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# MITSUBISHI DIESEL ENGINE

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# SHOP MANUAL

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MODEL **DR**

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(FOR INDUSTRIAL USE)

4DR5-744591  
6DR5-131569  
and up



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Mar. 1983 97811-04010

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# FOREWORD

This shop manual contains the specification, construction, operation, adjustment and service procedures of the Model 4DR5, 6DR5 diesel engine for service mechanics engaged in servicing of the Mitsubishi diesel engines.

Please make the most of this shop manual to perform correct servicing and wasteless operations.

Note that some of the contents of this shop manual are subject to change owing to improvements, etc. that may be introduced after publication of the shop manual.

## <Engine Designation >

4DR5P } Engine for general purposes  
6DR5P }

4DR5C } Engine for construction machinery  
6DR5C }

## <Applicable Engine Models >

4DR5 } for industrial use  
6DR5 }

## <Applicable Engine No. >

4DR5-744591 and up  
6DR5-131569

## COMPILATION OF THIS MANUAL

1. The contents of this shop manual are divided as shown below when edited.

Group No.	Group Name	Contents
1	General	General description, outside view photograph and cross sectional view of engine, specifications, construction and operation
2	Service standards	Adjustment standard table, service standard table, tightening torque table, sealant and grease table
3	Special tools	
4	Determining time to overhaul	Determination of time to overhaul, measurement of compression pressure, troubleshooting
5	Engine adjustment and break-in operation	
6	Removal and installation of auxiliaries	Removal and installation of auxiliaries such as injection pump, starter and alternator
7	Engine proper	Disassembly, inspection and reassembly of engine proper, including cylinder head, valve mechanism, camshaft, piston, crankshaft, timing gear, flywheel, etc.
8	Inlet and exhaust	Disassembly, inspection and reassembly of inlet and exhaust system, including inlet manifold, exhaust manifold, air cleaner, etc.
9	Lubrication	Disassembly, inspection and reassembly of lubrication system, including oil pump, oil filter, etc.
10	Cooling	Disassembly, inspection and reassembly of cooling system, including water pump, thermostat, etc.
11	Fuel	Disassembly, inspection and reassembly of fuel system, including injection pump, injection nozzle, fuel filter, etc.
12	Electrical	Disassembly, inspection and reassembly of electrical system, including starter, alternator, vacuum pump, glow plug, etc.
13	Other equipment	Inspection of automatic stop device
14	Clutch and transmission	Disassembly, inspection and reassembly of clutch, transmission, bearing case, etc.

## 2. How to Read Disassembly and Reassembly Drawings

- (a) The names and key numbers of parts in the drawings correspond to those in the text. The parts are numbered in the order of disassembly.
- (b) The items of checks to be made during disassembly operations are shown in the disassembly drawings.
- (c) All tightening torque specifications in the reassembly drawings may be considered "dry" unless "wet" is specified.

## 3. Definition of Terms

- (a) Nominal Dimension (Abbr.: ND)

Shows dimension of single part, mutual clearance between parts or standard performance. Values, however, are rounded off within limits necessary for inspection.

- (b) Repair Limit (Abbr.: RL)

Shows that when specified value is reached, repair is necessary. Repair means adjustment, grinding, replacement of bushings, metals and the like, selection of oversize, selection of shim thickness, etc.

- (c) Service Limit (Abbr.: SL)

Shows that when specified value is reached, replacement of the parts with new one is necessary.

- (d) Basic Diameter (Abbr.: BD)

Shows nominal diameter of part to be measured.

## 4. Unit

The SI unit (International System of Units) is used. Metric notation is jointly shown in parentheses.

5. Table of Conversion Rate for Foot-pound Units into SI Units

Unit	Sign of SI unit	Sign of foot-pound unit	Conversion rate
Mass quantity of matter	kg g	lbs oz	1 kg = 2.2046 lbs 1 g = 0.035274 oz
Dimension	m mm	ft. in.	1 m = 3.2808 ft. 1 mm = 0.03937 in.
Capacity	lit. cc	gal. oz	1 lit. = 0.2642 gal. (U.S.) 0.220 gal. (Imp.) 1 cc = 0.033814 oz (U.S.) 0.035195 oz (Imp.)
Force	N (Newton)	lbs.	1 N = 0.2248 lbf.
Pressure	kPa (kilopascal)	lbs/in. <sup>2</sup>	1 kPa = 0.145 lbf/in. <sup>2</sup> 1 kPa = 0.2953 in. Hg
Stress	N/cm <sup>2</sup>	lbf/in. <sup>2</sup>	1 N/cm <sup>2</sup> = 1.45 lbf/in. <sup>2</sup>
Moment of force	N m	ft.lbs	1 N m = 0.7375 ft.lbs
Output	kW (kilowatt)	HP	1 kW = 1.34 HP
Temperature	°C	°F	t°C = (1.8t°C + 32)°F

