

# 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.

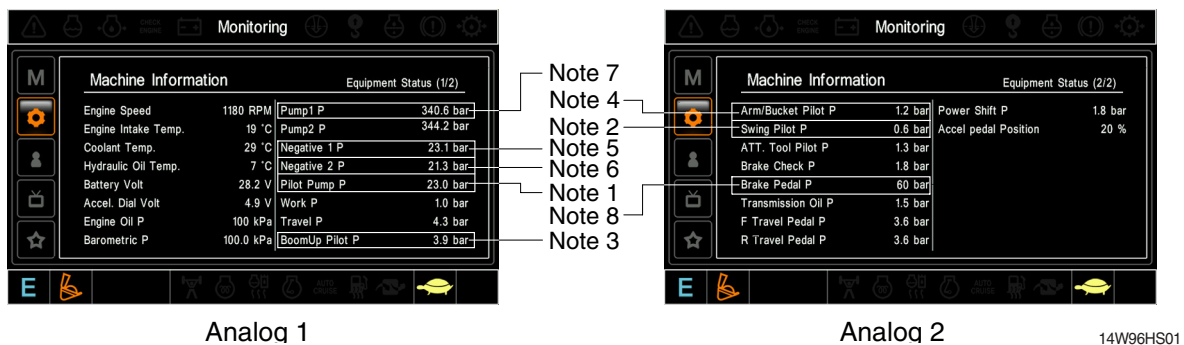
- ① Was there any strange thing about machine before failure occurred?
- ② Under what conditions did the failure occur?
- ③ Have any repairs been carried out before the failure?

(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) MACHINE STATUS MONITORING ON THE CLUSTER

(1) The machine status such as the engine rpm, oil temperature, voltage and pressure etc. can be checked by this menu.

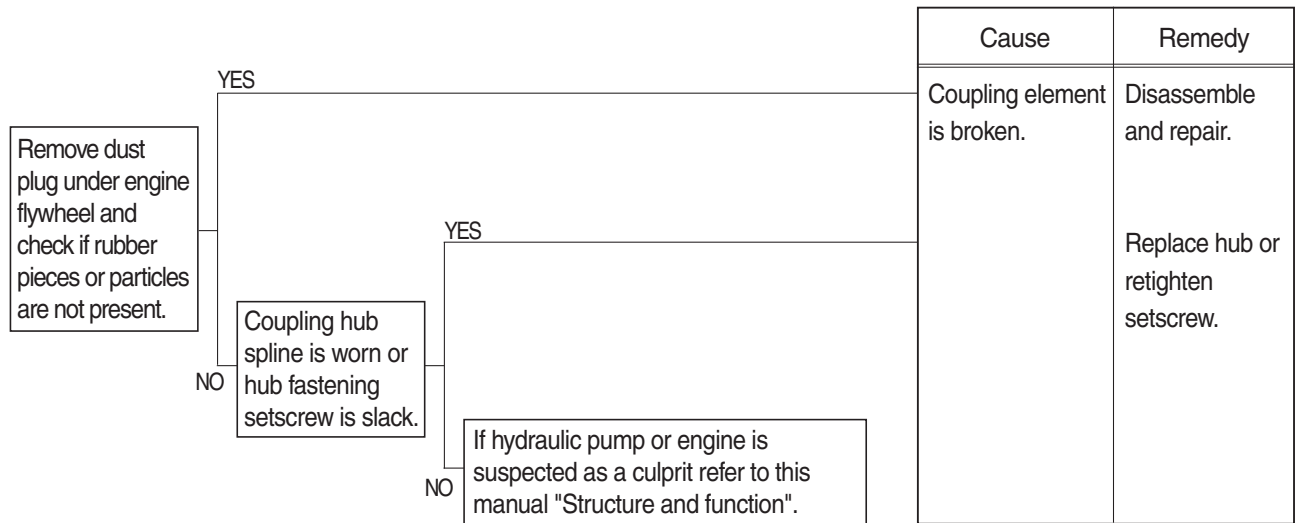


### (2) Specification

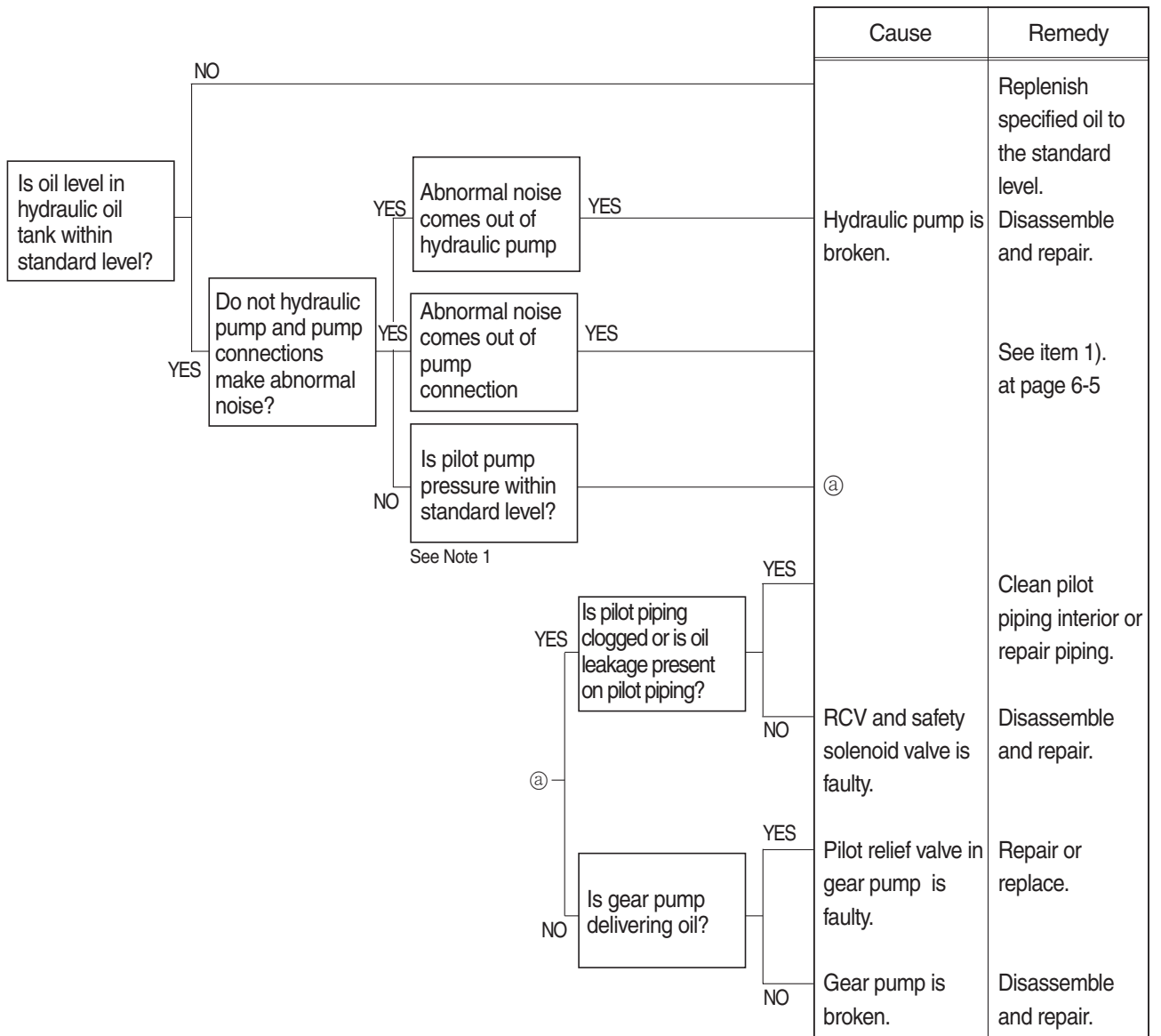
No.	Description	Specification
Note 1	Pilot pump pressure	40 <sup>+2</sup> <sub>0</sub> bar
Note 2	Swing pilot pressure	0~40 bar
Note 3	Boom up pilot pressure	0~40 bar
Note 4	Arm/bucket pilot pressure	0~40 bar
Note 5	P1 pump control pressure	0~25 bar
Note 6	P2 pump control pressure	0~25 bar
Note 7	Pump 1 pressure	350 bar
Note 8	Brake pedal pressure	60 ± 3 bar

