HONDA

BF115A•130A Paper book Part no. 66ZW500

PREFACE

This manual covers the construction, function and servicing procedures of the Honda BF115A / BF130A outboard motors.

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

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. HONDA MOTOR CO., LTD. RESERVES THE RIGHT TO MAKE CHANGES WITHOUT INCURRING ANY OBLIGATION WHATEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATIONS OFFICE

CONTENTS

SPECIFICATIONS	1
SERVICE INFORMATION	2
MAINTENANCE	3
ENGINE COVER/TIMING BELT UPPER COVER	4
PROGRAMMED FUEL INJECTION (PGM-FI)	5
ALTERNATOR/BALANCER BELT /TIMING BELT	6
ENGINE REMOVAL/INSTALLATION	7
WATER JACKET COVER/THERMOSTAT/ PRESSURE VALVE	8
CYLINDER HEAD/VALVES	9
FLYWHEEL/OIL PUMP	10
BALANCER SHAFT/CRANKCASE/ CRANKSHAFT/PISTON	11
PROPELLER/GEAR CASE/EXTENSION CASE	12
OIL PAN/ENGINE UNDERCASE/MOUNTING CASE	13
SWIVEL CASE/POWER TRIM/TILT ASSEMBLY	14
STEERING ROD/REMOTE CONTROL BOX	15
CABLES/SHIFT LINK BRACKET/SHIFT ARM	16
ELECTRICAL EQUIPMENT	17
OPERATION	18
WIRING DIAGRAM	19

Date of Issue: December, 1998
© HONDA MOTOR CO., LTD.

Abbreviations

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
Comp.	Complete
CYL	Cylinder
ECT	Engine Coolant Temperature
ECM	Engine Control Module
EX	Exhaust
F	Front or Forward
GND	Ground
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 Light
O. D.	Outside Diameter
OP	Optional Part
PCV	Positive Crankcase Ventilation
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 2. DIMENSIONAL DRAWING

1. SPECIFICATIONS

DIMENSIONS AND WEIGHTS

Item \ Model	BF115AX			
Description code	BZBD	BZBG	BZBD	BZBG
Type	LD	LCD	XD	XCD
Overall length	825 mm (32.5 in)			
Overall width	550 mm (21.7 in)			
Overall height	1,650 mm (65.0 in)		1,775 mm (69.9 in)	
Dry weight (*1)	225 kg (496 lbs)	228 kg (503 lbs)	230 kg (507 lbs)	233 kg (514 lbs)
Operating weight (including oil)	231 kg (509 lbs)	234 kg (516 lbs)	236 kg (520 lbs)	239 kg (527 lbs)

*1: With propeller mounted.

Item \ Model	BF130AX			
Description code	BZBE	BZBH	BZBE	BZBH
Type	LD	LCD	XD	XCD
Overall length	825 mm (32.5 in)			
Overall width	550 mm (21.7 in)			
Overall height	1,650 mm (65.0 in)		1,775 mm (69.9 in)	
Dry weight (*1)	225 kg (496 lbs)	228 kg (503 lbs)	230 kg (507 lbs)	233 kg (514 lbs)
Operating weight (including oil)	231 kg (509 lbs)	234 kg (516 lbs)	236 kg (520 lbs)	239 kg (527 lbs)

*1: With propeller mounted.

FRAME

Item \ Model	BF115AX/BF130AX			
Type	LD	LCD	XD	XCD
Transom height (*1)	537 mm (21.1 in)		664 mm (26.1 in)	
Transom angle	5 stage adjustment (8°, 12°, 16°, 20°, 24°)			
Tilting angle	72°			
Tilting stage	Stageless			
Swivel angle	30° right and left			
Trim angle (*1)	–4° to 16°			
Remote control steering system	Motor-mounted			

*1: Transom angle is at 12°.

APERÇU — Engine Manual — fichier complet disponible après achat 3/10

TYPES OF HONDA BF115A/BF130A OUTBOARD MOTORS

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

Model	Type	Shaft Length		Gear case		Remote Control	Control Panel	Power Trim/Tilt	Tachometer	Trimmeter
		Long	Extra-long	Standard Rotation	Counter Rotation					
BF115A/ BF130A	LD	○		○		(○)	(○)	○	(○)	(○)
	XD		○	○		(○)	(○)	○	(○)	(○)
	LCD	○			○	(○)	(○)	○	(○)	(○)
	XCD		○		○	(○)	(○)	○	(○)	(○)

L: Long shaft X: Extra-long shaft C: Counter rotation ( ): Optional part
The power trim/tilt type motors use an electric/hydraulic power cylinder to trim or tilt the motor.

