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Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [03/2023 -]
Title: SPECIFICATIONS: M20A-FXS ENGINE MECHANICAL: SERVICE DATA; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

SERVICE DATA

ENGINE

Ignition timing	Ignition advance function disabled by Active Test	8 to 12° BTDC at idle (Transaxle in park)
	Ignition advance function not disabled by Active Test	-2 to 14° BTDC at idle (Transaxle in park)
Idle speed		950 to 1050 rpm
Compression	Standard pressure	1400 kPa (14.3 kgf/cm ² , 203 psi)
	Minimum pressure	800 kPa (8.2 kgf/cm ² , 116 psi)
	Pressure difference between each cylinder	200 kPa (2.0 kgf/cm ² , 29 psi) or less

FRONT CRANKSHAFT OIL SEAL

Timing chain cover oil seal	Depth	Standard	0 to 2 mm (0 to 0.0787 in.)
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REAR CRANKSHAFT OIL SEAL

Rear engine oil seal	Depth	Standard	-0.9 to 1.1 mm (-0.0354 to 0.0433 in.)
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ENGINE UNIT (for HEV Model)

Intake camshaft sub-assembly	Oil clearance	No. 1 journal	Standard	0.035 to 0.072 mm (0.00138 to 0.00283 in.)
			Maximum	0.085 mm (0.00335 in.)
		Other journals	Standard	0.025 to 0.062 mm (0.000984 to 0.00244 in.)
			Maximum	0.085 mm (0.00335 in.)
	Runout		Maximum	0.03 mm (0.00118 in.)
	Cam lobe height		Standard	42.267 to 42.367 mm (1.66405 to 1.66799 in.)
			Minimum	42.157 mm (1.65972 in.)
	Journal diameter	No. 1	Standard	33.984 to 34.000 mm (1.33795 to 1.33858 in.)

		Other	Standard	23.959 to 23.975 mm (0.94327 to 0.94390 in.)
Exhaust camshaft sub-assembly	Oil clearance	No. 1 journal	Standard	0.027 to 0.064 mm (0.00106 to 0.00252 in.)
			Maximum	0.085 mm (0.00335 in.)
		Other journals	Standard	0.025 to 0.062 mm (0.000984 to 0.00244 in.)
			Maximum	0.085 mm (0.00335 in.)
	Runout		Maximum	0.03 mm (0.00118 in.)
	Cam lobe height	Exhaust camshaft sub-assembly	Standard	42.162 to 42.262 mm (1.65992 to 1.66385 in.)
			Minimum	42.052 mm (1.65559 in.)
		Exhaust camshaft sub-assembly (for Fuel Pump)	Standard	42.946 to 43.046 mm (1.69078 to 1.69472 in.)
			Minimum	42.836 mm (1.68645 in.)
	Journal diameter	No. 1	Standard	40.984 to 41.000 mm (1.61354 to 1.61417 in.)
Other		Standard	23.959 to 23.975 mm (0.94327 to 0.94390 in.)	
Chain sub-assembly	Chain elongation		Maximum	116.30 mm (4.58 in.)
Oil pump drive chain sub-assembly	Chain elongation		Maximum	116.30 mm (4.58 in.)
Oil pump drive sprocket (with oil pump drive chain sub-assembly)	Diameter		Minimum	51.35 mm (2.02 in.)
Oil pump drive shaft sprocket (with oil pump drive chain sub-assembly)	Diameter		Minimum	51.35 mm (2.02 in.)
Camshaft timing gear assembly (with chain sub-assembly)	Diameter		Minimum	100.01 mm (3.94 in.)
Camshaft timing exhaust gear assembly (with chain sub-assembly)	Diameter		Minimum	100.01 mm (3.94 in.)
Crankshaft timing sprocket (with chain sub-assembly)	Diameter		Minimum	51.35 mm (2.02 in.)
Chain tensioner slipper	Depth		Maximum	1.0 mm (0.0394 in.)

