Request to those who operate the crane.

The operator's manual describes correct operation methods, simple inspection, and service for the **SPS ENG** crane.

Be sure to read this manual carefully to carry out correct and safe operation of the crane.

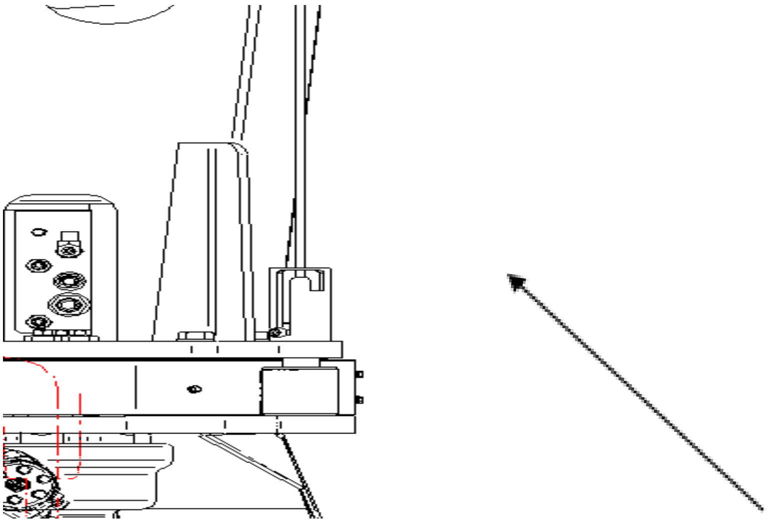
Operate the crane after you have understood the contents of this manual.

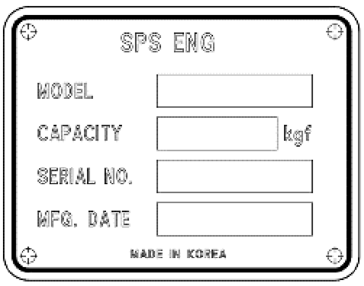
Although we take all possible measures to ensure quality of the crane, you are requested to contact **SPS ENG** sales agents, or authorized service stations whenever you have anything you do not understand.

♦ **For making inquiries**

When making inquiries, ordering spare parts, and requesting repairs, be sure to inform us of the crane model, specification, serial number, date of manufacture, and vehicle type.

♦ **Name plate** of the machine is located at the rear of column.





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6. HOW TO REFER TO "WORKING RANGE CHART"

7. DESCRIPTION OF EACH CONTROL DEVICE

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12. MEASURES TO BE TAKEN IN AN EMERGENCY

SETUP OF THIS MANUAL

SETUP OF THIS MANUAL

Cranes covered in this manual are somewhat different in operation of the cranes in accordance with how to store hook and specifications with or without the cable or specifications of with or without radio remote controller.

Difference in operation due to crane specifications is separately illustrated in this manual for each specification.

Refer to separate "Radio remote control instruction manual" or "Cable remote control instruction manual" for operation and/or maintenance of the cable or the radio remote control.

1. Designation of specifications

Crane specifications covered in this manual are divided broadly into categories according to how to store hook.

1. FOR SAFETY OPERATION

Observe all the safety regulations !
★ **Read preventive measures against danger and cautions stated in this manual for proper understanding.** ★ **Most accidents crane occur due to operation, maintenance, and inspection which have failed in observing basic safety regulations.**

□ Request to customers

♦ Never failed to observe **WARNING** and **CAUTION** described in the manual as they are of great importance in safety and the crane operation.

WARNING. Failure to observe this may invite an accident resulting in injury or death.

CAUTION. Failure to observe this may cause damage to the crane and vehicle.

♦ Store the instruction manual where it is easily accessible to read it over and over again.

♦ Failure to observe the right operation and maintenance/inspection illustrated in this manual may cause trouble in the crane and may invite an accident, and this will not only shorten its service life but will impair safety in the crane operation.

Please remember, in such cases, that no warranty will be given even if the crane is within warranty period.

♦ In order to prevent injury or death to crane operators and to those who stand close to crane operating area due to operational mistake, caution plates are stuck on the crane.

Read them carefully.

♦ Do not alter the crane.

- If you want to make an alteration, contact with SPS ENG sales agent
- SPS ENG does not bear any responsibility for troubles and/or accidents due to unauthorized alteration.

2. SAFETY PRECAUTIONS ON CRANE OPERATION

WARNING
★ **Observe the cautions for securing safety.** **Failure to observe the cautions may cause trouble or serious accident.**

□ Before operation

1. Dress neatly and wear protectors such as helmet, safety shoes, and gloves without fail.
- Do not wear baggy clothes and accessories which can be caught by control levers and fittings, and oil-stained working clothes which may catch fire.

2. Be sure to make inspection before operation and periodical inspection for slinging implements
- If a defective slinging implement is used, the fall of lifted cargo may result.

3. Be sure to make inspection before operation and periodical self-inspection. Make repairs without delay if found as abnormal.

4. Make sure that each safety device is always functioning properly.

5. Keep a safety distance away from the high-voltage power line to avoid an electric shock.

- The crane is not electrically insulated.

6. Do not operate the crane when wind velocity exceeds 10m/sec. and/or while thundering. stop the crane operation with a lifted cargo lowered down on the ground.
- Crane operation while strong wind is blowing can cause fall of a lifted cargo or overturn of the vehicle as the boom and/or a lifted cargo are hit by a gust of wind.

7. Pay attention that anyone except persons concerned will not enter within a working radius of the crane.

- Take good care to carry out safety operation by keeping a close watch around the working area.

8. Make sure that the ground on which outriggers are to be set up is solid and firm.

- When setting up the outriggers on an unleveled ground or on a slope, be sure to place a support (such as plank, steel plate etc.) under the outrigger foot flanges to keep the vehicle level.

In addition, when the crane is to be operated on a soft ground, take the same measures to prevent the outrigger foot flanges from sinking into the ground when a cargo is lifted up.

9. When setting up the outriggers, prevent the front wheels of vehicle from being raised away from the ground to level the vehicle.

10. Crane operation with the vehicle kept leaning makes the vehicle unstable when a cargo is lifted up.

This may cause vertical members of outrigger to break or the crane to be overturned.

11. In normal crane operation of the crane, be sure to set up the outriggers level with the outriggers fully extended.

- The stability of the vehicle varies with the extended width of the outriggers.

Accordingly, be careful that he crane reduces in lifting capacity when the horizontal outriggers are in minimum or halfway state than when they are in maximum extended state.

12. Do not put your foot under outrigger foot plate while vertical members of outrigger are being extended.

13. Lower the hook slowly when carrying out unhooking a cargo.

- Do not mistake this for winding-up operation.

Winding-up the hook may cause damage to chassis frame, fixing rope, and retaining hardware.

14. Do not try adjusting hydraulic equipment.

□ During operation

1. Pay attention that the hook will not be over-wound.

- Remember that the hook is wound up when boom is extending.

- If the hook hits against the boom top due to being over-wound of the hook, it may cause damage to wire rope and the sheaves at the boom top and may cause the fall of lifted cargo.

2. Operate each lever slowly and smoothly.

- An abrupt lever operation with a cargo lifted gives an excessive shock to the crane which may cause damage to the crane and/or overturn due to slewing of a lifted cargo.

3. Slew the crane at low speed.

- Slewing of a lifted cargo increases working radius of the crane which may cause it to be overloaded.

4. If the engine speed is too slow when operating the crane, control the accelerator lever to increase it.

- Crane operation with the engine (and pump) running at low speed may cause a cargo hoisted up to slewing due to pulsation of the engine.

This is not a malfunction but impairs smooth control of the crane.

5. Do not take anybody in the driver's position during crane operation.

- If a someone in the driver's position might accidentally work on the accelerator lever, working speed of crane is suddenly increased which may cause an accident.

6. Do not enter between the boom and the vehicle body or do not put your hand or arm in the movable members.

7. Never try to retract vertical members of outrigger when a cargo is being lifted or boom is extended.

- It may cause the vehicle to overturn.

8. Overloaded operation is strictly prohibited.

- Crane operation with a load exceeding the rated load may cause damage to the crane or vehicle to overturn.

- Take a special care not to overturn the vehicle when operating with a full load as specified in the "chart of rated load", especially in case where slewing it from the rear toward the side or from the side toward the rear because these slewing directions make the vehicle unstable.

9. Pulling a cargo (sideways, straight, or obliquely) is strictly prohibited.

- These operation may cause slewing members, booms, columns, and derrick cylinder to be damaged.

10. Do not leave from operating position with a cargo hoisted.

- Lower a hoisted cargo onto the ground before leaving from the operation site.

11. When a cargo being lifted is detached from the ground, stop hoisting temporarily to confirm safety.

- When a cargo being lifted is detached from the ground, stop hoisting temporarily to make sure that the cargo is kept horizontally, the vehicle maintains its stability, and the rope slinging up the cargo is positioned properly.

Then lift it up again after making sure of the safety.

- For lowering a cargo, stop lowering it immediately before it touches the ground then lower it again gradually.

12. Do not get up on a cargo being hoisted.

- This may cause a fall from the cargo being hoisted.

13. Do not stay under a hoisted cargo.

14. Pay extra attention to underground crane work in which the hook must be lowered longer than the ground work.

- When paying out wire ropes, be sure that more than 3 turns of rope are always left on the drum.

15. Pay attention that wire ropes will not be payed out unnecessarily to prevent the rope from being wound irregularly around the drum.

- Operations, such as paying out wire ropes with a cargo placed on the ground, retraction and/or derricking down of boom, loosen the rope causing them irregular winding which results in remarkable shortening service life of the rope.

- Wind the first layer of rope firmly and regularly around the drum.

- Correct kicks of wire rope with a mallet immediately.

16. Do not make an careless contact with the hydraulic tank.

- Since the hydraulic tank has been at a high temperature, it is likely that you may get burne if you touch the hydraulic tank carelessly.

17. Stop the crane operation when temperature of hydraulic oil exceeds 80°C.
- Oil temperature is apt to rise easily if repeated operation of winding up and down the hook, especially in a high lift, is required.
- Excessive high temperature of hydraulic oil damages high-pressure hoses and gaskets being employed to cause the oil to spout out so that a scald may result.

