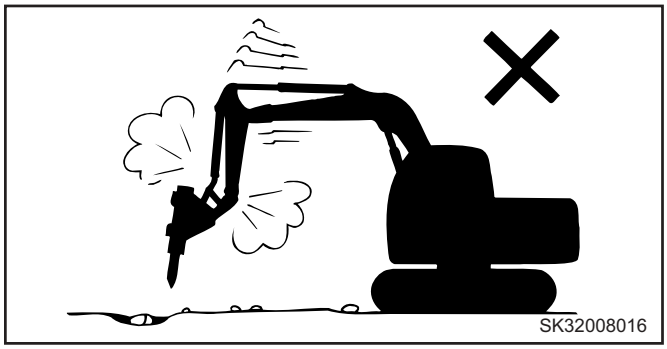


FIGURE 8.16

H. DO NOT USE SWING FORCE– FIGURE 8.17

Never use the swing force of the machine for pushing or sliding objects. This will cause premature failure of the attachment and other machine components.

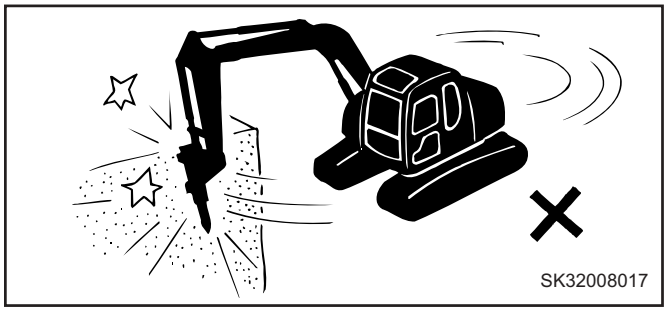


FIGURE 8.17

I. DO NOT LIFT– FIGURE 8.18

Never use an optional attachment to lift or transport objects or material. Doing so can cause extensive damage to the attachment, the machine structures or cause injury or death due to slipping of dropping of load due to improper attachment.

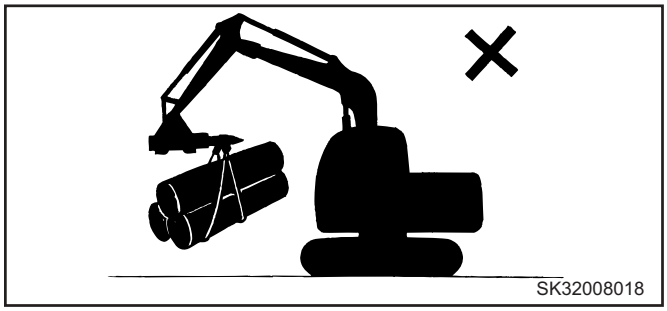


FIGURE 8.18

J. WORKING RANGES– FIGURE 8.19

Never operate an optional attachment over the sides of the machine. Only operate over the front or rear of the tracks.

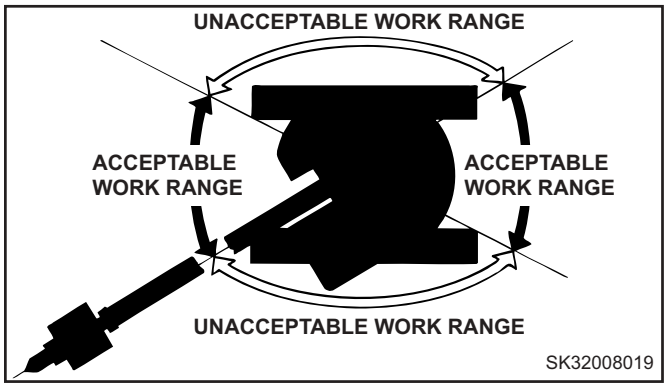


FIGURE 8.19

11

https://truckmanualshub.com/

8.4 GETTING THE MOST OUT OF YOUR BREAKER

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND OPERATING PROCEDURES FOUND IN THIS MANUAL BEFORE OPERATING THE MACHINE OR ANY ATTACHMENT.

A. BREAKER PROPER POSITIONING

Always position the breaker perpendicular to the material you intend to break, see Fig. 8.20. The breaker can be vertical, horizontal, or anywhere in between, as long as the tool is perpendicular to the surface and the pressure applied is in the same direction of the tool.

B. APPLIED PRESSURE ON BREAKER

The breaker must have sufficient pressure between the tool and the surface of the material intended to break to allow the shock wave to flow through the tool and to the material being broken. The applied pressure has to be constantly adjusted by combining the boom, arm, and bucket functions so that the breaker follows the tool at all times during breaker operation.

When the excavator boom is lowered, it normally follows a curved path, which changes the original perpendicular position of the breaker. Therefore, it is very important to keep adjusting the operator's controls to maintain constant perpendicularity between the breaker and the surface of the material being broken. In addition, the applied pressure should be sufficient to avoid the breaker tool from bouncing on the rock rather than transmitting the shock wave into it. The applied pressure should not lift the machine high off the ground, since the excavator can drop suddenly, as the breaker breaks through the material, and harmful shock loads will be transmitted through the entire machine.

C. BREAKING OVERSIZE ROCKS

Do not attempt breaking oversize boulders from the center. It is much more efficient to break these type of rocks from the edges, see Fig. 8.21. Also, do not break into smaller pieces than necessary. There is a direct relationship between the size of the boulders and the size of the breaker. It is inefficient to break large rocks with small breakers and viceversa.

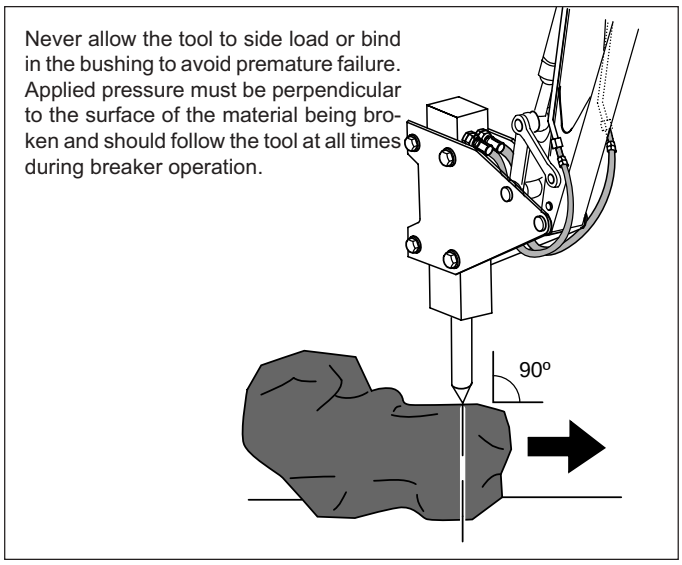


FIGURE 8.20

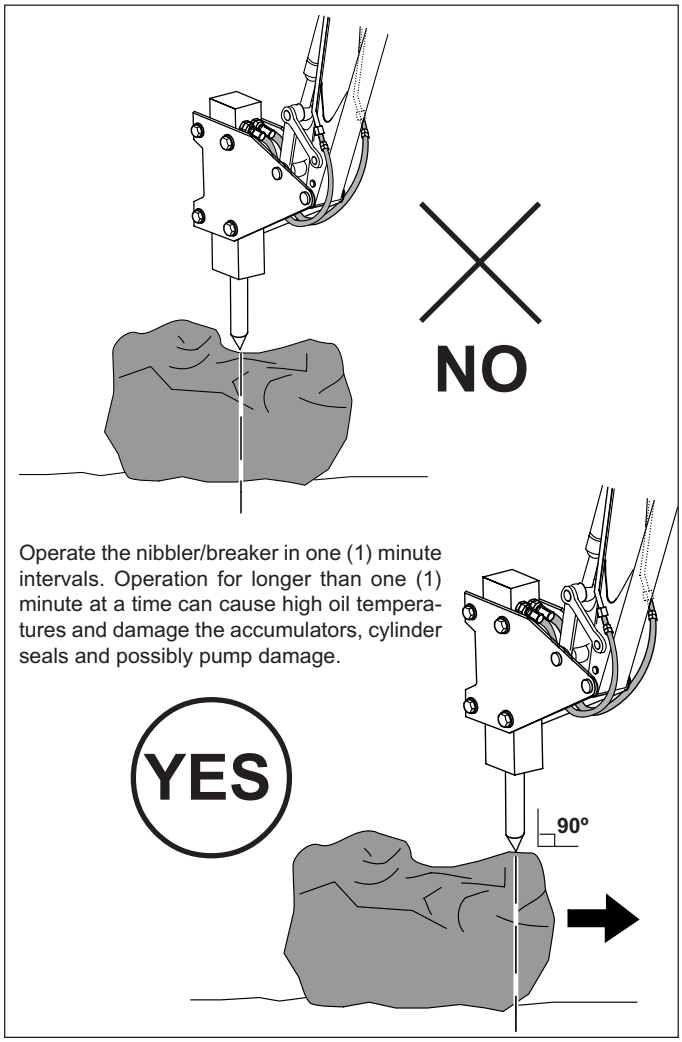


FIGURE 9.21

11

https://truckmanualshub.com/

D. SURFACE ROCK DEMOLITION

Use the breaker just as if it were a hand-held breaker, or a plain hammer an chisel. Adjust the breaker's position according to the work to be done, and take small bites at a time, see Fig. 8.22. The only difference between a hand-held breaker and the hydraulic excavator breaker is the size of the rocks that can be broken. Do not try to break to much at one time.

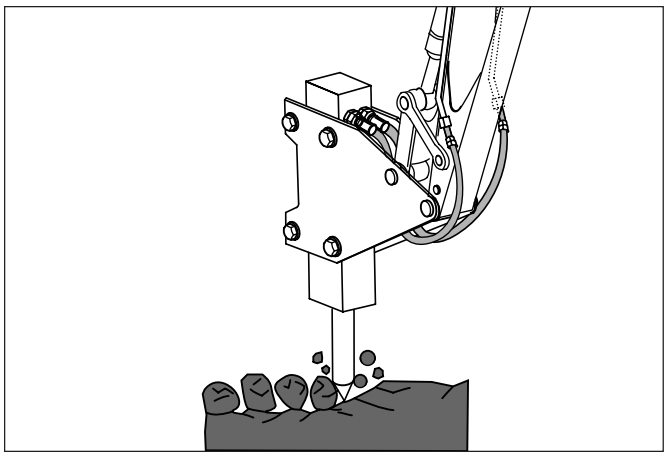


FIGURE 8.22

E. EXCAVATING AND TRENCHING

Lay back side walls a bit at the time so that they do not interfere with the breaker housing. To lessen the opportunity for side-loading, approach each wall from the opposite side by positioning the excavator perpendicular to the trench, see Fig. 8.23.

F. RULES TO REMEMBER

Use the following rules for correct breaker operation:

1. Make sure to adjust the proper hydraulic flow according to the breaker specifications.
2. Place tool against material to be broken at 90º angle to work surface.
3. Use the boom, arm, and bucket controls to press firmly against surface, keeping perpendicularity while operating the breaker.
4. As material breaks, stop breaker quickly to prevent idle strokes.
5. Reposition breaker if material does not break after 15 seconds of operation.
6. Do not bend or pry with the breaker tool while operating.
7. Do not operate breaker with the attachment cylinders at full extension.
8. Do not operate breaker submerged in water.
9. Do not operate breaker for more than a minute at a time.
10. Lubricate breaker every 30 minutes. Keep tool lubricated at all times.

