SUZUKI OUTBOARD MOTOR

DF90
DF115 FOUR STROKE

For '02 model

SUPPLEMENTARY SERVICE MANUAL

99501-90J00-01E

DF90/115 “K2” (2002) MODEL

FOREWORD

This supplementary service manual describes the outline, technical data and servicing procedures for the “K2” (2002) models outboard motor.
Please read and thoroughly familiarize yourself with this information before using it for your service activities.

NOTE:
Use this supplement with the following service manual:
DF90/115 Service Manual (P/no, 99500-90J0 • -01E)

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*SPECIFICATIONS

* These specifications are subject to change without notice.

Item	Unit	Data	
		DF90T	DF115T
PRE-FIX		09001F	11501F

DIMENSIONS & WEIGHT

Overall length (front to back)		mm (in.)	779 (30.7)
Overall width (side to side)		mm (in.)	481 (18.9)
Overall height	L	mm (in.)	1556 (61.3)
	UL	mm (in.)	1683 (66.3)
Weight (without engine oil)	L	kg (lbs.)	189.0 (416)
	UL	kg (lbs.)	194.0 (427)
Transom height	L	mm (in. type)	539 (20)
	UL	mm (in. type)	666 (25)

PERFORMANCE

Maximum output	kW (PS)	66.2 (90)	84.6 (115)
Recommended operating range	r/min.	4500 – 5500	5000 – 6000
Idle speed	r/min.	625 ± 25 (in-gear : approx. 625)	

POWERHEAD

Engine type		4-stroke DOHC
Number of cylinders		4
Bore	mm (in.)	84.0 (3.31)
Stroke	mm (in.)	88.0 (3.46)
Total displacement	cm^3 (cu in.)	1950 (119.0)
Compression ratio	: 1	9.8
Spark plug	NGK	BKR6E
Ignition system		Full-transistorized ignition
Fuel supply system		Multi-point sequential electronic fuel injection
Exhaust system		Through prop exhaust
Cooling system		Water cooled
Lubrication system		Wet sump by trochoid pump
Starting system		Electric
Throttle control		Remote control

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FUEL & OIL

Fuel		Suzuki highly recommends that you use alcohol-free unleaded gasoline with a minimum pump octane rating of 87 ($\frac{R+M}{2}$ method) or 91 (Research method). However, blends of unleaded gasoline and alcohol with equivalent octane content may be used.
Engine oil		API classification SE, SF, SG, SH, SJ Viscosity rating 10W-40
Engine oil amounts	L (US/Imp. qt)	5.5 (5.8 / 4.8) : Oil change only 5.7 (6.0 / 5.0) : Oil filter change
Gear oil		SUZUKI Outboard Motor Gear Oil (SAE #90 hypoid gear oil)
Gearcase oil capacity	ml (US/Imp. oz)	1050 (35.5 / 37.0)

BRACKET

Trim angle		PTT system
Number of trim position		PTT system
Maximum tilt angle	degree	75

LOWER UNIT

Reversing system	Gear
Transmission	Forward-Neutral-Reverse
Reduction system	Bevel gear
Gear ratio	12 : 25 (2.08)
Drive line impact protection	Spline drive rubber hub
Propeller	Blade × Diam. (in.) × Pitch (in.)
	3 × 14 × 17 3 × 14 × 19 3 × 14 × 21 3 × 14 × 23

REDUCTION SYSTEM

1st reduction gear ratio (Crankshaft drive gear: Driven gear)	29 : 36 (1.24)
2nd reduction gear ratio (Lower unit gear)	12 : 25 (2.08)
Total reduction gear ratio	$2.59\left(\frac{36}{29}\times\frac{25}{12}\right)$

*SERVICE DATA

* These service data are subject to change without notice.

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POWERHEAD

Recommended operating range	r/min	4500 – 5500	5000 – 6000
Idle speed	r/min	625 ± 25 (in-gear : approx. 625)	
**Cylinder compression	kPa (kg/cm², psi)	1300 – 1700 (13 – 17, 185 – 242)	
**Cylinder compression max. difference between any two cylinders	kPa (kg/cm², psi)	100 (1.0, 14)	
**Engine oil pressure	kPa (kg/cm², psi)	550 – 600 (5.5 – 6.0, 78 – 85) 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)	5.5 (5.8 / 4.8) : Oil change only 5.7 (6.0 / 5.0) : Oil filter change	
Thermostat operating temperature	°C (°F)	58 – 62 (136 – 144)	

