

SHOP

MANUAL

KOMATSU

94E, 98E SERIES

DIESEL ENGINE

As a part of revision of this shop manual, special descriptions of the engines certified by the EPA (Environmental Protection Agency) are added to the latter half of the manual (Chapter 20).

For the descriptions other than the above, see the first half, since they are the same as those of the conventional engines.

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Mark	Indication	Action required
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Pages having no marks are those previously revised or made additions.

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Applicable machine, Serial number

Engine	Machine model	Machine Serial No.	Engine output (kW{HP}/rpm)	Remarks
4D94E-1A	D20P-7	78604 and up	29.4 {39.4} / 2,450	
	D20P-7	62454 and up	29.4 {39.4} / 2,450	
	D20PL-7	62454 and up	29.4 {39.4} / 2,450	
	D20PLL-7	62454 and up	29.4 {39.4} / 2,450	
	D20QG-7	62454 and up	29.4 {39.4} / 2,450	
4D98E-1A	D21A-7T	78604 and up	36.8 {49.3} / 2,450	

Notice

Please update the part numbers and codes in this shop manual as follows.

[Method of updating]

Add YM in front of the part number and code.

(Note: This does not apply to all items. For details, see the Parts Book.)

(Example)

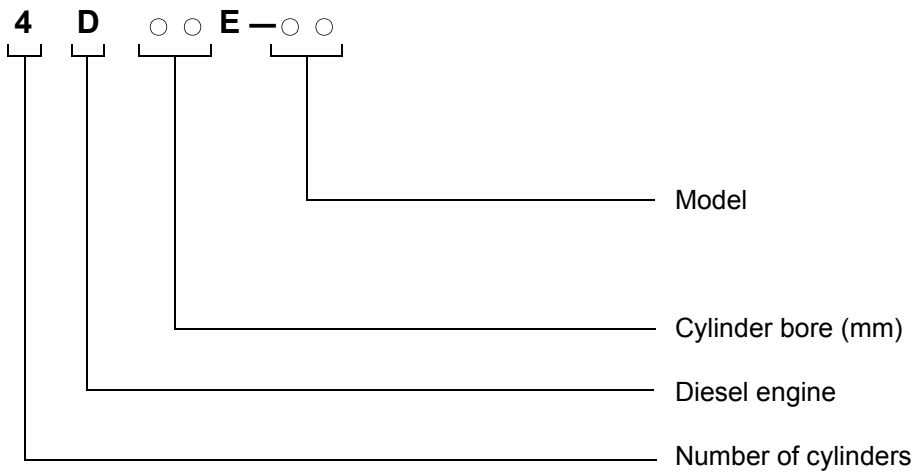
Update the part numbers and codes in this shop manual: 172187-08520 → YM172187-08520

Application Category

Application code	Usage	Eng. Rev. type.	Revolution speed (rpm)
CL	Generator drive	Constant	1,500/1,800
VM	General use	Variable	2,000 – 2,500

★ For engine application category described in Chapter 1, Specifications.

Engine Nomenclature



1. GENERAL

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1. GENERAL

1.1 Specifications

(1) 4D94E

Engine name		—	4D94E			
Engine specification class		—	VM			
Type		—	Vertical, in-line, 4-cycle, water-cooled diesel engine			
Combustion chamber		—	Direct injection			
Number of cylinders		—	4			
Cylinder bore x stroke		mm x mm	94 x 100			
Displacement		ℓ	2.776			
Rated output	Revolving speed	rpm	2,000	2,200	2,400	2,500
	Output	kW {HP}	35.3 {47.3}	38.2 {51.2}	41.6 {55.8}	43.0 {57.7}
Fuel injection timing (FID, B.T.D.C.)		deg	10 – 12			
Fuel injection pressure		MPa {kg/cm ² }	21.57 – 22.55 {220 – 230}			
Ignition order		—	1–3–4–2 (No.1 cylinder on flywheel side)			
Power take off		—	Flywheel			
Direction of rotation		—	Counterclockwise (viewed from flywheel)			
Cooling system		—	Radiator			
Lubrication system		—	Forced lubrication with trochoid pump			
Starting system		—	Electric			
Applicable fuel		—	Diesel oil-ISO 8217 DMA, BS 2869 A1 or A2 (cetane No. 45 min.)			
Applicable lubricant		—	API grade class CC or higher			
Battery capacity		V-AH	12–64 (5HR) or above			
Lubricant capacity (oil pan)	Total	ℓ	10.2			
	Effective	ℓ	4.5			
Cooling water capacity (engine only)		ℓ	4.2			
Engine dimensions	Overall length	mm	720			
	Overall width	mm	508			
	Overall height	mm	689			
Dry engine weight		kg	223			

(2) 4D98E

Engine name		—	4D98E			
Engine specification class		—	VM			
Type		—	Vertical, in-line, 4-cycle, water-cooled diesel engine			
Combustion chamber		—	Direct injection			
Number of cylinders		—	4			
Cylinder bore x stroke		mm x mm	98 x 110			
Displacement		ℓ	3.319			
Rated output	Revolving speed	rpm	2,000	2,200	2,400	2,500
	Output	kW {HP}	41.9 {56.2}	45.6 {61.2}	49.3 {66.1}	51.1 {68.5}
Fuel injection timing (FID, B.T.D.C)		deg	10 – 12			
Fuel injection pressure		MPa {kg/cm ² }	21.57 – 22.55 {220 – 230}			
Ignition order		—	1–3–4–2 (No.1 cylinder on flywheel side)			
Power take off		—	Flywheel			
Direction of rotation		—	Counterclockwise (viewed from flywheel)			
Cooling system		—	Radiator			
Lubrication system		—	Forced lubrication with trochoid pump			
Starting system		—	Electric			
Applicable fuel		—	Diesel oil-ISO 8217 DMA, BS 2869 A1 or A2 (cetane No. 45 min.)			
Applicable lubricant		—	API grade class CC or higher			
Battery capacity		V-AH	12–64 (5HR) or above			
Lubricant capacity (oil pan)	Total	ℓ	10.2			
	Effective	ℓ	4.5			
Cooling water capacity (engine only)		ℓ	4.2			
Engine dimensions	Overall length	mm	720			
	Overall width	mm	508			
	Overall height	mm	689			
Dry engine weight		kg	223			

1. GENERAL**1.2 Fuel oil, lubricating oil and cooling water****(1) Fuel oil**

⚠ Use of other than the specified fuel oil may fail to obtain the full engine performance or cause parts failures.

- **Applicable fuel**
Always use diesel gas oil ISO 8217DMA, BS 2869A1 or A2 (cetane No. 45 min.) that is most suitable for desired engine performance.

(2) Lubricating oil

⚠ Use of other than the specified lubricating oil may cause inner parts seizure or early wear, leading to shortening of the engine service life.

- **Applicable lubricating oil:**
API grade CC class or higher
If the engine oil sold on the market is to be used, always select class CD or CC (API classification.)
Select the viscosity number according to the ambient temperature by referring to the table below.
- **Handling of lubricating oil**
 - 1) Carefully store and handle the oil so as to prevent dust or dirt entrance. When supplying the oil, pay careful attention and clean around the filler port.
 - 2) Do not use mixture of different types of oil as it may degrade the lubricating performance.

