Kobelco Sk60v Hydraulic Excavator Book Code No S5le0007e
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HYDRAULIC EXCAVATOR

SHOP MANUAL model SK60V

This is the shop manual for KOBELCO hydraulic excavator. Contained is the necesary technical data concerning the maintenance and repair of this model. The manual is divided into the following four major sections; GENERAL, SYSTEM, 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. S5LE0007E

This is the cut pages sample. Download all 758 page(s) at: ManualPlace.com

⚠ WARNING

SAFETY

⚠ WARNING

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

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

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

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

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

1. Read and understand all Warning plates and labels 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 Compartment.

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 untilizes pressure.

7. Lower the bucket, blade, ripper or other attachments to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, blade, ripper or other attachments 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 compartments.

11. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device and 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 capscrews with same part number. Do not use a lesser quality capscrew 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 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 you 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, 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.

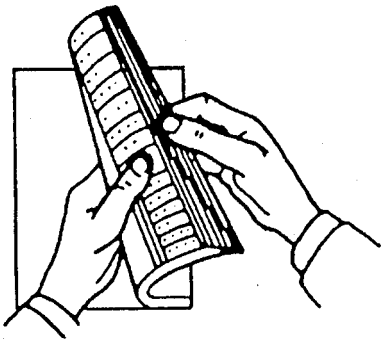
a. Never use compressed air for cleaning.
b. Avoid brushing or grinding of asbestos containing materials.
c. For clean up, use wet methods or a vacuum equipped with a high efficiency particulate air (HEPA) filter.
d. Use exhaust ventilation on permanent machining jobs.
e. Wear and approved respirator 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 SK60V

CONTENTS

* How to index sections in this manual
The general section in this manual is composed of 7 chapters as shown above, and every chapter can be indexed easily using the marks on the edge. This is useful for rapid reference.



⚠ WARNING

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⚠ WARNING

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GENERAL

SK60V List of General Section in Manual

Index	Title	Book code No. / Distribution date		
LE01	SPECIFICATION	S5LE0107E 1996−01		
——	OPERATION	S2LE1018E Refer to Operators manual		
LE03	LOCATION AND WEIGHT OF COMPONENTS	S5LE0307E 1996−01		
LE04	MAINTENANCE STANDARDS AND TEST PROCEDURES	S5LE0408E 1996−01		
——	MAINTENANCE	S2LE1018E Refer to Operators manual		
LE07	WORK STANDARD	S5LE0704E 1996−01		
LE08	STANDARD FLAT RATE TABLE	S5LE0304E 1996−01		
	Applicable Machine	LE20101∼		

Book code No. S5LE0107E

KOBELCO

SHOP MANUAL SK60V

SPECIFICATION

LE01

CONTENTS

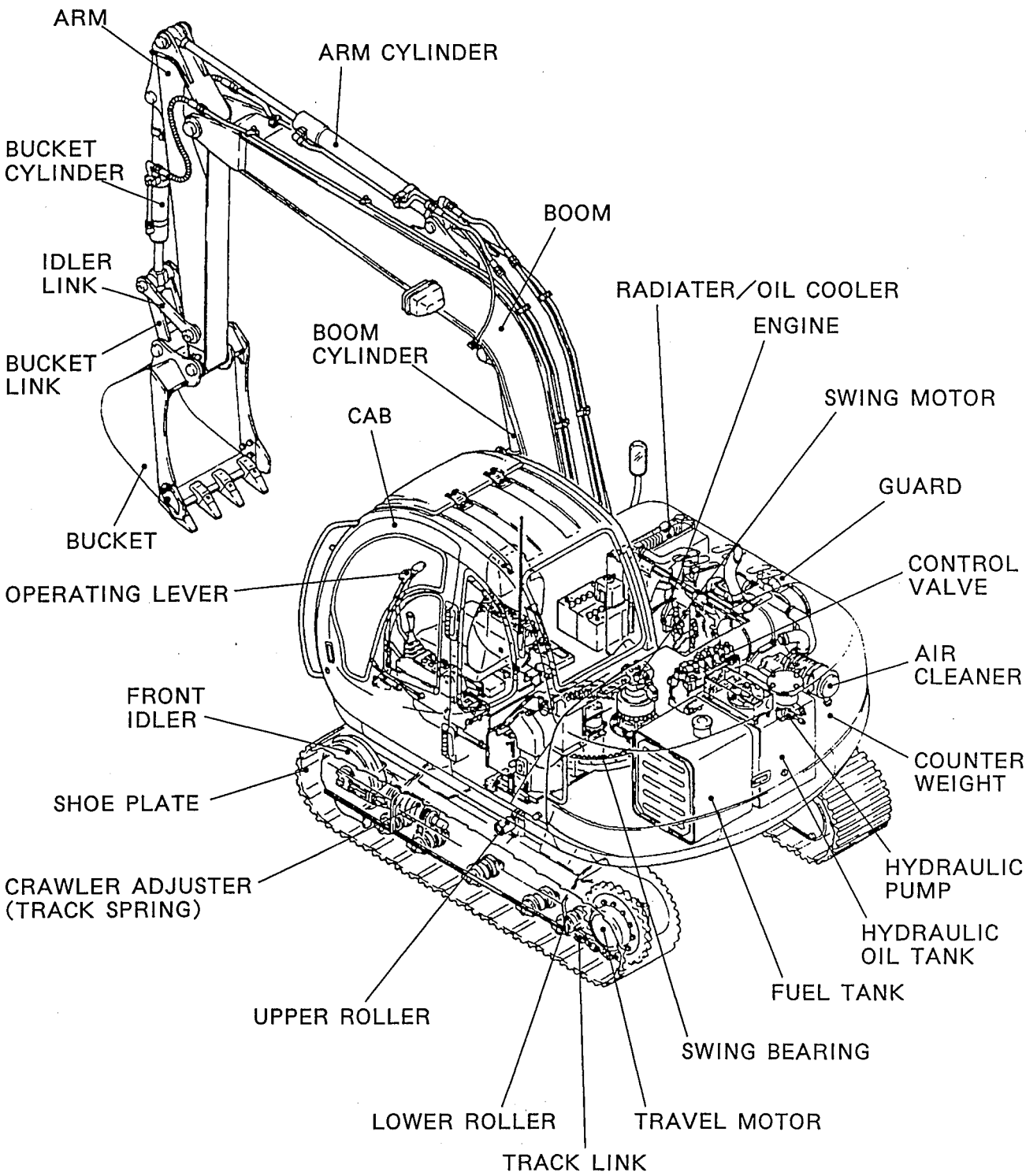
KOBE STEEL, LTD.