ENGINE

Model	BF115AX	BF130AX
Type	4-stroke, O.H.C., 4-cylinder	
Displacement	2,254 cm^3 (137.5 cu in)	
Bore x stroke	86 x 97 mm (3.4 x 3.8 in)	
Rated power *1	84.6 kW (115 PS) at 5,000 – 6,000 min^{-1} rpm	95.6 kW (130 PS) at 5,000 – 6,000 min^{-1} (rpm)
Maximum torque	169 N•m (17.2 kgf•m, 124 lbf•ft)	180 N•m (18.4 kgf•m, 133 lbf•ft)
Compression ratio	8.8 : 1	
Fuel consumption ratio	310 g/kW•h (228 g/PS•h)	345 g/kW•h (254 g/PS•h)
Cooling system	Forced water circulation by impeller pump with thermostat	
Ignition system	Full transistorized, battery ignition	
Ignition timing	10° at 650 min^{-1} (rpm) B.T.D.C to 24° at 6,000 min^{-1} (rpm) B.T.D.C.	
Spark plug	ZFR7F (NGK), KJ22CR-L8 (DENSO)	
Fuel supply system	Programmed fuel injection (PGM-FI)	
Fuel injection system	Electronic control	
Fuel injection nozzle	Pintle type	
Fuel pipe	Steel pipe and rubber tubes	
Lubrication system	Pressure lubrication by trochoid pump	
Lubrication capacity	5.6 ℓ (5.9 US qt, 4.9 Imp qt) [with oil filter replacement: 6.5 ℓ (6.9 US qt, 5.7 Imp qt]	
Starter system	Electric starter	
Stopping system	Primary circuit ground	
Fuel	Automotive unleaded gasoline 91 research octane, 86 pump octane or higher.	
Optional fuel tank capacity	25 ℓ (6.6 US gal, 5.5 Imp gal)	
Fuel pump	Electric and mechanical plunger type	
Exhaust system	Underwater type	
Recommended oil	SAE 10W – 30/40	

*1: Full throttle range.