No. 1 chain vibration damper	Depth		Maximum	1.0 mm (0.0394 in.)
Cylinder head set bolt	for 140 mm cylinder head set bolt	Diameter	Standard	10.7 to 10.9 mm (0.421 to 0.429 in.)
			Minimum	10.6 mm (0.417 in.)
	for 130 mm cylinder head set bolt	Diameter	Standard	9.7 to 9.9 mm (0.382 to 0.390 in.)
			Minimum	9.6 mm (0.378 in.)
Exhaust manifold	Warpage		Maximum	0.7 mm (0.0276 in.)
Straight pin (A)	Protrusion height		Standard	3.0 to 5.0 mm (0.118 to 0.197 in.)
Straight pin (B)	Protrusion height		Standard	5.0 to 7.0 mm (0.197 to 0.276 in.)
Ring pin (Camshaft housing sub-assembly side)	Protrusion height		Standard	3.2 to 4.3 mm (0.126 to 0.169 in.)
Ring pin (Stiffening crankcase assembly side)	Protrusion height		Standard	3.5 to 4.5 mm (0.138 to 0.177 in.)

ENGINE UNIT (for PHEV Model)

Intake camshaft sub-assembly	Oil clearance	No. 1 journal	Standard	0.035 to 0.072 mm (0.00138 to 0.00283 in.)
			Maximum	0.085 mm (0.00335 in.)
		Other journals	Standard	0.025 to 0.062 mm (0.000984 to 0.00244 in.)
			Maximum	0.085 mm (0.00335 in.)
	Runout		Maximum	0.03 mm (0.00118 in.)
	Cam lobe height		Standard	42.267 to 42.367 mm (1.66405 to 1.66799 in.)
			Minimum	42.157 mm (1.65972 in.)
	Journal diameter		No. 1	Standard
Other			Standard	23.959 to 23.975 mm (0.94327 to 0.94390 in.)
Exhaust camshaft sub-assembly	Oil clearance	No. 1 journal	Standard	0.027 to 0.064 mm (0.00106 to 0.00252 in.)
			Maximum	0.085 mm (0.00335 in.)

	Other journals	Standard	0.025 to 0.062 mm (0.000984 to 0.00244 in.)	
		Maximum	0.085 mm (0.00335 in.)	
	Runout		Maximum	0.03 mm (0.00118 in.)
	Cam lobe height	Exhaust camshaft sub-assembly	Standard	42.162 to 42.262 mm (1.65992 to 1.66385 in.)
			Minimum	42.052 mm (1.65559 in.)
		Exhaust camshaft sub-assembly (for Fuel Pump)	Standard	42.946 to 43.046 mm (1.69078 to 1.69472 in.)
Minimum			42.836 mm (1.68645 in.)	
Journal diameter	No. 1	Standard	40.984 to 41.000 mm (1.61354 to 1.61417 in.)	
	Other	Standard	23.959 to 23.975 mm (0.94327 to 0.94390 in.)	
Chain sub-assembly	Chain elongation		Maximum	116.30 mm (4.58 in.)
Oil pump drive chain sub-assembly	Chain elongation		Maximum	116.30 mm (4.58 in.)
Oil pump drive sprocket (with oil pump drive chain sub-assembly)	Diameter		Minimum	51.35 mm (2.02 in.)
Oil pump drive shaft sprocket (with oil pump drive chain sub-assembly)	Diameter		Minimum	51.35 mm (2.02 in.)
Camshaft timing gear assembly (with chain sub-assembly)	Diameter		Minimum	100.01 mm (3.94 in.)
Camshaft timing exhaust gear assembly (with chain sub-assembly)	Diameter		Minimum	100.01 mm (3.94 in.)
Crankshaft timing sprocket (with chain sub-assembly)	Diameter		Minimum	51.35 mm (2.02 in.)
Chain tensioner slipper	Depth		Maximum	1.0 mm (0.0394 in.)
No. 1 chain vibration damper	Depth		Maximum	1.0 mm (0.0394 in.)
Engine balancer assembly	Thrust clearance	No. 1 balance shaft	Standard	0.05 to 0.09 mm (0.00197 to 0.00354 in.)
			Maximum	0.09 mm (0.00354 in.)
		No. 2 balance shaft	Standard	0.05 to 0.09 mm (0.00197 to 0.00354 in.)

