UNIC HYDRAULIC CRANE

MAINTENANCE AND PARTS MANUAL

CABLE REMOTE CONTROL
&
RADIO REMOTE CONTROL

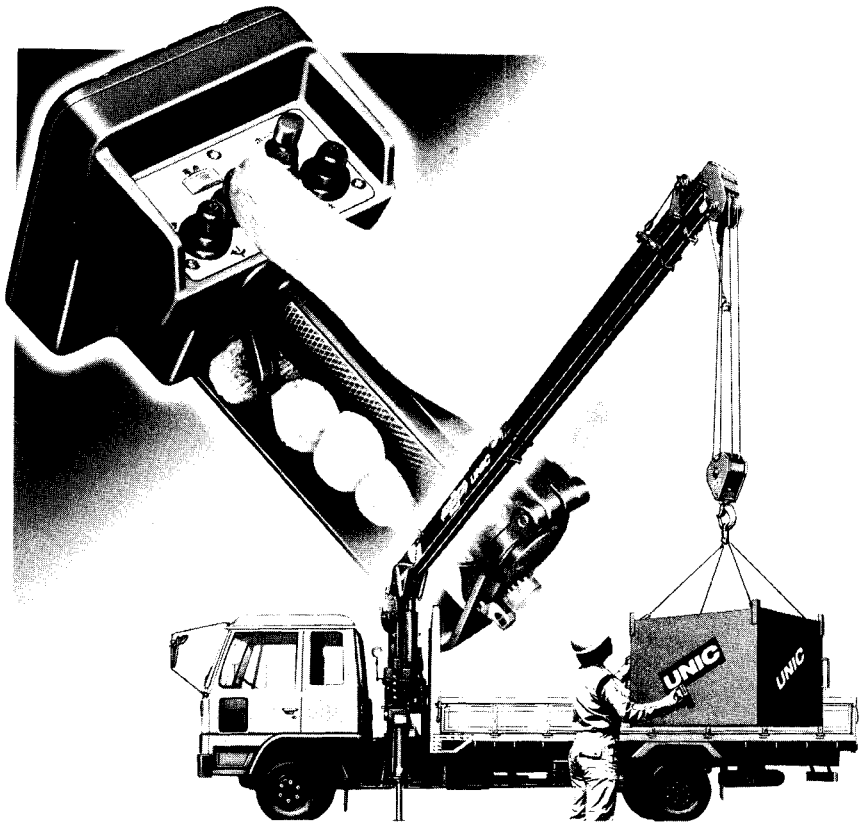
FURUKAWA UNIC CORPORATION

INTRODUCTION

The technical instruction manual describes the construction of the remote controller and inspection/repair procedures for the persons who engage in its repair.

In order to maintain proper operation of the remote controller, you are requested to read the manual carefully to acquire the correct maintenance technique and provide efficient, prompt, and correct service to our mutual customers.

Technical Section, Service Department
FURUKAWA UNIC Corporation



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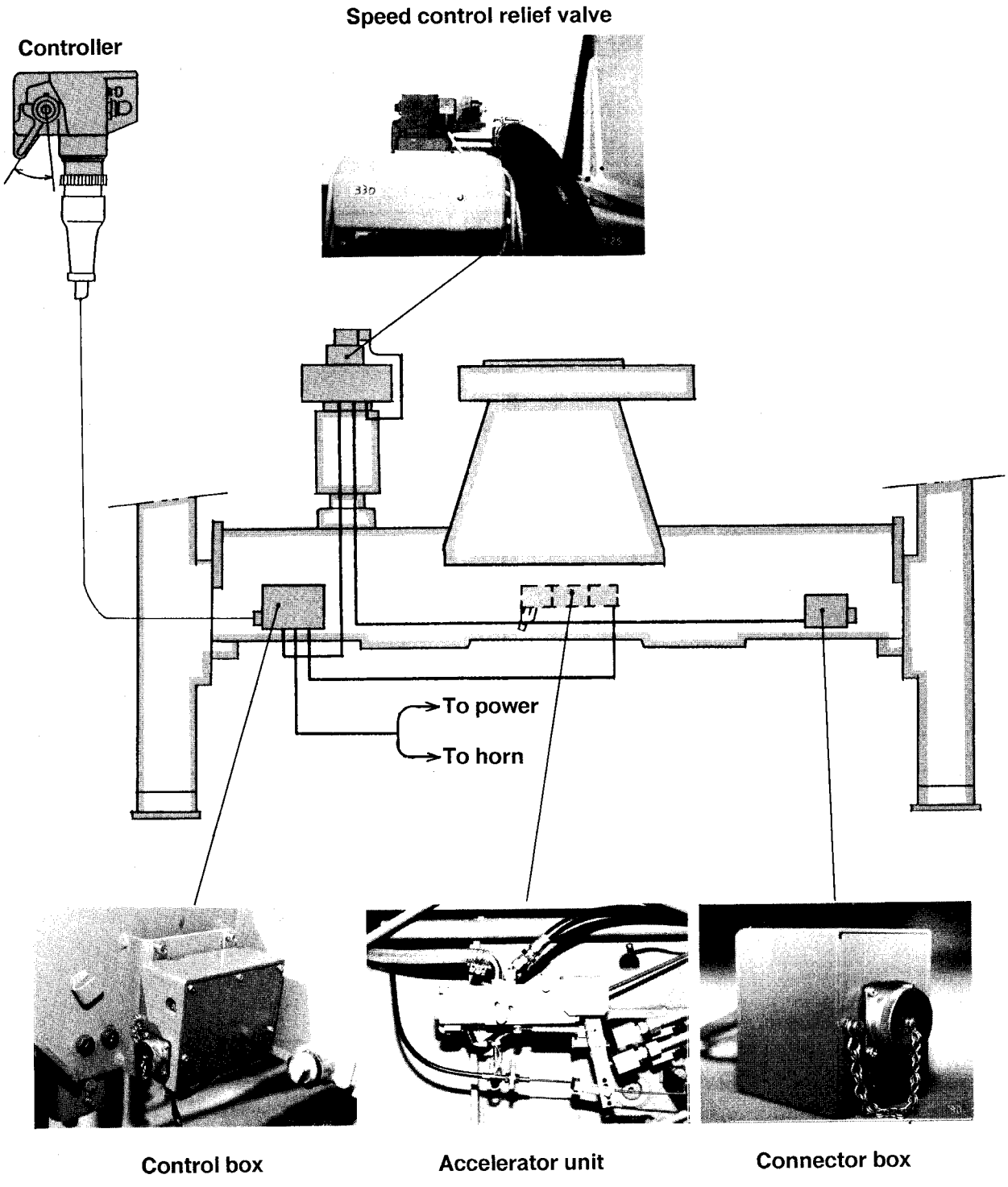
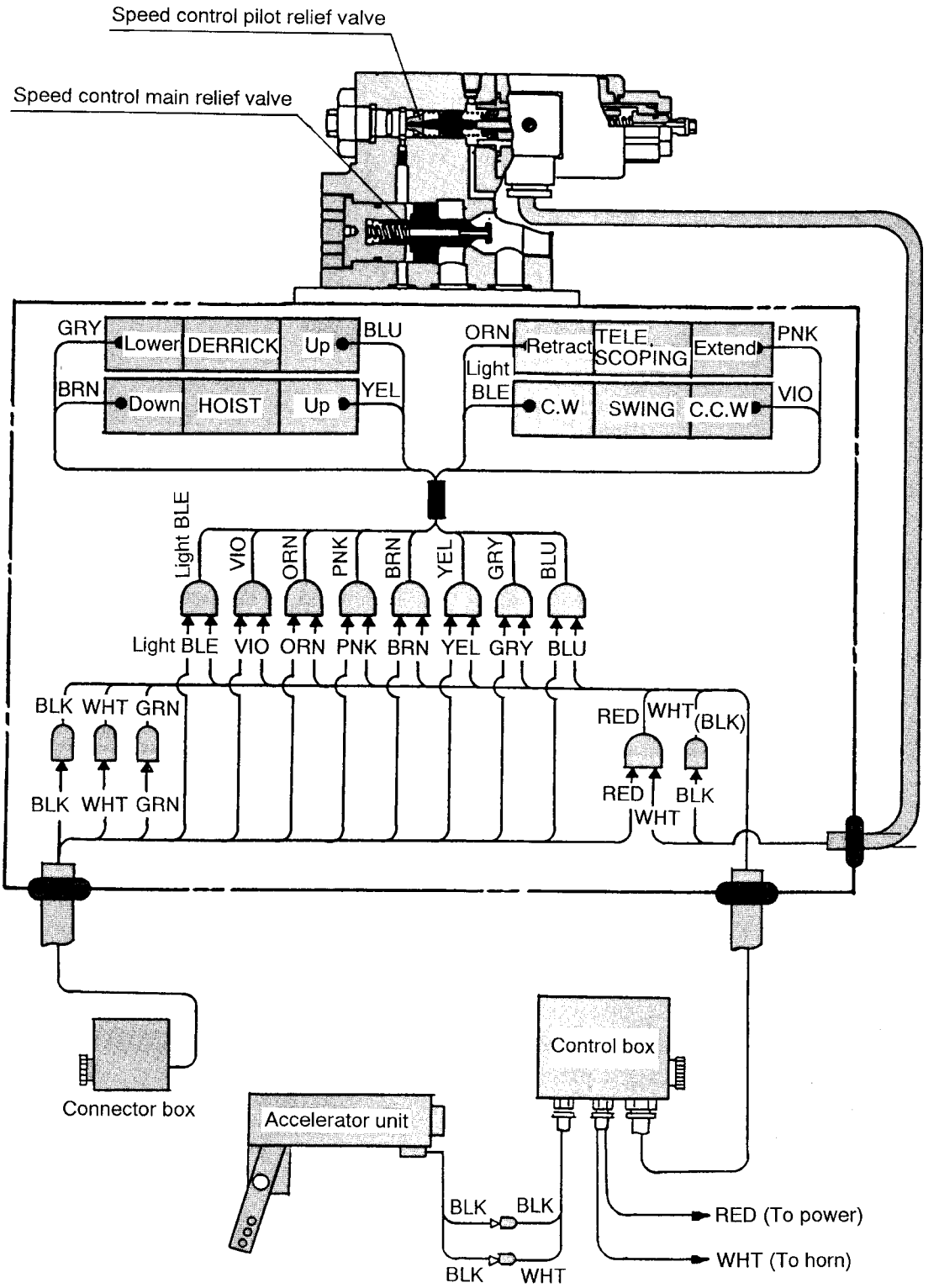
§1. Basic outline of remote controller

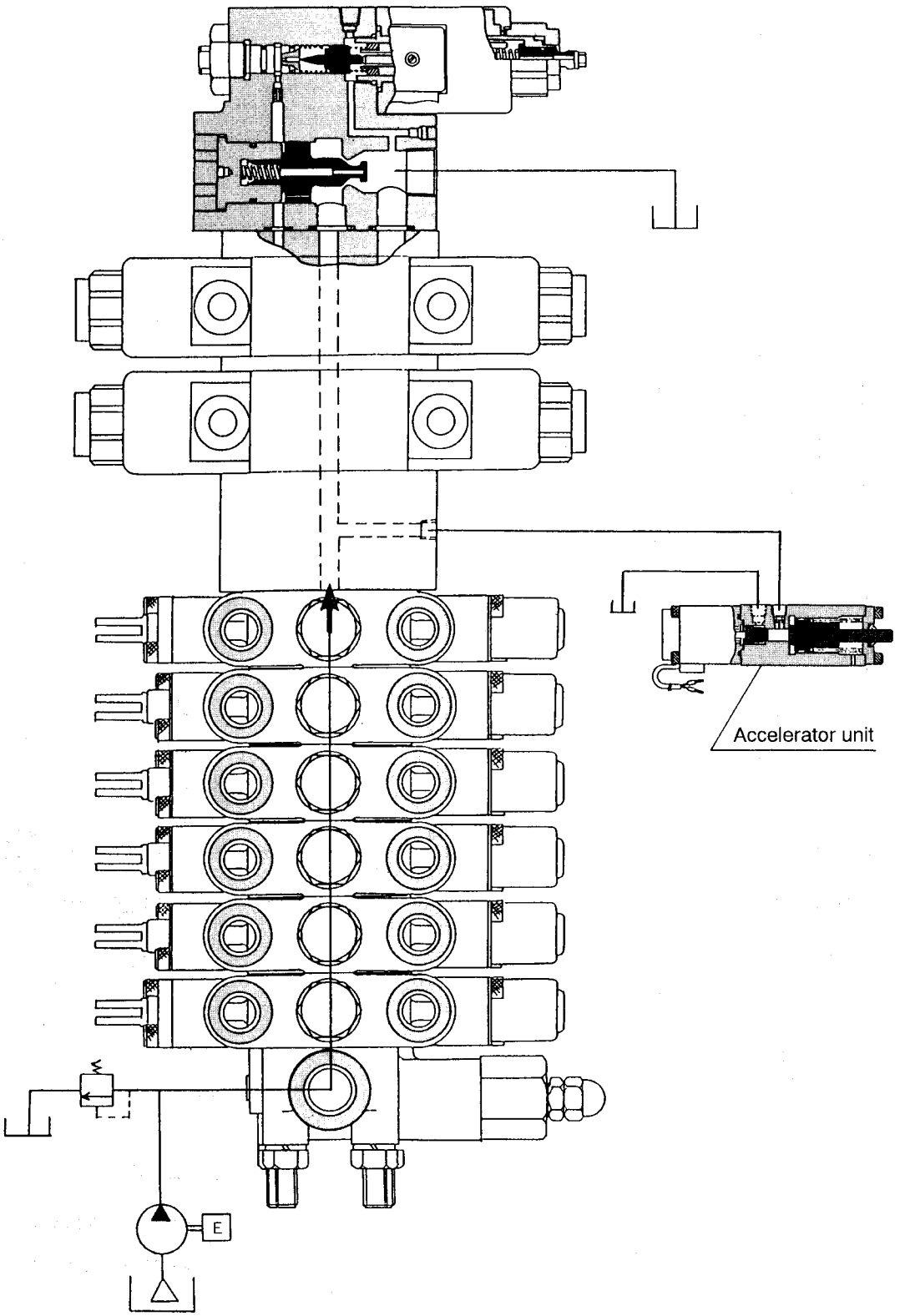
When the Pictured devices are mounted on the standard crane, it can be operated according to the remote control specifications.



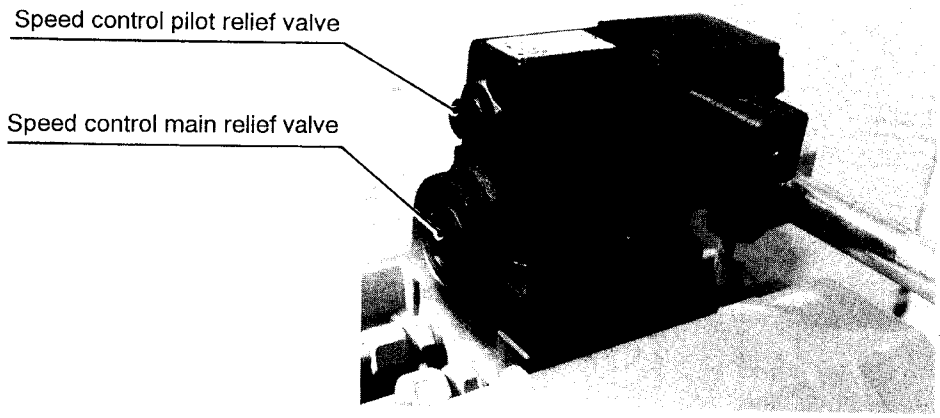
§2. Model RC-30S (Wiring diagram of remote controller)



§3. Oil-flow from control valve to remote control valve...



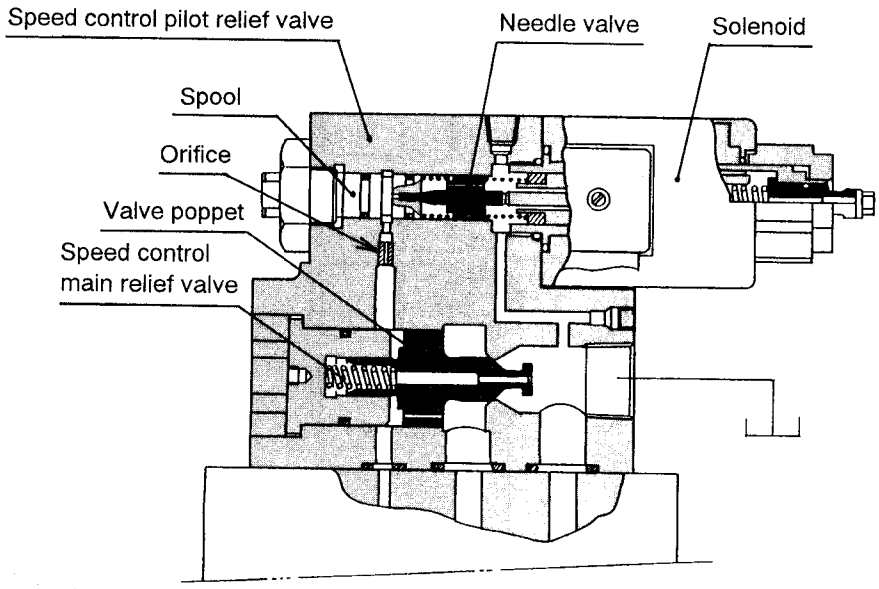
§4. Construction and operation of speed control relief valve



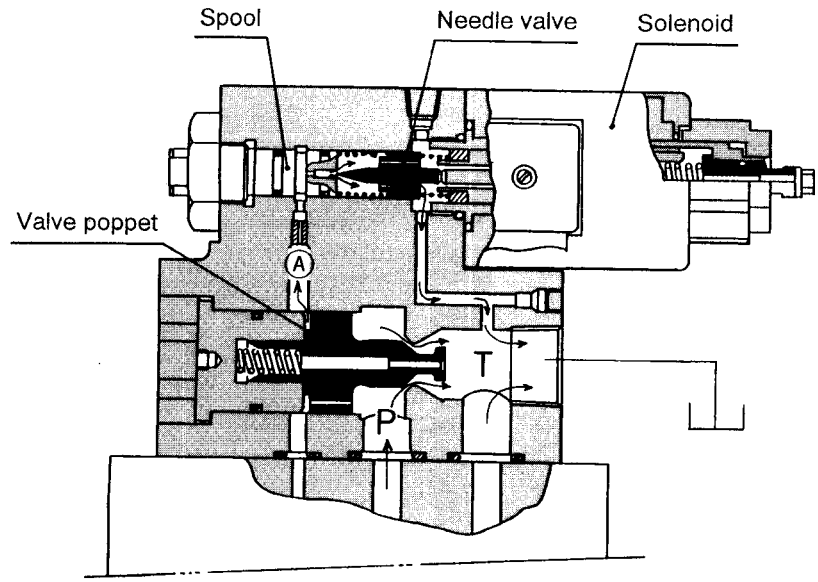
A) Construction (for common use Cable remote control device & Radio remote control device)

The speed control relief valve consists of a pilot relief valve and a main relief valve.

When the lever is pulled with the control switch on the controller (transmitter) turned on, the solenoid is activated so that the speed control pilot relief valve and the main relief valve control oil flow rate which in turn controls oil pressure in the P chamber.



