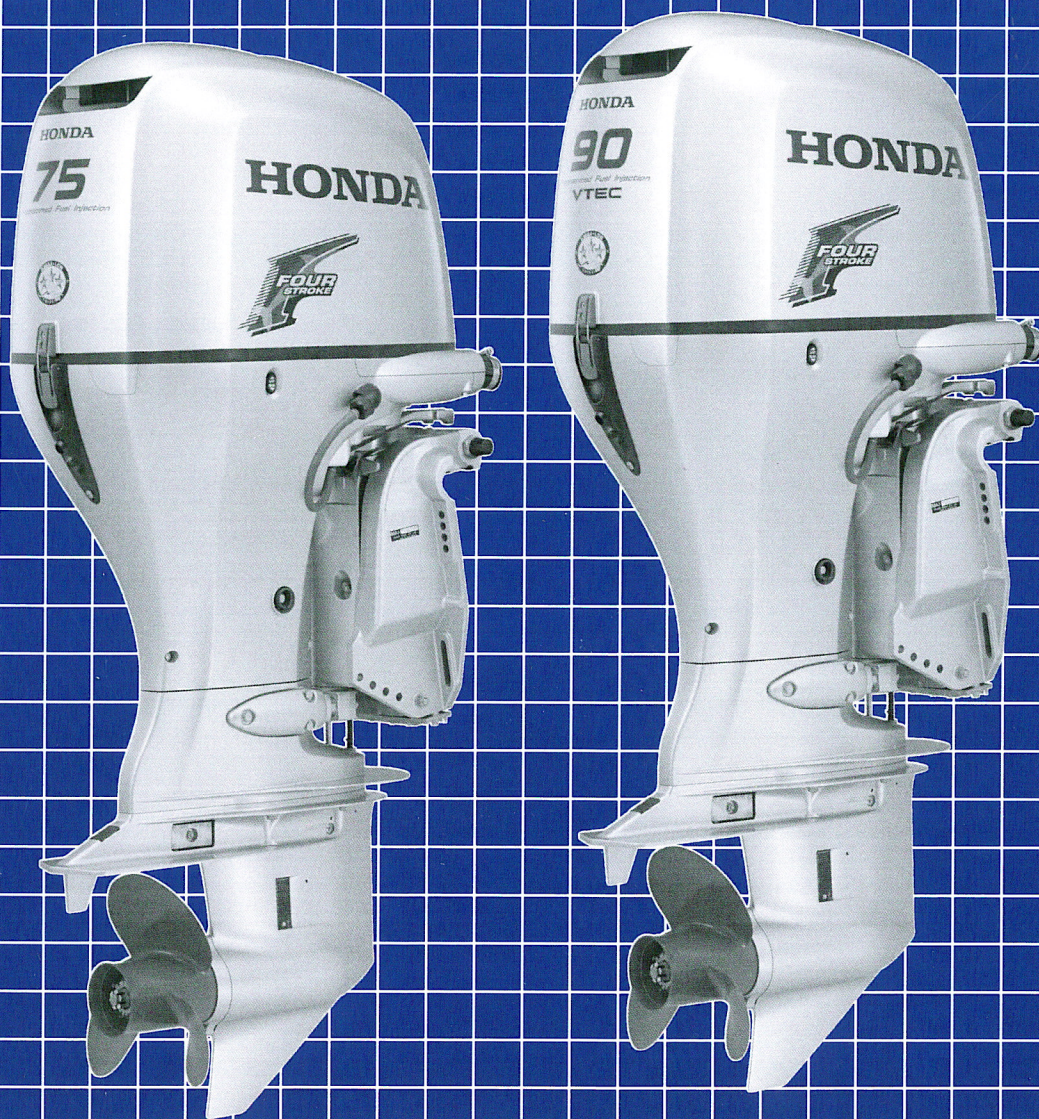


HONDA
MARINE

SHOP MANUAL

BF75D • BF90D



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SECOND EDITION

How to use this manual

A Few Words About Safety

SERVICE INFORMATION

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you and/or others. It could also damage this Honda product or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of special tools. Any person who intends to use a replacement part, service procedure, or a tool that is not recommended by Honda must determine the risks to their personal safety and the safe operation of this product.

If you need to replace a part, use Honda Genuine parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of this product. Any error or oversight while servicing this product can result in faulty operation, damage to the product, or injury to others.

⚠ WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts-wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practices, we recommend that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

⚠ WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles, or face shields anytime you hammer, drill, grind, or work around pressurized air, pressurized liquids, springs, or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have equipment hoisted in the air. Anytime you lift this product with a hoist, make sure that the hoist hook is securely attached to the product.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers, and clothing are out of the way.

Gasoline vapors and hydrogen gasses from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
 - Never store gasoline in an open container.
 - Keep all cigarettes, sparks, and flames away from the battery and all fuel-related parts.
-

Abbreviations

ACG	Alternator
API	American Petroleum Institute
Approx.	Approximately
Assy.	Assembly
ATDC	After Top Dead Center
ATF	Automatic Transmission Fluid
ATT	Attachment
BAT	Battery
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BARO	Barometric Pressure
CKP	Crankshaft Position
Comp.	Complete
CMP	Camshaft Position
CYL	Cylinder
DLC	Data Link Connector
EBT	Engine Block Temperature
ECT	Engine Coolant Temperature
ECM	Engine Control Module
EOP	Engine Oil Pressure
EX	Exhaust
F	Front or Forward
GND	Ground
HO2S	Heated Oxygen Sensor
IAC	Idle Air Control
IAT	Intake Air Temperature
I.D.	Inside Diameter
IG or IGN	Ignition
IN	Intake
INJ	Injection
L.	Left
MAP	Manifold Absolute Pressure
MIL	Malfunction Indicator Lamp
O.D.	Outside Diameter
OP	Optional Part
PGM-FI	Programmed-Fuel Injection
P/N	Part Number
Qty	Quantity
R.	Right
SAE	Society of Automotive Engineers
SCS	Service Check Signal
STD	Standard
SW	Switch
TDC	Top Dead Center
TP	Throttle Position

Bl	Black	G	Green	Br	Brown	Lg	Light green
Y	Yellow	R	Red	O	Orange	P	Pink
Bu	Blue	W	White	Lb	Light blue	Gr	Gray

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1. SPECIFICATIONS

• DIMENSIONS AND WEIGHTS

Model	BF75D	
Description code	BBAJ	
Types	LRT	LHT
Overall length	746 mm (29.4 in)	904 mm (35.6 in)
Overall width	449 mm (17.7 in)	646 mm (25.4 in)
Overall height	1,566 mm (61.7 in)	
Dry weight (*1)	165 kg (364 lbs)	171 kg (377 lbs)
Operating weight (including oil)	170 kg (375 lbs)	176 kg (388 lbs)

*1: With propeller mounted.