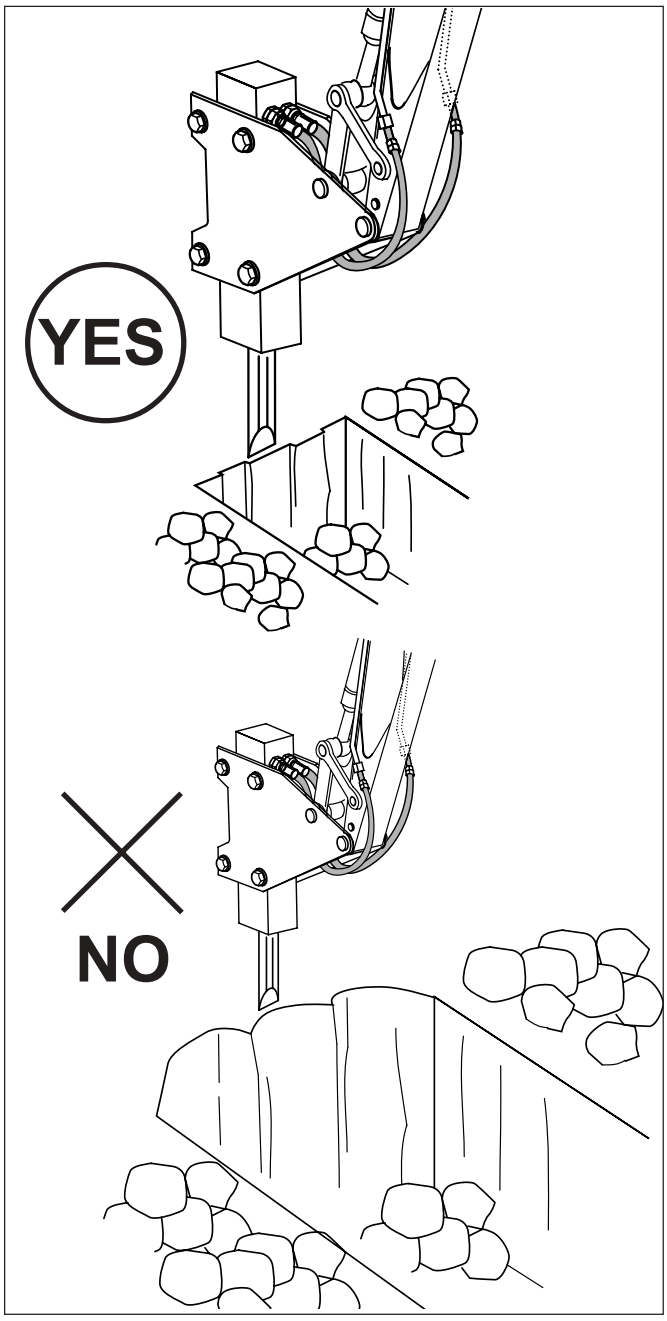


FIGURE 8.23

https://truckmanualshub.com/

8.5 MAINTENANCE FOR NIBBLER/BREAKER

A. It is necessary to perform the following maintenance schedule in regard to Hydraulic Oil and Filters along with normal inspection and maintenance as described in Section 03 of this manual.

NOTE

Make sure to use return filter Part Number:
YN50V00009P1
when using Breaker.

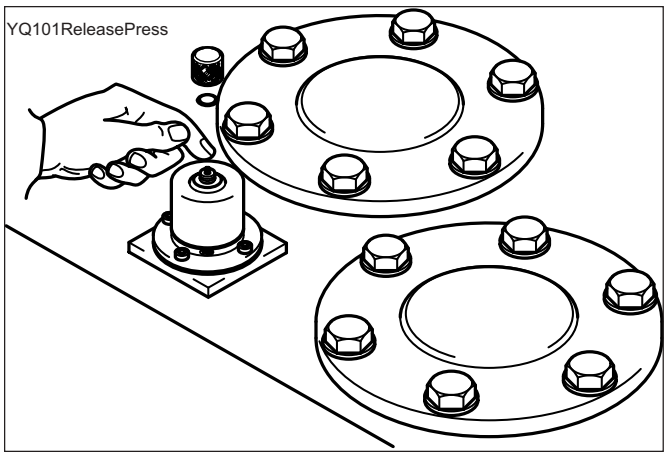
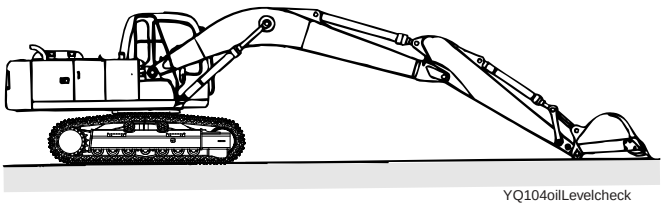


FIGURE 8.24

REPLACEMENT SCHEDULE				
COMPONENT	**LOCATION**	**1ST MAINTENANCE**	**2ND MAINTENANCE**	**REGULAR MAINTENANCE**
CHANGE HYDRAULIC OIL	**HYDRAULIC TANK**	**—**	**—**	**EVERY 600 HOURS**
RETURN FILTER (P/No. YN50V00009P1)	**HYDRAULIC TANK**	**50 HOURS**	**250 HOURS**	**EVERY 250 HOURS**

1. Move machine to firm level ground and place attachment in oil level check position.



2. Release hydraulic tank pressure. See Figure 8.24.
3. Remove the six mounting bolts from the hydraulic return cover plate. See Figure 8.25.
4. Remove “O”-Rings, filter springs and bypass valves. See Figure 8.25.
5. Remove the filter from the housing. See Figure 8.25.
6. Install new filter, bypass valve and spring into housing.
7. Install New “O”-Ring, KOBELCO part number ZD11G20000. Lubricate “O”-Ring before installing.
8. Install cover plates and torque mounting bolts to proper value. Refer to Specifications Section for torque value.

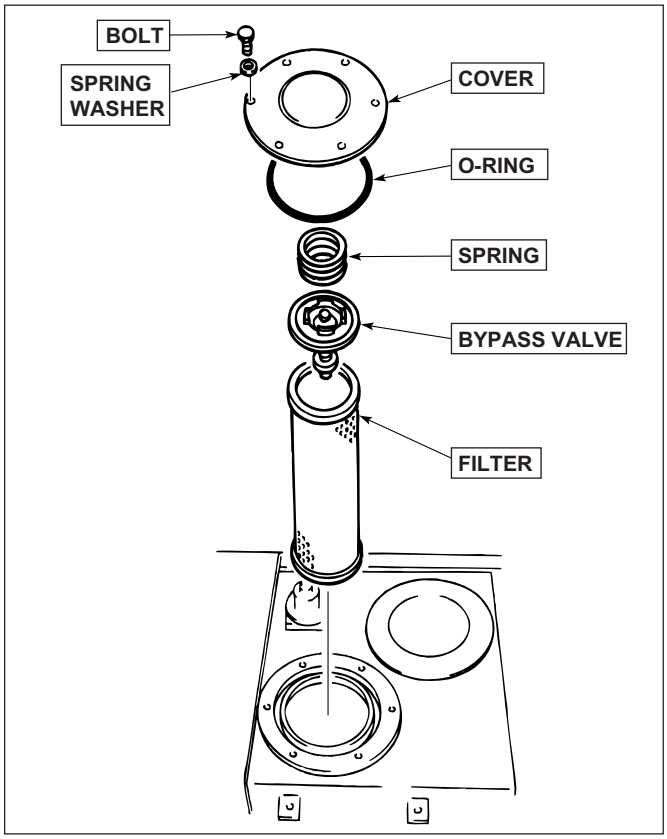


FIGURE 8.25

11

https://truckmanualshub.com/

8.6 EXTRA (GRAPPLE, CLAMSHELL, ETC) AND EXTRA & BREAKER

A. MACHINE SET-UP

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND OPERATING PROCEDURES FOUND IN THIS MANUAL BEFORE OPERATING THE MACHINE OR ANY ATTACHMENT.

1. **Setting Boom Selector Valves - Figure 8.26**
   - **a.** Locate the two (2) selector valves on the boom.
   - **b.** Use a 5 mm Allen type wrench and remove the socket head capscrews.
   - **c.** Using a 24 mm spanner wrench, turn the selectors until the stamped letter “E” is aligned with the socket head capscrew mounting hole.
   - **d.** Reinstall the 5 mm socket head capscrew and tighten securely.

2. **Setting Arm Selector Valves - Figure 8.27**
   - **a.** Locate the two (2) selector valves on the arm.
   - **b.** Use a 5 mm Allen type wrench and remove the socket head capscrews.
   - **c.** Using a 24 mm spanner wrench, turn the selectors until the stamped letter “E” is aligned with the socket head capscrew mounting hole.
   - **d.** Reinstall the 5 mm socket head capscrew and tighten securely.

NOTE

All selector valves **MUST** be turned to the “E” position or the EXTRA Attachment will not function properly.

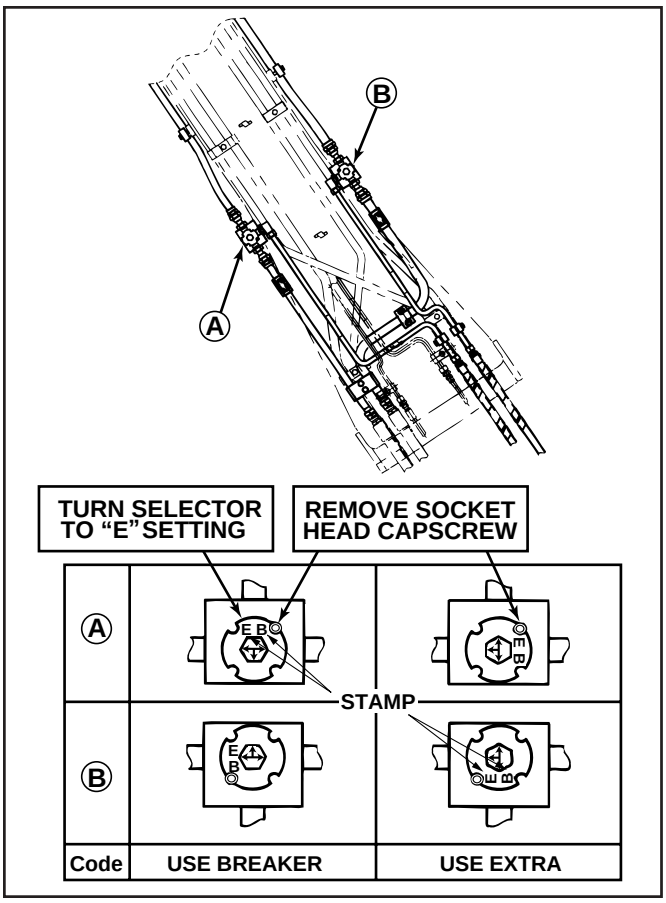


FIGURE 8.26

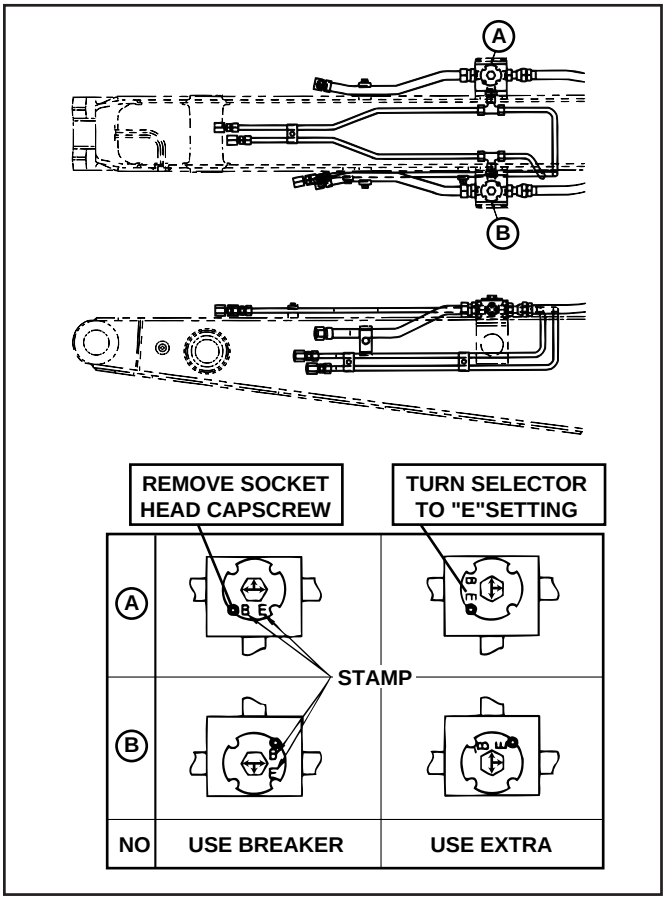


FIGURE 8.27

https://truckmanualshub.com/

B. BASIC OPERATION

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND OPERATING PROCEDURES FOUND IN THIS MANUAL BEFORE OPERATING THE MACHINE OR ANY ATTACHMENT.

