cap.00 BF40D 50D (A).qxp 2008/04/11 13:49 ページ 1

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 the outboard motor 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 the outboard motor.

If you need to replace a part, use genuine Honda 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 the outboard motor. Any error or oversight while servicing an outboard motor can result in faulty operation, damage to the outboard motor, 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 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.

cap.00 BF40D 50D (A).qxp 2008/04/11 13:49 ページ 2

INTRODUCTION

This manual covers service and repair procedures for Honda BF40D•BF50D 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.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the publisher. This includes text, figures, and tables.

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 these outboard motors correctly and safely.

Honda Motor Co., Ltd.
Service Publications Office

CONTENTS

SPECIFICATIONS	1
SERVICE INFORMATION	2
MAINTENANCE	3
COVER	4
PROGRAMMED-FUEL INJECTION	5
ENGINE REMOVAL/INSTALLATION	6
ALTERNATOR/PULSER ROTOR/TIMING BELT	7
WATER JACKET COVER/THERMOSTAT	8
CYLINDER HEAD/VALVES/OIL PUMP	9
CRANKCASE/CYLINDER BLOCK/ CRANKSHAFT/PISTONS	10
PROPELLER/GEAR CASE/EXTENSION CASE/ OIL CASE	11
SHIFT ROD/ENGINE UNDER CASE	12
MOUNT CASE/STERN BRACKET/SWIVEL CASE	13
POWER TRIM/TILT ASSEMBLY/GAS ASSISTED DAMPER ASSEMBLY	14
STEERING ROD [REMOTE CONTROL TYPE]	15
TILLER HANDLE [TILLER HANDLE TYPE]	16
CABLES/THROTTLE ARM BRACKET	17
ELECTRICAL EQUIPMENT	18
INDEX	19
WIRING DIAGRAMS/SYSTEM DIAGRAM	20

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.00 BF40D 50D (A).qxp 2008/04/11 13:49 ページ 3

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

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.01 BF40D 50D (A).qxp 2008/04/11 13:52 ページ 1-1

1. SPECIFICATIONS 1-1
2. DIMENSIONAL DRAWINGS 1-4

1. SPECIFICATIONS

• DIMENSIONS AND WEIGHTS

Model	BF40D	
Description code	BBDJ	
Types	LH	LRT
Overall length	794 mm (31.3 in)	694 mm (27.3 in)
Overall width	372 mm (14.6 in)	
Overall height	1,364 mm (53.7 in)	
Dry weight (*1)	100.0 kg (220.5 lbs)	98.0 kg (216.1 lbs)
Operating weight (including oil)	102.5 kg (226.0 lbs)	100.5 kg (221.6 lbs)

*1: With propeller mounted.

Model	BF50D	
Description code	BBEJ	
Types	LRT	XRT
Overall length	694 mm (27.3 in)	
Overall width	372 mm (14.6 in)	
Overall height	1,364 mm (53.7 in)	1,465 mm (57.7 in)
Dry weight (*1)	98.0 kg (216.1 lbs)	102.0 kg (224.9 lbs)
Operating weight (including oil)	100.5 kg (221.6 lbs)	104.5 kg (230.4 lbs)

*1: With propeller mounted.

© Honda Motor Co., Ltd.

00 cap.01 BF40D 50D (A).qxp 2008/04/11 13:52 ページ 1-2

• FRAME

Model	BF40D		BF50D	
Types	LH	LRT	LRT	XRT
Transom height (*1)	556 mm (21.9 in)			622 mm (24.5 in)
Transom angle	5 stage adjustment (8°, 12°, 16°, 20°, 24°)			
Tilting angle (*1)	63°			
Tilting stage	Stageless			
Swivel angle	35° right and left			
Trim angle (*1)	–4° to 12°			

*1: Transom angle is at 12°.

• TYPES OF Honda BF40D•BF50D OUTBOARD MOTORS

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

Model	BF40D		BF50D	
Types	LH	LRT	LRT	XRT
Shaft length type	L	L	L	XL
Remote control box		(○)	(○)	(○)
Tiller handle	○			
Power trim/tilt		○	○	○
Gas assisted damper	○			

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

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.01 BF40D 50D (A).qxp 2008/04/11 13:52 ページ 1-3

BF40D·BF50D

• ENGINE

Model	BF40D	BF50D
Description code	BEBDJ	BEBEJ
Type	4-stroke, S.O.H.C., 3-cylinder	
Displacement	808 cm^3 (49.3 cu-in)	
Bore x stroke	70.0 x 70.0 mm (2.8 x 2.8 in)	
Rated power	29.4 kW (40 PS) at 5,500 min^{-1} (rpm)	36.8 kW (50 PS) at 5,750 min^{-1} (rpm)
Maximum torque	60 N·m (6.1 kgf·m, 44 lbf·ft) at 4,000 min^{-1} (rpm)	65 N·m (6.6 kgf·m, 48 lbf·ft) at 5,000 min^{-1} (rpm)
Compression ratio	9.4 : 1	
Fuel consumption ratio	360 g/kW·h (265 g/PS·h, 0.592 lb/HP·h)	340 g/kW·h (250 g/PS·h, 0.559 lb/HP·h)
Cooling system	Forced water circulation by impeller pump with thermostat	
Ignition system	Full transistorized, battery ignition	
Ignition timing	5° at 850 min^{-1} (rpm) A.T.D.C.	
Spark plug	DR7EB (NGK), X22ESR-UB (DENSO)	
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	2.4 ℓ (2.5 US qt, 2.1 Imp qt) [with oil filter replacement: 2.1 ℓ (2.2 US qt, 1.85 Imp qt)] [without oil filter replacement: 2.0 ℓ (2.1 US qt, 1.76 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 5W-30	

• LOWER UNIT

Clutch	Dog clutch (Forward – Neutral – Reverse)
Gear ratio	2.08 (33/26 x 23/14)
Reduction	Helical gear and spiral bevel gear
Gear case oil capacity	0.41 ℓ (0.43 US qt, 0.36 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

© Honda Motor Co., Ltd.

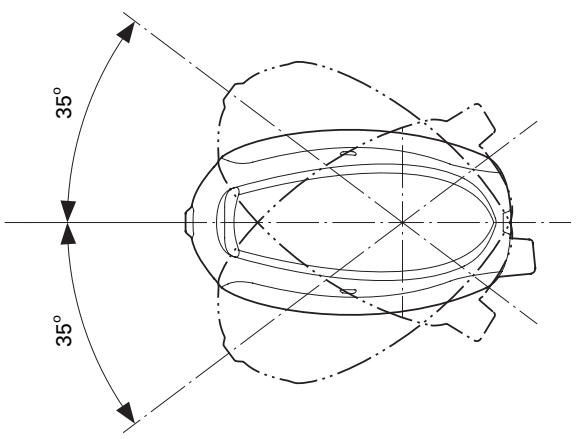
00 cap.01 BF40D 50D (A).qxp 2008/04/11 13:52 ページ 1-4

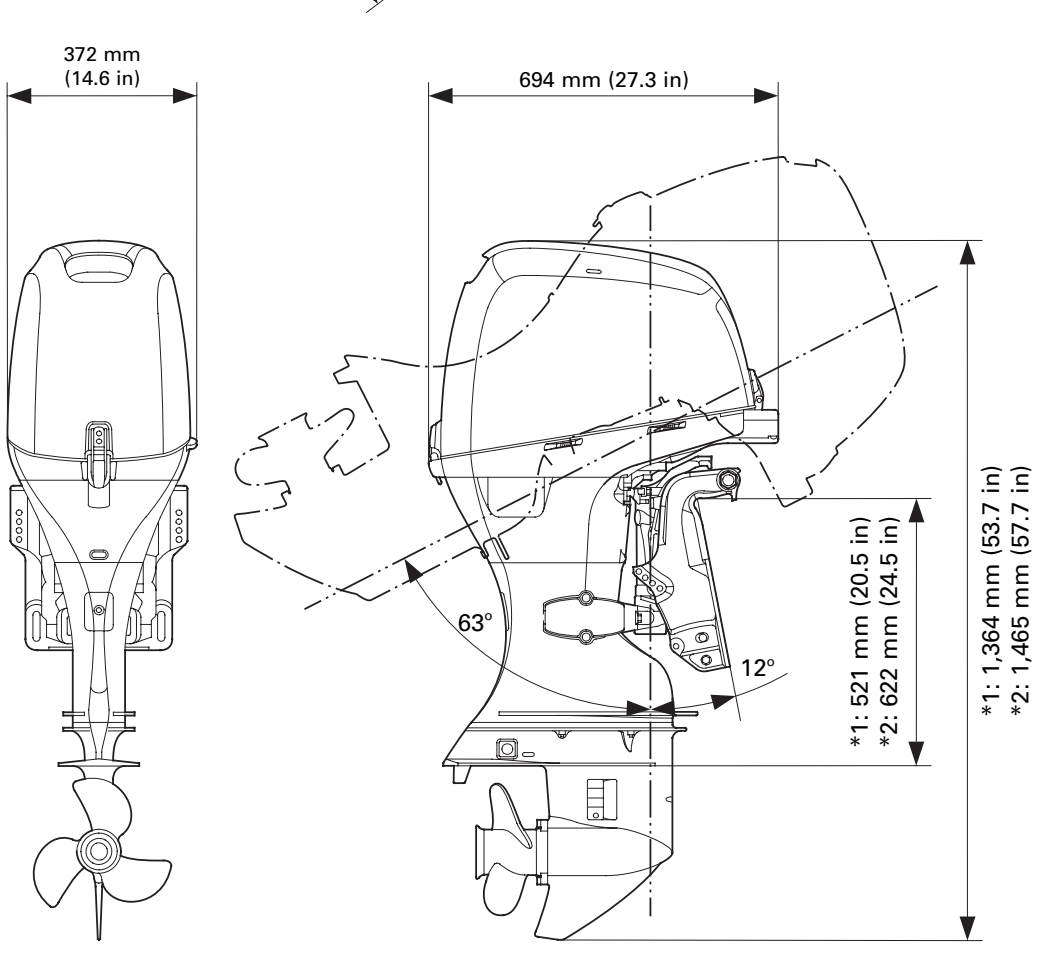
2. DIMENSIONAL DRAWINGS

• Remote control types only

*1: Long shaft type

*2: Extra-long shaft type

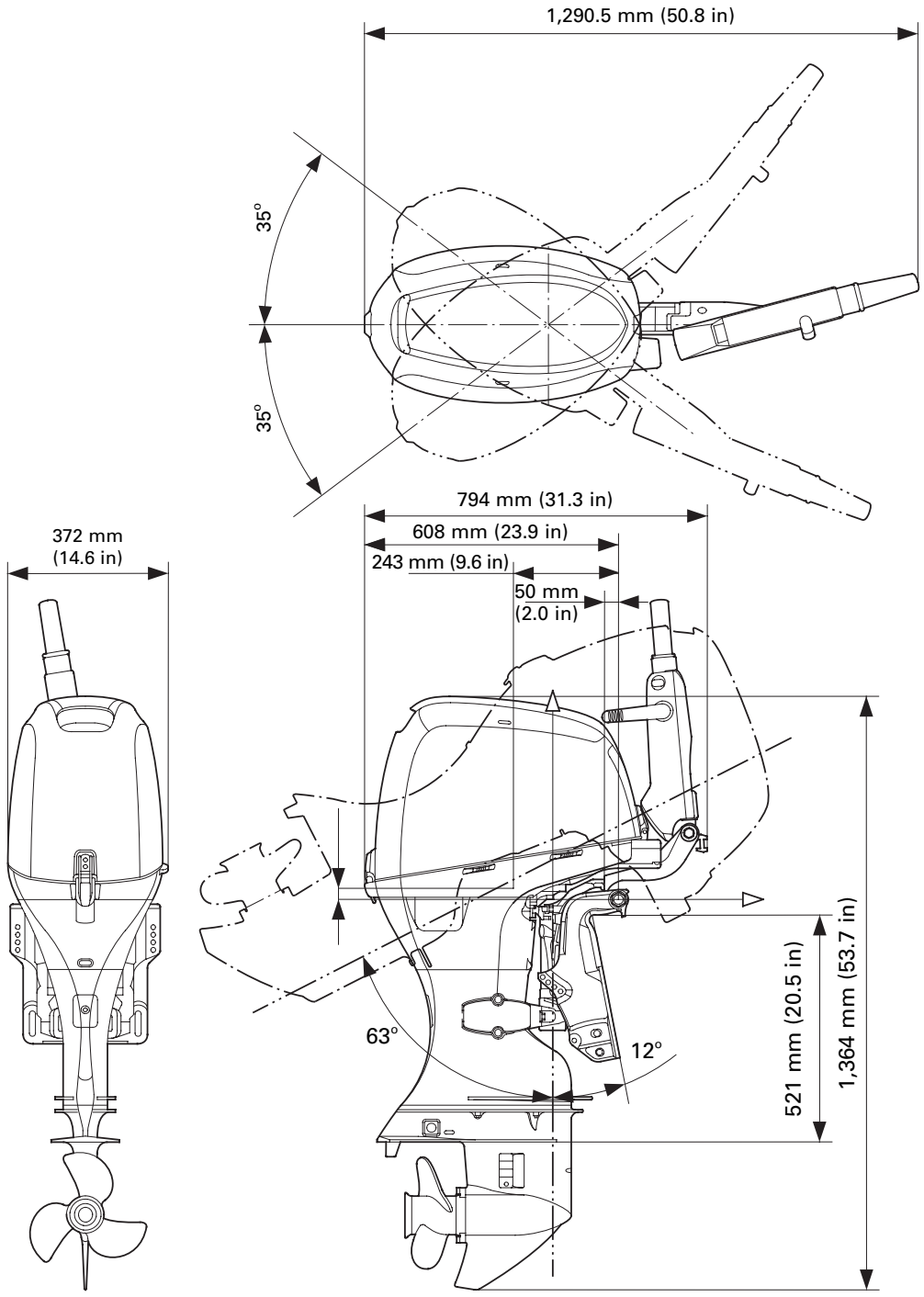




Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.01 BF40D 50D (A).qxp 2008/04/11 13:52 ページ 1-5

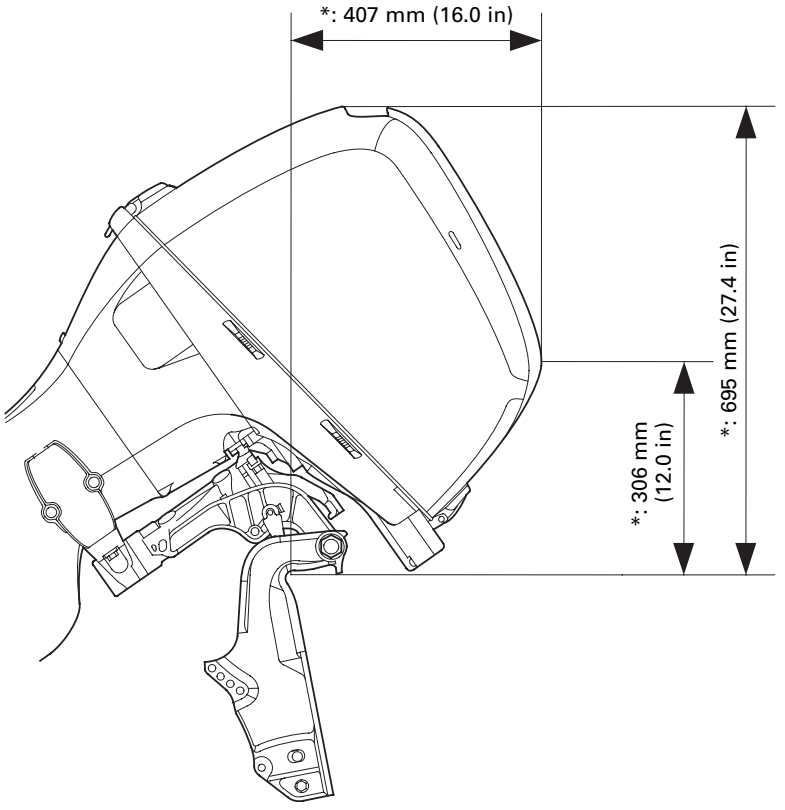
• Tiller handle types only

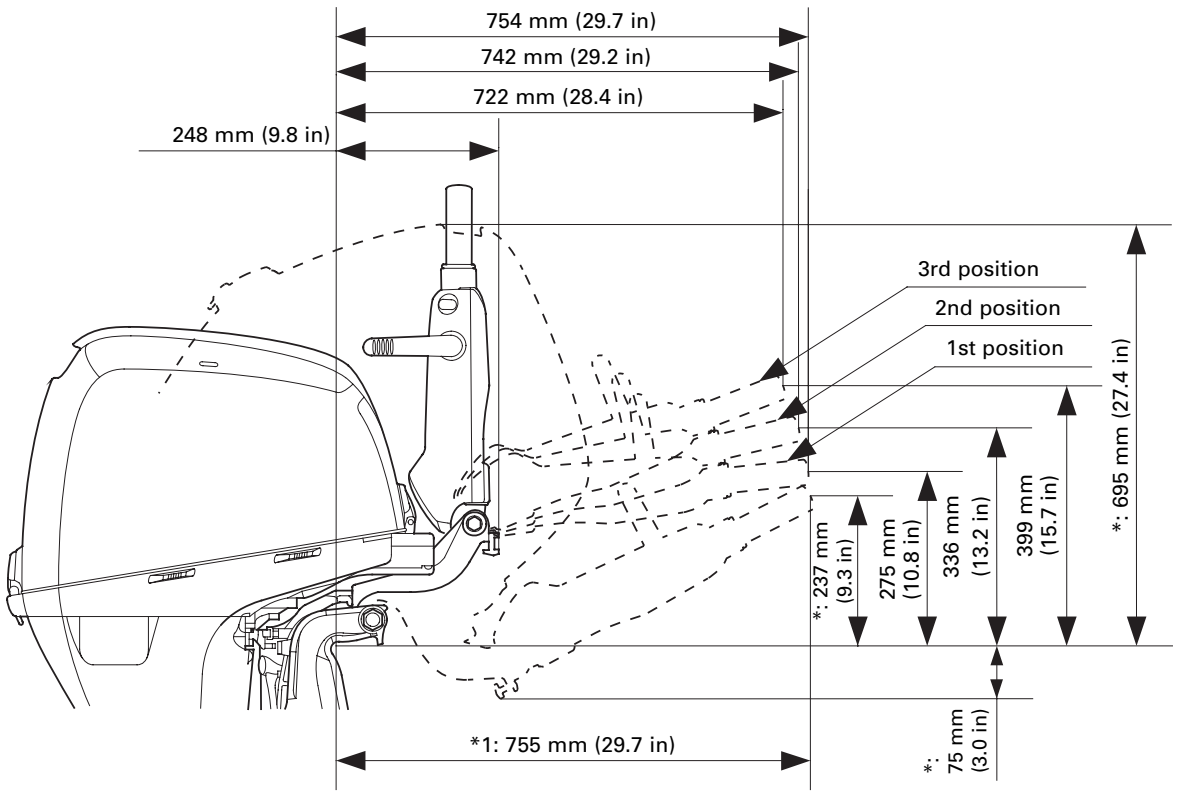


© Honda Motor Co., Ltd.

00 cap.01 BF40D 50D (A).qxp 2008/04/11 13:52 ページ 1-6

*: At 68° tilt up:

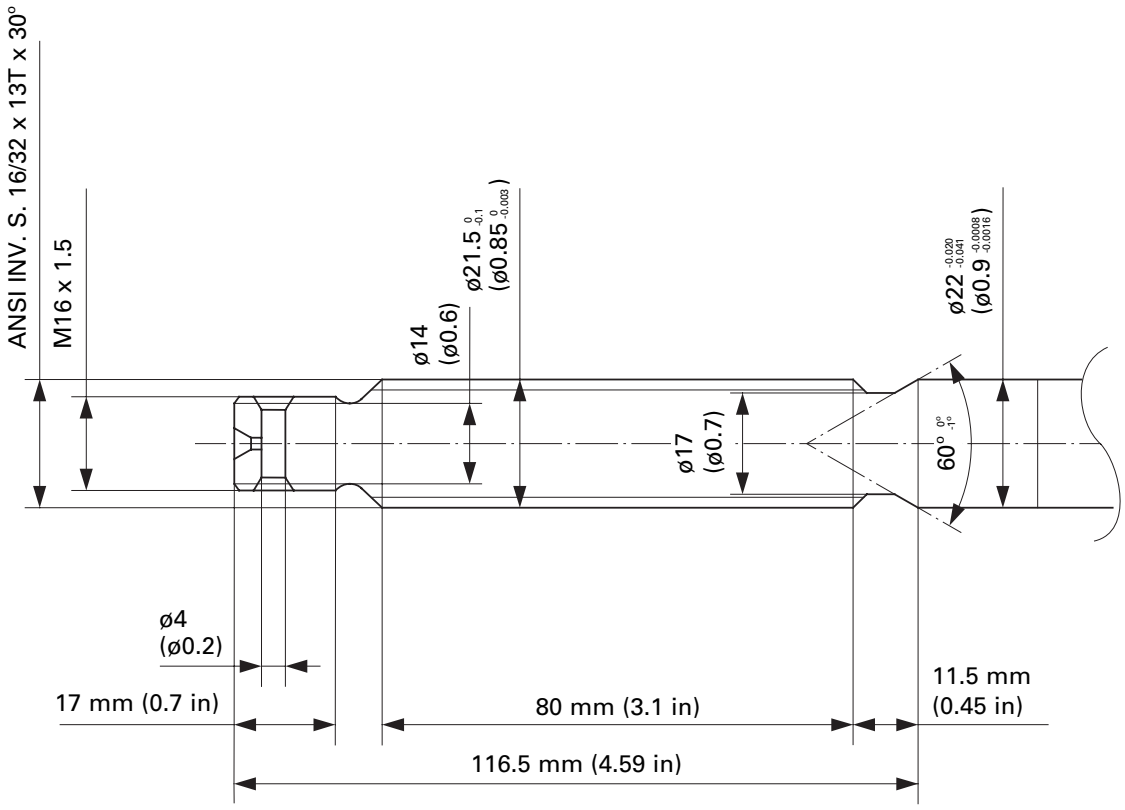




Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.01 BF40D 50D (A).qxp 2008/04/11 13:52 ページ 1-7

• PROPELLER SHAFT



© Honda Motor Co., Ltd.

00 cap.01 BF40D 50D (A).qxp 2008/04/11 13:52 ページ 1-8

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-1

2. SERVICE INFORMATION

1. SYMBOLS USED IN THIS MANUAL 2-1
2. SERIAL NUMBER LOCATION 2-1
3. STARTING PROCEDURE AFTER INSTALLING MAJOR ASSEMBLIES ... 2-2
4. MAINTENANCE STANDARDS 2-3
5. TORQUE VALUES 2-7
6. TOOLS 2-10
7. TROUBLESHOOTING 2-17
8. CABLE/HARNESS ROUTING 2-54
9. TUBE ROUTING 2-74
10. LUBRICATION POINTS 2-82

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.

(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.

GREASE — Apply grease.

GREASE (MARINE GREASE) — Apply marine grease.

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

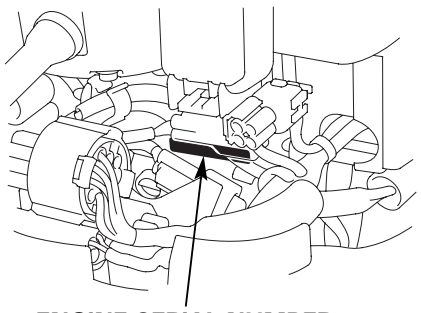
OIL — Apply oil.

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

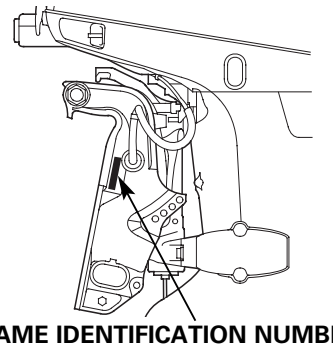
P. 1-1 — Indicates the reference page.

2. SERIAL NUMBER LOCATION

The engine serial number is stamped on the crankcase, 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

© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-2

3. STARTING PROCEDURE AFTER INSTALLING MAJOR ASSEMBLIES

- Engine assembly installation
- Cylinder head installation
- Oil case installation

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

1) Adjust the shift cable (P. 3-21).

2) Adjust the throttle cable (P. 3-18).

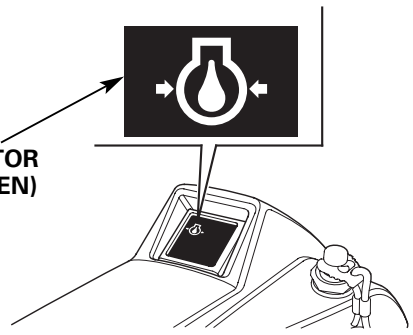
3) Connect commercially available digital multimeter or HDS (P. 3-17).

4) Start the engine and let it run to check that the oil indicator light (green) comes on. After checking, return the engine speed to idle speed.

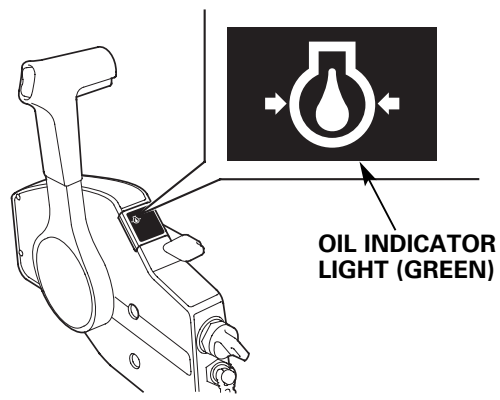
Specified idle speed (At neutral)	850±50 min^{-1} (rpm)

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. 2-35) and repeat the above procedures, starting with step 1.

<TILLER HANDLE TYPE>



<WHEN USING THE SIDE MOUNT REMOTE CONTROL BOX>



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-3

4. MAINTENANCE STANDARDS

• ENGINE

Unit: mm (in)

Parts	Item		Standard	Service limit
Engine	Idle speed (in neutral)		850±50 min^{-1} (rpm)	—
	Cylinder compression [Pressure check at 500 min^{-1} (rpm) with wide open throttle.]	Minimum	1.37 MPa (14.0 kgf/cm^2, 199 psi)	—
		Maximum variation	0.3 MPa (3.0 kgf/cm^2, 43 psi)	—
Spark plugs	Gap		0.6 – 0.7 (0.024 — 0.028)	—
Ignition coils	Resistance	Primary coil	2.1 — 2.6 Ω	—
		Secondary coil	9 — 11 kΩ	—
Valves	Valve clearance	IN	0.13 — 0.17	—
		EX	0.21 — 0.25	—
	Stem O.D.	IN	5.480 — 5.490 (0.2157 — 0.2161)	5.45 (0.215)
		EX	5.460 — 5.470 (0.2150 — 0.2154)	5.42 (0.213)
	Stem-to-guide clearance	IN	0.010 — 0.032 (0.0001 — 0.0013)	0.06 (0.002)
		EX	0.030 — 0.052 (0.0012 — 0.0020)	0.10 (0.004)
Valve seats	Seat width	IN	1.25 — 1.55 (0.049 — 0.061)	2.0 (0.08)
		EX	1.25 — 1.55 (0.049 — 0.061)	2.0 (0.08)
Valve guides	Guide I.D.	IN/EX	5.500 — 5.512 (0.2165 — 0.2170)	5.53 (0.218)
Valve springs	Free length	IN	36.9 (1.45)	35.4 (1.39)
		EX	36.9 (1.45)	35.4 (1.39)
Rocker arms	Rocker arm I.D.		14.010 — 14.028 (0.5516 — 0.5523)	14.05 (0.553)
	Rocker shaft O.D.		13.976 — 13.994 (0.5502 — 0.5509)	13.95 (0.549)
	Rocker arm-to-rocker shaft clearance		0.016 — 0.052 (0.0006 — 0.0020)	0.07 (0.003)
Pistons	Skirt O.D.		69.970 — 69.990 (2.7547 — 2.7555)	69.91 (2.752)
	Piston-to-cylinder clearance		0.010 — 0.045 (0.0004 — 0.0018)	0.09 (0.0035)
	Piston pin bore I.D.		18.002 — 18.008 (0.7087 — 0.7090)	18.021 (0.7095)

© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-4

Unit: mm (in)

Parts	Item		Standard	Service limit
Piston pins	Pin O.D.		17.994 — 18.000 (0.7084 — 0.7087)	17.954 (0.7068)
	Pin-to-pin bore clearance		0.002 — 0.014 (0.0001 — 0.0006)	0.04 (0.0016)
Piston rings	Ring side clearance	Top	0.040 — 0.065 (0.0016 — 0.0026)	0.1 (0.004)
		Second	0.015 — 0.045 (0.00059 — 0.0018)	0.1 (0.004)
		Oil	0.055 — 0.140 (0.0022 — 0.0055)	0.15 (0.006)
	Ring end gap	Top	0.15 — 0.30 (0.006 — 0.012)	0.8 (0.03)
		Second	0.15 — 0.30 (0.006 — 0.012)	0.8 (0.03)
		Oil	0.2 — 0.7 (0.008 — 0.028)	1.0 (0.04)
	Ring thickness	Top	0.975 — 0.990 (0.0384 — 0.0390)	0.96 (0.038)
		Second	1.175 — 1.190 (0.0463 — 0.0469)	1.16 (0.046)
Cylinder head	Warpage		0.05 (0.002) Max.	0.1 (0.004) Min.
	Camshaft journal I.D.		23.000 — 23.021 (0.9055 — 0.9063)	23.05 (0.907)
Cylinder block	Cylinder sleeve I.D.		70.000 — 70.015 (2.7559 — 2.7565)	70.06 (2.758)
	Warpage		0.05 (0.002) Max.	0.1 (0.004) Min.
Connecting rods	Small end I.D.		18.016 — 18.034 (0.7093 — 0.7100)	18.05 (0.711)
	Big end axial clearance		0.05 — 0.20 (0.002 — 0.008)	0.3 (0.012)
	Big end oil clearance		0.016 — 0.040 (0.0006 — 0.0016)	0.05 (0.002)
	Connecting rod bearing oil clearance		0.020 — 0.038 (0.0008 — 0.0015)	0.08 (0.003)
Crankshaft	Journal O.D.	Main	39.982 — 40.006 (1.5741 — 1.5750)	39.95 (1.573)
		Pin	37.976 — 38.000 (1.4951 — 1.4961)	37.94 (1.494)
	Main bearing oil clearance		0.021 — 0.039 (0.0008 — 0.0015)	0.05 (0.002)
	Thrust washer side clearance		0.05 — 0.3 (0.002 — 0.012)	0.45 (0.018)

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-5

Unit: mm (in)

Parts	Item		Standard	Service limit
Camshaft	Camshaft axial clearance		0.03 — 0.11 (0.0012 — 0.0043)	0.3 (0.012)
	Camshaft runout		0.03 (0.001) Max.	0.05 (0.002)
	Journal O.D.		22.959 — 22.980 (0.9039 — 0.9047)	22.93 (0.903)
	Cam height	IN	35.266 — 35.606 (1.3884 — 1.4018)	35.046 (1.3798)
		EX	35.311 — 35.651 (1.3902 — 1.4036)	35.091 (1.3815)
	Camshaft journal oil clearance		0.020 — 0.065 (0.0008 — 0.0026)	0.08 (0.003)
Oil pump	Body I.D.		50.15 — 50.18 (1.974 — 1.975)	50.20 (1.976)
	Inner rotor-to-outer rotor clearance		0.15 (0.006) Max.	0.20 (0.008)
	Outer rotor-to-oil pump body clearance		0.15 — 0.22 (0.006 — 0.009)	0.26 (0.010)
	Outer rotor height		16.98 — 17.00 (0.6685 — 0.6693)	16.93 (0.667)
	Pump body depth		17.02 — 17.05 (0.670 — 0.671)	17.09 (0.673)
	Outer rotor-to-oil body side clearance		0.02 — 0.07 (0.0008 — 0.0028)	0.1 (0.004)
Vapor separator	Float height		26.8 — 29.8 (1.06 — 1.17)	—
Fuel pump (High pressure side)	Discharge volume [with pump operated for 2 sec. at 12V]		35 cm^3 (1.2 US oz, 1.2 Imp oz) or more	—
Fuel line	Fuel pressure [kPa (kgf/cm^2, psi)]		280 — 330 (2.9 — 3.4, 41 — 48)	—
Alternator	Stator resistance		0.25 — 0.37 Ω	—
Pulser coil	Resistance		288 — 352 Ω	—
Starter motor	Brush length		16 (0.6)	12 (0.5)
	Insulator length (Mica depth)		—	0.2 (0.008)
Thermostat	Start opening		52°C (126°F)	—
	Full open		62°C (144°F)	—
	Lift height		3.0 (0.12) or more	—

© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-6

• FRAME

Unit: mm (in)

Parts	Item		Standard	Service limit
Propeller shaft	Shaft O.D.	At forward bevel gear	18.967 — 18.980 (0.7467 — 0.7472)	18.946 (0.7459)
		At reverse bevel gear	20.900 — 21.200 (0.8228 — 0.8346)	20.850 (0.8209)
		At needle bearing	22.007 — 22.020 (0.8664 — 0.8669)	21.990 (0.8657)
	Runout		0.01 (0.0004) or below	0.02 (0.0008)
Bevel gear	Gear I.D.	Forward	19.000 — 19.021 (0.7480 — 0.7489)	19.04 (0.750)
		Reverse	22.05 — 22.30 (0.868 — 0.878)	22.35 (0.880)
Vertical shaft	Shaft O.D. (at needle bearing)		22.217 — 22.230 (0.8747 — 0.8752)	22.196 (0.8739)
Power tilt motor	Brush length		9.75 (0.384)	5.5 (0.22)
	Mica depth		1.8 (0.07)	1.3 (0.05)
Power trim/tilt assembly	Lower chamber hydraulic pressure [MPa (kgf/cm^2, psi)]		19.3 — 23.0 (197 — 235, 2,802 — 3,342)	—
	Upper chamber hydraulic pressure [MPa (kgf/cm^2, psi)]		27.9 — 34.8 (285 — 355, 4,054 — 5,049)	—

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-7

5. TORQUE VALUES

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• **ENGINE**				
Crankcase bolt (*1)	M8 x 1.25	28	2.9	21
	M6 x 1.0	12	1.2	9
Cylinder head cover bolt	M6 x 1.0	12	1.2	9
Cylinder head bolt (*2)	M10 x 1.25	40	4.1	30
	M8 x 1.25	27	2.8	20
Camshaft holder (6 x 70 mm)	M6 x 1.0	14	1.4	10
(6 x 35 mm)	M6 x 1.0	12	1.2	9
Spark plug	M12 x 1.25	18	1.8	13
Connecting rod nut	M8 x 0.75 (Special bolt)	28	2.9	21
Valve adjusting lock nut	M7 x 0.75	23	2.3	17
48 mm lock nut	M48 x 1.5	130	13.3	96
Timing belt tensioner bolt	M10 x 1.25	45	4.6	33
Timing belt adjusting spring bolt	M6 x 1.0	12	1.2	9
Camshaft pulley bolt	M10 x 1.25	57	5.8	42
Oil filter holder	M20 x 1.5	18	1.8	13
Oil filter	M20 x 1.5	12	1.2	9
Oil drain plug bolt	M12 x 1.5	23	2.3	17
Oil pump bolt	M6 x 1.0	13	1.3	10
Oil pump 14 mm sealing bolt	M14 x 1.25	29	3.0	21
Oil strainer bolt	M6 x 1.0	13	1.3	10
Water tube joint	PT 1/8	9	0.9	6.6
Primary drive gear nut	M22 x 1.25	92	9.4	68
Alternator rotor nut	M24 x 1.5	300	30.6	221
ECM bolt	M6 x 1.0	5	0.5	3.7
Starter solenoid wire nut				
(Starter solenoid side)	M6 x 1.0	5.5	0.6	4.1
(Starter motor side)	M8 x 1.25	7	0.7	5.2
EOP switch	PT1/8	9	0.9	6.6
EBT sensor	M12 x 1.25	18	1.8	13
ECT2 sensor	M12 x 1.25	18	1.8	13
HO2S	M12 x 1.5	10	1.0	7
MAP sensor screw	M5 x 0.8	3.5	0.4	2.6
IAC valve bolt	M8 x 1.25	22	2.2	16
Primary gear case bolt				
(8 x 35 mm, 8 x 75 mm flange bolts)	M8 x 1.25	26.5	2.7	20
(8 x 55 mm hex bolts)	M8 x 1.25	21.5	2.2	16
Throttle body bolt	M6 x 1.0	12	1.2	9
Intake manifold bolt, nut	M6 x 1.0	12	1.2	9
Fuel hose bolt	M6 x 1.0	12	1.2	9
Fuel line bolt	M6 x 1.0	12	1.2	9
Pressure regulator bolt	M6 x 1.0	11.8	1.2	9
Water jacket cover bolt	M6 x 1.0	12	1.2	9
Oil pan bolt	M6 x 1.0	12	1.2	9

*1: Tighten the crankcase bolt to 28 N·m (2.9 kgf·m, 21 lbf·ft) (snug torque), then further tighten it 90° — 120° (angle method).

*2: Tighten the cylinder head bolt to 40 N·m (4.1 kgf·m, 30 lbf·ft) (snug torque), then further tighten it 90° — 120° (angle method).

© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-8

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• ENGINE				
Thermostat cover bolt	M6 x 1.0	12	1.2	9
Fuel pump (low pressure side) bolt	M6 x 1.0	9	0.9	6.6
Fuel strainer (low pressure side) strainer cup	———	3	0.3	2.2
Exhaust pipe bolt	M8 x 1.25	26.5	2.7	20
Service check bolt	M6 x 1.0	11.8	1.2	9
• GEAR CASE				
16 mm castle nut (*1)	M16 x 1.5	1	0.1	0.7
Gear case bolt				
(Long shaft type only)	M10 x 1.25	35	3.6	26
(Long shaft type only)	M8 x 1.25	22	2.2	16
Gear case nut				
(Extra-long shaft type only)	M10 x 1.25	35	3.6	26
(Extra-long shaft type only)	M8 x 1.25	22	2.2	16
Oil check bolt	M8 x 1.25	6.5	0.7	4.8
Flushing bolt	M8 x 1.25	6.5	0.7	4.8
Drain plug 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	M6 x 1.0	11	1.1	8
Sensor nipple	M8 x 1.0	1	0.1	0.7
Pinion gear nut	M12 x 1.25	75	7.6	55
• EXTENSION CASE/MOUNT CASE				
Extension case bolt	M8 x 1.25	22	2.2	16
Lower rubber mount nut	M12 x 1.25	55	5.6	41
Lower mount housing bolt	M8 x 1.25	22	2.2	16
Upper rubber mount nut	M10 x 1.25	45	4.6	33
Drain plug cover bolt	M6 x 1.0	6.5	0.7	4.8
Under cover screw	M5 x 0.8	3	0.3	2.2
• STERN BRACKET/SWIVEL CASE				
7/8-14 UNF self-locking nut (*2)	7/8-14 UNF	40	4.1	30
Stern bracket nut	M10 x 1.25	35	3.6	26
Friction lever nut (tiller handle type only) (*3)	M8 x 1.25 (Special nut)	9.5	1.0	7.0
Grease fitting	M6 x 1.0	3	0.3	2.2
• POWER TRIM/TILT ASSEMBLY				
Upper joint metal	M14 x 1.5	44	4.5	32
Oil tank cap	3/8-16 UNC	1.1	0.1	0.8
Oil tank socket bolt	M5 x 0.8	4.7	0.5	3.5
Outer tube guide	M52 x 1.5	88	9.0	65
Outer tube	M41 x 1.5	64	6.5	47
Gear pump assembly socket bolt	M5 x 0.8	5.2	0.5	3.8
Spool valve cap	M22 x 1.0	22	2.2	16
Manual valve	M14 x 1.75	1.7	0.2	1.3
2-way valve	M12 x 1.0	6.8	0.7	5.1
Power tilt motor assembly screw	1/4-20 UNF	5.9	0.6	4.4
Yoke screw	M5 x 0.8	2.1	0.2	1.5

*1: If the split pin cannot be set by tightening the 16 mm castle nuts to 1 N·m (0.1 kgf·m, 0.7 lbf·ft), tighten the 16 mm castle nut until the split pin can be set. Note that the maximum torque of the 16 mm castle nut is 35 N·m (3.6 kgf·m, 26 lbf·ft).

*2: Tighten the 7/8-14 UNF self-locking nut to 40 N·m (4.1 kgf·m, 30 lbf·ft) (snug torque), then turn it back to 180° — 210° (angle method).

*3: Turn the friction lever to the left side fully, and hold it in this position and tighten the friction lever nut to the specified torque.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-9

Item	Thread dia. (mm) and pitch (length)	Torque value		
		N·m	kgf·m	lbf·ft
• GAS ASSISTED DAMPER ASSEMBLY				
Tilt lever nut	M6 x 1.0	12	1.2	9
• STEERING ROD				
Steering rod nut	3/8-24 UNF	22	2.2	16
• 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
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				
Neutral switch nut	M20 x 1.0	2.5	0.3	1.8
Main wire harness B terminal nut	M6 x 1.0	5.5	0.6	4.1
Power tilt relay B terminal nut	M6 x 1.0	5.5	0.6	4.1

• 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	5 mm	5	0.5	3.7
	6 mm (SH bolt)	9	0.9	6.6
	6 mm (CT bolt)	12	1.2	9
	6 mm	12	1.2	9
	8 mm	26.5	2.7	20
	10 mm (Engine side)	34	3.5	25
	10 mm (Frame side)	39	4.0	29

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

© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-10

6. TOOLS

a. COMMERCIALLY AVAILABLE TOOLS
ORDERING INFORMATION

These 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 Honda Marine Tool and Equipment Program by calling (888) 424-6857. Refer to the catalog for a complete tool listing.

Tool name	Tool number	Application
Deep flare nut	ANM14	HO2S removal/installation
Compression gauge	EEPV303A	Cylinder compression testing
Leak down tester	KLIAT1006M	Cylinder leak down
Engine oil pressure gauge set	MT37A	Cylinder block oil pressure testing/ inspection
Engine oil pressure gauge attachment	AT77AH	
Gear case filler	STV-S33	Gear case oil filling
Adapter, 8 x 1.25 mm	STV-334Y	Gear case oil filling/gear case pressure check
Pressure tester	STV-V34	Gear case pressure check
Tube clamp (2 required)	HCP6	Fuel strainer and fuel pump removal/ installation Pressure regulator inspection
Digital multimeter	FLU-88	Idle speed and electrical testing
Valve seat cutter, #115 32°	NWY-CU115	Valve seat reconditioning (EX)
Valve seat cutter, #122 45°	NWY-CU122	
Valve seat cutter, #111 60°	NWY-CU111	
Solid pilot bar, 5.5 mm	NWY-100-5.5	
Solid pilot bar, 5.52 mm	NWY-100-5.52	
Valve seat cutter, #232 32° x 45°	NWY-CU232	Valve seat reconditioning (IN)
Valve seat cutter, #270 60°	NWY-CU270	
Solid pilot bar, 5.5 mm	NWY-140-5.5	
Solid pilot bar, 5.52 mm	NWY-140-5.52	
T-wrench, #505	NWY-TW-505	Valve seat reconditioning
Valve lapper	LIL-21100	Valve lapping
Piston ring compressor	RC40C	Piston installation
Heat gun	ETB1600	Lower mount center housing removal/ installation Upper joint metal removal
Steering wheel puller	OTC 7403	Forward bevel gear backlash adjustment
Slide hammer, 3/8 x 16"	KMT-J6125-B	6005 radial ball bearing removal

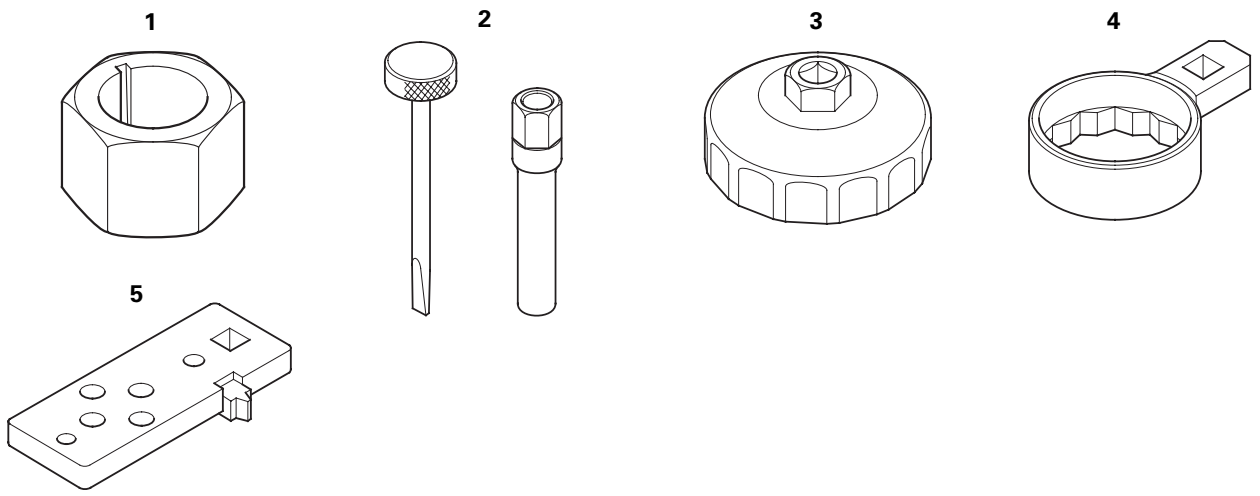
Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-11

b SPECIAL TOOLS

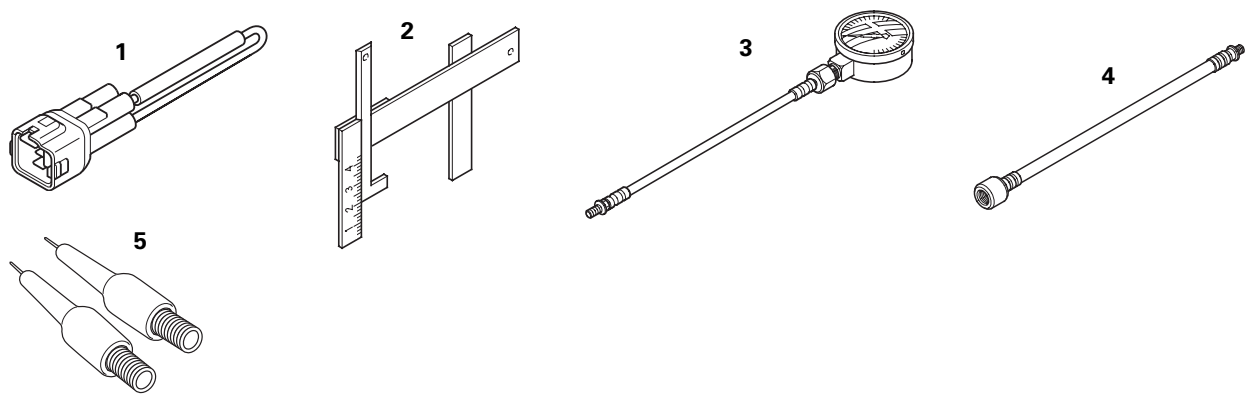
• MAINTENANCE

No.	Tool name	Tool number	Application
1	Crankshaft holder	070PB-ZZ50100	Timing belt replacement
2	Valve adjustment wrench, 10 mm	07908-5900000	Valve clearance adjustment
3	Oil filter wrench	07HAA-PJ70101 or 07AMA-MFJA100	Oil filter removal/installation
4	56 mm lock nut wrench	07LPA-ZV30200	Valve clearance inspection, timing belt replacement
5	Ring gear holder	07LPB-ZV30100	Alternator rotor removal/installation



• PROGRAMMED-FUEL INJECTION

No.	Tool name	Tool number	Application
1	SCS short connector	070PZ-ZY30100	ECM troubleshooting, idling adjustment
2	Float level gauge	07401-0010000	Vapor separator float level inspection
3	Fuel pressure gauge 0 – 100 PSI	07406-004000B	Fuel pressure inspection
4	Fuel pressure hose	07406-004020B	Fuel pump (high pressure side) inspection
5	Tester probe (male)	07ZAJ-RDJA110	ECM troubleshooting

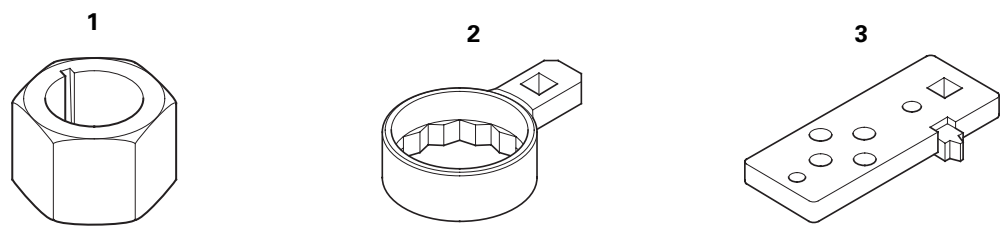


© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-12

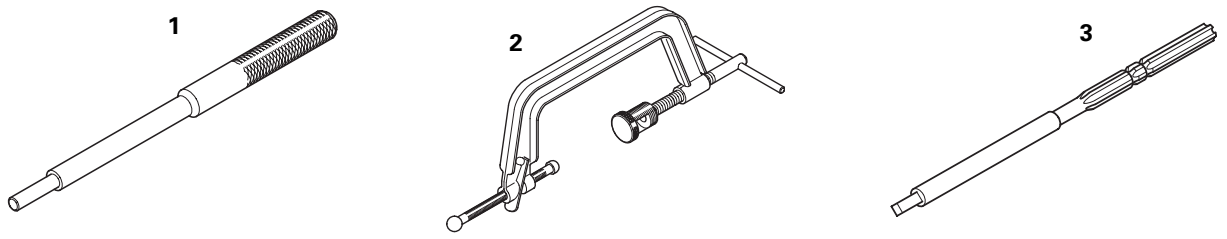
• ALTERNATOR/CAMSHAFT PULLEY/TIMING BELT

No.	Tool name	Tool number	Application
1	Crankshaft holder	070PB-ZZ50100	Timing belt replacement
2	56 mm lock nut wrench	07LPA-ZV30200	Valve clearance inspection, timing belt replacement
3	Ring gear holder	07LPB-ZV30100	Alternator rotor removal/installation



• CYLINDER HEAD/VALVES/OIL PUMP

No.	Tool name	Tool number	Application
1	Valve guide driver, 5.5 mm	07742-0010100	Valve guide removal/installation
2	Valve spring compressor	07757-0010000	Valve keeper removal/installation
3	Valve guide reamer, 5.5 mm	07984-200000D	Valve guide reaming



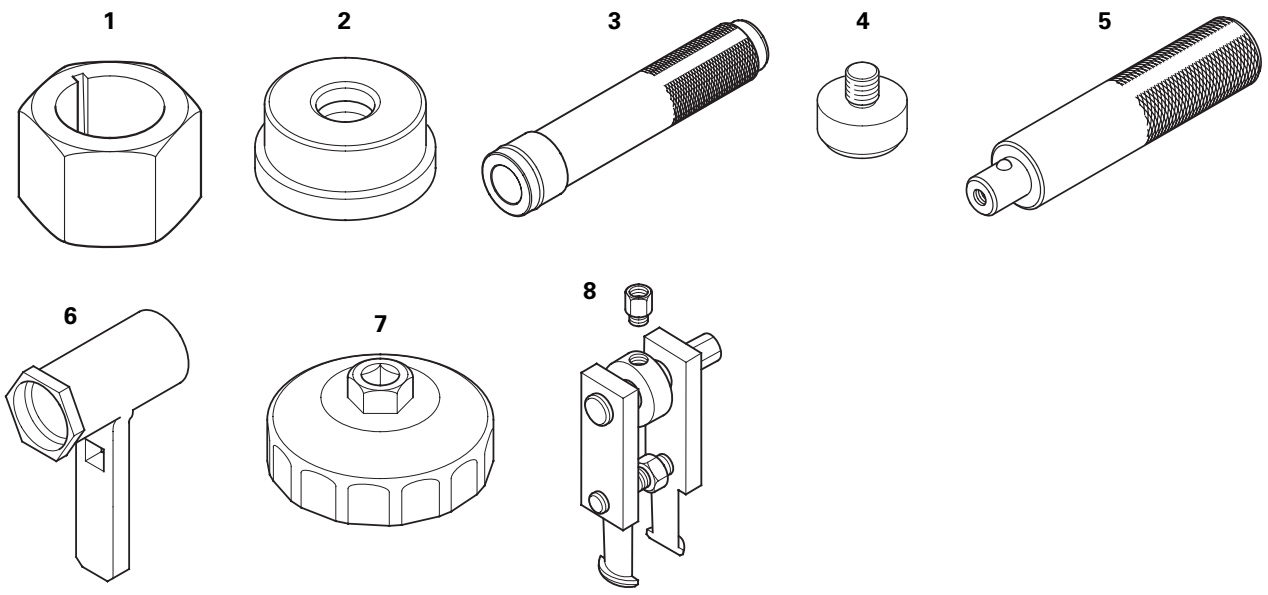
Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-13

• CRANKCASE/CYLINDER BLOCK/CRANKSHAFT/PISTONS

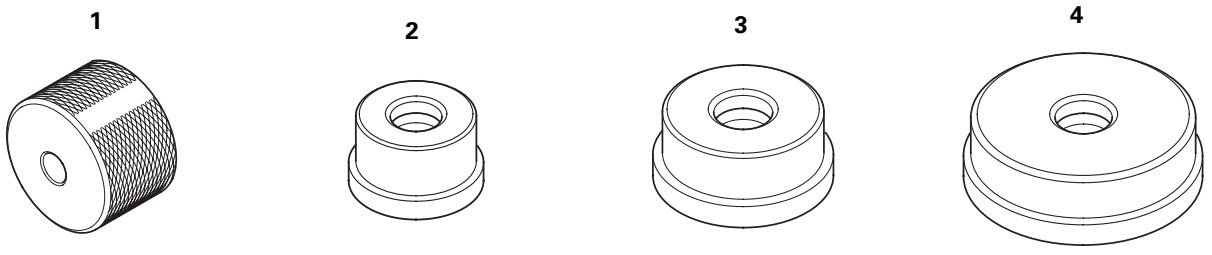
No.	Tool name	Tool number	Application
1	Crankshaft holder	070PB-ZZ50100	Crankshaft holding
2	Attachment, 42 x 47 mm	07746-0010300	6005 radial ball bearing installation
3	Driver, 22 mm I.D.	07746-0020100	Primary drive gear installation
4	Pilot, 25 mm	07746-0040600	6005 radial ball bearing installation
5	Driver	07749-0010000	Driver for 2 and 4
6	Lock nut wrench, 30 x 40 mm	07916-9690000	22 mm flange nut removal/installation
7	Oil filter wrench	07HAA-PJ70101 or 07AMA-MFJA100	Oil filter removal/installation
8	Adjustable bearing puller, 25-40 mm (*1:)	07736-A01000B	6005 radial ball bearing removal

(*1:) Must be used with commercially available slide hammer, 3/8-16" .



• PROPELLER/GEAR CASE/EXTENSION CASE/OIL CASE (1/3)

No.	Tool name	Tool number	Application
1	Remover weight	07936-371020A	Weight for 12 and 19
2	Attachment, 32 x 35 mm	07746-0010100	Reverse bevel gear removal, 22 x 35 x 7 mm water seal installation
3	Attachment, 42 x 47 mm	07746-0010300	25 x 47 x 15 mm bearing (outer race) installation
4	Attachment, 62 x 68 mm	07746-0010500	32 x 58 x 17 mm bearing (outer race) installation

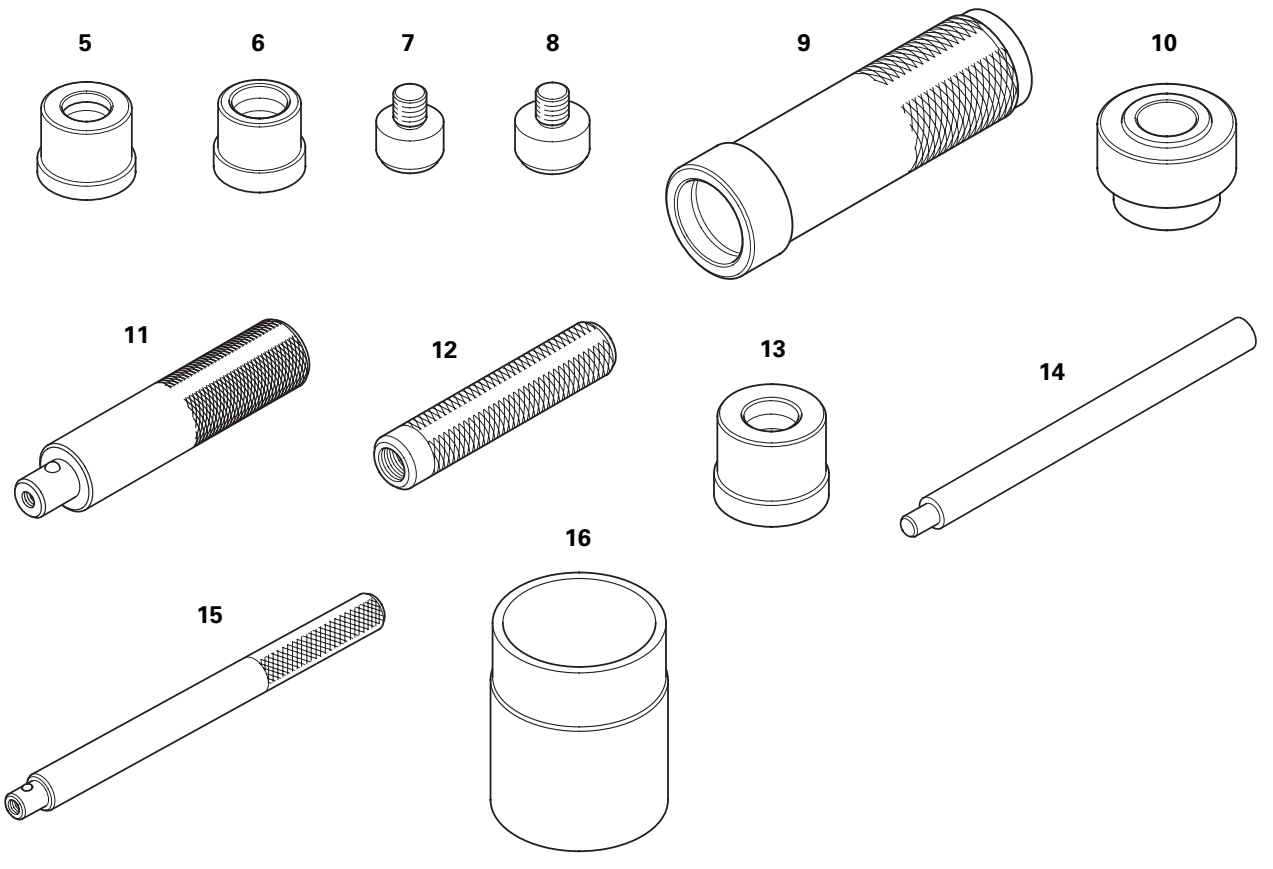


© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-14

• PROPELLER/GEAR CASE/EXTENSION CASE/OIL CASE (2/3)

No.	Tool name	Tool number	Application
5	Attachment, 24 x 26 mm	07746-0010700	7/8 x 1-1/8 x 1 needle bearing removal/ installation
6	Attachment, 22 x 24 mm	07746-0010800	22 x 28 x 20 mm needle bearing removal
7	Pilot, 17 mm	07746-0040400	17 x 30 x 7 mm water seal installation
8	Pilot, 22 mm	07746-0041000	Reverse bevel gear removal, 22 x 28 x 20 mm needle bearing removal/ installation, 22 x 35 x 7 mm water seal installation, 7/8 x 1-1/8 x 1 needle bearing removal/installation
9	Driver, 40 mm I.D.	07746-0030100	Driver for 10
10	Inner driver, 35 mm	07746-0030400	6007 radial ball bearing installation
11	Driver	07749-0010000	Driver for 2, 3, 6, 7, 8 and 13
12	Remover handle	07936-3710100	25 x 47 x 15 mm bearing (outer race) removal, 32 x 58 x 17 mm bearing (outer race) removal
13	Attachment, 28 x 30 mm	07946-1870100	22 x 28 x 20 mm needle bearing installation, 17 x 30 x 7 mm water seal installation
14	Driver handle, 15 x 325 mm	07946-MJ0A100	Reverse bevel gear/bearing assembly removal
15	Driver handle, 15 x 280 mm	07949-3710001	Driver for 4, 5 and 8
16	Base, 73 x 78/82.6	07965-SD90100	Reverse bevel gear/bearing assembly removal

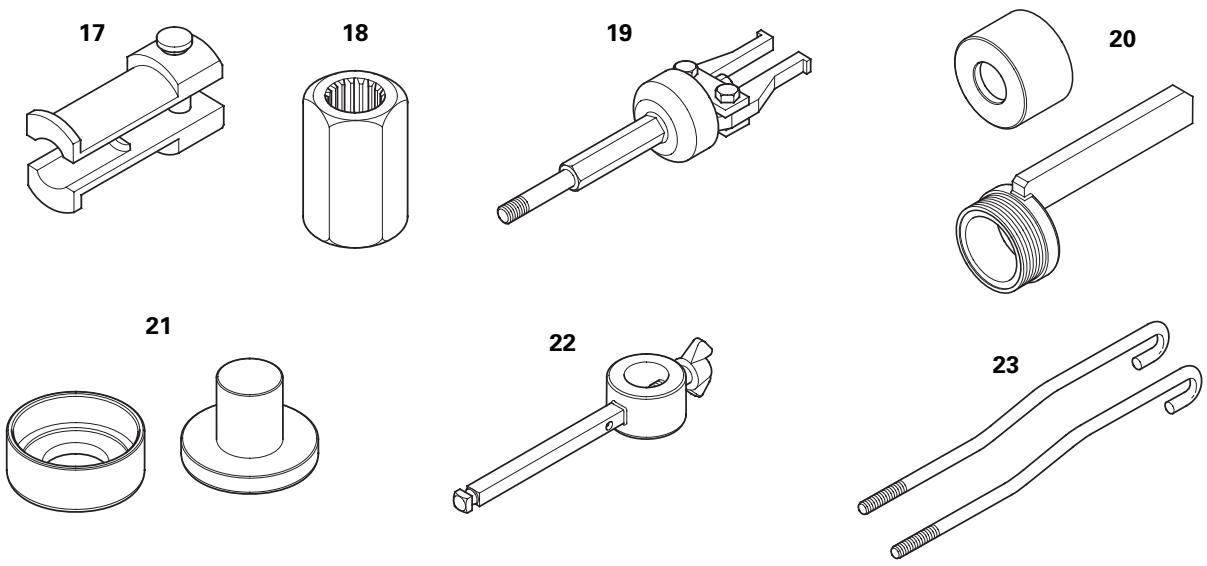


Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-15

• PROPELLER/GEAR CASE/EXTENSION CASE/OIL CASE (3/3)

No.	Tool name	Tool number	Application
17	Bearing remover, 22 mm	07GMD-KT70200	Reverse bevel gear/bearing assembly removal
18	Vertical shaft holder	07LPB-ZV30200	Pinion gear nut removal/installation
19	Bearing race puller	07LPC-ZV30101	25 x 47 x 15 mm bearing (outer race) removal, 32 x 58 x 17 mm bearing (outer race) removal
20	Vertical shaft gauge	07LPJ-ZV3010A	Pinion gear shim adjustment
21	Bearing height gauge	07LPJ-ZV30200	Forward bevel gear shim adjustment
22	Backlash inspection attachment	07MGJ-0010100	Forward bevel gear backlash adjustment
23	J bolt set	07LPB-ZV30310	Forward bevel gear backlash adjustment

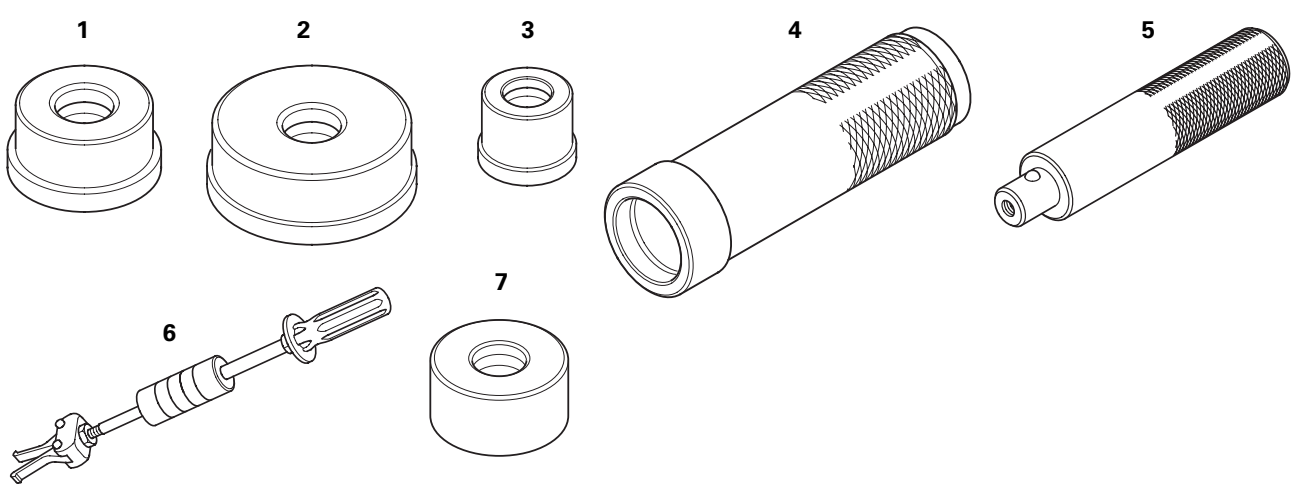


© Honda Motor Co., Ltd.

00 cap.02-1 BF40D 50D (A).qxp 2008/04/11 13:53 ページ 2-16

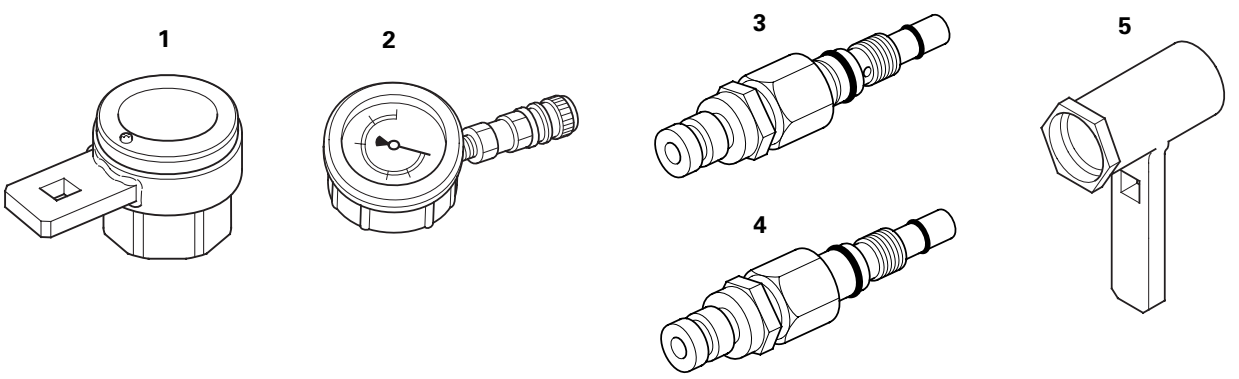
• MOUNT CASE/STERN BRACKET/SWIVEL CASE

No.	Tool name	Tool number	Application
1	Attachment, 37 x 40 mm	07746-0010200	25 x 40 x 7 mm oil seal installation
2	Attachment, 52 x 55 mm	07746-0010400	39.5 x 52 x 6 mm oil seal installation, Lower mount center housing installation, 6205 radial ball bearing installation
3	Attachment, 24 x 26 mm	07746-0010700	17 x 26 x 7 mm water seal installation
4	Driver, 40 mm I.D.	07746-0030100	Lower mount center housing installation
5	Driver	07749-0010000	Driver for 1 through 3 and 7
6	Universal bearing puller	07MGC-001010A	6205 radial ball bearing removal
7	Bearing driver attachment, 37 mm	07ZMD-MBW0200	Mount frame removal



• POWER TRIM/TILT ASSEMBLY/GAS ASSISTED DAMPER ASSEMBLY

No.	Tool name	Tool number	Application
1	Lock nut wrench	070PA-ZW40100	Outer tube guide removal/installation
2	Pressure gauge 10000 PSI	07APJ-ZW4A100	Power trim/tilt assembly blow pressure inspection
3	Gauge joint A (Upper chamber side)	070PJ-V15A100	Power trim/tilt assembly blow pressure inspection
4	Gauge joint B (Lower chamber side)	070PJ-V15A200	Power trim/tilt assembly blow pressure inspection
5	Lock nut wrench, 30 x 40 mm	07916-9690000	Outer tube removal/installation



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-17

7. TROUBLESHOOTING

Use a known-good battery for troubleshooting.

Before troubleshooting, check that the connectors are connected securely.

Check that the emergency stop switch clip is set securely.

Read the circuit tester's operation instructions carefully, and observe the instructions during inspection.

When a commercially available circuit tester is used for inspection, use the special tool [Tester probe (Male) 07ZAJ-RDJ110], and take care not to apply excessive force to the connector terminal.

Switch the tester lead polarities to check the circuit, including the diode (see below). The circuit is normal if there is continuity in one direction but not the other. If there is continuity in both directions or in neither direction, the circuit is abnormal.

- Indicator light
- Main relay
- Regulator/rectifier
- Power tilt relay (Power trim/tilt type only)

a. FUSE **2-18**
FUSE BOX CONNECTION TABLE 2-18
FUSE LOAD CHART 2-19

b. ENGINE **2-20**
HARD TO START OR DOES NOT START 2-20
ELECTRICAL POWER SYSTEM 2-22
STARTER SYSTEM 2-23
FUEL SYSTEM 2-25
IGNITION SYSTEM 2-27
ENGINE DOES NOT RUN SMOOTHLY 2-28
Engine starts but stalls soon. Idle speed or troll speed is not stable or engine stalls 2-28
Engine speed does not increase 2-29
Engine speed does not stabilize during running at high speed and engine speed is not as high as it used to be during running with the throttle fully open 2-30
Engine speed increases excessively 2-30
Engine speed does not decrease 2-31
Engine sometimes misfires or tends to stall 2-32
SPARK TEST 2-33
OIL PRESSURE CHECK 2-33
CYLINDER COMPRESSION CHECK 2-34

c. ALERT SYSTEM/WARNING SYSTEM **2-35**
SYMPTOM CHART 2-35
SYSTEM DESCRIPTIONS 2-35
FUNCTION TEST USING THE HDS 2-36
FUNCTION TEST WITHOUT USING THE HDS 2-37
WARNING BUZZER SOUNDS CONTINUOUSLY ... 2-40
INTERMITTENT WARNING BUZZER SOUNDS CONTINUOUSLY 2-44
ECM IS ABNORMAL 2-46

d. SHIFT MECHANISM **2-47**
HARD TO SHIFT 2-47

e. GAS ASSISTED DAMPER [GAS ASSISTED TYPE ONLY] **2-48**
DIFFICULT TO TILT UP 2-48
DOES NOT HOLD IN POSITION 2-48

f. POWER TRIM/TILT [POWER TRIM/TILT TYPE ONLY] **2-49**
POWER TRIM/TILT ASSEMBLY DOES NOT OPERATE 2-49
POWER TRIM/TILT ASSEMBLY DOES NOT HOLD IN POSITION 2-50
POWER TRIM/TILT MOTOR DOES NOT OPERATE 2-51
POWER TRIM/TILT ASSEMBLY QUICK REFERENCE CHART 2-52

© Honda Motor Co., Ltd.

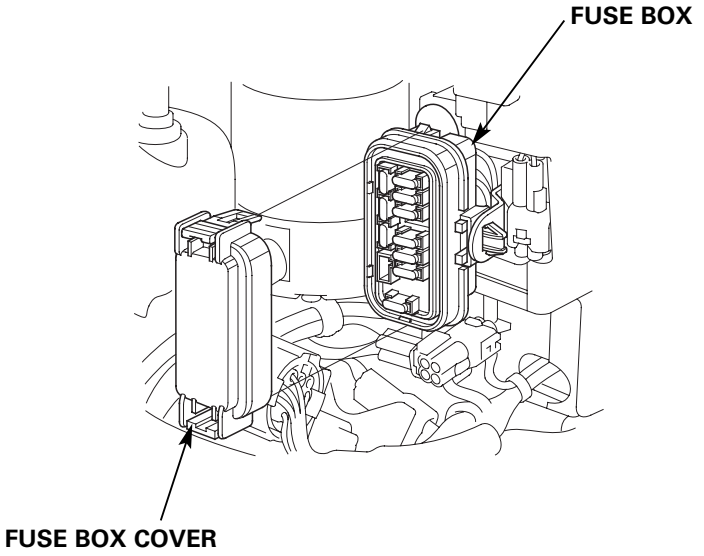
cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-18

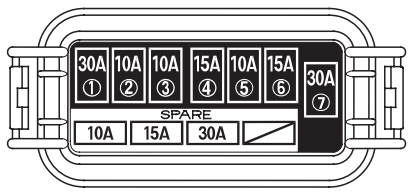
a. FUSE

• FUSE BOX CONNECTION TABLE

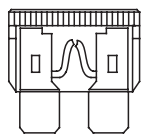
Fuse No.	Fuse capacity	Connect to
1	30A	Main relay
2	10A	Fuel pump (high pressure side)
3	10A	Combination switch, indicator light, warning buzzer, meters, main relay, power trim switch (power trim/tilt type only), power trim/tilt switch (power trim/tilt type only)
4	15A	Ignition coils
5	10A	HO2S, DLC
6	15A	ECM, CKP sensor 1, CKP sensor 2, injectors
7	30A	Regulator/rectifier

If a fuse is blown, check each wire for short-circuit and load by referring to the "FUSE LOAD CHART" (P. 2-19).





FUSE BOX COVER

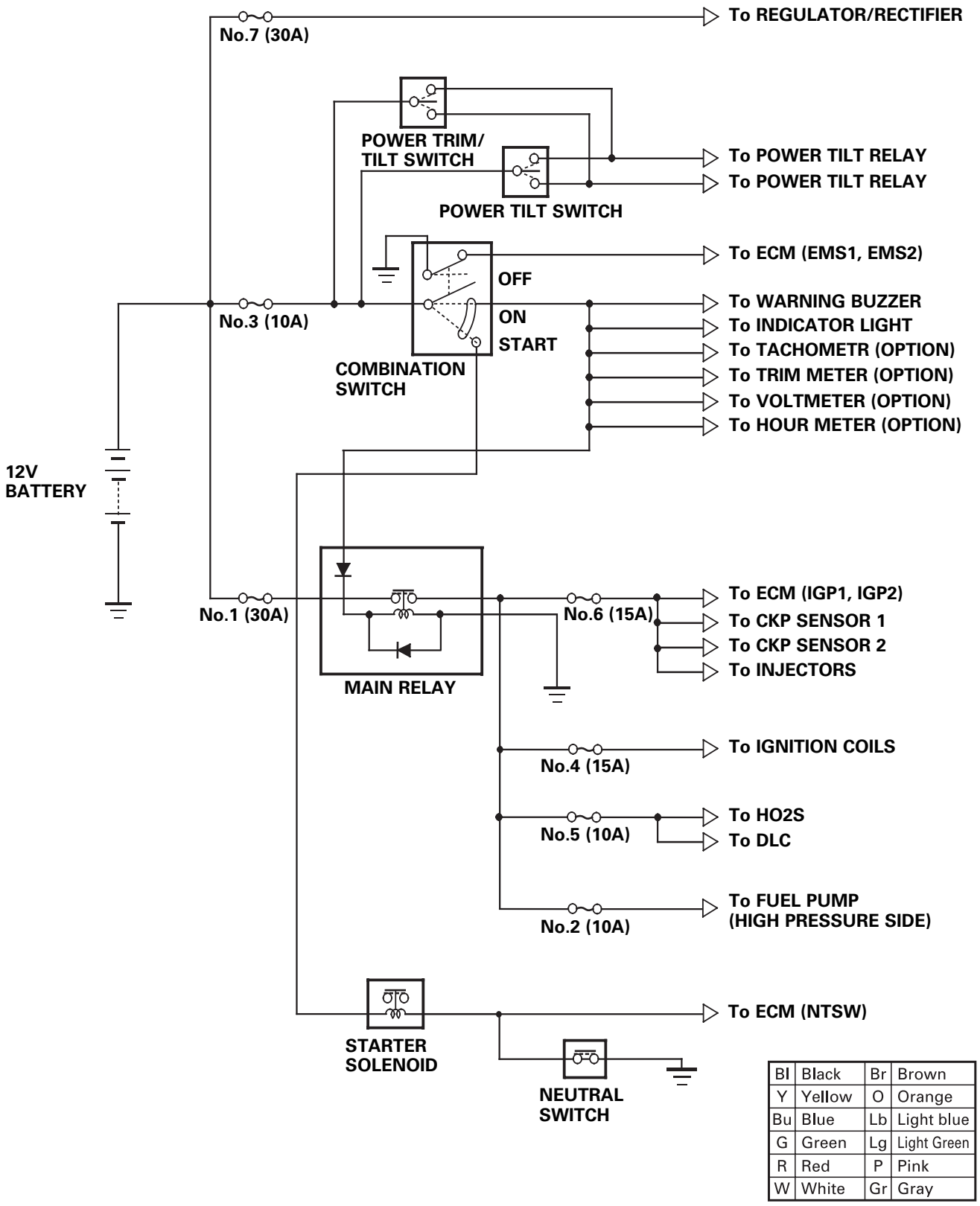


Blown fuse

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-19

• FUSE LOAD CHART

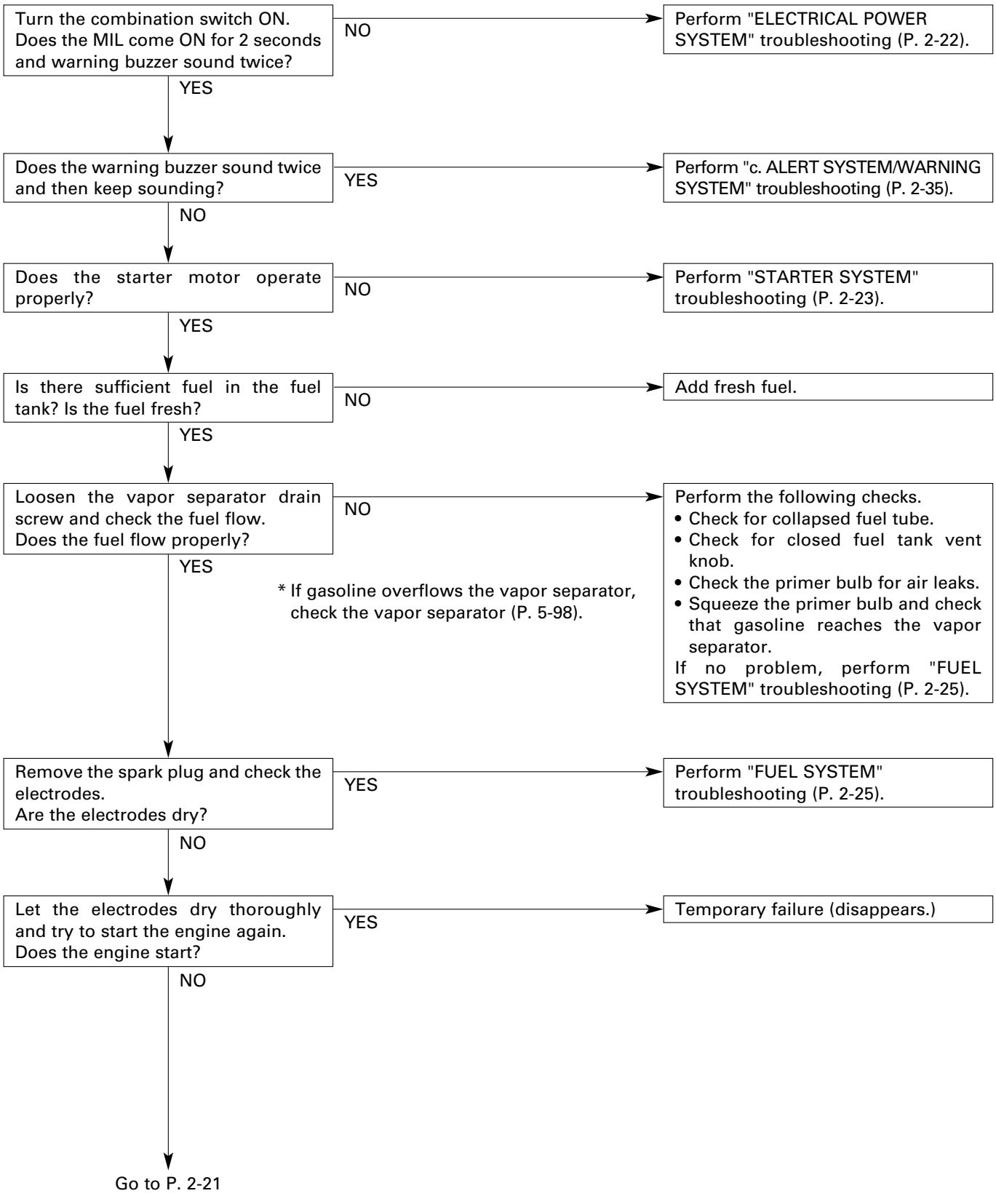


Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-20

b. ENGINE
• HARD TO START OR DOES NOT START



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-21

From P. 2-20

Check the spark plug (P. 2-33).
Are there good sparks between the electrodes?

NO → Perform "IGNITION SYSTEM" troubleshooting (P. 2-27).

YES

Check the cylinder compression (P. 2-34).
Is it normal?

NO → Perform the following checks and adjustments.
- Valve clearance (P. 3-9)
- Timing belt (P. 3-24)
- Cylinder head gasket, valve and valve seat for abnormality (P. 9-4)
- Piston, piston ring and cylinder for wear (P. 10-2)

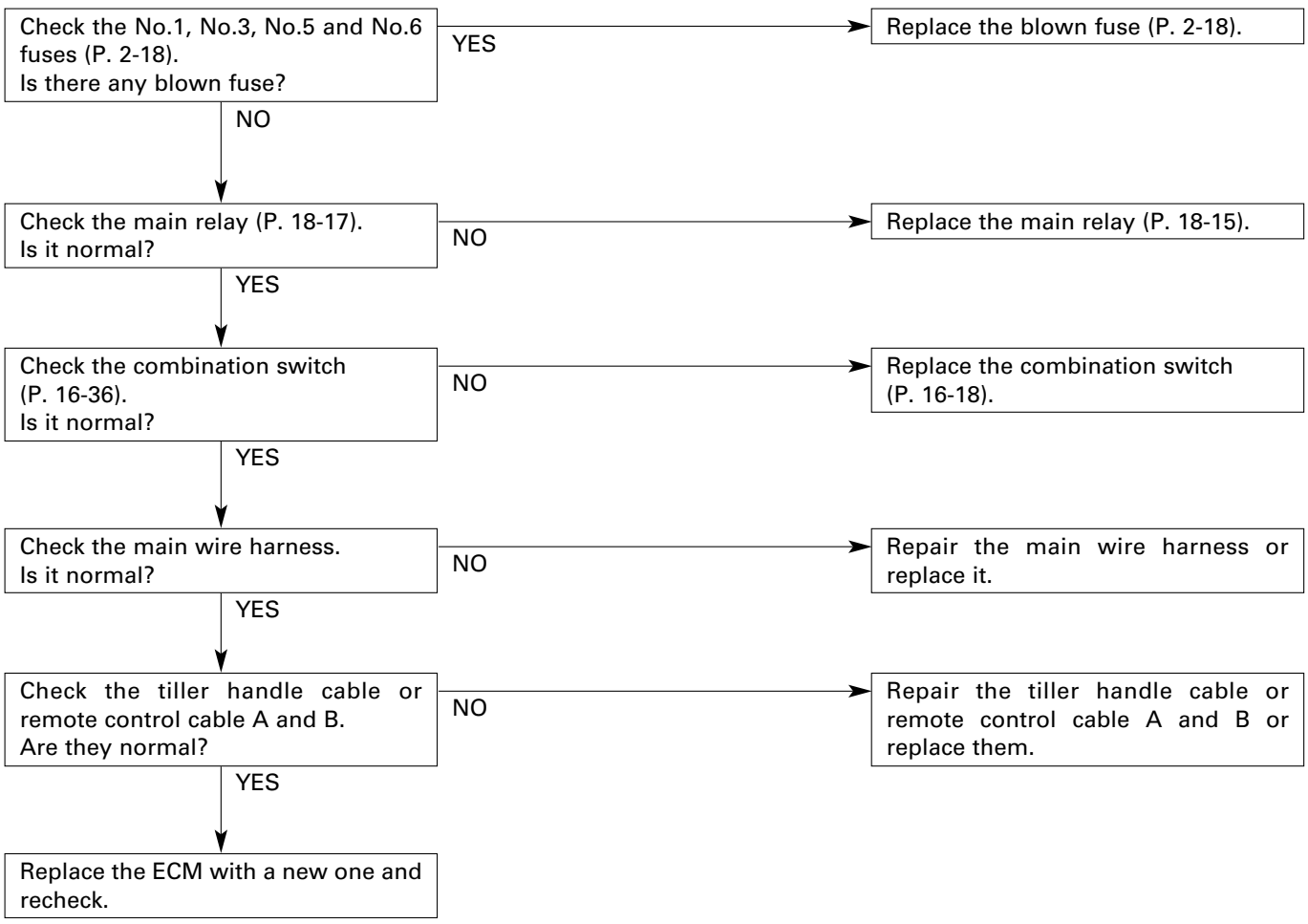
YES

Install the spark plug securely, and restart the engine according to the starting procedure.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-22

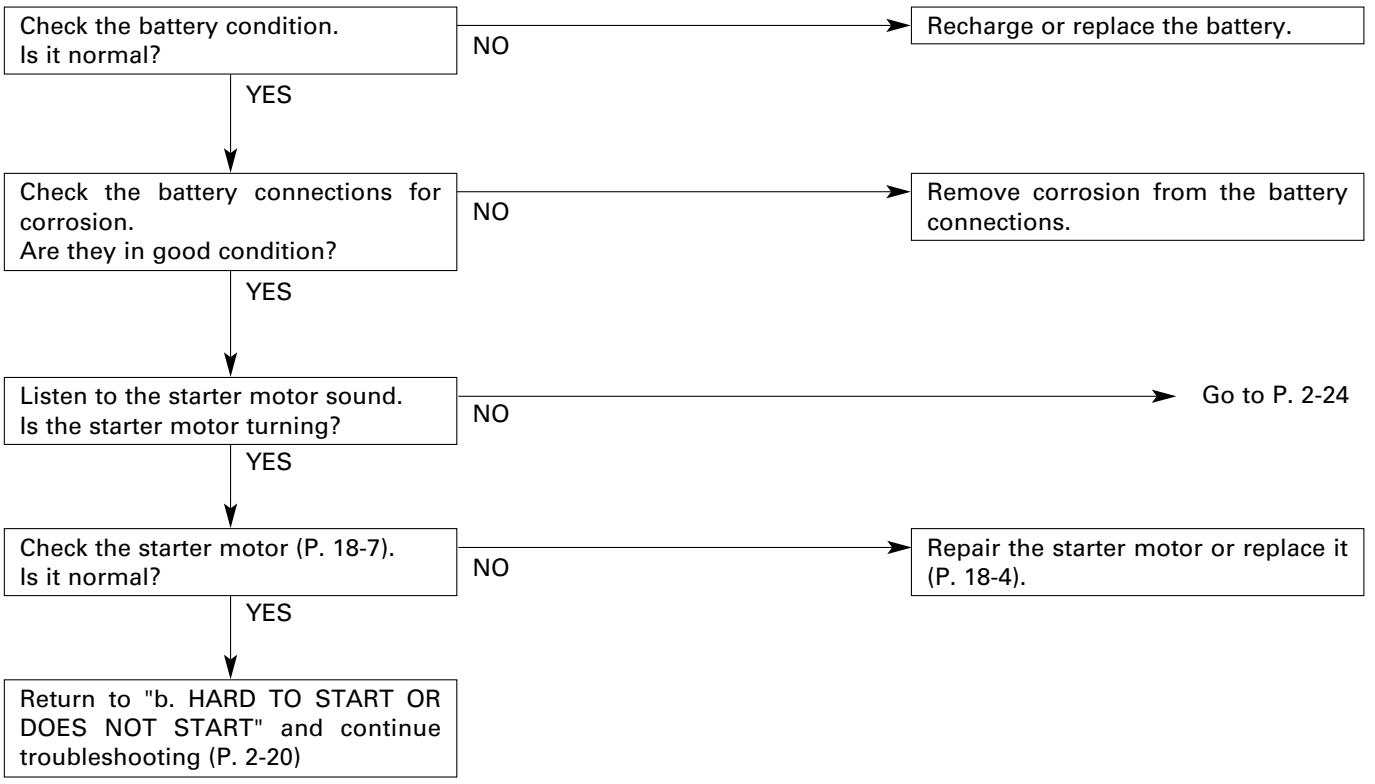
• ELECTRICAL POWER SYSTEM



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-23

• STARTER SYSTEM



© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-24

From P. 2-23

Check the shift lever or remote control lever.
Is it in the "N" (Neutral) position?
NO → Move the shift lever or remote control lever to the "N" (Neutral) position and recheck.
YES

Check the No.1 and No.3 fuses (P. 2-18).
Is there any blown fuse?
YES → Replace the blown fuse (P. 2-18).
NO

Check the neutral switch (P. 18-17).
Is it normal?
NO → Replace the neutral switch (P. 18-15).
YES

Check the starter solenoid (P. 18-17).
Is it normal?
NO → Replace the starter solenoid (P. 18-16).
YES

Check the combination switch (P. 16-36).
Is it normal?
NO → Replace the combination switch (P. 16-18).
YES

Check the main wire harness.
Is it normal?
NO → Repair the main wire harness or replace it.
YES

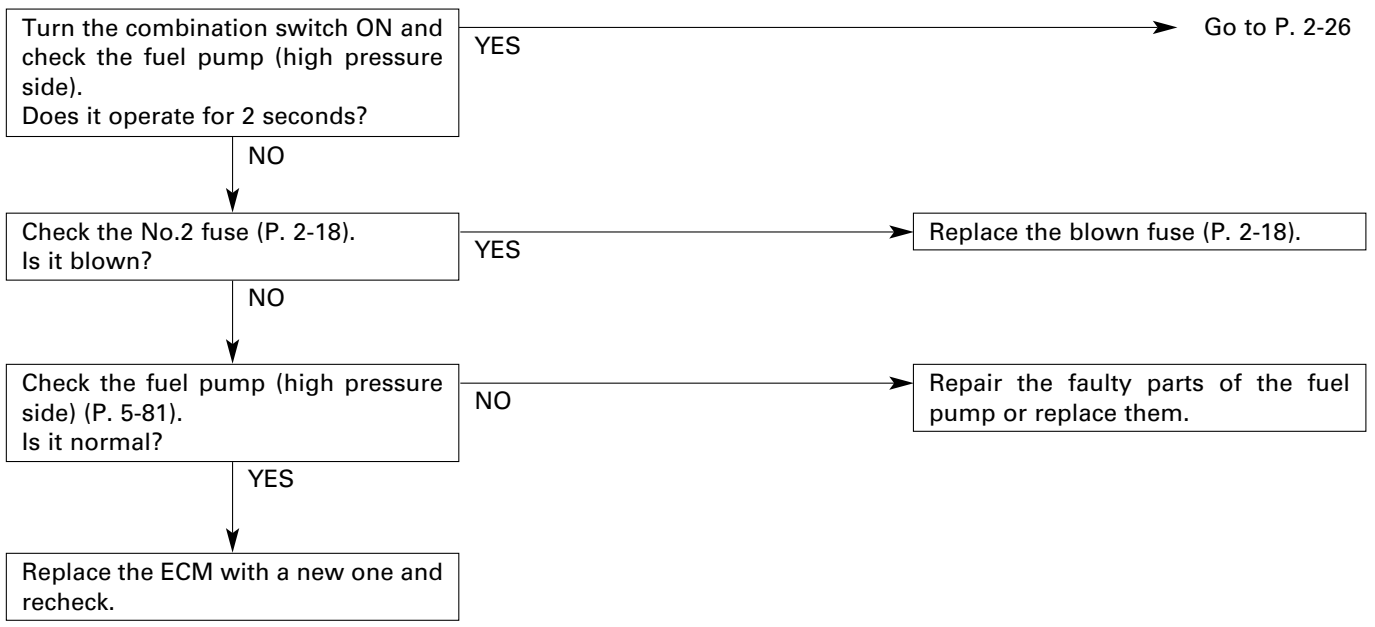
Check the tiller handle cable or remote control cable A and B.
Are they normal?
NO → Repair the tiller handle cable or remote control cable A and B or replace them.
YES

Repair the starter motor or replace it (P. 18-4).

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-25

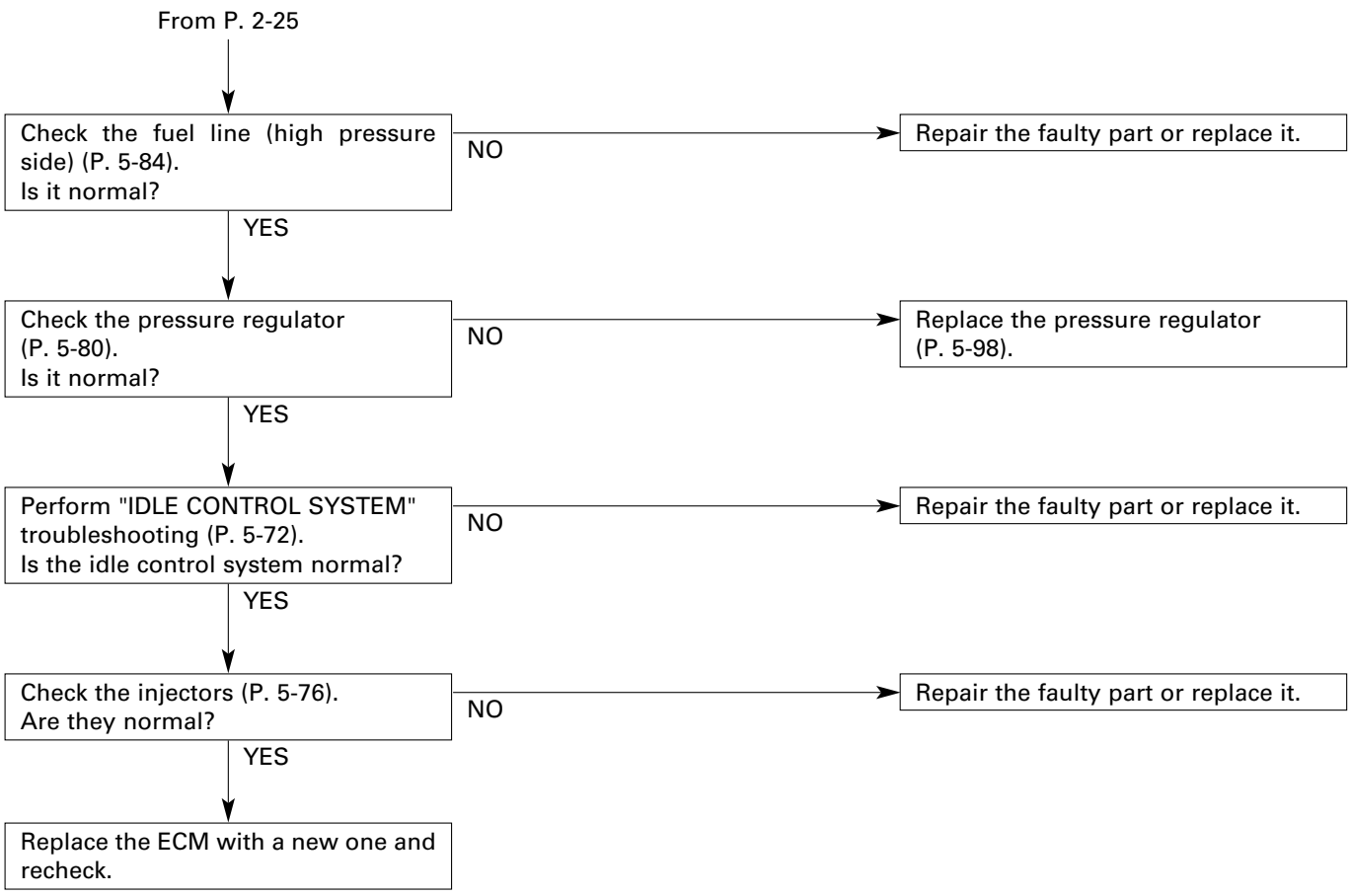
• FUEL SYSTEM



© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-26

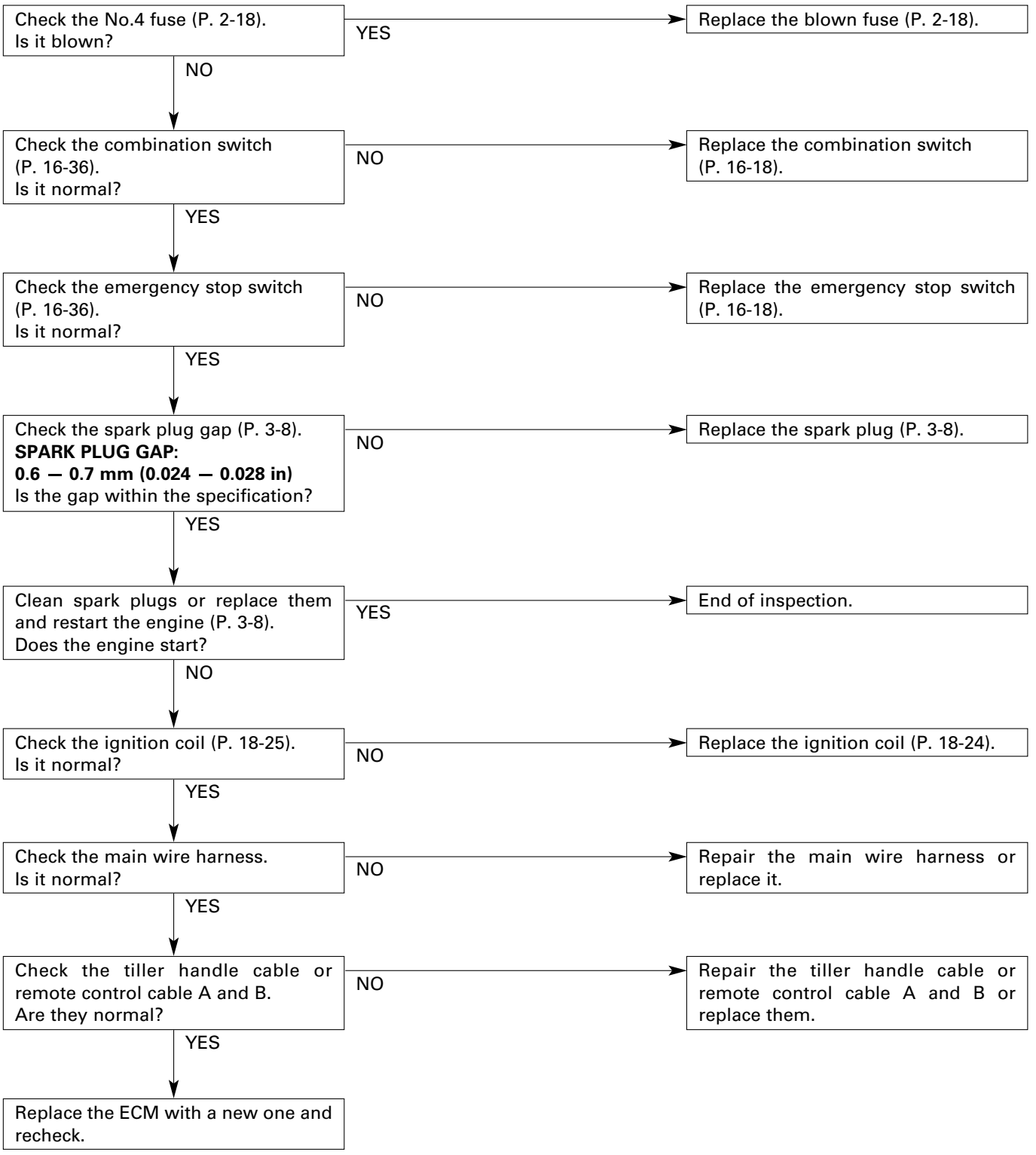
From P. 2-25



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-27

• IGNITION SYSTEM



© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-28

• ENGINE DOES NOT RUN SMOOTHLY

When the warning buzzer is sounding, perform "c. ALERT SYSTEM" troubleshooting (P. 2-35).
If the warning buzzer does not sound but the engine does not run smoothly, perform the following troubleshooting.

Engine starts but stalls soon.
Idle speed or troll speed is not stable or engine stalls.

- Spark plug is wet or fouled. → Replace the spark plug or dry it (P. 3-8).
- Secondary air in the system. →
  - Tighten the IAC mounting bolt to the specified torque. Replace the gasket if necessary (P. 5-74).
  - Tighten the throttle body mounting bolt to the specified torque. Replace the gasket if necessary (P. 5-93).
  - Tighten the intake manifold mounting bolt to the specified torque. Replace the gasket if necessary (P. 5-95).
  - Replace the injector O-ring or seal ring if it is damaged (P. 5-86).
  - Tighten the fuel line mounting bolt to the specified torque (P. 5-87).
  - Check the pressure regulator control tube for disconnection or damage. Repair the pressure regulator control tube or replace it if necessary.
- Low pressure side fuel system faulty. → Perform "FUEL SUPPLY SYSTEM" troubleshooting (P. 5-75).
- High pressure side fuel system faulty. → Perform "FUEL SUPPLY SYSTEM" troubleshooting (P. 5-75).
- Idle control system faulty. → Perform "IDLE CONTROL SYSTEM" troubleshooting (P. 5-72).

Date of Issue: May 2008
© Honda Motor Co., Ltd.

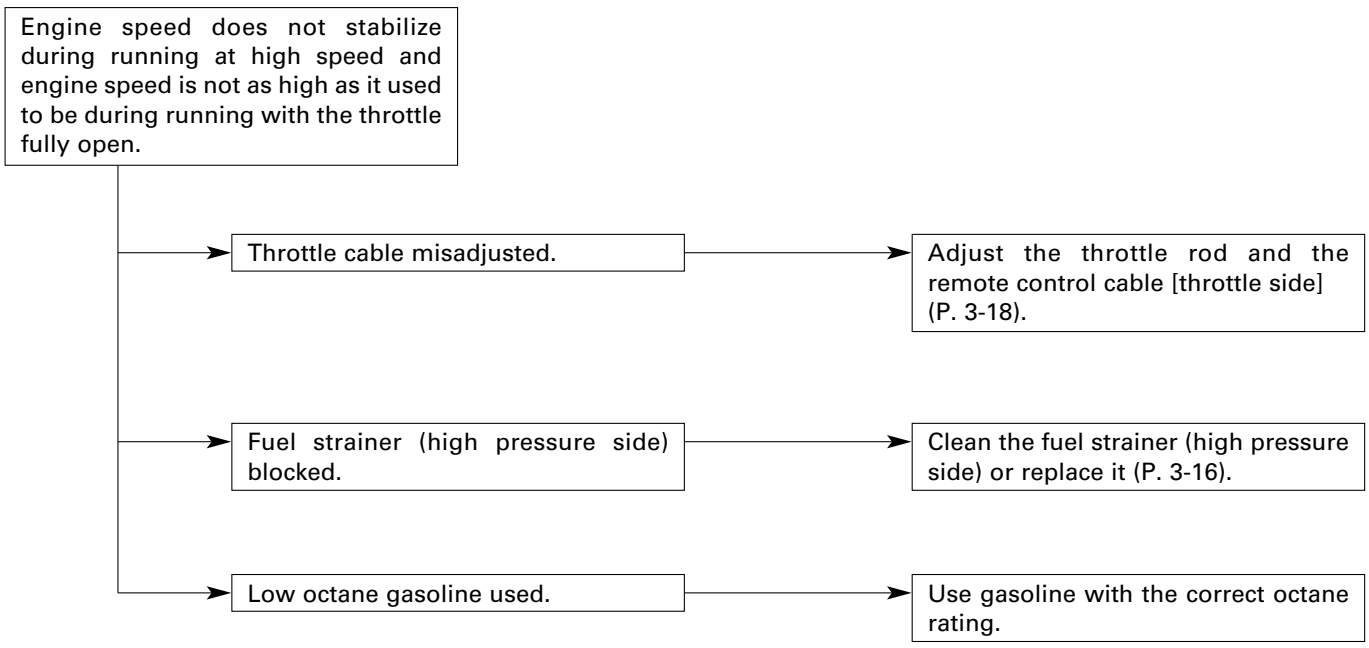
cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-29

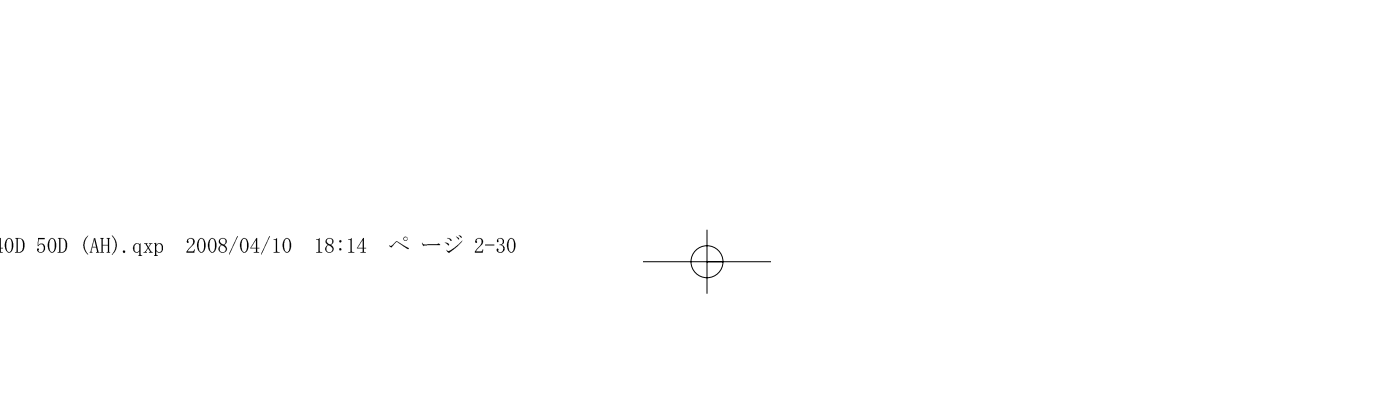
Engine speed does not increase correctly.

Throttle cable misadjusted.	Adjust the throttle rod and the remote control cable [throttle side] (P. 3-18).
Propeller mismatched.	Replace with the correct propeller.
Low pressure side fuel system faulty.	Perform "FUEL SUPPLY SYSTEM" troubleshooting (P. 5-75).
High pressure side fuel system faulty.	Perform "FUEL SUPPLY SYSTEM" troubleshooting (P. 5-75).
Valve clearance misadjusted.	Adjust the valve clearance (P. 3-9).
Air vent blocked.	Perform "FUEL SUPPLY SYSTEM" troubleshooting (P. 5-75).
Neutral switch faulty.	Check the neutral switch (P. 18-17).

© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-30





Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-31

Engine speed does not decrease.

Throttle cable misadjusted.	Adjust the throttle rod and the remote control cable [throttle side] (P. 3-18).
Throttle body's throttle shaft stuck.	Check the throttle body and clean it (P. 5-73).
Idle control system faulty.	Perform "IDLE CONTROL SYSTEM" troubleshooting (P. 5-72).
Secondary air in the system.	• Tighten the IAC mounting bolt to the specified torque. Replace the gasket if necessary (P. 5-74). • Tighten the throttle body mounting bolt to the specified torque. Replace the gasket if necessary (P. 5-93). • Tighten the intake manifold mounting bolt to the specified torque. Replace the gasket if necessary (P. 5-95). • Replace the injector O-ring or seal ring if it is damaged (P. 5-86). • Tighten the fuel line mounting bolt to the specified torque (P. 5-87). • Check the pressure regulator control tube for disconnection or damage. Repair the pressure regulator control tube or replace it if necessary.

© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-32

Engine sometimes misfires or tends to stall.		
	Water in the fuel.	Check the fuel strainer (low pressure side) (P. 3-12).
	Fuel strainer (low pressure side) blocked.	Clean the fuel strainer (low pressure side) or replace it (P. 3-12).
	Fuel strainer (high pressure side) blocked.	Clean the fuel strainer (high pressure side) or replace it (P. 3-16).
	Fuel tube abnormal.	• Check the fuel tube for collapse. • Check whether the fuel tank vent is open. • Check the primer bulb for air leakage.
	High pressure side fuel system faulty.	Perform "FUEL SUPPLY SYSTEM" troubleshooting (P. 5-75).

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-33

• SPARK TEST

1) Return the throttle to idle; move the shift lever or remote control lever to the "N" (Neutral) position, and turn the combination switch off.

2) Remove the engine cover (P. 4-2).

3) Disconnect the three injector 2P connectors.

4) Remove the No.1 spark plug cap and remove the spark plug.

5) Attach the removed No.1 spark plug cap to the spark plug.

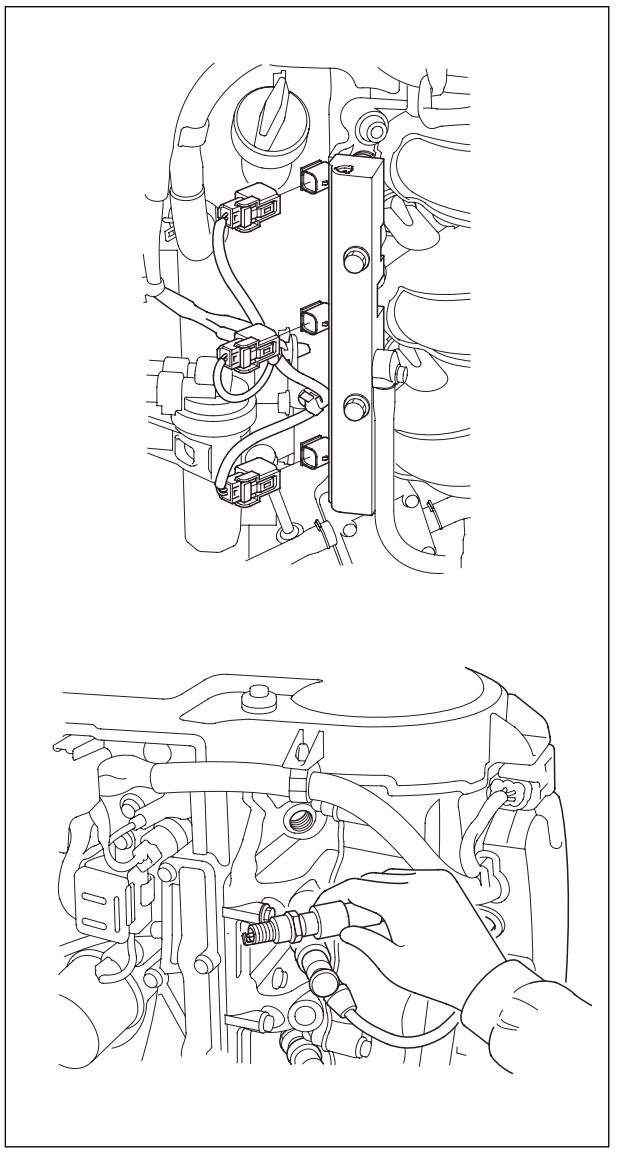
6) Ground the negative (–) electrode (i.e. threaded part) of the removed spark plug against the cylinder head mounting bolt.

7) Turn the combination switch to the "START" position and start the engine. Check whether sparks jump across the electrodes.

⚠CAUTION

Turning the combination switch to the "START" position while touching the high tension cord will generate high voltage, which is very dangerous. Be sure to ground the negative electrode of the spark plug against the cylinder head cover bolt and hold the spark plug cap to check for sparks.

8) Perform spark test at each spark plug.



• OIL PRESSURE CHECK

1) Return the throttle to idle; move the shift lever or remote control lever to the "N" (Neutral) position, and turn the combination switch off.

2) Remove the engine cover (P. 4-2).

3) Remove the EOP switch (P. 5-115).

4) Remove the liquid gasket from the mounting base of the EOP switch.

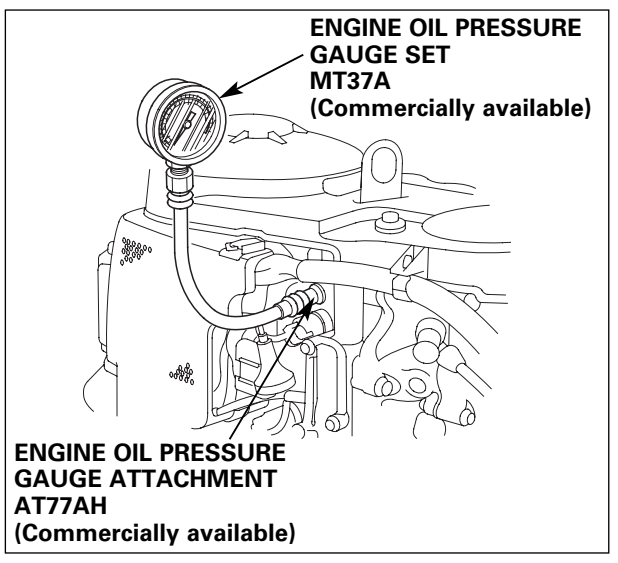
5) Install the oil pressure gauge attachment PT1/8 and tighten it to the specified torque.

TORQUE: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)

6) Install the oil pressure gauge set.

7) Start the engine and measure the oil pressure.

Oil pressure (gear in neutral)	78 — 118 kPa (0.8 — 1.2 kgf/cm^2, 11.4 — 17.1 psi) at 850 min^{-1} (rpm)



© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-34

• CYLINDER COMPRESSION CHECK

1) Return the throttle to idle; move the shift lever or remote control lever to the "N" (Neutral) position, and turn the combination switch off.

2) Remove the emergency stop switch clip.

3) Remove the engine cover (P. 4-2).

4) Remove the No.1 spark plug cap and remove the spark plug.

5) Install the compression gauge (commercially available) in the No.1 plug hole.

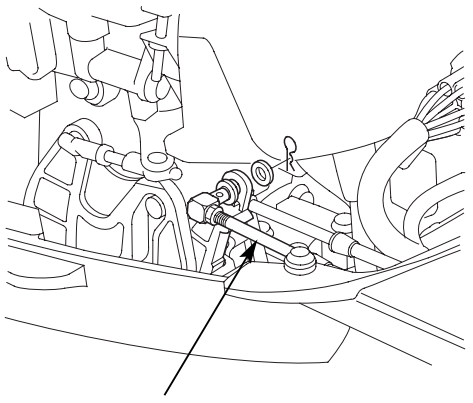
6) Disconnect the remote control cable (throttle side) from the throttle arm.

7) Push the throttle arm against the full open position to open the throttle fully.

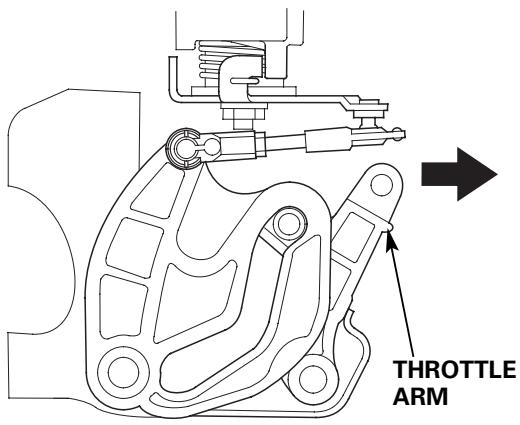
8) Turn the combination switch to the "START" position and operate the starter motor to measure the cylinder compression.

Cylinder compression [MPa (kgf/cm², psi)] Pressure check at 500 min⁻¹ (rpm) with wide open throttle	Minimum	1.37 (14.0, 199)
	Maximum variation	0.3 (3.0, 43)

9) Measure the cylinder compression at each cylinder.

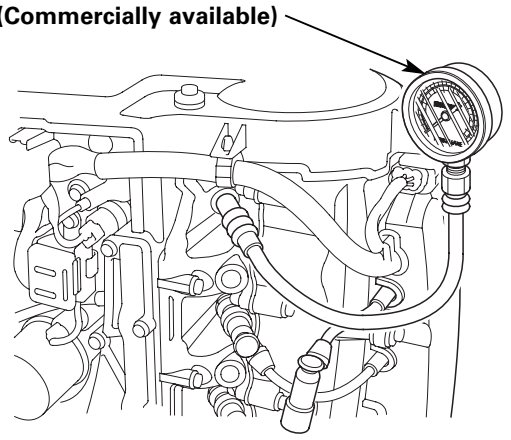


REMOTE CONTROL CABLE (THROTTLE SIDE)



THROTTLE ARM

COMPRESSION GAUGE EEPV303A (Commercially available)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-35

c. ALERT SYSTEM/WARNING SYSTEM

Perform MIL initial check before starting the engine.
The warning buzzer can sound when the starter motor speed is extremely low, but the alert system/warning system is normal if the buzzer stops sounding after starting the engine.
When the warning buzzer keeps sounding after MIL initial check, refer to the following symptom chart and perform necessary troubleshooting.
If the symptom is not shown in the following symptom chart, perform a function test according to the procedure on page 2-36 or 2-37.

• SYMPTOM CHART

Condition	Indicator light				Warning buzzer
	Oil indicator light (Green)	Overheat indicator light (Red)	MIL (Red)	Alternator indicator light (Red)	
Combination switch ON (MIL initial check)	● (for 2 sec.)	● (for 2 sec.)	● (for 2 sec.)	●	Sounds twice
2 sec. after turning combination switch ON	○	○	○	●	Stop
Normal operation	●	○	○	○	Stop
Low oil pressure (P. 2-40)	○	○	○	○	Continuous sound
Overheat (P. 2-40)	●	●	○	○	Continuous sound
MIL faulty (P. 2-44)	● *1	○ *2	●	○	Intermittent sound
Abnormal charging (P. 2-44)	●	○	○	●	Intermittent sound

●:ON ○:OFF

When two or more problems occur simultaneously, warning for each problem is indicated simultaneously.
When a problem occurred simultaneously with the malfunction of the MIL:
*1: The oil indicator light blinks when a problem with the EOP switch is indicated.
*2: The overheat indicator light blinks when a problem with the ECT2 sensor is indicated.
The buzzer of the prolonged sound takes precedence over the short sound.
Example: When problems with overheat and abnormal charging are detected simultaneously, the buzzer is the continuous sound.

• SYSTEM DESCRIPTIONS

OIL ALERT SYSTEM:
When the EOP switch detects low oil pressure, the ECM receives the signal from the EOP switch and decreases the engine speed gradually to 1,800 min^{-1} (rpm). The buzzer sounds and the oil indicator light (green) goes OFF. When the problem is corrected, the oil indicator light (green) comes ON, the buzzer stops sounding, the engine speed increases gradually, and the engine is restored to normal running.

OVERHEAT ALERT SYSTEM:
When the ECM detects an overheat condition by receiving the signal from the EBT or ECT2 sensors, it decreases the engine speed gradually to 1,800 min^{-1} (rpm). The buzzer sounds and the overheat indicator light (red) comes ON. When the problem is not removed within 20 seconds, the ECM decreases the engine speed further until it stops. When the problem is corrected during this operation sequence, the overheat indicator light (red) goes OFF, the ECM stops sounding the buzzer, and it increases the engine speed gradually until the engine is restored to normal running.

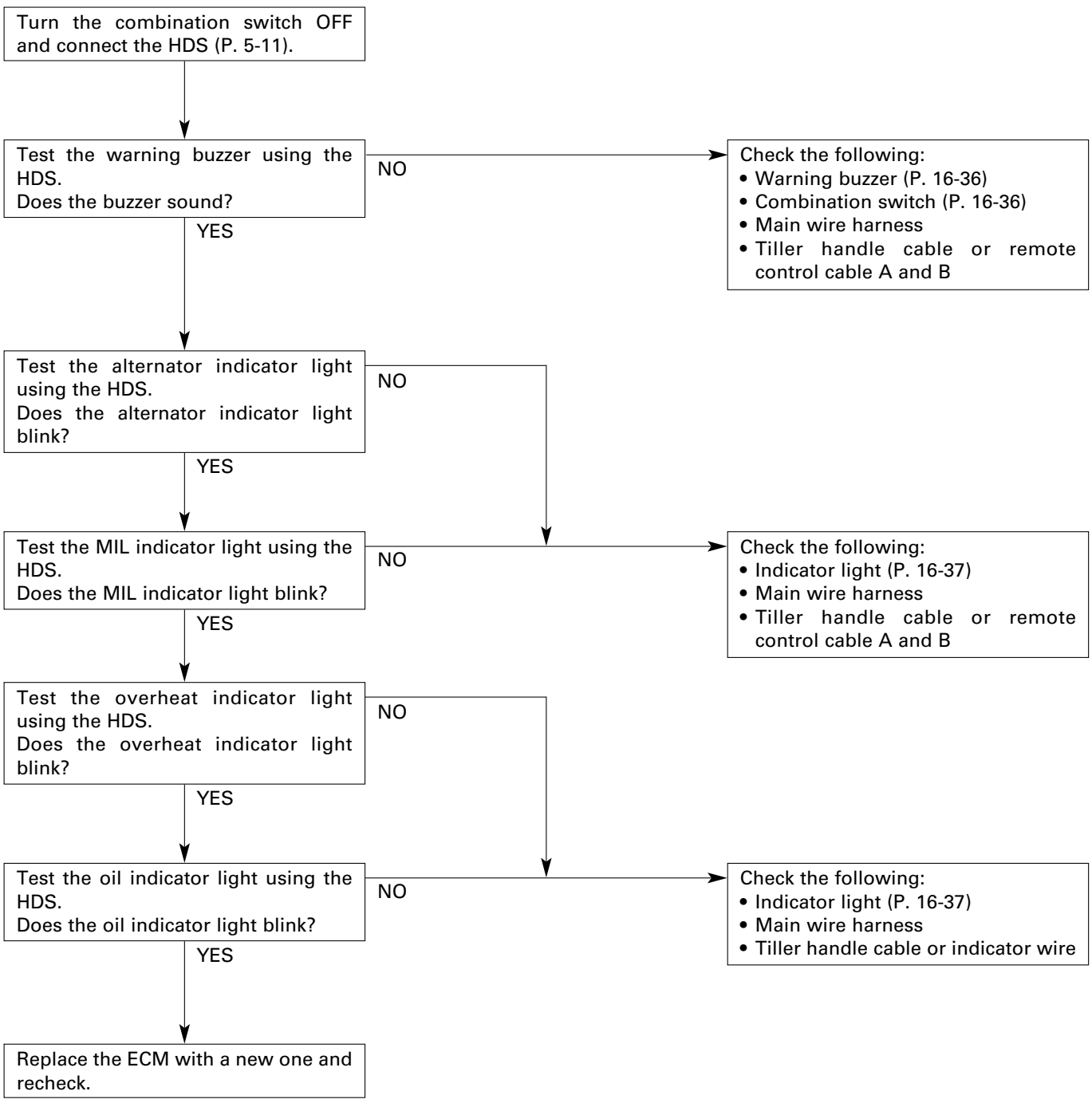
ALTERNATOR WARNING SYSTEM:
The alternator indicator light (red) comes ON and the buzzer sounds (intermittent sound) when the battery voltage drops abnormally.

MIL WARNING SYSTEM:
The MIL (red) comes ON and the buzzer sounds (intermittent sound) when the ECM diagnostic function detects a problem.

© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-36

• FUNCTION TEST USING THE HDS



Date of Issue: May 2008
© Honda Motor Co., Ltd.

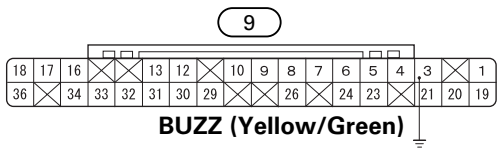
cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-37

• FUNCTION TEST WITHOUT USING THE HDS

Turn the combination switch OFF and disconnect the ECM connector A (9).

Short the No.3 connector (Yellow/Green) of the ECM connector A (9) main wire harness side 36P connector to the engine ground using a jumper wire.
Turn the combination switch ON.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

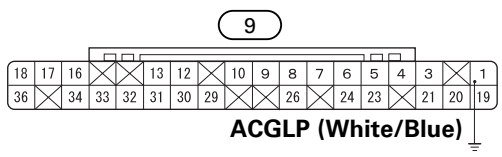
Does the warning buzzer sound?

NO → Check the following:
- Warning buzzer (P. 16-36)
- Combination switch (P. 16-36)
- Main wire harness
- Tiller handle cable or remote control cable A and B

YES

Turn the combination switch OFF.
Short the No.1 terminal (White/Blue) of the ECM connector A (9) main wire harness side 36P connector to the engine ground using a jumper wire.
Turn the combination switch ON.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

Does the alternator indicator light come ON?

NO → Check the following:
- Indicator light (P. 16-37)
- Main wire harness
- Tiller handle cable or remote control cable A and B

YES

Go to P. 2-38

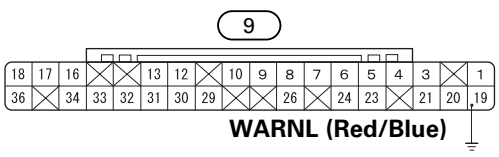
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-38

From P. 2-37

Turn the combination switch OFF.
Short the No.19 terminal (Red/Blue) of the ECM connector A (9) main wire harness side 36P connector to the engine ground using a jumper wire.
Turn the combination switch ON.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

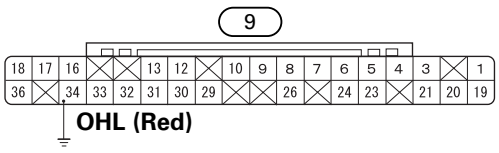
Does the MIL come ON?

NO → Check the following:
- Indicator light (P. 16-37)
- Main wire harness
- Tiller handle cable or remote control cable A and B

YES

Turn the combination switch OFF.
Short the No.34 terminal (Red) of the ECM connector A (9) main wire harness side 36P connector to the engine ground using a jumper wire.
Turn the combination switch ON.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

Does the overheat indicator light come ON?

NO → Check the following:
- Indicator light (P. 16-37)
- Main wire harness
- Tiller handle cable or indicator wire

YES

Go to P. 2-39

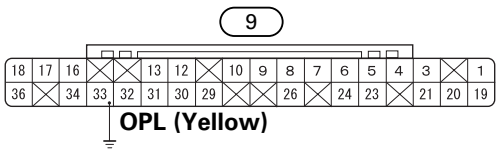
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-39

From P. 2-38

Turn the combination switch ON and check whether the oil indicator light comes ON.
Turn the combination switch OFF.
Short the No.33 terminal (Yellow) of the ECM connector A (9) main wire harness side 36P connector to the engine ground using a jumper wire.
Turn the combination switch ON.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

Check that the oil indicator light does not come ON.
Is it normal?

NO → Check the following:
- Indicator light (P. 16-37)
- Main wire harness
- Tiller handle cable or indicator wire

YES ↓

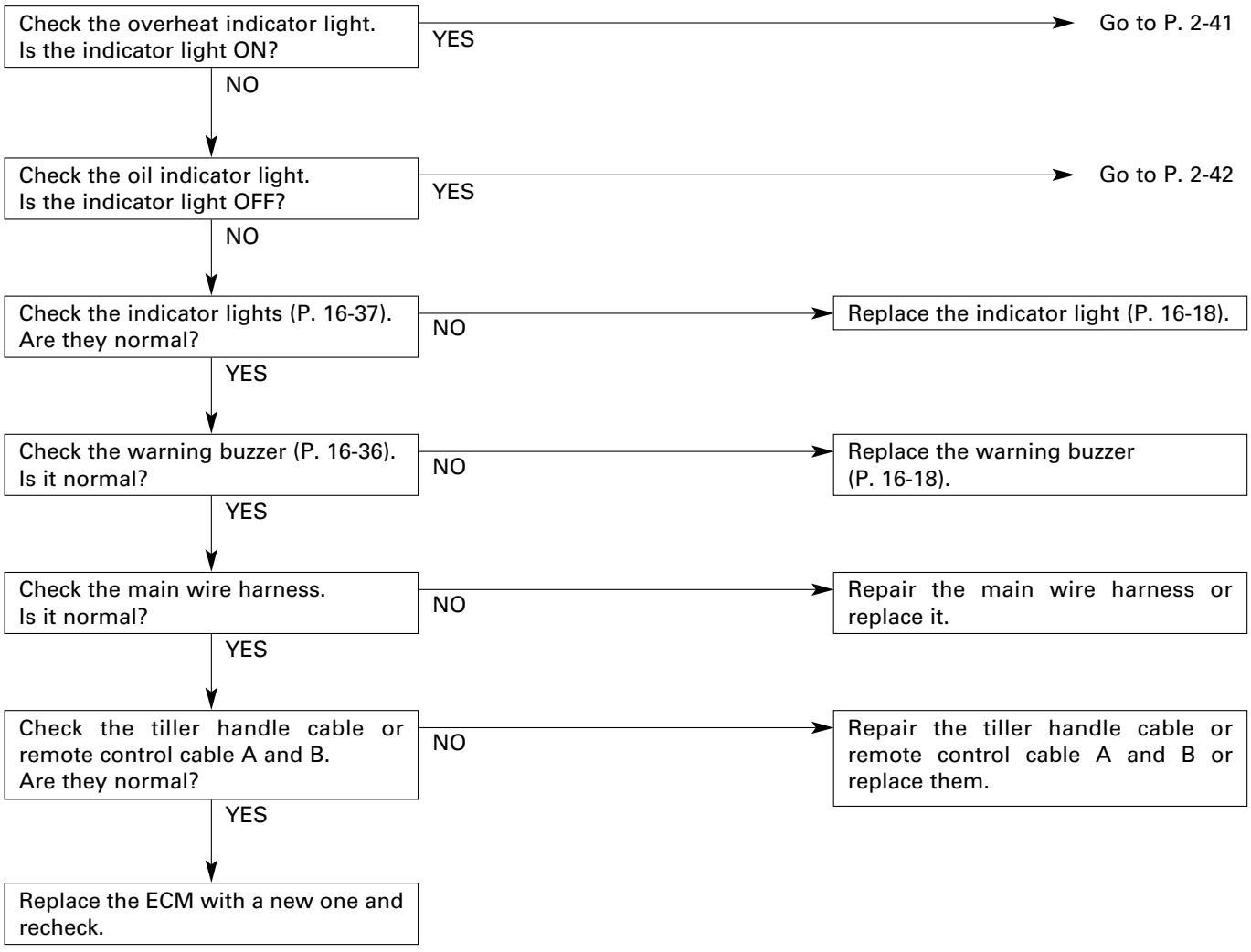
Replace the ECM with a new one and recheck.

© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-40

• WARNING BUZZER SOUNDS CONTINUOUSLY

The warning buzzer can sound when the starter motor speed is extremely low, but the alert system/warning system is normal if the buzzer stops sounding after starting the engine.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-41

From P. 2-40

Stop the engine and check the water screen.
Is it blocked with foreign material?

YES → Remove the foreign material.

NO

Check the cooling water with the engine idling.
Is the water flowing through the check port steadily?

NO →
- Check the water pump and replace if necessary (P. 11-19).
- Check the water tube. Replace the water tube if it is blocked or damaged (P. 11-56).

YES

Put the outboard motor into gear for a few minutes and let the engine cool down at idle speed.
Does the overheat indicator light go OFF and the buzzer stop sounding?

YES → Temporary failure (disappears.)

NO

Check the thermostat (P. 8-4).
Is it normal?

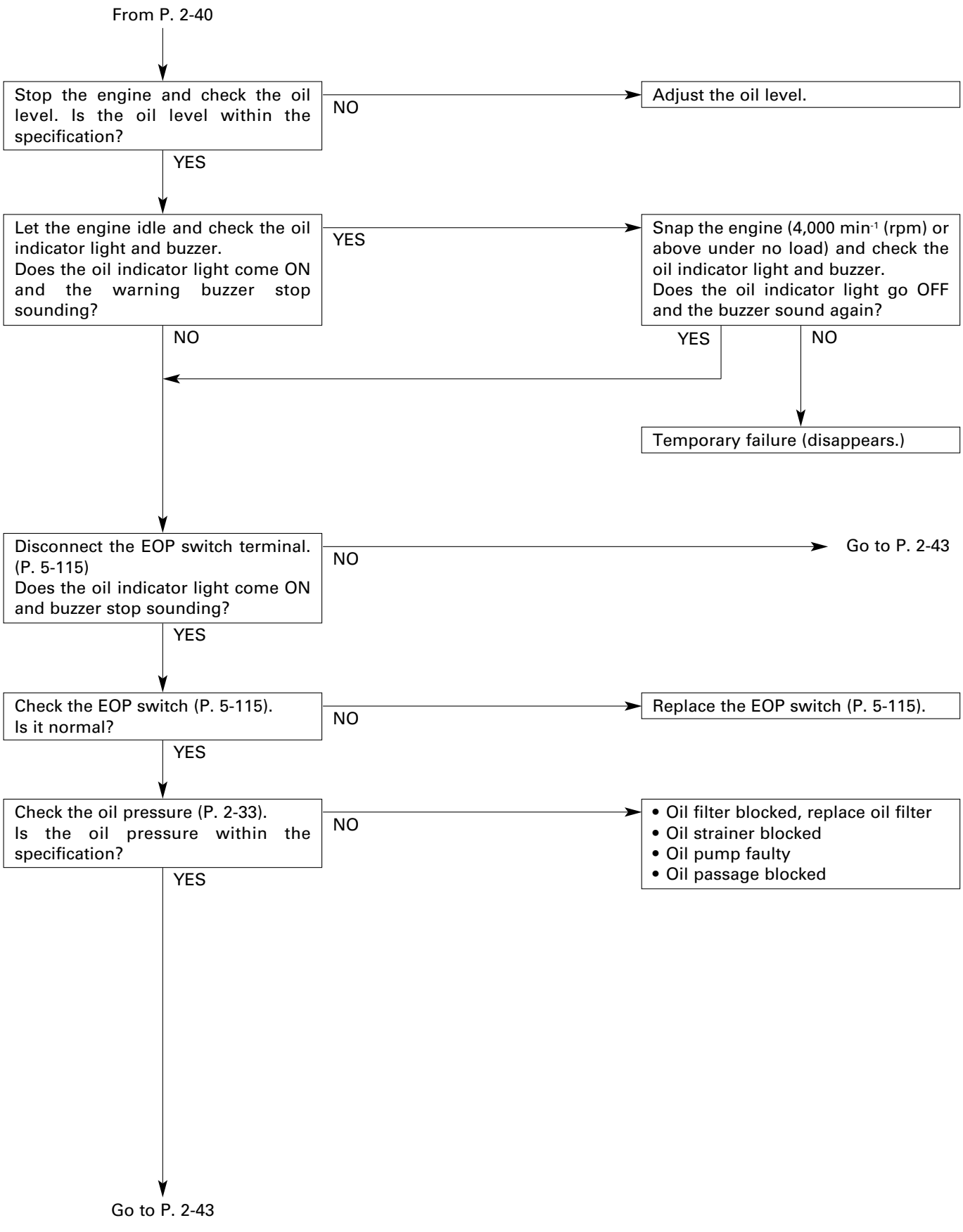
NO → Replace the thermostat (P. 8-2).

YES

Perform the ECT2 sensor troubleshooting (P. 5-38, 5-64).

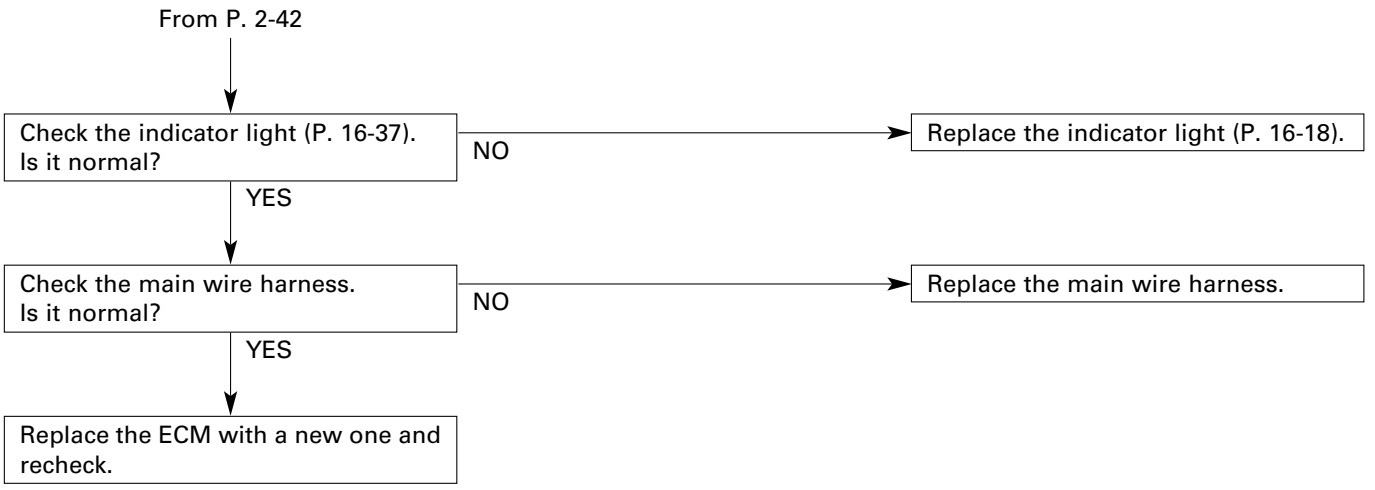
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-42



Date of Issue: May 2008
© Honda Motor Co., Ltd.

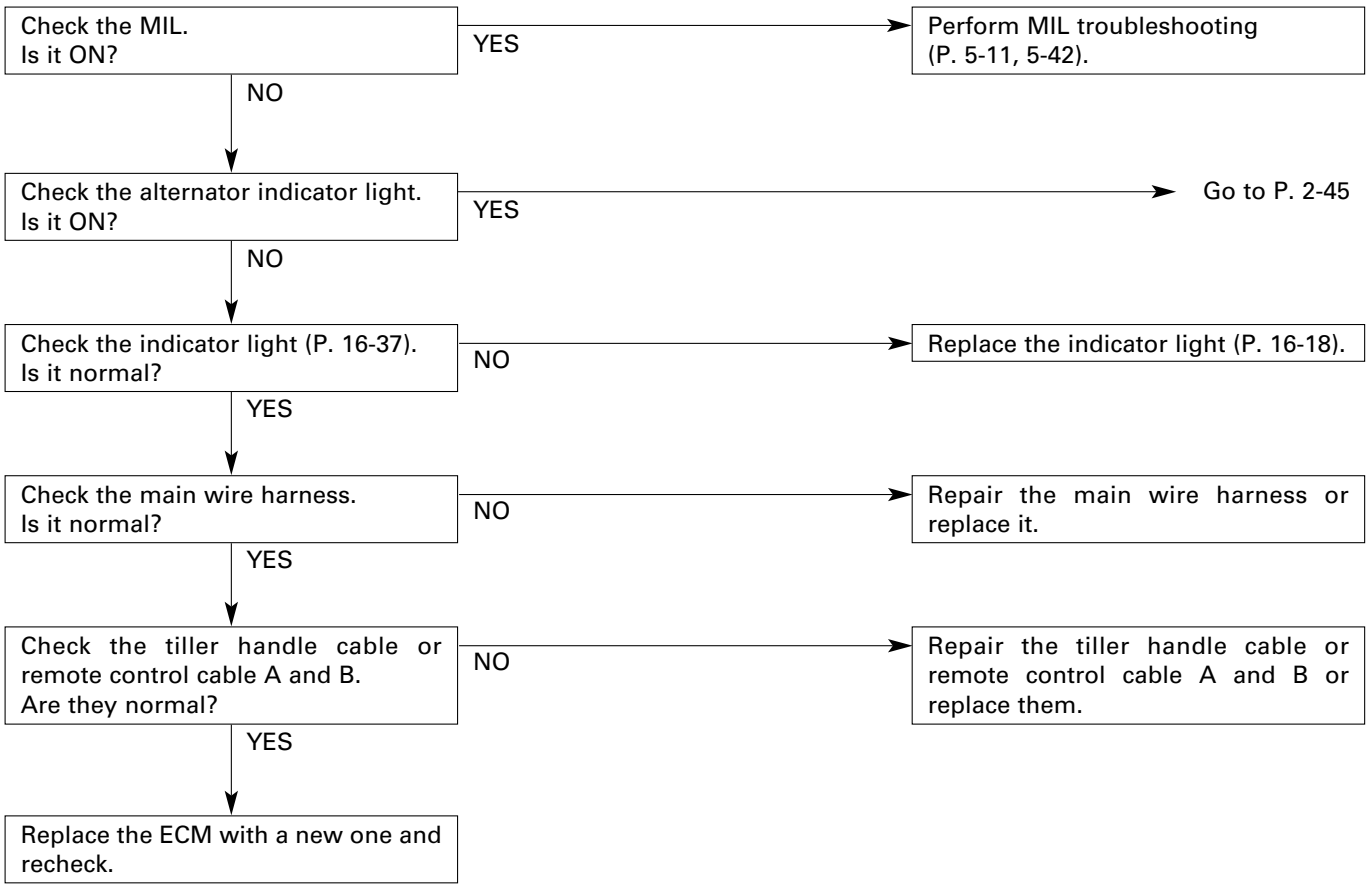
cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-43



© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-44

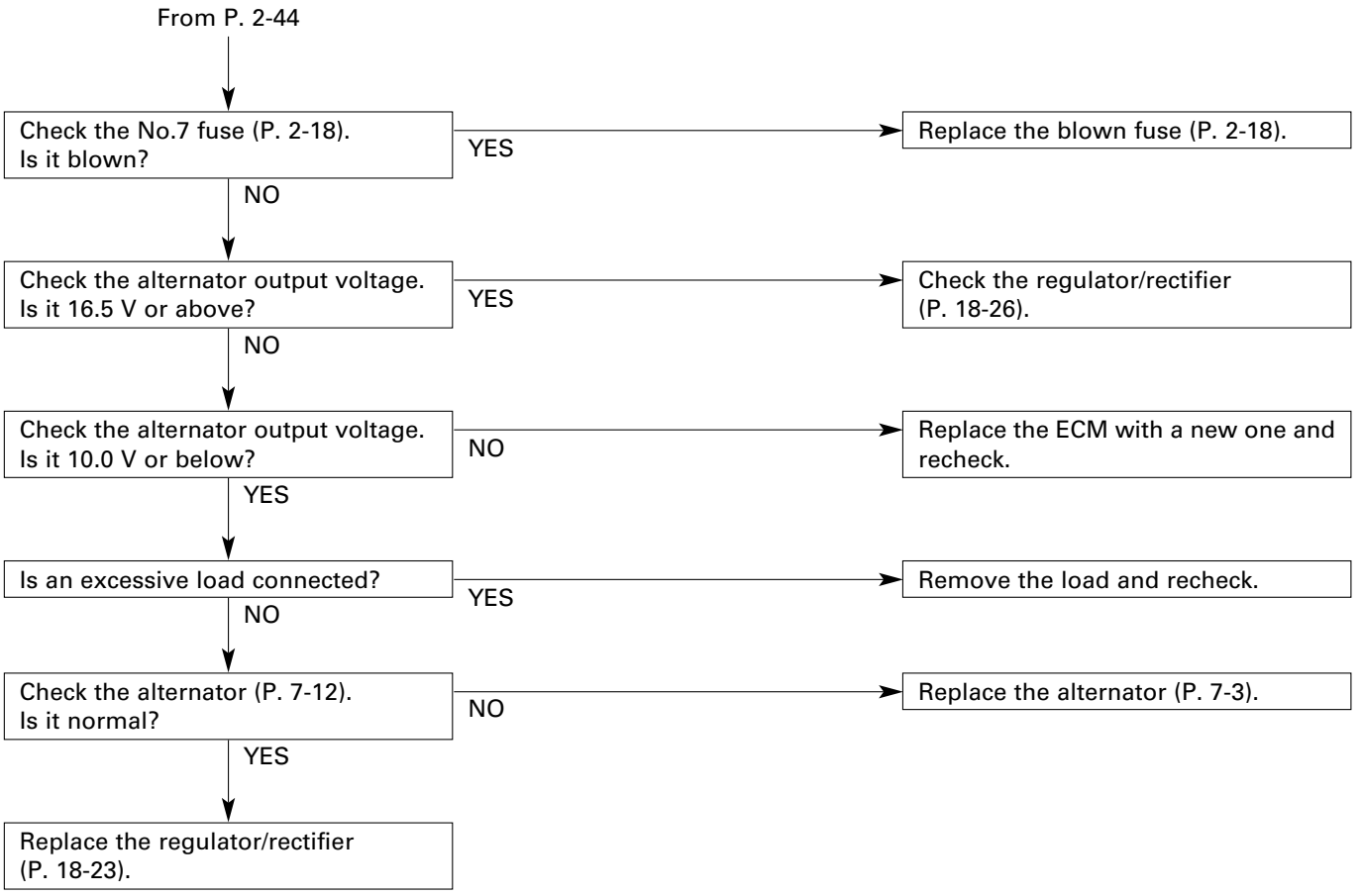
• INTERMITTENT WARNING BUZZER SOUNDS CONTINUOUSLY



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-45

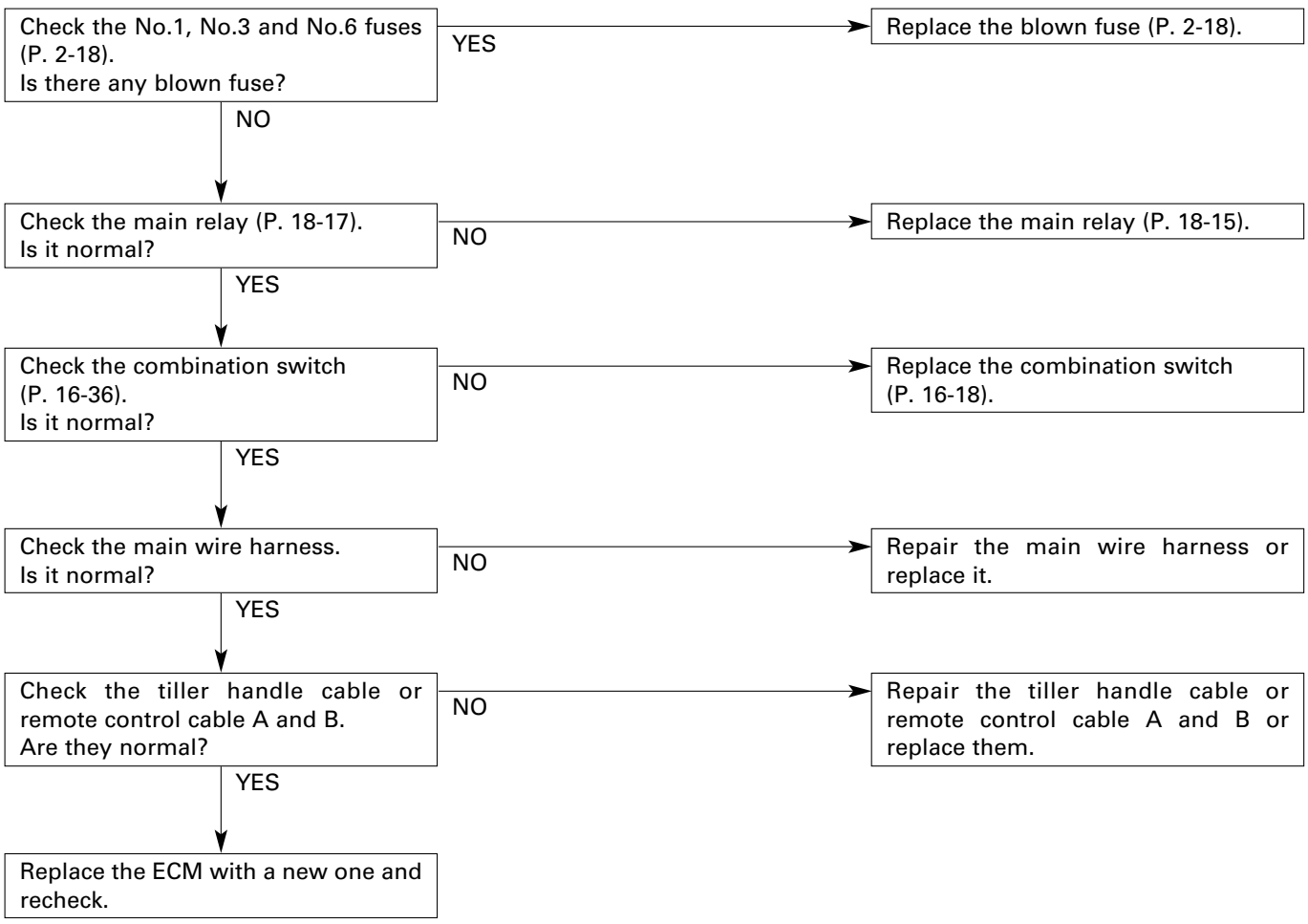
From P. 2-44



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-46

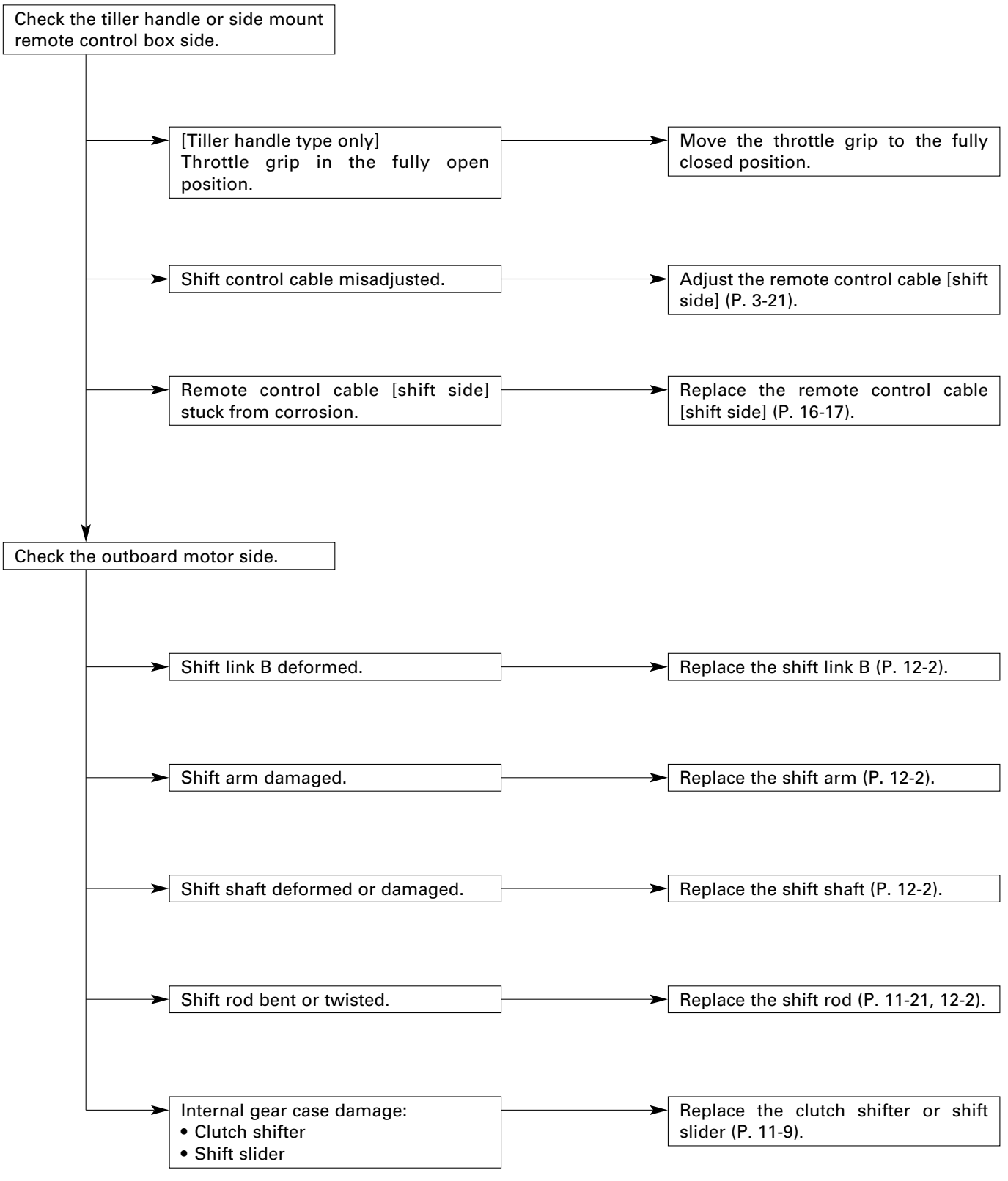
• ECM IS ABNORMAL



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-47

d. SHIFT MECHANISM
• HARD TO SHIFT

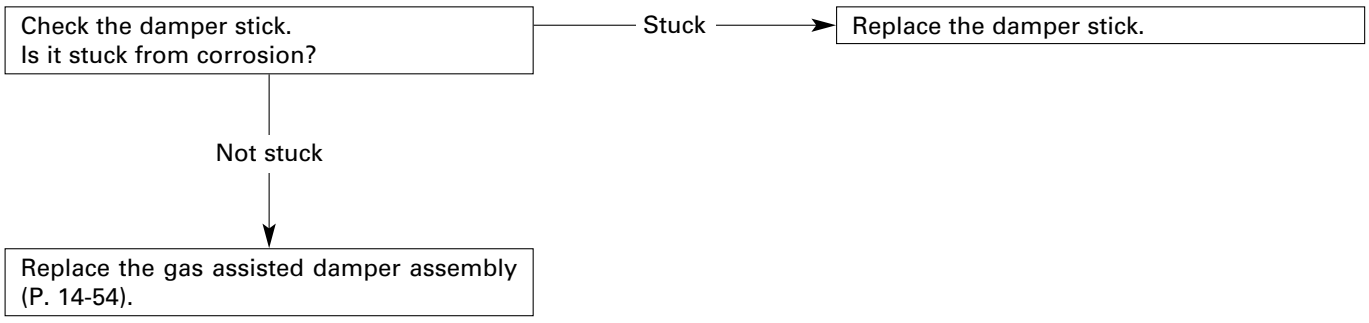


© Honda Motor Co., Ltd.

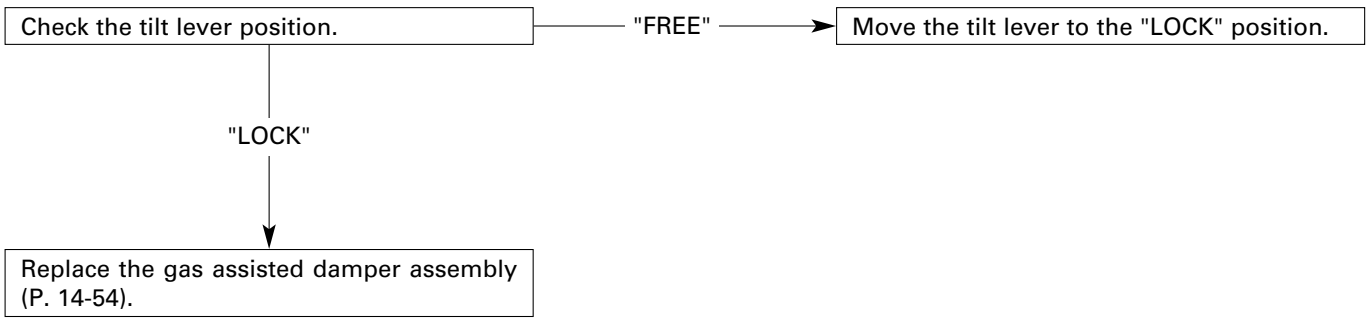
cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-48

e. GAS ASSISTED DAMPER [GAS ASSISTED TYPE ONLY]

• DIFFICULT TO TILT UP



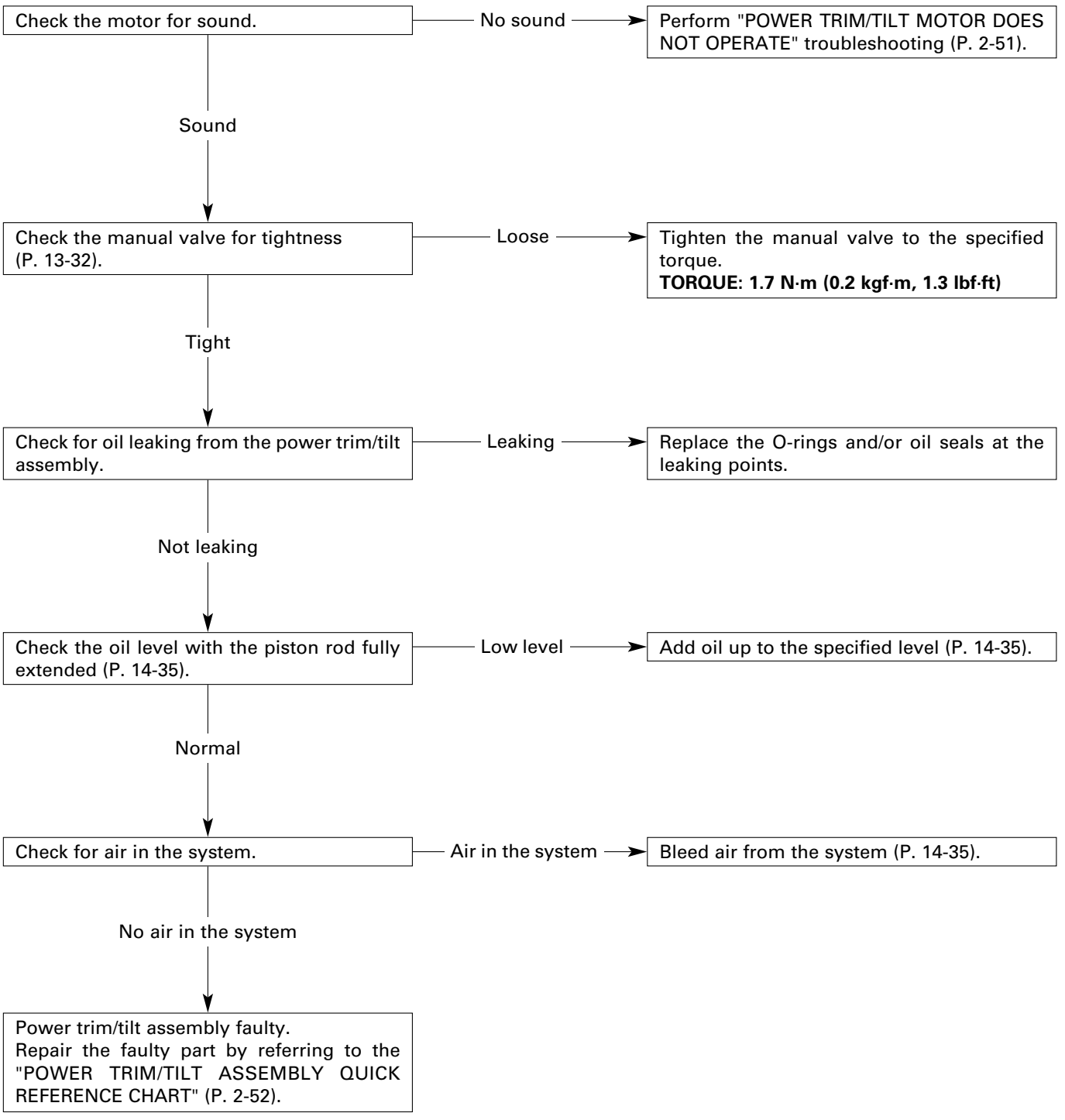
• DOES NOT HOLD IN POSITION



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-49

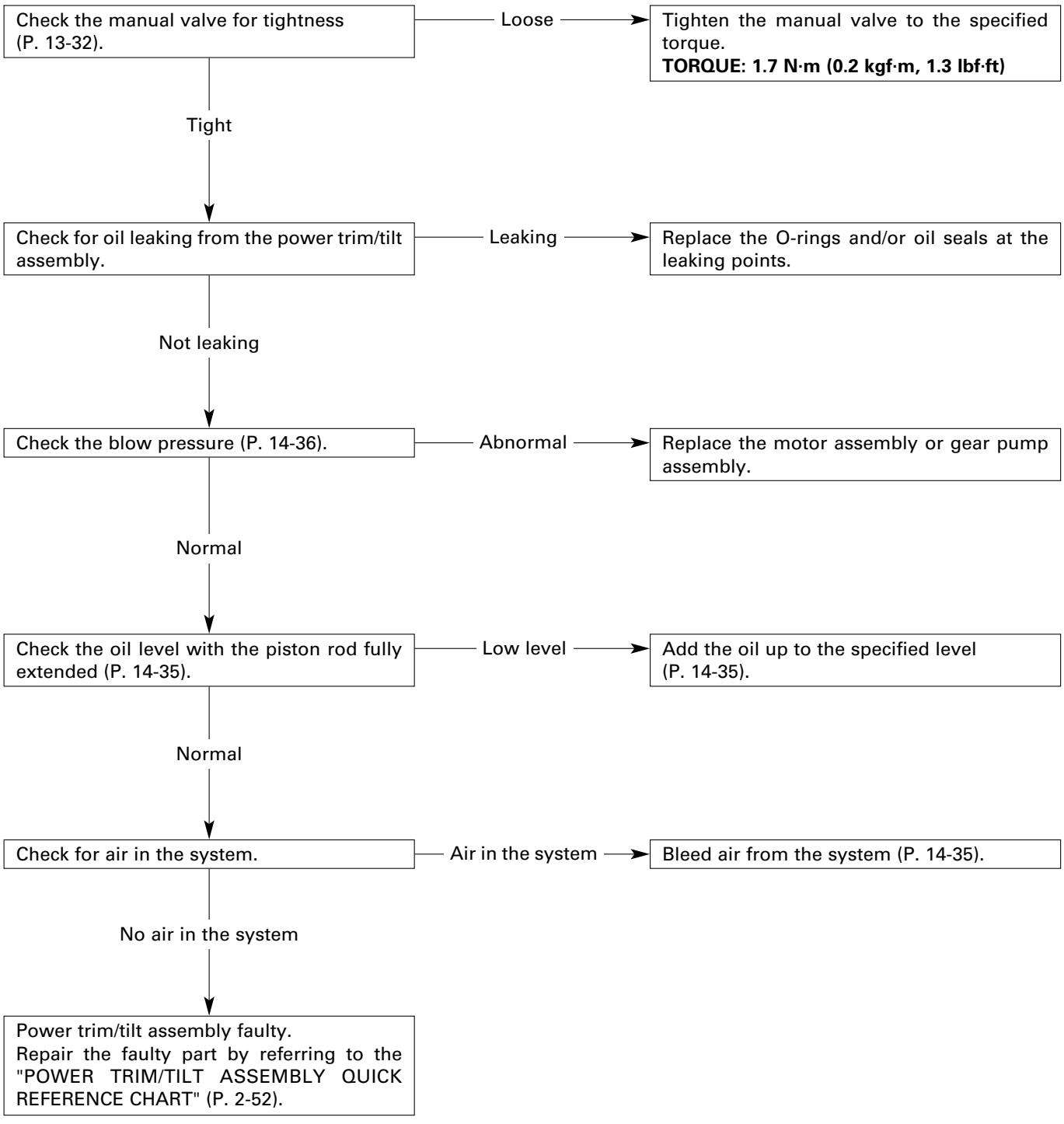
f. POWER TRIM/TILT [POWER TRIM/TILT TYPE ONLY]
• POWER TRIM/TILT ASSEMBLY DOES NOT OPERATE



© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-50

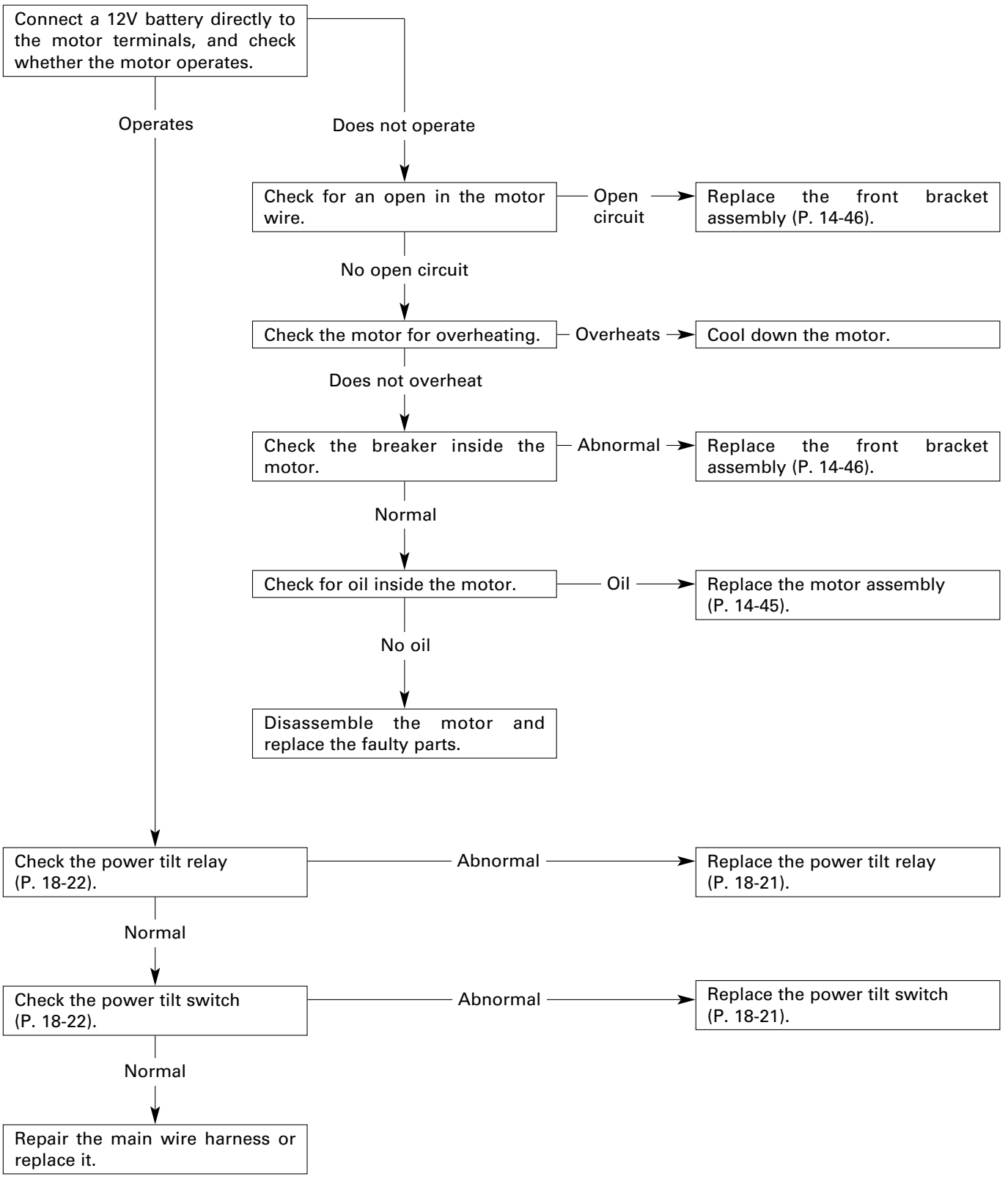
• POWER TRIM/TILT ASSEMBLY DOES NOT HOLD IN POSITION



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-51

• POWER TRIM/TILT MOTOR DOES NOT OPERATE



© Honda Motor Co., Ltd.

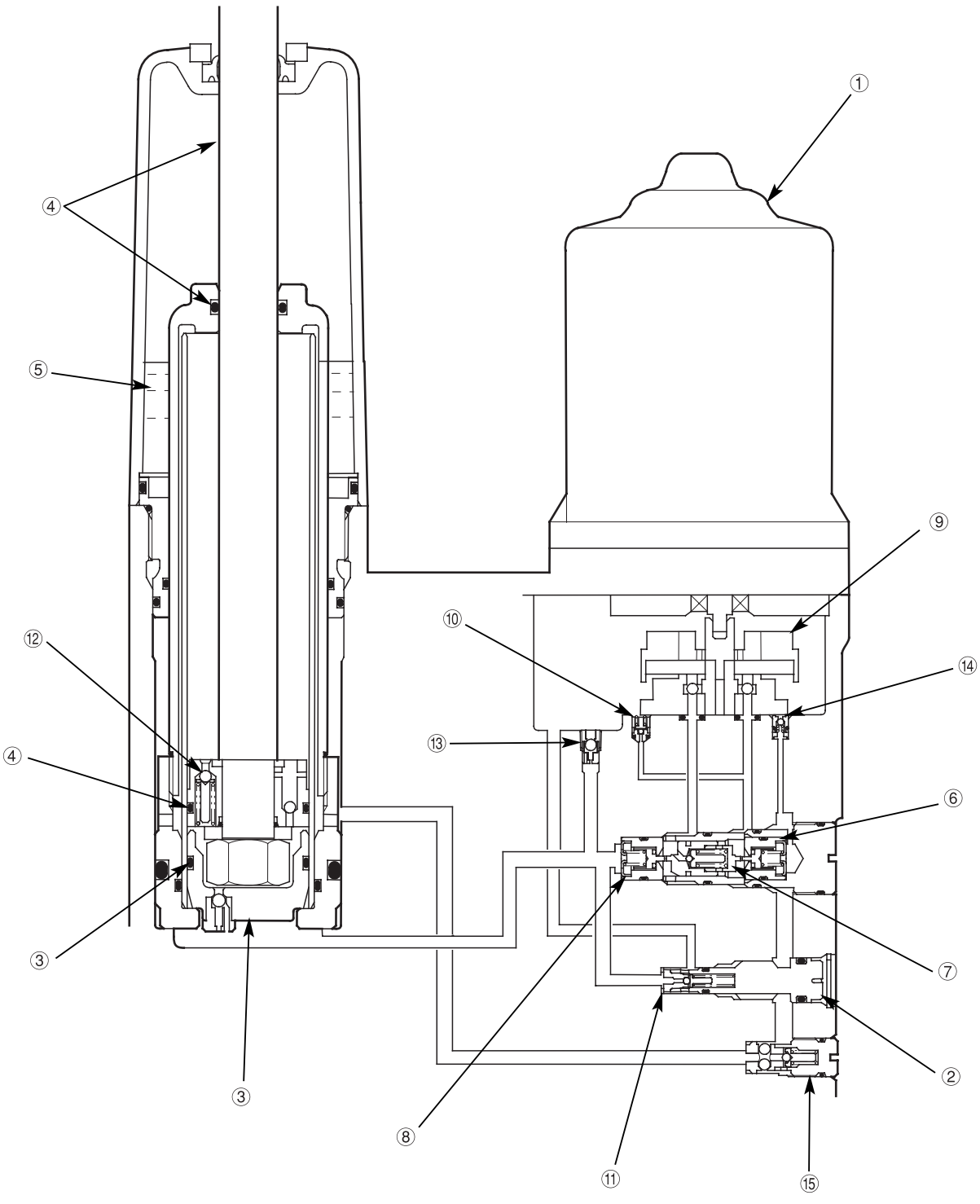
cap.02 BF40D 50D (AH).qxp 2008/04/10 18:14 ページ 2-52

• POWER TRIM/TILT ASSEMBLY QUICK REFERENCE CHART

Symptom				Pressure check		Check point (P. 2-53)	Check/repair method
Does not tilt up	Does not tilt down	Does not hold		Lower chamber hydraulic pressure lower than spec. or pressure drops.	Upper chamber hydraulic pressure lower than spec. or pressure drops.		
		Lowers	Extends				
○	○	—	—	○	○	① Motor assembly	Replace the motor assembly.
○	○	○	○	○	○	② Manual valve	Check that the manual valve is installed securely. Replace if it is damaged. Check the O-ring surface for damage and replace if necessary. If there is no damage, clean the O-ring and install on the manual valve properly.
○	—	○	—	○	—	③ Free piston, O-ring	Check the O-ring for damage and replace if necessary. If there is no damage, clean the free piston and O-ring and reinstall them properly.
—	○	—	○	—	○	④ Piston rod comp., O-ring, oil seal	Check the oil seal for damage and foreign material, and check the O-ring for damage. Replace the oil seal and O-ring if necessary. Check the piston rod comp. for wear, damage or bends. Replace the piston rod as an assembly if necessary. (Do not disassemble the piston rod comp.)
○	○	—	—	○	○	⑤ Oil (ATF)	Check the oil level and add oil if necessary.
○	○	—	○	—	○	⑥ Upper chamber check valve	Check the valve for wear and damage and replace it if necessary. If the valve is normal, clean it and reinstall it. (Do not disassemble the upper chamber/lower chamber check valve and spool valve. The up relief valve is built in the spool valve.)
○	○	—	○	—	○	⑦ Spool valve	
○	○	○	—	○	—	⑧ Lower chamber check valve	
○	○	—	—	○	○	⑨ Gear pump assembly	Replace the gear pump assembly if the pump idles or labors. (Do not disassemble the gear pump assembly.)
—	○	—	—	○	○	⑩ Down relief valve	Check the valve for damage and wear and replace if necessary. If the valve is normal, clean it and reinstall it. (If the thermal valve is abnormal, replace the manual valve.)
○	○	—	—	○	○	⑪ Thermal valve	
—	○	—	—	○	○	⑫ Shock relief valve	Check the ball seat and neighboring parts for damage and replace the piston rod as an assembly if necessary. (Do not disassemble the piston rod.) If the ball seat and neighboring parts are normal, clean them and reinstall them.
○	—	○	—	○	—	⑬ Lower chamber safety valve	Replace the cylinder comp. if the valve is abnormal. (Do not disassemble the lower chamber safety valve.)
—	○	—	—	—	○	⑭ Upper chamber safety valve	Check the valve for damage and wear and replace it if necessary. If normal, clean the valve and reinstall it. Check the O-ring for damage and replace it if necessary.
○	○	—	—	—	—	⑮ 2-way valve	

Date of Issue: May 2008
© Honda Motor Co., Ltd.

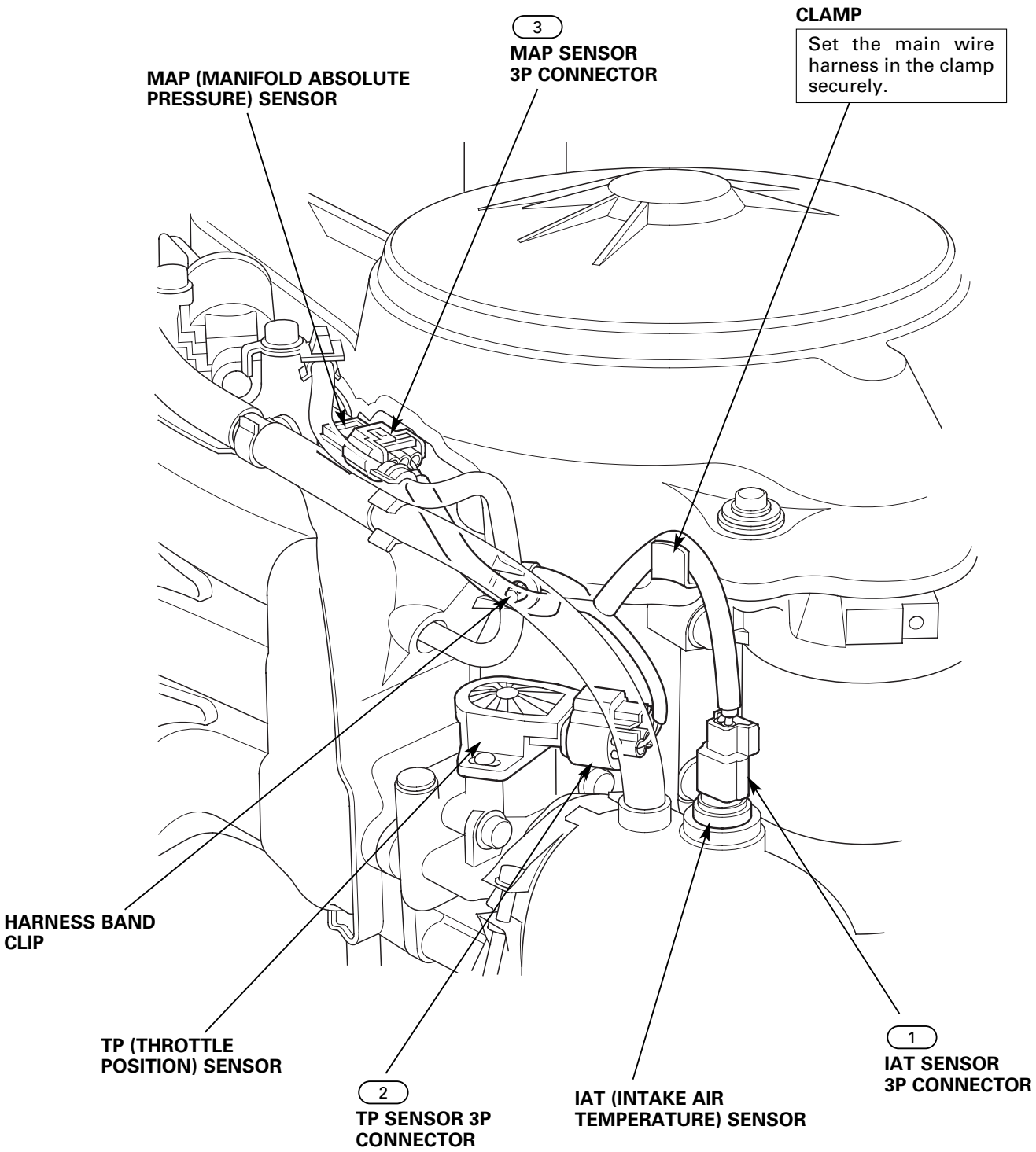
cap.02 BF40D 50D (AH).qxp 2008/04/10 18:15 ページ 2-53



© Honda Motor Co., Ltd.

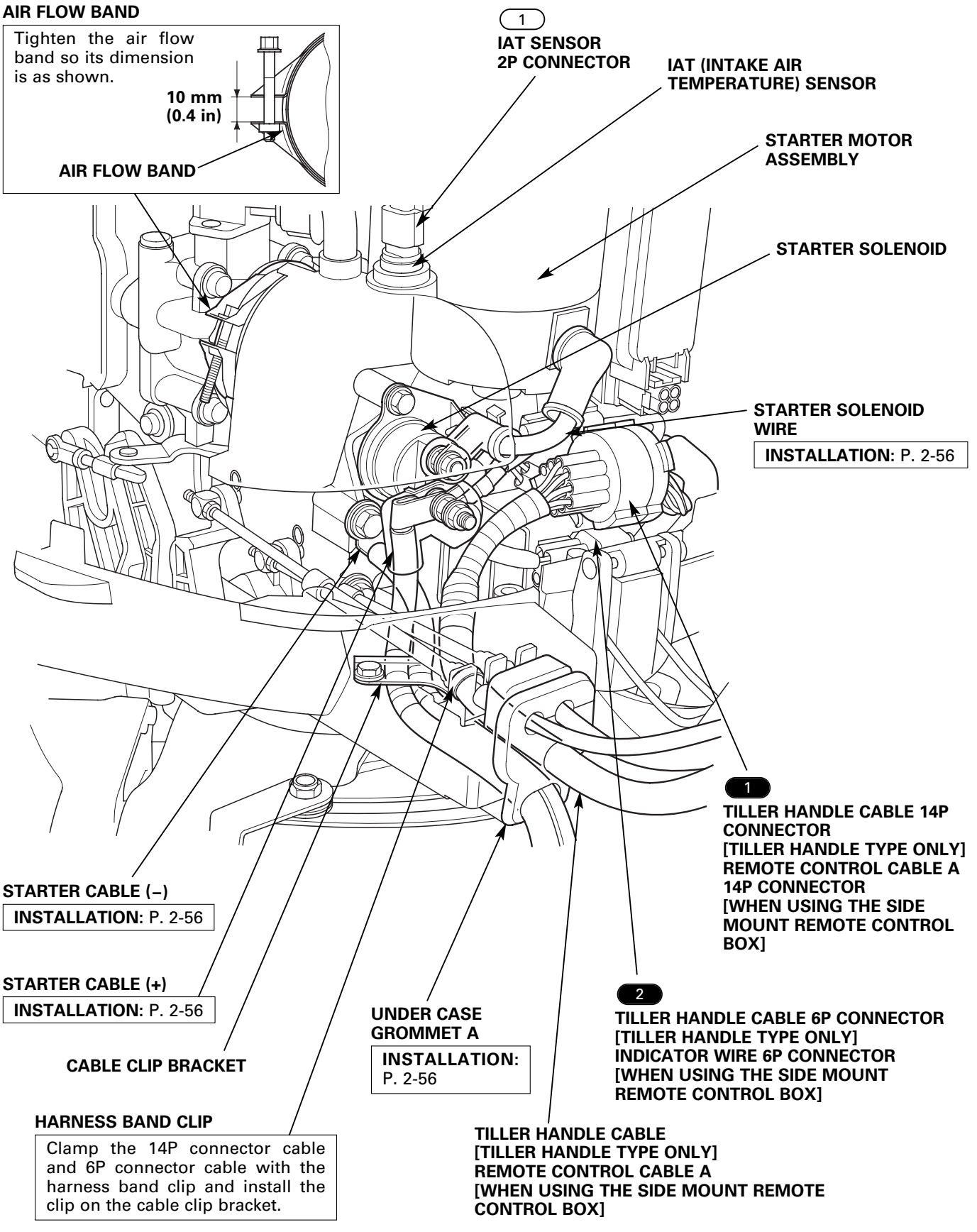
cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-54

8. CABLE/HARNESS ROUTING



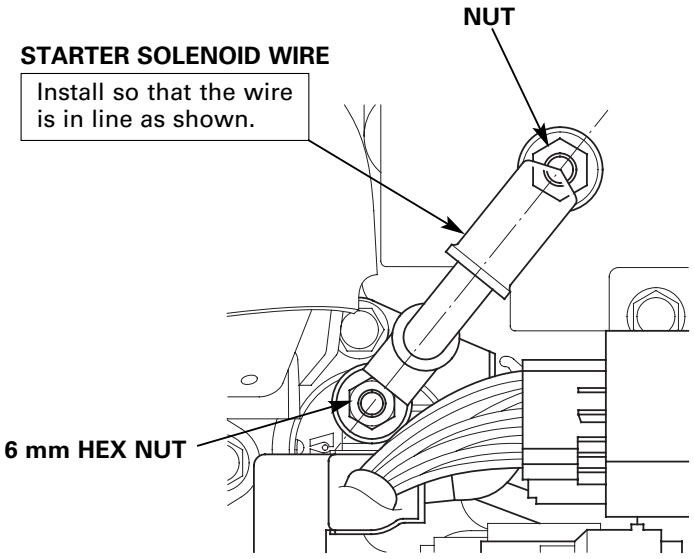
Date of Issue: May 2008
© Honda Motor Co., Ltd.

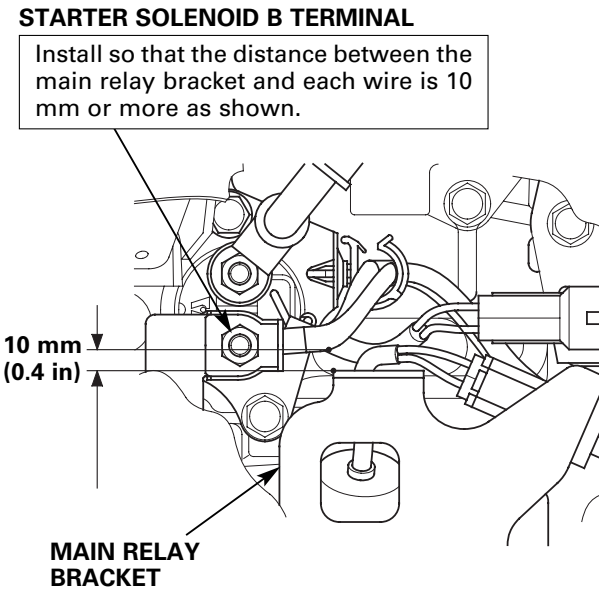
cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-55

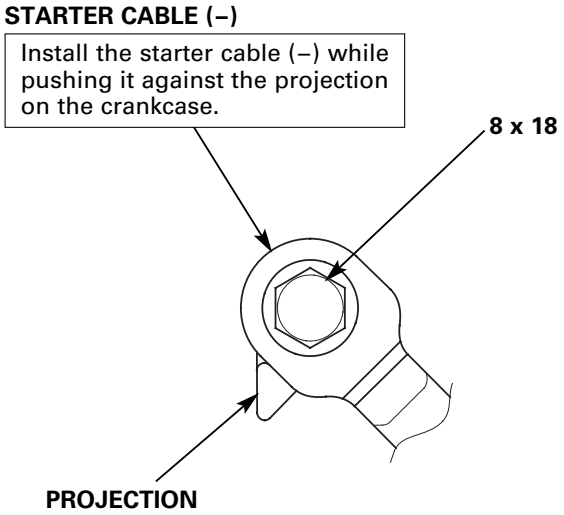


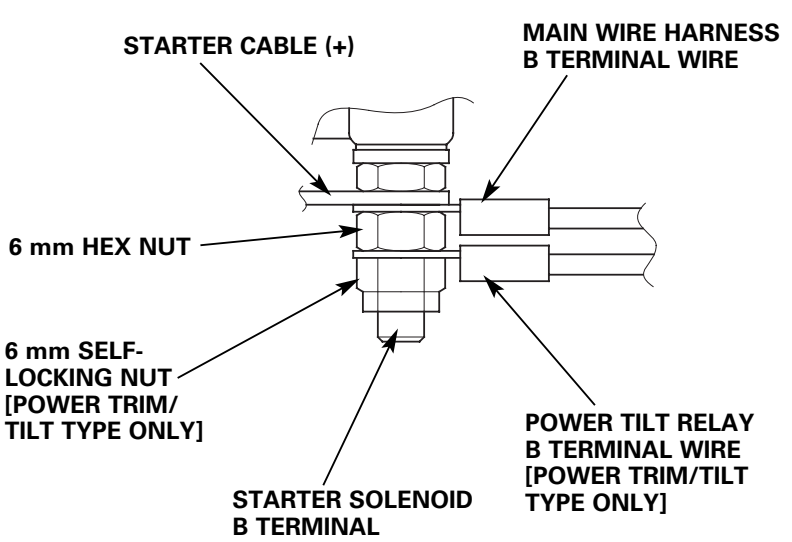
© Honda Motor Co., Ltd.

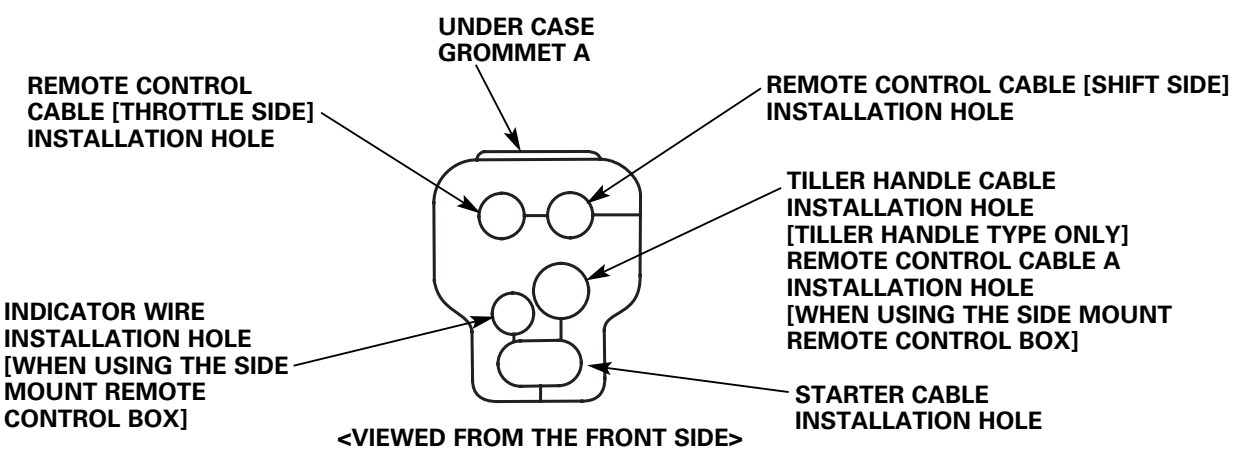
cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-56





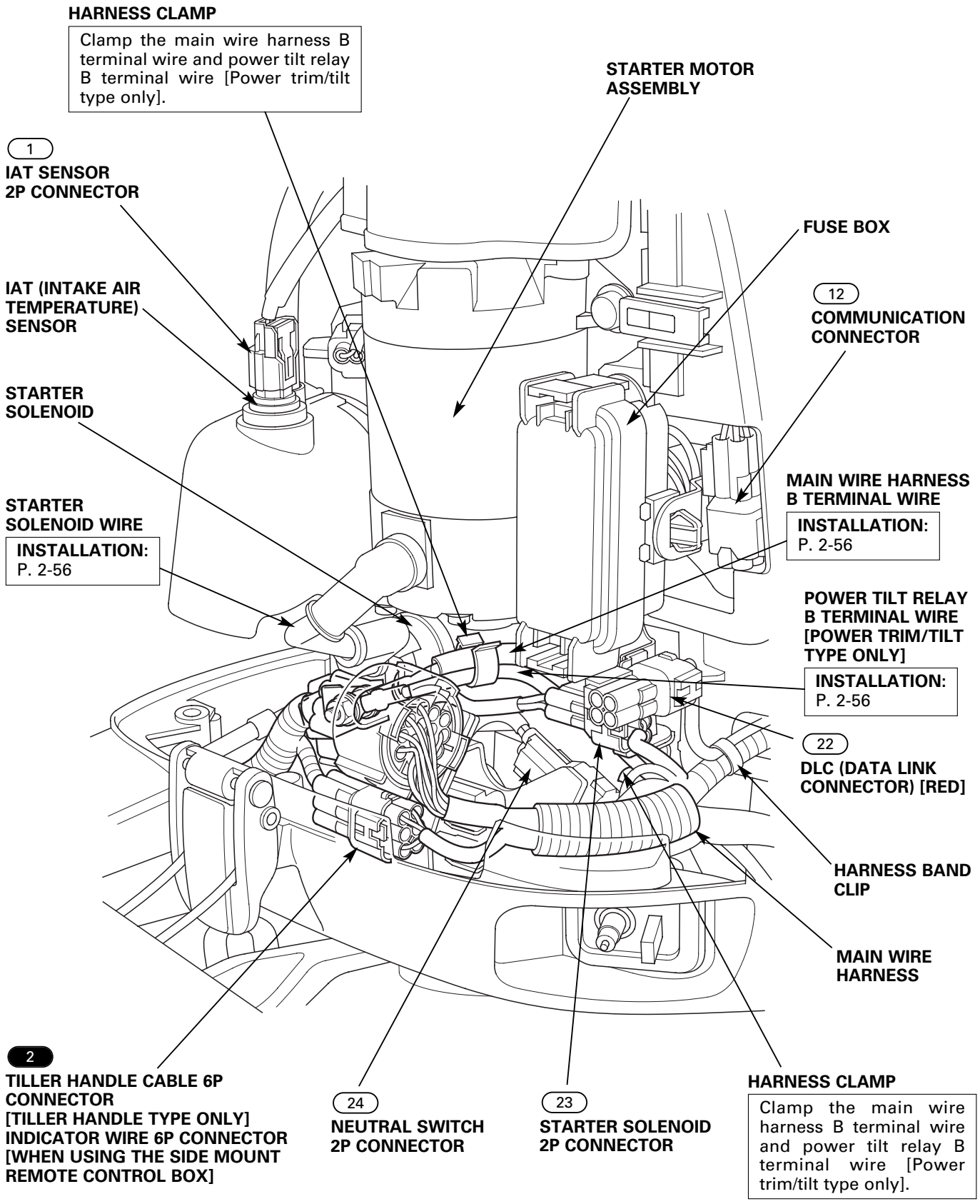






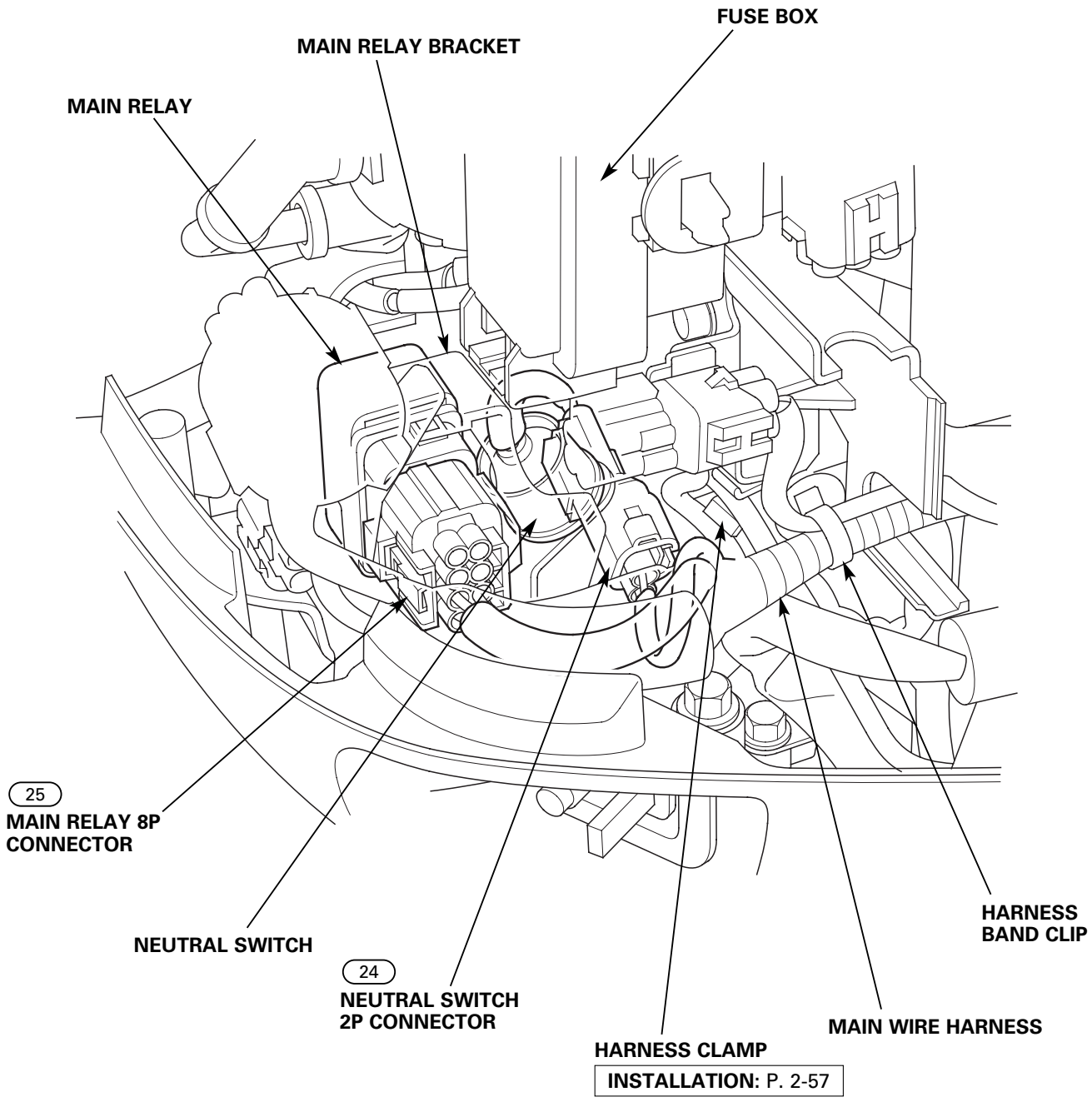
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-57



© Honda Motor Co., Ltd.