Model	BF90D		
Description code	BBCJ		
Types	LRT	XRT	LHT
Overall length	746 mm (29.4 in)		904 mm (35.6 in)
Overall width	449 mm (17.7 in)		646 mm (25.4 in)
Overall height	1,566 mm (61.7 in)	1,693 mm (66.7 in)	1,566 mm (61.7 in)
Dry weight (*1)	166 kg (366 lbs)	172 kg (380 lbs)	
Operating weight (including oil)	171 kg (377 lbs)	177 kg (390 lbs)	

*1: With propeller mounted.

• FRAME

Model	BF75D•BF90D		
Types	LRT	XRT (*3)	LHT
Transom height (*2)	537 mm (21.1 in)	664 mm (26.2 in)	537 mm (21.1 in)
Tilting angle (*2)	68°		
Tilting stage	Stageless		
Swivel angle	30° right and left		
Trim angle (*2)	- 4° to 16°		

*2: Transom angle is at 12°.

*3: BF90D only

• TYPES OF Honda BF75D•BF90D OUTBOARD MOTORS

It may be necessary to refer to this chart for reference purposes when reading this manual.

Models	BF75D•BF90D		
	LRT	XRT (*1)	LHT
Types	L	XL	L
Shaft length type	L	XL	L
Remote control box	(○)	(○)	
Tiller handle			○
Power trim/tilt	○	○	○

L: Long shaft XL: Extra-long shaft (○): Optional part

*1: BF90D only

BF75D•BF90D

• ENGINE

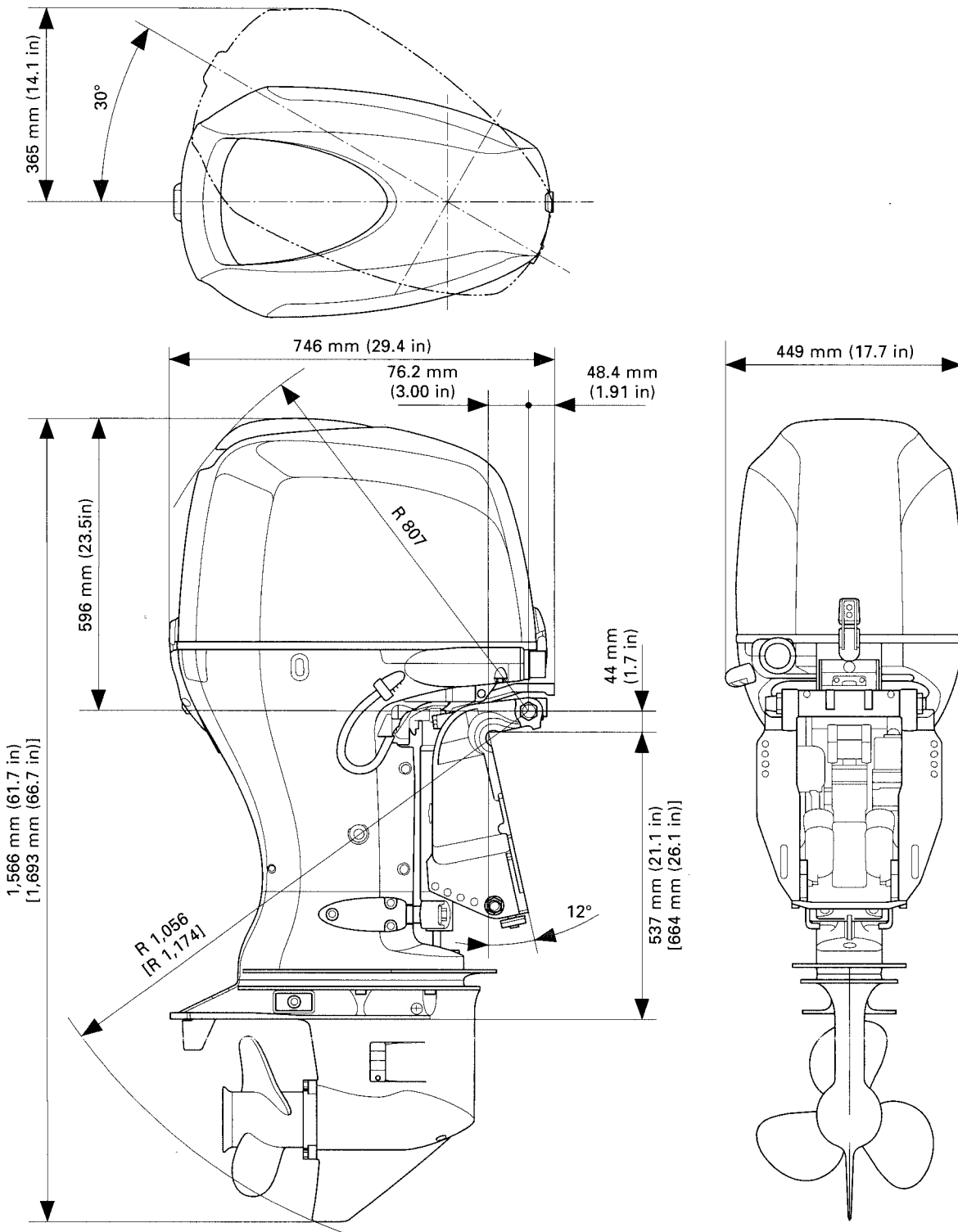
Model	BF75D	BF90D
Description code	BEBAJ	BEBCJ
Type	4-stroke, S.O.H.C., 4-cylinder	4-stroke, S.O.H.C., VTEC, 4-cylinder
Displacement	1,497 cm ³ (91.3 cu-in)	
Bore x stroke	73.0 x 89.4 mm (2.87 x 3.52 in)	
Rated power	55.9 kW (75 HP) at 5,500 min ⁻¹ (rpm)	67.1 kW (90 HP) at 5,800 min ⁻¹ (rpm)
Maximum torque	118 N·m (12.0 kgf·m, 87 lbf·ft) at 4,000 min ⁻¹ (rpm)	123 N·m (12.5 kgf·m, 91 lbf·ft) at 4,500 min ⁻¹ (rpm)
Compression ratio	9.7 : 1	
Fuel consumption ratio	340 g/kW·h (250 g/HP·h, 0.395 lb/HP·h)	350 g/kW·h (257 g/HP·h, 0.575 lb/HP·h)
Cooling system	Forced water circulation by impeller pump with thermostat	
Ignition system	Full transistorized, battery ignition	
Ignition timing	2.4° at 750 min ⁻¹ (rpm) A.T.D.C.	
Spark plug	IZFR6K-11E (NGK)	
Fuel supply system	Programmed fuel injection	
Fuel injection system	Electronic control	
Fuel injection nozzle	Multi-point type	
Fuel pipe	Rubber tubes, resin and steel pipe	
Lubrication system	Pressure lubrication by trochoid pump	
Lubrication capacity	4.7 ℓ (5.0 US qt, 4.1 Imp qt) [with oil filter replacement: 4.4 ℓ (4.6 US qt, 3.9 Imp qt)] [without oil filter replacement: 4.2 ℓ (4.4 US qt, 3.7 Imp qt)]	
Starting system	Electric starter	
Stopping system	Ignition primary circuit open	
Fuel used	Unleaded gasoline with a pump octane number 86 or higher	
Fuel pump	Electric and mechanical plunger type	
Exhaust system	Underwater type	
Recommended oil	SAE 10W-30	

