

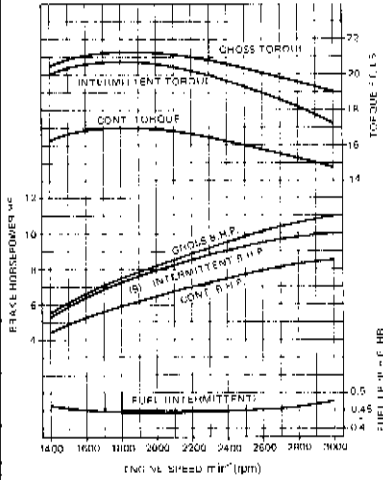
SPECIFICATIONS

Model		Z500-B	Z600-B	ZH600-B	D650-B	D750-B
Number of Cylinders		2			3	
Type		Vertical, water-cooled, 4 cycle diesel engine				
Bore × Stroke mm (in.)		68 × 70 (2.68 × 2.76)	72 × 70 (2.83 × 2.76)		64 × 70 (2.52 × 2.76)	68 × 70 (2.68 × 2.76)
Total Displacement cm ³ (cu.in.)		508 (31.00)	570 (34.78)		675 (41.2)	762 (46.5)
Brake Horsepower	SAE Net Cont. kW/min ⁻¹ (rpm) (HP/min ⁻¹ (rpm))	6.3/3000 (8.5/3000)	8.2/3200 (11/3200)	8.6/3600 (11.5/3600)	8.6/3000 (11.5/3000)	9.7/3000 (13.0/3000)
	SAE Net Intermittent kW/min ⁻¹ (rpm) (HP/min ⁻¹ (rpm))	7.46/3000 (10.0/3000)	9.3/3200 (12.5/3200)	10.4/3600 (14.0/3600)	9.7/3000 (13.0/3000)	11.2/3000 (15.0/3000)
	SAE Gross Intermittent kW/min ⁻¹ (rpm) (HP/min ⁻¹ (rpm))	8.2/3000 (11.0/3000)	10.4/3200 (13.8/3200)	11.5/3600 (15.5/3600)	11.2/3000 (14.3/3000)	12.7/3000 (16.5/3000)
	DIN6271-NA kW/min ⁻¹ (rpm) (PS/min ⁻¹ (rpm))	6.25/3000 (8.5/3000)	8.1/3200 (11.0/3200)	8.5/3600 (11.5/3600)	8.5/3000 (11.5/3000)	9.6/3000 (13.0/3000)
	DIN6271-NB kW/min ⁻¹ (rpm) (PS/min ⁻¹ (rpm))	7.0/3000 (9.5/3000)	8.8/3200 (12.0/3200)	9.9/3600 (13.5/3600)	9.2/3000 (12.5/3000)	10.7/3000 (14.5/3000)
	DIN70020 kW/min ⁻¹ (rpm) (PS/min ⁻¹ (rpm))	7.7/3000 (10.5/3000)	9.6/3200 (13.0/3200)	10.7/3600 (14.5/3600)	10.3/3000 (14.0/3000)	11.8/3000 (16.0/3000)
Maximum Bare Speed min ⁻¹ (rpm)		3200	3500	3780	3200	
Minimum Idling Speed min ⁻¹ (rpm)		800				
Maximum torque N·m/min ⁻¹ (rpm) kgf·m/min ⁻¹ (rpm) ft-lbs/min ⁻¹ (rpm)		28.0/1800 2.86/1800 20.72/1800	32.9/2000 3.36/2000 24.29/2000	33.2/2000 3.39/2000 24.52/2000	36.5/1800 3.72/1800 26.94/1800	42.2/1800 4.30/1800 31.08/1800
Combustion Chamber		Spherical Type				
Fuel Injection Pump		Bosch K Type Mini Pump				
Governor		Centrifugal Ball Mechanical Governor				
Direction of Rotation		Counter-clockwise (viewed from flywheel side)				
Injection Nozzle		Bosch Throttle Type				
Injection Timing		0.44 rad. (25°) before T.D.C.				
Firing Order		1-2			1-2-3	
Injection Pressure		13.73 MPa (140 kgf/cm ² , 1991 psi)				
Compression Ratio		22 : 1				
Lubricating System		Forced Lubrication by Pump				
Oil Pressure Indicating		Electrical Type Switch				
Lubricating Filter		Full Flow Paper Filter (Cartridge Type)				
Cooling System		Pressurized Radiator, Forced Circulation with Water Pump (Not included in the basic engine)				
Starting System V, kW		Electric Starting with Starter (12, 0.8)				
Starting Support Device		By Glow Plug in Combustion Chamber				
Battery		12 V, 45 AH, equivalent			12 V, 65 AH, equivalent	
Dynamo for Charging		12 V, 150 W				
Fuel		Diesel Fuel No. 2-D (ASTM D975)				
Lubricating Oil		Class CF lubricating oil as per API classification is recommended. If this class of lubricating oil is not available, preferably use Class CD or CE lubricating oil. For details on recommended lubricating oils.				
Lubricating Oil Capacity L		2.55 (2.70 U.S.qts., 2.24 Imp.qts.)			4.6 (4.86 U.S.qts., 4.05 Imp.qts.)	
Weight (Dry) kg (lbs)		69.7 (153.7)	70.5 (155.5)		82.6 (182.1)	82.1 (181.0)
Application		General Power Source				