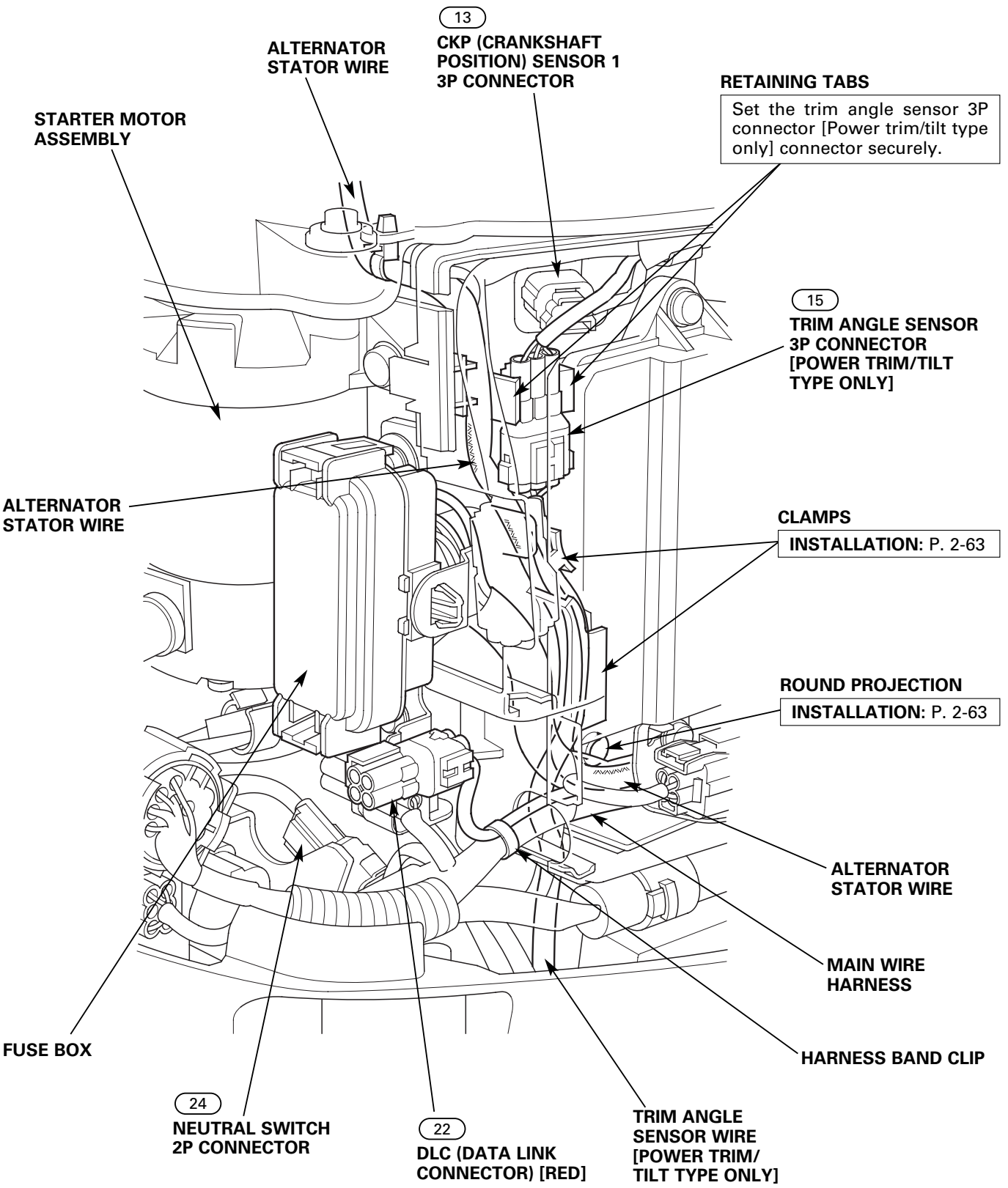
cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-58



INSTALLATION: P. 2-57

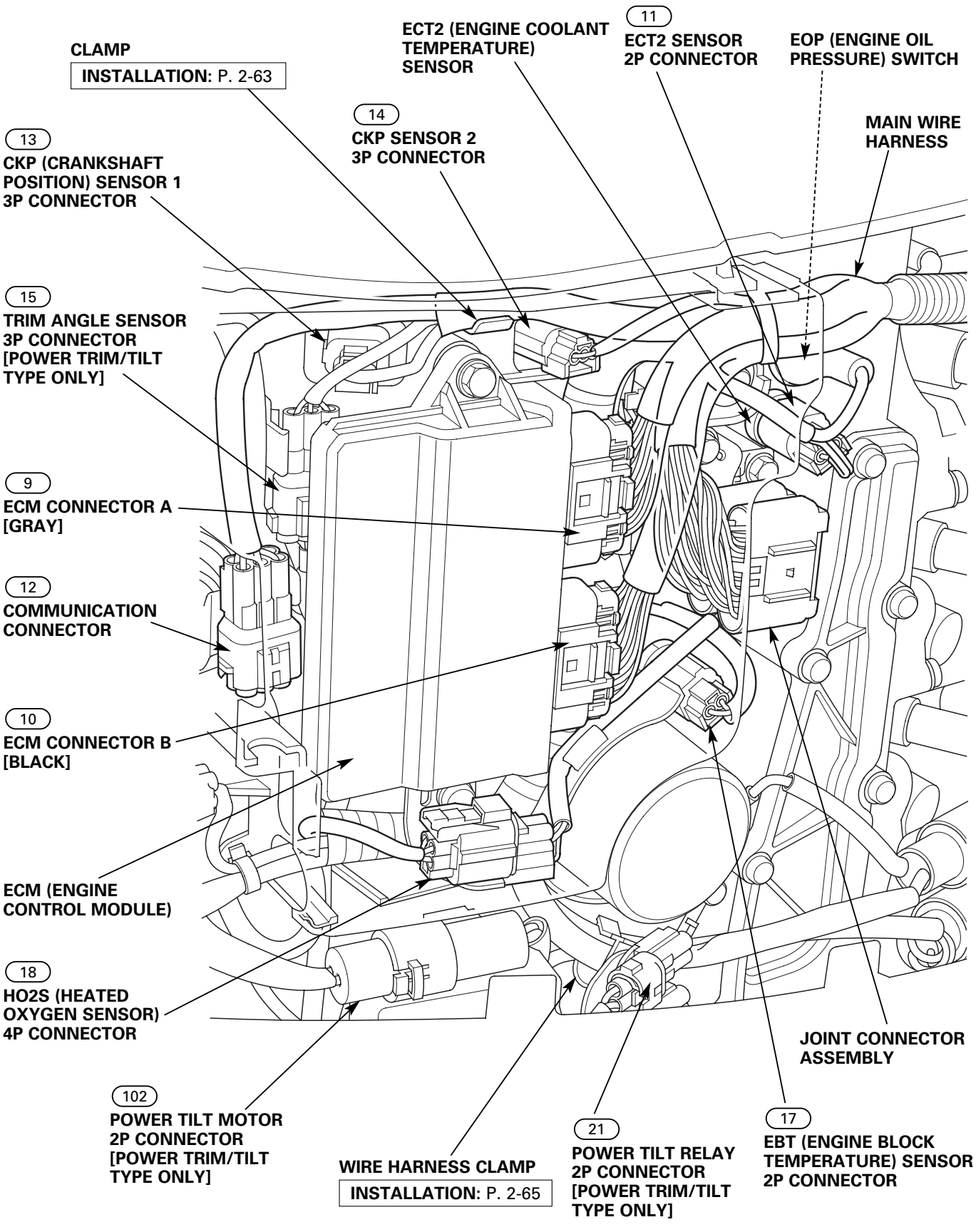
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-59



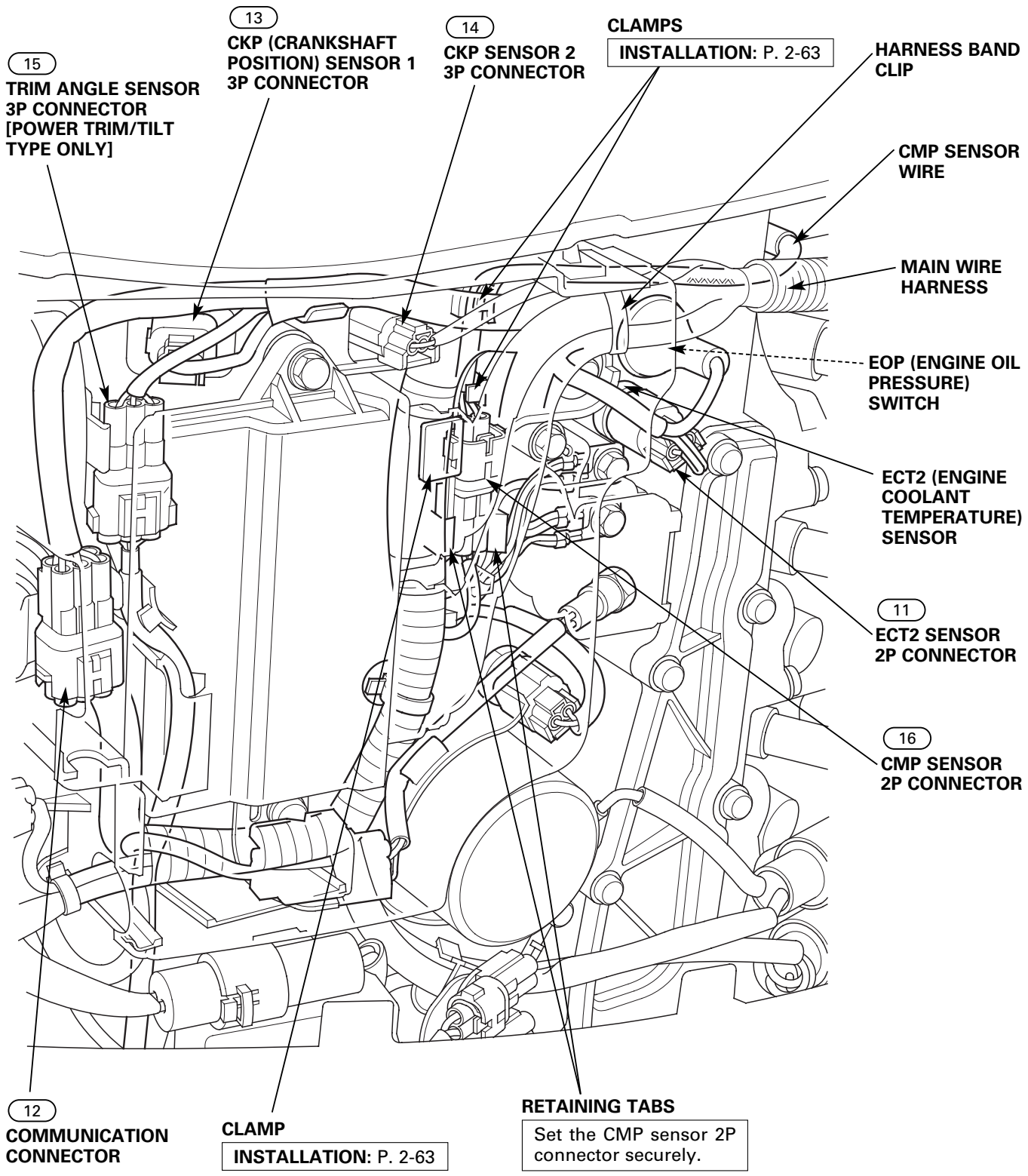
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-60



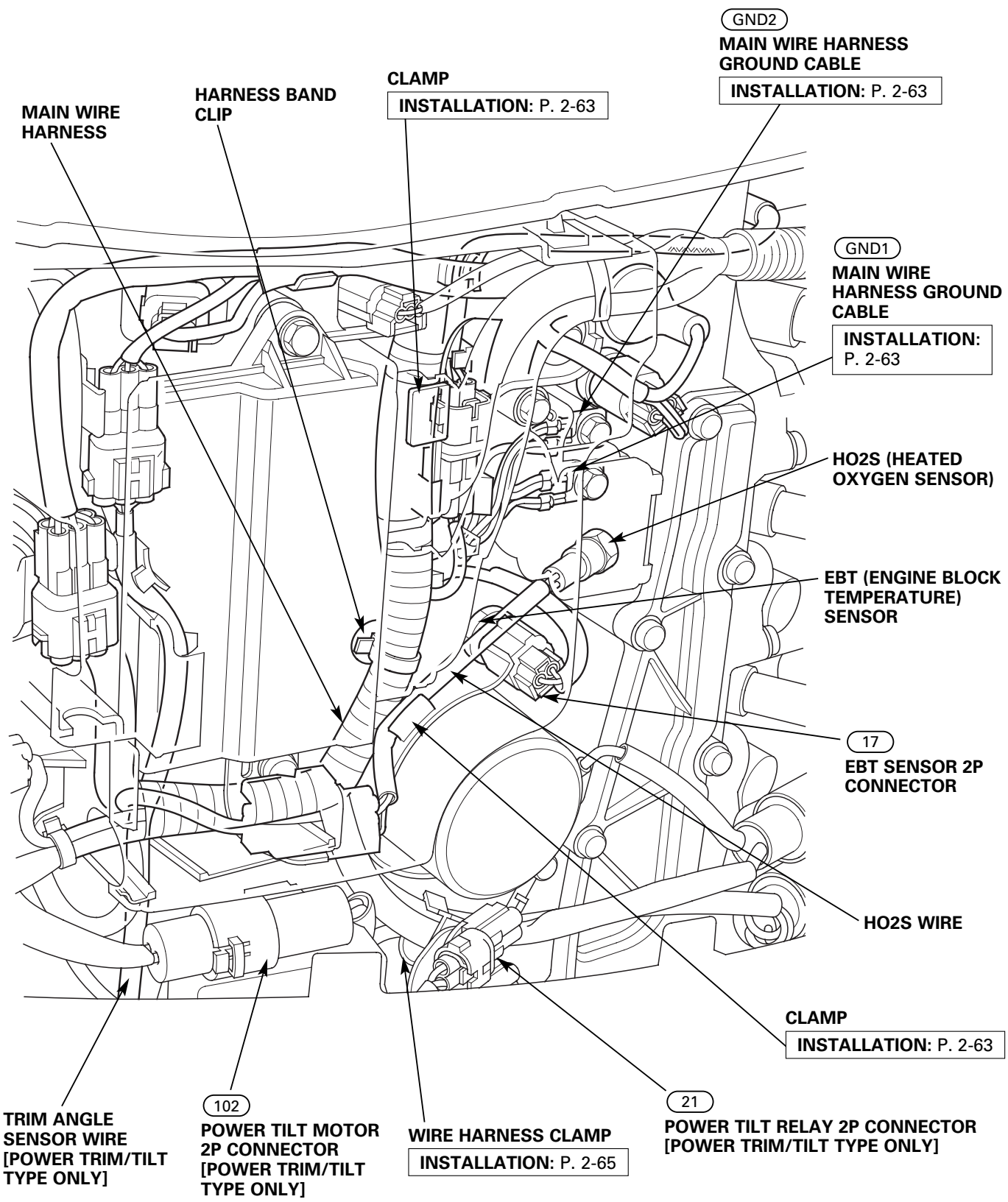
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-61



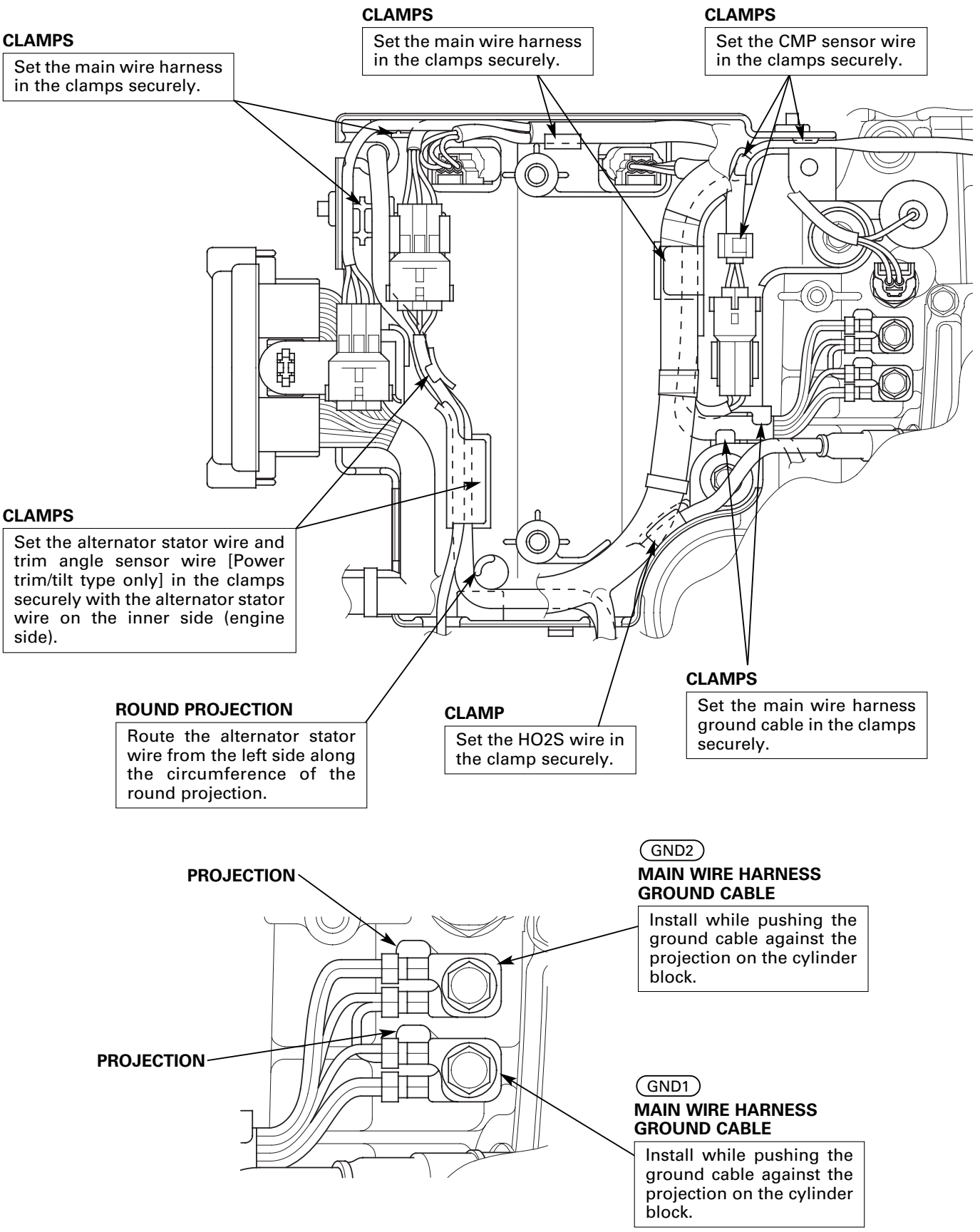
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:39 ページ 2-62



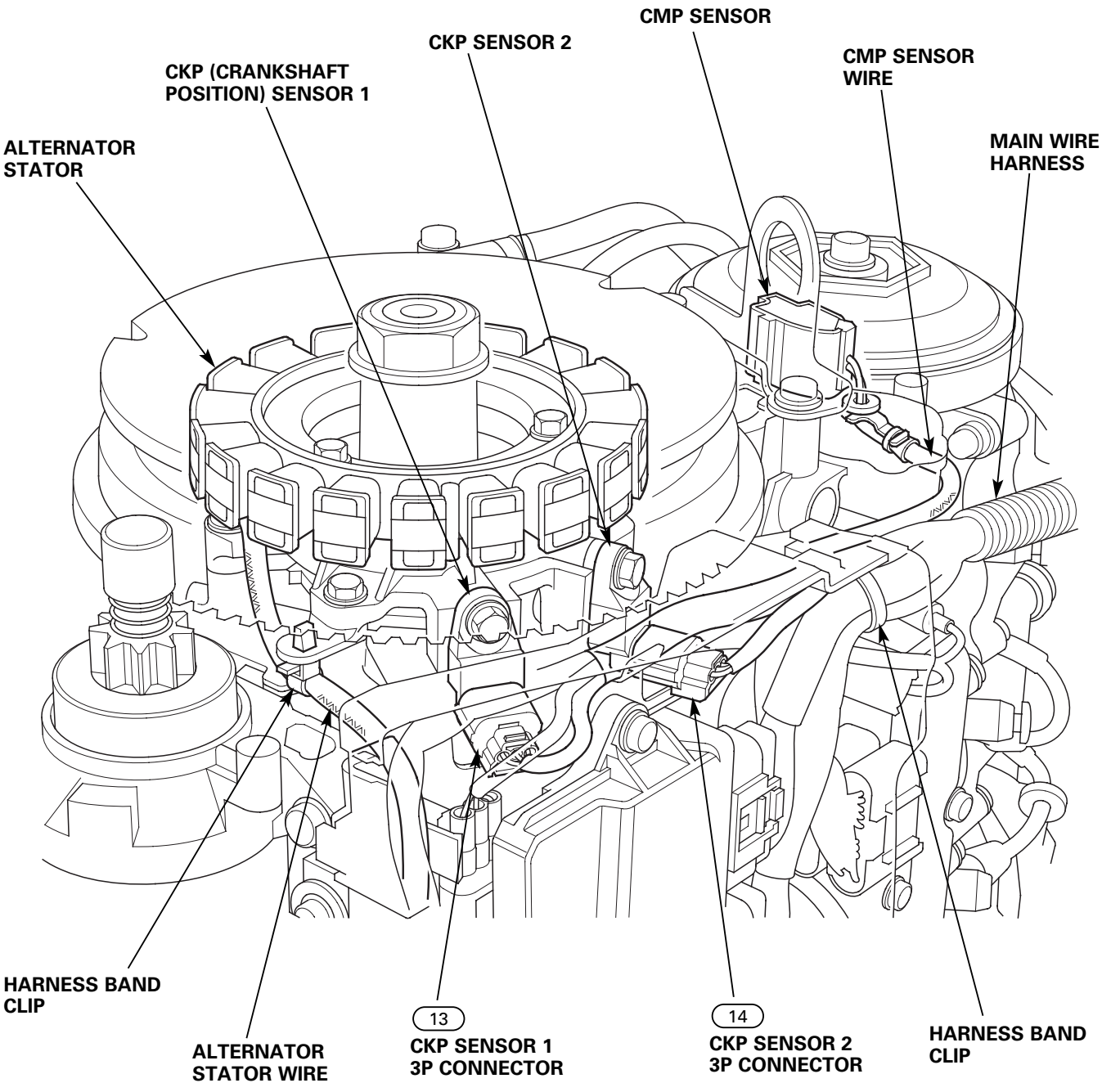
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-63



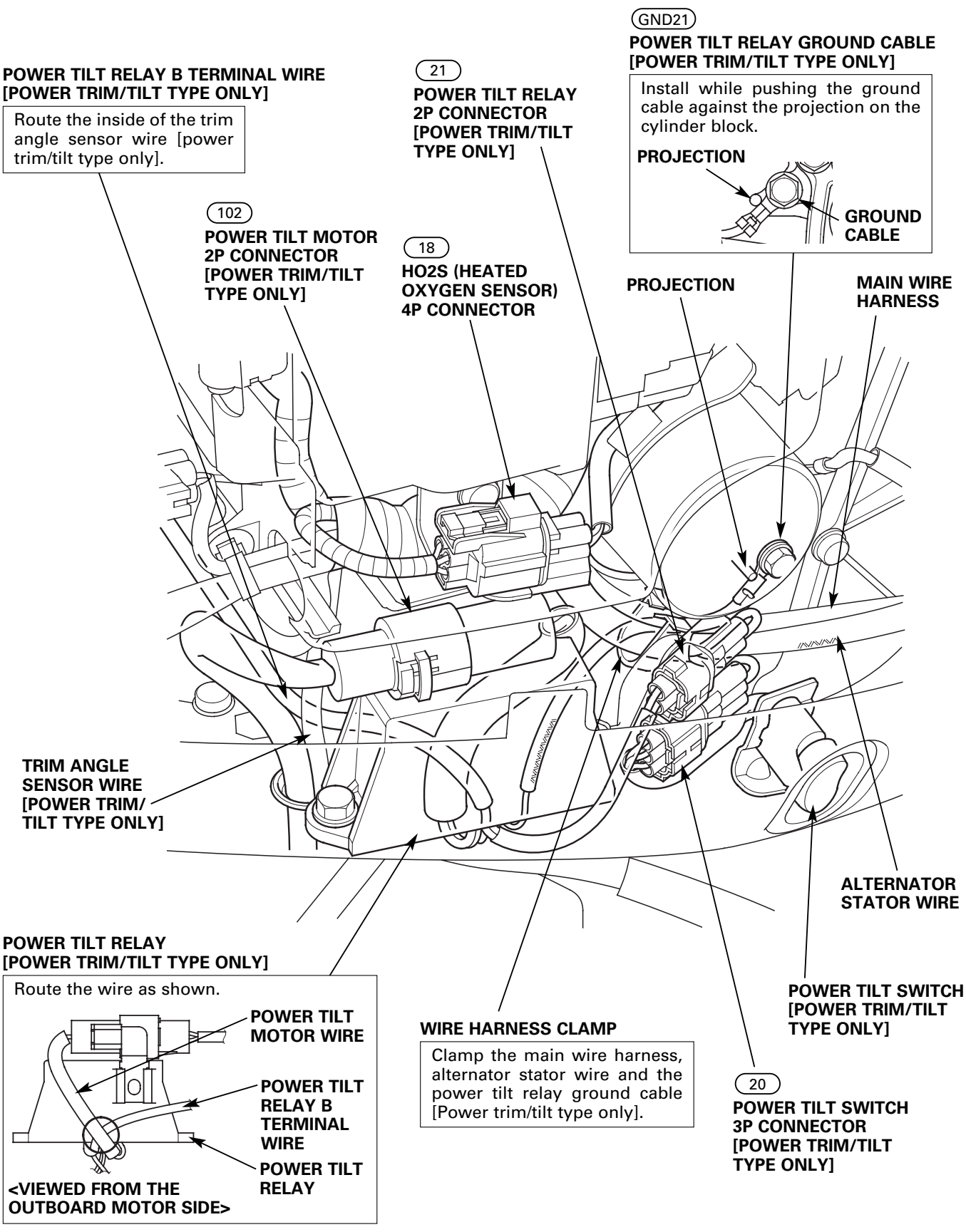
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-64



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-65



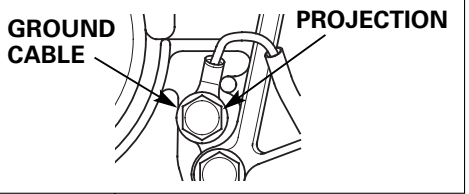
© Honda Motor Co., Ltd.

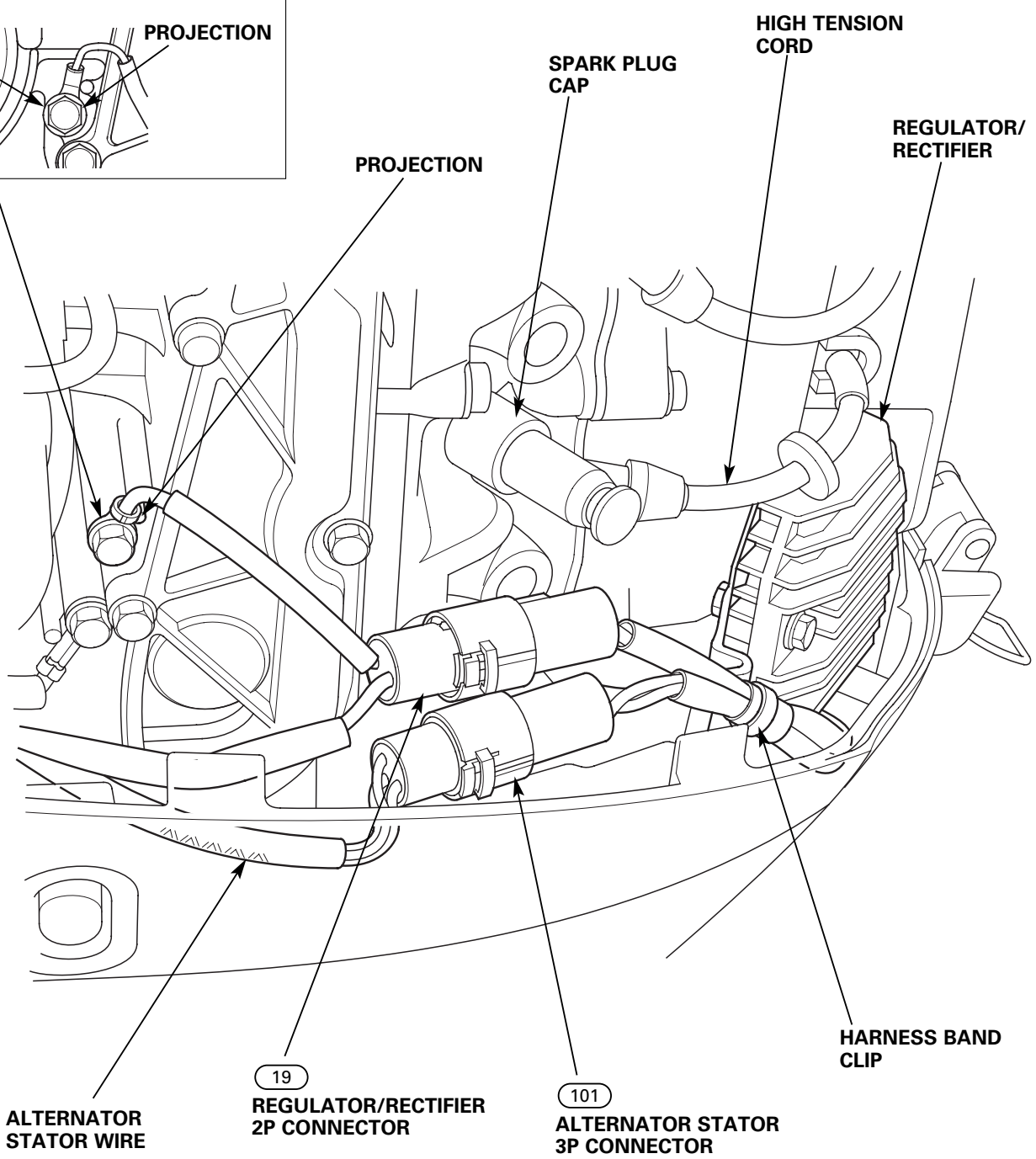
cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-66

GND3

REGULATOR/RECTIFIER GROUND CABLE

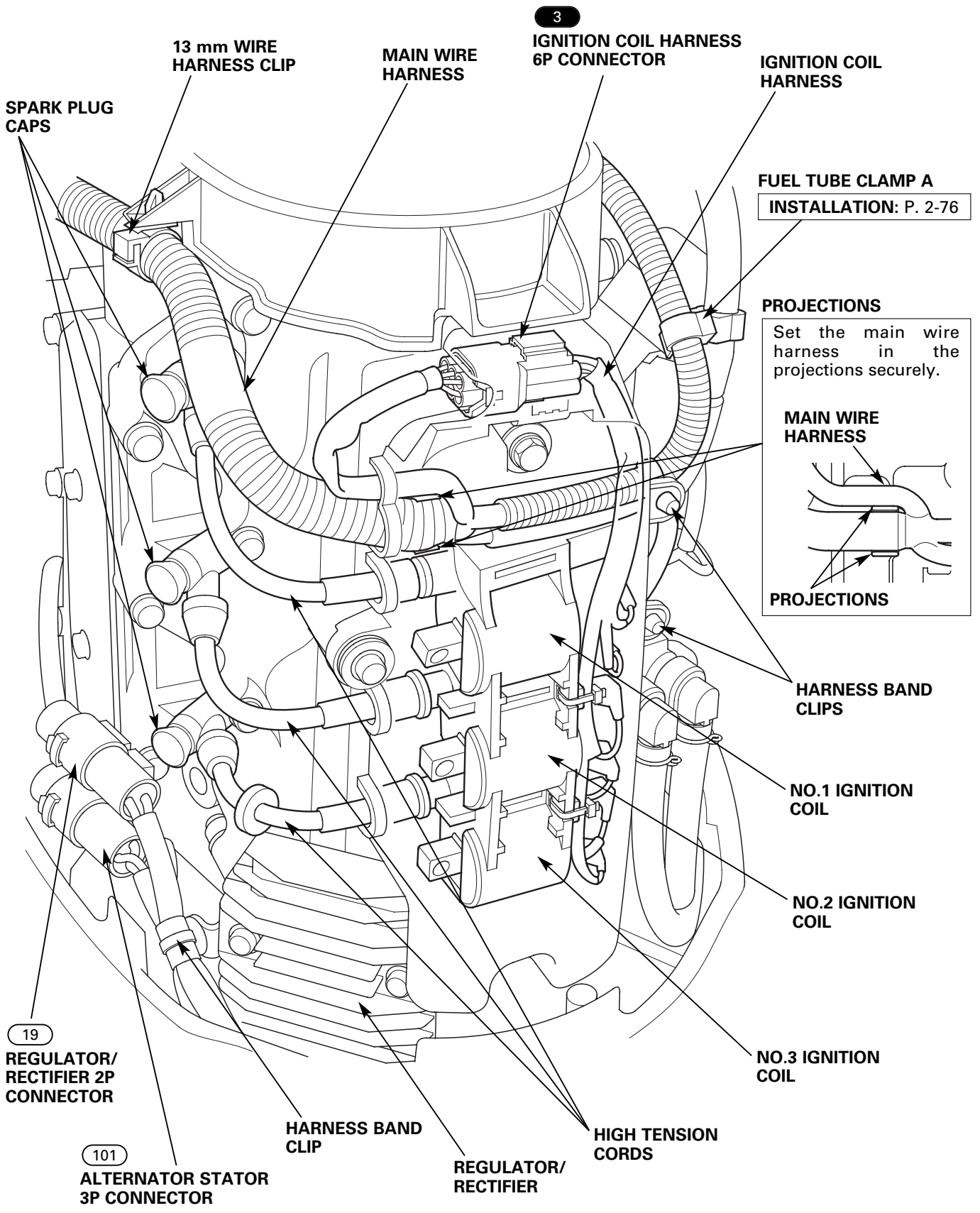
Install while pushing the ground cable against the projection on the cylinder block.





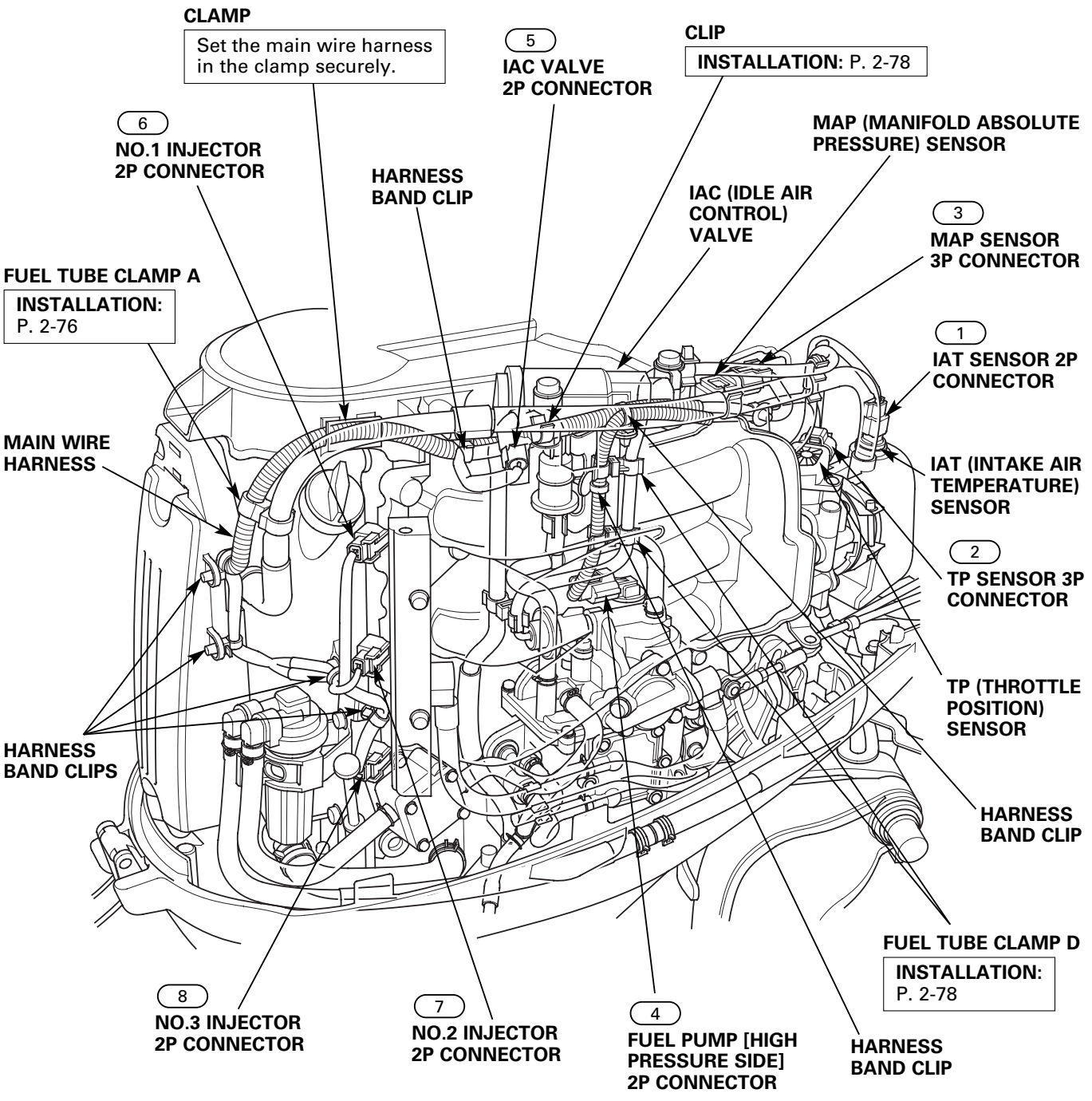
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-67



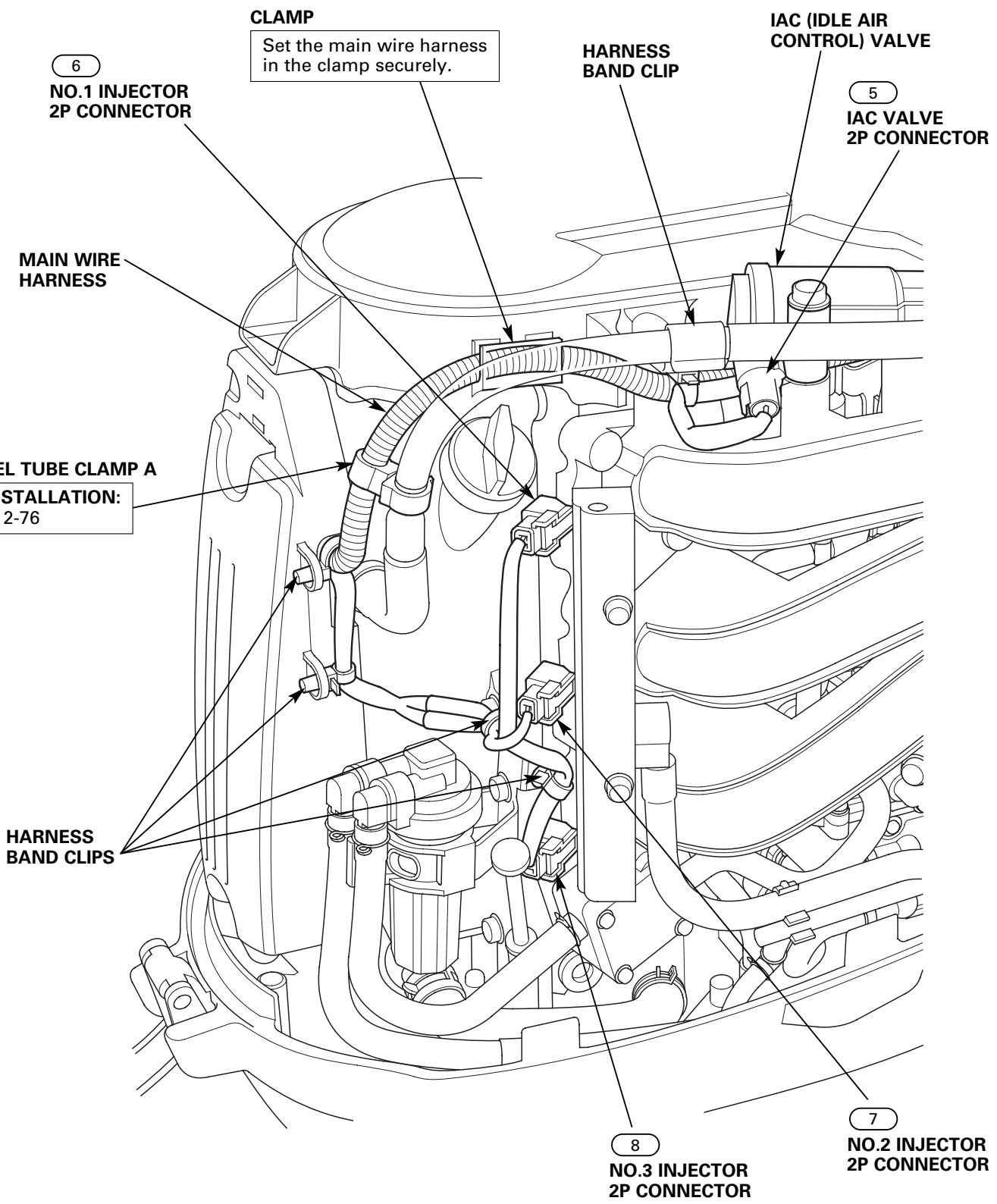
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-68



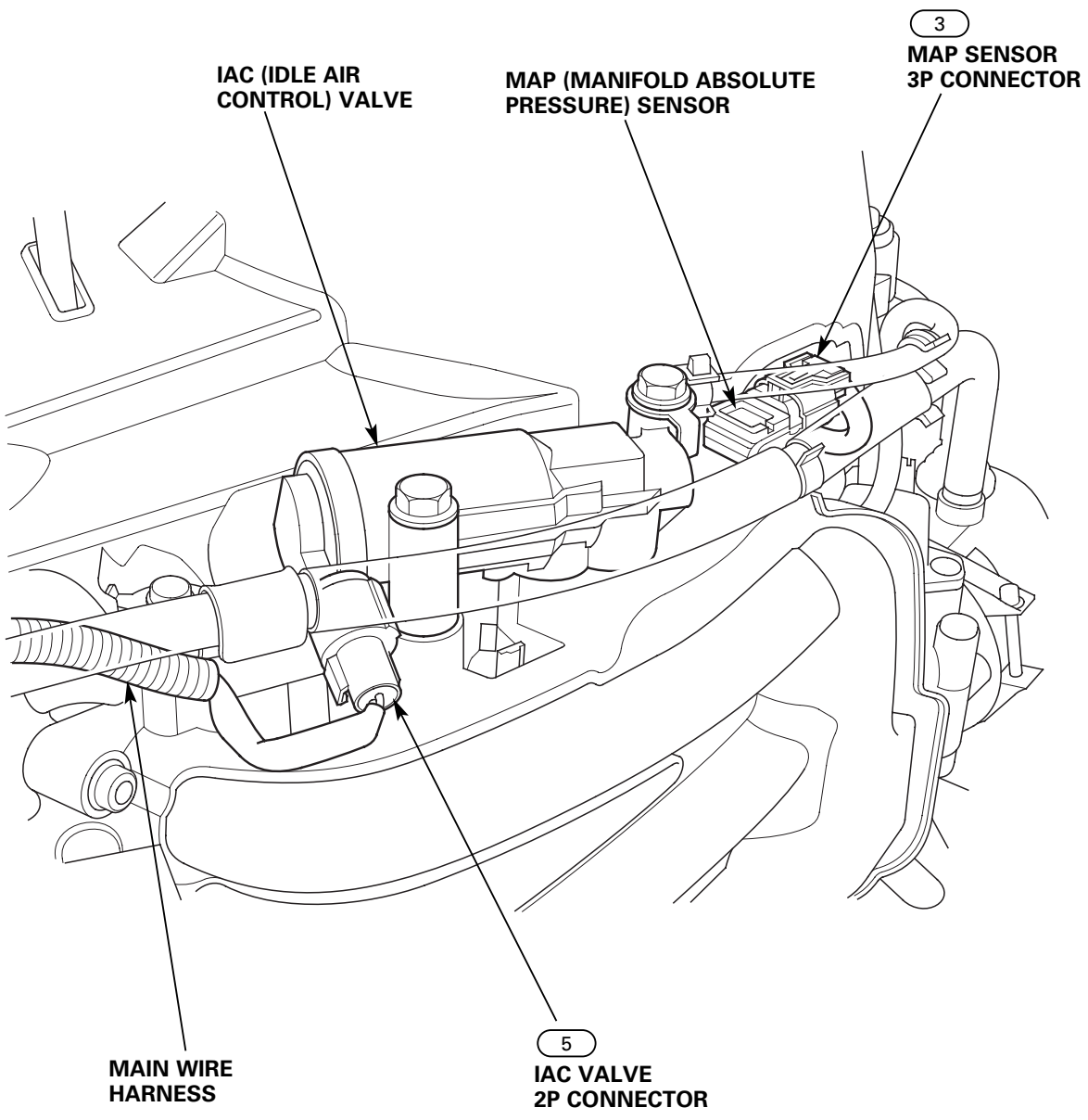
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-69



© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-70



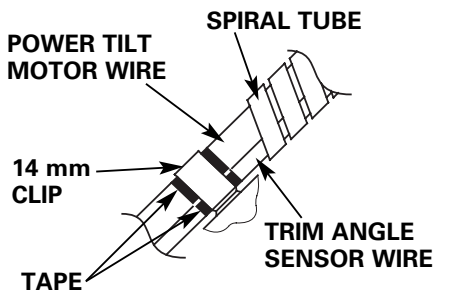
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-71

***: Power trim/tilt type only**

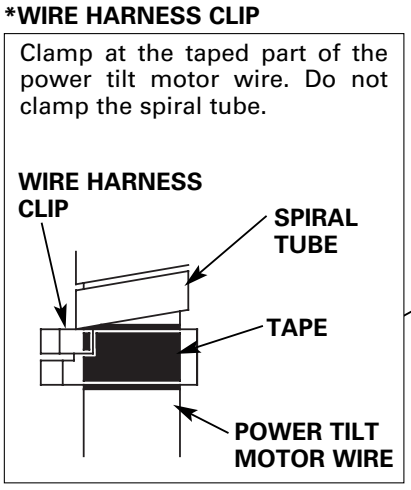
***14 mm CLIP**

Clamp at the taped part of the power tilt motor wire and trim angle sensor wire. Do not clamp the spiral tube.



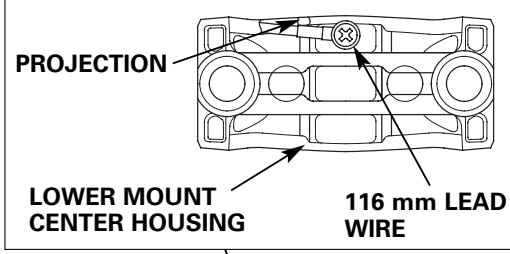
***WIRE HARNESS CLIP**

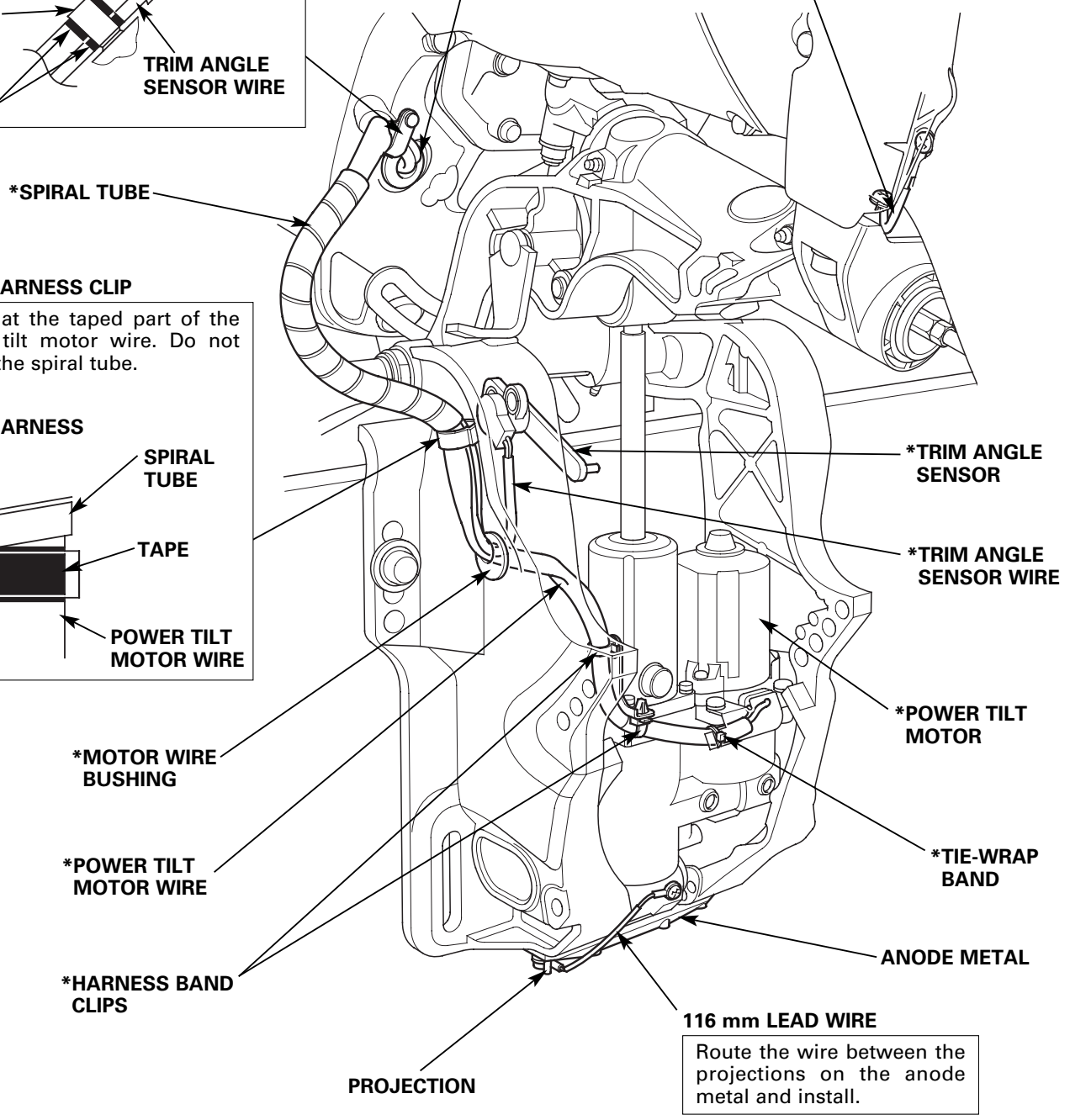
Clamp at the taped part of the power tilt motor wire. Do not clamp the spiral tube.



116 mm LEAD WIRE

Install while pushing the lead wire against the projection on the lower mount center housing.



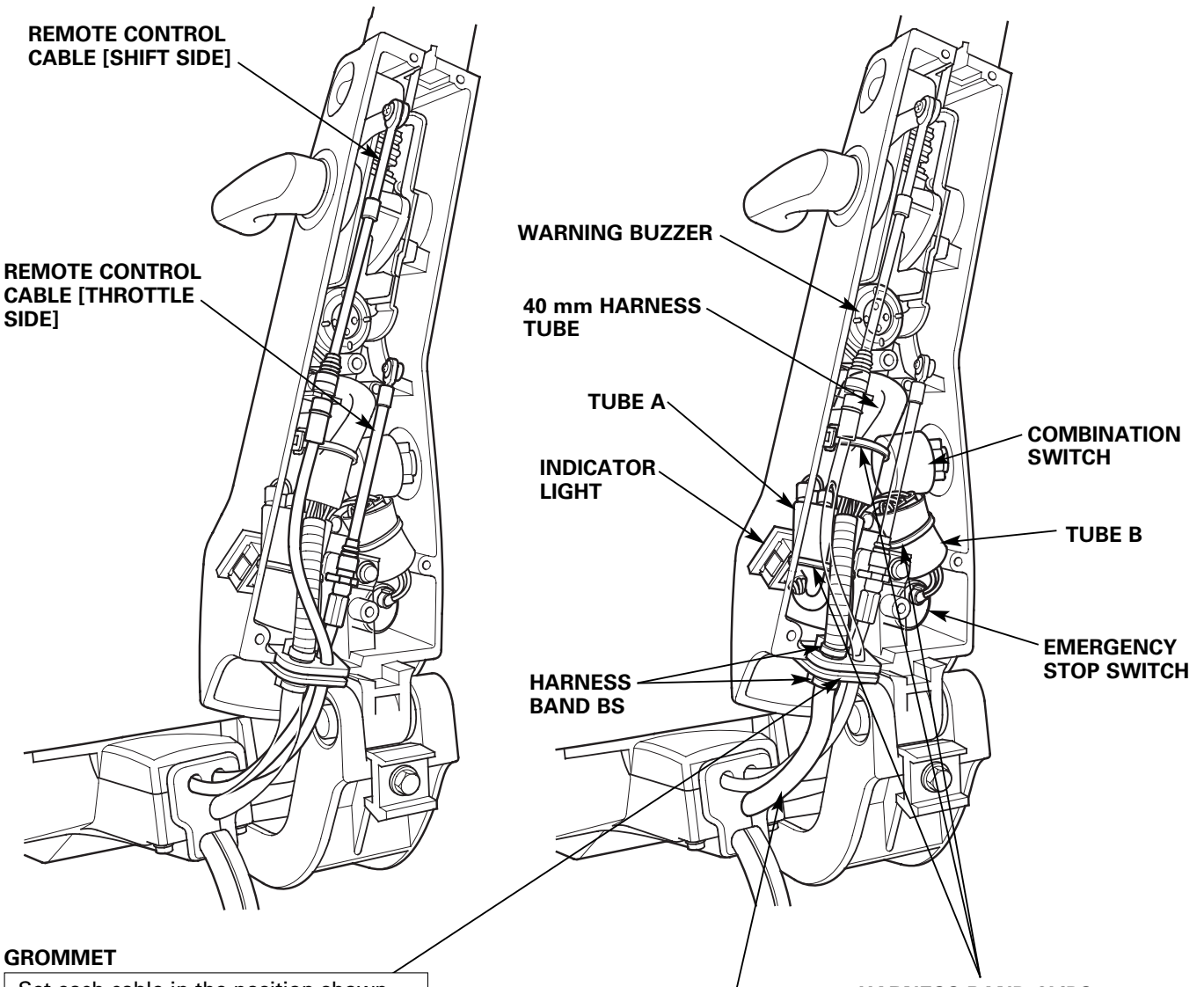


Route the wire between the projections on the anode metal and install.

© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-72

• TILLER HANDLE [TILLER HANDLE TYPE ONLY]

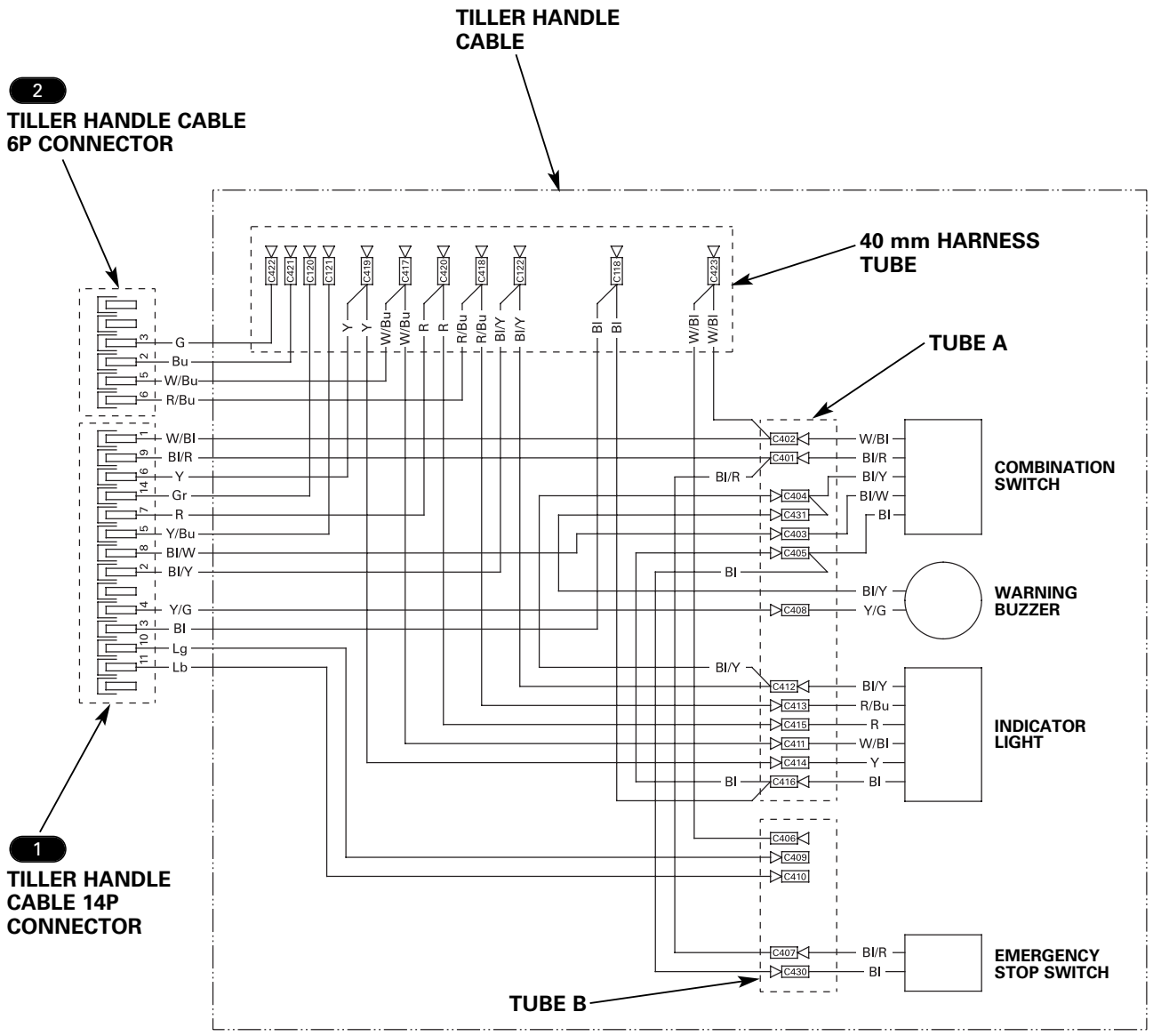


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-73

<WIRING DIAGRAM>

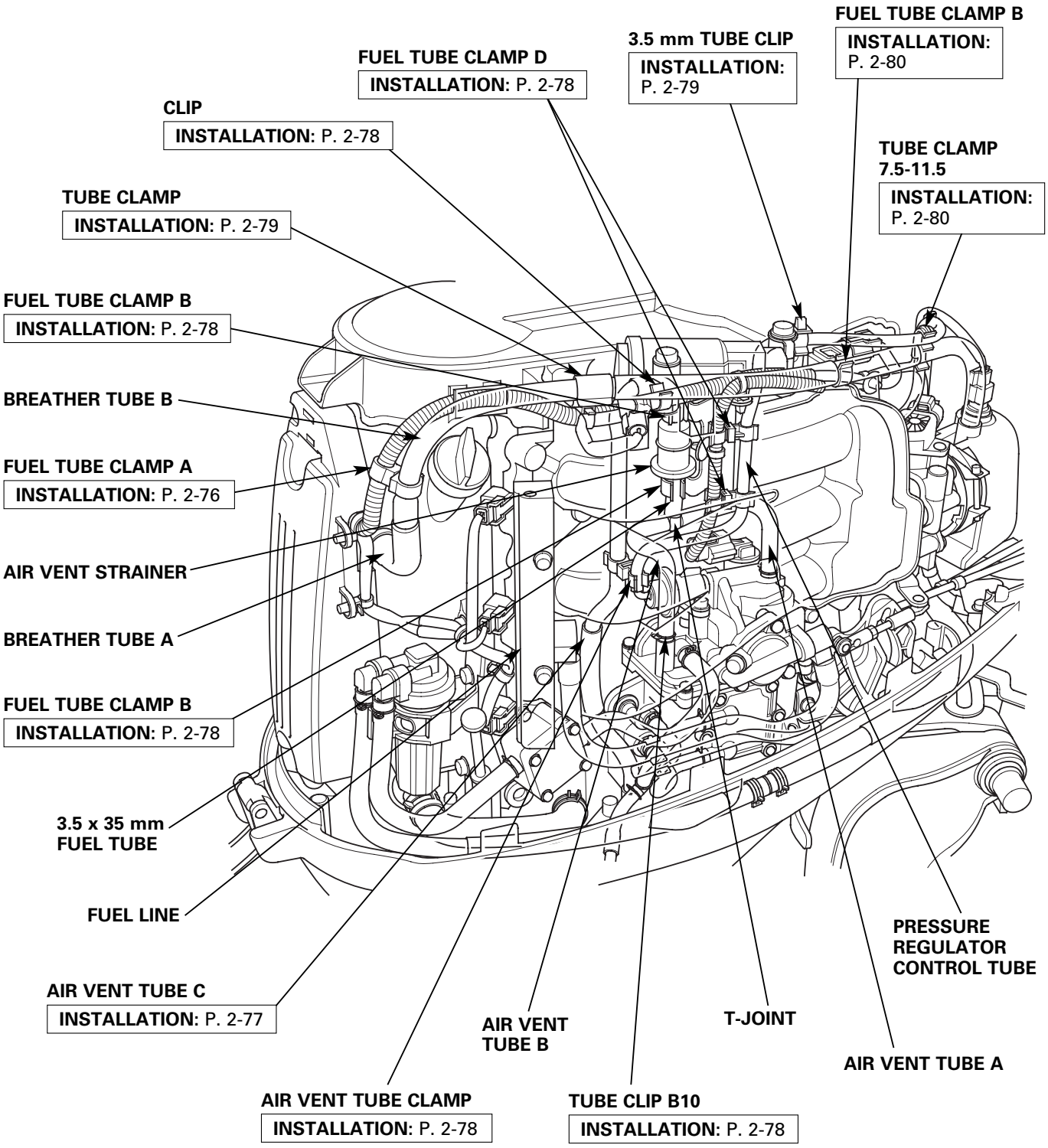
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray



© Honda Motor Co., Ltd.

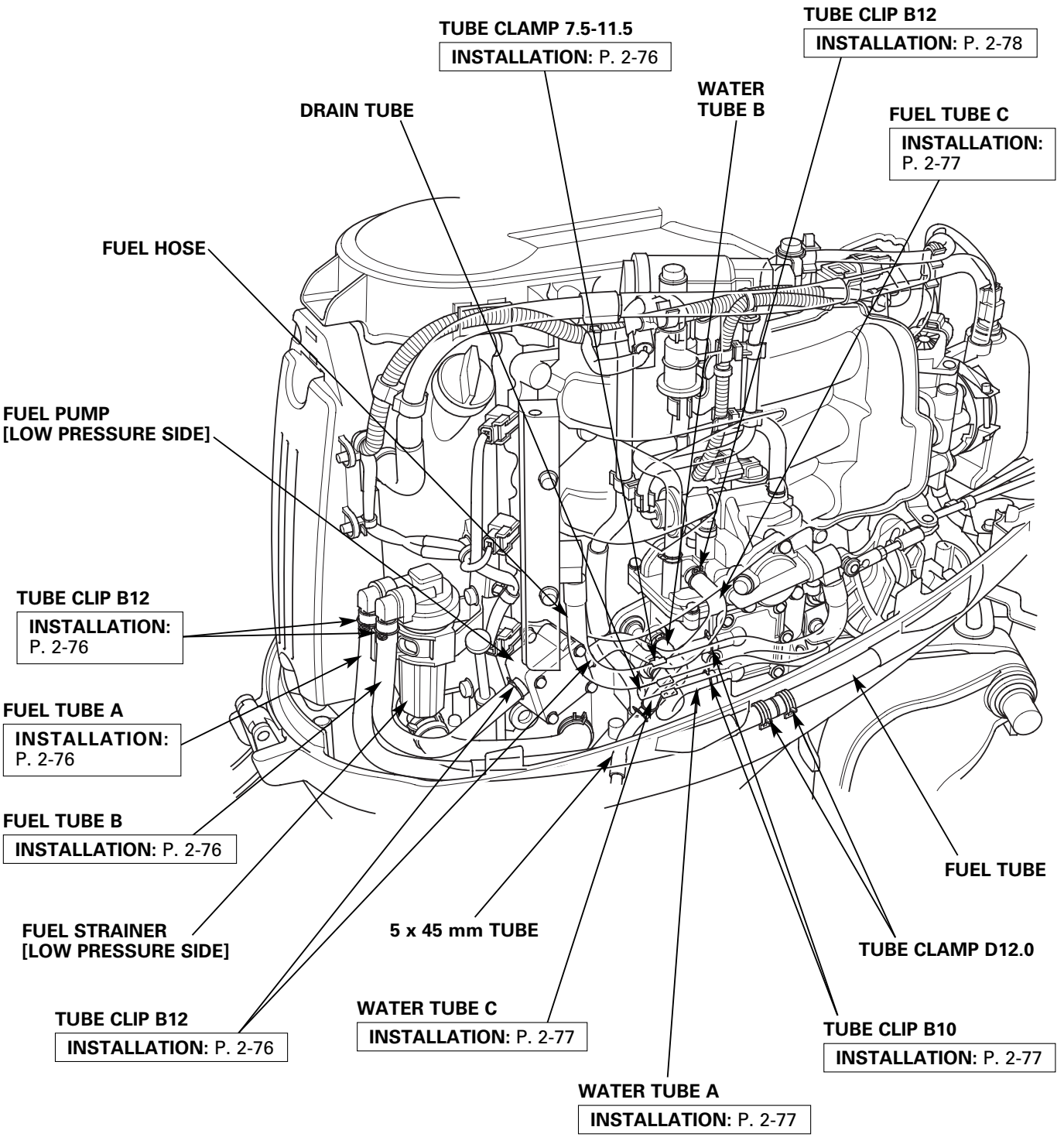
cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-74

9.TUBE ROUTING



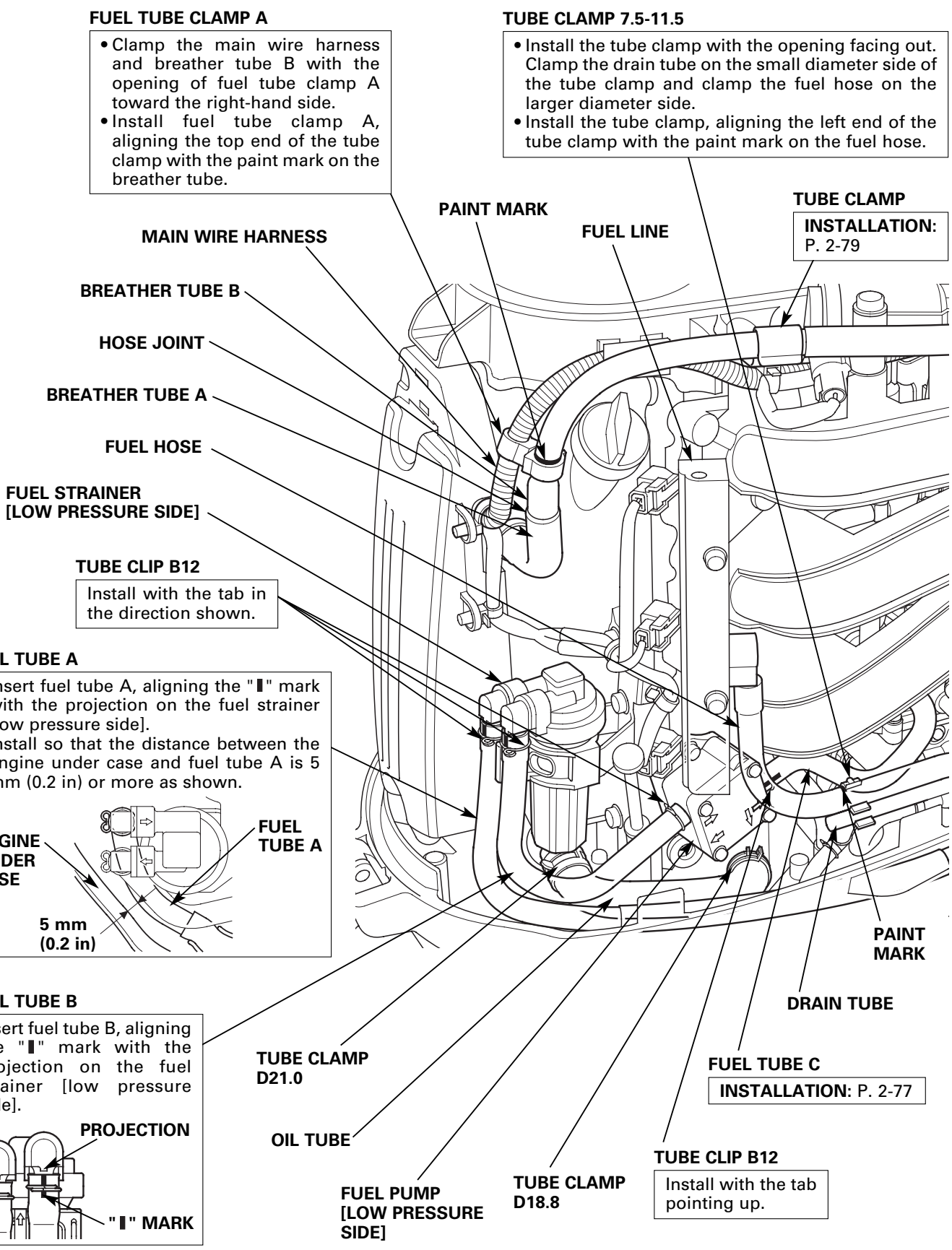
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-75



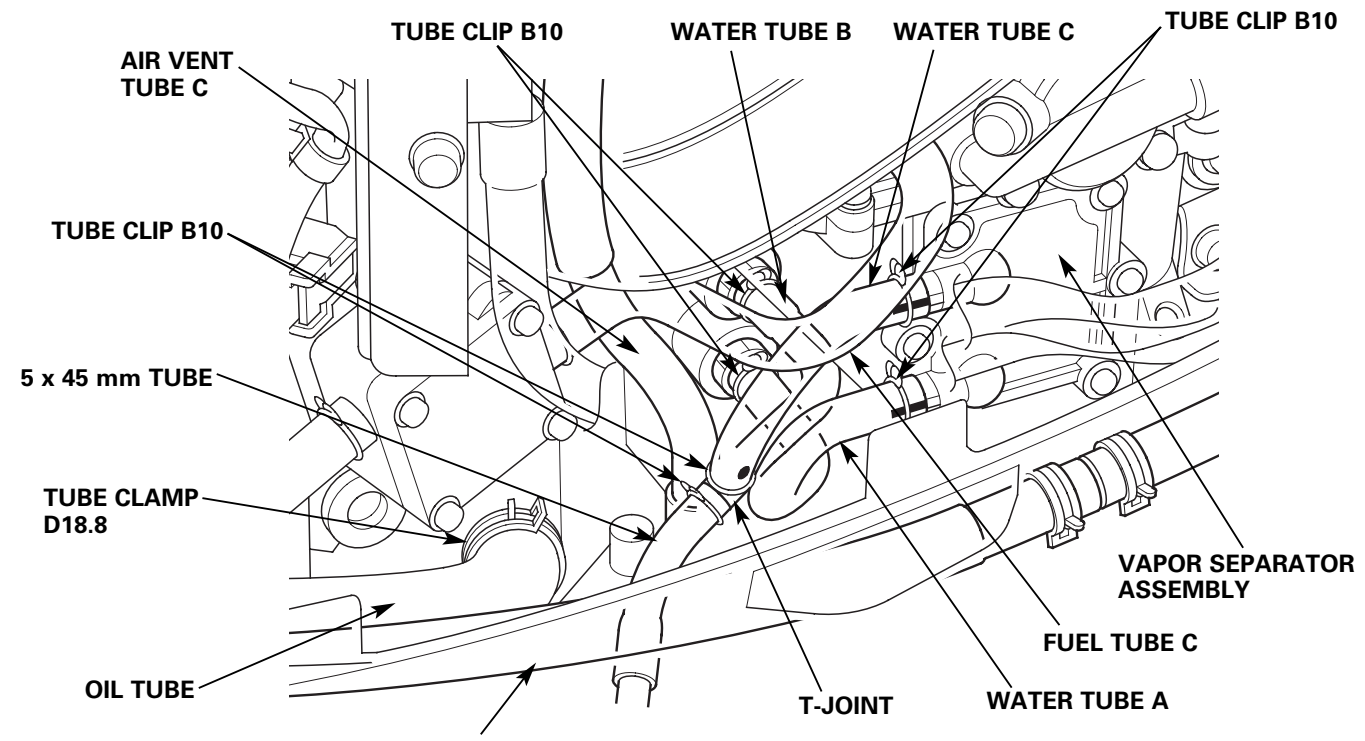
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-76



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-77



FUEL TUBE C

Insert by aligning the "▮" mark with the "➡" mark on the fuel pump [low pressure side].

TUBE CLIP B10

Install with the tab pointing up.

WATER TUBE C

Insert water tube C, aligning the "▮" mark with the projection on the vapor separator, and insert it into the T-joint with the "●" mark facing out.

"●" MARK

"●" MARK

"▮" MARK

PROJECTION

"▮" MARK

"➡" MARK

TUBE CLIP B10

Install with the tab pointing up.

TUBE CLIP B10

Install with the tab pointing toward the engine.

PROJECTION

T-JOINT

"▮" MARK

TUBE CLIP B10

Install with the tab pointing up.

TUBE CLIP B10

Install with the tab pointing up.

5 x 45 mm TUBE

WATER TUBE A

Insert by aligning the "▮" mark with the projection on the vapor separator assembly.

WATER TUBE B

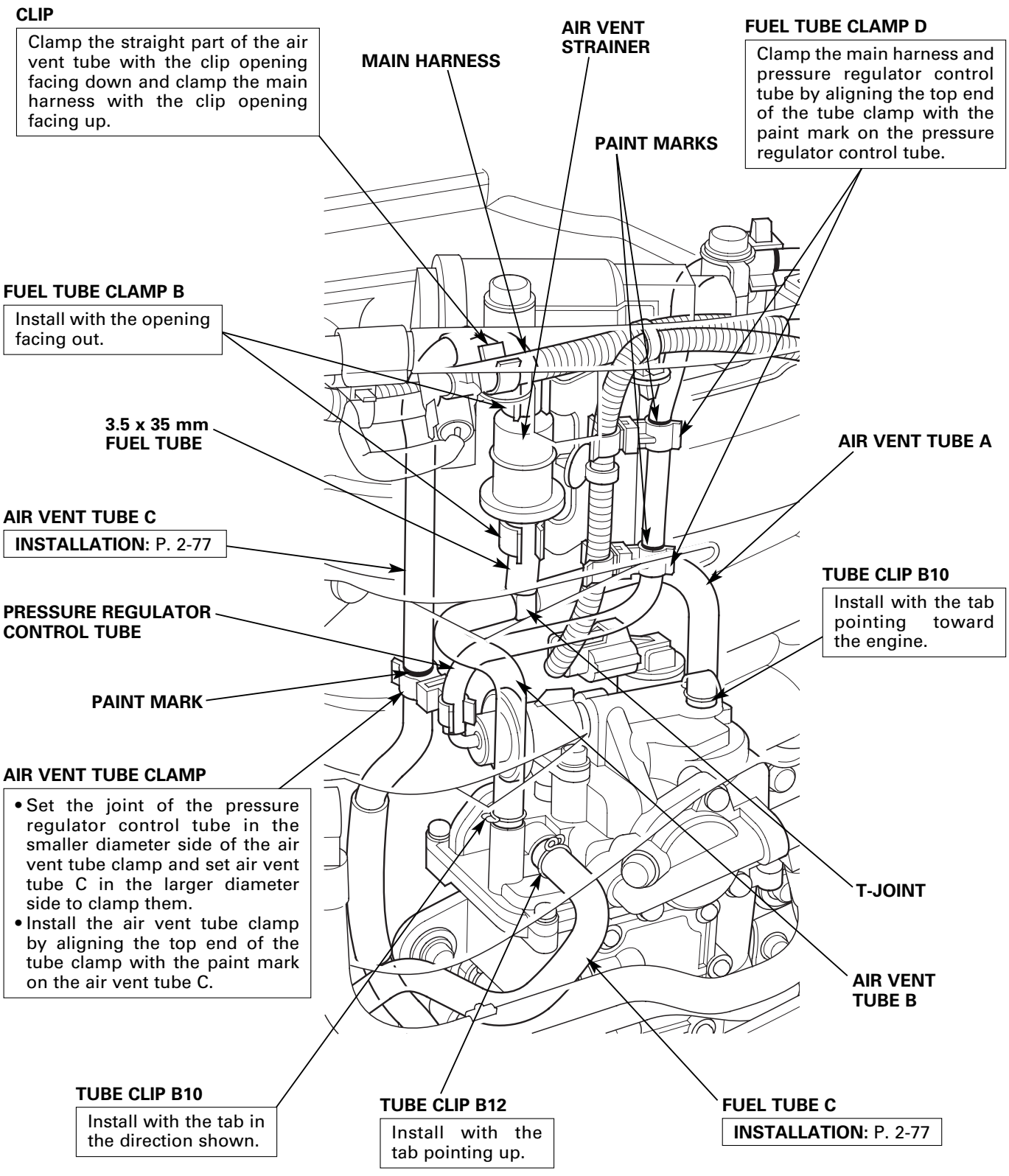
Insert into the T-joint with the "●" mark facing out.

AIR VENT TUBE C

Insert into the engine under case installation hole.

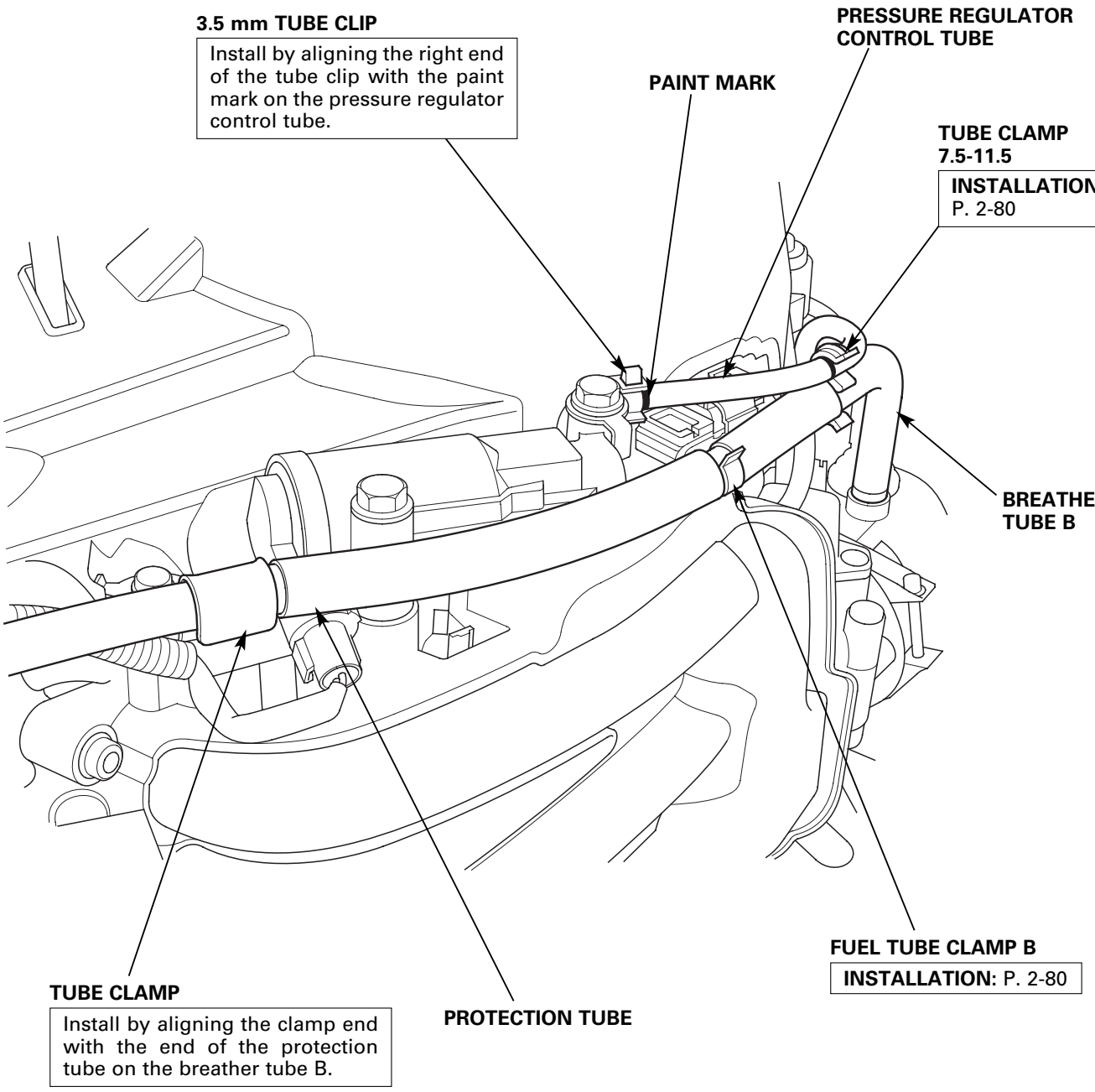
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-78



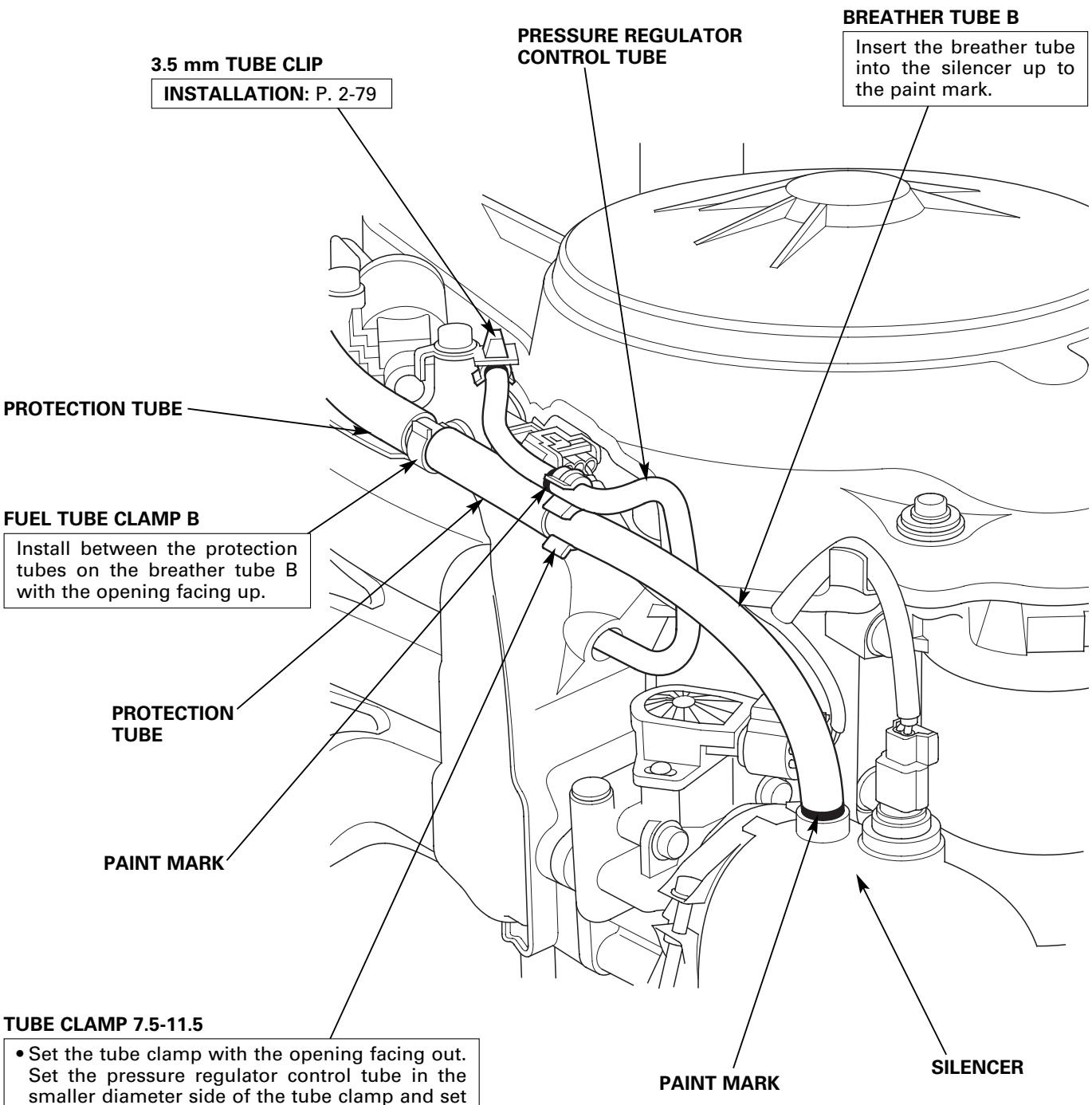
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-79



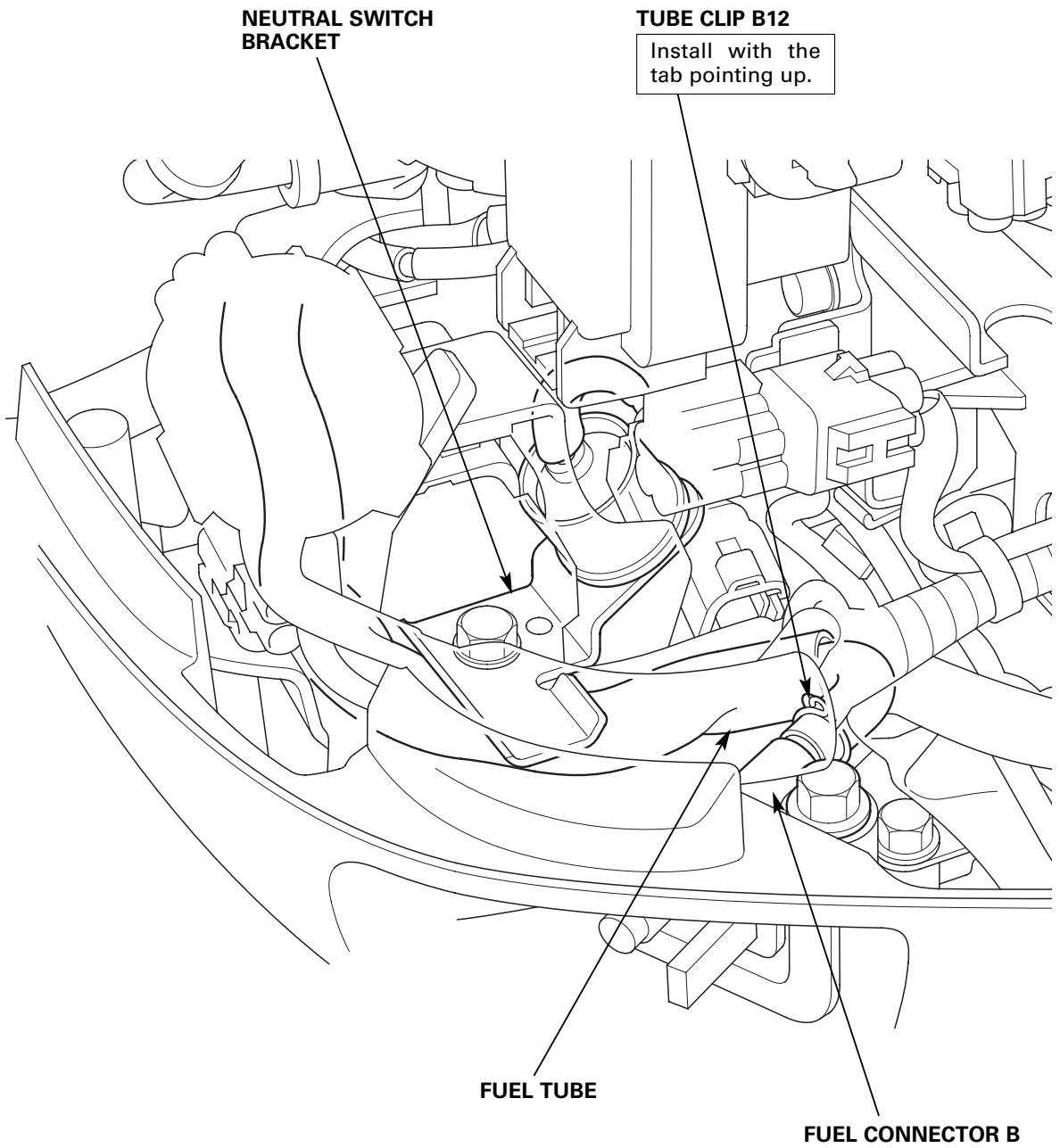
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-80



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-81

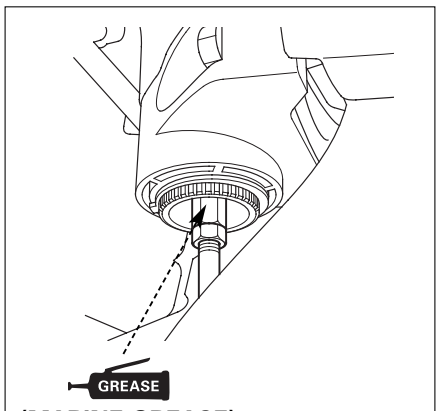


© Honda Motor Co., Ltd.

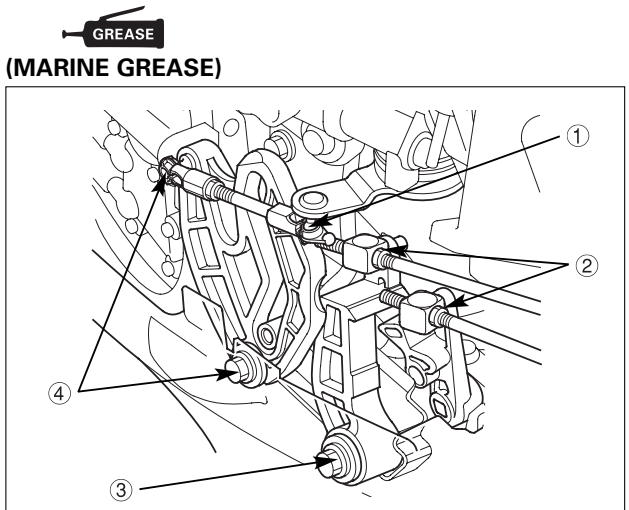
cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-82

10. LUBRICATION POINTS

Apply the specified oil or marine grease to the following parts.



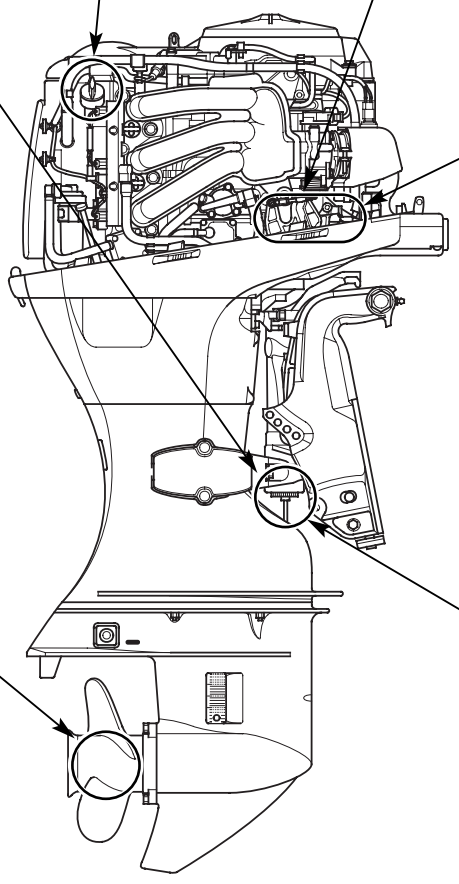
SHIFT ROD A THREADS

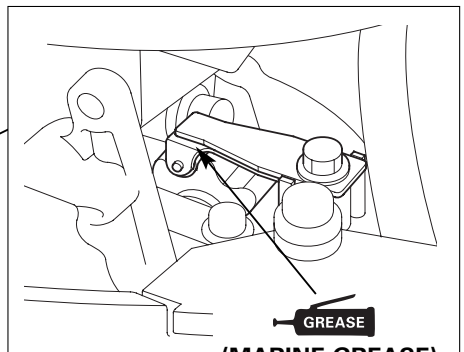


① THROTTLE BODY PIVOT
② SHIFT PIVOT INSTALLATION HOLE
③ THROTTLE ARM BEARING
④ THROTTLE CAM PIVOT AND BEARING

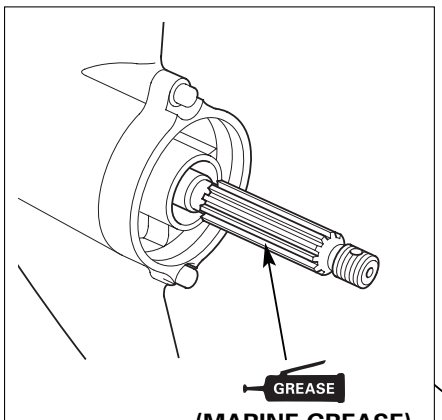


ENGINE OIL
(P. 3-3)

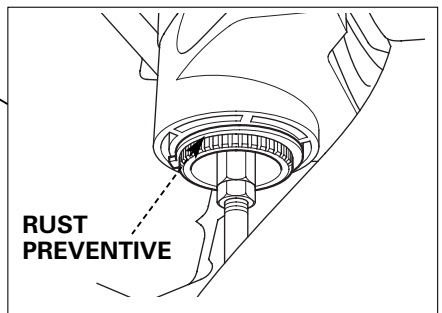




DETENT SPRING ROLLER



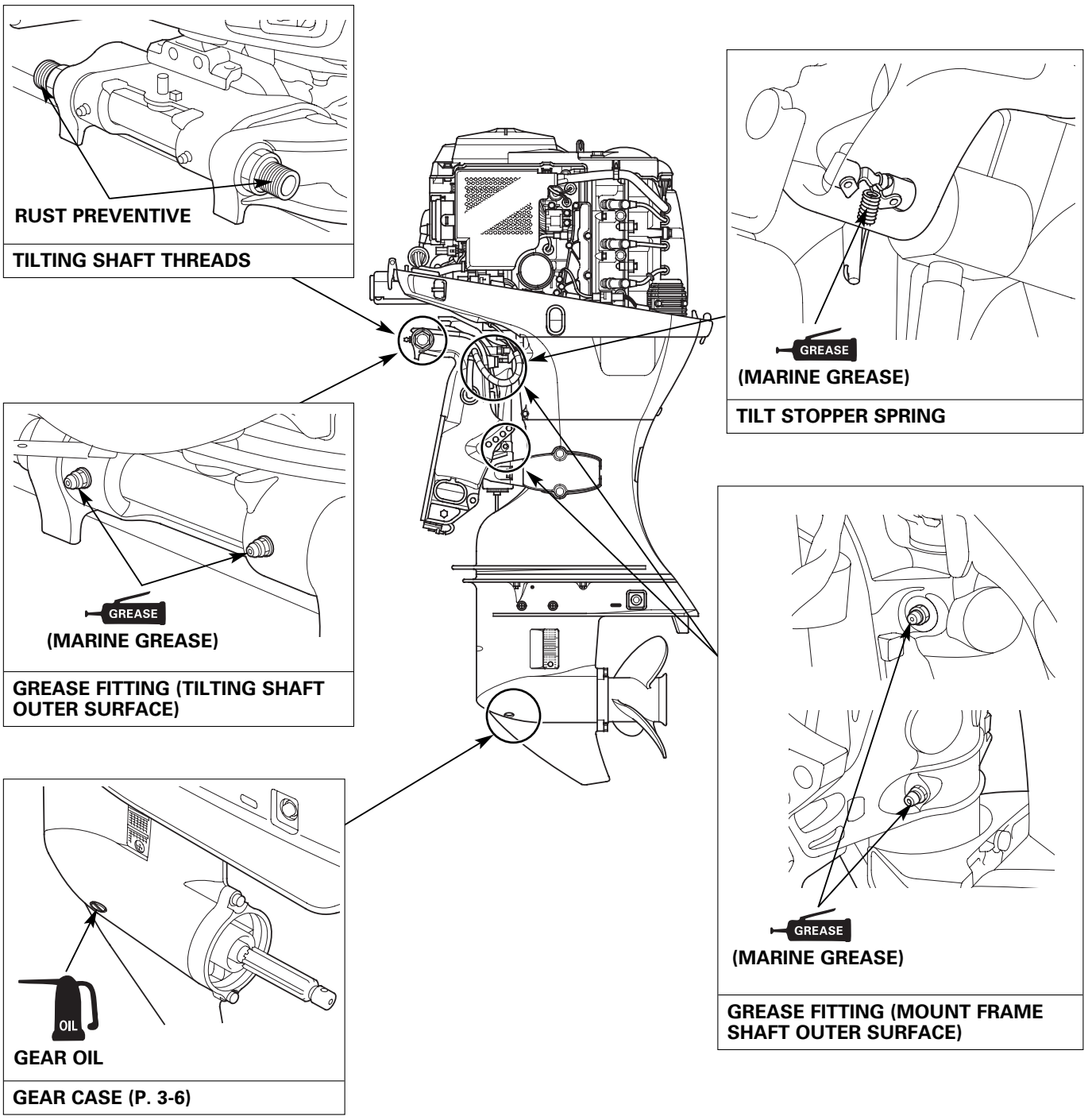
PROPELLER SHAFT



CIRCLIP INSTALLATION PART ON MOUNT FRAME

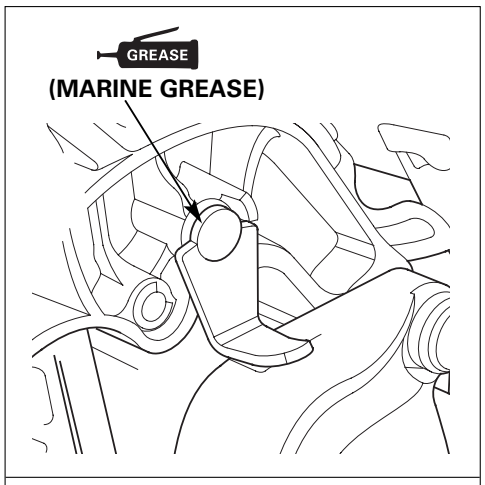
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-83

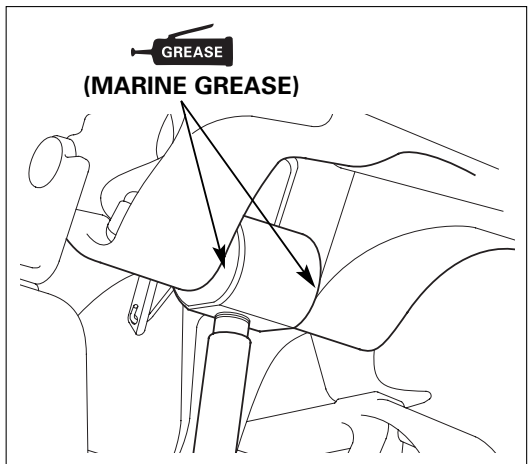


© Honda Motor Co., Ltd.

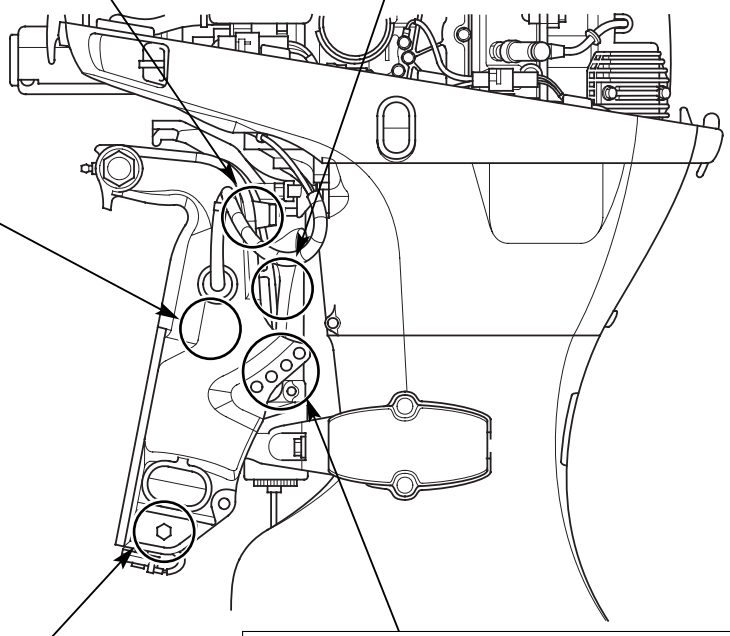
cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-84

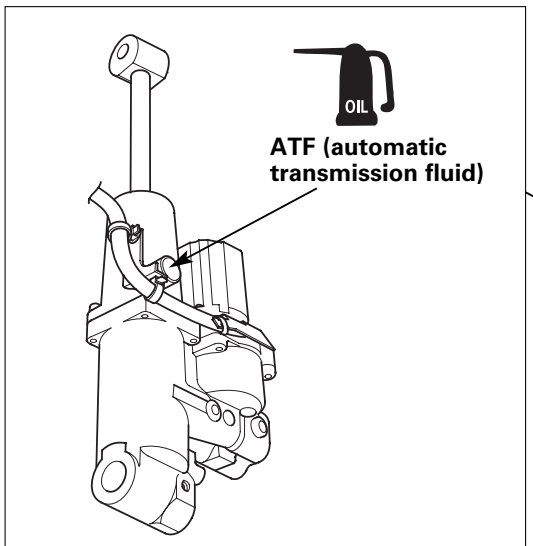


TILT STOPPER BEARING

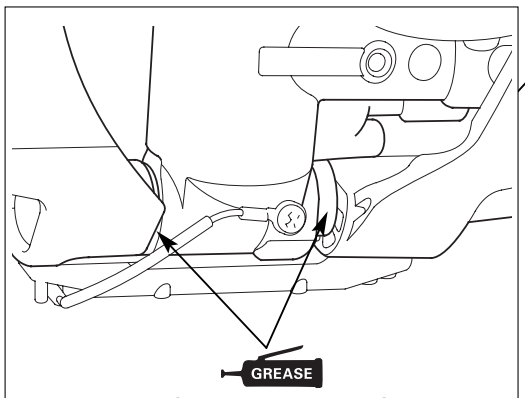


UPPER CYLINDER BUSHING/PIN

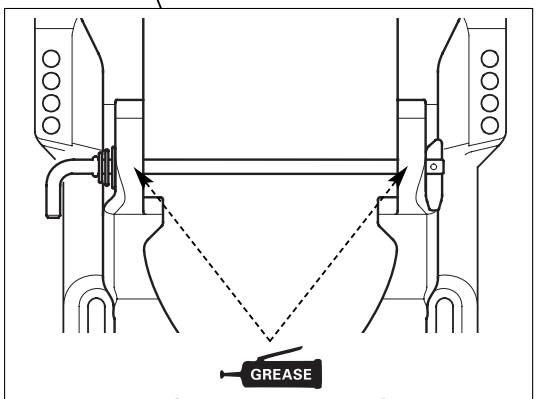




POWER TRIM/TILT ASSEMBLY [POWER TRIM/TILT TYPE ONLY] (P. 14-35)



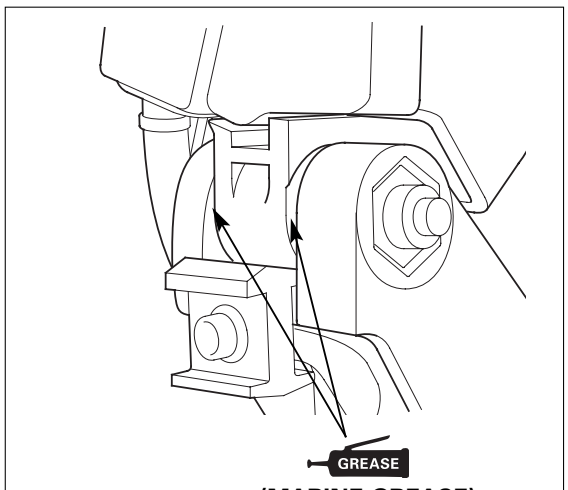
LOWER CYLINDER BUSHING/COLLAR



ADJUSTING ROD INSTALLATION HOLE OF STERN BRACKET [GAS ASSISTED TYPE ONLY]

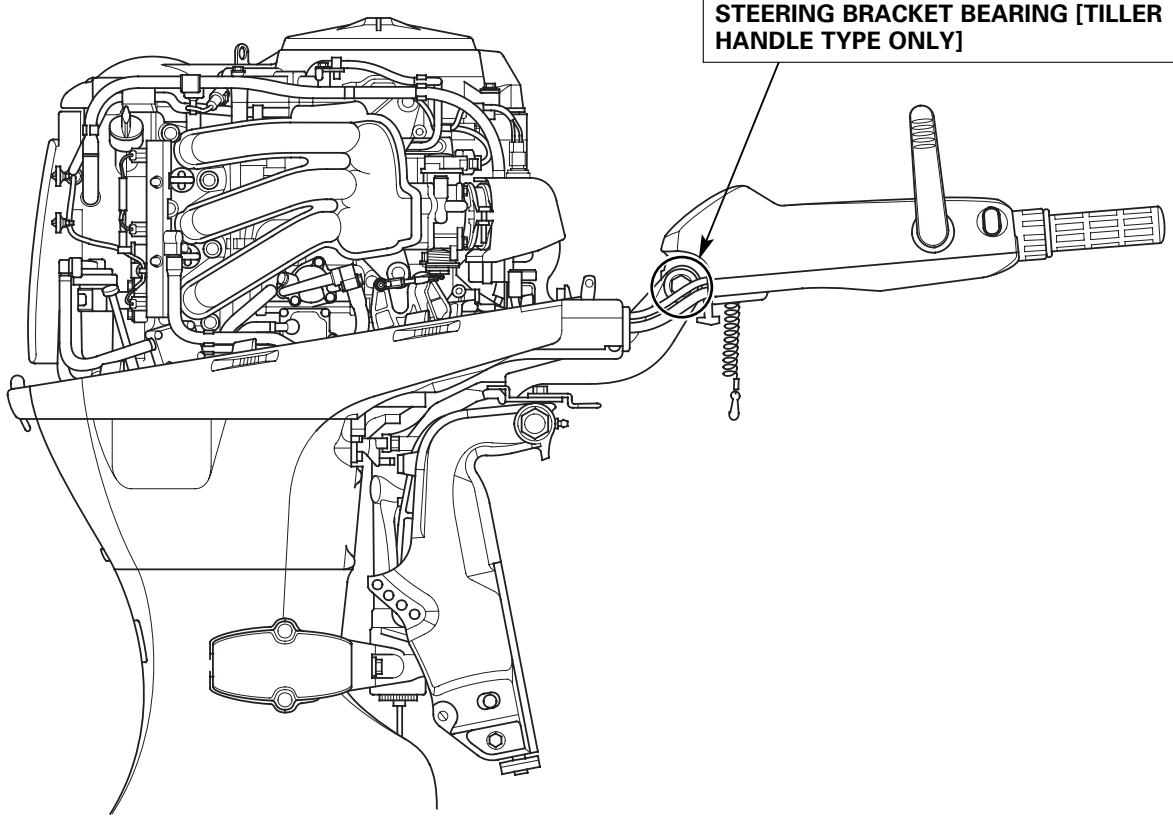
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-85



(MARINE GREASE)

STEERING BRACKET BEARING [TILLER HANDLE TYPE ONLY]



© Honda Motor Co., Ltd.

cap.02-3 BF40D 50D (A).qxp 2008/04/10 18:40 ページ 2-86

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:43 ページ 3-1

3. MAINTENANCE

1. MAINTENANCE SCHEDULE 3-2
2. ENGINE OIL..... 3-3
3. OIL FILTER..... 3-5
4. GEAR CASE OIL..... 3-6
5. SPARK PLUGS 3-8
6. VALVE CLEARANCE..... 3-9
7. FUEL STRAINER [LOW PRESSURE SIDE] 3-12
8. FUEL STRAINER [HIGH PRESSURE SIDE]..... 3-16
9. IDLE SPEED 3-17
10. THROTTLE CABLE 3-18
11. SHIFT CABLE 3-21
12. TIMING BELT 3-24
13. STEERING FRICTION [TILLER HANDLE TYPE ONLY] 3-27

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:43 ページ 3-2

1. MAINTENANCE SCHEDULE

REGULAR SERVICE PERIOD (1) Perform at every indicated month or operating hour interval, whichever comes first. / ITEM		Each use	After use	First month or 20 hrs.	Every 6 months or 100 hrs.	Every year or 200 hrs.	Every 2 years or 400 hrs.	Refer to page
Engine oil	Check level	○						3-3
	Change			○	○			
Engine oil filter	Replace			○	○			3-5
Gear case oil	Change					○		3-6
Timing belt	Check					○		3-24
Throttle linkage	Check-adjust			○	○			3-18
Idling speed	Check-adjust			○	○			3-17
Valve clearance	Check-adjust					○		3-9
Spark plug	Check				○			3-8
	Replace					○		
Propeller and cotter pin	Check	○						11-2
Anode metal (Outside installation)	Check	○						*1
Anode metal (Inside installation)	Check					○		8-3
Lubrication	Grease			○ (2)	○ (2)			2-82
Fuel tank and fuel filter	Clean					○		—
Thermostat	Check					○		8-4
Fuel strainer (Low pressure side)	Check	○ (3)			○			3-12
	Replace						○	
Fuel strainer (High pressure side)	Check				○			3-16
	Replace						○	
Fuel line	Check	○						5-84
	Replace	Every 2 years (Replace if necessary)						
Battery and cable connection	Check level-tightness	○						—
Bolts and nuts	Check-tightness			○	○			—
Breather tube	Check					○		—
Cooling water passages	Clean		○ (4)					—
Water pump	Check					○		11-19
Emergency stop switch	Check	○						16-36
Engine oil leak	Check	○						—
Each operation part	Check	○						—
Engine condition (5)	Check	○						—
Power trim/tilt unit	Check				○			14-36

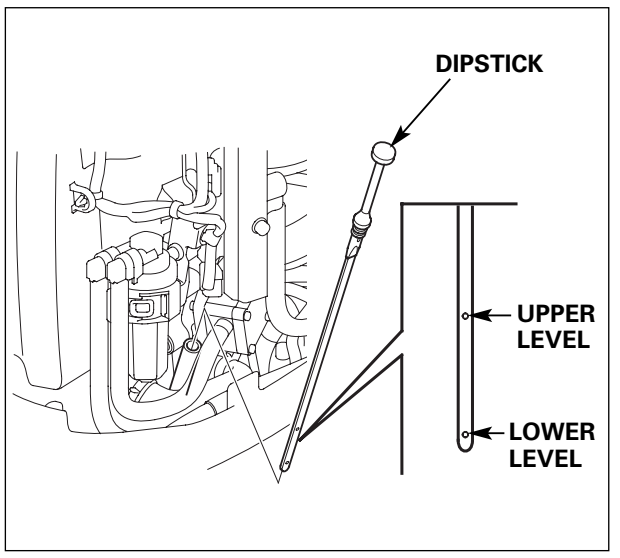
(1) For professional commercial use, log hours of operation to determine proper maintenance intervals.
(2) Lubricate more frequently when used in salt water.
(3) Please check a puddle before work.
(4) When operating in salt water, turbid or muddy water, the engine should be flushed with clean water after each use.
(5) Of the engine condition, a sound, the discharge of the coolant are in condition to take it.

*1: Refer to pages 11-47, 13-6 and 13-11.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:43 ページ 3-3

2. ENGINE OIL



Inspection:

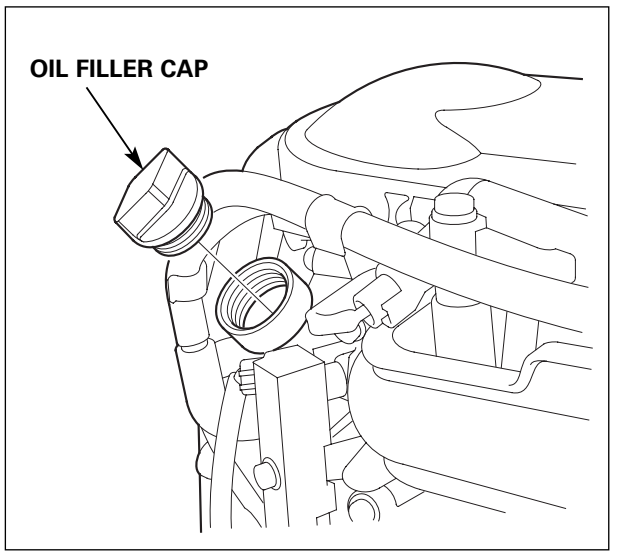
1) Start the engine, let it warm up to the normal operating temperature and stop the engine.
   Place the outboard motor in the vertical position (with the engine level), and remove the engine cover (P. 4-2).

2) Remove the dipstick and wipe it clean with a shop towel.

3) Insert the dipstick into the oil level pipe securely and check the oil level. Check whether the oil is dirty or has a milky color.

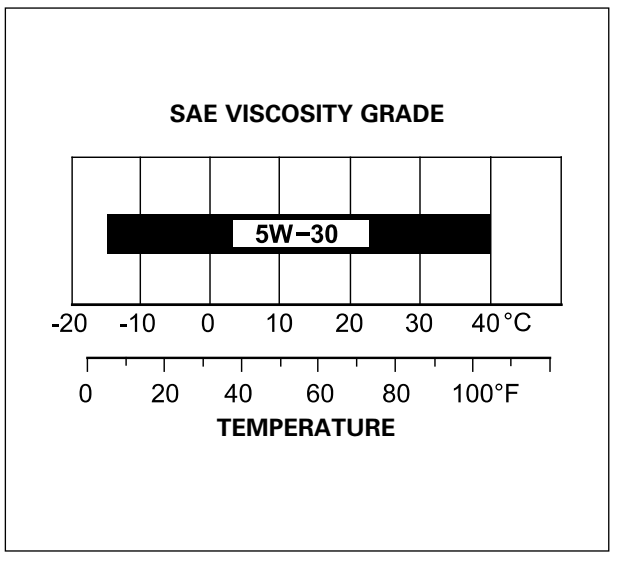
4) If the oil level is low, remove the oil filler cap and add the recommended engine oil to bring the oil level up to the upper level mark on the dipstick.

Recommended engine oil	SAE 5W-30 API Service category SG/SH/SJ



5) If the oil has a milky color, check the seals and gaskets and replace them with new ones if necessary (Section 6, 9 or 11).

6) Reinstall the oil filler cap securely.



© Honda Motor Co., Ltd.

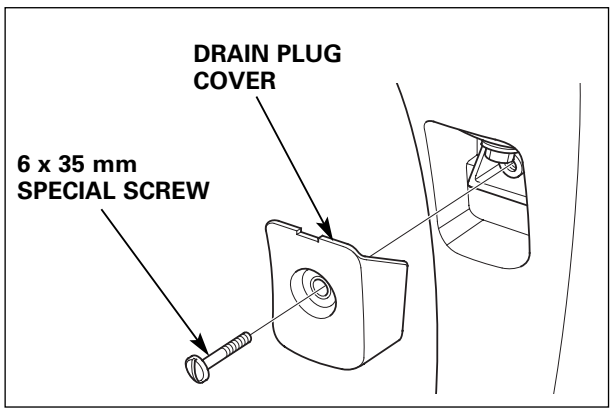
cap.03 BF40D 50D (A).qxp 2008/04/10 18:43 ページ 3-4

Oil Change:

Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

1) Place the outboard motor on a level surface and position the outboard motor vertically (with the engine level). Remove the oil filler cap.

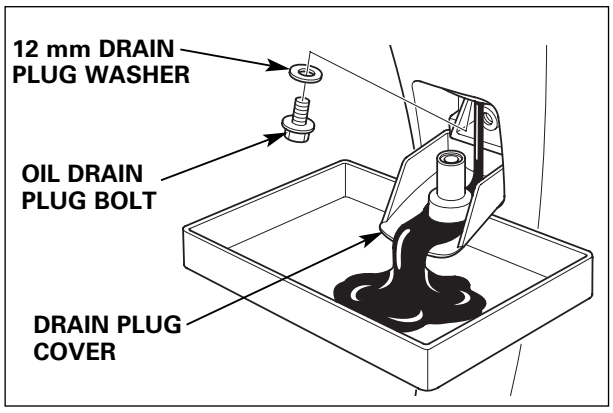
2) Remove the 6 x 35 mm special screw and remove the drain plug cover.



3) Set the drain plug cover on the outboard motor as shown.

4) Place a suitable container next to the outboard motor. Remove the oil drain plug bolt and the 12 mm drain plug washer, and drain the engine oil. Replace the 12 mm drain plug washer with a new one on reassembly.

   Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash, pour it on the ground, or pour it down a drain.



⚠CAUTION

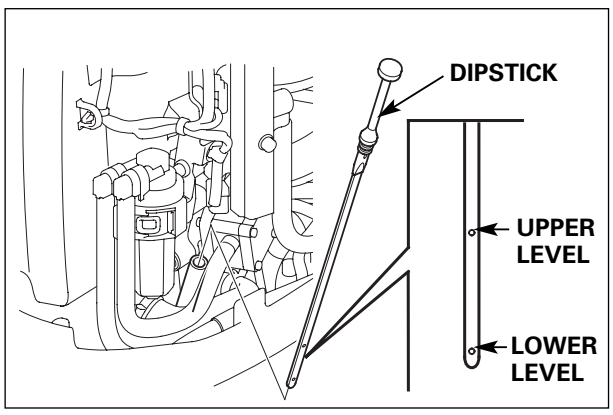
Used engine oil contains substances that have been identified as carcinogenic.

If repeatedly left in contact with the skin for prolonged periods, it may cause skin cancer.

Wash your hands thoroughly with soap and water as soon as possible after contact with used engine oil.

5) After draining, set a new 12 mm drain plug washer on the oil drain plug bolt. Tighten the oil drain plug bolt to the specified torque.

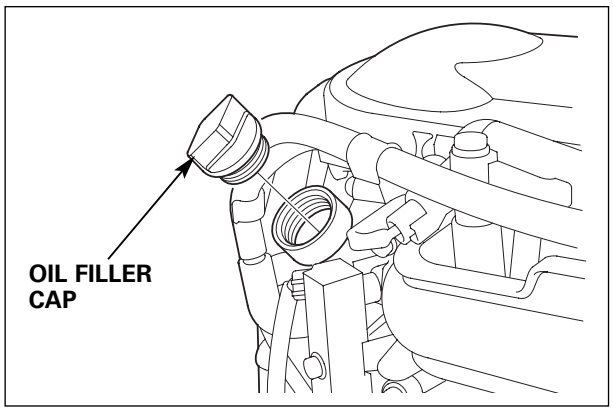
   TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



6) Refill with the recommended engine oil up to the upper level mark on the dipstick. Install the oil filler cap.

Engine oil capacity	Without oil filter replacement: 2.0 ℓ (2.1 US qt, 1.76 Imp qt) [With oil filter replacement: 2.1 ℓ (2.2 US qt, 1.85 Imp qt)]

Recommended engine oil	SAE 5W-30 API Service classification SG/SH/SJ

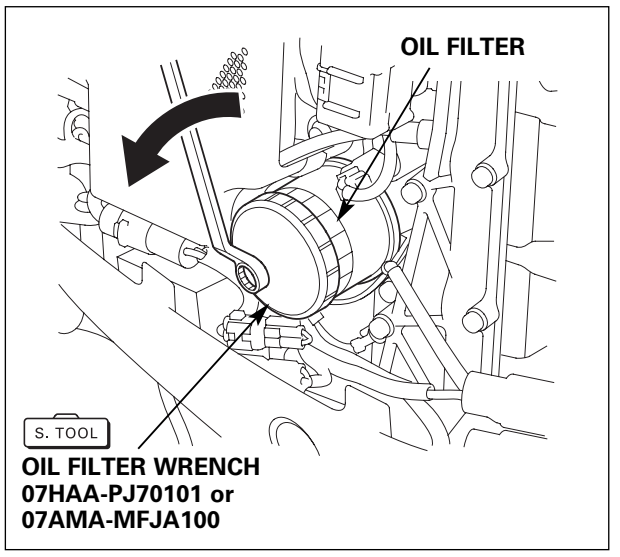


7) Install the engine cover (P. 4-2).

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:43 ページ 3-5

3. OIL FILTER



Replacement:

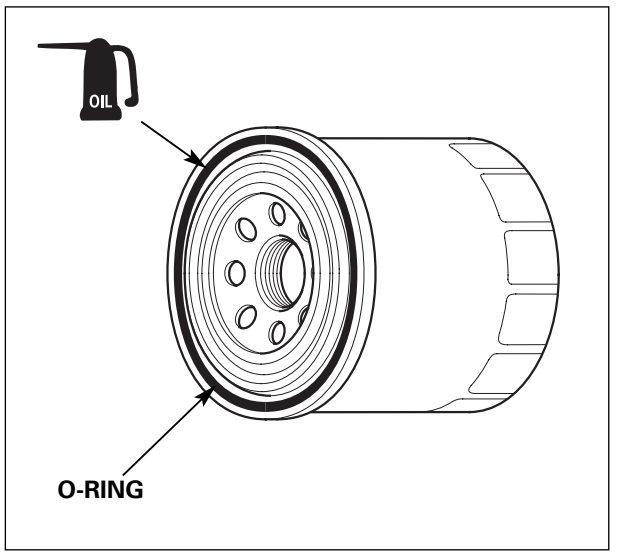
1) Remove the engine cover (P. 4-2).

2) Drain the engine oil as described in the oil change procedure (P. 3-4).

3) Place a shop towel under the oil filter to absorb any spilled oil.

4) Attach the special tool to the oil filter and remove the oil filter.

TOOL:
Oil filter wrench **07HAA-PJ70101 or 07AMA-MFJA100**



5) Apply clean engine oil to the O-ring on the inner side of a new oil filter.

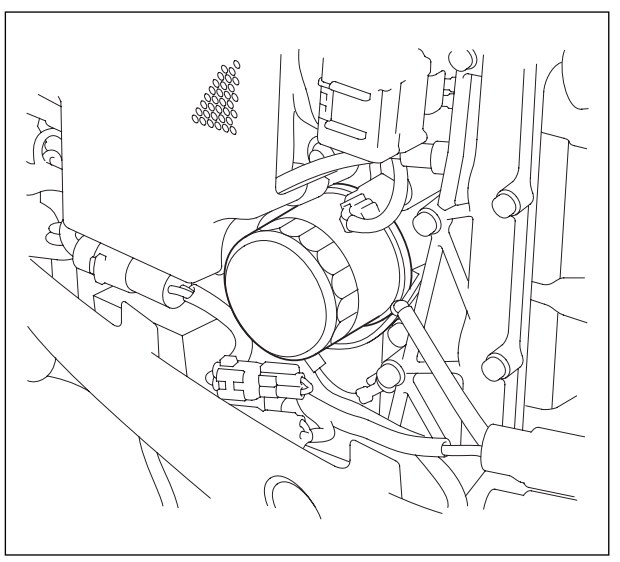
6) Clean the filter mounting base of the engine side oil filter flange, and coat the stud with clean engine oil.

- Use only a Honda Genuine oil filter or a filter of equivalent quality specified for your model. Using the wrong Honda filter or a non-Honda filter that is not of equivalent quality, may cause engine damage.

7) Screw on the filter by hand first, then screw it in to the specified torque using the special tool used for removing the filter.

TOOL:
Oil filter wrench **07HAA-PJ70101 or 07AMA-MFJA100**

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



8) Refill the engine with the specified amount of the recommended oil as described in the oil change procedure, and start the engine to warm it up to the normal operating temperature.
Stop the engine, and check for leaks from the oil filter.

Engine oil capacity	[With oil filter replacement: 2.1 ℓ (2.2 US qt, 1.8 Imp qt)]

Recommended engine oil	SAE 5W-30 API Service category SG/SH/SJ

9) Check the oil level. If necessary, add oil to the upper level mark on the dipstick (P. 3-4).

10) Install the engine cover (P. 4-2).

© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:43 ページ 3-6

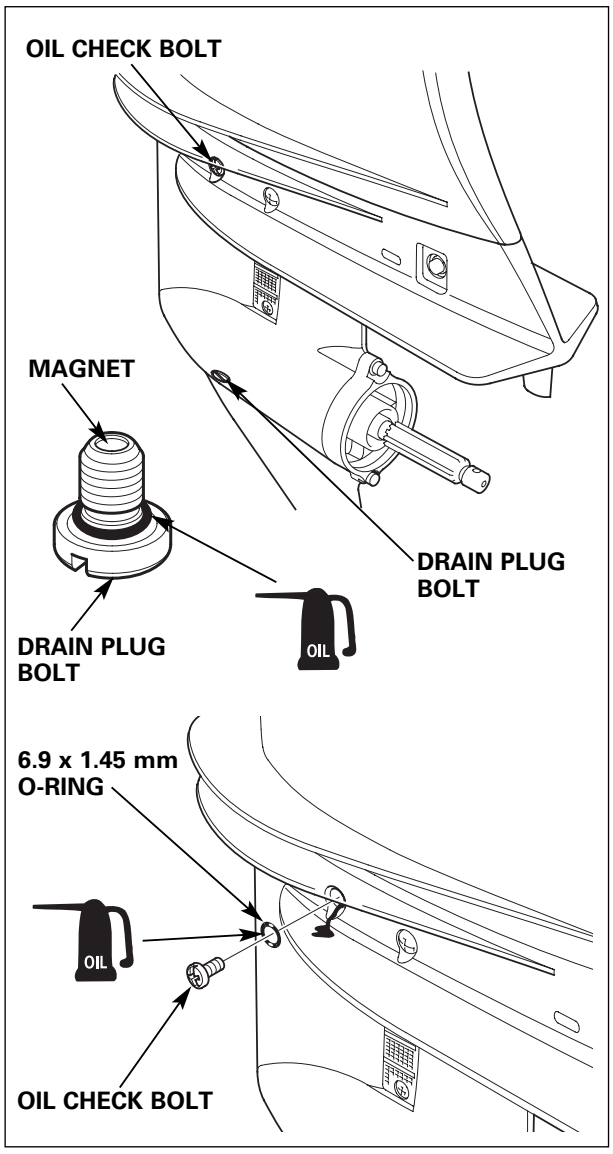
4. GEAR CASE OIL

Inspection:

1) Place the outboard motor on a level surface and position the outboard motor vertically (with the gear case level).
2) Remove the drain plug bolt and check for metal particles on the magnet end.
3) If there are metal particles on the magnet end of the drain plug bolt, disassemble and inspect the gear case assembly (Section 11).
   - If there is water in the oil, the water will flow out first when the drain plug bolt is removed, or the oil will be a milky color. If water in the gear oil is detected, perform a gear case pressure check (P. 11-45).
4) Coat a new O-ring with clean gear oil and set it on the oil drain bolt.
   Install the oil drain bolt in the gear case and tighten the bolt to the specified torque.

   TORQUE: 6.5 N·m (0.7 kgf·m, 4.8 lbf·ft)
5) Remove the oil check bolt and check whether gear case oil flows out of the gear case. Catch the oil in a suitable container.
   Replace the O-ring with a new one on reassembly.
6) If oil does not flow out, add oil.
7) Coat a new O-ring with clean gear oil and set it on the oil check bolt.
   Install the oil check bolt in the gear case and tighten the bolt to the specified torque.

   TORQUE: 6.5 N·m (0.7 kgf·m, 4.8 lbf·ft)



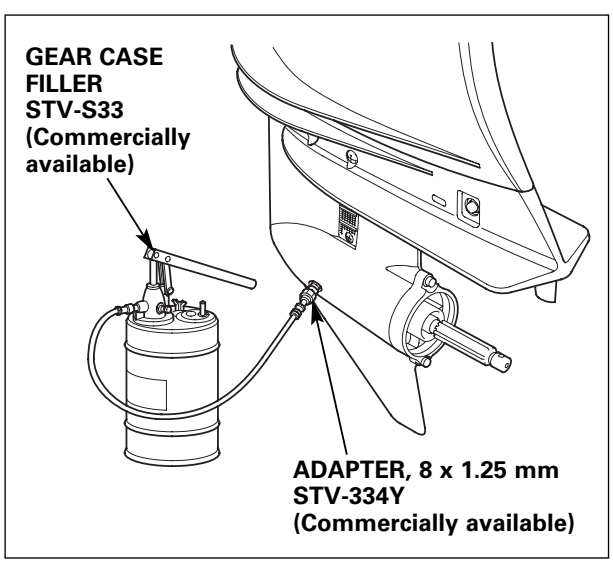
Adding Gear Oil:

1) Place the outboard motor on a level surface, and position the outboard motor vertically (with the gear case level).
2) Remove the drain plug bolt.
3) Install a commercially available 8 x 1.25 mm adapter and gear case filler in the oil drain plug bolt hole.
   Replace the O-ring with a new one on reassembly.
4) Remove the oil check bolt and add the oil through the oil drain plug bolt hole until the oil flows out of the oil check bolt hole.
   Replace the O-ring with a new one on reassembly.

Recommended gear oil	MARINE SAE 90 Hypoid gear oil API Service category (GL-4)

5) After adding gear oil, apply clean gear oil to the new O-rings, and install them on the drain plug bolt and the oil check bolt.
   Install the drain plug bolt and the oil check bolt on the gear case, and tighten them to the specified torque.

   TORQUE: 6.5 N·m (0.7 kgf·m, 4.8 lbf·ft)



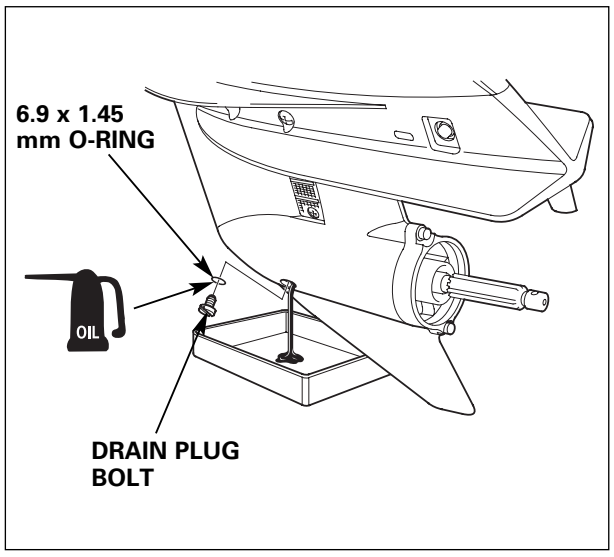
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:43 ページ 3-7

Replacement:

1) Place the outboard motor on a level surface, and position the outboard motor vertically (with the gear case level). Tilt the outboard up slightly until the drain hole is at its lowest point.

2) Remove the oil check bolt and the drain plug bolt, and drain the used oil in a suitable container.
Replace the O-rings on reassembly.

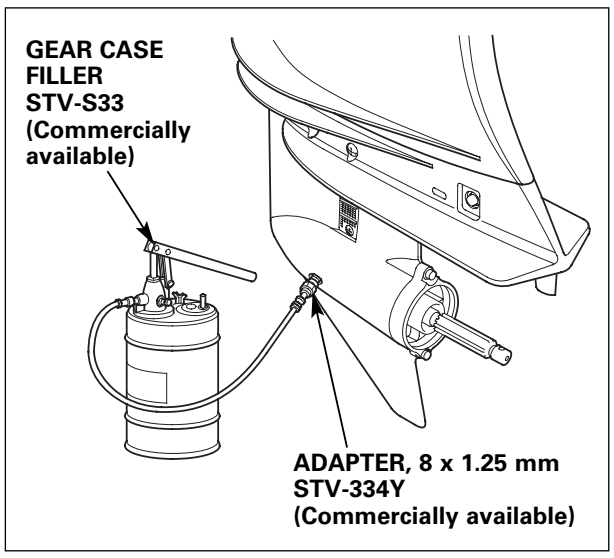


3) Tilt the outboard motor down until the gear case is level. Install a commercially available 8 x 1.25 mm adapter and gear case filler in the drain plug bolt hole.

4) Add the oil until it flows out of the oil check bolt hole.

Gear oil capacity	0.41 ℓ (0.43 US qt, 0.36 Imp qt)

Recommended gear oil	MARINE SAE 90 Hypoid gear oil API Service category (GL-4)



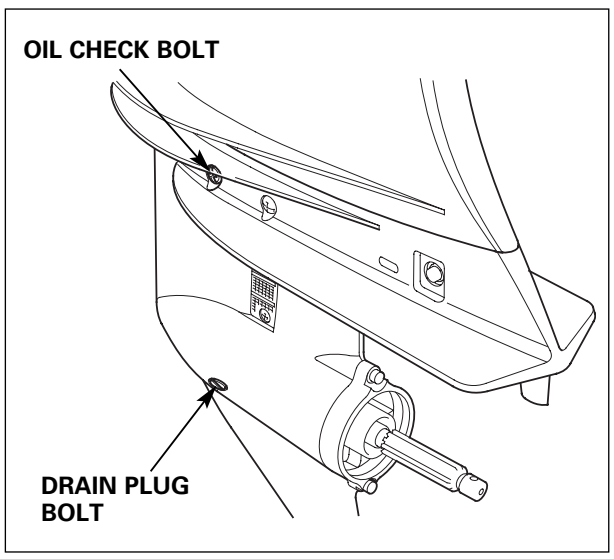
5) After adding gear oil, apply clean gear oil to the new O-rings and install them on the drain plug bolt and the oil check bolt.

6) Reinstall the oil check bolt on the gear case and tighten it to the specified torque.

TORQUE: 6.5 N·m (0.7 kgf·m, 4.8 lbf·ft)

7) Remove a commercially available gear case filler and 8 x 1.25 mm adapter. Reinstall the drain plug bolt on the gear case and tighten it to the specified torque.

TORQUE: 6.5 N·m (0.7 kgf·m, 4.8 lbf·ft)



© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-8

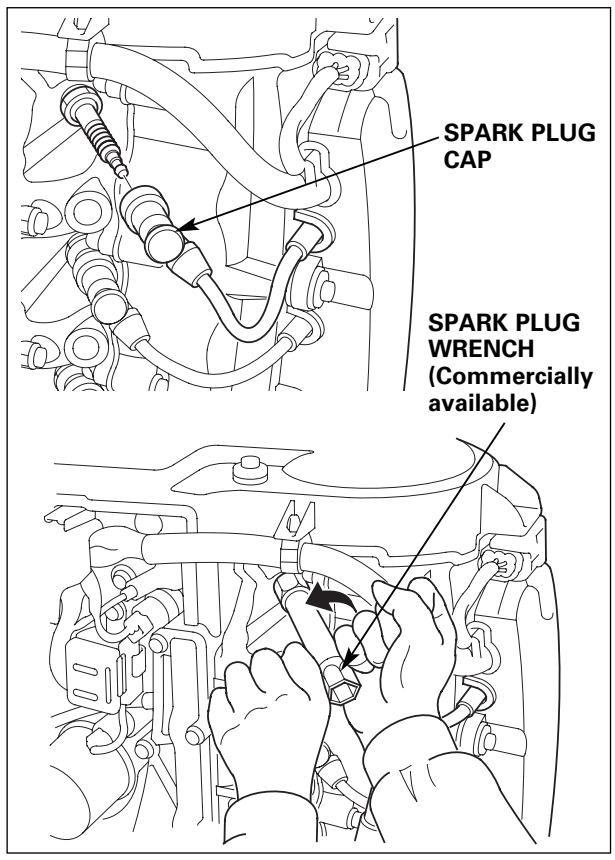
5. SPARK PLUGS

Inspection/Adjustment:

1) Remove the engine cover (P. 4-2).

2) Remove the spark plug caps and remove the spark plugs.

   • Before removing the spark plugs, clean any dirt from around the spark plug base to prevent dirt or foreign material from entering the combustion chamber.



3) Check the spark plug insulator and sealing washer for damage.
   Replace the spark plug with a new one if it is damaged.

4) Measure the plug gap with a wire-type plug gauge.
   If the measurement is out of specification, adjust the gap by bending the side electrode.

Plug gap	0.6 — 0.7 mm (0.024 — 0.028 in)

Recommended spark plug	DR7EB (NGK) X22ESR-UB (DENSO)

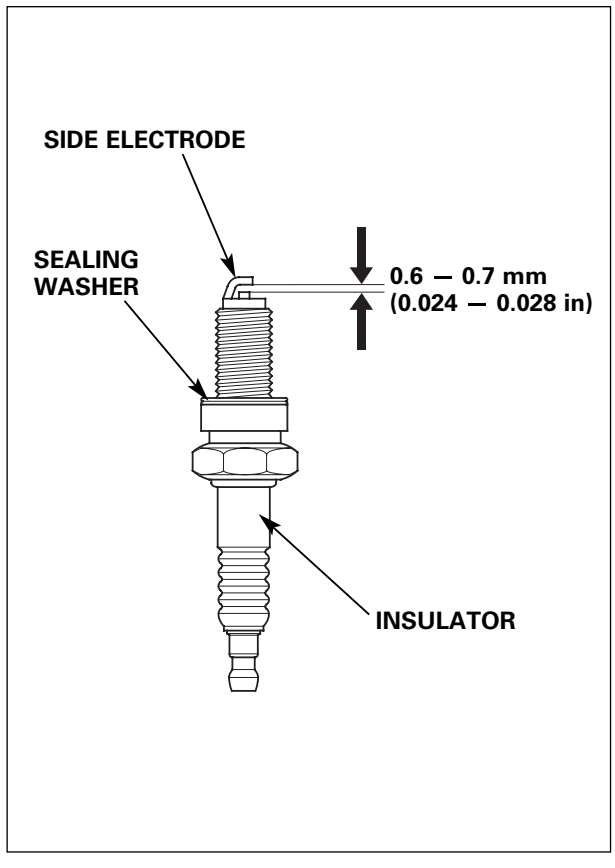
5) With the spark plug sealing washer attached, thread each spark plug in by hand to seat the sealing washer and prevent cross-threading.

   Then, tighten the spark plugs to the specified torque.

   TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

6) Install the spark plug cap on the spark plug.

7) Install the engine cover (P. 4-2).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-9

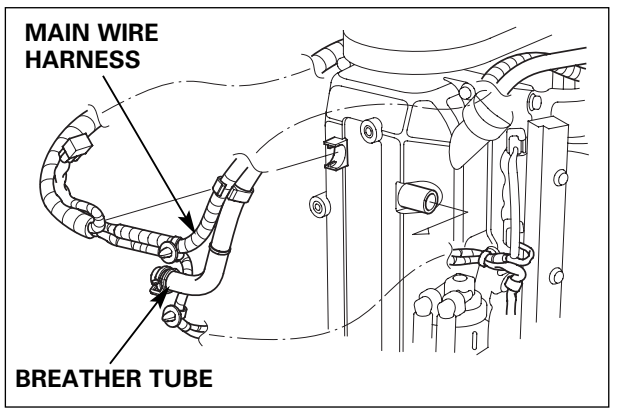
6. VALVE CLEARANCE

Inspection/Adjustment:

• Valve clearance inspection/adjustment must be made with the engine cold.

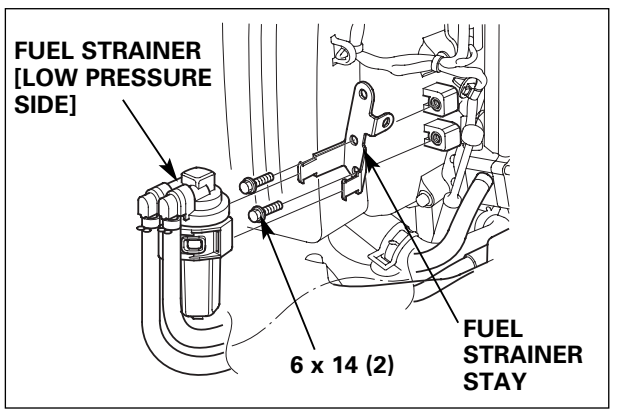
Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)
- Ignition coil/regulator/rectifier (P. 18-23)

1) Remove the main wire harness from the cylinder head cover, and disconnect the breather tube from the cylinder head cover.



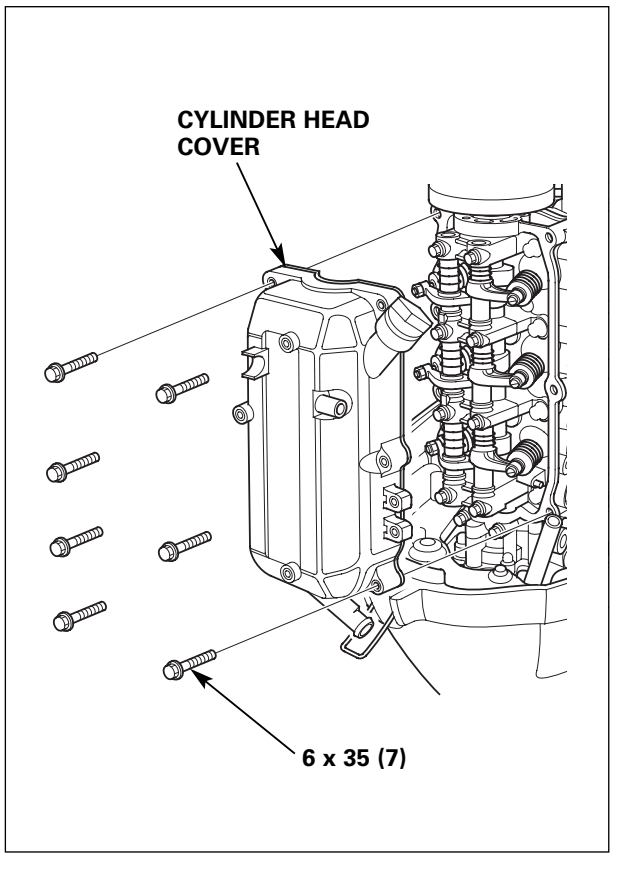
2) Remove the fuel strainer [low pressure side] from the fuel strainer stay.

3) Remove the two 6 x 14 mm flange bolts, and remove the fuel strainer stay from the cylinder head cover.



4) Remove the seven 6 x 35 mm flange bolts and remove the cylinder head cover.

• Oil can leak out when the cylinder head cover is removed. Catch the leaking oil with a shop towel and/or a suitable container.

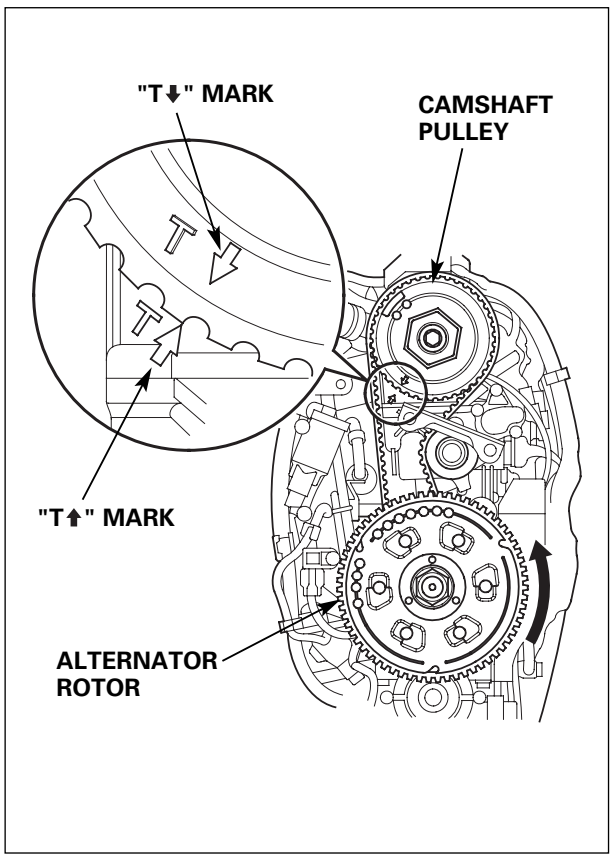


© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-10

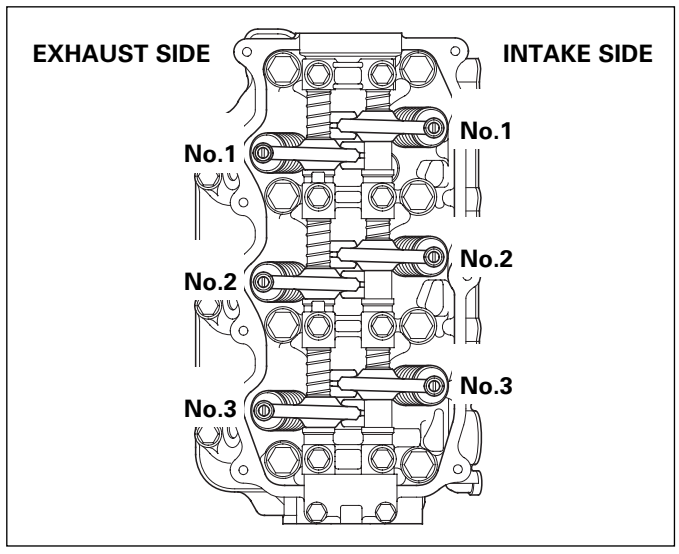
5) Align the "T⬇" mark on the camshaft pulley with the "T⬆" mark on the cylinder head by turning the alternator rotor counterclockwise. (The No.1 piston is at the top dead center of its compression stroke.)

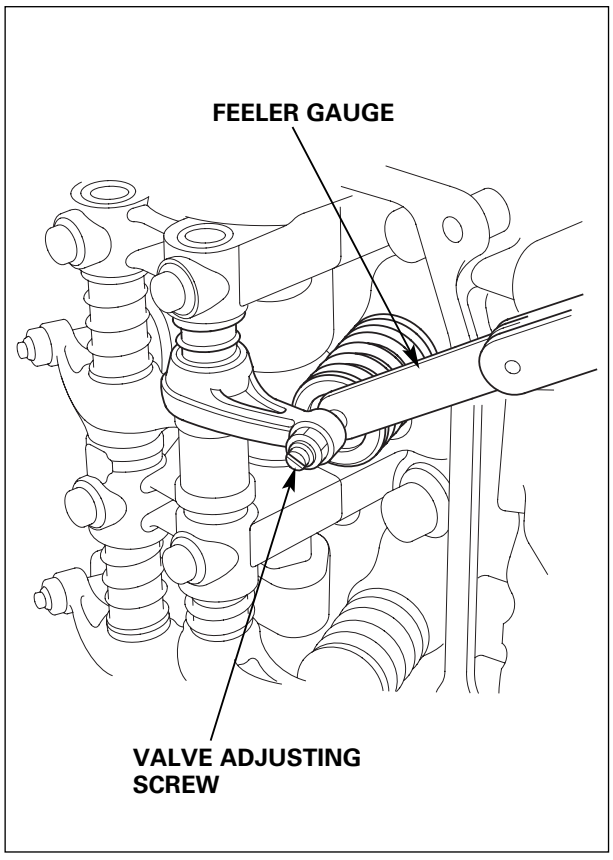
   • Be sure to turn the alternator rotor counterclockwise. Never turn it clockwise.



6) With the No.1 piston at top dead center of its compression stroke, check the valve clearance on the No.1 cylinder. Insert a feeler gauge between the intake/exhaust side valve adjusting screw and the valve stem, and measure the valve clearance.

Valve clearance	IN	0.13 — 0.17 mm
	EX	0.21 — 0.25 mm





Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-11

7) If adjustment is necessary, loosen the valve adjusting lock nut while holding the valve adjusting screw with the special tool.

TOOL:
Valve adjustment wrench, 10 mm 07908-5900000

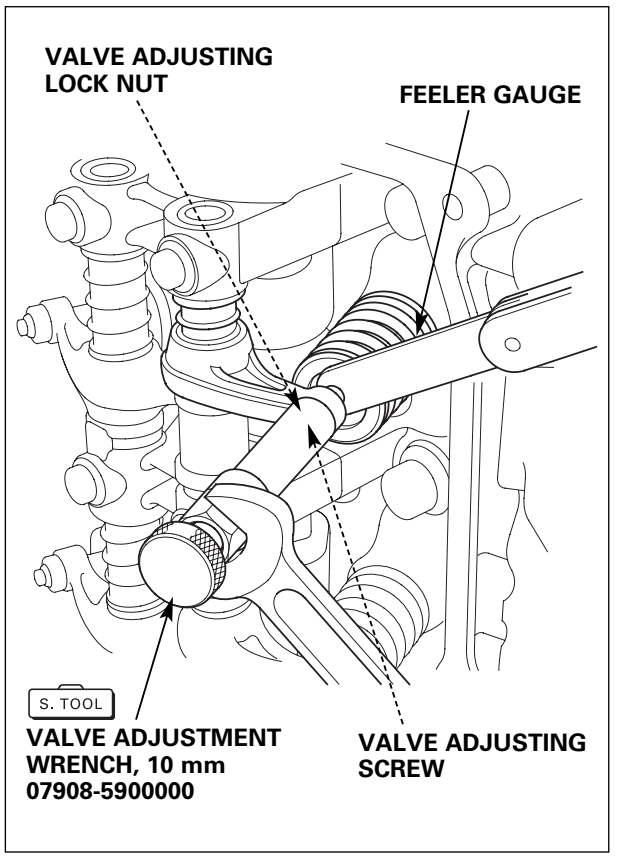
8) Insert a feeler gauge between the intake/exhaust side valve adjusting screw and the valve stem.

9) Adjust the valve clearance by turning the valve adjusting screw.

10) After adjustment, tighten the lock nut to the specified torque while holding the valve adjusting screw with the special tool.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

11) Recheck the valve clearance. If the measurements are out of specification, readjust the valve clearance.



12) After adjusting the valve clearances of the No.1 cylinder, turn the camshaft pulley counterclockwise by increments of 120° to bring the piston of each cylinder to the top dead center of its compression stroke.
Repeat the procedure from step 7 through step 12.

- Turn the alternator rotor counterclockwise. Never turn it clockwise.
- To bring the piston of the No.2 cylinder to top dead center of its compression stroke, align the "T⬆" mark on the cylinder head with the "2▼" mark on the camshaft pulley. To bring the piston of the No.3 cylinder to top dead center, align the "⬆" mark on the cylinder head with the "3▼" mark on the camshaft pulley.

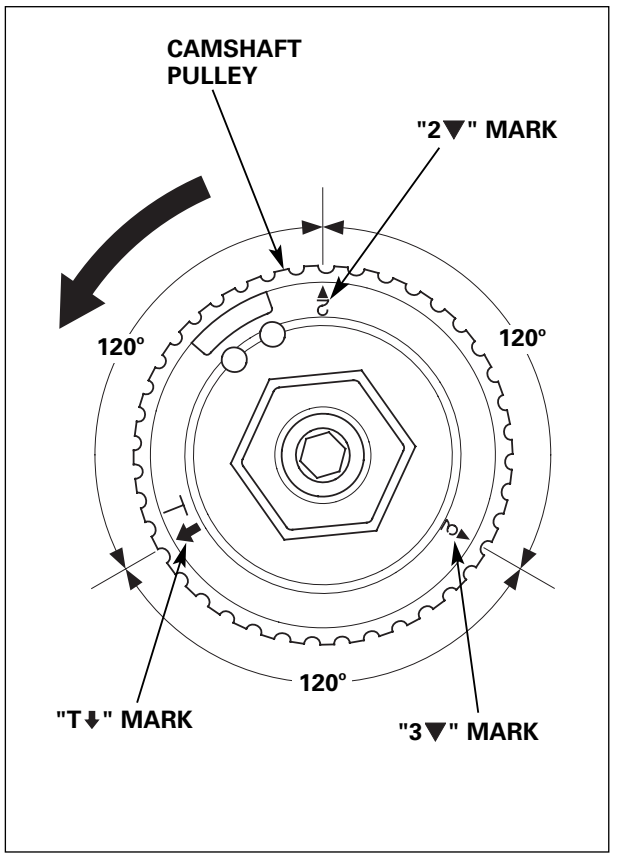
13) After adjusting the valve clearance on each cylinder, install the cylinder head cover and tighten the seven 6 x 35 mm flange bolts to the specified torque (P. 9-32).

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

14) Install the fuel strainer stay on the cylinder head cover, and tighten the two 6 x 14 mm flange bolts securely (P. 3-9).
Install the fuel strainer [low pressure side] on the fuel strainer stay (P. 3-9).

15) Set the main wire harness on the cylinder head cover and connect the breather tube (P. 3-9).

16) Install the following parts.
- Ignition coil/regulator/rectifier (P. 18-23)
- Alternator cover (P. 7-2)
- Engine cover (P. 4-2)



© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-12

7. FUEL STRAINER [LOW PRESSURE SIDE]

⚠WARNING

Gasoline is highly flammable and explosive.

You can be burned or seriously injured when handling fuel.

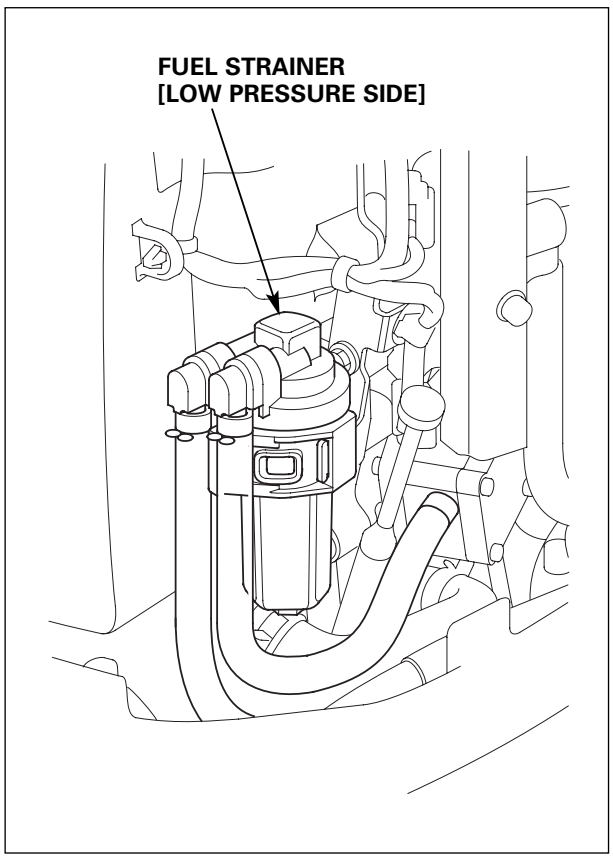
- Keep heat, sparks, and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

Inspection:

1) Remove the engine cover (P. 4-2).

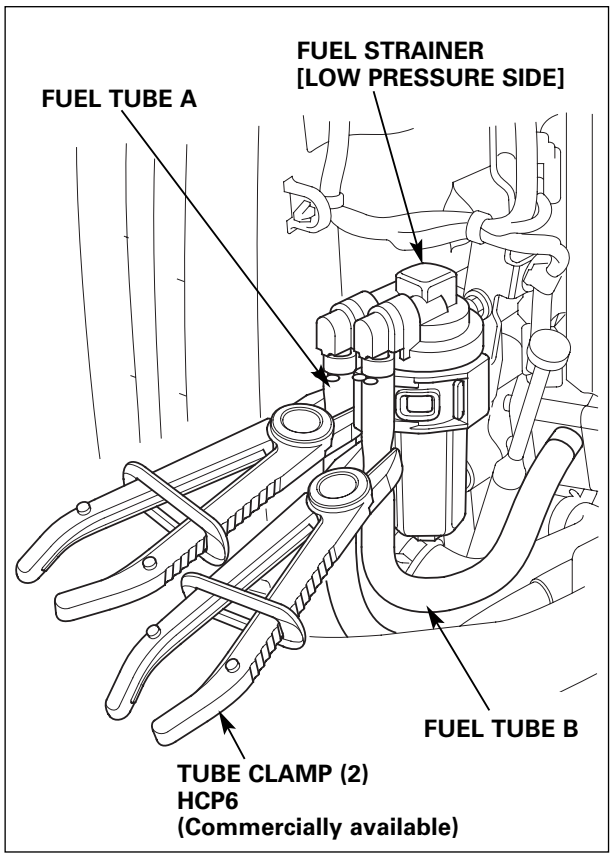
2) Visually check the fuel strainer for water or blockage with foreign material.

3) If there is water or blockage with foreign material, disassemble and clean the fuel strainer.



Disassembly/Cleaning:

1) Place a shop towel under the fuel tubes.
   Clamp fuel tube A and fuel tube B securely with two commercially available tube clamps.



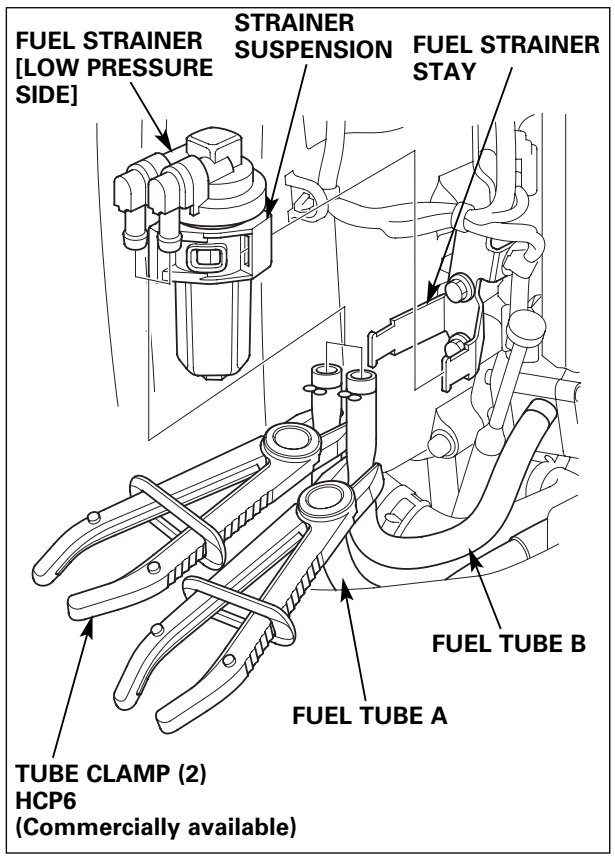
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-13

2) Remove the fuel strainer from the fuel strainer stay.

3) Disconnect fuel tube A and fuel tube B from the fuel strainer.

4) Remove the strainer suspension from the fuel strainer.



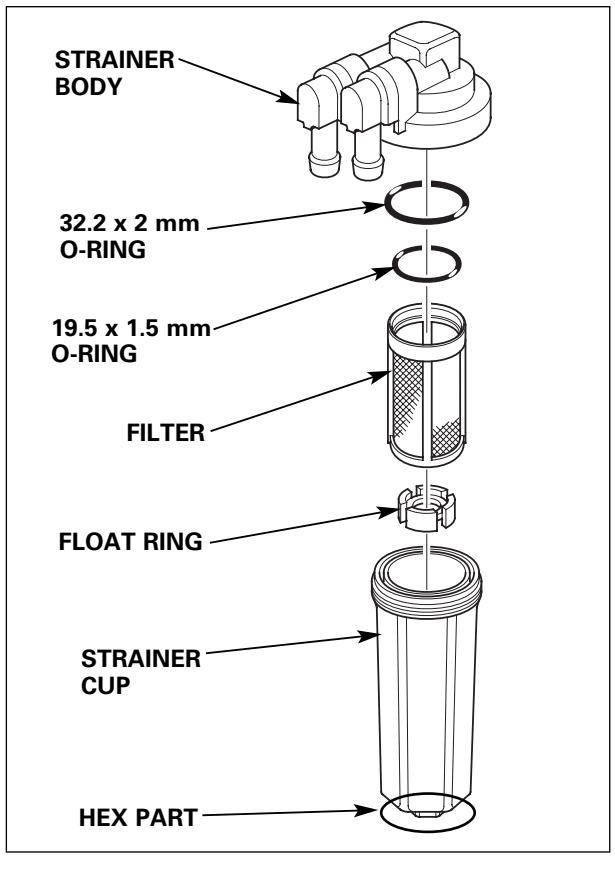
5) Remove the cup from the strainer body by attaching a wrench or equivalent tool to the hex part of the strainer cup.

6) Remove the filter from the strainer body, and remove the 19.5 x 1.5 mm O-ring.
Replace the O-ring with a new one on reassembly.

7) Check the filter for contamination, blockage with foreign material or tears. Replace the element with a new one if necessary.

8) Remove the 32.2 x 2 mm O-ring and the float ring from the strainer cup.
Replace the 32.2 x 2 mm O-ring with a new one on reassembly.

9) Remove water and foreign material from the strainer cup and clean the cup.



© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-14

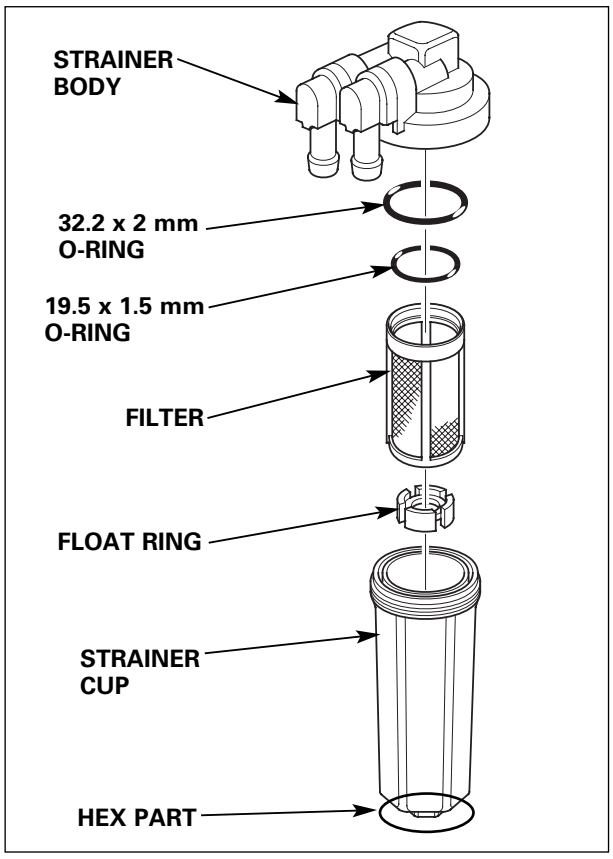
Reassembly:

1) Install a new 19.5 x 1.5 mm O-ring on the filter, and install the filter on the strainer body.

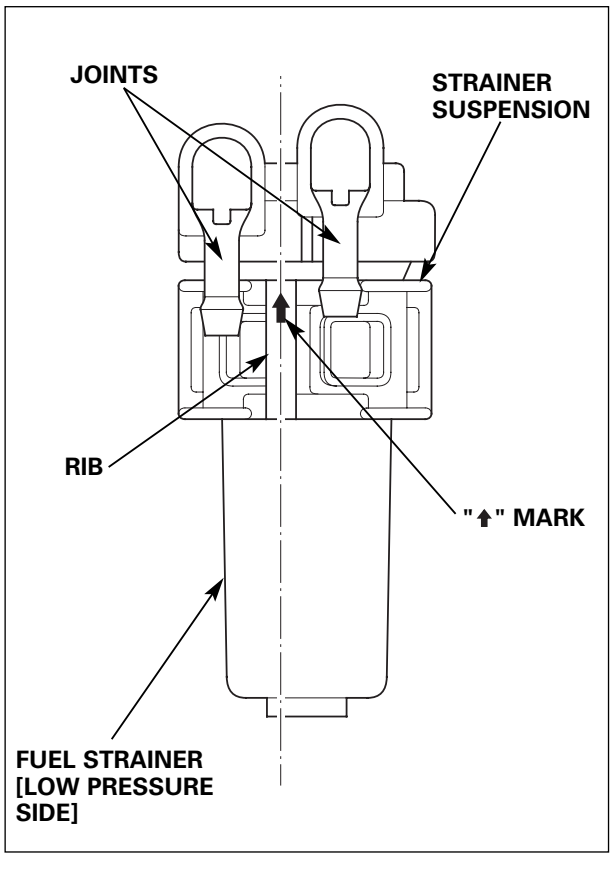
2) Install a new 32.2 x 2 mm O-ring and the float ring on the strainer cup.

3) Install the strainer cup on the strainer body, and tighten the strainer cup to the specified torque by attaching a wrench or equivalent tool to the hex part of the strainer cup.

   TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)



4) Install the strainer suspension on the fuel strainer by aligning the center of the rib of the strainer suspension with the midpoint between the joints of the fuel strainer and the "⬆" mark on the rib toward up as shown.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-15

5) Connect fuel tube A to the "➡" mark side (suction side) joint of the fuel strainer.

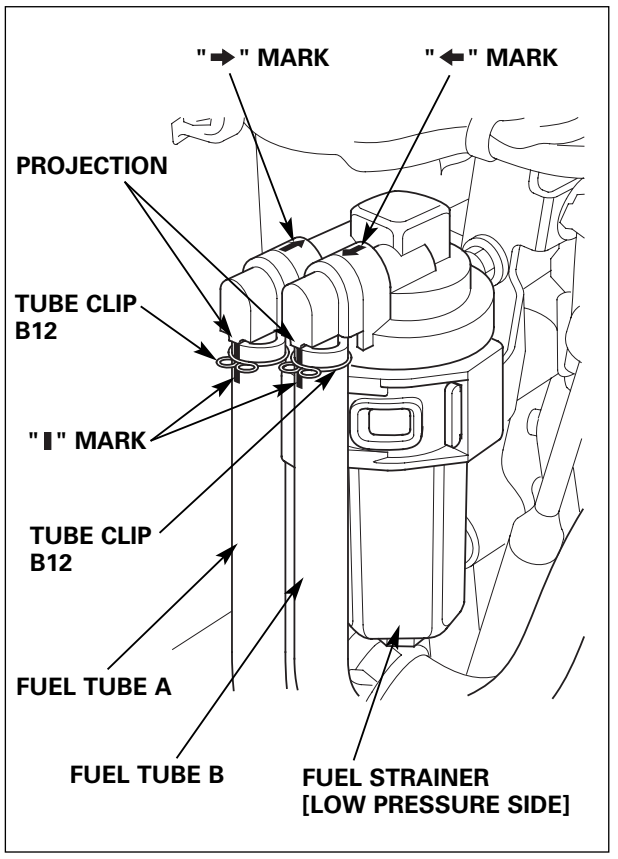
6) Connect fuel tube B to the "⬅" mark side (discharge side) joint of the fuel strainer.

   Connect while aligning the "▌" mark on fuel tube A/B with the projection on the fuel strainer.

7) Install tube clips B12 so that their tabs are facing away from the fuel strainer as shown.
   After connecting the tubes, check for gasoline leakage from each joint.

8) Install the fuel strainer on the fuel strainer stay.

9) Install the engine cover (P. 4-2).



© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-16

8. FUEL STRAINER [HIGH PRESSURE SIDE]

⚠WARNING

Gasoline is highly flammable and explosive.

You can be burned or seriously injured when handling fuel.

- Keep heat, sparks, and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

- Replace the sealing washer with a new one whenever the service check bolt is loosened or removed.
- After installing the fuel strainer, check for gasoline leakage from each joint.

Replace the fuel strainer at the replacement interval shown or in the following case:
- Regular replacement period of every two years or 400 operating hours
- When the fuel pump and the pressure regulator are normal but the gasoline discharge volume of the fuel pump is less than the standard discharge volume (P. 5-81)

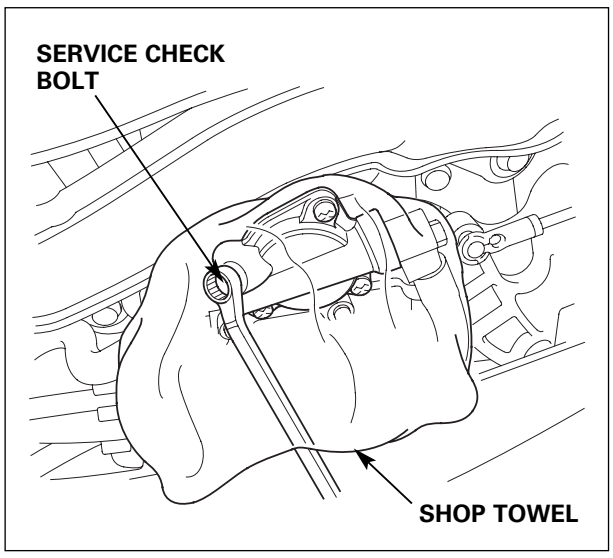
Inspection:

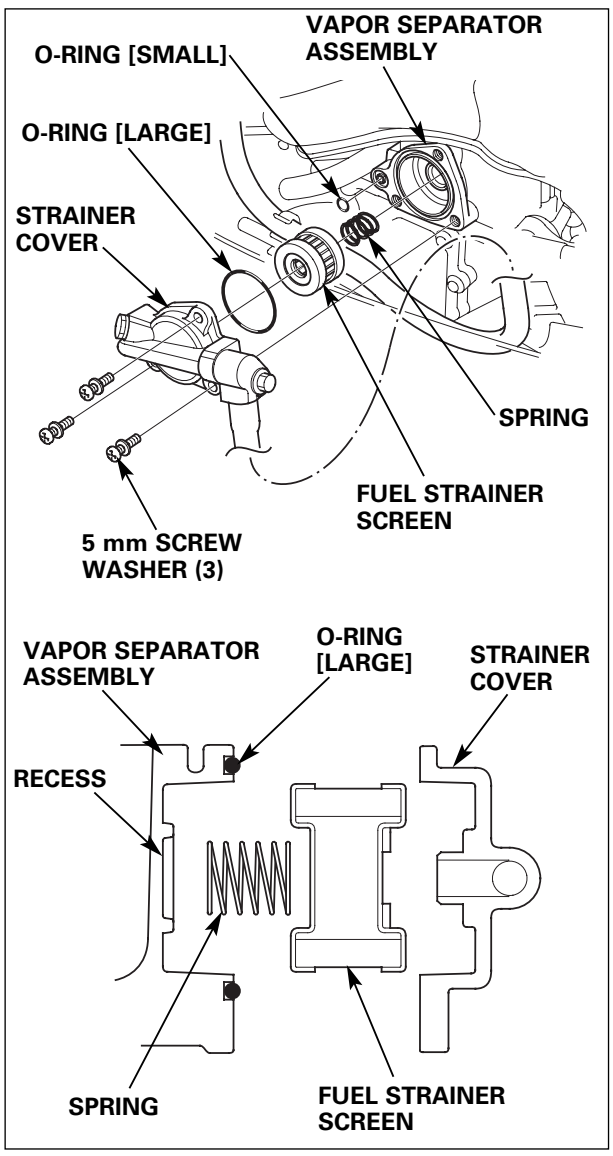
1) Remove the engine cover (P. 4-2).
2) Relieve the fuel pressure according to "How to relieve fuel pressure" (P. 5-78).
3) Place a shop towel under the strainer cover.
   Remove the three 5 mm screw washers and remove the strainer cover from the vapor separator assembly.
4) Remove the fuel strainer screen, spring and the two O-rings from the vapor separator assembly.
   Replace the O-rings with new ones on reassembly.
5) Check the fuel strainer screen for contamination, blockage with foreign material or tears. Replace the fuel strainer screen if necessary.

Reassembly:

1) Apply engine oil to the new O-rings and install them on the vapor separator assembly.
2) Set the spring in the recess in the vapor separator assembly, and set the fuel strainer screen in the vapor separator assembly as shown.
3) Install the strainer cover on the vapor separator assembly and tighten the three 5 mm screw washers securely.
4) Install a new sealing washer on the service check bolt and tighten the service check bolt to the specified torque.

   TORQUE: 11.8 N·m (1.2 kgf·m, 9 lbf·ft)
5) Install the engine cover (P. 4-2).





Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-17

9. IDLE SPEED

Inspection:

Check the following before starting the idle speed inspection.
- Spark plug electrodes (P. 3-8).
- MIL is OFF.

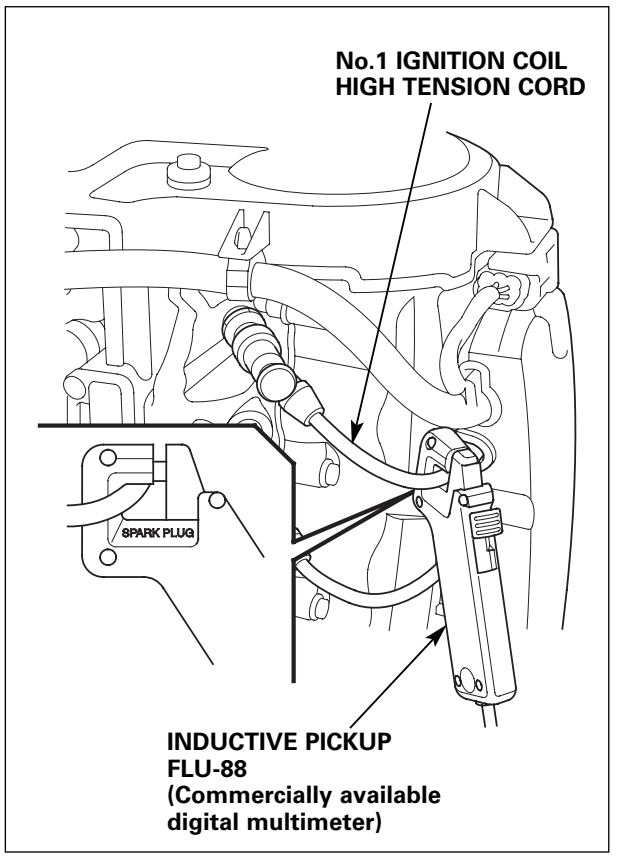
1) Place the outboard motor vertically (with the engine level) and move the shift to the "N" (Neutral) position.

2) Remove the propeller. Set the outboard motor gear case in a test tank filled with water.

3) Remove the engine cover (P. 4-2).

4) Install a commercially available digital multimeter with an inductive tachometer pickup (FLU-88) or HDS.

   Using a commercially available digital multimeter:
   a) Connect the inductive pickup to the No.1 ignition coil high tension cord with the "SPARK PLUG" side toward the spark plug as shown.



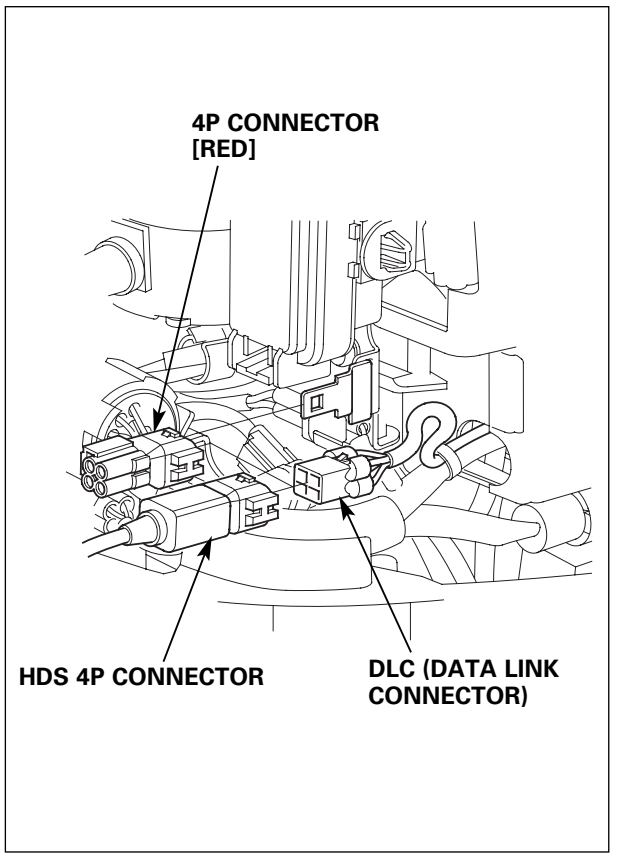
   Using the HDS:
   a) Disconnect the 4P connector [Red].
   b) Connect the HDS 4P connector to the DLC (Data Link Connector).

5) Start the engine.
   Run the engine under no load until the engine speed stabilizes, and check the idle speed. (Idle speed inspection must be made with the engine warmed up to the normal operating temperature.)

Specified idle speed (At neutral)	850±50 min^{-1} (rpm)

   - When the idle speed is outside the specification or when a symptom shown on the Idle Control System Troubleshooting Guide appears, perform the adjustment (P. 5-72).

6) After inspection, install the engine cover (P. 4-2).



© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-18

10. THROTTLE CABLE

Throttle Rod Adjustment:

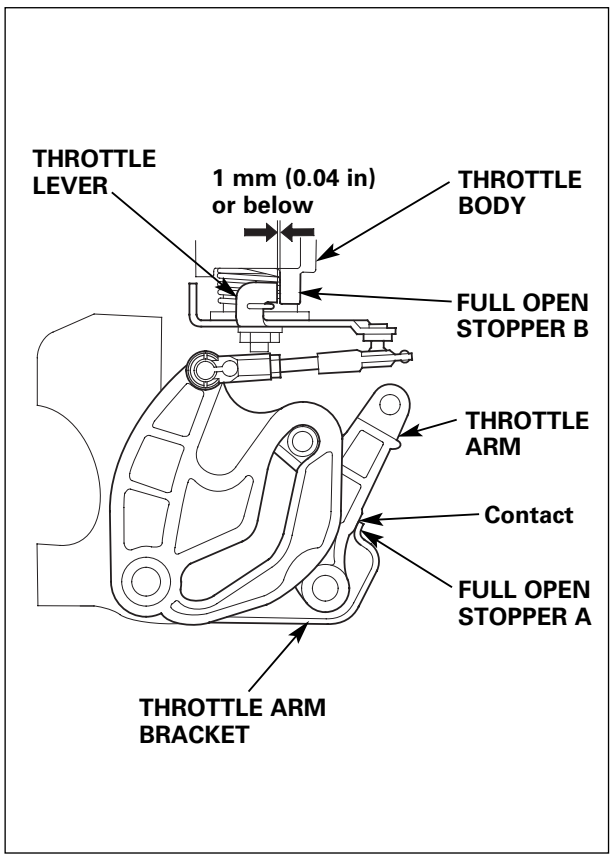
1) Remove the engine cover (P. 4-2).

2) Remove the remote control cable [throttle side] from the throttle arm (P. 3-20).

3) Bring the throttle arm in contact with full open stopper A of the throttle arm bracket.

4) With the throttle arm in this position, measure the clearance between the throttle lever and full open stopper B of the throttle body. It must be 1 mm (0.04 in) or less.

5) When the throttle arm does not come in contact with full open stopper A or the clearance between full open stopper B and the throttle body is more than 1 mm, adjust as follows.

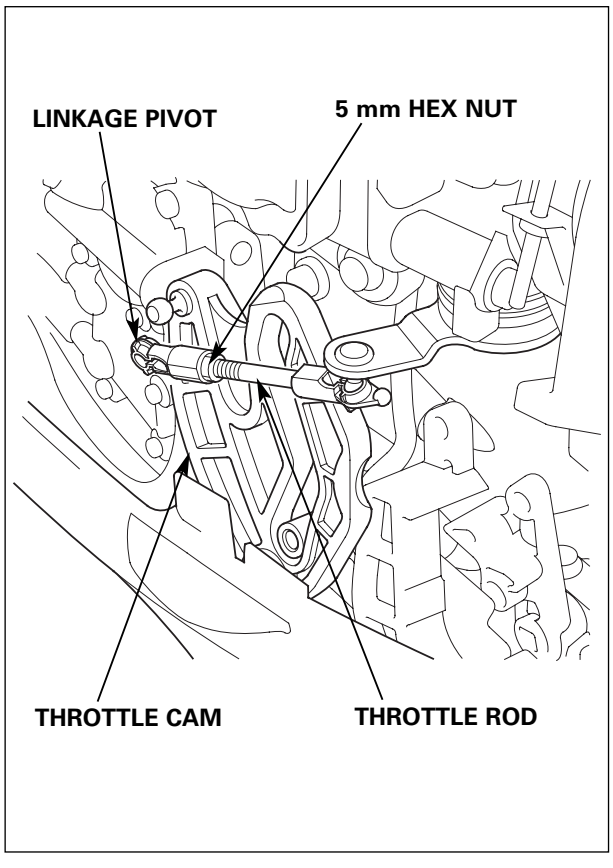


6) Remove the throttle rod from the throttle cam.
Loosen the 5 mm hex nut of the throttle rod and adjust the length of the throttle rod by turning the linkage pivot.
After adjustment, tighten the 5 mm hex nut securely.

7) Install the throttle rod on the throttle cam and recheck.

8) Install the remote control cable [throttle side] in the throttle arm (P. 3-20).

9) Install the engine cover (P. 4-2).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-19

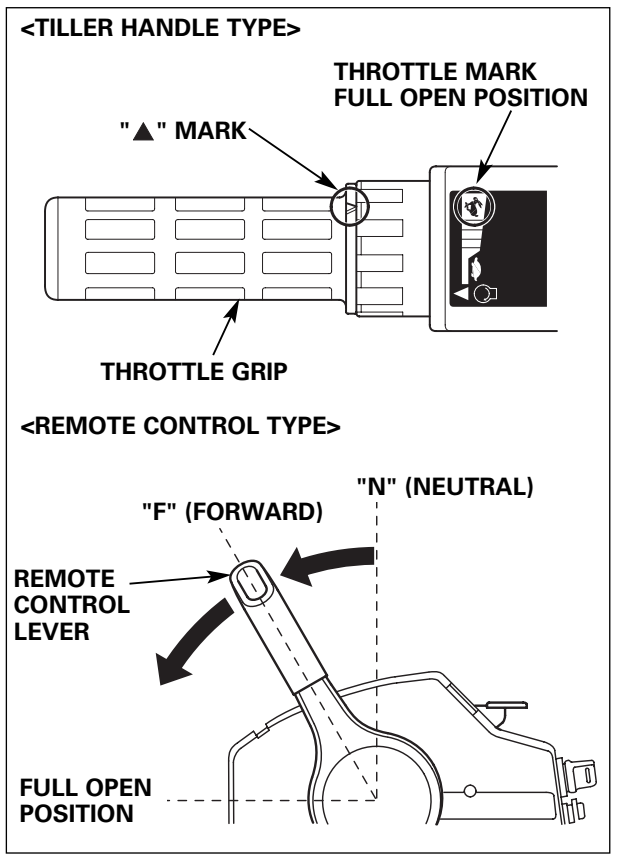
Remote Control Cable [Throttle Side] Adjustment:

Check that the remote control cable [throttle side] is installed on the throttle arm.

1) Remove the engine cover (P. 4-2).

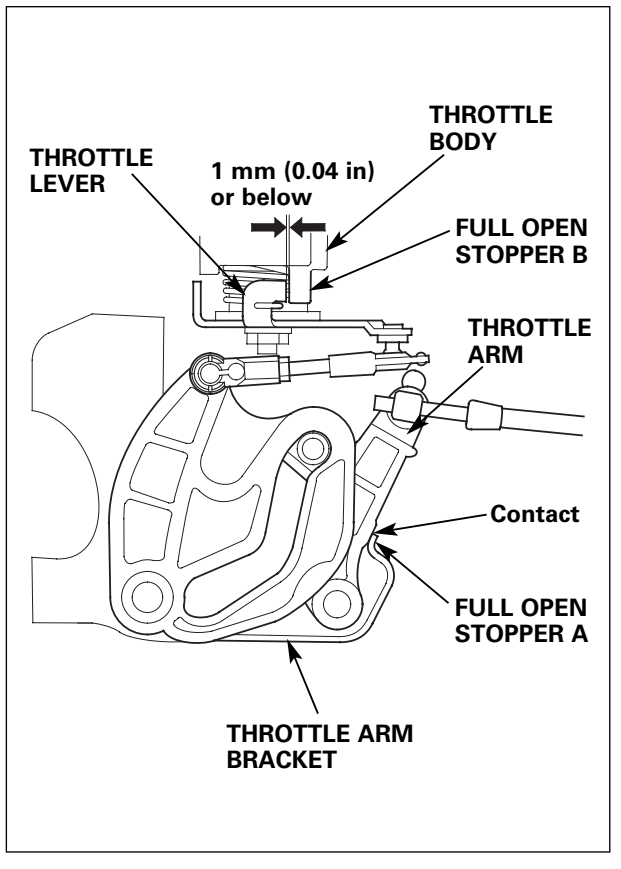
2) Perform throttle rod adjustment (P. 3-18).

3) Set the throttle in the full open position.



4) Place the throttle in the full open position. Check that the throttle arm is in contact with full open stopper A of the throttle arm bracket, and then check the clearance between the throttle lever and full open stopper B of the throttle body. It must be 1 mm (0.04 in) or less.

5) If the throttle arm does not come in contact with full open stopper A or the clearance between full open stopper B and the throttle body is more than 1 mm (0.04 in), adjust as follows.



© Honda Motor Co., Ltd.

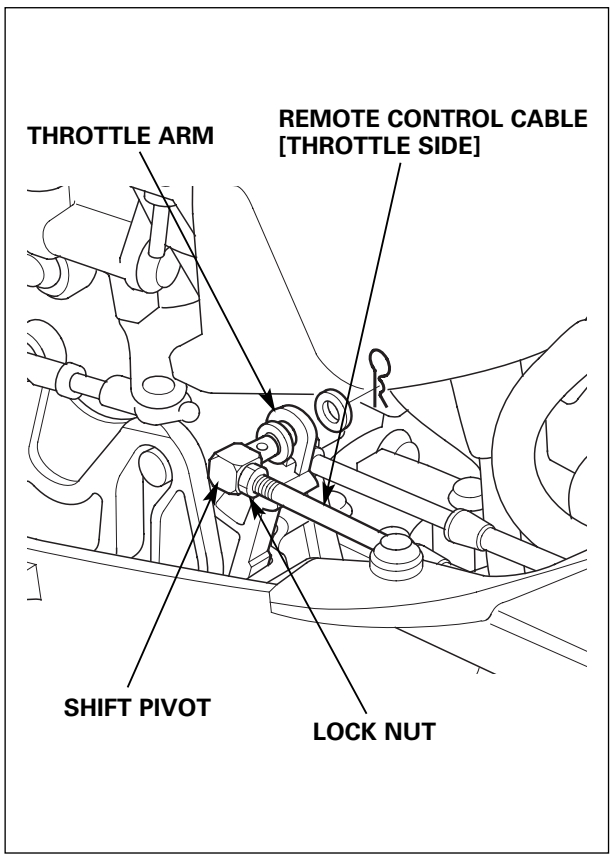
cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-20

6) Remove the remote control cable [throttle side] from the throttle arm.
   Loosen the remote control cable [throttle side] lock nut and adjust by turning the shift pivot until the shift pivot sets on the throttle arm easily.

   • Adjustment must be made with the throttle and the throttle arm in the full open position (P. 3-19).

   After adjustment, tighten the lock nut securely.

7) Install the remote control cable [throttle side] on the throttle arm and recheck (P. 3-19).



8) Return the throttle to the fully closed position, and check that the projection on the throttle arm is behind the throttle cam by viewing the throttle arm bracket assembly from the front side as shown.

9) When the projection on the throttle arm is not behind the throttle cam, adjust as follows:

   a) Remove the throttle rod from the throttle cam.

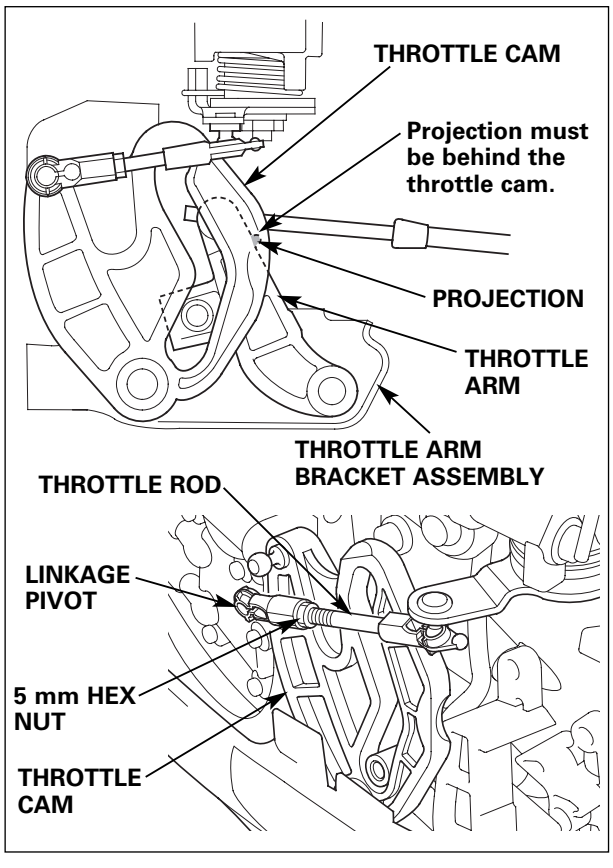
   b) Loosen the 5 mm hex nut on the throttle rod.

   c) Adjust the length of the throttle rod by turning the linkage pivot.

10) After adjustment, tighten the 5 mm hex nut securely and install the throttle rod on the throttle cam.

11) Check whether the throttle moves smoothly.

12) Install the engine cover (P. 4-2).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

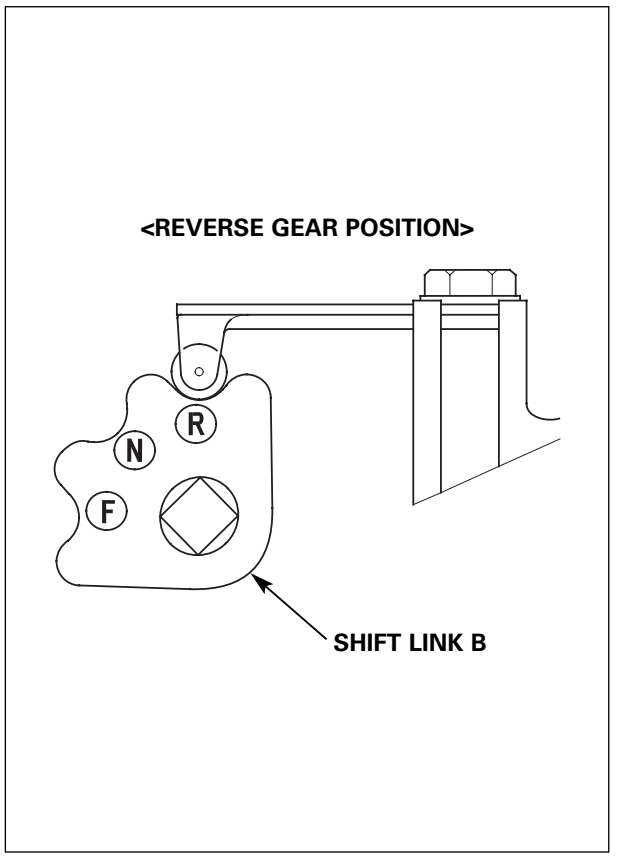
cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-21

11. SHIFT CABLE

Shift Rod Adjustment:

1) Put the outboard motor in the "R" (Reverse) gear, and check that shift link B is in the reverse gear position, too.
   Set the shift link in the "R" (Reverse) position and check that the outboard motor is in gear by turning the propeller shaft with your hand.

2) When shift link B and the outboard motor are not in the "R" (Reverse) gear, or when shift link B is in the "R" (Reverse) position but the outboard motor is out of gear, perform the following adjustment.



3) Put the outboard motor in the "N" (Neutral) gear. Loosen the shift rod joint nut and lock nut to disconnect shift rods A and B.

4) Put the outboard motor in the "R" (Reverse) gear, and push gear case assembly shift rod B down to the lowermost (i.e. reverse) position.

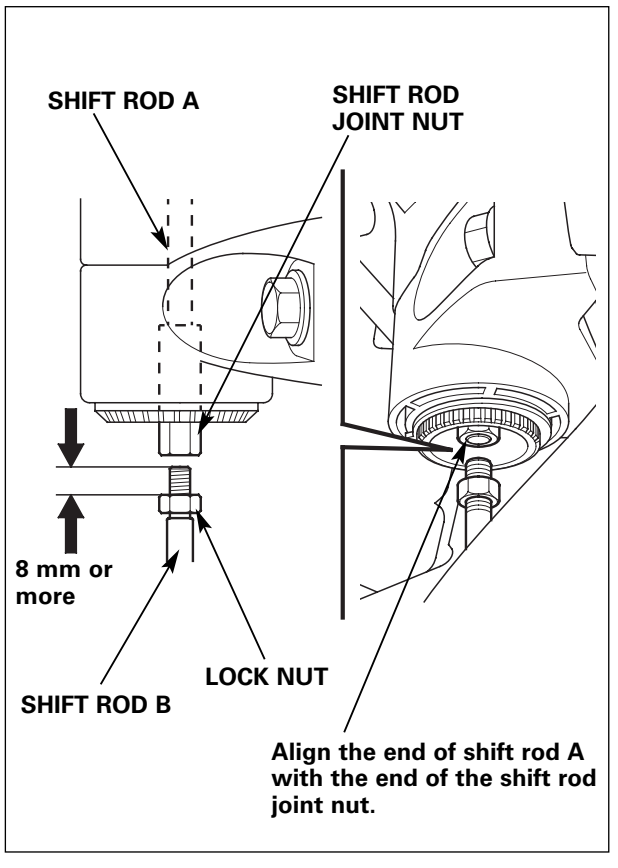
5) Turn the lock nut to bring the distance from the end of the lock nut to the end of shift rod B to 8 mm or more.

6) Turn the shift rod joint nut to align the bottom end of shift rod A with the bottom end of the shift rod joint nut.

7) Tighten the shift rod joint nut up to the lock nut position of shift rod B, and tighten the lock nut securely.
   After adjustment, check whether the shift moves smoothly.

   • Be sure to tighten the shift rod joint nut against shift rod B with the shift and shift rod B in the "R" (Reverse) position.

8) If the length where the shift rod joint nut sets on shift rod A is too small or if the shift rod joint nut comes out of shift rod A by tightening the shift rod joint nut against shift rod B 8 mm or more, check shift rod A and shift rod B for bends or other damage. Replace shift rod A and/or shift rod B if necessary (P. 11-19 and 12-2).



© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-22

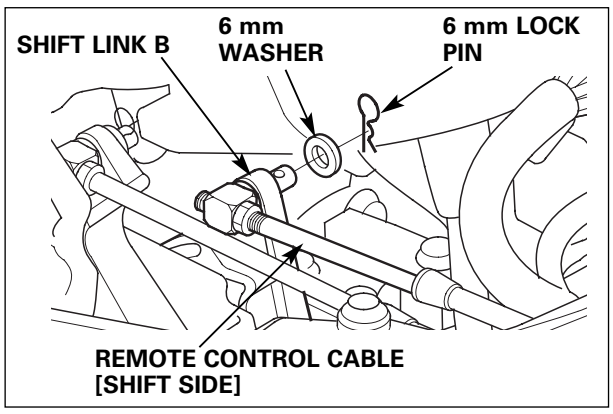
Remote Control Cable [Shift Side] Adjustment:

When the gearshift does not move properly after adjusting the shift rod (P. 3-21), adjust as follows.

1) Remove the engine cover (P. 4-2).

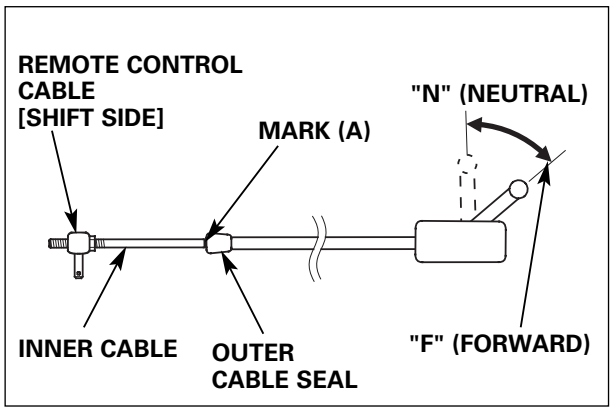
2) Remove the remote control cable [shift side] from shift link B.

3) Set shift link B and the outboard motor in the "N" (Neutral) gear, and check whether the remote control cable [shift side] sets on shift link B easily. If not, adjust as follows.



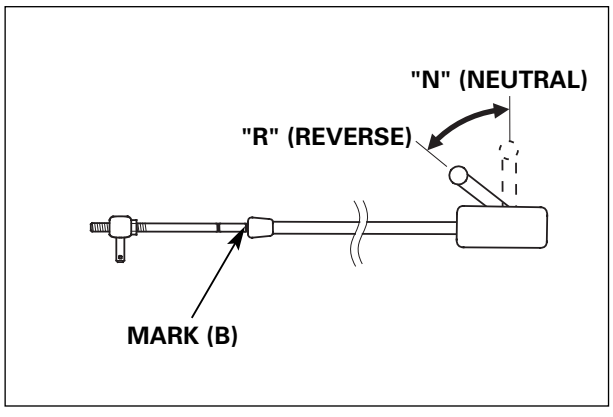
4) Put the outboard motor in "F" (Forward) gear and then shift to "N" (Neutral) gear slowly.

5) Holding the gear in the position described in step 4, mark the inner cable with (A) at the outer cable seal end.

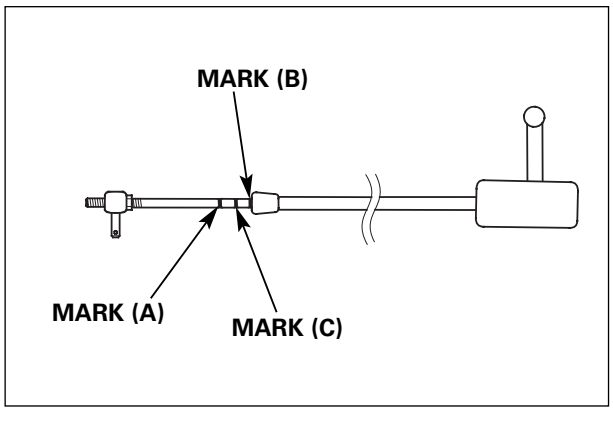


6) Put the outboard motor in "R" (Reverse) gear and then shift to "N" (Neutral) gear slowly.

7) Holding the gear in the position described in step 6, mark the inner cable with (B) at the outer cable seal end.



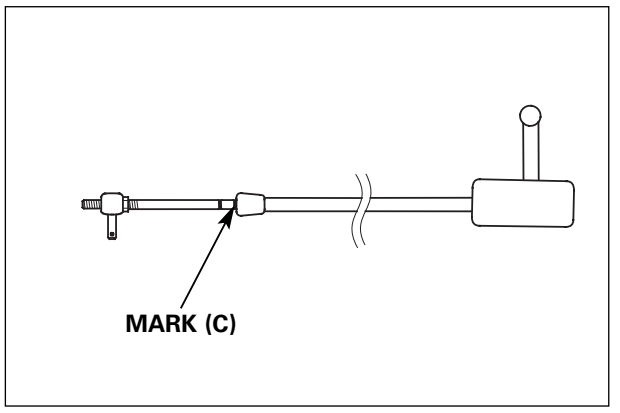
8) Mark the inner cable with mark (C) at the midpoint between mark (A) and mark (B).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

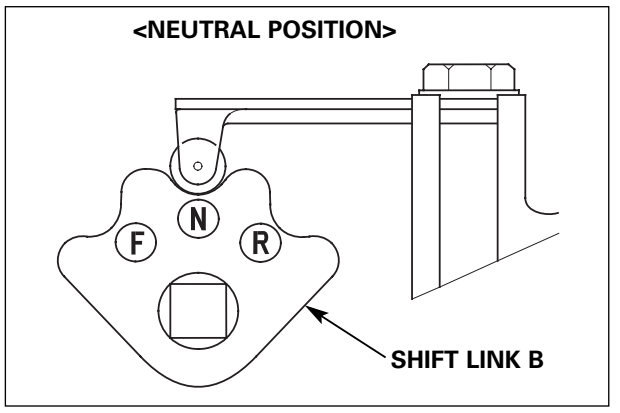
cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-23

9) Align mark (C) made in step 8 with the end of the outer cable seal.



10) Check that shift link B is in the neutral position.

11) Move shift link B lightly right or left and check for free play. If there is a play, set shift link B in the center of the free play.

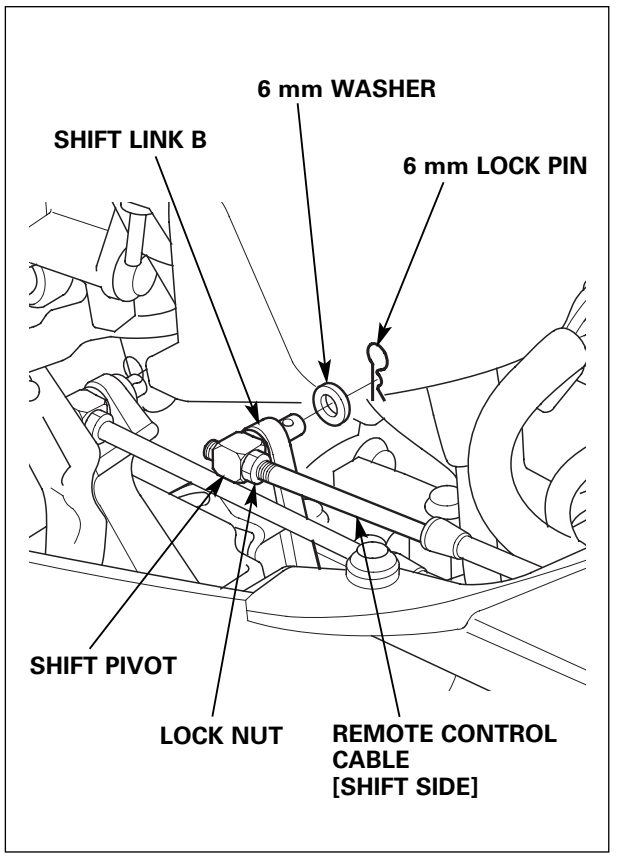


12) Holding the gear in the position described in step 9, loosen the remote control cable [shift side] lock nut and turn the shift pivot so it sets on shift link B easily.

13) After adjustment, tighten the lock nut securely and install the remote control cable [shift side] on shift link B.

14) After installing the cable, move the lever back and forth and check the gearshift operation.

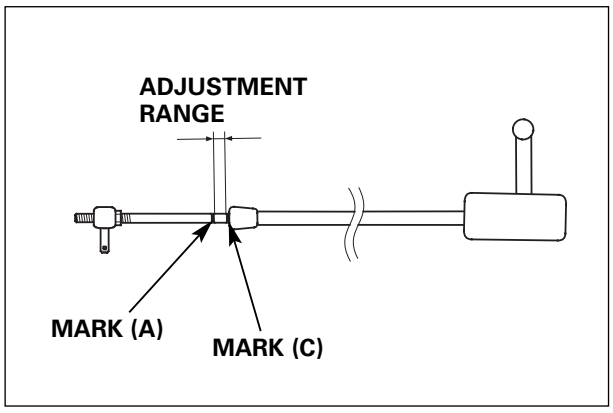
- If it is hard to shift to the "F" (Forward) gear or "R" (Reverse) gear position, turn the propeller or propeller shaft by hand to help the gears engage.



© Honda Motor Co., Ltd.

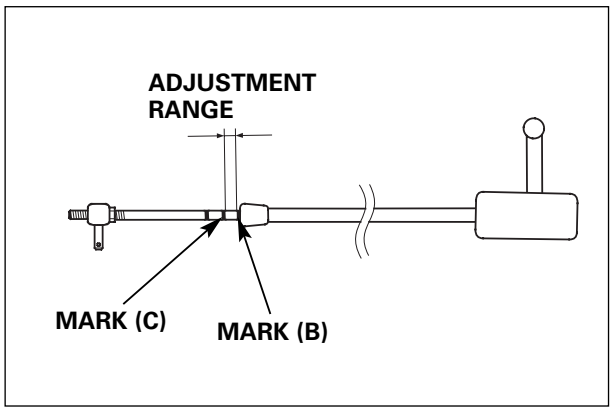
cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-24

15) Shift from the "F" (Forward) gear position to the "N" (Neutral) gear position.
If the gear fails to shift to neutral, remove the remote control cable [shift side] from shift link B, and install the shift pivot on shift link B with the inner cable moved toward mark (A).
After adjustment, shift from the "F" (Forward) gear position to the "N" (Neutral) gear position, and check for proper engagement.



16) Shift from the "R" (Reverse) gear position to the "N" (Neutral) gear position.
If the gear fails to shift to neutral, remove the remote control cable [shift side] from shift link B, and install the shift pivot on shift link B with the inner cable moved toward mark (B).
After adjustment, shift from the "R" (Reverse) gear position to the "N" (Neutral) gear position, and check for proper engagement.

17) Check the gearshift by putting the outboard motor to each gear position.
If neutral does not engage properly, repeat step 15 or step 16.

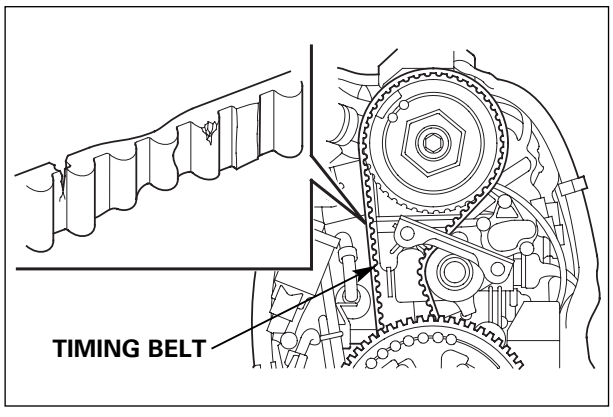


18) Install the engine cover (P. 4-2).

12. TIMING BELT

Inspection:
Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)

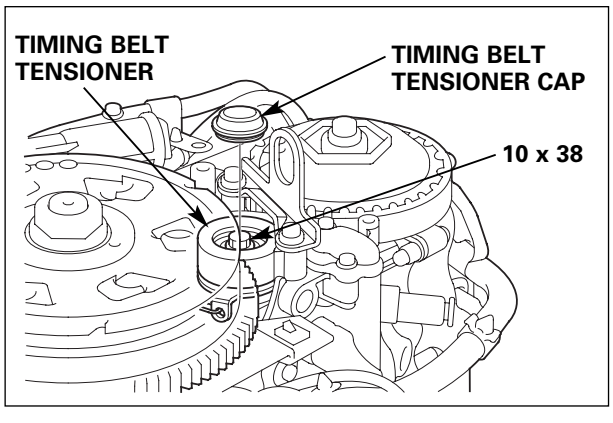
Check the timing belt for wear or damage.
Replace the timing belt with a new one if necessary (P. 7-3).



Belt Tension Adjustment:
Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)

1) Bring the No.1 piston to top dead center of its compression stroke (P. 3-10).

2) Remove the timing belt tensioner cap and loosen the 10 x 38 mm flange bolt that tightens the timing belt tensioner.

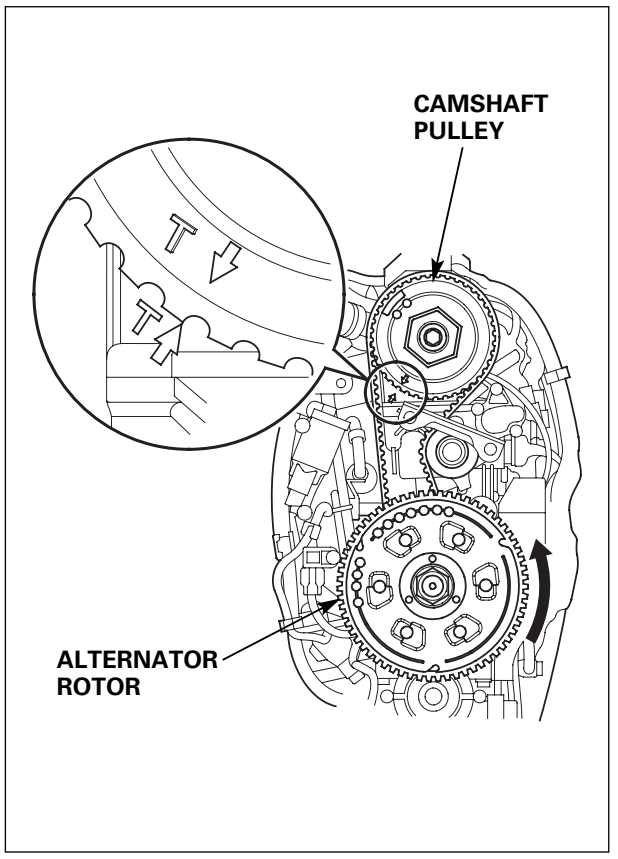


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-25

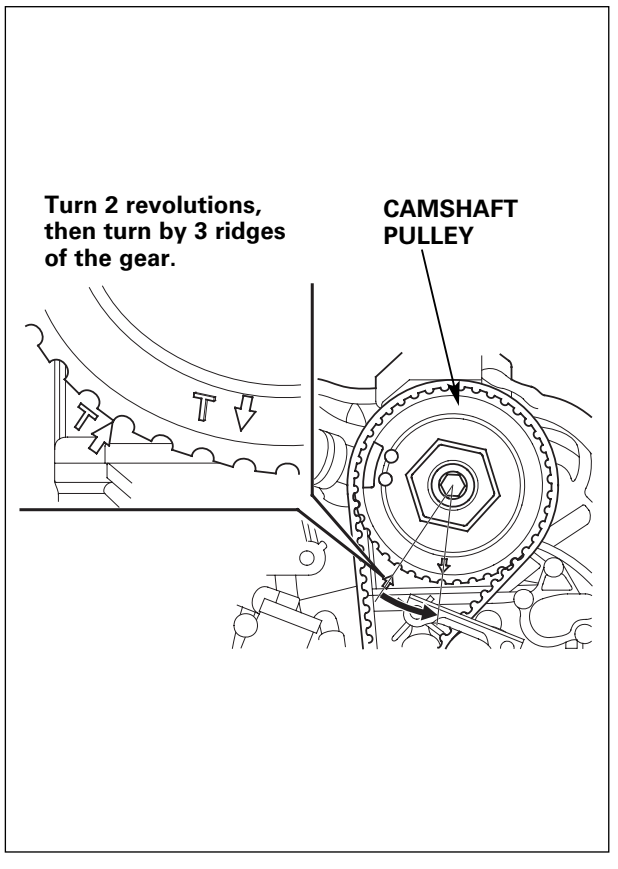
3) Turn the alternator rotor counterclockwise until the camshaft pulley turns 2 revolutions.

   • Note to turn the camshaft pulley 2 revolutions by turning the alternator rotor.
   • Turn the alternator rotor counterclockwise. Never turn it clockwise.



4) Turn the alternator rotor counterclockwise further until the camshaft pulley rotates an additional 3 ridges of the gear.

   • Turn the alternator rotor counterclockwise. Never turn it clockwise.
   • Do not touch the timing belt tensioner and do not push the tensioner toward the belt while turning the alternator rotor.



© Honda Motor Co., Ltd.

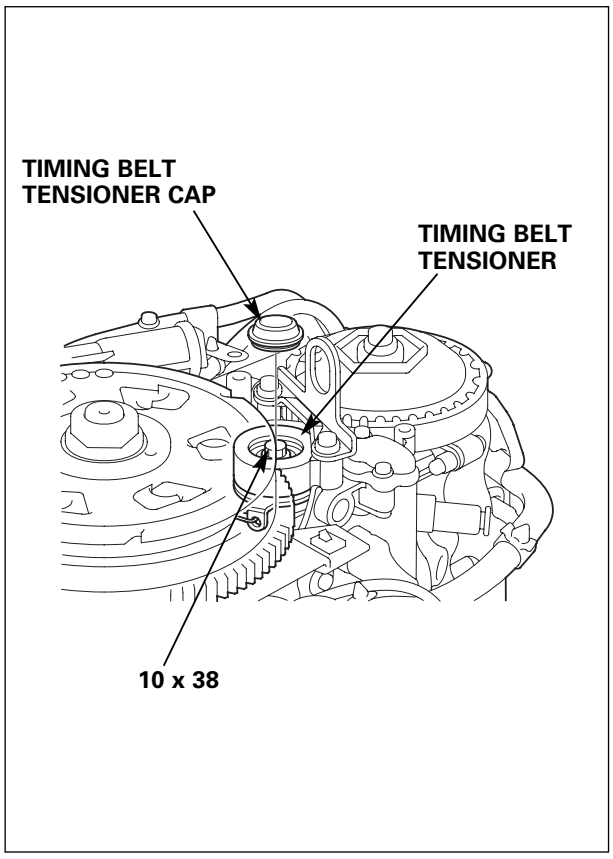
cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-26

5) While holding the camshaft pulley in the position described in step 4, tighten the 10 x 38 mm flange bolt of the timing belt tensioner to the specified torque.

   TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

6) Install the timing belt tensioner cap.

7) Install the following parts.
   - Alternator cover (P. 7-2)
   - Engine cover (P. 4-2)



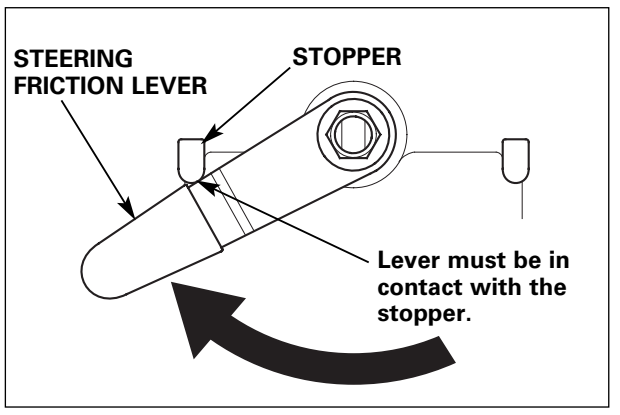
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-27

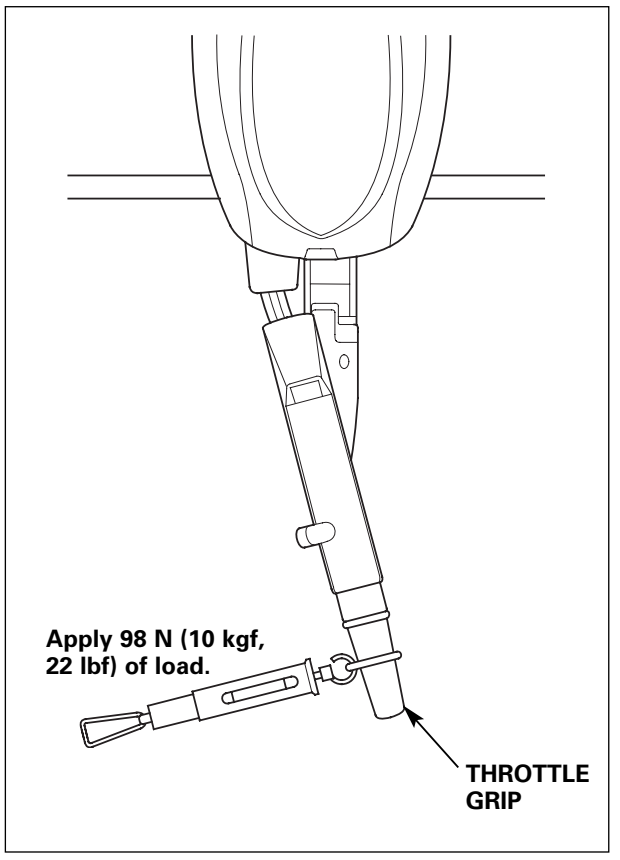
13. STEERING FRICTION [TILLER HANDLE TYPE ONLY]

Inspection/Adjustment:

1) Set the steering friction lever in the lock position (i.e. where the lever comes in contact with the stopper by turning it fully to the left).



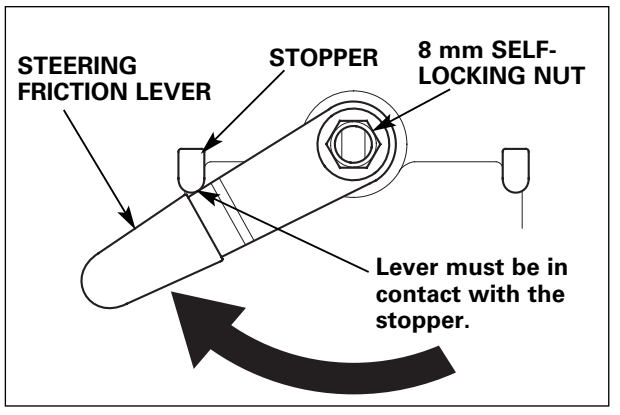
2) Holding the steering friction lever locked, apply 98 N (10 kgf, 22 lbf) of load to the center of the tiller handle throttle grip and check that the outboard motor does not turn.



3) If the outboard motor turns, set the steering friction lever in the lock position and tighten the 8 mm self-locking nut to the specified torque.

   TORQUE: 9.5 N·m (1.0 kgf·m, 7 lbf·ft)

4) If the outboard motor still turns after tightening the 8 mm self-locking nut to the specified torque, check the friction blocks for wear or contamination with grease. Replace the friction blocks if necessary (P. 16-2).



© Honda Motor Co., Ltd.

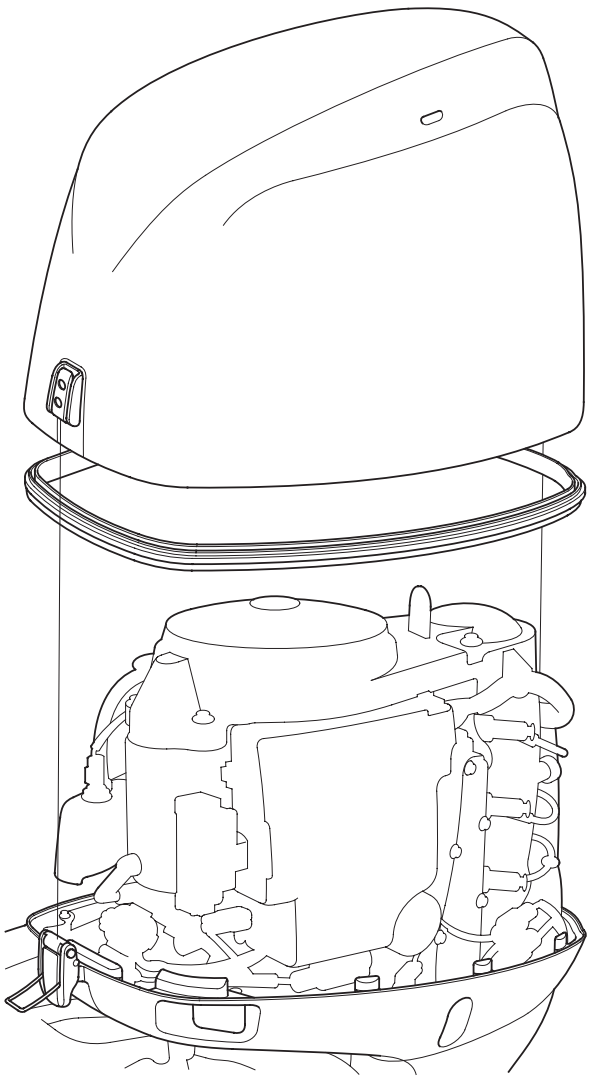
cap.03 BF40D 50D (A).qxp 2008/04/10 18:44 ページ 3-28

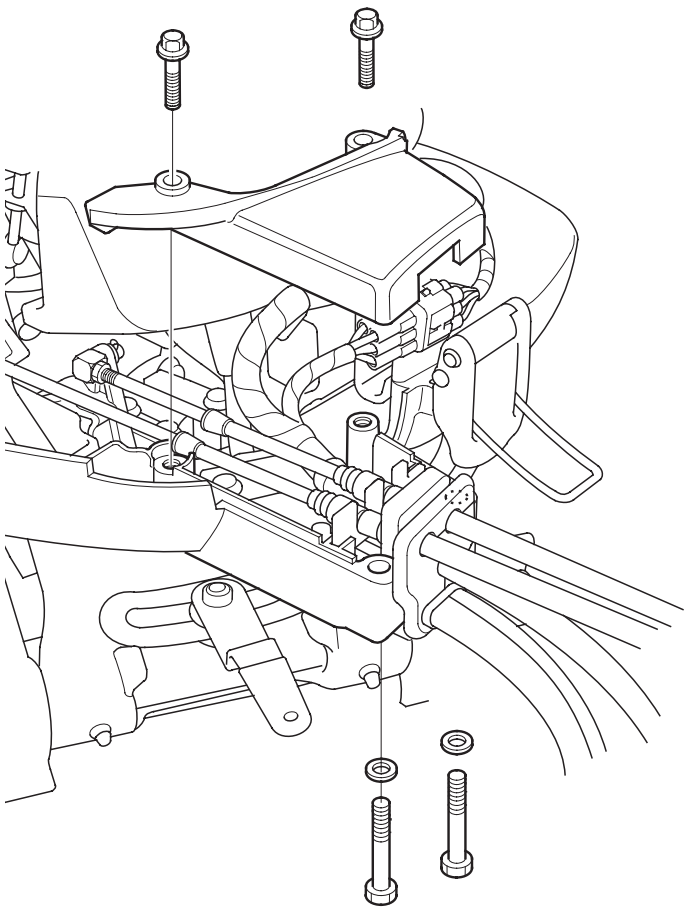
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40・50D 4章 (A).qxp 2008/04/10 16:30 ページ 4-1

4. COVER

1. ENGINE COVER 4-2
2. SEPARATE COVER 4-3



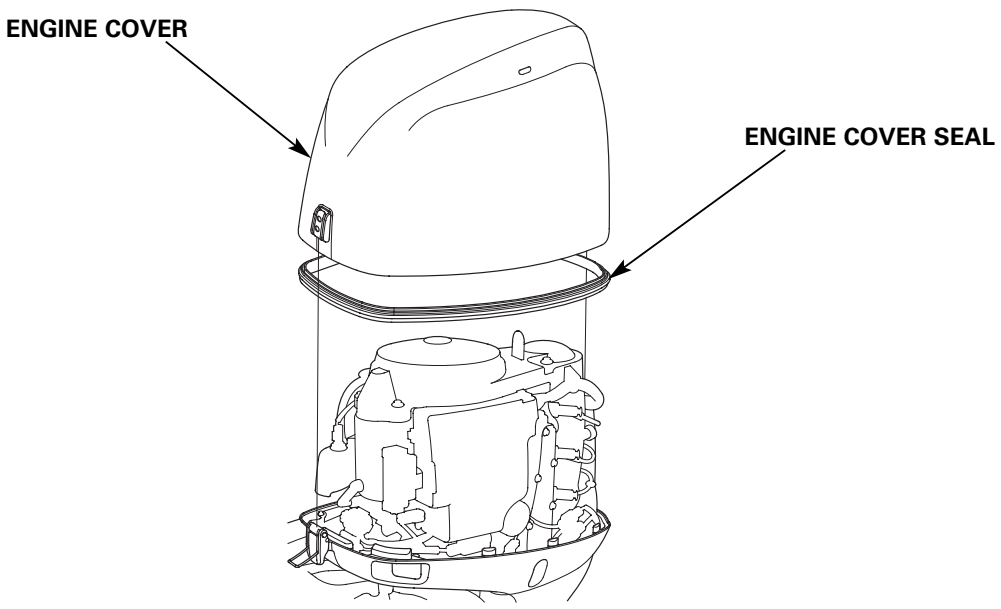


© Honda Motor Co., Ltd.

BF40・50D 4章 (A).qxp 2008/04/10 16:30 ページ 4-2

1. ENGINE COVER

a. REMOVAL
Unlock the locks on the front and rear of the engine cover, and remove the engine cover.

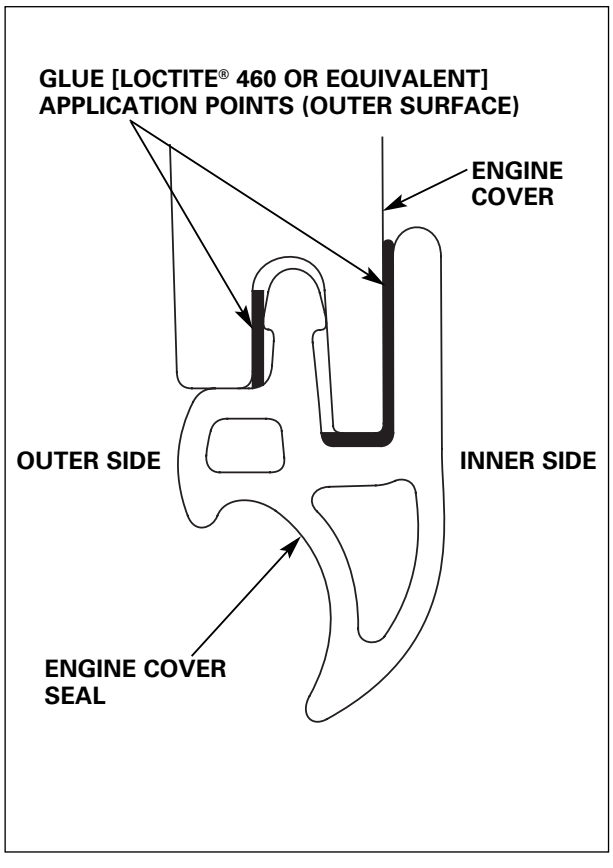


b. INSPECTION
1) Check the engine cover seal for damage or cracks. Remove the engine cover seal from the engine cover and replace it with a new one if necessary.

2) Apply glue (LOCTITE® 460 or equivalent) to the engine cover seal at the points shown.

3) Install the engine cover seal on the engine cover.

c. INSTALLATION
Install the engine cover on the outboard motor, and lock the engine cover on the front and rear sides.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40・50D 4章 (A).qxp 2008/04/10 16:30 ページ 4-3

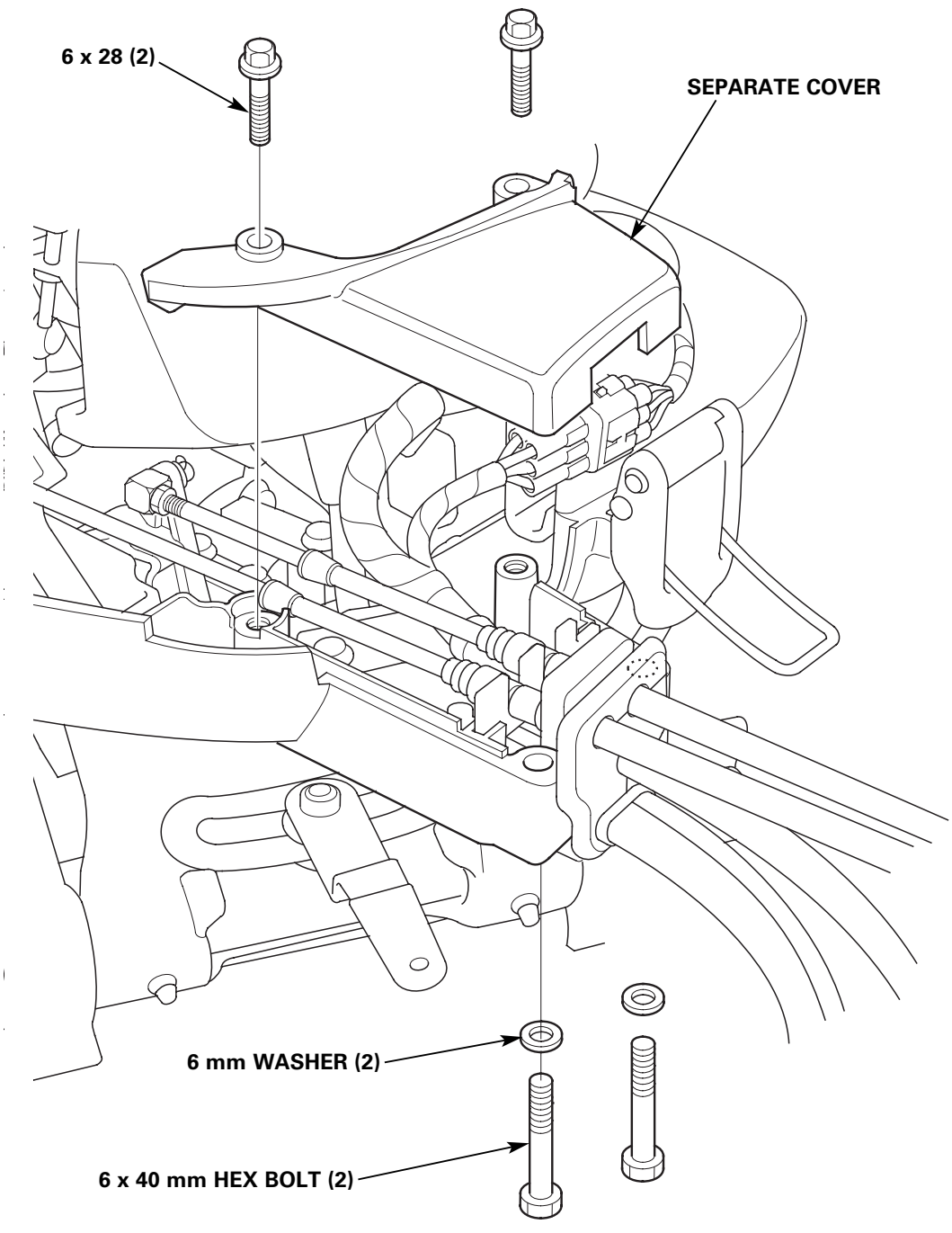
2. SEPARATE COVER

a. REMOVAL/INSTALLATION

1) Remove the engine cover (P. 4-2).

2) Remove the two 6 x 28 mm flange bolts, two 6 x 40 mm hex bolts and the two 6 mm washers, and remove the separate cover.

• Installation is the reverse order of removal.



© Honda Motor Co., Ltd.

BF40・50D 4章 (A).qxp 2008/04/10 16:30 ページ 4-4

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-1

5. PROGRAMMED-FUEL INJECTION

1. SERVICE PRECAUTIONS 5-2
2. VACUUM CONNECTIONS 5-3
3. CIRCUIT DIAGRAM..... 5-4
4. COMPONENT LOCATION 5-6
5. TROUBLESHOOTING 5-10
6. TROUBLESHOOTING WITH THE HDS..... 5-11
7. TROUBLESHOOTING WITHOUT THE HDS..... 5-42
8. IDLE CONTROL SYSTEM 5-72
9. FUEL SUPPLY SYSTEM 5-75
10. INJECTOR..... 5-85
11. SILENCER/THROTTLE BODY/ INTAKE MANIFOLD..... 5-88
12. VAPOR SEPARATOR/PRESSURE REGULATOR/FUEL PUMP (HIGH PRESSURE SIDE)..... 5-98
13. FUEL STRAINER (LOW PRESSURE SIDE)/FUEL PUMP (LOW PRESSURE SIDE)/FUEL TUBE..... 5-111
14. AIR VENT STRAINER/ AIR VENT TUBE..... 5-114
15. EOP (ENGINE OIL PRESSURE) SWITCH 5-115
16. IAT (INTAKE AIR TEMPERATURE) SENSOR 5-116
17. MAP (MANIFOLD ABSOLUTE PRESSURE) SENSOR 5-116
18. ECT2 (ENGINE COOLANT TEMPERATURE) SENSOR 5-117
19. CKP (CRANKSHAFT POSITION) SENSOR 1, 2 5-117
20. HO2S (HEATED OXYGEN SENSOR) 5-118
21. EBT (ENGINE BLOCK TEMPERATURE) SENSOR 5-119

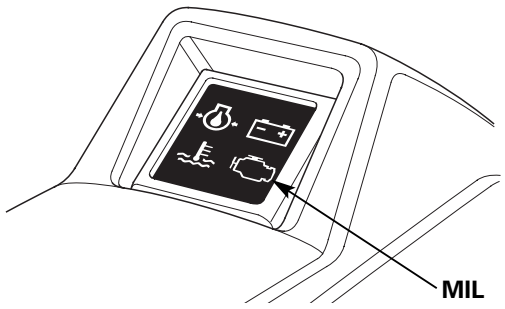
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-2

1. SERVICE PRECAUTIONS

• PROGRAMMED-FUEL INJECTION TROUBLESHOOTING

- First, check the MIL of the indicator.
- Be sure to turn the combination switch OFF before disconnecting and connecting the connectors.
- Clear the DTCs and reset the ECM after inspection and repair (P. 5-11 and 42).

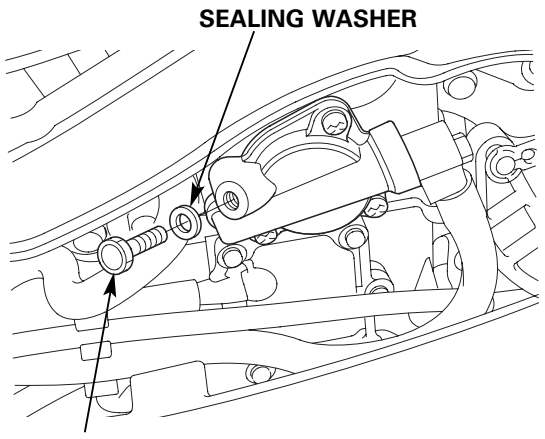


• FUEL LINE SERVICE

⚠WARNING

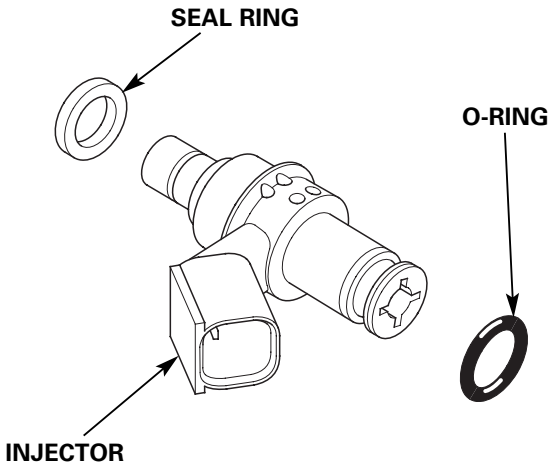
Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

- Disconnect the battery cable from the battery negative (–) terminal.
- Before removing and installing the fuel line, relieve the fuel pressure by loosening the service check bolt of the high pressure side fuel strainer, as described in "How to relieve fuel pressure" (P. 5-78).
- Replace the sealing washers during reassembly.



11.8 N·m (1.2 kgf·m, 9 lbf·ft)

- Replace the O-rings and seal rings with new ones when the fuel line is removed/installed or replaced.
- Apply the recommended engine oil to the O-rings and seal rings before installation. Avoid using vegetable oil or alcohol based lubricant.



• CHECK AFTER OPERATION

- Check the parts for secure installation and the bolts, screws and other fasteners for secure tightening.
- Connect the battery cable to the battery negative (–) terminal.

• FUEL LEAK CHECK

Turn the combination switch ON (but do not turn the starter) after connecting the fuel lines. The fuel pump (high pressure side) should operate for approximately 2 seconds and the fuel pressure in the high pressure side fuel line should rise. Repeat this operation 2 or 3 times and check for fuel leakage.

• WHEN THE BOAT IS EQUIPPED WITH RADIO EQUIPMENT/D-GPS

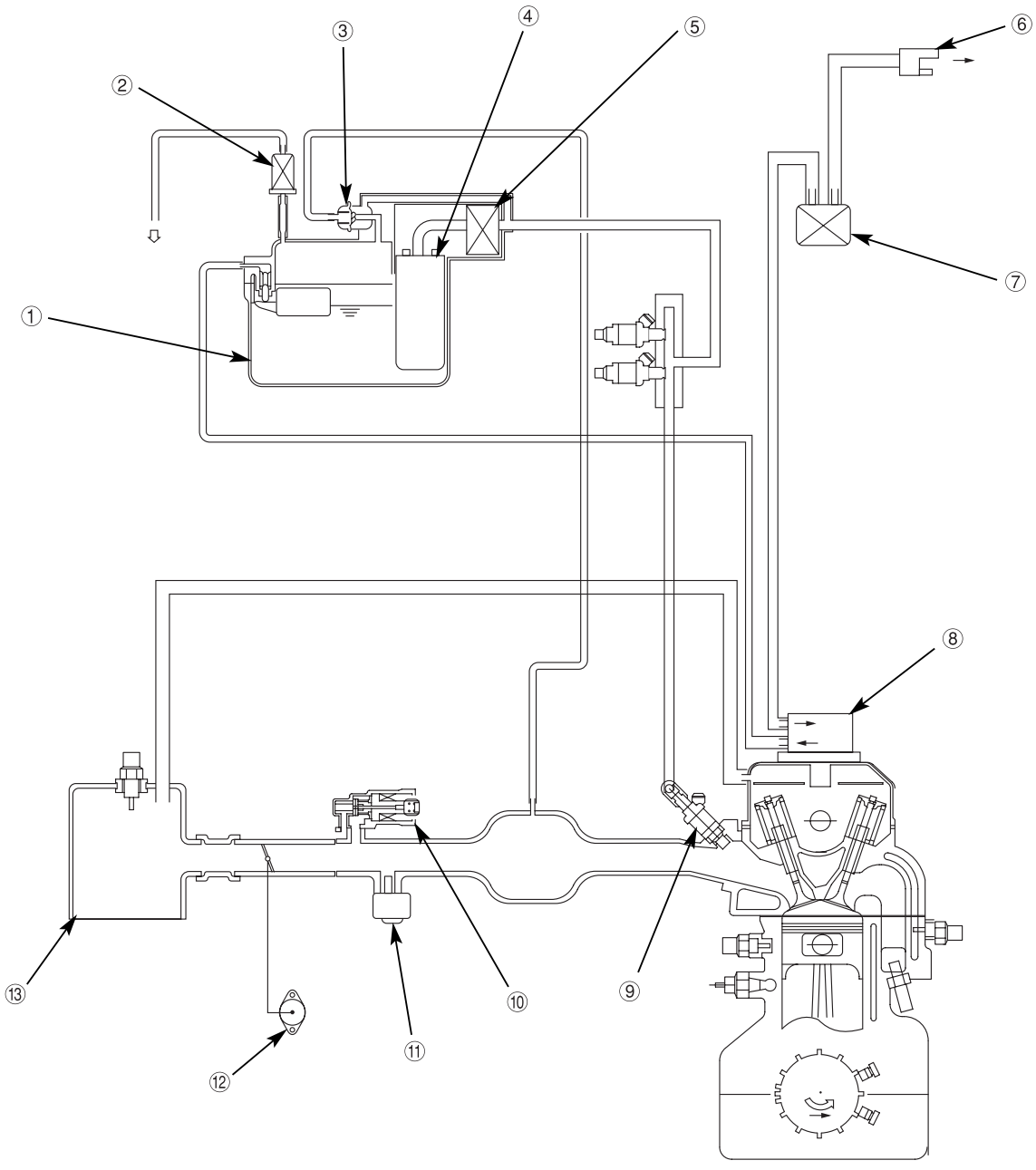
The ECM and its wires are designed to be unaffected by radio waves. However, the ECM can malfunction when it senses an extremely powerful electric wave. Note the following to avoid malfunction of the ECM.

- Install the antenna and the body of the radio equipment at least 50 cm (20.0 in) away from the ECM, remote control cable and the remote control box.
- Antenna wire must not be too long. Do not route the antenna wire along the main wire harness and other cables/wires.
- Do not mount high output power radio equipment on the boat. (The maximum output power of the radio equipment should be 10W.)
- Install the D-GPS antenna and the body unit at least 3m away from the engine.
- Connect the D-GPS antenna ground wire to ground.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-3

2. VACUUM CONNECTIONS

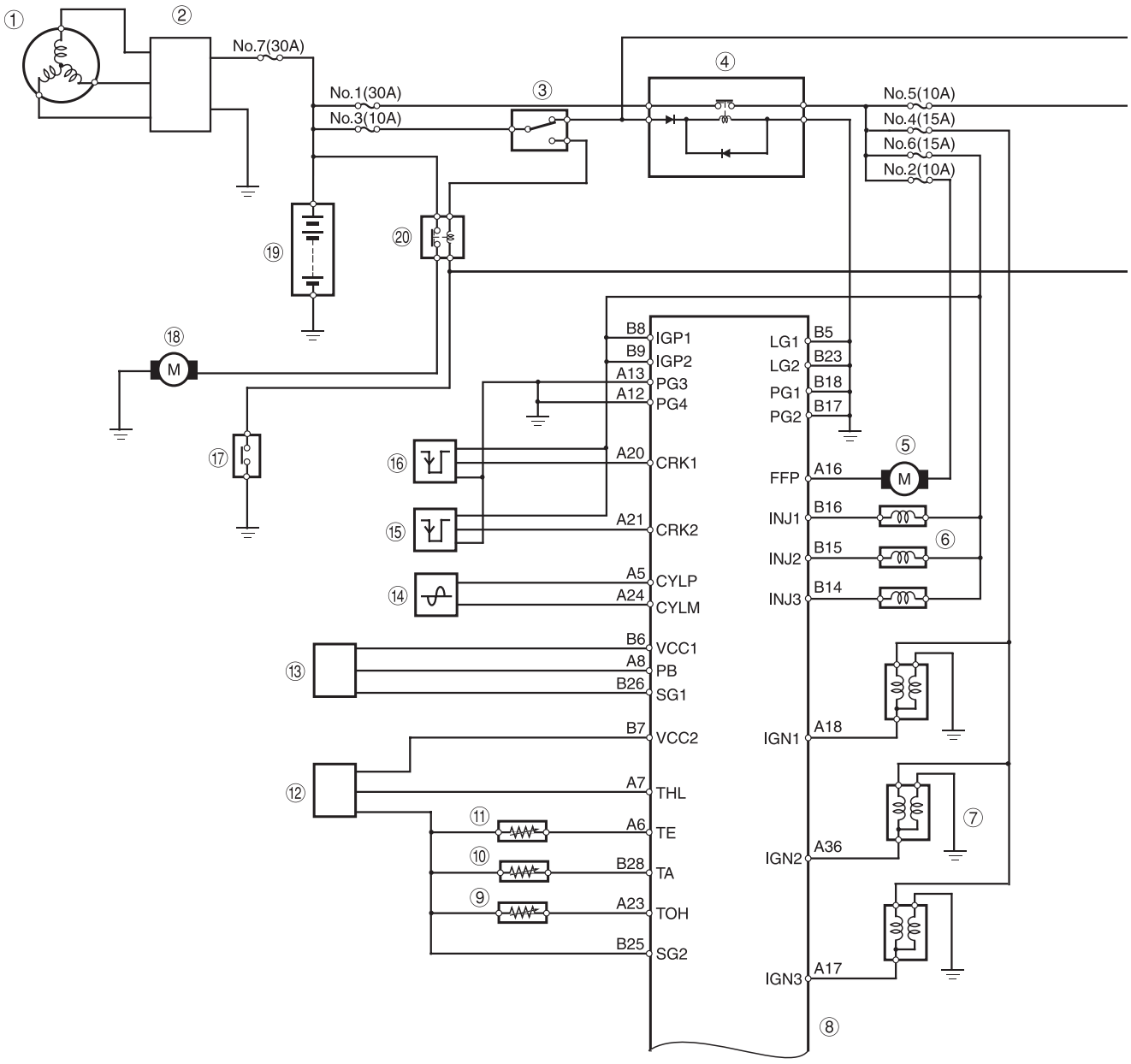


①**VAPOR SEPARATOR**
②**AIR VENT STRAINER**
③**PRESSURE REGULATOR**
④**FUEL PUMP (HIGH PRESSURE SIDE)**
⑤**FUEL STRAINER (HIGH PRESSURE SIDE)**
⑥**FUEL CONNECTOR**
⑦**FUEL STRAINER (LOW PRESSURE SIDE)**
⑧**FUEL PUMP (LOW PRESSURE SIDE)**
⑨**INJECTORS**
⑩**IAC (IDLE AIR CONTROL) VALVE**
⑪**MAP (MANIFOLD ABSOLUTE PRESSURE) SENSOR**
⑫**TP (THROTTLE POSITION) SENSOR**
⑬**SILENCER**

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-4

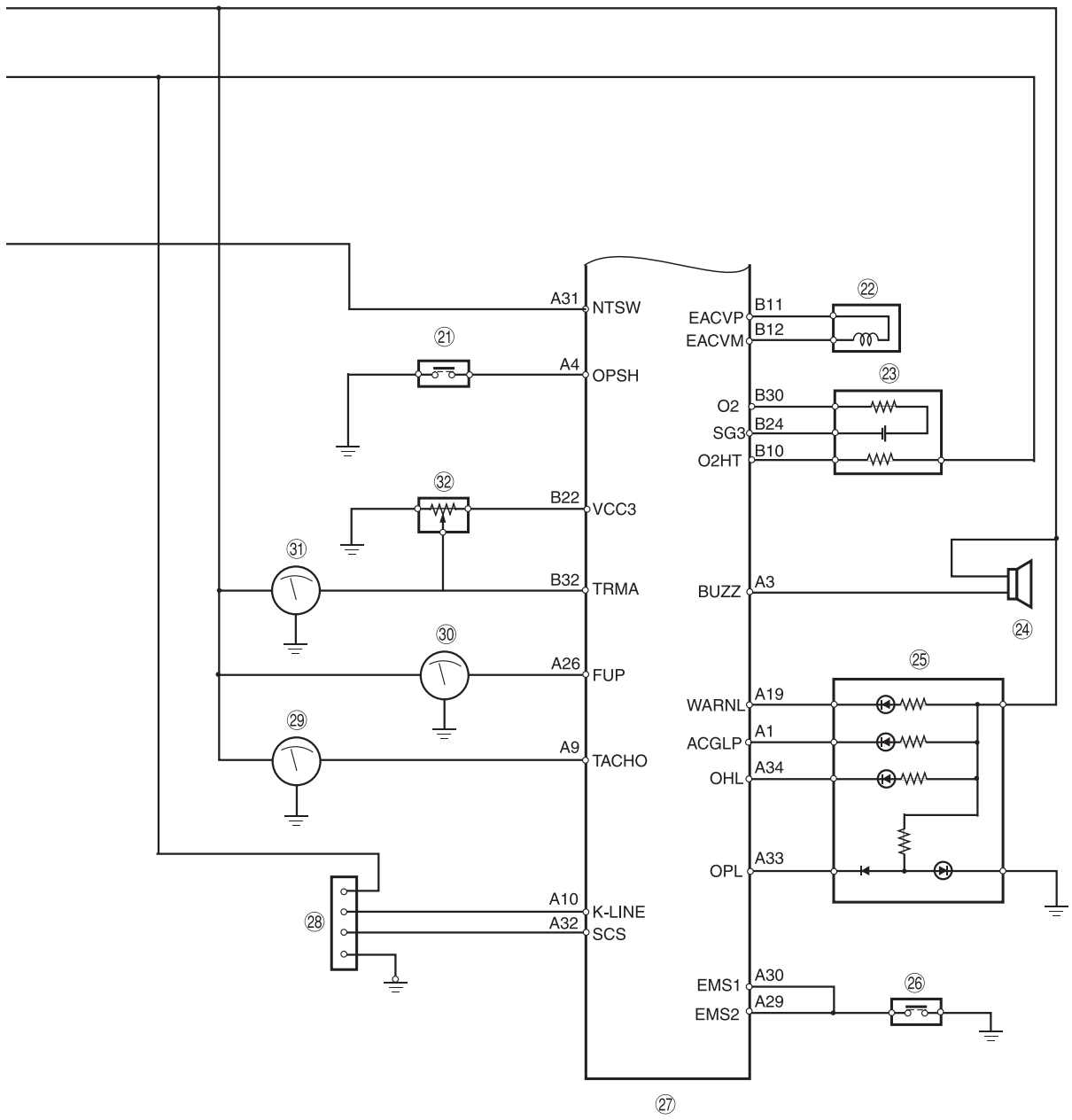
3. CIRCUIT DIAGRAM



① **ALTERNATOR**
② **REGULATOR/RECTIFIER**
③ **COMBINATION SWITCH**
④ **MAIN RELAY**
⑤ **FUEL PUMP (HIGH PRESSURE SIDE)**
⑥ **INJECTORS**
⑦ **IGNITION COILS**
⑧ **ECM**
⑨ **ECT2 (ENGINE COOLANT TEMPERATURE) SENSOR**
⑩ **IAT (INTAKE AIR TEMPERATURE) SENSOR**
⑪ **EBT (ENGINE BLOCK TEMPERATURE) SENSOR**
⑫ **TP (THROTTLE POSITION) SENSOR**
⑬ **MAP (MANIFOLD ABSOLUTE PRESSURE) SENSOR**
⑭ **CMP SENSOR**
⑮ **CKP (CRANKSHAFT POSITION) SENSOR 2**
⑯ **CKP (CRANKSHAFT POSITION) SENSOR 1**
⑰ **NEUTRAL SWITCH**
⑱ **STARTER MOTOR**
⑲ **12V BATTERY**
⑳ **STARTER SOLENOID**

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-5

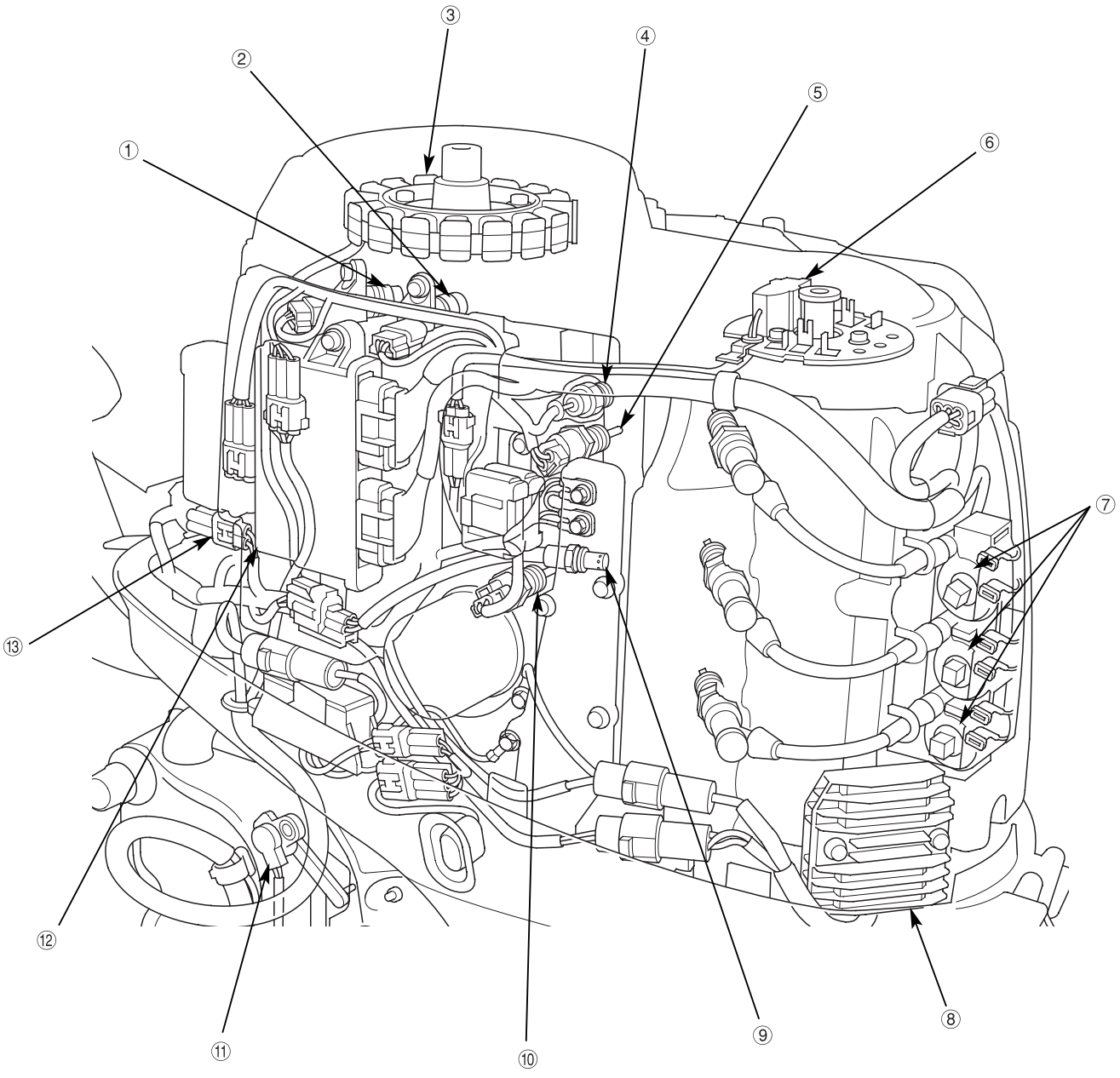


㉑ **EOP (ENGINE OIL PRESSURE) SWITCH**
㉒ **IAC (IDLE AIR CONTROL) VALVE**
㉓ **HO2S (HEATED OXYGEN SENSOR)**
㉔ **WARNING BUZZER**
㉕ **INDICATOR LIGHTS**
㉖ **EMERGENCY STOP SWITCH**
㉗ **ECM**
㉘ **DLC (DATA LINK CONNECTOR)**
㉙ **TACHOMETER (OPTION)**
㉚ **FUEL CONSUMPTION METER (OPTION)**
㉛ **TRIM METER (OPTION)**
㉜ **TRIM ANGLE SENSOR (POWER TRIM/TILT TYPE ONLY)**

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-6

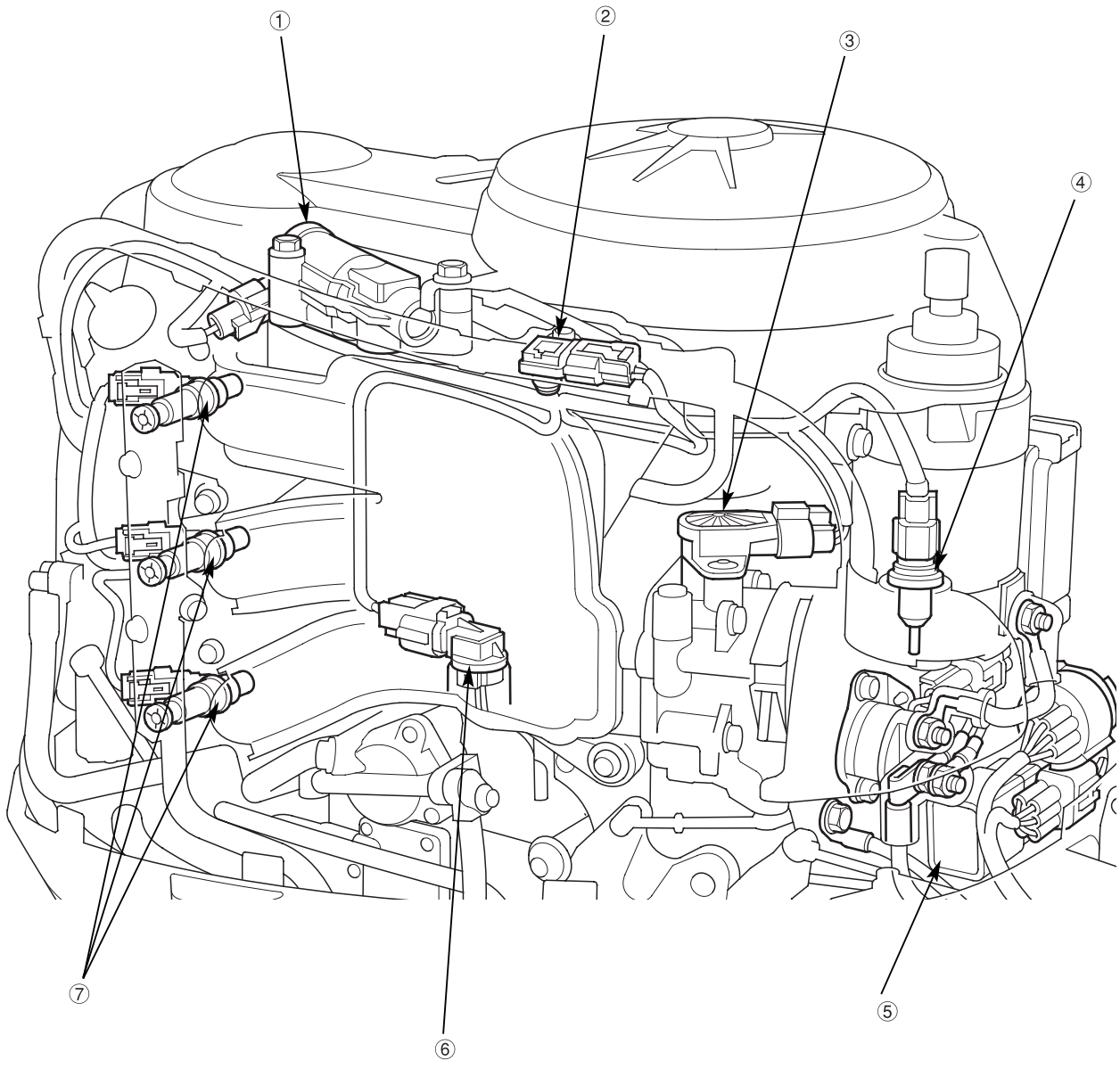
4. COMPONENT LOCATION



① CKP (CRANKSHAFT POSITION) SENSOR 1
② CKP (CRANKSHAFT POSITION) SENSOR 2
③ ALTERNATOR STATOR
④ EOP (ENGINE OIL PRESSURE) SWITCH
⑤ ECT2 (ENGINE COOLANT TEMPERATURE) SENSOR
⑥ CMP SENSOR
⑦ IGNITION COILS
⑧ REGULATOR/RECTIFIER
⑨ HO2S (HEATED OXYGEN SENSOR)
⑩ EBT (ENGINE BLOCK TEMPERATURE) SENSOR
⑪ TRIM ANGLE SENSOR (POWER TRIM/TILT TYPE ONLY)
⑫ ECM
⑬ DLC (DATA LINK CONNECTOR)

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-7



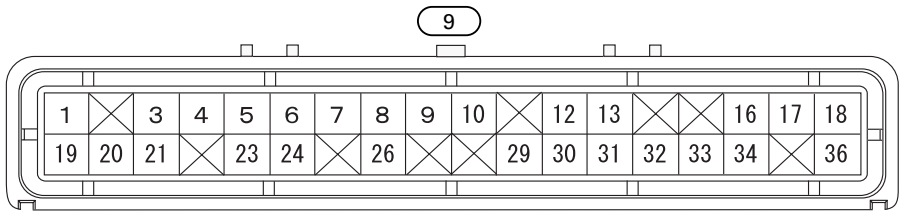
①**IAC (IDLE AIR CONTROL) VALVE**
②**MAP (MANIFOLD ABSOLUTE PRESSURE) SENSOR**
③**TP (THROTTLE POSITION) SENSOR**
④**IAT (INTAKE AIR TEMPERATURE) SENSOR**
⑤**MAIN RELAY**
⑥**FUEL PUMP (HIGH PRESSURE SIDE)**
⑦**INJECTORS**

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-8

• ECM TERMINAL ARRANGEMENT

ECM CONNECTOR A (GRAY)



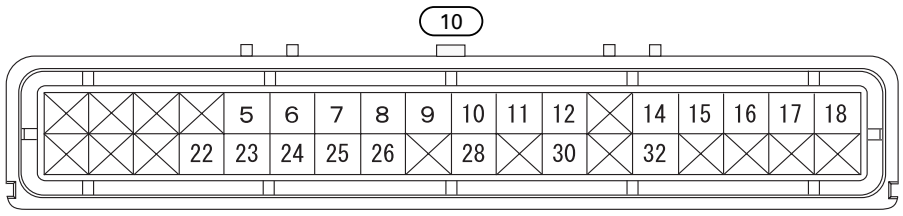
VIEWED FROM THE TERMINAL SIDE

Terminal No.	Terminal mark	Name	Content/Signal
1	ACGLP	Alternator indicator light	Alternator indicator light output
2	Not used		
3	BUZZ	Warning buzzer	Warning buzzer output
4	OPSH	EOP switch	EOP switch input
5	CYLP	CMP sensor (+)	CMP sensor (+) input
6	TE	EBT sensor	EBT sensor input
7	THL	TP sensor	TP sensor input
8	PB	MAP sensor	MAP sensor input
9	TACHO	Tachometer	Tachometer pulse output
10	K-LINE	Communication signal	Tester communication signal input/output
11	Not used		
12	PG4	Power ground 4	Power ground 4
13	PG3	Power ground 3	Power ground 3
14	Not used		
15	Not used		
16	FFP	Fuel pump	Fuel pump output
17	IGN3	No.3 ignition coil	No.3 ignition coil output
18	IGN1	No.1 ignition coil	No.1 ignition coil output
19	WARNL	MIL	MIL output
20	CRK1	CKP sensor 1	CKP sensor 1 input
21	CRK2	CKP sensor 2	CKP sensor 2 input
22	Not used		
23	TOH	ECT2 sensor	ECT2 sensor input
24	CYLM	CMP sensor (–)	CMP sensor (–) input
25	Not used		
26	FUP	Fuel consumption meter	Fuel consumption volume output
27	Not used		
28	Not used		
29	EMS2	Emergency stop switch 2	Emergency stop switch input 2
30	EMS1	Emergency stop switch 1	Emergency stop switch input 1
31	NTSW	Neutral switch	Neutral switch input
32	SCS	Service check signal	Service check signal input
33	OPL	Oil indicator light	Oil indicator light output
34	OHL	Overheat indicator light	Overheat indicator light output
35	Not used		
36	IGN2	No.2 ignition coil	No.2 ignition coil output

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-9

ECM CONNECTOR B (BLACK)



VIEWED FROM THE TERMINAL SIDE

Terminal No.	Terminal mark	Name	Content/Signal
1	Not used		
2	Not used		
3	Not used		
4	Not used		
5	LG1	Logic ground 1	Logic ground 1
6	VCC1	Sensor power 1	Sensor power 5V output 1
7	VCC2	Sensor power 2	Sensor power 5V output 2
8	IGP1	Power source 1	Power 12V input 1
9	IGP2	Power source 2	Power 12V input 2
10	O2HT	HO2S heater	HO2S heater output
11	EACVP	IAC valve (+)	IAC valve (+) output
12	EACVM	IAC valve (–)	IAC valve (–) output
13	Not used		
14	INJ3	No.3 injector	No.3 injector output
15	INJ2	No.2 injector	No.2 injector output
16	INJ1	No.1 injector	No.1 injector output
17	PG2	Power ground 2	Power ground 2
18	PG1	Power ground 1	Power ground 1
19	Not used		
20	Not used		
21	Not used		
22	VCC3	Sensor power 3 (Power trim/tilt type only)	Sensor power 5V output 3 (Power trim/tilt type only)
23	LG2	Logic ground 2	Logic ground 2
24	SG3	Sensor ground 3	Sensor ground 3
25	SG2	Sensor ground 2	Sensor ground 2
26	SG1	Sensor ground 1	Sensor ground 1
27	Not used		
28	TA	IAT sensor	IAT sensor input
29	Not used		
30	O2	HO2S	HO2S input
31	Not used		
32	TRMA	Trim angle sensor (Power trim/tilt type only)	Trim angle sensor input (Power trim/tilt type only)
33	Not used		
34	Not used		
35	Not used		
36	Not used		

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-10

5. TROUBLESHOOTING

The ECM (Engine Control Module) has a self-diagnosis function that memorizes the failure code and turns the MIL (Malfunction Indicator Lamp) ON when it detects an abnormality with the input/output system.

If the MIL does not come ON but an engine failure (abnormality other than monitoring ECM) occurred, troubleshoot according to the troubleshooting procedure of each system (P. 5-72 and 75).

• HOW TO CARRY OUT TROUBLESHOOTING

When the MIL comes ON or blinks or any abnormality occurs during running, identify the problem detected by the ECM according to the following procedure, and troubleshoot accordingly.

Use a known-good battery to troubleshoot.

Read the circuit tester's operation instructions carefully, and observe the instructions during inspection.

To troubleshoot, connect the tester probe to a commercially available digital circuit tester. Note that the tester probe must fit the connector terminal of the digital circuit tester so as not to apply excessive force to the connector terminal.

Switch the tester lead polarities to check the circuit including the diode (see below). The circuit is normal if there is continuity in one direction only. If there is continuity in both directions or in neither direction, the circuit is faulty.

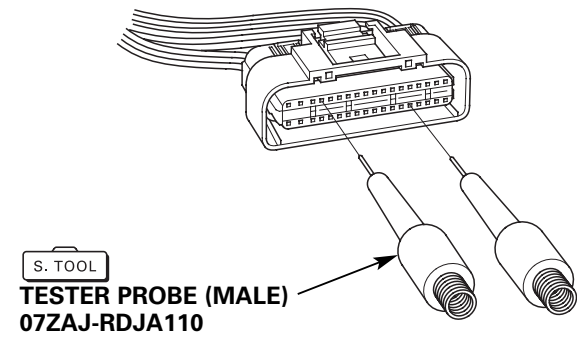
- Indicator light
- Main relay
- Regulator/rectifier
- Power tilt relay (Power trim/tilt type only)

Clean the ECM connectors and the neighboring area before disconnecting the connectors.

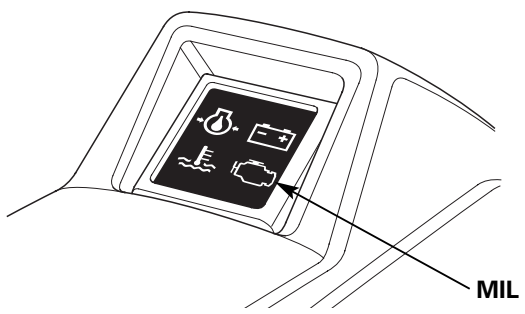
A loosely connected or corroded connector can cause programmed-fuel injection system malfunction.

Inspection on the main wire harness side ECM must be made using the special tool.

TOOL:
Tester probe (male) 07ZAJ-RDJA110



1) Turn the combination switch ON and check that the MIL comes ON.



2) When the MIL is ON or blinking, check the DTC (Diagnostic Trouble Code) using the HDS (P. 5-11). Or, use the SCS short connector and troubleshoot the problem indicated by the number of blinks of the MIL (P. 5-42).

3) Perform troubleshooting by referring to the "Troubleshooting Guide by DTC" (P. 5-12) or "Troubleshooting Guide by No. of Blinks" (P. 5-44). Check each connector and wire harness for secure connection and damage before troubleshooting. Repair the connector and wire harness if necessary.

4) After troubleshooting, perform repairs as needed and perform the "FINAL PROCEDURE (AFTER TROUBLESHOOTING)" (P. 5-11 or 43).

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-11

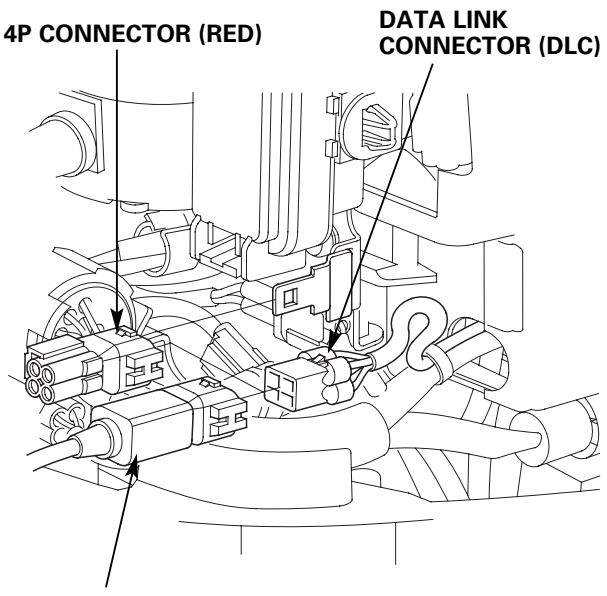
6. TROUBLESHOOTING WITH THE HDS

• DTC (DIAGNOSTIC TROUBLE CODE) CHECK

1) Remove the engine cover (P. 4-2).

2) Turn the combination switch OFF.

3) Disconnect the 4P connector (Red), and connect the HDS to the data link connector (DLC).



4) Turn the combination switch ON, and check the DTC shown on the HDS. Refer to the HDS operation instructions for how to use the HDS.

• TO CLEAR DTC

1) Remove the engine cover (P. 4-2).

2) Turn the combination switch OFF.

3) Disconnect the 4P connector (Red), and connect the HDS to the data link connector (DLC).

4) Turn the combination switch ON.

5) Clear the DTC using the HDS.
   - Refer to the HDS operation instructions for how to use the HDS.
   - When an abnormality remains in the system, the DTC does not clear as the ECM continues self-diagnosis.

6) Turn the combination switch OFF.

• FINAL PROCEDURE (AFTER TROUBLESHOOTING)

1) Clear the DTC.

2) Disconnect the HDS from the data link connector and connect the 4P connector (Red).

3) Install the engine cover (P. 4-2).

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-12

• TROUBLESHOOTING GUIDE BY DTC

DTC	MIL	Detected component	Probable problem	Ref. page
0 or does not communicate	MIL does not come ON/blink 	ECM	• Indicator light • MIL circuit (Open) • ECM ground circuit (Open, poor grounding) • ECM	2-36 2-46
0 or does not communicate	MIL stays ON 	ECM	• DLC circuit (Short) • MIL circuit (Short) • Sensor power circuit (Short) • ECM power circuit (Open) • ECM	5-14
1-4	ON 	HO2S	• HO2S circuit (Open, short) • HO2S • Fuel supply system • ECM	5-18
3-1	ON 	MAP sensor (Voltage too low)	• MAP sensor circuit (Short) • MAP sensor • ECM	5-20
3-2	ON 	MAP sensor (Voltage too high)	• MAP sensor circuit (Open) • MAP sensor • ECM	5-21
4-1	ON 	CKP sensor 1 (No pulse)	• CKP sensor 1 circuit (Open, short) • CKP sensor 1 • ECM	5-22
4-2	ON 	CKP sensor 1 (Abnormal pulse)	• CKP sensor 1 • Guide plate • ECM	5-23
6-1	ON 	EBT sensor (Voltage too low)	• EBT sensor circuit (Short) • EBT sensor • ECM	5-24
6-2	ON 	EBT sensor (Voltage too high)	• EBT sensor circuit (Open) • EBT sensor • ECM	5-25
7-1	ON 	TP sensor (Voltage too low)	• TP sensor circuit (Short) • TP sensor • ECM	5-26
7-2	ON 	TP sensor (Voltage too high)	• TP sensor circuit (Open) • TP sensor • ECM	5-27
8-1	ON 	CKP sensor 2 (No pulse)	• CKP sensor 2 circuit (Open, short) • CKP sensor 2 • ECM	5-28
8-2	ON 	CKP sensor 2 (Abnormal pulse)	• CKP sensor 2 • Guide plate • ECM	5-29

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:19 ページ 5-13

DTC	MIL	Detected component	Probable problem	Ref. page
10-1	ON	IAT sensor (Voltage too low)	• IAT sensor circuit (Short) • IAT sensor • ECM	5-30
10-2	ON	IAT sensor (Voltage too high)	• IAT sensor circuit (Open) • IAT sensor • ECM	5-31
14-1	ON	IAC valve (Abnormal current)	• IAC valve circuit (Open, short) • IAC valve • ECM	5-32
41-2	ON	HO2S heater (Abnormal current)	• HO2S heater circuit (Open, short) • HO2S heater • ECM	5-34
58-1	ON	CMP sensor (Abnormal current)	• CMP sensor circuit (Open, short) • CMP sensor • ECM	5-36
58-2	ON	CMP sensor (Abnormal current)	• CMP sensor • Camshaft pulley • ECM	5-37
140-1	ON	ECT2 sensor (Voltage too low)	• ECT2 sensor circuit (Short) • ECT2 sensor • ECM	5-38
140-2	ON	ECT2 sensor (Voltage too high)	• ECT2 sensor circuit (Open) • ECT2 sensor • ECM	5-39
142-1	ON	EOP switch	• EOP switch circuit (Open, short) • EOP switch • ECM	5-40

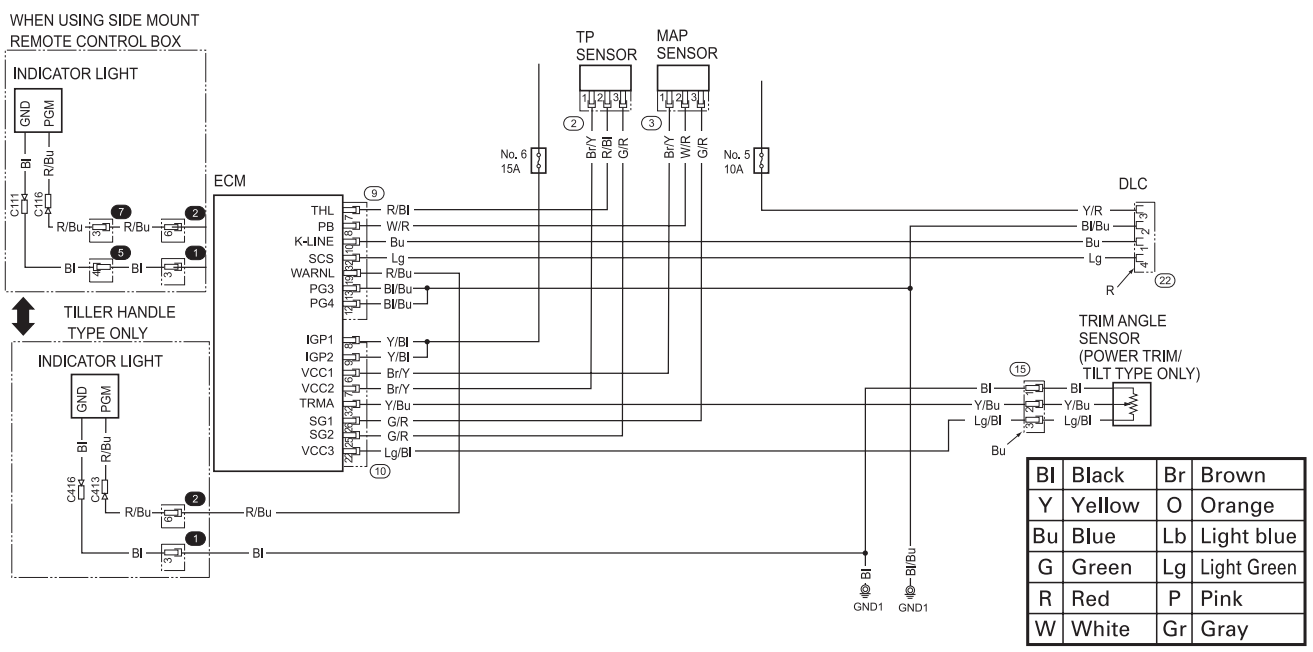
• When multiple DTCs are shown

DTC	MIL	Detected component	Probable problem	Ref. page
6, 7, 10, 140	ON	SG (Sensor Ground) line	• SG (Sensor Ground) line (Open)	—

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-14

• ECM TROUBLESHOOTING



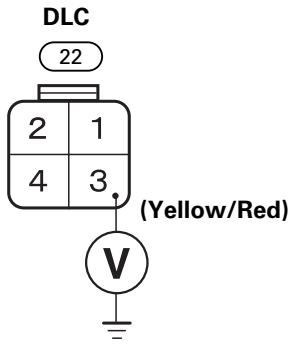
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

MIL Is ON But DTC Is 0 Or Does Not Communicate

1) DLC power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the HDS.

b. Turn the combination switch ON. Measure the voltage between the DLC (22) No.3 (Yellow/Red) terminal and the engine ground.



VIEWED FROM THE TERMINAL SIDE

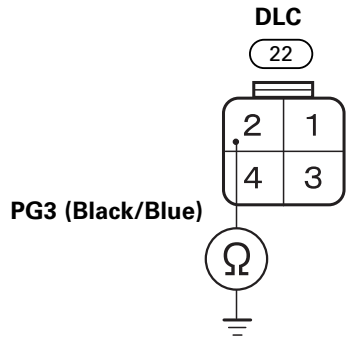
◆Is there battery voltage?

YES - Go to "2) DLC ground line open-circuit inspection."

NO - Check the No.5 fuse (P. 2-18) and main relay (P. 18-17). If there is no problem, replace the main wire harness.

2) DLC ground line open-circuit inspection

• Turn the combination switch OFF. Check for continuity between the DLC (22) No.2 (Black/Blue) terminal and the engine ground.



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Go to "3) DLC short-circuit inspection."

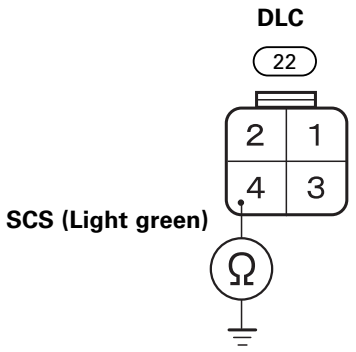
NO - Repair open in the main wire harness between the ECM and the DLC.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-15

3) DLC short-circuit inspection

• Disconnect the ECM connector A (9). Check for continuity between the DLC (22) No.4 (Light green) terminal and the engine ground.



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

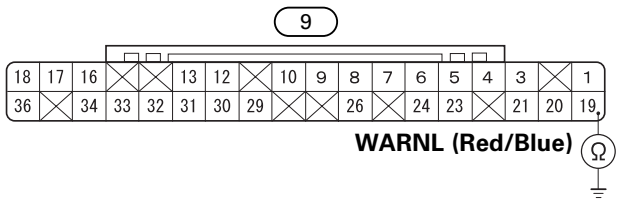
YES - Repair short in the main wire harness between the ECM and the DLC.

NO - Go to "4) MIL ON line short-circuit inspection."

4) MIL ON line short-circuit inspection

• Check for continuity between the ECM connector A (9) main wire harness side No.19 (Red/Blue) terminal and the engine ground.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Repair short in the main wire harness or tiller handle cable between the ECM and the MIL.

NO - Go to "5) MAP sensor power line short-circuit inspection."

5) MAP sensor power line short-circuit inspection

a. Connect the ECM connector A (9) and disconnect the MAP sensor 3P connector (3).

b. Turn the combination switch ON and check the MIL.

◆Does the MIL go OFF?

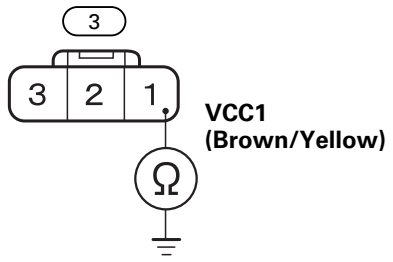
YES - Replace the MAP sensor.

NO - Go to the step c.

c. Turn the combination switch OFF and disconnect the ECM connector B (10).

d. Check for continuity between the MAP sensor 3P connector (3) main wire harness side No.1 (Brown/Yellow) terminal and the engine ground.

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Repair short in the main wire harness between the ECM and the MAP sensor.

NO - Go to "6) TP sensor power line short-circuit inspection."

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-16

6) TP sensor power line short-circuit inspection

a. Connect the ECM connector B (10) and disconnect the TP sensor 3P connector (2).

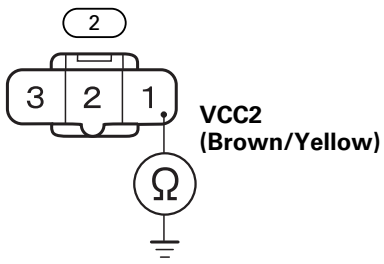
b. Turn the combination switch ON and check the MIL.

◆Does the MIL go OFF?
YES - Replace the throttle body.
NO - Go to the step c.

c. Turn the combination switch OFF and disconnect the ECM connector B (10).

d. Check for continuity between the TP sensor 3P connector (2) main wire harness side No.1 (Brown/Yellow) terminal and the engine ground.

TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the TP sensor.
NO - Go to "7) Trim angle sensor power line short-circuit inspection" (Power trim/tilt type only). Go to "8) ECM power line inspection" (Gas assisted type only).

7) Trim angle sensor power line short-circuit inspection (Power trim/tilt type only)

a. Connect the ECM connector B (10) and disconnect the trim angle sensor 3P connector (15).

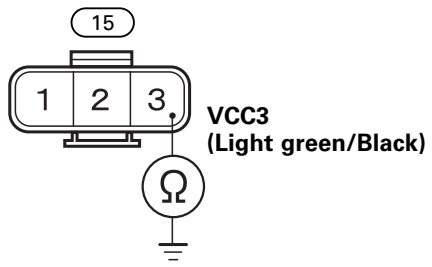
b. Turn the combination switch ON and check the MIL.

◆Does the MIL go OFF?
YES - Replace the trim angle sensor.
NO - Go to the step c.

c. Turn the combination switch OFF and disconnect the ECM connector B (15).

d. Check for continuity between the trim angle sensor 3P connector (15) main wire harness side No.3 (Light green/Black) terminal and the engine ground.

TRIM ANGLE SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the trim angle sensor.
NO - Go to "8) ECM power line inspection."

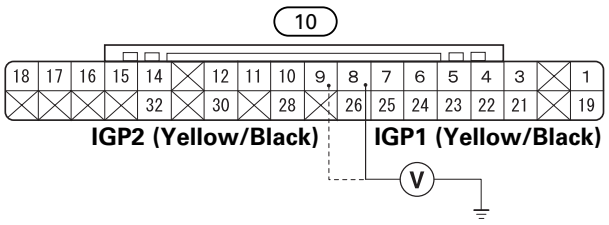
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-17

8) ECM power line inspection

- Turn the combination switch ON. Measure the voltage between the respective terminals of the main wire harness side No.8 (Yellow/Black) terminal and No.9 (Yellow/Black) terminal of the ECM connector B (10) and the body ground.

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

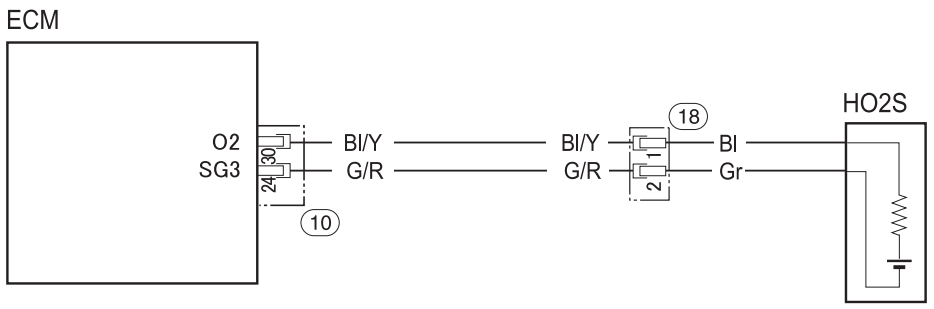
YES - Replace the ECM with a new one and recheck.

NO - Check the No.6 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-18

• HO2S TROUBLESHOOTING



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

DTC 1-4: HO2S is faulty

NOTICE

Connect a known-good battery to the connector terminals, being careful not to create a short circuit.

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the HO2S 4P connector (18) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Start the engine and let it run at 3,000 min^{-1} (rpm) for 5 minutes or more under no load.

d. Let the engine idle for 1 minute or more.

e. Check the DTC using the HDS.

◆Does the DTC 1-4 appear?
YES - Go to "2) Fuel supply system inspection."
NO - Temporary failure (Disappears).

2) Fuel supply system inspection

- Turn the combination switch OFF and measure the fuel pressure (P. 5-79).

◆Is the fuel pressure normal?
YES - Go to "3) HO2S inspection"
NO - Repair fuel supply system and recheck under normal fuel pressure.

3) HO2S inspection

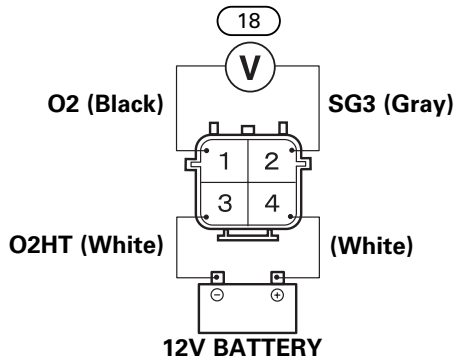
a. Turn the combination switch OFF and disconnect the HO2S 4P connector (18).

b. Connect the battery positive (+) cable to the sensor side No.4 (White) terminal and the battery negative cable (–) to the sensor side No.3 (White) terminal of the HO2S 4P connector (18) respectively.

c. Start the engine and let it run at 3,000 min^{-1} (rpm) for 3 minutes or more under no load.

d. Snap the engine throttle with the engine speed in the range between idle speed and 4,000 ± 500 min^{-1} (rpm). Measure the voltage between the No.1 (Black) terminal and No.2 (Gray) terminal of the HO2S sensor side 4P connector (18).

HO2S 4P CONNECTOR HO2S SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the voltage 0.6V or more with the throttle fully open and 0.4V or below with the throttle fully closed?
YES - Go to "4) HO2S signal line short-circuit inspection."
NO - Replace the HO2S with a new one and recheck.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

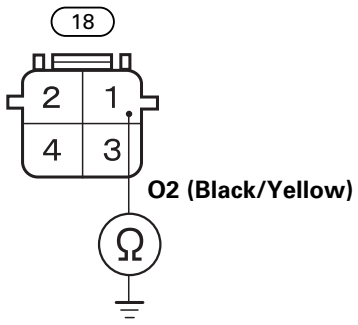
cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-19

4) HO2S signal line short-circuit inspection

a. Turn the combination switch OFF and disconnect the battery.

b. Disconnect the ECM connector B (10). Check for continuity between the HO2S 4P connector (18) main wire harness side No.1 (Black/Yellow) terminal and the engine ground.

HO2S 4P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

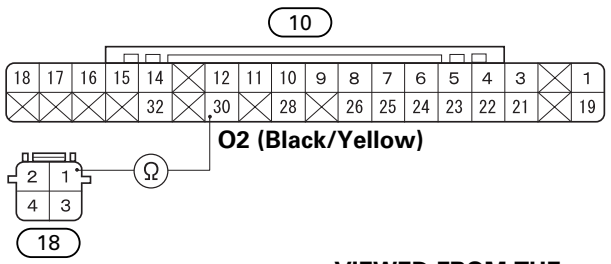
YES - Repair short in the main wire harness between the ECM and the HO2S.

NO - Go to "5) HO2S signal line open-circuit inspection."

5) HO2S signal line open-circuit inspection

• Check for continuity between the HO2S 4P connector (18) main wire harness side No.1 (Black/Yellow) terminal and the ECM connector B (10) main wire harness side No.30 (Black/Yellow) terminal.

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



HO2S 4P CONNECTOR
MAIN WIRE HARNESS SIDE

VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

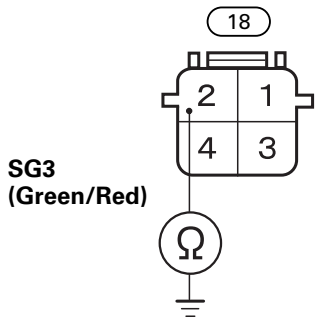
YES - Go to "6) HO2S GND line open-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the HO2S.

6) HO2S GND line open-circuit inspection

• Connect the ECM connector B (10). Check for continuity between the HO2S 4P connector (18) main wire harness side No.2 (Green/Red) terminal and the engine ground.

HO2S 4P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

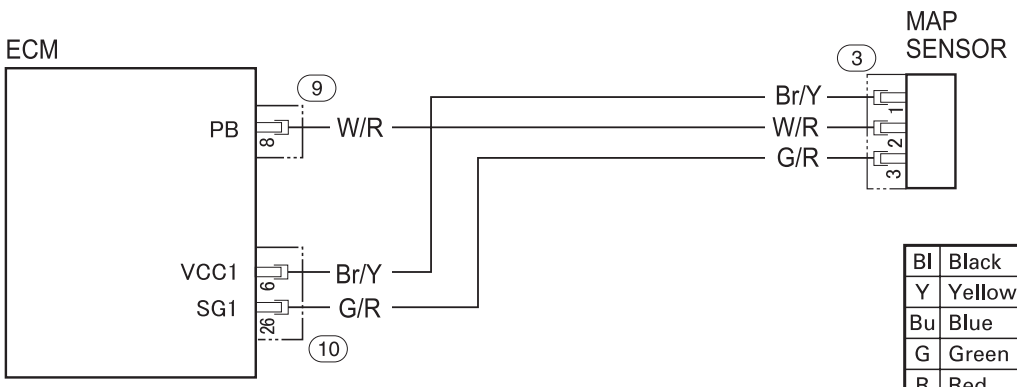
YES - Replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the HO2S.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-20

• MAP SENSOR TROUBLESHOOTING



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

DTC 3-1: MAP sensor voltage is too low

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the MAP sensor 3P connector (3) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the MAP sensor voltage using the HDS.

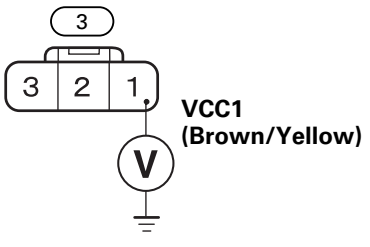
◆Is there 0.23 — 4.5V?
YES - Temporary failure (disappears.)
NO - Go to "2) MAP sensor power line open-circuit inspection."

2) MAP sensor power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the MAP sensor 3P connector (3).

b. Turn the combination switch ON. Measure the voltage between the MAP sensor 3P connector (3) main wire harness side No.1 (Brown/Yellow) terminal and the engine ground

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



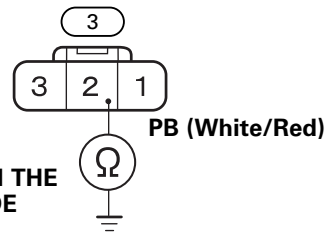
VIEWED FROM THE TERMINAL SIDE

◆Is there 4.75 — 5.25V?
YES - Go to "3) MAP sensor signal line short-circuit inspection."
NO - Repair open in the main wire harness between the ECM and the MAP sensor.

3) MAP sensor signal line short-circuit inspection

- Turn the combination switch OFF. Disconnect the ECM connector A (9). Check for continuity between the MAP sensor 3P connector (3) main wire harness side No.2 (White/Red) terminal and the engine ground.

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the MAP sensor.
NO - Go to "4) MAP sensor inspection."

4) MAP sensor inspection

a. Connect the ECM connector A (9). Replace the MAP sensor with a new one. Connect the MAP sensor 3P connector (3).

b. Turn the combination switch ON. Measure the MAP sensor voltage using the HDS.

◆Is the measurement 2.76 — 2.96V?
YES - End of inspection
NO - Replace the ECM with a new one and recheck.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-21

DTC 3-2: MAP sensor voltage is too high

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the MAP sensor 3P connector (3) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the MAP sensor voltage using the HDS.

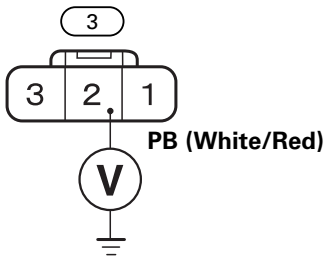
◆Is there 0.23 — 4.5V?
YES - Temporary failure (disappears.)
NO - Go to "2) MAP sensor signal line open-circuit inspection."

2) MAP sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the MAP sensor 3P connector (3).

b. Turn the combination switch ON. Measure the voltage between the MAP sensor 3P connector (3) main wire harness side No.2 terminal (White/Red) and the engine ground

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



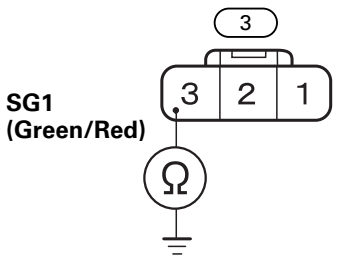
VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.30 — 5.25V?
YES - Go to "3) MAP sensor GND line open-circuit inspection."
NO - Repair open in the main wire harness between the ECM and the MAP sensor.

3) MAP sensor GND line open-circuit inspection

- Turn the combination switch OFF. Check for continuity between the MAP sensor 3P connector (3) main wire harness side No.3 (Green/Red) terminal and the engine ground.

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "4) MAP sensor inspection."
NO - Repair open in the main wire harness between the ECM and the MAP sensor.

4) MAP sensor inspection

a. Replace the MAP sensor and connect the MAP sensor 3P connector (3).

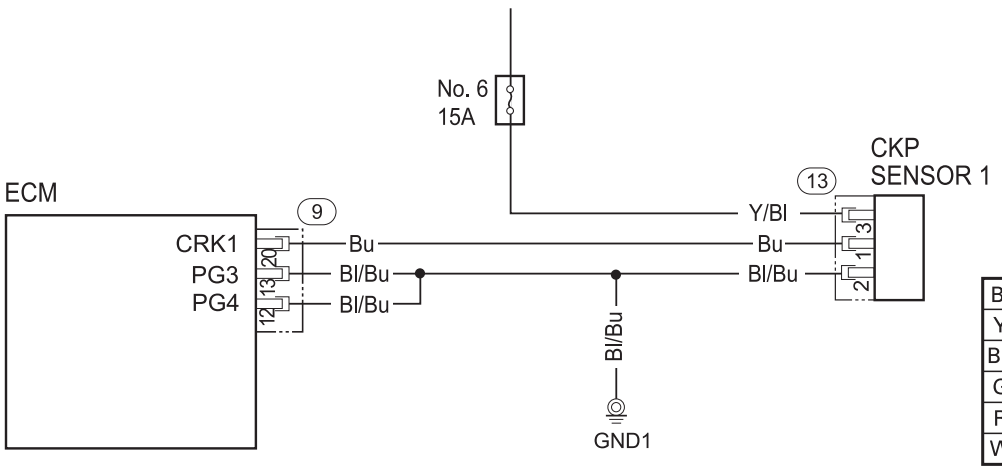
b. Turn the combination switch ON. Measure the MAP sensor voltage using the HDS.

◆Is the measurement within 2.76 — 2.96V?
YES - End of inspection
NO - Replace the ECM with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-22

• CKP SENSOR 1 TROUBLESHOOTING



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

DTC 4-1: No CKP sensor 1 pulse

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the CKP sensor 1 3P connector (13) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Start the engine and check the DTC using the HDS.

◆Does the DTC 4-1 appear?

YES - Go to "2) CKP sensor 1 power line open-circuit inspection."

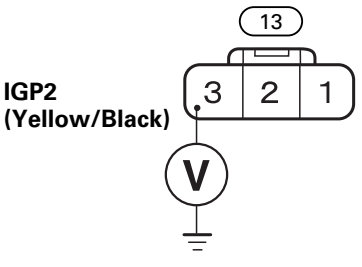
NO - Temporary failure (disappears.)

2) CKP sensor 1 power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the CKP sensor 1 3P connector (13).

b. Turn the combination switch ON. Measure the voltage between the CKP sensor 1 3P connector (13) main wire harness side No.3 (Yellow/Black) terminal and the engine ground

CKP SENSOR 1 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

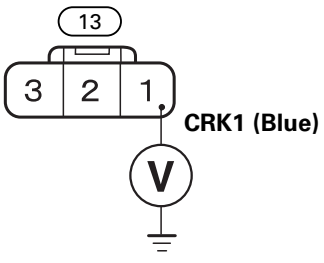
YES - Go to "3) CKP sensor 1 signal line open-circuit inspection."

NO - Check the No.6 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

3) CKP sensor 1 signal line open-circuit inspection

- Measure the voltage between the CKP sensor 1 3P connector (13) main wire harness side No.1 (Blue) terminal and the engine ground.

CKP SENSOR 1 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.75 — 5.25V?

YES - Go to "4) CKP sensor 1 signal line short-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the CKP sensor 1.

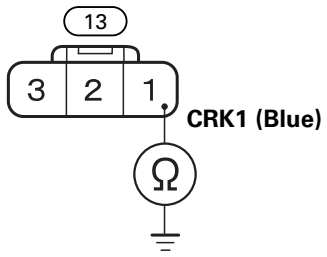
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-23

4) CKP sensor 1 signal line short-circuit inspection

• Turn the combination switch OFF. Disconnect the ECM connector A (9). Check for continuity between the CKP sensor 1 3P connector (13) main wire harness side No.1 (Blue) terminal and the engine ground.

CKP SENSOR 1 3P CONNECTOR
MAIN WIRE HARNESS SIDE



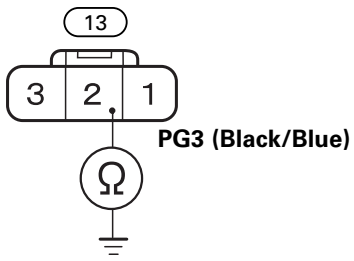
VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the CKP sensor 1.
NO - Go to "5) CKP sensor 1 GND line open-circuit inspection."

5) CKP sensor 1 GND line open-circuit inspection

• Connect the ECM connector A (9). Check for continuity between the CKP sensor 1 3P connector (13) main wire harness side No.2 (Black/Blue) terminal and the engine ground.

CKP SENSOR 1 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "6) CKP sensor 1 inspection."
NO - Repair open in the main wire harness between the ECM and the CKP sensor 1.

6) CKP sensor 1 inspection

a. Replace the CKP sensor 1 and connect the CKP sensor 1 3P connector (13).

b. Start the engine and check the DTC using the HDS.

◆Does the DTC 4-1 appear?
YES - Replace the ECM with a new one and recheck.
NO - End of inspection

DTC 4-2: CKP sensor 1 pulse is abnormal

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the CKP sensor 1 3P connector (13) and then reconnect it.

b. Clear the DTC (P. 5-11).
• Continue the procedure if the DTC does not clear.

c. Start the engine and check the DTC using the HDS.

◆Does the DTC 4-2 appear?
YES - Go to "2) Guide plate inspection."
NO - Temporary failure (disappears.)

2) Guide plate inspection

• Inspect the guide plate.

◆Is the guide plate damaged?
YES - Replace the guide plate with a new one and recheck.
NO - Go to "3) CKP sensor 1 inspection."

3) CKP sensor 1 inspection

a. Replace the CKP sensor 1 and connect the CKP sensor 1 3P connector (13).

b. Start the engine and check the DTC using the HDS.

◆Does the DTC 4-2 appear?
YES - Replace the ECM with a new one and recheck.
NO - End of inspection

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-24

• EBT SENSOR TROUBLESHOOTING



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

DTC 6-1: EBT sensor voltage is too low

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the EBT sensor 2P connector (17) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the EBT sensor voltage using the HDS.

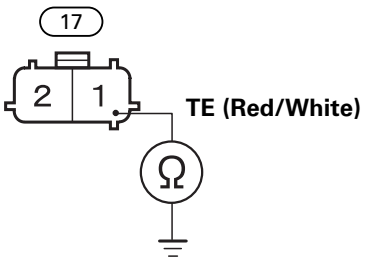
◆Is the measurement within 0.078 — 4.92V?
YES - Temporary failure (disappears.)
NO - Go to "2) EBT sensor signal line short-circuit inspection."

2) EBT sensor signal line short-circuit inspection

a. Turn the combination switch OFF. Disconnect the ECM connector A (9) and the EBT sensor 2P connector (17).

b. Check for continuity between the EBT sensor 2P connector (17) main wire harness side No.1 (Red/White) terminal and the engine ground.

EBT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the EBT sensor.
NO - Go to "3) EBT sensor inspection."

3) EBT sensor inspection

a. Connect the ECM connector A (9). Remove the EBT sensor and connect the EBT sensor 2P connector (17).

b. Turn the combination switch ON and measure the EBT sensor temperature using the HDS.

◆Does the measurement correspond to the ambient temperature?
YES - Replace the ECM with a new one and recheck.
NO - Replace the EBT sensor with a new one and recheck.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-25

DTC 6-2: EBT sensor voltage is too high

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the EBT sensor 2P connector (17) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the EBT sensor voltage using the HDS.

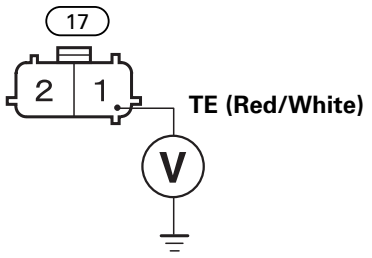
◆Is the measurement within 0.078 — 4.92V?
YES - Temporary failure (disappears.)
NO - Go to "2) EBT sensor signal line open-circuit inspection."

2) EBT sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the EBT sensor 2P connector (17).

b. Turn the combination switch ON. Measure the voltage between the EBT sensor 2P connector (17) main wire harness side No.1 (Red/White) terminal and the engine ground.

EBT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



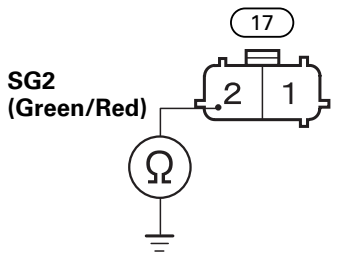
VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.30 — 5.25V?
YES - Go to "3) EBT sensor GND line open-circuit inspection."
NO - Repair open in the main wire harness between the ECM and the EBT sensor.

3) EBT sensor GND line open-circuit inspection

- Turn the combination switch OFF. Check for continuity between the EBT sensor 2P connector (17) main wire harness side No.2 (Green/Red) terminal and the engine ground.

EBT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "4) EBT sensor inspection."
NO - Repair open in the main wire harness between the ECM and the EBT sensor.

4) EBT sensor inspection

a. Remove the EBT sensor and connect the EBT sensor 2P connector (17).

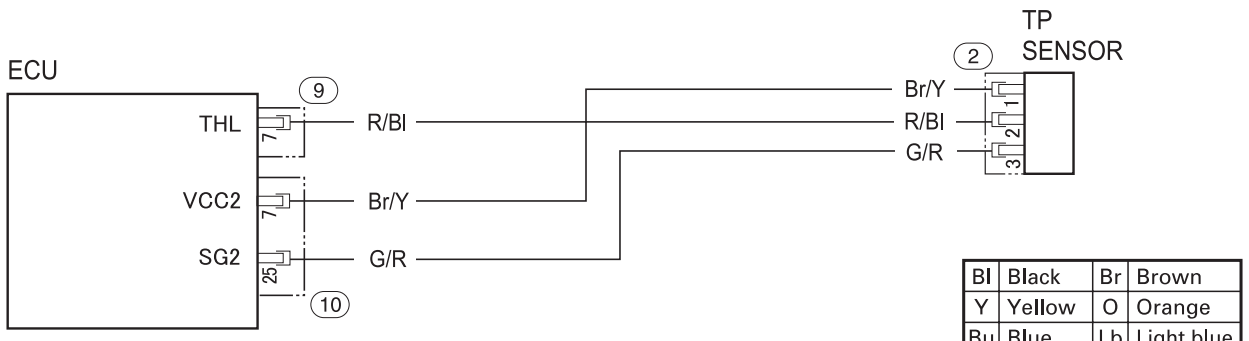
b. Turn the combination switch ON. Measure the sensor temperature using the HDS.

◆Does the measurement correspond to the ambient temperature?
YES - Replace the ECM with a new one and recheck.
NO - Replace the EBT sensor with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-26

• TP SENSOR TROUBLESHOOTING



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

DTC 7-1: TP sensor voltage is too low

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the TP sensor 3P connector (2) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the TP sensor voltage using the HDS.

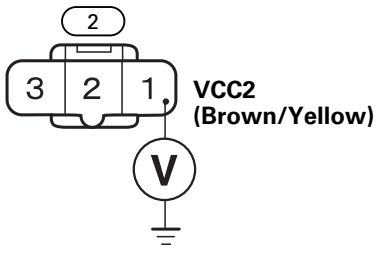
◆Is the measurement within 0.23 — 4.89V?
YES - Temporary failure (disappears.)
NO - Go to "2) TP sensor power line open-circuit inspection."

2) TP sensor power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the TP sensor 3P connector (2).

b. Turn the combination switch ON. Measure the voltage between the TP sensor 3P connector (2) main wire harness side No.1 (Brown/Yellow) terminal and the engine ground.

TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

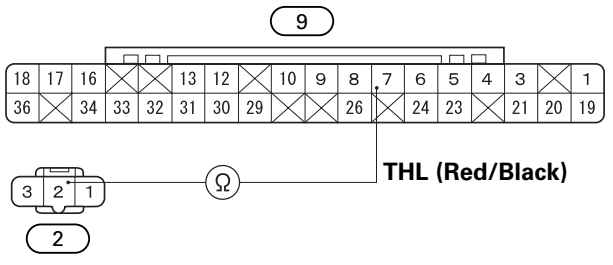
◆Is the measurement within 4.75 — 5.25V?
YES - Go to "3) TP sensor signal line open-circuit inspection."
NO - Repair open in the main wire harness between the ECM and the TP sensor.

3) TP sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the ECM connector A (9).

b. Check for continuity between the TP sensor 3P connector (2) main wire harness side No.2 (Red/Black) terminal and the ECM connector A (9) main wire harness side No.7 (Red/Black) terminal.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE

VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "4) TP sensor signal line short-circuit inspection."
NO - Repair open in the main wire harness between the ECM and the TP sensor.

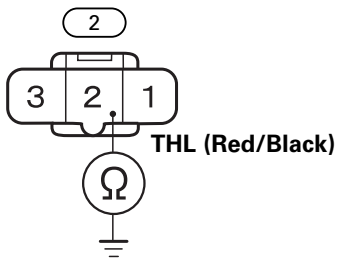
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-27

4) TP sensor signal line short-circuit inspection

• Check for continuity between the TP sensor 3P connector (2) main wire harness side No.2 (Red/Black) terminal and the engine ground.

TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Repair short in the main wire harness between the ECM and the TP sensor.

NO - Go to "5) TP sensor inspection."

5) TP sensor inspection

a. Connect the ECM connector A (9) and the TP sensor 3P connector (2).

b. Turn the combination switch ON. Measure the TP sensor voltage using the HDS.

◆Is the measurement 4.49 — 4.85V with the throttle fully open and 0.44 — 0.56V with the throttle fully closed?

YES - Replace the ECM with a new one and recheck.

NO - Replace the throttle body with a new one and recheck.

DTC 7-2: TP sensor voltage is too high

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the TP sensor 3P connector (2) and then reconnect it.

b. Clear the DTC (P. 5-11).

• Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the TP sensor voltage using the HDS.

◆Is the measurement within 0.23 — 4.89V?

YES - Temporary failure (disappears.)

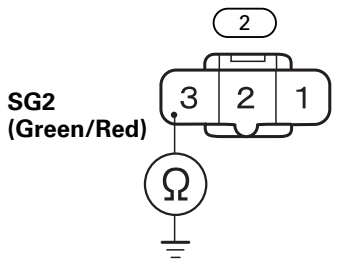
NO - Go to "2) TP sensor GND line open-circuit inspection."

2) TP sensor GND line open-circuit inspection

a. Turn the combination switch OFF and disconnect the TP sensor 3P connector (2).

b. Check for continuity between the TP sensor 3P connector (2) main wire harness side No.3 (Green/Red) terminal and the engine ground.

TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Go to "3) TP sensor inspection."

NO - Repair open in the main wire harness between the ECM and the TP sensor.

3) TP sensor inspection

a. Connect the TP sensor 3P connector (2).

b. Turn the combination switch ON and measure the TP sensor voltage using the HDS.

◆Is the measurement 4.49 — 4.85V with the throttle fully open and 0.44 — 0.56V with the throttle fully closed?

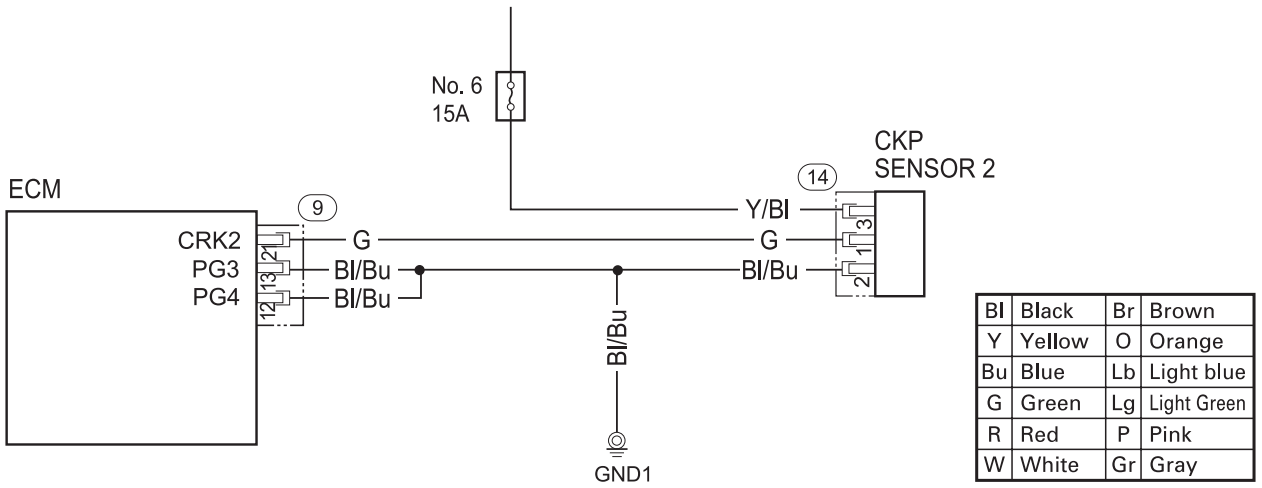
YES - Replace the ECM with a new one and recheck.

NO - Replace the throttle body with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-28

• CKP SENSOR 2 TROUBLESHOOTING



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

DTC 8-1: No CKP sensor 2 pulse

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the CKP sensor 2 3P connector (14) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Start the engine and check the DTC using the HDS.

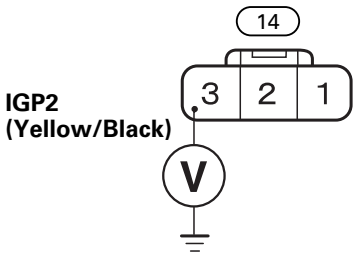
◆Does the DTC 8-1 appear?
YES - Go to "2) CKP sensor 2 power line open-circuit inspection."
NO - Temporary failure (disappears.)

2) CKP sensor 2 power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the CKP sensor 2 3P connector (14).

b. Turn the combination switch ON. Measure the voltage between the CKP sensor 2 3P connector (14) main wire harness side No.3 (Yellow/Black) terminal and the engine ground.

CKP SENSOR 2 3P CONNECTOR
MAIN WIRE HARNESS SIDE



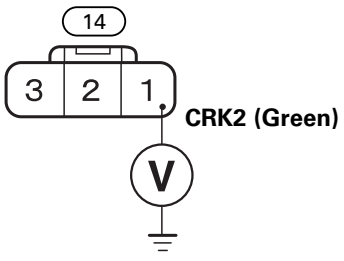
VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?
YES - Go to "3) CKP sensor 2 signal line open-circuit inspection."
NO - Check the No.6 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

3) CKP sensor 2 signal line open-circuit inspection

- Measure the voltage between the CKP sensor 2 3P connector (14) main wire harness side No.1 (Green) terminal and the engine ground.

CKP SENSOR 2 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.75 — 5.25V?
YES - Go to "4) CKP sensor 2 signal line short-circuit inspection."
NO - Repair open in the main wire harness between the ECM and the CKP sensor 2.

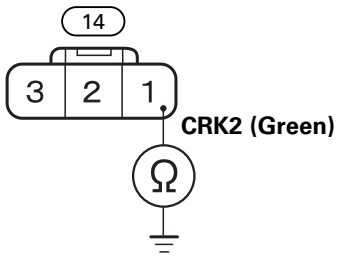
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-29

4) CKP sensor 2 signal line short-circuit inspection

• Turn the combination switch OFF. Disconnect the ECM connector A (9). Check for continuity between the CKP sensor 2 3P connector (14) main wire harness side No.1 (Green) terminal and the engine ground.

CKP SENSOR 2 3P CONNECTOR
MAIN WIRE HARNESS SIDE



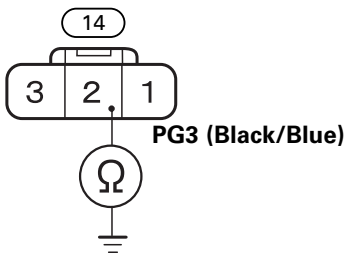
VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the CKP sensor 2.
NO - Go to "5) CKP sensor 2 GND line open-circuit inspection."

5) CKP sensor 2 GND line open-circuit inspection

• Connect the ECM connector A (9). Check for continuity between the CKP sensor 2 3P connector (14) main wire harness side No.2 (Black/Blue) terminal and the engine ground.

CKP SENSOR 2 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "6) CKP sensor 2 inspection."
NO - Repair open in the main wire harness between the ECM and the CKP sensor 2.

6) CKP sensor 2 inspection

a. Replace the CKP sensor 2 and connect the CKP sensor 2 3P connector (14).

b. Start the engine and check the DTC using the HDS.

◆Does the DTC 8-1 appear?
YES - Replace the ECM with a new one and recheck.
NO - End of inspection

DTC 8-2: Abnormal CKP sensor 2 pulse

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the CKP sensor 2 3P connector (14) and then reconnect it.

b. Clear the DTC (P. 5-11).
• Continue the procedure if the DTC does not clear.

c. Start the engine and check the DTC using the HDS.

◆Does the DTC 8-2 appear?
YES - Go to "2) Guide plate inspection."
NO - Temporary failure (disappears.)

2) Guide plate inspection

• Inspect the guide plate.

◆Is the guide plate damaged?
YES - Replace the guide plate with a new one and recheck.
NO - Go to "3) CKP sensor 2 inspection."

3) CKP sensor 2 inspection

a. Replace the CKP sensor 2 and connect the CKP sensor 2 3P connector (14).

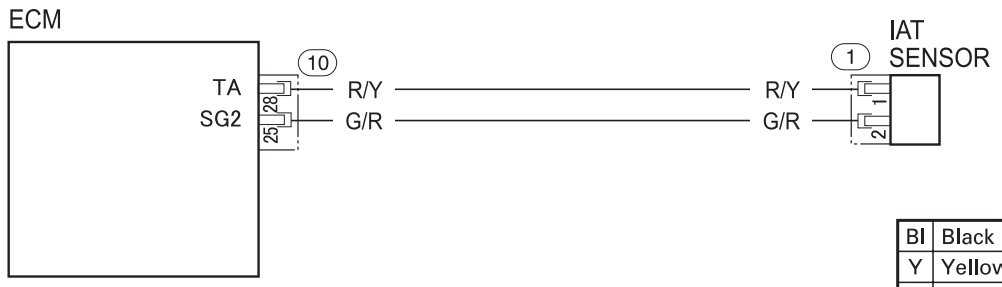
b. Start the engine and check the DTC using the HDS.

◆Does the DTC 8-2 appear?
YES - Replace the ECM with a new one and recheck.
NO - End of inspection

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-30

• IAT SENSOR TROUBLESHOOTING



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

DTC 10-1: IAT sensor voltage is too low

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the IAT sensor 2P connector (1) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the IAT sensor voltage using the HDS.

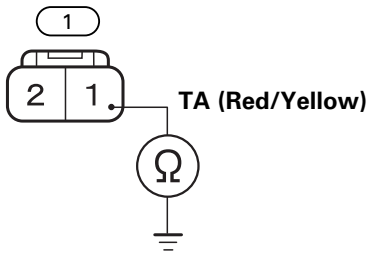
◆Is the measurement within 0.078 — 4.92V?
YES - Temporary failure (disappears.)
NO - Go to "2) IAT sensor signal line short-circuit inspection."

2) IAT sensor signal line short-circuit inspection

a. Turn the combination switch OFF. Disconnect the ECM connector B (10) and the IAT sensor 2P connector (1).

b. Check for continuity between the IAT sensor 2P connector (1) main wire harness side No.1 (Red/Yellow) terminal and the engine ground.

IAT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the IAT sensor.
NO - Go to "3) IAT sensor inspection."

3) IAT sensor inspection

a. Connect the ECM connector B (10) and the IAT sensor 2P connector (1).

b. Turn the combination switch ON and measure the sensor temperature using the HDS.

◆Does the measurement correspond to the ambient temperature?
YES - Replace the ECM with a new one and recheck.
NO - Replace the IAT sensor with a new one and recheck.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-31

DTC 10-2: IAT sensor voltage is too high

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the IAT sensor 2P connector (1) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the IAT sensor voltage using the HDS.

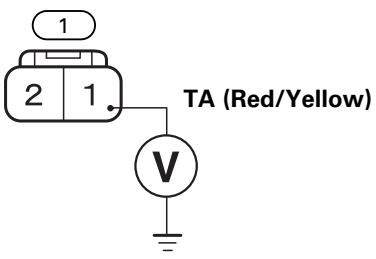
◆Is the measurement within 0.078 — 4.92V?
YES - Temporary failure (disappears.)
NO - Go to "2) IAT sensor signal line open-circuit inspection."

2) IAT sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the IAT sensor 2P connector (1).

b. Turn the combination switch ON. Measure the voltage between the IAT sensor 2P connector (1) main wire harness side No.1 (Red/Yellow) terminal and the engine ground.

IAT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



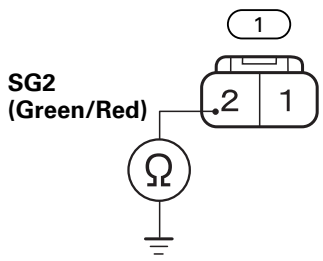
VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.30 — 5.25V?
YES - Go to "3) IAT sensor GND line open-circuit inspection."
NO - Repair open in the main wire harness between the ECM and the IAT sensor.

3) IAT sensor GND line open-circuit inspection

- Turn the combination switch OFF. Check for continuity between the IAT sensor 2P connector (1) main wire harness side No.2 (Green/Red) terminal and the engine ground.

IAT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "4) IAT sensor inspection."
NO - Repair open in the main wire harness between the ECM and the IAT sensor.

4) IAT sensor inspection

a. Connect the IAT sensor 2P connector (1).

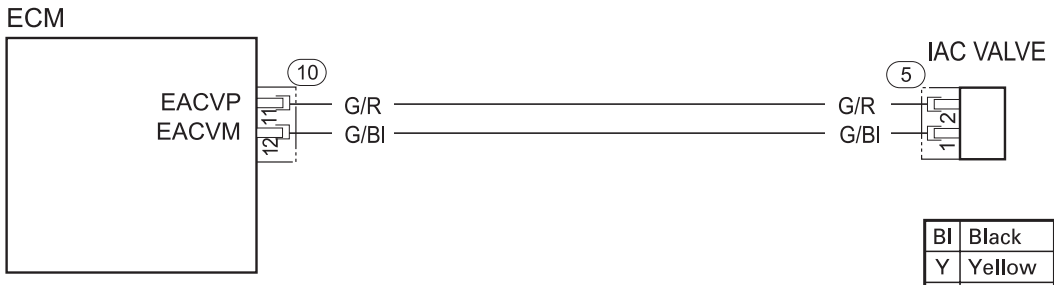
b. Turn the combination switch ON. Measure the sensor temperature using the HDS.

◆Does the measurement correspond to the ambient temperature?
YES - Replace the ECM with a new one and recheck.
NO - Replace the IAT sensor with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-32

• IAC VALVE TROUBLESHOOTING



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

DTC 14-1: Abnormal IAC valve

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the IAC valve 2P connector (5) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Start the engine ad check the DTC using the HDS.

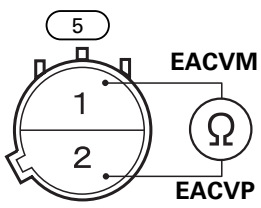
◆Does the DTC 14-1 appear?
YES - Go to "2) IAC valve inspection."
NO - Temporary failure (disappears.)

2) IAC valve inspection

a. Turn the combination switch OFF and disconnect the IAC valve 2P connector (5).

b. Measure the resistance between the IAC valve side No.1 terminal and No.2 terminal of the IAC valve 2P connector (5).

IAC VALVE 2P CONNECTOR IAC VALVE SIDE

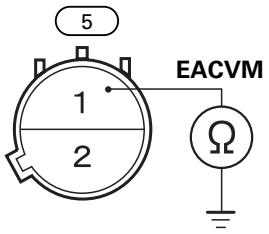


VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 10 — 13Ω?
YES - Go to the step c.
NO - Replace the IAC valve with a new one and recheck.

c. Check for continuity between the IAC valve 2P connector (5) IAC valve side No.1 terminal and the engine ground.

IAC VALVE 2P CONNECTOR IAC VALVE SIDE

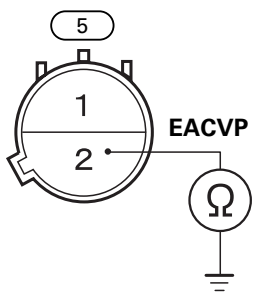


VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Replace the IAC valve with a new one and recheck.
NO - Go to the step d.

d. Check for continuity between the IAC valve 2P connector (5) IAC valve side No.2 terminal and the engine ground.

IAC VALVE 2P CONNECTOR IAC VALVE SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Replace the IAC valve with a new one and recheck.
NO - Go to "3) EACVP line short-circuit check."

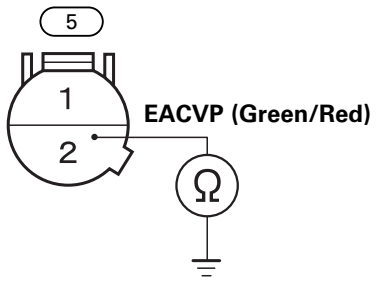
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-33

3) EACVP line short-circuit check

• Disconnect the ECM connector B (10). Check for continuity between the IAC valve 2P connector (5) main wire harness side No.2 (Green/Red) terminal and the engine ground.

IAC VALVE 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

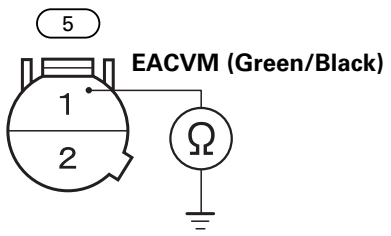
YES - Repair short in the main wire harness between the ECM and the IAC valve.

NO - Go to "4) EACVM line short-circuit inspection."

4) EACVM line short-circuit inspection

• Check for continuity between the IAC valve 2P connector (5) main wire harness side No.1 (Green/Black) terminal and the engine ground.

IAC VALVE 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

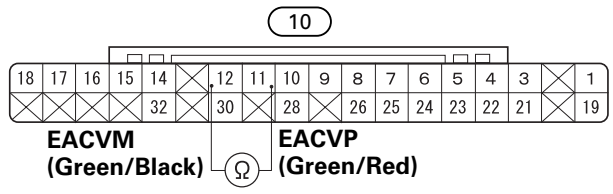
YES - Repair short in the main wire harness between the ECM and the IAC valve.

NO - Go to "5) IAC valve line open-circuit inspection."

5) IAC valve line open-circuit inspection

• Connect the IAC valve 2P connector (5). Measure the resistance between the main wire harness side No.11 (Green/Red) terminal and the No.12 (Green/Black) terminal of the ECM connector B (10).

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 10 — 13Ω?

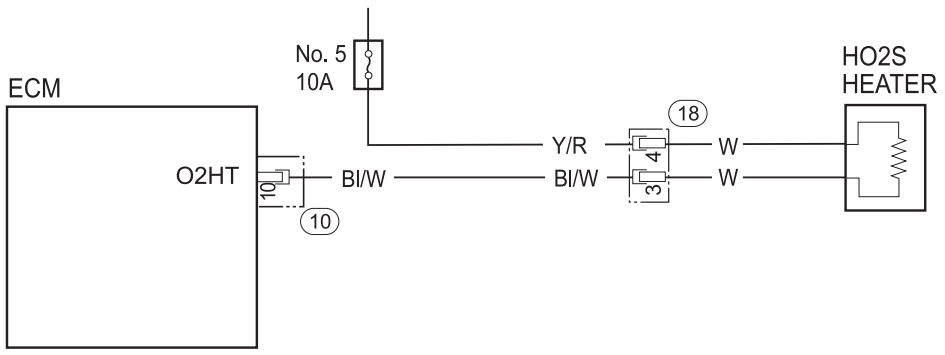
YES - Replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the IAC valve.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-34

• HO2S HEATER TROUBLESHOOTING



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

DTC 41-2: Abnormal HO2S heater

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the HO2S 4P connector (18) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Start the engine and let it run at 3,000 min^{-1} (rpm) for 5 minutes or more under no load.

d. Check the DTC using the HDS.

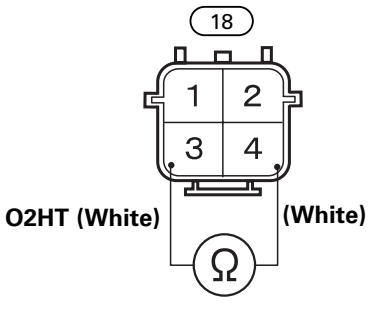
◆Does the DTC 41-2 appear?
YES - Go to "2) HO2S heater inspection."
NO - Temporary failure (disappears.)

2) HO2S heater inspection

a. Turn the combination switch OFF and disconnect the HO2S 4P connector (18).

b. Measure the resistance between the HO2S side No.3 (White) terminal and the No.4 (White) terminal of the HO2S 4P connector (18).

HO2S 4P CONNECTOR HO2S SIDE



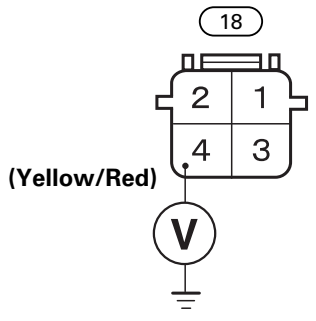
VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 10 — 40Ω?
YES - Go to "3) HO2S heater power line open-circuit inspection."
NO - Replace the HO2S with a new one and recheck.

3) HO2S heater power line open-circuit inspection

- Turn the combination switch ON. Measure the voltage between the HO2S 4P connector (18) main wire harness side No.4 (Yellow/Red) terminal and the engine ground.

HO2S 4P CONNECTOR MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?
YES - Go to "4) HO2S heater line short-circuit inspection."
NO - Check the No.5 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

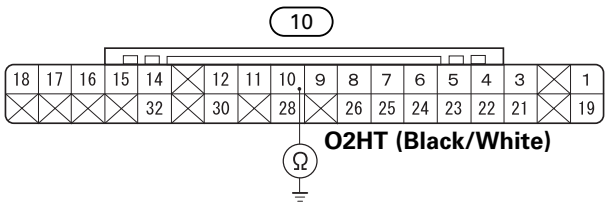
cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-35

4) HO2S heater line short-circuit inspection

a. Turn the combination switch OFF and connect the HO2S 4P connector (18).

b. Disconnect the ECM connector B (18). Check for continuity between the ECM connector B (10) main wire harness side No.10 (Black/White) terminal and the engine ground.

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

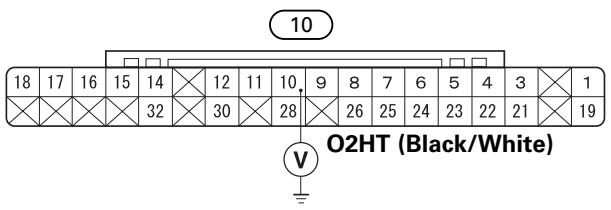
YES - Repair short in the main wire harness between the ECM and the HO2S.

NO - Go to "5) HO2S heater line open-circuit inspection."

5) HO2S heater line open-circuit inspection

• Turn the combination switch ON. Measure the voltage between the ECM connector B (10) main wire harness side No.10 (Black/White) terminal and the engine ground.

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

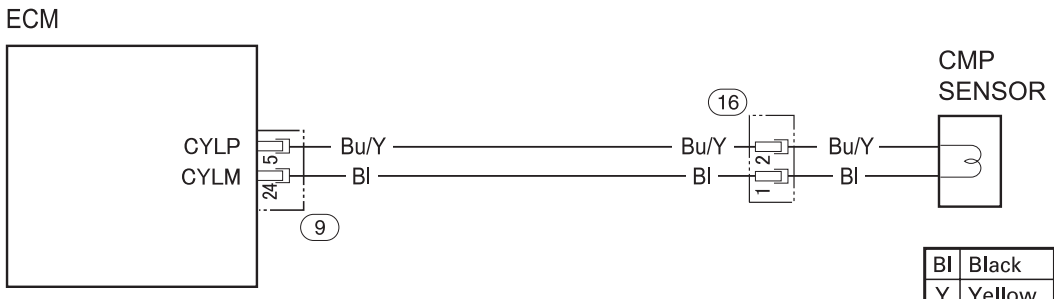
YES - Replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the HO2S.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-36

• CMP SENSOR TROUBLESHOOTING



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

DTC 58-1: Abnormal CMP sensor current

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the CMP sensor 2P connector (16) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Start the engine and check the DTC using the HDS.

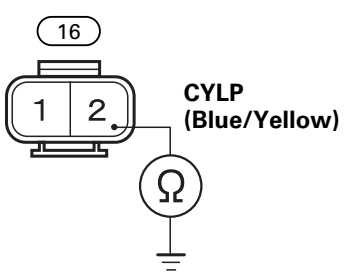
◆Does the DTC 58-1 appear?
YES - Go to "2) CYLP line short-circuit inspection."
NO - Temporary failure (disappears.)

2) CYLP line short-circuit inspection

a. Turn the combination switch OFF. Disconnect the CMP sensor 2P connector (16) and the ECM connector A (9).

b. Check for continuity between the CMP sensor 2P connector (16) main wire harness side No.2 (Blue/Yellow) terminal and the engine ground.

CMP SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



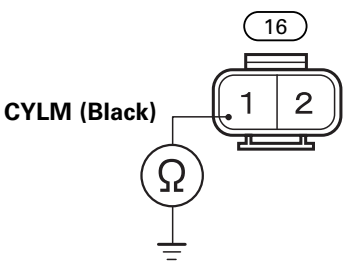
VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the CMP sensor.
NO - Go to "3) CYLM line short-circuit inspection."

3) CYLM line short-circuit inspection

- Check for continuity between the CMP sensor 2P connector (16) main wire harness side No.1 (Black) terminal and the engine ground.

CMP SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the CMP sensor.
NO - Go to "4) CYL line open-circuit inspection."

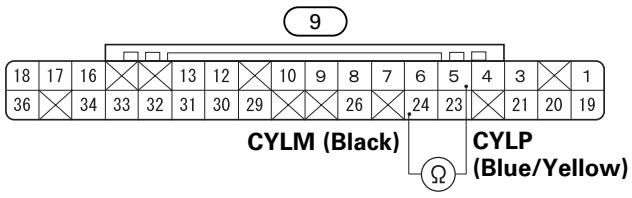
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-37

4) CYL line open-circuit inspection

• Connect the CMP sensor 2P connector (16). Check for continuity between the ECM connector A (9) main wire harness side No.5 (Blue/Yellow) terminal and the No.24 (Black) terminal.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



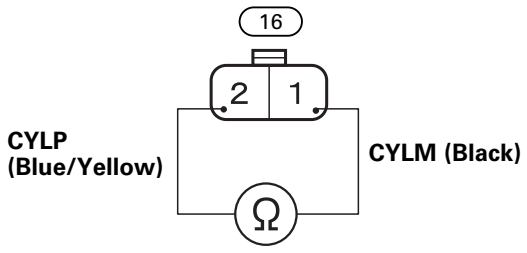
VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "5) CMP sensor inspection."
NO - Repair open in the main wire harness between the ECM and the CMP sensor.

5) CMP sensor inspection

• Disconnect the CMP sensor 2P connector (16). Measure the resistance between the CMP sensor side No.1 terminal and No.2 terminal of the CMP sensor 2P connector (16).

CMP SENSOR 2P CONNECTOR
CMP SENSOR SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 288 — 352Ω?
YES - Replace the ECM with a new one and recheck.
NO - Replace the CMP sensor with a new one and recheck.

DTC 58-2: Abnormal CMP sensor current

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the CMP sensor 2P connector (16) and then reconnect it.

b. Clear the DTC (P. 5-11).
• Continue the procedure if the DTC does not clear.

c. Start the engine and check the DTC using the HDS.

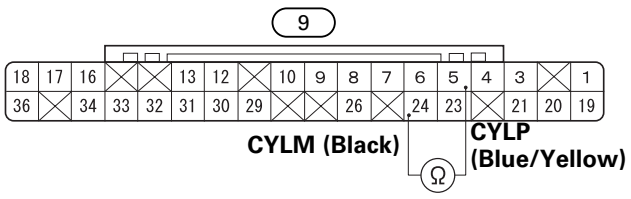
◆Does the DTC 58-2 appear?
YES - Go to "2) CYL line open-circuit inspection."
NO - Temporary failure (disappears.)

2) CYL line open-circuit inspection

a. Turn the combination switch OFF and disconnect the ECM connector A (9).

b. Check for continuity between the main wire harness side No.5 (Blue/Yellow) terminal and No.24 (Black) terminal of the ECM connector A (9).

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "3) Camshaft pulley inspection."
NO - Repair open in the main wire harness between the ECM and the CMP sensor.

3) Camshaft pulley inspection

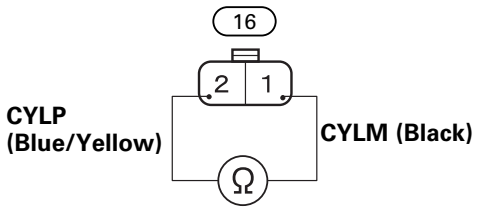
• Check the camshaft pulley.

◆Is the camshaft pulley damaged?
YES - Replace the camshaft pulley with a new one and recheck.
NO - Go to "4) CMP sensor inspection."

4) CMP sensor inspection

• Disconnect the CMP sensor 2P connector (9). Measure the resistance between the CMP sensor side No.1 terminal and No.2 terminal of the CMP sensor 2P connector (9).

CMP SENSOR 2P CONNECTOR
CMP SENSOR SIDE



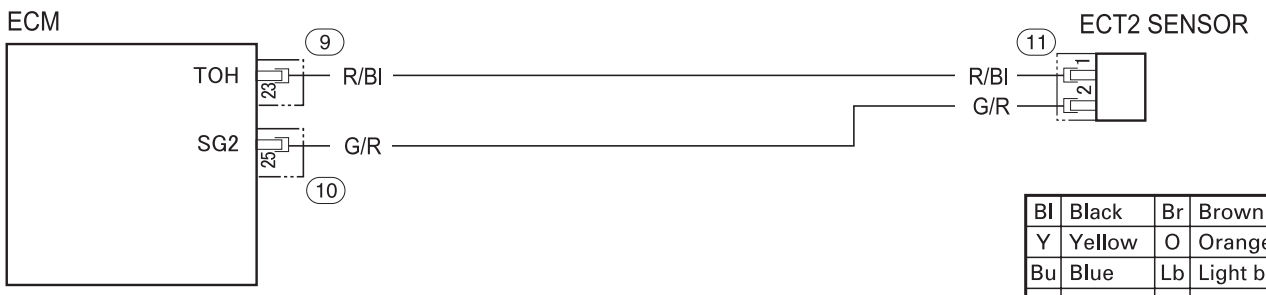
VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 288 — 352Ω?
YES - Replace the ECM with a new one and recheck.
NO - Replace the CMP sensor with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-38

• ECT2 SENSOR TROUBLESHOOTING



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

DTC 140-1: ECT2 sensor voltage is too low

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the ECT2 sensor 2P connector (11) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the ECT2 sensor voltage using the HDS.

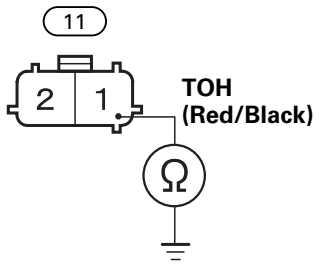
◆Is the measurement within 0.078 — 4.92V?
YES - Temporary failure (disappears.)
NO - Go to "2) ECT2 sensor signal line short-circuit inspection."

2) ECT2 sensor signal line short-circuit inspection

a. Turn the combination switch OFF. Disconnect the ECM connector A (9) and the ECT2 sensor 2P connector (11).

b. Check for continuity between the ECT2 sensor 2P connector (11) main wire harness side No.1 (Red/Black) terminal and the engine ground.

ECT2 SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the ECT2 sensor.
NO - Go to "3) ECT2 sensor inspection."

3) ECT2 sensor inspection

a. Connect the ECM connector A (9). Remove the ECT2 sensor and connect the ECT2 sensor 2P connector (11).

b. Turn the combination switch ON and measure the ECT2 sensor temperature using the HDS.

◆Does the measurement correspond to the ambient temperature?
YES - Replace the ECM with a new one and recheck.
NO - Replace the ECT2 sensor with a new one and recheck.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-39

DTC 140-2: ECT2 sensor voltage is too high

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the ECT2 sensor 2P connector (11) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Measure the ECT2 sensor voltage using the HDS.

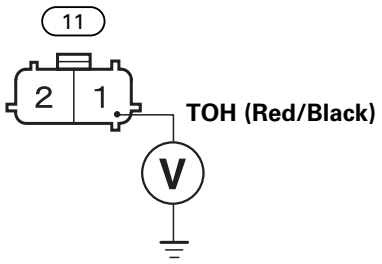
◆Is the measurement within 0.078 — 4.92V?
YES - Temporary failure (disappears.)
NO - Go to "2) ECT2 sensor signal line open-circuit inspection."

2) ECT2 sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the ECT2 sensor 2P connector (11).

b. Turn the combination switch ON. Measure the voltage between the ECT2 sensor 2P connector (11) main wire harness side No.1 (Red/Black) terminal and the engine ground.

ECT2 SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE

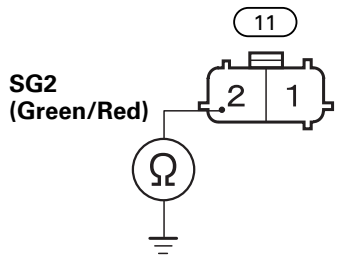


VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.30 — 5.25V?
YES - Go to "3) ECT2 sensor GND line open-circuit inspection."
NO - Repair open in the main wire harness between the ECM and the ECT2 sensor.

3) ECT2 sensor GND line open-circuit inspection
- Turn the combination switch OFF. Check for continuity between the ECT2 sensor 2P connector (11) main wire harness side No.2 (Green/Red) terminal and the engine ground.

ECT2 SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Go to "4) ECT2 sensor inspection."
NO - Repair open in the main wire harness between the ECM and the ECT2 sensor.

4) ECT2 sensor inspection

a. Remove the ECT2 sensor and connect the ECT2 sensor 2P connector (11).

b. Turn the combination switch ON and measure the sensor temperature using the HDS.

◆Does the measurement correspond to the ambient temperature?
YES - Replace the ECM with a new one and recheck.
NO - Replace the ECT2 sensor with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-40

• EOP SWITCH TROUBLESHOOTING



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

DTC 142-1: Abnormal EOP switch

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect the EOP switch terminal (C1) and then reconnect it.

b. Clear the DTC (P. 5-11).
- Continue the procedure if the DTC does not clear.

c. Turn the combination switch ON. Check the DTC using the HDS.

◆Does the DTC 142-1 appear?

YES - Go to "2) EOP switch signal line open-circuit inspection."

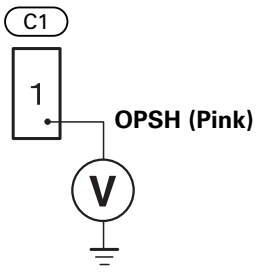
NO - Temporary failure (disappears.)

2) EOP switch signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the EOP switch terminal (C1).

b. Measure the voltage between the EOP switch terminal (C1) main wire harness side No.1 (Pink) terminal and the engine ground.

EOP SWITCH TERMINAL
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

YES - Replace the EOP switch with a new one. If the DTC 142-1 appears again, replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the EOP switch.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-41

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-42

7. TROUBLESHOOTING WITHOUT THE HDS

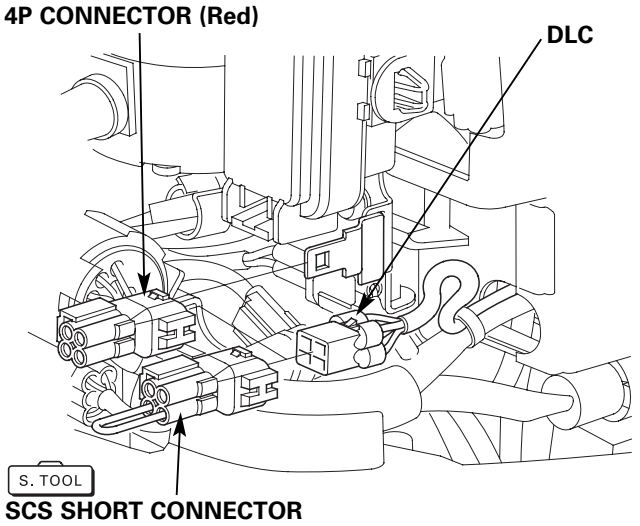
• NUMBER OF BLINKS OF MIL CHECK

1) Remove the engine cover (P. 4-2).

2) Turn the combination switch OFF.

3) Disconnect the 4P connector (Red) and connect the SCS short connector to the DLC (Data Link Connector).

TOOL:
SCS short connector **070PZ-ZY30100**



4) Turn the combination switch ON and check the number of blinks of the MIL.
   - Count the number of blinks when the MIL starts blinking. The diagnostic trouble code (DTC) is indicated repeatedly. The number of long blinks equals the first digit and the number of short blinks equals the second digit of the DTC.
   - When multiple problems occur simultaneously, the MIL repeatedly indicates them by blinking separate codes, one after another.

Single problem:

See DTC 1.

See DTC 3.

See DTC 14.

Multiple problems:

See DTC 1 and 3.

See DTC 3 and 4.

See DTC 1 and 14.

• ECM RESET PROCEDURE

1) Remove the engine cover (P. 4-2).

2) Turn the combination switch OFF.

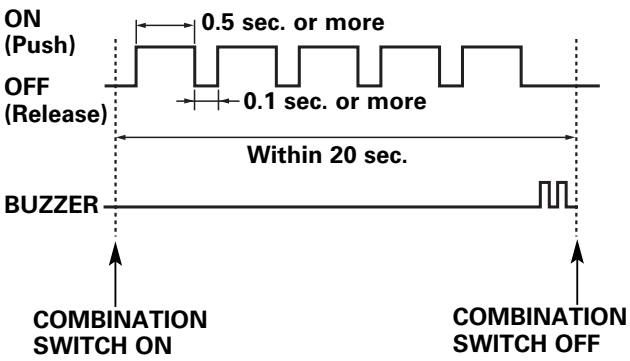
3) Disconnect the 4P connector (Red) and connect the SCS short connector to the DLC (Data Link Connector).

4) Turn the combination switch ON.

5) Turn the emergency stop switch ON (push for 0.5 sec. or more) and OFF (release for 0.1 sec. or more). Repeat the procedure five times.

6) Check that the buzzer sounds twice.
   The MIL should stay ON.

7) Turn the combination switch OFF. (ECM reset procedure completes.)
   Perform steps 5 through 7 within 20 seconds.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-43

• FINAL PROCEDURE (AFTER TROUBLESHOOTING)

1) Reset the ECM.

2) Disconnect the SCS short connector from the DLC (Data Link Connector) and connect the 4P connector (Red).
   Note that the MIL stays ON while the SCS short connector is connected to the DLC (Data Link Connector).

3) Install the engine cover (P. 4-2).

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-44

• TROUBLESHOOTING GUIDE BY MIL BLINKS

MIL		Detected component	Probable problem	Ref. page
No. of blinks	Condition			
MIL does not blink	Detected component 	ECM	• Indicator light • MIL circuit (Open) • ECM ground circuit (Open, poor grounding) • ECM	2-37 2-46
Stays ON	ON 	ECM	• DLC circuit (Short) • MIL circuit (Short) • Sensor power circuit (Short) • ECM power circuit (Open) • ECM	5-46
1	Blinks 	HO2S	• HO2S circuit (Open, short) • HO2S • Fuel supply system • ECM	5-48
3	Blinks 	MAP sensor (Sensor voltage)	• MAP sensor circuit (Open, short) • MAP sensor • ECM	5-50
4	Blinks 	CKP sensor 1 (Pulse)	• CKP sensor 1 circuit (Open, short) • CKP sensor 1 • Guide plate • ECM	5-52
6	Blinks 	EBT sensor (Sensor voltage)	• EBT sensor circuit (Open, short) • EBT sensor • ECM	5-54
7	Blinks 	TP sensor (Sensor voltage)	• TP sensor circuit (Open, short) • TP sensor • ECM	5-56
8	Blinks 	CKP sensor 2 (Pulse)	• CKP sensor 2 circuit (Open, short) • CKP sensor 2 • Guide plate • ECM	5-58
10	Blinks 	IAT sensor (Sensor voltage)	• IAT sensor circuit (Open, short) • IAT sensor • ECM	5-60
14	Blinks 	IAC valve (Abnormal current)	• IAC valve circuit (Open, short) • IAC valve • ECM	5-62
24	Blinks 	ECT2 sensor (Sensor voltage)	• ECT2 sensor circuit (Open, short) • ECT2 sensor • ECM	5-64
26	Blinks 	EOP switch	• EOP switch circuit (Open, short) • EOP switch • ECM	5-66

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-45

MIL		Detected component	Probable problem	Ref. page
No. of blinks	Condition			
41	Blinks 	HO2S heater (Abnormal current)	• HO2S heater circuit (Open, short) • HO2S heater • ECM	5-68
58	Blinks 	CMP sensor (Abnormal current)	• CMP sensor circuit (Open, short) • CMP sensor • Camshaft pulley • ECM	5-70

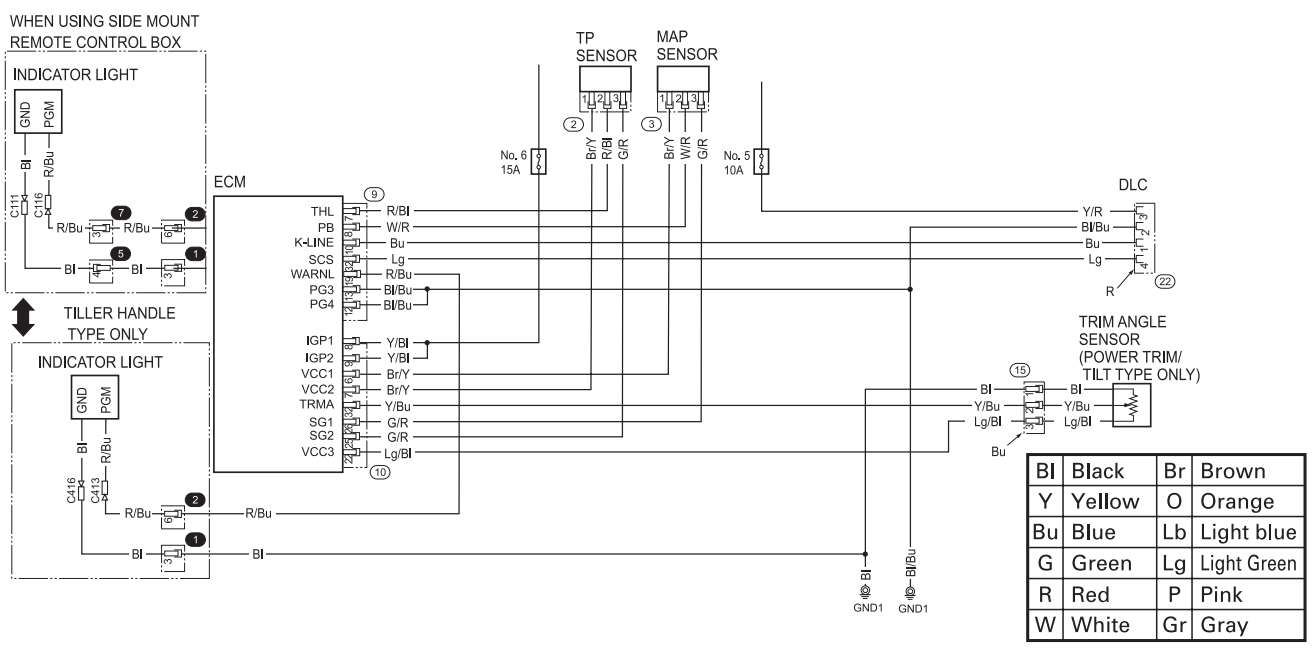
• When multiple DTC main codes appear

MIL		Detected component	Probable problem	Ref. page
No. of blinks	Condition			
6, 7, 10, 24	Blinks	SG (Sensor Ground) line	• SG (Sensor Ground) line (Open)	—

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-46

• ECM TROUBLESHOOTING



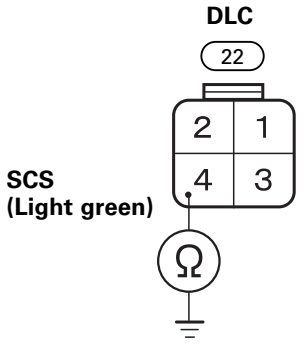
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

MIL ON But Does Not Blink or Indicate DTC Code

1) DLC short-circuit inspection

a. Turn the combination switch OFF. Disconnect the ECM connector A (9) and the SCS short connector.

b. Check for continuity between the DLC (22) No.4 (Light green) terminal and the engine ground.



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

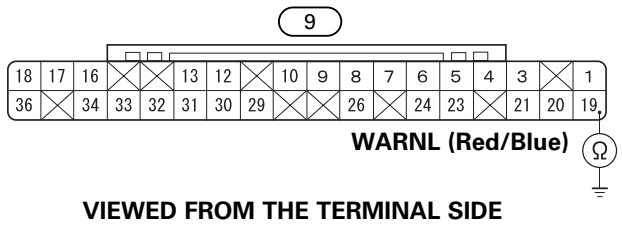
YES - Repair short in the main wire harness between the ECM and the DLC.

NO - Go to "2) MIL ON line short-circuit inspection."

2) MIL ON line short-circuit inspection

• Check for continuity between the ECM connector A (9) main wire harness side No.19 (Red/Blue) terminal and the engine ground.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Repair short in the main wire harness between the ECM and the MIL.

NO - Go to "3) MAP sensor power line short-circuit inspection."

3) MAP sensor power line short-circuit inspection

a. Connect the ECM connector A (9) and disconnect the MAP sensor 3P connector (3).

b. Turn the combination switch ON and check the MIL.

◆Does the MIL go OFF?

YES - Replace the MAP sensor.

NO - Go to the step c.

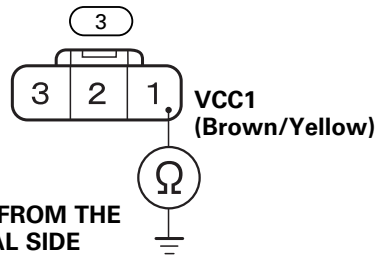
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-47

c. Turn the combination switch OFF and disconnect the ECM connector B (10).

d. Check for continuity between the MAP sensor 3P connector (3) main wire harness side No.1 terminal (Brown/Yellow) and the engine ground.

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the MAP sensor.
NO - Go to "4) TP sensor power line short-circuit inspection."

4) TP sensor power line short-circuit inspection
a. Connect the ECM connector B (10) and disconnect the TP sensor 3P connector (2).

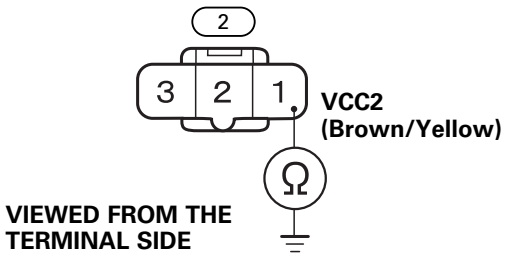
b. Turn the combination switch ON and check the MIL.

◆Does the MIL go OFF?
YES - Replace the throttle body.
NO - Go to the step c.

c. Turn the combination switch OFF and disconnect the ECM connector B (10).

d. Check for continuity between the TP sensor 3P connector (2) main wire harness side No.1 (Brown/Yellow) terminal and the engine ground.

TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the TP sensor.
NO - Go to "5) Trim angle sensor power line short-circuit inspection" (Power trim/tilt type only). Go to "6) ECM power line inspection" (Gas assisted type only).

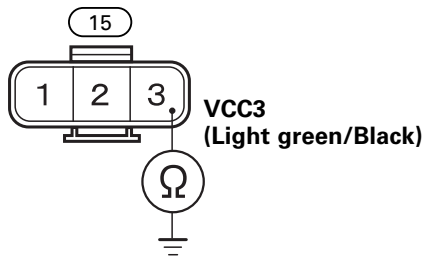
5) Trim angle sensor power line short-circuit inspection (Power trim/tilt type only)
a. Connect the ECM connector B (10) and disconnect the trim angle sensor 3P connector (15).

b. Turn the combination switch ON and check the MIL.

◆Does the MIL go OFF?
YES - Replace the trim angle sensor.
NO - Go to the step c.

c. Turn the combination switch OFF and disconnect the ECM connector B (10).
d. Check for continuity between the trim angle sensor 3P connector (15) main wire harness side No.3 (Light green/Black) terminal and the engine ground.

TRIM ANGLE SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE

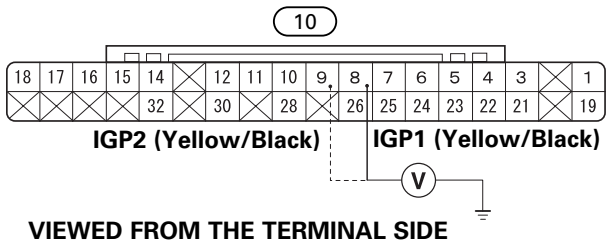


VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the trim angle sensor.
NO - Go to "6) ECM power line inspection."

6) ECM power line inspection
• Turn the combination switch ON. Measure the voltage between the respective terminals of the main wire harness side No.8 (Yellow/Black) terminal and No.9 (Yellow/Black) terminal of the ECM connector B (10) and the engine ground.

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



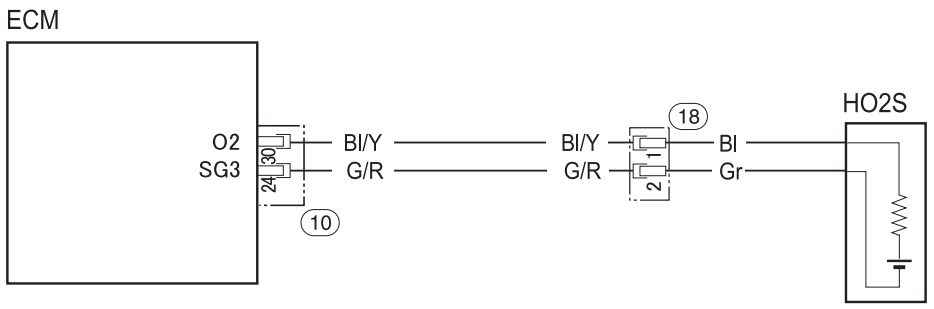
VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?
YES - Replace the ECM with a new one and recheck.
NO - Check the No.6 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-48

• HO2S TROUBLESHOOTING



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

MIL blinks once

NOTICE

Connect a known-good battery to the connector terminals, being careful not to create a short circuit.

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect HO2S 4P connector (18) and then reconnect it.

b. Reset the ECM and disconnect the SCS short connector (P. 5-42).

c. Start the engine and let it run at 3,000 min^{-1} (rpm) for 5 minutes or more under no load.

d. Run the engine at idle speed for one minute or more.

e. Turn the combination switch OFF and connect the SCS short connector.

f. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink once?
YES - Go to "2) Fuel supply system inspection."
NO - Temporary failure (Disappears).

2) Fuel supply system inspection

• Turn the combination switch OFF and measure the fuel pressure (P. 5-79).

◆Is the fuel pressure normal?
YES - Go to "3) HO2S inspection."
NO - Repair fuel supply system and recheck under normal fuel pressure.

3) HO2S inspection

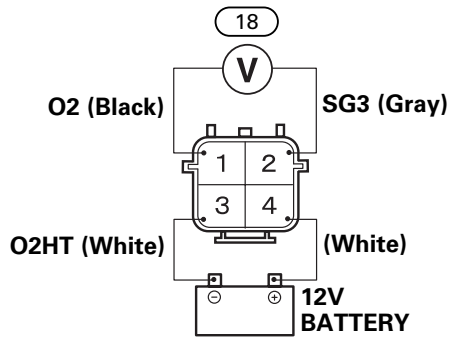
a. Turn the combination switch OFF and disconnect the HO2S 4P connector (18).

b. Connect the battery positive (+) cable to the HO2S side No.4 terminal (White) and the battery negative (–) cable to the HO2S side No.3 terminal (White) of the HO2S sensor 4P connector (18) as shown.

c. Start the engine and let it run at 3,000 min^{-1} (rpm) for 3 minutes or more under no load.

d. Snap the engine with the engine speed in the range between the idle speed and 4,000 ± 500 min^{-1} (rpm). Measure the voltage between the HO2S side No.1 terminal (Black) and No.2 (Gray) terminal of the HO2S 4P connector (18).

HO2S 4P CONNECTOR HO2S SIDE



VIEWED FROM THE TERMINAL SIDE

◆Are the measurements 0.6V or more with the throttle fully open and 0.4V or below with the throttle fully closed?
YES - Go to "4) HO2S signal line short-circuit inspection."
NO - Replace the HO2S with a new one and recheck.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

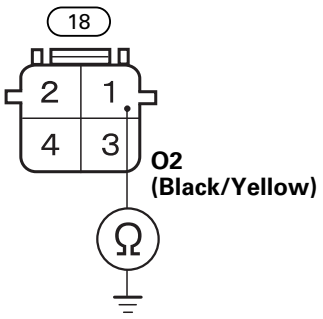
cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:20 ページ 5-49

4) HO2S signal line short-circuit inspection

a. Turn the combination switch OFF and disconnect the battery.

b. Disconnect the ECM connector B (10). Check for continuity between the HO2S 4P connector (18) main wire harness side No.1 (Black/Yellow) terminal and the engine ground.

HO2S 4P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

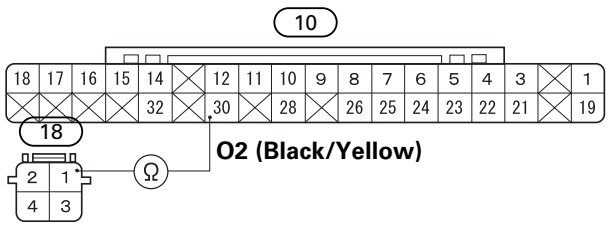
YES - Repair short in the main wire harness between the ECM and the HO2S.

NO - Go to "5) HO2S signal line open-circuit inspection."

5) HO2S signal line open-circuit inspection

• Check for continuity between the HO2S 4P connector (18) main wire harness side No.1 (Black/Yellow) terminal and the ECM connector B (10) main wire harness side No.30 (Black/Yellow) terminal.

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



HO2S 4P CONNECTOR
MAIN WIRE HARNESS SIDE

VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

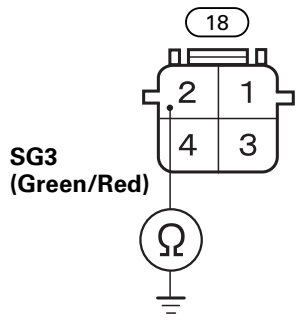
YES - Go to "6) HO2S GND line open-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the HO2S.

6) HO2S GND line open-circuit inspection

• Connect the ECM connector B (10). Check for continuity between the HO2S 4P connector (18) main wire harness side No.2 (Green/Red) terminal and the engine ground.

HO2S 4P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

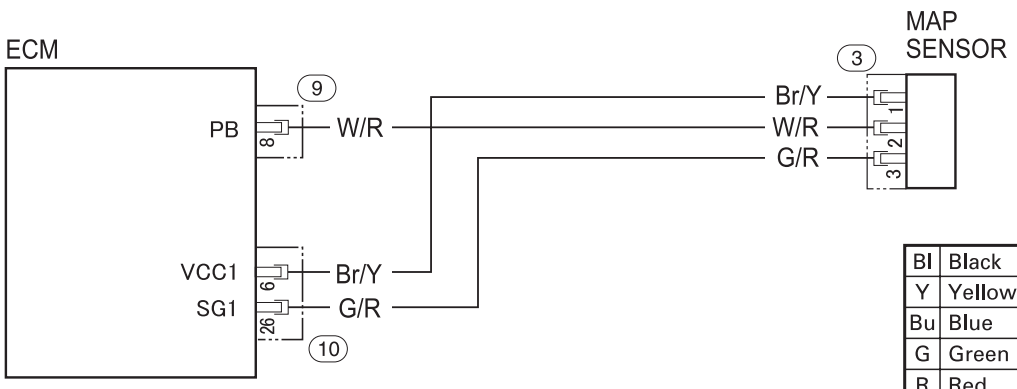
YES - Replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the HO2S.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-50

• MAP SENSOR TROUBLESHOOTING



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

MIL blinks 3 times

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect MAP sensor 3P connector (3) and then reconnect it.

b. Reset the ECM (P. 5-42).

c. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink 3 times?

YES - Go to "2) MAP sensor power line open-circuit inspection."

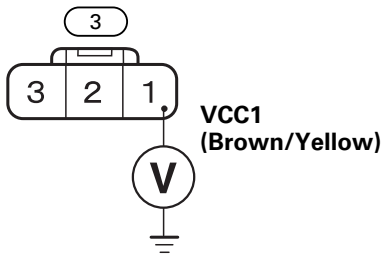
NO - Temporary failure (disappears.)

2) MAP sensor power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the MAP sensor 3P connector (3).

b. Turn the combination switch ON. Measure the voltage between the MAP sensor 3P connector (3) main wire harness side N.1 (Brown/Yellow) terminal and the engine ground.

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.75 — 5.25V?

YES - Go to "3) MAP sensor signal line open-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the MAP sensor.

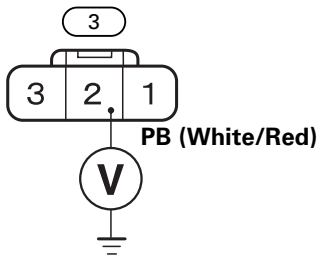
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-51

3) MAP sensor signal line open-circuit inspection

• Measure the voltage between the MAP sensor 3P connector (3) main wire harness side No.2 (White/Red) terminal and the engine ground.

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.30 — 5.25V?

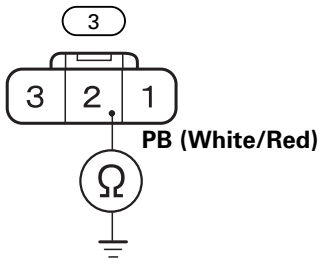
YES - Go to "4) MAP sensor signal line short-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the MAP sensor.

4) MAP sensor signal line short-circuit inspection

• Turn the combination switch OFF. Disconnect the ECM connector A (9). Check for continuity between the MAP sensor 3P connector (3) main wire harness side No.2 (White/Red) terminal and the engine ground.

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

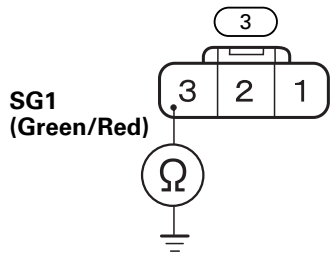
YES - Repair short in the main wire harness between the ECM and the MAP sensor.

NO - Go to "5) MAP sensor GND line open-circuit inspection."

5) MAP sensor GND line open-circuit inspection

• Connect the ECM connector A (9). Check for continuity between the MAP sensor 3P connector (3) main wire harness side No.3 (Green/Red) terminal and the engine ground.

MAP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

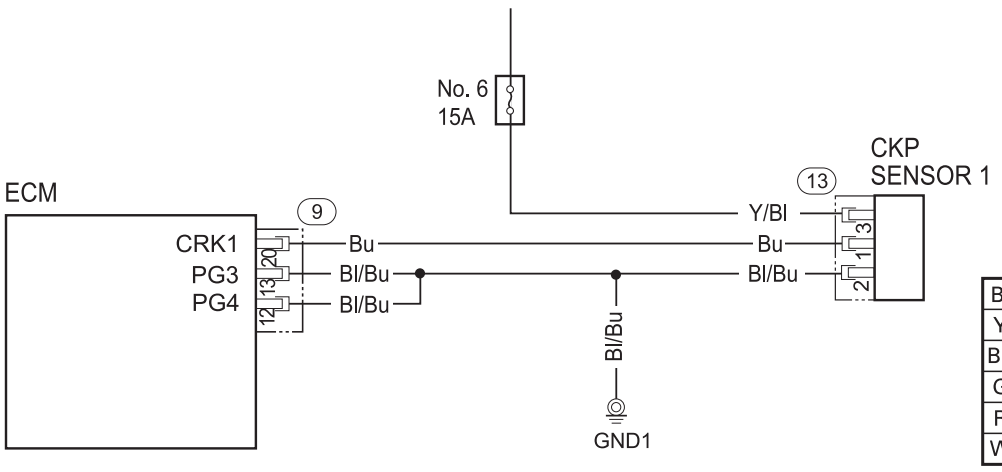
YES - Replace the MAP sensor with a new one and recheck. If the MIL blinks 3 times again, replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the MAP sensor.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-52

• CKP SENOR 1 TROUBLESHOOTING



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

MIL blinks 4 times

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect CKP sensor 1 3P connector (13) and then reconnect it.

b. Reset the ECM and disconnect the SCS short connector (P. 5-42).

c. Start the engine.

d. Turn the combination switch OFF and connect the SCS short connector.

e. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink 4 times?

YES - Go to "2) CKP sensor 1 power line open-circuit inspection."

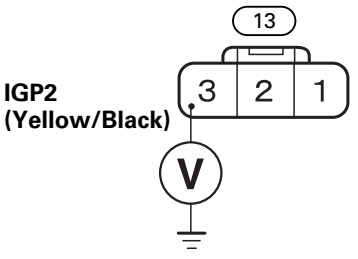
NO - Temporary failure (disappears.)

2) CKP sensor 1 power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the CKP sensor 1 3P connector (13).

b. Turn the combination switch ON. Measure the voltage between the CKP sensor 1 3P connector (13) main wire harness side No.3 (Yellow/Black) terminal and the engine ground.

CKP SENSOR 1 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

YES - Go to "3) CKP sensor 1 signal line open-circuit inspection."

NO - Check the No.6 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

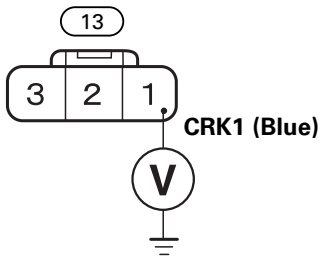
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-53

3) CKP sensor 1 signal line open-circuit inspection

• Measure the voltage between the CKP sensor 1 3P connector (13) main wire harness side No.1 terminal (Blue) and the engine ground.

CKP SENSOR 1 3P CONNECTOR MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.75 — 5.25V?

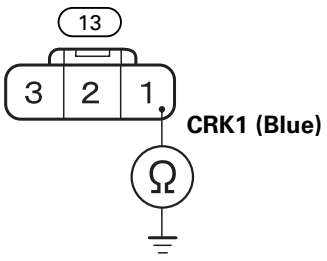
YES - Go to "4) CKP sensor 1 signal line short-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the CKP sensor 1.

4) CKP sensor 1 signal line short-circuit inspection

• Turn the combination switch OFF. Disconnect the ECM connector A (9). Check for continuity between the CKP sensor 1 3P connector (13) main wire harness side No.1 terminal (Blue) and the engine ground.

CKP SENSOR 1 3P CONNECTOR MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

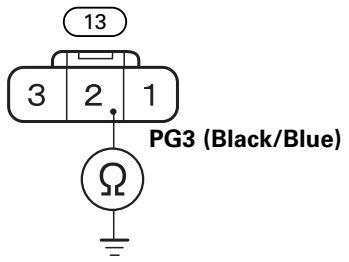
YES - Repair short in the main wire harness between the ECM and the CKP sensor 1.

NO - Go to "5) CKP sensor 1 GND line open-circuit inspection."

5) CKP sensor 1 GND line open-circuit inspection

• Connect the ECM connector A (9). Check for continuity between the CKP sensor 1 3P connector (13) main wire harness side No.2 (Black/Blue) terminal and the engine ground.

CKP SENSOR 1 3P CONNECTOR MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Go to "6) Guide plate inspection."

NO - Repair open in the main wire harness between the ECM and the CKP sensor 1.

6) Guide plate inspection

• Check the guide plate.

◆Is the guide plate damaged?

YES - Replace the guide plate with a new one and recheck.

NO - Replace the CKP sensor 1 with a new one and recheck. If the MIL blinks 4 times again, replace the ECM with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-54

• EBT SENSOR TROUBLESHOOTING



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

MIL blinks 6 times

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect EBT sensor 2P connector (17) and then reconnect it.

b. Reset the ECM (P. 5-42).

c. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink 6 times?

YES - Go to "2) EBT sensor signal line open-circuit inspection."

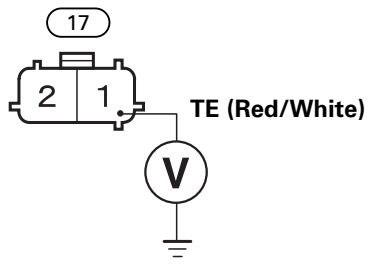
NO - Temporary failure (disappears.)

2) EBT sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the EBT sensor 2P connector (17).

b. Turn the combination switch ON. Measure the voltage between the EBT sensor 2P connector (17) main wire harness side No.1 (Red/White) terminal and the engine ground.

EBT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.30 — 5.25V?

YES - Go to "3) EBT sensor signal line short-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the EBT sensor.

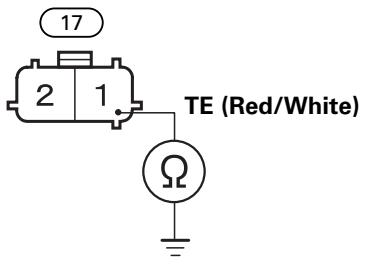
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-55

3) EBT sensor signal line short-circuit inspection

• Turn the combination switch OFF. Disconnect the ECM connector A (9). Check for continuity between the EBT sensor 2P connector (17) main wire harness side No.1 terminal (Red/White) and the engine ground.

EBT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

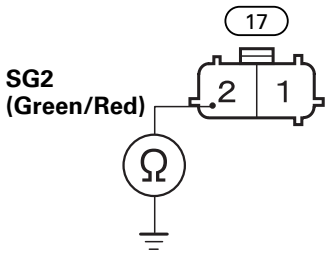
YES - Repair short in the main wire harness between the ECM and the EBT sensor.

NO - Go to "4) EBT sensor GND line open-circuit inspection."

4) EBT sensor GND line open-circuit inspection

• Connect the ECM connector A (9). Check for continuity between the EBT sensor 2P connector (17) main wire harness side No.2 (Green/Red) terminal and the engine ground.

EBT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Go to "5) EBT sensor inspection."

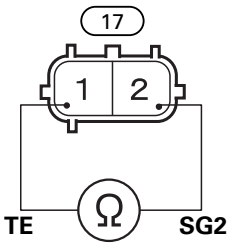
NO - Repair open in the main wire harness between the ECM and the EBT sensor.

5) EBT sensor inspection

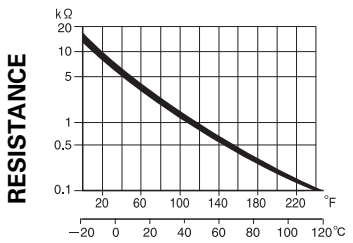
a. Disconnect the EBT sensor.

b. Measure the resistance between the EBT sensor side No.1 terminal and No.2 terminal of the EBT sensor 2P connector (17).

EBT SENSOR 2P CONNECTOR
EBT SENSOR SIDE



VIEWED FROM THE TERMINAL SIDE



◆Does the measurement correspond to the ambient temperature?

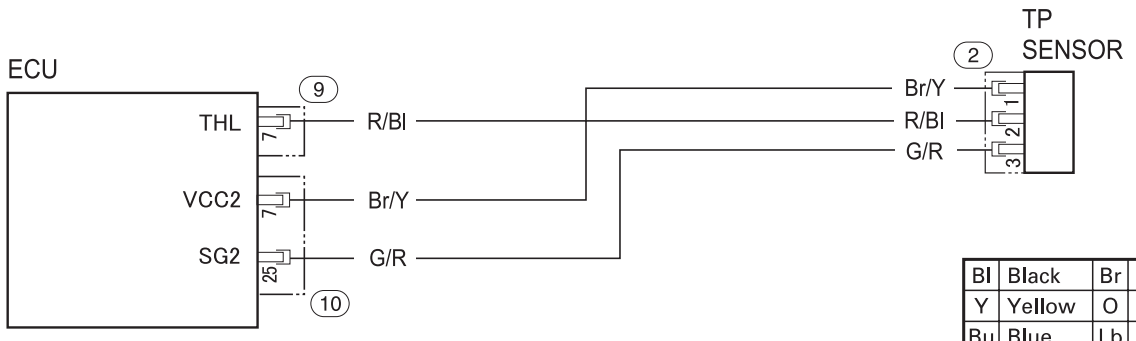
YES - Replace the ECM with a new one and recheck.

NO - Replace the EBT sensor with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-56

• TP SENSOR TROUBLESHOOTING



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

MIL blinks 7 times

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect TP sensor 3P connector (2) and then reconnect it.

b. Reset the ECM (P. 5-42).

c. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink 7 times?

YES - Go to "2) TP sensor power line open-circuit inspection."

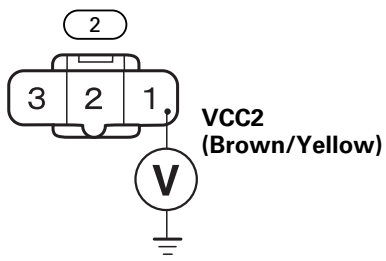
NO - Temporary failure (disappears.)

2) TP sensor power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the TP sensor 3P connector (2).

b. Turn the combination switch ON. Measure the voltage between the TP sensor 3P connector (2) main wire harness side No.1 (Brown/Yellow) terminal and the engine ground.

TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.75 — 5.25V?

YES - Go to "3) TP sensor signal line open-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the TP sensor.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

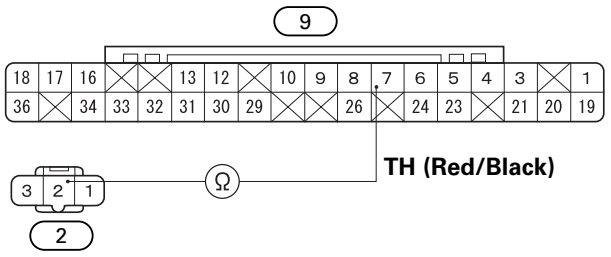
cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-57

3) TP sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the ECM connector A (9).

b. Check for continuity between the TP sensor 3P connector (2) main wire harness side No.2 (Red/Black) terminal and the ECM connector A (9) main wire harness side No.7 (Red/Black) terminal.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE

VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

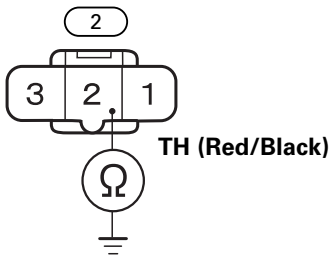
YES - Go to "4) TP sensor signal line short-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the TP sensor.

4) TP sensor signal line short-circuit inspection

• Check for continuity between the TP sensor 3P connector (2) main wire harness side No.2 (Red/Black) terminal and the engine ground.

TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

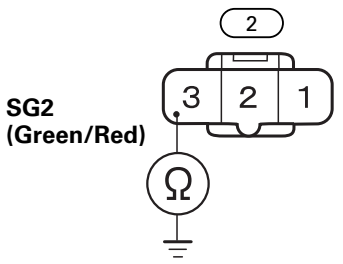
YES - Repair short in the main wire harness between the ECM and the TP sensor.

NO - Go to "5) TP sensor GND line open-circuit inspection."

5) TP sensor GND line open-circuit inspection

• Connect the ECM connector A (9). Check for continuity between the TP sensor 3P connector (2) main wire harness side No.3 (Green/Red) terminal and the engine ground.

TP SENSOR 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

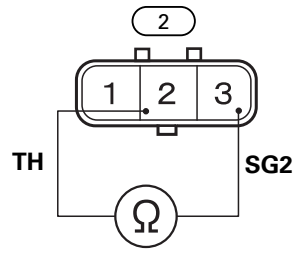
YES - Go to "6) TP sensor inspection."

NO - Repair open in the main wire harness between the ECM and the TP sensor.

6) TP sensor inspection

• Measure the resistance between the TP sensor side No.2 terminal and No.3 terminal of the TP sensor 3P connector (2).

TP SENSOR 3P CONNECTOR
TP SENSOR SIDE



VIEWED FROM THE TERMINAL SIDE

◆Are the measurements within 0 — 6kΩ? with the throttle fully open and fully closed?

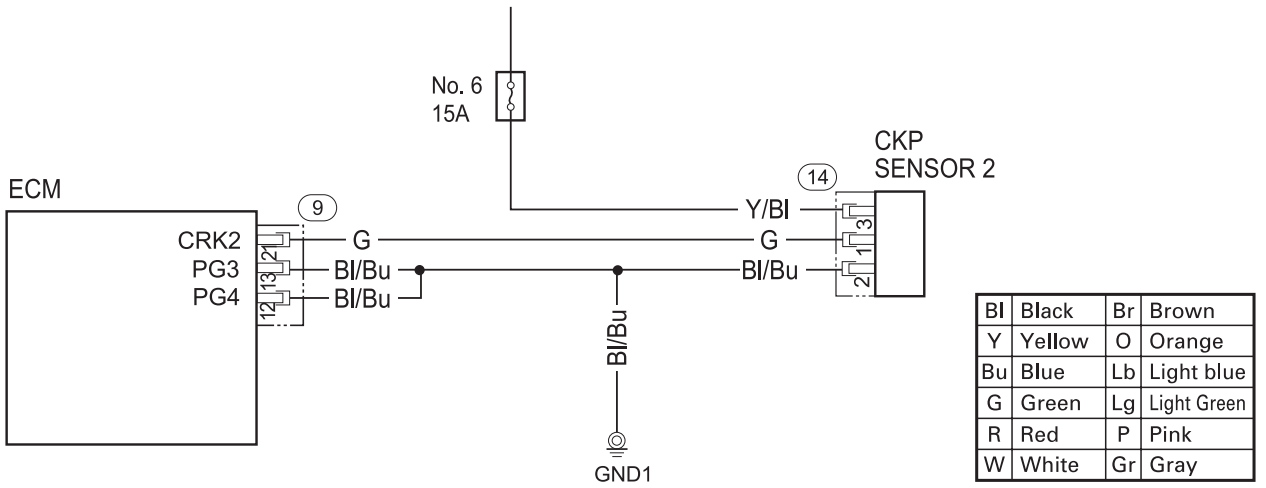
YES - Replace the ECM with a new one and recheck.

NO - Replace the throttle body with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-58

• CKP SENSOR 2 TROUBLESHOOTING



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

MIL blinks 8 times

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect CKP sensor 2 3P connector (14) and then reconnect it.

b. Reset the ECM and disconnect the SCS short connector (P. 5-42).

c. Start the engine.

d. Turn the combination switch OFF and connect the SCS short connector.

e. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink 8 times?

YES - Go to "2) CKP sensor 2 power line open-circuit inspection."

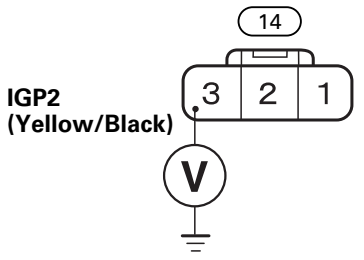
NO - Temporary failure (disappears.)

2) CKP sensor 2 power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the CKP sensor 2 3P connector (14).

b. Turn the combination switch ON. Measure the voltage between the CKP sensor 2 3P connector (14) main wire harness side No.3 (Yellow/Black) terminal and the engine ground.

CKP SENSOR 2 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

YES - Go to "3) CKP sensor 2 signal line open-circuit inspection."

NO - Check the No.6 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

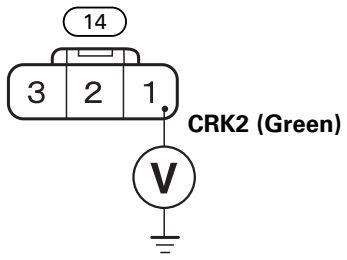
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-59

3) CKP sensor 2 signal line open-circuit inspection

• Measure the voltage between the CKP sensor 2 3P connector (14) main wire harness side No.1 (Green) terminal and the engine ground.

CKP SENSOR 2 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.75 — 5.25V?

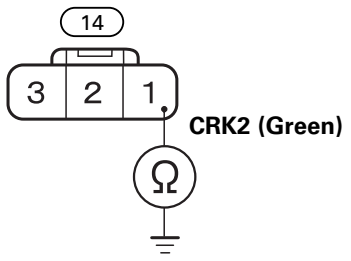
YES - Go to "4) CKP sensor 2 signal line short-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the CKP sensor 2.

4) CKP sensor 2 signal line short-circuit inspection

• Turn the combination switch OFF. Disconnect the ECM connector A (9). Check for continuity between the CKP sensor 2 3P connector (14) main wire harness side No.1 (Green) terminal and the engine ground.

CKP SENSOR 2 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

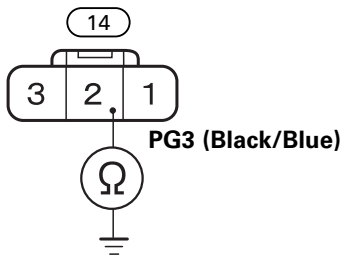
YES - Repair short in the main wire harness between the ECM and the CKP sensor 2.

NO - Go to "5) CKP sensor 2 GND line open-circuit inspection."

5) CKP sensor 2 GND line open-circuit inspection

• Connect the ECM connector A (9). Check for continuity between the CKP sensor 2 3P connector (14) main wire harness side No.2 (Black/Blue) terminal and the engine ground.

CKP SENSOR 2 3P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Go to "6) Guide plate inspection."

NO - Repair open in the main wire harness between the ECM and the CKP sensor 2.

6) Guide plate inspection

• Check the guide plate.

◆Is the guide plate damaged?

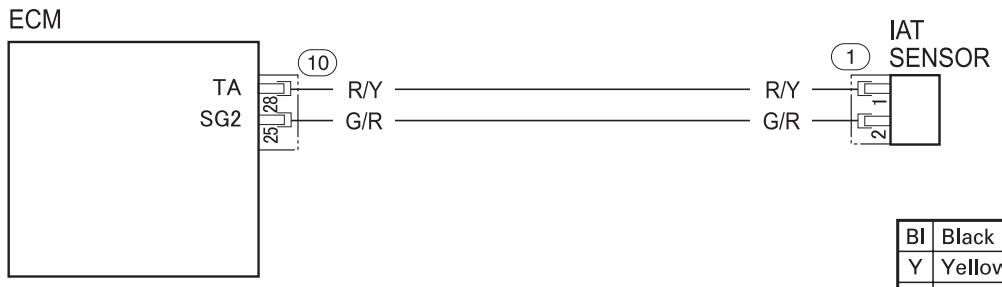
YES - Replace the guide plate with a new one and recheck.

NO - Replace the CKP sensor 2 with a new one and recheck. If the MIL blinks 8 times again, replace the ECM with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-60

• IAT SENSOR TROUBLESHOOTING



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

MIL blinks "10" (one long blink, no short blinks)

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect IAT sensor 2P connector (1) and then reconnect it.

b. Reset the ECM (P. 5-42).

c. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink 10 times?

YES - Go to "2) IAT sensor signal line open-circuit inspection."

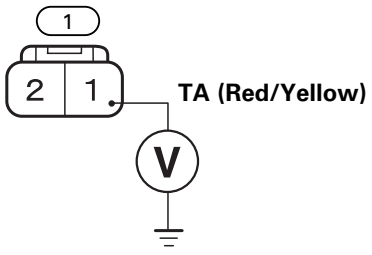
NO - Temporary failure (disappears.)

2) IAT sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect IAT sensor 2P connector (1).

b. Turn the combination switch ON. Measure the voltage between the IAT sensor 2P connector (1) main wire harness side No.1 (Red/Yellow) terminal and the engine ground.

IAT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.30 — 5.25V?

YES - Go to "3) IAT sensor signal line short-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the IAT sensor.

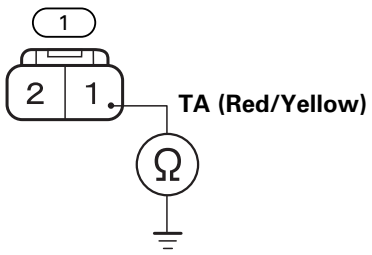
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-61

3) IAT sensor signal line short-circuit inspection

- Turn the combination switch OFF. Disconnect the ECM connector B (10). Check for continuity between the IAT sensor 2P connector (1) main wire harness side No.1 (Red/Yellow) terminal and the engine ground.

IAT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

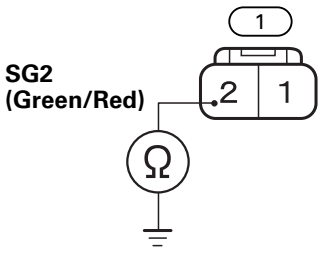
YES - Repair short in the main wire harness between the ECM and the IAT sensor.

NO - Go to "4) IAT sensor GND line open-circuit inspection."

4) IAT sensor GND line open-circuit inspection

- Connect the ECM connector B (10). Check for continuity between the IAT sensor 2P connector (1) main wire harness side No.2 (Green/Red) terminal and the engine ground.

IAT SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

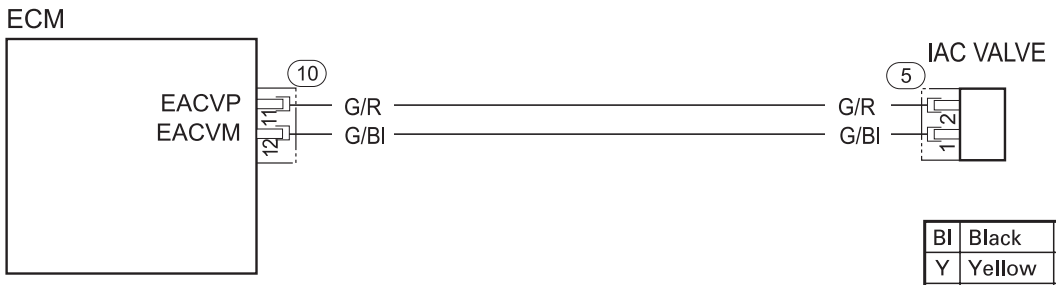
YES - Replace the IAT sensor with a new one and recheck. If the MIL blinks 10 times again, replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the IAT sensor.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-62

• IAC VALVE TROUBLESHOOTING



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

MIL blinks "14" (one long blink and 4 short blinks)

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect IAC valve 2P connector (5) and then reconnect it.

b. Reset the ECM and disconnect the SCS short connector (P. 5-42).

c. Start the engine.

d. Turn the combination switch OFF and connect the SCS short connector.

e. Turn the combination switch ON and check the number of blinks of the MIL.

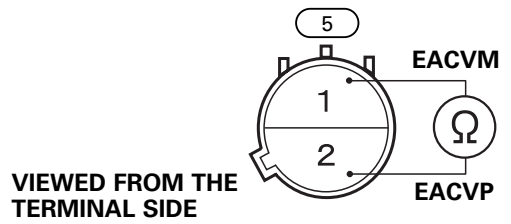
◆Does the MIL blink "14"?
YES - Go to "2) IAC valve inspection."
NO - Temporary failure (disappears.)

2) IAC valve inspection

a. Turn the combination switch OFF and disconnect the IAC valve 2P connector (5).

b. Measure the resistance between the IAC valve side No.1 terminal and No.2 terminal of the IAC valve 2P connector (5).

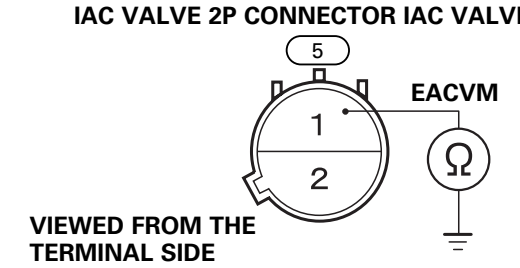
IAC VALVE 2P CONNECTOR IAC VALVE SIDE



◆Is the measurement within 10 — 13Ω?
YES - Go to the step c.
NO - Replace the IAC valve with a new one and recheck.

c. Check for continuity between the IAC valve 2P connector (5) IAC valve side No.1 terminal and the engine ground.

IAC VALVE 2P CONNECTOR IAC VALVE SIDE



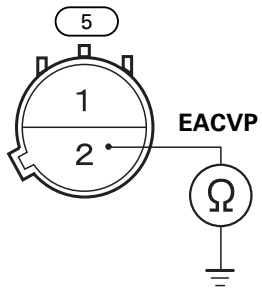
◆Is there continuity?
YES - Replace the IAC valve with a new one and recheck.
NO - Go to the step d.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-63

d. Check for continuity between the IAC valve 2P connector (5) IAC valve side No.2 terminal and the engine ground.

AC VALVE 2P CONNECTOR
IAC VALVE SIDE

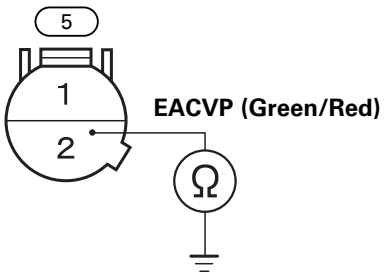


VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Replace the IAC valve with a new one and recheck.
NO - Go to "3) EACVP line short-circuit inspection."

3) EACVP line short-circuit inspection
• Disconnect the ECM connector B (10). Check for continuity between the IAC valve 2P connector (5) main wire harness side No.2 (Green/Red) terminal and the engine ground.

IAC VALVE 2P CONNECTOR
MAIN WIRE HARNESS SIDE

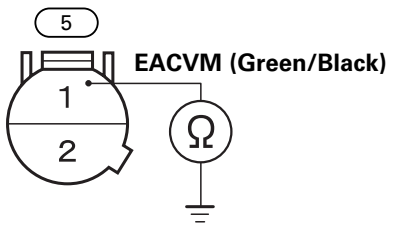


VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the IAC valve.
NO - Go to "4) EACVM line short-circuit inspection."

