

SERVICE MANUAL

EH160 Crawler Excavator

6-75770NA



NEW HOLLAND
CONSTRUCTION

SERVICE MANUAL

EH160 CRAWLER EXCAVATOR



NEW HOLLAND CONSTRUCTION

Form Number 6-75770NA-NH

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EH160 CRAWLER EXCAVATOR

NEW HOLLAND CONSTRUCTION

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CHAPTER 1

**EH160 CRAWLER EXCAVATOR
NEW HOLLAND CONSTRUCTION**

SAFETY

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1.1 GENERAL SAFETY INFORMATION

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

1. Most accidents, which occur during operation, are due to neglect of precautionary measures and safety rules. Sufficient care should be taken to avoid these accidents. Erroneous operation, lubrication or maintenance services are very dangerous and may cause injury or death of personnel. Therefore all precautionary measures, NOTES, DANGERS, WARNINGS and CAUTIONS contained in this manual and on the machine should be read and understood by all personnel before starting any work with or on the machine.
2. Operation, inspection, and maintenance should be carefully carried out, and safety must be given the first priority. Messages of safety are indicated with marks. The safety information contained in this manual is intended only to supplement safety codes, insurance requirements, local laws, rules and regulations.
3. Messages of safety appear in this manual and on the machine. All messages of safety are identified by the words DANGER, WARNING and CAUTION.
 - a. **DANGER** – Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury and is represented as follows:

 DANGER 

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

 WARNING 
--

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

 CAUTION 
--

4. It is very difficult to forecast every danger that may occur during operation. However, safety can be ensured by fully understanding proper operating procedures for this machine according to methods recommended by the manufacturer.
5. While operating the machine, be sure to perform work with great care, so as not to damage the machine, or allow accidents to occur.
6. Continue studying this manual until all Safety, Operation and Maintenance procedures are completely understood by all persons working with the machine.

 WARNING 
The proper and safe lubrication and maintenance for this machine, recommended by the manufacturer, is outlined in the OPERATOR'S MANUAL for this machine. Improper performance of lubrication or maintenance procedures are dangerous and could result in injury or death. Read and understand the OPERATOR'S MANUAL before performing any lubrication or maintenance.

1.2 SAFETY PRECAUTIONS

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

Because of the size of some of the machine components, the serviceman or mechanic should check the weights noted in this manual. Use proper lifting procedures when removing any components. Weight of components table is shown in chapter SPECIFICATIONS in this manual.

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

1. Read and understand all warning plates and decals on the machine before operating, maintaining or repairing this machine.
2. Always wear protective glasses and protective shoes when working around machines. In particular, wear protective glasses when using hammers, punches or drifts on any part of the machine or attachments. Use welders gloves, hood/goggles, apron and the protective clothing appropriate to the welding job being performed. Do not wear loose fitting or torn clothing. Remove all rings from fingers, loose jewelry, confine long hair and loose clothing before working on this machinery.
3. Disconnect the battery and hang a "Do Not Operate" tag in the operator's compartment. remove ignition keys.
4. If possible, make all repairs with the machine parked on a level, hard surface. Block the machine so it does not roll while working on or under the machine. Hang a "Do Not Operate" tag in the operator's compartment.
5. Do not work on any machine that is supported only by lift, jacks or a hoist. Always use blocks or jack stands, capable of supporting the machine, before performing any disassembly.



WARNING



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

6. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
7. Lower the bucket, blade or other attachments to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, blade or other attachment is blocked correctly to prevent it from dropping unexpectedly.
8. Use steps and grab handles when mounting or dismounting a machine. Clean any mud, grease, oil or debris from steps, walkways or work platforms before using. Always face the machine when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.
9. To avoid back injury, use a hoist when lifting components which weigh 23 kg (50 lbs) or more. Make sure all chains, hooks, slings, etc., are in good condition and are the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.
10. To avoid burns, be alert for hot parts on machines which have just been stopped and hot fluids in lines, tubes and components.
11. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device and carefully pry cover loose to relieve any spring or other pressure, before removing the last two bolts or nuts completely.
12. Be careful when removing filler caps, breathers and plugs on the machine. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.
13. Always use the proper tools that are in good condition and that are suited for the job at hand. Be sure you understand how to use them before performing any service work.
14. Reinstall all fasteners with the same part number. Do not use a lesser quality fastener if replacements are necessary.

SAFETY PRECAUTIONS

15. Repairs which require welding should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine type of metal being welded and select correct welding procedure and electrodes, rods or wire to provide a weld metal strength equivalent at least to that of the parent metal. Make sure to disconnect battery before any welding procedures are attempted.
16. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will be damaged in operation of the machine by contacting sharp corners, or by rubbing against some object or hot surface. Do not connect wiring to a line containing fluid.
17. Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution and replace the guard or shield after repair is complete.
18. The maintenance and repair work while holding the bucket raised is dangerous due to the possibility of a falling attachment. Don't fail to lower the attachment and place the bucket to the ground before starting the work.
19. Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Do not check for leaks with your hands. Very small (pin hole) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use cardboard or paper to locate pin hole leaks.
20. Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure must be installed correctly.
21. Do not operate a machine if any rotating part is damaged or contacts any other part during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing.
22. Be careful when servicing or separating the tracks. Chips can fly when removing or installing a track pin. Wear safety glasses and long sleeve protective clothing. Tracks can unroll very quickly when separated. Keep away from front and rear of machine. The machine can move unexpectedly when both tracks are disengaged from the sprockets. Block the machine to prevent it from moving.

NOTES

CHAPTER 2

CH 02

EH160 CRAWLER EXCAVATOR
NEW HOLLAND CONSTRUCTION

TRANSPORTATION

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WARNING



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

A. GROUND TRANSPORTATION

1. Machine Preparation

- Know the total weight, length, width and height of the machine being transported. See Figures 5.2A ~5.2B.
- Know route to be traveled. Investigate bridges, overpasses, height of road signs on route.
- Obtain any permits required from proper government agencies for machine transportation.
- Use only a trailer with a rated capacity sufficient to transport the machine.
- Make certain trailer has ramps or a ramp is available for loading and unloading the machine.

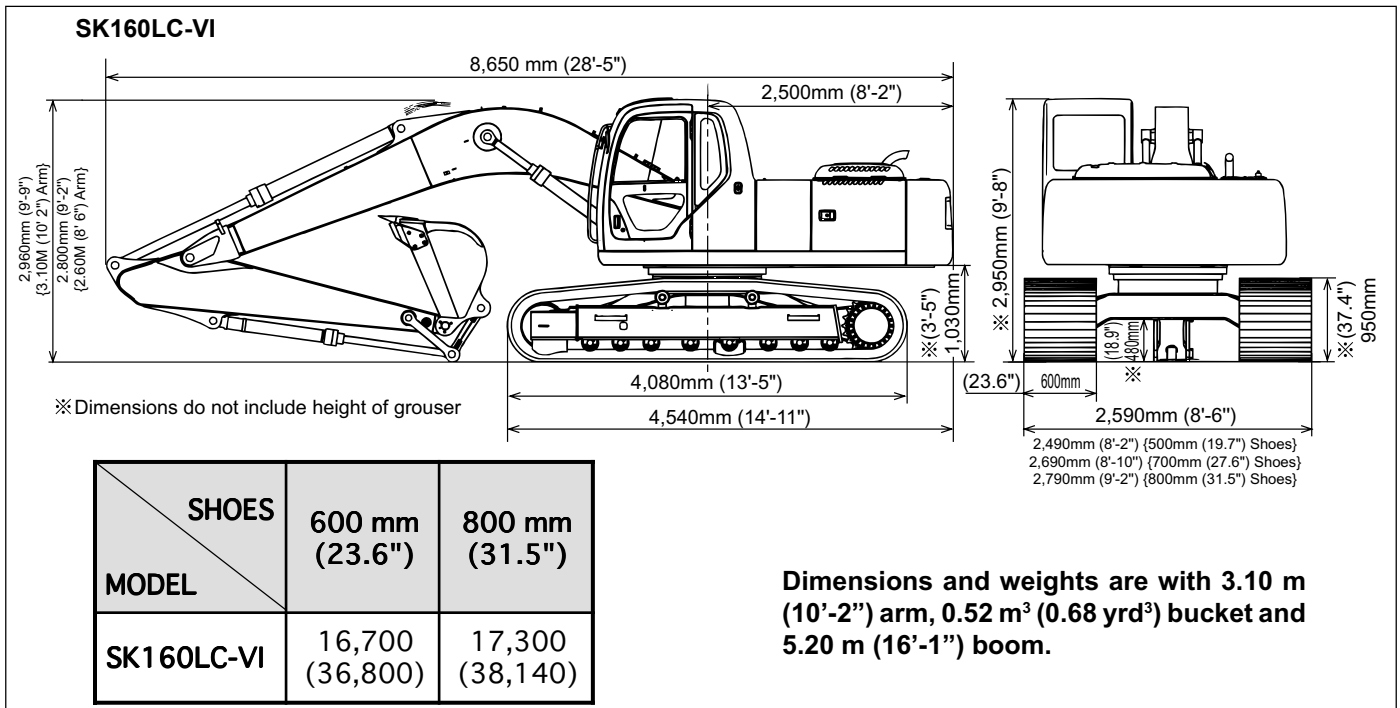


FIGURE 5.2A

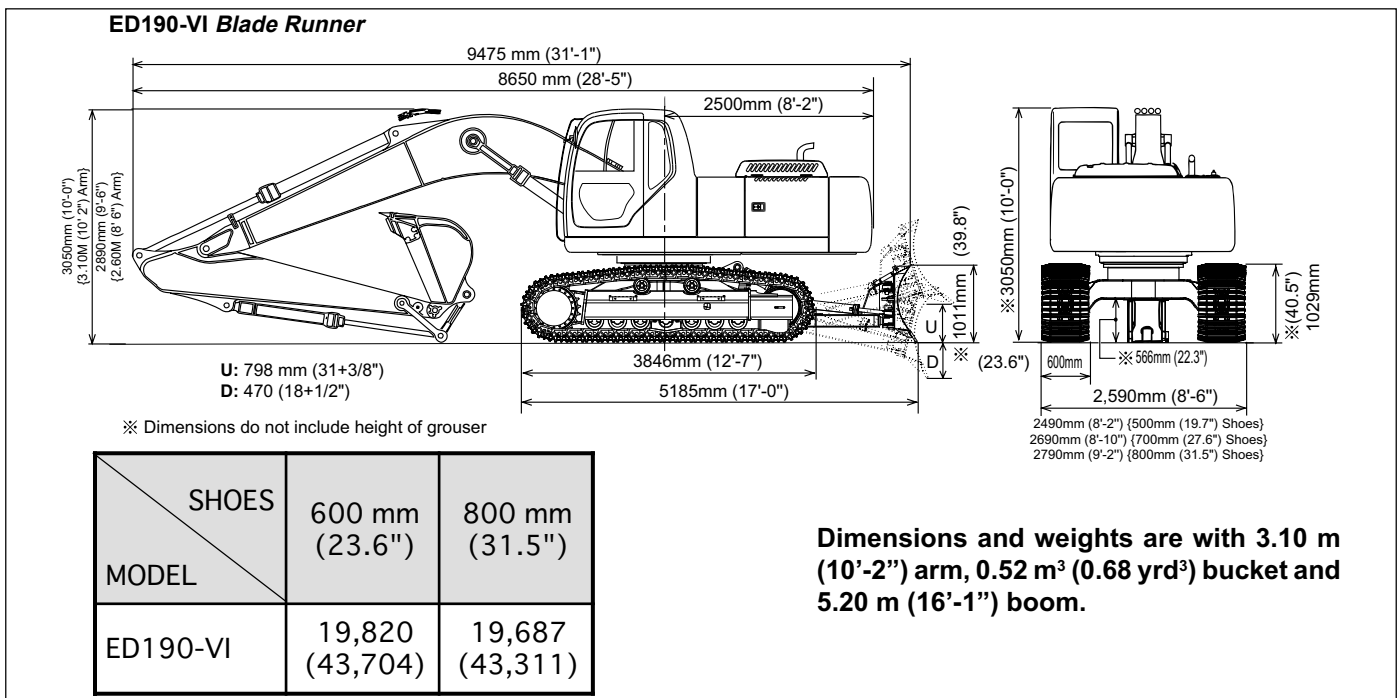


FIGURE 5.2B

2. Loading the Machine



WARNING



NEVER ATTEMPT TO LOAD OR UNLOAD MACHINE WITHOUT RAMPS.

- Apply parking brakes on tractor and trailer and chock trailer wheels before attempting to load or unload machine.
- Lower ramps of trailer.
- Place travel speed select switch on travel lever in 1st (🐢) speed position and move throttle control to the “LOW” idle position. See Figure 5.3A.

CAUTION

Do not fold the blade wings on the ED190, before loading, to avoid contact between the blade wings and the counterweight. Unfold blade wings and lock them in position before unloading machine.

- Raise the attachments and slowly travel machine up trailer ramps and over rear axles of trailer, see Fig. 5.3B.



WARNING



TO PREVENT THE ARM AND BUCKET CYLINDER (S) FROM ANY DAMAGE, YOU ARE ADVISED TO FOLLOW THE FOLLOWING INSTRUCTIONS. DO NOT HAVE THE ARM AND/OR BUCKET CYLINDER FULLY EXTENDED TO A “RAMP OVER CENTER” SITUATION. THIS ALLOWS SUDDEN AND ABRUPT CONTACT OF THE ARM OR BUCKET TO A TRAILER DECK, RAMP OR THE GROUND. THIS CAN RESULT IN INTERNAL MECHANICAL CONTACT, WHICH CAN STRETCH THE CYLINDER ROD(S).

- Slowly travel machine completely onto trailer until in proper transport position.

Follow steps f ~ i for ED190(LC)-VI:

- Place a wood blocks below the blade, equally separated (about one meter (3 ft)) from the center of the blade, and slowly lower the blade onto the wood blocks. See Fig. 5.3C as reference.



WARNING



MAKE SURE TO PLACE THE SAFETY LOCK LEVER IN THE LOCKED (UP) POSITION BEFORE LEAVING THE CAB

CAUTION

DO NOT LOAD/UNLOAD THE ED190LC-VI WITH THE DOZER BLADE WINGS IN THE TRANSPORT POSITION (FOLDED IN). LOAD AND UNLOAD THE MACHINE WITH THE WINGS UNFOLDED AND LOCKED IN THE DOZING POSITION TO AVOID CONTACT BETWEEN THE BLADE WINGS AND THE COUNTERWEIGHT.

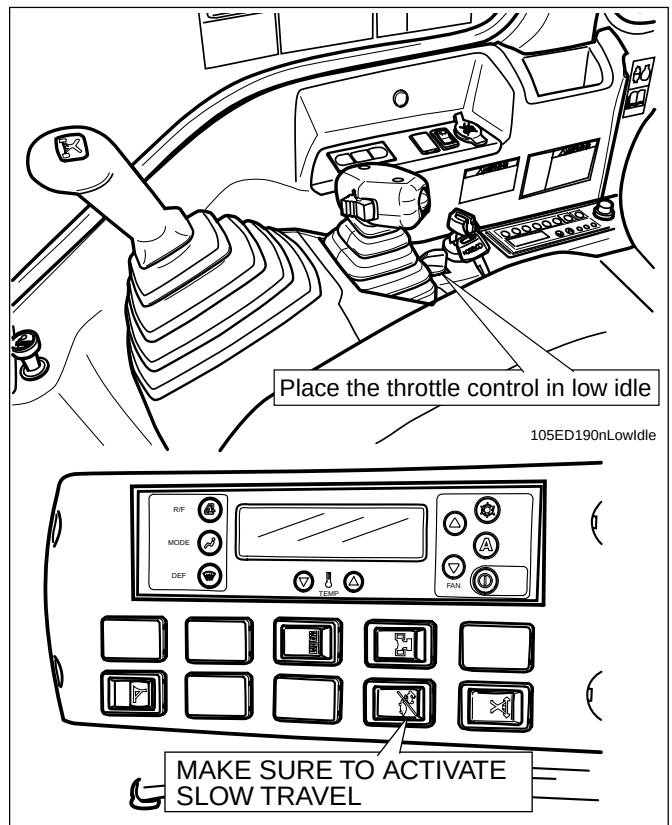


FIGURE 5.3A

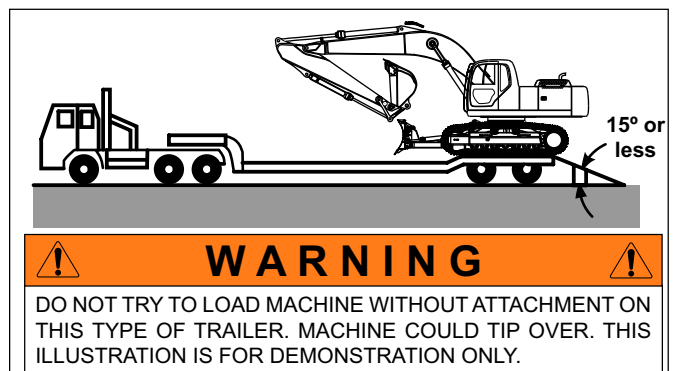


FIGURE 5.3B

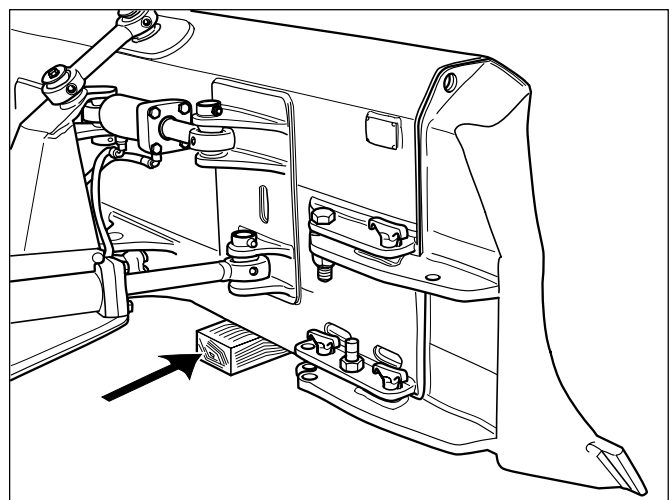


FIGURE 5.3C

- g. Shut off the engine and remove all three pins A, B, and C from blade wings, see Fig. 5.4A, and 5.4B as reference.