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# 1. GENERAL

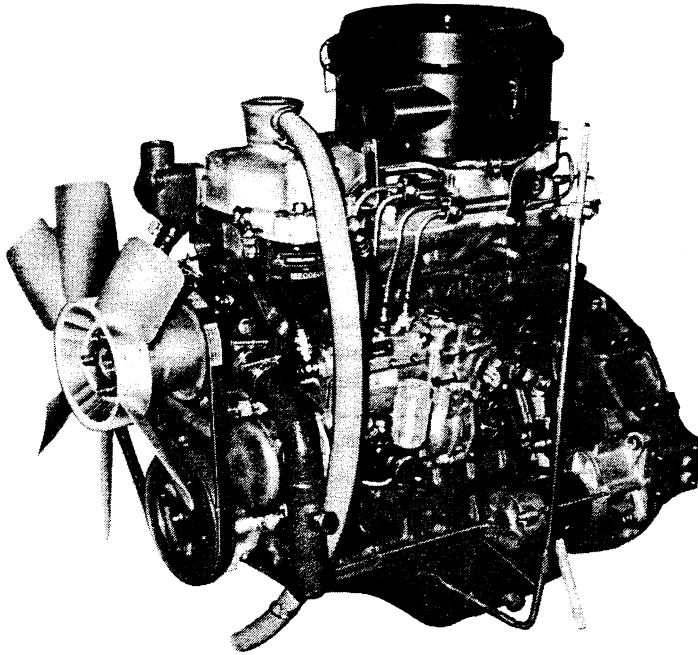
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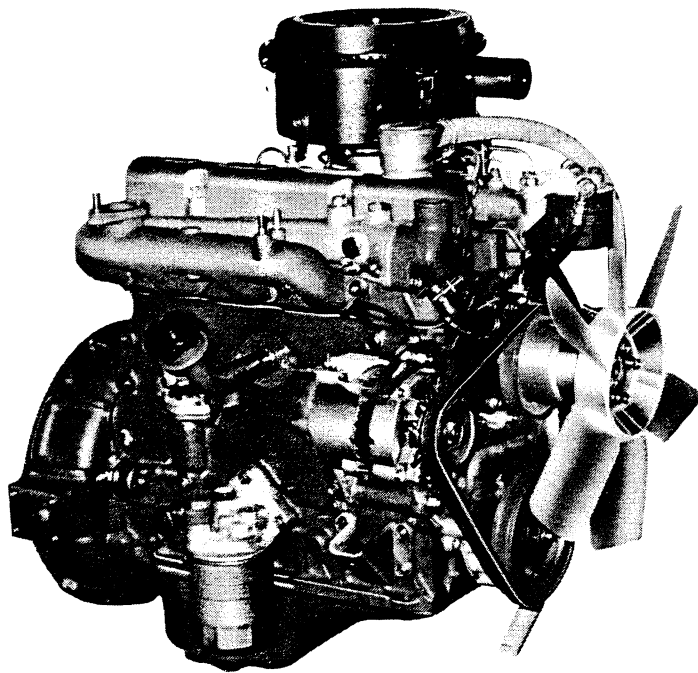
## 1-1 GENERAL DESCRIPTION