## 2. DRIVE SYSTEM

### 1) UNUSUAL NOISE COMES OUT OF PUMP CONNECTION

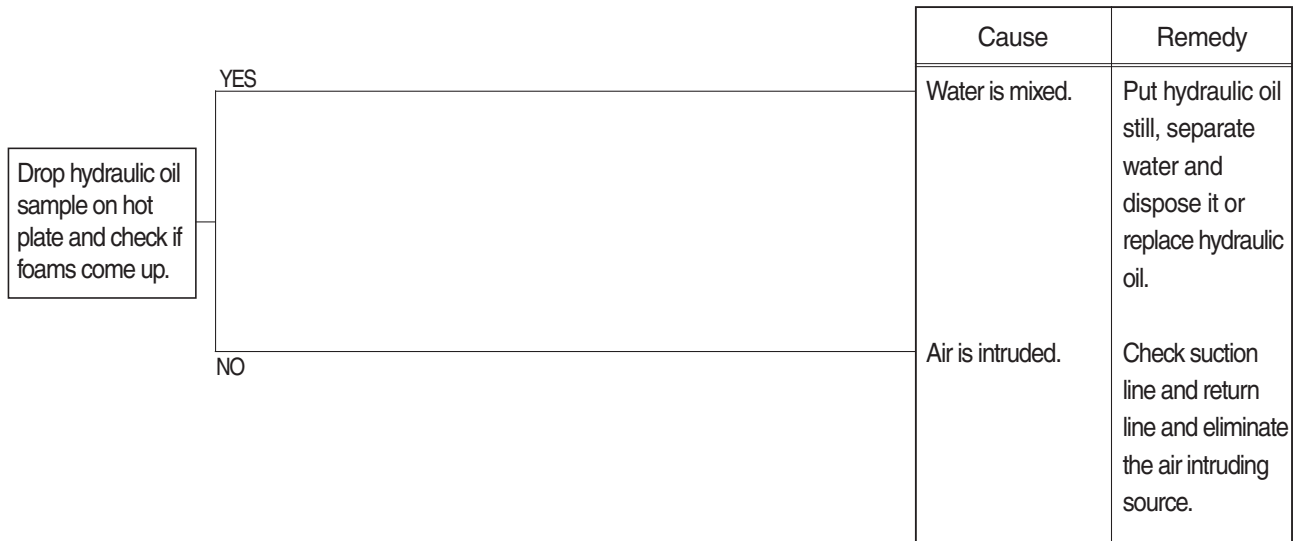


## 2) ENGINE STARTS BUT MACHINE DOES NOT OPERATE AT ALL

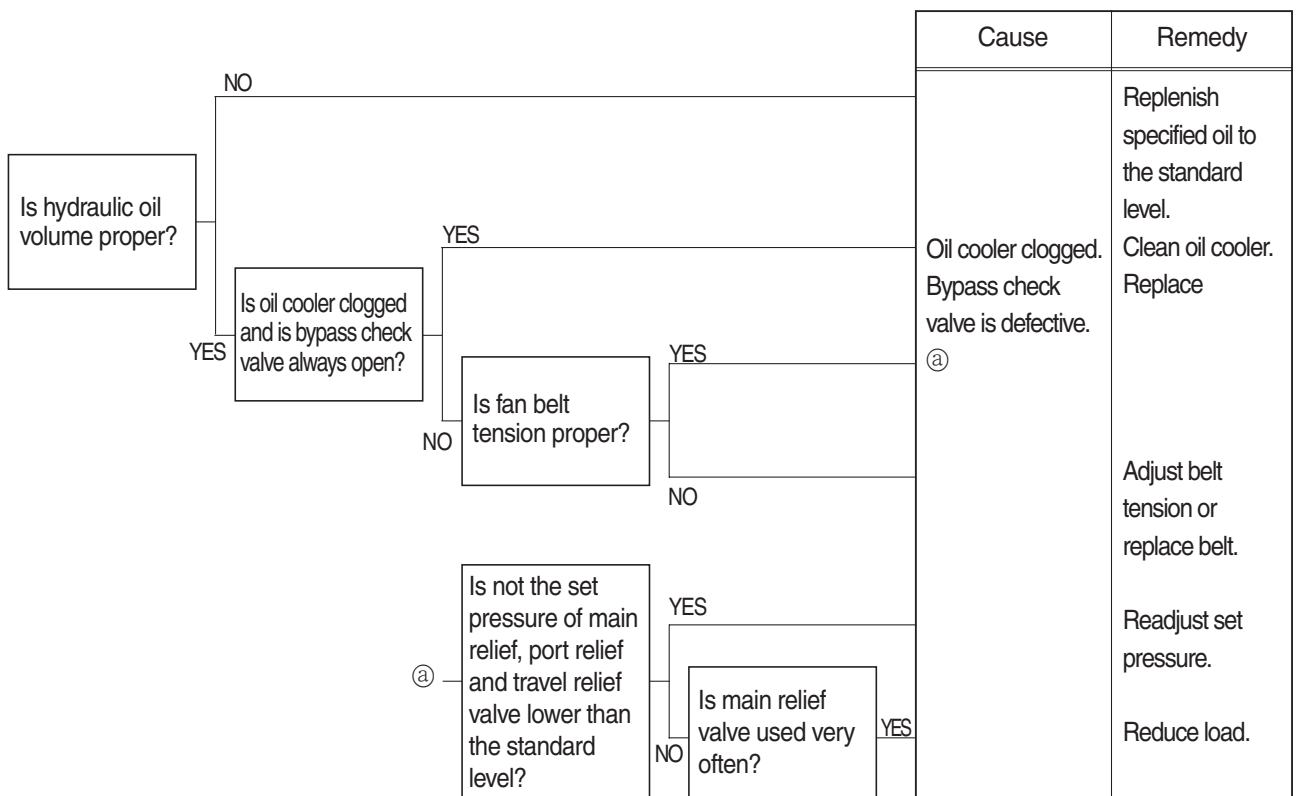


### 3. HYDRAULIC SYSTEM

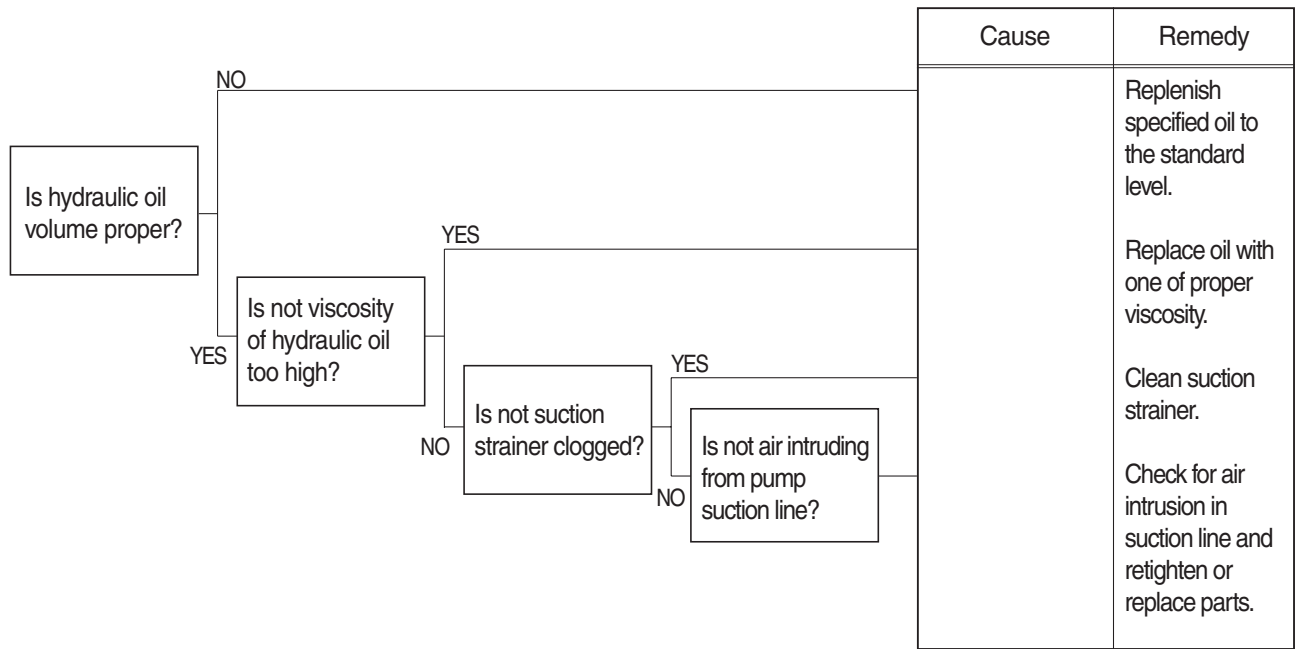
#### 1) HYDRAULIC OIL IS CLOUDY



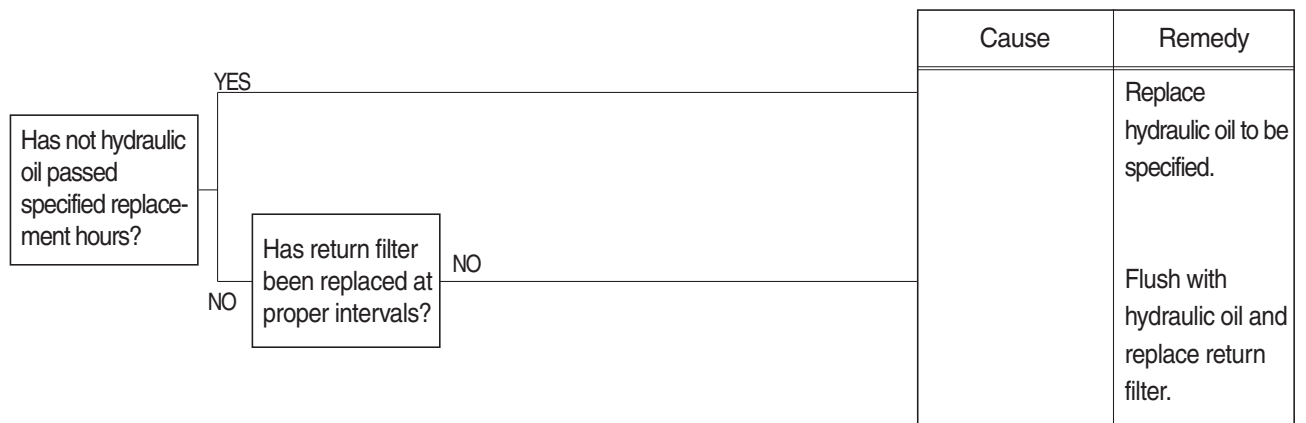