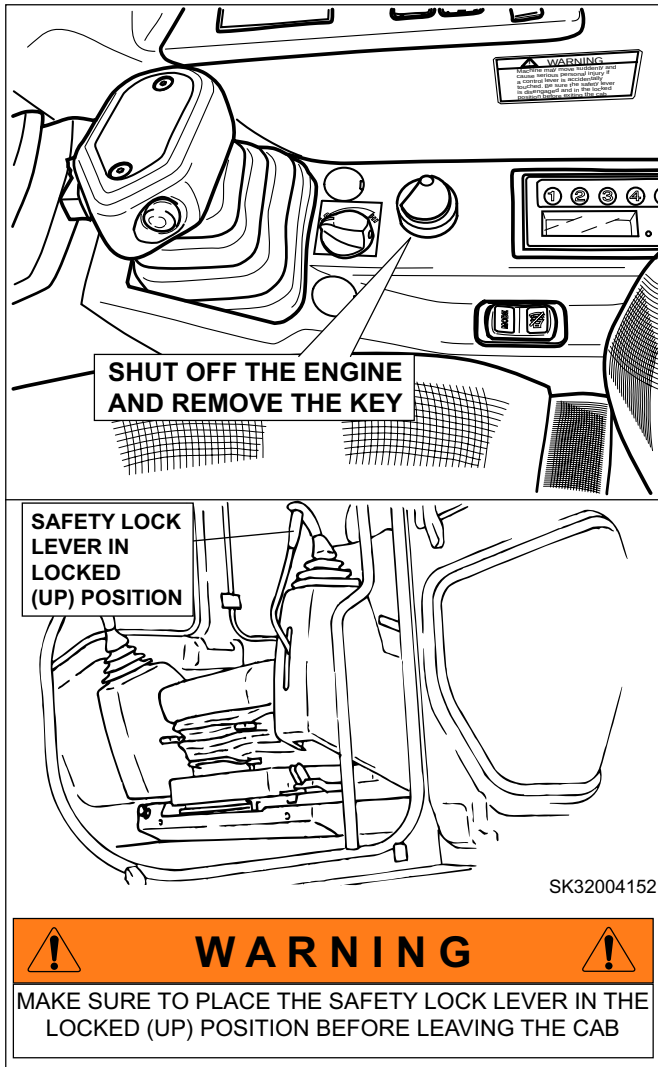


FIGURE 5.4A

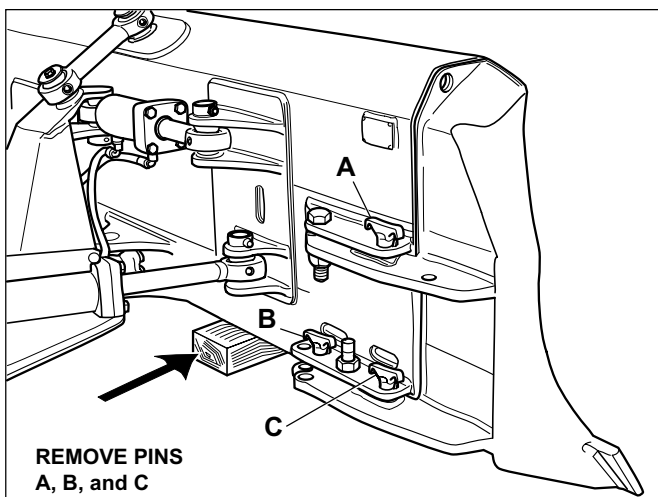


FIGURE 5.4B

- h. Proceed to fold and lock the blade wings, as shown in Fig. 5.4C. Make sure to place pins A, B, and C into the holes as indicated in the figure.

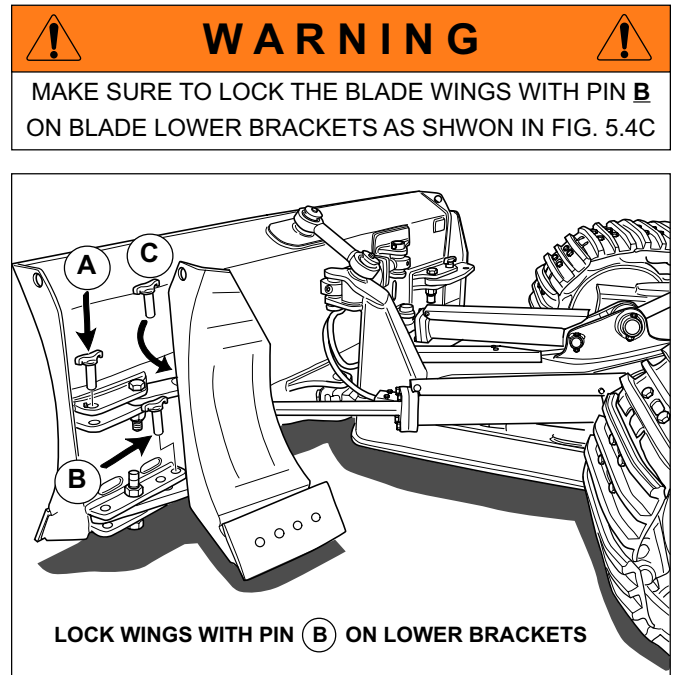


FIGURE 5.4C

- i. Start the engine, lower the safety lever to activate all hydraulic functions, raise the blade and remove the wood blocks. **Make sure to lift the safety lever before leaving the cab.**
- j. With blade wings folded and blade lowered, slowly swing machine 180° until attachment is toward rear of trailer.
- k. Slowly lower boom until attachment rests on trailer bed.

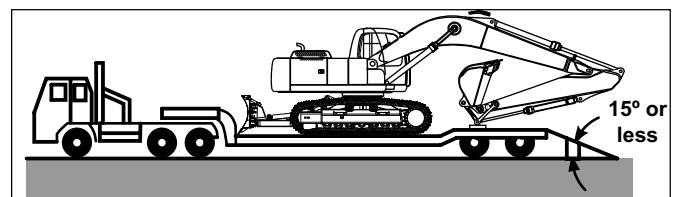


FIGURE 5.4D

- l. Place safety lock lever in the up "LOCKED" position.
- m. Turn machine "OFF", remove key and lock all doors, filler caps and access panels.

CAUTION

Place a cover over the exhaust pipe of the machine and secure to avoid water entering the engine, and possible turbo damage.

3. Securing Machine to Trailer

- Use cable or wire rope with sufficient capacity to secure front and rear of the machine to trailer. See Figure 5.5A. Chock the tracks, use the lower frame front and rear brackets to secure machine to trailer. Also, make sure to secure front and rear of each track.
- Securely fasten all loose parts, as well as removed parts to trailer or transporting platform.

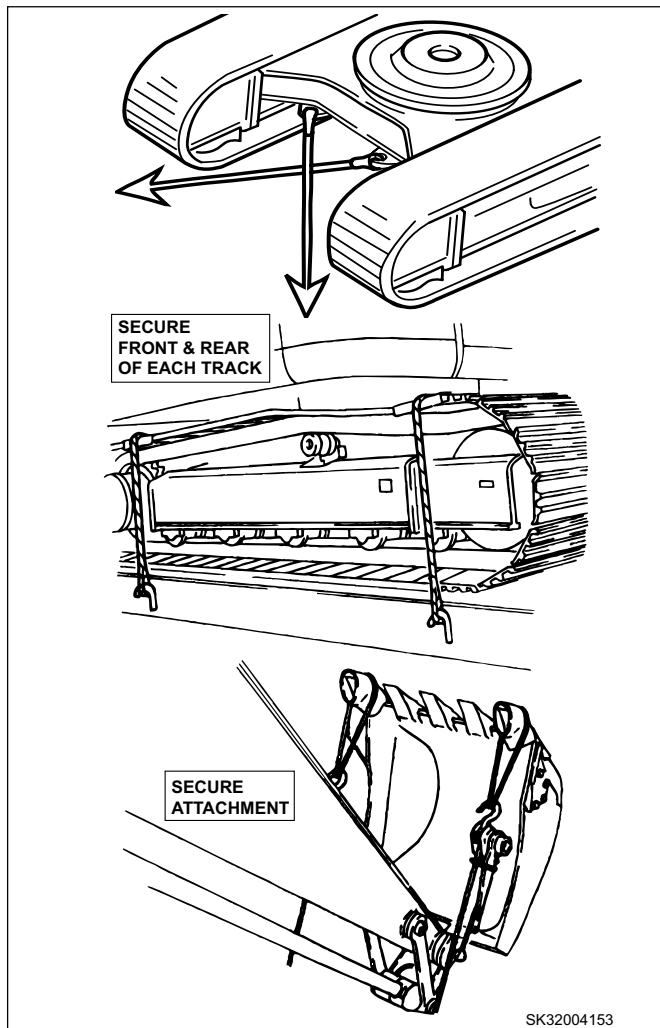


FIGURE 5.5A

B. LIFTING MACHINE

The following procedures are for lifting the machine. These procedure do not take into account modifications made to the machine that affect machine weight or center of gravity.

1. Lifting Machine With Attachment Installed

- Locate lifting locations at the front and rear of each crawler frame. See Figure 5.5B.
- Attach cables or wire rope with a capacity rating sufficient to lift the machine, at lifting locations.

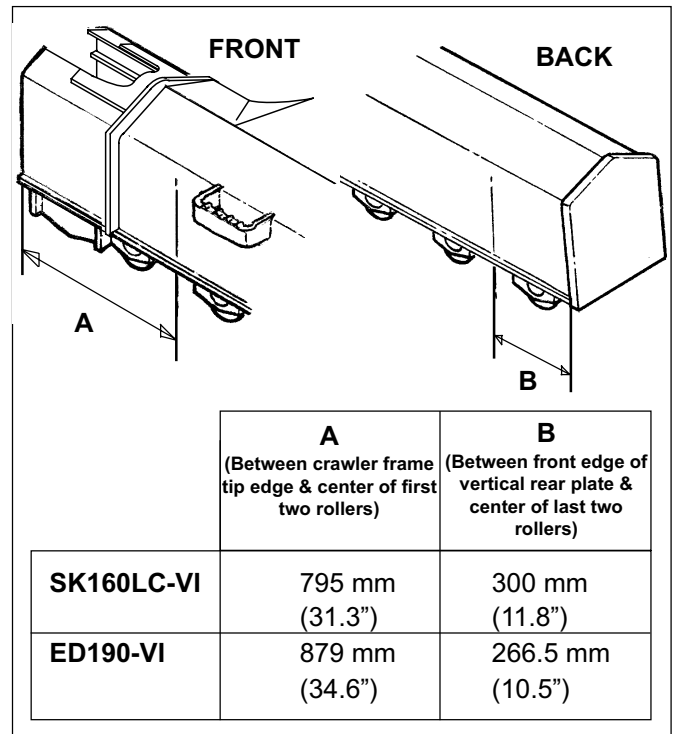


FIGURE 5.5B

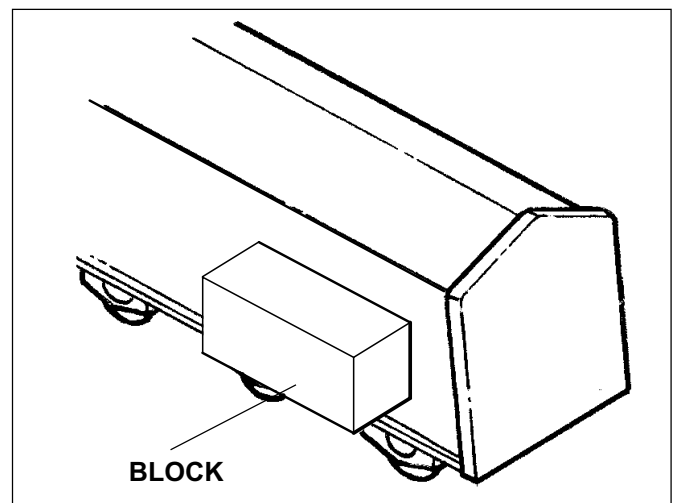
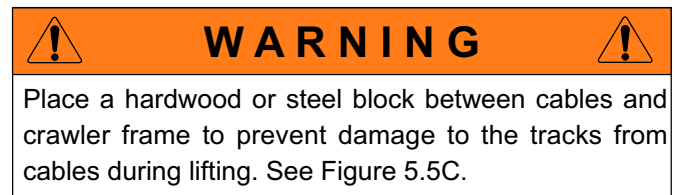
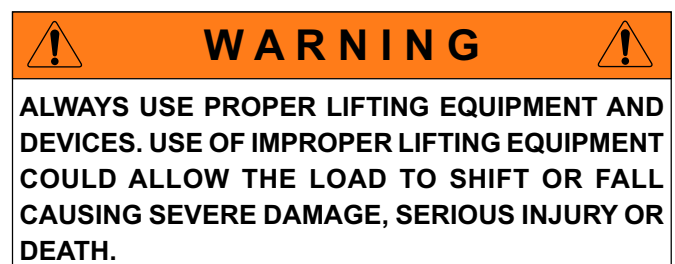


FIGURE 5.5C



- c. Bring loose ends of cables together at machine center of gravity and attach to an overhead lifting device with a rated lifting capacity sufficient to lift the machine. See Figures 5.6A, and 5.6B.

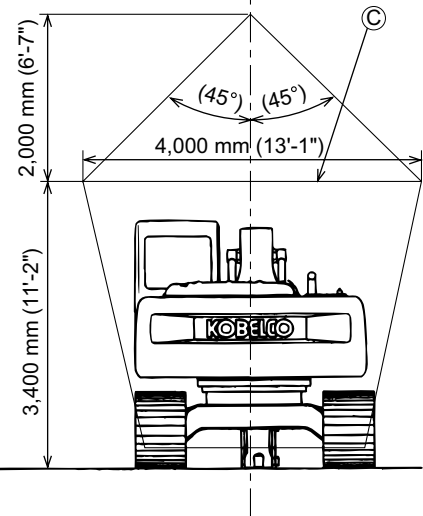
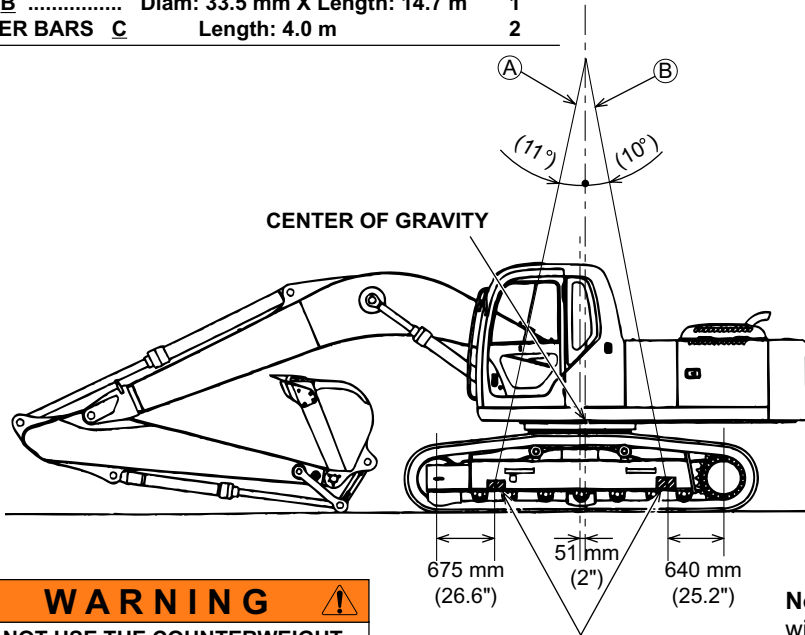
NOTE

It may be necessary to place reinforced spreader bars between lifting cables to prevent damage to the machine during lifting. See Figure 5.6A, and 5.6B.