• LOWER UNIT

Clutch	Dog clutch (Forward – Neutral – Reverse)
Gear ratio	2.33 (28/12)
Reduction	Spiral bevel
Gear case oil capacity	0.95 ℓ (1.00 US qt, 0.84 Imp qt)
Recommended gear oil	MARINE SAE 90 Hypoid gear oil API Service classification (GL-4)
Propeller rotating direction	Clockwise (viewed from rear)
Propeller driving system	Spline

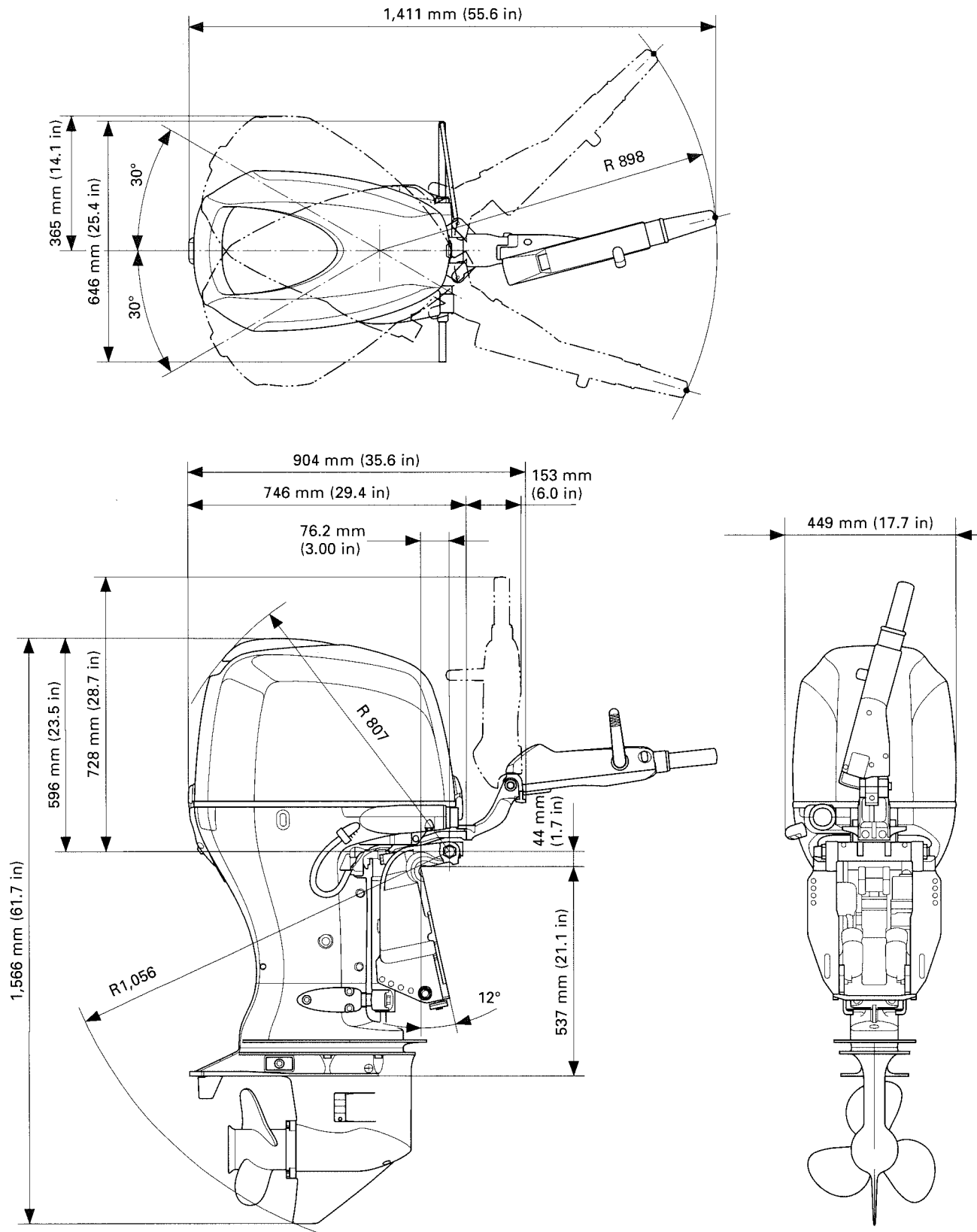
2. DIMENSIONAL DRAWINGS

- LRT and XRT types only
- []: Extra-long shaft type

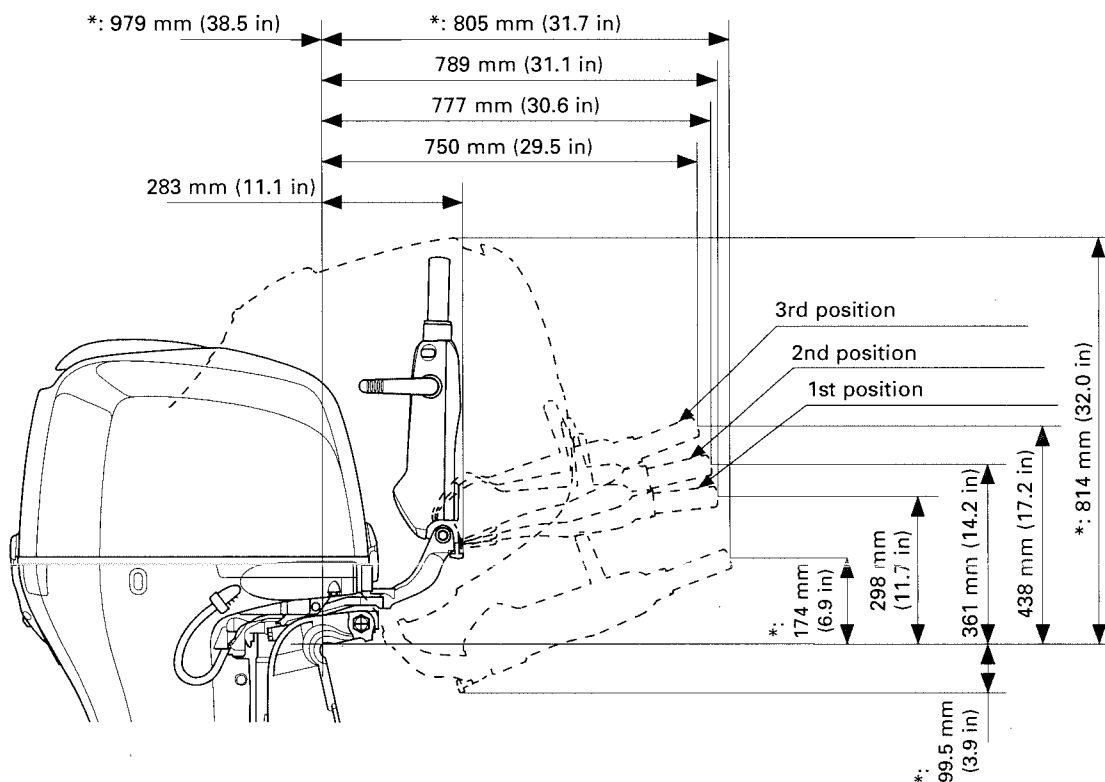
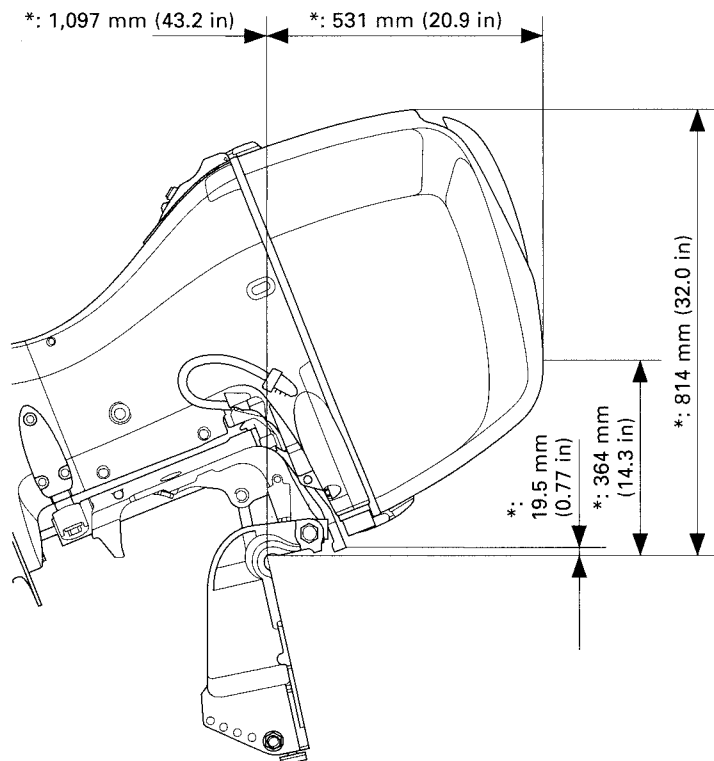


