

GRADALL®

OPERATOR'S MANUAL

XL 3300

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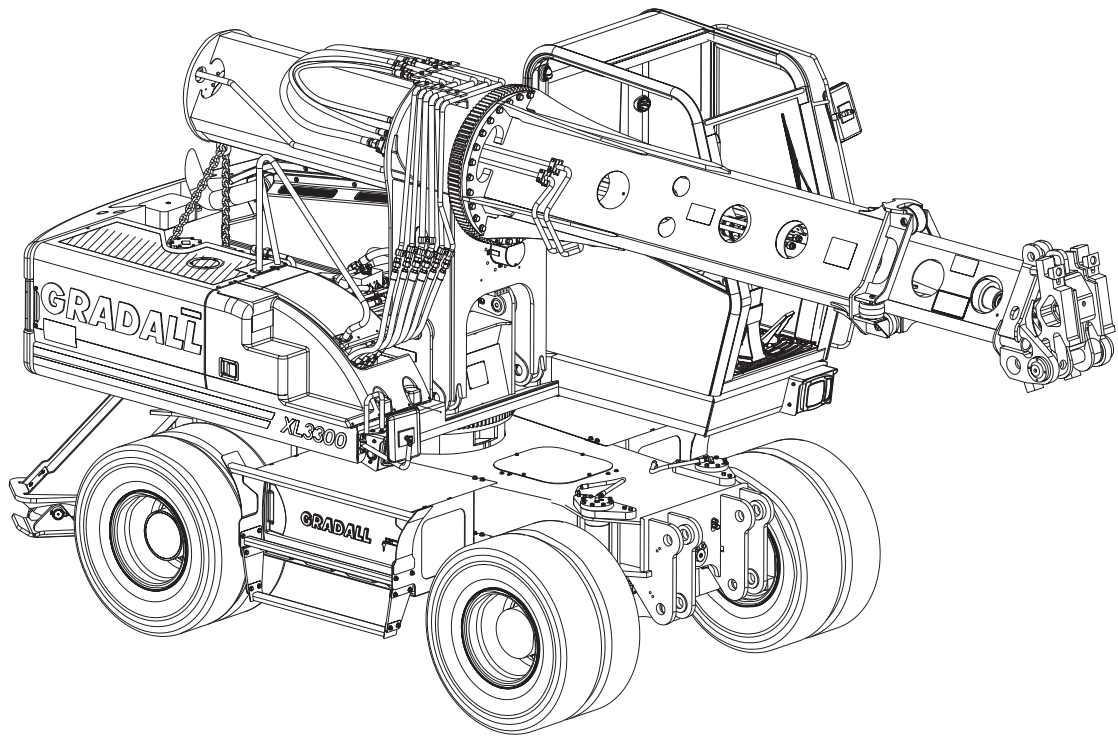
GRADALL®

HYDRAULIC EXCAVATORS

XL 3300 EXCAVATOR

OWNER/OPERATOR MANUAL

COVERING OPERATION & PERIODIC MAINTENANCE



IMPORTANT

Read and understand this manual and the Gradall and EMI Hydraulic Excavator Safety Manuals before starting, operating or performing maintenance procedures on this machine.

KEEP THESE MANUALS IN CAB

AVERTISSEMENT!

Si vous ne lisez pas l'anglais, demandez à votre surveillant de vous donner les instructions de sécurité!

¡ATENCIÓN!

Si no lee inglés, pida las instrucciones de seguridad a su supervisor!

ACHTUNG!

Wenn Sie kein Englisch lesen, bitten Sie ihren Vorgesetzten um das Sicherheitshandbuch!

IMPORTANT SAFETY NOTICES

IT MUST REMAIN THE RESPONSIBILITY OF MACHINE OWNER to ensure that any assigned operator be fully trained and experienced, and has a full understanding of Owner/Operator Manual provided, and that operator has had sufficient, supervised, opportunity to practice in a safe area to become familiar with machine before operating machine at a work site.

Safe operation depends upon reliable equipment and proper operating procedures. Performing the checks and services described in this manual will help keep your Gradall® Excavator in reliable condition and use of the recommended operating procedures can help you avoid accidents. Because some procedures may be new to even the experienced operator we recommend that this manual be read, understood and followed by all who operate the unit.

Strict attention to, and compliance with, instructions provided in this manual as well as the EMI & Gradall Hydraulic Excavator Safety Manuals and all instructional decals and plates affixed to the machine, will help you avoid personal injury and damage to the equipment. The information provided is not intended to cover all situations; it would be impossible to anticipate and evaluate all possible applications and methods of operation for this unit.

Any procedure not specifically recommended by The Gradall Company must be thoroughly evaluated from the standpoint of safety before it is placed in practice. If you aren't sure, contact your Gradall Excavator Distributor before operating.

**Do not modify this machine without written permission from The Gradall Company.
Use only genuine Gradall replacement parts.**

The Gradall Company retains all proprietary rights to the information contained in this manual.

The company also reserves the right to change specifications without notice.

Gradall is a registered trademark for hydraulic excavators, hydraulic material handlers and attachments manufactured by The Gradall Company.

It is Gradall Policy to continually improve its products. Therefore designs, materials and specifications are subject to change without notice and without incurring any liability on units already sold. Units shown may have optional equipment.

Though no offense or discrimination is intended, only the masculine pronouns will be used throughout this manual.

The Gradall Company
406 Mill Ave. S.W., New Philadelphia, Ohio 44663

If no entries are shown under PAGE, DATE, and DESCRIPTION columns, all pages are current for that manuals FORM and PART numbers and no pages have been revised.

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INTRODUCTION

General

This manual provides important information to familiarize you with required lubrication and maintenance by operator and with proper operating procedures for the Gradall Hydraulic Excavator. The upperstructure includes an operator's station for control of all excavator and travel functions.

Related Manuals & Decals

Separate publications are furnished with the excavator to provide information concerning safety, replacement parts, maintenance procedures, theory of operation and vendor components. All decals and additional manuals for your machine are available from your Gradall Distributor.

Operator Qualifications

This excavator has been designed for operators weighing from 104 to 216 pounds (47 to 98.5 kg) and from 61 to 74 inches (155 to 188 cm) tall. Potential operators beyond these limits should be observed while operating and driving the unit in an open area to determine their ability for safe, efficient operation.

The operator must hold a valid, applicable driver's license which requires acceptable age, vision, hearing, manual dexterity and response. He must also be in acceptable physical and mental condition, not undergoing medical treatment or using drugs or alcohol.

Before traveling on a road or highway or operating the excavator at a work site, the operator must familiarize himself with the machine by practicing in an open area not hazardous to persons or property. The operator also needs to make sure the machine complies with federal, state/provincial and local travel laws and regulations (permit, escorts, etc.). See travel section (pg 7.0) for details. Because many operational features of the XL 3300 are different from previous Gradall excavators extensive practice is required for proper operation.

The operator must read, understand and comply with instructions contained in the following material furnished with the excavator:

- This Owner/Operator Manual
- Gradall Hydraulic Excavator Safety Manual
- EMI Hydraulic Excavator Safety Manual
- All Instructional decals and plates
- Any optional equipment instructions furnished

Orientation

When used to indicate direction or location, the terms front, rear, left and right relate to the orientation of a person sitting in the operator's seat (figure I-1).

In relation to the undercarriage, outriggers at the rear (which are standard equipment) are welded on. If equipped with an optional blade, it will be located at the front of the undercarriage. If equipped with optional outriggers on the front, they can be identified by being pinned on rather than welded.

Serial Number Location (Product Identification No.)

Specify Serial Number and lot number when ordering parts and when discussing specific applications and procedures with your distributor. The PIN plate (figure I-2) is located on front, center portion of upperstructure frame.

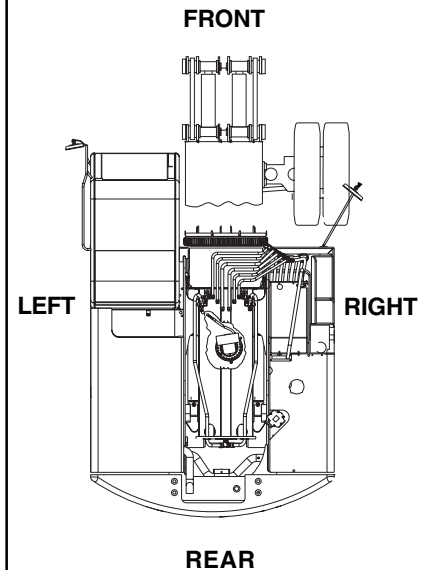


Figure I-1

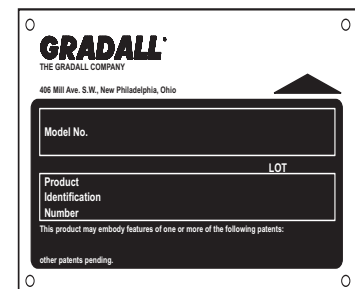
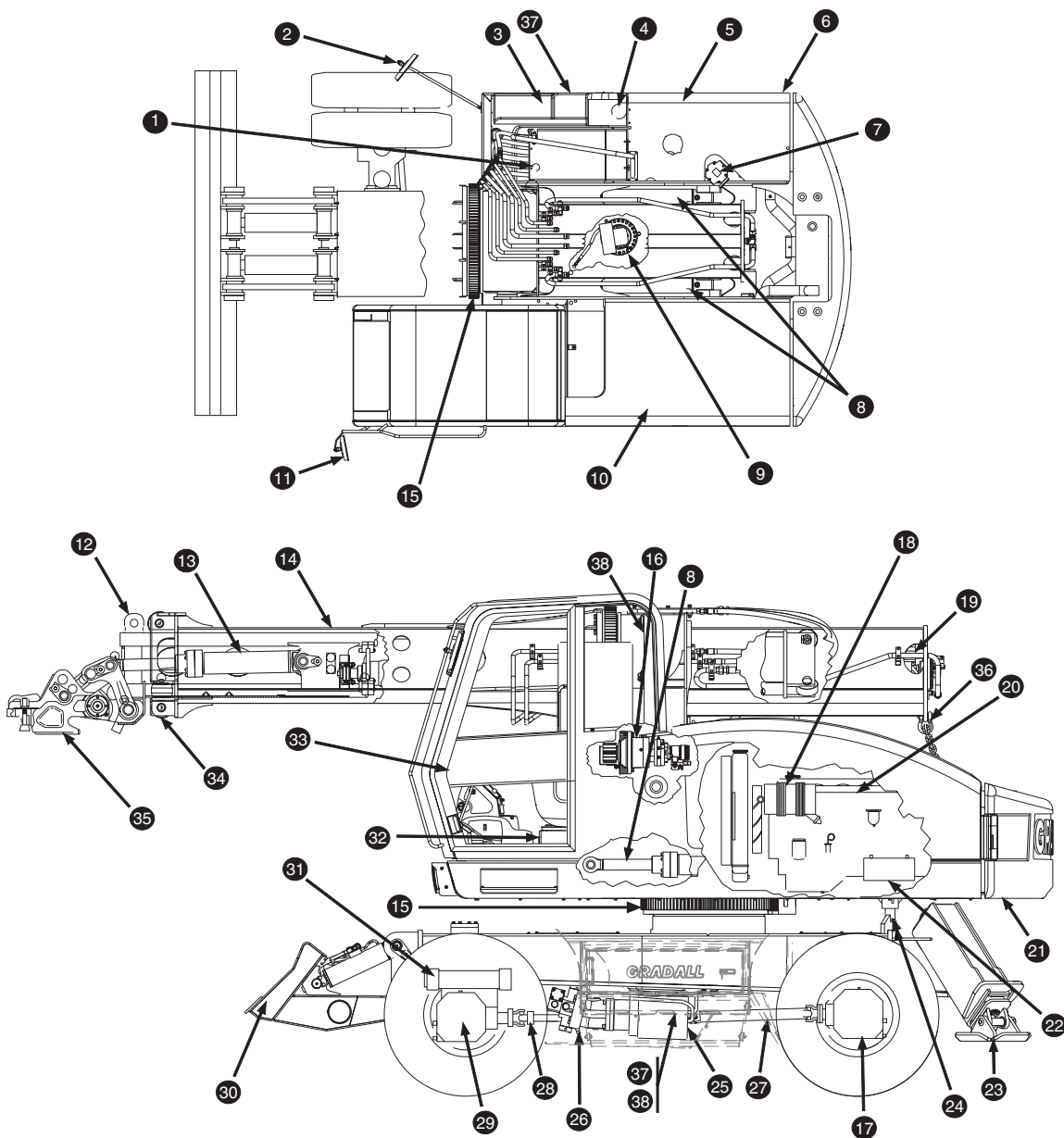


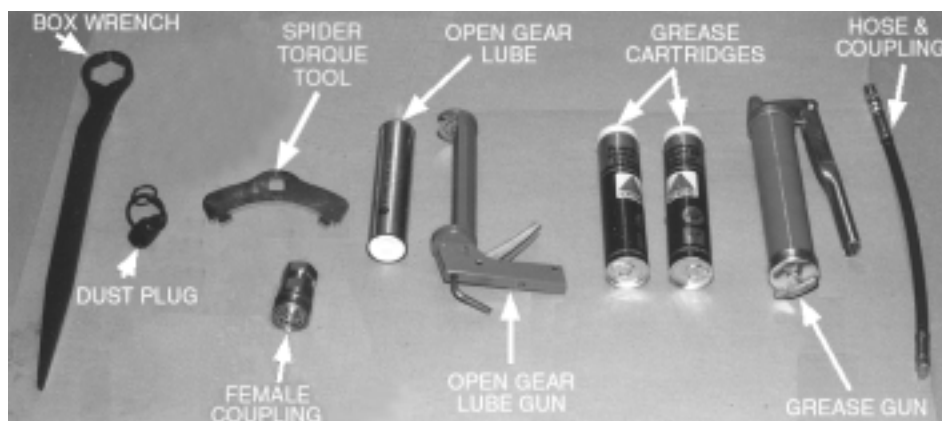
Figure I-2

NOMENCLATURE



1	Hydraulic reservoir pressure release valve	21	Counterweight
2	Mirror	22	Battery
3	Valve compartment	23	Outrigger
4	Fuel tank fill	24	Swing lock
5	Fuel tank	25	Transmission/Transfer case
6	Hydraulic Reservoir	26	Propel motor
7	Hydraulic filter	27	Rear propeller shaft
8	Hoist cylinder (2)	28	Front propeller shaft
9	Swing transmission	29	Steering axle
10	Engine/pump compartment	30	Blade (optional equipment)
11	Mirror	31	Front axle pivot
12	Telescoping boom	32	Manual storage drawer
13	Tool cylinder	33	Operator cab
14	Main boom	34	Boom rollers
15	Swing/Tilt bearing	35	Bucket adapter
16	Tilt transmission	36	Boom Tie-down chain
17	Rear Axle	37	Tool Box (under step)
18	Air cleaner	38	Fire Extinguisher (not supplied with machine) location (in toolbox)
19	Telescoping boom cylinder		
20	Engine		

TOOLS



XL 3300 Tool Kit

(Kit can be ordered under part number 8030-5008)

QTY	PART NO.	DESCRIPTION	USE
1	8000-1670	Spider Torque Tool	Torque collar on boom cylinder
1	8345-1128	Female Coupling	Pressure fill hydraulic reservoir
1	8362-3027	Dust Plug	Protect female coupling
1	8504-1300	Grease Gun	Apply grease to fittings
1	8504-1301	Hose and Coupling	Adapt grease gun to fittings
2	8504-1302	Grease Cartridges	Initial supply for grease gun
1	8504-1356	Box Wrench (1-7/8")	Install and remove attachment
1	8664-1304	Open Gear Lubricant	Lubricate swing & tilt gears
1	8664-1305	Open Gear Lubricant Gun	Apply open gear lubricant to gears

1.0 SAFETY

Read and understand all manuals and instructional material listed on cover, inside front cover and introduction page of this Manual before starting, operating or performing maintenance procedures on this equipment.

Safe operation depends on reliable equipment and proper operating procedures. Performing the adjustments and repairs described in this Manual will help to keep your Hydraulic Excavator in reliable condition. Use of the recommended operating procedures can help you avoid accidents. Because some procedures may be new to even the experienced operator, this Manual must be read, understood and followed by all who operate and service this machine.

Regardless of previous experience operating similar equipment, the operator must be given sufficient opportunity to practice with the excavator in a safe, open area (not hazardous to people or property) to gain operating skills and the proper “feel” for controls and operating clearances required for safe, efficient operation.

Complying with the DANGER, WARNING and CAUTION notes in this Manual will help you avoid injury and damage to the equipment. These notes are not intended to cover all eventualities; it would be impossible to anticipate and evaluate all possible applications and methods of operation for this equipment.

Any procedure not specifically recommended by GRADALL must be thoroughly evaluated from the standpoint of safety before it is placed in practice. If you are not sure, contact your GRADALL Distributor before operating.

Do not modify this machine without written permission from GRADALL.

SAFETY PRECAUTIONS

Make sure all **DANGER, WARNING, CAUTION and INSTRUCTIONAL DECALS** are in place and can be read. Clean or replace decals as required.

Before traveling, adjust boom and attachment positions to ensure clear view of right mirror. Adjust these positions as necessary to clear overhead obstructions. Return to initial positions after clearing overhead obstructions. If these instructions do not resolve all visibility problems, use a signal person.

Do not approach power lines, overhead or underground cables or other power sources with any part of your excavator or load unless all local, state/provincial and federal regulations have been met and the appropriate utility company’s hotline has been contacted to de-energize the lines or cables.

The excavator is equipped with a travel alarm to warn others in area of machine travel, either forward or reverse. When in travel mode, alarm will sound for 3 seconds; in work mode the alarm will sound whenever the travel pedal is activated. **If alarm fails to sound when in work mode, STOP.** Contact maintenance personnel to have condition repaired before traveling.

Before stopping engine always be certain to position upperstructure to permit an easy, safe climb to ground and then back to cab. Always remove key from ignition before leaving cab.

When machine is operating on public roadways, **be aware of all local, state/provincial and federal regulations.** If you are not aware of regulations, ask your supervisor. Be sure signal persons and traffic guides are aware of regulations.

Before travel, check to be sure you are aware of orientation of upperstructure with regard to undercarriage. Confusion in this area can cause travel in the opposite direction of that which you may expect.

WATCH FOR THESE SYMBOLS ; THEY CALL YOUR ATTENTION TO SAFETY NOTICES.



This symbol indicates an extreme hazard which will result in high probability of death or serious injury if proper precautions are not taken.



This symbol indicates a hazard which could result in death or serious injury if proper precautions are not taken.



This symbol indicates a hazard which may result in injury or damage to equipment or property if proper precautions are not taken.

1.1

BASIC SAFETY ISSUES

Always **check to be sure all controls are in neutral position before starting engine**. Although controls are designed to return to neutral when released, a foreign object could hold a control in an activated position, especially a travel pedal.

Be certain of location of buried pipelines, cables and overhead wires.

Always maintain **3-point contact** with grab handles and steps when climbing on and off the machine. Never jump from the machine. Repair or replace any damaged steps and grab handles.

Perform all **"Checks and Services Before Starting the Engine"** and all **"Warm-Up and Operational Checks"** at the beginning of each work shift. Complete all required maintenance before operating the equipment.

Owners often alter their machines. **Make sure your machine matches the picture located on the front cover of this Manual**. If not, contact your Authorized Gradall Distributor before operating the machine.

Learn and **follow your employer's safety rules**.

Keep everyone off the machine while it is operating. Be alert for bystanders or anyone who may be working nearby. **Do not lift people with this machine**.

Never carry a water can, equipment, or other worker's tools or personal items on the machine. Such items can cause other workers to approach the machine without your knowledge and result in serious injury or death.

Stay clear of moving fan, belts, pulleys, meshing gears, drive shafts and other moving parts. Do not operate this equipment without doors, covers, and guards in place and secured.

Be particularly careful if this is not the machine you usually operate. **Read the manuals** listed in the introduction and then **practice operating the machine in a safe, open area** to become familiar with the controls.

Always sound the horn to warn others of unexpected machine movements. When in work mode, an automatic travel alarm warns others of machine travel in either direction.

Be certain boom or attachment is resting firmly on ground and that **engine is stopped with key removed** before performing lubrication or maintenance procedures inside boom. Place a "DO NOT OPERATE" tag on the steering wheel. **Always lower boom to ground and stop engine** before leaving cab.

Inspect brakes before driving after digging. Do not drive unit until any damage or malfunction has been repaired.

Check operation of all tail lights and flashing swing warning lights. Lights on each side of counterweight flash when upperstructure is swinging.

Prior to raising or lowering outriggers and/or blade, sound horn and check mirrors to assure the areas are clear of personnel.

WARNING

Failure to comply with safety precautions listed in this Manual and detailed on the machine could result in machine damage, personnel injury or death.

WARNING

Operator must be seated with seat belt fastened, before traveling.

WARNING

Welding could damage electrical wires, engine electronics.

Turn off engine, disconnect both the positive (+) and negative (-) battery cables and disconnect the 23-pin Deutsch connector located toward the rear L.H. side of engine before welding to prevent damage to electronic components.

Damaged electronic components could lead to an accident due to loss of vehicle control, resulting in severe injury.

WARNING

Always relieve pressure trapped in circuits before disconnecting, removing or installing hydraulic components.

1.2

Mark all hoses before servicing to assure proper re-assembly.

Keep grab handles, steps, and walkways free of mud, oil, grease, and other foreign material. Replace non-skid surface material as required.

Always check lift capacity chart and plan lift to be sure it can be performed safely.

Be sure windows and door are securely latched in open or closed position when operating. Replace damaged latches and weak access cover support struts immediately.

Always stop engine and apply parking brake before leaving cab.

Never pass load line over open bucket. Relief valves in bucket circuit could cause unexpected, dangerous movement of load. Bucket linkage could also be damaged (see page 1.3).

Check to be sure windows and mirrors are clean and that mirrors are properly adjusted for your driving position and machine configuration. **Ensure adequate visibility for safe travel.**

Know overall height of your unit before traveling. Approach unknown clearances slowly (measure from ground to tallest point of machine/attachment [see 18.0]).