Applicable machine

LE20101～

Revisions	Print date	Remarks
First edition	January, 1996	S5LE0107E Y•E (F)

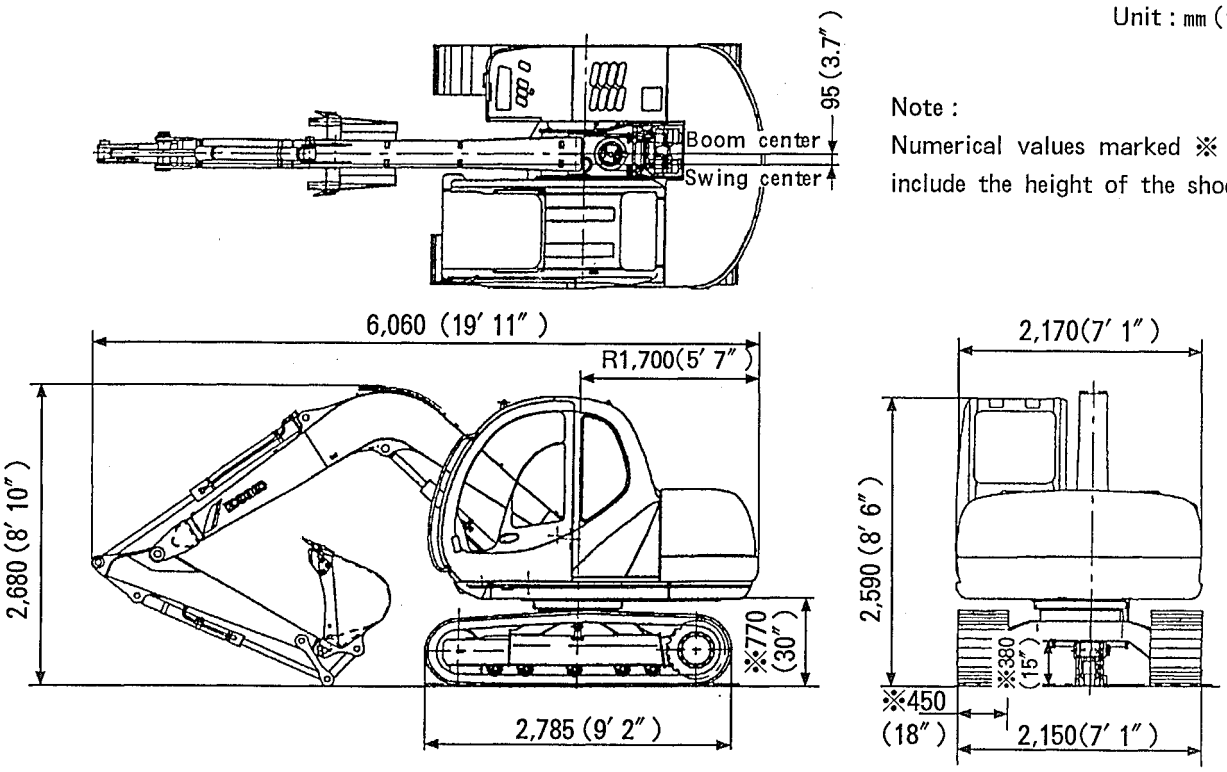
1. NAME OF COMPONENTS



2. GENERAL DIMENSION

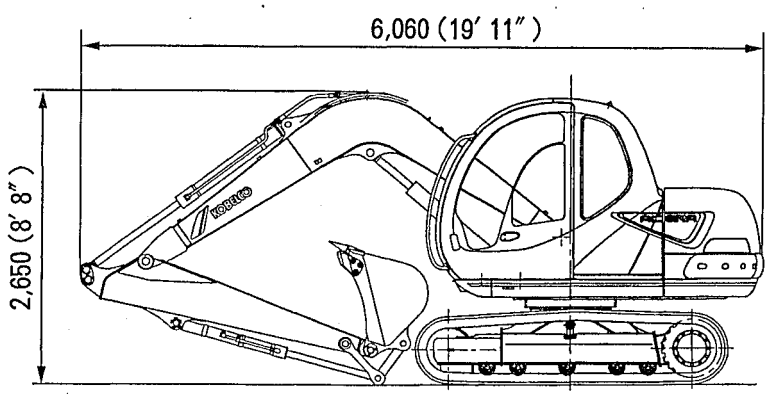
●Standard with 3.7m (12′ 2″) Boom + 1.73m (5′ 8″) Arm

Unit : mm (ft−in)

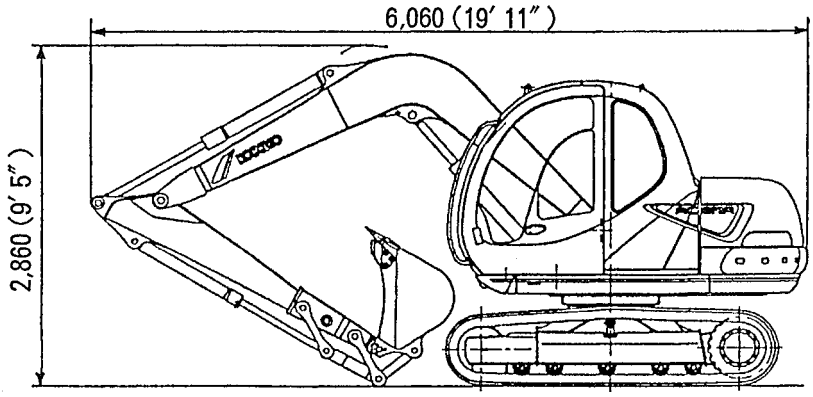


Note :
Numerical values marked ※ do not include the height of the shoe lug.