4) EACVM line short-circuit inspection
• Check for continuity between the IAC valve 2P connector (5) main wire harness side No.1 (Green/Black) terminal and the engine ground.

IAC VALVE 2P CONNECTOR
MAIN WIRE HARNESS SIDE

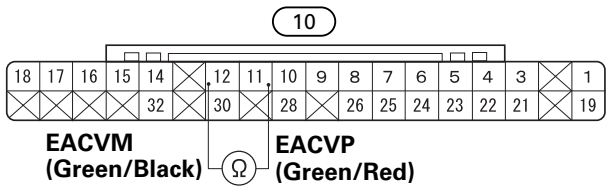


VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the IAC valve.
NO - Go to "5) IAC valve line open-circuit inspection."

5) IAC valve line open-circuit inspection
• Connect the IAC valve 2P connector (5). Measure the resistance between the main wire harness side No.11 (Green/Red) terminal and No.12 (Green/Black) terminal of the ECM connector B (10).

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



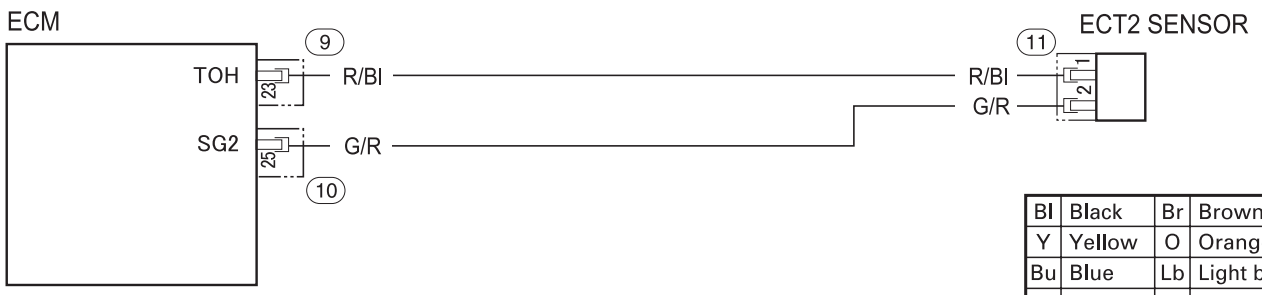
VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 10 — 13Ω?
YES - Replace the ECM with a new one and recheck.
NO - Repair open in the main wire harness between the ECM and the IAC valve.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-64

• ECT2 SENSOR TROUBLESHOOTING



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

MIL blinks "24" (2 long blink and 4 short blinks)

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect ECT2 sensor 2P connector (11) and then reconnect it.

b. Reset the ECM (P. 5-42).

c. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink "24"?

YES - Go to "2) ECT2 sensor signal line open-circuit inspection."

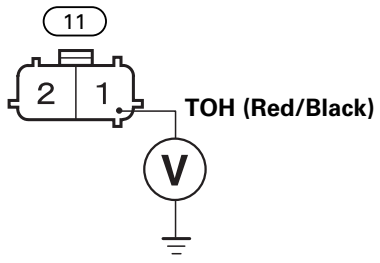
NO - Temporary failure (disappears.)

2) ECT2 sensor signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the ECT2 sensor 2P connector (11).

b. Turn the combination switch ON. Measure the voltage between the ECT2 sensor 2P connector (11) main wire harness side No.1 (Red/Black) terminal and the engine ground.

ECT2 SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 4.30 — 5.25V?

YES - Go to "3) ECT2 sensor signal line short-circuit inspection."

NO - Repair open in the main wire harness between the ECM and the ECT2 sensor.

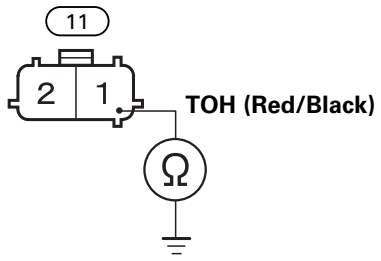
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-65

3) ECT2 sensor signal line short-circuit inspection

- Turn the combination switch OFF. Disconnect the ECM connector A (9). Check for continuity between the ECT2 sensor 2P connector (11) main wire harness side No.1 (Red/Black) terminal and the engine ground.

ECT2 SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

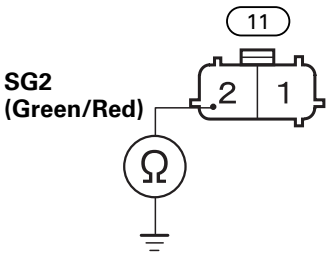
YES - Repair short in the main wire harness between the ECM and the ECT2 sensor.

NO - Go to "4) ECT2 sensor GND line open-circuit inspection."

4) ECT2 sensor GND line open-circuit inspection

- Connect the ECM connector A (9). Check for continuity between the ECT2 sensor 2P connector (11) main wire harness side No.2 (Green/Red) terminal and the engine ground.

ECT2 SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

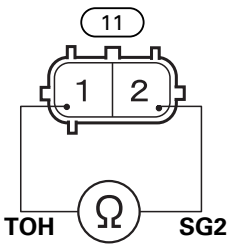
YES - Go to "5) ECT2 sensor inspection."

NO - Repair open in the main wire harness between the ECM and the ECT2 sensor.

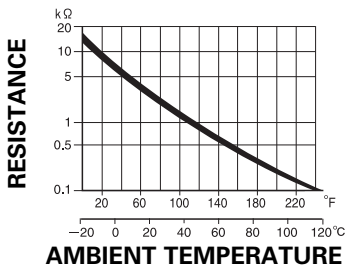
5) ECT2 sensor inspection

- Disconnect the ECT2 sensor. Measure the resistance between the ECT2 sensor side No.1 terminal and No.2 terminal of the ECT2 sensor 2P connector (11) .

ECT2 SENSOR 2P CONNECTOR
ECT2 SENSOR SIDE



VIEWED FROM THE TERMINAL SIDE



◆Does the measurement correspond to the ambient temperature?

YES - Replace the ECM with a new one and recheck.

NO - Replace the ECT2 sensor with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-66

• EOP SWITCH TROUBLESHOOTING



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

MIL blinks "26" (2 long blink and 6 short blinks)

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect EPO switch terminal (C1) and then reconnect it.

b. Reset the ECM (P. 5-42).

c. Turn the combination switch ON and check the number of blinks of the MIL.

◆Does the MIL blink "26"?

YES - Go to "2) EPO switch signal line open-circuit inspection."

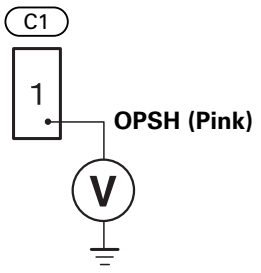
NO - Temporary failure (disappears.)

2) EPO switch signal line open-circuit inspection

a. Turn the combination switch OFF and disconnect the EPO switch terminal (C1).

b. Measure the voltage between the EPO switch terminal (C1) main wire harness side No.1 (Pink) terminal and the engine ground.

EPO SWITCH TERMINAL
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

YES - Replace the EPO switch with a new one and recheck. If the MIL blinks 26 times again, replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the EOP switch.

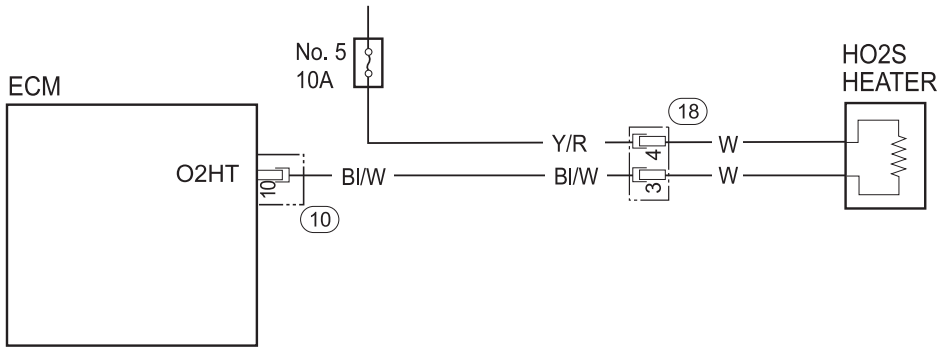
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-67

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-68

• HO2S HEATER TROUBLESHOOTING



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

MIL blinks "41" (4 long blink and 1 short blinks)

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect HO2S 4P connector (18) and then reconnect it.

b. Reset the ECM and disconnect the SCS short connector (P. 5-42).

c. Start the engine and let it run at 3,000 min^{-1} (rpm) for 5 minutes or more under no load.

d. Turn the combination switch OFF and connect the SCS short connector.

e. Turn the combination switch ON and check the number of blinks of the MIL.

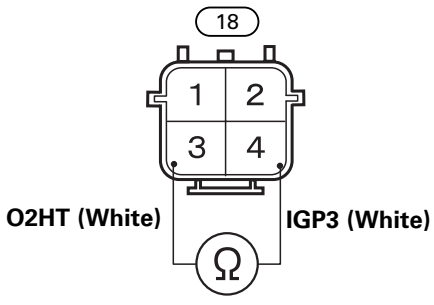
◆Does the MIL blink "41"?
YES - Go to "2) HO2S heater inspection."
NO - Temporary failure (disappears.)

2) HO2S heater inspection

a. Turn the combination switch OFF and disconnect the HO2S 4P connector (18).

b. Measure the resistance between the HO2S side No.3 (White) terminal and No.4 (White) terminal of the HO2S 4P connector (18).

HO2S 4P CONNECTOR HO2S SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 10 — 40Ω?
YES - Go to "3) HO2S heater power line open-circuit inspection."
NO - Replace the HO2S with a new one and recheck.

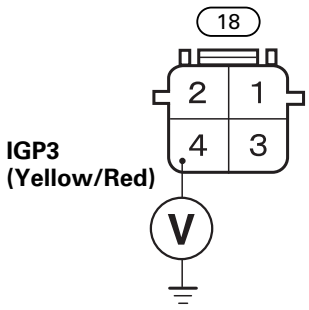
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-69

3) HO2S power line open-circuit inspection

• Turn the combination switch ON. Measure the voltage between the HO2S 4P connector (18) main wire harness side No.4 (Yellow/Red) terminal and the engine ground.

HO2S 4P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

YES - Go to "4) HO2S heater line short-circuit inspection."

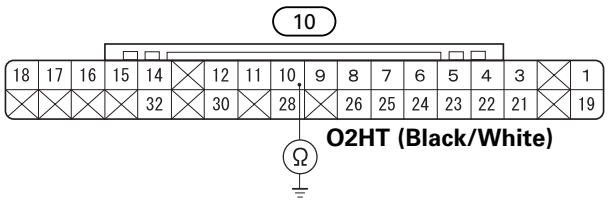
NO - Check the No.5 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

4) HO2S heater line short-circuit inspection

a. Turn the combination switch OFF and connect the HO2S 4P connector (18).

b. Disconnect the ECM connector B (10). Check for continuity between the ECM connector B (10) main wire harness side No.10 (Black/White) terminal and the engine ground.

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

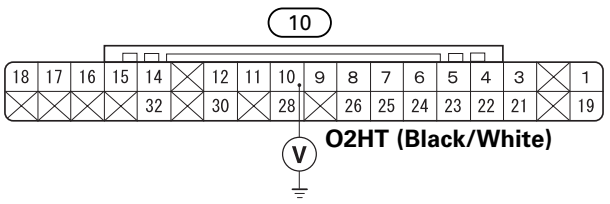
YES - Repair short in the main wire harness between the ECM and the HO2S.

NO - Go to "5) HO2S heater line open-circuit inspection."

5) HO2S heater line open-circuit inspection

• Turn the combination switch ON. Measure the voltage between the ECM connector B (10) main wire harness side No.10 (Black/White) terminal and the engine ground.

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

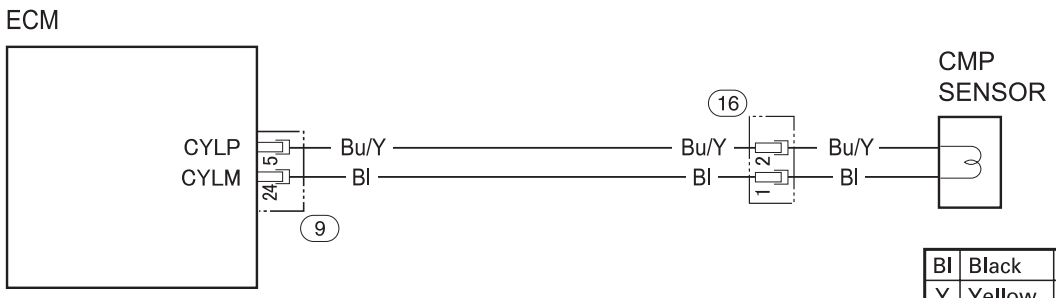
YES - Replace the ECM with a new one and recheck.

NO - Repair open in the main wire harness between the ECM and the HO2S.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-70

• CMP SENSOR TROUBLESHOOTING



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

MIL blinks "58" (5 long blink and 8 short blinks)

1) Symptom reproduction test

a. Turn the combination switch OFF. Disconnect CMP sensor 2P connector (16) and then reconnect it.

b. Reset the ECM and disconnect the SCS short connector (P. 5-42).

c. Start the engine.

d. Turn the combination switch OFF and connect the SCS short connector.

e. Turn the combination switch ON and check the number of blinks of the MIL.

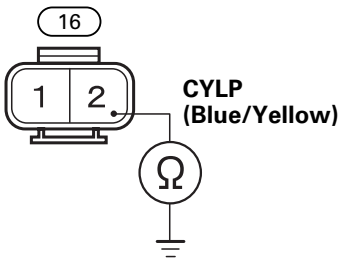
◆Does the MIL blink "58"?
YES - Go to "2) CYLP line short-circuit inspection."
NO - Temporary failure (disappears.)

2) CYLP line short-circuit inspection

a. Turn the combination switch OFF. Disconnect the CMP sensor 2P connector (16) and the ECM connector A (9).

b. Check for continuity between the CMP sensor 2P connector (16) main wire harness side No.2 (Blue/Yellow) terminal and the engine ground.

CMP SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?
YES - Repair short in the main wire harness between the ECM and the CMP sensor.
NO - Go to "3) CYLM line short-circuit inspection."

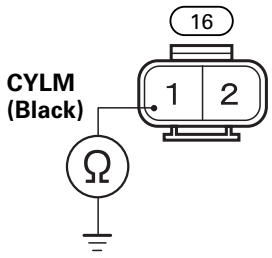
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-71

3) CYLM line short-circuit inspection

• Check for continuity between the CMP sensor 2P connector (16) main wire harness side No.1 (Black) terminal and the engine ground.

CMP SENSOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

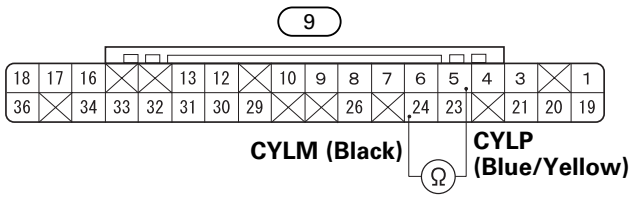
YES - Repair short in the main wire harness between the ECM and the CMP sensor.

NO - Go to "4) CYL line open-circuit inspection."

4) CYL line open-circuit inspection

• Connect the CMP sensor 2P connector (16). Check for continuity between the main wire harness side No.5 (Blue/Yellow) terminal and No.24 (Black) terminal of the ECM connector A (9).

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Go to "5) Camshaft pulley inspection."

NO - Repair open in the main wire harness between the ECM and the CMP sensor.

5) Camshaft pulley inspection

• Inspect the camshaft pulley.

◆Is the camshaft pulley damaged?

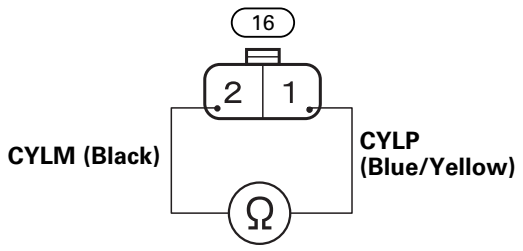
YES - Replace the camshaft pulley with a new one and recheck.

NO - Go to "6) CMP sensor inspection."

6) CMP sensor inspection

• Disconnect the CMP sensor 2P connector (16). Measure the resistance between the CMP sensor side No.1 terminal and No.2 terminal of the CMP sensor 2P connector (16).

CMP SENSOR 2P CONNECTOR
CMP SENSOR SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is the measurement within 288 — 352Ω?

YES - Replace the ECM with a new one and recheck.

NO - Replace the CMP sensor with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-72

8. IDLE CONTROL SYSTEM

• TROUBLESHOOTING

When the MIL does not come ON but an engine failure showing any of the following symptoms occurs, inspect the system(s) and part(s) in the numbered sequence.

• Hard to start
1. IAC valve (P. 5-74)
2. Pressure regulator control tube

• Engine starts but stalls soon
1. Idle adjusting screw
2. IAC valve (P.5-74)
3. Pressure regulator control tube

• Engine speed is higher than the specified idle speed after warming up.
1. Idle adjusting screw
2. IAC valve (P.5-74)
3. Pressure regulator control tube

• Engine speed is higher than the specified trolling speed after warming up.
1. Neutral switch (P. 18-17)
2. IAC valve (P. 5-74)
3. Idle adjusting screw
4. Pressure regulator control tube

• Engine speed is lower than the specified idle speed after warming up.
1. IAC valve (P. 5-74)
2. Idle adjusting screw
3. Pressure regulator control tube

• Engine speed is lower than the specified trolling speed after warming up.
1. IAC valve (P. 5-74)
2. Idle adjusting screw
3. Pressure regulator control tube

• Engine speed is not stable during idle and trolling.
1. IAC valve (P. 5-74)
2. Idle adjusting screw
3. Pressure regulator control tube
4. Neutral switch (P. 18-17)

• Idle Adjusting Screw Adjustment

Perform idle speed adjustment before adjusting the idle adjusting screw (P. 3-17).

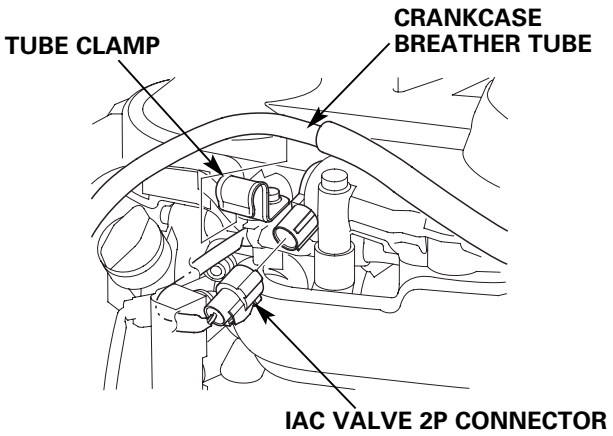
Adjustment with HDS

1) Disconnect the 4P connector (Red) and connect the HDS to the DLC (Data Link Connector) (P. 5-11).

2) Set the SCS mode using the HDS.
See the HDS Users Guide for instructions.

3) Release the crankcase breather tube from the tube clamp.

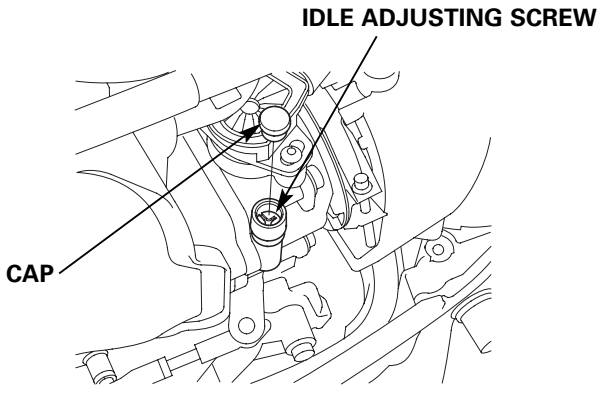
4) Disconnect the IAC valve 2P connector. (The MIL should come ON.)



5) Check the idle speed with the HDS.

Idle speed (in neutral)	700 ± 30 min^{-1} (rpm)

If the measurement is outside the specification, remove the cap and adjust the idle speed by turning the idle adjusting screw.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-73

6) Turn the combination switch OFF and install the cap.

7) Connect the IAC valve 2P connector and clear the DTC (P. 5-11).

8) Set the fuel tube on fuel tube clamp B.

9) Check the idle speed (P. 3-17).

Adjustment without HDS

1) Disconnect the 4P connector (Red) and connect the SCS short connector to the DLC (P. 5-42).

2) Disconnect the IAC valve 2P connector (P. 5-72). (The MIL should come ON.)

3) Release the crankcase breather tube from fuel tube clamp B.

4) Check the idle speed with a commercially available digital tachometer.

Idle speed (in neutral)	700 ± 30 min^{-1} (rpm)

If the measurement is outside the specification, remove the cap and adjust the idle speed by turning the idle adjusting screw (P. 5-72).

5) Turn the combination switch OFF and install the cap.

6) Connect the IAC valve 2P connector and reset the ECM (P. 5-42).

7) Set the crankcase breather tube on fuel tube clamp B.

8) Check the idle speed (P. 3-17).

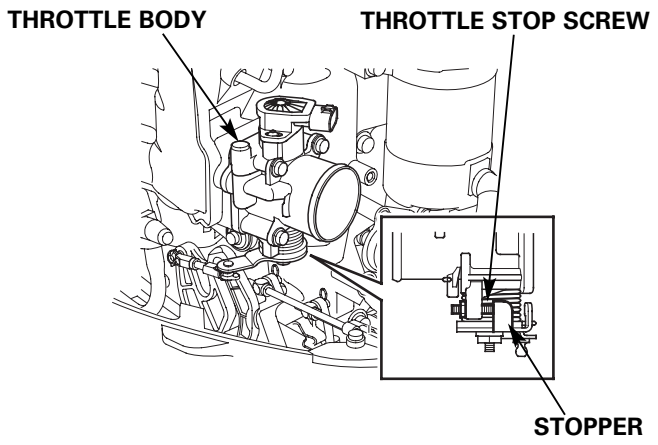
• Throttle Body Inspection/Cleaning

1) Remove the throttle body (P. 5-88).

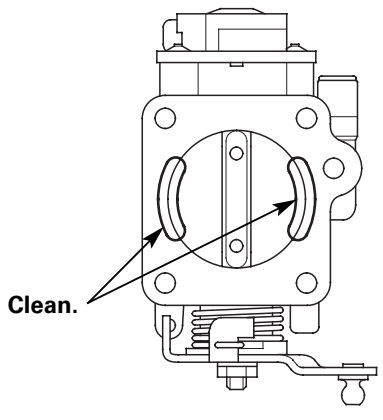
2) Turn the throttle cam and check whether the throttle valve moves from the fully closed position to the fully open position smoothly.

3) Turn the throttle lever and check the throttle valve shaft for play.

4) Check that there is no gap between the throttle lever and throttle stop screw.
The throttle stop screw cannot be adjusted. If it is faulty, replace the throttle body with a new one.



5) Check the throttle valve and bore for contamination. Clean if necessary.



6) Install the throttle body (P. 5-93).

7) Check the idle speed (P. 3-17).

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-74

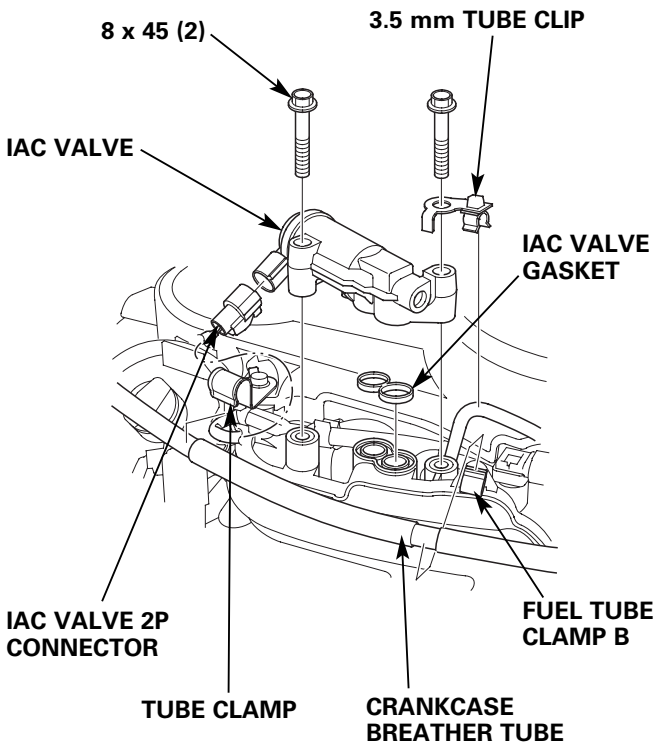
• IAC Valve Replacement

1) Remove the engine cover (P. 4-2)

2) Release the crankcase breather tube from the tube clamp and fuel tube clamp B.

3) Disconnect the IAC valve 2P connector.

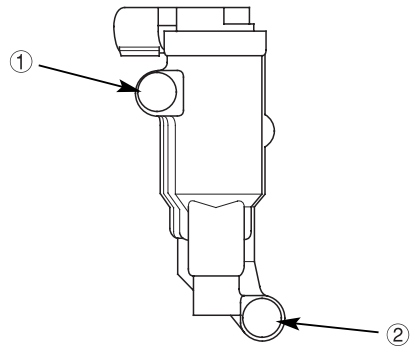
4) Remove the two 8 x 45 mm flange bolts, and remove the 3.5 mm tube clip, IAC valve and the IAC valve gasket.
Replace the IAC valve and gasket with new ones.



5) Set the new IAC valve gasket, IAC valve and the 3.5 mm tube clip on the intake manifold.

6) Tighten the 8 x 45 mm flange bolts in several steps to the specified torque in the numbered sequence shown.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



7) Connect the IAC valve 2P connector.

8) Secure the crankcase breather tube to the tube clamp and fuel tube clamp B.

9) Check the idle speed (P. 3-17).

10) Install the engine cover (P. 4-2).

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-75

9. FUEL SUPPLY SYSTEM

• TROUBLESHOOTING

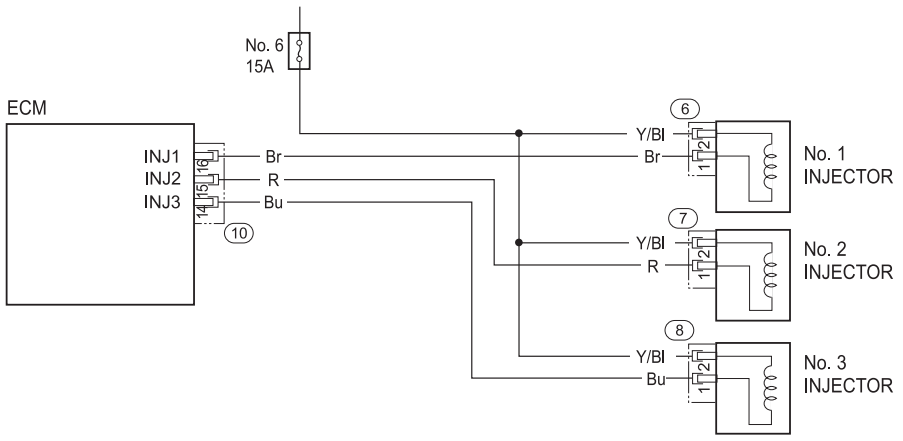
When the MIL does not come ON but an engine failure showing any of the following symptoms occurs, inspect the system(s) and part(s) in the numbered sequence.

Condition	Low pressure fuel supply system	High pressure fuel supply system
Hard to start	1. Fuel strainer (Low pressure side) ..... 3-12 2. Low pressure side fuel line ..... 5-84 3. Vapor separator..... 5-98	1. High pressure side fuel line..... 5-84 2. Fuel pump (High pressure side)..... 5-81 3. Injector..... 5-76
Engine starts but stalls soon	1. Fuel strainer (Low pressure side) ..... 3-12 2. Low pressure side fuel line ..... 5-84 3. Vapor separator..... 5-98	1. High pressure side fuel line..... 5-84 2. Injector..... 5-76 3. Pressure regulator 5-80
Engine speed is not stable during idle and trolling, or engine stalls	1. Fuel strainer (Low pressure side) 3-12	1. High pressure side fuel line..... 5-84 2. Injector..... 5-76 3. Pressure regulator 5-80
Engine sometimes misfires or tends to stall	1. Fuel strainer (Low pressure side) ..... 3-12 2. Low pressure side fuel line ..... 5-84 3. Fuel pump (Low pressure side) 5-111	1. High pressure side fuel line..... 5-84 2. Injector..... 5-76 3. Fuel pump (High pressure side)..... 5-81 4. Pressure regulator 5-80
Engine speed does not increase	1. Fuel pump (Low pressure side) ..... 5-111 2. Fuel strainer (Low pressure side) ..... 3-12 3. Low pressure side fuel line ..... 5-84 4. Vapor separator..... 5-98	1. High pressure side fuel line..... 5-84 2. Pressure regulator ..... 5-80 3. Fuel strainer (High pressure side)..... 3-16 4. Fuel pump (High pressure side)..... 5-81 5. Injector..... 5-76
Engine tends to stall during hot restart of the engine	1. Vapor separator..... 5-98	

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-76

• Injector Inspection



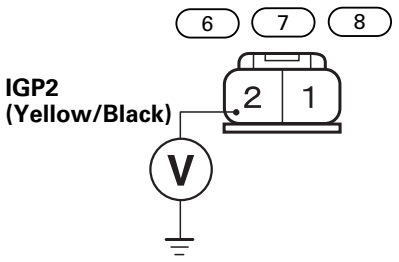
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

1) Injector power line open-circuit inspection

a. Turn the combination switch OFF. Disconnect the injector 2P connectors (6), (7) and (8).

b. Turn the combination switch ON. Measure the voltage between the main wire harness side No.2 (Yellow/Black) terminal of the respective injector 2P connectors (6), (7) and (8) and the engine ground.

INJECTOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

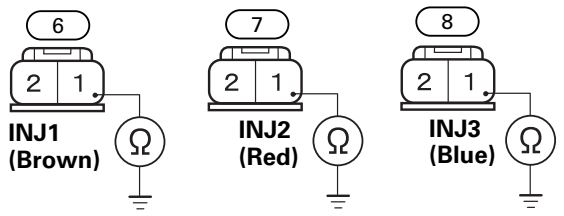
YES - Go to "2) Injector GND line short-circuit inspection."

NO - Check the No.6 fuse (P. 2-18) and the main relay (P. 18-17). If there is no problem, replace the main wire harness.

2) Injector GND line short-circuit inspection

• Turn the combination switch OFF. Disconnect the ECM connector B (10). Check for continuity between the main wire harness side No.1 terminal of the respective injector 2P connectors (6), (7) and (8) and the engine ground.

INJECTOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Repair short in the main wire harness between the ECM and the injector.

NO - Go to "3) Injector GND line open-circuit inspection."

Date of Issue: May 2008
© Honda Motor Co., Ltd.

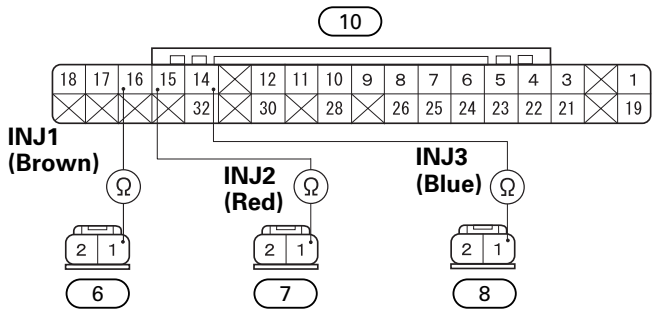
cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-77

3) Injector GND line open-circuit inspection

- Check for continuity between each main wire harness side connector of the ECM connector B (10) and the main wire harness side No.1 terminal of the respective injector 2P connectors (6), (7) and (8).

- Between No.16 terminal of (10) and No.1 terminal of (6)
- Between No.15 terminal of (10) and No.1 terminal of (7)
- Between No.16 terminal of (10) and No.1 terminal of (8)

ECM CONNECTOR B
MAIN WIRE HARNESS SIDE



INJECTOR 2P CONNECTOR
MAIN WIRE HARNESS SIDE

VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

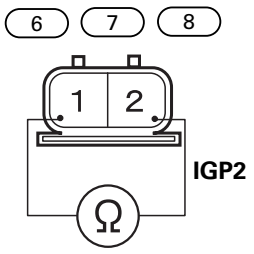
YES - Repair open in the main wire harness between the ECM and the injector.

NO - Go to "4) Injector inspection."

4) Injector inspection

- Measure the resistance between the injector side No.1 and No.2 terminals of all the injector 2P connectors.

INJECTOR 2P CONNECTOR
INJECTOR SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there 10 — 11Ω?

YES - Replace the ECM with a new one and recheck.

NO - Replace the injector with a new one.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-78

• How to Relieve Fuel Pressure

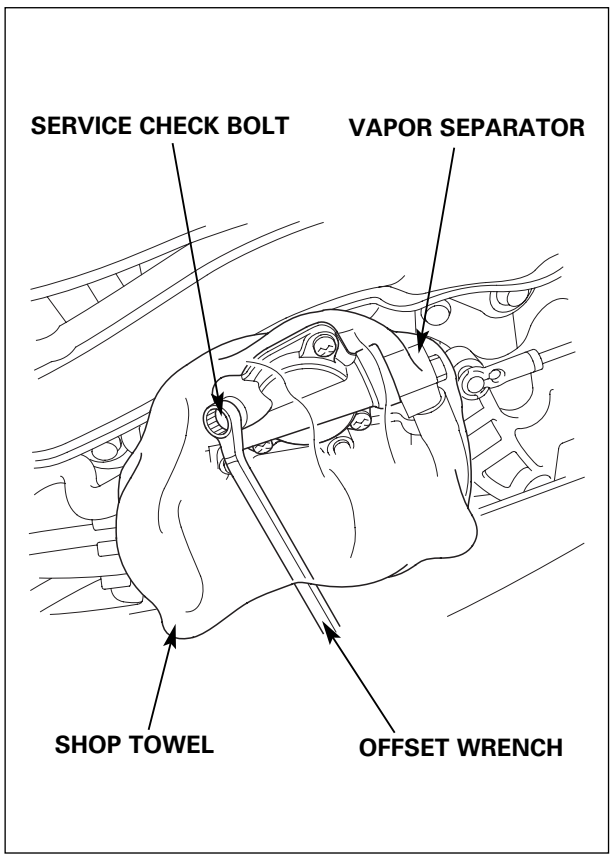
⚠WARNING

Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

1) Remove the engine cover (P. 4-2).

2) Set an offset wrench on the service check bolt of the vapor separator. Place a shop towel or equivalent material over the service check bolt.

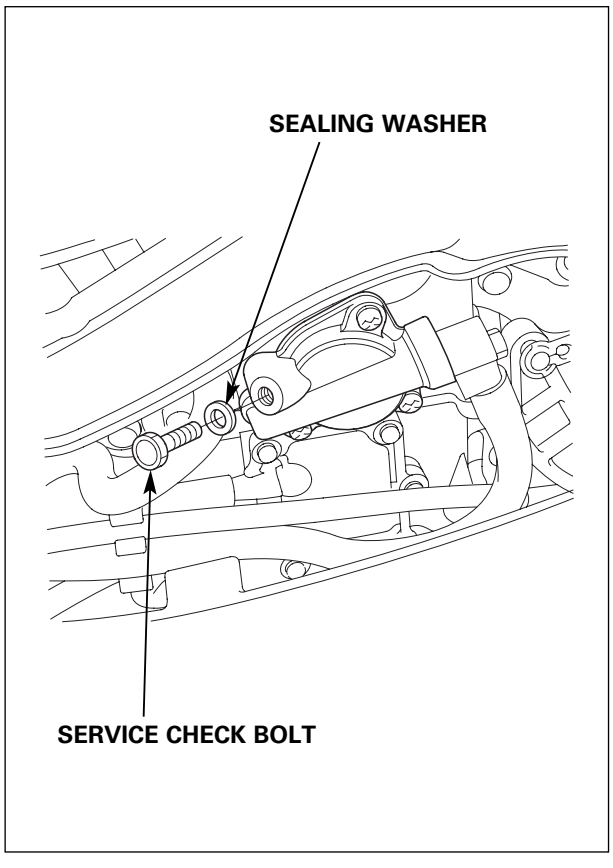
3) Loosen the service check bolt slowly approximately one turn to relieve the fuel pressure.



4) After relieving the fuel pressure, remove the service check bolt and sealing washer.
Replace the sealing washer with a new one.

5) Set a new sealing washer and tighten the service check bolt to the specified torque.

TORQUE: 11.8 N·m (1.2 kgf·m, 9 lbf·ft)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-79

• Fuel Pressure Measurement

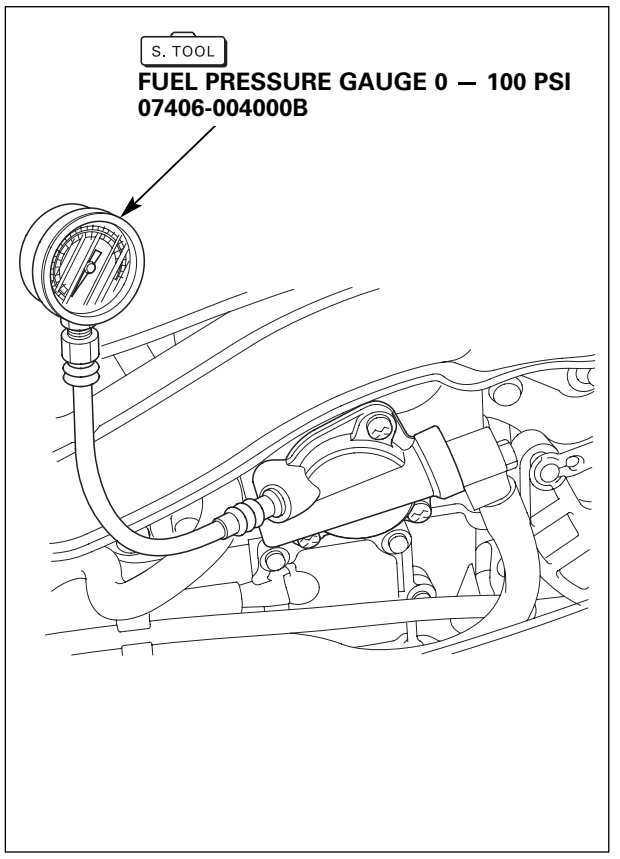
⚠WARNING

Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

1) Relieve the fuel pressure according to "How to Relieve Fuel Pressure" (P. 5-78).

2) Remove the service check bolt and set the special tool (fuel pressure gauge set) in the threaded bolt hole.

TOOL:
Fuel pressure gauge 0 — 100 PSI **07406-004000B**



3) Disconnect the pressure regulator control tube from the intake manifold, and plug the blind plug into the intake manifold.

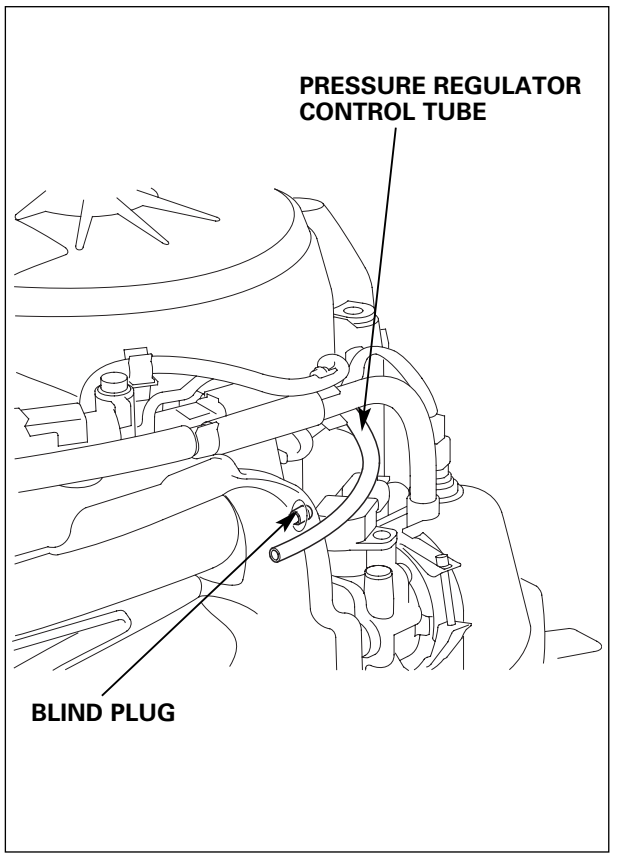
4) Start the engine and measure the fuel pressure at idle.

Standard fuel pressure (at idle speed: 850 ± 50 rpm)	280 — 330 kPa (2.9 — 3.4 kgf/cm², 41 — 48 psi)

5) When the fuel pressure is outside the specified standard pressure, check the following.

When fuel pressure is higher than standard pressure:
- Check the pressure regulator for proper operation (P. 5-80).
- Check the air vent tube for kinking, collapse or restrictions.

When fuel pressure is lower than standard pressure:
- Check the pressure regulator for proper operation (P. 5-80).
- Check the high pressure side fuel pump for proper operation (P. 5-81).



© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-80

• Pressure Regulator Inspection

⚠WARNING

Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

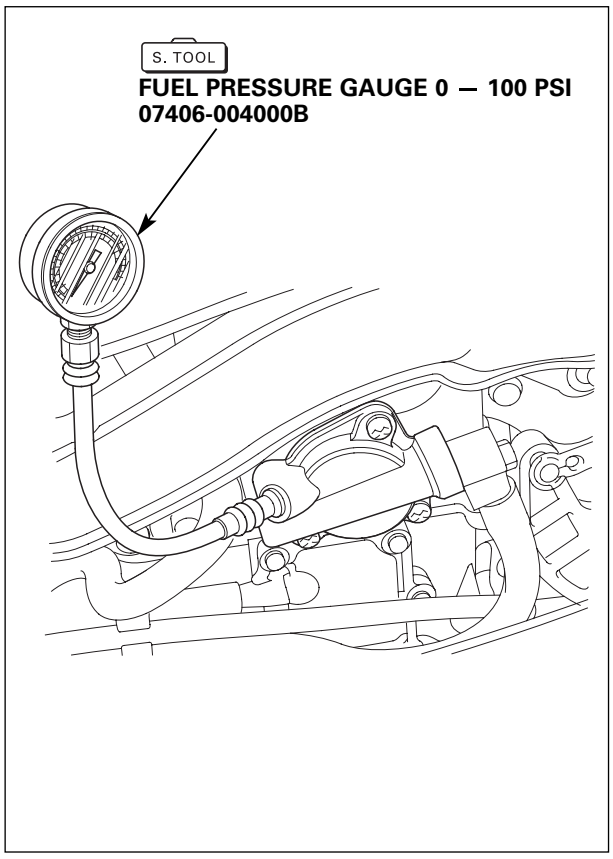
1) Check that the pressure regulator control tube is not bent, disconnected or damaged.

2) Relieve the fuel pressure according to "How to Relieve Fuel Pressure" (P. 5-78).

3) Remove the service check bolt and set the special tool (fuel pressure gauge set) in the threaded bolt hole.

   TOOL:
   Fuel pressure gauge 0 — 100 PSI 07406-004000B

4) Start the engine and measure the fuel pressure at idle.

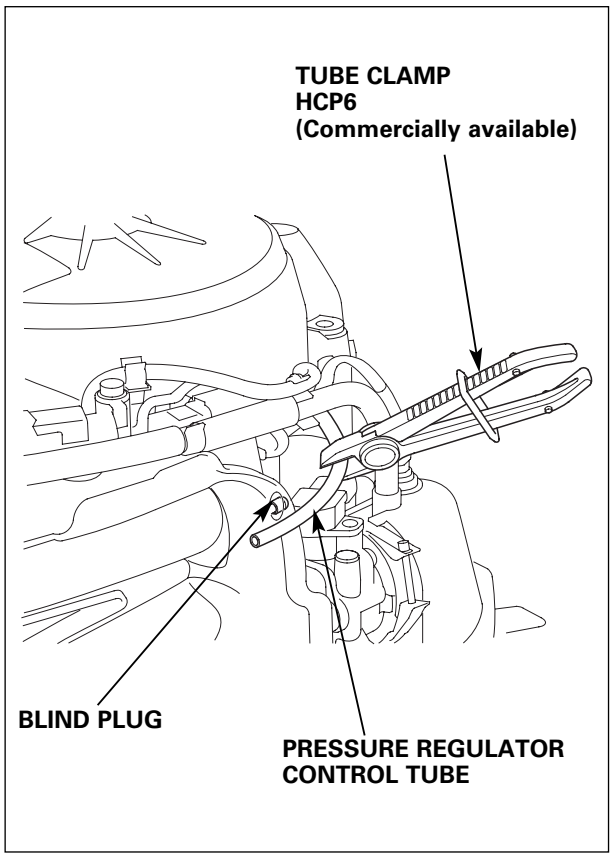


5) Disconnect the pressure regulator control tube from the intake manifold. Plug the blind plug into the intake manifold.

6) Clamp the pressure regulator control tube with a commercially available tube clamp.

7) Check that the fuel pressure is higher than the pressure measured in step 4.

8) If the fuel pressure is not higher than the pressure measured in step 4, replace the pressure regulator.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-81

• Fuel Pump (High Pressure Side) Inspection

⚠WARNING

Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

1) Remove the emergency stop switch clip.

2) Turn the combination switch ON. Operate the fuel pump (high pressure side) and check that it operates for approximately 2 seconds.
If it does not sound, check the fuel pump (high pressure side) main wire harness (P. 5-82).

3) Relieve the fuel pressure according to "How to Relieve Fuel Pressure" (P. 5-78).

4) Remove the service check bolt and set the special tool (fuel pressure hose) in the threaded bolt hole.

TOOL:
Fuel pressure hose **07406-004020B**

5) Operate the priming pump and feed the fuel to the vapor separator.

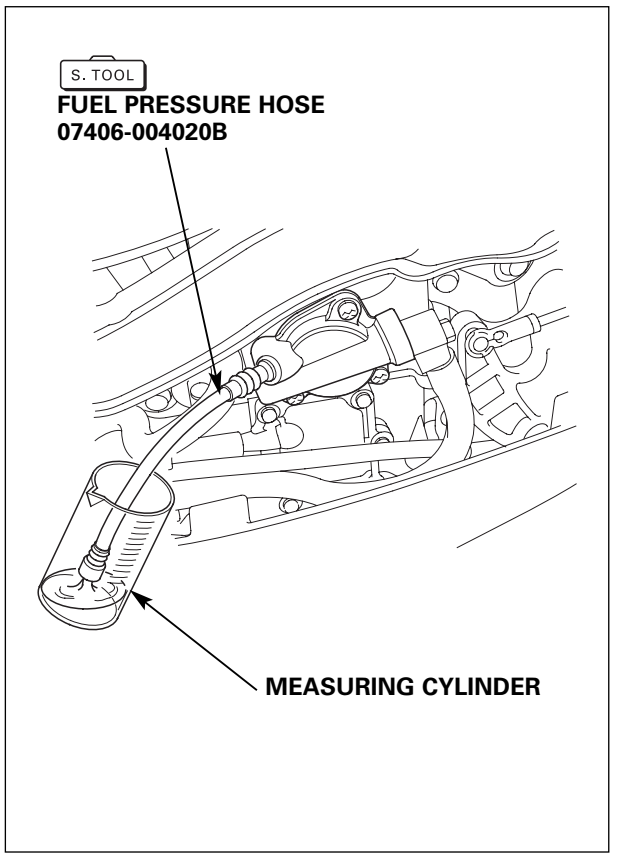
6) Turn the combination switch ON. Operate the fuel pump once for approximately 2 seconds and measure the gasoline discharge volume using a measuring cylinder.

Standard discharge volume	35 cm³ (1.2 US oz, 1.2 Imp oz) or more

7) If there is no discharge or discharge volume is too small, check the following.

- Check the fuel strainer (high pressure side) for blockage (P. 3-16).
- Check the fuel hose for blockage.
- Check the pressure regulator for proper operation (P. 5-80).

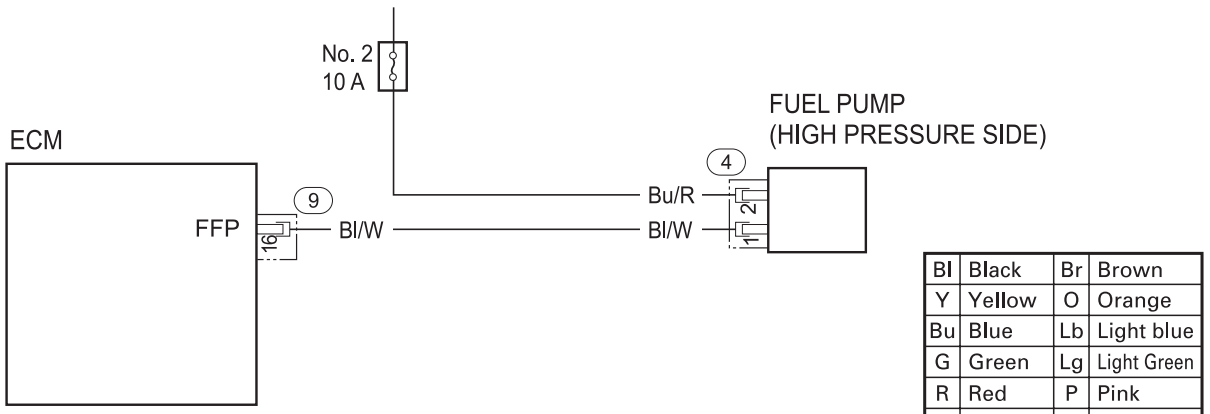
8) If no abnormality is detected, replace the fuel pump (high pressure side).



© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-82

• Fuel Pump (High Pressure Side) Main Wire Harness Inspection



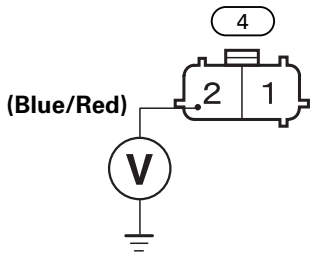
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

1) Fuel pump power line open-circuit inspection

a. Turn the combination switch OFF and disconnect the fuel pump 2P connector (4).

b. Turn the combination switch ON. Measure the voltage between the fuel pump 2P connector (4) main wire harness side No.2 (Blue/Red) terminal and the engine ground.

FUEL PUMP 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Is there battery voltage?

YES - Go to "2) Fuel pump GND line open-circuit inspection."

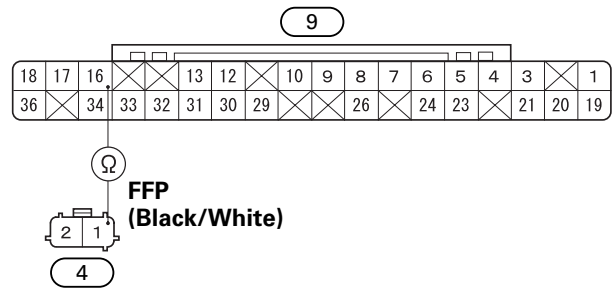
NO - Check the No.2 fuse (P. 2-18) and main relay (P. 18-17). If there is no problem, replace the main wire harness.

2) Fuel pump GND line open-circuit inspection

a. Turn the combination switch OFF and disconnect the ECM connector A (9).

b. Check for continuity between the ECM connector A (9) main wire harness side No.16 (Black/White) terminal and the fuel pump 2P connector (4) main wire harness side No.1 (Black/White) terminal.

ECM CONNECTOR A
MAIN WIRE HARNESS SIDE



FUEL PUMP 2P CONNECTOR
MAIN WIRE HARNESS SIDE

VIEWED FROM THE TERMINAL SIDE

◆Is there continuity?

YES - Go to the step c.

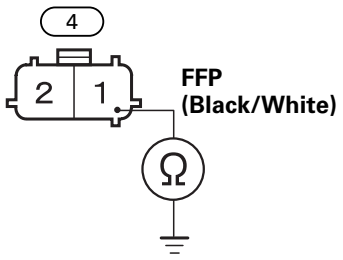
NO - Repair open in the main wire harness between the ECM and the fuel pump.

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-83

c. Connect the ECM connector A (9). Check for continuity between the fuel pump 2P connector (4) main wire harness side No.1 (Black/White) terminal and the engine ground.

FUEL PUMP 2P CONNECTOR
MAIN WIRE HARNESS SIDE



VIEWED FROM THE TERMINAL SIDE

◆Turn the combination switch ON. Is there continuity for 2 seconds?
YES - Replace the fuel pump with a new one.
NO - Replace the ECM with a new one and recheck.

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 1.qxp 2008/04/10 13:21 ページ 5-84

• Fuel Line Inspection

⚠WARNING

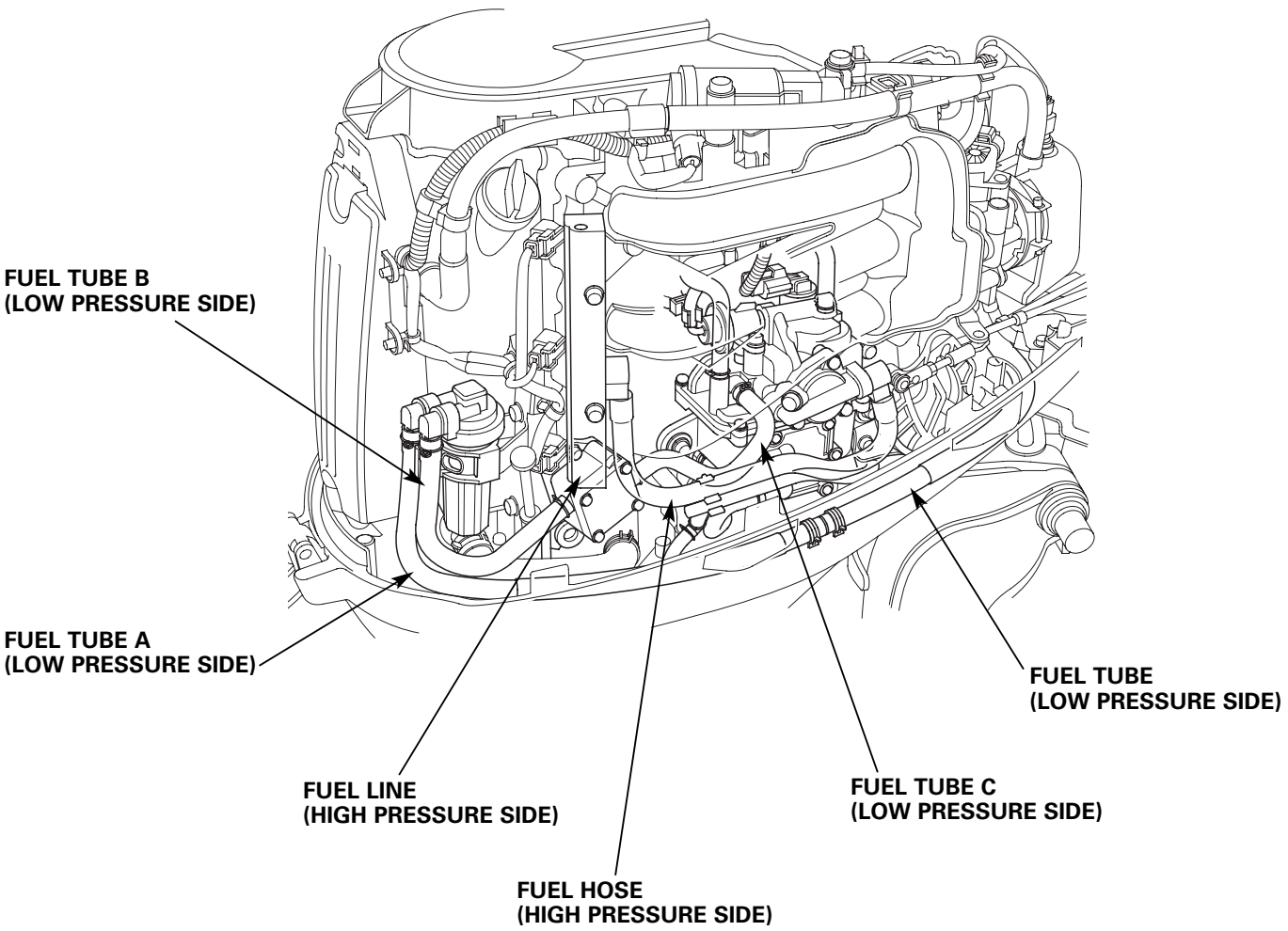
Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

1) Check the fuel line, fuel hoses and the fuel tubes for damage, fuel leakage, corrosion and other abnormalities. Check that the hoses and tubes are not interfering with the neighboring parts.

2) Replace the hose or tube if there is damage, fuel leakage, corrosion, etc.

   Note the following when replacing the fuel line.

   - Relieve the fuel pressure according to "How to Relieve Fuel Pressure" before replacing the high pressure side fuel line (P. 5-78).
   - Replace the O-rings with the new ones, and coat them with engine oil before installation.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-85

10. INJECTOR

⚠WARNING

Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

a. FUEL LINE ASSEMBLY REMOVAL

1) Remove the engine cover (P. 4-2).

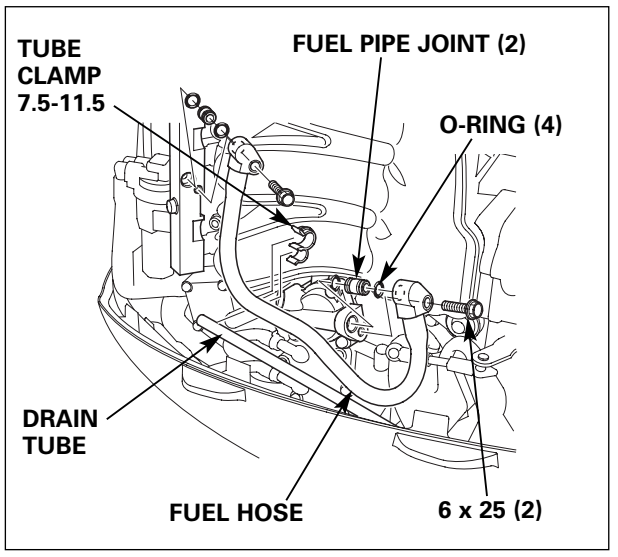
2) Relieve the fuel pressure according to "How to Relieve Fuel Pressure" (P. 5-78).

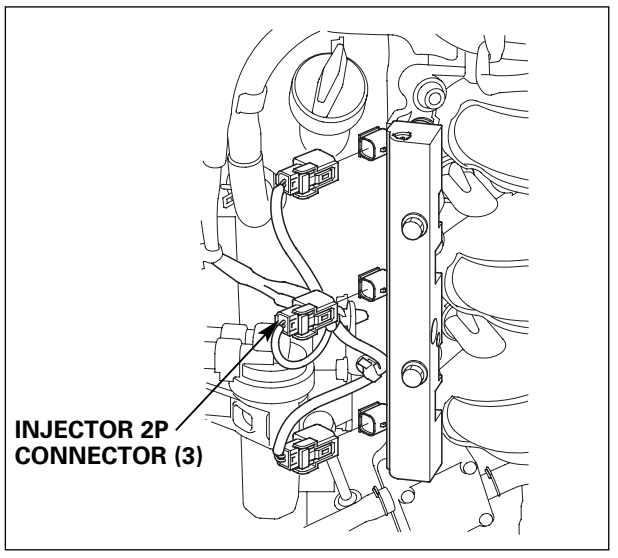
3) Remove the drain tube and tube clamp 7.5-11.5 from the fuel hose.

4) Remove the two 6 x 25 mm flange bolts and remove the fuel hose.

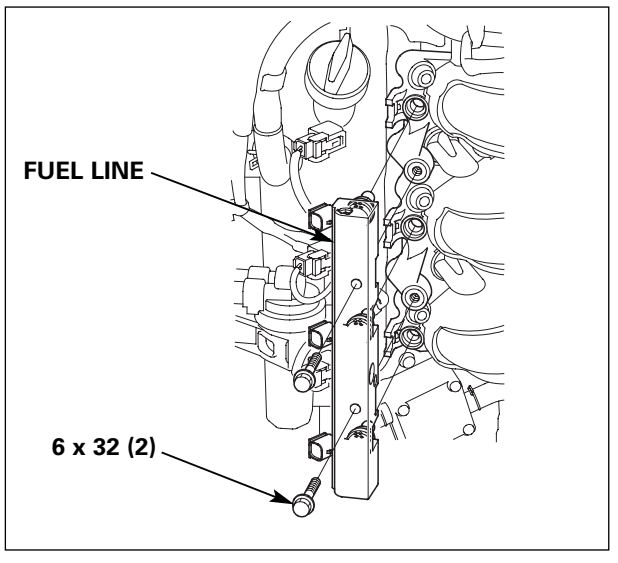
5) Remove the two fuel pipe joints and remove the four O-rings.
Replace the O-rings with the new ones.

6) Disconnect the three injector 2P connectors.





7) Remove the two 6 x 32 mm flange bolts and remove the fuel line.

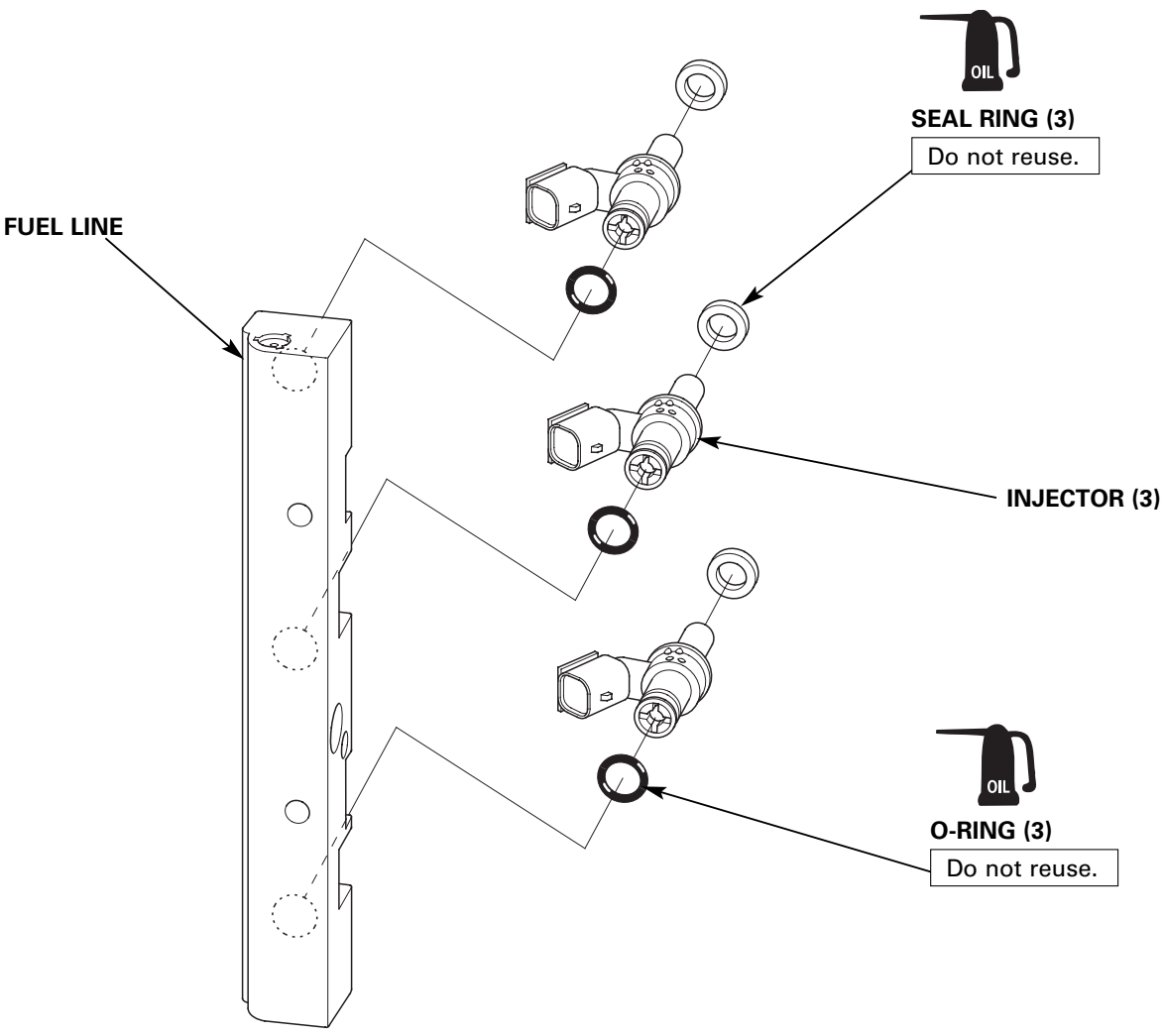


© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-86

b. INJECTOR/FUEL LINE DISASSEMBLY/REASSEMBLY

- Replace O-rings and seals with new ones.
- Apply engine oil to the new O-rings and seals, then install them on the injectors.



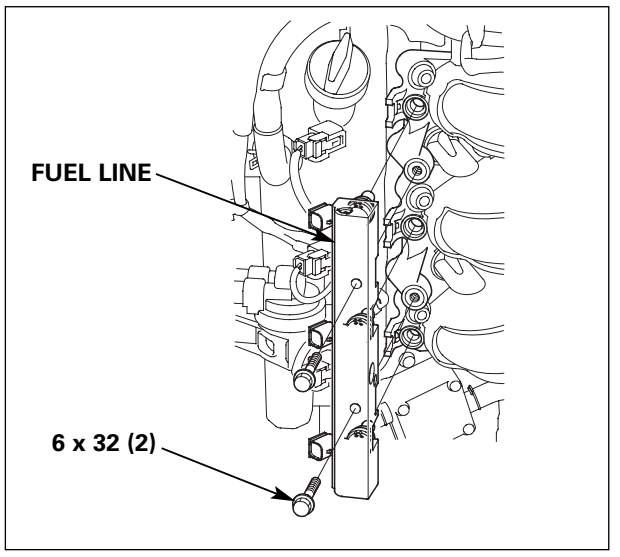
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-87

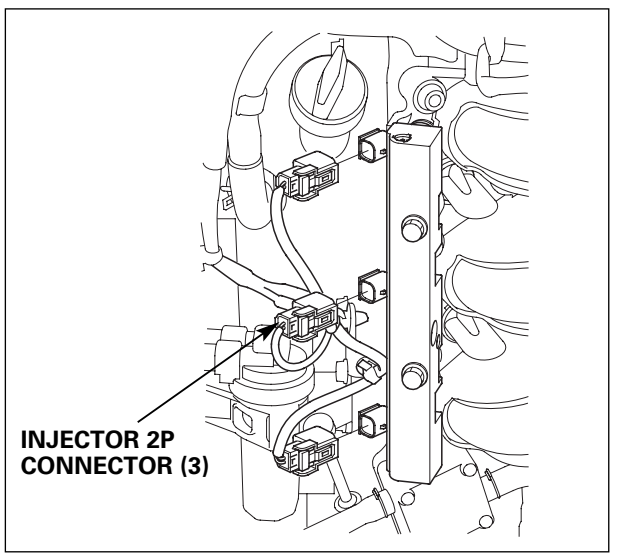
c. FUEL LINE ASSEMBLY INSTALLATION

1) Set the fuel line and tighten the two 6 x 32 mm flange bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



2) Connect the three injector 2P connectors.



3) Apply engine oil to the four new O-rings and install them on the fuel pipe joints.

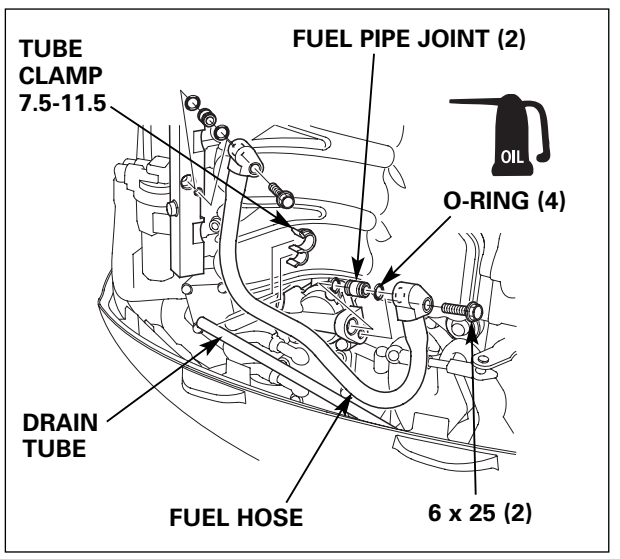
4) Set the two fuel pipe joints and install the fuel hose.

5) Tighten the two 6 x 25 mm flange bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

6) Install the tube clamp 7.5-11.5 on the fuel hose and connect the drain tube to the fuel hose.

7) Install the engine cover (P. 4-2).



© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-88

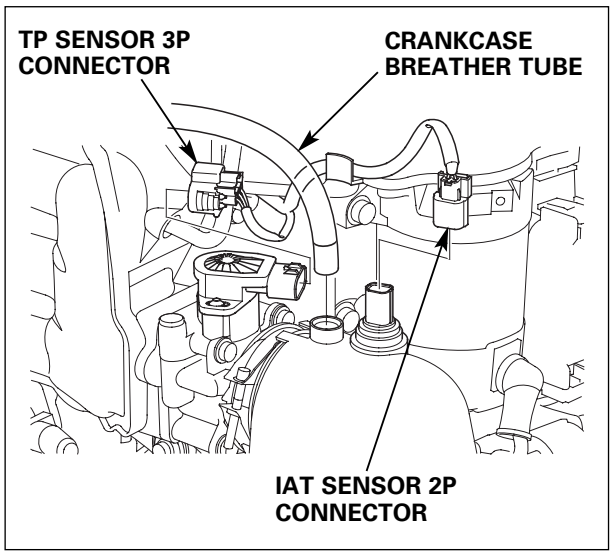
11. SILENCER/THROTTLE BODY/ INTAKE MANIFOLD

a. REMOVAL

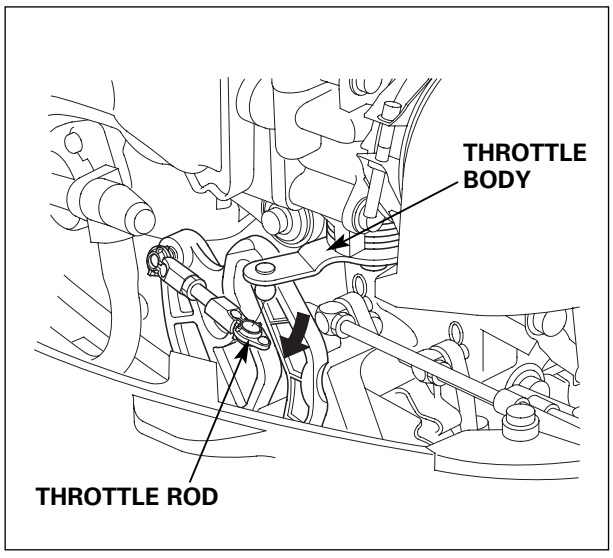
• SILENCER/THROTTLE BODY

1) Remove the engine cover (P. 4-2).

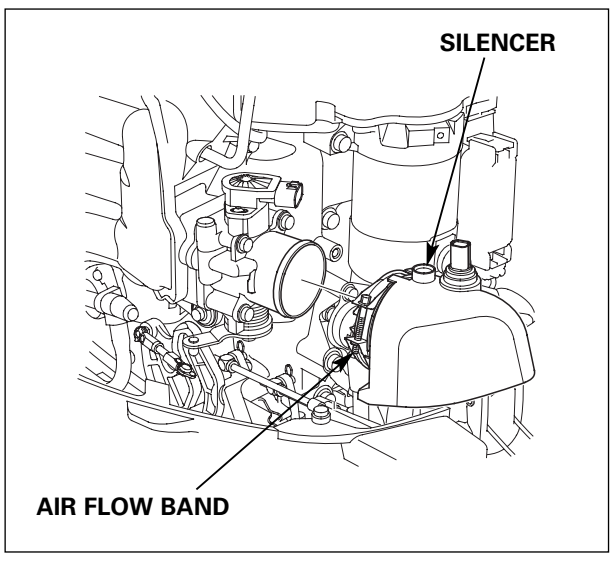
2) Disconnect the IAT sensor 2P connector, TP sensor 3P connector and the crankcase breather tube.



3) Disconnect the throttle rod from the throttle body.



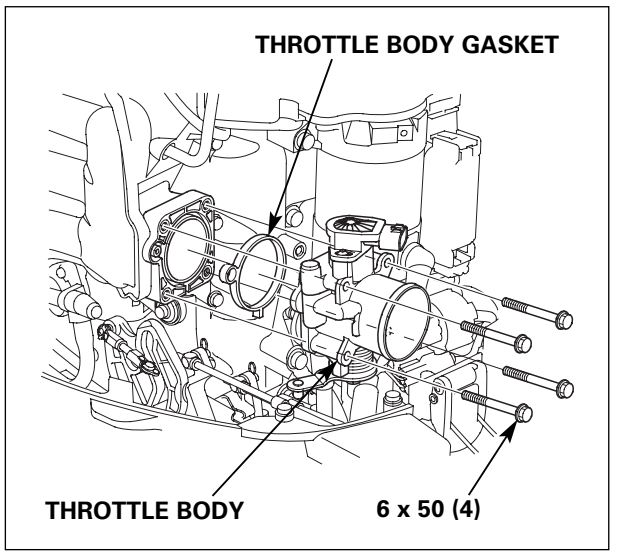
4) Loosen the air flow band and remove the silencer.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-89

5) Remove the four 6 x 50 mm flange bolts, and remove the throttle body and throttle body gasket.
Replace the throttle body gasket with a new one.



• INTAKE MANIFOLD/THROTTLE BODY/ SILENCER ASSEMBLY

⚠WARNING

Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

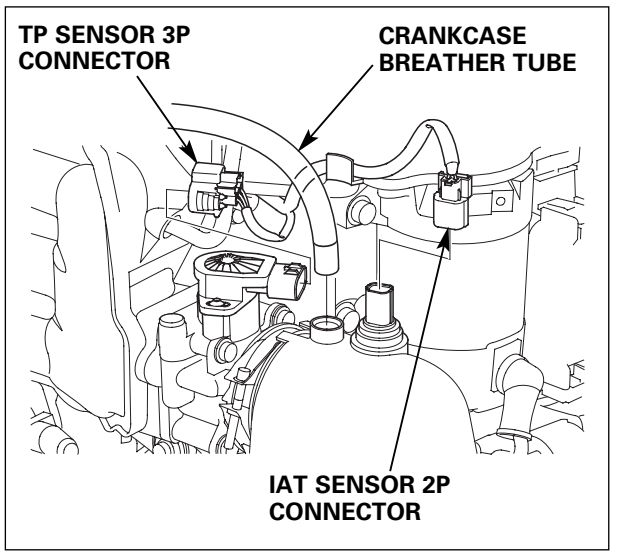
1) Remove the engine cover (P. 4-2).

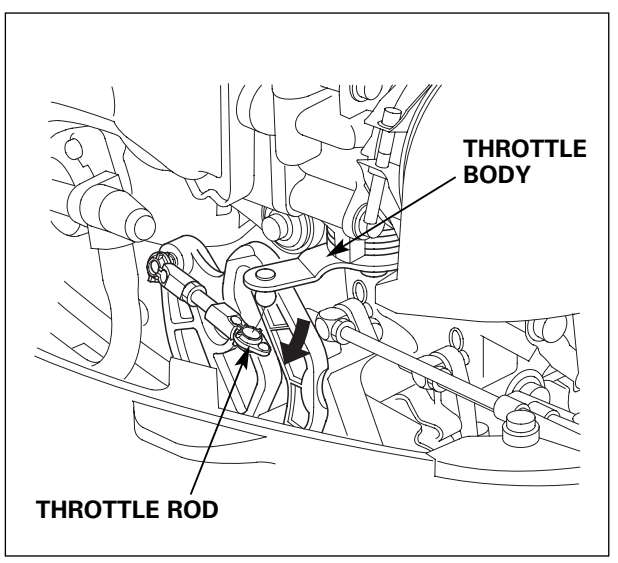
2) Relieve the fuel pressure according to "How to Relieve Fuel Pressure" (P. 5-78).

3) Disconnect the fuel hose (P. 5-85).

4) Disconnect the IAT sensor 2P connector, TP sensor 3P connector and the crankcase breather tube.

5) Disconnect the throttle rod from the throttle body.

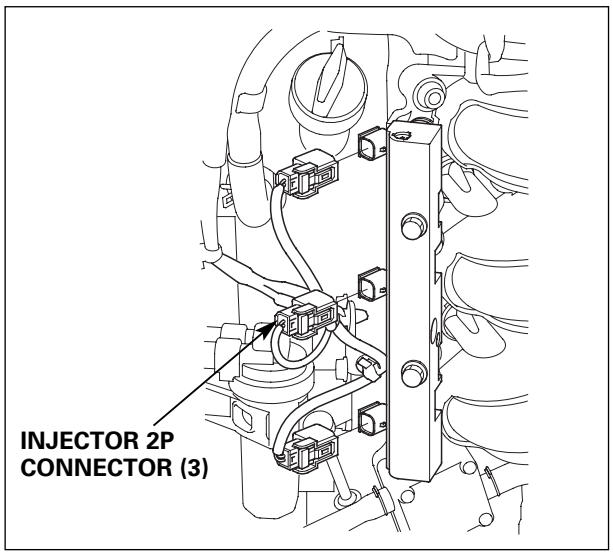




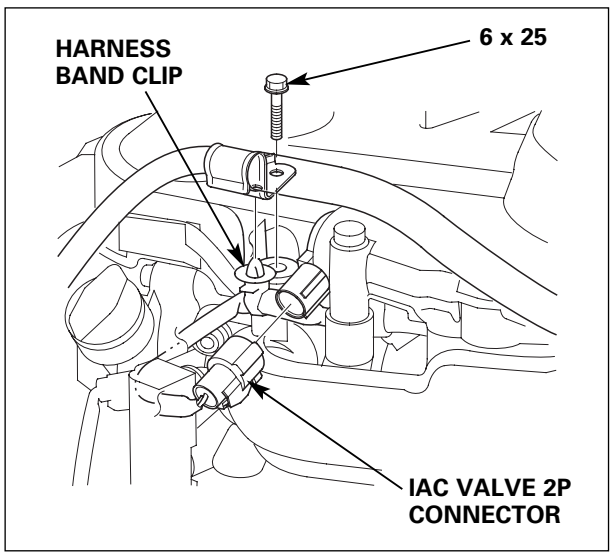
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-90

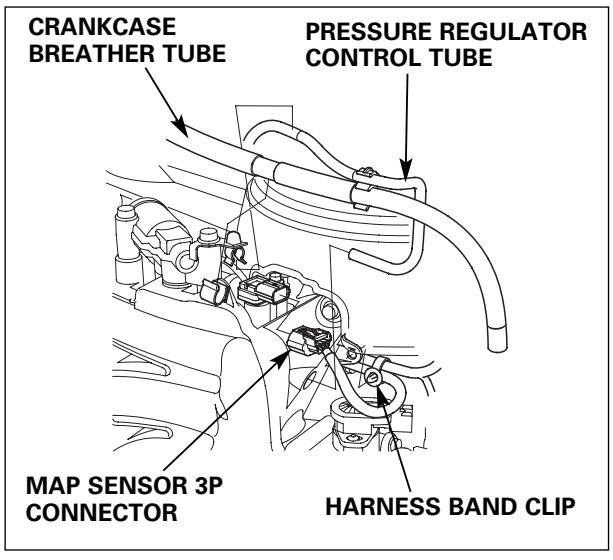
6) Disconnect the three injector 2P connectors.



7) Remove the 6 x 25 mm flange bolt. Release the harness band clip and disconnect the IAC valve 2P connector.



8) Disconnect the pressure regulator control tube at the two points. Release the harness band clip and disconnect the crankcase breather tube and the MAP sensor 3P connector.

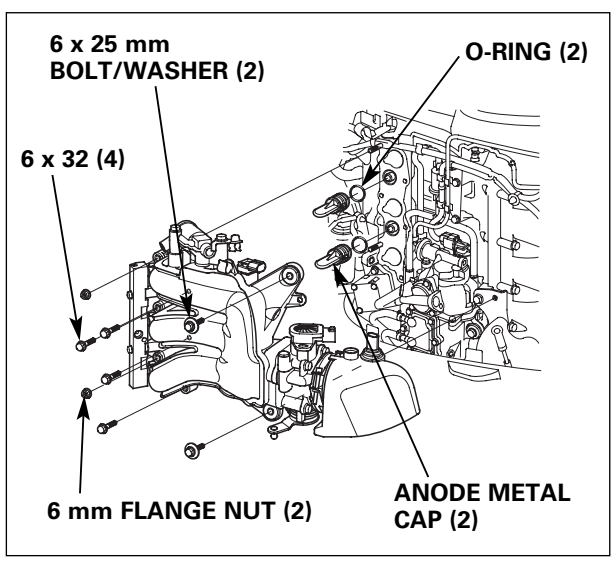


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-91

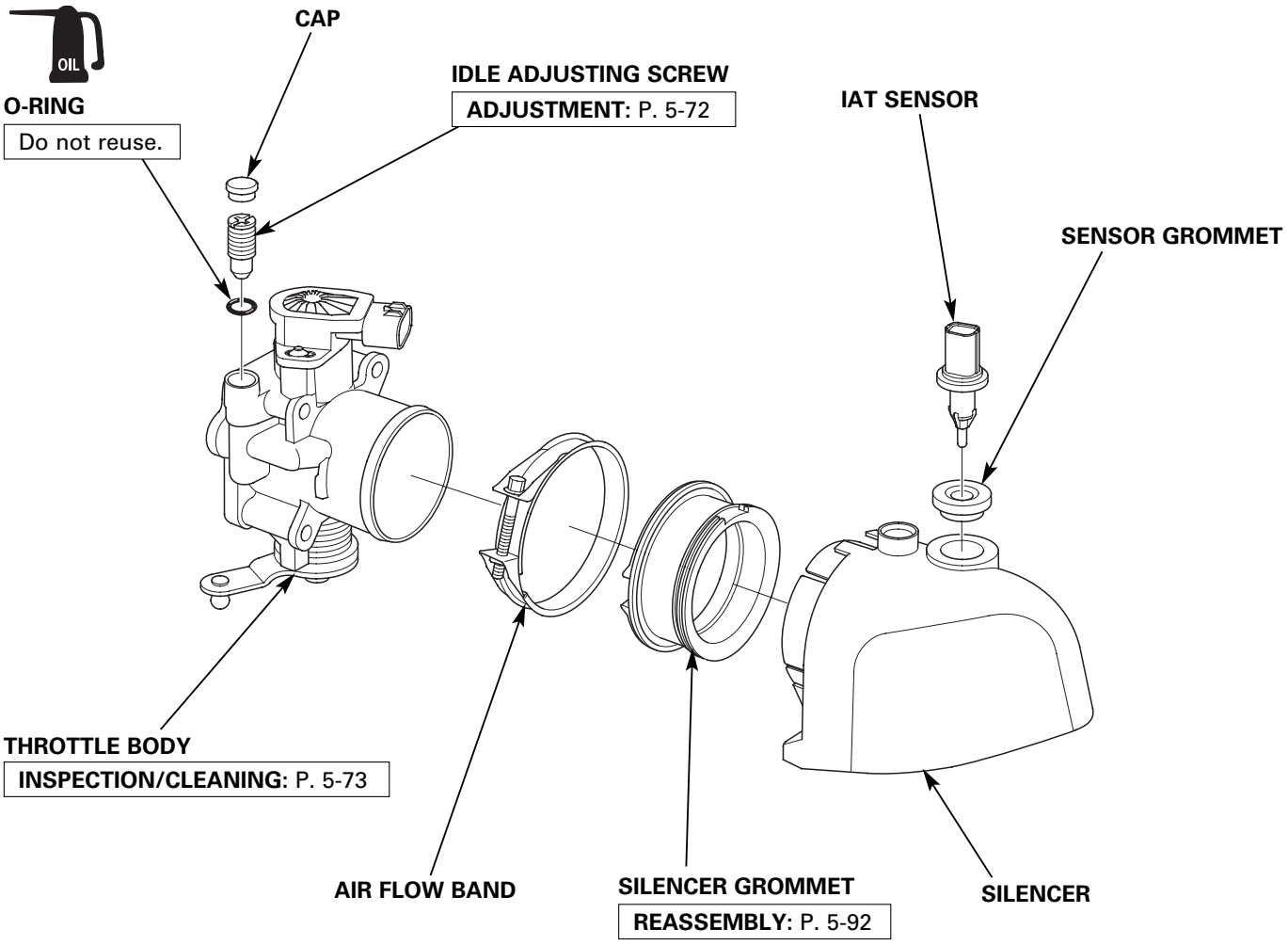
9) Remove the four 6 x 32 mm flange bolts, two 6 mm flange nuts and the two 6 x 25 mm bolt/washers. Remove the intake manifold/throttle body/silencer assembly.

10) Remove the two anode metal caps and remove the O-rings. Replace the O-rings with the new ones.



b. DISASSEMBLY/REASSEMBLY

• SILENCER/THROTTLE BODY



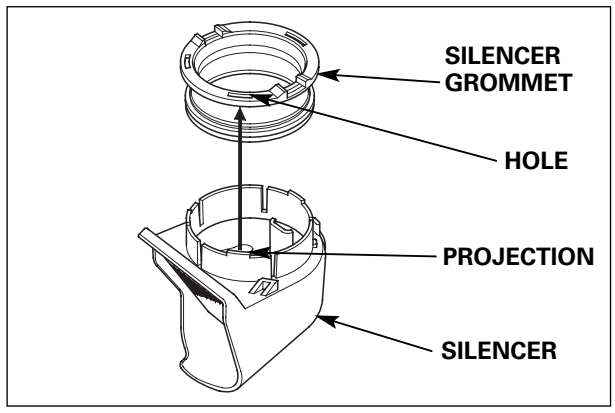
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-92

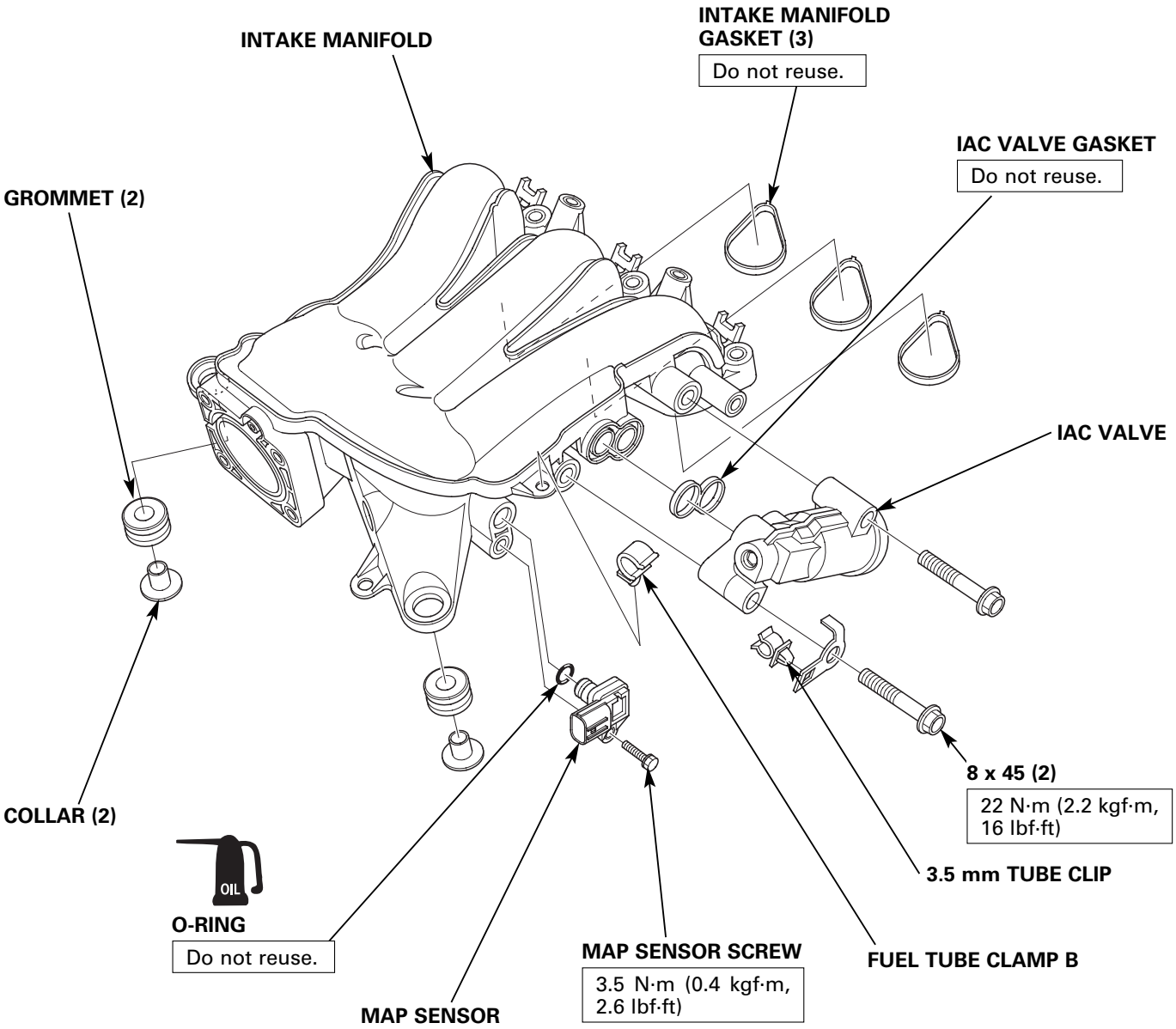
• SILENCER GROMMET

REASSEMBLY:

Install the silencer grommet, aligning the hole in the silencer grommet with the projection on the silencer.



• INTAKE MANIFOLD ASSEMBLY



Date of Issue: May 2008
© Honda Motor Co., Ltd.

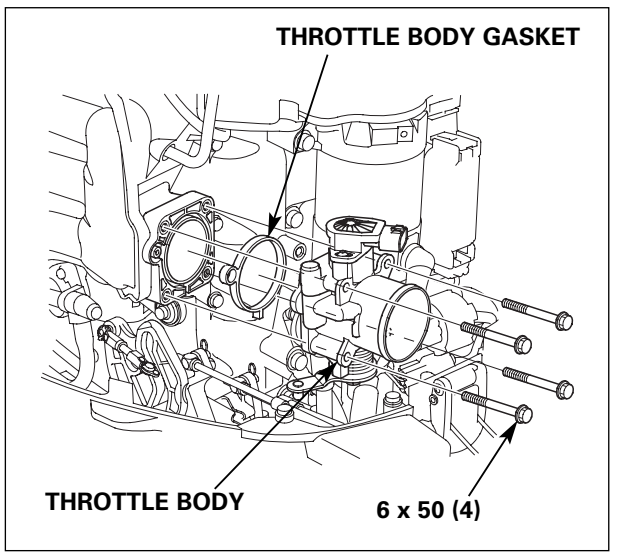
cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-93

c. INSTALLATION

• SILENCER/THROTTLE BODY

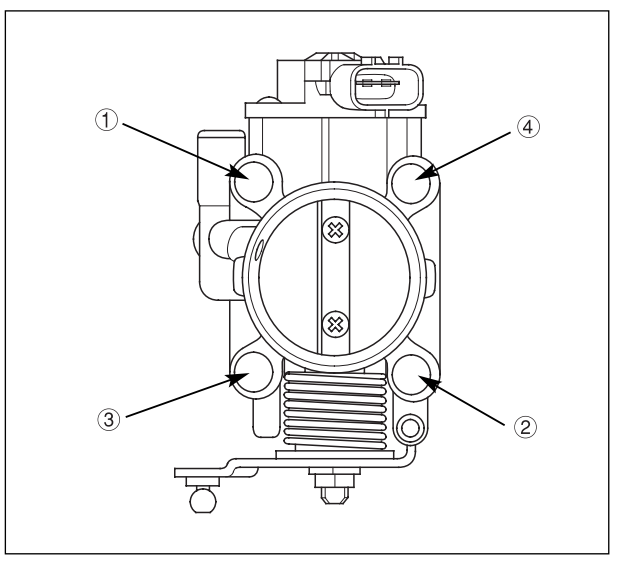
1) Install the new throttle body gasket on the intake manifold.

2) Set the throttle body and loosely tighten the four 6 x 50 mm flange bolts.

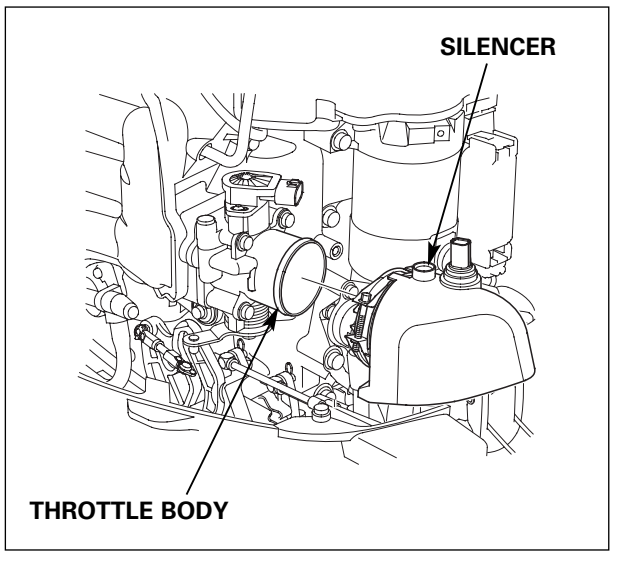


3) Tighten the four 6 x 50 mm flange bolts in several steps to the specified torque in the numbered sequence shown.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



4) Set the silencer on the throttle body.



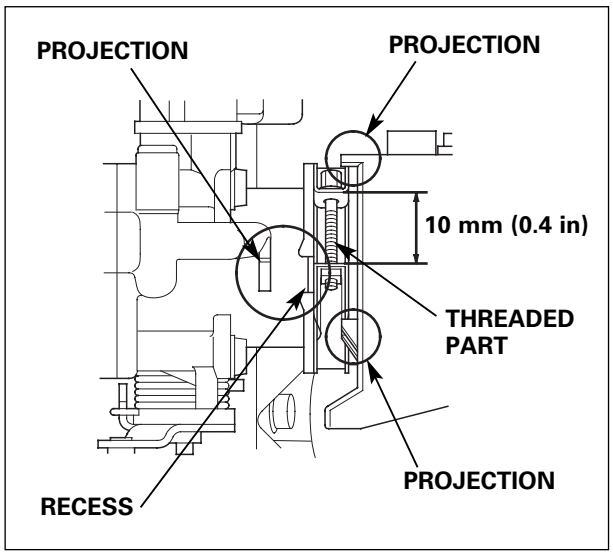
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-94

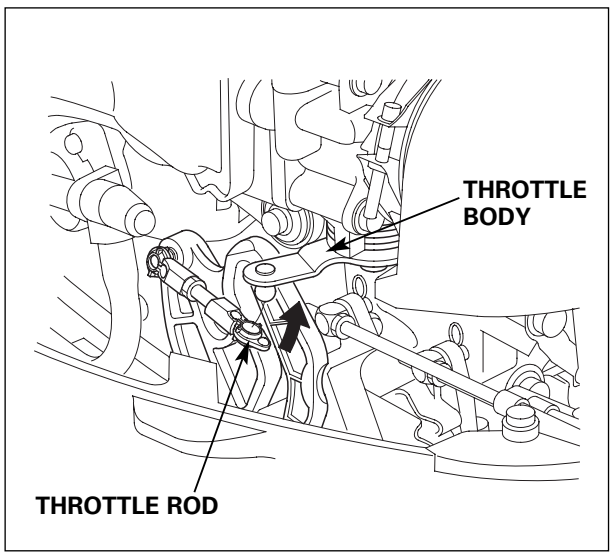
5) Align the projection on the throttle body with the recess in the silencer grommet as shown.

6) Set the air flow band so its threaded part is between the projections on the silencer as shown.

7) Tighten the air flow band to the dimension shown.



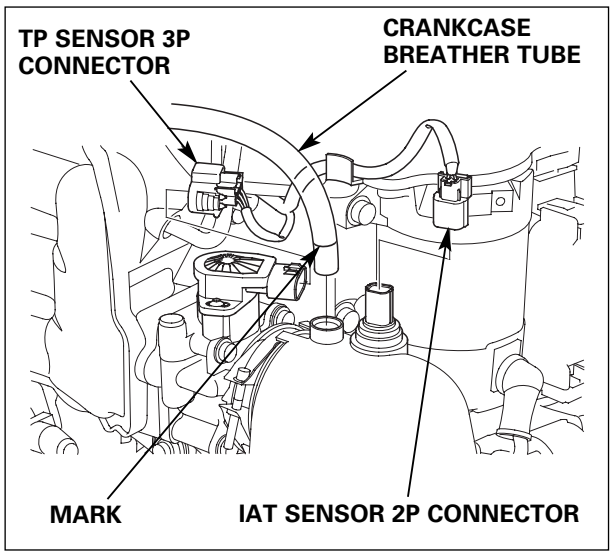
8) Install the throttle rod on the throttle body.



9) Connect the IAT sensor 2P connector and the TP sensor 3P connector as shown.

10) Insert the crankcase breather tube up to the marked point into the silencer.

11) Install the engine cover (P. 4-2).



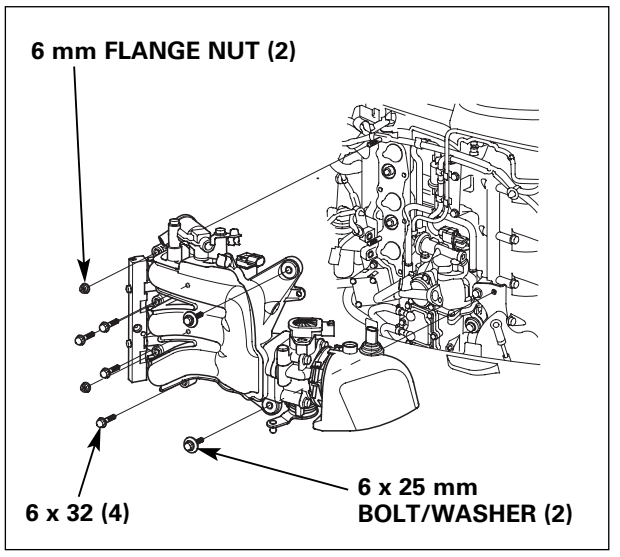
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-95

• INTAKE MANIFOLD/THROTTLE BODY/ SILENCER ASSEMBLY

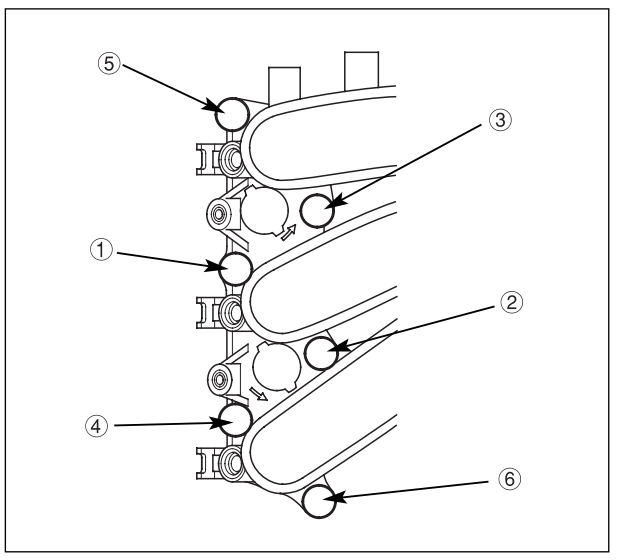
1) Set the intake manifold assembly. Loosely tighten the four 6 x 32 mm flange bolts and the two 6 mm flange nuts.

2) Tighten the two 6 x 25 mm bolt/washers securely.

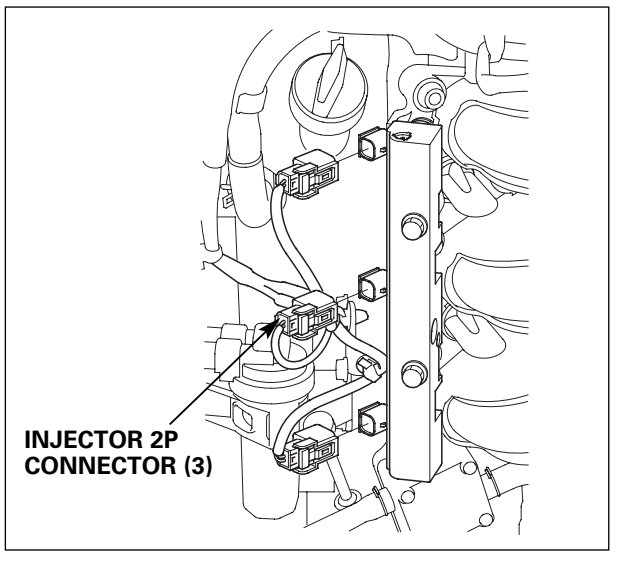


3) Tighten the four 6 x 32 mm flange bolts and the two 6 mm flange nuts in several steps to the specified torque in the numbered sequence shown.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



4) Connect the three injector 2P connectors.

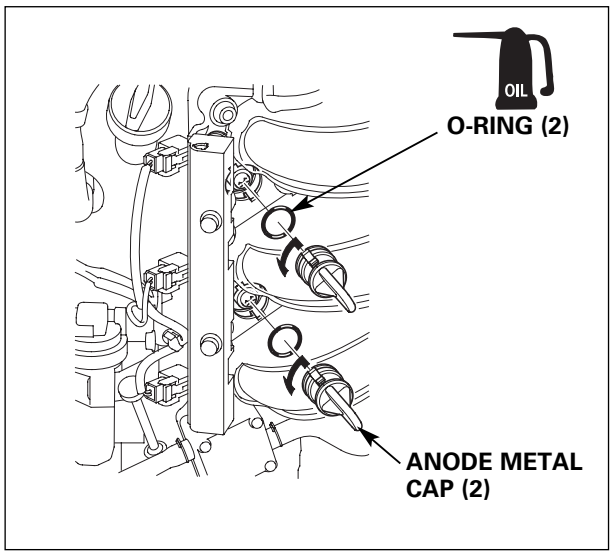


© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-96

5) Apply engine oil to the two new O-rings and install them on the two anode metal caps respectively.

6) Install the anode metal caps on the intake manifold assembly.

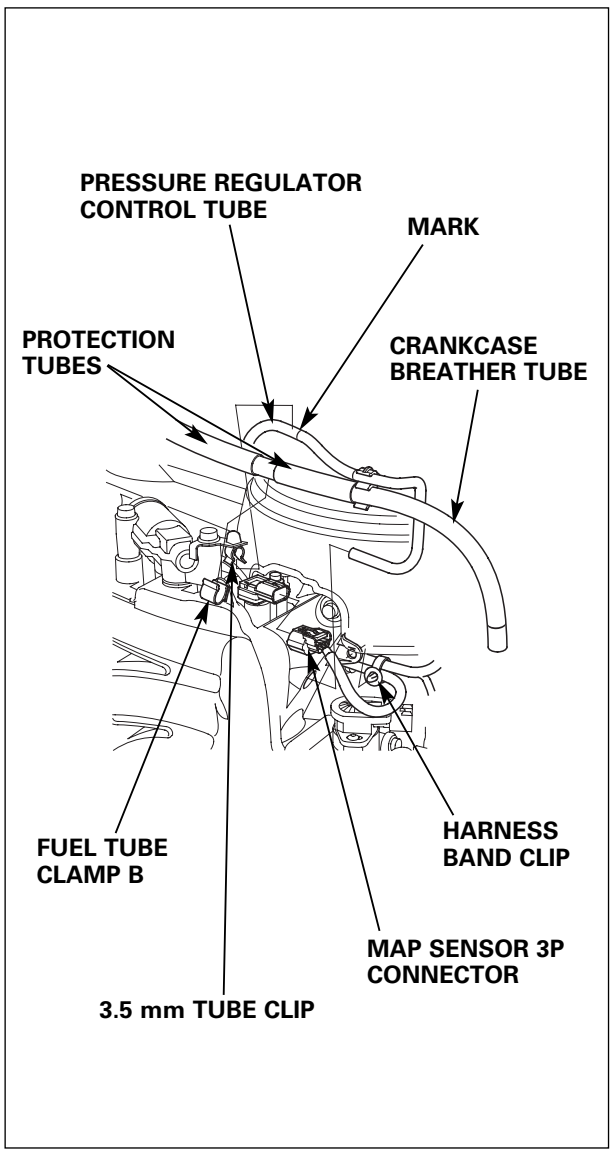


7) Connect the MAP sensor 3P connector and install the harness band clip.

8) Install fuel tube clamp B between the protection tubes on the crankcase breather tube.

9) Connect the pressure regulator control tube to the intake manifold assembly.

10) Install the pressure regulator control tube so that the mark on the tube is at the right end of the 3.5 mm tube clip.

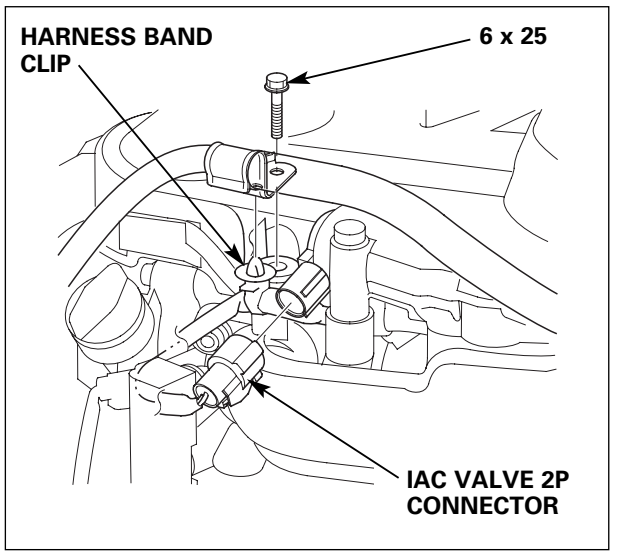


Date of Issue: May 2008
© Honda Motor Co., Ltd.

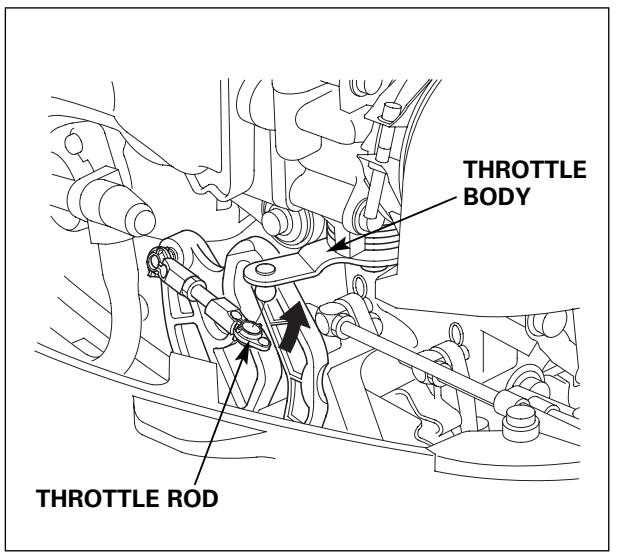
cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-97

11) Connect the IAC valve 2P connector and tighten the 6 x 25 mm flange bolt securely.

12) Install the harness band clip.



13) Install the throttle rod on the throttle body.

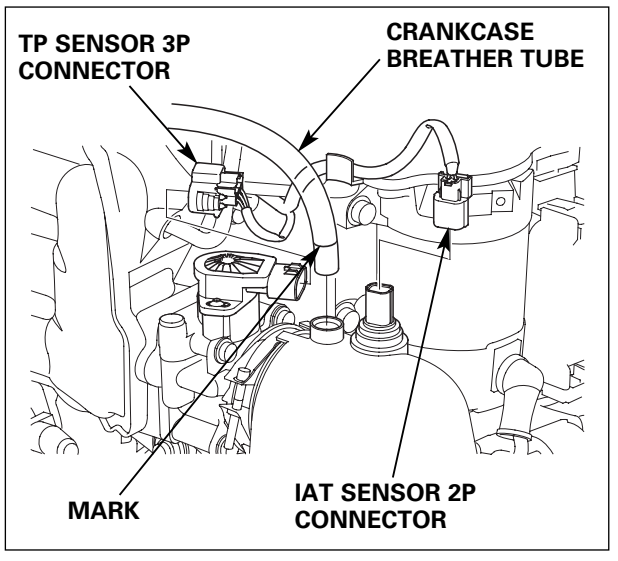


14) Connect the IAT sensor 2P connector and the TP sensor 3P connector.

15) Insert the crankcase breather tube into the silencer up to the marked point.

16) Install the fuel hose (P. 5-87).

17) Install the engine cover (P. 4-2).



© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-98

12. VAPOR SEPARATOR/PRESSURE REGULATOR/FUEL PUMP (HIGH PRESSURE SIDE)

⚠WARNING

Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

a. REMOVAL

Remove the following parts.
- Engine cover (P. 4-2)
- Intake manifold/throttle body/silencer assembly (P. 5-89)

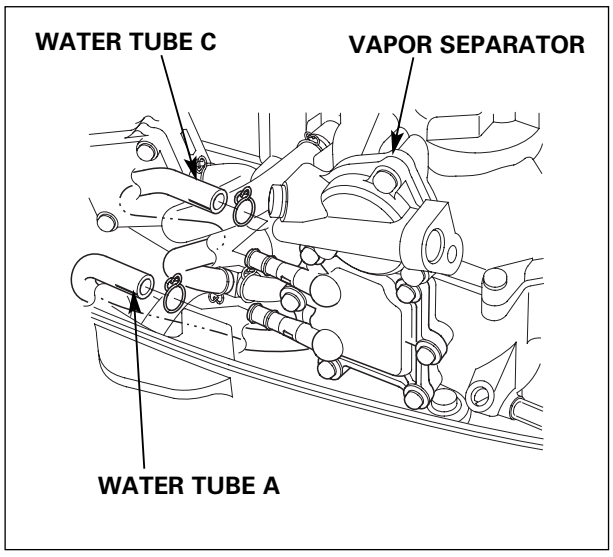
1) Disconnect water tube A and water tube C from the vapor separator.

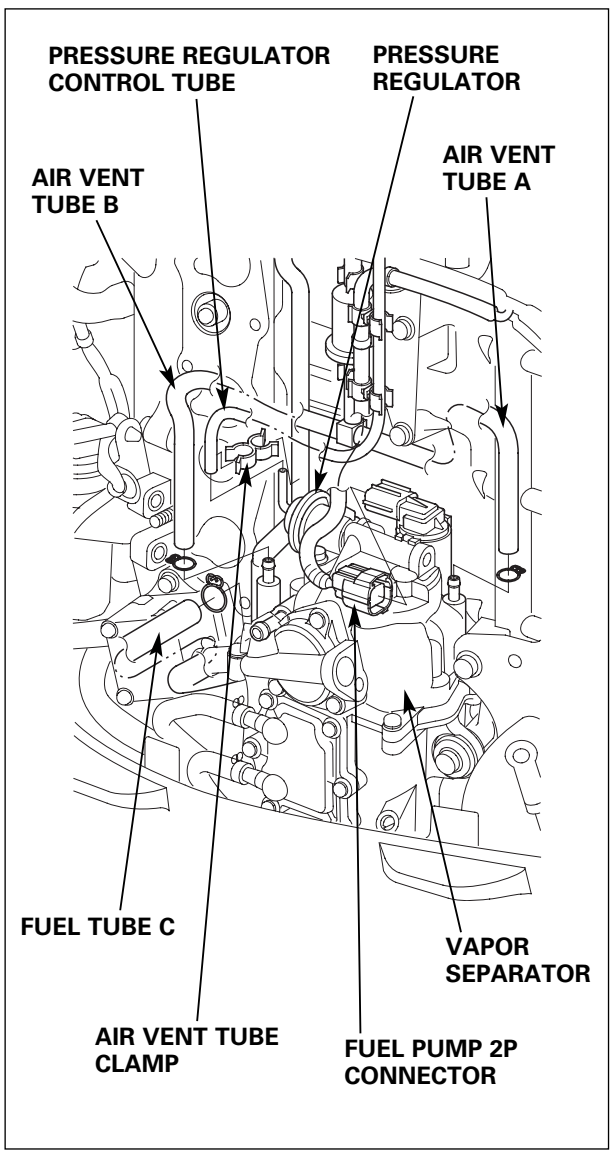
2) Disconnect air vent tube A, air vent tube B and fuel tube C from the vapor separator.

3) Disconnect the fuel pump 2P connector.

4) Remove the air vent tube clamp from the pressure regulator control tube.

5) Disconnect the pressure regulator control tube from the pressure regulator.



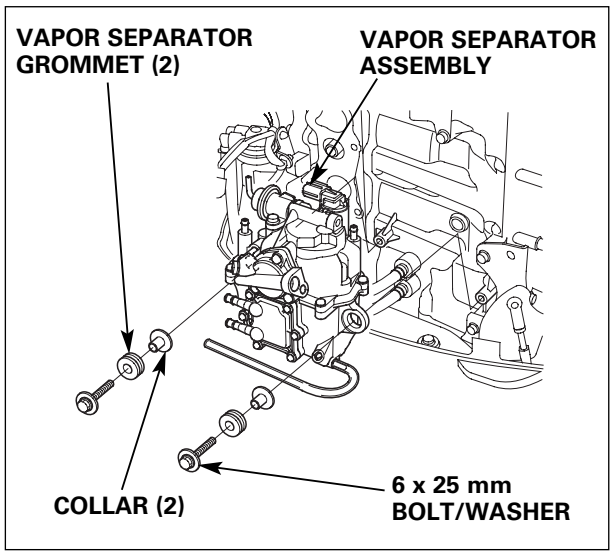


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-99

6) Remove the two 6 x 25 mm bolt/washers from the vapor separator assembly.

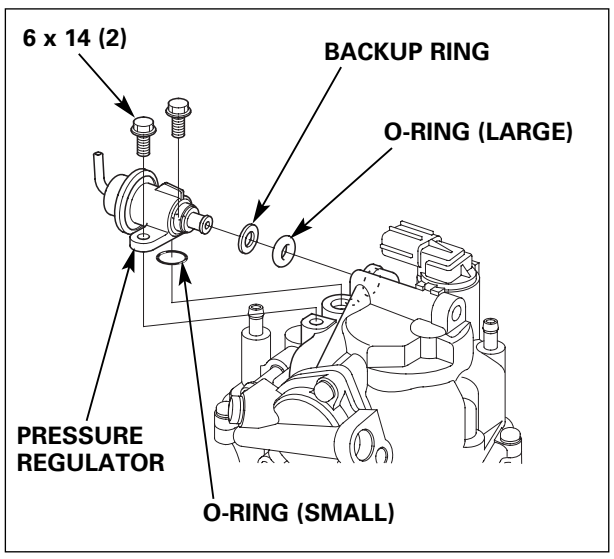
7) Remove the two vapor separator grommets and the two collars.



b. DISASSEMBLY

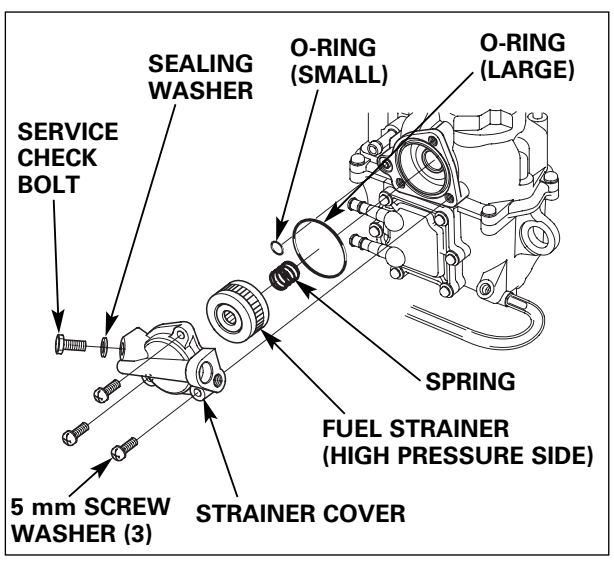
1) Remove the two 6 x 14 mm flange bolts and remove the pressure regulator.

2) Remove the two O-rings and the backup ring from the pressure regulator.
Replace the O-rings and the backup ring with the new ones.



3) Remove the three 5 mm screw washers and remove the strainer cover, two O-rings, fuel strainer (high pressure side) and the spring.
Replace the O-rings with the new ones.

4) Remove the service check bolt and remove the sealing washer.
Replace the sealing washer with a new one.



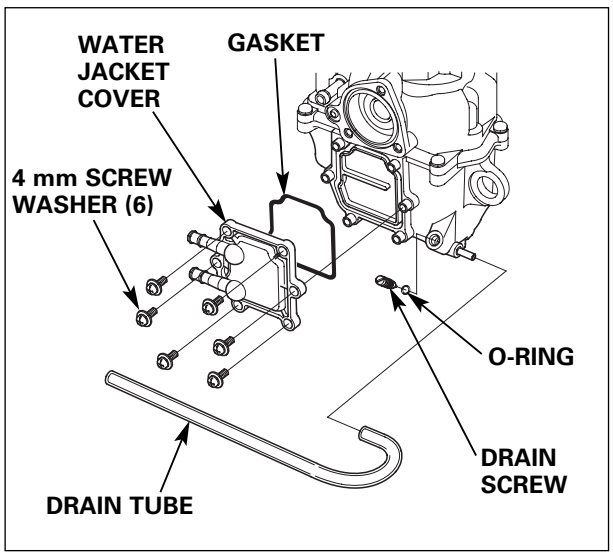
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-100

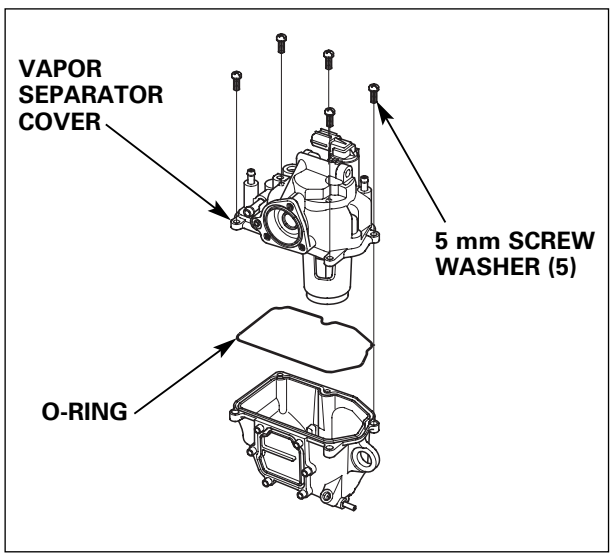
5) Remove the six 4 mm screw washers. Remove the water jacket cover and the gasket.
Replace the gasket with the a new one.

6) Disconnect the drain tube and remove the drain screw.

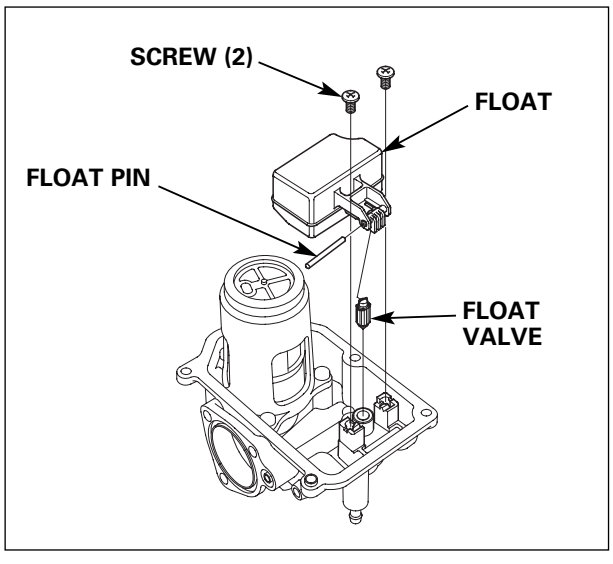
7) Remove the O-ring from the drain screw.
Replace the O-ring with a new one.



8) Remove the five 5 mm screw washers. Remove the vapor separator cover and the O-ring.
Replace the O-ring with a new one.



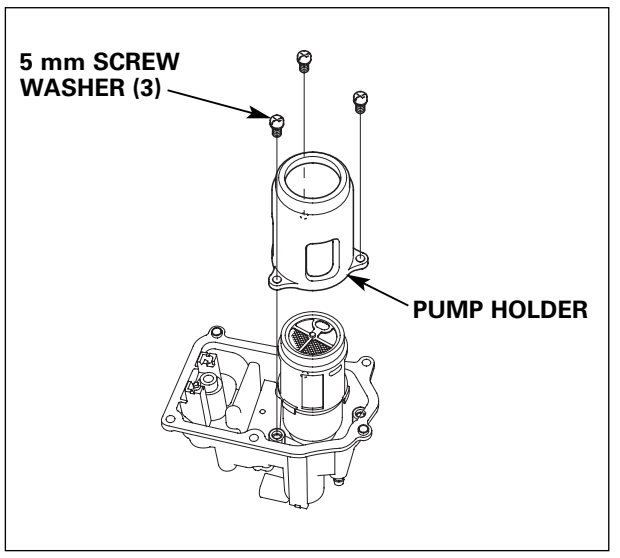
9) Remove the two screws and remove the float, float pin and the float valve.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

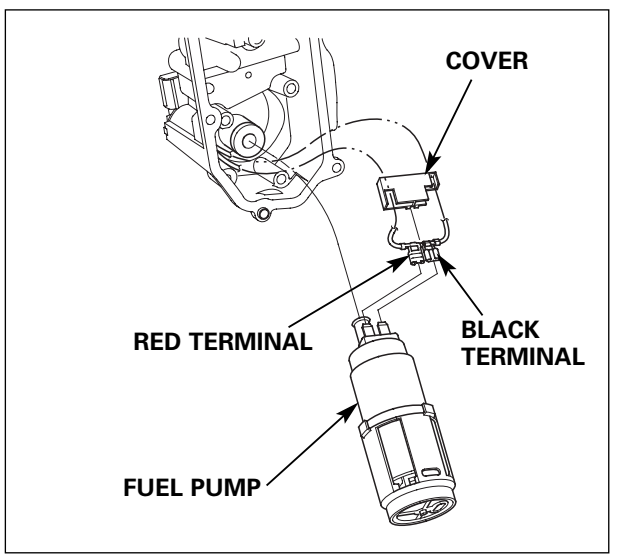
cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-101

10) Remove the three 5 mm screw washers and remove the pump holder.

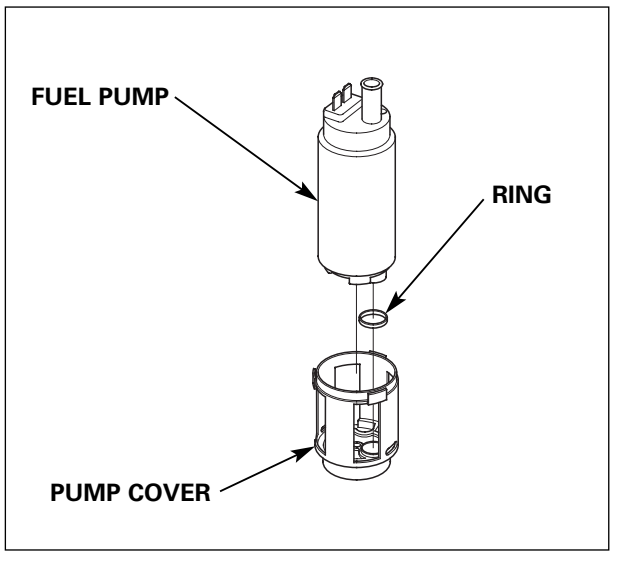


11) Pull the fuel pump out and remove the cover.

12) Disconnect the red terminal and the black terminal, and remove the fuel pump.



13) Remove the pump cover and the ring from the fuel pump.

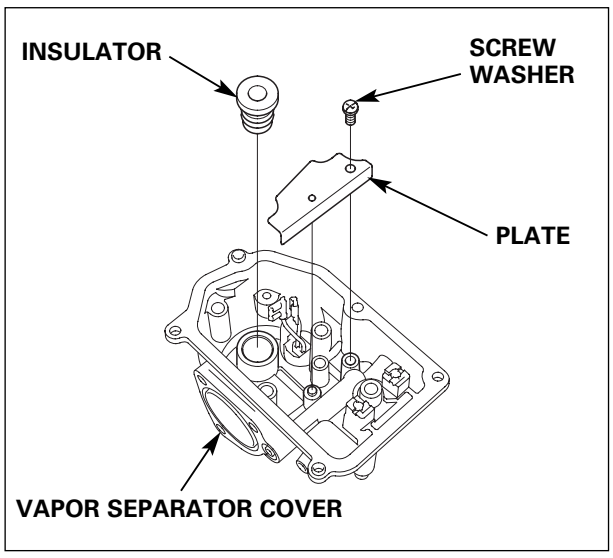


© Honda Motor Co., Ltd.

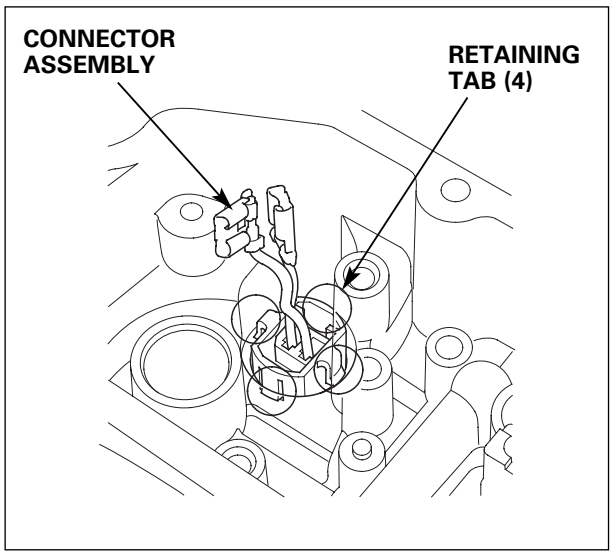
cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-102

14) Remove the screw washer and remove the plate.

15) Remove the insulator from the vapor separator cover.

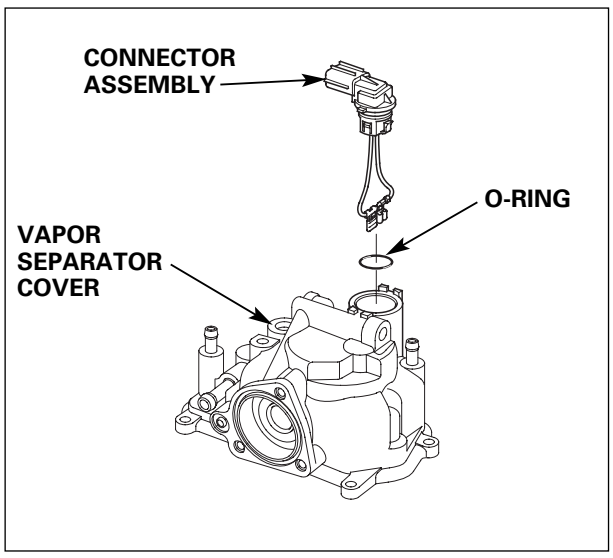


16) Raise the four retaining tabs of the connector assembly in the positions shown.



17) Remove the connector assembly from the vapor separator cover.

18) Remove the O-ring from the connector assembly. Replace the O-ring with a new one.



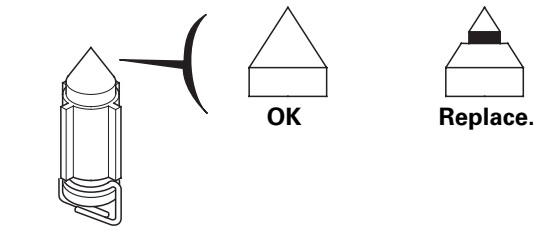
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-103

c. INSPECTION

• FLOAT VALVE

Check the float valve head for scores, scratches, wear or damage.



• FLOAT

Check the float for damage or deformation, and check for gasoline in the float.

• FLOAT HEIGHT

After checking the float valve, check the float height by installing the float properly.

1) Place the vapor separator as shown. Set the special tool (float level gauge) at right angles to the float chamber mating surface.

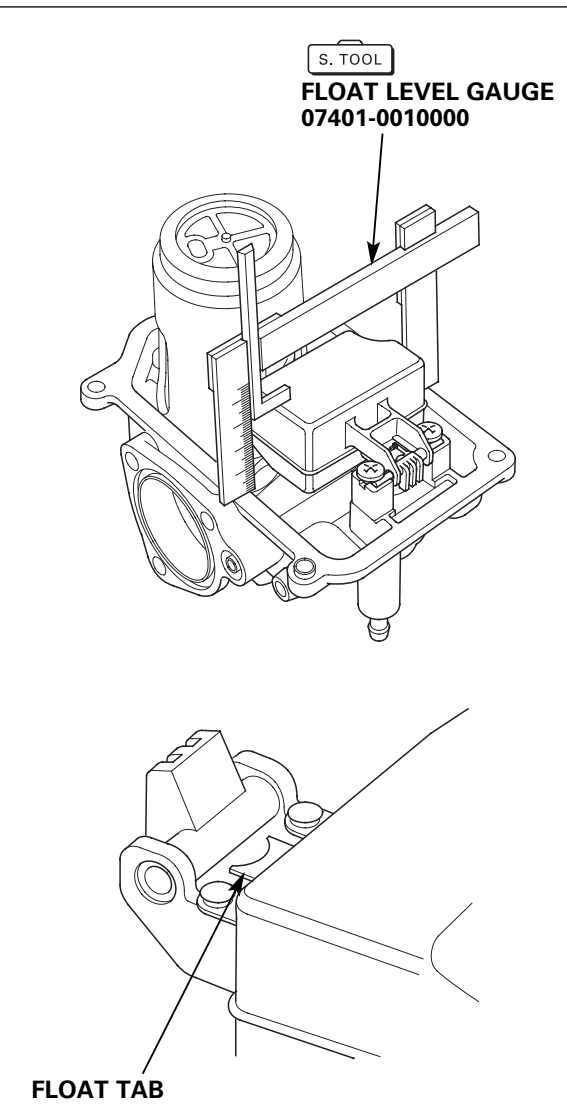
   TOOL:
   Float level gauge **07401-0010000**

2) Measure the distance between the float and vapor separator cover (i.e. float height) at the center of the float.

Float height	26.8 — 29.8 mm (1.06 — 1.17 in)

3) If the measurement is outside the specification, adjust the float height by gently bending the float tab, taking care not to damage the float.

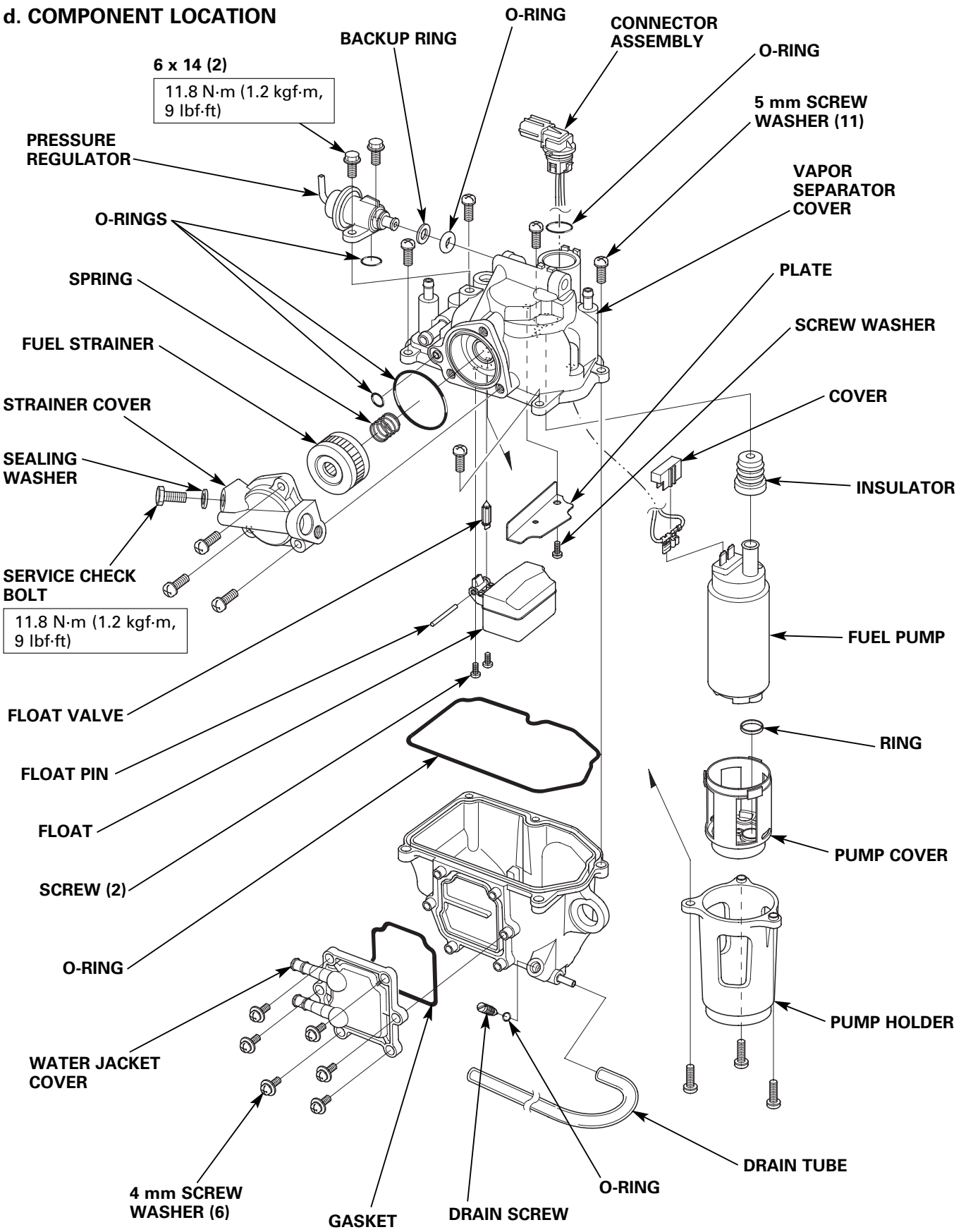
4) Check the float for smooth movement.



© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-104

d. COMPONENT LOCATION



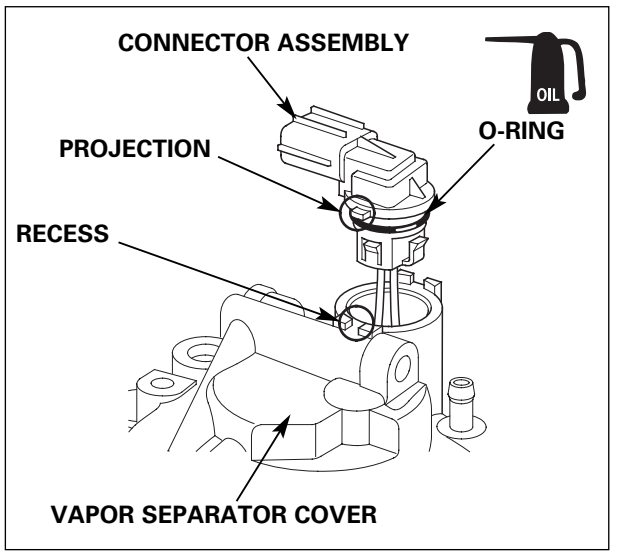
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-105

e. REASSEMBLY

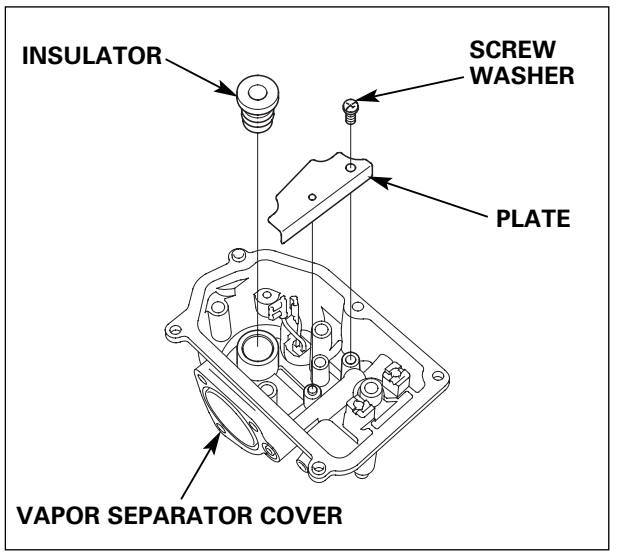
1) Apply engine oil to the new O-ring and install it on the connector assembly.

2) Install the connector assembly, aligning the projection on the connector assembly with the recess in the vapor separator cover.



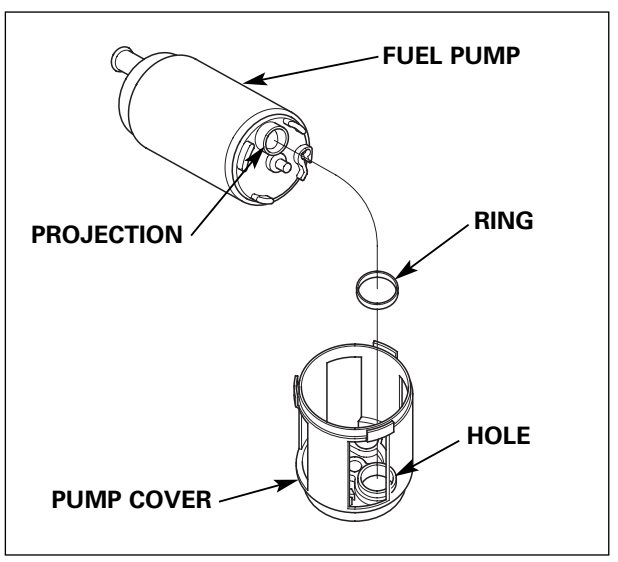
3) Install the insulator on the vapor separator cover.

4) Set the plate and tighten the screw washer securely.



5) Install the ring on the pump cover.

6) Assemble the pump cover with the fuel pump, aligning the projection on the fuel pump with the hole in the pump cover.

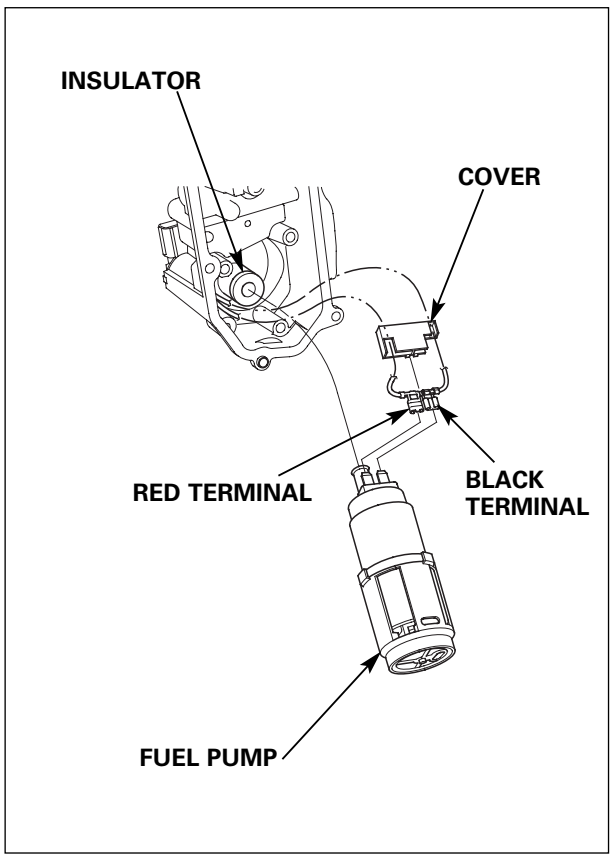


© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-106

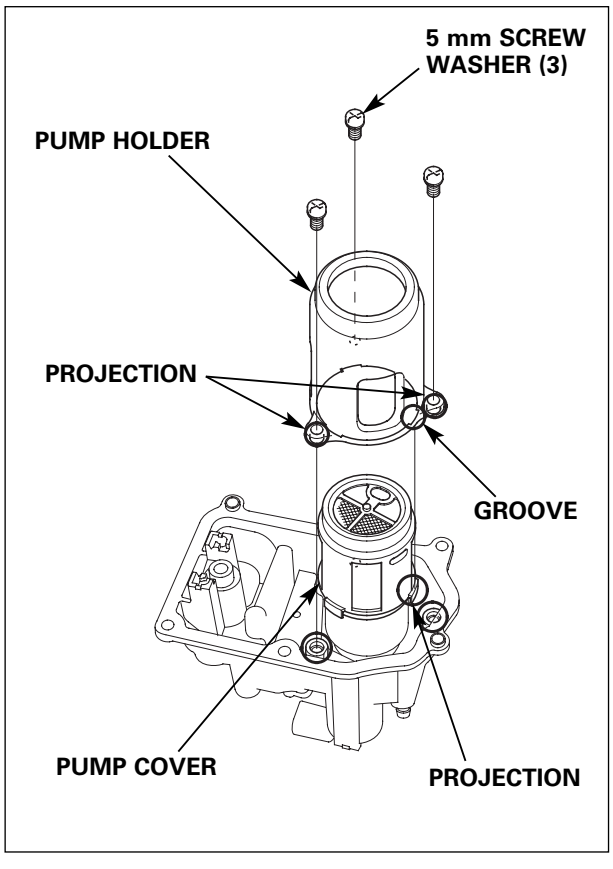
7) Connect the red terminal and the black terminal as shown and install the cover.

8) Install the fuel pump on the insulator.



9) Align the projection on the pump cover with the groove in the pump holder.

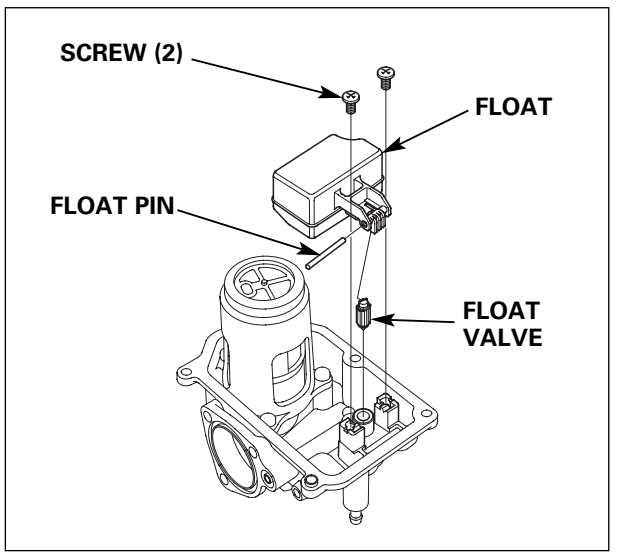
10) Set the pump holder so the two projections on the pump holder are in the positions shown and tighten the three 5 mm screw washers securely.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

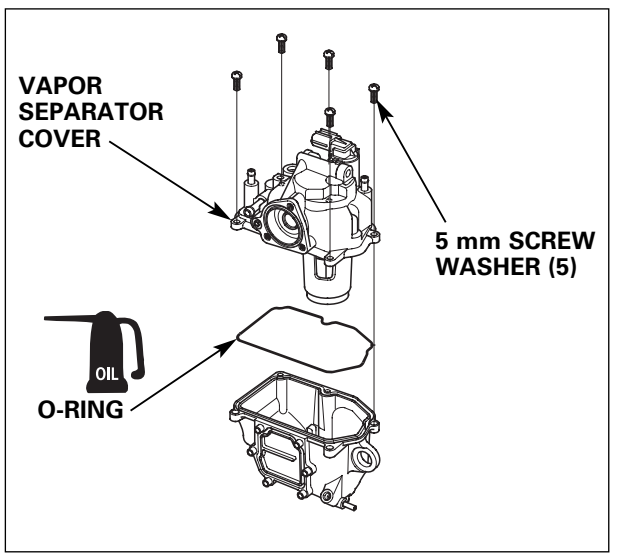
cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-107

11) Install the float valve and float pin on the float, and set the float on the vapor separator cover. Tighten the two screws securely.



12) Apply engine oil to the new O-ring and install it on the vapor separator body.

13) Install the vapor separator cover on the vapor separator body, and tighten the five 5 mm screw washers securely.

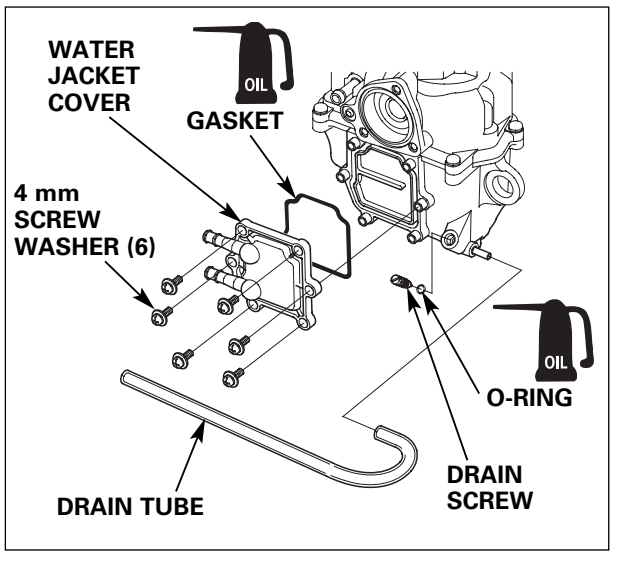


14) Apply engine oil to the new gasket and install it on the vapor separator body.

15) Set the water jacket cover and tighten it with the six 4 mm screw washers securely.

16) Apply engine oil to the new O-ring and install it on the drain screw.

17) Install the drain screw and connect the drain tube.



© Honda Motor Co., Ltd.

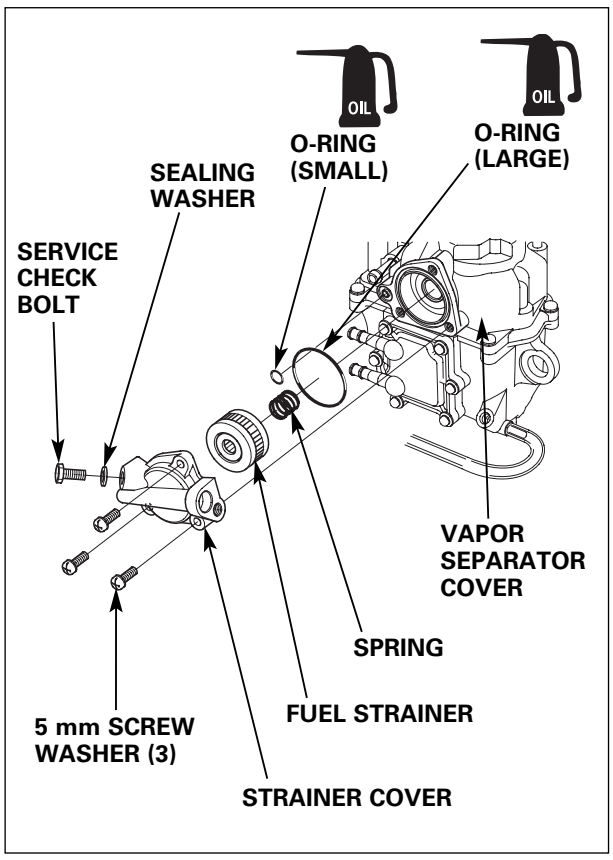
cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-108

18) Apply engine oil to the two new O-rings and install them on the vapor separator cover.

19) Install the spring, fuel strainer, and the strainer cover, and tighten the three 5 mm screw washers securely.

20) Set the new sealing washer and tighten the service check bolt to the specified torque.

TORQUE: 11.8 N·m (1.2 kgf·m, 9 lbf·ft)

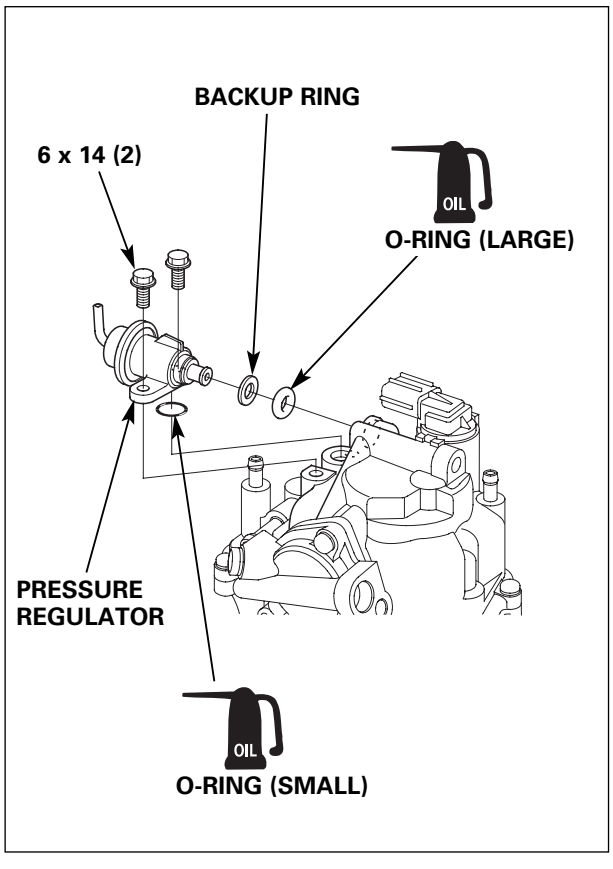


21) Install the new backup ring on the pressure regulator.

22) Apply engine oil to the two new O-rings and install them on the pressure regulator.

23) Install the pressure regulator on the vapor separator cover, and tighten the two 6 x 14 mm flange bolts to the specified torque.

TORQUE: 11.8 N·m (1.2 kgf·m, 9 lbf·ft)



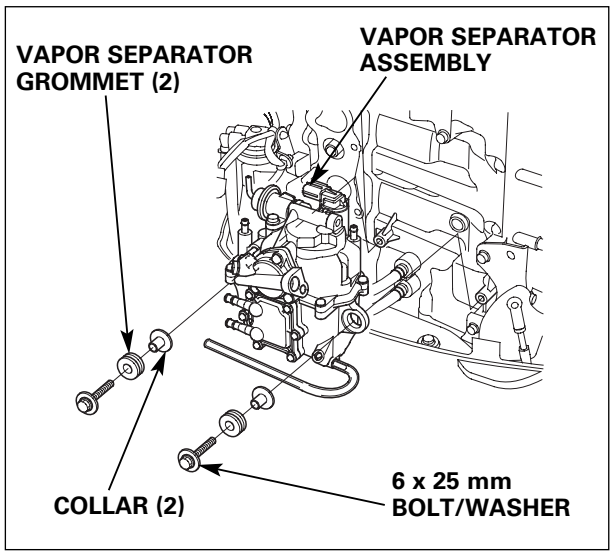
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-109

f. INSTALLATION

1) Install the two vapor separator grommets and the two collars.

2) Set the vapor separator assembly and tighten the two 6 x 25 mm bolt/washers securely.

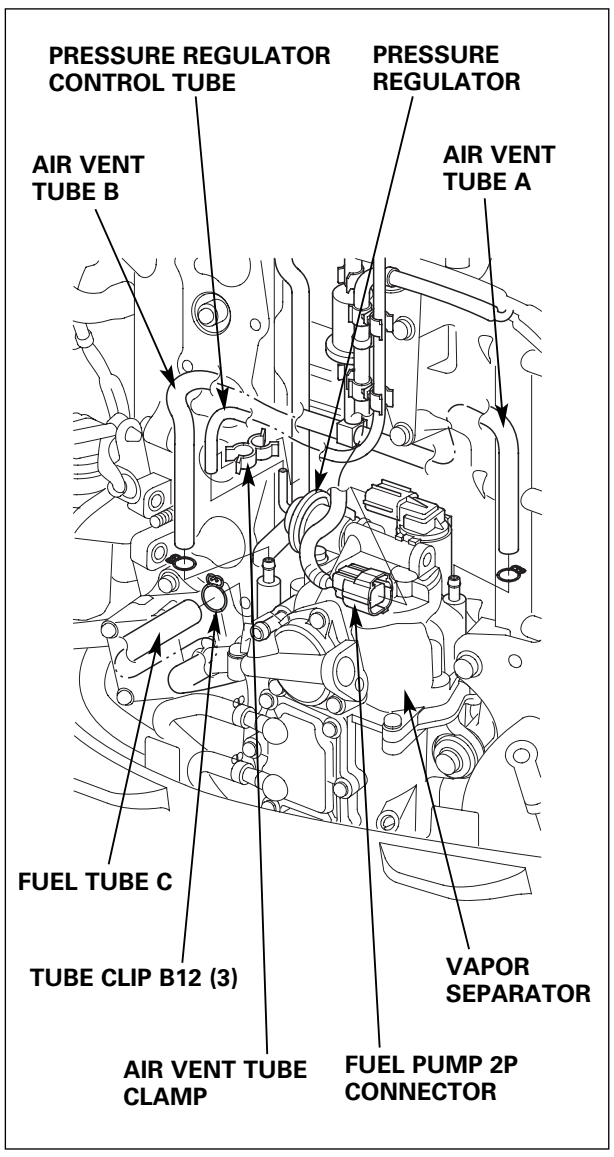


3) Connect the pressure regulator control tube to the pressure regulator.

4) Install the air vent tube clamp on the pressure regulator control tube.

5) Connect the fuel pump 2P connector.

6) Connect air vent tube A, air vent tube B and fuel tube C to the vapor separator.
Install the three tube clips B12 with the tabs in the direction shown.

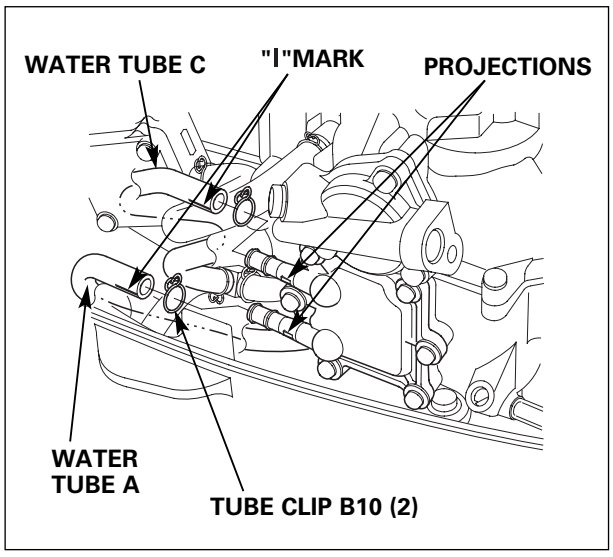


© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-110

7) Connect water tube A and water tube C to the vapor separator.
Connect water tube A and water tube C to the vaporseparator by aligning the "I" mark on each tube with the corresponding projection on the vapor separator.
Install both tube clips B10 with their tabs facing up.

Install the following parts.
- Intake manifold/throttle body/silencer assembly (P. 5-95)
- Engine cover (P. 4-2)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-111

13. FUEL STRAINER (LOW PRESSURE SIDE)/ FUEL PUMP (LOW PRESSURE SIDE)/FUEL TUBE

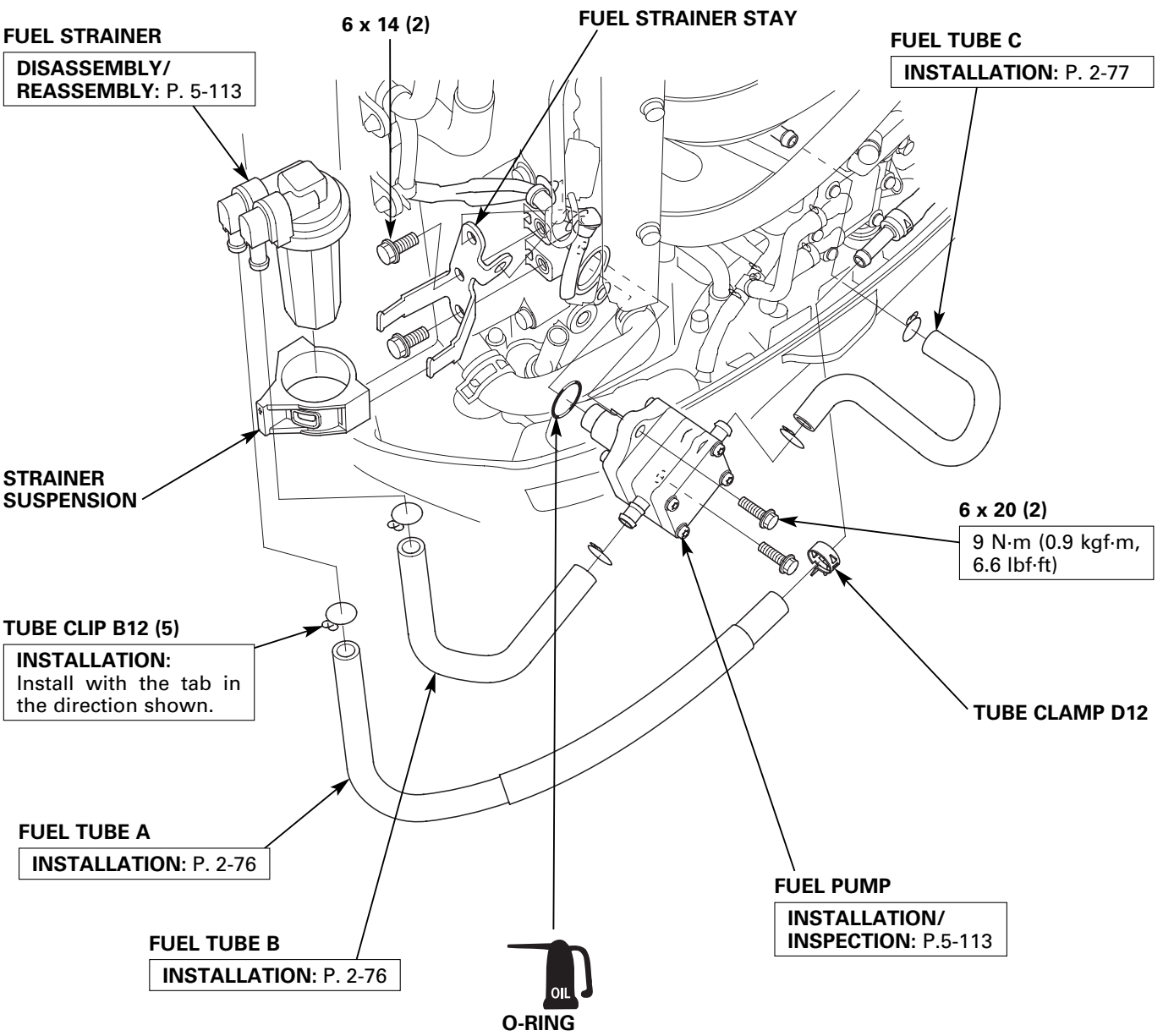
⚠WARNING

Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

a. REMOVAL/INSTALLATION

• FUEL STRAINER/FUEL PUMP

Remove the engine cover (P. 4-2).

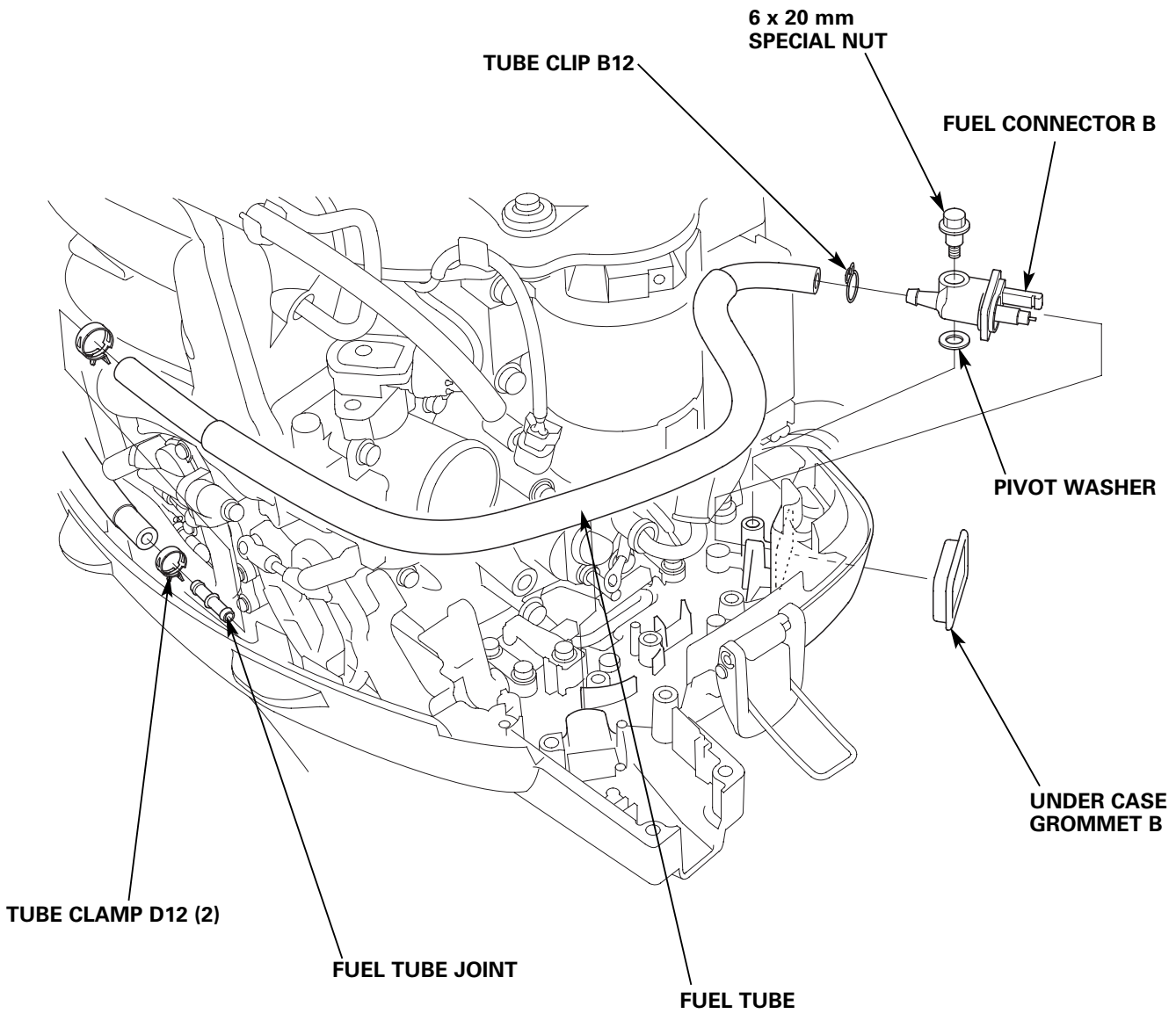


© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-112

• FUEL TUBE

Remove the following parts.
- Engine cover (P. 4-2)
- Starter cable/starter solenoid/main relay/neutral switch (P. 18-15)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-113

• FUEL PUMP

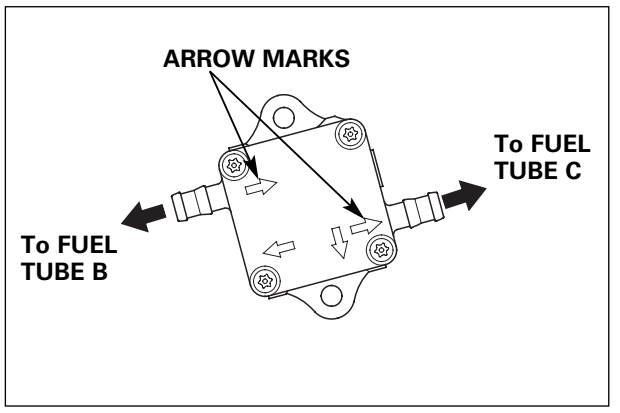
INSTALLATION:

1) Apply engine oil to the new O-ring and install it on the fuel pump.

2) Install the fuel pump with the arrow marks in the directions shown.

3) Tighten the two 6 x 20 mm flange bolts to the specified torque.

   TORQUE: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)

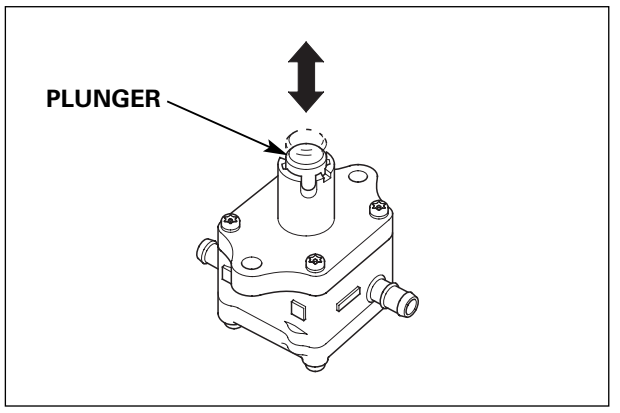


b. INSPECTION

• FUEL PUMP

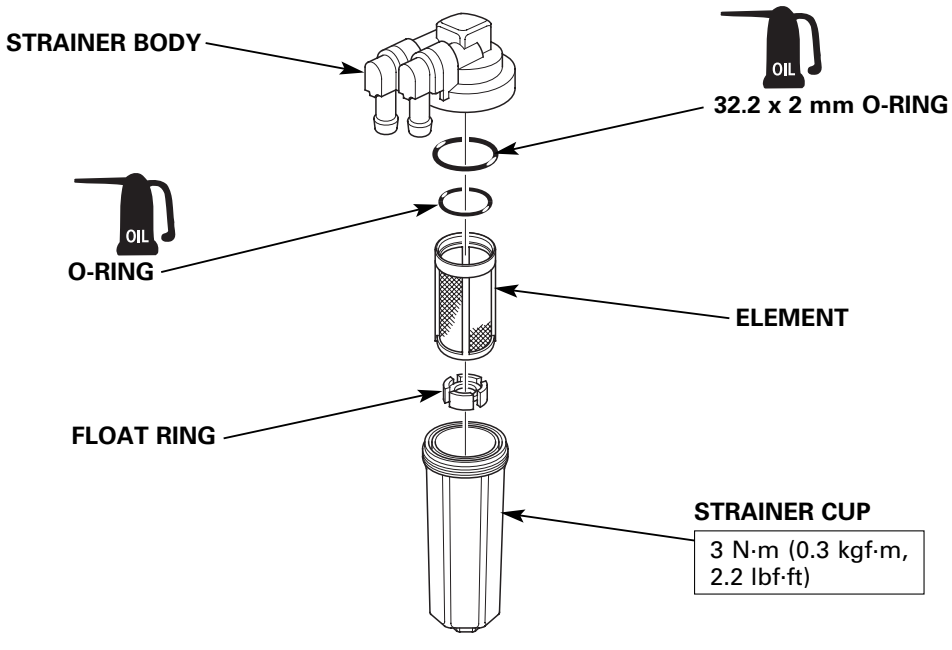
1) Check the fuel pump for fuel leakage.

2) Push the plunger and check that it moves smoothly. Replace the plunger if necessary.



c. DISASSEMBLY/REASSEMBLY

• FUEL STRAINER



© Honda Motor Co., Ltd.

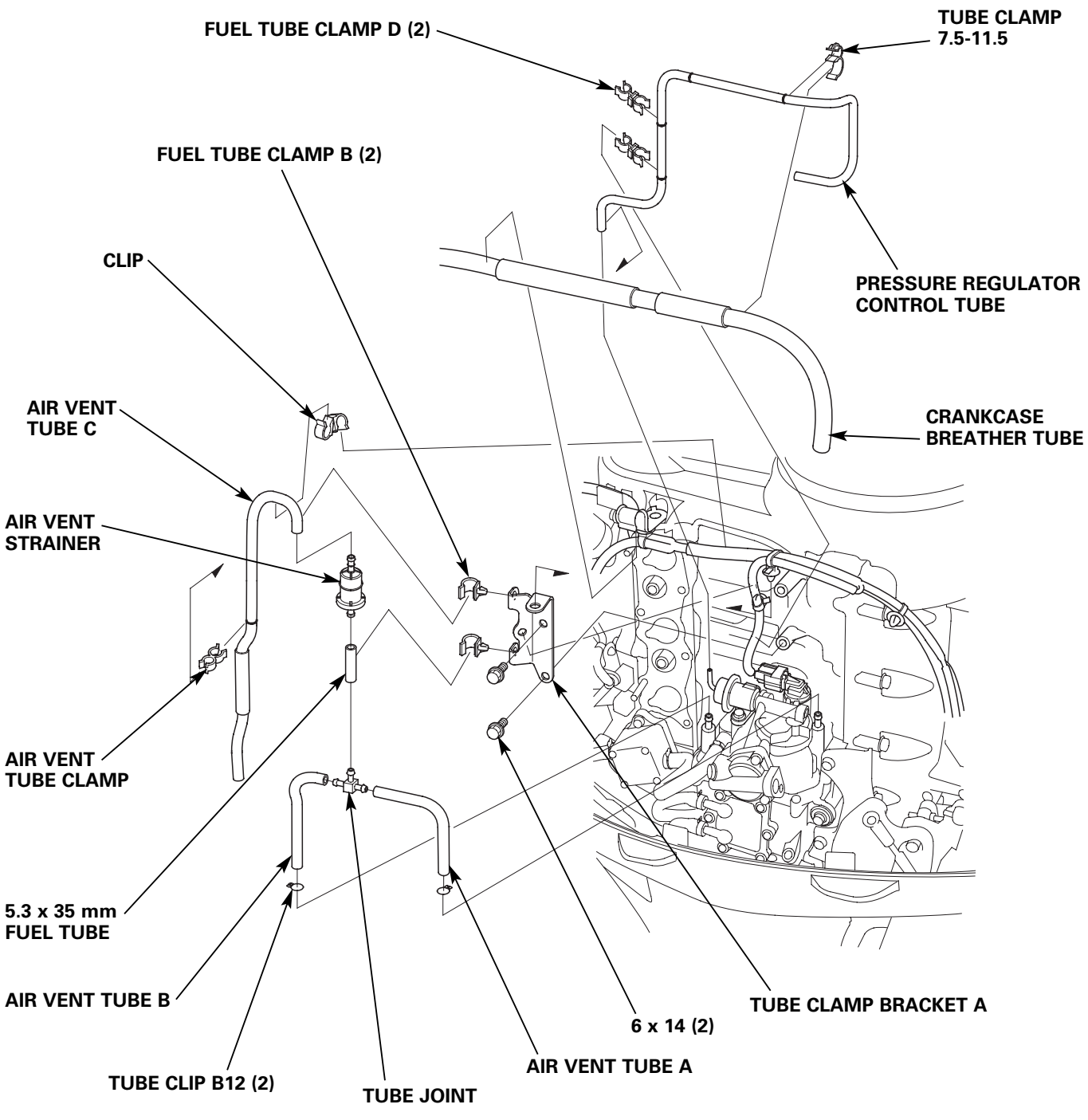
cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-114

14. AIR VENT STRAINER/AIR VENT TUBE

• REMOVAL/INSTALLATION

Remove the following parts.
- Engine cover (P. 4-2)
- Intake manifold/throttle body/silencer assembly (P. 5-89)

• Check the tubes for deterioration or cracks. Replace the tubes if necessary.
• After assembly, check that the tube clamps are installed properly (P. 2-78).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-115

15. EOP (ENGINE OIL PRESSURE) SWITCH

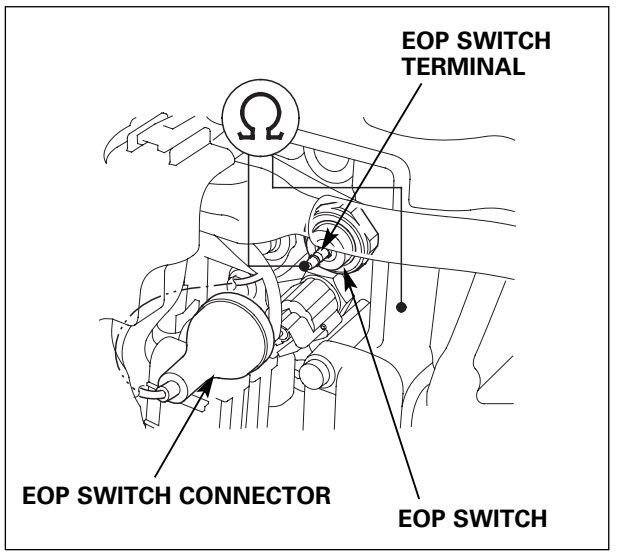
a. INSPECTION

1) Remove the engine cover (P. 4-2).

2) Disconnect the EOP switch connector.

3) Check for continuity between the EOP switch terminal and the engine ground.

   • The EOP switch is normal if there is continuity.
   • Replace the EOP switch if there is no continuity.



b. REPLACEMENT

1) Remove the engine cover (P. 4-2).

2) Disconnect the EOP switch connector.

3) Remove the EOP switch and remove the liquid gasket from the mounting base of the switch.

4) Apply liquid gasket (ThreeBond® #1215 or equivalent) to the threaded part of the new EOP switch in the area shown.

5) Install the new EOP switch and tighten it to the specified torque.

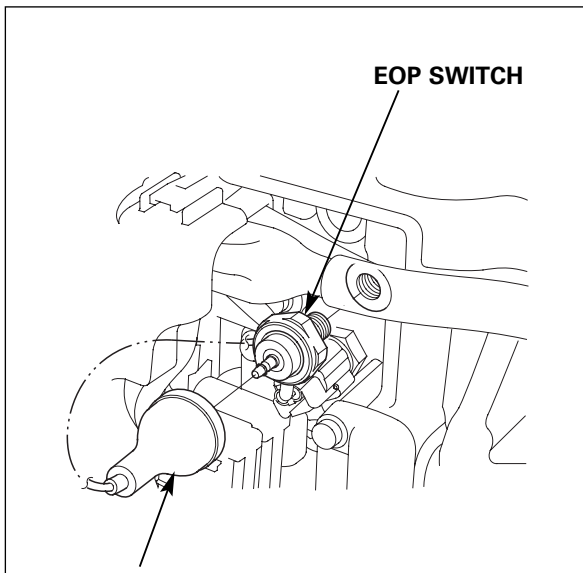
   TORQUE: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)

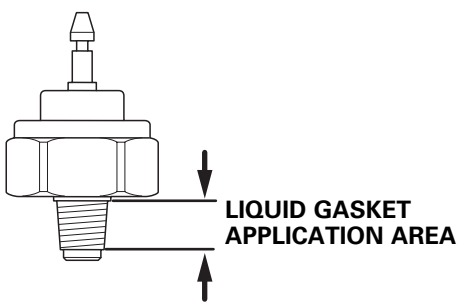
   NOTICE

   Do not tighten the EOP switch excessively. Overtightening can cause damage to the cylinder block. Tighten the EOP switch using a torque wrench.

6) Connect the EOP switch connector.

7) Install the engine cover (P. 4-2).





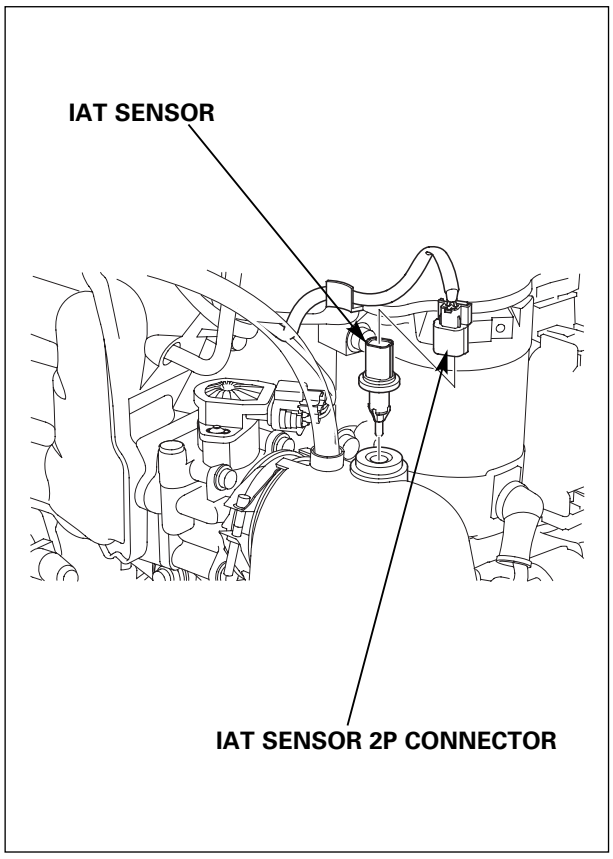
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-116

16. IAT (INTAKE AIR TEMPERATURE) SENSOR

• REPLACEMENT

1) Remove the engine cover (P. 4-2).
2) Disconnect the IAT sensor 2P connector.
3) Remove the IAT sensor.
4) Install the new IAT sensor.
5) Connect the IAT sensor 2P connector.
6) Install the engine cover (P. 4-2).



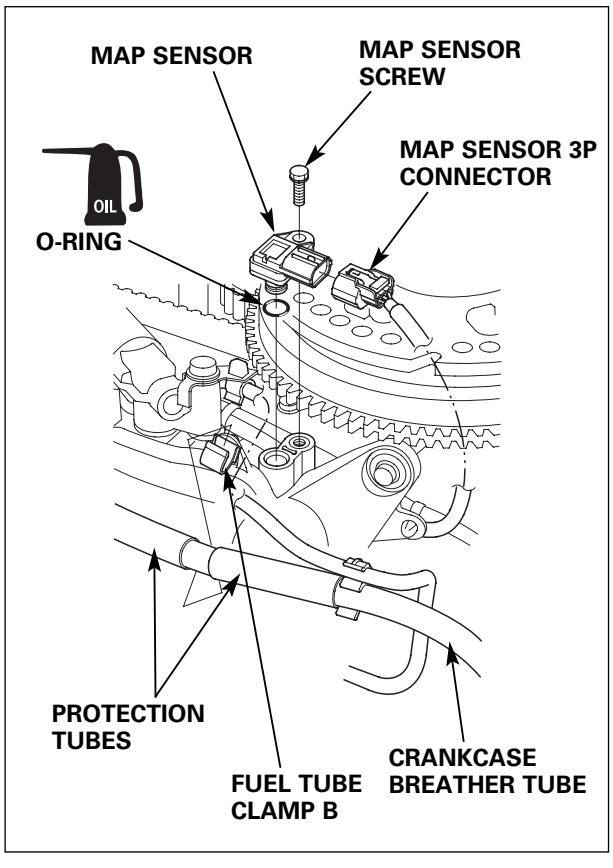
17. MAP (MANIFOLD ABSOLUTE PRESSURE) SENSOR

• REPLACEMENT

1) Remove the engine cover (P. 4-2).
2) Remove the crankcase breather tube from fuel tube clamp B.
3) Disconnect the MAP sensor 3P connector.
4) Remove the MAP sensor screw and remove the MAP sensor and the O-ring.
5) Apply engine oil to the new O-ring and install it on the new MAP sensor.
6) Install the new MAP sensor and tighten the MAP sensor screw to the specified torque.

   TORQUE: 3.5 N·m (0.4 kgf·m, 2.6 lbf·ft)

7) Connect the MAP sensor 3P connector.
8) Install fuel tube clamp B between the protection tubes on the crankcase breather tube.
9) Install the engine cover (P. 4-2).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-117

18. ECT2 (ENGINE COOLANT TEMPERATURE) SENSOR

• REPLACEMENT

1) Remove the engine cover (P. 4-2).

2) Disconnect the ECT2 sensor 2P connector and remove the ECT2 sensor.

3) Remove the O-ring from the ECT2 sensor.

4) Apply engine oil to the new O-ring and install it on the new ECT2 sensor.

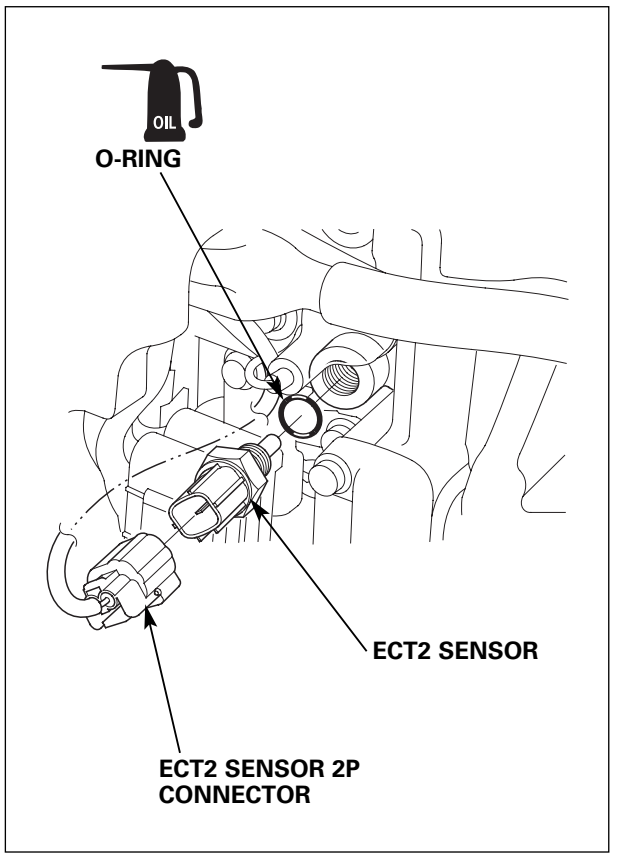
5) Apply liquid gasket (ThreeBond® #1201 or #1215 or equivalent) to the threaded part of the new ECT2 sensor.

6) Install the new ECT2 sensor and tighten it to the specified torque.

   TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

7) Connect the ECT2 sensor 2P connector.

8) Install the engine cover (P. 4-2).



19. CKP (CRANKSHAFT POSITION) SENSOR 1, 2

• REPLACEMENT

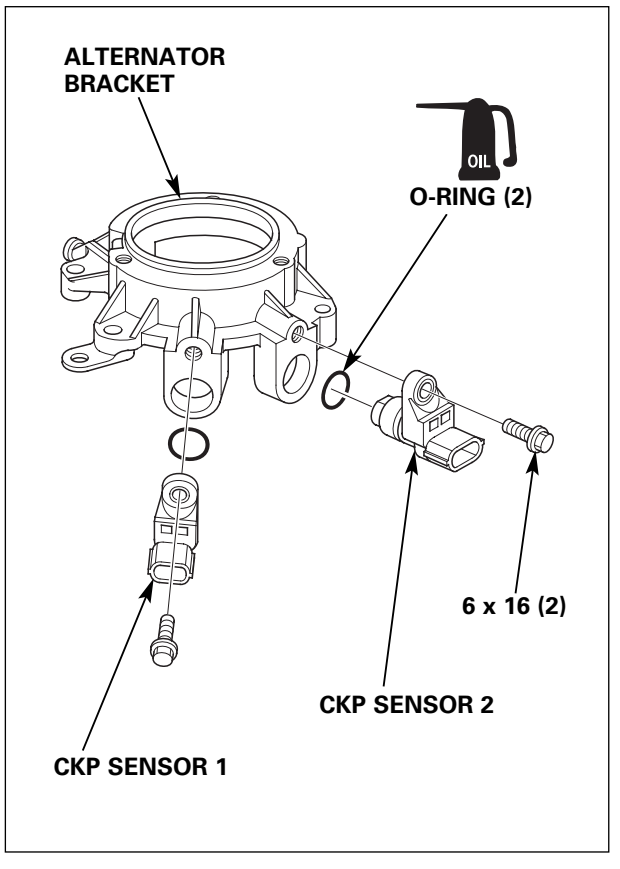
1) Remove the alternator bracket (P. 7-8).

2) Remove the 6 x 16 mm flange bolt, and remove the CKP sensor and the O-ring.

3) Apply engine oil to the new O-ring and install it on the new CKP sensor.

4) Install the new CKP sensor and tighten the 6 x 16 mm flange bolt securely.

5) Install the alternator bracket (P. 7-16).



© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-118

20. HO2S (HEATED OXYGEN SENSOR)

• REPLACEMENT

1) Remove the engine cover (P. 4-2).

2) Remove the 6 x 14 mm flange bolt and remove the connector bracket C.

3) Remove the HO2S 4P connector from the ECM bracket.

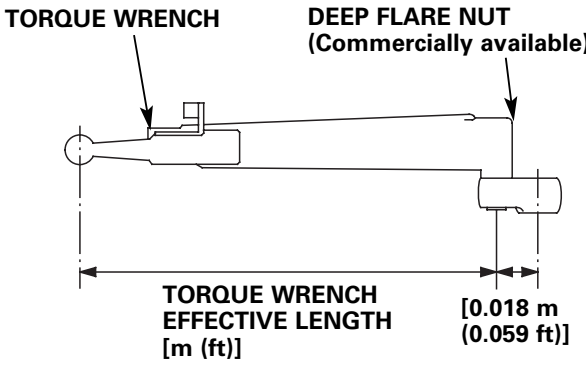
4) Disconnect the HO2S 4P connector and remove the HO2S.

5) Install a new HO2S and tighten it to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

NOTICE

To tighten the HO2S, use the deep flare nut (Commercially available) and read the torque as follows.



• Formula:

Torque wrench reading =

$$\frac{\text{Torque wrench effective length [m (ft)] x Specified torque [N·m (kgf·m, lbf·ft)]}}{\text{Torque wrench effective length [m(ft)] + 0.018 [m (0.059 ft)]}}$$

• Example:

Torque wrench reading using a torque wrench with an effective length of 0.2 m (0.66 ft)

$$\frac{\text{0.2 [m (0.66 (ft)] x 10 [N·m (1.0 kgf·m, 7 lbf·ft)]}}{\text{0.2 [m (0.66 ft)] + 0.018 [m (0.059 ft)]}}$$

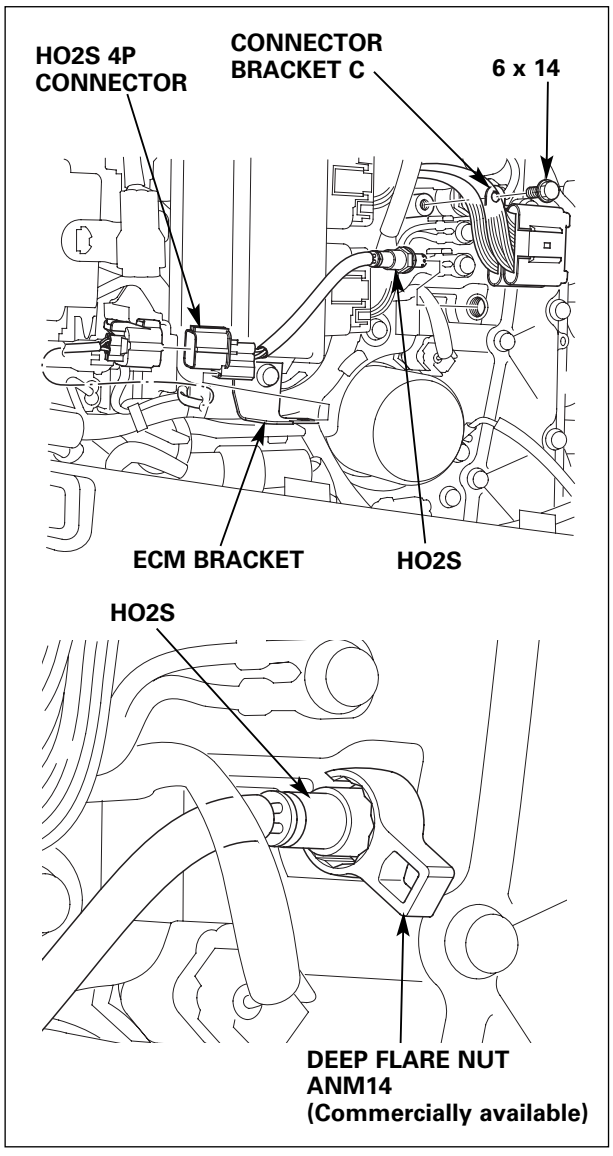
= 9.2 [N·m (0.9 kgf·m, 6.8 lbf·ft)]

6) Connect the HO2S 4P connector.

7) Install the HO2S 4P connector on the ECM bracket.

8) Install the connector bracket C and tighten the 6 x 14 mm flange bolt securely.

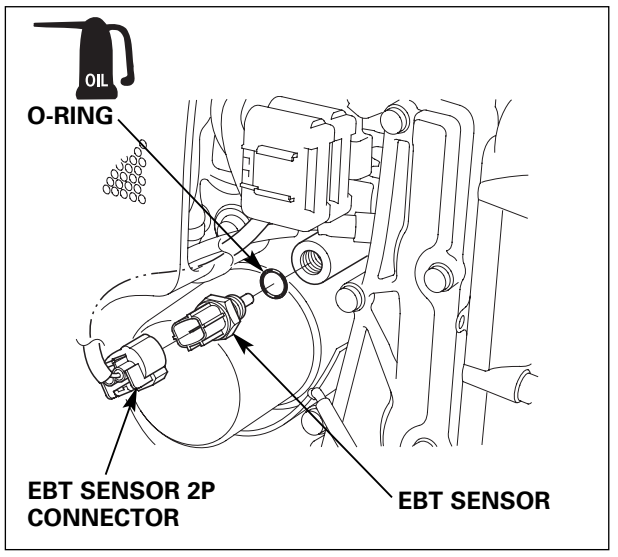
9) Install the engine cover (P. 4-2).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-119

21. EBT (ENGINE BLOCK TEMPERATURE) SENSOR



• REPLACEMENT

1) Remove the engine cover (P. 4-2).
2) Disconnect the EBT sensor 2P connector and remove the EBT sensor.
3) Remove the O-ring from the EBT sensor.
4) Apply engine oil to the new O-ring and install it on the new EBT sensor.
5) Install the new EBT sensor and tighten it to the specified torque.

   TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

6) Connect the EBT sensor 2P connector.
7) Install the engine cover (P. 4-2).

© Honda Motor Co., Ltd.

cap.05 BF40D 50D (AH) 2.qxp 2008/04/09 15:31 ページ 5-120

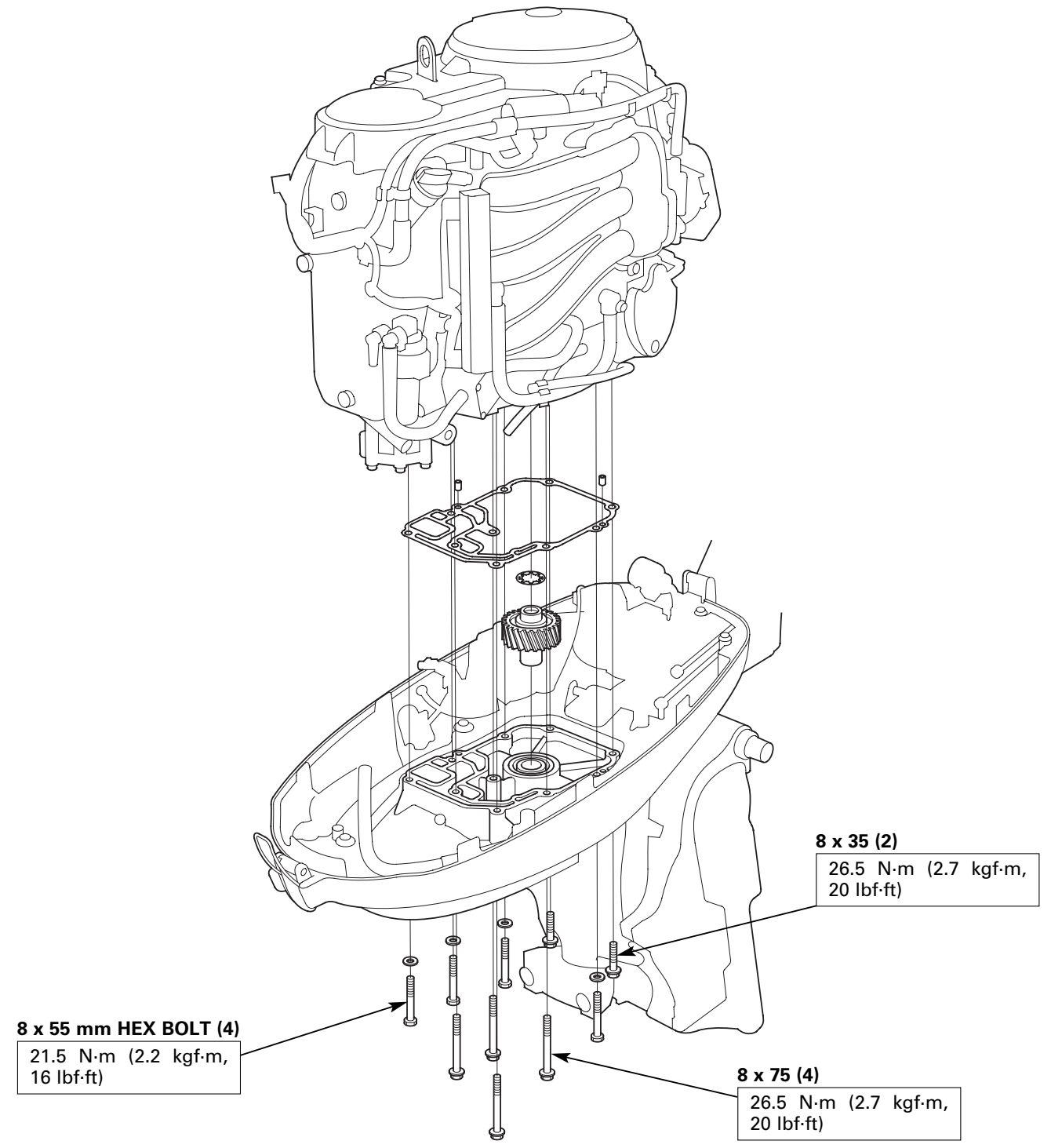
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-1

BF40D·BF50D

6. ENGINE REMOVAL/INSTALLATION

1. REMOVAL 6-2
2. INSTALLATION 6-9



© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-2

1. REMOVAL

⚠WARNING

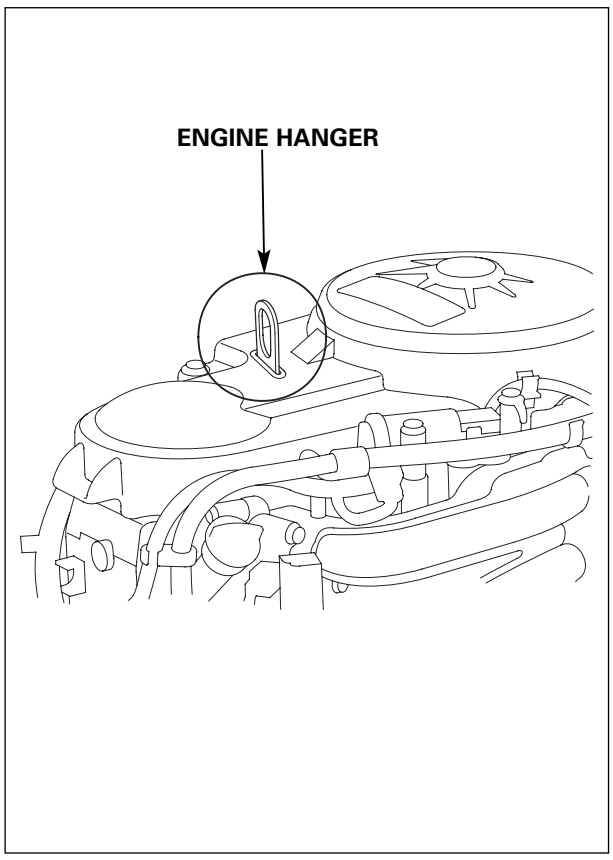
Gasoline is highly flammable and explosive.