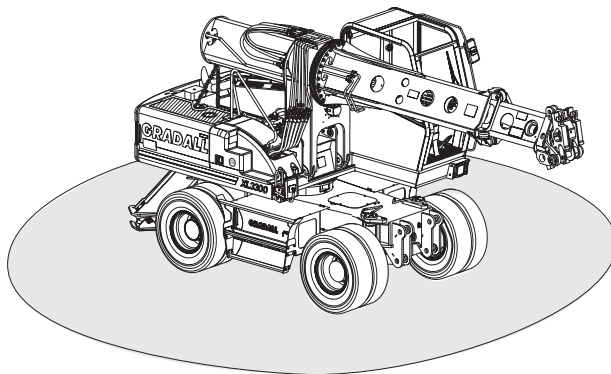
Don't get too close to unstable ground or the edge of an excavation, getting too close can cause the unit to tip.

Always be especially careful when using mirrors; distances are distorted and field of view is limited, especially when swinging. **Always use a signal person when operating in tight quarters.**

Stay away from hot exhaust.

Do not use this machine in an explosive environment. This machine is not designed to protect the operator from external fire or blast.

Be aware of the potential hazards related to batteries (**Figure 1-1 & Figure 1-2**).



The **XL3300 Excavator is designed as a one-person machine.** There is no safe place for another person on the unit other than the operator. Do not allow anyone inside the swing radius of the boom/attachment (other than the operator) while the machine is in operation. Failure to keep all people clear could cause an accident resulting in serious injury or death.

GRADALL®

WARNING

Travel on off-highway grades is recommended only under the following conditions:

Boom and attachment are positioned for maximum visibility and adequate clearances.

Tires are properly inflated.

Surface is firm enough to support unit.

Surface provides adequate traction to prevent slipping.

Surface is not rough enough or steep enough to cause tipping.

Low travel speed is selected.

There is no load in bucket, attached to boom, or any other part of machine.

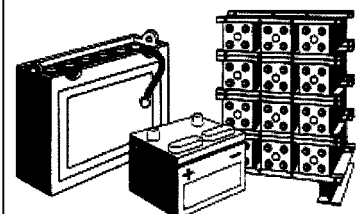
CALIFORNIA PROPOSITION 65 BATTERY WARNING

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm.

**WASH HANDS
AFTER HANDLING !**

Figure 1-1

BATTERIES AND RELATED PARTS CONTAIN LEAD



**WASH HANDS
AFTER HANDLING!**

WARNING: Battery posts, terminal and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm.

Figure 1-2

1.3

Pressure can be maintained in hydraulic circuits long after the engine has been shut down. This pressure can cause oil (or items such as pipe plugs) to “shoot out” at high speed **if pressure is not released** correctly. **Refer to service manual for procedure to relieve hydraulic pressure trapped in circuits** (figure 1-3).

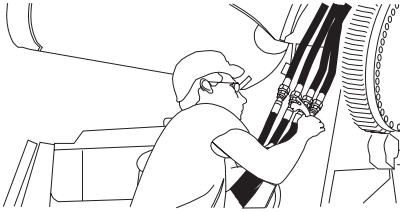


Figure 1-3

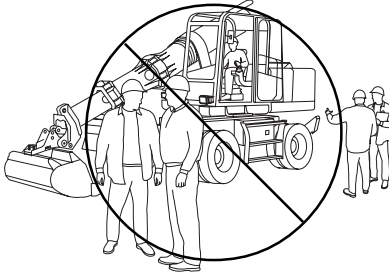


Figure 1-4

Do not operate with bystanders or other workers near machine (figure 1-4).

Be certain boom or attachment is resting on ground and that engine is stopped before performing lubrication or maintenance procedures inside boom (figure 1-5).

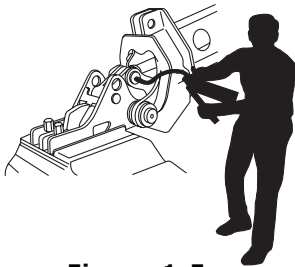


Figure 1-5

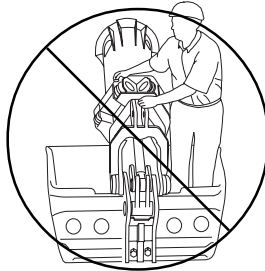


Figure 1-6

Keep everyone off of machine while it is operating. Do not lift people with this machine (figure 1-6).

Never pass load line over open bucket. Relief valves in bucket circuit could cause unexpected, dangerous movement of the load. Bucket linkage could also be damaged (figure 1-7).

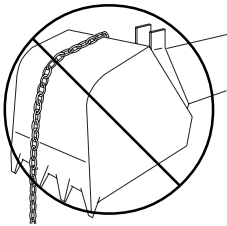


Figure 1-7

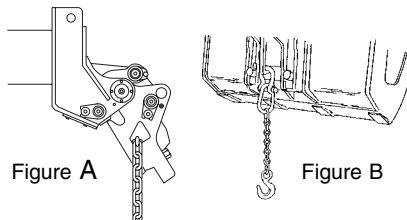


Figure A

Figure B

Figure 1-8

To lift loads, remove bucket, **level boom from side to side and close adapter fully against stops**. Pass chain thru adapter as shown in figure A and **be certain chain is locked on itself**. A chain can be used as shown in figure B for light loads with bucket installed and adapter **closed against stops** (figure 1-8). **Do not use boom tie-down chain for lifting and placing loads.**

WARNING

Avoid injury! Always relieve pressure trapped in circuits before disconnecting, removing or installing hydraulic components.

1.4

Lock front axle oscillation cylinders to increase stability when digging or maneuvering a load. Unlock oscillation cylinders when traveling to maintain proper wheel contact with travel path. Refer to travel section (pg 7.0).

Additional Precautions (see Travel section for further details)

- **Before traveling, adjust boom elevation to ensure clear view of right mirror (see 18.0). Adjust these positions as necessary to clear overhead obstructions. Return to initial positions after clearing overhead obstructions. If these instructions do not resolve all visibility problems, use a signal person.**
- **The excavator is equipped with a travel alarm to warn others in area of machine travel, either forward or reverse. If alarm fails to sound when traveling in "work" mode, STOP. Contact maintenance personnel to have condition repaired before traveling.**
- **Before stopping engine always be certain to position upperstructure to permit an easy, safe climb to ground and then back to cab. Always remove key from ignition before leaving cab.**
- **Before operating at a worksite, check location of all utility, phone and cable lines. Have your supervisor determine how close you can safely permit attachment to approach utility lines. Stay clear of phone and cable lines.**
- **Always fasten seat belt before operating or traveling.**

1.5

“PINCH POINTS”

Save lives and prevent injuries: Learn to recognize and avoid “Pinch Points”!

It must remain the **RESPONSIBILITY OF OWNER** to be certain **OPERATOR** is aware of **PINCH POINTS** and the dangers involved. The dangers include **SERIOUS INJURY OR DEATH**.

It is the **OPERATOR’S** responsibility to **KEEP OTHERS CLEAR OF PINCH POINTS**. Never allow others to be on or near machine while operating or traveling.

Boom Holes & Rollers (Figure 1-10)

Always rest boom or attachment firmly on ground and stop engine before performing any procedure thru a boom hole or before servicing boom rollers.



Figure 1-10



Figure 1-11

Access Covers (Figure 1-11)

Be sure all access covers are in the fully open position before performing any procedures inside compartments. Additional measures may be required to keep covers open in high wind environments.

Counterweight and Another Object (Figure 1-12)

Position machine to prevent possibility of a person being injured in a pinch point between counterweight and another object. Avoid working too close to other objects.

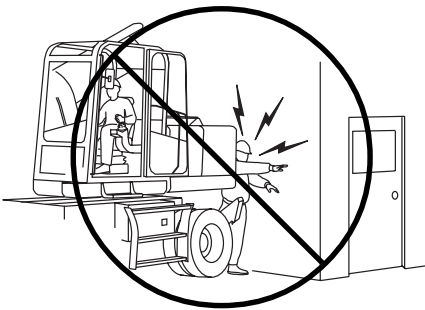


Figure 1-12

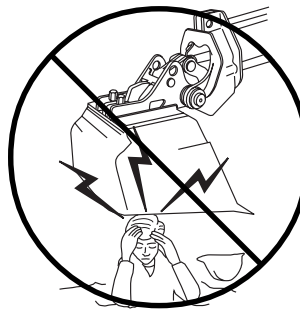


Figure 1-13

Boom and Attachment (Figure 1-13)

Never permit anyone under boom, attachment or load.

1.6

Bucket & Linkage (Figure 1-14)

Be certain that attachment is resting firmly on ground and engine is stopped before performing any procedure on bucket, linkage or boom rollers.

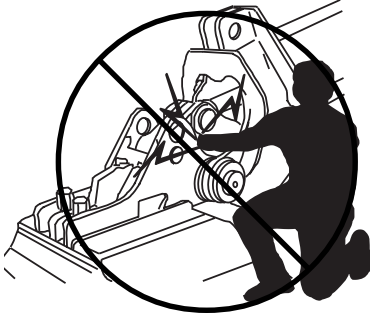


Figure 1-14

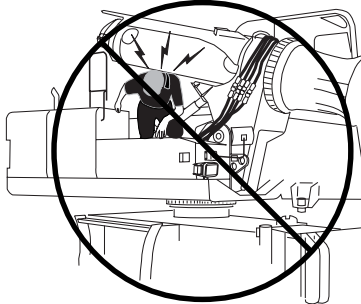


Figure 1-15

Boom Cradle & Deck (Figure 1-15)

Rest boom or attachment on ground and stop engine before permitting anyone to work beneath boom cradle.

Upperstructure & Carrier (Figure 1-16)

Never permit anyone to approach the machine while upperstructure is swinging.

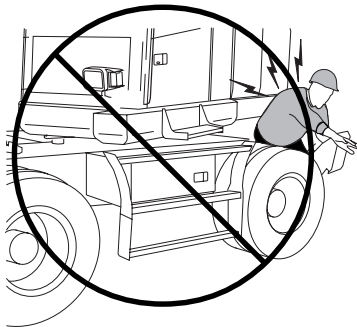


Figure 1-16

Outrigger & Blade (Figure 1-17 & Figure 1-18)

Always sound horn and check mirrors for bystanders before moving outriggers or blade.



Figure 1-17

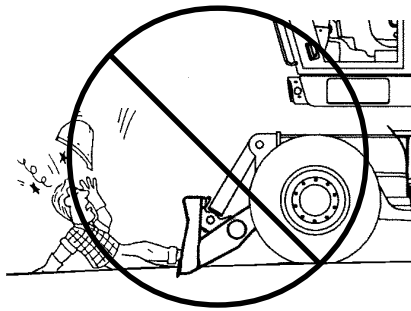
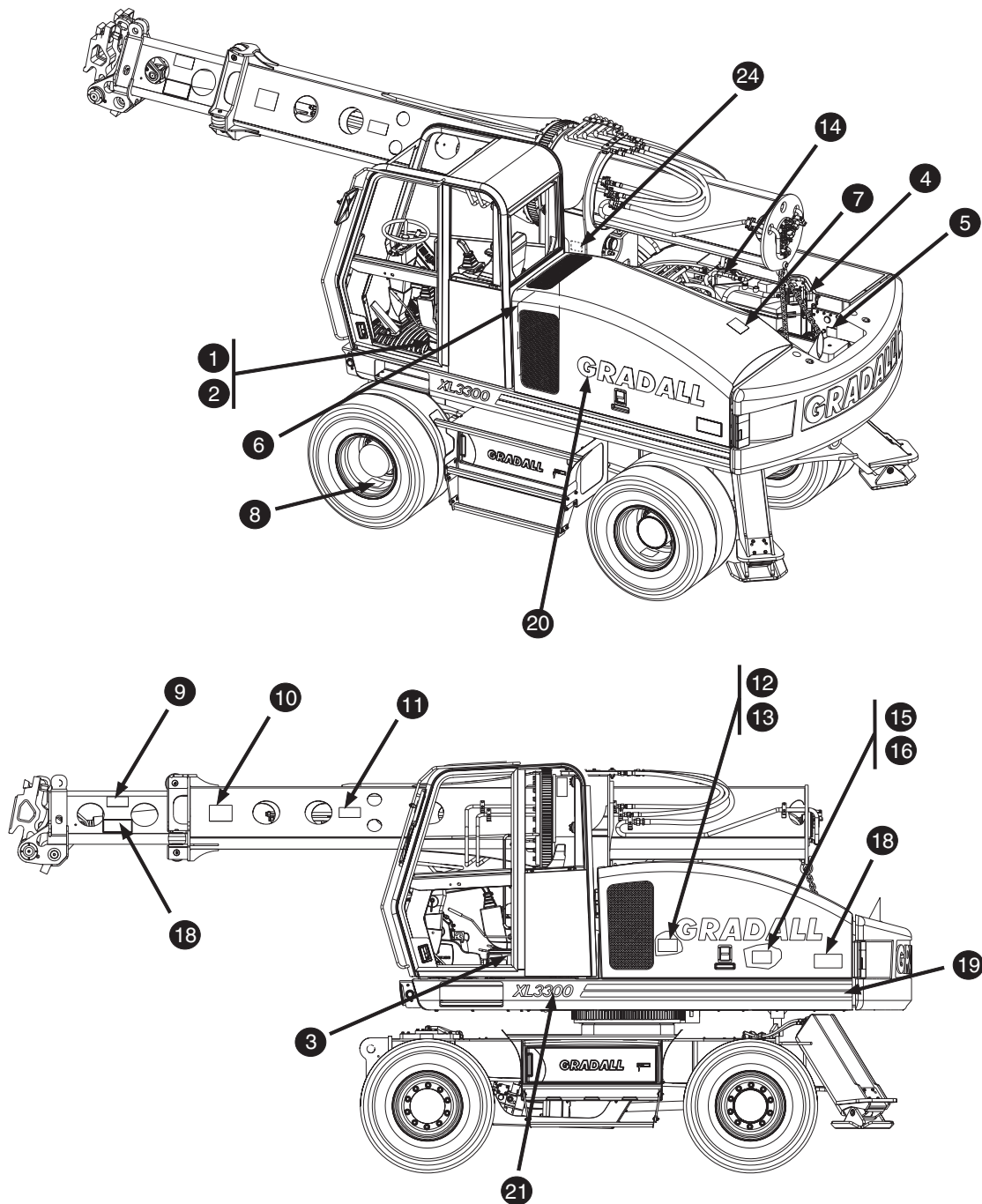


Figure 1-18

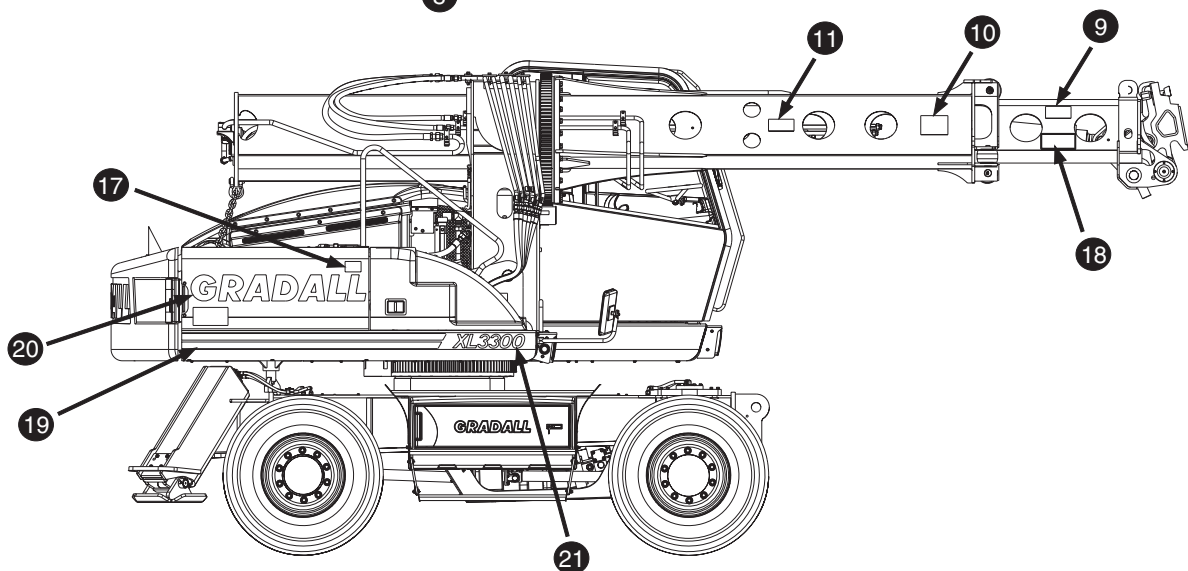
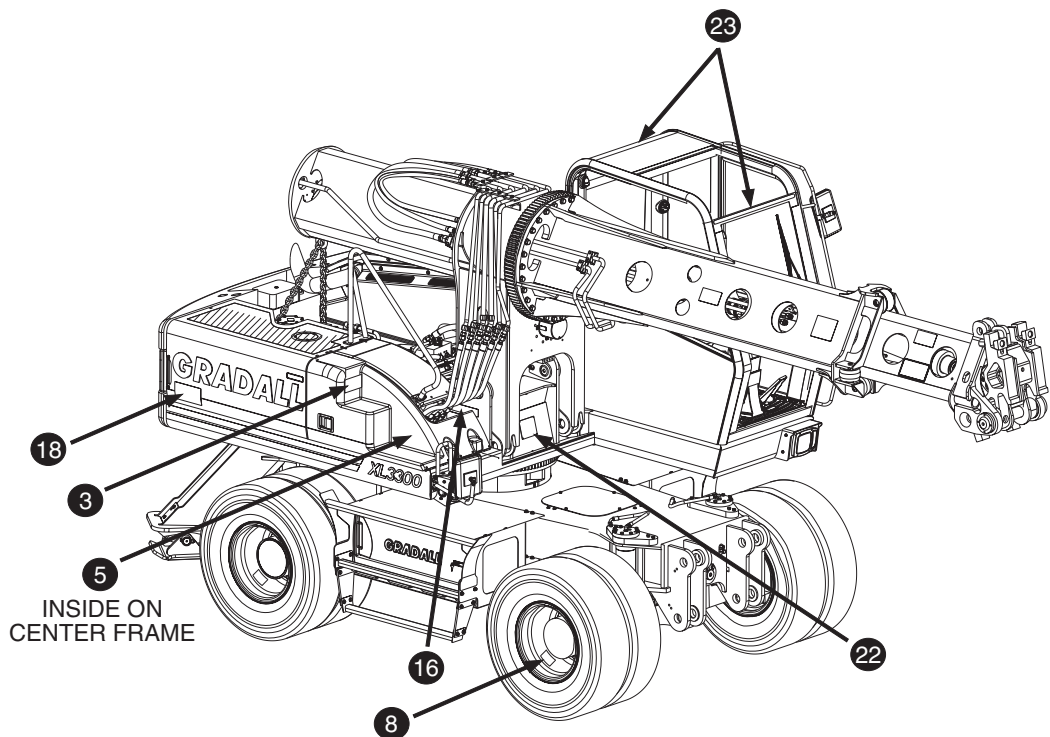
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2.0 DECAL LOCATIONS



1	8321-1037	Manual Decal	7	8037-3077	No Step Decal
2	7733-3027	Made in USA Decal	8	8020-3009	Tire Pressure Decal
3	8060-3036	Warning Decal-Climbing	9	8090-3017	Warning Decal-Riders
4	8031-3019	Reservoir Decal	10	8360-1011	Danger Decal-Utilities
5	8090-3012	Hydraulic Warning Decal	11	8060-3037	Warning Decal-Pinch Point
6	8031-3032	Lube/Maintenance Decal	12	8060-3026	Caution Decal

2.1 DECAL LOCATIONS



13	8060-3038	Warning Decal	19	8037-3104	Side Stripe Decal
14	9114-3288	Hydraulic Decal	20	8037-3065	Large Gradall Decal
15	7736-3358	Battery Warning Decal	21	8037-3103	XL3300 Model Decal
16	9108-3492	Oil Warning Decal	22	7733-3047	Serial Plate
17	7702-3008	Diesel Fuel Decal	23	8037-3066	Reflective Stripe
18	8060-3039	Warning Decal-Swing	24	8031-3034	XL3300 Boom Decal

2.2 DECALS

DIESEL FUEL

Located on fuel tank
Part No. 7702-3008

INFLATE TIRE TO
95 - 105 psi
(655 - 725 kpa)

8020-3009-A

GRADALL®

MADE
IN THE USA

7733-3027

Located inside cab on seat riser
Part No. 7733-3027

GRADALL
THE GRADALL COMPANY
406 Mill Ave. S.W., New Philadelphia, Ohio

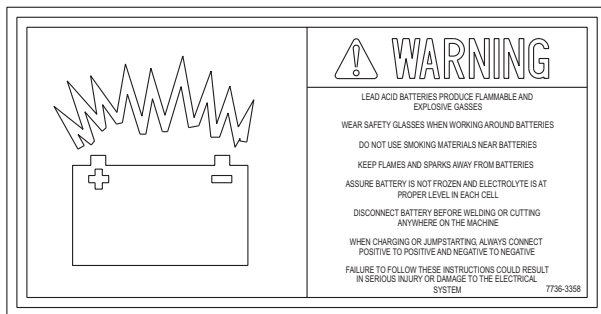
Model No. _____

Product Identification Number _____

LOT _____

This product may embody features of one or more of the following patents:
other patents pending.

