

Product: ISUZU 4J SERIES Engine for NHR55/NKR55/NPR55/NPR69 Service Repair Workshop Manual
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WORKSHOP MANUAL

NHR • NKR • NPR

ENGINE 4J SERIES

SECTION 6

ISUZU

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NOTICE

Before using this Workshop Manual to assist you in performing vehicle service and maintenance operations, it is recommended that you carefully read and thoroughly understand the information contained in Section 0A under the headings "GENERAL REPAIR INSTRUCTIONS" and "HOW TO USE THIS MANUAL".

All material contained in this Manual is based on the latest product information available at the time of publication.

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Applicable Model : NHR55. NKR55. NPR55. NPR69

This manual is applicable to 1994 year model and later vehicles.

THIS MANUAL INCLUDES THE FOLLOWING SECTIONS:

SECTION NO.	CONTENTS
00	Service Information
6A	Engine Mechanical
6A1	4JB1/4JB1T/4JB1-TC/4JG2 Engine
6B	Engine Cooling
6C	Fuel System
6D	Engine Electrical
6E	Exhaust Gas Recirculation (EGR) System
6F	Exhaust
6G	Turbocharger

SECTION 00

SERVICE INFORMATION

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TROUBLESHOOTING

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1. HARD STARTING

1. STARTER INOPERATIVE		
Checkpoint	Possible cause	Correction
Battery	Loose battery cable terminal poor connections due to rusting	Clean and/or retighten the battery cable terminal
	Battery discharged or weak	Recharge or replace the battery
	Fan belt loose or broken	Adjust or replace the fan belt
Fusible link	Fusible link shorted	Replace the fusible link
Starter switch	Defective starter switch or starter relay	Replace the starter switch or the Starter relay
Starter motor	Defective magnetic switch or starter relay	Repair or replace the magnetic switch
	Defective starter motor	Repair or replace the starter motor

2. STARTER MOTOR OPERATES BUT ENGINE DOES NOT TURN OVER

Battery	Loose battery cable terminal	Clean and/or retighten the battery cable terminal
	Poor connections due to rusting	Recharge or replace the battery
	Battery discharged or weak	Recharge or replace the battery
	Fan belt loose or broken	Adjust or replace the fan belt
Starter	Defective pinion gear	Replace the pinion gear
	Defective magnetic switch	Repair or replace the magnetic switch
	Brush wear, Weak brush spring	Replace the brush and/or the brush spring
Engine	Piston, crank bearing seizure, or other damage	Repair or replace the related parts

3. ENGINE TURNS OVER BUT DOES NOT START		
Checkpoint	Possible cause	Correction
Engine stop mechanism	Defective fuel cut solenoid valve	Replace the fuel cut solenoid valve
FUEL IS NOT BEING DELIVERED TO THE INJECTION PUMP		
Fuel	Fuel tank is empty	Fill the fuel tank
Fuel piping	Clogged or damaged fuel lines. Loose fuel line connection	Repair or replace the fuel lines Retighten the fuel line connection
Fuel filter	Fuel filter overflow valve does not close	Repair or replace the fuel filter overflow valve
	Clogged fuel filter element	Replace the fuel filter element or the filter cartridge
Fuel system	Air in the fuel system	Bleed the air from the fuel system
Fuel feed pump	Defective feed pump	Repair or replace the feed pump
FUEL IS BEING DELIVERED TO THE INJECTION PUMP		
Fuel	Use of the wrong fuel	Use the correct fuel
	Water particles in the fuel	Change the fuel
Fuel system	Air in the injection pump	Bleed the air from the fuel system
Injection nozzle	Injection nozzle sticking	
	Injection nozzle injection starting pressure too low Improper spray condition	Adjust or replace the injection nozzle
Injection pump	Defective fuel injection nozzle resulting in the fuel drippage after fuel injection	Replace the delivery valve
	Defective injection pump control rack operation	Repair or replace the injection pump control rack
	Injection pump plunger worn or stuck	Replace the injection pump plunger assembly
	Injection pump drive shaft seizure or other damage	Replace the injection drive shaft
	Injection pump governor spring seizure	Replace the injection pump governor spring

4. QUICK-ON START SYSTEM

PREPARATION

- 1 Disconnect the thermoswitch connector.
- 2 Determine whether or not the glow plugs are receiving power.
 - a) Make sure that the starter switch is "OFF".
 - b) Connect a voltmeter between one of the glow plugs and the cylinder wall.
 - c) Move the starter switch to the "ON" position.

The voltmeter needle will show the source voltage (12V) if the glow plugs are receiving power.
If the voltmeter needle does not move, the glow plugs are not receiving power.
- 3 Perform the troubleshooting procedure.

GLOW PLUGS ARE RECEIVING POWER

Checkpoint	Possible cause	Correction
Glow plug indicator light does not turn on	Defective indicator light bulb	Replace the indicator light bulb
Quick-on start timer	Defective quick-on start timer	Replace the quick-on start timer
Glow plug indicator light turns on the 0.3 seconds	Defective quick-on start timer	Replace the quick-on start timer
Glow plug indicator light turns on for 3.5 seconds	Return the starter switch to the "ON" position from the "START" position after the engine starts if the glow plug relay remains on less than 14 seconds, the quick-on start timer is defective	Replace the quick-on start timer
	Move the starter switch from the "OFF" position to the "ON" position if the glow plug relay remains on less than 14 seconds, the quick-on start timer is defective	Replace the quick-on start timer
Thermoswitch	Defective thermoswitch	Replace the thermoswitch
Glow plug continuity	No glow plug continuity	Replace the glow plugs

GLOW PLUGS ARE NOT RECEIVING POWER

Glow plug indicator light does not turn on	Broken indicator light fuse	Replace the fuse
Quick-on start timer	Defective quick-on start timer	Replace the quick-on start timer

GLOW PLUGS ARE NOT RECEIVING POWER (Cont'd)		
Checkpoint	Possible cause	Correction
Glow plug indicator light turns on for 3.5 seconds	Defective glow plug relay The glow plug relay does not turn on after the starter switch is moved from the "OFF" position to the "ON" position	Replace the glow plug relay
	Defective quick-on start timer	Replace the quick-on start timer
	Defective glow plug relay wiring harness	Repair or replace the wiring harness
	Defective fusible link or wiring harness The glow plug relay turns on when the starter switch is moved from the "OFF" position to the "ON" position	Replace the fusible link or the wiring harness

