

GROUP 2 HYDRAULIC AND MECHANICAL SYSTEM

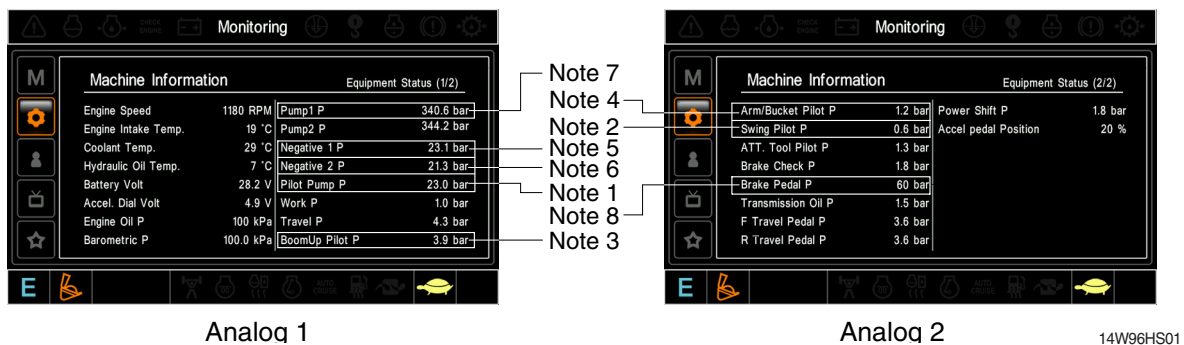
1. INTRODUCTION

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.

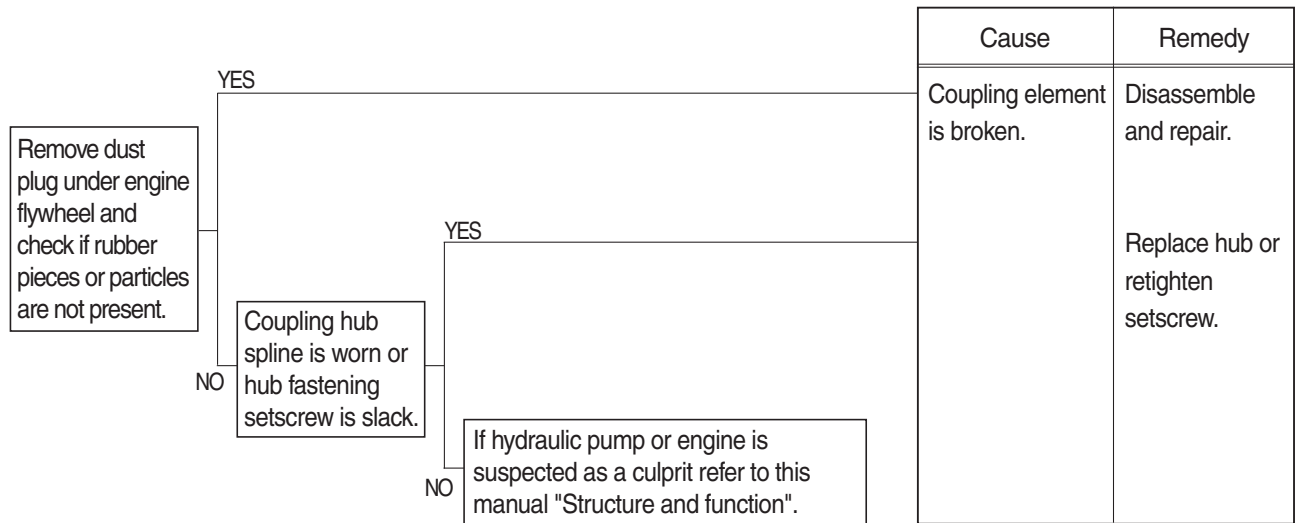


(2) Specification

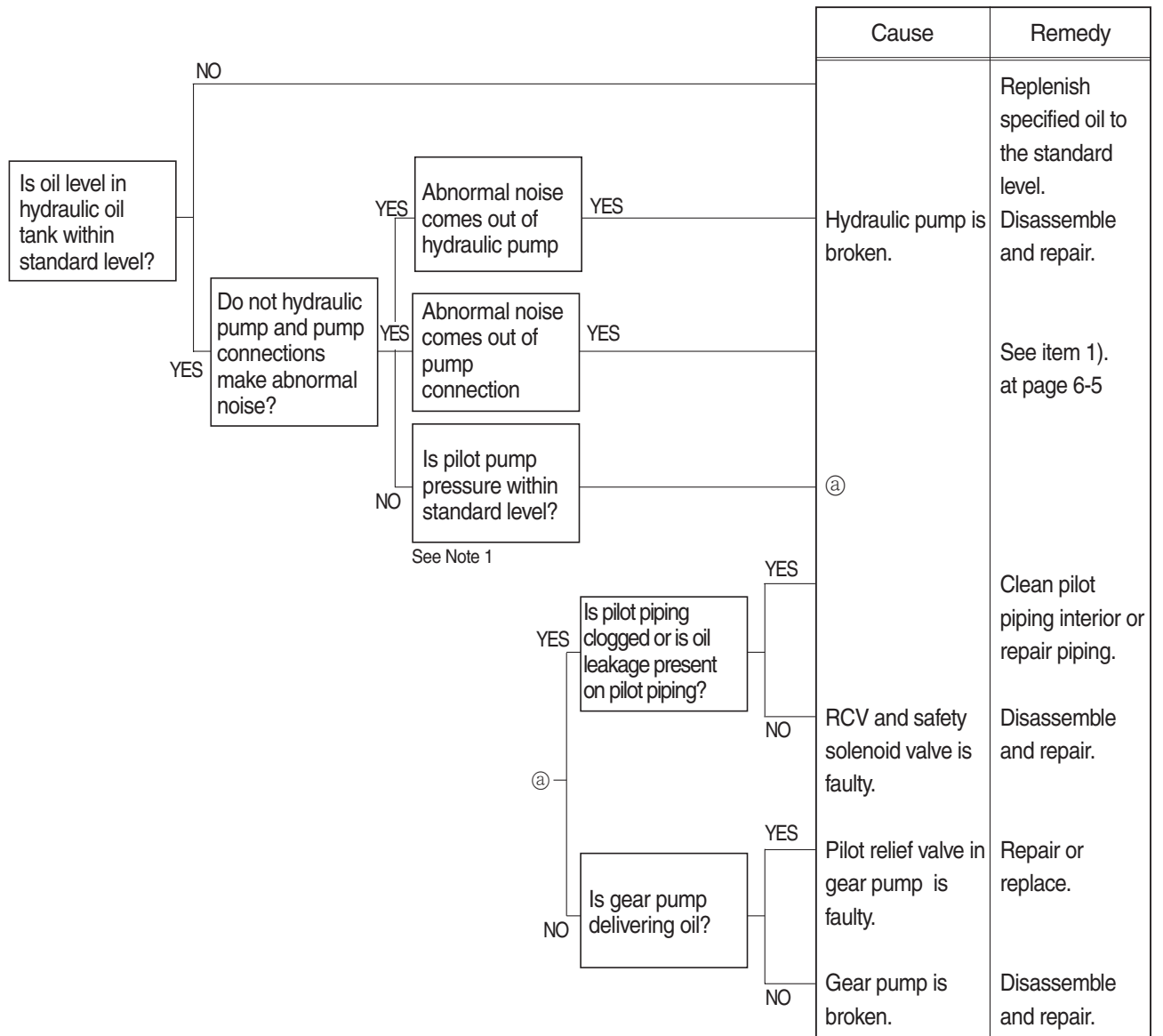
| No. | Description | Specification |
|--------|---------------------------|-----------------|
| Note 1 | Pilot pump pressure | 40^{+2}_0 bar |
| Note 2 | Swing pilot pressure | 0~40 bar |
| Note 3 | Boom up pilot pressure | 0~40 bar |
| Note 4 | Arm/bucket pilot pressure | 0~40 bar |
| Note 5 | P1 pump 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

