

# Shop Manual

HYDRAULIC  
EXCAVATOR

**PC138US -8**

**PC138USLC-8**

SERIAL NUMBERS PC138US- 20001 and up  
PC138USLC-20001

**ecot3**

**KOMATSU**



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# HYDRAULIC EXCAVATOR

## PC138US-8 PC138USLC-8

Machine model	Serial number
PC138US-8	20001 and up
PC138USLC-8	20001 and up

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## 00 Index and foreword

### Index

---

Composition of shop manual .....	2
Table of contents .....	4

## Composition of shop manual

The contents of this shop manual are shown together with Form No. in a list.

Note 1: Always keep the latest version of this manual in accordance with this list and utilize accordingly.

The marks shown to the right of Form No. denote the following:

○: New issue (to be filed additionally) ●: Revision (to be replaced for each Form No.)

Note 2: This shop manual can be supplied for each Form No.

Note 3: To file this shop manual in the special binder for management, handle it as follows:

- Place a divider on the top of each section in the file after matching the Tab No. with No. indicated next to each Section Name shown in the table below:
- File overview and other materials in sections in the order shown below and utilize them accordingly.

Section Title	Form Number
Shop Manual, contents binder, binder label and tabs .....	SEN01968-12
00 Index and foreword .....	SEN01969-12
Index .....	SEN01977-12 ●
Foreword and general information .....	SEN01978-01
01 Specification .....	SEN01970-02
Specification and technical data .....	SEN01979-02
10 Structure, function and maintenance standard .....	SEN01971-04
Engine and cooling system .....	SEN02545-01
Power train .....	SEN02546-01
Undercarriage and frame .....	SEN02547-01
Hydraulic system, Part 1 .....	SEN02548-01
Hydraulic system, Part 2 .....	SEN02549-02
Hydraulic system, Part 3 .....	SEN02550-02
Work equipment .....	SEN02551-00
Cab and its attachments .....	SEN02552-01
Electrical system .....	SEN02553-02
20 Standard value table .....	SEN01972-04
Standard service value table .....	SEN02457-04
30 Testing and adjusting .....	SEN01973-06
Testing and adjusting, Part 1 .....	SEN02458-04
Testing and adjusting, Part 2 .....	SEN02459-05 ●
Testing and adjusting, Part 3 .....	SEN02460-02
40 Troubleshooting .....	SEN01974-03
Failure code table and fuse locations .....	SEN02461-03
General information on troubleshooting .....	SEN02462-01
Troubleshooting by failure code, Part 1 .....	SEN02463-02
Troubleshooting by failure code, Part 2 .....	SEN02464-03
Troubleshooting by failure code, Part 3 .....	SEN02465-01
Troubleshooting by failure code, Part 4 .....	SEN02466-01
Troubleshooting of electrical system (E-mode) .....	SEN02467-01

---

Troubleshooting of hydraulic and mechanical system (H-mode).....	SEN02468-01
Troubleshooting of engine (S-mode) .....	SEN02469-01
50 Disassembly and assembly .....	SEN01975-06
General information on disassembly and assembly .....	SEN02709-02
Engine and cooling system.....	SEN02710-02
Power train.....	SEN02711-02
Undercarriage and frame.....	SEN02712-02
Hydraulic system .....	SEN02713-00
Work equipment Body .....	SEN02714-01
Cab and its attachments .....	SEN02715-02
Electrical system.....	SEN02716-02
90 Diagrams and drawings.....	SEN01976-02
Hydraulic circuit diagram .....	SEN01980-00
Electrical diagrams and drawings.....	SEN01981-02

## Table of contents

00 Index and foreword	
Index	SEN01977-12
Composition of shop manual .....	2
Table of contents .....	4
Foreword and general information	SEN01978-01
Safety notice .....	2
How to read the shop manual .....	7
Explanation of terms for maintenance standard .....	9
Handling of electric equipment and hydraulic component .....	11
Handling of connectors newly used for engines .....	20
How to read electric wire code .....	23
Precautions when carrying out operation .....	26
Method of disassembling and connecting push-pull type coupler .....	29
Standard tightening torque table .....	32
Conversion table .....	36
01 Specification	
Specification and technical data	SEN01979-02
Specification dimension drawing .....	2
Working range diagram .....	3
Specifications .....	4
Weight table .....	10
Table of fuel, coolant and lubricants .....	14
10 Structure, function and maintenance standard	
Engine and cooling system	SEN02545-01
Engine mount .....	2
PTO .....	3
Cooling system .....	4
Power train	SEN02546-01
Power train .....	2
Swing circle .....	3
Swing machinery .....	4
Undercarriage and frame	SEN02547-01
Track frame .....	2
Idler cushion .....	4
Idler .....	6
Track roller .....	7
Carrier roller .....	8
Sprocket .....	9
Track shoe .....	10
Hydraulic system, Part 1	SEN02548-01
Hydraulic equipment layout drawing .....	2
Valve control .....	4
Hydraulic tank and filter .....	6
Hydraulic pump .....	8
Hydraulic system, Part 2	SEN02549-02
Control valve .....	2
CLSS .....	14
Functions and operation by valve .....	18
Hydraulic system, Part 3	SEN02550-02
PPC valve .....	2

