PREFACE

This manual covers the construction, function and serving procedures for the Honda BF135A•BF150A outboard motors.

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at anytime without notice.

As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to the outboard motor, other property, or the environment.

SAFETY MESSAGES

Your safety, and the safety of others, are very important. To help you make informed decisions, we have provided safety messages and other safety information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing these outboard motors. You must use your own good judgment.

You will find important safety information in a variety of forms, including:

- **Safety Labels** — on the engine cover.
- **Safety messages** — Preceded by a safety alert symbol ⚠ and one of three signal words, DANGER, WARNING, or CAUTION.

  These signal words mean:

  ⚠DANGER You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

  ⚠WARNING You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

  ⚠CAUTION You CAN be HURT if you don't follow instructions.

- **Instructions** — how to service this outboard motor correctly and safely.

Honda Motor Co., Ltd.
Service Publications Office

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Date of Issue: November, 2003

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Abbreviations

ACG	Alternator
A/F	Air Fuel Ratio
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
ECT	Engine Coolant Temperature
ECM	Engine Control Module
EOP	Engine Oil Pressure
EX	Exhaust
F	Front or Forward
GND	Ground
IAB	Intake Air Bypass
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

1. SPECIFICATIONS

• DIMENSIONS AND WEIGHTS

Model	BF135A						
Description code	BARJ		BASJ	BARJ		BASJ	
Types	LC	LD	LCD	XC	XD	XCC	XCD
Overall length	845 mm (33.3 in)						
Overall width	580 mm (22.8 in)						
Overall height	1,665 mm (65.6 in)			1,790 mm (70.5 in)			
Dry weight (*1)	220 kg (485 lbs)		223 kg (492 lbs)			226 kg (498 lbs)	
Operating weight (including oil)	228 kg (503 lbs)		231 kg (509 lbs)			234 kg (516 lbs)	

*1: With propeller mounted.

Model	BF150A						
Description code	BANJ		BAPJ	BANJ		BAPJ	
Types	LC	LD	LCD	XC	XD	XCC	XCD
Overall length	845 mm (33.3 in)						
Overall width	580 mm (22.8 in)						
Overall height	1,665 mm (65.6 in)			1,790 mm (70.5 in)			
Dry weight (*1)	220 kg (485 lbs)		223 kg (492 lbs)			226 kg (498 lbs)	
Operating weight (including oil)	228 kg (503 lbs)		231 kg (509 lbs)			234 kg (516 lbs)	

*1: With propeller mounted.

• FRAME

Model	BF135A•BF150A						
Types	LC	LD	LCD	XC	XD	XCC	XCD
Transom height (*1)	508 mm (20.0 in)			635 mm (25.0 in)			
Tilting angle	72°						
Tilting stage	Stageless						
Swivel angle	30° right and left						
Trim angle	– 4° to 16°						

*2: Transom angle is at 12°.

• TYPES OF Honda BF135A•BF150A OUTBOARD MOTORS

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

Model	BF135A•BF150A						
Types	LC	LD	LCD	XC	XD	XCC	XCD
Shaft length type	L	L	L	XL	XL	XL	XL
Remote control	(○)	(○)	(○)	(○)	(○)	(○)	(○)
Control panel	(○)	(○)	(○)	(○)	(○)	(○)	(○)
Counter rotation			○			○	○
Power trim/tilt	○	○	○	○	○	○	○