2. UNSTABLE IDLING

Checkpoint	Possible cause	Correction
Idling system	Idling improperly adjusted	Adjust the idling
Fast idling speed	Defective fast idling speed control device	Repair or replace the fast idling speed control device
Accelerator control system	Accelerator control system improperly adjusted	Adjust the accelerator control system
Fuel system	Fuel system leakage or blockage	Repair or replace the fuel system
	Air in the fuel system	Bleed the air from the fuel system
	Water particles in the fuel system	Change the fuel
Fuel filter	Clogged fuel filter element	Replace the fuel filter element or the fuel filter cartridge
Fuel feed pump	Defective fuel feed pump	Repair or replace the fuel feed pump
Injection nozzle	Injection nozzle sticking	Replace the injection nozzle
	Injection nozzle injection starting pressure too low Improper spray condition	Adjust or replace the injection nozzle
Injection pump	Defective delivery valve resulting in fuel drippage after fuel injection	Replace the delivery valve

Checkpoint	Possible cause	Correction
Injection pump (Cont'd)	Injection timing improperly adjusted	Adjust the injection timing
	Insufficient injection volume	Adjust the injection volume
	Defective idle spring	Replace the idle spring
	Defective governor lever operation	Repair or replace the governor lever
	Regulator valve improperly adjustment	Adjust or replace the regulator valve
	Broken plunger spring	Replace the plunger spring
	Worn plunger	Replace the plunger assembly
	Worn cam disc	Replace the cam disc
Valve clearance	Valve clearance improperly adjusted	Adjust the valve clearance
Compression pressure	Blown out cylinder head gasket. Worn cylinder liner. Piston ring sticking	Replace the related parts

3. INSUFFICIENT POWER

Checkpoint	Possible cause	Correction
Air cleaner	Clogged air cleaner element	Clean or replace the air cleaner element
Fuel	Water particle in the fuel	Replace fuel
Fuel filter	Clogged fuel filter element	Replace the fuel filter element or the fuel filter cartridge
Fuel feed pump	Defective fuel feed pump	Repair or replace the fuel feed pump
Injection nozzle	Injection nozzle sticking	Replace the injection nozzle
	Injection nozzle injection starting pressure too low Improper spray condition	Adjust or replace the injection nozzle
Fuel injection pipes	Fuel injection pipes damaged or obstructed	Replace the fuel injection pipes

Checkpoint	Possible cause	Correction
Injection pump	Defective regulating valve	Repair or replace the regulating valve
	Defective delivery valve	Replace the delivery valve
	Defective timer	Repair or replace the timer
	Worn cam disc	Replace the cam disc
	Improper control lever operation	Adjust or replace the control lever
	Defective injection timing	Adjust the injection timing Repair or replace the injection pump timer
	Weak governor spring	Replace the governor spring
	Worn plunger	Replace the plunger assembly
Compression pressure	Blown out cylinder head gasket. Worn cylinder liner. Piston ring sticking	Replace the related parts
Valve clearance	Valve clearance improperly adjusted	Adjust the valve clearance
Valve spring	Valve spring weak or broken	Replace the valve spring
Exhaust system	Exhaust pipe clogged	Clean the exhaust pipe
Full load adjusting screw seal	Open and improperly set adjusting screw seal	Adjust and reseal the adjusting screw

4. EXCESSIVE FUEL CONSUMPTION

Checkpoint	Possible cause	Correction
Fuel system	Fuel leakage	Repair or replace the fuel system related parts
Air cleaner	Clogged air cleaner element	Clean or replace the air cleaner element
Idling speed	Poorly adjusted idling speed	Adjust the idling speed
Injection nozzle	Injection nozzle injection starting pressure too low Improper spray condition	Adjust or replace the injection nozzle
Fuel injection timing	Fuel injection timing improperly	Adjust the fuel injection timing
Injection pump	Defective Delivery valve resulting in fuel drippage after fuel injection	Replace the delivery valve
Valve clearance	Valve clearance improperly adjusted	Adjust the valve clearance
Compression pressure	Blown out cylinder head gasket. Worn cylinder liner. Piston ring sticking	Replace the related parts
Valve spring	Valve spring weak or broken	Replace the valve spring

5. EXCESSIVE OIL CONSUMPTION

Checkpoint	Possible cause	Correction
Engine oil	Engine oil unsuitable Too much engine oil	Replace the engine oil Correct the engine oil level
Oil seal and gasket	Oil leakage from the oil seal and/or the gasket	Replace the oil seal and/or the gasket
Air breather	Clogged air breather	Clean the air breather
Intake and exhaust valve	Worn valve stems and valve guides	Replace the intake and exhaust valves and the valve guides

6. OVERHEATING

Checkpoint	Possible cause	Correction
Cooling water	Insufficient cooling water	Replenish the cooling water
Fan clutch	Oil leakage from the fan clutch	Replace the fan clutch
Fan belt	Fan belt loose or cracked causing slippage	Replace the fan belt
Radiator	Defective radiator cap or clogged radiator core	Replace the radiator cap or clean the radiator core
Water pump	Defective water pump	Repair or replace the water pump
Cylinder head and cylinder body sealing cap	Defective sealing cap resulting in water leakage	Replace the sealing cap
Thermostat	Defective thermostat	Replace the thermostat
Cooling system	Cooling system clogged by foreign material	Clean the foreign material from the cooling system
Fuel injection timing	Fuel injection timing improperly adjusted	Adjust the fuel injection timing

7. WHITE EXHAUST SMOKE

Checkpoint	Possible cause	Correction
Cooling water	Insufficient cooling water	Replace the cooling water
Fuel	Water particles in the fuel	Replace the fuel
Fuel injection timing	Delayed fuel injection timing	Adjust the fuel injection timing
Compression pressure	Blown out cylinder head gasket. Worn cylinder liner. Piston ring sticking	Replace the related parts
Inlet and exhaust valve Valves seals	Defective valve seals. Worn valves stems and valve guides	Replace the valve seals, the valves, and the valve guides

8. DARK EXHAUST SMOKE

Checkpoint	Possible cause	Correction
Air cleaner	Clogged air cleaner element	Clean or replace the air cleaner element
Injection nozzle	Injection nozzle injection starting pressure too low Improper spray condition	Adjust or replace the injection nozzle
Fuel injection timing	Fuel injection timing improperly adjusted	Adjust the fuel injection timing
Injection pump	Defective delivery valve resulting in fuel drippage after fuel injection	Replace the delivery valve
	Excessive injection volume	Adjust the injection volume

9. OIL PRESSURE DOES NOT RISE

Checkpoint	Possible cause	Correction
Engine oil	Improper viscosity engine oil. Insufficient engine oil	Replace the engine oil Correct the engine oil volume
Oil pressure gauge or unit Oil pressure indicator light	Defective oil pressure gauge or unit Defective indicator light	Repair or replace the oil pressure gauge or unit Replace the indicator light
Oil filter	Clogged oil filter element	Replace the oil filter element or the oil filter cartridge
Relief valve and by-pass valve	Relief valve sticking and/or weak by-pass valve spring	Replace the relief valve and/or the by-pass valve spring
Oil pump	Clogged oil pump strainer	Clean the oil pump strainer
	Worn oil pump related parts	Replace the oil pump related parts
Rocker arm shaft	Worn rocker arm bushing	Replace the rocker arm bushing
Camshaft	Worn camshaft and camshaft bearing	Replace the camshaft and the camshaft bearing
Crankshaft and bearings	Worn crankshaft and bearings	Replace the crankshaft and/or the bearings

10. ABNORMAL ENGINE NOISE

1. ENGINE KNOCKING

Check to see that the engine has been thoroughly warmed up before beginning the troubleshooting procedure.

