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SERVICE MANUAL

EH160 Crawler Excavator



NEW HOLLAND
CONSTRUCTION

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SERVICE MANUAL

EH160 CRAWLER EXCAVATOR



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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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SAFETY PRECAUTIONS

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.

SAFETY PRECAUTIONS

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.

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.



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.

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

EH160 CRAWLER EXCAVATOR
NEW HOLLAND CONSTRUCTION

TRANSPORTATION

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 WARNING 	
<p>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.</p>	

TRANSPORTATION

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.

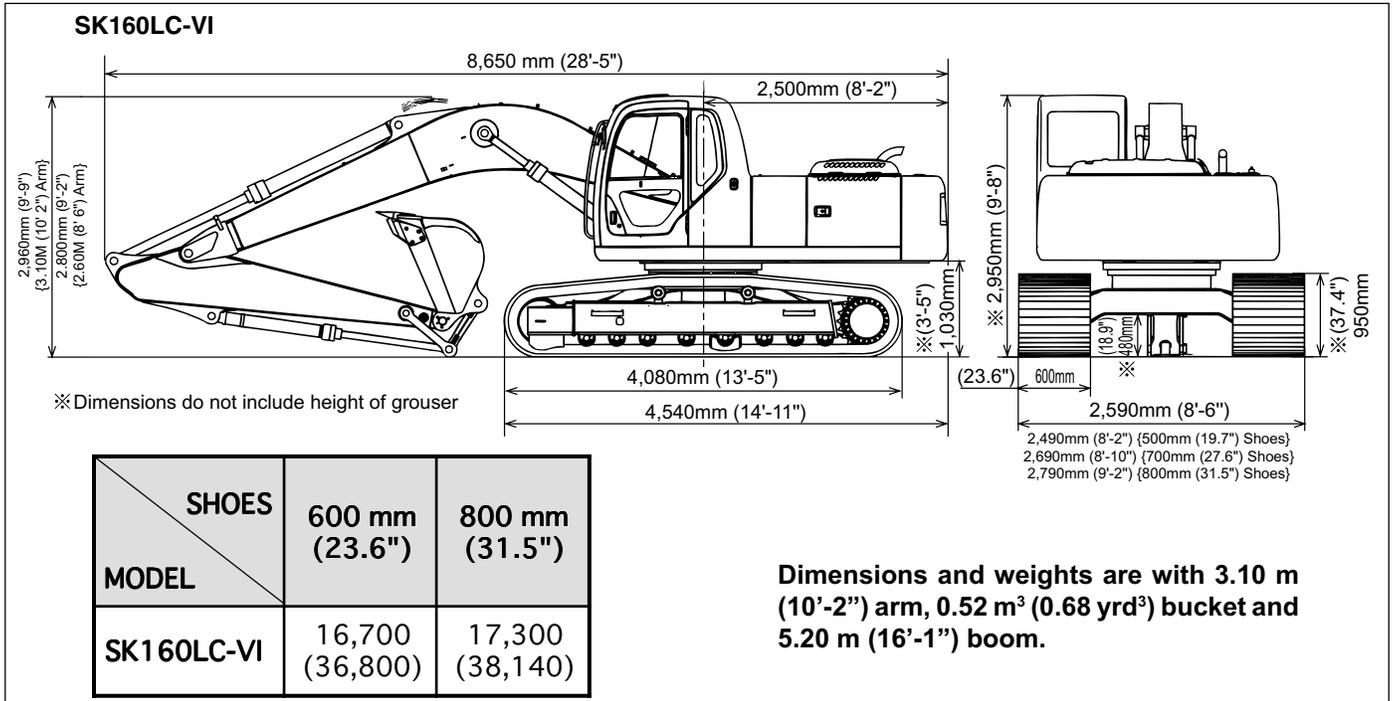


FIGURE 5.2A

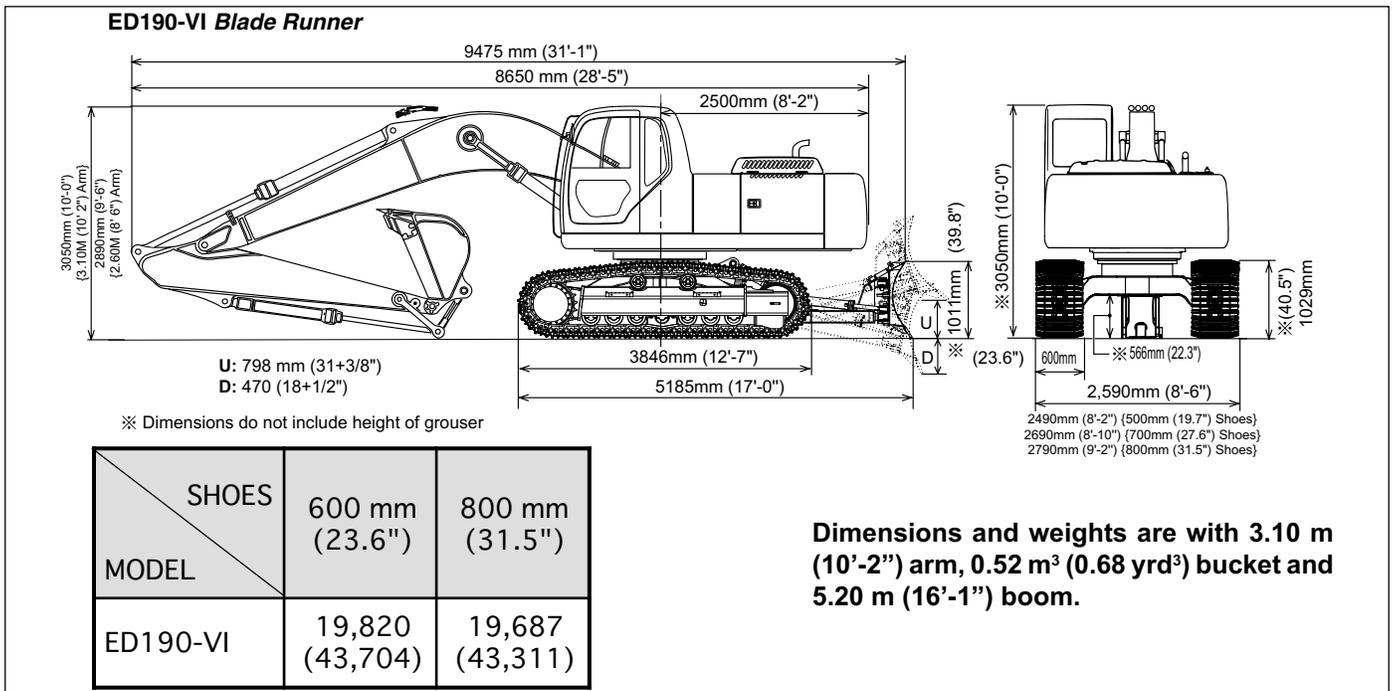


FIGURE 5.2B

TRANSPORTATION

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.