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

• ENGINE

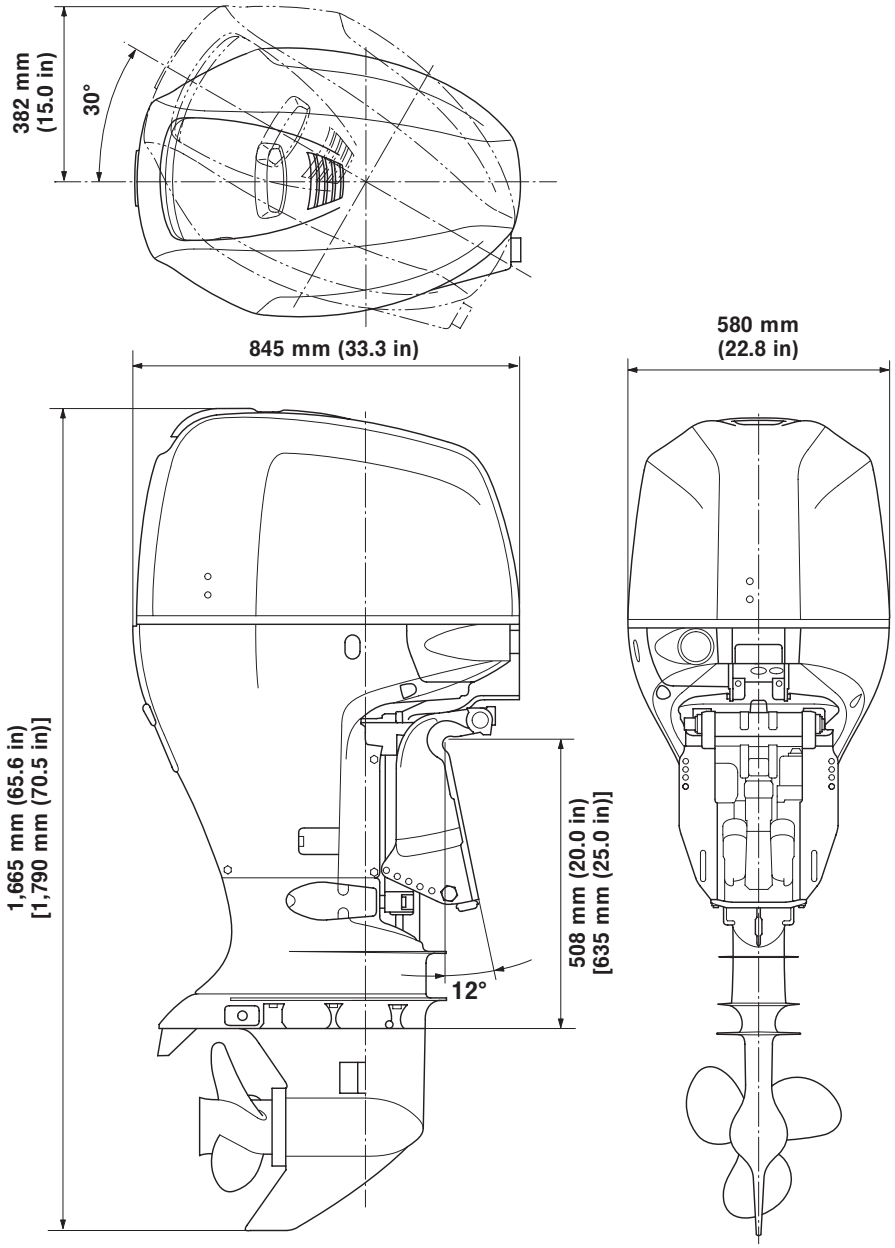
Model	BF135A	BF150A
Description code	BEARJ	BEANJ
Type	4-stroke, D.O.H.C., 4-cylinder	4-stroke, D.O.H.C., VTEC, 4-cylinder
Displacement	2,354 cm^3 (143.6 cu-in)	
Bore x stroke	87 x 99 mm (3.4 x 3.9 in)	
Rated power (Full throttle range)	100.7 kW (135 HP) at 5,000 – 6,000 min^{-1} (rpm)	111.9 kW (150 HP) at 5,000 – 6,000 min^{-1} (rpm)
Maximum torque	196 N·m (20.0 kgf·m, 145 lbf·ft)	202 N·m (20.6 kgf·m, 149 lbf·ft)
Compression ratio	9.6 : 1	
Fuel consumption ratio	350 g/kW·h (257 g/HP·h, 0.575 lb/HP·h)	320 g/kW·h (235 g/HP·h, 0.526 lb/HP·h)
Cooling system	Forced water circulation by impeller pump with thermostat	
Ignition system	Full transistorized, battery ignition	
Ignition timing	0° ± 2° at 750 min^{-1} (rpm) B.T.D.C.	
Spark plug	IZFR6K11 (NGK), SKJ20DR-M11 (DENSO)	
Fuel supply system	Programmed fuel injection	
Fuel injection system	Electronic control	
Fuel injection nozzle	Multi-hole type	
Fuel pipe	Rubber tubes	
Lubrication system	Pressure lubrication by trochoid pump	
Lubrication capacity	7.35ℓ (7.8 US qt, 6.5 Imp qt) [with oil filter replacement: 6.7ℓ (7.1 US qt, 5.9 Imp qt)] [without oil filter replacement: 6.5ℓ (6.9 US qt, 5.7 Imp qt)]	
Starting system	Electric starter	
Stopping system	Primary circuit ground	
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

