HYDRAULIC EXCAVATOR

SHOP MANUAL

model SK200v SK200LCv

This is the shop manual for KOBELCO hydraulic excavator. Contained is the necessary technical data concerning the maintenance and repair of this model. The manual is divided into the following four major sections; GENERAL, SYSTEMS, COMPONENTS and PROCEDURE.

When checking or repairing the machine we suggest that you refer to this manual carefully. We hope that reference to this manual will help to maintain a high level of working efficiency and reliability. For further details on maintenance and checks refer to the "OPERATORS MANUAL" which has been supplied with the machine.

Although all data was correct at the time of printing, due to continual design changes and improvements, some contents may not conform to the actual machine. Take special care to order parts only after confirming the validity of the part number in the "PARTS MANUAL".

If you notice any explanatory discrepancies, after consulting one of our representatives, please update your manual according to the latest data. However, in the event of any specification changes, we will issue revised edition.

INDEX

KOBELCO

Book code No. S5YN0008E③

⚠ WARNING

SAFETY

⚠ WARNING

The proper and safe lubrication and maintenance for this machine, recommended by KOBELCO are outlined in the OPERATION & MAINTENANCE GUIDE for this machine.

Improper performance of lubrication or maintenance procedures is dangerous and could result in injury or death. Read and understand the OPERATION & MAINTENANCE GUIDE before performing any lubrication or maintenance.

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

Because of the size of some of the machine components, the serviceman or mechanic should check the weights noted in this Manual. Use proper lifting procedures when removing any components.

Following is a list of basic precautions that should always be observed.

1. Read and understand all Warning plates and decals on the machine before operating, lubricating or repairing this product.

2. Always wear protective glasses and protective shoes when working around machines. In particular, wear protective glasses when pounding on any part of the machine or its attachments with a hammer or sledge. Use welders gloves, hood/goggles, apron and other protective clothing appropriate to the welding job being performed. Do not wear loose-fitting or torn clothing. Remove all rings from fingers when working on machinery.

3. Disconnect battery and discharge any capacitors before starting to work on machine. Hang "Do Not Operate" tag in the Operator's Cab.
4. If possible, make all repairs with the machine parked on a level, hard surface. Block machine so it does not roll while working on or under machine.

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

⚠ WARNING

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

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

8. Use steps and grab handles when mounting or dismounting a machine. Clean any mud or debris from steps, walkways or work platforms before using. Always face 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 in 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 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.

⚠ WARNING

13. Always use tools that are in good condition and be sure you understand how to use them before performing any service work.

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

15. Repairs which require welding should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine type of metal being welded and select correct welding procedure and electrodes, rods or wire to provide a weld metal strength equivalent at least to that of parent metal. Always disconnect battery during welding operations to protect sensitive electric equipment.

16. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will it be damaged in operation 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.

18. 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. Pin hole (very small) 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.

19. 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.

20. 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.

21. On track-type machines, be careful when servicing or separating tracks. Chips can fly when removing or installing a track pin. Wear safety glasses and long sleeve shirts. Track 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.

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

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

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

SHOP MANUAL

model SK200V SK200LCV

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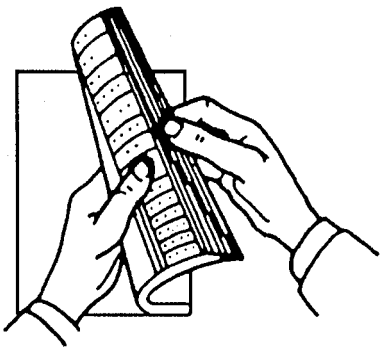
○How to Index each Shop Manual Section
The GENERAL of this shop manual consists of 8 headings as shown above. Each section can be easily referred to by indexes appended to the margin of the page as indicated on the right. Please use the indexes for speedy reference.



KOBELCO

GENERAL

SK200 V / SK200LC V List of Shop Manual GENERAL Section

Index No.	Title	Book Code No. / Distribution Year-Month		
YN01	SPECIFICATION	S5YN0106E 1995-11		
—	OPERATION	S2YN1011E Refer to Operators manual		
YN03	LOCATION AND WEIGHT OF COMPONENTS	S5YN0306E 1995-11		
YN04	MAINTENANCE STANDARDS AND TEST PROCEDURES	S5YN0408E① 1996-02		
—	PREVENTIVE MAINTENANCE	S2YN1011E Refer to Operators manual		
YN07	WORKING STANDARDS	S5YN0704E 1995-11		
YN08	STANDARD MAN-HOUR TABLE	S5YN0802E 1995-11		
	Applicable Machines	YN23301~ YQ02801~		

Book code No. S5YN0106E

KOBELCO

SHOP MANUAL

SK200v
SK200LCv

YN01

SPECIFICATION

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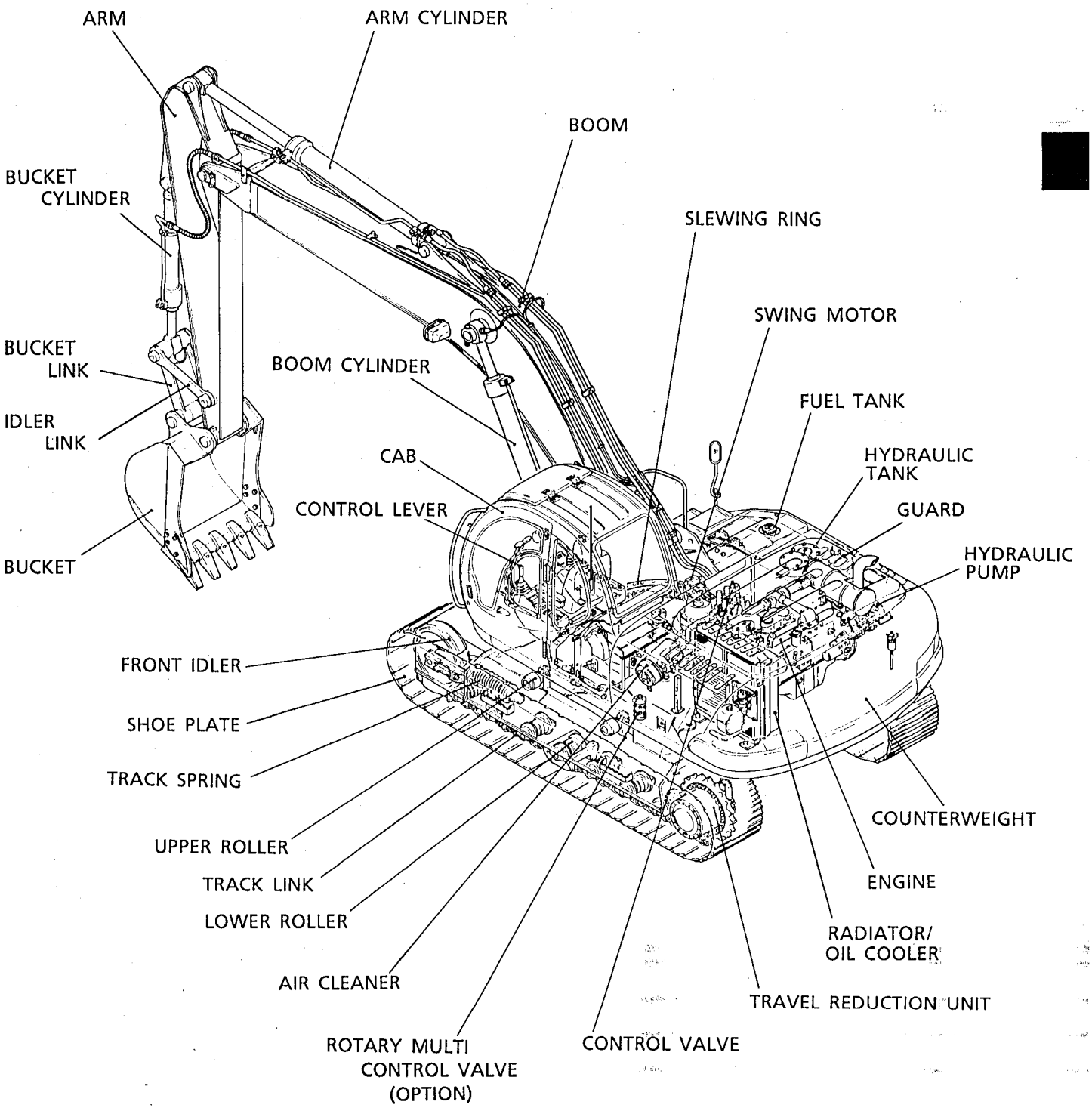
KOBE STEEL, LTD.

