

# **SERVICE MANUAL 4BG1T and 6BG1T ISUZU ENGINES**



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SECTION 1

GENERAL INFORMATION

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## GENERAL REPAIR INSTRUCTIONS

1. Before performing any service operation with the engine mounted, disconnect the grounding cable from the battery.  
This will reduce the chance of cable damage and burning due to short circuiting.
2. Always use the proper tool or tools for the job on hand.  
Where specified use the specially designed tool or tools.
3. Use genuine CASE parts, referring to the CASE PARTS CATALOG for engine safety.
4. Never reuse cotter pins, gaskets, O-rings, lock washers, and self locking nuts. Discard them as you remove them. Replace them with new ones.
5. Always keep disassembled parts neatly in groups. This will ensure a smooth reassembly operation.  
It is especially important to keep fastening parts separate. These parts vary in hardness and design, depending on their installation position.
6. All parts should be carefully cleaned before inspection or reassembly.  
Oil ports and other openings should be cleaned with compressed air to make sure that they are completely free of obstructions.
7. Rotating and sliding part surfaces should be lubricated with oil or grease before reassembly.
8. If necessary, use sealing compound on gaskets to prevent leakage.
9. Nut and bolt torque specifications should be carefully followed.
10. Always release the air pressure from any machine-mounted air tank(s) before dismantling the engine or disconnecting pipes and hoses. To not do so is extremely dangerous.
11. Always check and recheck you work. No service operation is complete until you have done this.

## NOTES ON THE FORMAT OF THIS MANUAL

This Service Manual is applicable to the 4BG1T and 6BG1T family of industrial diesel engines. Unless otherwise specified, these engines have common parts and components as well as data and specifications.

Illustrations used in this Service Manual are based on the 6BG1 and 6BG1T engines.

The 4BG1T engine and the 6BG1T engine are turbocharged.

1. Find the applicable section by referring to the Table of Contents at the beginning of the Manual.
2. Common technical data such as general maintenance items, service specifications, and tightening torques are included in the "General Information" section.
3. Each section is divided into sub-sections dealing with disassembly, inspection and repair, and reassembly.  
The section ENGINE ASSEMBLY is an exception. This part is divided into three sections to facilitate quick indexing.
4. When the same servicing operation is applicable to several different units, the manual will direct you to the appropriate page.
5. For the sake of brevity, self-explanatory removal and installation procedures are omitted.  
More complex procedures are covered in detail.

6. Each service operation section in this Service Manual begins with an exploded view of the applicable area. A brief explanation of the notation used follows.

Parts marked with an asterisk (\*) are included in the repair kit.

Parts within a square frame are to be removed and installed as a single unit.

All parts within an irregularly shaped frame form a single assembly. They are considered to be a "major component".

Individual parts within the irregularly shaped frame are considered to be "minor components".

The number indicates the service operation sequence.

Removal of unnumbered parts is unnecessary unless replacement is required.

The "\*\* Repair Kit" indicates that a repair kit is available.

The parts listed under "Reassembly Steps" or "Installation Steps" are in the service operation sequence.

The removal or installation of parts marked with a triangle (▲) is an important operation. Detailed information is given in the text.

**Disassembly Steps - 2**

<ul style="list-style-type: none"> <li>1. Water by-pass hose</li> <li>2. Thermostat housing</li> <li>3. Water pump</li> <li>▲ 4. Injection nozzle holder</li> <li>5. Glow plug and glow plug connector</li> <li>6. Cylinder head cover</li> <li>▲ 7. Rocker arm shaft and rocker arm</li> <li>8. Push rod</li> <li>▲ 9. Cylinder head</li> </ul>	<ul style="list-style-type: none"> <li>10. Cylinder head gasket</li> <li>▲ 11. Crankshaft damper pulley with dust seal</li> <li>12. Timing gear case cover</li> <li>13. Timing gear cover</li> <li>14. Timing gear oil pipe</li> <li>15. Idler gear "B" and shaft</li> <li>▲ 16. Idler gear "A"</li> <li>▲ 17. Idler gear shaft</li> </ul>
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Inverted Engine

## 1-4 GENERAL INFORMATION

7. Below is a sample of the text of the Service Manual

**Valve Guide Installation**

1. Lubricate the valve guide outer face with engine oil.
2. Attach the installer to the valve guide.
3. Use a hammer to drive the valve guide into position from the cylinder head upper face.
4. Measure the height of the valve guide upper end from the upper face of the cylinder head.