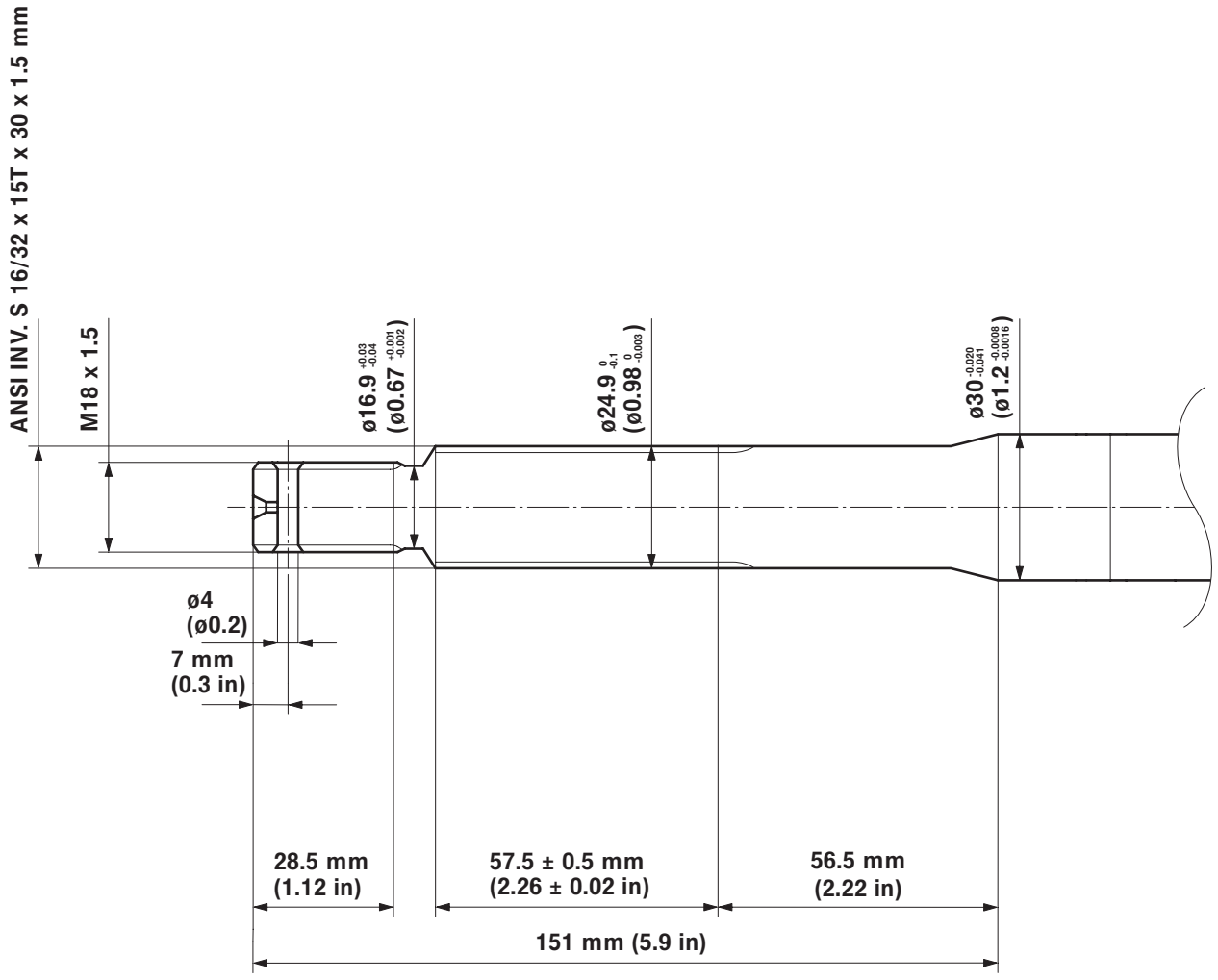
Clutch	Dog clutch (Forward – Neutral – Reverse)
Gear ratio	0.467 (14/30)
Reduction	Spiral bevel
Gear case oil capacity	0.98ℓ (1.04 US qt, 0.86 Imp qt)
Propeller rotating direction	Clockwise (viewed from rear): LC, LD, XC and XD types Counterclockwise (viewed from rear): LDC, XCC and XCD types
Propeller driving system	Spline

2. DIMENSIONAL DRAWINGS

[ ]: Extra-long shaft type



• PROPELLER SHAFT



2. SERVICE INFORMATION

1. THE IMPORTANCE OF PROPER SERVICING

Proper servicing is essential to the safety of the operator and the reliability of the outboard motor. Any error or oversight made by the technician while servicing can easily result in faulty operation, damage to the outboard motor or injury to the operator.

⚠WARNING

Improper servicing can cause an unsafe condition that can lead to serious injury or death.

Follow the procedures and precautions in this shop manual carefully.

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

⚠WARNING

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

Follow the procedures and precautions in this shop manual carefully.

2. 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 any time you hammer, drill, grind, or work around pressurized air or liquids, and 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 engine-powered equipment up in the air.
  Any time you lift an outboard motor with a hoist, make sure that the hoist hook is securely attached to the outboard motor.

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 drain or store gasoline in an open container.
- Keep all cigarettes, sparks, and flames away from the battery and all fuel-related parts.

3. SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may damage the unit.
2. Use the special tools designed for the product.
3. Install new gaskets, O-rings, etc. when reassembling.
4. When torquing bolts or nuts, begin with larger-diameter or inner bolts first and tighten to the specified torque diagonally, unless a particular sequence is specified.
5. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
6. After reassembly, check all parts for proper installation and operation.
7. Many screws used in this machine are self-tapping. Be aware that cross-threading or overtightening these screws will strip the threads and ruin the hole.
8. Use only metric tools when servicing this unit. Metric bolts, nuts and screws are not interchangeable with non-metric fasteners. The use of incorrect tools and fasteners will damage the unit.

4. SYMBOLS USED IN THIS MANUAL

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

S. TOOL — A special tool is required to perform the procedure.

GREASE — Apply grease.

