

INSTRUCTION MANUAL

CK90UR

Apply to :
CK90UR YA01-00101 ~



You must read and understand this manual
before operating or servicing this machine.

Book code : No. S2YA1001 ⑥

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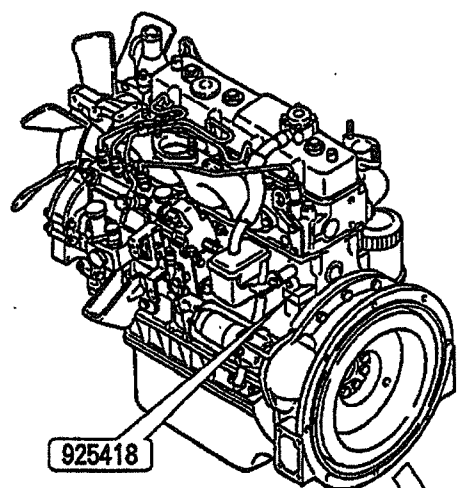
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■ For maintenance and service

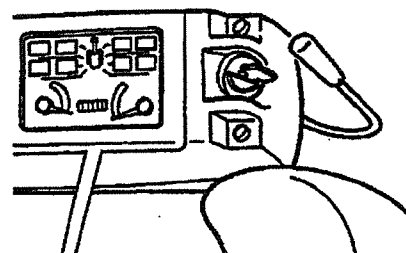
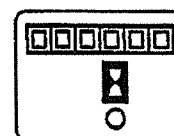
For maintenance and service, please inform the machine type, machine number and engine number.

Machine type	CK90UR
Machine number	YA01-
Engine number	A-4JB1

● Position of the engine number

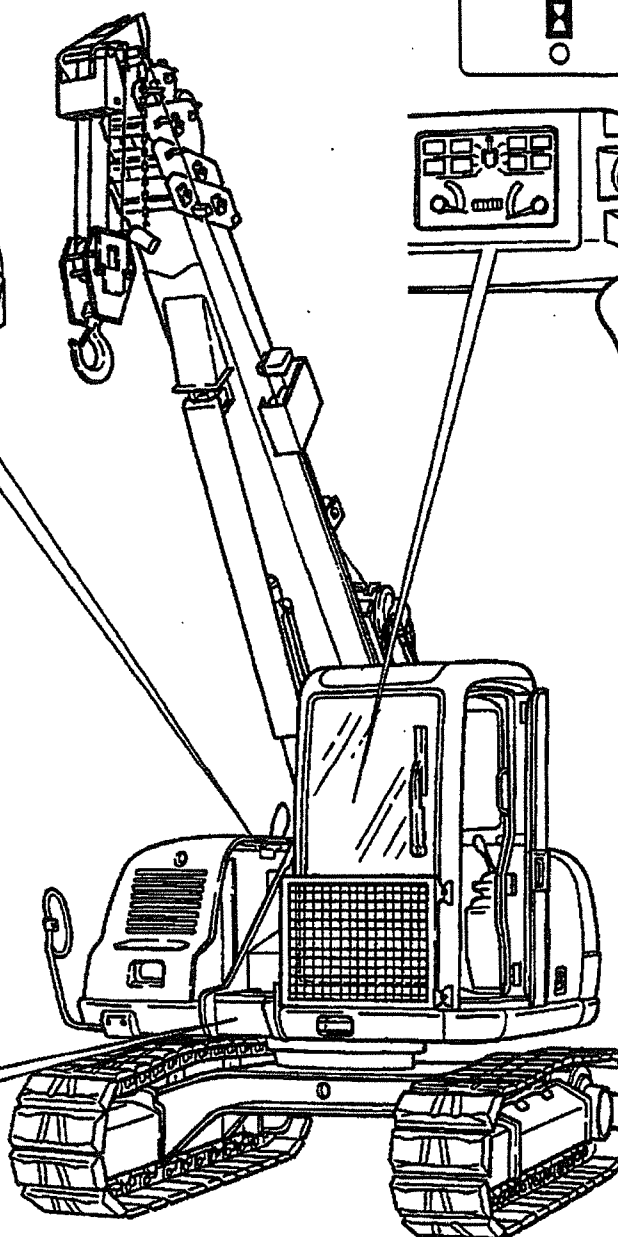


● Hour meter

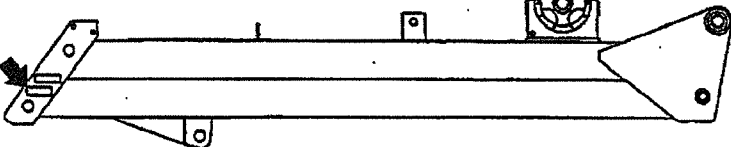
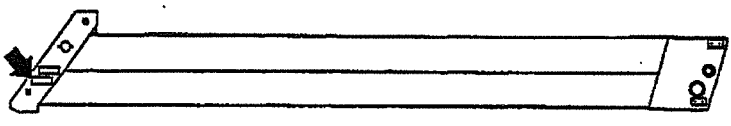
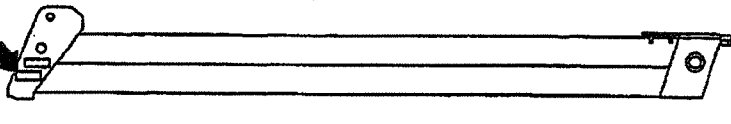
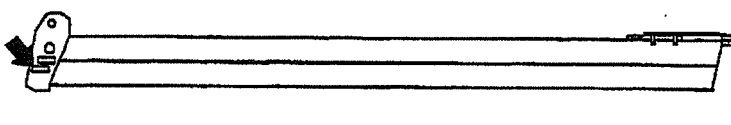
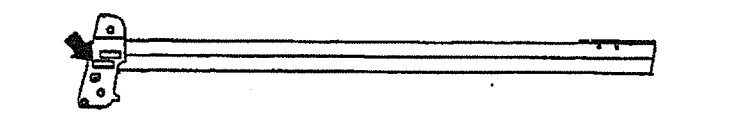
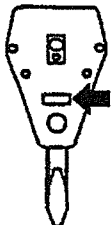
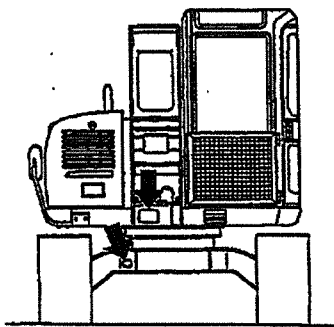


● Position of the machine number

KOBELCO	
CK90UR	クレーン
つり上荷重	
機械番号	YK
製造年月	年 月
コベルコ建機株式会社	

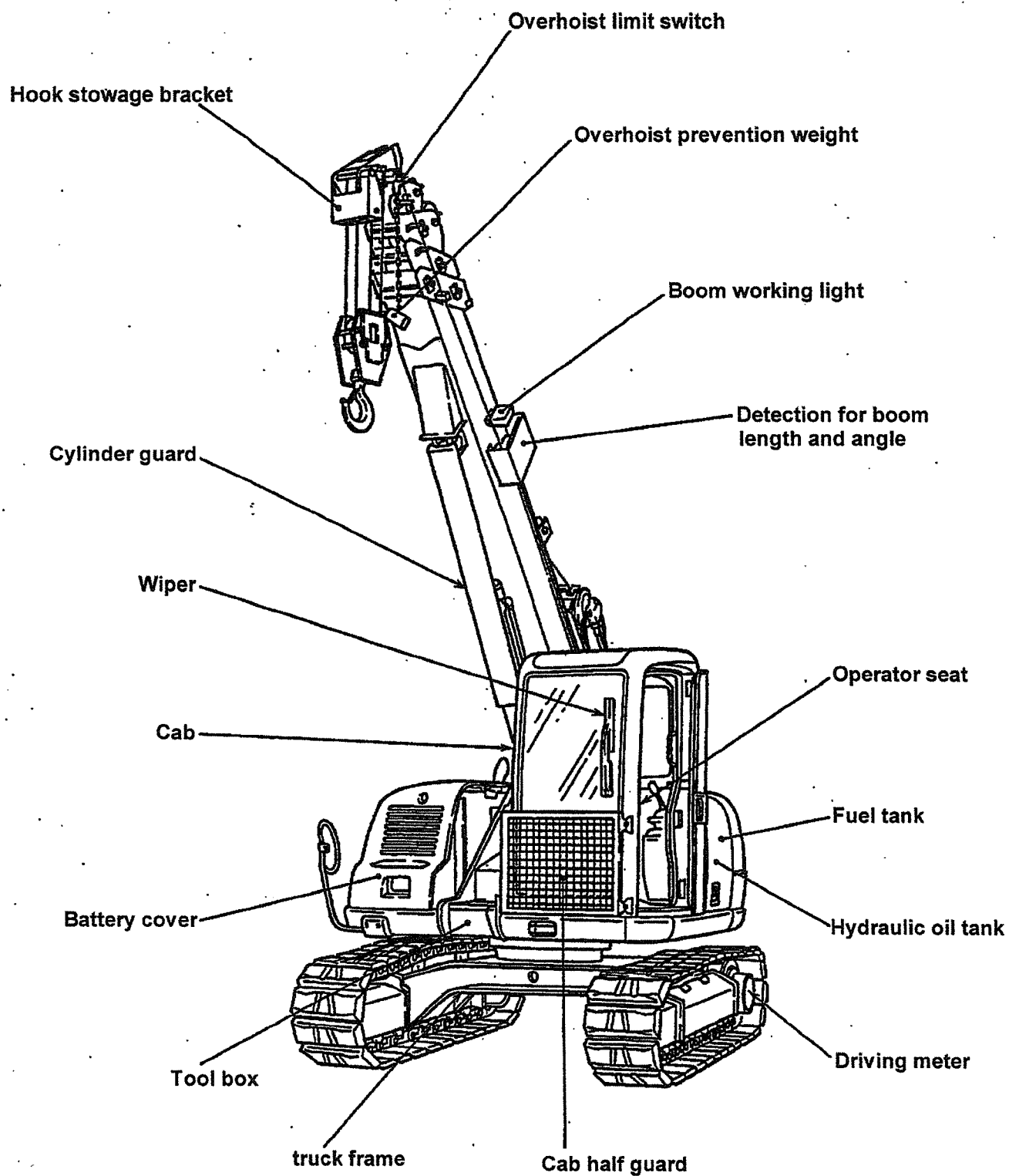


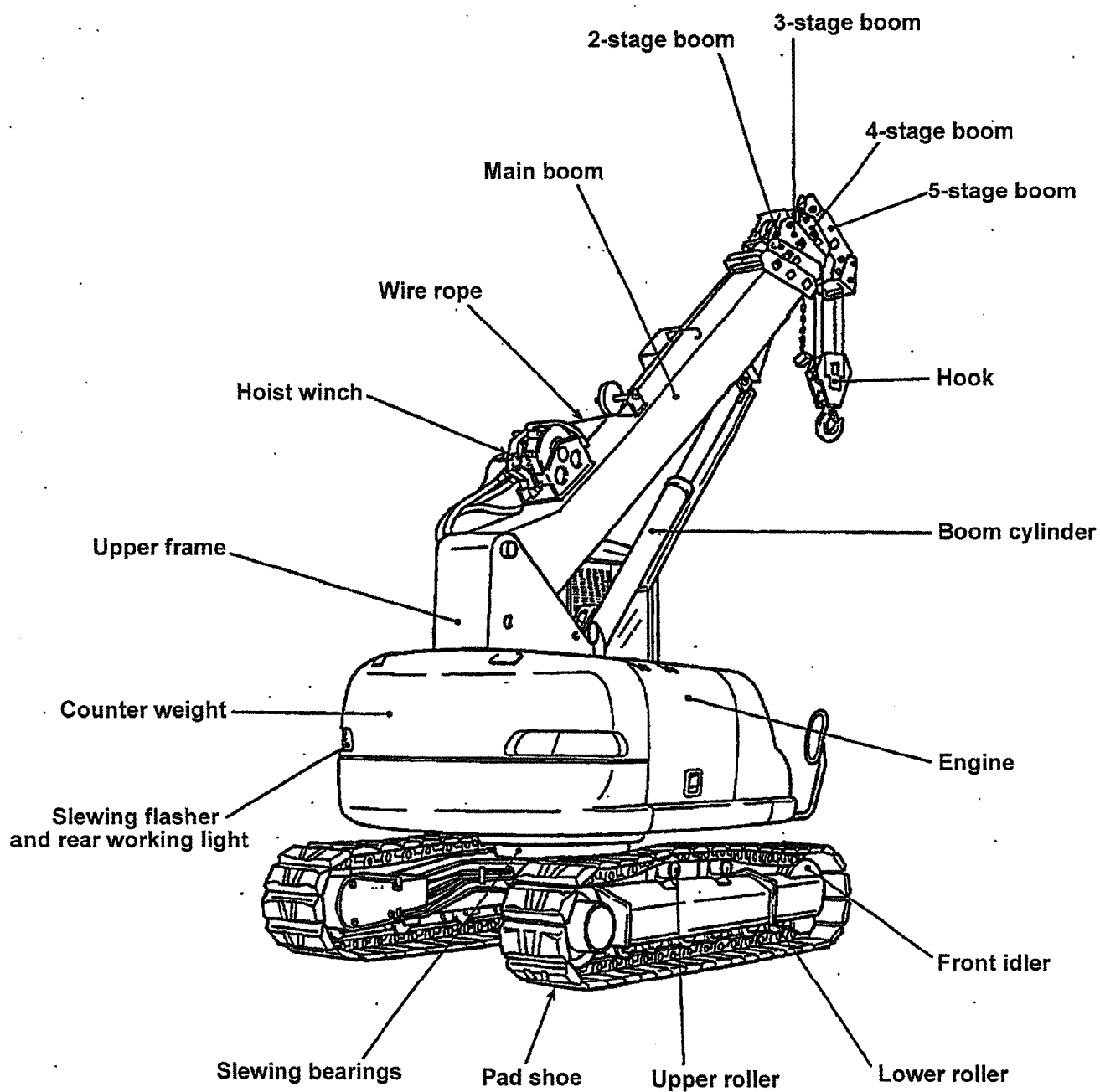
■ Position of the production numbers

Main boom	
2-stage boom	
3-stage boom	
4-stage boom	
5-stage boom	
<p>Hook</p> 	<p>main body (upper) (lower)</p> 

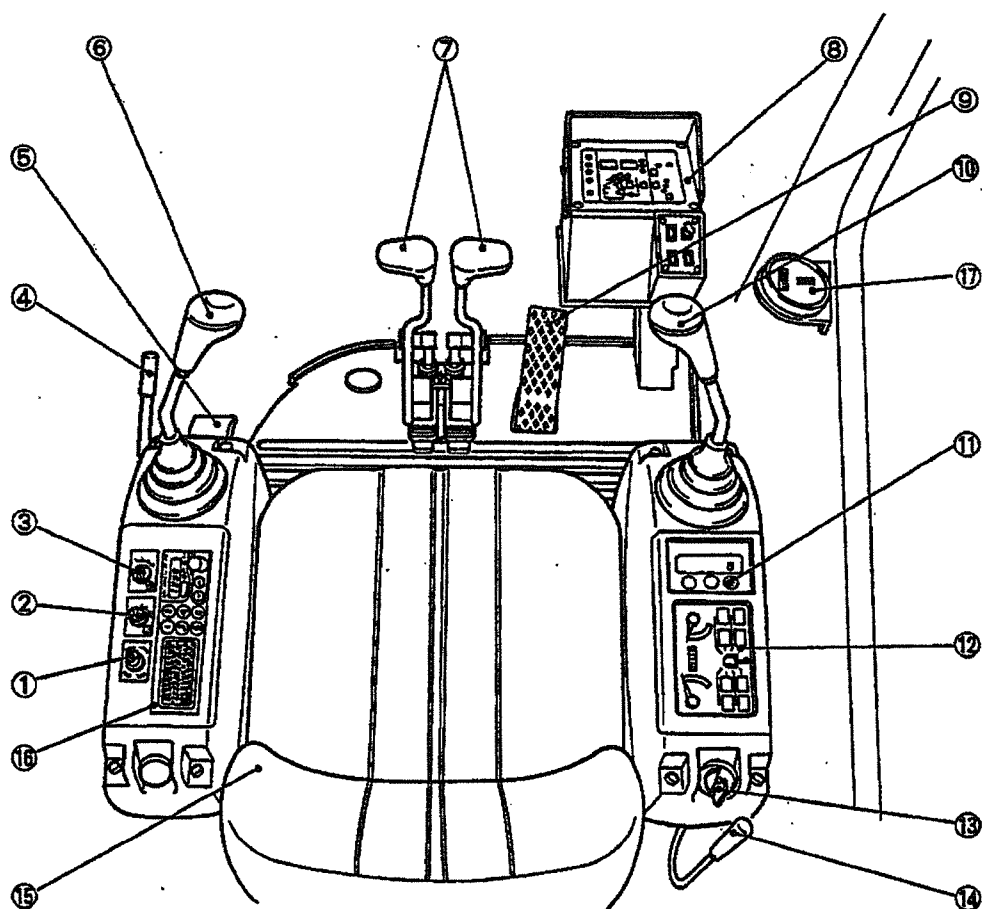
Parts names

■ Exterior

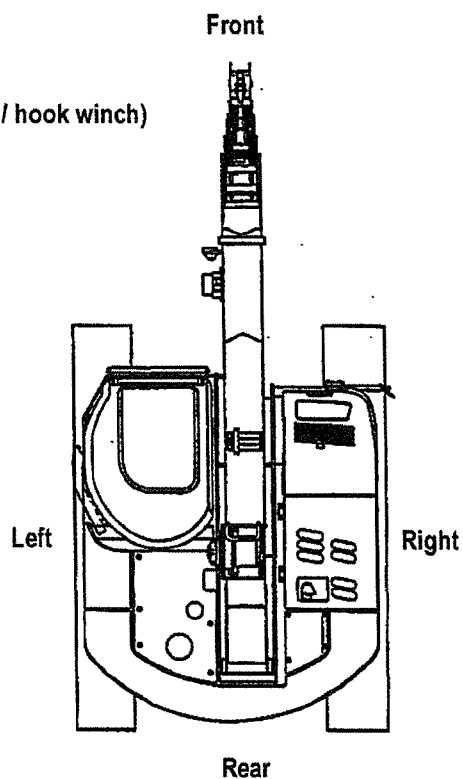




Inside the cab



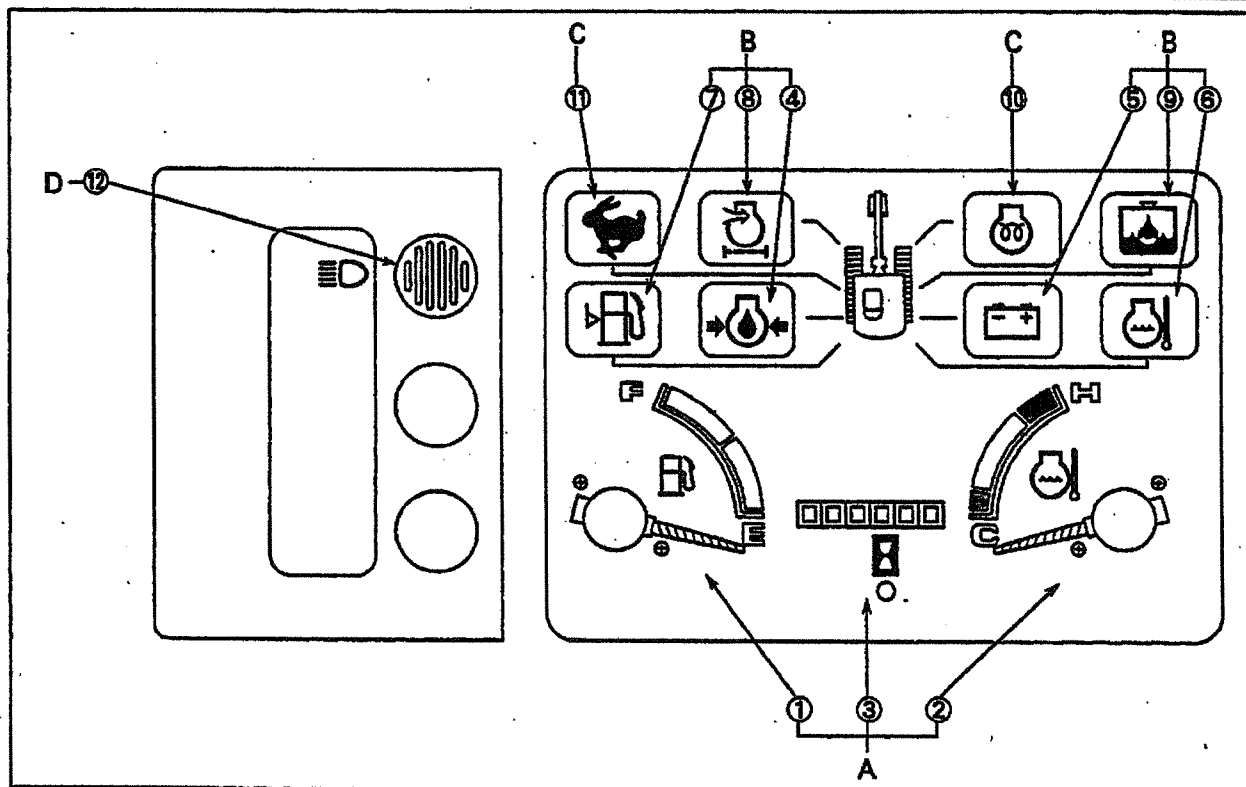
- | | |
|---|--|
| ① Air conditioner temperature switch | ⑨ Accelerator pedal |
| ② Air conditioner switch | ⑩ Right operation lever
(Boom derrick&lower / hook winch) |
| ③ Wiper switch | ⑪ Working light switch |
| ④ N/A | ⑫ Monitor switch |
| ⑤ Control lock lever | ⑬ Starter switch |
| ⑥ Left operation lever (with horn switch)
(Slewing right&left / boom extend&retract) | ⑭ Accelerator lever |
| ⑦ Driving lever
(with driving 1&2 speed switch) | ⑮ Operator seat |
| ⑧ Overload prevention device
(moment limiter) | ⑯ N/A |
| | ⑰ Level gauge |



■ Monitor panel

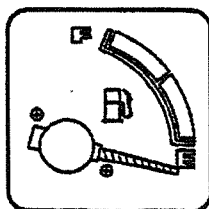
The monitor panel has following four functions.

Sign	
A	Meter
B	Warning lamp
C	Indication lamp
D	Selection switch



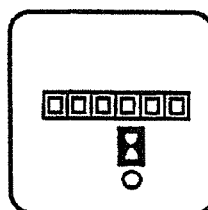
● Meter (A)

① Fuel gauge



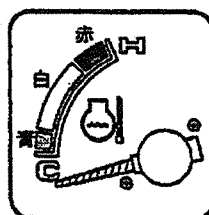
Indicates the amount of fuel remaining.
When the remaining fuel goes less, it points out E.
Fuel full amount (100L)

③ Hour meter



This counts the time the engine is running to indicate the time the machine has been in use.
If the engine is on the hour moves on.

② Engine water temperature gauge



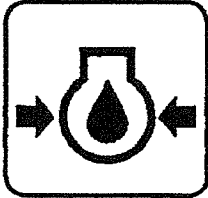
Indicates the temperature of engine coolant. If the needle lies in white range it is normal. If it is in red keep the engine in low idling and wait until the needle goes back to white.

● Warning lamps (B)

⚠ CAUTION

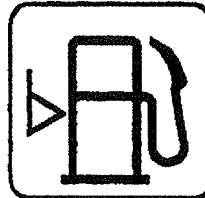
When the warning lamps are on, stop operation immediately.
Refer to the maintenance and servicing for maintenance and service.

④ Engine oil pressure gauge



Indicates the pressure of engine oil.
When the lamp is off during operation it is normal.

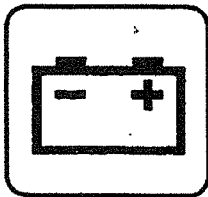
⑦ Fuel gauge



Indicates the amount of fuel remaining.
It will be lit when the remaining amount becomes about 13 L.



