

**KOBELCO**

**SHOP MANUAL**

**EXCAVATOR**

**SK160LC**

**ED190LC**

YM91ZU0009P1 NA

Issued 12-2006

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## **SHOP MANUAL - SECTION 1**

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**SK160LC / ED190LC  
(MINOR CHANGE MACHINES)  
HYDRAULIC EXCAVATOR**

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## **STANDARD SPECIFICATIONS AND MAINTENANCE**

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SECTION 1 - STANDARD SPECIFICATIONS AND MAINTENANCE

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Revision History			
Issue	Issue Date	Applicable Machines	Remarks
First Edition	01Dec06		

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**CHAPTER 1**

**SK160LC / ED190LC  
(MINOR CHANGE MACHINES)  
HYDRAULIC EXCAVATORS**

**GENERAL INFORMATION AND  
SAFETY**

SECTION 1 - STANDARD SPECIFICATIONS AND MAINTENANCE  
CHAPTER 1 - GENERAL INFORMATION AND SAFETY

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## NOTES

## 1.1 PERSONAL SAFETY



RH02F040

Throughout this manual and on the machine's safety decals, you will find precautionary statements: **DANGER, WARNING, or CAUTION** followed by specific instructions or ISO two panel safety pictorial symbols. These precautions are intended for your personal safety.

Failure to follow the **DANGER, WARNING or CAUTION** instructions may result in death or serious bodily injury.

**DANGER, WARNING or CAUTION** are defined as follows:

- **DANGER:** Indicates a potentially hazardous situation that, if not avoided, will result in death or serious injury. The color associated with Danger is RED.
- **WARNING:** Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. The color associated with Warning is ORANGE.
- **CAUTION:** Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The color associated with Caution is YELLOW.

ISO two panel pictorial symbol decals are defined as follows:

- The first panel indicates the nature of the hazard.
- The second panel indicates the appropriate avoidance of the hazard.
- Background color is YELLOW.

Prohibition symbols such as   and  if used, are RED.

## 1.2 GENERAL SAFETY INFORMATION



**WARNING:** Do not operate or perform any maintenance on this machine until all instructions in the OPERATOR'S MANUAL and this MANUAL have been thoroughly read and understood. Failure to comply will result in death or serious injury.



**WARNING:** Improper operation or maintenance of this machine may cause accidents and could result in serious injury or death.



**WARNING:** Always keep the manual in storage. If it is missing or damaged, place an order with an authorized Distributor for a replacement. If you have any questions, please consult your dealer.

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 the 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, safety must be given the first priority. The safety information contained in the manual is intended only to supplement safety codes, insurance requirements, local laws, rules and regulations.

3. Messages of safety appear in the manual and on the machine:

All messages of safety are identified by either word of DANGER, WARNING, and CAUTION.



**DANGER:** Shows an imminently hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING:** Shows a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION:** Shows 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.

4. It is very difficult to foresee 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.
5. While operating the machine, be sure to perform work with great care, so no damage to the machine or accidents will occur.
6. Continue studying the manual until all Safety, Operation and Maintenance procedures are completely understood by all persons working with the machine.

### 1.3 SAFETY PRECAUTIONS



**WARNING:** *The proper lubrication and maintenance for this machine are outlined in the OPERATOR'S MANUAL.*



**WARNING:** *Improper lubrication and maintenance procedures are dangerous and could result in injury or death. Read and understand the MANUAL before performing maintenance or adding/changing lubricants.*

The serviceman 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 should check the weights noted in this manual. Use proper lifting procedures when removing any components. Weight of components table is shown in the SPECIFICATIONS section.

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 machine.
2. Always wear protective glasses and protective shoes when working around machines. 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 Operators 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 Operators Compartment.
5. Do not work on any machine that is supported only by jacks or a hoist. Always use blocks or jack stands capable of supporting the machine.



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

6. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
7. Lower the bucket, dozer, or other attachments to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, dozer, 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 to 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 20kg (45lbs) 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 capscrews 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 capscrews 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 from being sprayed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.