GREASE
(Molybdenum disulfide oil) : Use molybdenum oil solution (mixture of the engine oil and molybdenum grease with the ratio 1 : 1).

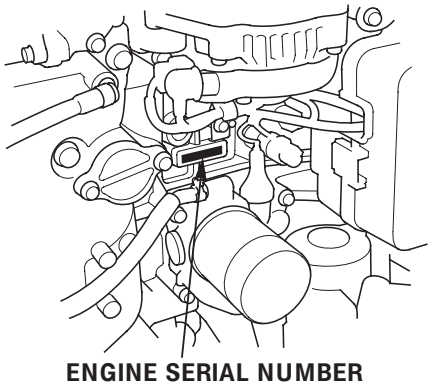
OIL — Apply oil.

○ x ○ (○) Indicates the diameter, length, and quantity of metric flange bolts used.

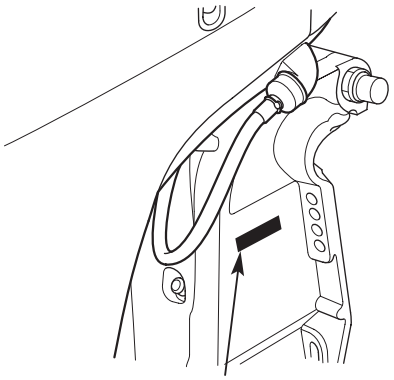
P. 1-1 Indicates the reference page.

5. SERIAL NUMBER LOCATIONS

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



PRODUCT IDENTIFICATION NUMBER

6. 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 [kPa (kgf/cm^2, psi) at 200 min^{-1} (rpm)]		1,532 – 1,728 (15.6 – 17.6, 222 – 250)	930 (9.5, 135)
	Compression gap between cylinders [kPa (kgf/cm^2, psi)]		–	200 (2.0, 28)
Spark plugs	Gap		1.0 – 1.1 (0.039 – 0.043)	1.3 (0.051)
Valves	Valve clearance	IN	0.21 – 0.25 (0.008 – 0.010)	–
		EX	0.28 – 0.32 (0.011 – 0.013)	–
	Overall length	IN	108.7 – 109.5 (4.28 – 4.31)	–
		EX	108.3 – 109.1 (4.26 – 4.30)	–
	Valve O.D.	IN	34.85 – 35.15 (1.372 – 1.384)	–
		EX	29.85 – 30.15 (1.175 – 1.187)	–
	Stem O.D.	IN	5.475 – 5.485 (0.2156 – 0.2159)	5.445 (0.2144)
		EX	5.450 – 5.460 (0.2146 – 0.2150)	5.420 (0.2134)
	Stem-to-guide clearance	IN	0.030 – 0.055 (0.0012 – 0.0022)	0.08 (0.003)
		EX	0.055 – 0.080 (0.0022 – 0.0031)	0.11 (0.004)
Valve seats	Seat width	IN/EX	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.08)
	Seat installation height	IN/EX	44.0 – 44.6 (1.73 – 1.76)	–
Valve guides	Guide I.D.	IN/EX	5.51 – 5.53 (0.217 – 0.218)	5.55 (0.219)
	Guide extrusion amount	IN	15.2 – 16.2 (0.60 – 0.64)	–
		EX	15.5 – 16.5 (0.61 – 0.65)	–
Valve springs	Free length	IN	49.64 (1.954)	–
		EX	49.64 (1.954)	–
Rocker arms	Rocker arm I.D.	IN	17.019 – 17.035 (0.6700 – 0.6707)	–
		EX	17.012 – 17.039 (0.6698 – 0.6708)	–
	Rocker arm shaft O.D.	IN/EX	16.983 – 16.994 (0.6686 – 0.6690)	–
	Rocker arm-to-rocker arm shaft clearance	IN	0.025 – 0.052 (0.0010 – 0.0020)	0.08 (0.003)
		EX	0.018 – 0.056 (0.0007 – 0.0022)	0.08 (0.003)
Pistons	Skirt O.D.	A	86.98 – 86.99 (3.4244 – 3.4248)	86.93 (3.4224)
		B	86.97 – 86.98 (3.4240 – 3.4244)	86.92 (3.4220)
	Piston-to-cylinder clearance		0.02 – 0.04 (0.001 – 0.002)	0.05 (0.002)
	Piston pin bore I.D.		21.960 – 21.963 (0.8646 – 0.8647)	–

Unit: mm (in)