Applicable Machines
YN23301~
YQ02801~

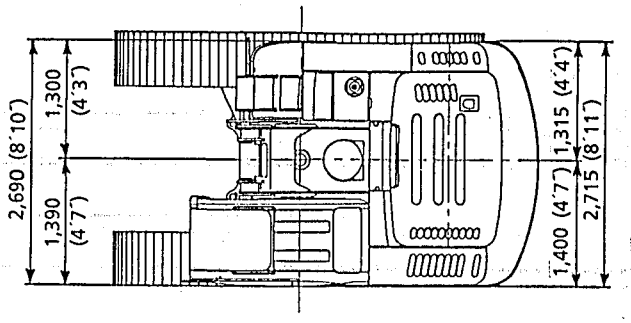
Revision	Date of Issue	Remarks
First edition	November, 1995	S5YN0106E K

1. NAME OF COMPONENTS



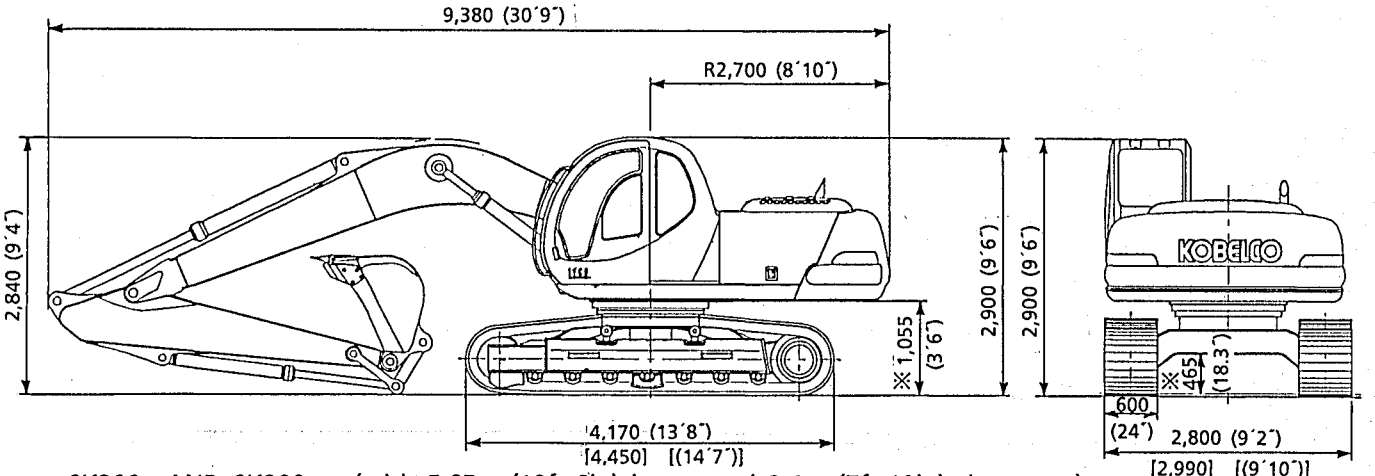
2. GENERAL DIMENSIONS

● SK200V AND SK200LCV (with 5.65m (18ft-6in) boom and 2.94m (9ft-8in) slandard arm)

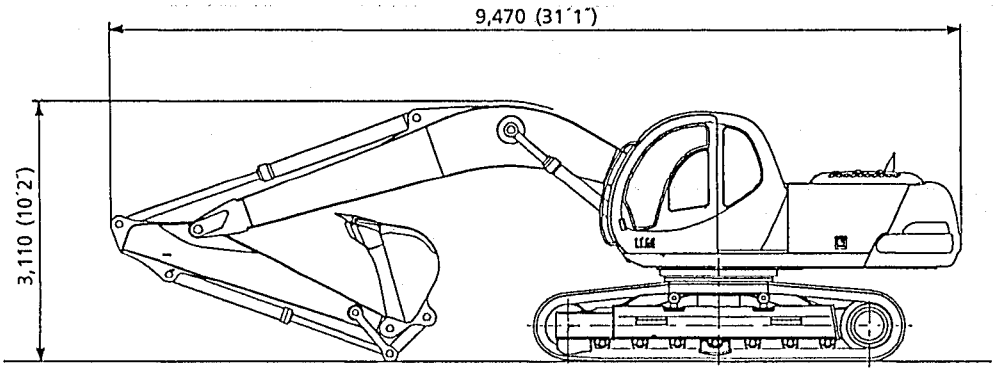


Unit : mm (ft-in)

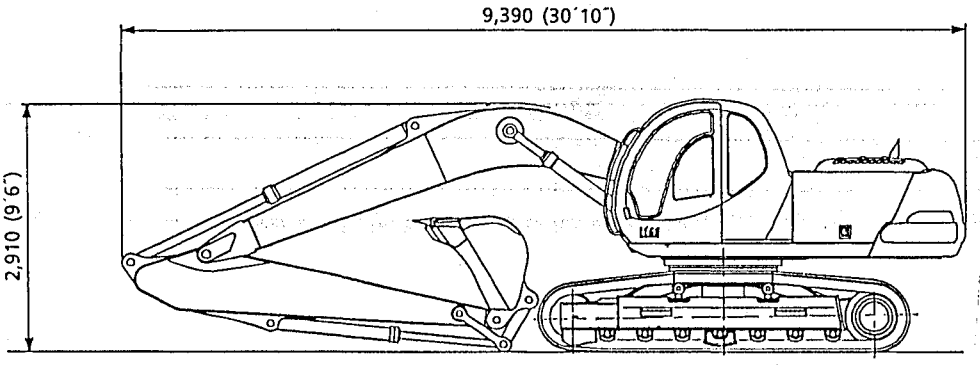
Numerical values marked * do not include the height of the shoe lug. Numerical valuse encloesd in parentheses [ ] indicate LC specifications.