●With 3.7m (12′ 2″) Boom + 2.15m (7′ 1″) Long Arm



●With 3.7m (12′ 2″) Boom + 1.73m (5′ 8″) Arm + 0.5m (1′ 8″) Extension Arm



3. SPECIFICATION AND PERFORMANCE

●SPEED AND GRADABILITY

Item \ Model	SK60V
Swing speed rpm	13
Travel speed (High/Low)	5.5/3.5/ km/h (3.4/2.2/ mph)
Gradability % (degree)	70 (35)

●ENGINE

Item \ Model	SK60V
Model	ISUZU A-4JB1
Type	4 cycle, Water – coold direct injection type
Number of cylinder – Bore × Stroke	4 – 93mm × 102mm (4 –3.66 in × 4.02 in)
Total displacement	2,771 c.c (169 cu•in)
Rated output/Revolution	57PS/2,200 rpm
Maximum torque/Revolution	19.2 kgf•m (139 ft•lbs) /1,600 rpm

●HYDRAULIC SYSTEM

Item \ Model	SK60V
Hydraulic pump	Variable displacement double pump(Axial piston + Gear pump)
Hydraulic motor (Swing)	Axial piston type motor
Hydraulic motor (Travel)	Axial piston type motor
Control valve	6 – function multiple control valve
Cylinder (Boom, Arm, Bucket)	Double acting cylinders
Return filter	Filter paper with safety valve
Oil cooler	Air – cooled type

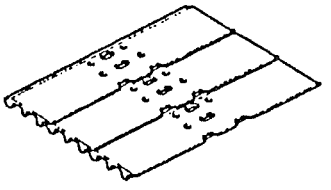
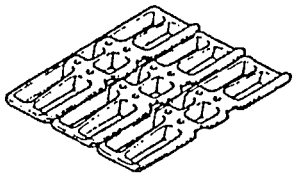
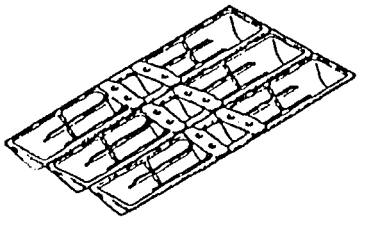
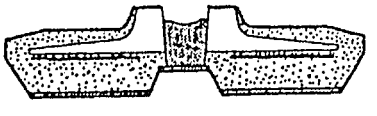
●WEIGHT

Unit: kg (lbs)

Item \ Model	SK60V
Working weight	6,500 (14,300)
Upper structure	3,200 (7,050)
Under carriage (with 450mm (18″) grouser shoes)	2,250 (4,950)
Attachment 3.7m(12′ 2″)Boom + 1.73m(5′ 8″)Arm + 0.28m³(0.37cu•yd)Bucket	1,050 (2,300)

4. TYPE OF SHOES

■ TYPE OF SHOES

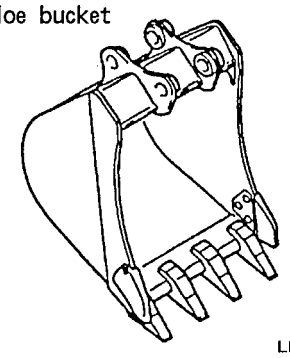
Shape	Width of track shoe mm (in)	Overall width of crawler mm (ft-in)	Ground pressure kg/cm² (psi)
Grouser shoe  38 links LE-6-4	450 (18)	2,150 (7′ 1″)	0.30 (4.27)
	600 (24)	2,300 (7′ 7″)	0.23 (3.27)
Flat shoe  38 links LE-6-5	450 (18)	2,150 (7′ 1″)	0.31 (4.41)
Triangle shoe  38 links LE-6-6	600 (24)	2,300 (7′ 7″)	0.23 (3.27)
	700 (28)	2,400 (7′ 10″)	0.20 (2.84)
Rubber shoe  LE-6-7	450 (18)	2,150 (7′ 1″)	0.30 (4.27)

Note:

- Do not use the shoes other than 450 mm (18in) grouser shoe in gravel pit or rocky areas. Traveling and digging work in those areas cause the shoe to be bent, and loosening of shoe bolt, etc., and also may damage other undercarriage (link, roller, etc.).

5. TYPE OF BUCKET

Hoe bucket



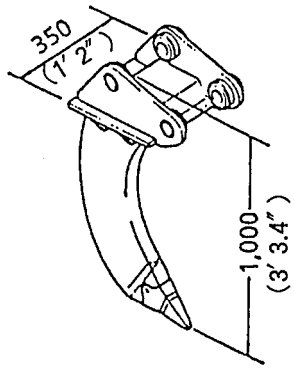
LE-6-8

Heaped capacity m³ (cu•yd)	Outer width mm (ft-in)		Number of tooth	W or W/O side cutter	Availability of face shovel	Weight kg (lbs)
	With side cutter	Without side cutter				
0.11(0.14)	—	400(1'4")	3	No	Yes	150(330)
0.14(0.18)	450(1'6")	—	3	Yes(Welded)	Yes	150(330)
0.18(0.24)	550(1'10")	480(1'7")	3	Yes	Yes	170(370)
0.22(0.29)	650(2'2")	580(1'11")	4	Yes	Yes	190(420)
STD 0.28(0.37)	750(2'6")	680(2'3")	4	Yes	Yes	200(440)
0.35(0.46)	850(2'9")	780(2'7")	4	Yes	Yes	220(490)

Ripper

Weight: 210 kg (460 lbs)