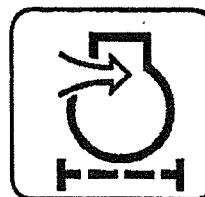
⑤ Battery charge indicator lamp



It is the warning sign of a malfunction of the alternator system. It will be on when the starter switch is on but it will be off soon after

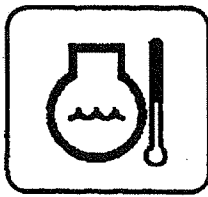
the engine is on. It also lights when the battery voltage drops.

⑧ Air cleaner filter warning indicator lamp



This lamp lights when air cleaner needs to be changed.
When this lamp lights stop the engine and clean up the filter.

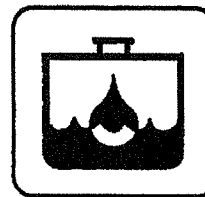
⑥ Engine water temperature gauge



Indicates the temperature of engine coolant. It is lit stop operation and wait for the engine becomes cool. When the temperature

becomes low, stop the engine and check the amount of the coolant, fanbelt and radiator etc.

⑨ Water separator lamp



When there is more water than the specified amount at the bottom of the water separator this lamp lights. Drain water when this is lit.

⚠ WARNING

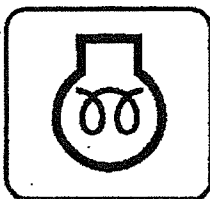
The temperature of each part may be quite high soon after the engine stop.
Wait until the temperature goes down.

Driving device

● Indication lamp (C)

Indicate operation condition

⑩ Glow lamp

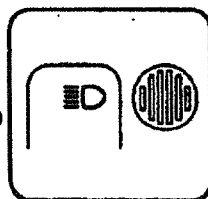


It will turn on when the switch position moves from "OFF" to "HEAT". It warms up the air inside the engine to make easy start when the

engine is cold.

● Selection switch (D)

⑫ Working light switch



When the switch is pressed the working lights for the boom and rear side turn on. Press one more time the lights turn off. When the starter switch

turns from "ON" to "OFF" it automatically turns off.

⑪ Driving high / low speed lamp

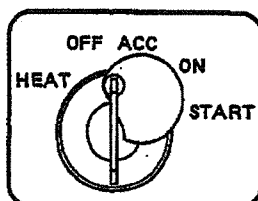


This lamp is lit when the driving speed is changed. The driving speed switch is attached to the grip of the right driving lever.

When the starter switch turns to "OFF" it automatically goes back to the 1 driving speed.

■ Switch panel

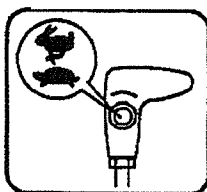
● Starter switch



Use this switch to start and stop the engine.

OFF	You can insert the key and turn off all switches for the electric system.
ON	Electric runs into all the electrical circuit. Engine revlolution position.
ACC	When the engine stopped, radio and horn can be used at "ACC" position.
START	Engine start position. Leave the hand off from the key so the key goes back to the "ON" position automatically.
HEAT	When temperature is low move the switch to "HEAT" position to warm up the engine. Refer to the page 3-4 for details.

● Driving high / low speed switch



Use the switch on the grip of the right driving lever to choose either high speed (2 speed) or low speed (1 speed). Turn the starter switch to "OFF" from "ON", speed is set

to low speed automatically. You can choose speed after the engine starts.

⚠ WARNING

For pick and carry operation, keep the speed at low speed (1 speed).



- Use this switch to move on muddy or wet ground or pull a heavy load.

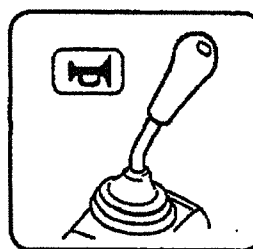
Driving speed1.7km/h



- Use this switch to move on level and firm ground.

Driving speed2.7km/h

● Horn switch

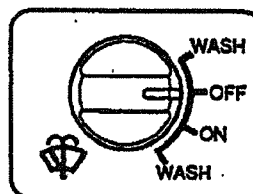


Press the switch at the middle of the grip on the left operation lever to sound horn.

⚠ CAUTION

Sound horn to call attention to people around a machine before start operation.

● Wiper switch



Move the wiper of the front glass or spurt washing liquid by moving the switch.

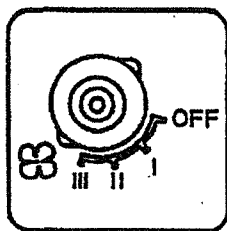
- WASH (upper) : Spurt washing liquid.
- OFF : Stop moving the wiper.
- ON : Move the wiper.
- WASH (lower) : Spurt washing liquid while the wiper is moving.

NOTE :

Using washer liquid more than 20 seconds or using WASH without washing liquid may cause damage to the motor attached to the washer tank.

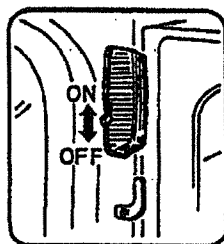
Driving device

● Air conditioning switch



Use this switch to turn on / off the main switch of the air conditioning. Adjust the air by this switch.

● Room lamp



Use this switch to turn on / off the lamp.

ON lamp is lit

OFF lamp is unlit

Cooling

Press the middle button ON

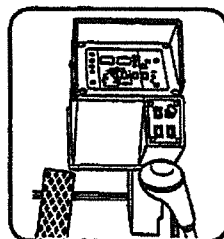
Heating

Middle button comes out ON

Adjust air

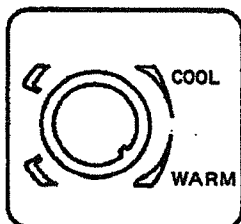
- I low
- II medium
- III high

● Crane operation switch



Refer to the page 4-14 to 4-25.

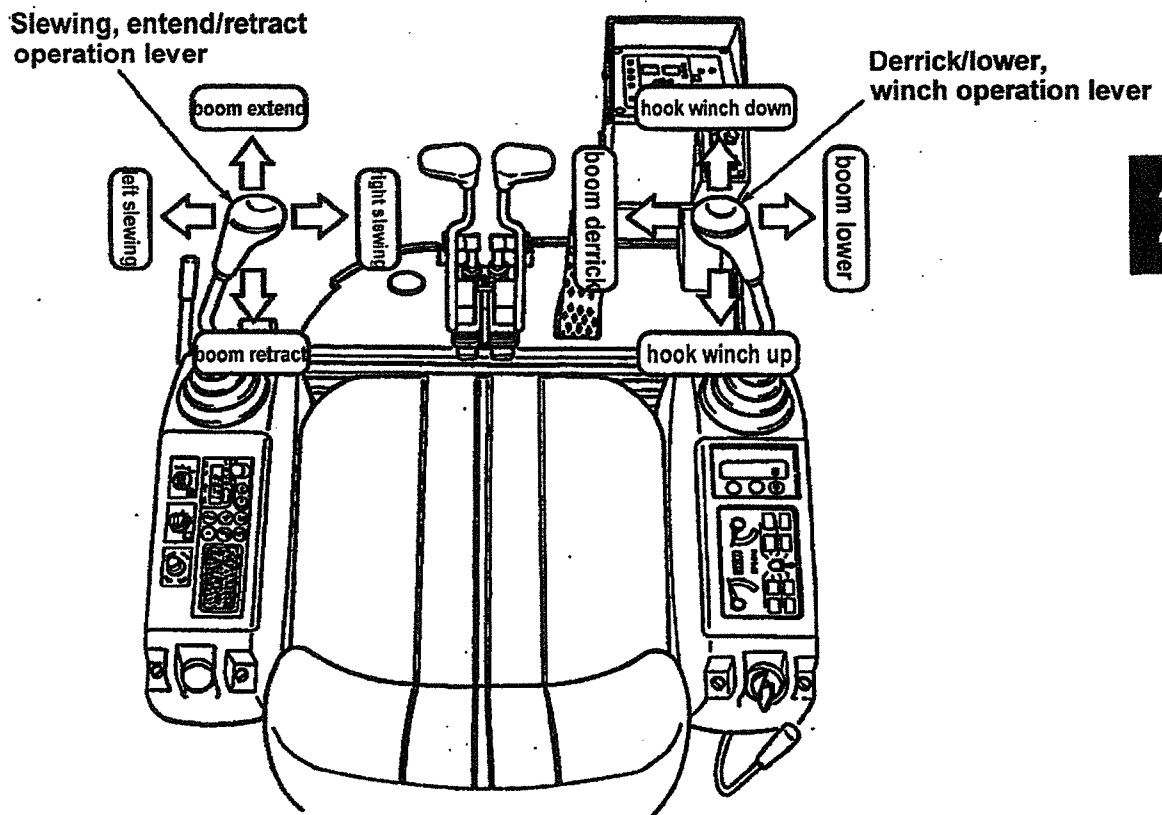
● Air conditioning temperature adjustment switch



Use this switch to adjust the temperature.

Refer to the page 2-16 for details.

Names and terminology for each operation lever and pedal



● Slewing , extend / retract operation levers ● Derrick / lower , winch operation lever

• Slewing operation

- Left slewing Move the left operation lever to "left" side.
- Right slewing Move the left operation lever to "right" side.
- Stop Move the left operation lever back to "neutral".

• Extend / retract operation

- Extend Push the left operation lever to "forward".
- Retract Push the left operation lever to "backward".
- Stop Move the left operation lever back to "neutral".

• Derrick / lower operation

- Derrick Move the right operation lever to "left" side.
- Lower Move the right operation lever to "right" side.
- Stop Move the right operation lever back to "neutral".

• Extend / retract operation

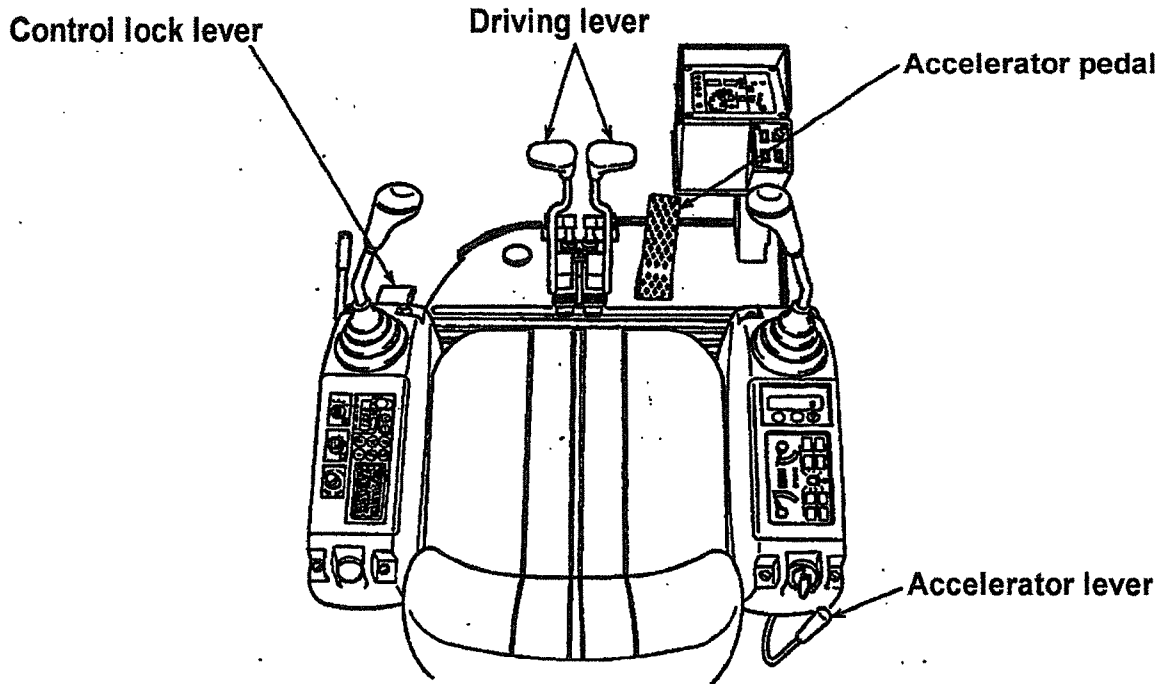
- Winch up Pull the right operation lever "backward" to hoist.
- Winch down ... Pull the right operation lever "forward" to lower.
- Stop Move the right operation lever back to "neutral".



WARNING

Check the following points before starting operation.

1. Positions of each operation lever and pedal.
2. Operation directions of levers and pedals and machine movement.



● Driving lever

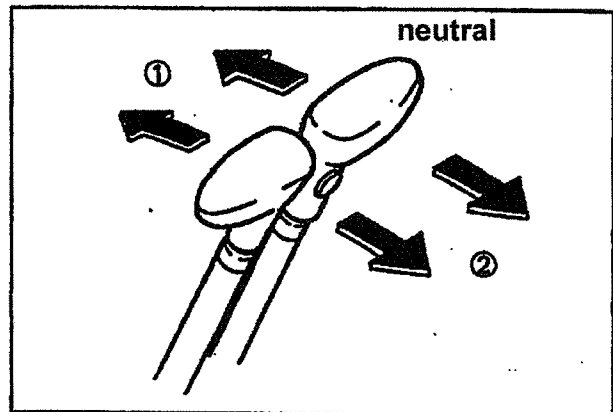
Use the left and right driving levers to move the machine.



WARNING

When operating the driving lever check the position of the driving motor. If the driving motor is in front position, driving lever operation is in the opposit way.

- ① Forward Position pushing the lever "front"
- ② Backward Position pulling the lever "back"
- Stop Position moving the lever back to "neutral"



Note :

Refer to the pages 3-8 to 3-9 for details.

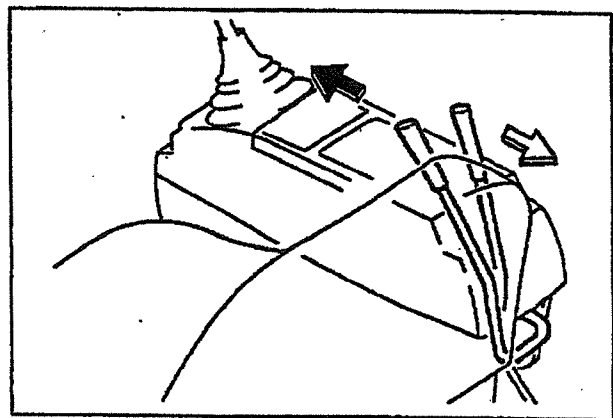
● Accelerator lever

This lever controls engine speed.

Pushing the lever forwards to reduce and pulling it backwards to increase the engine speed.

Crane operation speed can be adjusted by the lever operation.

The accelerator lever stays even you remove your hand from the lever.



● Control lock lever

Control lock lever is attached on the left control stand in order not to move the machine in the case body touches levers by chance.



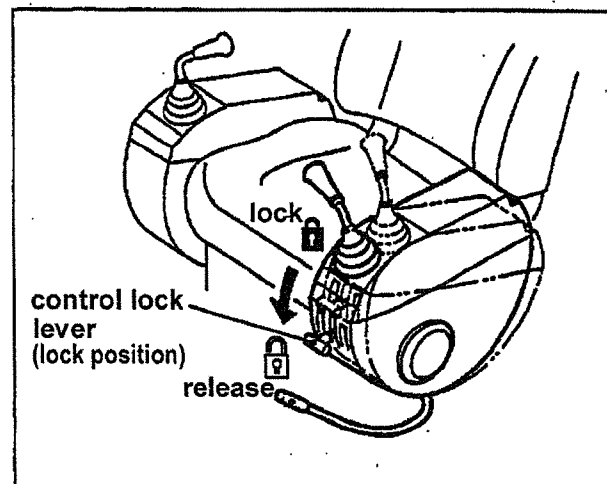
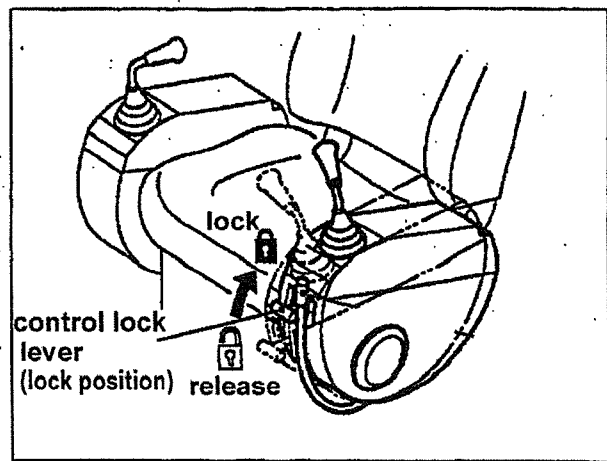
WARNING

- Whenever you move or stand up in the cab during operation, make sure to keep the control lever in "lock position" as the machine may move accidentally.
- Keep the control lock lever in "lock position" after operation and during transport.



CAUTION

Use the control lock lever for oil pressure lock operation.



Oil pressure function / lock



Keep the all operation levers in neutral positions and pull the control lock lever to backward to keep it in "lock position" then all oil pressure function will be blocked. While the machine is not in use, keep it in "lock position" for your safety.

Oil pressure function / lock release



Move this lever forward to "lock release position" to release oil pressure function lock.

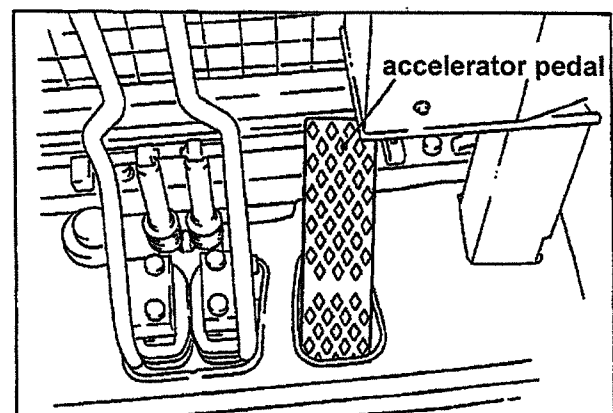
● Accelerator pedal

Adjust the engine revolutions.

Use this pedal mainly during crane operation.

Depress the accelerator pedal to increase and remove your foot from the accelerator pedal to decrease the engine revolutions.

While the engine is running if you remove your foot from the pedal the engine goes back to idling condition but the accelerator lever precedes for the engine revolutions.



Driving device

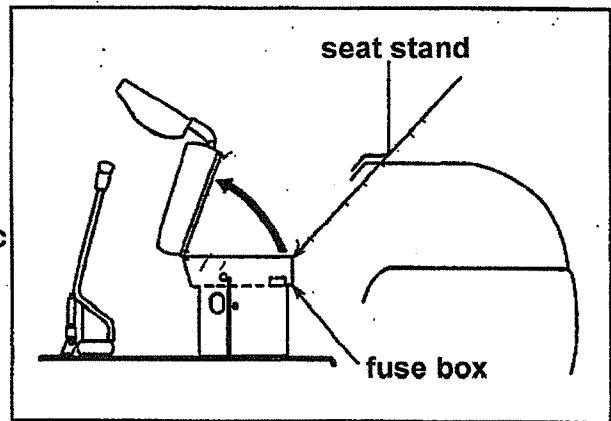
Fuse box

⚠ CAUTION

Turn the power off (starter switch "OFF") to change a fuse.

If lamps do not light or devices of the electric circuit do not work, fuse may blow.

If the fuse is like the right below picture the fuse has blown. Change the fuse.

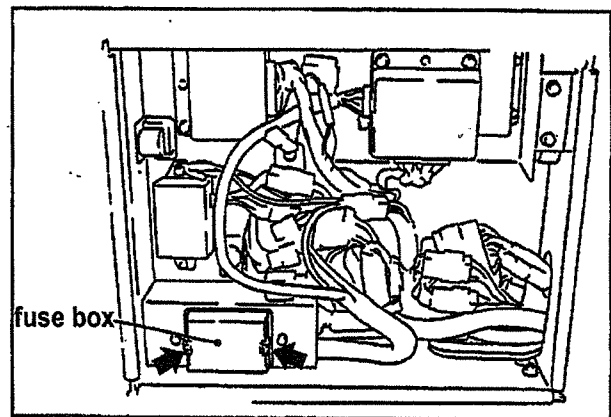


● Changing procedue

⚠ CAUTION

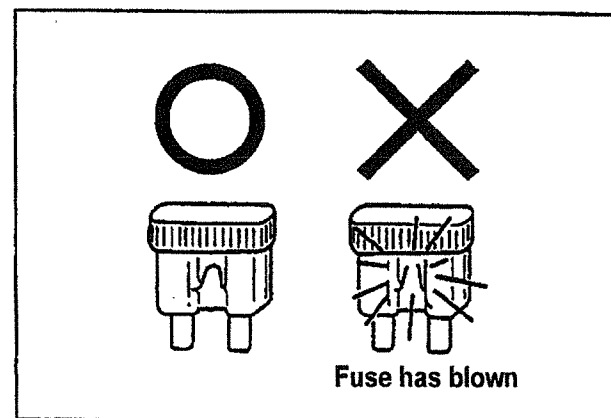
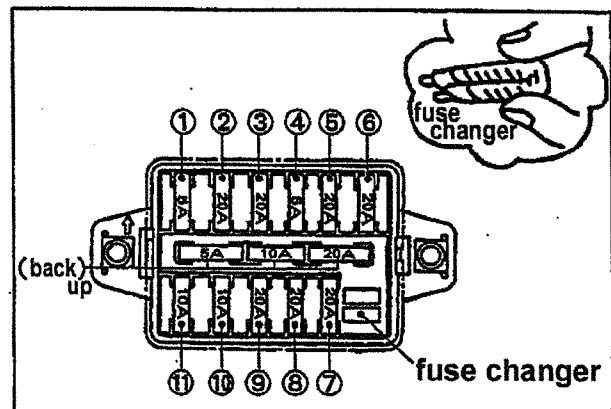
- When you push down the seat stand, be careful not to touch the operation lever.
- When you push down the seat stand, stop the engine then pull up the control lock lever to "lock position".

- 1 Push the seat forward.
- 2 Press the middle of the both sides of the cover hook inside and bring it up to take the fuse box cover off.
- 3 Use the fuse changer to change a fuse.
- 4 Attach the fuse cover in the specific position after changing a fuse.
- 5 Push the seat back to the original position.



● Fuse capacity and name of the circuit

No.	capacity	Name of the circuit
①	5A	relay, switch (overhoist prevention release, express winch change)
②	20A	back up
③	20A	working light
④	5A	lever lock solenoid
⑤	20A	overhoisting prevention device
⑥	20A	solenoid bulb, slewing flush wiper, slewing alarm device
⑦	20A	overhoisting prevention device, radio, room lamp, back up (overhoist device, radio)
⑧	20A	key switch
⑨	20A	timer, engine stop solenoid
⑩	10A	monitor panel
⑪	10A	air conditioning



■ Air conditioner operation

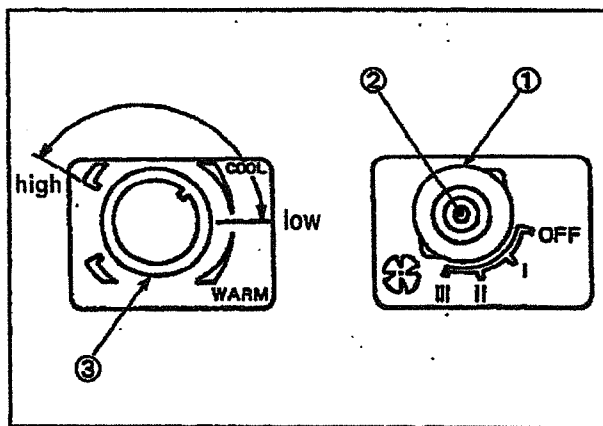
Air conditioner can be switched between cooling, heating and dehumidifier heating modes.

● Cooling

① Select the fan switch ① between I (low) ~ III (high).

② Keep the middle button ② sticking out.

③ Use the temperature switch in the range mentioned in the picture ③.