You can be burned or seriously injured when handling fuel.

- Keep heat, sparks, and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

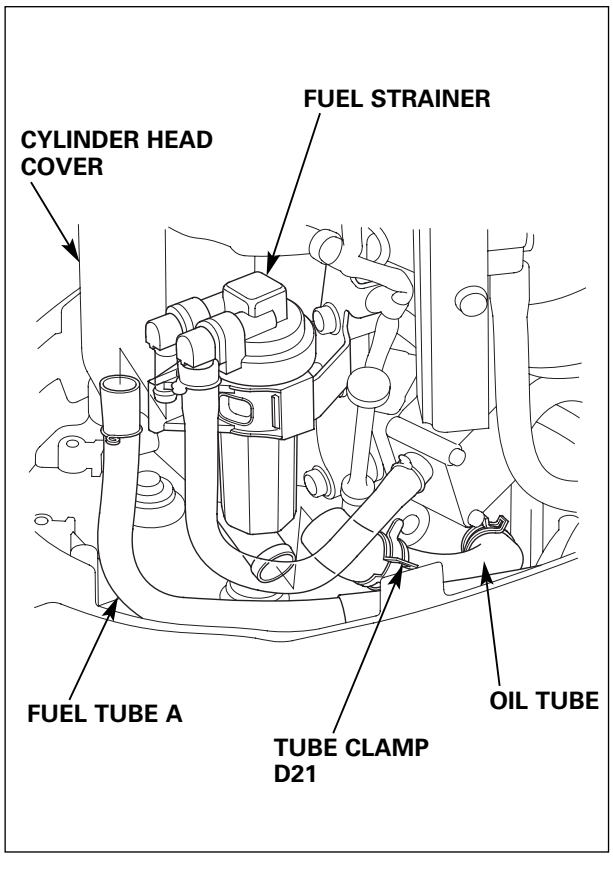
Remove the following parts.
- Engine cover (P. 4-2)
- Ignition coil/regulator/rectifier (P. 18-23)

1) Lift up the engine and secure it so it does not fall. Remove the oil case (P. 11-56).



2) Remove the oil tube from the cylinder head cover.

3) Disconnect fuel tube A from the fuel strainer.



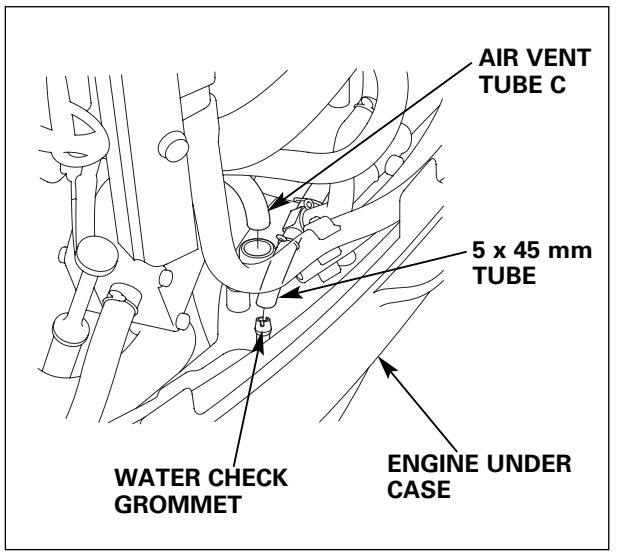
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-3

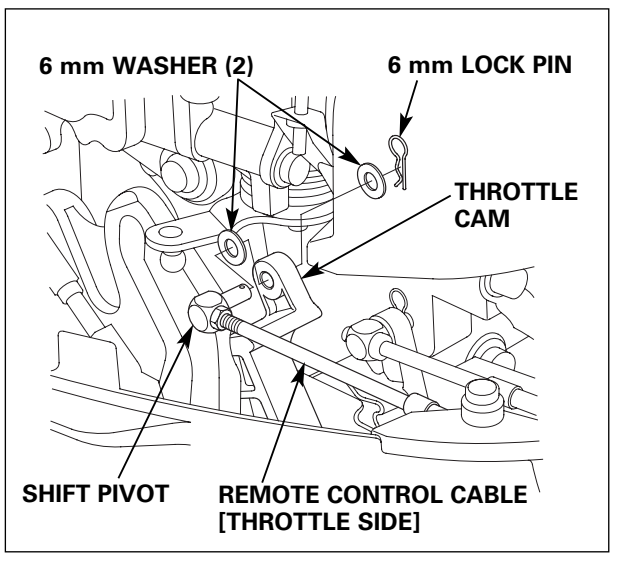
4) Remove the 5 x 45 mm tube from the water check grommet.

5) Remove air vent tube C from the engine under case.

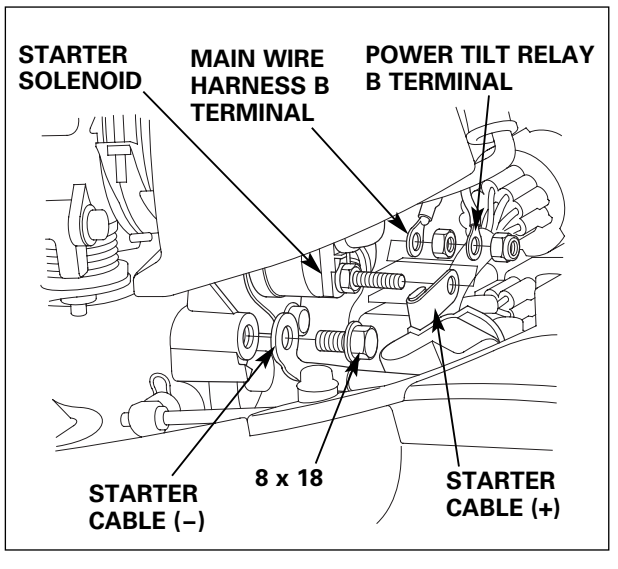
6) Remove the dipstick.



7) Remove the 6 mm lock pin and the two 6 mm washers from the shift pivot of the remote control cable [throttle side]. Remove the remote control cable [throttle side] from the throttle cam.



8) Disconnect the power tilt relay B terminal [Power trim/tilt type only], main wire harness B terminal and the starter cable (+) from the starter solenoid.
Remove the 8 x 18 mm flange bolt and disconnect the starter cable (–).



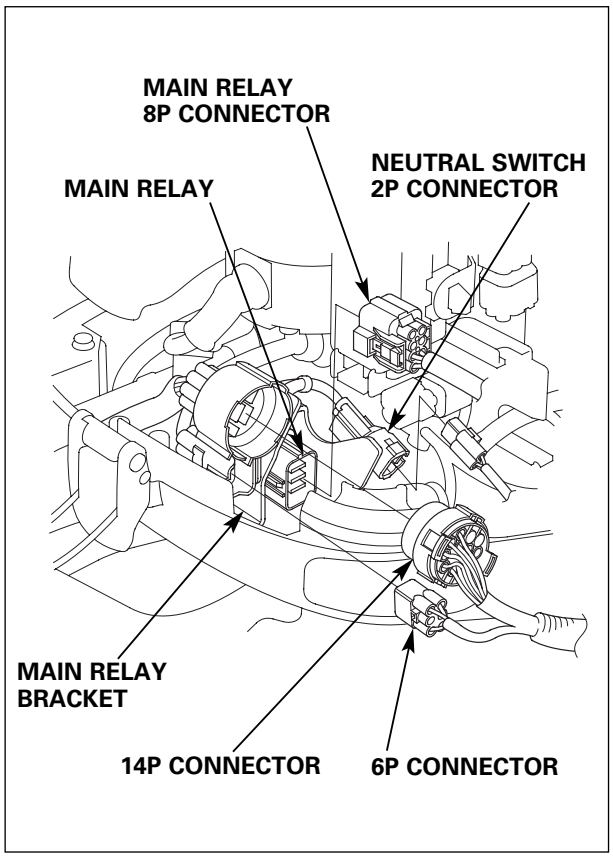
© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-4

9) Disconnect the 14P connector and the 6P connector.

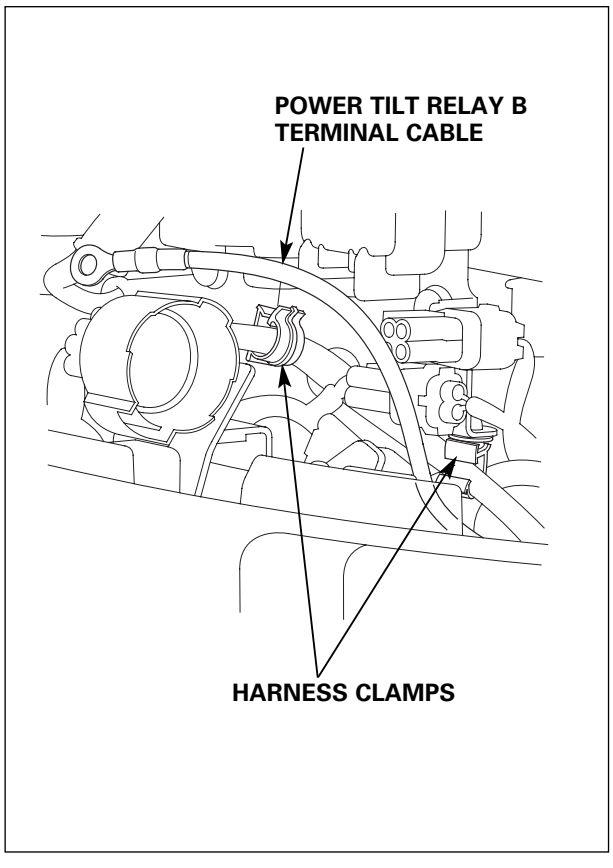
10) Disconnect the neutral switch 2P connector.

11) Disconnect the main relay 8P connector from the main relay.



12) Release the power tilt relay B terminal cable from the two harness clamps [Power trim/tilt type only].

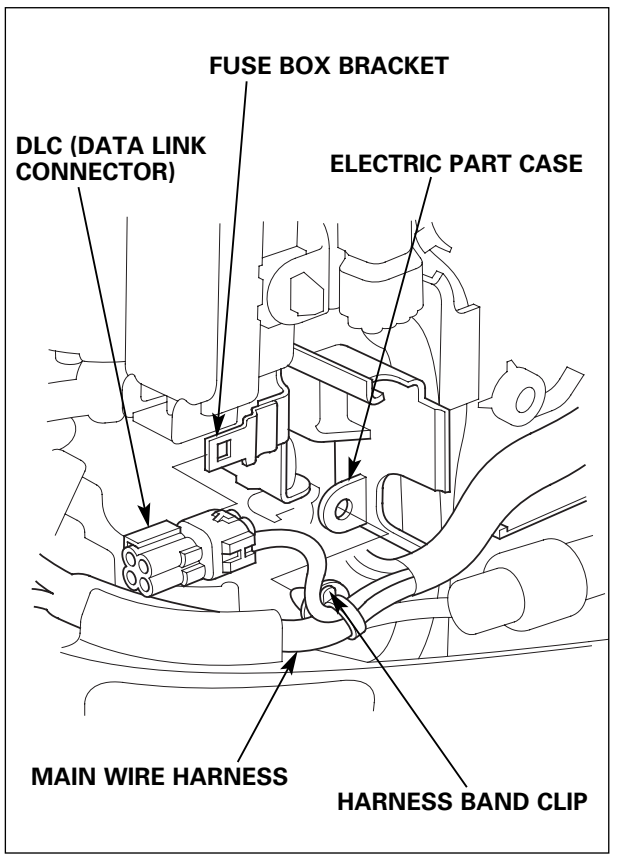
13) Remove the ECM (P. 7-6).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

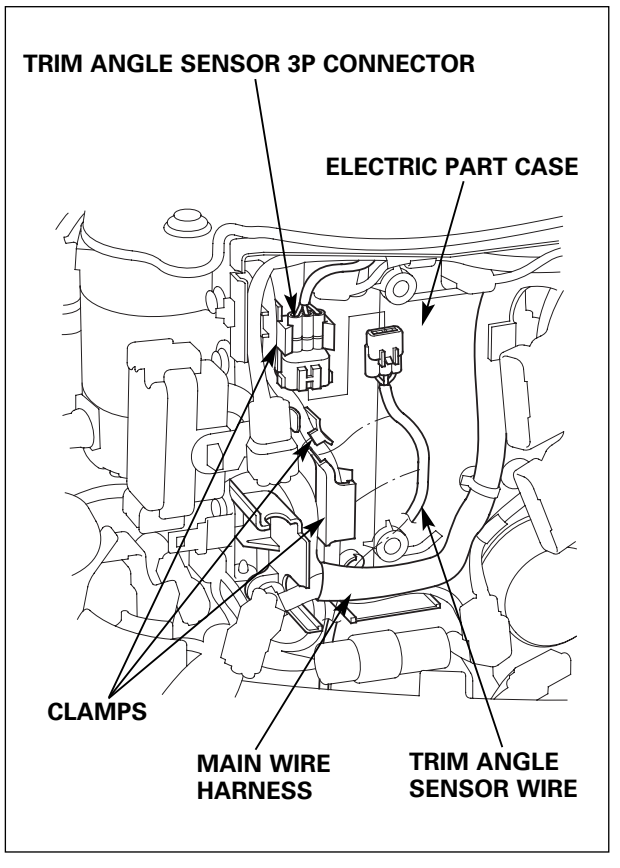
BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-5

14) Remove the DLC (data link connector) from the fuse box bracket.
Remove the harness band clip of the main wire harness from the electric part case.



15) Disconnect the trim angle sensor 3P connector, and release the trim angle sensor wire from each clamp of the electric part case [Power trim/tilt type only].

16) While pulling the main wire harness toward you, pull out the trim angle sensor wire from the gap between the electric part case and the main wire harness [Power trim/tilt type only].



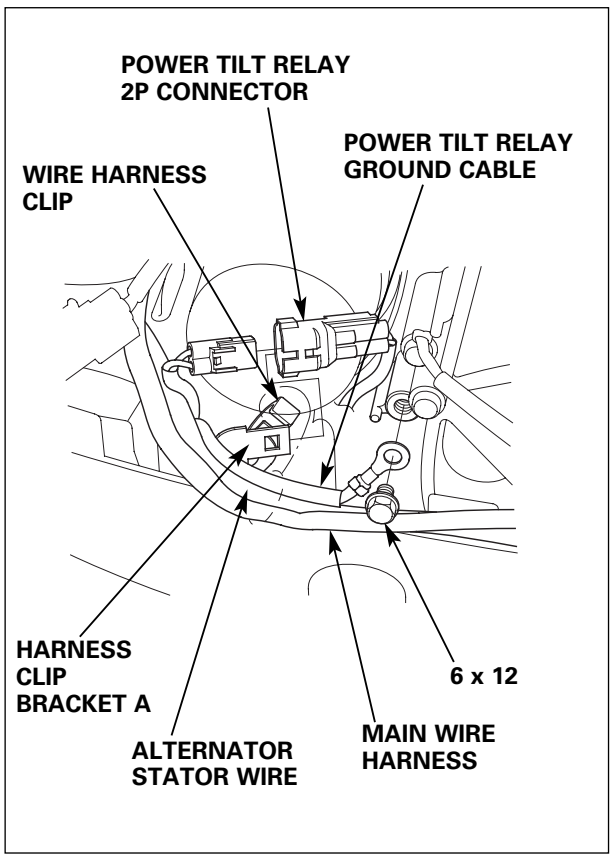
© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-6

17) Release the power tilt relay 2P connector from harness clip bracket A, and disconnect the power tilt relay 2P connector [Power trim/tilt type only].

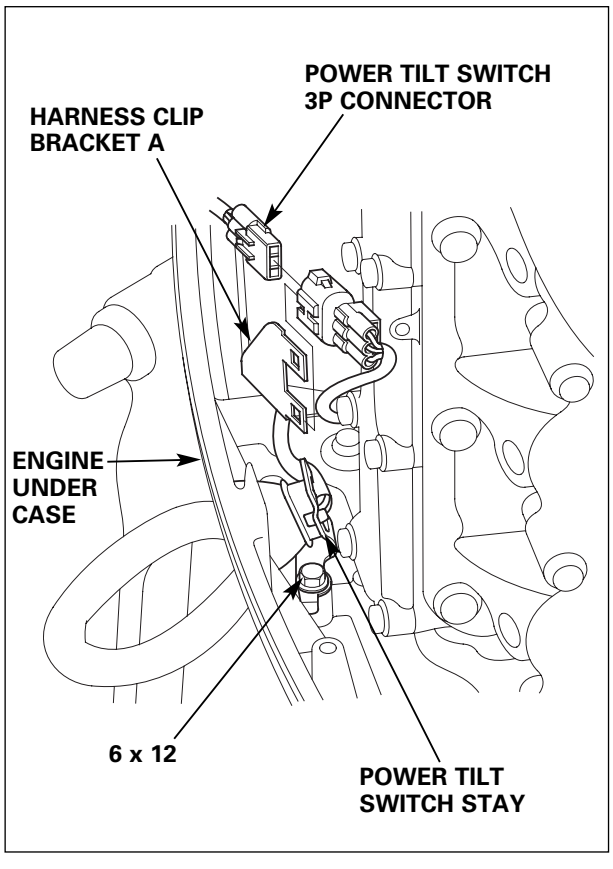
18) Release the alternator stator wire, main wire harness and the power tilt relay ground cable [Power trim/tilt type only] from the wire harness clip.

19) Remove the 6 x 12 mm flange bolt and remove the power tilt relay ground cable [Power trim/tilt type only].



20) Disconnect the power tilt switch 3P connector, and release the power tilt switch 3P connector from harness clip bracket A [Power trim/tilt type only].

21) Loosen the 6 x 12 mm flange bolt that secures the power tilt switch stay [Power trim/tilt type only].
Tighten the 6 x 12 mm flange bolt while pushing the power tilt switch stay toward out (engine under case side) [Power trim/tilt type only].



Date of Issue: May 2008
© Honda Motor Co., Ltd.

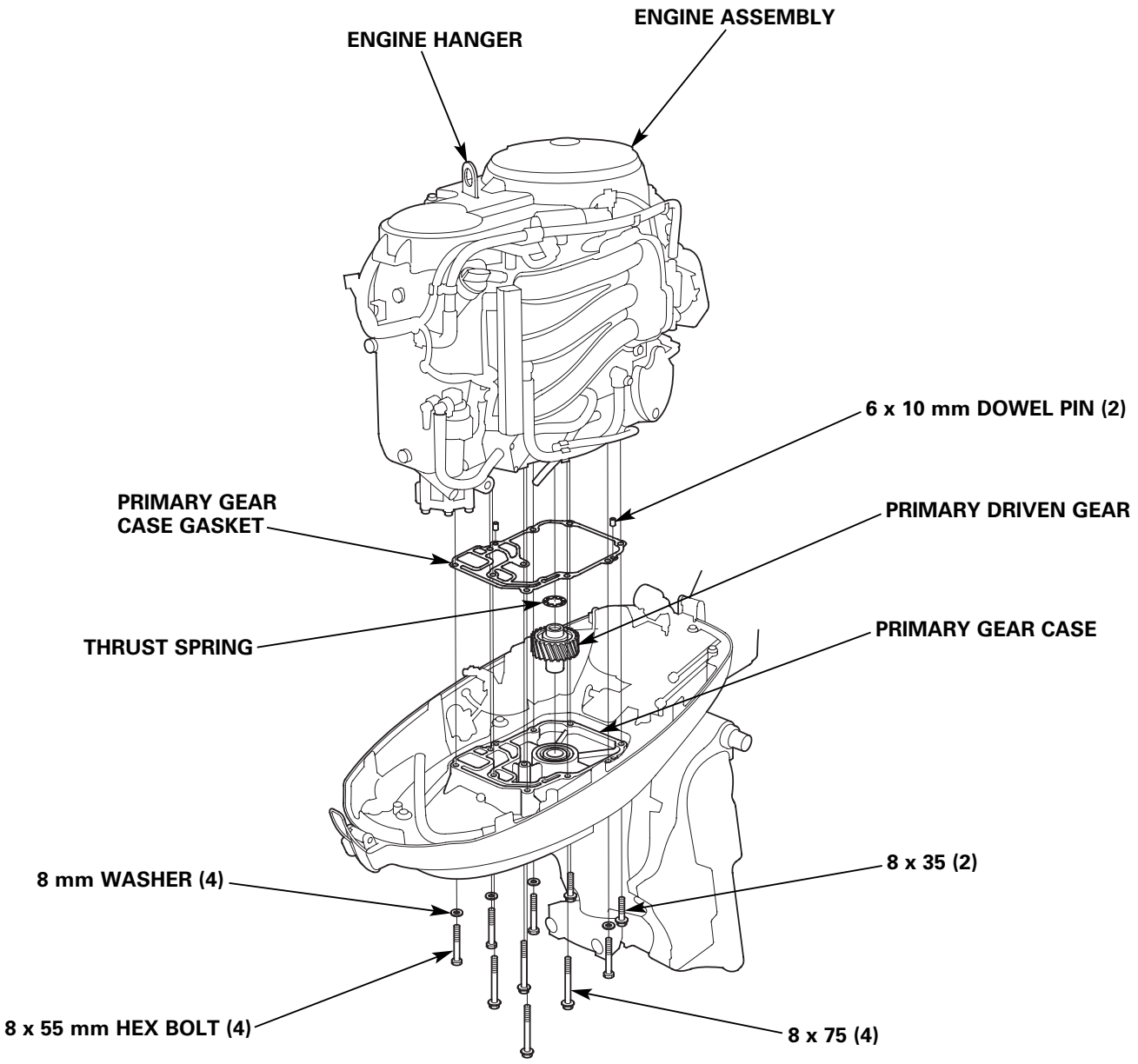
BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-7

22) Remove the four 8 x 75 mm flange bolts, four 8 x 55 mm hex bolts, four 8 mm washers and the two 8 x 35 mm flange bolts from the underside of the primary gear case.

23) Lift up the engine assembly slowly and remove it from the primary gear case.

- Be sure that the chain is set on the engine hangers securely.
- Hold the engine assembly level while lifting it up.

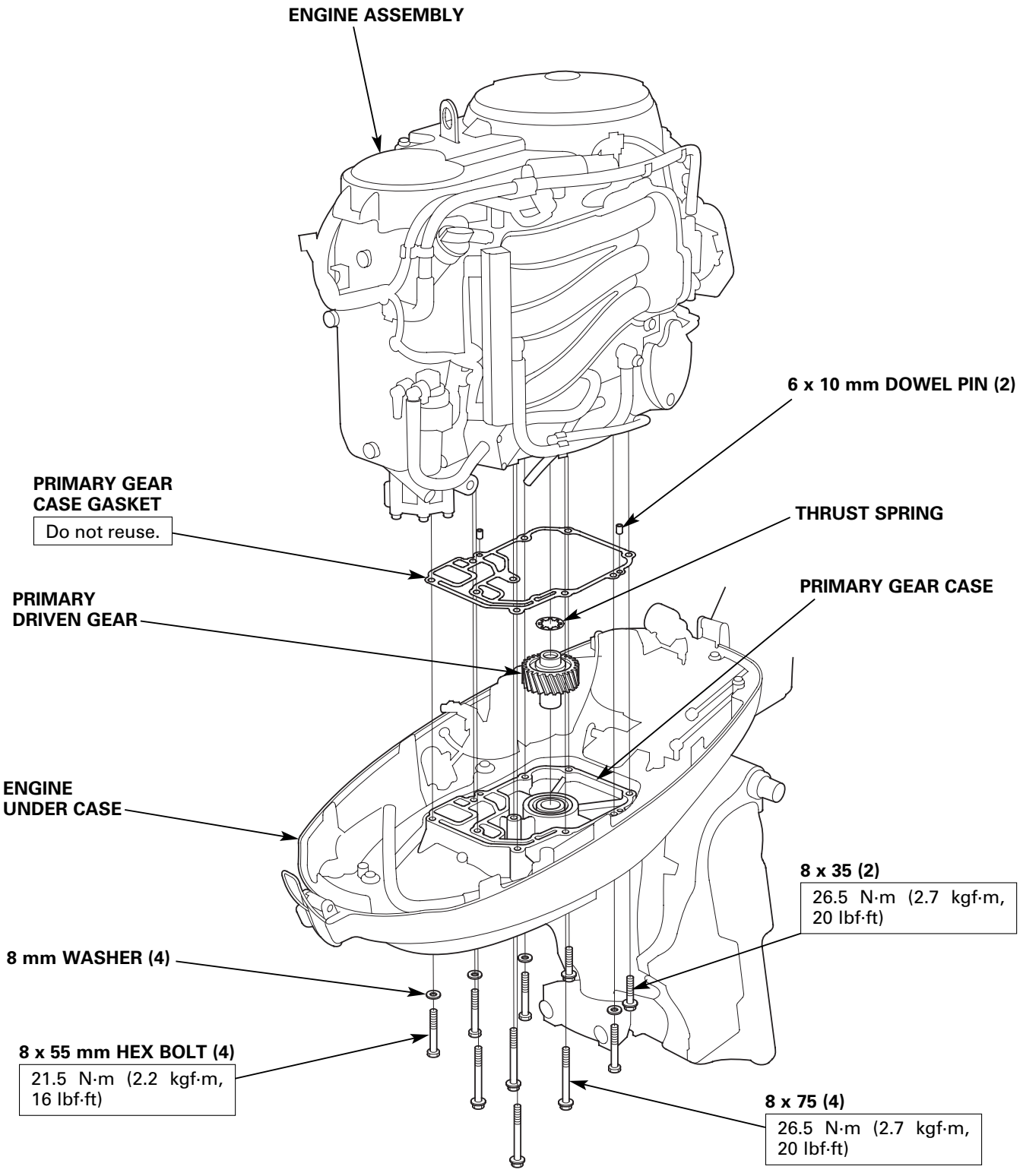
24) Remove the primary gear case gasket, two 6 x 10 mm dowel pins, thrust spring and the primary driven gear from the primary gear case.
Replace the primary gear case gasket with a new one on reassembly.



© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-8

COMPONENT DRAWING



Date of Issue: May 2008
© Honda Motor Co., Ltd.

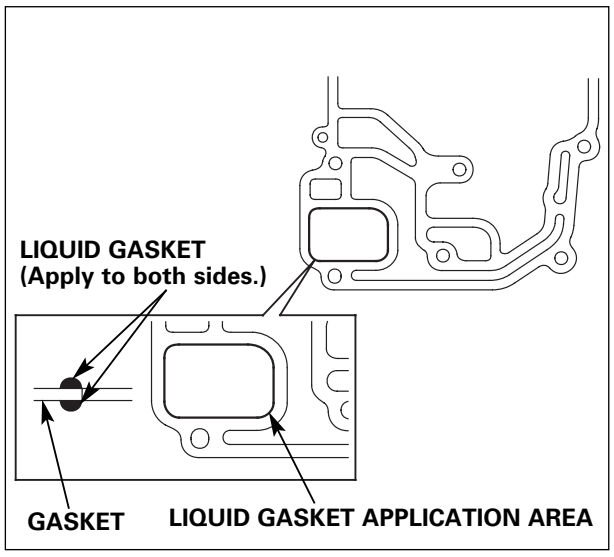
BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-9

2. INSTALLATION

1) Clean the engine assembly/primary gear case mating surfaces and both sides of the primary gear case gasket thoroughly using a shop towel and a degreasing cleaning solvent.

2) Apply beads [1.0 — 5.0 mm (0.04 — 0.20 in) thick] of liquid gasket (ThreeBond® #1211 or equivalent) to the indicated area of the primary gear case gasket.

   - Assemble within 90 minutes after application of the liquid gasket. If the parts have been left unassembled for 90 minutes or longer, remove the old gasket and apply a new gasket again.
   - Do not fill the oil case with engine oil and do not start the engine for 15 minutes after assembly.



3) Install the two 6 x 10 mm dowel pins and a new primary gear case gasket on the primary gear case.
   Set the thrust spring on the primary driven gear, and install the primary driven gear on the primary gear case.

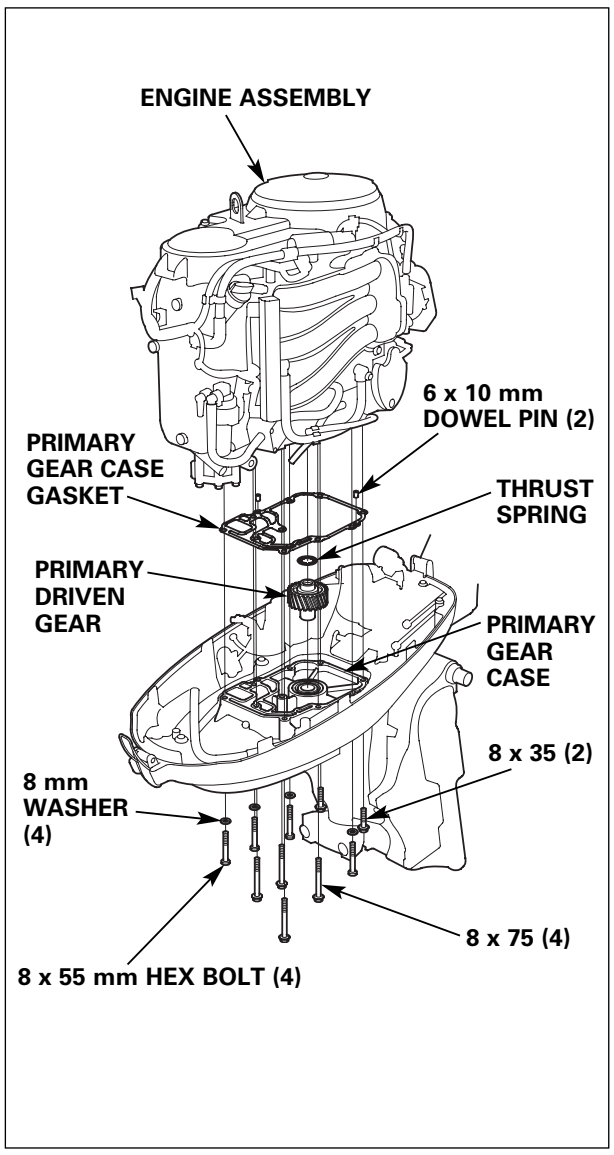
4) While aligning the primary driven gear with the engine assembly installation hole, slowly lower the engine assembly and install it on the primary gear case.

   - Check that the thrust spring is set on the primary driven gear before lowering the engine assembly.
   - Lower the engine assembly while holding it level to the ground. Take care not to damage the throttle arm bracket while lowering the engine assembly.

   NOTICE

   Take care not to damage the primary driven gear spline.

5) Loosely tighten the four 8 x 75 mm flange bolts, four 8 x 55 mm hex bolts, four 8 mm washers and the two 8 x 35 mm flange bolts from the underside of the primary gear case.



© Honda Motor Co., Ltd.

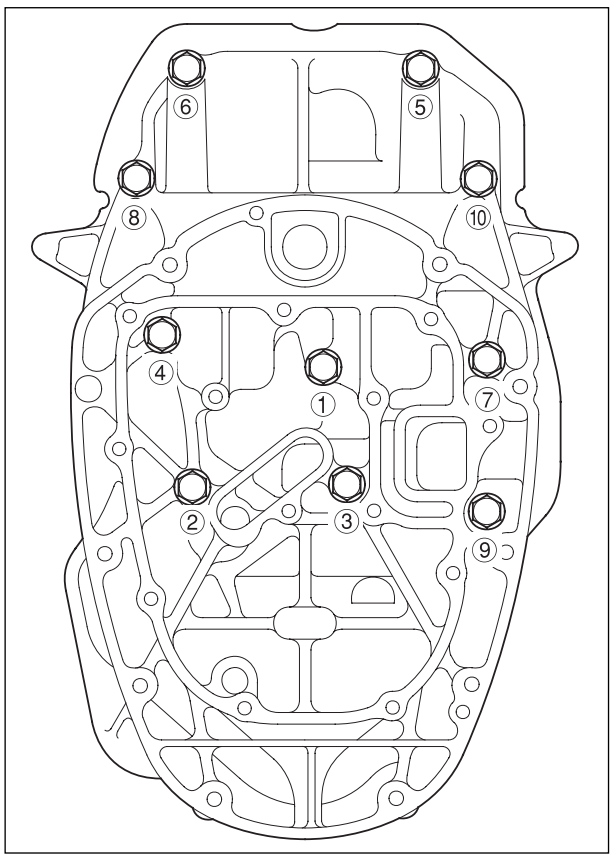
BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-10

6) Tighten the bolts to the specified torque in the numbered order in two or three steps.

TORQUE:
8 x 75 mm/8 x 35 mm flange bolt:
26.5 N·m (2.7 kgf·m, 20 lbf·ft)
8 x 55 mm hex bolt: 21.5 N·m (2.2 kgf·m, 16 lbf·ft)

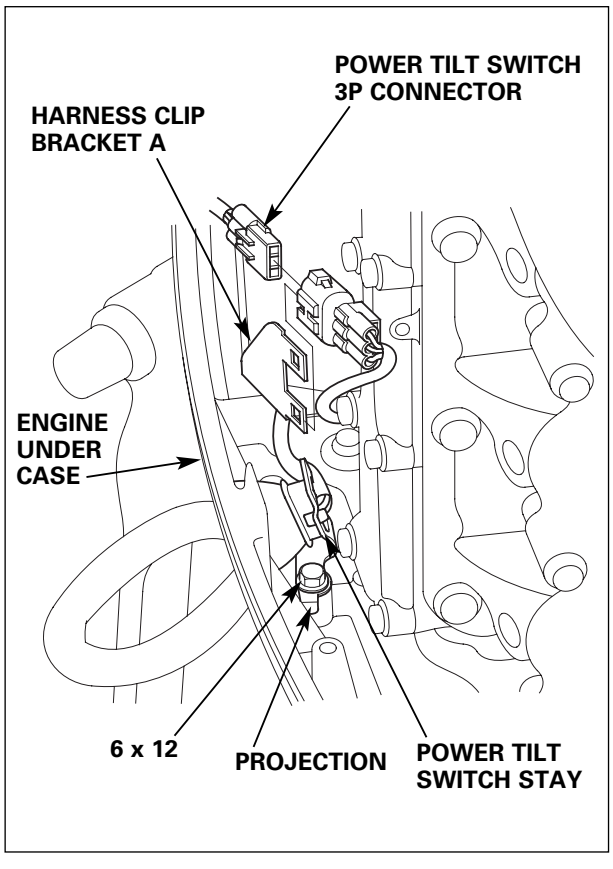
• Do not confuse the bolts on assembly.

Tightening point	Part name	Qty
(1) — (4)	8 x 75 mm flange bolt	4
(5), (6)	8 x 35 mm flange bolt	2
(7) — (10)	8 x 55 mm hex bolt	4



7) Loosen the 6 x 12 mm flange bolt that secures the power tilt switch stay [Power trim/tilt type only].
Tighten the 6 x 12 mm flange bolt while pushing the projection of the power tilt switch stay against the engine under case [Power trim/tilt type only].

8) Install the power tilt switch 3P connector on harness clip bracket A and connect the connector [Power trim/tilt type only].



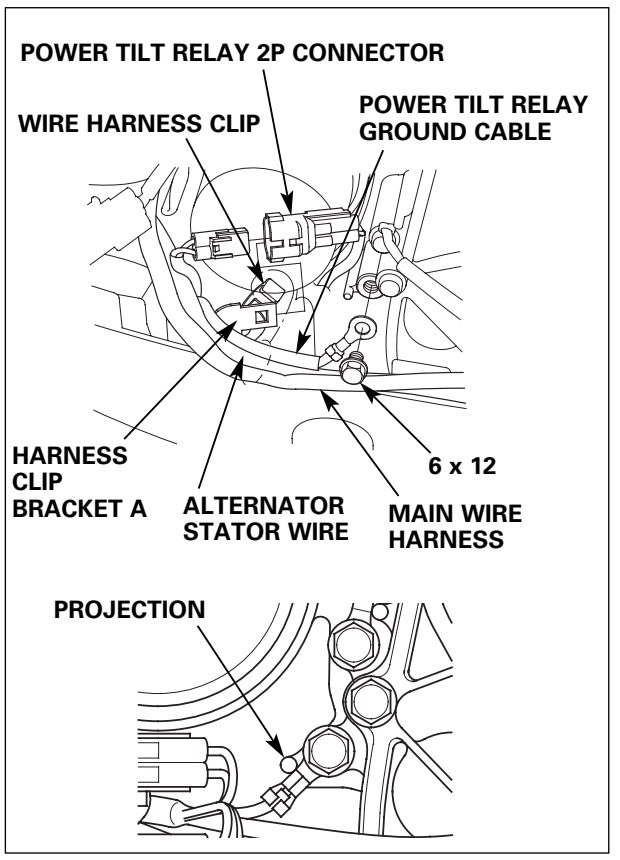
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-11

9) Secure the power tilt relay ground cable with the 6 x 12 mm flange bolt while pushing it against the projection [Power trim/tilt type only].

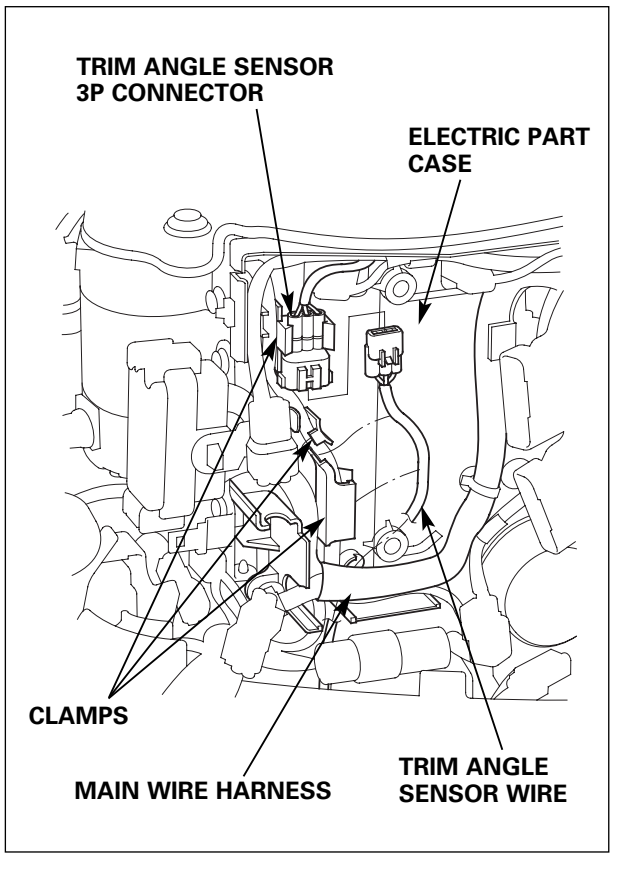
10) Set the alternator stator wire, main wire harness and the power tilt relay ground cable [Power trim/tilt type only] in the wire harness clip.

11) Connect the power tilt relay 2P connector and install the connector on harness clip bracket A [Power trim/tilt type only].



12) Route the trim angle sensor wire between the main wire harness and the electric part case while pulling the main wire harness toward you [Power trim/tilt type only].

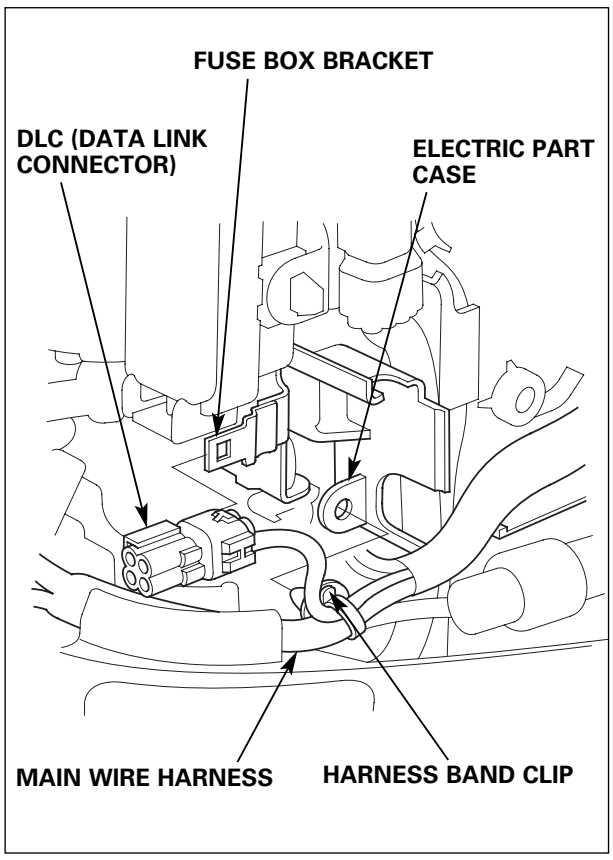
13) Set the trim angle sensor wire in each clamp of the electric part case, and connect the trim angle sensor 3P connector [Power trim/tilt type only].



© Honda Motor Co., Ltd.

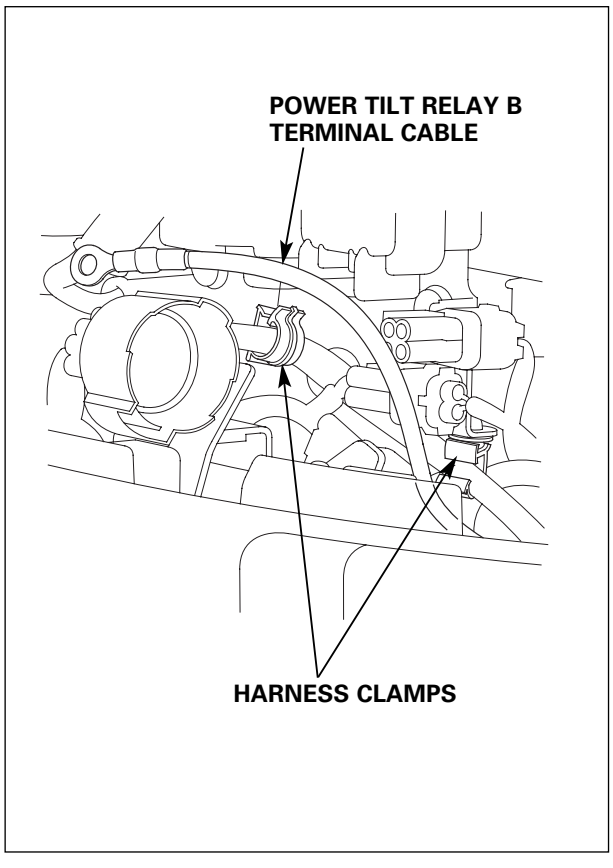
BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-12

14) Install the harness band clip located on the main wire harness on the electric part case.
Install the DLC (data link connector) on the fuse box bracket.



15) Install the ECM (P. 7-19).

16) Set the power tilt relay B terminal cable in the two harness clamps [Power trim/tilt type only].



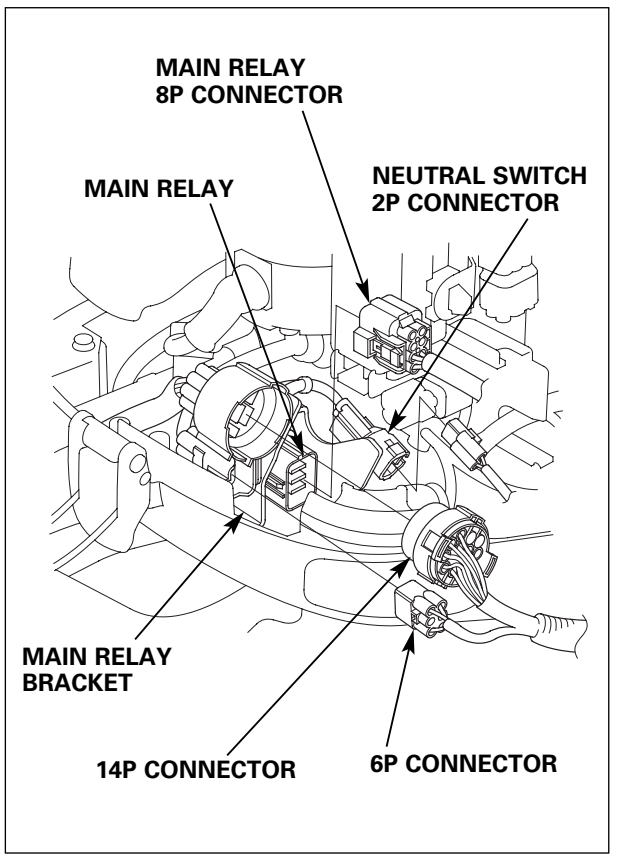
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-13

17) Connect the main relay 8P connector to the main relay.

18) Connect the neutral switch 2P connector.

19) Connect the 14P connector and the 6P connector.

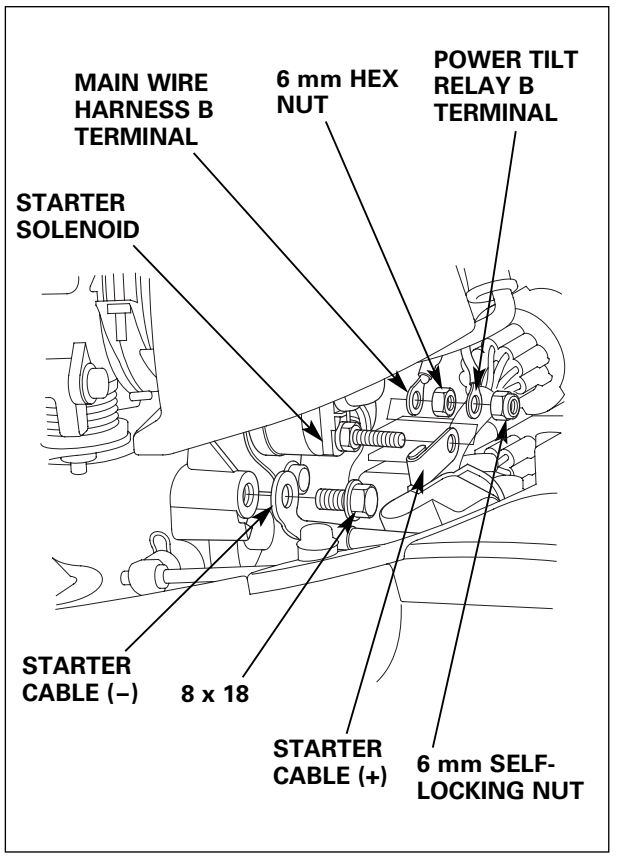


20) Tighten the 8 x 18 mm flange bolt securely while pushing the starter cable (–) against the projection on the crankcase.
Install the starter cable (+) and the main wire harness B terminal on the starter solenoid, and tighten the 6 mm hex nut to the specified torque.

TORQUE: 5.5 N·m (0.6 kgf·m, 4.1 lbf·ft)

Install the power tilt relay B terminal on the starter solenoid, and tighten the 6 mm self-locking nut to the specified torque [Power trim/tilt type only].

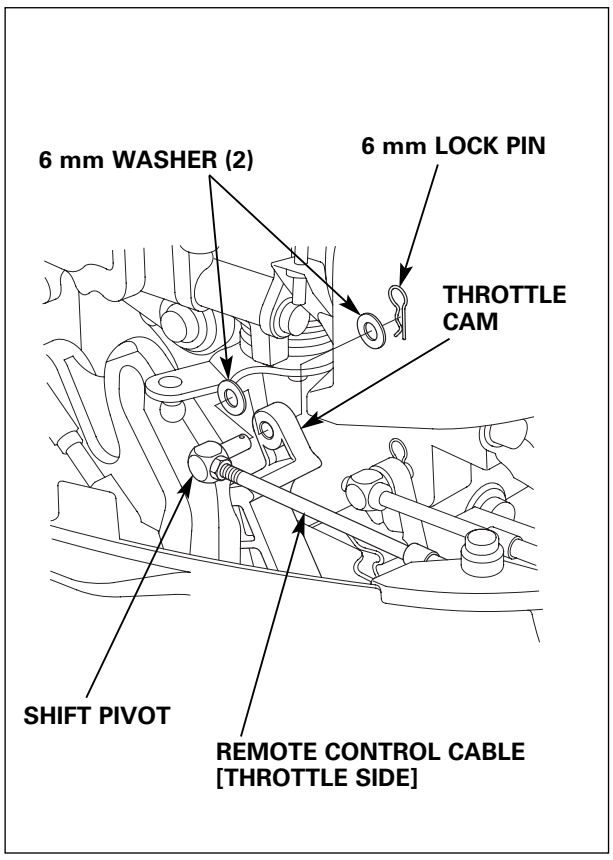
TORQUE: 5.5 N·m (0.6 kgf·m, 4.1 lbf·ft)



© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-14

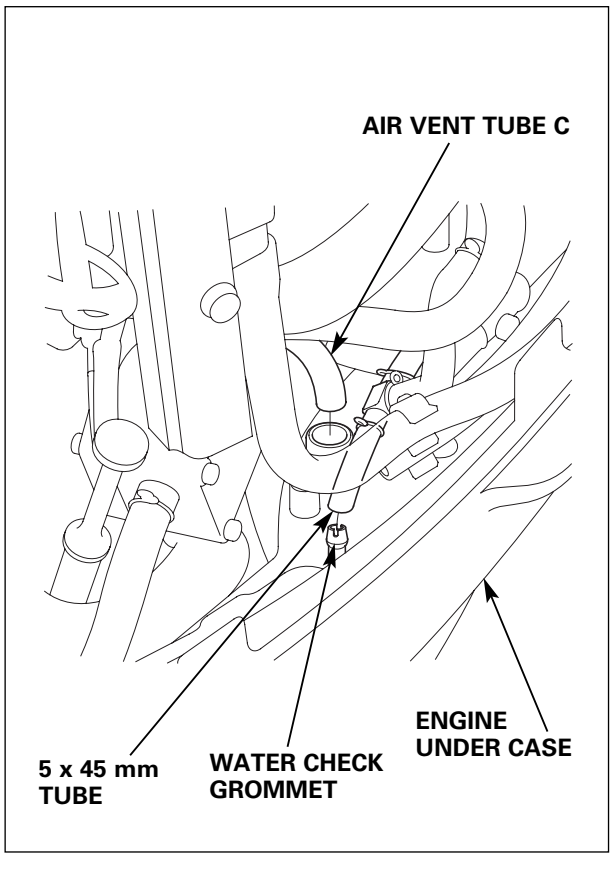
21) Install the remote control cable [throttle side] on the throttle cam. Install the two 6 mm washers and the 6 mm lock pin on the shift pivot of the remote control cable [throttle side].



22) Install the dipstick.

23) Install the air vent tube C on the engine under case.

24) Install the 5 x 45 mm tube on the water check grommet.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

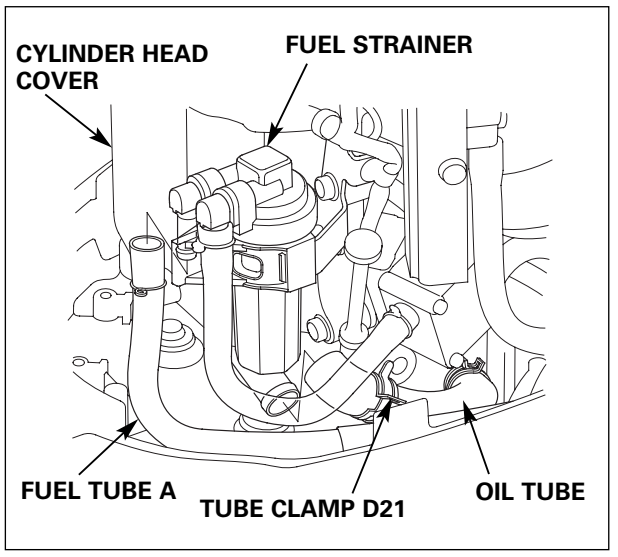
BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-15

25) Connect fuel tube A to the fuel strainer (P. 2-76).

26) Insert the oil tube into the cylinder head cover up to its base.
Clamp tube clamp D21 securely.

27) Install the following parts.
- Ignition coil/regulator/rectifier (P. 18-23)
- Engine cover (P. 4-2)

28) When the engine is started after adjustment, follow the starting procedure after assembly (P. 2-2).



© Honda Motor Co., Ltd.

BF40・50D 6章 (A).qxp 2008/04/10 16:16 ページ 6-16

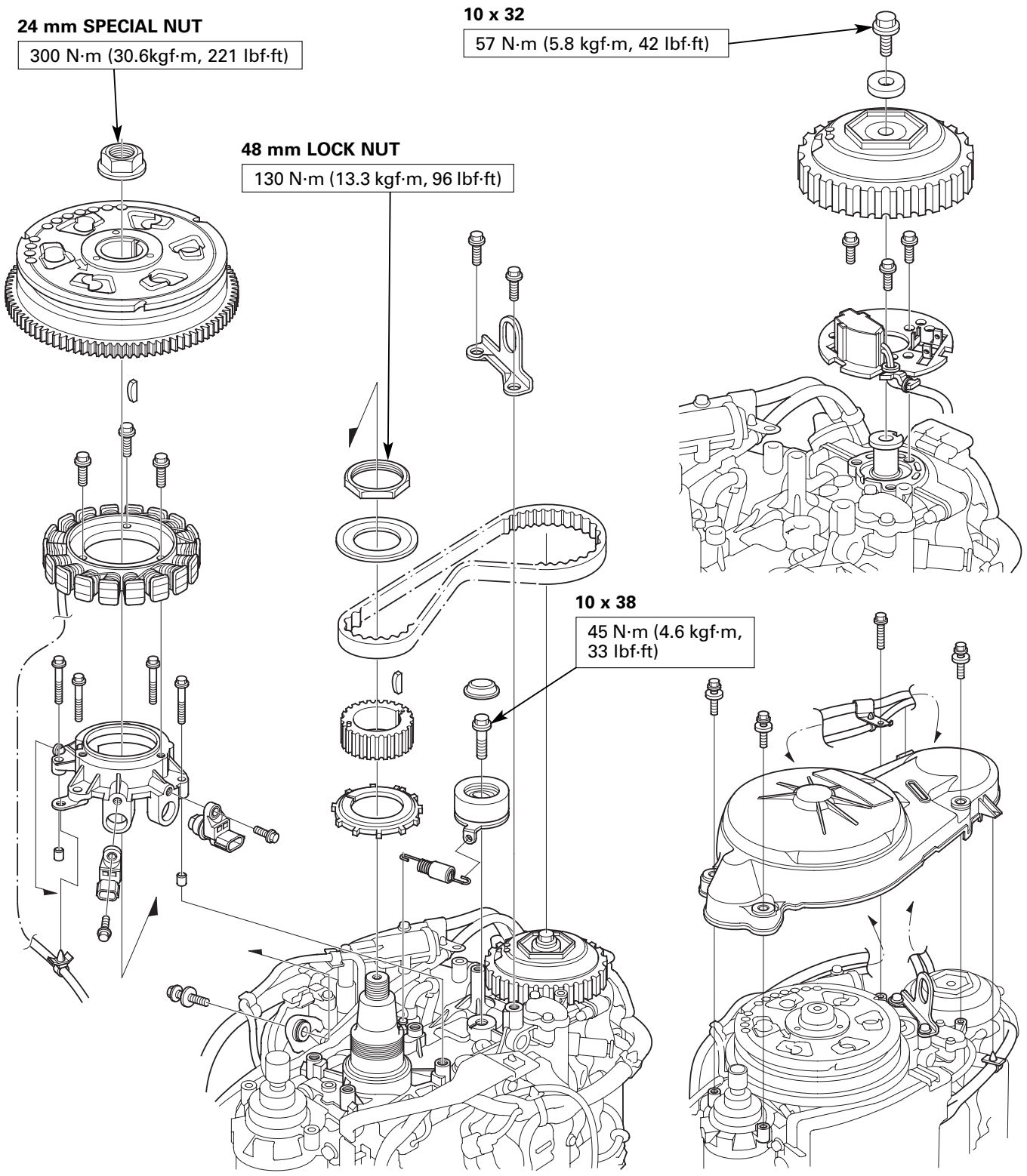
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:18 ページ 7-1

7. ALTERNATOR/CAMSHAFT PULLEY/TIMING BELT

BF40D·BF50D

1. ALTERNATOR COVER..... 7-2
2. ALTERNATOR/TIMING BELT 7-3
3. CAMSHAFT PULLEY/ CMP SENSOR 7-22



© Honda Motor Co., Ltd.

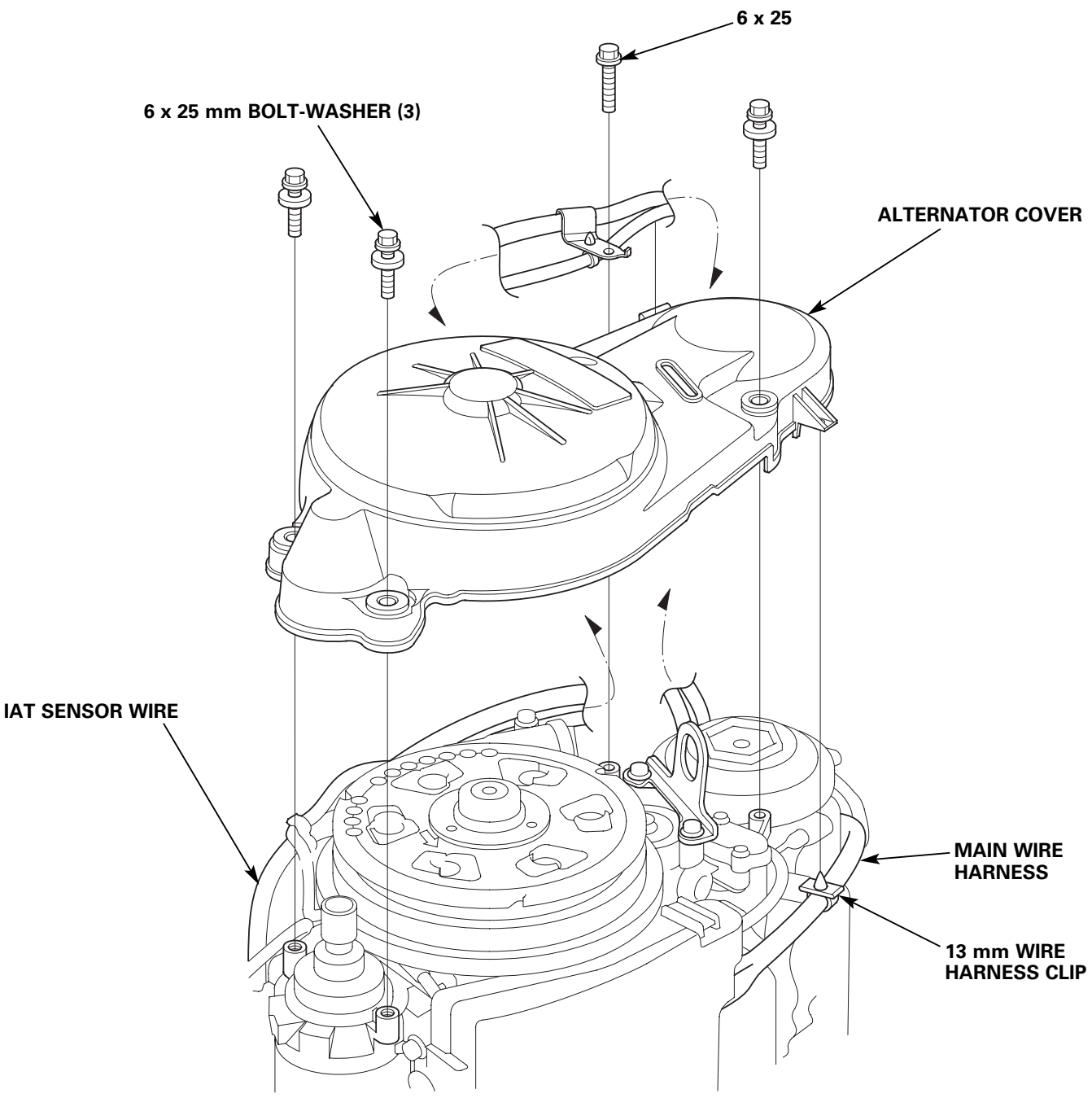
BF40D・50D 7章 (A).qxp 2008/04/10 16:18 ページ 7-2

1. ALTERNATOR COVER

a. REMOVAL/INSTALLATION

1) Remove the engine cover (P. 4-2).
2) Remove the 13 mm wire harness clip from the alternator cover.
3) Release the main wire harness from the clamp on the alternator cover.
4) Release the IAT sensor wire from the clamp on the alternator cover.
5) Remove the three 6 x 25 mm bolt-washers and the 6 x 25 mm flange bolt, and remove the alternator cover.

• Installation is the reverse order of removal.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-3

2. ALTERNATOR/TIMING BELT

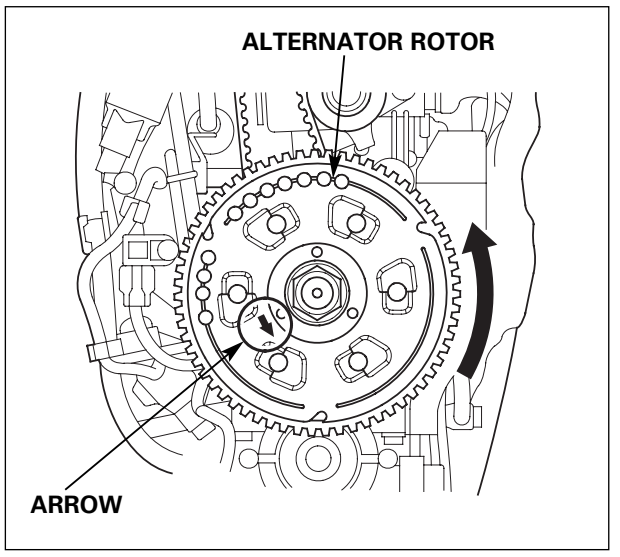
a. REMOVAL

Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)
- Electric part cover (P. 18-19)

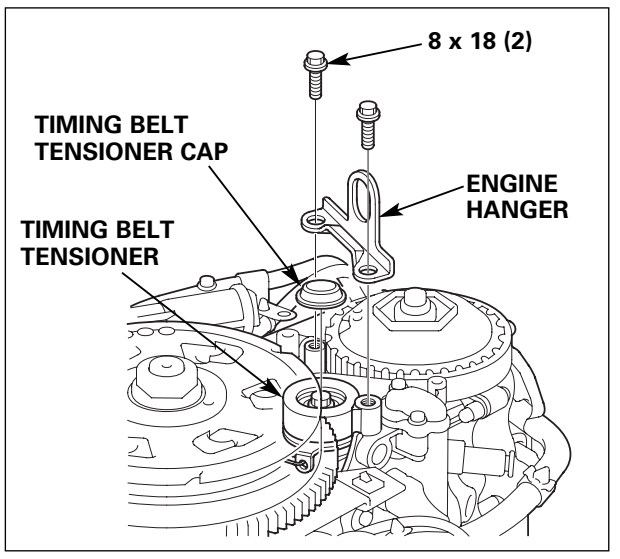
1) Turn the alternator rotor counterclockwise to bring the No.1 cylinder piston to the top dead center of its compression stroke (P. 3-10).

NOTICE

Be sure to turn the alternator rotor in the direction shown with the arrow. Never turn it clockwise.



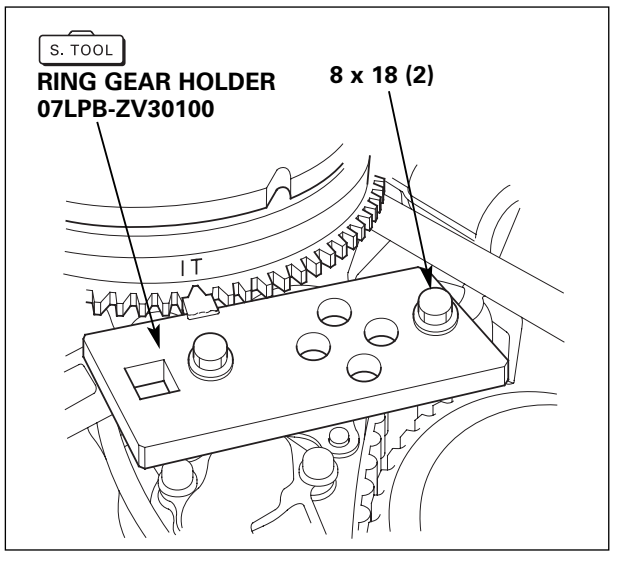
2) Remove the two 8 x 18 mm flange bolts, and remove the engine hanger.
3) Remove the timing belt tensioner cap from the timing belt tensioner.



4) Set the special tool on the engine hanger mounting holes. Install the two 8 x 18 mm flange bolts (engine hanger mounting bolts) and tighten securely.

• Check that the special tool is set in the ring gear teeth.

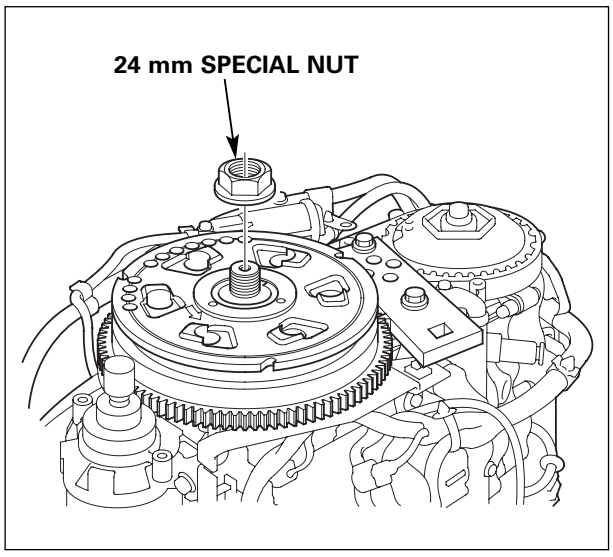
TOOL:
Ring gear holder **07LPB-ZV30100**



© Honda Motor Co., Ltd.

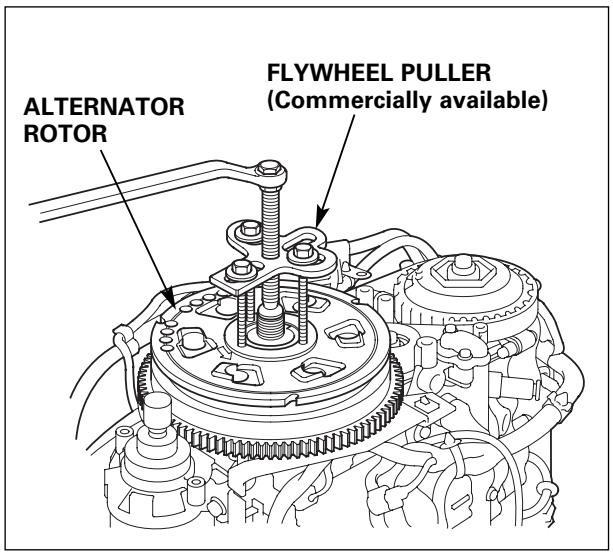
BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-4

5) Remove the 24 mm special nut and remove the special tool.

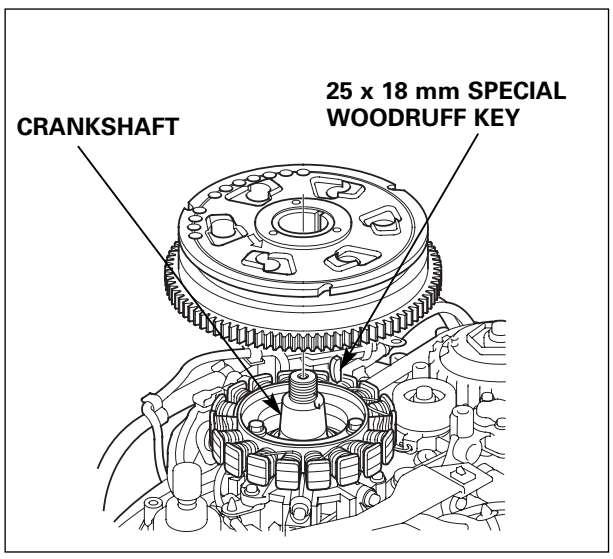


6) Set a commercially available flywheel puller as shown, and remove the alternator rotor.

- The alternator rotor has very strong magnetic force. Do not hold the alternator rotor by the ring gear. Hold it by the recoil starter rope winding area, so you will not pinch your fingers with the rotor.



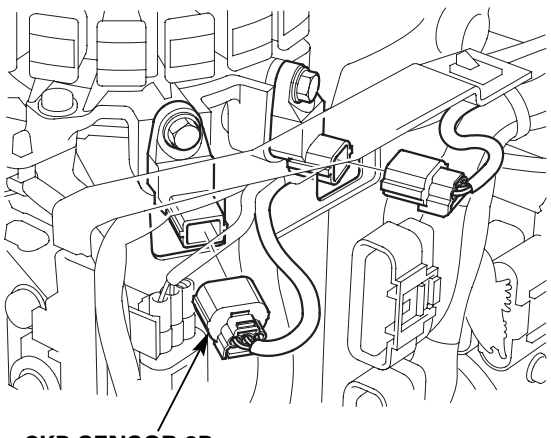
7) Remove the 25 x 18 mm special woodruff key from the crankshaft.



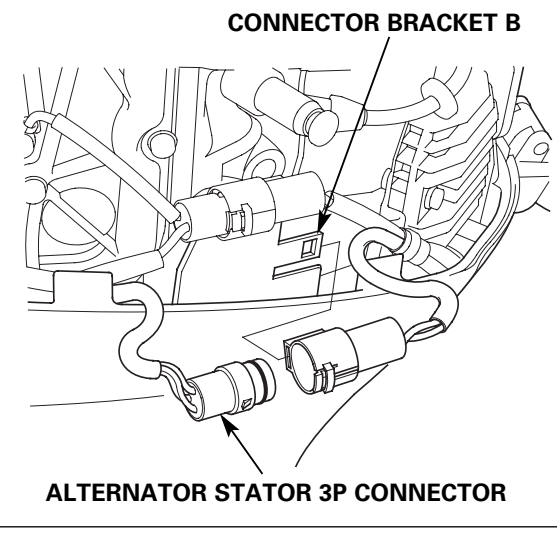
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-5

8) Disconnect the two CKP sensor 3P connectors.

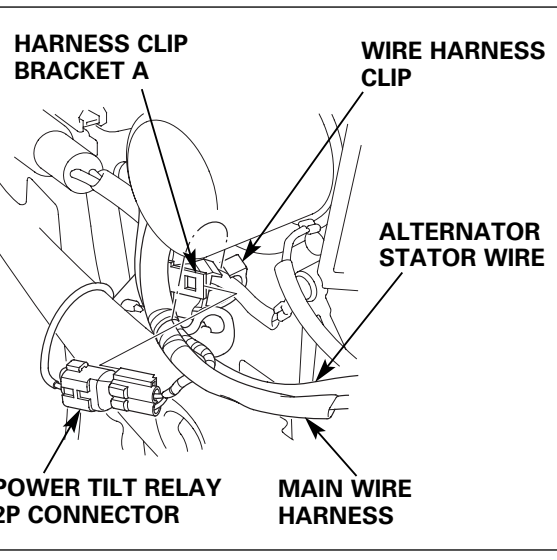


9) Remove the alternator stator 3P connector from connector bracket B, and disconnect the connector.



10) Remove the power tilt relay 2P connector from harness clip bracket A [Power trim/tilt type only].

11) Release the alternator stator wire and the main wire harness from the wire harness clip.

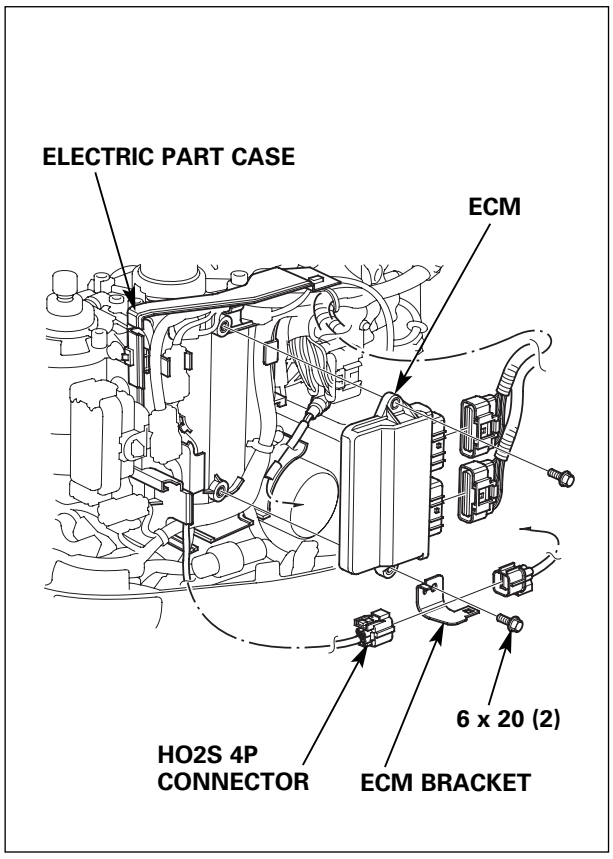


© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-6

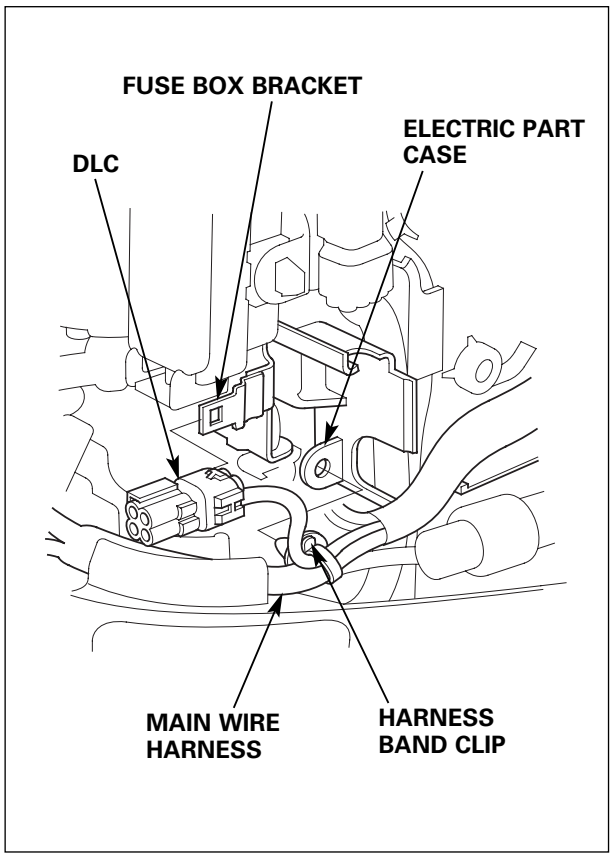
12) Disconnect the HO2S 4P connector, and remove the HO2S 4P connector from the ECM bracket.

13) Remove the two 6 x 20 mm flange bolts, and remove the ECM bracket and the ECM from the electric part case.



14) Remove the DLC (Data Link Connector) from the fuse box bracket.

15) Remove the main wire harness' harness band clip from the electric part case.

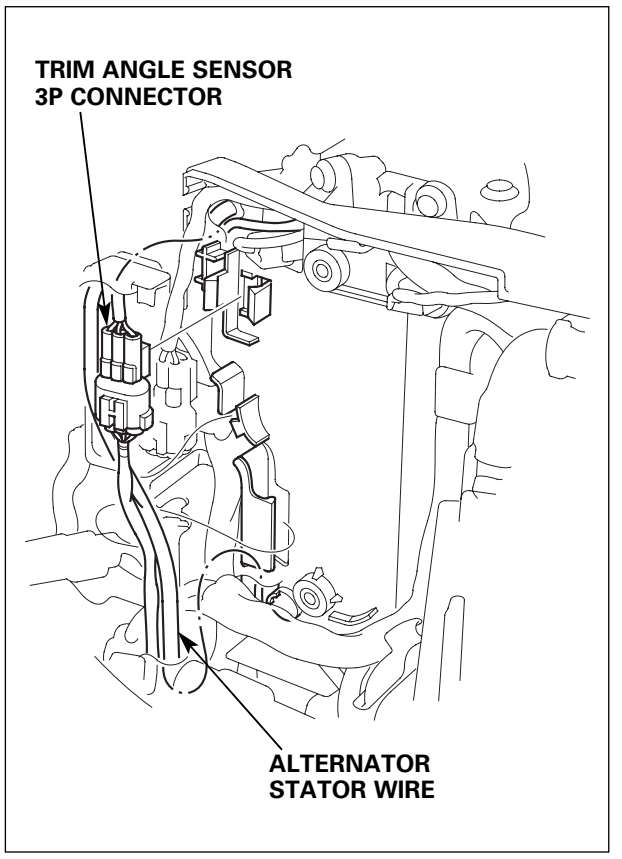


Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-7

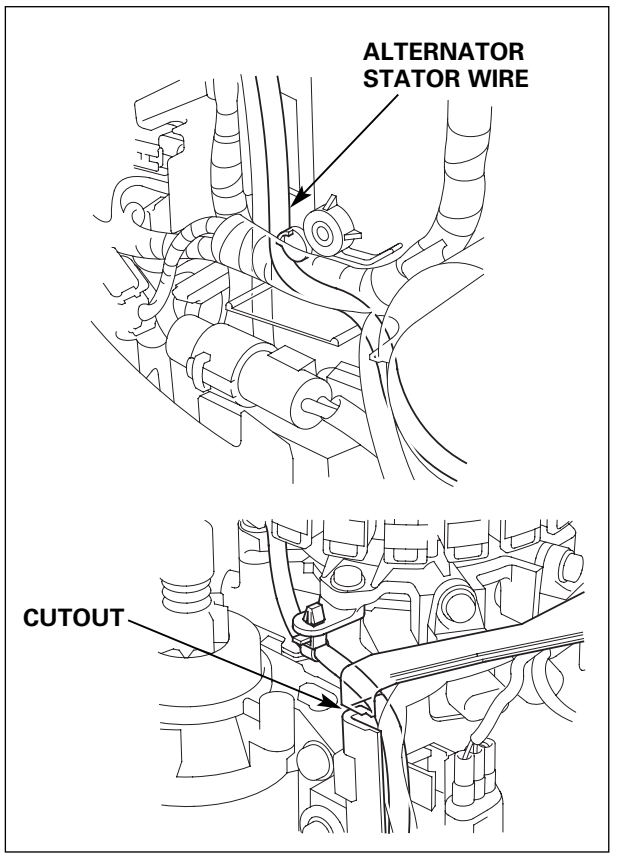
16) Remove the trim angle sensor 3P connector from the electric part case [Power trim/tilt type only].

17) Release the alternator stator wire from each clamp of the electric part case.



18) Pull out the alternator stator wire from the gap between the electric part case and the main wire harness as shown.

19) Remove the alternator stator wire through the cutout in the electric part case.

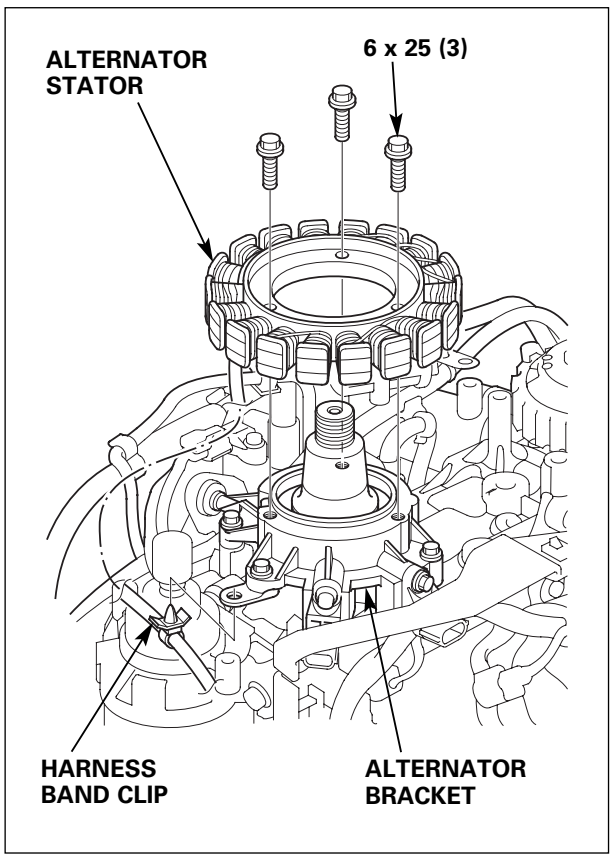


© Honda Motor Co., Ltd.

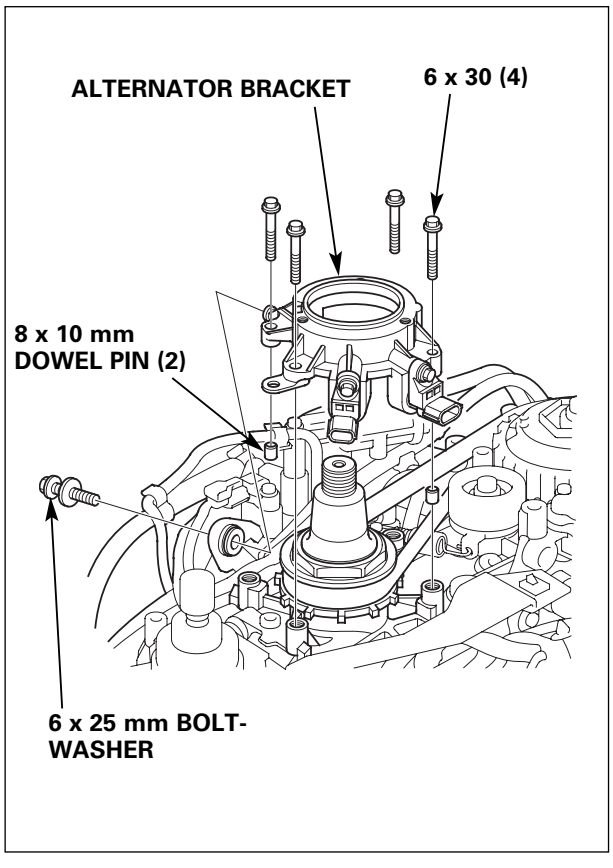
BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-8

20) Remove the harness band clip from the alternator bracket.

21) Remove the three 6 x 25 mm flange bolts, and remove the alternator stator from the alternator bracket.



22) Remove the four 6 x 30 mm flange bolts and the 6 x 25 mm bolt-washer, and remove the alternator bracket and the two 8 x 10 mm dowel pins.



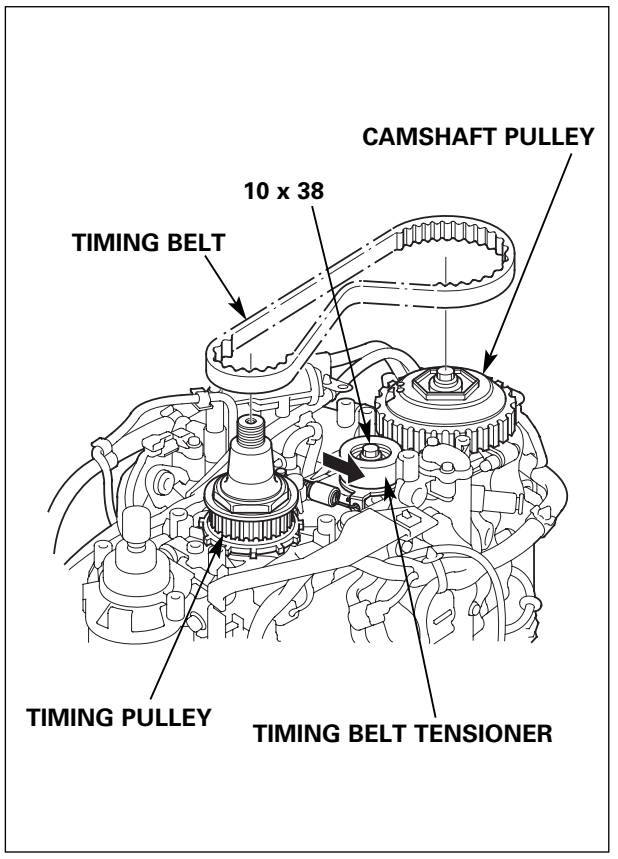
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-9

23) Loosen the 10 x 38 mm flange bolt that secures the timing belt tensioner.
Tighten the 10 x 38 mm flange bolt while pushing the timing belt tensioner outward.

24) Remove the timing belt from the camshaft pulley first, and then remove the timing belt from the timing pulley.

- Check the timing belt for damage or wear, and replace it with a new one if necessary.
- Do not remove the timing belt with force using a screwdriver.
- Take care not to contaminate the timing belt with oil or grease after removing it.
- Do not bend or distort the timing belt after removing it. Store the timing belt by hanging it on a wall.

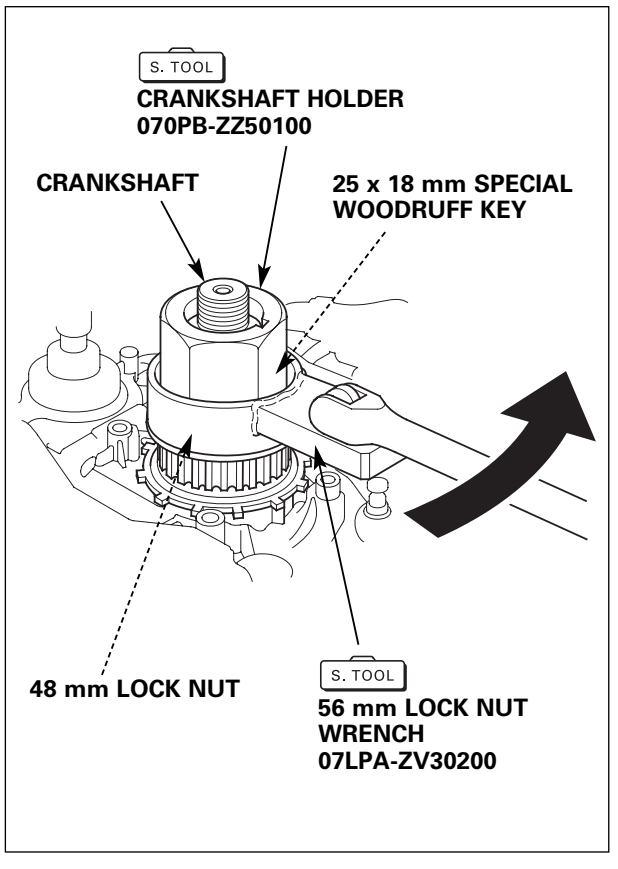


25) Set the 25 x 18 mm special woodruff key on the crankshaft (P. 7-14), then install the crankshaft holder.

26) Loosen the 48 mm lock nut using the special tool as shown. Holding the crankshaft with the special tool (crankshaft holder), loosen the 48 mm lock nut using the special tool (56 mm lock nut wrench).

TOOLS:

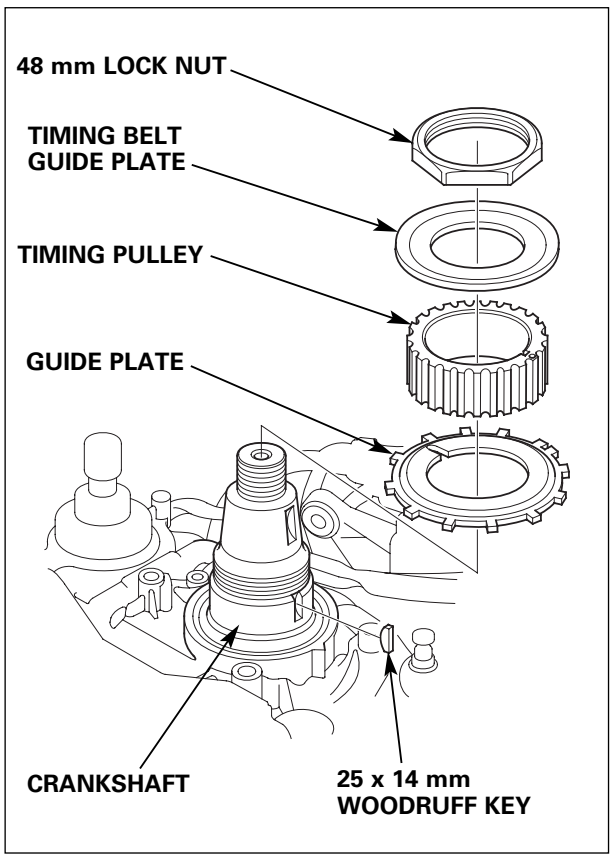
Crankshaft holder	**070PB-ZZ50100**
56 mm lock nut wrench	**07LPA-ZV30200**



© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-10

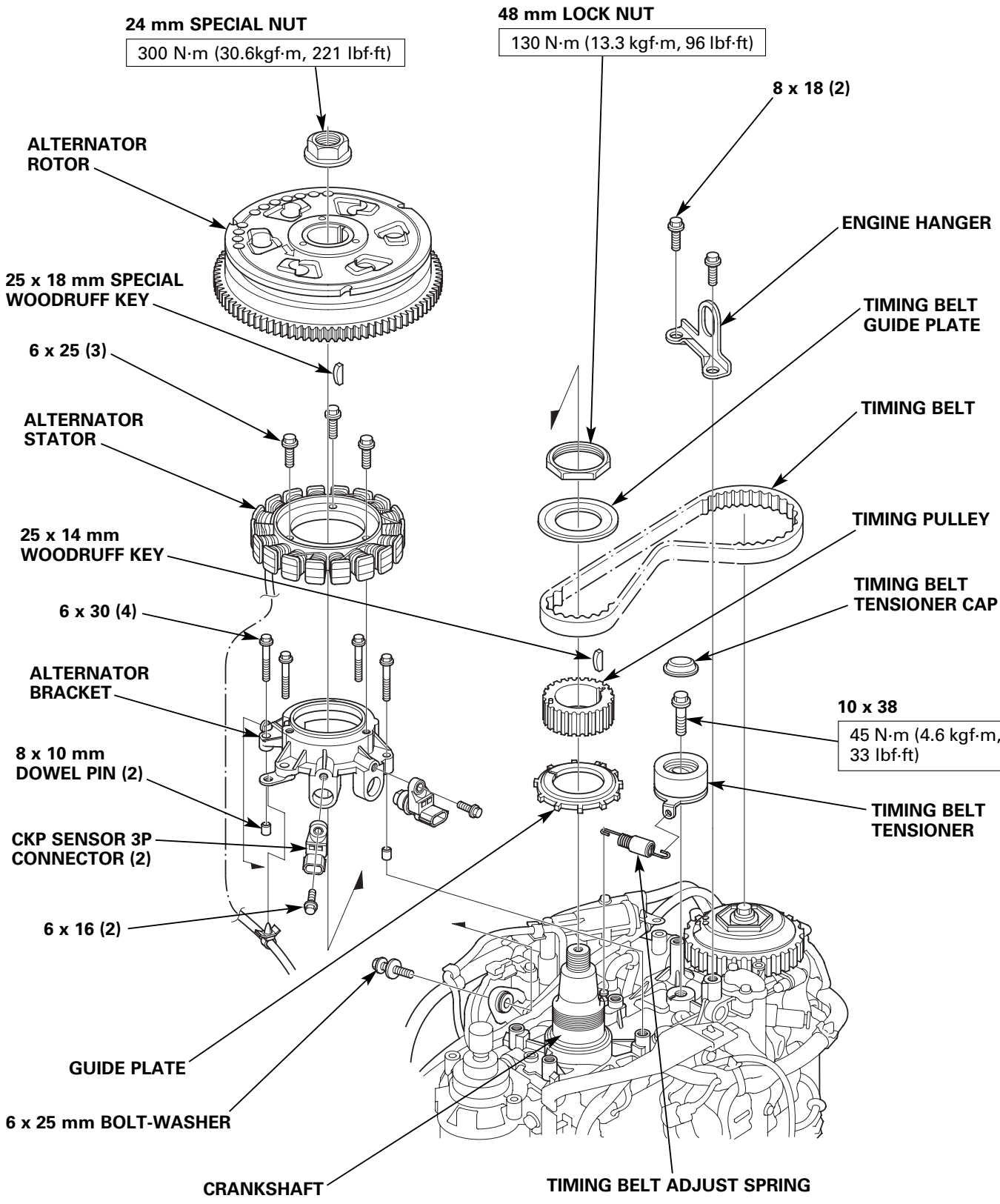
27) Remove the 48 mm lock nut, timing belt guide plate, timing pulley, 25 x 14 mm woodruff key and the guide plate from the crankshaft.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-11

b. COMPONENT DRAWING



© Honda Motor Co., Ltd.

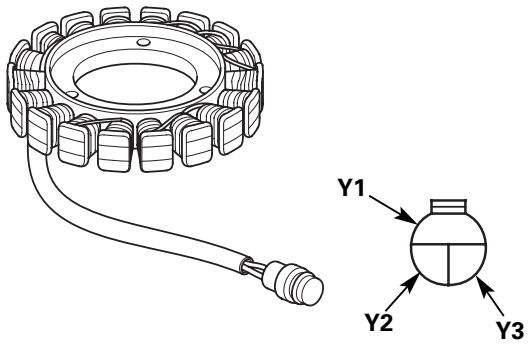
BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-12

c. INSPECTION

• ALTERNATOR STATOR

Measure the resistance between the following terminals.

Between Y1 and Y2 terminals	0.25 — 0.37 Ω
Between Y1 and Y3 terminals	
Between Y2 and Y3 terminals	

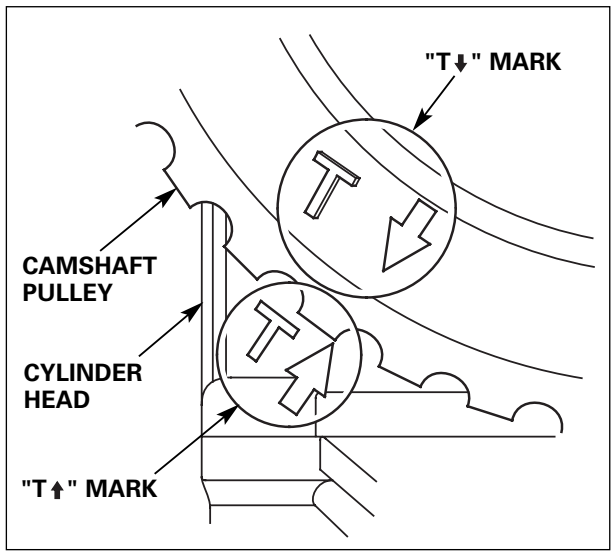


Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-13

d. INSTALLATION

1) Check that the "T⬇" mark on the camshaft pulley is in alignment with the "T⬆" mark on the cylinder head.



2) While aligning the "●" mark on the guide plate with the "▮" mark on the cylinder plate, set the guide plate on the crankshaft with the "●" mark toward up.

3) Install the 25 x 14 mm woodruff key on the crankshaft.

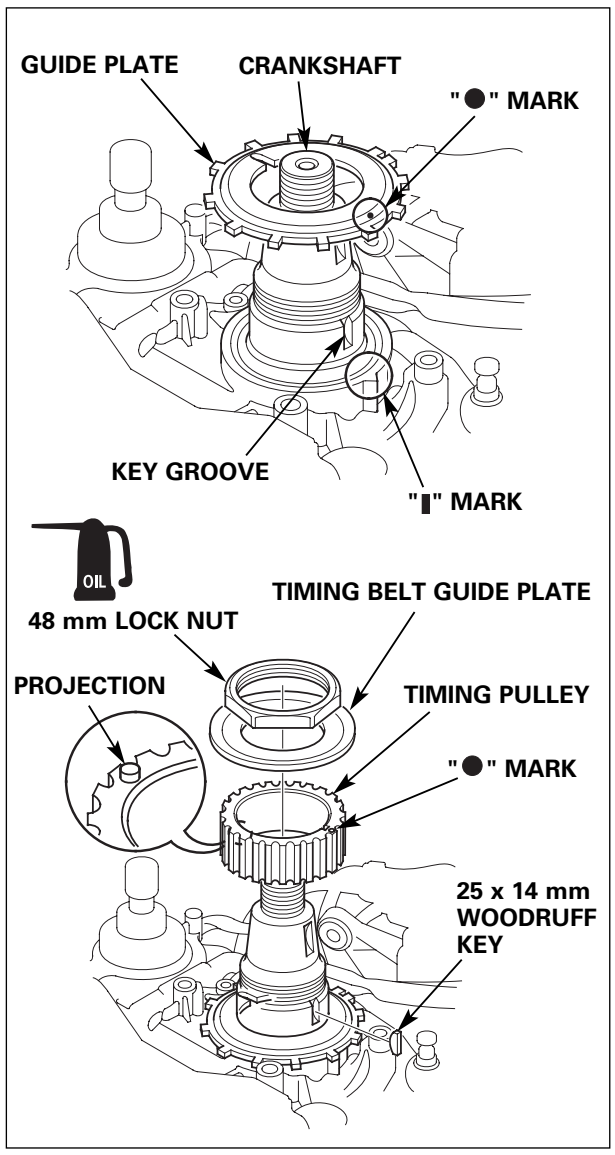
4) Install the timing pulley with the projection toward down while aligning the key groove in the timing pulley with the 25 x 14 mm woodruff key that is set on the crankshaft.
If there is clearance between the guide plate and the timing pulley, remove the clearance by turning the guide plate.
Align the "●" mark on the guide plate with the "●" mark on the timing pulley.

5) Install the timing belt guide plate on the crankshaft.

   • Note the timing belt guide plate installation direction.

6) Apply engine oil to the threads and seat of the 48 mm lock nut.

7) Loosely tighten the 48 mm lock nut.



© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-14

8) Install the 25 x 18 mm special woodruff key on the crankshaft.
Install the special tool on the crankshaft.

TOOL:
Crankshaft holder **070PB-ZZ50100**

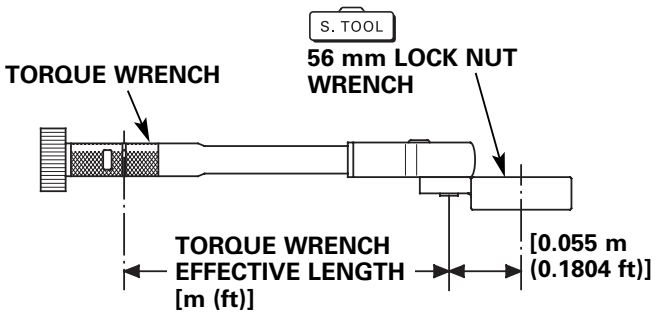
9) Tighten the 48 mm lock nut to the specified torque using the special tool.

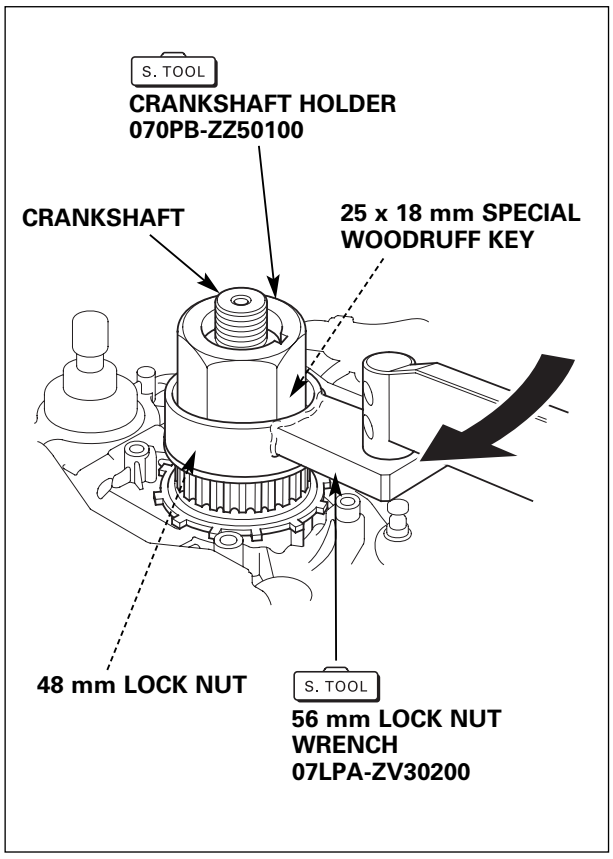
TORQUE: 130 N·m (13.3 kgf·m, 96 lbf·ft)

NOTICE

To tighten the 48 mm lock nut, use the special tool and read the torque as follows.

TOOL:
56 mm lock nut wrench **07LPA-ZV30200**





- **Formula:**

Torque wrench reading =

$$\frac{\text{Torque wrench effective length [m (ft)]} \times \text{Specified torque [N·m (kgf·m, lbf·ft)]}}{\text{Torque wrench effective length [m(ft)]} + 0.055\ \text{[m (0.1804 ft)]}}$$

- **Example:**

Torque wrench reading using a torque wrench with an effective length of 0.4 m (1.31 ft)

$$\frac{0.4\ \text{[m (1.31 ft)]} \times 130\ \text{[N·m (13.3 kgf·m, 96 lbf·ft)]}}{0.4\ \text{[m (1.31 ft)]} + 0.055\ \text{[m (0.1804 ft)]}}$$

= 114 [N·m (11.6 kgf·m, 84 lbf·ft)]

NOTICE

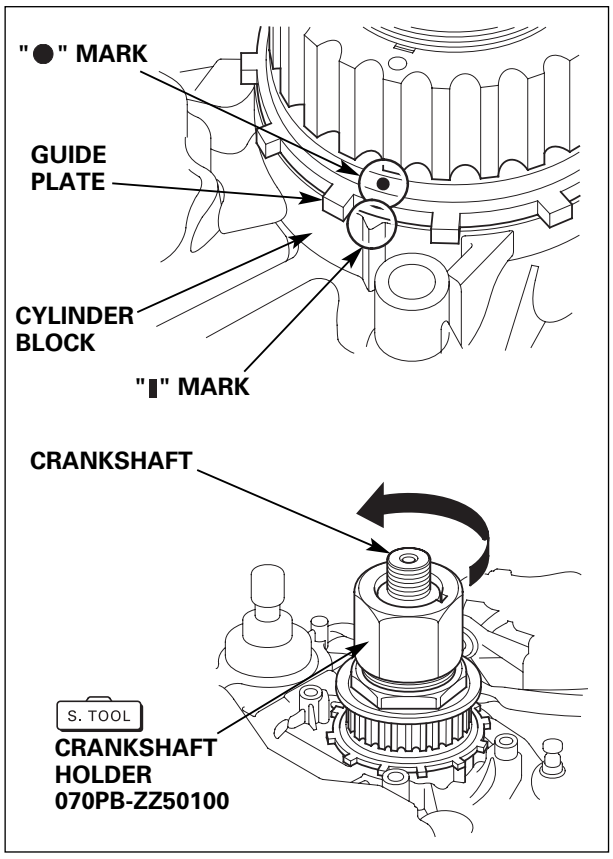
Tighten the 48 mm lock nut with care not to turn the crankshaft clockwise.

10) Check that the "●" mark on the guide plate is in alignment with the "▮" mark on the cylinder block.
If not, set the special tool on the crankshaft and turn the crankshaft counterclockwise to align the marks.
Remove the special tool from the crankshaft.

TOOL:
Crankshaft holder **070PB-ZZ50100**

NOTICE

Do not turn the crankshaft clockwise.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

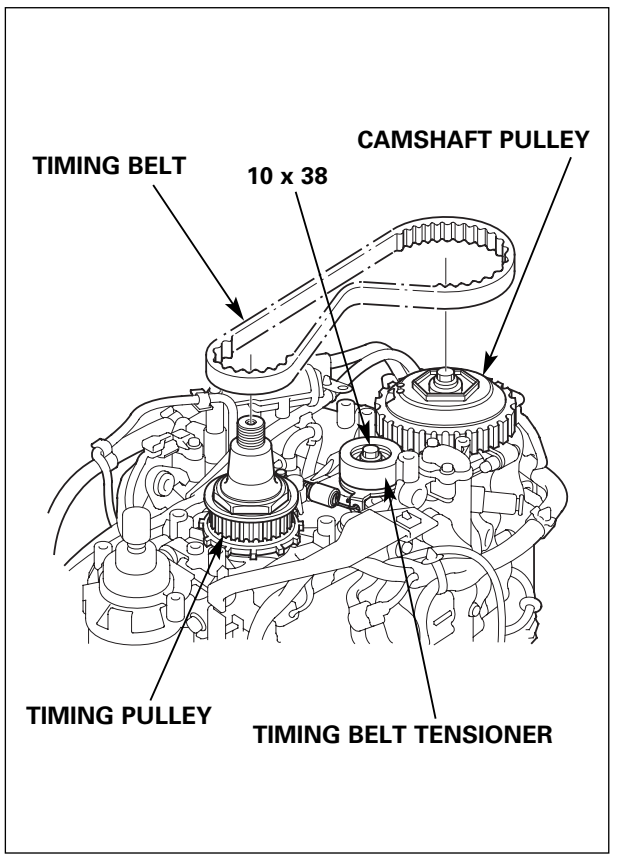
BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-15

11) Install the timing belt on the timing pulley side first, then on the camshaft pulley side.

- Install the timing belt with care not to bring the marks on the camshaft pulley and the timing mark out of alignment.

12) Loosen the 10 x 38 mm flange bolt of the timing belt tensioner.

- Do not tighten the 10 x 38 mm flange bolt at this time.



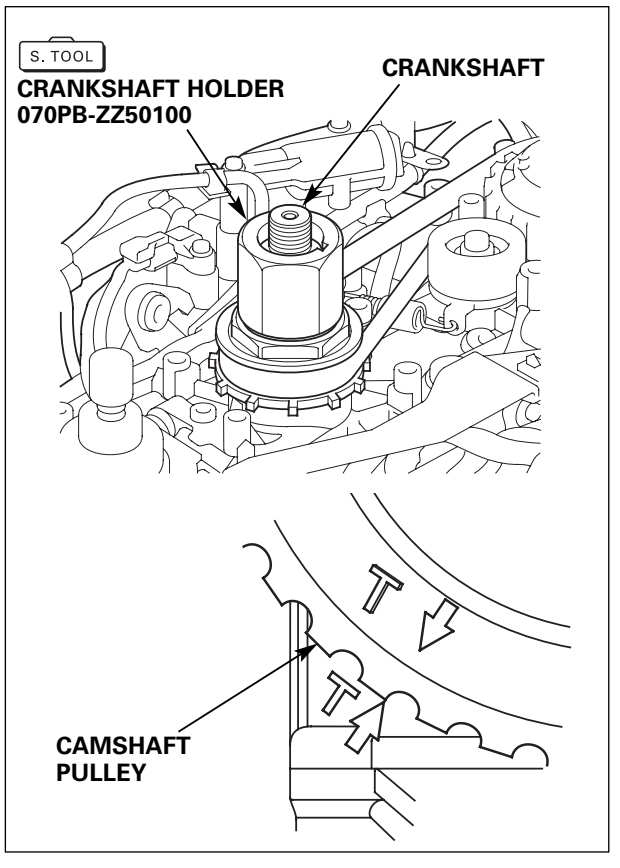
13) Install the special tool on the crankshaft.

TOOL:
Crankshaft holder **070PB-ZZ50100**

14) Turn the crankshaft 2 turns counterclockwise using the alignment mark on the camshaft pulley as the reference point.

NOTICE

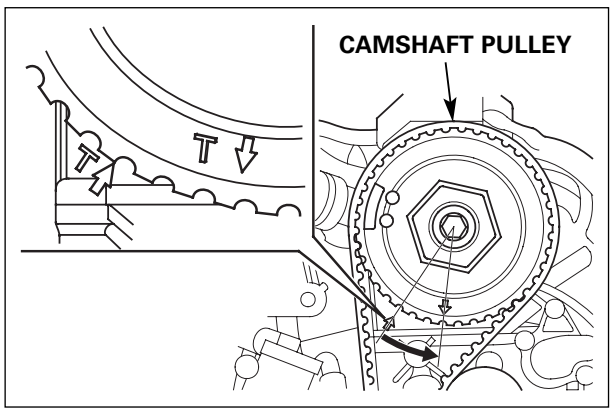
Do not turn the crankshaft clockwise.



© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-16

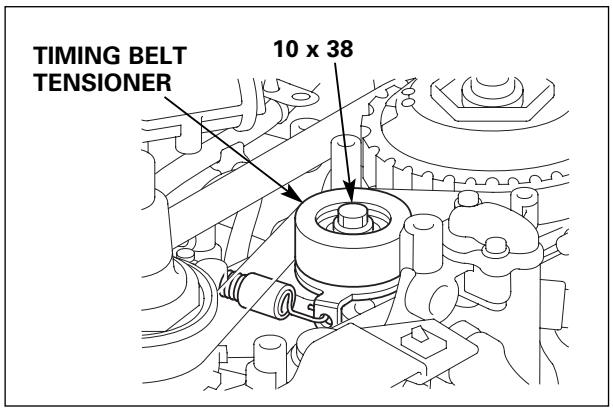
15) Turn the crankshaft counterclockwise farther until the camshaft pulley turns an additional 3 ridges of the gear teeth.



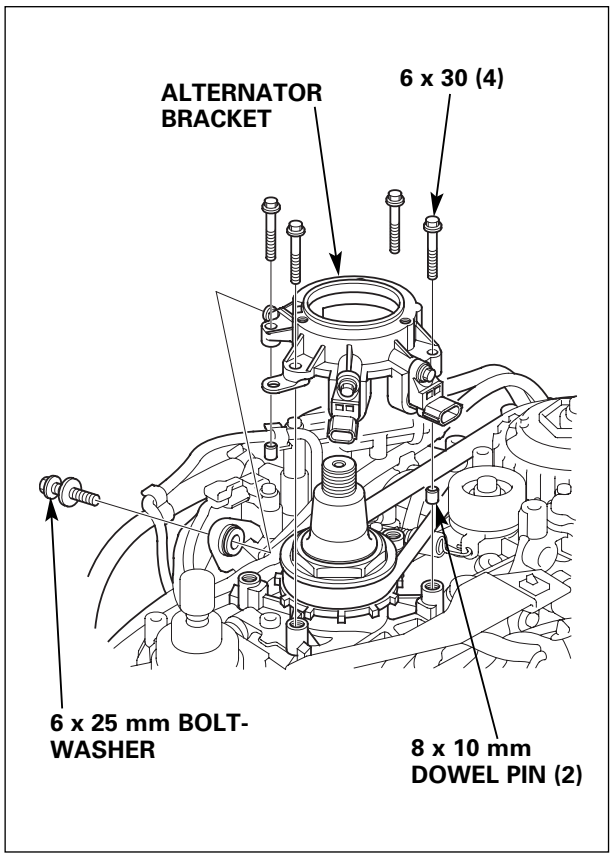
16) Tighten the 10 x 38 mm flange bolt of the timing belt tensioner to the specified torque.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

- The timing belt tensioner is automatically adjusted. Do not push the tensioner toward the belt by hand.



17) Install the two 8 x 10 mm dowel pins and the alternator bracket, and tighten the four 6 x 30 mm flange bolts and the 6 x 25 mm bolt-washer securely.

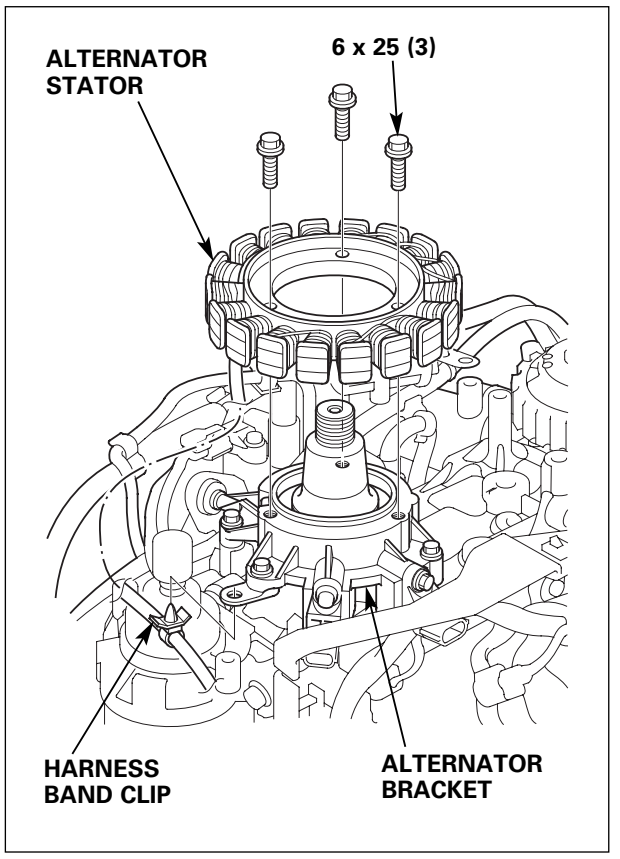


Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-17

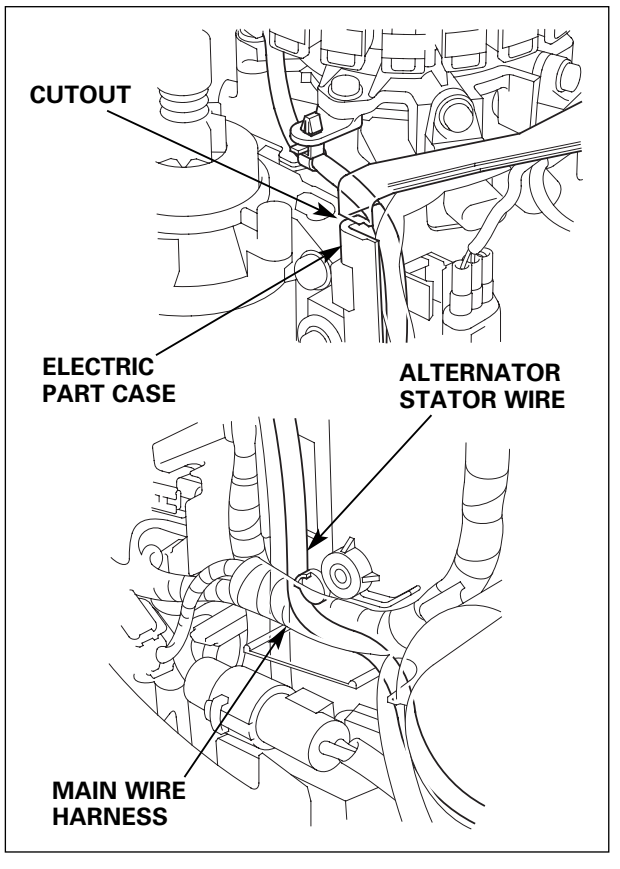
18) Install the alternator stator on the alternator bracket, and tighten the three 6 x 25 mm flange bolts securely.

19) Install the harness band clip on the alternator bracket.



20) Route the alternator stator wire through the cutout in the electric part case.

21) Route the alternator stator wire through the gap between the electric part case and the main wire harness as shown.



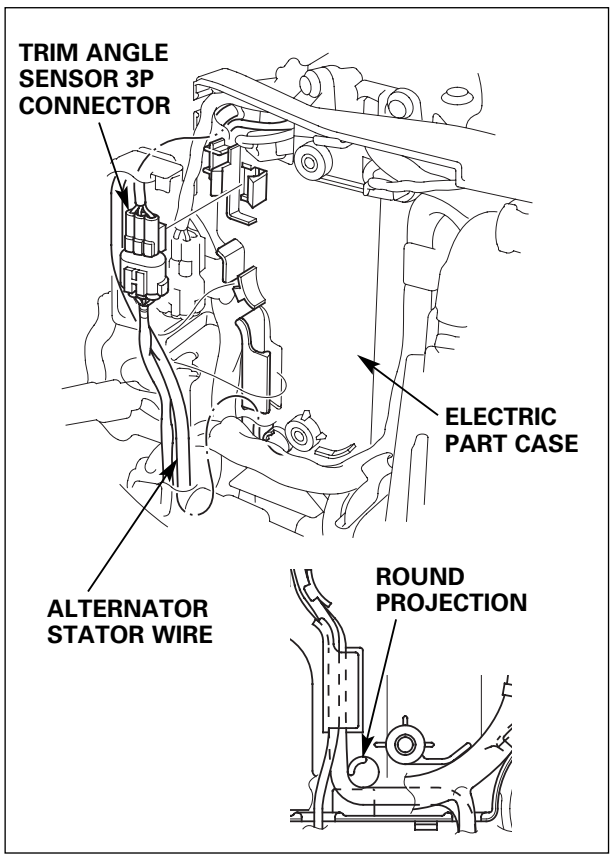
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-18

22) Set the alternator stator wire in each clamp on the electric part case.

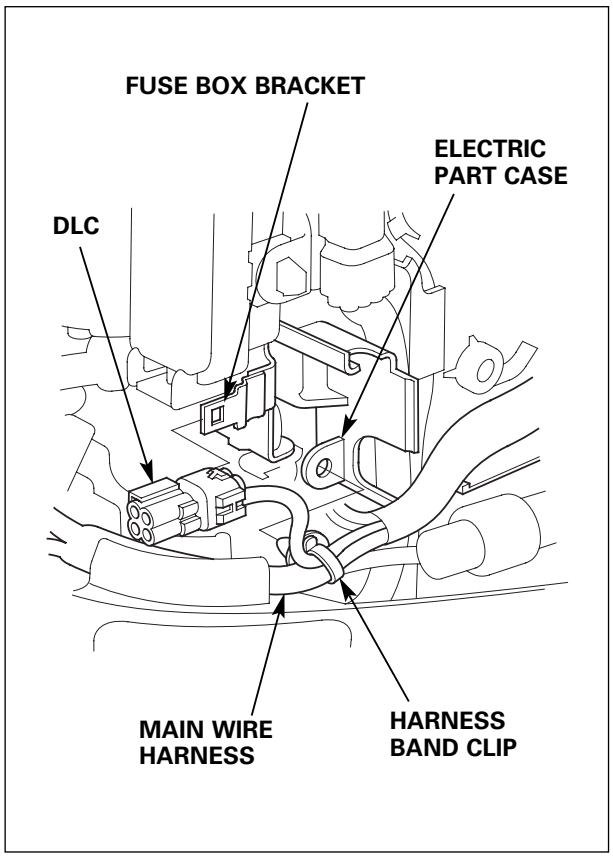
- Route the alternator stator wire under the round projection in the position shown.

23) Install the trim angle sensor 3P connector on the electric part case [Power trim/tilt type only].



24) Install the main wire harness' harness band clip on the electric part case.

25) Install the DLC (Data Link Connector) on the fuse box bracket.



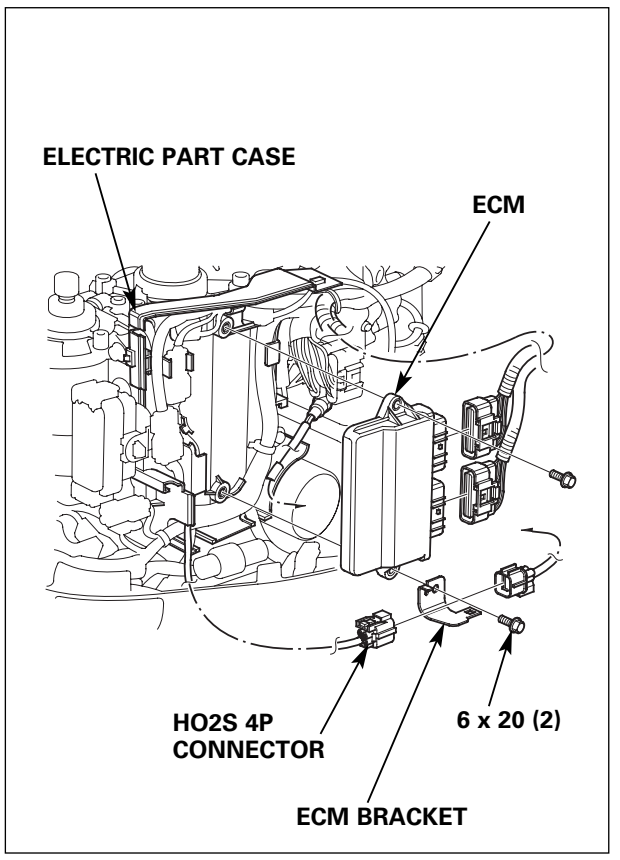
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-19

26) Set the ECM and the ECM bracket on the electric part case, and tighten the two 6 x 20 mm flange bolts to the specified torque.

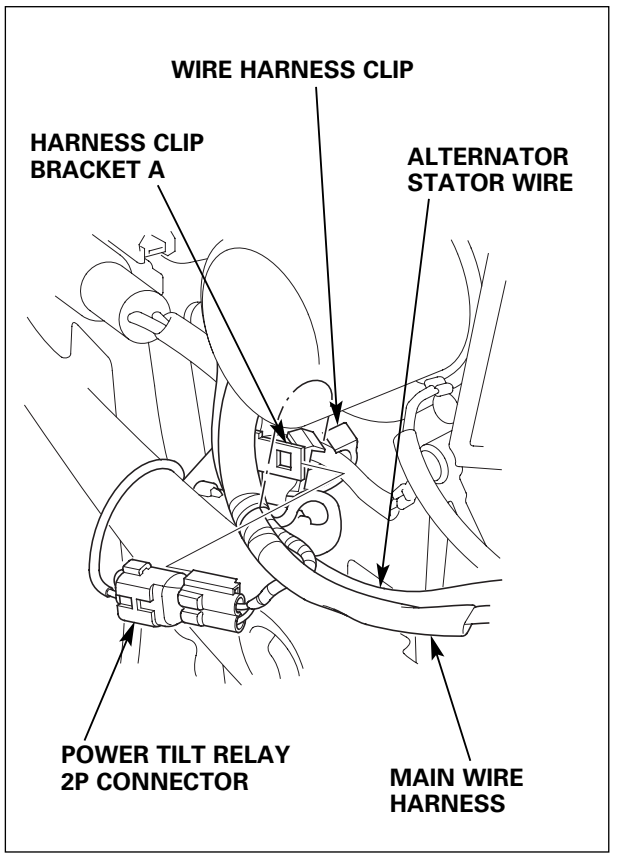
TORQUE: 5 N·m (0.5 kgf·m, 3.7 lbf·ft)

27) Install the HO2S 4P connector on the ECM bracket and connect the connector.



28) Set the alternator stator wire and the main wire harness in the wire harness clip.

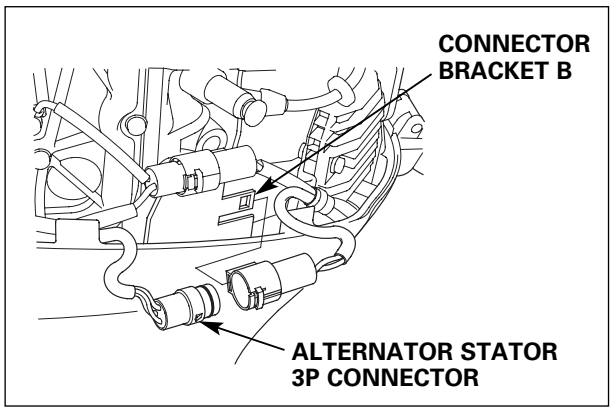
29) Install the power tilt relay 2P connector on the harness clip bracket A [Power trim/tilt type only].



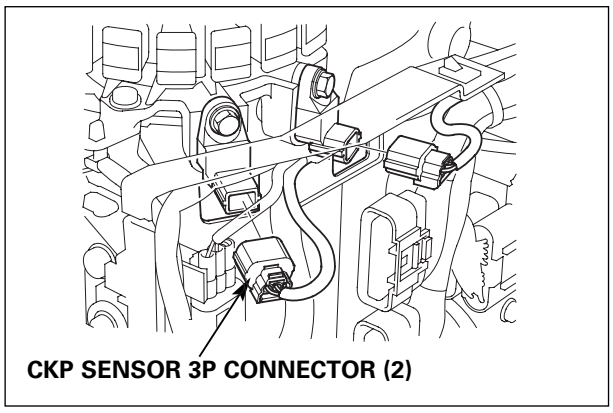
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-20

30) Connect the alternator stator 3P connector and install the connector on connector bracket B.



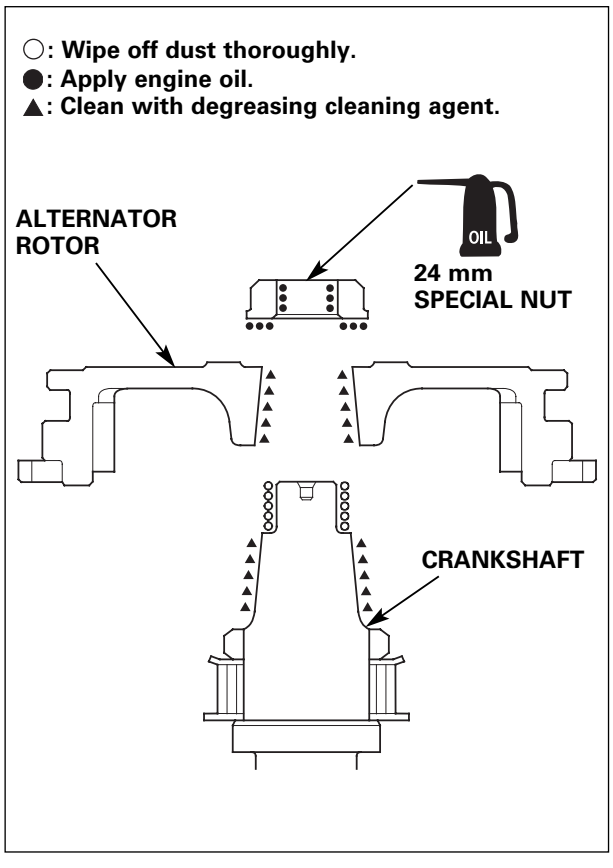
31) Connect the two CKP sensor 3P connectors.



32) Clean the threaded part of the crankshaft where the 24 mm special nut is installed and the part of the alternator rotor where the 24 mm special nut will seat using a clean shop towel.

33) Clean the tapered surface of the crankshaft using a clean shop towel sprayed with the degreasing cleaning agent.

34) Apply engine oil to the threads and seat of the 24 mm special nut.

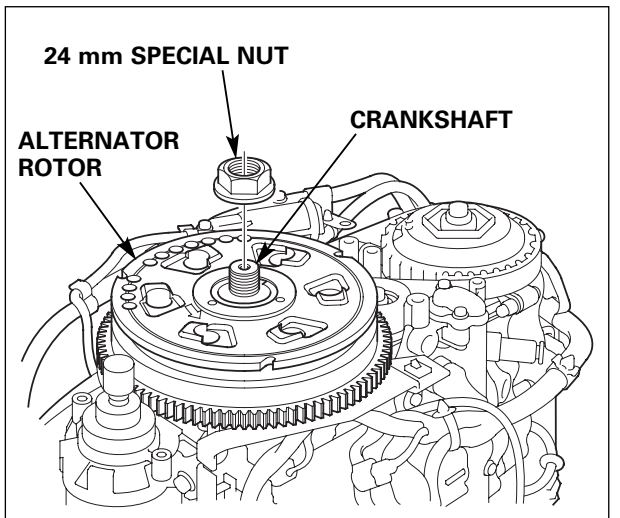


Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-21

35) Install the alternator rotor on the crankshaft, and loosely tighten the 24 mm special nut.

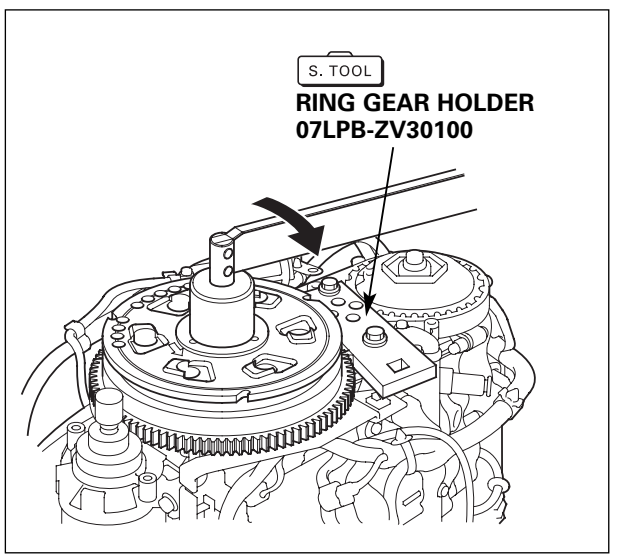
- The alternator rotor has very strong magnetic force. Do not hold the alternator rotor by the ring gear. Hold it by the recoil starter rope winding area, so you will not pinch your fingers with the rotor.



36) Tighten the 24 mm special nut to the specified torque using the special tool as shown.

TOOL:
Ring gear holder **07LPB-ZV30100**

TORQUE: 300 N·m (30.6 kgf·m, 221 lbf·ft)

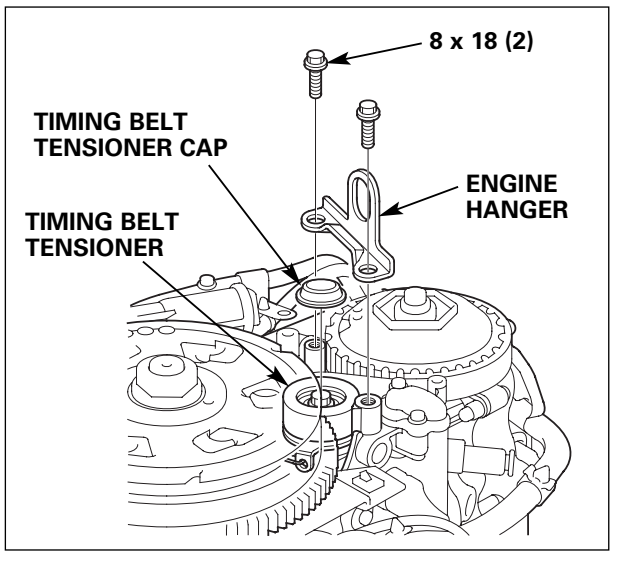


37) Install the timing belt tensioner cap on the timing belt tensioner.

38) Install the engine hanger on the cylinder block and tighten the two 8 x 18 mm flange bolts securely.

39) Perform timing belt tension adjustment (P. 3-24).

40) Install the following parts.
- Electric part cover (P. 18-19)
- Alternator cover (P. 7-2)
- Engine cover (P. 4-2)



© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-22

3. CAMSHAFT PULLEY/CMP SENSOR

a. REMOVAL

Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)
- Electric part cover (P. 18-19)
- Engine hanger, timing belt tensioner cap (P. 7-3)

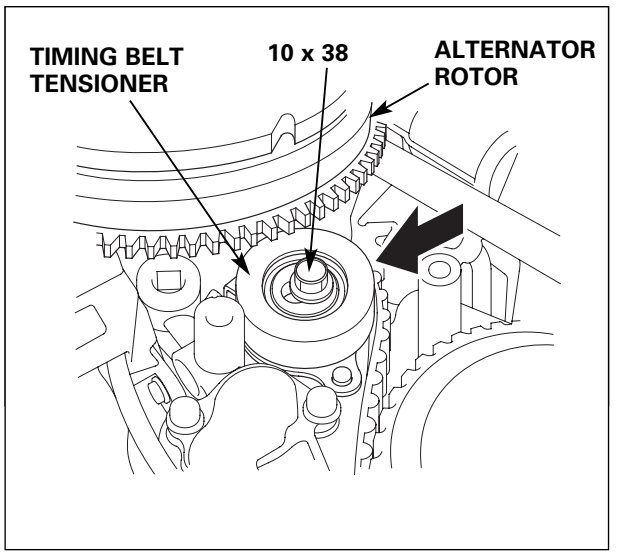
1) Turn the alternator rotor counterclockwise to bring the No.1 cylinder piston to the top dead center of its compression stroke (P. 3-10).

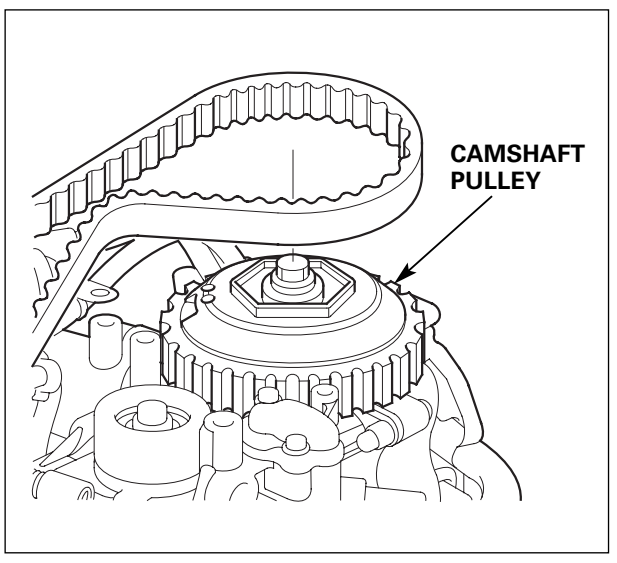
NOTICE

Always turn the alternator rotor counterclockwise to set TDC. Do not turn the alternator rotor clockwise.

2) Loosen the 10 x 38 mm flange bolt that secures the timing belt tensioner, then tighten the 10 x 38 mm flange bolt while pushing the timing belt tensioner outward.

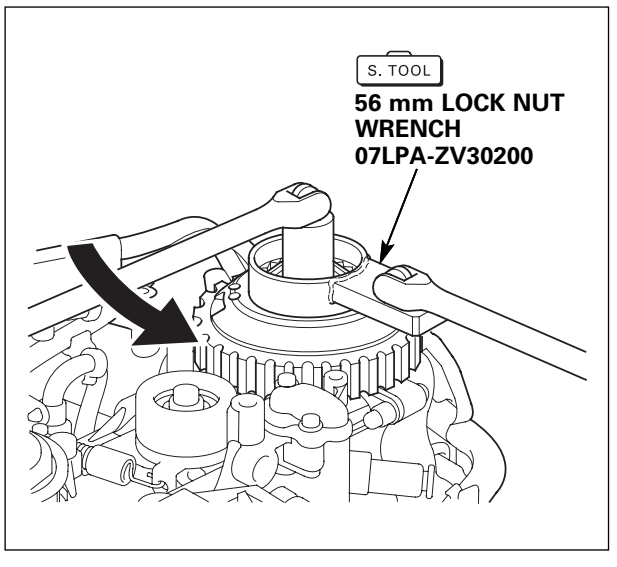
3) Remove the timing belt from the camshaft pulley.





4) Loosen the 10 x 32 mm flange bolt using the special tool as shown.

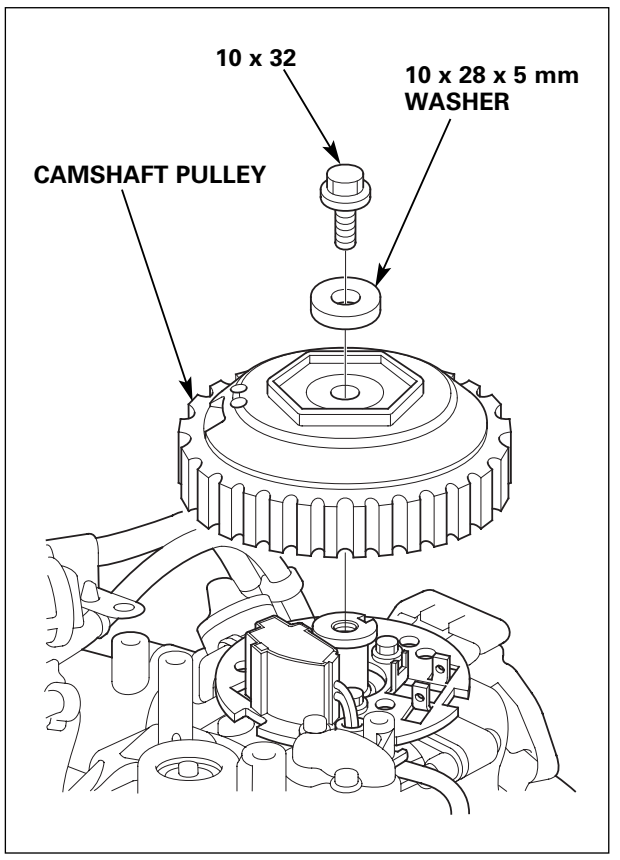
TOOL:
56 mm lock nut wrench **07LPA-ZV30200**



Date of Issue: May 2008
© Honda Motor Co., Ltd.

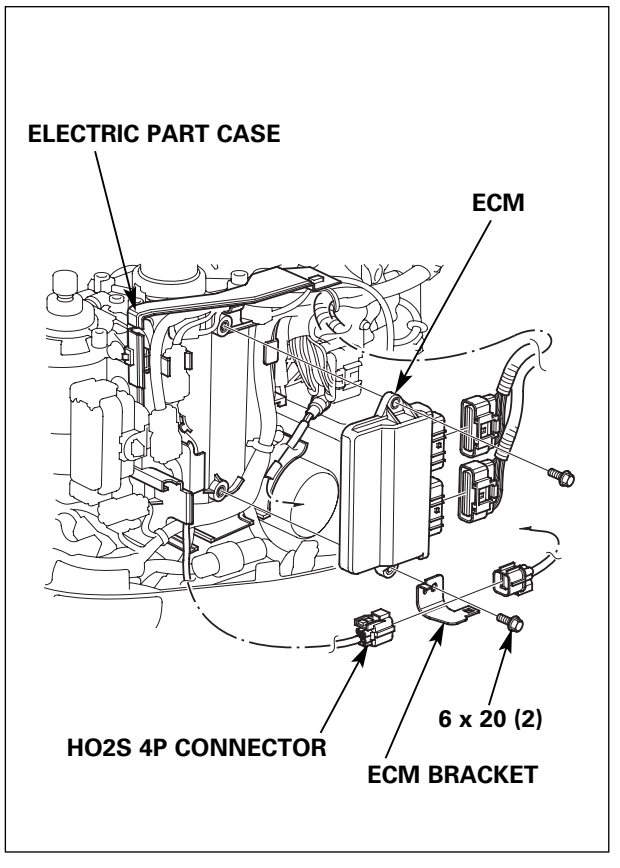
BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-23

5) Remove the 10 x 32 mm flange bolt and the 10 x 28 x 5 mm washer, and remove the camshaft pulley.



6) Disconnect the HO2S 4P connector, and remove it from the ECM bracket.

7) Remove the two 6 x 20 mm flange bolts, and remove the ECM bracket and the ECM from the electric part case.



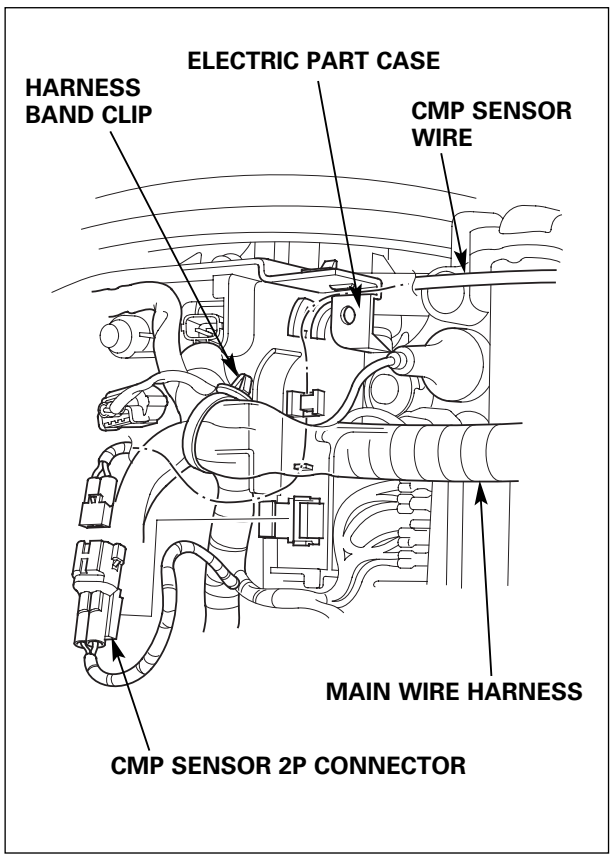
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-24

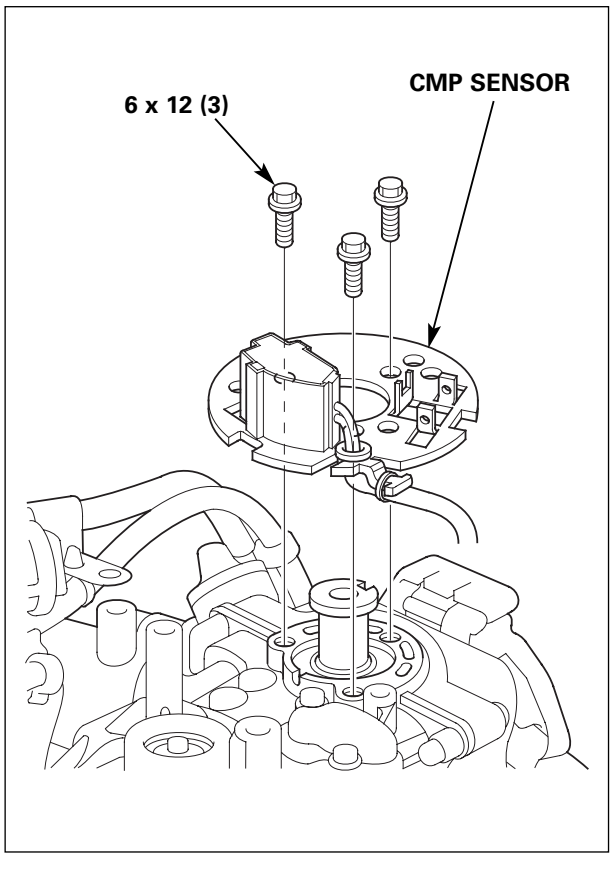
8) Remove the main wire harness' harness band clip from the electric part case.

9) Remove the CMP sensor 2P connector from the electric part case, and disconnect the connector.

10) Remove the CMP sensor wire through the gap between the electric part case and the main wire harness as shown.



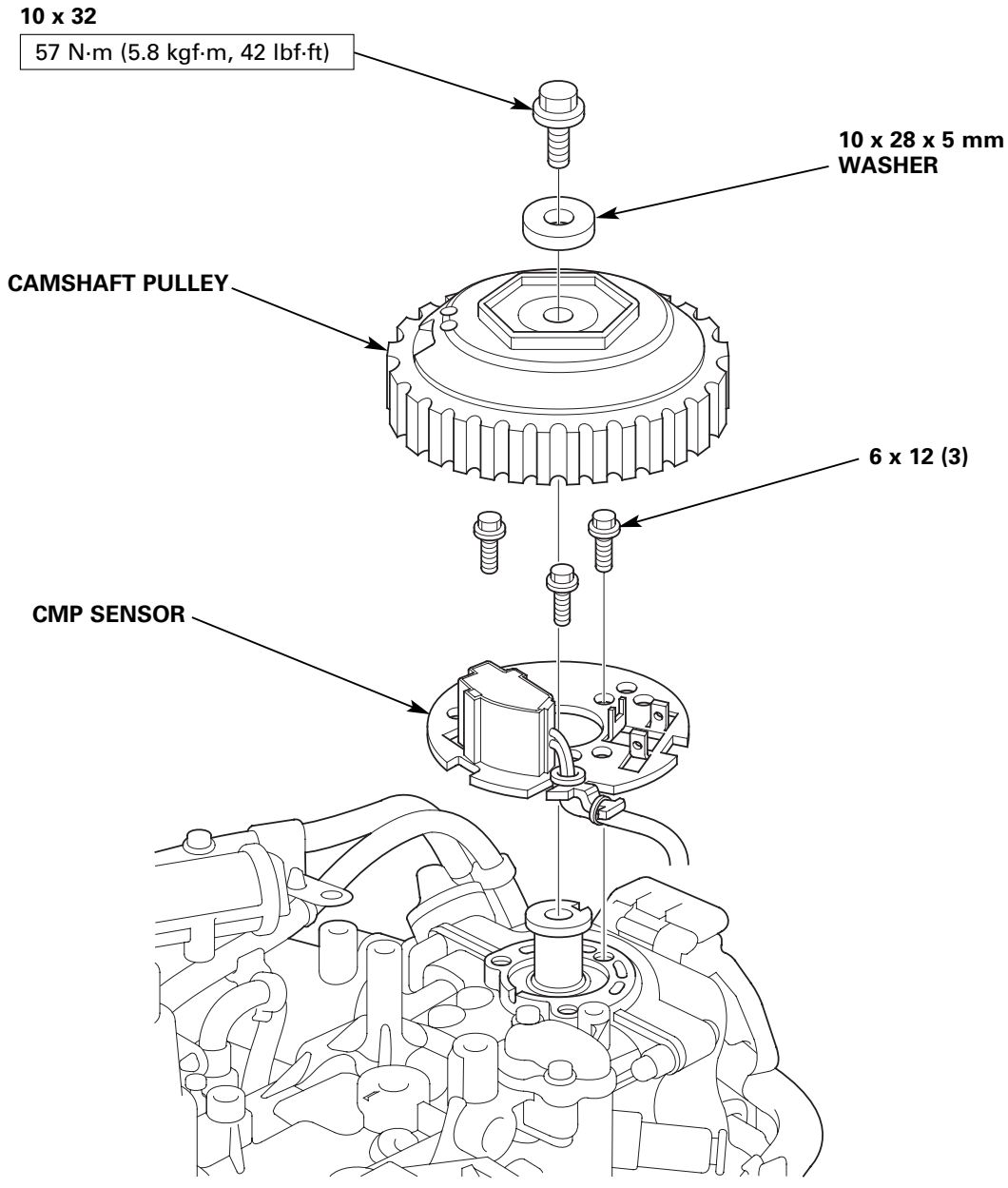
11) Remove the three 6 x 12 mm flange bolts and remove the CMP sensor.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-25

b. COMPONENT DRAWING

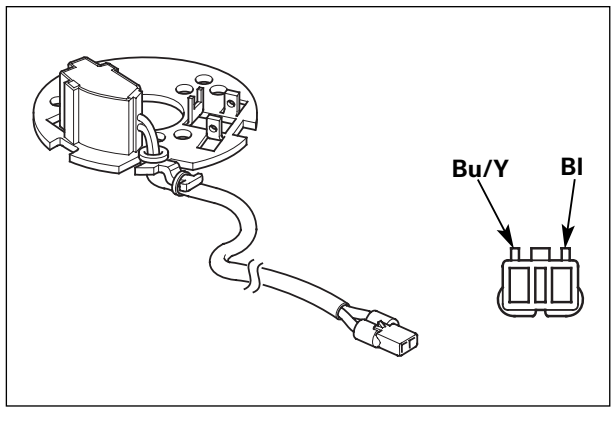


c. INSPECTION

• CMP SENSOR

Measure the resistance between the following terminals.

Between Bl and Bu/Y terminals	288 — 352 Ω

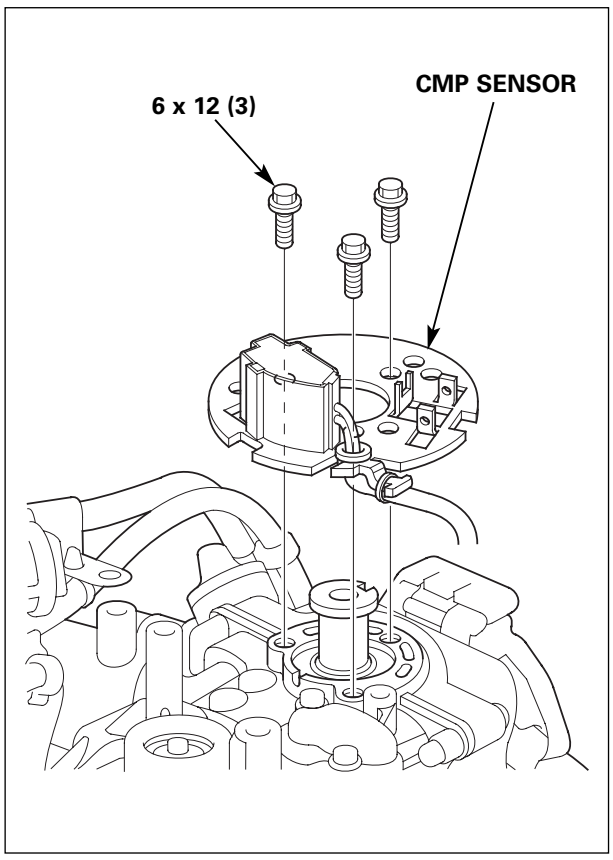


© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-26

d. INSTALLATION

1) Tighten the CMP sensor securely using the three 6 x 12 mm flange bolts.

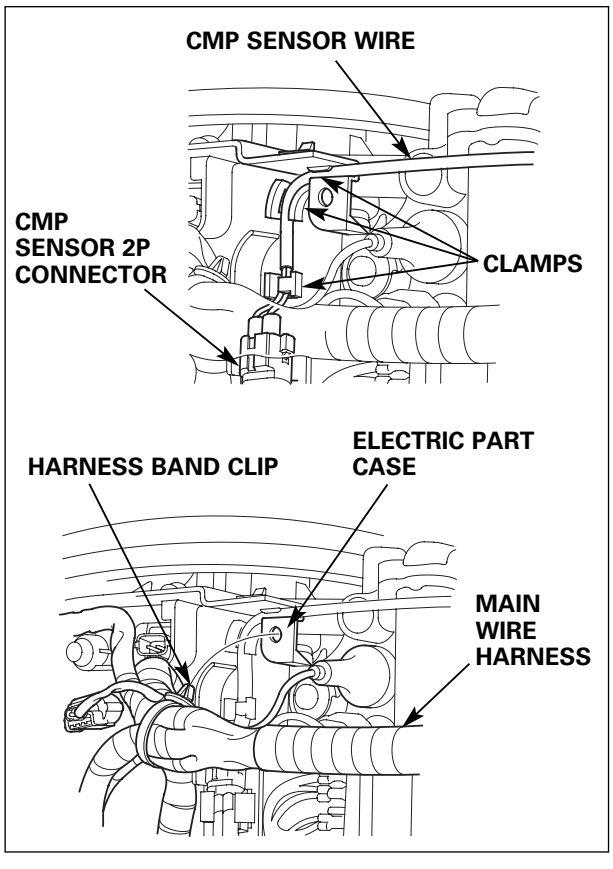


2) Route the CMP sensor wire through the gap between the electric part case and the main wire harness as shown.

3) Set the CMP sensor wire in the clamps of the electric part case.

4) Connect the CMP sensor 2P connector.

5) Install the main wire harness' harness band clip on the electric part case.



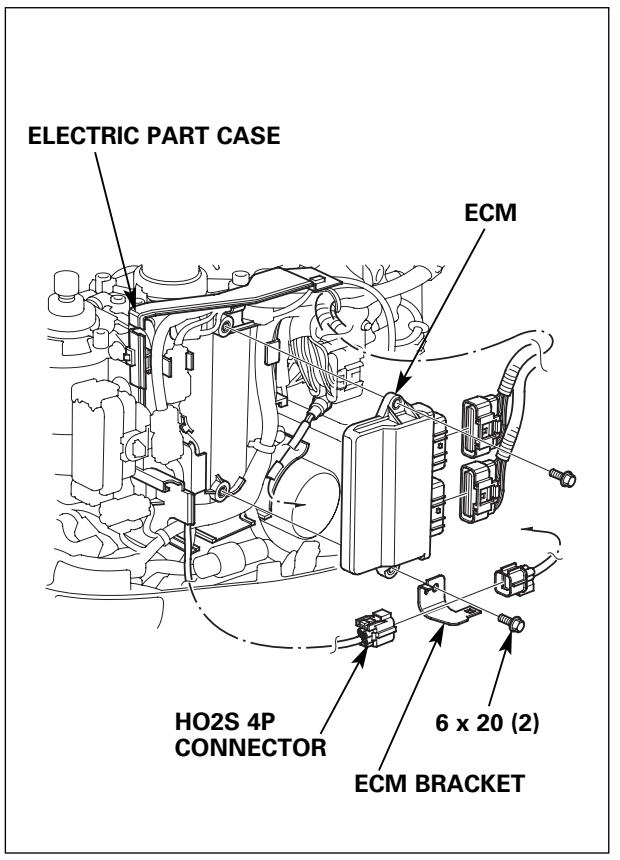
Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-27

6) Set the ECM and the ECM bracket on the electric part case, and tighten the two 6 x 20 mm flange bolts to the specified torque.

   TORQUE: 5 N·m (0.5 kgf·m, 3.7 lbf·ft)

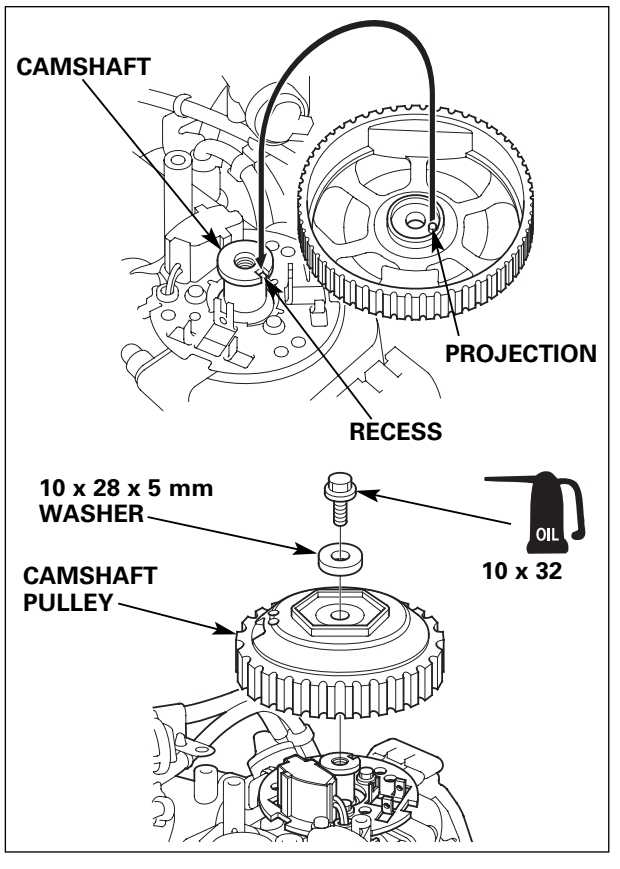
7) Install the HO2S 4P connector on the ECM bracket, and connect the connector.



8) Install the camshaft pulley on the camshaft while aligning the projection on the camshaft pulley with the recess in the camshaft.

9) Apply engine oil to the threads and seat of the 10 x 32 mm flange bolt.

10) Set the 10 x 28 x 5 mm washer on the 10 x 32 mm flange bolt, and loosely tighten the 10 x 32 mm flange bolt.



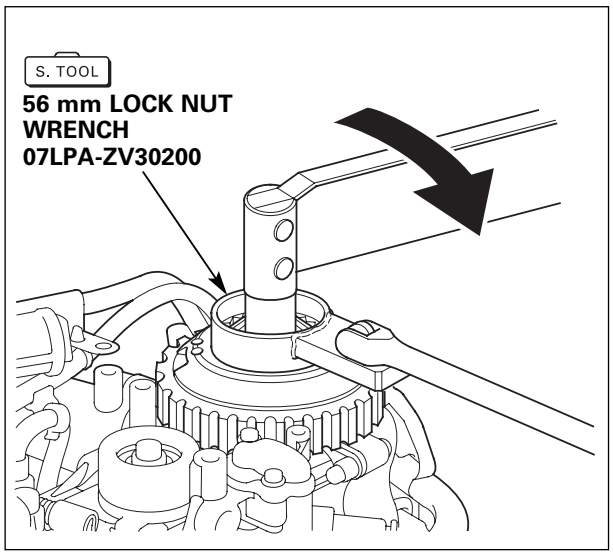
© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-28

11) Tighten the 10 x 32 mm flange bolt to the specified torque using the special tool as shown.

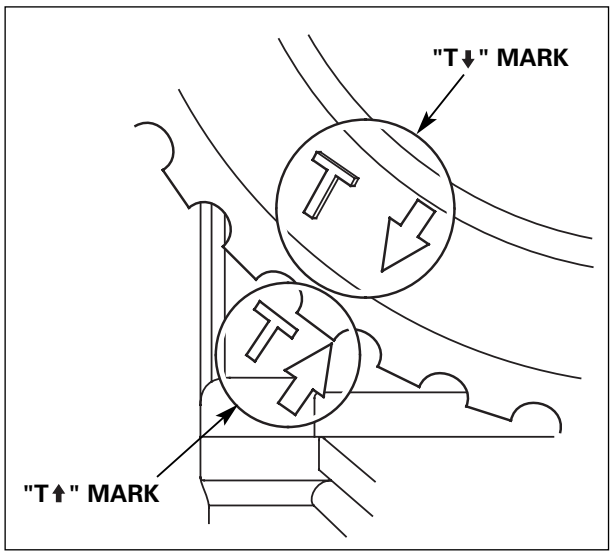
TOOL:
56 mm lock nut wrench **07LPA-ZV30200**

TORQUE: 57 N·m (5.8 kgf·m, 42 lbf·ft)



12) Check that the "T⬇" mark on the camshaft pulley is in alignment with the "T⬆" mark on the cylinder head.
If the marks are out of alignment, set the special tool on the camshaft pulley and turn the camshaft pulley counterclockwise to align the marks.

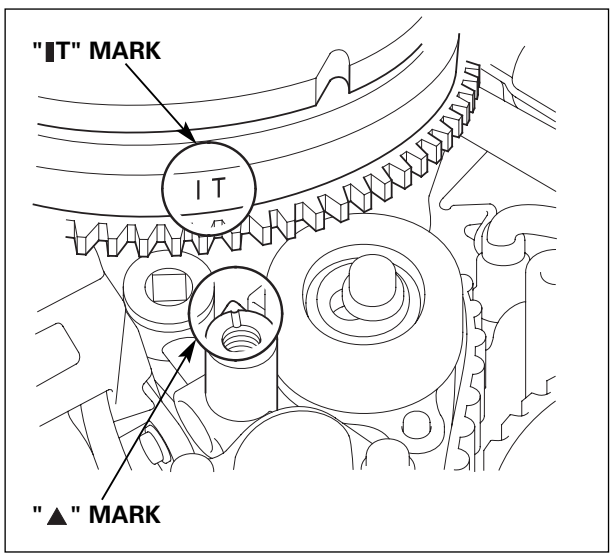
TOOL:
56 mm lock nut wrench **07LPA-ZV30200**



13) Check that the "▮T" mark on the alternator rotor is in alignment with the "▲" mark on the cylinder block.
If the marks are out of alignment, turn the alternator rotor counterclockwise to align the marks.

NOTICE

Always turn the alternator rotor counterclockwise. Do not turn the alternator rotor clockwise.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

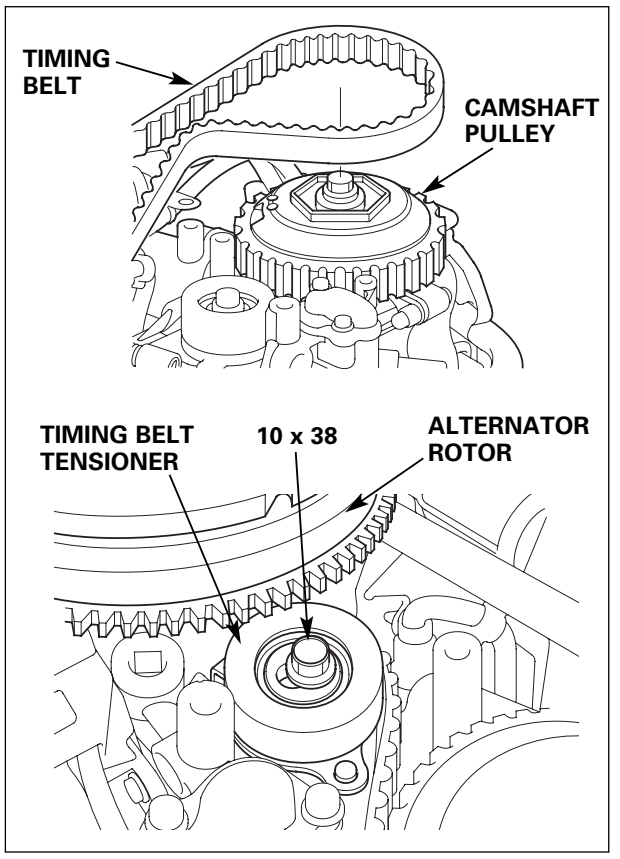
BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-29

14) Install the timing belt on the camshaft pulley.

- Install the timing belt with care not to bring the alignment marks on the camshaft pulley and on the alternator rotor out of alignment.

15) Loosen the 10 x 38 mm flange bolt on the timing belt tensioner.

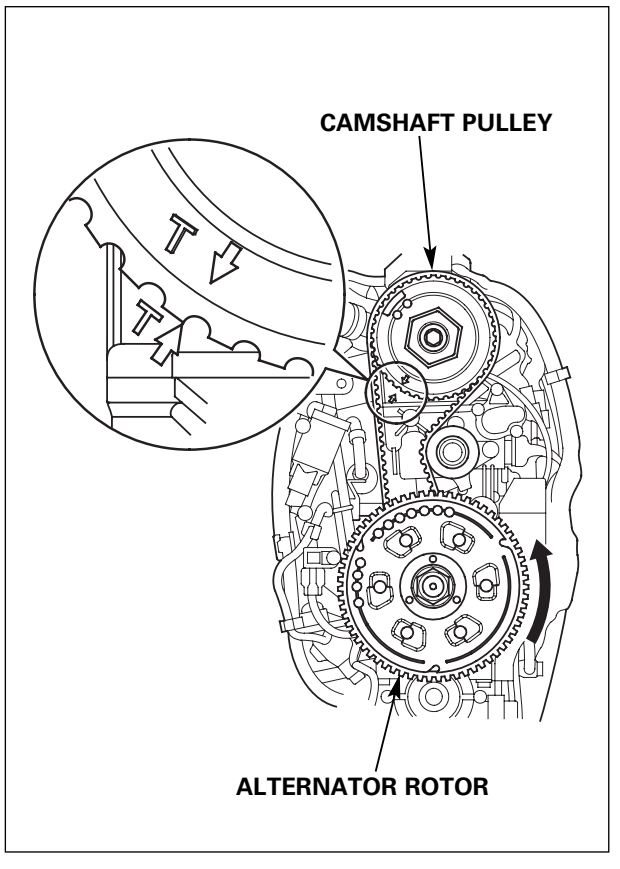
- Do not tighten the 10 x 38 mm flange bolt at this time.



16) Turn the alternator rotor 2 turns counterclockwise using the alignment mark on the camshaft pulley as the reference point.

NOTICE

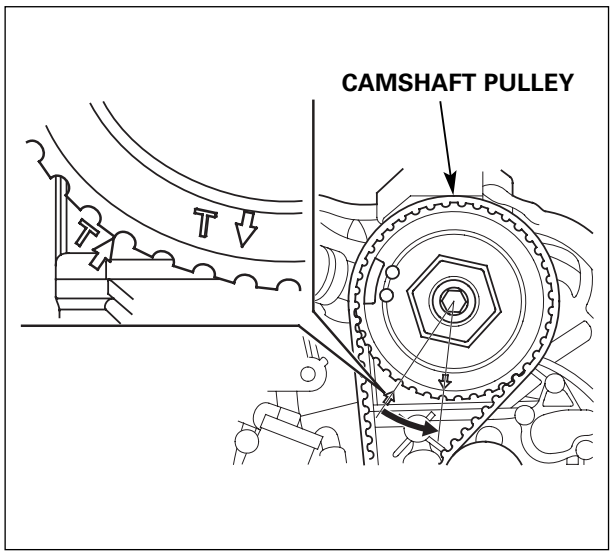
Do not turn the alternator rotor clockwise.



© Honda Motor Co., Ltd.

BF40D・50D 7章 (A).qxp 2008/04/10 16:19 ページ 7-30

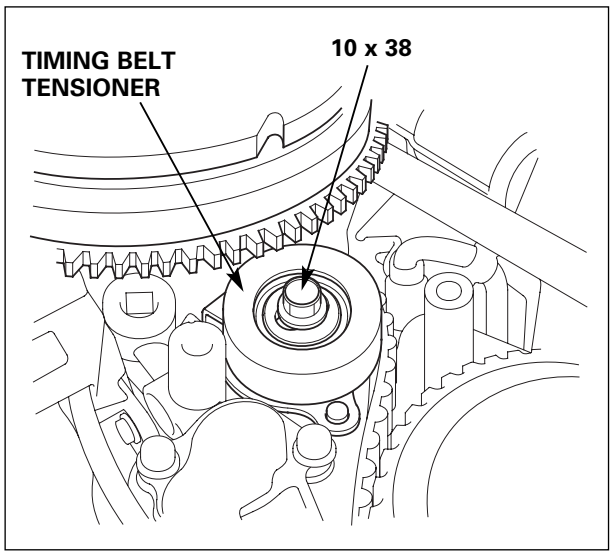
17) Turn the alternator rotor farther counterclockwise until the camshaft pulley turns three additional ridges of the gear teeth.



18) Tighten the 10 x 38 mm flange bolt on the timing belt tensioner to the specified torque.

TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

- The timing belt tensioner is automatically adjusted. Do not push the tensioner toward the belt by hand.



19) Perform timing belt tension adjustment (P. 3-23).

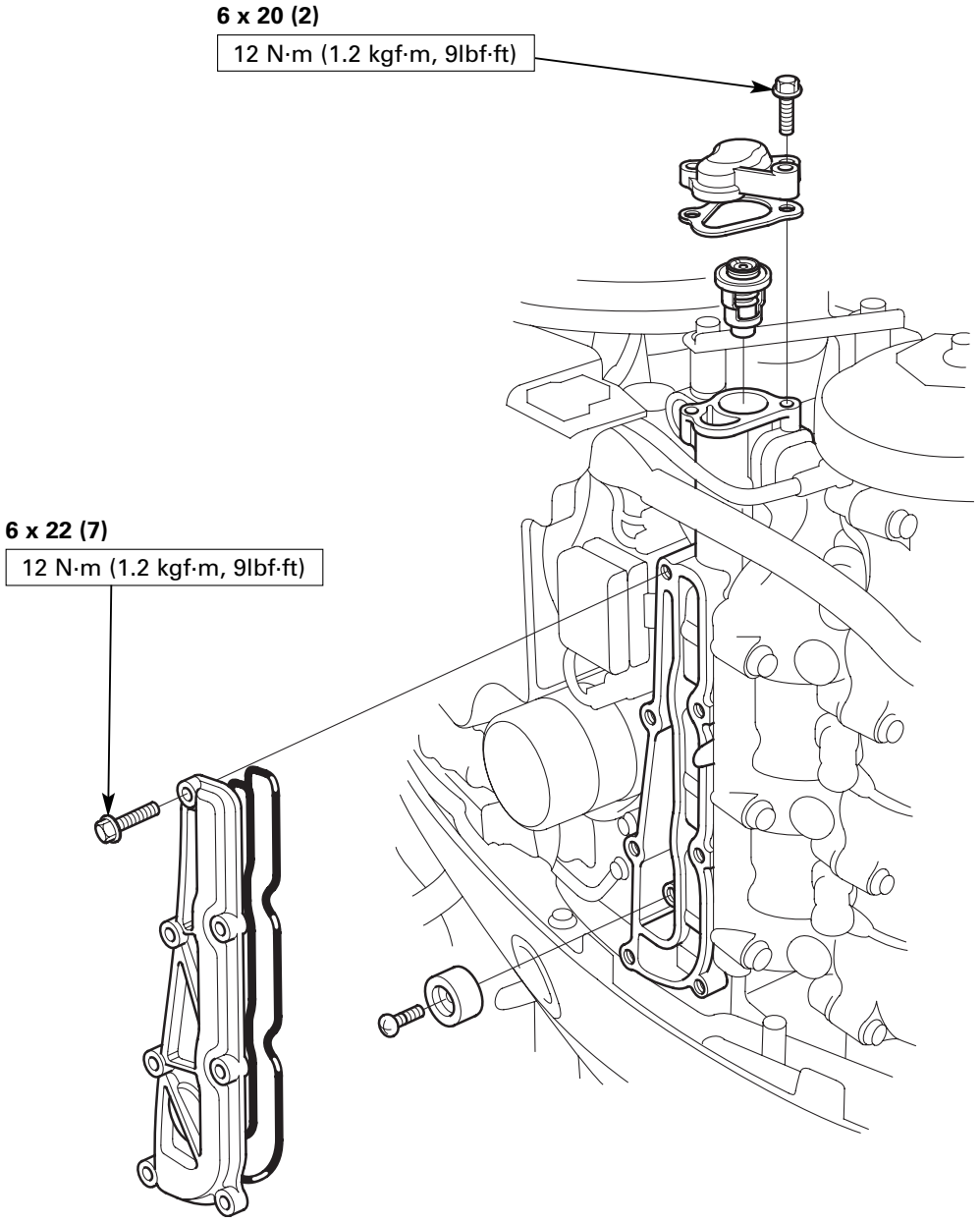
20) Install the following parts.
- Timing belt tensioner cap, engine hanger (P. 7-21)
- Electric part cover (P. 18-19)
- Alternator cover (P. 7-2)
- Engine cover (P. 4-2)

Date of Issue: May 2008
© Honda Motor Co., Ltd.

8章(A).qxp 2008/04/10 16:20 ページ 8-1

8. WATER JACKET COVER/THERMOSTAT

1. WATER JACKET COVER/
THERMOSTAT 8-2



© Honda Motor Co., Ltd.

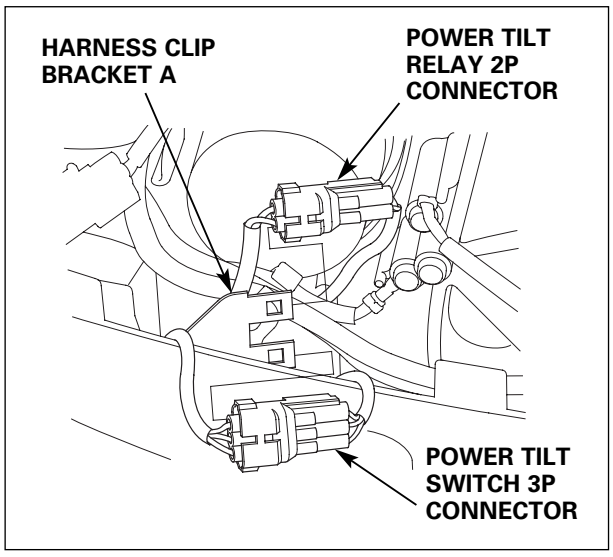
8章(A).qxp 2008/04/10 16:20 ページ 8-2

1. WATER JACKET COVER/ THERMOSTAT

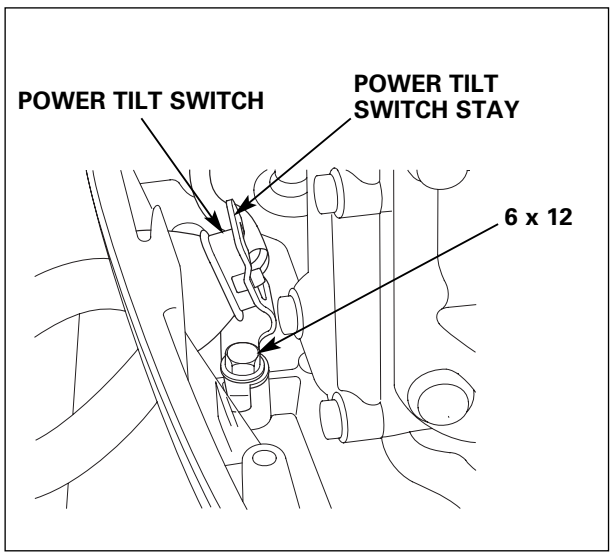
a. REMOVAL

Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)

1) Remove the power tilt relay 2P connector and the power tilt switch 3P connector from harness clip bracket A [Power trim/tilt type only].

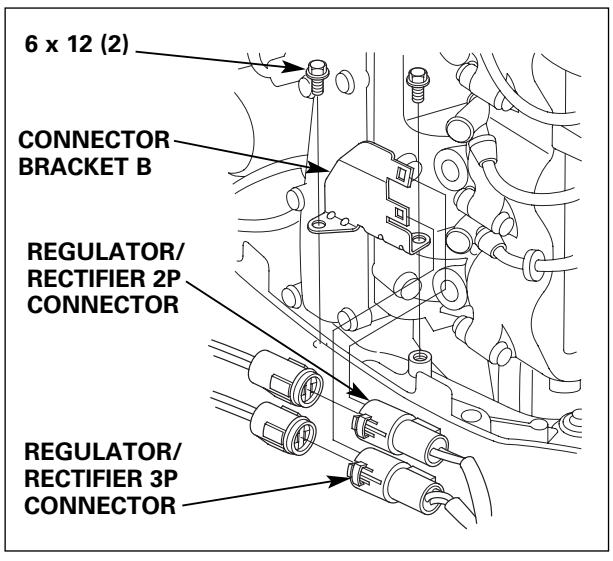


2) Remove the 6 x 12 mm flange bolt, and remove the power tilt switch and the power tilt switch stay as a set [Power trim/tilt type only].



3) Disconnect the regulator/rectifier 2P connector and the regulator/rectifier 3P connector.
   Remove the regulator/rectifier 2P connector and the regulator/rectifier 3P connector from connector bracket B.

4) Remove the two 6 x 12 mm flange bolts and remove connector bracket B.



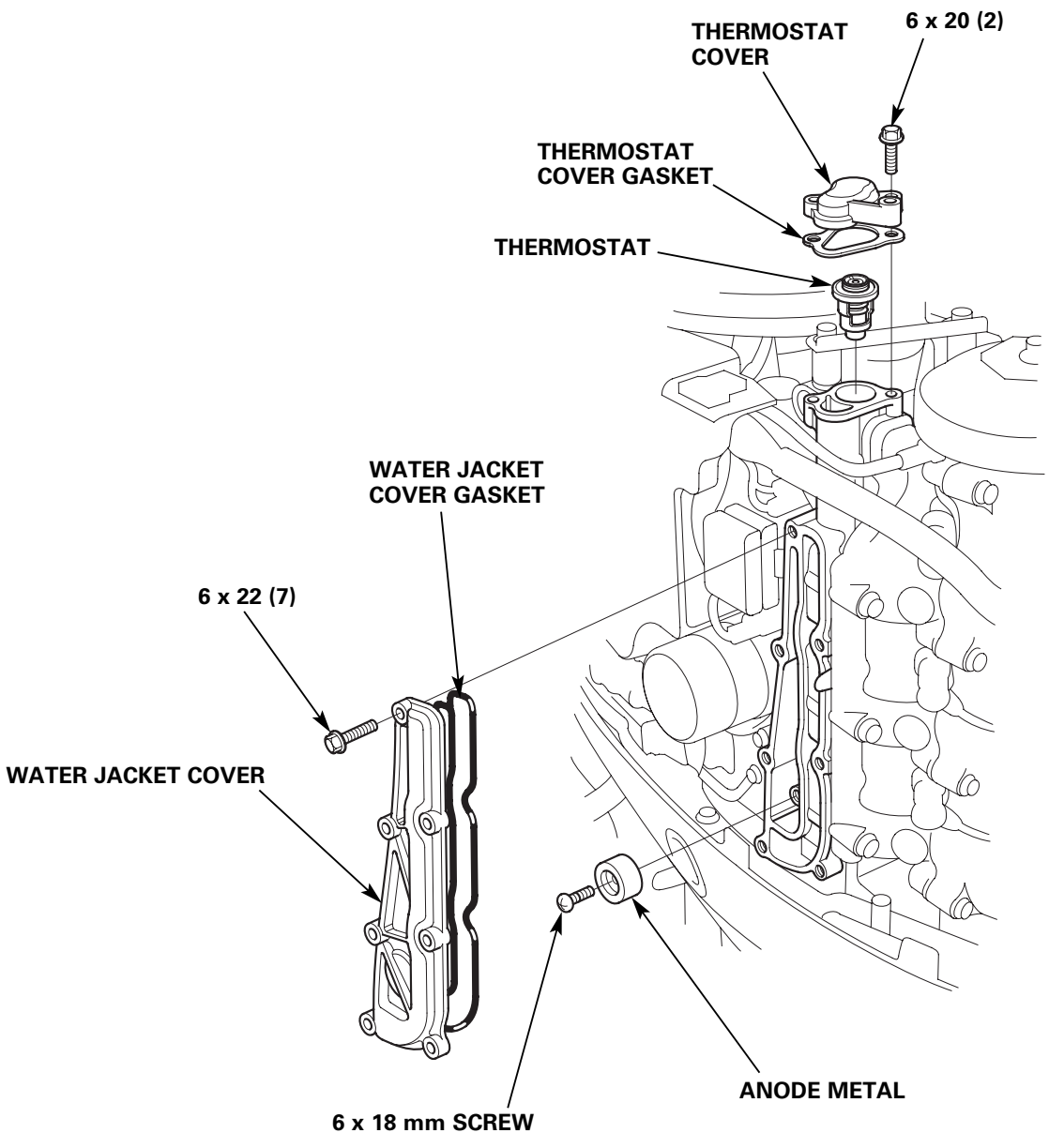
Date of Issue: May 2008
© Honda Motor Co., Ltd.

8章(A).qxp 2008/04/10 16:20 ページ 8-3

5) Remove the two 6 x 20 mm flange bolts, and remove the thermostat cover, thermostat cover gasket and the thermostat from the cylinder block.
Replace the gasket with a new one on reassembly.
Check the thermostat and replace it with a new one if necessary (P. 8-4).

6) Remove the seven 6 x 22 mm flange bolts, and remove the water jacket cover and the water jacket cover gasket from the cylinder block.
Replace the gasket with a new one on reassembly.

7) Remove the 6 x 18 mm screw, and remove the anode metal from the cylinder block.
Check the anode metal for corrosion, and replace it with a new one if it is excessively corroded.



© Honda Motor Co., Ltd.

8章(A).qxp 2008/04/10 16:20 ページ 8-4

b. INSPECTION

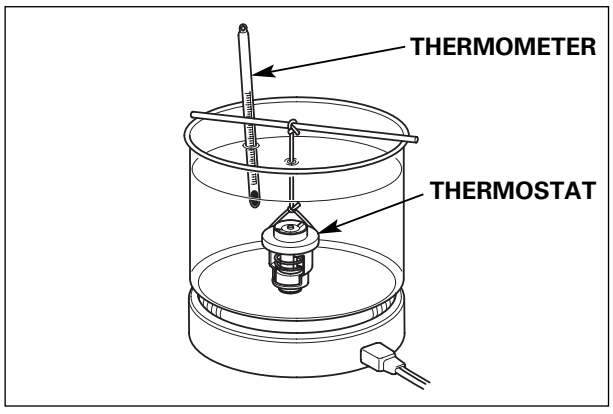
• THERMOSTAT

1) Immerse the thermostat in water.

2) Heat the water and observe the operation of the thermostat as the water temperature increases. Measure the water temperature when the thermostat starts to open.

   • Do not let the thermometer or the thermostat touch the container; this may cause a false reading.

Start opening	52°C (126°F)
Fully open	60°C (140°F)



3) Measure the lift height when the thermostat is fully open.

Lift height	3.0 mm (0.12 in) or more

c. INSTALLATION

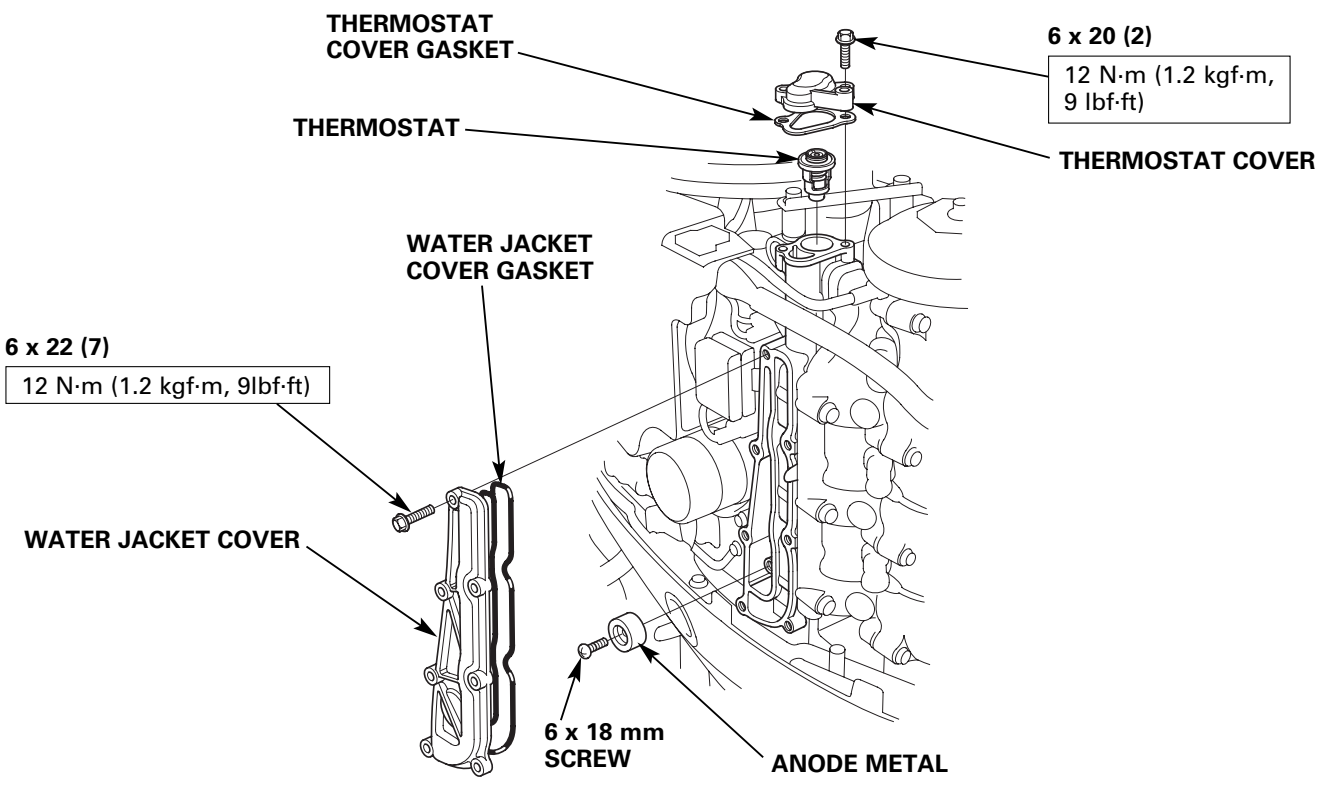
1) Install the anode metal on the cylinder block and tighten the 6 x 18 mm screw securely.

2) Install a new water jacket cover gasket on the water jacket cover.
   Install the water jacket cover, and tighten the seven 6 x 22 mm flange bolts to the specified torque.

   TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

3) Install the thermostat, a new thermostat cover gasket and the thermostat cover on the cylinder block, and tighten the two 6 x 20 mm flange bolts to the specified torque.

   TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

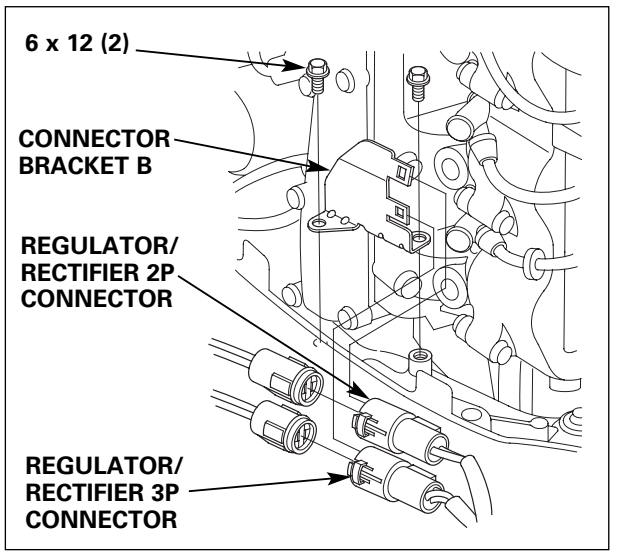


Date of Issue: May 2008
© Honda Motor Co., Ltd.

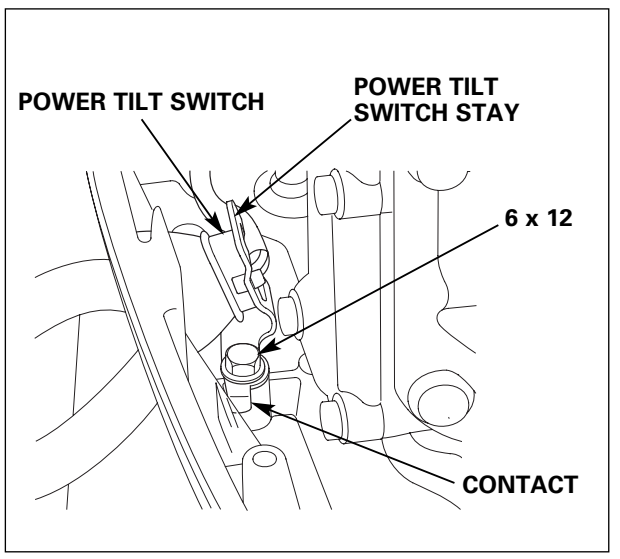
8章(A).qxp 2008/04/10 16:20 ページ 8-5

4) Install the connector bracket B and tighten the two 6 x 12 mm flange bolts securely.

5) Install the regulator/rectifier 2P connector and the regulator/rectifier 3P connector on connector bracket B. Connect the regulator/rectifier 2P connector and the regulator/rectifier 3P connector.

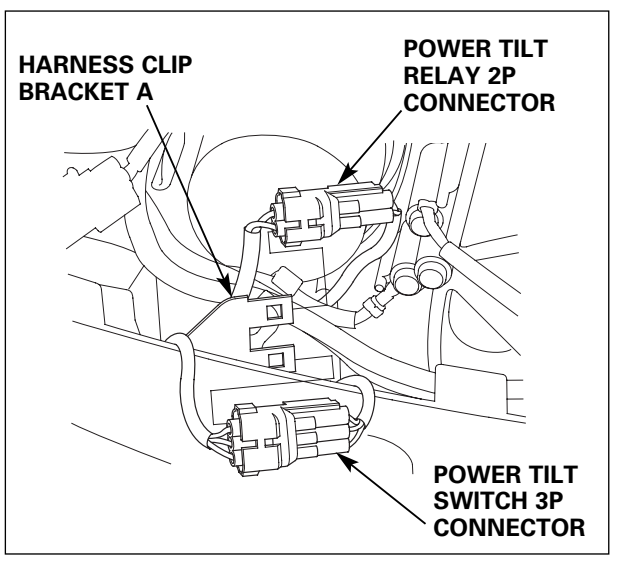


6) Install the power tilt switch and the power tilt switch stay as a set. Tighten the 6 x 12 mm flange bolt while pushing the projection on the power tilt switch stay against the engine under case [Power trim/tilt type only].



7) Install the power tilt switch 3P connector and the power tilt relay 2P connector on harness clip bracket A [Power trim/tilt type only].

8) Install the following parts.
- Alternator cover (P. 7-2)
- Engine cover (P. 4-2)



© Honda Motor Co., Ltd.

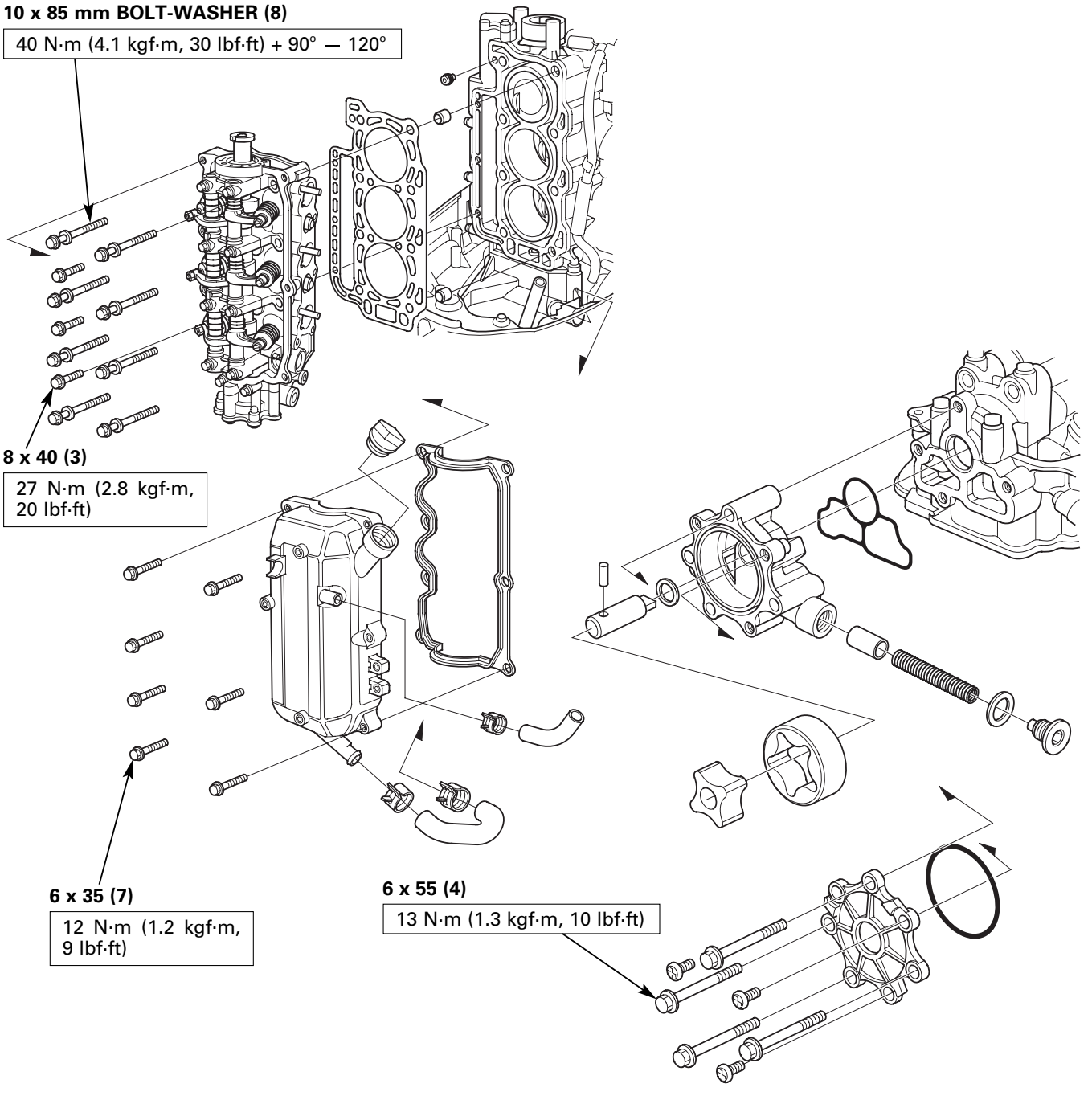
8章(A).qxp 2008/04/10 16:20 ページ 8-6

Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-1

9. CYLINDER HEAD/VALVES/OIL PUMP

1. CYLINDER HEAD COVER REMOVAL 9-2
2. CYLINDER HEAD ASSEMBLY REMOVAL 9-4
3. CYLINDER HEAD ASSEMBLY DISASSEMBLY..... 9-6
4. INSPECTION..... 9-13
5. VALVE GUIDE REPLACEMENT 9-19
6. VALVE SEAT RECONDITIONING 9-21
7. CYLINDER HEAD ASSEMBLY REASSEMBLY 9-23
8. CYLINDER HEAD ASSEMBLY INSTALLATION 9-29
9. CYLINDER HEAD COVER INSTALLATION 9-31
10. OIL PUMP 9-34



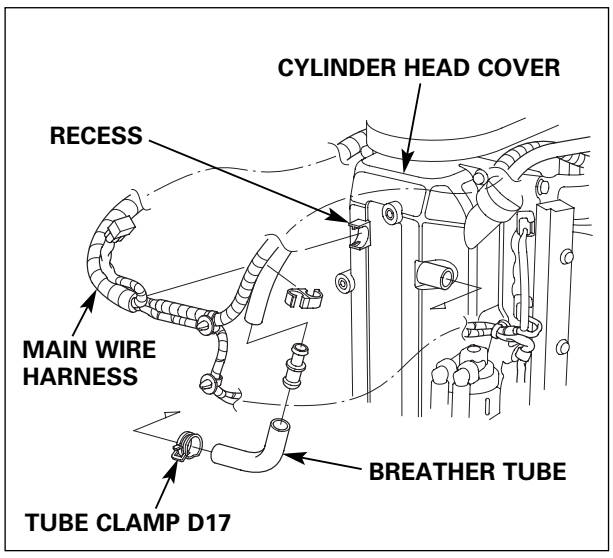
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-2

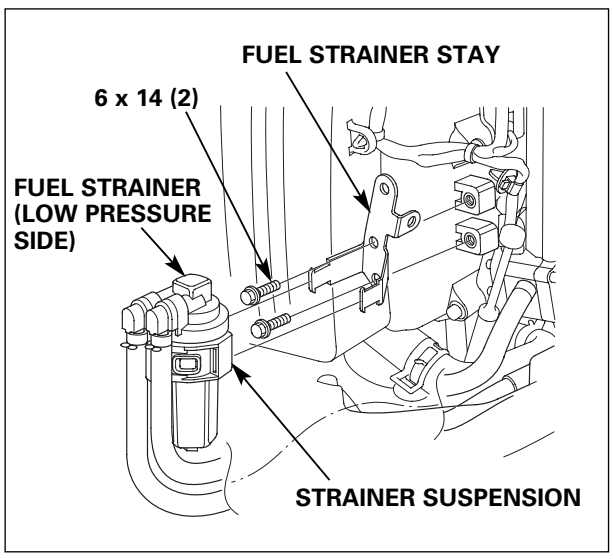
1. CYLINDER HEAD COVER REMOVAL

Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)
- Ignition coil/regulator/rectifier (P. 18-23)

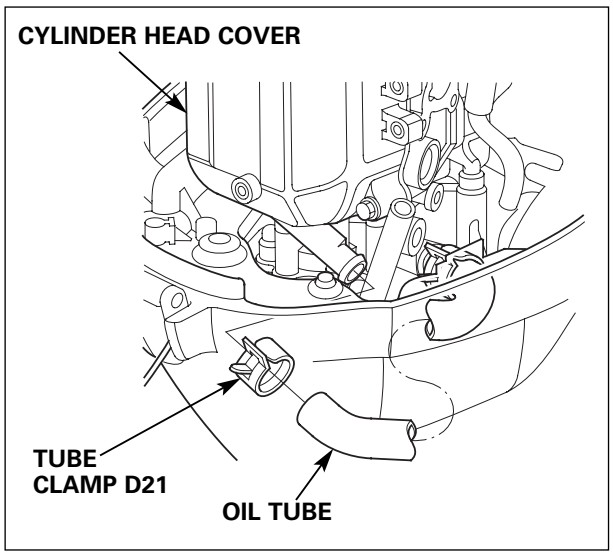
1) Remove the main wire harness from the recess in the cylinder head cover.
Remove the breather tube from the cylinder head cover.



2) Remove the fuel strainer (low pressure side) and the strainer suspension as a set from the fuel strainer stay.
Remove the two 6 x 14 mm flange bolts, and remove the fuel strainer stay from the cylinder head cover.



3) Remove the oil tube from the cylinder head cover.



