PREFACE

This manual covers the construction, function and servicing procedures of the Honda BF200A and BF225A outboard motors.

Careful observance of these instructions will result in better, safer service work.

Pay attention to these symbols and their meaning:

⚠ WARNING **Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.**

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

Honda Motor Co., Ltd.
Service Publications Office

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Abbreviations

Abbreviations	
ACG	Alternator
API	American Petroleum Institute
Approx.	Approximately
Assy.	Assembly
ATDC	After Top Dead Center
ATF	Automatic Transmission Fluid
ATT	Attachment
BARO	Barometric
BAT	Battery
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
CKP	Crankshaft Position
Comp.	Complete
CYL	Cylinder
DTC	Diagnostic Trouble Code
ECT	Engine Coolant Temperature
ECM	Engine Control Module
EX	Exhaust
F	Front or Forward
GND	Ground
GPS	Global Positioning System
HO2S	Heated Oxygen Sensor
IAB	Intake Air Bypass
IAC	Idle Air Control
IAT	Intake Air Temperature
ID or I.D.	Inside Diameter
IG or IGN	Ignition
IN	Intake
INJ	Injection
L.	Left
KS	Knock Sensor
MAP	Manifold Absolute Pressure
MIL	Malfunction Indicator Light
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
SOL	Solenoid
STD	Standard
SW	Switch
TDC	Top Dead Center
TP	Throttle Position
VTEC	Variable Valve Timing & Valve Lift Electronic Control

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 2. DIMENSIONAL DRAWING

1. SPECIFICATIONS

DIMENSIONS AND WEIGHTS

Item \ Model	BF200A				
Description code	BAEJ	BAEJ	BAFJ	BAEJ	BAFJ
Type	LD	XD	XCD	XXD	XXCD
Overall length	920 mm (36.2 in)				
Overall width	625 mm (24.6 in)				
Overall height	1,670 mm (65.7 in)	1,800 mm (70.8 in)	1,800 mm (70.8 in)	1,925 mm (75.8 in)	1,925 mm (75.8 in)
Dry weight (*1)	270 kg (595 lbs)	275 kg (606 lbs)	278 kg (613 lbs)	280 kg (617 lbs)	283 kg (624 lbs)
Dry weight (*2)	267 kg (589 lbs)	272 kg (600 lbs)	272 kg (600 lbs)	277 kg (611 lbs)	277 kg (611 lbs)
Operating weight (including oil)	279 kg (615 lbs)	284 kg (626 lbs)	287 kg (633 lbs)	289 kg (637 lbs)	292 kg (644 lbs)

*1: With propeller mounted.
*2: Without propeller mounted.

Item \ Model	BF225A				
Description code	BAGJ	BAGJ	BAHJ	BAGJ	BAHJ
Type	LD	XD	XCD	XXD	XXCD
Overall length	920 mm (36.2 in)				
Overall width	625 mm (24.6 in)				
Overall height	1,670 mm (65.7 in)	1,800 mm (70.8 in)	1,800 mm (70.8 in)	1,925 mm (75.8 in)	1,925 mm (75.8 in)
Dry weight (*1)	270 kg (595 lbs)	275 kg (606 lbs)	278 kg (613 lbs)	280 kg (617 lbs)	283 kg (624 lbs)
Dry weight (*2)	267 kg (589 lbs)	272 kg (600 lbs)	272 kg (600 lbs)	277 kg (611 lbs)	277 kg (611 lbs)
Operating weight (including oil)	279 kg (615 lbs)	284 kg (626 lbs)	287 kg (633 lbs)	289 kg (637 lbs)	292 kg (644 lbs)

*1: With propeller mounted.
*2: Without propeller mounted.

FRAME

Item \ Model	BF200A•BF225A				
Type	LD	XD	XCD	XXD	XXCD
Transom height (*1)	508 mm (20.0 in)	635 mm (25.0 in)		762 mm (30.0 in)	
Tilting angle	68°				
Tilting stage	Stageless				
Trim angle (*1)	–4° to 16°				
Swivel angle	30° right and left				

*1: Transom angle is at 12°.

TYPES OF Honda BF200A/BF225A OUTBOARD MOTORS

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

Model	BF200A•BF225A				
Type	LD	XD	XCD	XXD	XXCD
Shaft Length type	L	XL	XL	XXL	XXL
Counter Rotation			○		○
Remote control	○	○	○	○	○
Power Trim/Tilt	○	○	○	○	○
Tachometer	(○)	(○)	(○)	(○)	(○)
Trimmeter	(○)	(○)	(○)	(○)	(○)

XL: Extra long, XXL: Extra-extra long
(_): Optional part

The power trim/tilt type motors use an electric/hydraulic power cylinder to trim or tilt the motor.

