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This file was not scanned to deprive Mazda of any money – it was scanned due to the rareness of the original manuals and the overwhelming need of the RX-7 owner to have this information so that they can accurately troubleshoot problems. Perhaps if Mazda's dealerships could support the Rotary Engine it wouldn't be so necessary for the owners to do so.



Many thanks to Anh Diep for scanning this file.

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37UTDX-001

C. ENGINE

Item		Engine model		13B (Turbo)
Type				Rotary engine
Displacement		cc {cu in}		654 × 2 {40.0 × 2}
Number of rotors and arrangement				2 rotors, longitudinal
Combustion chamber type				Bathtub
Compression ratio				9.0: 1
Port timing	Intake	Open	Primary	45° BTDC
			Secondary	32° BTDC
		Close	Primary	50° ABDC
			Secondary	50° ABDC
	Exhaust	Open		75° BBDC
		Close		48° ATDC
Compression pressure kPa {kgf/cm <sup>2</sup> , psi}-rpm	Minimum			686 {7.0, 100}-250
	Maximum difference between chambers			147 {1.5, 21}-250
Side housing (Front, intermediate and rear housing)	Distortion limit		mm {in}	0.04 {0.002}
	Side seal wear limit		mm {in}	0.10 {0.004}
	Side seal wear limit, overlapping oil seal wear		mm {in}	0.01 {0.0004}
	Side seal wear limit, outside oil seal wear		mm {in}	0.10 {0.004}
	Oil seal wear limit		mm {in}	0.02 {0.0008}
Rotor housing	Width		mm {in}	80 {3.1}
	Maximum width difference		mm {in}	0.06 {0.0024}
Rotor	Width (Apex)		mm {in}	79.675 {3.1368}
	Clearance of side housing to rotor	mm {in}		
		Standard		0.12-0.21 {0.0047-0.0083}
		Min.		0.10 {0.0039}
	Diameter of corner seal groove		mm {in}	11.000-11.018 {0.4331-0.4338}
	Width of side seal groove		mm {in}	0.714-0.739 {0.0281-0.0291}
Width of apex seal groove		mm {in}	1.995-2.012 {0.0785-0.0792}	
Apex seal and spring	Width		mm {in}	2.0 {0.079}
	Height (upper and lower)	mm {in}		
		Standard		8.5 {0.33}
		Min.		7.5 {0.295}-Refer to ENGINE INSPECTION section
	Clearance of apex seal and rotor groove	mm {in}		
		Standard		0.051-0.101 {0.002-0.004}
		Max.		0.15 {0.0059}
Spring free height	mm {in}	Long	Standard	6.25 {0.246}
			Min.	3.5 {0.138}
		Short	Standard	3.3 {0.130}
Side seal and spring	Thickness		mm {in}	0.661-0.686 {0.0260-0.0270}
	Clearance of side seal to rotor groove	mm {in}		
		Standard		0.028-0.078 {0.0011-0.0031}
		Max.		0.10 {0.0039}
	Height		mm {in}	3.0 {0.118}
	Protrusion min.		mm {in}	0.50 {0.020}
Clearance of side seal to corner seal	mm {in}			
	Standard		0.05-0.15 {0.0020-0.0059}	
	Max.		0.40 {0.016}	
Corner seal and spring	Outer diameter		mm {in}	10.990-11.014 {0.4327-0.4336}
	Height		mm {in}	7.0 {0.276}
	Protrusion min.		mm {in}	0.50 {0.020}
Rotor oil seal and spring	Height		mm {in}	5.6-5.8 {0.220-0.228}
	Oil seal lip width max.		mm {in}	0.50 {0.020}
	Protrusion min.		mm {in}	0.50 {0.020}
Main bearing	Inner diameter		mm {in}	43.025-43.050 {1.6939-1.6949}
Rotor bearing	Inner diameter		mm {in}	74.025-74.050 {2.9144-2.9153}

Item		Engine model	13B (Turbo)	
Eccentric shaft	Runout max.	mm {in}	0.06 {0.0027}	
	End play	mm {in}	Standard	0.040-0.070 {0.0016-0.0028}
			Limit	0.09 {0.0035}
	Main journal diameter	mm {in}	43 {0.37}	
	Clearance of main journal	mm {in}	Standard	0.08-0.11 {0.0031-0.0043}...outside 0.06-0.08 {0.0023-0.0031}...inside
			Limit	0.13 {0.0051}...outside 0.11 {0.0043}...inside
	Rotor journal diameter	mm {in}	74 {2.9}	
Clearance of rotor journal	mm {in}	Standard	0.060-0.080 {0.0023-0.0031}	
		Limit	0.10 {0.0039}	
Drive belt deflection at 98 N {10*kgf, 22 lbf} mm {in}	Alternator and Air pump	Used	7.0-7.5 {0.28-0.29}	
	P/S pump and A/C compressor	Used	4.5-5.0 {0.18-0.19}	