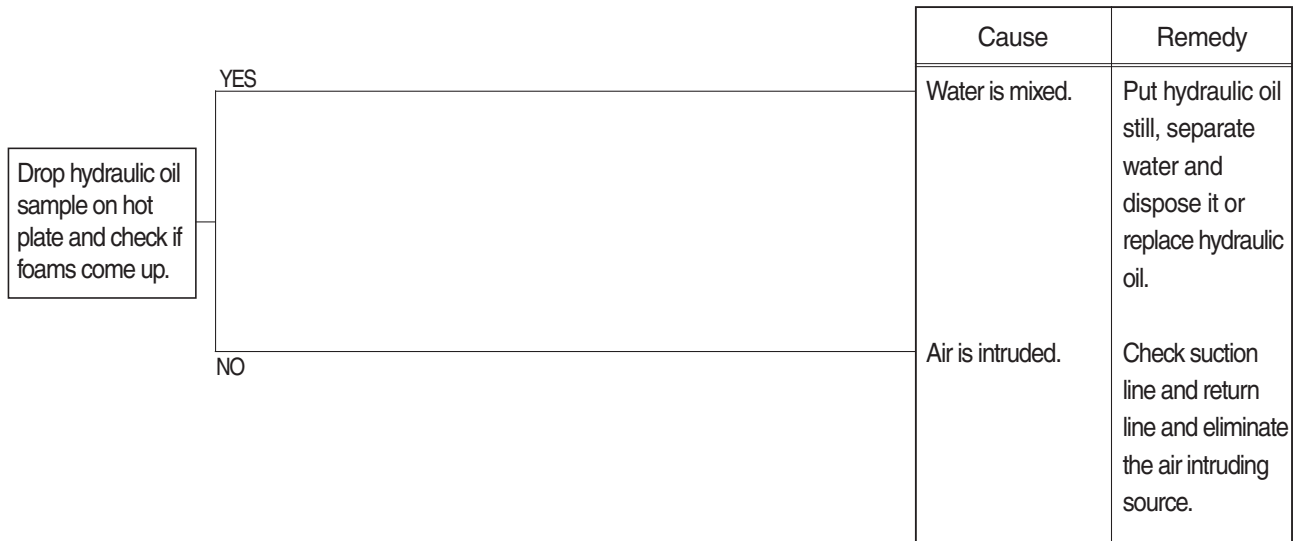


2) ENGINE STARTS BUT MACHINE DOES NOT OPERATE AT ALL

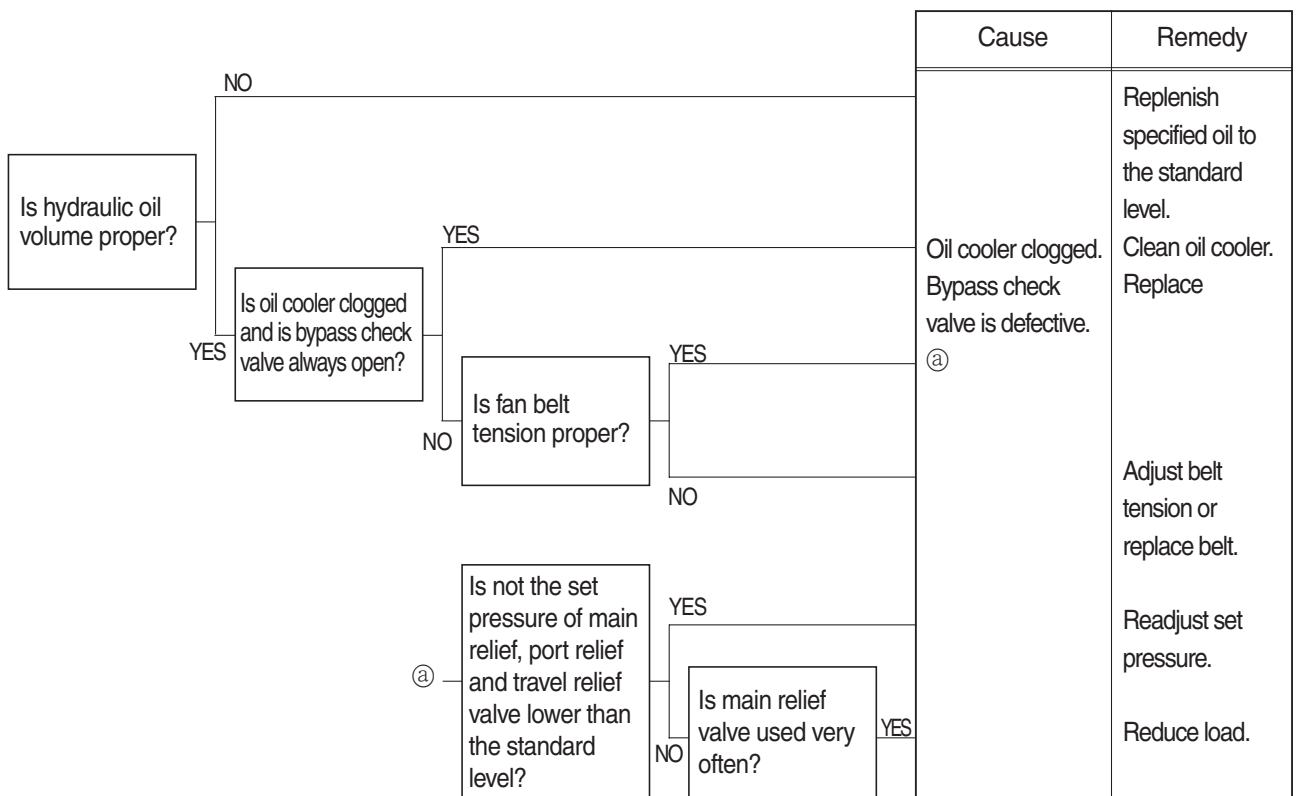


3. HYDRAULIC SYSTEM

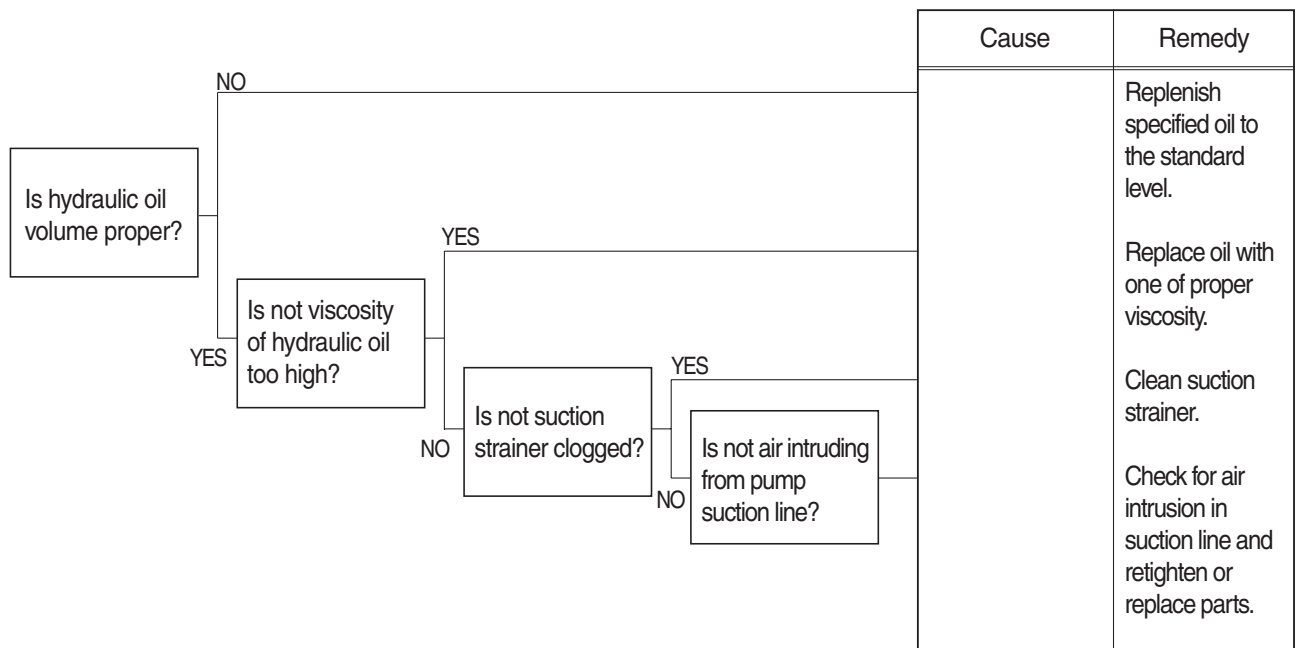
1) HYDRAULIC OIL IS CLOUDY



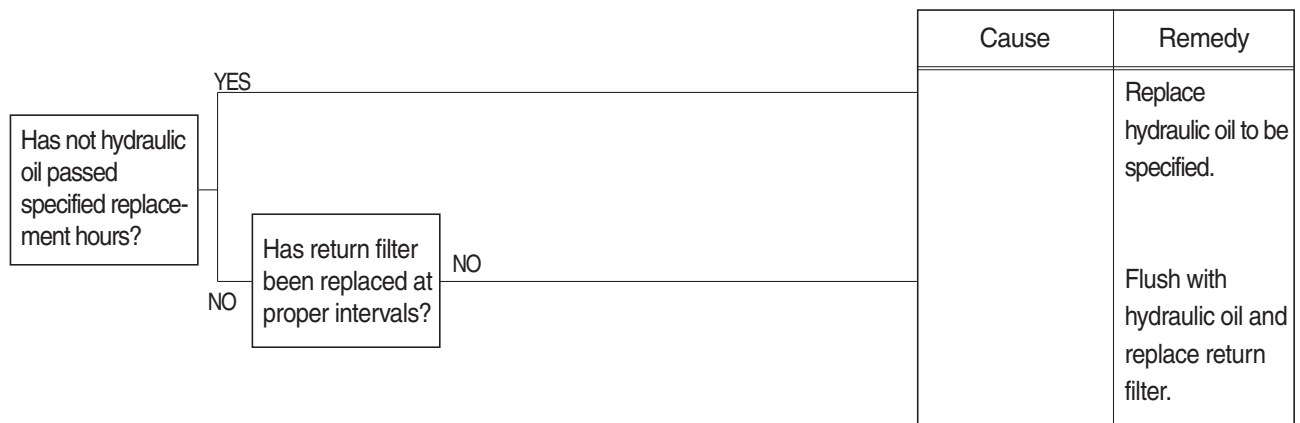
2) HYDRAULIC OIL TEMPERATURE HAS RISEN ABNORMALLY



3) CAVITATION OCCURS WITH PUMP

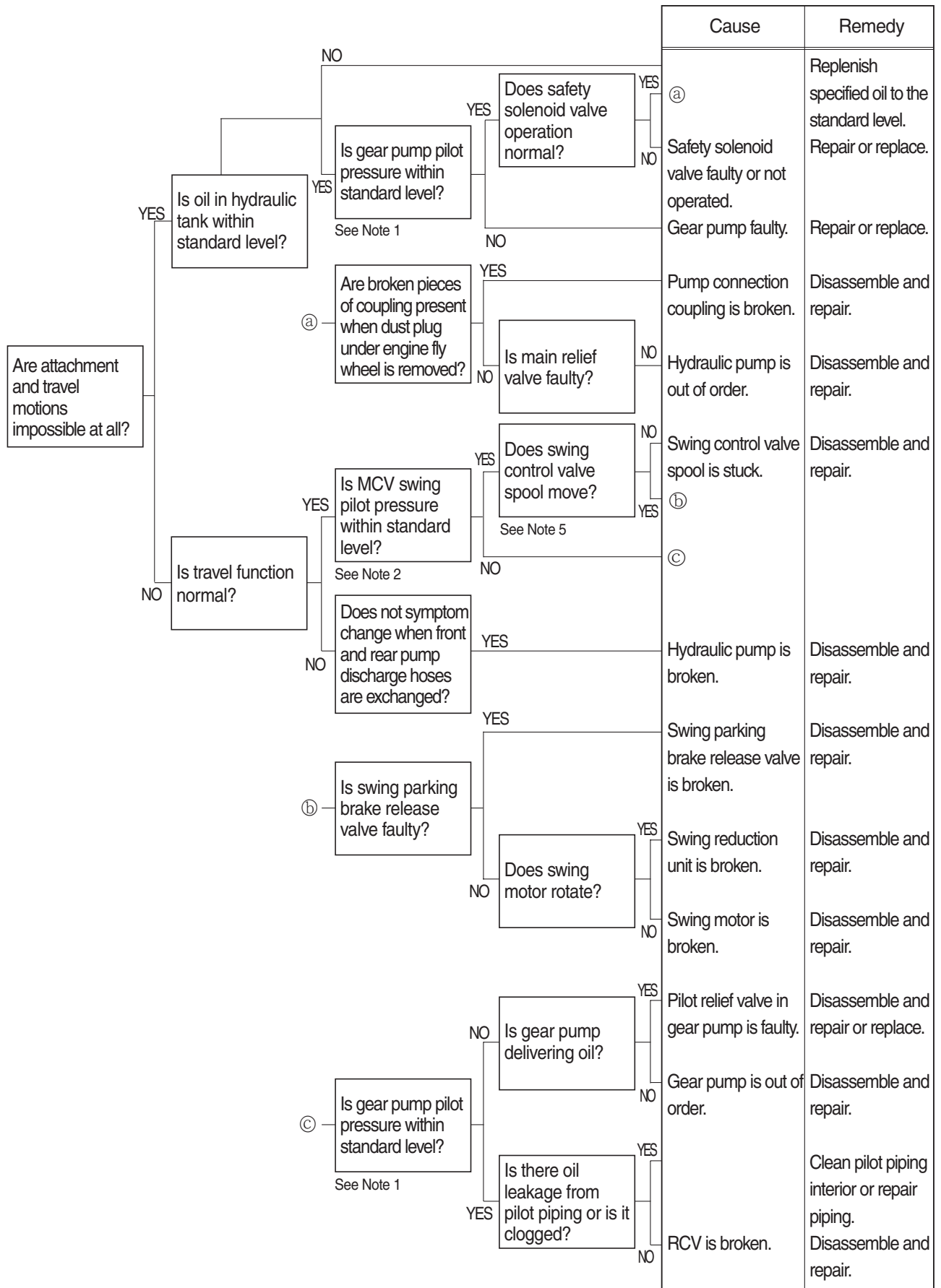


4) HYDRAULIC OIL IS CONTAMINATED