ENGINE

Item \ Model	BF200A	BF225A
Description code	BEAEJ-SE	BEAGJ-SE
Type	4-stroke, O.H.C., 6-cylinder	
Displacement	3,471 cm³ (211.7 cu in)	
Bore x stroke	89 x 93 mm (3.5 x 3.7 in)	
Rated power *1	147.1 kW (200HP)	165.5 kW (225HP)
Maximum torque	295 N•m (30.1 kgf•m, 217.7 lbf•ft)	
Compression ratio	9.4 : 1	
Fuel consumption ratio	334 g/kW•h (246 g/PS•h)	
Cooling system	Forced water circulation by impeller pump with thermostat	
Ignition system	Full transistorized, battery ignition	
Ignition timing	10° at 650 rpm B.T.D.C.	
Spark plug	IZFR6F11 (NGK), VKJ20RZ-M11 (DENSO)	
Fuel supply system	Programmed fuel injection	
Fuel injection system	Electronic control	
Fuel injection nozzle	Pintle type	
Fuel	Unleaded gasoline with a pump octane rating of 86 or higher	
Fuel pump	Electric and mechanical plunger type	
Lubrication system	Pressure lubrication by trochoid pump	
Lubrication capacity	8.8 ℓ (9.3 US qt, 7.7 Imp qt)	
Starter system	Electric starter	
Stopping system	Primary circuit ground	
Exhaust system	Underwater type	

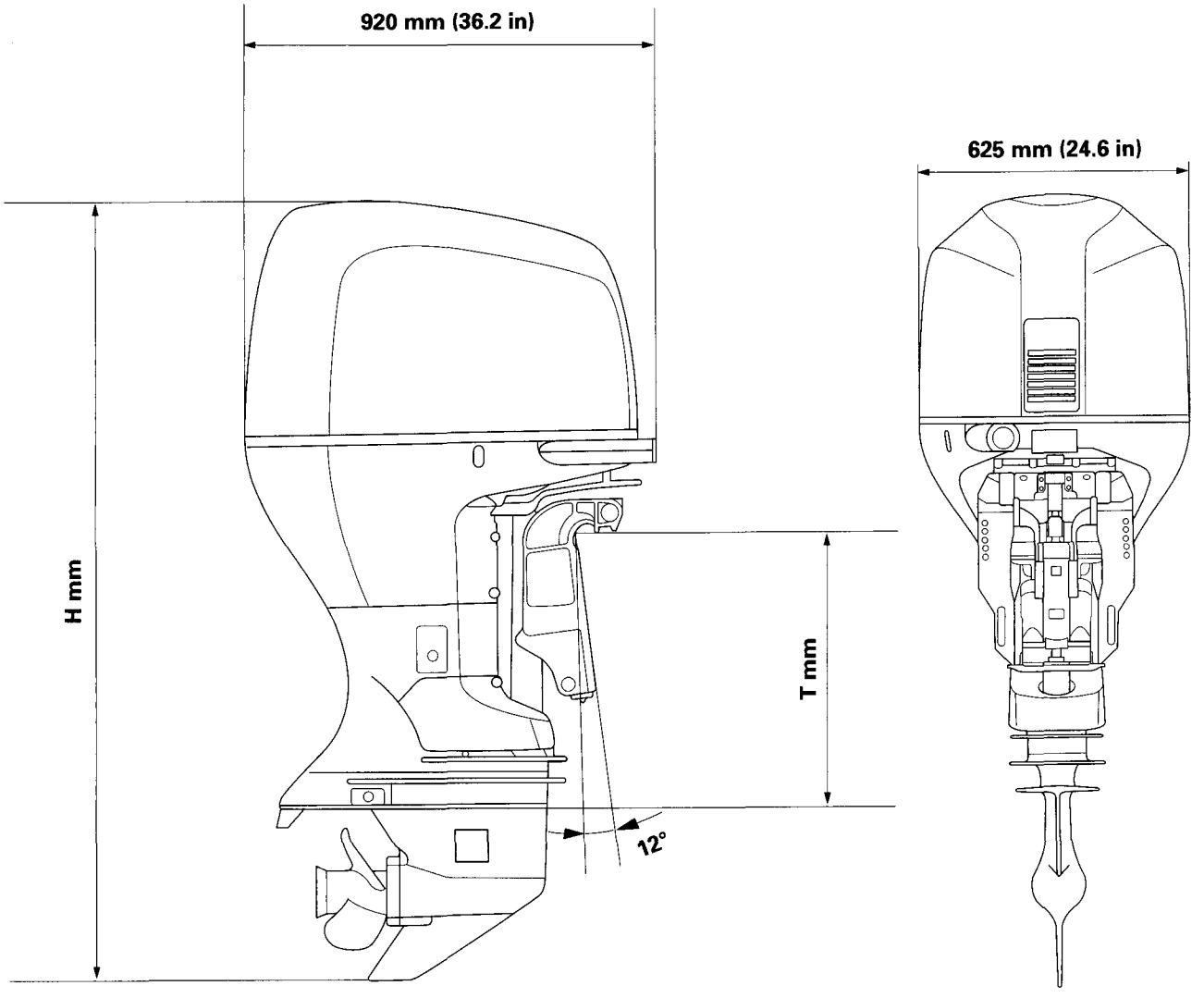
*1: Full throttle range.

