

ENGINE

Engine speed	Standard engine idle speed	500 to 600 rpm
	Maximum engine speed	4700 to 4900 rpm
Compression	Standard compression pressure (normal condition)	2700 kPa (27.5 kgf/cm ² , 392 psi) or higher
	Minimum compression pressure	2200 kPa (22.4 kgf/cm ² , 319 psi)
	Difference between each cylinder	500 kPa (5.1 kgf/cm ² , 73 psi)

CYLINDER HEAD GASKET

Select No. 1 cylinder head gasket	Piston protrusion	Standard piston protrusion	0.520 to 0.780 mm (0.0205 to 0.0307 in.)
	New No. 1 cylinder head gasket thickness HINT: The specified condition indicates the thickness of the No. 1 cylinder head gasket after tightening the cylinder head sub-assembly RH.	1 cutout (item A)	1.20 to 1.30 mm (0.0472 to 0.0512 in.)
		2 cutout (item B)	1.25 to 1.35 mm (0.0492 to 0.0532 in.)
		3 cutout (item C)	1.30 to 1.40 mm (0.0512 to 0.0551 in.)
		4 cutout (item D)	1.35 to 1.45 mm (0.0532 to 0.0571 in.)
		5 cutout (item E)	1.40 to 1.50 mm (0.0551 to 0.0591 in.)
	Piston protrusion	Item A	0.520 to 0.575 mm (0.0205 to 0.0226 in.)
		Item B	0.575 to 0.625 mm (0.0226 to 0.0246 in.)
		Item C	0.625 to 0.675 mm (0.0246 to 0.0266 in.)
		Item D	0.675 to 0.725 mm (0.0266 to 0.0285 in.)
		Item E	0.725 to 0.780 mm (0.0285 to 0.0307 in.)
Select No. 2 cylinder head gasket	Piston protrusion	Standard piston protrusion	0.520 to 0.780 mm (0.0205 to 0.0307 in.)
	New No. 2 cylinder head gasket thickness HINT: The specified condition indicates the thickness of the No. 2 cylinder head gasket after tightening the cylinder head sub-assembly LH.	1 cutout (item A)	1.20 to 1.30 mm (0.0472 to 0.0512 in.)
		2 cutout (item B)	1.25 to 1.35 mm (0.0492 to 0.0532 in.)
		3 cutout (item C)	1.30 to 1.40 mm (0.0512 to 0.0551 in.)
		4 cutout (item D)	1.35 to 1.45 mm (0.0532 to 0.0571 in.)
		5 cutout (item E)	1.40 to 1.50 mm (0.0551 to 0.0591 in.)
	Piston protrusion	Item A	0.520 to 0.575 mm (0.0205 to 0.0226 in.)
		Item B	0.575 to 0.625 mm (0.0226 to 0.0246 in.)
		Item C	0.625 to 0.675 mm (0.0246 to 0.0266 in.)
		Item D	0.675 to 0.725 mm (0.0266 to 0.0285 in.)
		Item E	0.725 to 0.780 mm (0.0285 to 0.0307 in.)

ENGINE UNIT

Cylinder head set bolt	Outside thread diameter	Standard	12.8 to 13.0 mm (0.504 to 0.512 in.)
		Minimum	12.5 mm (0.492 in.)