D. LUBRICATING SYSTEM

Item		Engine model	13B (Turbo)	
Lubrication system			Forced-fed	
Oil pump	Type		Trochoid	
	Lobe clearance of outer rotor to inner rotor	mm {in}	Standard	0.03-0.12 {0.0012-0.0047}
			Max.	0.15 {0.0059}
	Clearance of outer rotor to pump body	mm {in}	Standard	0.20-0.25 {0.0079-0.0098}
			Max.	0.30 {0.0118}
	End float	mm {in}	Standard	0.03-0.125 {0.0012-0.0049}
Max.			0.15 {0.0059}	
Pressure control valve	Relief pressure	kPa {kgf/cm <sup>2</sup> , psi}	1,080 {11.0, 156}	
Oil cooler	Type		Air-cooled, with bypass valve	
	Relief temperature	°C {°F}	60-65 {140-149} or below	
	Relief pressure dif.	kPa {kgf/cm <sup>2</sup> , psi}	349 {3.56, 50} at 60°C {140°F}	
	Bypass valve protrusion	mm {in}	5 {0.2} or more	
Regulator valve	Relief pressure	kPa {kgf/cm <sup>2</sup> , psi}	490 {5.0, 71}	
Oil filter	Type		Full flow, paper element	
	Relief pressure dif.	kPa {kgf/cm <sup>2</sup> , psi}	98 {1.0, 14}	
Eccentric shaft bypass valve	Relief temperature	°C {°F}	60 {140} or below	
	Protrusion	mm {in}	6 {0.24} or more	
Engine oil	Capacity L {US qt, Imp qt}	Total (dry engine)	4.9 {5.2, 4.3} *5.4 {5.7, 4.8}	
		Oil pan	4.2 {4.4, 3.7}	
		Oil cooler	0.85 {0.90, 0.75}	
		Oil filter	0.19 {0.20, 0.17}	
	Classification		API Service SG Energy Conserving II (ECII)	
	Above - 25°C {- 10°F}		10W-30	
	Below 0°C {32°F}		5W-30	

\* R1 model

**E. COOLING SYSTEM**

Item		Engine model	13B (Turbo)		
Cooling method			Water-cooled, forced circulation		
Water pump	Type		Centrifugal		
	Pulley ratio (Speed)		1: 1.22		
Thermostat	Type		Wax, bottom bypass		
	Opening temperature	°C {°F}	80.5–83.5 {177–182}		
	Full-open temperature	°C {°F}	95 {203}		
	Full-open lift min.	mm {in}	8–10 {0.31–0.39}		
Radiator	Type		Corrugated fin		
Coolant filler cap	Relief pressure	kPa {kgf/cm <sup>2</sup> , psi}	115–145 {1.15–1.45, 16.4–20.6}		
Electric cooling fan	Type		Electrical		
	Capacity	W	160 × 2		
	Number of blades		No1: 5, No2: 4		
	Outer diameter	mm {in}	300 {11.8}		
Drive belt deflection at 98 N {10 kgf, 22 lbf}	mm {in}	Alternator and air pump	Used	7.0–7.5 {0.28–0.29}	
Coolant	Capacity	L {US qt, Imp qt}	8.8 {9.3, 7.7}		
Antifreeze solution	Protection	Mixture	Mixture percentage	%	Specific gravity at 20°C {68°F}
	Above – 16°C {3°F}		Water	Antifreeze	1.054
	Above – 26°C {– 15°F}		65	35	1.066
	Above – 40°C {– 40°F}		55	45	1.078
			45	55	