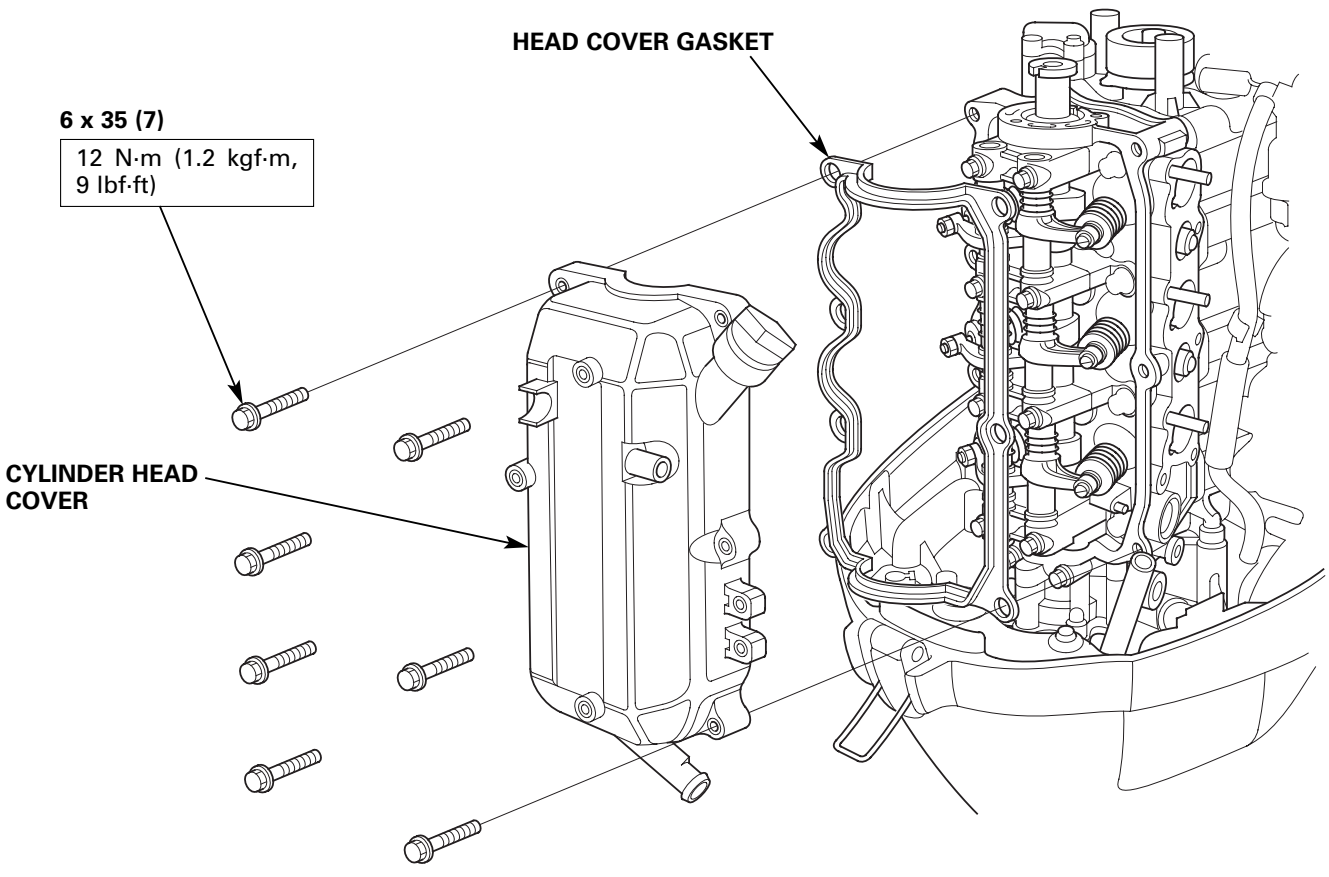
Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-3

4) Remove the seven 6 x 35 mm flange bolts, and remove the cylinder head cover.

   • Oil leaks out when the cylinder head cover is removed.
   Catch the leaking oil with a shop towel and a suitable container, and wipe up the spilled oil.

5) Remove the head cover gasket from the cylinder head cover.
   Replace the head cover gasket with a new one on reassembly.
   Check the head cover gasket for damage or deformation, and replace it with a new one if necessary.



© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-4

2. CYLINDER HEAD ASSEMBLY REMOVAL

NOTICE

Remove the cylinder head assembly while the engine is cold to prevent heat warpage.

Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)
- Fuel strainer (low pressure side)/fuel pump (low pressure side)/fuel tube (P. 5-111)
- Cylinder head cover (P. 9-2)
- Camshaft pulley/CMP sensor (P. 7-22)
- Silencer/throttle body/intake manifold (P. 5-88)

1) Move the shift to the "N" (Neutral) position.

2) Turn the alternator rotor counterclockwise to bring the No.1 cylinder piston to the top dead center of its compression stroke (P. 3-10).

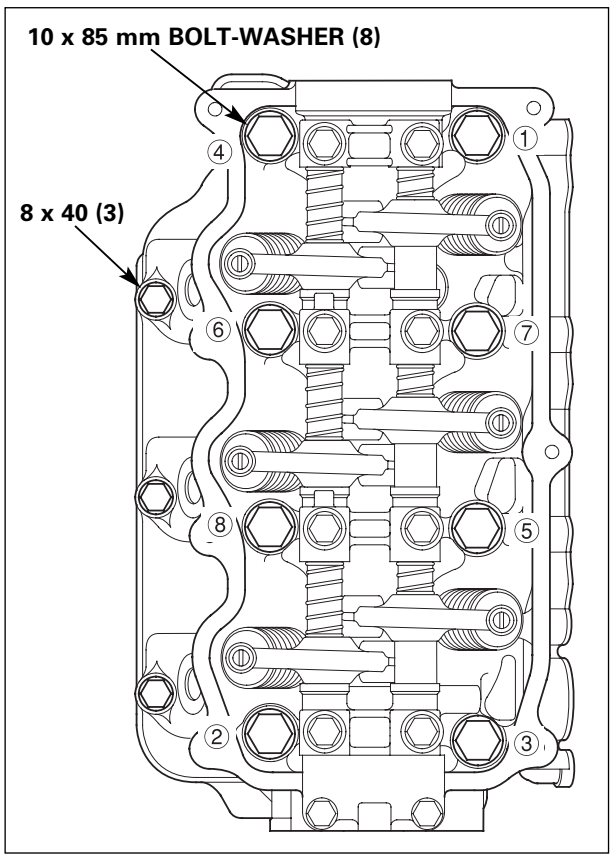
   NOTICE

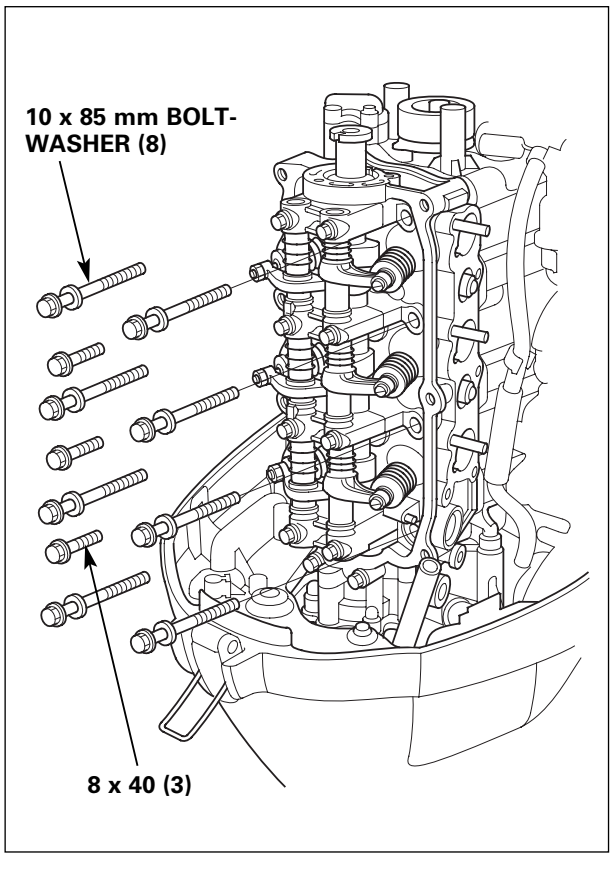
   Do not turn the alternator rotor clockwise.

3) Loosen the three 8 x 40 mm flange bolts.

4) Loosen the eight 10 x 85 mm bolt-washers in two or three steps in the numbered sequence shown.

5) Remove the eight 10 x 85 mm bolt-washers and the three 8 x 40 mm flange bolts from the cylinder head assembly.



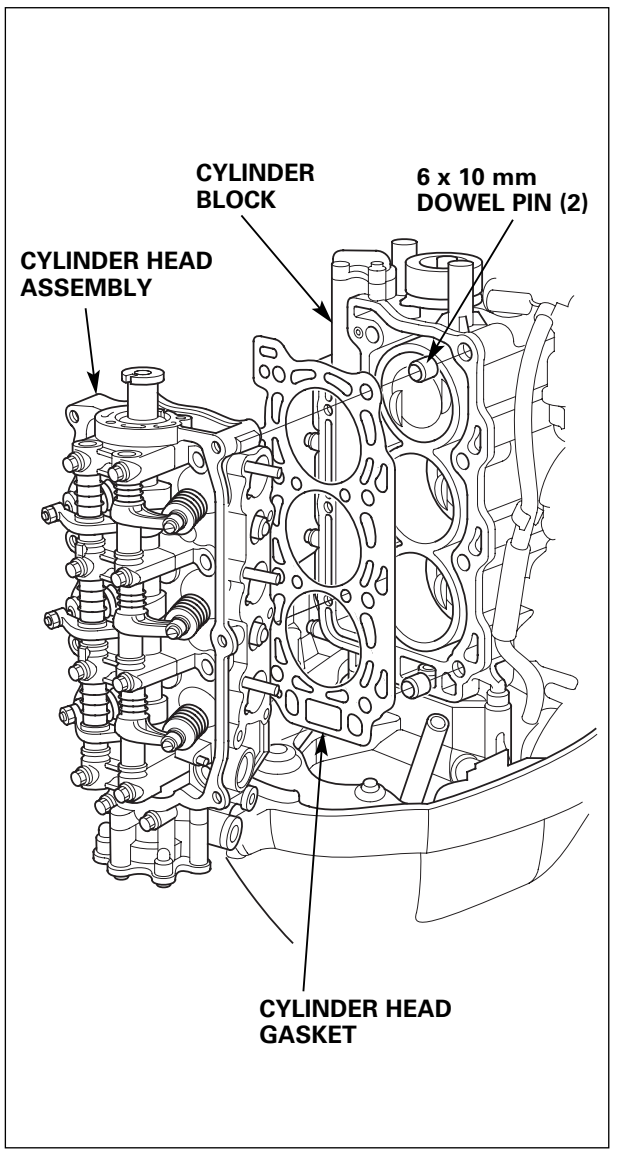


Date of Issue: May 2008
© Honda Motor Co., Ltd.

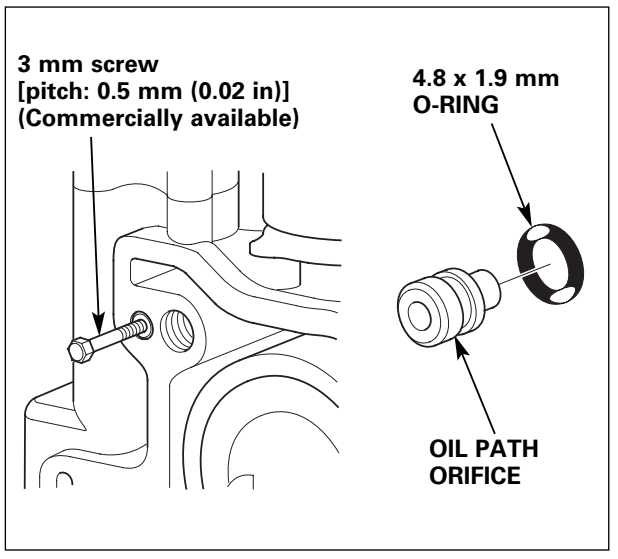
9章(A).qxp 2008/04/10 16:22 ページ 9-5

6) Remove the cylinder head assembly from the cylinder block.

7) Remove the cylinder head gasket and the two 6 x 10 mm dowel pins from the cylinder block.
Replace the cylinder head gasket with a new one on reassembly.



8) Get a commercially available 3 mm screw [pitch: 0.5 mm (0.02 in)] on hand.
Screw the 3 mm screw into the oil path orifice and remove the oil path orifice.
Replace the O-ring with a new one on reassembly.



© Honda Motor Co., Ltd.

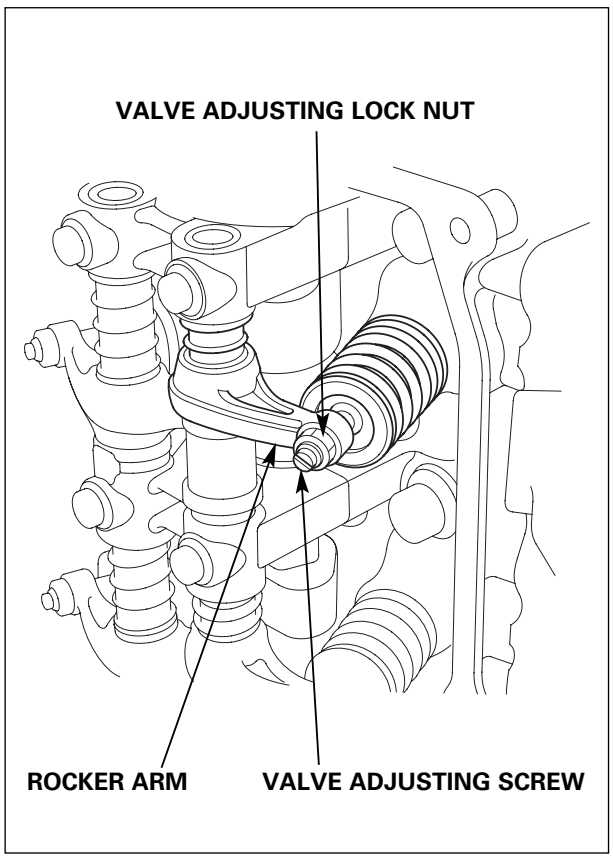
9章(A).qxp 2008/04/10 16:22 ページ 9-6

3. CYLINDER HEAD ASSEMBLY DISASSEMBLY

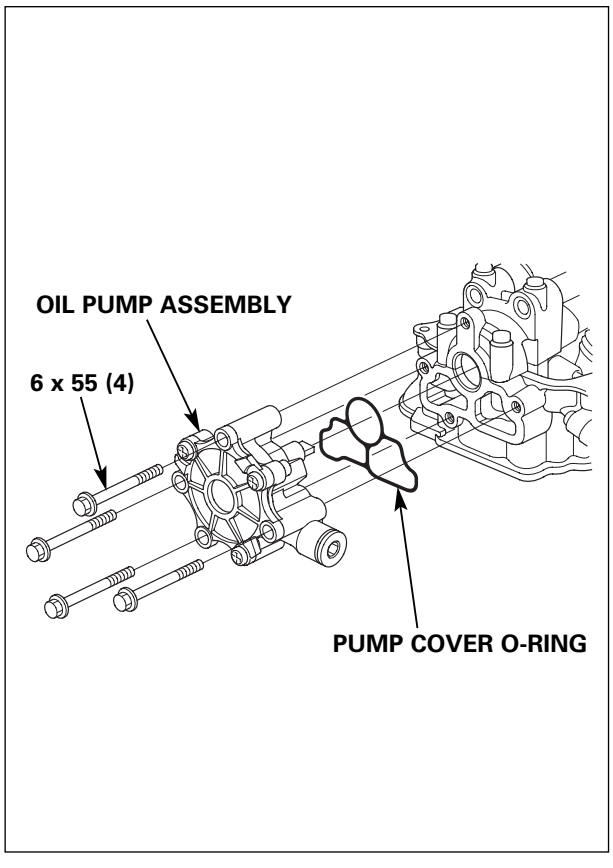
• Mark the removed parts (e.g. valves, springs and other related parts) and store them securely, grouping them by intake side and exhaust side for each cylinder.
Reinstall each part in its original position.

1) Remove the cylinder head assembly from the outboard motor (P. 9-4).

2) Loosen the rocker arm valve adjusting lock nut, and loosen the valve adjusting screw fully.



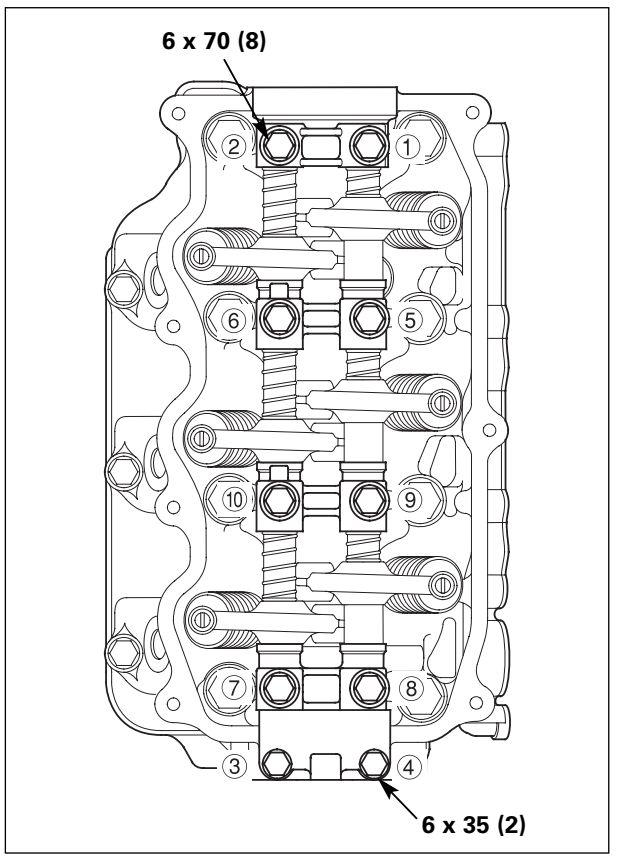
3) Remove the four 6 x 55 mm flange bolts, and remove the oil pump assembly and the pump cover O-ring.
Replace the O-ring with a new one on reassembly.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

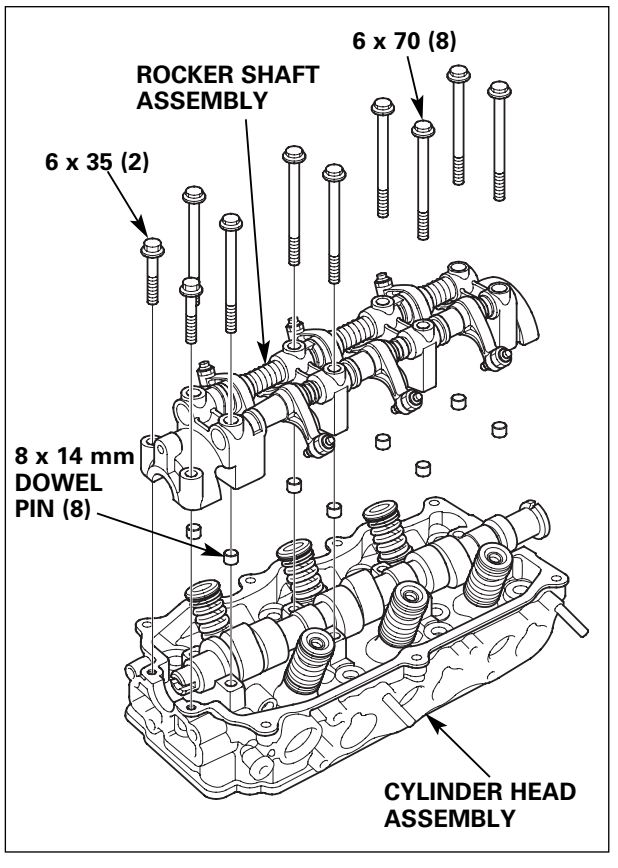
9章(A).qxp 2008/04/10 16:22 ページ 9-7

4) Loosen the eight 6 x 70 mm flange bolts and the two 6 x 35 mm flange bolts in two or three steps in the numbered sequence shown.



5) Remove the eight 6 x 70 mm flange bolts and the two 6 x 35 mm flange bolts, and remove the rocker shaft assembly.

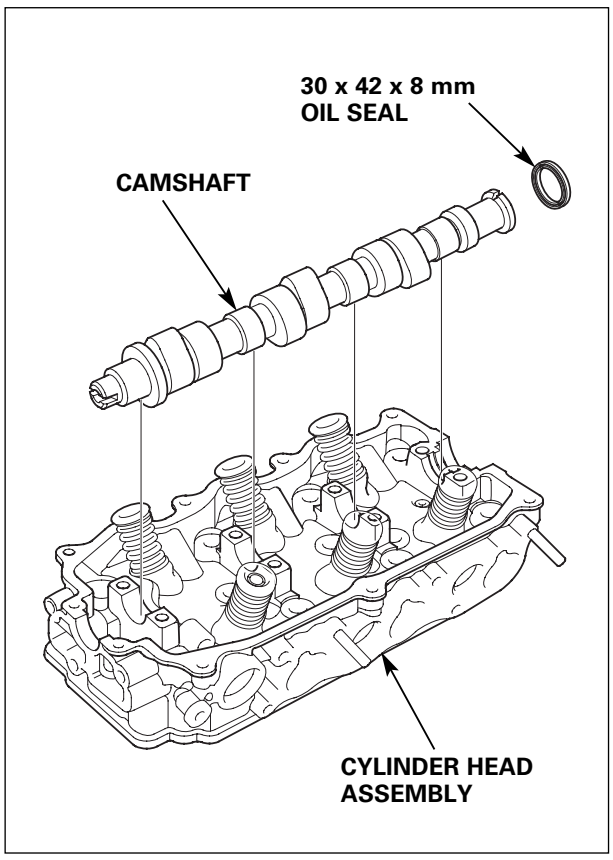
6) Remove the eight 8 x 14 mm dowel pins.



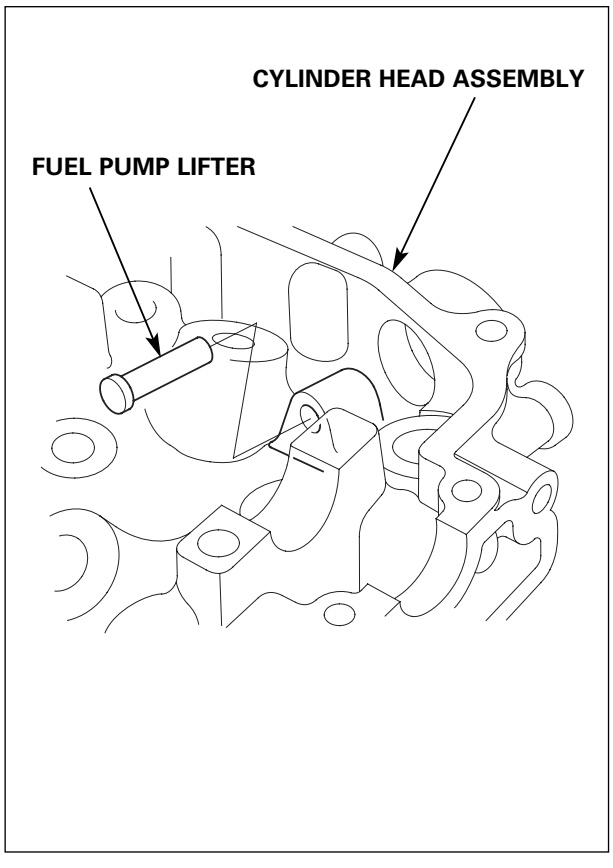
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-8

7) Remove the camshaft from the cylinder head assembly. Remove the 30 x 42 x 8 mm oil seal from the camshaft. Replace the oil seal with a new one on reassembly.



8) Remove the fuel pump lifter from the cylinder head assembly.

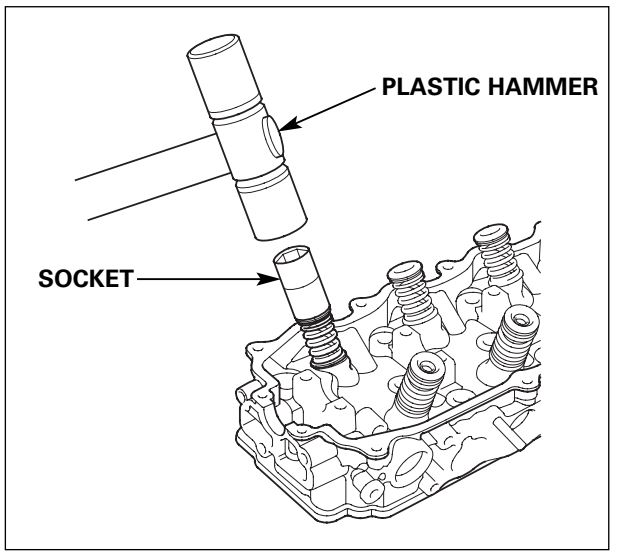


Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-9

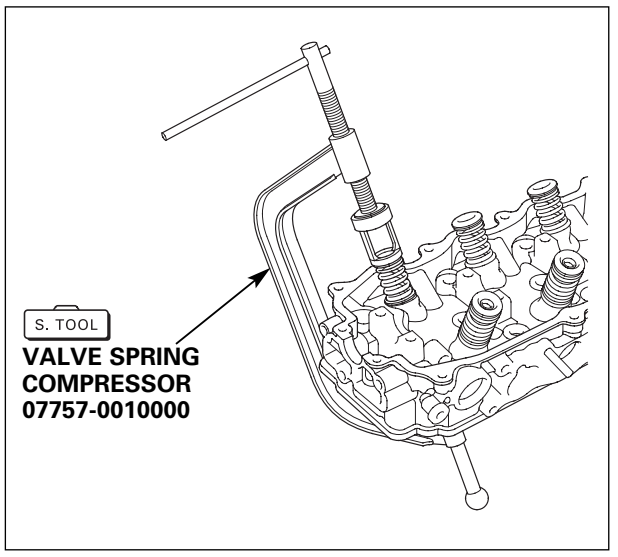
9) Use a socket that matches the diameter of the valve spring retainer. Attach the socket to the retainer, and lightly tap the socket to separate the valve keepers from the retainer.

- Tap each valve stem head straight down. Take care not to bend the valves.
- Support the cylinder head assembly with an engine table or equivalent to prevent damage to the valve.

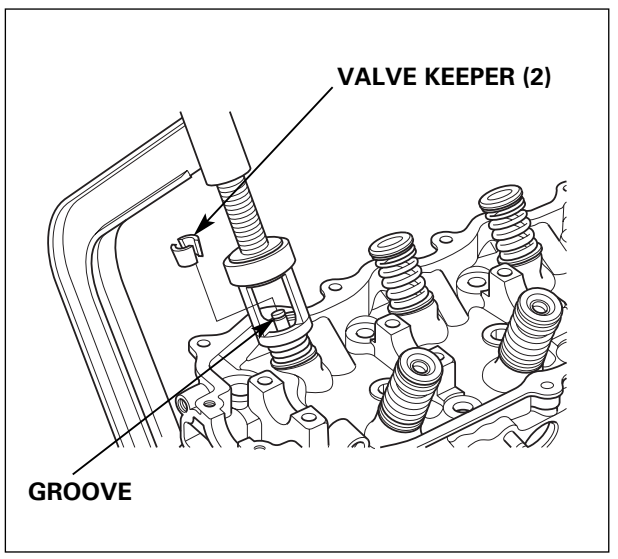


10) Compress the valve springs using the special tool as shown.

TOOL:
Valve spring compressor **07757-0010000**



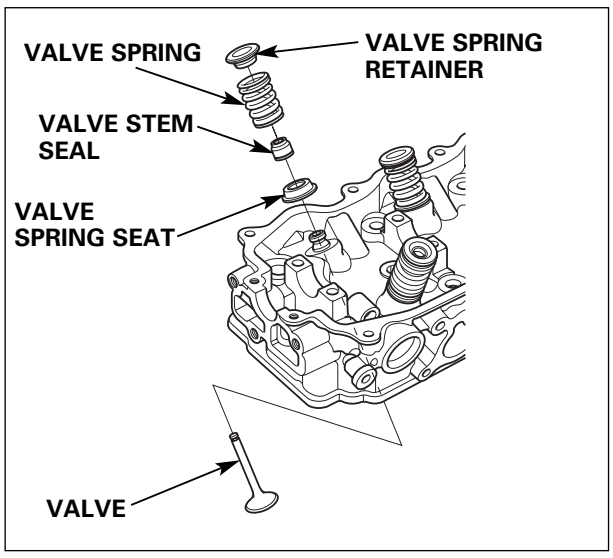
11) Remove the two valve keepers from the groove in the valve stem.



© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-10

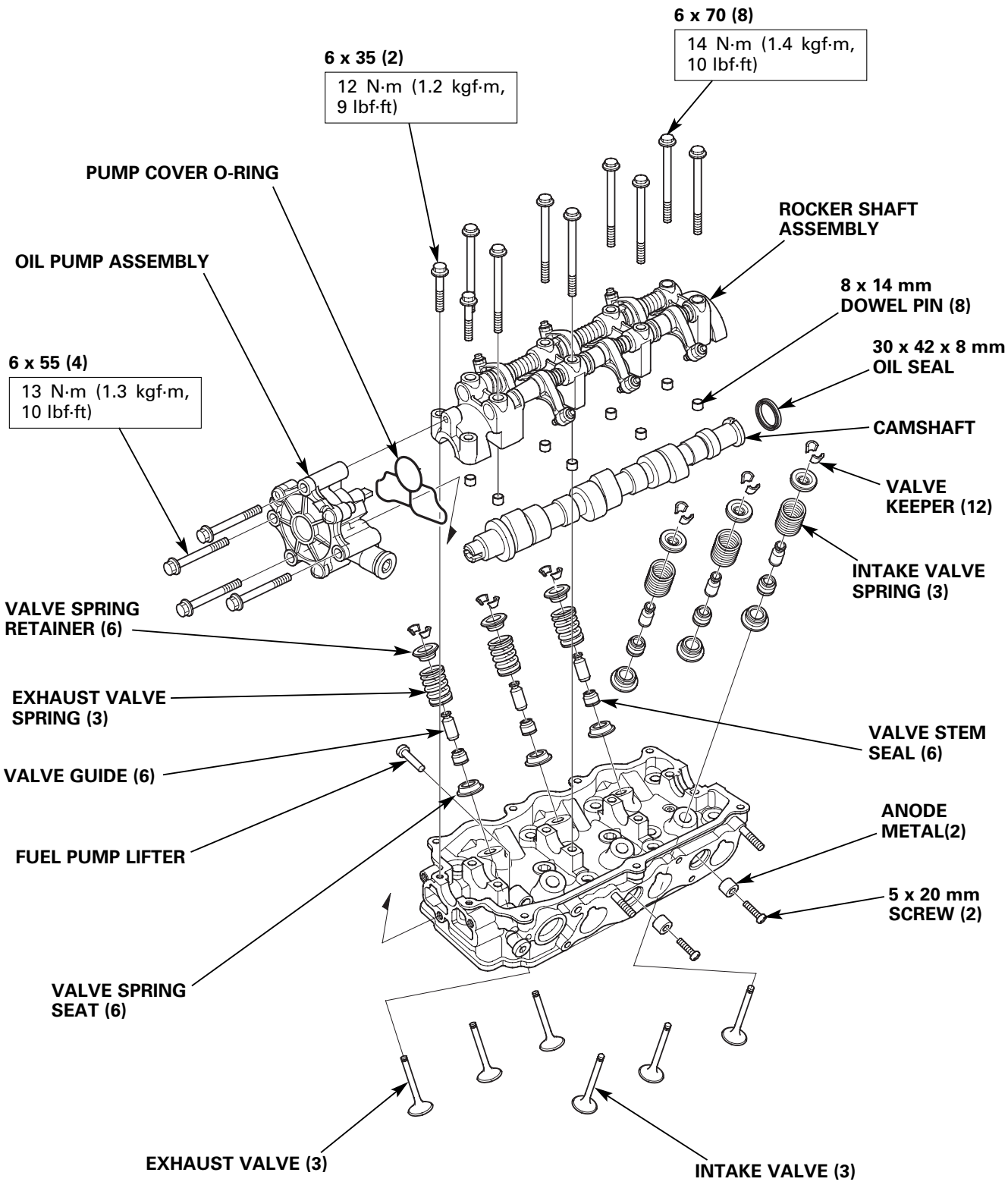
12) Remove the valve spring retainer, valve spring, valve, valve stem seal and the valve spring seat from the cylinder head. Check the valve for chipping and excessive carbon deposits. Clean the valve if necessary.
Replace the valve stem seal with a new one on reassembly.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-11

COMPONENT DRAWING



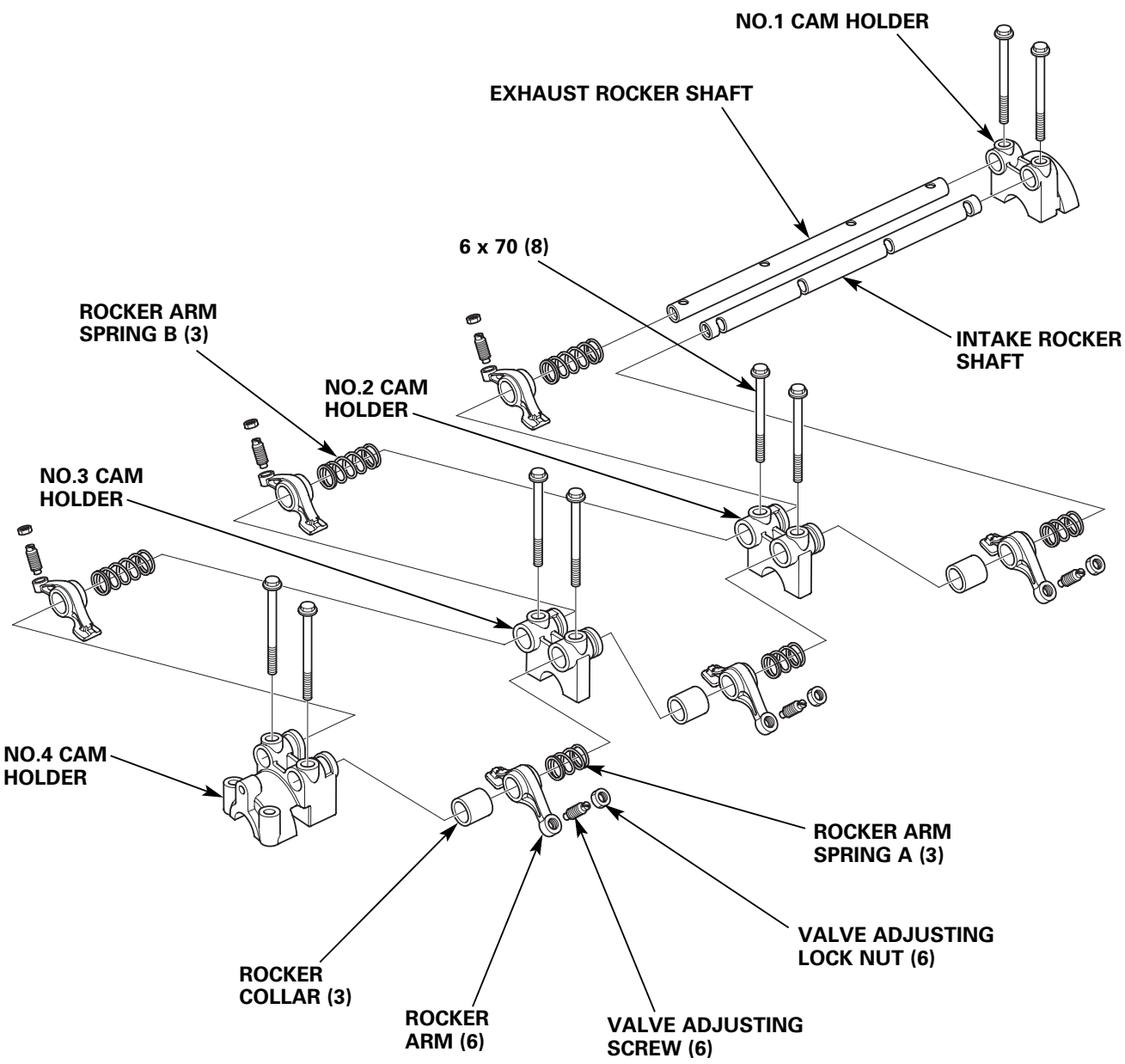
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-12

ROCKER SHAFT ASSEMBLY DISASSEMBLY/REASSEMBLY

- Note the location of each part before disassembly. Do not confuse the parts; install them in their original position.
- Check each rocker arm for wear or damage in the part where it contacts with the camshaft.

Apply molybdenum disulfide oil to the outer surface of the rocker shaft and to the part of each rocker arm where it contacts with the camshaft on reassembly.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-13

4. INSPECTION

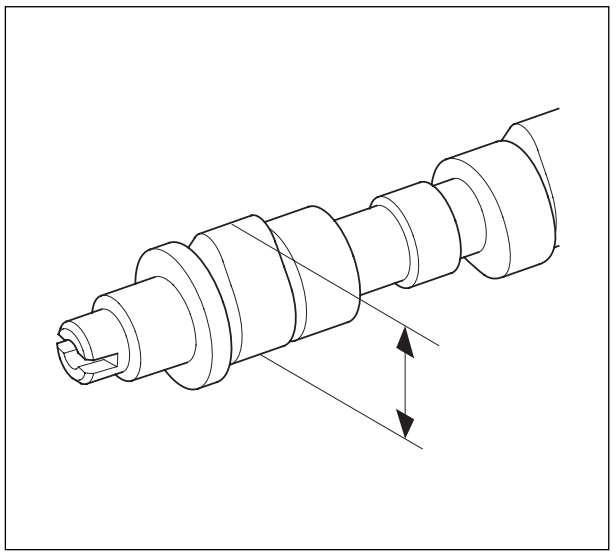
• CAM HEIGHT

1) Clean the camshaft and check the cam surface for wear or damage.

2) Measure the cam height.

	Standard	Service limit
IN	35.266 — 35.606 mm (1.3884 — 1.4018 in)	35.046 mm (1.3798 in)
EX	35.311 — 35.651 mm (1.3902 — 1.4036 in)	35.091 mm (1.3815 in)

3) If the measurement is less than the service limit, replace the camshaft with a new one.

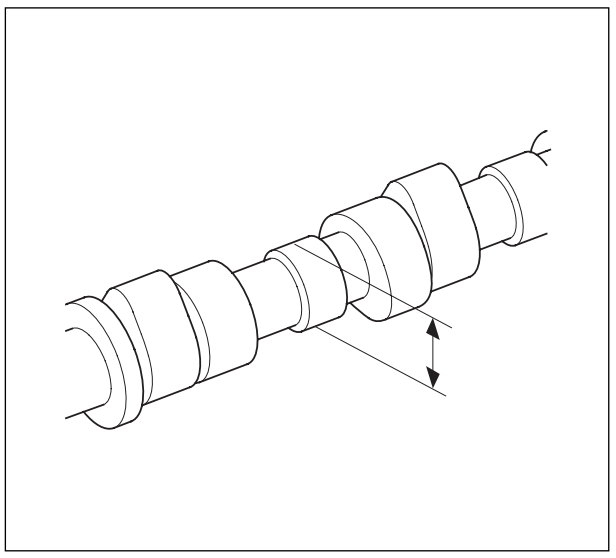


• CAMSHAFT JOURNAL O.D.

1) Clean the camshaft and check the journals for wear or damage.

2) Measure the O.D. of each camshaft journal.

Standard	Service limit
22.959 — 22.980 mm (0.9039 — 0.9047 in)	22.930 mm (0.9028 in)

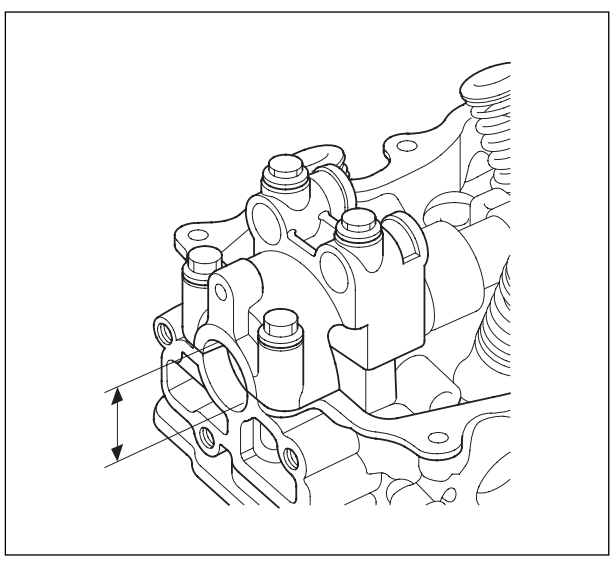


• CAMSHAFT JOURNAL I.D.

1) Tighten each cam holder to the specified torque with the eight 6 x 70 mm flange bolts and the two 6 x 35 mm flange bolts (P. 9-14).

2) Measure the I.D. of each cylinder head journal.

Standard	Service limit
23.000 — 23.021 mm (0.9055 — 0.9063 in)	23.050 mm (0.9075 in)



© Honda Motor Co., Ltd.

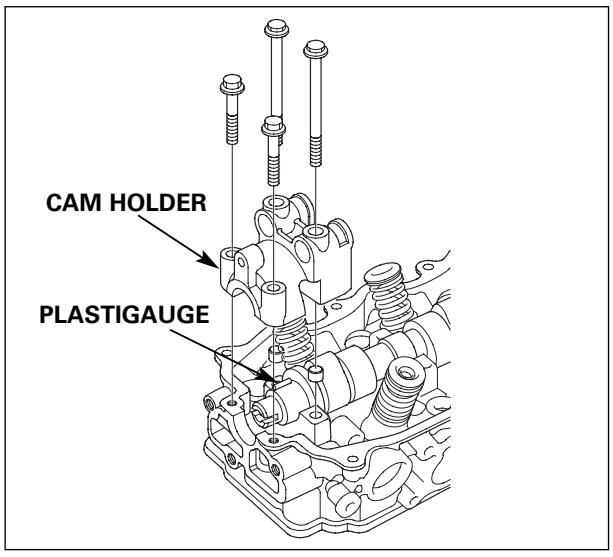
9章(A).qxp 2008/04/10 16:22 ページ 9-14

• CAMSHAFT JOURNAL OIL CLEARANCE

1) Clean the journals of the cylinder head, camshaft and the cam holder, and check the journals for wear or damage.

2) Place a plastigauge on each journal of the camshaft as shown.

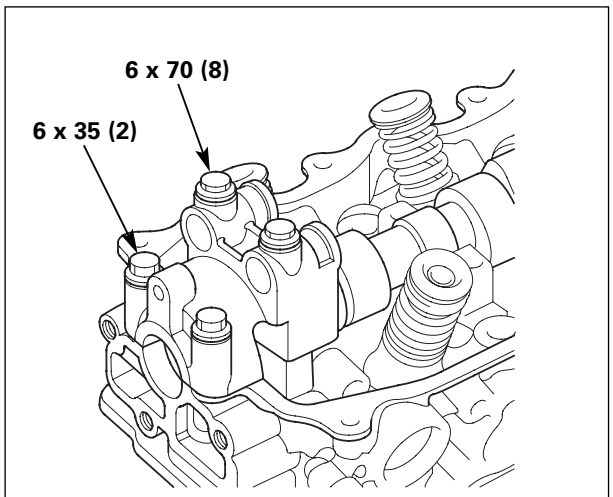
   • Place the plastigauge in the axial direction.



3) Set the 8 x 14 mm dowel pin on each cam holder, and install the cam holder.
   Tighten the eight 6 x 70 mm flange bolts and the two 6 x 35 mm flange bolts to the specified torque.

   TORQUE:
   6 x 70 mm flange bolt: 14 N·m (1.4 kgf·m, 10 lbf·ft)
   6 x 35 mm flange bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)

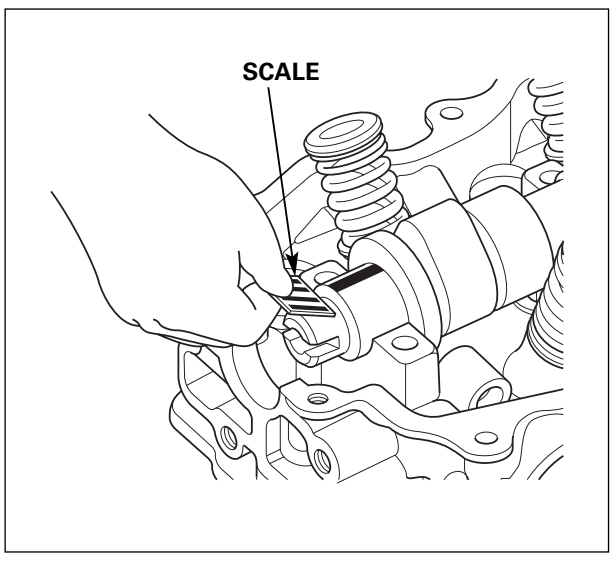
   • Take care not to turn the camshaft.



4) Remove each cam holder.
   Measure the pressed width of the plastigauge using the scale printed on the bag of the plastigauge.

Standard	Service limit
0.020 — 0.065 mm (0.0008 — 0.0026 in)	0.080 mm (0.0031 in)

5) If the measurement exceeds the service limit, replace the camshaft with a new one and recheck the oil clearance.
   If the measurement still exceeds the service limit after replacing the camshaft, replace the cam holder and the cylinder head.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

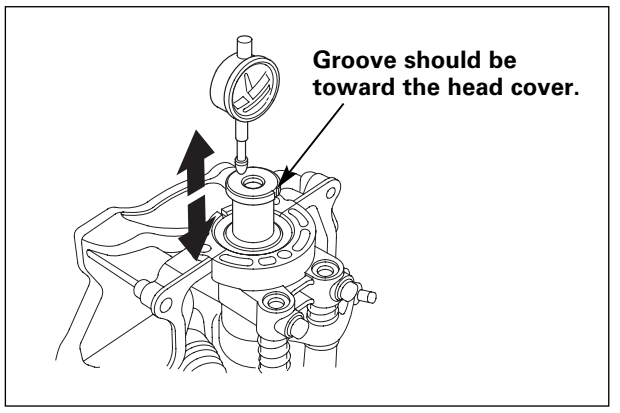
9章(A).qxp 2008/04/10 16:22 ページ 9-15

• CAMSHAFT AXIAL PLAY

1) Check that the oil pump assembly is installed properly on the cylinder head assembly.
2) Loosen all the valve adjusting lock nuts and the valve adjusting screws fully.
3) Put the camshaft at the top dead center of the compression stroke of the No.1 cylinder piston (with the groove in the camshaft toward the head cover side). Install the dial indicator.
4) Check the camshaft axial play by moving the camshaft up and down with a screwdriver.

Standard	Service limit
0.03 — 0.11 mm (0.001 — 0.004 in)	0.30 mm (0.012 in)

5) If the measurement exceeds the service limit, replace the camshaft with a new one and recheck.
   If the measurement still exceeds the service limit after replacing the camshaft, replace the cylinder head with a new one.



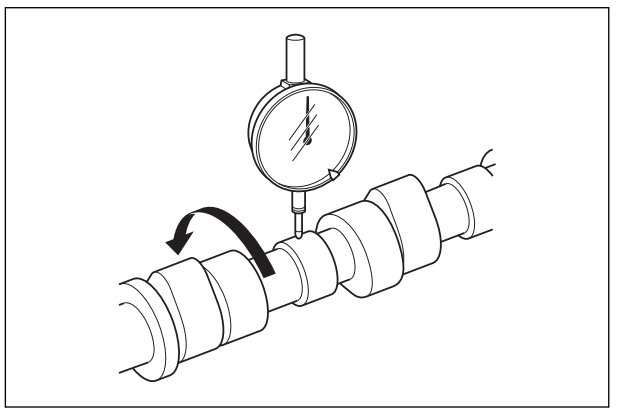
• CAMSHAFT RUNOUT

1) Place V blocks or equivalent under the journal at both ends of the camshaft.

2) Install the dial indicator on the camshaft, and measure the camshaft runout by turning the camshaft.

Standard	Service limit
0.03 mm max. (0.001 in)	0.05 mm (0.002 in)

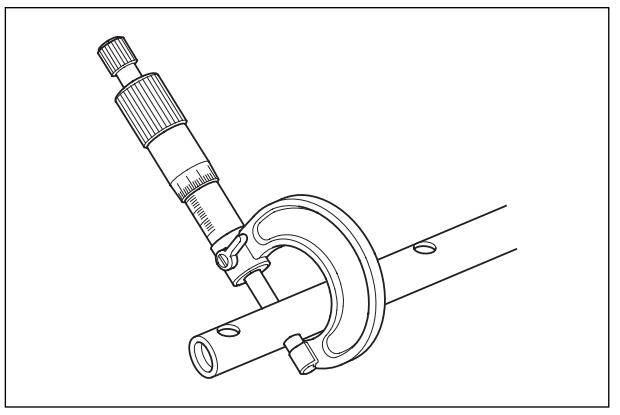
3) If the measurement exceeds the service limit, replace the camshaft with a new one.



• ROCKER SHAFT O.D.

Measure the rocker shaft O.D. at the sliding part of each rocker arm.

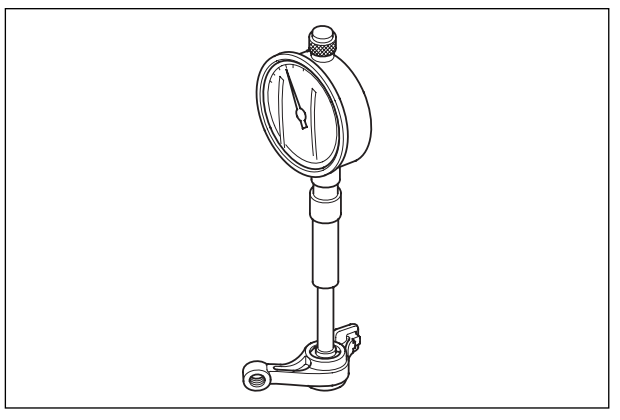
Standard	Service limit
13.976 — 13.994 mm (0.5502 — 0.5509 in)	13.950 mm (0.5492 in)



• ROCKER ARM I.D.

Measure the I.D. of each rocker arm.

Standard	Service limit
14.010 — 14.028 mm (0.5516 — 0.5523 in)	14.050 mm (0.5531 in)

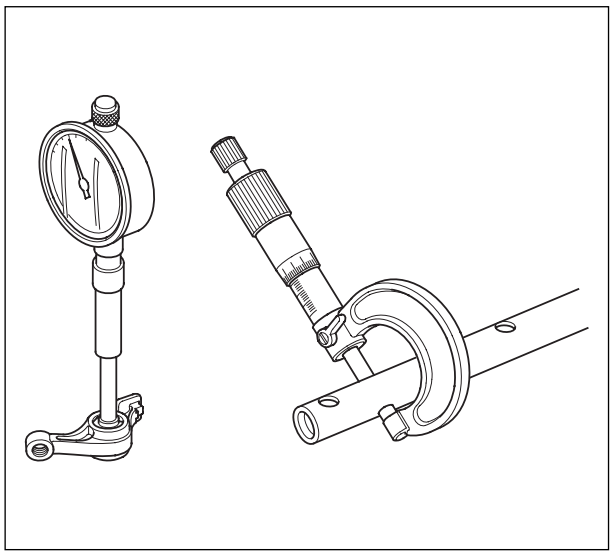


© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-16

• ROCKER ARM-TO-ROCKER SHAFT CLEARANCE

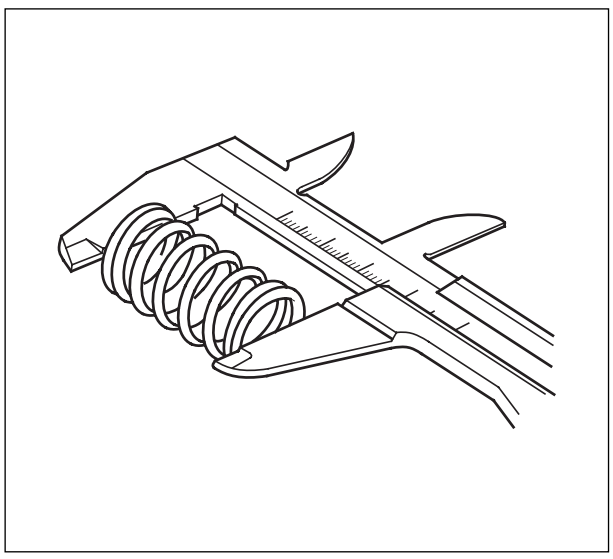
Standard	Service limit
0.016 — 0.052 mm (0.0006 — 0.0020 in)	0.070 mm (0.0028 in)



• VALVE SPRING FREE LENGTH

Measure the valve spring free length.

	Standard	Service limit
IN/EX	36.9 mm (1.45 in)	35.4 mm (1.39 in)



• VALVE FACE/VALVE STEM O.D.

<Valve face>

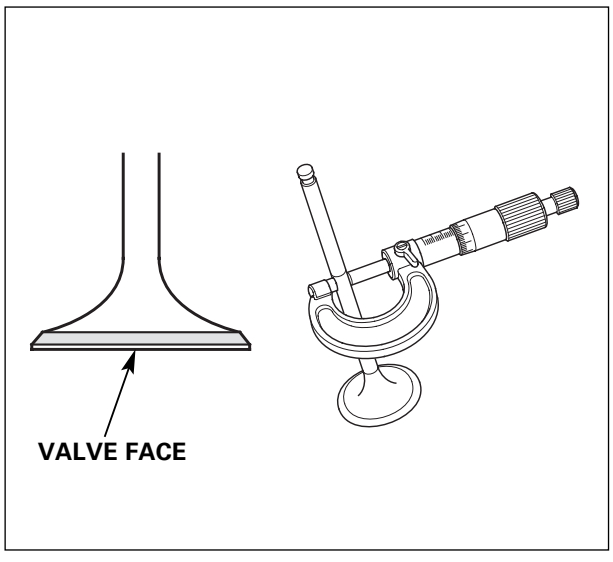
Check each valve face for pitting or wear irregularities. Check each valve face for even seat. Replace the valve if necessary.

<Valve stem>

1) Check each valve for bend, seizure or damage.
2) Insert each valve into the corresponding valve guide to check the operation.
3) Measure the valve stem O.D. at the sliding surface of the valve guide.

	Standard	Service limit
IN	5.480 — 5.490 mm (0.2157 — 0.2161 in)	5.450 mm (0.2146 in)
EX	5.460 — 5.470 mm (0.2150 — 0.2154 in)	5.420 mm (0.2134 in)

4) If the measurement is less than the service limit, replace the valve with a new one.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-17

• VALVE GUIDE I.D.

1) Before measuring the valve guide I.D., ream the valve guides to remove any carbon deposits using the special tool.

NOTICE

Turn the special tool (valve guide reamer, 5.5 mm) clockwise; never turn it counterclockwise. Continue to turn it clockwise as you lift it from the valve guide.

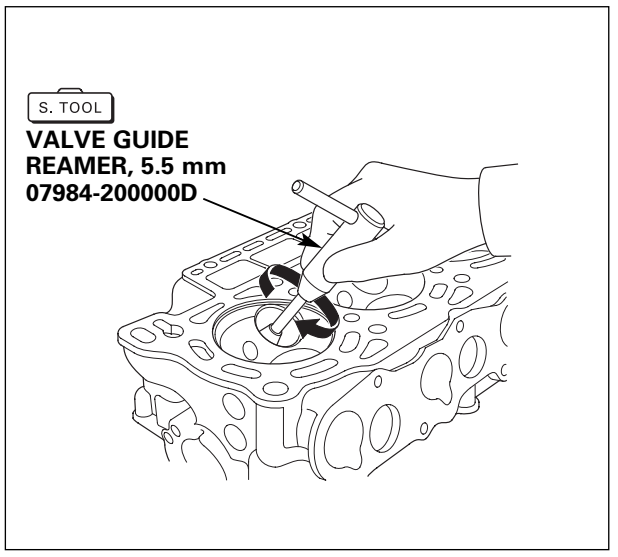
TOOL:
Valve guide reamer, 5.5 mm **07984-200000D**

2) Measure and record each valve guide I.D.

	Standard	Service limit
IN/EX	5.500 — 5.512 mm (0.2165 — 0.2170 in)	5.530 mm (0.2177 in)

3) If the measurement exceeds the service limit, replace the valve guide with a new one.

- Check the valve stem-to-valve guide clearance after replacing the valve guide.

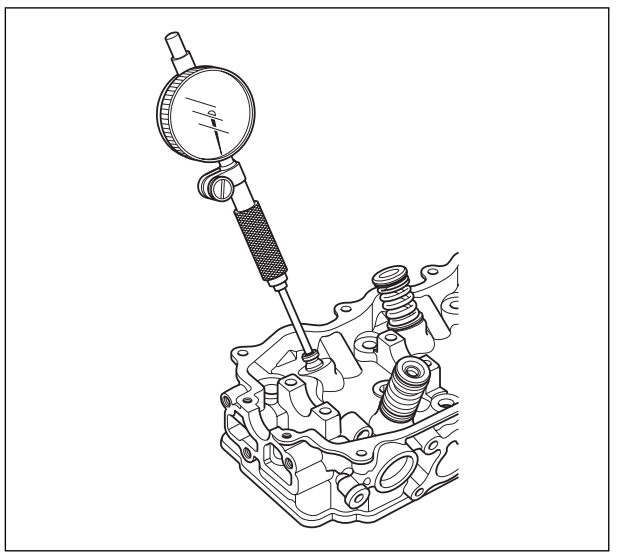


• VALVE STEM-TO-VALVE GUIDE CLEARANCE

Calculate the gap between the valve stem O.D. and the valve guide I.D.

	Standard	Service limit
IN	0.010 — 0.030 mm (0.0004 — 0.0012 in)	0.060 mm (0.0024 in)
EX	0.030 — 0.050 mm (0.0012 — 0.0020 in)	0.100 mm (0.0039 in)

If the stem-to-guide clearance exceeds the service limit, replace the valve and the valve guide as a set (P. 9-19).

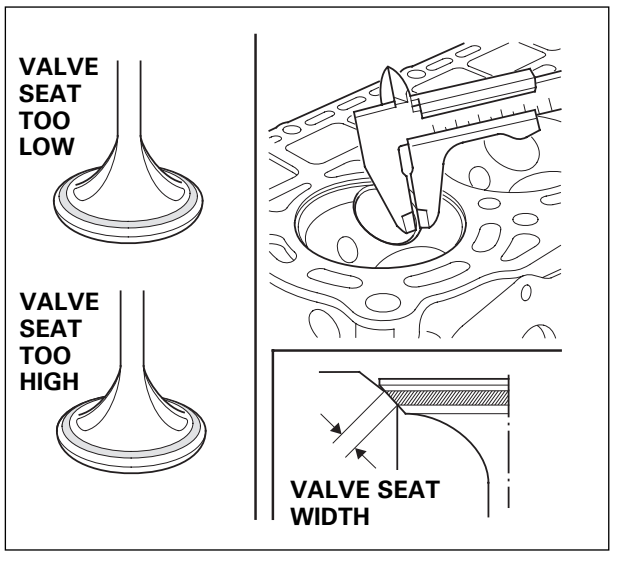


• VALVE SEAT WIDTH

Measure the valve seat width.

	Standard	Service limit
IN/EX	1.25 — 1.55 mm (0.049 — 0.061 in)	2.00 mm (0.079 in)

If the valve seat width is too wide or narrow, or if the valve seat is too high or low, recondition the valve seat (P. 9-21).



© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-18

• CYLINDER HEAD WARPAGE

1) Remove the carbon deposits from the combustion chamber. Clean off any gasket material from the cylinder head surface.

2) Check the spark plug holes and valve seats for cracks.

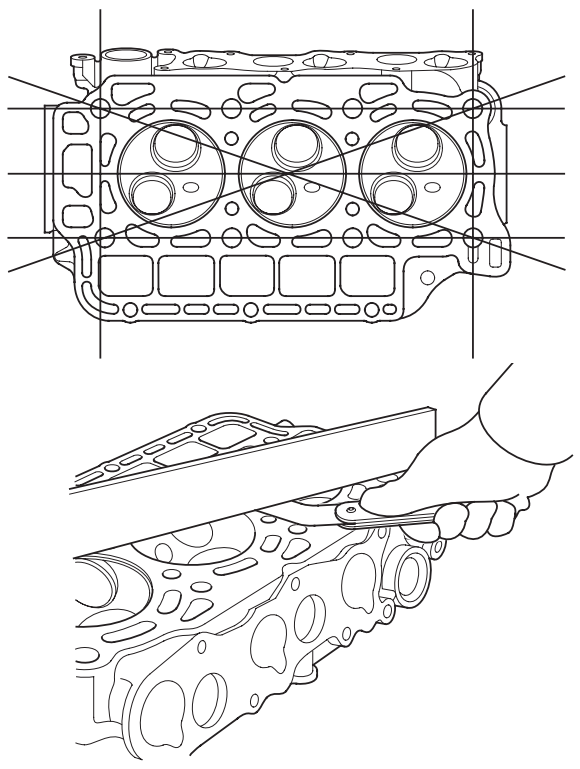
3) Check the cylinder head for warpage using a straight edge and a feeler gauge.

Standard	Service limit
Less than 0.05 mm (0.002 in)	0.10 mm (0.004 in)

4) If the measurement exceeds the service limit, recondition the cylinder head.

Cylinder head reconditioning procedure:
Apply Prussian Blue compound to the level block to identify the warpage, and using a fine oil stone, grind the cylinder head in a "figure 8", with the warped part being the center of the ground part. Or use the lapping machine to recondition the cylinder head.

MEASUREMENT POINT



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-19

5. VALVE GUIDE REPLACEMENT

1) Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.

2) Use a hot plate or oven to heat the cylinder head evenly to 150°C (300°F). Check the temperature with a temperature indicating stick (available at welding supply store) or equivalent.

NOTICE

- *Do not use a torch to heat the cylinder head; warpage of the cylinder head may result.*
- *Do not get the head hotter than 150°C (300°F); excessive heat may loosen the valve seats.*

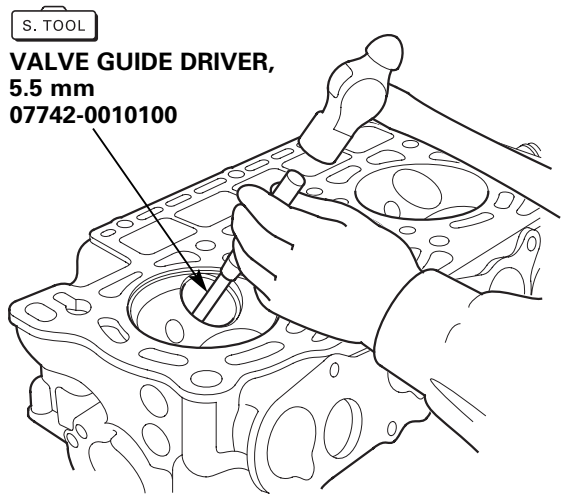
3) Remove the heated cylinder head from the hot plate, and support it with wooden blocks. Wear heavy gloves to protect your hands.

4) Drive the valve guide out from the combustion chamber side using a special tools.

TOOL:
Valve guide driver, 5.5 mm **07742-0010100**

S. TOOL

VALVE GUIDE DRIVER, 5.5 mm 07742-0010100



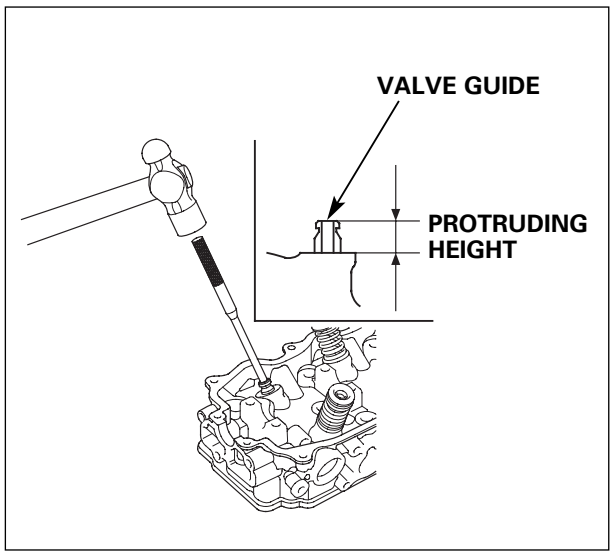
5) Allow the cylinder head to cool to room temperature.
Clean and inspect the valve guide bores in the cylinder head.

6) Use a hot plate or oven to heat the cylinder head evenly to 150°C (300°F). Check the temperature with a temperature indicating stick or equivalent.

7) Remove the new valve guides from the freezer one at a time as needed.

8) Install the new valve guides from the valve spring side of the cylinder head.
Drive each valve guide to the specified height, measured from the top of the valve guide to the cylinder casting as shown.

Valve guide protruding height	IN	14.25 — 14.75 mm (0.561 — 0.581 in)
	EX	12.75 — 13.25 mm (0.502 — 0.522 in)



9) After installation, inspect the valve guide for damage.
Replace any damaged valve guides.

© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-20

• VALVE GUIDE REAMING

For best results, be sure the cylinder head is at room temperature before reaming valve guides.

1) Coat the reamer and valve guide with cutting oil.

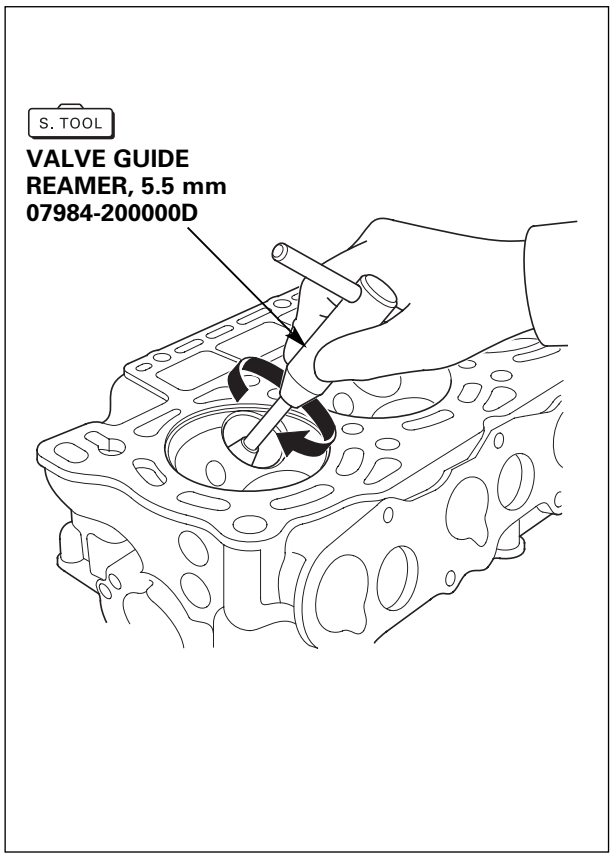
2) Rotate the reamer clockwise through the valve guide for the full length of the reamer.

3) Continue to rotate the reamer clockwise while removing it from the valve guide.

TOOL:
Valve guide reamer, 5.5 mm **07984-200000D**

NOTICE

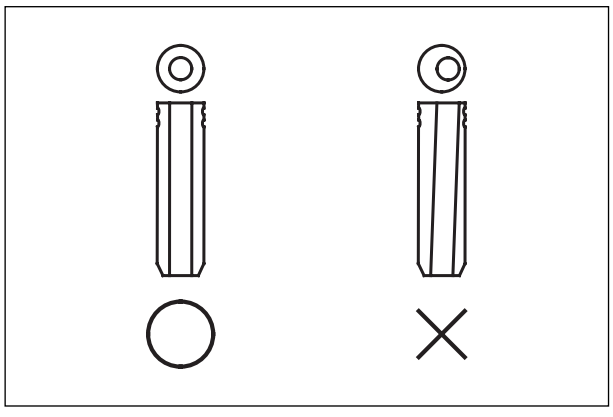
Turn the special tool (valve guide reamer, 5.5 mm) clockwise; never turn it counterclockwise. Continue to turn it clockwise as you lift it from the valve guide.



4) Thoroughly clean the cylinder head to remove any cutting residue.

5) Check the valve guide bore; it should be straight, round and centered in the valve guide. Insert the valve and check for smooth movement.
If the valve does not operate smoothly, the guide may have been bent during installation.
Replace the valve guide if it is bent or damaged.

6) Check the valve stem-to-valve guide clearance (P. 9-17).



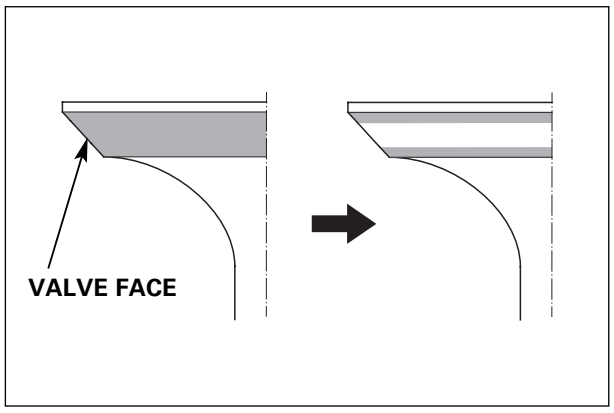
Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-21

6. VALVE SEAT RECONDITIONING

1) Thoroughly clean the combustion chambers and valve seats to remove carbon deposits. Apply a light coat of Prussian Blue compound or erasable felt-tipped marker ink to the valve faces.

2) Insert the valves, and then lift them and snap them closed against their seats several times. Be sure the valve does not rotate on the seat. The transferred marking compound will show any area of the seat that is not concentric.

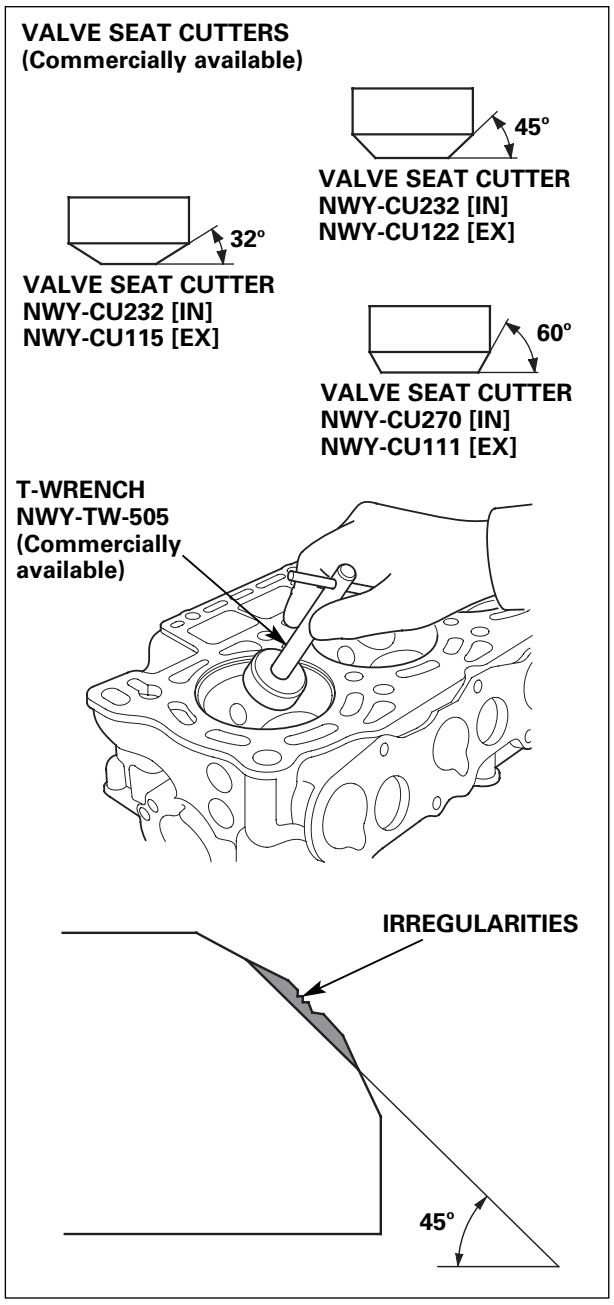


3) Using a 45° cutter, remove enough material to produce a smooth and concentric seat. Follow the valve seat cutter manufacturer's instructions.

   Turn the cutter clockwise, never counterclockwise. Continue to turn the cutter as you lift it from the valve seat.

TOOLS (Commercially available):

Valve seat cutter, #232 32° x 45°	**NWY-CU232 [IN]**
Valve seat cutter, #115 32°	**NWY-CU115 [EX]**
Valve seat cutter, #122 45°	**NWY-CU122 [EX]**
Valve seat cutter, #270 60°	**NWY-CU270 [IN]**
Valve seat cutter, #111 60°	**NWY-CU111 [EX]**
Solid pilot bar, 5.5 mm	**NWY-140-5.5 [IN]**
Solid pilot bar, 5.5 mm	**NWY-100-5.5 [EX]**
Solid pilot bar, 5.52 mm	**NWY-140-5.52 [IN]**
Solid pilot bar, 5.52 mm	**NWY-100-5.52 [EX]**
T-wrench, #505	**NWY-TW-505**

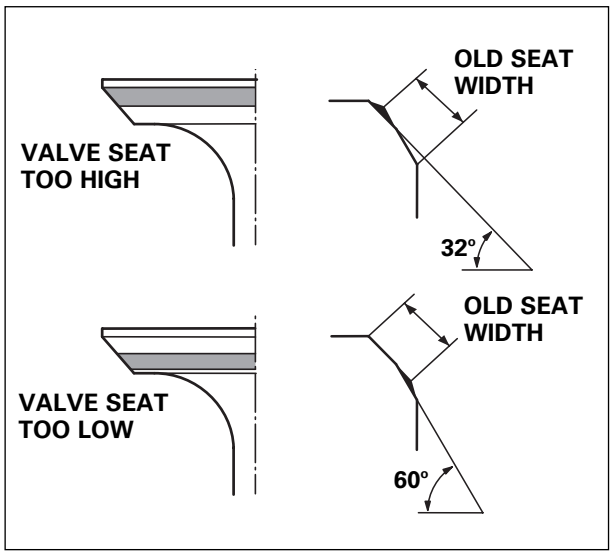


© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-22

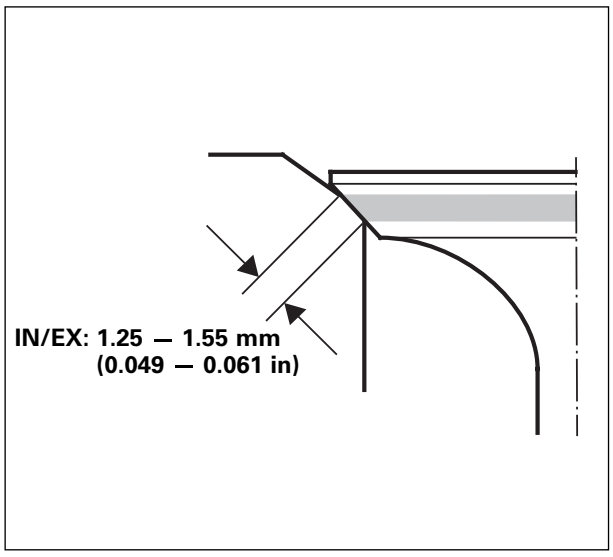
4) Use the 32° and 60° cutters to narrow and adjust the valve seat so that it contacts the middle of the valve face.
The 32° cutter removes material from the top edge.
The 60° cutter removes material from the bottom edge. Be sure that the width of the finished valve seat is within specification.

Valve seat width	IN/EX	1.25 — 1.55 mm (0.049 — 0.061 in)



5) Make a light pass with the 45° cutter to remove any possible burrs at the edges of the seat.

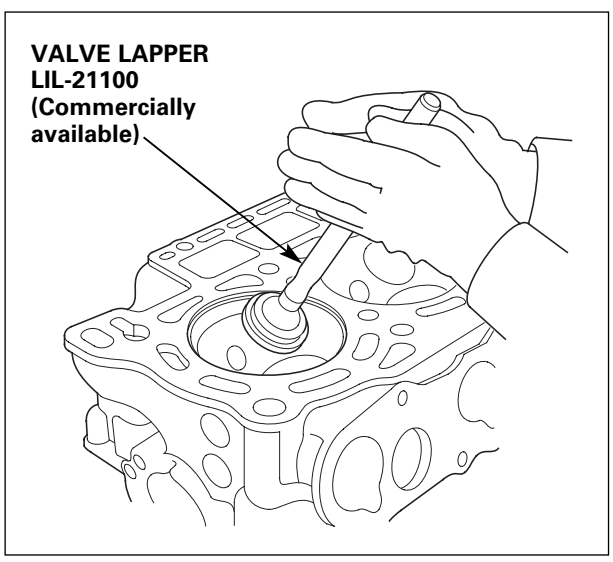
6) After resurfacing the seats, inspect for even valve seating. Apply Prussian Blue compound or erasable felt-tipped marker ink to the valve faces. Insert the valves, and then lift them and snap them closed against their seats several times. Be sure the valve does not rotate on the seat. The seating surface, as shown by the transferred marking compound, should have good contact all the way around.



7) Lap the valves into their seats, using a hand valve lapper (commercially available) and lapping compound.

NOTICE

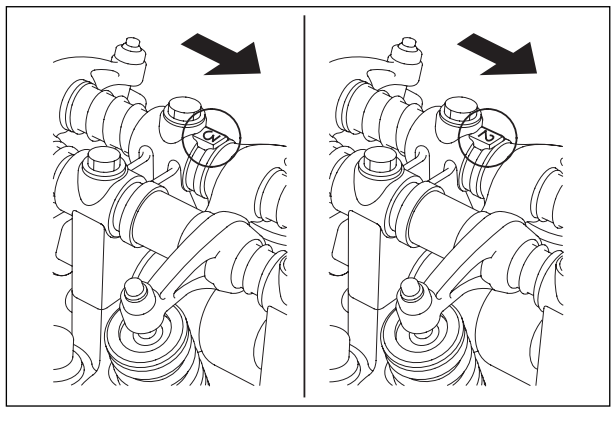
To avoid severe engine damage, be sure to remove all lapping compound from the cylinder head before assembly.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

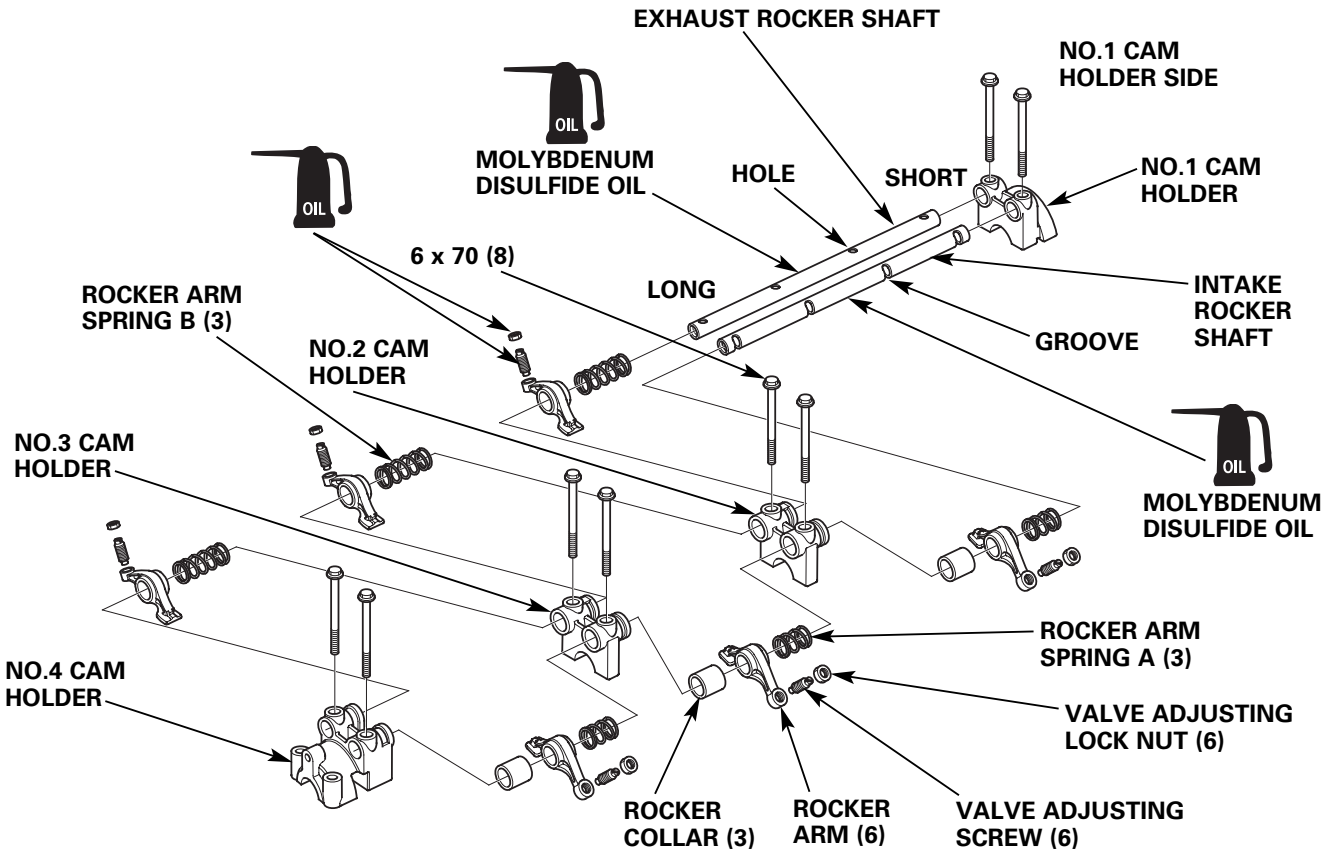
9章(A).qxp 2008/04/10 16:22 ページ 9-23

7. CYLINDER HEAD ASSEMBLY REASSEMBLY



ROCKER SHAFT ASSEMBLY REASSEMBLY

1) Do not confuse the intake and exhaust rocker shafts.
   Note the installation direction.
   <Intake rocker shaft>
   The intake rocker arm shaft has grooves in it. The grooves are closer to one end of the shaft than the other. Install the close end in the No.1 cam holder.
   <Exhaust rocker shaft>
   The exhaust rocker arm shaft has holes in it. The holes are closer to one end of the shaft than the other. Install that close end in the No.1 cam holder.
2) Apply molybdenum disulfide oil to the outer surface of the intake and exhaust rocker shafts.
   Install the intake and exhaust rocker shafts on the No.1 cam holder and insert two 6 x 70 mm flange bolts into the cam holder.
   Note the installation direction of the intake and exhaust rocker shafts.
3) Install the following parts on the intake and exhaust rocker shafts.
   <Intake rocker shaft>
   Install in this order: a rocker arm spring A, a rocker arm and a rocker collar.
   <Exhaust rocker shaft>
   Install in this order: a rocker arm spring B and a rocker arm.
4) Install the No.2 cam holder on the rocker shaft with the number on the cam holder toward the No.1 cam holder.
   Insert two 6 x 70 mm flange bolts into the No.2 cam holder.
5) Repeat steps 3 and 4 to assemble the No.3 and No.4 cam holders and associated parts.
6) Apply engine oil to the threads of the valve adjusting screw and to the threads and seat of the valve adjusting lock nut.
   Loosely install the valve adjusting screw and valve adjusting lock nut on the rocker arm.



© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-24

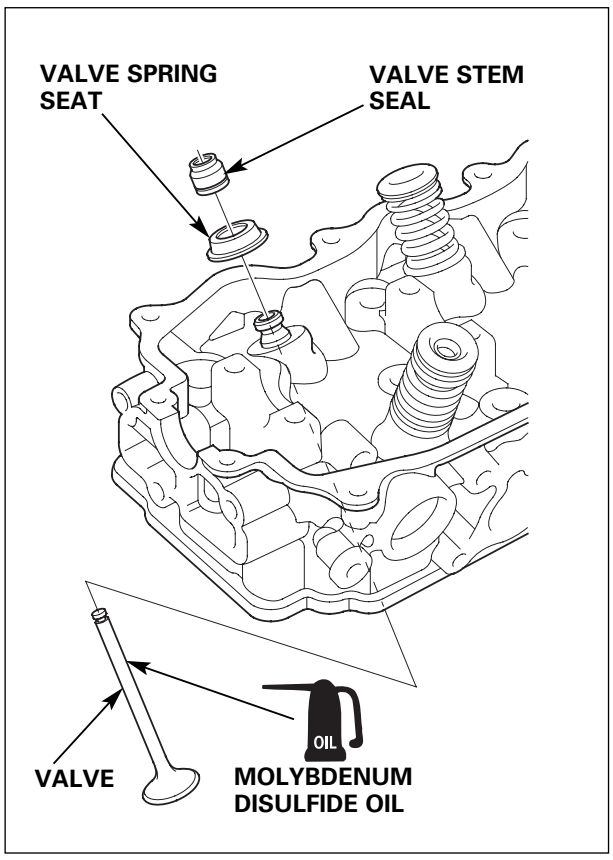
CYLINDER HEAD REASSEMBLY

1) Apply molybdenum disulfide oil to the valve stem sliding surface, and insert the valve into the valve guide.
Check that the valve moves up and down smoothly.

   • Do not confuse the intake valve with the exhaust valve on reassembly.

Valve O.D.	IN	32.90 — 33.10 mm (1.295 — 1.303 in)
	EX	28.90 — 29.10 mm (1.138 — 1.146 in)

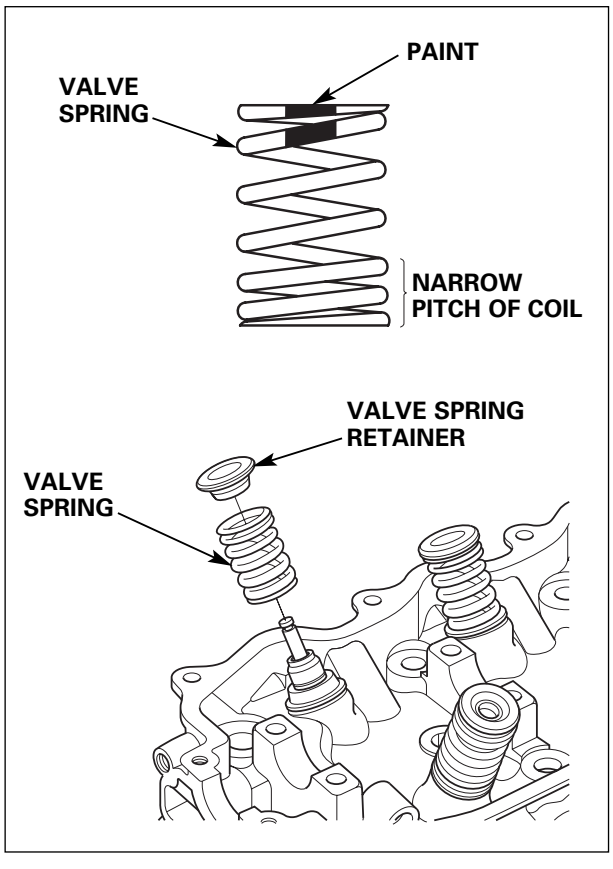
2) Install the valve spring seat on the cylinder head.
Apply engine oil to the inner wall of a new valve stem seal, and install it on the valve guide.



3) Set the valve spring, and install the valve spring retainer.

   • Do not confuse the intake valve spring with the exhaust valve spring.

Installation direction:
Install the valve spring with the painted side toward the valve spring retainer, and with the narrow pitch side of the coil toward the valve spring seat.



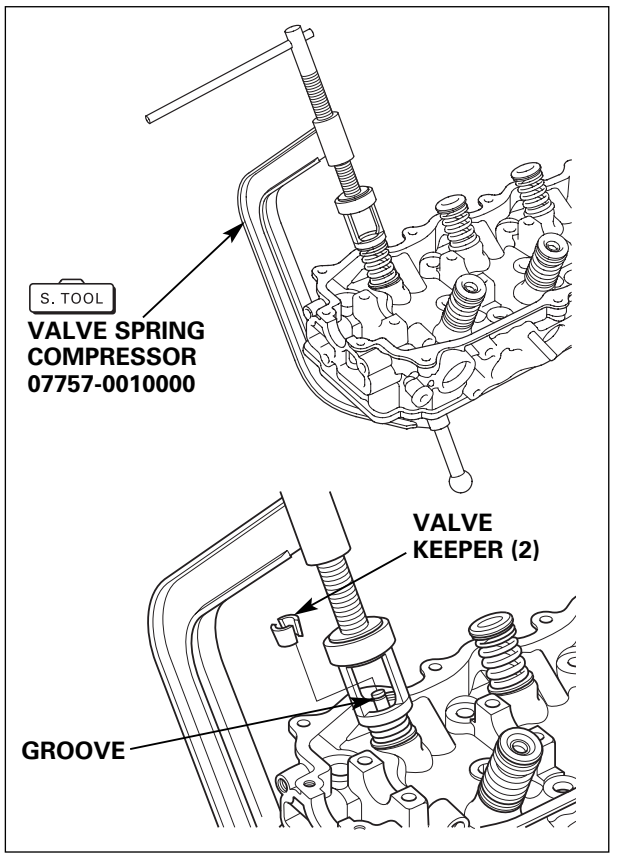
Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-25

4) Using the special tool, compress the valve spring and set the two valve keepers in the groove in the valve stem as shown. Then, release the special tool.

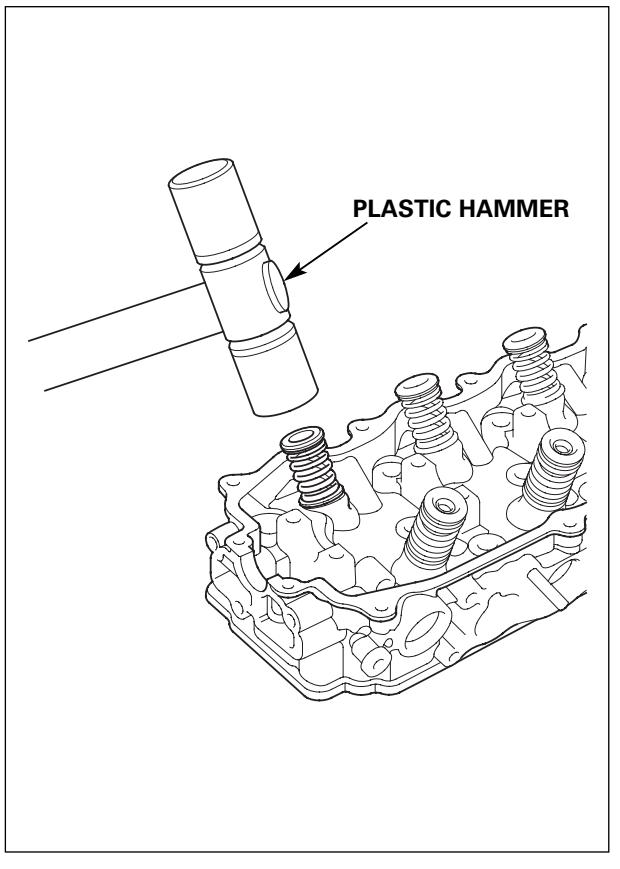
   • To facilitate installation of the valve keepers, apply a small amount of grease to the valve keepers and push them in the groove in the valve stem.

   TOOL:
   Valve spring compressor **07757-0010000**



5) Tap the valve stem head lightly with a plastic hammer two or three times, and set the valve stem and valve keepers in the proper position securely.

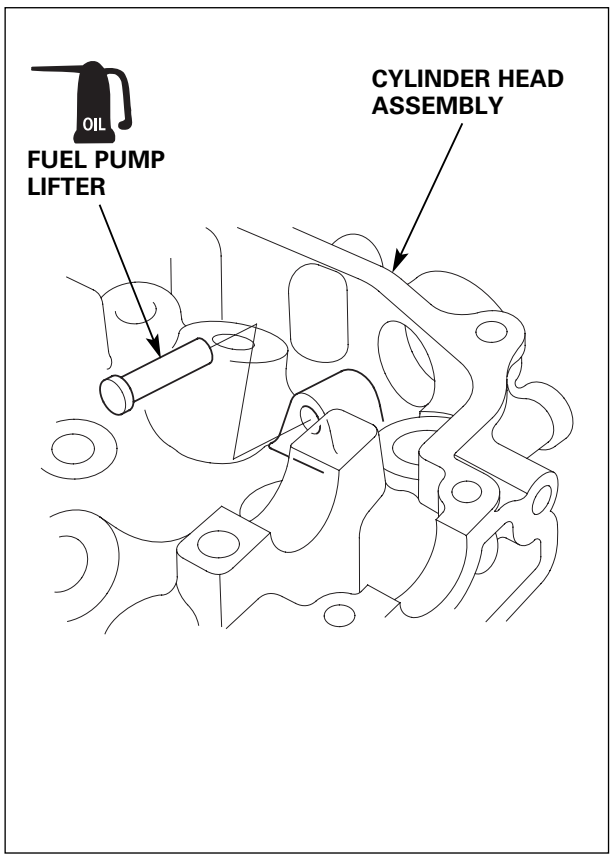
   • Tap each valve stem head straight down. Take care not to bend the valve.
   • Support the cylinder head with an engine table or equivalent to prevent damage to the valve.



© Honda Motor Co., Ltd.

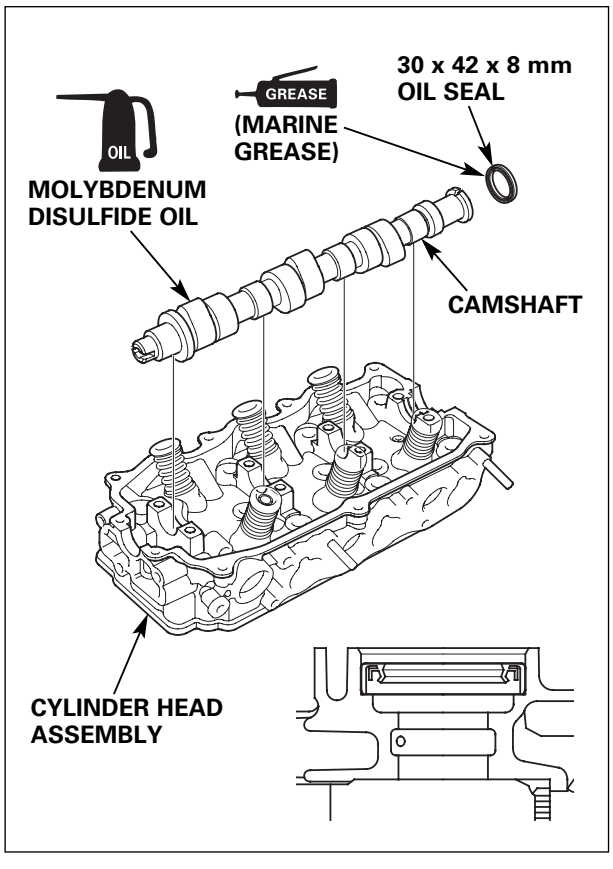
9章(A).qxp 2008/04/10 16:22 ページ 9-26

6) Apply engine oil to the fuel pump lifter and install it in the cylinder head assembly.



7) Apply molybdenum disulfide oil to the camshaft journal and cam face.
Apply marine grease to a new 30 x 42 x 8 mm oil seal lip, and install it on the camshaft.
Apply soapy water to the outer surface of the oil seal.

8) Install the camshaft in the cylinder head assembly with the groove in the CMP sensor installation part of the camshaft toward the cylinder head cover as shown.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-27

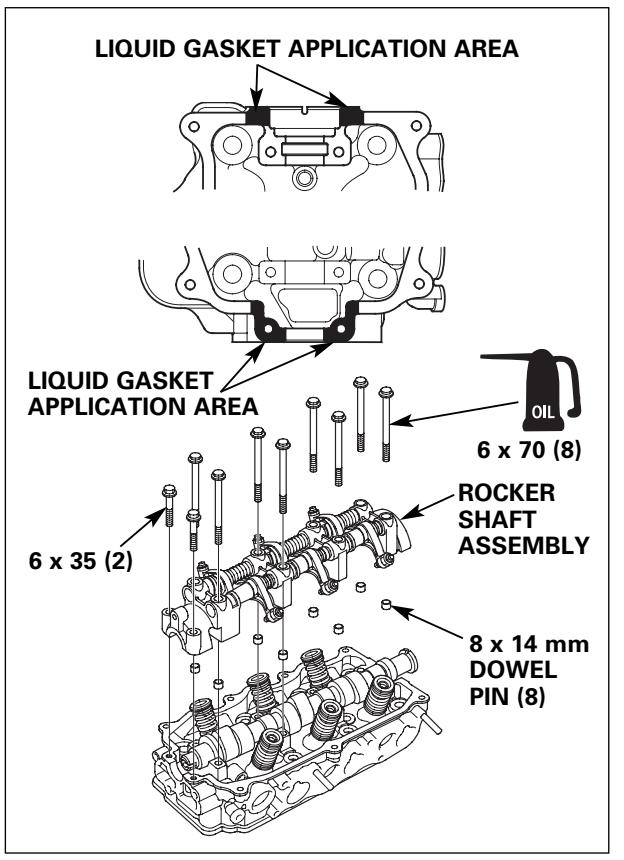
9) Thoroughly clean the parts of the cylinder head where the No.1 and No.4 cam holders are installed using the degreasing cleaning solvent.

10) Apply beads of liquid gasket (ThreeBond® #1141C or equivalent) to the indicated area of the cylinder head (where the No.1 and No.4 cam holders are installed).

11) Apply molybdenum disulfide oil to the rocker arm/camshaft contact surfaces.

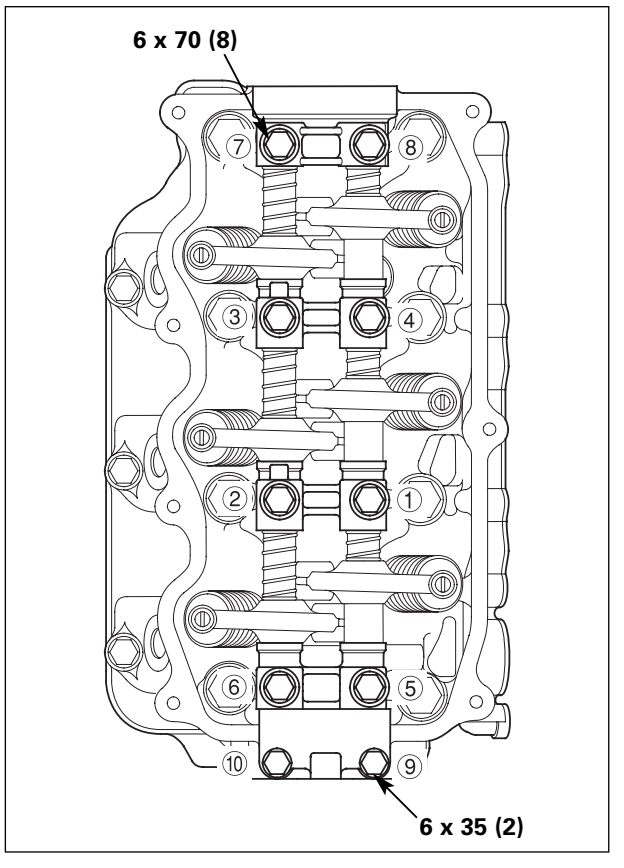
12) Set the eight 8 x 14 mm dowel pins on the cylinder head assembly, and install the rocker shaft assembly on the cylinder head assembly.
Remove the eight 6 x 70 mm flange bolts from the cam holders.

13) Apply engine oil to the threads and seat of the 6 x 70 mm flange bolts, and loosely tighten the eight 6 x 70 mm flange bolts and the two 6 x 35 mm flange bolts against the cam holder.



14) Tighten the eight 6 x 70 mm flange bolts and the two 6 x 35 mm flange bolts in two or three steps in the numbered sequence shown. Tighten to the specified torque.

TORQUE:
6 x 70 mm flange bolt: 14 N·m (1.4 kgf·m, 10 lbf·ft)
6 x 35 mm flange bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)

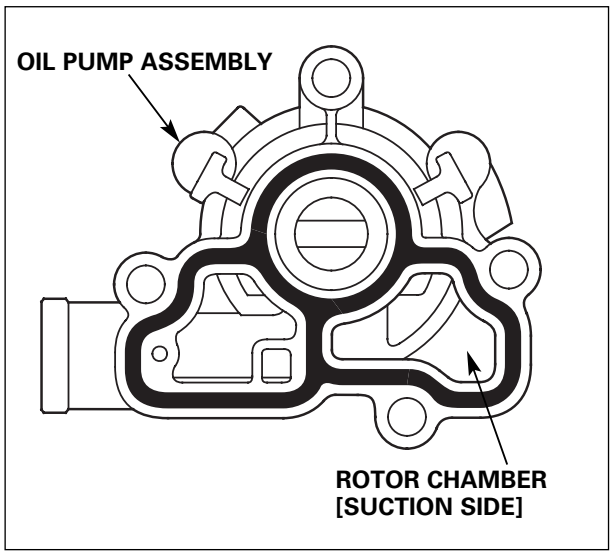


© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-28

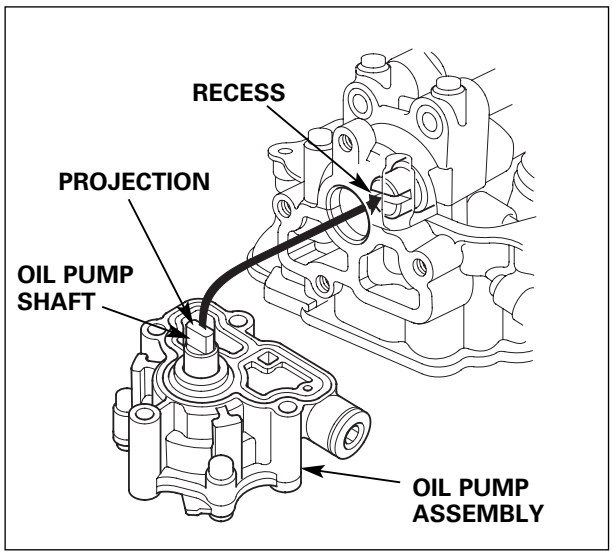
15) Apply engine oil to a new pump cover O-ring, and install it on the oil pump assembly.

16) Pour 0.005ℓ (1 Teaspoon) of engine oil into the rotor chamber [suction side] of the oil pump assembly.



17) Install the oil pump assembly on the cylinder head assembly while aligning the projection on the oil pump shaft with the recess in the camshaft.

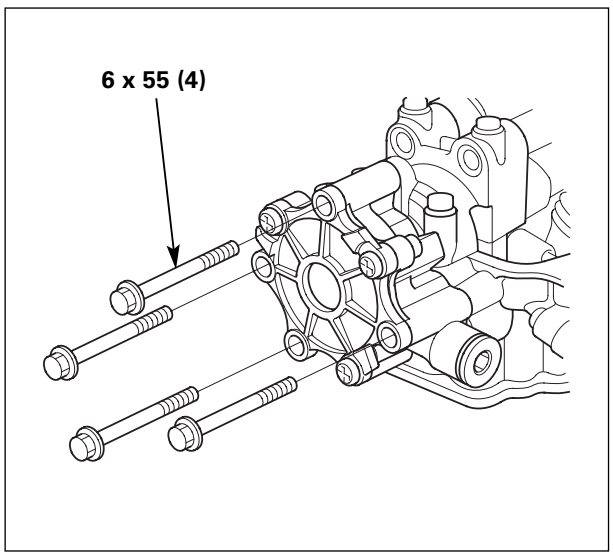
- Install quickly with care not to spill the engine oil from the oil pump assembly.



18) Tighten the four 6 x 55 mm flange bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)

19) Install the cylinder head assembly on the outboard motor (P. 9-29).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-29

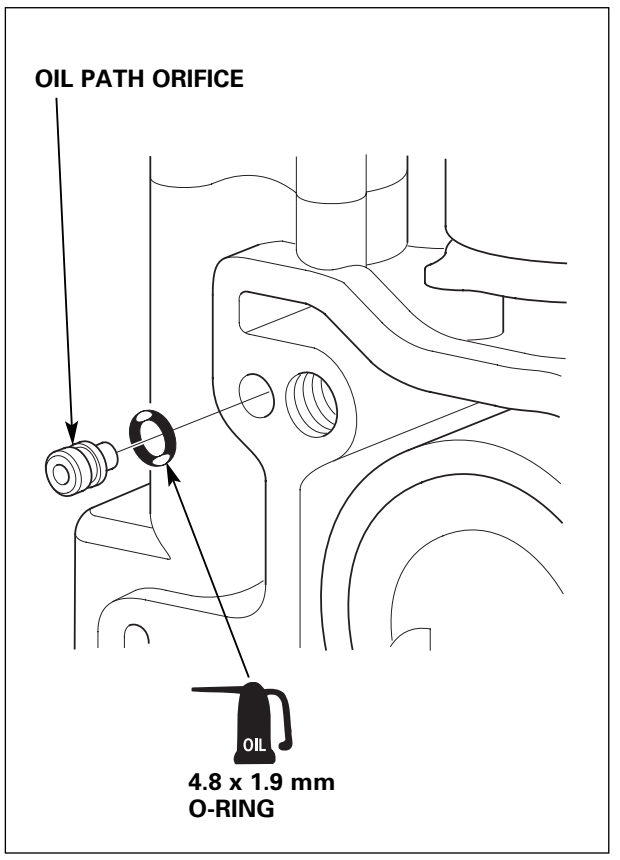
8. CYLINDER HEAD ASSEMBLY INSTALLATION

1) Clean the cylinder head and the cylinder block mating surfaces.

2) Clean the oil path orifice and the oil passage by blowing air.

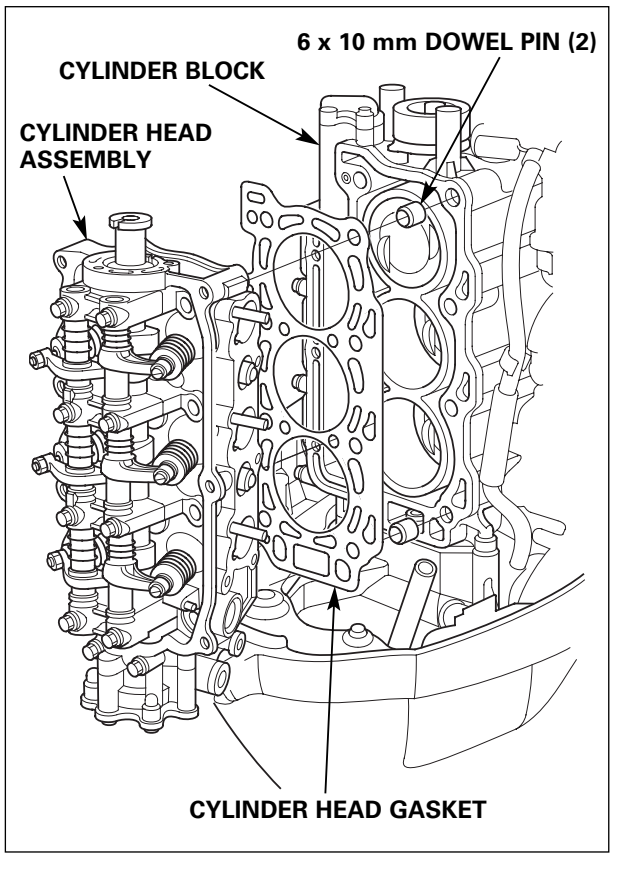
   • Take care not to blow off the oil path orifice.

   Apply engine oil to a new 4.8 x 1.9 mm O-ring and install it on the oil path orifice.
   Install the oil path orifice in the cylinder block.



3) Install the two 6 x 10 mm dowel pins on the cylinder block. Install a new cylinder head gasket on the cylinder block.

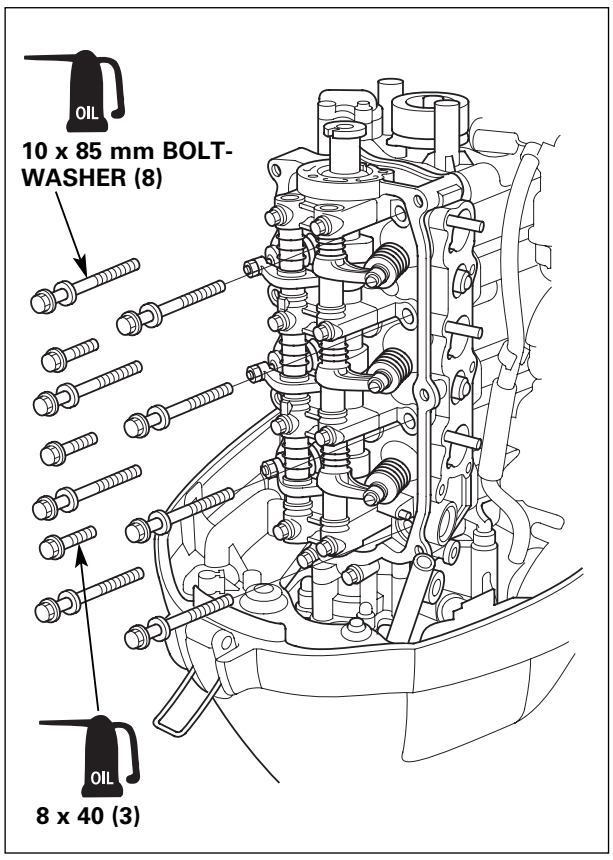
4) Install the cylinder head assembly on the cylinder block, aligning the dowel pin installation position of the cylinder head assembly with the corresponding position of the cylinder block securely.



© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-30

5) Apply engine oil to the threads and seats of the 10 x 85 mm bolt-washers and 8 x 40 mm flange bolts. Loosely tighten the eight 10 x 85 mm bolt-washers and the three 8 x 40 mm flange bolts on the cylinder head assembly.



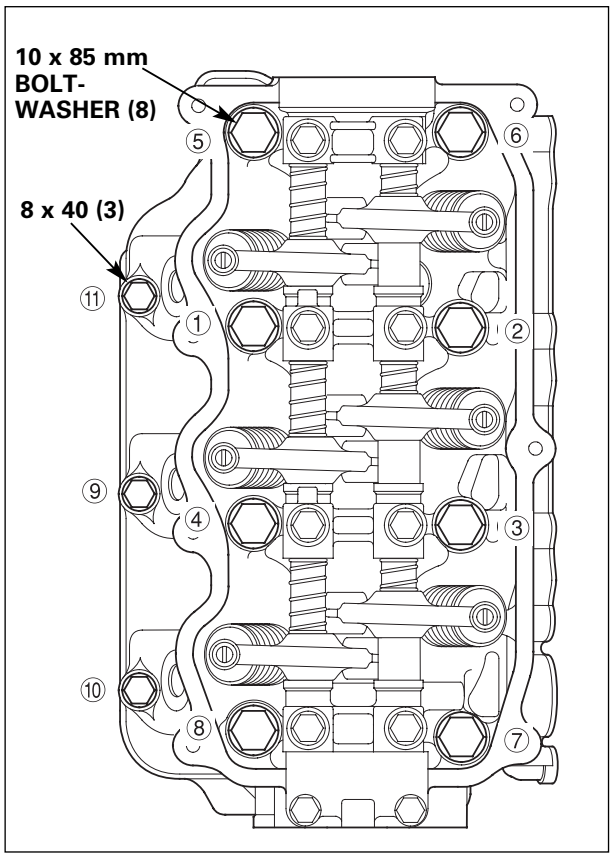
6) Tighten the eight 10 x 85 mm bolt-washers and the three 8 x 40 mm flange bolts in two or three steps in the numbered sequence shown. Tighten to the specified torque.
After tightening the 10 x 85 mm bolt-washers to the specified torque, mark the bolts and the cylinder head, then tighten the bolts further to 90° — 120° in the numbered sequence shown.

TORQUE:
10 x 85 mm bolt-washer: 40 N·m (4.1 kgf·m, 30 lbf·ft) + 90° — 120°
8 x 40 mm flange bolt: 27 N·m (2.8 kgf·m, 20 lbf·ft)

7) Install the following parts.
- Silencer/throttle body/intake manifold (P. 5-93)
- Camshaft pulley/CMP sensor (P. 7-26)
- Fuel strainer (low pressure side)/fuel pump (low pressure side)/fuel tube (P. 5-111)
- Alternator cover (P. 7-2)
- Engine cover (P. 4-2)

8) Adjust the valve clearance after assembly (P. 3-9).
Install the cylinder head cover (P. 9-31).

9) When the engine is started after adjustment, follow the starting procedure after assembly (P. 2-2).



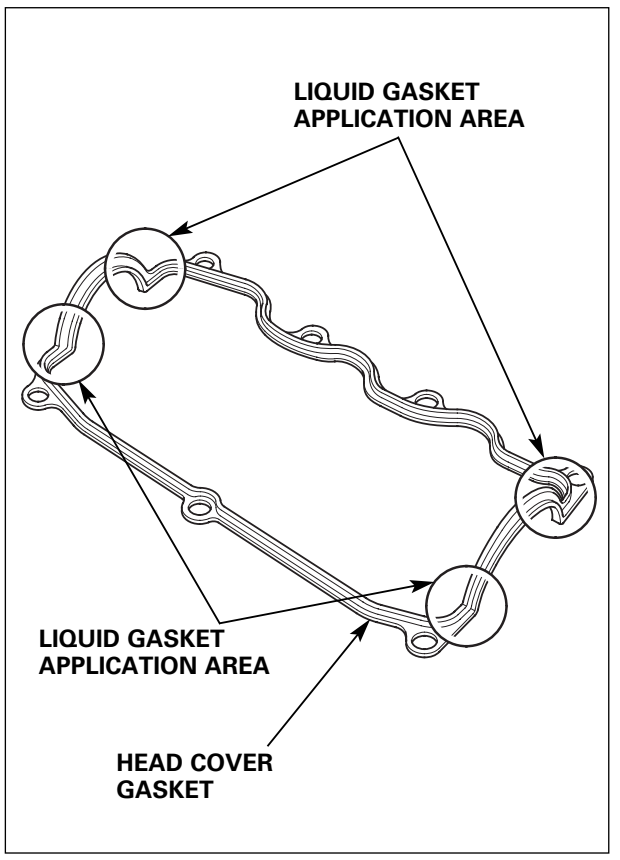
Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-31

9. CYLINDER HEAD COVER INSTALLATION

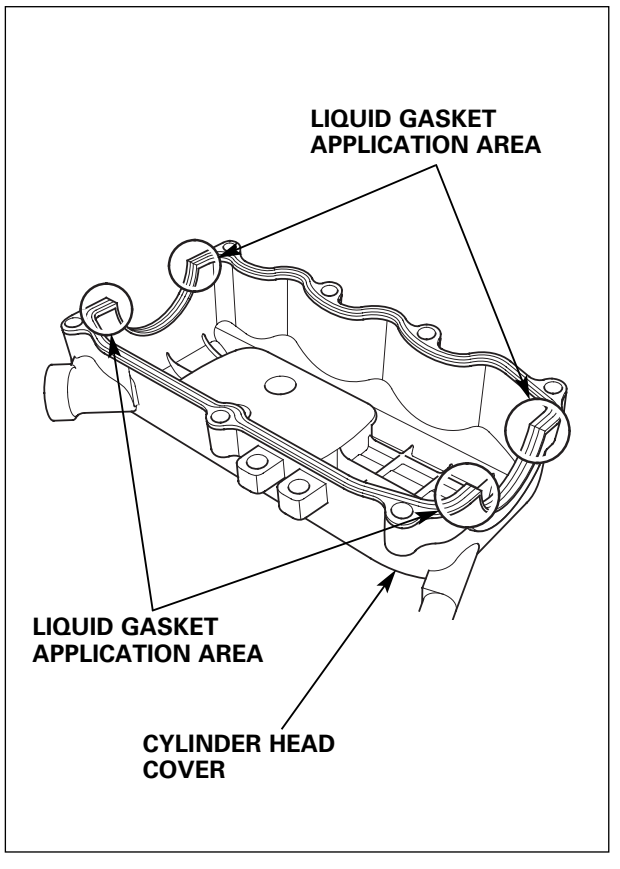
1) Clean the groove in the cylinder head cover and clean the head cover gasket.

2) Apply beads of liquid gasket (ThreeBond® #1201 or #1215 or equivalent) to the indicated area of the head cover gasket, and install it on the cylinder head cover.



3) Clean the cylinder head/cylinder head cover mating surfaces thoroughly using the degreasing cleaning solvent.

4) Apply beads of liquid gasket (ThreeBond® #1201 or #1215 or equivalent) to the indicated area of the head cover gasket.



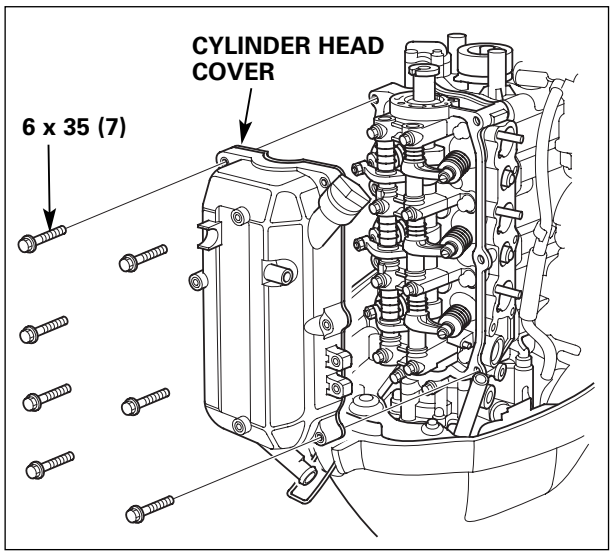
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-32

5) Install the cylinder head cover on the cylinder head.

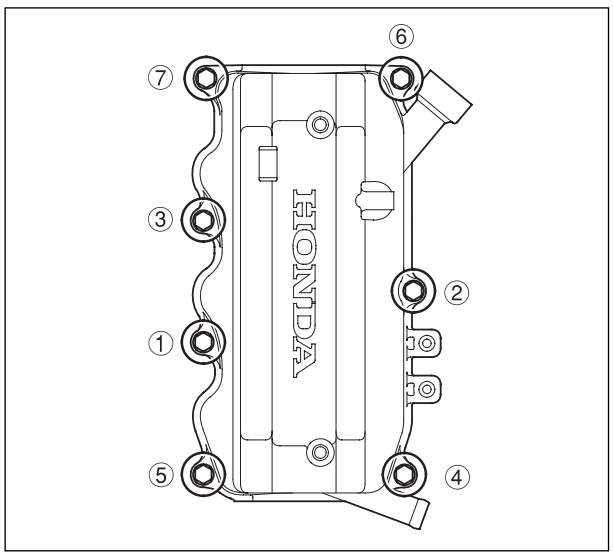
6) After installation, move the cylinder head cover lightly from side to side, making sure that the gasket seats properly.

7) Loosely tighten the seven 6 x 35 mm flange bolts on the cylinder head cover.

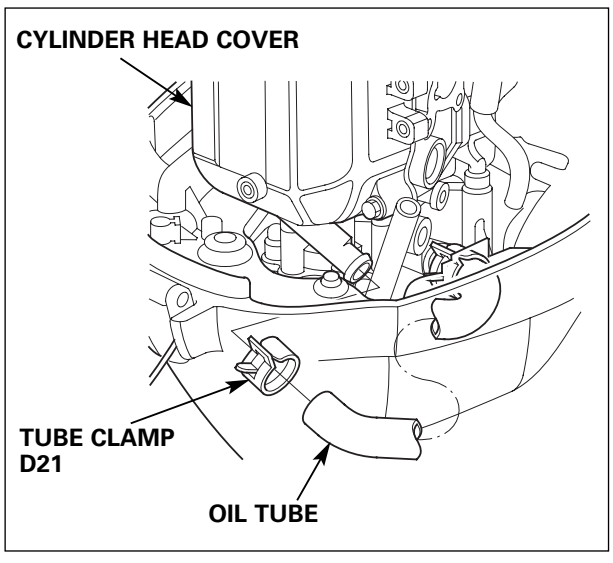


8) Tighten the seven 6 x 35 mm flange bolts in two or three steps in the numbered sequence shown. Tighten to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



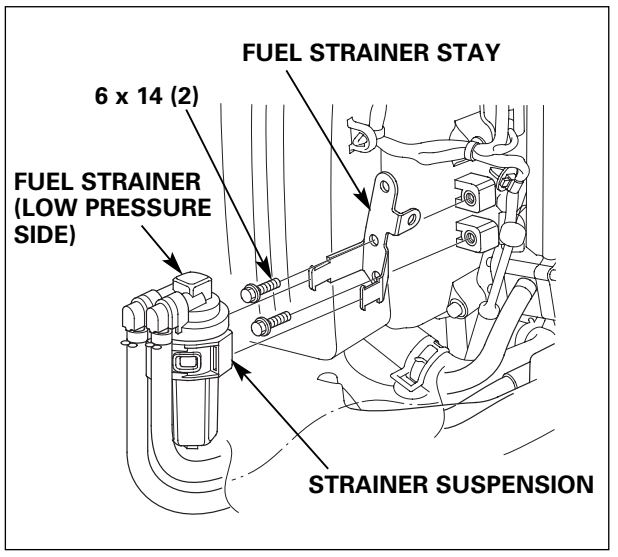
9) Insert the oil tube up to the base of the cylinder head cover. Clamp the oil tube securely using the tube clamp D21.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-33

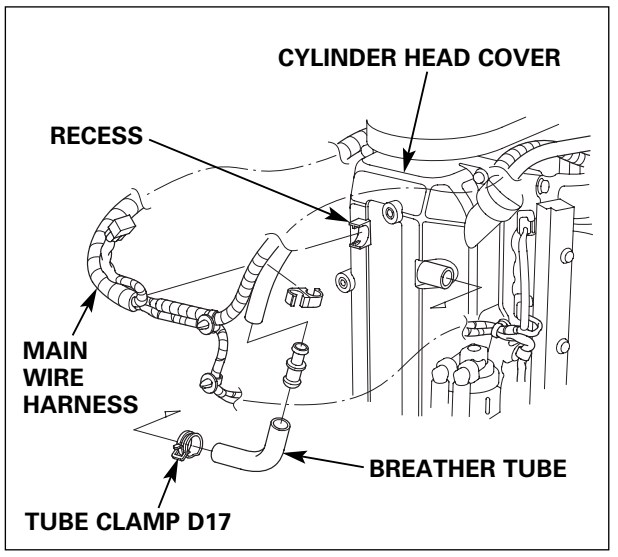
10) Set the fuel strainer stay on the cylinder head cover, and tighten the two 6 x 14 mm flange bolts securely.
Install the fuel strainer (low pressure side) and the strainer suspension as a set on the fuel strainer stay.



11) Insert the breather tube up to the base of the cylinder head cover, and clamp with the tube clamp D17.
Install the main wire harness in the recess in the cylinder head cover.

- Check that fuel tube clamp A, which clamps breather tube B and the main wire harness, is set on the painted part of breather tube B securely (P. 2-76).

12) Install the following parts.
- Ignition coil/regulator/rectifier (P. 18-23)
- Alternator cover (P. 7-2)
- Engine cover (P. 4-2)



© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-34

10. OIL PUMP

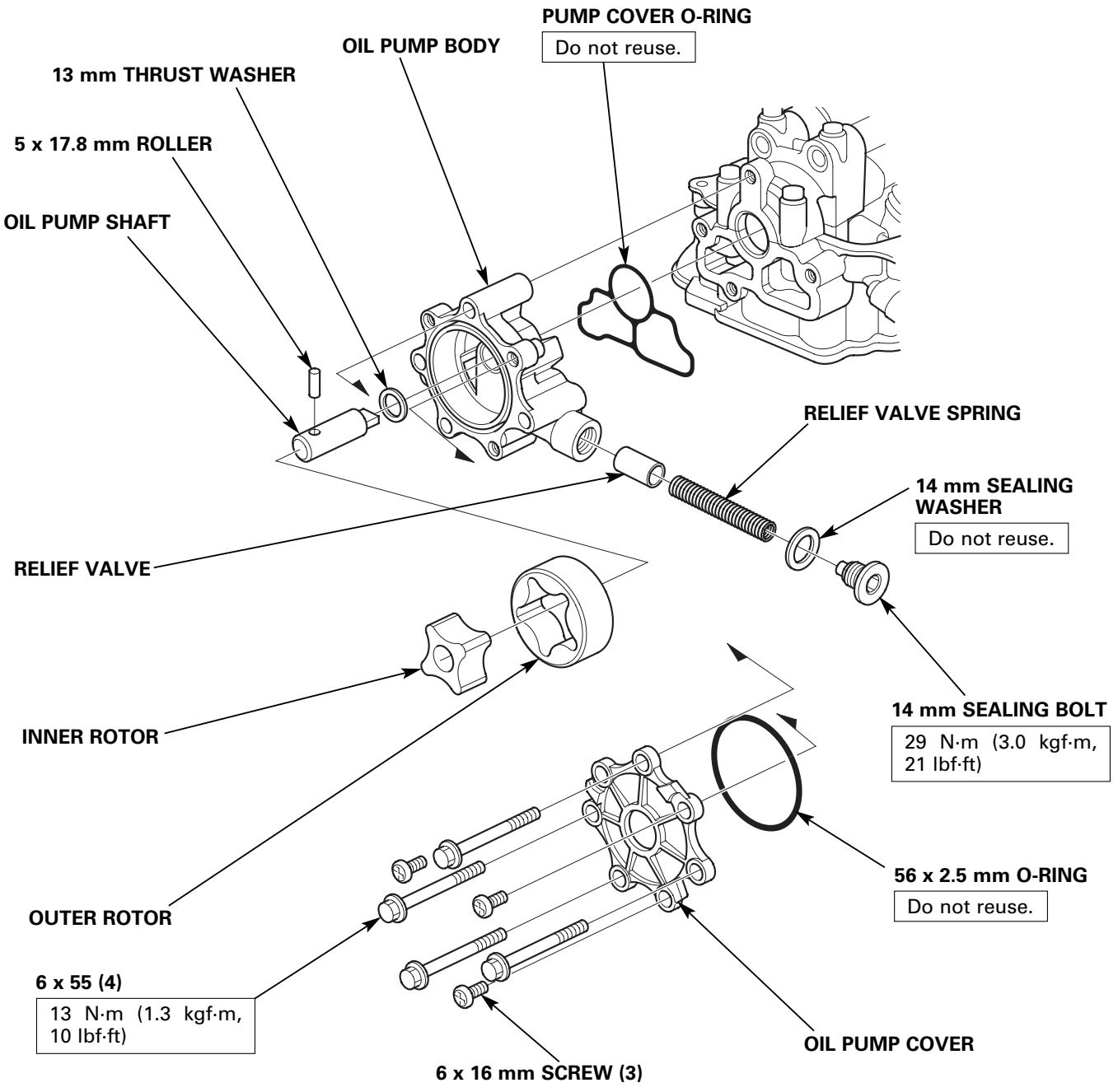
a. REMOVAL

1) Remove the cylinder head assembly from the outboard motor (P. 9-4).

2) Remove the four 6 x 55 mm flange bolts, and remove the oil pump assembly and the pump cover O-ring. Replace the O-ring with a new one on reassembly.

b. DISASSEMBLY

Remove the three 6 x 16 mm screws, and remove the oil pump cover.
Note the direction the inner rotor faces for reassembly.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-35

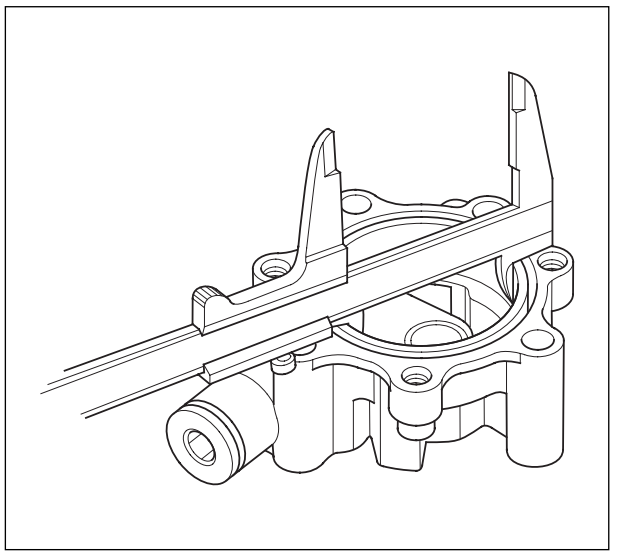
c. INSPECTION

• OIL PUMP BODY I.D.

Measure the oil pump body I.D.

Standard	Service limit
50.15 — 50.18 mm (1.9744 — 1.9756 in)	50.20 mm (1.9764 in)

If the measurement exceeds the service limit, replace the oil pump body with a new one.

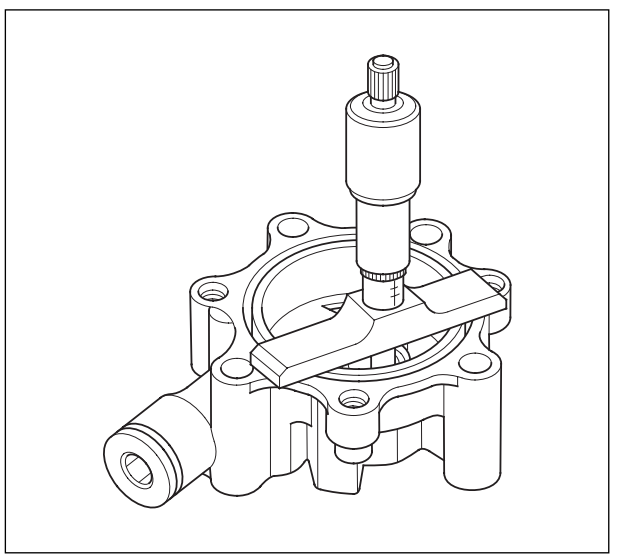


• OIL PUMP BODY DEPTH

Measure the oil pump body depth.

Standard	Service limit
17.02 — 17.05 mm (0.670 — 0.671 in)	17.09 mm (0.673 in)

If the measurement exceeds the service limit, replace the oil pump with a new one.

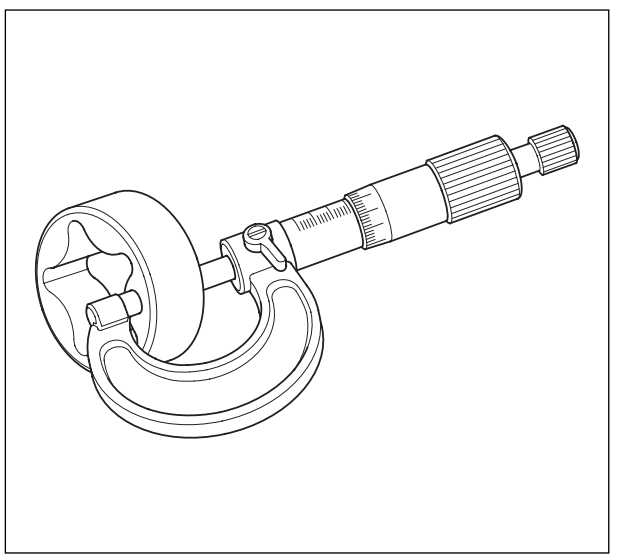


• OUTER ROTOR HEIGHT

Measure the outer rotor height.

Standard	Service limit
16.98 — 17.00 mm (0.6685 — 0.6693 in)	16.93 mm (0.6665 in)

If the measurement is less than the service limit, replace the outer rotor with a new one.



© Honda Motor Co., Ltd.

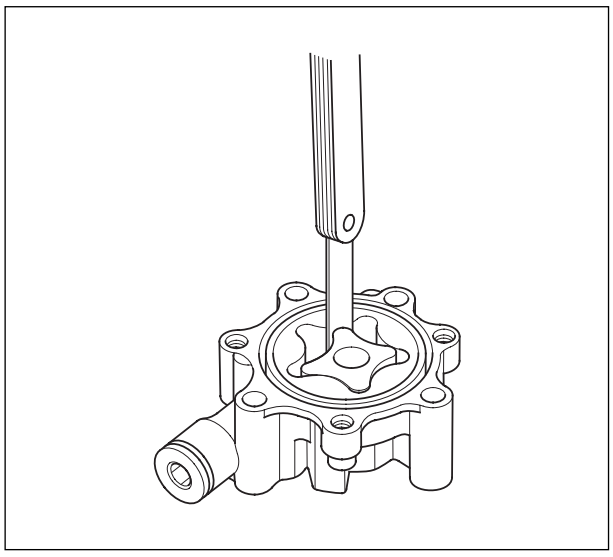
9章(A).qxp 2008/04/10 16:22 ページ 9-36

• INNER ROTOR-TO-OUTER ROTOR CLEARANCE

Measure the inner rotor-to-outer rotor clearance.

Standard	Service limit
0.15 mm max. (0.669 in)	0.20 mm (0.667 in)

If the measurement exceeds the service limit, replace the inner rotor and the outer rotor with the new ones as a set.

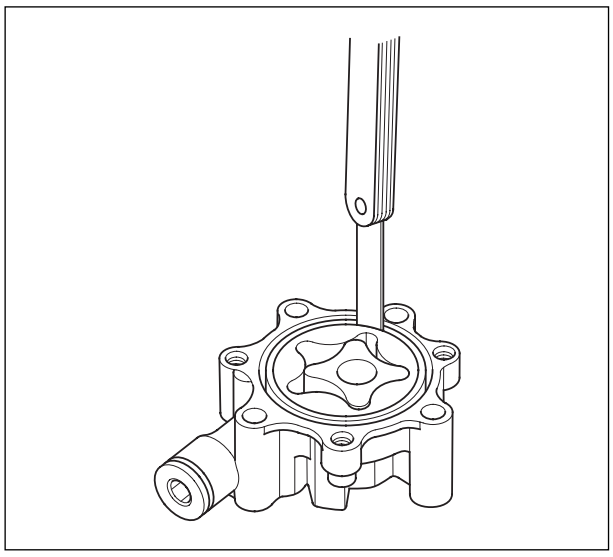


• OUTER ROTOR-TO-OIL PUMP BODY CLEARANCE

Measure the outer rotor-to-oil pump clearance.

Standard	Service limit
0.15 — 0.22 mm (0.006 — 0.009 in)	0.26 mm (0.010 in)

If the measurement exceeds the service limit, replace the outer rotor and the oil pump body with the new ones as a set.

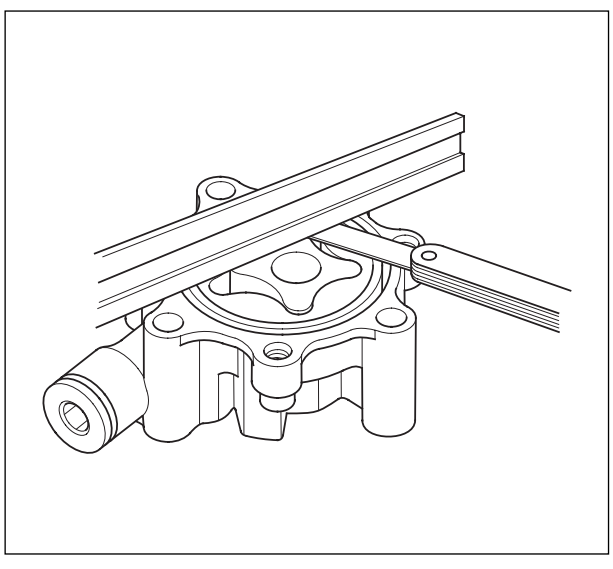


• OUTER ROTOR-TO-OIL PUMP BODY SIDE CLEARANCE

Measure the outer rotor-to-oil pump body side clearance.

Standard	Service limit
0.02 — 0.07 mm (0.001 — 0.003 in)	0.10 mm (0.004 in)

If the measurement exceeds the service limit, replace the outer rotor and the oil pump body with the new ones as a set.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-37

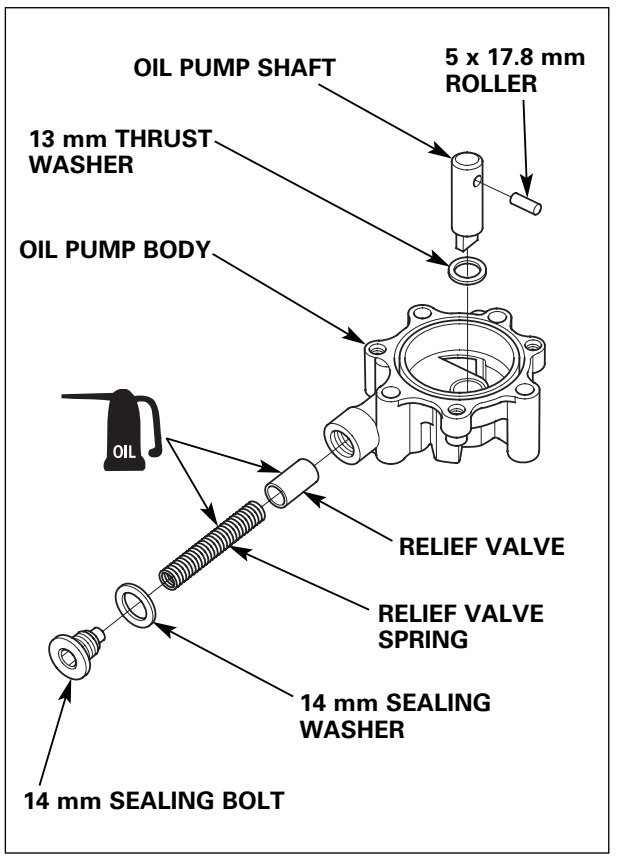
d. REASSEMBLY

1) Check the relief valve for scores, scratches or other damage. Apply engine oil to the relief valve and the relief valve spring.

2) Set the relief valve and the relief valve spring in the oil pump body. Set a new 14 mm sealing washer on the 14 mm sealing bolt, and tighten the 14 mm sealing bolt to the specified torque.

   TORQUE: 29 N·m (3.0 kgf·m, 21 lbf·ft)

3) Insert the 5 x 17.8 mm roller into the oil pump shaft, and install the 13 mm thrust washer and the oil pump shaft in the oil pump body.

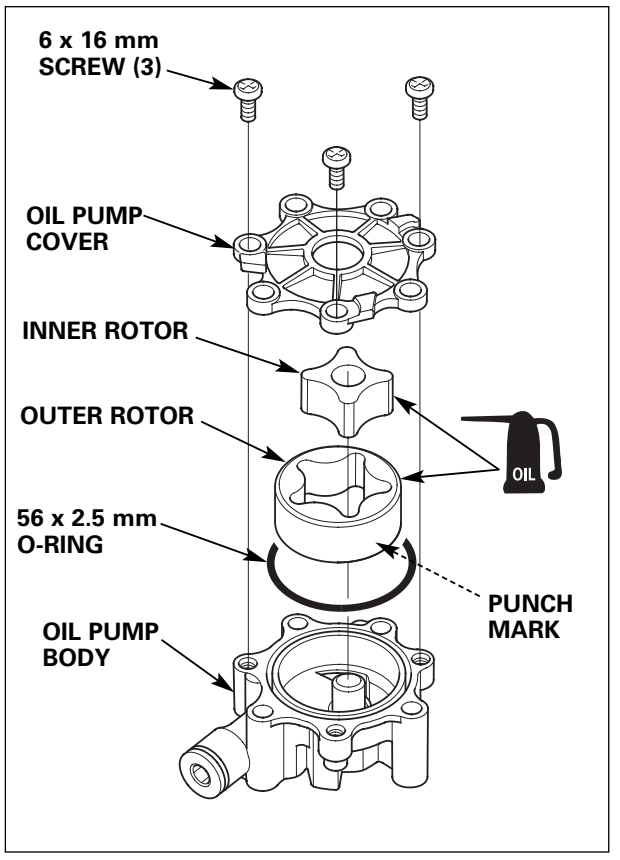


4) Clean the inner rotor and the outer rotor thoroughly.
   Apply engine oil to the outer rotor, and install it with the punch mark toward the oil pump body.

5) Apply engine oil to the inner rotor, and install it in the oil pump body.

   • Install the inner rotor, placing it in the same direction it faced before disassembly.

   Apply engine oil to a new 56 x 2.5 mm O-ring, and install it on the oil pump body.
   Install the oil pump cover on the oil pump body, and tighten the three 6 x 16 mm screws securely.
   After installation, turn the oil pump shaft and check whether the rotor moves smoothly.

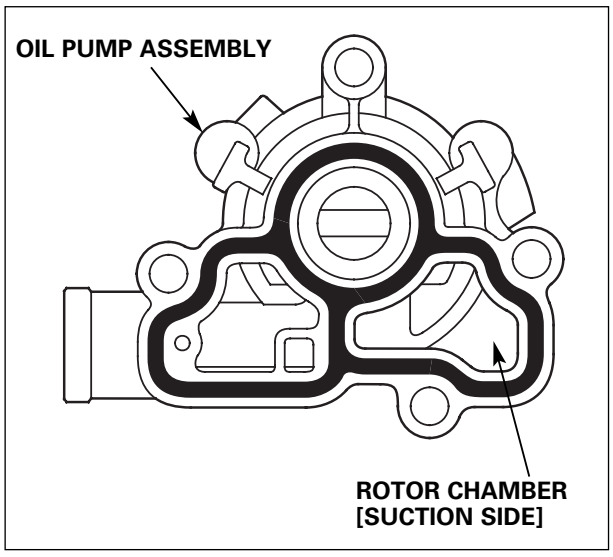


© Honda Motor Co., Ltd.

9章(A).qxp 2008/04/10 16:22 ページ 9-38

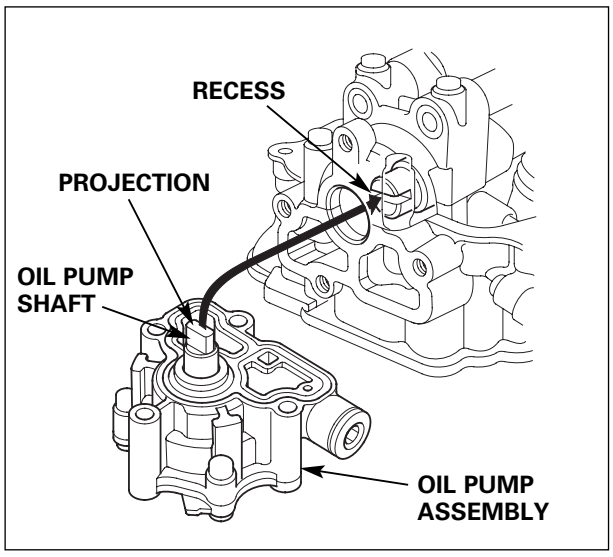
6) Apply engine oil to a new pump cover O-ring and install it on the oil pump assembly.

7) Pour 0.005ℓ (1 teaspoon) of engine oil into the rotor chamber [suction side] of the oil pump assembly.



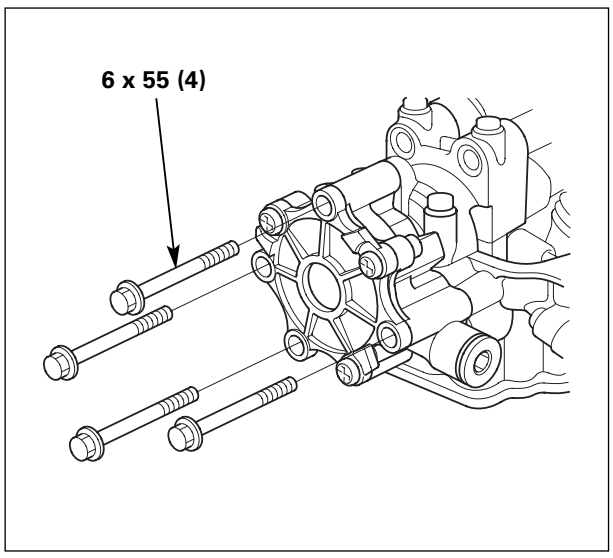
8) Install the oil pump assembly on the cylinder head assembly while aligning the projection on the oil pump shaft with the recess in the camshaft.

- Install quickly with care not to spill the engine oil from the oil pump assembly.



9) Tighten the four 6 x 55 mm flange bolts securely.

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)



e. INSTALLATION

Install the cylinder head assembly on the outboard motor (P. 9-29).

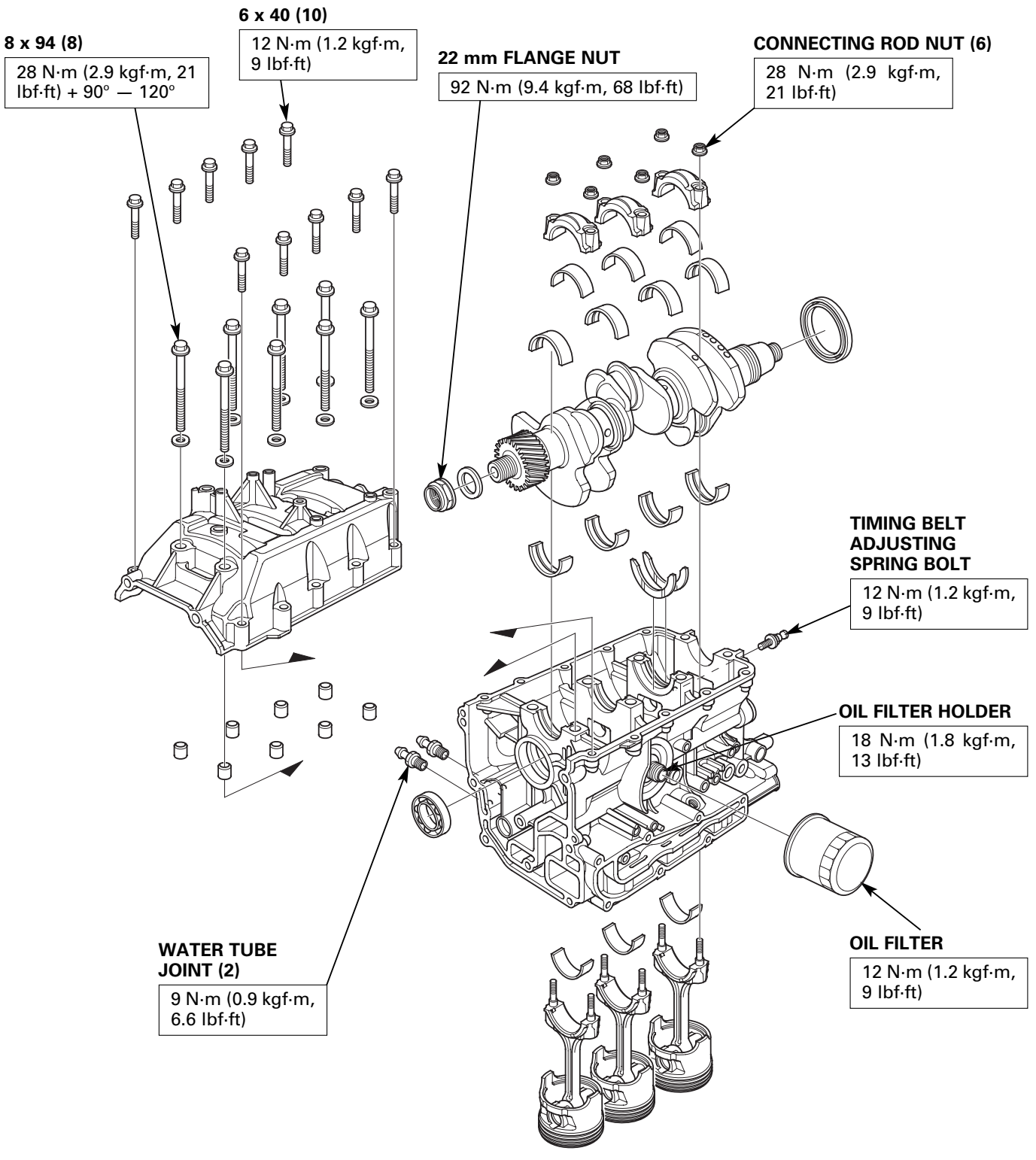
Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-1

10. CRANKCASE/CYLINDER BLOCK/ CRANKSHAFT/PISTONS

BF40D·BF50D

1. DISASSEMBLY..... 10-2
2. INSPECTION..... 10-10
3. BEARING SELECTION..... 10-16
4. PRIMARY DRIVE GEAR SELECTION 10-20
5. REASSEMBLY..... 10-21



© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-2

1. DISASSEMBLY

a. CRANKCASE/CRANKSHAFT/CYLINDER BLOCK

Store the removed parts (e.g. bearings, connecting rods, rod caps, bolts) securely, grouping them for each cylinder.
Remove the following part.
- Engine cover (P. 4-2)

1) Move the shift to the "N" (Neutral) position.
2) Turn the alternator rotor counterclockwise to bring the No.1 cylinder piston to the top dead center of its compression stroke (P. 3-10).

   Remove the following parts.
   - Alternator/timing belt (P. 7-3)
   - Vapor separator (P. 5-98)
   - Air vent strainer/air vent tube (P. 5-114)
   - Cylinder head assembly (P. 9-4)
   - Oil filter (P. 3-5)
   - Electric parts/main wire harness (Section 18)

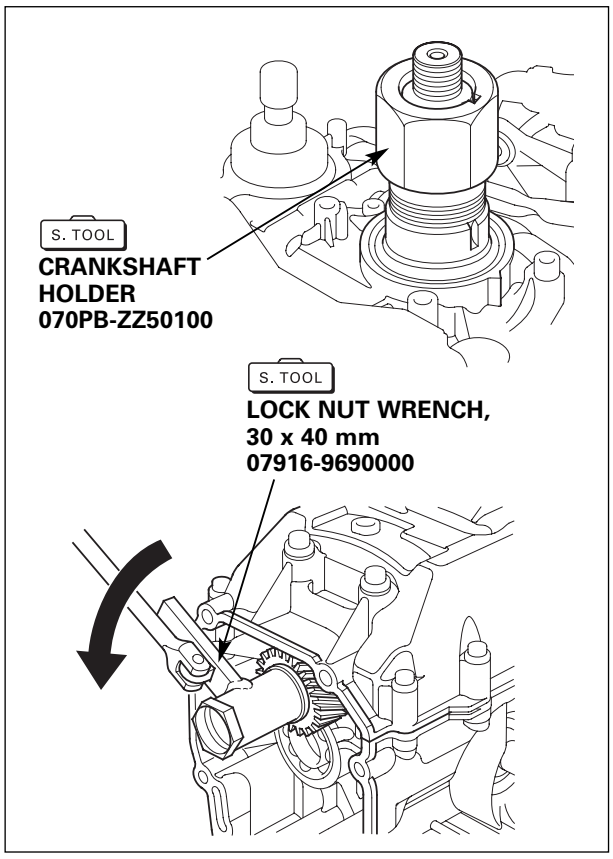
3) Remove the engine from the outboard motor (P. 6-2).
4) Raise the locking lug of the 22 mm flange nut.
5) Set the special tool on the alternator rotor side of the crankshaft as shown to hold the crankshaft.

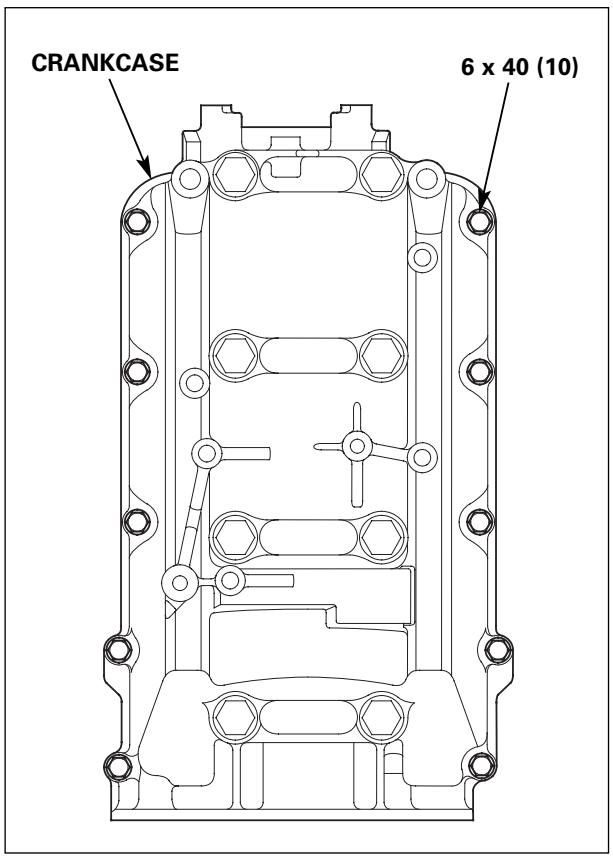
   TOOL:
   Crankshaft holder 070PB-ZZ50100

6) Remove the 22 mm flange nut and the 22 mm washer using the special tool.
   Replace the 22 mm flange nut with a new one on reassembly.

   TOOL:
   Lock nut wrench, 30 x 40 mm 07916-9690000

7) Remove the ten 6 x 40 mm flange bolts from the crankcase.



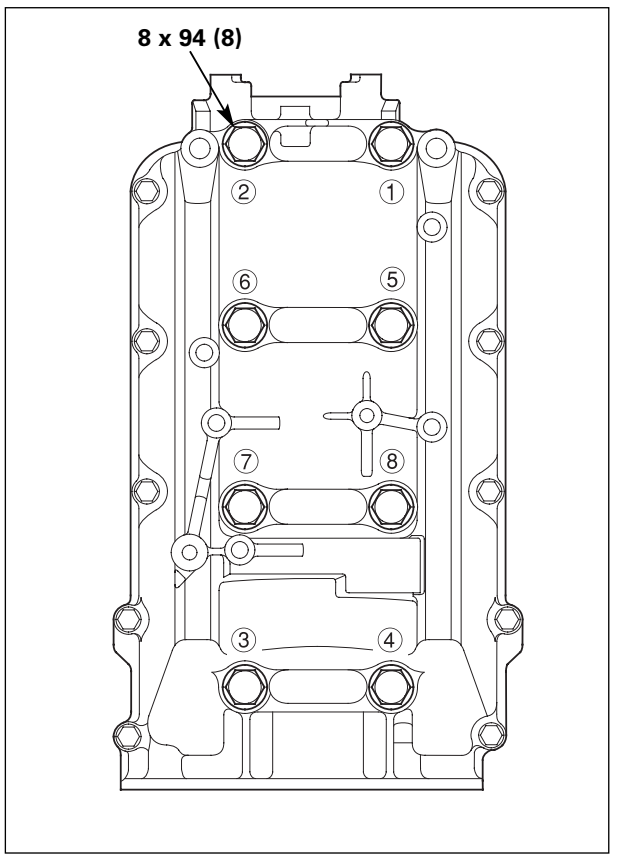


Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-3

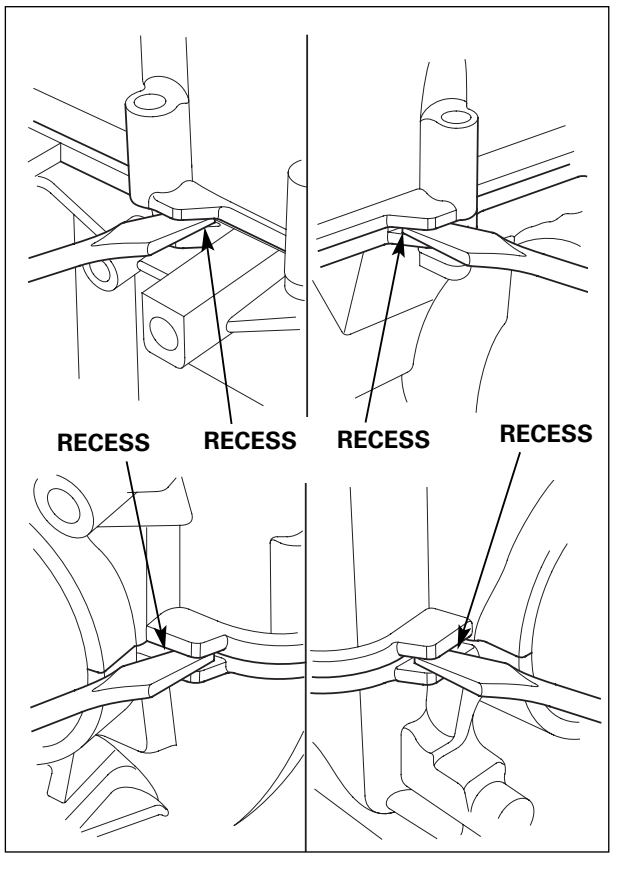
8) Loosen the eight 8 x 94 mm flange bolts in two or three steps in the numbered sequence shown.

9) Remove the eight 8 x 94 mm flange bolts and the eight 8 mm washers from the crankcase.



10) Insert a screwdriver into the recesses in the crankcase and separate the crankcase little by little.

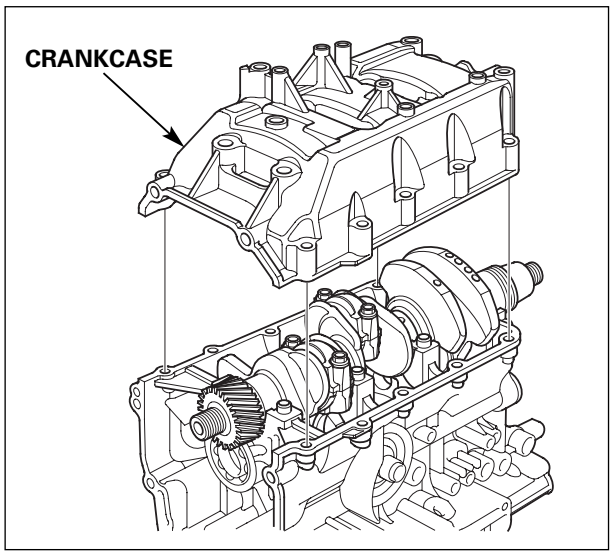
- Do not damage the crankcase/cylinder block mating surfaces.



© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-4

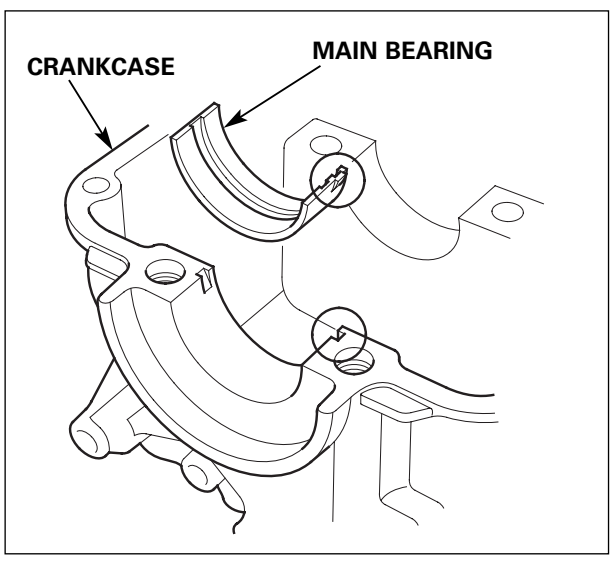
11) Remove the crankcase from the cylinder block.



12) Check each main bearing in the crankcase for damage (scores, scratches, etc.) and replace it with a new one if necessary.

13) Remove the four main bearings from the crankcase.

- Store the removed main bearings separately by its main journal.



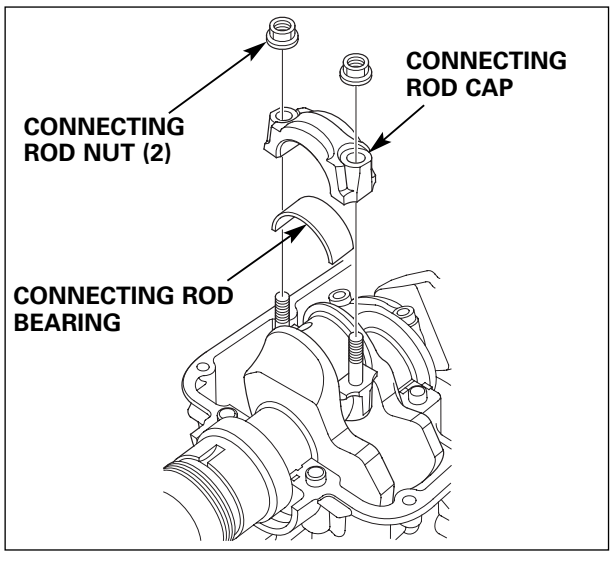
14) Check that the piston is at the bottom dead center of its compression stroke.
If not, turn the crankshaft to bring the piston to the bottom dead center of its compression stroke.

15) Remove the connecting rod nut, and remove the connecting rod cap assembly.

16) Check the connecting rod bearing for damage (scores, scratches, etc.), and replace it with a new one if necessary.

17) Remove the connecting rod bearing from the connecting rod cap.

- Store the connecting rod cap and the connecting rod bearing separately by its cylinder.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-5

18) Remove the crankshaft from the cylinder block with care not to damage the journal.

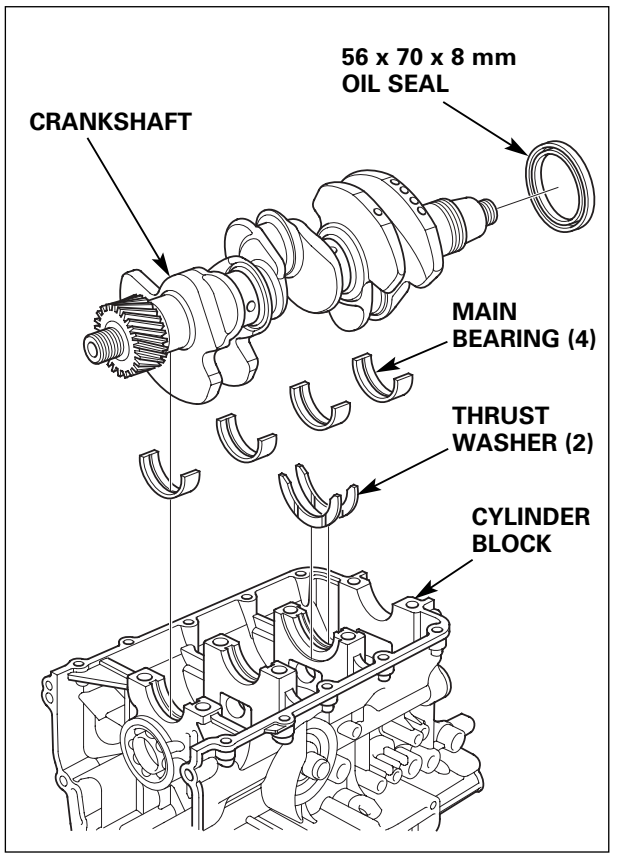
19) Remove the 56 x 70 x 8 mm oil seal from the crankshaft. Replace the oil seal with a new one on reassembly.

20) Remove the two thrust washers from the cylinder block. Check the thrust washers for damage (scores, scratches, etc.) and replace them with the new ones if necessary.

21) Check each main bearing for damage (scores, scratches, etc.) and replace it with a new one if necessary.

22) Remove the four main bearings from the cylinder block.

- Store the removed main bearings separately by its journal.

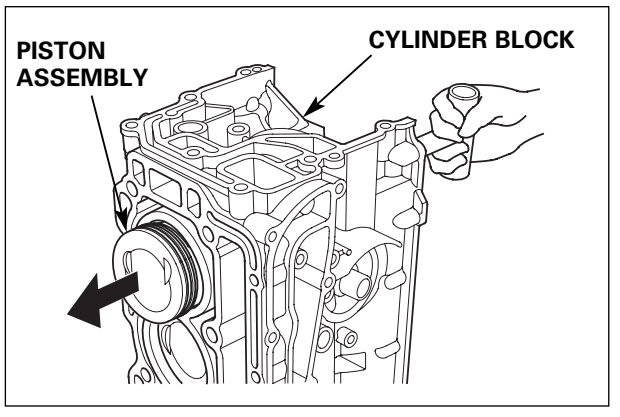


23) Remove the piston assembly from the cylinder by pushing the piston assembly with the handle of a hammer as shown.

- Store the removed piston assembly components separately by its cylinder.

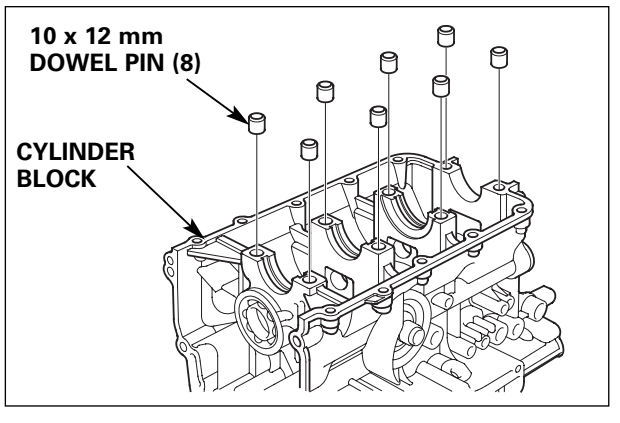
NOTICE

- *Before removing the piston assembly, remove the carbon deposits from the cylinder. Be careful not to damage the piston.*
- *Do not damage the cylinder with the connecting rod.*



24) Check the 10 x 12 mm dowel pins for deformation and damage, and replace them with the new ones if necessary.

25) Remove the eight 10 x 12 mm dowel pins from the cylinder block.
Replace the dowel pins with the new ones on reassembly.

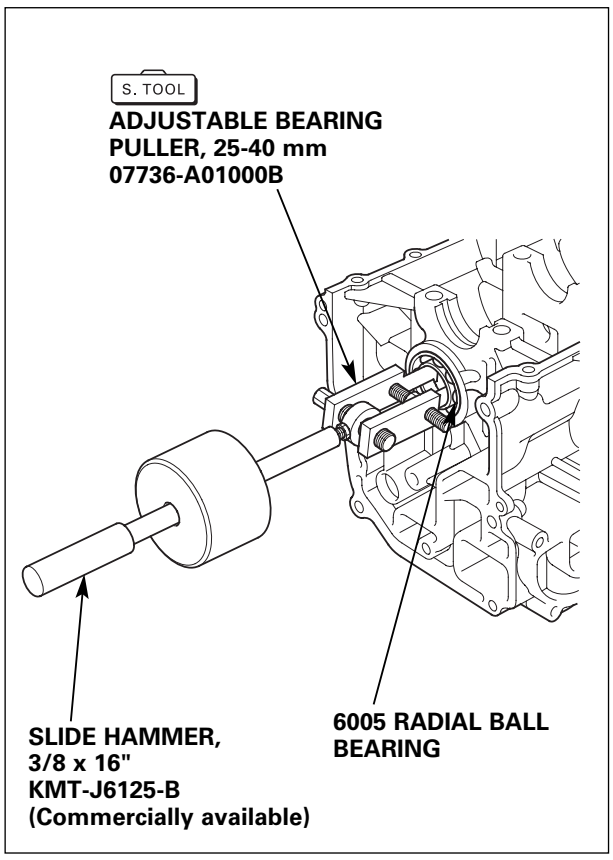


© Honda Motor Co., Ltd.

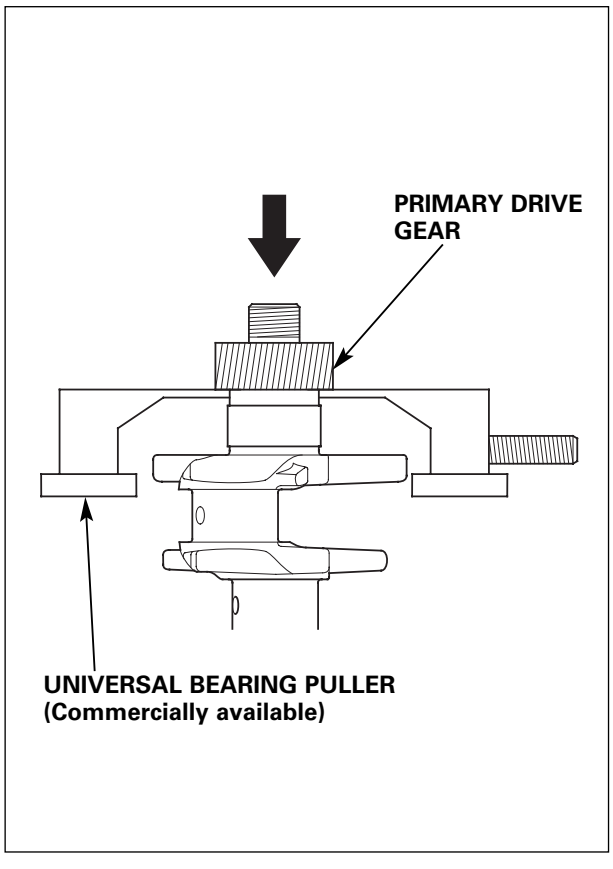
10章(A).qxp 2008/04/10 17:16 ページ 10-6

26) Check the 6005 radial ball bearing for abnormal noise and play, and replace it with a new one if necessary.
Remove the 6005 radial ball bearing from the cylinder block using the special tools as shown.
Replace the bearing with a new one on reassembly.

TOOL:
Adjustable bearing puller, 25-40 mm 07736-A01000B
Must be used with commercially available slide hammer, 3/8-16".



b. PRIMARY DRIVE GEAR
Remove the primary drive gear from the crankshaft using the hydraulic press as shown.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

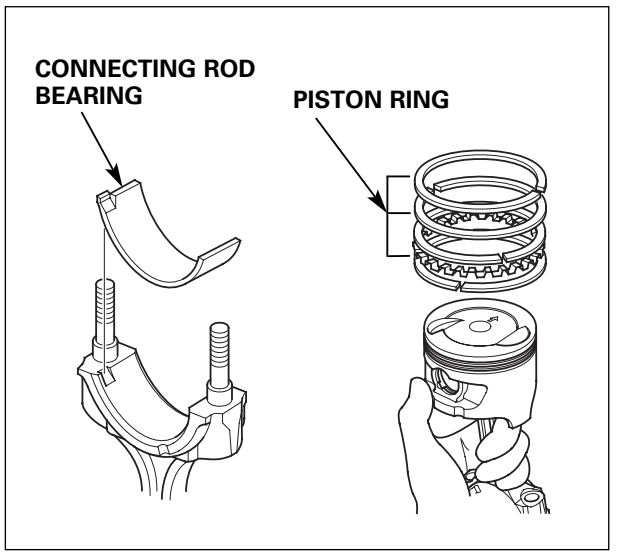
10章(A).qxp 2008/04/10 17:16 ページ 10-7

c. PISTON ASSEMBLY

1) Check the connecting rod bearing for damage (scores, scratches, etc.) and replace it with a new one if necessary.

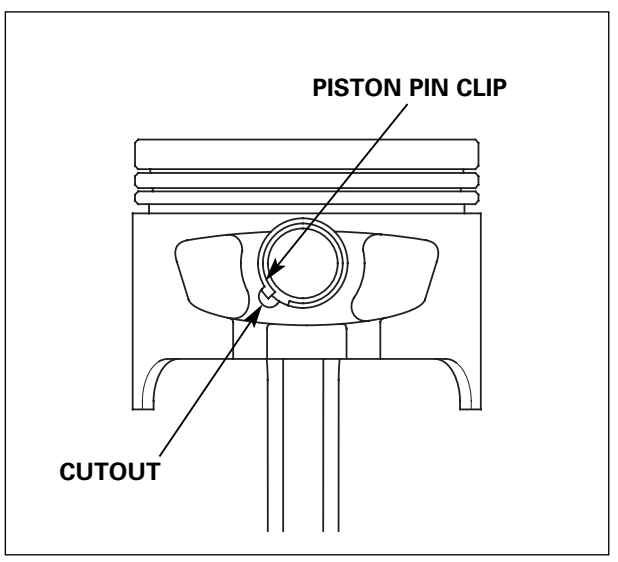
2) Remove the connecting rod bearing and the piston rings from the piston assembly.
Check the piston rings for damage (scores, scratches, etc.) and replace them with a new ones if necessary.

- Store the removed connecting rod bearing and the piston ring grouped by the piston.
- Do not expand the piston ring excessively as it can break easily.
- Do not damage the piston with the piston ring.



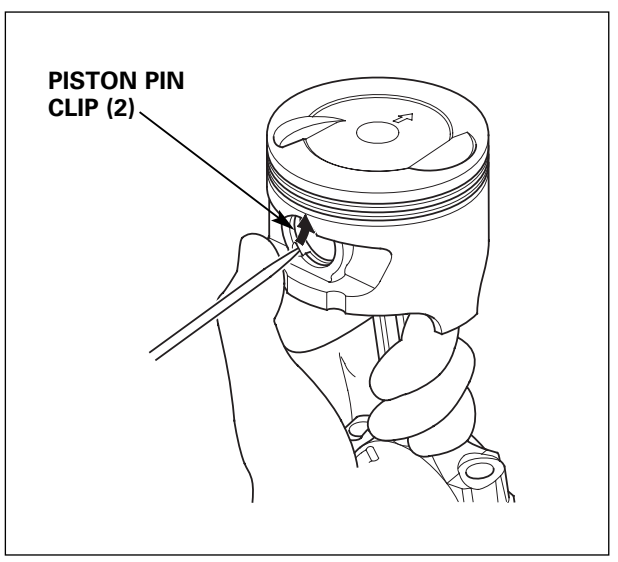
3) Apply engine oil to the piston pin clip, and align the end gap of the piston pin clip with the cutout in the piston pin bore.

- Do not damage the piston pin clip installation groove.



4) Remove the piston pin clips installed on both sides of the piston through the cutout in the piston pin.
Remove the piston pin.
Replace the piston pin clips with new ones on reassembly.

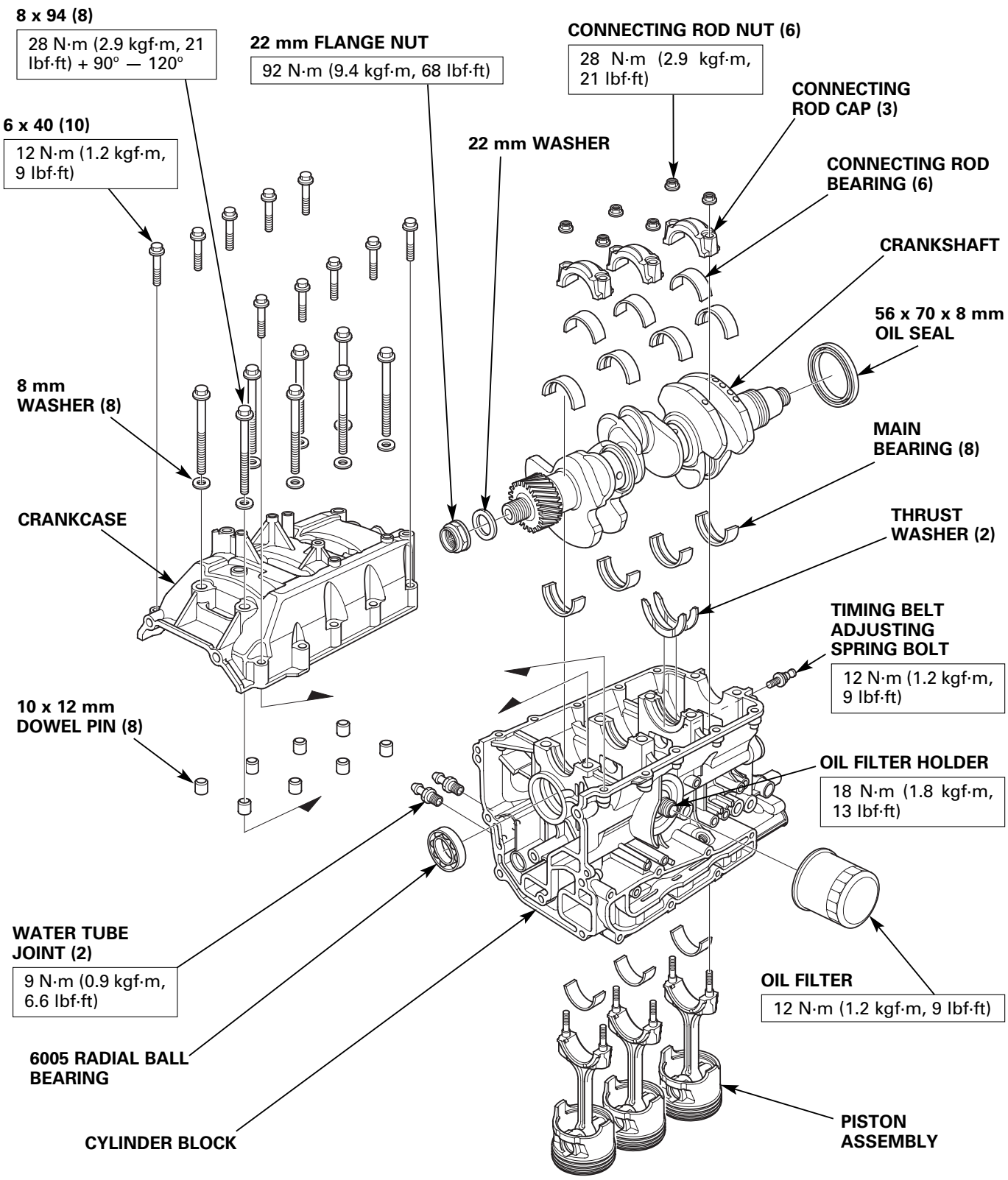
- Wear eye protection as the piston pin clips can pop out.



© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-8

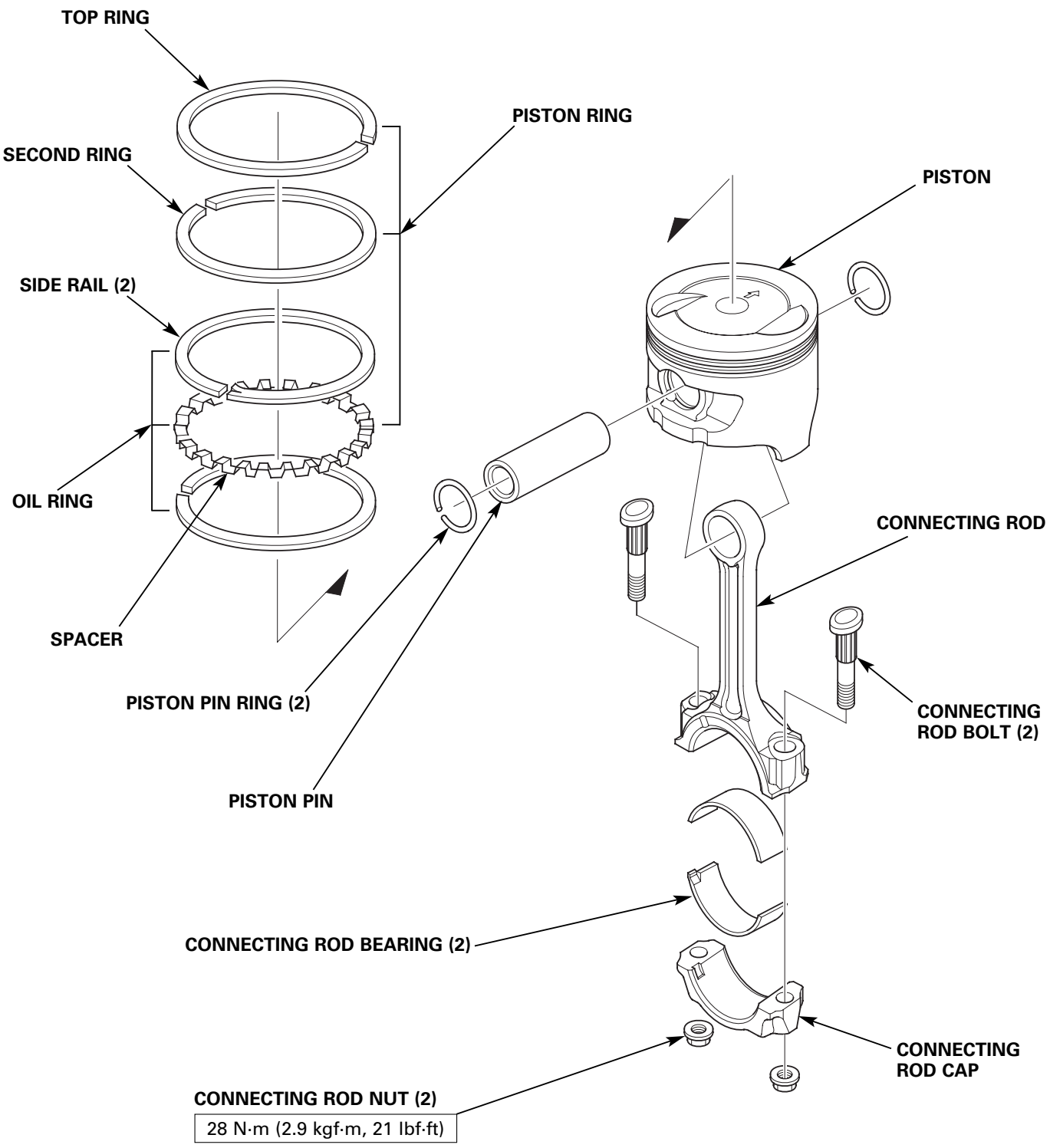
COMPONENT DRAWING



Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-9

COMPONENT DRAWING



© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-10

2. INSPECTION

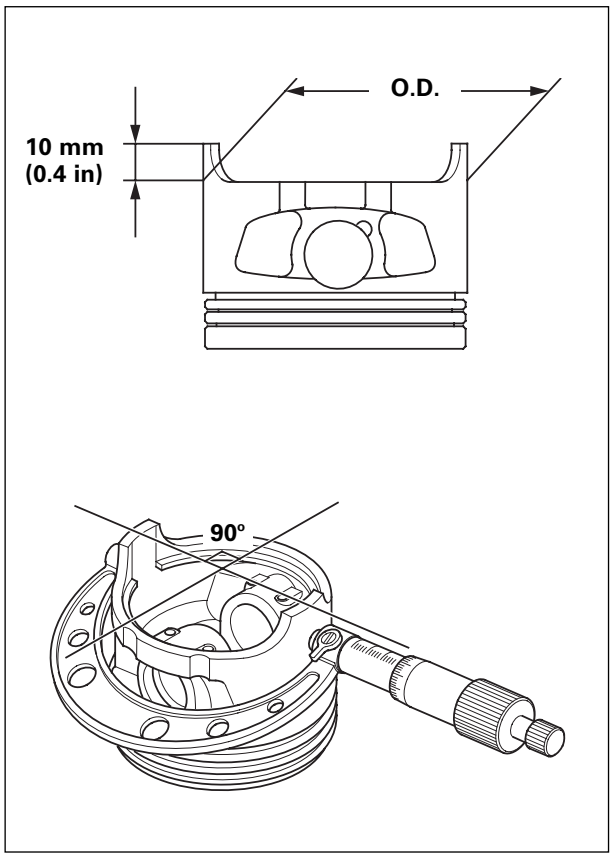
• PISTON SKIRT O.D.

1) Check the piston outer surface for damage (scores, scratches, etc.). Check the piston for warpage and cracks.

2) Measure and record the piston O.D. at 10 mm (0.4 in) from the bottom and perpendicular to the piston pin bore.

Standard	Service limit
69.970 — 69.990 mm (2.7547 — 2.7555 in)	69.910 mm (2.7524 in)

3) If the measurement is less than the service limit, replace the piston with a new one.



• CYLINDER SLEEVE I.D.

1) Check the inner wall of the cylinder for damage (scores, scratches, etc.).

2) Measure and record the cylinder I.D. at three levels in both X and Y axes. Take the maximum reading to determine the cylinder I.D.

Standard	Service limit
70.000 — 70.015 mm (2.7559 — 2.7565 in)	70.060 mm (2.7583 in)

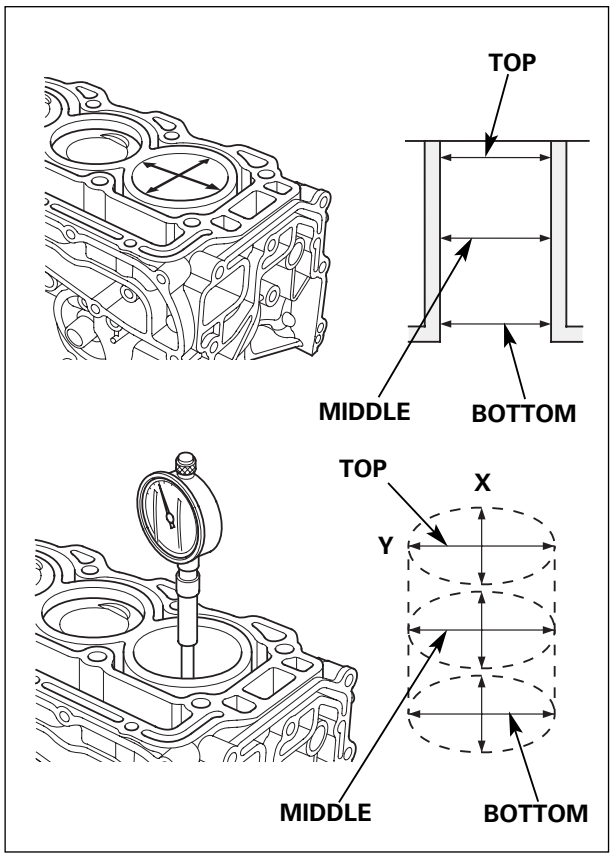
3) If the measurement exceeds the service limit, replace the cylinder block with a new one.

• PISTON-TO-CYLINDER CLEARANCE

Determine the difference between the piston skirt O.D. and the cylinder sleeve I.D.

Standard	Service limit
0.010 — 0.045 mm (0.0004 — 0.0018 in)	0.090 mm (0.0035 in)

If the measurement exceeds the service limit, replace the cylinder block with a new one.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

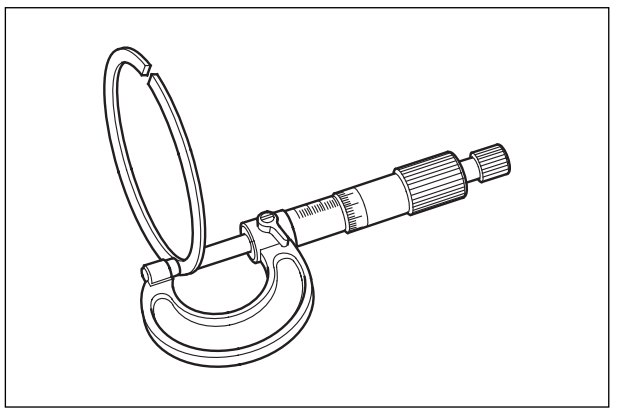
10章(A).qxp 2008/04/10 17:16 ページ 10-11

• PISTON RING THICKNESS

1) Check the piston ring for damage (scores, scratches, etc.).
2) Measure the piston ring thickness.

	Standard	Service limit
Top	0.975 — 0.990 mm (0.0384 — 0.0390 in)	0.960 mm (0.0378 in)
Second	1.175 — 1.190 mm (0.0463 — 0.0469 in)	1.160 mm (0.0457 in)

The oil rings are the combination rings. Replace the side rails and the spacer as a set when either the top or second ring needs replacement.

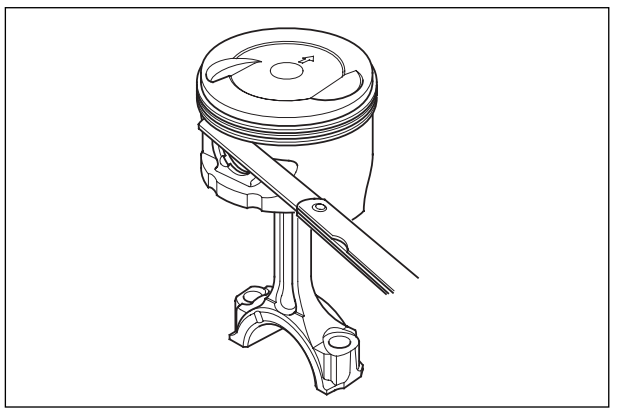


• PISTON RING-TO-RING GROOVE CLEARANCE

Install the piston ring on the piston. Push the piston ring in until it is flush with the outer surface of the piston, and measure the piston ring-to-ring groove clearance.

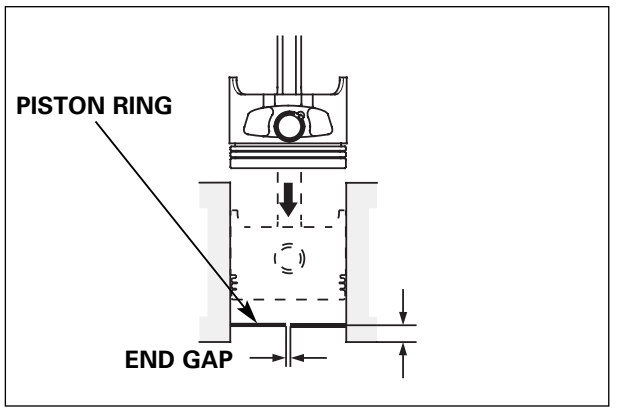
	Standard	Service limit
Top	0.040 — 0.065 mm (0.0016 — 0.0026 in)	0.100 mm (0.0039 in)
Second	0.015 — 0.045 mm (0.0006 — 0.0018 in)	0.100 mm (0.0039 in)
Oil	0.055 — 0.140 mm (0.0022 — 0.0055 in)	0.150 mm (0.0059 in)

If the measurement exceeds the service limit, replace the piston ring with a new one and recheck.
If the measurement still exceeds the service limit after replacing the piston ring, replace the piston with a new one.



• PISTON RING END GAP

	Standard	Service limit
Top	0.15 — 0.30 mm (0.006 — 0.012 in)	0.80 mm (0.031in)
Second	0.15 — 0.30 mm (0.006 — 0.012 in)	0.80 mm (0.031 in)
Oil	0.20 — 0.70 mm (0.008 — 0.028 in)	1.00 mm (0.039in)

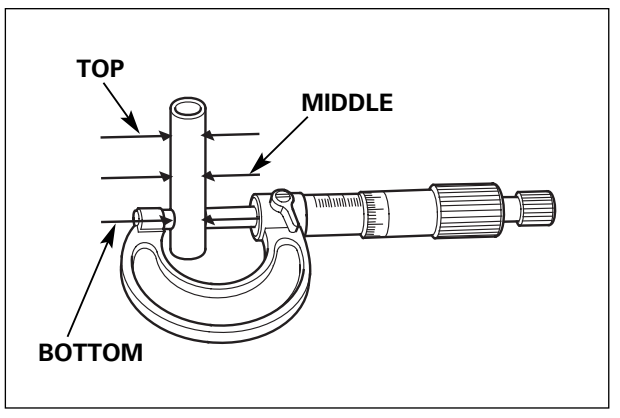


• PISTON PIN O.D.

1) Check the outer surface of the piston pin for damage (scores, scratches, etc.).

2) Measure the piston pin O.D. at three levels. Take the minimum reading to determine the piston pin O.D.

Standard	Service limit
17.994 — 18.000 mm (0.7084 — 0.7087 in)	17.954 mm (0.7068 in)



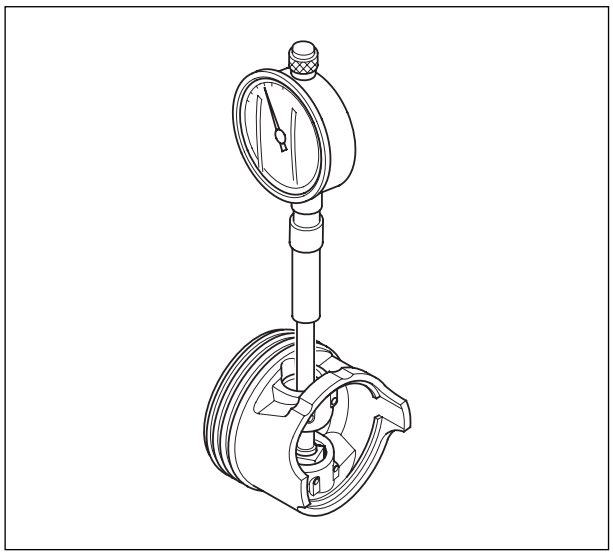
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-12

• PISTON PIN BORE I.D.

Measure the I.D. of the two piston pin bores, and take the maximum reading to determine the I.D. of each piston pin bore.

Standard	Service limit
18.002 — 18.008 mm (0.7087 — 0.7090 in)	18.021 mm (0.7095 in)



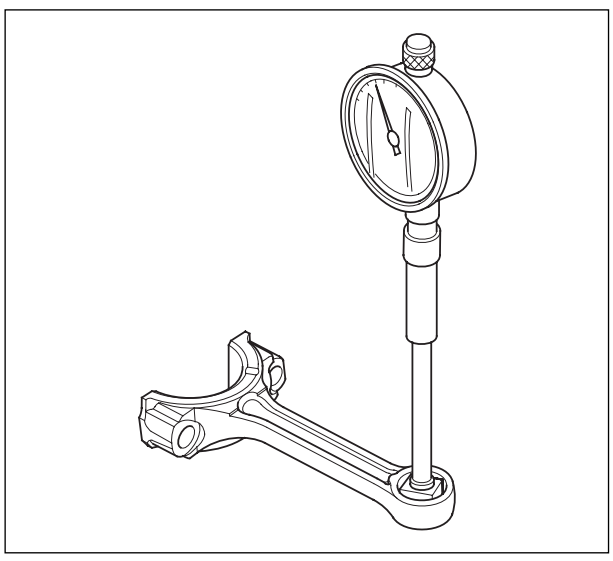
• PISTON PIN-TO-PIN BORE CLEARANCE

Standard	Service limit
0.002 — 0.014 mm (0.0001 — 0.0006 in)	0.040 mm (0.0016 in)

• CONNECTING ROD SMALL END I.D.

Measure the I.D. of the connecting rod small end.

Standard	Service limit
18.016 — 18.034 mm (0.7093 — 0.7100 in)	18.050 mm (0.7106 in)

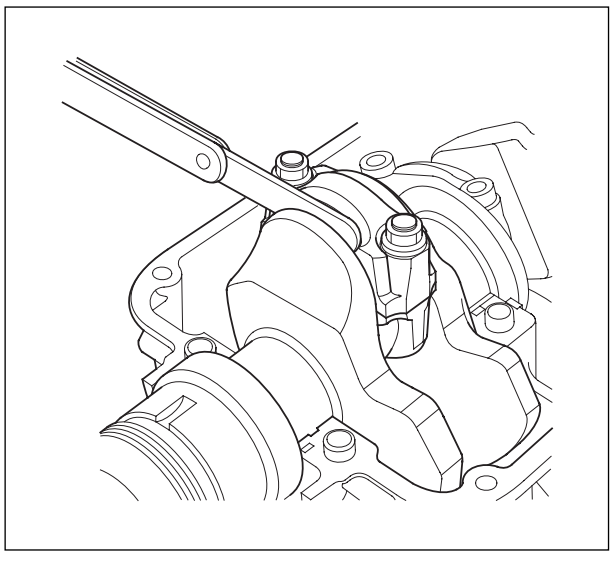


• CONNECTING ROD BIG END AXIAL CLEARANCE

Measure the axial clearance at each connecting rod big end.

Standard	Service limit
0.05 — 0.20 mm (0.002 — 0.008 in)	0.30 mm (0.012 in)

If the measurement exceeds the service limit, replace the connecting rod and the connecting rod cap with new ones as a set, and recheck.
If the measurement still exceeds the service limit after replacing the connecting rod and the connecting rod cap, replace the crankshaft with a new one.



