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ISUZU
Bellett

TROUBLE-SHOOTING

ENGINE SERIES

PART 3 INTRODUCTION

ISUZU MOTORS LIMITED

TOKYO, JAPAN

PART 3 TROUBLE-SHOOTING

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PART 3 TROUBLE-SHOOTING

3-1 GASOLINE ENGINE

Following is a trouble-shooting table which deals with operating troubles, most commonly experienced with the gasoline engine.

It is always advisable to make proper corrections of the system before the trouble grows serious.

Trouble	Cause	Repair
1. Starting failure 1) Starter fails to operate	1) Discharged or performance failure of the battery 2) Poor connections 3) Starter motor failure or switch with trouble 4) Engine oil used is too heavy	Recharge the battery or replace if necessary Clean and retighten the terminals Overhaul or replace Drain and refill with specified oil
2) Fuel fails to come to the carburetor	1) Fuel pump failure 2) Carburetor float valve sticking 3) Clogged strainer or fuel pipe 4) No fuel in the fuel tank	Overhaul or replace Overhaul or clean the carburetor Overhaul or clean Supply fuel
3) Ignition system failure	1) Poorly adjusted ignition timing 2) Wear of the contact points of the distributor 3) Poorly adjusted contact point gap	Adjust Clean or replace Adjust

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Trouble	Cause	Repair
	4) Ignition coil or condenser failure	Replace
	5) Short circuited contact breaker arm or rotor	Inspect connection and tighten as necessary
	6) Poorly adjusted spark plug gap	Clean, adjust or replace if necessary
	7) Poor connection	Check for loose connection and tighten as necessary
4) Carburetor failure	1) Choke valve operating failure	Adjust choke system as necessary
	2) Carburetor operation failure	Adjust engine idling and check other parts for operating failure
	3) Contaminated or clogged carburetor parts	Clean or overhaul
5) Power system failure	1) Valve wear or seizure	Correct by grinding or replace if necessary
	2) Worn or damaged cylinder head gasket	Replace gasket
	3) Poor compression pressure	Replace piston and piston rings Rectify cylinder for distortion or tapered wear
2. Poor idling condition		
1) Carburetor failure	1) Poorly adjusted carburetor setting	Adjusted
2) Air leakage	1) Loosened carburetor mounting bolts	Retighten or replace gasket
	2) Loosened intake manifolds mounting	Retighten or replace gasket

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Trouble	Cause	Repair
	3) Cylinder head blow-by	Retighten or replace gasket
3) Valve system failure	1) Poorly adjusted valve clearance	Adjusted as necessary
	2) Poor valve contact with the valve seat	Rectified with the aid of valve grinding machine
	3) Excessive clearance between the valve stem and valve guide	Replace valve and valve guide as required
3. Engine power failure		
1) Continuous power failure	1) Poorly adjusted valve clearance	Adjust valve clearance as necessary
	2) Poor valve contact with the valve seat	Rectify valve contact with the aid of abrasive compound
	3) Valve stem seizure or bending	Rectify or replace
	4) Weakened valve spring	Replace valve spring
	5) Cylinder head gasket blow-by	Replace cylinder head gasket
	6) Piston ring sticking or damage	Replace piston ring
	7) Piston or cylinder wall wear	Overhaul the engine and replace the parts
	8) Maladjusted ignition timing	Readjust the ignition timing
	9) Spark plug fouling	Clean and readjust the spark gap, replace if necessary
	10) Distributor contact breaker point fouling or wear	Adjust point gap and replace as necessary

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Trouble	Cause	Repair
	11) Unsuitable mixture caused by maladjusted carburetor	Clean and overhaul carburetor
	12) Air cleaner clogging	Clean or replace
	13) Carburetor always held choked due to choke system failure	Repair the entire choke system
	14) Residual air in the fuel system	Check and retighten the connections
	15) Fuel system clogging	Clean
	16) Operating failure of the fuel pump	Repair or replace
	17) Use of unsuitable fuel	Drain the fuel tank and refill with recommended fuel
	18) Clutch slipping	Repair the clutch system
	19) Partially dragged brakes	Adjust the brakes
2) Mis-firing occurs when accelerated	1) Clogging of the carburetor	Clean or overhaul
	2) Unsuitable mixture	Clean or overhaul the carburetor
	3) Spark plug fouling	Clean or replace
	4) Contact point failure or fouling	Readjust the point gap or replace
	5) Water mixed in the fuel	Drain the tank and refill with recommended fuel
	6) Worn or maladjusted valve clearance	Adjust or replace the valve

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Trouble	Cause	Repair
	7) Insufficient cylinder compression	Overhaul the engine and its associated parts
	8) Cylinder head gasket blow-by	Replace cylinder head gasket
4. Overheating	1) Insufficient cooling water	Replenish with soft water
	2) Loose, worn or broken fan belt	Adjust the tension or replace
	3) Maladjusted ignition timing	Adjust the ignition timing as specified
	4) Thermostat operating failure	Replace thermostat
	5) Radiator clogging or leaking	Clean, repair or replace as necessary
	6) Water pump operating failure	Replace water pump
	7) Use of unsuitable engine oil or insufficient oil	Drain and refill with specified oil or replenish
	8) Maladjusted valve clearance	Readjust valve clearance
	9) Partially clogged exhaust system	Clean the fuel system or replace the parts with faulty
	10) Partially dragged brakes	Readjust the brakes
5. Abnormal combustion: (Power failure due to irregular combustion, improper engine performance caused by poorly adjusted ignition)	1) Supply of unsuitable mixture (too thin)	Adjust carburetor setting
	2) Mixture leaking in the carburetor or intake manifold	Retighten the mounting bolts or replace the gasket