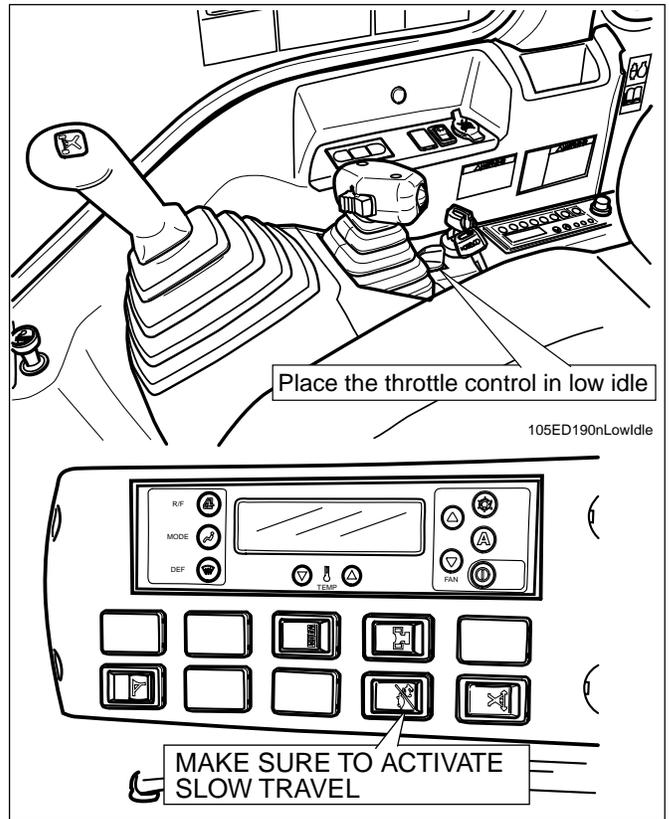


FIGURE 5.3A

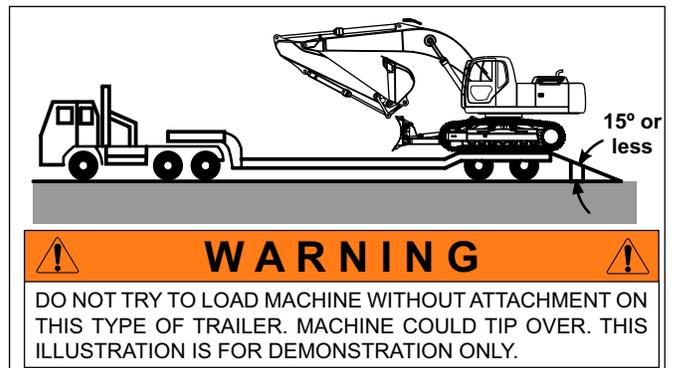


FIGURE 5.3B

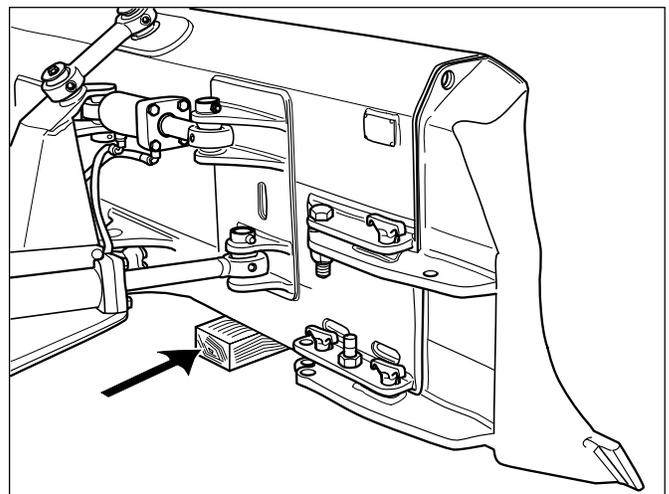


FIGURE 5.3C

TRANSPORTATION

- 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.