### 1-1-1 Outside View Photographs

(1) 〈4DR5〉

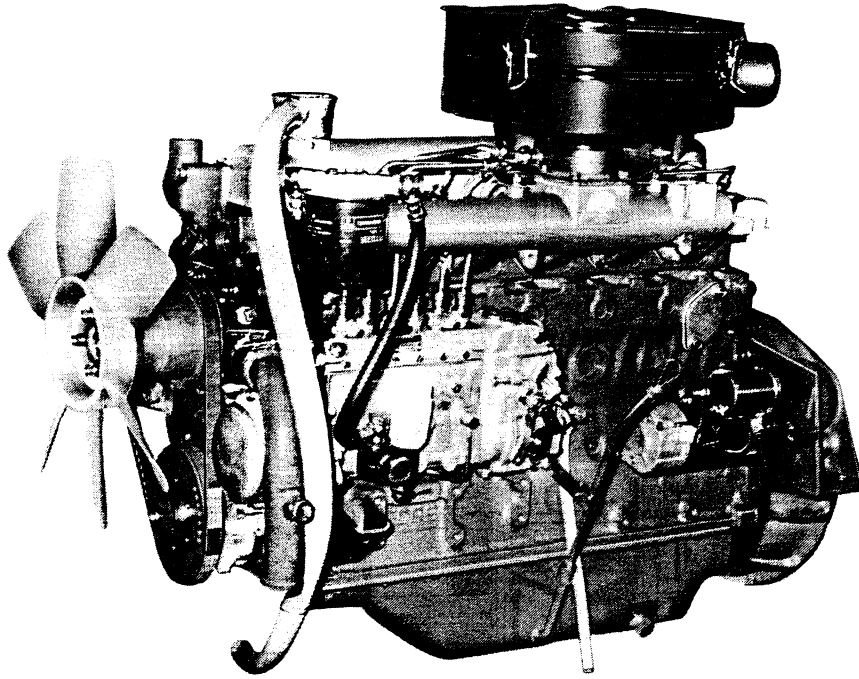


PE2057

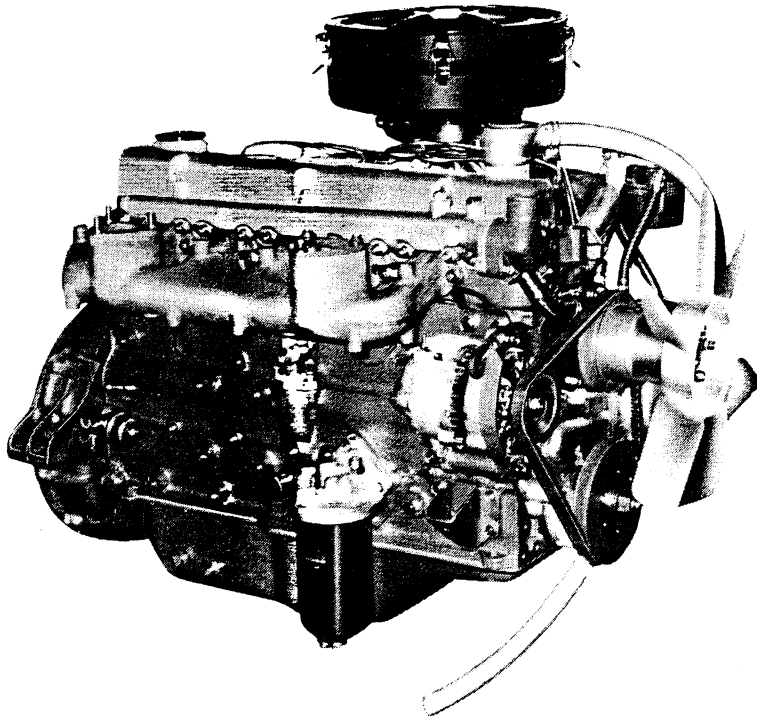


PE2058

(2) <6DR5>



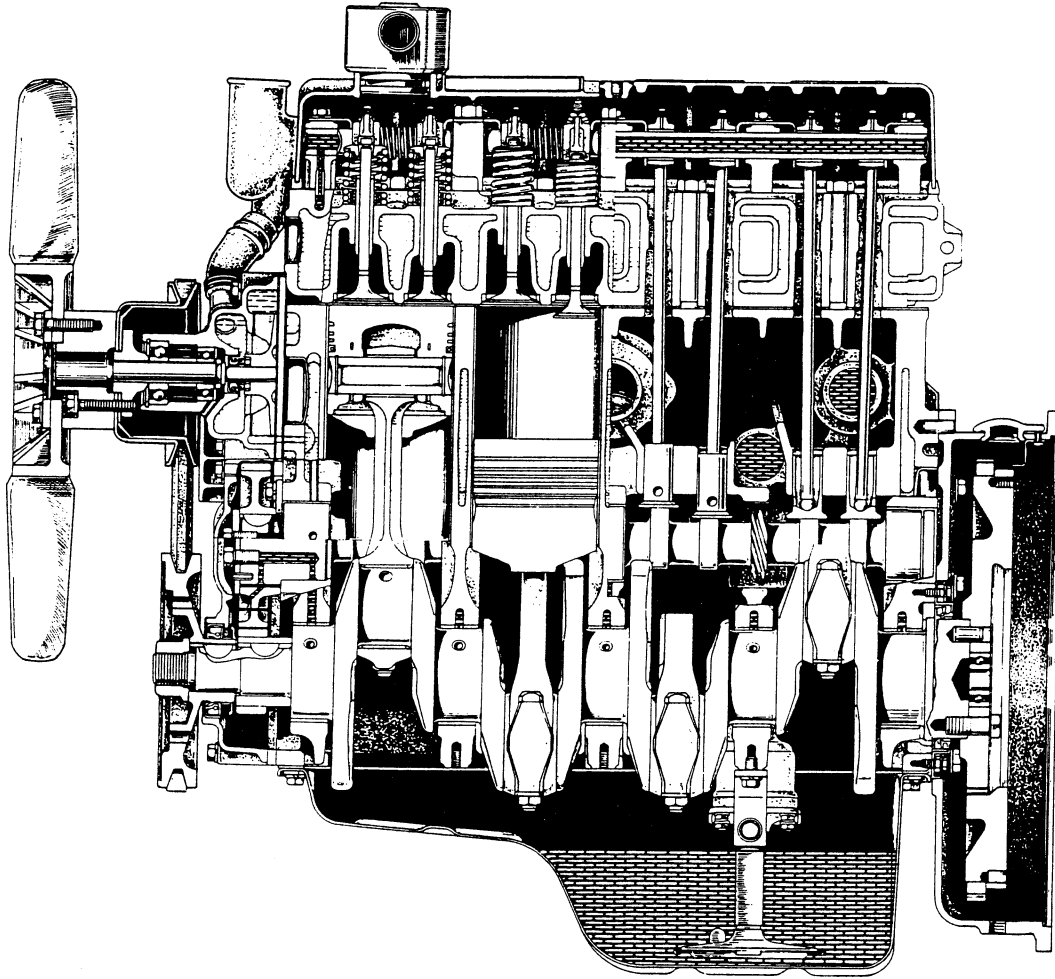