**F. FUEL AND EMISSION CONTROL SYSTEMS**

Item		Specification
Idle speed*	rpm	700–750
Ignition timing	Leading	ATDC 5°
	Trailing	ATDC 20°
<b>Air cleaner</b>		
Element type		Oil permeated
<b>Throttle body</b>		
Type		Horizontal draft (2 stage-3 barrel)
Throat diameter	Primary	mm {in} 45 {1.772}
	Secondary	mm {in} 50 {1.969} × 2
Dashpot touch angle		8
Water thermostatic valve Operation (full open) temperature	°C {°F}	55–65 {131–149} or more
<b>Intercooler</b>		
Type		Air cooled
Core size {w × h × t}	mm {in}	294 × 114 × 65 {11.575 × 4.4882 × 2.5591}
<b>Turbocharger</b>		
System type		Sequential twin turbocharged
Cooling method		Water + engine oil
Boost control actuator		Turbo precontrol + wastegate control
Boost control method		Solenoid valve (duty-controlled) × 2
<b>Fuel tank</b>		
Capacity	L {US gal, Imp gal}	76 {20.1, 16.7}
<b>Fuel filter</b>		
Type	Low-pressure	Nylon element
	High-pressure	Paper element
<b>Pressure regulator</b>		
Type		Diaphragm
Regulated pressure	kPa {kgf/cm <sup>2</sup> , psi}	250–260 {2.5–2.6, 35.6–37.0}

\* TEN terminal of diagnosis connector grounded

Item		Specification
<b>Fuel pump</b>		
Type		Impeller (In tank)
Output pressure		kPa {kgf/cm <sup>2</sup> , psi} 490-740 {5.0-7.5, 71.1-106.7}
<b>Injector</b>		
Type		Side-feeding
Injection volume	Primary	cm <sup>3</sup> {cc, cu in}/min 550 {550, 33.5}
	Secondary	cm <sup>3</sup> {cc, cu in}/min 850 {850, 51.8}
<b>Catalytic converter</b>		
Type	Pri-converter	Metal
	Main converter	Monolithic
<b>Air pump</b>		
Capacity		cm <sup>3</sup> {cc}/rev 375 {375}
Output		L/min MT 140-200, AT 160-200
<b>Fuel</b>		
Specification		Unleaded premium (RON95 or higher)

**G. ENGINE ELECTRICAL SYSTEM**

Item		Transmission	MT	AT
voltage		V	12, negative ground	
Battery	Type and capacity (20-hour rate)		55D23L (60Ah) 65D23L (55Ah)* <sup>1</sup>	55D23L (60Ah) 75D26L (65Ah)* <sup>1</sup>
	Spark timing (test connector grounded)		Leading : ATDC 5° (BTDC - 5°) Trailing : ATDC 20° (BTDC - 20°) at idle (AT: P range)	
Ignition system	Spark advance		Electronic spark advance (ESA)	
	Spark plug	Type	Leading	NGK : BUR7EQP* <sup>2</sup> , BUR6EQP, BUR7EQ, BUR6EQ
			Trailing	NGK : BUR9EQP* <sup>2</sup> , BUR8EQP, BUR9EQ, BUR8EQ
		Plug gap	mm {in} 1.1-1.7 {0.044-0.066}	
Alternator	Output		V-A 12-100	
	Regulated voltage		V 14.1-14.7 (With temperature gradient characteristics)	
	Brush length	Standard	mm {in} 21.5 {0.846}	
		Minimum	mm {in} 8.0 {0.315}	
Stater	Type		Direct	Reduction
	Output		V-kW 12-1.2 11 12-2.0	
	Output (no load)	Voltage	V 11	
		Current	A Max 90	
		Speed	rpm Min 3000 Mir 2200	
	Brush length	Standard	mm {in} 17.5 {0.689} 18 {0.71}	
Minimum		mm {in} 12 {0.47} 11 {0.43}		

\*<sup>1</sup> Cold area

\*<sup>2</sup> Standard plug

**H. CLUTCH**

Item	Transmission	R15M-D (R5M-D)
<b>Clutch control</b>		Hydraulic
<b>Clutch pedal</b>		
Type		Suspended
Pedal ratio		6.35
Full stroke		mm {in} 135 {5.32}
Height (with carpet)		mm {in} 165.5-177.0 {6.516-6.968}
Free play		mm {in} 0.6-3.2 {0.02-0.13}
Distance from carpet when clutch is fully disengaged		mm {in} 48 {1.9} min.