TOOLS NEEDED {SK160LC with 3.1m Arm/600mm Shoes}:

ITEM	SIZE	QTY
CABLE A	Diam: 33.5 mm X Length: 14.9 m	1
CABLE B	Diam: 33.5 mm X Length: 14.7 m	1
SPREADER BARS C	Length: 4.0 m	2

WEIGHT : 16,700 kg (36,800 lbs)
ARM : 3.1 M (10'-2")
SHOE : 600 mm (23.6")
MODEL : SK160LC-VI



WARNING
DO NOT USE THE COUNTERWEIGHT
LIFTING EYES TO LIFT MACHINE

PLACE BLOCK BETWEEN
EACH CABLE AND FRAME

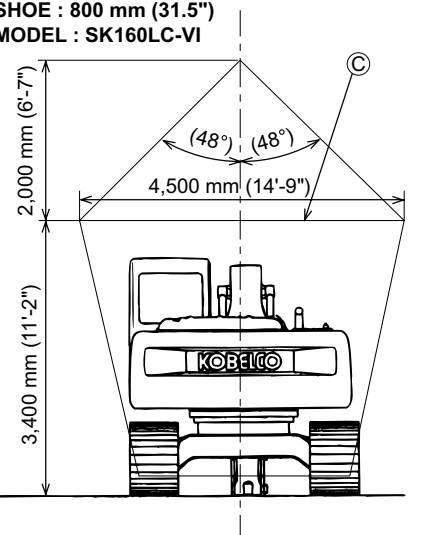
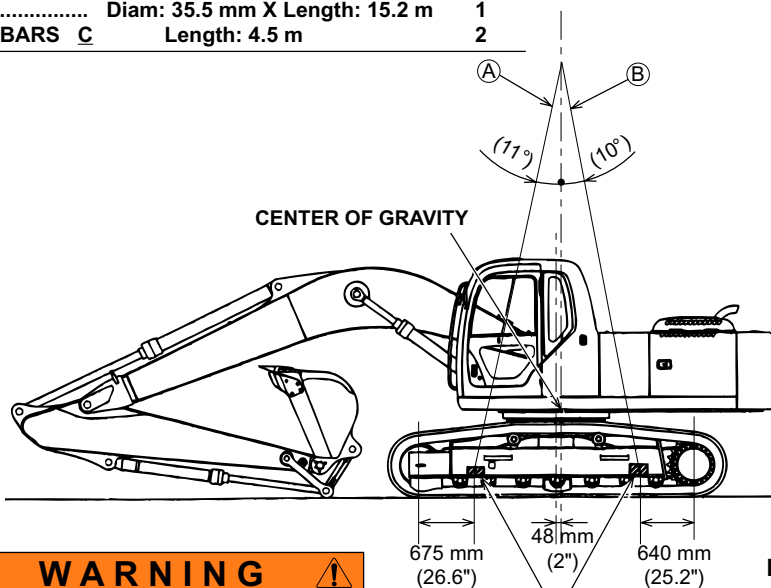
Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

FIGURE 5.6A

TOOLS NEEDED {SK160LC with 3.1m Arm/800mm Shoes}:

ITEM	SIZE	QTY
CABLE A	Diam: 35.5 mm X Length: 15.2 m	1
CABLE B	Diam: 35.5 mm X Length: 15.2 m	1
SPREADER BARS C	Length: 4.5 m	2

WEIGHT : 17,300 kg (38,140 lbs)
ARM : 3.1 M (10'-2")
SHOE : 800 mm (31.5")
MODEL : SK160LC-VI



WARNING
DO NOT USE THE COUNTERWEIGHT
LIFTING EYES TO LIFT MACHINE

PLACE BLOCK BETWEEN
EACH CABLE AND FRAME

Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

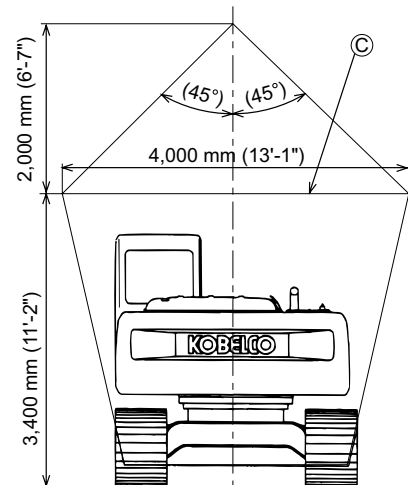
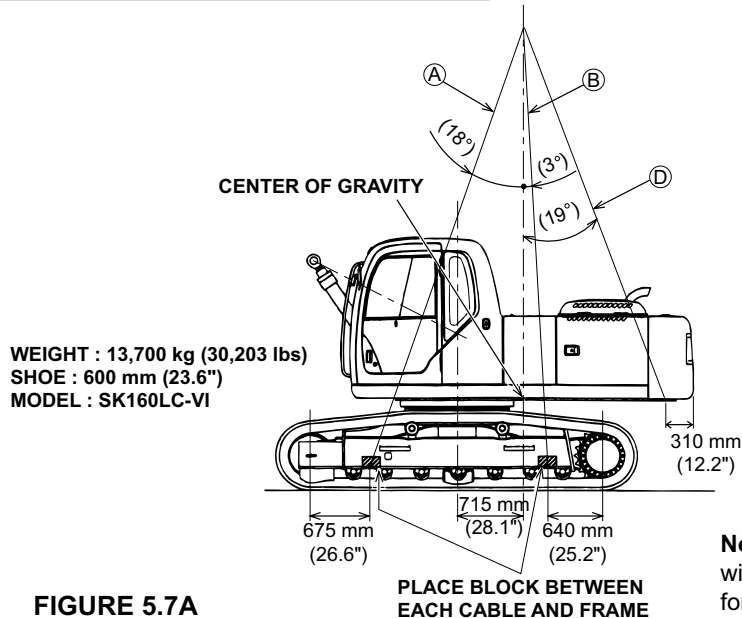
FIGURE 5.6B

2. Lifting Machine Without Attachment

Pass the cables through the lifting points on the crawlers as indicated in page 5-5 and bring loose ends of cables together at machine center of gravity and attach to an overhead lifting device with a rated lifting capacity sufficient to lift the machine. See Figures 5.7A, 5.7B, and 5.8A (next page) for better reference.

TOOLS NEEDED {SK160LC/600mm Shoes/no attachments}:

ITEM	SIZE	QTY
CABLE A	Diam: 33.5 mm X Length: 15.0 m	1
CABLE B	Diam: 33.5 mm X Length: 14.6 m	1
CABLE D	Diam: 33.5 mm X Length: 13.5 m	1
SPREADER BARS C	Length: 4.0 m	3

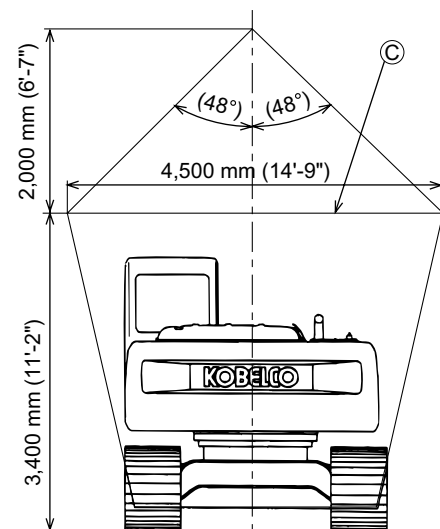
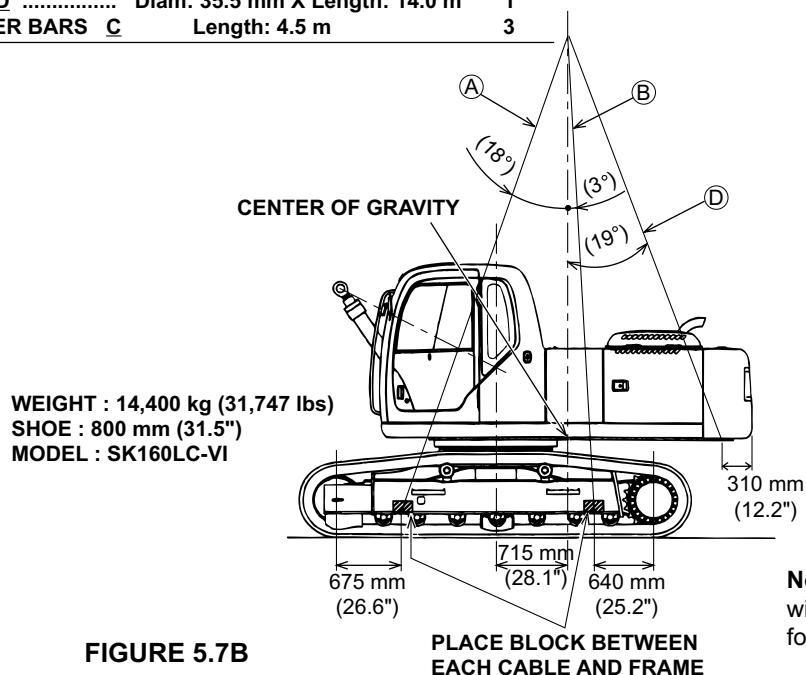


Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

FIGURE 5.7A

TOOLS NEEDED {SK160LC/800mm Shoes/no attachments}:

ITEM	SIZE	QTY
CABLE A	Diam: 35.5 mm X Length: 15.5 m	1
CABLE B	Diam: 35.5 mm X Length: 15.1 m	1
CABLE D	Diam: 35.5 mm X Length: 14.0 m	1
SPREADER BARS C	Length: 4.5 m	3

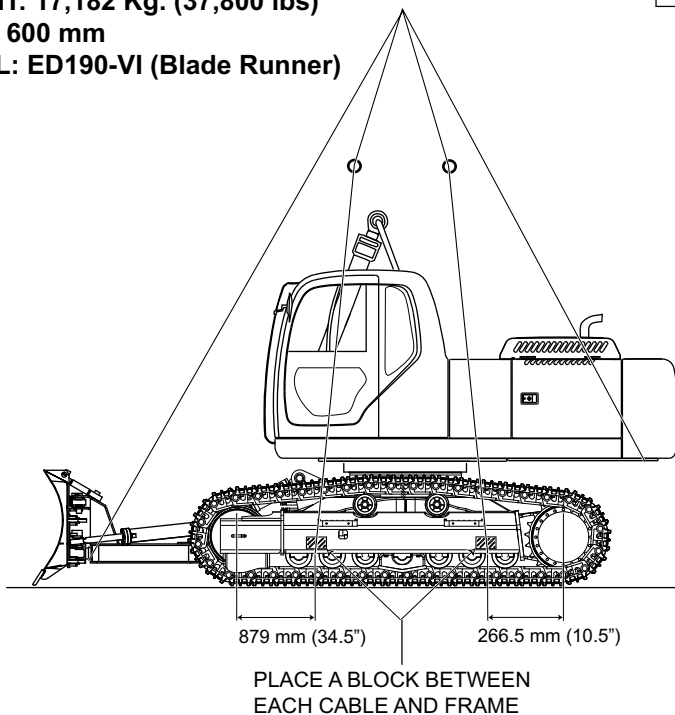


Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

FIGURE 5.7B

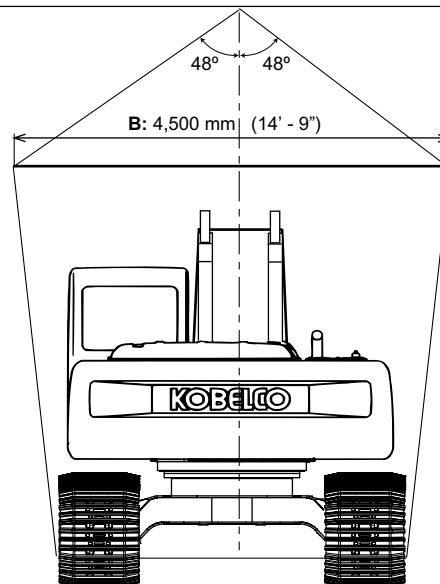
WARNING
DO NOT USE THE COUNTERWEIGHT
LIFTING EYES TO LIFT MACHINE

WEIGHT: 17,182 Kg. (37,800 lbs)
SHOE: 600 mm
MODEL: ED190-VI (Blade Runner)



CAUTION

USE CABLES WITH DIAMETER OF 41.5 MM (1.63")
AND REINFORCED SPREADER BARS



Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

CAUTION

IT IS NOT RECOMMENDED TO LIFT THE ED190 WITH THE FRONT ATTACHMENT INSTALLED. THE ADDITIONAL WEIGHT OF THE DOZER BLADE MAKES THE MACHINE UNSTABLE DURING LIFTING DURING LIFTING WITH THE FRONT ATTACHMENTS INSTALLED.

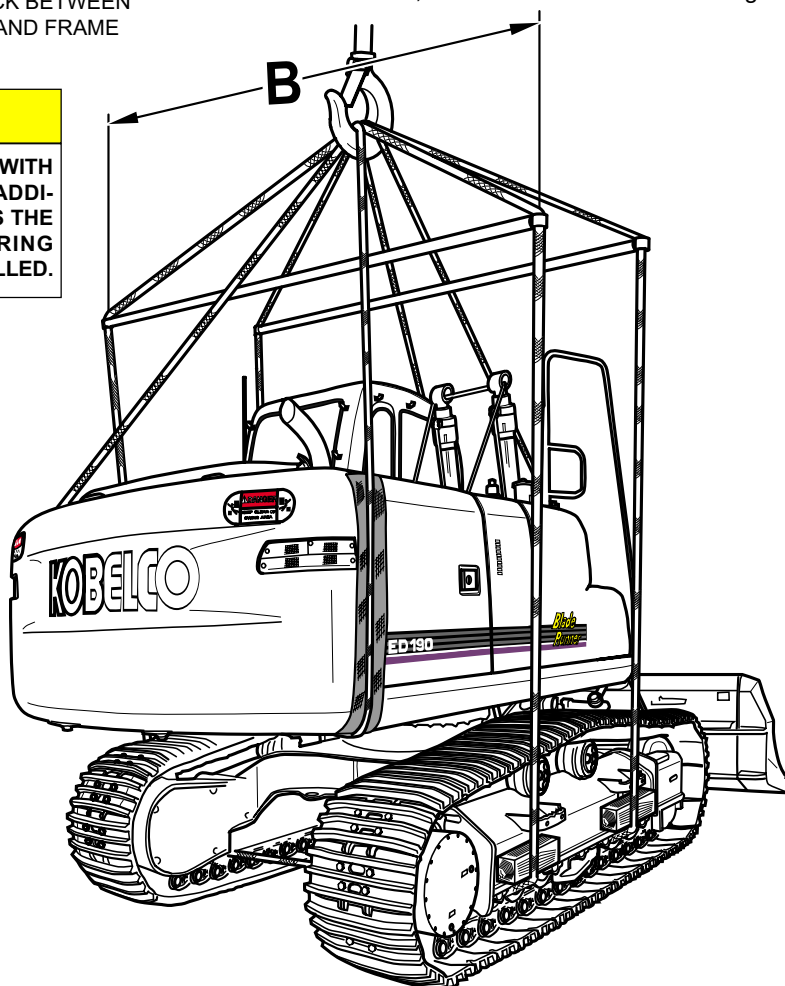


FIGURE 5.8A

C. ATTACHMENT SHIPPING DIMENSIONS

The SK160LC-VI and ED190 Blade Runner, as manufactured, are shipped with standard attachments:

- C1-** Standard Boom - 5.20 m (16'-1")
- C2-** Standard Arm - 3.10 m (10'-2")
- C3-** Bucket - 0.52 m³ (0.68 yd³)

CAUTION

ALLOWANCES MUST BE CONSIDERED FOR ADDITIONAL ATTACHMENTS SUCH AS: THUMBS, COUPLERS, OVER SIZED BUCKETS, ETC.

1. Boom With Arm Cylinder - Figure 5.9A

Boom mm (ft-in)	5650 (18' - 6")
L X H X W mm (ft-in)	5380 X 1400 X 620 (17' 8" X 4' 7" X 2' 0")
Weight w/Arm Cylinder Kg (lbs)	1325 (2921)

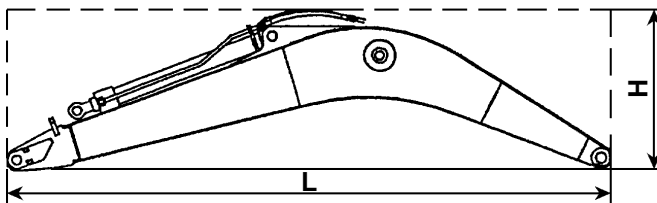


FIGURE 5.9A

2. Arm With Bucket Cylinder - Figure 5.9B

Arm	2600 mm (8' 6")	3100 mm (10' 2")
LxHxW mm (ft-in)	3520 x 735 x 300 (11' 7"x2' 5"x11.8")	3820 x 735 x 300 (12' 6"x2' 5"x11.8")
Weight w/Bucket Cyl. Kg (lbs)	770 (1700)	833 (1836)

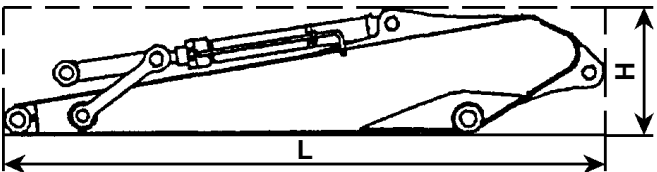


FIGURE 5.9B

3. Arm With Bucket Cylinder and Bucket - Figure 5.9C

Combination	Arm 2.6 m (8' 6") Bucket 0.63 m ³ (0.82 yd ³)	Arm 3.1 m (10' 2") Bucket 0.52 m ³ (0.68 yd ³)
LxHxW mm (ft-in)	4790 x 830 x 1080 (15' 9"x2' 9"x3' 7")	5250 x 830 x 950 (17' 3"x2' 9"x3' 1")
Weight Kg (lbs)	1210 (2670)	1230 (2710)

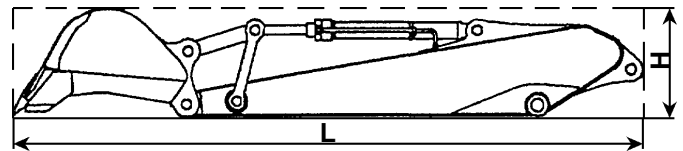


FIGURE 5.9C

4. Bucket - Figure 5.9D

Standard bucket is 0.52 m³ (0.68 yd³)

- A-** Length is 1.30 m (4'-3")
- B-** Height is 1.16 m (3'-10")
- C-** Width without side cutters is 0.854 m (33.7")
- D-** Width with side cutters- 0.954 m (37.6")
- E-** Bucket weight is 370 kg (816 lbs)

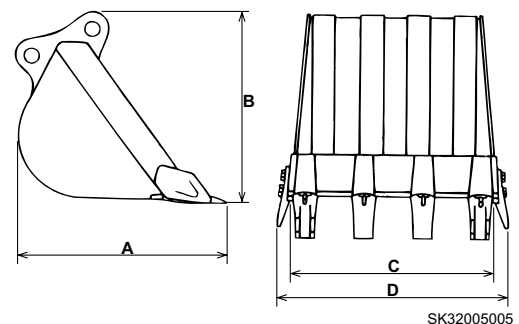


FIGURE 5.9D

5. ED190-VI Blade - Figure 5.9E

SHIPPING ASSEMBLY
APPROXIMATE WEIGHT

3550 Lbs
(1613.64 Kg)

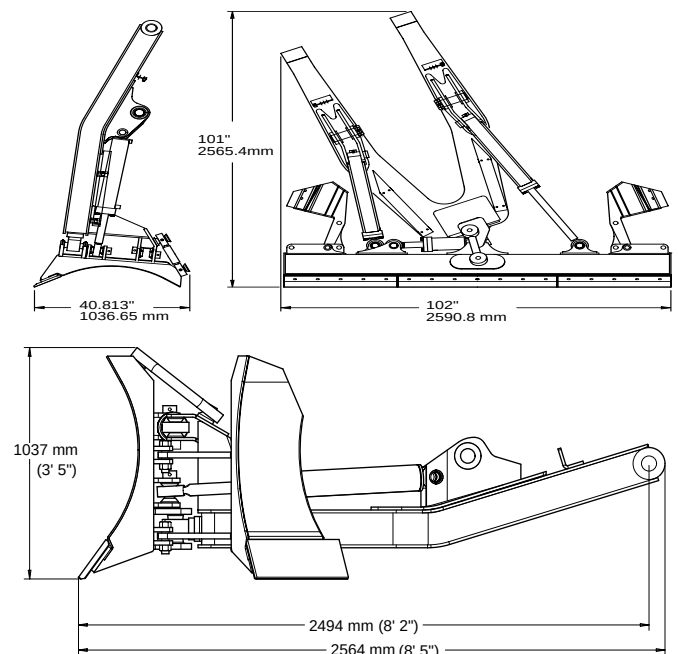


FIGURE 5.9E

NOTES

CHAPTER 3

CH 03

**EH160 CRAWLER EXCAVATOR
NEW HOLLAND CONSTRUCTION**

SPECIFICATIONS

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6.1 SK160LC/ED190-VI GENERAL SPECIFICATIONS

The specifications found in this section are given on the Standard SK160 LC/ED190 -VI Hydraulic Excavator as manufactured by KOEBELCO: Boom {5.20 m (16' 1")}, Arm {3.10 M (10'2")}, and 0.52 m³ (0.68 yrd³) SAE bucket. No modifications or options are taken in to consideration in regard to these specifications.