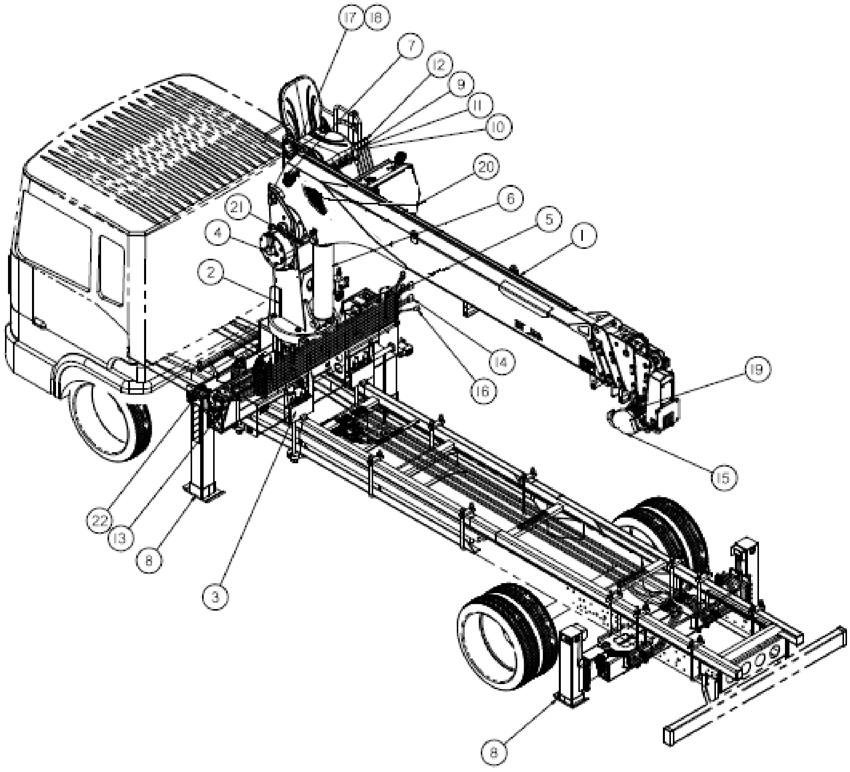
□ After operation

1. Make sure that the booms, the outriggers, and the hook have been stored and securely fixed before traveling the vehicle.
- Before traveling the vehicle, be sure to fully retract and store the outriggers and check that any of outrigger inner boxes is not protruded.
- Traveling the vehicle with incomplete storage of or fastening of the boom. The outriggers and the hook allows them to loosen or to slewing which may cause accidents such as damage to each crane member or bumping into vehicles running in the opposite direction.

2. Be sure to turn off P.T.O. before traveling the vehicle.
- Traveling the vehicle without P.T.O. turned off allows the hydraulic pump to keep running so that damage to the hydraulic pump may result.

3. Do not carry out maintenance and inspection while temperature of either hydraulic oil or gear oil is still high.
- Temperature of both hydraulic and gear oil is high immediately after crane operation so that accumulated high pressure still remains.
Removing filling cap, draining oil, or replacing oil filter while oil temperature is still high allows hydraulic and/or gear oil to spout out and a scald may result.

3. DESCRIPTION OF CRANE EQUIPMENT



CAUTION
★ The illustration shows a behind-cabin mounting type. Mounting position of the crane may differ according to vehicles to be mounted. ★ The illustration does not imply that the vehicle has been prepared to drive on the road.

1. Boom

It extends and retracts by hydraulic cylinder and the hook is suspended from its top.

2. Column

This is a vertically mounted member on the crane in which boom, winch, and derrick cylinders are installed.

The column can be turned by slewing device.

3. Base

This is fixed on the vehicle to support the column and outriggers.

4. Hoist winch

This is a device which rotates the wire drum by hydraulic motor to hoist up and down a cargo via wire rope.

5. Slewing device

This turns the column by hydraulic motor.

6. Derrick cylinder

This raises and lowers the boom.

7. Telescoping cylinder

This extends and retracts sections of boom.

8. Outrigger

This supports the vehicle to maintain its stability while it is operated.

9. Boom derricking lever

This controls the derrick cylinder to change the boom angle.

10. Winch hoisting/lowering lever

This controls the hydraulic motor to rotate the winch drum allowing the hook to lift up and down.

11. Boom telescoping lever

This controls cylinder in the boom to extend and retract the boom.

12. Slewing lever

This controls the slewing device to turn the column allowing the boom to turn clockwise or counterclockwise.

13. 14. Outrigger control levers

This vertically extends and retracts either side of outrigger individually.

15. Hook

16. Accelerator lever

This adjusts engine speed as necessary.

17. Over-winding alarm

When the hook comes close to the boom top, this makes an alarm to warn that wire ropes are to be over-wound.

18. Warning horn

Depression of warning switch sounds the vehicle horn for warning.

This is to warn co-workers and others in the operation site.

19. Wire rope

20. Load indicator

This reads the rated load value corresponding to extend length of the boom and its angle.

21. Wire rope arranger

This prevents wire rope wound around the winch drum from slackening.

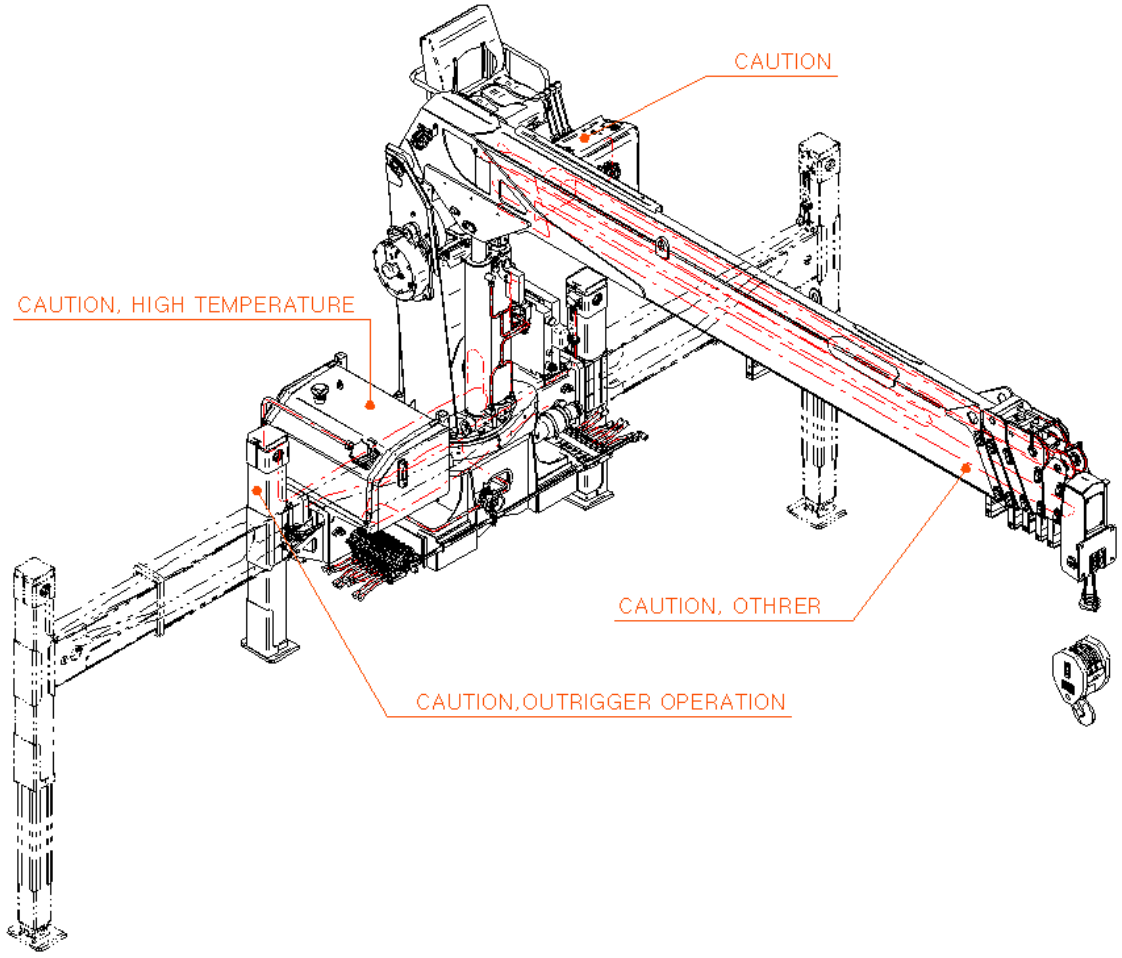
22. level

A device to find a degree of horizontality of crane mounting vehicle.

4. NAME PLATES

□ Description of name plates (Stickers)

The machine is provided with stickers indicating caution (framed in box) and specifications, in addition to stickers showing control levers, switches, and instructions for lubrication.

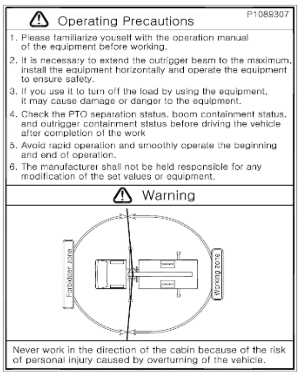


Caution plates in detail

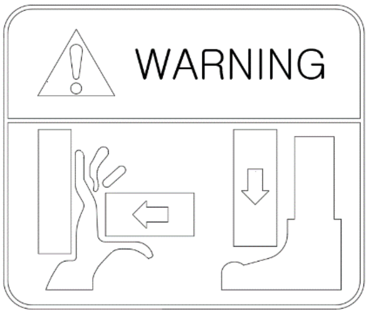
CAUTION
★ **Always keep the stickers clean so that they can be read easily.** ★ **If any of the stickers has come off, stick it again or replace it with new sticker.** ★ **When ordering stickers, specify the part number shown at the bottom-right of the sticker concerned.**

Sticker(CAUTION, HIGH TEMPERATURE)

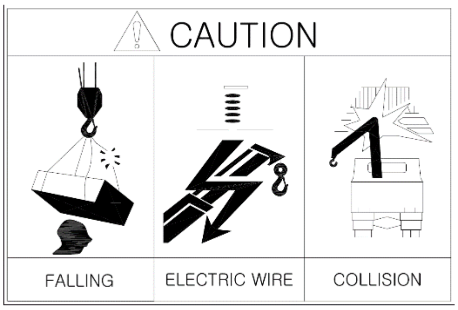
Sticker(CAUTION)



Sticker(CAUTION OF OUTRIGGER OPERATION)



Sticker(CAUTION, OTHER)



5. DEFINITION OF TERMS

□ Behind-cabin mounting

Arrangement in which crane is mounted between the cabin and the body of vehicle.

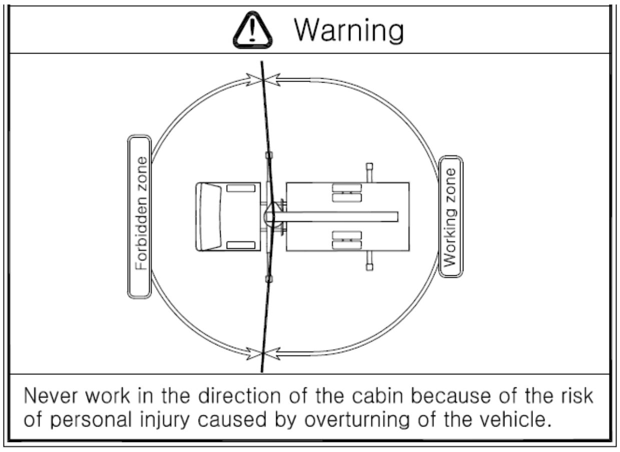
● Remark

The instruction manual covers the performance of the behind-cabin mounting type.

For middle position mounting in which crane is mounted at a middle position of the vehicle body, and for the rear mounting which crane is mounted at the rear of the vehicle body, the capacity of each crane is different from that covered in this manual.