BF75D·BF90D

• LHT type only

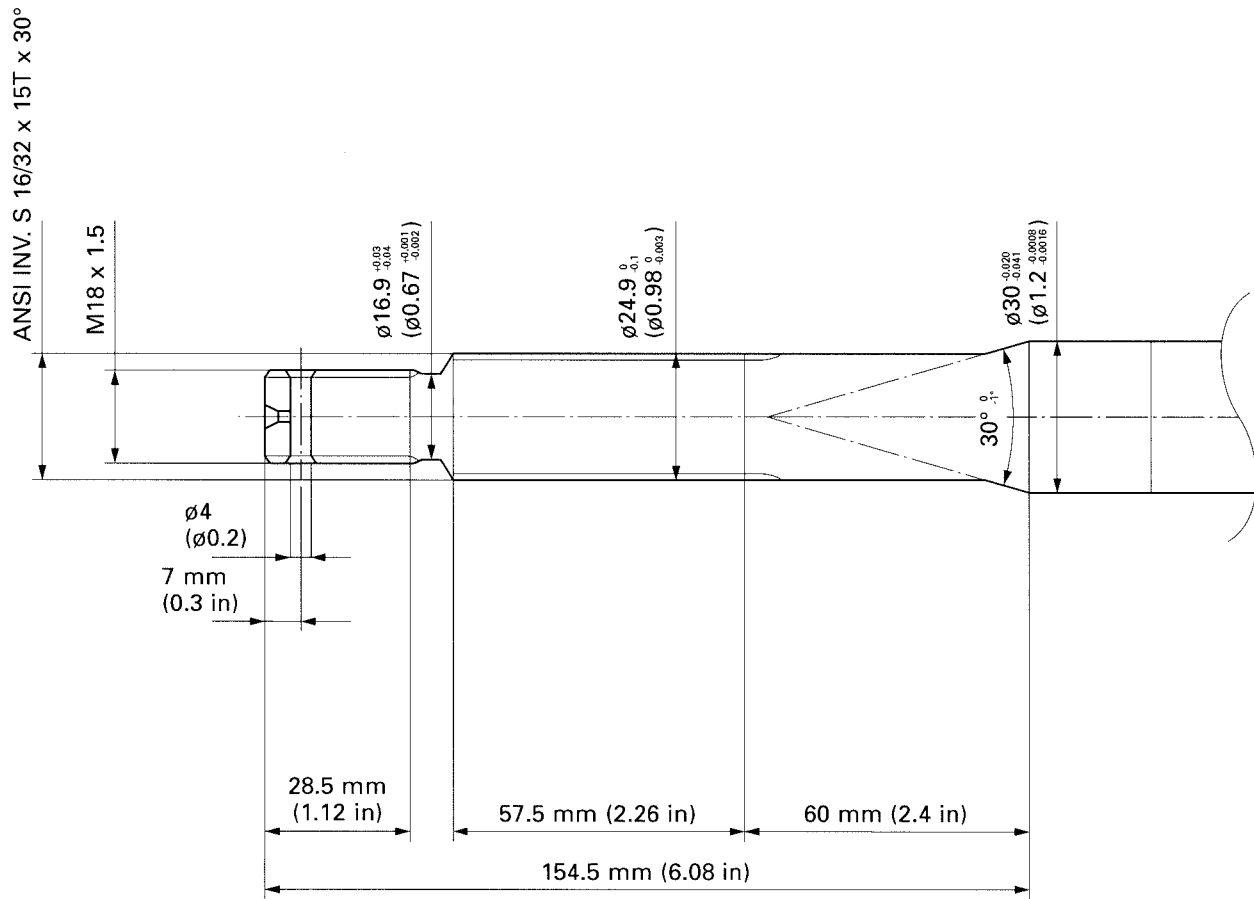


*: At 68° tilt up:



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• PROPELLER SHAFT



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1. SYMBOLS USED IN THIS MANUAL

As you read this manual, you may find the following symbols with the instructions.



A special tool is required to perform the procedure.

(Commercially available)

Commercially available tools are distinguished by the words (commercially available). They are not available through the American Honda Parts Department. Most commercially available tools shown in this shop manual can be ordered through the Tool and Equipment program by calling (888) 424-6857. Refer to the Tool and Equipment program catalog for a complete tool listing.



Apply grease.



Apply marine grease.



(Molybdenum disulfide oil)

Use molybdenum oil solution (mixture of engine oil and molybdenum grease in the ratio 1 : 1).



Apply oil.

○x○(○)

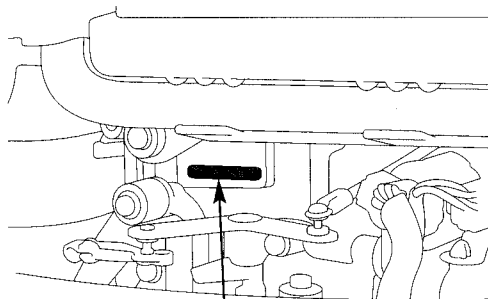
Indicates the diameter, length, and quantity of metric flange bolts used.

P. 1-1

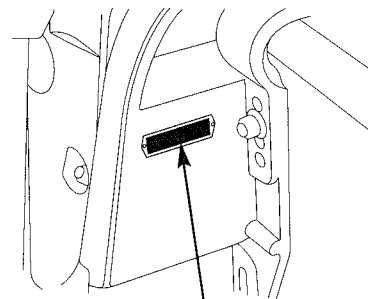
Indicates the reference page.

2. SERIAL NUMBER LOCATION

The engine serial number is stamped on the right side of the cylinder block, and the product identification number is located on the right side of the stern bracket. Always specify these numbers when inquiring about the engine or when ordering parts in order to obtain the correct parts for the outboard motor being serviced.



ENGINE SERIAL NUMBER



FRAME IDENTIFICATION NUMBER

3. STARTING PROCEDURE AFTER INSTALLING THE ENGINE

- Engine assembly removal
- Cylinder head removal
- Oil case removal

After completing the above procedures, assemble the outboard motor and perform the following:

- 1) Adjust the shift control cable (P. 3-26).
- 2) Adjust the throttle control cable/throttle link (P. 3-29).
- 3) Connect commercially available digital multimeter or HDS pocket tester (P. 3-24, 25).
- 4) Start the engine, raise the engine speed to $2,500 \pm 300 \text{ min}^{-1}$ (rpm) and run it until the oil indicator light (green) comes on.

Specified engine speed	$2,500 \pm 300 \text{ min}^{-1}$ (rpm)
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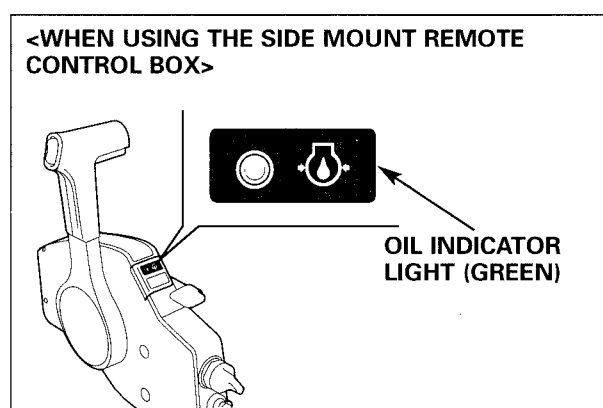
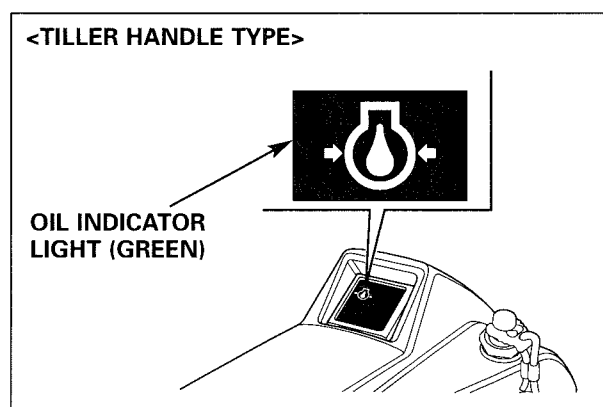
- 5) After the oil indicator light (green) comes on, lower the engine speed to the idle speed.

Specified idle speed (At neutral)	$750 \pm 50 \text{ min}^{-1}$ (rpm)
-----------------------------------	-------------------------------------

If the oil indicator light (green) does not come on within 10 seconds after starting the engine, the oil alert system is activated and the warning buzzer operates.

If that happens, stop the engine and repeat the above procedures, starting with step 1).