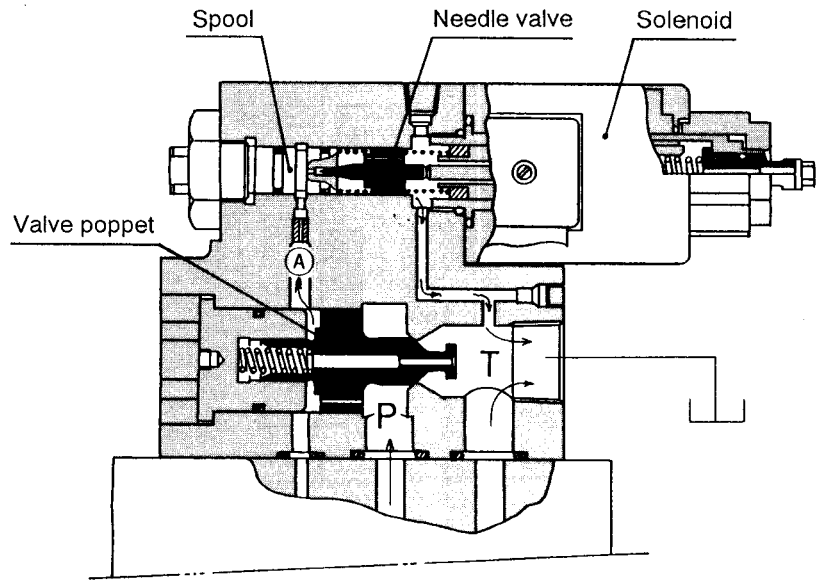
B) Speed control (when the controller is not functioning)



When the controller (transmitter) is not operated, oil pressure in the chamber A is low because the oil out of chamber A is flowing from choke section in the needle valve to the tank port.

As a result, the valve poppet moves to left hand side due to the area difference so that the oil out of the P port flows into the tank port.

C) Speed control (when the controller is functioning)

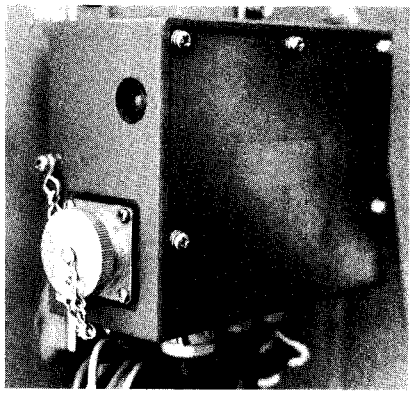


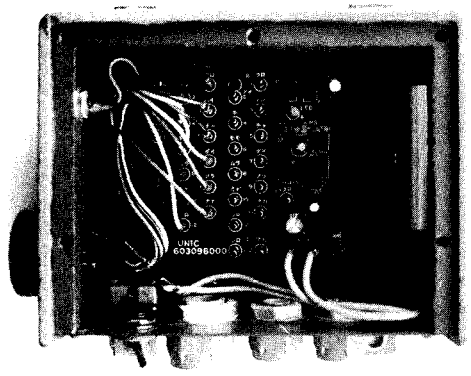
When the lever is pulled with the control switch on the controller (transmitter) turned on, the solenoid is activated so that it presses the needle valve against the spool.

As a result, the oil from chamber A is restricted at choke section in the needle valve so that flow rate of oil coming from the P port is controlled and the speed is controlled by regulating the oil pressure proportionally.

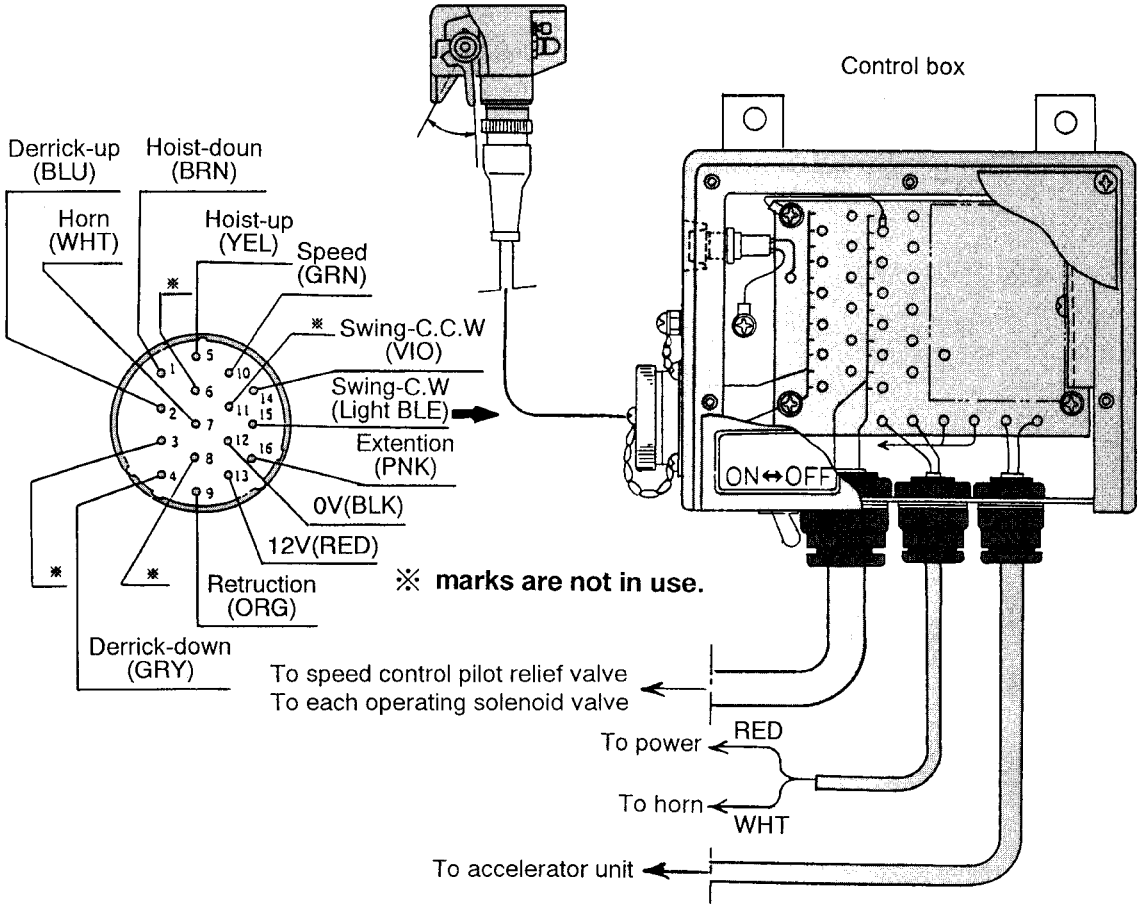
§5. Construction of control box
(for common use Cable remote control device & Radio remote control device)

The control box is a junction box which accepts power supplied from chassis to connect it to the speed control relief valve and the accelerator unit, and controls operating instructions provided to the speed control relief valve, each operating solenoid valve, and the accelerator unit through remote controller operation.





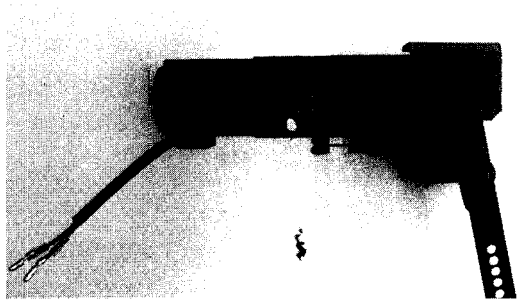
(Construction)



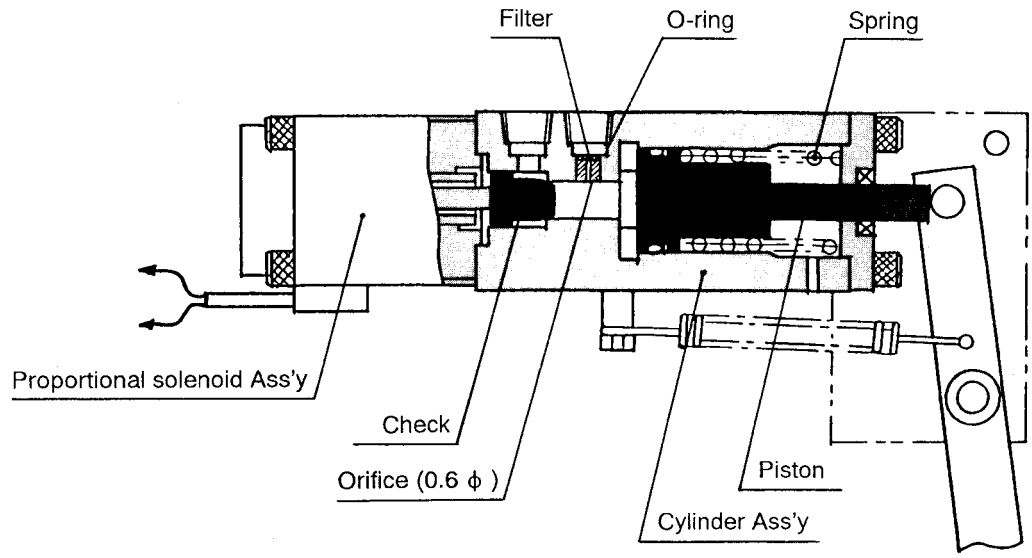
§6. Construction of accelerator unit
(for common use Cable remote control device & Radio remote control device)

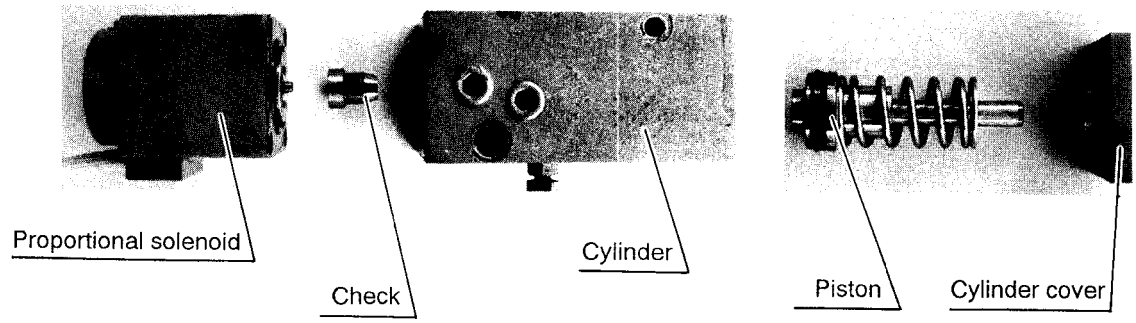
The accelerator unit is constructed by combining a proportional solenoid with a cylinder.

When the lever is pulled with the control switch on the controller turned on, the cylinder rod is extended to move the lever in the accelerator unit which in turn activates the accelerator cable.



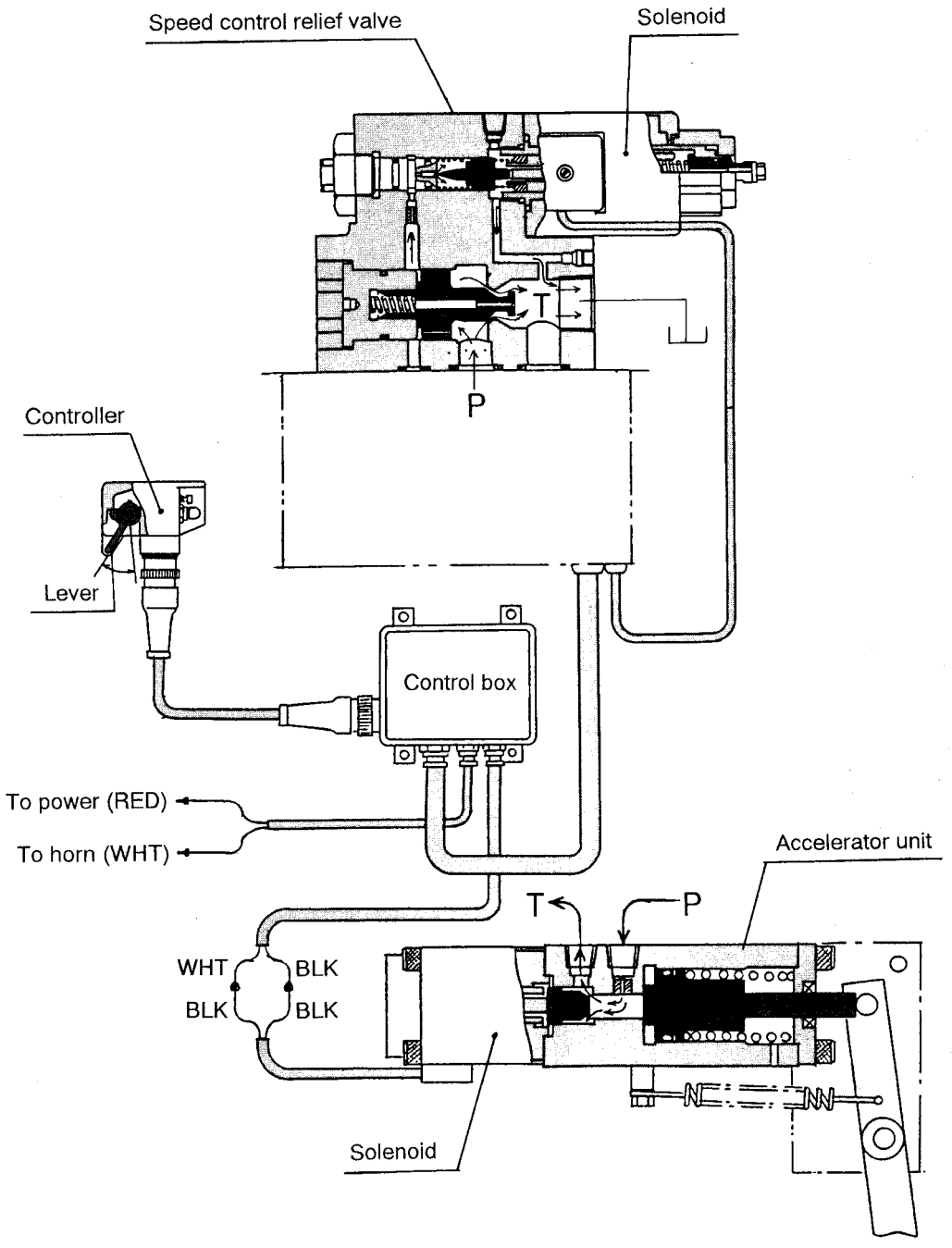
(Construction)





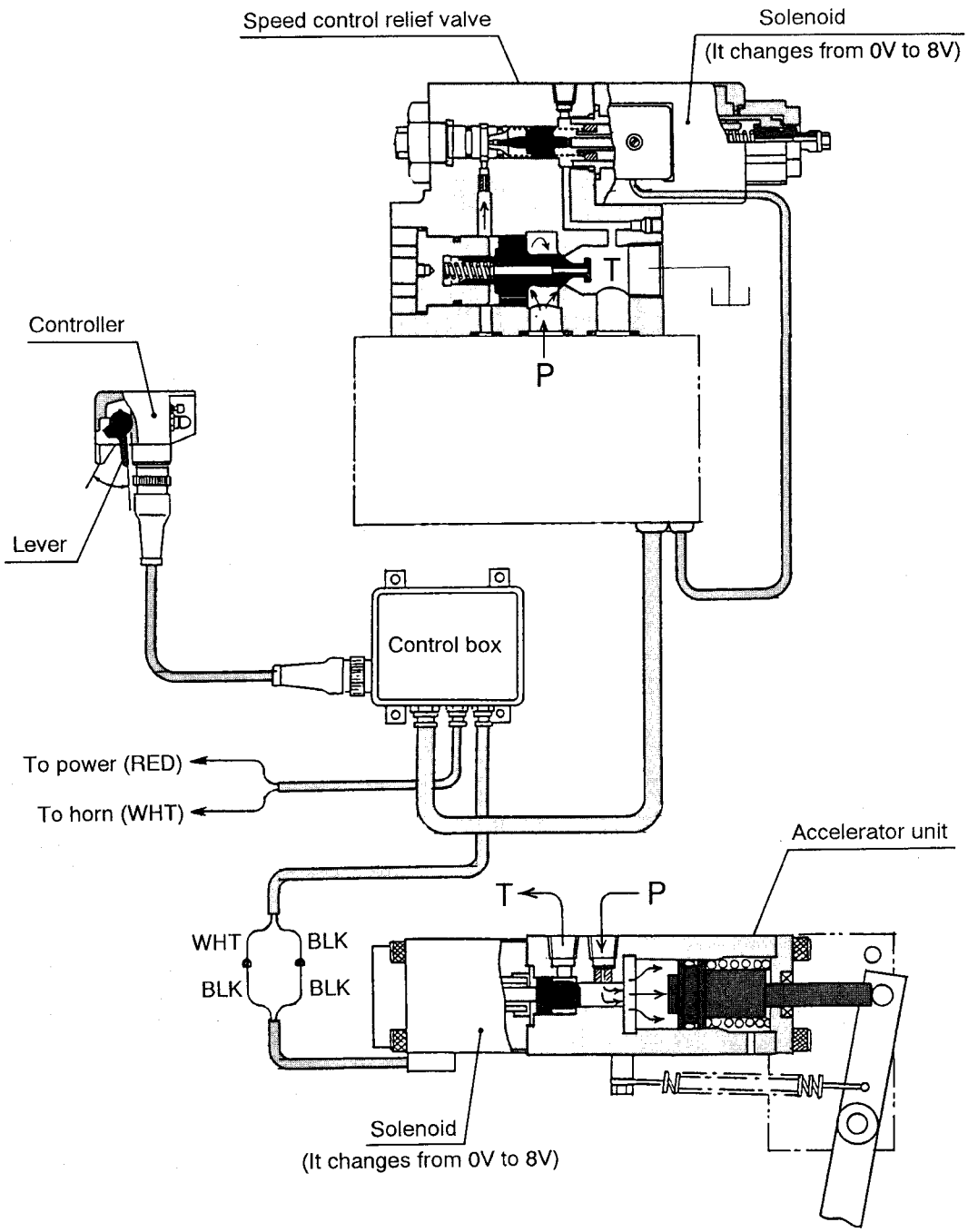
§7. Model RC-30S (Operation of remote controller)

A) Oil-flow when it is not functioning



When the lever on the controller is not pulled, the speed relief valve and the solenoid in the accelerator unit are not functioning so that oil coming from P port flows into the tank.