● SK200V AND SK200LCV (with 5.65m (18ft-6in) boom and 2.4m (7ft-10in) short arm)



● SK200V AND SK200LCV (with 5.65m (18ft-6in) boom and 3.3m (10ft-10in) long arm)



3. SPECIFICATIONS AND PERFORMANCE

● SPEED AND CLIMBING CAPABILITY

Item \ Model	SK200 V, SK200LC V
Swing speed	11rpm
Travel Speed (high/low)	7 / 4km/h (4.3 / 2.5mph)
Gradeability	70% (35°)

● ENGINE

Item \ Model	SK200 V, SK200LC V
Engine model	Mitsubishi 6D34−TE1
Type	Water-cooled 4-cycle direct injection type engine with an exhaust turbocharger
Number of Cylinders − Inner Diameter×Stroke	6−104mm×115mm (4.09in. × 4.53in.)
Total Displacement	5,861 c.c (358cu·in)
Rated Output / Rotation Speed	140PS / 2,150rpm
Maximum Torque / Rotation Speed	50kgf·m / 1,600rpm

● HYDRAULIC COMPONENTS

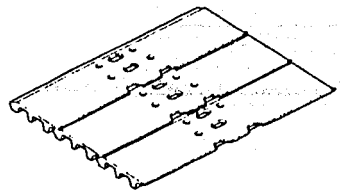
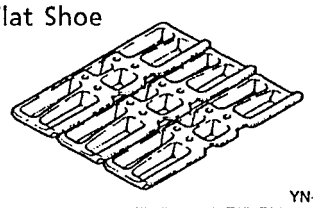
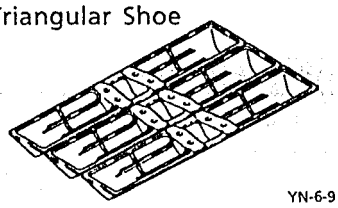
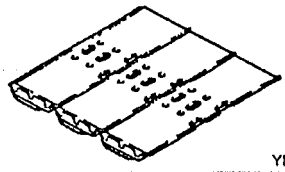
Item \ Model	SK200 V, SK200LC V
Hydraulic Pump	Double-pump variable displacement axial piston + gear pump
Hydraulic Motor (swing)	Axial piston motor
Hydraulic Motor (travel)	Axial piston motor
Control Valve	6-section multiple control valve
Cylinder (boom, arm, and bucket)	Double action cylinder
Oil Cooler	Air-cooled type

● WEIGHT

Unit ; kg (lbs)

Item \ Model	SK200 V	SK200LC V
Fully equipped Weight	19,000 (41,900)	19,500 (43,000)
Upper Frame machinery	8,900 (19,600)	←
Lower Frame machinery (with 600mm (24in) grouser shoe)	6,800 (15,000)	7,300 (16,100)
Attachment ; 5.65m (18ft6in) boom + 2.94m (9ft-8in) arm + 0.7m^3 (0.92cuyd) bucket	3,300 (7,300)	←

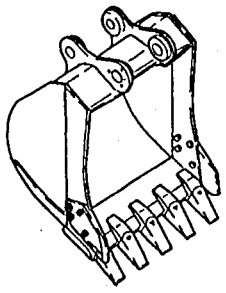
4. TYPE OF SHOES

Shape	Model	Shoe Width mm (in.)	Total Width of Crawler mm (ft-in.)	Ground Pressure kg /cm² (psi)
Grouser Shoe  YN-6-7	SK200V 46 links	600 (24)	2,800 (9´2˝)	0.43 (6.11)
		700 (28)	2,900 (9´6˝)	0.38 (5.40)
		800 (32)	3,000 (9´10˝)	0.33 (4.69)
	SK200LCV 49 links	600 (24)	2,990 (9´10˝)	0.41 (5.83)
		700 (28)	3,090 (10´2˝)	0.36 (5.12)
		800 (32)	3,190 (10´6˝)	0.32 (4.55)
Flat Shoe  YN-6-8	SK200V 46 links	600 (24)	2,800 (9´2˝)	0.44 (6.26)
	SK200LCV 49 links	600 (24)	2,990 (9´10˝)	0.42 (5.97)
		—	—	—
		—	—	—
Triangular Shoe  YN-6-9	SK200V 46 links	900 (36)	3,100 (10´2˝)	0.30 (4.27)
	SK200LCV 49 links	900 (36)	3,290 (10´10˝)	0.28 (3.98)
		—	—	—
		—	—	—
Rubber Pad Shoe  YN-6-21	SK200V 46 links	600 (24)	2,800 (9´2˝)	0.44 (6.26)
	SK200LCV 49 links	600 (24)	2,990 (9´10˝)	0.42 (5.97)

Note : Use grouser shoes 600mm (24in) on rough ground (areas covered with rocks and gravel). If you drive or excavate with other shoes, this may cause shoe bending, shoe bolt looseness, and track assembly (link, roller, etc.) damage.

5. TYPES OF BUCKETS

Hoe Bucket



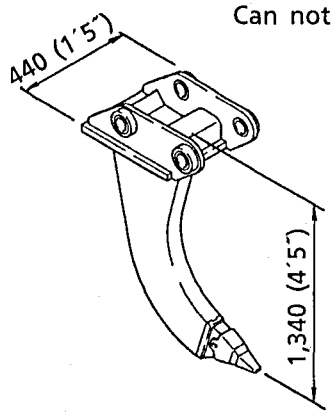
YN-6-10

The numerical value marked* is for heavy digging.

Heaped Capacily m^3 (cu·yd)	Outside Width of Bucket mm (ft-in)		Number of teeth	Equipped with Side Cutters	Can be Turned over	Weight kg (lbs)
	With side cutters	Without side cutters				
0.51 (0.67)	840 (2'9")	730 (2'5")	3	Yes	Yes	500 (1,100)
0.72 (0.94)	1,060 (3'6")	950 (3'1")	5	Yes	Yes	600 (1,320)
STD 0.80 (1.05)	1,160 (3'6")	1,050 (3'5")	5	Yes	Yes	640 (1,410)
*0.80 (1.05)	1,170 (3'10")	1,060 (3'6")	5	Yes	Yes	720 (1,590)
0.93 (1.22)	1,280 (4'2")	1,170 (3'10")	5	Yes	Yes	680 (1,500)
1.00 (1.31)	1,410 (4'8")	1,300 (4'3")	6	Yes	Yes	740 (1,630)

Ripper

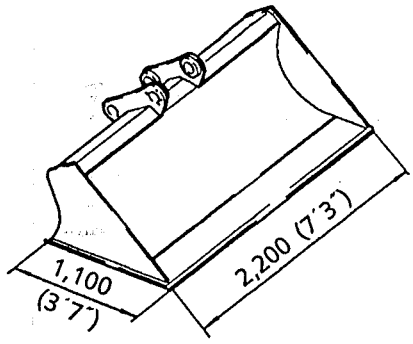
Weight: 430kg (950lbs)
Can not be turned over



YN-6-11

Slope Finishing Bucket

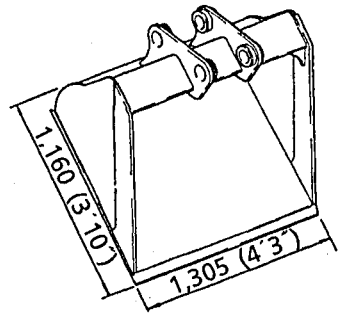
Weight: 890kg (1960lbs)
Can not be turned over



YN-6-13

Scraper bucket

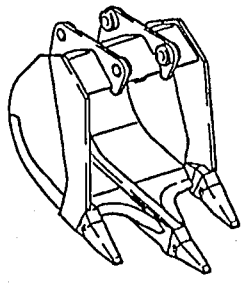
Capacity : 0.90m^3 (1.17cuyd)
Weight: 680kg (1500lbs)
Can not be turned over