PE2059



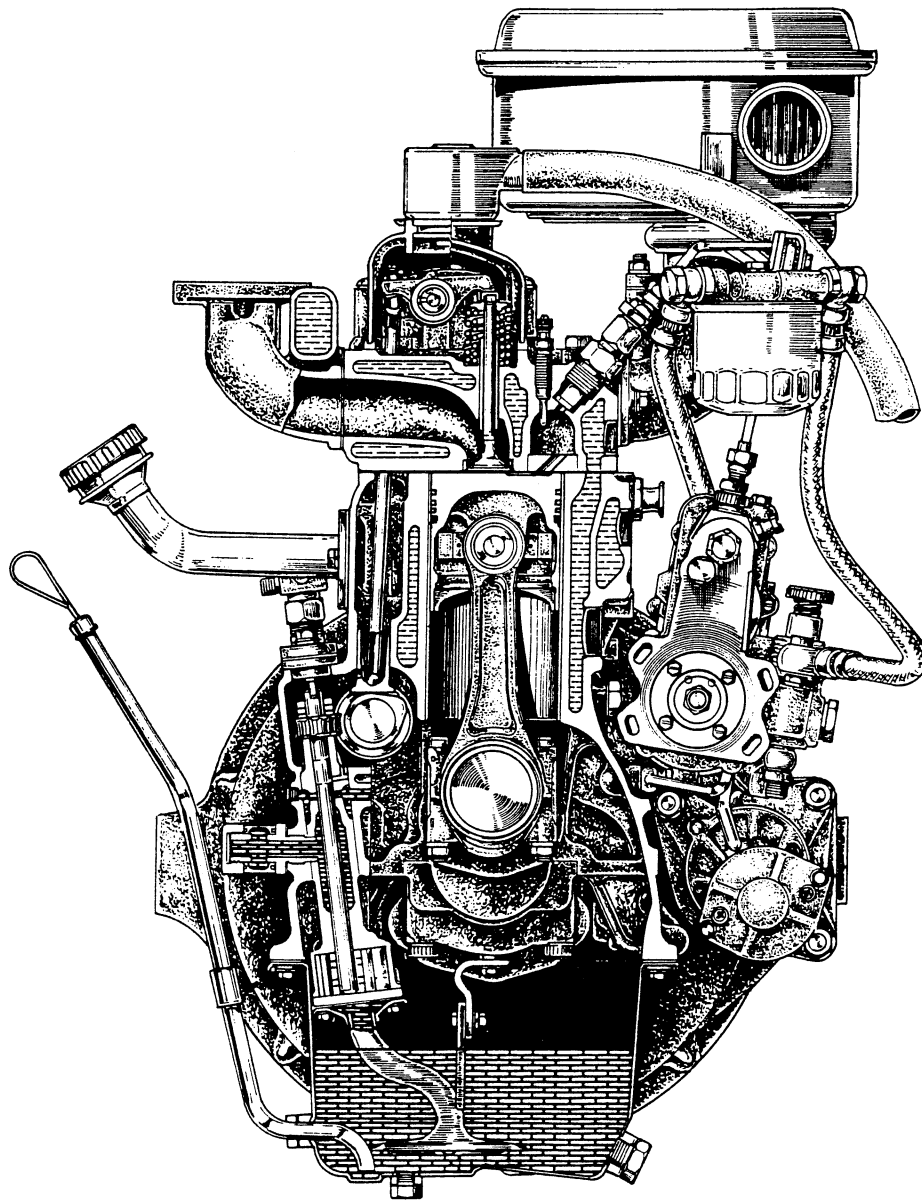
PE2060

1-1-2 Engine Sectional View

(1) <4DR5>

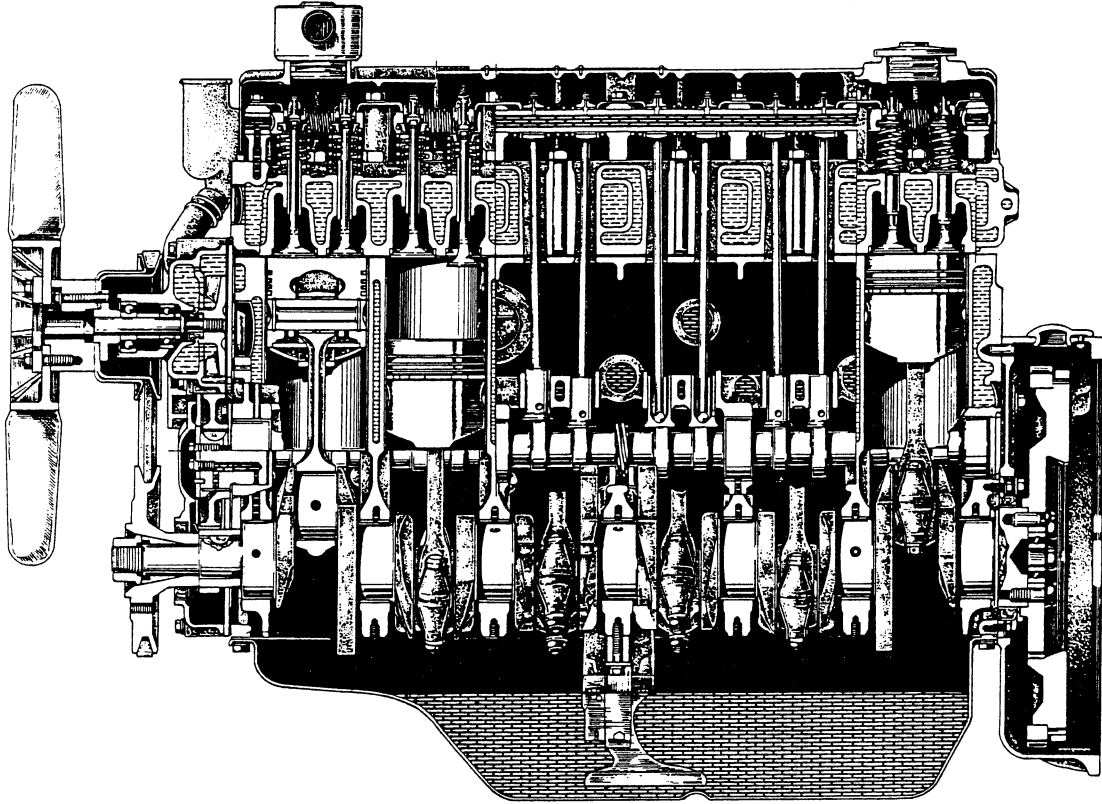


PE7453

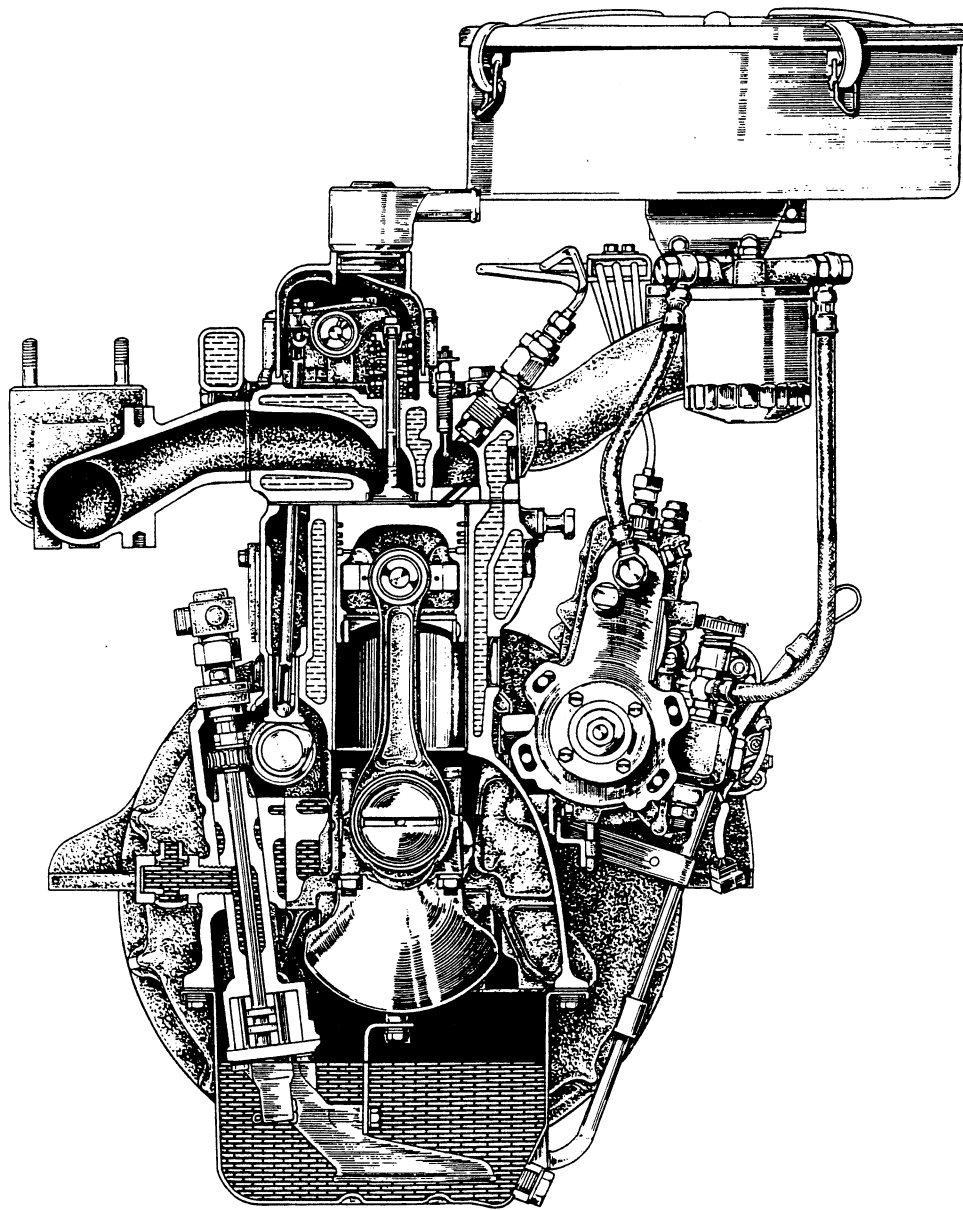