#### 2) HYDRAULIC OIL TEMPERATURE HAS RISEN ABNORMALLY



### 3) CAVITATION OCCURS WITH PUMP

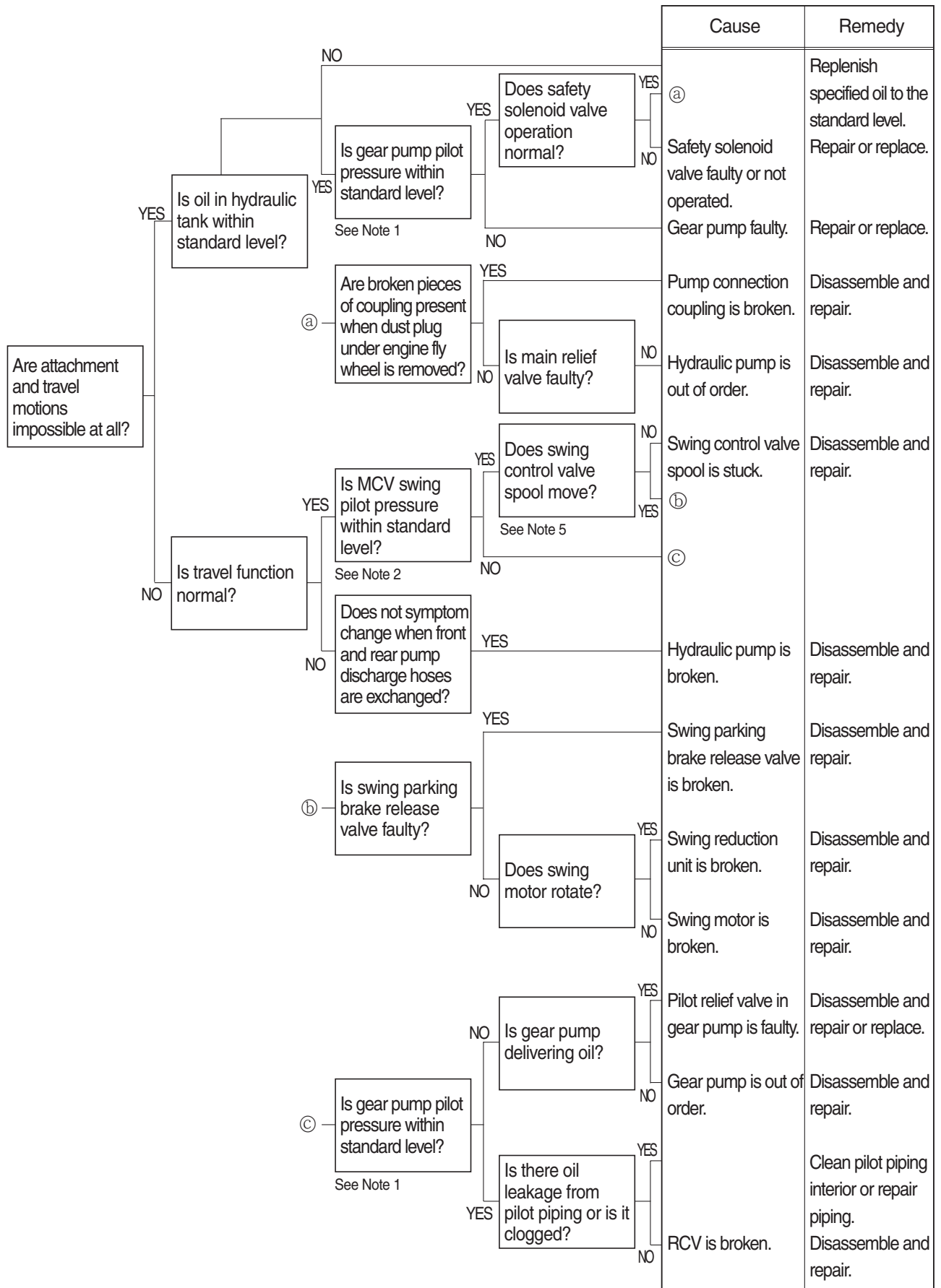


### 4) HYDRAULIC OIL IS CONTAMINATED

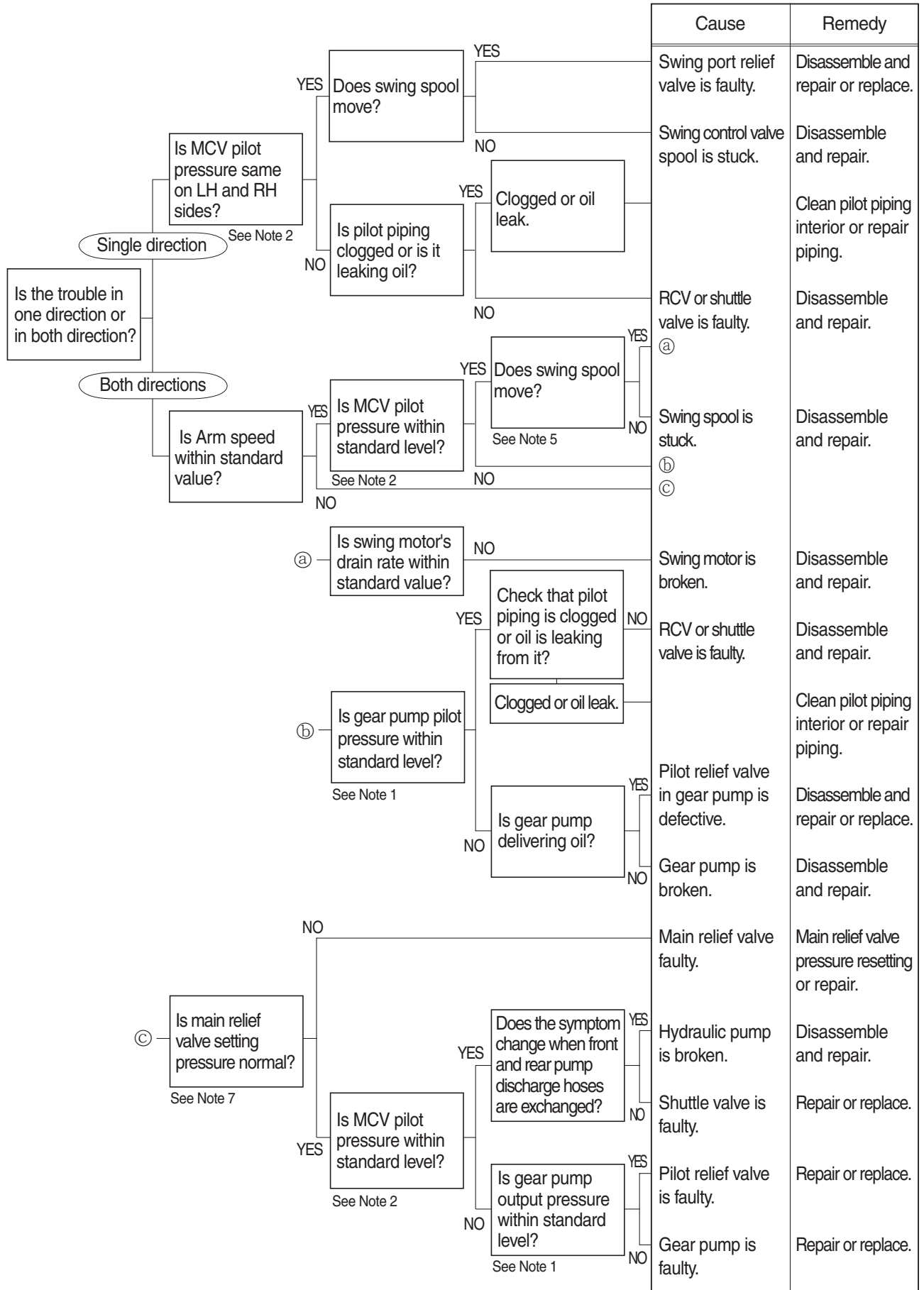


## 4. SWING SYSTEM

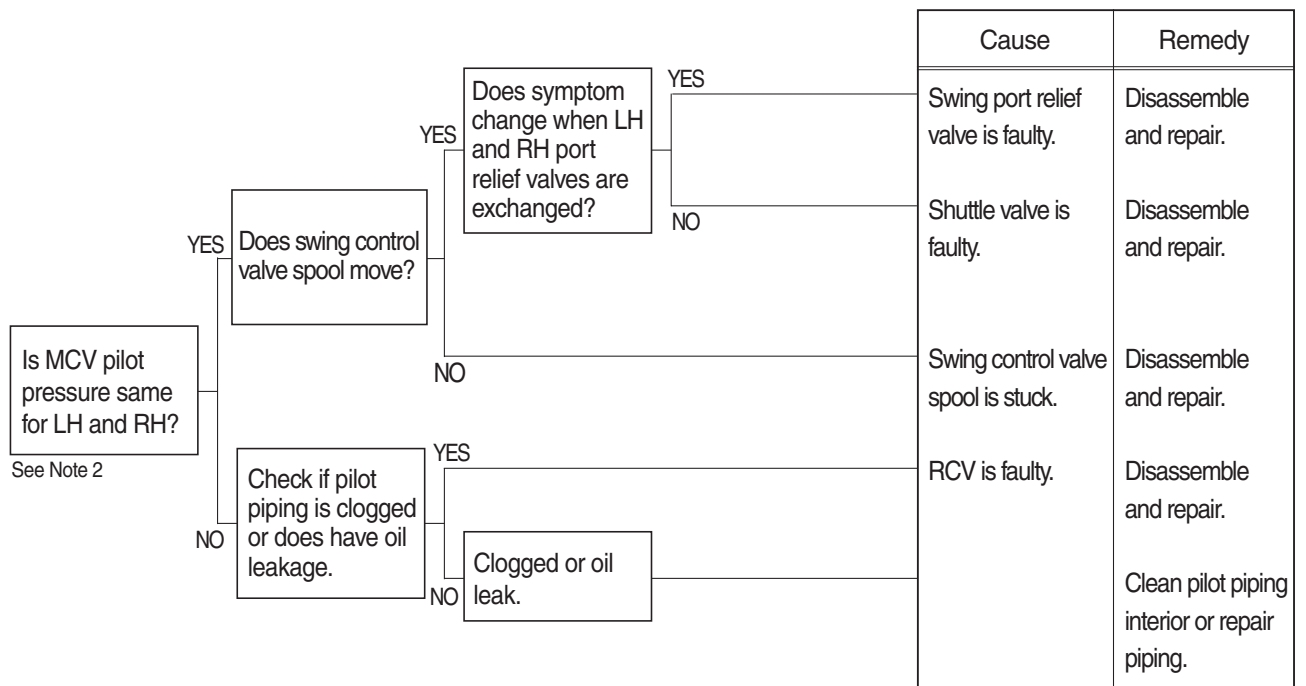