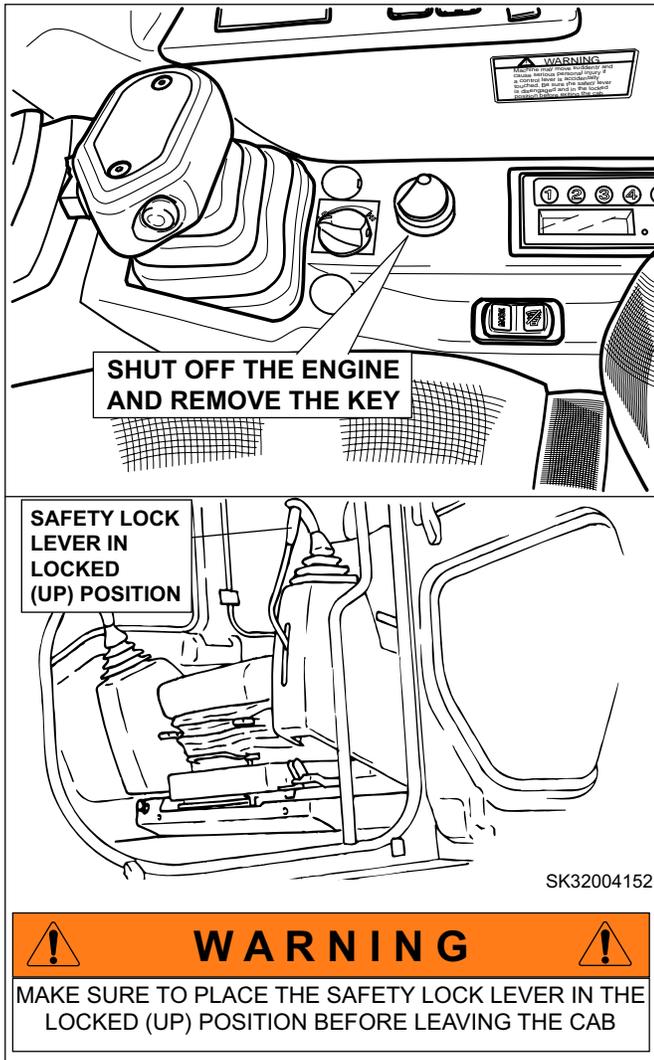


FIGURE 5.4A

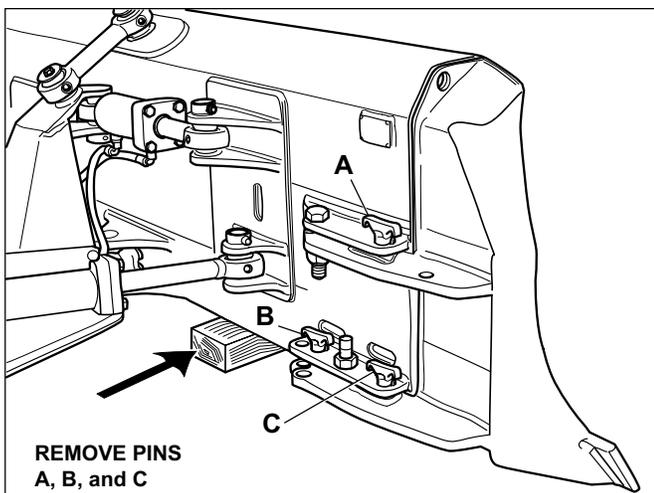


FIGURE 5.4B

- 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.

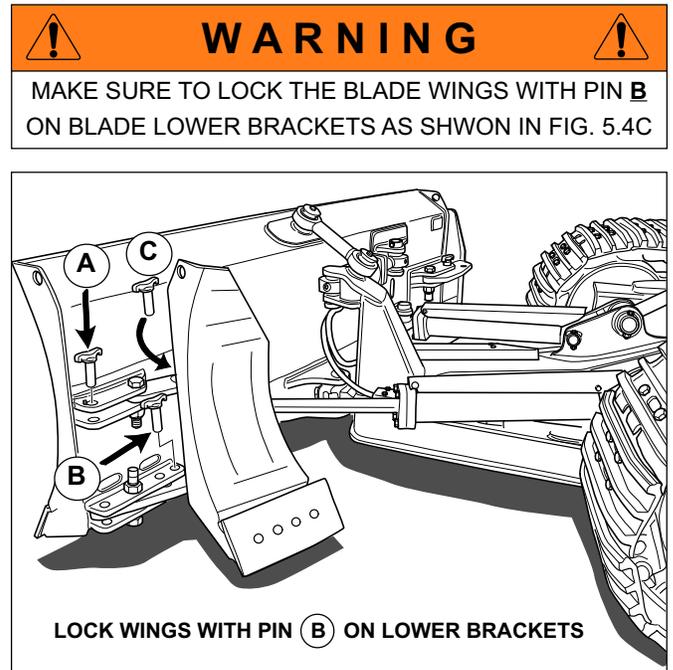


FIGURE 5.4C

- 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.

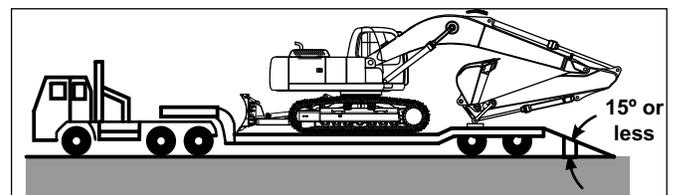
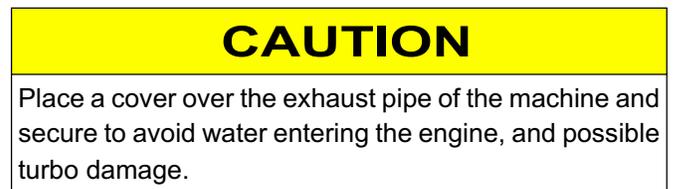


FIGURE 5.4D

- 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.



TRANSPORTATION

3. Securing Machine to Trailer

- a. Use cable or wire rope with sufficient capacity to secure front and rear of the machine to trailer. See Figure 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.
- b. Securely fasten all loose parts, as well as removed parts to trailer or transporting platform.