□ Over-front hoisting

Crane operation within a range of cabin-side area created by drawing lines from the slewing center of crane to each center of both outrigger foot plates as shown in the figure.



□ Over-side hoisting

Crane operation within a range of rear-side area created by drawing lines from the slewing center of crane to each center of both rear wheels of vehicle as shown in the figure.

Right : Refers to area on the right-hand side in the driving direction of vehicle.

Left : Refers to area on the left-hand side in the driving direction of vehicle.

□ Over-rear hoisting

Crane operation within a range of body-side area created by drawing lines from the slewing center of crane to each center of both rear wheels of vehicle as shown in the figure.

□ Net rated load

Net load which can be lifted by hook determined on the basis of strength of crane.

□ Rated load

Maximum load including hook and hooking implements which can be lifted according to the boom angle and/or the boom length determined on the basis of strength of crane.

□ Lifting capacity

This refers to maximum load of the rated load described section □ above.

□ Working radius

This is horizontal distance from the slewing center to the hook center.

□ Boom length

This is distance from the boom foot pin to the sheave pin on the boom top.

□ Boom angle

This refers to an angle made by axis line of boom line and the horizontal line.

□ Lift above ground

This refers to maximum vertical distance between bottom end of the hook to the ground surface with the hook wound up to touch the over-winding alarm detector.

□ Outrigger Extension

Outrigger allow the vehicle to keep stable during crane operation.

Outriggers consist of four(4) outrigger members, horizontal and vertical as illustrated in the figures.

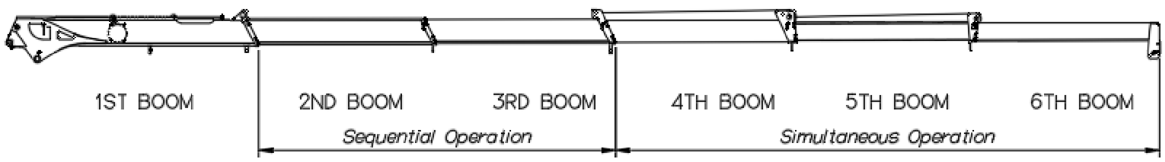
Crane is operated with the horizontal members of outrigger extracted as necessary and the vertical members lowered on the ground to support the vehicle.

□ Booms employed

Designation of each boom is as illustrated in figures.

For simultaneous telescoping booms, The second and third boom operations are sequentially operated, and the fourth, fifth, dnad sixth boom perform both enpansion and enpansion at the same time.

6-section Boom

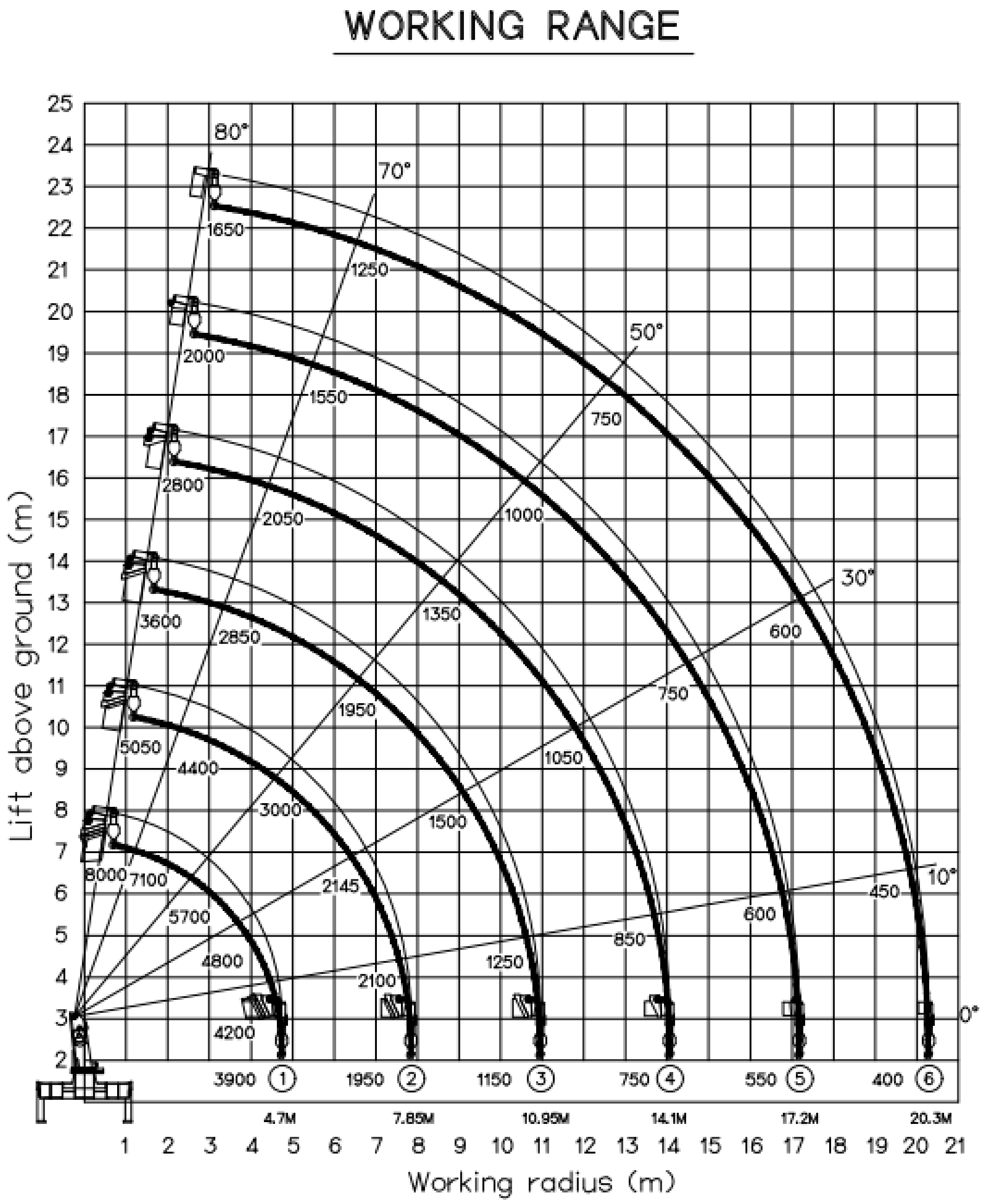


6. HOW TO REFER TO "WORKING RANGE CHART"

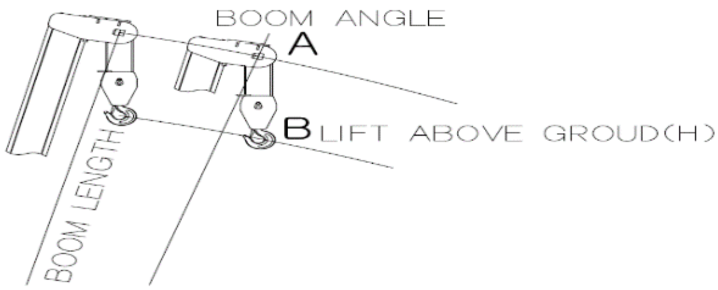
How to refer to the charts is illustrated as follows:

□ Working range chart

The chart shows the relation among boom length and working radius, boom angle, and lift above ground



Although the point-A and the point-B follow the tracks along the same working radius, the point-A refers to the boom angle and the point-B the lift above ground..

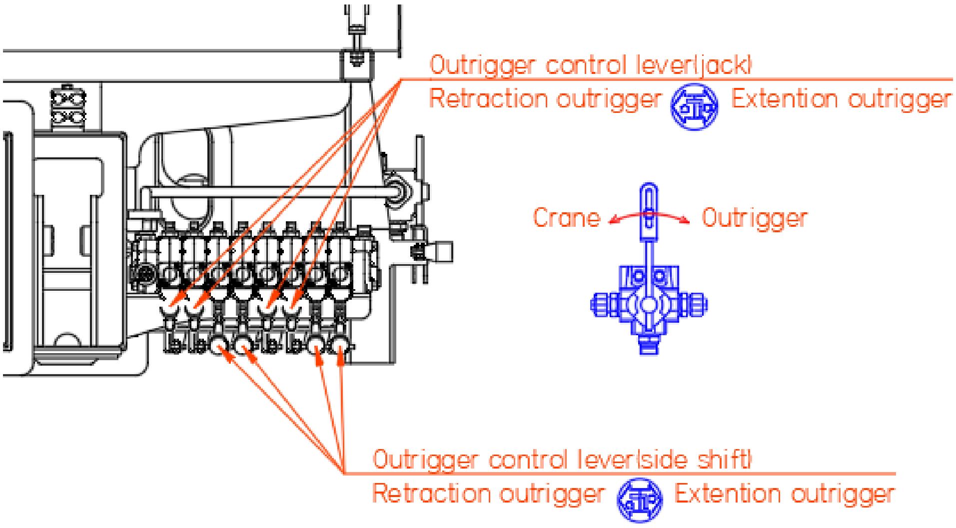


The working range chart does not incorporate any shift due to deflection of boom.

Keep in mind that the actual working radius is somewhat extended due to boom deflection when a cargo is being hoisted.

7. DESCRIPTION OF EACH CONTROL DEVICE

□ Designation of each control levers and their arrangements



CAUTION
★ **When starting and stopping each outrigger function, be sure to the return accelerator lever to low speed position to avoid abrupt starts and stops.** ★ **Return the accelerator lever to low speed position before operating it.** ★ **Be sure to return the accelerator lever to low speed position where it come to a stop after outrigger operation.**

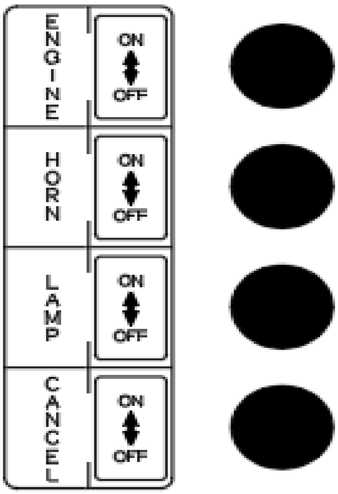
● Remarks

It is convenient that the accelerator lever used when making an adjustment for load meter calibration or when warming-up the engine in wintertime.

□ Warning horn

Switch either of the warning horn switches located on control seat to give warning sound to those who have entered within slewing range during crane operation, or to co-workers in charge of slinging work standing close to the cargo or in a course through which the cargo is to be lifted up before starting the crane operation.