### 1) BOTH LH AND RH SWING ACTIONS ARE IMPOSSIBLE



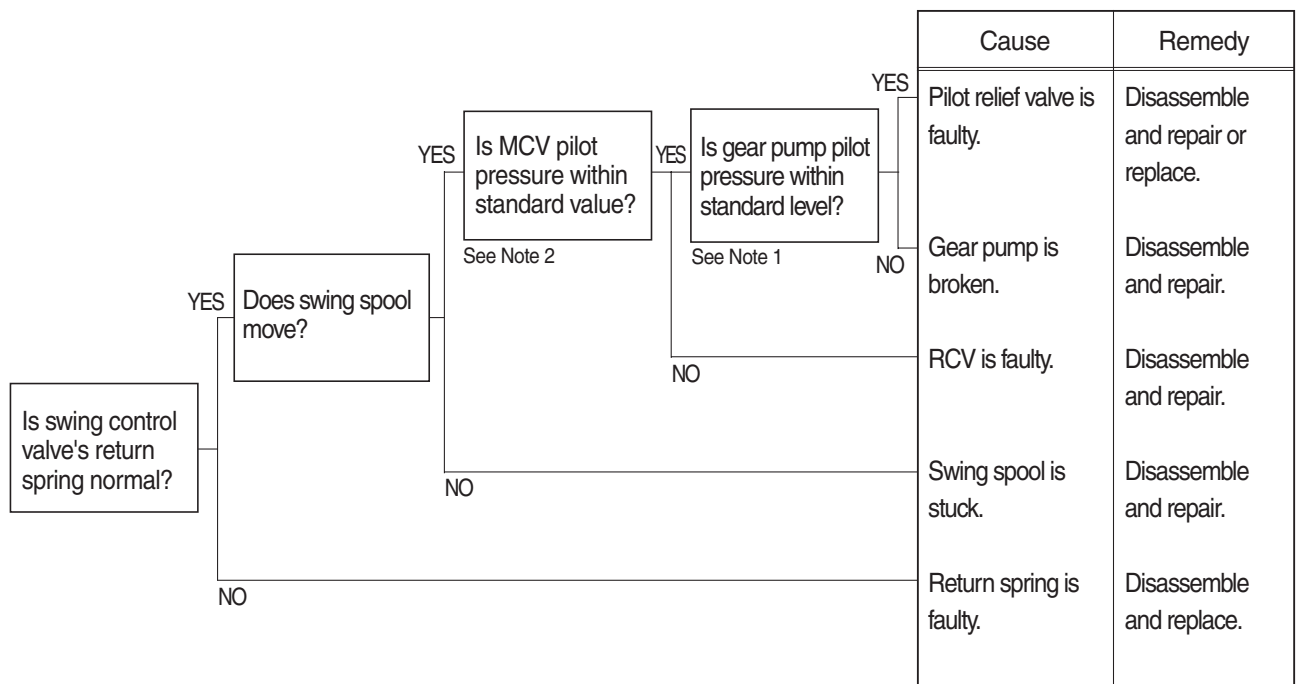
## 2) SWING SPEED IS LOW



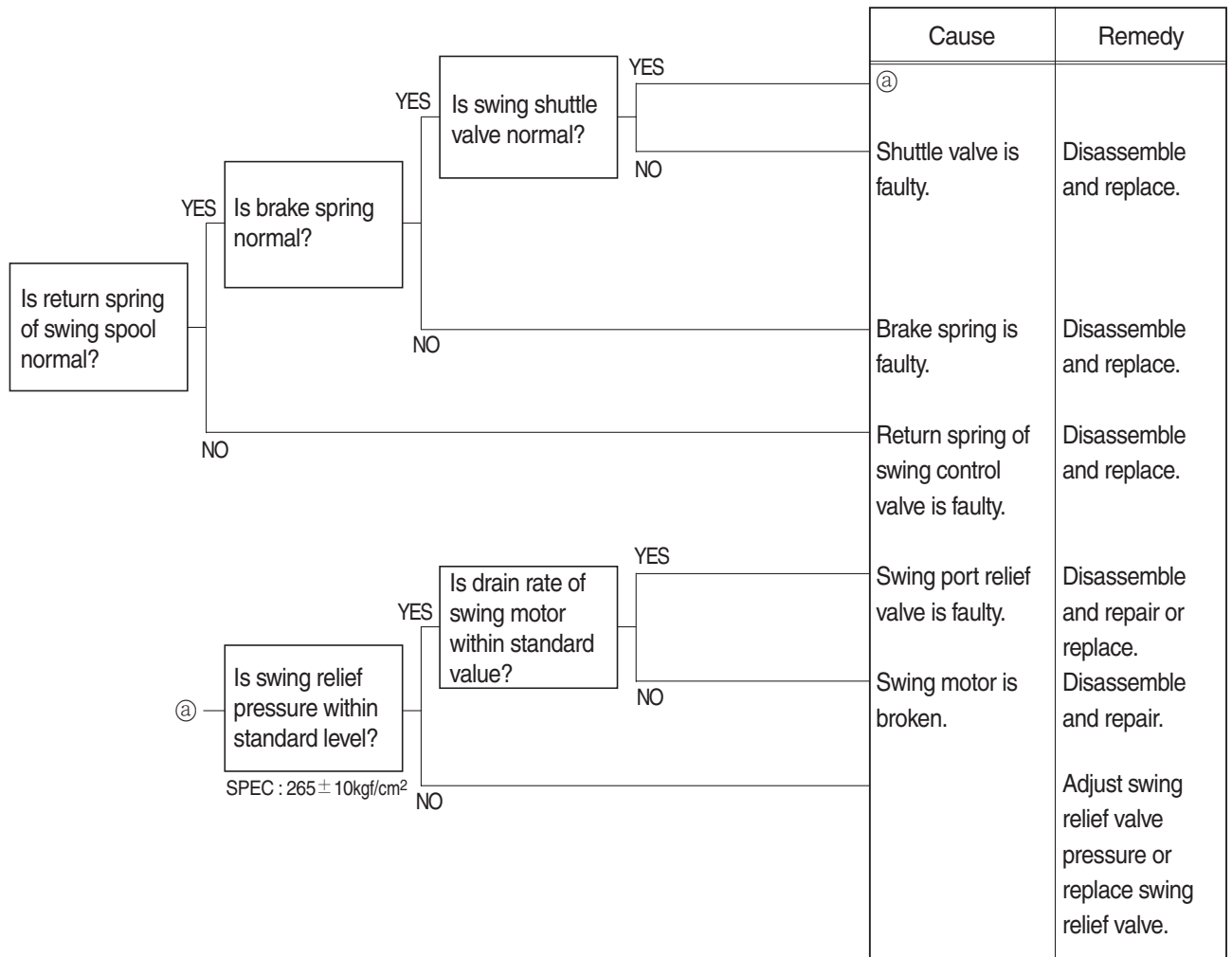
### 3) SWING MOTION IS IMPOSSIBLE IN ONE DIRECTION



### 4) MACHINE SWINGS BUT DOES NOT STOP

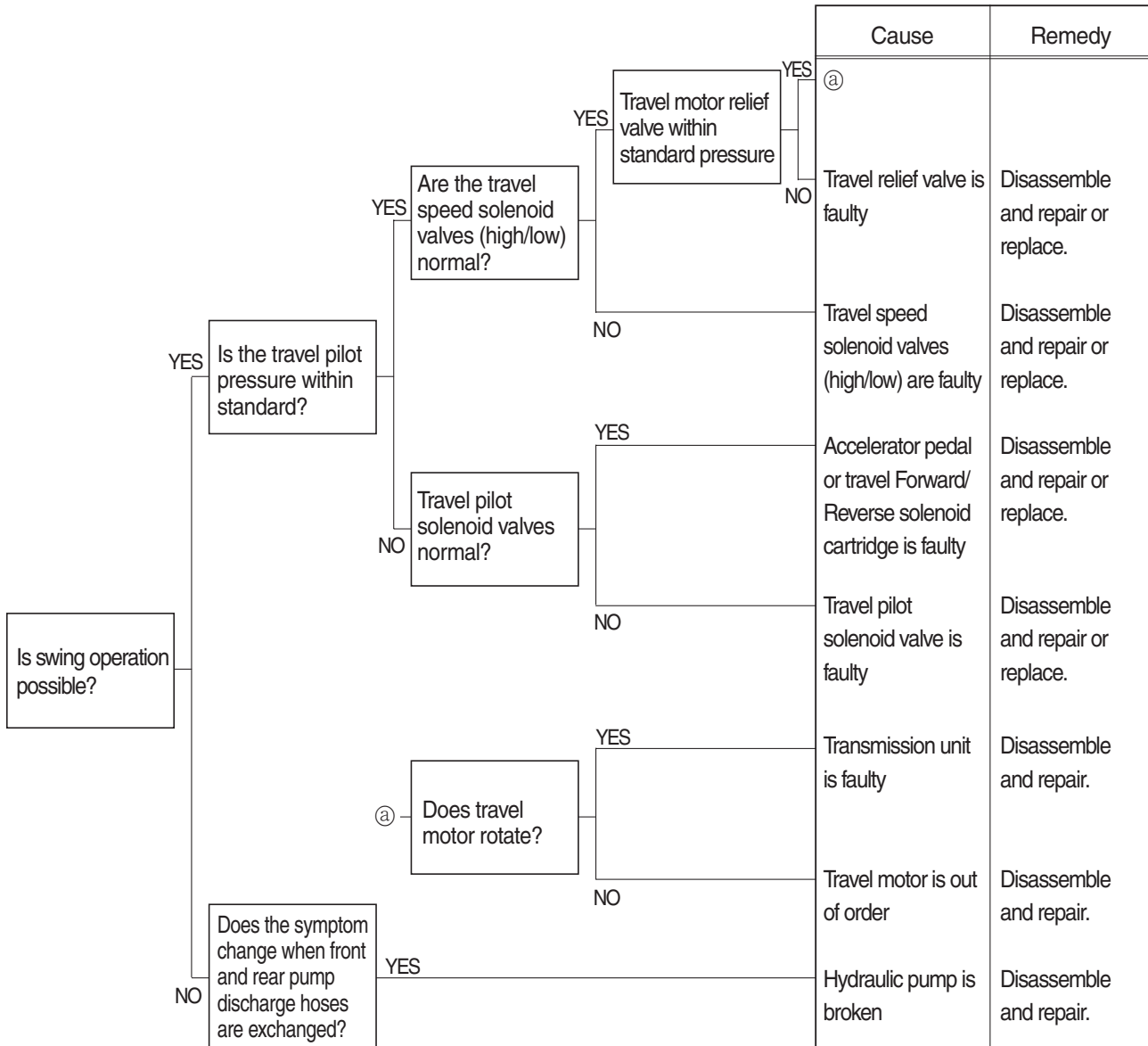