1. Start machine and place the safety lock lever in the “UNLOCKED” (down) position. See Figure 8.28.
2. Move throttle control to the “HI” idle position.
3. Place the “EXTRA” switch, located on the L.H. control console, to the “ON” position. See Figure 8.29.
4. Use the boom, arm and bucket controls to position the attachment.
5. Unlock left pedal and place left foot on pedal. Depress with toe to close attachment and depress back of pedal with heel to open attachment. See Figure 8.30.
6. After operation is complete or operator is required to leave the machine, place pedal lock rod in the locked position, operate attachment in hydraulic oil check position, move throttle control to “LO” idle position, and place the EXTRA switch in the “OFF” position.

⚠ WARNING

NEVER LEAVE THE OPERATOR CAB WITH ENGINE RUNNING.

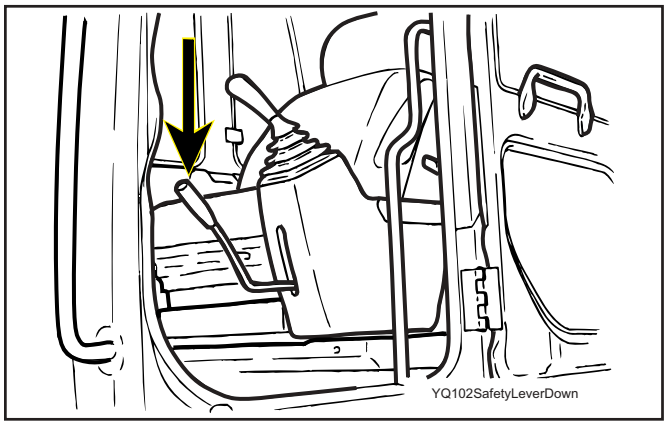


FIGURE 8.28

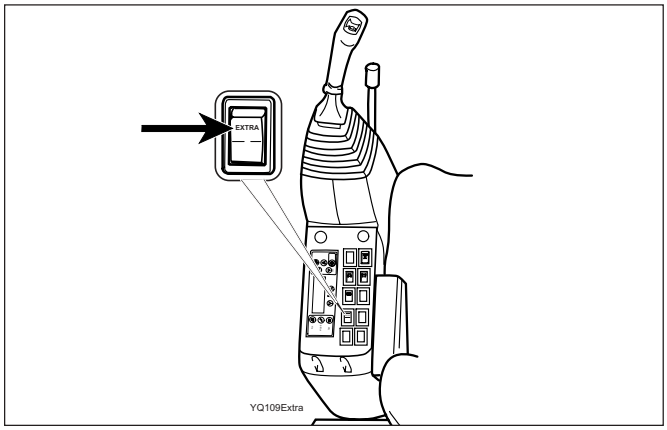


FIGURE 8.29

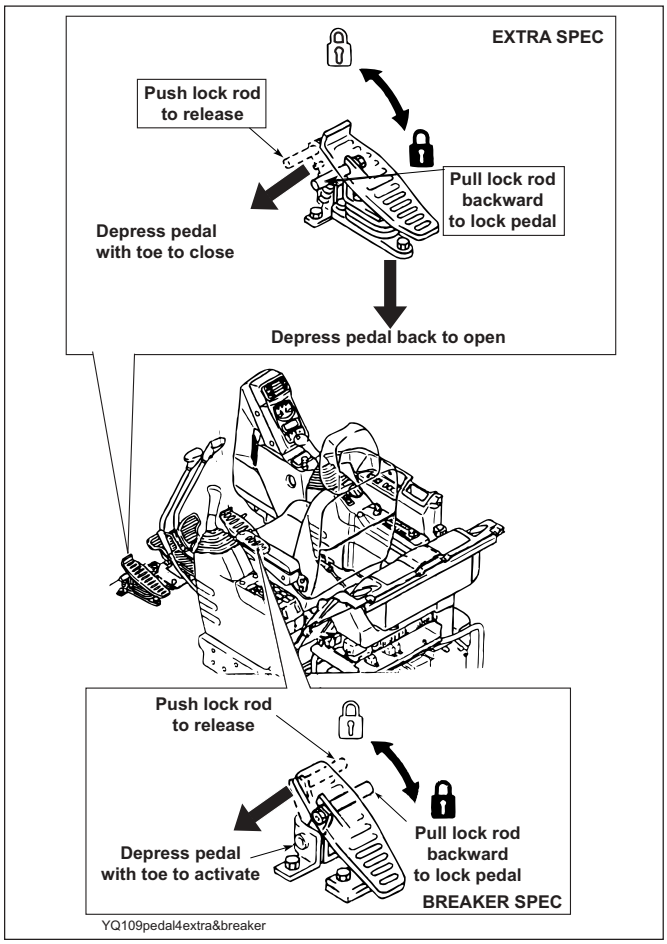


FIGURE 8.30

https://truckmanualshub.com/

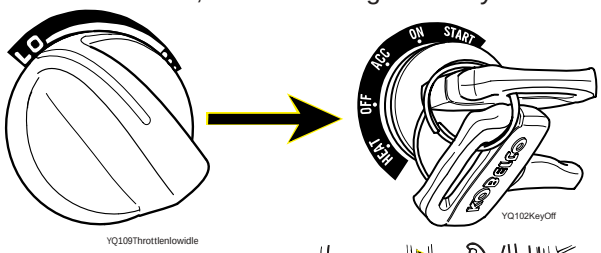
⚠ DANGER

DO NOT OPERATE MACHINE UNLESS YOU HAVE READ AND UNDERSTOOD THE INSTRUCTIONS IN THE OPERATOR'S MANUAL. IMPROPER MACHINE OPERATION IS DANGEROUS AND COULD RESULT IN INJURY OR DEATH.

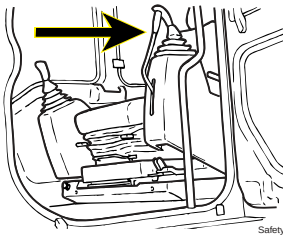
8.7 PATTERN CONTROL CHANGE

A. To change the machine's control pattern from SAE to Back Hoe Loader pattern, proceed as follows:

1. Place the attachment on the ground, throttle control in low idle, and turn the ignition key off.

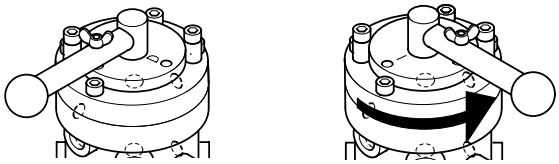


2. Place the safety lever in the lock and up position before leaving the cab.



3. Open the air cleaner compartment door, locate the pattern changer valve and change valve's handle postion from "I" (SAE) to "D" (Back Hoe Loader).

SAE PATTERN **BHL PATTERN**



⚠ WARNING

CHECK MACHINE'S CONTROL PATTERN FOR CONFORMANCE TO PATTERN ON DECAL-CARD IN CAB. IF PATTERN DOES NOT MATCH DECAL-CARD ON CAB DOOR HOLDER, FLIP DECAL-CARD ON HOLDER TO MATCH THE MACHINE'S CONTROL PATTERN BEFORE OPERATING MACHINE. FAILURE TO DO SO COULD RESULT IN INJURY.

⚠ WARNING

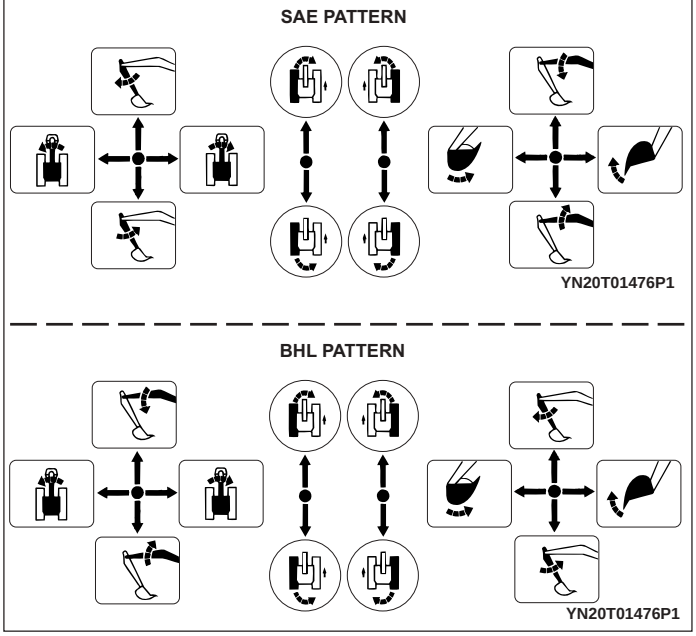
SHOULD THE CONTROL PATTERN DECAL-CARD IS LOST, ORDER P/N: YN20T01476P1.

NOTE

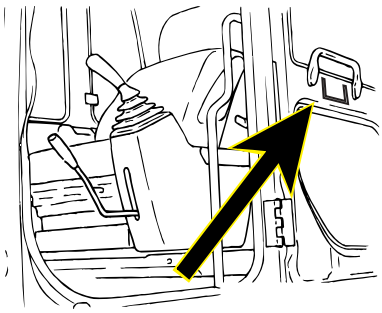
If your machine does not have the pattern changer valve, and would like to add this feature, please contact your Kobelco representative to order YN64H00101F1.

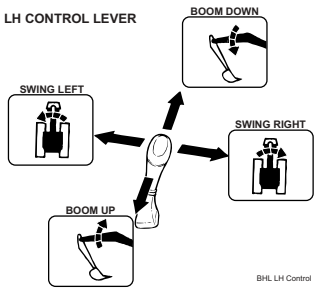
⚠ WARNING

WHENEVER A CHANGE IS MADE TO THE MACHINE'S CONTROL PATTERN, ALSO EXCHANGE THE PATTERN DECAL IN THE CAB TO MATCH THE NEW PATTERN.