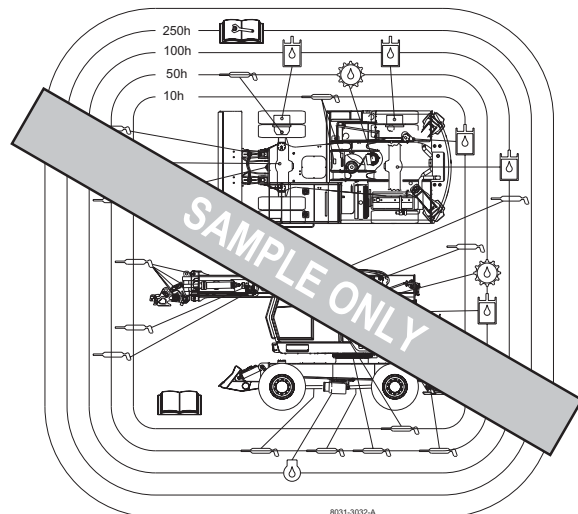
Located on front center of upperstructure
Part No. 7733-3047



Located above battery
Part No. 7736-3358

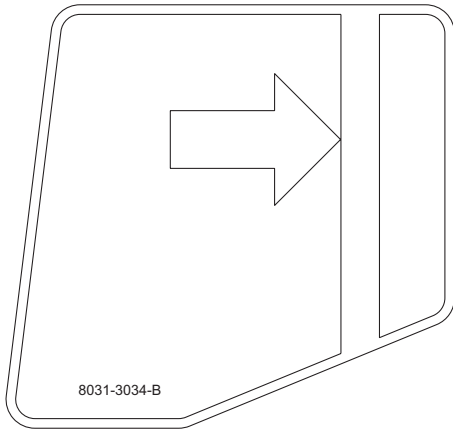
HOT
F
U
L
L
COLD
LOW

Located on hydraulic reservoir
Part No. 8031-3019



Located on back of cab
Part No. 8031-3032

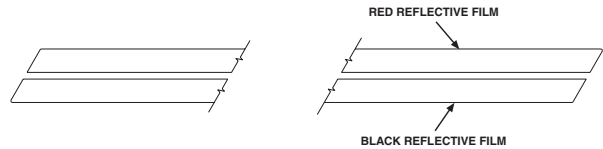
2.3 DECALS



Located on base of boom
Part No. 8031-3034

XL3300

Located on both sides of upperstructure frame
Part No. 8037-3103
(reflective decal)



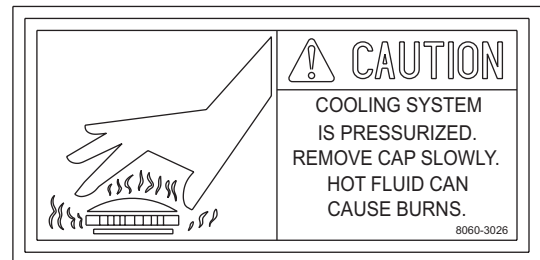
Located on both sides of upperstructure frame
Part No. 8037-3104
(reflective decal)

GRADALL

Located on both sides of upperstructure
Part No. 8037-3065
(reflective decal)



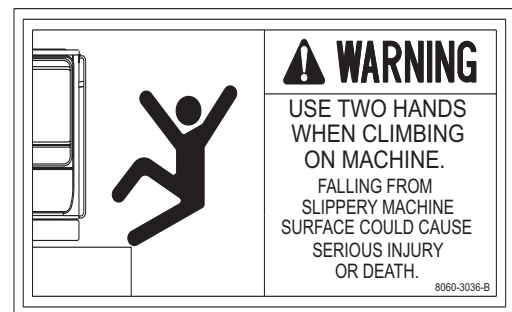
Located above rear cab window
Part No. 8037-3066
(reflective decal)



Located in engine compartment
Part No. 8060-3026



Located on engine cover
Part No. 8037-3077



Located inside cab door
and valve compartment door
Part No. 8060-3036

2.4 DECALS



Located on both sides of boom
Part No. 8060-3037



Located on hydraulic reservoir
Part No. 8090-3012



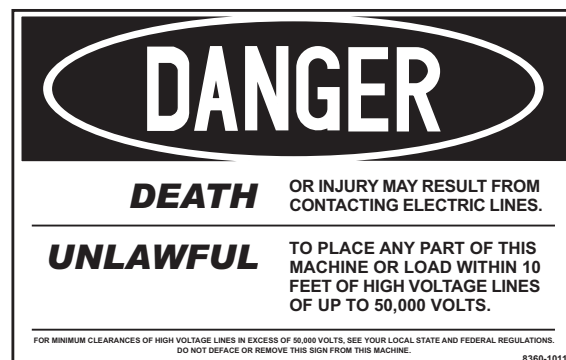
Located inside engine compartment
Part No. 8060-3038



Located on both sides of boom
Part No. 8090-3017

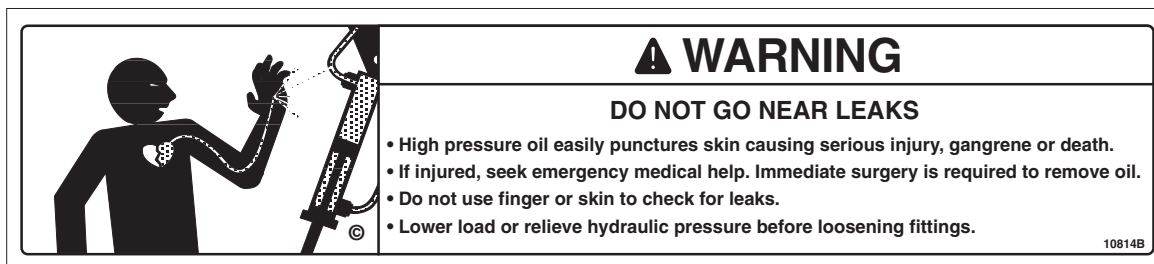


Located on both sides of boom,
engine cover and hydraulic tank
Part No. 8060-3039



Located on both sides of boom
Part No. 8360-1011

2.5 DECALS



Located in engine compartment and on center frame
under boom hoses, below valve cover profile
Part No. 9108-3492

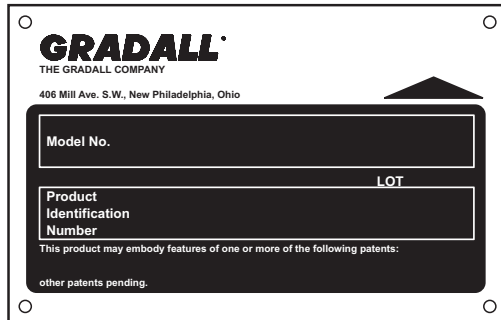


Located on seat riser
Part No. 8321-1037



Located beside pressure fill port
Part No. 9114-3288

3.0 SERIAL NUMBER PLATES



Machine Product Identification No. Plate
Located on Front Upperstructure Frame



Swing Motor
Located on Swing Transmission



Engine
Located in Engine Compartment



Swing Transmission
Located Beneath Boom Cradle



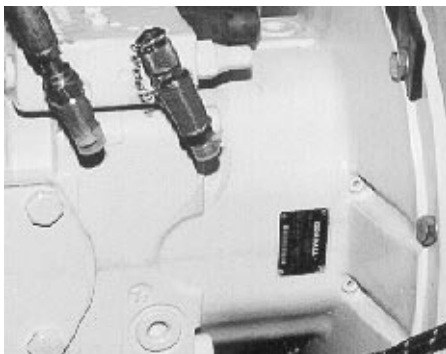
Drive & Steer Axles
Located on undercarriage



Drive Transmission
Located on Undercarriage



Drive Motor
Located on Undercarriage



Hydraulic Pump
Located in Engine/Pump
Compartment



Tilt Motor
Located on
tilt transmission



Tilt Transmission
Located within boom cradle

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4.0 OPERATORS CAB

Heater

The cab is equipped with a heater located behind operator's seat. Engine coolant supplied to heater is controlled by a valve at engine block and a rotary knob located on right arm pod. Rotate knob clockwise for maximum heat or rotate knob counter-clockwise for no heat. The three-speed heater fan must be operated to circulate heated air.

Air Conditioner (optional)

The air conditioner is controlled by a rocker switch located on right arm pod. Air conditioner will operate only when heater/air conditioner fan switch is positioned for operation (high, medium, or low). Turn off engine coolant valve at engine block for maximum cooling.

Defrosting

Window defrosting can be accomplished by aiming air vents to direct air toward windows as appropriate. Defrost action can be increased by operating heater to provide warm air. Maximum defrosting is accomplished by operating both heater and optional air conditioner to provide warm dry air.

Heater/Air Conditioner Fan

The heater fan is located within heater housing and is controlled by a rotary switch located on right arm pod. It provides three levels of air circulation for heating, defrosting, and air conditioning (high, medium, or low).

Fresh air is supplied to fan thru a filtered vent in cab floor.

An air filter element is provided to clean outside air flowing to fan. Service element as indicated in the Service Manual. Operating conditions may require more frequent element cleaning or replacement. A noticeable reduction of air flow from vents indicates a need to service element.

Ventilation

In addition to heating, defrosting and optional air conditioning, the cab is equipped for varying degrees of natural ventilation.

Door and upper front window must be latched in open or closed position during operation.

Cab door can be latched in fully opened position. Lever to release door from latched-open position is located above lower door hinge.

Main (upper) front window can be latched in fully open position. Be certain window is secured firmly in position selected (including closed) using both latches. Lower front window can be removed and stored to the right of operator's seat.

Wiper/Washer

A wiper/washer is furnished as standard equipment (figure 4-1). The washer reservoir bottle is located in the valve compartment. Fill as required.

Cigarette Lighter

A cigarette lighter is provided on right hand console. With lighter element removed, the receptacle can be used to power an auxiliary 12 VDC device equipped with an appropriate adapter.

WARNING

Always be certain to position boom or attachment on ground and stop engine before opening or closing door or front windows. Accidental actuation of controls could cause serious injury or death.

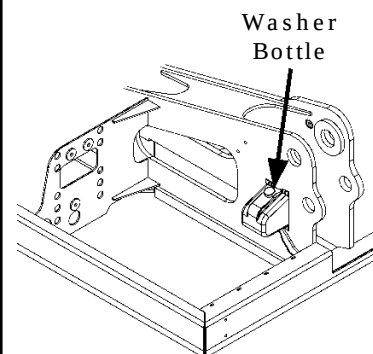
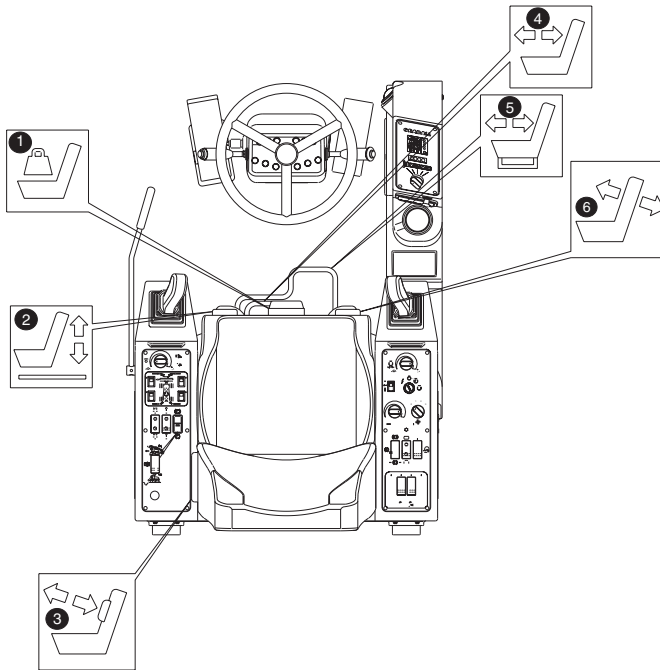


Figure 4-1

4.1

Seat Adjustment

Prior to S/N 0330664:



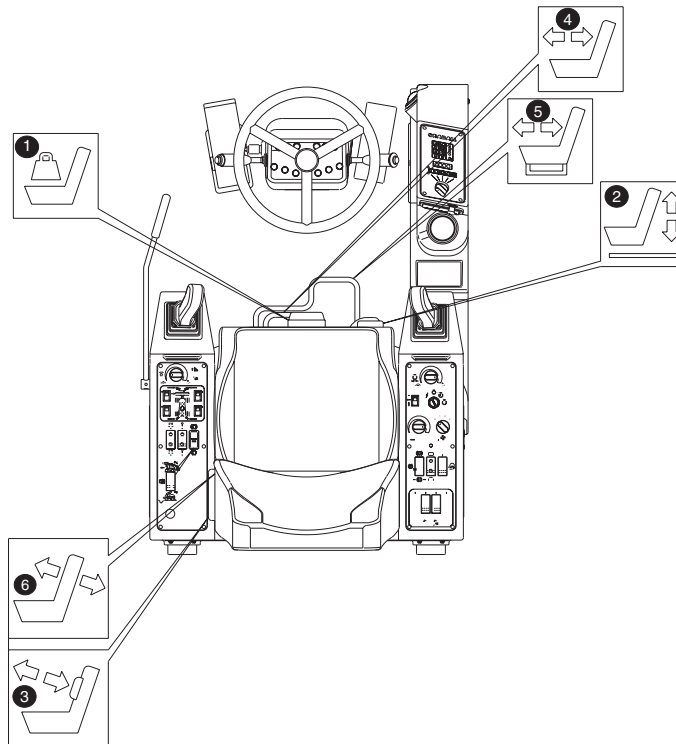
⚠ WARNING

Perform all seat adjustments with engine stopped. Accidental actuation of controls could cause serious injury or death.

It may become necessary to revise some adjustments to find the most comfortable operating position. Be sure to stop engine first.

1	WEIGHT ADJUSTMENT CONTROL
2	HEIGHT ADJUSTMENT CONTROL
3	LUMBAR ADJUSTMENT CONTROL
4	UPPER FORE AND AFT ADJUSTMENT CONTROL
5	LOWER FORE AND AFT ADJUSTMENT CONTROL
6	SEAT BACK ADJUSTMENT

S/N 0330664 and after:



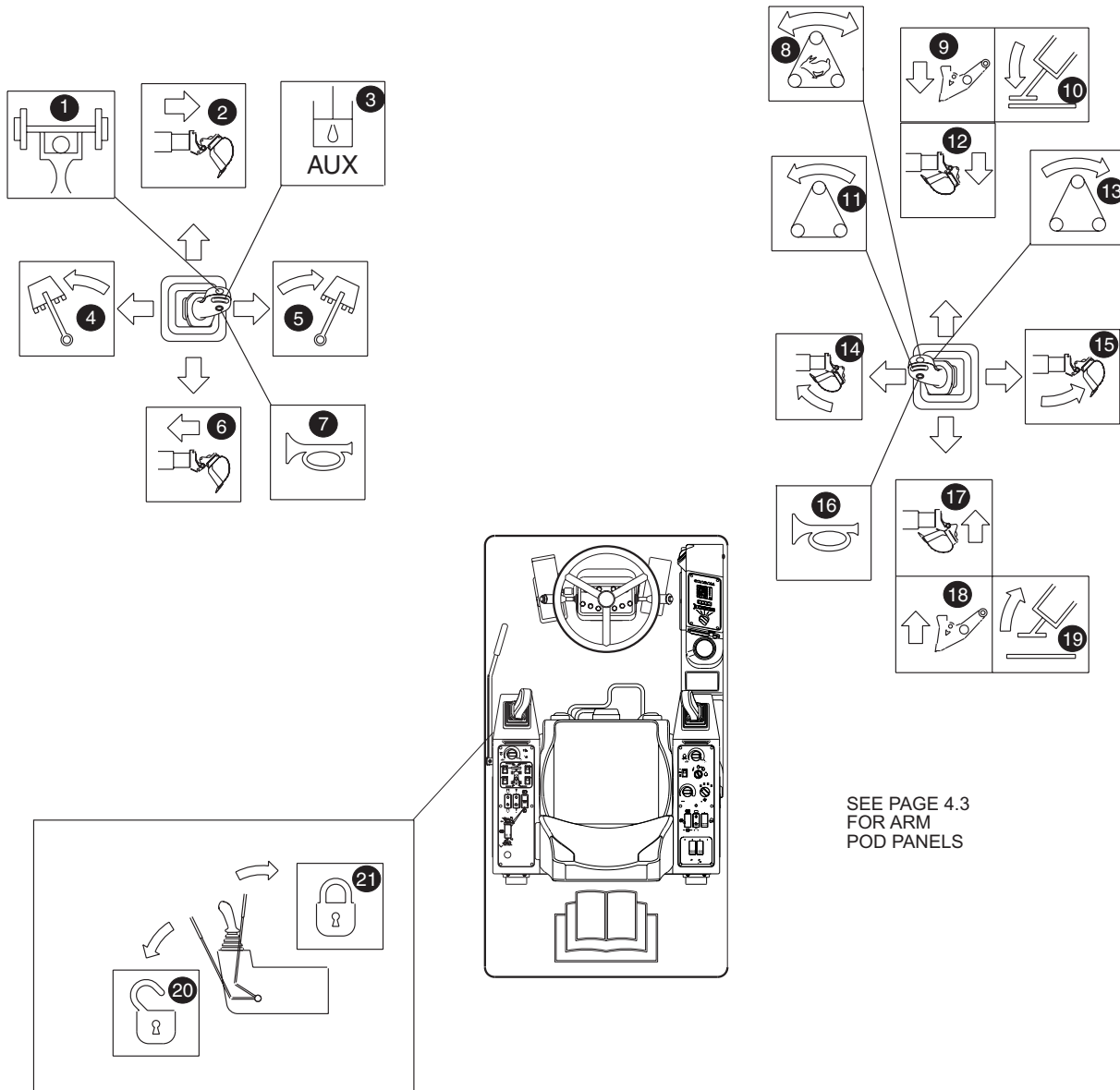
NOTE!

Pilot control lever must be in down position and engaged for joystick controls and pedals to function.

4.2

Control & Instrument Identification

(Standard SAE Pattern shown, see section 10.0 for alternate patterns)



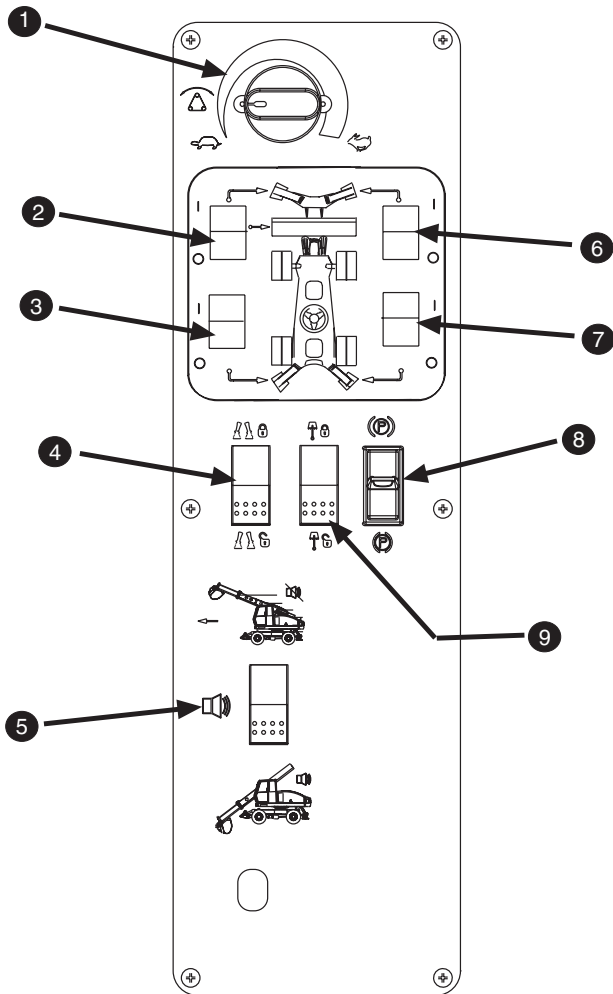
SEE PAGE 4.3
FOR ARM
POD PANELS

1	POWER BOOST
2	EXTEND BOOM
3	AUXILIARY HYDRAULICS FUNCTION
4	SWING LEFT
5	SWING RIGHT
6	RETRACT BOOM
7	HORN
8	MOMENTARY FAST TILT
9	LOWER BLADE
10	LOWER OUTRIGGER
11	COUNTER CLOCKWISE TILT

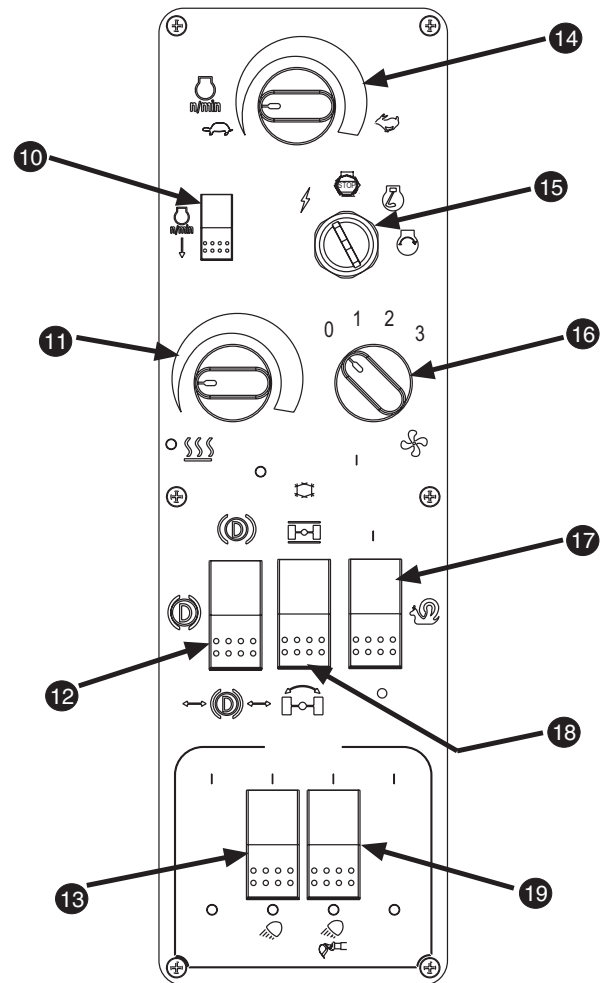
12	LOWER BOOM
13	CLOCKWISE TILT
14	CLOSE BUCKET
15	OPEN BUCKET
16	HORN
17	RAISE BOOM
18	RAISE BLADE
19	RAISE OUTRIGGER
20	JOYSTICKS ACTIVE
21	JOYSTICKS INACTIVE

4.3

Control & Instrument Identification (continued)