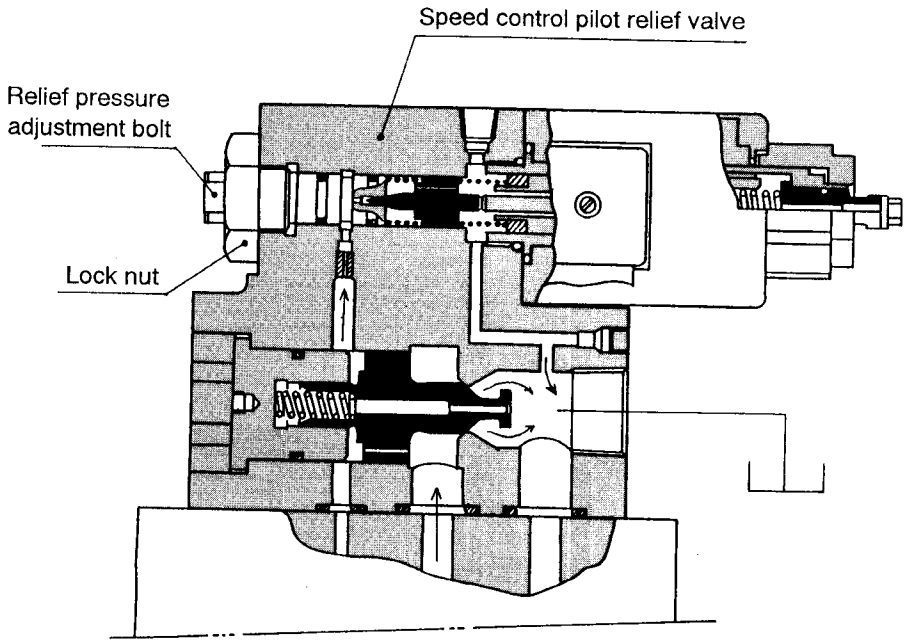
B) Oil-flow when it is functioning



When the lever is pulled with the control switch on the controller (transmitter) turned on, the speed control relief valve and the solenoid in the accelerator unit are activated so that oil-flow coming from the P port is controlled and the speed is controlled by regulating oil pressure in the P port proportionally.

§8. How to adjust the pilot relief valve for speed control

When the speed control pilot relief valve has been overhauled, conduct pressure adjustment as illustrated below.



A) Preparation before adjustment

(1) Attach a pressure gauge, capable of measuring more than 3555.68 PSI (250kg/cm^2=24.52 MPa) of pressure, to the pressure output port in the control valve.

(2) Remove the controller in advance.

B) Adjustment

(1) Start the engine and rotate the hydraulic pump by engaging PTO.

(2) Loosen the lock nut for the relief pressure adjustment bolt in the speed control pilot relief valve.

(3) Turn clockwise the relief pressure adjustment bolt slowly until the pressure reaches the following set pressure of the crane.

UR330 ---------- P=2488.98 PSI (175kg/cm^2=14.16 MPa)

UR500 ---------- P=2844.55 PSI (200kg/cm^2=19.61 MPa)

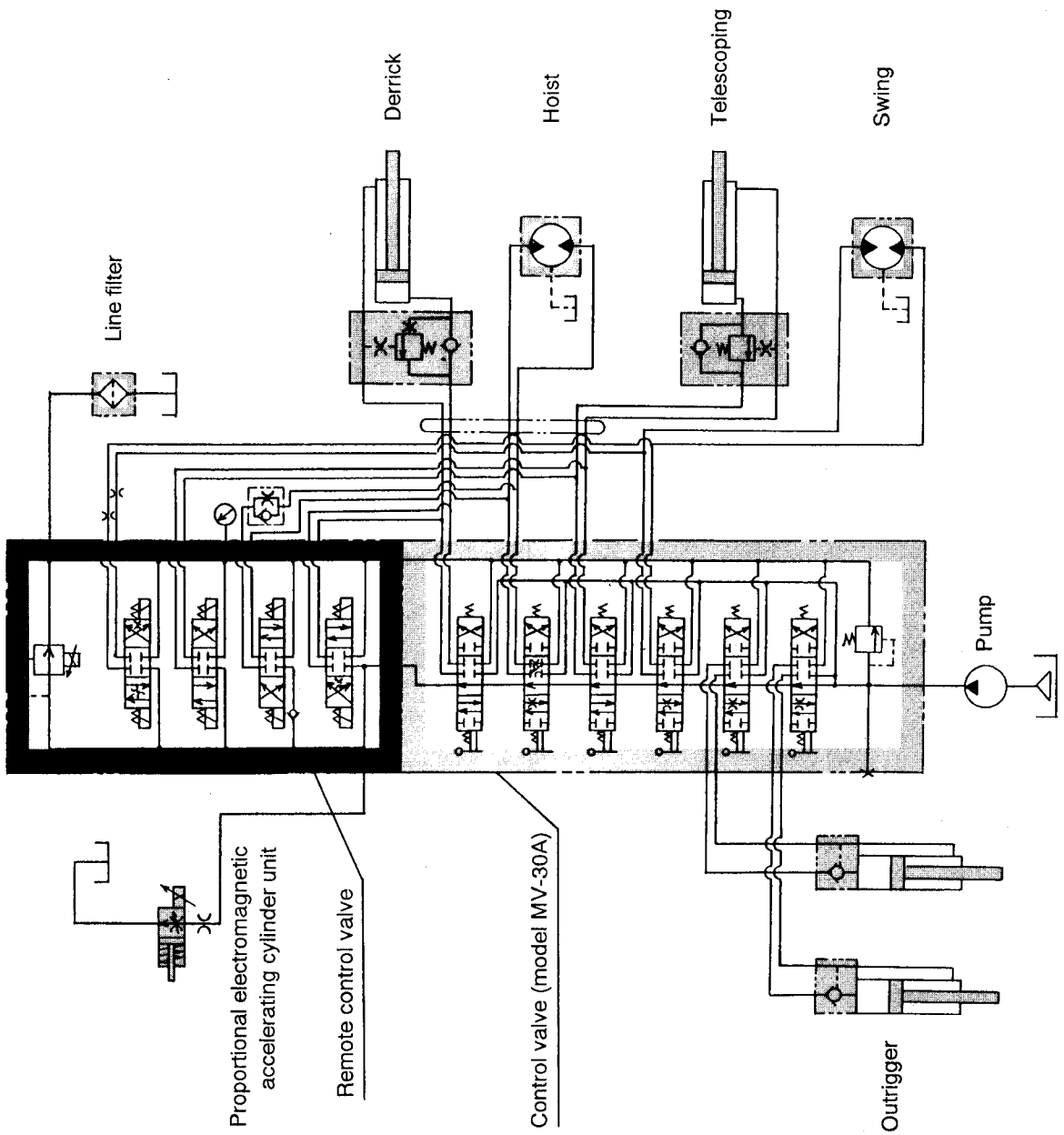
(4) Turn counterclockwise the relief pressure adjustment bolt to loosen it after making sure that the correct pressure reads on the pressure gauge.

(5) Lower the pressure to read 142.23 PSI (10kg/cm^2=0.98 MPa) (minimum pressure) on the pressure gauge.

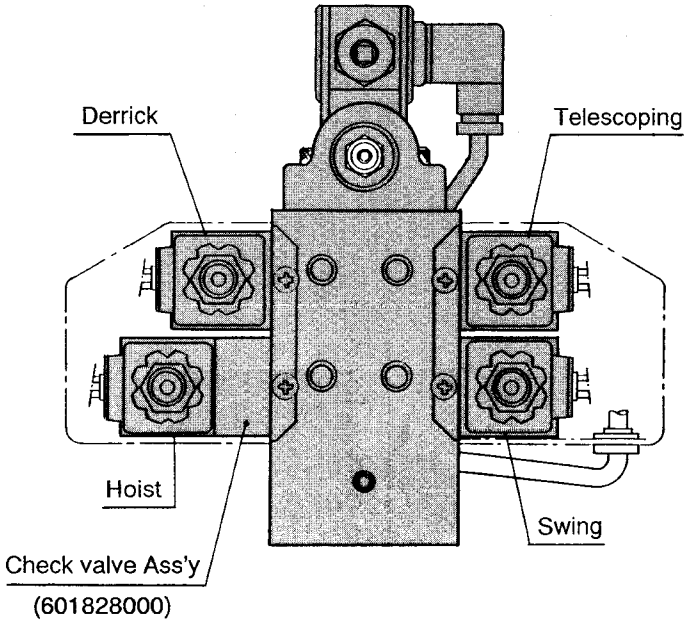
(6) Secure the relief pressure adjustment bolt at this position and lock it with the lock nut.

This concludes the adjustments.

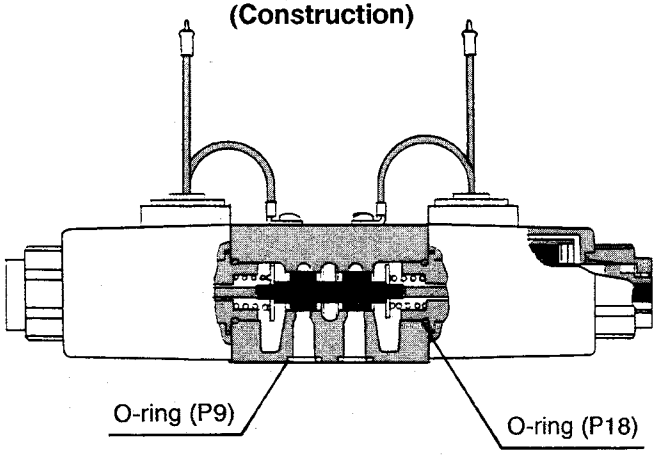
§9. Hydraulic schematic (with remote control valve)



§10. 1/4 electromagnetic selectorvalve (for common use Cable remote control device & Radio remote control device)

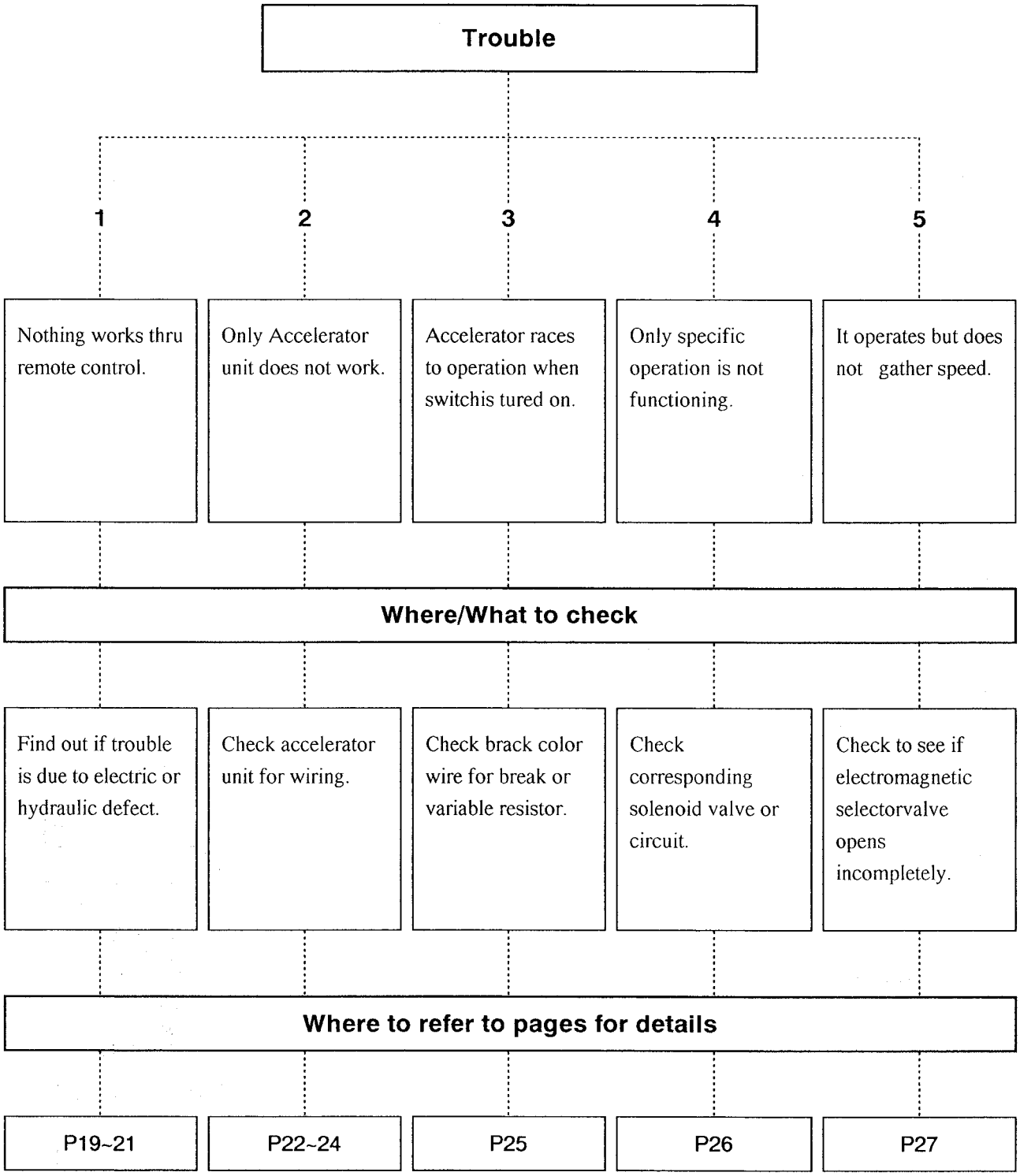


1/4 electromagnetic selector valve (Construction)



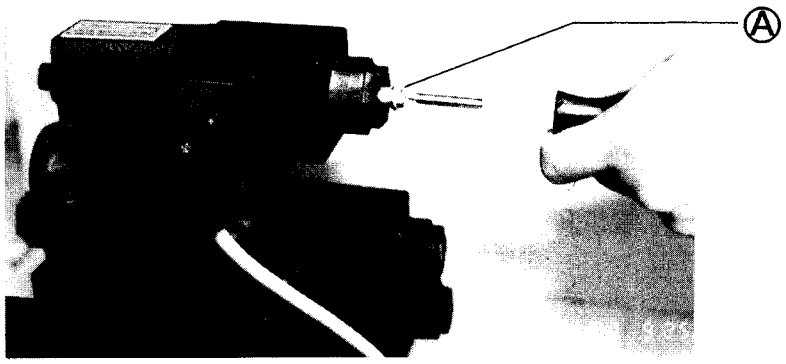
1/4 electromagnetic selector valve	Standard	Telescoping Hoist	SD4SGS-ACB-02C -D12 – 46-S213 **740192045** (P/N)
	Standard	Swing	SD4SGS – ACB – 02C – D12 – 46 – S214 **740192046** (P/N)
	Standard	Derrick	SD4GS – ABC – 02C – D12 – 46 – S213 **740192047** (P/N)

§11. Trouble-shooting procedures for the remote controller (model RC-30S)

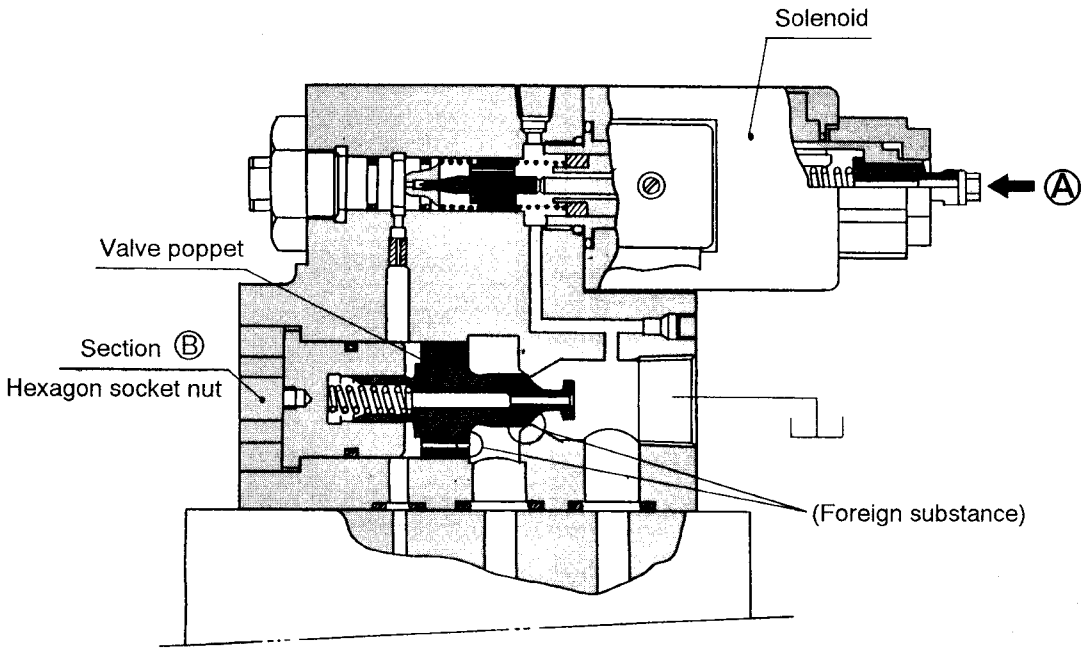


A) Nothing work through remote control.

To make sure whether the speed control relief valve is in electric or in hydraulic trouble, try to push the point A of the solenoid in the speed control pilot relief valve with a screwdriver as illustrated.



(1) When it is in hydraulic trouble;



ⓐ No operating (hissing) sound coming from the relief valve is heard.

ⓑ Pressure does not build up even after pressure has been confirmed.

(Possible causes)

Foreign substances may be stuck in the valve poppet section as shown in the illustration above.

(Corrective measures)

Untighten the hexagon socket nut located in section B and extract the valve poppet to make overhaul cleaning.

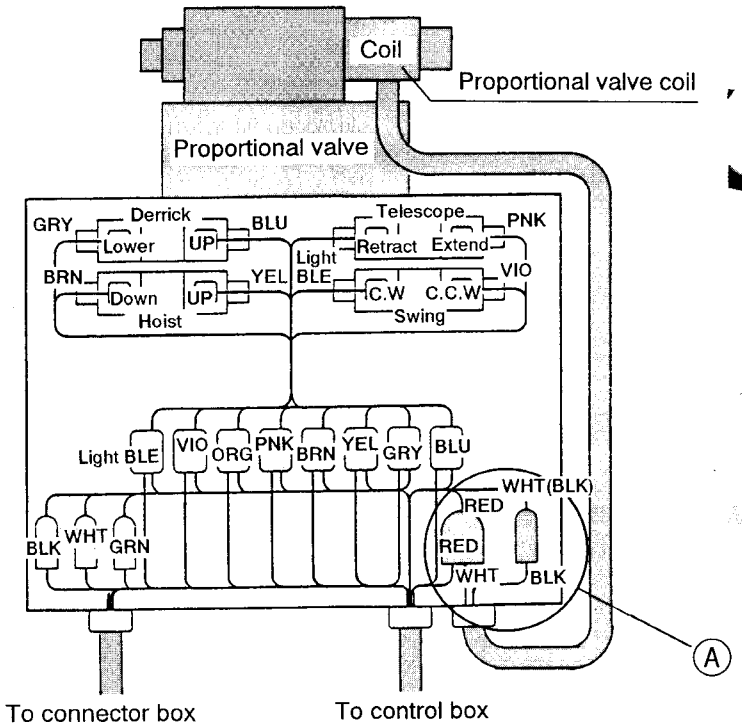
(2) When it is in electrical trouble;

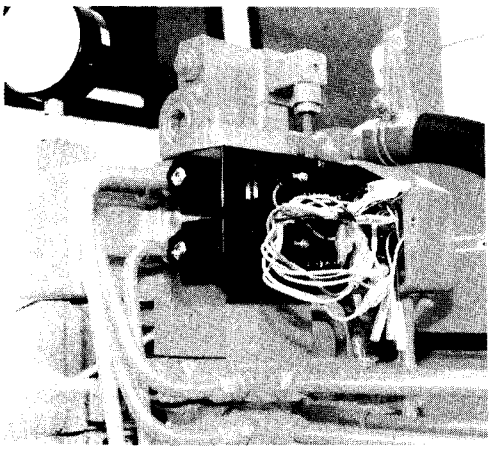
If pressure build up when the point Ⓐ of the solenoid in the speed control pilot relief valve is pushed, the trouble is in electrical area.