### 5) THE SWING UNIT DRIFTS WHEN THE MACHINE IS AT REST ON A SLOPE

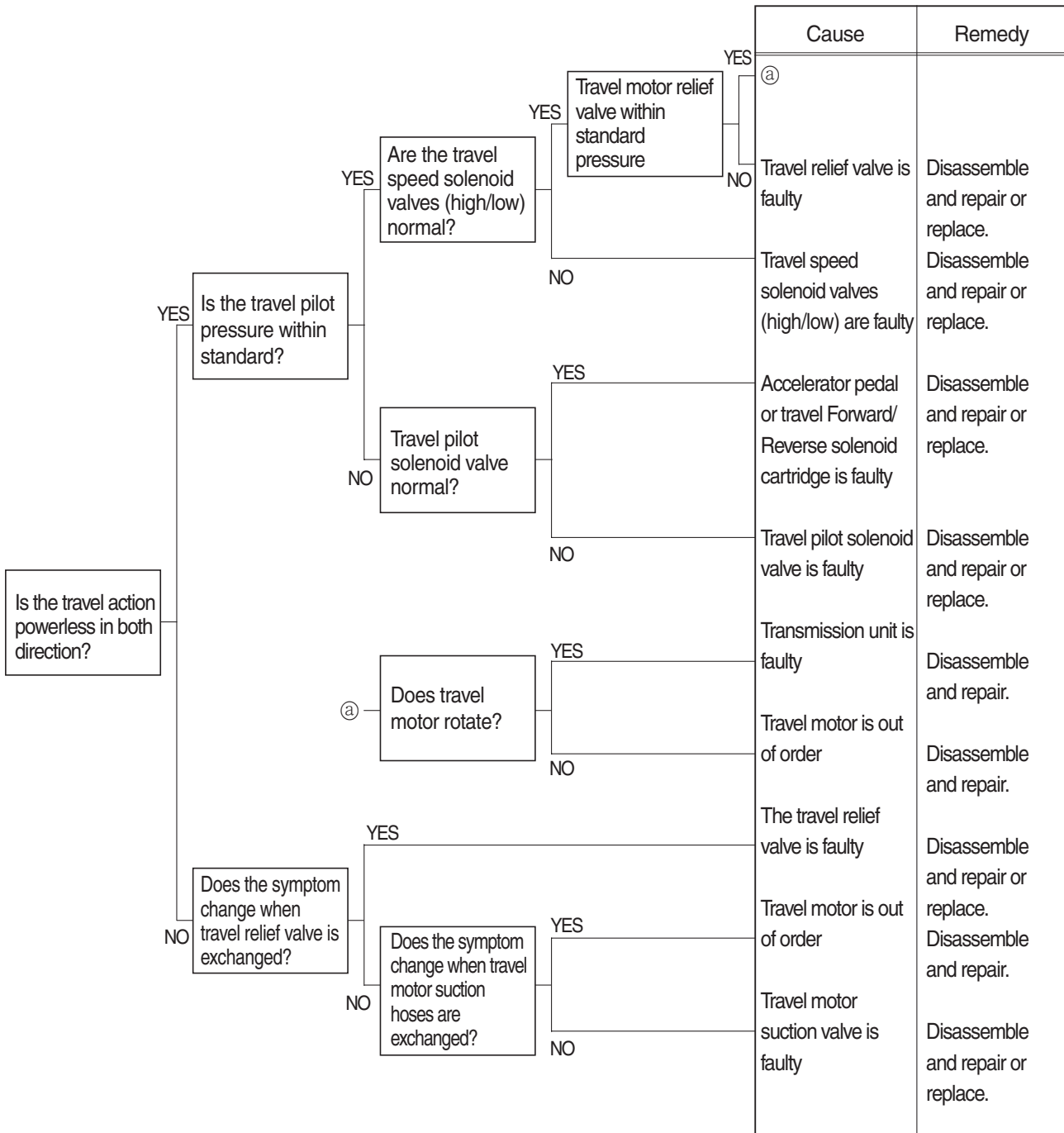


## 5. TRAVEL SYSTEM

### 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-avitation 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.

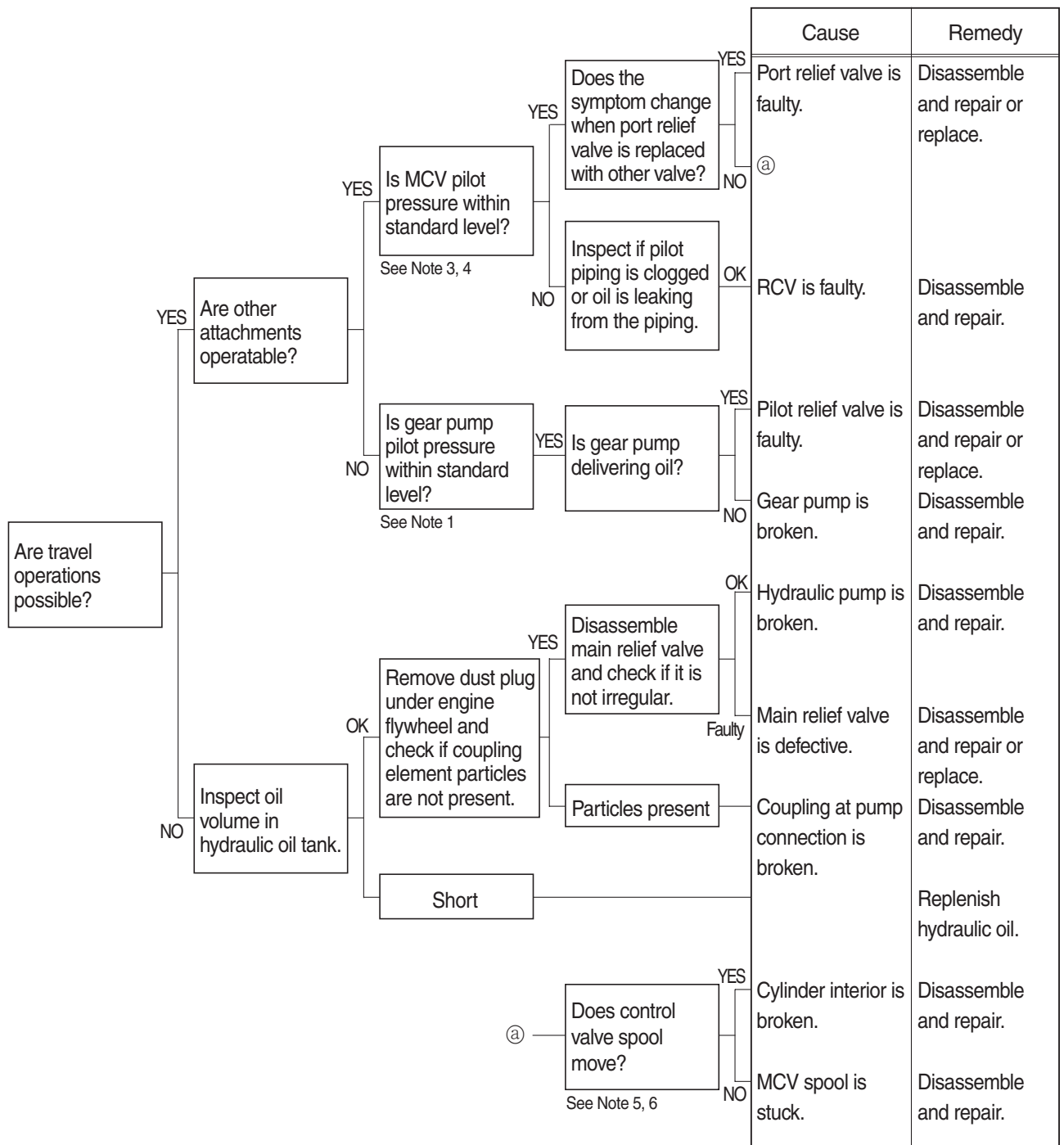
**6) EXTRAORDINARY NOISE IS HEARD WHEN SUDDENLY