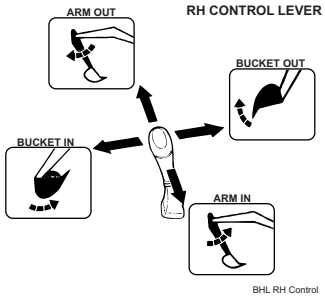
B. Make sure to place the BHL pattern plate in its respective holder, located below the cab door handle. Make sure BHL pattern is showing.





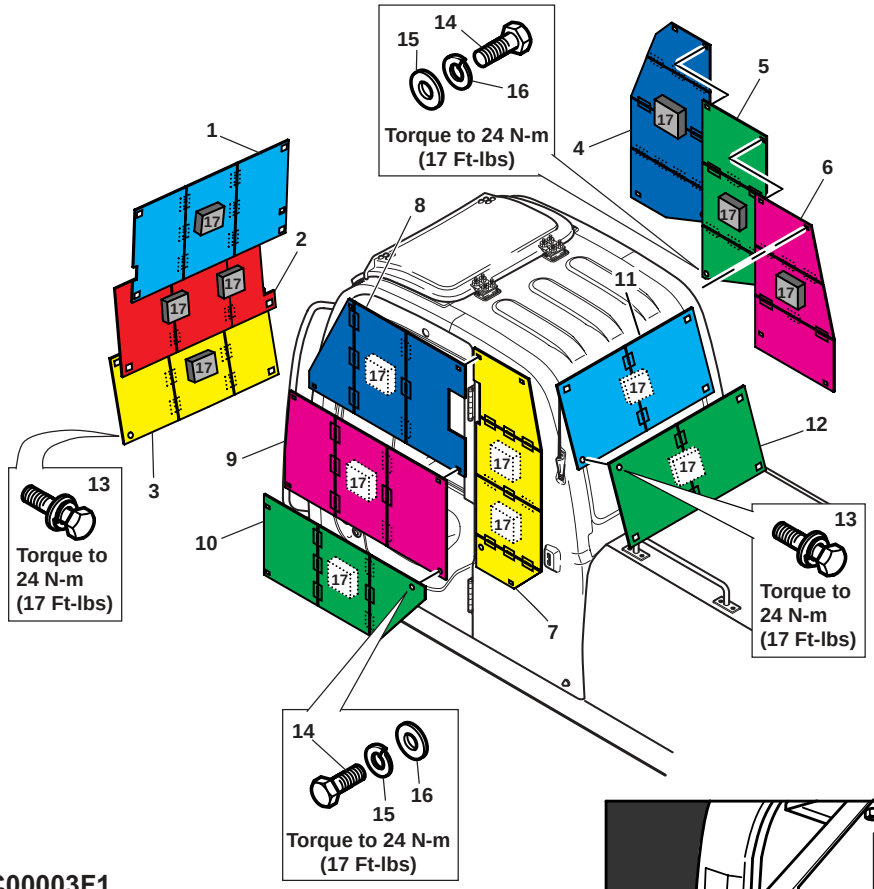
C. Slowly operate Left Hand control to make sure it matches BHL pattern and to familiarize yourself with the new control pattern.

D. Slowly operate Right Hand control to make sure it matches BHL pattern and to familiarize yourself with the new control pattern.



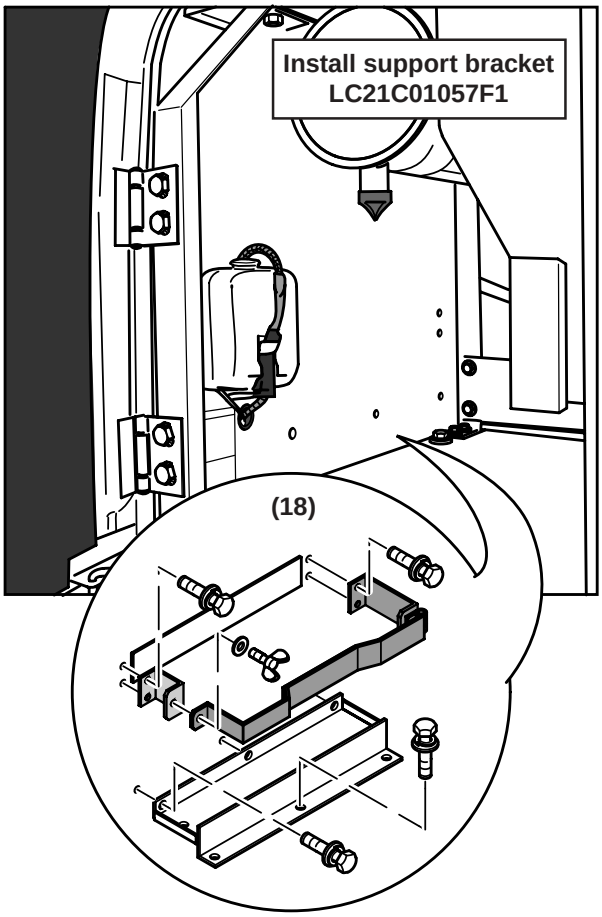
https://truckmanualshub.com/

8.8 INSTALLATION OF VANDALISM GUARDS



KIT P/N: YN25C00003F1

ITEM	PART NUMBER	DESCRIPTION	QTY	OBSERVATIONS
1	YN25C01010P1	GUARD	1	
2	YN25C01012P1	GUARD	1	
3	YN25C01011P1	GUARD	1	
4	YN25C01007P2	GUARD	1	
5	YN25C01008P2	GUARD	1	
6	YN25C01009P2	GUARD	1	
7	YN25C01006P1	GUARD	1	
8	YN25C01005P1	GUARD	1	
9	YN25C01004P1	GUARD	1	
10	YN25C01003P1	GUARD	1	
11	YN25C01002P1	GUARD	1	
12	YN25C01001P1	GUARD	1	
13	ZM22C08020	SEMS-BOLT	2	Torque to 24 N-m (17 Ft-lbs)
14	ZS18C08014	CAP SCREW	2	Torque to 24 N-m (17 Ft-lbs)
15	ZW26X08000	LOCK WASHER	2	
16	ZW16X08000	WASHER	2	
17	YN25C01014P1	MAGNET	14	Place between guard and cab window
18	LB21C01057F1	BRACKET ASSY	1	Install behind cab, inside air cleaner compartment



https://truckmanualshub.com/

Table of contents

Page

9.1 GENERAL 12-2
9.2 RELEASING TRAVEL MOTOR BRAKES 12-2
A. Tools & Equipment Required 12-2
B. Procedures 12-2
9.3 LOWERING ATTACHMENT WHEN SUDDEN ENGINE FAILURE OCCURS 12-6
9.4 RELEASING SWING BRAKE 12-7
A. Tools & Equipment Required 12-8
B. Procedures 12-8
9.5 BLEEDING THE PILOT SYSTEM 12-10
A. Tools & Equipment Required 12-10
B. Bleeding Procedure 12-10

WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND PROCEDURES FOUND IN THIS MANUAL BEFORE ATTEMPTING ANY OPERATION, INSPECTION OR MAINTENANCE OF THIS MACHINE, ATTACHMENT OR SYSTEMS. KOBELCO CANNOT ANTICIPATE EVERY POSSIBLE CIRCUMSTANCE THAT MIGHT INVOLVE A POTENTIAL HAZARD. THE WARNINGS IN THIS PUBLICATION AND ON THE PRODUCT ARE THEREFORE NOT ALL INCLUSIVE. IF A TOOL, PROCEDURE, WORK METHOD OR OPERATING TECHNIQUE NOT SPECIFICALLY RECOMMENDED BY KOBELCO IS USED, YOU MUST SATISFY YOURSELF THAT IT IS SAFE FOR YOU AND OTHERS. YOU SHOULD ALSO ENSURE THAT THE PRODUCT WILL NOT BE DAMAGED OR MADE UNSAFE BY THE OPERATION, LUBRICATION, MAINTENANCE AND/OR REPAIR PROCEDURES YOU CHOOSE.

https://truckmanualshub.com/

9.1 GENERAL

The Dynamica Acera excavators incorporate automatically applied spring brake systems in the travel motors and swing motors. These systems will automatically engage the brakes when the engine is stopped, making it possible to move the machine. This section contains the required procedures for releasing the travel motor brakes, the swing motor brake and lowering the attachments to the ground should sudden engine failure be experienced.

⚠ WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND PROCEDURES FOUND IN THIS MANUAL BEFORE ATTEMPTING ANY OPERATION, INSPECTION, MAINTENANCE OR REPAIRS OF THIS MACHINE, ATTACHMENT OR ANY OR ITS SYSTEMS.

⚠ WARNING

THE PROCEDURES FOUND IN THIS SECTION SHOULD BE PERFORMED BY A WELL TRAINED EXPERIENCED SERVICE TECHNICIAN WHO IS FAMILIAR WITH THE KOBELCO EXCAVATORS.

9.2 RELEASING TRAVEL MOTOR BRAKES

A. Tools & Equipment Required

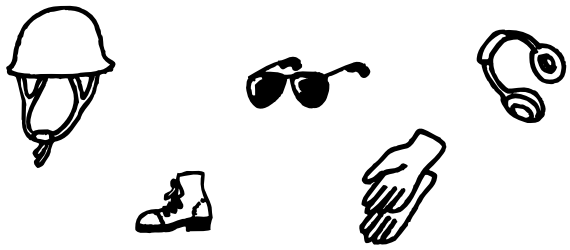
1. Four (4) chock blocks
2. One (1) 14 mm Allen type socket wrench.
3. One (1) 8 mm Allen type socket wrench.
4. Two (2) 6 liter (1.6) Gal capacity drain pans.
5. Two (2) M10-1.5 X 30 mm lifting eyes.
6. Two (2) M12-1.75 X 20 mm lifting eyes.
7. Overhead lifting device capable of lifting and holding 45 Kg (100 lbs).
8. Torque wrench 10~16 Kgf-m (72~116 ft-lb) capacity or better.
9. Thread sealant (for drain and check/fill plugs), and loctite # 515 for cover bolts.
10. Rubber or soft face mallet.

B. Procedures

1. Place chock blocks at front and rear of each track to prevent machine from moving when brakes are released. See Figure 10.1.
2. Lower attachment to ground. See "9.3 Lowering Attachment" in this Section for proper procedures.

⚠ CAUTION

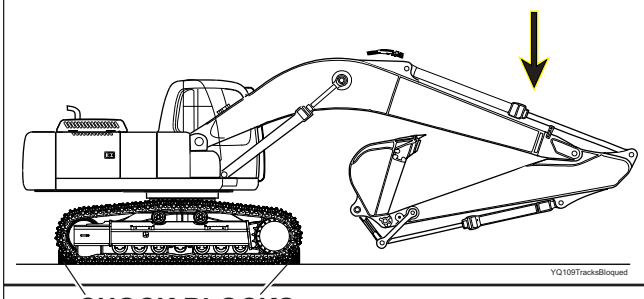
USE SAFETY PROTECTION SUCH AS: HARD HAT, WORKING GLOVES, SAFETY SHOES AND SAFETY GLASSES WHEN NEEDED TO PERFORM THIS JOB.