Swing motor .....	19
Travel motor .....	27
Center swivel joint .....	36
Solenoid valve .....	40
PPC accumulator .....	44
Holding valve .....	46
Multi-control valve .....	51
Work equipment .....	SEN02551-00
Work equipment .....	2
Dimensions of components .....	4
Hydraulic cylinder .....	8
Cab and its attachments .....	SEN02552-01
Air conditioner .....	2
Electrical system .....	SEN02553-02
Electronic control system .....	2
Monitor system .....	35
KOMTRAX system .....	49
Sensor .....	51
20 Standard value table .....	
Standard service value table .....	SEN02457-04
Standard value table for engine related parts .....	2
Standard value table for chassis related parts .....	3
30 Testing and adjusting .....	
Testing and adjusting, Part 1 .....	SEN02458-04
Tools for testing, adjusting, and troubleshooting .....	3
Sketches of special tools .....	7
Testing engine speed .....	8
Testing exhaust temperature .....	9
Checking exhaust gas color .....	10
Adjusting valve clearance .....	11
Testing compression pressure .....	13
Testing blow-by pressure .....	15
Testing engine oil pressure .....	16
Handling fuel system parts .....	17
Releasing residual pressure from fuel system .....	17
Testing fuel pressure .....	18
Testing fuel return rate and fuel leakage .....	19
Bleeding air from fuel circuit .....	21
Checking fuel circuit for leakage .....	23
Testing and adjusting alternator belt tension .....	24
Checking and adjusting air conditioner compressor belt tension .....	25
Testing swing circle bearing clearance .....	26
Checking and adjusting track shoe tension .....	27
Testing and adjusting oil pressure in work equipment, swing, and travel circuits .....	29
Testing control circuit basic pressure .....	32
Testing and adjusting oil pressure in pump PC control circuit .....	33
Testing and adjusting oil pressure in pump LS control circuit .....	36
Testing solenoid valve output pressure .....	40
Testing PPC valve output pressure .....	41
Adjusting play of work equipment and swing PPC valves .....	43
Checking parts which cause hydraulic drift of work equipment .....	44
Testing and adjusting travel deviation .....	46
Releasing residual pressure from hydraulic circuit .....	48
Testing oil leakage .....	49

Bleeding air from each part .....	52
Checking cab tipping stopper .....	54
Adjusting mirrors .....	54
Testing and adjusting, Part 2 .....	SEN02459-05
Special functions of machine monitor .....	2
Testing and adjusting, Part 3 .....	SEN02460-02
Handling voltage circuit of engine controller .....	2
Preparation work for troubleshooting of electrical system .....	3
Procedure for testing diodes .....	8
Pm Clinic service .....	9
 40 Troubleshooting	
Failure code table and fuse locations .....	SEN02461-03
Failure code table .....	2
Fuse locations .....	6
General information on troubleshooting .....	SEN02462-01
Points to remember when troubleshooting .....	2
Sequence of events in troubleshooting .....	3
Checks before troubleshooting .....	4
Classification and procedures for troubleshooting .....	5
Information in troubleshooting table .....	6
Phenomena looking like troubles and troubleshooting Nos. ....	8
Connection table for connector pin numbers .....	11
T- branch box and T- branch adapter table .....	47
Troubleshooting by failure code, Part 1 .....	SEN02463-02
Failure code [989L00] Engine controller lock caution 1 .....	3
Failure code [989M00] Engine controller lock caution 2 .....	3
Failure code [989N00] Engine controller lock caution 3 .....	4
Failure code [AB00KE] Charge voltage low .....	6
Failure code [B@BAZG] Eng oil press. low .....	8
Failure code [B@BAZK] Eng oil level low .....	8
Failure code [B@BCNS] Eng coolant overheat .....	9
Failure code [B@HANS] Hydr oil overheat .....	9
Failure code [CA111] ECM critical internal failure .....	10
Failure code [CA115] Eng. Ne and Bkup speed sensor error .....	13
Failure code [CA122] Charge air press sensor high error .....	14
Failure code [CA123] Charge air press sensor low error .....	16
Failure code [CA131] Throttle sensor high error .....	18
Failure code [CA132] Throttle sensor low error .....	20
Failure code [CA144] Coolant temp. sensor high error .....	21
Failure code [CA145] Coolant temp. sensor low error .....	22
Failure code [CA153] Charge air temp. sensor high error .....	23
Failure code [CA154] Charge air temp. sensor low error .....	24
Failure code [CA187] Sensor sup. 2 volt. low error .....	24
Failure code [CA221] Ambient air press. sensor high error .....	26
Failure code [CA222] Ambient air press. sensor low error .....	28
Failure code [CA227] Sensor sup. 2 volt. high error .....	30
Failure code [CA234] Eng. overspeed .....	31
Failure code [CA238] Ne speed sensor sup. volt. error .....	32
Failure code [CA271] IMV/PCV1 short error .....	34
Failure code [CA272] IMV/PCV1 open error .....	35
Failure code [CA322] Injector #1 (L #1) system open/short error .....	36
Failure code [CA324] Injector #3 (L/B #3) system open/short error .....	38
Failure code [CA331] Injector #2 (L/B #2) system open/short error .....	40
Failure code [CA332] Injector #4 (L/B #4) system open/short error .....	42