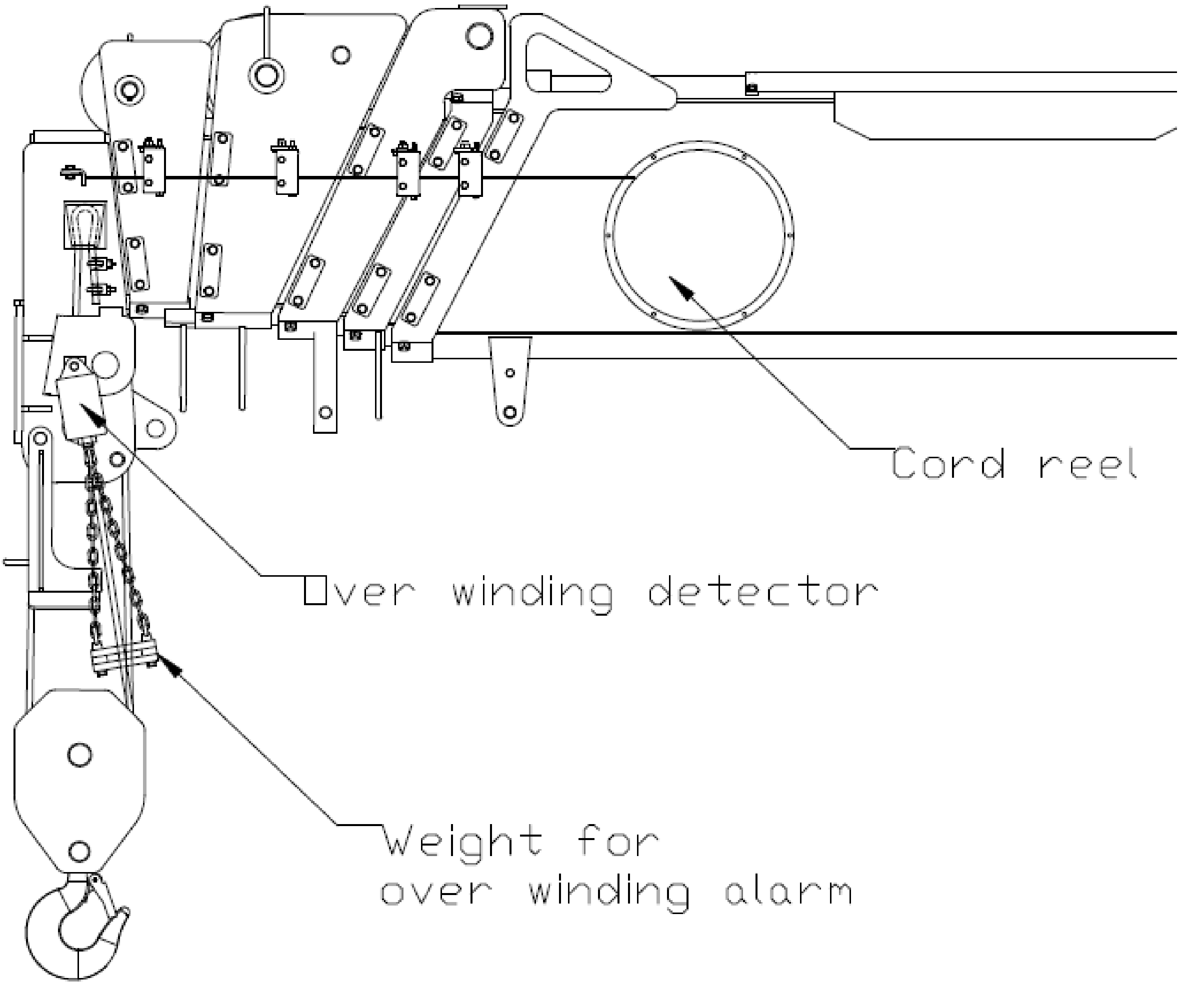
Vehicle horn gives warning sound while the switch is switches is ON.



□ Over-winding alarm

♦1. Function of over-winding alarm

The device automatically makes an alarm sound to warn that the wire ropes are being over-wound when the hook comes close to the boom top.



♦2. Procedures for operation

If the alarm sounds while the hook is being hoisted or the boom is being extended, stop the crane operation immediately and lower the hook or retract the boom.

CAUTION
★ Check that the alarm sounds every time when the weight for over-winding alarm is lifted up to the detector. **★ Since the length of wire rope hanging the weight is specified by laws and regulations concerned, do not make it short at random.**

★ **The alarm sounds even if any of electric wires connected to the over-winding detector at the boom top is broken. Pay attention to the wires(cords).**

□ Automatic stop for over-winding(For option model)

♦1. Function of automatic stop for over-winding

If the hook comes close to the boom top and it hits against the weight for over-winding alarm, the buzzer sounds and functions of winding-up hook, extending boom, and raising boom stop automatically.

When the automatic stop is activated, lower the hook, retract or lower the boom until the buzzer stops sounding.

This allows the activated automatic stop to return to normal.

● Remarks

Since viscosity of hydraulic oil increases during cold winter or in low temperature environment, function of winding-up hook or extending hook may not stop perfectly but it allows to make a slight movement even if the hook hits against the weight which is not a disorder.

Carry out warming-up and the automatic stop recovers functioning when temperature of hydraulic oil rises to a certain level.

♦2. How to reset when automatic stop for over winding is found abnormal

If crane operation can not be carried out due to malfunction of the automatic stop for over winding alarm, reset the automatic stop and store the crane.

● Step 1

Wind up the hook, extend or raise the boom by controlling operation lever.

● Step 2

If the crane failed to be operated by following "Step 1", operate the crane as follows:

■ Separate mating of the connector located under the control valve.

This can operate the crane to store the crane by operating control lever.

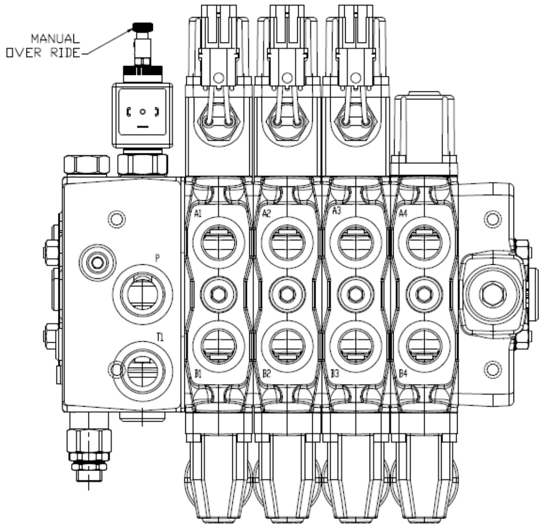
CAUTION

★ **Do not detach the connector when using cranes with the super ML radio controller.**

Refer to separate instruction manual on the "radio controller"

● Step 3

If the crane can not be operated by following the "Step 2" above, operate the crane by following the steps illustrated below.



■ Loosen the hexagon nut on the unload-valve attached to the upper part of control valve and tighten the locked set bolt until it comes to a stop to make the crane operational.

Store the crane by operating each control lever.

CAUTION
★ Be sure to repair the crane at an authorized SPS ENG service shop after the crane has been stored as the measures illustrated above are temporary.

□ Load indicator(with angle indicator)

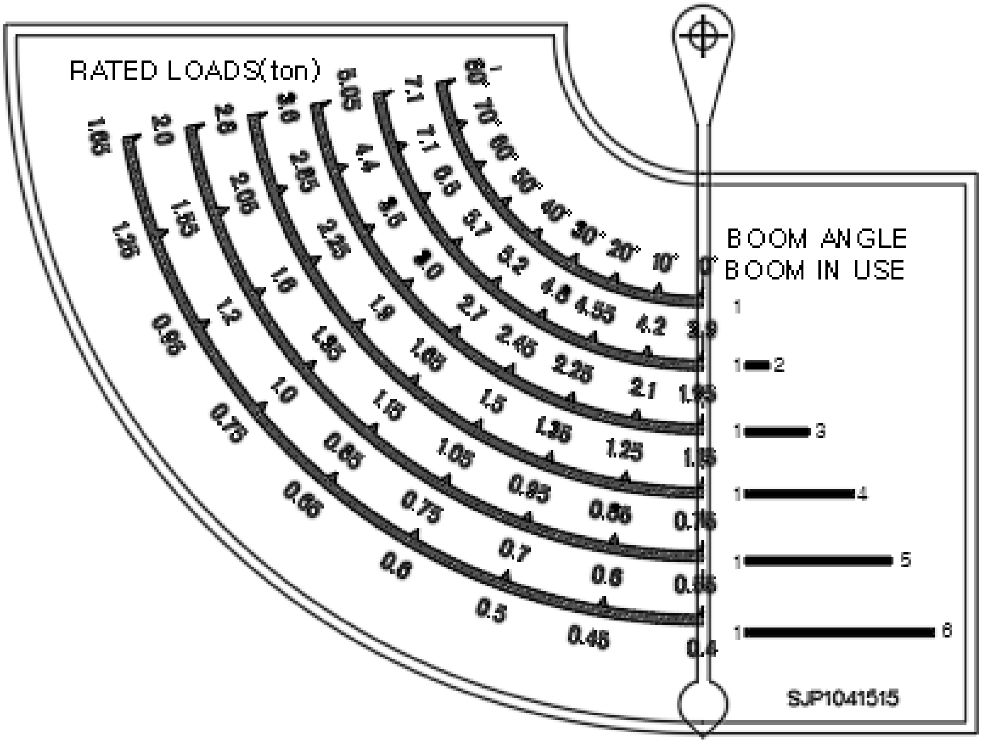
The indicator reads the rated load corresponding to extended length of boom and its angle to show the maximum weight of cargo which can be hoisted at this point.

◆1. Rated load

The value to which the pointer on the scale of meter is the rated load in each combination of boom-sections being extended.

◆2. Boom angle

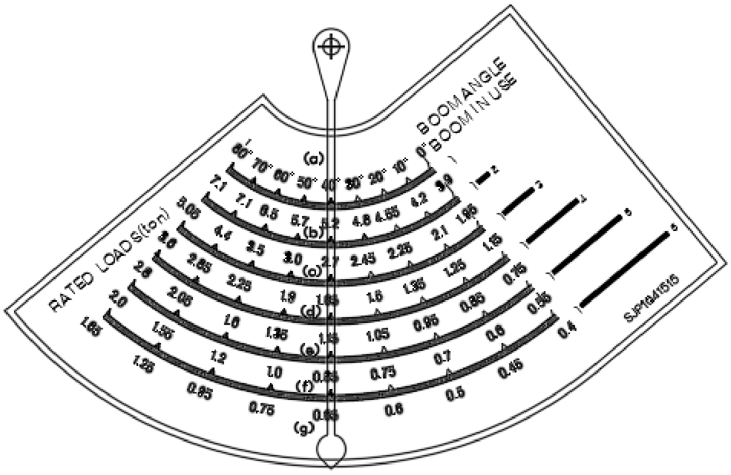
Pointer deflection on the angle scale reads the boom angle.



CAUTION
★ **The load indicator reads the rated load that is based on the crane strength rather than stability.** ★ **Graduations on the load indicator scale are different according to the number of boom-sections and vehicles being loaded.**

[Example]

How to read each valve when the pointer deflects as shown in the figure.



(1) Boom angle reads 40° at the point (a) on the boom angle scale.

(2) Maximum load which can be hoisted (rated load) reads:

•For boom 1st stage (With all boom sections retracted) : 4.4m at point (b).

•For boom 2nd stage (With boom section 2 extended) : 7.3m at point (c).