Face shovel unavailable

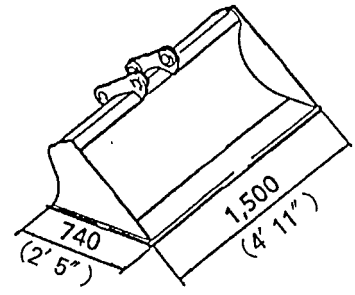


LE-6-9

Slope finishing bucket

Capacity: 0.26 m³ (0.34 cu•yd)
Weight: 300 kg (660 lbs)

Face shovel unavailable

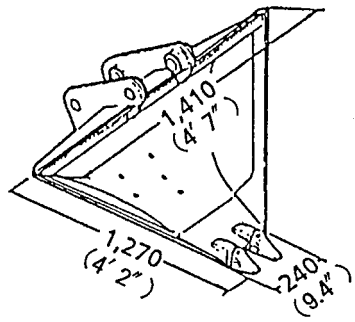


LE-6-11

V-shape bucket

Capacity: 0.24 m³ (0.31 cu•yd)
Weight: 180 kg (400 lbs)

Face shovel unavailable



LE-6-10

6. COMBINATION OF ATTACHMENTS

Bucket		Applicable arm		
Type	Heaped capacity m^3 (cu•yd)	1.73m (5′ 8″) Standard arm	2.15m (7′ 1″) Long arm	1.73m(5′ 8″)arm+0.5m (1′ 8″)extention arm
Hoe bucket	0.11 (0.14)	○	○	○
	0.14 (0.18)	○	○	○
	0.18 (0.24)	○	○	○
	0.22 (0.29)	○	◎	◎
	0.28 STD (0.37)	◎	△	△
	0.35 (0.46)	△	×	×
Bucket with ejector	0.11 (0.14)	○	○	○
Slope finishing bucket	740×1,500 (2′ 5″ ×4′ 11″)	△	△	△
Ripper	—	○	×	×
V-shape bucket	0.24 (0.31)	△	△	△
Breaker	—	○	×	×

Note: Marks in the above mean the following.

◎ Standard combination

○ General use .... Digging and loading of gravel, sand and clayey soil

△ Light duty .... Work mainly loading loose gravel or clayey soil

× Not usable .... Not warranted

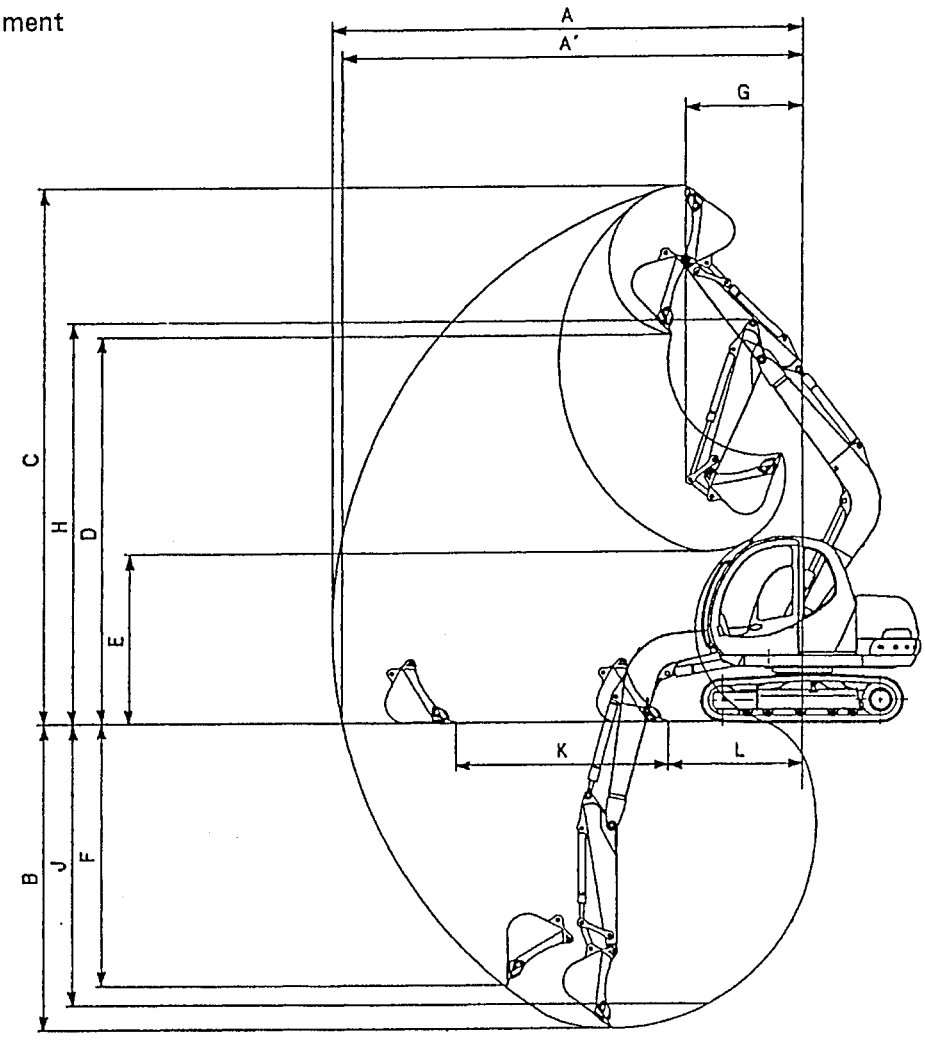
The genuine or KOBELCO recommended attachments should be used for this machine.
The use of attachments other than the designated ones may cause the abnormality of the machine.
Maker does not compensate for those abnormalities of attachments.

⚠ CAUTION

If a bucket other than the back hoe bucket is turned over and used, the arm and the bucket may be broken.