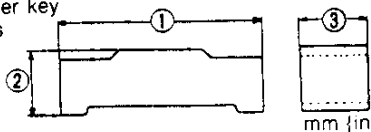
Item		Transmission	R15M-D (R5M-D)
<b>Flywheel</b>			
Runout limit		mm {in}	0.2 {0.008}
<b>Clutch disc</b>			
Type		Single dry-plate	
Runout limit		mm {in}	0.6 {0.024}
Wear limit		mm {in}	0.3 {0.012} from rivet head
Outer diameter		mm {in}	236 {9.29}
Inner diameter		mm {in}	160 {6.30}
Facing thickness	mm {in}	Flywheel side	3.5 {0.14}
		Pressure plate side	3.5 {0.14}
<b>Clutch cover</b>			
Type		Diaphragm spring	
Set load		N {kgf, lbf}	7.220 {736, 1619}
<b>Clutch master cylinder</b>	Inner diameter	mm {in}	15.87 {0.625}
<b>Clutch release cylinder</b>	Inner diameter	mm {in}	19.05 {0.750}
<b>Clutch fluid</b>		FMVSS116 DOT-3	

**J. MANUAL TRANSMISSION (R15M-D)**

Item		Engine	13B
<b>Specifications</b>			
<b>Transmission type</b>		R15M-D (R5M-D)	
<b>Transmission control</b>		Floor shift	
Synchronization mechanism		Forward : Synchromesh Reverse : Synchromesh	
Gear ratio	1st	3.483	
	2nd	2.015	
	3rd	1.391	
	4th	1.000	
	5th	0.719	
	Reverse	3.288	
Final gear ratio		4.100	
Speedometer gear ratio (driven gear/drive gear)		0.304 (23/7)	
Oil	Grade	API service GL-4 or GL-5	
	Viscosity	All-season	SAE 75W-90
		Above 10°C {50°F}	SAE 80W-90
Capacity	L {US qt, Imp qt}	2.5 {2.6, 2.2}	
<b>Runout</b>			
Mainshaft		mm {in}	0.03 {0.0012}
<b>Clearance</b>			
Each gear inner diameter and mainshaft outer diameter		mm {in}	0.15 {0.006}
Each clutch hub sleeve groove and shift fork	mm {in}	Standard	0.2-0.3 {0.008-0.012}
		Maximum	0.5 {0.020}
Reverse idler gear and shaft	mm {in}	Standard	0.02-0.05 {0.0008-0.0020}
		Maximum	0.15 {0.006}
Synchronizer ring (all) and flank surface of gear	mm {in}	Standard	1.5 {0.059}
		Minimum	0.8 {0.031}
Control rod lever and shift rod gate		mm {in}	0.8 {0.031}
<b>Thrust plan</b>			
Synchronizer key and synchronizer ring (4th)	mm {in}	Standard	0.66-2.0 {0.026-0.079}
		Available thrust washer thicknesses	2.5, 3.0, 3.5 {0.098, 0.118, 0.138}

# TECHNICAL DATA

**TD**

Item		Engine	13B
Thrust lock washer and C-washers (5th gear thrust play)	mm {in}	Standard	0.1-0.2 {0.004-0.008}
		Available thrust lock washer thick	6.2, 6.3, 6.4, 6.5, 6.6, 6.7 {0.244, 0.248, 0.252, 0.256, 0.260, 0.264}
C-washers and mainshaft groove	mm {in}	Standard	0-0.1 {0-0.004}
		Available C-washer thick-nesses	2.9, 3.0, 3.1, 3.2 {0.114, 0.118, 0.122, 0.126}
Clutch housing and main drive gear bearing	mm {in}	Standard	0-0.1 {0-0.004}
		Available adjust shim thick-nesses	0.3, 0.4, 0.5, 0.6, 0.7 {0.012, 0.016, 0.020, 0.024, 0.028}
Mainshaft front bearing	mm {in}	Standard	0-0.05 {0-0.002}
		Available adjust shim thick-nesses	0.1, 0.3 {0.004, 0.012}
Countershaft front bearing	mm {in}	Bearing height	0.9-1.0 {0.035-0.039}
		Available adjust shim thick-nesses	0.1, 0.3 {0.004, 0.012}
<b>Reference</b>			
Detent ball spring	Free length	mm {in}	22.5 {0.886}
5th/reverse retaining spring	Free length	mm {in}	73.00 {2.874}
Select lock spindle spring	Free length	mm {in}	43.25 {1.703}
Synchronizer key dimensions		1st and 2nd	① 18.00 {0.709}, ② 5.45 {0.215} ③ 6.00 {0.236}
		3rd, 4th 5th and Reverse	① 17.00 {0.669} ② 4.25 {0.167} ③ 5.00 {0.197}



