

SECTION 5 TROUBLESHOOTING

Group 1 Before Troubleshooting	5-1
Group 2 Hydraulic and Mechanical System	5-4
Group 3 Electrical System	5-23
Group 4 Axle	5-33

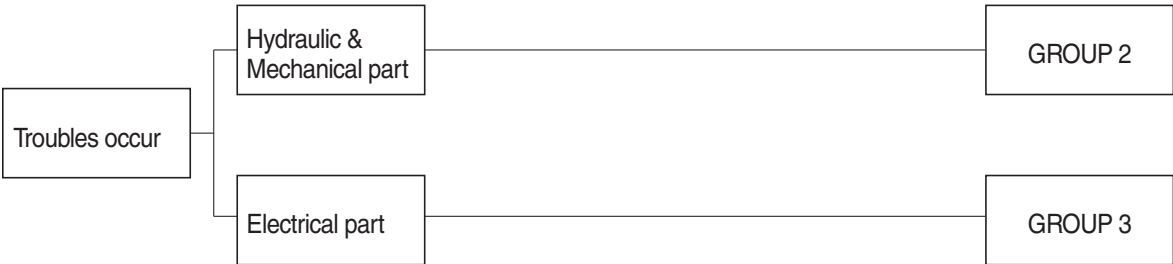
GROUP 1 BEFORE TROUBLESHOOTING

1. INTRODUCTION

When a trouble is occurred in the machine, this section will help an operator to maintain the machine with easy.

The trouble of machine is parted Hydraulic & Mechanical system and Electrical system system.

At each system part, an operator can check the machine according to the troubleshooting process diagram.



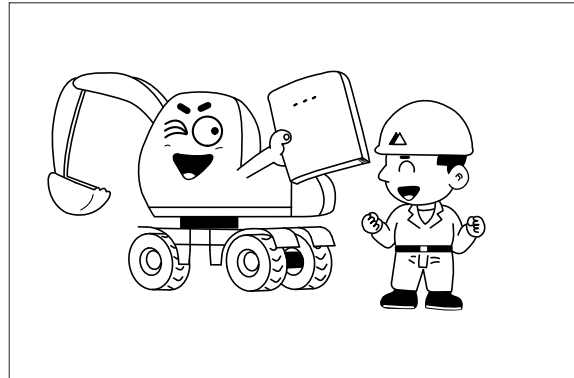
2. DIAGNOSING PROCEDURE

To carry out troubleshooting efficiently, the following steps must be observed.

STEP 1. Study the machine system

Study and know how the machine is operating, how the system is composing, what kinds of function are installed in the machine and what are specifications of the system components by the machine service manual.

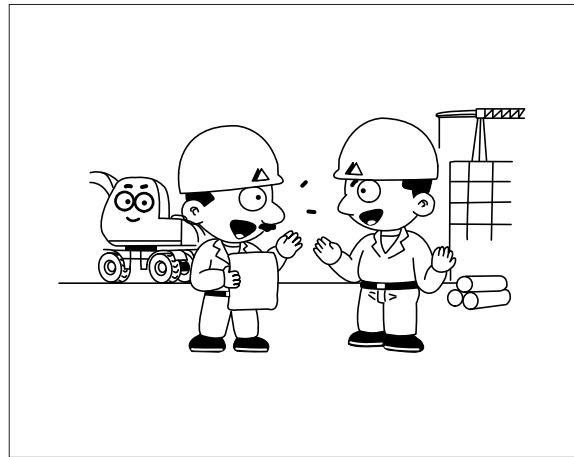
Especially, deepen the knowledge for the related parts of the trouble.



STEP 2. Ask the operator

Before inspecting, get the full story of malfunctions from a witness --- the operator.

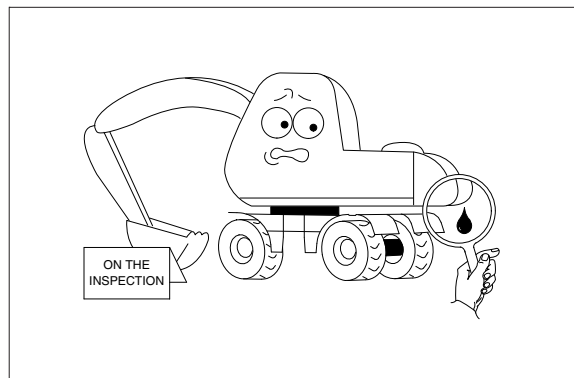
- 1) How the machine is used and when it is serviced?
- 2) When the trouble was noticed and what work the machine was doing at that time?
- 3) What is the phenomenon of the trouble?
Was the trouble getting worse, or did it come out suddenly for the first time?
- 4) Did the machine have any troubles previously? If so, which parts were repaired before.



STEP 3. Inspect the machine

Before starting troubleshooting, check the machine for the daily maintenance points as shown in the operator's manual.

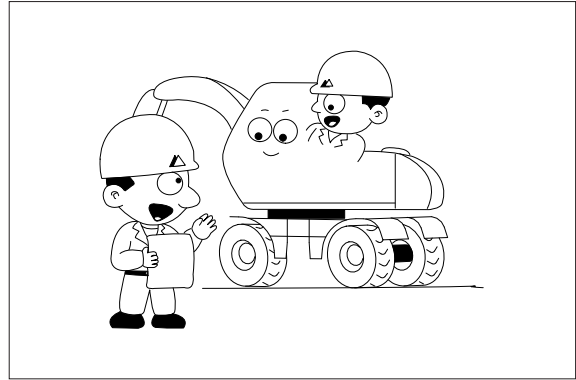
And also check the electrical system including batteries, as the troubles in the electrical system such as low battery voltage, loose connections and blown out fuses will result in malfunction of the controllers causing total operational failures of the machine.



STEP 4. Inspect the trouble actually on the machine

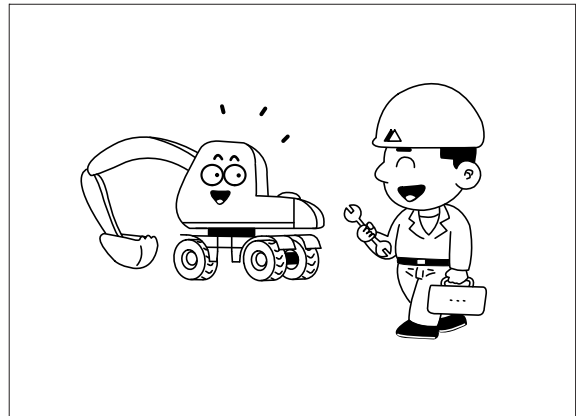
In case that some trouble cannot be confirmed, obtain the details of the malfunction from the operator.

Also, check if there are any in complete connections of the wire harnesses are or not.



STEP 5. Perform troubleshooting

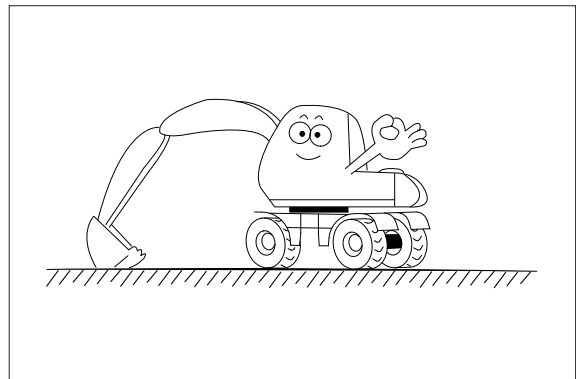
According to where the trouble parts are located, hydraulic & mechanical system part or electrical system part or mechatronics system part, perform troubleshooting the machine refer to the each system part's troubleshooting process diagram.



STEP 6. Trace a cause

Before reaching a conclusion, check the most susceptible causes again. Try to trace what the real cause of the trouble is.

Make a plan of the appropriate repairing procedure to avoid consequential malfunctions.



GROUP 2 HYDRAULIC AND MECHANICAL SYSTEM

1. INTRODUCTION

1) MACHINE IN GENERAL

(1) If even a minor fault is left intact and operation is continued, a fatal failure may be caused, entailing a large sum of expenses and long hours of restoration.

Therefore when even a small trouble occurs, do not rely on your intuition and experience, but look for the cause based on the troubleshooting principle and perform maintenance and adjustment to prevent major failure from occurring. Keep in mind that a fault results from a combination of different causes.

(2) The following lists up commonly occurring faults and possible causes with this machine. For the troubleshooting of the engine, refer to the coming troubleshooting and repair.

(3) When carrying out troubleshooting, do not hurry to disassemble the components. It will become impossible to find the cause of the problem.

(4) Ask user or operator the following.

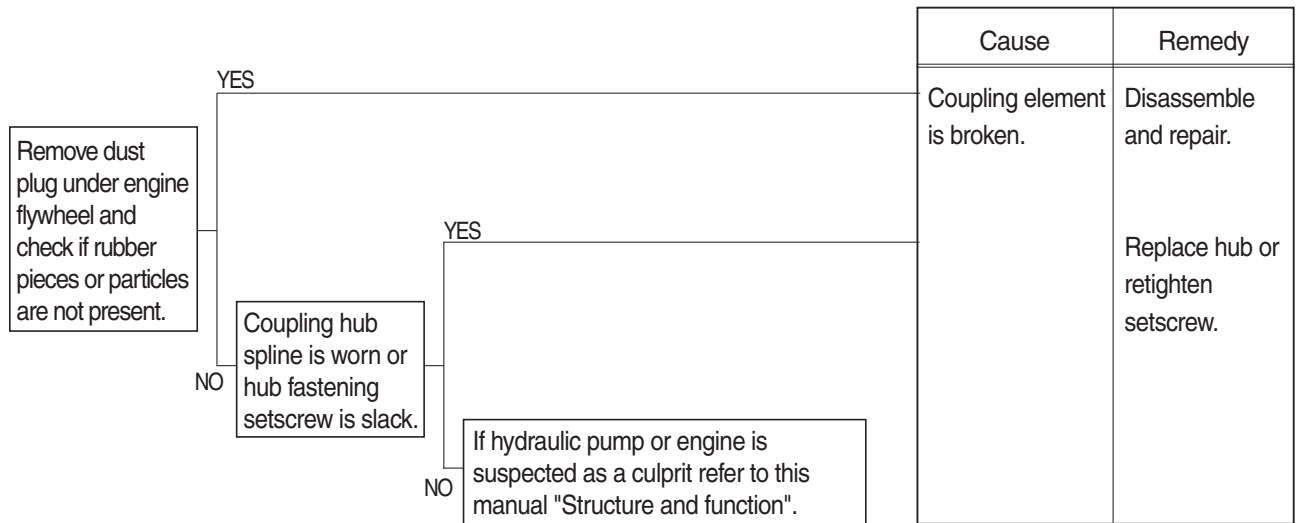
- ① Was there any strange thing about machine before failure occurred?
- ② Under what conditions did the failure occur?
- ③ Have any repairs been carried out before the failure?

(5) Check before troubleshooting.

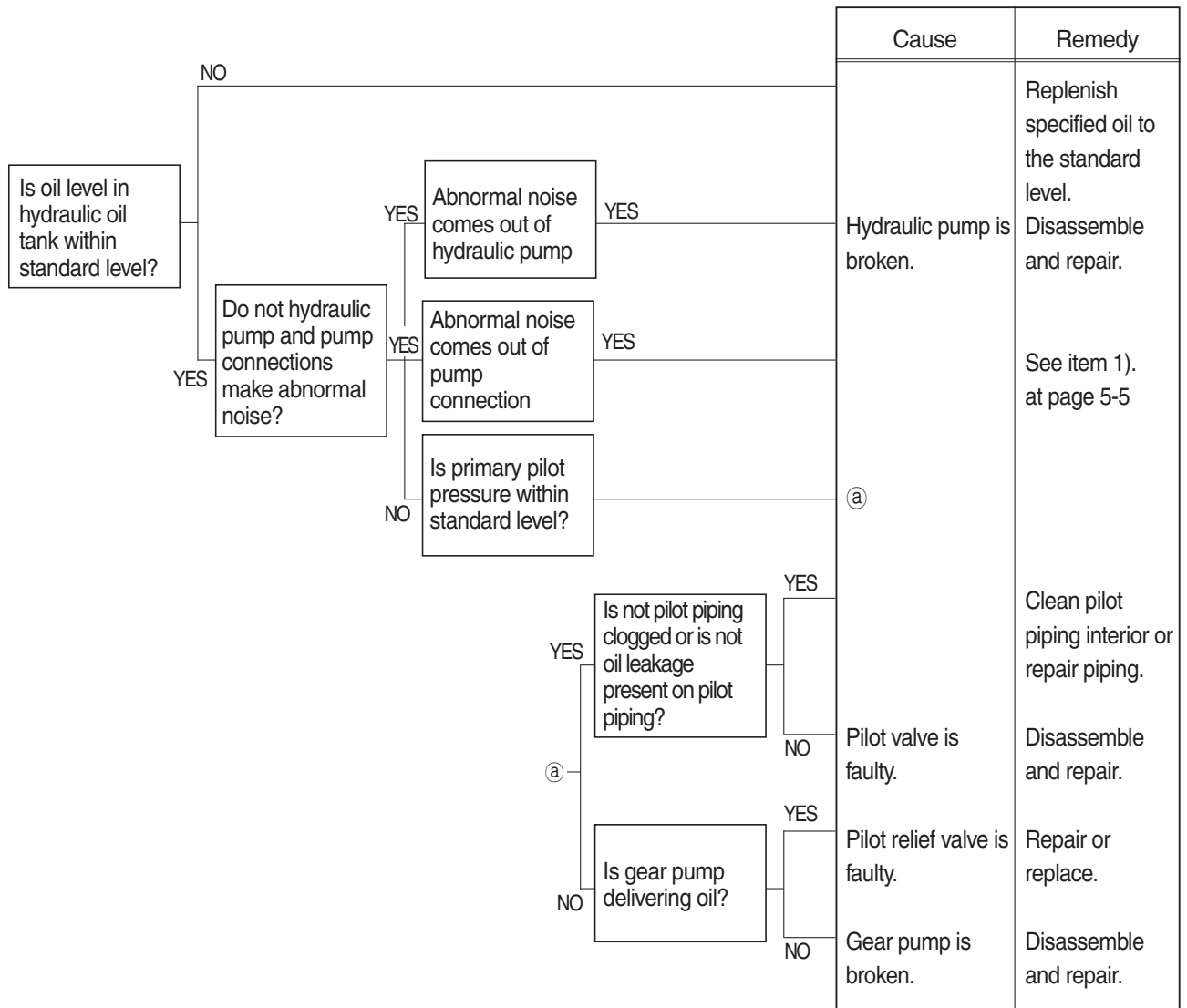
- ① Check oil and fuel level.
- ② Check for any external leakage of oil from components.
- ③ Check for loose or damage of wiring and connections.