LOWER UNIT

Clutch	Dog clutch (Forward – Neutral – Reverse)
Gear ratio	0.536 (15/28)
Reduction	Spiral bevel
Gear case oil capacity	1.17 ℓ (1.24 US qt, 1.03 Imp qt)
Propeller rotating direction	Clockwise (viewed from rear): LD, XD and XXD types Counterclockwise (viewed from rear): XCD and XXCD types

2. DIMENSIONAL DRAWING

Transom	H	T
LD type	1,670 mm (65.7 in)	508 mm (20.0 in)
XD type	1,800 mm (70.8 in)	635 mm (25.0 in)
XXD type	1,925 mm (75.8 in)	762 mm (30.0 in)



1. SYMBOLS USED IN THIS MANUAL
2. SERIAL NUMBER LOCATION
3. MAINTENANCE STANDARDS
4. TORQUE VALUES
5. SPECIAL TOOLS
6. TROUBLESHOOTING
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a. HARD STARTING
Cylinder compression test
b. ENGINE DOES NOT RUN SMOOTHLY
c. IGNITION (POWER) SYSTEM
Fuse load list
d. STARTER MOTOR
e. IGNITION SYSTEM
Spark test
• FRAME
a. SHIFT
b. POWER TRIM/TILT ASSEMBLY DOES NOT MOVE
c. THE POWER TRIM/TILT ASSEMBLY DOES NOT HOLD
7. CABLE/HARNESS ROUTING
8. TUBE ROUTING
9. LUBRICATION

1. 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

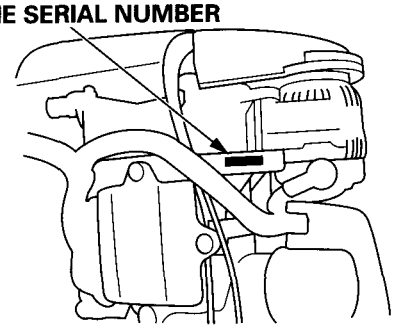
○ x ○ (○) Indicates the diameter, length, and quantity of metric flange bolts used.

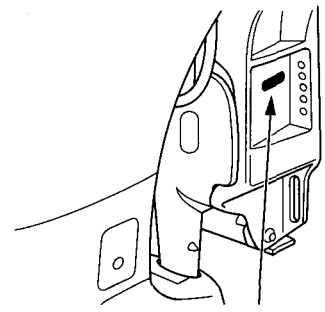
P. Indicates the reference page.

2. SERIAL NUMBER LOCATION

The engine serial number is stamped on the alternator bracket and the product identification number is located on the right 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

3. MAINTENANCE STANDARDS

• ENGINE

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Idle speed (in neutral)		650 ± 50 rpm	———
	Trolling speed		650 ± 50 rpm	———
	Cylinder compression		1,373 – 1,569 kPa (14 – 16 kgf/cm², 199 – 228 psi) at 300 rpm	———
Ignition timing	At idle*1		10 ± 2°BTDC at 650 ± 50 rpm	———
Spark plugs	Gap		1.0 – 1.1 (0.039 – 0.043)	———
Valves	Valve clearance	IN	0.20 – 0.24	———
		EX	0.28 – 0.32	———
	Stem O.D.	IN	5.485 – 5.495 (0.2159 – 0.2163)	5.455 (0.2148)
		EX	5.450 – 5.460 (0.2146 – 0.2150)	5.420 (0.2134)
	Guide I.D.	IN/EX	5.515 – 5.530 (0.2171 – 0.2177)	5.55 (0.219)
	Guide extrusion amount	IN	21.20 – 22.20 (0.835 – 0.874)	———
		EX	20.63 – 21.63 (0.812 – 0.852)	———
	Stem-to-guide clearance	IN	0.020 – 0.045 (0.0008 – 0.0018)	0.080 (0.0031)
		EX	0.055 – 0.080 (0.0022 – 0.0031)	0.120 (0.0047)
	Seat width	IN/EX	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.08)
	Seat installation height	IN	46.75 – 47.55 (1.841 – 1.872)	47.80 (1.882)
		EX	46.68 – 47.48 (1.838 – 1.869)	47.73 (1.879)
	Spring free length	IN	50.07 (1.971)	———
		EX	53.48 (2.106)	———
Rocker arms	Rocker arm I.D.	IN	20.012 – 20.030 (0.7879 – 0.7886)	———
		EX	18.012 – 18.030 (0.7091 – 0.7098)	———
	Rocker arm shaft O.D.	IN	19.972 – 19.993 (0.7863 – 0.7871)	———
		EX	17.976 – 17.994 (0.7077 – 0.7084)	———
	Rocker arm-to-rocker arm shaft clearance	IN	0.026 – 0.067 (0.0010 – 0.0026)	0.067 (0.0026)
		EX	0.026 – 0.077 (0.0010 – 0.0030)	0.077 (0.0030)
Pistons	Skirt O.D.		88.975 – 88.985 (3.5029 – 3.5033)	88.965 (3.5026)
	Piston-to-cylinder clearance		0.015 – 0.040 (0.0006 – 0.0016)	0.080 (0.0031)
	Pin bore I.D.		21.960 – 21.963 (0.8645 – 0.8647)	———
	Pin O.D.		21.961 – 21.965 (0.8646 – 0.8648)	———
	Pin-to-pin bore clearance		–0.005 – + 0.002 (–0.0002 – + 0.0001)	———
	Ring groove width	Top/Second	1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
		Oil	2.805 – 2.825 (0.1104 – 0.1112)	2.85 (0.112)

*1: With the SCS short connector connected to the service check connector.