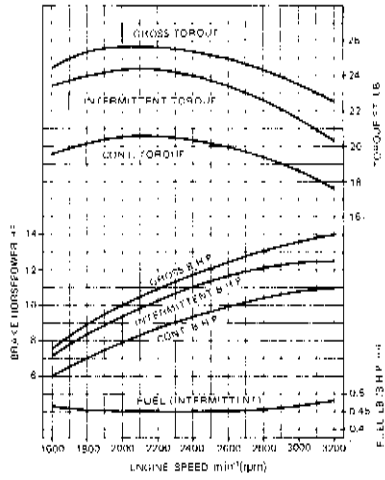
D850-B	DH850-B	D950-B	V1100-B	VH1100-B	V1200-B
3			4		
Vertical, water-cooled, 4-cycle diesel engine					
72 × 70 (2.83 × 2.76)		75 × 70 (2.95 × 2.76)	72 × 70 (2.83 × 2.76)		75 × 70 (2.95 × 2.76)
855 (52.2)		927 (56.6)	1140 (69.56)		1237 (75.49)
11.6/3000 (15.5/3000)	13.1/3600 (17.5/3600)	12.7/3000 (17.0/3000)	15.29/3000 (20.5/3000)	17.15/3600 (23/3600)	16.79/3000 (22.5/3000)
13.4/3000 (18.0/3000)	15.7/3600 (21.0/3600)	14.5/3000 (19.5/3000)	17.90/3000 (24.0/3000)	20.89/3600 (28.0/3600)	19.40/3000 (26.0/3000)
14.9/3000 (19.8/3000)	17.2/3600 (23.0/3600)	16.0/3000 (21.5/3000)	19.77/3000 (26.5/3000)	22.98/3600 (30.8/3600)	21.26/3000 (28.5/3000)
11.4/3000 (15.5/3000)	12.9/3600 (17.5/3600)	12.5/3000 (17.0/3000)	15.08/3000 (20.5/3000)	16.92/3600 (23.0/3600)	16.55/3000 (22.5/3000)
12.5/3000 (17.0/3000)	14.7/3600 (20.0/3600)	13.6/3000 (18.5/3000)	16.55/3000 (22.5/3000)	19.86/3600 (27.0/3600)	18.02/3000 (24.5/3000)
14.0/3000 (19.0/3000)	16.2/3600 (22.0/3600)	15.1/3000 (20.5/3000)	18.39/3000 (25.0/3000)	21.70/3600 (29.5/3600)	19.86/3000 (27.0/3000)
3200	3780	3200	3200	3780	3200
800					
50.6/1800 5.16/1800 37.30/1800	49.9/2400 5.09/2400 36.78/2400	55.6/1800 5.67/1800 41.00/1800	68.45/1800 6.98/1800 50.45/1800	66.49/2400 6.78/2400 49.04/2400	74.04/1800 7.55/1800 54.65/1800
Spherical Type					
Bosch K Type Mini Pump					
Centrifugal Ball Mechanical Governor					
Counter-clockwise (viewed from flywheel side)					
Bosch Throttle Type					
0.44 rad. (25°) before T.D.C.					
1-2-3			1-3-4-2		
13.73 MPa (140 kgf/cm ² , 1991 psi)					
?? : 1					
Forced Lubrication by Pump					
Electrical Type Switch					
Full Flow Paper Filter (Cartridge Type)					
Pressurized Radiator, Forced Circulation with Water Pump (Not included in the basic engine)					
Electric Starting with Starter (12, 0.8)			Electric Starting with Starter (12, 1.0)		
By Glow Plug in Combustion Chamber					
12 V, 65 AH, equivalent			12 V, 80 AH, equivalent		
12 V, 150 W					
Diesel Fuel No. 2-D (ASTM D975)					
Class CF lubricating oil as per API classification is recommended. If this class of lubricating oil is not available, preferably use Class CD or CE lubricating oil. For details on recommended lubricating oils.					
4.6 (4.86 U.S.qts., 4.05 Imp.qts.)	3.7 (3.91 U.S.qts., 3.26 Imp.qts.)	4.6 (4.86 U.S.qts., 4.05 Imp.qts.)	5.7 (6.0 U.S.qts., 5.02 Imp.qts.)		
82.6 (182.1)		83.1 (183.2)	103.3 (227.8)		104 (229.3)
General Power Source					

PERFORMANCE CURVES

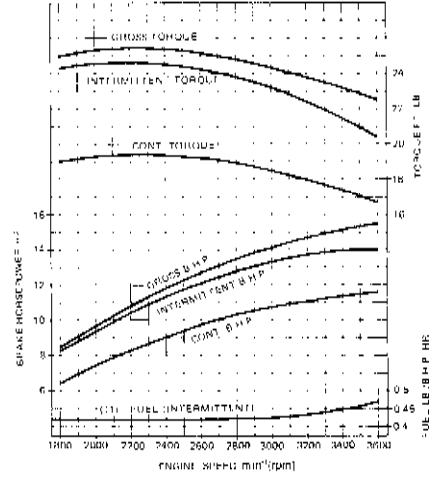
Z500-B (SAE)



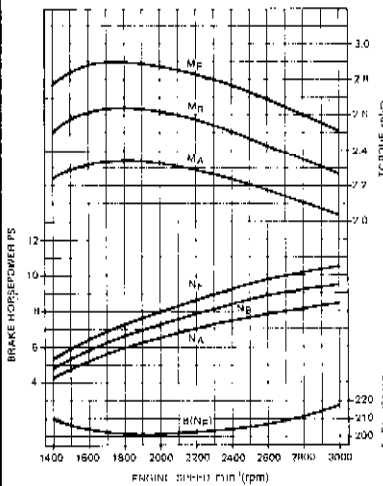
Z600-B (SAE)