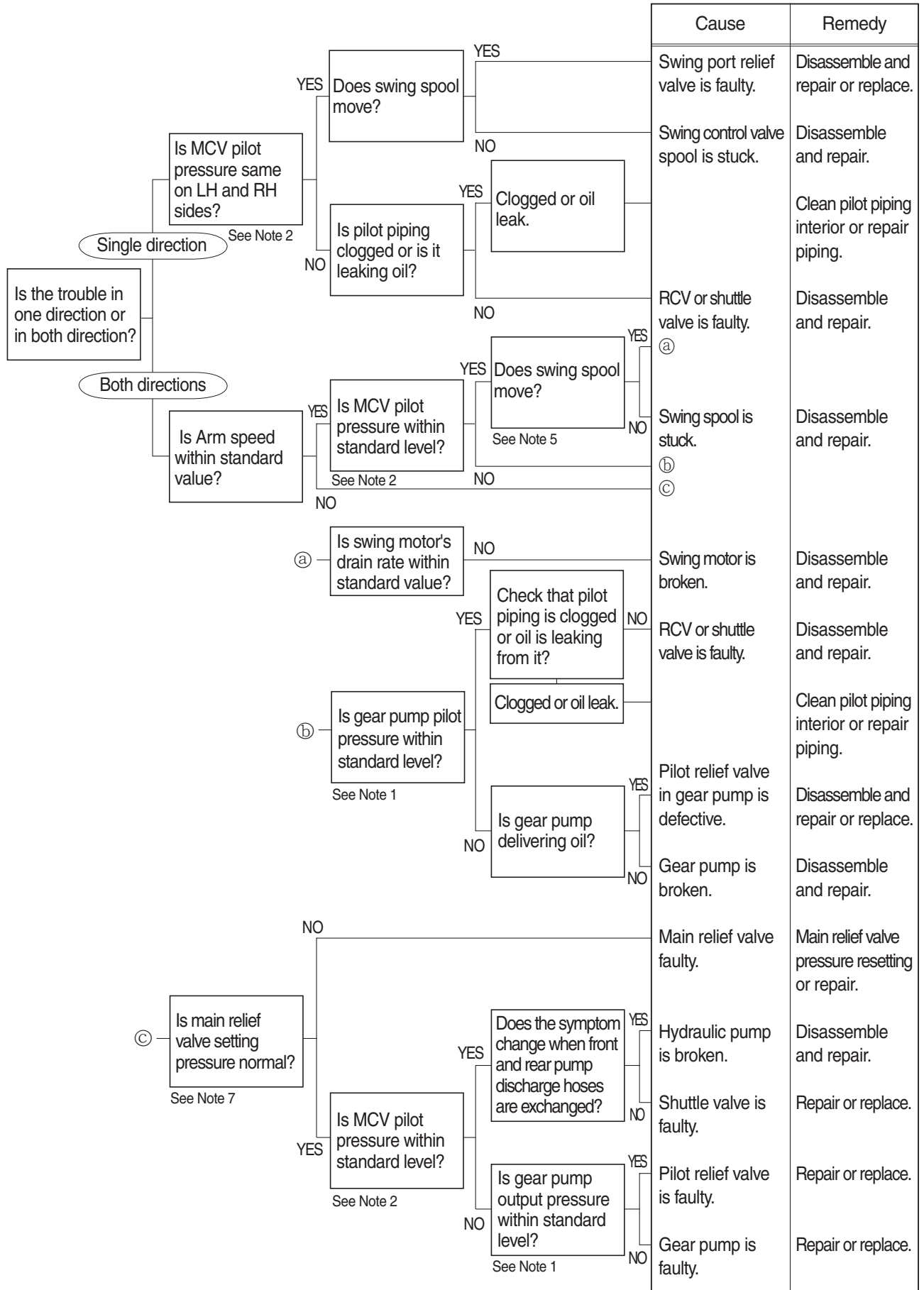


4. SWING SYSTEM

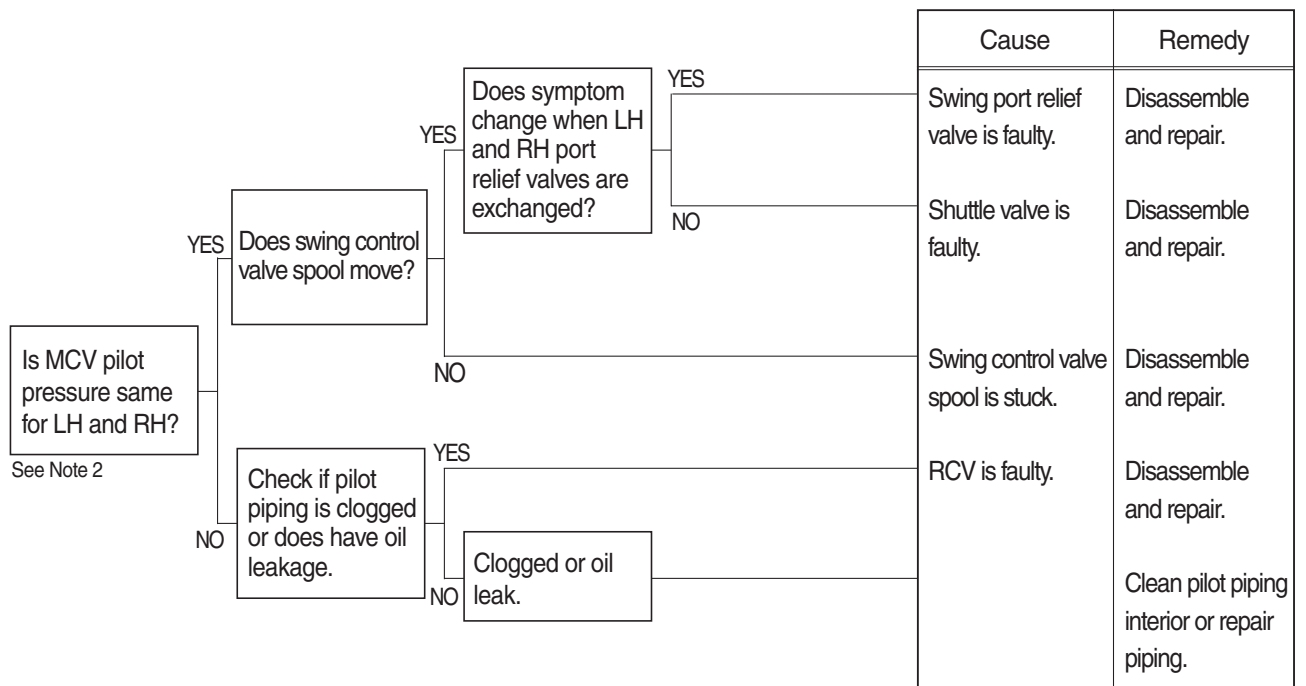
1) BOTH LH AND RH SWING ACTIONS ARE IMPOSSIBLE



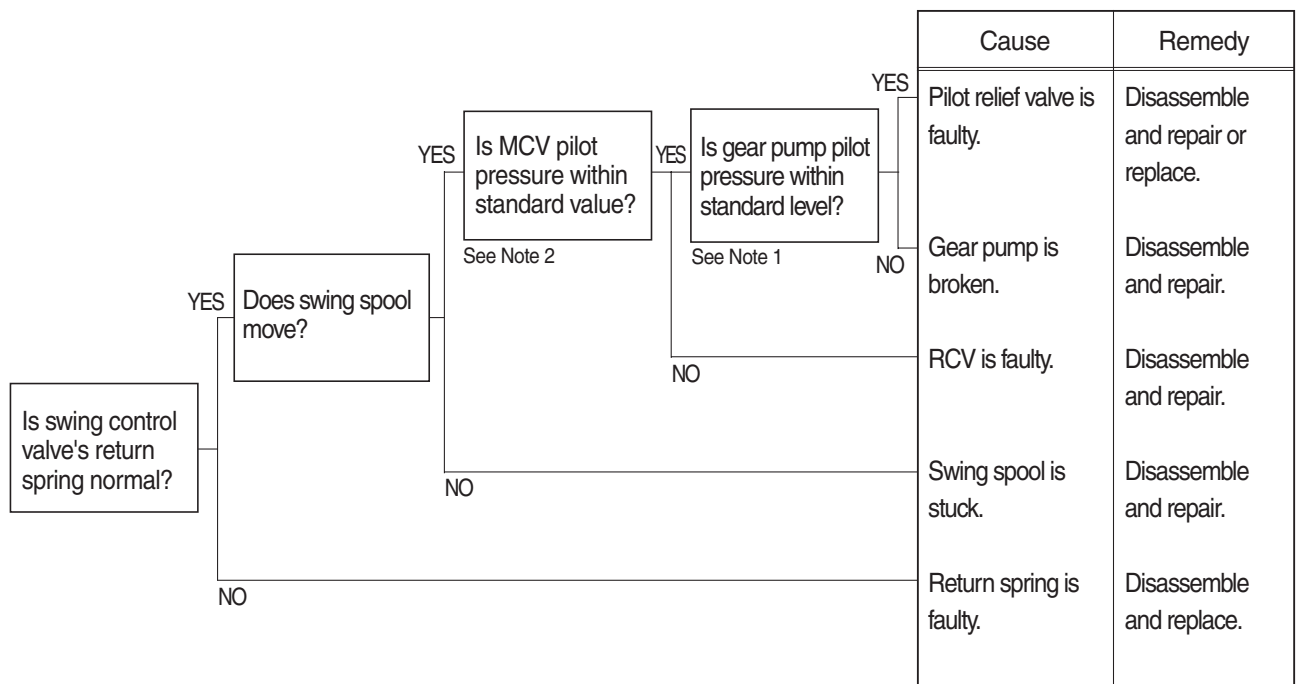
2) SWING SPEED IS LOW



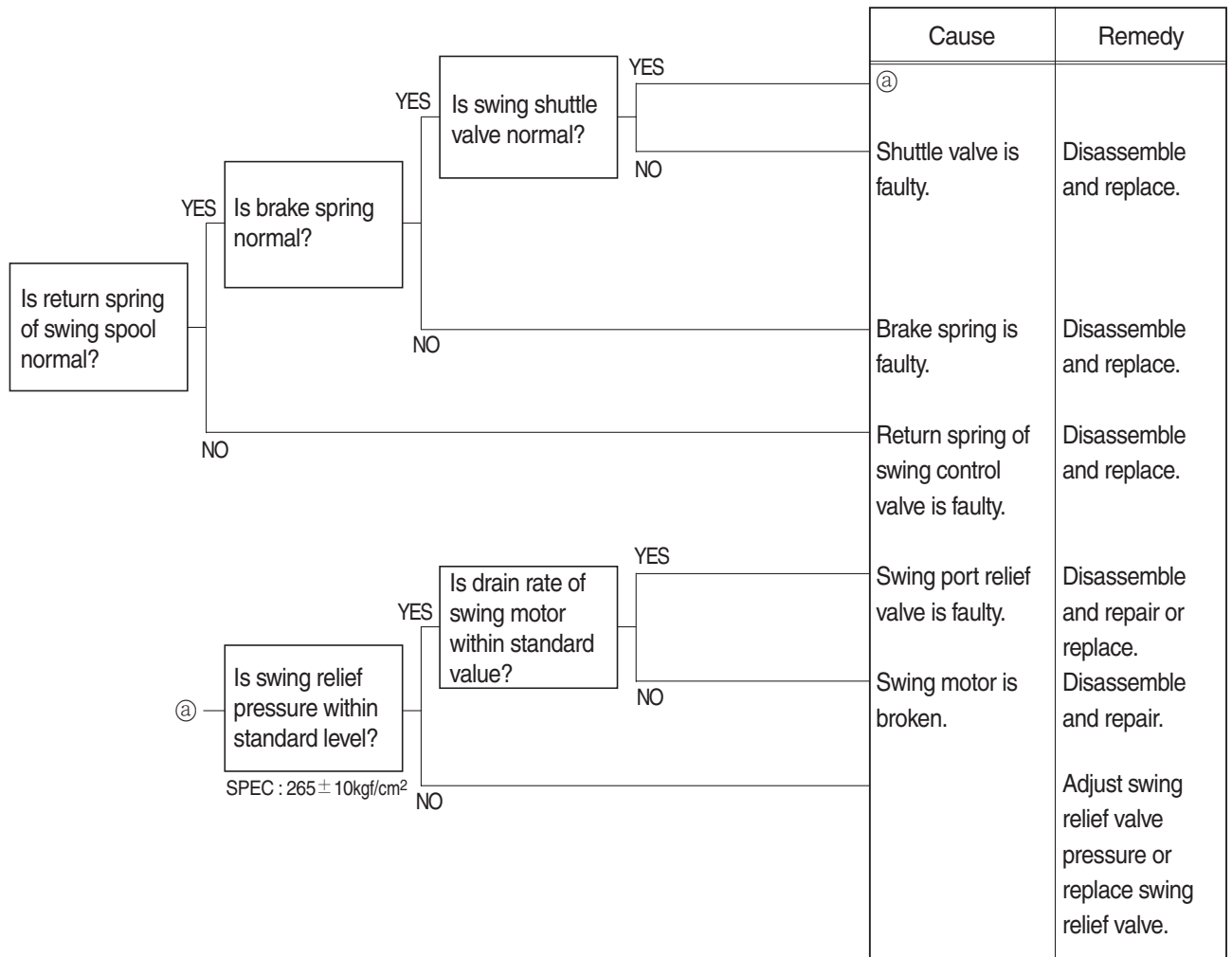
3) SWING MOTION IS IMPOSSIBLE IN ONE DIRECTION



4) MACHINE SWINGS BUT DOES NOT STOP

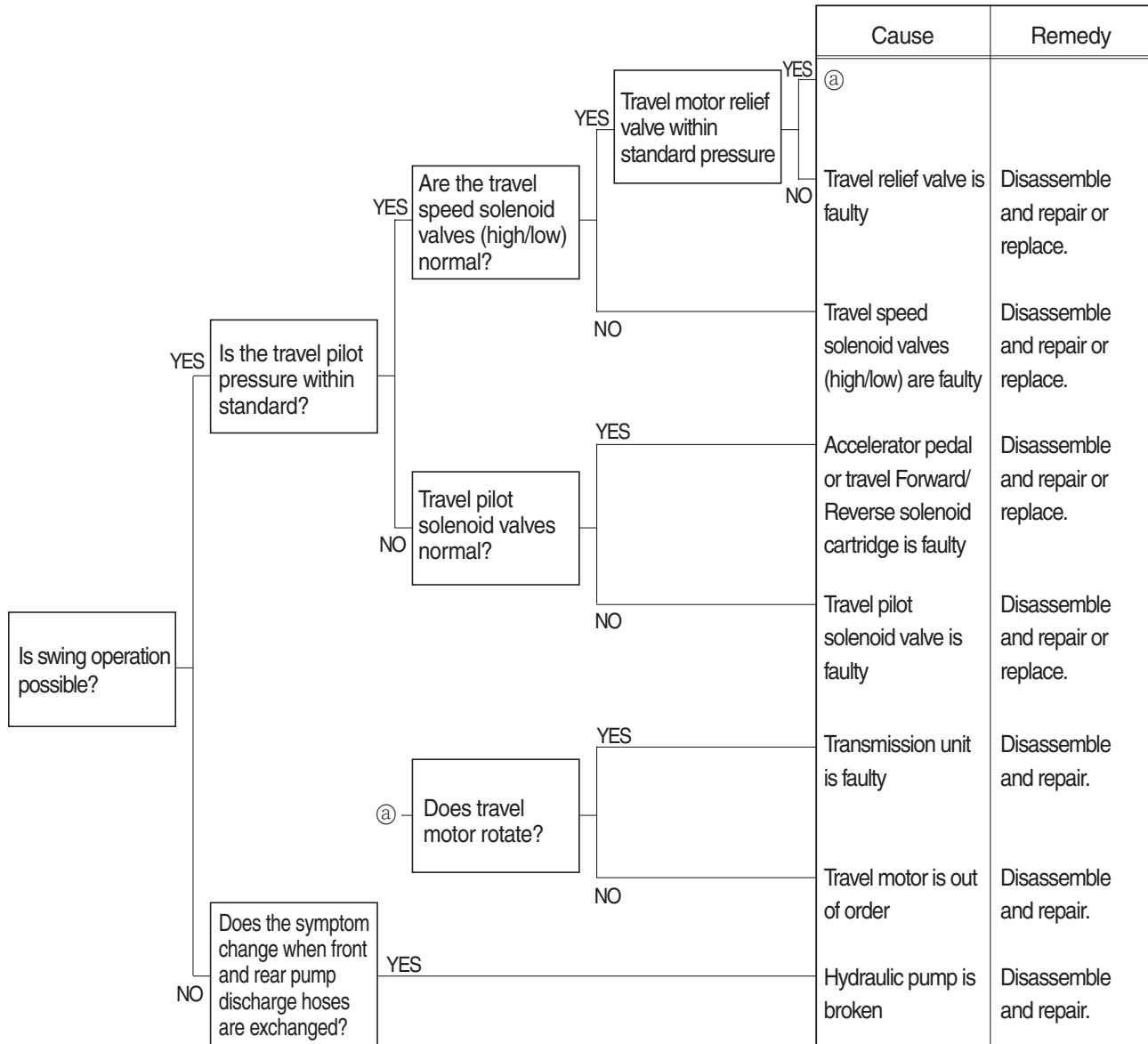


5) THE SWING UNIT DRIFTS WHEN THE MACHINE IS AT REST ON A SLOPE