YN-6-12

Ripper bucket

Capacity : 0.50m^3 (0.65cuyd)
Weight: 800kg (1760lbs)
Can not be turned over



YN-6-14

6. COMBINATIONS OF ATTACHMENTS

Bucket			Applicable Arm				
Type	SAE heaped capacity m^3 (cu·yd)	JIS, SAE struck capacity m^3 (cu·yd)	2.4m (7ft-10in) Arm (short)	2.94m (9ft-8in) Arm (STD)	3.3m (10ft-10in) Arm (long)	2.4m (7ft-10in) +1.52m (5ft) Extension Arm	2.94m (9ft8in) +1.52m (5ft) Extension Arm
Hoe Bucket The numerical value marked *is for heavy digging.	0.51 (0.67)	0.39 (0.51)	○	○	○	◎	◎
	0.72 (0.94)	0.51 (0.67)	○	○	◎	△	×
	0.80 (1.05) (STD)	0.59 (0.77)	○	◎	△	×	×
	*0.80 (1.05)	0.59 (0.77)	○	○	×	×	×
	0.93 (1.22)	0.67 (0.88)	◎	△	×	×	×
	1.00 (1.31)	0.75 (0.98)	△	×	×	×	×
Slope Finishing Bucket	Width×Depth 2.2m×1.1m (7′3″×3′7″)	—	△	△	△	×	×
Ripper	—	—	○	○	×	×	×
Scraper Bucket	0.90 (1.17)	0.60(0.78)	△	△	△	△	△
Ripper Bucket	0.50 (0.65)	0.38(0.50)	○	○	×	×	×
Breaker	—	—	○	○	×	×	×

Note :

◎ Standard combination
○ General operation : Excavation or loading of sand, gravel, and clay
△ Light operation : Mainly loading or loose gravel (e.g., cultivation or loading of sand or gravel)
× Prohibited combination : KOBELCO'S warranty does not cover any damages resulting from theses combinations. Do not use these combinations.

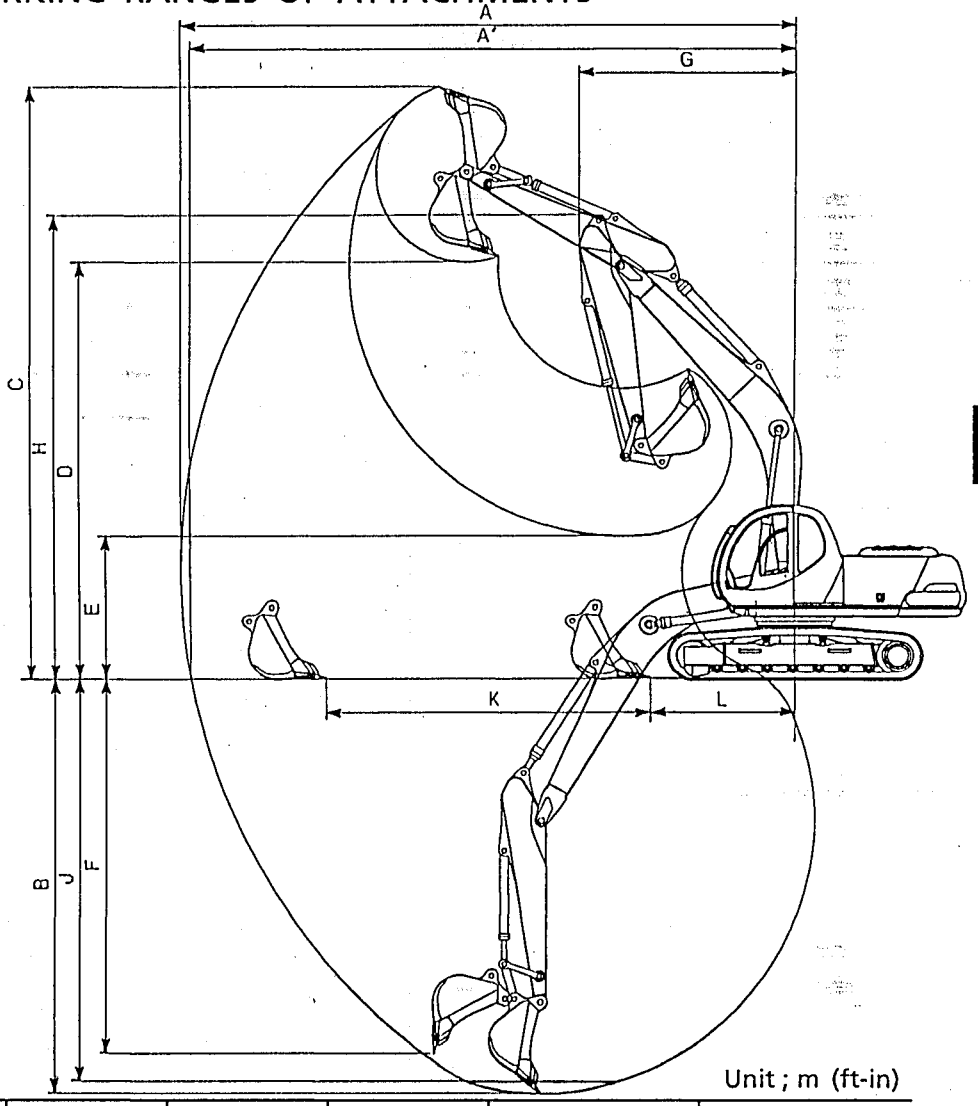
Install only genuine attachment recommended by KOBELCO on the machine. KOBELCO is not liable for any damages to the machine or attachment arising from the installment of attachment other than the specified attachments.

⚠ CAUTION

- If any other bucket, except for the backhoe bucket, is turned over and used for excavation, damage to the arm and bucket may occur.
- Do not operate the power boost switch when the long arm or extension arm is installed.