7. WORKING RANGE OF ATTACHMENTS

● Back hoe attachment

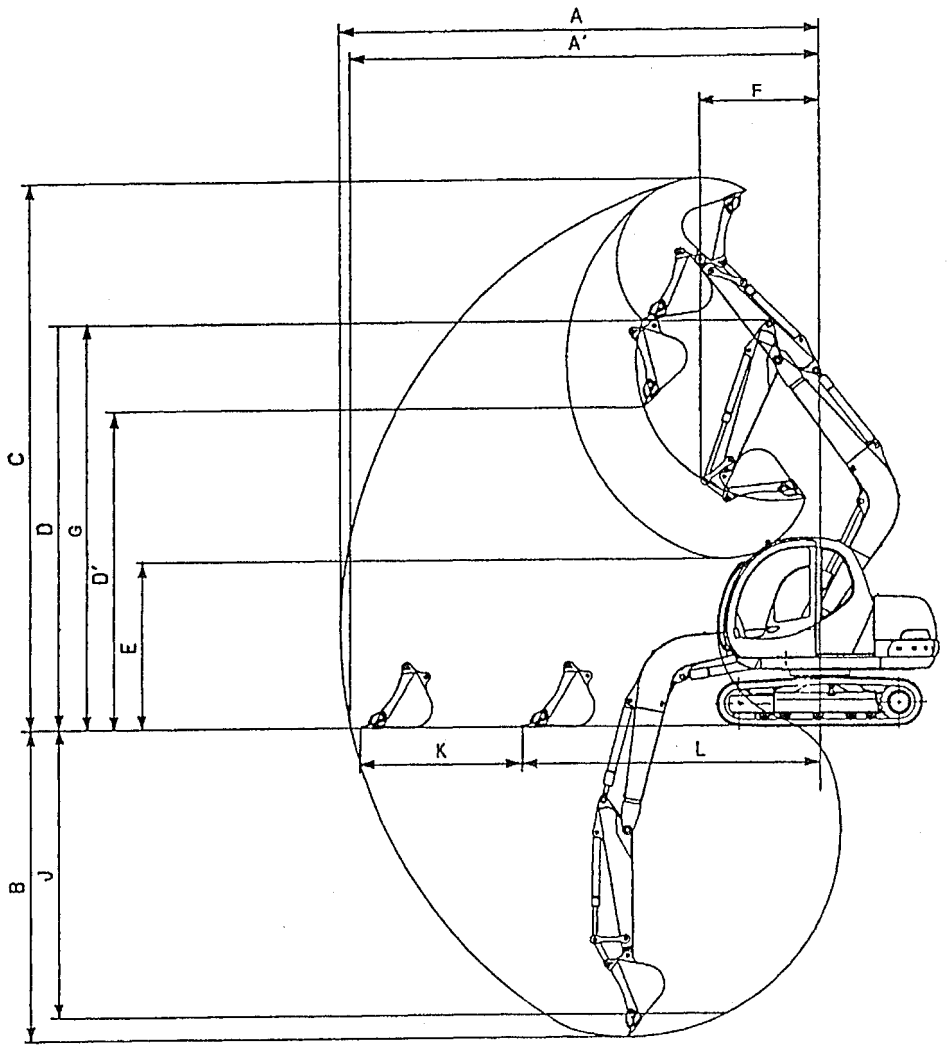


Unit: m(ft•in)

Item \ Type			1.73m(5′ 8″) Arm with 0.28m³(0.37 cu•yd) Bucket	2.15m(7′ 1″) Arm with 0.22m³(0.29 cu•yd) Bucket	1.73m(5′ 8″) Arm + 0.5m (1′ 8″) Extention arm with 0.22m³(0.29 cu•yd) Bucket
A Maximum digging reach			6.39 (21′)	6.78 (22′ 3″)	6.84 (22′ 5″)
A′ Maximum digging reach at ground level			6.26 (20′ 6″)	6.65 (21′ 10″)	6.71 (22′)
※ B Maximum digging depth			4.20 (13′ 9″)	4.61 (15′ 1″)	4.69 (15′ 5″)
※ C Maximum digging height			7.40 (24′ 3″)	7.72 (25′ 4″)	7.76 (25′ 6″)
※ D Maximum dumping height			5.34 (17′ 6″)	5.66 (18′ 7″)	5.69 (18′ 8.″)
※ E Minimum dumping height			2.37 (7′ 9″)	2.06 (6′ 9″)	1.89 (6′ 2″)
※ F Vertical digging depth			3.60 (11′ 10″)	3.97 (13′)	4.09 (13′ 5″)
G Minimum swing radius			1.62 (5′ 4″)	1.92 (6′ 4″)	1.75 (5′ 9″)
※ H Height at minimum swing radius			5.54 (18′ 2″)	5.59 (18′ 4″)	5.54 (18′ 2″)
※ J Digging depth for 8 feet flat bottom			3.86 (12′ 8″)	4.28 (14′ 1″)	4.41 (14′ 6″)
K	Horizontal digging stroke at ground level	Stroke	2.88 (9′ 5″)	3.35 (11′)	3.64 (11′ 11″)
L		Minimum	1.82 (6′)	1.74 (5′ 9″)	1.50 (4′ 11″)

Note: Dimensions with ※ mark do not include the shoe lug height.

◎ Face shovel attachment



Unit: m (ft•in)