				in.)
			Maximum	0.09 mm (0.00354 in.)
	Backlash		Standard	0.045 to 0.155 mm (0.00177 to 0.00610 in.)
			Maximum	0.155 mm (0.00610 in.)
Cylinder head set bolt	for 140 mm cylinder head set bolt	Diameter	Standard	10.7 to 10.9 mm (0.421 to 0.429 in.)
			Minimum	10.6 mm (0.417 in.)
	for 130 mm cylinder head set bolt	Diameter	Standard	9.7 to 9.9 mm (0.382 to 0.390 in.)
			Minimum	9.6 mm (0.378 in.)
Exhaust manifold	Warpage		Maximum	0.7 mm (0.0276 in.)
Straight pin (A)	Protrusion height		Standard	3.0 to 5.0 mm (0.118 to 0.197 in.)
Straight pin (B)	Protrusion height		Standard	5.0 to 7.0 mm (0.197 to 0.276 in.)
Ring pin (Camshaft housing sub-assembly side)	Protrusion height		Standard	3.2 to 4.3 mm (0.126 to 0.169 in.)
Ring pin (Stiffening crankcase assembly side)	Protrusion height		Standard	3.5 to 4.5 mm (0.138 to 0.177 in.)

CYLINDER HEAD

Cylinder head	Warpage	Bottom side	Maximum	0.05 mm (0.00197 in.)
		Intake manifold side	Maximum	0.10 mm (0.00394 in.)
		Exhaust manifold side	Maximum	0.10 mm (0.00394 in.)
Compression spring (Intake side)	Free length		Standard	58.81 mm (2.32 in.)
	Deviation (Reference)		Maximum	1.0 mm (0.0394 in.)
Compression spring (Exhaust side)	Free length		Standard	58.81 mm (2.32 in.)
	Deviation (Reference)		Maximum	1.0 mm (0.0394 in.)
Intake valve	Valve stem diameter		Standard	5.470 to 5.485 mm (0.215 to 0.216 in.)
	Margin thickness		Standard	1.0 mm (0.0394 in.)
			Minimum	0.5 mm (0.0197 in.)
	Overall length		Standard	102.45 mm (4.03 in.)
		Minimum	101.95 mm (4.01 in.)	
Exhaust valve	Valve stem diameter		Standard	5.465 to 5.480 mm (0.215 to 0.216 in.)

	Margin thickness	Standard	1.0 mm (0.0394 in.)	
		Minimum	0.5 mm (0.0197 in.)	
	Overall length	Standard	106.4 mm (4.19 in.)	
		Minimum	105.9 mm (4.17 in.)	
Valve guide bush	Inside diameter	Standard	5.51 to 5.53 mm (0.217 to 0.218 in.)	
	Oil clearance	Intake	Standard	0.025 to 0.060 mm (0.000984 to 0.00236 in.)
			Maximum	0.080 mm (0.00315 in.)
		Exhaust	Standard	0.030 to 0.065 mm (0.00118 to 0.00256 in.)
			Maximum	0.10 mm (0.00394 in.)
	Bush Bore diameter for cylinder head sub-assembly	Intake	Standard	10.285 to 10.306 mm (0.405 to 0.406 in.)
			Use STD	10.333 to 10.344 mm (0.40681 to 0.40724 in.)
			Use O/S 0.05	10.383 to 10.394 mm (0.40878 to 0.40921 in.)
			Standard Bush Length	41.3 to 41.7 mm (1.63 to 1.64 in.)
		Exhaust	Standard	10.285 to 10.306 mm (0.405 to 0.406 in.)
			Use STD	10.333 to 10.344 mm (0.40681 to 0.40724 in.)
			Use O/S 0.05	10.383 to 10.394 mm (0.40878 to 0.40921 in.)
			Standard Bush Length	43.3 to 43.7 mm (1.70 to 1.72 in.)
	Protrusion height	Intake	Standard	13.35 to 13.60 mm (0.526 to 0.535 in.)
		Exhaust	Standard	13.75 to 14.00 mm (0.541 to 0.551 in.)
	Intake camshaft sub-assembly	Thrust clearance	Standard	0.04 to 0.17 mm (0.00157 to 0.00669 in.)
Maximum			0.22 mm (0.00866 in.)	
Exhaust camshaft sub-assembly	Thrust clearance	Standard	0.04 to 0.17 mm (0.00157 to 0.00669 in.)	
		Maximum	0.22 mm (0.00866 in.)	
Ring pin	Protrusion height	Standard	6.5 to 7.5 mm (0.256 to 0.295 in.)	
Spark plug tube	Protrusion height	Standard	77.3 to 78.3 mm (3.04 to 3.08 in.)	