Check it as follows:

ⓐ Check to use if the fuse is not blown and DC12V power supplied from chassis is applied into the control box.

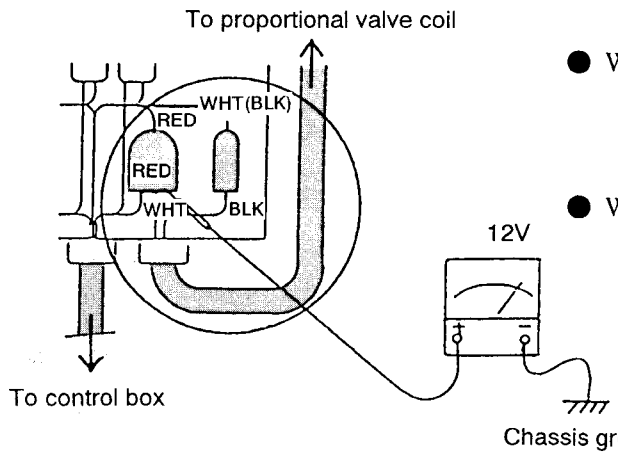
ⓑ Remove the cover for the 1/4 electromagnetic selector valve to check the wiring inside.





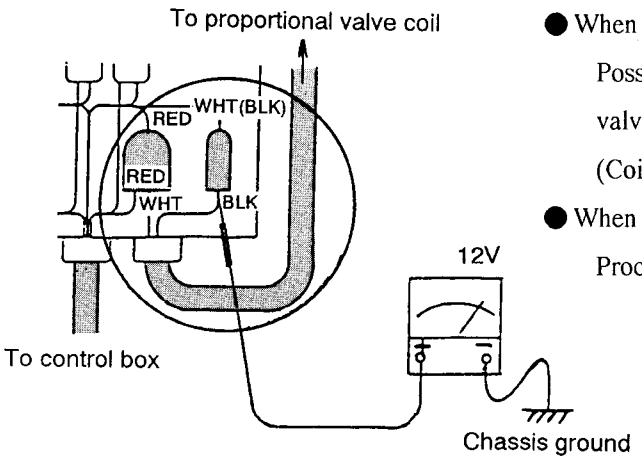
ⓒ Check voltage using a circuit tester at the terminals shown within the point Ⓐ in the above illustration where white wire and black wire from the proportional valve are connected.

① Check to see if the voltage between the terminal, where white and red wires lead from proportional valve are terminated, and the chassis ground measures DC12V.



- When it does not measure DC12V ➡ Failure.
  Check power wiring led from the chassis to the control box.
- When it measures DC12V ➡ Normal.
  Proceed to next stop ②.

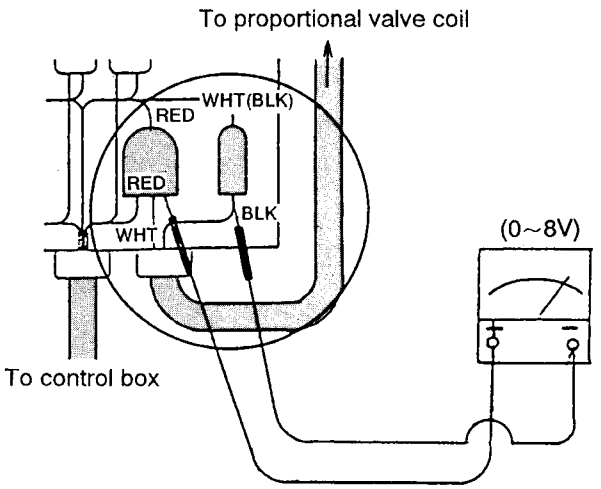
② Check to see if the voltage between the terminal, where 2(two) wires of black and white/black coming from proportional valve are terminated, and the chassis ground measures DC12V.



● When it does not measure DC12V ➡ Failure.
Possible causes may be break of proportional valve coil or poor contacts at the connector.
(Coil resistance should be approx. 6 Ω)

● When it measures DC12V ➡ Normal.
Proceed to next step ③.

③ Check to see if the voltage between terminals changes 0V to 12V as the controller lever is being pulled with the plus (+) probe of circuit tester connected to one terminal (where white and red wires are terminated) and minus (－) probe to other terminal (where black and black/white wires are terminated).



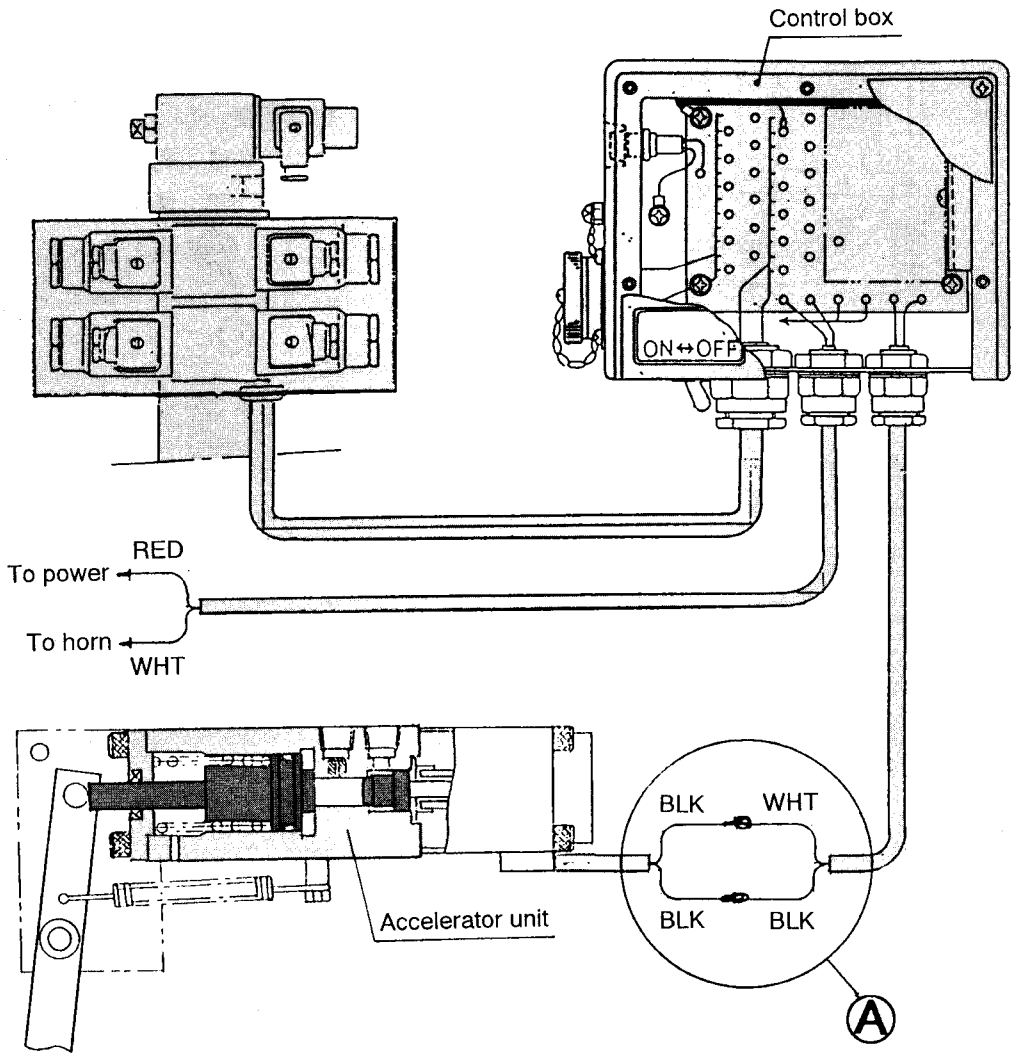
● Voltage does not change from 0V to 8V ➡ Failure.
Possible causes may be broken power cable (red) of the controller or damage in control box.

● Voltage changes from 0V to 8V ➡ Normal.

(Note) Power voltage (DC12V) drops when the controller is operated.

※ An extra load may be added to the power distribution section. Check the power distribution section. (It frequently occurs when mounting a loading.)

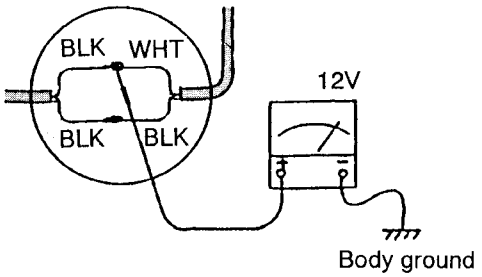
B) Only accelerator unit does not work.



(1) If the accelerator unit does not work at all, check it as follows;

Check, using a tester, voltage at the terminals to which wires from control box are terminated as shown within the circle.

ⓐ Check to see if the voltage between the junction of white wire led from control box and black wire from accelerator unit (with the plus (+) probe of circuit tester inserted into the junction) and the body ground (with the minus (-) probe touched to the body) measures DC12V.



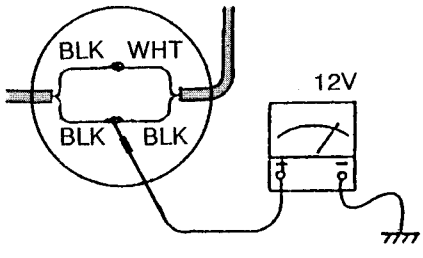
● When it does not measure DC12V ➡ Failure.

Check power wiring leading to the control box.

● When it measures DC12V ➡ Normal.

Proceed to next step ②.

ⓑ Likewise, check if voltage between the junction of black wire from control box and black wire from accelerator unit (with the plus (+) probe inserted into the junction) and the body ground (with the minus (－) probe touched to the body) measures DC12V.

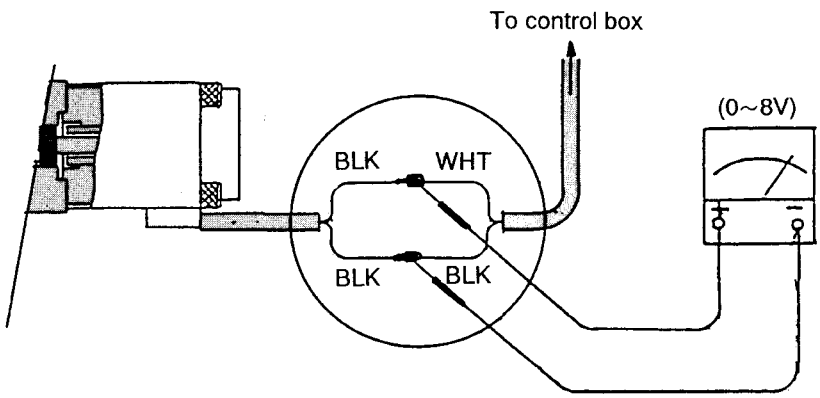


● When it does not measure DC12V, ➡ Failure.
Accelerator coil is broken.
(Coil resistance should be 3.8 Ω)

● When it measures DC12V, ➡ Normal.
Proceed to next stop. ⓒ

ⓒ If found normal at the checks in step ⓐ and step ⓑ, then check as follows;

(Check): Insert plus (+) probe of circuit tester into one junction of white wire from control box and black wire from accelerator unit, and minus (－) probe into the other junction of black wire from control box and black wire from accelerator unit.
Check then if voltage across the junctions changes from 0V to DC 8V as the control lever is being pulled with the switch in the controller turned on.



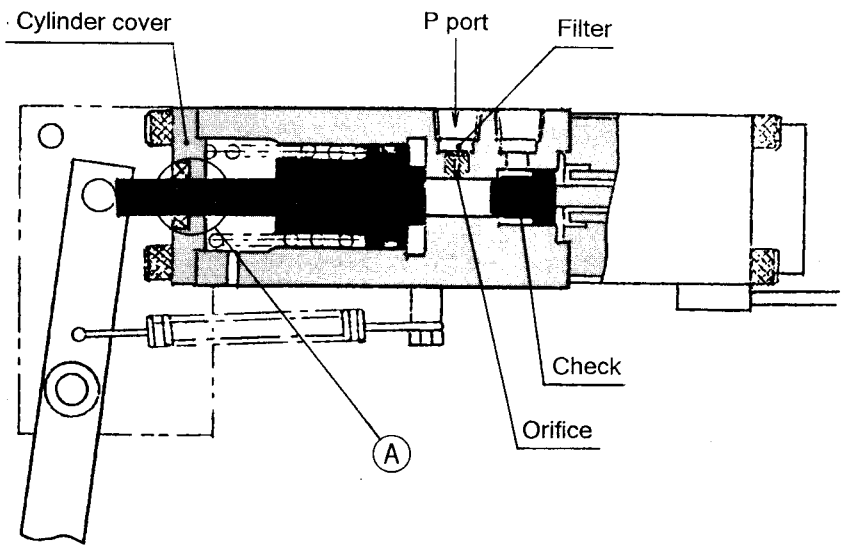
● No voltage. ➡ Failure.
Defects in the package located inside of the control box.

● Voltage changes from 0V to DC 8V ➡ Normal.

(2) Failure is in hydraulic area if it is found normal electrically.

(Possible causes)

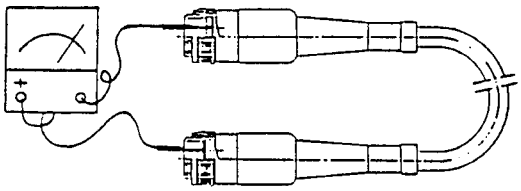
- Foreign substances may be stuck to the P port in accelerator unit.
- Section A in the cylinder cover may be locked up with rust.
- Foreign substances may be stuck into valve check section and prevent it from smooth operation.



C) Accelerator races to operation only when switch is turned on.

(1) Check the controller cable for continuity.

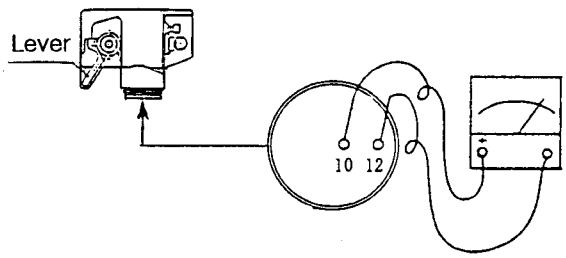
※ If either of black wire or green wire is broken, accelerator races.



ⓐ Check terminal No. 10 (green wire) and terminal No. 12 (black wire) for continuity.

- If there is no continuity, ➡ Failure.
  Cable is broken.
- If there is continuity, ➡ Normal.
  Proceed to next step ⓑ.

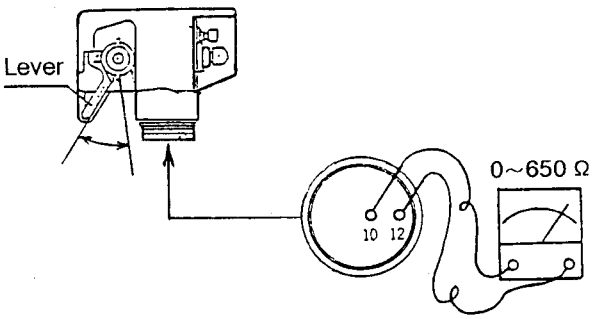
(2) Check connector pins in the controller for continuity.



ⓑ Check continuity between terminal No. 10 and terminal No. 12.

- If there is no continuity, ➡ Failure.
  Variable resister is defective or wiring is broken.
- If there is continuity, ➡ Normal.
  Proceed to next step ⓒ.

(3) Inspect the variable resistor in the controller.

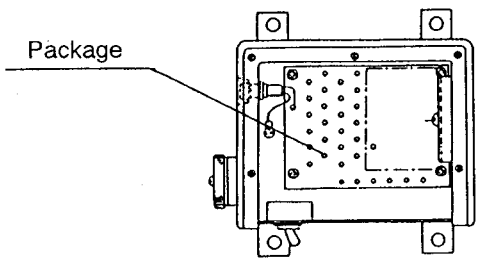


ⓒ Check if resistance varies smoothly from 0 Ω to approx. 650 Ω as the controller lever is being pulled.

- If an indicator fluctuates, ➡ Failure.
  Variable resistor is defective.
- If resistance makes a smooth change, ➡ Normal.
  Proceed to next step ⓓ.

(4) Check the control box.

※ Check the package located inside of the control box and the wiring if no defects have been found in the controller and the controller cables.

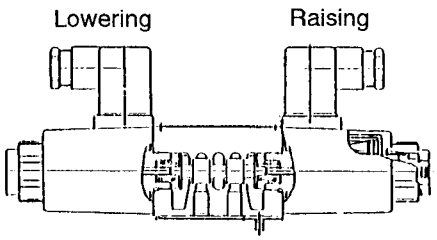


ⓓ Check wiring concerned -(green wire) (black wire)- for the package located inside of the control box and check the package terminals for being tightened.
Check if inside of the control box has not been wet.

D) A specific operation is not functioning.

(1) Check the solenoid valve for the operation that is not functioning.

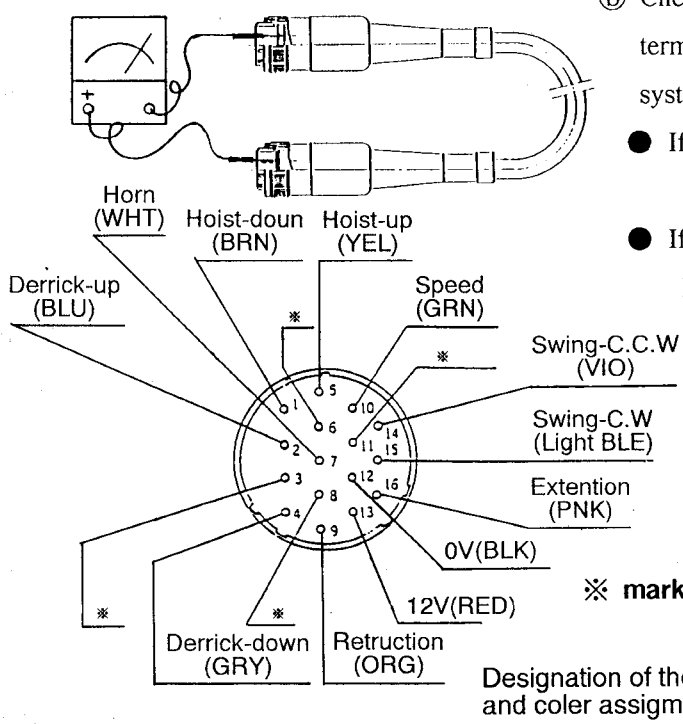
(Example) When the derrick fails to lower;



ⓐ Check derrick operation by exchanging connection by switching connectors or wirings leading to solenoid valves for lowering and raising.

- If derrick still fails to lower, ➡ Failure.
  The solenoid valve for lowering is defective.
- If derrick lowers, ➡ Normal.
  Proceed to next step ⓑ.

(2) Check the controller cable for continuity.