Checkpoint	Possible cause	Correction
Fuel	Fuel unsuitable	Replace the fuel
Fuel injection timing	Fuel injection timing improperly adjusted	Adjust the fuel injection timing
Injection nozzle	Improper injection nozzle starting pressure and spray condition	Adjust or replace the injection nozzle
Compression pressure	Blown out head gasket Broken piston ring	Replace the head gasket or the piston ring

2. GAS LEAKAGE NOISE

Exhaust pipes	Loosely connected exhaust pipes. Broken exhaust pipes	Tighten the exhaust pipe connections Replace the exhaust pipes
Injection nozzles and/or glow plugs	Loose injection nozzles and/or glow plugs	Replace the washers Tighten the injection nozzles and/or the glow plugs
Exhaust manifold	Loosely connected exhaust manifold and/or glow plugs	Tighten the exhaust manifold connections
Cylinder head gasket	Damaged cylinder head gasket	Replace the cylinder head gasket

3. CONTINUOUS NOISE

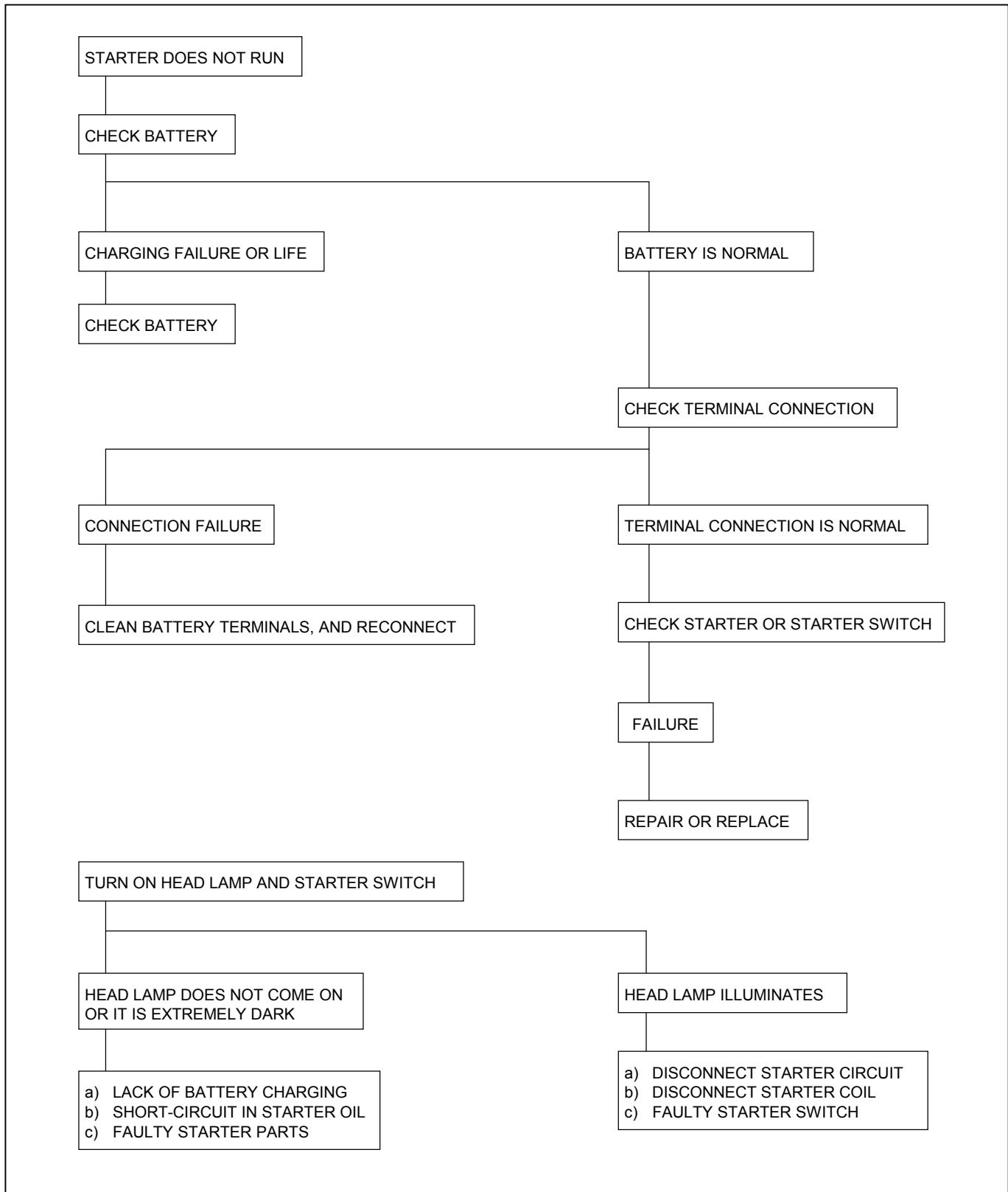
Fan belt	Loose fan belt	Readjust the fan belt tension
Cooling fan	Loose cooling fan	Retighten the cooling fan
Water pump bearing	Worn or damaged water pump bearing	Replace the water pump bearing
Generator or vacuum pump	Defective generator or vacuum pump	Repair or replace the generator or the vacuum pump
Valve clearance	Clearance improperly adjust	Adjust the valve clearances