If the oil indicator light (green) still does not come on, perform the alert system troubleshooting (P. 2-32) and repeat the above procedures, starting with step 1.



4. MAINTENANCE STANDARDS

• **ENGINE**

Unit: mm (in)

Parts	Item		Standard	Service limit
Engine	Idle speed (in neutral)		750 ± 50 min ⁻¹ (rpm)	-
	Trolling speed		650 ± 50 min ⁻¹ (rpm)	-
	Cylinder compression [MPa (kgf/cm ² , psi) at 300 min ⁻¹ (rpm)]		1.45 – 1.65 (14.8 – 16.8, 211 – 239)	0.93 (9.5, 135)
	Compression gap between cylinders [MPa (kgf/cm ² , psi)]		-	0.2 (2.0, 28)
Spark plugs	Gap		1.0 – 1.1 (0.039 – 0.043)	1.3 (0.051)
Valves	Valve clearance	IN	0.15 – 0.19	-
		EX	0.26 – 0.30	-
	Overall length	IN	108.05 – 108.65 (4.254 – 4.278)	-
		EX	117.25 – 117.85 (4.616 – 4.640)	-
	Valve O.D.	IN	27.35 – 27.65 (1.077 – 1.089)	-
		EX	22.85 – 23.15 (0.900 – 0.911)	-
	Stem O.D.	IN	5.48 – 5.49 (0.2157 – 0.2161)	5.45 (0.2146)
		EX	5.45 – 5.46 (0.2146 – 0.2150)	5.42 (0.2134)
Stem-to-guide clearance	IN	0.02 – 0.05 (0.001 – 0.002)	0.08 (0.003)	
	EX	0.05 – 0.08 (0.002 – 0.003)	0.11 (0.004)	
Valve seats	Seat width	IN	0.85 – 1.15 (0.033 – 0.045)	1.60 (0.063)
		EX	1.25 – 1.55 (0.049 – 0.061)	2.00 (0.079)
	Seat installation height	IN	46.0 – 46.6 (1.81 – 1.83)	46.9 (0.85)
		EX	46.1 – 46.7 (1.81 – 1.84)	47.0 (1.85)
Valve guides	Guide I.D.	IN/EX	5.51 – 5.53 (0.217 – 0.218)	5.55 (0.219)
	Guide installation height	IN/EX	15.85 – 16.35 (0.624 – 0.644)	-
Valve springs	Free length	IN	53.43 (2.104)	-
		EX	55.29 (2.177)	-
Rocker arms	Rocker arm I.D.		20.012 – 20.030 (0.7879 – 0.7886)	-
	Rocker shaft O.D.		19.972 – 19.993 (0.7863 – 0.7871)	-
	Rocker arm-to-rocker shaft clearance		0.019 – 0.058 (0.0007 – 0.0023)	0.080 (0.0031)
Pistons	Skirt O.D.		72.98 – 72.99 (2.8732 – 2.8736)	72.97 (2.8728)
	Piston-to-cylinder clearance		0.01 – 0.04 (0.0004 – 0.0016)	0.05 (0.0020)
	Piston pin bore I.D.		18.010 – 18.014 (0.7091 – 0.7092)	-

BF75D·BF90D

Unit: mm (in)

Parts	Item		Standard	Service limit
Pistons	Ring groove width	Top	1.050 – 1.060 (0.0413 – 0.0417)	–
		Second	1.220 – 1.230 (0.0480 – 0.0484)	–
		Oil	2.005 – 2.020 (0.0789 – 0.0795)	–
Piston pins	Pin O.D.		17.997 – 18.000 (0.7085 – 0.7087)	–
	Pin-to-pin bore clearance		0.010 – 0.017 (0.0004 – 0.0007)	0.020 (0.0008)
Piston rings	Ring side clearance	Top	0.065 – 0.090 (0.0026 – 0.0035)	0.150 (0.0059)
		Second	0.030 – 0.055 (0.0012 – 0.0022)	0.130 (0.0051)
	Ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.60 (0.024)
		Second	0.35 – 0.50 (0.014 – 0.020)	0.65 (0.026)
		Oil	0.20 – 0.70 (0.008 – 0.028)	0.80 (0.031)
	Ring thickness	Top	0.970 – 0.985 (0.0382 – 0.0388)	–
Second		1.175 – 1.190 (0.0463 – 0.0469)	–	
Cylinder head	Warpage		0.08 (0.003) Max.	0.08 (0.003) Min.
	Camshaft journal I.D.		41.995 – 42.019 (1.6533 – 1.6543)	–
	Head height		119.9 – 120.1 (4.72 – 4.73)	–
Cylinder block	Cylinder sleeve I.D.		73.00 – 73.02 (2.874 – 2.875)	73.07 (2.877)
	Difference between top and bottom points of sleeve I.D.		–	0.05 (0.002)
	Warpage		0.07 (0.003) Max.	0.10 (0.004)
Connecting rods	Small end I.D.		17.964 – 17.977 (0.7072 – 0.7078)	–
	Small end-to-piston pin clearance		0.020 – 0.036 (0.0008 – 0.0014)	–
	Big end axial clearance		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
	Connecting rod bearing oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.050 (0.0020)
	Gap between A and B points of bolt O.D.		0 – 0.05 (0 – 0.002)	0.05 (0.002)
Crankshaft	Journal O.D.	Main	49.976 – 50.000 (1.9676 – 1.9685)	–
		Pin	39.976 – 40.000 (1.5739 – 1.5748)	–
	Journal cylindricity		0.005 (0.0002) Max.	0.010 (0.0004)
	Journal roundness		0.005 (0.0002) Max.	0.010 (0.0004)
	Crankshaft runout		0.03 (0.001) Max.	0.04 (0.002)
	Main bearing oil clearance		0.018 – 0.036 (0.0007 – 0.0014)	0.050 (0.0020)
	Thrust washer side clearance		0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)

BF75D·BF90D

Unit: mm (in)