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

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CYLINDER HEAD / CAMSHAFT

Cylinder head distortion		Limit	mm (in)	0.05 (0.002)	
Manifold seating faces distortion		Limit	mm (in)	0.10 (0.004)	
Cam height	IN	STD	mm (in)	37.320 – 37.480 (1.4693 – 1.4756)	39.220 – 39.380 (1.5441 – 1.5504)
		Limit	mm (in)	37.220 (1.4654)	39.120 (1.5402)
	EX	STD	mm (in)	37.030 – 37.190 (1.4579 – 1.4642)	39.040 – 39.200 (1.5370 – 1.5433)
		Limit	mm (in)	36.930 (1.4539)	38.940 (1.5330)
Camshaft journal oil clearance	Top, 2nd, 3rd, 4th	STD	mm (in)	0.020 – 0.062 (0.0008 – 0.0024)	
		Limit	mm (in)	0.120 (0.0047)	
	5th	STD	mm (in)	0.045 – 0.087 (0.0018 – 0.0034)	
		Limit	mm (in)	0.120 (0.0047)	
Camshaft journal (housing) inside diameter	Top, 2nd, 3rd, 4th	STD	mm (in)	23.000 – 23.021 (0.9055 – 0.9063)	
		Limit	mm (in)	23.171 (0.9122)	
	5th	STD	mm (in)	26.000 – 26.021 (1.0236 – 1.0244)	
		Limit	mm (in)	26.171 (1.0304)	
Camshaft journal outside diameter	Top, 2nd, 3rd, 4th	STD	mm (in)	22.959 – 22.980 (0.9039 – 0.9047)	
		Limit	mm (in)	22.869 (0.9004)	
	5th	STD	mm (in)	25.934 – 25.955 (1.0210 – 1.0219)	
		Limit	mm (in)	25.844 (1.0175)	
Camshaft runout		Limit	mm (in)	0.10 (0.004)	
Cylinder head bore to tappet clearance		STD	mm (in)	0.025 – 0.066 (0.0010 – 0.0026)	
		Limit	mm (in)	0.150 (0.0059)	
Tappet outer diameter		STD	mm (in)	30.959 – 30.975 (1.2189 – 1.2195)	
Cylinder head bore		STD	mm (in)	31.000 – 31.025 (1.2203 – 1.2215)	

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VALVE / VALVE GUIDE

Valve diameter		IN	mm (in)	33 (1.3)
		EX	mm (in)	28 (1.1)
Tappet clearance (Cold engine condition)	IN	STD	mm (in)	0.23 – 0.27 (0.009 – 0.011)
	EX	STD	mm (in)	0.23 – 0.27 (0.009 – 0.011)
Valve seat angle	IN		——	15°, 45°, 60°
	EX		——	15°, 45°
Valve guide to valve stem clearance	IN	STD	mm (in)	0.020 – 0.047 (0.0008 – 0.0019)
		Limit	mm (in)	0.070 (0.0028)
	EX	STD	mm (in)	0.045 – 0.072 (0.0018 – 0.0028)
		Limit	mm (in)	0.090 (0.0035)
Valve guide inside diameter	IN,EX	STD	mm (in)	6.000 – 6.012 (0.2362 – 0.2367)
Valve guide protrusion	IN,EX	STD	mm (in)	13.5 (0.53)
Valve stem outside diameter	IN	STD	mm (in)	5.965 – 5.980 (0.2348 – 0.2354)
	EX	STD	mm (in)	5.940 – 5.955 (0.2339 – 0.2344)
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	STD	mm (in)	1.0 (0.04)
		Limit	mm (in)	0.7 (0.03)
	EX	STD	mm (in)	1.20 (0.05)
		Limit	mm (in)	0.7 (0.03)
Valve seat contact width	IN	STD	mm (in)	1.1 – 1.3 (0.04 – 0.05)
	EX	STD	mm (in)	1.1 – 1.3 (0.04 – 0.05)
Valve spring free length		STD	mm (in)	42.7 (1.68)
		Limit	mm (in)	41.0 (1.61)
Valve spring tension		STD	N (kg, lbs)	167 – 193 (16.7 – 19.3, 36.8 – 42.5) for 32.6 mm (1.28 in)
		Limit	N (kg, lbs)	151 (15.1, 33.3) for 32.6 mm (1.28 in)
Valve spring squareness		Limit	mm (in)	2.0 (0.08)

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CYLINDER / PISTON / PISTON RING