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Trouble	Cause	Repair
timing) (Including after-fire, back fire and other ignition failure are included)	3) Carbon deposit in the combustion chamber 4) Spark plug fouling 5) Use of unsuitable spark plug 6) Poorly adjusted valve clearance 7) Valve sticking	Clean and remove carbon deposit Clean, adjust the spark gap or replace Replace with specified spark plug Readjust the valve clearance Overhaul or replace the valve
Operating noises usually arise from various moving and sliding parts and are combined to develop an abnormal operating noise. It is therefore, necessary to detect where the noise comes from.		
1) Crankshaft bearing	1) Excessive clearance between bearing and crankshaft due to bearing or shaft wear 2) Tapered wear of the crankshaft 3) Clogged oil port 4) Bearing seizure	Replace bearing or rectify the crankshaft with the grinding machine Rectify or replace the crankshaft Clean the passage Replace the bearing or rectify the crankshaft as necessary
2) Connecting rod and connecting rod bearing	1) Wear of the connecting rod bearing 2) Wear of the crankshaft pin	Replace bearing Rectify the crankshaft

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Trouble	Cause	Repair
	3) Connecting rod bending 4) Bearing seizure 5) Insufficient oil	Rectify the crankshaft bending or replace Replace bearing and rectify the crankshaft Clean the oil passage
3) Piston, piston pin and piston rings	1) Excessive piston clearance due to worn cylinder wall 2) Worn piston or piston pin 3) Piston seizure 4) Poor sealing effect of the piston 5) Piston ring wear or damage	Correct cylinder wall by boring and honing, and then fit the oversized piston in position Replace piston and piston pin as necessary Replace piston Rectify or replace piston Replace piston rings
4) Others	1) Worn crankshaft thrust bearing 2) Excessive play in the camshaft end 3) Loosened timing chain 4) Excessive valve clearance 5) Worn valve lifter	Replace the thrust bearing Replace thrust plate Replace chain tensioner Readjust valve clearance Replace valve
7. Unreasonable fuel consumption	1) Misadjusted carburetor 2) Restricted operation of the choke valve	Adjust carburetor Adjust operation of choke valve system

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Trouble	Cause	Repair
	3) Incorrect ignition timing	Readjust ignition timing
	4) Excessively fast engine idling speed	Readjust idling
	5) Poor contact of clutch facing (slipping)	Adjust clutch
	6) Partially dragged brakes	Adjust brakes
	7) Insufficient air pressure in the tires	Check and adjust tire pressure
	8) Excessive use of low speed gears	Use correct method of operation
8. Unreasonable engine oil consumption		
1) Oil leakage	1) Loosened drain plug on the oil pan	Retighten the drain plug
	2) Loosened oil pan set bolts	Retighten the setting bolts
	3) Oil pan gasket wear	Replacing the gasket
	4) Loosened timing sprocket cover setting bolts or worn gasket	Retighten setting bolts or replace the packing
	5) Loosened cylinder head cover setting bolts or gasket wear	Retighten setting bolts or replace the packing
	6) Loosened fuel pump clamping bolts or gasket wear	Retighten setting bolts or replace the packing
	7) Loosened oil filter setting bolts or work gasket	Retighten setting bolts or replace the packing

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Trouble	Cause	Repair
	8) Wear of the crankshaft retainer gasket	Replace the packing
	9) Wear of the crankshaft rear oil seal	Replace oil seal
2) Oil sinking	1) Excessive clearance between valve stem and valve guide	Replace either the valve or valve guide
3) Oil-up	1) Worn or broken piston rings	Replace the piston rings
	2) Malaligned piston ring gaps	Properly align the piston rings
	3) Piston ring sticking	Replace the piston rings
	4) Clogged oil slots on the oil control ring	Replace oil control rings
	5) Worn piston and cylinder walls	Replace piston or rectify the cylinder walls by boring.