No. 1 and No. 4 camshaft (for Exhaust Camshaft)	Circle runout		Maximum	0.03 mm (0.00118 in.)
	Cam lobe height		Standard	38,324 to 38,434 mm (1.509 to 1.513 in.)
			Minimum	38.324 mm (1.509 in.)
	Journal diameter		No. 1 journal	29,969 to 29,985 mm (1.180 to 1.181 in.)
			Other journal	26,969 to 26,985 mm (1.0618 to 1.0624 in.)
No. 2 and No. 3 camshaft (for Intake Camshaft)	Circle runout		Maximum	0.03 mm (0.00118 in.)
	Cam lobe height		Standard	37,277 to 37,387 mm (1.468 to 1.472 in.)
			Minimum	37,277 mm (1.468 in.)
	Journal diameter		No. 1 journal	29,969 to 29,985 mm (1.180 to 1.181 in.)
			Other journal	26,969 to 26,985 mm (1.0618 to 1.0624 in.)
Camshaft oil clearance			Standard	0,025 to 0,062 mm (0.000984 to 0.00244 in.)
			Maximum	0,072 mm (0.00283 in.)
No. 1 chain sub-assembly	Chain elongation		Maximum	143.95 mm (5.67 in.)
No. 2 chain sub-assembly	Chain elongation		Maximum	143.95 mm (5.67 in.)
Injection pump shaft sprocket	Injection pump shaft sprocket with No. 1 chain sub-assembly diameter		Minimum	101.55 mm (4.00 in.)
	Injection pump shaft sprocket with No. 2 chain sub-assembly diameter		Minimum	101.55 mm (4.00 in.)
No. 1 camshaft timing sprocket	No. 1 camshaft timing sprocket with No. 1 chain sub-assembly diameter		Minimum	134.90 mm (5.31 in.)
No. 2 camshaft timing sprocket	No. 2 camshaft timing sprocket with No. 2 chain sub-assembly diameter		Minimum	134.90 mm (5.31 in.)
No. 1 idle gear shaft oil clearance	No. 1 idle gear shaft diameter		Standard	44,947 to 44,975 mm (1.770 to 1.771 in.)
	No. 1 idle gear inside diameter		Standard	45,000 to 45,025 mm (1.772 to 1.773 in.)
	Oil clearance		Standard	0,025 to 0,078 mm (0.000984 to 0.00307 in.)
			Maximum	0,078 mm (0.00307 in.)
No. 1 chain tensioner slipper	Depth		Maximum	1.0 mm (0.0394 in.)
No. 2 chain tensioner slipper	Depth		Maximum	1.0 mm (0.0394 in.)
No. 1 chain vibration damper	Depth		Maximum	1.0 mm (0.0394 in.)
No. 2 chain vibration damper	Depth		Maximum	1.0 mm (0.0394 in.)
No. 1 intake manifold	Warpage	No. 3 intake manifold side	Maximum	0.10 mm (0.00394 in.)
		Cylinder head sub-assembly RH side	Maximum	0.10 mm (0.00394 in.)
No. 2 intake manifold	Warpage	No. 3 intake manifold side	Maximum	0.10 mm (0.00394 in.)
		Cylinder head sub-assembly LH side	Maximum	0.10 mm (0.00394 in.)
No. 3 intake manifold	Warpage	Intake pipe side	Maximum	0.10 mm (0.00394 in.)
		No. 1 and No. 2 intake manifold side	Maximum	0.15 mm (0.00591 in.)
Exhaust manifold	Warpage		Maximum	0.80 mm (0.0315 in.)

CYLINDER HEAD

Cylinder head sub-assembly	Warpage	Cylinder block sub-assembly side	Standard	0 to 0.05 mm (0 to 0.00197 in.)
			Maximum	0.05 mm (0.00197 in.)
		Intake manifold side	Standard	0 to 0.08 mm (0 to 0.00315 in.)
			Maximum	0.08 mm (0.00315 in.)
		Exhaust manifold side	Standard	0 to 0.08 mm (0 to 0.00315 in.)
			Maximum	0.08 mm (0.00315 in.)
Inner compression spring	Deviation		Maximum	1.5 mm (0.0591 in.)
	Free length		Standard	45.9 mm (1.81 in.)
	Tension		Installed tension	219 to 242 N (22 to 25 kgf, 49.2 to 54.4 lbf) at 31.0 mm (1.22 in.)
Intake valve	Valve stem diameter		Standard	5.970 to 5.985 mm (0.2350 to 0.2356 in.)
	Valve face angle		Standard	45.5°
	Margin thickness		Standard	1.0 mm (0.0394 in.)
			Minimum	0.5 mm (0.0197 in.)
	Overall length		Standard	104.4 mm (4.11 in.)
			Minimum	104.1 mm (4.10 in.)
Exhaust valve	Valve stem diameter		Standard	5.960 to 5.975 mm (0.2346 to 0.2352 in.)
	Valve face angle		Standard	45.5°
	Margin thickness		Standard	1.0 mm (0.0394 in.)
			Minimum	0.5 mm (0.0197 in.)
	Overall length		Standard	104.1 mm (4.10 in.)
			Minimum	103.8 mm (4.09 in.)
Valve guide bush	Valve guide bush inside diameter		Standard	6.01 to 6.03 mm (0.2366 to 0.2374 in.)
	Oil clearance	Intake	Standard	0.025 to 0.060 mm (0.000984 to 0.00236 in.)
			Maximum	0.120 mm (0.00472 in.)
		Exhaust	Standard	0.035 to 0.070 mm (0.00138 to 0.00276 in.)
			Maximum	0.130 mm (0.00512 in.)
	Bush bore diameter		Standard	10.985 to 11.006 mm (0.432 to 0.433 in.)
	Valve guide bush diameter	Use STD	Standard	11.033 to 11.044 mm (0.434 to 0.435 in.)
		Use O/S 0.05	Standard	11.083 to 11.094 mm (0.436 to 0.437 in.)
	Protrusion height		Standard	9.0 to 9.4 mm (0.354 to 0.370 in.)
	Overall length	Intake	Standard	0.025 to 0.060 mm (0.000984 to 0.00236 in.)
		Exhaust	Standard	0.035 to 0.070 mm (0.00138 to 0.00276 in.)
No. 1 and No. 4 camshaft (for Exhaust Camshaft)	Thrust clearance		Standard	0.035 to 0.160 mm (0.00138 to 0.00630 in.)
			Maximum	0.180 mm (0.00709 in.)

