



SERVICE MANUAL

March 2002



SERVICE MANUAL

L-SERIES L2A, L2C, L2E, L3A, L3C, L3E

MITSUBISHI DIESEL ENGINES

L-SERIES

L2A, L2C, L2E
L3A, L3C, L3E

MARCH 2002



Foreword

This service manual is written to familiarize you with the maintenance of your L-series Diesel Engine. If the engine is carefully maintained it will deliver a long productive life and efficient performance marked by power and economy.

Before attempting to inspect, disassemble, or repair the engine, read this manual carefully to learn more about the engine and how to care for it properly. All descriptions, illustrations, specifications and serial numbers in this manual are effective as of the date of printing of this manual.

The information contained in this manual applies to the engine model produced at the time of publication. It should be noted that specifications and design may change due to improvements made thereafter.

What This Manual Covers

This service manual covers standard specifications for the L-series Mitsubishi Diesel Engine, and describes

- Specification
- Maintenance standard
- Adjustment
- Disassembly, inspection and repair
- Reassembly

In addition to the Summary of Manual Contents, a short summary of contents is found on the first page of each group of the manual.

Operation and periodic maintenance are described in the *Operation & Maintenance Manual*, component parts and ordering of service parts are described in the *Parts Catalogue*. Structure and function of the engine are described in the various training manuals.

How to Use This Manual

1. Parts in illustrations are numbered to correspond with references to those numbers in the disassembly sequence.
2. Items or conditions to be inspected during disassembly are enclosed in a box in the disassembled views:

Clogged oil hole
3. Maintenance standards for inspection and repair are described in text where they are relevant. For a quick summary of maintenance standards, refer to group 9 of this manual.
4. Tightening torque under *wet* conditions is indicated as “(wet)” in text, drawings and tables. When so indicated as (wet), apply engine oil to the threaded portion of the fastener. Unless indicated as such, the tightening torque is to be assumed in the dry condition.
5. Measurements are based on the International System of Units (SI), and they are converted to the metric and English system units in this manual based on the following conversion rates.

- Pressure : 1 Mpa = 10.197 kgf/cm²
- Torque : N·m = 0.10197 kgf·m
- Force : N = 0.10197 kgf
- Horsepower : 1 kW = 1.341 HP = 1.3596 PS

Notes and Cautions

Notes and cautions are used in this manual to emphasize important or critical instructions or advice.

- CAUTION** Indicates operating procedure, practice, etc., resulting in personal injury or damage to or destruction of the engine.
- NOTE** An operating procedure, condition, etc. that will help you work more efficiently.

Terms Used in This Manual

Before reading this manual, note that the following special terms are used in dimensional and other specifications.

- Assembly Standard** Indicates the dimension of a part, the dimension to be attained at the time of reassembly or the standard performance. The value is rounded to the nearest number needed for inspection and is different from the design value.
- Repair Limit** A part which has reached this limit must be repaired.
- Service Limit** A part which has reached this limit must be replaced.

Summary of Manual Contents

Group	Contents
1. General	Engine model and engine number, external views, features, engine specifications, maintenance, troubleshooting
2. Engine Main Parts	General, rocker arms and rocker shaft, cylinder head, valves and valve springs, inlet manifold and exhaust manifold, gear case and oil pump, timing gear, camshaft (valve camshaft and injection pump camshaft), piston and connecting rod, crankshaft, cylinder block
3. Lubrication System	General, oil filter and oil pressure switch
4. Fuel System	General, fuel injection pump, injection nozzle
5. Governor System	General, torque spring
6. Cooling System	General, fan and fan belt, water pump, thermostat, water temperature gauge unit and thermostick
7. Air Cleaner	Air cleaner
8. Electrical System	General, starter, alternator and dynamo, glow plug, key-off stop system, glow timer system
9. Service Specifications and Standard	Periodic service chart, specifications and standards, tightening torque chart and sealant chart, special tools