2. DRIVE SYSTEM

1) UNUSUAL NOISE COMES OUT OF PUMP CONNECTION

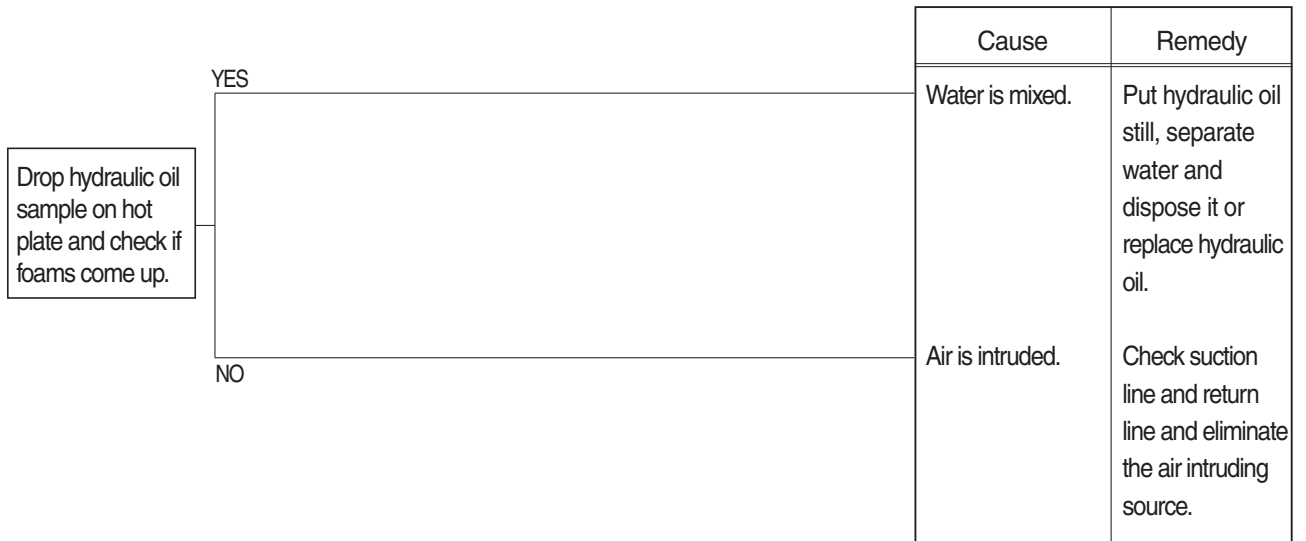


2) ENGINE STARTS BUT MACHINE DOES NOT OPERATE AT ALL

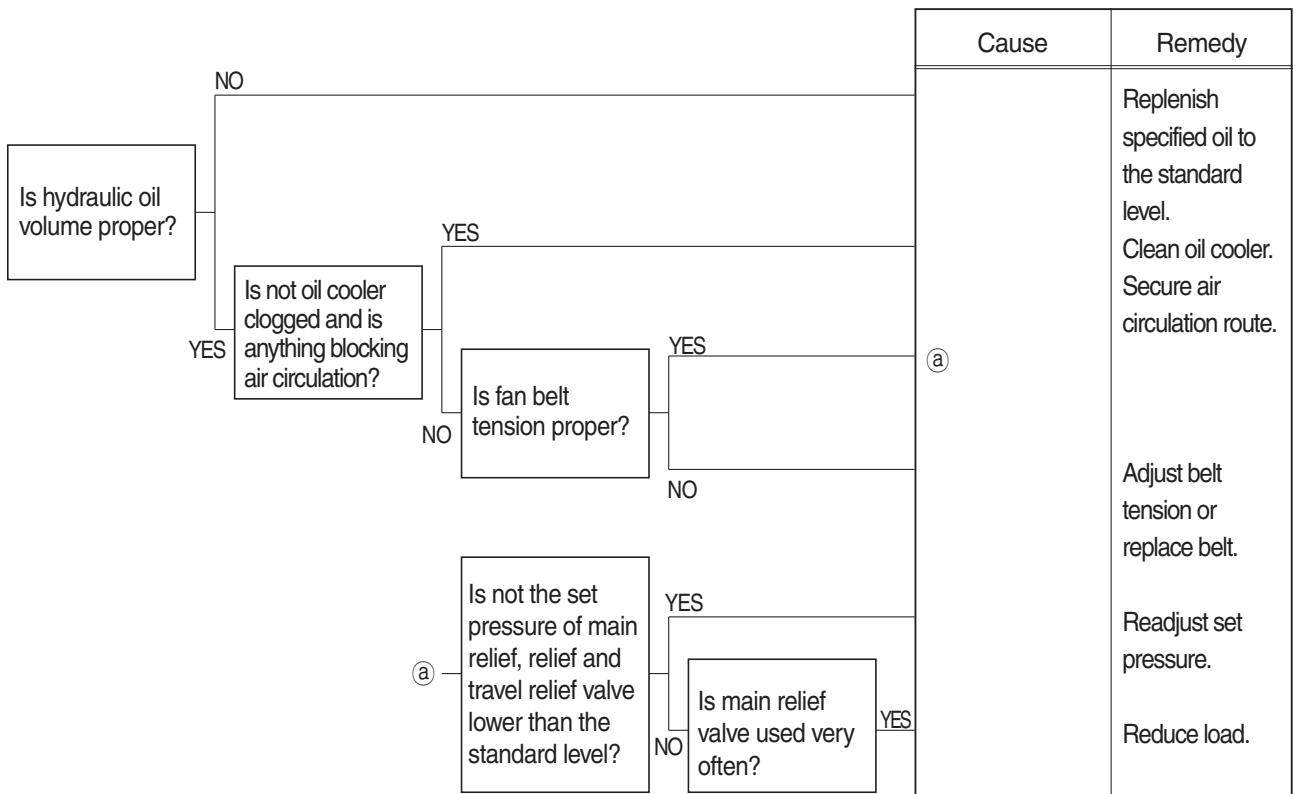


3. HYDRAULIC SYSTEM

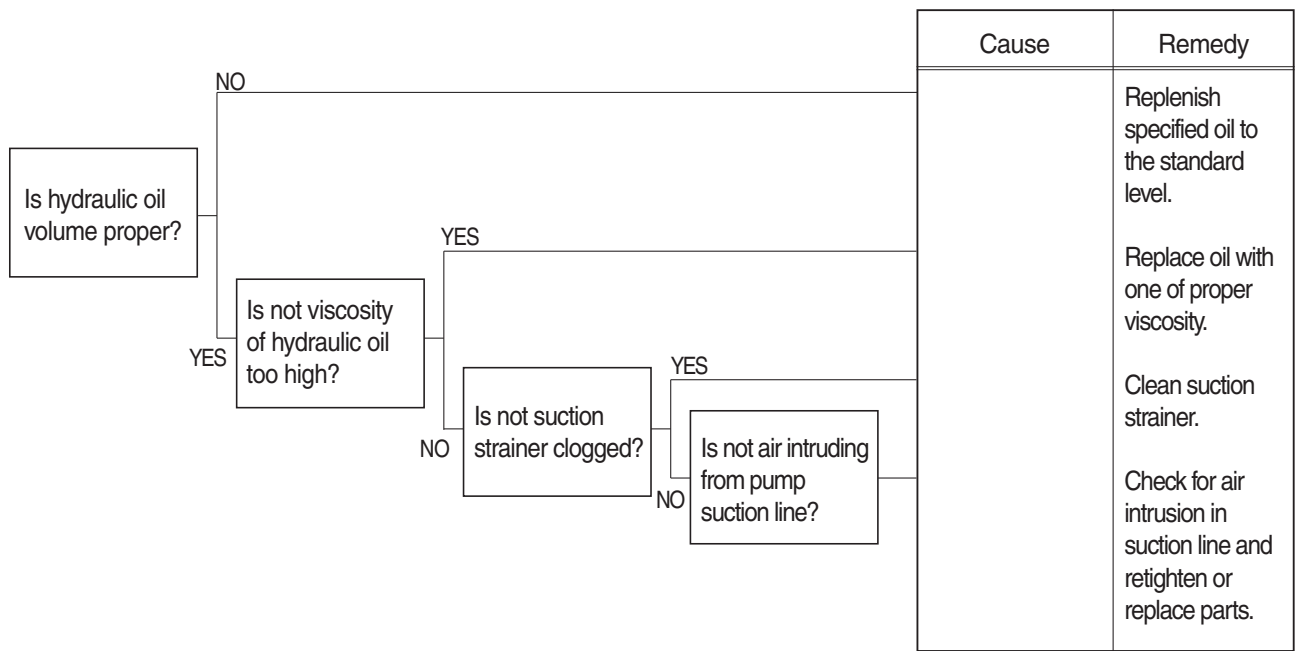
1) HYDRAULIC OIL IS CLOUDY



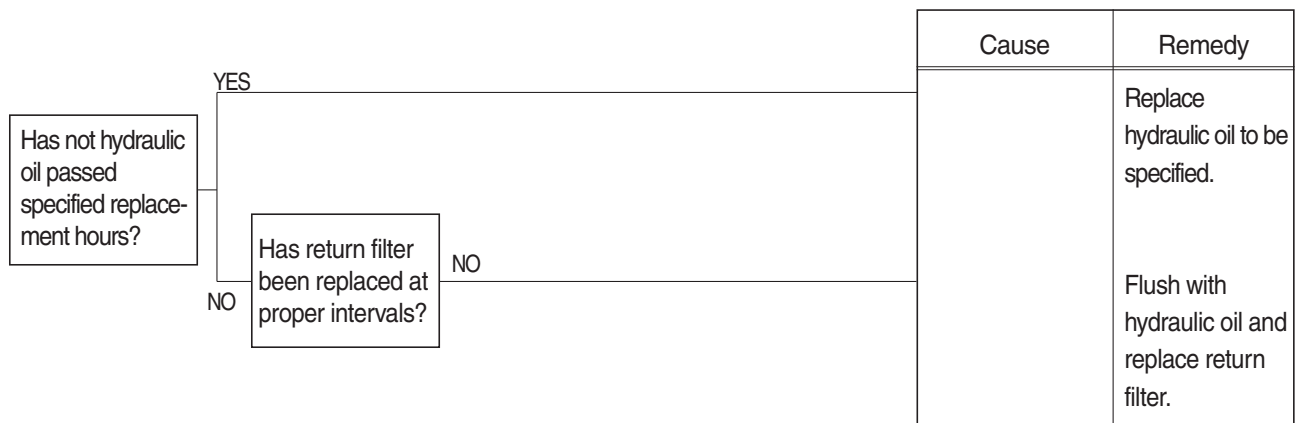
2) HYDRAULIC OIL TEMPERATURE HAS RISEN ABNORMALLY



3) CAVITATION OCCURS WITH PUMP

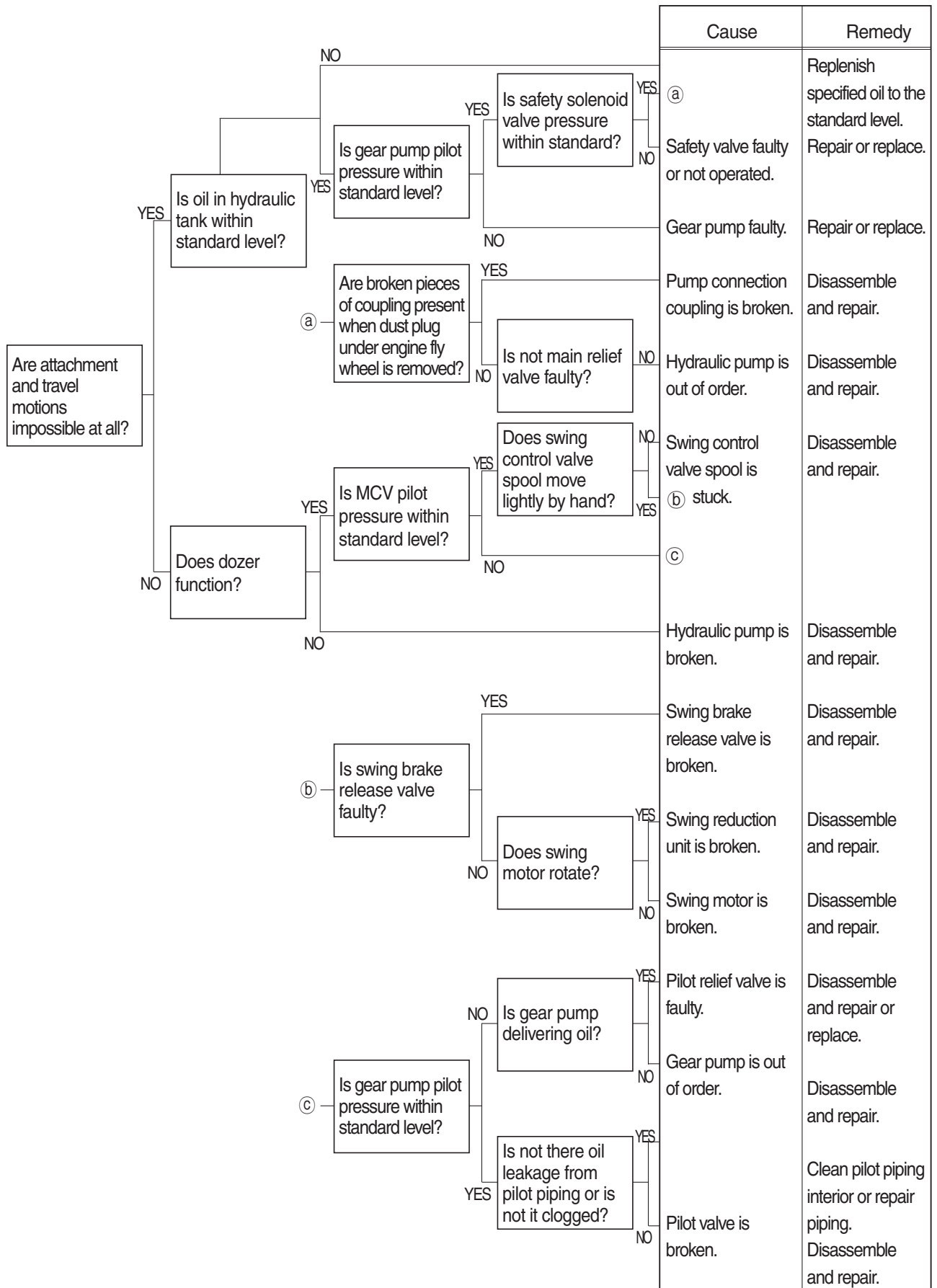


4) HYDRAULIC OIL IS CONTAMINATED

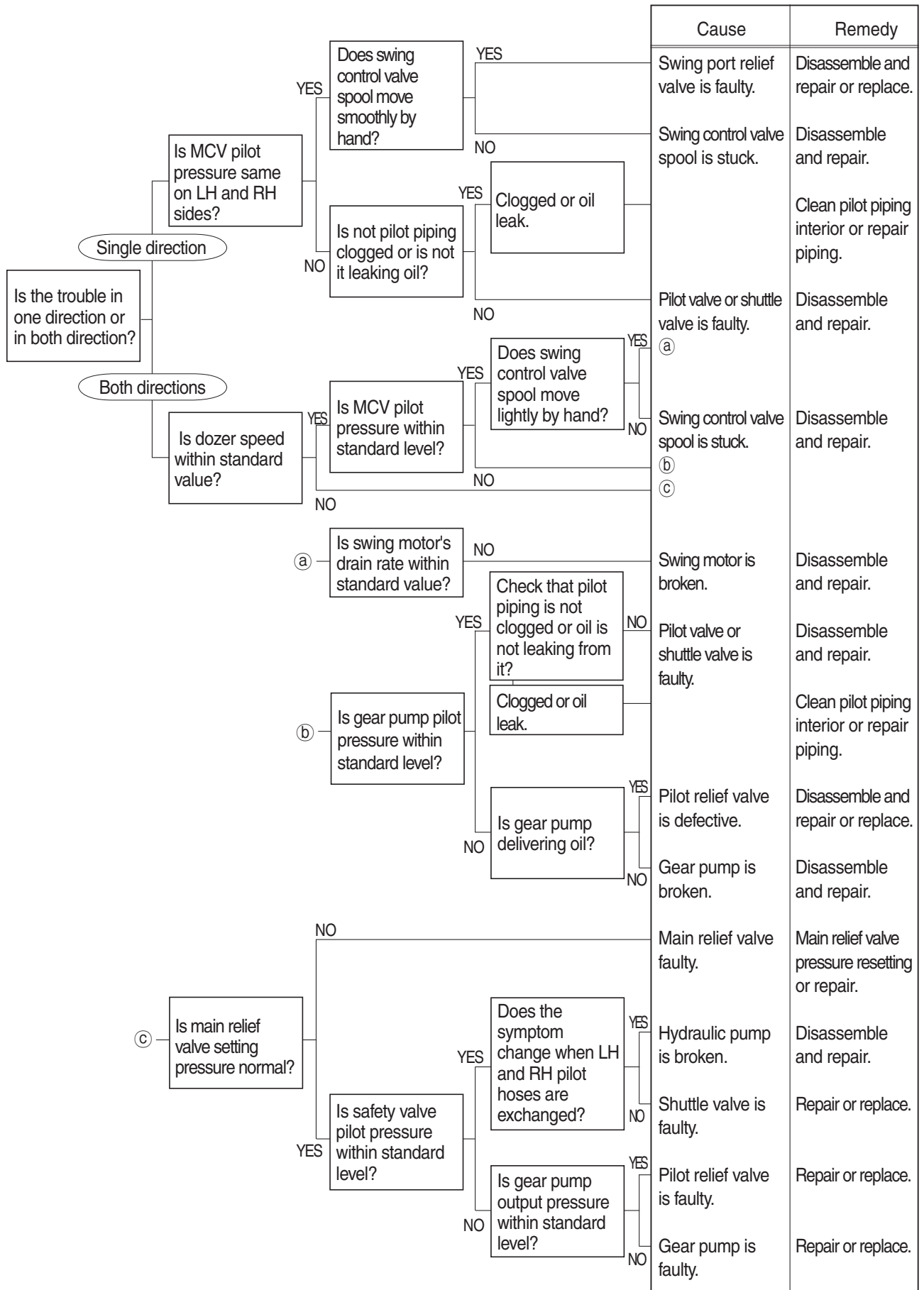


4. SWING SYSTEM

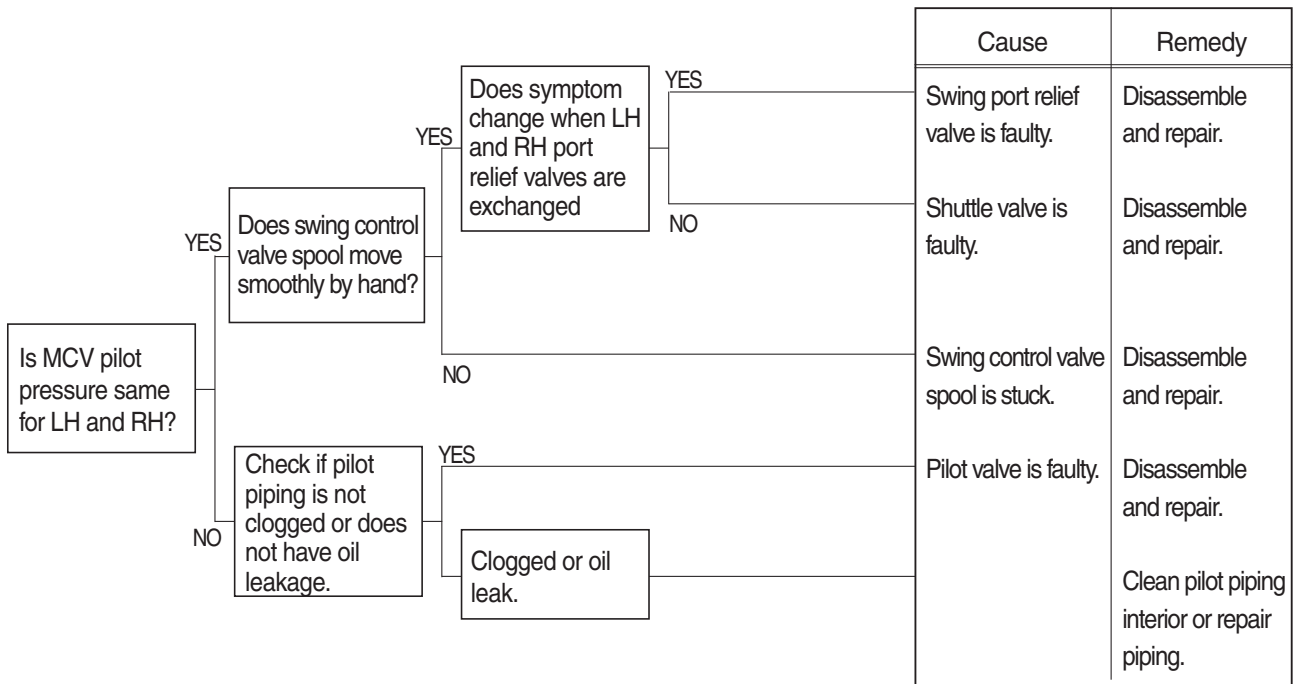
1) BOTH LH AND RH SWING ACTIONS ARE IMPOSSIBLE



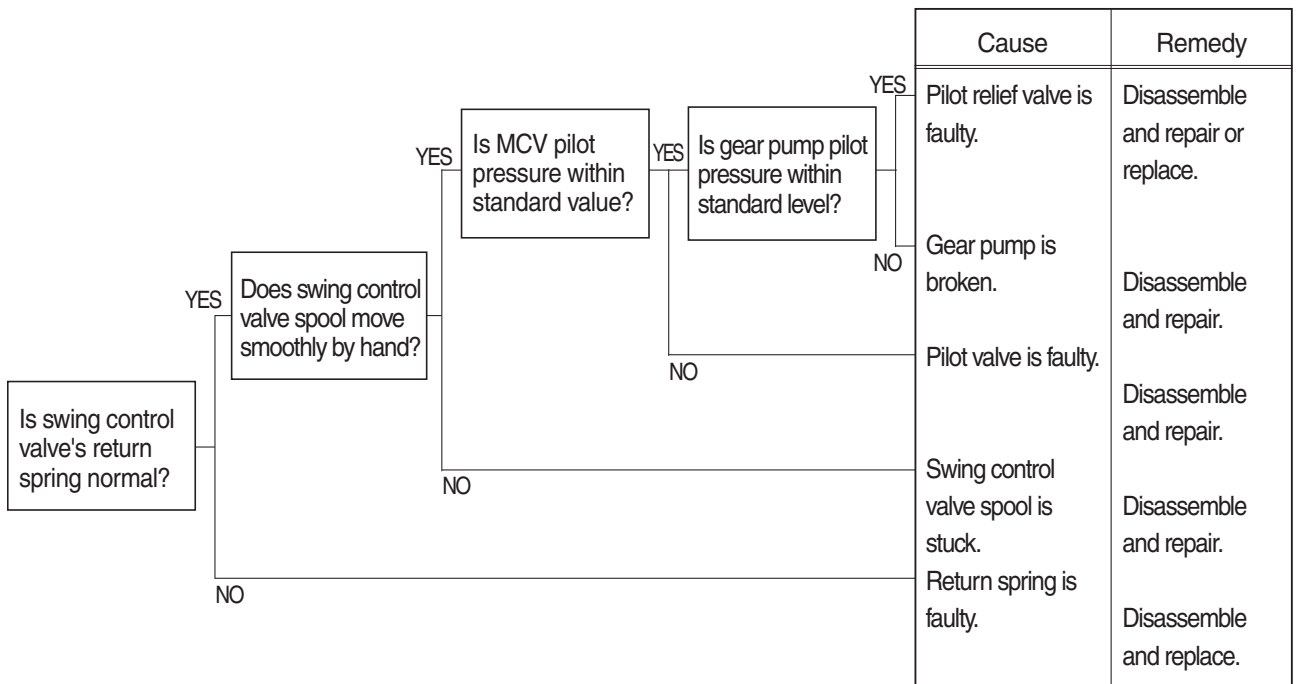
2) SWING SPEED IS LOW



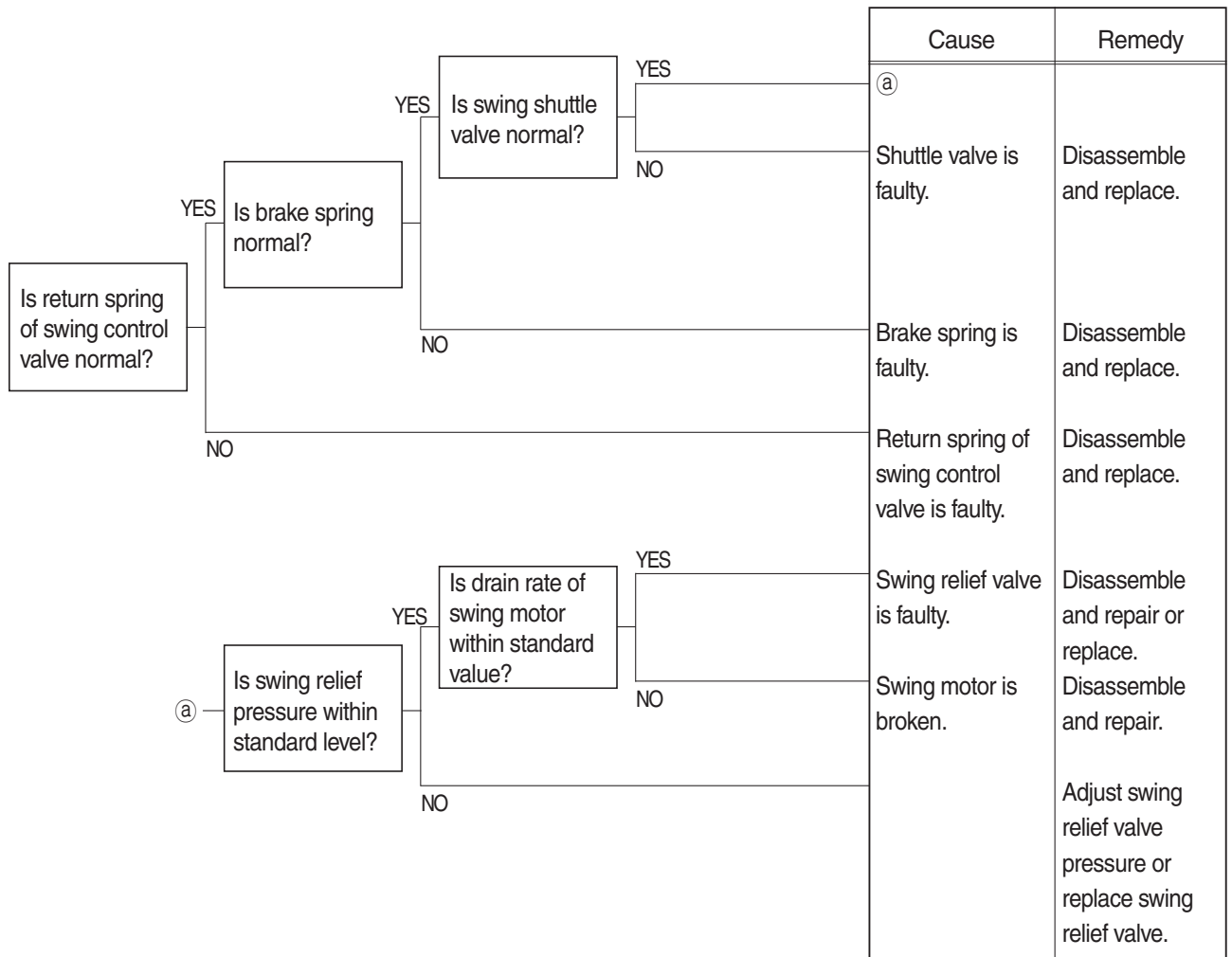
3) SWING MOTION IS IMPOSSIBLE IN ONE DIRECTION



4) MACHINE SWINGS BUT DOES NOT STOP