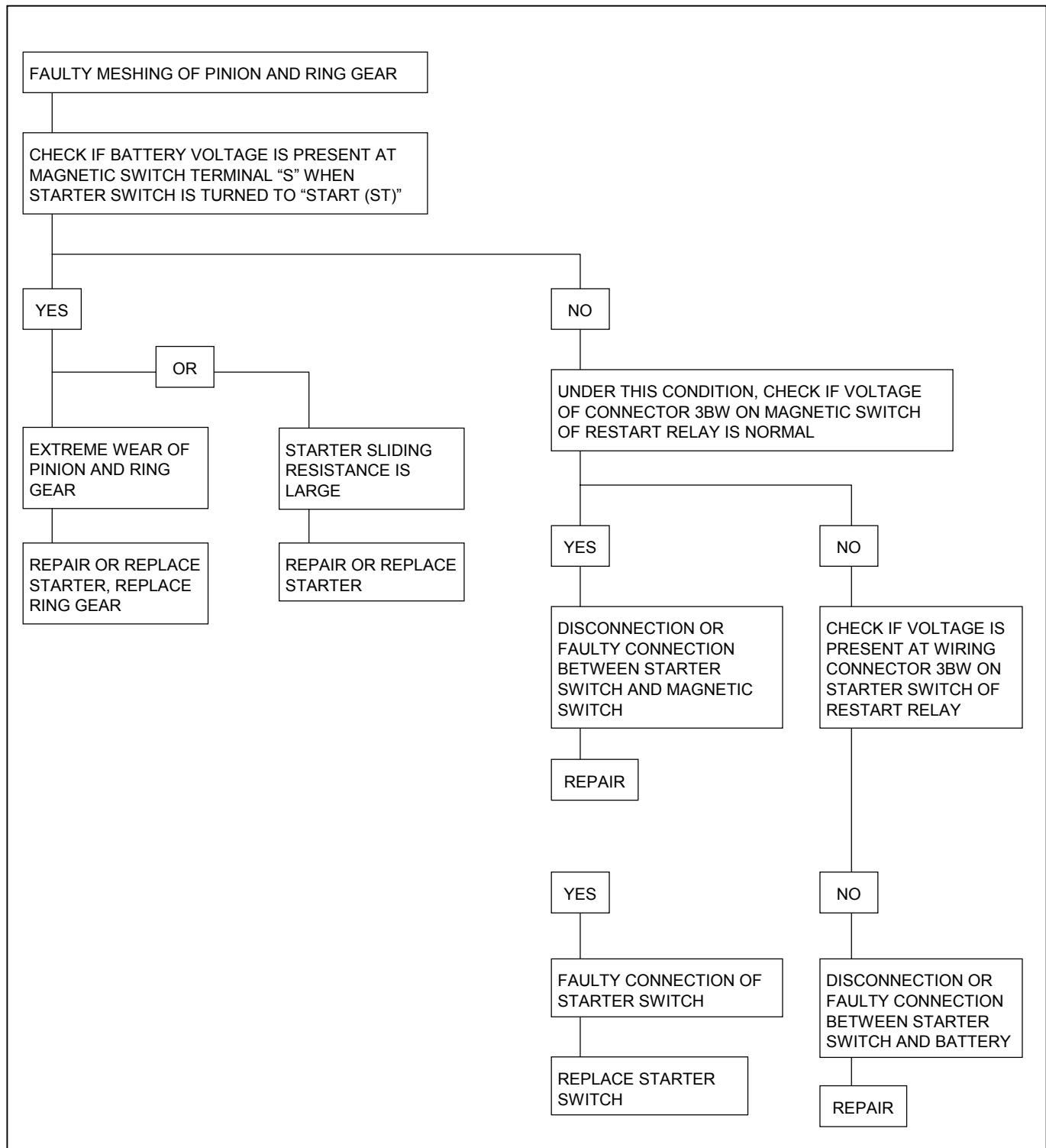
4. SLAPPING NOISE		
Checkpoint	Possible cause	Correction
Valve clearance	Valve clearance improperly adjusted	Adjust the valve clearance
Rocker arm	Damaged rocker arm	Replace the rocker arm
Flywheel	Loose flywheel bolts	Retighten the flywheel bolts
Crankshaft and thrust bearings	Worn or damaged crankshaft and/or thrust bearings	Replace the crankshaft and/or the thrust bearings
Crankshaft and connecting rod bearings	Worn or damaged crankshaft and/or connecting rod bearings	Replace the crankshaft and/or the connecting rod bearings
Connecting rod bushing and piston pin	Worn or damaged connecting rod bushing and piston pin	Replace the connecting rod bushing and/or the piston pin
Piston and cylinder liner	Worn or damaged piston and cylinder liner.	Replace the piston and the cylinder liner.