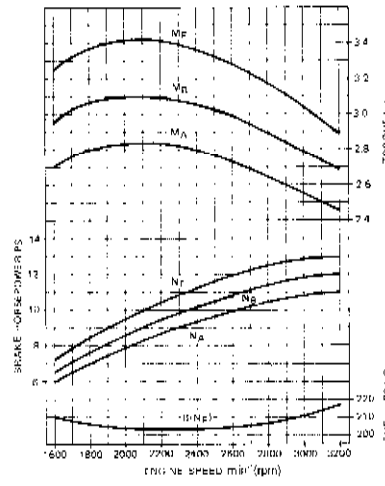
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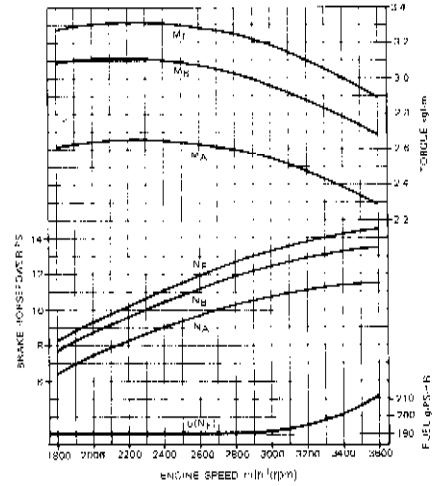
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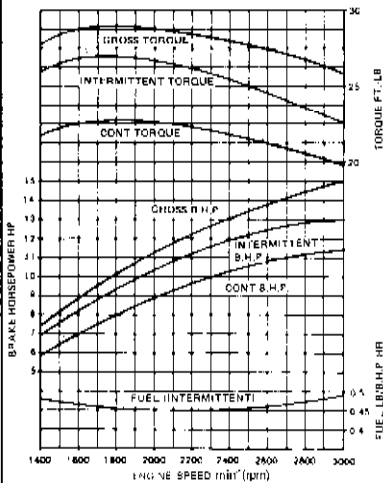
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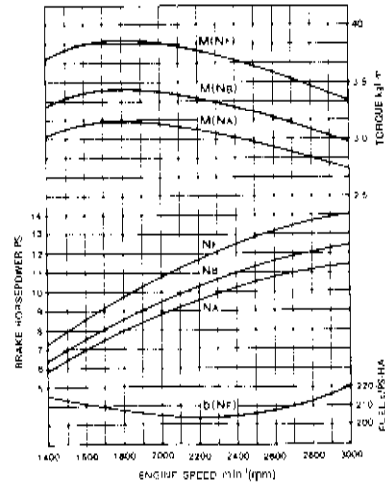
ZH600-B (DIN)



D650-B (SAE)



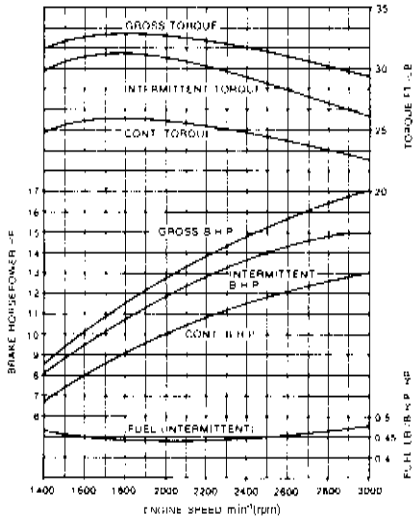
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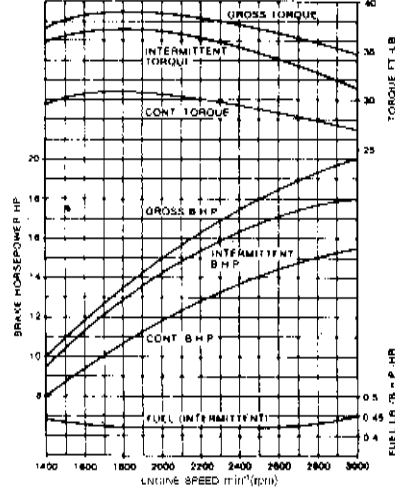
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D750-B (SAE)



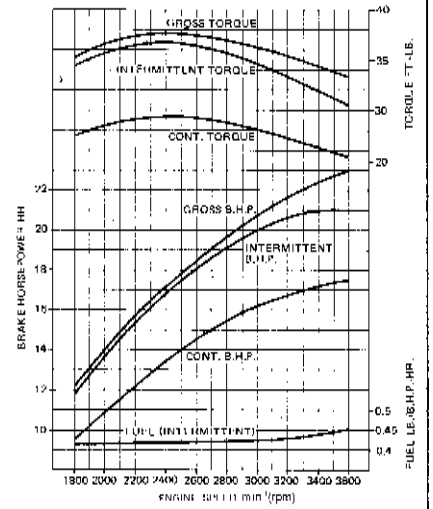
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D850-B (SAE)



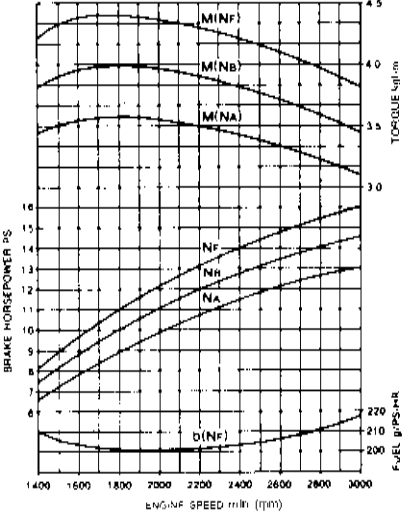
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DH850-B (SAE)