•For boom 3rd (With boom-section 3 extended) : 10.1m at point (d).

•For boom 4th (With boom-section 4 extended) : 13.0m at point (e).

•For boom 5th (With boom-section 5 extended) : 15.8m at point (f).

•For boom 6th (With boom-section 6 extended) : 18.7m at point (g).

Find the load at the chart of rated load corresponding to actual extended configuration of boom and working radius.

CAUTION
★ For securing safety, when a boom is extended to halfway, use the rated load with the boom concerned fully extended in order to secure safety. **● When 2nd boom-section is extended from 1st boom-section, take the rated load for 2nd boom (2.58ton in the example shown above).** **● When the mark on the side of 4th boom-section is extended from 3rd boom-section, take the value for boom 4th boom(1.22ton in the example shown above).** **★ Since the working radius increases due to deflection of the boom when a cargo starts to be lifted up, set the boom angle so that the hook comes to somewhat inner side.**

□ Hook safety latch

The mechanism is to prevent slinging wire rope from being disengaged out of the hook.

□ Automatic stop for leaving minimum wire rope (with wire rope retaining roller, for option model)

This is a devise to restrict slackening of wire rope on the drum.
The device prevents the rope on the drum from slackening when winding up and down the hook or making it an abrupt stop and when the hook is lowered to the ground.
In addition, it allows to stop unwinding automatically when remaining wire ropes on the drum come close to 3 turns so that the rope can not be unwound further.

8. How to operate the crane

□ How to start hydraulic pump

♦ Procedure for operation

1. Confirm a condition of the ground where crane is to be set up.

Make sure that the ground on which the vehicle is to be parked to set up the crane is solid and firm.

2. Secure crane-mounted-vehicle immovable.

① Pull the parking brake lever to allow the vehicle to check motion.

② Be sure to use a drag when operating the crane at slanted areas such as on a slope or on a road in a mountain.

3. Confirm where each control lever is positioned.

① Check that the accelerator lever in the crane is returned to low speed position.

② Check that each control lever is in its neutral position.

4. Confirm position of gearshift lever.

Move the gearshift lever on the vehicle to its neutral position.

5. Start engine.

Start the engine running.

6. Pull the PTO lever.

① Depress the clutch pedal fully to disengage the clutch.

② Pull or switch the PTO lever to its extreme.

③ Release the clutch pedal gradually.

④ Check that the PTO indicator lamp lights.

CAUTION
★ The PTO fails to engage smoothly unless the clutch is completely disengaged.

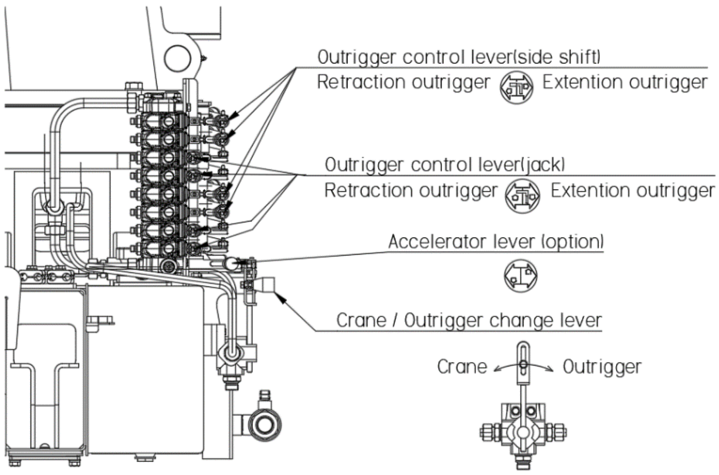
7. Start hydraulic pump.

This starts the hydraulic pump running.

CAUTION
★ In wintertime, try not to operate the crane immediately but run the hydraulic pump for a while to warm it up even if the crane is ready for operation. **★ Viscosity of hydraulic oil is high when the oil temperature is low. For that reason, if the hydraulic pump is operated in high speed with the hydraulic oil at low temperature, the pump may be damaged due to seizure because the oil will not be sufficiently circulated.**

Procedures to set up outriggers

WARNING
★ Crane operation without setting up the outriggers is strictly prohibited. **★ When setting up the outriggers on a rough ground or on a slope, be sure to place a support (such as plank, steel plate etc.) under the outrigger foot flanges to keep the crane level.** **In addition, when the crane is to be operated on a soft ground, take the same measures to prevent the outrigger foot flanges from sinking into the ground when a cargo is lifted up. Setting up the crane on a ground where it is not solid and firm enough may cause it to be overturned.** **★ Putting your foot under the outrigger foot flange while outriggers are being extended. It may invite such accident as that the foot may be crushed by the outrigger.** **★ Crane operation with the vehicle kept leaning makes it unstable when a cargo is lifted up. Such operation can cause the outriggers to be damaged and the crane to be overturned.**



Follow the procedures when setting up outriggers:

1. Shift the outrigger control lever to [Extension].

The control levers(each on both sides) can be shifted either simultaneously or independently.

To extend

Shift the lever to "EXT" to extend the horizontal members of outrigger

To retract

Shift the lever to "RET" to retract the horizontal members of outrigger.

To stop

Return the lever to neutral position to stop extension and retraction of outriggers.

CAUTION
★ Extend the outriggers to the maximum in normal crane operation.

◆ Use of accelerator lever

Although engine speed increases from idling to the highest, how it increases varies from vehicle to vehicle.

Operate the outriggers smoothly by using the accelerator lever together.

2. Adjust each member of outrigger with the levers so that the vehicle can be set up level.

CAUTION
★ Set up the outriggers so that the front wheels of the vehicle touch lightly to the ground.

To extend

Shift the lever to "EXT" to extend the vertical members of outrigger

To retract

Shift the lever to "RET" to retract the vertical members of outrigger.

To stop

Return the lever to neutral position to stop extension and retraction of outriggers.

3. Return each control lever to neutral position after the outriggers have been set up.

4. After completion of setting-up the front outriggers on the ground, set up the rear outriggers according to procedures as follows:

CAUTION
★ Stability of vehicle differs according to how far the outriggers have been extended. Therefore, the hoisting capacity with the rear outriggers extended to less than the maximum becomes lower than the capacity with the outriggers fully extended. (Refer to the chart of rated load for hoisting capacity.)

5. Shift the outrigger control lever to [Extension].

The control levers(each on both sides) can be shifted either simultaneously or independently.

To extend

Shift the lever to "EXT" to extend the horizontal members of outrigger

To retract

Shift the lever to "RET" to retract the horizontal members of outrigger.

To stop

Return the lever to neutral position to stop extension and retraction of outriggers.

6. Adjust each member of outrigger with the levers so that the vehicle can be set up level.

Pay attention that rear wheel of the vehicle will not be off the ground.

To extend

Shift the lever to "EXT" to extend the vertical members of outrigger

To retract

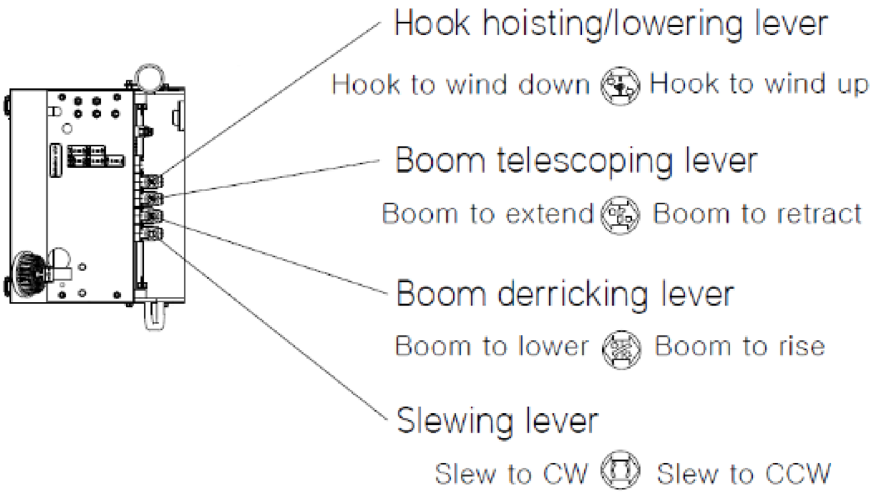
Shift the lever to "RET" to retract the vertical members of outrigger.

To stop

Return the lever to neutral position to stop extension and retraction of outriggers.

7. Return each control lever to neutral position after the outriggers have been set up securely.

□ How to operate boom for derricking boom(raising and lowering)



WARNING
★ An abrupt crane operation while a cargo is being lifted up gives an excessive shock to the crane which may cause the crane to be damage or the vehicle to be overturned. Be sure to control levers slowly. ★ The longer the boom is extended, the faster a cargo is lifted up and down by boom derricking operation. Operate the boom so that a cargo can be lifted up slowly. ★ When lowering boom with a cargo hoisted, the working radius increases which in turn decreases the capacity specified in the rated load chart. Check the readings of load indicator to confirm the safety before the boom is lowered.

To raise

Shift the lever to "**RAISE**" to raise the boom.

To lower

Shift the lever to "**LOWER**" to lower the boom.

To stop

Return the lever to neutral position to stop the boom derricking.

◆ Use of accelerator pedal

Although engine speed increases from the idling to the highest, how it increases varies from vehicle to vehicle.

Operate the derricking boom smoothly by using the accelerator pedal.

□ How to hoist and lower the hook

WARNING
★ Pay attention that the hook will not be over-wound. ★ If the hook hits against the boom top due to being over-wound of the hook, it may cause damage to the wire rope and the sheaves at the boom top and may cause the lifted cargo to fall.

To hoist

Shift the lever to "UP" to raise the hook.

To lower

Shift the lever to "DOWN" to lower the hook.

To stop

Return the lever to neutral position to stop the hook being wound up/down.

◆ Use of accelerator pedal

Although engine speed increases from the idling to the highest, how it increases varies from vehicle to vehicle.

Operate the hoisting/lowering the hook smoothly by using the accelerator pedal.

CAUTION
★ Further paying out of the wire rope after the hook has reached the ground causes the rope to be wound around the drum irregularly. Lifting up a cargo with the rope irregularly wound on the drum damages the rope which results in remarkable shortening of its service life. ★ When paying out wire rope longer such as down to underground work site, make sure that more than 3 turns of wire rope shall always be left on the drum. ★ When the first layer of wire rope fails to be wound around the drum firmly and regularly, ropes wound over the first layer may dig into the inner layers to cause an irregular winding. When the wire rope is unwound to or wound up from the first layer of rope, wind it up/down slowly so that the first layer of rope can be wound around the drum firmly and regularly. ★ Stop the crane operation when hydraulic oil temperature exceeds 80°C.

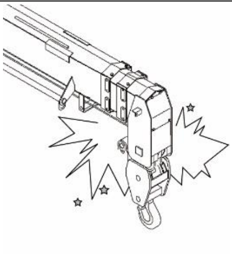
Oil temperature is apt to rise easily if repeated operation of winding up/down of the hook, especially in a high lift, is required.