Valve Guide Upper End Height (H)	mm(in)
	14.1 (0.56)

**Note:**  
If the valve guide has been removed, both the valve and the valve guide must be replaced with new ones as a set.  
Be absolutely sure to discard the used valves and valve guides.

This is the item shown in the illustration. It is marked with a triangle (▲) on the Major Components page.

Letters and numbers contained in a circle refer to the illustration.

Symbols indicate the type of service operation or step to be performed. A detailed explanation of these symbols follows.

Service data and specifications are given in this table.

8. The following symbols appear throughout this Service Manual. They indicate the type of service operation or step to perform.



**Removal**



**Adjustment**



**Installation**



**Cleaning**



**Disassembly**



**Important Operation Requiring Extra Care**



**Reassembly**



**Specified Torque (Tighten)**



**Alignment (Marks)**



**Commercially Available Tool Use Required or Recommended**



**Directional Indication**



**Lubrication (Oil)**



**Inspection**



**Lubrication (Grease)**



**Measurement**



**Sealant Application**



9. Measurement criteria are defined by the terms “standard” and “limit”.

A measurement falling within the “standard” range indicates that the applicable part or parts are serviceable. “Limit” should be taken as an absolute value.

10. Components and parts are listed in the singular form throughout the Manual.

11. Directions used in this Manual are as follows:

**Front:** The cooling fan side of the engine viewed from the flywheel.

**Right:** The injection pump side of the engine.

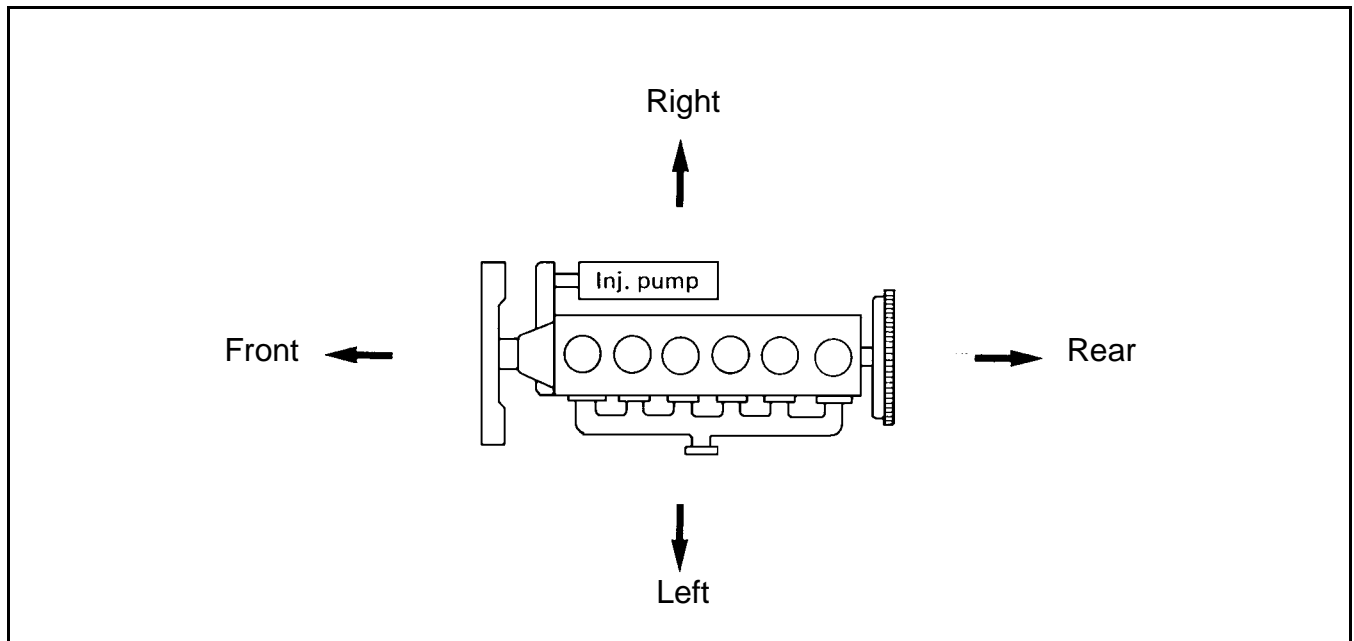
**Left:** The exhaust manifold side of the engine.

