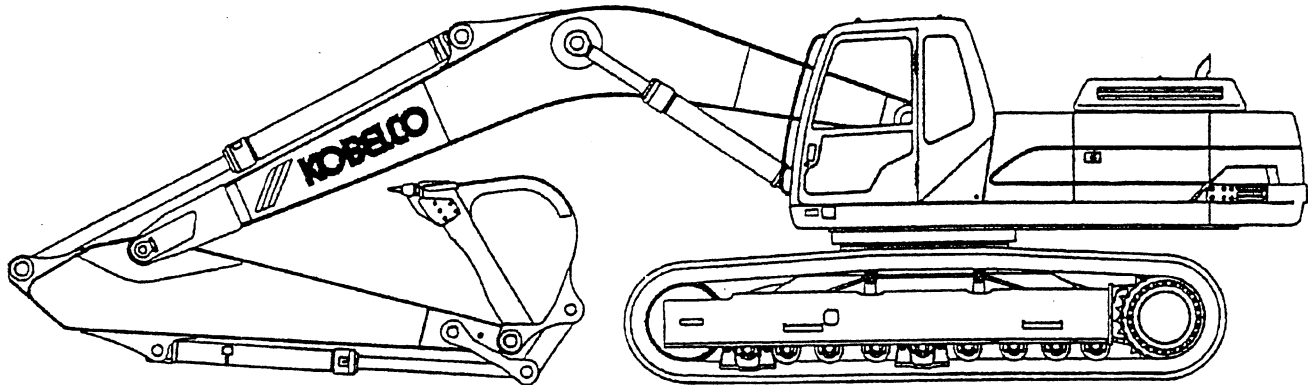


KOBELCO

SERVICEMANS HANDBOOK
HYDRAULIC EXCAVATOR
MARK IV

KOBELCO

MARK IV



SERVICEMANS HANDBOOK

Applicable to the following Models & Serial Numbers:

KAI SPEC

MODEL	SERIAL No.
SK100	YMU1001~
SK120	LPU1001~
SK120LC	YPY1001~
SK150LC	YMU1001~
SK200	YNU0201~
SK200LC	YQU2001~
SK220	LQU0101~
SK220LC	LLU1201~
SK270LC	LBU1001~
SK300	LCU00001~
SK300LC	YCU00301~
SK400	LSJ00001~
SK400LC	YSJ00002~

EUROPEAN SPEC

MODEL	SERIAL No.
SK110	YMU1001~
SK130	LPU1001~
SK130LC	YPY1001~
SK160LC	YMU1001~
SK210	YNU0201~
SK210LC	YQU2001~
SK250	LQU0101~
SK250LC	LLU1201~
SK250NLC	LLU5001
SK330	LCU00001~
SK330LC	YCU00301~
SK460	LSJ00001~
SK460LC	YSJ00002~

SAFETY PRECAUTIONS



WARNING



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

Improper performance of lubrication or maintenance procedures are 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 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 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 before starting to work on the machine. Hang a "Do Not Operate" tag in the Operators Compartment.
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.
5. Do not work on any machine that is supported only by lift jacks or a hoist. Always use blocks or jack stands, capable of supporting the machine, before performing any disassembly.



WARNING



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

6. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
7. Lower the bucket, blade, ripper or other implements to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, blade, ripper or other implement 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 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 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 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.

SAFETY PRECAUTIONS

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.
 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. Make reference to "Techniques of Structural Repair Course". 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.
 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. Always use lift arm supports to keep the bucket arms raised and bucket tilted down when maintenance or repair work is performed which requires the bucket in the raised position.
 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. 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.
 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. On track-type machines, be careful when servicing or separating the tracks. Chips can fly when removing or installing a track pin. Wear safety glasses. 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.
 23. 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.