Unit: mm (in)

Part	Item		Standard	Service limit
Piston rings	Ring side clearance	Top	0.035 – 0.060 (0.0014 – 0.0024)	0.13 (0.005)
		Second	0.030 – 0.055 (0.0012 – 0.0022)	0.13 (0.005)
	Ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.6 (0.024)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.028)
		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 (0.0462 – 0.0469)	———
Cylinder head	Warpage		———	0.05 (0.002)
	Camshaft journal I.D.		43.000 – 43.024 (1.6929 – 1.6939)	———
	Head height		120.95 – 121.05 (4.762 – 4.766)	———
Cylinder block	Cylinder sleeve I.D.		89.00 – 89.015 (3.5039 – 3.5045)	89.065 (3.5065)
	Warpage		0.07 (0.003) Max	0.10 (0.004)
	Gap between upper and lower parts of sleeve I.D.		———	0.05 (0.002)
Connecting rods	Small end I.D.		21.970 – 21.976 (0.8650 – 0.8652)	———
	Small end-to-piston pin clearance		0.005 – 0.015 (0.0002 – 0.0006)	———
	Big end axial clearance		0.15 – 0.35 (0.006 – 0.014)	0.45 (0.018)
	Connecting rod big end oil clearance		0.020 – 0.044 (0.0008 – 0.0017)	———
Crankshaft	Journal O.D.	Main	71.976 – 72.000 (2.8337 – 2.8346)	———
		Pin	54.976 – 55.000 (2.1644 – 2.1654)	———
	Journal roundness (Main/Pin)		0.005 (0.0002) Max	0.01 (0.0004)
	Shaft runout		0.020 (0.0008) Max	0.030 (0.0012)
	Crankshaft main bearing oil clearance		0.020 – 0.044 (0.0008 – 0.0017)	0.050 (0.0020)
	Crankshaft axial clearance		0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)

Unit: mm (in)

Part	Item			Standard	Service limit
Camshaft	Camshaft axial clearance			0.05 – 0.20 (0.002 – 0.008)	0.2 (0.008)
	Shaft runout			0.03 (0.001) Max	0.04 (0.002)
	Journal O.D.			42.935 – 42.950 (1.6904 – 1.6909)	———
	Cam height	IN	Primary	34.769 – 35.054 (1.3689 – 1.3992)	———
			Mid	36.295 – 36.580 (1.4289 – 1.4402)	———
			Secondary	35.073 – 35.358 (1.3808 – 1.3920)	———
		EX		36.176 – 36.461 (1.4242 – 1.4355)	———
	Shaft oil clearance			0.050 – 0.089 (0.0020 – 0.0035)	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)
Fuel pump/ Fuel line	Discharge volume [with pump operated for 2 sec.]			60 m ℓ (2.0 US oz,z, 2.1 Imp oz) or more	———
	Fuel pressure [kPa (kgf/cm², psi)]			280 – 330 (2.9 – 3.4, 41 – 48)	———
Vapor separator	Float height			28.5 – 33.5 (1.12 – 1.32)	———

Unit: mm (in)

Part	Item		Standard	Service limit
Alternator	Brush length		10.5 (0.41)	9.0 (0.35)
	Brush spring pressure		3.2 N (0.33 kgf, 0.73 lbf)	———
	Rotor coil resistance		2.7 – 3.1 Ω	———
	Slip ring O.D.		14.2 – 14.4 (0.56 – 0.57)	13.8 (0.54)
	Belt tension [N (kgf, lbf)] Measured between the pulleys with belt tension gauge.	Used belt	490 – 590 (50 – 60, 110 – 132)	———
		New belt	880 – 980 (90 – 100, 198 – 220)*1	———
			660 – 740 (67 – 75, 148 – 165)*2	———
	Belt deflection Measured with 98 N (10 kgf, 22 lbf) of force applied to the center of belt between the pulleys.	Used belt	5.4 – 6.3 (0.21 – 0.25)	———
		New belt	3.2 – 3.4 (0.12 – 0.13)*1	———
			4.2 – 4.8 (0.17 – 0.19)*2	———
Starter motor	Brush length		12.3 (0.48)	7.0 (0.28)
	Insulation 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)
CKP sensor	Resistance		1,850 – 2,450 Ω	———
TDC sensor	Resistance		1,850 – 2,450 Ω	

*1: With a new belt installed
*2: After the engine running for five minutes.

• FRAME

Unit: mm (in)

Part	Item	Standard	Service limit
Vertical shaft	Shaft O.D. (at needle bearing)	31.991 – 32.000 (1.2595 – 1.2598)	———
Propeller shaft	Shaft O.D. (at needle bearing)	32.007 – 32.020 (1.2601 – 1.2606)	———