No. 2 and No. 3 camshaft (for Intake Camshaft)	Thrust clearance		in.)
		Standard	0.035 to 0.160 mm (0.00138 to 0.00630 in.)
		Maximum	0.180 mm (0.00709 in.)
Intake valve seat	Width	Standard	1.0 to 1.4 mm (0.0394 to 0.0551 in.)
Exhaust valve seat	Width	Standard	1.0 to 1.4 mm (0.0394 to 0.0551 in.)

CYLINDER BLOCK

Connecting rod	Thrust clearance			Standard	0.14 to 0.54 mm (0.00551 to 0.0213 in.)
				Maximum	0.60 mm (0.0236 in.)
	Oil clearance			Standard	0.024 to 0.042 mm (0.000945 to 0.00165 in.)
				Maximum	0.052 mm (0.00205 in.)
	Bend			Maximum	0.07 mm (0.00276 in.) per 100 mm (3.94 in.)
	Twist			Maximum	0.15 mm (0.00591 in.) per 100 mm (3.94 in.)
	Connecting rod big end	Inside diameter	Mark 1	Standard	58.000 to 58.006 mm (2.2835 to 2.2837 in.)
			Mark 2	Standard	58.006 to 58.012 mm (2.2837 to 2.2839 in.)
			Mark 3	Standard	58.012 to 58.018 mm (2.2839 to 2.2842 in.)
	Connecting rod bush	Inside diameter	Mark A	Standard	29.019 to 29.023 mm (1.1425 to 1.1426 in.)
			Mark B	Standard	29.023 to 29.027 mm (1.1426 to 1.1428 in.)
			Mark C	Standard	29.027 to 29.031 mm (1.1428 to 1.1430 in.)
Connecting rod bearing	Center Wall Thickness		Mark 1	Standard	1.485 to 1.488 mm (0.0585 to 0.0586 in.)
			Mark 2	Standard	1.488 to 1.491 mm (0.0586 to 0.0587 in.)
			Mark 3	Standard	1.491 to 1.494 mm (0.0587 to 0.0588 in.)
			Mark 4	Standard	1.494 to 1.497 mm (0.0588 to 0.0589 in.)
			Mark 5	Standard	1.497 to 1.500 mm (0.0589 to 0.0591 in.)
Crankshaft	Circle runout			Maximum	0.04 mm (0.00158 in.)
	Main journal	Diameter		Standard	74.982 to 75.000