Parts	Item		Standard	Service limit	
Camshaft	Camshaft axial clearance		0.05 – 0.25 (0.002 – 0.010)	0.50 (0.020)	
	Camshaft runout		0.03 (0.001) Max.	0.04 (0.002)	
	Journal O.D.		41.935 – 41.950 (1.6510 – 1.6516)	–	
	Cam height	BF75D	IN	34.070 – 34.375 (1.3413 – 1.3533)	33.870 (1.3335)
			EX	35.223 – 35.508 (1.3867 – 1.3979)	35.023 (1.3789)
		BF90D	IN:PRI	35.420 – 35.707 (1.3946 – 1.4058)	35.222 (1.3867)
			IN:SEC	34.710 – 34.995 (1.3665 – 1.3778)	34.510 (1.3587)
			EX	35.223 – 35.508 (1.3867 – 1.3979)	35.023 (1.3789)
Camshaft oil clearance		0.045 – 0.084 (0.0018 – 0.0033)	0.100 (0.0039)		
Oil pump	Body I.D.		80.00 – 80.04 (3.150 – 3.151)	–	
	Inner rotor-to-outer rotor clearance		0.02 – 0.16 (0.001 – 0.006)	0.20 (0.008)	
	Outer rotor-to-oil pump body clearance		0.10 – 0.19 (0.004 – 0.007)	0.23 (0.009)	
	Outer rotor height		17.98 – 18.00 (0.708 – 0.709)	17.96 (0.707)	
	Pump body depth		18.04 – 18.07 (0.710 – 0.711)	–	
	Outer rotor-to-oil body side clearance		0.04 – 0.09 (0.002 – 0.004)	0.12 (0.005)	
Vapor separator	Float height		26 – 31 (1.0 – 1.2)	–	
Fuel pump	Discharge volume [with pump operated for 2 sec. at 12V]		20 cm ³ (0.7 US oz, 0.7 Imp oz) or more	–	
Fuel line	Fuel pressure [kPa (kgf/cm ² , psi)]		325 – 375 (3.3 – 3.8, 47 – 54)	–	
Alternator	Stator resistance		0.09 – 0.14 Ω	–	
Starter motor	Brush length		12.3 (0.48)	7.0 (0.28)	
	Insulator length (Mica depth)		0.4 – 0.5 (0.016 – 0.020)	0.2 (0.008)	
	Commutator O.D.		29.4 (1.16)	28.8 (1.13)	
	Commutator runout		–	0.1 (0.004)	
Thermostat	Cylinder head side	Start opening	48 – 52°C (118 – 126°F)	–	
		Full open	60°C (140°F)	–	
		Lift height	3.0 (0.12) or more	–	
	Cylinder block side	Start opening	58 – 62°C (136 – 144°F)	–	
		Full open	70°C (158°F)	–	
		Lift height	3.0 (0.12) or more	–	

PRI: Primary, SEC: Secondary

• FRAME

Unit: mm (in)

Parts	Item		Standard	Service limit
Propeller shaft	Shaft O.D.	At forward bevel gear	25.390 – 25.425 (0.9996 – 1.0010)	25.369 (0.9988)
		At needle bearing	30.149 – 30.162 (1.1870 – 1.1875)	30.128 (1.1861)
Vertical shaft	Shaft O.D. (at needle bearing)		28.562 – 28.575 (1.1245 – 1.1250)	28.541 (1.1237)
Power tilt motor	Brush length		9.8 (0.39)	4.8 (0.19)
	Mica depth		–	0.5 (0.020)

5. TORQUE VALUES

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• ENGINE				
Crankcase bolt (*1)	M10 x 1.25	24	2.4	18
Cylinder head bolt (*2)	M9 x 1.25	29	3.0	21
Spark plug	M14 x 1.25	18	1.8	13
Connecting rod bolt (*3)	M6 x 0.75 (Special bolt)	10	1.0	7
Tensioner pivot bolt	M8 x 1.25	22	2.2	16
Cam chain driven sprocket bolt	M10 x 1.25	61	6.2	45
Valve adjusting lock nut (BF75D: IN/EX)	M7 x 0.75	14	1.4	10
(BF90D: IN side)	M7 x 0.75	20	2.0	15
(BF90D: EX side)	M7 x 0.75	14	1.4	10
Oil filter cartridge	M20 x 1.5	12	1.2	9
Oil filter holder	M22 x 1.5	49	5.0	36
Oil drain plug bolt	M12 x 1.5	23	2.3	17
Rocker shaft bolt	M8 x 1.25	29	3.0	21
CMP pulser plate bolt	M14 x 1.5 (Special bolt)	34	3.5	25
Throttle body bolt	M8 x 1.25	22	2.2	16
IAC valve bolt	M8 x 1.25	22	2.2	16
Mount case bolts and nuts (8 x 120, 8 x 100, 8 x 45, 8 x 35 and 8 mm cap nuts)	M8 x 1.25	27	2.8	20
Flywheel bolt	M12 x 1.0	103	10.5	76
Alternator rotor bolt (*4)	M14 x 1.25	37	3.8	27
Starter motor bolt	M10 x 1.25	44	4.5	32
EOP switch (low pressure side)	PT1/8	8	0.8	5.9
EOP switch (high pressure side)	M10 x 1.25	22	2.2	16
EBT sensor	M10 x 1.25	12	1.2	9
ECT sensor 2, 3	M10 x 1.25	12	1.2	9
HO2S	M18 x 1.5	42	4.3	31
Knock sensor	M12 x 1.25	31	3.2	23
ECM bolt	M6 x 1.0	5	0.5	3.7
Air flow band (*5)	M5 x 0.8	2.2	0.2	1.6
Oil case bolt	M8 x 1.25	21.5	2.2	16
Water tube joint	PT1/8	9	0.9	6.6
Chain case special bolt	M6 x 1.0 (Special bolt)	12	1.2	9
Fuel hose bolt	M6 x 1.0	12	1.2	9
Service check bolt	M6 x 1.0	11.8	1.2	9
Pressure regulator bolt	M6 x 1.0	11.8	1.2	9
Pump case bolt	M6 x 1.0	11.8	1.2	9

- *1: Tighten the crankcase bolt to 24 N·m (2.4 kgf·m, 18 lbf·ft) (snug torque), then further tighten it 40° (angle method).
 *2: Tighten the cylinder head bolt to 29 N·m (3.0 kgf·m, 21 lbf·ft) (snug torque), then further tighten it 130° (angle method).
 *3: Tighten the connecting rod bolt to 10 N·m (1.0 kgf·m, 7 lbf·ft) (snug torque), then further tighten it 90° (angle method).
 *4: Tighten the alternator rotor bolt to 187 N·m (19.1 kgf·m, 138 lbf·ft) (snug torque), remove it once and tighten it to 37 N·m (3.8 kgf·m, 27 lbf·ft) (snug torque). Then tighten the alternator rotor bolt further 90° (angle method).
 *5: Tighten the band bolt to 2.2 N·m (0.2 kgf·m, 1.6 lbf·ft) or tighten it so that the band inside dimension is 6 – 8 mm (0.24 – 0.31 in).