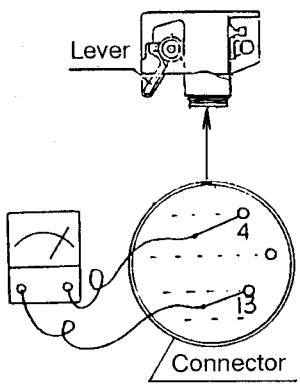
Designation of the connector pin and coler assigment of the cable

ⓑ Check continuity between both ends of the cable at terminals of No. 4 (gray) if the defect is in the lowering system.

- If there is no continuity, ➡ Failure.
  Controller cable is broken.
- If there is continuity, ➡ Normal.
  Proceed to next step ⓒ.

※ marks are not in use.

(3) Check the switch in the controller.

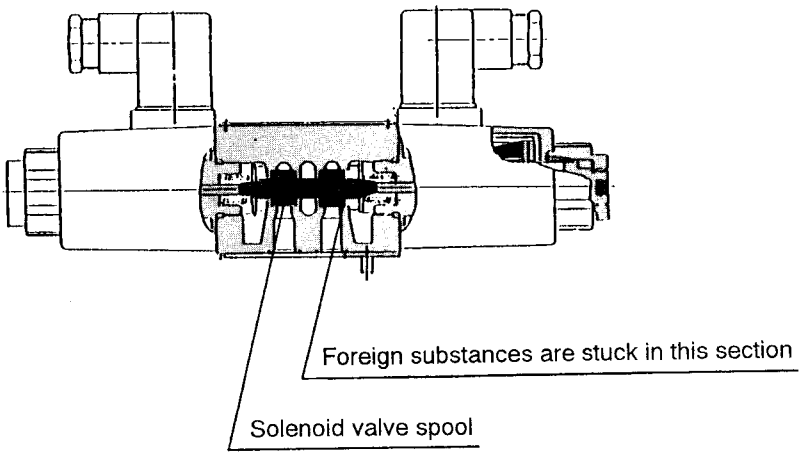


ⓒ Check continuity by turning the controller switch ON and OFF repeatedly with one of the tester probes contacted to connector pin No. 4 and the other to pin No. 13.

- If there is no continuity, ➡ Failure.
  The switch is defective or lead wire(s) is disconnected
- If there is continuity, ➡ Normal.

E) It operates but does not gain R.P.M. (On manual operation)

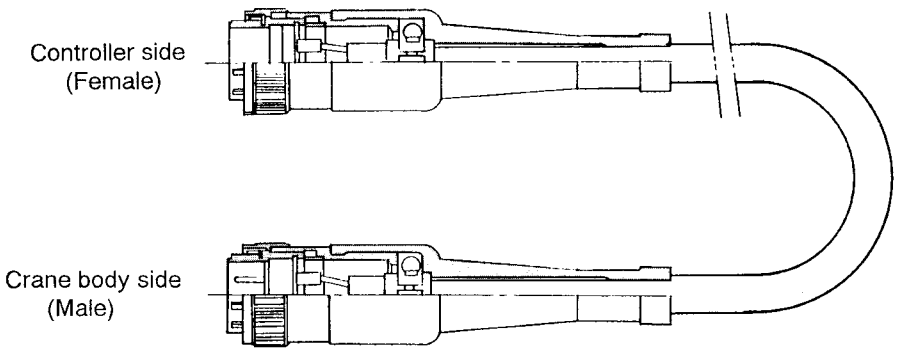
(Example) **Speed of only derrick lowering side is slow when the remote control crane is manually operated.**



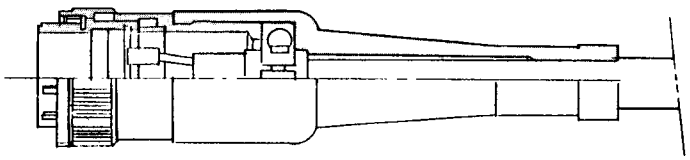
Check to see if foreign substances are stuck in the spool of the 1/4 electromagnetic selector valve for derrick control and if the solenoid valve spool has been engaging.

※ When the above failure occurred, operation speed becomes slows because oil escapes from the tank port of solenoid valve since the tank port links with the tank when operated manually.

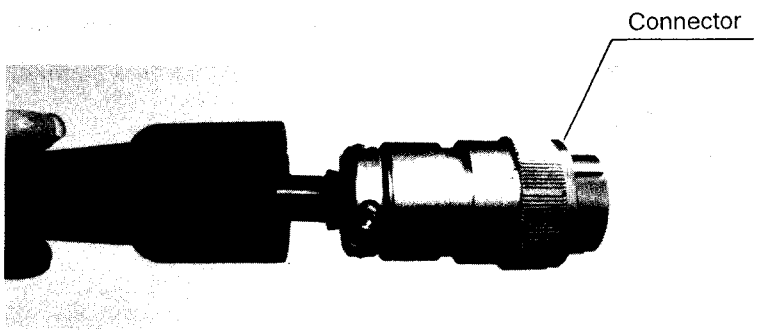
§12. Controller cable (model RC-30S)



A) Construction of connector.



B) Cautions to be taken when cable connector is being disconnected.

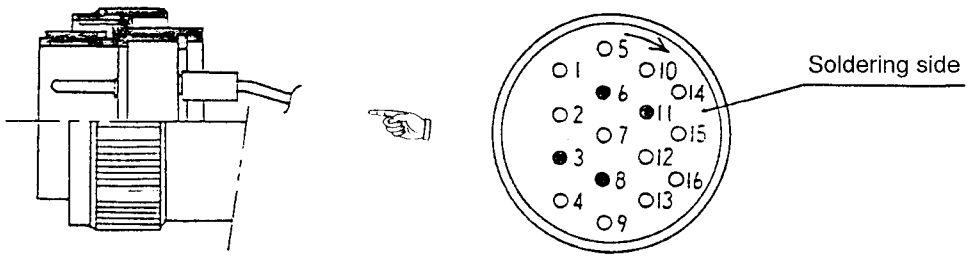


The connector screw can easily be loosened after heating the connecting sections by soaking it in hot water of approx. 194°F (90°C) for about 2 to 3 minutes. An anti-loose agent (lock-tight) has been applied to the connector threads.

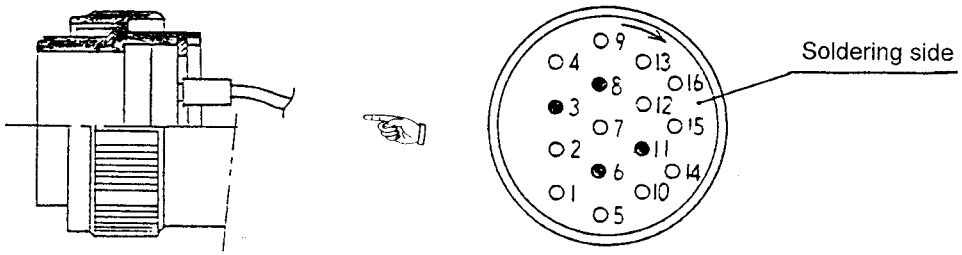
(Note) Remember that the connector can crack if it is forcibly unscrewed.

C) How to wire connector.

Wiring will easily be done in the order from pin No. 7 ➡ No. 12 ➡ No. 10 and then following the arrow mark to the final No. 5.



Cable connector (Male) – (Crane body side)



Cable connector (Female) – (Controller side)

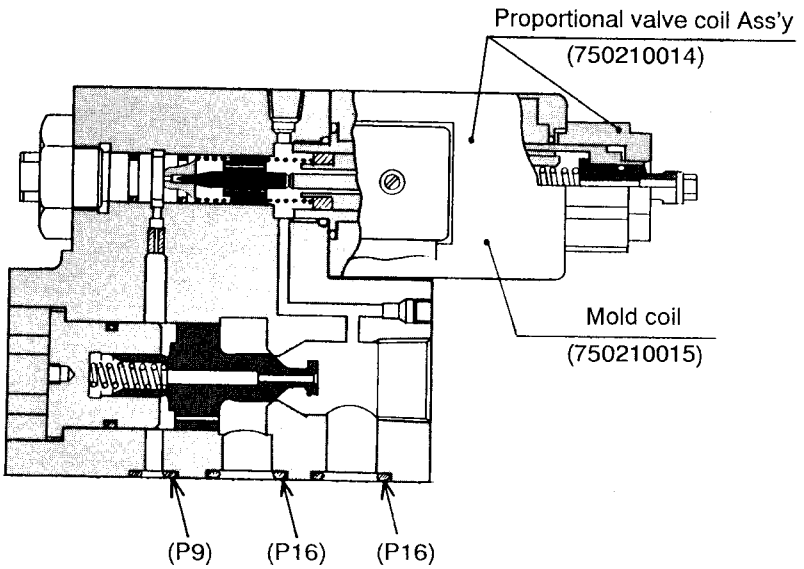
① Brown	② Blue	③ Not in use (gray)	④ Gray	⑤ Yellow	⑥ Not in use
⑦ White	⑧ Not in use	⑨ Orange	⑩ Green	⑪ Not in use	⑫ Black
⑬ Red	⑭ Violet	⑮ Light blue	⑯ Pink		

§13. Part designation and part number

A) Part designation and part number of 3/8 electromagnetic proportional pressure control valve ass'y

(1) 3/8 electromagnetic proportional pressure control valve

(Part number **740192044**) – **for common use Cable remote control device & Radio remote control device**

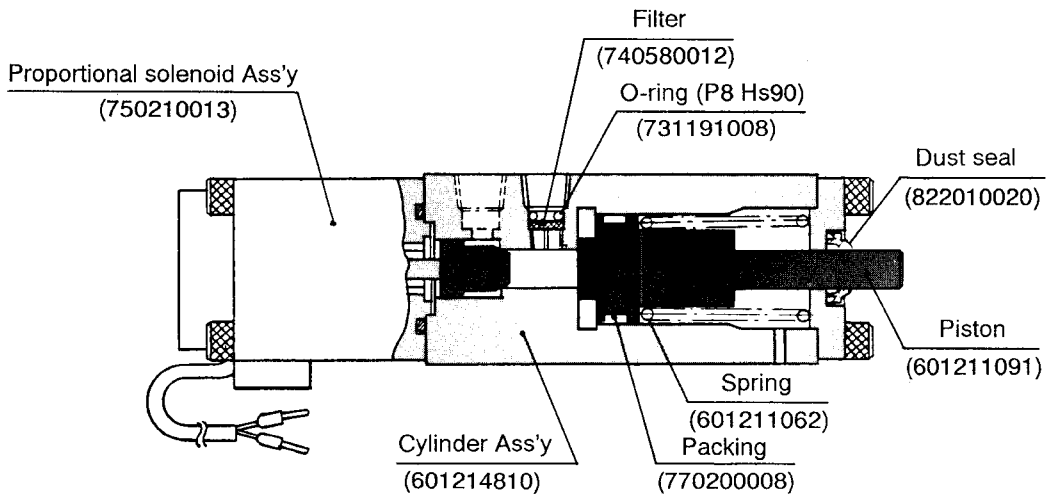


B) Part designation and part number of accelerator unit

(1) Model RC-30S

● Accelerator unit Ass'y (Part number **603188000**)

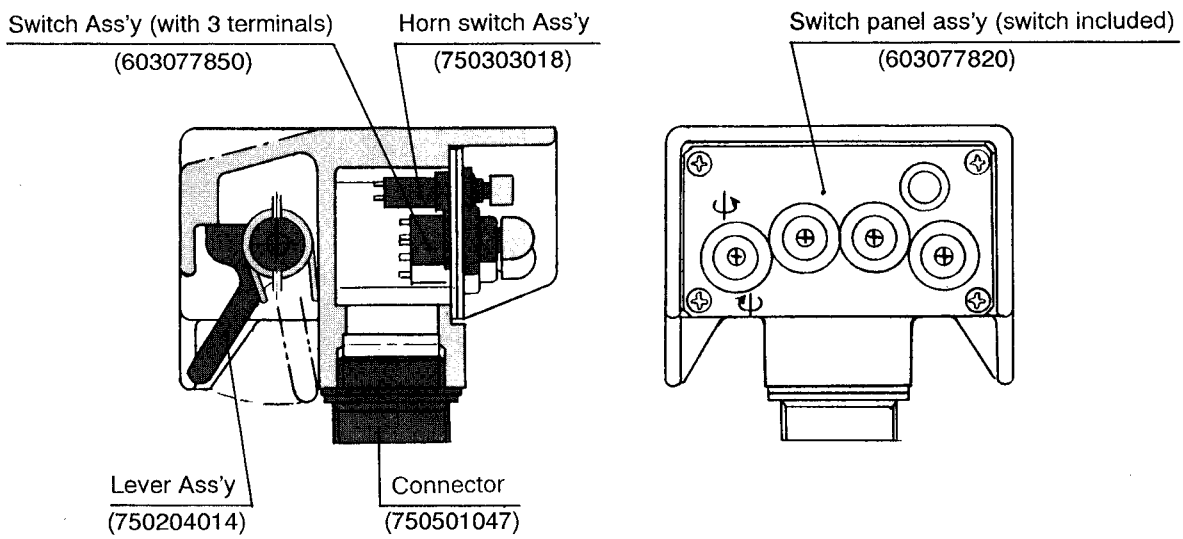
– **for common use Cable remote control device & Radio remote control device**



C) Part designation and part number of remote controller Ass'y.

(1) Model RC-30S

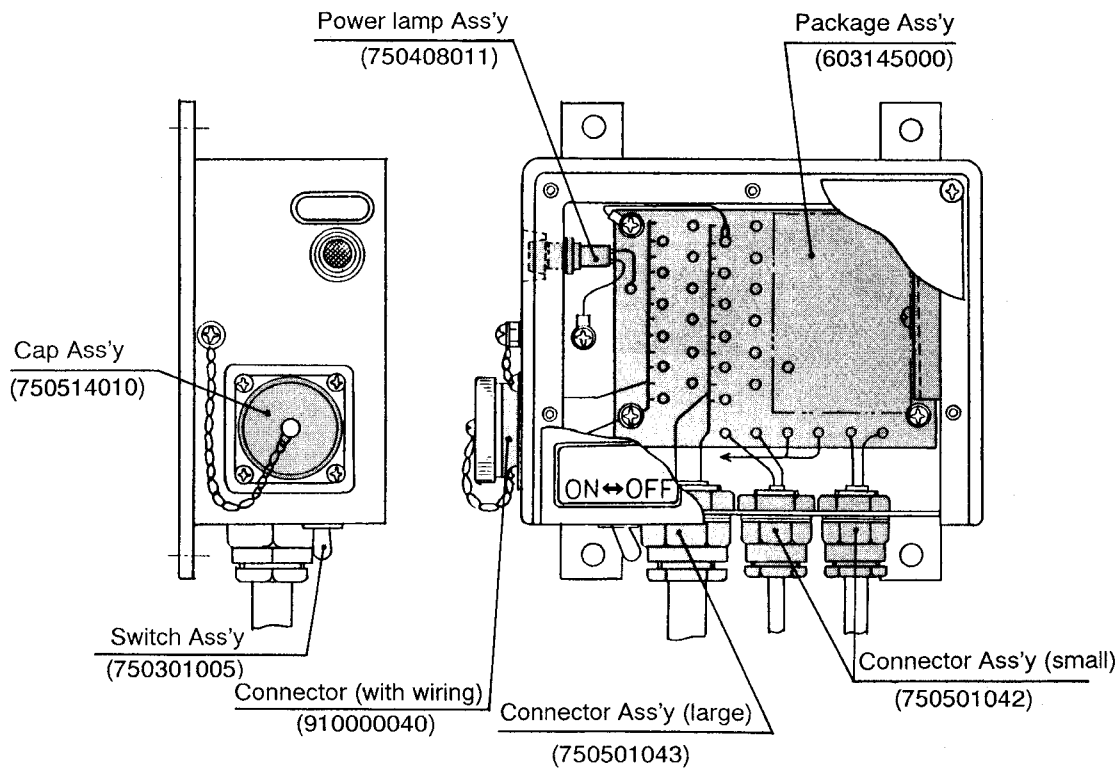
Controller Ass'y (P/N **603077000**)



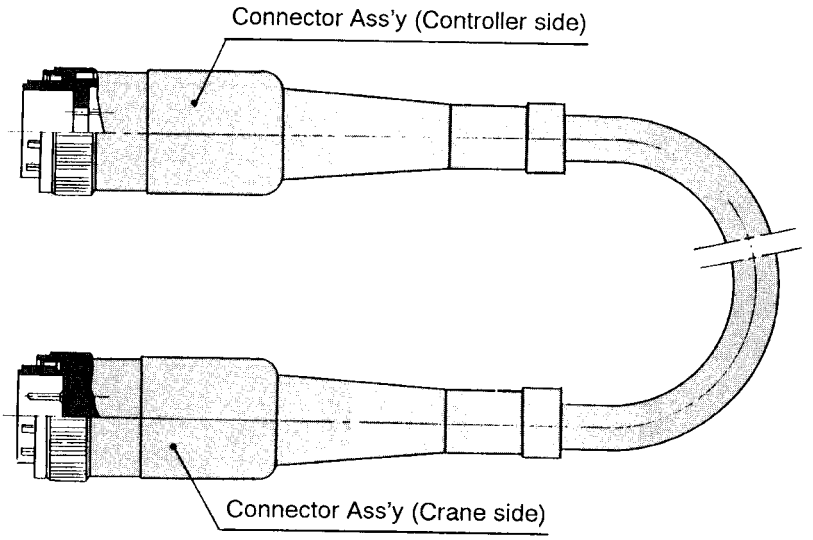
D) Part designation and part number of control box Ass'y.

(1) Control box Ass'y

(P/N **603187000**) – **for common use Cable remote control device & Radio remote control device**



E) Part designation and part number of controller cable



(1) Controller cable for model RC-30S

- Connector Ass'y (Controller side)———— (P/N **750501045**)
- Connector Ass'y (Crane body side) ———— (P/N **750501046**)

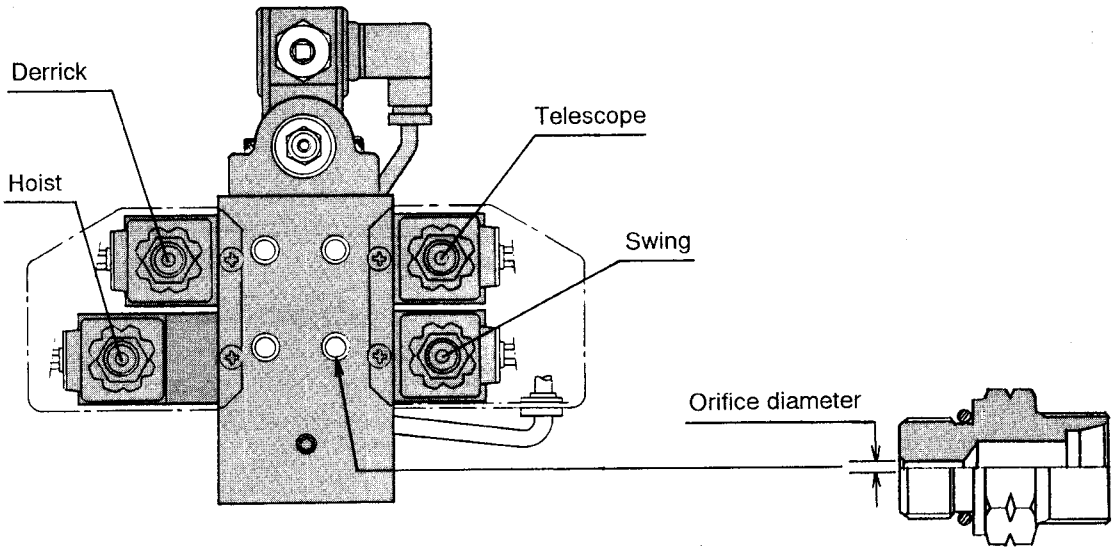
Controller cable Ass'y

Cable length	Cable Ass'y (P/N)
32.89F (10m)	**603081000**
49.33F (15m)	**603085000**
65.78F (20m)	**603086000**

F) Swing check connector parts and part numbers.

