Item	Unit	Data	
		DF60T	DF70T/70WT/70WTH

POWERHEAD

Recommended operating range	r/min	4700 – 5300	5200 – 5800
Idle speed	r/min	700 ± 50 (in-gear: approx. 700)	
* Cylinder compression	kPa (kg/cm², psi)	1300 – 1600 (13 – 16, 185 – 228)	
* Cylinder compression difference	kPa (kg/cm², psi)	200 (2.0, 28)	
* Engine oil pressure	kPa (kg/cm², psi)	420 – 490 (4.2 – 4.9, 60 – 70) at 3000 r/min (at normal operating temp.)	
Engine oil		API classification SE, SF, SG, SH, SJ Viscosity rating SAE 10W-40	
Engine oil amounts	L (US/Imp. qt)	4.5 (4.8/4.0): Oil change only 4.8 (5.1/4.2): Oil filter change	
Thermostat operating temperature	°C (°F)	58 – 62 (136 – 144)	

* Figures shown are guidelines only, not absolute service limits.

Item		Unit	Data	
			DF60T	DF70T/70WT/70WTH

CYLINDER HEAD/CAMSHAFT

Cylinder head distortion		Limit	mm (in)	0.05 (0.002)	
Intake manifold seating faces distortion		Limit	mm (in)	0.10 (0.004)	
Cam height	IN	STD	mm (in)	38.061 – 38.221 (1.4985 – 1.5048)	37.631 – 37.791 (1.4815 – 1.4878)
		Limit	mm (in)	37.961 (1.4945)	37.531 (1.4776)
	EX	STD	mm (in)	38.059 – 38.219 (1.4984 – 1.5047)	37.629 – 37.789 (1.4815 – 1.4878)
		Limit	mm (in)	37.959 (1.4944)	37.529 (1.4775)
Camshaft journal oil clearance		STD	mm (in)	0.050 – 0.091 (0.0020 – 0.0036)	
		Limit	mm (in)	0.150 (0.0059)	
Camshaft holder inside diameter	Top	STD	mm (in)	45.000 – 45.016 (1.7717 – 1.7723)	
	2nd	STD	mm (in)	44.800 – 44.816 (1.7638 – 1.7644)	
	3rd	STD	mm (in)	44.600 – 44.616 (1.7559 – 1.7565)	
	4th	STD	mm (in)	44.400 – 44.416 (1.7480 – 1.7487)	
	Bottom	STD	mm (in)	44.200 – 44.216 (1.7402 – 1.7408)	
Camshaft journal outside diameter	Top	STD	mm (in)	44.925 – 44.950 (1.7687 – 1.7697)	
	2nd	STD	mm (in)	44.725 – 44.750 (1.7608 – 1.7618)	
	3rd	STD	mm (in)	44.525 – 44.550 (1.7530 – 1.7539)	
	4th	STD	mm (in)	44.325 – 44.350 (1.7451 – 1.7461)	
	Bottom	STD	mm (in)	44.125 – 44.150 (1.7372 – 1.7382)	
Camshaft runout		Limit	mm (in)	0.10 (0.004)	
Rocker arm shaft to rocker arm clearance		STD	mm (in)	0.012 – 0.045 (0.0005 – 0.0018)	
		Limit	mm (in)	0.090 (0.0035)	
Rocker arm inside diameter		STD	mm (in)	16.000 – 16.018 (0.6299 – 0.6306)	
Rocker arm shaft outside diameter		STD	mm (in)	15.973 – 15.988 (0.6289 – 0.6294)	
Rocker arm shaft runout		Limit	mm (in)	0.12 (0.005)	

Item		Unit	Data	
			DF60T	DF70T/70WT/70WTH

VALVE/VALVE GUIDE

Valve diameter		IN	mm (in)	36 (1.4)
		EX	mm (in)	30 (1.2)
Valve clearance (Cold engine condition)	IN	STD	mm (in)	0.11 – 0.15 (0.004 – 0.006)
	EX	STD	mm (in)	0.13 – 0.17 (0.005 – 0.007)
Valve guide to valve stem clearance	IN	STD	mm (in)	0.020 – 0.050 (0.0008 – 0.0020)
		Limit	mm (in)	0.070 (0.0028)
	EX	STD	mm (in)	0.045 – 0.075 (0.0018 – 0.0030)
		Limit	mm (in)	0.090 (0.0035)
Valve guide inside diameter	IN, EX	STD	mm (in)	7.000 – 7.015 (0.2756 – 0.2762)
Valve guide protrusion	IN, EX	STD	mm (in)	14.0 (0.55)
Valve stem outside diameter	IN	STD	mm (in)	6.965 – 6.980 (0.2742 – 0.2748)
	EX	STD	mm (in)	6.940 – 6.955 (0.2732 – 0.2738)
Valve stem end length	IN, EX	Limit	mm (in)	6.05 (0.238)
Valve stem end deflection	IN	Limit	mm (in)	0.14 (0.006)
	EX	Limit	mm (in)	0.18 (0.007)
Valve stem runout	IN, EX	Limit	mm (in)	0.05 (0.002)
Valve head radial runout	IN, EX	Limit	mm (in)	0.08 (0.003)
Valve head thickness	IN, EX	STD	mm (in)	1.0 (0.04)
	IN	Limit	mm (in)	0.6 (0.02)
	EX	Limit	mm (in)	0.7 (0.03)
Valve seating contact width	IN, EX	STD	mm (in)	1.3 – 1.5 (0.05 – 0.06)
Valve spring free length		STD	mm (in)	49.3 (1.94)
		Limit	mm (in)	48.1 (1.89)
Valve spring tension		STD	N (kg, lbs)	248 – 292 (24.8 – 29.2, 54.7 – 64.3) for 41.5 mm (1.63 in)
		Limit	N (kg, lbs)	228 (22.8, 50.2) for 41.5 mm (1.63 in)
Valve spring squareness		Limit	mm (in)	2.0 (0.08)