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• ENGINE				
Pump cover screw	M5 screw	3.4	0.3	2.5
Vapor separator cover screw	M5 screw	3.4	0.3	2.5
Strainer cover screw	M5 screw	3.4	0.3	2.5
Pump harness assembly screw	M4 screw	2.1	0.2	1.5
Water jacket cover screw	M4 screw	2.1	0.2	1.5
Float pin screw	M4 screw	2.1	0.2	1.5
Pump case drain screw	M6 screw	1.5	0.2	1.1
Intake manifold bolt, nut	M8 x 1.25	26.5	2.7	20
Injector clip bolt	M6 x 1.0	9	0.9	6.6
Water separator body screw	M5 screw	3.4	0.3	2.5
Oil pump 18 mm sealing bolt	M18 x 1.25	39.2	4.0	29
• GEAR CASE				
18 mm castle nut (*1)	M18 x 1.5	1	0.1	0.7
Gear case bolt (LRT/LHT types only)	M10 x 1.25	34	3.5	25
nut (XRT type only)	M10 x 1.25	34	3.5	25
Gear case cover B bolt	M6 x 1.0	12	1.2	9
Oil level bolt	M8 x 1.25	6.5	0.7	4.8
Oil drain bolt	M8 x 1.25	6.5	0.7	4.8
Water screen screw	M5 x 0.8	1	0.1	0.7
Impeller housing bolt	M8 x 1.25	19.7	2.0	15
Pinion gear nut	M16 x 1.0	103	10.5	76
64 mm lock nut	M64 x 1.5	123	12.5	91
• EXTENSION CASE/MOUNT CASE				
Lower rubber mount nut	M12 x 1.25	83	8.5	61
Upper rubber mount nut	M12 x 1.25	83	8.5	61
• STERN BRACKET/SWIVEL CASE				
7/8-14 UNF self-locking nut	7/8-14 UNF	34	3.5	25
25 x 2.0 mm self-locking nut	M25 x 2.0	34	3.5	25
10 mm self-lock nut	M10 x 1.25	34	3.5	25
Thrust receiver nut	M10 x 1.25	34	3.5	25
Detent assisted spring	M6 x 1.0	10	1.0	7
Grease fitting	M6 x 1.0	3	0.3	2.2
• POWER TRIM/TILT ASSEMBLY				
Cylinder cap	—————	207.5	21.2	153
Rod guide	—————	139.5	14.2	103
Manual valve	M14 x 1.5	3.4	0.3	2.5
Socket bolt A, B	—————	8.3	0.8	6.1
Power tilt motor assembly bolt	1/4-20 UNF	4.9	0.5	3.6
Power tilt motor assembly wire holder screw	M4 screw	1.4	0.1	1.0
Oil tank bolt	—————	4.9	0.5	3.6
Oil tank cap	—————	2.5	0.3	1.8
• TILLER HANDLE				
Steering bracket bolt	M12 x 1.25	29	3.0	21
nut	M12 x 1.25	54	5.5	40
bolt	M10 x 1.25	34	3.5	25

*1: If the split pin cannot be set by tightening the 18 mm castle nuts to 1 N·m (0.1 kgf·m, 0.7 lbf·ft), tighten the 18 mm castle nut until the split pin can be set. Note that the maximum torque of the 18 mm castle nut is 44 N·m (4.5 kgf·m, 33 lbf·ft).

BF75D•BF90D

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• TILLER HANDLE				
Under cover screw	M5 screw	2.4	0.2	1.8
Cable bracket bolt	M6 x 1.0	7	0.7	5.2
Height adjust block bolt	M8 x 1.25	26.5	2.7	20
Connector bracket bolt	M6 x 1.0	7	0.7	5.2
Combination switch nut	M22 x 1.0	4.9	0.5	3.6
Emergency stop switch nut	M16 x 1.0	1.2	0.1	0.9
Grip pipe bolt	M6 x 1.0	7	0.7	5.2
Throttle cable pivot nut	M5 x 1.0	1.3	0.1	1.0
Switch bracket bolt	M6 x 1.0	4.5	0.5	3.3
Guide plate bolt	M5 x 1.0	4.5	0.5	3.3
Shift unit assembly bolt	M6 x 1.0	7	0.7	5.2
• FRAME/ELECTRICAL				
L./R. engine under cover bolt	M6 x 1.0	10	1.0	7
Front separator cover bolt	M6 x 1.0 (Special bolt)	10	1.0	7
	M6 x 1.0 (SH bolt)	5	0.5	3.7
Plug maintenance cover bolt	M6 x 1.0 (SH bolt)	5	0.5	3.7
Under cover rear bracket bolt	M6 x 1.0 (Special bolt)	5	0.5	3.7
Water joint cap nut	M6 x 1.0	1	0.1	0.7
Neutral switch nut	M20 x 1.0	2.5	0.3	1.8
Starter motor B terminal nut	M8 x 1.25	11	1.1	8
PGM-FI main relay bolt	M6 x 1.0	5	0.5	3.7
Connector bracket C bolt	M6 x 1.0	5	0.5	3.7
Throttle rod lock nut	M6 x 1.0	1.3	0.1	1.0
Starter motor rear bracket screw	M5 screw	2.5	0.3	1.8
Starter motor through bolt	M5 bolt	5	0.5	3.7
Starter solenoid screw	M6 screw	6	0.6	4.4
MAP sensor screw	M5 screw	3.4	0.3	2.5

• Use the standard torque values for the bolts, nuts and screws that are not listed in this table.

STANDARD TORQUE VALUES

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
Screw	5 mm	4.2	0.4	3.1
	6 mm	9	0.9	6.6
Bolt and nut	5 mm	5.2	0.5	3.8
	6 mm	10	1.0	7
	8 mm	21.5	2.2	16
	10 mm	34	3.5	25
	12 mm	54	5.5	40
Flange bolt and nut	6 mm			
	(SH bolt): Engine side	9	0.9	6.6
	(SH bolt): Frame side	10	1.0	7
	6 mm (CT bolt)	12	1.2	9
	6 mm	12	1.2	9
	8 mm	26.5	2.7	20
	10 mm	39	4.0	29

- CT bolt: Self-tapping bolt
- SH bolt: Small head bolt