A.MACHINE DIMENSIONS– Figure 6.2A

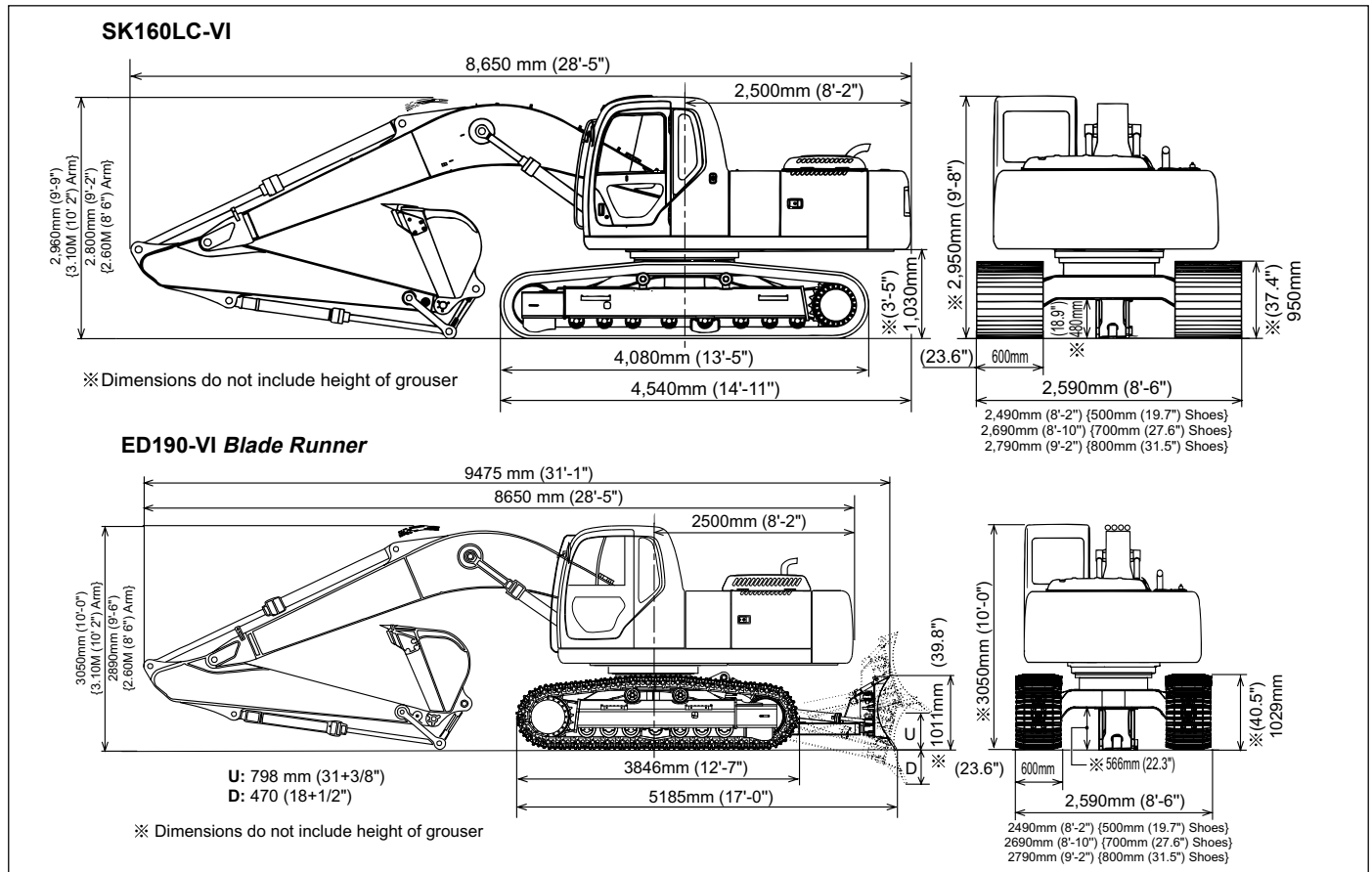


FIGURE 6.2A

B. WORKING WEIGHTS

**Standard SK160LC-VI {3.10 M (10'2") Arm
and 0.52 m³ (0.68 yrd³) SAE bucket}**

		TRIPLE GROUSER SHOES	
Track shoe width	mm (in)	600 (23.6)	800 (31.5)
Overall width	m (ft-in)	2,590 (8 - 6)	2,790 (9 - 2)
Ground pressure	KPa (psi)	38 (5.51)	30 (4.35)
Working weight	Kg (lbs)	16,700 (36,800)	17,300 (38,100)

Bucket weight: 370 Kg (816 lbs)

C. DIGGING FORCES

Unit: Kgf (lbf)

SK160LC-VI

ARM LENGTH	M (ft-in)	2.60 (8 - 6)	3.10 (10 - 2)
Bucket digging force		*11,293 (24,900)	11,293 (24,900)
Arm crowding force		*8,934 (19,700)	7,800 (17,200f)

* Power boost engaged

D. STANDARD ATTACHMENT WORKING RANGES– Figure 6.3

Units: M (ft-in)

SK160(LC)

		SK160(LC)-VI		ED190-VI
ARM		2.60 M (8' 6")	3.10 M (10' 2")	3.10 M (10' 2")
WORKING RANGE				
A	Max. digging reach	8.980 (29' 6")	9.500 (31' 2")	9.500 (31' 2")
A'	Max. dig. reach at ground level	8.810 (28' 11")	9.330 (30' 7")	9.330 (30' 7")
B	Max. digging depth	6.070 (19' 11")	6.570 (21' 7")	6.520 (21' 5")
C	Max. digging height	9.200 (30' 2")	9.620 (31' 7")	9.670 (31' 9")
D	Max. dumping clearance	6.570 (21' 7")	6.960 (22' 10")	7.010 (23' 0")
E	Min. dumping clearance	2.570 (8' 5")	2.070 (6' 9")	2.120 (6' 11.5")
F	Max. vertical wall digging depth	5.180 (16' 12")	6.020 (19' 9")	5.970 (19' 7")
G	Min. front swing radius	2.830 (9' 3")	2.830 (9' 3")	2.830 (9' 3")
H	Height at min. swing radius	7.340 (24' 1")	7.320 (24' 0")	7.370 (24' 2")
I	Digging depth for 2.40 m (8') flat bottom	5.830 (19' 2")	6.400 (21' 0")	6.350 (20' 10")

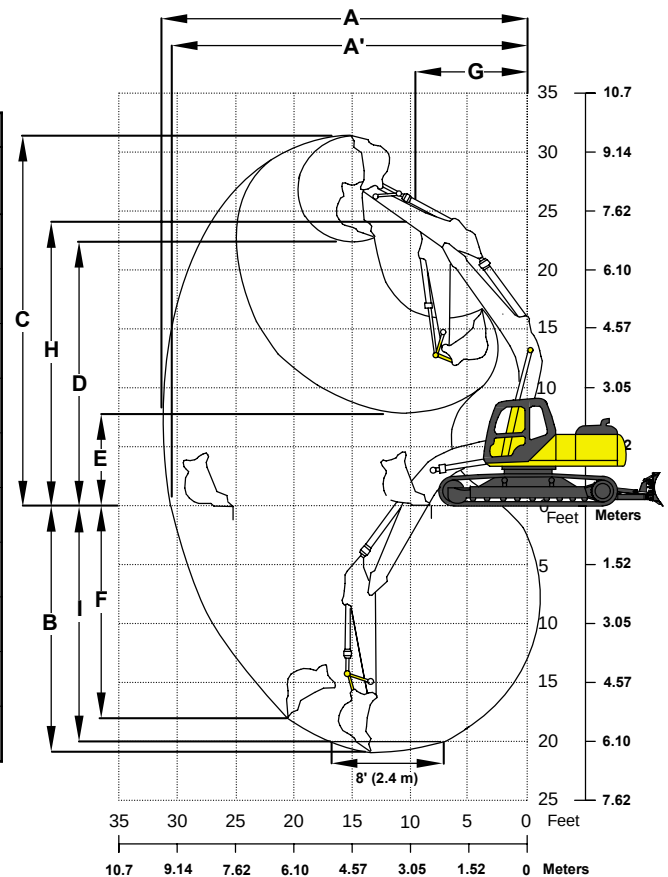


FIGURE 6.3

E. BUCKET SELECTION CHART

SK160(LC)

Application	Capacity m ³ (yd ³)	Width cm (inches)	Weight Kg (lbs)	Arm	
				2.60 M (8'- 6")	3.10 M (10'- 2")
General Purpose	0.344 (0.45)	0.508 (20)	474 (1,045)	H	H
	0.443 (0.58)	0.610 (24)	508 (1,120)	H	H
	0.589 (0.77)	0.762 (30)	580 (1,280)	H	M
	0.742 (0.97)	0.914 (36)	633 (1,395)	M	L
	0.887 (1.16)	1.067 (42)	703 (1,550)	L	X
	1.040 (1.36)	1.219 (48)	775 (1,710)	X	X
Heavy Duty	0.344 (0.45)	0.508 (20)	508 (1,120)	H	H
	0.443 (0.58)	0.609 (24)	544 (1,200)	H	H
	0.589 (0.77)	0.762 (30)	619 (1,365)	H	M
	0.742 (0.97)	0.914 (36)	678 (1,495)	M	L
	0.887 (1.16)	1.066 (42)	753 (1,660)	L	X
Severe Duty	0.428 (0.56)	0.660 (26)	637 (1,405)	H	H
	0.528 (0.69)	0.787 (31)	698 (1,540)	H	M
	0.650 (0.85)	0.940 (37)	789 (1,740)	M	L

H- Used with material weight up to 1,780 kg/m³ (3,000 lb/yr³).

M- Used with material weight up to 1483 kg/m³ (2,500 lb/yr³).

L- Used with material weight up to 1186 kg/m³ (2,000 lb/yr³).

X- Not recommended.

F. BOOM— Figure 6.4A

1. Standard boom is 5.65 meter (18'-6")

A—Length is 5.20 METER (16'-1")

Center line to center line of pins.

B—Height is 1,106.5 mm (43.6")

From centerline of boom end to centerline of arm cylinder boss.

C—Width is 620 mm (24.4")

From edge to edge of boom foot.

WEIGHT—Approximately 1,121 kg (2,471 lbs)

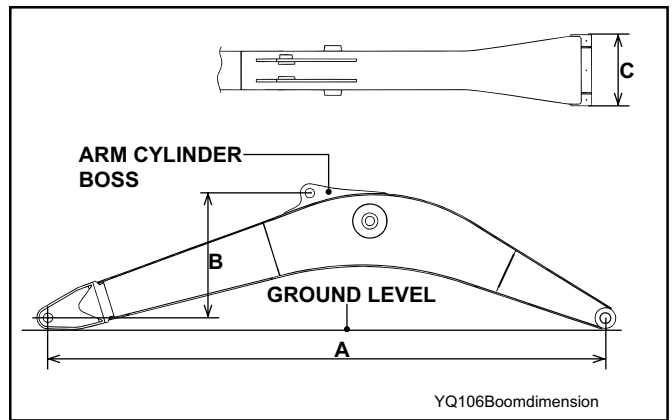


FIGURE 6.4A

G. ARM— Figure 6.4B

1. Standard arm is 3.10 meter (10'-2")

A—Length is 3.10 METER (10'-2")

Center line to center line of pins.

B—Width is 300 mm (11.8")

From edge to edge of arm tip.

C—Width is 286 mm (11.26")

From edge to edge of arm-boom pin connection.

WEIGHT—Approximately 563 kg (1,241 lbs)

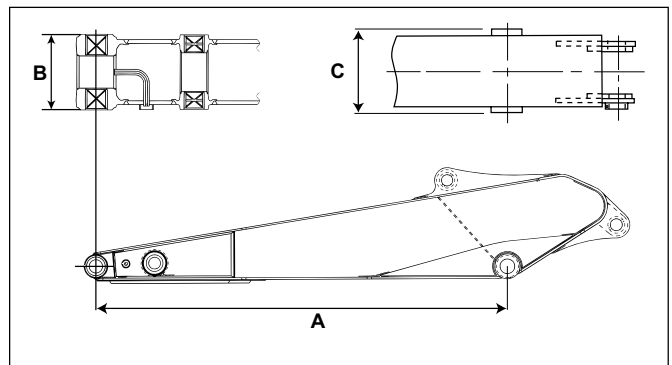


FIGURE 6.4B

H. BUCKET— Figure 6.4C

1. Standard bucket is 0.52 m³ (0.68 yd³)

A—Length is 1.30 m (4'-3")

B—Height is 1.16 m (3'-10")

C—Width without side cutters is 0.854 m (33.7")

D—Width with side cutters— 0.954 m (37.6")

E— Bucket weight is 370 kg (816 lbs)

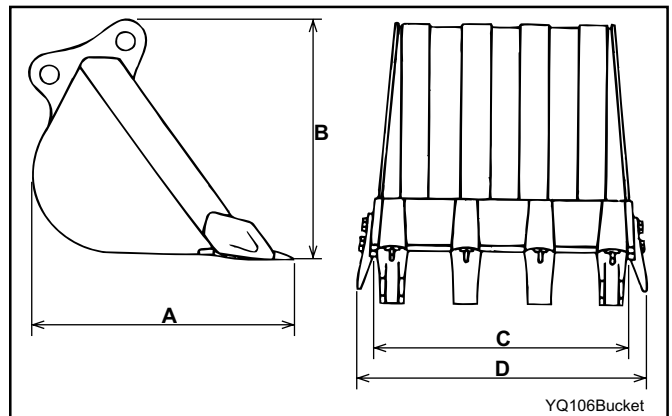


FIGURE 6.4C

I. SHOES— FIGURE 6.4D

1. Standard shoes for the SK160LC/ED190-VI are 600 mm (23.6") triple grouser.
Height of grouser: 30 mm (1.18")
2. Quantity of shoes:
SK160LC-VI: 45 per track
ED190-VI: 40 per track

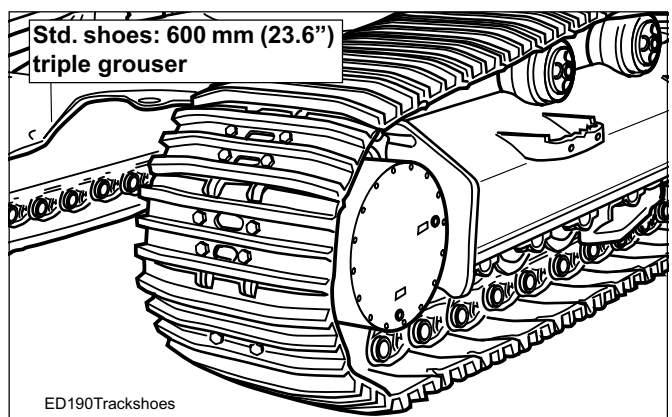


FIGURE 6.4D

J. PERFORMANCE SPECIFICATIONS

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

1. Travel Speed, Swing Speed & Gradeability

DESCRIPTION	SPECIFICATION
TRAVEL SPEED	6.0 km per hr (3.7 mph) in  mode. 4.0 km per hr (2.5 mph) in  mode.
SWING SPEED	11 RPM IN M-Mode / "HI" Idle.
GRADEABILITY	70% (35°) {Limited by engine lubrication}
DRAWBAR FORCE	SK160LC-VI: 156 KN (35,100 lbs) ED190LC-VI: 189 KN (42,556)

2. Engine

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

*Less flywheel and electrics.

3. Hydraulic Components

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

4. Operating Pressures

Kgf/cm² (psi)

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

K. MACHINE & COMPONENT WEIGHTS

Based on the std. machine with std. attachment.