Item \ Type			1.73 m (5′ 8″) Arm with 0.28 m³ (0.37 cu•yd) Bucket	2.15 m (7′ 1″) Arm with 0.22 m³ (0.29 cu•yd) Bucket	1.73 m (5′ 8″) Arm + 0.5 m (1′ 8″) Extention arm with 0.22 m³ (0.29 cu•yd) Bucket
A Maximum digging reach			6.48 (21′ 3″)	6.86 (22′ 6″)	6.92 (22′ 8″)
A′ Maximum digging reach at ground level			6.34 (20′ 10″)	6.74 (22′ 1″)	6.80 (22′ 4″)
※ B Maximum digging depth			4.27 (14′)	4.69 (15′ 5″)	4.77 (15′ 8″)
※ C Maximum digging height			7.48 (24′ 6″)	7.80 (25′ 7″)	7.84 (25′ 9″)
※ D′ Maximum dumping height (45°)			5.55 (18′ 3″)	5.86 (19′ 3″)	5.90 (19′ 4″)
※ E Minimum dumping height			4.36 (14′ 4″)	4.48 (14′ 8″)	4.44 (14′ 7″)
F Maximum vertical wall digging			2.29 (7′ 6″)	2.43 (8′)	1.81 (5′ 11″)
※ G Minimum swing radius			1.61 (5′ 3″)	1.91 (6′ 3″)	1.75 (5′ 9″)
※ H Height at minimum swing radius			5.54 (18′ 2″)	5.56 (18′ 3″)	5.54 (18′ 2″)
※ J Digging depth for 8 feet flat bottom			3.95 (13′)	4.37 (14′ 4″)	4.50 (14′ 9″)
K	Horizontal digging stroke at ground level	Stroke	2.21 (7′ 3″)	2.86 (9′ 5″)	3.02 (9′ 11″)
L		Minimum	4.00 (13′ 1″)	3.74 (12′ 3″)	3.63 (11′ 11″)

Note: Dimensions with ※ mark do not include the shoe lug height.

8. LIFTING CAPACITY DIAGRAM

(1) Conditions of calculation

1) The lifting load indicates a smaller value of either an 87% of hydraulic lifting capacity or a 75% of tipping load.
2) The load point is on the bucket supporting point, and the bucket position is a loading position.
3) The values in the upper rows show the lifting capacity in a horizontal position of machine, and values in the lower rows show in a vertical position of machine.
4) Unit : ton Shoe : 450 mm, Iron shoe
5) Set hydraulic pressure 260 kg/cm².

(2) Reference No. list of lifting capacity line diagram

Arm / Bucket W or W/O	1.73m(5′ 8″) Arm		2.15m(7′ 0.6″) Arm		1.73m(5′8″) Arm + 0.5m(1′8″) Ext.	
	With 0.28m³ (0.37cu•yd) bucket	Without	With 0.22m³ (0.29cu•yd) bucket	Without	With 0.22m³ (0.29cu•yd) bucket	Without
	(1)	(2)	(3)	(4)	(5)	(6)

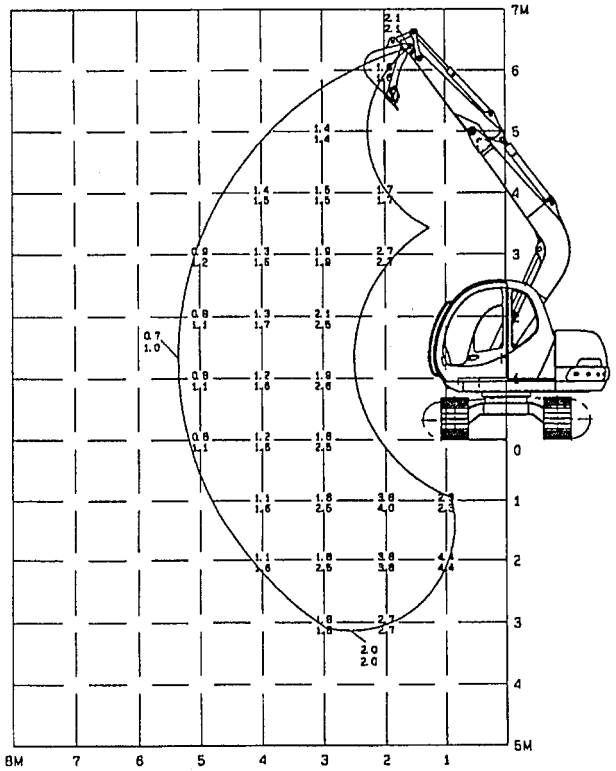
1 kg=2.2046lb

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 ×1,000 kg

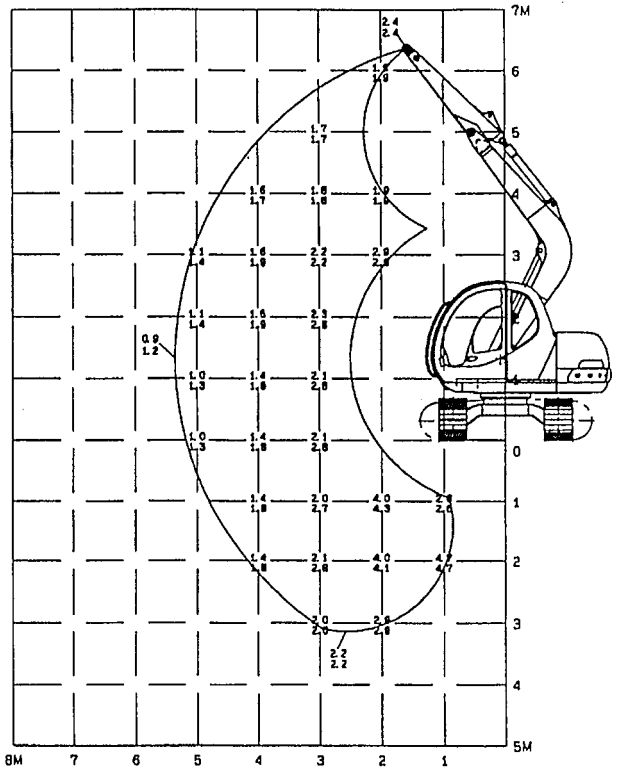
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 ×1,000 lb