7. WORKING RANGES OF ATTACHMENTS

● BACKHOE ATTACHMENT

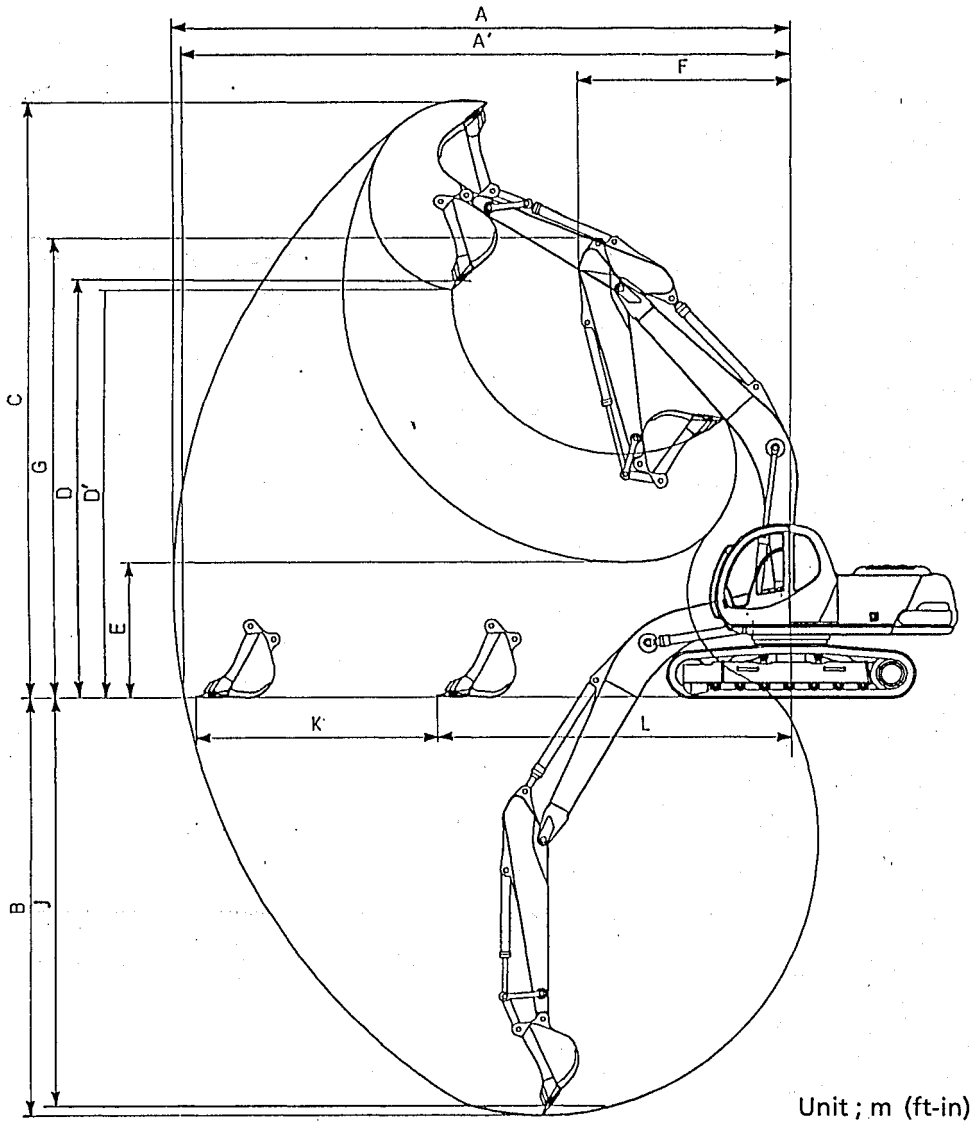


Unit ; m (ft-in)

Item \ Attachment Type			2.4m (7ft10in) arm with 0.93m³ (1.22cuyd) bucket	2.94m (9ft8in) arm with 0.80m³ (1.05cuyd) bucket	3.3m (10ft10in) arm with 0.72m³ (0.94cuyd) bucket	2.4m (7ft10in) arm + 1.52m (5ft) extension arm with 0.51m³ (0.67cuyd) bucket	2.94m (9ft8in) arm + 1.52m (5ft) extension arm with 0.51m³ (0.67cuyd) bucket
A : Maximum digging reach			9.42 (30'11")	9.90 (32'6")	10.22 (33'6")	10.82 (35'6")	11.31 (37'1")
A' : Maximum reach at ground level			9.25 (30'4")	9.75 (32'0")	10.07 (33'0")	10.68 (35'1")	11.18 (36'8")
★B : Maximum digging depth			6.19 (20'4")	6.70 (22'0")	7.09 (23'3")	7.71 (25'4")	8.25 (27'1")
★C : Maximum dumping height			9.40 (30'10")	9.66 (31'8")	9.77 (32'1")	10.15 (33'4")	10.35 (33'11")
★D : Minimum dumping height			6.56 (21'6")	6.83 (22'5")	6.95 (22'10")	7.31 (24'0")	7.52 (24'8")
★E : Minimum dumping height			2.87 (9'5")	2.36 (7'9")	1.97 (6'6")	1.35 (4'5")	0.81 (2'8")
★F : Vertical digging depth			5.55 (18'3")	6.08 (19'11")	6.46 (21'2")	7.07 (23'2")	7.60 (24'11")
G : Minimum swing radius			3.46 (11'4")	3.46 (11'4")	3.47 (11'5")	3.46 (11'4")	3.47 (11'5")
★H : Height at minimum swing			7.63 (25'0")	7.59 (24'11")	7.56 (24'10")	7.63 (25'0")	7.57 (24'10")
★J : 8-foot level digging depth			5.98 (19'7")	6.53 (21'5")	6.92 (22'8")	7.57 (24'10")	8.12 (26'8")
K	Horizontal digging	Stroke	4.05 (13'3")	5.23 (17'2")	5.89 (19'4")	6.29 (20'8")	7.64 (25'1")
L	stroke at ground level	Minimum	3.02 (9'11")	2.32 (7'7")	1.98 (6'6")	2.18 (7'2")	1.33 (4'4")

NOTE : Dimensions marked ★ do not include the height of the shoe lug.

● FACE SHOVEL ATTACHMENT



Unit ; m (ft-in)

Item \ Attachment Type			2.4m (7ft10in) arm with 0.93m³ (1.22cuyd) bucket	2.94m (9ft8in) arm with 0.80m³ (1.05cuyd) bucket	3.3m (10ft10in) arm with 0.72m³ (0.94cuyd) bucket	2.4m (7ft10in) arm + 1.52m (5ft) extension arm with 0.51m³ (0.67cuyd) bucket	2.94m (9ft8in) arm + 1.52m (5ft) extension arm with 0.51m³ (0.67cuyd) bucket
A : Maximum digging reach			9.53 (31'3")	10.01 (32'10")	10.34 (33'11")	10.94 (35'11")	11.43 (37'6")
A' : Maximum reach at ground level			9.37 (30'9")	9.86 (32'4")	10.19 (33'5")	10.80 (35'5")	11.29 (37'0")
★B : Maximum digging depth			6.30 (20'8)	6.84 (22'5")	7.20 (23'7")	7.82 (25'8")	8.36 (27'5")
★C : Maximum dumping height			9.58 (31'5")	9.78 (32'1")	9.96 (32'8")	10.32 (33'10")	10.53 (34'7")
★D : Maximum dumping height			6.48 (21'3")	6.71 (22'0")	6.85 (22'6")	7.23 (23'9")	7.43 (24'5")
★D' : Maximum dumping height (45°)			6.40 (21'0")	6.68 (21'11")	6.85 (22'6")	7.06 (23'2")	7.33 (24'1")
★E : Minimum dumping height			2.76 (9'1")	2.22 (7'3")	1.86 (6'1")	1.24 (4'1")	0.70 (2'4")
F : Minimum swing radius			3.46 (11'4")	3.46 (11'4")	3.47 (11'5")	3.46 (11'4")	3.47 (11'5")
★G : Height at minimum swing			7.63 (25'0")	7.57 (24'10")	7.56 (24'10")	7.63 (25'0")	7.57 (24'10")
★J : 8-foot level digging depth			6.10 (20'0")	6.68 (21'11")	7.04 (23'1")	7.68 (25'2")	8.24 (27'0")
K	Horizontal digging stroke at ground level	Stroke	3.08 (10'1")	3.90 (12'10")	4.48 (14'8")	5.63 (18'6")	6.64 (21'9")
L		Minimum	6.10 (20'1")	5.77 (18'11")	5.51 (18'1")	4.96 (16'3")	4.45 (14'7")

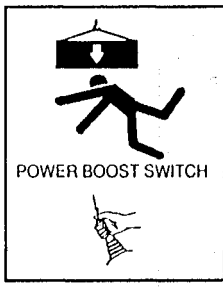
NOTE : Dimensions marked ★ do not include the height of the shoe lug.

8. LIFTING-UP ABILITY DIAGRAM

(1) Calculation condition
The lifting-up ability of this drawing is indicated by metric standard. The indicated figures fall within 87% of a set pressure of the main relief valve used in the arm and the boom cylinder and 75% of static tilting load.

1) The load point is the fulcrum of the bucket and the bucket position is an embraced posture.
2) The figures on the upper stage indicate the lifting-up abillty of a machine facing sideways, while the figures at the bottom stage represent a machine facing longitudinally.
3) Unit : ton Shoe width : 600mm (24˝) shoe

⚠ Do not use the power boost switch while lifting a load.