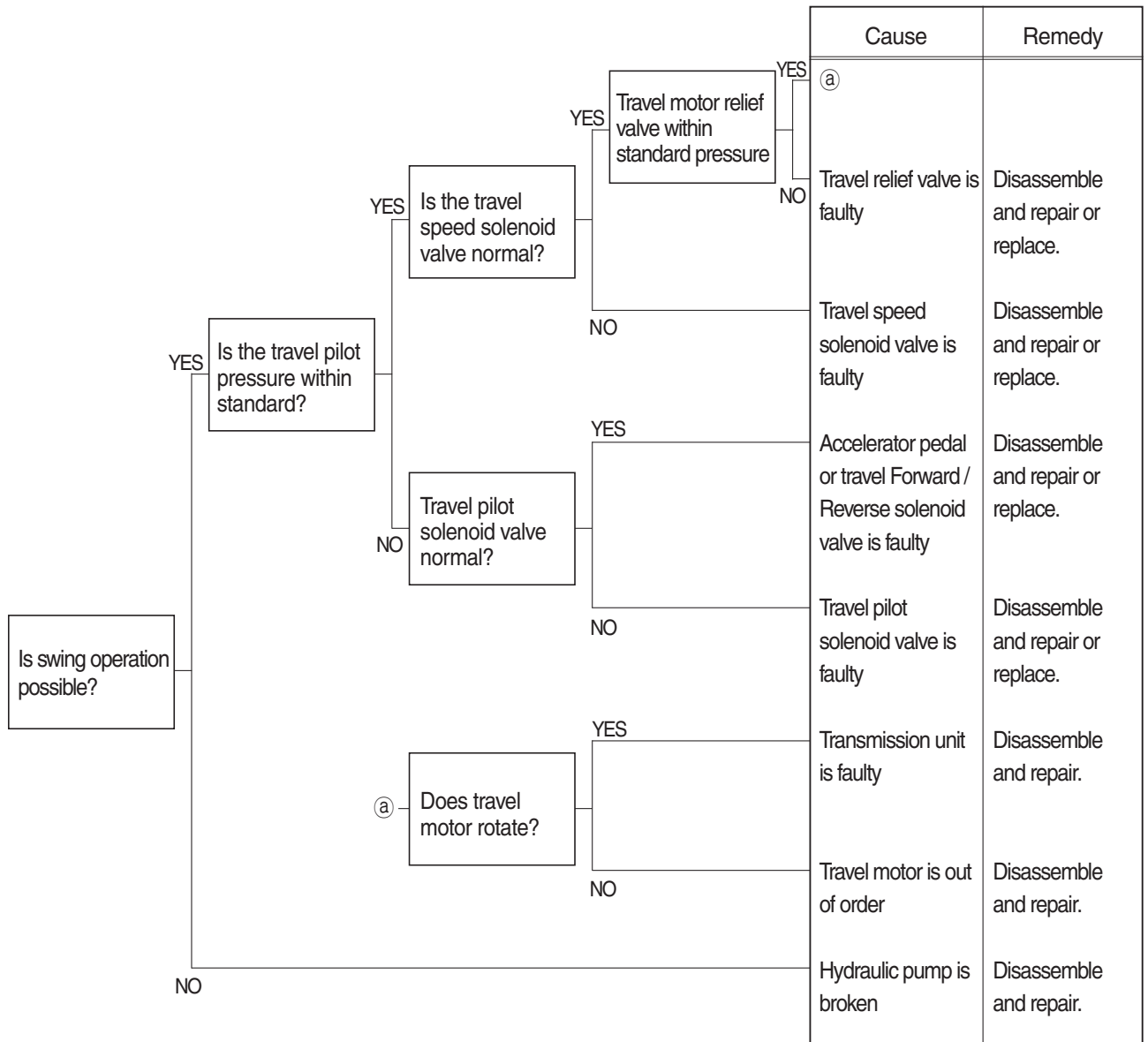


5) THE SWING UNIT DRIFTS WHEN THE MACHINE IS AT REST ON A SLOPE

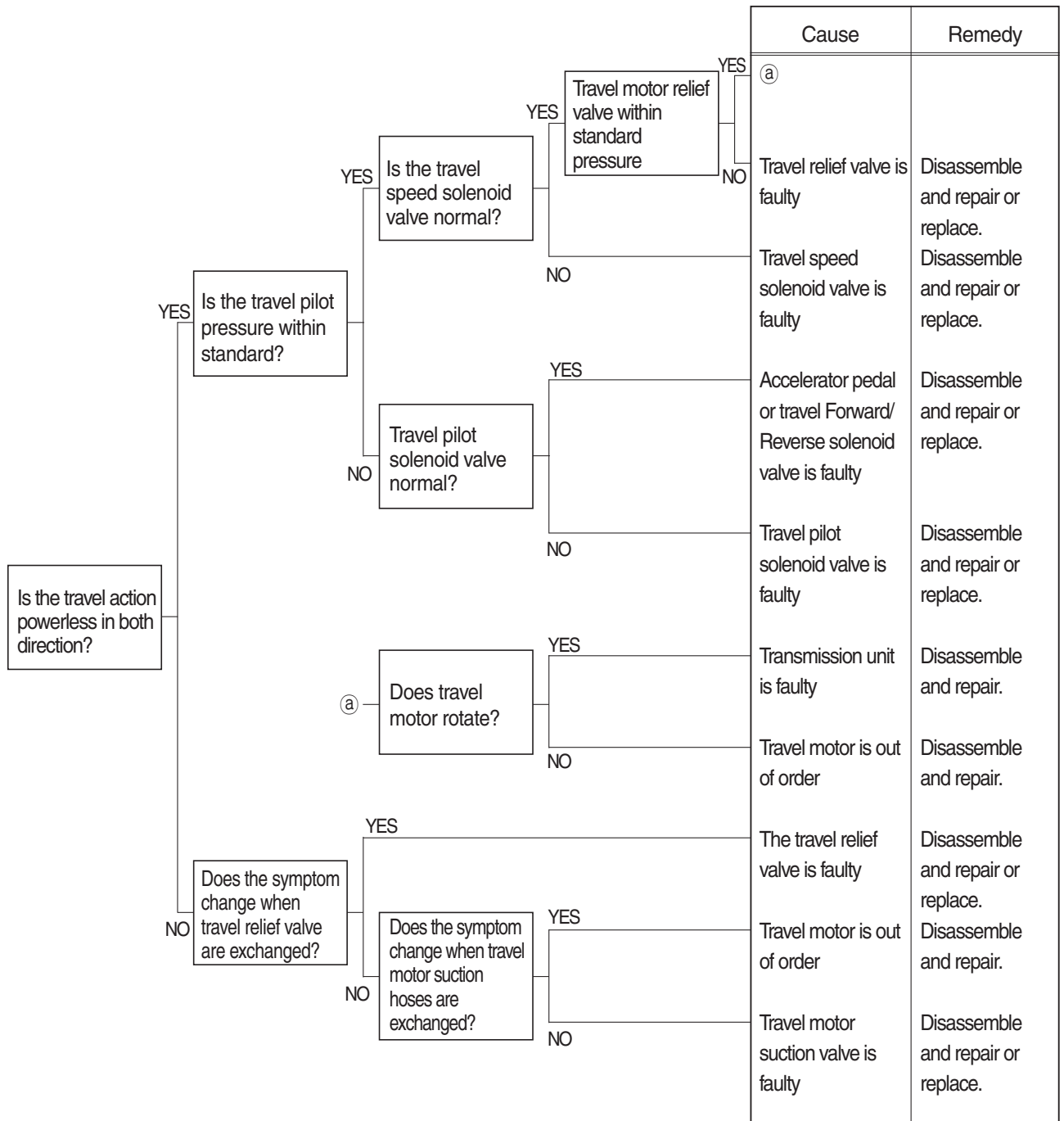


5. TRAVEL SYSTEM

1) TRAVEL DOES NOT FUNCTION



2) TRAVEL ACTION IS POWERLESS (travel only)



3) THE HYDRAULIC MOTOR DOES NOT GET STARTED

	Cause	Remedy
The hydraulic motor does not get started	The spool does not work properly. (the spool keeps fully open)	Screw the fitting bolts one more time with correct tightening torque. If the spool turns out to be damaged, it should be repaired or the new one should be used
	The anti-cavitation check valve does not work properly. (the check valve is kept open.)	Ditto

4) IT TAKES TIME TO ACCELERATE THE MOTOR

	Cause	Remedy
It takes time to accelerate the motor	The spool does not work properly.	Screw the fitting bolts one more time with correct tightening torque. If the spool turns out to be damaged, it should be repaired, or the new one should be used.