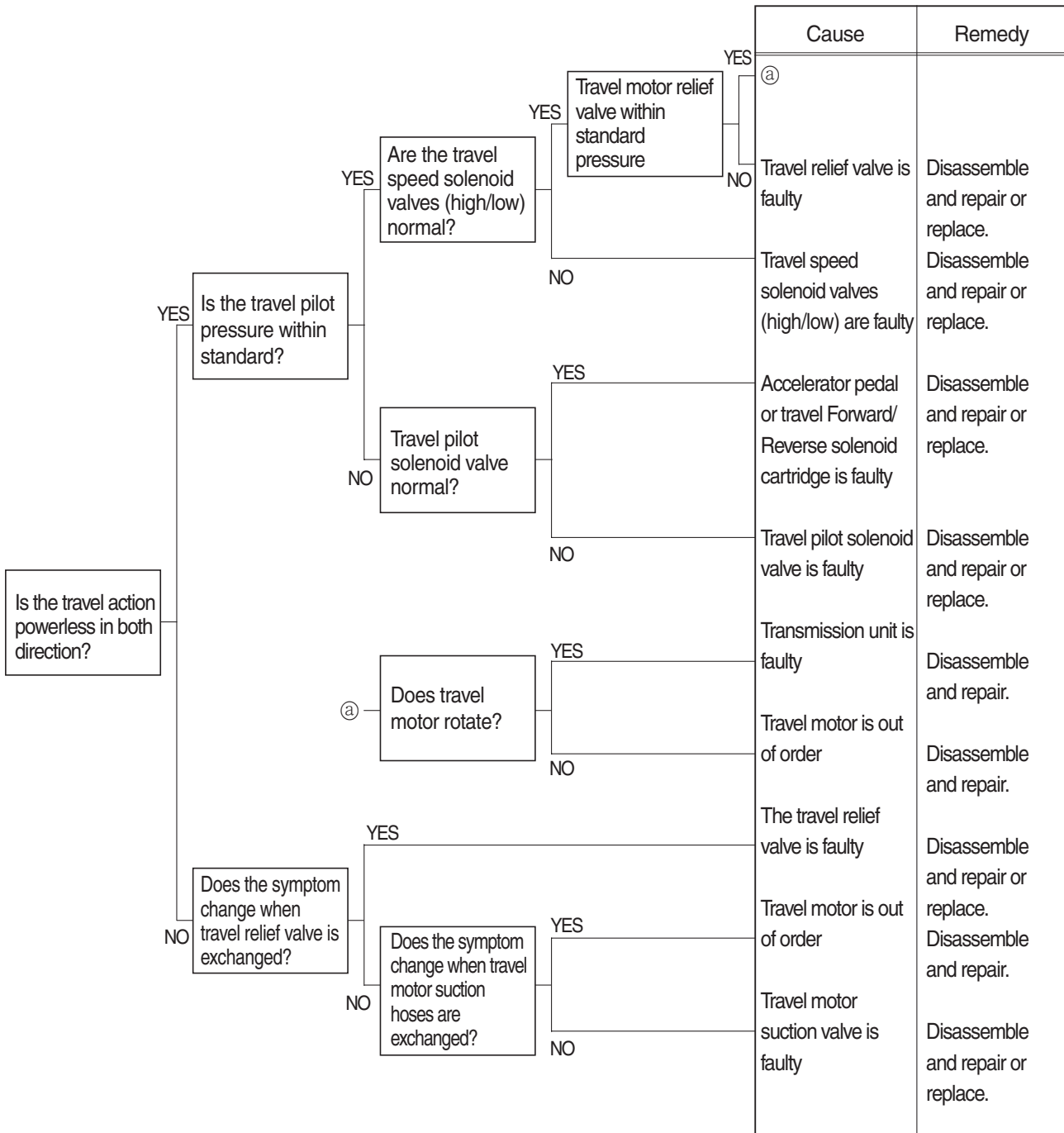


5. TRAVEL SYSTEM

1) TRAVEL DOES NOT FUNCTION



2) TRAVEL ACTION IS POWERLESS (travel only)



3) THE HYDRAULIC MOTOR DOES NOT GET STARTED

| | Cause | Remedy |
|---|---|--|
| <p>The hydraulic motor does not get started</p> | <p>The spool does not work properly. (The spool keeps fully open)</p> | <p>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</p> |