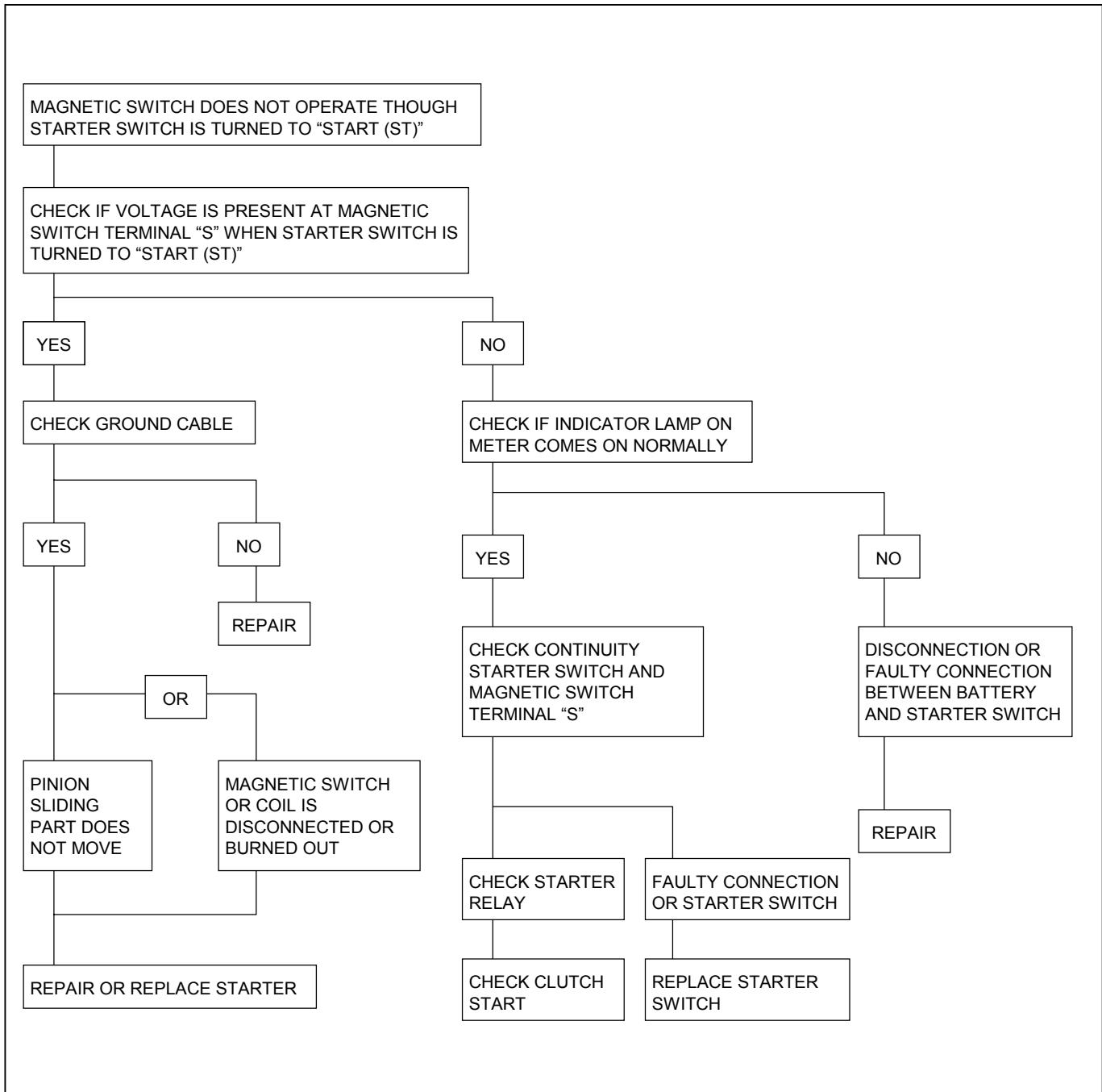
11. ENGINE COOLING TROUBLE

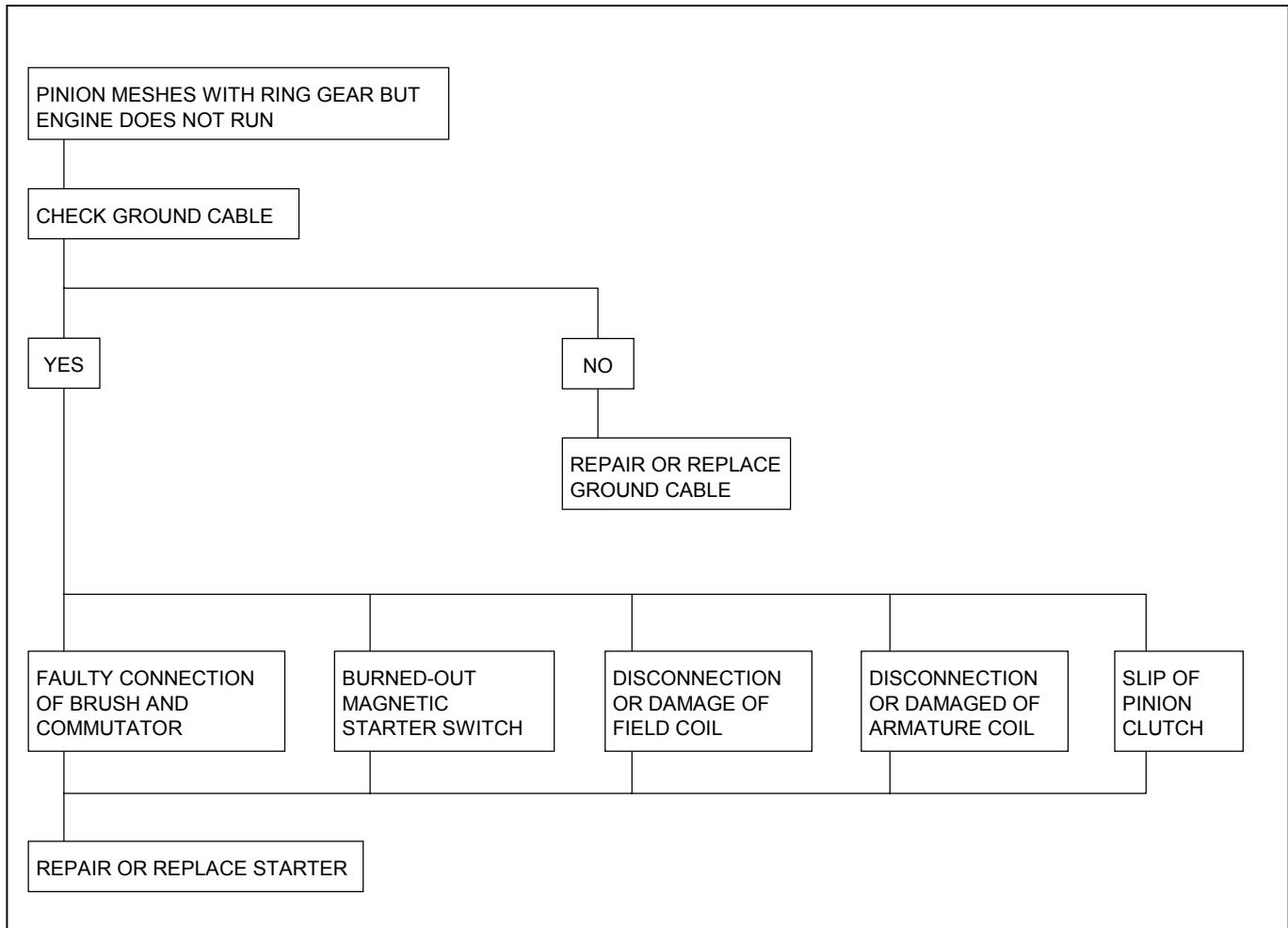
Checkpoint	Possible cause	Correction
Engine overheating	Low coolant level	Replenish
	Thermo unit faulty	Replace
	Faulty thermostat	Replace
	Faulty coolant unit	Repair or replace
	Clogged radiator	Clean or replace
	Faulty radiator cap	Replace
	Low engine oil level or use of improper engine oil	Replenish or change oil Replenish
	Damaged cylinder head gasket	Replace
	Clogged exhaust system	Clean exhaust system or replace faulty parts
	Loose fan belt	Adjust
	Excessive fuel injected	Adjust
	Improper injection timing	Adjust
Engine overcooling	Faulty thermostat	Replace
Too long engine warm-up time	Faulty thermostat	Replace
	Thermo unit faulty	Replace

12. ENGINE ELECTRICAL PART TROUBLE









STARTER DOES NOT STOP THOUGH STARTER SWITCH IS RETURNED TO "ON" FROM "START"

DISCONNECTED STARTER SWITCH WIRING CONNECTOR, AND CHECK STARTER SWITCH OPERATION.

KEY POSITION	BATTERY B1	IGNITION IG1	BATTERY B2	ACCESSORIES ACC	IGNITION IG2	STARTER ST
LOCK						
OFF						
ACC			•	•		
ON	•	•	•	•	•	
START	•	•	•		•	•

THERE MUST BE NO CONTINUITY EXCEPT ABOVE LINES.