REDUCING THE SPEED FROM THE HIGH-SPEED MODE**

It takes time to accelerate the motor

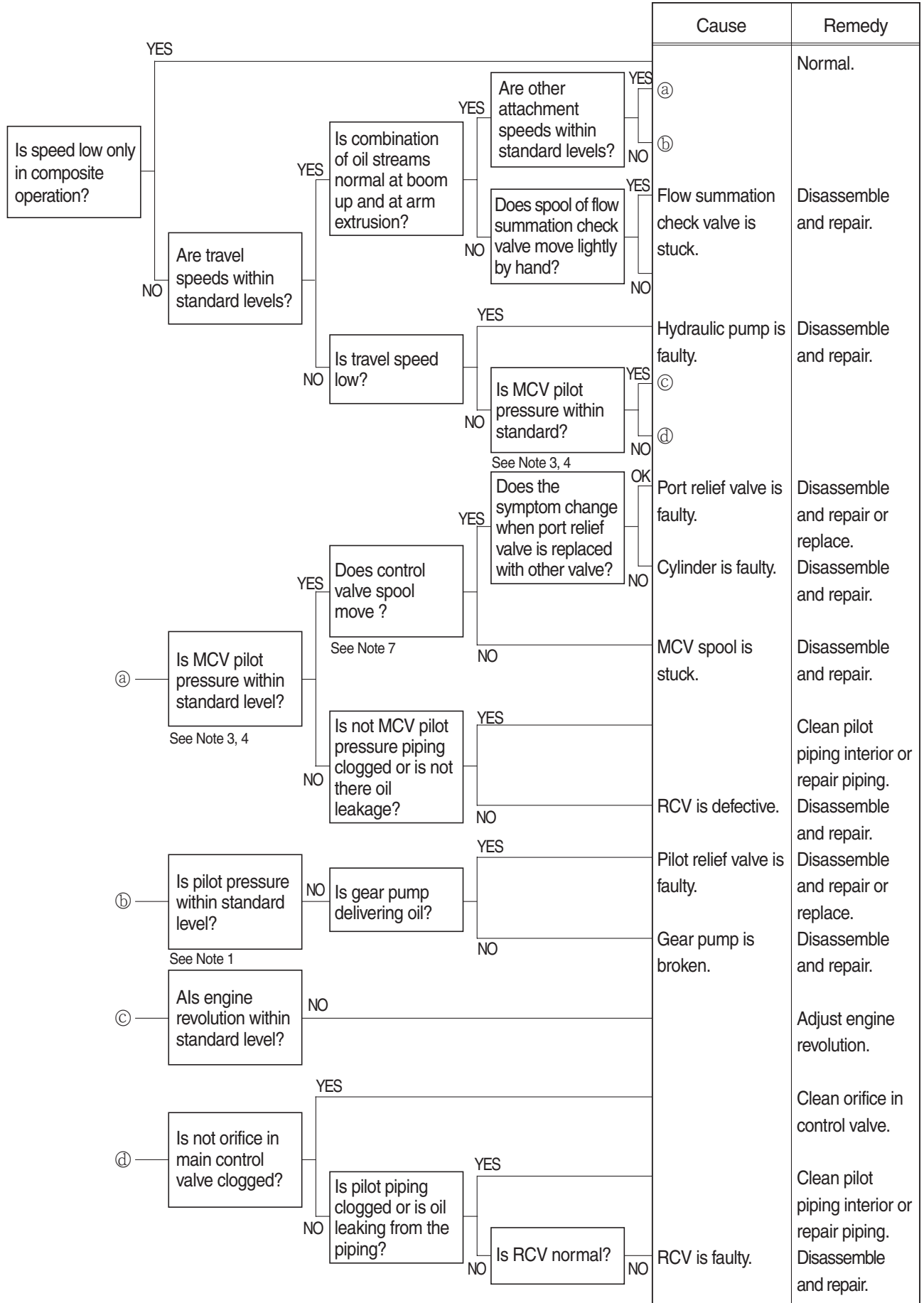
Cause	Remedy
The anti-cavitation valve does not work properly.	Screw the fitting bolts one more time with correct tightening torque. If the valve turns out to be damaged, it should be repaired.