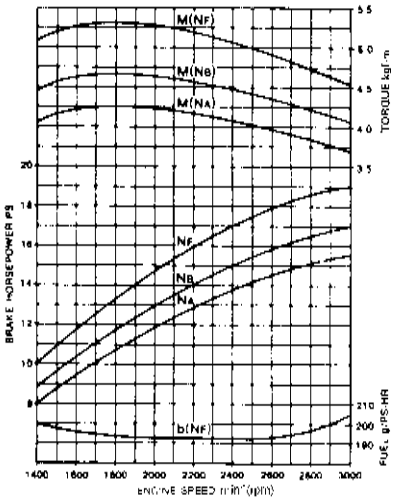
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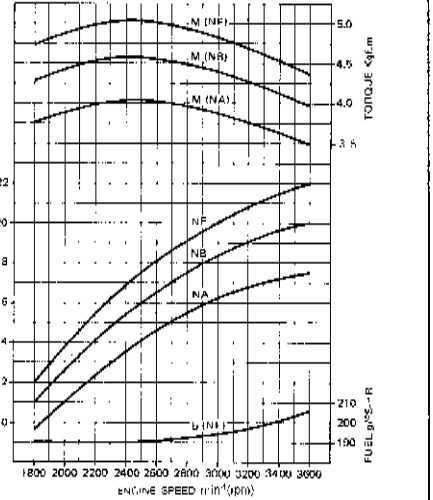
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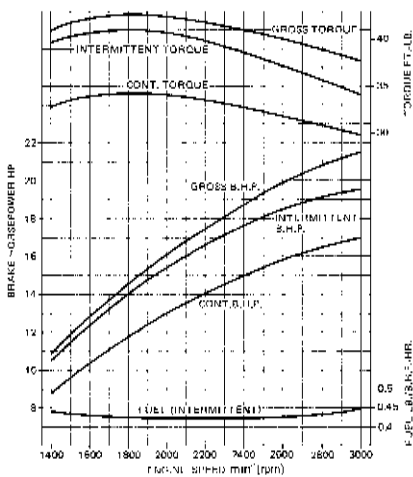
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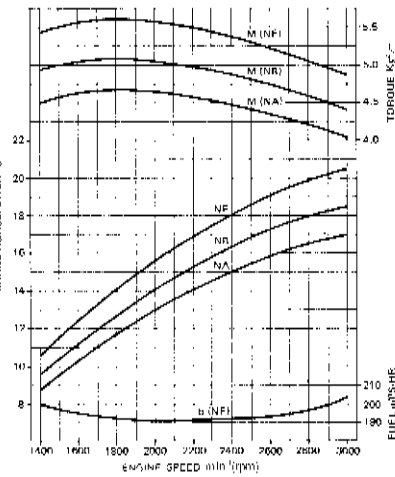
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D950-B (SAE)



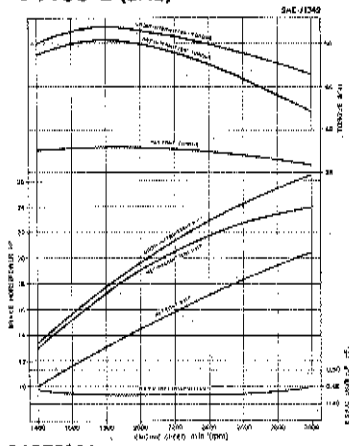
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D950-B (DIN)



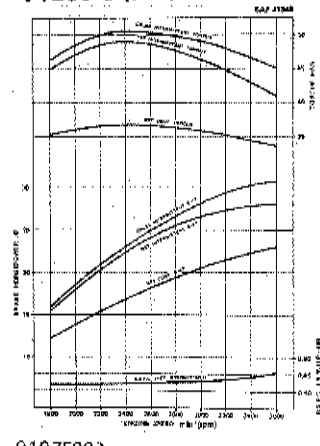
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V1100-B (SAE)



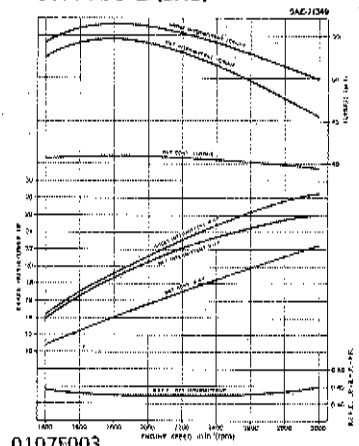
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V1200-B (SAE)



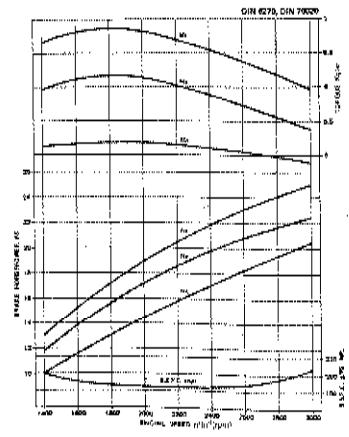
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VH1100-B (SAE)