PE7454

(2) 〈6DR5〉



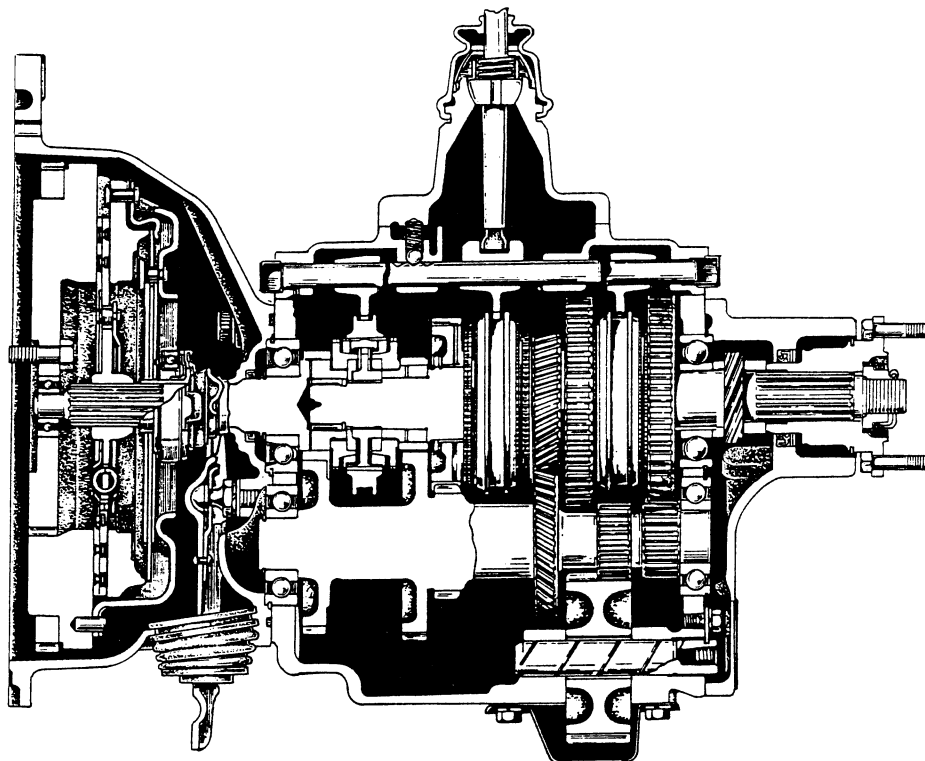
PE7455



PE7456

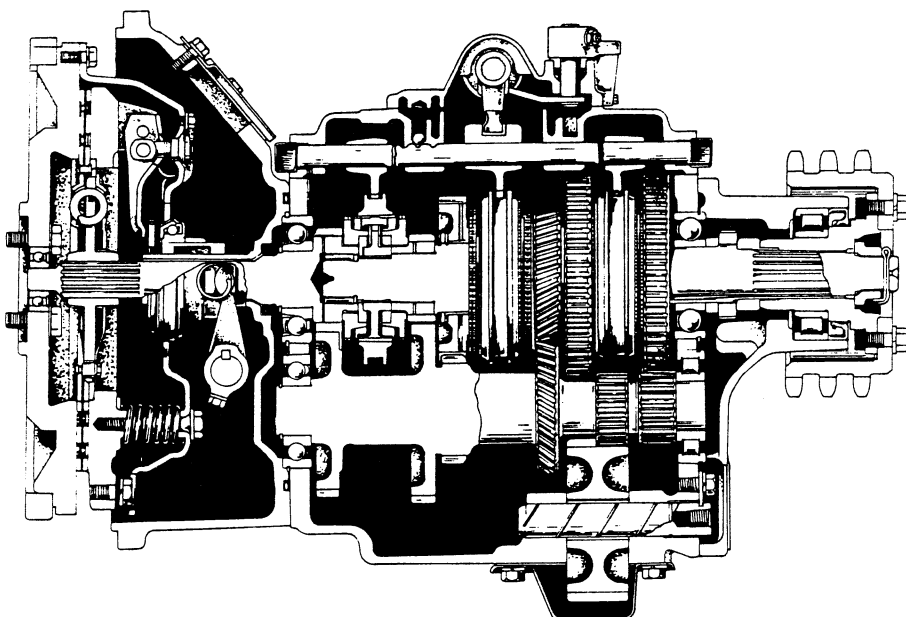
1-1-3 Sectional View of Clutch and Transmission

(1) <4DR5>



PE7457

(2) <6DR5>



PE7190



## 1-1-4 Engine Number and Nameplate

### (1) Engine Number

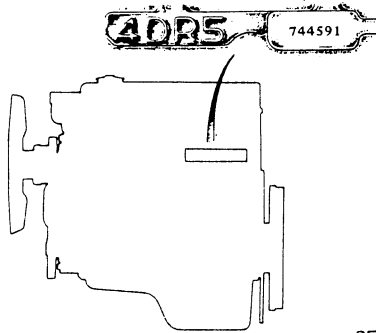
The engine number is stamped on the left side of the crankcase as shown below.

E.g. Model Engine No.

4DR5 - 744591

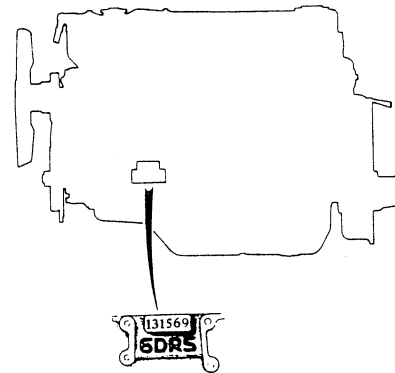
The engine number is an important number in learning the history of the engine.