| | <p>The anti-avitation check valve does not work properly. (The check valve is kept open.)</p> | <p>Ditto</p> |

4) IT TAKES TIME TO ACCELERATE THE MOTOR

| | Cause | Remedy |
|--|---|--|
| <p>It takes time to accelerate the motor</p> | <p>The spool does not work properly.</p> | <p>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.</p> |
| | <p>The orifice for closing the counterbalance is clogged.</p> | <p>Remove the foreign matter by disassembling and cleaning.</p> |
| | <p>Wrong setting of pressure of the relief valve.</p> | <p>Adjust at the correct value. If the relief valve turns out to be out of order, the new one should be used.</p> |

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. |

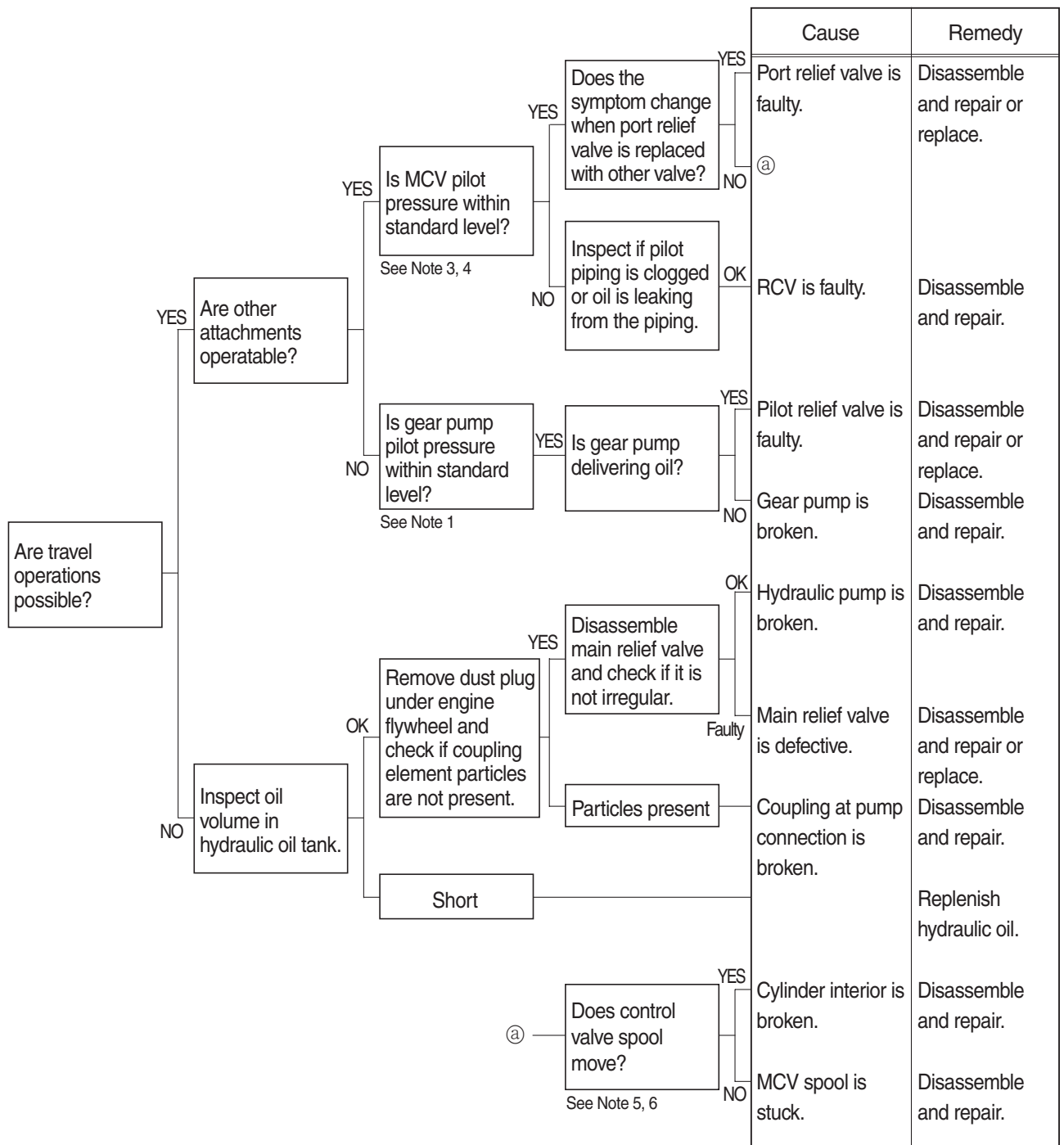
6) EXTRAORDINARY NOISE IS HEARD WHEN SUDDENLY REDUCING THE SPEED FROM THE HIGH-SPEED MODE