GENERAL

1. Engine Model and Engine Number	1- 2
1.1 Model, Classification and Use	1- 2
1.2 Engine Model Embossment and Engine Number Stamp	1- 2
2. External View	1- 3
3. Features	1- 5
3.1 Aim of Development	1- 5
3.2 Features of the New Series	1- 5
4. Engine Specifications	1- 6
5. Maintenance	1- 7
5.1 Engine Oil and Oil Filter	1- 7
5.2 Retightening the Cylinder Head Bolts	1- 9
5.3 Adjusting the Valve Clearance	1- 9
5.4 Adjusting the Fan Belt Tension	1-10
5.5 Bleeding Air from the Fuel System	1-10
5.6 Replacing the Fuel Filter	1-11
5.7 Checking and Adjusting the Injection Timing	1-13
5.8 Adjusting the Engine Speed	1-15
5.9 Checking and Adjustment of Nozzles	1-16
6. Troubleshooting	1-18
6.1 Hints on using the Trouble-Diagnosis Chart	1-18
6.2 Hard Starting	1-19
6.3 Knocking	1-20
6.4 Overheating	1-21
6.5 Black-smoky Exhaust	1-22
6.6 Unsteady Idling	1-23
6.7 Low Output	1-24

GENERAL

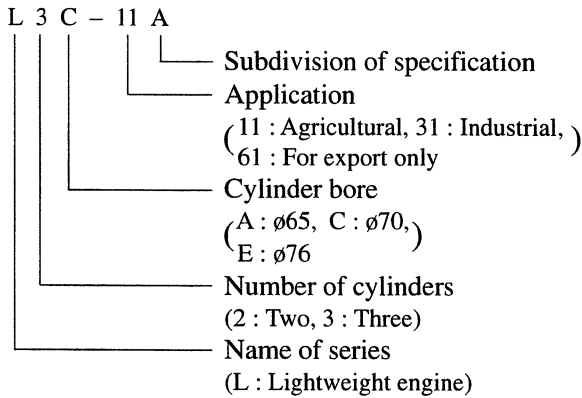
1. Engine Model and Engine Number

1.1 Model, Classification and Use

(1) Engine model

Model	Application	Use
L2A L2C	11, 12 -	For Agricultural
L2E L3A	31, 32 -	For Industrial
L3C L3E	61, 62 -	For Export only

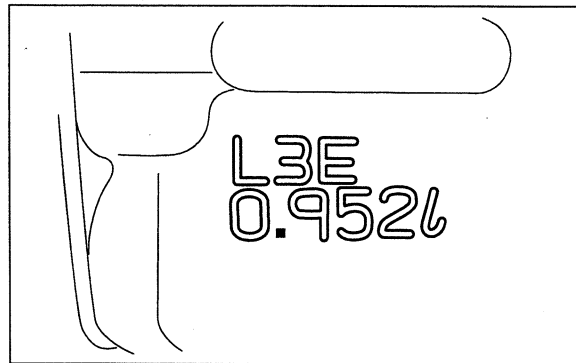
(2) Engine model and application codes



1.2 Engine Model Embossment and Engine Number Stamp

(1) Embossment of engine model and cylinder volume

The engine model and cylinder volume are embossed on the side of injection pump mounting portion of the cylinder block.



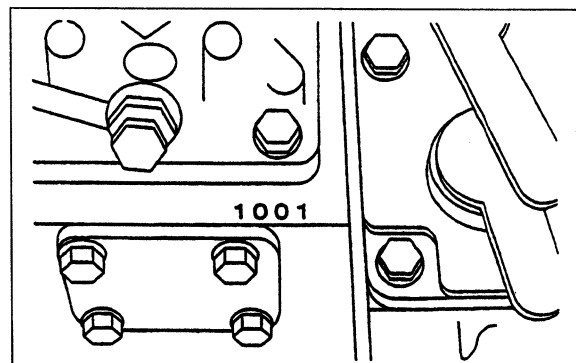
Engine model and cylinder volume

(2) Engine number stamp

The engine number is stamped on the injection pump mounting portion of the cylinder block (on the upper side of the tie rod cover).

It is a serial number beginning with 1001 shown as below.