**K. AUTOMATIC TRANSMISSION**

Item		Transmission		RB4A-EL
Gear ratio		1st		3.027
		2nd		1.619
		3rd		1.000
		O/D		0.694
		Reverse		2.272
Final gear ratio				3.909
Automatic transmission fluid (ATF)	Type	Dexron®II or M-III		
	Capacity	L {US qt, Imp qt}	8.6 {9.1, 7.6}	
Torque converter		Stall torque ratio	2.200	
Number of drive plates / driven plates	Reverse clutch		2/2	
	High clutch		4/7	
	Forward clutch		6/6	
	Overrunning clutch		3/5	
	Low and reverse brake		7/7	
Band servo	mm {in}	Servo piston outer dia. / inner dia.	80.0/50.0 {3.15/1.97}	
		O/D servo piston outer dia.	72.0 {2.83}	
<b>Mechanical system test</b>				
Engine stall speed		rpm	D, S, L, R range	3,000–3,300
Time lag	sec.	N → D range		Approx. below 1.0
		N → R range		Approx. below 1.2
Line pressure kPa {kgf/cm <sup>2</sup> , psi}	D range	Idle	500–520 {5.0–5.4, 72–76}	
		Stall	1,200–1,270 {12.2–13.0, 174–184}	
	S range	Idle	500–520 {5.0–5.4, 72–76}	
		Stall	1,200–1,270 {12.2–13.0, 174–184}	
	L range	Idle	500–520 {5.0–5.4, 72–76}	
		Stall	1,200–1,270 {12.2–13.0, 174–184}	
	R range	Idle	620–650 {6.3–6.7, 90–95}	
		Stall	1,510–1,570 {15.3–16.1, 218–228}	
<b>Shift point km/h {MPH}</b>				
POWER	D range	Fully open	D <sub>1</sub> → D <sub>2</sub>	50–56 {31–35}
			D <sub>2</sub> → D <sub>3</sub>	103–111 {64–69}
			D <sub>3</sub> → O/D	178–188 {111–117}
		Half throttle	D <sub>1</sub> → D <sub>2</sub>	35–41 {22–25}
			D <sub>2</sub> → D <sub>3</sub>	81–93 {50–58}
			D <sub>3</sub> → O/D	126–144 {78–99}
			Lockup ON (D <sub>3</sub> )	94–106 {58–66} (*81–93 {50–58})
		Fully closed	Lockup ON (O/D)	174–192 {108–119} (*126–144 {78–89})
			O/D → D <sub>3</sub>	39–45 {24–28}
			D <sub>3</sub> → D <sub>2</sub>	13–19 {8–12}
		Kickdown (Fully open)	D <sub>2</sub> → D <sub>1</sub>	5–11 {3–7}
			O/D → D <sub>3</sub>	142–152 {88–94}
			D <sub>3</sub> → D <sub>2</sub>	91–99 {57–62}
			D <sub>2</sub> → D <sub>1</sub>	38–44 {24–27}

**Caution**

- Lockup indicates complete lockup.
- \* mark indicates lockup points when the engine coolant temperature is above 115°C {239°F}.