SK32001002

⚠ CAUTION

AVOID OIL SPILLS. USE CONTAINERS, RAGS, AND/OR PAPER TOWELS TO CONTAIN ANY OIL LEAKAGE. DISPOSE ALL WASTE OILS, FLUIDS, LUBRICANTS AND OTHER HAZARDOUS WASTE PROPERLY, ACCORDING TO GOVERNMENT REGULATIONS.



⚠ WARNING

MAKE CERTAIN CHOCK BLOCKS ARE SECURE AT FRONT AND REAR OF EACH TRACK BEFORE ATTEMPTING TO RELEASE BRAKES. NEVER STAND IN THE PATH OF THE TRACKS WHEN RELEASING BRAKES.

FIGURE 9.1

https://truckmanualshub.com/

3. Turn key switch “OFF” and remove key. See Figure 9.2.
4. Remove check/fill plug from each travel motor using the 14 mm socket head wrench. See Figure 9.3.

⚠ CAUTION

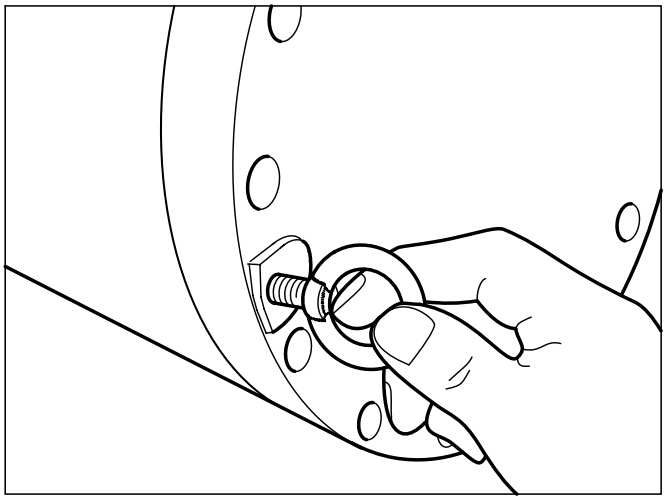
REDUCTION UNIT MAY BE UNDER PRESSURE. REMOVE PLUG SLOWLY.

5. Place a clean empty container under each travel motor drain plug and remove drain plug using the 14 mm socket head wrench. See Figure 9.4.

NOTE

If the reduction unit drain plug is not at its lowest point (6:00 o’clock) for draining, just drain as much oil as possible through the plug orifices, then:

- Remove the reduction unit cover plate mounting bolts, as indicated in Figure 9.5. Leave a couple of bolts half way installed on the top side of the cover to hold it from coming completely out.
- Remove the two bolts from the bossed areas and install the two (2) M10-1.5 X 30 mm lifting eyes into each one of these holes, as shown in the figure below.



- Attach the overhead lifting device to the lifting eyes and remove most of the slack from the chain or cable.
- Use a rubber mallet to strike the edge of the cover plate gently to help releasing it from the housing, until oil starts draining.

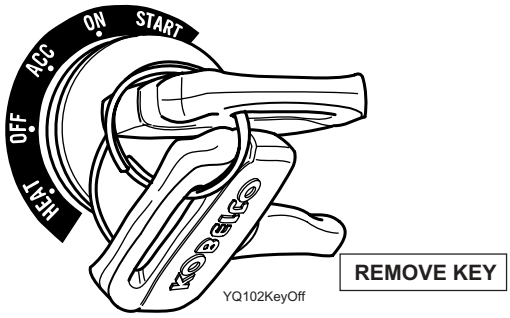


FIGURE 9.2

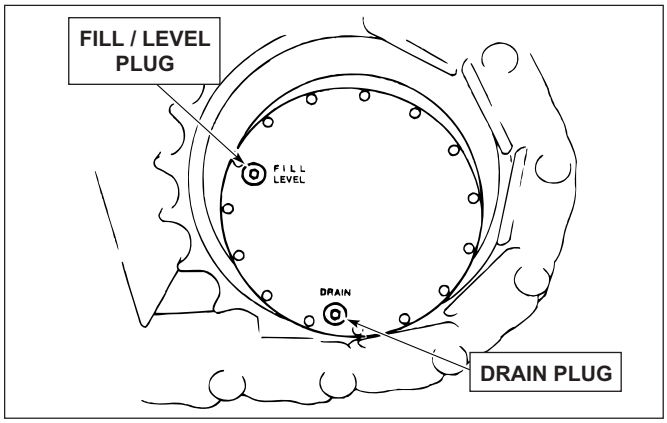


FIGURE 9.3

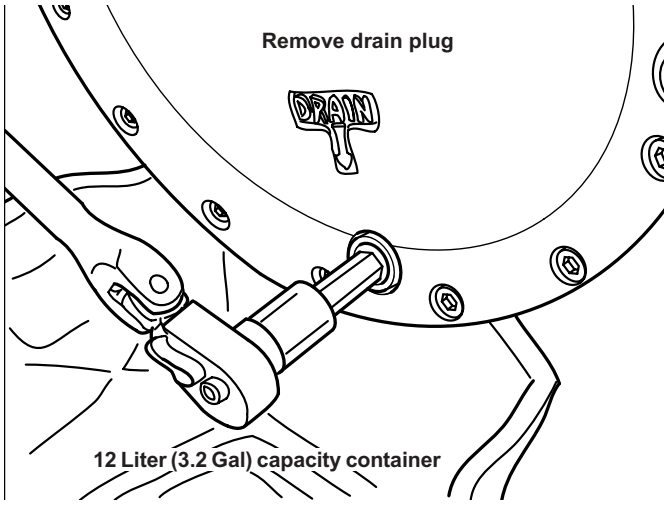


FIGURE 9.4

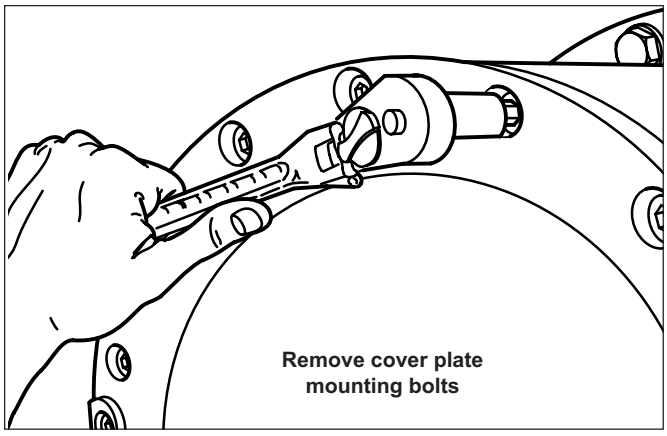


FIGURE 9.5

https://truckmanualshub.com/

6. After all of the gear oil has drained, cover the drain pans to prevent contamination and move them to an area away from the machine.
7. Remove the bolts holding the Reduction Unit cover and remove the cover. Be careful not to damage the cover plate seal or its surface lip.

⚠ CAUTION

Protect your hands from pinching areas at all times when removing or installing planetary gears.

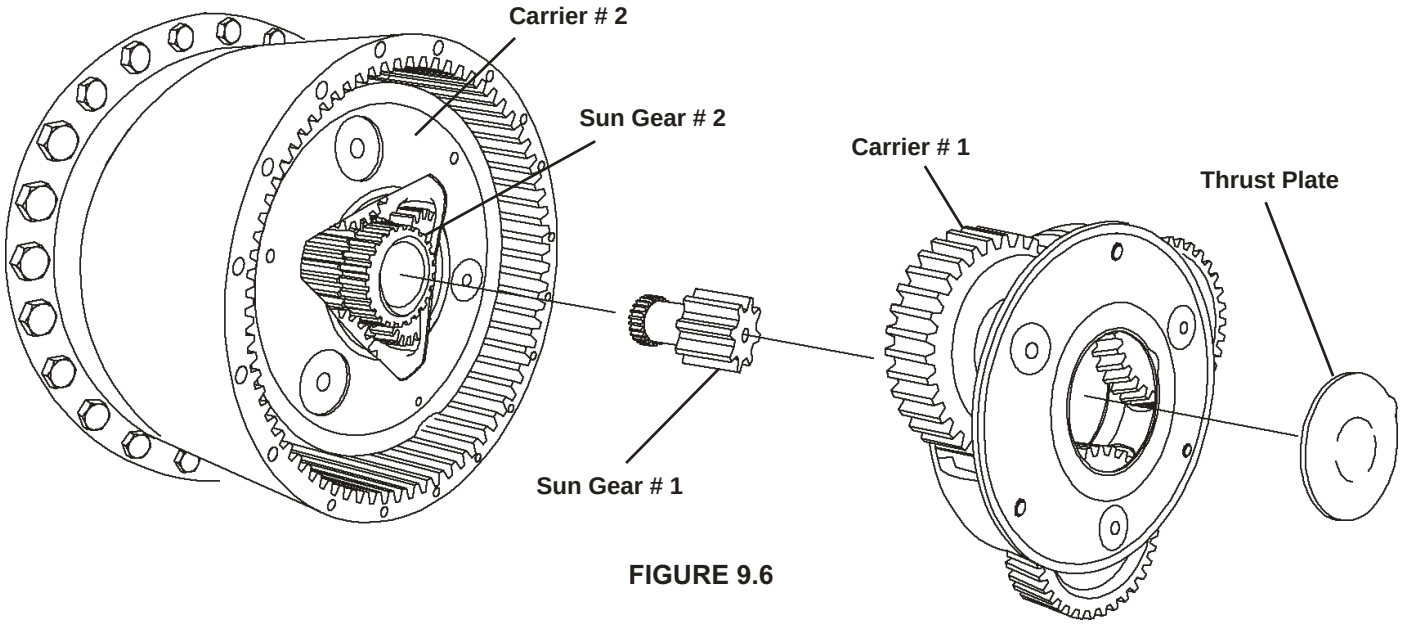


FIGURE 9.6

8. Use Fig. 9.6 as reference to identify the internal parts of the travel reduction unit assembly.
9. Use the tip of a screw driver and remove the thrust washer as indicated in Fig. 9.7.

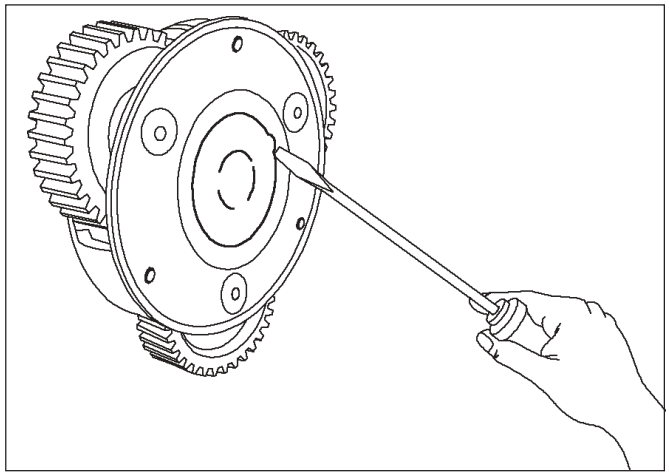


FIGURE 9.7

10. Install the M10 eye bolt onto the number one carrier assembly and use the crane hook on the eye bolt to pull out the carrier as indicated in Fig. 9.8, and remove most of the slack from the cable or chain. Work the carrier by hand to remove it.