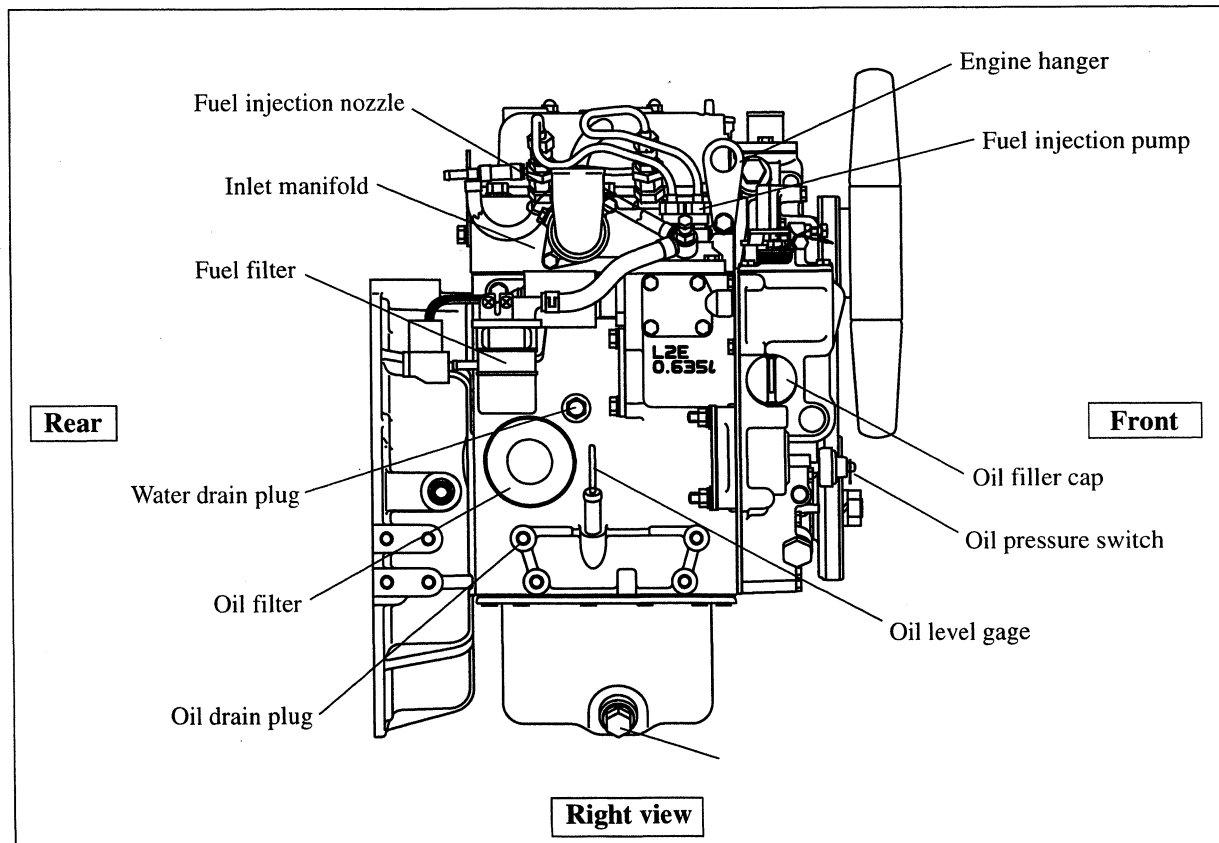
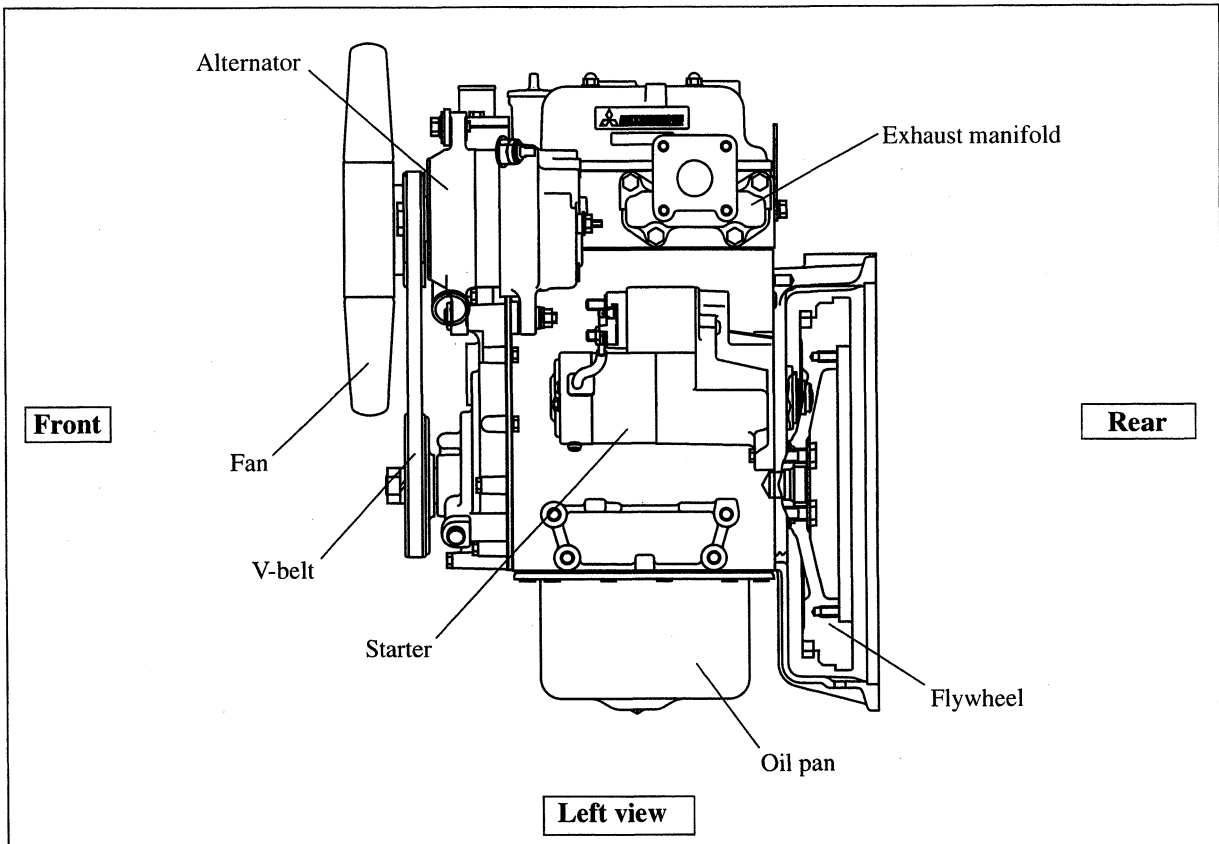
Number	Engine model
1001 -	(ALL models)