LEFT ARM POD



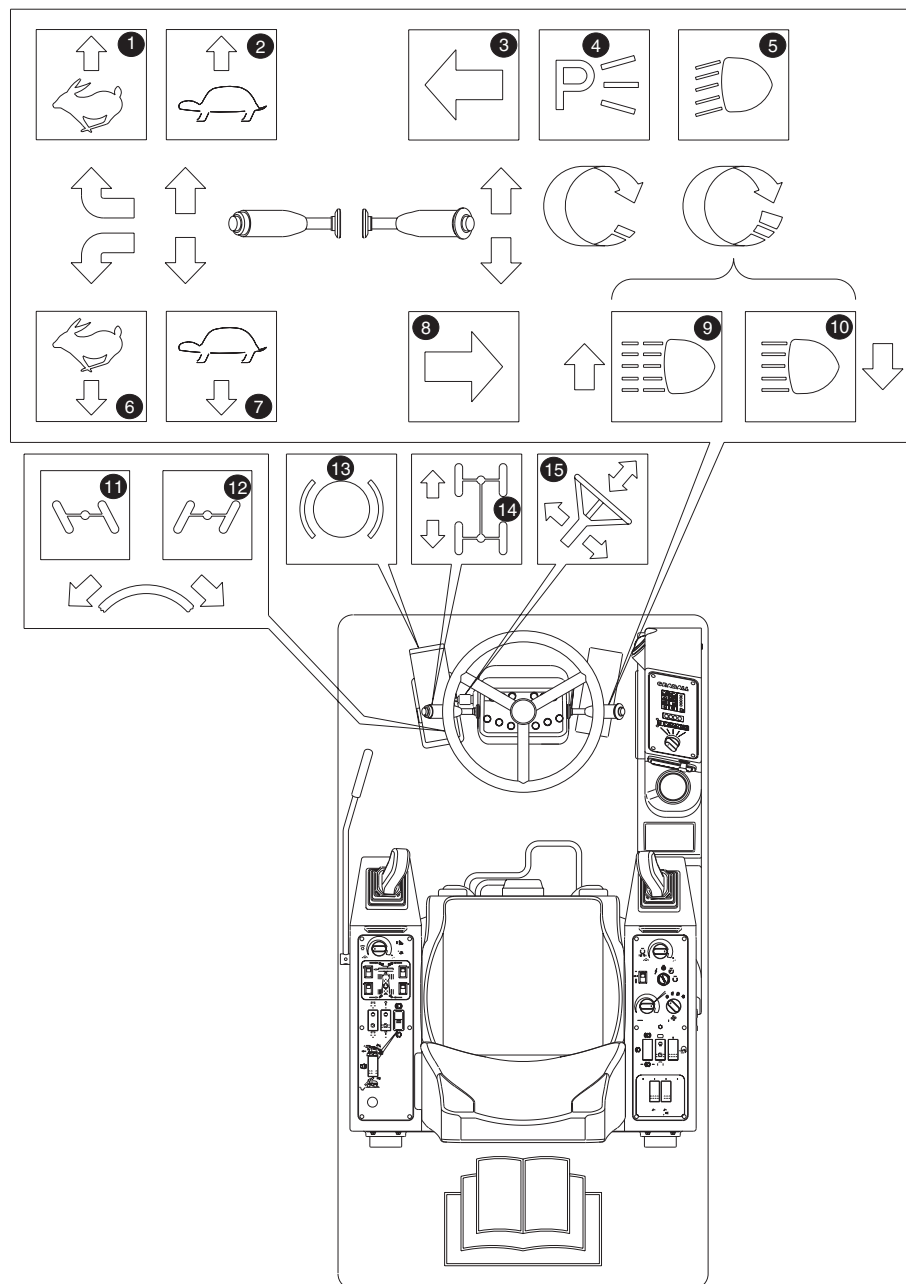
RIGHT ARM POD

1	TILT SPEED CONTROL
2	BLADE/LEFT FRONT OUTRIGGER SELECT
3	LEFT REAR OUTRIGGER SELECT
4	JOYSTICK LOCKOUT
5	ALARM - WORK/TRAVEL MODE
6	RIGHT FRONT OUTRIGGER SELECT
7	RIGHT REAR OUTRIGGER SELECT
8	PARKING BRAKE
9	SWING LOCK
10	AUTO IDLE OVERRIDE SWITCH

11	TEMPERATURE CONTROL
12	DIG BRAKE MODE SELECT
13	WORK LIGHTS
14	ENGINE SPEED
15	IGNITION SWITCH
16	FAN SPEED CONTROL
17	CREEPER MODE
18	AXLE OSCILLATION LOCK
19	BOOM LIGHTS

4.4

Control & Instrument Identification (continued)

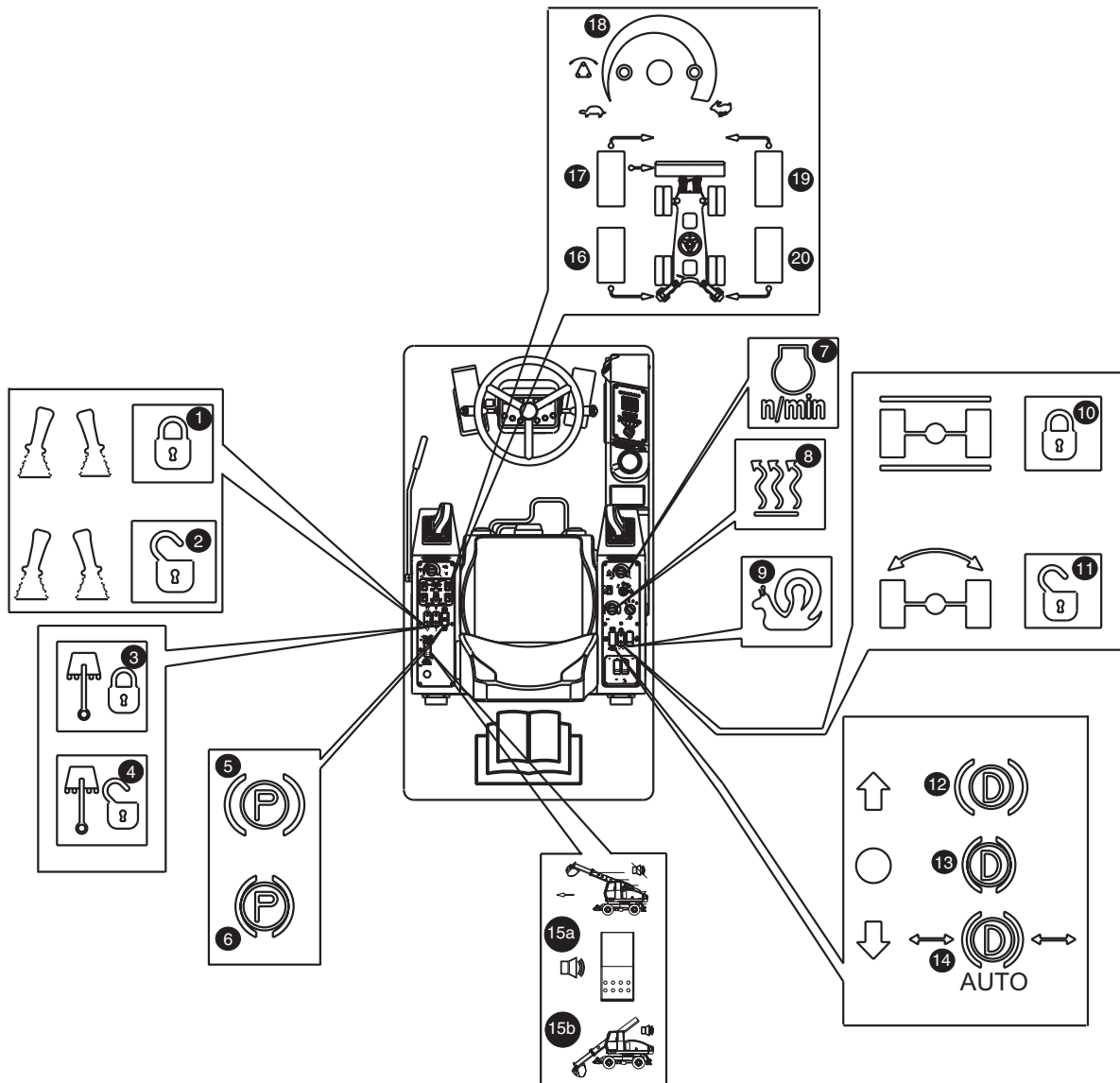


1	FAST FORWARD
2	SLOW FORWARD
3	LEFT TURN SIGNAL
4	PARKING LIGHTS
5	HEADLIGHTS
6	FAST REVERSE
7	SLOW REVERSE
8	RIGHT TURN SIGNAL

9	HIGH BEAM
10	LOW BEAM
11	STEERING (left)
12	STEERING (right)
13	SERVICE BRAKE
14	TRAVEL SPEED PEDAL
15	STEERING WHEEL ADJUSTMENT

4.5

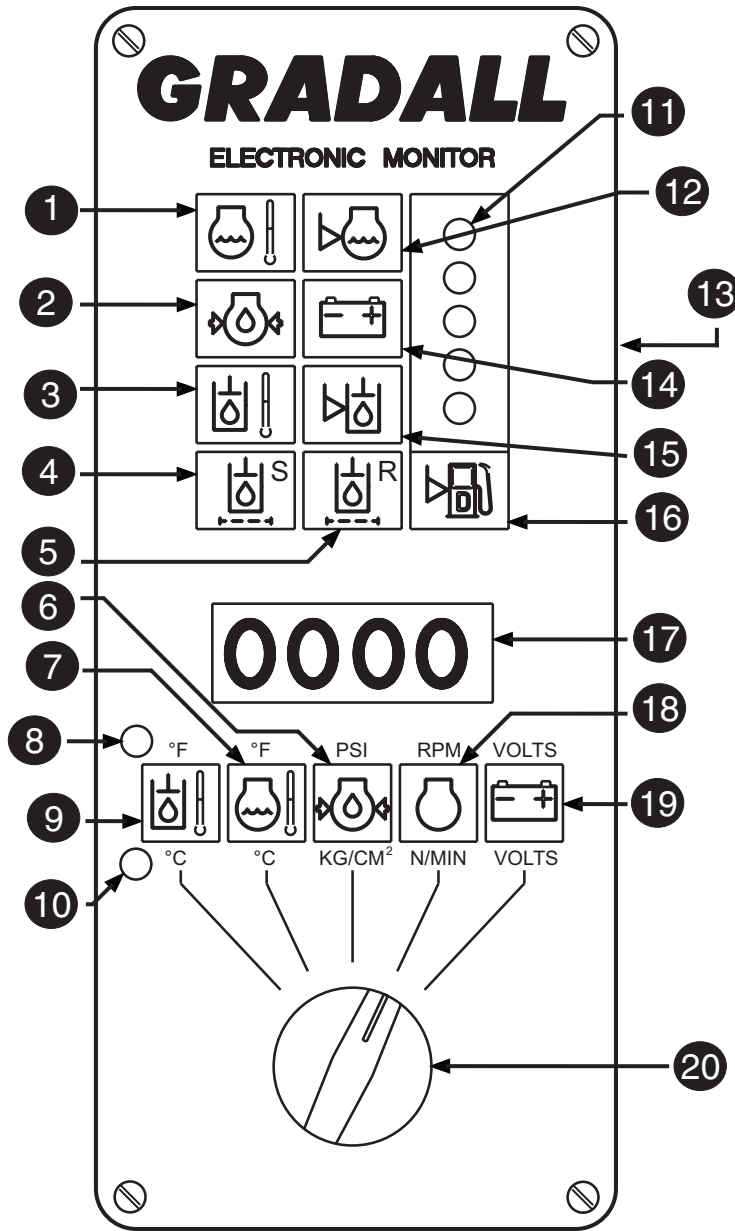
Control & Instrument Identification (continued)



1	JOYSTICK INACTIVE	12	DIG BRAKE OFF
2	JOYSTICK ACTIVE	13	DIG BRAKE ON
3	SWING LOCK ON (locked)	14	DIG BRAKE AUTO MODE
4	SWING LOCK OFF (unlocked)	15a	TRAVEL ALARM (travel mode)
5	PARK BRAKE OFF	15b	TRAVEL ALARM (work mode)
6	PARK BRAKE ON (pilot signal inactive)	16	LEFT REAR OUTRIGGER SELECT
7	ENGINE THROTTLE	17	BLADE/LEFT FRONT OUTRIGGER SELECT
8	TEMPERATURE CONTROL	18	TILT SPEED CONTROL
9	CREEPER MODE	19	RIGHT FRONT OUTRIGGER SELECT
10	AXLE OSCILLATION LOCKED	20	RIGHT REAR OUTRIGGER SELECT
11	AXLE OSCILLATION UNLOCKED		

4.6

Electronic Monitor



⚠ WARNING

An electronic monitor caution signal indicates a condition which could cause serious damage to your machine. Correct cause of signal before continuing operation.

1	ENGINE COOLANT TEMPERATURE
2	ENGINE OIL PRESSURE
3	HYDRAULIC OIL TEMPERATURE
4	HYDRAULIC OIL SUCTION
5	HYDRAULIC OIL RETURN FILTER
6	ENGINE OIL PRESSURE
7	ENGINE COOLANT TEMPERATURE
8	ENGLISH UNITS INDICATOR
9	HYDRAULIC OIL TEMPERATURE
10	METRIC UNITS INDICATOR
11	FUEL LEVEL

12	ENGINE COOLANT LEVEL
13	U.S./METRIC SELECTION SWITCH (back of monitor)
14	BATTERY CHARGE
15	HYDRAULIC OIL LEVEL
16	FUEL LEVEL LOW
17	DIGITAL DISPLAY WINDOW
18	ENGINE SPEED
19	BATTERY CHARGE
20	DIGITAL DISPLAY SELECTOR SWITCH

4.7

Digital Display Selector Switch & Symbols: This switch permits operator to choose which operating value will be shown in digital display window: battery charge, engine speed, engine oil pressure, engine coolant temperature or hydraulic oil temperature.

Appropriate symbol will glow (green) to indicate which value has been selected.

If value displayed flashes on and off, value is outside normal operating range.

U.S./Metric Unit Indicators: The operator may choose to have engine oil pressure, engine coolant temperature and hydraulic oil temperature shown in U.S. or metric units as defined beside symbols.

Selection of units to be shown is made by a switch (not shown) located on back surface of monitor. Move switch as appropriate for U.S. units or for metric units.

U.S. or Metric mode must be selected with ignition switch in OFF position. Indicator light will glow (green) to show which mode has been selected.

CAUTION SYMBOLS & ALARM

Battery Charge: Symbol glows (red) in response to low battery charge (below 11.6 VDC)

Engine Coolant Level: Symbol glows (red) and alarm sounds if coolant level falls below acceptable operating level.

Engine Coolant Temperature: Prior to serial number 0330643, symbol glows (red) if coolant temperature exceeds 214°F (101°C). Alarm sounds if temperature reaches 220°F (104°C).

After serial number 0330643, symbol glows (red) if coolant temperature exceeds 230°F (110°C). Alarm sounds if temperature reaches 234°F (112°C).

Engine Oil Pressure: Symbol glows (red) if oil pressure falls below 10 psi (68.9 kPa). Alarm sounds if pressure remains below 10 psi (68.9 kPa) for 10 seconds or longer.

Fuel Level: These lights glow (green) to indicate approximate fuel level. For example, if all five are glowing, tank is full; if only the bottom three are glowing tank is approximately half full. With no lights glowing, tank is less than 10% full.

Fuel Level Low: Symbol glows (red) if fuel level falls below 15% full.

Hydraulic Oil Level: Symbol glows (red) and alarm sounds if oil level falls below acceptable operating level.

Hydraulic Oil Return Filter: Symbol glows (yellow) in response to excessive resistance to flow. Cold oil can cause symbol to glow. Refer to Warm-Up & Operational Checks for details.

Hydraulic Oil Suction: Symbol glows (yellow) and alarm sounds in response to a few conditions. Refer to Warm-Up & Operational Checks for details.

Hydraulic Oil Temperature: Symbol glows (yellow) in response to excessive hydraulic temperature (200°F/93°C).

Check fuel level symbols on electronic monitor and replenish as necessary. It is recommended that the unit be refueled at the end of the work shift to minimize condensation.

Check engine coolant level symbol on electronic monitor and replenish as necessary. Be sure antifreeze solution is adequate for expected temperatures. Be sure radiator and cooler fins are clean. See Service Manual (coolant conditioner).

5.0 ENGINE OPERATION

CHECKS & SERVICES BEFORE STARTING ENGINE (To be performed at beginning of each work shift.)

Do not step or stand on engine cover.

Before removing filler caps or fill plugs, wipe all dirt and grease away from the ports. If dirt is allowed to enter these ports, it can shorten the life of major hydraulic components along with o-rings, seals, packing and bearings.

When adding fluids or lubricants, refer to lubrication section of this manual to determine proper type, specification and grade to be used.

If spark arrestors are required, be sure they are in place and in good working order.

Inspect unit for obvious damage, vandalism and needed maintenance (figure 5-1). Check for signs of fuel, lubricant, coolant and hydraulic leaks. Open all access doors and look for loose fittings, clamps, components and attaching hardware. Replace hydraulic lines that are cracked, brittle, cut or show signs of abrasion. Also look for signs of tampering.



Figure 5-1



Figure 5-2

Check to be sure **windows, lights and mirrors are clean and undamaged (figure 5-2).** Also be certain **mirrors are properly adjusted** for operator's position.

Service the unit in accordance with the lubrication and maintenance diagram and schedule (figure 5-3).

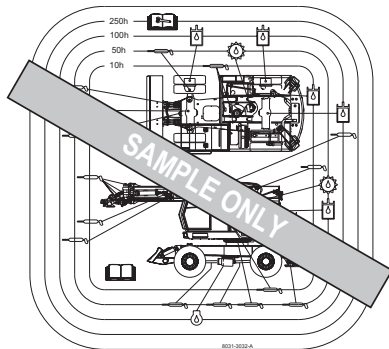


Figure 5-3



Figure 5-4

Check hydraulic fluid level in reservoir with boom extended half way and bottom of bucket flat on ground (figure 5-4). Refill reservoir as necessary using proper fluid.

NOTE!

Complete required maintenance before operating machine.

WARNING

Use extreme caution when checking items beyond your normal reach. Use an approved safety ladder.

5.1

Check fuel level symbol on electronic monitor and replenish as necessary. It is recommended that the unit be refueled at the end of work shift to minimize condensation. Over tightening cap on plastic tank will cause difficulty in removal - **Do not over tighten (figure 5-5).**



Figure 5-5

Check engine coolant level symbol on electronic monitor and replenish as necessary (figure 5-6). **Be sure antifreeze solution is adequate** (50/50 mixture of water and antifreeze plus 1oz of conditioner per liter of coolant) for expected temperatures. **Be sure radiator and oil cooler fins are clean.** Oil cooler is hinged to facilitate cleaning.



Figure 5-6

WARNING

Always stop engine when refueling. Be sure area is free of open flame, sparks or any condition which could cause fuel or fuel vapor to ignite.

WARNING

If it becomes necessary to replenish coolant in a hot radiator, stop engine and relieve pressure before removing the radiator cap. Relieve pressure by holding cap with heavy rags and turning cap slowly counterclockwise until sound of escaping pressure is heard. Wait a few minutes until sound of escaping pressure stops. Then remove cap cautiously.

5.2

Starting John Deere Engine

Note: This procedure assumes that engine and hydraulic systems are cold and engine is being started at beginning of work shift. In this situation, perform all steps in the procedure. If engine is being restarted within a work shift, and if engine and hydraulic systems are warm, warm-up steps may be eliminated.

Insert ignition key and turn clockwise to RUN position while observing electronic monitor.

All monitor symbols should glow briefly and alarm should sound momentarily as a bulb check.

If any symbol continues to glow, correct cause before starting engine.

At temperatures above 32° F. (0° C.) throttle should be at low idle. At temperatures below 32° F. (0° C.) apply full throttle when cranking.

Sound horn as a warning before starting engine.

Turn ignition switch key clockwise to START position to engage starter motor. Release key immediately when engine starts. If engine fails to start within 30 seconds, release key and allow starter motor to cool before trying again.

After engine starts, reduce speed to low idle and observe **engine oil pressure** caution symbol on electronic monitor. If symbol continues to glow for more than fifteen seconds, stop engine and determine cause of low oil pressure. Correct cause of malfunction before restarting engine.

To assure **proper lubrication**, operate engine at or below 1200 rpm with no load for 1-2 minutes. Extend this period 2-4 minutes when temperatures are below freezing.

Observe **battery charge** caution symbol. Symbol should go out to indicate that charging system is functioning properly.

Observe **hydraulic oil suction filter** caution symbol. Symbol may go out in a few seconds to indicate hydraulic reservoir is pressurized and oil is flowing thru suction filter properly. Cold hydraulic oil may cause suction filter symbol to continue to glow and alarm to sound. Continue to next step.

Adjust engine speed to approximately 1500 RPM and perform warm up and operational checks shown on page 5.4.

Cold Weather Starting Aids

Diesel engine ignition is accomplished by heat generated when fuel/air mixture is compressed within the cylinders. Because this heat may be insufficient to start a cold engine in cold weather, the use of starting aids has become common practice.

Because of the wide variety of starting aids available it would be impractical to attempt to provide specific instructions for their use in this manual. Carefully follow instructions furnished with your starting aid.

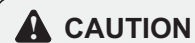
It must remain the **responsibility of the owner** to determine proper use of starting aid with regard to engine and starting aid manufacturer's instructions.

NOTE!

When starting engine at the beginning of work shift, be sure to perform all "CHECKS AND SERVICES BEFORE STARTING ENGINE".



Turning ignition switch to START position while engine flywheel is rotating may cause serious damage to engine and/or starting motor.



Improper use of a starting aid may cause severe engine damage. Be sure you understand how to use your starting aid, pay particular attention to manufacturer's warnings.

5.3

Normal Engine Operation

Engine Oil Pressure:

Low Idle (950 RPM) - 15 psi (105 kPa)
Max RPM (2400 RPM) - 50 psi (345 kPa)

Engine Operating Temperature:

John Deere - 180°F. to 202°F. (82° to 94°C)

Battery charge indication of alternator output: Approximately 14 volts with engine running at 2000 RPM.

Be alert for unusual noises or vibration. When an unusual condition is noticed, stop machine in a safe position and shut off engine. Determine cause and correct problem before continuing.

Avoid prolonged idling. Idling causes engine temperature to drop and this permits formation of heavy carbon deposits and dilution of lubricating oil by incompletely burned fuel. If the engine is not being used, turn it off.

Auto Idle (fuel saving)

If the application demands it, this feature can be activated or de-activated with the auto idle switch located on the right arm pod.