⚠ WARNING

Releasing power boost switch while lifting a load can cause unexpected lowering of load, resulting in severe injury or death.

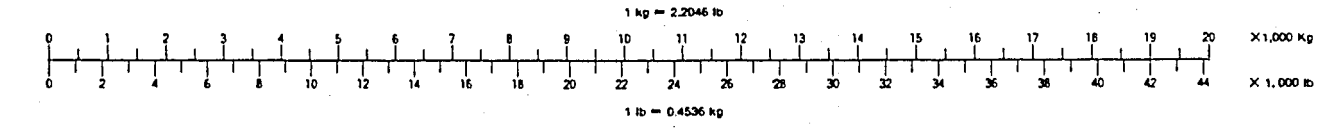
Never use power boost switch for lifting a load.

YN20T01004P1

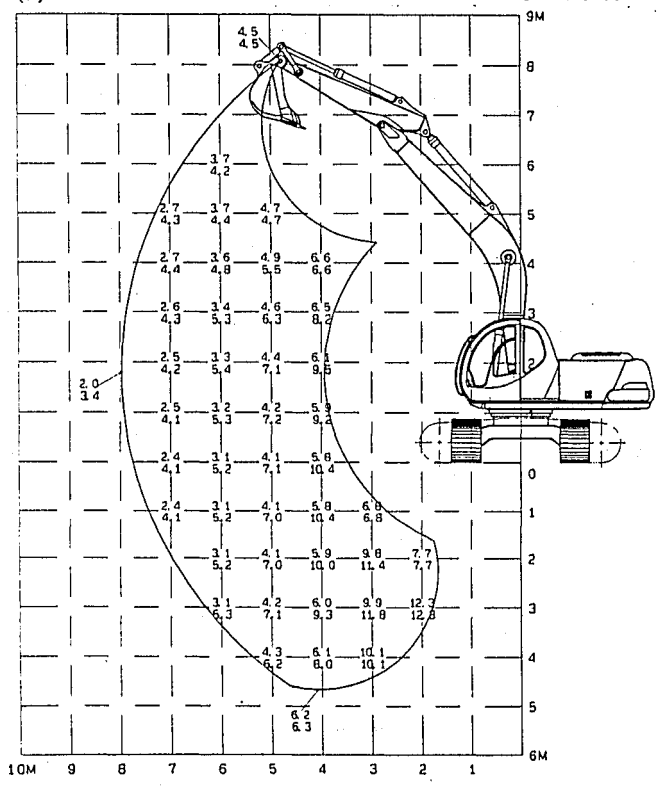
Attached to the right side of the cab interior

(2) Lifting-up ability diagram Item No. table

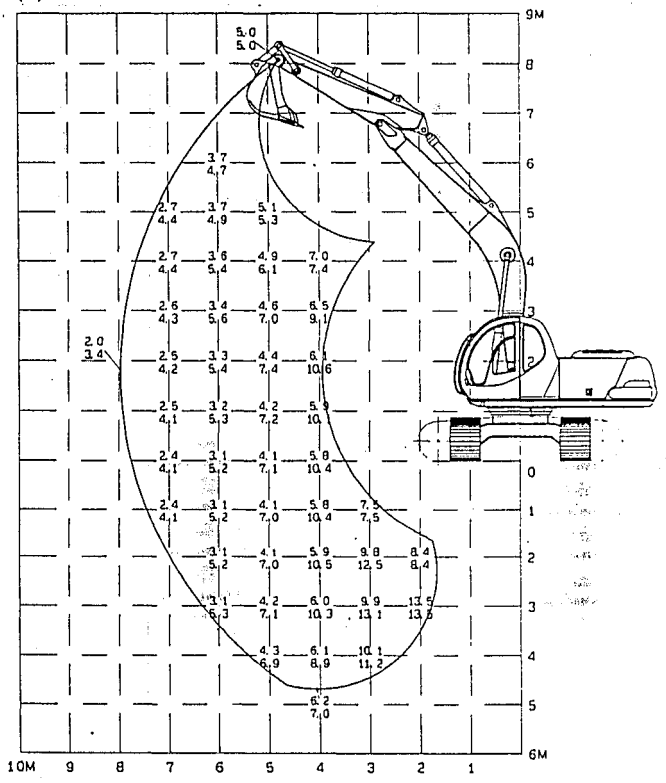
Model	Pressure kgf/cm² (psi)	Arm M (ft-in) + Bucket M³ (cuyd)			
		2.4M (7´10˝) Arm +0.93M³ (1.22 cuyd) Bucket	2.9M (9´6˝) Arm +0.80M³ (1.05 cuyd) Bucket	3.3M (10´10˝) Arm +0.72M³ (0.94 cuyd) Bucket	2.94M (9´8˝) Arm +EXT+0.51M³ (0.67 cuyd) Bucket
		600 mm shoe (24 in)	600 mm shoe (24 in)	600 mm shoe (24 in)	600 mm shoe (24 in)
SK200 V	350 (4980)	1	3	5	6
	380 (5400)	2	4	—	—
SK200LC V	350 (4980)	7	9	11	12
	380 (5400)	8	10	—	—