1 lb=0.4536kg

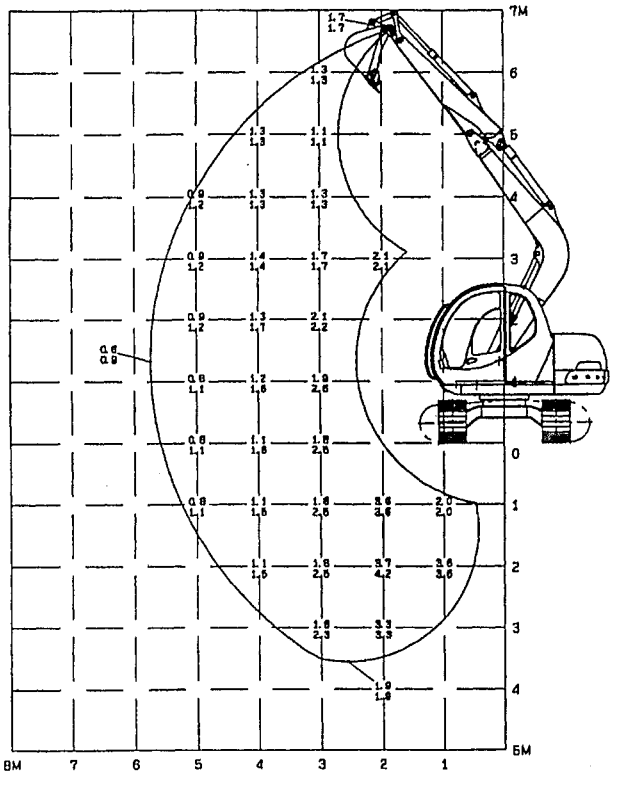
(1) Unit: TON



(2) Unit: TON



(3) Unit: TON



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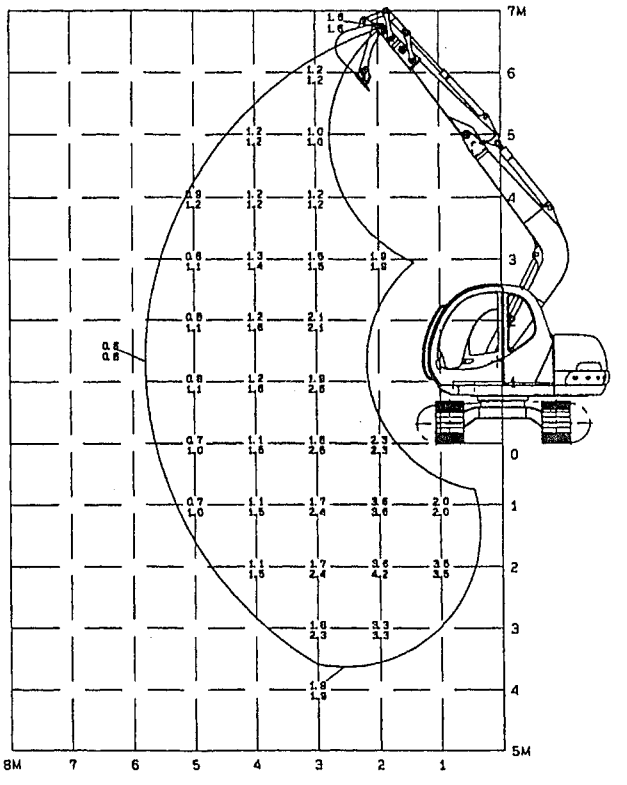

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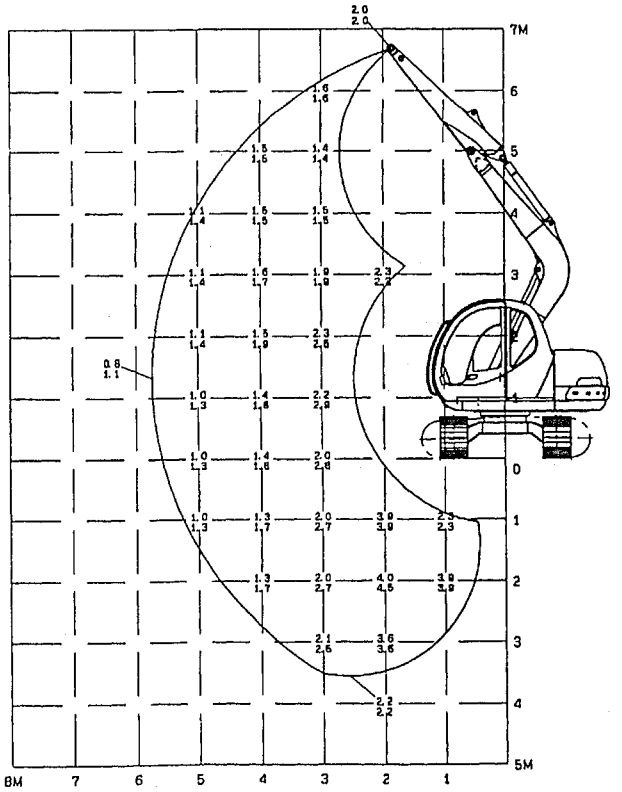

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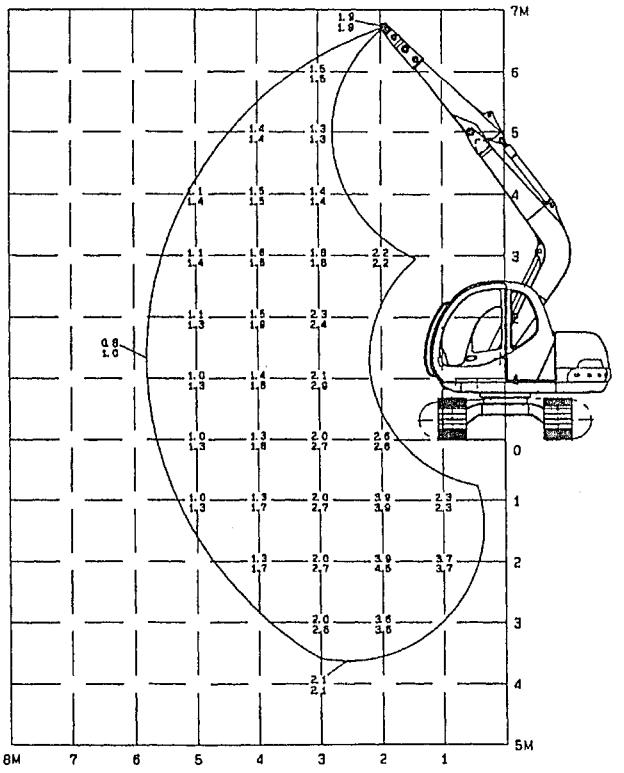