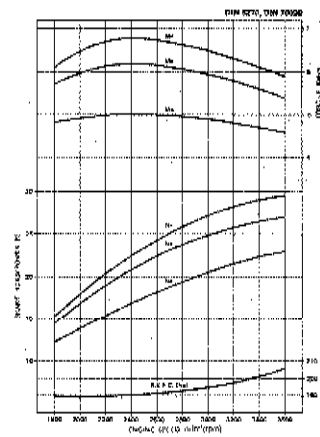
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V1100-B (DIN)



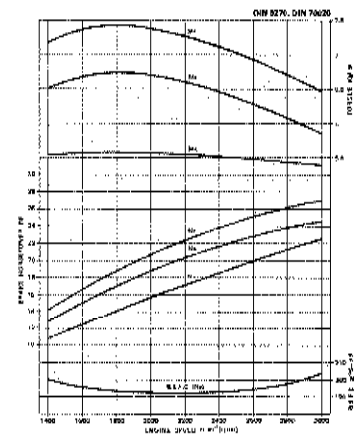
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VH1100-B (DIN)



0107F005

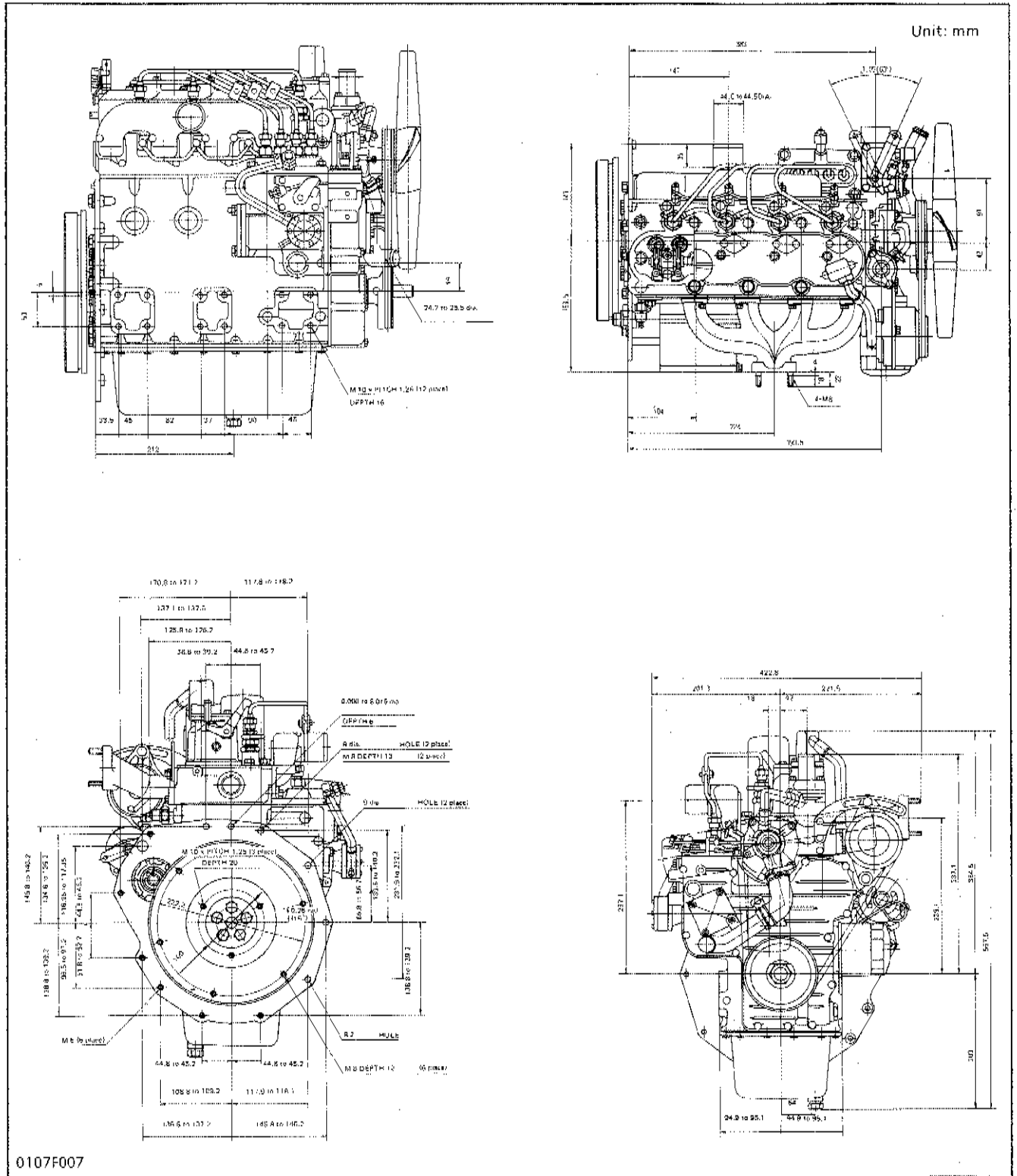
V1200-B (DIN)



0107F006

NOTE

- Each performance curves, obtained in accordance with DIN 6271.
- Each performance curves, obtained in accordance with SAE J1349.



[3] TIGHTENING TORQUES

Screws, bolts and nuts must be tightened to the specified torque using a torque wrench, Several screws, bolts and nuts such as those used on the cylinder head must be tightened in proper sequence and at the proper torque.

(1) Tightening torques for special use screws, bolts and nuts

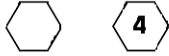

■ NOTE

- For "*" marked screws, bolts and nuts on the table, apply engine oil to their threads and seats before tightening.