Parts	Item			Standard	Service limit
Pistons	Ring groove width		Top	1.23 – 1.24 (0.0484 – 0.0488)	1.25 (0.0492)
			Second	1.24 – 1.25 (0.0488 – 0.0492)	1.25 (0.0492)
			Oil	2.005 – 2.025 (0.0789 – 0.0797)	2.05 (0.081)
Piston pins	Pin O.D.			21.961 – 21.965 (0.8646 – 0.8648)	21.953 (0.8643)
	Pin-to-pin bore clearance			–0.005 – +0.002 (–0.0002 – +0.0001)	0.005 (0.0002)
Piston rings	Ring side clearance		Top	0.045 – 0.070 (0.0018 – 0.0028)	0.13 (0.005)
			Second	0.040 – 0.065 (0.0016 – 0.0026)	0.13 (0.005)
	Ring end gap		Top	0.20 – 0.35 (0.008 – 0.014)	0.6 (0.02)
			Second	0.50 – 0.65 (0.020 – 0.026)	0.75 (0.030)
			Oil	0.20 – 0.70 (0.008 – 0.028)	0.8 (0.031)
	Ring thickness		Top	1.170 – 1.185 (0.0461 – 0.0467)	–
			Second	1.175 – 1.190 (0.0463 – 0.0469)	–
Cylinder head	Warpage			–	0.05 (0.002) Min.
	Camshaft journal I.D.			29.000 – 29.024 (1.1417 – 1.1427)	–
	Head height			103.95 – 104.05 (4.093 – 4.096)	–
Cylinder block	Cylinder sleeve I.D.		A or I	87.01 – 87.02 (3.4256 – 3.4260)	87.07 (3.4279)
			B or II	87.00 – 87.01 (3.4252 – 3.4256)	87.07 (3.4279)
	Gap between upper and lower 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.			23.969 – 23.982 (0.9437 – 0.9442)	–
	Small end-to-piston pin clearance			0.005 – 0.015 (0.0002 – 0.0006)	0.02 (0.001)
	Big end axial clearance			0.15 – 0.35 (0.006 – 0.014)	0.4 (0.02)
	Connecting rod bearing oil clearance			0.032 – 0.066 (0.0013 – 0.0026)	0.077 (0.0030)
Crankshaft	Journal O.D.	Main	No. 1, 2, 4, 5	54.984 – 54.992 (2.1647 – 2.1650)	–
			No. 3	54.976 – 55.000 (2.1644 – 2.1654)	–
	Pin			47.976 – 48.000 (1.8888 – 1.8898)	–
	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)
	Crankshaft axial clearance			0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)
	Main bearing oil clearance		No. 1, 2, 4, 5	0.017 – 0.041 (0.0007 – 0.0016)	0.05 (0.002)
			No. 3	0.025 – 0.049 (0.0010 – 0.0019)	0.055 (0.0022)
	Thrust metal side clearance			0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)

Unit: mm (in)

Parts	Item		Standard	Service limit
Camshaft	Camshaft axial clearance		0.05 – 0.20 (0.002 – 0.008)	0.4 (0.02)
	Camshaft runout		0.03 (0.001) Max.	0.4 (0.02)
	Journal O.D.	No. 1	28.955 – 28.970 (1.1400 – 1.1405)	–
		No. 2 – No. 5	28.925 – 28.940 (1.1388 – 1.1394)	–
	Cam height	IN:PRI/SEC	32.626 – 32.931 (1.2845 – 1.2965)	–
		IN:MID	35.369 – 35.654 (1.3925 – 1.4037)	–
		EX	33.927 – 34.212 (1.3357 – 1.3469)	–
	Camshaft oil clearance	No. 1	0.030 – 0.069 (0.0012 – 0.0027)	0.15 (0.006)
		No. 2 – No. 5	0.060 – 0.099 (0.0024 – 0.0039)	0.15 (0.006)
Oil pump	Body I.D.		84.000 – 84.030 (3.3071 – 3.3083)	–
	Inner rotor-to-outer rotor clearance		0.04 – 0.16 (0.002 – 0.006)	0.20 (0.008)
	Outer rotor-to-oil pump body clearance		0.02 – 0.07 (0.001 – 0.003)	0.12 (0.005)
	Outer rotor height		9.480 – 9.500 (0.3732 – 0.3740)	–
	Pump body depth		9.520 – 9.550 (0.3748 – 0.3760)	–
	Outer rotor-to-oil body side clearance		0.14 – 0.19 (0.006 – 0.007)	0.20 (0.008)
Vapor separator	Float height		28.5 – 33.5 (1.12 – 1.32)	–
Fuel pump	Discharge volume [with pump operated for 2 sec. at 12V]		45 mR (1.5 Us oz, 1.6 Imp oz) or more	–
Fuel line	Fuel pressure [kPa (kgf/cm^2, psi)]		270 – 320 (2.8 – 3.3, 40 – 47)	–
Alternator	Brush length		10.5 (0.41)	8.4 (0.33)
	Brush spring pressure		3.2 N (0.33 kgf, 0.73 lbf)	–
	Rotor coil resistance		2.9 Ω	–
	Slip ring O.D.		14.4 (0.57)	14.0 (0.55)
	Belt tension Measured at the center of belt between the pulleys with belt tension gauge.	Used belt	392 – 490 N (40 – 50 kgf, 88 – 100 lbf)	–
		New belt	490 – 588 N (50 – 60 kgf, 110 – 132 lbf)	–
	Belt deflection Measured with 98 N (10 kgf, 22 lbf) of force applied to the center of belt between the pulleys)	Used belt	10.6 – 11.1 (0.42 – 0.44)	–
		New belt	10.1 – 10.6 (0.40 – 0.42)	–
Starter motor	Brush length		12.3 (0.48)	7.0
	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)