<4DR5>



SE5004

<6DR5>

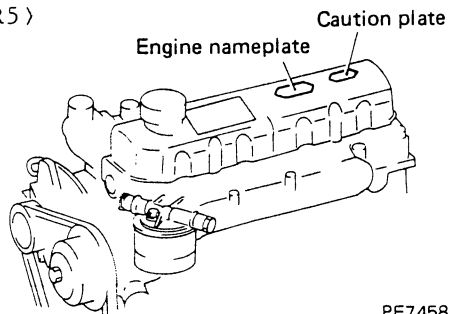


SE5372

### (2) Engine Nameplate

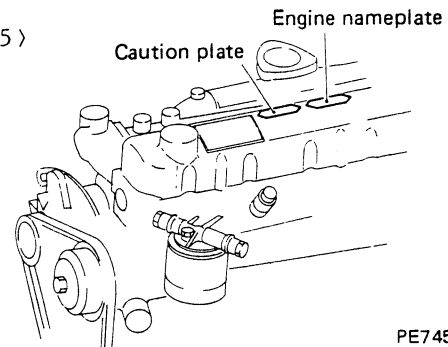
The nameplate is located at the position shown in illustration below. The nameplate shows the engine model, application symbol, total displacement, and rated output/engine speed. The caution plate shows valve clearance, firing order and fuel injection timing.

<4DR5>



PE7458

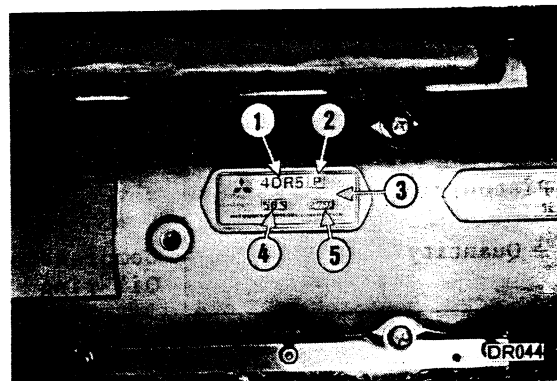
<6DR5>



PE7459

### Indication on Nameplate

- 1 Engine model
- 2 Application symbol  
C: For construction machinery  
P: For power generator and  
general power plant
- 3 Total displacement
- 4 Rated output
- 5 Engine speed



## 1-2 SPECIFICATIONS

### 1-2-1 Principal Specifications

Item	Specification	
Engine model	4DR5	6DR5
Type	Water cooled, 4-cycle diesel	←
Number of cylinders- arrangement	4 - in-line	6 - in-line
Valve mechanism	Overhead valve	←
Combustion chamber	Swirl chamber type	←
Cylinder bore x stroke	92 x 100 mm	←
Total displacement	2 659 lit.	3 988 lit.
Compression ratio	20	←
Firing order	1-3-4-2	1-5-3-6-2-4
Engine dimensions		
Overall length	773 mm	1 003.5 mm
Overall width	648 mm	695 mm
Overall height	857.5 mm	853.5 mm
Weight	255 kg	370 kg

The weight and dimensions of engine built to standard specifications are shown.

### 1-2-2 Specifications of Each Device

#### ENGINE PROPER

Item	Specification
Cylinder sleeve	
Type	Dry type
Piston type	Trunk, slipper - skirt type
Piston ring	
Quantity	Compression ring: 3 Oil ring : 1

INLET AND EXHAUST

Item	Specification	
Air cleaner  Element type	〈Standard〉  (Nippon Rokaki Co., Ltd. product)	〈Option〉  (Nippon Donaldson Ltd. product)
	Flat type filter paper element	Cyclone type filter paper element

LUBRICATION

Item	Specification		
	〈4DR5〉		〈6DR5〉
Engine oil			
Quality	API classification Grade CC or better		←
Quantity	Approx. 5 lit (oil pan only)		Approx. 8.5 lit (oil pan only)
	Approx. 0.8 lit (oil filter only)		Approx. 1.5 lit (oil filter only)
Lubrication system	Forced lubrication by oil pump		←
Oil pump			
Type	Trochoid type		←
Relief valve			
Type	—		Ball valve type
Oil filter	〈Standard〉      〈Option〉		
Type	Throw-away filter paper type (built-in bypass valve)	Center bolt filter paper type	Center bolt filter paper type
Relief valve			
Type	Piston valve type	←	←
Oil bypass alarm			
Type	—	Piston valve containing electric contact	←

# Mitsubishi Diesel Dr Engine

Full download: <http://manualplace.com/download/mitsubishi-diesel-dr-engine/>

Item	Specification		
Oil cooler (4DR5: 2 500 rpm or more) (6DR5: 2 200 rpm or more)			
Type	Shell and plate type	←	
Bypass valve			
Type	Piston valve type	←	
Oil pressure unit	<Standard>                      <Option>		
Type	Bimetal type	Variable resist- ance type	Bimetal type
Oil pressure switch	<Option>		<Option>
Type	Diaphragm type with built-in electric contacts		←