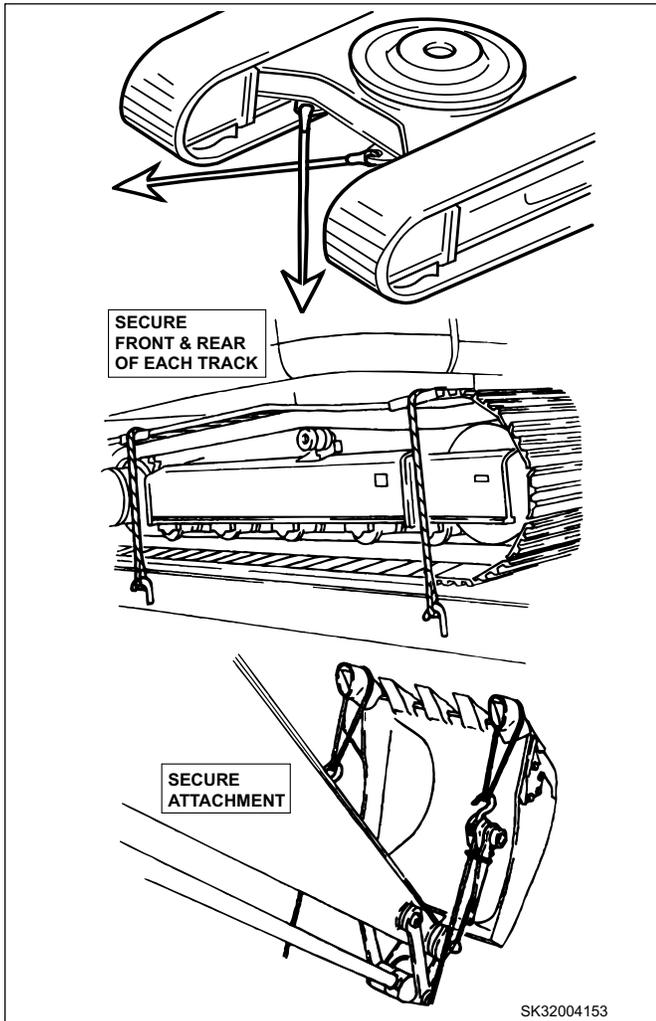


FIGURE 5.5A

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

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

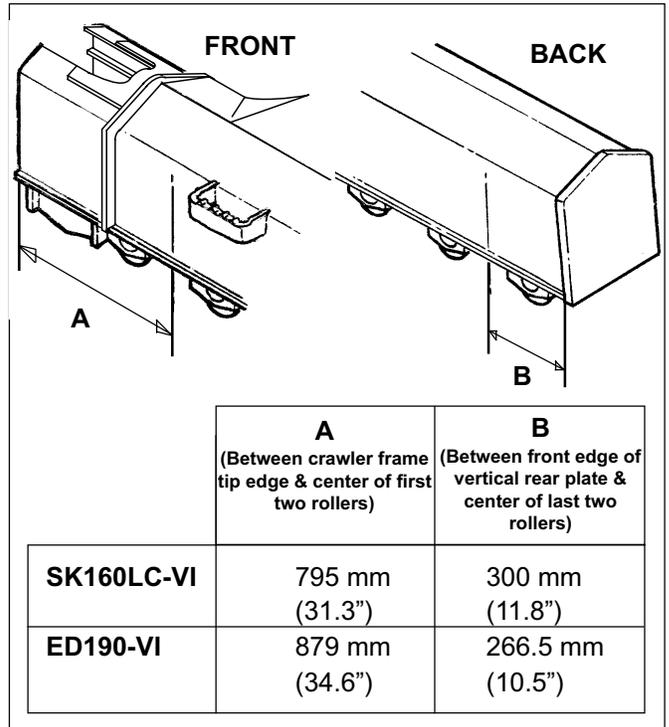


FIGURE 5.5B

WARNING

Place a hardwood or steel block between cables and crawler frame to prevent damage to the tracks from cables during lifting. See Figure 5.5C.

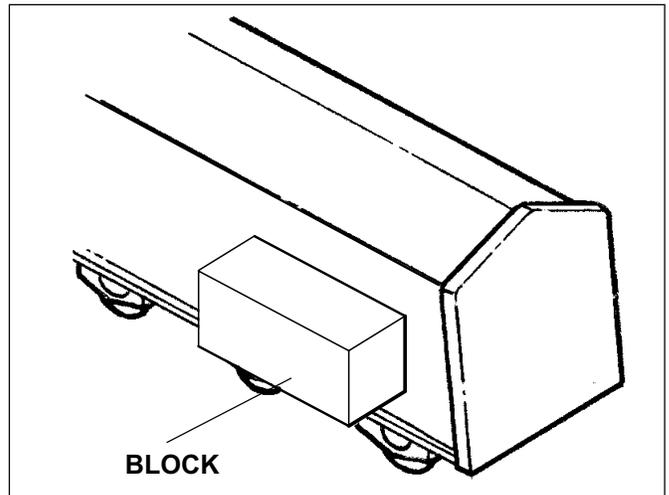


FIGURE 5.5C

WARNING

ALWAYS USE PROPER LIFTING EQUIPMENT AND DEVICES. USE OF IMPROPER LIFTING EQUIPMENT COULD ALLOW THE LOAD TO SHIFT OR FALL CAUSING SEVERE DAMAGE, SERIOUS INJURY OR DEATH.

TRANSPORTATION

- 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.

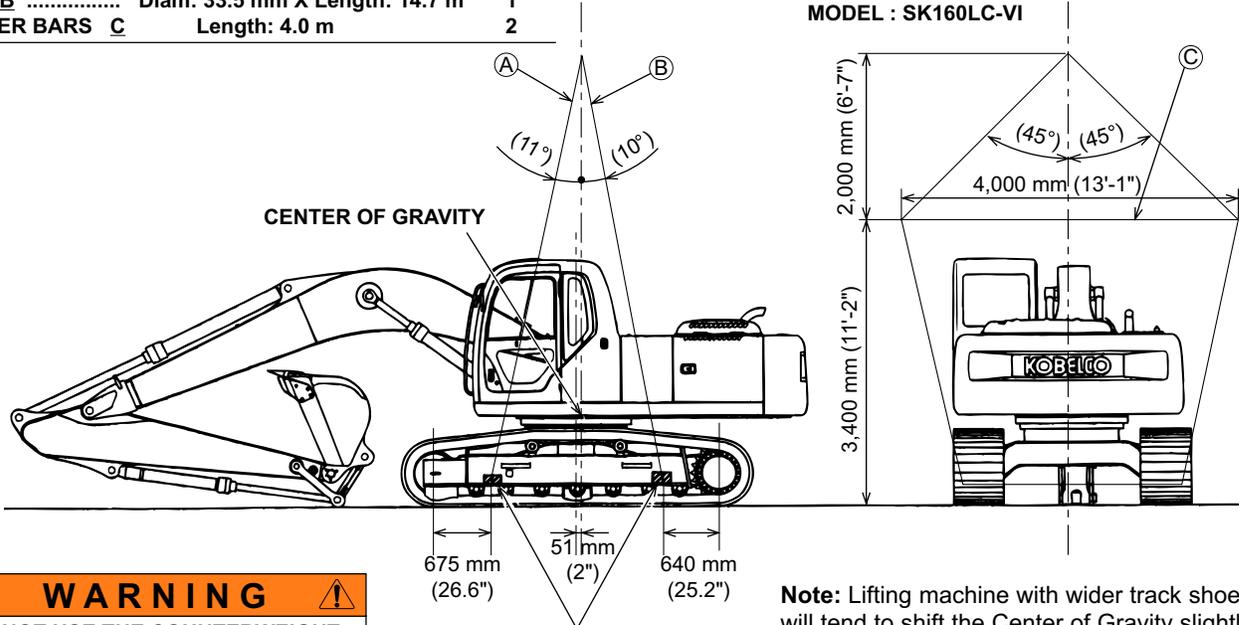
NOTE

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

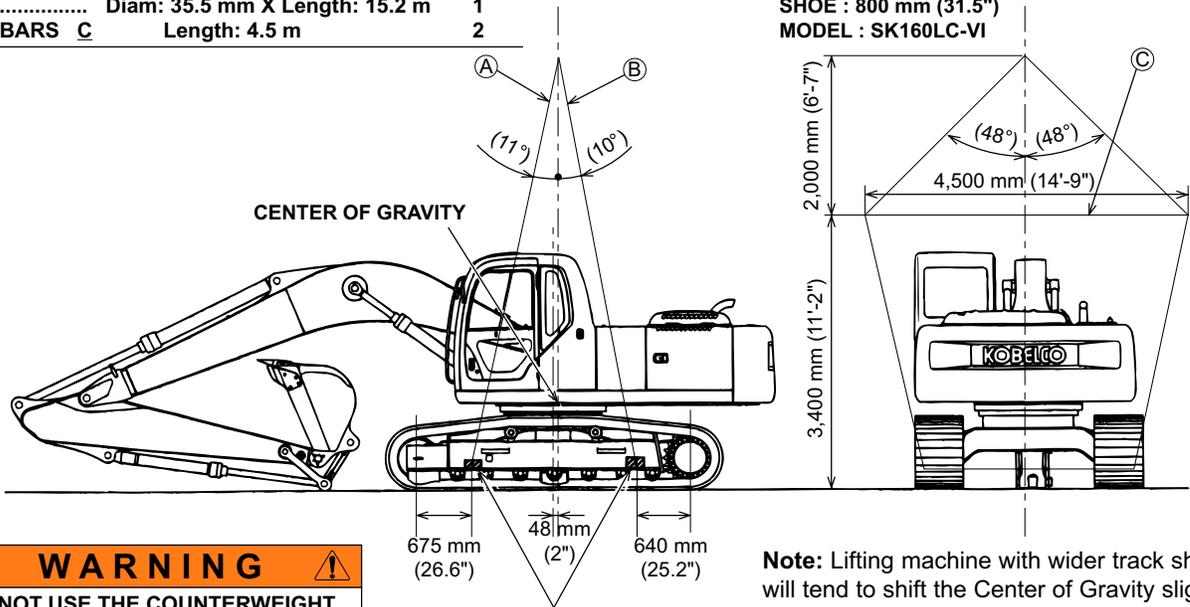
Note: Lifting machine with wider track shoes will tend to shift the Center of Gravity slightly forward, toward the center of the slewing ring.