YES

MAGNETIC SWITCH CONTACTS ARE FUSED AND NOT MOVED, OR A RETURN SPRING IS BROKEN OR DETERIORATED

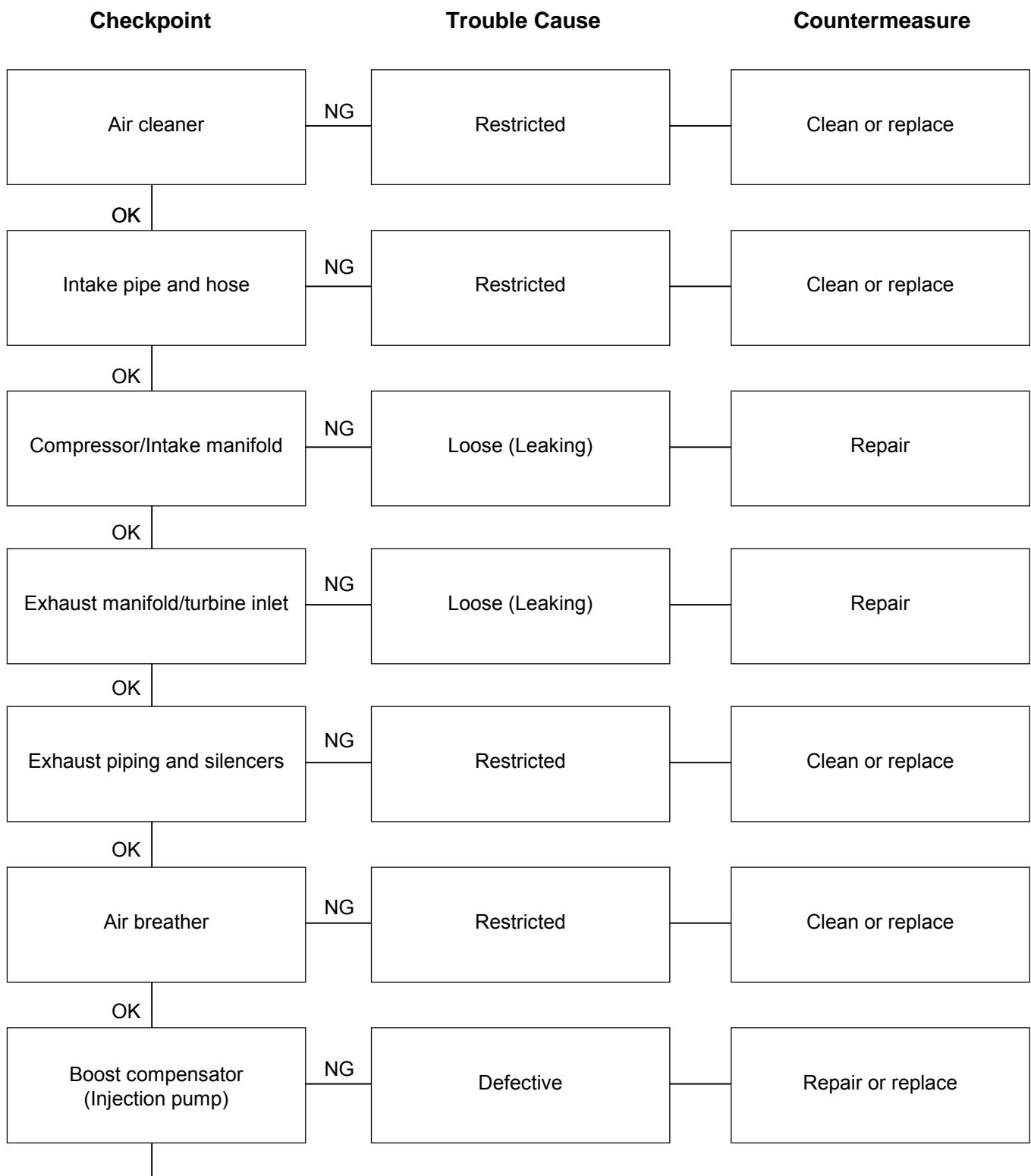
NO

REPLACE STARTER SWITCH

REPLACE MAGNETIC SWITCH

13. TURBOCHARGER