PRI: Primary, MID: Mid, SEC: Secondary

• FRAME

Unit: mm (in)

Parts	Item		Standard	Service limit
Propeller shaft	Shaft O.D.	At forward bevel gear (LC, LD, XC and XD types)	24.987 – 25.000 (0.9837 – 0.9843)	24.966 (0.9829)
		At reverse bevel gear (LCD, XCC and XCD types)	24.987 – 25.000 (0.9837 – 0.9843)	24.966 (0.9829)
		At needle bearing	30.007 – 30.020 (1.1814 – 1.1819)	29.990 (1.1807)
Vertical shaft	Shaft O.D. (at needle bearing)		28.556 – 28.575 (1.1242 – 1.1250)	28.545 (1.1238)

7. TORQUE VALUES

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• ENGINE				
Lower block bolt (*1)	M11 x 1.5	29	3.0	22
	M8 x 1.25	26	2.7	20
Crankcase bolt	M6 x 1.0	12	1.2	9
Oil case bolt	M10 x 1.25	34	3.5	25
Lower block orifice	M10 x 1.0	10	1.0	7
Oil jet bolt	M8 x 0.75 (Special bolt)	16	1.6	12
No.1 camshaft holder 10 mm sealing bolt	M10 x 1.0 (Special bolt)	20	2.0	14
Cylinder head bolt (*2)	M11 x 1.5	39	4.0	29
Cylinder head cover nut	M6 x 1.0	12	1.2	9
Spark plug	M14 x 1.25	18	1.8	13
Connecting rod bolt (*3)	M8 x 0.75 (Special bolt)	20	2.0	14
Crankshaft pulley bolt	M16 x 1.5	245	25.0	181
Balancer chain guide bolt	M6 x 1.0	12	1.2	9
Balancer driven sprocket bolt	M10 x 1.25	44	4.5	33
Balancer case assembly bolt (8 x 50 mm/8 x 75 mm)	M8 x 1.25	22	2.2	16
(8 x 55 mm)	M8 x 1.25	27	2.8	20
(10 x 105 mm)	M10 x 1.25	44	4.5	33
Balancer holder bolt	M6 x 1.0	12	1.2	9
	M8 x 1.25	27	2.8	20
Chain case special bolt	M6 x 1.0 (Special bolt)	12	1.2	9
Chain case bolt	M6 x 1.0	12	1.2	9
	M6 x 1.0 (SH bolt)	12	1.2	9
Chain case cover bolt	M6 x 1.0	12	1.2	9
Cam chain tensioner bolt	M6 x 1.0	12	1.2	9
Cam chain guide bolt	M6 x 1.0	12	1.2	9
Cam chain guide B bolt	M8 x 1.25	22	2.2	16
Cam chain tensioner arm bolt	M8 x 1.25 (Special bolt)	22	2.2	16
Exhaust camshaft sprocket bolt	M10 x 1.25	72	7.3	53
VTC flange bolt	M12 x 1.25 (Special bolt)	113	11.5	83
Camshaft holder bolt	M8 x 1.25	22	2.2	16
	M6 x 1.0	12	1.2	9
Camshaft collar bolt	M14 x 1.0 (Special bolt)	39	4.0	29
CMP pulse plate bolt	M14 x 1.0 (Special bolt)	39	4.0	29
Valve adjusting lock nut (IN side)	M7 x 0.75	20	2.0	14
Valve adjusting lock nut (EX side)	M7 x 0.75	14	1.4	10
Oil filter	M20 x 1.5	12	1.2	9
Oil drain plug bolt	M12 x 1.5	23	2.3	17
Throttle body bolt	M8 x 1.25	22	2.2	16
IAC valve bolt	M8 x 1.25	22	2.2	16
Injector base bolt, nut	M8 x 1.25	24	2.4	17
Fuel pipe bolt	M8 x 1.25	22	2.2	16
Pressure regulator nut	M18 x 1.0	27	2.8	20
IAB control valve bolt	M5 x 0.8	5.4	0.55	4.0

*1: Tighten the lower block bolts to 29 N·m (3.0 kgf·m, 22 lbf·ft) first, then tighten them to additional 56° (Angle method).
*2: Tighten the new cylinder head bolts to 39 N·m (4.0 kgf·m, 29 lbf·ft) (Snag torque), then tighten them to additional 278°. (Tighten to 90° at first, then to 90°, and to 98° in this order) (Angle method).
At assembly, tighten the lower block bolts to 39 N·m (4.0 kgf·m, 29 lbf·ft) (Snag torque), then tighten them to additional 180°. (Tighten to 90° at first, then to 90° in this order) (Angle method).
*3: Tighten the connecting rod bolts to 20 N·m (2.0 kgf·m, 14 lbf·ft) (Snag torque), then tighten them to additional 90° (Angle method).
• SH bolt: Small head bolt.