It takes time to accelerate the motor

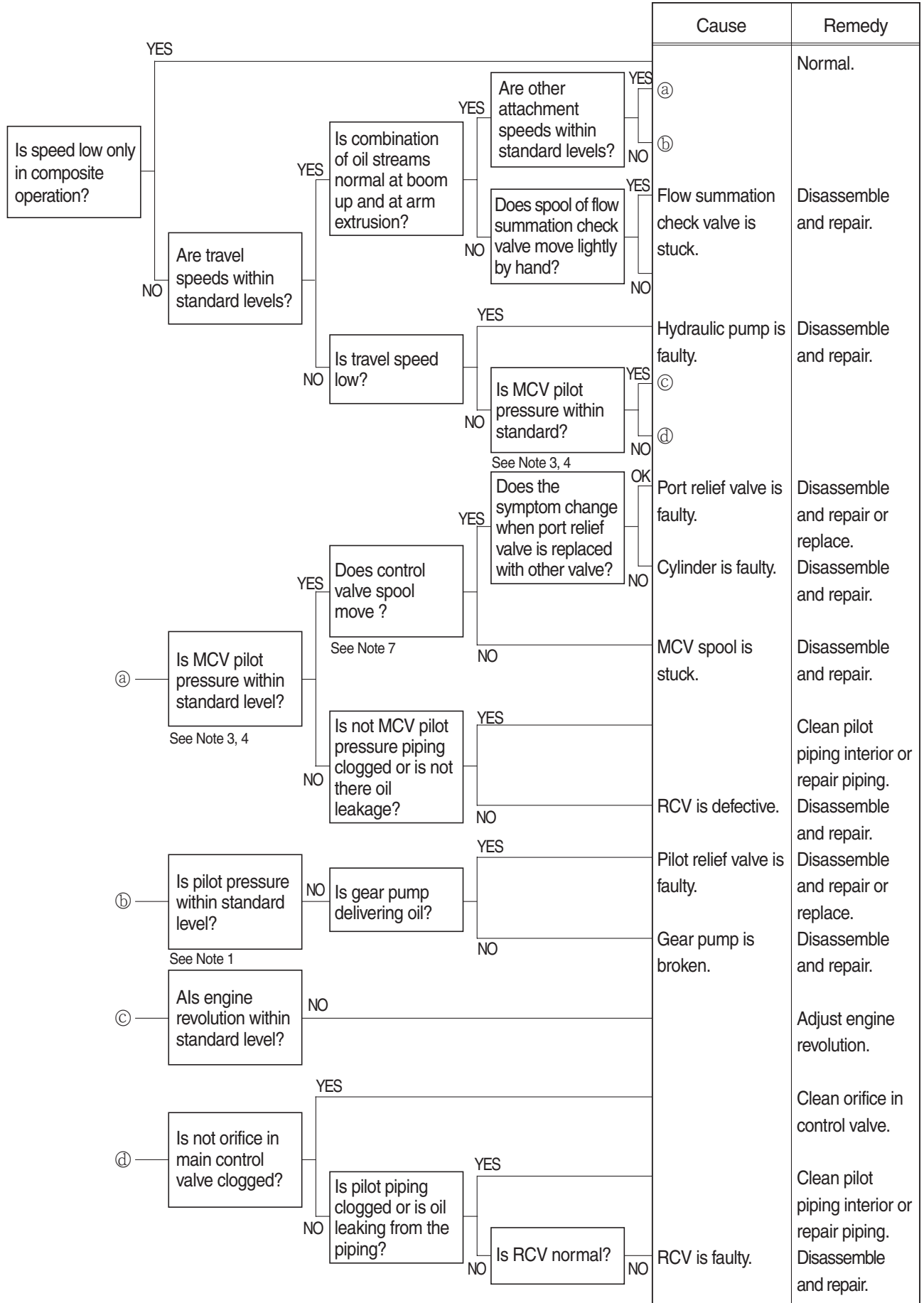
| Cause | Remedy |
|---|--|
| The anti-cavitation valve does not work properly. | Screw the fitting bolts one more time with correct tightening torque. If the valve turns out to be damaged, is should be repaired. |

6. ATTACHMENT SYSTEM

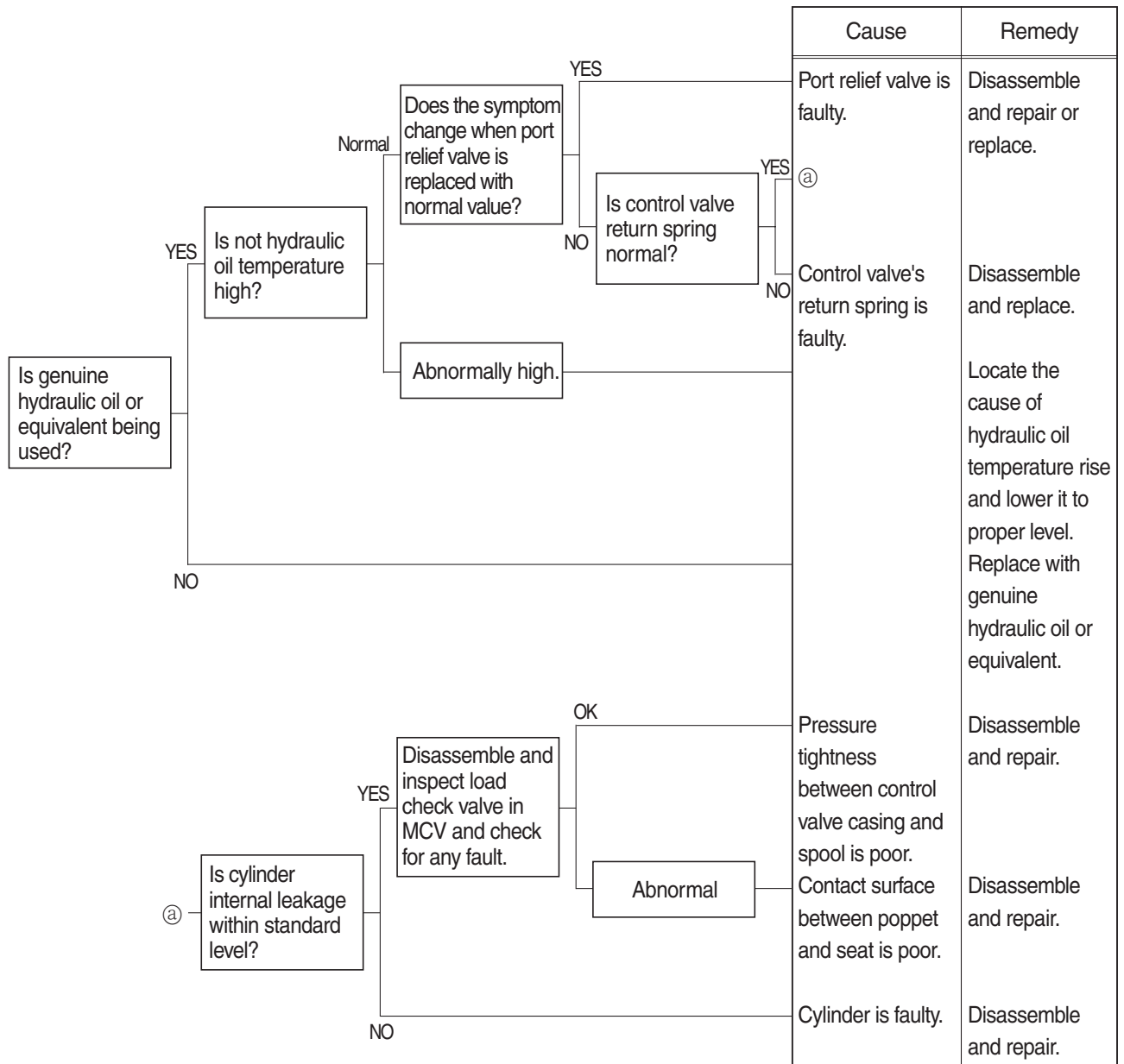
1) BOOM OR ARM ACTION IS IMPOSSIBLE AT ALL