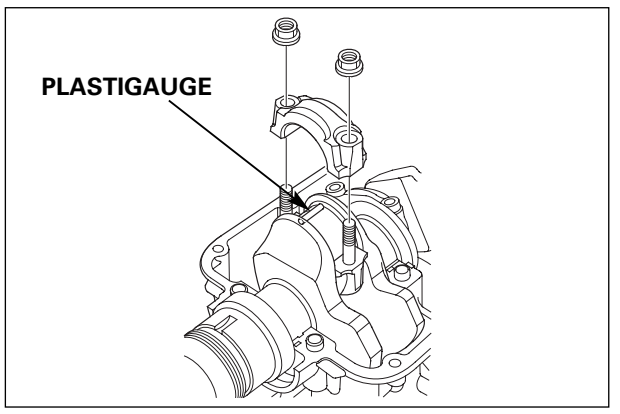
Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-13

• CONNECTING ROD BEARING OIL CLEARANCE

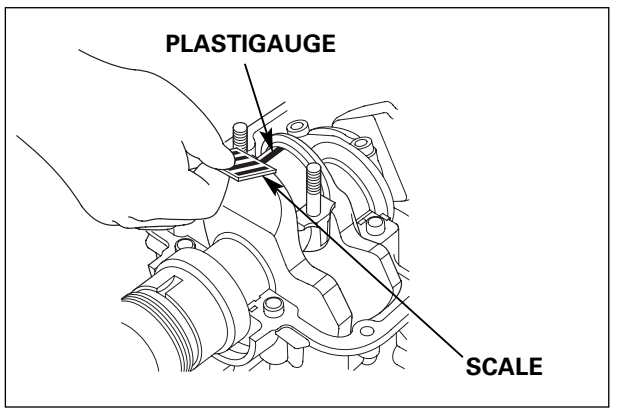
1) Clean the crank pin and the bearing of the connecting rod cap assembly. Check the crank pin and the bearing for wear or damage.
2) Install the crankshaft on the cylinder block. Install the connecting rod cap assembly on the connecting rod, and tighten the connecting rod nut to the specified torque (P. 10-26).
3) Remove the connecting rod cap assembly and set a plastigauge on the crank pin as shown.

   • Set the plastigauge in the axial direction.
   • Avoid the oil passage in the bearing journal to set the plastigauge.



4) Reinstall the connecting rod cap assembly on the connecting rod, and tighten the connecting rod nut to the specified torque (P. 10-26).

   • Tighten the connecting rod nut with care not to turn the crankshaft and/or the connecting rod.



5) Remove the connecting rod cap assembly. Measure the compressed width of the plastigauge using the scale printed on the bag of the plastigauge.

   • Measure the widest width on the plastigauge.

Standard	Service limit
0.020 — 0.038 mm (0.0008 — 0.0015 in)	0.080 mm (0.0031 in)

6) If the measurement exceeds the service limit, replace with an undersize bearing by referring to the connecting rod bearing selection table (P. 10-17). Recheck the connecting rod bearing oil clearance.
   If the measurement still exceeds the service limit, replace the crankshaft with a new one.

• CRANKSHAFT MAIN JOURNAL O.D.

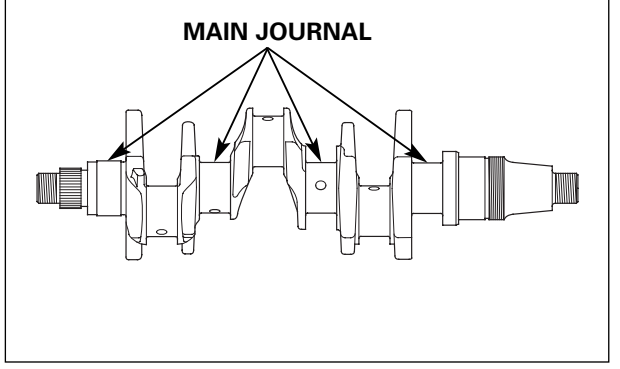
Measure the crankshaft main journal O.D.

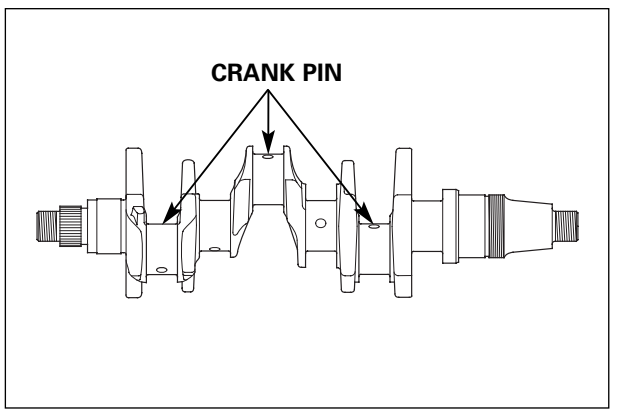
Standard	Service limit
39.982 — 40.006 mm (1.5741 — 1.5750 in)	39.950 mm (1.5728 in)

• CRANK PIN JOURNAL O.D.

Measure the crank pin journal O.D.

Standard	Service limit
37.976 — 38.000 mm (1.4951 — 1.4961 in)	37.940 mm (1.4937 in)





© Honda Motor Co., Ltd.

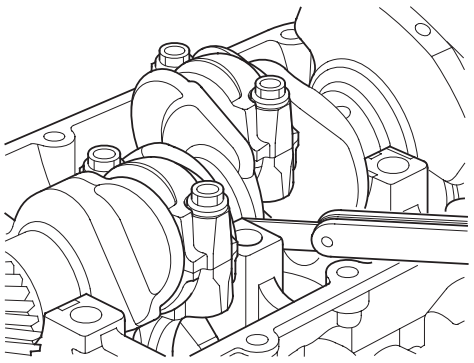
10章(A).qxp 2008/04/10 17:16 ページ 10-14

• THRUST WASHER SIDE CLEARANCE

Measure the clearance between the main journal thrust washer and the crankshaft.

Standard	Service limit
0.05 — 0.30 mm (0.002 — 0.012 in)	0.45 mm (0.018 in)

If the measurement exceeds the service limit, check the thrust washer and the cylinder block thrust surface. Replace the thrust washer with a new one if necessary and recheck.
If the measurement still exceeds the service limit after replacing the thrust washer, replace the crankshaft with a new one.



• CRANKSHAFT MAIN BEARING OIL CLEARANCE

1) Clean the crankshaft main journals and main bearings, and check the journals and the bearings for wear or damage.

2) Install the four main bearings and crankshaft on the cylinder block, and install the four main bearings on the crankcase.

3) Install the crankcase on the cylinder block, and tighten the bolts to the specified torque (P. 10-28).

4) Remove the crankcase. Set the plastigauge on each main journal of the crankshaft.

   • Set the plastigauge in the axial direction.
   • Avoid the oil passage in the bearing journal to set the plastigauge.

5) Reinstall the crankcase on the cylinder block, and tighten the bolts to the specified torque (P. 10-28).

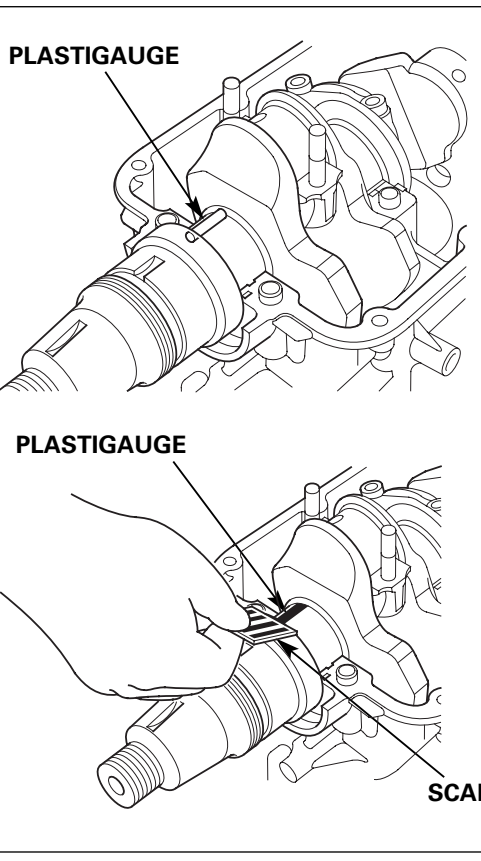
   • Do not turn the crankshaft during this check.

6) Remove the crankcase. Measure the compressed width on the plastigauge using the scale printed on the bag of the plastigauge.

   • Take the widest width on the plastigauge.

Standard	Service limit
0.021 — 0.039 mm (0.0008 — 0.0015 in)	0.050 mm (0.0020 in)

7) If the measurement exceeds the service limit, replace the main bearing with an undersize bearing by referring to the main bearing selection table (P. 10-19). Recheck the oil clearance.
   If the measurement still exceeds the service limit, replace the crankshaft with a new one.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-15

• CYLINDER BLOCK SURFACE WARPAGE

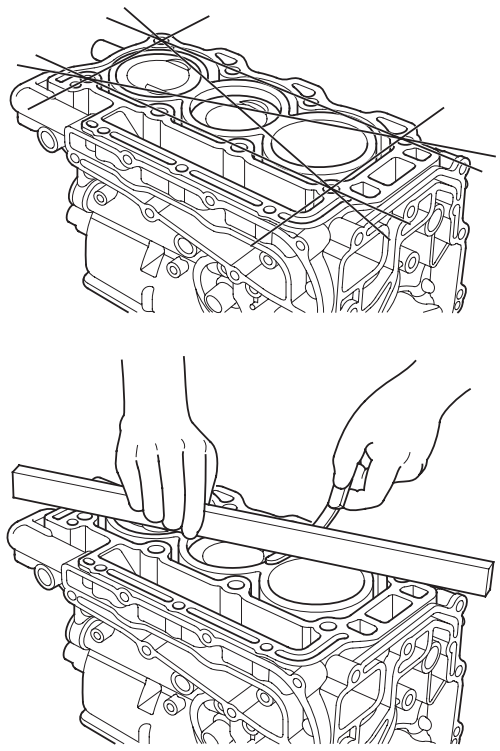
1) Take care not to damage (score, scratch, etc.) the mating surface with the cylinder head gasket.

2) Measure the surface warpage using a straight edge and a feeler gauge as shown.

Standard	Service limit
Less than 0.05 mm (0.002 in)	0.10 mm min. (0.004 in)

3) If the measurement exceeds the service limit, replace the cylinder block with a new one.

MEASUREMENT POINT



© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-16

3. BEARING SELECTION

a. CONNECTING ROD BEARING

When replacing the connecting rod bearing, check the crank pin code letter and the connecting rod code number, and select the correct bearing by referring to the bearing selection table.

- If the code letter and/or number is not clear, clean the area with a cleaning solvent and check again. Do not scrub with a stiff brush or screwdriver to clean.

1) Check each crank pin code letter in the position shown and record them.

Crank pin O.D.: 38 mm (1.5 in)

Code letter	Tolerance
D	−0.024 — −0.018 mm (−0.0009 — −0.0007 in)
C	−0.018 — −0.012 mm (−0.0007 — −0.0005 in)
B	−0.012 — −0.006 mm (−0.0005 — −0.0002 in)
A	−0.006 — ±0.000 mm (−0.0002 — ±0.0000 in)

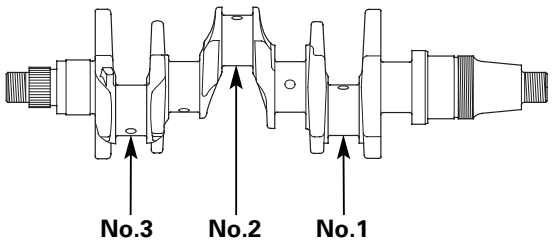
2) Check each connecting rod code number in the position shown and record them.

Connecting rod big end I.D.: 41 mm (1.6 in)

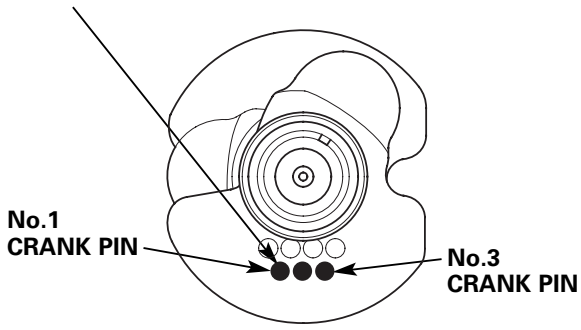
Code number	Tolerance
1	±0.000 — +0.006 mm (±0.0000 — +0.0002 in)
2	+0.006 — +0.012 mm (+0.0002 — +0.0005 in)
3	+0.012 — +0.018 mm (+0.0005 — +0.0007 in)
4	+0.018 — +0.024 mm (+0.0007 — +0.0009 in)

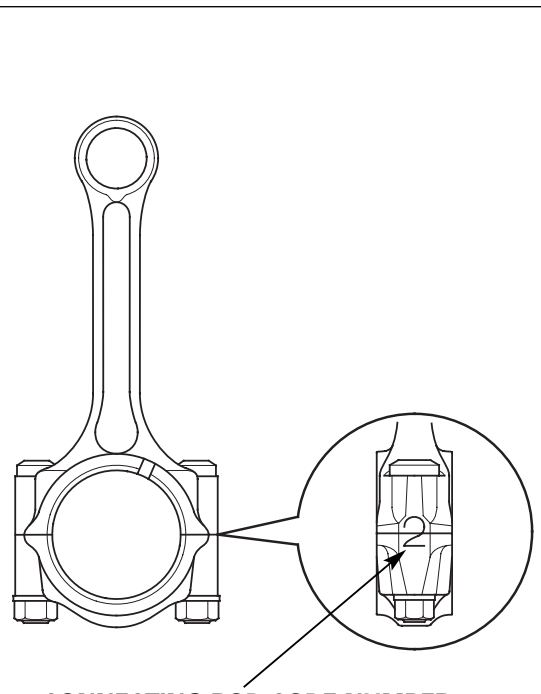
3) Select the correct bearing by referring to the crank pin code letter and the connecting rod code number.

No.1 crank pin journal and the subsequent numbers viewed from the alternator rotor side.



CRANK PIN CODE LETTER (No.1 journal and the subsequent numbers viewed from the left side)





CONNECTING ROD CODE NUMBER (No.1 journal and the subsequent numbers viewed from the alternator rotor side)

Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-17

Connecting rod bearing selection table:

Crank pin journal code letter	Connecting rod big end I.D. code number			
	1	2	3	4
	Bearing identification color			
A	Red	Pink	Yellow	Green
B	Pink	Yellow	Green	Brown
C	Yellow	Green	Brown	Black
D	Green	Brown	Black	Blue

Selection table:
Connecting rod bearing center thickness: 1.5 mm (0.06 in)

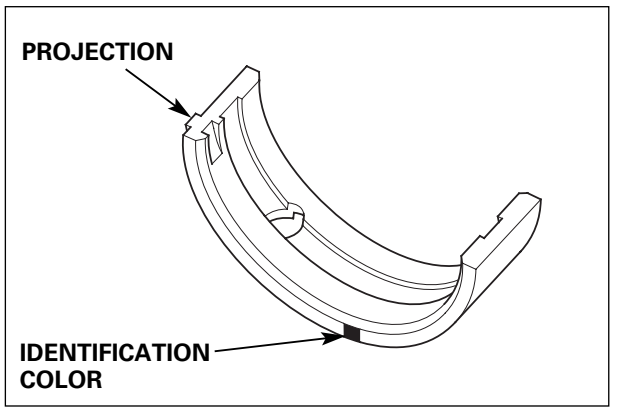
Code letter	ID color	Tolerance
G	Red	–0.008 — –0.005 mm (–0.0003 — –0.0002 in)
F	Pink	–0.005 — –0.002 mm (–0.0002 — –0.0001 in)
E	Yellow	–0.002 — +0.001 mm (–0.0001 — +0.00004 in)
D	Green	+0.001 — +0.004 mm (+0.00004 — +0.0002 in)
C	Brown	+0.004 — +0.007 mm (+0.0002 — +0.0003 in)
B	Black	+0.007 — +0.010 mm (+0.0003 — +0.0004 in)
A	Blue	+0.010 — +0.013 mm (+0.0004 — +0.0005 in)

The connecting rod bearings are available in the seven I.D. colors (Blue, Black, Brown, Green, Yellow, Pink and Red in this order) at intervals of 0.003 mm (0.0001 in) in tolerance.

4) Select the bearings so the oil clearance is 0.020 — 0.038 mm (0.0008 — 0.0015 in).

5) Align the projection on the bearing with the cutout in the connecting rod and in the connecting rod cap. Install the bearing with care not to damage the sliding surface.

6) Check the connecting rod bearing oil clearance after installing the selected bearing (P. 10-13).



© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-18

b. CRANKSHAFT MAIN BEARING

When replacing the main bearing, check the crankshaft main journal code number and the cylinder block I.D. code letter, and select the correct bearing by referring to the bearing selection table.

- If the code letter and/or number is not clear, clean the area with a cleaning solvent and check again. Do not scrub with a stiff wire brush or screwdriver to clean.

1) Check each crankshaft main journal code number in the position shown, and record them.

Crankshaft main journal O.D.: 40 mm (1.6 in)

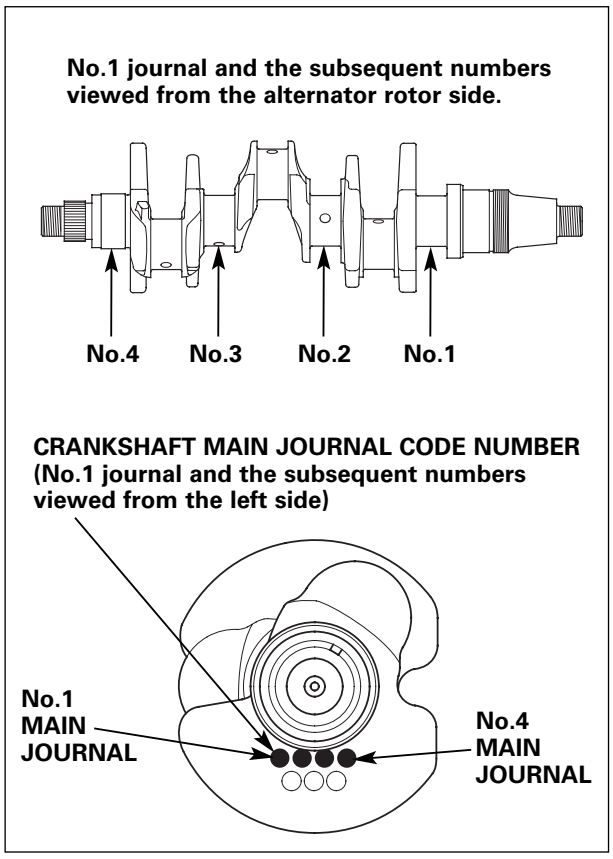
Code number	Tolerance
4	−0.018 — −0.012 mm (−0.0007 — −0.0005 in)
3	−0.012 — −0.006 mm (−0.0005 — −0.0002 in)
2	−0.006 — ±0.000 mm (−0.0002 — ±0.0000 in)
1	±0.000 — +0.006 mm (±0.0000 — +0.0002 in)

2) Check each cylinder block I.D. code letter in the position shown, and record it.

Main bearing I.D.: 44 mm (1.7 in)

Code letter	Tolerance
A	±0.000 — +0.006 mm (±0.0000 — +0.0002 in)
B	+0.006 — +0.012 mm (+0.0002 — +0.0005 in)
C	+0.012 — +0.018 mm (+0.0005 — +0.0007 in)
D	+0.018 — +0.024 mm (+0.0007 — +0.0009 in)

3) Select the correct bearing by referring to the crankshaft main journal code number and the cylinder block I.D. code letter.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-19

Crankshaft main bearing selection table:

Crankshaft main journal code number	Cylinder block I.D. code letter			
	A	B	C	D
	Bearing identification color			
1	Red	Pink	Yellow	Green
2	Pink	Yellow	Green	Brown
3	Yellow	Green	Brown	Black
4	Green	Brown	Black	Blue

Selection table:
Connecting rod bearing center thickness: 2.0 mm (0.08 in)

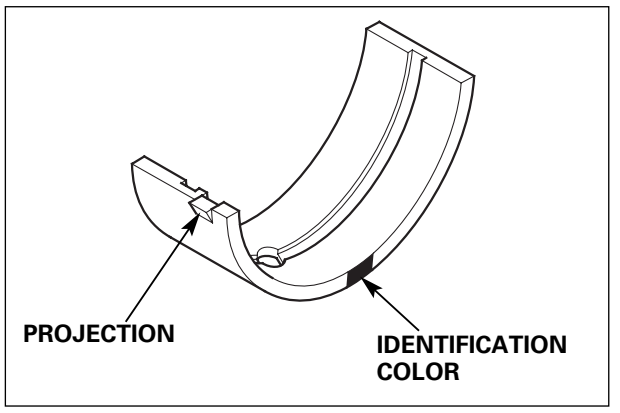
Code letter	ID color	Tolerance
G	Red	–0.003 — ±0.000 mm (–0.0001 — ±0.0000 in)
F	Pink	±0.000 — +0.003 mm (±0.0000 — +0.0001 in)
E	Yellow	+0.003 — +0.006 mm (+0.0001 — +0.0002 in)
D	Green	+0.006 — +0.009 mm (+0.0002 — +0.0004 in)
C	Brown	+0.009 — +0.012 mm (+0.0004 — +0.0005 in)
B	Black	+0.012 — +0.015 mm (+0.0005 — +0.0006 in)
A	Blue	+0.015 — +0.018 mm (+0.0006 — +0.0007 in)

The main bearings are available in the seven I.D. colors (Blue, Black, Brown, Green, Yellow, Pink and Red in this order) at intervals of 0.003 mm (0.0001 in) in tolerance.

4) Select the bearings so the oil clearance is 0.028 — 0.038 mm (0.0011 — 0.0015 in).

5) Align the projection on the bearing with the cutout in the connecting rod and in the connecting rod cap. Install the bearing with care not to damage the sliding surface.

6) Check the main bearing oil clearance after installing the selected bearing (P. 10-14).



© Honda Motor Co., Ltd.

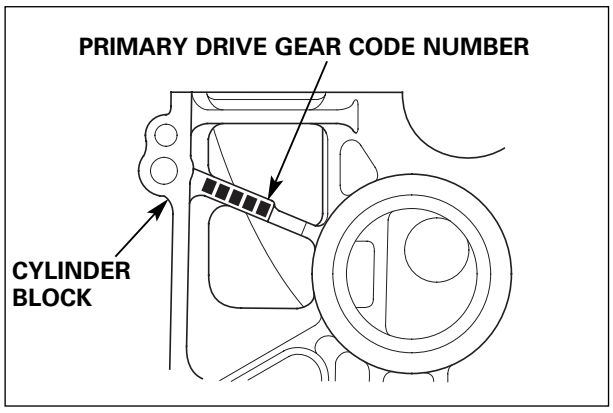
10章(A).qxp 2008/04/10 17:16 ページ 10-20

4. PRIMARY DRIVE GEAR SELECTION

When replacing the primary drive gear, check the primary drive gear code number and select the correct gear by referring to the selection table.

- If the code number is not clear, clean the area with a cleaning solvent and check again. Do not scrub with a stiff wire brush or screwdriver to clean.

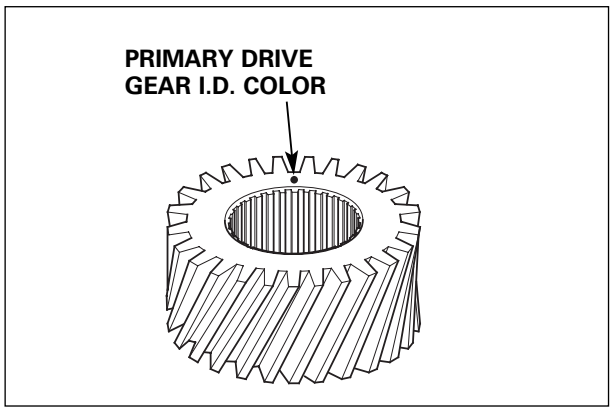
1) Check the primary drive gear code number in the position shown, and record it.



2) Select the correct primary drive gear I.D color by referring to the primary drive gear code number.

Selection table:

Code number	I.D. color	Part name
1	Yellow	Primary drive gear C
2	Blue	Primary drive gear B
3	White	Primary drive gear A



3) Install the selected primary drive gear (P. 10-23).

Date of Issue: May 2008
© Honda Motor Co., Ltd.

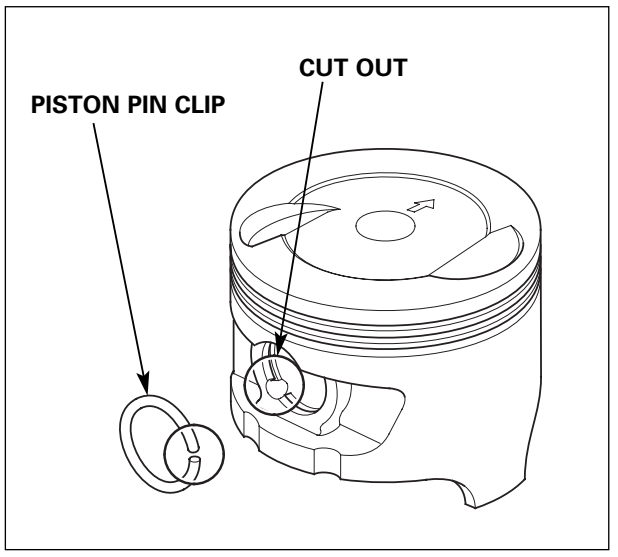
10章(A).qxp 2008/04/10 17:16 ページ 10-21

5. REASSEMBLY

a. PISTON ASSEMBLY

1) Install a new piston pin clip on one side of the piston.

   - Wear eye protection as the piston pin clips can pop out during installation.
   - Make sure the piston pin clip does not align with the cutout in the piston pin bore.

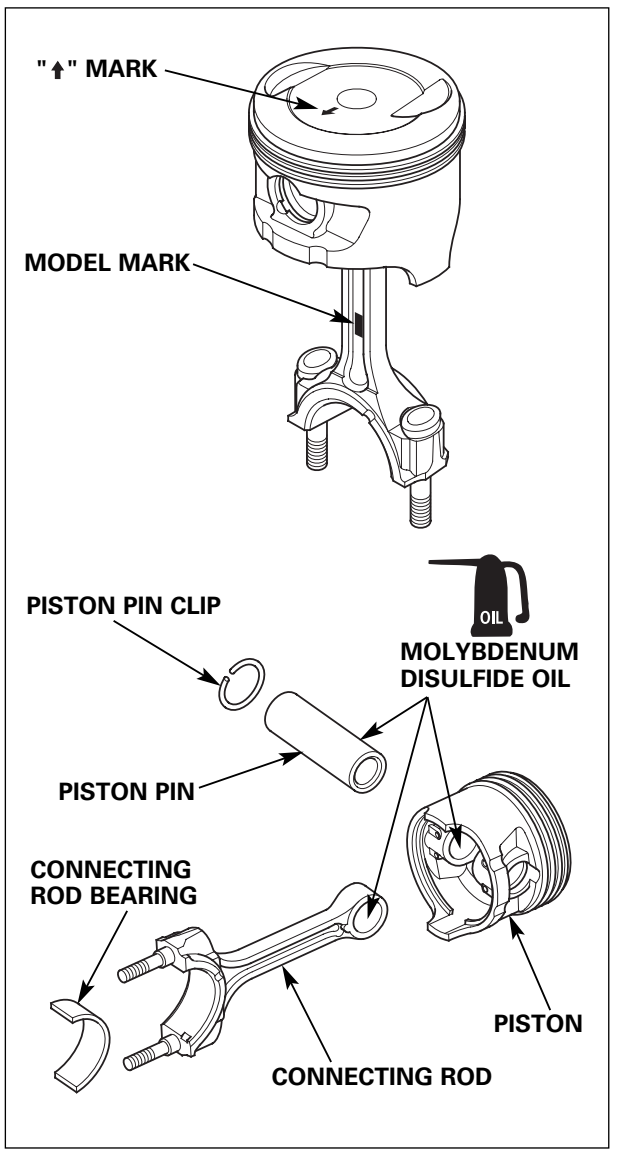


2) Apply molybdenum disulfide oil to the outer surface of the piston pin, inner wall of the piston pin bore and to the inner wall of the connecting rod small end.
   Install the connecting rod on the piston so the "⬆" mark on the piston head and the model mark on the connecting rod are in the same direction.

3) Install a new piston pin clip on the other side of the piston (i.e. opposite side from step 1).

   - Wear eye protection as the piston pin clips can pop out during installation.
   - Make sure the piston pin clip does not align with the cutout in the piston pin bore.

4) Install each connecting rod bearing by aligning the projection on the connecting rod bearing with the recess in the connecting rod.

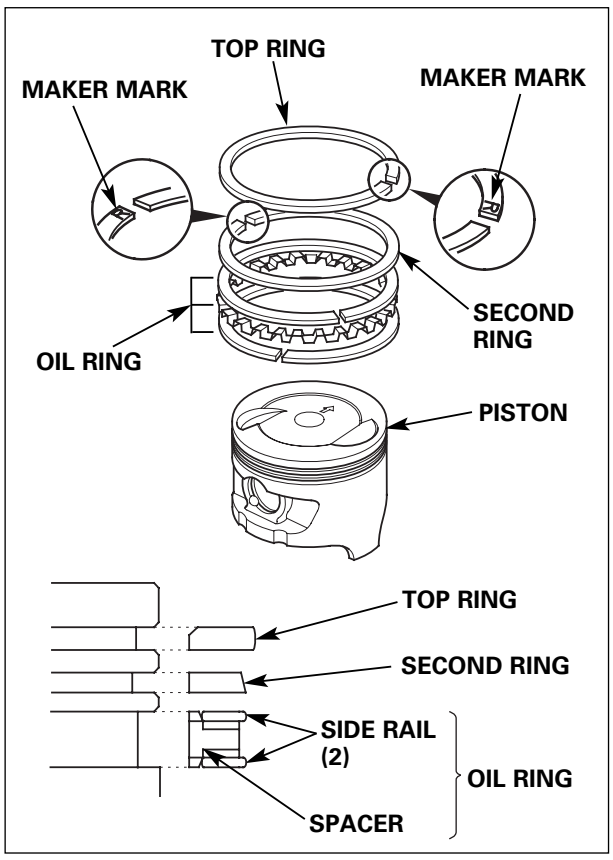


© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-22

5) Install the top ring and the second ring in the ring grooves in the piston with the maker marks facing up.
Install the oil ring in the ring groove.

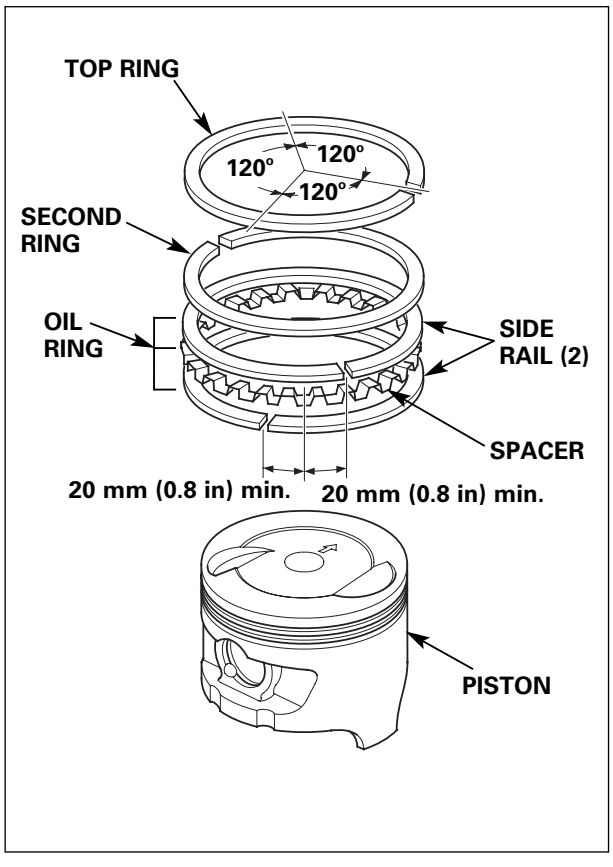
- Clean the ring grooves thoroughly before installing the piston rings.
- Install the piston rings with care not to break them. Take care not to score or scratch the piston.
- Do not confuse the top ring with the second ring.
- To install the oil rings, install the spacer first, then install the side rails.



6) After installing the piston rings, turn each ring by hand to check for smooth movement.

7) Stagger the piston ring end gaps as shown.

- Do not align with the piston pin, and avoid the direction that makes a right angle with the piston pin.
Stagger the end gaps 120° apart right and left.



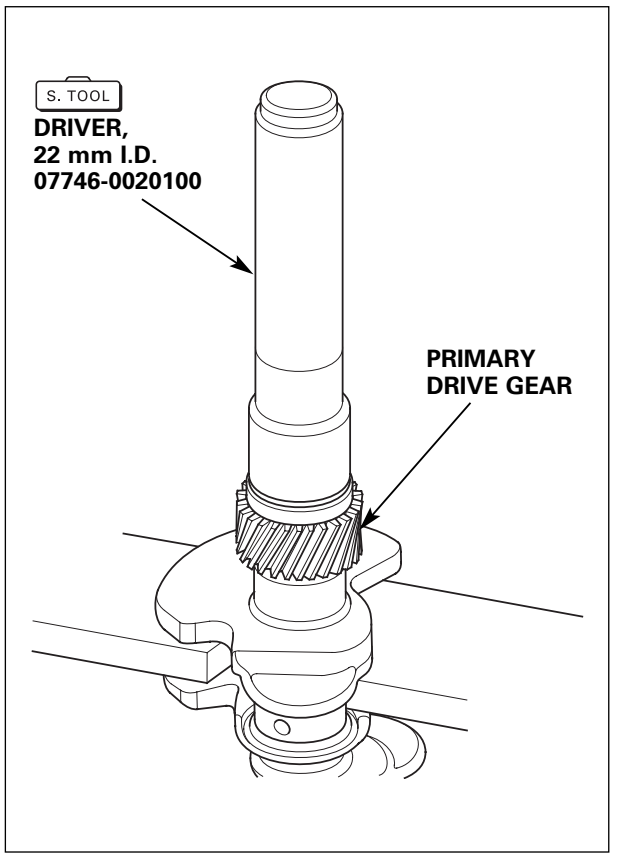
Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-23

b. PRIMARY DRIVE GEAR

Install the primary drive gear on the crankshaft using the special tool and the hydraulic press as shown.

TOOL:
Driver, 22 mm I.D. 07746-0020100



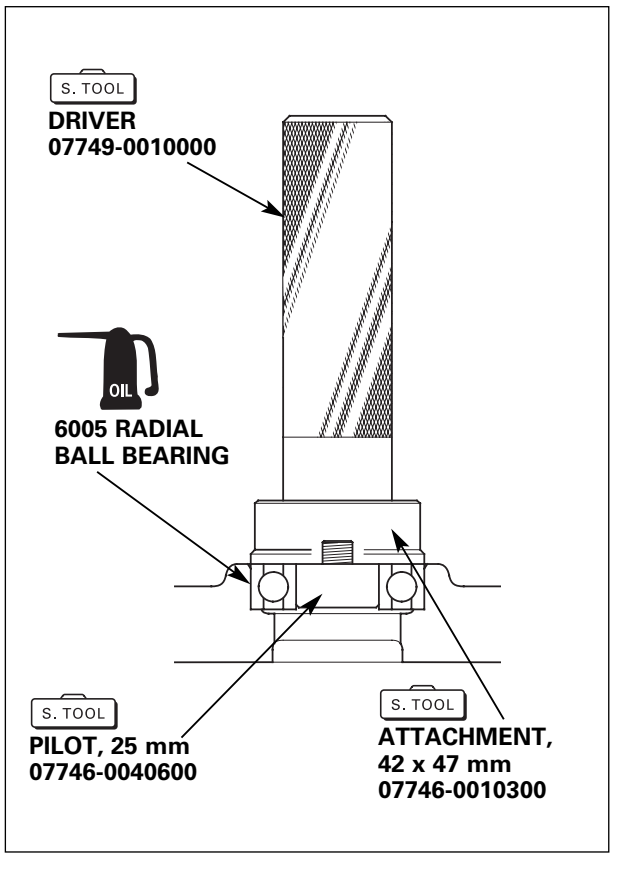
c. CRANKCASE/CRANKSHAFT/CYLINDER BLOCK

1) Apply engine oil to the outer surface of a new 6005 radial ball bearing.

2) Drive the 6005 radial ball bearing into the cylinder block using the special tools as shown.

TOOLS:

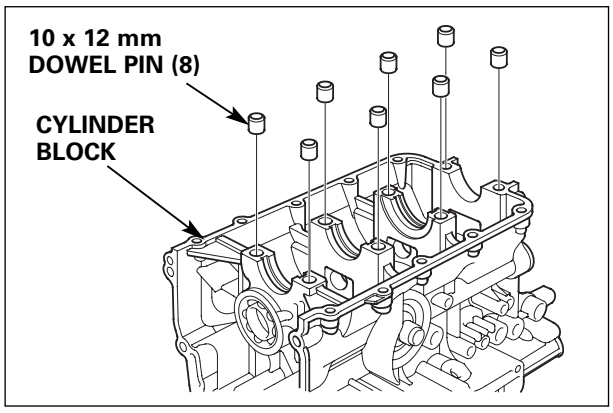
Attachment, 42 x 47 mm	**07746-0010300**
Driver	**07749-0010000**
Pilot, 25 mm	**07746-0040600**



© Honda Motor Co., Ltd.

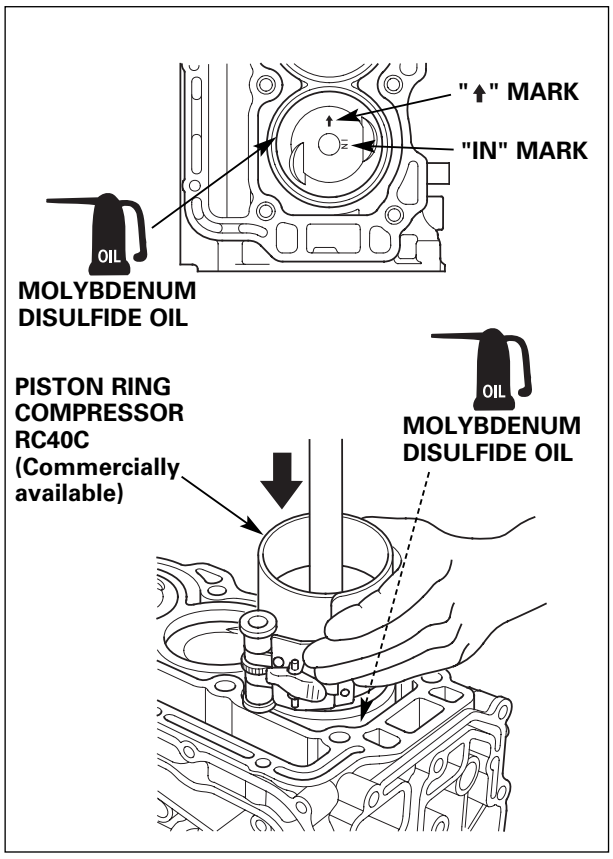
10章(A).qxp 2008/04/10 17:16 ページ 10-24

3) Install the eight new 10 x 12 mm dowel pins on the cylinder block.

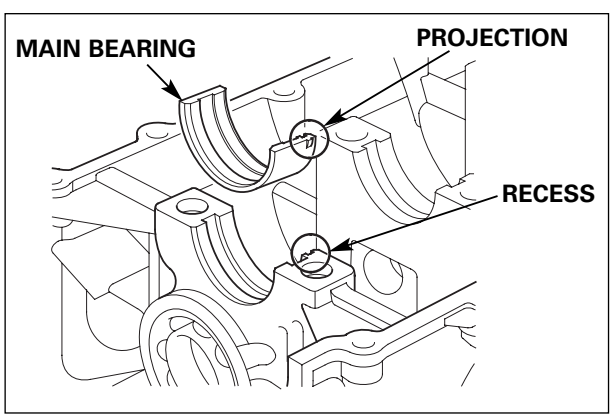


4) Apply molybdenum disulfide oil to the outer surface of the piston (including piston ring) and to the inner wall of the cylinder sleeve.

5) Using a piston ring compressor (commercially available), push the piston into the cylinder block gently using the handle of a hammer. Install with the "IN" mark on the piston head toward the intake valve and the "⬆" mark toward the timing belt.



6) Install the main bearing in the cylinder block by aligning the projection on the bearing with the recess in the cylinder block.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-25

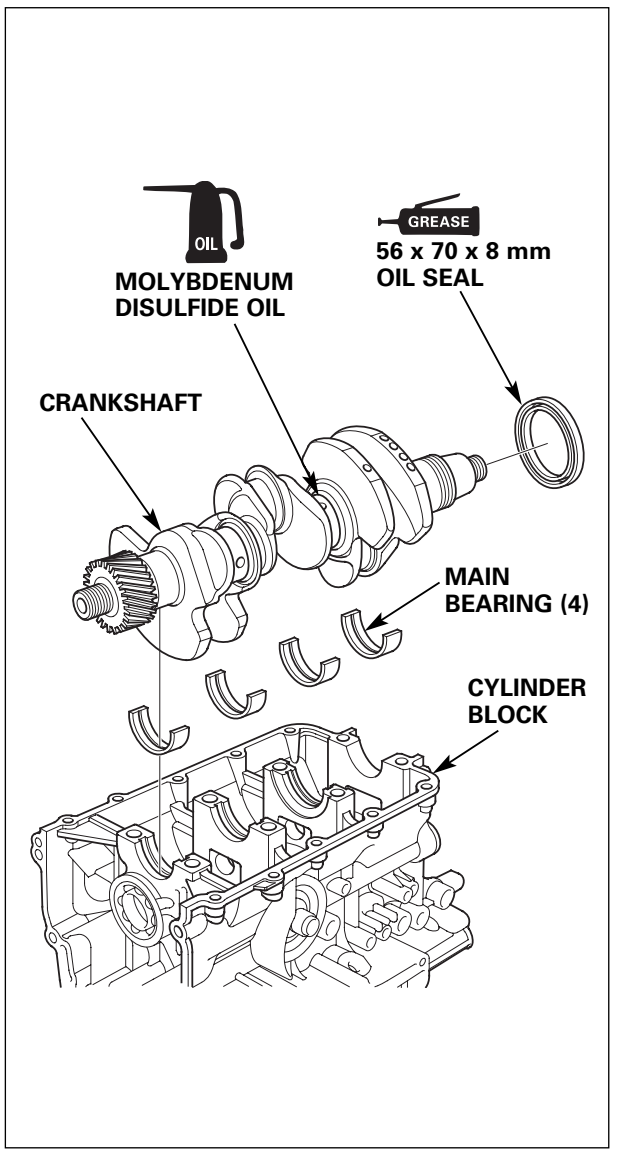
7) Apply molybdenum disulfide oil to the crankshaft main journal/crank pin mating surface and the main journal/thrust washer mating surface.

8) Apply grease to the lip of a new 56 x 70 x 8 mm oil seal.

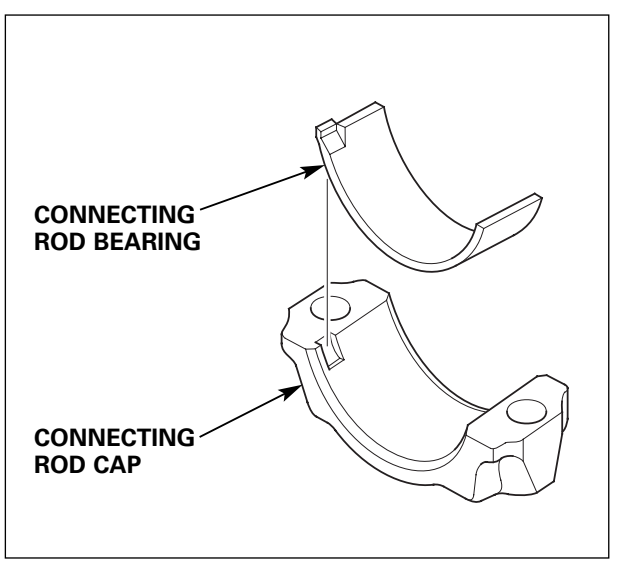
9) Install the 56 x 70 x 8 mm oil seal on the crankshaft as shown.

   • Install by aligning the projection on the oil seal with the groove in the cylinder block.

10) Install each connecting rod by aligning it with the corresponding journal of the crankshaft.



11) Install the connecting rod bearing and the connecting rod cap by aligning the projection on the connecting rod bearing with the recess in the connecting rod cap.



© Honda Motor Co., Ltd.

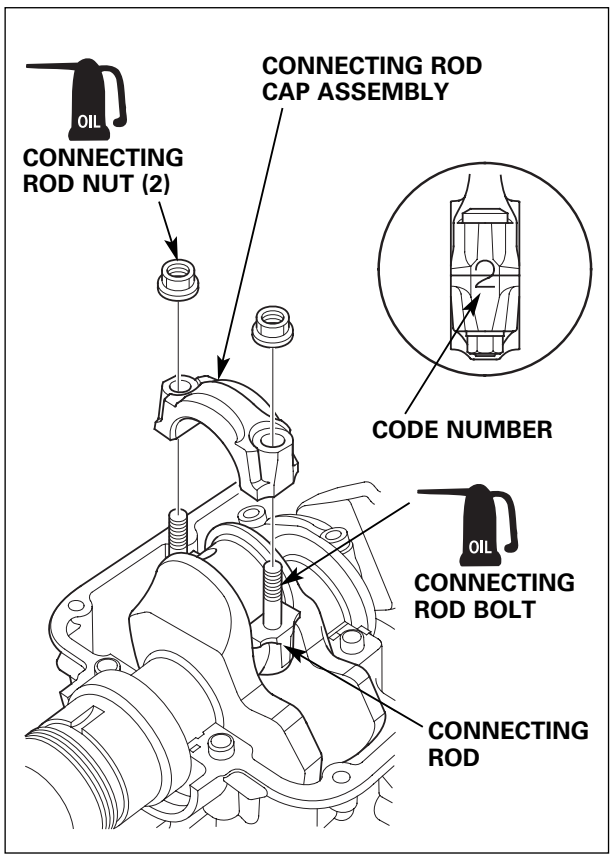
10章(A).qxp 2008/04/10 17:16 ページ 10-26

12) Apply engine oil to the threads of the connecting rod bolt and to the seat of the connecting rod nut.

13) Install the connecting rod cap assembly on the connecting rod, and tighten the two connecting rod nuts to the specified torque.

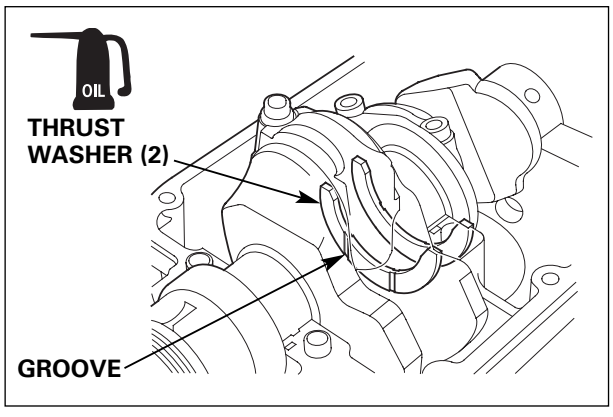
TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

- Install the connecting rod cap assembly, aligning the code number with the number on the connecting rod.
- Check that the piston is at the bottom dead center of its compression stroke before tightening the nuts. If not, turn the crankshaft to bring the piston to the bottom dead center of its compression stroke.

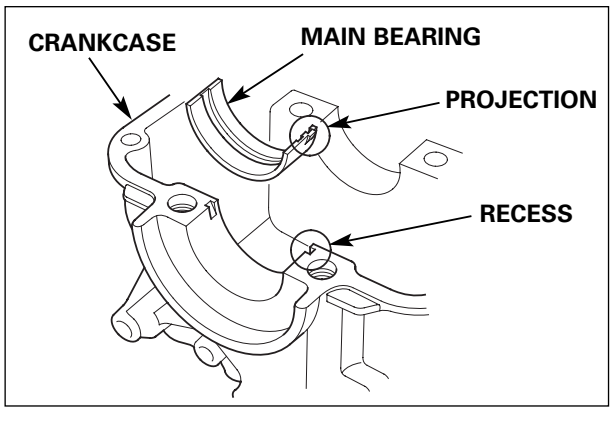


14) Apply engine oil to the thrust washers, and install them on the No.2 journal of the cylinder block.

- Install the thrust washers with the grooved side toward the crankshaft.



15) Install the main bearing on the crankcase by aligning the projection with the recess in the crankcase.

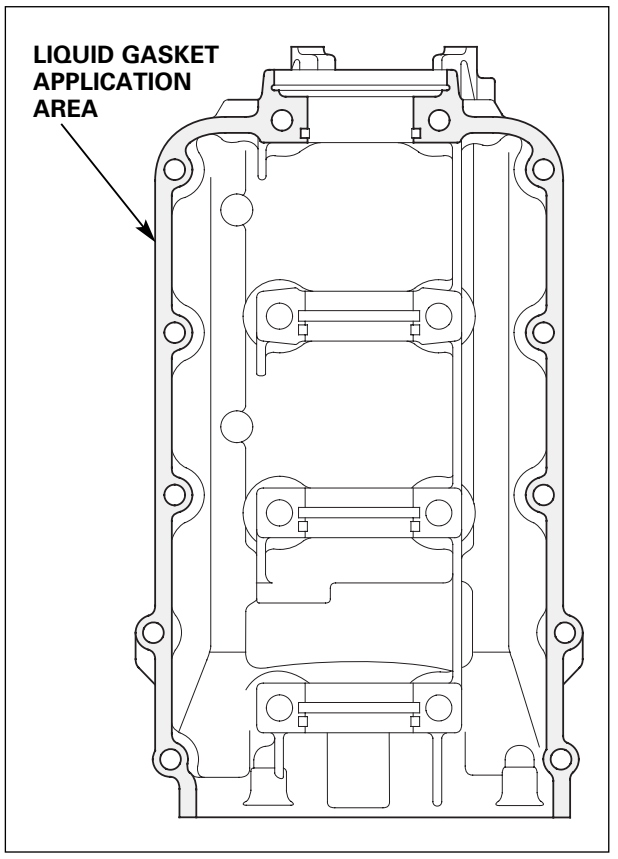


Date of Issue: May 2008
© Honda Motor Co., Ltd.

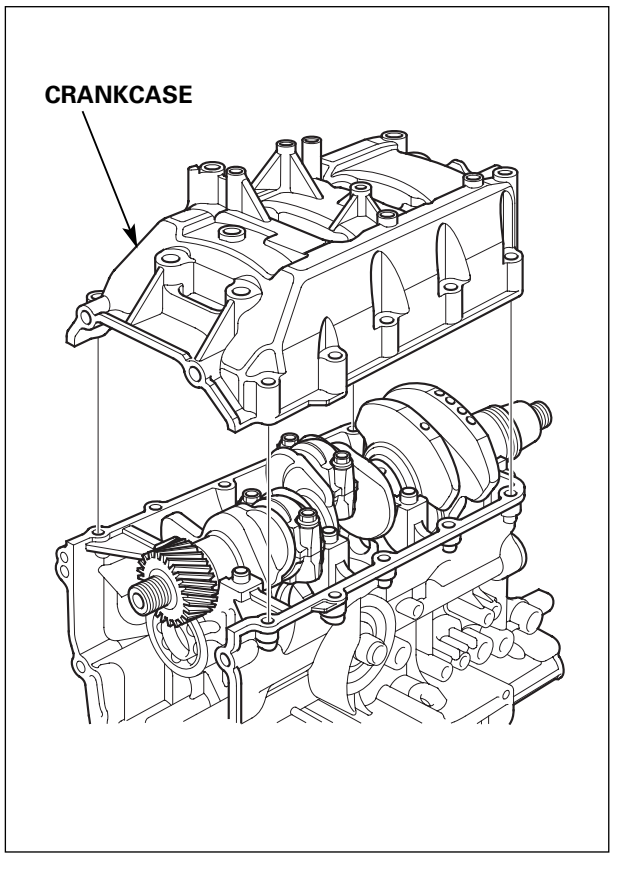
10章(A).qxp 2008/04/10 17:16 ページ 10-27

16) Clean the cylinder block/crankcase mating surfaces thoroughly using the degreasing cleaning solvent.

17) Apply liquid gasket (ThreeBond® #1141C or equivalent) to indicated area of the crankcase.



18) Install the crankcase on the cylinder block.



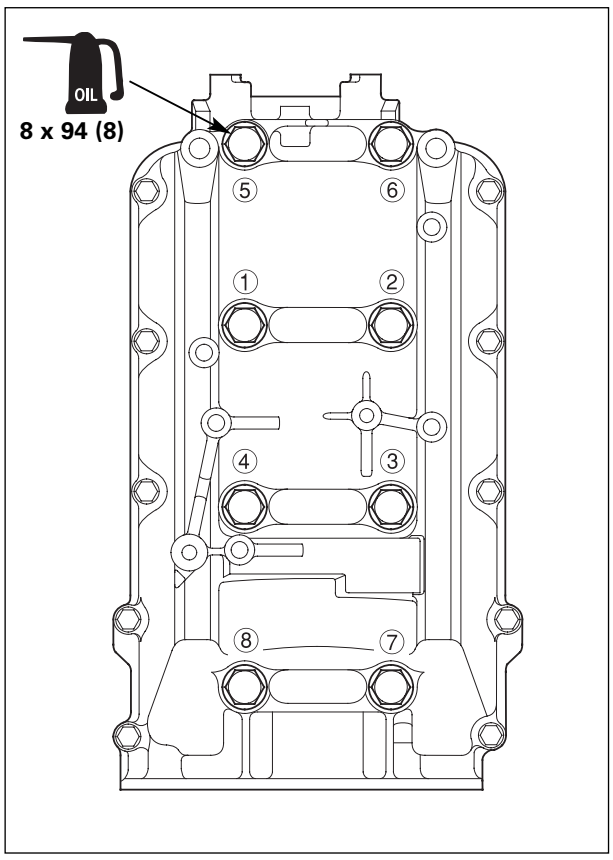
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-28

19) Apply engine oil to the threads and seat of the 8 x 94 mm flange bolts.

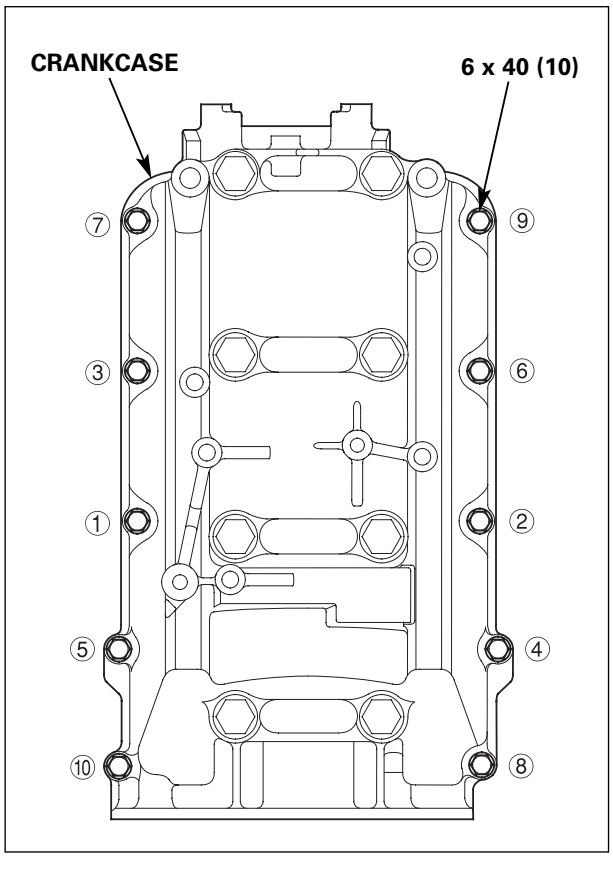
20) Loosely tighten the eight 8 x 94 mm flange bolts and the eight 8 mm washers on the crankcase, then tighten them to the specified torque in two or three steps in the numbered sequence shown.
After tightening to the specified torque, tighten the bolts additionally to 90° — 120° in the numbered sequence shown.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft) + 90° — 120°



21) Loosely tighten the ten 6 x 40 mm flange bolts on the crankcase, then tighten them to the specified torque in two or three steps in the numbered sequence shown.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-29

22) Apply engine oil to the crankshaft's primary drive gear installation threads.
23) Install a new 22 mm flange nut and 22 mm washer on the crankshaft.
24) Set the special tool on the alternator rotor side of the crankshaft as shown, to hold the crankshaft.

TOOL:
Crankshaft holder 070PB-ZZ50100

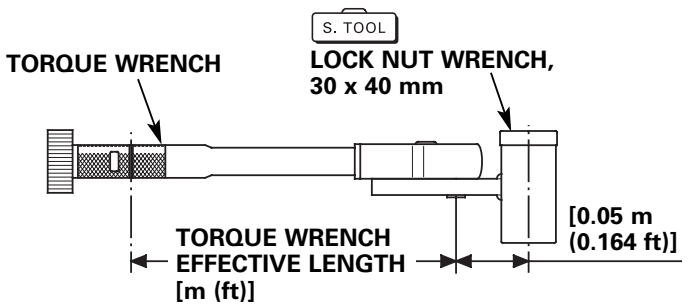
25) Tighten the 22 mm flange nut to the specified torque using the special tool as shown.

TORQUE: 92 N·m (9.4 kgf·m, 68 lbf·ft)

NOTICE

To tighten the 22 mm flange nut, use the special tool and read the torque as follows.

TOOL:
Lock nut wrench, 30 x 40 mm 07916-9690000



- **Formula:**

Torque wrench reading =

$$\frac{\text{Torque wrench effective length [m (ft)] x Specified torque [N·m (kgf·m, lbf·ft)]}}{\text{Torque wrench effective length [m(ft)] + 0.05 [m (0.164 ft)]}}$$

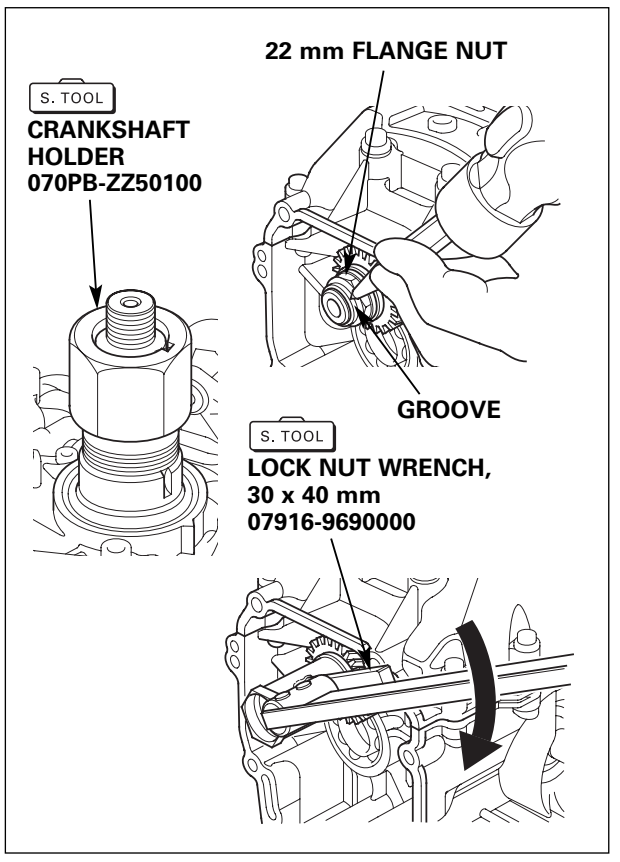
- **Example:**

Torque wrench reading using a torque wrench with an effective length of 0.4 m (1.31 ft)

$$\frac{\text{0.4 [m (1.31 (ft)] x 92 [N·m (9.4 kgf·m, 68 lbf·ft)]}}{\text{0.4 [m (1.31 ft)] + 0.05 [m (0.164 ft)]}}$$

= 82 [N·m (8.4 kgf·m, 60 lbf·ft)]

26) After tightening the 22 mm flange nut, stake it into the groove in the crankshaft with a punch.
27) Clean the crankshaft/alternator rotor mating surfaces thoroughly using a clean shop towel sprayed with degreasing cleaning solvent. Wipe up oil from the mating surface with the alternator rotor (P. 7-20).
28) Install the engine on the outboard motor (P. 6-9).
29) Install the following parts.
- Electric parts/main wire harness (Section 18)
- Oil filter (P. 3-5)
- Cylinder head assembly (P. 9-29)
- Air vent strainer/air vent tube (P. 5-114)
- Vapor separator (P. 5-109)
- Alternator/timing belt (P. 7-13)
- Engine cover (P. 4-2)



© Honda Motor Co., Ltd.

10章(A).qxp 2008/04/10 17:16 ページ 10-30

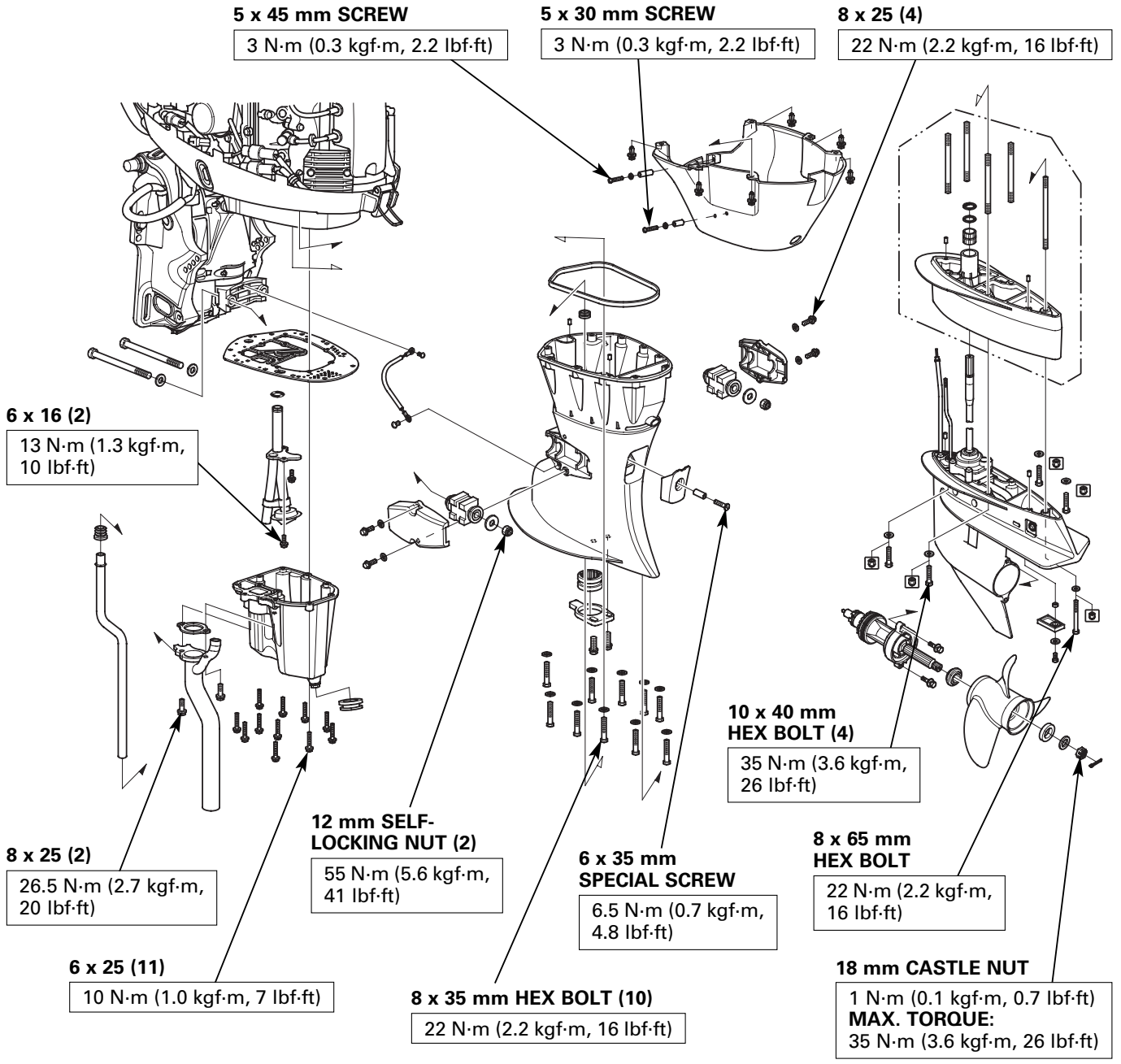
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-1

BF40D·BF50D

11. PROPELLER/GEAR CASE/ EXTENSION CASE/OIL CASE

1. PROPELLER 11-2
2. GEAR CASE ASSEMBLY/ EXTENSION SEPARATOR [EXTRA-LONG SHAFT TYPE ONLY] 11-3
3. PROPELLER SHAFT HOLDER ASSEMBLY 11-7
4. PROPELLER SHAFT/PROPELLER SHAFT HOLDER 11-9
5. WATER PUMP/SHIFT ROD 11-19
6. VERTICAL SHAFT/BEVEL GEAR ... 11-29
7. SHIM ADJUSTMENT 11-39
8. BACKLASH ADJUSTMENT 11-44
9. GEAR CASE PRESSURE CHECK ... 11-45
10. ANODE METAL/WATER SCREEN/TRIM TAB 11-47
11. EXTENSION CASE/LOWER RUBBER MOUNT 11-48
12. OIL CASE 11-56

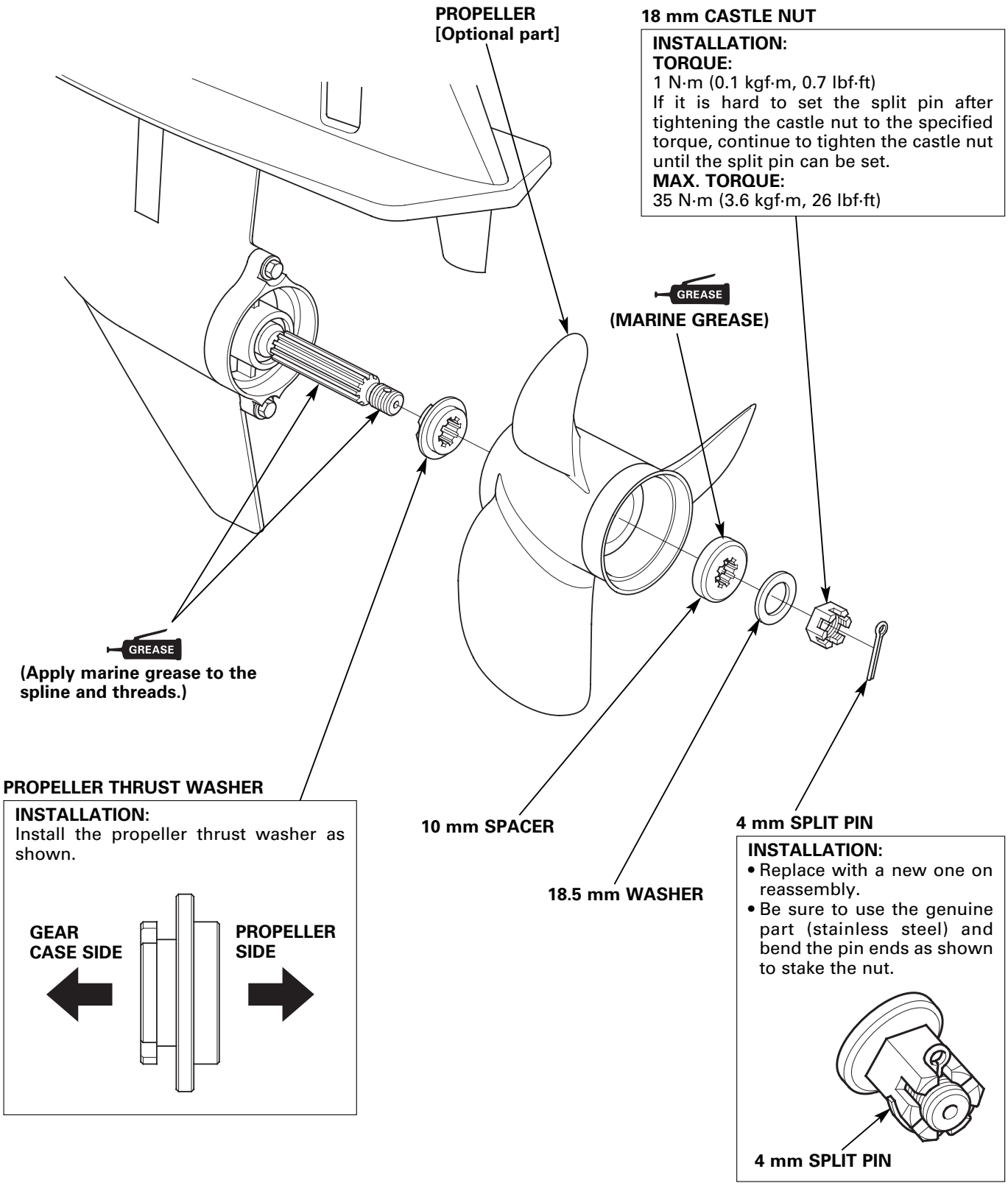


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-2

1. PROPELLER

a. REMOVAL/INSTALLATION



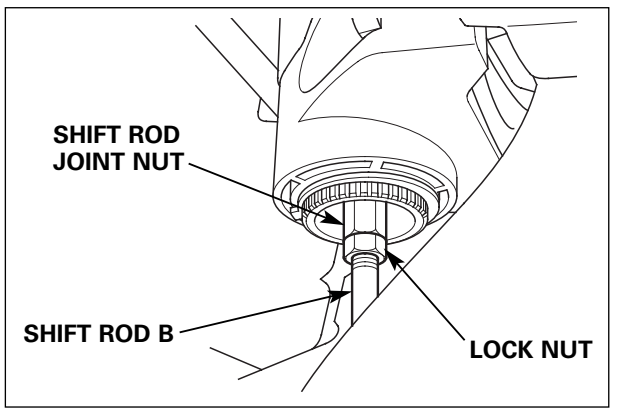
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-3

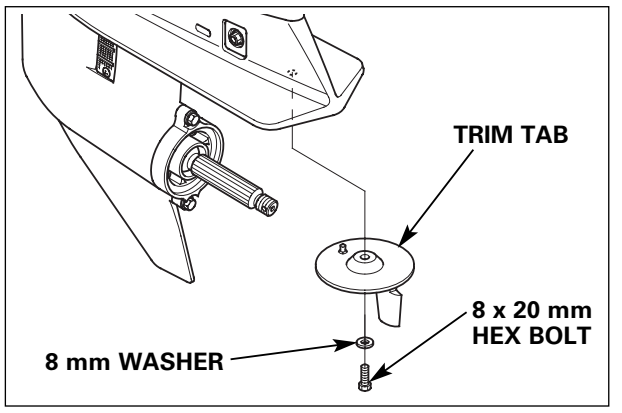
2. GEAR CASE ASSEMBLY/ EXTENSION SEPARATOR [EXTRA-LONG SHAFT TYPE ONLY]

a. REMOVAL

1) Remove the propeller (P. 11-2).
2) Move the shift to the "N" (Neutral) position.
3) Tilt the outboard motor up to the uppermost position. Pull the tilt stopper down to secure the outboard motor.
4) Loosen the shift rod B lock nut and disconnect shift rod A and shift rod B by turning the shift rod joint nut.



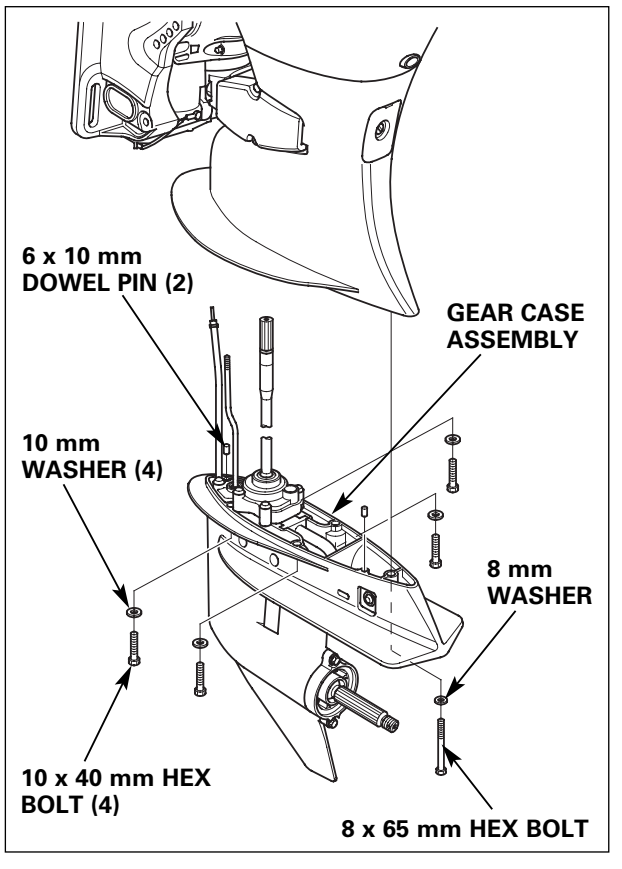
5) Remove the 8 x 20 mm hex bolt and 8 mm washer, and remove the trim tab from the gear case assembly.



6) Remove the four 10 x 40 mm hex bolts, four 10 mm washers, 8 x 65 mm hex bolt and the 8 mm washer, and remove the gear case assembly from the outboard motor [Long shaft type only].

   Remove the four 10 mm self-locking nut, four 10 mm washers, 8 mm self-locking nut and the 8 mm washer, and remove the gear case assembly and extension separator from the outboard motor [Extra-long shaft type only] (P. 11-4).

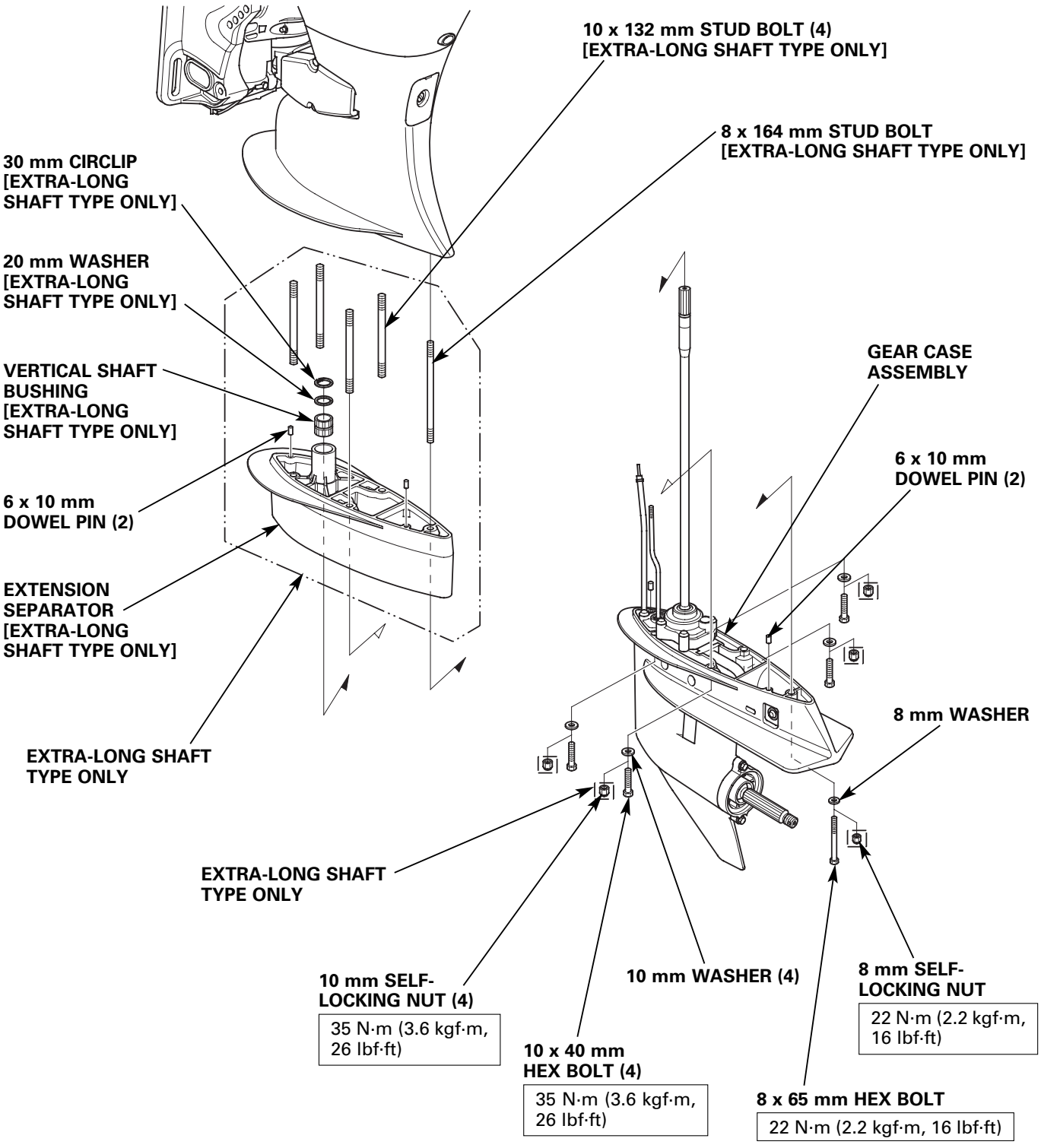
   Remove the two 6 x 10 mm dowel pins.



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-4

b. COMPONENT DRAWING



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-5

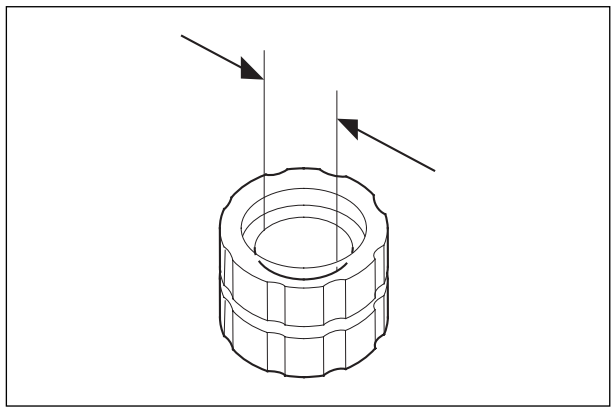
c. INSPECTION

• VERTICAL SHAFT BUSHING I.D. [EXTRA-LONG SHAFT TYPE ONLY]

1) Measure the vertical shaft bushing I.D.

Standard	Service limit
17.02 — 17.13 mm (0.670 — 0.674 in)	17.65 mm (0.695 in)

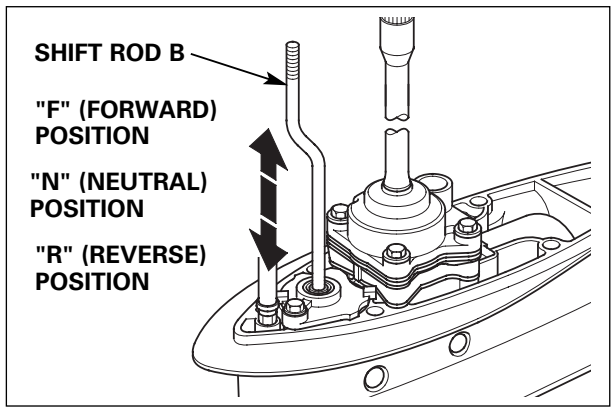
2) If the measurement exceeds the service limit, replace the vertical shaft bushing with a new one.



d. INSTALLATION

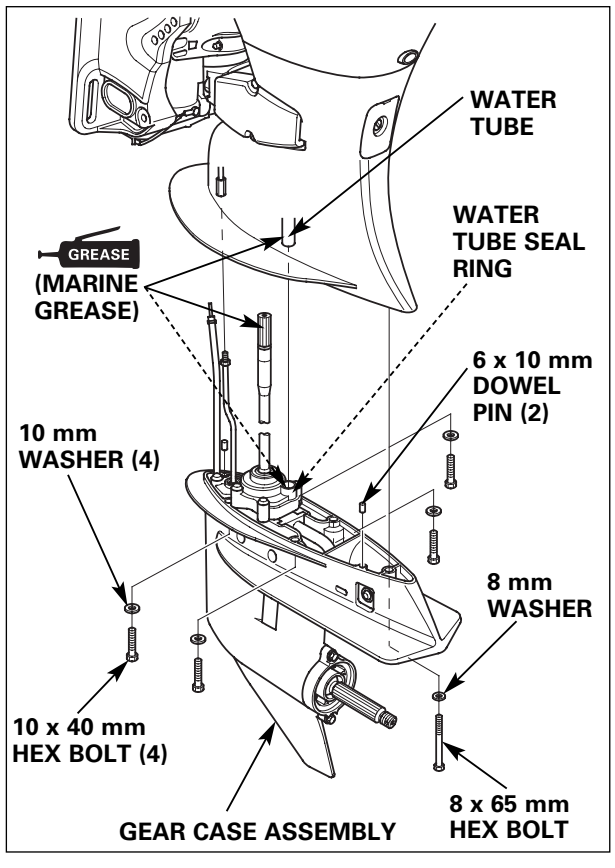
1) Move the shift to the "N" (Neutral) position.
2) Check that shift rod B in the gear case assembly is in the "N" (Neutral) position.

   To check:
   Shift rod B is in the "N" (Neutral) when it is in the middle position as shown.



3) Tilt the outboard motor up to the uppermost position. Pull the tilt stopper down to secure the outboard motor.
4) Apply marine grease to the vertical shaft spline, water tube insertion part and to the inner wall of the water tube seal ring of the impeller housing.
   Install the vertical shaft bushing in the extension separator and apply marine grease to the inner wall of the vertical shaft bushing [Extra-long shaft type only] (P. 11-4).
5) Install the two 6 x 10 mm dowel pins on the gear case. While aligning the water tube with the water tube seal ring of the impeller housing, align the vertical shaft with the primary driven gear and install the gear case assembly on the outboard motor.
6) Loosely tighten the four 10 mm washers, four 10 x 40 mm hex bolts, 8 mm washer and the 8 x 65 mm hex bolt on the gear case assembly [Long shaft type only].
   Loosely tighten the four 10 mm washers, four 10 mm self-locking nuts, 8 mm washer and the 8 mm self-locking nut on the gear case assembly [Extra-long shaft type only] (P. 11-4).
7) Lower the outboard motor to the lowermost position. Tighten the four 10 x 40 mm hex bolts and 8 x 65 mm hex bolt to the specified torque [Long shaft type only].
   Tighten the four 10 mm self-locking nuts and 8 mm self-locking nut to the specified torque [Extra-long shaft type only] (P. 11-4).

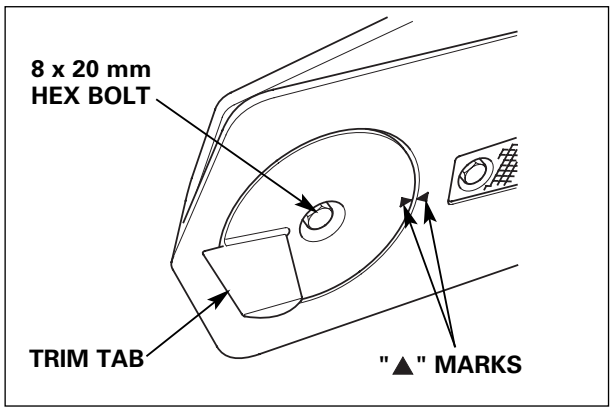
   TORQUE:
   10 x 40 mm hex bolt, 10 mm self-locking nut:
   35 N·m (3.6 kgf·m, 26 lbf·ft)
   8 x 65 mm hex bolt, 8 mm self-locking nut:
   22 N·m (2.2 kgf·m, 16 lbf·ft)



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-6

8) Set the trim tab by aligning the "▲" mark on the trim tab with the "▲" mark on the gear case assembly, and tighten the 8 mm washer and 8 x 20 mm hex bolt securely.



9) Move the shift to the "R" (Reverse) position and push shift rod B of the gear case assembly down to the lowermost position (Reverse position).

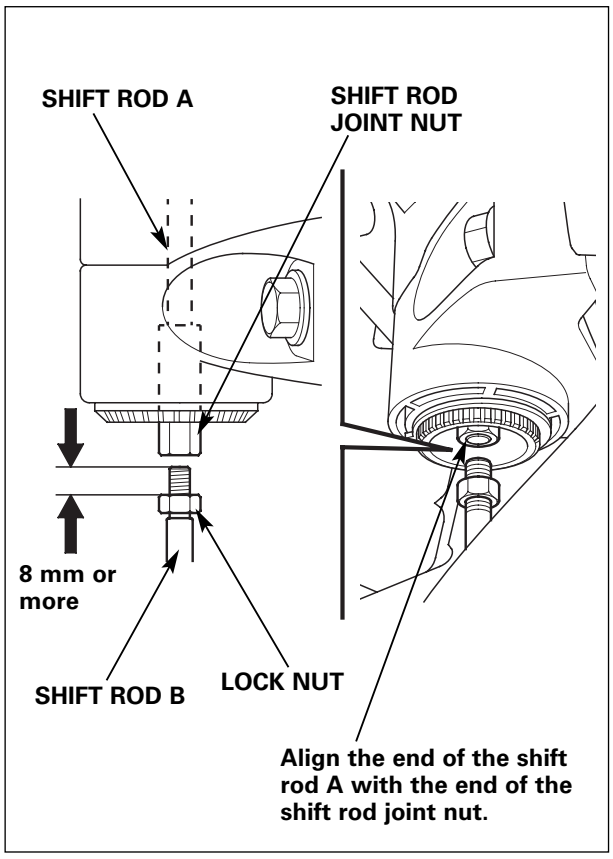
10) Turn the lock nut right or left to adjust the distance from the lock nut end to the end of shift rod B to 8 mm or more as shown.

11) Turn the shift rod joint nut to align the bottom end of shift rod A with the bottom end of the shift rod joint nut.

12) Tighten the shift rod joint nut up to the lock nut position of shift rod B and tighten the lock nut securely.
After installation, move the shift to the "N" (Neutral) position. Check whether the shift moves smoothly.

- Be sure to tighten the shift rod joint nut against shift rod B with the shift and shift rod B in the "R" (Reverse) position.

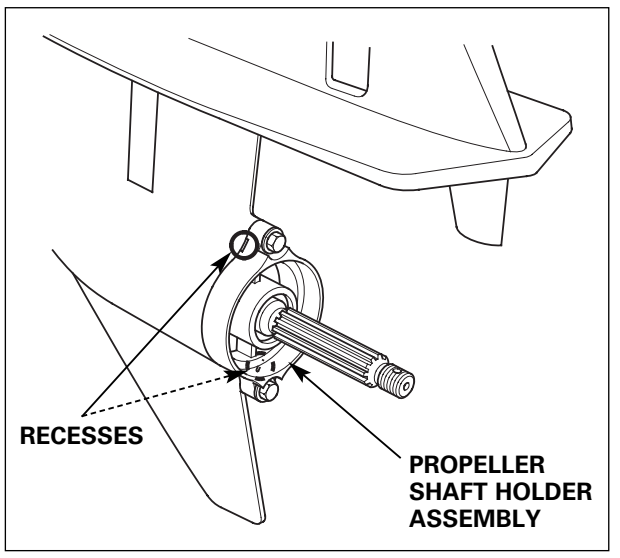
13) Adjust the shift cable (P. 3-21).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-7

3. PROPELLER SHAFT HOLDER ASSEMBLY



a. REMOVAL/INSTALLATION

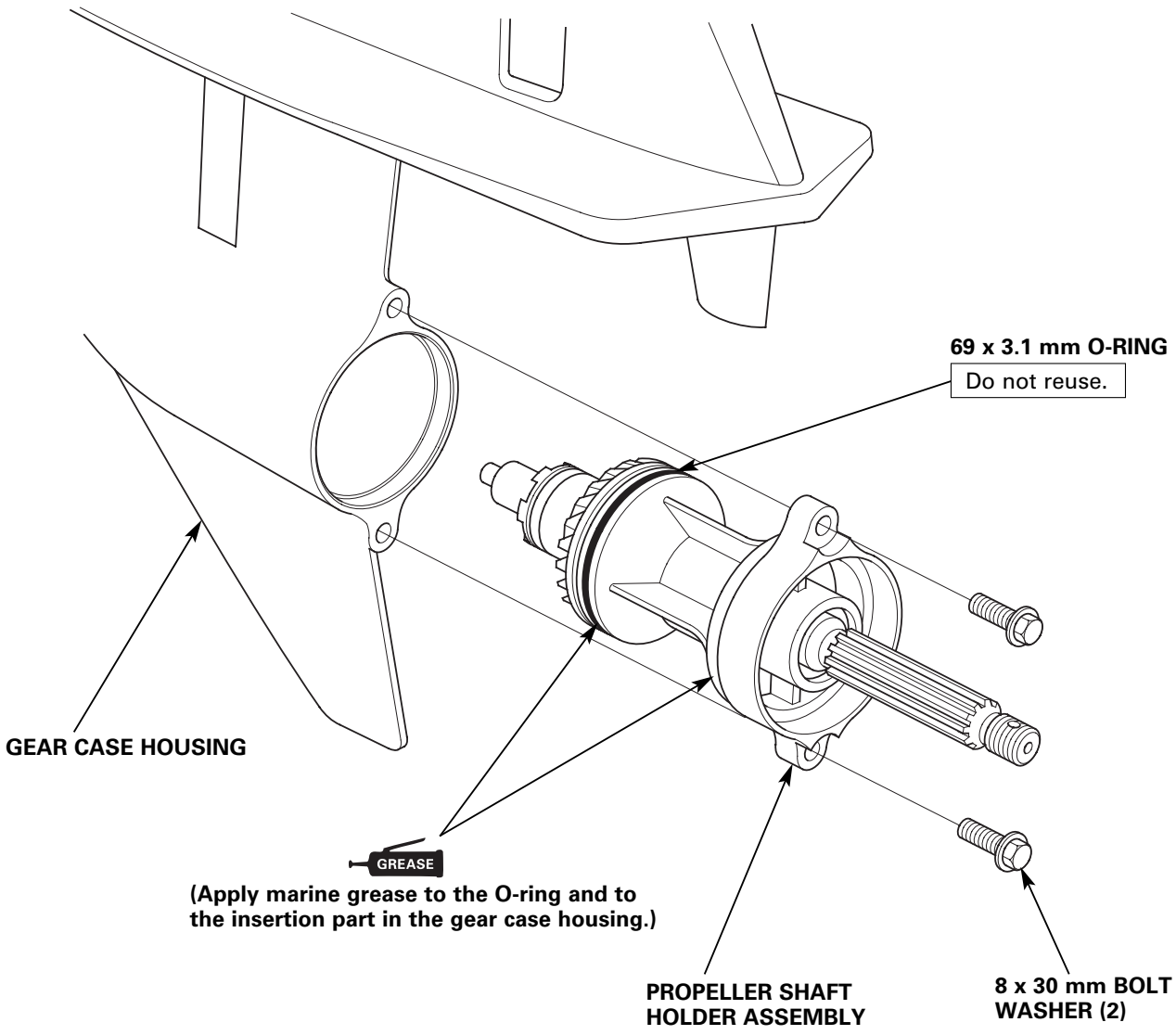
1) Remove the propeller (P. 11-2).

2) Remove the two 8 x 30 mm bolt washers.

3) Insert a screwdriver or equivalent tool into the recesses in the propeller shaft holder and remove the propeller shaft holder assembly from the gear case housing.

Installation is the reverse order of removal. Note the following.

- Check the propeller shaft thrust clearance after installation (P. 11-8).
- Perform gear case pressure check after installation (P. 11-45).



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-8

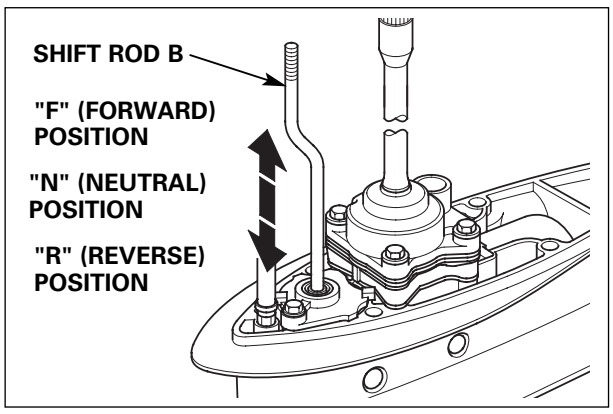
b. INSPECTION

• PROPELLER SHAFT THRUST CLEARANCE

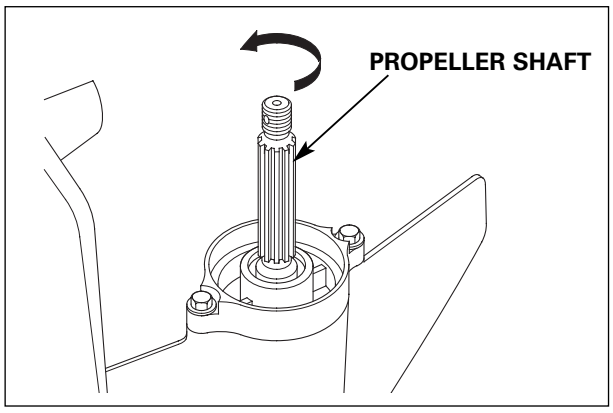
1) Remove the gear case assembly (P. 11-3).

2) Set the gear case assembly so that the propeller shaft is in the vertical position and secure the gear case assembly.

3) Push shift rod B of the gear case assembly down to the lowermost position ["R" (Reverse) position].



4) Turn the propeller shaft 2 or 3 turns counterclockwise to make snug contact of the bearing and gear.

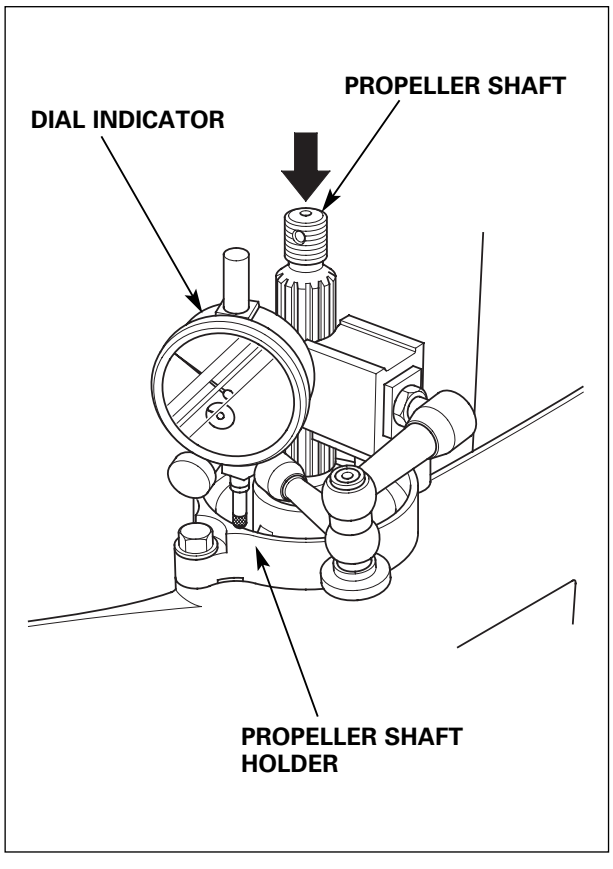


5) Set the dial indicator on the propeller shaft and bring the tip of the gauge in contact with the rib of the propeller shaft holder perpendicularly.

6) Push the propeller shaft down in the direction shown and measure the propeller shaft thrust clearance.

Standard	0.10 — 0.99 mm (0.004 — 0.039 in)

7) If the propeller shaft thrust clearance is less than the specification, check that the bearing is set in the forward bevel gear or the reverse bevel gear securely (P. 11-14, 15 and 35).
If the propeller shaft thrust clearance exceeds the specification, check the propeller shaft, 22 mm washer, forward bevel gear and the reverse bevel gear for wear and replace the faulty part(s) if necessary (P. 11-12 and 33).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-9

4. PROPELLER SHAFT/PROPELLER SHAFT HOLDER

a. DISASSEMBLY

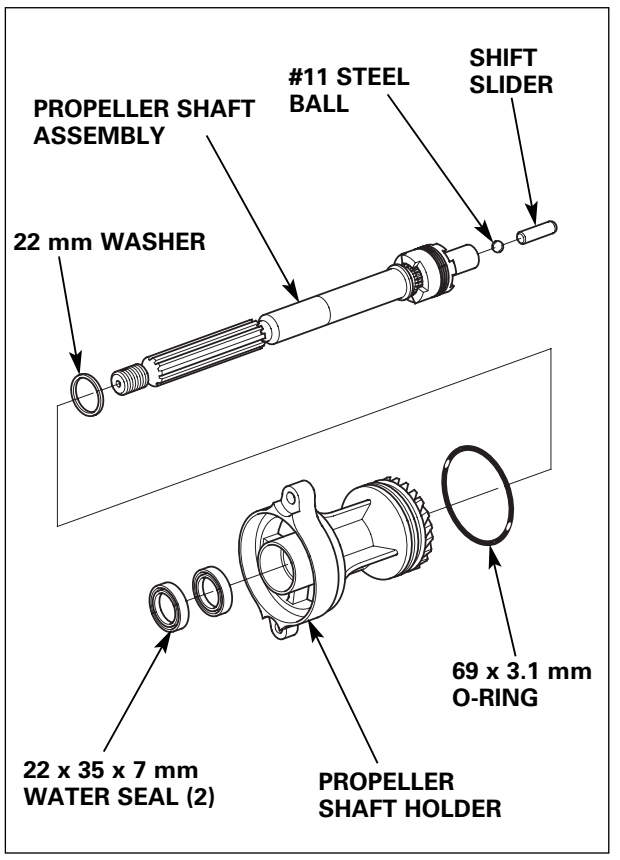
Remove the following parts.
- Propeller (P. 11-2)
- Propeller shaft holder assembly (P. 11-7)

1) Remove the shift slider, #11 steel ball, propeller shaft assembly, 22 mm washer and the 69 x 3.1 mm O-ring. Replace the O-ring with a new one.

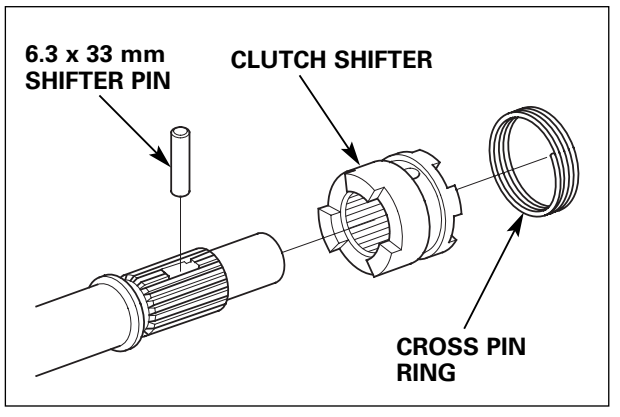
2) Before removing the 22 x 35 x 7 mm water seals, check the water seal lips for cuts and damage and replace them with new ones if necessary.

3) Remove the two 22 x 35 x 7 mm water seals from the propeller shaft holder if necessary.

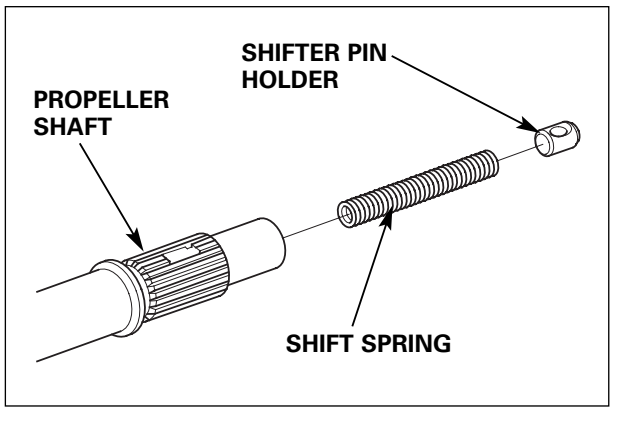
   • Always replace the seals with new ones if you have to remove them.



4) Remove the cross pin ring and the 6.3 x 33 mm shifter pin, then remove the clutch shifter.



5) Remove the shifter pin holder and the shift spring from the propeller shaft.



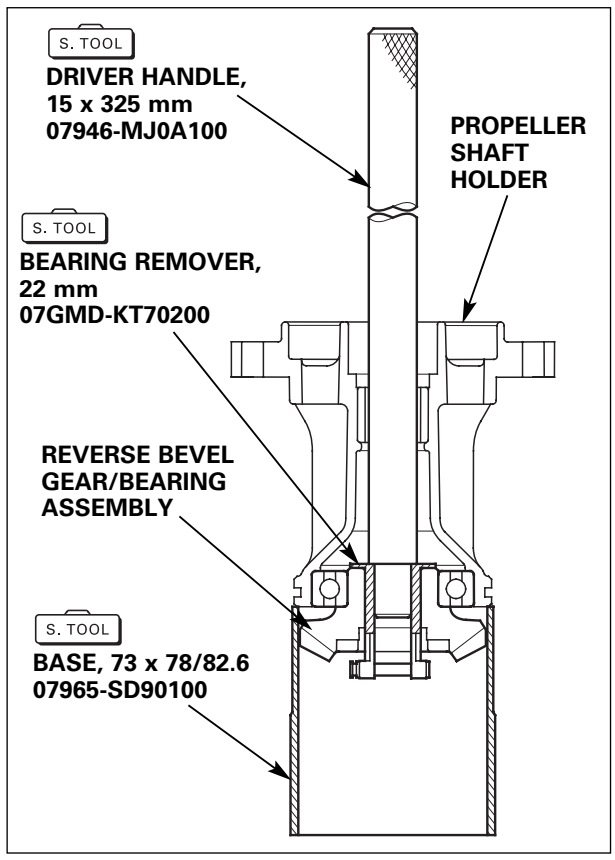
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-10

6) Remove the reverse bevel gear/bearing assembly from the propeller shaft holder using the special tools and hydraulic press as shown.

TOOLS:

Driver handle, 15 x 325 mm	**07946-MJ0A100**
Base, 73 x 78/82.6	**07965-SD90100**
Bearing remover, 22 mm	**07GMD-KT70200**



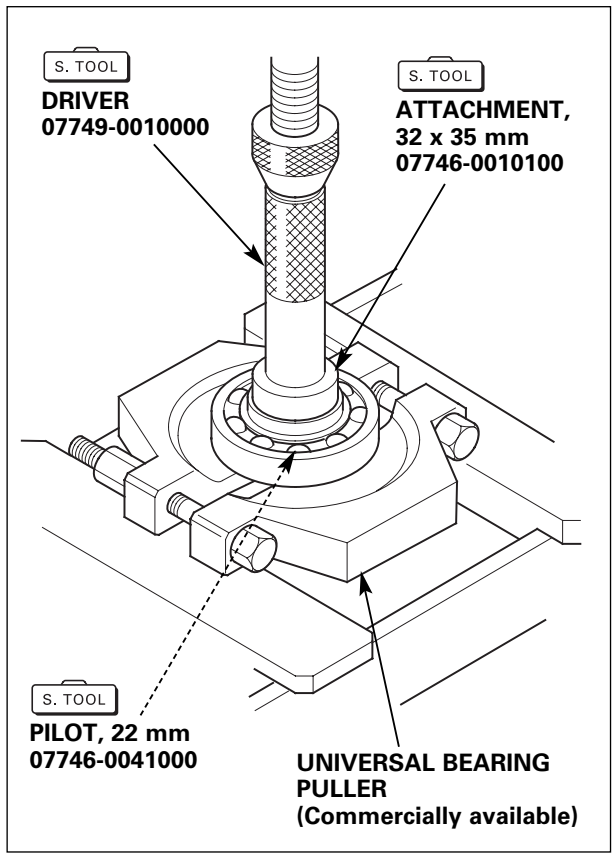
7) Check the bearing for abnormal sound or play before removing it. Replace the bearing if necessary.

8) Install a commercially available universal bearing puller between the reverse bevel gear and bearing.

9) Remove the 6007 radial ball bearing from the reverse bevel gear using the special tools and hydraulic press as shown. Replace the bearing with a new one.

TOOLS:

Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 22 mm	**07746-0041000**



Date of Issue: May 2008
© Honda Motor Co., Ltd.

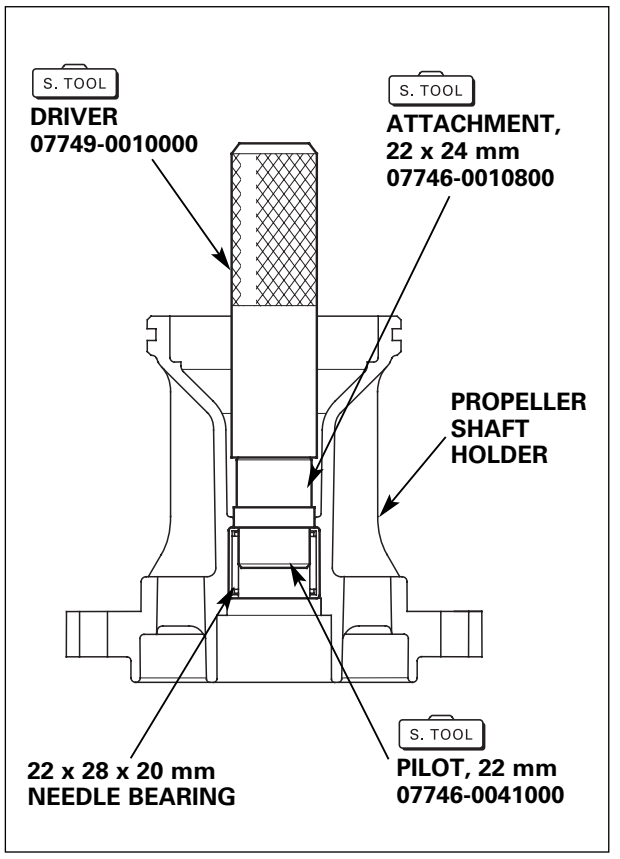
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-11

10) Check the needle bearing for abnormal sound or play before removing it. Replace the bearing if necessary.

11) Remove the 22 x 28 x 20 mm needle bearing from the propeller shaft holder using the special tools and hydraulic press.
Replace the needle bearing with a new one.

TOOLS:

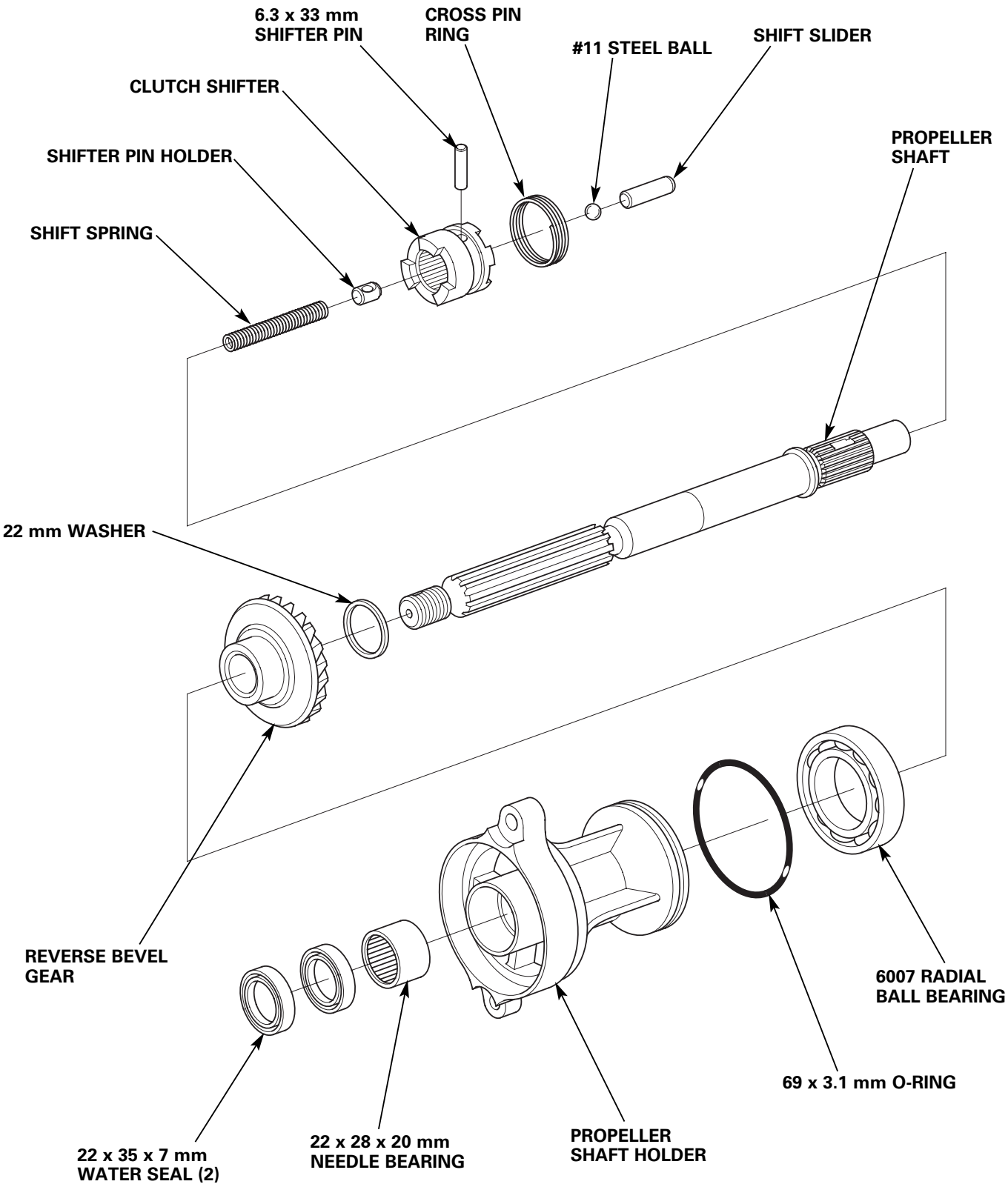
Driver	**07749-0010000**
Attachment, 22 x 24 mm	**07746-0010800**
Pilot, 22 mm	**07746-0041000**



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-12

b. COMPONENT DRAWING



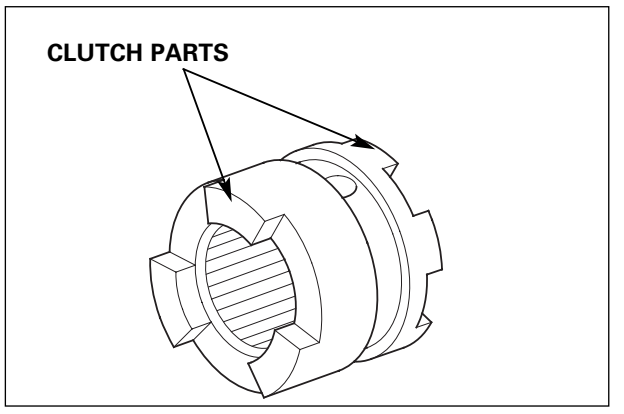
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-13

c. INSPECTION

• CLUTCH SHIFTER

Check the clutch parts on both the forward and reverse sides for wear and damage.

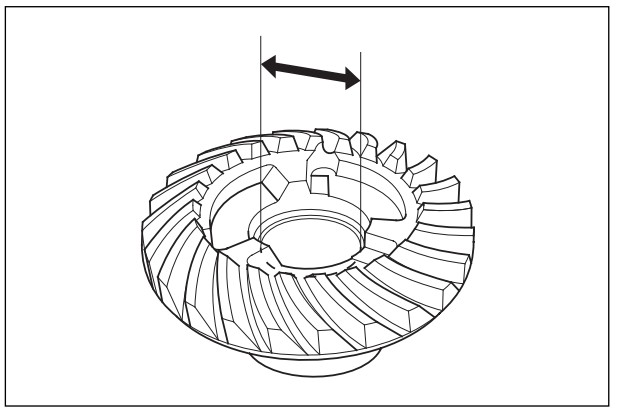


• REVERSE BEVEL GEAR I.D.

1) Measure the reverse bevel gear I.D.

Standard	Service limit
22.05 — 22.30 mm (0.868 — 0.878 in)	22.35 mm (0.880 in)

2) If the measurement exceeds the service limit, replace the reverse bevel gear with a new one.

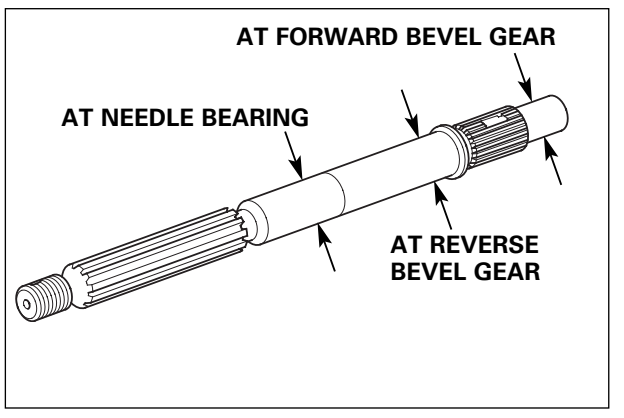


• PROPELLER SHAFT O.D.

1) Measure the O.D. of the propeller shaft at the journals and bearings.

	Standard	Service limit
At forward bevel gear	18.967 — 18.980 mm (0.7467 — 0.7472 in)	18.946 mm (0.7459 in)
At reverse bevel gear	20.900 — 21.200 mm (0.8228 — 0.8346 in)	20.850 mm (0.8209 in)
At needle bearing	22.007 — 22.020 mm (0.8664 — 0.8669 in)	21.990 mm (0.8657 in)

2) If the measurement is less than the service limit, replace the propeller shaft with a new one.



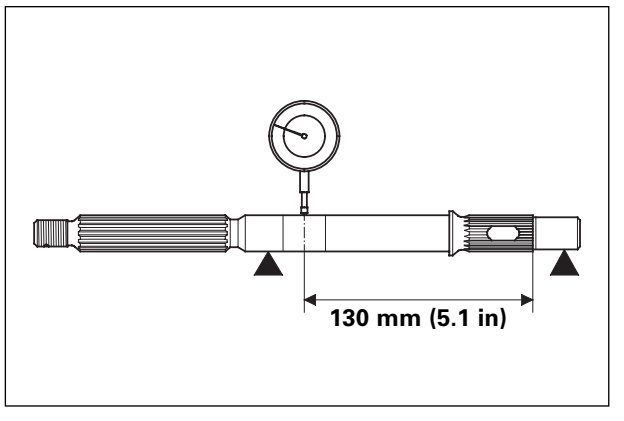
• PROPELLER SHAFT RUNOUT

1) Support each journal with V-blocks as shown.

2) Set the dial indicator and measure the propeller shaft runout while turning the shaft.

Standard	Service limit
0.01 mm (0.0004 in) or below	0.02 mm (0.0008 in)

3) If the measurement exceeds the service limit, replace the propeller shaft with a new one.



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-14

d. REASSEMBLY

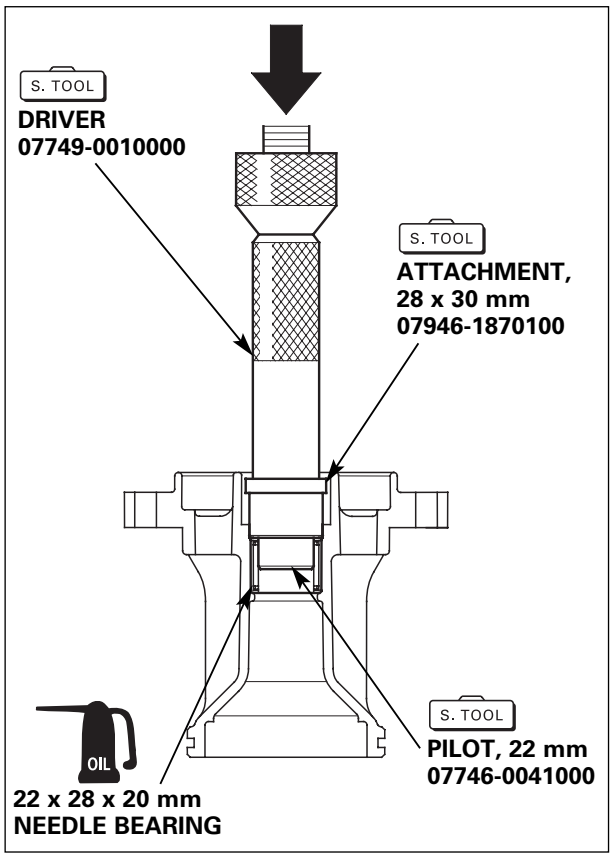
1) Apply gear oil to the circumference of a new needle bearing.

2) Drive the 22 x 28 x 20 mm needle bearing into the propeller shaft holder using the special tools and hydraulic press as shown.

   • Install the needle bearing with the stamped side toward the special tools.

   TOOLS:

Driver	**07749-0010000**
Attachment, 28 x 30 mm	**07946-1870100**
Pilot, 22 mm	**07746-0041000**



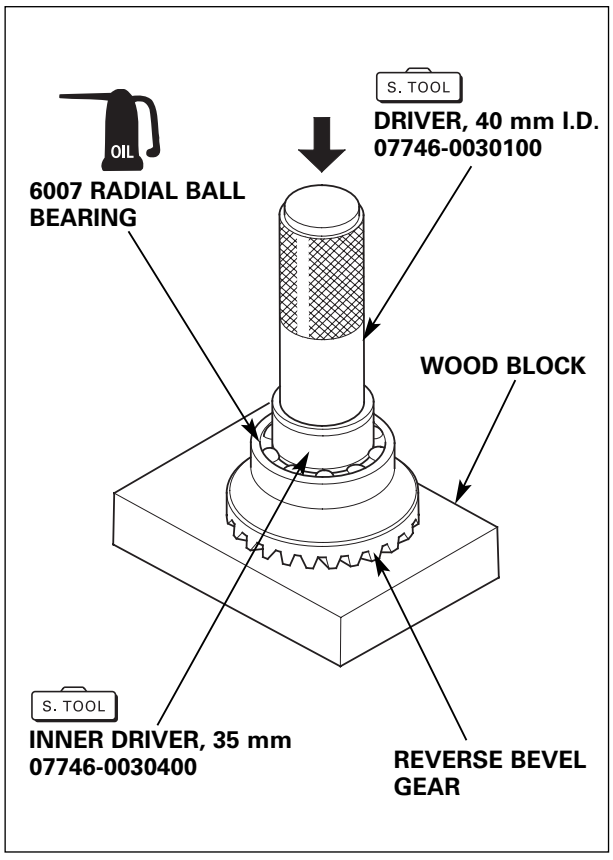
3) Apply gear oil to the circumference of a new bearing.

4) Set a wood block under the reverse bevel gear.

5) Drive the 6007 radial ball bearing into the reverse bevel gear using the special tools and hydraulic press as shown.

   TOOLS:

Driver, 40 mm I.D.	**07746-0030100**
Inner driver, 35 mm	**07746-0030400**



Date of Issue: May 2008
© Honda Motor Co., Ltd.

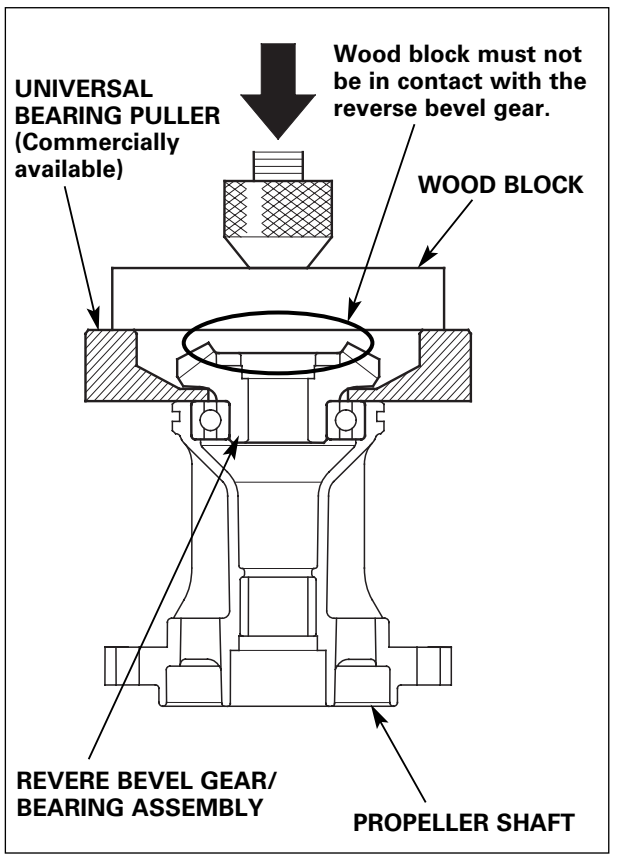
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-15

6) Install a commercially available universal bearing puller between the reverse bevel gear and bearing.

   • Be sure that the universal bearing puller is set on the bearing outer race securely.

7) Set a wood block or equivalent material on the commercially available universal bearing puller as shown. Drive the reverse bevel gear/bearing assembly into the propeller shaft holder using the hydraulic press.

   • If the reverse bevel gear is protruding from the top surface of the universal bearing puller and the wood block is in contact with the reverse bevel gear, set a spacer between the wood block and the universal bearing puller to drive the reverse bevel gear/bearing assembly.



8) Set a wood block under the reverse bevel gear.

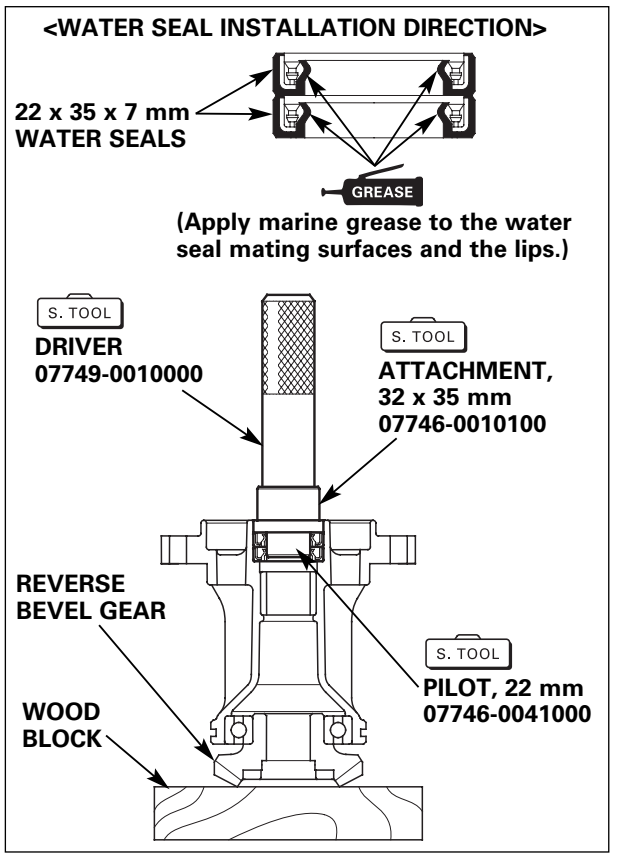
9) Apply soapy water to the outer surface of the 22 x 35 x 7 mm water seals.

10) Drive the 22 x 35 x 7 mm water seals one by one into the propeller shaft holder using the special tools. Note the installation direction of the water seals.
    Apply marine grease to the water seal mating surfaces before installation.

    TOOLS:

Driver	**07749-0010000**
Attachment, 32 x 35 mm	**07746-0010100**
Pilot, 22 mm	**07746-0041000**

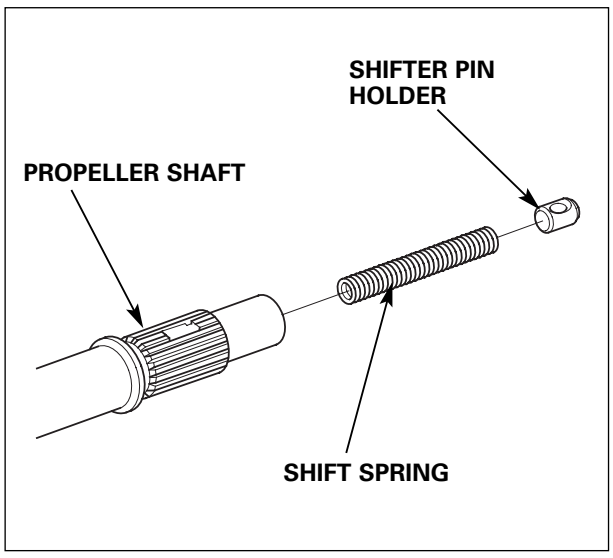
11) After installation of the water seals, apply marine grease to the water seal lips.



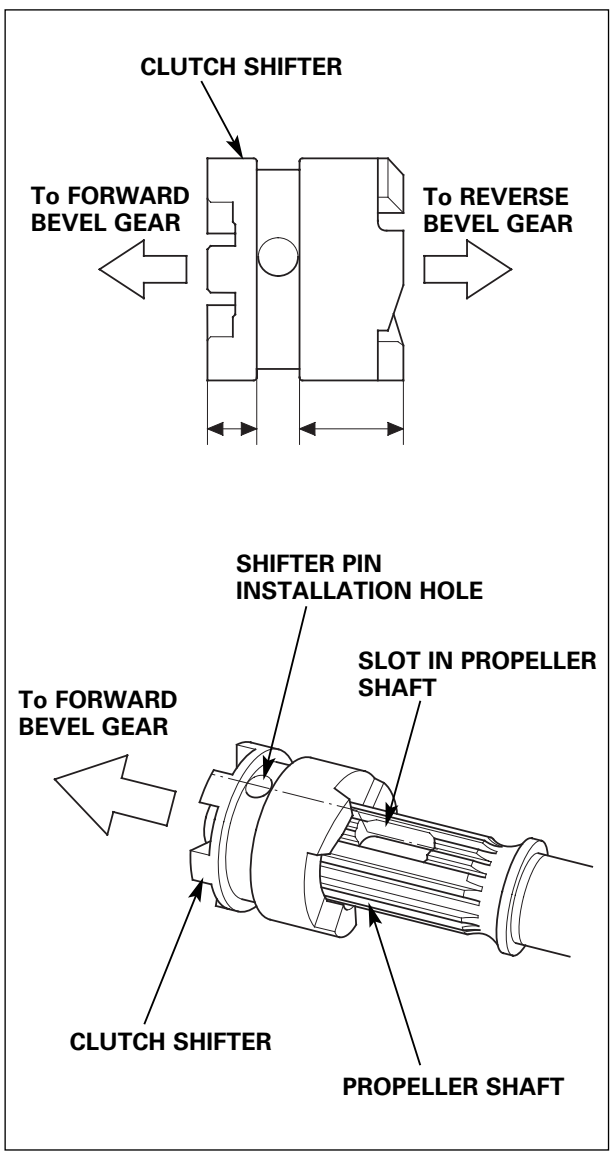
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-16

12) Install the shift spring and the shifter pin holder in the propeller shaft.



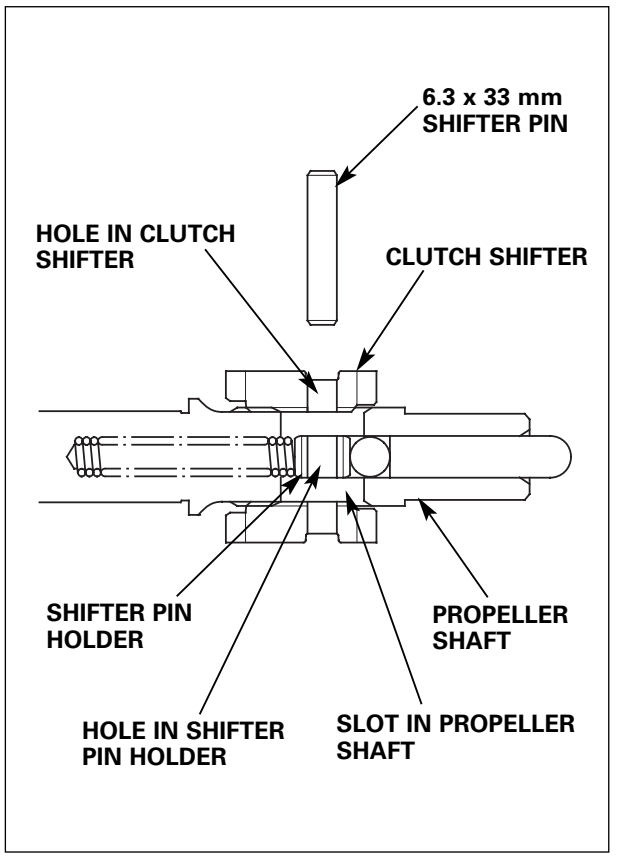
13) Install the clutch shifter with the thinner side toward the forward bevel gear side (front side) by aligning the 6.3 x 33 mm shifter pin installation hole with the long hole in the propeller shaft as shown.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

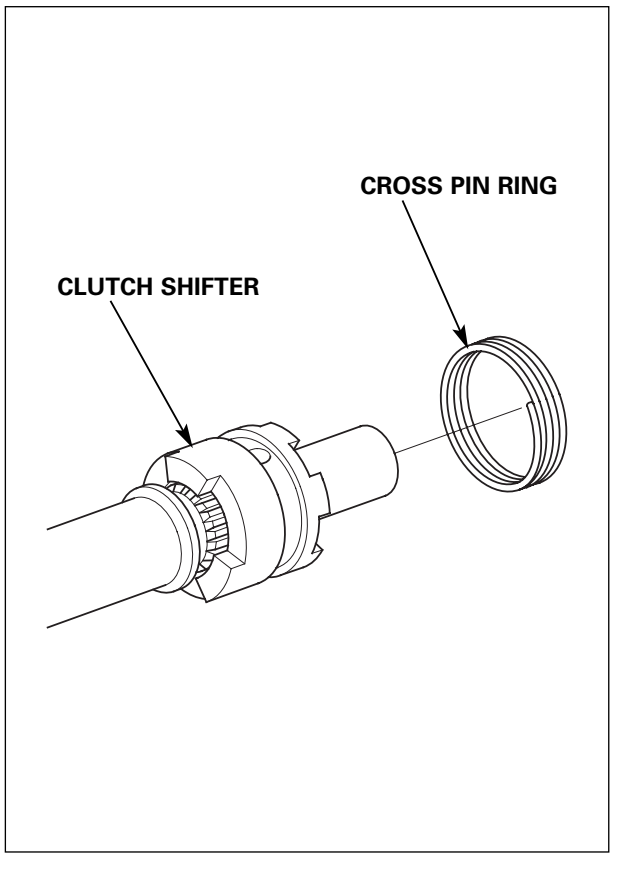
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-17

14) Install the 6.3 x 33 mm shifter pin while aligning the hole in the clutch shifter with the hole in the shifter pin holder.



15) Install the cross pin ring on the clutch shifter.

- Check that the coils of the cross pin ring do not overlap each other.



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-18

16) Apply marine grease to the outer surface of a new 69 x 3.1 mm O-ring and install it on the propeller shaft holder.

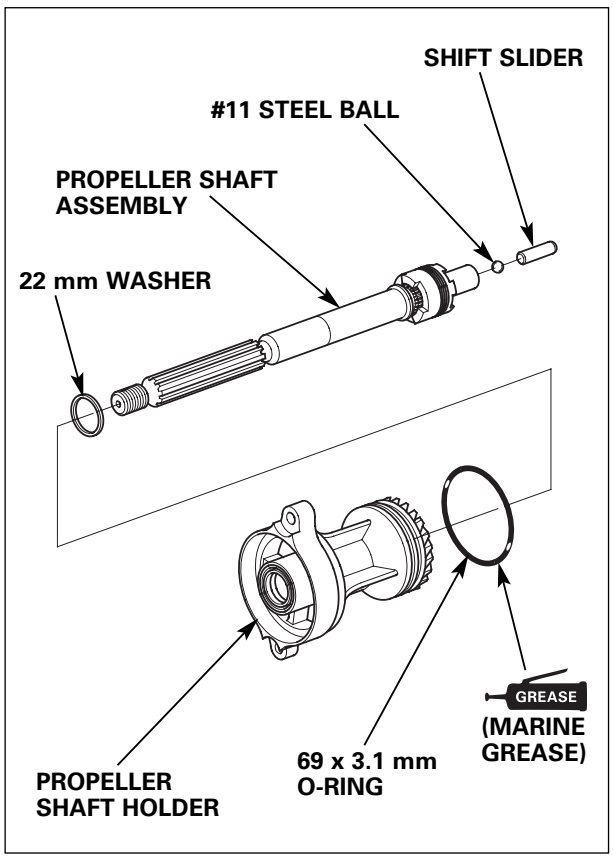
17) Install the 22 mm washer on the propeller shaft assembly.

18) Install the #11 steel ball and the shift slider in the propeller shaft assembly.

- Install the shift slider with the flat end toward the propeller shaft.

19) Install the propeller shaft assembly in the propeller shaft holder.

20) Install the following parts.
- Propeller shaft holder assembly (P. 11-7)
- Propeller (P. 11-2)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-19

5. WATER PUMP/SHIFT ROD

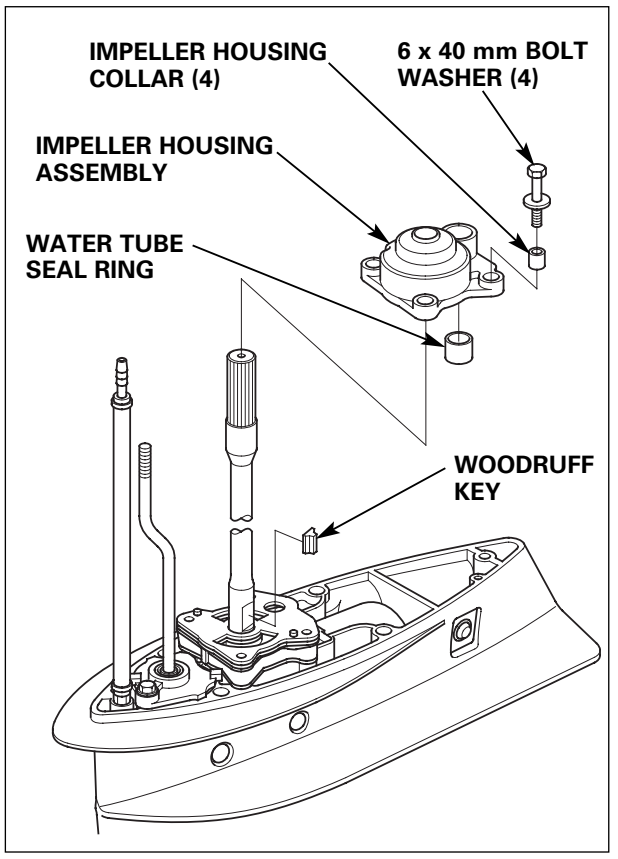
a. DISASSEMBLY

Remove the following parts.
- Propeller (P. 11-2)
- Gear case assembly (P. 11-3)
- Propeller shaft holder assembly (P. 11-7)

1) Remove the four 6 x 40 mm hex bolts and the four 6 mm washers, and remove the impeller housing assembly from the gear case housing.

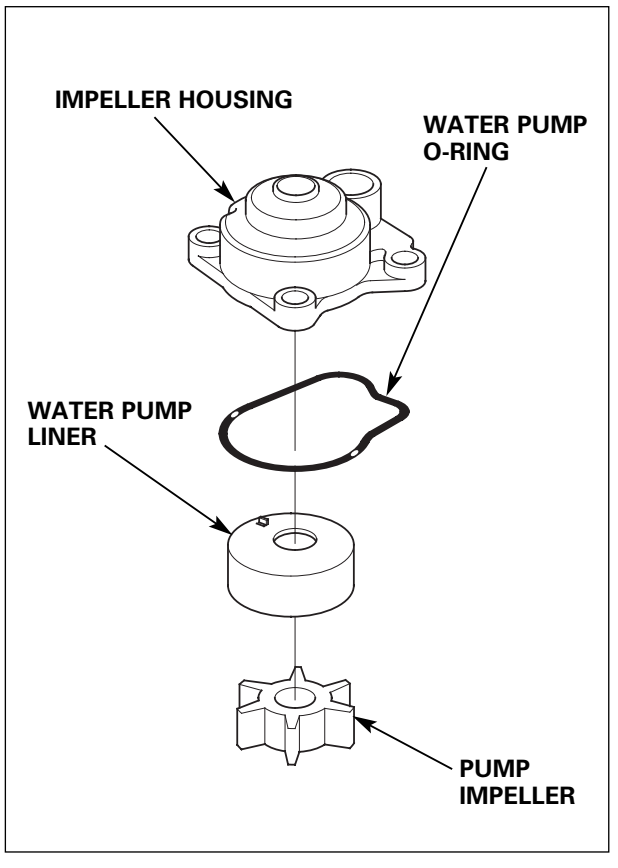
2) Remove the four impeller housing collars and the water tube seal ring from the impeller housing assembly.

3) Remove the woodruff key from the vertical shaft.



4) Check the pump impeller for cracks, wear or damage from overheating, and replace it if necessary.

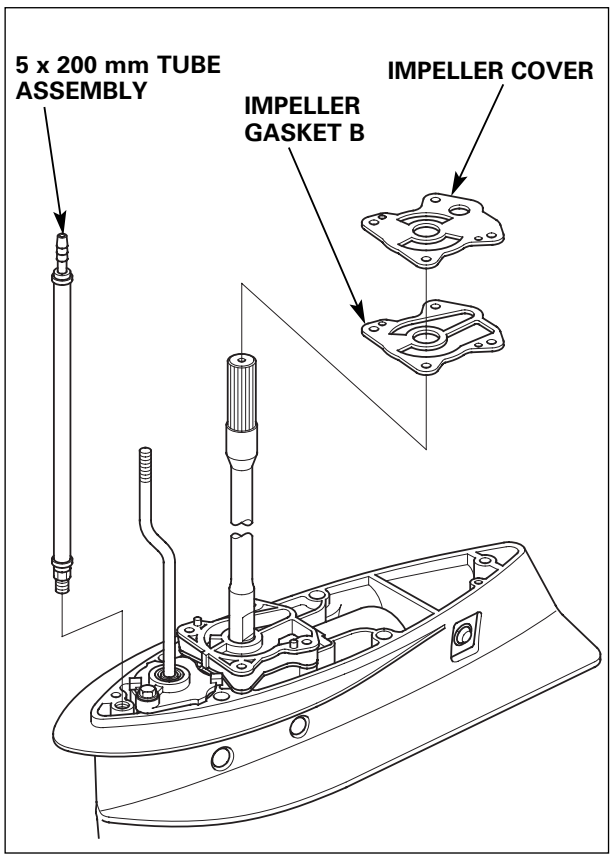
5) Remove the pump impeller, water pump liner and the water pump O-ring from the impeller housing.
Replace the O-ring with a new one on reassembly.



© Honda Motor Co., Ltd.

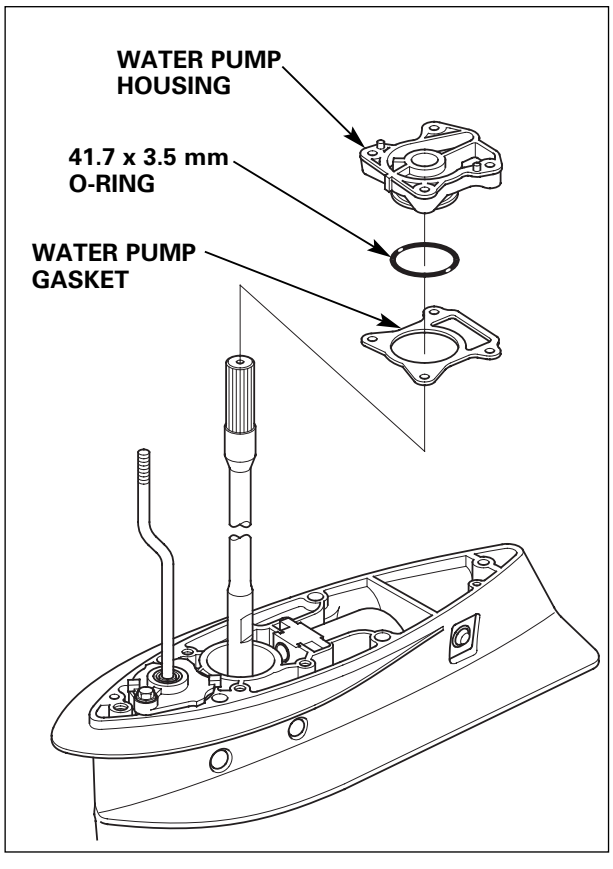
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-20

6) Remove the impeller cover and impeller gasket B.
Replace the gasket with a new one on reassembly.
Remove the 5 x 200 mm tube assembly from the gear case housing.



7) Remove the water pump housing and the water pump gasket.
Replace the gasket with a new one on reassembly.

8) Remove the 41.7 x 3.5 mm O-ring from the water pump housing.
Replace the O-ring with a new one on reassembly.



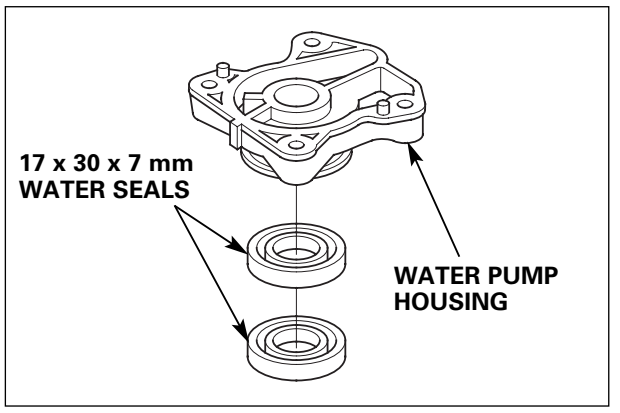
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-21

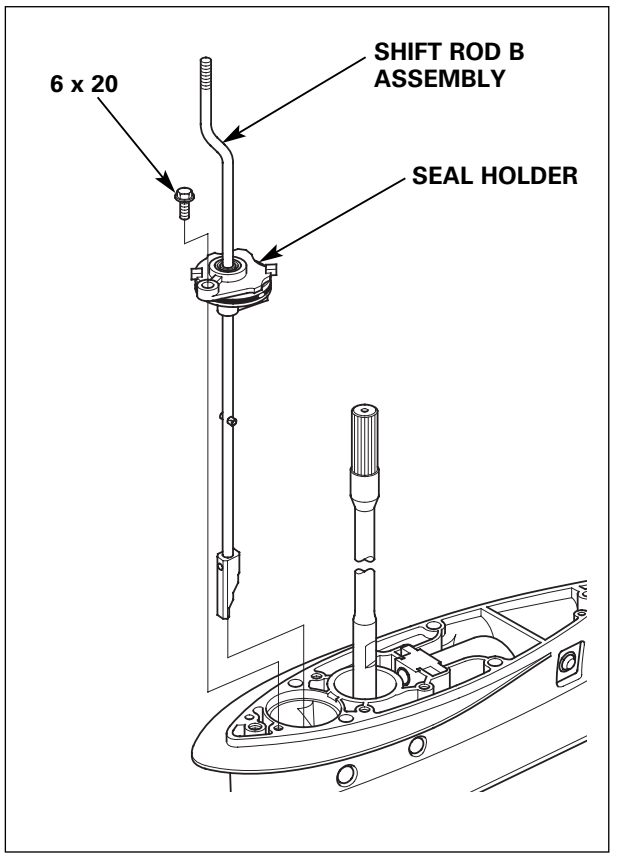
9) Before removing the 17 x 30 x 7 mm water seals, check the lips for cuts. Replace the water seals with new ones if necessary.

10) Remove the two 17 x 30 x 7 mm water seals from the water pump housing if necessary.

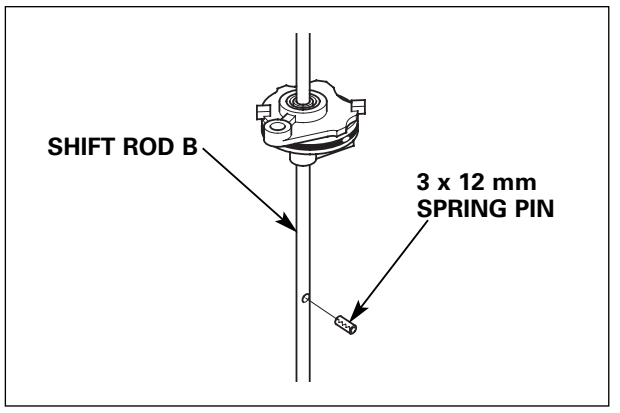
- Always replace the seals with new ones if you have to remove them.



11) Remove the 6 x 20 mm flange bolt, and remove the seal holder and shift rod B assembly from the gear case housing.



12) Remove the 3 x 12 mm spring pin from shift rod B using a commercially available pin driver.

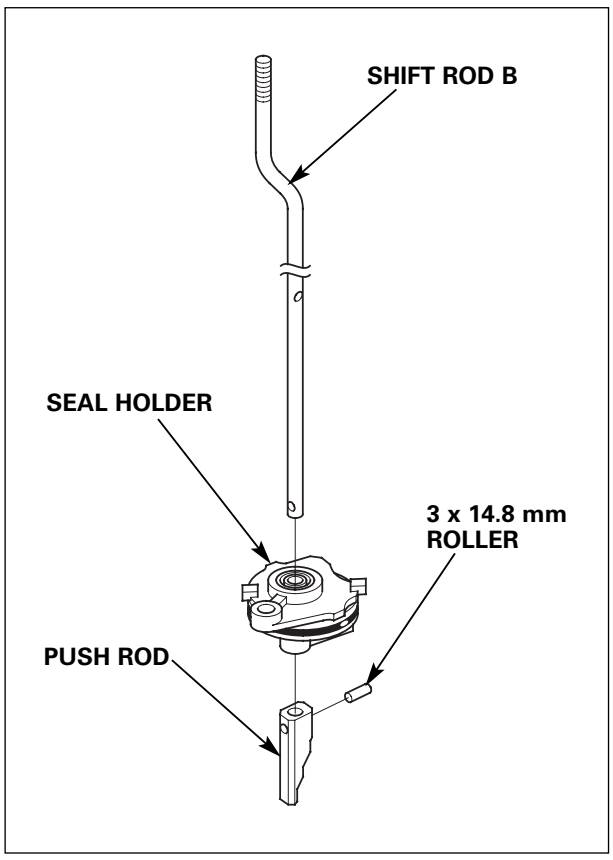


© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-22

13) Remove the 3 x 14.8 mm roller from the push rod using a commercially available pin driver, then remove the push rod from shift rod B.

14) Remove the seal holder from shift rod B.

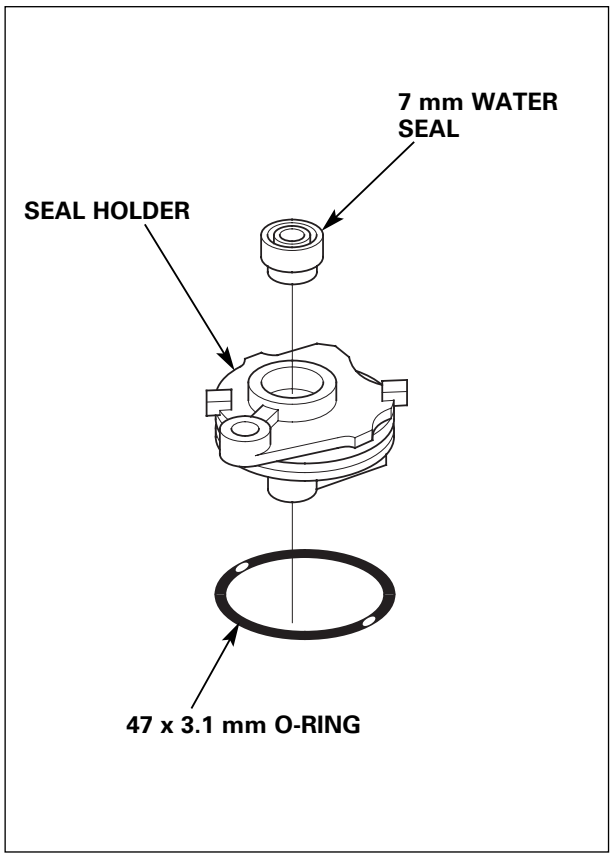


15) Check the 7 mm water seal lip for cuts and replace it if necessary.

16) Remove the 7 mm water seal from the seal holder if necessary.

- Always replace the seal with a new one if you have to remove it.

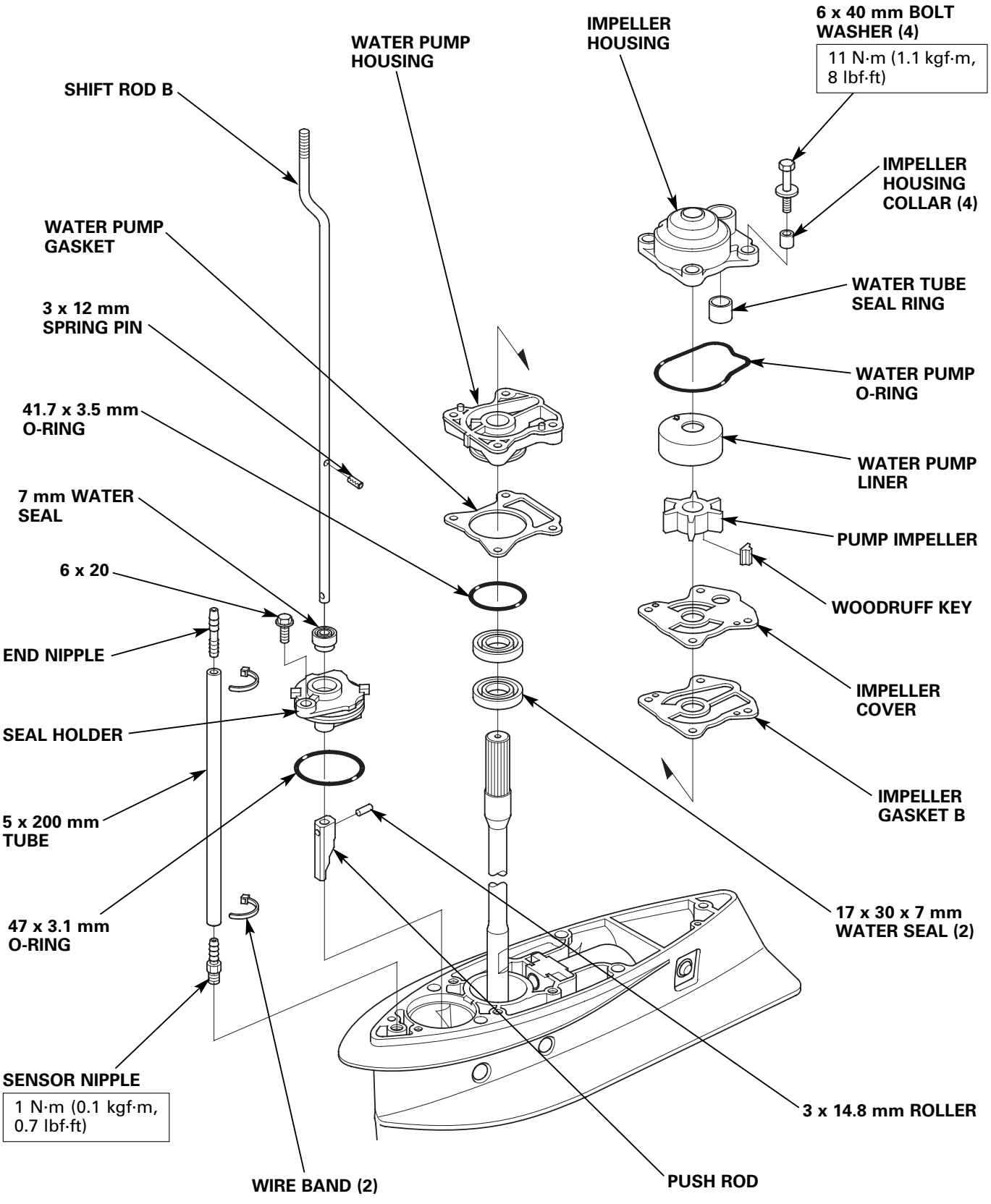
17) Remove the 47 x 3.1 mm O-ring from the seal holder. Replace the O-ring with a new one on reassembly.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-23

b. COMPONENT DRAWING



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-24

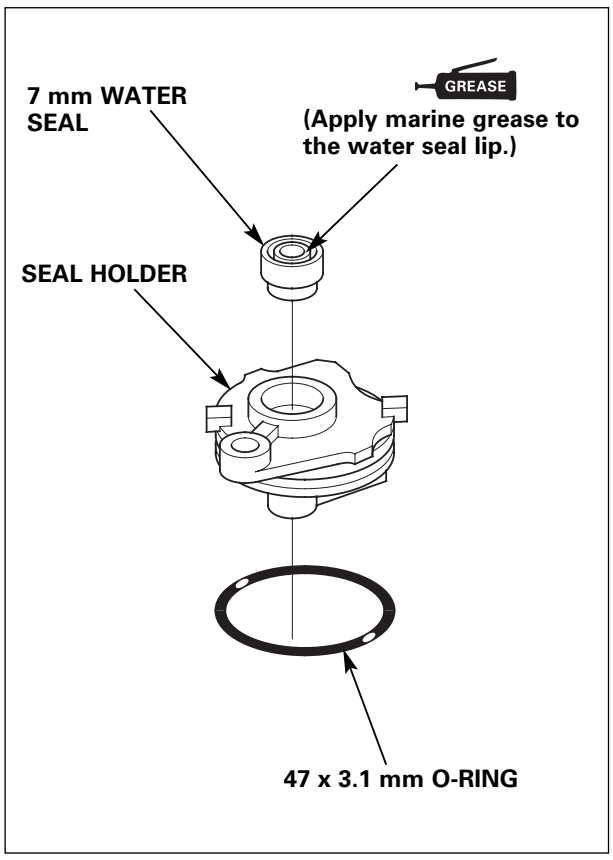
c. REASSEMBLY

1) Apply soapy water to the outer surface of a new 7 mm water seal.

2) Install the 7 mm water seal in the seal holder.

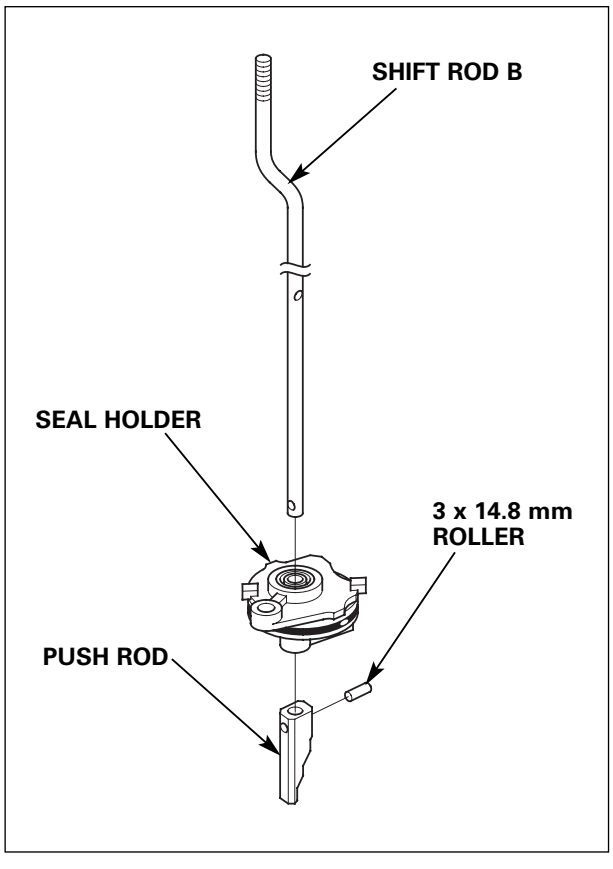
3) After installing the water seal, apply marine grease to the seal lip.

4) Install the new 47 x 3.1 mm O-ring on the seal holder.



5) Install the seal holder on shift rod B.

6) Set the push rod on shift rod B, and align the hole in the push rod with the hole in shift rod B. Drive the 3 x 14.8 mm roller into the push rod using a commercially available pin driver.

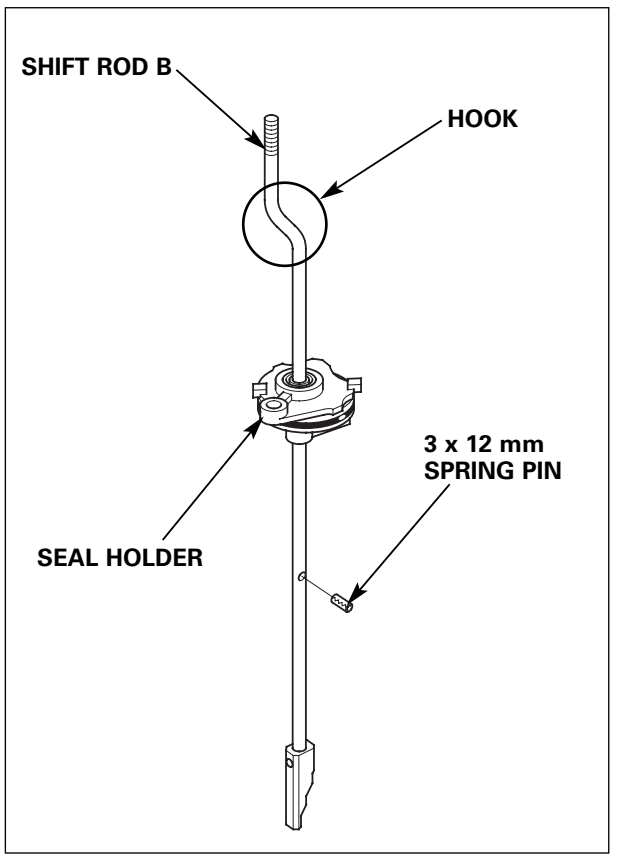


Date of Issue: May 2008
© Honda Motor Co., Ltd.

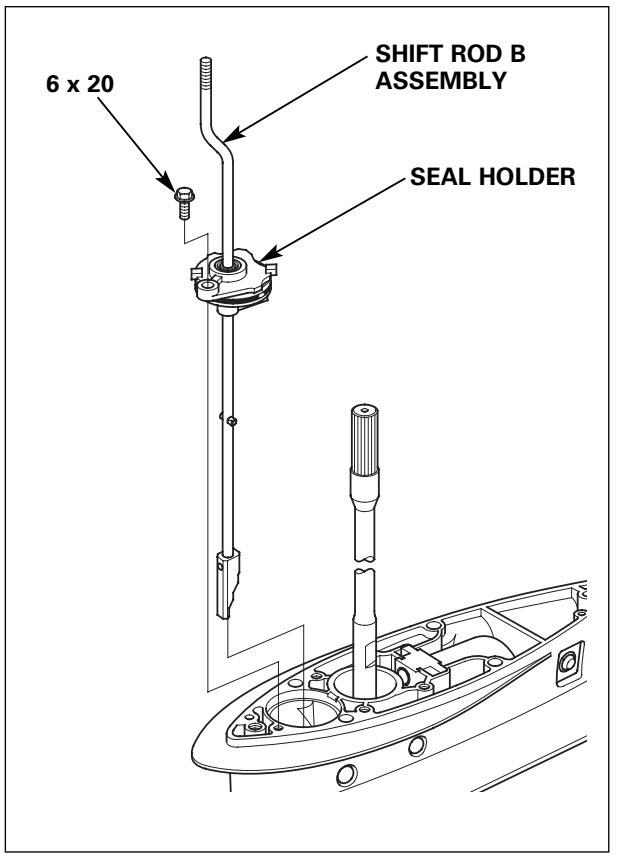
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-25

7) Drive the 3 x 12 mm spring pin into shift rod B using a commercially available pin driver.

   • Before installing the spring pin, move the seal holder above the spring pin installation part of shift rod B (i.e. on the hook side of shift rod B).



8) Install shift rod B assembly and the seal holder in the gear case housing and tighten the 6 x 20 mm flange bolt securely.



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-26

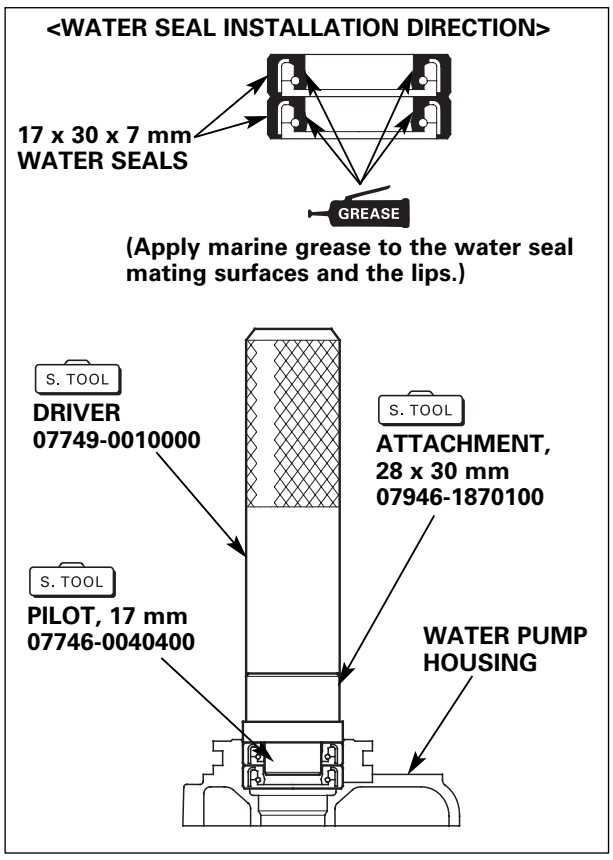
9) Apply soapy water to the outer surface of a new 17 x 30 x 7 mm water seal.

10) Drive the 17 x 30 x 7 mm water seals one by one into the water pump housing using the special tools. Note the installation direction of the water seals.
Apply marine grease to the water seal mating surfaces before installation.

TOOLS:

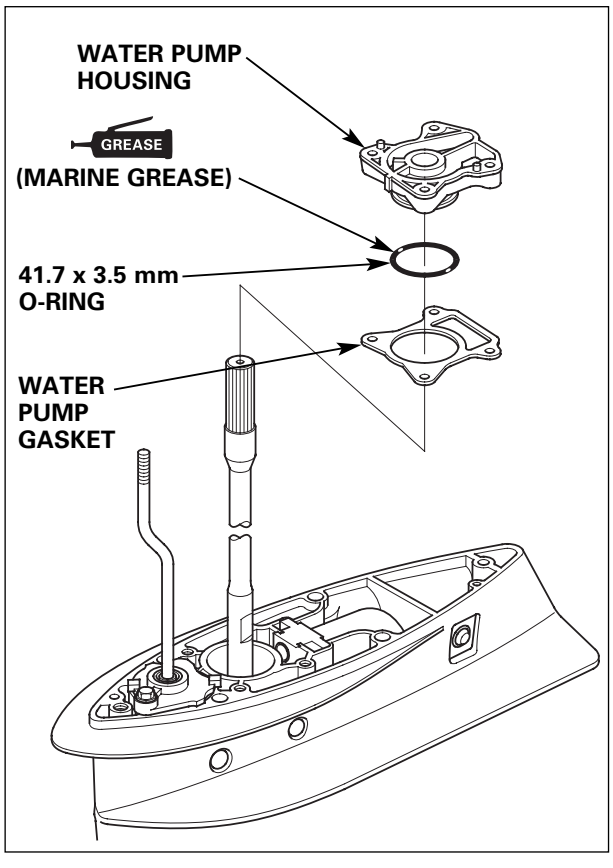
Driver	**07749-0010000**
Attachment, 28 x 30 mm	**07946-1870100**
Pilot, 17 mm	**07746-0040400**

11) After installation, apply marine grease to the water seal lips.



12) Apply marine grease to the outer surface of a new 41.7 x 3.5 mm O-ring and install it on the water pump housing.

13) Install a new water pump gasket and the water pump housing on the gear case housing.

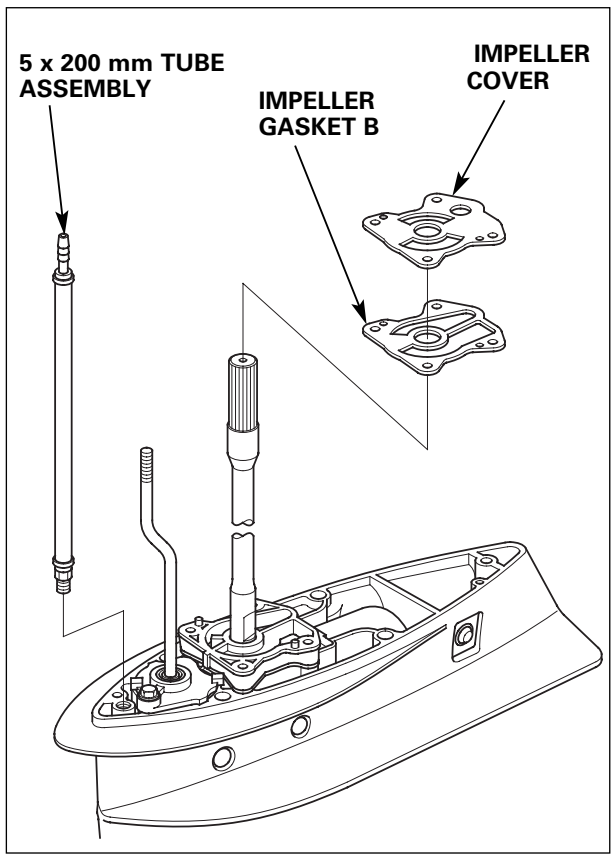


Date of Issue: May 2008
© Honda Motor Co., Ltd.

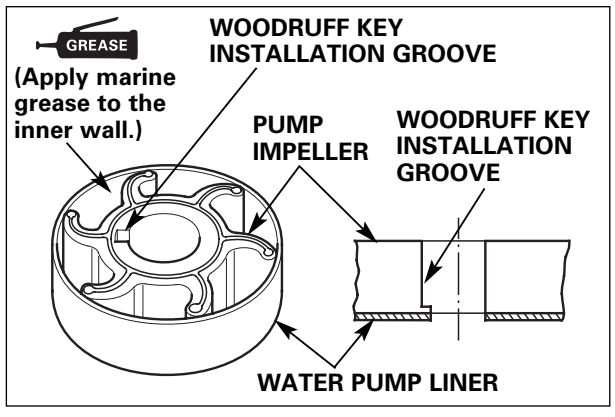
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-27

14) Install a new impeller gasket and impeller cover on the gear case housing.
Tighten the sensor nipple to the specified torque, and install the 5 x 200 mm tube assembly in the gear case housing.

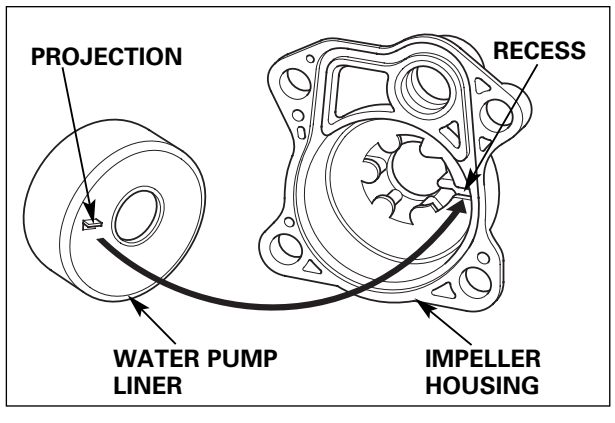
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



15) Apply marine grease to the inner wall of the water pump liner. Install the pump impeller in the water pump liner with the woodruff key installation groove facing out and the pump impeller fins in the direction shown.
Be sure to align the hole in the water pump liner with the hole in the pump impeller.



16) Install the water pump liner in the impeller housing by aligning the projection on the water pump liner with the recess in the impeller housing.



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-28

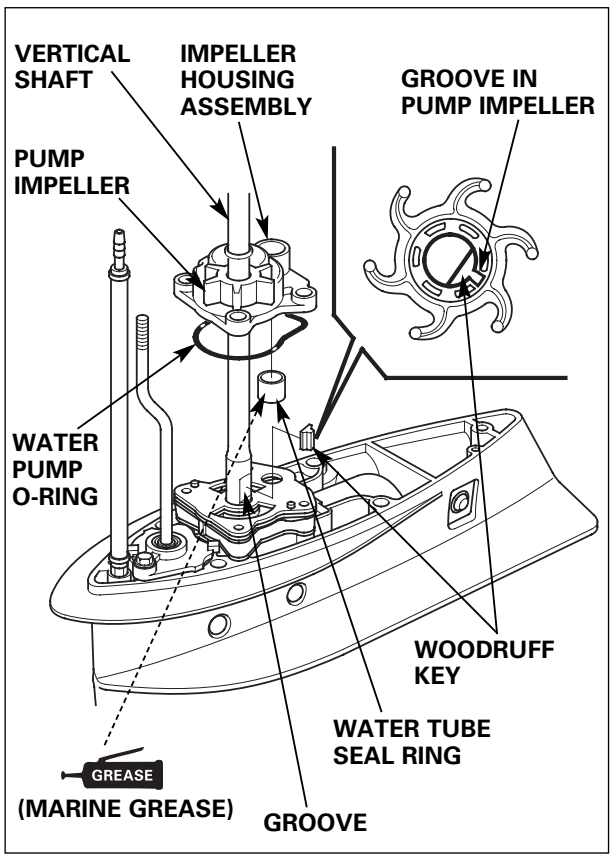
17) Apply marine grease to the outer surface of a new water pump O-ring and install it on the impeller housing.

18) Install the water tube seal ring in the impeller housing and apply marine grease to the inner wall of the water tube seal ring.

19) Install the woodruff key in the groove in the vertical shaft. Turning the impeller housing assembly clockwise, align the woodruff key with the groove in the pump impeller and install the impeller housing assembly.
After installation, check that the impeller cover and the impeller gasket are set in the proper position securely.

NOTICE

Turn the impeller housing assembly clockwise when it is turned with the pump impeller mounted.

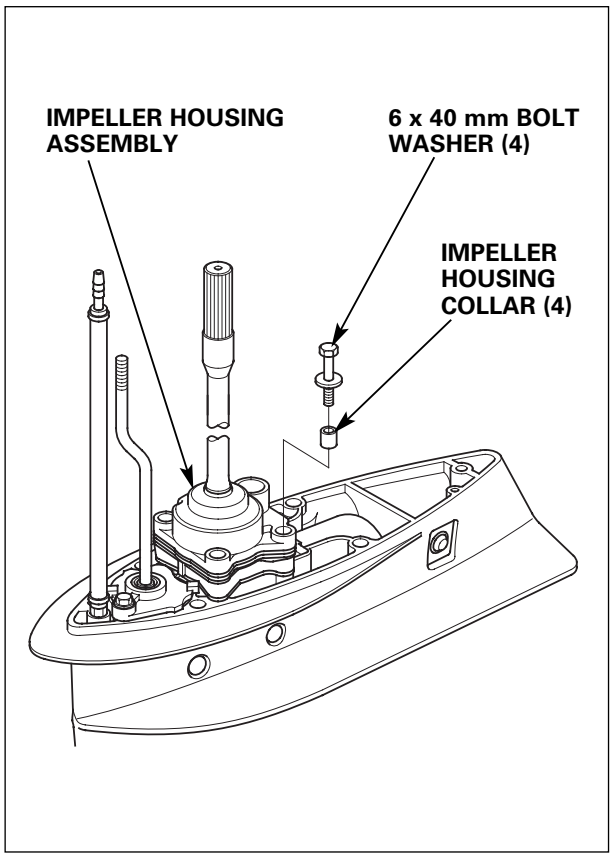


20) Install the four impeller housing collars in the impeller housing assembly, and tighten the four 6 mm washers and four 6 x 40 mm hex bolts to the specified toque.

TORQUE: 11 N·m (1.1 kgf·m, 8 lbf·ft)

21) Perform gear case pressure check after assembly (P. 11-45).

22) Install the following parts.
- Propeller shaft holder assembly (P. 11-7)
- Gear case assembly (P. 11-5)
- Propeller (P. 11-2)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-29

6. VERTICAL SHAFT/BEVEL GEAR

a. DISASSEMBLY

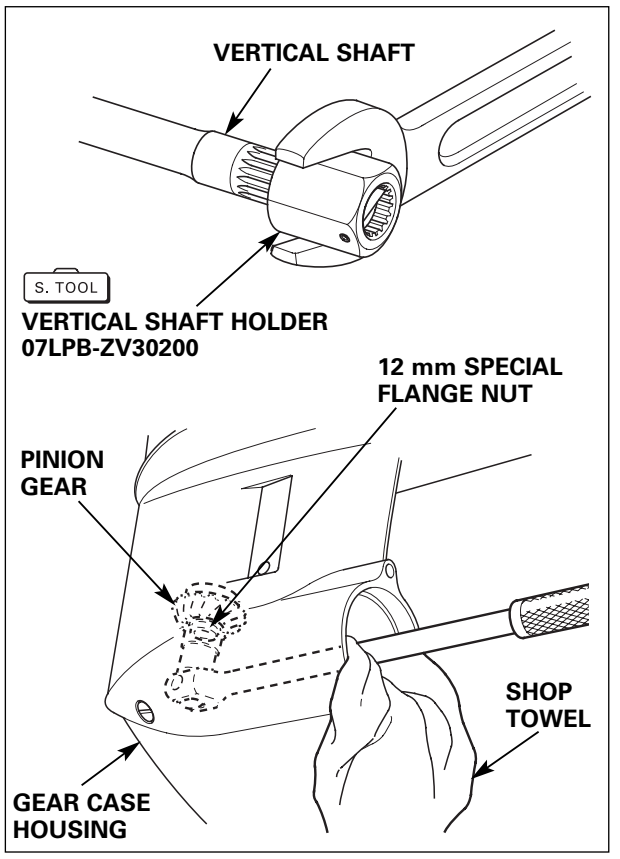
Remove the following parts.
- Propeller (P. 11-2)
- Gear case assembly (P. 11-3)
- Propeller shaft holder assembly (P. 11-7)
- Water pump/shift rod (P. 11-19)

1) Attach the special tool to the end (primary driven gear installation side) of the vertical shaft.

   TOOL:
   Vertical shaft holder **07LPB-ZV30200**

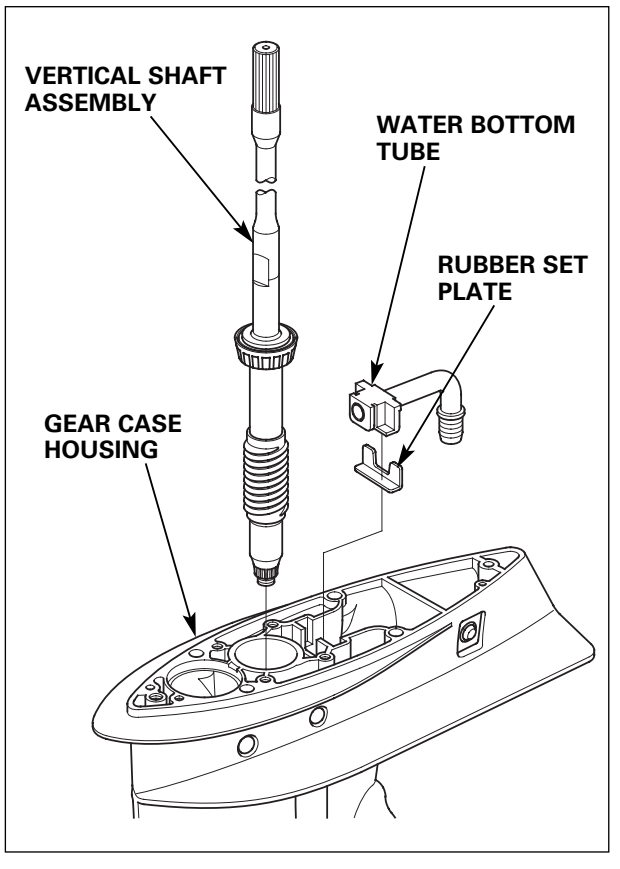
2) Place a shop towel or equivalent material as shown to protect the gear case housing.

3) Holding the vertical shaft with the special tool, remove the 12 mm special flange nut and remove the pinion gear from the vertical shaft.



4) Remove the vertical shaft assembly from the gear case housing.

5) Remove the water bottom tube and the rubber set plate from the gear case housing.

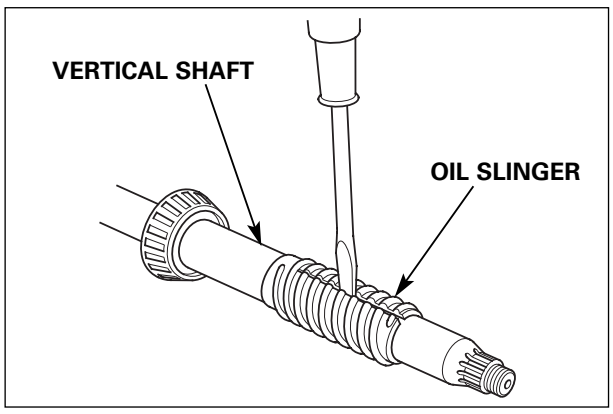


© Honda Motor Co., Ltd.

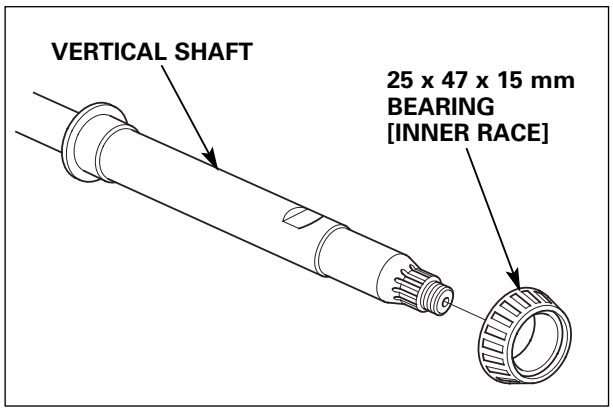
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-30

6) Before removing the oil slinger, check the oil slinger for wear, damage or deformation, and check the bearing [inner race] for abnormal sound or play. Replace if necessary.

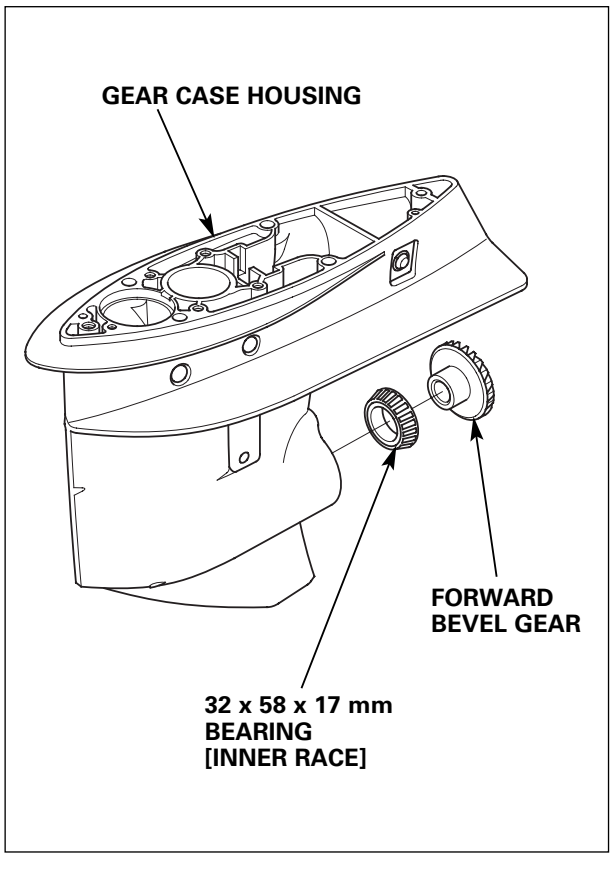
7) Remove the oil slinger from the vertical shaft by expanding the cut in the oil slinger with a screwdriver.



8) Remove the 25 x 47 x 15 mm bearing [inner race] from the vertical shaft.



9) Remove the forward bevel gear/bearing assembly from the gear case housing.
Remove the 32 x 58 x 17 mm bearing [inner race] from the forward bevel gear.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-31

10) Check the bearing [outer race] for damage before removing it.
Replace the bearing [outer race] and the bearing inner race as a set if necessary.

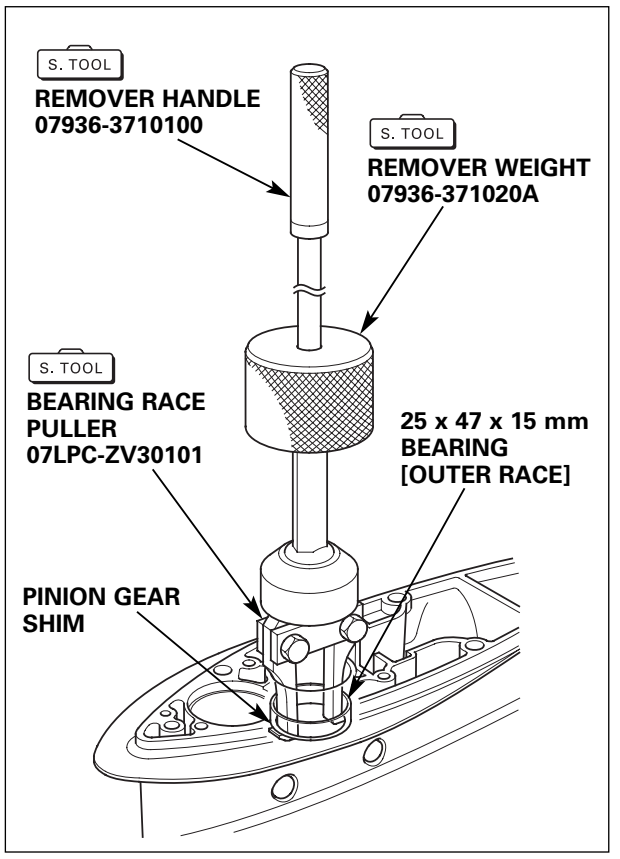
11) Remove the 25 x 47 x 15 mm bearing [outer race] using the special tools as shown if necessary.

- Always replace the bearing and race with a new set if you have to remove it.

TOOLS:

Remover handle	**07936-3710100**
Remover weight	**07936-371020A**
Bearing race puller	**07LPC-ZV30101**

12) Remove the pinion gear shim from the gear case housing.
Replace the shim with a new one on reassembly.



13) Check the bearing [outer race] for damage before removing it.
Replace the bearing [outer race] and the bearing inner race as a set if necessary.

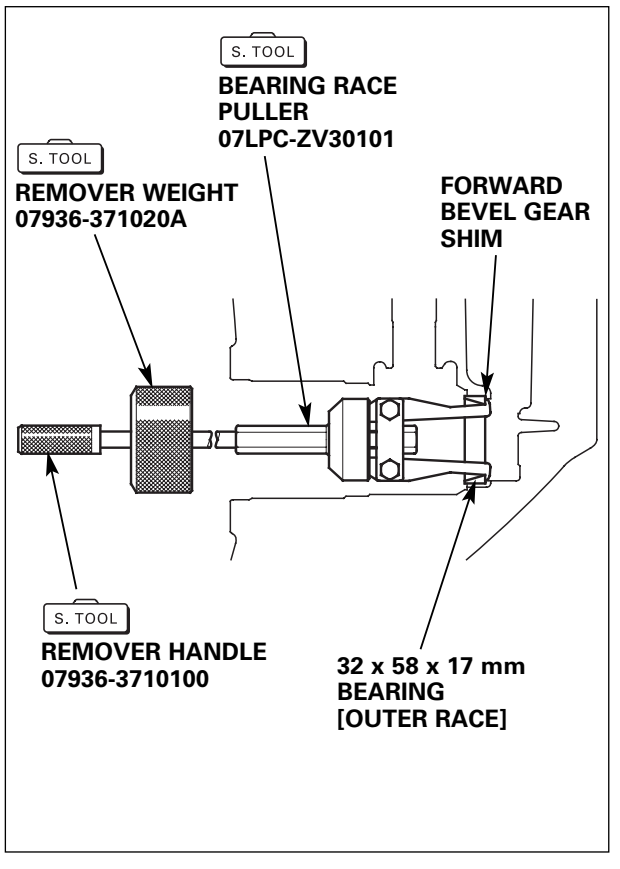
14) Remove the 32 x 58 x 17 mm bearing [outer race] using the special tools as shown if necessary.

- Always replace the bearing and race with a new set if you have to remove it.

TOOLS:

Remover handle	**07936-3710100**
Remover weight	**07936-371020A**
Bearing race puller	**07LPC-ZV30101**

15) Remove the forward bevel gear shim from the gear case housing.
Replace the shim with a new one on reassembly.



© Honda Motor Co., Ltd.

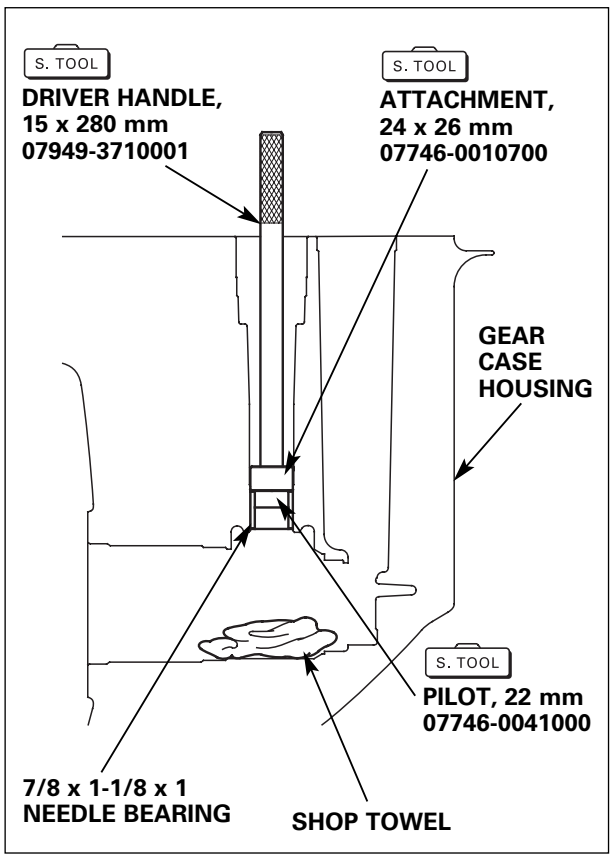
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-32

16) Check the needle bearing for abnormal sound or play before removing it. Replace the needle bearing with a new one if necessary.

17) Set the special tools on the needle bearing and place a shop towel or equivalent material under the needle bearing as shown.

TOOLS:

Driver handle, 15 x 280 mm	**07949-3710001**
Attachment, 24 x 26 mm	**07746-0010700**
Pilot, 22 mm	**07746-0041000**



18) Before removing the needle bearing, mark the special tool at a point level to the gear case housing end using a straight edge as shown.

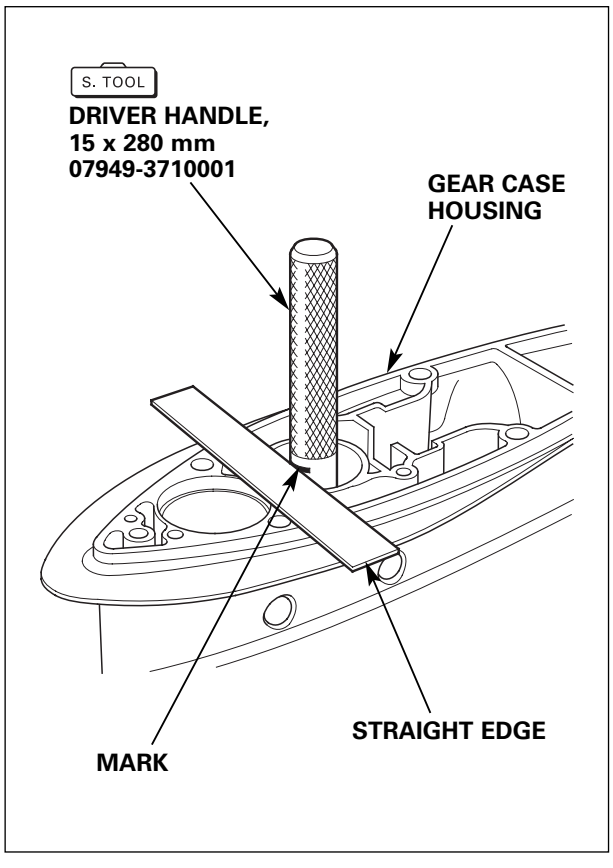
- The mark on the special tool is used for installation of the needle bearing. Do not erase the mark before installation.

TOOL:

Driver handle, 15 x 280 mm	**07949-3710001**

19) Remove the 7/8 x 1-1/8 x 1 needle bearing from the gear case housing using the special tool.
Replace the needle bearing with a new one on reassembly.

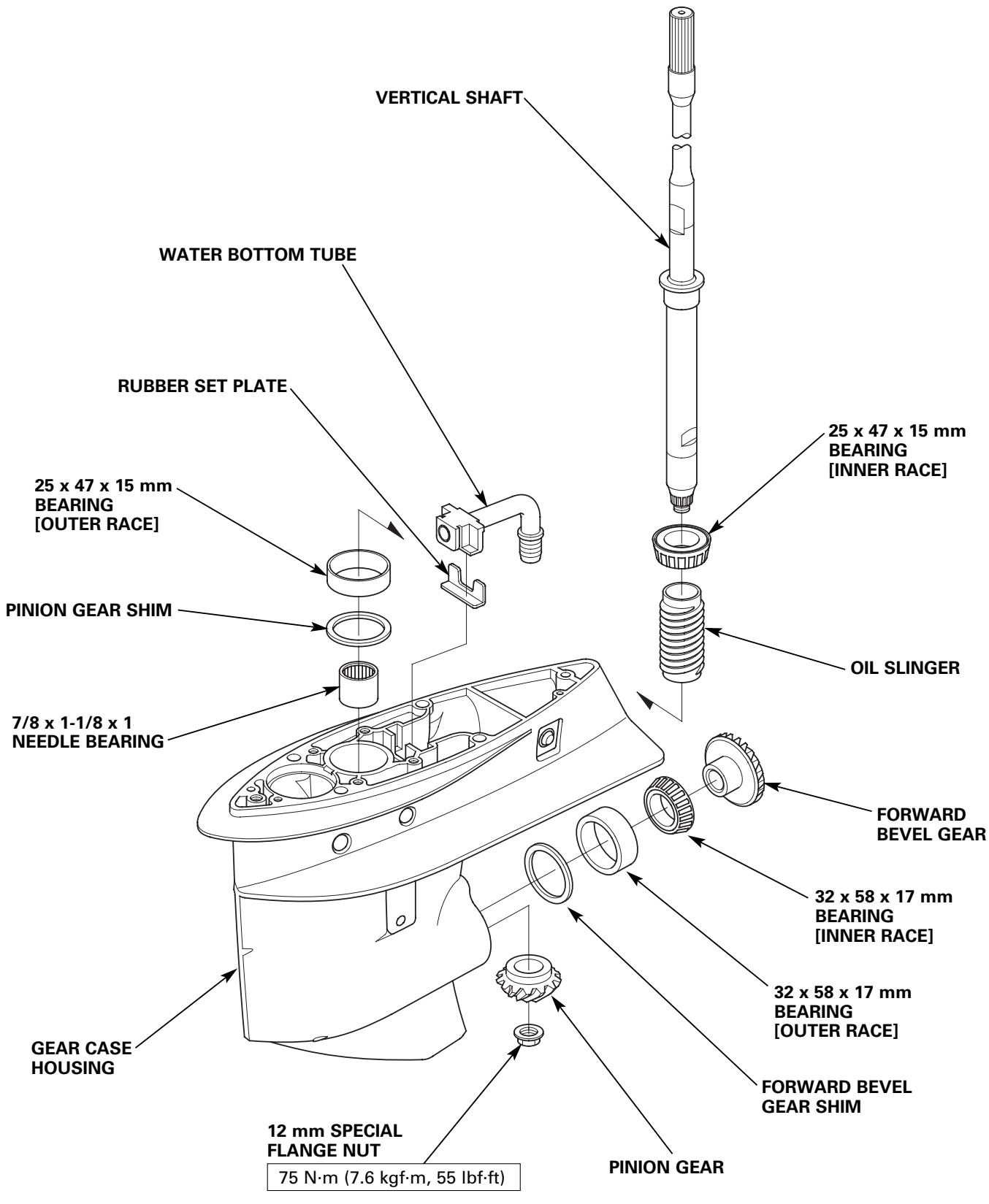
- Remove the needle bearing with care not to damage the gear case housing.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-33

b. COMPONENT DRAWING



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-34

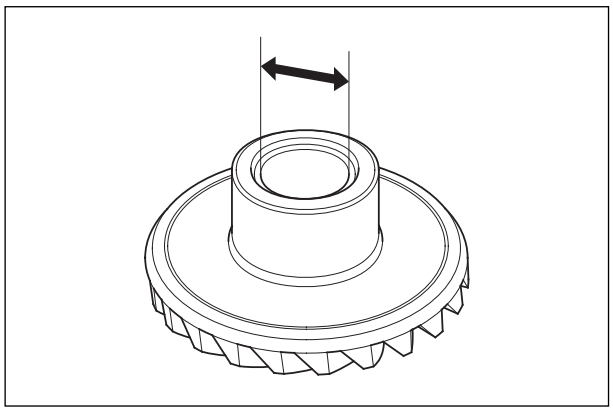
c. INSPECTION

• FORWARD BEVEL GEAR I.D.

1) Measure the forward bevel gear I.D.

Standard	Service limit
19.000 — 19.021 mm (0.7480 — 0.7489 in)	19.04 mm (0.750 in)

2) If the measurement exceeds the service limit, replace the forward bevel gear with a new one.

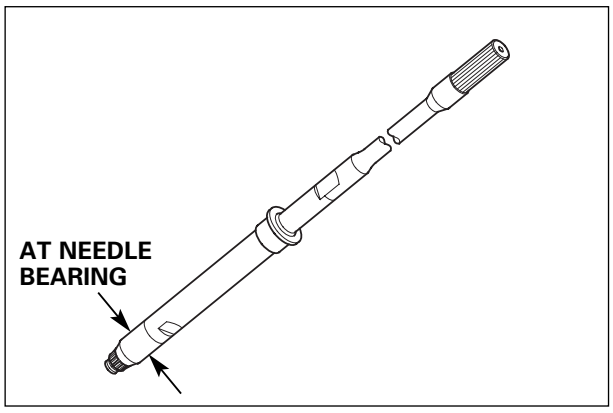


• VERTICAL SHAFT O.D.

1) Measure the vertical shaft O.D. at the needle bearing.

Standard	Service limit
22.217 — 23.230 mm (0.8747 — 0.9146 in)	22.196 mm (0.8739 in)

2) If the measurement is less than the service limit, replace the vertical shaft with a new one.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-35

c. REASSEMBLY

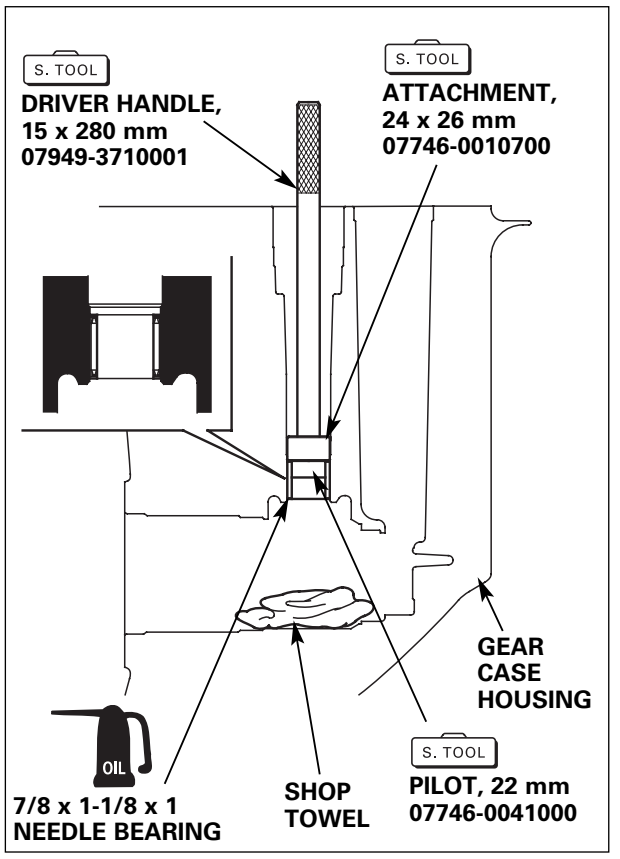
1) Apply gear oil to the outer surface of a new needle bearing.