■ To know approximate oil temperature by sense of touch:

70°C	You can touch the oil tank (Lower part) with the palm of your hand for 3~4 seconds.
80°C	You can touch the oil tank (Lower part) with your finger tip for 1~2 seconds.
90°C	The moment you touch the oil tank (Lower part), you will let the hand off by reflex action.

□ How to telescope the boom

WARNING



★ If the boom is extended further with the hook come close to the boom top, the hook may hit against the boom top causing the wire rope and the sheaves at the boom top to be damaged, and the fall of lifted cargo may result.

To extend

Shift the lever to "EXT" to extend the boom.

To retract

Shift the lever to "RET" to retract the boom.

To stop

Return the lever to neutral position to stop the boom telescoping.

◆ Use of accelerator pedal

Although engine speed increases from the idling to the highest, how it increases varies from vehicle to vehicle.

Operate the telescoping boom smoothly by using the accelerator pedal.

CAUTION

★ The hook is lifted up as the boom extends and is lowered as it retracts.

When telescoping the boom, pay attention to where the hook is.

- Sequence of boom extension

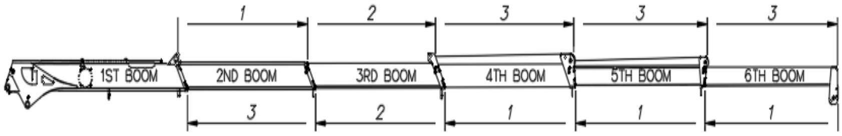
The boom is to start extending from outer sections of boom.

- Sequence of boom retraction

The boom is to start retracting from top sections of boom.

● Remarks

Sections of boom shown in figure indicate that they are telescoping simultaneously.



● Remarks

- When telescoping speed of boom is decreased due to high viscosity of oil during winter time or in low temperature environment, try telescoping the boom to and from one-cycle between both extremes, the shortest and the longest, to recover the speed as the oil in the boom is discharged to be replaced with warm oil.

□ How to make the boom slewing

WARNING

★ Carry out slewing operation slowly without racing the engine.

★ Slewing without outriggers set up is strictly prohibited.

★ Control levers slowly to allow the boom to make a smooth start and stop for slewing. An abrupt lever control with a cargo hoisted allow it to swing which may cause hitting against the other objects and overturn of the crane.

★ The longer the boom is extended and the smaller the derricking angle becomes, the lifted cargo moves faster. Perform slewing operation slowly with the above in mind.

To slew to the right(C.W.)

Shift the lever to "↻ "to slew it C. W..

To slew to the left(C.C.W.)

Shift the lever to "↺ " to slew it C. C. W..

To stop

Return the lever to neutral position to stop the boom slewing.

For slewing direction of boom, "slew to the right" means slewing in the direction in which the hands of a clock rotate (C. W.) and "slew to the left" means slewing in the opposite direction of clock hands (C. C. W.) when viewed from the top.

◆ Use of accelerator pedal

Although engine speed increases from the idling to the highest, how it increases varies from vehicle to vehicle.

Operate the slewing the boom smoothly by using the accelerator pedal.

CAUTION
★ Before starting the boom to slew, sound the warning horn to those who are attending or in the working site.

□ How to store outriggers

WARNING
★ Start storing outriggers after the boom has been stored. **★ There is a risk that your fingers may be caught in the outriggers when you roughly pushing outriggers with your hand being touched other than the extension lever. Be sure to hold the extension lever and push them in slowly.** **★ Unless horizontal members of outriggers are securely locked, they will stick out while vehicle is travelling and this may invite an accident.**

Store the outriggers as follows:

1 Shift the outrigger control levers to "RET" to retract the vertical members of outrigger.

CAUTION
★ When retracting vertical members of outrigger, operate the levers so that either side of member can be retracted equally.

2 Shift the outrigger control levers to "RET" to retract the horizontal members of outrigger.

CAUTION
★ Make sure that the vertical members of outrigger on both sides have been retracted to their minimum before pushing in the horizontal member of outrigger.

□ Preparation before travelling vehicle

WARNING
★ Make sure that the boom, the outrigger, and the hook have been stored and fixed securely before traveling the vehicle. **★ Be sure to fully retract and store the outrigger members and any of outrigger inner boxes is not protruded.** **★ Traveling the vehicle with incomplete storage of or fastening of the boom, the outrigger, and the hook allows them to be loose or to swing which may cause accidents such as of damage to each crane member or of bumping into vehicles running in the opposite direction.**

Follow the procedures for traveling vehicle.

1. Retract the boom.

2. Move the boom either to the front or to the rear.

3. Lower the boom to its lowest extreme.

Pay attention that the hook will not strike against;

The driver's cabin when storing it to the front, or The cargo loading body when storing it to the rear.

4. Put the hooking wire rope on the hook.

5. Hoist the hook gradually and stop it where the rope is pulled up with a moderate tension.

CAUTION

★ Do not give an excessive tension to the wire rope when storing the hook to the front. Otherwise, this may cause to bend the frame of vehicle or to damage the bumper.

6. Store either side of vertical and horizontal member of outrigger securely. Store the front outriggers. Store them in accordance with section □ "How to store outriggers".
7. Check that the accelerator control lever is returned to the position of lowest speed.
8. Turn OFF the "Power switch".
9. Push in the P.T.O. lever fully with the clutch pedal in the driver's seat depressed, then release the pedal gradually. The P.T.O. indicator light turns off and the hydraulic pump stops running.
10. The vehicle is now ready for traveling.

CAUTION

★ Traveling the vehicle without P.T.O. turned off allows the hydraulic pump to the pump may failure result.

9. MAINTENANCE AND INSPECTION

WARNING

★ Inspection before operation and periodical inspection.

Preform the inspection before operation and independent periodical (monthly and annual) inspection, and make repairs immediately when anything abnormal is found.

★ Be sure to hang a “caution signboard” such as on control levers while either maintenance or inspection is being carried out, and do not try operating the crane.

★ Be sure to replace consumable items according to the replacement criteria. Failure to observe the replacement as specified may cause a breakdown and warranty will not be given even if it is within the period to be applied.

★ When a part needs to be replaced or anything abnormal is found, contact a SPS ENG service shop for consultation or for ask inspection or repair as soon as possible.

□ Inspection before operation

In order to secure safe operation and improve working efficiency, be sure to inspect each part of the crane according to the table as follows:

Device	Servicing item
P.T.O.	Oil leakage, Unusual noise
Hydraulic oil tank	Oil level, Oil leakage
Outriggers	Operation, Deformation, Damage, Oil leakage, Cracks
Hoisting winch	Operation, Braking function, Irregular winding
Slewing device	Operation, Oil leakage
Derricking boom	Operation, Oil leakage, Mounting of foot-pin
Telescoping boom	Operation, Oil leakage, Deformation Cracks, Mounting of fixing pin
Hook	Rotation of hook, Function of hook safety latch
Wire rope	Damage, Condition of rope end
Over-winding alarm	Operation, Alarm sound
Load meter	Oil leakage, Operation
Warning horn	Operation
Piping, Hydraulic hose	Oil leakage, Damage
Base	Mounting of crane body Cracks, Tightness of bolts Missing bolt
Slinging implements	Items necessary for crane operation are provided
Automatic stop device for hook	Function of automatic stop

CAUTION
★ Always keep the machine in good condition so that it will be always ready for normal operation.

□ Cleaning

Keep the crane clean at any time.

Sands and fine dusts may cause an abnormal wear.

Do not wash the crane by splashing highly pressurized water to prevent it from entering into the electric system by which may cause malfunction of the machine.

□ Inspection of slewing bearing mounting bolts

When the slewing device makes an unusual noise while operating the crane, or when a gap is created on the mounting surface, contact a KANGLIM authorized service shop for inspection and/ for repair.

□ Replacement of return filter

The replacement of the return filter is depends on how often the crane has been operated, however, as a general rule, replace it after 3 months of initial operation and once a year thereafter.

How to replace

● Give the gasket a thin coat of oil

● Screw in the cartridge and tighten it with your hand securely.

□ Replacement of wire rope (for winding-up)

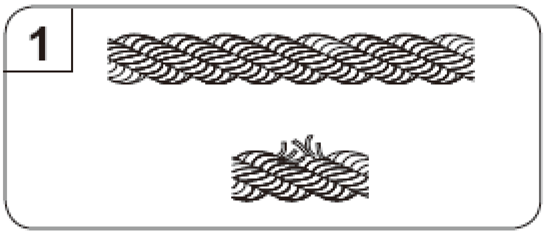
Wire rope is an expendable article and it will be damaged or broken in its strand wires through a long period of use.

Replace the rope according to the following criteria.

♦ 1. Replacement criteria

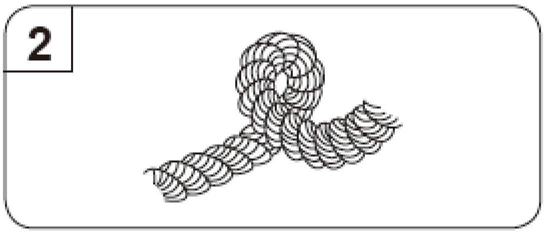
CAUTION

★ **Wear leather gloves when replacing wire ropes.**

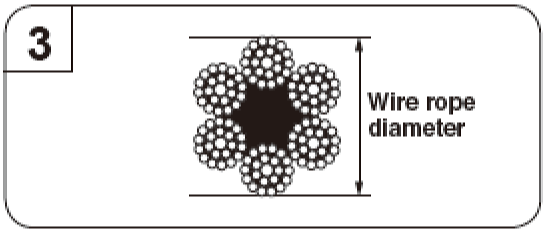


1. A rope in which amount of broken strand wires (except filler wires) comes to more than 10% within a pitch of twist.

Replace the wire ropes intended for use with this crane if 5% of strand wire have been broken within a pitch of twist.



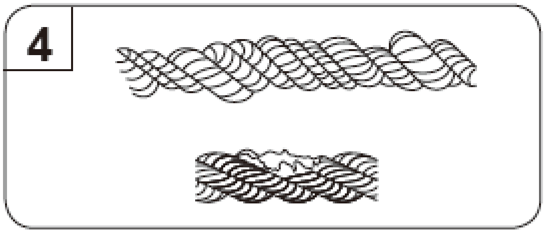
2. A rope being kinked.



3. A rope from which its diameter has decreased by more than 7% of the nominal diameter.

For example, if wire rope with a nominal diameter of 10mm is used, replace it when the diameter becomes 9.3mm.

Refer to the section 12. MAJOR SPECIFICATIONS, for length and construction of the wire rope for winding-up.



4. A rope which has been deformed and/or corroded excessively.

★ Be sure to replace a wire rope when it comes under the criteria, item 1 through 4, illustrated above.

♦ 2. How to replace wire ropes

1. Refer to the figure in the left for how to hook the wire ropes for winding-up and for where the weight for over-winding alarm is to be mounted.

2. How to fix wire rope end

● Winch drum

① When passing the wire rope end through the wire socket, be sure to pass it as indicated by the arrow mark on the socket.