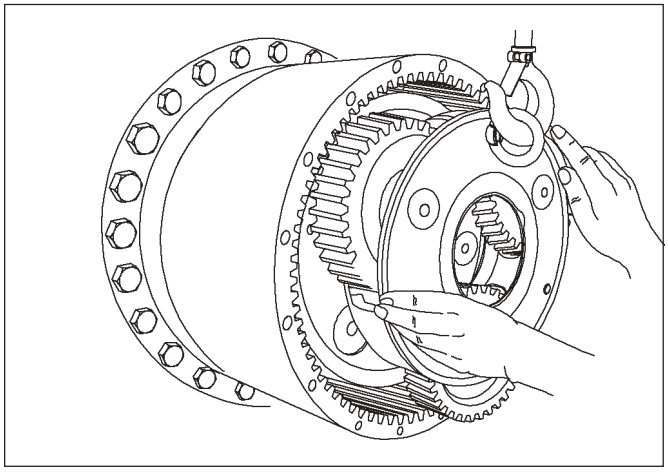


FIGURE 9.8

12

https://truckmanualshub.com/

11. Remove the sun gear # 1. See Fig. 9.9.

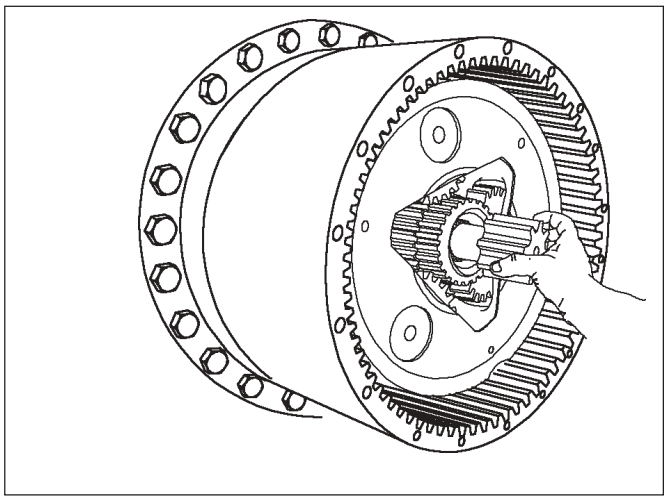
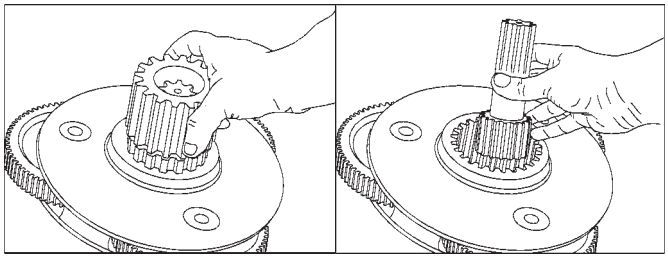


FIGURE 9.9

If the sun gear can not be removed due to the loaded condition, remove it together with the number one carrier. Then remove the sun gears # 2, and # 1 respectively, as shown in Fig. 9.10.



Remove Sun Gear # 2 Remove Sun Gear # 1

FIGURE 9.10

12. Make sure the gear coupling for Sun Gear # 1, and Sun Gear # 2 are properly installed. See Figure 9.11.

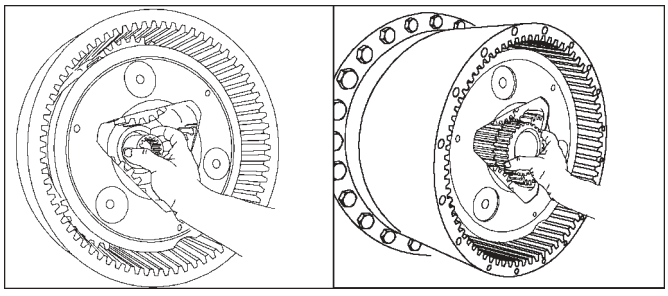


FIGURE 9.11

13. Reinstall the number 1 carrier assembly (DO NOT INSTALL SUN GEAR # 1) into reduction unit and remove the special eye bolt. Make sure to use plenty of grease on the thrust plate to hold it on place during assembling.

14. Install cover plate onto reduction unit housing and tighten all bolts securely.

15. Install drain plug and refill reduction unit with drained oil.

16. Install fill/level plug.

17. Repeat steps 4~16 on the opposite travel reduction unit to prepare machine for towing.

18. After all repairs are made, reinstall sun gear # 1 on both reduction units in reverse order and make sure to use fresh gear oil. Refer to Maintenance Section, for proper oil and capacities.

TORQUE SPECIFICATIONS FOR BOTH MODELS

Apply loctite 515 on cover bolts and torque to:
7.5 kgf•m (54 ft.lbs.)
Use teflon tape on plugs and torque to:
16 kgf•m (116 ft.lbs.)

⚠ CAUTION

AVOID OIL SPILLS. USE CONTAINERS, RAGS, AND/OR PAPER TOWELS TO CONTAIN ANY OIL LEAKAGE. DISPOSE ALL WASTE OILS, FLUIDS, LUBRICANTS AND OTHER HAZARDOUS WASTE PROPERLY, ACCORDING TO GOVERNMENT REGULATIONS.

https://truckmanualshub.com/

9.3 LOWERING ATTACHMENT WHEN SUDDEN ENGINE FAILURE OCCURS

Should sudden engine failure occur, follow the instructions below to place the attachment on the ground.

NOTE

Rotation of the engine with the starter motor is necessary in order to lower the attachment to the ground. If rotation of the engine is not possible, contact an authorized KOBELCO service technician for service and assistance.

⚠ WARNING

MAKE CERTAIN THE AREA AROUND THE MACHINE IS CLEAR OF PEOPLE AND OBJECTS BEFORE ATTEMPTING THESE PROCEDURES.

1. Locate the engine emergency stop control at the lower R.H. corner of the seat base and pull control out. See Figure 9.12.
2. Place the safety lock lever in the “UNLOCKED” (Down) position. See Figure 9.13.
3. Sound horn to alert people in the area of machine movement.
4. Turn the ignition key to the “START” position to use starter motor to rotate the engine.

CAUTION

Only operate the Starter Motor in 20 second intervals and allow 3 ~ 5 minutes between intervals to allow the starter motor to cool.

5. While engine is rotating, slowly and carefully move the R.H. control lever forward (boom down) and lower boom completely to ground. See Figure 9.14.
6. After Boom is completely down, leave the ignition key in the ON position, operate the arm, bucket and swing controls to release hydraulic pressure in these circuits. Turn ignition key off.
7. Locate hydraulic tank air breather on top of hydraulic tank. Remove cap and depress stem until all internal hydraulic tank pressure is released. See Figure 9.15.

⚠ WARNING

USE CAUTION WHEN REMOVING OR REPAIRING HYDRAULIC COMPONENTS AS HYDRAULIC PRESSURE MAY EXIST OR BE TRAPPED IN CIRCUITS.

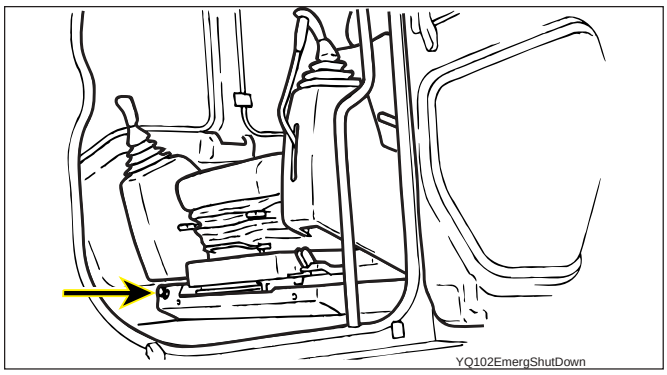


FIGURE 9.12

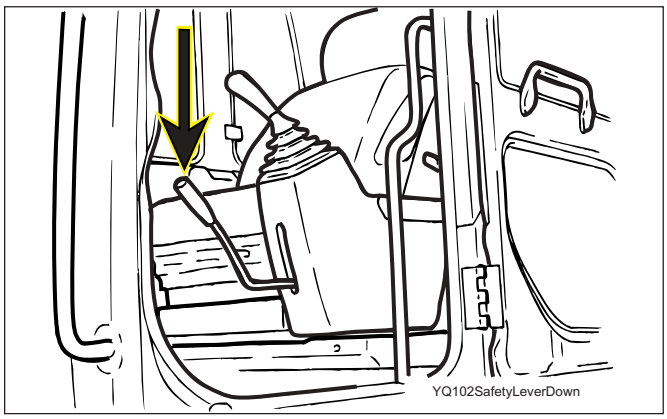


FIGURE 9.13

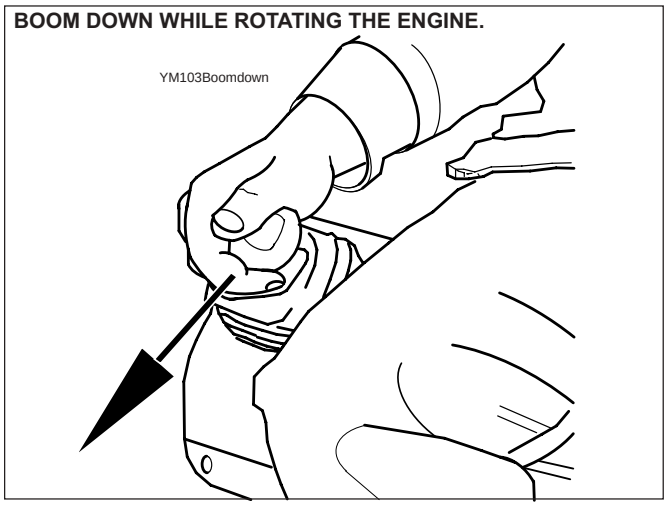


FIGURE 9.14

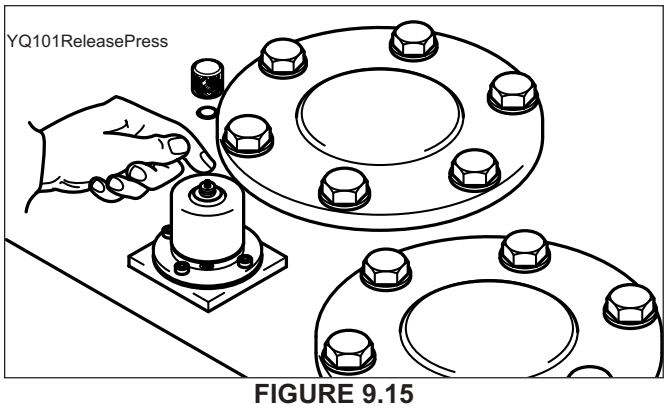


FIGURE 9.15

https://truckmanualshub.com/

9.4 RELEASING SWING BRAKE

⚠ WARNING

MAKE CERTAIN THAT THE ATTACHMENT IS ON THE GROUND TO HELP PREVENT SUDDEN ROTATION OF THE UPPER STRUCTURE BEFORE ATTEMPTING TO RELEASE THE SWING BRAKE. REFER TO PAGE 10-6 FOR ATTACHMENT LOWERING PROCEDURES.