Troubleshooting by failure code, Part 2	SEN02464-03
Failure code [CA351] Inj. drive circuit error.....	3
Failure code [CA352] Sensor sup. 1 volt. low error.....	6
Failure code [CA386] Sensor sup. 1 volt. high error.....	8
Failure code [CA435] Abnormality in engine oil pressure switch.....	10
Failure code [CA441] Battery voltage low error.....	11
Failure code [CA442] Battery voltage high error.....	11
Failure code [CA449] Rail press. very high error.....	12
Failure code [CA451] Rail press. sensor high error.....	14
Failure code [CA452] Rail press. sensor low error.....	16
Failure code [CA553] Rail press. high error.....	16
Failure code [CA559] Rail press. low error.....	17
Failure code [CA689] Eng. Ne speed sensor error.....	20
Failure code [CA731] Eng. Bkup speed sensor phase error.....	22
Failure code [CA757] All persistent data lost error.....	22
Failure code [CA778] Eng. Bkup speed sensor error.....	24
Failure code [CA1633] KOMNET datalink timeout error.....	26
Failure code [CA2185] Throttle sens. sup. volt. high error.....	28
Failure code [CA2186] Throttle sens. sup. volt. low error.....	30
Failure code [CA2249] Rail press. very low error.....	30
Failure code [CA2311] Abnormality in IMV solenoid.....	31
Failure code [D110KB] Battery relay drive short.....	32
Failure code [D19JKZ] Personal code relay abnormality.....	34
Failure code [D862KA] GPS antenna discon.....	36
Failure code [DA22KK] Pump solenoid power low error.....	38
Failure code [DA25KP] 5V sensor 1 power abnormality.....	40
Failure code [DA26KP] 5V sensor 2 power abnormality.....	43
Troubleshooting by failure code, Part 3	SEN02465-01
Failure code [DA2RMC] CAN discon (Pump controller detected).....	4
Failure code [DAF8KB] Short circuit in camera power supply.....	6
Failure code [DAFGMC] GPS module error.....	8
Failure code [DAFRMC] CAN discon (Monitor detected).....	10
Failure code [DGH2KB] Hydr oil sensor short.....	12
Failure code [DHPAMA] Pump press sensor abnormality.....	14
Failure code [DHSFMA] Travel left forward PPC press sensor abnormality.....	16
Failure code [DHSGMA] Travel right forward PPC press sensor abnormality.....	18
Failure code [DHSHMA] Travel left reverse PPC press sensor abnormality.....	20
Failure code [DHSJMA] Travel right reverse PPC press sensor abnormality.....	22
Failure code [DHSMMA] Blade raise PPC press sensor abnormality.....	24
Failure code [DHSLMA] Blade lower PPC press sensor abnormality.....	26
Failure code [DHX1MA] Overload sensor abnormality (Analog).....	28
Failure code [DV20KB] Travel alarm S/C.....	29
Failure code [DW43KA] Travel speed sol discon.....	30
Failure code [DW43KB] Travel speed sol short.....	31
Failure code [DW45KA] Swing brake sol discon.....	32
Failure code [DW45KB] Swing brake sol short.....	34
Failure code [DW91KA] Travel junction sol discon.....	36
Failure code [DW91KB] Travel junction sol short.....	37
Failure code [DWJ0KA] Merge-divider sol discon.....	38
Failure code [DWJ0KB] Merge-divider sol short.....	39
Troubleshooting by failure code, Part 4	SEN02466-01
Failure code [DXA8KA] PC-EPC sol discon.....	2
Failure code [DXA8KB] PC-EPC sol short.....	4
Failure code [DXE4KA] Service current EPC discon.....	6
Failure code [DXE4KB] Service current EPC short.....	7
Failure code [DY20KA] Wiper working abnormality.....	8
Failure code [DY20MA] Wiper parking abnormality.....	10