Intake valve seat	Width	Standard	1.0 to 1.4 mm (0.0394 to 0.0551 in.)
Exhaust valve seat	Width	Standard	1.2 to 1.6 mm (0.0472 to 0.0630 in.)

CYLINDER BLOCK

Connecting rod	Thrust clearance	Standard	0.160 to 0.512 mm (0.00630 to 0.0202 in.)
		Maximum	0.512 mm (0.0202 in.)
	Oil clearance	Standard	0.032 to 0.065 mm (0.00126 to 0.00256 in.)
		Maximum	0.065 mm (0.00256 in.)
Crankshaft pin	Diameter	Standard	47.992 to 48.000 mm (1.88945 to 1.88976 in.)
Connecting rod big end inside diameter	Mark 1	Standard	51.000 to 51.008 mm (2.00787 to 2.00818 in.)
	Mark 2	Standard	51.008 to 51.016 mm (2.00818 to 2.00850 in.)
	Mark 3	Standard	51.016 to 51.024 mm (2.00850 to 2.00881 in.)
Connecting rod bearing center wall thickness	Mark 1	Standard	1.483 to 1.487 mm (0.0584 to 0.0585 in.)
	Mark 2	Standard	1.487 to 1.491 mm (0.0585 to 0.0587 in.)
	Mark 3	Standard	1.491 to 1.495 mm (0.0587 to 0.0589 in.)
Crankshaft	Thrust clearance	Standard	0.02 to 0.22 mm (0.000787 to 0.00866 in.)
		Maximum	0.22 mm (0.00866 in.)
Crankshaft thrust washer	Thickness	Standard	2.415 to 2.465 mm (0.0951 to 0.0970 in.)
Cylinder block	Warpage	Maximum	0.05 mm (0.00197 in.)
Cylinder bore	Diameter	Reference diameter (New parts)	80.500 to 80.513 mm (3.16929 to 3.16980 in.)
		Maximum	80.633 mm (3.17452 in.)
Piston	Diameter	Reference diameter (New parts)	80.470 to 80.490 mm (3.16810 to 3.16889 in.)

			parts)	
			Reference oil clearance (New parts)	0.010 to 0.043 mm (0.000394 to 0.00169 in.)
			Maximum	0.083 mm (0.00327 in.)
Piston ring	Ring groove clearance	No. 1 compression spring	Standard	0.020 to 0.060 mm (0.00079 to 0.00236 in.)
		No. 2 compression spring	Standard	0.020 to 0.060 mm (0.00079 to 0.00236 in.)
		Oil ring	Standard	0.070 to 0.110 mm (0.00276 to 0.00433 in.)
	End gap	No. 1 compression spring	Standard	0.200 to 0.225 mm (0.00787 to 0.00886 in.)
			Maximum	0.475 mm (0.0187 in.)
		No. 2 compression spring	Standard	0.575 to 0.625 mm (0.02264 to 0.02461 in.)
			Maximum	0.875 mm (0.0344 in.)
		Oil ring	Standard	0.100 to 0.350 mm (0.00394 to 0.01378 in.)
			Maximum	0.6 mm (0.0236 in.)
	Piston pin hole inside diameter	Mark A		Standard
Mark B		Standard	19.009 to 19.012 mm (0.74838 to 0.74850 in.)	
Mark C		Standard	19.012 to 19.015 mm (0.74850 to 0.74862 in.)	
Piston pin	Diameter	Mark A	Standard	19.004 to 19.007 mm (0.74819 to 0.74831 in.)
		Mark B	Standard	19.007 to 19.010 mm (0.74831 to 0.74842 in.)
		Mark C	Standard	19.010 to 19.013 mm (0.74842 to 0.74854 in.)
Connecting rod small end bush inside diameter	Mark A		Standard	19.012 to 19.015 mm (0.74850 to 0.74862 in.)
	Mark B		Standard	19.015 to 19.018 mm (0.74862 to 0.74874 in.)
	Mark C		Standard	19.018 to 19.021 mm (0.74874 to 0.74886 in.)