- With switch in off position, engine speed will remain as set by operator.
- With switch in on position, engine speed will return to low idle (depending on hydraulic system conditions) after 7 seconds of inactivity. Once controls are activated, the engine resumes speed setting.

Stopping the Engine

Operate engine at idle speed for 3 to 5 minutes before turning it off. This allows engine coolant and lubricating oil to carry excessive heat away from critical engine areas. Without a reasonable cooling period, turbocharger can be seriously damaged.

Do not “gun” engine before shut down; this practice causes raw fuel to remove oil from cylinder walls and dilute lubricant in crankcase.

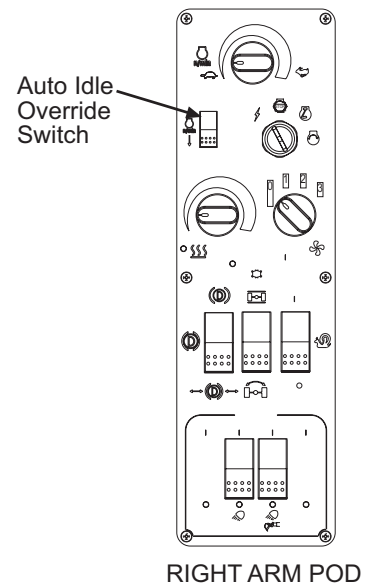
To stop engine, turn ignition key to “OFF” position. Always remove key from switch before leaving cab. Never leave cab with engine running.

NOTE!

Observe electronic monitor frequently to be sure all engine systems are functioning properly.



Always keep engine covers closed while engine is running.



5.4

WARM UP & OPERATIONAL CHECKS (To be performed at beginning of each work shift)

The safety, efficiency and service life of your excavator will be increased by performing the following operational checks while the engine and hydraulic oil are warming to operating temperature.

1. Observe electronic monitor digital display for appropriate values while switching to each position. Leave switch positioned for hydraulic oil temperature display.
2. Observe Hydraulic oil suction filter caution symbol. If symbol continues to glow after two minutes of engine operation, perform the following procedure:
 - a. Increase engine speed to approximately half throttle.
 - b. Slowly raise and extend boom fully.
 - c. Retract and lower boom fully and return engine speed to low idle. These boom movements should have created sufficient positive pressure in reservoir to cause suction filter light to go out.

NOTE: Step 3 requires that hydraulic oil be at least 60° F (15.6° C.). If necessary, increase engine speed to full throttle and **stall boom extend function** to speed warming of hydraulic system.

3. Observe **hydraulic oil return filter** caution symbol. If symbol is still glowing, observe hydraulic oil temperature value on digital display. Normally, symbol light will not glow when hydraulic oil reaches approximately 60° F. (15.6° C.).
4. Check operation of all **excavator functions** in both directions.
5. Check operation of **travel functions** in both directions and be certain that **travel alarm sounds** when traveling. Travel alarm and horn must be audible from inside operators cab with engine running.
6. Stop engine and **service all items** which could not be serviced with machine in original position.
7. Check to ensure swing lock mechanism is operating properly at regular weekly intervals.

NOTE!

Complete required maintenance before operating machine.

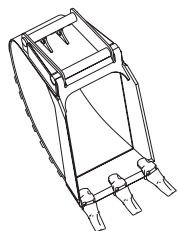
NOTE!

A small residual flow from the pump flushes thru the main valve until there is a demand from any circuit. With hydraulic oil temperature within operating range, and all functions at rest, it is unlikely that return filter indicator light will glow even if the filter is clogged.

However, if this symbol flashes on and off during operation of these circuits, it can be assumed that return filter element is clogged and must be replaced.

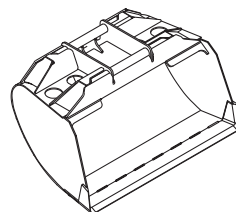
6.0 ATTACHMENTS

Excavating buckets



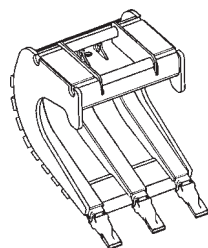
24" (610 mm) - 665 lbs (302 kg)
30" (762 mm) - 734 lbs (333 kg)
36" (914 mm) - 802 lbs (364 kg)

Ditching buckets



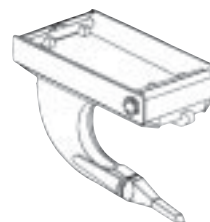
60" (1524 mm) - 869 lbs (394 kg)
66" (1676 mm) - 892 lbs (404 kg)

Pavement removal bucket



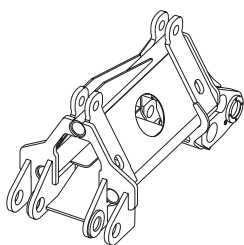
30" (762 mm) - 1142 lbs (518 kg)

Single tooth ripper



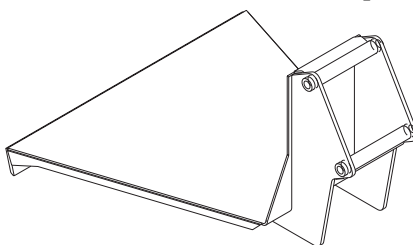
30" (762 mm) - 682 lbs (309 kg)

Boom extension



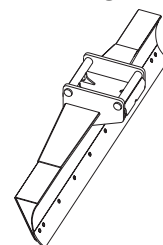
4' (1.2 m) - 1015 lbs (460 kg)

Guard rail back scraper



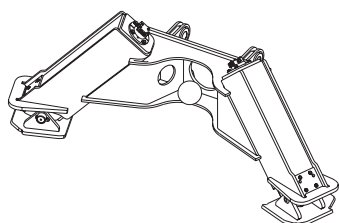
669 lbs (303 kg)

8' Grading blade



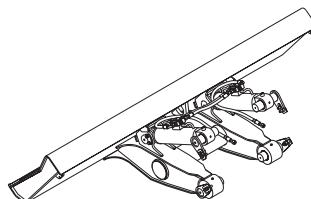
8' (2.4m) 729 lbs (331 kg)

Front pin-on outriggers



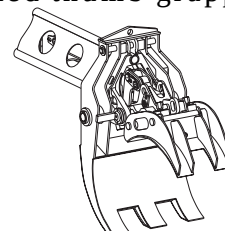
2346 lbs (1064 kg)

Front chassis blade



8.5' (2.6 m) - 1515 lbs (687 kg)

Fixed thumb grapple



1138 lbs (516 kg)

6.1

ADAPTER ATTACHMENT INSTALLATION



1. Be sure wedge bolts are secured in storage position (toward rear) and position bucket adapter above bucket bar as shown.



2. Lower boom until concave section of adapter contacts bucket bar.



3. Move adapter toward “bucket close” position until outer end of adapter contacts bucket. Ensure proper alignment and continue to close until adapter contact stops.



4. Move wedge bolts forward and position wedge between adapter and bucket bar. Be certain wedge surfaces are flush between adapter and bar and tighten fully. Jog tool control a few times and retighten. Check often to be sure bolts remain tight.



5. Position bucket linkage as desired.

WARNING

Keep boom in fully extended position while installing bucket. Stay clear until bucket adapter has been fitted to bucket as shown in step four.

CAUTION

Digging with a loose or improperly fitted bucket may cause excessive wear, shear adapter bolts or cause loss of bucket.

7.0 TRAVEL

General: There are at least five modes of travel which should be considered separately:

- **Moving machine less than 4.6m (5 yards)** as in ditching operations, to adjust digging position
- **Performing grading operations**
- **Moving machine to a different area of worksite**
- **Over-the-road travel**
- **Pick-and-carry operations**

These five travel modes do not cover all possible travel conditions, **but** a thorough understanding of these travel modes will enable the operator to select proper control options for other conditions.

Direction of Travel: Select "FORWARD" OR "REVERSE" travel by moving the travel direction lever (left side of column) either forward or back, respectively.

Travel Speeds: There are two speeds available in the powershift transmission. Gear selection is made by rotating the handle on the end of the travel direction lever to either the turtle symbol (low gear) or the rabbit symbol (high gear). This gear selection can be made at any time, whether machine is moving or still. In either gear selection, the rate of travel is controlled by the travel speed pedal (on floor to the right of the steering column.)

Travel Pedal Depression: With TRAVEL PEDAL in fully raised position, there is not enough hydraulic flow to travel motor to move machine on a level surface. The further pedal is depressed, the greater the travel speed.

Travel Procedures:

IMPORTANT PRECAUTIONS: There are three important precautions which must be observed, **REGARDLESS OF THE OPERATION BEING PERFORMED:**

- **Always fasten seat belt immediately after sitting in operator's seat.** Travel and excavator functions can cause sudden, unexpected jolts to both machine and operator.
- **Unless all immediate travel will be on a flat and level surface, always move AXLE LOCK switch (on LEFT CONTROL CONSOLE) to unlock position to unlock front axle oscillation cylinders before traveling in first gear (oscillation cylinders are automatically unlocked when in second gear). Traveling with oscillation cylinders locked could cause an unstable condition.**

CAUTION

The travel system of the XL3300 Excavator IS NOT similar to previous Gradall travel systems. Even experienced Gradall operators must study and understand TRAVEL section completely before practicing in a safe, open area.

Practice must be supervised and must include all phases of travel functions in varying terrain conditions.

DO NOT operate this machine at a worksite until observed practice has been approved by your supervisor.

WARNING

When selecting travel direction, always be aware of orientation of upperstructure on under-carriage. The machine doesn't know which way you are facing; it only knows front and rear. If you confuse direction of travel, it could result in an accident causing serious injury or death.

NOTE!

Machine operation in either travel or work mode is limited to 45° (engine operation).

WARNING

*The XL3300 Excavator **is not designed to perform travel and excavator functions at the same time.** Under some conditions it is possible to operate both functions at the same time.*

Do not operate both functions at the same time for the following reasons:

- *Trying to operate travel and excavator functions at the same time **divides operator's attention.** This endangers operator and those who could be near machine.*

- *Depending on grade, extent of TRAVEL PEDAL depression and other conditions, **machine could fail to respond** to excavator controls.*

7.1

Moving machine less than 4.6m (5 yards) to adjust digging position: It is assumed that machine is performing a ditching (or similar) operation.

Always **fasten seat belt** when operating.

Switch alarm to work mode and be sure **first gear is selected, and that DIG BRAKE switch is positioned in AUTO.**

If unit is working from a roadway, be sure all required **traffic control devices/ persons are in position.** Perform following procedure for travel.

1. Align upperstructure and undercarriage with **cab facing direction of travel.** Be certain of orientation of upper on undercarriage (see previous **WARNING** under DIRECTION OF TRAVEL heading).
2. If outriggers are being used, raise them fully. If optional blade is lowered, raise it as required.
3. Using TRAVEL LEVER switches, select LOW GEAR and appropriate direction of travel.
4. Check to be certain of adequate clearance along travel path. Give special attention to how unit must be steered to avoid obstacles. Give special attention to orientation of upper on undercarriage to avoid steering and travel in wrong direction. Confusion could cause you to steer or travel in direction opposite of that intended. See **STEERING** section.
5. Sound horn to warn others of move. Travel alarm sounds when travel pedal is depressed.
6. Depress TRAVEL PEDAL to move unit to new digging position. DIG BRAKE will release automatically when travel pedal is depressed and apply automatically when pedal is released.
7. Be sure traffic control person(s) are aware that excavator operation will begin again.
8. Lower outriggers to increase excavator stability, if required.

Performing Grading Operations: If machine is equipped with optional blade, light to medium grading operations can be performed. To define "medium" grading: The material to be moved **must** be loose material (previously broken). The material to be moved **must not** be sufficient to spill over top of blade.

When equipped with a blade, the XL 3300 **does not** become a bulldozer. It is mounted on tires, not tracks. It's possible to move compacted material to a limited extent but this practice will cause stresses which will **shorten service life** of components.

If grading operations cause material to spill over top of blade, grading will be distorted. There is no provision to tilt blade. Use excavator functions to create a roughly level condition before grading.

WARNING

Do not attempt to perform excavator and travel functions at the same time. While possible under some conditions, this practice could cause an accident resulting in serious injury or death. Perform excavator and travel functions separately.

Always fasten seat belt prior to operating or traveling.

7.2

Performing Grading Operations (continued)

With seat belt fastened, perform following procedure for grading function:

1. Align upperstructure with carrier with cab facing front-end of machine.
2. Retract boom fully and tilt boom as required for best visibility.
3. Position machine on a surface parallel (side-to-side) to desired grade. Be sure AXLE LOCK switch is positioned in unlocked position (on left control console). Switch alarm to work mode.
4. Using TRAVEL LEVER switches select FORWARD TRAVEL and LOW GEAR.
5. Using BOOM/BLADE ENABLE switch, select BLADE (on left control console). Blade height can now be controlled by right joystick.
6. Using DIG BRAKE switch, select OFF or AUTO as appropriate (on left control console). If OFF is selected, BRAKE PEDAL must be used to slow or stop machine.
7. Depress TRAVEL PEDAL to obtain appropriate travel speed and adjust blade height as needed.

Moving machine to a different area of worksite: This operation is similar to MOVING MACHINE LESS THAN 4.6M (5 YARDS). **However**, it is not necessarily the same.

Gradall cannot predict worksite conditions and cannot provide an exact procedure for unknown conditions. **Inspect travel path** to new worksite to discover all conditions which could cause problems.

With details of travel path inspection in mind, consider the following conditions to **select safest possible setting of machine conditions**:

- **Is travel path on-road or off-road, or both?** If both, determine point at which you must stop and adjust machine controls for new conditions.
- **Consider travel speed:** If travel path terrain is rough, select low gear, this makes slower speed operation easier to control in rough terrain. Extent of depression of travel pedal can help avoid unnecessary gear and/or fast or slow travel speed changes.
- If travel path is smooth and grades are not too steep, select high gear as appropriate.
- Extent of depression of travel pedal can help in selection of travel speeds.
- **Consider terrain:** If travel path includes rough terrain, be certain to unlock front axle oscillation cylinders (use AXLE LOCK switch on right control console). Also consider engaging SWING LOCK (see next heading OVER-THE-ROAD TRAVEL).
- **Consider brake mode:** Either the brake pedal or automatic dig brake can be used but, the brake pedal (DIG BRAKE OFF) is best or recommended when traveling in HIGH GEAR. Use of brake pedal will avoid abrupt stops.
- Switch alarm to work mode.

7.3

Over-the-road travel: Over-the-road travel is permitted when it is in compliance with federal, state/provincial and local laws and traffic regulations. Ask your supervisor if there are any special conditions you must fulfill, such as slow moving vehicle symbol (SMV), permit, clearances, escort car(s) etc. Perform following procedure in preparation for over-the-road travel: **Always fasten seat belt.**

1. Align upperstructure and undercarriage with cab facing front. Engage SWING LOCK. To engage swing lock turn switch to “lock” position (located on left arm pod). Swing upperstructure slowly to forward position until pin engages in receiver.
2. Align boom travel position decal on boom cradle with indicator on upper frame.



3. Lock joystick using JOYSTICK LOCK switch (on left control console). This prevents accidental actuation of excavator controls.
4. Be sure axle lock switch is in unlocked position.
5. Be sure mirrors and lights are undamaged, clean and properly adjusted for over-the-road travel.
6. Select FIRST or SECOND GEAR range and creeper mode on/off as appropriate.
7. With service brake applied, turn DIG BRAKE switch (on right control console) to OFF position. In this condition BRAKE PEDAL must be used to slow or stop machine. Use BRAKE PEDAL to hold machine in position.
8. Turn hazard warning lights ON using HAZARD WARNING switch (on steering column).
9. If appropriate, test any communication equipment required for safe travel.
10. Keeping in mind previous steps, release BRAKE PEDAL and depress TRAVEL PEDAL to obtain appropriate travel speed. Use BRAKE PEDAL to slow or stop machine.
11. Prior to operation at new work site, perform a thorough inspection and reset controls accordingly.

 WARNING

Always maintain adequate clearance with overhead obstructions when traveling.

 WARNING

Do not use boom tie-down chain for lifting loads. Boom tie-down chain was developed specifically for transport purpose only.

7.4

Pick-and-carry options:

General: A generally accepted meaning of the term “Pick-and-Carry” follows:

- The operation starts by **picking** (lifting) a load from its resting place (ground, truck, etc.).
- Next is the carry function; The load is carried to its destination (delivery point).
- Finally, load is positioned in appropriate location at delivery point.

The operation described above seems straightforward and easy. **However**, to be performed properly there are several factors to be considered.

For this reason **separate procedures** are provided for each stage of the operation.

But first, perform preliminary steps below:

- **Inspect pick (lift) site, travel path and delivery site.**
- Then **determine weight of load and rigging**. Based on load weight, and using **rated lift capacity chart**, determine most appropriate machine positions at both pick and delivery sites.
- Depending on travel path inspection, decide on appropriate travel sites.
- Based on these decisions, **plan operation in advance**. Read and understand following three procedures before starting operation.

Picking load: The following steps must be performed to extent they are appropriate to plan.

1. Position machine as close as practical to load. The best position is with boom directly over front; next best is with boom directly over rear; least stable is with boom over side.
2. Lower outriggers (and blade if furnished) to increase stability.
3. Move AXLE LOCK switch forward to LOCK position to provide more stability (located on LEFT CONTROL CONSOLE). This provides a rigid support between front axle and upperstructure.
4. Inspect any rigging (must be of adequate capacity) attached to load. Never permit rigging to pass over bucket teeth. This could cause tool cylinder relief valve to open and result in loss of control of load. Refer to RATED LIFT CAPACITY CHART.
5. Lift load far enough to be sure rigging has been properly centered. Center rigging if necessary.
6. Raise load far enough to clear obstructions and swing load directly over front or rear as appropriate for travel plan. **Do not travel with load over side.**

7.5

7. Lower load close to ground. Load should be no higher than necessary to clear travel path.
8. Assuming a long, narrow load (pipe), align load according to plan and then retract boom as far as possible.
9. Move JOYSTICK LOCK switch forward to LOCK position to prevent accidental control actuation.

Carry (travel) function:

1. With load aligned according to plan, have helpers attach tag lines to load. Helpers must keep load in proper alignment during carry function. If necessary, swing lock can be used to help alignment.
2. Move AXLE LOCK switch to rear to UNLOCKED position. Never carry with this switch in LOCKED position. This condition could cause loss of traction and an unstable situation resulting in a serious accident.
3. Select travel speed based on terrain and/or walking speed of those holding tag lines.
4. Move TRAVEL ALARM switch to WORK position to provide continuous alarm when traveling.
5. With service brake applied, move DIG BRAKE switch to OFF position and control braking using BRAKE PEDAL.
6. While observing those who may be guiding load with tag lines and also clearance between load and ground, travel carefully to delivery point.
7. With machine in planned position at delivery point, move DIG BRAKE switch to either AUTO or ON position. Disengage SWING LOCK if necessary.

Delivery (positioning load)

1. Move JOYSTICK LOCK switch to rear to UNLOCK joysticks (to energize joystick functions).
2. Lower outriggers and level machine to the extent possible. Blade can be lowered if furnished.
3. Move AXLE LOCK switch forward to LOCK front axle (increases stability if blade is not furnished).
4. Sound HORN to warn of excavator operation.
5. With tag lines attended as needed, use joystick functions as necessary to position load at delivery point.

NOTE!

Delivery procedure assumes that all excavator functions must be used to complete delivery.

8.0 BRAKE SYSTEM & OUTRIGGERS

BRAKE SYSTEM

General: There are three methods of applying machine brakes under varying conditions. All methods depend on positioning of DIG BRAKE switch (located on right console).

Dig Brake Switch: The DIG BRAKE switch offers three options to help operator choose the best brake selection for conditions (OFF, ON or AUTO):

- **OFF:** With DIG BRAKE switch positioned in OFF, DIG BRAKE cannot function. With DIG BRAKE OFF, BRAKE PEDAL (service brake) is the only means of controlling slowing or stopping unit. This mode must be used for travel only.
- **ON:** With DIG BRAKE switch positioned in ON, DIG BRAKE is applied and overrides brake pedal (service brake).
- **AUTO** (automatic): With DIG BRAKE switch positioned in AUTO, dig brake is automatically released when travel pedal is depressed and then applied when travel pedal is released. This is a convenient feature when making short moves at low speeds. However, selecting AUTO for higher travel speeds will cause **abrupt, jarring stops** and is not recommended.

Brake Pedal (service brake): Activated by foot pedal. The pedal permits slowing or stopping machine depending on extent of pedal depression.

Park Brake: Activated by rocker switch on left hand pod panel. This should be used when the machine is running but not excavating. The joysticks are disabled when the park brake is engaged. The park brake will set when the key is turned off but could release at restart. Therefore always manually set park brake before shutting down machine.

OUTRIGGERS

General: The XL 3300 has been designed for excavator operation on rough terrain. Because rough terrain can include soft and/or uneven surfaces, outriggers are provided to increase machine stability when excavating; **not to increase lift capacity.**

If equipped with optional blade, blade can also be used to increase stability and level condition.

Lower outriggers to increase stability. With stability established, move AXLE LOCK switch forward to LOCK front axle and increase stability.

If necessary, adjust outriggers and/or blade as required to stabilize normal excavator operations.

NOTE!

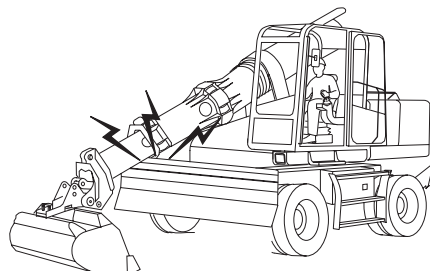
Be sure to allow for front and rear outrigger and/or optional blade clearance while in work mode. It is possible for the boom to come in contact with these items while digging.

NOTE!

All excavating operations must be done with dig brake in "on" or "auto" mode.

NOTE!

If service brake fails during travel, immediately move PARK BRAKE switch to ON position.



9.0 STEERING & DRIVE TRAIN

STEERING

General: The hydraulic power steering system provides low effort steering under normal conditions and greater control under soft or uneven ground conditions. Road feel is similar to conventional power steering systems.