Failure code [DY2CKA] Washer drive discon.....	12
Failure code [DY2CKB] Washer drive short.....	14
Failure code [DY2DKB] Wiper drive (for) short.....	16
Failure code [DY2EKB] Wiper drive (rev) short.....	18
Troubleshooting of electrical system (E-mode)	SEN02467-01
Before carrying out troubleshooting of electrical system.....	3
Information in troubleshooting table.....	5
E-1 When starting switch turned ON, machine monitor displays nothing.....	6
E-2 When starting switch turned ON (before starting engine), basic check item lights up.....	8
E-3 Engine does not start (Engine does not turn).....	9
E-4 Preheater does not operate.....	12
E-5 Automatic warm-up system does not operate (in cold season).....	14
E-6 All work equipment, swing, and travel mechanism do not move or cannot be locked.....	16
E-7 Precaution lights up while engine is running.....	18
E-8 Emergency stop item lights up while engine is running.....	21
E-9 Engine coolant temperature gauge does not indicate normally.....	22
E-10 Hydraulic oil temperature gauge does not indicate normally.....	23
E-11 Fuel level gauge does not indicate normally.....	25
E-12 Contents of display by machine monitor are different from applicable machine.....	27
E-13 Machine monitor does not display some items.....	27
E-14 Function switch does not work.....	27
E-15 Auto-decelerator does not operate normally.....	28
E-16 Working mode does not change.....	29
E-17 Travel speed does not change.....	30
E-18 Alarm buzzer cannot be stopped.....	31
E-19 Windshield wiper and window washer do not operate.....	32
E-20 Swing holding brake does not operate normally.....	36
E-21 Travel alarm does not sound or does not stop sounding.....	38
E-22 Air conditioner does not operate normally (including air conditioner abnormality record) ..	39
E-23 While starting switch is in OFF position, service meter is not displayed.....	51
E-24 Machine monitor cannot be set in service mode.....	51
E-25 Monitoring function does not display lever control signal normally.....	52
E-26 KOMTRAX system does not operate normally.....	68
Troubleshooting of hydraulic and mechanical system (H-mode)	SEN02468-01
Information contained in troubleshooting table.....	3
System chart for hydraulic and mechanical systems.....	4
H-1 Speed or power of all work equipment, swing, and travel are low.....	6
H-2 Engine speed sharply drops or engine stalls.....	7
H-3 No work equipment, travel and swing move.....	8
H-4 Abnormal noise is heard from around hydraulic pump.....	8
H-5 Fine control mode does not function.....	9
H-6 Speed or power of boom is low.....	10
H-7 Speed or power of arm is low.....	11
H-8 Speed or power of bucket is low.....	12
H-9 Work equipment does not move in its single operation.....	13
H-10 Hydraulic drift of work equipment is large.....	14
H-11 Time lag of work equipment is large.....	15
H-12 Work equipment loaded more is slower during compound operation.....	15
H-13 Boom RAISE speed is low in compound operation of swing + boom RAISE.....	15
H-14 Travel speed lowers largely during compound operation of work equipment/swing + travel ..	16
H-15 Machine deviates during travel.....	17
H-16 Travel speed is low.....	18
H-17 Machine cannot be steered easily or steering power is low.....	19
H-18 Travel speed does not change or it is kept low or high.....	20
H-19 Track does not move (Only either side).....	20
H-20 Machine does not swing.....	21
H-21 Swing acceleration or swing speed is low.....	22