APERÇU — Engine Manual — fichier complet disponible après achat 4/10

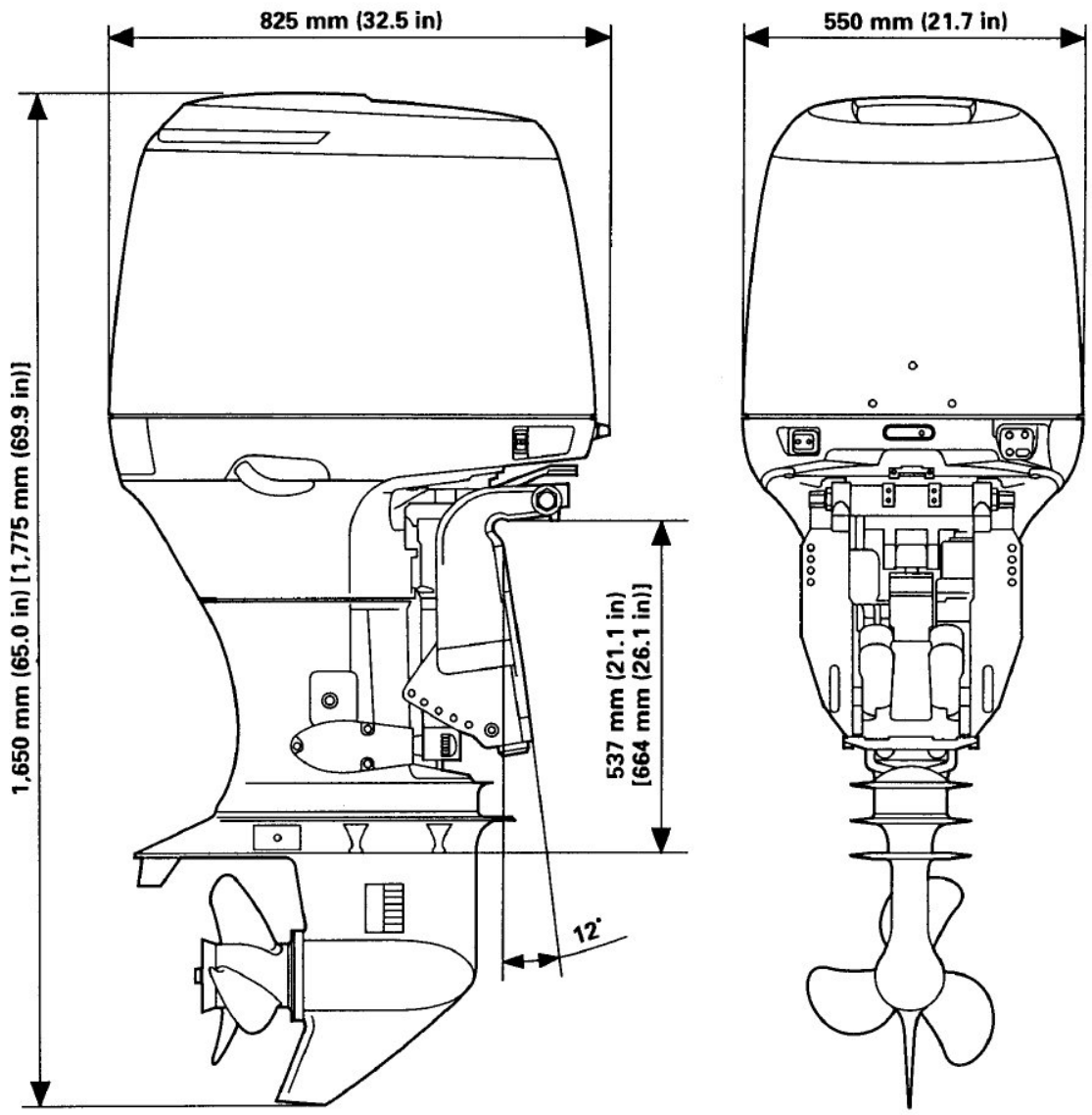
LOWER UNIT

Clutch	Dog clutch (Forward – Neutral – Reverse)
Gear ratio	0.50 (14/28)
Reduction	Spiral bevel
Gear case oil capacity	1.0 ℓ (1.1 US qt, 0.9 Imp qt)
Propeller No. of blades-Dia. x Pitch	Optional part
Propeller rotating direction	Clockwise (viewed from rear): LD and XD types Counterclockwise (viewed from rear): LCD and XCD types
Propeller driving system	Spline

APERÇU — Engine Manual — fichier complet disponible après achat

2. DIMENSIONAL DRAWING

[ ]: Extra-long shaft type



APERÇU — Engine Manual — fichier complet disponible après achat

2. SERVICE INFORMATION

1. THE IMPORTANCE OF PROPER SERVICING
2. IMPORTANT SAFETY PRECAUTIONS
3. SERVICE RULES
4. SERIAL NUMBER LOCATION
5. MAINTENANCE STANDARDS
6. TORQUE VALUES
7. SPECIAL TOOLS
8. TROUBLESHOOTING
• ENGINE
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
9. CABLE/HARNESS ROUTING
10. TUBE ROUTING
11. LUBRICATION

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 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

Be sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and safety equipment. When performing maintenance or repairs, be especially careful of the following:

- **Read the instructions before you begin, and be sure you have the tools and skills required to perform the tasks safely.**

  Be sure the engine is off before you begin any maintenance or repairs. This will reduce the possibility of several 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 cool before you touch it.

- **Injury from moving parts.**
  Do not run the engine unless the instruction tells you to do so. Even then, keep your hands, fingers, and clothing away.

To reduce the possibility of a fire or explosion, be careful when working around gasoline. Use only a nonflammable solvent, not gasoline, to clean parts. Keep all cigarettes, sparks, and flames away from the battery and all fuel-related parts.