	The orifice for closing the counterbalance is clogged.	Remove the foreign matter by disassembling and cleaning.
	Wrong setting of pressure of the relief valve.	Adjust at the correct value. If the relief valve turns out to be out of order, the new one should be used.

5) IT IS NOT POSSIBLE TO REDUCE THE MOTOR SMOOTHLY

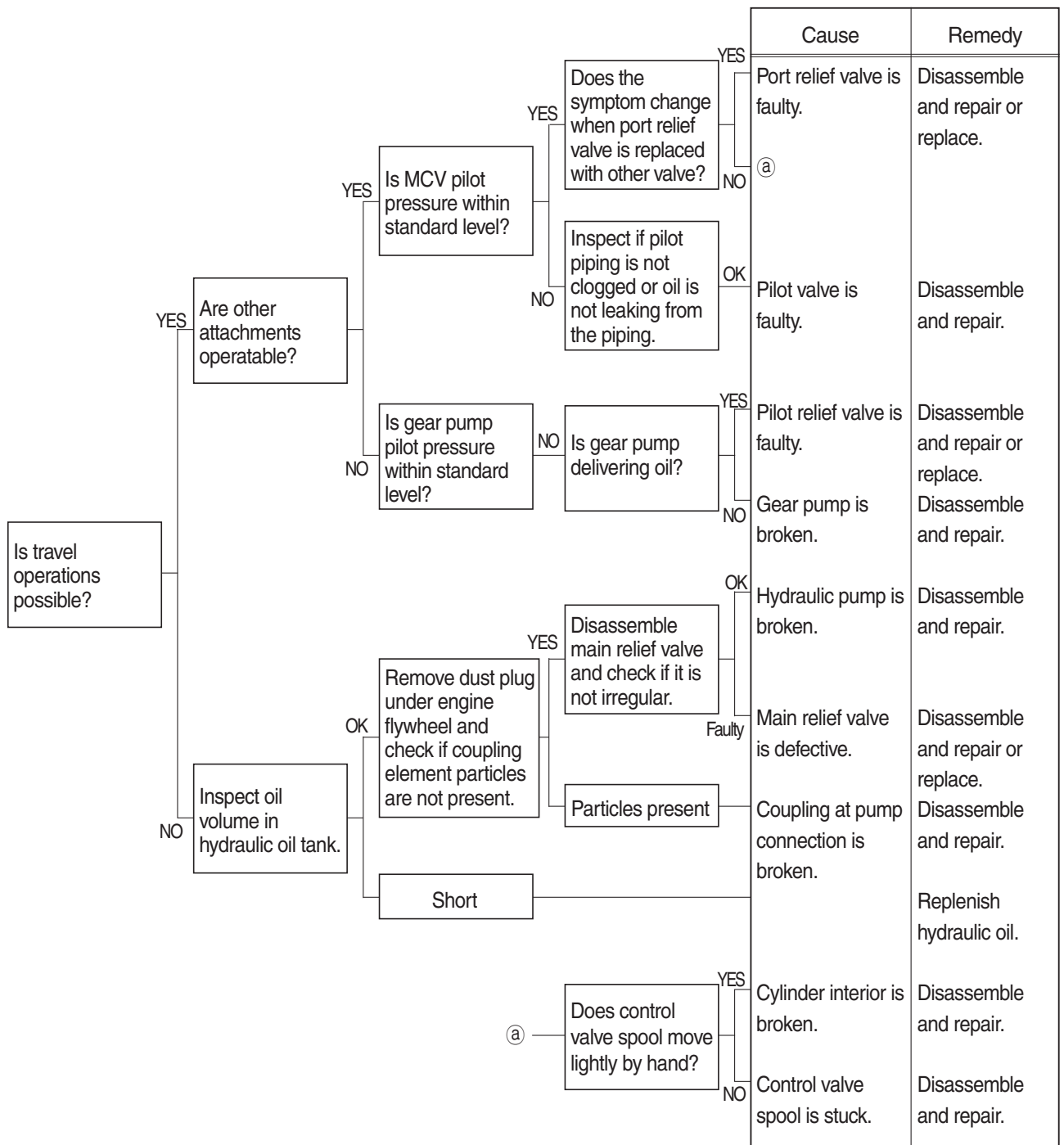
It is not possible to reduce the motor smoothly		Cause	Remedy
		The orifice for closing the counterbalance is clogged. The opening of the neutral position of the spool is clogged.	Remove the foreign matter by disassembling and cleaning.
		Wrong setting of pressure of the relief valve.	Adjust at the correct value. If the relief valve turns out to be out of order, the new one should be used.