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3-2 DIESEL ENGINE

Trouble	Cause	Repair
1. Starting failure		
1) Starter fails to operate	1) Discharged or performance failure of the battery 2) Poor connection 3) Starter motor failure or switch trouble 4) Use of unsuitable oil (too heavy)	Recharge or replace Clean and retighten the battery terminals Replace or overhaul Replace with specified oil
2) Injection nozzle is not provided with fuel	1) Fuel filter clogging 2) Feed pump failure 3) Air residues in the injection pump 4) Control rack sticks in its off-position 5) No fuel left in the fuel tank	Clean or replace the fuel filter element Overhaul Bleed residual air from the air bleeder plug Rectify Supply fuel and bleed the air from the fuel system
3) Other starting failures	1) Glow plug performance failure 2) Poorly adjusted injection timing 3) Throttle valve does not fully open 4) Reduction of compression pressure in the cylinders	Clean, inspect or replace Adjusted Adjusted Rectify the cylinder walls by the boring

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Trouble	Cause	Repair
2. Poor idling	1) Feed pump sticking 2) Residual air in the fuel system 3) Poorly adjusted injection system	Overhaul Bleed residual air from the fuel system Adjust
3. Unsmooth engine rotation		
1) Unsmooth engine idling	1) Poorly adjusted injection system 2) Crack in the high pressure piping 3) Nozzle operation failure 4) Wear of the throttle valve shaft 5) Unevenness of cylinder compression 6) Poor returning action of the intake shutter 7) Poor returning action of the throttle valve 8) Cracks in the vacuum vinyl piping 9) Governor (diaphragm) failure	Adjust Replace the injection pipe Rectify or replace as necessary Rectify or replace as necessary Rectify or correct by boring Rectify Rectify Replace vacuum vinyl pipe Inspect operation and replace the diaphragm if necessary
2) Engine performance failure at medium engine speed (hunting)	1) Weakened governor spring	Replace spring or adjust by inserting adjusting washer between spring and spring seat as necessary

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Trouble	Cause	Repair
	2) Worn diaphragm	Replace the diaphragm
3) Engine performance failure at high speed revolution	1) Air in the fuel system 2) Clogged fuel filter 3) Unevenness of fuel injection amount 4) Weakened governor spring 5) Poorly adjusted tappet clearance 6) Weakened valve spring	Bleed the air through the air bleed plug Clean or replace the filter element Adjust Replace spring or adjust by inserting adjusting washer between the spring and spring seat Adjust Replace spring
4) Engine retains high speed rotation on release of accelerator pedal	1) Sticking or restricted movement of the operating system 2) Cracks in the vacuum vinyl pipe 3) Worn diaphragm in the governor	Inspect and rectify the operation Replace vacuum vinyl pipe Replace diaphragm
4. Power failure		
1) Poorly adjusted injection pump and its associated parts	1) Misadjusted injection timing a) Excessively advanced injection timing b) Excessively retarded injection timing c) Poorly mounted injection pump 2) Nozzle operating failure	Adjust Adjust Rectify

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Trouble	Cause	Repair
	a) Poorly adjusted injection pressure b) Injection performance failure 3) Insufficient fuel supply to the injection pump a) Insufficient fuel in the fuel tank b) Residual air in the injection pump c) Clogged fuel filter d) Leakage in the over flow valve 4) Operating failure of the governor a) Clogged air cleaner b) Poorly adjusted accelerator pedal position c) Weakened governor spring	Adjust Rectify nozzle failure or replace Supply fuel Bleed the air from the air bleed plug Clean or replace the fuel filter element Check tightness or replace the valve Clean or replace the element Adjust the operation of the pedal Replace spring or adjust by inserting adjusting washer between spring and the spring seat
2) Insufficient compression pressure	1) Compression leakage a) Poorly adjusted tappet clearance b) Poorly mounted nozzle holders	Adjusted Check and retighten as necessary

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Trouble	Cause	Repair
	c) Worn cylinders	Replace piston ring or rectify the cylinder by boring
	2) Insufficient air intake effect	
	a) Clogged or contaminated air cleaner	
	b) Operating failure of the throttle valve	
	c) Restricted operation of the intake shutter	
3) Undue friction provided to the automobile	1) Insufficient spring pressure causes the clutch to slip	Adjust or replace the clutch driven plate as necessary
	2) Partially dragged brakes	Adjust
	3) Insufficient air pressure in the tires	Adjust
4) Over-heating	1) Insufficient cooling water	Replenish coolant with soft water
	2) Loosely tensioned fan belt	Readjust the fan belt tension
	3) Thermostat operating failure	Replace thermostat
	4) Failure of the pressure-type filler cap	Check water filler cap for failure and replace if necessary
	5) Clogged or contaminated cooling system	Clean the cooling system (Use chemical cleanser as necessary)

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Trouble	Cause	Repair
	6) Radiator core clogging	Clean the radiator and replace if necessary
	7) Over-loading the engine by excessively increasing the engine speed	
	a) Excessive (fast) engine idling speed	Adjust idling speed
	b) Excessive use of the low speed gears	Use proper manner of operation
	8) Other engine trouble or mis-adjustment of the parts	Adjust or rectify as necessary
5. Knocking	1) Excessively advanced injection timing	Adjusted
	2) Excessively high injection pressure	Adjusted
	3) Nozzle performance failure	Replace the nozzle if necessary
6. The engine lightly knocks with abnormal exhaust smoke	1) Poorly adjusted injection timing	Adjusted
	2) Excessively low injection pressure	Adjusted
	3) Poor state of fuel injection	Rectify or replace nozzle
	4) Broken nozzle spring	Replace spring
	5) Worn plunger	Replace plunger

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Trouble	Cause	Repair
	6) Poor contact of delivery valve seat	Rectify contacting face of the valve seat or replace the valve
	7) Excessive fuel supply	Adjust