APERÇU — Engine Manual — fichier complet disponible après achat

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 assembling.
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 assembly.
6. After assembly, 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 female threads and ruin the hole.
8. Use only metric tools when servicing this unit. Metric bolts, nuts and screws are not interchangeable with nonmetric fasteners. The use of incorrect tools and fasteners will damage the unit.
9. Follow the instructions represented by these symbols when they are used:



: Apply oil. S. TOOL :Use special tool. GREASE :Apply grease

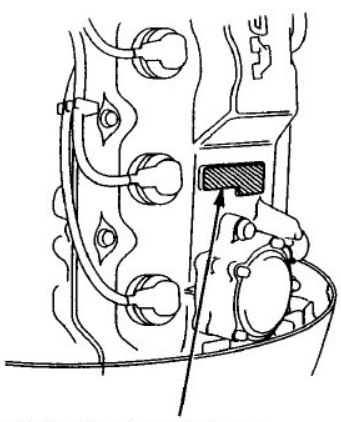
○ x ○ (○) : Indicates the type, length, and number of the flange bolt used.

P. : Indicates the reference page.

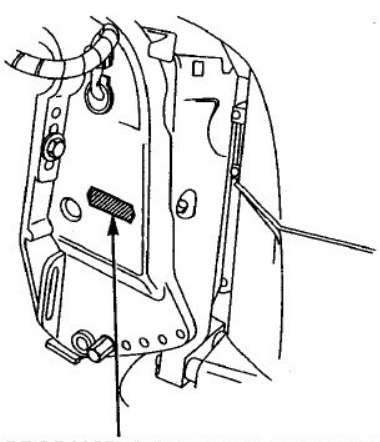
GREASE
(Molybdenum disulfide oil) : Use molybdenum oil solution (mixture of the engine oil and molybdenum grease with the ratio 1 : 1).

4. SERIAL NUMBER LOCATION

The engine serial number is stamped on the cylinder head cover and the product identification number is located on the L. 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

APERÇU — Engine Manual — fichier complet disponible après achat

5. MAINTENANCE STANDARDS

• ENGINE

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Idle speed (in neutral)		750 ± 50 min^{-1} (rpm)	———
	Trolling speed		650 ± 50 min^{-1} (rpm)	———
	Cylinder compression		1,373–1,569 kPa (14–16 kgf/cm², 199–228 psi) at 300 min^{-1} (rpm)	———
Spark plugs	Gap		0.7 – 0.8 (0.028 – 0.031)	———
Valves	Valve clearance	IN	0.24 – 0.28 (0.009 – 0.011)	———
		EX	0.28 – 0.32 (0.011 – 0.013)	———
	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	53.66 (2.113)	———
		EX	55.58 (2.188)	———
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	0.019 – 0.058 (0.0007 – 0.0023)	0.08 (0.003)
		EX	0.018 – 0.054 (0.0007 – 0.0021)	0.08 (0.003)
Pistons	Skirt O.D.		85.97 – 85.98 (3.3846 – 3.3850)	85.96 (3.384)
	Piston-to-cylinder clearance		0.020 – 0.045 (0.0008 – 0.0018)	0.050 (0.0020)
	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)

APERÇU — Engine Manual — fichier complet disponible après achat

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.		No.1–No.5	28.000 – 28.024 (1.1024 – 1.1033)	———
	Head height			99.95 – 100.05 (3.935 – 3.939)	———
Cylinder block	Cylinder sleeve I.D.			86.00 – 86.015 (3.3858 – 3.3864)	86.07 (3.389)
	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 – 0.30 (0.006 – 0.012)	0.4 (0.016)
	Connecting rod big end oil clearance			0.026 – 0.044 (0.0010 – 0.0017)	———
Crankshaft	Journal O. D.	Main	No.1/No.2	54.980 – 55.004 (2.1646 – 2.1655)	———
			No.3	54.976 – 55.000 (2.1644 – 2.1654)	———
			No.4	54.980 – 55.004 (2.1646 – 2.1655)	———
			No.5	54.992 – 55.016 (2.1650 – 2.1660)	———
		Pin		44.976 – 45.000 (1.7707 – 1.7717)	———
	Journal roundness (Main/Pin)			0.005 (0.0002) Max	0.006 (0.0002)
	Shaft runout			0.030 (0.0012) Max	0.040 (0.0016)
	Crankshaft main bearing oil clearance		No.1/No.2/ No.4	0.027 – 0.045 (0.0011 – 0.0018)	0.050 (0.0020)
			No.3	0.031 – 0.049 (0.0012 – 0.0019)	0.055 (0.0022)
			No.5	0.017 – 0.035 (0.0007 – 0.0014)	0.040 (0.0016)
	Crankshaft axial clearance			0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)

APERÇU — Engine Manual — fichier complet disponible après achat