H-22 Excessive overrun when stopping swing.....	23
H-23 When upper structure stops swinging, it makes large shock .....	24
H-24 When upper structure stops swinging, it makes large sound .....	24
H-25 Hydraulic drift of swing is large.....	25
H-26 Flow rate in attachment circuit cannot be adjusted .....	26
Troubleshooting of engine (S-mode) .....	SEN02469-01
Method of using troubleshooting chart .....	4
S-1 Starting performance is poor .....	8
S-2 Engine does not start.....	9
S-3 Engine does not pick up smoothly .....	12
S-4 Engine stops during operations .....	13
S-5 Engine does not rotate smoothly .....	14
S-6 Engine lacks output (or lacks power).....	15
S-7 Exhaust smoke is black (incomplete combustion).....	16
S-8 Oil consumption is excessive (or exhaust smoke is blue) .....	17
S-9 Oil becomes contaminated quickly .....	18
S-10 Fuel consumption is excessive .....	19
S-11 Oil is in coolant (or coolant spurts back or coolant level goes down) .....	20
S-12 Oil pressure drops .....	21
S-13 Oil level rises (Entry of coolant or fuel).....	22
S-14 Coolant temperature becomes too high (overheating) .....	23
S-15 Abnormal noise is made .....	24
S-16 Vibration is excessive .....	25
50 Disassembly and assembly .....	
General information on disassembly and assembly .....	SEN02709-02
How to read this manual .....	2
Coating materials list.....	4
Special tool list .....	7
Sketch of special tool .....	11
Engine and cooling system .....	SEN02710-02
Removal and installation of fuel supply pump assembly.....	2
Removal and installation of fuel injector assembly .....	4
Removal and installation of front oil seal.....	7
Removal and installation of rear oil seal .....	9
Removal and installation of cylinder head assembly .....	12
Removal and installation of radiator assembly.....	19
Removal and installation of aftercooler assembly .....	21
Removal and installation of work equipment oil cooler assembly .....	23
Removal and installation of engine and work equipment pump assembly.....	26
Removal and installation of fuel tank assembly .....	31
Power train .....	SEN02711-02
Removal and installation of travel motor and final drive assembly .....	2
Disassembly and assembly of travel motor and final drive assembly .....	4
Removal and installation of swing motor and swing machinery assembly.....	41
Disassembly and assembly of swing machinery assembly.....	43
Removal and installation of swing circle assembly .....	49
Undercarriage and frame .....	SEN02712-02
Disassembly and assembly of track roller .....	2
Disassembly and assembly of idler assembly.....	5
Disassembly and assembly of recoil spring .....	8
Removal and installation of track shoe assembly .....	11
Removal and installation of sprocket .....	13
Removal and installation of revolving frame assembly .....	14
Removal and installation of counterweight assembly (Machine without add-on weight).....	16
Removal and installation of counterweight assembly (Machine with add-on weight).....	18

Hydraulic system	SEN02713-00
Removal and installation of center swivel joint assembly.....	2
Disassembly and assembly of center swivel joint assembly .....	4
Removal and installation of hydraulic tank assembly .....	5
Removal and installation of hydraulic pump assembly.....	8
Removal and installation of control valve assembly .....	12
Disassembly and assembly of control valve assembly .....	17
Disassembly and assembly of work equipment PPC valve assembly .....	27
Disassembly and assembly of travel PPC valve assembly .....	30
Disassembly and assembly of hydraulic cylinder assembly .....	32
Work equipment Body	SEN02714-01
Removal and installation of work equipment assembly.....	2
Cab and its attachments	SEN02715-02
Removal and installation of operator cab assembly .....	2
Removal and Installation of operator's cab door .....	4
Removal and installation of operator's cab glass (stuck glass) .....	7
Removal and installation of front window assembly .....	16
Removal and installation of floor frame assembly .....	17
Electrical system	SEN02716-02
Removal and installation of air compressor assembly .....	2
Removal and installation of air conditioner condenser.....	3
Removal and installation of air compressor unit assembly .....	4
Removal and installation of machine monitor assembly .....	7
Removal and installation of pump controller assembly .....	8
Removal and installation of engine controller assembly .....	9
Removal and installation of KOMTRAX communications module.....	10
90 Diagrams and drawings	
Hydraulic circuit diagram	SEN01980-00
Hydraulic circuit diagram .....	3
Electrical diagrams and drawings	SEN01981-02
Electrical circuit diagram .....	3
Connectors table and arrangement drawing .....	15



PC138US, USLC-8 Hydraulic excavator

Form No. SEN01977-12

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Printed in Japan 10-12

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# HYDRAULIC EXCAVATOR

## PC138US-8 PC138USLC-8

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## 00 Index and foreword

### Foreword and general information

---

Safety notice .....	2
How to read the shop manual .....	7
Explanation of terms for maintenance standard .....	9
Handling of electric equipment and hydraulic component .....	11
Handling of connectors newly used for engines .....	20
How to read electric wire code .....	23
Precautions when carrying out operation .....	26
Method of disassembling and connecting push-pull type coupler .....	29
Standard tightening torque table .....	32
Conversion table .....	36

## Safety notice

(Rev. 2007/03)

### Important safety notice

Proper service and repair are extremely important for safe machine operation. The service and repair techniques recommended by Komatsu and described in this manual are both effective and safe. Some of these techniques require the use of tools specially designed by Komatsu for the specific purpose.