● Heating

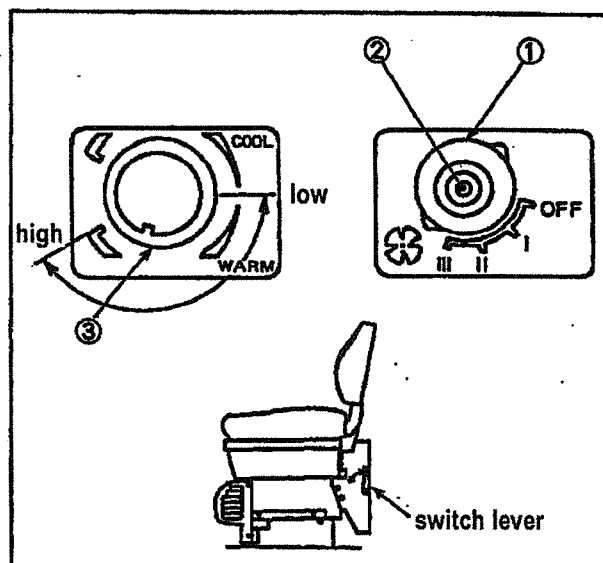
① Select the fan switch ① between I (low) ~ III (high).

② Keep the middle button ② sticking out.

③ Use the temperature switch in the range mentioned in the picture ③.

NOTE :

Move the switch lever (rear seat) to change the direction of the outlet.

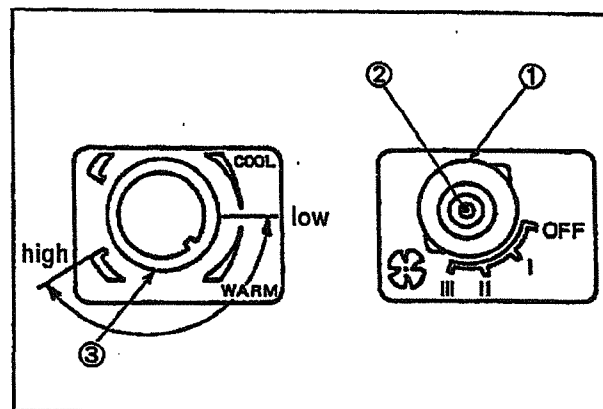


● Dehumidifier heating

① Select the fan switch ① between I (low) ~ III (high).

② Keep the middle button ② sticking out.

③ Use the temperature switch in the range mentioned in the picture ③.



Driving device

- Front window can be open to refresh the air inside of the cab.

⚠ CAUTION

When open or close the front window, move the control lock lever up to the "lock position" to avoid misoperation.

● Open / close the cab door

Use the starter switch key to lock and unlock the cab door.

⚠ CAUTION

Check that the door is locked for both open side and close side during operation. without locking, the door may open by itself which is dangerous.

① Open / close the door

Use the starter key to open the locked door. Pull the knob next to the key hole to open the door. When open the door fully the door will be secured by itself. To keep the door open press the door to catch part ① to secure it firmly.

- ② Unlock the door from inside the cab
Pull the lock release lever backward to take it off from the catch.

- ③ Unlock the door from outside the cab
Pull the door knob forward to take it off from the catch part ① to close the door.

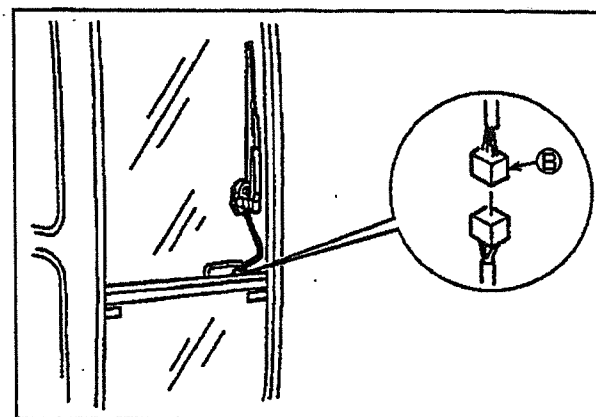
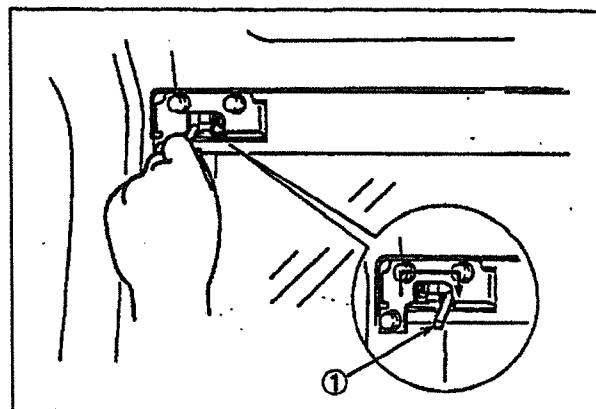
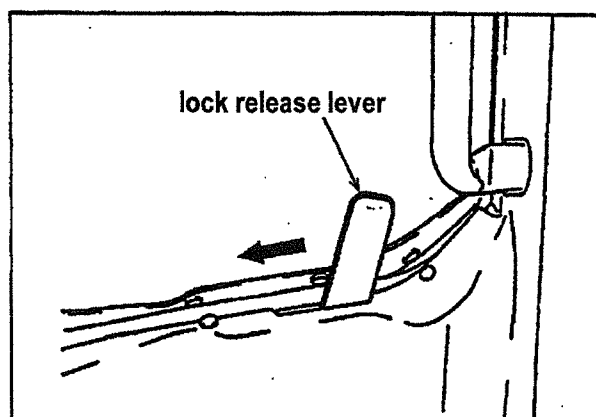
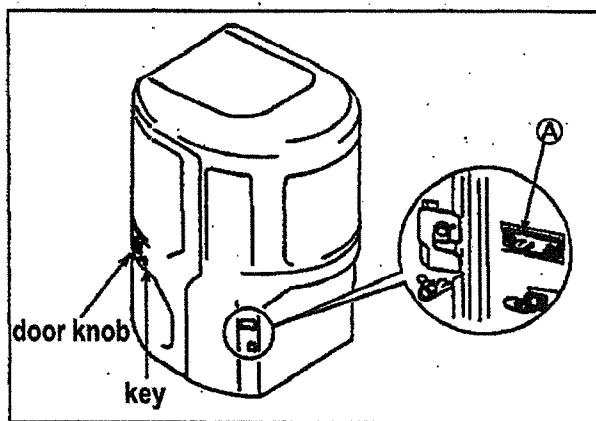
● Stow the front window (top)

The front window can be stowed to the ceiling.

- ① Retract the boom on the level ground then stop the engine.
- ② Move the upper left/right lock pins ① inside to release the lock.
- ③ Pull out the harness coupler ② connecting to the wiper motor.

⚠ CAUTION

Check that the coupler is disconnected when you pull up the front window.



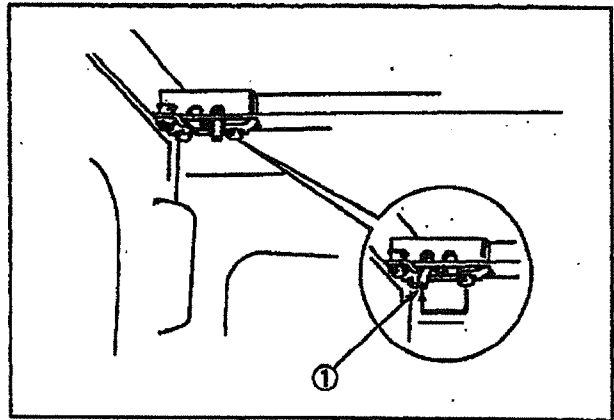
Driving device

- ④ Hold the knob of the front window and move it back of the ceiling. Insert the lock pin ① to the lock hole firmly.

⚠ CAUTION

Open/close the front window on the level ground to lock firmly.

- ⑤ Release the left and right lock pins ① to close the front window (top).

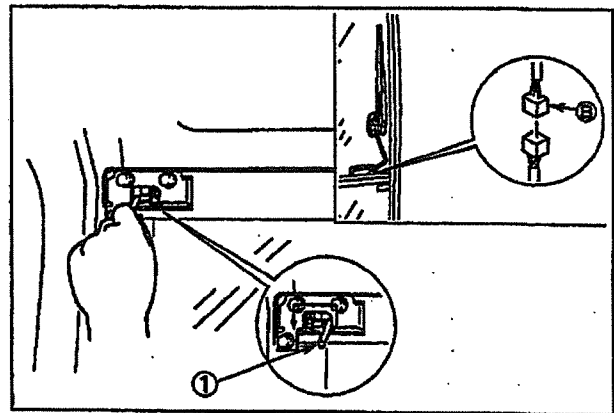


- ⑥ Hold the top and bottom knobs of the front window and pull forward.

⚠ CAUTION

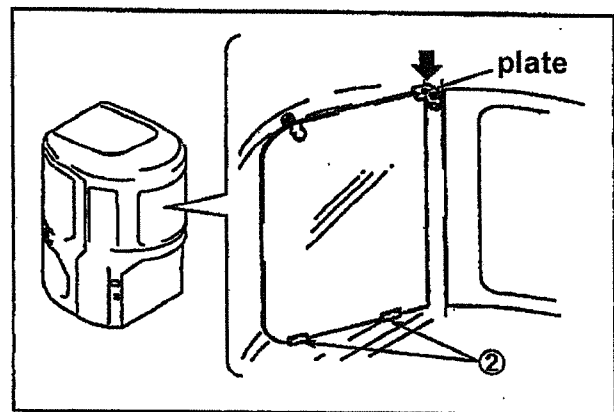
Close the front window slowly not to catch your fingers.

- ⑦ Insert the lock pin ① to the hole firmly to lock.
- ⑧ Connect the wiper harness coupler ⑧.



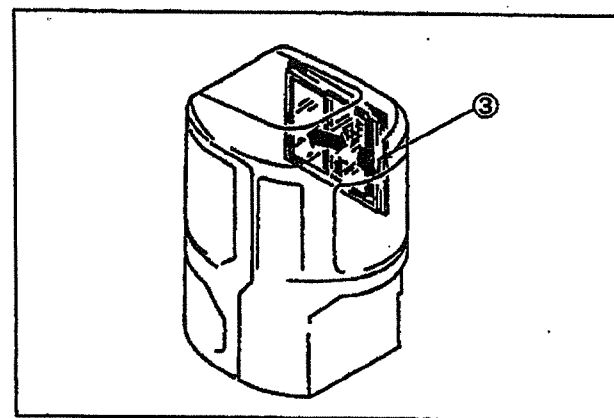
- Stow the front window (bottom)
Stow the front window (bottom) to the holder, back of the cab, to keep it safely.

- ① Lift up the front window to take it off from the window frame.
- ② Insert the front glass to the rail ② to stow.
- ③ Lower the plate to secure the front glass.



- Open/close the right side window

- ① Grip the lock ③ to unlock then move the slide glass.
- ② Grip the lock ③ and move the slide glass back to the normal place to close then lock.

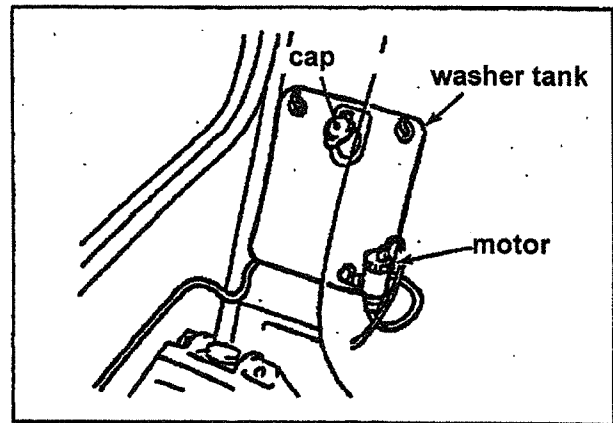


Driving device

● Refill washer liquid

The washer tank is attached the right rear side of the cab.

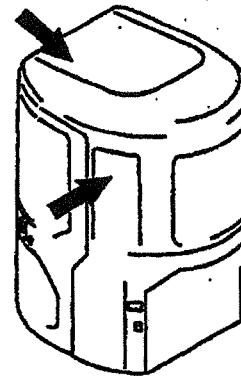
- ① Check the amount in the washer tank.
- ② Take the lid off from the tank to supply.



● How to clean up cab buildup acrylic

- ① Use mild detergent in warm water to wash then rinse it in clean water.
- ② Do not use cleanser nor alkaline soap as these detergent may damage the surface.
- ③ Use alcohol, kerosene or petroleum ether for paint and oil spot. After that wash it by a mild soap.
- ④ Do not use benzene, acetone, carbon tetrachloride, gasoline and thinner as these may cause a crack.
- ⑤ Use antistat if it is very dusty.

skylight (buildup acrylic)
left side (buildup acrylic)

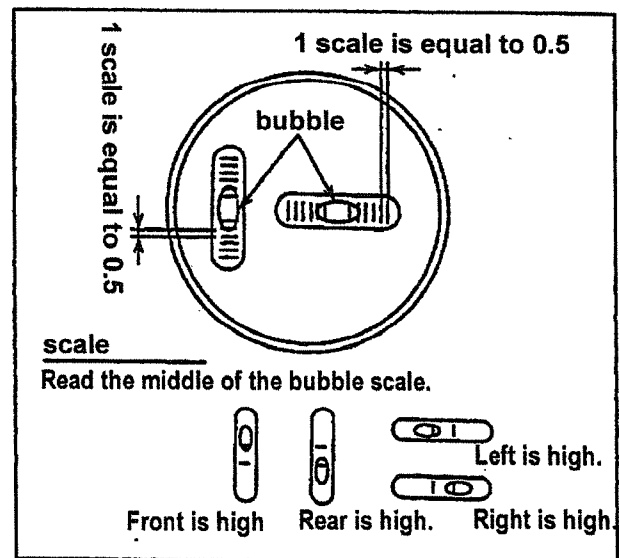


NOTE:

Use a commercial antistat for cleaning.

■ Water level gauge

Use this level gauge to chek if the crane is level.



Driving operation

■ Before starting engine

- Refer to the pages 5-24 to 5-29 for maintenance details.

● Crane control lever

Check that the operation lever and driving lever are in the neutral position.

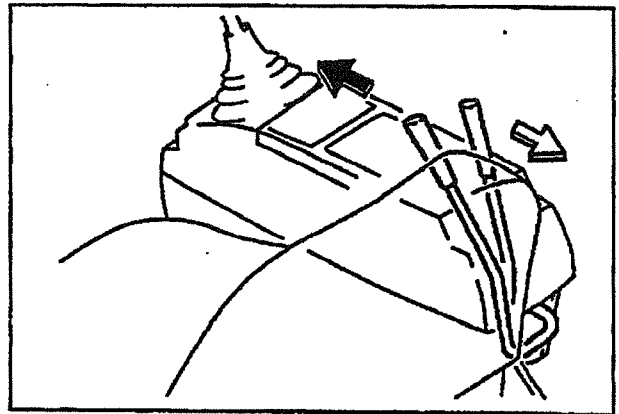
● Accelerator lever

This lever controls engine speed.

Pushing the lever forward to reduce and pulling it backwards to increase the engine speed.

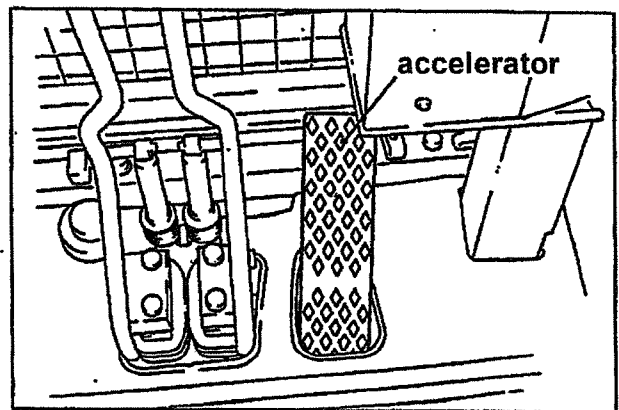
Crane operation speed can be adjusted by the lever operation.

The accelerator lever stays even you remove your hand from the lever.



● Accelerator pedal

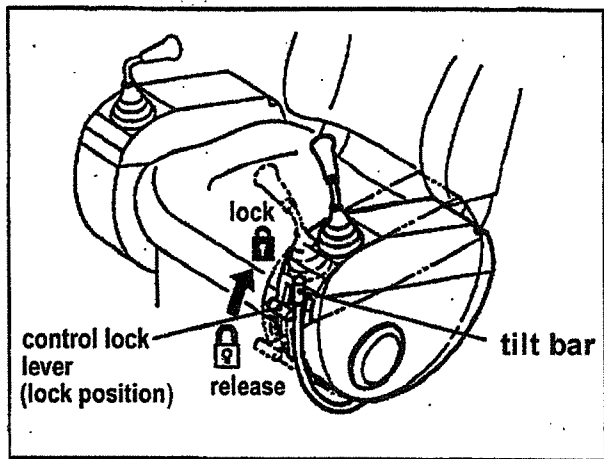
Depress the accelerator pedal forwards to increase the speed (high speed) and remove your foot from the accelerator pedal to decrease the engine speed (low speed). While the engine is running if you remove your foot from the pedal the engine goes back to idling condition but the accelerator lever preceeds for the engine revolutions.



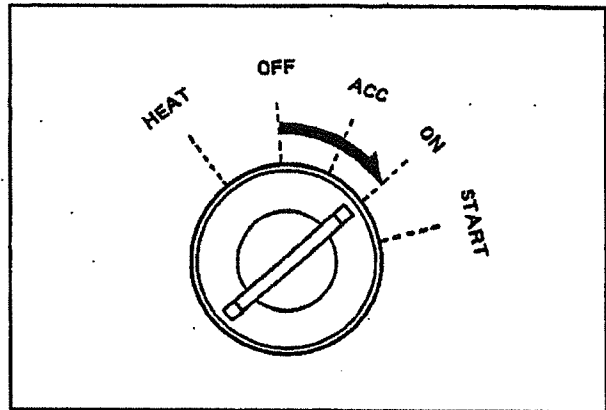
Starting engine

⚠ WARNING

- Before starting engine check that control lock lever is in "lock position" and each operation lever and pedal is in "neutral position".
- Careless touch with operation levers and pedals may cause a sudden move.
- Sound the horn to warn people on the site.

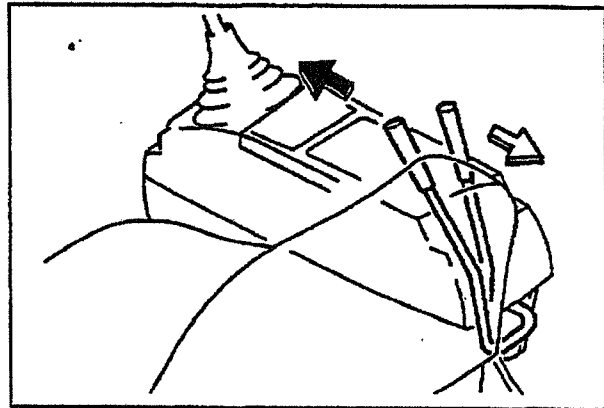


- Start engine in normal temperature
- 1 Check that each operation lever is in the neutral position.
 - 2 Check that the accelerator lever is in low idling position.
 - 3 Change the position of the starter switch key from "OFF" to "ON". The battery charge lamp of the monitor panel is lit.
 - 4 Move the starter switch key to "START" position to start engine.



NOTE :

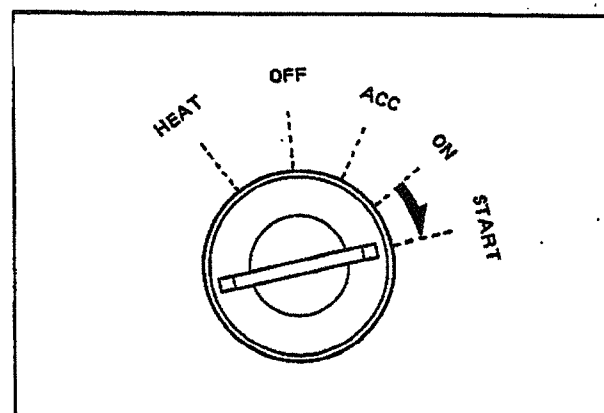
Do not turn the starter more than 20 seconds continuously. When it does not start try again more than 30 seconds later.



- 5 Remove your hand soon after the engine starts. The key moves back to "ON" position automatically. The battery charge lamp goes off after the engine starts.

NOTE :

When warning comes out on the monitor panel when you start engine, stop the engine and find out what causes a trouble.

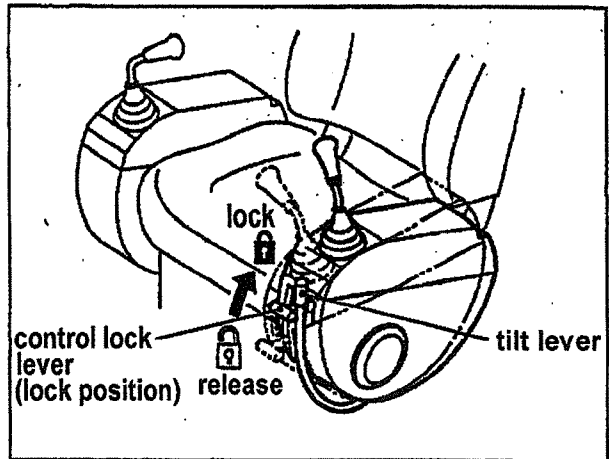


Driving operation

● Starting engine in low temperature

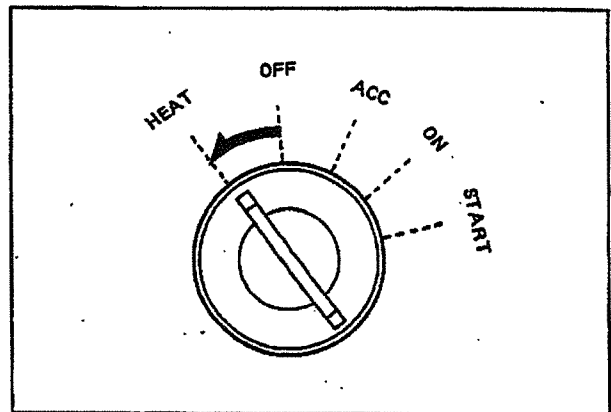
WARNING

- Before starting engine check that control lock lever is in "lock position" and each operation lever and pedal is in "neutral position".
- Careless touch with operation levers and pedals may cause a sudden move.
- Sound the horn to warn people on the site.



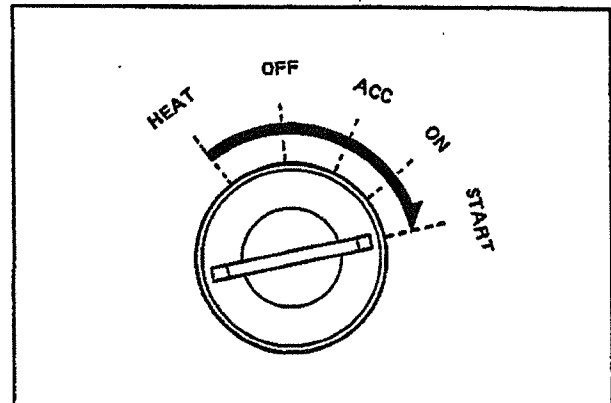
Starting engine in low temperature is mentioned as below.

- 1 Follow the procedure mentioned in "Start engine in normal temperature" 1~2.
- 2 Keep the starter switch key in "HEAT" position and check that glow lamp on the monitor panel is lit. Preheating for about 20 seconds makes starting engine easier.
- 3 Move the starter switch key to "START" position to start engine.