## 6. ATTACHMENT SYSTEM

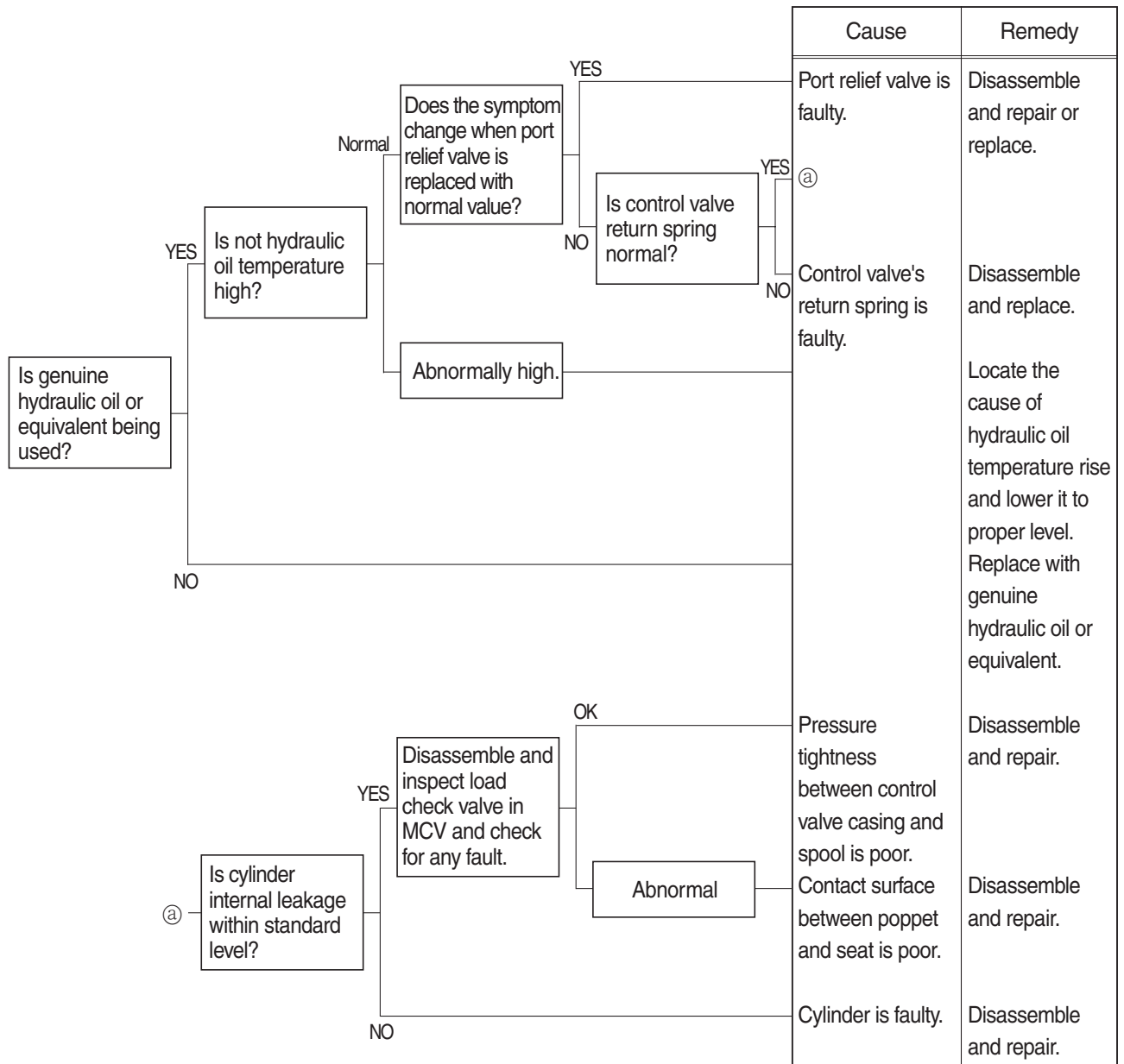
### 1) BOOM OR ARM ACTION IS IMPOSSIBLE AT ALL