Item		Transmission		RB4A-EL	
NORMAL	D range (A/C ON)	Fully open	D <sub>1</sub> → D <sub>2</sub>	50-56 {31-35}	
			D <sub>2</sub> → D <sub>3</sub>	103-111 {64-69}	
			D <sub>3</sub> → O/D	178-188 {111-117}	
		Half throttle	D <sub>1</sub> → D <sub>2</sub>	32-38 {20-24}	
			D <sub>2</sub> → D <sub>3</sub>	80-92 {50-57}	
			D <sub>3</sub> → O/D	126-144 {78-89}	
		Lockup ON (D <sub>3</sub> )	Lockup ON (D <sub>3</sub> )		94-106 {58-66} (* 80-92 {50-57})
			Lockup ON (O/D)		174-192 {108-119} (*126-144 {78-89})
		Fully closed	O/D → D <sub>3</sub>	39-45 {24-28}	
			D <sub>3</sub> → D <sub>2</sub>	13-19 {8-12}	
			D <sub>2</sub> → D <sub>1</sub>	5-11 {3-7}	
	Kickdown (Fully open)	O/D → D <sub>3</sub>	142-152 {88-94}		
		D <sub>3</sub> → D <sub>2</sub>	91-99 {57-62}		
		D <sub>2</sub> → D <sub>1</sub>	38-44 {24-27}		
	D range (A/C OFF)	Fully open	D <sub>1</sub> → D <sub>2</sub>	50-56 {31-35}	
			D <sub>2</sub> → D <sub>3</sub>	103-111 {64-69}	
			D <sub>3</sub> → O/D	178-188 {111-117}	
		Half throttle	D <sub>1</sub> → D <sub>2</sub>	32-38 {20-24}	
			D <sub>2</sub> → D <sub>3</sub>	80-92 {50-57}	
			D <sub>3</sub> → O/D	126-144 {78-89}	
		Lockup ON (D <sub>3</sub> )	Lockup ON (D <sub>3</sub> )		94-106 {58-66} (*80-92 {50-57})
			Lockup ON (O/D)		174-192 {108-119} (*126-144 {78-89})
Fully closed		O/D → D <sub>3</sub>	35-41 {22-25}		
		D <sub>3</sub> → D <sub>2</sub>	13-19 {8-12}		
		D <sub>2</sub> → D <sub>1</sub>	5-11 {3-7}		
Kickdown (Fully open)	O/D → D <sub>3</sub>	142-152 {88-94}			
	D <sub>3</sub> → D <sub>2</sub>	91-99 {57-62}			
	D <sub>2</sub> → D <sub>1</sub>	38-44 {24-27}			
HOLD	D range	-	O/D → D <sub>3</sub>	180-186 {112-116}	
			D <sub>3</sub> → D <sub>2</sub>	7-13 {4-8}	
			D <sub>2</sub> → D <sub>3</sub>	15-25 {9-16}	
			Lockup ON (D <sub>3</sub> )	94-106 {58-66} (*39-51 {24-32})	
NORMAL	S range	Fully open	S <sub>1</sub> → S <sub>2</sub>	50-56 {31-35}	
			S <sub>2</sub> → S <sub>3</sub>	103-111 {64-69}	
		Half throttle	S <sub>1</sub> → S <sub>2</sub>	35-41 {22-25}	
			S <sub>2</sub> → S <sub>3</sub>	81-93 {50-58}	
		Lockup ON (S <sub>3</sub> )	Lockup ON (S <sub>3</sub> )		94-106 {58-66} (*81-93 {50-58})
		Fully closed	S <sub>3</sub> → S <sub>2</sub>	13-19 {8-12}	
			S <sub>2</sub> → S <sub>1</sub>	5-11 {3-7}	
Kickdown (Fully open)	S <sub>3</sub> → S <sub>2</sub>	91-99 {57-62}			
	S <sub>2</sub> → S <sub>1</sub>	38-44 {24-27}			
HOLD		-	S <sub>3</sub> → S <sub>2</sub>	112-118 {70-73}	

**Caution**

- Lockup indicates complete lockup.
- \* mark indicates lockup points when the engine coolant temperature is above 115°C {239°F}.

Item		Transmission		RB4A-EL
NORMAL	L range	Fully open	$L_1 \rightarrow L_2$	50-56 {31-35}
		Half throttle	$L_1 \rightarrow L_2$	35-41 {22-25}
		Fully closed	$L_2 \rightarrow L_1$	5-11 {3-7}
		Kickdown (Fully open)	$L_2 \rightarrow L_1$	38-44 {24-27}
HOLD	-	$L_2 \rightarrow L_1$	45-51 {28-32}	
<b>Control valve body</b>				
<b>(Upper control valve body)</b>				
Torque converter relief valve spring	mm {in}	Outer diameter		9.2 {0.362}
		Free length		38.3 {1.508}
Pressure regulator valve spring	mm {in}	Outer diameter		14.0 {0.551}
		Free length		29.0 {1.142}
Pressure modifier valve spring*	mm {in}	Outer diameter		(A) 6.8 {0.268} (B) 6.9 {0.272} (C) 6.9 {0.272}
		Free length		(A) 31.95 {1.258} (B) 32.6 {1.283} (C) 32.8 {1.291}
Accumulator control valve spring	mm {in}	Outer diameter		10.5 {0.413}
		Free length		17.0 {0.669}
Shuttle shift valve D spring	mm {in}	Outer diameter		6.0 {0.236}
		Free length		26.5 {1.043}
Shift valve B spring	mm {in}	Outer diameter		7.0 {0.276}
		Free length		25.0 {0.984}
4-2 sequence valve spring	mm {in}	Outer diameter		6.95 {0.274}
		Free length		29.1 {1.146}
Shift valve A spring	mm {in}	Outer diameter		7.0 {0.276}
		Free length		25.0 {0.984}
4-2 relay valve spring	mm {in}	Outer diameter		6.95 {0.274}
		Free length		29.1 {1.146}
Overrunning clutch control valve spring	mm {in}	Outer diameter		7.0 {0.276}
		Free length		23.6 {0.929}
Overrunning clutch reducing valve spring	mm {in}	Outer diameter		7.0 {0.276}
		Free length		32.5 {1.280}
Pilot valve spring	mm {in}	Outer diameter		9.1 {0.358}
		Free length		25.7 {1.012}
Lockup control valve spring	mm {in}	Outer diameter		4.7 {0.185}
		Free length		23.4 {0.921}
Lockup modifier valve spring	mm {in}	Outer diameter		4.2 {0.165}
		Free length		21.5 {0.846}
<b>(Lower control valve body)</b>				
Modifier accumulator valve spring	mm {in}	Outer diameter		9.8 {0.39}
		Free length		30.5 {1.20}
1st reducing valve spring	mm {in}	Outer diameter		6.8 {0.27}
		Free length		25.4 {1.00}
Servo charger valve spring	mm {in}	Outer diameter		6.5 {0.26}
		Free length		33.2 {1.31}