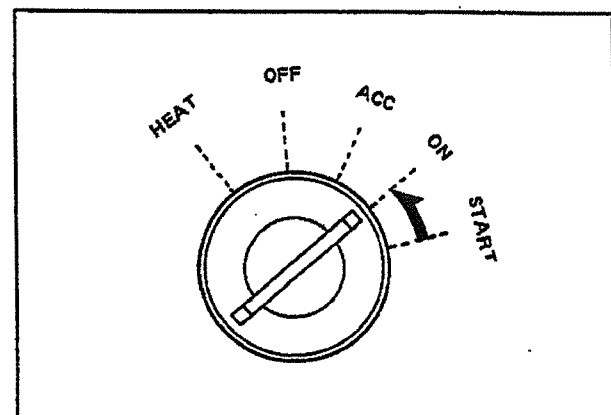


NOTE :

Do not turn the starter more than 20 seconds continuously. When it does not start, try from 2 more than 30 seconds later.



- 4 Remove your hand soon after the engine starts. The key moves back to "ON" position automatically.
- 5 Move the accelerator lever in the middle speed rotation position for a couple minutes without any load.

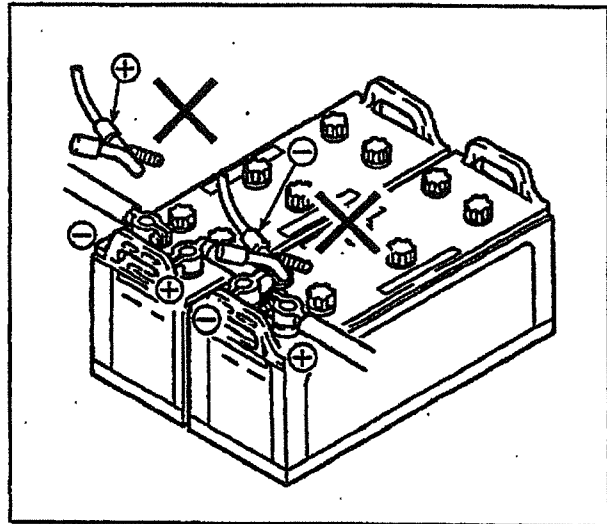


Starting engine by a booster cable

Follow the procedure to use a booster cable in the case the battery is flat.

⚠ WARNING

- Never mix up (+) with (-) terminal when you connect the cables.
- Use protection glasses when you start engine by a booster cable.
- Do not make contact with normal car and a broken-down car.
- Never put battery close to fire as the battery may produce hydrogen gas.
- Do not connect a booster cable in a wrong way. The last connection is to the upper slewing frame. It may spark so try to connect far away from the battery.
- Do not get a clip of booster cable touch with other clip nor machine when disconnect a booster cable.



- Use the same capacity of the battery when you replace.
- Use the right size booster cable and clip for the battery.
- Check if there is no crack nor corrode on the cables and clips.
- Connect clips firmly.

Driving operation

■ Connect / disconnect a booster cable



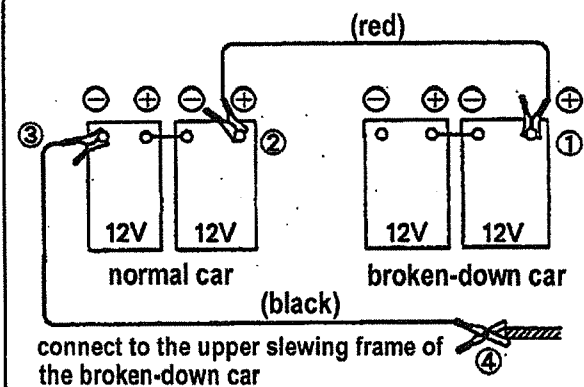
WARNING

This machine's starting system is 24V.
Use 24V for the auxiliary battery.
Using high voltage may cause damage
to an electric system.

- ① Move all operation levers in the neutral position and the control lock lever to the lock position.
- ② Move a normal car close to a broken-down car.
However do not make contact with a normal car and a broken-down car.
- ③ Open the battery covers of both cars to remove flammable gas
- ④ Move the both starter switches to "OFF" position.
- ⑤ Connect the clip of plus \oplus booster cable (red) to the terminal of the plus \oplus battery of the broken-down car.
- ⑥ Connect the clip of plus \oplus booster cable (red) to the terminal of the plus \oplus battery of a normal car.
- ⑦ Connect the clip of minus \ominus booster cable (black) to the terminal of the minus \ominus battery of a normal car.
- ⑧ Connect the clip of minus \ominus booster cable (black) to the upper slewing frame of the broken-down car.
- ⑨ Start the engine of the normal car then keep it in high-speed rotation for 10 minutes for battery charge for the broken-down car.
- ⑩ Start the engine of the broken-down car.
- ⑪ Once the engine of the broken-down car starts, remove the booster cable by the opposite way of attachment.
- ⑫ Last, check the cause of troubles and fix them.

Cable connection procedure ①→②→③→④

Cable disconnection procedure ④→③→②→①

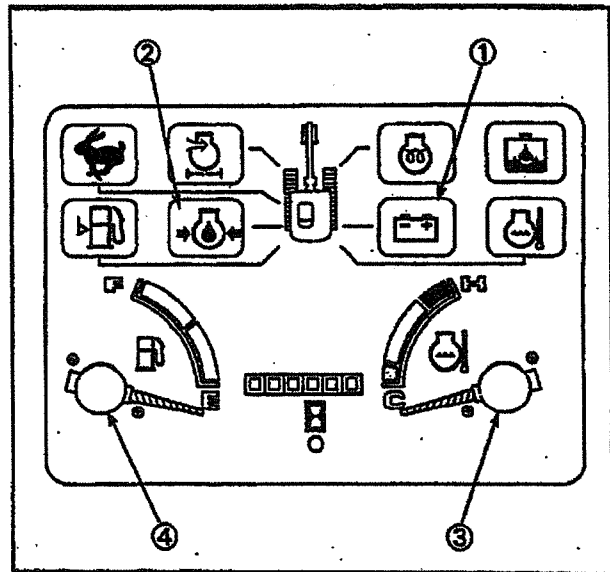


■ Checking after the engine starts

⚠ WARNING

When malfunction shows on the monitor panel, stop the engine immediately.

- ① Any leaking oil or water ?
- ② The battery charge ① and engine oil pressure ② go off? Are gauge pointers of the engine water temperature gauge ③ and fuel level gauge ④ normal?
- ③ Are the exhaust sound and color normal?
- ④ Any abnormal noise or vibration?



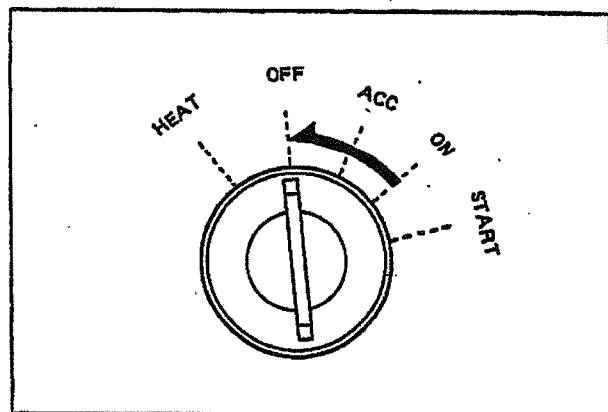
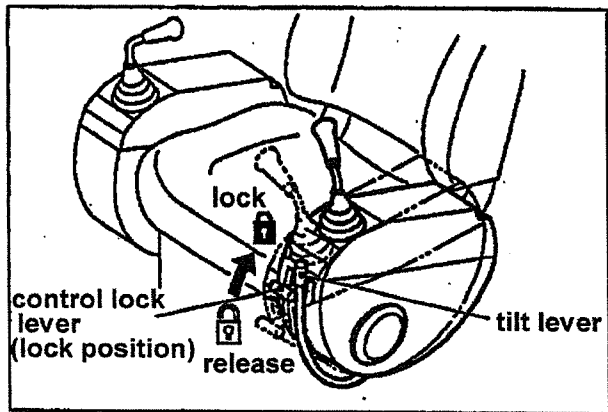
● Stop the engine

Follow the procedure to stop the engine.

NOTE :

Stop the engine after keeping the engine idling for about 5 minutes for engine safety.

- ① Pull the control lock lever to "lock position".
- ② Move the accelerator lever back to the low idling position and keep idling for about 5 minutes. The engine temperature becomes very high after operation so idle the engine to lower the engine water temperature.
- ③ Move the starter switch key to "OFF" position and stop the engine.
- ④ Remove the starter switch key.



Driving operation

■ Start and stop the machine

Use the driving levers for driving operation.

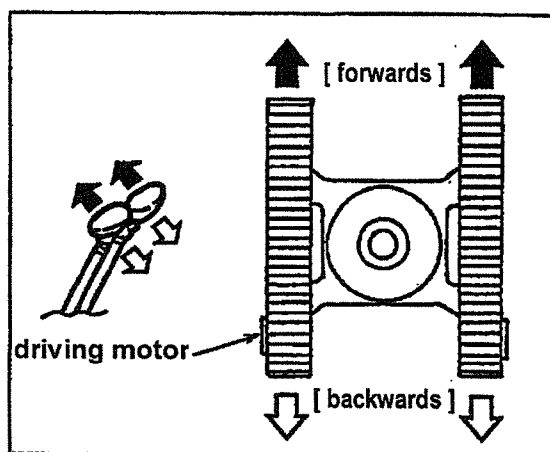


WARNING

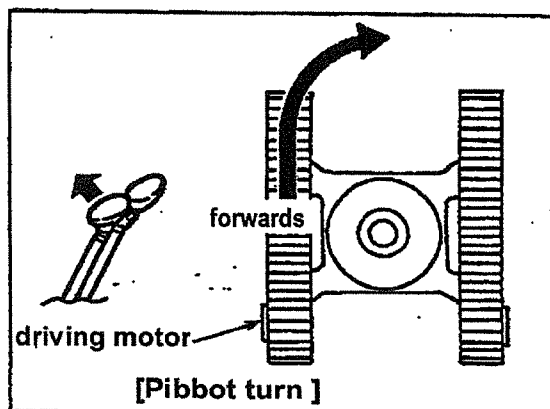
- Check the position of driving motor. If the driving motor is in front, the driving lever operation is in the opposite way.
- Check safety around the machine and sound the horn to start moving.
- Do not allow anyone to come close to the machine.

● Driving forward / backward

- 1 Pull the accelerator lever or depress the accelerator pedal forward to run up.
- 2 Move left and right levers forwards (go forwards) or backwards (go backwards) at the same time.
Driving speed can be adjusted by the angle of the lever.



Use only one side of the crawlers to change the direction. Use only either one side of the driving levers to operate.

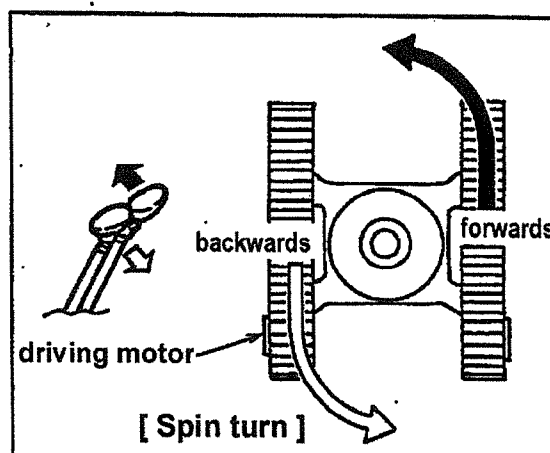


● Spin turn

Drive both sides of the crawlers to a reverse direction each other to change the direction on the spot. Move one side to forwards and the other side to backwards.

NOTE :

Do not operate any pivot turn / spin turn on a high coefficient of friction as it may cause early worn away or run off tyres.



● Stopping

1. Avoid a sudden stop.

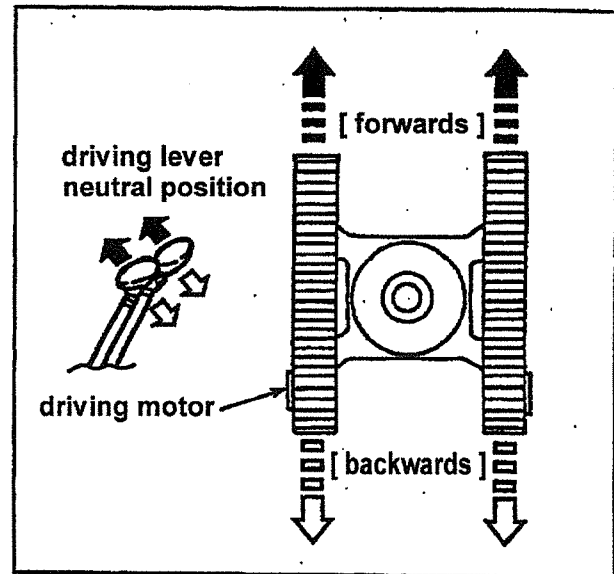
Move the right and left driving levers to the neutral position.

! WARNING

When you park, park on the firm and level ground.

If you need to park on the slope, use stoppers for crawlers.

2. Put the accelerator lever or the accelerator pedal back to lower engine speed.

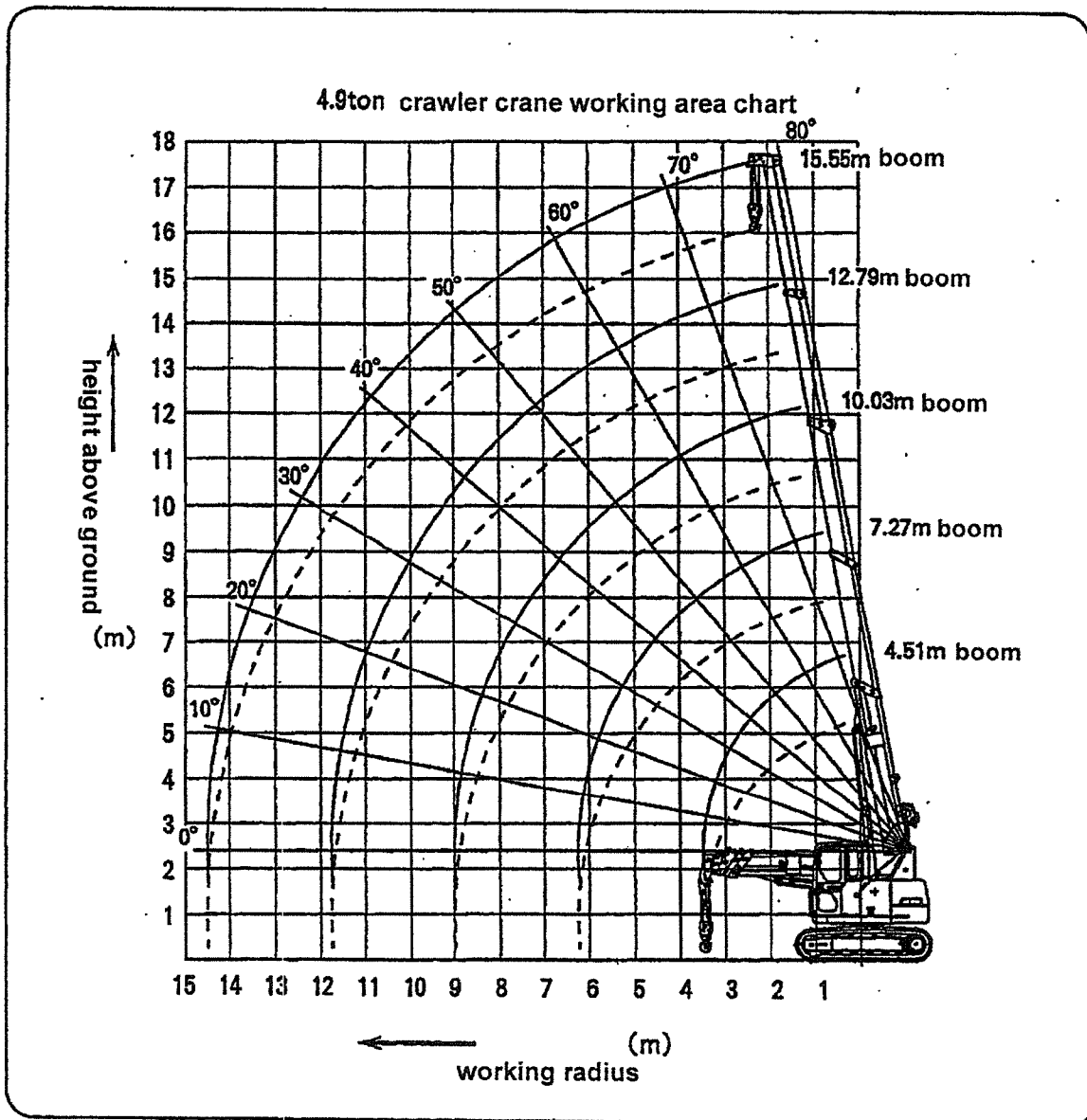


■ Working area chart ----- how to read rate lifting chart

Working radius ----- rated lifting chart shows relation between working radius and boom length and boom angle.

- ① This chart does not include deflection of the boom. With a load suspended the working radius will increase slightly due to deflection under the load.
- ② Working radius is the distance between the slewing centre of the crane and the centre of the load.
- ③ For height above ground, consider the length of the hook and wire.

NOTE : This chart does not included the boom deflection.



Crane operation

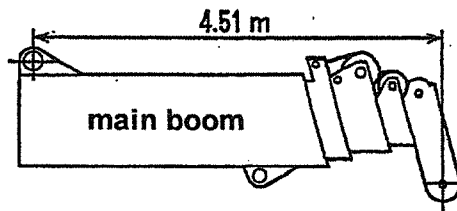
■ Precautions on crane operation

- ① The rated lifting capacity shows the maximum value of the total weight decided by the conditions such as boom length, stationary crane-on-rubber operation, pick and carry operation at every working radius.**
- ② The value is based upon within 78% of the tipping load on the firm and level ground.**
- ③ Loading capacity on a slope or soft and muddy ground falls far below than the rated lifting capacity. Do not set the crane on these places.**
- ④ The working radii are the actual values allowing for boom deflection. Operations need to be done based on the working radius.**
- ⑤ If the boom length is longer than the rated lifting capacity refer to the rated length and one rank longer boom length and work at whichever rated lifting capacity is lower.**
- ⑥ Pick and carry operation should be done in a continuous straight line as it is unstable and dangerous operation.**
- ⑦ Before starting pick and carry operation, set the starter limiter switch to stationary crane-on-rubber operation and stationary crane-on-rubber operation mode. Make sure to keep the rated lifting capacity within 2000kg.**
- ⑧ The rated lifting capacity at pick and carry operation is the maximum total weight that can be carried on the firm and level ground after picking up the load in stop condition. Do not operate pick and carry operation on soft and muddy ground.**
- ⑨ Keep the load close to the ground.
Sudden braking or sharp steering while in motion will cause the suspended load to swing dangerously.**
- ⑩ All crane operations are forbidden during traveling.**
- ⑪ Keep the driving speed less than 1.7km/h (1 speed) during pick and carry operation.**

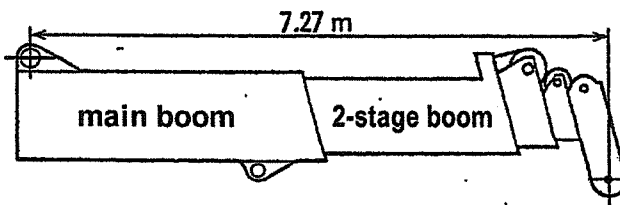
■ Boom extension/retraction condition chart

Boom conditions in working area chart / rated lifting capacity chart are mentioned below. When the boom is extended more than each boom length, refer to one stage longer rated lifting capacity chart.

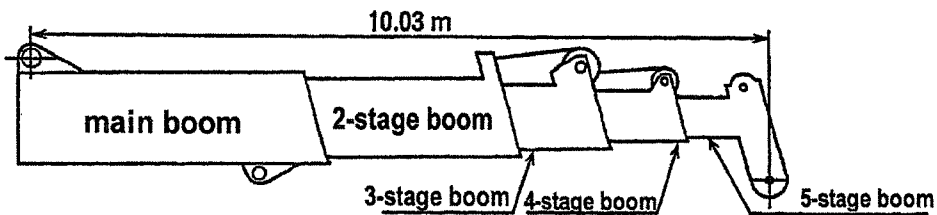
① 4.51m boom boom fully retracted



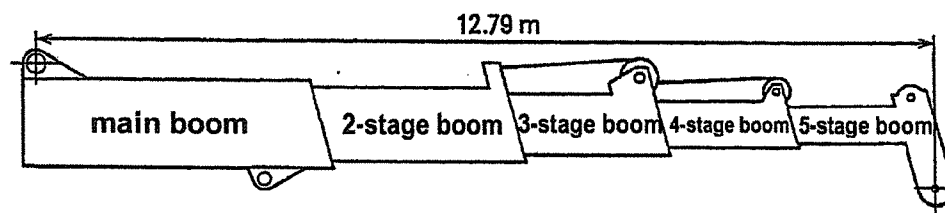
② 7.27m boom 2-stage boom fully extended 3,4,5-stages booms fully retracted



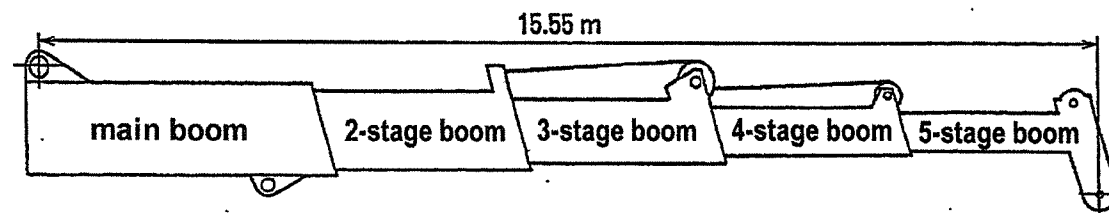
③ 10.03m boom 2-stage boom fully extended 3,4,5-stage each boom 1/3 stroke extended



④ 12.79m boom 2-stage boom fully extended 3,4,5-stage each boom 2/3 stroke extended



⑤ 15.55m boom all stages fully extended



■ Rated lifting capacity chart (hook 4 wire)

Unit : kg

boom length working radius	① 4.51m boom		② 7.27m boom		③ 10.03m boom		④ 12.79m boom		⑤ 15.55m boom	
	Stationary	Driving	Stationary	Driving	Stationary	Driving	Stationary	Driving	Stationary	Driving
1.00 m	4900	2000	4900	2000						
1.50 m	4900	2000	4900	2000	2600	1400				
1.90 m	4900	2000	4900	2000	2600	1400				
2.00 m	4690	2000	4690	2000	2600	1400	2000	—		
2.10 m	4480	2000	4480	2000	2600	1400	2000	—		
2.50 m	3660	2000	3750	2000	2600	1400	2000	—	1400	—
3.00 m	2700	1490	2770	1520	2160	1160	2000	—	1400	—
3.15 m	2500	1380	2550	1400	2060	1110	2000	—	1400	—
3.45 m	2110	1160	2190	1200	1880	1010	1820	—	1400	—
3.50 m			2140	1170	1850	990	1780	—	1400	—
4.00 m			1710	940	1620	870	1570	—	1400	—
4.50 m			1390	760	1440	770	1390	—	1160	—
5.00 m			1210	660	1260	690	1250	—	1040	—
5.50 m			990	540	1070	580	1130	—	980	—
6.00 m			830	450	920	500	980	—	920	—
6.22 m			770	420	860	470	930	—	890	—
6.50 m					790	430	860	—	850	—
7.00 m					690	370	750	—	790	—
7.50 m					600	330	660	—	740	—
8.00 m					510	280	590	—	660	—
8.50 m					440	240	520	—	600	—
8.98 m					380	210	450	—	530	—
9.00 m							450	—	530	—
9.50 m							390	—	470	—
10.00 m							340	—	400	—
10.50 m							290	—	360	—
11.00 m				strength area			250	—	310	—
11.50 m							210	—	260	—
11.74 m							190	—	250	—
12.00 m									230	—
12.50 m									190	—
13.00 m									160	—
13.50 m									150	—
14.00 m									150	—
14.50 m									150	—