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• ENGINE				
Mounting case bolt	M12 x 1.25	64	6.5	47
	M10 x 1.25	44	4.5	33
	M8 x 1.25	26	2.7	20
Mounting case nut	M10 x 1.25	44	4.5	33
Plug hole coil bolt	M6 x 1.0	12	1.2	9
Flywheel boss bolt	M8 x 1.25	32	3.3	24
Flywheel bolt	M12 x 1.0	118	12.0	87
Alternator bolt	M10 x 1.25	44	4.5	33
nut	M8 x 1.25	26	2.7	20
Alternator pulley lock nut	M14 x 1.5	110	11.2	81
Starter motor bolt	M10 x 1.25	44	4.5	33
Starter motor front bracket screw	M5 screw	2.5	0.25	1.8
Starter motor bolt screw	M5	5	0.5	3.6
Starter solenoid switch screw	M6 screw	6	0.6	4.3
EOP switch (Low pressure side)	PT 1／8	8	0.8	5.8
EOP switch (High pressure side)	M10 x 1.25	22	2.2	16
ECT sensor	M10 x 1.25	12	1.2	9
A/F sensor	M18 x 1.5	42	4.3	31
Knock sensor	M12 x 1.25	31	3.2	23
MAP sensor bolt	M5 x 0.8	3.4	0.35	2.5
ECM bolt	M6 x 1.0	5	0.5	3.6
Intake manifold bolt, nut	M8 x 1.25	26	2.7	20
Exhaust manifold bolt	M10 x 1.25	39	4.0	29
Exhaust guide bolt	M8 x 1.25	26	2.7	20
Water separator body screw	M5 screw	3.4	0.35	2.5
Fuel strainer body screw	M5 screw	3.4	0.35	2.5
Fuel pump (low pressure side) bolt	M6 x 1.0	12	1.2	9
Vapor separator assembly bolt	M8 x 1.25	26	2.7	20
Vapor separator stay bolt	M8 x 1.25	26	2.7	20
Service check bolt	M6 x 1.0	12	1.2	9
Vapor separator cover screw	M5 screw	3.4	0.35	2.5
Water jacket cover screw	M5 screw	3.4	0.35	2.5
Strainer cover screw	M5 screw	3.4	0.35	2.5
Pump cover screw	M5 screw	3.4	0.35	2.5
Pump harness assembly screw	M4 screw	2.1	0.21	1.5
Float pin screw	———	2.1	0.21	1.5
Fuel pump case bolt	M6 x 1.0	12	1.2	9
Plate stay A bolt	M6 x 1.0	12	1.2	9
• GEAR CASE				
Propeller shaft holder bolt	M10 x 1.25	34	3.5	25
18 mm castle nut (*1)	M18 x 1.5	1	0.1	0.7
Gear case bolt	M10 x 1.25	34	3.5	25
Oil level bolt	M8 x 1.25	3.4	0.35	2.5
Oil drain bolt	M8 x 1.25	3.4	0.35	2.5
Water screen screw	M5 x 0.8	1	0.1	0.7
Sensor nipple	M8 x 1.0	3	0.3	2.2
Bearing holder (LCD, XCC and XCD types only)	M100 x 2.0	191	19.5	141
Impeller housing bolt	M8 x 1.25	19.7	2.0	14
64 mm lock nut	M64 x 1.5	123	12.5	90
Pinion gear nut	M18 x 1.0	142	14.5	105
• EXTENSION CASE/MOUNTING CASE				
Extension case bolt	M10 x 1.25	39	4.0	29
Lower rubber mounting bolt	M12 x 1.25	83	8.5	61
Upper rubber mounting bolt	M12 x 1.25	83	8.5	61

*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).

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• STERN BRACKET				
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-locking nut	M10 x 1.25	34	3.5	25
• POWER TRIM/TILT ASSEMBLY				
Cylinder cap comp.	———	162	16.5	119
Rod guide comp.	———	78	8.0	58
Manual valve	M14 x 1.5	3.5	0.35	2.5
Socket bolt A/B	———	8.5	0.85	6.1
Power tilt motor assembly bolt	1/4-20 UNF	5	0.5	3.6
Power tilt motor assembly code holder screw	M4 screw	1.4	0.14	1.0
Oil tank bolt	———	5	0.5	3.6
Oil tank cap	———	2.5	0.25	1.8
• FRAME/ELECTRICAL				
Grease fitting	M6 x 1.0	3	0.3	2.2
Neutral switch nut	M20 x 1.0	2.5	0.25	1.8
Starter motor B terminal washer-nut	M8 x 1.25	11	1.1	8
Alternator B terminal washer-nut	M6 x 1.0	8	0.8	5.8
Alternator fuse box B terminal washer-nut	M6 x 1.0	8	0.8	5.8
Alternator fuse box bolt	M6 x 1.0	5	0.5	3.6
Fuse box bracket bolt	M6 x 1.0	5	0.5	3.6
PGM-FI main relay bolt	M6 x 1.0	5	0.5	3.6
ECM bracket bolt	M6 x 1.0	5	0.5	3.6
L./R. engine under cover screw	M6 screw	4.5	0.45	3.3
Starter motor bolt	M10 x 1.25	44	4.5	33