Kobelco highly recommends the use of a hydraulic hand pump to release the swing brake manually when the engines fails to start. Refer the Figure 9.16B to use the proper fitting connector on PG port. Remove the hose and install the proper connector on PG port. Install the hydraulic hand pump and apply hydraulic pressure:

29 Kgf/cm² (413 psi)

CAUTION

IN HIGHLY CONTAMINATED ENVIRONMENTS IT IS RECOMMENDED TO REMOVE THE WHOLE SWING MOTOR ASSEMBLY, IF A HYDRAULIC HAND PUMP IS NOT AVAILABLE. REFER TO THE SHOP MANUAL FOR SPECIAL INSTRUCTIONS OR CONTACT YOUR KOBELCO DEALER'S SERVICE DEPARTMENT FOR ASSISTANCE. WHEN THE SWING MOTOR IS REMOVED, MAKE SURE TO USE CAPS AND PLUGS ON HOSES, TUBES AND FITTINGS TO PROTECT THE HYDRAULIC SYSTEM FROM ANY CONTAMINATION. ALSO, A COVER MUST BE USED TO PROTECT THE SLEWING GEAR COMPARTMENT. IF THIS APPROACH IS TAKEN, AND THE SLEWING GEAR GREASE BATH BECOMES CONTAMINATED, MAKE SURE TO FLUSH AND CLEAN THE SLEWING GEAR COMPARTMENT. REFER SPECIFICATION SECTION FOR PROPER GREASE AND COMPONENT CAPACITY.

If a hydraulic hand pump is not available, and the contamination can be controlled easily, then proceed to the next page for specific instructions on a different alternative to release the swing parking brake.

⚠ CAUTION

USE SAFETY PROTECTION SUCH AS: HARD HAT, WORKING GLOVES, SAFETY SHOES AND SAFETY GLASSES WHEN NEEDED TO PERFORM THIS JOB.

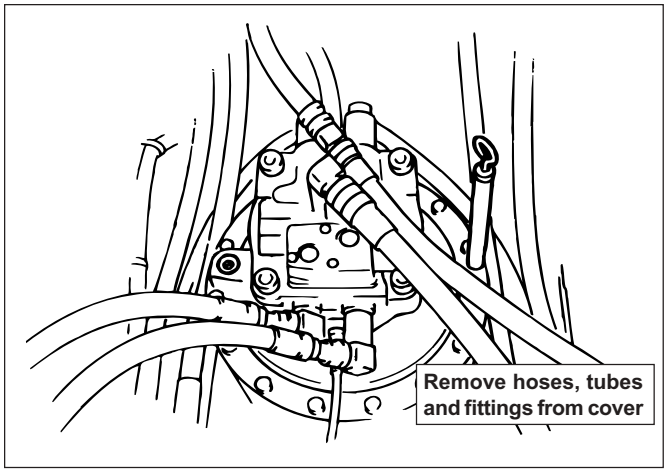
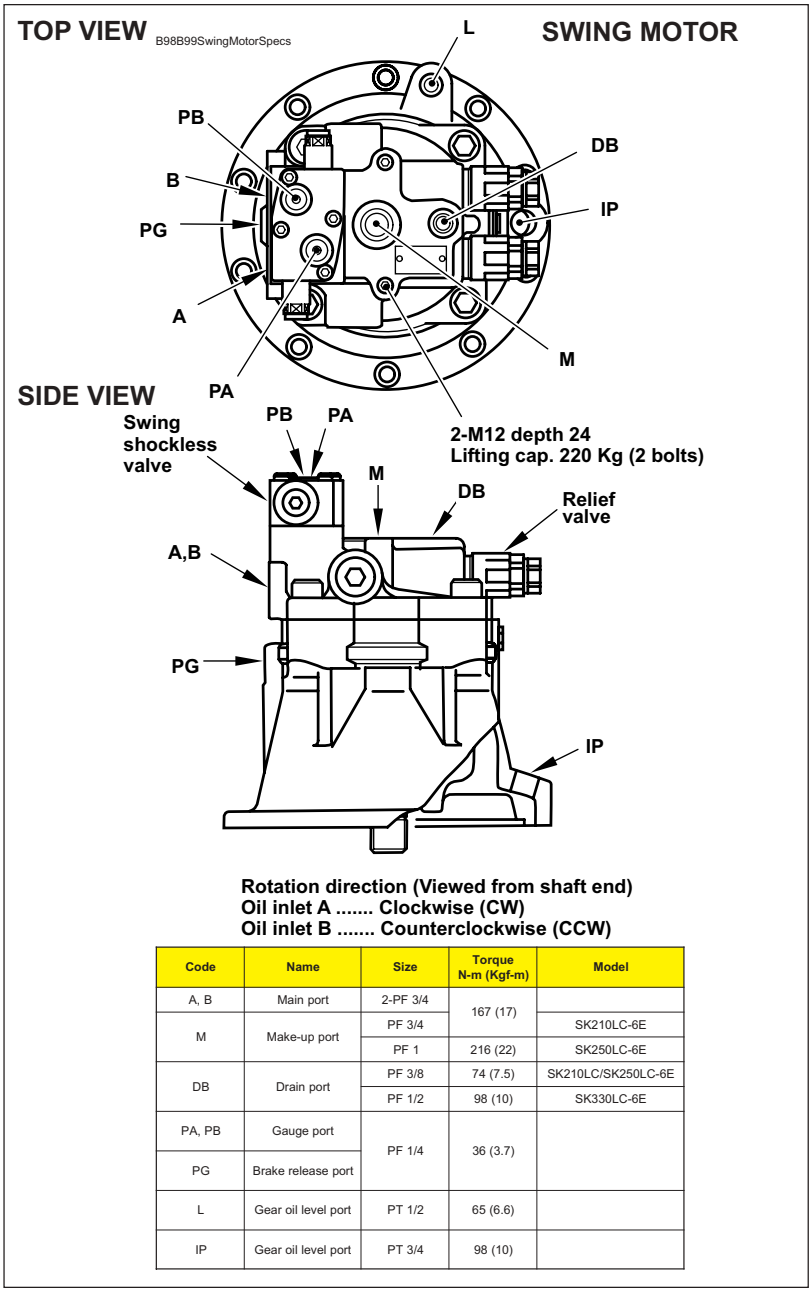


FIGURE 9.16A



Rotation direction (Viewed from shaft end)
Oil inlet A ..... Clockwise (CW)
Oil inlet B ..... Counterclockwise (CCW)

Code	Name	Size	Torque N-m (Kgf-m)	Model
A, B	Main port	2-PF 3/4	167 (17)	
M	Make-up port	PF 3/4		SK210LC-6E
		PF 1	216 (22)	SK250LC-6E
DB	Drain port	PF 3/8	74 (7.5)	SK210LC/SK250LC-6E
		PF 1/2	98 (10)	SK330LC-6E
PA, PB	Gauge port	PF 1/4	36 (3.7)	
PG	Brake release port			
L	Gear oil level port	PT 1/2	65 (6.6)	
IP	Gear oil level port	PT 3/4	98 (10)	

FIGURE 9.16B

12

https://truckmanualshub.com/

A. Tools & Equipment Required

1. Handtools required for removal of hydraulic tubes, hoses and fittings.
2. Plugs and caps for tubes, hoses and fittings.
3. 12 mm Allen type socket head wrench.
4. 5 mm Allen type socket head wrench.
5. Two (2) M12-1.75 X 24 mm Lifting Eye.
6. Overhead lifting device capable of lifting and holding 100 kg (220 lbs).
7. Plenty of clean, dry shop rags and/or paper towels.
8. 17 mm Allen type socket head wrench.
9. 45 kgf-m (325 ft-lb) torque wrench.

B. Procedures

1. Lower attachment to ground and block them to avoid sudden movement. Refer to previous page for proper procedures in lowering the attachment.
2. Remove all hoses and tubes from the swing motor top plate and swing shock valves to gain access to the top plate mountounting bolts. See Figure 9.17.
3. Install the proper plugs and caps onto hoses, tubes and fittings to avoid the possibility of contamination entering the hydraulic system. See Figure 9.18.

CAUTION

Use only plugs and caps designed to properly seal the specific hose, tube or fitting they are to be installed on.

4. Remove two plugs, as indicated in Fig. 9.19, install 2XM12-1.75X24 mm eye bolts, and place a reference mark between top cover and housing.

NOTE

Place a large quantity of clean, dry shop rags around the swing motor to help catch any overflow of hydraulic oil from the removal of the Top Plate.

5. Carefully loosen the four (4) top plate mounting bolts with the 17 mm socket head wrench. See Figure 9.19.
6. Remove two (2) top plate mounting bolts from corners opposite of each other.
7. Attach overhead lifting device to the lifting eyes and remove most of the slack from the cable or chain.
8. Carefully remove the remaining two (2) bolts from the top mounting plate.

NOTE

The top plate will raise from spring pressure as the last two (2) bolts are removes. Some movement of the upper frame may be experienced as the spring tension is released.

9. Using the overhead lifting device, carefully lift the swing motor top cover with swing shock valve assembly and away from the swing motor, see Fig. 9.20.

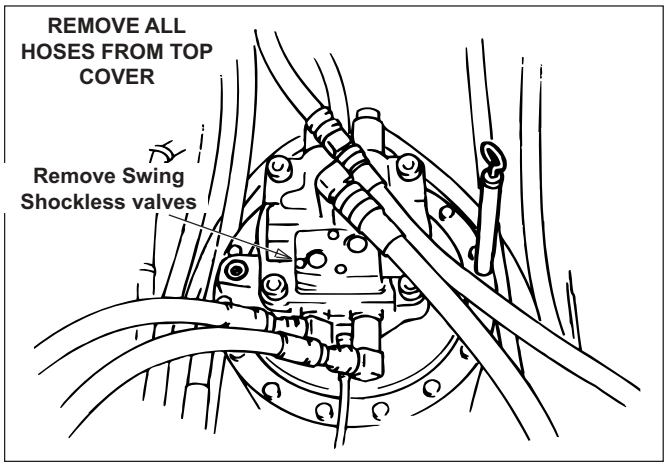


FIGURE 9.17

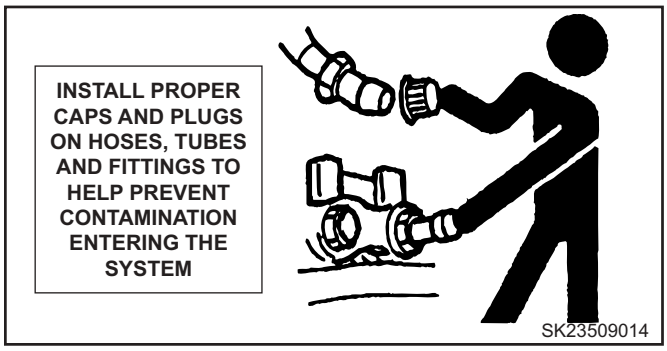


FIGURE 9.18

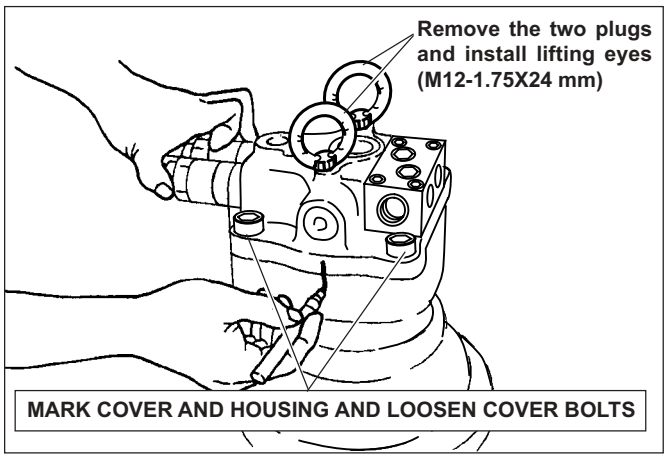


FIGURE 9.19

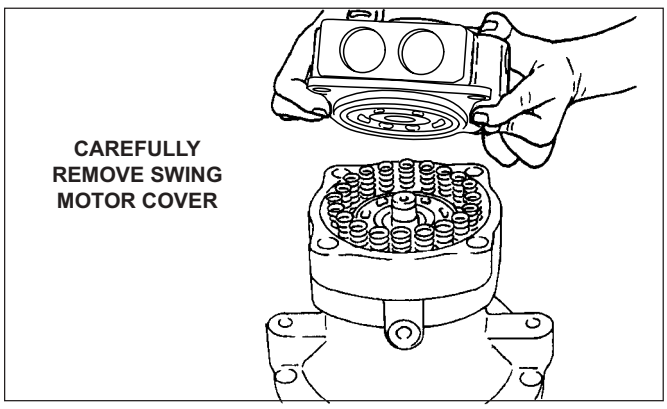


FIGURE 9.20

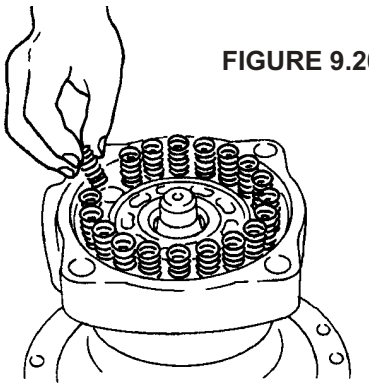
https://truckmanualshub.com/

CAUTION

Do not allow any dirt or debris to enter the swing motor or settle on the top plate.