9. ENGINE SPECIFICATION

Specifications

Type		ISUZU A-4JB1		
Number of cylinders — Bore × Stroke		4 — 93 mm × 102 mm (3.66 in × 4.02 in)		
Total displacement		2,771 cc (169 cu•in)		
Compression ratio		18.2		
Rated output		57PS/2,200 rpm (42 kW/2,200 rpm)		
Maximum torque		19.2 kgf•m/1,600 rpm (139 ft•lbs or over/1,600 rpm)		
High idling		2.420±20 rpm		
Low idling		1000±20rpm		
Injection valve opening pressure		185 kgf/cm² (2632 psi)		
Thermostat action		Start 82°C (180°F) Full open 95°C (203°F)		
Firing order		1—3—4—2		
Compression pressure		30 kgf/cm² (427 psi) at 200 rpm		
Lubrication oil pressure		——		
Fuel injection timing		17° before top dead point		
Valve clearance		Valve clearance	Open	Close
	Intake valve	0.4mm (0.016") in cold condition	24.5° before top dead point	55.5° after bottom dead point
	Exhaust valve	↑	54° before bottom dead point	26° after top dead point
Starter capacity		24V, 3.5 kW		
Generator capaity		24V 20A		
Cooling fan drive method		φ450mm (φ17.7 in) suction type seven fans Belt driven pulley ratio Crank/Fan=1.117		
Engine oil quantity		Engine body 7±1 ℓ (1.85±0.3 gal)		
Dry weight		240 kg (530 lbs)		
Fuel consumption ratio		176±8.8 g/PS•h		
Allowable inclination		Front/Rear and Right/Left: 35°		
Dimension L × W × H		760 mm × 570 mm × 715 mm (30 in × 22.4 in × 28.1 in)		
Turning direction		Clockwise direction from fan side		

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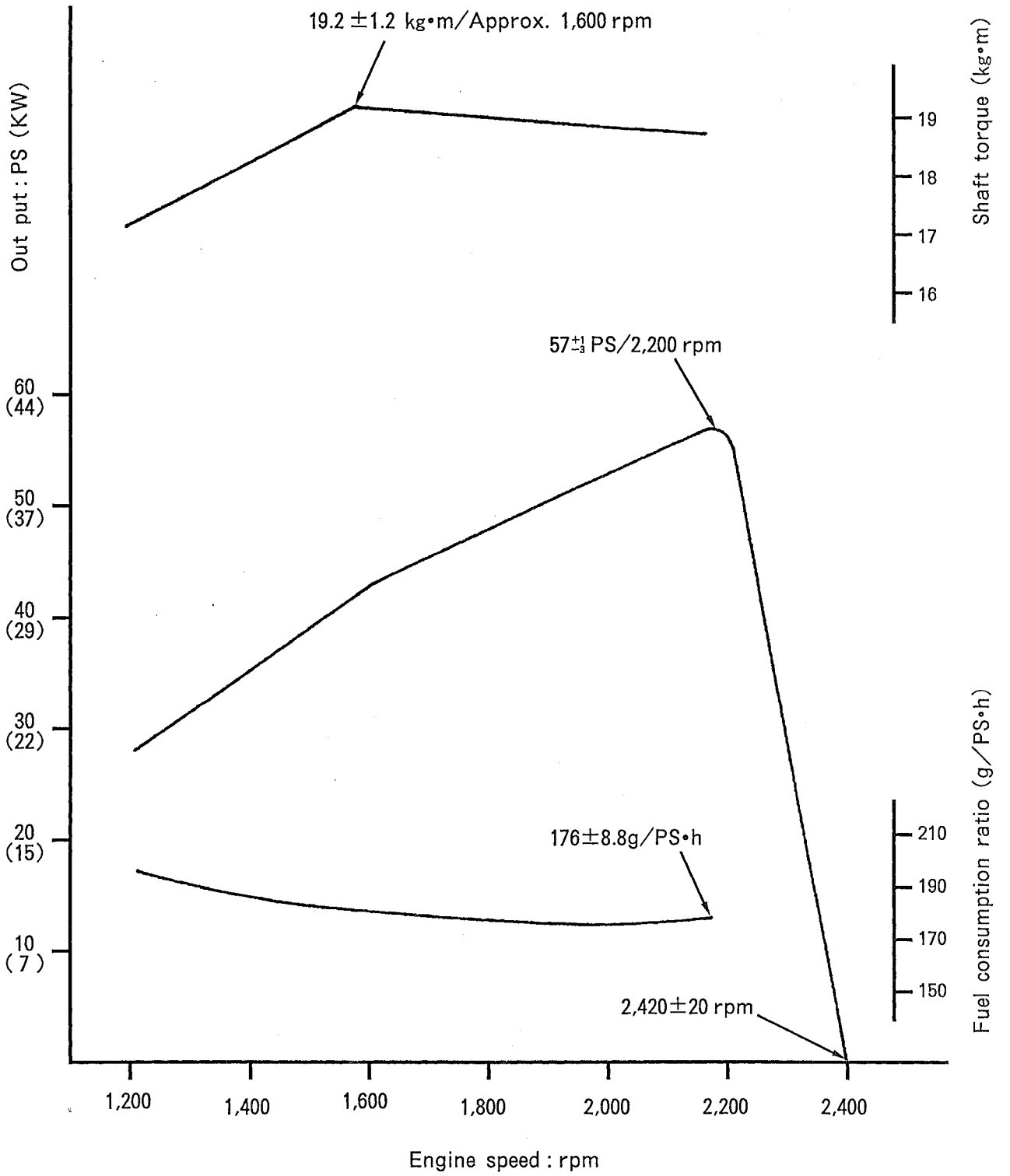
Engine performance
(ISUZU A-4JB1)

Test condition : with fan and alternator
without air-cleaner and silencer



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