\*: Either A, B, or C type spring is installed at shipment. Only A type spring is available for replacement.

# TECHNICAL DATA

# TD

Item		Transmission	RB4A-EL
<b>Accumulator</b>			
N-D accumulator piston spring	mm {in}	Outer diameter	18.0 {0.71}
		Free length	43.0 {1.69}
1-2 accumulator piston spring	mm {in}	Outer diameter	29.3 {1.16}
		Free length	45.0 {1.77}
2-3 accumulator piston spring	mm {in}	Outer diameter	19.5 {0.768}
		Free length	66.0 {2.60}
3-4 / N-R accumulator piston spring	mm {in}	Outer diameter	18.0 {0.709}
		Free length	43.0 {1.69}
<b>Oil pump</b>			
Cam ring clearance	mm {in}	Standard	0.010–0.024 {0.0004–0.0009}
		Maximum	0.030 {0.0012}
Rotor, vanes, and control piston clearance	mm {in}	Standard	0.030–0.044 {0.0012–0.0017}
		Maximum	0.050 {0.0020}
Seal ring clearance	mm {in}	Standard	0.10–0.25 {0.004–0.010}
		Maximum	0.25 {0.010}
Cam ring spring	mm {in}	Outer diameter	13.7 {0.539}
		Free length	39.8 {1.567}
<b>Reverse clutch</b>			
Clutch clearance	mm {in}	With new drive / driven plates	0.50–0.80 {0.020–0.031}
		With reusing drive / driven plates	0.50–1.20 {0.020–0.047}
Retaining plate size	mm {in}	4.6 {0.181}, 4.8 {0.189}, 5.0 {0.197}, 5.2 {0.205}, 5.4 {0.213}, 5.6 {0.220}, 5.8 {0.228}	
Return spring	mm {in}	Outer diameter	11.6 {0.457}
		Free length	19.69 {0.775}
<b>High clutch</b>			
Clutch clearance	mm {in}	With new drive / driven plates	1.8–2.2 {0.071–0.087}
		With reusing drive / driven plates	1.8–3.0 {0.071–0.118}
Retaining plate size	mm {in}	3.4 {0.134}, 3.6 {0.142}, 3.8 {0.150}, 4.0 {0.157}, 4.2 {0.165}	
Return spring	mm {in}	Outer diameter	11.6 {0.457}
		Free length	22.3 {0.878}
<b>Band servo</b>			
Return spring A	mm {in}	Outer diameter	40.3 {1.59}
		Free length	53.8 {2.12}
Return spring B	mm {in}	Outer diameter	34.3 {1.35}
		Free length	45.6 {1.80}
Return spring C	mm {in}	Outer diameter	27.6 {1.09}
		Free length	29.7 {1.17}