Unit: Kg (lb)

C O M P O N E N T	ED190-VI	SK160LC-VI
Complete machine (Std)	19,820 (43,704)	16,700 (36,800)
Upper frame assembly	6928 (15,242)	6928 (15,242)
Upper chassis	1,405 (3,091)	1,405 (3,091)
Swing motor assy*	223 (491)	223 (491)
Swing motor*	57 (125)	57 (125)
Swing reduction unit*	147 (323)	147 (323)
Upper covers and guards	255 (561)	255 (561)
Lower covers	42 (92)	42 (92)
Cab floor plate	129 (284)	129 (284)
Cab assy	259 (570)	259 (570)
Operator's control panels	27 (59)	27 (59)
A/C assy	39 (86)	39 (86)
Control assy (Behind operator's seat)	19 (42)	19 (42)
Seat assy	75 (165)	75 (165)
Hydraulic tank*	102 (224)	102 (224)
Fuel tank*	99 (218)	99 (218)
Upper hyd. piping and hoses (main and pilot)	316 (695)	316 (695)
Engine*	403 (887)	403 (887)
Engine control assy (step motor+control accessory)	9 (20)	9 (20)
Muffler	19 (42)	19 (42)
Radiator* + oil cooler*	75 (165)	75 (165)
Power plant coupling (housing, coupler, etc.)	18 (40)	18 (40)
Pump assy (main + pilot)	90 (198)	90 (198)
Batteries	50 (110)	50 (110)
Electrical harness + lights	20 (44)	20 (44)
Counterweight	3,007 (6,615)	3,007 (6,615)
Control valve	250 (550)	250 (550)
Lower frame assembly	9,728 (21,402)	6,608 (14,568)
Frame+track guides+covers+piping	2,593 (5,705)	2,162 (4,766)
Slewing ring assembly	218 (480)	218 (481)
Travel motor+reduction unit	300 (660) x 2	217 (478) x 2
Track tension+idlers	200 (442) x 2	210 (463) x 2
Lower roller assembly (single flange -SF)	53 (118) x 8	35 (77) x 14
Lower roller assembly (double flange - DF)	60 (132) x 6	—
Upper roller assembly	33 (73) x 4	17 (37) x 4
Sprockets	64 (141) x 2	72 (159) x 2
Swivel joint	83 (183)	30 (66)
Track link w/600 mm (23.6") shoes	1,588 (3,494) x 2	1,321 (2,912) x 2
Blade assembly	1,614 (3,550)	—
Tilt cylinder*	27 (59)	—
Angle cylinder*	40 (88) x 2	—
Lift cylinder*	45 (98) x 2	—
Blade only (including wings)	855 (1880)	—
Blade wing	100 (200) x 2	—
Attachment (Std)	2,638 (5,810)	2,638 (5,810)
Bucket assembly [ED190/SK160LC-VI: 0.52 m ³ (0.68 yrd ³)]	370 (816)	370 (816)
Arm assembly [ED190/SK160LC-VI: 3.10 m (10'-2")]	857 (1,889)	857 (1,889)
Arm [ED190/SK160LC-VI: 3.10 m (10'-2")]	564 (1,340)	564 (1,340)
Bucket cylinder* + 2 pins	142 (313)	142 (313)
Idler links	32 (76)	32 (76)
Bucket links	65 (143)	65 (143)
Pins (4 - for bucket, & links)	54 (119)	54 (119)
Boom assembly (standar)	1,411 (3,111)	1,411 (3,111)
Boom + cyl. pin + foot pin	1,176 (2,593)	1,176 (2,593)
Arm cylinder* + 2 pins	215 (474)	215 (474)
Pin (mounting the arm)	20 (44)	20 (44)
Fluids	436 (958)	436 (958)
Hydraulic oil	139 (306)	139 (306)
Engine oil (engine + reduction units)	130 (285)	130 (285)
Grease	8.7 (19)	8.7 (19)
Fuel	139 (306)	139 (306)
Water	19 (42)	19 (42)
Bolts and other miscellaneous	90 (199)	90 (199)

*Dry weight

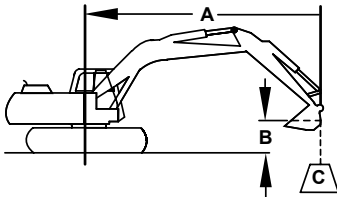
L. LIFTING CAPACITIES

1. Do not attempt to lift any load that exceeds these rated values at their specified load radii and heights.
2. Lifting capacities assume a machine standing on a level, firm, and uniform supporting surface. Operator must make allowance for job conditions such as soft or uneven ground, out of level conditions, side loads, sudden stopping of loads, hazardous conditions, inexperienced personnel, weight of various other buckets, lifting slings, attachments, etc.
3. Ratings at bucket lift hook.
4. The previous rated loads are in compliance with SAE Hydraulic Excavator Lift Capacity Standard J 1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's manual before operating this machine. Rules for safe operation of equipment should be followed at all times.
6. Capacities apply to the machine as originally manufactured and normally equipped by the manufacturer.

CAUTION

THE OPERATOR MUST CONSIDER THE WEIGHT OF ANY DEVICE UTILIZED FOR LIFTING TO PROPERLY CALCULATE THE TOTAL LIFTING CAPACITY OF THE MACHINE, EXAMPLE:

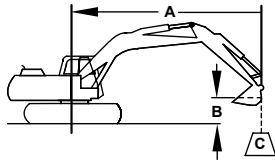
1. If the excavator uses the same bucket size indicated in the lifting table, and a lifting cable, etc. weighing 100 kg (220 lbs) is used for lifting, then you have to subtract this additional 100 kg (220 lbs) from every value indicated in the lifting table accordingly.
2. If a bucket is changed for a larger bucket, which weight is 350 Kg (770 lbs) more than the bucket indicated in the lifting chart, then you have to subtract this additional weight from every value indicated in the lifting table accordingly.
3. If a bucket is changed for a smaller bucket, which weight is 350 Kg (770 lbs) less than the bucket indicated in lifting chart, then you can safely add 350 kg (770 lbs) to every value indicated in the lifting table accordingly.



SK160LC-VI LIFTING CAPACITIES

Based on a machine equipped with 5.20 m (16' 1") boom, 2.60 m (8' 6") arm, 0.63 m³ (0.82 yd³) bucket, and 600 mm (23.6") shoes.

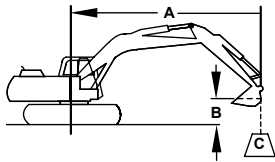
SK160LC		Boom: 5.20 m (16' 1")		Arm: 2.60 m (8' 6")		Bucket: 0.63 m ³ (0.82 yd ³)		SAE/PCSA		450 Kg (992 lbs)	
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0")	
	C										
6.1 m (20' 0")	lb kg							*5510 *2500	*5510 *2500		
4.6 m (15' 0")	lb kg					*9310 *4220	*9310 *4220	*8300 *3760	6290 2850		
3.0 m (10' 0")	lb kg			*17360 *7870	*17360 *7870	*11590 *5250	9430 4270	*9260 *4200	5930 2690	*4270 *1940	4000 1810
1.5 m (5' 0")	lb kg			*19730 *8940	15620 7080	*13900 *6300	8570 3880	9840 4460	5540 2510	*5870 *2660	3830 1730
Ground Level	lb kg			*18570 *8420	14860 6740	15020 6810	8010 3630	9500 4310	5240 2370		
-1.5 m (-5' 0")	lb kg	*14690 *6660	*14690 *6660	*22220 *10070	14820 6720	14780 6700	7820 3540	9360 4240	5110 2310		
-3.0 m (-10' 0")	lb kg	*21550 *9770	*21550 *9770	*18750 *8500	15130 6860	*13060 *5920	7910 3590				
-4.6 m (-15' 0")	lb kg			*12290 *5570	*12290 *5570						



SK160LC-VI LIFTING CAPACITIES (HEAVY LIFT)

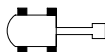
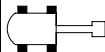
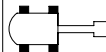
Based on a machine equipped with 5.20 m boom (16' 1"), 2.60 m (8' 6") arm, 0.63 m³ (0.82 yrd³) bucket, and 600 mm (23.6") shoes.

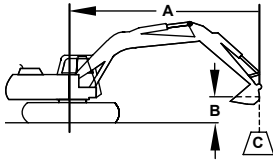
SK160LC		Boom: 5.20 m (16' 1")		Arm: 2.60 m (8' 6")		Bucket: 0.63 m³ (0.82 yd³)		SAE/PCSA		450 Kg (992 lbs)	
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
	C										
6.1 m (20' 0")	lb kg							*6190 *2800	*6190 *2800		
4.6 m (15' 0")	lb kg					*10470 *4750	10260 4650	*9380 *4250	6290 2850		
3.0 m (10' 0")	lb kg			*19470 *8830	17960 8140	*13060 *5920	9430 4270	10280 4660	5930 2690	*4830 *2190	4000 1810
1.5 m (5' 0")	lb kg			*21800 *9890	15620 7080	15670 7110	8570 3880	9840 4460	5540 2510	*6600 *2990	3830 1730
Ground Level	lb kg			*20530 *9310	14860 6740	15020 6810	8010 3630	9500 4310	5240 2370		
-1.5 m (-5' 0")	lb kg	*16290 *7380	*16290 *7380	*25060 *11360	14820 6720	14780 6700	7820 3540	9360 4240	5110 2310		
-3.0 m (-10' 0")	lb kg	*23830 *10800	*23830 *10800	*21220 *9620	15130 6860	14800 6710	7910 3590				
-4.6 m (-15' 0")	lb kg			*14050 *6370	*14050 *6370						



SK160LC-VI LIFTING CAPACITIES

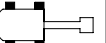
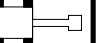
Based on a machine equipped with 5.20 m boom (16' 1"), 2.60 m (8' 6") arm, 0.63 m³ (0.82 yrd³) bucket, and 800 mm (31.5") shoes.

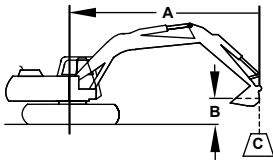
SK160LC											
Boom: 5.20 m (16' 1")				Arm: 2.60 m (8' 6")				Bucket: 0.63 m³ (0.82 yd³) SAE/PCSA 450 Kg (992 lbs)			
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
	C										
6.1 m (20' 0")	lb kg							*5510 *2500	*5510 *2500		
4.6 m (15' 0")	lb kg					*9310 *4220	*9310 *4220	*8300 *3760	6530 2960		
3.0 m (10' 0")	lb kg			*17360 *7870	*17360 *7870	*11590 *5250	9780 4430	*9260 *4200	6180 2800	*4270 *1940	4190 1900
1.5 m (5' 0")	lb kg			*19730 *8940	16240 7360	*13900 *6300	8920 4040	10270 4660	5780 2620	*5870 *2660	4020 1820
Ground Level	lb kg			*18570 *8420	15490 7020	*15140 *6860	8370 3790	9940 4500	5480 2480		
-1.5 m (-5' 0")	lb kg	*14690 *6660	*14690 *6660	*22220 *10070	15450 7000	*14920 *6760	8170 3700	9790 4440	5350 2430		
-3.0 m (-10' 0")	lb kg	*21550 *9770	*21550 *9770	*18750 *8500	15760 7140	*13060 *5920	8270 3750				
-4.6 m (-15' 0")	lb kg			*12290 *5570	*12290 *5570						



SK160LC-VI LIFTING CAPACITIES (HEAVY LIFT)

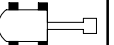
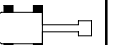
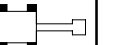
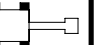
Based on a machine equipped with 5.20 m boom (16' 1"), 2.60 m (8' 6") arm, 0.63 m³ (0.82 yrd³) bucket, and 800 mm (31.5") shoes.

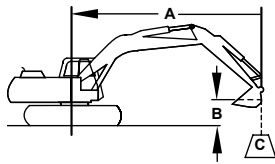
SK160LC		Boom: 5.20 m (16' 1")		Arm: 2.60 m (8' 6")		Bucket: 0.63 m³ (0.82 yd³)		SAE/PCSA		450 Kg (992 lbs)	
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
	C										
6.1 m (20' 0")	lb kg							*6190 *2800	*6190 *2800		
4.6 m (15' 0")	lb kg					*10470 *4750	*10470 *4750	*9380 *4250	6530 2960		
3.0 m (10' 0")	lb kg			*19470 *8830	18590 8430	*13060 *5920	9780 4430	*10470 *4750	6180 2800	*4830 *2190	4190 1900
1.5 m (5' 0")	lb kg			*21800 *9890	16240 7360	*15680 *7110	8920 4040	10270 4660	5780 2620	*6600 *2990	4020 1820
Ground Level	lb kg			*20530 *9310	15490 7020	15680 7110	8370 3790	9940 4500	5480 2480		
-1.5 m (-5' 0")	lb kg	*16290 *7380	*16290 *7380	*25060 *11360	15450 7000	15440 7000	8170 3700	9790 4440	5350 2430		
-3.0 m (-10' 0")	lb kg	*23830 *10800	*23830 *10800	*21220 *9620	15760 7140	*14800 *6710	8270 3750				
-4.6 m (-15' 0")	lb kg			*14050 *6370	*14050 *6370						



SK160LC-VI LIFTING CAPACITIES

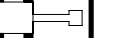
Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") shoes.

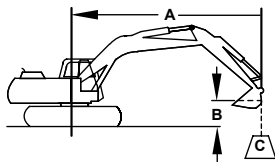
SK160LC											
Boom: 5.20 m (16' 1")				Arm: 3.10 m (10' 2")				Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)			
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
	C										
6.1 m (20' 0")	lb kg							*6030 *2730	*6030 *2730		
4.6 m (15' 0")	lb kg							*7650 *3470	6470 2930	*3860 *1750	*3860 *1750
3.0 m (10' 0")	lb kg			*15000 *6800	*15000 *6800	*10620 *4810	9710 4400	*8710 *3950	6080 2750	*6130 *2780	4100 1860
1.5 m (5' 0")	lb kg			*21300 *9690	16180 7340	*13180 *5970	8770 3980	*9900 *4490	5640 2550	6950 3150	3890 1760
Ground Level	lb kg	*7390 *3350	*7390 *3350	*18840 *8540	14960 6780	*14840 *6730	8100 3670	9550 4330	5280 2390	6750 3060	3720 1680
-1.5 m (-5' 0")	lb kg	*12560 *5690	*12560 *5690	*22290 *10110	14690 6660	14760 6690	7790 3530	9340 4230	5090 2390		
-3.0 m (-10' 0")	lb kg	*18260 *8280	*18260 *8280	*20330 *9220	14870 6740	*13830 *6270	7800 3530	9350 4240	5100 2310		
-4.6 m (-15' 0")	lb kg	*23770 *10780	*23770 *10780	*14990 *6790	*14990 *6790	*10280 *4660	8120 3680				



SK160LC-VI LIFTING CAPACITIES (HEAVY LIFT)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") shoes.

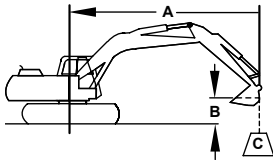
SK160LC		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
	C										
6.1 m (20' 0")	lb kg							*6760 *3060	6680 3030		
4.6 m (15' 0")	lb kg							*8660 *3920	6470 2930	*4380 *1980	4260 1930
3.0 m (10' 0")	lb kg			*16810 *7620	*16810 *7620	*11960 *5420	9710 4400	*9850 *4460	6080 2750	*6880 *3120	4100 1860
1.5 m (5' 0")	lb kg			*24010 *10890	16180 7340	*14860 *6740	8770 3980	9950 4510	5640 2550	6950 3150	3890 1760
Ground Level	lb kg	*8260 *3740	*8260 *3740	*20830 *9440	14960 6780	15120 6850	8100 3670	9550 4330	5280 2390	6750 3060	3720 1680
-1.5 m (-5' 0")	lb kg	*13940 *6320	*13940 *6320	*24630 *11170	14690 6660	14760 6690	7790 3530	9340 4230	5090 2390		
-3.0 m (-10' 0")	lb kg	*20200 *9160	*20200 *9160	*22970 *10410	14870 6740	14760 6690	7800 3530	9350 4240	5100 2310		
-4.6 m (-15' 0")	lb kg	*27100 *12290	*27100 *12290	*17050 *7730	15450 7000	*11730 *5320	8120 3680				



SK160LC-VI LIFTING CAPACITIES

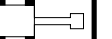
Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") shoes.

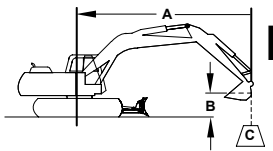
SK160LC											
Boom: 5.20 m (16' 1")				Arm: 3.10 m (10' 2")				Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)			
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
	C										
6.1 m (20' 0")	lb kg							*6030 *2730	*6030 *2730		
4.6 m (15' 0")	lb kg							*7650 *3470	6710 3040	*3860 *1750	*3860 *1750
3.0 m (10' 0")	lb kg			*15000 *6800	*15000 *6800	*10620 *4810	10070 4560	*8710 *3950	6320 2860	*6130 *2780	4290 1940
1.5 m (5' 0")	lb kg			*21360 *9690	16810 7620	*13180 *5970	9130 4140	*9900 *4490	5880 2670	7270 3290	4080 1850
Ground Level	lb kg	*7390 *3350	*7390 *3350	*18840 *8540	15580 7060	*14840 *6730	8450 3830	9990 4530	5530 2500	7080 3210	3910 1770
-1.5 m (-5' 0")	lb kg	*12560 *5690	*12560 *5690	*22290 *10110	15310 6940	*15100 *6850	8140 3690	9770 4430	5330 2420		
-3.0 m (-10' 0")	lb kg	*18260 *8280	*18260 *8280	*20330 *9220	15500 7030	*13830 *6270	8150 3690	9780 4430	5350 2420		
-4.6 m (-15' 0")	lb kg	*23770 *10780	*23770 *10780	*14990 *6790	*14990 *6790	*10280 *4660	8470 3840				



SK160LC-VI LIFTING CAPACITIES (HEAVY LIFT)

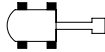
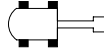
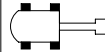
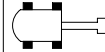
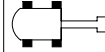
Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 800 mm (31.5") shoes.

SK160LC		Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA 370 Kg (816 lbs)					
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')	
	C										
6.1 m (20' 0")	lb kg							*6760 *3060	*6760 *3060		
4.6 m (15' 0")	lb kg							*8660 *3920	6710 3040	*4380 *1980	*4380 *1980
3.0 m (10' 0")	lb kg			*16810 *7620	*16810 *7620	*11960 *5420	10070 4560	*9850 *4460	6320 2860	*6880 *3120	4290 1940
1.5 m (5' 0")	lb kg			*24010 *10890	16810 7620	*14860 *6740	9130 4140	10390 4710	5880 2670	7270 3290	4080 1850
Ground Level	lb kg	*8260 *3740	*8260 *3740	*20830 *9440	15580 7060	15780 7150	8450 3830	9990 4530	5530 2500	7080 3210	3910 1770
-1.5 m (-5' 0")	lb kg	*13940 *6320	*13940 *6320	*24630 *11170	15310 6940	15420 6990	8140 3690	9770 4430	5330 2420		
-3.0 m (-10' 0")	lb kg	*20200 *9160	*20200 *9160	*22970 *10410	15500 7030	15420 6990	8150 3690	9780 4430	5350 2420		
-4.6 m (-15' 0")	lb kg	*27100 *12290	*27100 *12290	*17050 *7730	16070 7290	*11730 *5320	8470 3840				



ED190LC-VI LIFTING CAPACITIES (Blade Down in Front)

Based on a machine equipped with 5.20 m boom (16' 1"), 3.10 m (10' 2") arm, 0.52 m³ (0.68 yrd³) bucket, and 600 mm (23.6") triple grouser shoes.