Item	Size x Pitch	N-m	kgf-m	ft-lbs
* Head cover cap nuts	M7 x 1.0	6.9 to 8.8	0.7 to 0.9	5.1 to 6.5
* Head screws and nuts (Z500-B only)	M8 x 1.25	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5
(Others)	M9 x 1.25	64.7 to 69.6	6.6 to 7.1	47.7 to 51.4
* Bearing case screws 1				
(Flange bolts)	M7 x 1.0	26.5 to 30.4	2.7 to 3.1	19.5 to 22.4
(Non-flange bolt)	M7 x 1.0	19.6 to 23.5	2.0 to 2.4	14.5 to 17.4
* Bearing case screws 2	M8 x 1.25	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
* Flywheel screws				
(Flange bolts)	M10 x 1.25	58.8 to 63.7	6.0 to 6.5	43.4 to 47.0
(Non-flange bolts)	M10 x 1.25	53.9 to 58.8	5.5 to 6.0	39.8 to 43.4
* Connecting rod screws	M7 x 0.75	26.5 to 30.4	2.7 to 3.1	19.5 to 22.4
* Rocker arm bracket nuts	M7 x 1.0	16.7 to 20.6	1.7 to 2.1	12.3 to 5.2
* Idle gear shaft screws	M6 x 1.0	9.8 to 11.3	1.00 to 1.15	7.2 to 8.3
Glow plugs	M10 x 1.25	19.6 to 24.5	2.0 to 2.5	14.5 to 18.1
Drain plug	M12 x 1.25	39.2 to 49.0	4.0 to 5.0	28.9 to 36.2
Nozzle holder assembly	M24 x 2.0	29.4 to 49.0	3.0 to 5.0	21.7 to 36.2
Oil switch taper screw	PT 1/8	14.7 to 19.6	1.5 to 2.0	10.8 to 14.5
Fuel limit lock nut	M12 x 1.0	27.5 to 34.3	2.8 to 3.5	20.3 to 25.3
Fuel limit cap nut	M12 x 1.0	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Injection pipe retaining nuts	M12 x 1.5	14.7 to 24.5	1.5 to 2.5	10.8 to 8.1
Nozzle holder and nozzle retaining nut		58.8 to 78.5	6.0 to 8.0	43.4 to 57.9
Nozzle holder mounting screw	M24 x 2.0	39.2 to 49.0	4.0 to 5.0	28.9 to 36.2
* Crankshaft nut	M20 x 1.5	137.3 to 156.9	14.0 to 16.0	101.3 to 115.7

(2) Tightening torques for general use screws, bolts and nuts

When the tightening torques are not specified, tighten the screws, bolts and nuts according to the table below.

Grade Nominal Diameter	Unit	Standard Screw and Bolt			Special Screw and Bolt		
		N-m	kgf-m	ft-lbs	N-m	kgf-m	ft-lbs
							
		SG00F004					
M 6		7.9 to 9.3	0.80 to 0.95	5.8 to 6.9	9.8 to 11.3	1.00 to 1.15	7.23 to 8.32
M 8		17.7 to 20.6	1.8 to 2.1	13.0 to 15.2	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
M10		39.2 to 45.1	4.0 to 4.6	28.9 to 33.3	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
M12		62.8 to 72.6	6.4 to 7.4	46.3 to 53.5	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5

Screw and bolt material grades are shown by numbers punched on the screw and bolt heads. Prior to tightening, be sure to check out the numbers as shown below.

Punched Number	Screw and Bolt Material Grade
None or 4	Standard Screw and Bolt S541, S20C
7	Special Screw and Bolt S43C, S48C (Refined)

[5] SERVICING SPECIFICATIONS**(1) ENGINE BODY****Cylinder Head**

Item		Factory Specification	Allowable Limit
Cylinder head surface flatness		—	0.05 mm 0.0019 in.
Top clearance		0.6 to 0.8 mm 0.0237 to 0.0315 in.	—
Cylinder head gasket shim thickness		0.2 mm 0.0079 in.	—
Cylinder head gasket thickness (Grommet section)	Free	1.15 to 1.30 mm 0.0453 to 0.0512 in.	—
	Tightened	1.05 to 1.15 mm 0.0413 to 0.0453 in.	—
Compression pressure		3.09 MPa 31.5 kgf/cm ² , 448 psi	2.32 MPa 23.7 kgf/cm ² , 337 psi
Variance among cylinders			10% or less

Valves

Valve clearance (Cold)			0.145 to 0.185 mm 0.0057 to 0.0072 in.	—
Valve seat width	IN.		2.12 mm 0.0835 in.	—
		VH1100-B only	1.74 mm 0.0685 in.	—
	EX.		2.12 mm 0.0835 in.	—
Valve seat angle	IN.		0.785 rad. 45°	—
		VH1100-B only	1.047 rad. 60°	—
	EX.		0.785 rad. 45°	—
Valve face angle	IN.		0.794 rad. 45.5°	—
		VH1100-B only	1.051 rad. 60°15'	—
	EX.		0.794 rad. 45.5°	—
Valve recessing			0.9 to 1.1 mm 0.036 to 0.043 in.	1.3 mm 0.051 in.
Clearance between valve stem and valve guide				
Valve stem O.D.			0.035 to 0.065 mm 0.0014 to 0.0025 in.	0.1 mm 0.0039 in.
Valve guide I.D.			6.960 to 6.975 mm 0.2741 to 0.2746 in.	—
			7.010 to 7.025 mm 0.2760 to 0.2765 in.	—

Valve Timing

Item		Factory Specification	Allowable Limit
Intake valve	Open	0.35 rad. (20°) before T.D.C.	-
	Close	0.79 rad. (45°) after B.D.C.	-
Exhaust valve	Open	0.87 rad. (50°) before B.D.C.	-
	Close	0.26 rad. (15°) after T.D.C.	-

Valve Spring

Free length	35.1 to 35.6 mm 1.382 to 1.401 in.	34.8 mm 1.370 in.
Setting load / setting length	73.5 N/31.0 mm 7.5 kgf/31.0 mm, 16.5 lbs/1.22 in.	62.8 N/31.0 mm 6.4 kgf/31.0 mm, 14.1 lbs/1.22 in.
Tilt	-	1.3 mm 0.051 in.