6) EXTRAORDINARY NOISE IS HEARD WHEN SUDDENLY REDUCING THE SPEED FROM THE HIGH-SPEED MODE

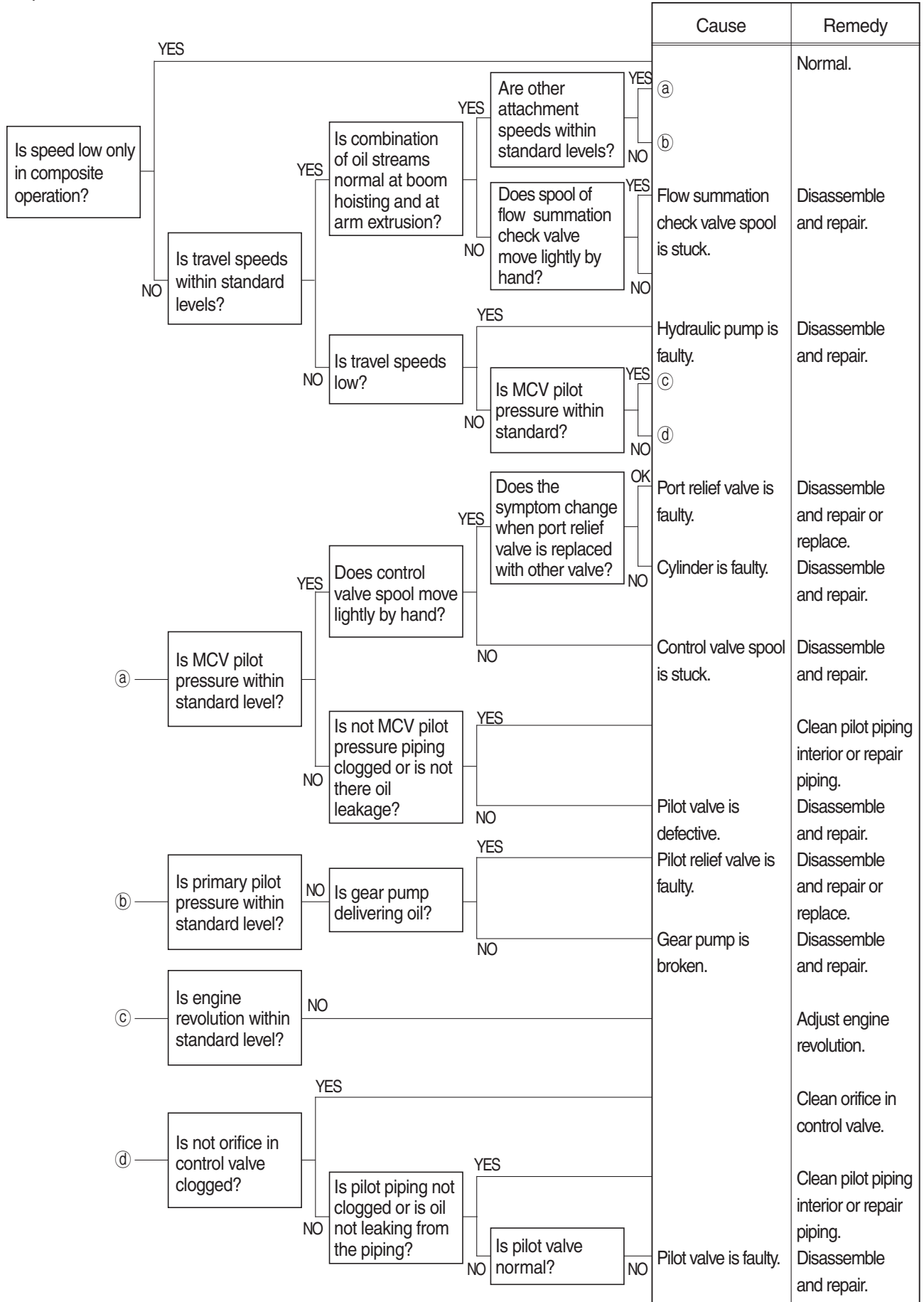
It takes time to accelerate the motor		Cause	Remedy
		The anti-cavitation valve does not work properly.	Screw the fitting bolts one more time with correct tightening torque. If the valve turns out to be damaged, it should be repaired.

6. ATTACHMENT SYSTEM

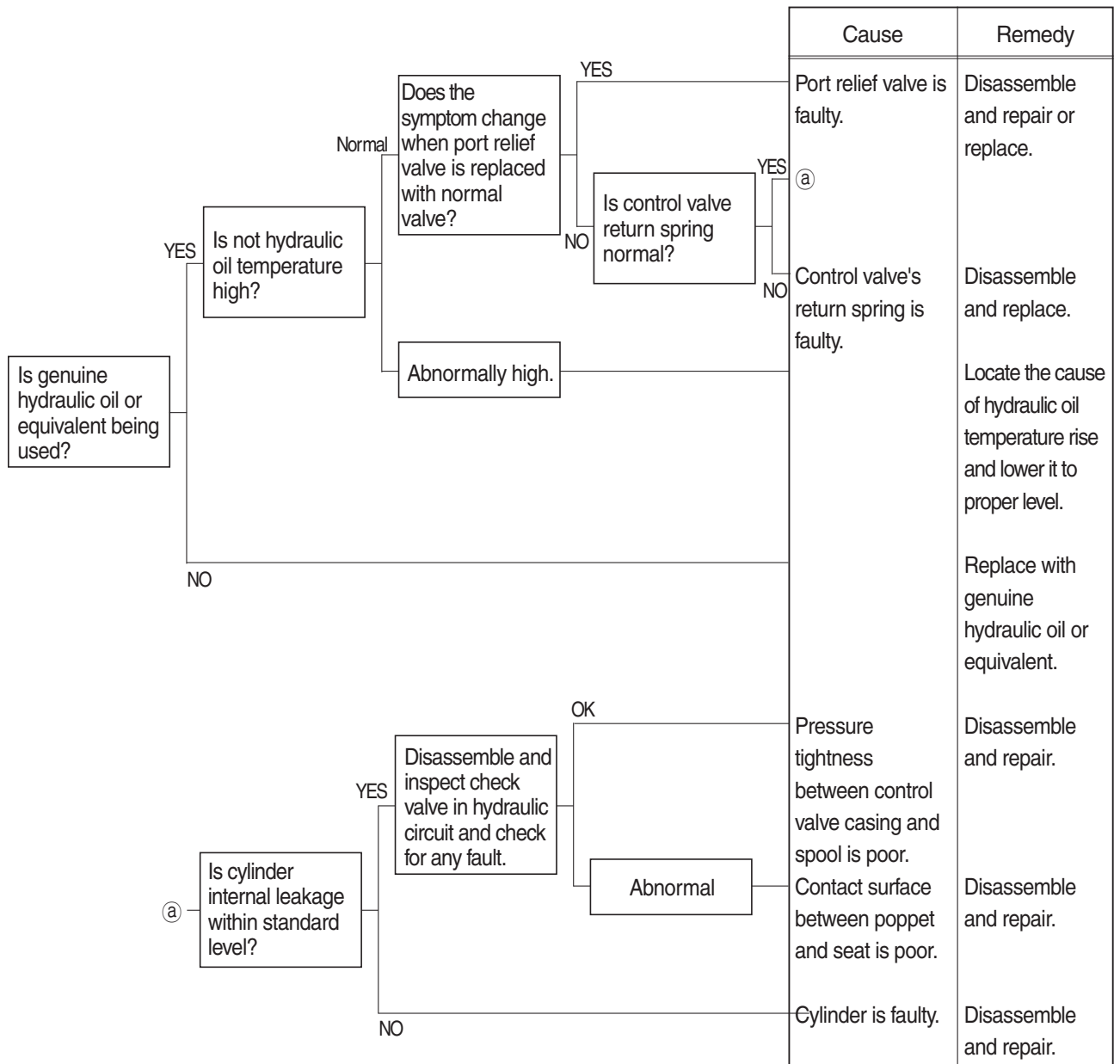
1) BOOM OR ARM ACTION IS IMPOSSIBLE AT ALL



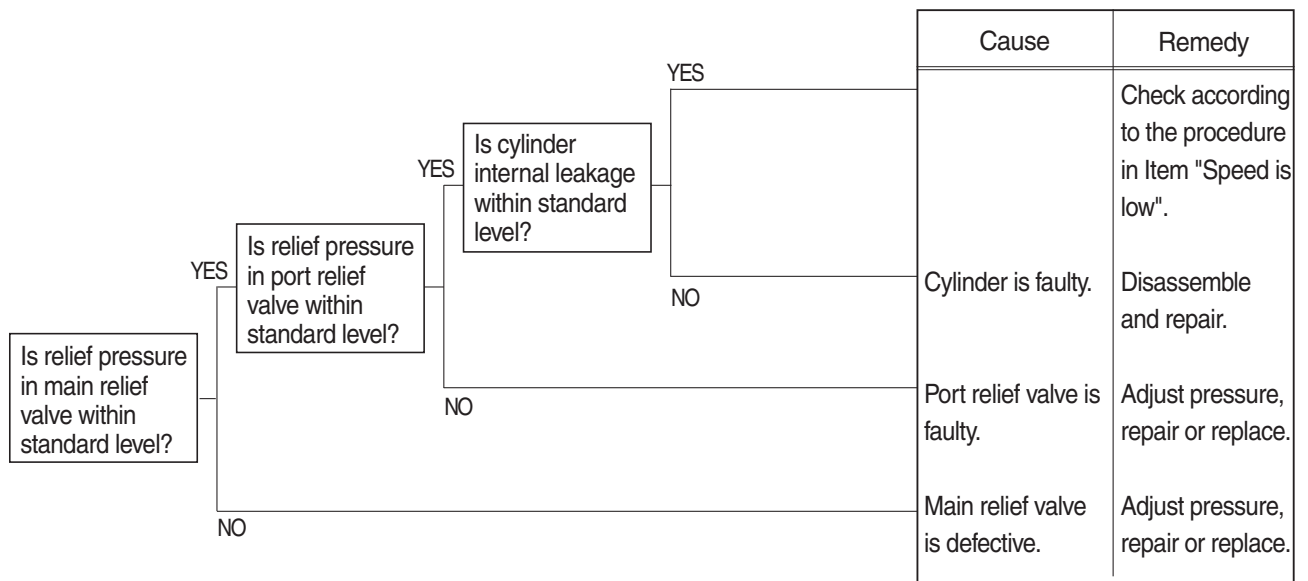
2) BOOM, ARM OR BUCKET SPEED IS LOW



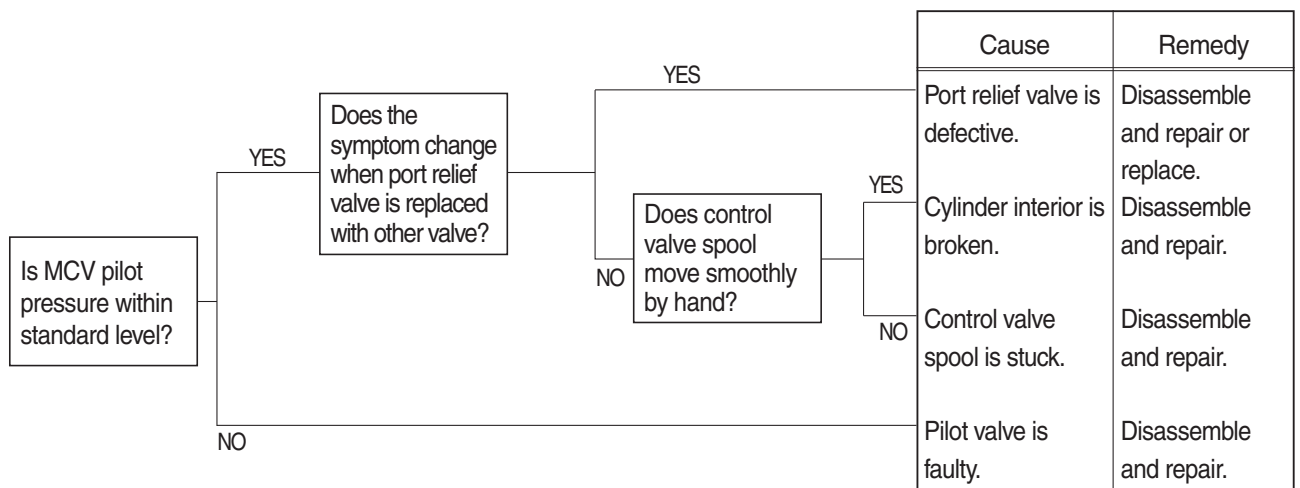
3) BOOM, ARM OR BUCKET CYLINDER EXTENDS OR CONTRACTS ITSELF AND ATTACHMENT FALLS



4) BOOM, ARM OR BUCKET POWER IS WEAK



5) ONLY BUCKET OPERATION IS TOTALLY IMPOSSIBLE

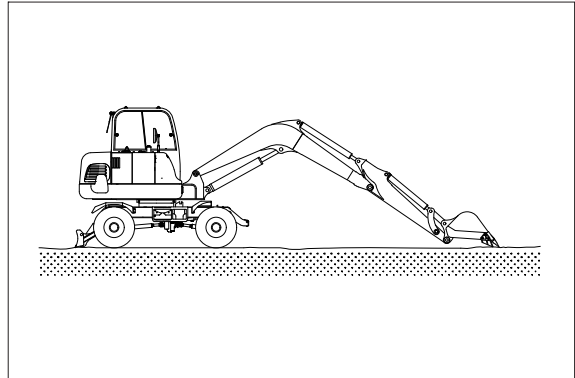


6) BOOM MAKES A SQUARING NOISE WHEN BOOM IS OPERATED

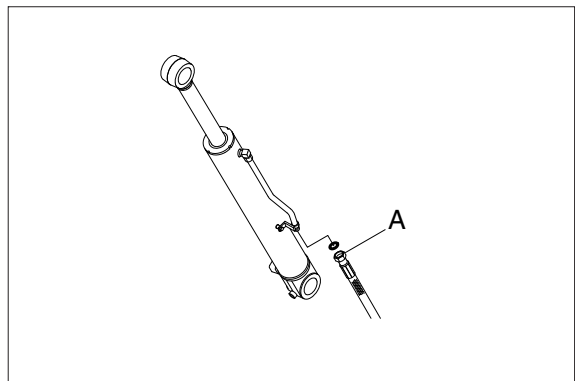
	Cause	Remedy
<p>Is boom foot pin greased sufficiently?</p>	<p>YES</p>	<p>Frictional noise occurs between the sliding faces of boom cylinder's oil seal and boom proper.</p> <p>※ Frictional noise will disappear if they are kept used.</p>
<p>NO</p>	<p>Boom foot pin has run out of grease.</p>	<p>Supply grease to it.</p> <p>※ If seizure is in an initial stage, supply sufficient grease. If seizure is in a grown state, correct it by paper lapping or with an oil stone.</p>

※ HOW TO CHECK INTERNAL BOOM CYLINDER LEAKAGE

1. Lower the bucket teeth to the ground with bucket cylinder fully retracted and arm cylinder rod retracted almost in full.