ED190LC Blade Runner												Boom: 5.20 m (16' 1")		Arm: 3.10 m (10' 2")		Bucket: 0.52 m³ (0.68 yd³) SAE/PCSA		370 Kg (816 lbs)	
B	A	1.5 m (5' 0")		3.0 (10' 0")		4.6 m (15' 0")		6.1 m (20' 0")		7.6 m (25' 0')									
	C																		
6.1 m (20' 0")	kg lb							*2810 *6200	*2810 *6200										
4.6 m (15' 0")	kg lb							*3530 *7780	3490 7700	*1850 *4080	*1850 *4080								
3.0 m (10' 0")	kg lb			*7000 *15440	*7000 *15440	*4920 *10840	*4920 *10840	*4010 *8850	3320 7310	*2850 *6290	2300 5070								
1.5 m (5' 0")	kg lb			*9830 *21680	8720 19220	*6070 *13370	4770 10510	4190 9230	3120 6870	2940 6480	2200 4860								
Ground Level	kg lb	*3510 *7740	*3510 *7740	*8610 *18970	8190 18060	6270 13820	4470 9850	4010 8840	2960 6520	2850 6290	4690 2130								
-1.5 m (-5' 0")	kg lb	*5860 *12910	*5860 *12910	*10280 *22670	8080 17820	6120 13490	4340 9560	3920 8640	2880 6340										
-3.0 m (-10' 0")	kg lb	*8460 *18660	*8460 *18660	*9170 *20200	8170 18020	6130 13510	4350 9580	3930 8670	2890 6360										
-4.6 m (-15' 0")	kg lb	*10490 *23120	*10490 *23120	*6670 *14700	*6670 *14700	*4570 *10070	4500 9920												

6.2 TORQUE SPECIFICATIONS

The following Torque Specifications are provided for use when actual torque value of a fastener is not known.

A. CAPSCREWS & NUTS

1. Metric Coarse Thread Standard Tightening Torque Values. Make certain to tighten all Capscrews & Nuts to proper torque values.

Classification	4.8 T		7 T		10.9 T	
NOMINAL SIZE	NO LUBRICATION	OIL LUBRICATION	NO LUBRICATION	OIL LUBRICATION	NO LUBRICATION	OIL LUBRICATION
M6 P=1	0.45±0.05 (3.2±0.4)	0.38±0.04(2.7±0.3)	0.98±0.1 (7.1±0.7)	0.83±0.08 (6.0±0.6)	1.77±0.18 (12.8±1.3)	1.5±0.15 (10.8±1.1)
M8 P=1.25	1.09±0.11 (7.9±0.8)	0.92±0.09 (6.6±0.7)	2.4±0.2 (17.3±1.4)	2.0±0.2 (14.4±1.4)	4.3±0.4 (31.0±2.9)	3.6±0.4 (26.0±2.9)
M10 P=1.5	2.2±0.2 (15.9±1.4)	1.83±0.18 (13.2±1.3)	4.7±0.5 (33.9±3.6)	4.0±0.4 (28.9±2.9)	8.5±0.9 (61.3±6.5)	7.2±0.7 (52.0±5.1)
M12 P=1.75	3.7±0.4 (26.7±2.9)	3.2±0.3 (23.1±2.2)	8.1±0.8 (58.5±5.8)	6.8±0.7 (49.1±5.1)	14.6±1.5 (105±10.8)	12.3±1.2 (88.8±8.7)
M14 P=2	5.9±0.6 (42.6±4.3)	5.0±0.5 (36.1±3.6)	12.8±1.3 (92.5±9.4)	10.8±1.1 (78.0±7.9)	23±2 (166±14)	19.5±1.9 (140±14)
M16 P=2	9.0±0.9 (64.9±6.5)	7.6±0.7 (54.8±5.1)	19.5±2.0 (140±14.4)	16.4±1.6 (118±11.5)	35±4 (252±28.9)	29±3 (209±21.6)
M18 P=2.5	12.4±1.2 (89.6±8.7)	10.5±1.0 (75.8±7.2)	27±3 (195±22)	23±2 (166±14)	49±5 (354±36)	41±4 (296±29)
M20 P=2.5	17.5±1.7 (126±12.3)	14.7±1.4 (106±10.1)	38±4 (274±29)	32±3 (231±22)	68±7 (491±51)	57±6 (412±43)
M22 P=2.5	23±2 (166±14)	19.6±2.0 (142±14)	51±5 (368±36)	43±4 (310±29)	92±9 (663±65)	77±7 (555±58)
M24 P=3	30±3 (217±22)	24±3 (173±22)	65±7 (469±51)	53±5 (383±36)	118±12 (852±87)	96±10 (693±72)
M27 P=3	44±4 (318±29)	36±3 (260±22)	96±10 (693±72)	78±8 (563±58)	173±17 (1250±120)	140±14 (1010±100)
M30 P=3.5	60±6 (433±43)	50±5 (361±36)	131±13 (946±94)	110±11 (794±79)	235±24 (1700±170)	198±20 (1430±140)
M33 P=3.5	81±8 (585±58)	68±7 (491±51)	176±18 (1270±130)	148±15 (1070±110)	317±32 (2290±200)	266±27 (1920±200)
M36 P=4	105±10 (758±72)	88±9 (636±65)	227±23 (1640±170)	190±19 (1370±140)	409±41 (2960±300)	343±34 (2480±250)

TORQUE VALUE UNIT– kgf-m (ft. lbs.)

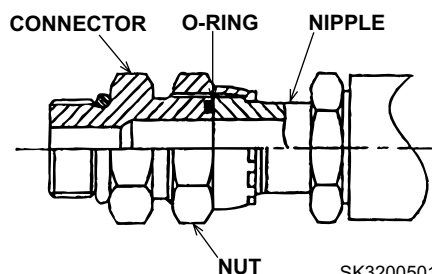
2. Metric Fine Thread Standard Tightening Torque Values. Make certain to tighten all Capscrews & Nuts to proper torque values.

Classification	4.8 T		7 T		10.9 T	
NOMINAL SIZE	NO LUBRICATION	OIL LUBRICATION	NO LUBRICATION	OIL LUBRICATION	NO LUBRICATION	OIL LUBRICATION
M8 P=1.0	1.15±0.11 (8.3±0.8)	0.97±0.1 (7.0±0.7)	2.5±0.2 (18.0±1.4)	2.1±0.2 (15.2±1.4)	4.5±0.4 (32.5±2.9)	3.8±0.4 (27.4±2.9)
M10 P=1.25	2.3±0.2 (16.6±1.4)	1.91±0.19 (13.8±1.4)	4.9±0.5 (35.4±3.6)	4.2±0.4 (30.3±2.9)	8.9±0.9 (64.2±6.5)	7.5±0.7 (54.2±5.1)
M12 P=1.25	4.0±0.4 (28.9±2.9)	3.4±0.3 (24.5±2.2)	8.7±0.9 (62.8±6.5)	7.3±0.7 (52.7±5.1)	15.7±1.6 (113±13)	13.2±1.3 (95.3±9.4)
M16 P=1.5	9.4±0.9 (67.9±6.5)	7.9±0.8 (57.0±5.8)	20±2 (144±14)	17.2±1.7 (124±12)	37±4 (267±29)	31±3 (224±22)
M20 P=1.5	19±9 (137±14)	15.8±1.6 (114±14)	41±4 (296±29)	34±3 (246±22)	74±7 (535±51)	62±6 (448±43)
M24 P=2	32±3 (231±22)	27±3 (195±22)	70±7 (506±51)	58±6 (419±43)	126±12 (910±87)	105±10 (758±72)
M30 P=2	65±6 (469±43)	54±5 (390±36)	142±14 (1030±100)	118±12 (852±87)	255±26 (1840±190)	212±21 (1530±150)
M36 P=3	109±11 (787±79)	91±9 (657±65)	238±23 (1720±170)	198±20 (1430±140)	428±43 (3090±310)	357±36 (2580±260)

TORQUE VALUE UNIT – kgf-m (ft. lbs.)

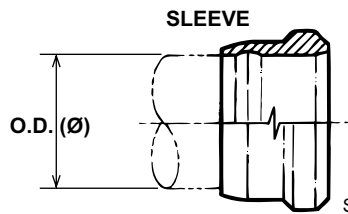
B. ORS JOINT (O-RING SEALING TYPE)

	NOMINAL SIZE	OPPOSING FLATS mm	TORQUE VALUE kgf•m (ft. lbs.)	WORKING PRESSURE kgf/cm ² (psi)
Hose mouth ring and Coupling	1 - 14 UNS	30 • 32	14 ± 1.4 (101 ± 10)	350 (4980)
	1 - 3/16 12 UN	36 • 41	18 ± 1.8 (130 ± 13)	385 (5475)
	1 - 7/16 12 UN	41 • 46	21 ± 2.1 (152 ± 15)	(POWER BOOST)

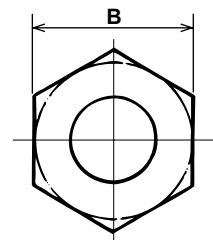
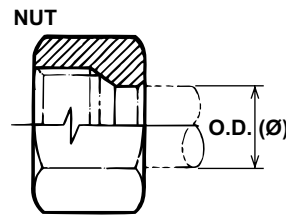


SK32005011

C. NUTS & SLEEVES



SK32005008



SK32005009

MANUFACTURER'S NAME	WORKING PRESSURE kgf/cm ² (psi)	TUBE SIZE O.D. X THICKNESS mm (in)	OPPOSING FLATS mm Dimension B	TORQUE VALUE kgf•m (ft. lbs.)
NIPPON A.M.C.	350 (4980) Travel line only	10 X 1.5 (0.394 X 0.059)	19	4.5±0.5 (33±4)
		15 X 2.0 (0.591 X 0.079)	27	15±2 (108±14)
		18 X 2.5 (0.709 X 0.098)	32	18±2 (130±14)
		22 X 3.0 (0.866 X 0.118)	36	22±2 (159±14)
		28 X 4.0 (1.10 X 0.157)	41	28±3 (203±22)
IHARA KOATSU	350 (4980) Travel line only	35 X 5.0 (1.38 X 0.20)	55	35±4.5 (253±29)

D. FLARE TYPE FITTING JOINTS

Overtightening of flare type (Union Nut Type) metal joints may cause damage to nuts, seat surfaces and prevent optimum sealing resulting in oil leaks.

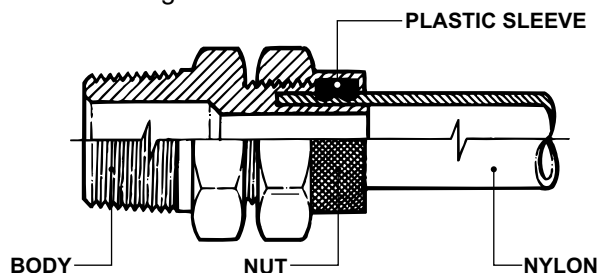
1. PIPE THREADS

Unit: kg-m (ft. lbs.)

NOMINAL SIZE	TORQUE VALUE
1/4"	2.5±0.3 (18.1±1.8)
3/8"	5±0.5 (36.2±3.6)
1/2"	6±0.6 (43.4±4.3)
3/4"	12±1.2 (86.8±8.7)
1"	14±1.4 (101±10)
1-1/4"	17±1.7 (123±12)
1-1/2"	21±2.1 (152±15)
2"	42±4.2 (304±30)

E. N₂ (NYLON) TUBE FITTING JOINTS

1. Clean tube and make certain tube end is trimmed smooth.
2. Insert tube into fitting until tube end is securely seated in fitting body.
3. Tighten the nut by hand.
4. Use a spanner wrench, securely tighten nut by turning 1-1/4 turns.



SK32005010

F. TORQUE VALUES FOR MOST COMMON BOLTS

{Bolt Size} Units: N-m (Ft-lbs)

Qty	Location	SK160LC-VI	ED190 Blade Runner
5	-Fuel tank sending unit mounting	{M5} 1.96 ±0.2 (1.4 ±0.1)	←
6	-A/C Condenser mounting	{M6 X 50} 4.41 (3.3)	←
1	-Hyd. tank sending unit mounting	147 ±15 (108 ±14)	←
6	-A/C pulley mounting on damper	{M8 X 16} 39 (29)	←
4	-Coolant reservoir mounting	10.8 ±1 (8 ±0.7)	←
4	-A/C compressor mounting	{M8 X 100} 10.8 ±1 (8 ±0.7)	←
1	-A/C idler pulley nut	{M10} 39-54 (29-40)	←
2	-Pilot pump mount bolts	{M10} 39 ±4 (29 ±3) Apply lockite # 262	←
8	-Hydraulic oil tank cover mounting	{M10} 46.1 ±4.6 (34 ±4)	←
2	-Swing grease bath inspection cover mounting	{M10} 29.4 ±2.9 (22 ±4)	←
8	-Swivel joint dust cover mounting	{M10} 14.7 ±1.5 (11 ±2)	←
6	-Muffler support bracket mounting	{M10} 39.2 ±3.5 (30 ±3)	←
16	-Engine mounting (engine body side)	{M10} 64.7 ±6.5 (48 ±3) Apply lockite # 262	←
4	-Travel lever mounting	{M10} 23.5 ±2 (17 ±2)	←
3	-Stepping motor mounting	{M10} 19.6 (14) Apply lockite # 242	←
12	-Hyd. pump housing to engine block mounting	{M10} 64.7 ±6 (48 ±4) Apply lockite # 262	←
39	-Lower cover mounting (all)	{M10} 83.3 ±8 (38 ±4)	←
2	-A/C Compressor support bracket	{M10 X 45} 64.7 (45)	←
5	-Travel motor cover mounting	83.4 ±4.9 (61 ±6) Apply lockite # 262	←
16	-Cab support mounting bolts	46 (34)	←
3	-Swivel joint mounting	108 ±10.8 (79 ±7) Apply lockite # 262	←
4	-Nuts for cab mounts	186 (137)	←
4	-Idler and idler adjuster connection	{M16} 279.5 ±28 (206 ±22) Apply lockite # 262	←
4	-Hydraulic oil tank and fuel tank mounting	{M16} 216 ±19.6 (159 ±14) Apply lockite # 262	←
4	-Radiator bottom support mounting	{M12} 120 ±12.1 (89 ±9)	←
1	-Swivel joint locking nut	{M16} 157 ±20 (115 ±14)	←
8	-Hydraulic pump coupling mounting	{M16} 216 ±9.8 (159 ±7)	←
8	-Track guide mounting	{M18} 397 ±39 (292 ±29) Apply lockite # 262	←
4	-Engine mounting (upper frame side)	{M18} 225 ±20 (166 ±14) Apply lockite # 271	←
21X2 (SK160) 20X2 (ED190)	-Sprocket mounting	{M18} 397 ±39 (292 ±29) Apply lockite # 262	539 ±50 (398 ±37) Apply lockite # 262
28X2	-Lower roller caps	{M18} 397 ±39 (292 ±29) Apply lockite # 262	←
4	-Hydraulic pump mounting	{M20} 191 ±19.5 (318 ±29) Apply lockite # 262	←
12	-Swing reduction unit mounting	{M20} 539 ±54 (397 ±43) Apply lockite # 262	←
36	-Swing bearing inner race mounting	{M20} 563 ±56 (415 ±42) Apply lockite # 262	←
28	-Swing bearing outer race mounting	{M20} 181 ±20 (133 ±15) Apply lockite # 262	←
(45X4)X2	-Shoe bolt mounting	{M20} 853 ±49 (628 ±36)	←
4	-Upper roller mounting	{M20} 539 ±54 (397 ±40) Apply lockite # 262	588 ±59 (434 ±43) Apply lockite # 262
30X2	-Travel motor mounting	{M20} 539 ±54 (397 ±40) Apply lockite # 262	←
4	-Counterweight mounting	873 ±49 (644 ±36) Apply lockite # 242	←
8	-Side cutter mounting	{M24} 95-105 Kgf-m (686-758)	←
4	-Blade Trunnion Cap Bolts	7/8"-9UNC GR8 70 kgf-m (500) Apply lockite # 262	←
2	-Idler adjuster grease fitting mounting	{5/8-18 UNF} 59 ±6 (43 ±7)	←
2	-Connector for heater hoses	24.5 (18) Apply three bond #1110B	←
1	-Nut on breather valve	9.8-13.7 (7 ±10)	←
4	-Breather mounting bolts	4.4 (3.5)	←
1	-Hydraulic tank plug	161.8 ±16.7 (119 ±12) Apply teflon tape	←
4	-Top nuts for U-bolts muffler mounting	10.8 ±1 (8 ±1)	←
4	-Bottom nuts for U-bolts muffler mounting	8.8 ±0.8 (6.5 ±1)	←
1	-Engine temperature sensor	24.5 ±5 (18 ±4) Apply three bond 1110B	←
2	-A/C hose connection on compressor	22.6 ±2 (17 ±1.4)	←
2	-A/C hose connection on condenser	9.8 ±13.7 (7.2 ±0.72)	←
4	-Cover mounting on swing motor	{M20} 430 (317)	←
1	-Swing reduction unit oil plug	54.9 (41) Apply teflon tape	←
2	-Oil plugs on travel reduction unit cover	54.9 (41) Apply teflon tape	←

6.3 MISCELLANEOUS INFORMATION

A. TEMPERATURE TABLE

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-10	14	55	131	120	248	185	365	250	482	315	599
-5	23	60	140	125	257	190	374	255	491	329	608
0	32	65	149	130	266	195	383	260	500	335	617
5	41	70	158	135	275	200	392	265	509	340	626
10	50	75	167	140	284	205	401	270	518	345	635
15	59	80	176	145	293	210	410	275	527	350	644
20	68	85	185	150	302	215	419	280	536	355	653
25	77	90	194	155	311	220	428	285	545	360	662
30	86	95	203	160	320	225	437	290	554	365	671
35	95	100	212	165	329	230	446	295	563	370	680
40	104	105	221	170	338	235	455	300	572	375	689
45	113	110	230	175	347	240	464	305	581	380	698
50	122	115	239	180	356	245	473	310	590	385	707