					mm (2.9520 to 2.9528 in.)
Taper and out-of-round				Maximum	0.01 mm (0.000394 in.)
Main journal diameter	No. 1 and No. 3 journals	Mark 2	Standard	74.994 to 75.000 mm (2.9525 to 2.9528 in.)	
		Mark 3	Standard	74.988 to 74.994 mm (2.9523 to 2.9525 in.)	
		Mark 4	Standard	74.982 to 74.988 mm (2.9520 to 2.9523 in.)	
	No. 2, No. 4 and No. 5 journals	Mark 0	Standard	74.994 to 75.000 mm (2.9530 to 2.9528 in.)	
		Mark 1	Standard	74.988 to 74.994 mm (2.9523 to 2.9525 in.)	
		Mark 2	Standard	74.982 to 74.988 mm (2.9520 to 2.9523 in.)	
Thrust clearance			Standard	0.02 to 0.22 mm (0.000787 to 0.00866 in.)	
			Maximum	0.30 mm (0.0118 in.)	
Crankshaft pin	Diameter			Standard	54.982 to 55.000 mm (2.1646 to 2.1654 in.)
Taper and out-of-round				Maximum	0.01 mm (0.000394 in.)
Pin diameter		Mark 0	Standard	54.994 to 55.000 mm (2.1651 to 2.1654 in.)	
		Mark 1	Standard	54.988 to 54.994 mm (2.1649 to 2.1651 in.)	
		Mark 2	Standard	54.982 to 54.988 mm (2.1646 to 2.1649 in.)	
Crankshaft	Oil clearance	No. 1 and No. 3 journals		Standard	0.020 to 0.038 mm (0.000787 to 0.00150 in.)
				Maximum	0.048 mm (0.00189 in.)
		No. 2, No. 4 and No. 5 journals		Standard	0.032 to 0.050 mm (0.00126 to 0.00197 in.)
				Maximum	0.060 mm (0.00236 in.)
	Oil clearance (use for under size bearing)	No. 1 and No. 3 journals			0.021 to 0.061 mm (0.000827 to 0.00240 in.)
		No. 2, No. 4 and No. 5 journals			0.033 to 0.073 mm (0.00130 to 0.00287 in.)
Crankshaft bearing	Bearing width	No. 1 and No. 5 journals		Standard	22.5 mm (0.886 in.)
		No. 2, No. 3 and No. 4 journals		Standard	20.5 mm (0.807 in.)
	Center wall thickness (for Upper Bearing)	No. 1 and No. 3 journals	Mark 1	Standard	1.987 to 1.990 mm (0.0782 to 0.0783 in.)
			Mark 2	Standard	1.990 to 1.993 mm (0.0783 to 0.0785 in.)
			Mark 3	Standard	1.993 to 1.996

					mm (0.0785 to 0.0786 in.)
			Mark 4	Standard	1.996 to 1.999 mm (0.0786 to 0.0787 in.)
			Mark 5	Standard	1.999 to 2.002 mm (0.0787 to 0.0788 in.)
			Mark 6	Standard	2.002 to 2.005 mm (0.0788 to 0.0789 in.)
			Mark 7	Standard	2.005 to 2.008 mm (0.0789 to 0.0791 in.)
		No. 2, No. 4 and No. 5 journals	Mark 1	Standard	1.975 to 1.978 mm (0.0778 to 0.0779 in.)
			Mark 2	Standard	1.978 to 1.981 mm (0.0779 to 0.0780 in.)
			Mark 3	Standard	1.981 to 1.984 mm (0.0780 to 0.0781 in.)
			Mark 4	Standard	1.984 to 1.987 mm (0.0781 to 0.0782 in.)
			Mark 5	Standard	1.987 to 1.990 mm (0.0782 to 0.0783 in.)
			Mark 6	Standard	1.990 to 1.993 mm (0.0783 to 0.0785 in.)
			Mark 7	Standard	1.993 to 1.996 mm (0.0785 to 0.0786 in.)
Crankshaft bearing	Center wall thickness (for Lower Bearing)	No. 1 and No. 3 journals	Mark 1	Standard	1.975 to 1.978 mm (0.0778 to 0.0779 in.)
			Mark 2	Standard	1.978 to 1.981 mm (0.0779 to 0.0780 in.)
			Mark 3	Standard	1.981 to 1.984 mm (0.0780 to 0.0781 in.)
			Mark 4	Standard	1.984 to 1.987 mm (0.0781 to 0.0782 in.)
			Mark 5	Standard	1.987 to 1.990 mm (0.0782 to 0.0783 in.)
			Mark 6	Standard	1.990 to 1.993 mm (0.0783 to 0.0785 in.)
			Mark 7	Standard	1.993 to 1.996 mm (0.0785 to 0.0786 in.)
		No. 2, No. 4 and No. 5 journals	Mark 1	Standard	1.987 to 1.990 mm (0.0782 to 0.0783 in.)
			Mark 2	Standard	1.990 to 1.993 mm (0.0783 to 0.0785 in.)
			Mark 3	Standard	1.993 to 1.996 mm (0.0785 to 0.0786 in.)
			Mark 4	Standard	1.996 to 1.999 mm (0.0786 to 0.0787 in.)