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

TRANSPORTATION

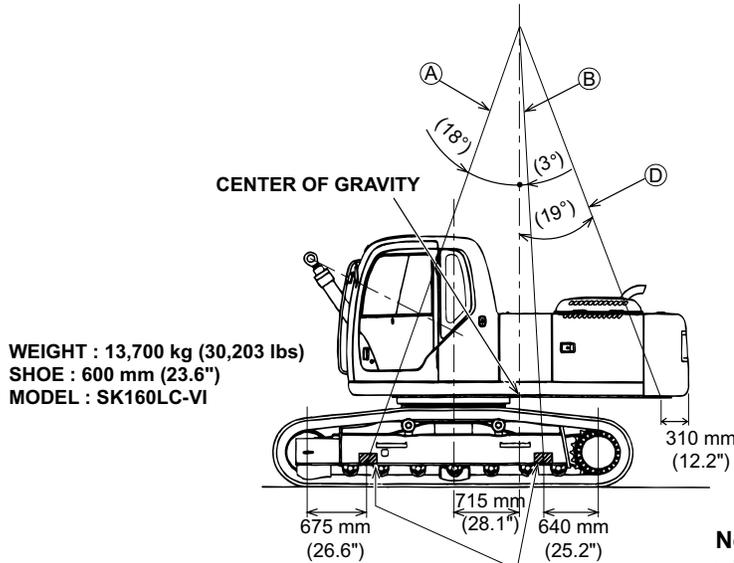
2. Lifting Machine Without Attachment

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.

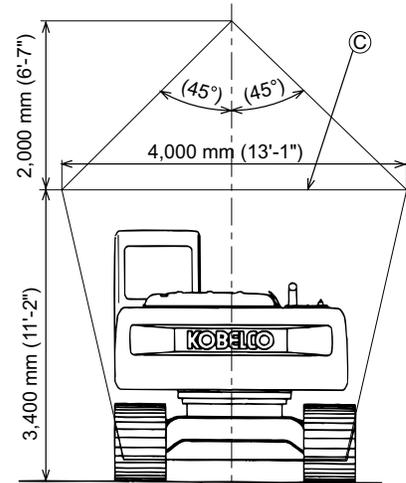
TOOLS NEEDED {SK160LC/600mm Shoes/no attachments}:

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

WARNING
DO NOT USE THE COUNTERWEIGHT LIFTING EYES TO LIFT MACHINE



WEIGHT : 13,700 kg (30,203 lbs)
SHOE : 600 mm (23.6")
MODEL : SK160LC-VI



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

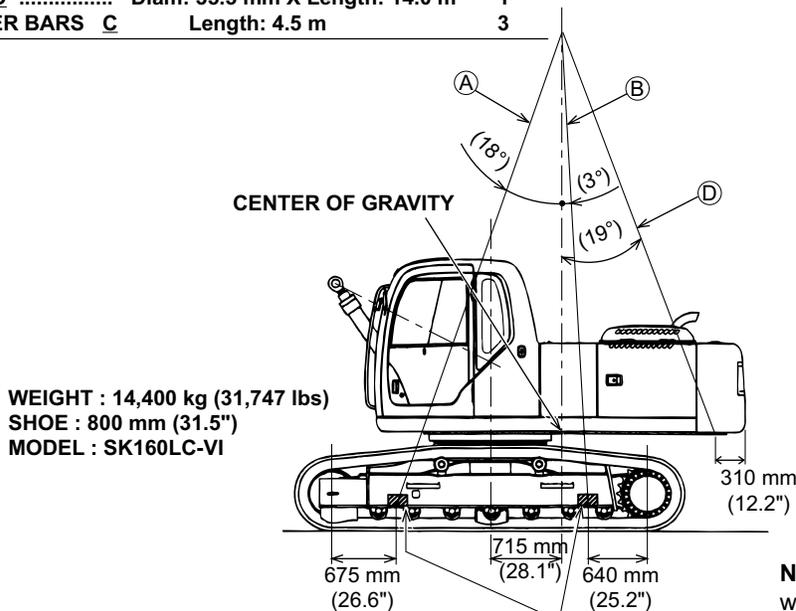
FIGURE 5.7A

PLACE BLOCK BETWEEN EACH CABLE AND FRAME

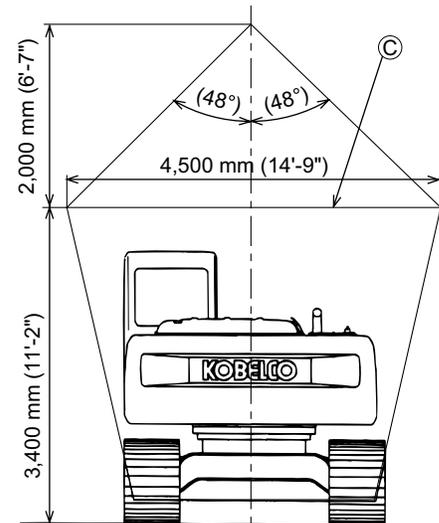
TOOLS NEEDED {SK160LC/800mm Shoes/no attachments}:

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

WARNING
DO NOT USE THE COUNTERWEIGHT LIFTING EYES TO LIFT MACHINE



WEIGHT : 14,400 kg (31,747 lbs)
SHOE : 800 mm (31.5")
MODEL : SK160LC-VI



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

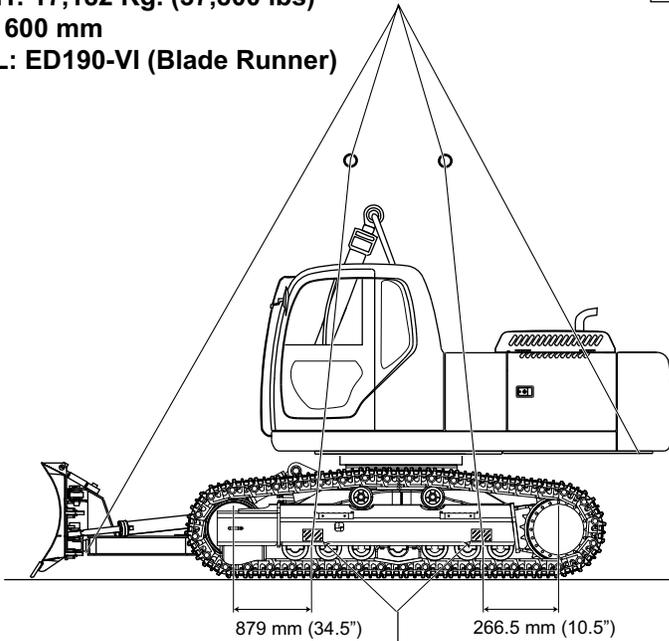
FIGURE 5.7B

PLACE BLOCK BETWEEN EACH CABLE AND FRAME

TRANSPORTATION

WARNING
DO NOT USE THE COUNTERWEIGHT
LIFTING EYES TO LIFT MACHINE

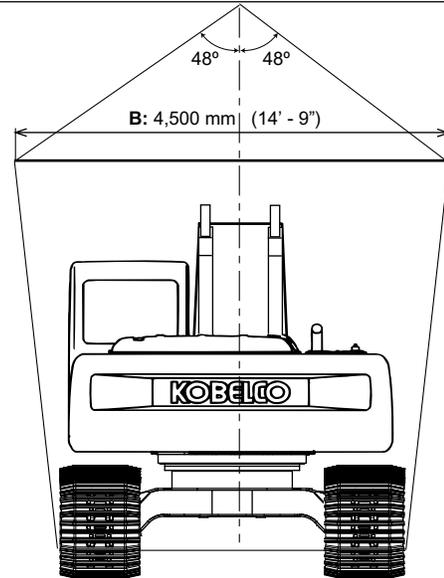
WEIGHT: 17,182 Kg. (37,800 lbs)
SHOE: 600 mm
MODEL: ED190-VI (Blade Runner)



PLACE A BLOCK BETWEEN
EACH CABLE AND FRAME

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.

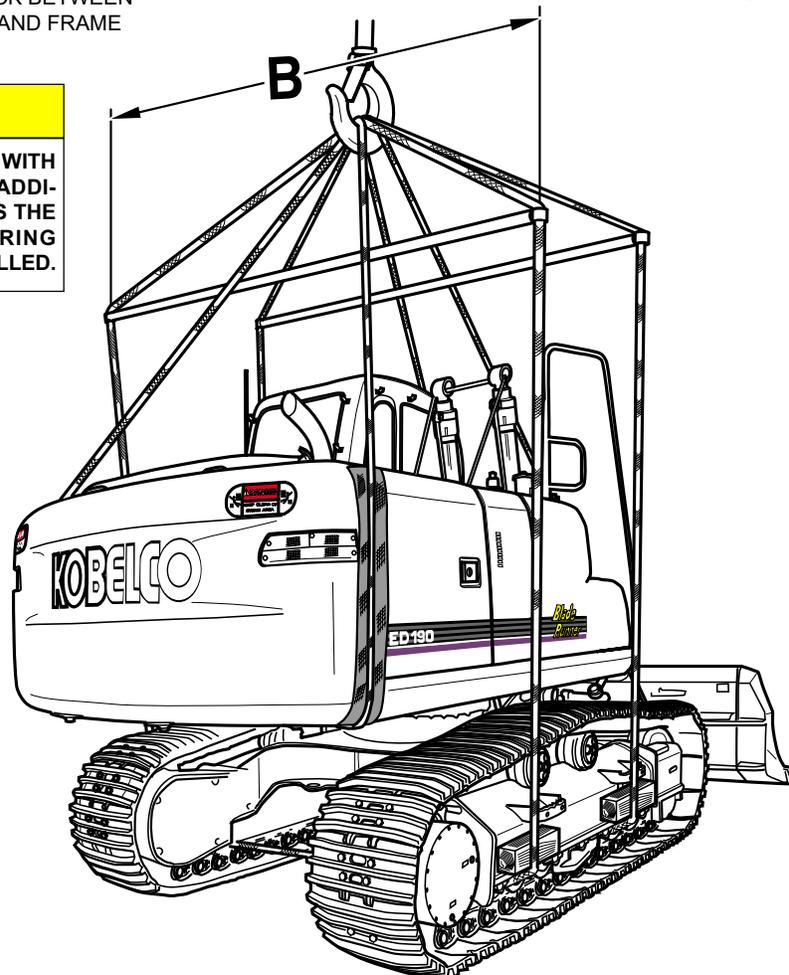


FIGURE 5.8A

TRANSPORTATION

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 yard³)

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)

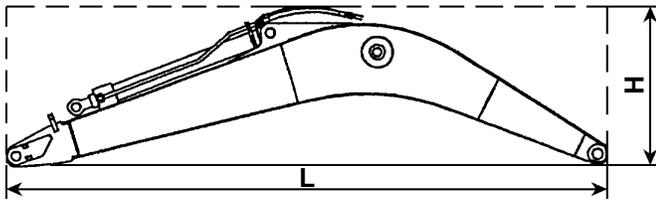


FIGURE 5.9A

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)

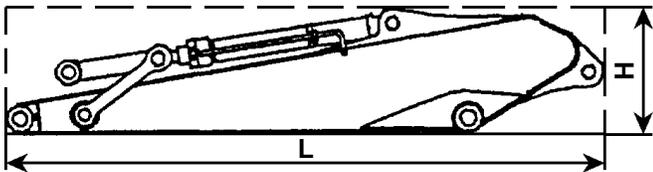


FIGURE 5.9B

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

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

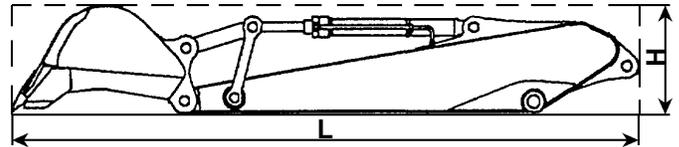


FIGURE 5.9C

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)