Engine number

2. External View

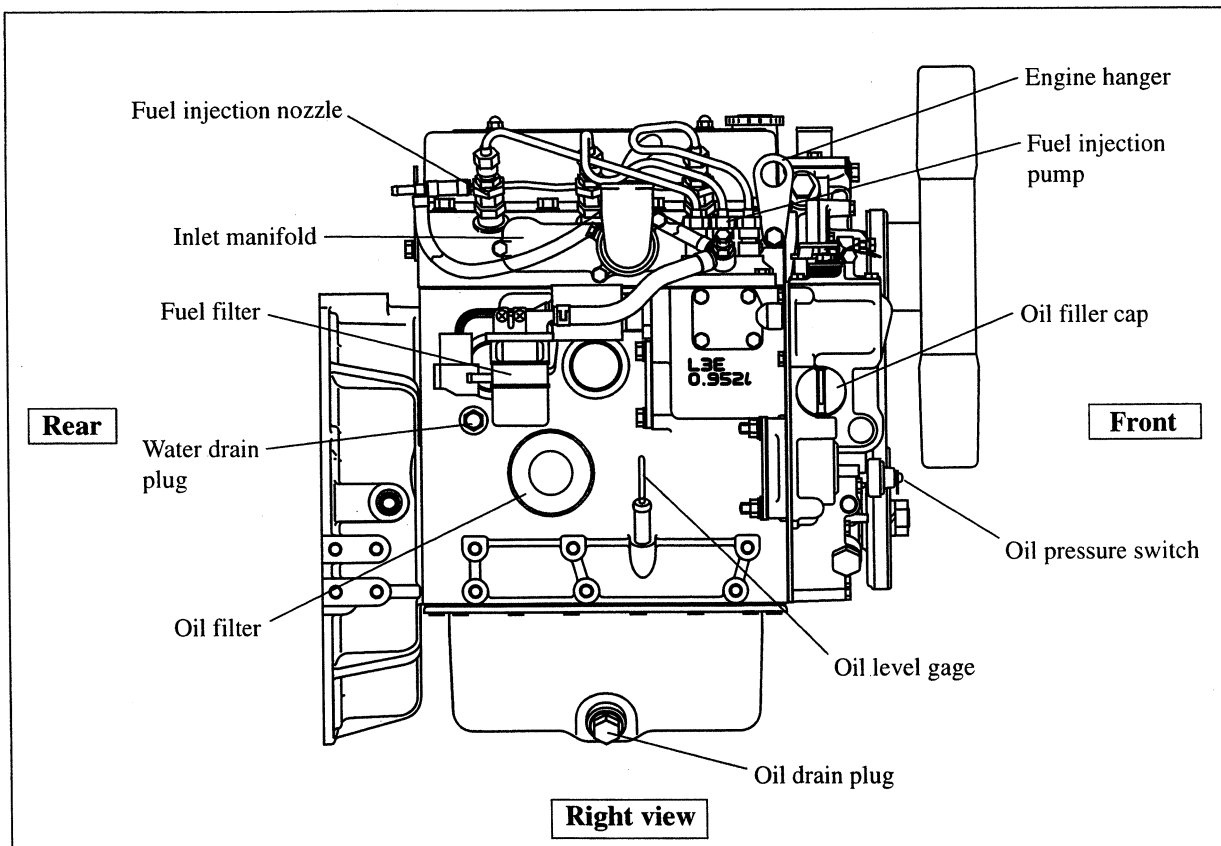
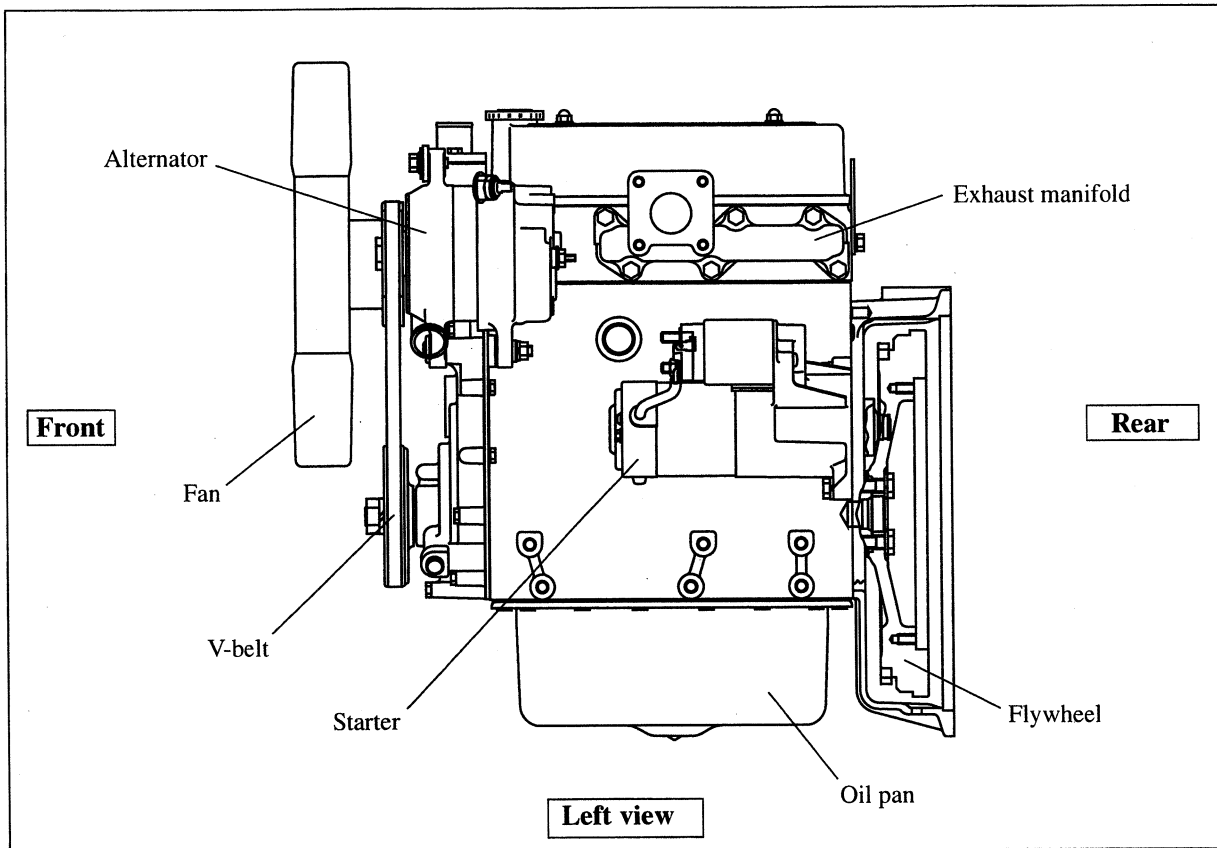
[L2 External View]