Item			Unit	Data	
				DF60T	DF70T/70WT/70WTH

CYLINDER/PISTON/PISTON RING

Cylinder distortion		Limit	mm (in)	0.060 (0.0024)
Piston to cylinder clearance		STD	mm (in)	0.020 – 0.040 (0.0008 – 0.0016)
		Limit	mm (in)	0.100 (0.0039)
Cylinder bore		STD	mm (in)	74.000 – 74.020 (2.9134 – 2.9142)
Cylinder measuring position			mm (in)	50 (2.0) from cylinder top surface
Piston skirt diameter		STD	mm (in)	73.970 – 73.990 (2.9122 – 2.9130)
Piston measuring position			mm (in)	15 (0.6) from piston skirt end
Cylinder bore wear		Limit	mm (in)	0.100 (0.0039)
Piston ring end gap	1st	STD	mm (in)	0.15 – 0.30 (0.006 – 0.012)
		Limit	mm (in)	0.70 (0.028)
	2nd	STD	mm (in)	0.20 – 0.35 (0.008 – 0.014)
		Limit	mm (in)	0.70 (0.028)
Piston ring free end gap	1st	STD	mm (in)	Approx. 7.7 (0.30)
		Limit	mm (in)	6.1 (0.24)
	2nd	STD	mm (in)	Approx. 10.4 (0.41)
		Limit	mm (in)	8.3 (0.33)
Piston ring to groove clearance	1st	STD	mm (in)	0.03 – 0.07 (0.001– 0.003)
		Limit	mm (in)	0.12 (0.005)
	2nd	STD	mm (in)	0.02 – 0.06 (0.001– 0.002)
		Limit	mm (in)	0.10 (0.004)
Piston ring groove width	1st		mm (in)	1.22 – 1.24 (0.048 – 0.049)
	2nd		mm (in)	1.51 – 1.53 (0.059 – 0.060)
	Oil		mm (in)	2.81 – 2.83 (0.111 – 0.112)
Piston ring thickness	1st	STD	mm (in)	1.17 – 1.19 (0.046 – 0.047)
	2nd	STD	mm (in)	1.47 – 1.49 (0.058 – 0.059)
Piston pin oil clearance		STD	mm (in)	0.003 – 0.016 (0.0001 – 0.0006)
		Limit	mm (in)	0.040 (0.0016)
Piston pin outside diameter		STD	mm (in)	16.995 – 17.000 (0.6691 – 0.6693)
Piston pin hole diameter		STD	mm (in)	17.003 – 17.011 (0.6694 – 0.6697)

Item		Unit	Data	
			DF60T	DF70T/70WT/70WTH

CRANKSHAFT/CONROD

Conrod small end inside diameter	STD	mm (in)	16.968 – 16.979 (0.6680 – 0.6685)
Conrod big end oil clearance	STD	mm (in)	0.020 – 0.050 (0.0008 – 0.0020)
	Limit	mm (in)	0.080 (0.0031)
Conrod big end inside diameter	STD	mm (in)	45.000 – 45.018 (1.7717 – 1.7724)
Crank pin outside diameter	STD	mm (in)	41.982 – 42.000 (1.6528 – 1.6535)
Crank pin outside diameter difference (out-of-round and taper)	Limit	mm (in)	0.010 (0.0004)
Conrod bearing thickness	STD	mm (in)	1.484 – 1.502 (0.0584 – 0.0591)
Conrod big end side clearance	STD	mm (in)	0.10 – 0.25 (0.004 – 0.010)
	Limit	mm (in)	0.35 (0.014)
Conrod big end width	STD	mm (in)	21.95 – 22.00 (0.864 – 0.866)
Crank pin width	STD	mm (in)	22.10 – 22.20 (0.870 – 0.874)
Crankshaft center journal runout	Limit	mm (in)	0.06 (0.002)
Crankshaft journal oil clearance	STD	mm (in)	0.016 – 0.036 (0.0006 – 0.0014)
	Limit	mm (in)	0.060 (0.0024)
Crankcase bearing holder inside diameter	STD	mm (in)	56.000 – 56.018 (2.2047 – 2.2054)
Crankshaft journal outside diameter	STD	mm (in)	51.982 – 52.000 (2.0465 – 2.0472)
Crankshaft journal outside diameter difference (out-of-round and taper)	Limit	mm (in)	0.010 (0.0004)
Crankshaft bearing thickness	STD	mm (in)	1.998 – 2.014 (0.0787 – 0.0793)
Crankshaft thrust clearance	STD	mm (in)	0.11 – 0.31 (0.004 – 0.012)
	Limit	mm (in)	0.38 (0.015)
Crankshaft thrust bearing thickness	STD	mm (in)	2.47 – 2.52 (0.097 – 0.099)