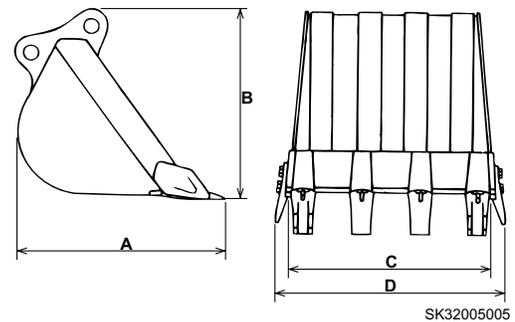


FIGURE 5.9D

5. ED190-VI Blade - Figure 5.9E

SHIPPING ASSEMBLY
APPROXIMATE WEIGHT

3550 Lbs
(1613.64 Kg)

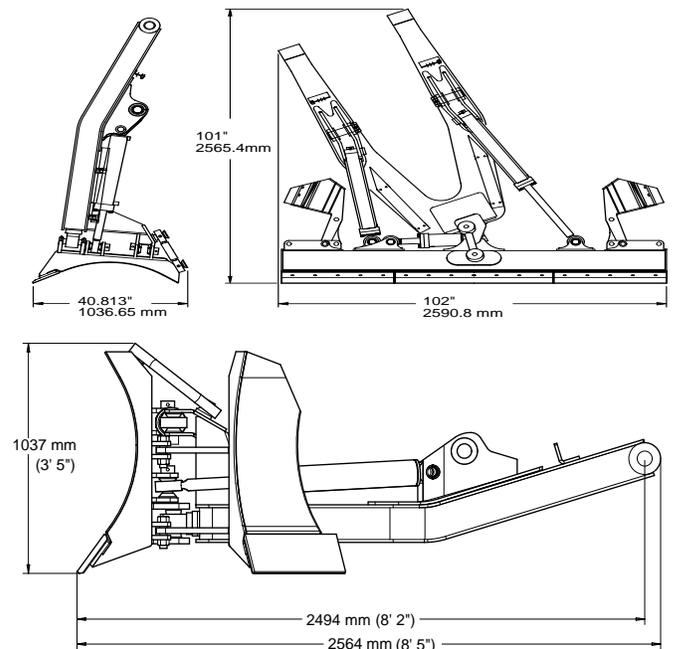


FIGURE 5.9E

NOTES

CHAPTER 3

CH 03

EH160 CRAWLER EXCAVATOR
NEW HOLLAND CONSTRUCTION

SPECIFICATIONS

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SPECIFICATIONS

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

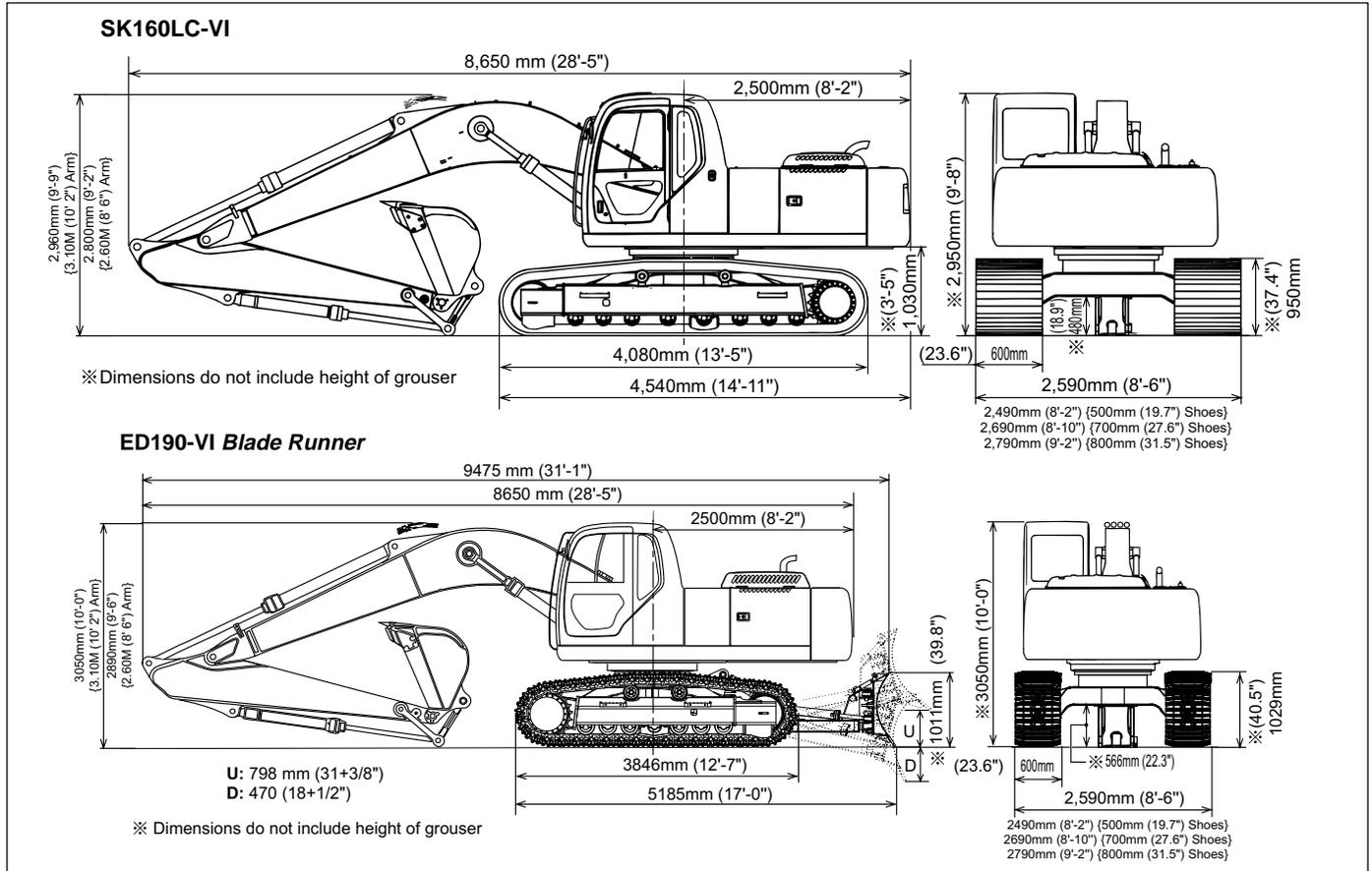


FIGURE 6.2A

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

SPECIFICATIONS

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")