Item		Transmission	RB4A-EL
<b>Forward clutch</b>			
Clutch clearance	mm {in}	With new drive / driven plates	0.45–0.85 {0.018–0.033}
		With reusing drive / driven plates	0.45–1.85 {0.018–0.073}
Retaining plate size		mm {in}	8.0 {0.315}, 8.2 {0.323}, 8.4 {0.331}, 8.6 {0.339}, 8.8 {0.346}, 9.0 {0.354}, 9.2 {0.362}
Return spring	mm {in}	Outer diameter	9.7 {0.38}
		Free length	35.8 {1.41}
<b>Overrunning clutch</b>			
Clutch clearance	mm {in}	With new drive / driven plates	1.0–1.4 {0.039–0.055}
		With reusing drive / driven plates	1.0–2.0 {0.039–0.079}
Retaining plate size		mm {in}	4.0 {0.157}, 4.2 {0.165}, 4.4 {0.173}, 4.6 {0.181}, 4.8 {0.189}, 5.0 {0.197}, 5.2 {0.205}
<b>Low and reverse brake</b>			
Brake clearance	mm {in}	With new drive / driven plates	0.8–1.2 {0.031–0.047}
		With reusing drive / driven plates	0.8–2.6 {0.031–0.102}
Retaining plate size		mm {in}	6.2 {0.244}, 6.4 {0.252}, 6.6 {0.260}, 6.8 {0.268}, 7.0 {0.276}, 7.2 {0.283}, 7.4 {0.291}, 7.6 {0.299}, 7.8 {0.307}, 8.0 {0.315}
Return spring	mm {in}	Outer diameter	11.6 {0.457}
		Free length	22.3 {0.878}
<b>Low one-way clutch inner race</b>			
Seal ring clearance	mm {in}	Standard	0.10–0.25 {0.004–0.010}
		Maximum	0.25 {0.010}
<b>Total end play</b>			
Standard end play		mm {in}	0.25–0.55 {0.010–0.022}
Bearing race size		mm {in}	0.8 {0.031}, 1.0 {0.039}, 1.2 {0.047}, 1.4 {0.055}, 1.6 {0.063}, 1.8 {0.071}, 2.0 {0.079}
<b>Reverse clutch end play</b>			
Standard end play		mm {in}	0.55–0.90 {0.022–0.035}
Thrust washer size		mm {in}	0.7 {0.028}, 0.9 {0.035}, 1.1 {0.043}, 1.3 {0.051}, 1.5 {0.059}, 1.7 {0.067}, 1.9 {0.075}
<b>Torque converter distance (A)</b>			
Torque converter distance (A)		mm {in}	29.0 {1.14} min.

**L. PROPELLER SHAFT**

Item	Transmission model	R15M-D (R5M-D)
Length	mm {in}	863 {33.98}
Outer diameter	mm {in}	75 {3.0}
Max. permissible runout	mm {in}	0.4 {0.02}

**M. FRONT AND REAR AXLES**

Item		Specifications
<b>Drive shaft</b>		
Type	Wheel side	BJ (bell joint)
	Differential side	TJ (Tripod joint)
Outer diameter of large boot end mm {in}	Wheel side	105.3 {4.146}
	Differential side	100.5 {3.957}
Grease amount g {oz}	Wheel side	100-120 {3.53-4.23}
	Differential side	170-190 {6.01-6.70}
Shaft length*	mm {in}	791.2-801.2 {31.15-31.54}
<b>Front axle</b>		
Bearing play axil direction	mm {in}	0.05 {0.002} max.
<b>Rear axle</b>		
Bearing play axil direction	mm {in}	0.05 {0.002} max.
<b>Differential</b>		
Backlash (Ring gear and drive pinion)	mm {in}	0.09-0.11 {0.0035-0.0043}
Drive pinion preload (without oil seal)	N·m {kgf·cm, in·lbf}	1.3-1.7 {13-18, 12-15}
Differential oil	Grade	API Service GL-4 or 5
	Viscosity	Above -18°C {0°F} : SAE 90 Below -18°C {0°F} : SAE 80
	Capacity L {US qt, Imp qt}	1.30 {1.38, 1.14}

\* Before measuring the drive shaft length, lift the boot to equalize the pressure within it.

**N. STEERING SYSTEM**

Item		Specifications
<b>Steering wheel</b>		
Outer diameter	mm {in}	380 {15.0}
Free play	mm {in}	0-30 {0-1.18}
Wheel effort	N {kgf, lbf}	30-38 {3.0-3.9, 6.6-8.5}
Lock-to-lock	turns	2.9
<b>Steering shaft</b>		
Shaft type		Collapsible
Joint type		2-cross joint
<b>Power steering system</b>		
Gear type		Rack and pinion
Gear ratio		∞ (infinite)
Rack stroke	mm {in}	160 {6.30}
Power steering fluid		ATF DEXRON®II or M-III
Fluid capacity	L {US qt, Imp qt}	0.96 {1.01, 0.84}
Fluid pressure	kPa {kgf/cm <sup>2</sup> , psi}	7620-8350 {77.7-85.2, 1110-1210}