– for common use Cable remote control device & Radio remote control device

(Location)

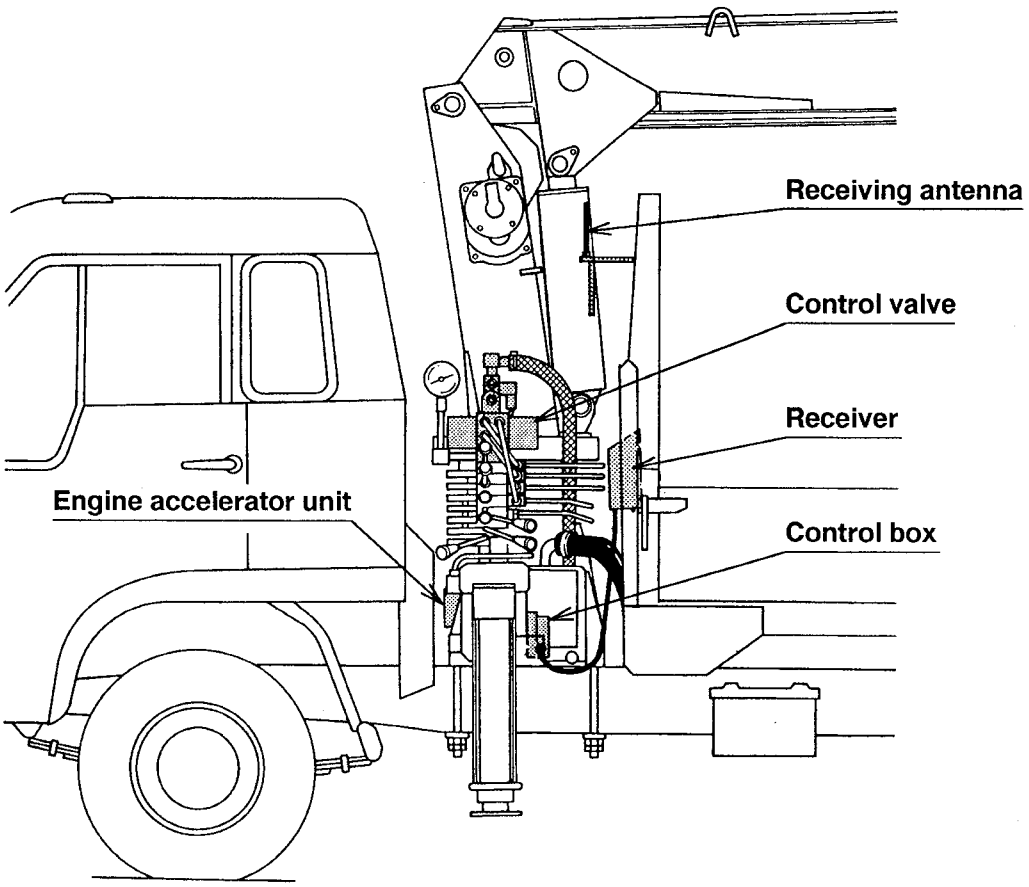


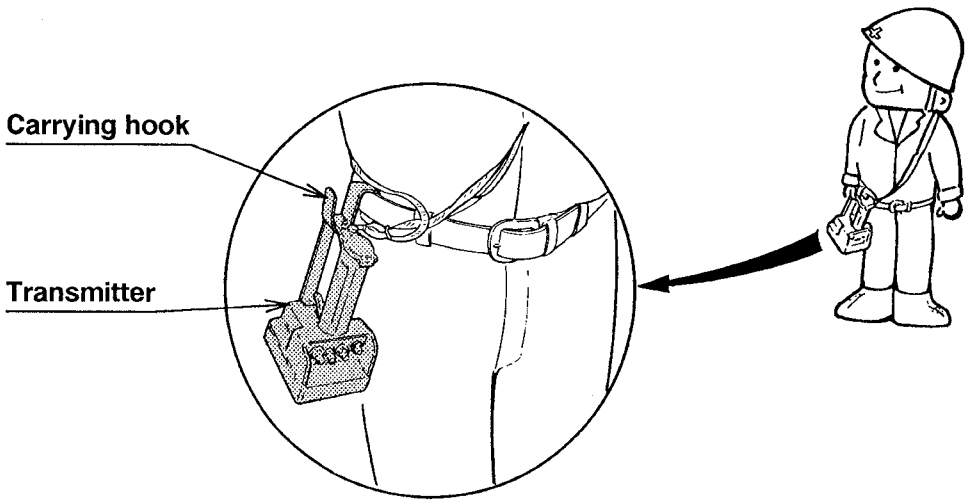
Models of check connector mounted in each crane model and its orifice diameter.

Crane model	Connector model	Oriffice diameter	Q'ty	P/N
UR330 family	KCT10	0.087in (2.2mm)	2	**728S05027**
UR500 family	KCT10	0.094in (2.4mm)	2	**728S05040**

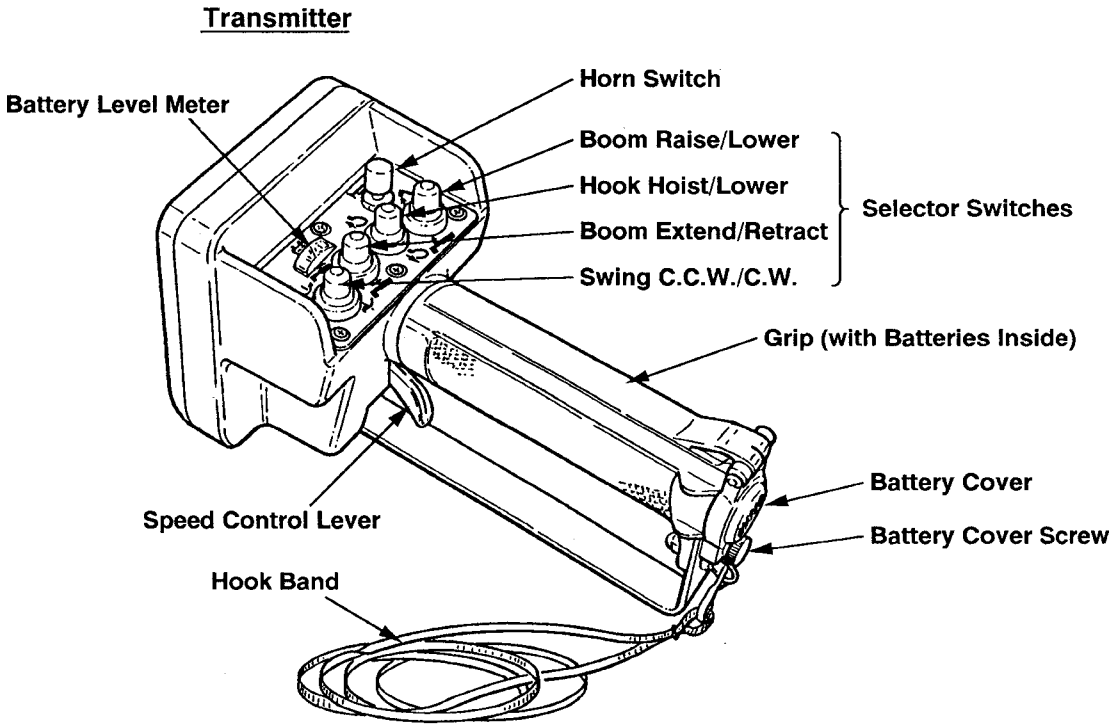
§14. Radio controller (RC-30R)

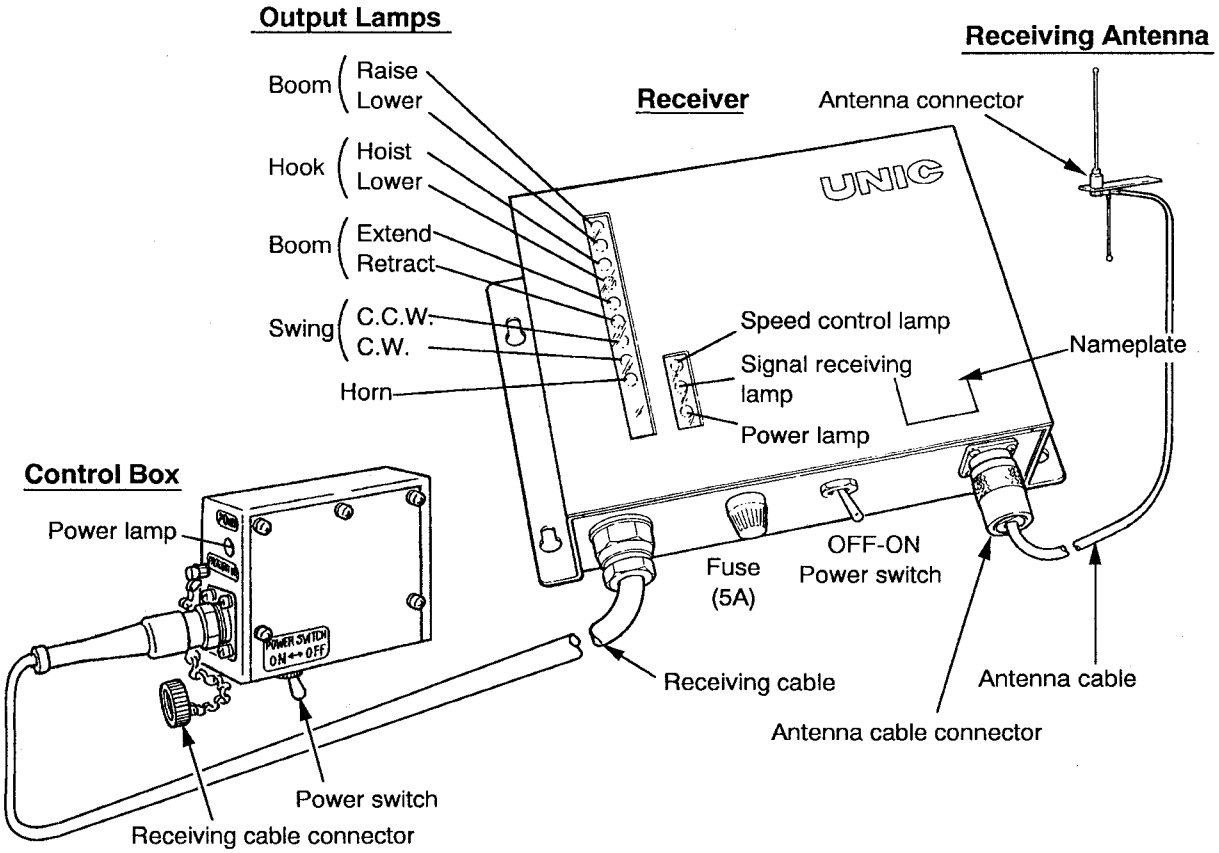
If the crane is equipped with remote controller (model RC-30S), connect the cable connector of receiver to the control box then turn the power on so that the crane can be operated by controlling transmitter.





A) Designation of each part of transmitter, receiver, control box, and receiving antenna.





B) Cautions to be taken when operating the crane through radio controller.

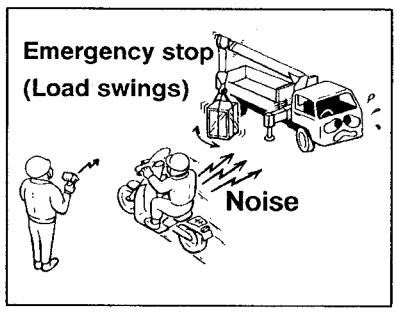
(1) Since radio controllers make use of radio wave, it will inevitably be affected by radio interference, radio jamming, and noise interference from outside.

When the controller is affected by noise, crane operation through radio controller may stop.

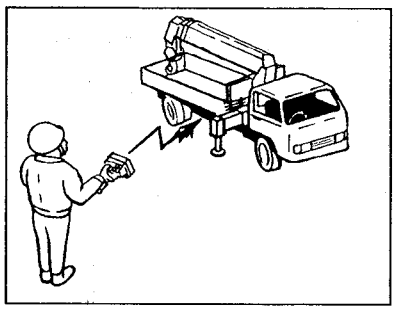
※ **Typical sources of noise interference.**

- Engine exhaust noise from motorcycles on other loud vehicles.
- Ignition noise from vehicles, such as micro-cars and power cultivators, in which exposed engine is mounted.
- Noise from electric fans for cab compartment.
- Noise generated by electromagnetic buzzers.

Observe the following to secure operation under a quieter noise influence.



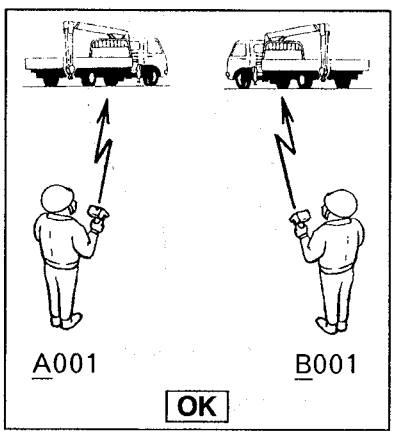
ⓐ Operator should not operate cranes too far away from the crane body. Under normal conditions, operate it within working radius of the crane.



ⓑ Operate the controller with the top part of transmitter directed toward the receiving antenna (crane body).

ⓒ Replace batteries as early as possible when the indicator of 'battery level meter' enters into yellow zone.

ⓓ Use the specified receiving antenna.



(2) When a crane manufactured by this firm is operated at a site close to the place where your crane is working, the crane operated through radio controller might stop due to mutual jamming. In this case, make sure before starting crane operation that the serial number on the transmitter (or on receiver) of each side of the crane and observe as follows;

Pay attention to the first letter of the serial number (either in Japanese syllable 'katakana' or in alphabet capital) as in the example.

(Example) A001

└——First letter (Katakana or alphabet capital)

ⓐ If the letters are the same: They jam each other. Operate either your crane or other's crane manually.

ⓑ If the letters are different: They do not jam each other.

Operate the cranes as usual.

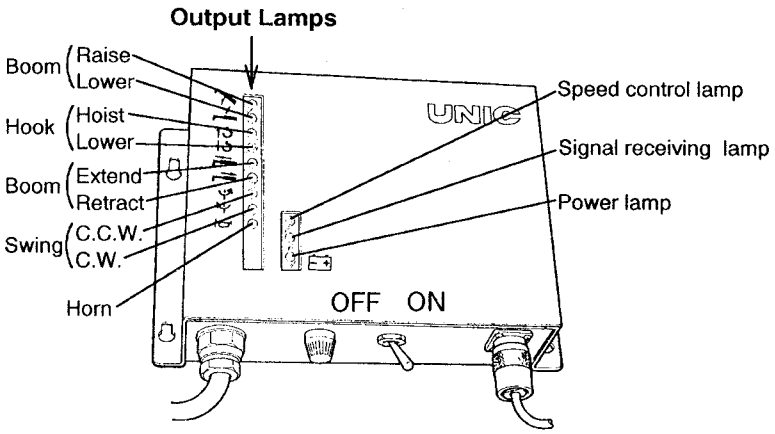
C) How to locate and check when radio controller is in trouble.

If a problem occurs to the radio controller, first carry out the function test for the radio controller solely to see if lamps on the Receiver (RX) responds correctly without crane operation (or without engaging PTO).

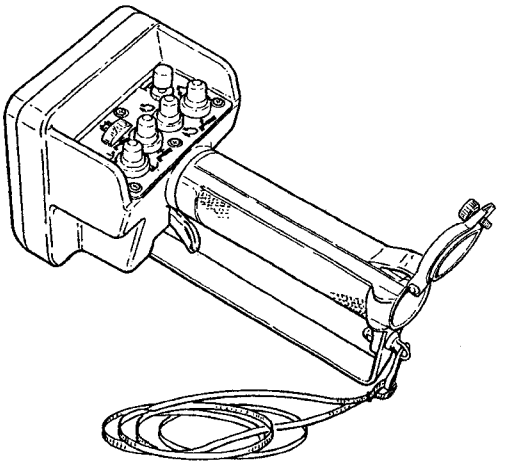
Check if power lamp, receiving lamp, speed control lamp, and monitoring lamps on the receiver (RX) respond correctly to Transmitter (TX) operation.

The radio controller is operations normally if all the lamps respond as the transmitter is operated.

On the otherhand, a problem exists in the radio controller if a lamp responds differently to transmitter operation.



Receiver (RX)



Transmitter (TX)

(1) Check in following order if the radio controller is found defective.

ⓐ Visually check the radio controller transmitter to confirm ;

(1) No cracks in the transmitter.

(2) No discolored (whitened) area on the transmitter surface.

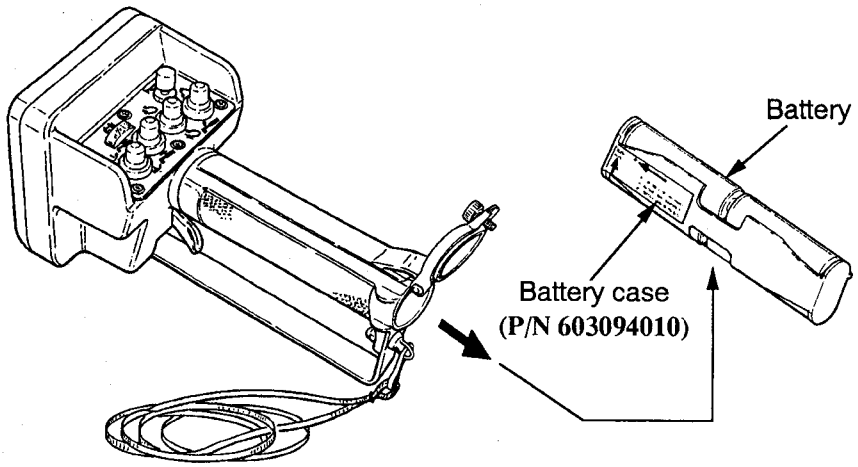
(3) No looseness and deformation of the grip of the transmitter.

※ If any of the above is not satisfied, failure due to invasion of moisture into the transmitter and/or damage in the wiring and the package due to mechanical shocks is suspected.
This is considered to be a failure due to improper handling of the transmitter.

ⓑ Check batteries in the transmitter.

Remove the battery case from the transmitter to check if the voltage measures more than 5V using a circuit tester.

※ If leakage of battery liquid is found, check the battery contacts inside of the transmitter grip. Wipe off any liquid, stain, and rust completely.