WARNING

1. The lifting capacity at pick and carry operation is the load that can be carried on the firm and level ground after picking up the load in immovable swing. Keep the load close to the ground.
Sudden braking or sharp steering are dangerous. Move the moment limiter to pick and carry mode.
2. All crane operations are forbidden during traveling.
3. Keep the driving speed less than 1.7km/h (1 speed) during pick and carry operation.
4. The hook weight for two wire ropes is 60kg.
5. Load limits for number of wire ropes : 4 ropes-up to 4,900kg, 2 ropes-up to 2,200kg, 1 rope-up to 1,400kg

■ Rated lifting capacity chart (two wire ropes)

unit : kg

boom length working radius	① 4.51m boom		② 7.27m boom		③ 10.03m boom		④ 12.79m boom		⑤ 15.55m boom	
	immovable swing	driving swing	immovable swing	driving swing	immovable swing	driving swing	immovable swing	driving swing	immovable swing	driving swing
1.00 m	2200	2000	2200	2000						
1.50 m	2200	2000	2200	2000	2200	1400				
1.90 m	2200	2000	2200	2000	2200	1400				
2.00 m	2200	2000	2200	2000	2200	1400	2000	—		
2.10 m	2200	2000	2200	2000	2200	1400	2000	—		
2.50 m	2200	2000	2200	2000	2200	1400	2000	—	1400	—
3.00 m	2200	1490	2200	1520	2160	1160	2000	—	1400	—
3.15 m	2200	1380	2200	1400	2060	1110	2000	—	1400	—
3.45 m	2110	1160	2190	1200	1880	1010	1820	—	1400	—
3.50 m			2140	1170	1850	990	1780	—	1400	—
4.00 m			1710	940	1620	870	1570	—	1400	—
4.50 m			1390	760	1440	770	1390	—	1160	—
5.00 m			1210	660	1260	690	1250	—	1040	—
5.50 m			990	540	1070	580	1130	—	990	—
6.00 m			830	450	920	500	980	—	920	—
6.22 m			770	420	860	470	930	—	890	—
6.50 m					790	430	860	—	850	—
7.00 m					690	370	750	—	790	—
7.50 m					600	330	660	—	740	—
8.00 m					510	280	590	—	660	—
8.50 m					440	240	520	—	600	—
8.98 m					380	210	450	—	530	—
9.00 m							450	—	530	—
9.50 m							390	—	470	—
10.00 m							340	—	400	—
10.50 m							290	—	360	—
11.00 m				strength area			250	—	310	—
11.50 m							210	—	260	—
11.74 m							190	—	250	—
12.00 m									230	—
12.50 m									190	—
13.00 m									160	—
13.50 m									150	—
14.00 m									150	—
14.50 m									150	—



WARNING

1. The lifting capacity at pick and carry operation is the load that can be carried on the firm and level ground after picking up the load in immovable swing. Keep the load close to the ground.
Sudden braking or sharp steering are dangerous. Move the moment limiter to pick and carry mode.
2. All crane operations are forbidden during traveling.
3. Keep the driving speed less than 1.7km/h (1 speed) during pick and carry operation.
4. The hook weight for two wire ropes is 60kg.
5. Load limits for number of wire ropes : 4 ropes-up to 4,900kg, 2 ropes-up to 2,200kg, 1 rope-up to 1,400kg

Driving operation

■ Rated lifting capacity chart (one wire rope)

unit : kg

boom length working radius	① 4.51m boom		② 7.27m boom		③ 10.03m boom		④ 12.79m boom		⑤ 15.55m boom	
	immovable swing	driving swing	immovable swing	driving swing	immovable swing	driving swing	immovable swing	driving swing	immovable swing	driving swing
1.00 m	1400	1400	1400	1400						
1.50 m	1400	1400	1400	1400	1400	1400				
1.90 m	1400	1400	1400	1400	1400	1400				
2.00 m	1400	1400	1400	1400	1400	1400	1400	—		
2.10 m	1400	1400	1400	1400	1400	1400	1400	—		
2.50 m	1400	1400	1400	1400	1400	1400	1400	—	1400	—
3.00 m	1400	1400	1400	1400	1400	1160	1400	—	1400	—
3.15 m	1400	1380	1400	1400	1400	1110	1400	—	1400	—
3.45 m	1400	1160	1400	1200	1400	1010	1400	—	1400	—
3.50 m			1400	1170	1400	990	1400	—	1400	—
4.00 m			1400	940	1400	870	1400	—	1400	—
4.50 m			1390	760	1400	770	1390	—	1160	—
5.00 m			1210	660	1260	690	1250	—	1040	—
5.50 m			990	540	1070	580	1130	—	980	—
6.00 m			830	450	920	500	980	—	920	—
6.22 m			770	420	860	470	930	—	890	—
6.50 m					790	430	860	—	850	—
7.00 m					690	370	750	—	790	—
7.50 m					600	330	660	—	740	—
8.00 m					510	280	590	—	660	—
8.50 m					440	240	520	—	600	—
8.98 m					380	210	450	—	530	—
9.00 m							450	—	530	—
9.50 m							390	—	470	—
10.00 m							340	—	400	—
10.50 m							290	—	360	—
11.00 m				strength area			250	—	310	—
11.50 m							210	—	260	—
11.74 m							190	—	250	—
12.00 m									230	—
12.50 m									190	—
13.00 m									160	—
13.50 m									150	—
14.00 m									150	—
14.50 m									150	—



WARNING

1. The lifting capacity at pick and carry operation is the load that can be carried on the firm and level ground after picking up the load in immovable swing. Keep the load close to the ground.
Sudden braking or sharp steering are dangerous. Move the moment limiter to pick and carry mode.
2. All crane operations are forbidden during traveling.
3. Keep the driving speed less than 1.7km/h (1 speed) during pick and carry operation.
4. The hook weight for two wire ropes is 60kg.
5. Load limits for number of wire ropes : 4 ropes-up to 4,900kg, 2 ropes-up to 2,200kg, 1 rope-up to 1,400kg

Safety device management

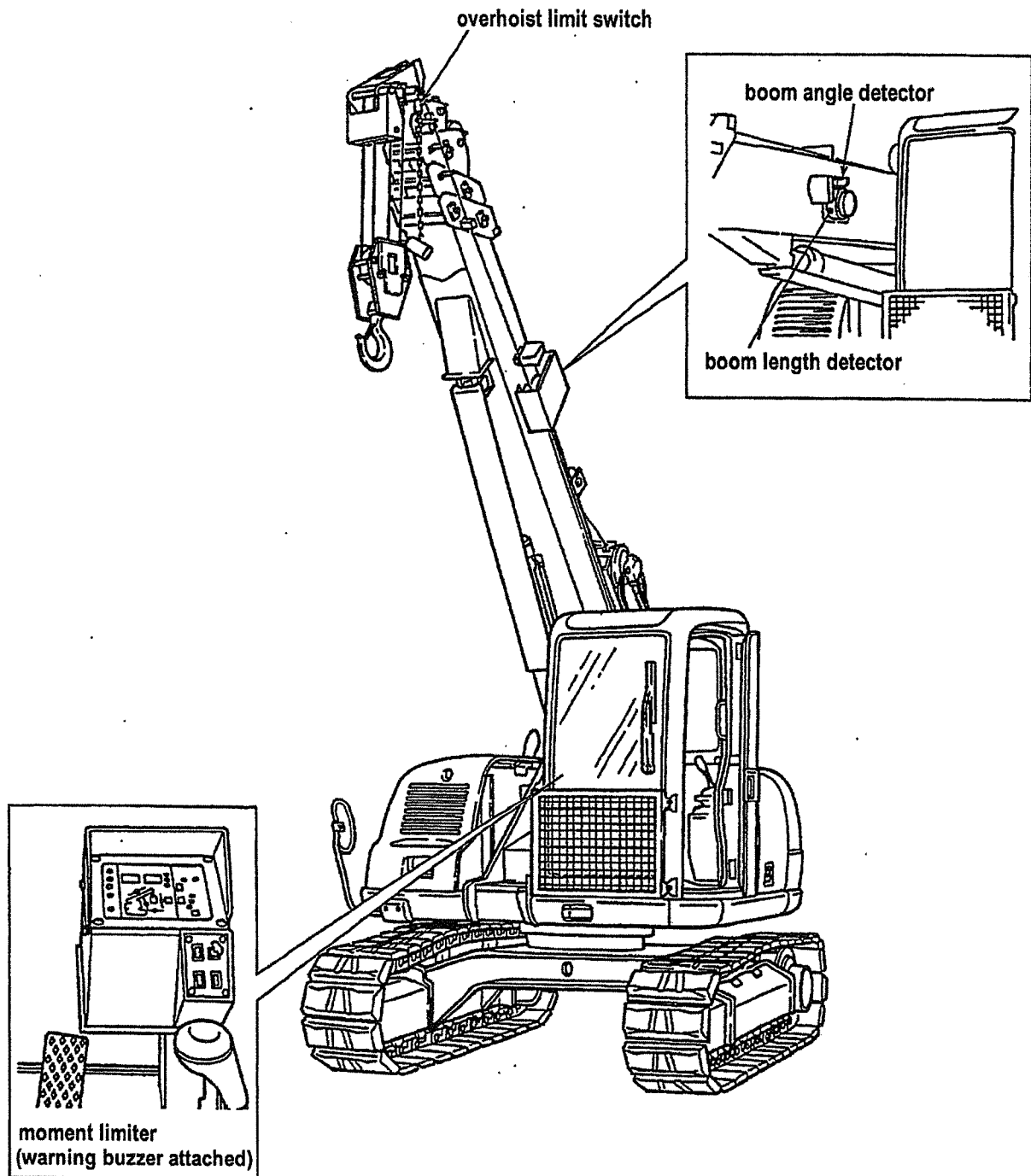
■ Structure of the overload prevention device (moment limiter)

The overload prevention device is a safety device to avoid crane damage by overload or tip over. Use this device for your safe crane operation.

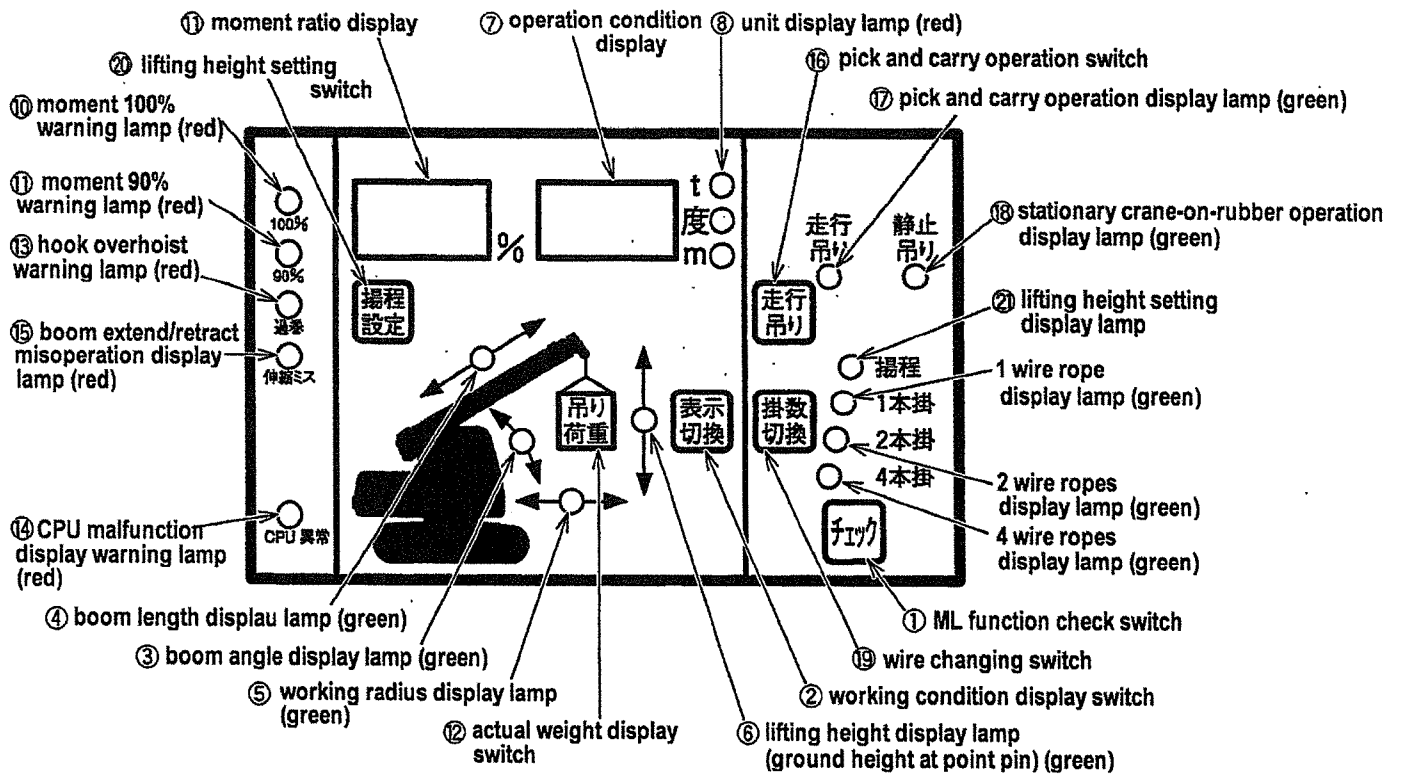
⚠ WARNING

Never operate crane when moment limiter is not functional.

● Machinery layout and names



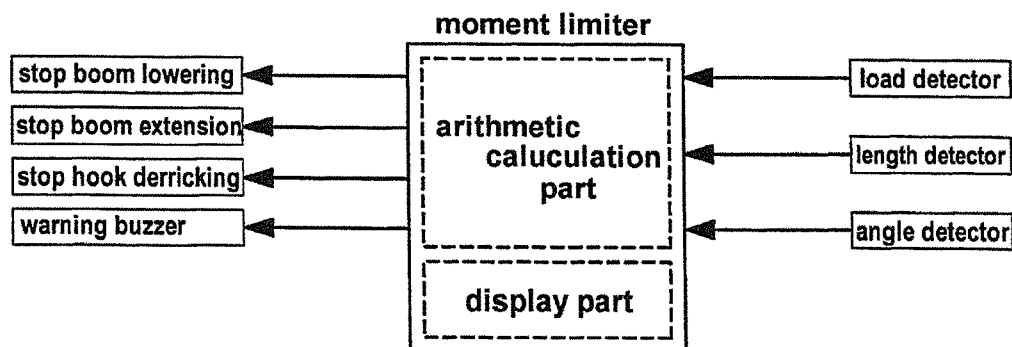
Names for moment limiter panel



● Moment limiter function

① Main function of the moment limiter

- (1) Machine status and arithmetic calculation of loading condition
- (2) Judgement of dangerous situations such as overloading, hook overhoisting and boom misoperation.
- (3) Output of warning and auto stop signal
- (4) Malfunction display function



■ Precautions for using overloading preventing device


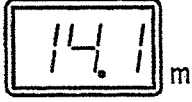




- ①** Select the correct working status setting switch for operation part and indication part. The limit value is determined according to the stationary / driving switch and number of wire changing switch at the indication part. User wrong switch setting moment limiter function does not work and cause very dangerous situation.
- ②** Slewing body does not stop automatically even at overload situation.
- ③** Before starting crane operation implement moment limiter checkup to make sure there is no malfunction.
- ④** When operating crane pay attention to the moment limiter indication and not to overload.
- ⑤** Do not give any shock on angle, length and load detectors as it will not indicate correct figures. Furthermore do not open the inside of detectors since it is nonadjustable. Never take apart.
- ⑥** Lifting load up from the ground should be done by hoisting operation.
Remain a load on the ground to make sure it is safe. Do not use boom hoist operation.
- ⑦** When there is some malfunctions on moment limiter stop operation immediately and contact your authorised dealer.
- ⑧** When operating to non-safety side (boom extend, boom lower or hook hoist) and stop automatically, operate restoration work to the safe side (boom retract, boom derrick or hook lower). Refer to the pages from 4-22 to 4-23 Automatic stop function and how to use release switch.
- ⑨** Pay attention to handle wiring connector.
 - (1) Penetrating water cause inaccurate detection and damage the inside of the operation part.
 - (2) Make sure to turn off the engine when connecting or disconnecting the connector.
- ⑩** When you are affected by radio disturbance overload preventing detection may not work correctly. Stop operation and contact your authorised dealer.
- ⑪** If you rub the indication part of the moment limiter by a nylon cloth it produces static electricity. Static electricity gives damage to the moment limiter so do not rub hard.

■ How to use moment limiter

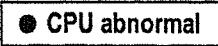

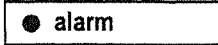
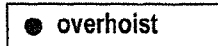
● How to read moment limiter indication

① digital (numeric display)

example

boom length display	indicate boom length by 0.1m unit. (less than that will be rounded.)	working radius display	indicate working radius by 0.1m unit. (less than that will be rounded.)
			
hoist height display	indicate hoist height by 0.1m unit. (less than that will be rounded.)	hanging weight display	indicate present loading weight by 0.05ton unit. (less than that will be truncated.)
			
boom angle display	indicate boom angle by 0.2° unit. (less than that will be rounded.)	moment ratio display	Indicate the moment ratio of the loading weight and load rating at %. $\text{load factor} = \frac{\text{load weight (ton)}}{\text{load rating (ton)}} \times 100$
			


② Alarm display

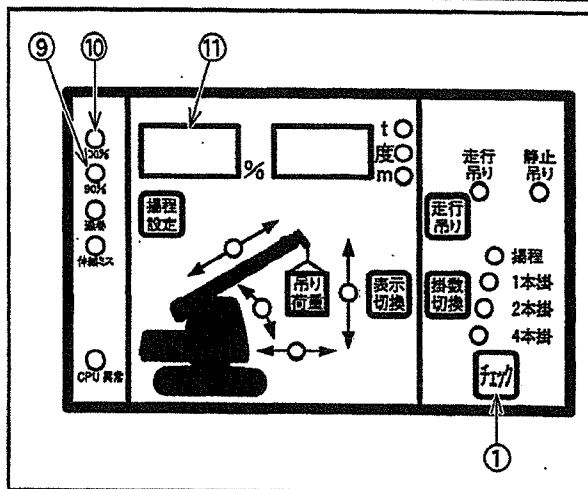
CPU abnormal display lamp  CPU abnormal	When computer function of the moment limiter becomes abnormal, CPU abnormal display lamp lits and continuous alarm sounds. Contact your authorised dealer.
overload alarm lamp  prediction	When loading weight exceeds 90% of the load rating, 90% alarm lamp lits and intermittent buzzer sounds.
overload alarm lamp  alarm	When loading weight exceeds 100% of the load rating, 100% alarm lamp lits and continuous buzzer sounds. Boom lower. boom extend and hook hoist operations stop automatically to avoid danger.
hook overhoist display lamp  overhoist	When hook lifts up the overhoisting preventing weight, hook overhoisting display lamp lits and continuous buzzer sounds and winch, boom extend stop automatically.

Crane operation

● Each part function

1 How to use ML function switch (pre-operational check)

- Before operation press ML function switch ① and check following display and alarm condition come out.
- ⑨ and ⑩ alarm lamps lit.
-  indicates at the ⑪ moment ratio display.
- Continuous alarm sounds.

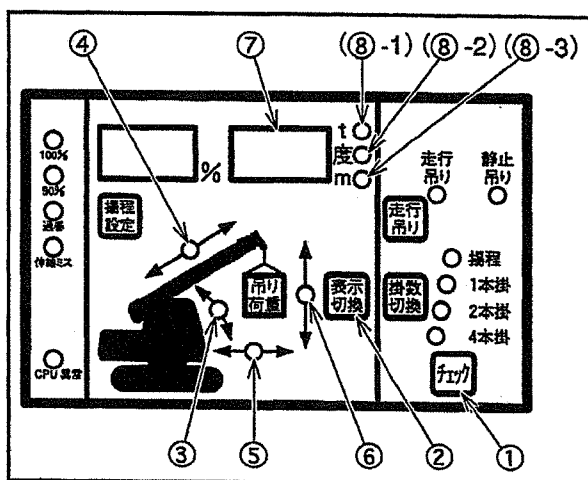


DANGER

If the alarm lamp does not light when you press the check switch, it is system malfunction. Contact your dealer.

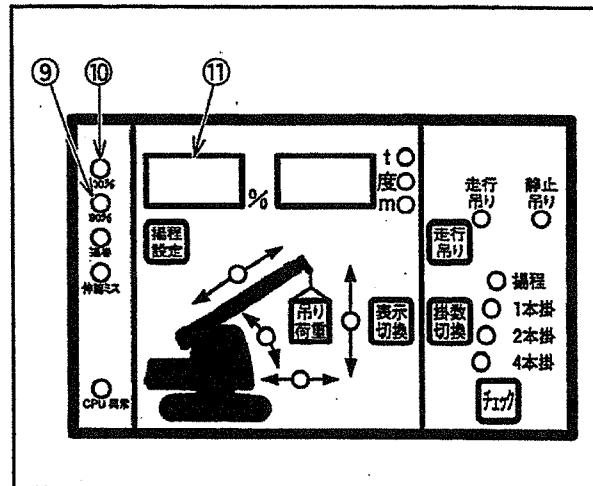
2 How to use working status switch ②

- Indicate boom angle Press switch ② to light indication lamp at ③. Indicate boom angle at display ⑦ then (⑧-2) [angle] lamp lights.
- Indicate boom length Press switch ② to light indication lamp at ④. Indicate boom angle at display ⑦ then 「m」 lamp at (⑧-3) lights.
- Indicate working radius Press switch ② to light indication lamp at ⑤. Indicate working radius at display ⑦ then 「m」 lamp at (⑧-3) lights.
- Indicate hoist height (point pin height) Press switch ② to light indication lamp at ⑥. Indicate hoist height at display ⑦ then 「m」 lamp at (⑧-3) lights.
- After indicating hoist height, press ② to indicate [rated capacity value] at the display ⑦. Then 「t」 lamp at (⑧-1) lights.



working status display lamp / working status display part	working status display switch
boom angle ③ lighting ⑦ display	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> <div style="margin-right: 5px;">press</div> <div style="border-left: 1px solid black; width: 10px; height: 100px; margin-left: 5px;"></div> <div style="margin-left: 5px;">press</div> </div>
boom length ④ lighting ⑦ display	
working radius ⑤ lighting ⑦ display	
hoist height ⑥ lighting ⑦ display	
load rating ⑦ display	
<p>Press ② "working status display switch" to light indication lamp like ③ → ④ → ⑤ → ⑥ → ③.</p>	

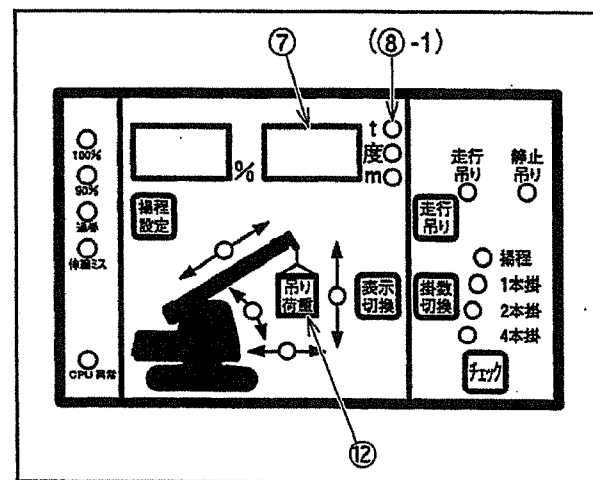
- ③ **Moment 90% alarm lamp**
Hanging load exceeds 90% of the
 load rating, moment 90% alarm lamp ⑨
 lights and buzzer sounds continuously.
- ④ **Moment 100% alarm lamp**
Hanging load exceeds 100%, moment
 100% alarm lamp ⑩ lights and
 buzzer sounds continuously.
- ⑤ The ratio of the hanging load moment
 and the load rating moment is shown
 at the moment ratio display ⑪ by
 % number.