DRIVE TRAIN

There are three operator controls which govern DRIVE TRAIN operation:

- TRAVEL LEVER which selects FORWARD or REVERSE travel directions. A rotary switch on the end of the travel lever selects 1st or 2nd gear. Indicator lights are provided to show which gear has been selected.
- CREEPER MODE switch selects standard or creeper range. Standard mode allows full speed in each gear. Creeper mode allows approximately 35% of full speed in each gear, allowing for better control during load placement or driving onto trailer.
- TRAVEL PEDAL governs hydraulic flow to motor which provides torque to powershift transmission.

The location of these controls is shown in CONTROL & INSTRUMENT IDENTIFICATION section. Use of these controls is described in TRAVEL SECTION.

The TRAVEL section describes when, why and how to use these controls under various conditions. The DRIVE TRAIN section does not provide this information.

A travel alarm is provided to warn others that a machine is traveling. The alarm has two modes (WORK and TRAVEL) which can be actuated by TRAVEL ALARM switch on left control console.

- In WORK mode, alarm will beep continually while machine is moving, to warn others in area of machine travel. WORK mode must be selected when others in area may not be aware of machine movement.
- In TRAVEL mode, alarm will beep only for three seconds after machine begins movement and then remains silent. This operator option is provided to silence alarm and is only to be used for over-the-road travel.

Gradall cannot anticipate all operating situations. The **operator** and/or **supervisor, company,** and **owner** must accept full responsibility for any accident, damage, injury or death resulting from travel alarm being silenced.

Always consider situation and choose safest selection for travel alarm.

WARNING

Be alert for any increase in effort needed to steer. If an effort increase is noted, notify maintenance personnel immediately for repair.

If power assist feature should fail, IT WILL BECOME VERY DIFFICULT TO STEER. For this reason it is very important that you never stop engine while traveling.

If power steering system fails, stop machine as soon as possible. Do not drive unit until problem has been corrected.

CAUTION

Use of power steering while undercarriage is stopped causes unnecessary stress on system components and may cause serious damage.

Holding steering wheel in full left turn or full right turn may cause system to overheat. This can cause steering pump to fail.

CAUTION

Always bring unit to a complete stop before reversing direction. An abrupt change of direction may cause damage to drive train.

Always bring unit to a complete stop and apply digging brake before using excavating functions.

10.0 OPERATOR CONTROL PATTERNS

CHANGING CONTROL PATTERNS

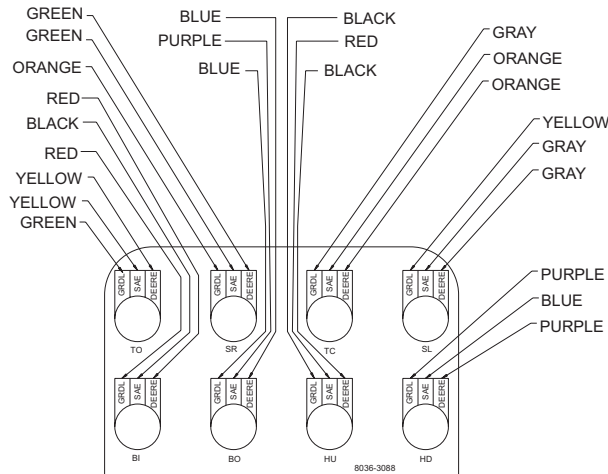


Figure 10-1.

This excavator, unless specified differently, is assembled and shipped with the operating controls in the standard SAE control configuration. The controls can be very easily changed to GRADALL or JOHN DEERE patterns. Located under the valve cover is a bulkhead with a decal (**figure 10-1**) showing different positions for the pilot control lines. There are eight pilot lines that are individually coded by different color bands with a quick-disconnect fitting on the end of each hose. There are eight different positions (two rows) on the bulkhead. In order to change the control pattern, **TURN OFF ENGINE, REMOVE KEY,** and select the desired pattern (SAE, GRDL, DEERE). To complete the change, the hoses are disconnected and positioned such that the hose band color is matched with the color corresponding to the desired control pattern color. For example, to change the “tool open” function from SAE to Gradall (GRDL), the yellow pilot hose would be removed from the bulkhead and moved to the position that currently has the gray pilot hose. **Note that the hose colors and the pattern identifying colors must match for all control configurations.** In all cases, hoses in the top row always stay in the top row, while hoses in the bottom row will always stay on the bottom. After changing the control pattern in the valve compartment, **ALWAYS** change the operating decal in the operator’s cab. **CAREFULLY** check the pattern change before the start of any machine operation to make certain all controls are functioning as expected.

Control Patterns

SAE CONTROL PATTERN (permanent decal)

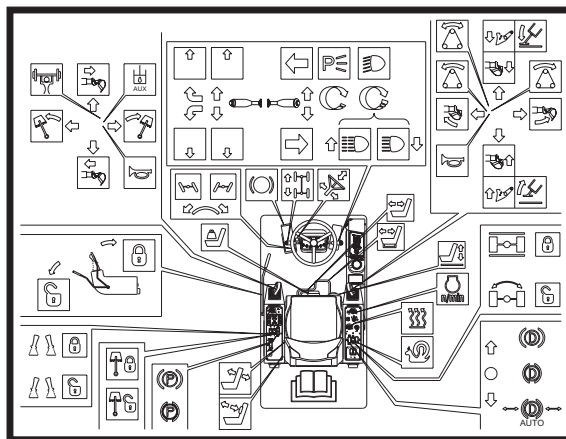


Figure 10-2.



WARNING

Always change cab control decal when changing control pattern. Alternate patterns are located in drawer under seat.



WARNING

Test your controls before operating. If controls have been modified to another pattern, be sure you are familiar with functions and ensure that diagram in cab shows actual pattern. Alternate patterns are located under seat. If you do not have the proper control pattern decal, do not change the control pattern.

NOTE!

*SAE, Gradall, and John Deere controls relate only to boom, swing, and bucket (tool) functions. **Do not alter other control operations.***

10.1

Control Patterns

GRADALL CONTROL PATTERN Overlay (to be placed over permanent decal)

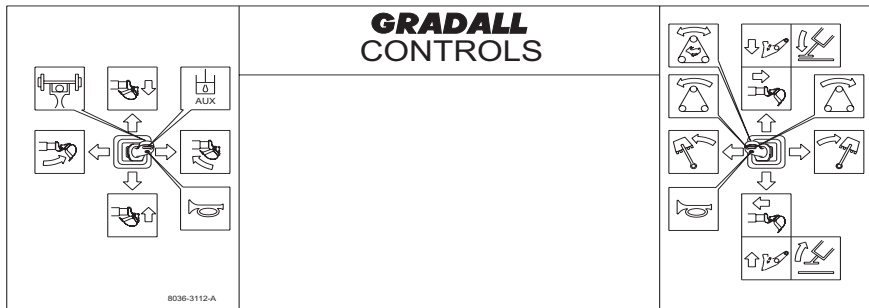


Figure 10-3.

JOHN DEERE CONTROL PATTERN Overlay (to be placed over permanent decal)



Figure 10-4.



Always change cab control decal when changing control pattern. Alternate pattern decals are in drawer under seat.



Test your controls before operating. If controls have been modified to another pattern, be sure you are familiar with functions and ensure that diagram in cab shows actual pattern. Alternate patterns are under seat. If you do not have the proper control pattern decal, do not change the control pattern.

10.2 TYPICAL DIGGING CYCLE

Prepare for Digging

1. Position unit for efficient digging cycle and check for appropriate clearances.
2. Stop engine and secure door and windows in desired position for ventilation. Remove boom tie down chain from boom.
3. Warm up engine and hydraulic oil and then set engine to full throttle position.
4. Be certain pilot control lever is in down position to energize joysticks and pedals.

Joystick Controls and digging cycle shown with standard SAE pattern

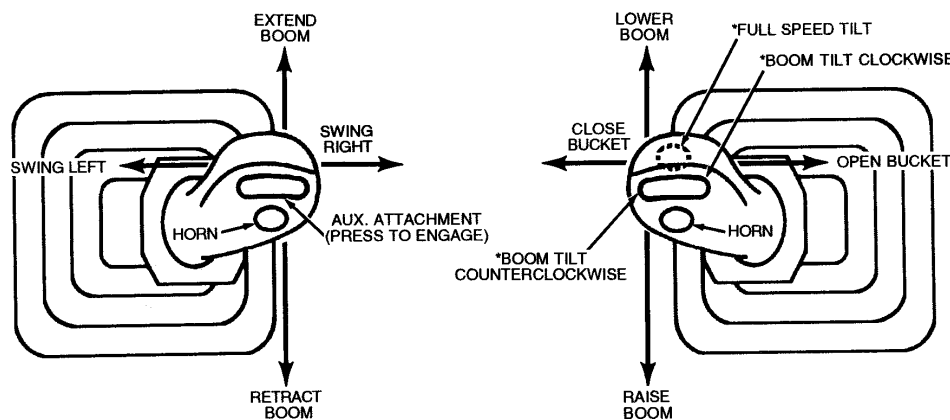


Figure 10-5

* If tilt speed has been reduced for conditions speed can be temporarily increased to maximum by depressing FULL SPEED TILT button.

CAUTION

While digging, pay close attention to the degree of boom angle in relation to machine position. In certain instances it is possible for the boom to come into contact with the undercarriage, front and rear outriggers, or optional blade.

WARNING

Avoid accidental actuation of controls. Always stop engine before repositioning door and windows for ventilation.

WARNING

Test your controls before operating. The control pattern shown in figure 10-5 is the standard SAE pattern. If controls have been modified to another pattern, be sure you are familiar with functions and ensure that diagram in cab shows actual pattern. Alternate patterns are located under seat. If you do not have the proper control pattern decal, do not change the control pattern.

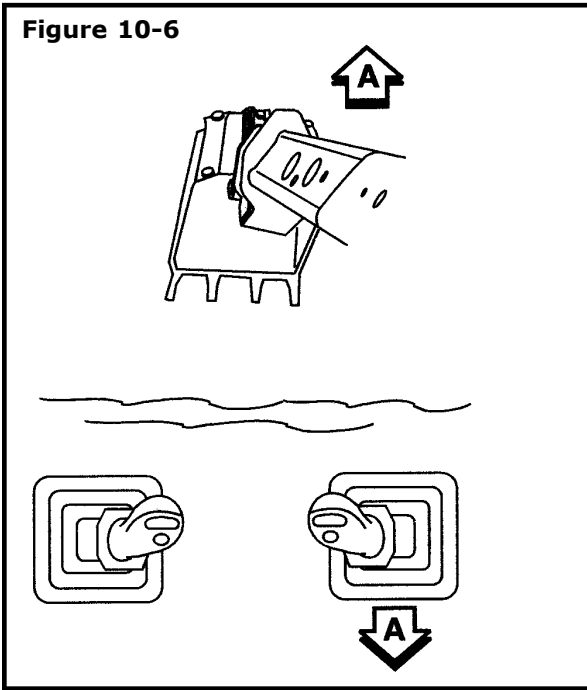
NOTE!

Practice with controls in a safe, open area.

Joysticks & pedals return to neutral position when released.

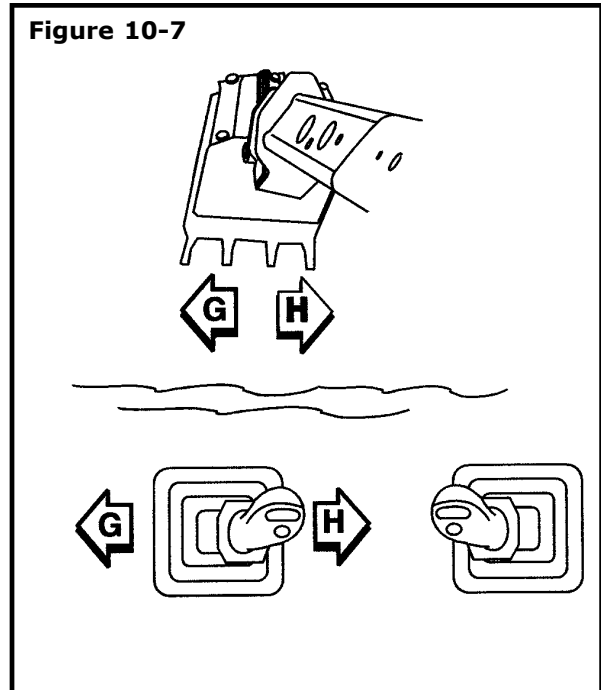
10.3 SAE DIGGING CYCLE

Figure 10-6



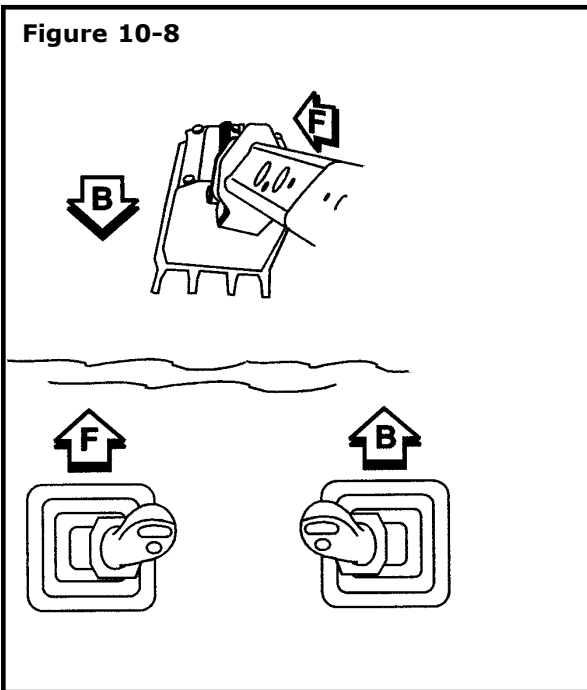
5. Pull back on right joystick (**A**) to raise boom far enough to clear all obstructions. **See Figure 10-6.**

Figure 10-7



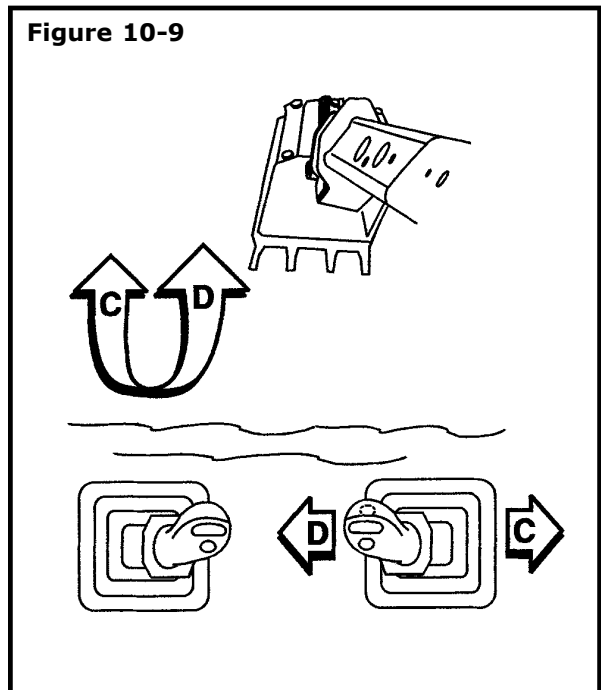
6. Move left joystick to left (**G**) to swing left or to right (**H**) to swing right to digging site. **See Figure 10-7.**

Figure 10-8



7. While pushing left joystick forward (**F**) to extend boom, push right joystick forward (**B**) to lower boom into position for start of cut. **See Figure 10-8.**

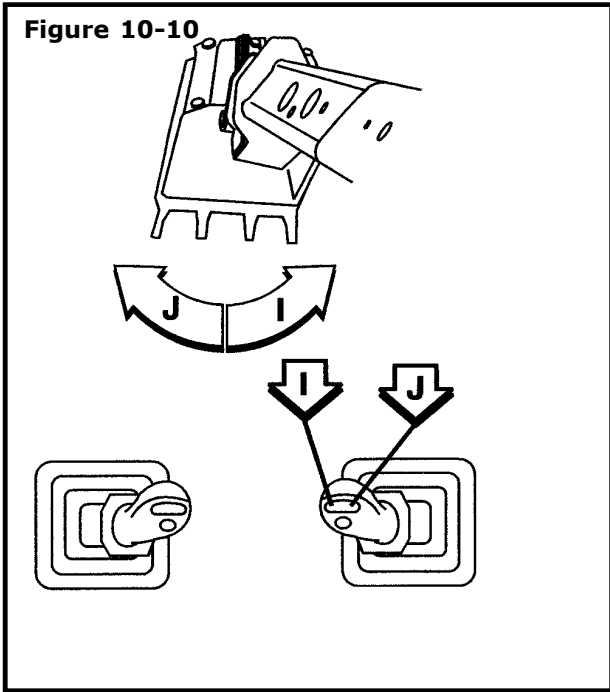
Figure 10-9



8. Move right joystick to right (**C**) to open bucket or to left (**D**) to close bucket for correct penetration. Teeth should angle downward slightly (about 5 degrees). Angle may be greater for soft digging. **See Figure 10-9.**

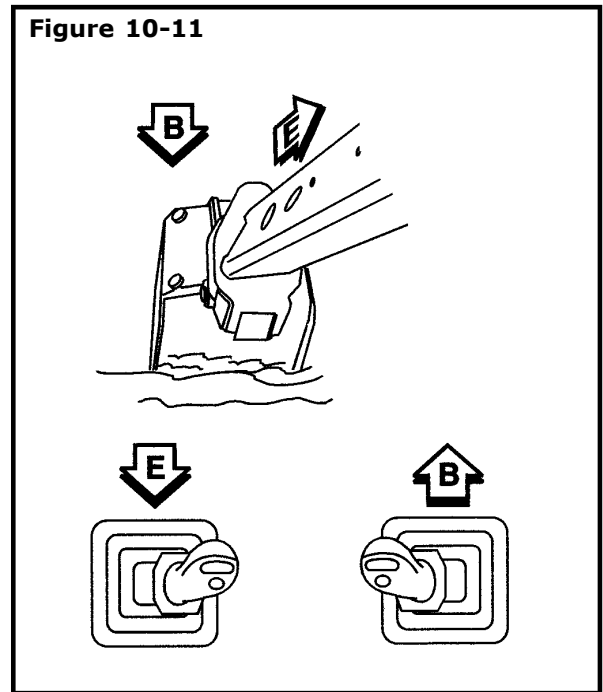
10.4 SAE DIGGING CYCLE

Figure 10-10



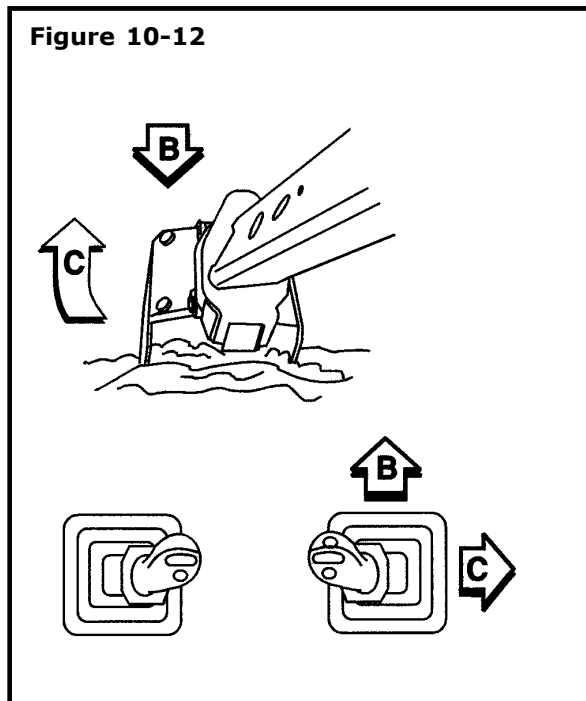
9. If required, press left side of tilt switch (**I**) to tilt counterclockwise or right side of switch (**J**) to tilt clockwise. If necessary, use full speed tilt button to return to full speed tilt. **See Figure 10-10.**

Figure 10-11



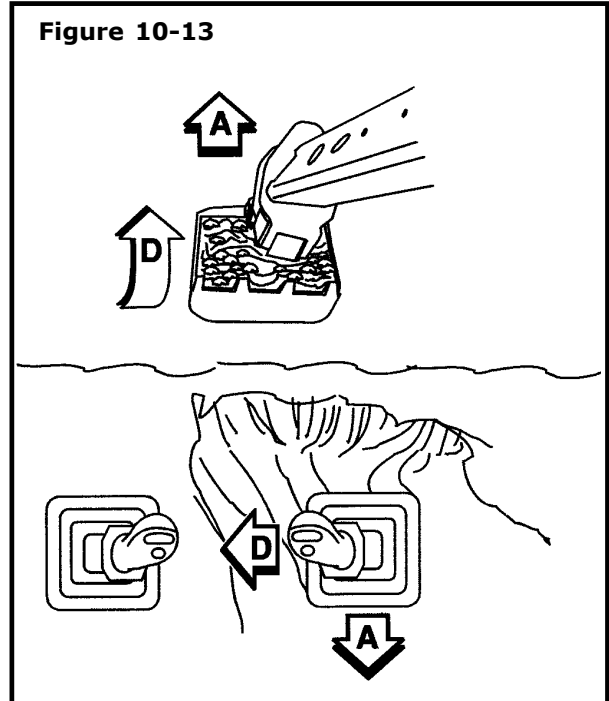
10. While pushing forward on right joystick (**B**) to lower boom and force bucket into ground, pull back on left joystick (**E**) to retract boom and fill bucket. **See Figure 10-11.**

Figure 10-12



11. As bucket is filling, jog right joystick forward (**B**) to lower boom and maintain depth of cut. At same time jog right joystick to right (**C**) to open bucket and maintain proper bucket angle. **See Figure 10-12.**