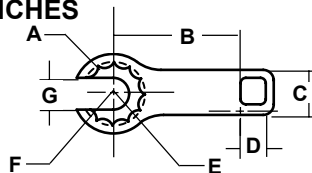
Example of how to convert 45 °C to °F:

$$^{\circ}\text{F} = 1,8 \times ^{\circ}\text{C} + 32 \Rightarrow ^{\circ}\text{F} = 1,8 \times 45 + 32 = 81 + 32 = 113 ^{\circ}\text{F}$$

Example of how to convert 122 °F en °C :

$$^{\circ}\text{C} = 0,56 (^{\circ}\text{F} - 32) \Rightarrow ^{\circ}\text{C} = 0,56 (122 - 32) = 0,56 \times 90 = 50 ^{\circ}\text{F}$$

B. SPECIAL PIPE WRENCHES



TUBE DIA.	PART No.	A	B	C	D	E	F	G
15 (0,591)	2421T160	27 (1,06)	70 (2,76)	22 (0,87)	12,7 (0,50)	8 (0,32)	40 (1,57)	16 (0,63)
18 (0,709)	2421T138	32 (1,26)	70 (2,76)	22 (0,87)	12,7 (0,50)	11 (0,43)	42 (1,65)	19 (0,75)
22 (0,866)	2421T130	36 (1,42)	70 (2,76)	22 (0,87)	12,7 (0,50)	11,5 (0,45)	48 (1,89)	23 (0,91)
28 (1,10)	2421T115	41 (1,614)	109 (4,29)	22 (0,87)	12,7 (0,50)	14,5 (0,57)	60 (2,36)	29 (1,14)
35 (1,38)	2421T314	55 (2,17)	90 (3,54)	45 (1,77)	20 (0,79)	20,5 (0,81)	81 (3,19)	41 (1,61)

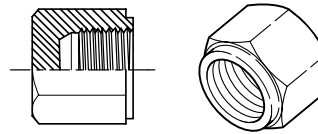
Unidad: mm (inches)

C. WEIGHT OF MATERIALS TABLE

Lb/yrds	Kg/m ³	Material (loose weight)
700	420	Wood chips
750	440	Peat, dry
950	560	Cinders
1170	690	Peat, wet
1600	950	Topsoil
1780	1050	Coal
2100	1250	Caliche
2100	1250	Earth, loam
2250	1330	Shale
2400	1420	Sand, dry
2500	1480	Clay, dry
2550	1510	Earth, dry
2600	1540	Limestone, broken or crushed
2700	1600	Earth, wet
2800	1660	Clay, wet
2800	1660	Rock, granite, blasted & broken
2850	1690	Sand, moist
2900	1720	Sand and gravel, dry
3100	1840	Sand, wet
3400	2020	Sand and gravel, wet

D. CAPS AND PLUGS FOR TUBES AND HOSE FITTINGS

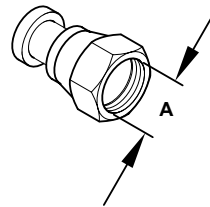
FEMALE PF CAPS



SIZE	PART NUMBER
PF 1/4	2444Z2729D1
PF 3/8	2444Z2729D2
PF 1/2	2444Z2729D3
PF 3/4	2444Z2729D4
PF 1	2444Z2729D5

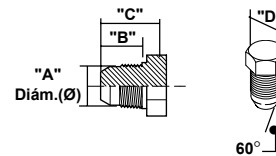
Unit: mm

FEMALE CAPS FOR ORFS FITTINGS



PLUG SIZE (A)	PART NUMBER
5/8"	YN01H01004P1
3/4"	YN01H01005P1
1"	YN01H01006P1

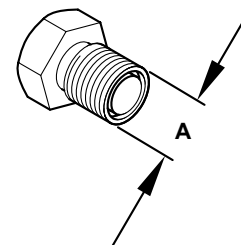
MALE PF PLUGS



PLUG SIZE	PART NUMBER	"A" O.D. (Ø)	"B" LENGTH	"C" LENGTH	"D" FLATS
PF 1/4	2444Z2728D1	13.5	16.5	24.5	14
PF 3/8	2444Z2728D2	16.6	17.5	25.5	17
PF 1/2	2444Z2728D3	20.6	20.0	31.0	22
PF 3/4	2444Z2728D4	26.2	21.5	34.0	27
PF 1	2444Z2728D5	33.3	23.5	36.0	36

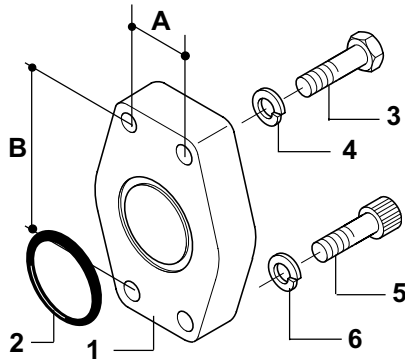
Unit: mm

MALE PLUGS FOR ORFS FITTINGS



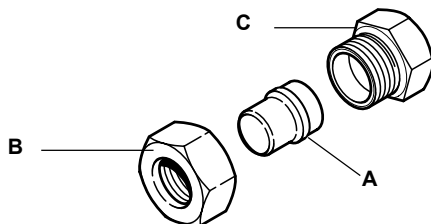
PLUG SIZE (A)	PART NUMBER	O-RING PART NUMBER
5/8"	YN01H01001P1	ZD12A01600
3/4"	YN01H01002P1	ZD12A01800
1"	YN01H01003P1	ZD12A02100

4 BOLT FLANGE CAPS



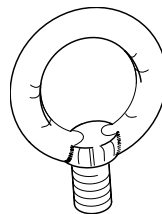
ITEM 1 (Nom. Size)		ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	DIM A	DIM B
ZE13Q08000	12.7 (1/2")	2445Z831D1	ZS18C08030	ZW26X08000	ZS23C08030	ZW26K08000	18.24 (0.72")	40.49 (1.59")
ZE13Q12000	19.1 (3/4")	ZD12P02600	ZS18C10035	ZW26X10000	ZS23C10035	ZW26K10000	23.80 (0.94")	50.80 (2.00")
ZE13Q16000	25.4 (1.0")	ZD12P03400	ZS18C12040	ZW26X12000	ZS23C12040	ZW26K12000	27.76 (1.09")	57.15 (2.25")
ZE13Q20000	31.8 (1.25")	ZD12P03800	ZS18C14045	ZW26X14000	ZS23C14045	ZW26K14000	31.75 (1.25")	66.68 (2.62")
ZE13Q24000	38.1 (1.50")	ZD12P04800	ZS18C16050	ZW26X16000	ZS23C16050	ZW26K16000	36.50 (1.44")	79.38 (3.12")
ZE13Q32000	50.8 (2.0")	2445Z831D2	ZS18C20065	ZW26X20000	ZS23C20065	ZW26K20000	44.45 (1.75")	96.82 (3.81")

TUBE & HOSE PLUGS



TUBE DIA.	"A" INTERNAL (For hose end)	"B" NUT (Use with "A")	"C" EXTERNAL (For tube end)
10mm	ZF83P10000	ZF93N10000	ZF83H10000
15mm	ZF83P15000	ZF93N15000	ZF83H15000
18mm	ZF83P18000	ZF93N18000	ZF83H18000
22mm	2444T1338D4	ZF93N22000	2444T1329D4
28mm	ZF83P28000	ZF93N28000	2444T1329D5
35mm	ZF83P35000	ZF93N35000	ZF83H35000

EYEBOLTS



BOLT Ø (mm)	THREAD TYPE	PART NUMBER
10	M10	ZS91C01000
12	M12	ZS91C01200
16	M16	ZS91C01600
20	M20	ZS91C02000
30	M30	ZS91C03000
36	M36	ZS91C03600
48	M48	ZS91C04800

E. SOME CONVERSION UNITS

Units of weight:

From	Into	Multiply by
Kg	lb	2.2
Lb	Kg	0.454

Units of length:

From	Into	Multiply by	Divide by
meters	feet	3.28	
mm	inches		25.4
inches	mm	25.4	

Units of power:

From	Into	Multiply by
Hp	KW	0.7457
KW	Hp	1.341

Units of flow:

From	Into	Multiply by
Gal/min (US liq.)	Lit/min	3.79
	Lit/sec	0.0631
	cm ³ /min	3785.4
	ft ³ /min	0.1337
Lit/min	ft ³ /min	0.0353
	Gal/min	0.264
	Gal/sec	0.004403
	yard ³ /min	0.001308

Units of torque:

From	Into	Multiply by
N-m	Lbf-ft	0.738
	Kgf-m	0.1019716
	Lbf-ft	0.737561
	Lbf-in	8.85075
Lbf-ft	Kgf-m	0.1382552
	N-m	1.35582
	Lbf-in	12

Units of pressure:

From	Into	Multiply by
Kg/cm ²	psi	14.223
	Pa (Pascal)	9.807
psi	Atm	0.06805
	Bars	0.06895
	Kg/cm ²	0.0703
	Pa (Pascal)	6894.76
MPa (MegaPascal)	psi	145.04

Units of volume:

From	Into	Multiply by
Liters	Gal (US liq)	0.264
	in ³	61.02
	yard ³	0.00131
	quarts	1.0567
	ounces (US)	33.81
Yard ³	m ³	0.765
	in ³	46656
	ft ³	27
	cm ³	764554.9
	liters	764.555

CHAPTER 4

EH160 CRAWLER EXCAVATOR NEW HOLLAND CONSTRUCTION

CH 04

ATTACHMENT DIMENSIONS

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Source Code No. S5YM/YL0401E-00

1.1 BOOM DIMINENSIONAL DRAWING

1. BOOM

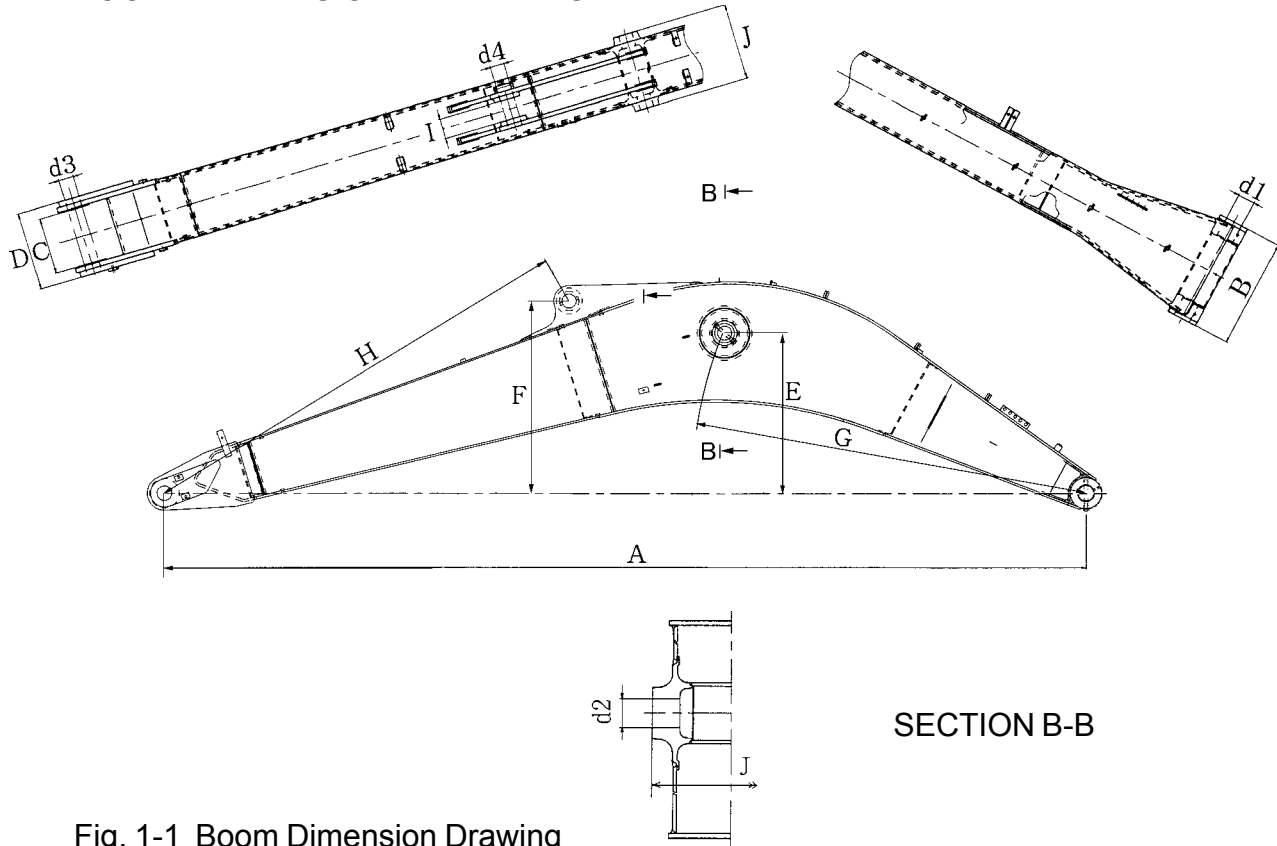


Fig. 1-1 Boom Dimension Drawing

Table 1-1

Unit: mm (Ft-in)

5.2M (17foot 0.72 inch) Boom YM02B00001F2		Unit: mm (ft-in)
A	Boom Length	5,200mm (17' 0.72")
B	Boom foot width	620mm (24.41")
C	Boom end inner width	287mm (11.30")
D	Boom end outer width	421mm (16.57")
E	Height of boom cylinder rod pin	965mm (37.99")
F	Height of arm cylinder (head side) pin	1,106.5mm (43.56")
G	Distance between pins and boss	R2,288mm (7' 6.08")
H	Distance between pins and bracket	R2,428mm (7' 11.59")
I	Arm cylinder (head side) inner width	122mm (4.80")
J	Outer width of bracket on the arm cylinder (rod side) mounting	426mm (16.77")
d ₁	Boom foot pin diameter	φ85mm (3.35")
d ₂	Boom cylinder (rod side) pin diameter	φ85mm (3.35")
d ₃	Pin diameter of arm end	φ80mm (3.15")
d ₄	Arm Cylinder (head side) pin diameter	φ80mm (3.15")

1.2 BOOM MAINTENANCE STANDARD

1. BOOM

(1) Clearance of pin and bushing on boom section

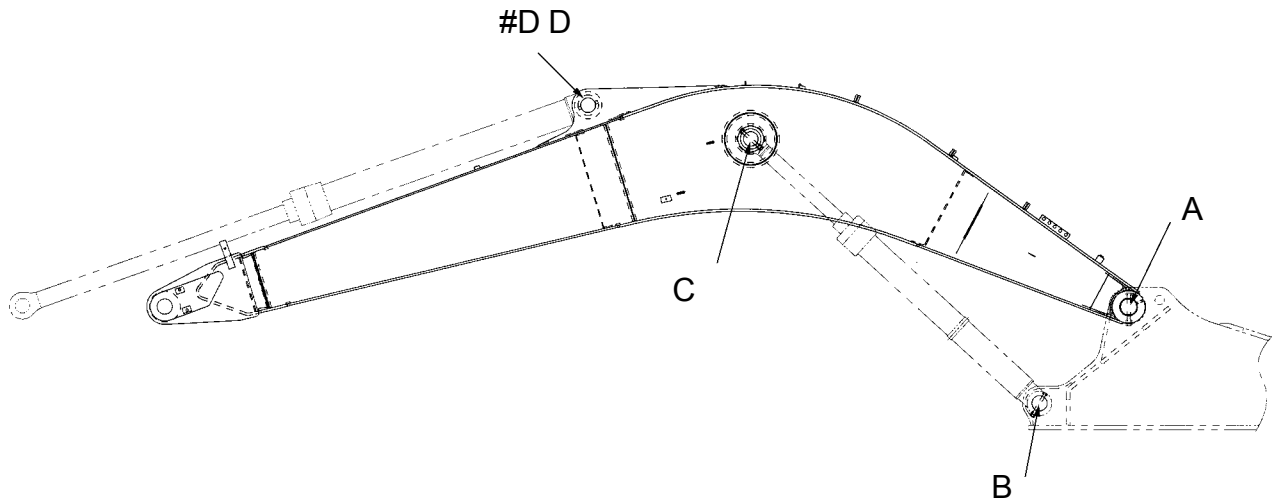


Fig. 1-2 Clearance of pin and bushing on boom section

Table 1-2

Unit: mm (Ft-in)

Symbol	Item	Pin part No.	Pin dia.	Pin dai. Tolerance	Bushing I.D. Tolerance	Standard value	Repairable level	Service Limit	Remedy
A	Boom foot	YM02B01010P1	φ85mm (3.35")	+0.20mm (+0.0008") -0.020mm (-0.0008")	+0.227mm (+0.0089") +0.147mm (+0.0058")	+0.247mm (+0.0097") +0.127mm (+0.0050")	More than 2.0mm (0.8")	2.5mm (0.1")	Replace bushing or pin
B	Boom cylinder (head side)	YM02B01008P1	φ80mm (3.15")		+0.250mm (+0.0098") +0.050mm (+0.0020")	+0.270mm (+0.0106") +0.030mm (+0.0012")			
C	Boom cylinder (rod side)	YM02B01007P1	φ85mm (3.35")	+0.280mm (+0.0110") +0.020mm (+0.0008")					
D	Arm cylinder (Head side)	YM12B01011P1	φ80mm (3.15")	+0.20mm (+0.0008") -0.020mm (-0.0008")		+0.280mm (+0.0110") +0.020mm (+0.0008")			
# D		YM12B01011P1							

Mark Shows Ground Pin (EU spec.)