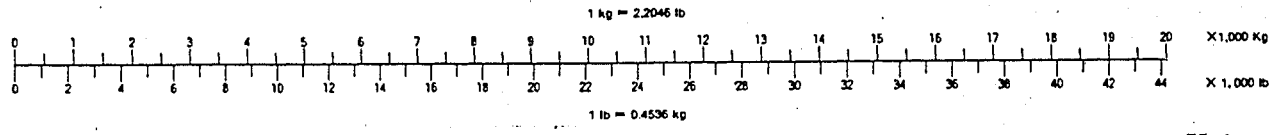


(1) Unit : ton

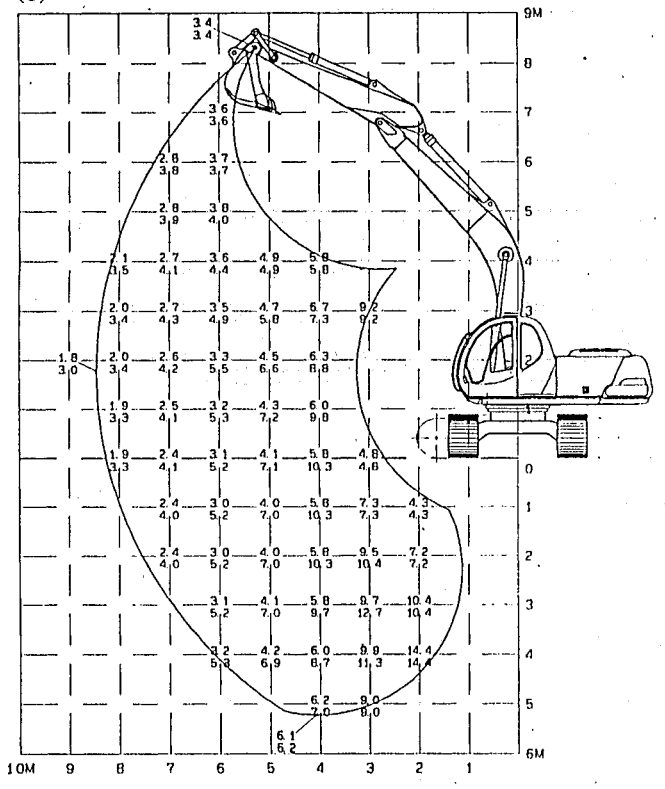


(2) Unit : ton

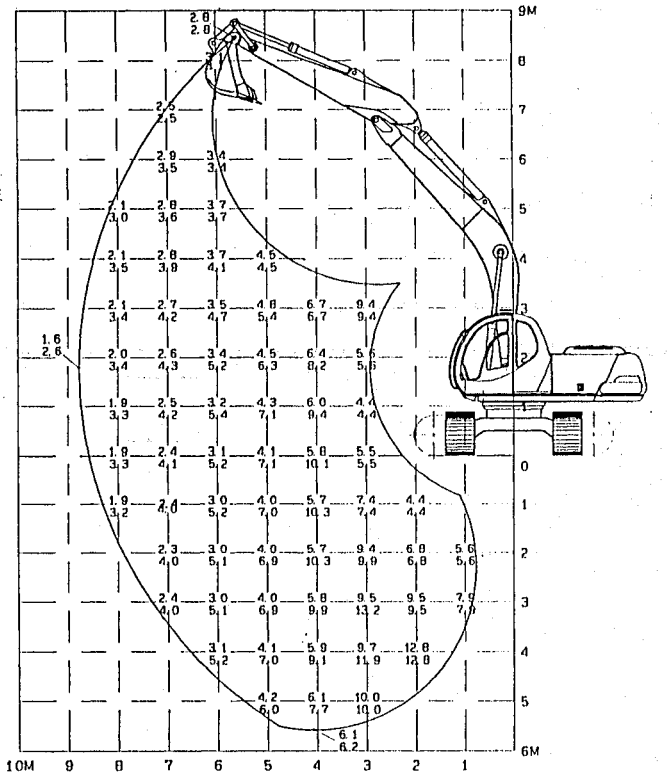




(3) Unit : ton



(5) Unit : ton



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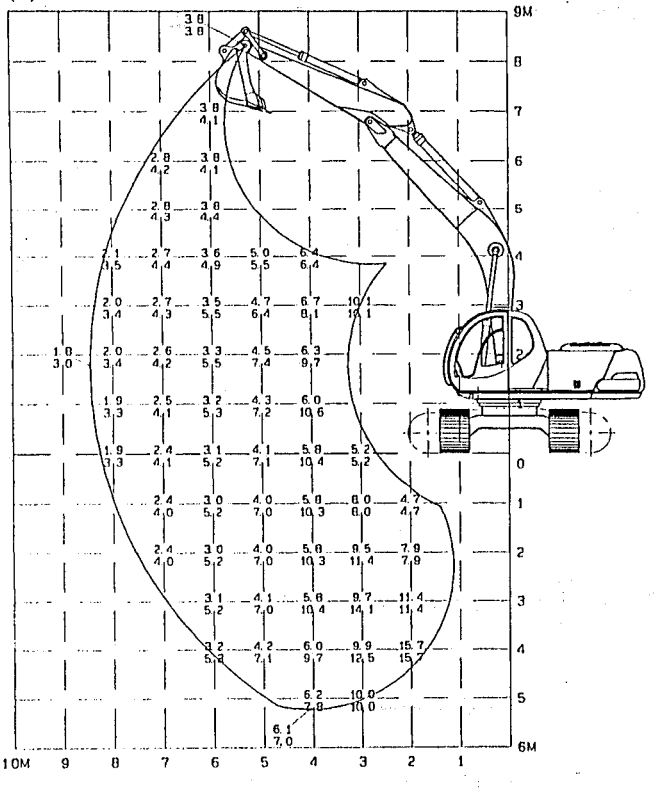
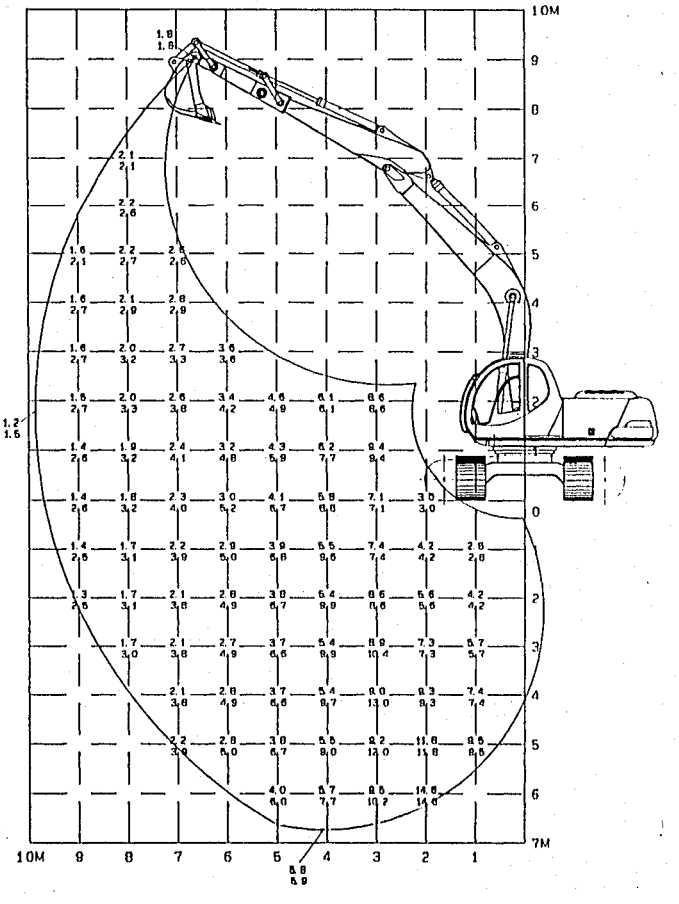
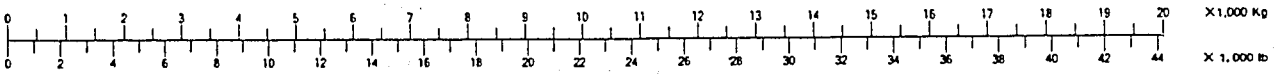