4. TORQUE VALUES

Item	Thread Dia. (mm) and pitch (length)	Torque values		
		N•m	kgf•m	lbf•ft
• Engine				
Bearing cap bolt (11 x 131 mm)	M11 x 1.5	*1 : 29	3.0	22
Side bolt (10 x 60 mm)	M10 x 1.25	49	5.0	36
Side bolt (10 x 80 mm)	M10 x 1.25	49	5.0	36
Side bolt (10 x 109 mm)	M10 x 1.25	49	5.0	36
Timing belt back cover (TDC sensor) bolt	M5 x 0.8	3.9	0.4	2.9
Cylinder head bolt	M12 x 1.5	*2 : 39.2	4.0	29
Spark plug	M14 x 1.25	18	1.8	13
Valve adjusting nut	M7 x 0.75	20	2.0	14
Connecting rod bolt	M8 x 0.75	*3 : 20	2.0	14
Crankshaft pulley bolt	M16 x 1.5	245	25.0	181
Timing belt tensioner bolt	M10 x 1.25	39	4.0	29
Timing belt idler bolt	M12 x 1.25	83	8.5	61
Timing belt driven pulley bolt	M12 x 1.25	90	9.2	67
Rocker shaft (IN side) bolt	M8 x 1.25	24	2.4	17
Rocker shaft (EX side) bolt	M8 x 1.25	24	2.4	17
Oil pressure switch (High pressure side)	M10 x 1.25	21.6	2.2	16
Oil filter cartridge	M20 x 1.5	21.6	2.2	16
Oil filter holder bolt	M22 x 1.5	49	5.0	36
Oil drain plug bolt	M12 x 1.5	23	2.3	17
Throttle body bolt, nut	M8 x 1.25	21.6	2.2	16
Mount case bolt	M10 x 1.25	44	4.5	33
Mount case bolt	M12 x 1.25	64	6.5	47
Mount case nut	M10 x 1.25 flange nut	44	4.5	33
Ignition coil bolt	M6 x 1.0	12	1.2	9
Flywheel bolt	M12 x 1.0	118	12.0	87
Flywheel boss bolt	M8 x1.25	32	3.2	24
Alternator bolt	M10 x 1.25	44	4.5	33
Alternator nut	M8 nut	26	2.7	20
Starter motor bolt	M10 x 1.25	44	4.5	33
Oil pressure switch (Low pressure side)	PT 1/8	8	0.85	6.1
MAP sensor	M5 x 0.8	3.4	0.35	2.5
IAT sensor	M12 x 1.5	18	1.8	13
ECT sensor	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

*1: Tighten the crankcase bolts to 29 N•m (3.0 kgf•m, 22 lbf•ft) first, then tighten them an additional 51° (Snag torque [Angle method]).

*2: Tighten the cylinder head bolts to 39.2 N•m (4.0 kgf•m, 29 lbf•ft) first, then tighten them an additional 103° (Snag torque [Angle method]).

*3: Tighten the connection rod bolt to 20 N•m (2.0 kgf•m, 14 lbf•ft) first, then tighten them an additional 90° (Snag torque [Angle method]).

Item	Thread Dia. (mm) and pitch (length)	Torque values		
		N•m	kgf•m	lbf•ft
• GEAR CASE				
Gear case bolt	M10 x 1.25	37	3.75	27
Gear case self-lock nut	M10 x 1.25	37	3.75	27
Pinion gear nut	M18 x 1.0	182	18.5	134
Gear oil level bolt	M8 x 1.25	3.5	0.35	2.5
Bearing holder	M100 x 2.0	191	19.5	141
Gear oil drain plug bolt	M8 x 1.25	3.4	0.35	25
Impeller housing bolt	M8 x 1.25	20	2.0	14
Propeller castle nut	M18 x 1.5	*1 : 1.0	0.1	0.7
64 mm lock nut	M64 x 1.5	123	12.5	90
Water screen screw	M5 x 0.8	1.0	0.1	0.7
• EXTENSION/MOUNT				
Lower rubber motor mount nut	M14 x 1.5	103	10.5	76
Upper rubber mount nut	M12 x 1.25	83	8.5	61
Extension separator stud bolt	M12 x 1.25	22	2.25	16
Extension separator stud bolt	M10 x 1.25	15	1.5	11
• STERN BRACKET				
Stern bracket nut	M25 x 2.0	34	3.5	25
Stern bracket nut	7/8-14UNF	34	3.5	25
• Others				
Neutral switch nut	M20 x 1.0	2.5	0.25	1.8
Grease fitting	M6 x 1.0	3	0.3	2.2
Starter motor B terminal nut	M8 x 1.25	11	1.1	8.0
Alternator terminal B terminal nut	M6 x 1.0	8	0.85	6.1

*1 If the split pin cannot be set by tightening the 18 mm castle nut to the specified torque, tighten the castle nut additionally until the split pin can be set. Note that the maximum torque of the 18 mm castle nut is 44.1 N•m (4.5 kgf•m, 33 lbf•ft).

• Use standard torque values for fasteners that are not listed in this table.

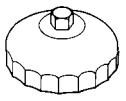
STANDARD TORQUE VALUES

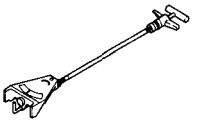
Item	Thread Dia. (mm) and pitch (length)	Torque values		
		N•m	kgf•m	lbf•ft
Bolt and nut	5 mm	5.2	0.52	3.8
	6 mm	10	1.0	7
	8 mm	21.5	2.15	15.6
	10 mm	34	3.5	25
	12 mm	54	5.5	40
Flange bolt and nut	6 mm (SH Flange bolt)	9	0.9	6.5
	6 mm	12	1.2	9
	8 mm	26	2.7	20
	10 mm	39	4.0	29
Screw	5 mm	4.2	0.42	3.0
	6 mm	9	0.9	6.5

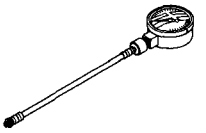
5. SPECIAL TOOLS

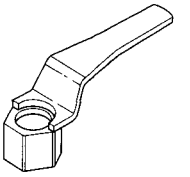
• **Special tool applicable to the parts except gear case**