If it is passed from the opposite direction, service life of wire rope becomes shorter as the wire rope is kept bent all the time.

② Pay attention that wire rope end will not be jutted out of the winding-up area of winch drum

③ In order to avoid irregular winding, wind up a wire rope slowly on the drum along its groove with a proper tension applied to the rope to form the 1st layer.

From the 2nd layer on, wind up the rope over the wound-up layer so that it is fit in each gutter formed between ropes wound side by side of the layer below.

● **Wire socket**

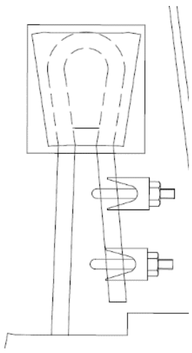
① When passing the wire rope end through the wire socket, be sure to pass it as indicated by the socket.

Leave the wire rope end to allow a distance from the notch to the rope end by more than 400mm as illustrated in the figure right.

If it is passed from the opposite direction, service life of wire rope becomes shorter as the wire rope is kept bent all the time.

② Do not forget to mount the wedge and the wire clip as illustrated in the figure in the right.

③ Pass the pin through with the wire socket held with your hand and tighten it with the bolt securely.



♦3. How to correct twisted wire ropes

Wire ropes tend to turn in untwisting direction when they are under tension.

If two or more wire ropes are hooked together, they tend to be twisted particularly while they are new.

The twist will decreases as the ropes are getting fit to the crane.

If wire ropes are twisted, correct them as follows:

1. Unload the hook.
2. Extend the boom fully.
3. Raise the boom to an angle of approximately 65°.
4. Unwind the hook until it comes close to the ground.

5. Check how many turns the wire rope has been twisted.

6. Wind up the hook and retract the boom to be on a stored condition.

7. Remove the wire socket and turn the socket in the untwisting direction by as many turns as the wire ropes have been twisted multiplied by the number of wire ropes being hooked.

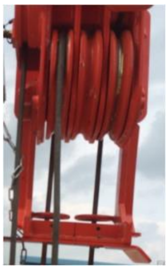
However, remember that the wire socket may be turned up to 4 turns at a time.

8. Attach the wire socket and repeat winding up and down the rope 2 or 3 times between both extremes.

Then, check if twist of the wire ropes is corrected.

If they remain twisted, repeat the procedures shown above.

♦4. How to correct wire ropes position.

 4 fall	 6 fall

□ Replacement of expendable parts

♦1. Replacement of gaskets and seals for each cylinder

Although timing of replacement of a part varies according to how frequently the crane has been operated, replace gaskets and seals used in each cylinder after every 3 years of operation (period during which crane has not been operated is included) in order to operate the crane safely.

Ask a local authorized service shop for replacement of gaskets and/or seals.

♦2. Replacement of sliding plate of boom

Replace it every 3 years.

♦3. Replacement of brake shoe of hoisting winch

Replace it every 3 years.

□ Welding precautions

When welding is needed for some reason, do not use outrigger cylinder for welding ground as the cylinder rod and/or the piston may be damaged by electric sparks due to current flown in the inner part of cylinder.

10. LUBRICATION

WARNING
★ Do not carry out maintenance and inspection while temperature of hydraulic oil is still high. **★ Temperature of both hydraulic and gear oils is very high immediately after crane operation so that accumulated high pressure still remains inside.** **Uncapping the filling port, draining oil, and replacing filter while oil temperature is high may allow the hydraulic and/or gear oils to spout out from which a scald may result.**

□ Precaution on lubrication

Lubricate according to “Lubrication chart” and keep the following instructions in mind when carrying out lubrication.

1. Clean filling ports and grease nipples thoroughly before carrying out lubrication.

2. Always supply new lubricant and prevent dusts from entering inside.

3. When supplying grease into each grease nipple, be sure to inject it until old grease is forced out of it.

CAUTION
★ In order to ensure smooth operation of each part of the crane, minimum wear, and longer service life, be sure to supply lubricant as well as hydraulic oil which is indispensable to drive hydraulic equipment.

★ Warranty will not be given, even if it is within the period to be applied, for failure to observe the replacement of lubricant as specified.

♦1. List of recommended lubricants

★ Use the recommended greases listed below as grease for lubrication.

(a) Chassis grease

Use NLGI No. 1 grade.

Petroleum Maker	Brand
MOBIL	HP221
CALTEX	Multifak EPI
SHELL	RETINAX-CD

(b) Molybdenum grease

Use NLGI No. 2 grade.

Petroleum Maker	Brand
MOBIL	Mobilplex Special
CALTEX	Molytex Grease EP2
SHELL	Retinax AM

★ Use the recommended lubricants listed below as gear oil for lubrication.

Use API Service GL-4 gear oils.

Petroleum Maker	Brand
MOBIL	Mobilube SAE 90
CALTEX	Universal Thuban SAE 90
SHELL	Shell Spirax EP 90

★ Recommended hydraulic oil

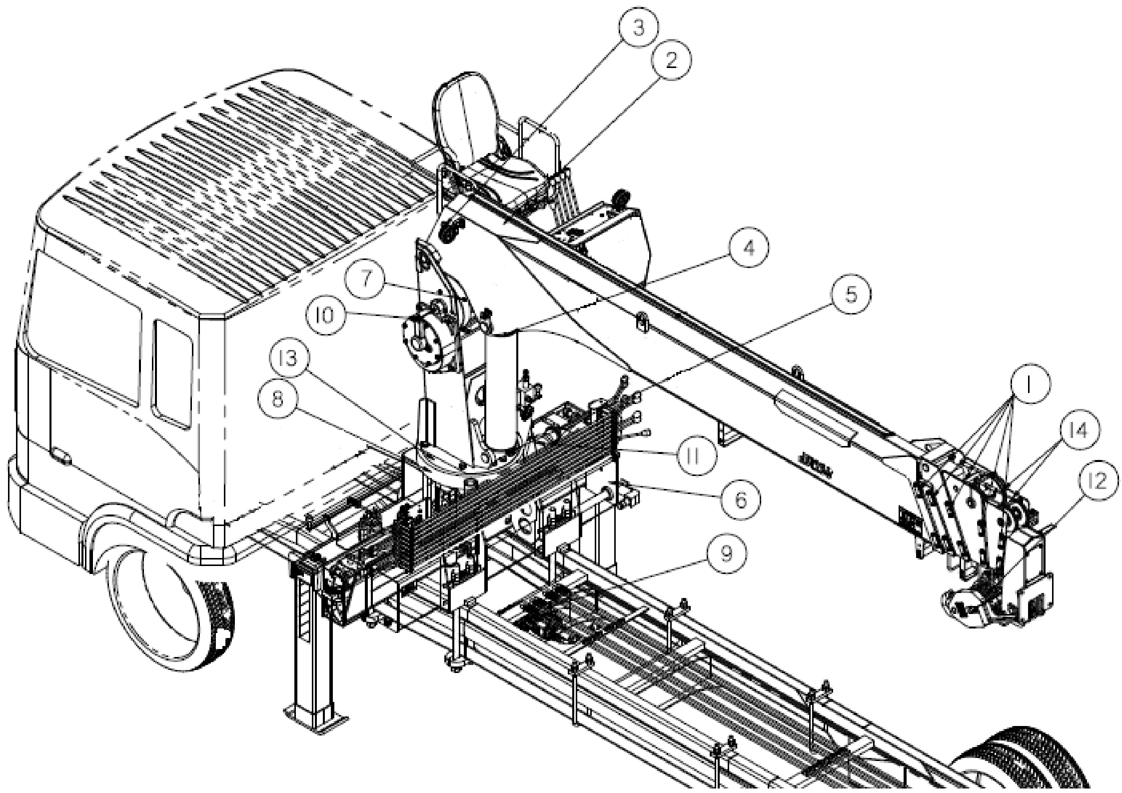
Use industrial-type hydraulic oil

ISO VG 46 for temperatures above 0°C.

ISO VG 22 for temperatures below 0°C.

Petroleum Maker	Brand	
	ISO VG 22	ISO VG 46
MOBIL	Mobil DTE 22	Mobil DTE Oil Medium
CALTEX	Spindura oil 22	Rando Oil 46
SHELL	Shell Tellus Oil 22	Shell Tellus Oil 46

♦2. Lubrication chart



Service interval	Where to lubricate	No. of part	Lubricant	Tool
Daily	① Boom slide plate (Underside & side face of boom sections 1, 2, 3, 4 and 5)	5	Molybdenum grease	Manual application
	② Boom slide plate (Upper side of boom section 2, 3, 4, 5 and 6)	5	Molybdenum grease	Grease pump
	③ Boom foot pin	1	Chassis grease	Grease pump
	④ Upper support pin of derrick cylinder	1	Chassis grease	Grease pump
	⑤ Lower support pin of derrick cylinder	1	Chassis grease	Grease pump
		1	Hydraulic oil (up to middle of level gauge)	

	⑥ Oil tank (120 liters)			
Weekly	⑦ Winch drum gears ⑧ Slewing gears(to gear-teeth) ⑨ Propeller shaft	1 1 3	Chassis grease Chassis grease Chassis grease	Grease pump Manual application Grease pump
Monthly	⑩ Winch reduction gears (Approx. 1.0 liter) ⑪ Slewing reduction gears (Approx. 0.7 liters) ⑫ Wire rope ⑬ Slewing bearings ⑭ Wire rope for boom extension	1 1 1 1 2	Gear oil Gear oil Rope grease Chassis grease Rope grease	 Spray gun Grease pump Spray gun

□ Lubrication

◆1. Replacement of hydraulic oil

★ The amount required for oil change is 120 liters when filled up to the middle between upper and lower limits of the level gauge.

★ The oil should be replaced at early autumn because there is possibility of freezing moisture in the tank as well as in the hydraulic circuit when temperature goes below the freezing point.(depending on the countries)

★ Air entering in the oil tank bring dirt and moisture.

In addition, since hydraulic equipment gradually wears to produce worn particles, replace the oil 3 months after the start of crane operation then once a year thereafter.

★ Tighten the cap securely with your hand after oil has been refilled. Remember that hydraulic oil may leak out if the cap is loosely tightened.

CAUTION
★ Do not mix a different brand of hydraulic oil as properties of mixed oil deteriorates and damage to hydraulic equipment result.

◆2. Draining hydraulic tank

★ Remove moisture in the hydraulic tank.

★ Moisture may enter through the air-breather and it is mixed with the hydraulic oil when the crane has been operated for a long time.

★ Remove the drain plug located at lowe part on the tank to drain the water.

♦3. Replacement of gear oil

(Winch reduction gears and Slewing reduction gears)

★ Air enters in and out of the gear case so that dirt and moisture are brought in the gear case.

In addition, since hydraulic equipment gradually wears to produce worn particles, replace gear oil after 6 months from the start of operation.

★ Afterward, replace gear oil:

•Once a year for winch reduction gears, and

•Once every 2 years for slewing reduction gears.

CAUTION
★ Replace gear oil after oil temperature has dropped.