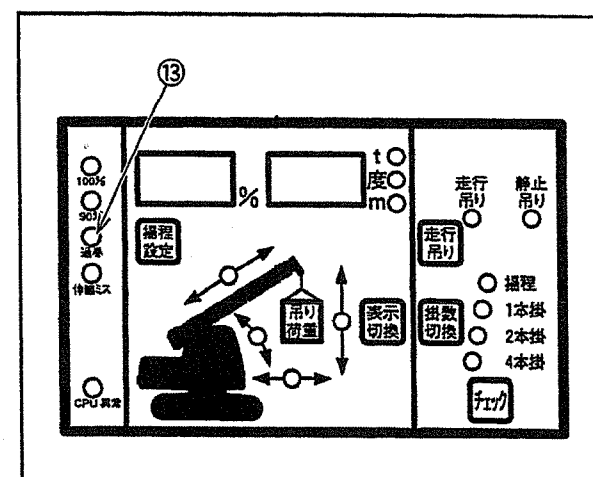
- ⑥ **Actual load display switch**
When you want to know the rough
hanging load weight, press the switch
 ⑫ ton figure is displays at working
 status display part ⑦ and 「t」 part of
 (⑧-1) unit display lamp flashes.

NOTE :

Use the actual loading weight display as
 a reference. During boom derrick / lower
 operation display value may move.



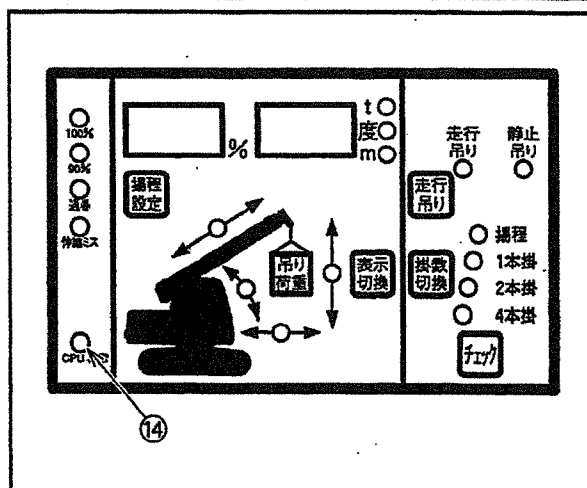
- ⑦ **Hook overhoisting display lamp**
When the hook lifts the overhoisting
preventing weight ⑬ the hook
 overhoisting display lamp lights and
 buzzer sounds. Hoisting stops
 automatically.



Crane operation

⑧ CPU malfunction display lamp

When the computer function of the moment limiter becomes malfunction "CPU malfunction" display lamp ⑭ lights and continuous alarm sounds. Contact your authorised dealer.

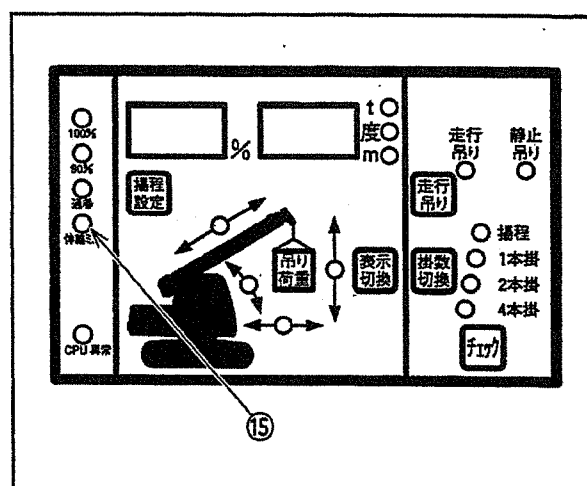


⑨ Expansion mistake display lamp

When choose a wrong switch to extend 2nd, 3/4/5th boom, the expansion mistake lamp ⑮ lights and buzzer sounds. Boom extension movement stops.

NOTE :

Refer to page 4-24 for how to use boom extension switch.



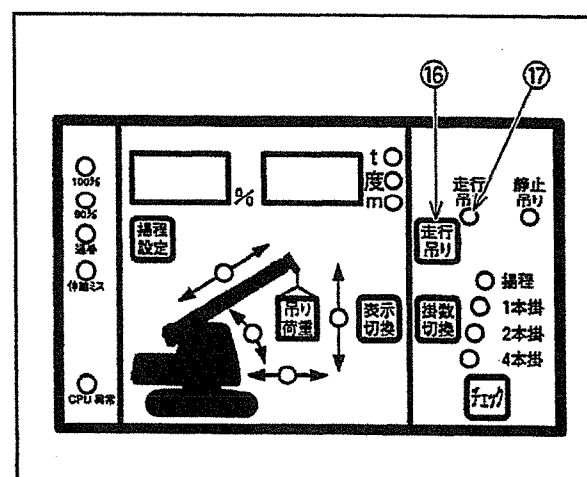
⑩ Pick and carry operation switch

For pick and carry operation press the switch ⑯ to light the pick and carry operation lamp ⑰.



WARNING

- Since pick and carry operation is not stable and can be dangerous, refer to the rated lifting capacity chart.
(Maximum load is less than 2,000kg)
- Drive on a firm and level ground.
- Use lower than low speed (1 speed) for pick and carry operation.



11 Stationary carry-on-rubber operation

Press driving switch ⑯ to change between pick and carry operation and stationary carry-on-rubber operation. When turn the switch "ON" it picks up the last driving status which had been used.

Normally it selects stationary carry-on-rubber lamp (LED) ⑱.

12 Changing number of wire switch

Use this switch to change number of wires. Press switch ⑲ to change number of wires by 3 stages.

1 wire lamp lit : 1 wire (option)

2 wires lamp lit : 2 wires

4 wires lamp lit : 4 wires

This switch remembers the last wire numbers you used even after turning the starter switch "OFF".

**WARNING**

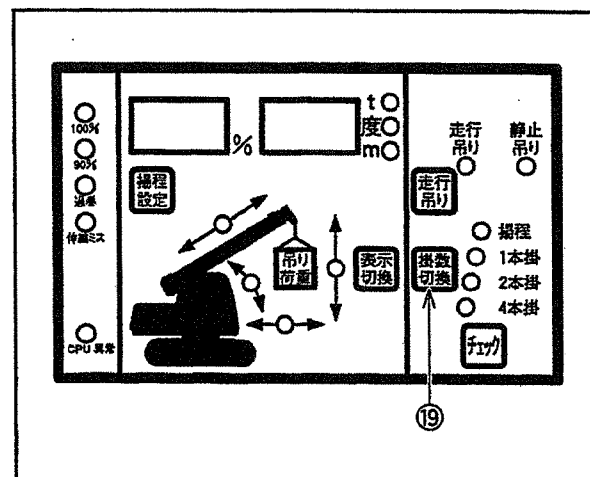
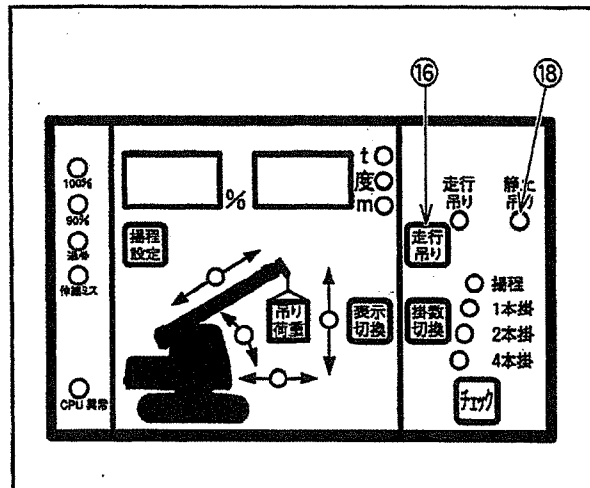
Actual hanging weight changes depending on the number of wires. Choose the correct numbers.

● Loading limit for number of wires

4 wires / 2 wires	4,900 kg/2,200 kg
1 wire (option)	1,400 kg

NOTE :

To change to 1,2 wire specifications you need to change a hook and a wire rope. Contact your authorised dealer.

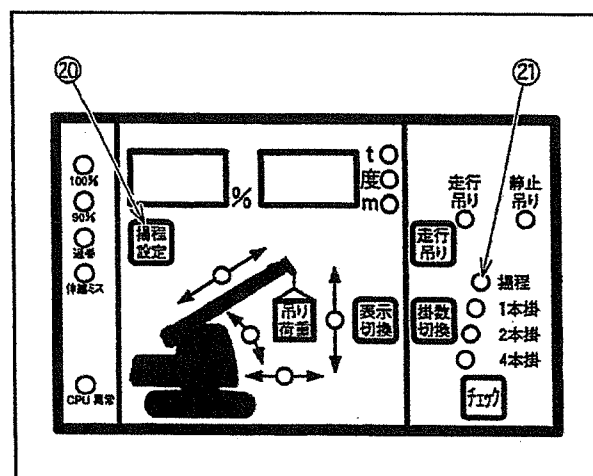
**13 Hoist height setting switch**

Use this switch to control boom height. Press switch ⑳ to set or reset the height limit.

The hoist height setting switch ㉑ flashes during setting the height limit.

Set the boom to the height you want to set the height limit and press switch ㉑ to set. The lamp ㉒ lights. Press the switch ㉑ again to release.

Prediction sounds 500mm before the setting height and alarm sounds 200mm before the setting and stop.



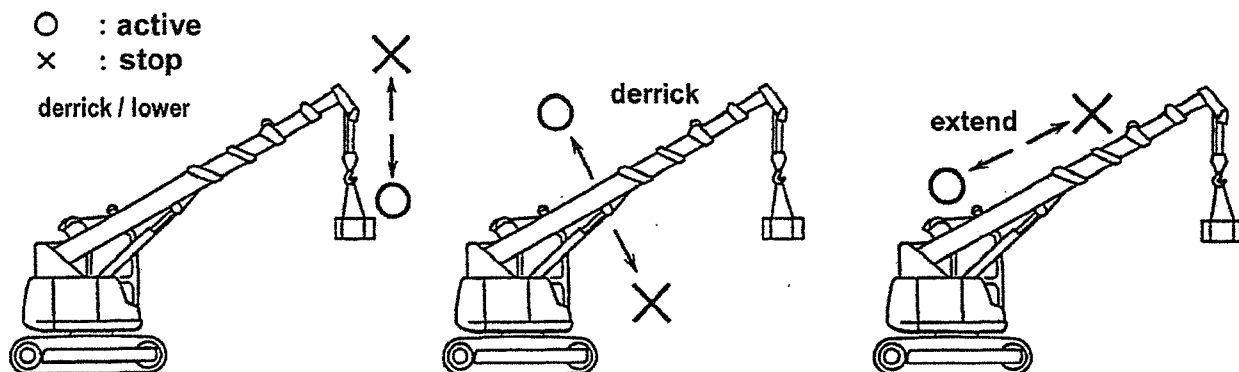
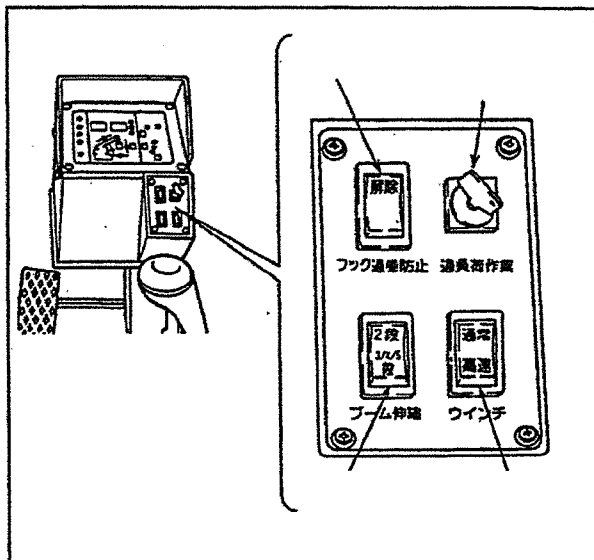
How to use moment limiter

Automatic stop function

This function makes crane stop automatically when overhoisting or overload situation during operation.

When it stops all operations to the dangerous side cannot be done.

Even when automatic stop function is working operations to the safe side can be done.



Content of the automatic stop function and release method

condition	content	release method (1)	release method (2)
overload operation	When buzzer sounds continuously and moment alarm lamp lights because of overloaded.	Derrick the boom, retract and lower it. Unload and change the working status.	Turn the automatic stop release switch to the right and hold it.
overhoist hook	When overhoisted and alarm sounds.	Lowering the hook.	Press the overhoist preventing switch to release side.
extension error in operation (only extension operation is automatically stopped)	When made an error in boom 2nd, 3rd, 4th extension switch operation.	Reselect the boom extension switch.	When the automatic stop release switch is released, the movement which the extension switch chose becomes movable.
hoist height	When the height is -200mm from the setting height.	Lower the boom or retract the boom.	_____
(1) Release method during normal movement (2) Emergency release method			

● Overload release switch (self recover)

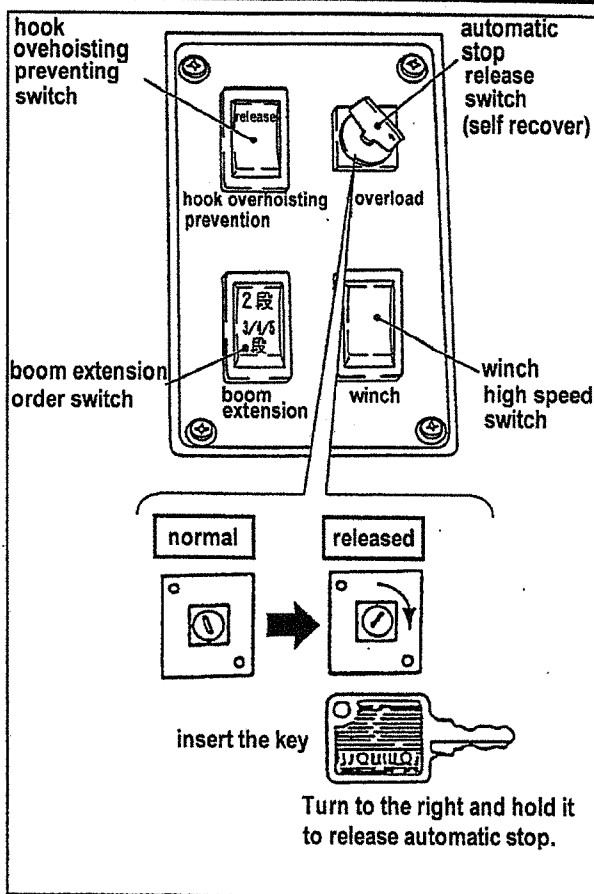
Turn this switch to the right and hold it to release the following automatic stop functions. Take off the key and give it to the supervisor while operation.

overloaded	○
error in extension operation	○
hook overhoisted	×

○ = releasable × = cannot release

⚠ DANGER

Operating in release condition constantly is extremely dangerous. This switch should be used only for maintenance or emergency purpose.

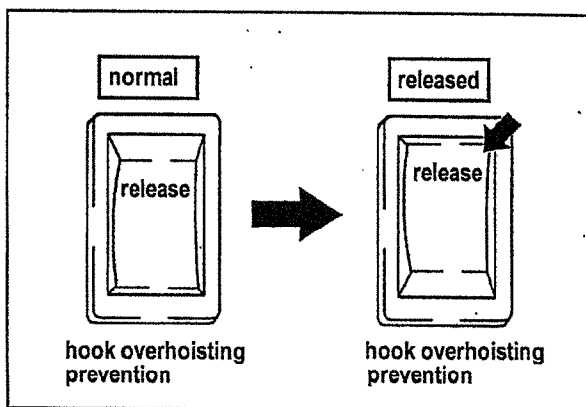


● Hook overhoisting preventing release switch

When it is overhoisted, the overhoisting preventing function works and stop operation automatically. To release overhoisting preventing function press the overhoisting release switch. It can be released only while you are pressing the switch.

⚠ WARNING

Never operate crane constantly when the overhoisting release switch is "ON" since it may damage the boom or cause drop accident.



Crane operation

● boom extension order switch

NOTE :

When boom automatic extension device is attached, there is no boom extension order switch as shown. 2nd or 3rd stage extension will be changed automatically when boom extension operation lever is operated.

When extending from the basic boom position to fully extended, use this switch to extend the boom.



CAUTION

Be careful not to overhoist the hook. Lower the hook before extending the boom or combine it with winch lowering operation.

● 2nd stage boom extension

1. Press the "2nd stage" side of the boom extension order switch.
2. Press the boom extension operation lever to "extension side".
3. Once 2nd stage boom is fully extended move the boom extension lever to neutral.

● 3/4/5th stage boom extension

1. Press the "3/4/5th stage" side of the boom extension order switch.
2. Press the boom extension operation lever to "extension side".
3. 3/4/5th stage booms extend equally.

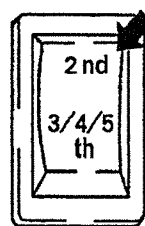
NOTE :

When you hit the wrong order key of the boom extension order switch, "extension error" lamp of the moment limiter lights and stop automatically.

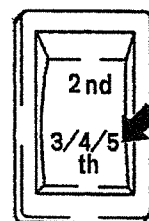
● Retraction operation

1. Retract 3/4/5th stage booms first and once they are fully retracted then retract the 2nd stage boom.
2. Operate the boom extension lever slowly when retracting the boom from fully extended condition.
3. When it does hunting during normal operation, add some grease on the boom surface or adjust extension wire rope.

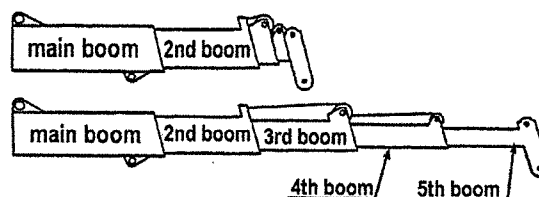
Not all machines are attached boom extension order switch.



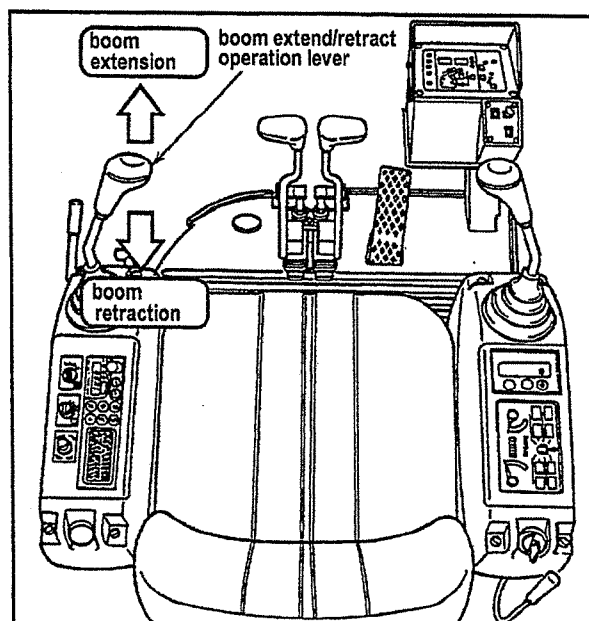
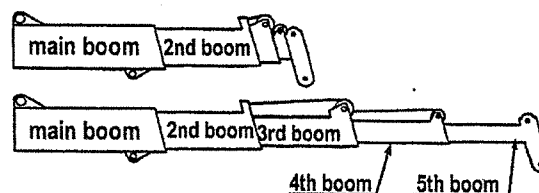
to retract
2nd stage



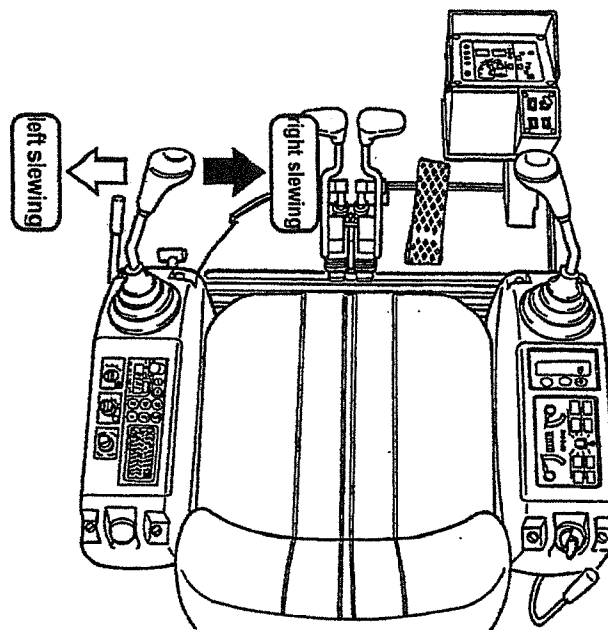
to retract
3/4/5th stage



Not all machines are attached boom extension order switch.



■ Slewing operation



● Operation instruction

Move the left operation lever to slew the upper slewing part.

Left slewing : Shift the left operation lever to "Left".

Right slewing : Shift the left operation lever to "Right".

Stop : Move the left operation lever back to "Neutral".

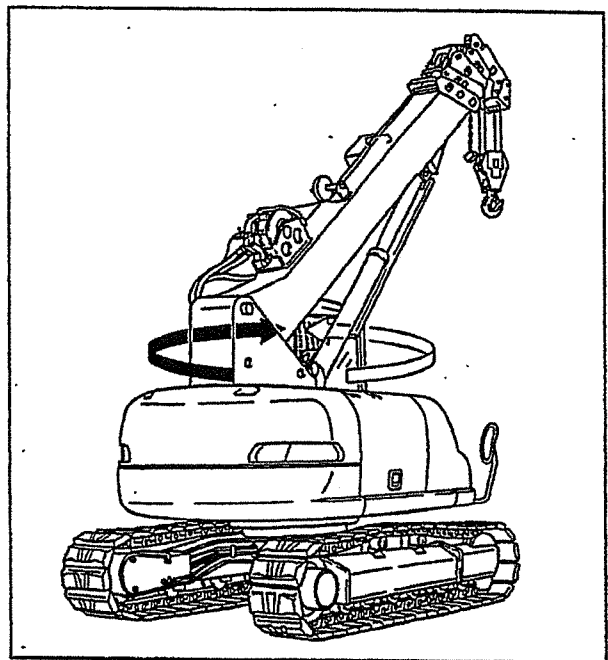
! DANGER

Operate the lever slowly and start / stop smoothly. Sudden lever operation may cause collapse of the load or tipping over the crane.

Slewing speed can be changed by lever operation. Operation lever should be moved smoothly, especially at start and stop operation.

! CAUTION

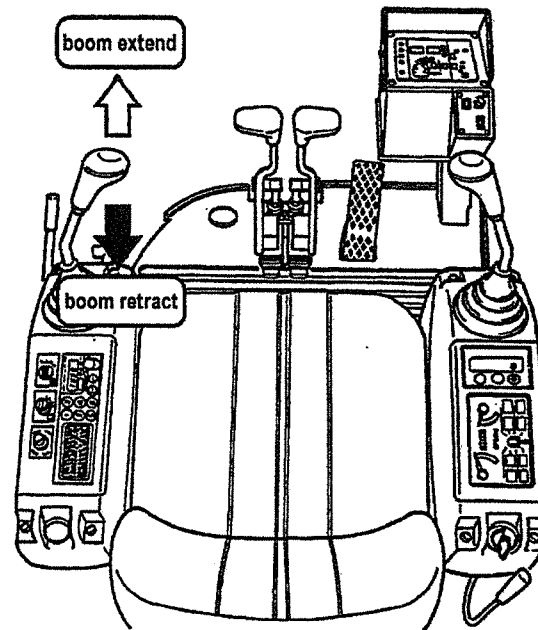
Sound the horn by the left operation lever grip before starting the operation.



■ Boom extend/retract operation

NOTE :

When boom automatic extension device is attached, there is no boom extension order switch. 2nd and 3rd stage extension will be changed automatically when boom extension operation lever is operated.