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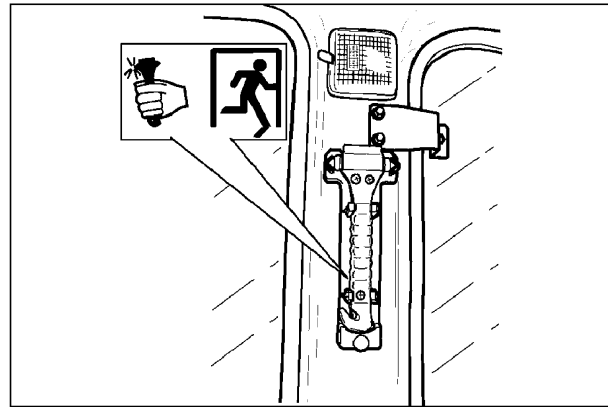
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13. Always use the proper tools that are in good condition and that are suited for the job. Be sure you understand how to use them before performing any service work.
14. Reinstall all fasteners with the same part number. Do not use a lesser quality fastener if replacements are necessary.
15. Repairs which require welding should be performed 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 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 will not be damaged during operation of the machine by contacting sharp corners, or by rubbing against some object or hot surface.
17. Be sure all protective devices including guards and shields are properly installed correctly before starting repair. If a guard or shield must be removed to perform the repair work, replace the guard or shield after repair is completed.
18. Performing maintenance or repair work with the bucket raised is dangerous due to the possibility of it falling. Lower the attachment and place the bucket on 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 (pinhole) 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 pinhole 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.



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Figure 1

23. A life hammer is provided on the right side of cab. In case of emergency, take the life hammer, break the cab glass, and escape from the cab. In addition, the life hammer is equipped with a cutter on the lever side to cut the seat belt, etc.

## 1.4 GENERAL PRECAUTIONS FOR REPAIRS

### 1.4.1 PREPARATION BEFORE DISASSEMBLING



#### 1. Understand operating procedure

Read OPERATOR'S MANUAL and this MANUAL carefully prior to operating the machine.

#### 2. Cleaning machines

Remove soil, mud, and dust from the machine before service. This will prevent loss of work efficiency, damaged parts, and difficulty in rust prevention and dust protection while reassembling.

#### 3. Inspecting machines

Identify the parts to be disassembled before starting work, determine the disassembling procedure considering the workshop situations etc., request necessary parts in advance.

#### 4. Record the following items

- A. Inspection date and place
- B. Model name, applicable machine number, and hour meter reading
- C. Trouble condition, place and cause.
- D. Visible oil leakage, water leakage and damage
- E. Clogged filters, oil level, oil quality, oil contamination and loose connections
- F. Is it a recurring fault at approximately the same amount of operating hours.

#### 5. Arrangement and cleaning in service shop

- A. Tools required for repair work.
- B. Prepare space to place the disassembled parts.
- C. Prepare oil containers for draining oil etc.

### 1.4.2 SAFETY IN DISASSEMBLING AND ASSEMBLING



1. Wear appropriate clothes with long sleeves, safety shoes, safety helmet and protective glasses.
2. Suspend warning tag DO NOT OPERATE from the doorknob or the operating lever.
3. Stop the engine before starting inspection and maintenance.

4. Identify the location of a first-aid kit and a fire extinguisher, also who to contact in case of an emergency.
5. Choose a hard, level and safe place, and place the attachment on the ground securely.
6. Use a hoist to remove heavy parts (20 kg [45 lbs] or more) from the machine.
7. Use proper tools, and replace or repair defective tools.
8. Support the machine and attachment with supports or blocks if the work is performed in the lifted condition.

### 1.4.3 DISASSEMBLING AND ASSEMBLING HYDRAULIC EQUIPMENT



1. Removing hydraulic equipment
  - A. Before disconnecting pipes, release the hydraulic pressure in the system.
  - B. Carefully drain oil of the removed pipes into a containers without spilling on the floor.
  - C. Install plugs or caps on the pipe ends to avoid oil spillage and contamination.
  - D. Clean off the external surface of the equipment before disassembling, drain hydraulic and gear oil before placing component on the workbench.
2. Disassembling hydraulic equipment
  - A. Do not modify the hydraulic equipment without the permission of the manufacturer. Manufacturer will not be responsible for the performance and function of the product after modification.
  - B. When disassembling and reassembling for repair, refer the work to qualified personnel who have the knowledge or have completed the service training.
  - C. Provide aligning marks to facilitate reassembly.
  - D. Before starting the work, read the manual for disassembly procedures and decide whether the work can be performed by yourself or if assistance is required.
  - E. Use the special jig or tools if they are specified.

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