Cylinder distortion		Limit	mm (in)	0.05 (0.002)
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)	84.000 – 84.020 (3.3071 – 3.3079)
Cylinder measuring position			mm (in)	50 (2.0) from cylinder top surface
Piston skirt diameter		STD	mm (in)	83.970 – 83.990 (3.3059 – 3.3067)
Piston measuring position			mm (in)	26.5 (1.04) from piston skirt end.
Cylinder bore wear		Limit	mm (in)	0.10 (0.039)
Piston ring end gap	1st	STD	mm (in)	0.20 – 0.35 (0.008 – 0.014)
		Limit	mm (in)	0.70 (0.028)
	2nd	STD	mm (in)	0.35 – 0.50 (0.014 – 0.020)
		Limit	mm (in)	1.00 (0.039)
Piston ring free end gap	1st	STD	mm (in)	Approx. 11.3 (0.44)
		Limit	mm (in)	9.0 (0.354)
	2nd	STD	mm (in)	Approx. 11.0 (0.43)
		Limit	mm (in)	8.8 (0.347)
Piston ring to groove clearance	1st	STD	mm (in)	0.030 – 0.070 (0.0012 – 0.0028)
		Limit	mm (in)	0.12 (0.005)
	2nd	STD	mm (in)	0.020 – 0.060 (0.0008 – 0.0024)
		Limit	mm (in)	0.10 (0.004)
Piston ring groove width	1st	STD	mm (in)	1.22 – 1.24 (0.048 – 0.049)
	2nd	STD	mm (in)	1.51 – 1.53 (0.059 – 0.060)
	Oil	STD	mm (in)	2.51 – 2.53 (0.099 – 0.100)
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)
Pin clearance in piston pin hole		STD	mm (in)	0.006 – 0.017 (0.0002 – 0.0007)
		Limit	mm (in)	0.040 (0.0016)
Piston pin outside diameter		STD	mm (in)	20.997 – 21.000 (0.8267 – 0.8268)
		Limit	mm (in)	20.980 (0.8260)
Piston pin hole diameter		STD	mm (in)	21.006 – 21.014 (0.8270 – 0.8273)
		Limit	mm (in)	21.040 (0.8283)
Pin clearance in conrod small end		STD	mm (in)	0.003 – 0.014 (0.0001 – 0.0006)
		Limit	mm (in)	0.050 (0.0020)
Conrod small end bore		STD	mm (in)	21.003 – 21.011 (0.8269 – 0.8272)

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CRANKSHAFT / CONROD

Conrod small end inside diameter	STD	mm (in)	21.003 – 21.011 (0.8269 – 0.8272)
Conrod big end oil clearance	STD	mm (in)	0.020 – 0.040 (0.0008 – 0.0016)
	Limit	mm (in)	0.065 (0.0026)
Conrod big end inside diameter	STD	mm (in)	47.000 – 47.018 (1.8504 – 1.8511)
Crank pin outside diameter	STD	mm (in)	43.982 – 44.000 (1.7316 – 1.7323)
Crank pin outside diameter difference (out of round and aper)	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)	0.100 – 0.250 (0.0039 – 0.0098)
	Limit	mm (in)	0.350 (0.0138)
Conrod big end width	STD	mm (in)	21.950 – 22.000 (0.8642 – 0.8661)
Crank pin width	STD	mm (in)	22.100 – 22.200 (0.8700 – 0.8740)
Crankshaft center journal runout	Limit	mm (in)	0.04 (0.002)
Crankshaft journal oil clearance	STD	mm (in)	0.020 – 0.040 (0.0008 – 0.0016)
	Limit	mm (in)	0.065 (0.0026)
Crankcase bearing holder inside diameter	STD	mm (in)	62.000 – 62.018 (2.4409 – 2.4417)
Crankshaft journal outside diameter	STD	mm (in)	57.994 – 58.012 (2.2832 – 2.2839)
Crankshaft journal outside diameter difference (out of round and taper)	Limit	mm (in)	0.010 (0.0004)
Crankshaft bearing thickness	STD	mm (in)	1.990 – 2.006 (0.0783 – 0.0790)
Crankshaft thrust play	STD	mm (in)	0.11 – 0.31 (0.004 – 0.012)
	Limit	mm (in)	0.35 (0.014)
Crankshaft thrust bearing thickness	STD	mm (in)	2.425 – 2.475 (0.0955 – 0.0974)

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ELECTRICAL

** New "K2" service data

Ignition timing		Degrees at r/min	BTDC 1° – BTDC 44°	BTDC 3° – BTDC 44°
Over revolution limiter		r/min	**6200	
CKP sensor resistance		Ω at 20°C	168 – 252	
CMP sensor resistance		Ω at 20°C	——	
Ignition coil resistance	Primary	Ω at 20°C	1.9 – 2.5	
	Secondary	kΩ at 20°C	No.2–No.3 : 18–34 (including H.T.cord and spark plug cap) No.1–No.4 : 19–36 (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	0.16 – 0.24	
Battery charge coil output (12V)		Watt	480	
Standard spark plug	Type	NGK	BKR6E	
	Gap	mm (in)	0.7 – 0.8 (0.028 – 0.031)	
Fuse amp. rating		A	Main fuse : 60 Sub fuse : 30	
Recommended battery capacity (12V)		Ah (kC)	100 (360) or larger	
Fuel injector resistance		Ω at 20°C	11.0 – 16.5	
IAC valve resistance		Ω at 20°C	8 – 12	
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	80 – 120	
Starter relay coil resistance		Ω at 20°C	80 – 120	
PTT motor relay coil resistance		Ω at 20°C	3.0 – 4.5	

STARTER MOTOR

Max. continuous time of use		Sec	30
Motor output		kW	1.4
Brush length	STD	mm (in)	16.0 (0.63)
	Limit	mm (in)	12.0 (0.47)
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)	29.0 (1.14)
	Limit	mm (in)	28.0 (1.10)
Commutator outside diameter difference	STD	mm (in)	0.05 (0.002)
	Limit	mm (in)	0.40 (0.016)