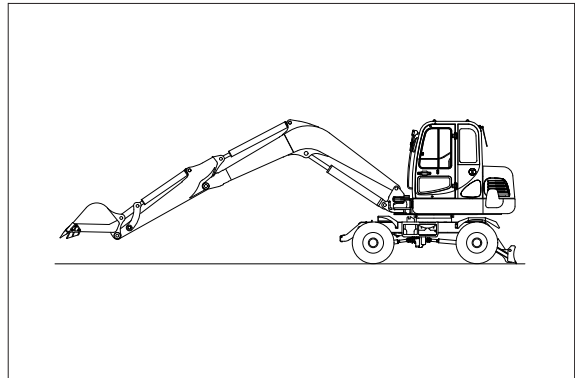
2. Disconnect hose (A) from rod side of boom cylinder and drain oil from cylinder and hose. (put cups on piping and hose ends)



3. Raise bucket OFF the ground by retracting the arm cylinder rod.

If oil leaks from piping side and boom cylinder rod is retracted there is an internal leak in the cylinder.

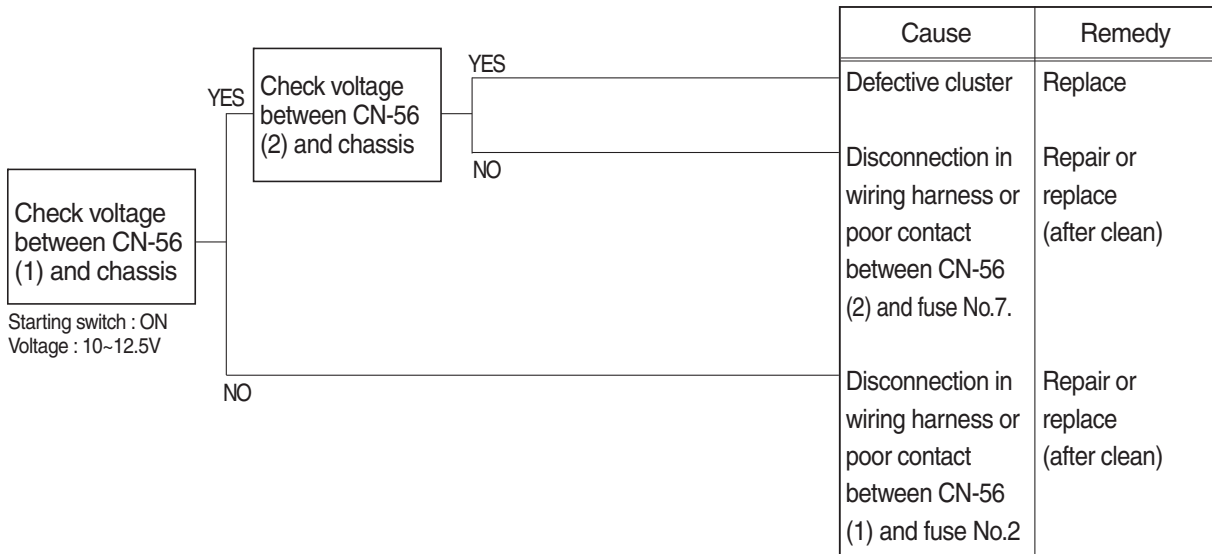
If no oil leaks from piping side and boom cylinder rod is retracted, there is an internal leak in the control valve.



GROUP 3 ELECTRICAL SYSTEM

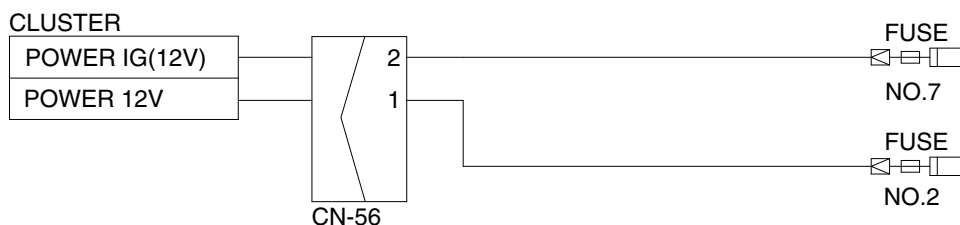
1. WHEN STARTING SWITCH IS TURNED ON, MONITOR PANEL DISPLAY DOES NOT APPEAR

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted and short of fuse No.2 and No.7.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



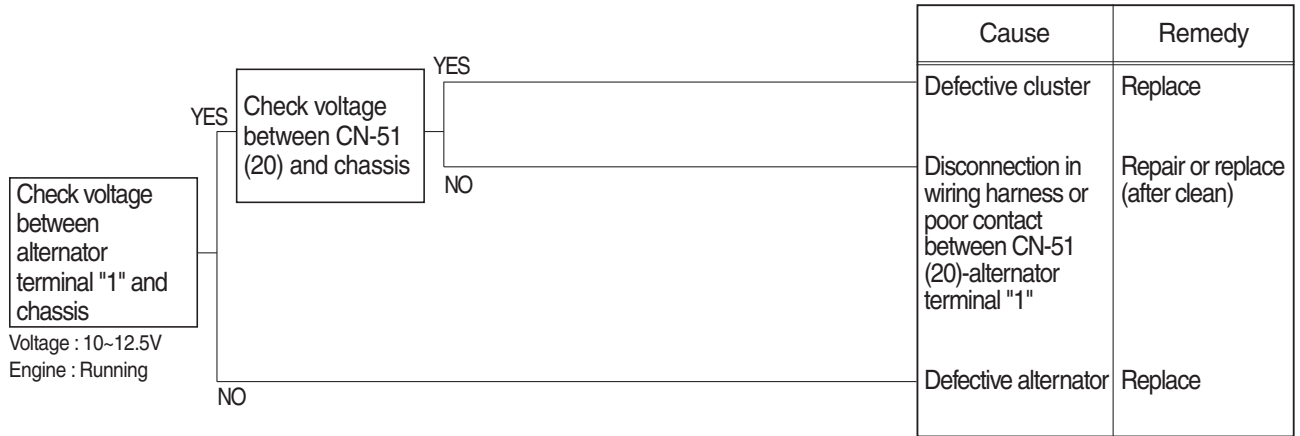
Check voltage

YES	10 ~ 12.5V
NO	0V



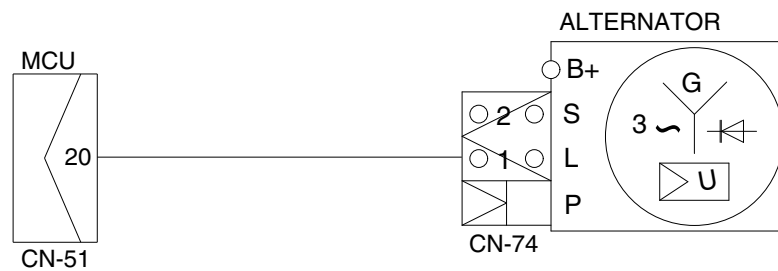
2. BATTERY CHARGING WARNING LAMP LIGHTS UP (starting switch : ON)

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



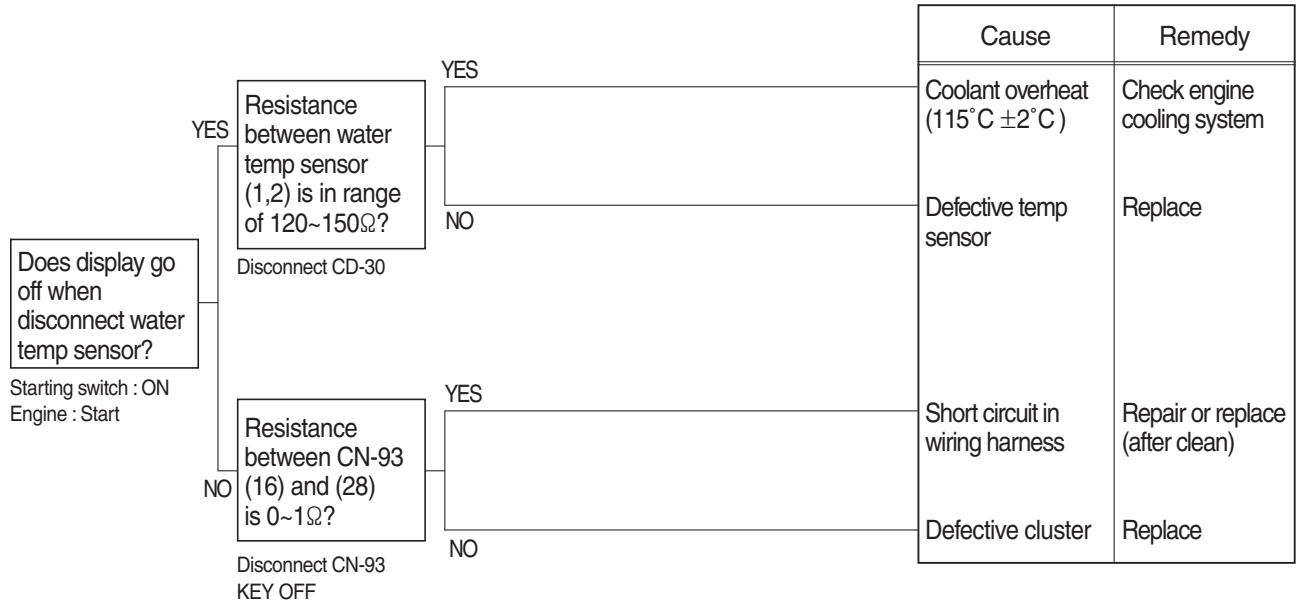
Check voltage

YES	10 ~ 12.5V
NO	0V



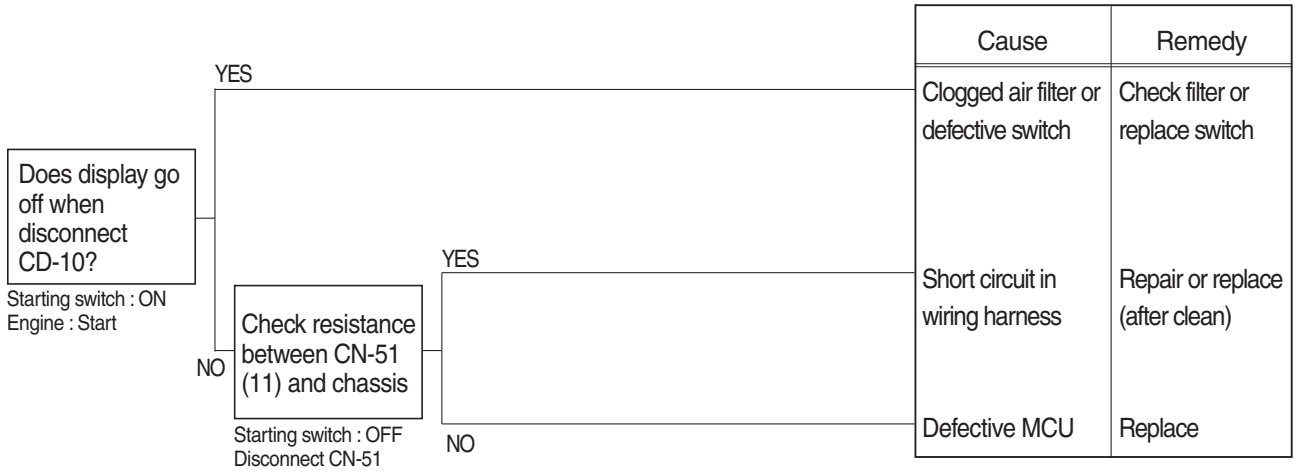
3. WHEN COOLANT OVERHEAT WARNING LAMP LIGHTS UP (engine is started)