Rocker Arm

Clearance between rocker arm shaft and bearing	0.016 to 0.068 mm 0.0006 to 0.0027 in.	0.12 mm 0.0047 in.
Rocker arm shaft O.D.	10.973 to 10.984 mm 0.4320 to 0.4324 in.	-
Rocker arm bearing I.D.	11.000 to 11.041 mm 0.4331 to 0.4347 in.	-

Tappet

Clearance between tappet and guide	0.020 to 0.062 mm 0.0008 to 0.0024 in.	0.1 mm 0.0039 in.
Tappet O.D.	19.959 to 19.980 mm 0.7858 to 0.7866 in.	-
Tappet guide I.D.	20.000 to 20.021 mm 0.7874 to 0.7882 in.	-

Camshaft

Camshaft side clearance	0.07 to 0.22 mm 0.0028 to 0.0087 in.	0.3 mm 0.0118 in.
Camshaft alignment	-	0.01 mm 0.0004 in.
Cam height (IN., EX.)	26.88 mm 1.0583 in.	26.83 mm 1.0563 in.
Oil clearance of camshaft	0.050 to 0.091 mm 0.0020 to 0.0036 in.	0.15 mm 0.0059 in.
Camshaft journal O.D.	32.934 to 32.950 mm 1.2966 to 1.2972 in.	
Camshaft bearing I.D.	33.000 to 33.025 mm 1.2992 to 1.3002 in.	

Timing Gear

Item	Factory Specification	Allowable Limit
Timing gear backlash	0.042 to 0.115 mm 0.0017 to 0.0045 in.	0.2 mm 0.0079 in.
Idle gear side clearance	0.20 to 0.51 mm 0.0079 to 0.0201 in.	0.8 mm 0.0315 in.
Clearance between idle gear shaft and idle gear bushing	0.016 to 0.045 mm 0.0006 to 0.0018 in.	0.1 mm 0.0039 in.
Idle gear shaft O.D.	17.973 to 17.984 mm 0.7076 to 0.7080 mm	—
Idle gear bushing I.D.	18.000 to 18.018 mm 0.7087 to 0.7094 in.	—
Engine serial number: 407507 and beyond (Z500-B, Z600-B, ZH600-B, D650-B, D750-B, D850-B, DH850-B, V1100-B, VH1100-B, V1200-B) 393782 and beyond (D950-B)		
Clearance between idle gear shaft and idle gear bushing	0.020 to 0.054 mm 0.0008 to 0.0021 in.	0.1 mm 0.0039 in.
Idle gear shaft O.D.	23.967 to 23.980 mm 0.9436 to 0.9441 in.	—
Idle gear bushing I.D.	24.000 to 24.021 mm 0.9449 to 0.9457 in.	—
Engine serial number: 599860 and beyond (Z500-B, Z600-B, ZH600-B, D650-B, D750-B, D850-B, DH850-B, D950-B, V1100-B, VH1100-B, V1200-B)		
Clearance between idle gear shaft and idle gear bushing	0.020 to 0.054 mm 0.0008 to 0.0021 in.	0.1 mm 0.0039 in.
Idle gear shaft O.D.	29.967 to 29.980 mm 1.1798 to 1.1803 in.	—
Idle gear bushing I.D.	30.000 to 30.021 mm 1.1811 to 1.1819 in.	—

Piston-Piston Ring

Piston Pin Bore	20.000 to 20.013 mm 0.7874 to 0.7879 in.	20.03 mm 0.7886 in.
Clearance between compression ring 2 and ring groove	0.085 to 0.112 mm 0.0033 to 0.0044 in.	0.20 mm 0.0079 in.
Piston ring groove width	1.555 to 1.570 mm 0.0613 to 0.0618 in.	—
Compression ring 2 width	1.458 to 1.470 mm 0.0574 to 0.0579 in.	—
Clearance between oil ring and ring groove	0.020 to 0.055 mm 0.0008 to 0.0021 in.	0.20 mm 0.0079 in.
Piston ring groove width	4.010 to 4.030 mm 0.1579 to 0.1587 in.	—
Oil ring width	3.975 to 3.990 mm 0.1565 to 0.1571 in.	—

Piston-Piston Ring (Continued)

Item		Factory Specification	Allowable Limit
Ring gap	Compression ring 1	0.25 to 0.40 mm 0.0098 to 0.0157 in.	1.25 mm 0.0492 in.
		D950-B, V1200-B only 0.20 to 0.35 mm 0.0079 to 0.0138 in.	
	Compression ring 2	0.25 to 0.40 mm 0.0098 to 0.0157 in.	1.25 mm 0.0492 in.
		D950-B only 0.30 to 0.45 mm 0.0118 to 0.0177 in.	
	Oil ring	0.25 to 0.40 mm 0.0098 to 0.0157 in.	1.25 mm 0.0492 in.
		D650-B, D750-B only 0.20 to 0.40 mm 0.0079 to 0.0157 in.	