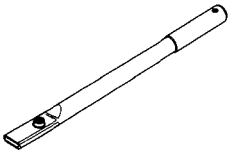
	Tool name	Tool number	Application
1	Oil filter wrench	07912 – 6110001	Oil filter replacement
2	Belt tension gauge	07JGG – 0010101	Alternator belt tension inspection
3	Fuel pressure gauge	07406 – 0040003	Fuel pressure inspection
4	Holder attachment, 50 mm offset	07MAB – PY30100	Crankshaft pulley bolt removal/installation
5	Holder handle	07JAB – 001020B	
6	Lock nut wrench, 56 mm	07LPA – ZV30200	
7	Air supply	07LAJ – PR30102	VTEC system, VTEC valve inspection
8	Air supply adapter M10 x 1.0	070AJ – 0010100	
9	VTEC air adapter	07VAJ – P8A0100	
10	VTEC air stopper	07VAJ – P8A0200	
11	Stem seal driver	07PAD – 0010000	Stem seal replacement
12	Valve spring compressor	07757 – 0010000	Valve keeper removal/installation
13	Valve guide driver, 5.5 mm	07742 – 0010100	Valve guide removal/installation
14	Valve guide reamer	07HAH – PJ70100	Valve guide reaming
15	Cutter holder, 5.5 mm	07781 – 0010101	Valve seat reconditioning (IN/EX)
16	Valve seat cutter 32° 35 mm	07780 – 0012300	Valve seat reconditioning (IN)
17	Valve seat cutter 32° 33 mm	07780 – 0012900	Valve seat reconditioning (EX)
18	Valve seat cutter 45° 35 mm	07780 – 0010400	Valve seat reconditioning (IN)
19	Valve seat cutter 45° 29 mm	07780 – 0010300	Valve seat reconditioning (EX)
20	Valve seat cutter 60° 37.5 mm	07780 – 0014100	Valve seat reconditioning (IN)
21	Valve seat cutter 60° 30 mm	07780 – 0014000	Valve seat reconditioning (EX)
22	Driver	07749 – 0010000	Camshaft oil seal installation
23	Attachment, 52 x 55 mm	07746 – 0010400	
24	Oil pressure gauge set	07506 – 3000001	Cylinder block oil pressure inspection
25	Oil pressure gauge attachment	07406 – 0030000	
26	Driver	07749 – 0010000	Cylinder block left side cover oil seal installation
27	Oil seal driver attachment, 96	07948 – SB00101	
28	Driver	07749 – 0010000	Oil pump crankshaft oil seal installation
29	Attachment, 52 x 55 mm	07746 – 0010400	
30	Driver	07749 – 0010000	*Water pump housing 26 x 42 x 7 mm water seal replacement*
31	Attachment, 42 x 47 mm	07746 – 0010300	
32	Ring gear holder	070PB – ZY30100	Flywheel boss removal/installation, flywheel removal/installation
33	Driver	07749 – 0010000	Mounting case oil seal installation
34	Attachment, 32 x 35 mm	07746 – 0010100	
35	Pilot, 22 mm	07746 – 0041000	
36	Driver	07749 – 0010000	Mounting case shift shaft oil seal installation
37	Attachment, 24 x 26 mm	07746 – 0010700	
38	Pilot, 12 mm	07746 – 0040200	
39	Bearing puller attachment	07931 – 4630100	Lower mount center housing removal
40	Pin wrench, 6 mm	07SPA – ZW10100	Piston rod comp. removal/installation
41	Pin wrench, 4 mm	07SPA – ZW10200	Rod guide comp. removal/installation
42	Pressure gauge kit	07YAJ – 0010410	Power trim/tilt assembly upper chamber blow pressure inspection
43	Hose comp.	07FPJ – 7520100	
44	Oil pressure gauge joint A	07SPJ – ZW10100	
45	Pressure gauge kit	07YAJ – 0010410	Power trim/tilt assembly lower chamber blow pressure inspection
46	Hose comp.	07FPJ – 7520100	
47	Oil pressure gauge joint B	07SPJ – ZW10200	
48	SCS service check connector	070PZ – ZY30100	ECM troubleshooting
49	ECM test harness	070PZ – ZY30200	
50	Float level gauge	07401 – 0010000	Vapor separator float level inspection
51	Driver	07749 – 0010000	Cylinder head 39 x 53 x 8 mm oil seal installation
52	Attachment, 52 x 55 mm	07746 – 0010400	
53	Sensor socket wrench, 22 x 90L	07LAA – PT50101	HO2S removal/installation