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



4. WHEN AIR CLEANER WARNING LAMP LIGHTS UP (engine is started)

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



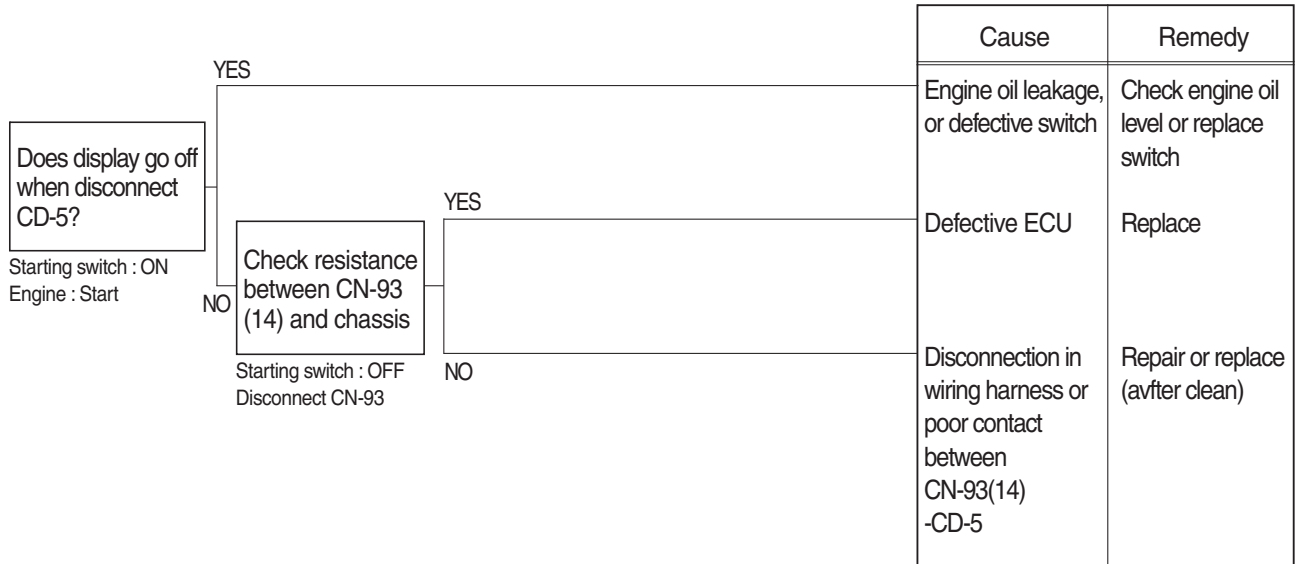
Check resistance

YES	MAX 1Ω
NO	MIN 1MΩ



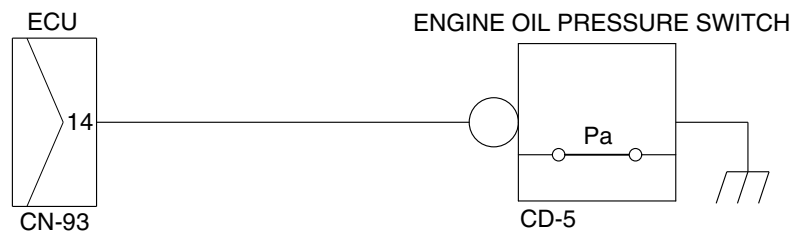
5. WHEN ENGINE OIL PRESSURE WARNING LAMP LIGHTS UP (engine is started)

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



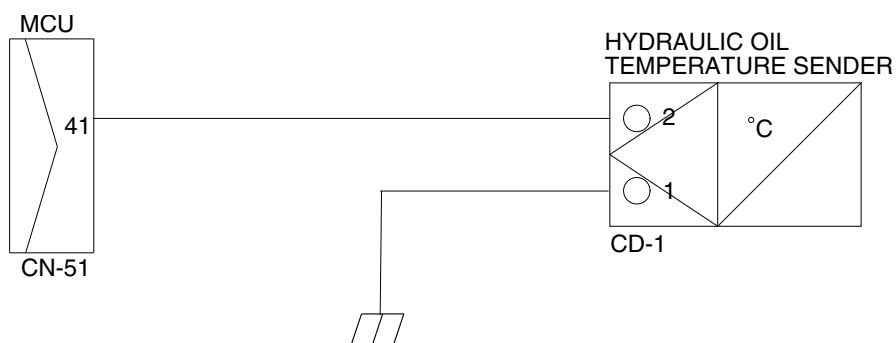
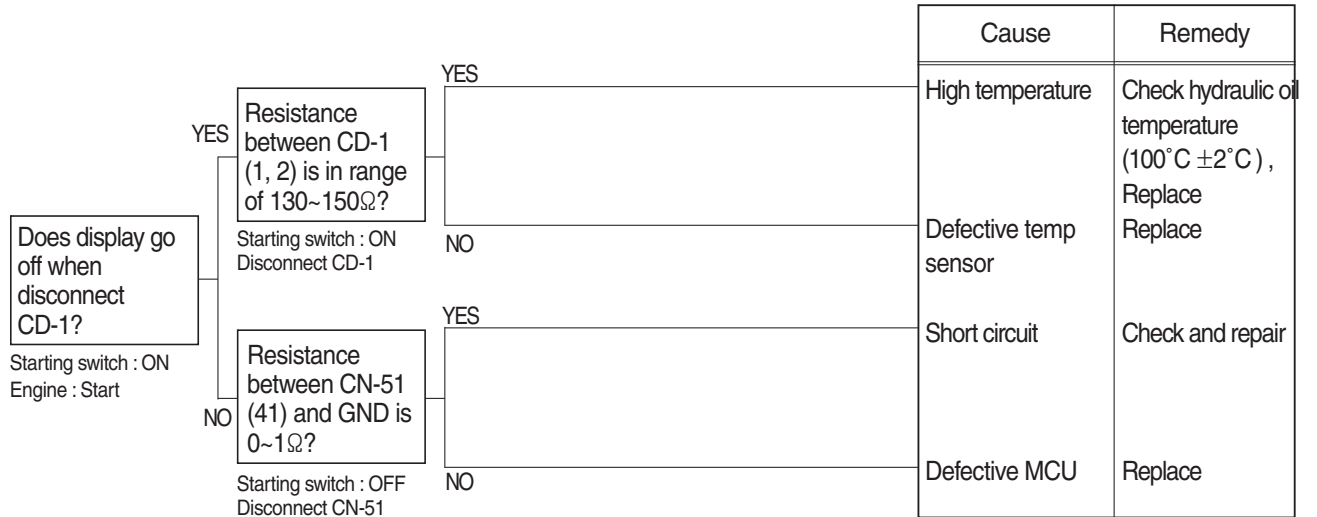
Check resistance

YES	MAX 1Ω
NO	MIN 1MΩ



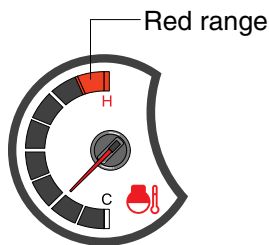
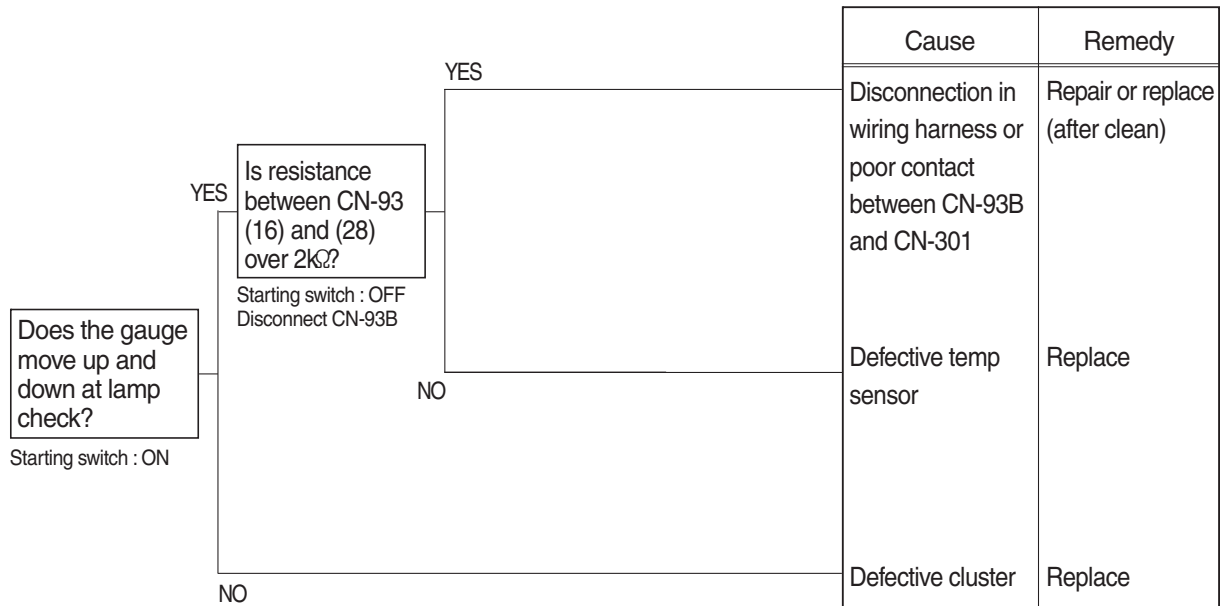
6. WHEN HYDRAULIC OIL TEMPERATURE WARNING LAMP LIGHTS UP (engine is started)

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



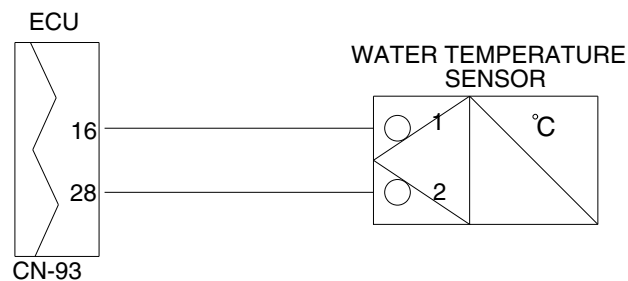
7. WHEN COOLANT TEMPERATURE GAUGE DOES NOT OPERATE

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



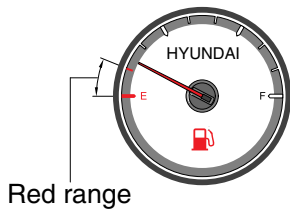
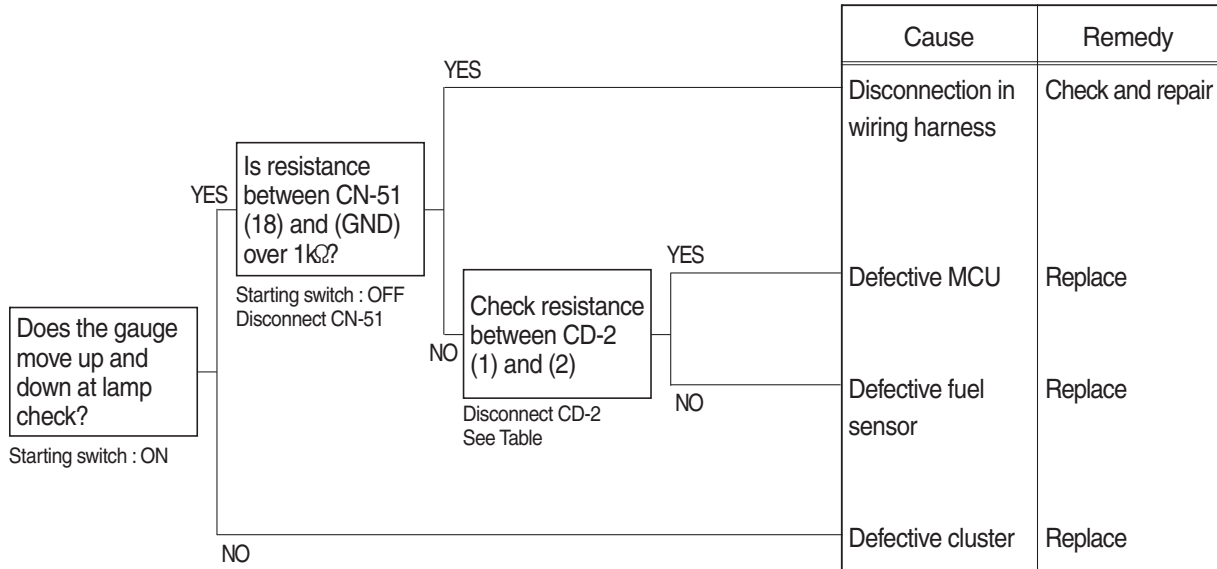
Check Table

Temperature \ Item	40°C	85~110°C	115°C (red range)
Unit Resistance(Ω)	1170~	270~130	~124
Tolerance(%)	± 5	-8~0	± 5



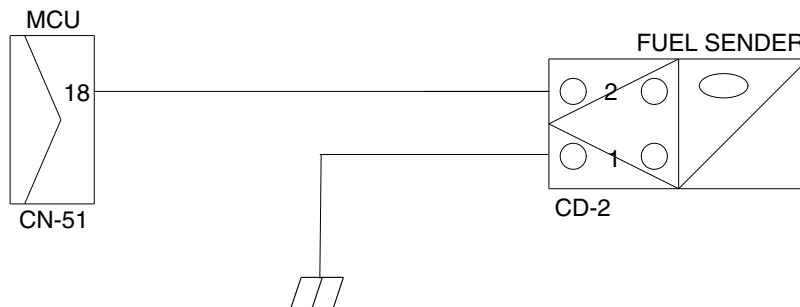
8. WHEN FUEL GAUGE DOES NOT OPERATE (check warning lamp ON/OFF)