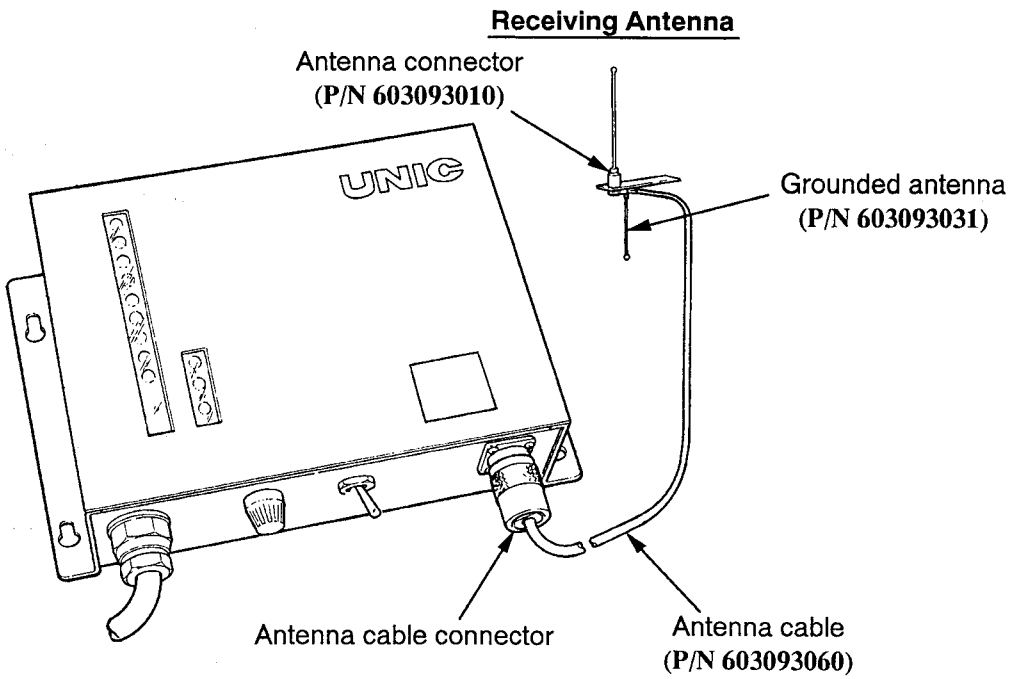
ⓒ Check antenna and antenna cable to see if ;

(1) Proper antenna is securely mounted to the transmitter (with antenna).

(2) Both the receiving antenna and the grounded antenna are securely attached.

When the receiving antenna is mounted in the cab, the grounded antenna is not necessary.

(3) The receiving antenna is not broken and the cable connector is not loose.



D) How to replace batteries in the transmitter.

(1) When to replace battery.

Check the indicator on 'battery level meter' with the 'selector switches' on the transmitter turned on.

ⓐ If on green zone : Operation is allowed.

ⓑ If on yellow zone : Battery is close to run down.

Replace the batteries as early as possible to maintain specified operation.

ⓒ If on red zone : Replace the battery immediately, otherwise the controller does not work as specified.

(2) Battery utilized.

SUM-3 type : 4 pieces AA

(3) How to replace battery.

ⓐ Make sure that 'power switch' on the control box of the crane body side is turned OFF.

ⓑ Turn the battery cover lock screw counterclockwise to open the battery cover.

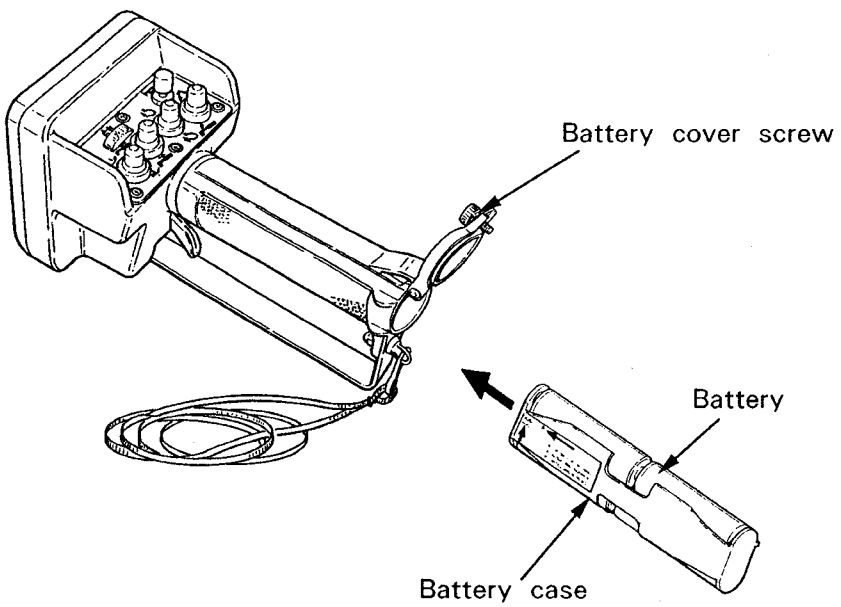
ⓒ Remove the battery case from the transmitter grip.

ⓓ Replace old batteries in the battery case with new batteries then return the case into the grip.

(Remember that polarity of battery shall be in agreement with that indicated in the battery case. Also remember not to put old and new batteries mixed in the case.)

ⓔ Tighten the battery cover lock screw securely.

ⓕ Check the indicator on 'battery level meter' so that it is within the green zone with the 'selector switches' turned on.



E) Daily inspection.

(1) Check that enclosures of both transmitter and receiver are not broken.

If the enclosure is broken, moisture and dust will enter into the inside through the broken part.

Since this will cause not only damage to electronic components inside but also irregular operation of the crane, you are requested immediately to get it repaired.

(2) Check that receiving the antenna is not broken or deformed. The receiving antenna has been designed so that this radio system can obtain optimum operation.

Replace, if the antenna is broken and correct if it is deformed.

If used as it is, service area shrinks remarkably so that it may be susceptible to jamming and noise from outside.

(3) Check that every connector is tightened securely.

Insufficient tightening of receiving antenna connector, antenna connector, and receiving connector allows moisture and/or dust to enter into the contact area of connectors.

This causes poor contacts and corrosion of the contacts resulting in irregular operation or defect in the equipment.

In addition, periodically disconnect each connector to inspect its contacts.

(4) Check that both of the switch and the lever on the transmitter function normally.

Use of transmitter with dust and dirt accumulated on it causes a defect especially in the switch and the lever.

Wipe them off with a piece of cloth after use.

(Never wash them off with water.)

(Cautions)

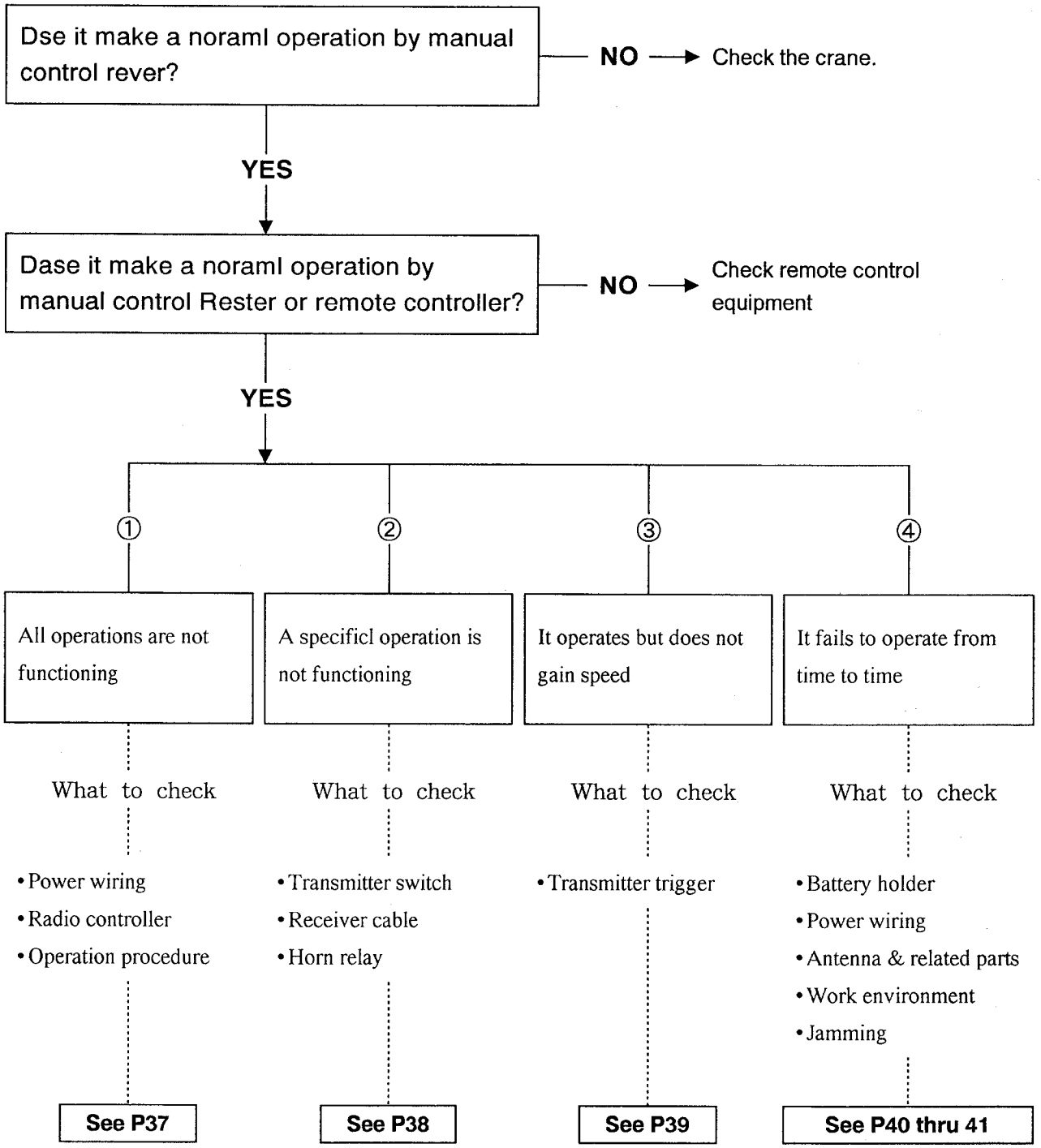
1. Do not disassemble transmitter as electronic circuit is built inside of it.

   Unauthorized disassembling may cause irregular operation, and will void your warranty!

2. Electronic system is easily affected by moisture.

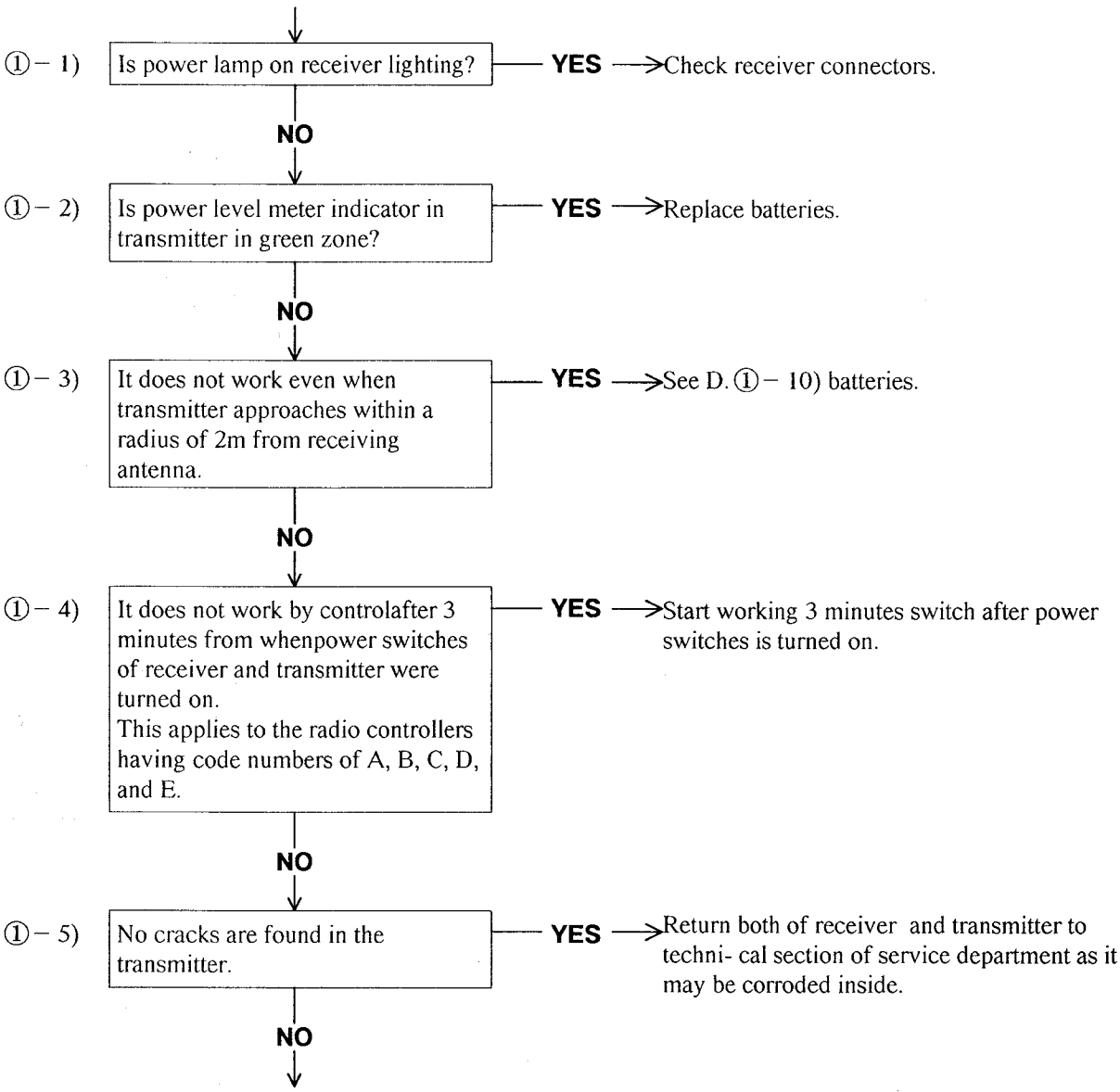
   Never wash the transmitter, the receiver, and the control box with water directly. They are water resistant, not water-proof.

§15. Procedures to check radio controller when not working



A) All operations are not functioning.

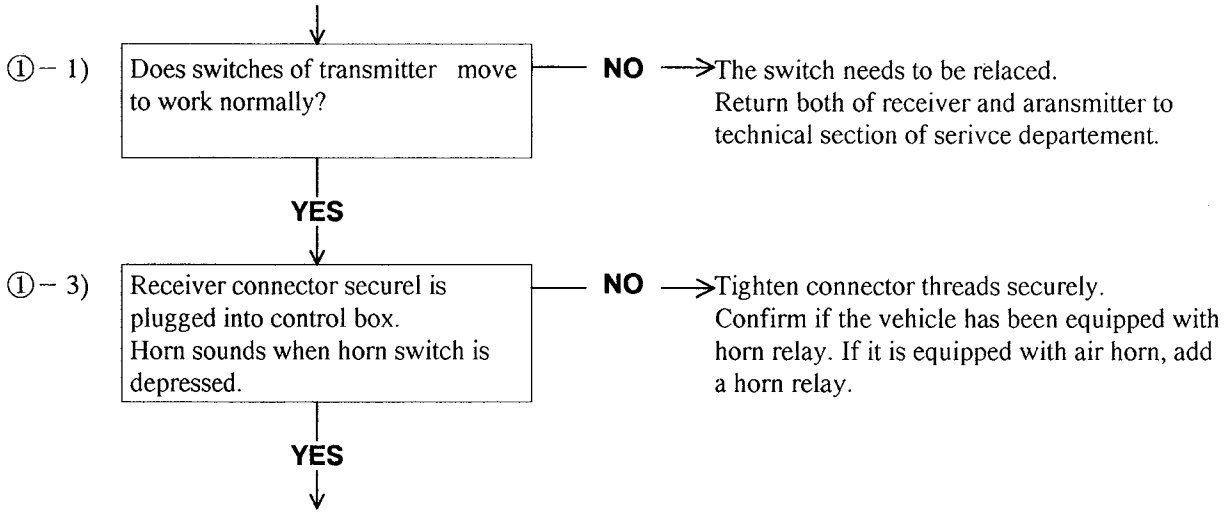
① All operations are not functioning.



Investigate to report if a place nearby working site has been hit by lightening, if transmitter has not been welded to repair recently, and if the radio-controlled crane has not been worked near a machine which consumes a large electric power.

B) A specific operation is not functioning.

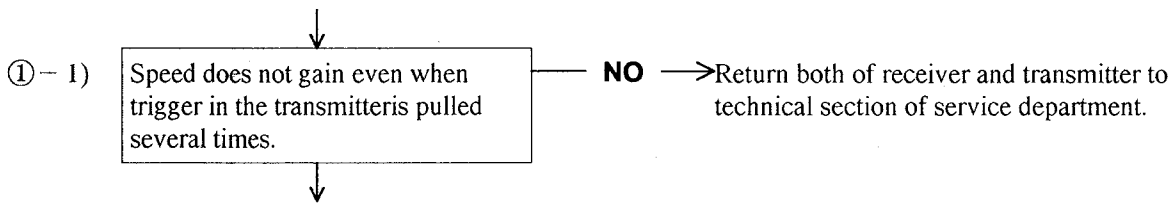
① Only specific operation is not functioning.



Return both of receiver and transmitter to tecnical section of service department after confirming that the lammps on the receiver light.

C) It operates but does not gain R.P.M.

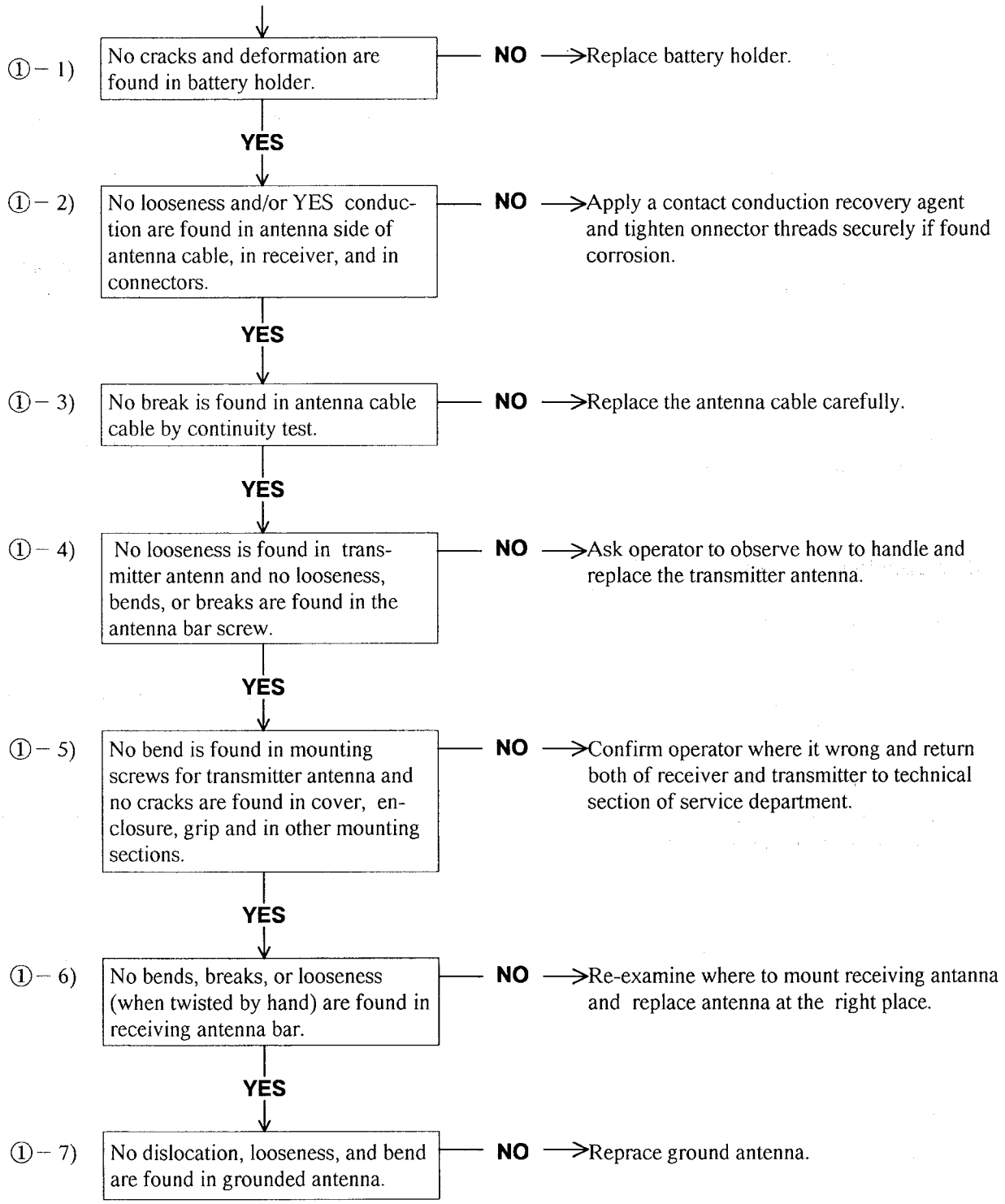
① It operates but does not gain R.P.M.