★ Fill up the oil for winch reduction gears until oil level comes to halfway between upper limit and lower limit on the oil level gauge (oil quantity: approx. 1.0 liter).

★ Fill up the oil for slewing reduction gear until oil level comes to halfway between upper limit and lower limit on the oil level gauge (oil quantity: approx. 0.7 liters).

In order to check oil level, insert the level gauge until it just touches the oil level port (not screwing it in).

♦4. Lubrication to slewing bearings

★ The crane employs ball bearings as the slewing bearing.

★ Be sure to lubricate the bearings as insufficient lubrication may cause it to make unusual noise.

★ Grease the nipples while slewing the boom once a month for moderate operation, and once a week for heavy-duty operation.

♦5. Lubrication to wire ropes for boom extension

Spray the rope grease sufficiently once a month to the wire ropes for boom extension with the boom fully extended.

11. MAJOR SPECIFICATIONS

□ S818 M6

(Operating speeds are on condition that oil temperature at 45~55℃, no-load and rated oil flow.)

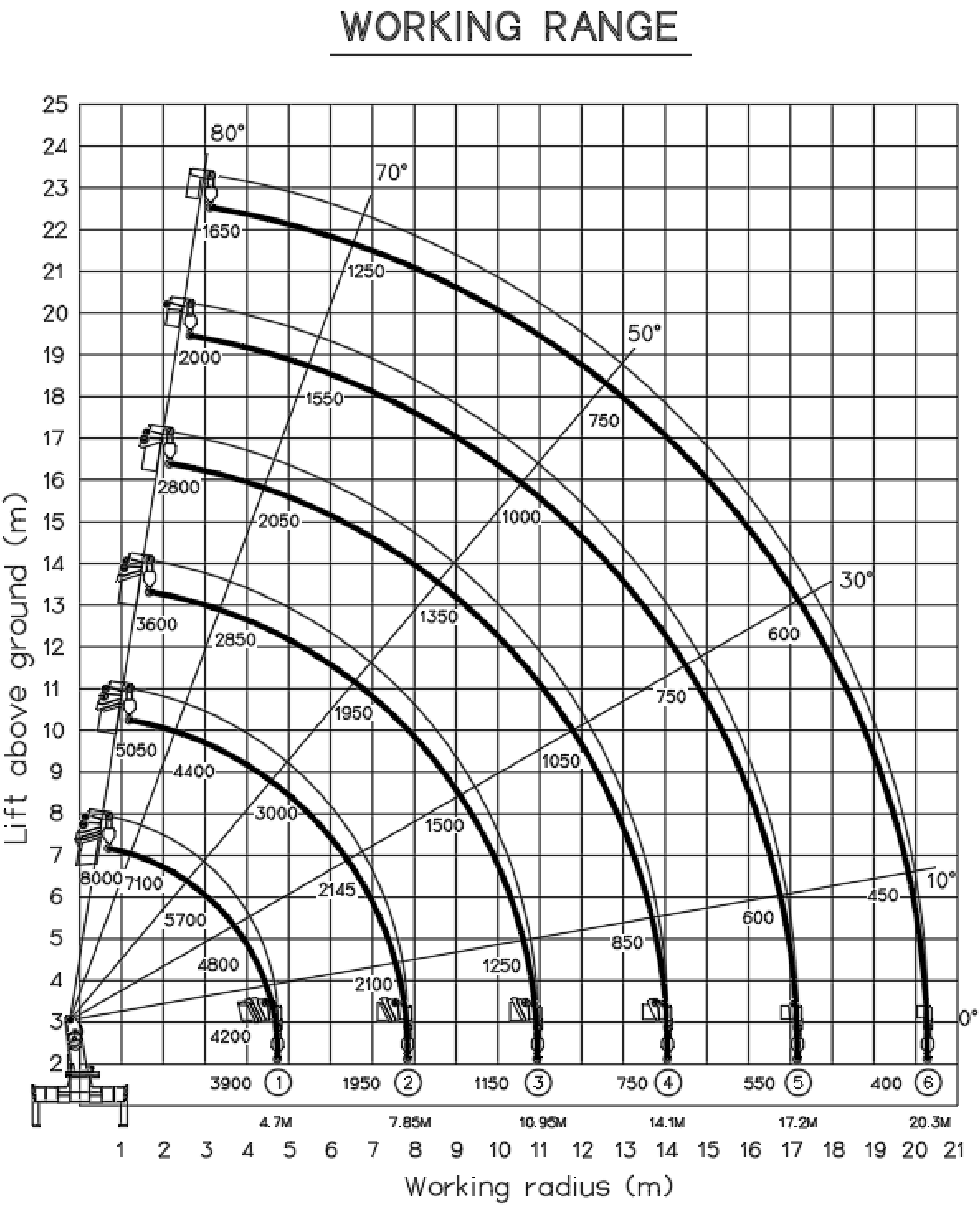
Major specifications

Crane capacity (Net rated load)		8.0ton × 1.5m (With outriggers, extended fully)
Maximum lift above ground(Hook)		23.3m
Maximum working radius		20.3m
Speed of winding-up (Rope speed)		60m/min (At 6th layer on the drum)
Hoisting speed of hook		16m/min (At 4th layer on the drum, with 4-part line hooking)
Extending speed of boom		15.5m/42sec
Raising speed of boom		-17° ~ 80°/18sec
Slewing speed		2 RPM.
Slewing range		360°(continuous)
Hoisting rope	Construction	IWRC6 × (29), or 19*7 heracles
	Diameter×length	10mm × 116m
Outrigger	Horizontal	Direct pushing by double acting hydraulic cylinder
	Vertical	Direct pushing by double acting hydraulic cylinder (directly connected to hydraulic automatic locking device)
Hydraulic pump	Rated pressure	20.6MPa (210kgf/cm2)
	Rated discharge	Approx. 60 ℓ/min
	Rated rotation	Approx. 2500rpm
Hydraulic oil tank Capacity		170 liters

Equipment and construction

Boom telescoping	Boom : 6-section, Hexagonal box beam
	Telescoped by direct pushing of double acting hydraulic cylinder together with by wire rope (With hydraulic automatic locking device) (5th & 6th section : sequential actuation)
Boom derricking	Direct pushing by hydraulic cylinder (With hydraulic automatic locking device)
Hoisting	Hydraulic motor: Axial plunger type
	Reduction gears: Spur-gear reduction
	Brake: Automatic mechanical brake
Slewing	Hydraulic motor: Axial plunger type
	Reduction gears: Worm-gear+Spur-gear reduction (Supported by ball bearings)
	Brake: Worm self-lock
Hydraulic pump	Gear pump
Hooking capacity	7.2ton. Number of slinging rope: 6
Safety devices	Safety valve for hydraulic circuit
	Hydraulic automatic lock
	Automatic stop for Over-winding
	Over-winding alarm
	Slewing automatic lock
	Automatic stop for leaving minimum wire rope
	Load indicator (With angle meter)
	Alarm buzzer
	Retaining mechanism to prevent wire rope from disengagement (option)
	Emergency stop button(option)
	Level
Weight	Approx. 4000kg

Working range chart



Rated load

정 격 하 중

단위 : kgf

작업반경 (M)	붐 길이 4.7M	7.85M	10.95M	14.1M	17.2M	20.3M
1.5	*8000					
2.0	* 7100	5050				
2.5	*6300	4450	3600			
3.0	*5650	4000	3200	2800		
3.5	5200	3650	2900	2500		
4.0	4800	3400	2650	2300	2000	
4.5	(4.7) 3900	3200	2500	2100	1850	1650
5.0		3000	2350	1950	1700	1550
5.5		2850	2200	1850	1600	1450
6.0		2700	2100	1750	1500	1350
7.0		2400	1900	1600	1350	1200
8.0		(7.85)1950	1700	1450	1200	1100
9.0			1550	1350	1150	1000
10.0			1400	1250	1050	950
11.0			(10.95)1150	1150	1000	875
12.0				1050	900	825
13.0				950	850	775
14.0				(14.1) 750	800	725
15.0					750	700
16.0					700	650
17.0					(17.2) 550	600
18.0						575
19.0						525
20.0						(20.3)400
와이어연수	(*) 6연	4연 (기본)				

( ) : 작업반경

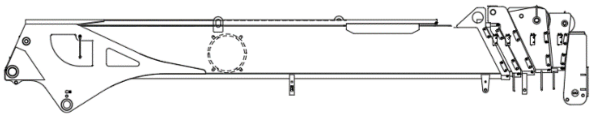
주 의

1. 위의 정격하중표는 지면이 단단하고 수평인 상태에서 아우트리거를 완전히 신장 후 다리를 내려 차량이 수평을 유지한 상태입니다.
2. 위의 정격하중표는 메인윈치와 보조윈치의 권상하중의 합입니다.
3. 위의 정격하중표는 차량자중, 차량에 실린 하중물의 적재상태, 크레인의 장착위치, 작업속도, 지면의 상태 및 바람의 속도에 따라 감소됩니다.
4. 위의 정격하중표에서 훅크, 활차 및 악세서리의 무게를 뺀 것이 실제로 크레인이 들 수 있는 능력입니다.

•Operating condition of booms;

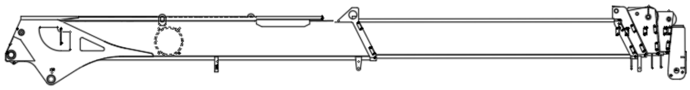
Boom 1 :

All booms are completely retracted.



Boom 1+2 or 2 :

Boom 2 only is extended



Boom 1+2+3 or 3 :

Boom sections 2 and 3 are extended

Boom 1+2+3+4 or 4 :

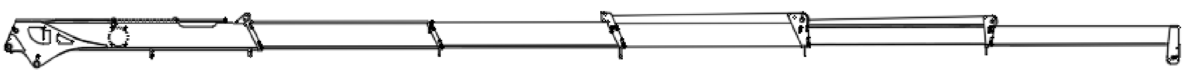
Boom sections 4, 5 and 6 are extended equally to 1/3 point of each stage

Boom 1+2+3+4+5 or 5

Boom sections 4, 5 and 6 are extended equally to 2/3 point of each stage

Boom 1+2+3+4+5+6 or 6 :

Boom sections 4, 5 and 6 are extended to their extremes.



12. MEASURES TO BE TAKEN IN AN EMERGENCY

□ Measures to be taken in an emergency

The “code indicator lamp”is mounted in the control box indicating conditions of crane operation and troubles in detail.

Trouble	Possible cause	Measure to be taken
Crane works arbitrarily even when no controls have been made or a manual control lever has been shifted.	A solenoid valve of control valve is in failure.	Depress EMERGENCY stop switch to stop crane operation immediately. Tighten the emergency screw clockwise lightly to its extreme. (Pay attention that the screw may break if it is tightened with an excessive force.) Depress EMERGENCY stop switch again to reset emergency stop. Check that crane does not work when no controls have been made. Store crane with manual levers and ask a SPS ENG authorized service shop for replacement of faulty solenoid valve

Remarks

The emergency screw is fixed with a lock pin.

Remove the lock pin before turning the emergency screw.