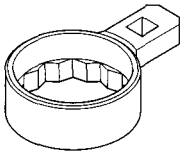
① 

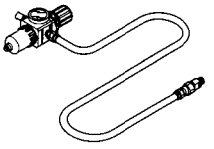
② 

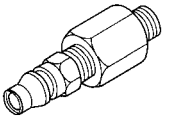
③ 

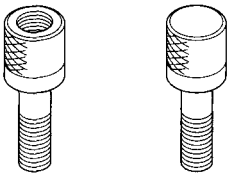
④ 

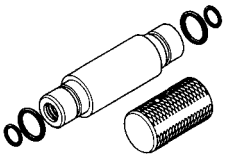
⑤ 

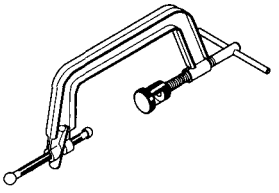
⑥ 

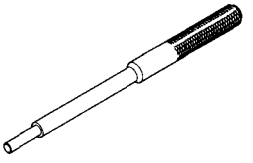
⑦ 

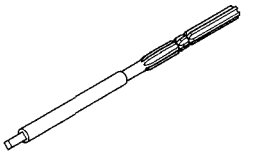
⑧ 

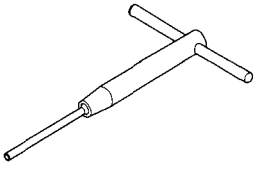
⑨ ⑩ 

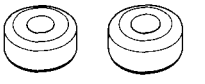
⑪ 

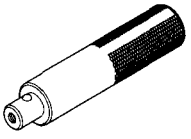
⑫ 

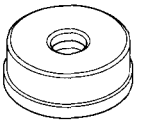
⑬ 

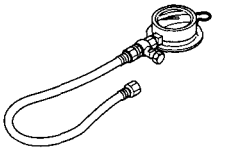
⑭ 

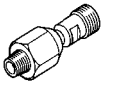
⑮ 

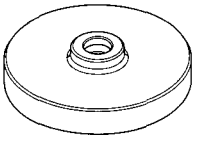
⑯ – ㉑ 

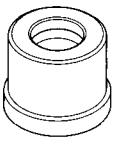
㉒, ㉖, ㉘, ㉙, ㉜, ㉟, ㊶ 

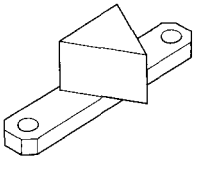
㉓, ㉙, ㊷ 

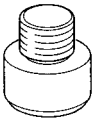
㉔, ㊷, ㊸ 

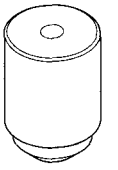
㉕ 

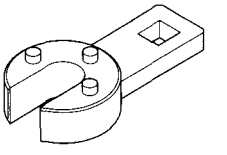
㉗ 

㉛, ㉞, ㉗ 

㉜ 

㉟, ㊳ 

㊴ 

㊵, ㊶ 

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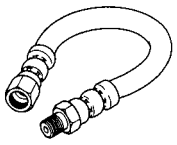

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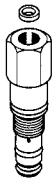

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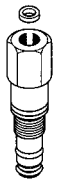

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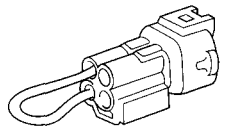

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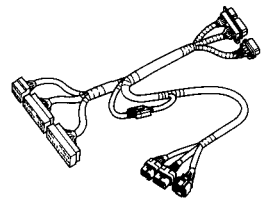

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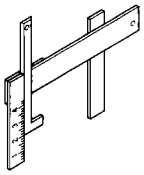

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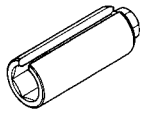
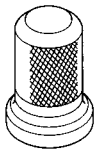