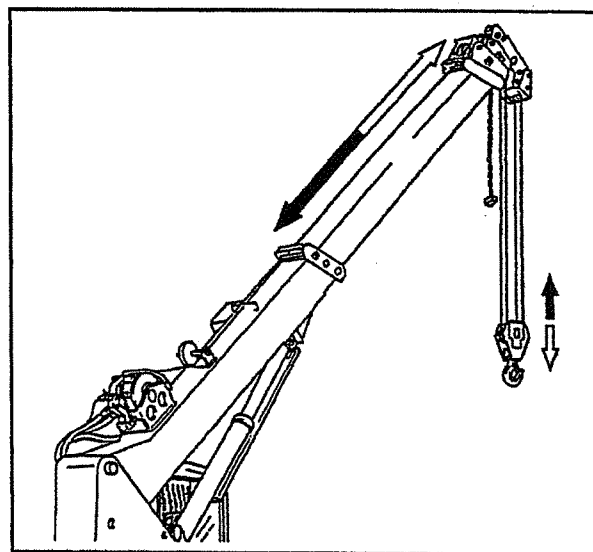


● Operation instruction

Following explanation is an example by using the left operation lever and boom extend/retract switch (2nd, 3rd, 4th, 5th stage).

⚠ CAUTION

During hook extend/retract operation be careful not to overhoist the hook. Lower the hook before extending the boom or combine it with winch lowering operation.



① Boom extension /retraction (basic operation)

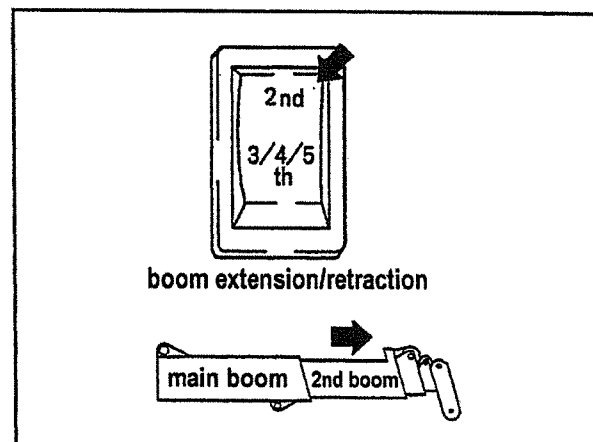
Boom extension : Push the boom extension/retraction operation lever to "front".

Boom retraction : Pull the boom extension/retraction operation lever to "backwards".

Stop : Move the boom extension/retraction operation lever back to "neutral".

② 2nd stage boom extension

- (1) Press the "2nd stage side" of the boom extension/retraction switch.
- (2) Push the boom extension/retraction operation lever to "front".
- (3) When the 2nd stage boom is fully extended, move the boom extension/retraction lever back to "neutral".



Crane operation

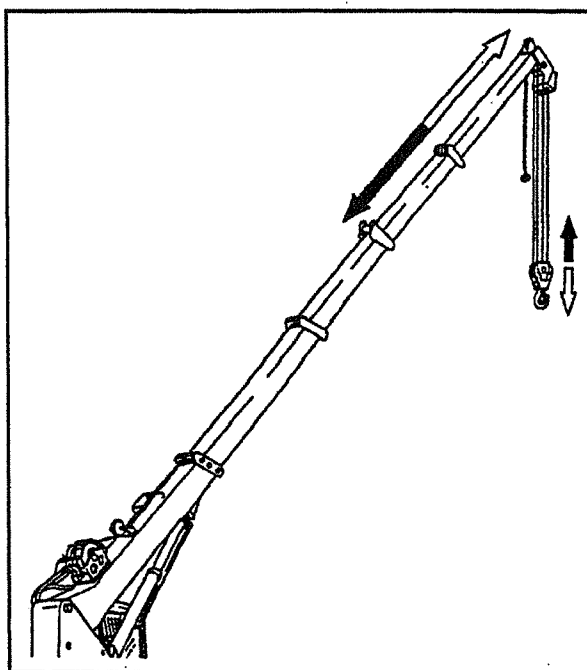
3 3/4/5th stage boom extension

- (1) Press the "3/4/5th stage " side of the boom extension/retraction switch.
- (2) Push the boom extension/retraction lever to "front".
- (3) The boom 3/4/5th stage booms extend at the same time. When it comes to fully extension, extend slowly.
- (4) When 3/4/5th boom extend fully shift the boom extension/retraction lever back to neutral. When wrong switch is selected "extension/retraction error lamp" of the moment limiter lights and stop automatically.



DANGER

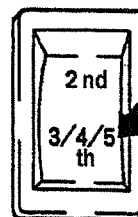
Wrong extension/retraction operation damage the boom.



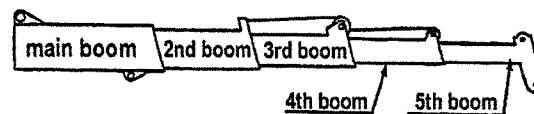
4 Boom retraction

Follow the reverse procedure to retract.

- (1) Retract the 3/4/5th boom first. Once 3/4/5th are fully retracted start retracting the 2nd stage boom.
- (2) Move the operation lever slowly when retracting from fully extended situation. Sudden operation may cause hunting.
- (3) When hunting during normal operation check grease and adjust the extension/retraction wire rope.



boom extension/retraction



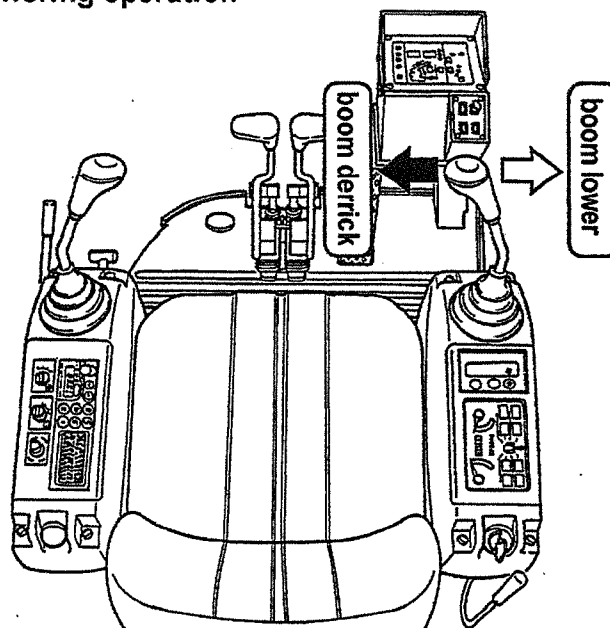
NOTE :

During boom extended situation over time, boom shrinks a bit naturally because of hydraulic oil bulk change in the cylinder by temperature change.

● Boom automatic extension/retraction device attached

- There is no boom extension/retraction switch.
- 2nd and 3rd stage boom extension/retraction will be automatically switched by the boom extension/retraction operation lever.

■ boom derricking/lowering operation



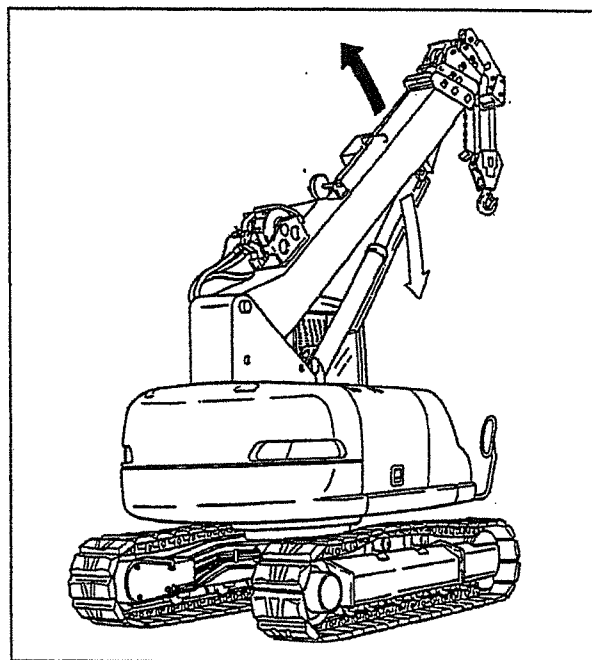
● Operation guidelines

Move the right operation lever to derrick/lower the boom.

Boom derricking : Move the boom derrick/ lower lever to "left" side.

Boom lowering : Move the boom derrick/ lower lever to "right" side.

Stop : Move the right operation lever back to "neutral" position.



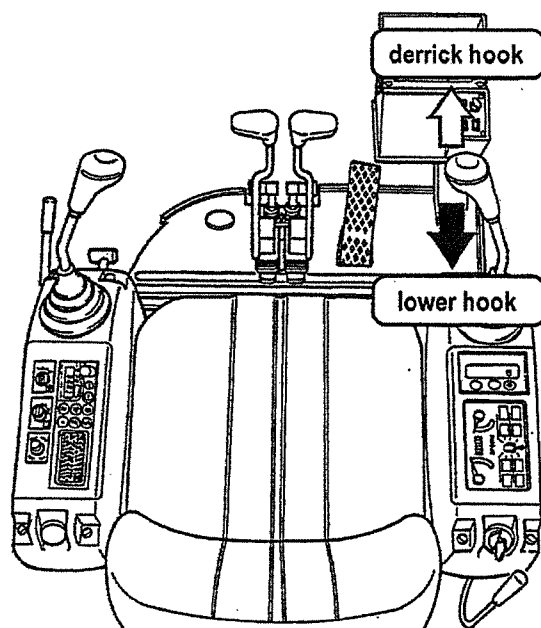
⚠ CAUTION

Caution to derrick/lower the boom

1. Operate the lever slowly. Sudden operation may cause boom damage especially when hanging a load.
2. There is a case to be overloaded when lowering the boom, since working radius becomes bigger. Pay attention not to be overloaded.
3. Do not pull a load while boom is derricking.
4. Pay attention to the combination between the boom length and boom angle.
5. Lower the boom and reduce speed when the overload prediction lamp lights and buzzer sounds.

Crane operation

Winch operation



● Operation guidelines

Move the hook derrick/lower operation lever to derrick/lower the hook.

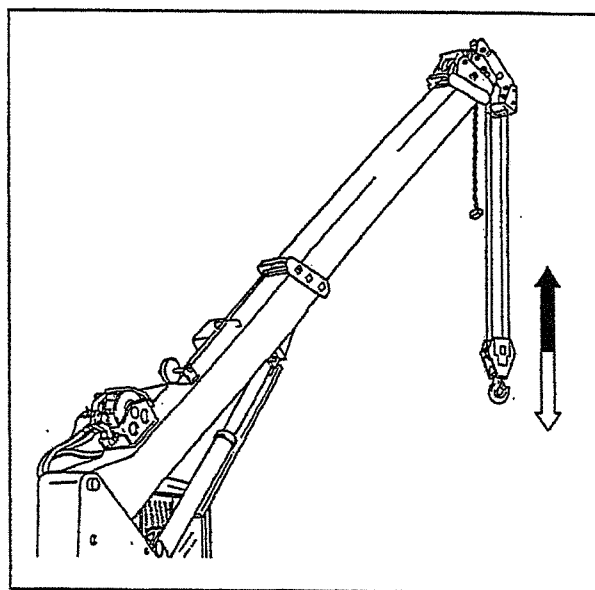
Derricking : Pull the winch operation lever to "backwards".

Lowering : Push the winch operation lever to "forward".

Stop : Move the winch operation lever back to "neutral" position.

- ① Use the winch lever to derrick/lower the winch and adjust the speed of derricking/lowering hook by stroke of the accelerator pedal and winch operation lever.

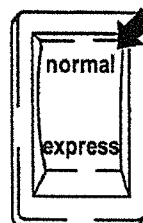
②



WARNING

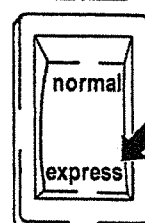
Pay attention to the distance between the wire rope and sheave when derricking. When it is overhoisted, the overhoisting limit switch works, the overhoisting lamp of moment limiter switch lights and alarm buzzer sounds at the same time then hoisting movement stops automatically.

normal



winch

express



winch

⚠ WARNING

- Do not get the hook touched on the ground nor hoisted while hanging a load since it may get tangled wire rope and shorten its operating time.
- Sudden operation to start and stop may get tangled wire since drum movement and hook movement will mismatch. Slow operation is required.
- During underground operation with hanging a hook for a long time, leave more than three winding on drum.
- Wind the first rope layer neatly so the second wind goes smoothly and will not get wire tangled up.

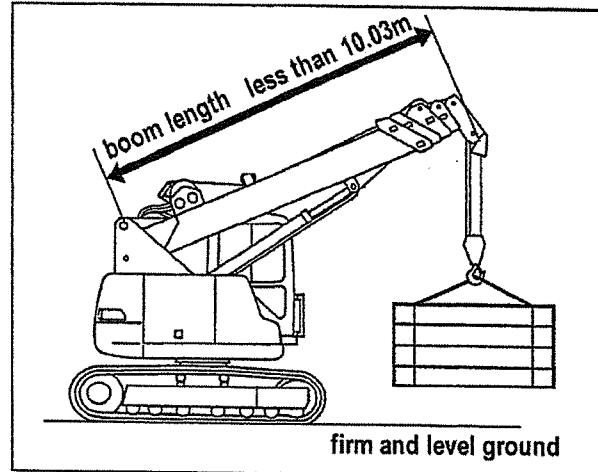
■ Pick and carry operation

⚠ WARNING

- Since pick and carry operation is very unstable and dangerous, it is basically banned. However when you need to operate pick and carry use the rated lifting capacity chart. (Longer than 10.03m boom length cannot operate pick and carry.) Strictly follow the pick and carry rated lifting capacity chart. (Maximum load is less than 2000kg)
- Pick and carry rated lifting capacity is the maximum load weight which is winched on the firm and level ground in resting state. Uneven or soft ground is not suitable.
- Switch moment limiter to pick and carry before starting pick and carry operation.
- Operations to winch/lower hook or derrick/lower, extend/retract, slew boom are banned during pick and carry.

Go through the following steps.

- 1 Set the crane forward and keep the front idler at the front position.
- 2 Press the pick and carry switch of the moment limiter.
- 3 Lift up the load to the lowest height to operate pick and carry. Do not lift it up higher than the crawler.
- 4 Keep the driving speed less than 1.7km/h (1 drive).



Crane operation

Hook automatic stowage device

■ Hook stowage

When finishing operation retract the boom fully to see the hook stowage.

NOTE :

When the boom is fully retracted and the overhoisting release switch is set to "release" hoisting power is set to decrease for safety reason.

⚠ CAUTION

Hook stowage operation should be done only when the boom is fully retracted. If stowing when the boom is extended the stowage link may get damaged.

- ① Shift the winch operation lever to the "winch" side until the hook becomes overhoisted and stops.
- ② After stop while pressing the hook overhoisting preventing release switch, stow slowly.

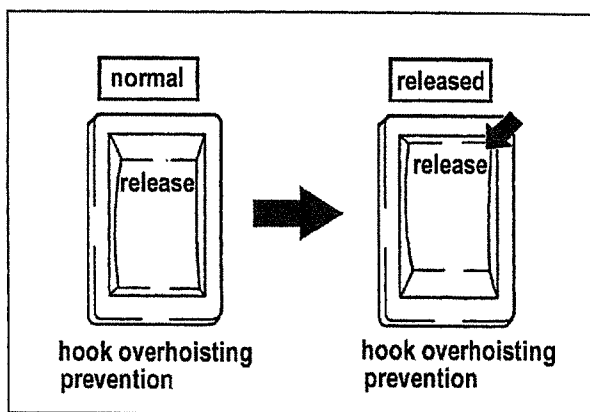
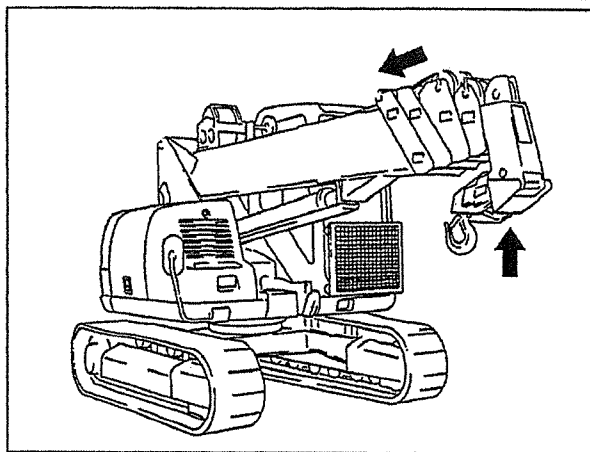
⚠ CAUTION

Engine revolution during stowage operation : 1000 ~ 1200 rpm
Overhoisting may damage a rope.

- ③ Check that the overhoisting preventing switch is moved back to the "normal" side.

■ Take off the hook

- ① Derrick the boom to see the hook in the boom fully retracted state.
- ② Shift the winch operation lever to "lower" side.



■ Emergency procedure at crane operation

In the case of breakdown during crane operation, display "Keep out" sign in the working radius and deploy an observer. Especially breakdown during pick and carry is dangerous. Put the sign of breakdown in the cab.

① The case you cannot unload goods

When the winch is breakdown and can not unload goods, retract the boom and lower it with caution not to overload. Unload goods and contact your authorised dealer.

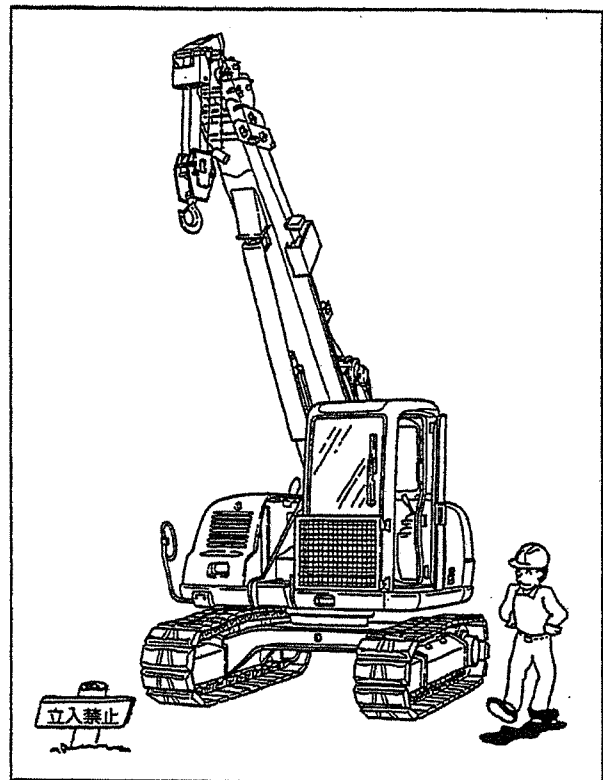
② The case engine stops and cannot start
it is extremely dangerous. Display "Keep out" sign and deploy an observer.

- ① Move the each operation lever to neutral.
- ② Turn the key switch to "Off".

③ The case "CPU abnormal" display lamp lights on the moment limiter.**⚠ DANGER**

When the CPU abnormal is displayed it is very dangerous since crane safety control by the moment limiter does not work. Stop operation immediately and follow the instruction.

Since automatic stop function does not operate, move the crane to the safe side (boom derricking, boom retracting, winch lowering sides) and unload goods then contact your authorised dealer.



Crane operation

Wire rope treatment

■ Wire rope treatment

- When winding a new rope to the winch pay attention not to get wire rope kinked.
- For the first layer of the drum, wind a rope nicely with even tension.
- Right after attaching a new rope set the boom fully extended and highest position then derrick and lower about 500kg load couple times to break in.
- Keep the distance more than 45cm between the upper surface of the hook block and under surface of the 5th boom.
- When operating crane do not get hook block touch the ground. It may get wire rope entangled. (When it gets entangled pull the wire rope out and rewind.)
- Do not use a wire rope if it is twisted. It may get a wire rope entangled.
- When pulling out a wire rope leave more than 3 rolls on the drum.

■ Treatment when main hook is twisted

- 1 Check the direction from normal position and number of twist.

- 2 Lower the hook to the ground.

NOTE :

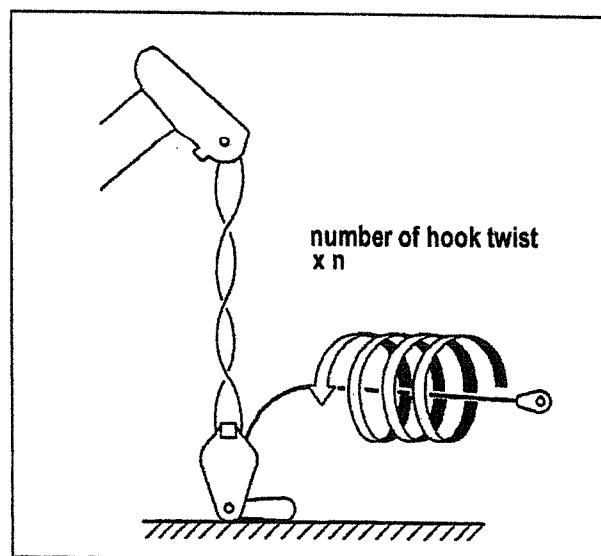
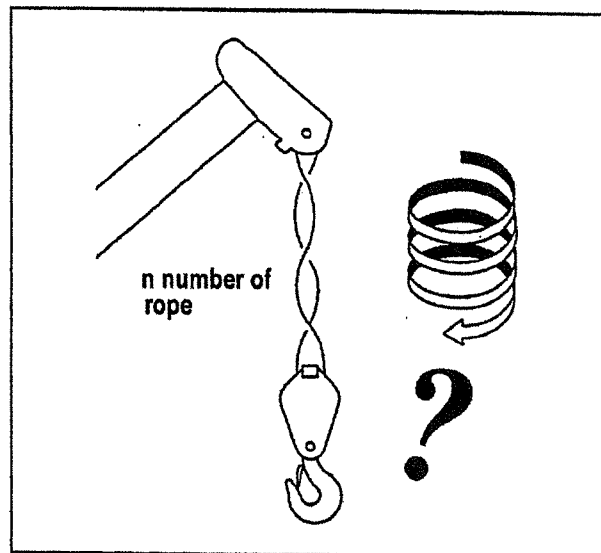
When rope is twisted badly and cannot lower, lower the boom.

- 3 Remove the rope socket from the boom. Keep the rope end to the opposite direction and attach it to the boom after forcing into twist back by n number of ropes of the twisting number of the hook.

NOTE :

Do not twist more than 5 times at a time. The wire rope may lose its original shape.

- 4 Attach the rope socket back to the original position.
- 5 Extend the boom fully and derrick to the highest and take a big lifting height then derrick and lower the hook couple times.
- 6 Follow the above procedure until straighten the hook. In the case a rope cannot be straighten replace a wire rope.



■ Wire rope basis of exchange

Change the wire rope when it becomes like mentioned below. Check a wire rope periodically and never use the breaking, worn or corroded wire rope.

① More than 10% of wire is disconnected in 1 wire rope lay.

② More than 7% of wire diameter is reduced.

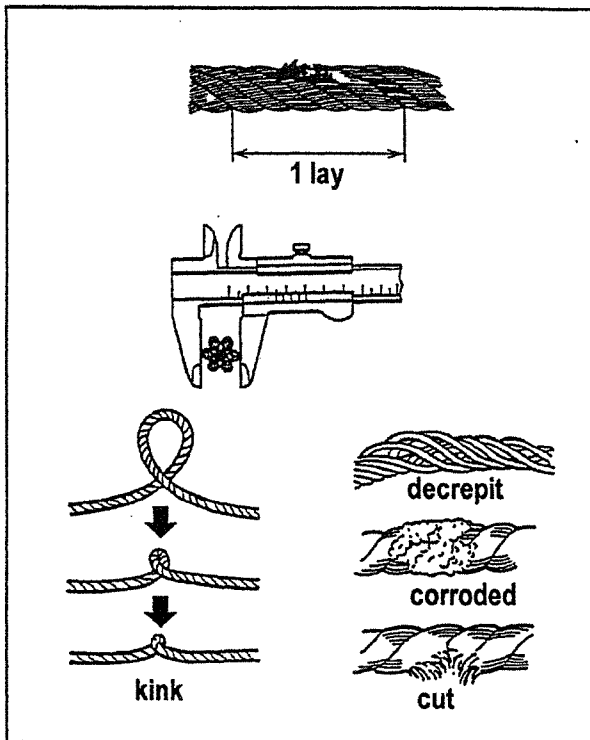
rope width is less than 13.0mm for 14mm diameter

rope width is less than 9.3mm for 10mm diameter

rope width is less than 7.5mm for 8mm diameter

rope width is less than 5.6mm for 6mm diameter

NOTE : Diameter should be the figure of the average amount of width measured in 3 directions at the point where going through sheave repeatedly.