(6) Unit : ton

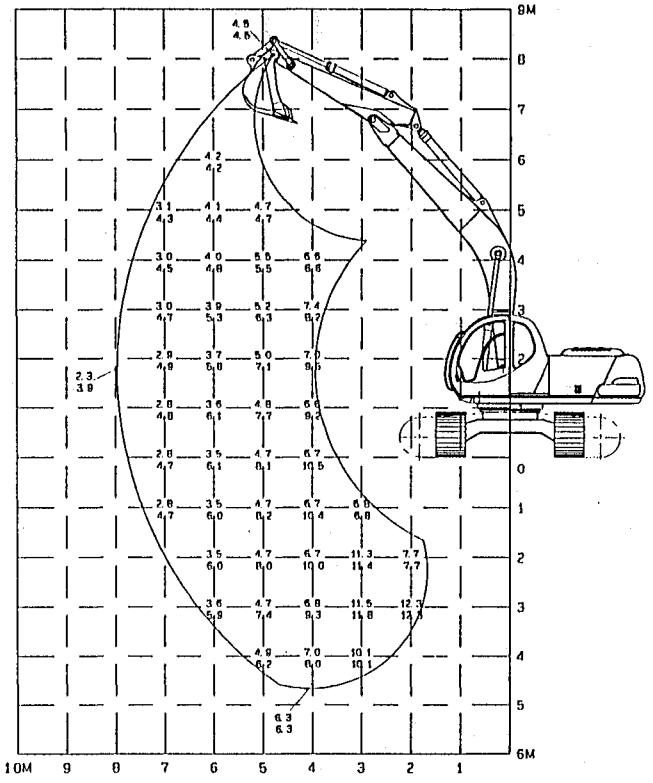


1 kg = 2.2046 lb

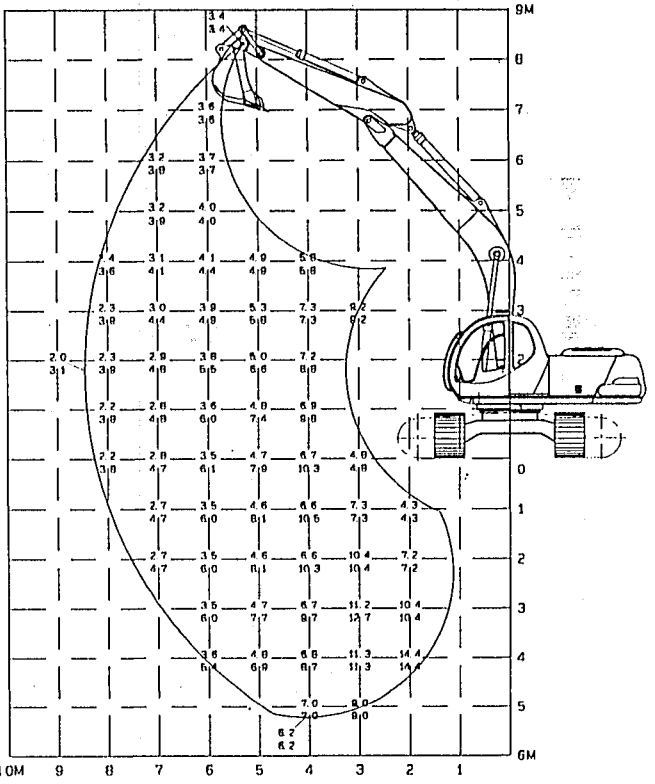


1 lb = 0.4536 kg

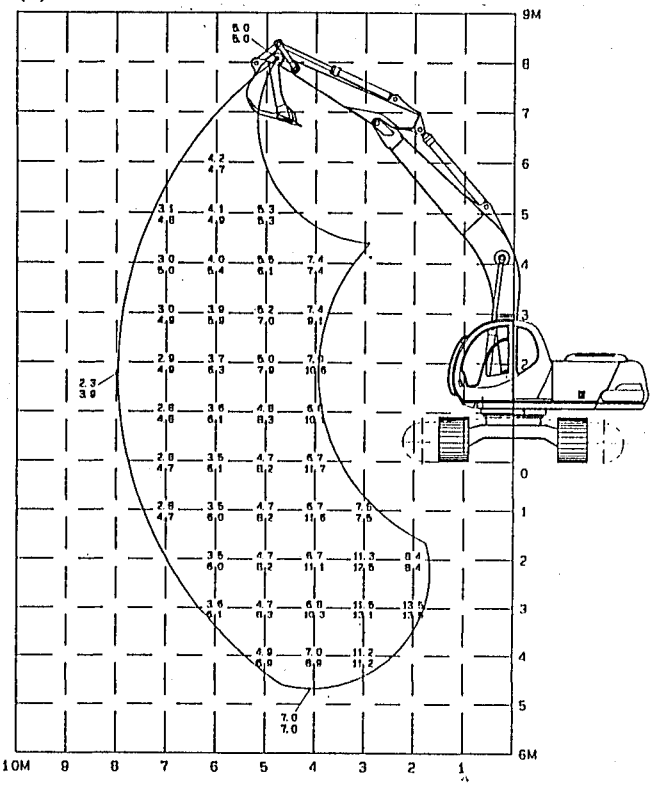
(7) Unit : ton



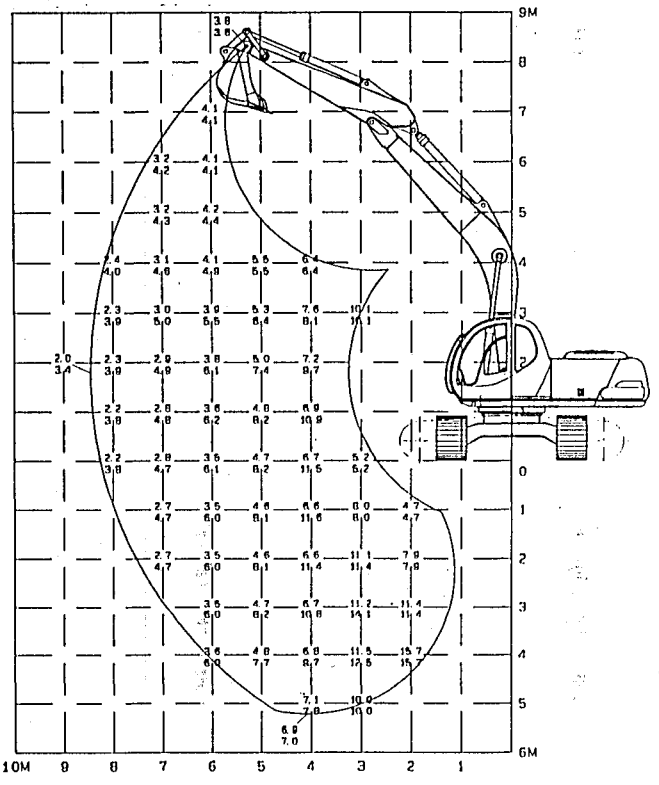
(9) Unit : ton

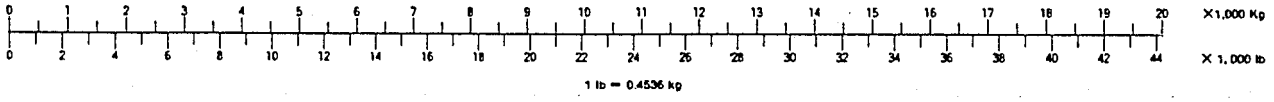


(8) Unit : ton

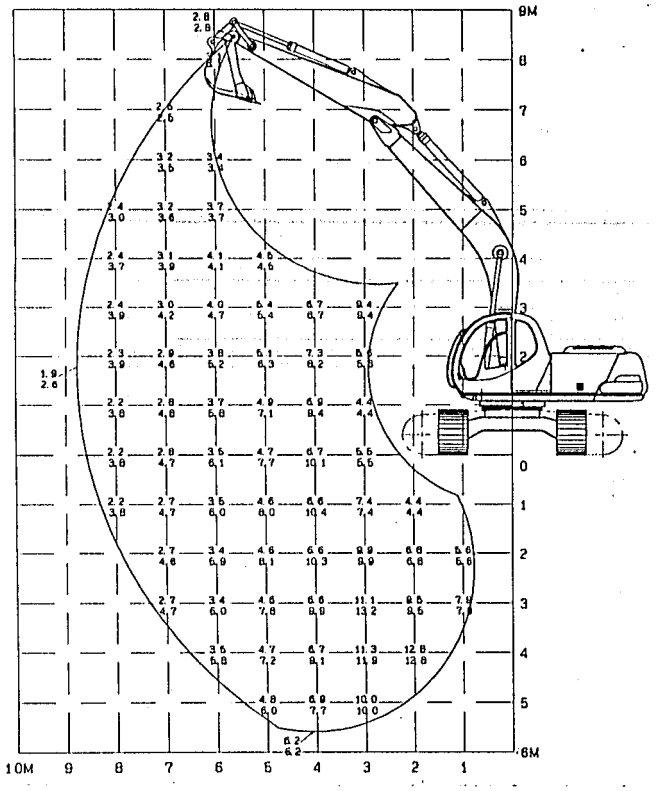


(10) Unit : ton





(11) Unit : ton



(12) Unit : ton