• 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	0.42	3.0
	6 mm	9	0.9	6.5
Bolt and nut	5 mm	5.2	0.52	3.8
	6 mm	10	1.0	7
	8 mm	21.5	2.15	16
	10 mm	34	3.5	25
	12 mm	54	5.5	40
Flange bolt and nut	6 mm (SH bolt)	9	0.9	6.5
	6 mm (CT bolt)	12	1.2	9
	6 mm	12	1.2	9
	8 mm	26	2.7	20
	10 mm	39	4.0	29

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

8. SPECIAL TOOLS

• Special tools applicable to the parts except gear case

	Tool name	Tool number	Application
1	Ring gear holder	070PB-ZY60100	Flywheel boss, flywheel removal/installation
2	SCS service check connector	070PZ-ZY30100	ECU troubleshooting, idling adjustment
3	Test harness	070PZ-ZY60100	ECU troubleshooting
4	Float level gauge	07401-0010000	Vapor separator float level inspection
5	Oil pressure gauge attachment	07406-0030000	Oil pressure test
6	Fuel pressure gauge set	07406-0040003	Fuel pressure inspection
7	Oil pressure gauge set	07506-3000001	Oil pressure test
8	Valve guide driver, 5.5 mm	07742-0010100	Valve guide removal/installation
9	Pin driver, 6.0 mm	07744-0010500	Balancer shaft hold
10	Attachment, 32 x 35 mm	07746-0010100	22 x 35 x 7 mm water seal installation, Lower mount center hosing removal
11	Attachment, 37 x 40 mm	07746-0010200	Alternator front bearing installation
12	Attachment, 52 x 55 mm	07746-0010400	Alternator rear bearing, Chain case oil seal installation
13	Attachment, 24 x 26 mm	07746-0010700	Alternator front bearing removal, 14 x 26 x 8 mm water seal installation
14	Driver, 22 mm I.D.	07746-0020100	Alternator rear bearing installation
15	Attachment, 15 mm I.D.	07746-0020200	Alternator rear bearing installation
16	Driver, 40 mm I.D.	07746-0030100	Lower mount center housing installation
17	Pilot, 12 mm	07746-0040100	14 x 26 x 8 mm water seal installation
18	Pilot, 15 mm	07746-0040300	Alternator front bearing removal/installation
19	Pilot, 20 mm	07746-0040500	Mounting case needle bearing installation
20	Pilot, 30 mm	07746-0040700	Lower mount center housing removal
21	Pilot, 22 mm	07746-0041000	22 x 35 x 7 mm water seal installation
22	Driver	07749-0010000	Driver for 10 through 13, 17 through 21, 33 through 35 and 48
23	Valve spring compressor	07757-0010000	Valve keeper removal/installation
24	Valve spring compressor attachment	07757-PJ10100	
25	Valve seat cutter, 45° 35 mm	07780-0010400	Valve seat reconditioning (IN)
26	Valve seat cutter, 45° 33 mm	07780-0010800	Valve seat reconditioning (EX)
27	Valve seat cutter, 32° 38.5 mm	07780-0012400	Valve seat reconditioning (IN)
28	Valve seat cutter, 32° 33 mm	07780-0012900	Valve seat reconditioning (EX)
29	Valve seat cutter, 60° 30 mm	07780-0014000	Valve seat reconditioning (EX)
30	Valve seat cutter, 60° 37.5 mm	07780-0014100	Valve seat reconditioning (IN)
31	Cutter holder, 5.5 mm	07781-0010101	Valve seat reconditioning (IN/EX)
32	Sensor socket wrench, 22 x 150L	07906-PD10000	A/F sensor removal/installation
33	Attachment, 28 x 30 mm	07946-1870100	Mounting case needle bearing installation
34	Oil seal driver attachment, 72 mm	07947-6340201	Oil pump body oil seal installation
35	Oil seal driver	07947-SB00100	Oil pump cover oil seal installation
36	Oil filter wrench	07HAA-PJ70101	Oil filter removal/installation
37	Valve guide reamer, 5.525 mm	07HAH-PJ70100	Valve guide reaming
38	Socket wrench, 19 mm	07JAA-001020A	Crankshaft pulley bolt removal/installation
39	Handle	07JAB-001020B	
40	Pulley holder attachment, HEX 50 mm	07JAB-0010400	
41	Belt tension gauge	07JGG-0010101	Alternator belt tension inspection
42	Air supply	07LAJ-PR30102	VTEC system, VTEC valve inspection
43	Stem seal driver	07PAD-0010000	Valve stem seal A/B installation