Connecting Rod

Connecting rod alignment	—	0.05 mm 0.0020 in.
Clearance between piston pin and small end bushing	0.014 to 0.038 mm 0.0006 to 0.0015 in.	0.15 mm 0.0059 in.
Piston pin O.D.	20.002 to 20.011 mm 0.7875 to 0.7878 in.	—
Small end bushing I.D.	20.025 to 20.040 mm 0.7884 to 0.7890 in.	—

Crankshaft

Crankshaft alignment	—	0.02 mm 0.0008 in.
Oil clearance between crankshaft and crankshaft bearing 1	0.034 to 0.106 mm 0.0013 to 0.0042 in.	0.2 mm 0.0079 in.
Crankshaft O.D.	43.934 to 43.950 mm 1.7297 to 1.7303 in.	—
Crankshaft bearing 1 I.D.	43.984 to 44.040 mm 1.7317 to 1.7339 in.	—
Oil clearance between crankshaft and crankshaft bearing 2	0.034 to 0.092 mm 0.0013 to 0.0036 in.	0.2 mm 0.0079 in.
Crankshaft O.D.	43.934 to 43.950 mm 1.7297 to 1.7303 in.	—
Crankshaft bearing 2 I.D.	43.984 to 44.026 mm 1.7317 to 1.7333 in.	—
Oil clearance between crank pin and crank pin bearing	0.029 to 0.087 mm 0.0011 to 0.0034 in.	0.2 mm 0.0079 in.
Crank pin O.D.	36.959 to 36.975 mm 1.4551 to 1.4557 in.	—
Crank pin bearing I.D.	37.004 to 37.046 mm 1.4569 to 1.4585 in.	—
Crankshaft side clearance	0.15 to 0.31 mm 0.0059 to 0.0122 in.	0.5 mm 0.0197 in.
Crankshaft sleeve wear	—	0.1 mm 0.0039 in.

Cylinder Liner

Item		Factory Specification	Allowable Limit
Cylinder liner I.D.	D650-B	64.000 to 64.019 mm 2.5197 to 2.5204 in.	+ 0.15 mm 0.0059 in.
	Z500-B, D750-B	68.000 to 68.019 mm 2.6772 to 2.6779 in.	
	D600-B, ZH600-B D850-B, DH850-B V1100-B VH1100-B	72.000 to 72.019 mm 2.8347 to 2.8354 in.	
	D950-B, V1200-B	75.000 to 75.019 mm 2.9528 to 2.9535 in.	
Oversized cylinder liner I.D.		+ 0.5 mm 0.0197 in.	

(2) LUBRICATING SYSTEM**Oil Pump**

Engine oil pressure	At idle speed		68 kPa 0.7 kgf/cm ² , 10 psi	---
	At rated speed		196 to 441 kPa 2.0 to 4.5 kgf/cm ² , 29 to 64 psi	196 kPa 2.0 kgf/cm ² , 29 psi
		V1100-B V1200-B only	167 to 343 kPa 1.7 to 3.5 kgf/cm ² , 24 to 49 psi	167 kPa 1.7 kgf/cm ² , 24 psi
Clearance between inner rotor and outer rotor			0.11 to 0.15 mm 0.0043 to 0.0059 in.	0.2 mm 0.0079 in.
Clearance between outer rotor and pump body			0.07 to 0.15 mm 0.0028 to 0.0059 in.	0.25 mm 0.0098 in.
End clearance between inner rotor and cover			0.08 to 0.13 mm 0.0031 to 0.0051 in.	0.2 mm 0.0079 in.

(3) COOLING SYSTEM**Thermostat**

Thermostat's valve opening temperature	69.5 to 72.5°C 157.1 to 162.5°F	---
Temperature at which thermostat completely opens	85°C 185°F	---

(4) FUEL SYSTEM**Injection Pump**

Item	Factory Specification	Allowable Limit
Injection timing	0.402 to 0.436 rad before T.D.C. (23° to 25°)	—
Fuel tightness of pump element	—	14.7 MPa 150 kgf/cm ² , 2133 psi
Fuel tightness of delivery valve	More 10 seconds 14.7 — 13.7 MPa 150 — 140 kgf/cm ² 2133 — 1990 psi	5 seconds 14.7 — 13.7 MPa 150 — 140 kgf/cm ² 2133 — 1990 psi

Injection Nozzle

Fuel injection pressure	13.73 to 14.71 MPa 140 to 150 kgf/cm ² 1991 to 2133 psi	—
Fuel tightness of nozzle valve seat	When the pressure is 12.75 MPa (130 kgf/cm ² , 1849 psi), the valve seat must be fuel tightness.	—

(5) ELECTRICAL SYSTEM**Starter**

Commutator O.D.	(1 kW)	30.0 mm 1.1811 in.	29.0 mm 1.1417 in.
	(0.8 kW)	28.0 mm 1.1024 in.	27.0 mm 1.0630 in.
Mica undercut		0.5 to 0.8 mm 0.0197 to 0.0315 in.	0.2 mm 0.079 in.
Brush length	(1 kW)	13.0 mm 0.5118 in.	8.5 mm 0.3346 in.
	(0.8 kW)	16.0 mm 0.6299 in.	10.5 mm 0.4134 in.

Alternator

No-load voltage	AC 20 V at 5200 rpm	—
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Glow Plug

Glow plug resistance	1.0 to 1.2 Ω	—
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