**Rear:** The flywheel side of the engine.

Cylinder numbers are counted from the front of the engine.

The front cylinder is No. 1 and rear cylinder is No. 4 or No. 6.

The engine’s direction of rotation is counterclockwise as viewed from the flywheel.



## 1-6 GENERAL INFORMATION

### MAIN DATA AND SPECIFICATIONS

**Note:**

1. These specifications are based on the standard engine.
2. Specifications for items marked with an asterisk (\*) will vary according to the type of equipment on which the engine is installed.

If you are unable to locate the data applicable to these specifications, please contact Isuzu Motors LTD through your machine supplier.

Item	Engine Model 4BG1T	Engine Model 6BG1T
Engine type	Water cooled, four cycle, vertical in-line overhead valve	
Combustion chamber type	Direct injection	
Cylinder liner type	Dry	
No. of cylinders - bore x stroke mm (in)	4 - 105 x 125 (4.13 x 4.92)	6 - 105 x 125 (4.13 x 4.92)
Total piston displacement cm <sup>3</sup> (cid)	4329 (264)	6494 (396)
Compression ratio	17.0 to 1	17.5 to 1
* Engine dimensions mm (in)	878 x 702 x 883	1193 x 739 x 949
Length x width x height	(34.6 x 27.6 x 34.8)	(47.0 x 29.1 x 37.4)
* Engine weight (Dry) kg (lb)	361 (796)	489 (1078)
Fuel injection order	1-3-4-2	1-5-3-6-2-4
Specified fuel	Diesel fuel (ASTM D975 No. 2D)	
Injection pump	In-line plunger, Bosch A type	In-line plunger, Bosch AD type
Injection nozzle	Multi orifice	
Injection starting pressure kg/cm <sup>2</sup> (psi)	185 (2630) cartridge (spin-on)	
Fuel filter type	Center bolt or cartridge (spin-on)	
Water sediment decanter (if so equipped)	Sediment/water level indicating type	
Compression pressure kg/cm <sup>2</sup> (psi)	31 (441) at 200 rpm at sea level	
(When warm)		
Valve clearances (When cold)		
Intake mm (in)	0.40 (0.016)	
Exhaust mm (in)	0.40 (0.016)	
Lubrication method	Pressurized circulation	
Oil pump	Gear type	
Main oil filter type	Full flow, cartridge (spin-on)	Centerbolt, fullflow or cartridge (spin-on)
Partial oil filler	Equipped by OEM	
* Lubricating oil volume lit. (US gal)	13.2 (3.5)	21.5 (5.68)
Oil cooler	Water cooled integral type	
Cooling method	Pressurized forced circulation	
Coolant volume (engine only) lit. (US gal)	8.5 (2.25)	12 (3.2)
Water pump	Belt driven impeller type	
Thermostat type	Wax pellet type	
* Generator V-A	24-40	
* Starter V-KW	24-4.5	
* Turbocharger manufacturer	MITSUBISHI	IHI
* Turbocharger model	TD04H	RHE6