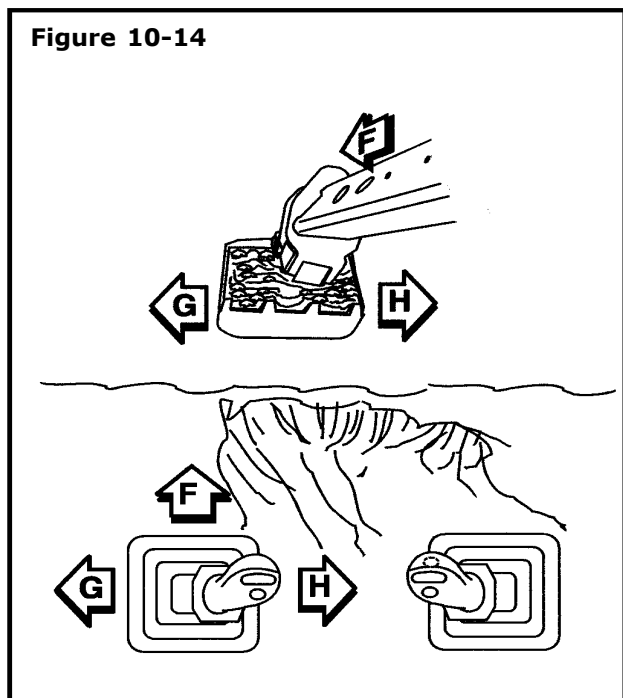
Figure 10-13



12. When bucket is full, or when boom is fully retracted, move right joystick to left (**D**) to close bucket. At same time pull right joystick back (**A**) to raise boom far enough to clear obstructions. **See Figure 10-13.**

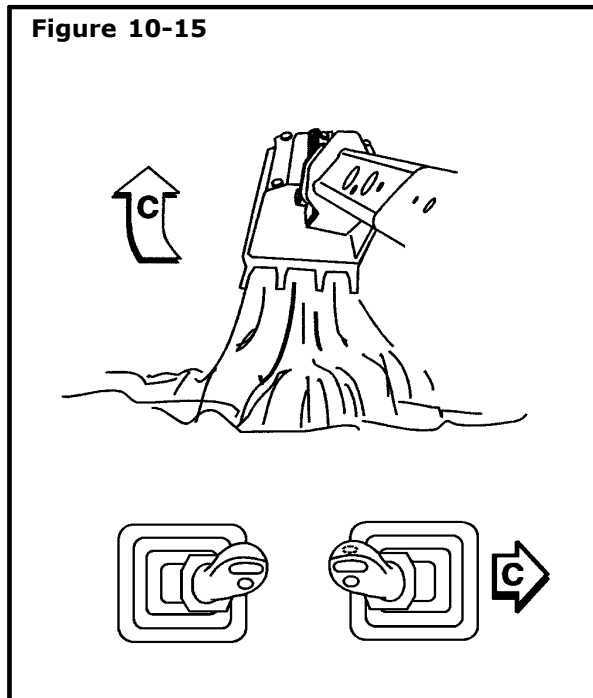
10.5 SAE DIGGING CYCLE

Figure 10-14



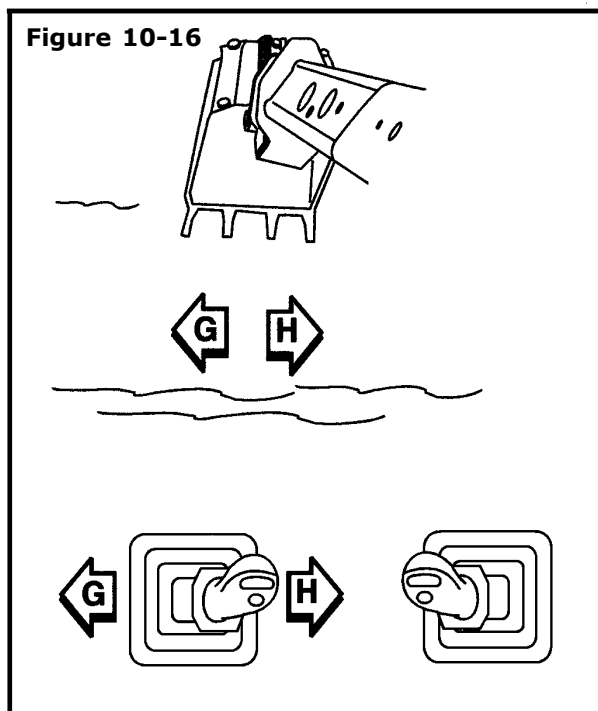
13. Move left joystick to right (**H**) to swing right or to left (**G**) to swing left to dump site. If necessary, extend boom by pushing left joystick forward (**F**). See Figure 10-14.

Figure 10-15



14. Move right joystick to right (**C**) to open bucket and dump load. See Figure 10-15.

Figure 10-16



15. Move left joystick to left (**G**) or right (**H**) to align boom for next cut. Repeat steps 7 thru 15. See Figure 10-16.

11.0 LIFTING & POSITIONING A LOAD

Precautions

Do not depend on machine tipping as a warning of overload. Some load ratings are based on hydraulic lift capacity, not stability.

Hydraulic relief settings must be correct when lifting and positioning loads. Do not increase relief settings to lift a load.

Suspend loads only as shown in figure 11-2. Passing load line over open bucket can cause uncontrolled movement of load. Boom must be tilted to level position.

Keep everyone clear of machine (especially the boom and suspended load). Use guide ropes to position load.

Do not travel with a suspended load positioned over the side of the machine.

Sudden swing braking can cause unexpected movement of the load and tip the machine.

Keep the load line vertical. Side loads can cause structural damage and tip the machine.

Use the lift capacity chart to calculate maximum load. Keep in mind, the weight of the chains and of the attachment must be added to the load, then compared to the value on the lift capacity chart.

Be thoroughly familiar with excavator hand signals (shown at end of manual).

Operate machine at full throttle.

If it becomes necessary to shut the engine off while positioning a load, place load on the ground prior to shutting off engine.

General

The excavator can lift and position loads safely only if you plan the lift properly. There is a great lift capacity difference between the excavator's best and worst lift positions. **Just because it can lift a load from one point does not mean it can safely deliver the load to any other point.**

Assume that you have just lifted the rated load from a truck with the unit in this position. You may raise the boom to the very best lifting position. Also, since all loads shown on the chart are based on hydraulic limits (not stability limits) you may safely swing to any position. However, load limits begin to be exceeded if you lower the boom below horizontal or above maximum LOAD POINT HEIGHT. Study "LOAD POINT HEIGHT" and "MIN. RADIUS" columns on Rated Lift Capacity Chart while reading this paragraph again. Also note how the load capacities decrease for other conditions (other columns).

The point is, you must plan the lift based on the worst condition of the lift and delivery, not the best. The worst condition can only be determined by performing an UNLOADED TEST LIFT AND DELIVERY of the load.

The "common sense" and "feel" of an experienced operator might apply in regard to "tipping loads" BUT DOES NOT APPLY to loads limited by hydraulic lift capacity. Exceeding these capacities can cause a relief valve to open allowing the load to fall.



Failure to plan a lift properly could cause death or serious injury.

11.1

Positioning Machine For A Lift

Whenever possible, the machine should be on a firm, level surface when making a lift. Do not travel with a suspended load positioned over the side of the machine.

The shorter the load radius, the greater the lift capacity. Position the unit to minimize boom extension and swing while keeping a safe distance from obstructions and excavations.

Finally, position machine to gain maximum visibility of load and delivery point. If conditions do not permit a clear view, use a signal man.

Planning A Lift

1. Determine the weight of the load. Weight of slings, chains, bucket, attachment, and auxiliary lifting devices must be added as part of the load. Refer to lift capacity chart for weight adjustment required for bucket.
2. Move the machine to the best probable position for making the lift.
3. Perform an unloaded trial run of lift to determine maximum boom height/depth and load radius required to complete lift.
4. Measure boom height/depth from hole in adapter to ground level (same level as bottom of tire). Be sure to allow for length of chain and height of load.
5. Measure load radius from inner corner of frame at front of cab to vertical load line (**see figure 11-1**) and add distance to center of rotation which is 1.7m (67.62 inches).
6. Refer to lift capacity chart column for required load radius. If required radius is between columns, use column for next larger radius.
7. Check the appropriate capacities for required boom height/depth. The smaller of these capacities is the maximum load permitted for lift conditions.
8. To determine practical working load limits the operator must also consider slopes, wind, hazardous conditions, experience of personnel and proper load handling.

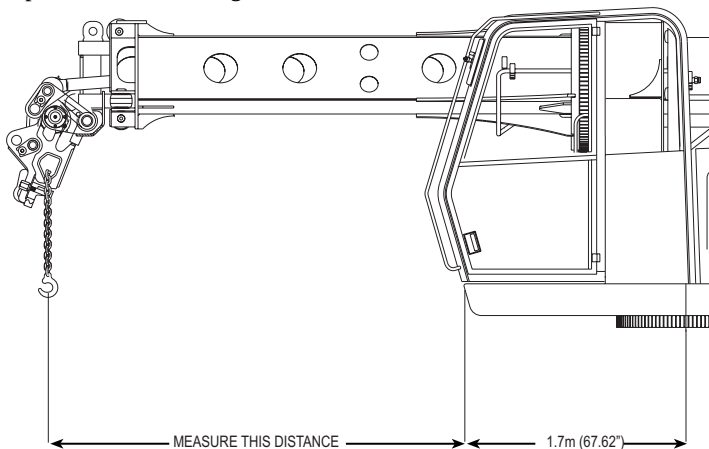


Figure 11-1

WARNING

Do not use boom tie-down chain for lifting and placing loads.

WARNING

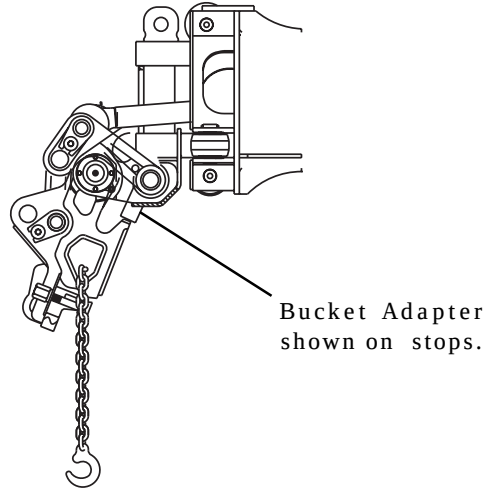
Failure to plan a lift properly could cause death or serious injury.

NOTE!

Lift capacities are based on machine being on a firm, level surface and also on load being freely suspended beneath bucket adapter.

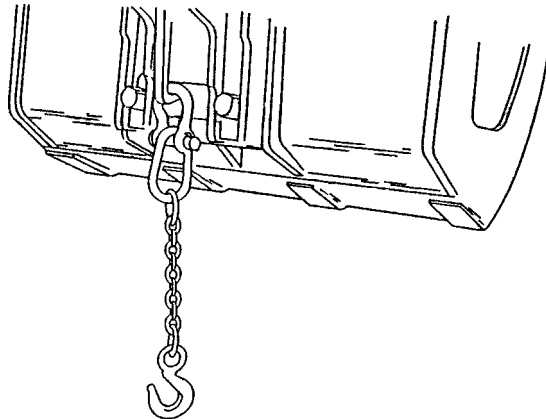
11.2

Figure 11-2



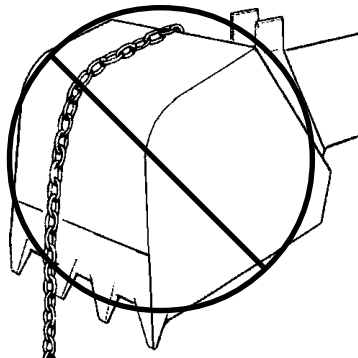
To lift loads, remove bucket, level boom from side to side and close adapter fully against stops. Pass thru adapter as shown and be certain chain is locked on itself (**see figure 11-2**). With load attached as shown, boom must be level from side-to-side and bucket adapter must be closed against stops (**see figure 11-2**).

Figure 11-3



A chain can be used for light loads with bucket installed and adapter closed against stops (**see figure 11-3**).

Figure 11-4



Never pass load line over open bucket. Relief valves in bucket circuit could cause unexpected, dangerous movement of the load. Bucket linkage could also be damaged (**see figure 11-4**).

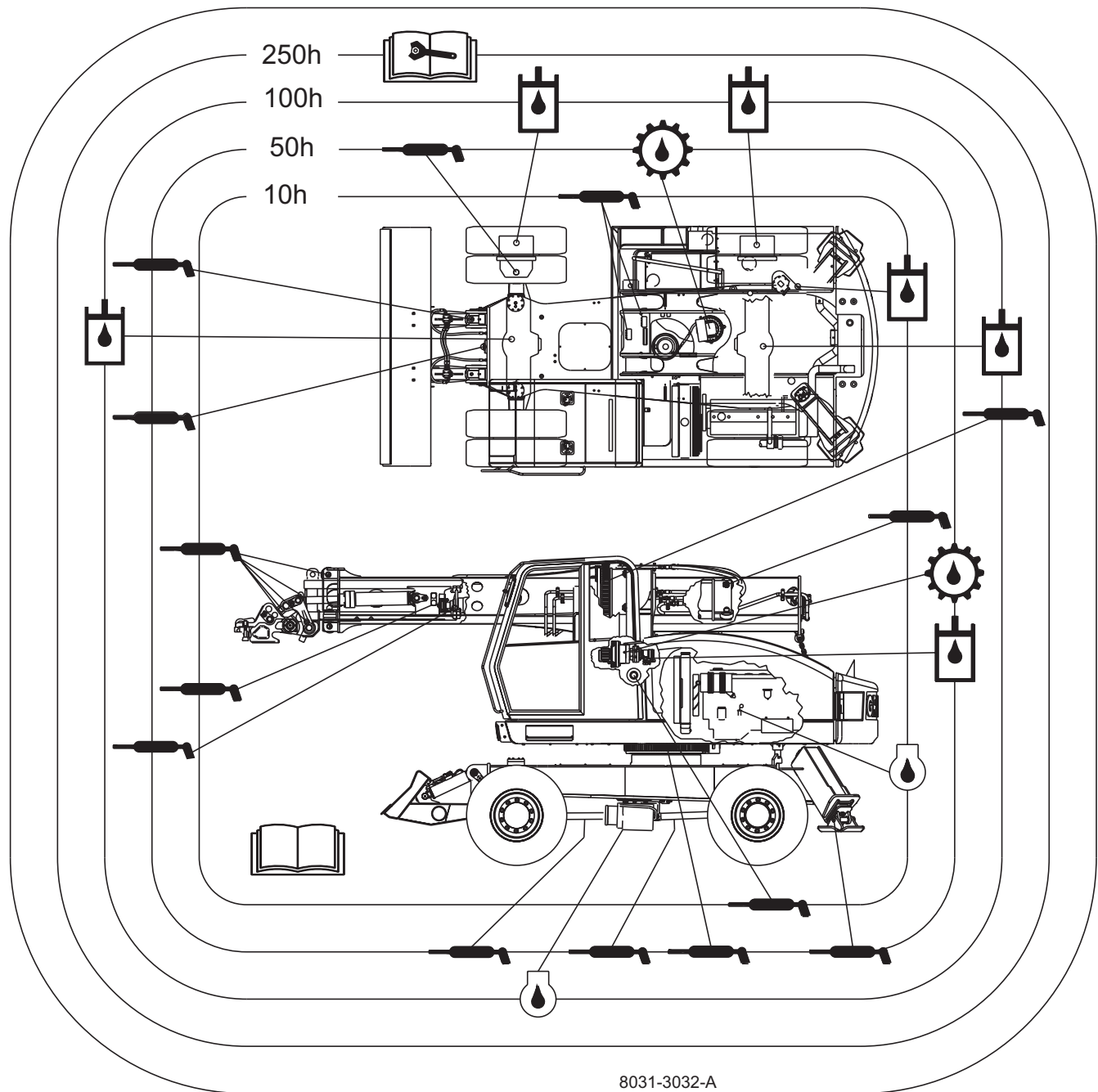
WARNING

The automatic boom tilt brake will not prevent boom from tilting in response to an external load. Load must be centered under bucket adapter with boom level from side to side.

WARNING

Do not use boom tie down chain for lifting loads. Boom tie down chain was developed specifically for boom tie-down purpose only.

12.0 MAINTENANCE AND LUBRICATION DIAGRAM



Engine Oil
(cold climate)



Grease



Hydraulic Oil



Transmission Oil

NOTE!

Drain & refill special engine breakin oil at the end of the first 100 hours.

See service manual for additional lubrication and maintenance information.

13.0 RECOMMENDED LUBRICANTS & CAPACITIES

XL 3300			SPECIFICATIONS		CAPACITIES*	
APPLICATION	SYMBOL	GRADE**	GENERAL	ISO	ENGLISH	LITERS
Front Axle Differential	HF (hydraulic fluid)	***	***		2.9 gallons	11.0
Engine Cooling System	AF/cc (antifreeze/water)****	50/50 mix	Permanent		23 quarts	21.8
Engine Crankcase	EO (engine oil)	15W-40	MIL-L-2104E		17 quarts	16
Grease Fittings	CG (extreme pressure lube)	No. 2	-		-	-
Hydraulic System	HF (hydraulic fluid)	***	***		55 gallons	208.2
Rear Axle Differential	HF (hydraulic fluid)	***	***		3.1 gallons	11.7
Swing Brake	HF (hydraulic fluid)	***	***		6.75 ounces	0.2
Swing Bull Gear	GL (open gear lubricant)	-	P/N 8664-1304		-	-
Swing Transmission	GO (multi-purpose lube)	EP 85/140	MIL-L-2105D		6.3 pints	3
Tilt Bull Gear	GL (open gear lubricant)	-	P/N 8664-1304		-	-
Tilt Transmission (prior to S/N 0333338)	GO (multi-purpose lube)	85W140	p/n 1440-3665		23 ounces	0.7
Tilt Brake (prior to S/N 0333338)	HF (hydraulic fluid)	***	***		3.4 ounces	0.1
Tilt Transmission (starting S/N 0333338) includes Tilt Brake	GO (multi-purpose lube)	80W90	P/N 1440-3126		32-34 ounces	0.9-1
Transmission/Transfer Case	EO (engine oil)	15W40	MIL-L-2104E		6.8 pints	3.2
Wheel Ends (4)	HF (hydraulic fluid)	***	***		3.2 pints	1.5
Outrigger Slider Pads	GL (open gear lubricant)	-	P/N 8664-1304		As Required	-

*Capacities are approximate; check level to be sure.

**May vary; check vendor literature in service manual for ambient temperature limits.

***Hydraulic Fluid Specifications: Pour Point -46° F; SSU @ 100° F 275; Flash point 442° F

Approved Supplier & Type: Mobile Mobilfluid 424

****Add 19 ounces of John Deere System Conditioner (P/N 1440-5267) when refilling cooling system.

Torque Chart



CAUTION

The following bolt torque chart covering English and Metric fasteners are the ones used by Gradall Engineering. Gradall ratings are for lubricated fasteners. Do not exceed the allowable rating. An over-torqued bolt in most cases will fail as rapidly as an under-torqued one.

To check GRADALL torque values, set the torque wrench at 95% of rated torque value and check fastener. If the torque wrench releases before the fastener moves, assume fastener torque is correct. When setting GRADALL torque values, use the values given on the following chart. Do not exceed allowances.

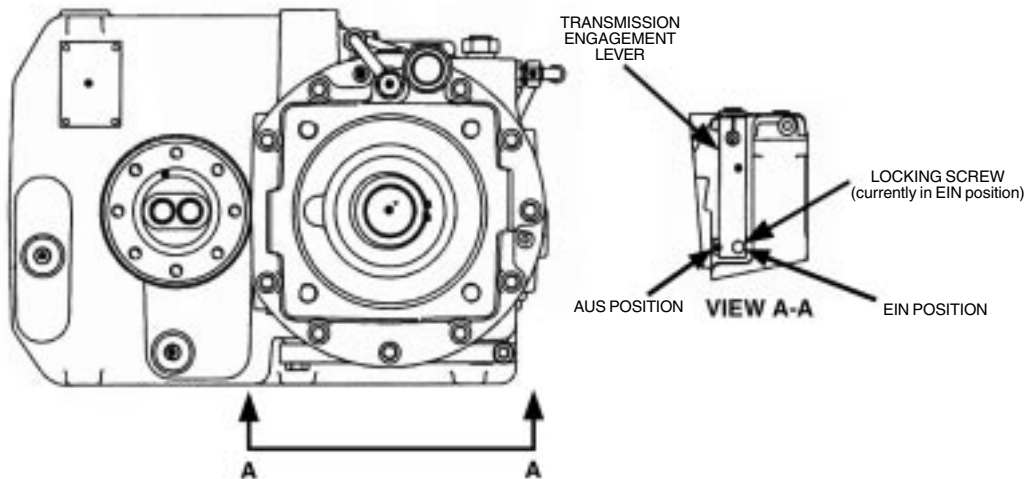
APPLICATION	QUANTITY	THREAD SIZE (GRADE)	TORQUE (lubricated)			
			POUND / FEET		NEWTON / METERS	
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
BOOM ROLLER ECCENTRIC KEEPERS	24	1/2-13 (8)	100	110	136	150
EXTENSION CYLINDER SUPPORT	8	1/2-20 (8)	115	125	155	170
OSCILLATING CYLINDER MOUNTING	12	M20x2.5 (8.8)	325	360	441	490
REAR AXLE MOUNTING	8	M22x2.5 (8.8)	420	460	570	624
SWING BEARING	84	5/8-11 (8)	200	215	272	292
SWING MOTOR	2	1/2-13 (8)	100	110	136	150
SWING TRANSMISSION	8	5/8-11 (8)	200	215	272	292
TILT MOTOR	2	1/2-13 (8)	100	110	136	150
TILT TRANSMISSION	4	5/8-11 (8)	200	215	272	292
WHEEL LUG NUTS	40	M22x1.5 (8.8)	360	400	490	544

14.0 EMERGENCY TOWING

To be performed **ONLY** by qualified field maintenance personnel.

1. Block machine with wheel chocks and attach the machine to tow vehicle.
2. Disengage transmission by removing locking screw on transmission engagement lever (located on bottom of transmission), moving lever to “AUS” position, and put locking screw into new position (**see figure 14-1**). Note: Use only hand force to operate lever. This is only possible when there is no torque stress between input and output shafts.
3. If engine and brake/steering circuits are operable, have an operator ride in the machine to operate steering and service brake controls. **Note: the park brake is inoperable when lever is in “AUS” position and service brakes will not function if machine does not run.**
4. Do not attempt to tow the machine downgrade without a rigid tow bar and/or operator to work service brake controls.
5. **Do not tow above 25 MPH (40 kPa).** Doing so **WILL** cause axle failure.
6. When finished towing, block the machine with wheel chocks and re-engage transmission lever to “EIN” position and install locking screw. It may be necessary to rotate drive shaft slightly to re-engage.