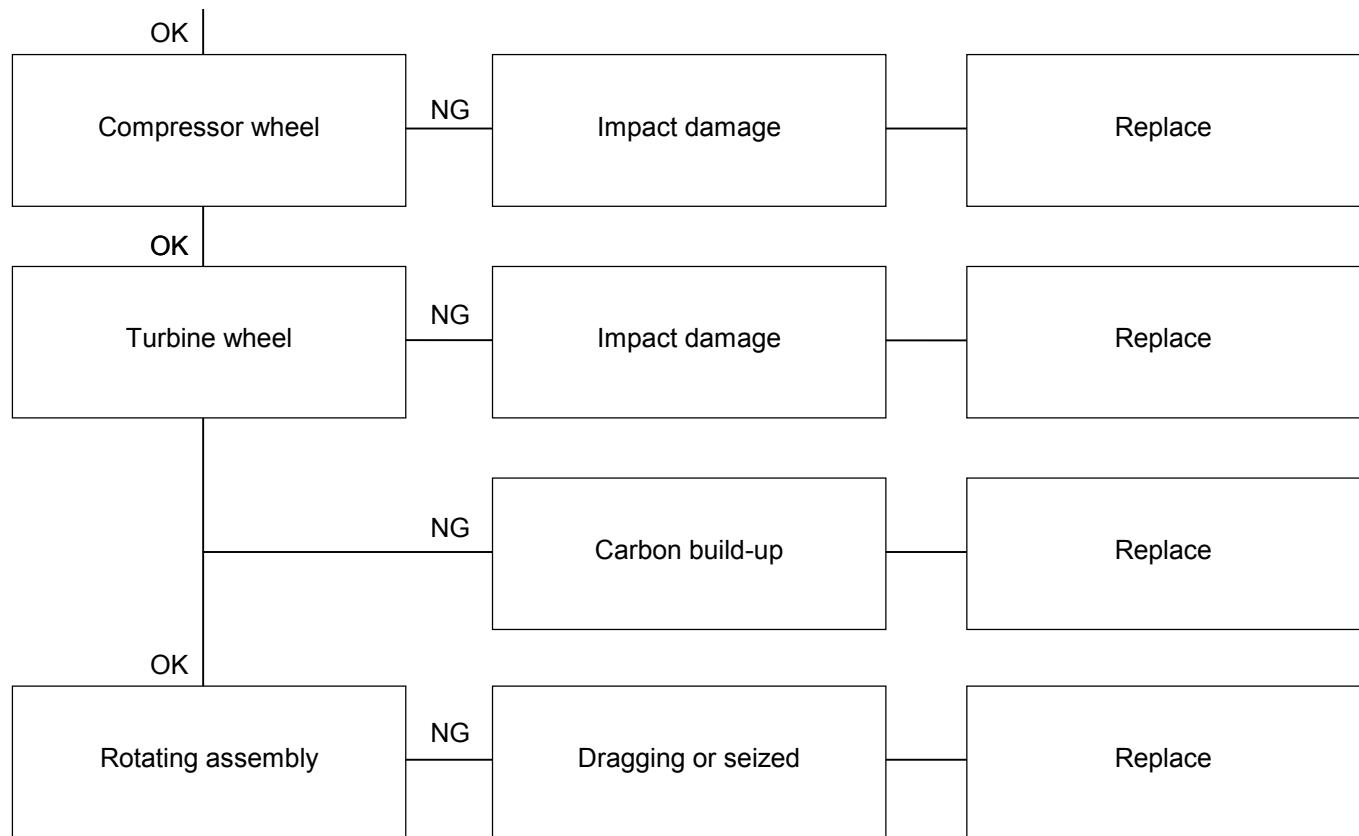
1) ENGINE HAS LESS THAN NORMAL POWER



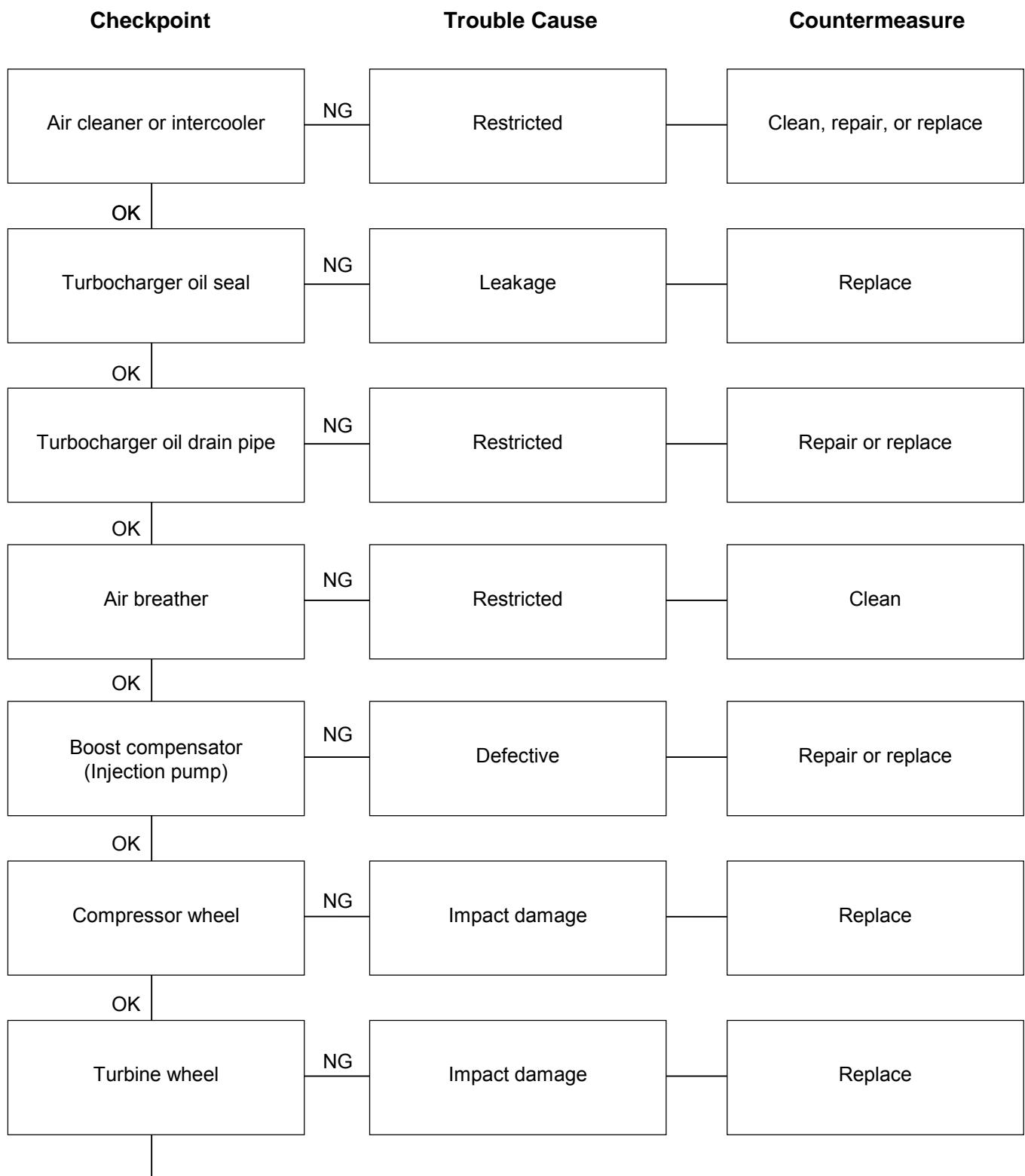
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Checkpoint**Trouble Cause****Countermeasure**