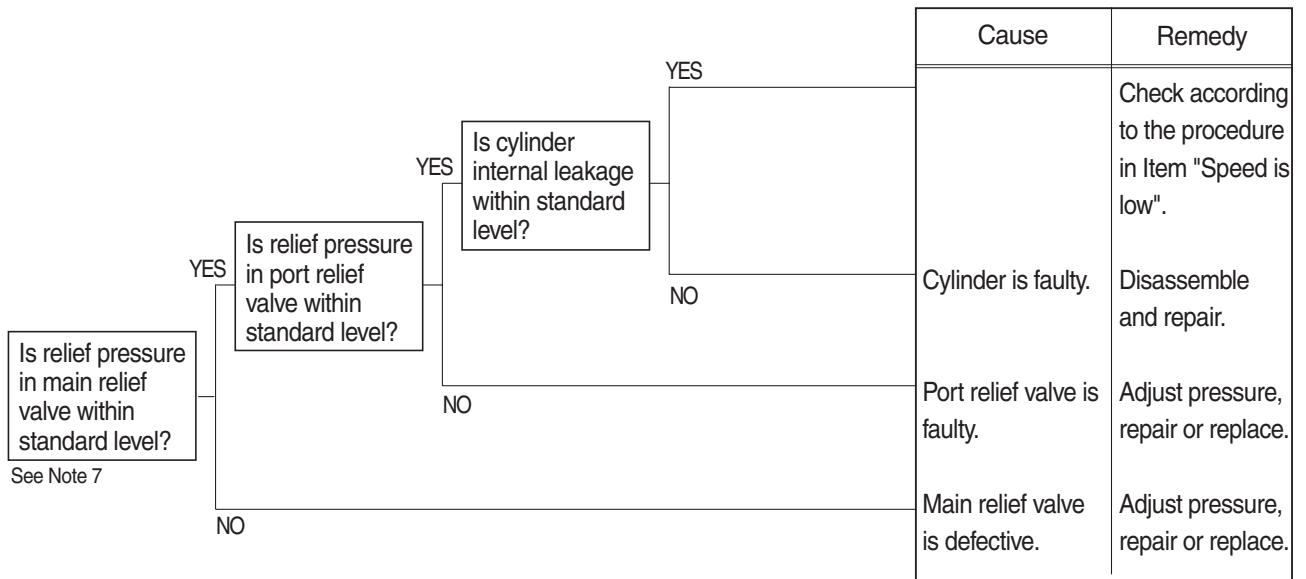
## 2) BOOM, ARM OR BUCKET SPEED IS LOW



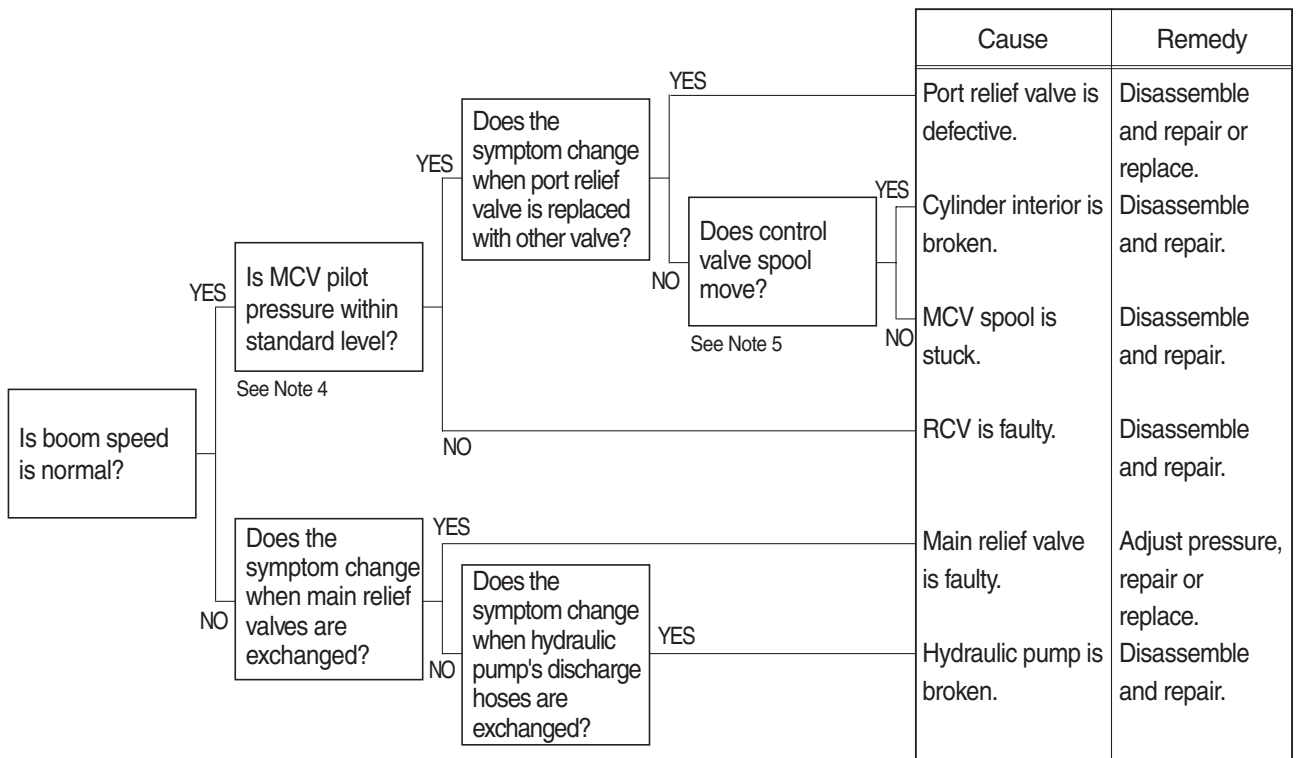
### 3) BOOM, ARM OR BUCKET CYLINDER EXTENDS OR CONTRACTS ITSELF AND ATTACHMENT FALLS



#### 4) BOOM, ARM OR BUCKET POWER IS WEAK



#### 5) ONLY BUCKET OPERATION IS TOTALLY IMPOSSIBLE

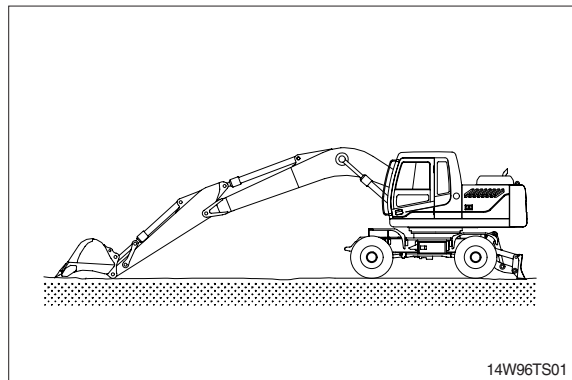


6) BOOM MAKES A SQUEAKING NOISE WHEN BOOM IS OPERATED

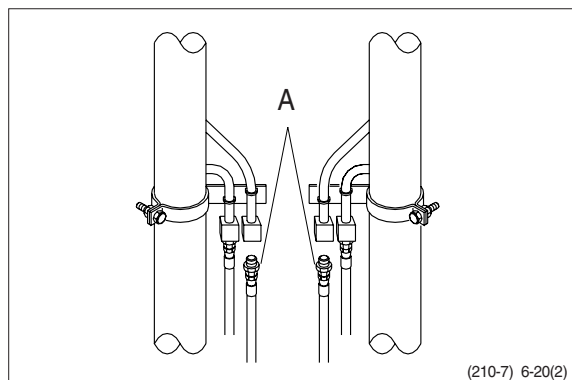
<p>Is boom foot pin greased sufficiently?</p>	YES		<p>Cause</p> <p>Remedy</p> <p>Frictional noise occurs between the sliding faces of boom cylinder's oil seal and boom proper.</p> <p>※ Frictional noise will disappear if they are kept used.</p>
	NO	<p>Boom foot pin has run out of grease.</p>	<p>Supply 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.



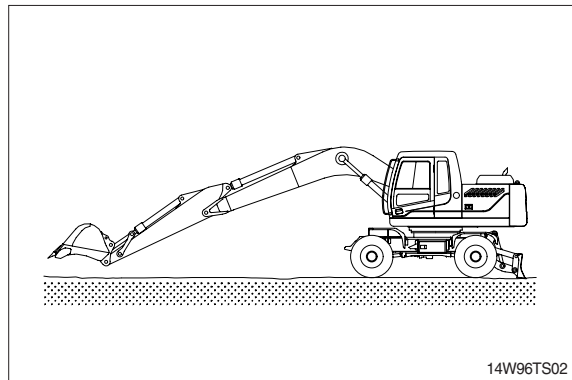
2. Disconnect hose (A) from rod side of boom cylinder and drain oil from cylinders and hose. (put cups on piping and hose ends)



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.



## 7. FRONT AXLE AND REAR AXLE

Problem	Cause	Correction
Insufficient braking	1. Incorrect adjustment	Inspect disc thickness and if discs are usable readjust brakes to the specifications in the manual.
	2. Brake discs worn out	Inspect disc thickness and replace if necessary.
	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 housings. 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 "overheating" problem.
Soft brake pedal	6. Air in brake circuit	Bleed air in brake circuit.
Ineffective safety brake	7. Incorrect adjustment	See correction No.1.
	8. Brake disc worn out	See correction No.2.
Overheating	9. Oil level wrong	Drain, flush and refill oil to proper level.
	10. Too small of a brake gap	Readjust brakes to the specifications.
	11. Park brake dragging	Unlock the brake and adjust the correct gap.
	12. Incorrect brake fluid in system	See correction No.3.
	13. No free-pedal at master cylinder	Readjust brake pedal.
	14. Restriction in brake lines	Inspect for and replace damage lines.
	15. 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.
16. Incorrect lubricant	Change the retaining rings of the brake circuit and brake pump.	
Diff-lock inoperative	17. If manual control, loose or misadjusted linkage	Inspect and correct linkage and readjust.
	18. If hydraulic control, problems in the hydraulic or electrical circuits of the machine.	Refer to the hydraulic or electrical section in this manual.
	19. If hydraulic control problems in actuating cylinder (noteable through loss of hydraulic oil or increase of the oil level in axle)	Rebuilt cylinder.
	20. If with limit slip differential, worn discs	Replace discs.

Problem	Cause	Correction
Oil coming out of breather	21. Leak in internal brake system 22. Leak in diff-lock actuating cylinder	See correction No.2 and No.3. See correction No.19.
Nospin indexing noise when driving straight * With nospin, fatigue damage can occur on the side with the larger tire.	23. Unequal tire pressure left and right 24. Different style, size or brand of tires between left and right hand side	Inflate tires to the recommended pressure in this manual, or until the rolling radius is equal. Change tires to make the rolling radius equal. Vary the tire pressure within the specifications until the rolling radius is equal.
Noise during coast and under power the same	25. Wheel bearings damaged	Replace and adjust
Noise under power greater than during coast	26. Low oil level 27. Incorrect lubricant 28. Ring and pinion worn 29. Worn ring and pinion bearings 30. Worn planetary gears or bearings	Refill oil to proper level See correction No.16. Inspect through top cover. Replace and adjust. Replace and adjust Replace.
Noise during coast greater than under power	31. Loose pinion nut 32. Only pinion bearing damaged	Inspect ring, pinion and pinion bearings. If undamaged, retighten nut. See correction No.29.
Noise during turn (Without nospin)	33. Worn spider and/or side gears	Replace.
A stick slip noise when going from forward to reverse	34. Worn or damaged cardan shaft 35. Loose wheel 36. Articulation box joint and achsel shaft damaged 37. Spider pins loose in diff-carrier 38. Damaged or missing spider and/or side gear washers	Inspect and replace. Inspect for wheel and wheel stud damage. Replace if needed and retorque lugnuts. Inspect and replace. Inspect through top cover. Replace. See correction No.33.