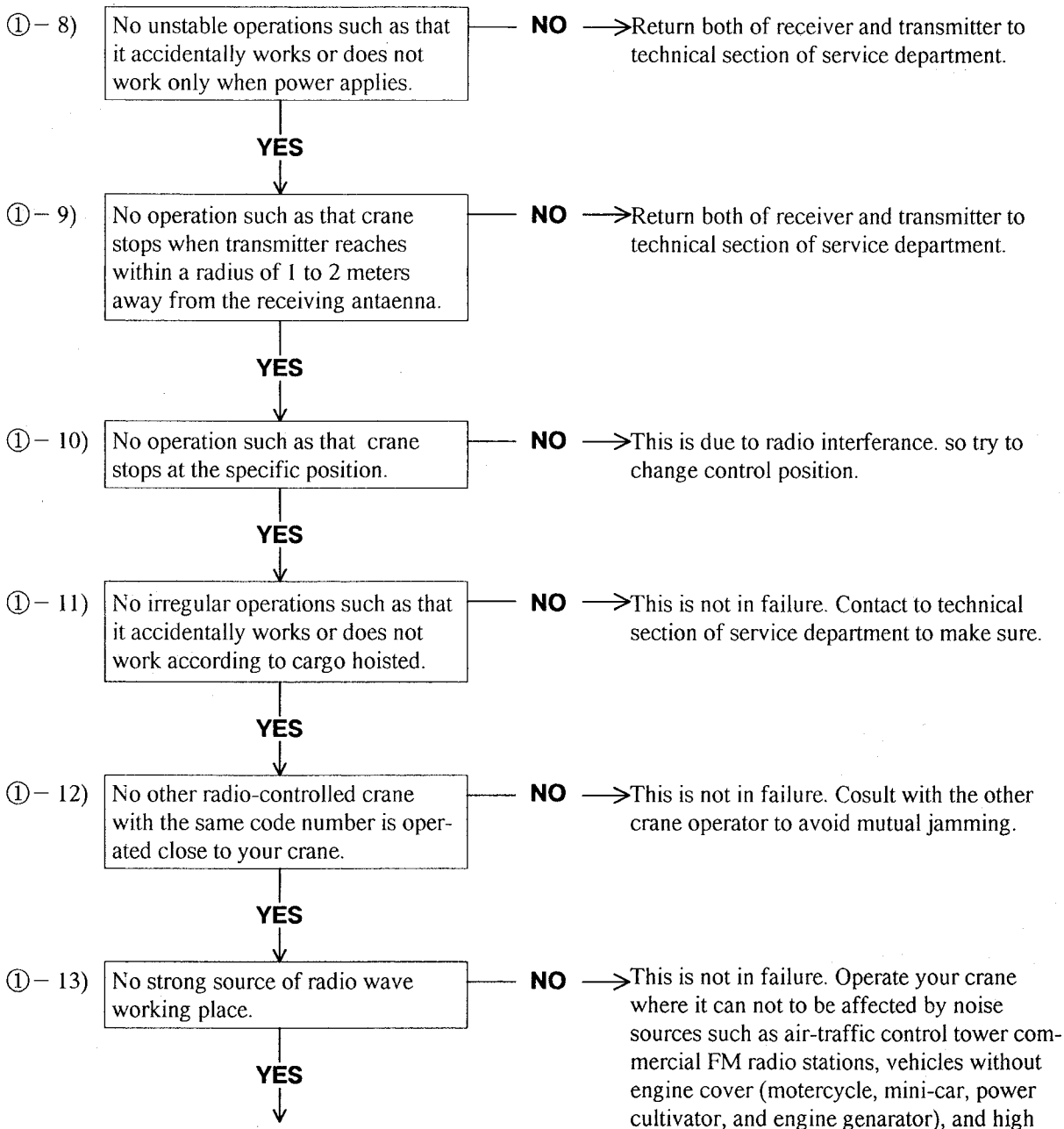


Return both of receiver and transmitter to tecnical section of service department after confirming that voltage between the green wire in the control box and chassis ground measures 0.4 to 0.5 V maximum.

D) It fails to operate from time to time.

① It fails to operate from time to time.

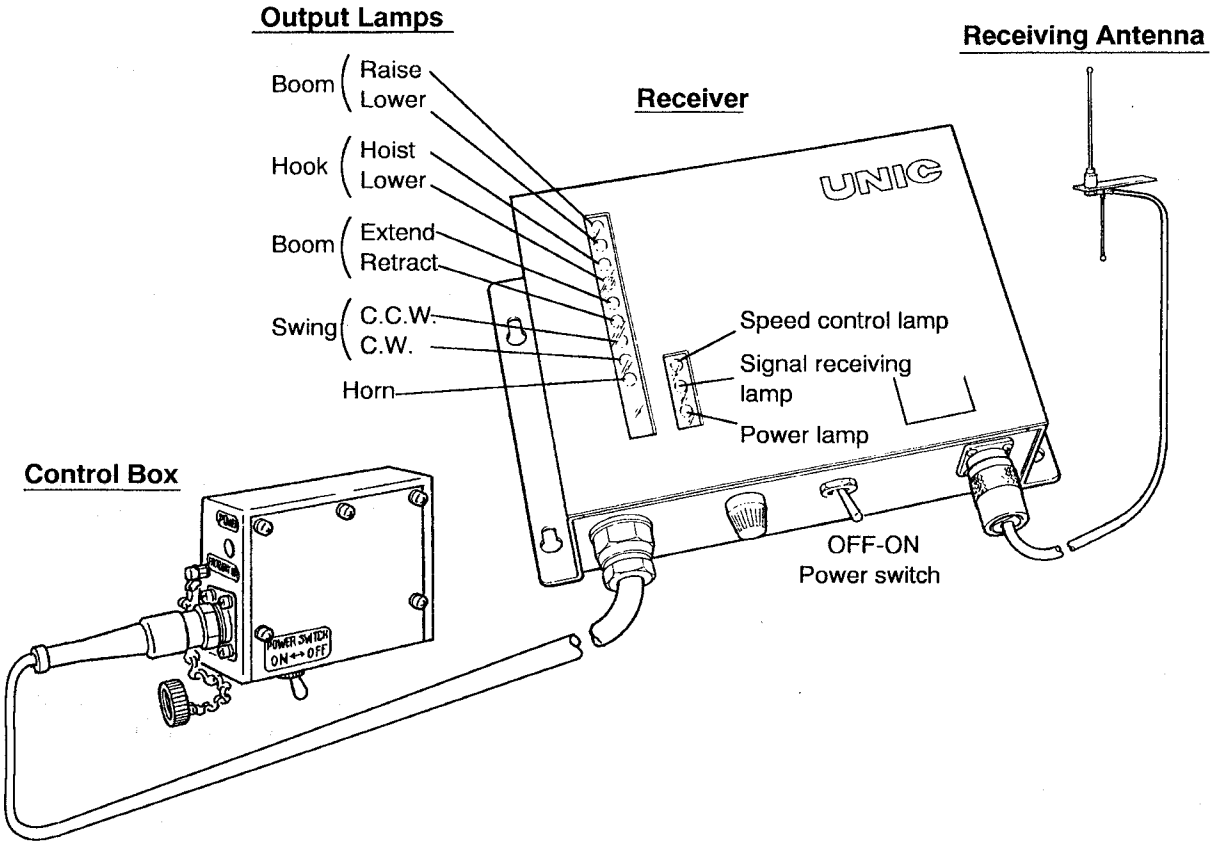



①－8)
No unstable operations such as that it accidentally works or does not work only when power applies.
NO
Return both of receiver and transmitter to technical section of service department.
YES
①－9)
No operation such as that crane stops when transmitter reaches within a radius of 1 to 2 meters away from the receiving antaenna.
NO
Return both of receiver and transmitter to technical section of service department.
YES
①－10)
No operation such as that crane stops at the specific position.
NO
This is due to radio interferance. so try to change control position.
YES
①－11)
No irregular operations such as that it accidentally works or does not work according to cargo hoisted.
NO
This is not in failure. Contact to technical section of service department to make sure.
YES
①－12)
No other radio-controlled crane with the same code number is operated close to your crane.
NO
This is not in failure. Cosult with the other crane operator to avoid mutual jamming.
YES
①－13)
No strong source of radio wave working place.
NO
This is not in failure. Operate your crane where it can not to be affected by noise sources such as air-traffic control tower commercial FM radio stations, vehicles without engine cover (motercycle, mini-car, power cultivator, and engine genarator), and high voltage utility cable.
YES
Call technical section of service department for further procedures.

§16. Information

A) Cautions to be taken when performing welding.

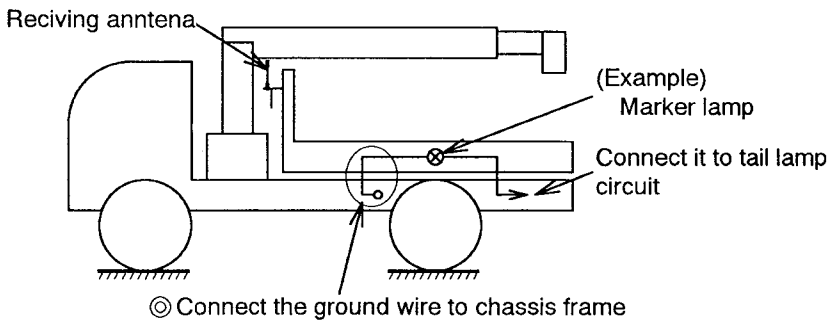
Always remove the receiver connector (Reason: To prevent the equipment from damage.) shown in circle A and the antenna connector in circle B before welding.



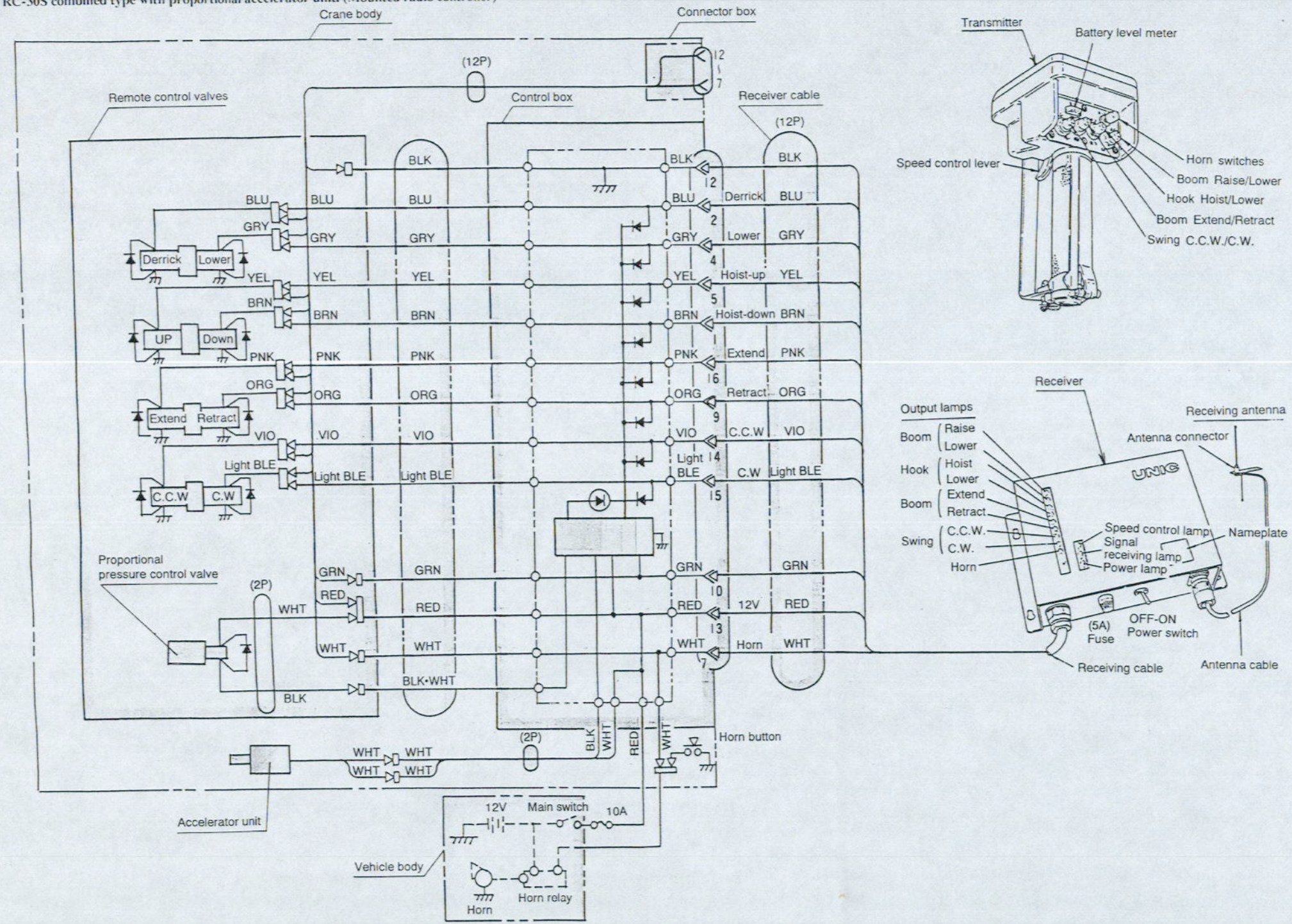
B) Cautions to be taken when mounting electrical components.

When attaching electrical components (such as lamp) to the body (vehicle bed) in receiving antenna being mounted to ground the component's minus (ground) terminal to the chassis frame using an exclusive ground wire.

(Reason: If current flows through antenna wire, it may result in irregular speed control when operating it with radio controller.)

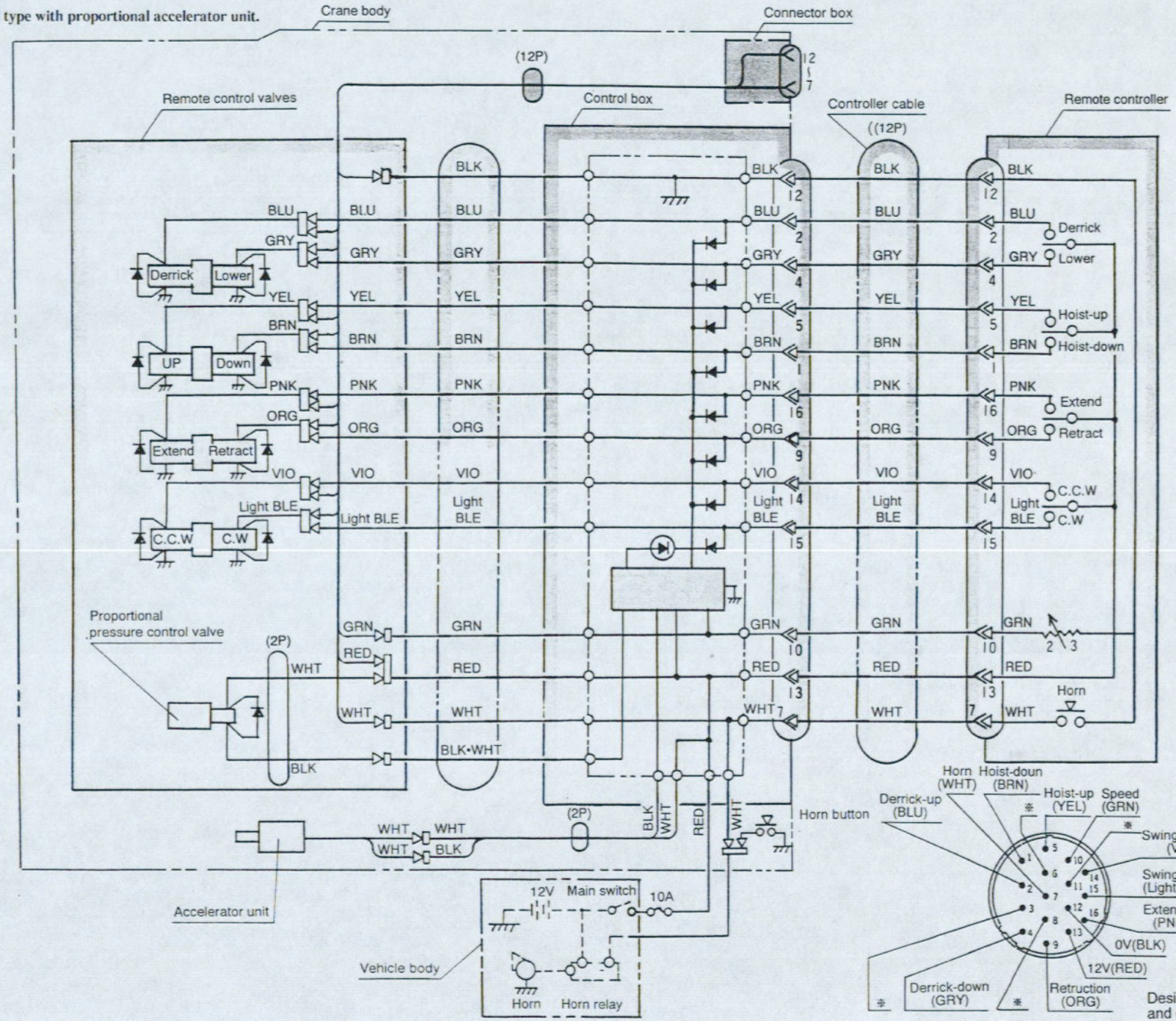


2) Model RC-30S combined type with proportional accelerator unit. (Mounted radio controller)



§17. Electrical circuit diagram

1) Model RC-30S combined type with proportional accelerator unit.



FURUKAWA UNIC Corporation