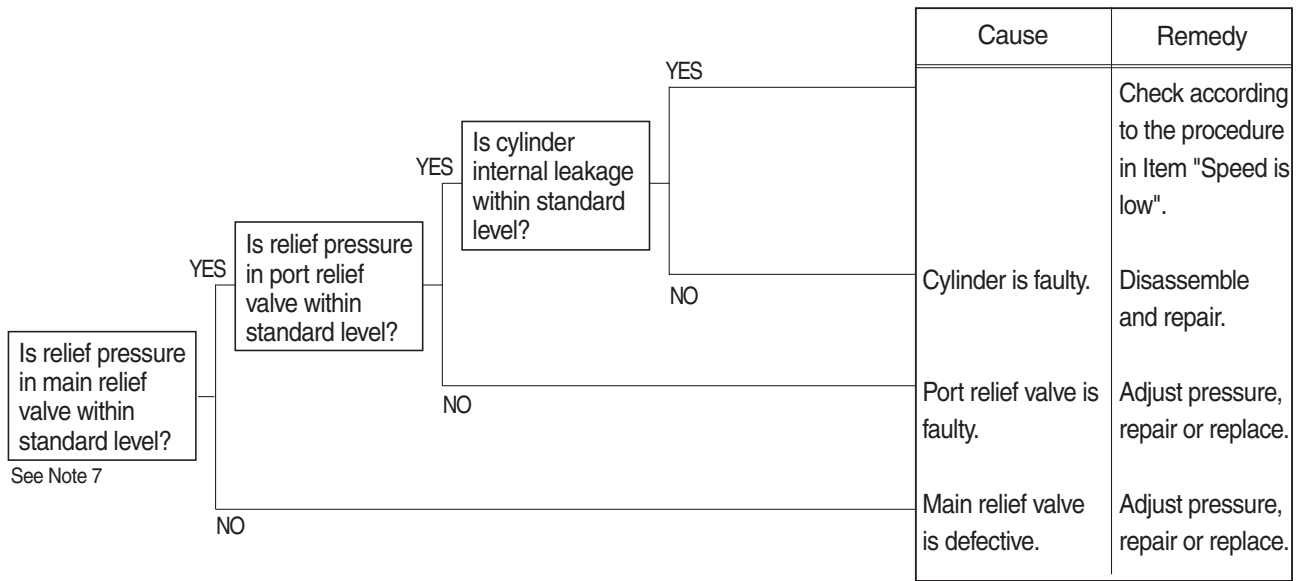
2) BOOM, ARM OR BUCKET SPEED IS LOW



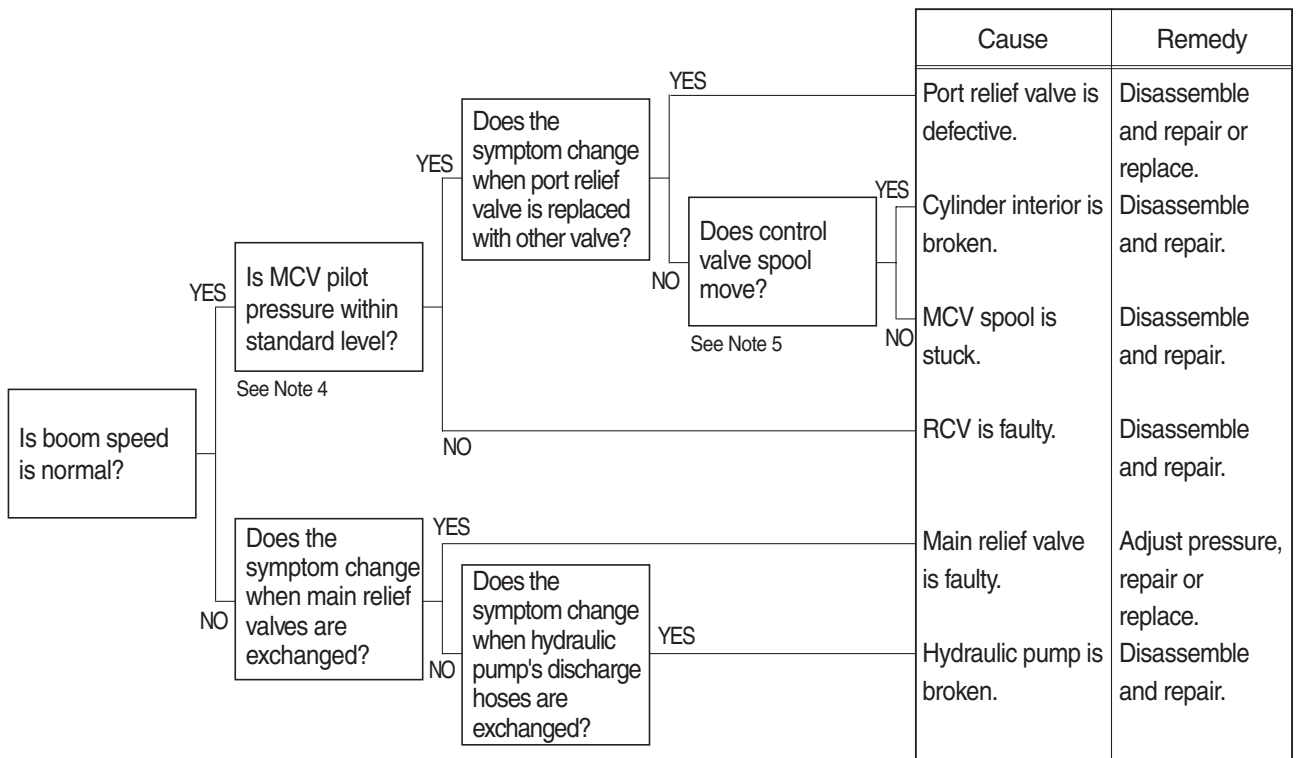
3) BOOM, ARM OR BUCKET CYLINDER EXTENDS OR CONTRACTS ITSELF AND ATTACHMENT FALLS



4) BOOM, ARM OR BUCKET POWER IS WEAK



5) ONLY BUCKET OPERATION IS TOTALLY IMPOSSIBLE

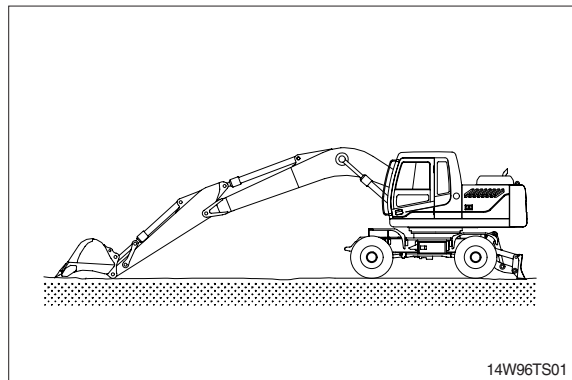


6) BOOM MAKES A SQUEAKING NOISE WHEN BOOM IS OPERATED

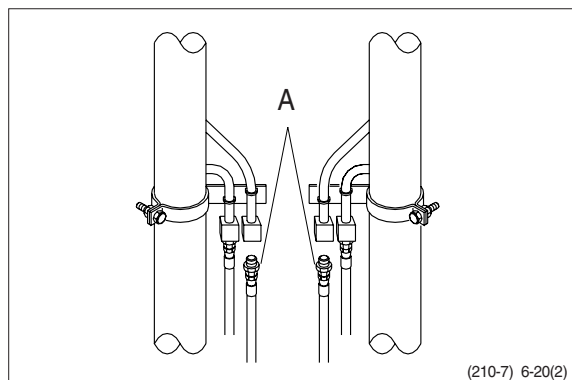
| | | Cause | Remedy |
|--|-----|--------------------------------------|--|
| <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Is boom foot pin greased sufficiently? </div> | YES | | Frictional noise occurs between the sliding faces of boom cylinder's oil seal and boom proper. ※ Frictional noise will disappear if they are kept used. |
| | NO | Boom foot pin has run out of grease. | Supply grease to it. ※ 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. |

※ 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.



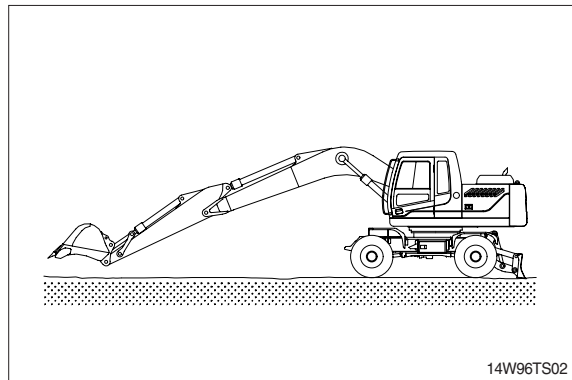
2. Disconnect hose (A) from rod side of boom cylinder and drain oil from cylinders and hose. (put cups on piping and hose ends)



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 retorquing lugnuts. Inspect and replace. Inspect through top cover. Replace. See correction No.33. |