Continued from the previous page



2) BLUE OR BLACK SMOKE



Continued on the next page

Checkpoint

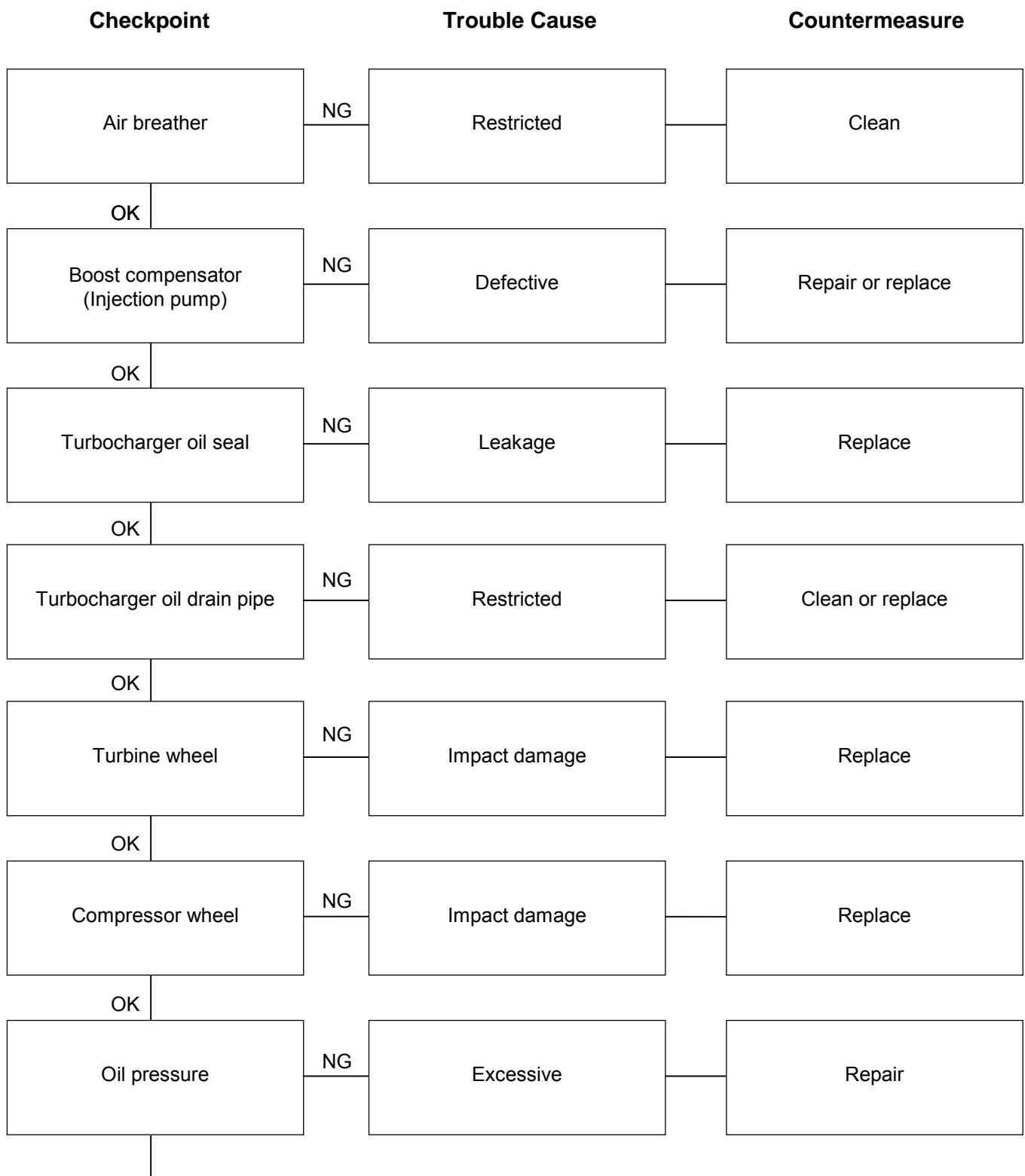
Trouble Cause

Countermeasure

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3) EXCESSIVE OIL CONSUMPTION



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Checkpoint

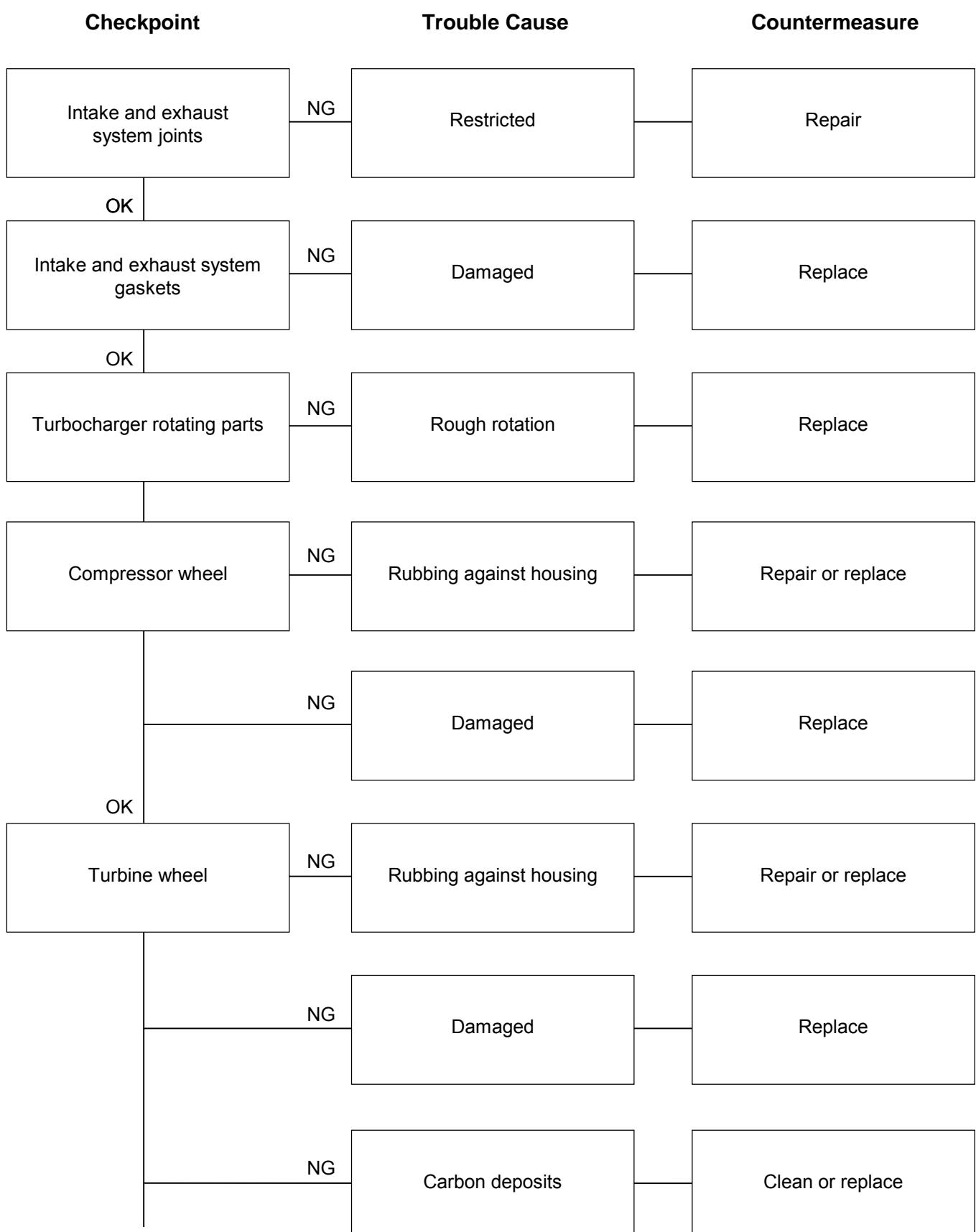
Trouble Cause

Countermeasure

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4) EXCESSIVE TURBOCHARGER NOISE



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