				Mark 5	Standard	1.999 to 2.002 mm (0.0787 to 0.0788 in.)
				Mark 6	Standard	2.002 to 2.005 mm (0.0788 to 0.0789 in.)
				Mark 7	Standard	2.005 to 2.008 mm (0.0789 to 0.0791 in.)
Crankshaft thrust washer	Thickness				Standard	2.44 to 2.49 mm (0.0961 to 0.0980 in.)
Cylinder block sub-assembly	Warpage				Maximum	0.05 mm (0.00197 in.)
	Cylinder bore				Reference value (New Parts)	86.000 to 86.013 mm (3.3858 to 3.3863 in.)
					Maximum	86.03 mm (3.3870 in.)
	Main journal bore	Diameter	No. 1 and No. 3 journals	Mark 1	Standard	79.000 to 79.006 mm (3.1102 to 3.1105 in.)
				Mark 2	Standard	79.006 to 79.012 mm (3.1105 to 3.1107 in.)
				Mark 3	Standard	79.012 to 79.018 mm (3.1107 to 3.1109 in.)
			No. 2, No. 4 and No. 5 journals	Mark 1	Standard	79.000 to 79.006 mm (3.1102 to 3.1105 in.)
				Mark 2	Standard	79.006 to 79.012 mm (3.1105 to 3.1107 in.)
				Mark 3	Standard	79.012 to 79.018 mm (3.1107 to 3.1109 in.)
Piston	Diameter				Reference value (New Parts)	85.932 to 85.966 mm (3.383 to 3.384 in.)
					Minimum	85.910 mm (3.382 in.)
	Oil clearance				Reference value (New Parts)	0.034 to 0.081 mm (0.00134 to 0.00319 in.)
					Maximum	0.091 mm (0.00358 in.)
	Piston ring groove	Ring groove clearance	No. 1 compression ring		Standard	0.11 to 0.15 mm (0.00433 to 0.00591 in.)
			No. 2 compression ring		Standard	0.08 to 0.12 mm (0.00315 to 0.00472 in.)
			Oil ring		Standard	0.03 to 0.07 mm (0.00118 to 0.00276 in.)
	Piston pin hole	Inside diameter		Mark A	Standard	29.009 to 29.013 mm (1.1421 to 1.1422 in.)
				Mark B	Standard	29.013 to 29.017 mm (1.1422 to 1.1424 in.)
				Mark C	Standard	29.017 to 29.021 mm (1.1424 to 1.1426 in.)
Piston ring	End gap		No. 1 compression ring		Standard	0.20 to 0.30 mm (0.00787 to 0.0118 in.)

				Maximum	0.40 mm (0.0157 in.)
			No. 2 compression ring	Standard	0.47 to 0.62 mm (0.0185 to 0.0244 in.)
				Maximum	0.75 mm (0.0295 in.)
			Oil ring	Standard	0.10 to 0.40 mm (0.00394 to 0.0157 in.)
				Maximum	0.50 mm (0.0197 in.)
Piston pin	Diameter	Mark A (White)	Standard	29.000 to 29.004 mm (1.1417 to 1.1419 in.)	
		Mark B (Pink)	Standard	29.004 to 29.008 mm (1.1419 to 1.1420 in.)	
		Mark C (Blue)	Standard	29.008 to 29.012 mm (1.1420 to 1.1422 in.)	
	Oil clearance (Piston)		Standard	0.005 to 0.013 mm (0.000197 to 0.000512 in.)	
			Maximum	0.018 mm (0.000709 in.)	
	Oil clearance (Connecting rod)		Standard	0.015 to 0.023 mm (0.000591 to 0.000906 in.)	
			Maximum	0.028 mm (0.00110 in.)	
	Connecting rod bolt	Diameter		Standard	8.7 to 8.8 mm (0.343 to 0.346 in.)
			Minimum	8.5 mm (0.335 in.)	
Crankshaft bearing cap set bolt	Diameter	Bolt A 106 mm (4.17 in.) bolt length	Standard	10.8 to 11.0 mm (0.425 to 0.433 in.)	
			Minimum	10.5 mm (0.413 in.)	
		Bolt B 90.5 mm (3.56 in.) bolt length	Standard	9.8 to 10.0 mm (0.386 to 0.394 in.)	
			Minimum	9.5 mm (0.374 in.)	