To prevent injury to workers, the symbol **▲** is used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

### 1. General precautions

**▲ Mistakes in operation are extremely dangerous. Read the Operation and Maintenance Manual carefully before operating the machine.**

- 1) Before carrying out any greasing or repairs, read all the safety plates stuck to the machine. For the locations of the safety plates and detailed explanation of precautions, see the Operation and Maintenance Manual.
- 2) Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt, water, or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.
- 3) When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
  - Always wear safety glasses when hitting parts with a hammer.
  - Always wear safety glasses when grinding parts with a grinder, etc.
- 4) When carrying out any operation with 2 or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR warning signs in the operator's compartment.
- 5) Only qualified workers must carry out work and operation which require license or qualification.
- 6) Keep all tools in good condition, learn the correct way to use them, and use the proper ones of them. Before starting work, thoroughly check the tools, machine, fork-lift, service car, etc.
- 7) If welding repairs are needed, always have a trained and experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, shielding goggles, cap and other clothes suited for welding work.
- 8) Before starting work, warm up your body thoroughly to start work under good condition.

### Safety points

1	Good arrangement
2	Correct work clothes
3	Following work standard
4	Making and checking signs
5	Prohibition of operation and handling by unlicensed workers
6	Safety check before starting work
7	Wearing protective goggles (for cleaning or grinding work)
8	Wearing shielding goggles and protectors (for welding work)
9	Good physical condition and preparation
10	Precautions against work which you are not used to or you are used to too much

### 2. Preparations for work

- 1) Before adding oil or making any repairs, park the machine on hard and level ground, and apply the parking brake and block the wheels or tracks to prevent the machine from moving.
- 2) Before starting work, lower the work equipment (blade, ripper, bucket, etc.) to the ground. If this is not possible, insert the lock pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.



- 3) When disassembling or assembling, support the machine with blocks, jacks, or stands before starting work.
- 4) Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

### 3. Precautions during work

- 1) Before disconnecting or removing components of the oil, water, or air circuits, first release the pressure completely from the circuit. When removing the oil filler cap, a drain plug, or an oil pressure pickup plug, loosen it slowly to prevent the oil from spurting out.
- 2) The coolant and oil in the circuits are hot when the engine is stopped, so be careful not to get scalded. Wait for the oil and coolant to cool before carrying out any work on the oil or water circuits.
- 3) Before starting work, stop the engine. When working on or around a rotating part, in particular, stop the engine. When checking the machine without stopping the engine (measuring oil pressure, revolving speed, temperature, etc.), take extreme care not to get rolled or caught in rotating parts or moving parts.
- 4) Before starting work, remove the leads from the battery. Always remove the lead from the negative (-) terminal first.
- 5) When raising a heavy component (heavier than 25 kg), use a hoist or crane. Before starting work, check that the slings (wire ropes, chains, and hooks) are free from damage. Always use slings which have ample capacity and install them to proper places. Operate the hoist or crane slowly to prevent the component from hitting any other part. Do not work with any part still raised by the hoist or crane.
- 6) When removing a cover which is under internal pressure or under pressure from a spring, always leave 2 bolts in diagonal positions. Loosen those bolts gradually and alternately to release the pressure, and then remove the cover.
- 7) When removing components, be careful not to break or damage the electrical wiring. Damaged wiring may cause electrical fires.
- 8) When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips onto the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip and can even start fires.
- 9) As a general rule, do not use gasoline to wash parts. Do not use it to clean electrical parts, in particular.
- 10) Be sure to assemble all parts again in their original places. Replace any damaged parts and parts which must not be reused with new parts. When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is operated.
- 11) When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. In addition, check that connecting parts are correctly installed.
- 12) When assembling or installing parts, always tighten them to the specified torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.
- 13) When aligning 2 holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
- 14) When measuring hydraulic pressure, check that the measuring tools are correctly assembled.
- 15) Take care when removing or installing the tracks of track-type machines. When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.
- 16) If the engine is operated for a long time in a place which is not ventilated well, you may suffer from gas poisoning. Accordingly, open the windows and doors to ventilate well.