Section I- GENERAL SPECIFICATIONS

E. SK300~SK330LC (Mitsubishi) Major Engine Specifications.

Engine Make	Mitsubishi
Model	6D22-T Diesel
Number of Cylinders- Bore X Stroke	6-130mm X 140mm (5.12" X 5.51")
Displacement	11,149cc (680 cu in.)
Compression Ratio	16.0:1
Net Output Rating	172kw / 1,750 rpm (230HP / 1,750 rpm)
Net Maximum Torque	101kgf-m / 1,200 rpm (731ft lbs / 1,200 rpm)
Maximum RPM at No Load- High Idle	1,930-1970 rpm
Maximum RPM at No Load- Low Idle	8850-900 rpm
Ignition Order	1-5-3-6-2-4 Clockwise Rotation
Compression Pressure	28kgf / cm ² (398 psi) @ 200rpm
Lube Oil Pressure	Rating 1.5-5kgf / cm ² (21.3-71.1psi)
Injection Timing	17° Before Top Dead Center
Injection Start Pressure	180kgf / cm ² (2,560psi)
Intake Valve Clearance Cold	0.4mm (.016")
Exhaust Valve Clearance Cold	0.6mm (.024")
Electrical System	D.C. 24V
Starting Motor	24V-5.5KW
Alternator	24V-30A-800W
Batteries*	2- 12V- (136AH)
Engine Dry Weight**	990kg (2,180 lbs)
Thermostat	Begin to open at 76.5°C (170°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø700 (Ø28") Suction Type Belt Drive Pulley Ratio: 0.95
Air Cleaner***	Dry Type with Safety Elements
Super Charging Type	Turbo
Engine Oil Volume	18 liter (4.76 gal.)

* EC SPEC MACHINES- HD Batteries

** ALL MACHINES- Less Flywheel & Electrics

*** EC SPEC MACHINES- Single Element Only, No Safety Element

F. SK400 ~ SK460LC (Mitsubishi) Major Engine Specifications.

Engine Make	Mitsubishi
Model	6D22-TC Diesel
Number of Cylinders- Bore X Stroke	6-130mm X 140mm (5.12" X 5.51")
Displacement	11,149cc (680 cu in.)
Compression Ratio	15.5:1
Net Output Rating	224kw / 2,000 rpm (300HP / 2,000 rpm)
Net Maximum Torque	121kgf-m / 1,200 rpm (875ft lbs / 1,200 rpm)
Maximum RPM at No Load- High Idle	2150-2220 rpm
Maximum RPM at No Load- Low Idle	850-900 rpm
Ignition Order	1-5-3-6-2-4 Clockwise Rotation
Compression Pressure	28kgf / cm ² (398 psi) @ 200rpm
Lube Oil Pressure	Rating 1.5-5kgf / cm ² (21.3-71.1psi)
Injection Timing	17° Before Top Dead Center
Injection Start Pressure	180kgf / cm ² (2,560psi)
Intake Valve Clearance Cold	0.4mm (.016")
Exhaust Valve Clearance Cold	0.6mm (.024")
Electrical System	D.C. 24V
Starting Motor	24V-5.5KW
Alternator	24V-30A-800W
Batteries*	2- 12V- (136AH)
Engine Dry Weight**	1065kg (2,350 lbs)
Thermostat	Begin to open at 76.5°C (170°F). Full open at 90°C (194°F).
Cooling Fan Drive Method	Ø700 (Ø28") Suction Type Belt Drive Pulley Ratio: 0.95
Air Cleaner***	Dry Type with Safety Elements
Super Charging Type	Turbo
Engine Oil Volume	34 liter (8.98 gal.)

G. Fuel Consumption

The following specifications are estimates. Actual fuel consumption may vary depending upon operating conditions, frequency of maintenance, operator experience etc.

MODEL	WORKING MODE (KPSS)	HARD DIGGING	NORMAL DIGGING	LIGHT DIGGING
SK100~SK110	NOT APPLICABLE	14.76 (3.9)	10.59 (2.8)	7.19 (1.9)
SK120~SK130	NOT APPLICABLE	15.14 (4.0)	10.97 (2.9)	7.57 (2.0)
SK150~SK160	H	21.19 (5.6)	13.62 (3.6)	10.22 (2.7)
	S	17.03 (4.5)	11.35 (3.0)	8.32 (2.2)
	FC	9.46 (2.5)	6.81 (1.8)	4.54 (1.2)
SK200~SK210	H	23.88 (6.31)	14.38 (3.8)	10.97 (2.9)
	S	18.54 (4.9)	12.49 (3.3)	9.46 (2.5)
	FC	11.35 (3.0)	7.19 (1.9)	5.29 (1.4)
SK220~SK270	H	24.98 (6.6)	18.16 (4.8)	12.87 (3.4)
	S	19.68 (5.2)	14.38 (3.8)	10.22 (2.7)
	FC	10.97 (2.9)	8.32 (2.2)	6.43 (1.7)
SK300~SK330	H	36.33 (9.6)	25.36 (6.7)	17.98 (4.75)
	S	30.09 (7.95)	20.81 (5.5)	15.02 (3.97)
	FC	28.38 (7.5)	19.68 (5.2)	14.30 (3.78)
SK400~SK460	H	46.18 (12.2)	31.79 (8.4)	23.27 (6.15)
	S	43.53 (11.5)	30.24 (7.99)	22.25 (5.88)
	FC	40.50 (10.7)	28.38 (7.5)	20.21 (5.34)

Unit: Liter per Hour (Gallon per Hour)

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