Piston pin oil clearance	Piston side	Standard	-0.001 to 0.005 mm (-0.0000394 to 0.000197 in.)
		Maximum	0.015 mm (0.000591 in.)
	Connecting rod side	Standard	0.005 to 0.011 mm (0.000197 to 0.000433 in.)
		Maximum	0.021 mm (0.000827 in.)
Connecting rod alignment	Misalignment	Maximum	0.05 mm (0.00197 in.) per 100 mm (3.94 in.)
	Twist	Maximum	0.15 mm (0.00591 in.) per 100 mm (3.94 in.)
Crankshaft	Runout	Maximum	0.03 mm (0.00118 in.)
	Main journal diameter	Standard	51.988 to 52.000 mm (2.04677 to 2.04724 in.)
	Taper and out-of-round (Main journal side)	Maximum	0.003 mm (0.000118 in.)
	Crank pin diameter	Standard	47.992 to 48.000 mm (1.88945 to 1.88976 in.)
	Taper and out-of-round (Crank pin side)	Maximum	0.003 mm (0.000118 in.)
	Oil clearance (for No. 3 journal)	Standard	0.024 to 0.040 mm (0.000945 to 0.00157 in.)
		Maximum	0.040 mm (0.00157 in.)
	Oil clearance (except No. 3 journal)	Standard	0.012 to 0.028 mm (0.000472 to 0.00110 in.)
		Maximum	0.028 mm (0.00110 in.)
	Cylinder block journal inside diameter	Mark 0	Standard
Mark 1		Standard	56.003 to 56.005 mm (2.20484 to 2.20492 in.)
Mark 2		Standard	56.005 to 56.007 mm (2.20492 to 2.20500 in.)
Mark 3		Standard	56.007 to 56.010 mm (2.20500 to 2.20511 in.)
Mark 4		Standard	56.010 to 56.012 mm (2.20511 to 2.20519 in.)
Mark 5		Standard	56.012 to 56.014 mm (2.20519 to 2.20527 in.)

	Mark 6	Standard	56.014 to 56.016 mm (2.20527 to 2.20535 in.)
Crankshaft main journal	Diameter	Mark 0	Standard 51.998 to 52.000 mm (2.04716 to 2.04724 in.)
		Mark 1	Standard 51.996 to 51.998 mm (2.04708 to 2.04716 in.)
		Mark 2	Standard 51.994 to 51.996 mm (2.04700 to 2.04708 in.)
		Mark 3	Standard 51.992 to 51.994 mm (2.04693 to 2.04700 in.)
		Mark 4	Standard 51.990 to 51.992 mm (2.04685 to 2.04693 in.)
		Mark 5	Standard 51.988 to 51.990 mm (2.04677 to 2.04685 in.)
Crankshaft bearing center wall	Thickness	Mark 1	Standard 1.985 to 1.988 mm (0.07815 to 0.07827 in.)
		Mark 2	Standard 1.988 to 1.991 mm (0.07827 to 0.07839 in.)
		Mark 3	Standard 1.991 to 1.994 mm (0.07839 to 0.07850 in.)
		Mark 4	Standard 1.994 to 1.997 mm (0.07850 to 0.07862 in.)
		Mark 5	Standard 1.997 to 2.000 mm (0.07862 to 0.07874 in.)
		Mark 6	Standard 2.000 to 2.003 mm (0.07874 to 0.07886 in.)
Crankshaft bearing cap set bolt	Diameter	Standard	10.73 to 10.97 mm (0.422 to 0.432 in.)
Connecting rod bolt	Diameter	Standard	8.36 to 8.5 mm (0.329 to 0.335 in.)
Ring pin	Protrusion height	Standard	5.0 to 7.0 mm (0.197 to 0.276 in.)
Straight pin (A)	Protrusion height	Standard	11.0 to 13.0 mm (0.433 to 0.512 in.)
Straight pin (B)	Protrusion height	Standard	5.0 to 7.0 mm (0.197 to 0.276 in.)
Straight pin (C)	Protrusion height	Standard	1.2 to 2.2 mm (0.0472 to 0.0866 in.)
No. 2 crankshaft bearing	Difference between (A) and (B)	Standard	0 to 0.9 mm (0 to 0.0354 in.)
Connecting rod bearing	Difference between (A) and (B)	Standard	0 to 0.7 mm (0 to 0.0276 in.)