**4. Precautions for sling work and making signs**

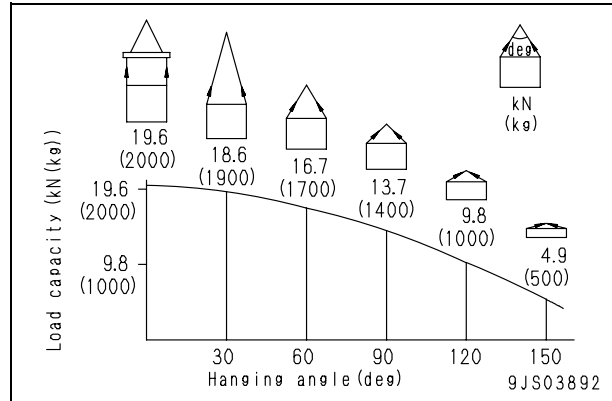
1) Only one appointed worker must make signs and co-workers must communicate with each other frequently. The appointed sign maker must make specified signs clearly at a place where he is seen well from the operator's seat and where he can see the working condition easily. The sign maker must always stand in front of the load and guide the operator safely.

- Do not stand under the load.
- Do not step on the load.

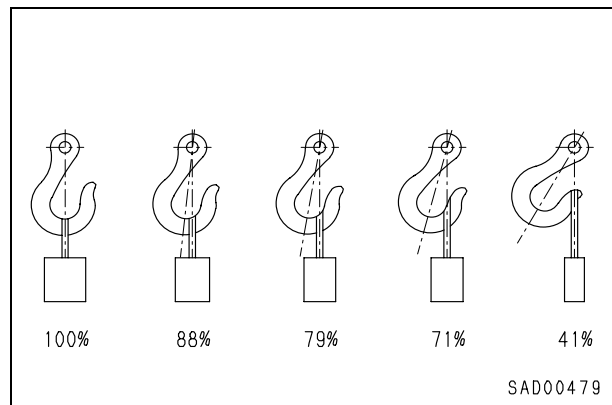
- 2) Check the slings before starting sling work.
- 3) Keep putting on gloves during sling work. (Put on leather gloves, if available.)
- 4) Measure the weight of the load by the eye and check its center of gravity.
- 5) Use proper sling according to the weight of the load and method of slinging. If too thick wire ropes are used to sling a light load, the load may slip and fall.
- 6) Do not sling a load with 1 wire rope alone. If it is slung so, it may rotate and may slip out of the rope. Install 2 or more wire ropes symmetrically.

**⚠ Slinging with 1 rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can result in a dangerous accident.**

- 7) Limit the hanging angle to 60°, as a rule. Do not sling a heavy load with ropes forming a wide hanging angle from the hook. When hoisting a load with 2 or more ropes, the force subjected to each rope will increase with the hanging angle. The table below shows the variation of allowable load in kN {kg} when hoisting is made with 2 ropes, each of which is allowed to sling up to 9.8 kN {1,000 kg} vertically, at various hanging angles. When the 2 ropes sling a load vertically, up to 19.6 kN {2,000 kg} of total weight can be suspended. This weight is reduced to 9.8 kN {1,000 kg} when the 2 ropes make a hanging angle of 120°. If the 2 ropes sling a 19.6 kN {2,000 kg} load at a lifting angle of 150°, each of them is subjected to a force as large as 39.2 kN {4,000 kg}.



- 8) When installing wire ropes to an angular load, apply pads to protect the wire ropes. If the load is slippery, apply proper material to prevent the wire rope from slipping.
- 9) Use the specified eyebolts and fix wire ropes, chains, etc. to them with shackles, etc.
- 10) Apply wire ropes to the middle portion of the hook.
  - Slinging near the tip of the hook may cause the rope to slip off the hook during hoisting. The hook has the maximum strength at the middle portion.




- 11) Do not use twisted or kinked wire ropes.
- 12) When lifting up a load, observe the following.
  - Wind in the crane slowly until wire ropes are stretched. When settling the wire ropes with the hand, do not grasp them but press them from above. If you grasp them, your fingers may be caught.
  - After the wire ropes are stretched, stop the crane and check the condition of the slung load, wire ropes, and pads.

- If the load is unstable or the wire rope or chains are twisted, lower the load and lift it up again.
  - Do not lift up the load slantingly.
- 13) When lifting down a load, observe the following.
- When lifting down a load, stop it temporarily at 30 cm above the floor, and then lower it slowly.
  - Check that the load is stable, and then remove the sling.
  - Remove kinks and dirt from the wire ropes and chains used for the sling work, and put them in the specified place.