10. Carefully remove all brake springs and place in a container filled with fresh, clean hydraulic oil. Then, seal the container to prevent contamination. See Figure 9.20.

FIGURE 9.20



11. Align the holes of the distributor plate in the swing motor until they are located toward the front and back of the swing motor housing. See Figure 9.21. Use grease to hold the distributor plate on the top cover, aligned with dowel pins, before installing.

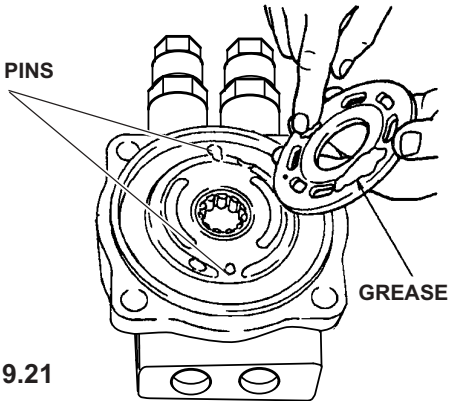


FIGURE 9.21

12. Carefully place the top plate over the swing motor and align the dowel pins of the top plate with the holes in the distributor plate. See Figure 9.22. Slowly lower the top plate into position on the swing motor and install, by hand, the four (4) top plate mounting bolts.

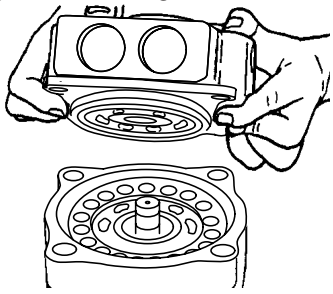
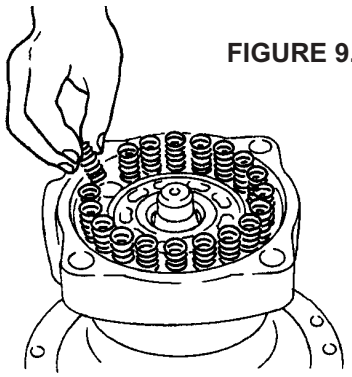


FIGURE 9.22

13. After the machine upper structure is positioned for towing, remove cover again and reinstall the swing brake springs, see Fig. 9.23.

FIGURE 9.23



14. Repeat steps 11~13 to lock the upper frame into position for proper transportation. Make sure to use grease to hold the distributor plate on top cover before installing, see Fig. 9.24.

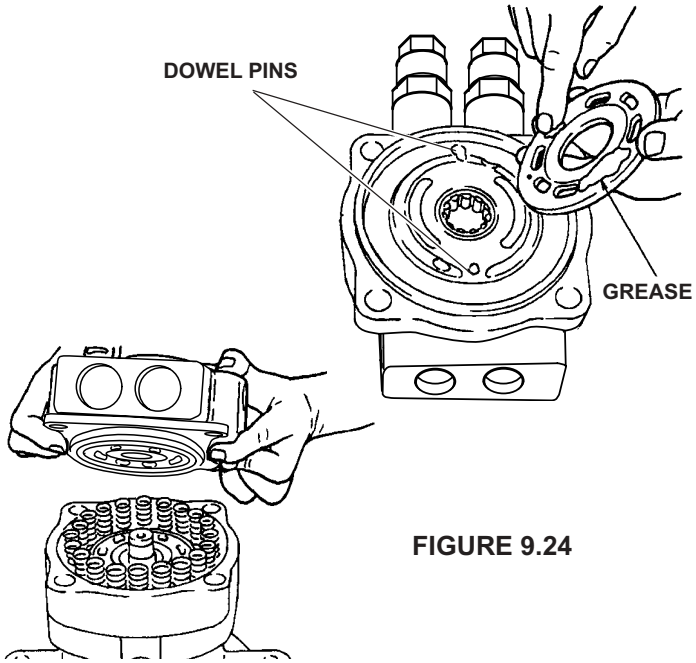


FIGURE 9.24

CAUTION

Make certain the top plate dowel pins and the distributor plate holes mesh together.

⚠ CAUTION

AVOID OIL SPILLS. USE CONTAINERS, RAGS, AND/OR PAPER TOWELS TO CONTAIN ANY OIL LEAKAGE. DISPOSE ALL WASTE OILS, FLUIDS, LUBRICANTS AND OTHER HAZARDOUS WASTE PROPERLY, ACCORDING TO GOVERNMENT REGULATIONS.

12

https://truckmanualshub.com/

9.5 BLEEDING THE PILOT SYSTEM

⚠ WARNING

AVOID OIL SPILLS. USE CONTAINERS, RAGS, AND/ OR ABSORBENT TOWELS TO CONTAIN ANY OIL LEAKAGE. DISPOSE ALL WASTE OILS, FLUIDS, LUBRICANTS AND OTHER HAZARDOUS WASTES PROPERLY.

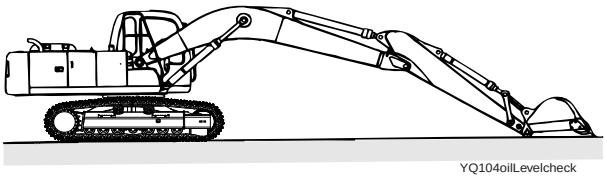
Whenever the hydraulic system is opened for repairs, pilot line change, etc., it is highly recommend that you bleed the pilot system to prevent erratic or delayed operation of the machine normal functions.

A. Tools & Equipment Required

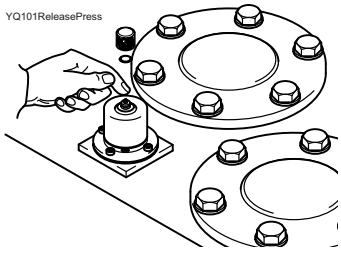
1. A set of 1/2" drive metric sockets and wrenches including sizes 13 ~ 22 mm.
2. A 1/2" drive ratchet.
3. Sufficient rags and paper towels.

B. Bleeding Procedure

1. Make sure the machine to firm level ground and the attachments are positioned on the ground in the oil level check position as indicated in the figure.


YQ104oilLevelcheck

2. Release hydraulic tank pressure.

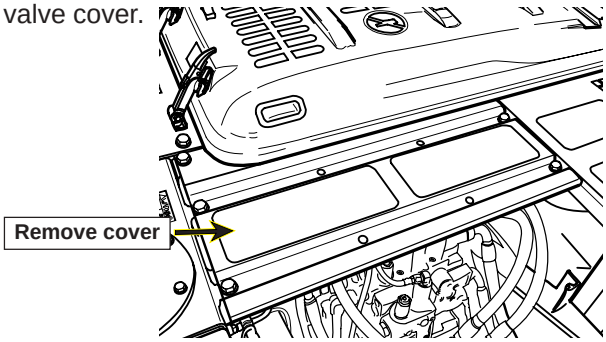

YQ101ReleasePress

⚠ WARNING

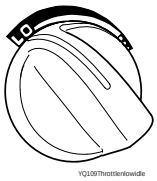
Use safety protection such as: hard hat, working gloves, safety shoes and safety glasses when needed to perform this job.

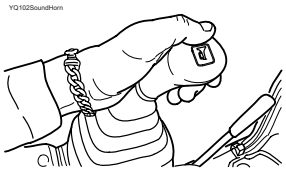


3. Use a 19 mm wrench and remove the main control valve cover.

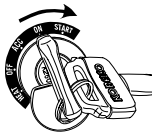


4. Make sure the throttle control is positioned in low idle and sound horn before starting.


YQ109ThrottleInlowidle


YQ102SoundHorn

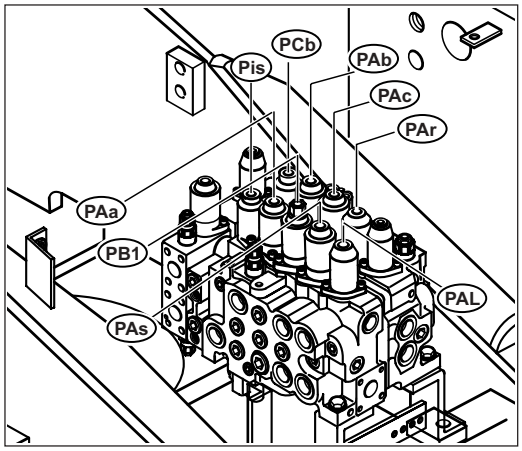
5. Start the engine and let run at low idle for about 10 minutes.



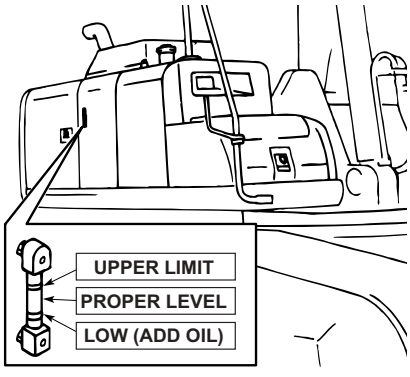
⚠ WARNING

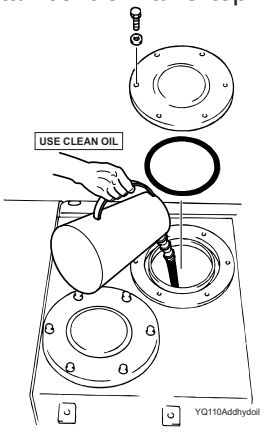
Use a rag or paper towels on the pilot connections to protect yourself from spraying during bleeding.

6. Use the figure below as reference. With the engine running at low idle, loosen the pilot lines from the top side of the spools in the Control Valve, **one at the time**, and operate the function for the spool being bled to bleed the air out of the pilot system. Make sure to bleed each one of the spools indicated in the figure. Tighten hose connections to 50 N-m (37 Ft-lbs) after bleeding each line.



7. Make sure hydraulic oil level is within specifications, and clean up any oil spilled. Check all connections, repair any leakage and reinstall control valve top cover.





YQ110Addhydoil

12