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



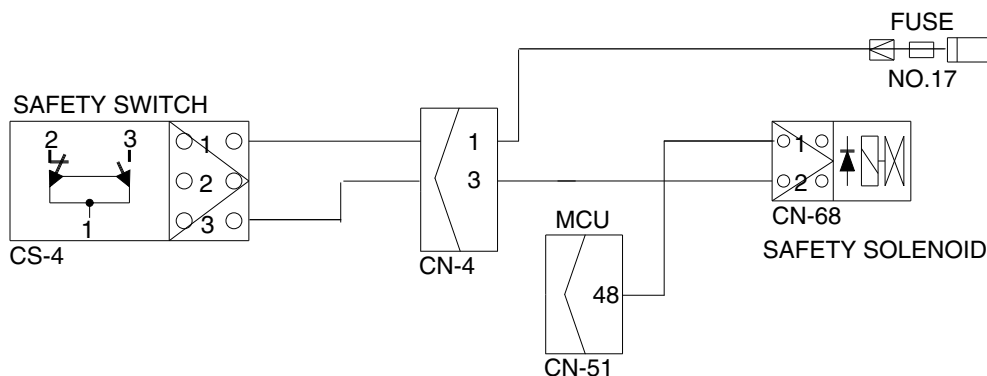
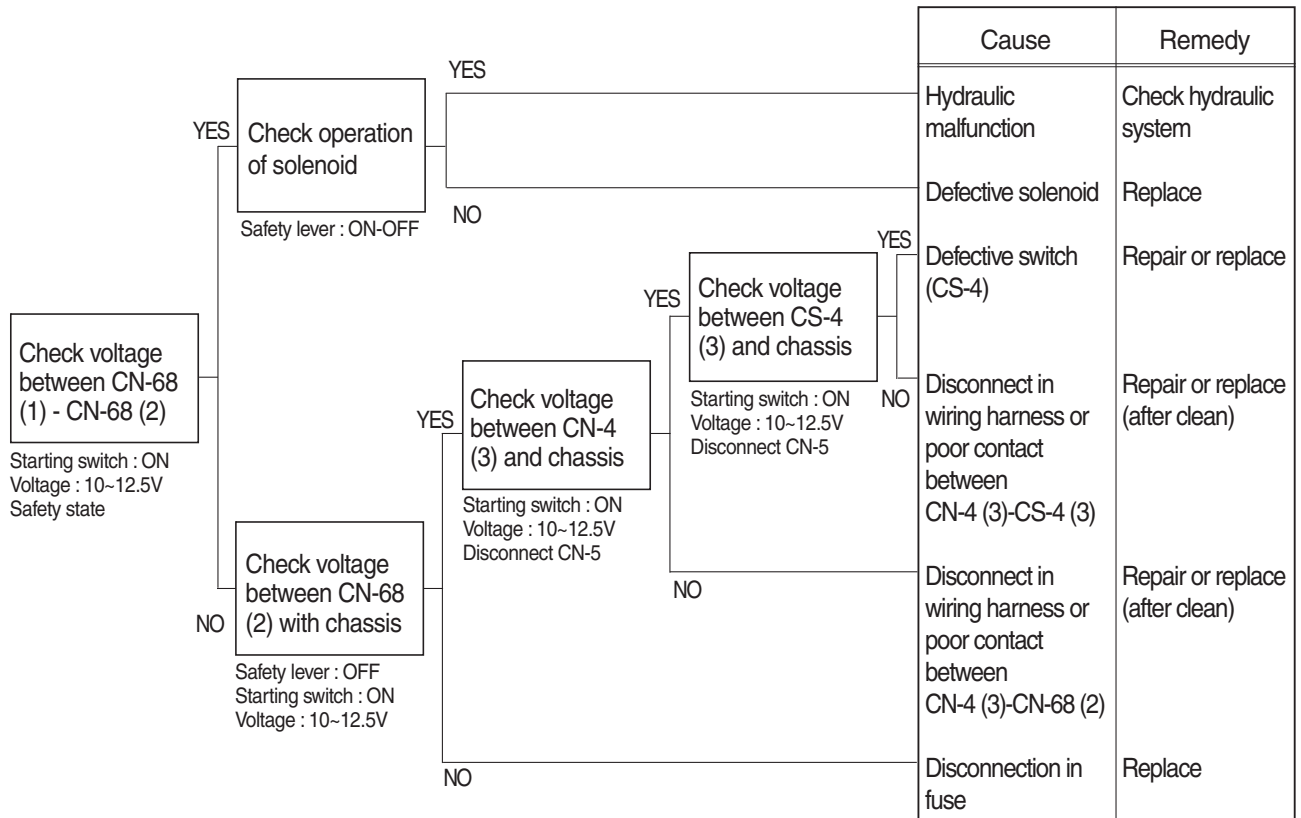
Check Table

Item \ Level	Empty	1/2	Full
Unit Resistance (Ω)	700	300	~100
Tolerance (%)	± 5	± 8	± 5



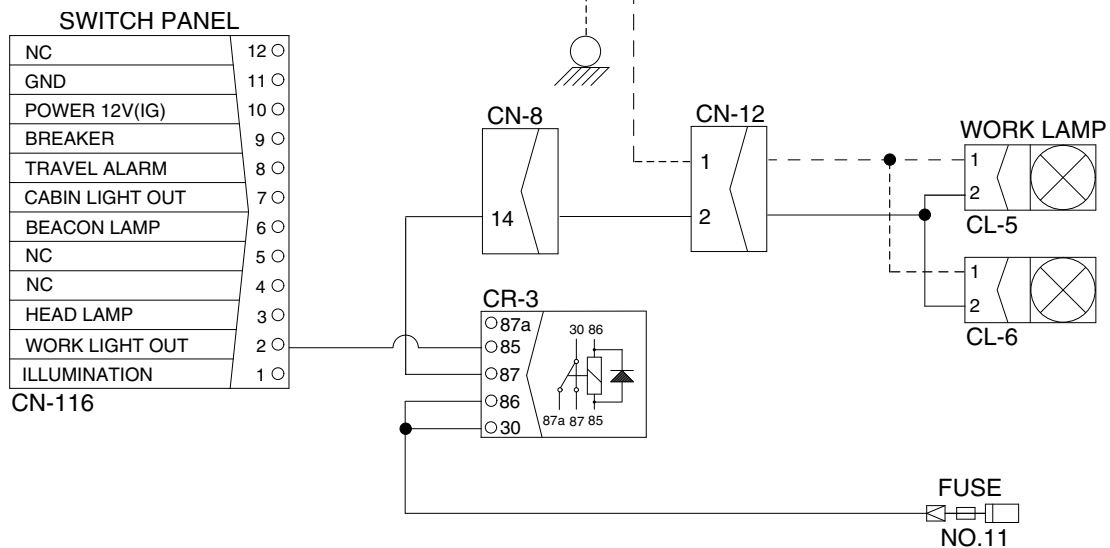
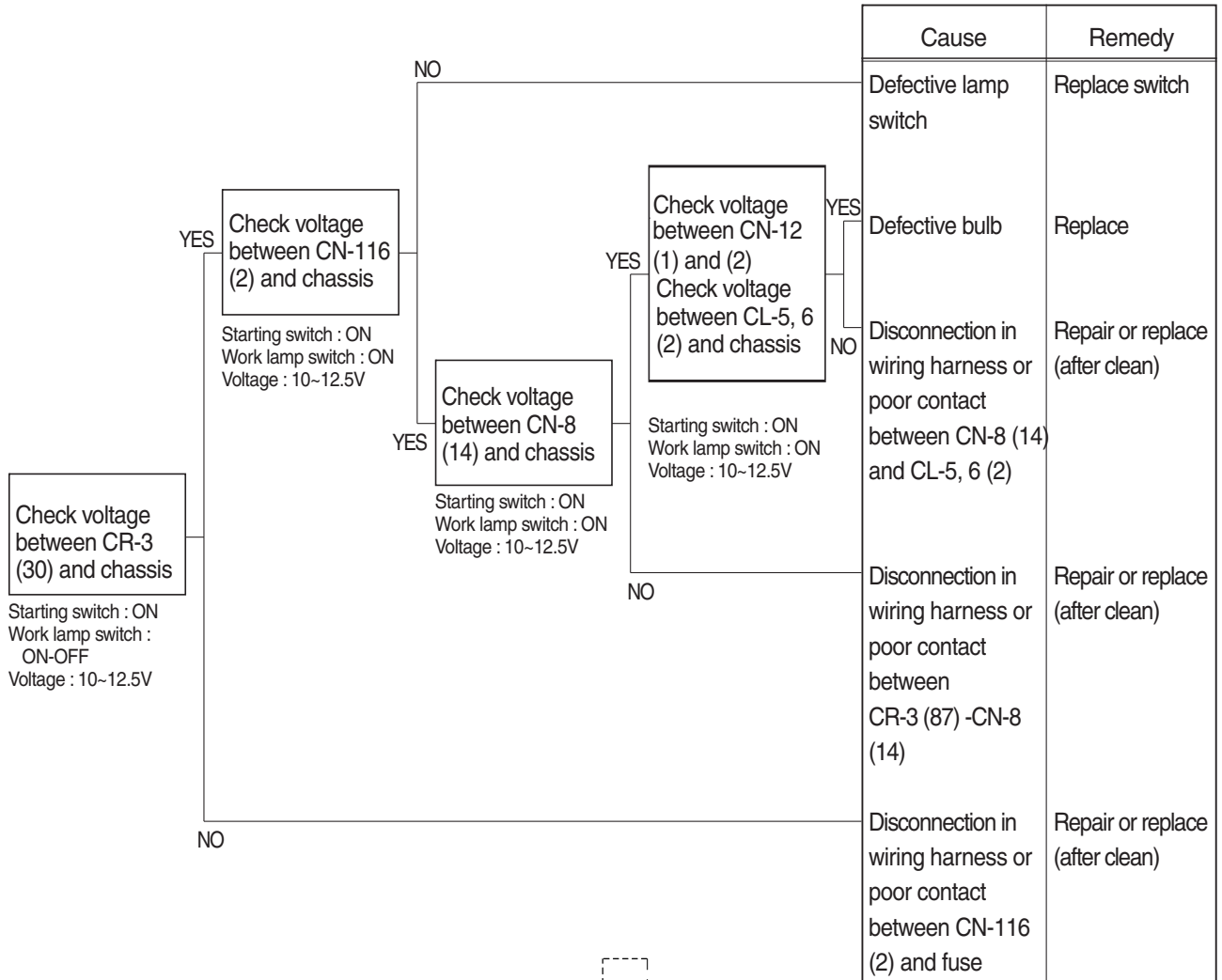
9. WHEN SAFETY SOLENOID DOES NOT OPERATE

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted and short of fuse No.17.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



10. WHEN STARTING SWITCH IS TURNED ON, WORK LAMP DOES NOT LIGHTS UP

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted and short of fuse No.11.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



GROUP 4 AXLE

1. TROUBLE SHOOTING

Problem	Cause	Correction
Loss of brakes	1. Incorrect adjustment	Inspect disc thickness (see page 7-149) and if discs are usable readjust brakes to the specifications in the manual.
	2. Brake discs worn out	Inspect disc thickness (see page 7-149) and replace if needed
	3. Incorrect brake fluid	Replace all seals in axle and master cylinder that have made contact with the incorrect fluid and all brake hoses. If incorrect fluid leaked into axle oil, seals and O-rings in axle must be replaced.
	4. Loss of brake fluid	Inspect for and repair any leaks in outside circuit or master cylinder. If caused by incorrect brake fluid see correction No.3. If leak is to the outside replace the O-rings between the center and intermediate sections. If leak is to the inside replace above O-rings and brake piston O-rings.
	5. Overheated axle causing brake fluid to vaporize (brake return when axle cools).	See "Overhearing" problem.
Soft brake pedal	6. Air in brake fluid	Bleed brakes.
Ineffective safety brake	7. One or both overrides are engaged	Check override bolts and adjust if needed (see page 7-155).
	8. Incorrect adjustment	See correction No.1.
	9. Brake disc worn out	See correction No.2.
Overheating	10. Oil level wrong	Drain, flush and refill oil to proper level.
	11. Too small of a brake gap.	Readjust brakes to the specifications (see page 7-155)
	12. Park brake dragging.	Unlock the brake and adjust the correct gap.
	13. Incorrect brake fluid in system.	See correction No.3.
	14. No free-pedal at master cylinder.	Readjust brake pedal.
	15. Restriction in brake lines.	Inspect for and replace damage lines.
	16. Restriction in return line of brake servo system.	Inspect for and replace damaged return line. Inspect for and remove any filter, tee'd in line or any other source of back pressure from the return line.
17. Incorrect oil	Drain, flush and refill to the proper level with oil recommended.	

Problem	Cause	Correction
Diff-lock inoperative	<p>18. If manual, loss or misadjusted linkage.</p> <p>19. If hydraulic, problems in the hydraulic or electrical circuits of the vehicle.</p> <p>20. If hydraulic, problems in the hydraulic or electrical circuits of the vehicle.</p> <p>21. If with self locking differential, weared discs.</p>	<p>Inspect and correct linkage and readjust.</p> <p>Refer to the Group 2 and 3 of this section.</p> <p>Rebuilt cylinder as described on page 7-192.</p> <p>Replace discs as described on page 7-189.</p>
Oil coming out of breather	<p>22. Hydraulic leak in brake system.</p> <p>23. Hydraulic leak in diff-lock activating cylinder.</p>	<p>See corrections No.2 & 3.</p> <p>See corrections No.20.</p>
No spin indexing noise when driven straight.	<p>24. Unequal tire pressure from one side to the other.</p> <p>25. Different style, size or brand of tires from one side to the other.</p>	<p>Inflate tires to the recommended pressure or until the rolling radius is equal.</p> <p>Change tires to make the rolling radius equal. Vary the tire pressure within the specifications until the rolling radius is equal.</p>
Noise during coast and under power the same	26. Wheel bearings	Replace and adjust as described on page 7-157.
Noise under power greater than during coast.	<p>27. Low oil level</p> <p>28. Incorrect oil</p> <p>29. Ring and pinion worn</p> <p>30. Worn ring and pinion bearings</p> <p>31. Worn planetary gears or bearings</p>	<p>Refill oil to proper level</p> <p>See correction No.17.</p> <p>Inspect through rear cover. Replace and adjust as described on page 7-173.</p> <p>Replace and adjust as described on page 7-173.</p> <p>Replace as described on page 7-157.</p>
Noise during coast greater than under power	<p>32. Loose pinion nut</p> <p>33. Only one pinion bearing damages.</p>	<p>Inspect ring, pinion and pinion bearings. If undamaged, retighten nut as described on page 7-173.</p> <p>See correction No.30.</p>
Noise during turn (without no spin)	34. Worn spider and / or side gears	Replace as described on page 7-185.

Problem	Cause	Correction
A "Stick slip" noise when going from forward to reverse.	35. Worn or damaged U-joint on drive shaft 36. Loose wheel 37. Worn or damaged U-joint at steering knuckle 38. Spider pins loose in carrier. 39. Damaged or missing spider and / or side gear washers	Inspect and replace the u-joint. Inspection for wheel and wheel stud damage. Replace if needs and retorque nuts. Inspect and replace as described on page 7-166. Inspect through rear cover. Replace as described on page 7-185. See correction No.34.