Clearance in thrust direction on the boom cylinder installation section

1. BOOM

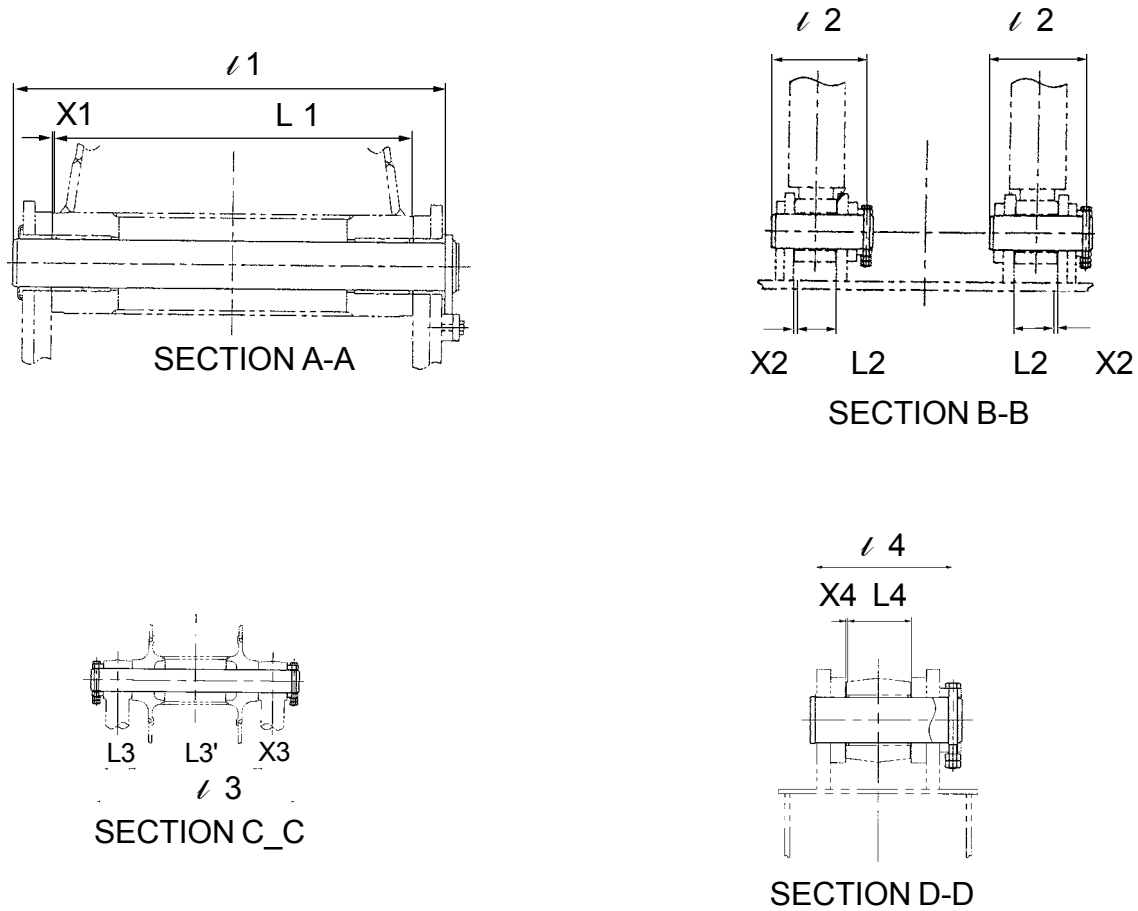


Fig. 1-3 Clearance in thrust direction on the boom clinder installation section.

(2) Clearance in thrust direction on the boom cylinder installation section

1. BOOM

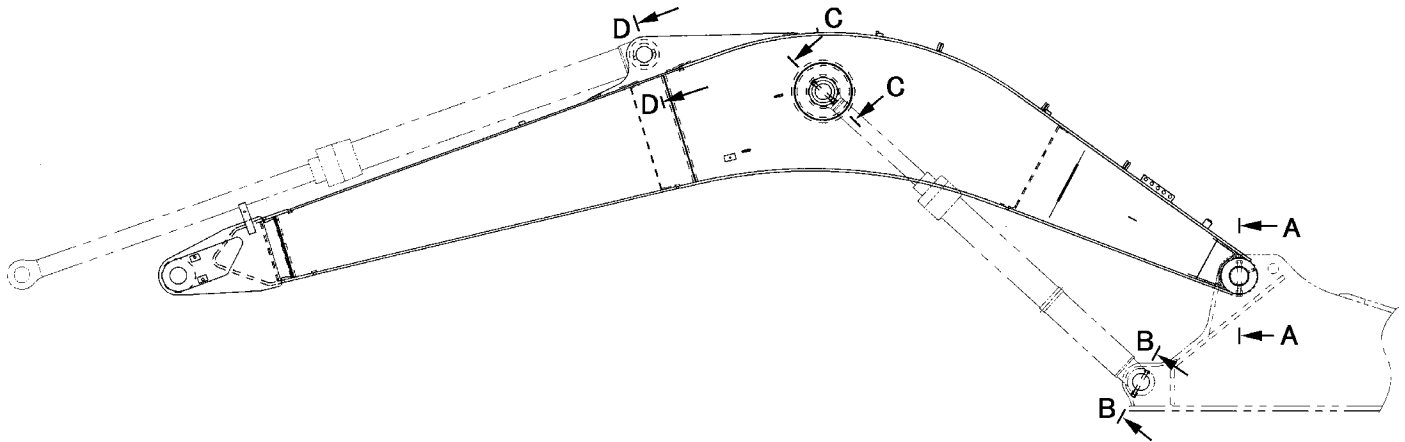


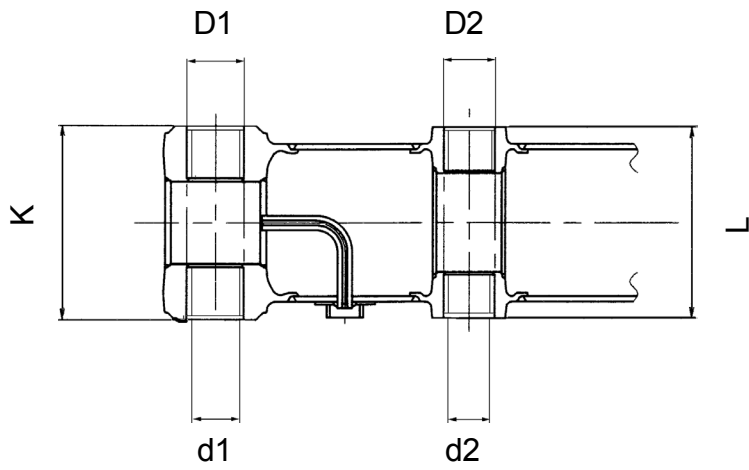
Fig. 1-3 Clearance in thrust direction on the boom clinder installation section.

Table 1-3

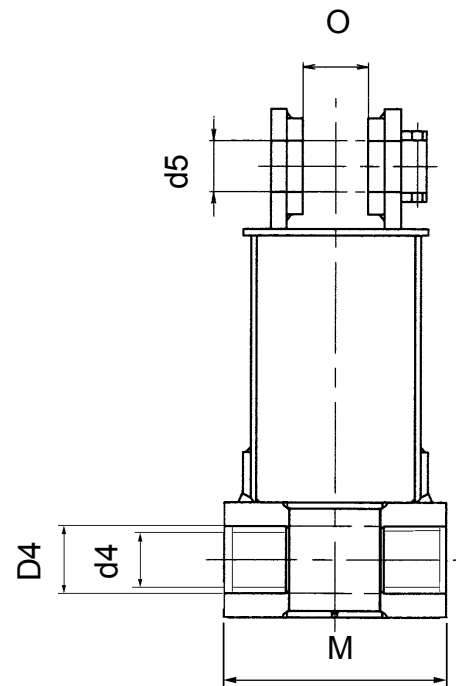
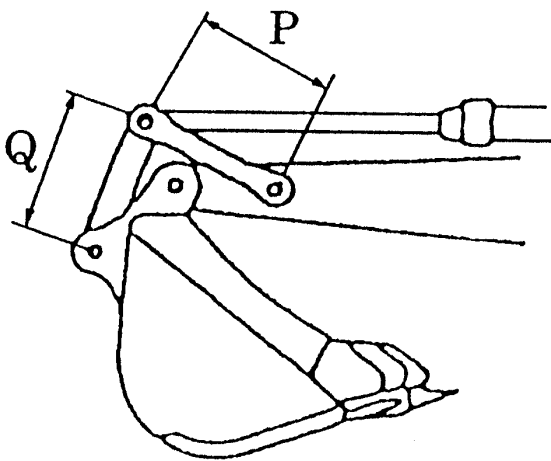
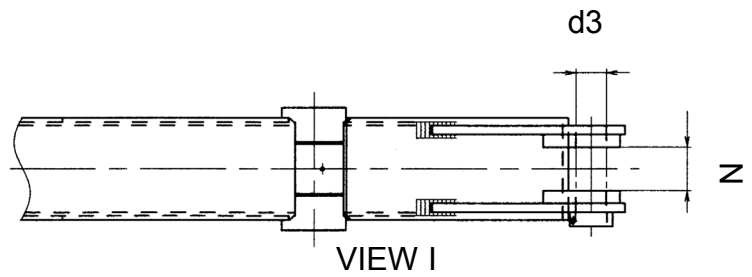
Unit: mm (Ft-in)

Section	Item		Basic size		Shim adjusting clearance X (Total of both sides)			Length under pin neck		Remedy
			Symbol	Size	Standard Value	Repairable Level	Service Limit	No.	Length	
A-A	Boom foot	Boom	L1	620mm (24.40")	0.6mm (0.02") or less	2.0mm (0.08")	2.5mm (0.10")	1	916mm (36.1")	Shim Adjust- ment
		Upper frame		622mm (24.48")						
B-B	Boom cylinder (Head side)	Boom cylinder	L2	100mm (3.937")	0.6~1.0mm (0.02~0.04")			2	245mm (9.65")	
		Upper frame		102mm (4.016")						
C-C	Boom cylinder (Rod side)	Boom cylinder	L3	100mm (3.937")	0.6~2.0mm (0.02~0.08")	3.0mm (0.12")	4.0mm (0.16")	3	796mm (31.3")	
		Boom	L3'	418mm (16.46")						
D-D	Arm cylinder (Head side)	Arm cylinder	L4	120mm (4.72")	0.6~1.0mm (0.02~0.04")	2.0mm (0.08")	2.5mm (0.10")	4	265mm (10.4")	
		Arm		122mm 4.8"						

2.1 ARM DIMENSIONAL DRAWING - STD.3.1METER (10 FT. 2 IN.)



SECTION A-A



SECTION B-B

2.1 ARM DIMENSIONAL DRAWING - STD.3.1METER (10 FT. 2 IN.)

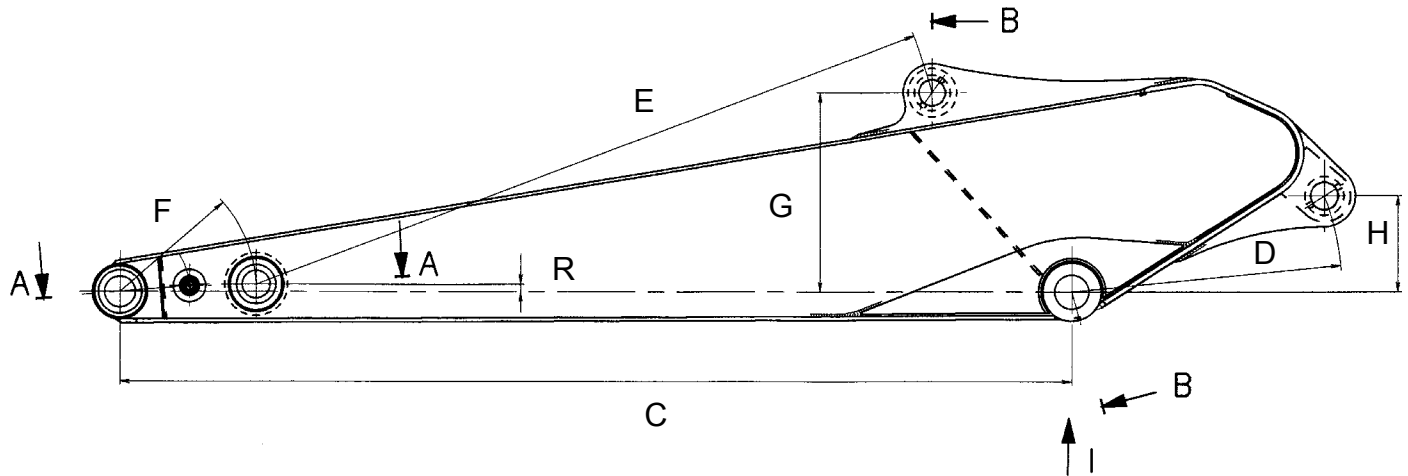


Fig. 2-1 Arm dimensional drawing

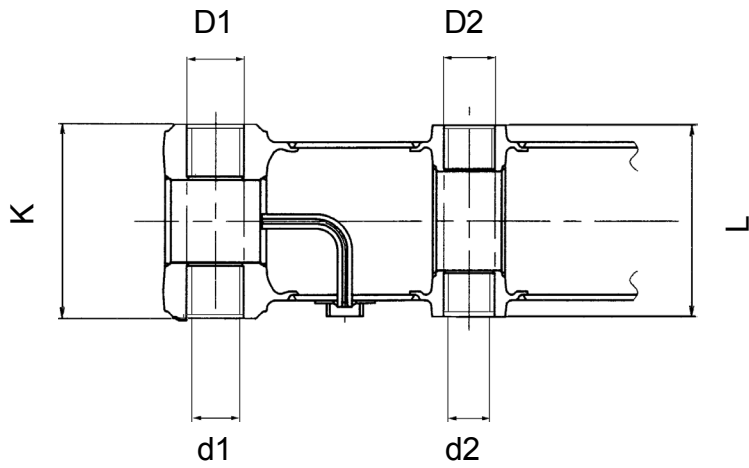
Table 2-1 Standard Arm

Unit: mm (Ft-in)

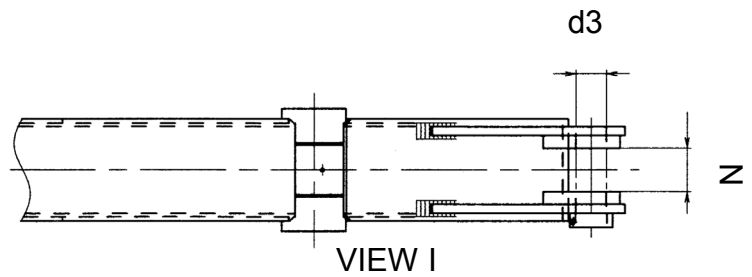
Code	NAME	DIMENSION 3.1M (10ft-2.05in) Arm	No.	NAME	DIMENSION 3.1M (10ft-2.05in) ARM
C	Arm length	3,100mm (10' 2.05")	M	Boss width	286mm (11.26")
D	Distance between pins of boss and bracket	R729mm (28.7")	N	Bracket inner width	102mm (4.02")
D1	I.D. of boss	φ95mm (3.74")	O	Bracket inner width	102mm (4.02")
D2	I.D. of boss	φ85mm (3.35")	P	Idler link dimension	580mm (22.83")
D4	I.D. of boss	φ105mm (4.13")	Q	Bucket link dimension	525mm (20.67")
E	Distance between pins of boss and bracket	R2,083mm (6'10")	R	height between pins of boss and center	8mm (0.314")
F	Distance between pins of boss and boss	R330 (12.99")	d1	Pin diameter Bucket	φ70mm (2.75")
G	Height between pins of boss and bracket	570mm (22.44")	d2	Pin diameter Bucket	φ70mm (2.75")
H	Height between pins of boss and bracket	215mm (8.46")	d3	Pin diameter Arm cyl rod	φ80mm (3.15")
K	Arm top end boss width	300mm (11.81")	d4	Pin diameter Boom to Arm	φ80mm (3.15")
L	Link section boss width	300mm (11.81")	d5	Pin diameter Bucket cyl head	φ80mm (3.15")

2.1 ARM DIMENSIONAL DRAWING - SHORT 2.6 METER (8 FT. 6 IN.)

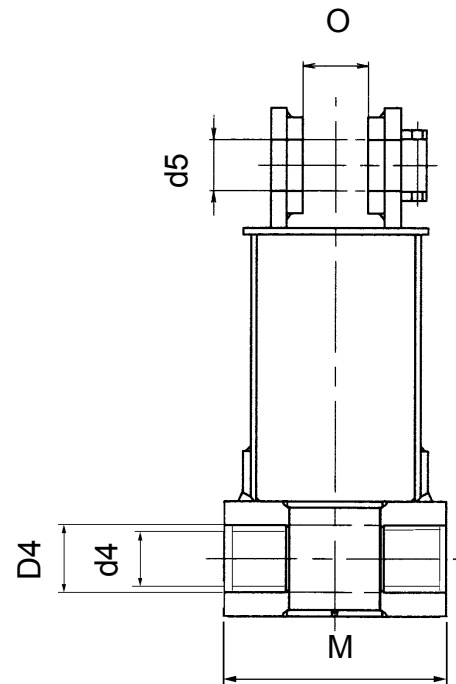
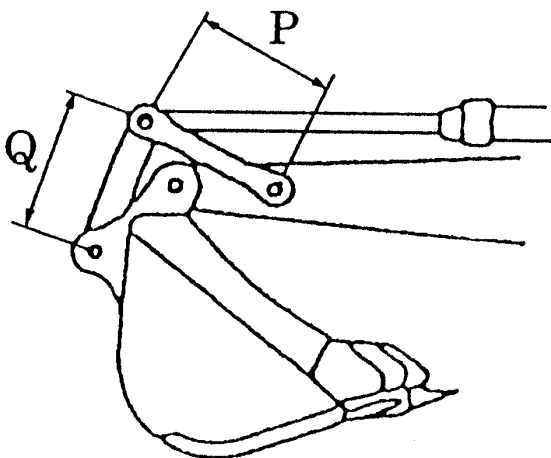
2. ARM



SECTION A-A



VIEW I



SECTION B-B

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