Figure 14-1



15.0 LOADING & SECURING FOR TRANSPORT

Lifting Machine

1. Retract horizontal boom fully, install boom tie-down chain at the rear of the main boom, chain located in tool box under step (suggested storage).
2. Align upperstructure with wheels (outriggers at rear). Engage swing lock.
3. Attach four legged chain of adequate capacity as shown in figure 15-3. Using crane of adequate capacity, take most of slack from chains.
4. Pad chains as necessary to prevent damage to hydraulic and non structural components and paint. Be certain right rear chain is clear of hydraulic reservoir fittings.
5. Take all slack from chains and inspect rigging for safety. Use tag lines to control load during lift.

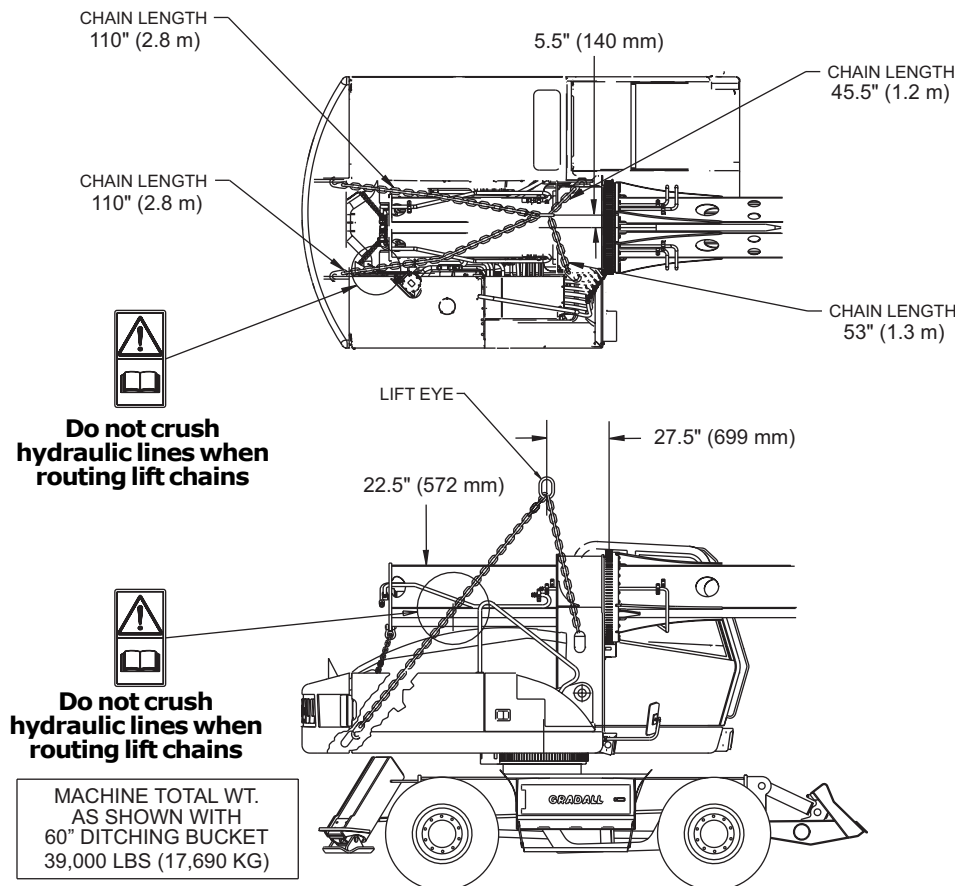


Figure 15-3
Overall dimensions = See page 18.0



Figure 15-1
Boom Tie-Down



Figure 15-3
Boom Tie-Down
Chain Installation

15.1

Securing Machine

1. Position excavator with boom fully retracted and horizontal. Install boom tie-down chain at rear of boom. Boom tie-down chain is stored in tool box located under step. See figures 15-1 and 15-2 on previous page.
2. Align upperstructure with wheels (outriggers at rear). **Engage swing lock.**
3. Secure to transport using four chains as shown in figure 15-4.
4. This machine is shown equipped with the optional blade. If you have a machine without a blade, secure unit by passing chains through the empty burnout holes and front blade mounts.
5. **Do not tie down front of boom.**

Figure 15-4



16.0 PRESERVATION & STORAGE

General

Recommended storage practices vary with conditions at the storage site, the length of time the unit will be stored (two months maximum) and the temperatures expected during the storage period.

Obviously, some storage sites will require greater storage precautions than others. Choosing the best storage site available is one of the most important steps you can take to protect the machine.

Because Gradall cannot anticipate all storage situations, we do not provide a step-by-step procedure for short term storage. However, we do require that you review the following points and implement those appropriate to your situation:

For All Situations:

- This may be a good opportunity to take a sample of hydraulic fluid for analysis.
- Lubricate all grease gun points until fresh lube is expelled from lube point.
- Check the hourmeter and the Lubrication and Maintenance schedule. If you are close to any lubricant change period, make the change before storage.
- Check level of anti-freeze protection and drain and refill if necessary to obtain proper protection.

Site Conditions:

- Always select a site providing a firm, level surface.
- Be sure site is free of natural hazards: salt or corrosive spray, mud slides, flooding, fire, etc.
- If machine must remain on an unpaved surface, be sure wheels are resting on sturdy boards to prevent wheels from being frozen in soft ground.
- Whenever possible, select a site that will minimize the threat of theft, damage or vandalism.
- The site should afford sufficient space to allow the unit to be exercised periodically.
- Apply Boeshield® T9 (Gradall Part No. 1440-4645) to exposed cylinder rods.

General Considerations

- Thoroughly clean all mud and debris from the machine to help protect surfaces from corrosive action.
- Be sure all doors, windows and covers are closed and locked. Install vandal covers if available.
- Exercise all excavator functions periodically, preferably on a weekly basis. The exercise period should last until engine and hydraulic oil have reached normal operating temperature.
- If it is impractical to exercise machine regularly, and freezing temperatures are expected, remove batteries and store in a warm location.
- Tape a note inside cab window indicating the person to be called in an emergency.
- Always be certain to remove ignition key before leaving machine.

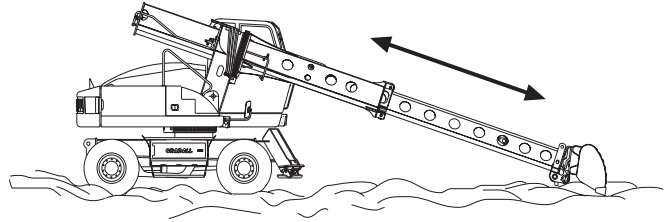
17.0 IF YOU GET STUCK

If unit becomes stuck in soft ground you can use the boom to help free it.

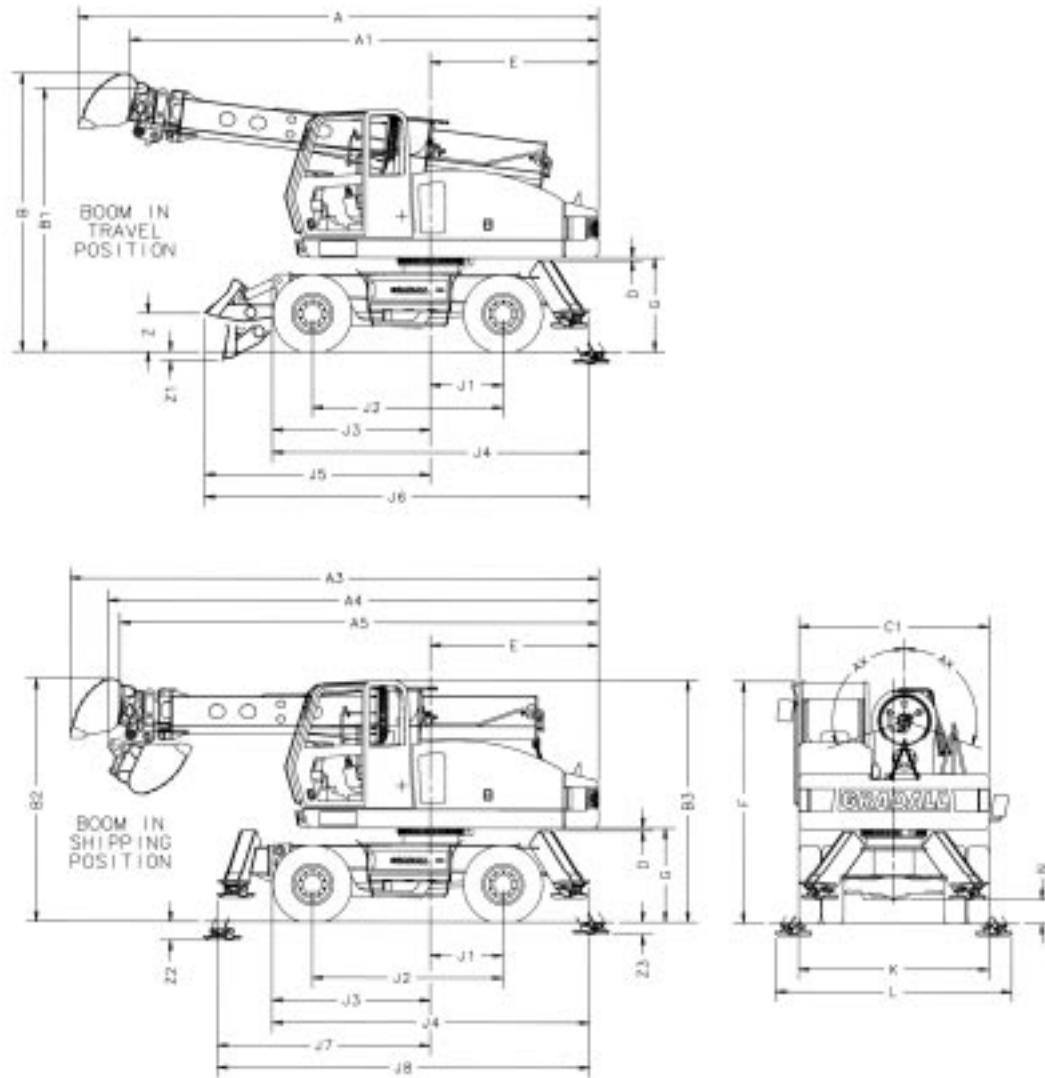
Position upperstructure parallel to undercarriage with boom to front or rear as appropriate for boom to help push or pull unit free. Pushing works best.

While actuating travel pedal extend or retract boom as required to push or pull unit to solid ground.

Whether pushing or pulling, be sure to adjust boom angle as required to keep bucket imbedded in ground.



18.0 BASIC MACHINE DIMENSIONS



NOMENCLATURE AND DIMENSIONS FOR HYDRAULIC EXCAVATORS-SAE J1193 NOV84

DIMENSION			DESCRIPTION			DIMENSION			DESCRIPTION		
A	23' 2" (7)	OVERALL LENGTH WITH BUCKET OPEN (TRAVEL POSITION)	J1	3' 3" (1)	AXIS OF ROTATION TO CENTERLINE OF FIXED AXLE						
A1	20' 10" (6.3)	OVERALL LENGTH WITHOUT BUCKET (TRAVEL POSITION)	J2	8' 6" (2.6)	WHEELBASE OF UNDERCARRIAGE						
A2		OVERALL LENGTH WITH BUCKET CLOSED (TRAVEL POSITION)	J3	7' 0" (2.1)	AXIS OF ROTATION TO FRONT OF UNDERCARRIAGE						
A3	23' 6" (7.2)	OVERALL LENGTH WITH BUCKET OPEN (SHIPMENT POSITION)	J4	14' 1" (4.3)	NOMINAL OVERALL LENGTH OF UNDERCARRIAGE						
A4	21' 10" (6.6)	OVERALL LENGTH WITH BUCKET CLOSED (SHIPMENT POSITION)	J5	10' 1" (3.1)	AXIS OF ROTATION TO FRONT OF BLADE OPTION (TRAVEL POSITION)						
A5	21' 3" (6.4)	OVERALL LENGTH WITHOUT BUCKET (SHIPMENT POSITION)	J6	17' 2" (5.2)	NOMINAL OVERALL LENGTH OF UNDERCARRIAGE WITH BLADE OPTION (TRAVEL POSITION)						
B	12' 5" (3.8)	OVERALL HEIGHT WITH BUCKET OPEN (TRAVEL POSITION)	J7	9' 6" (2.9)	AXIS OF ROTATION TO FRONT OF OUTRIGGER OPTION (TRAVEL POSITION)						
B1	11' 9" (3.6)	OVERALL HEIGHT WITHOUT BUCKET (TRAVEL POSITION)	J8	16' 7" (5)	NOMINAL OVERALL LENGTH OF UNDERCARRIAGE WITH OUTRIGGER OPTION (TRAVEL POS.)						
B2	10' 10" (3.3)	OVERALL HEIGHT WITH BUCKET OPEN (SHIPMENT POSITION)	K	8' 6" (2.6)	OVERALL WIDTH (OUTRIGGERS UP, STEP RETRACTED)						
B3	10' 10" (3.3)	OVERALL HEIGHT WITHOUT BUCKET (SHIPMENT POSITION)	L	10' 6" (3.2)	WIDTH ACROSS GROUNDED OUTRIGGERS						
C1	8' 6" (2.6)	WIDTH OF UPPERSTRUCTURE	N	1' 1" (330mm)	GROUND CLEARANCE (PER SAE J1234)						
D	1" (25.4mm)	MINIMUM CLEARANCE, UPPERSTRUCTURE TO UNDERCARRIAGE	Z	1' 8" (508mm)	MAXIMUM LIFT OF BLADE						
E	7' 6" (2.3)	SWING CLEARANCE, REAR OF UPPERSTRUCTURE	Z1	5" (127mm)	BLADE BELOW GROUND (OPTION)						
F	10' 10" (3.3)	TOP OF CAB TO GROUNDLINE	Z2	10" (254mm)	OUTRIGGER BELOW GROUND (OPTION)						
G	4' 2" (1.3)	CLEARANCE, UPPERSTRUCTURE TO GROUNDLINE	Z3	7" (178mm)	MAXIMUM LIFT OF OUTRIGGERS (STD)						

BUCKET SIZE & PART NUMBER
60" (1.5) DITCHING BUCKET 8035-6004

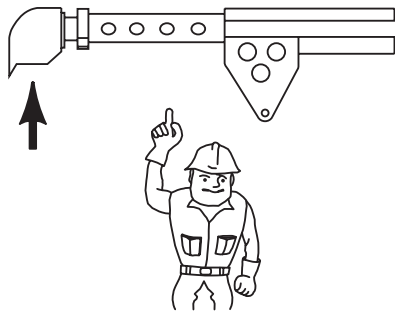
GRADALL MODEL XL3300

19.0 EXCAVATOR HAND SIGNALS

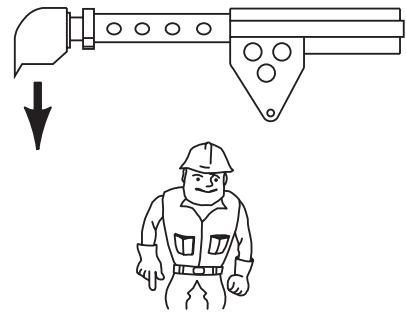
Standard Signals - When excavator work conditions require hand signals, they shall be provided or posted conspicuously for the use of both signalman and operator. No excavator motions shall be made unless signals are clearly understood by both signalman and operator.

Special Signals - When signals for auxiliary equipment functions or conditions not covered are required, they shall be agreed upon in advance by the operator and signalman.

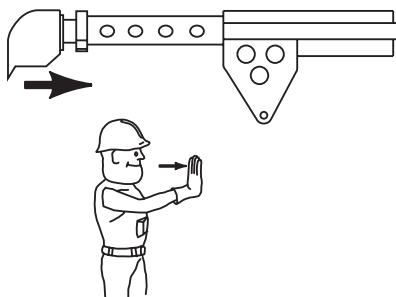
Instructions - When it is desired to give instructions to the operator other than provided by the established signal system, all excavator motions shall first be stopped.



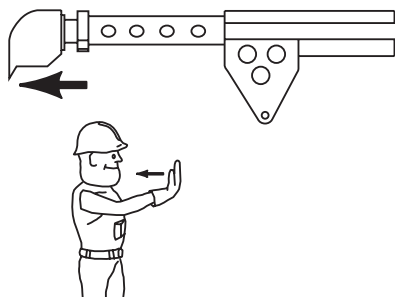
RAISE LOAD VERTICALLY - With either forearm vertical, forefinger pointing up, move hand in small horizontal circle.



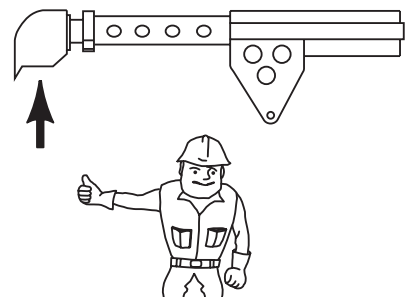
LOWER LOAD VERTICALLY - With either arm extended downward, forefinger pointing down, move hand in small horizontal circle.



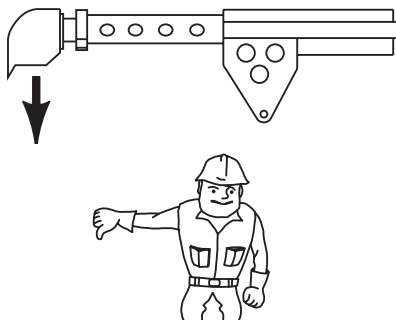
MOVE LOAD IN HORIZONTALLY - With either arm extended, hand raised and open toward direction of movement, move hand in direction of required movement.



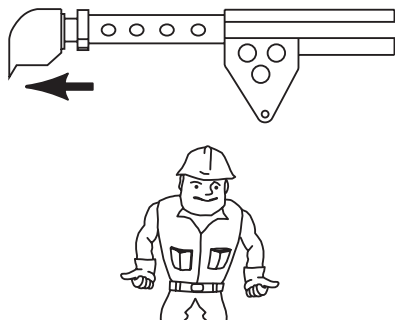
MOVE LOAD OUT HORIZONTALLY - With either arm extended, hand raised and open toward direction of movement, move hand in direction of required movement.



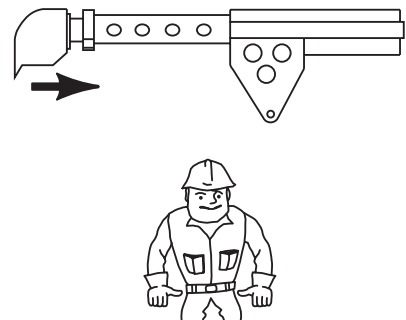
RAISE BOOM - With either arm extended horizontally, fingers closed, point thumb upward.



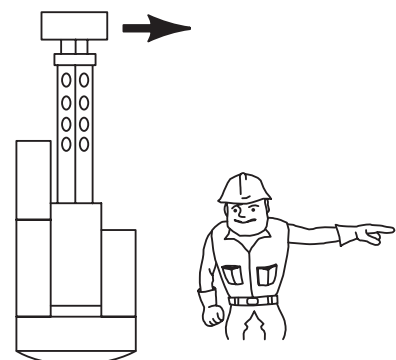
LOWER BOOM - With either arm extended horizontally, fingers closed, point thumb downward.



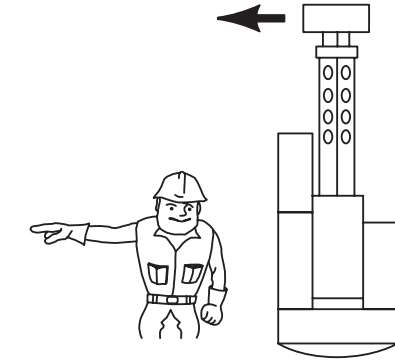
EXTEND TELESCOPIC BOOM - With both hands clenched, point thumbs outward.



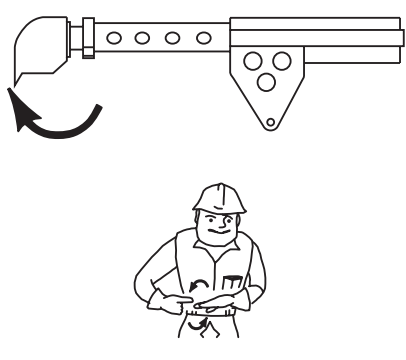
RETRACT TELESCOPIC BOOM - With both hands clenched, point thumbs inward.



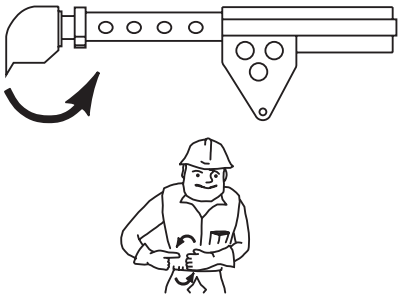
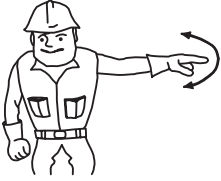
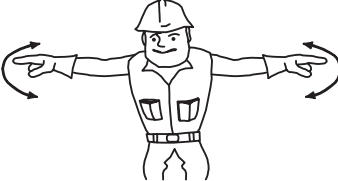
SWING - With either arm extended horizontally, point with forefinger to direction of swing rotation.



SWING - With either arm extended horizontally, point with forefinger to direction of swing rotation.



OPEN BUCKET - Hold one hand open and stationary. Rotate other hand in small vertical circle with forefinger pointing horizontally at open hand.

 CLOSE BUCKET - Hold one hand closed and stationary. Rotate other hand in small vertical circle with forefinger pointing horizontally at closed hand.	 MOVE SLOWLY - Place one hand motionless in front of hand giving motion signal. (Raise load slowly is shown.)	 THIS FAR TO GO - With hands raised and open inward, move hands laterally, indicating distance to go.
 STOP - With either arm extended laterally, hand open downward, move arm back and forth.	 EMERGENCY STOP - With both arms extended laterally, hands open downward, move arms back and forth.	 STOP ENGINE - Draw thumb or forefinger across throat.

GRADALL[®]

Hydraulic Equipment

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CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

CALIFORNIA

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Wash hands after handling.