#### 5. Precautions for using mobile crane

- ★ Read the Operation and Maintenance Manual of the crane carefully in advance and operate the crane safely.

#### 6. Precautions for using overhead hoist crane

**▲ When raising a heavy part (heavier than 25 kg), use a hoist, etc. In Disassembly and assembly, the weight of a part heavier than 25 kg is indicated after the mark of .**

- 1) Before starting work, inspect the wire ropes, brake, clutch, controller, rails, over wind stop device, electric shock prevention earth leakage breaker, crane collision prevention device, and power application warning lamp, and check safety.
- 2) Observe the signs for sling work.
- 3) Operate the hoist at a safe place.
- 4) Check the direction indicator plates (east, west, south, and north) and the directions of the control buttons without fail.
- 5) Do not sling a load slantingly. Do not move the crane while the slung load is swinging.
- 6) Do not raise or lower a load while the crane is moving longitudinally or laterally.
- 7) Do not drag a sling.
- 8) When lifting up a load, stop it just after it leaves the ground and check safety, and then lift it up.
- 9) Consider the travel route in advance and lift up a load to a safe height.
- 10) Place the control switch on a position where it will not be an obstacle to work and passage.
- 11) After operating the hoist, do not swing the control switch.
- 12) Remember the position of the main switch so that you can turn off the power immediately in an emergency.

- 13) If the hoist stops because of a power failure, turn the power switch OFF. When turning on a switch which was turned OFF by the electric shock prevention earth leakage breaker, check that the devices related to that switch are not in operation state.
- 14) If you find an obstacle around the hoist, stop the operation.
- 15) After finishing the work, stop the hoist at the specified position and raise the hook to at least 2 m above the floor. Do not leave the sling installed to the hook.

#### 7. Selecting wire ropes

- 1) Select adequate ropes depending on the weight of parts to be hoisted, referring to the table below.

Wire ropes  
(Standard "Z" twist ropes without galvanizing)  
(JIS G3525, No. 6, Type 6X37-A)

Nominal diameter of rope mm	Allowable load	
	kN	ton
10	8.8	0.9
12	12.7	1.3
14	17.3	1.7
16	22.6	2.3
18	28.6	2.9
20	35.3	3.6
25	55.3	5.6
30	79.6	8.1
40	141.6	14.4
50	221.6	22.6
60	318.3	32.4

- ★ The allowable load is one-sixth of the breaking strength of the rope used (Safety coefficient: 6).

## 8. Precautions for disconnecting and connecting hoses and tubes in air conditioner circuit

### 1) Disconnection

**⚠ Collect the air conditioner refrigerant (R134a) from the air conditioner circuit in advance.**

★ Ask professional traders for collecting and filling operation of refrigerant (R134a).

★ Never release the refrigerant (R134a) to the atmosphere.

**⚠ If the refrigerant gas (R134a) gets in your eyes, you may lose your sight. Accordingly, when collecting or filling it, you must be qualified for handling the refrigerant and put on protective goggles.**

### 2) Connection

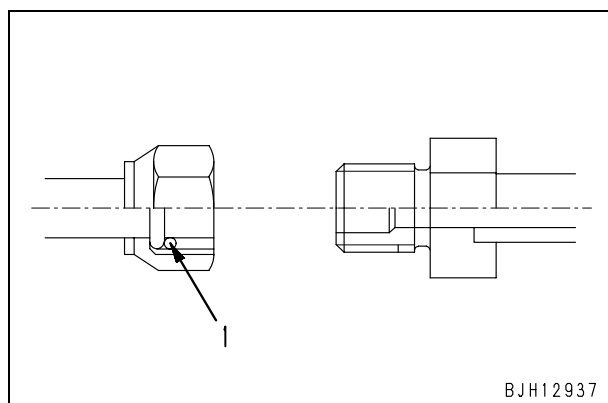
1] When installing the air conditioner circuit hoses and tubes, take care that dirt, dust, water, etc. will not enter them.

2] When connecting the air conditioner hoses and tubes, check that O-rings (1) are fitted to their joints.

3] Check that each O-ring is not damaged or deteriorated.

4] When connecting the refrigerant piping, apply compressor oil for refrigerant (R134a) (**DENSO: ND-OIL8, ZEXEL: ZXL100PG (equivalent to PAG46)**) to its O-rings.

★ Example of O-ring (Fitted to every joint of hoses and tubes)



★ For tightening torque, see the precautions for installation in each section of "Disassembly and assembly".