③ Kinked rope

④ Extremely decrepit or corroded

⑤ Extremely stretched by loading heavy goods or dropping off from sheave

⑥ Shorted out by current

⑦ Being sparked by electricity or weld or exposed to extreme heat

■ How to change a wire rope

Follow the procedure to change a wire rope.

To remove a wire rope

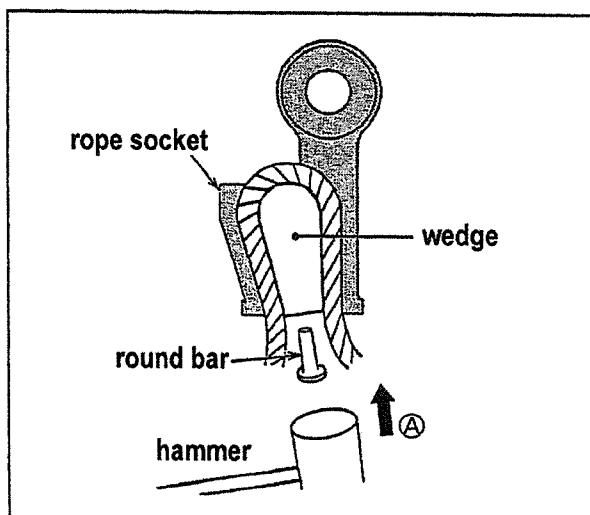
① Lower the hook until touching the ground.

② Remove the rope socket from the boom.

③ Remove the rope clamp.

④ Remove the wedge from the rope socket and undo the wire rope.

(Put a round bar like the right figure and tap towards ① direction by a hammer to remove the wedge.)



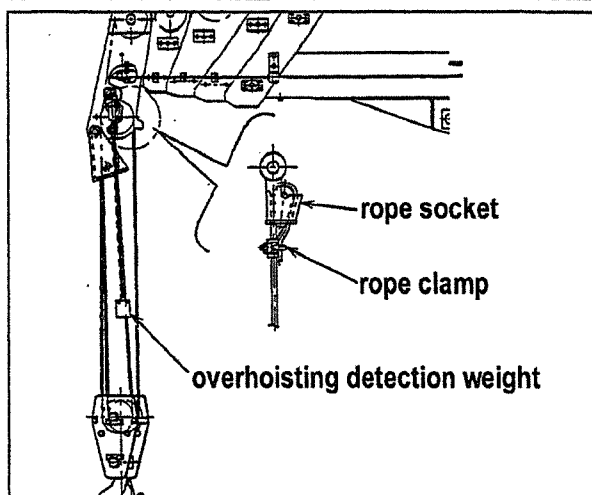
Crane operation

- ⑤ Remove the overhoisting detection weight from the wire rope.
- ⑥ Remove the wire rope from sheave of the hook block and the boom.
- ⑦ Wind the wire rope from rope drum to the winder.



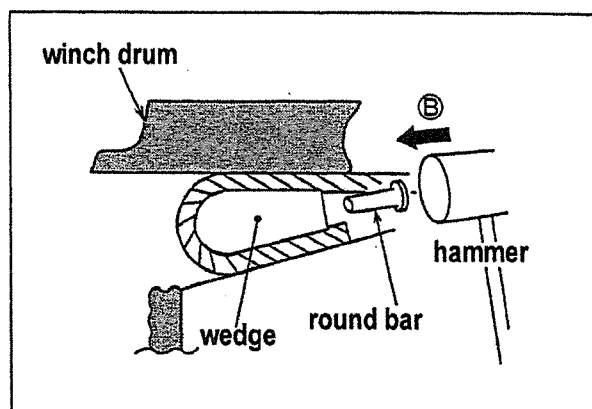
CAUTION

Pay attention not to be hit by the rope end when slipping off the rope.



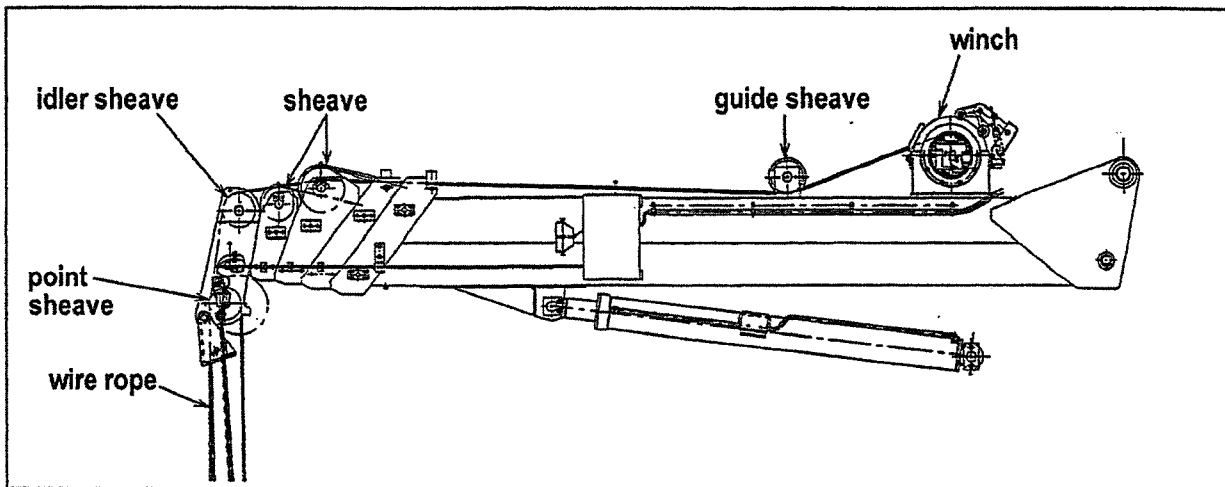
- ⑧ Remove the wedge from the winch drum and undo wire rope.

(Put a round bar like the right figure and tap towards ㊸ direction by a hammer to remove the wedge.)

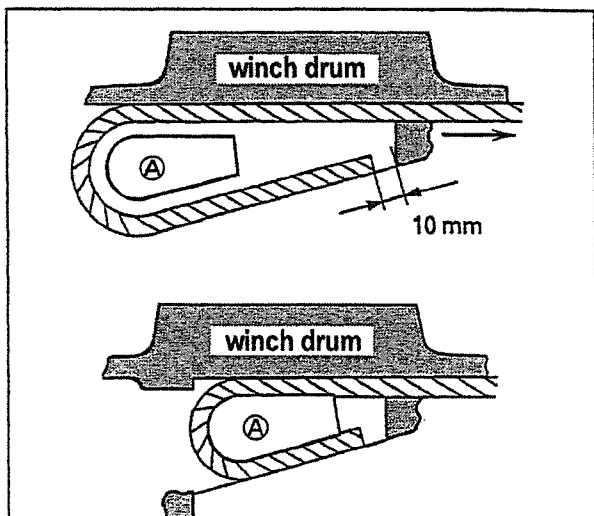


■ How to attach a wire rope

Follow the procedure to attach a wire rope.



- ① Run a wire rope through from point sheave, idler sheave, sheave to guide sheave.
- ② Attach the wire rope end to the winch drum. Run a wire rope through winch drum loosely and put wedge ① in then pull the wire rope hard to the direction of arrow to attach like the right figure.



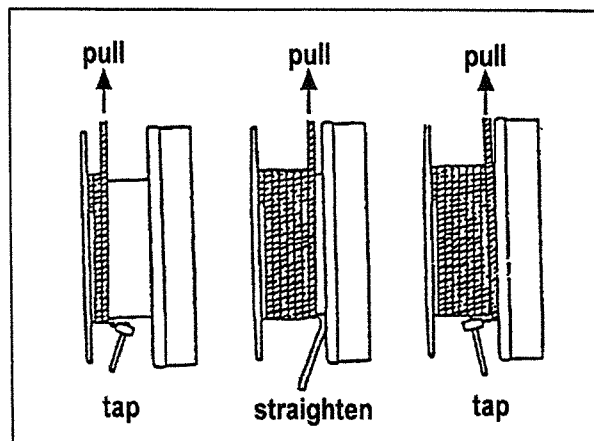
⚠ CAUTION

Use leather gloves to handle a wire rope.

- ③ Pulling the wire rope hard and wind it to the winch drum firmly.

⚠ CAUTION

Pulling the wire rope and wind slowly to avoid tangling.
Attention to a running rope.



Crane operation

- 4 Set the wire rope on the hook block.
- 5 Get the wire through the overhoisting detection weight.
- 6 Attach the wire rope end to the rope socket.
- 7 Run a wire rope through the rope socket like the figure below and put the wedge **A** in then pull the wire rope hard to the direction of arrow to fasten tight.
- 8 Attach the wire rope by the rope clamp.
- 9 Attach the rope socket to the boom point.
- 10 Attach the overhoisting detection weight.

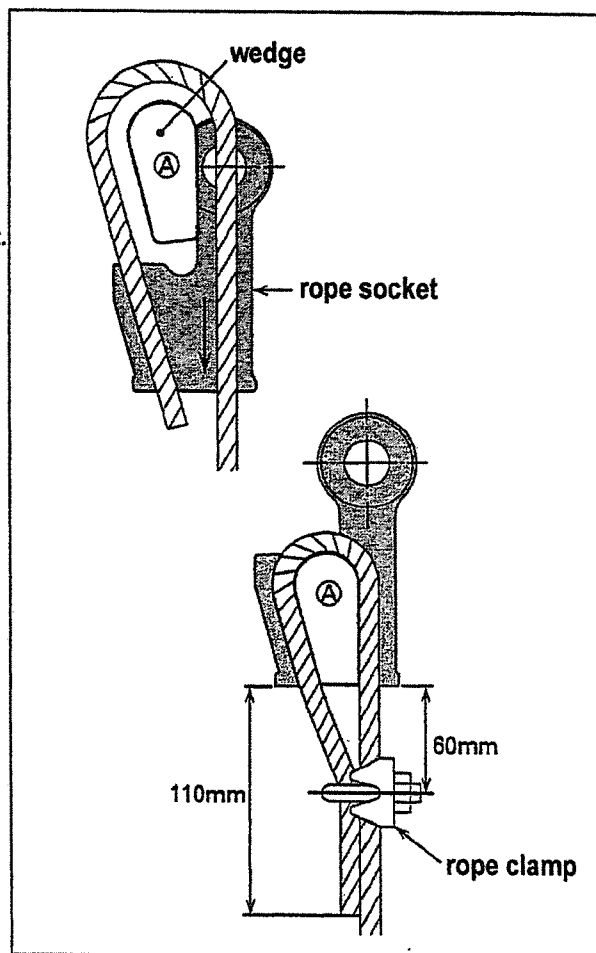
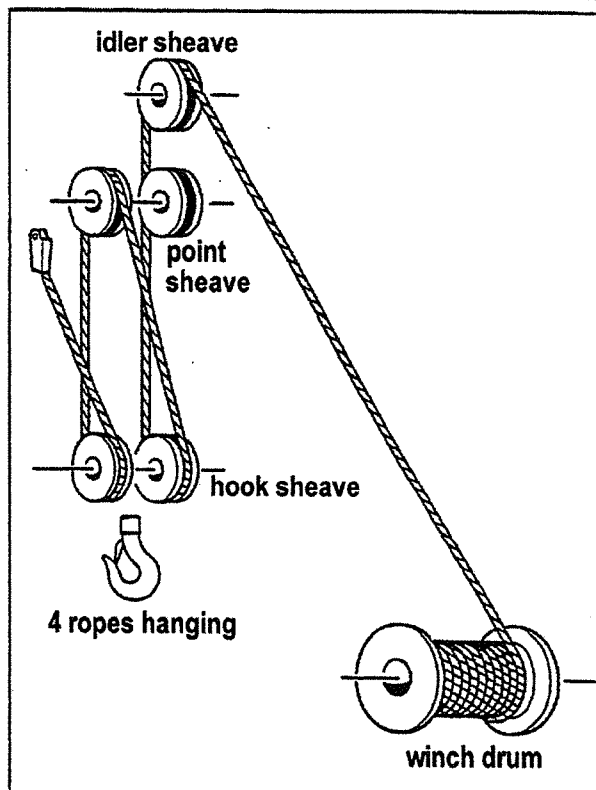
NOTE :

- Right after attaching a new rope set the boom fully extended and highest position then derick and lower about 500kg load couple times to break in.
- Do not forget to attach the overhoisting detection weight.



WARNING

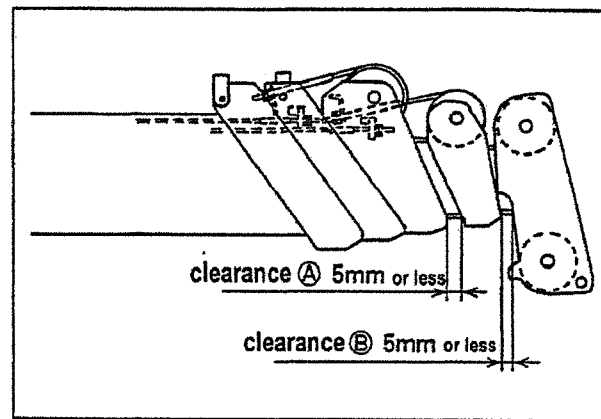
Pay attention to the direction of the rope socket when attaching. Do not use any U bolt to tensile rope.



Crane operation

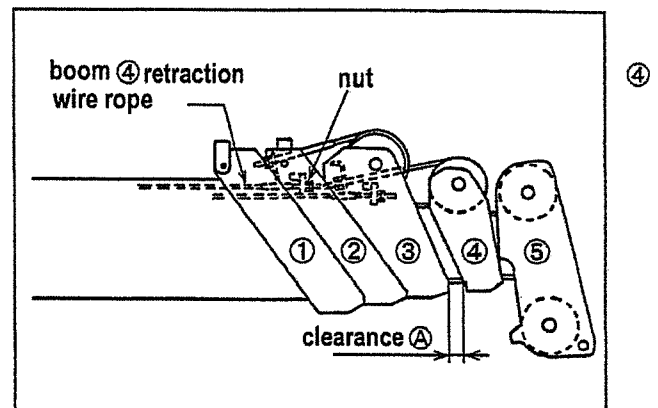
(3) Retract slowly until stowed condition.

Check the clearance between ④ and ⑤ under this situation. When there is more than 5mm for clearance ④ adjust boom retraction wire rope ④. When there is "no" clearance follow the procedure "boom ④ extension wire rope adjustment" from (6).



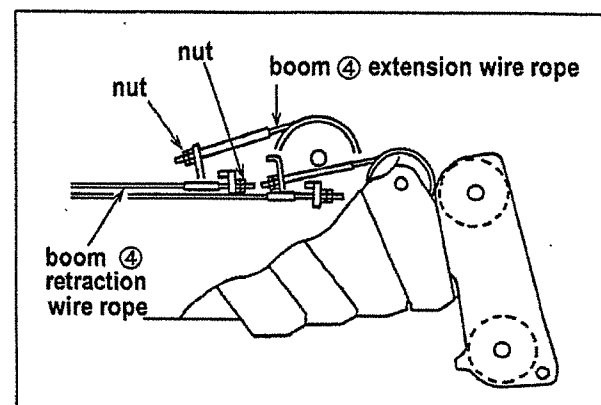
• Boom ④ retraction wire rope adjustment

- (4) Be tightly fastened by a nut to the direction retraction wire rope is stretched until clearance ④ becomes "zero".
- (5) Operate procedure (2) and (3) and if there is clearance ④ then readjust.



• Boom ④ extension wire rope adjustment

- (6) Fasten a nut evenly to the direction wire rope is stretched until the boom ⑤ just before starts stretching. (Beware of excess stretching)
- (7) Fasten the retraction wire rope nut for the boom ④ one more round.
- (8) Hold the boom ④ retraction / extension wire rope by a nut.
- (9) Follow the procedure (2),(3) and when there is clearance ⑤ follow the procedure "boom ⑤ retraction wire rope adjustment" of (10). When clearance ⑤ is "zero" follow the procedure "boom ⑤ extension wire rope adjustment" of (12).



• **Boom ⑤ retraction wire rope adjustment**

(10) Tightly fasten a nut to the direction retraction wire rope is extended until clearance ⑥ becomes "zero".

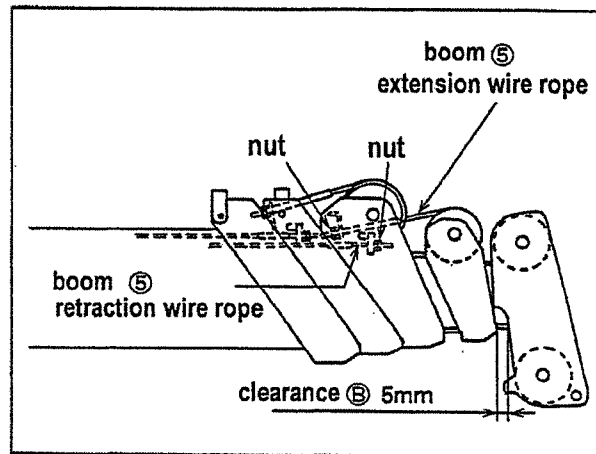
(11) Follow the procedure (2) and (3) and when there is some clearance ⑥ then readjust.

• **Boom ⑤ extension wire rope adjustment**

(12) Fasten a nut evenly to the direction wire rope is stretched until the boom ⑤ just before starts stretching. (Beware of excess stretching)

(13) Fasten the retraction wire rope nut for the boom ⑤ one more round.

(14) Hold the boom ⑤ retraction / extension wire rope by a nut.



Check and maintenance

■ Periodical change important security part

Following parts may cause serious accidents when they are deteriorated, worn or fatigate by age softening and repeat.

When it reaches its replacement time contact your authorised dealer and replace parts periodically.

Periodical change important security part

	Parts name	Place to use	Replacement time
engine system	fuel hose	fuel tunk ~ engine	every 2 years
	radiator hose	engine ~ radiator	every 2 years
	air conditioner hose	air conditioner ~ compressor	every 2 years
	heater hose	engine ~ heater	every 2 years
crane system	wire rope	boom to extend/retract, hoist/lower	every 4 years
	packing / seal	each cylinder	every 2 years
	hydraulic oil hose	boom derrick/lower cylinder	every 2 years
	hydraulic oil hose	hoisting brake	every 2 years

NOTE : Depending on status of use wear volume and fatigue degree will be different.
Early replacement is recommended.

■ Recommended oil viscosity and exchange capacity

● Fuel / oil

Use the suitable fuel depending on temperature.

filler	type	capacity (L)	How to use (depending on temperature) °C								Specified oil and Kobelco parts No.
			-30	-20	-10	0	10	20	30	40	
hydraulic oil tank	HO hydraulic oil	72 ℓ (normal oil quantity)								ISO VG68	KW68
										ISO VG46	KW46
		100 ℓ (full capacity)								ISO VG32	KW32S
engine oil pan	MO engine oil (API classification CD class)	8 ℓ (H level)							SAE 40		SAE40
		6 ℓ (L level)							SAE 30		SAE30
									SAE10W-30		SAE10W-30
		1.5 ℓ							SAE 30		SAE30
		1.7 ℓ × 2							SAE 30		SAE30
hoisting reduction gears	GO gear oil (API classification GL-4)	1.4 ℓ							SAE 90		SAE90
operation lever	EPG extreme-pressure grease	a few grams									2421R114D1 (cartridge 4-pack)
hook		1 place									2421Z183 (cartridge 1-pack)
guide sheave		1 place									2421Z191D1 (pail can 16kg)
boom foot (R/L) derrick/ lower cylinder head		3 places									
derrick/lower cylinder rod attach pin		1 place									
idler adjuster		2 places									
boom sliding pad	SL pad grease	16 places									molybdenum disulfide 2421R114D3 (cartridge 4-pack)
cylinder guard sliding pad		2 places									2421Z183D3 (cartridge 1-pack)
extend/retract hose reel hose		a few grams									2421Z62 (molybdenum spray 500g)
wire rope	WO wire rope oil	—									EN01T01013D1 (spray) EN01T01013D2 (16kg can)
slewing gear	molybdenum extreme- pressure grease	5 kg									N. L. G. I No. 2
fuel tank	light oil	100 ℓ								JIS No.2	JIS No.2
										JIS No.3	JIS No.3
										JIS special No.3	JIS special No. 3
radiator reserve tank	coolant water (LLC)	3.7 ℓ (total water capacity 12 ℓ)								30% LLC mix	Kobelco antifreeze (Check the LLC mix ratio)
										50% LLC mix	

Check and maintenance

device	interval		irregular	before operation	every week	every month or	every 3 month or	every 6 month or	every 12 month or	2,000H	grease (change parts)	reference
				8H	50H	120H	250H	500H	1,000H			
engine	starting performance, exhaust color, noise			⊙								5-26
	tightening of cylinder head, manifold and mounting bracket								⊙			—
	check of each oil and fuel leak			⊙								—
	water leak for each part			⊙								—
	fuel tank	oil capacity check		⊙								5-26
		defecate water and sediment						⊙				5-40
		cleaning cap and strainer						⊙				5-40
oil pressure system	hydraulic oil	oil capacity check		⊙							HO hydraulic oil	5-27
		replacement								⊙		5-50~5-51
	suction strainer	cleaning and change								⊙		
	change return filter				⊗ first time			⊙			element	5-41
	oil leak and damage check of oil pressure device, wiring and hose			⊙								5-28
upper frame	reducing gears oil	oil capacity check				⊙					MO engine oil	5-33
		replacement						⊗ first time		⊙		5-52
	grease for slewing bearing						⊙				EPG extreme-pressure grease	5-37
	slewing gear tooth surface check							⊙				5-42
	grease change for slewing									⊙	molybdenum extreme-pressure grease N.L.G. 1 No.2	5-54
	slewing brake			⊙								—
	operation lever push add grease to rod part					⊙					EPG extreme-pressure grease	5-34
	slewing bearing attachment loose of cap screw						⊙					5-37
lower frame	travelling reducing gear oil	oil capacity check				⊙					MO engine oil	5-33
		replacement						⊗ first time		⊙		5-53
	check truck link and shoe			⊙								5-28
	extension adjustment for crawler				⊙							5-32

Check and maintenance

device	interval		irregular	before operation	every week	every month or	every 3 month or	every 6 month or	every 12 month or	grease (change parts)	reference
				8H	50H	120H	250H	500H	1,000H		
lower frame	check oil leak and maintenance of upper roller / lower roller			⊙							5-28
	check oil leak and maintenance of idler and travelling reducing gear			⊙							5-28
	check wear of sprocket / idler / roller			⊙							5-28
crane	put grease on derrick / lower cylinder and boom hoot pin				⊙					EPG extreme-pressure grease	5-31
	put grease on derrick / lower cylinder rod pin and guide sheave				⊙						5-31
	put grease on hook block				⊙						5-31
	put grease on boom sliding pad				⊙					SL pad grease	5-30
	put grease on cylinder guard sliding pad				⊙						5-30
	put grease on extend / retract rope end				⊙						5-30
	hoist wire rope feed				⊙					WO wire rope oil	5-31
	hoist reducing gears	oil capacity check			⊙					GO gear oil	5-34
		replacement			⊗ first time				⊙		5-49
	put grease on eboom extend / retract hose reel				⊙					SL pad grease	5-34
	beginning set of hose reel for boom extend / retract cylinder		⊙								5-23
	operational check for moment limiter (overloading preventing device)			⊙							5-28
	hook deform / damage check			⊙							5-29
	boom sheave deform / damage check			⊙							5-29
	wire rope (to hoist, extend, retract) deform, damage and wear			⊙							5-29
	overhoisting preventing device			⊙							5-29
electricity	buttery	liquid check	⊙								5-22
		densitometric measurement	⊙								5-22
		cleaning / grease	⊙								5-22
	electric wiring			⊙				⊙			5-28
	gauge, switch, lamp, security alarm			⊙							5-28