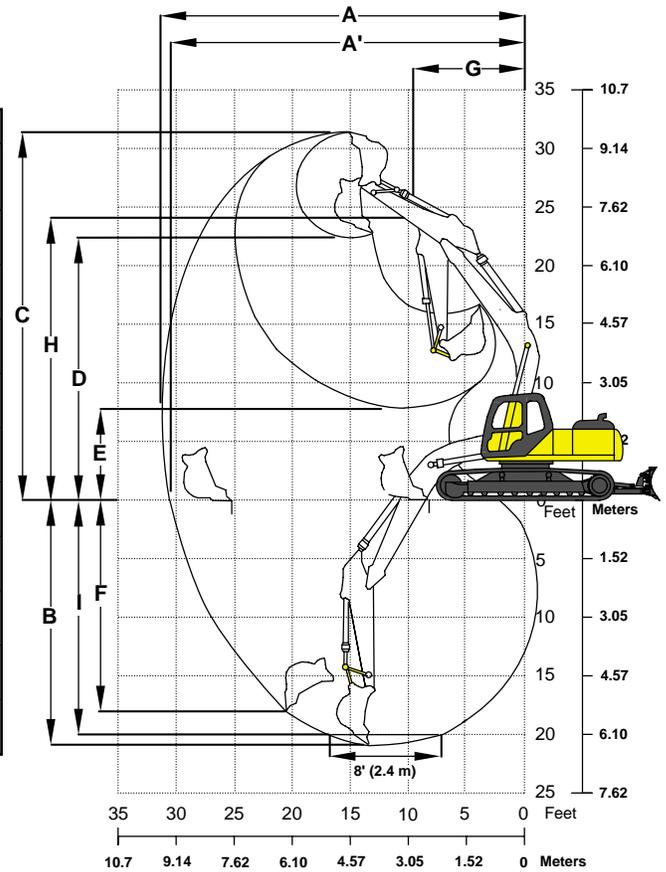


FIGURE 6.3

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.

SPECIFICATIONS

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)

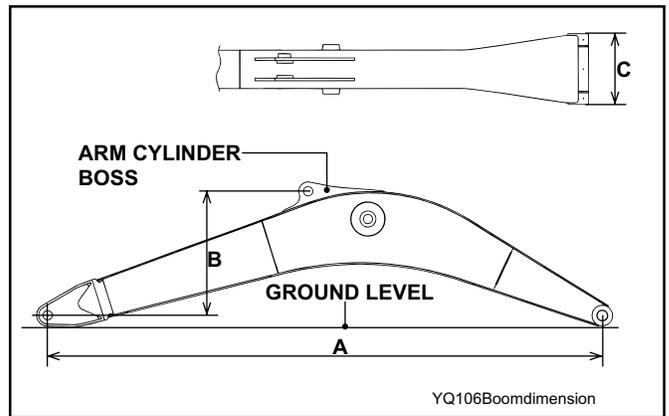


FIGURE 6.4A

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)

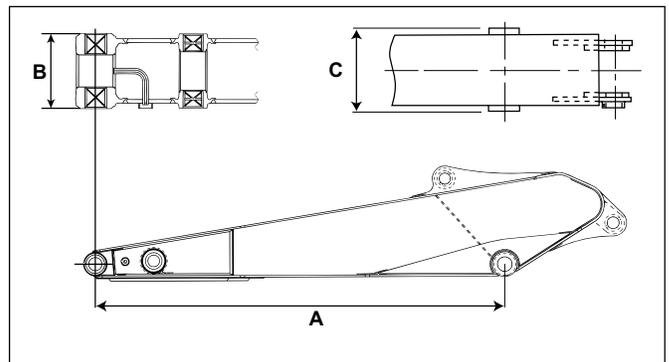


FIGURE 6.4B

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)

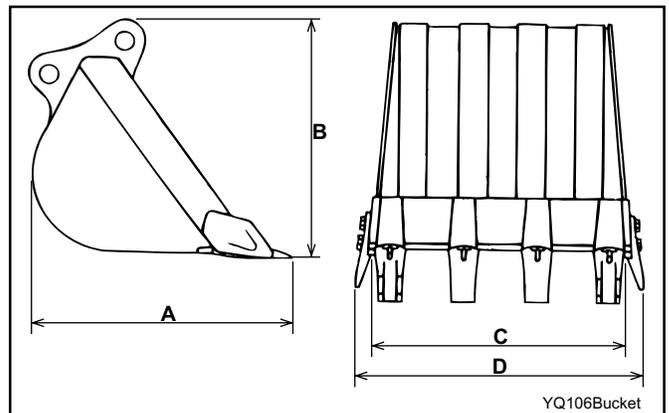


FIGURE 6.4C

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

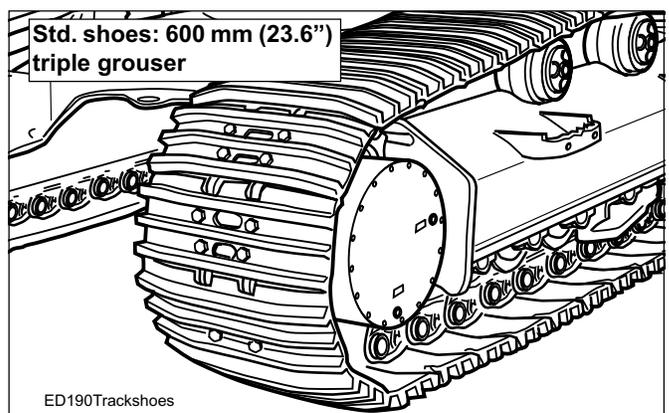


FIGURE 6.4D

SPECIFICATIONS

Product: New Holland EH160 Crawler Excavator Service Repair Manual

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	285 (4050)

K. MACHINE & COMPONENT WEIGHTS

Based on the std. machine with std. attachment.

Unit: Kg (lb)

COMPONENT	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)
Operator's seat	19 (42)	19 (42)
Operator's control panels	27 (59)	27 (59)
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)
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Idler links	32 (76)	32 (76)
Bucket links	65 (143)	65 (143)
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Boom assembly (standar)	1,411 (3,111)	1,411 (3,111)
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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)
Operator's seat	19 (42)	19 (42)
Operator's control panels	27 (59)	27 (59)
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)
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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)
Operator's seat	19 (42)	19 (42)
Operator's control panels	27 (59)	27 (59)
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)
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Operator's control panels	27 (59)	27 (59)
Control assy (Behind operator's seat)	19 (42)	19 (42)
Seat assy	75 (165)	75 (165)
Hydraulic tank*	102 (224)	102 (224)
Fuel tank*	9	