• **Special tool applicable to all types of gear case**

	Tool name	Tool number	Application
1	Oil seal driver, 44.5	07947 – SB00100	Propeller shaft holder 30 x 45 x 7 mm water seal installation
2	Driver handle, 15 x 280L	07949 – 3710001	
3	Oil seal driver attachment, 28 x 35 mm	07945 – 4150200	Propeller shaft holder 32 x 42 x 30 mm needle bearing removal
4	Pilot, 32 x 50 mm	07MAD – PR90200	
5	Taper bearing installer attachment	070PF – ZY30100	Propeller shaft holder 32 x 42 x 30 mm needle bearing installation
6	Attachment, 32 x 42 mm	070PD – ZY30100	
7	Pin type wrench, 110 mm ID	07WAA – S1G0100	Bearing holder assembly disassembly/reassembly
8	Oil seal driver, 65	07JAD – PL90100	Bearing holder bevel gear disassembly
9	Driver handle, 15 x 280L	07949 – 3710001	Forward bevel gear disassembly
10	Attachment, 37 x 40 mm	07746 – 0010200	
11	Pilot, 25 mm	07746 – 0040600	
12	Attachment, 27.2	07747 – 0010300	
13	Driver	07749 – 0010000	Forward bevel gear installation
14	Taper bearing installer attachment	070PF – ZY30100	
15	Oil seal driver, 65	07JAD – PL90100	Bearing holder bevel gear installation
16	Pin type wrench, 110 mm ID	07WAA – S1G0100	Bearing holder assembly disassembly/reassembly
17	Driver	07749 – 0010000	Bearing holder assembly (outer race) disassembly
18	Attachment, 72 x 75 mm	07746 – 0010600	
19	Driver	07749 – 0010000	Bearing holder assembly (outer race) reassembly
20	Taper bearing installer attachment	070PF – ZY30100	
21	Driver	07749 – 0010000	Taper bearing/bevel gear disassembly/reassembly
22	Bearing driver attachment, 44 x 49.5 mm	07945 – 3330300	
23	Pilot, 28 mm	07746 – 0041100	
24	Oil seal driver, 65	07JAD – PL90100	
25	Bearing race puller	070PC – ZY30100	Propeller shaft taper bearing (outer race) removal/installation
26	Remover handle	07936 – 3710100	
27	Remover weight	07741 – 0010201	
28	Taper bearing installer attachment	070PF – ZY30100	
29	Driver handle, 480L	070GD – 0010100	
30	Driver	07749 – 0010000	Propeller shaft bearing (inner race) disassembly
31	Bearing driver attachment, 44 x 49.5 mm	07945 – 3330300	
32	Pilot, 28 mm	07746 – 0041100	
33	Driver	07749 – 0010000	Propeller shaft bearing (inner race) reassembly
34	Oil seal driver, 52 x 55 mm	07NAD – P200100	
35	Puller jaws	07WPC – ZW50100	Propeller shaft reverse bevel gear removal
36	Bearing race puller	070PC – ZY30100	
37	Remover handle	07936 – 3710100	
38	Remover weight	07741 – 0010201	
39	Puller jaws	07WPC – ZW50100	Propeller shaft reverse bevel gear bearing removal
40	Bearing race puller	070PC – ZY30100	
41	Remover handle	07936 – 3710100	
42	Remover weight	07741 – 0010201	
43	Oil seal driver, 65	07JAD – PL90100	Propeller shaft bearing/bevel gear installation
44	Vertical shaft holder	07SPB – ZW10200	Vertical shaft pinion gear nut removal/installation
45	Lock nut wrench, 30/64 mm	07916 – MB00002	Vertical shaft lock nut removal
46	Gauge adapter, 100	070PJ – ZY30100	Vertical shaft pinion gear shim adjustment
47	Puller jaws	07SPC – ZW0010Z	Vertical bevel gear backlash inspection
48	Puller bolt	07SPC – ZW0011Z	
49	Backlash indicator tool	07SPJ – ZW0030Z	
50	Driver handle, 15 x 15 x 280L	07949 – 3710001	Gear case vertical shaft 36 x 46 x 37 mm needle bearing removal
51	Attachment, 37 x 40 mm	07746 – 0010200	
52	Pilot, 32 x 50 mm	07MAD – PR90200	
53	Shaft installer, 15 x 370L	07VMF – KZ30200	Gear case vertical shaft 36 x 46 x 37 mm needle bearing installation
54	Bearing driver attachment, 64 x 72 mm	07946 – SB20000	
55	Attachment, 32 x 42 mm	070PD – ZY30100	
56	Drive shaft B	07964 – MB00200	Propeller shaft taper roller bearing (inner race) installation
57	Oil seal remover	07748 – 0010001	Water pump housing, water seal removal/installation
58	Attachment, 42 x 47 mm	07746 – 0010300	

①, ⑧, ⑮, ㉔, ㉞



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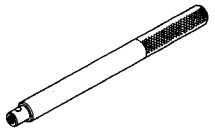

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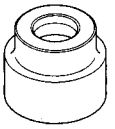

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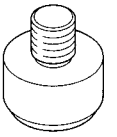

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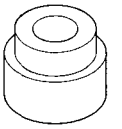

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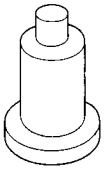

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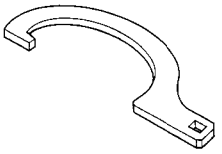

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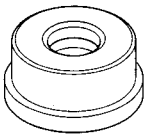

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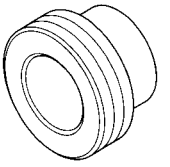

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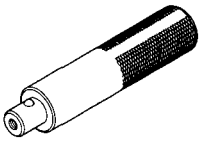

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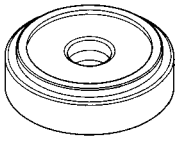

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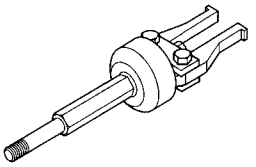

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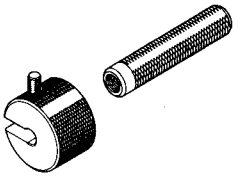

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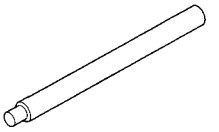

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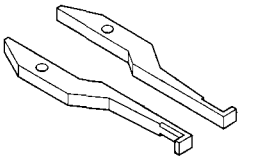

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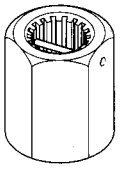

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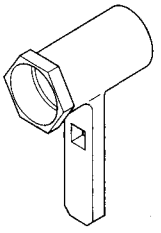

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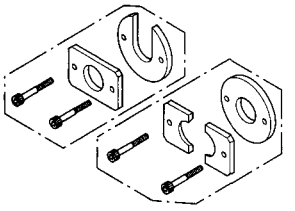

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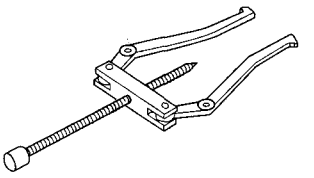

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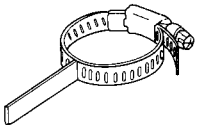

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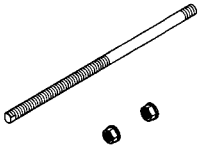

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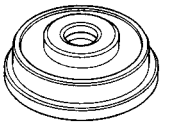

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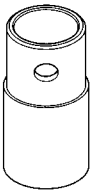

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