Item	Unit	Data	
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LOWER UNIT

Design specification thickness for shim & washer

Pinion gear back-up shim	mm (in)	1.00 (0.039)
Forward gear back-up shim	mm (in)	1.00 (0.039)
Forward gear thrust washer	mm (in)	3.0 (0.12)
Reverse gear thrust washer	mm (in)	2.2 (0.09)
Reverse gear back-up shim	mm (in)	1.5 (0.06)

ELECTRICAL

Ignition timing		Degrees	BTDC 4 – BTDC 33	BTDC 4 – BTDC 29
Over revolution limiter		r/min	6500	
CKP sensor resistance		Ω at 20 °C	—	
CMP sensor resistance		Ω at 20 °C	168 – 252	
Ignition coil resistance	Primary	Ω at 20 °C	1.9 – 2.5	
	Secondary	kΩ at 20 °C	No. 2 – No. 3: 15 – 26 (including H.T. cord and spark plug cap) No. 1 – No. 4: 16 – 28 (including H.T. cord and spark plug cap)	
High tension cord resistance		kΩ/m at 20 °C	Approx. 16	
Battery charge coil resistance		Ω at 20 °C	0.3 – 0.5	
Battery charge coil output (12 V)		Watt	300	
Standard spark plug	Type	NGK	BPR6ES	
	Gap	mm (in)	0.7 – 0.8 (0.028 – 0.031)	
Fuse amp. rating		A	Main fuse: 30	
Recommended battery capacity (12 V)		Ah (kC)	100 (360) or larger	
Fuel injector resistance		Ω at 20 °C	11.0 – 16.6	
IAC valve resistance		Ω at 20 °C	4.8 – 7.2	
IAT sensor/Cylinder temp. sensor/Ex-mani. temp. sensor (Thermistor characteristic)		kΩ at 25 °C	1.8 – 2.3	
ECM main relay resistance		Ω at 20 °C	145 – 190	
Starter motor relay resistance		Ω at 20 °C	3.5 – 5.1	
PTT motor relay resistance		Ω at 20 °C	3.0 – 4.5	

Item		Unit	Data	
			DF60T	DF70T/70WT/70WTH

STARTER MOTOR

Max. continuous time of use		Sec	30
Motor output		kW	0.9
Brush length	STD	mm (in)	17.0 (0.67)
	Limit	mm (in)	10.0 (0.39)
Commutator undercut	STD	mm (in)	0.5 – 0.8 (0.02 – 0.03)
	Limit	mm (in)	0.2 (0.01)
Commutator outside diameter	STD	mm (in)	33.0 (1.30)
	Limit	mm (in)	32.0 (1.26)
Commutator outside diameter difference	STD	mm (in)	0.05 (0.002)
	Limit	mm (in)	0.40 (0.016)
Pinion to ring gear gap	STD	mm (in)	3.0 – 5.0 (0.12 – 0.20)

PTT MOTOR

Brush length	STD	mm (in)	9.8 (0.39)
	Limit	mm (in)	5.5 (0.22)
Commutactor out-side diameter	STD	mm (in)	22.0 (0.87)
	Limit	mm (in)	21.0 (0.83)

SELF-DIAGNOSTIC SYSTEM INDICATION

When the abnormality occurs in a signal from sensor, switch etc., the “CHECK ENGINE” lamp on the monitor-tachometer flashes (lights intermittently) according to the each code pattern with buzzer sounding.

PRIORITY	FAILED ITEM	CODE	LAMP FLASHING PATTERN	FAIL-SAFE SYSTEM ACTIVATING
1	MAP sensor 1	3 - 4		YES
2	CKP sensor	4 - 2		YES
3	IAC valve/By-pass air screw adjustment	3 - 1		NO
4	CMP sensor	2 - 4		YES
5	CTP switch	2 - 2		NO
6	Cylinder temp. sensor	1 - 4		YES
7	IAT sensor	2 - 3		YES
8	MAP sensor 2 (Sensor hose)	3 - 2		NO
9	Rectifier & regulator (Over-charging)	1 - 1		NO
10	Exhaust manifold temp. sensor	1 - 5		YES
11	Fuel injector (Open circuit)	4 - 3		NO

NOTE:

- *If more than two items fail at once, the self-diagnostic indication appears according to priority order. The indication repeats three times.*
- *On the tiller handle (TH) model, alerts is signaled by a sound from the caution buzzer contained in the tiller handle.*