Remarks: Rotation direction of this engine is counterclockwise as seen from flywheel side.

GENERAL

[L3 External View]



Cross section (L3C)

Remarks: Rotation direction of this engine is counterclockwise as seen from flywheel side.

3. Features

3.1 Aim of Development

The L-series designs are compact, lightweight engines suitable for superseding gasoline engines to power lawn mowers, vehicles, etc. The high-speed (3600 min⁻¹ continuous) engines are also available for generators, welders, and marine use. The L series are the smallest and the lightest water-cooled diesel engines in the world.

3.2 Features of the New Series

(1) Small and lightweight engine

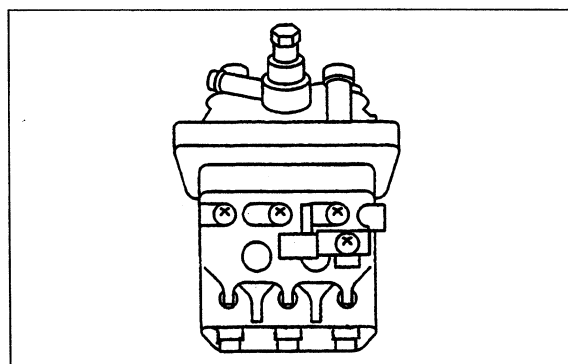
The new L-series are 10 to 20% lighter in weight and 15 to 20% smaller in contour volume than the same class of competitor's engines.

(2) Low noise and economical fuel consumption

Low noise and economical fuel consumption are attained by the well designed cylinder block construction (having curved side faces), the rearranged combustion chambers, and the compacted fuel injection system.

(3) Easy starting

The engine can be started instantly only by keeping the starting switch key in the ON position for about 6 seconds to feed electric current to the glow plugs automatically (For engines with the automatic glow plug system). The new governor mechanism also contributes to easy engine start, by increasing the amount of fuel injection and delaying injection timing, without moving the throttle lever to the "full throttle" position.

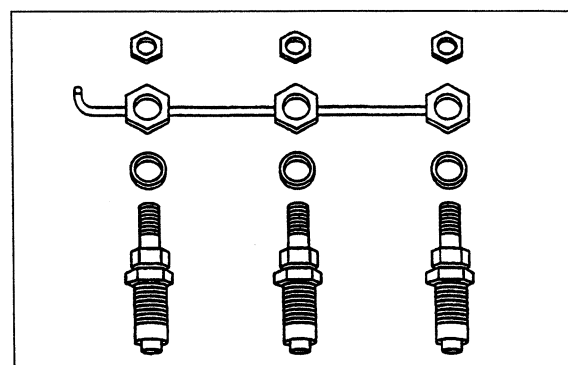


Injection pump

(4) Multipurpose engine

The L-series engine can be equipped with various kinds of optional devices.

- Ex. ● Key-OFF stop system (Fuel cutoff valve)
● Torque spring
● Manual stop lever



Nozzle holders and return pipe