2) Drive the 7/8 x 1-1/8 x 1 needle bearing into the gear case housing up to the mark made on the special tool during needle bearing removal using the same tools used for removal.

TOOLS:

Driver handle, 15 x 280 mm	**07949-3710001**
Attachment, 24 x 26 mm	**07746-0010700**
Pilot, 22 mm	**07746-0041000**

3) After installation, check that the bottom surface of the needle bearing is not protruding into the bottom of the gear case housing.



4) Install a new forward bevel gear shim in the gear case housing.

- When the gear case housing or bearing is replaced with a new one, perform shim adjustment and select the appropriate shim accordingly (P. 11-39).

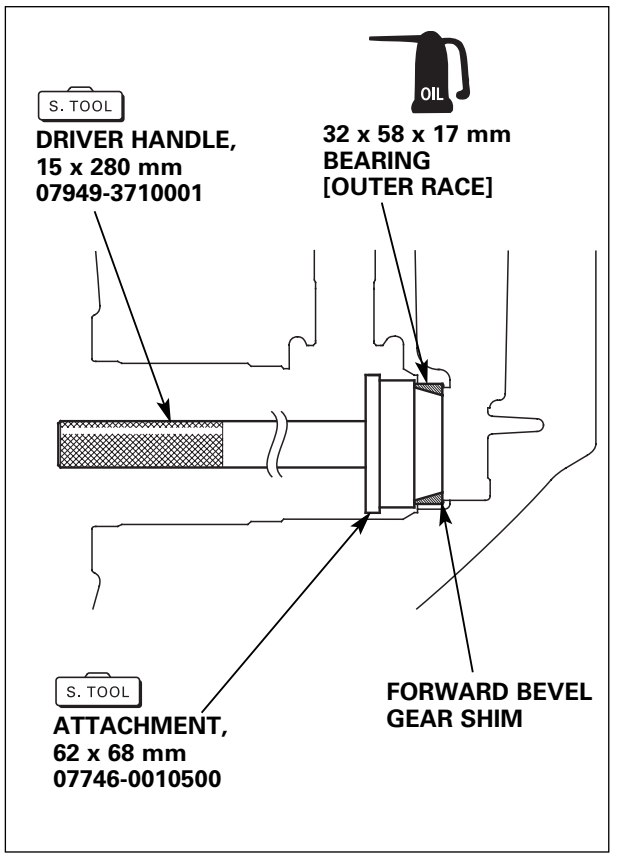
5) Apply gear oil to the outer surface of a new bearing [outer race].

6) Install the 32 x 58 x 17 mm bearing [outer race] in the gear case housing using the special tools as shown.

- Install the bearing [outer race] with the larger I.D. side toward the forward bevel gear.

TOOLS:

Driver handle, 15 x 280 mm	**07949-3710001**
Attachment, 62 x 68 mm	**07746-0010500**



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-36

7) Install a new pinion gear shim in the gear case housing.

   • When the gear case housing, vertical shaft or the bearing is replaced with a new one, perform shim adjustment and select the appropriate shim accordingly (P. 11-39).

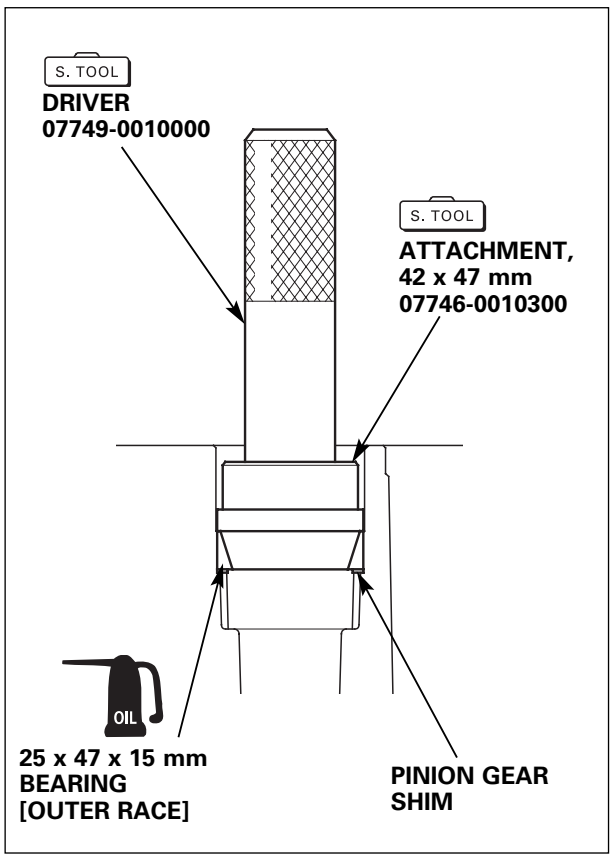
8) Apply gear oil to the outer surface of the new bearing [outer race].

9) Drive the 25 x 47 x 15 mm bearing [outer race] into the gear case housing using the special tools as shown.

   • Install the bearing [outer race] with the larger I.D. side toward the water pump housing.

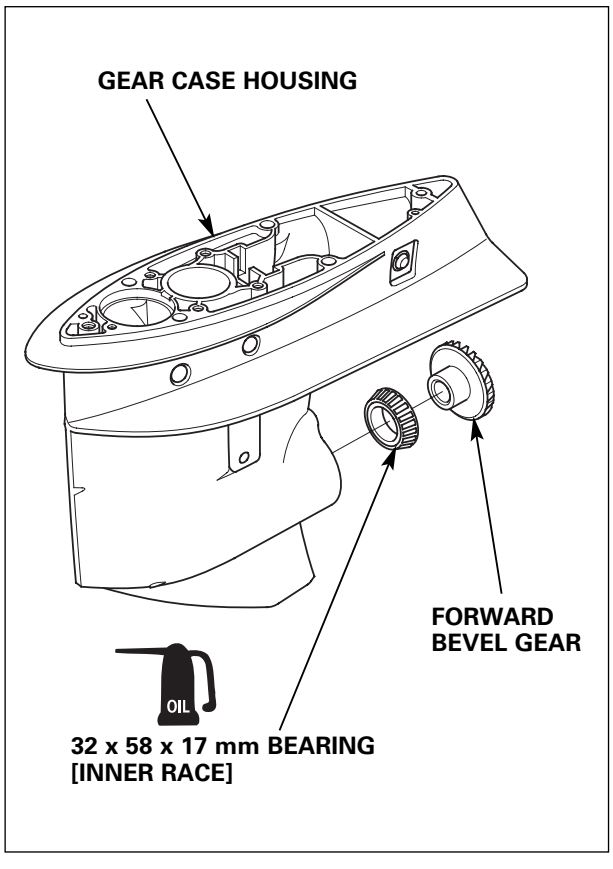
TOOLS:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**



10) Apply gear oil to the inner wall and roller of the bearing [inner race]. Install the 32 x 58 x 17 mm bearing [inner race] on the forward bevel gear.

11) Install the forward bevel gear/bearing assembly in the gear case housing.

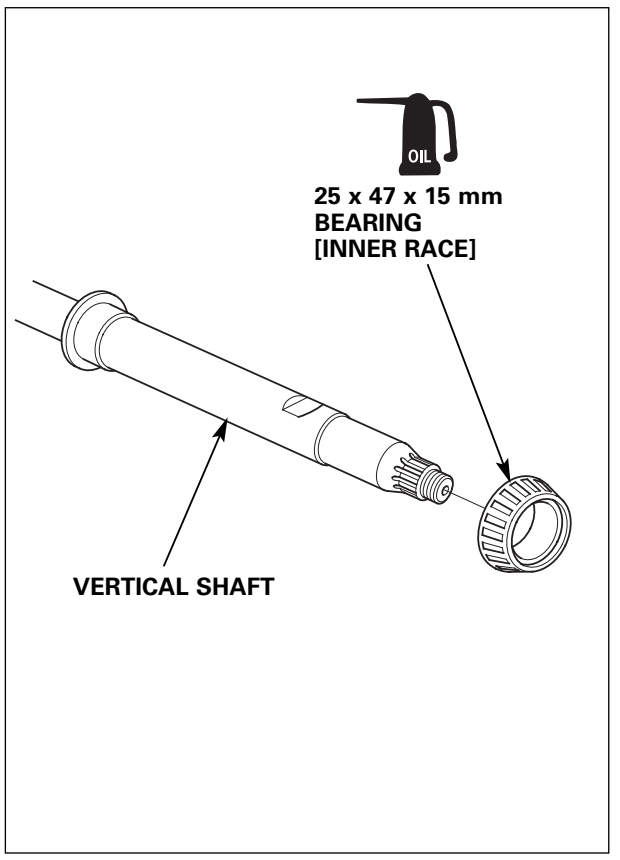


Date of Issue: May 2008
© Honda Motor Co., Ltd.

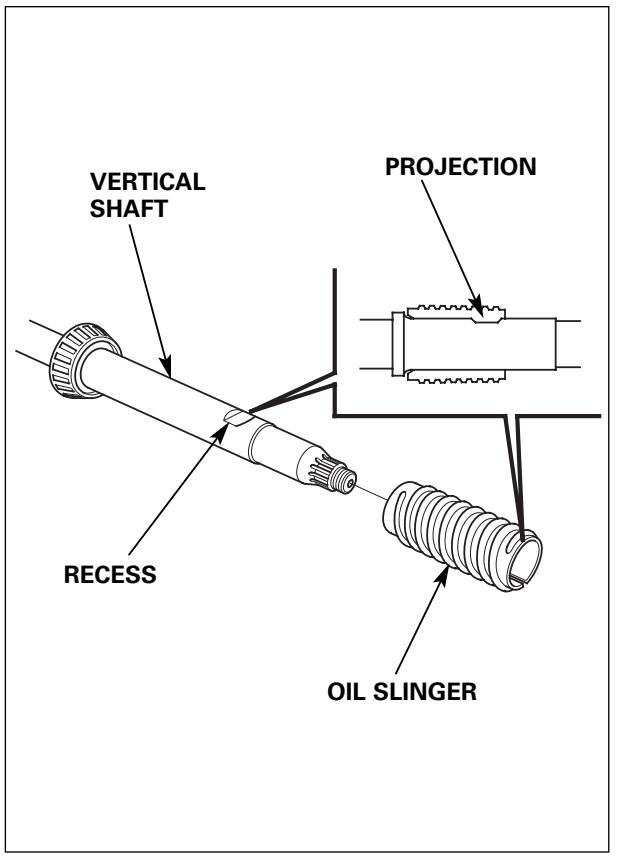
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-37

12) Apply gear oil to the inner wall and roller of the bearing [inner race]. Install the 25 x 47 x 15 mm bearing [inner race] on the vertical shaft.

- Install the bearing [inner race] with the roller side toward the pinion gear.



13) Install the oil slinger on the vertical shaft, aligning the projection on the inside of the oil singer with the recess on the pinion gear side of the vertical shaft.



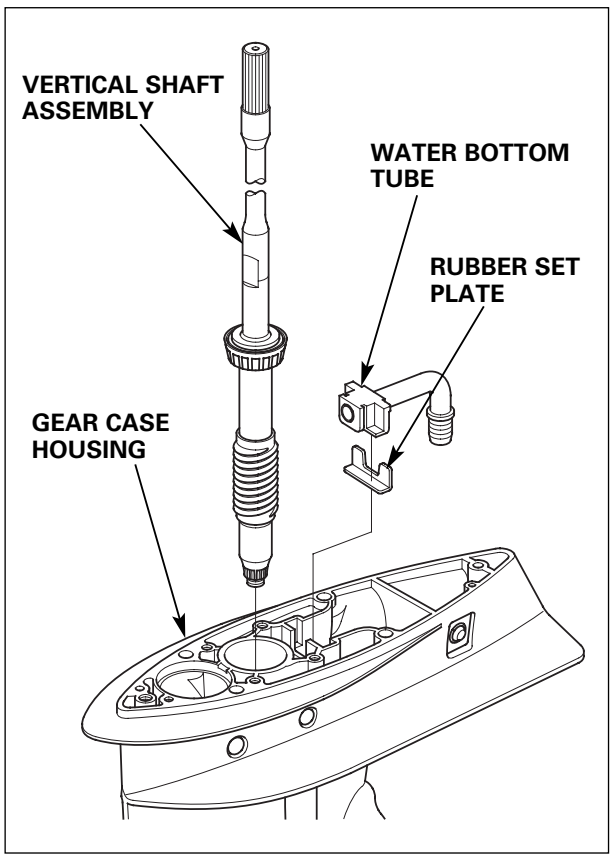
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-38

14) Install the rubber set plate and the water bottom tube on the gear case housing.

15) Wipe the vertical shaft and the taper of the pinion gear with a shop towel and degreasing cleaning solvent.

16) Install the vertical shaft assembly in the gear case housing.



17) Install the special tool on the end (primary driven gear installation side) of the vertical shaft.

TOOL:
Vertical shaft holder **07LPB-ZV30200**

18) Place a shop towel in the gear case housing as shown to protect it.

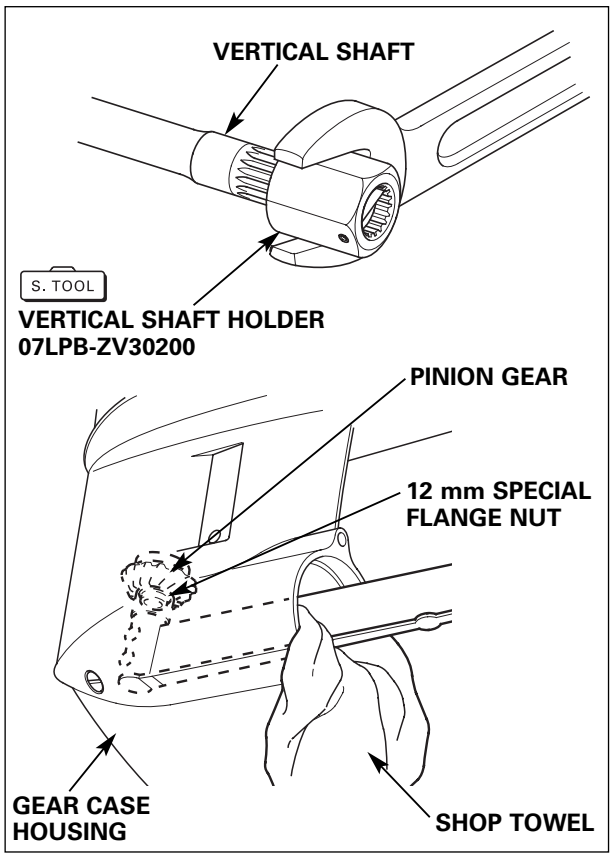
19) Apply gear oil to the threaded part and seat of the 12 mm special flange nut.

20) Install the pinion gear on the vertical shaft.
Holding the vertical shaft with the special tool, tighten the pinion gear nut to the specified torque.

TORQUE: 75 N·m (7.5 kgf·m, 55 lbf·ft)

- Check that the forward bevel gear/bearing assembly is set in the gear case housing properly before installing the pinion gear.

21) Install the following parts.
- Water pump/shift rod (P. 11-24)
- Propeller shaft holder assembly (P. 11-7)
- Gear case assembly (P. 11-5)
- Propeller (P. 11-2)



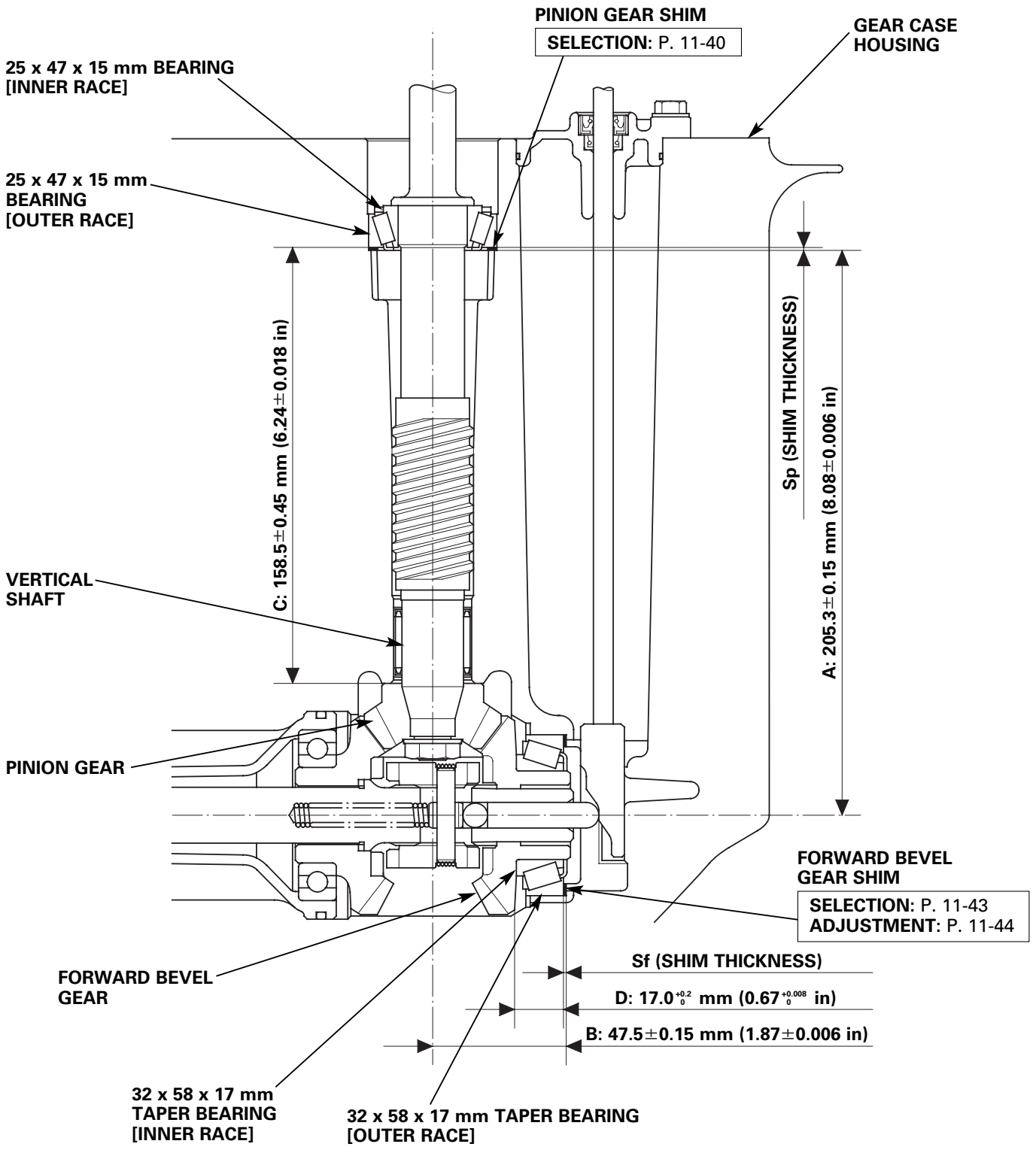
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-39

7. SHIM ADJUSTMENT

Shim thickness adjustment is made to engage the gears properly by adjusting the position of each gear. Adjust the shim thickness and select a shim of proper thickness whenever the gear case housing, vertical shaft and/or bearing is replaced.

<SHIM LOCATION>



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-40

• PINION GEAR SHIM

1) Install a new 25 x 47 x 15 mm bearing on the vertical shaft, and install the special tool on the vertical shaft as shown.

2) Hold the gauge end of the special tool as shown. Then hand tighten the knurled cap onto the gauge end securely.
After tightening, there should be no side play at the measuring end.

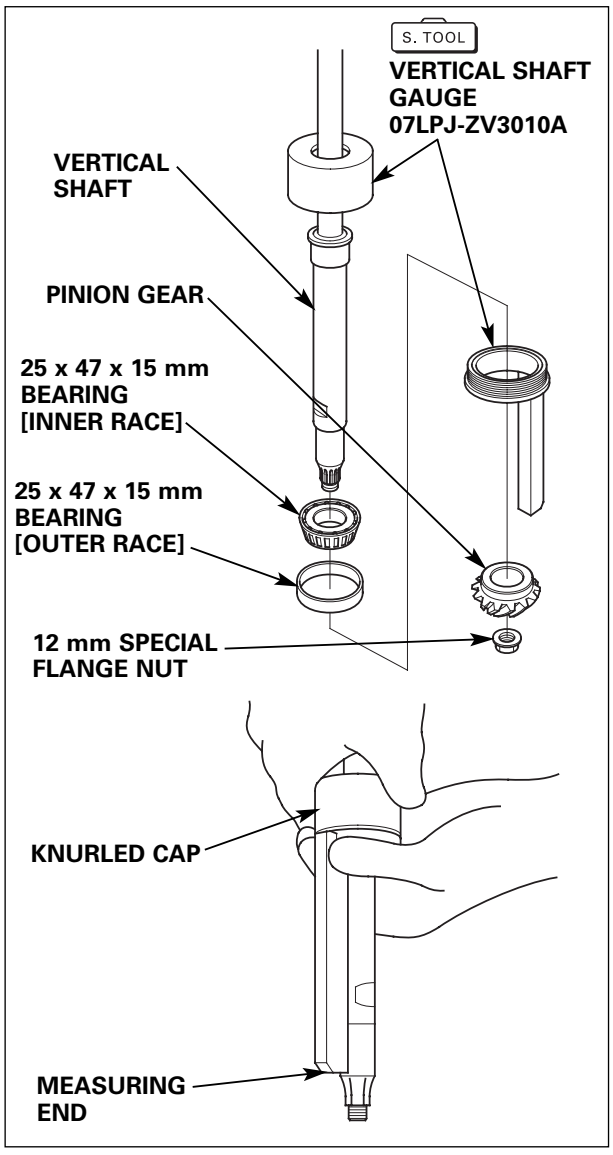
TOOL:
Vertical shaft gauge **07LPJ-ZV3010A**

3) Clean the tapered surface of both the vertical shaft and pinion gear thoroughly using a shop towel and degreasing cleaning solvent.

4) Install the pinion gear on the vertical shaft and tighten the 12 mm special flange nut to the specified torque.

TORQUE: 75 N·m (7.6 kgf·m, 55 lbf·ft)

- Use the special tool (Spline shaft holder, 16 x 14 x 1 mm) to tighten the 12 mm special flange nut (P. 11-38).



5) Measure the gap (E) between the special tool and the pinion gear. Determine the tolerance using the following formula and record it.

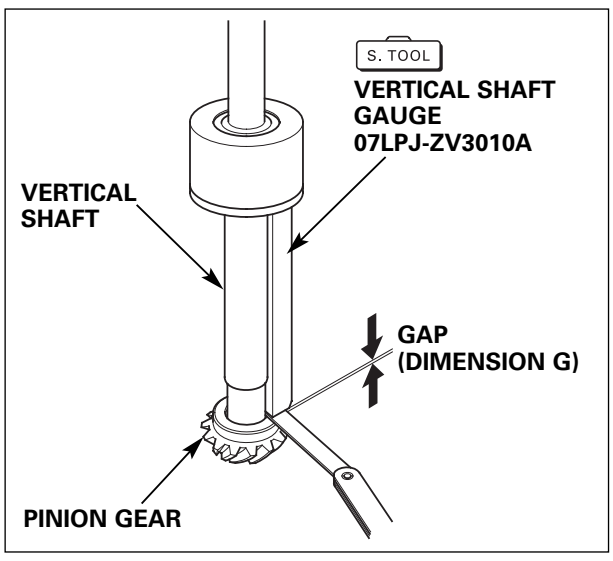
Formula: E – 0.5 = Tolerance

Example:
When the gap (E) between the special tool and the pinion gear is 0.7 mm (0.03 in):

0.7 – 0.5 = 0.2

The tolerance is +0.20 mm (+0.008 in).

TOOL:
Vertical shaft gauge **07LPJ-ZV3010A**



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-41

6) Remove the trim tab from the gear case housing (P. 11-47).

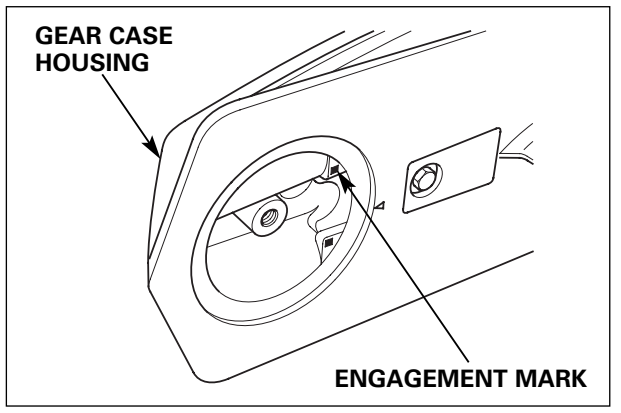
7) Cross reference the engagement mark located on the gear case housing in the position shown and the tolerance calculated in step 5, and refer to the pinion gear shim selection table (P. 11-42) to determine the required thickness of the shim (Sp).

8) Select the shims from the gear shims of different thickness to obtain the required thickness (Sp) by combining the shims.

<Shim type table>

Shim type	Thickness
Gear shim A	0.10 mm (0.004 in)
Gear shim B	0.15 mm (0.006 in)
Gear shim C	0.30 mm (0.012 in)
Gear shim D	0.50 mm (0.020 in)

9) Install the trim tab on the gear case housing (P. 11-47).



Engagement mark on gear case housing
Dimension A: 205.3±0.15 mm (8.08±0.006 in)

Mark	Range
A	−0.15 — −0.10 mm (−0.006 — −0.004 in)
B	−0.10 — −0.05 mm (−0.004 — −0.002 in)
C	−0.05 — 0.00 mm (−0.002 — 0.000 in)
D	0.00 — +0.05 mm (0.000 — +0.002 in)
E	+0.05 — +0.10 mm (+0.002 — +0.004 in)
F	+0.10 — +0.15 mm (+0.004 — +0.006 in)

How to read shim selection table:
When the engagement mark on the gear case housing is D and the tolerance is +0.20 mm (+0.008 in), the shim selection table shows that the required shim thickness is 0.85 mm (0.033 in). (See the table shown below).

Unit: mm (in)

		Tolerance					
		+0.15 (+0.006) — +0.20 (+0.008)	+0.20 (+0.008) — +0.25 (+0.010)	+0.25 (+0.010) — +0.30 (+0.012)	+0.30 (+0.012) — +0.35 (+0.014)	+0.35 (+0.014) — +0.40 (+0.016)	+0.40 (+0.016) — +0.45 (+0.018)
Engagement mark on the gear case housing	A	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)	1.10 (0.043)	1.15 (0.045)	1.20 (0.047)
	B	0.90 (0.035)	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)	1.10 (0.043)	1.15 (0.045)
	C	0.85 (0.033)	0.90 (0.035)	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)	1.10 (0.043)
	D	0.80 (0.032)	0.85 (0.033)	0.90 (0.035)	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)
	E	0.75 (0.030)	0.80 (0.032)	0.85 (0.033)	0.90 (0.035)	0.95 (0.037)	1.00 (0.039)
	F	0.70 (0.028)	0.75 (0.030)	0.80 (0.032)	0.85 (0.033)	0.90 (0.035)	0.95 (0.037)

Shim combination:
To obtain 0.85 mm (0.033 in) of shim thickness, combine two gear shim As, one gear shim B and one gear shim D, or combine four gear shim As, one gear shim B and one gear shim C.

© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-42

Pinion gear shim selection table

Unit: mm (in)

		Tolerance					
		−0.45 (−0.018) — −0.40 (−0.016)	−0.40 (−0.016) — −0.35 (−0.014)	−0.35 (−0.014) — −0.30 (−0.012)	−0.30 (−0.012) — −0.25 (−0.010)	−0.25 (−0.010) — −0.20 (−0.008)	−0.20 (−0.008) — −0.15 (−0.006)
Engagement mark on the gear case housing	A	0.35 (0.014)	0.40 (0.016)	0.45 (0.018)	0.50 (0.020)	0.55 (0.022)	0.60 (0.024)
	B	0.30 (0.012)	0.35 (0.014)	0.40 (0.016)	0.45 (0.018)	0.50 (0.020)	0.55 (0.022)
	C	0.25 (0.010)	0.30 (0.012)	0.35 (0.014)	0.40 (0.016)	0.45 (0.018)	0.50 (0.020)
	D	0.20 (0.008)	0.25 (0.010)	0.30 (0.012)	0.35 (0.014)	0.40 (0.016)	0.45 (0.018)
	E	0.15 (0.006)	0.20 (0.008)	0.25 (0.010)	0.30 (0.012)	0.35 (0.014)	0.40 (0.016)
	F	0.10 (0.004)	0.15 (0.006)	0.20 (0.008)	0.25 (0.010)	0.30 (0.012)	0.35 (0.014)

Unit: mm (in)

		Tolerance					
		−0.15 (−0.006) — −0.10 (−0.004)	−0.10 (−0.004) — −0.05 (−0.002)	−0.05 (−0.002) — 0.00 (0.000)	0.00 (0.000) — +0.05 (+0.002)	+0.05 (+0.002) — +0.10 (+0.004)	+0.10 (+0.004) — +0.15 (+0.006)
Engagement mark on the gear case housing	A	0.65 (0.026)	0.70 (0.028)	0.75 (0.030)	0.80 (0.032)	0.85 (0.033)	0.90 (0.035)
	B	0.60 (0.024)	0.65 (0.026)	0.70 (0.028)	0.75 (0.030)	0.80 (0.032)	0.85 (0.033)
	C	0.55 (0.022)	0.60 (0.024)	0.65 (0.026)	0.70 (0.028)	0.75 (0.030)	0.80 (0.032)
	D	0.50 (0.020)	0.55 (0.022)	0.60 (0.024)	0.65 (0.026)	0.70 (0.028)	0.75 (0.030)
	E	0.45 (0.018)	0.50 (0.020)	0.55 (0.022)	0.60 (0.024)	0.65 (0.026)	0.70 (0.028)
	F	0.40 (0.016)	0.45 (0.018)	0.50 (0.020)	0.55 (0.022)	0.60 (0.024)	0.65 (0.026)

Unit: mm (in)

		Tolerance					
		+0.15 (+0.006) — +0.20 (+0.008)	+0.20 (+0.008) — +0.25 (+0.010)	+0.25 (+0.010) — +0.30 (+0.012)	+0.30 (+0.012) — +0.35 (+0.014)	+0.35 (+0.014) — +0.40 (+0.016)	+0.40 (+0.016) — +0.45 (+0.018)
Engagement mark on the gear case housing	A	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)	1.10 (0.043)	1.15 (0.045)	1.20 (0.047)
	B	0.90 (0.035)	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)	1.10 (0.043)	1.15 (0.045)
	C	0.85 (0.033)	0.90 (0.035)	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)	1.10 (0.043)
	D	0.80 (0.032)	0.85 (0.033)	0.90 (0.035)	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)
	E	0.75 (0.030)	0.80 (0.032)	0.85 (0.033)	0.90 (0.035)	0.95 (0.037)	1.00 (0.039)
	F	0.70 (0.028)	0.75 (0.030)	0.80 (0.032)	0.85 (0.033)	0.90 (0.035)	0.95 (0.037)

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-43

• FORWARD BEVEL GEAR SHIM

1) Set the special tool on a new 35 x 58 x 17 mm bearing.

   TOOL:
   Bearing height gauge **07LPJ-ZV30200**

2) Measure the gap (F) in the special tool as shown. Determine the tolerance using the following formula and record it.

   Formula: F – 0.5 = Tolerance

   Example:
   When the gap (F) is 0.6 mm (0.02 in):

   0.6 – 0.5 = 0.1

   The tolerance is +0.1 mm (+0.004 in).

3) Remove the trim tab from the gear case housing (P. 11-47).

4) Cross reference the engagement mark located on the trim tab installation part of the gear case housing in the position shown and the tolerance calculated in step 2, and refer to the shim selection table to determine the required thickness of the shim (Sf).

5) Select the shims from the forward bevel shims of different thickness to obtain the required thickness (Sf) by combining the shims.

<Shim type table>

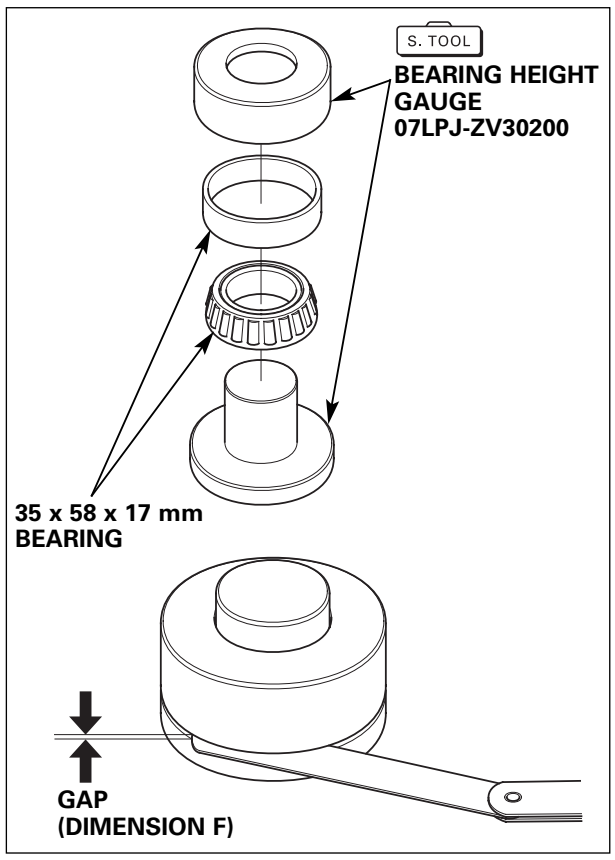
Shim type	Thickness
Forward bevel shim A	0.10 mm (0.004 in)
Forward bevel shim B	0.15 mm (0.006 in)
Forward bevel shim C	0.30 mm (0.012 in)
Forward bevel shim D	0.50 mm (0.020 in)

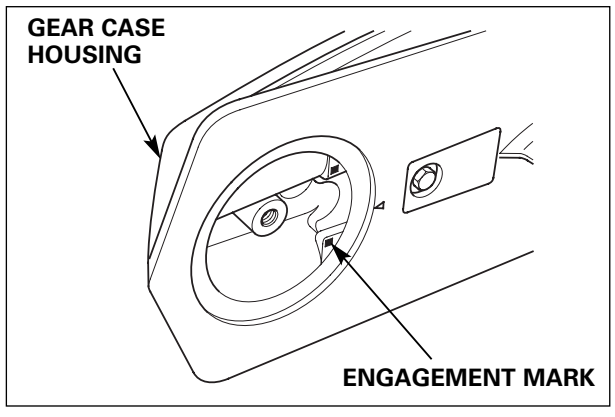
6) Install the trim tab on the gear case housing (P. 11-47).

Forward bevel gear shim selection table Unit: mm (in)

		Tolerance			
		0.00 (0.000) — +0.05 (+0.002)	+0.05 (+0.002) — +0.10 (+0.004)	+0.10 (+0.004) — +0.15 (+0.006)	+0.15 (+0.006) — +0.20 (+0.008)
Engagement mark on the gear case housing	1	0.55 (0.022)	0.50 (0.020)	0.45 (0.018)	0.40 (0.016)
	2	0.50 (0.020)	0.45 (0.018)	0.40 (0.016)	0.35 (0.014)
	3	0.45 (0.018)	0.40 (0.016)	0.35 (0.014)	0.30 (0.012)
	4	0.40 (0.016)	0.35 (0.014)	0.30 (0.012)	0.25 (0.010)
	5	0.35 (0.014)	0.30 (0.012)	0.25 (0.010)	0.20 (0.008)
	6	0.30 (0.012)	0.25 (0.010)	0.20 (0.008)	0.15 (0.006)

Refer to P. 11-41 for the information on how to read the shim selection table and shim combination.





Engagement mark on gear case housing
Dimension B: 47.5±0.15 mm (1.87±0.006 in)

Mark	Range
1	+0.10 — +0.15 mm (+0.004 — +0.006 in)
2	+0.05 — +0.10 mm (+0.002 — +0.004 in)
3	0.00 — +0.05 mm (0.000 — +0.002 in)
4	–0.05 — 0.00 mm (–0.002 — 0.000 in)
5	–0.10 — –0.05 mm (–0.004 — –0.002 in)
6	–0.15 — –0.10 mm (–0.006 — –0.004 in)

© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-44

8. BACKLASH ADJUSTMENT

• FORWARD BEVEL GEAR BACKLASH

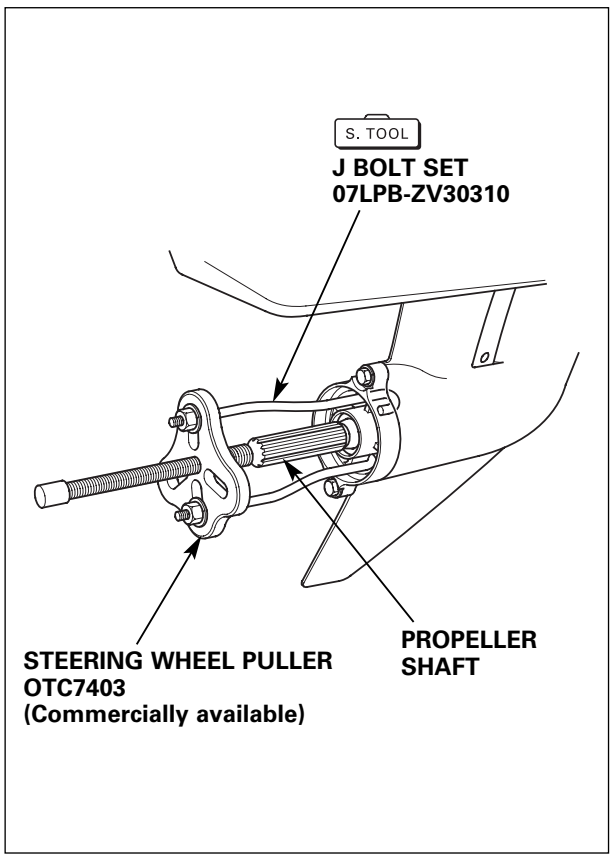
Backlash adjustment must be made after adjustment of each gear shim (P. 11-39).
Install the following parts except the water pump.
- Vertical shaft/bevel gear (P. 11-35)
- Shift rod B assembly (P. 11-24)
- Propeller shaft holder assembly (P. 11-7)

1) Holding the propeller shaft securely with the special tool as shown, tighten the puller bolt to the specified torque.

   TORQUE: 5 N·m (0.5 kgf·m, 3.7 lbf·ft)

   Turn the vertical shaft five to ten turns clockwise to seat the bearing.

   TOOLS:
   J bolt set **07LPB-ZV30310**



2) Attach the special tool to the vertical shaft as shown, and bring the tip of the dial indicator in contact with the special tool (backlash indicator tool) perpendicularly.

   TOOL:
   Backlash inspection attachment **07MGJ-0010100**

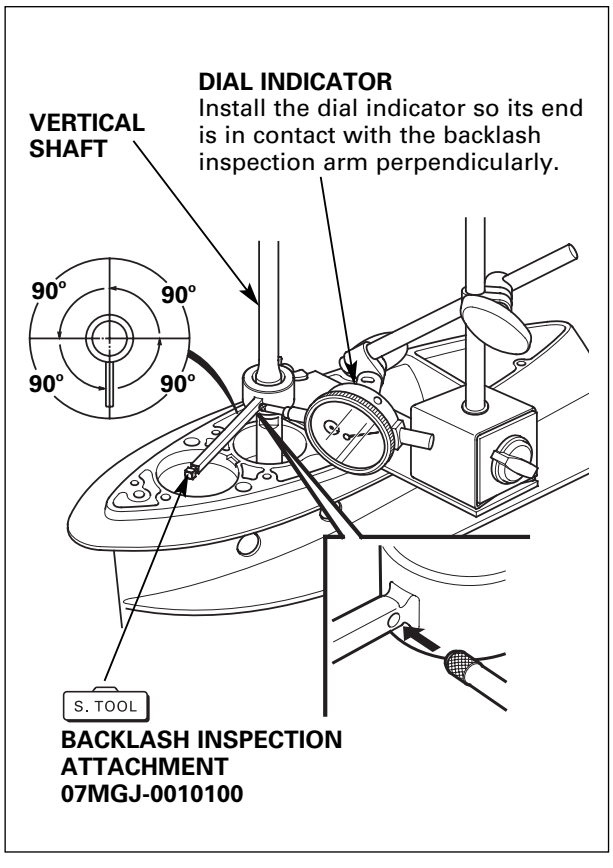
3) Turn the vertical shaft lightly right and left while pushing it down with 10 kg of force and record the dial indicator reading.
   Measure the backlash at four points (by turning the vertical shaft in increments of 90°) in the same manner.

   • Do not turn the propeller shaft when turning the vertical shaft.

Standard	0.11 — 0.34 mm (0.004 — 0.013 in)

4) If the backlash is too large, increase the forward bevel gear shim thickness and recheck the backlash.
   If the backlash is too small, reduce the forward bevel gear shim thickness and recheck the backlash.

   • Use the special tool when the 32 x 58 x 17 mm bearing [outer race] is removed to adjust the backlash again (P. 11-31).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-45

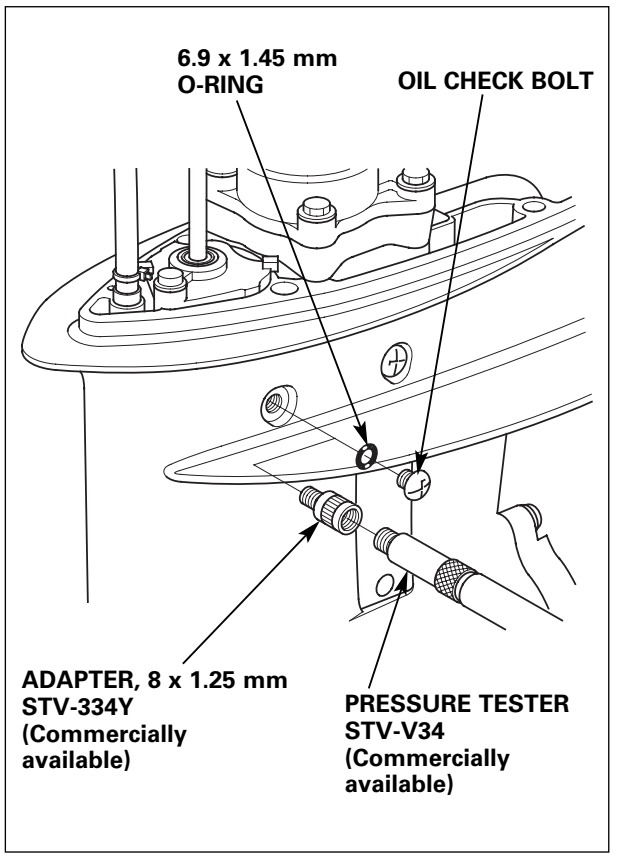
9. GEAR CASE PRESSURE CHECK

- Perform gear case pressure check and check for pressure leakage after disassembling and reassembling the gear case assemlby.
- In principle, the pressure check should be made on the gear case assembly before filling it with gear oil and before installing it on the outboard motor. However, the check can be made with the gear case assembly filled with gear oil.

1) Remove the oil check bolt and the 6.9 x 1.45 mm O-ring. Replace the O-ring with a new one on reassembly.

2) Install the 8 x 1.25 mm adapter (commercially available) in the oil check bolt hole.
   Attach the hose end of the pressure tester (commercially available) to the adapter.

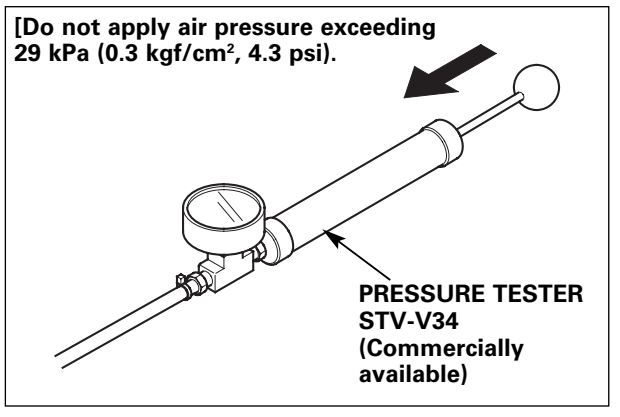
   - Do not screw in the adapter and the hose end with force.



3) While watching the gear case assemlby pressure tester gauge, apply the specified air pressure to the gear case assembly by moving the handle slowly.

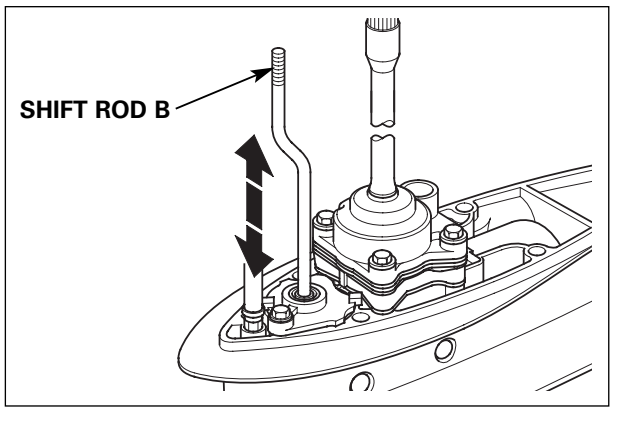
   - Do not apply air pressure excessively.

Standard air pressure	29 kPa (0.3 kgf/cm², 4.3 psi)



4) While applying the specified air pressure to the gear case assembly, perform the following:

   a) Move the shift rod up and down five or six times.



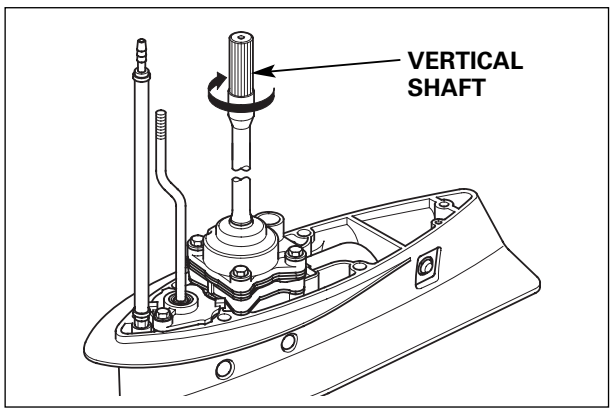
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-46

b) Turn the vertical shaft five or six turns clockwise.

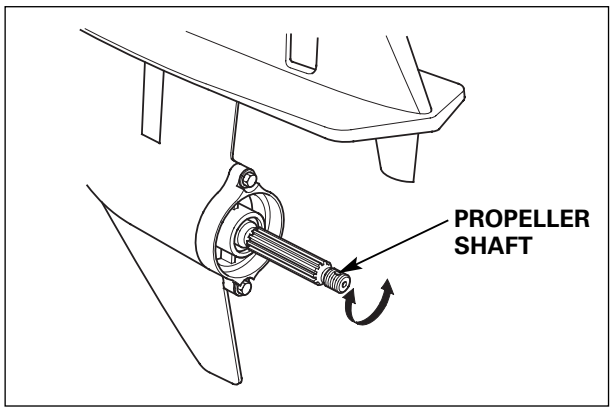
NOTICE

Be sure to turn the vertical shaft clockwise, or damage to the pump impeller can occur.



c) Turn the propeller shaft right and left two or three turns.

5) Leave the gear case assembly for five minutes and then check that the air pressure is maintained.



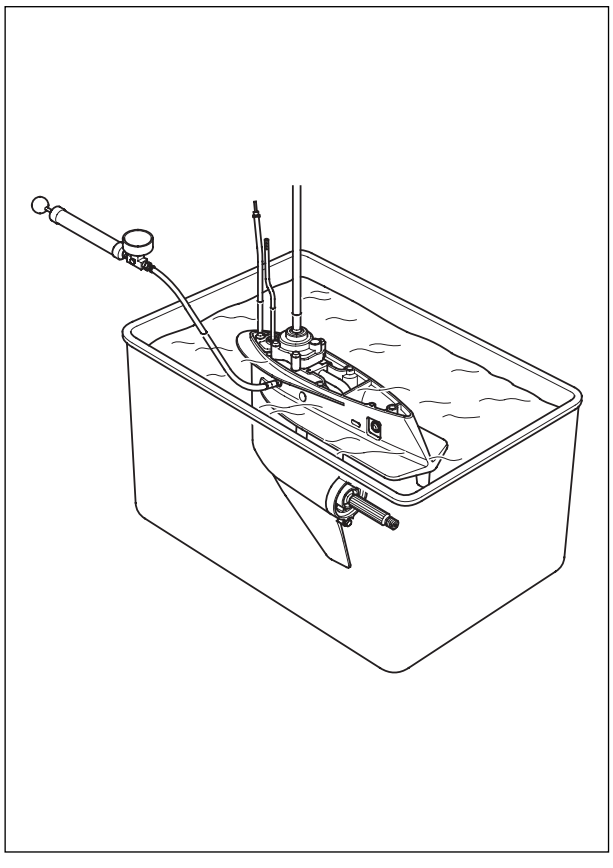
6) If the air pressure drops, place the gear case assembly in a container filled with water. Apply the specified air pressure to the gear case assemlby again, move the shift rod B, vertical shaft and the propeller shaft, and locate the point where the air is leaking.

7) Remove the gear case assembly from the water and replace the water seal or O-ring where the air is leaking.

8) After replacing the water seal or O-ring, perform pressure check again and be sure that the air is not leaking.

9) Remove the gear case assembly pressure tester and the adapter from the gear case assemlby.
Install a new 6.9 x 1.45 mm O-ring on the oil check bolt, and tighten the oil check bolt to the specified torque.

TORQUE: 6.5 N·m (0.7 kgf·m, 4.8 lbf·ft)

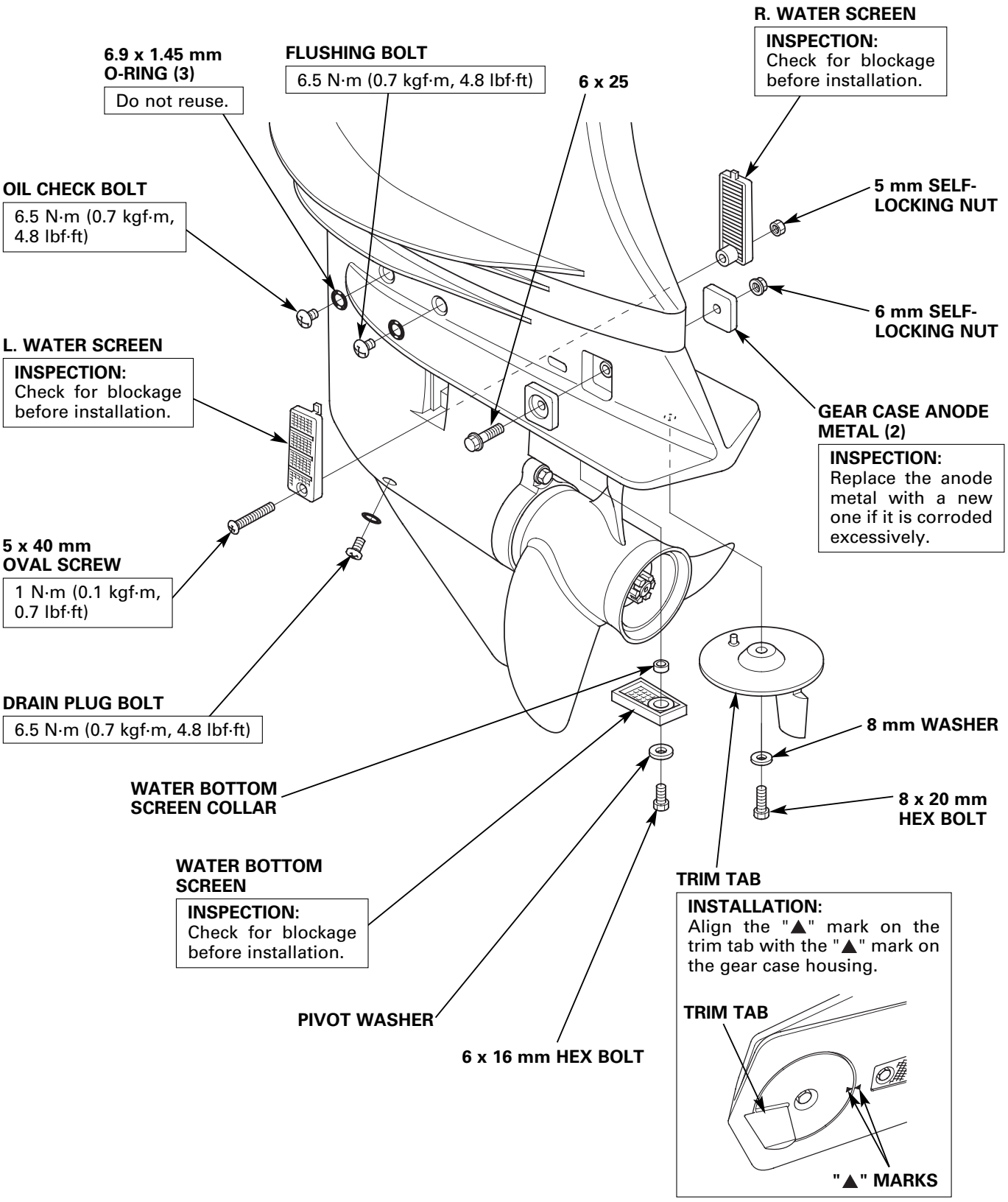


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-47

10. ANODE METAL/WATER SCREEN/TRIM TAB

a. REMOVAL/INSTALLATION



© Honda Motor Co., Ltd.

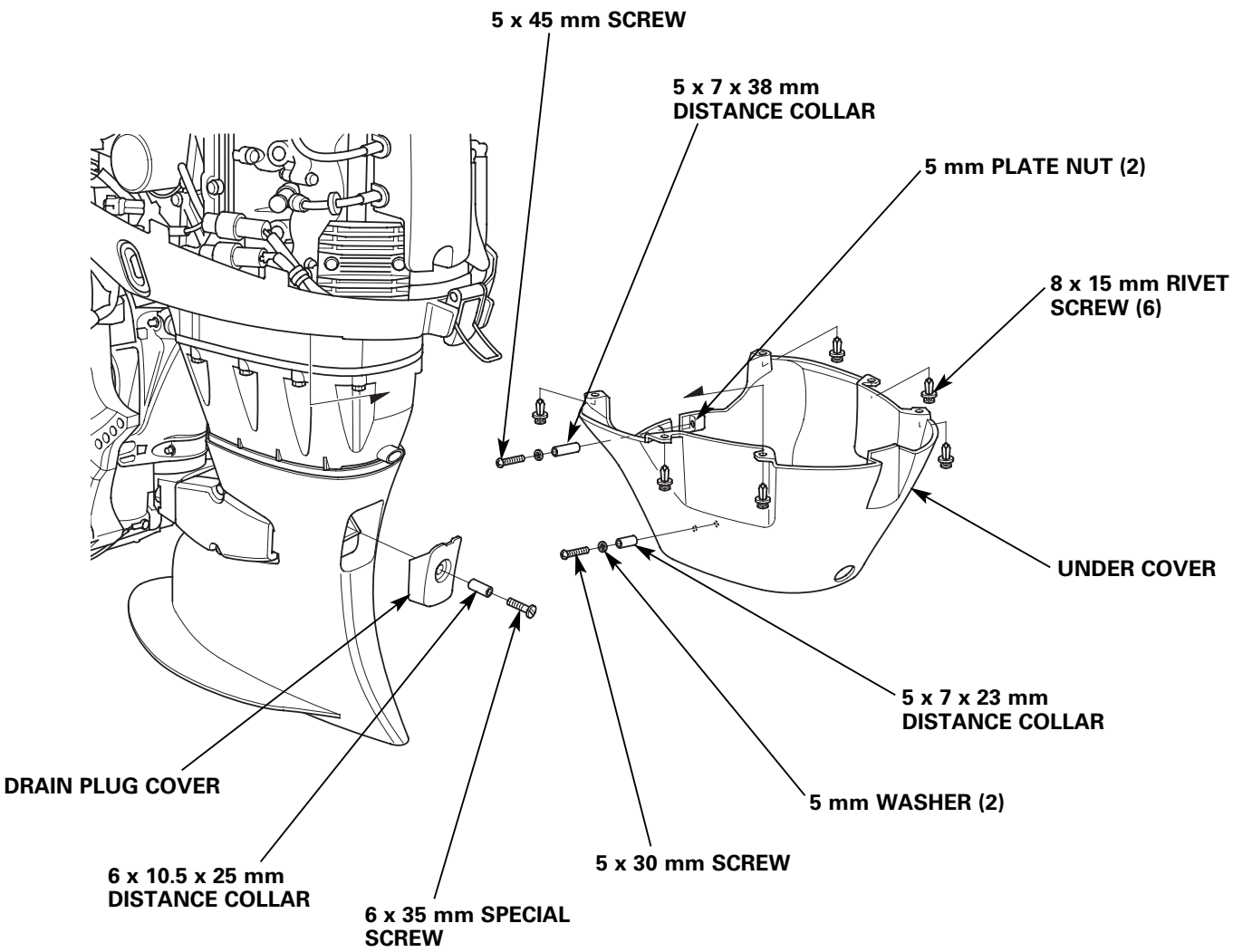
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-48

11. EXTENSION CASE/LOWER RUBBER MOUNT

a. DISASSEMBLY

Remove the following parts.
- Engine cover (P. 4-2)
- Gear case assembly/extension separator [Extra-long shaft type only] (P. 11-3)

1) Remove the six 8 x 15 mm rivet screws, 5 x 45 mm screw, 5 x 30 mm screw, 5 x 7 x 38 mm distance collar, 5 x 7 x 23 mm distance collar, two 5 mm washers and the two 5 mm plate nuts. Remove the under cover from the extension case.
2) Remove the 6 x 35 mm special screw, and remove the drain plug cover and the 6 x 10.5 x 25 mm distance collar from the extension case.



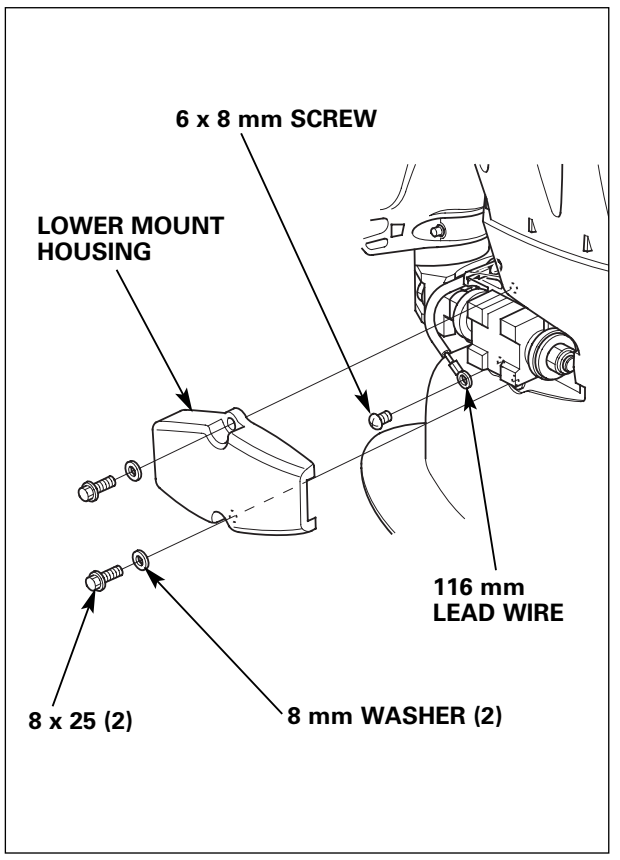
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-49

3) Tilt the outboard motor up and secure it in position by hooking a chain to the engine hanger.

4) Remove the two 8 x 25 mm flange bolts, and remove the lower mount housing from the extension case.

5) Remove the 6 x 8 mm screw from the extension case, and disconnect the 116 mm lead wire.

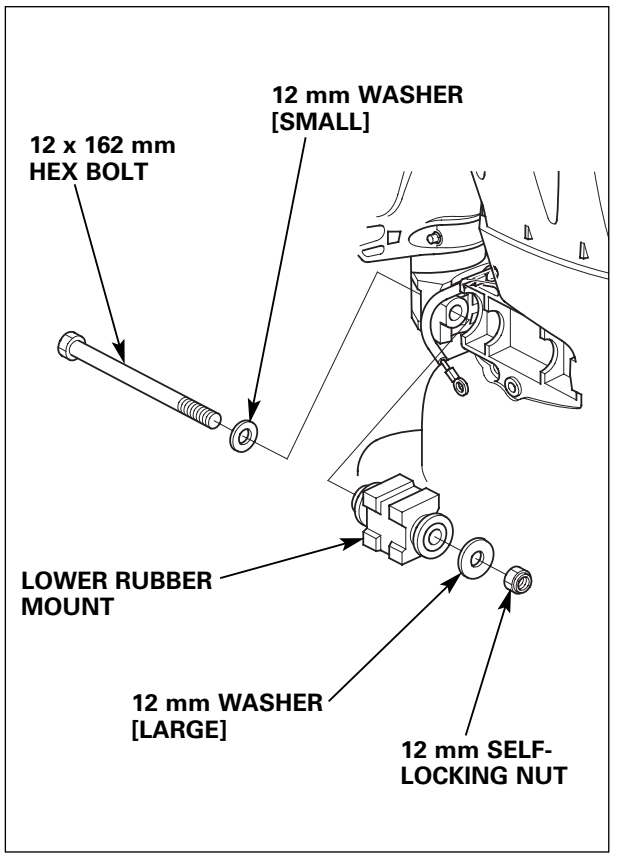


6) Holding the 12 x 162 mm hex bolt with a wrench or equivalent tool, remove the 12 mm self-locking nut and the 12 mm washer (large), then remove the 12 x 162 mm hex bolt and the 12 mm washer (small).

7) Remove the lower rubber mount from the extension case.

NOTICE

The upper mount is under pressure when the lower rubber mount is removed from the extension case, and the excessive pressure can damage the upper mount. Hold the outboard motor securely to prevent it from dropping or becoming unsteady.

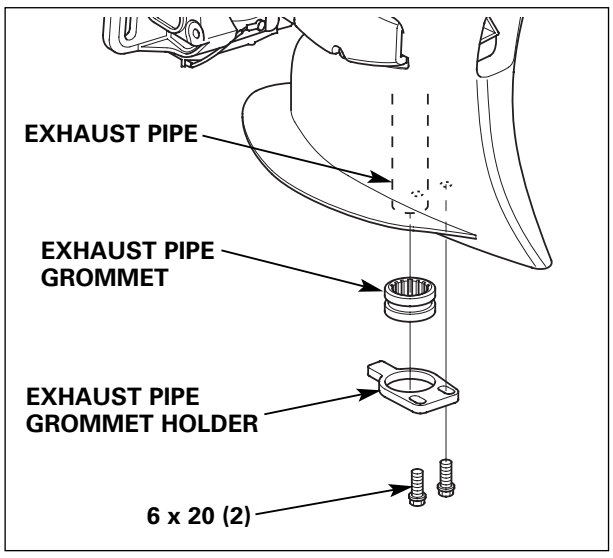


© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-50

8) Remove the two 6 x 20 mm flange bolts, and remove the exhaust pipe grommet holder assembly from the exhaust pipe.

9) Remove the exhaust pipe grommet from the exhaust pipe grommet holder.

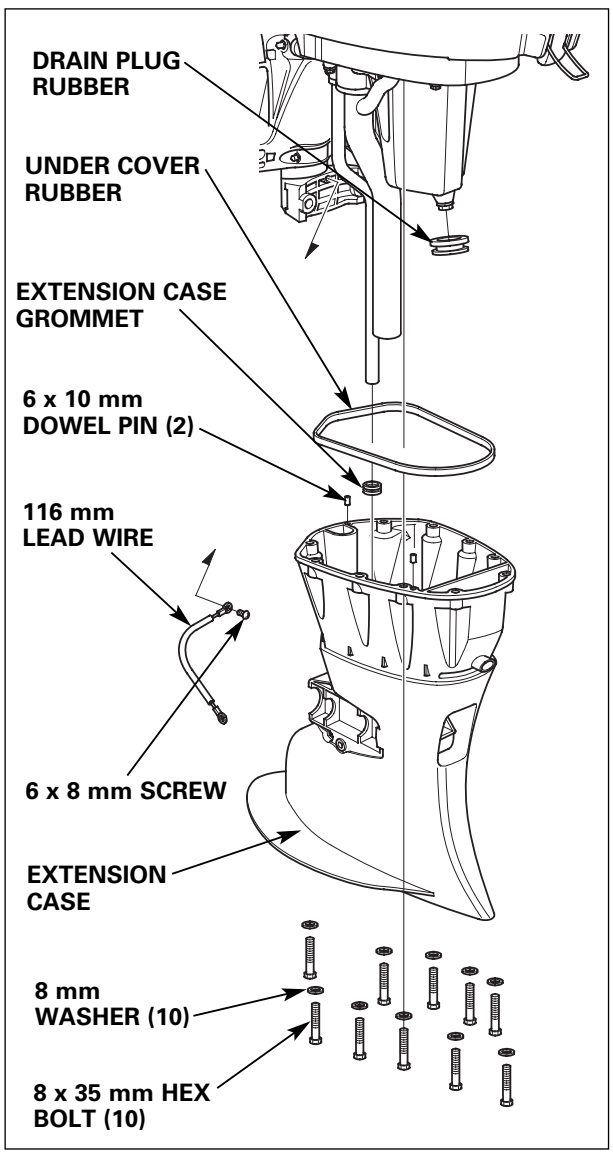


10) Remove the ten 8 x 35 mm hex bolts and remove the extension case from the outboard motor.
Remove the two 6 x 10 mm dowel pins.

- Take care not to drop the extension case.

11) Remove the under cover rubber, extension case grommet and the drain plug rubber from the extension case.

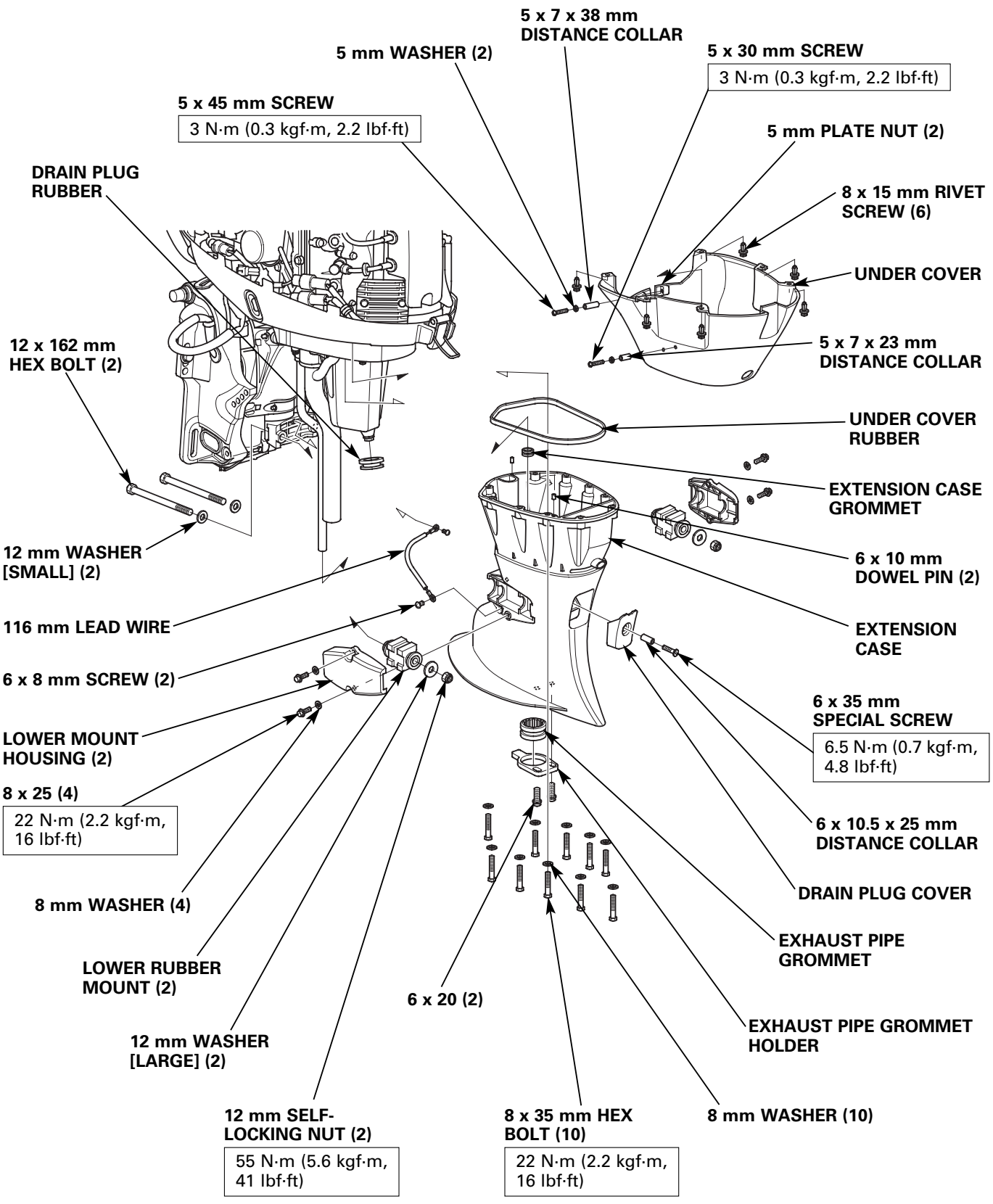
12) Remove the 6 x 8 mm screw and remove the 116 mm lead wire.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-51

b. COMPONENT DRAWING



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-52

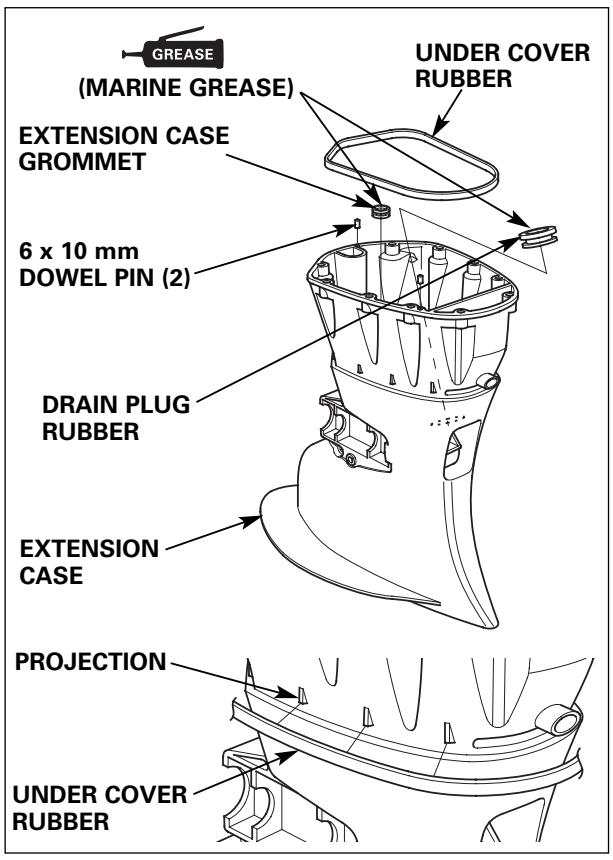
c. REASSEMBLY

1) Tilt the outboard motor up and hold it in position by hooking the chain on the engine hanger.

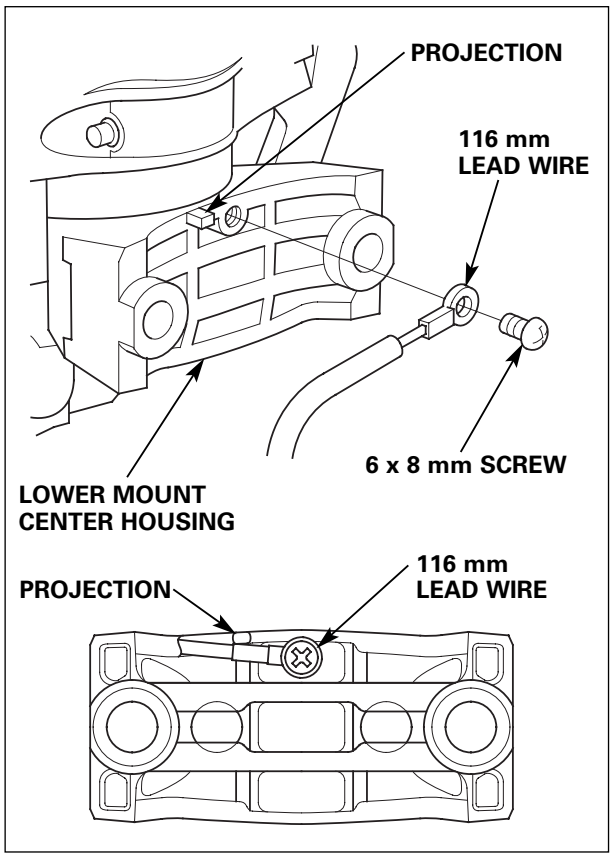
2) Install the under cover rubber, extension case grommet, drain plug rubber, and the two 6 x 10 mm dowel pins on the extension case.

   • Install the under cover rubber under the projection on the extension case securely.

3) Apply marine grease to the inner wall of the extension case grommet and drain plug rubber.



4) Push the 116 mm lead wire against the projection on the lower mount center housing, and install the 116 mm lead wire by tightening the 6 x 8 mm screw securely.



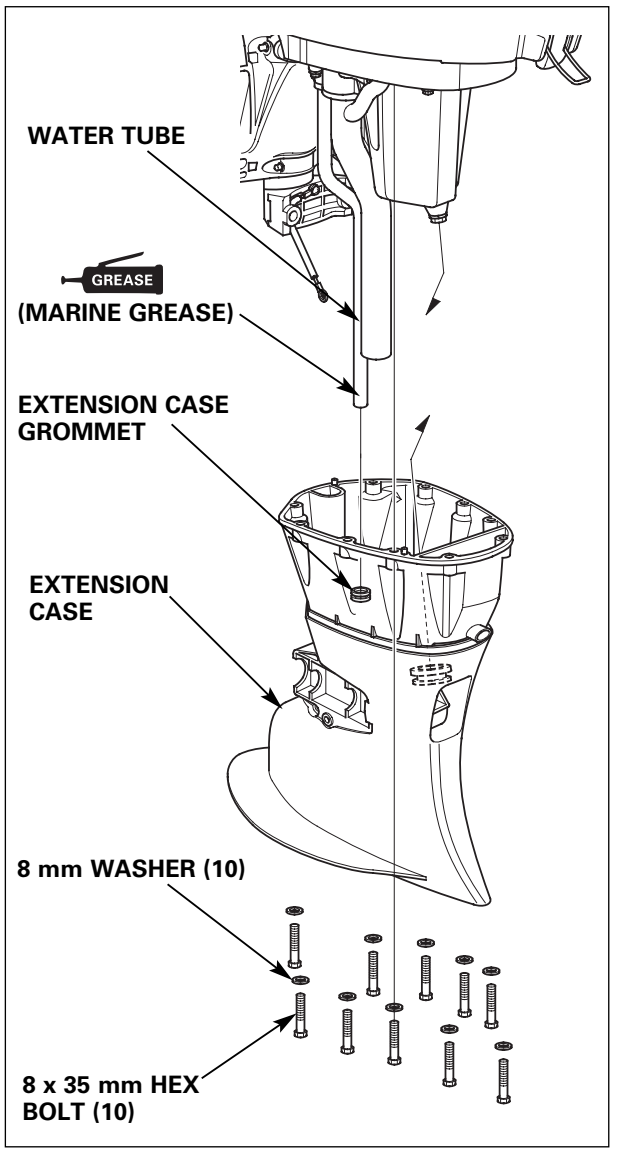
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-53

5) Apply marine grease to the water tube end.
Install the extension case on the outboard motor, aligning the water tube with the extension case grommet.

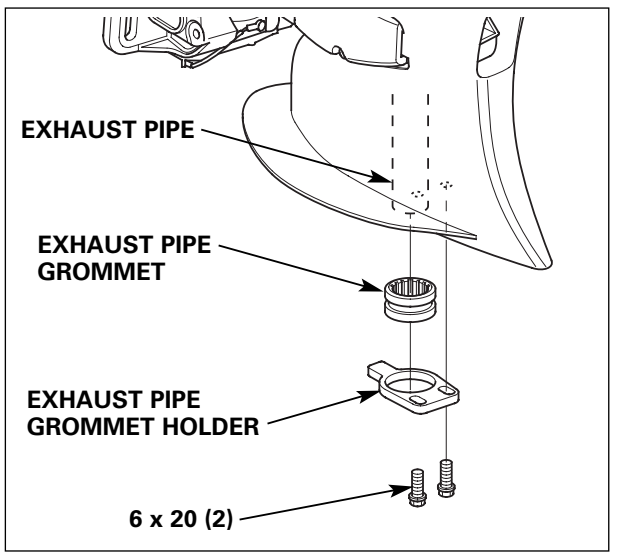
6) Tighten the ten 8 x 35 mm hex bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



7) Install the exhaust pipe grommet on the exhaust pipe grommet holder.

8) Install the exhaust pipe grommet holder assembly on the exhaust pipe, and tighten the two 6 x 20 mm flange bolts securely.



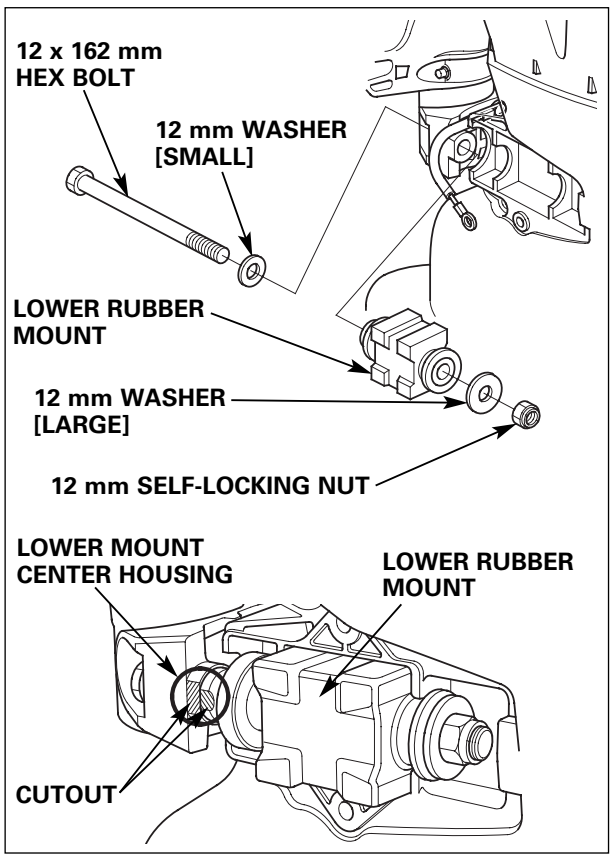
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-54

9) Install the lower rubber mount on the extension case aligning the cutout in the lower mount center housing with the cutout in the lower rubber mount as shown.

10) Install the 12 mm washer [small] and the 12 x 162 mm hex bolt. Holding the 12 x 162 mm hex bolt with a wrench, install the 12 mm washer [large] and tighten the 12 mm self-locking nut to the specified torque.

TORQUE: 55 N·m (5.6 kgf·m, 41 lbf·ft)

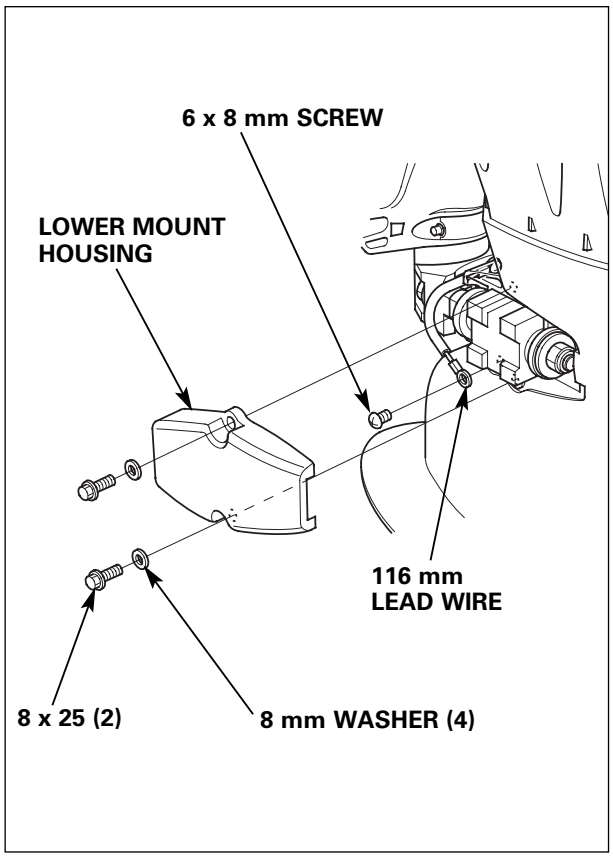


11) Install the 116 mm lead wire on the extension case, and tighten the 6 x 8 mm screw securely.

12) Install the lower mount housing on the extension case, and tighten the two 8 x 25 mm flange bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

13) Remove the engine hanger chain from the engine hanger, and lower the outboard motor to the lowermost position.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-55

14) Install the drain plug cover and the 6 x 10.5 x 25 mm distance collar on the extension case, and tighten the 6 x 35 mm special screw to the specified torque.

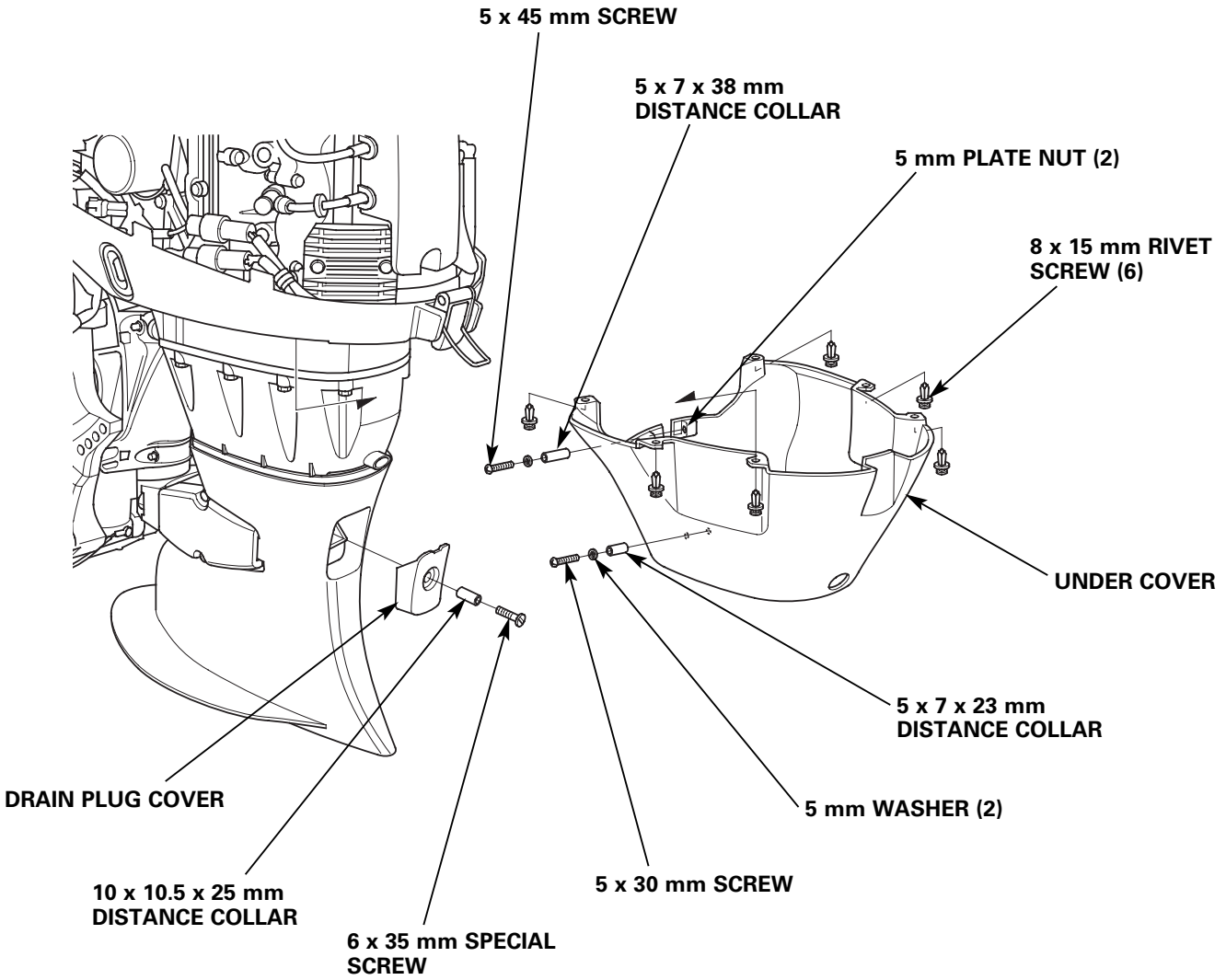
TORQUE: 6.5 N·m (0.7 kgf·m, 4.8 lbf·ft)

15) Set the under cover on the extension case and install the 5 mm plate nut on the under cover.
Set the 5 x 7 x 38 mm distance collar and the 5 x 7 x 23 mm distance collar on the under cover, and tighten the two 5 mm washers, 5 x 45 mm screw and the 5 x 30 mm screw to the specified torque.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

16) Install the six 8 x 15 mm rivet screws on the under cover.

17) Install the following parts.
- Gear case assembly/extension separator [Extra-long shaft type only] (P. 11-5)
- Engine cover (P. 4-2)



© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-56

12. OIL CASE

a. REMOVAL

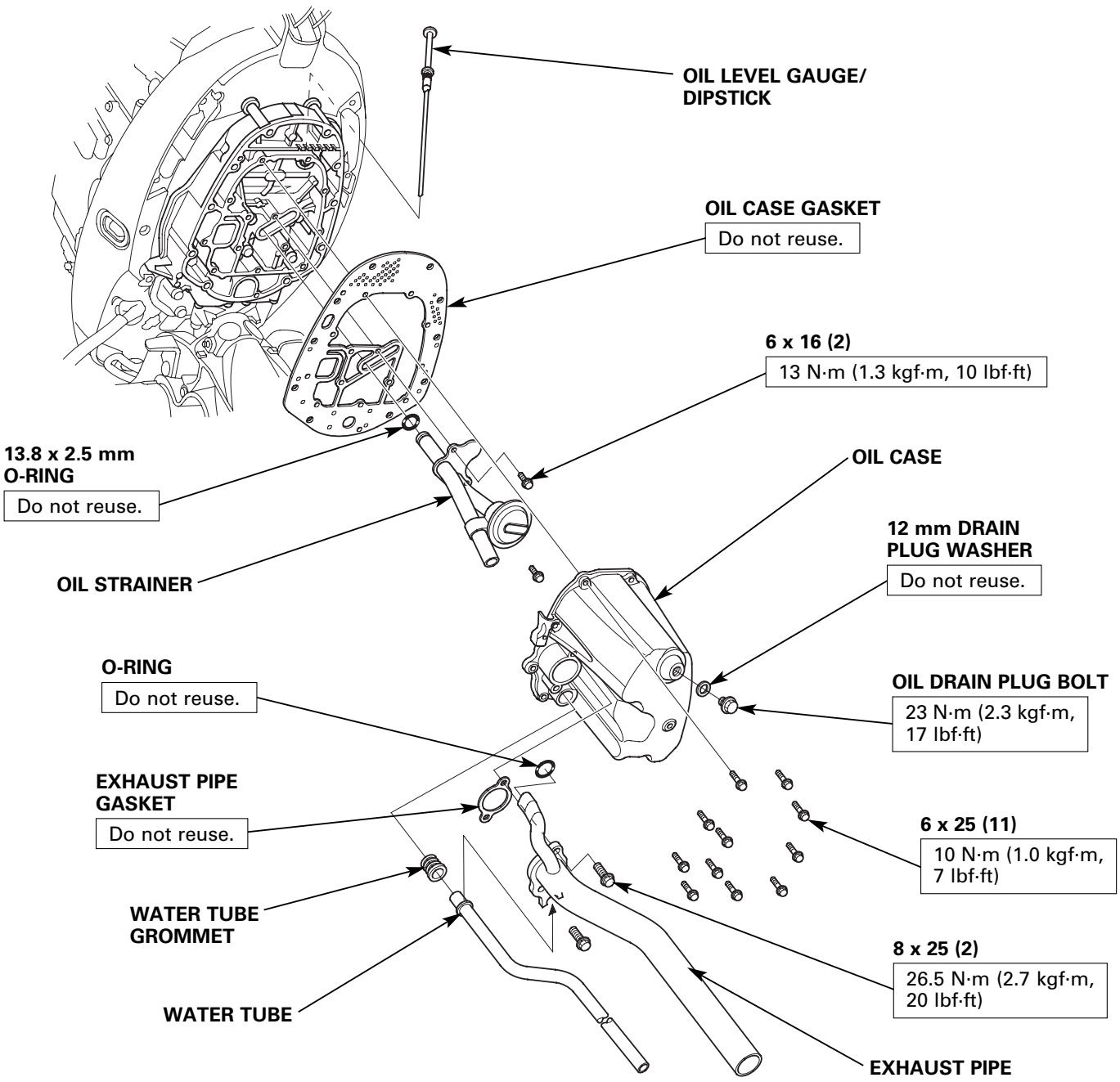
- Engine cover (P. 4-2)
- Gear case assembly/extension separator [Extra-long shaft type only] (P. 11-3)
- Extension case/lower rubber mount (P. 11-48)

1) Drain the engine oil from the oil case (P. 3-4).

2) Remove the two 8 x 25 mm flange bolts, and remove the exhaust pipe and exhaust pipe gasket.

3) Disconnect the water tube from the oil case, and remove the water tube grommet from the oil case.

4) Remove the eleven 6 x 25 mm flange bolts, and remove the oil case from the primary gear case.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

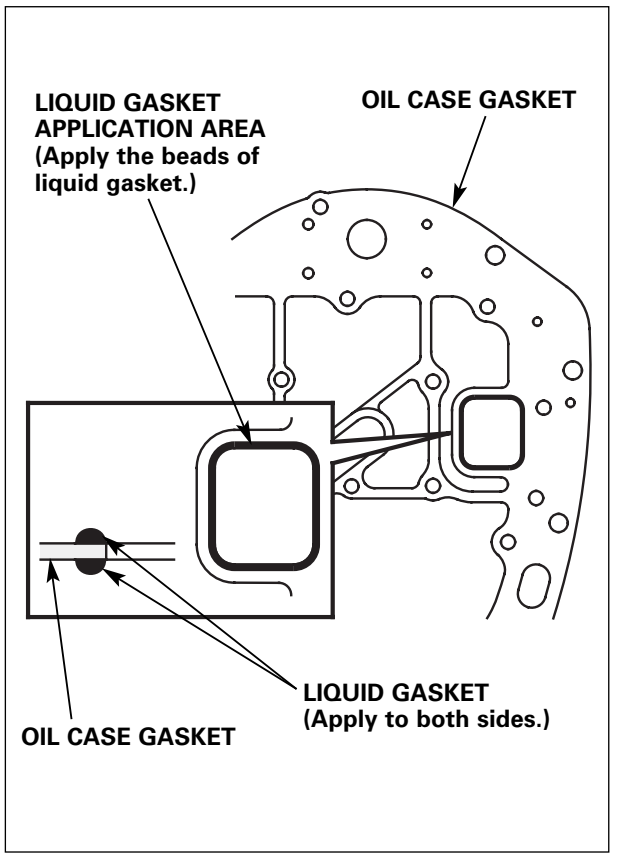
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-57

b. INSTALLATION

1) Clean the oil case/primary gear case mating surfaces and both sides of a new oil case gasket thoroughly using a shop towel and degreasing cleaning solvent.

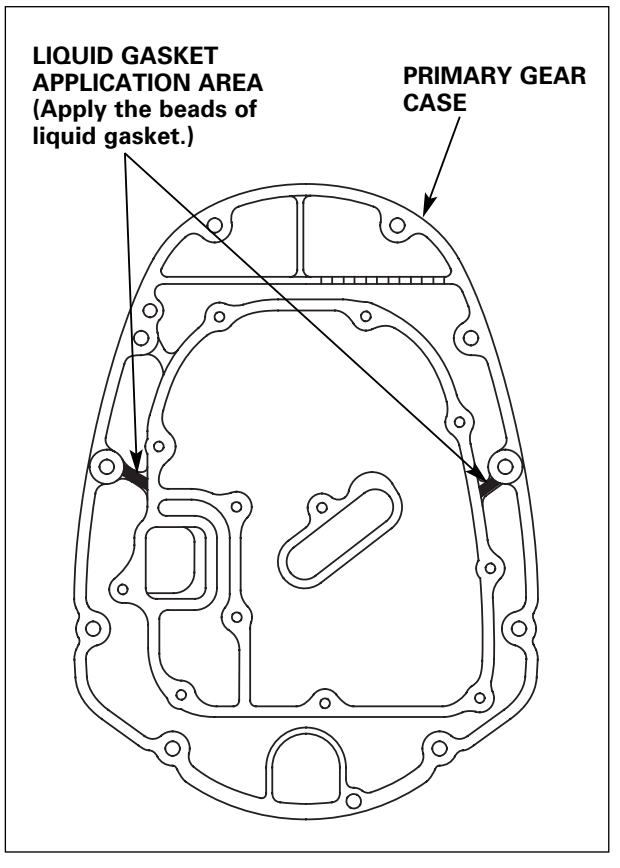
2) Apply beads [1.0 — 6.0 mm (0.04 — 0.24 in) thick] of liquid gasket (ThreeBond® #1211 or equivalent) to the indicated area of the oil case gasket.

   - Assemble within 90 minutes after application of the liquid gasket. If the parts have been left unassembled for 90 minutes or longer, remove the old gasket and apply a liquid gasket again.
   - Do not fill the oil case with the engine oil and do not start the engine for 15 minutes after assembly.



3) Apply beads [2.0 — 4.0 mm (0.08 — 0.16 in) thick] of liquid gasket (ThreeBond® #1207B or equivalent) to the indicated area of the primary gear case.

   - Assemble within 20 minutes after application of the liquid gasket. If the parts have been left unassembled for 20 minutes or longer, remove the old gasket and apply a liquid gasket again.
   - Do not fill the oil case with the engine oil and do not start the engine for 15 minutes after assembly.



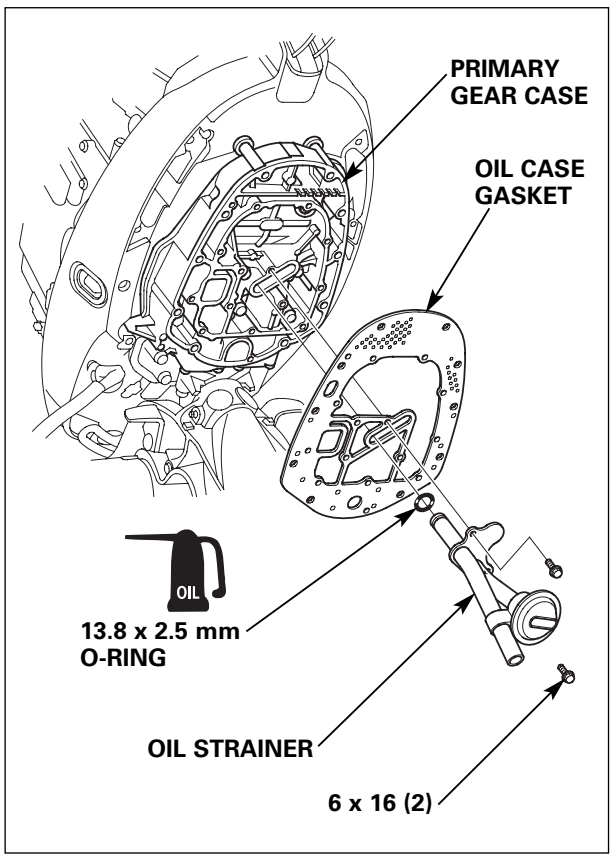
© Honda Motor Co., Ltd.

cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-58

4) Apply engine oil to the outer surface of a new 13.8 x 2.5 mm O-ring and install it on the oil strainer.

5) Set the oil case gasket on the primary gear case.
Install the oil strainer on the primary gear case and tighten the two 6 x 16 mm flange bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)



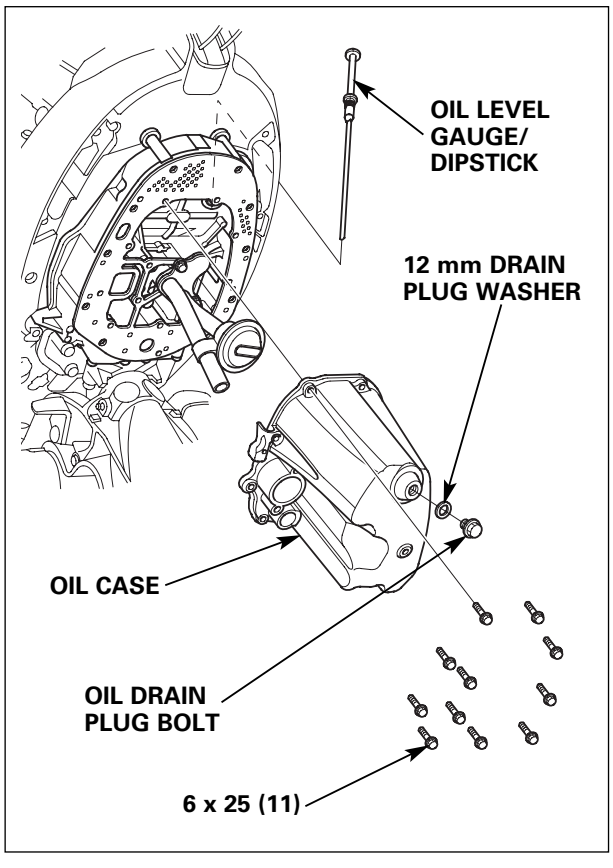
6) Install the oil case on the primary gear case and tighten the eleven 6 x 25 mm flange bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

7) Tighten a new 12 mm drain plug washer and oil drain plug bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

8) Install the oil level gauge/dipstick.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

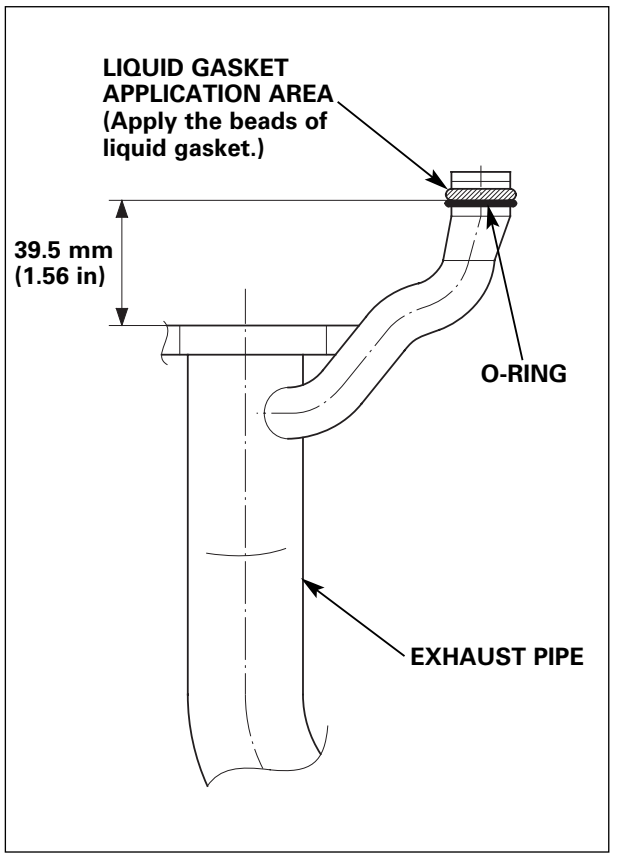
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-59

9) Clean the exhaust pipe in the areas shown thoroughly using a shop towel and degreasing cleaning solvent.

10) Apply sealant (ThreeBond® #7781 or equivalent) to the inside of a new O-ring.
Install the new O-ring on the exhaust pipe as shown.

11) Apply beads [3.0 — 7.0 mm (0.12 — 0.28 in) thick] of liquid gasket (ThreeBond® #1207B or equivalent) to the indicated area of the exhaust pipe.

- Assemble within 20 minutes after application of the liquid gasket. If the parts have been left unassembled for 20 minutes or longer, remove the old gasket and apply a liquid gasket again.
- Do not fill the oil case with the engine oil and do not start the engine for 15 minutes after assembly.



12) Apply marine grease to the inner surface and outer surface of the water tube grommet, and install it on the water tube.

13) Install the water tube in the oil case.

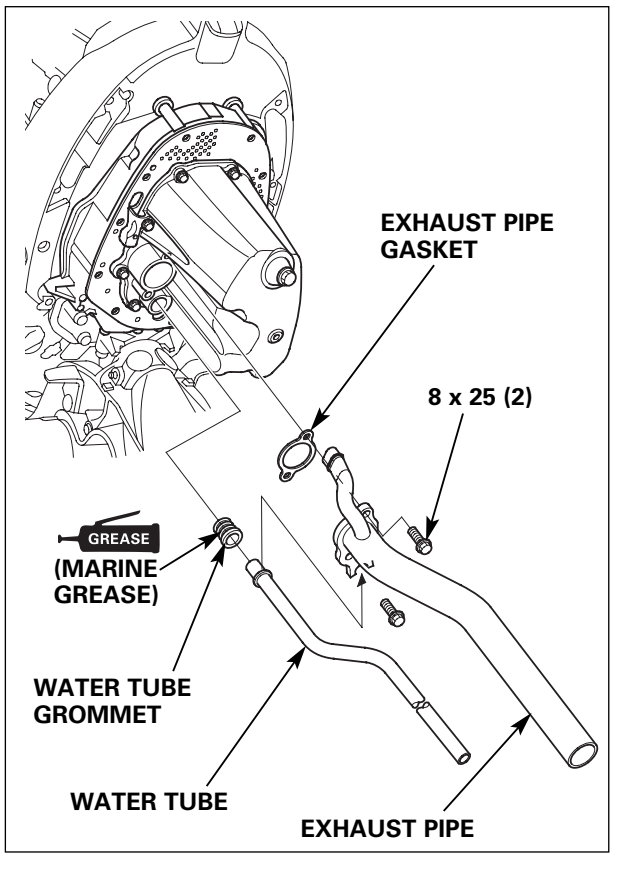
14) Install the exhaust pipe gasket and the exhaust pipe in the oil case, and tighten the 8 x 25 mm flange bolt to the specified torque.

TORQUE: 26.5 N·m (2.7 kgf·m, 20 lbf·ft)

15) Fill the oil case with the engine oil (P. 3-4).

16) Install the following parts.
- Extension case/lower rubber mount (P. 11-52)
- Gear case assembly/extension separator [Extra-long shaft types only] (P. 11-5)
- Engine cover (P. 4-2)

17) When the engine is started after assembly, follow the starting procedure after assembly (P. 2-2).



© Honda Motor Co., Ltd.

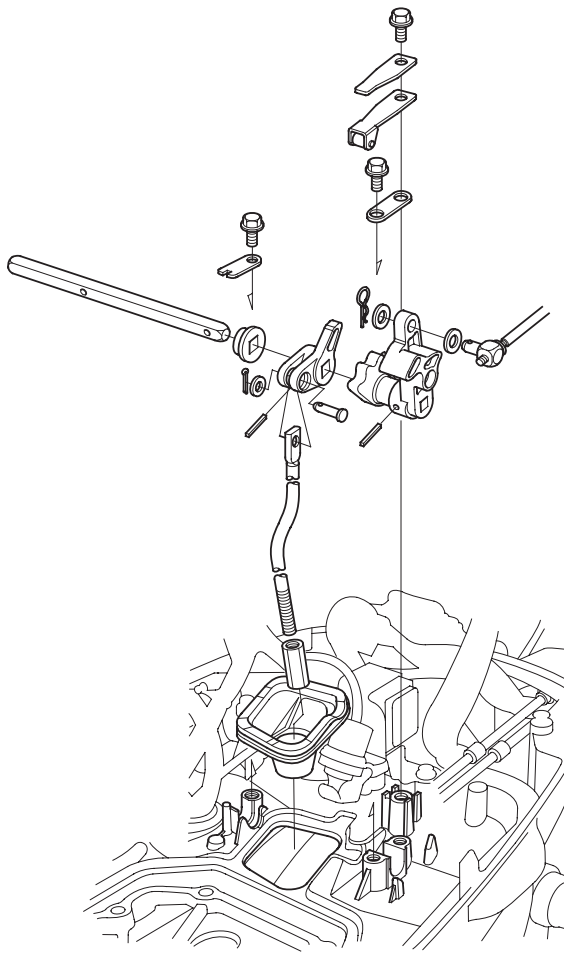
cap.11 BF40D 50D (A).qxp 2008/04/10 18:50 ページ 11-60

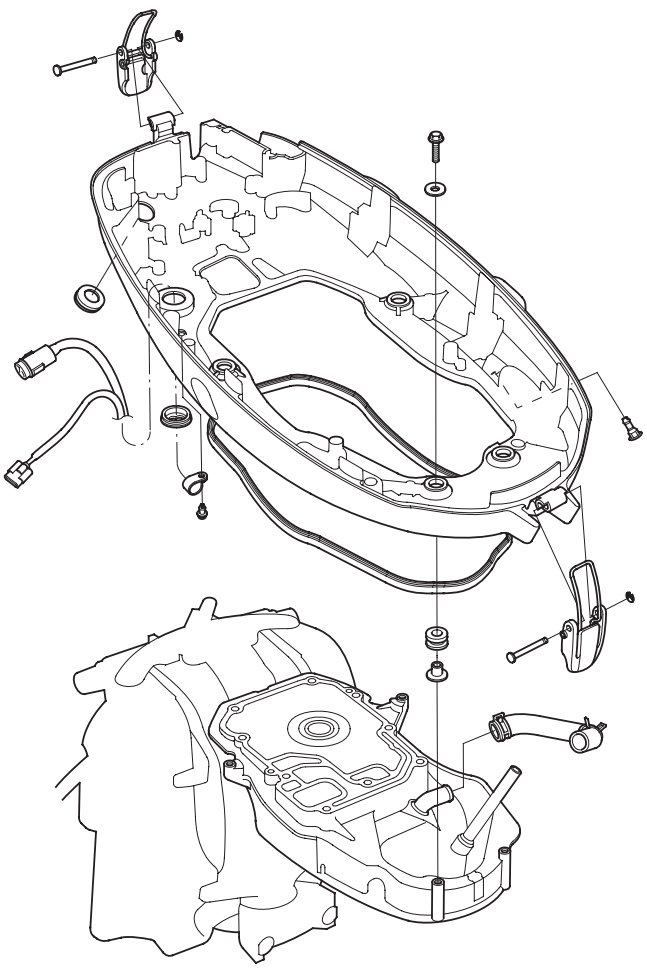
Date of Issue: May 2008
© Honda Motor Co., Ltd.

12章(A).qxp 2008/04/10 16:25 ページ 12-1

12. SHIFT ROD/ENGINE UNDER CASE

1. SHIFT ROD 12-2
2. ENGINE UNDER CASE 12-4





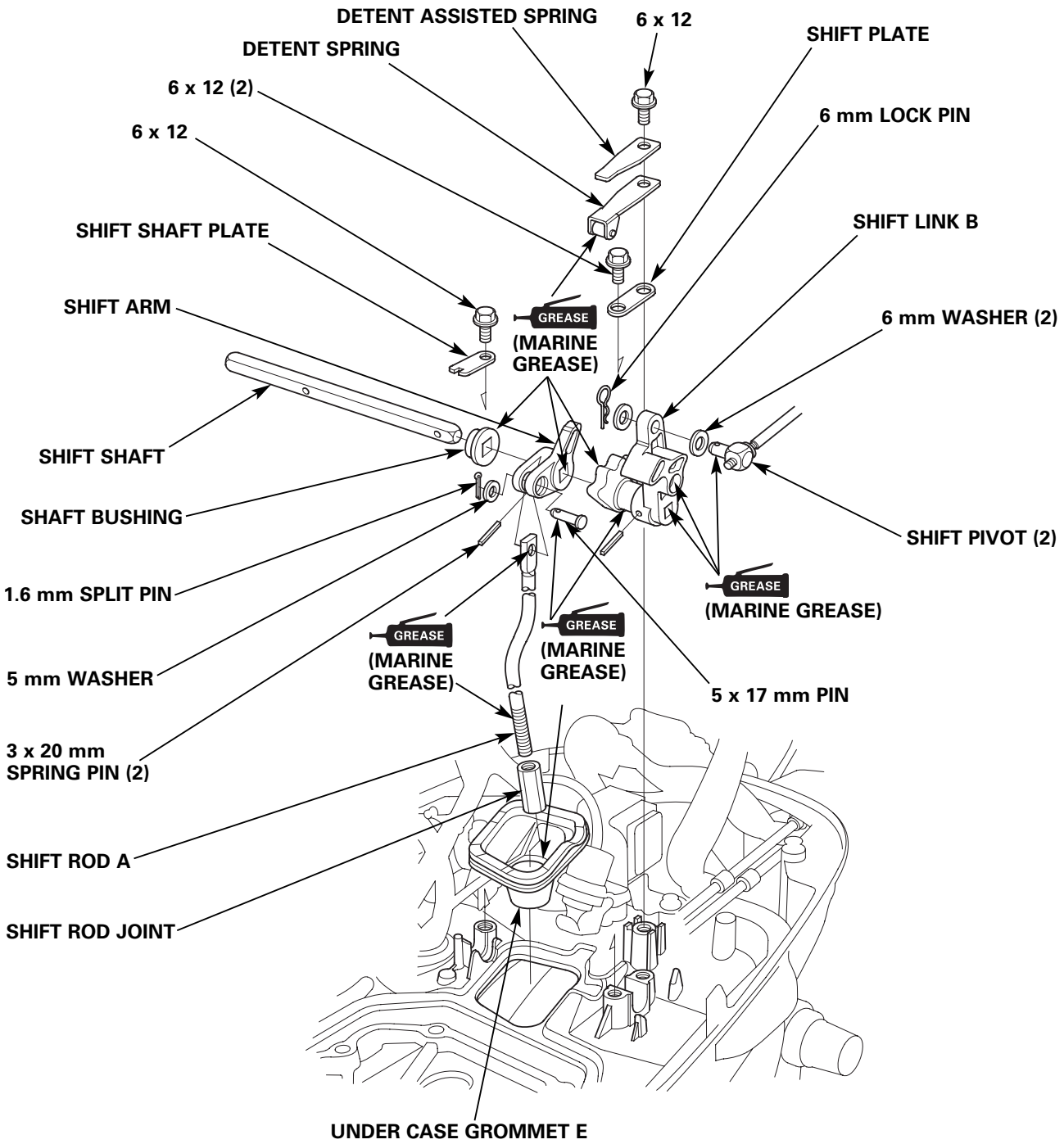
© Honda Motor Co., Ltd.

12章(A).qxp 2008/04/10 16:25 ページ 12-2

1. SHIFT ROD

a. DISASSEMBLY/REASSEMBLY

1) Remove the remote control cable [throttle/shift side] (P. 17-2).
2) Remove the throttle arm bracket assembly (P. 17-8).
3) Remove the tiller handle [Tiller handle type only] (P. 16-6).
4) Remove the engine assembly from the outboard motor (P. 6-2).
5) Remove the two 10 mm self-locking nuts from the mount case.
6) Slide the mount case away from the stem bracket to remove the shift rod.

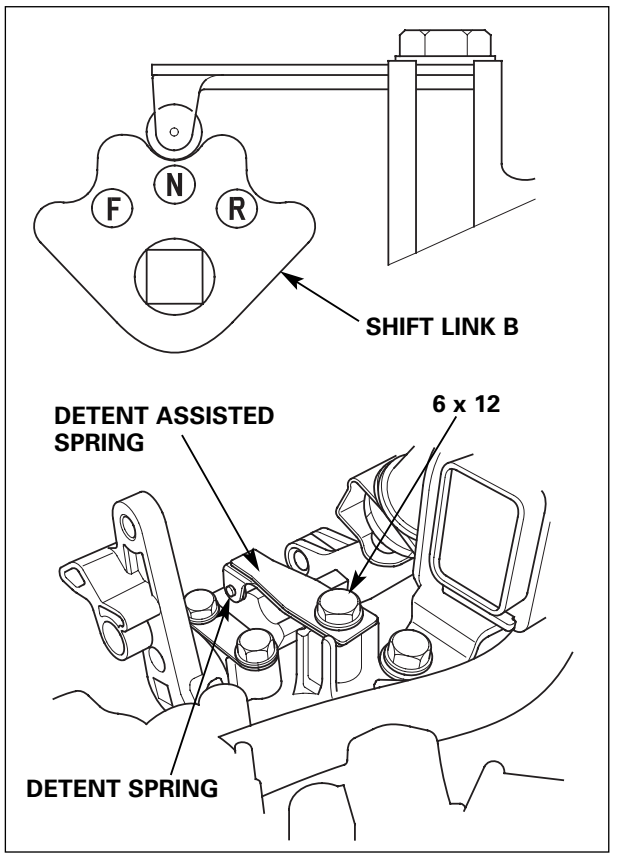


Date of Issue: May 2008
© Honda Motor Co., Ltd.

12章(A).qxp 2008/04/10 16:25 ページ 12-3

• DETENT SPRING ADJUSTMENT:

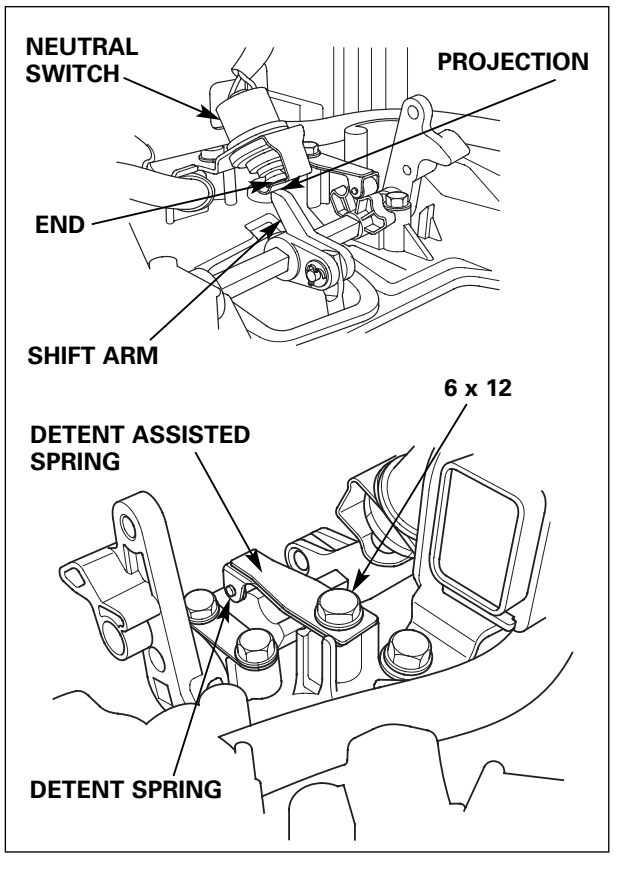
1) Set the detent spring and the detent assisted spring in the "N" (Neutral) position of shift link B, and tighten the 6 x 12 mm flange bolt as shown.



2) Holding the detent spring and the detent assisted spring in the position described in the step 1 and the 6 x 12 mm flange bolt tightened, check that the neutral switch is pushed in securely by the end of the shift arm projection. If not, adjust by loosening the 6 x 12 mm flange bolt and moving the detent spring.

   • If the neutral switch is not pushed in by moving the detent spring, check the detent spring or the shift arm for deformation or damage. Replace the detent spring or the shift arm if necessary.

3) After adjustment, perform the shift cable adjustment (P. 3-21).



© Honda Motor Co., Ltd.

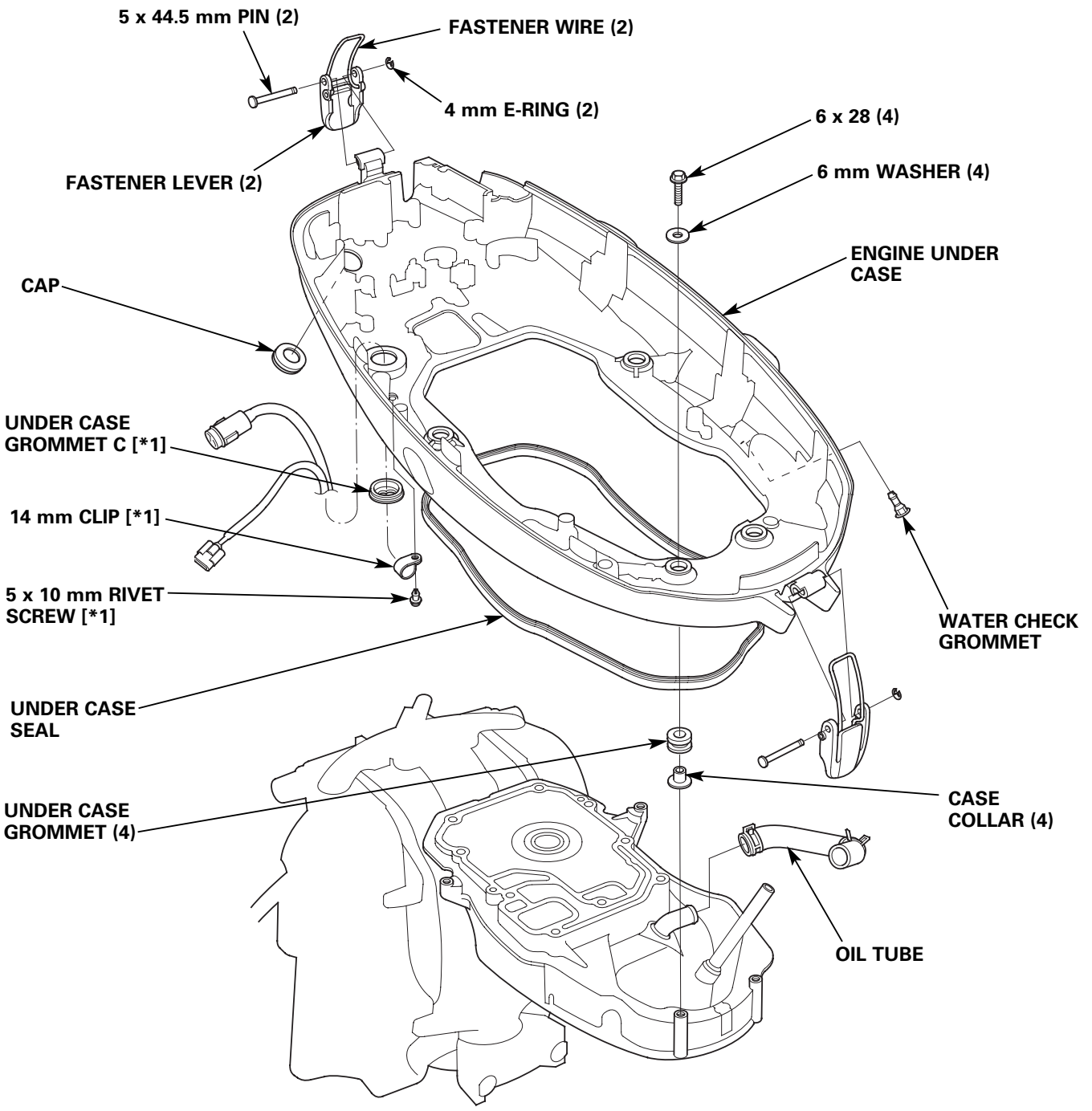
12章(A).qxp 2008/04/10 16:25 ページ 12-4

2. ENGINE UNDER CASE

a. DISASSEMBLY/REASSEMBLY

1) Remove the engine assembly from the outboard motor (P. 6-2).
2) Remove the tiller handle [Tiller handle type only] (P. 16-6).
3) Remove the electric parts from the engine under case.
4) Remove the shift rod (P. 12-2).

*1: Power trim/tilt type only.



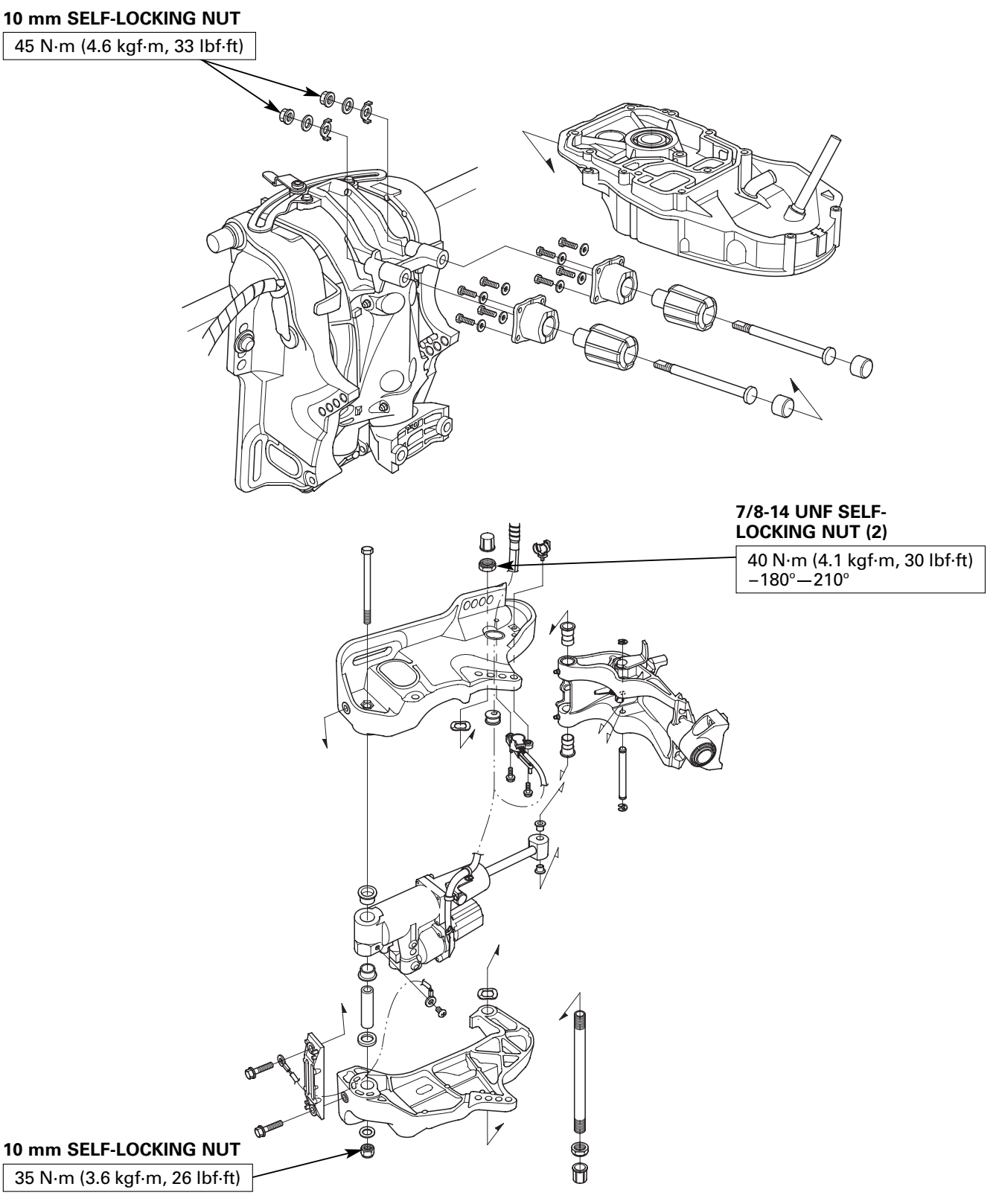
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-1

13. MOUNT CASE/STERN BRACKET/ SWIVEL CASE

BF40D·BF50D

1. MOUNT CASE..... 13-2 **2. STERN BRACKET/SWIVEL CASE.... 13-6**



© Honda Motor Co., Ltd.

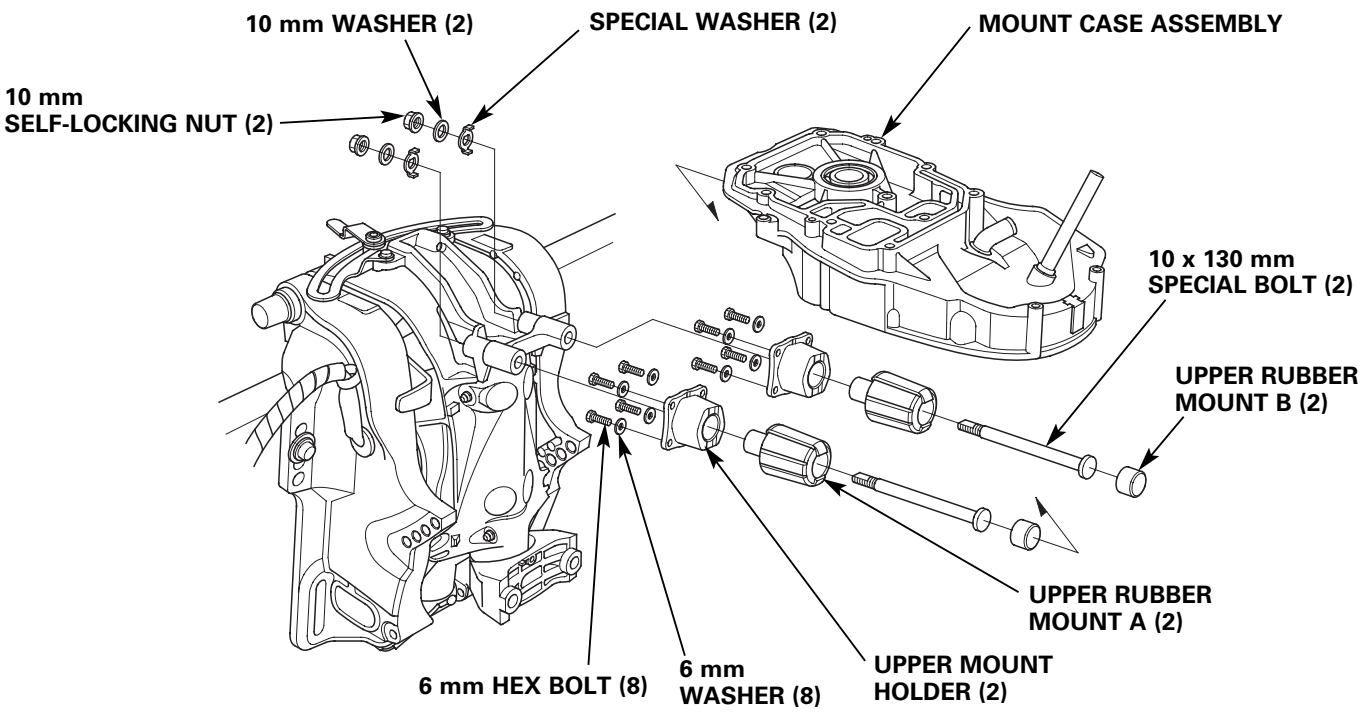
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-2

1. MOUNT CASE

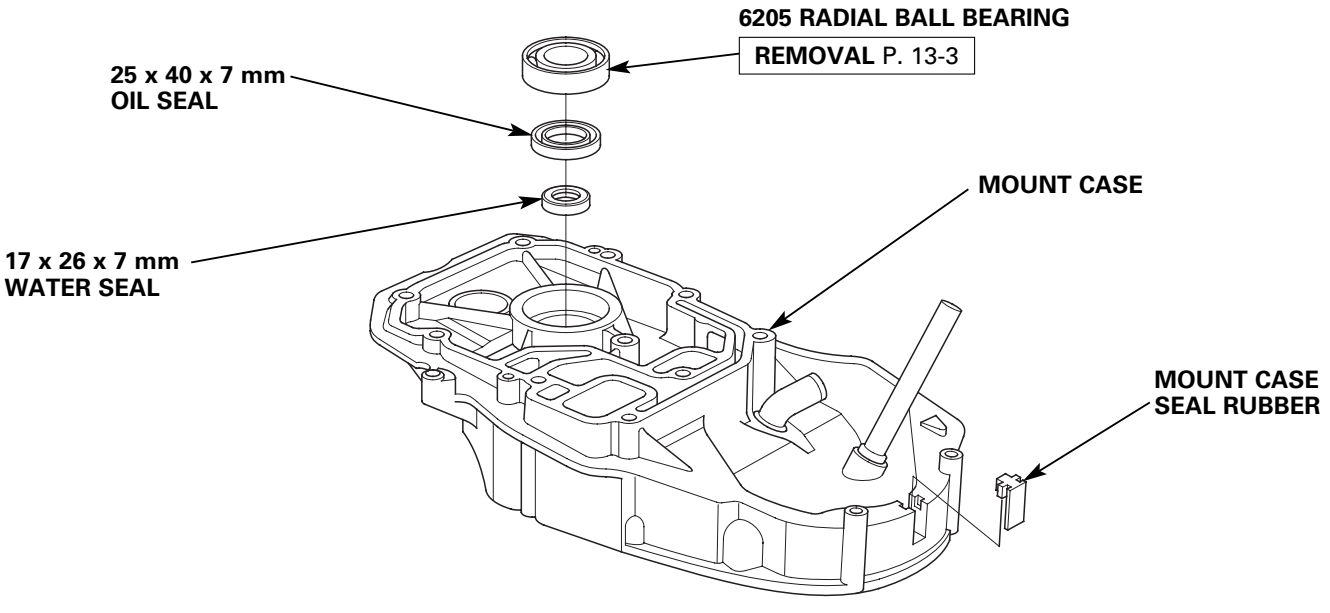
a. REMOVAL

Remove the following parts.
- Engine assembly (P. 6-2)
- Engine under case (P. 12-4)

1) Remove the two 10 mm self-locking nuts, and remove the mount case assembly.
2) Remove the eight 6 mm hex bolts, and remove the 6 mm washers, upper mount holders, upper rubber mount A's, 10 x 130 mm special bolts and the upper rubber mount B's.



b. MOUNT CASE ASSEMBLY DISASSEMBLY



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-3

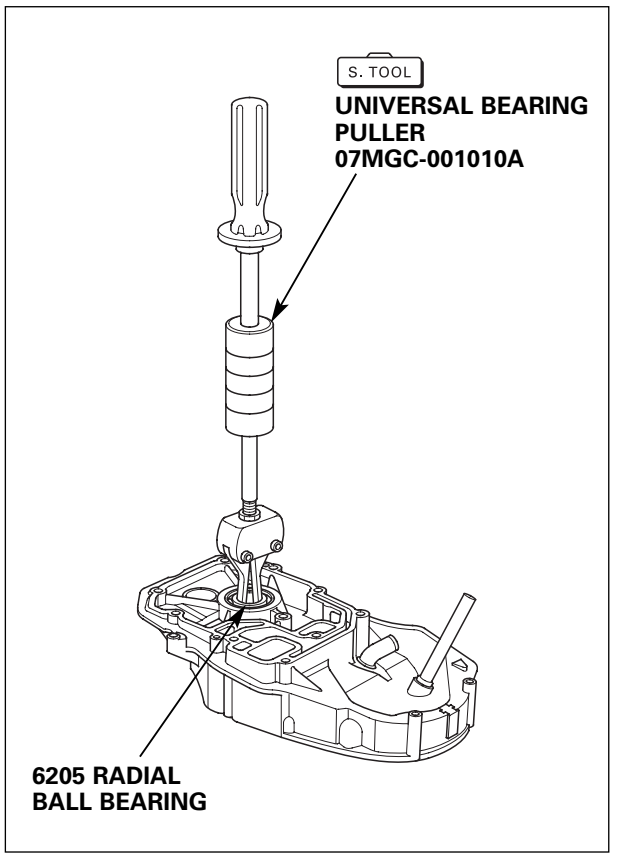
• 6205 RADIAL BALL BEARING

REMOVAL:

Remove the 6205 radial ball bearing using the special tools as shown.

TOOL:

Universal bearing puller	**07MGC-001010A**



c. MOUNT CASE REASSEMBLY

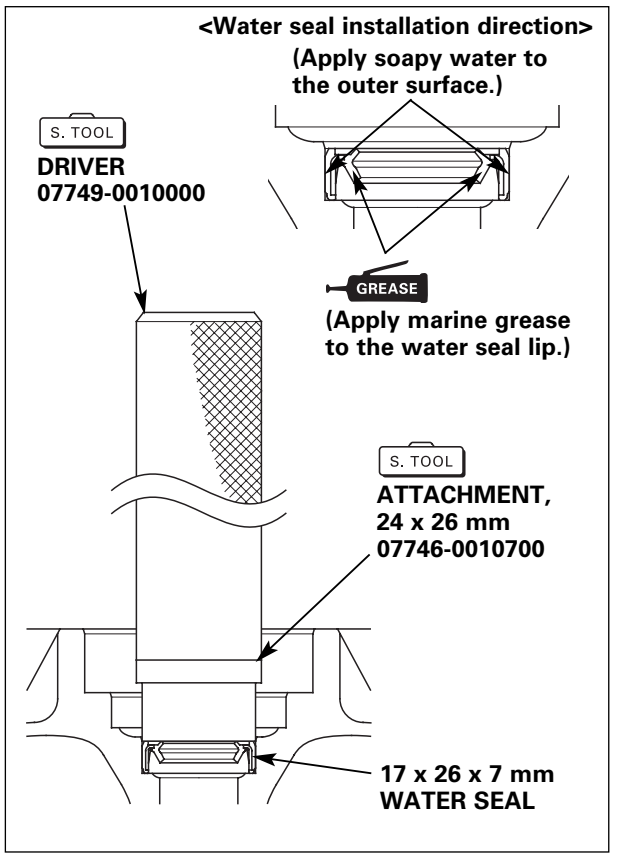
1) Apply soapy water to the outer surface of a new 17 x 26 x 7 mm water seal.

2) Install the water seal using the special tools as shown. Note the installation direction of the water seal.

   TOOLS:

Driver	**07749-0010000**
Attachment, 24 x 26 mm	**07746-0010700**

3) After installing the water seal, apply marine grease to the lip of the water seal.



© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-4

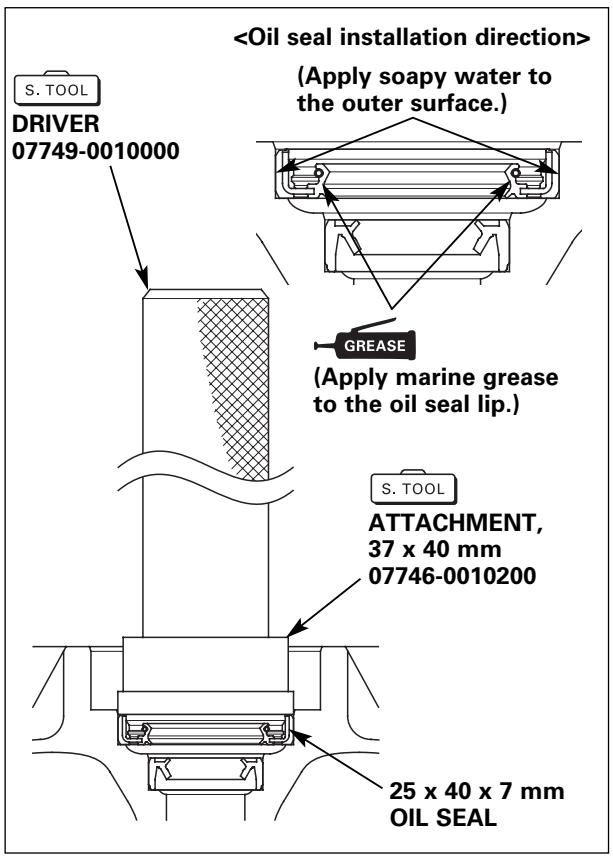
4) Apply soapy water to the outer surface of a new 25 x 40 x 7 mm oil seal.

5) Install the oil seal using the special tools as shown. Note the installation direction of the oil seal.

TOOLS:

Driver	**07749-0010000**
Attachment, 37 x 40 mm	**07746-0010200**

6) After installing the oil seal, apply marine grease to the lip of the oil seal.

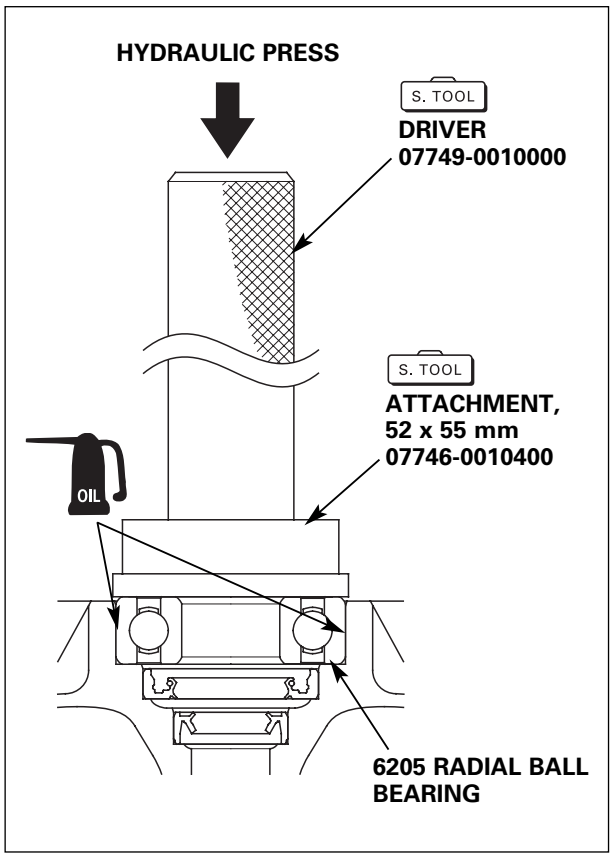


7) Apply engine oil to the outer surface of the 6205 radial ball bearing.

8) Install the 6205 radial ball bearing using the special tools and hydraulic press as shown.

TOOLS:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-5

d. INSTALLATION

1) Apply marine grease to the insertion part and threads of the two 10 x 130 mm special bolts.

2) Install the 10 x 130 mm special bolts, upper rubber mount A's and the upper mount holders on the mount case assembly. Install with the cutout in the special bolts, projection on the upper rubber mount A and the recess in the upper mount holders facing up as shown.

3) Set the 6 mm washers, and tighten the eight 6 mm hex bolts securely.

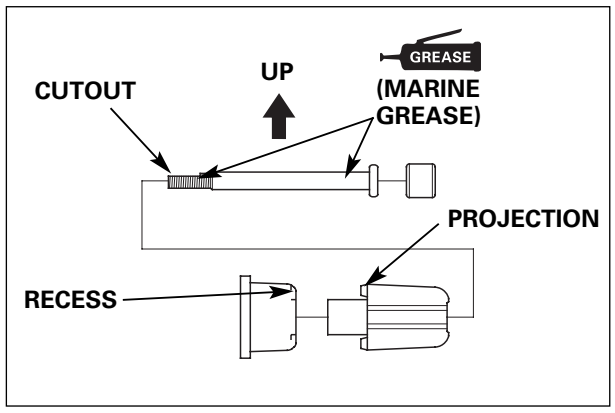
4) Install the mount case assembly on the swivel case assembly.

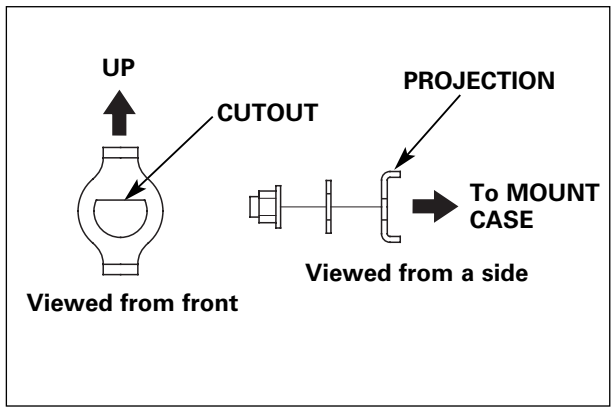
5) Install the special washers on the mount case with the cutout facing up and the projection toward the mount case as shown.

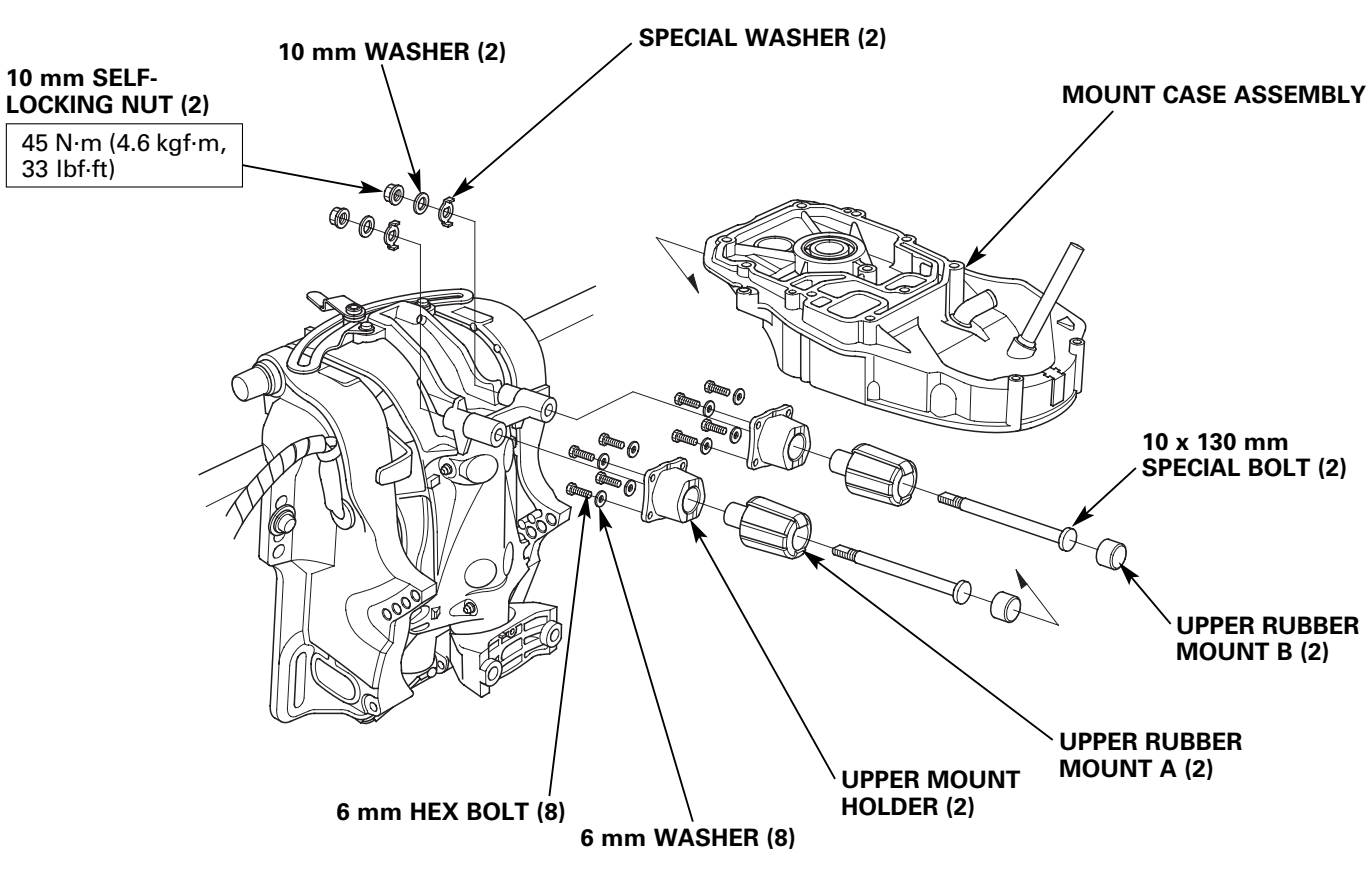
6) Set the 10 mm washers on the special washers, and tighten the 10 mm self-locking nuts to the specified torque.

   TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)

   Install the following parts.
   - Engine under case (P. 12-4)
   - Engine assembly (P. 6-9)







© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-6

2. STERN BRACKET/SWIVEL CASE

a. REMOVAL
[POWER TRIM/TILT TYPE]

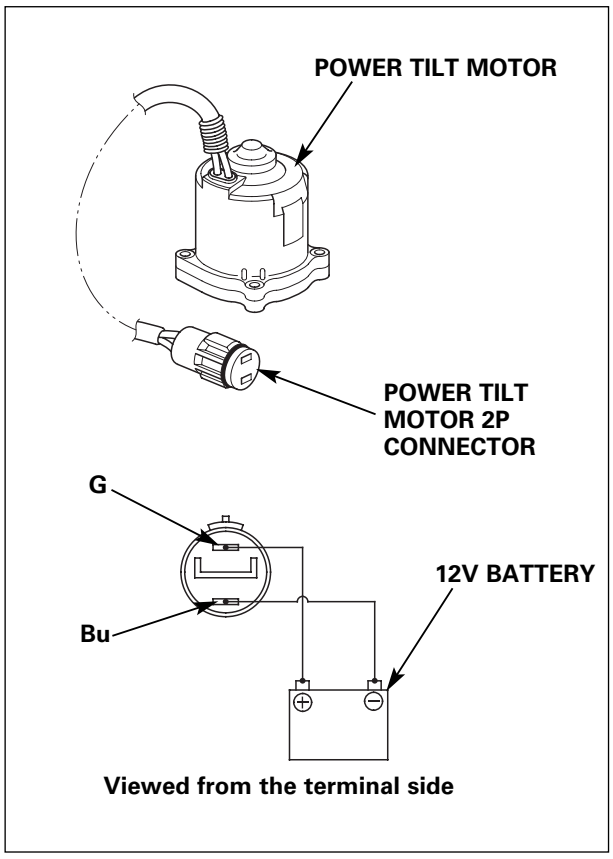
Remove the following parts.
- Engine assembly (P. 6-2)
- Engine under case (P. 12-4)
- Mount case (P. 13-2)

NOTICE

Use a known-good battery to connect it to the connector terminals. Take care not to short-circuit the terminals.

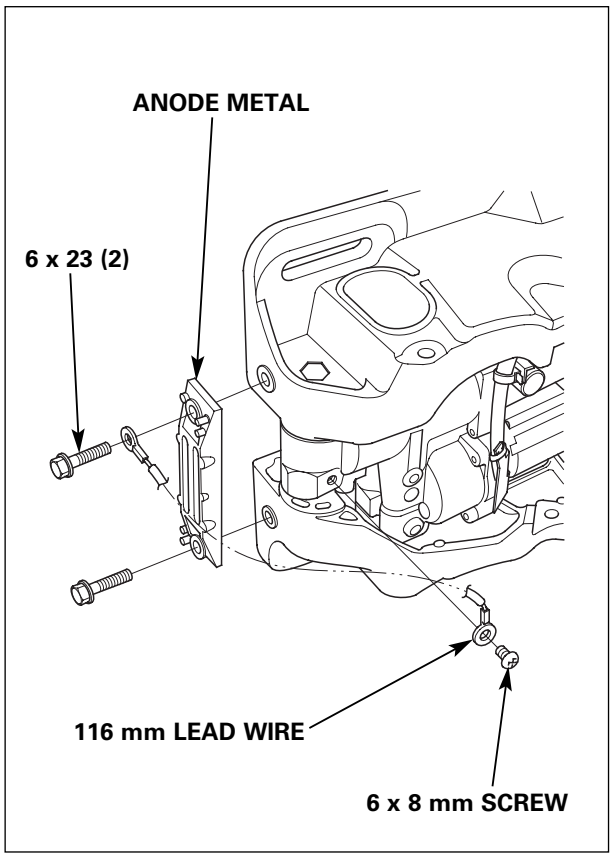
1) Connect the battery positive (+) cable to the green terminal of the power tilt motor 2P connector and the battery negative (–) cable to the blue terminal. Raise the swivel case assembly to the uppermost position (the piston rod of the power trim/tilt assembly is fully extended).

2) After raising the swivel case assembly to the uppermost position, disconnect the battery cables from the power tilt motor 2P connector terminals.



3) Remove the 6 x 8 mm screw.

4) Remove the two 6 x 23 mm flange bolts. Disconnect the 116 mm lead wire and remove the anode metal. Check the anode metal for corrosion. Replace the anode metal with a new one if it is excessively corroded.



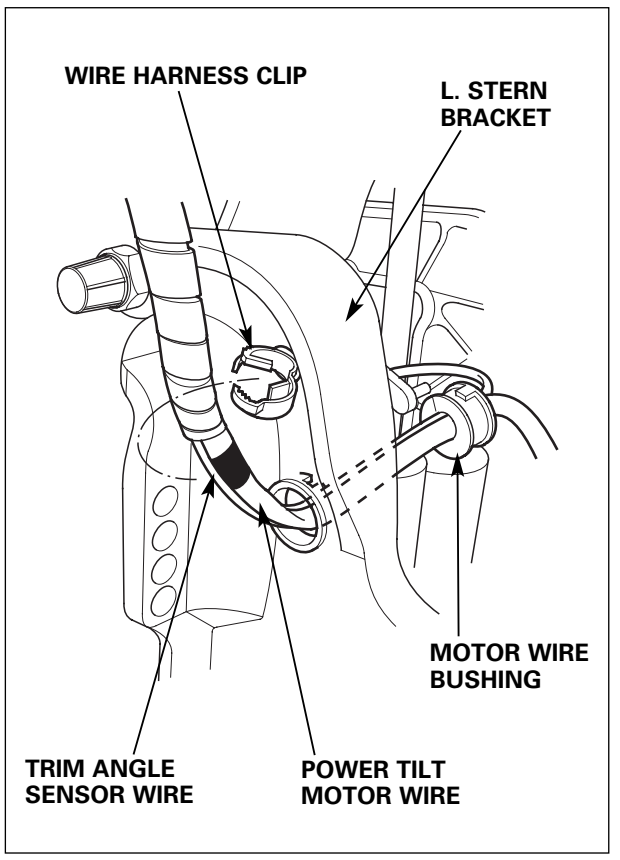
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-7

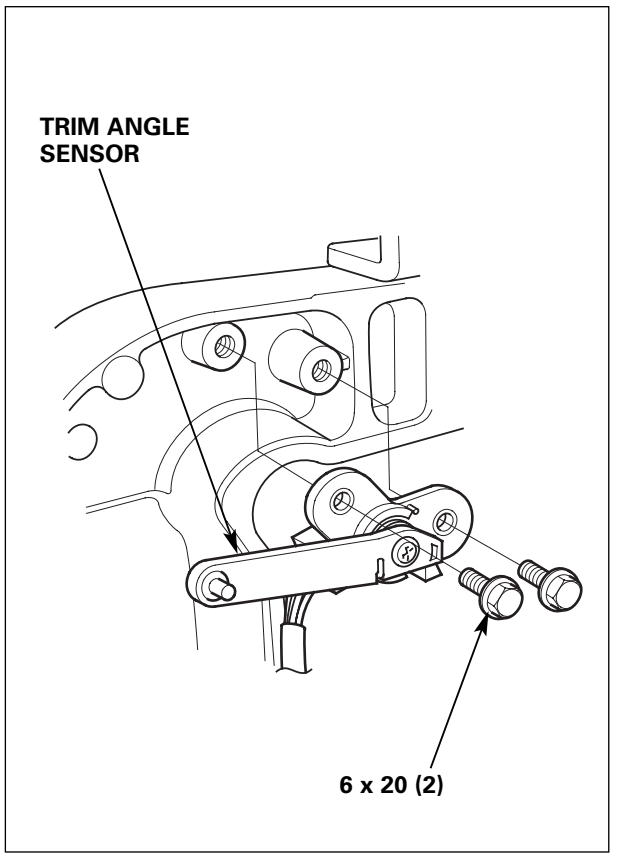
5) Open the wire harness clip and release the trim angle sensor wire and the power tilt motor wire.

6) Pull the power tilt motor wire and the trim angle sensor wire out of the hole in the L. stern bracket.

7) Remove the motor wire bushing and the wire harness clip.



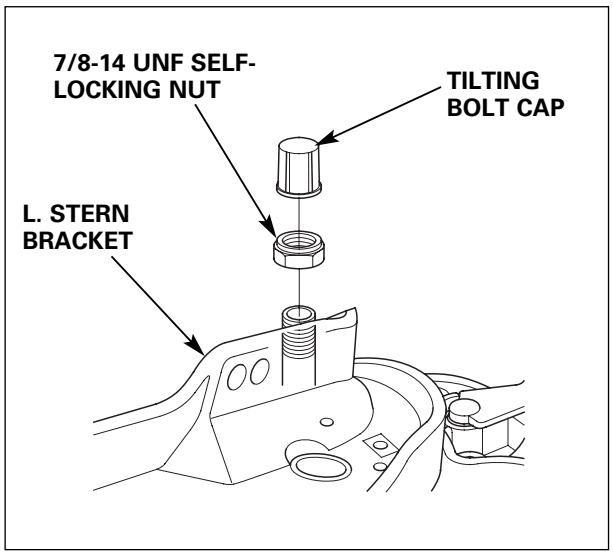
8) Remove the two 6 x 20 mm flange bolts and remove the trim angle sensor.



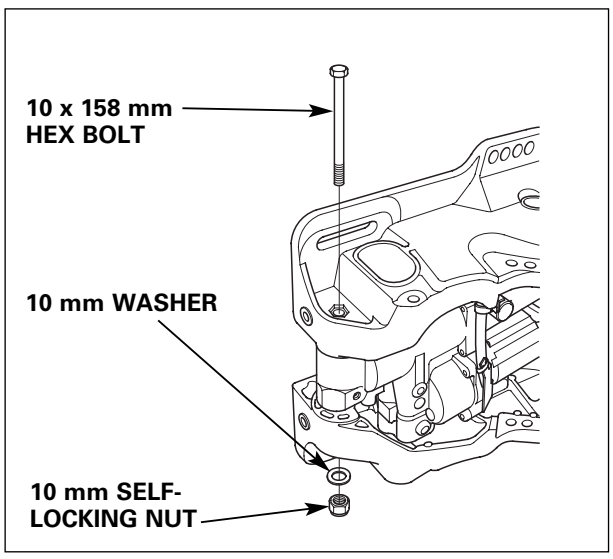
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-8

9) Remove the tilting bolt cap and the 7/8-14 UNF self-locking nut that are on the L. stern bracket side.
Replace the 7/8-14 UNF self-locking nut with a new one on reassembly.

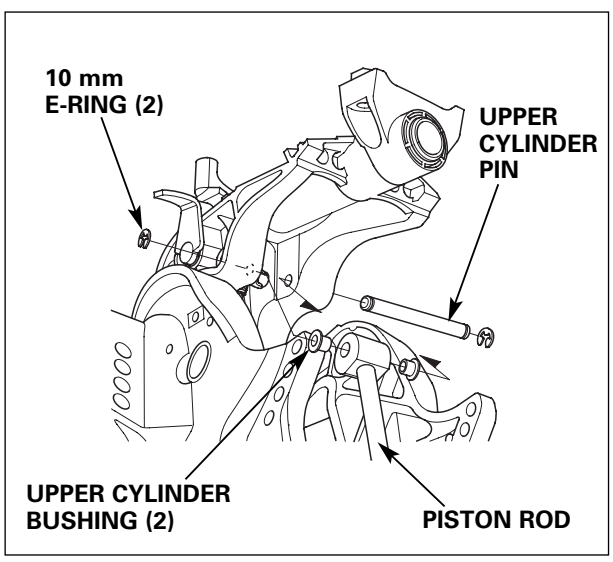


10) Remove the 10 mm self-locking nut, and remove the 10 mm washer and the 10 x 158 mm hex bolt.
Replace the 10 mm self-locking nut with a new one on reassembly.



11) Remove the two 10 mm E-rings, and remove the upper cylinder pin.

12) Remove the two upper cylinder bushings from the piston rod.
Check the upper cylinder bushings for wear, damage or deformation, and replace them with new ones if necessary.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

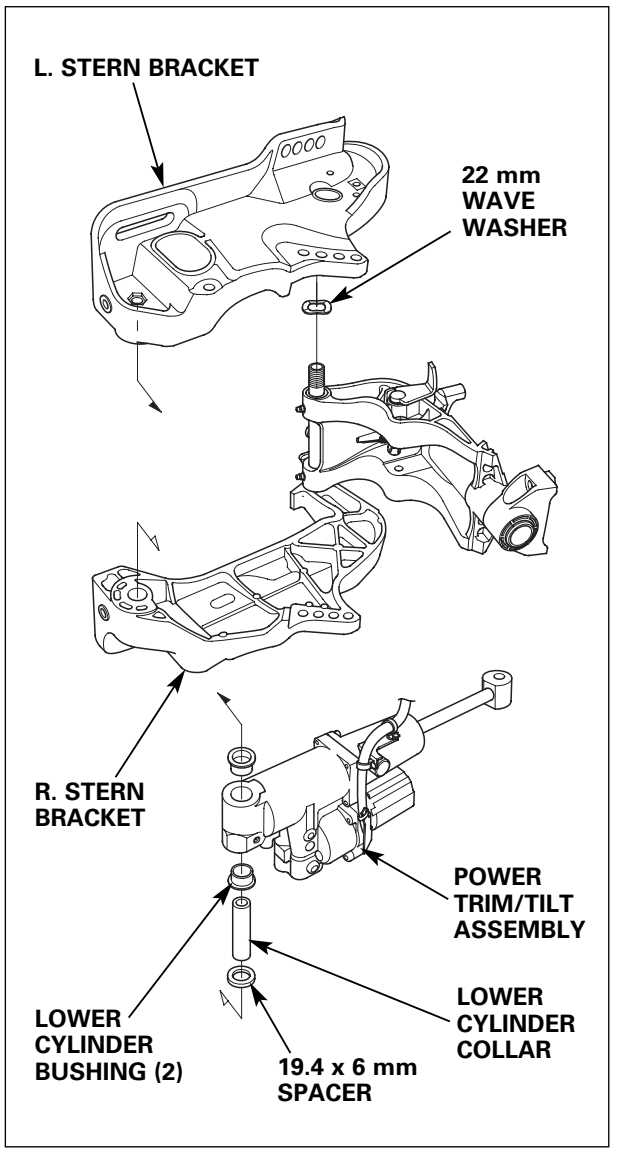
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-9

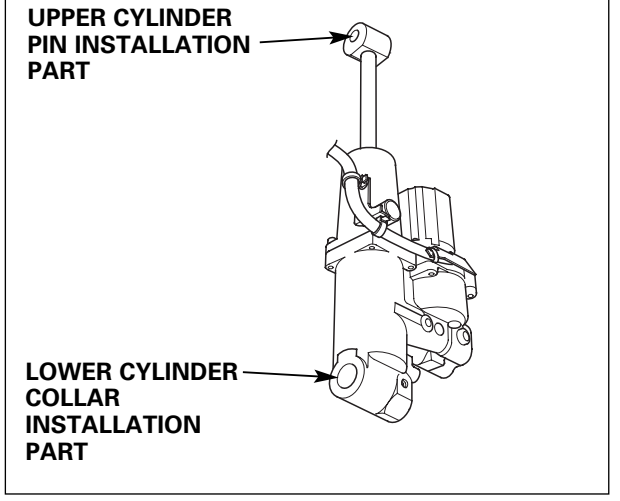
13) Remove the L. stern bracket, and remove the 22 mm wave washer.

14) Remove the power trim/tilt assembly from the R. stern bracket.

- Do not push in the piston rod after removing the power trim/tilt assembly. If the piston rod has been pushed down, set it in the fully extended position (P. 13-6).
- After removing the power trim/tilt assembly, store it in an upright position with the upper cylinder pin installation part up. Never lay the power trim/tilt assembly on its side or store it upside down (with the lower cylinder collar installation part up).

15) Remove the lower cylinder collar, 19.4 x 6 mm spacer and the two lower cylinder bushings from the power trim/tilt assembly.
Check the lower cylinder bushing for wear, damage or deformation, and replace it with a new one if necessary.





© Honda Motor Co., Ltd.

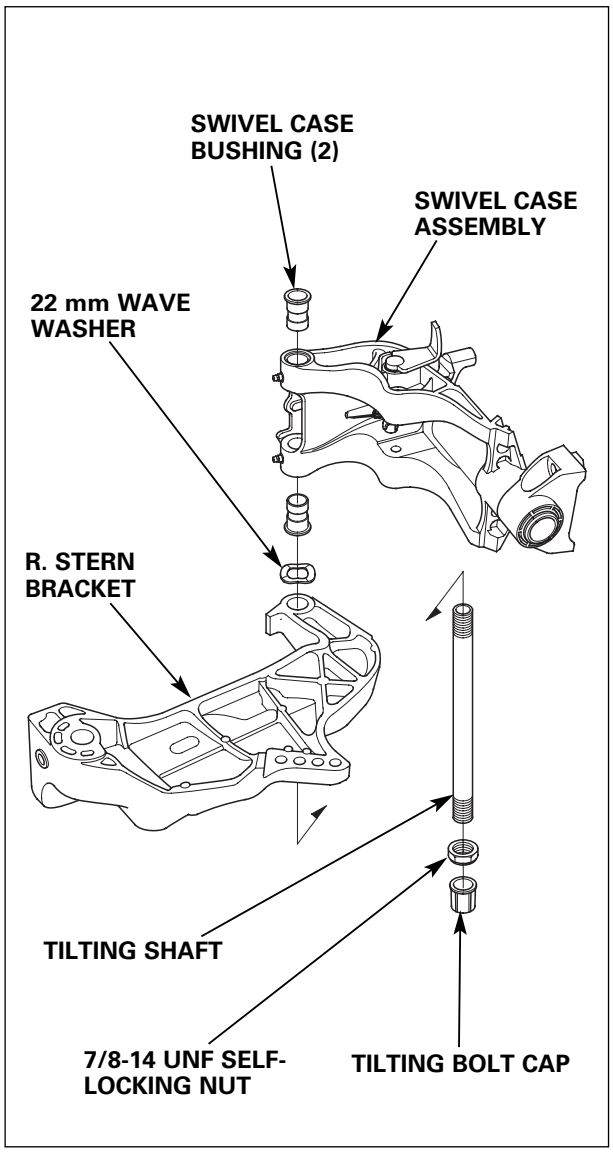
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-10

16) Remove the swivel case assembly and the 22 mm wave washer.

17) Remove the two swivel case bushings from the swivel case assembly.
Check the swivel case bushings for wear, damage or deformation, and replace them with new ones if necessary.

18) Remove the tilting shaft from the R. stern bracket.

19) Remove the tilting bolt cap and the 7/8-14 UNF self-locking nut from the tilting shaft.
Replace the 7/8-14 UNF self-locking nut with a new one on reassembly.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

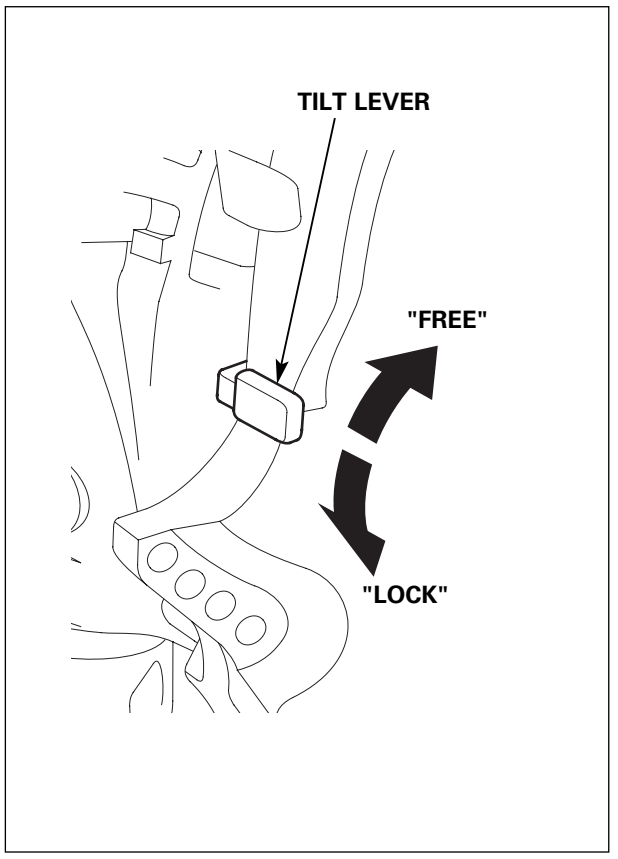
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-11

[GAS ASSISTED TYPE]

Remove the following parts.
- Engine assembly (P. 6-2)
- Engine under case (P. 12-4)
- Mount case (P. 13-2)

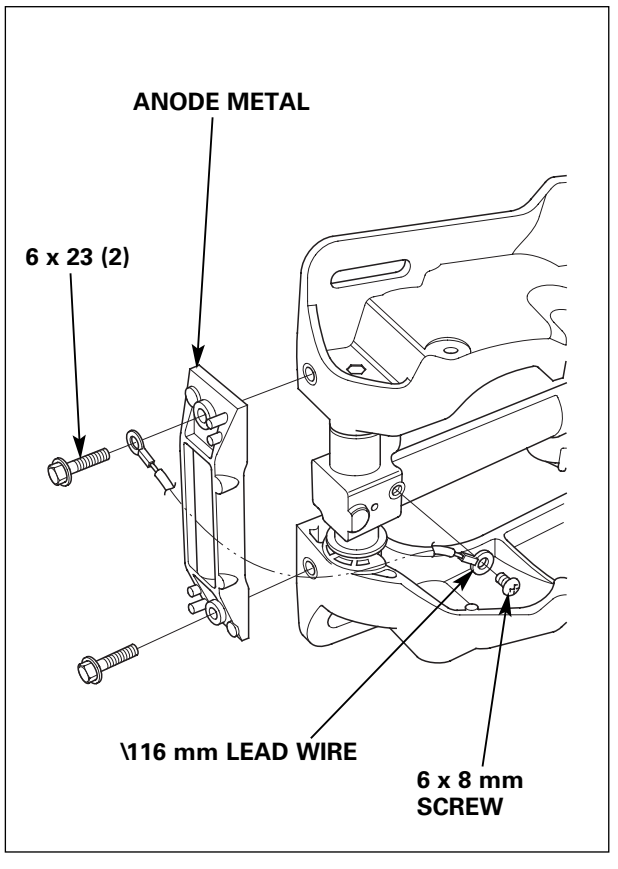
1) Move the tilt lever to the "FREE" position, and raise the swivel case assembly to the uppermost position (the piston rod of the gas assisted damper assembly is fully extended).

2) After raising the swivel case assembly to the uppermost position, move the gas assisted lever to the "LOCK" position.



3) Remove the 6 x 8 mm screw.

4) Remove the two 6 x 23 mm flange bolts. Disconnect the 116 mm lead wire and remove the anode metal.
Check the anode metal and replace it with a new one if it is excessively corroded.

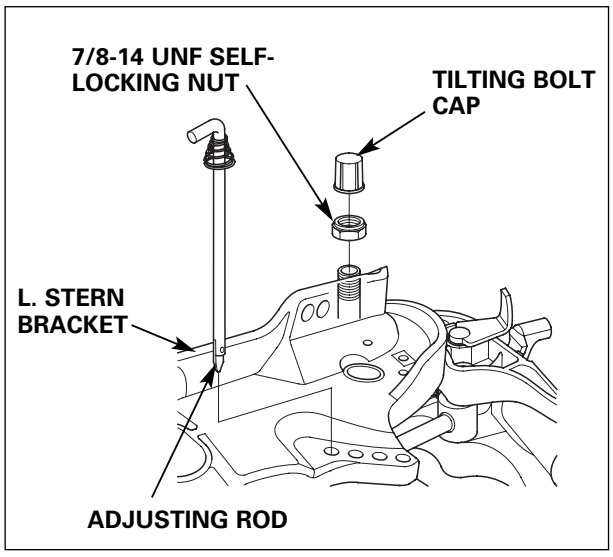


© Honda Motor Co., Ltd.

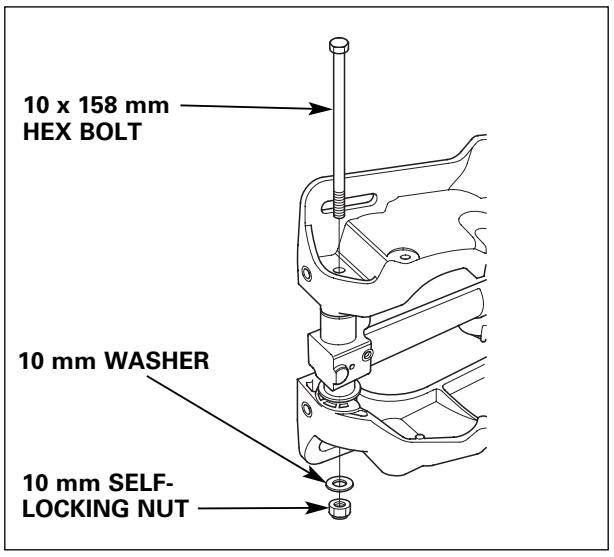
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-12

5) Remove the adjusting rod.

6) Remove the tilting bolt cap and the 7/8-14 UNF self-locking nut that are on the L. stern bracket side.
Replace the 7/8-14 UNF self-locking nut with a new one on reassembly.

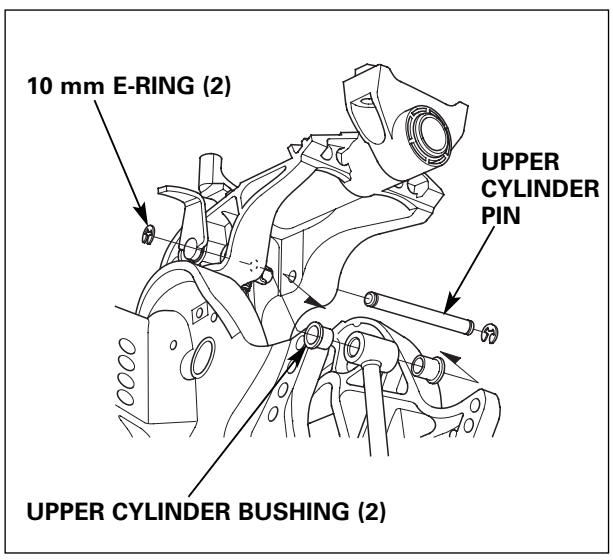


7) Remove the 10 mm self-locking nut, and remove the 10 mm washer and the 10 x 158 mm hex bolt.
Replace the 10 mm self-locking nut with a new one on reassembly.



8) Remove the two 10 mm E-rings, and remove the upper cylinder pin.

9) Remove the two upper cylinder bushings from the piston rod.
Check the upper cylinder bushings for wear, damage or deformation, and replace them with new ones if necessary.



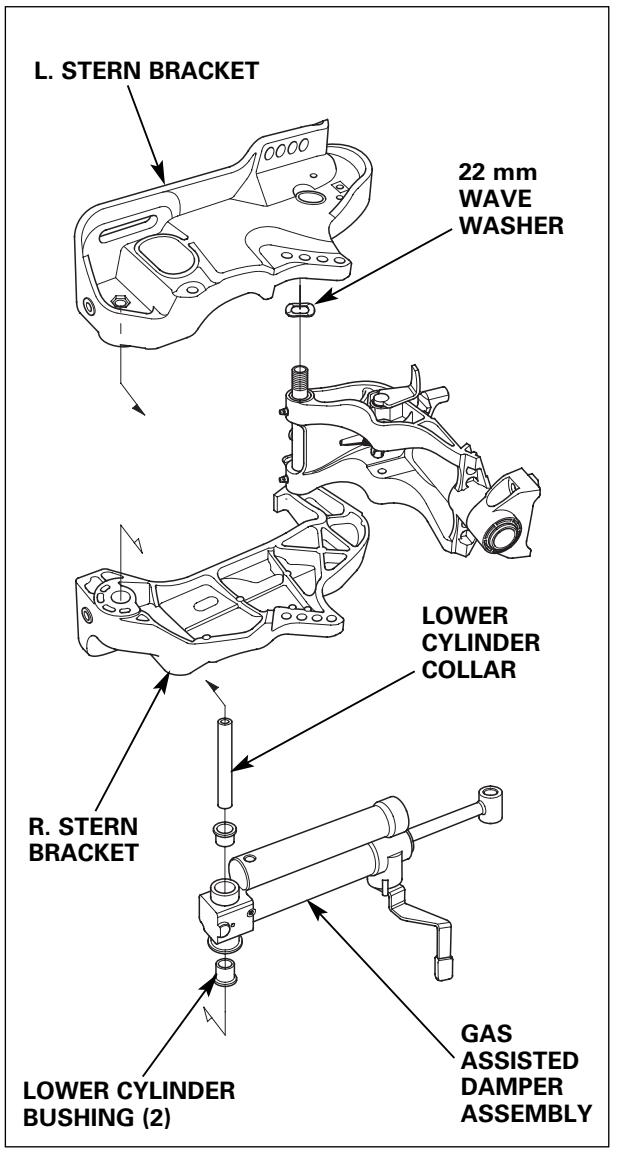
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-13

10) Remove the L. stern bracket and the 22 mm wave washer.

11) Remove the gas assisted damper assembly from the R. stern bracket.
Do not push the piston rod in after removing the gas assisted damper assembly.
If the piston rod has been pushed down, set it in the fully extended position (P. 13-11).

12) Remove the lower cylinder collar and the two lower cylinder bushings from the gas assisted damper assembly. Check the lower cylinder bushings for wear, damage or deformation, and replace them with new ones if necessary.



© Honda Motor Co., Ltd.

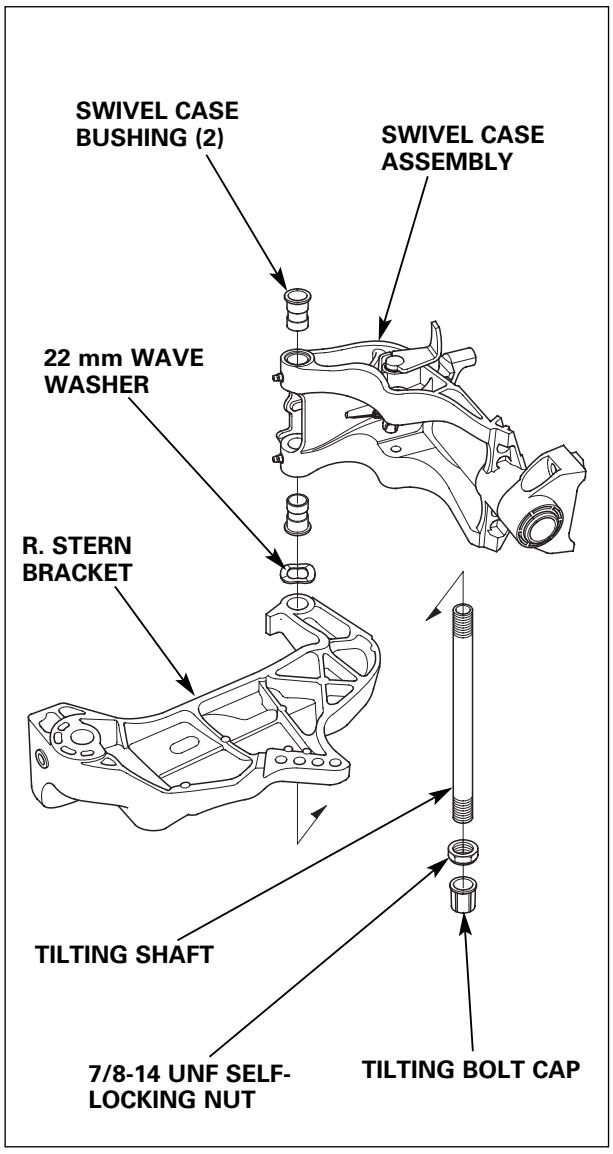
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-14

13) Remove the swivel case assembly and the 22 mm wave washer.

14) Remove the two swivel case bushings from the swivel case assembly.
Check the swivel case bushings for wear, damage or deformation, and replace them with new ones if necessary.

15) Remove the tilting shaft from the R. stern bracket.

16) Remove the tilting bolt cap and the 7/8-14 UNF self-locking nut from the tilting shaft.
Replace the 7/8-14 UNF self-locking nut with a new one on reassembly.

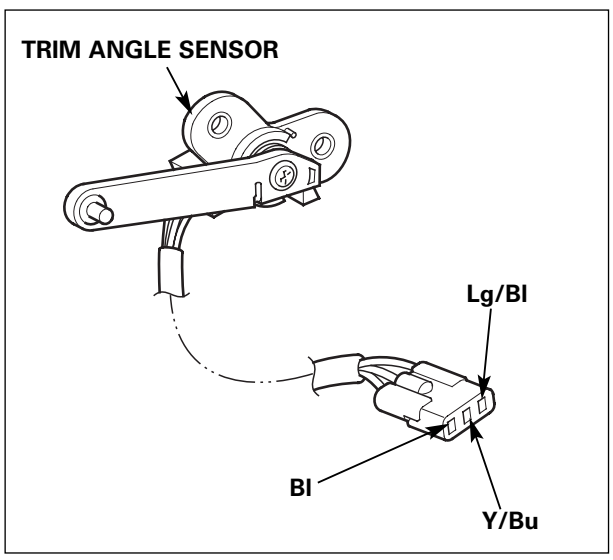


b. INSPECTION
[POWER TRIM/TILT TYPE ONLY]
• TRIM ANGLE SENSOR

Measure the resistance between the following terminals.

Between Light green/Black and Black terminals	4 — 6 kΩ
Between Yellow/Blue and Black terminals	2.9 — 4.4 kΩ

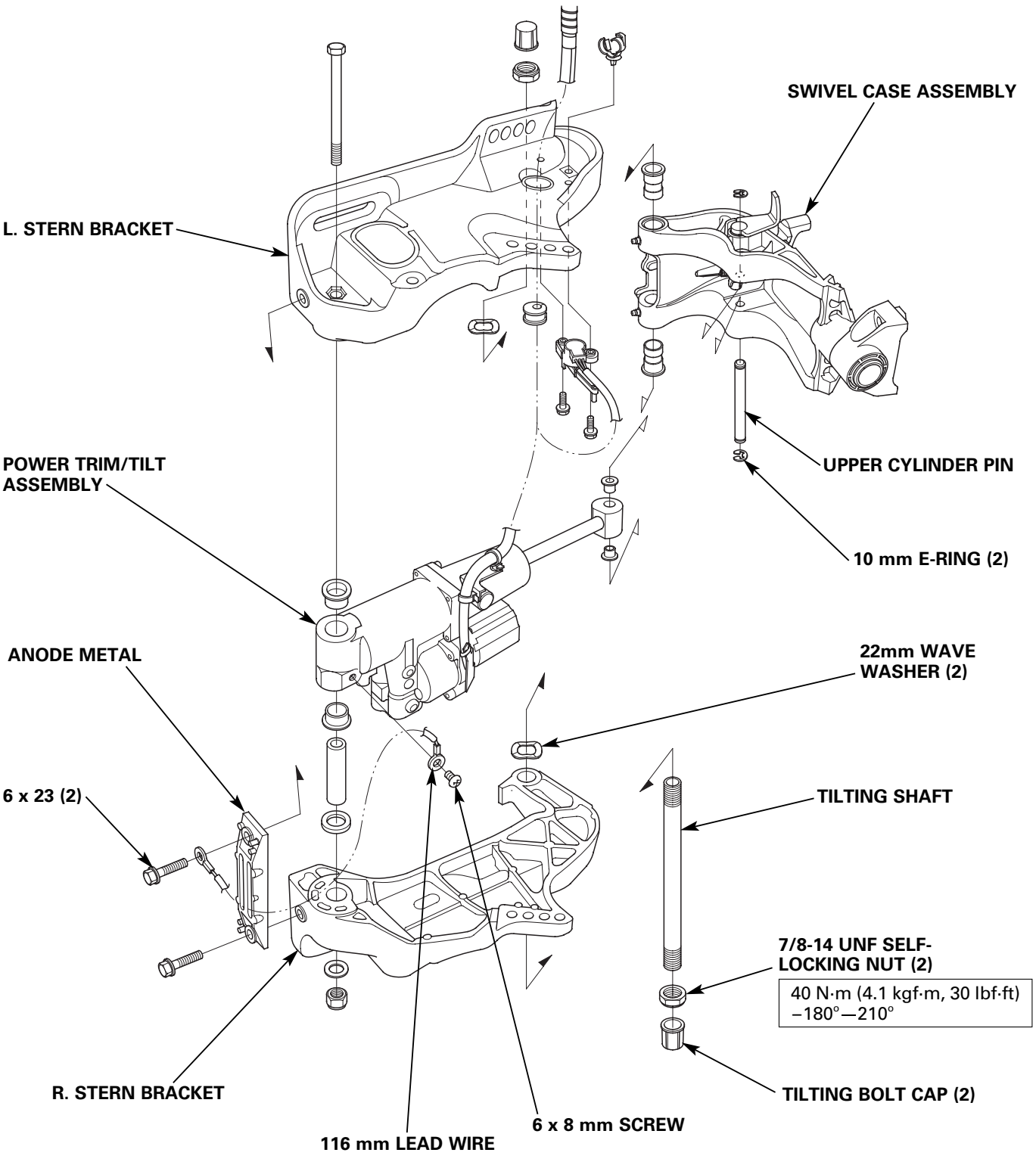
If the measurements are outside the specification, replace the trim angle sensor.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

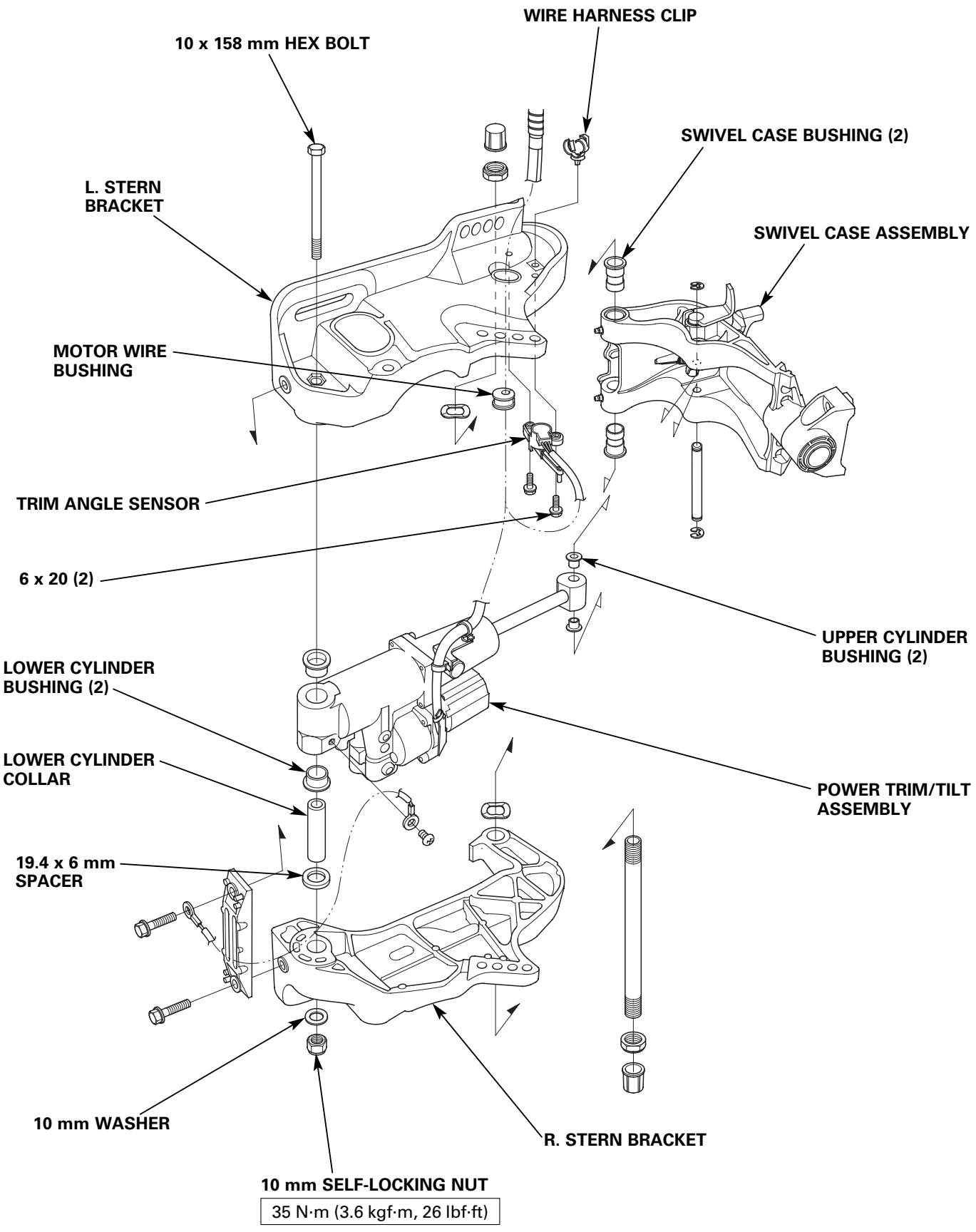
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-15

c. COMPONENT DRAWING
[POWER TRIM/TILT TYPE]



© Honda Motor Co., Ltd.

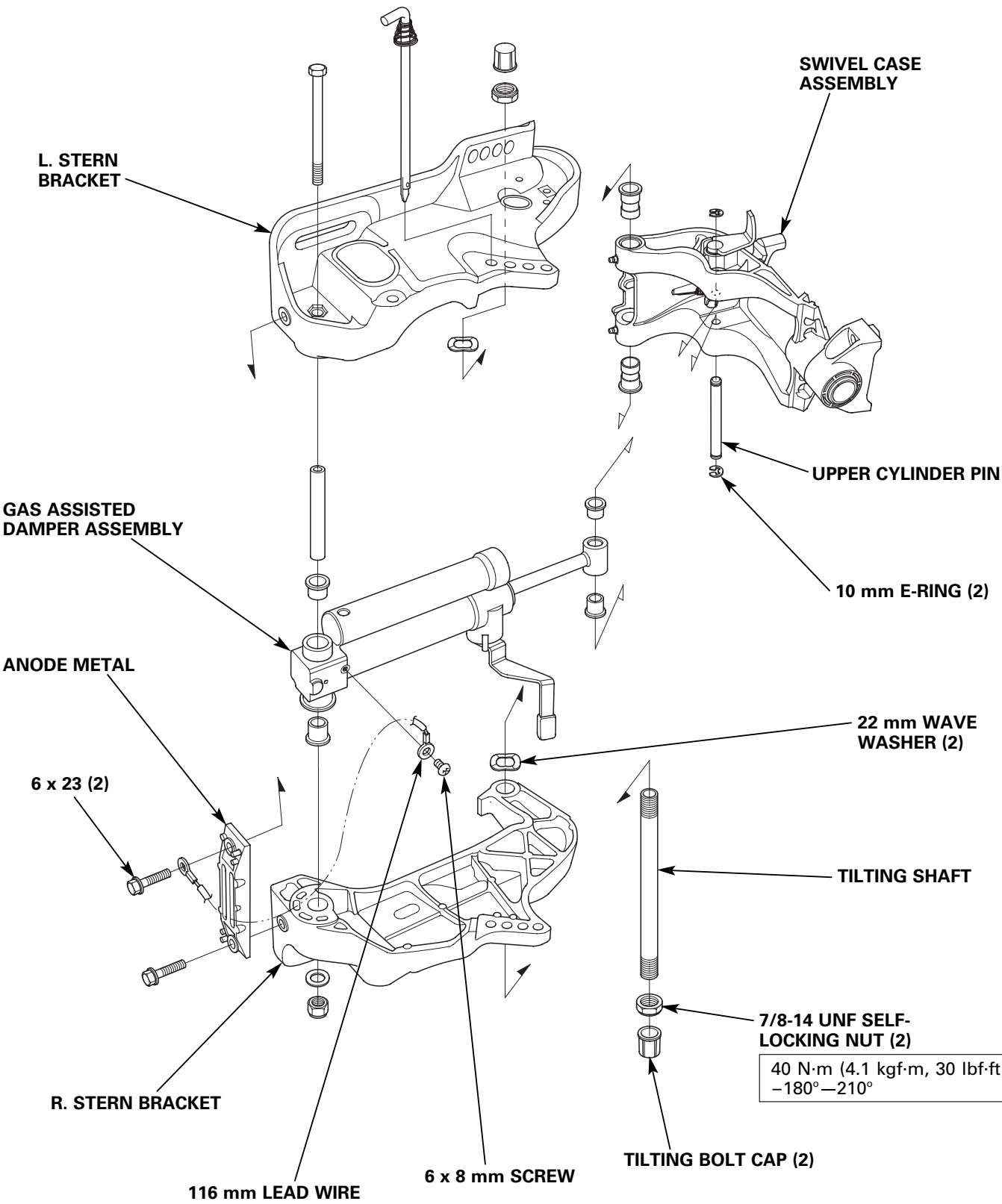
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-16



Date of Issue: May 2008
© Honda Motor Co., Ltd.

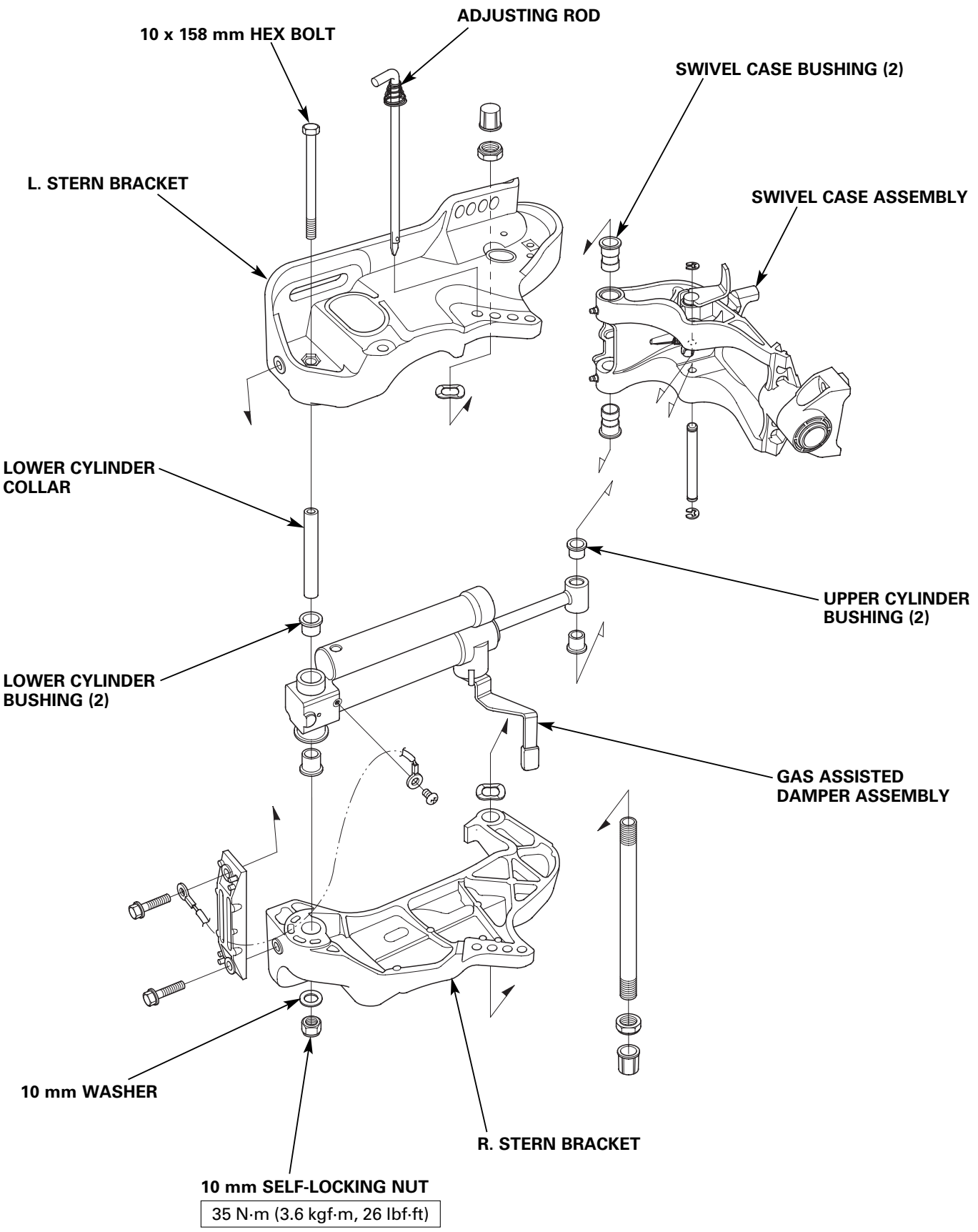
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-17

[GAS ASSISTED TYPE]



© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-18

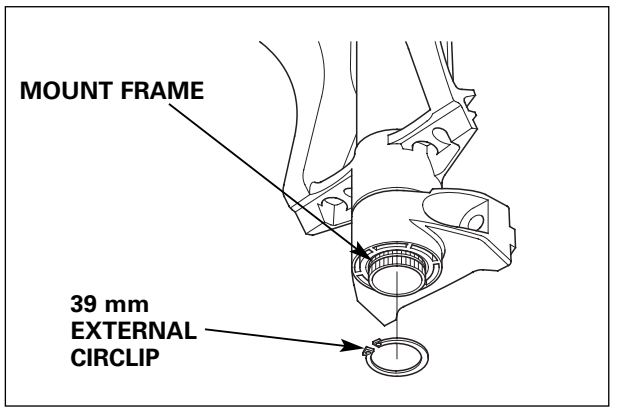


Date of Issue: May 2008
© Honda Motor Co., Ltd.

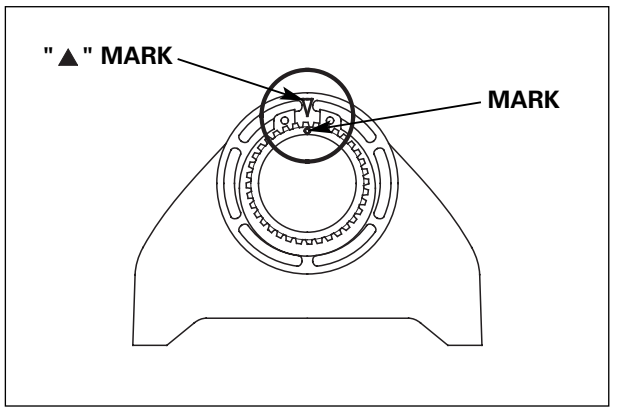
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-19

d. SWIVEL CASE ASSEMBLY DISASSEMBLY

1) Remove the 39 mm external circlip from the mount frame.



2) Mark the mount frame for reassembly. Place a mark on the mount frame where it aligns with the "▲" mark on the lower mount center housing.

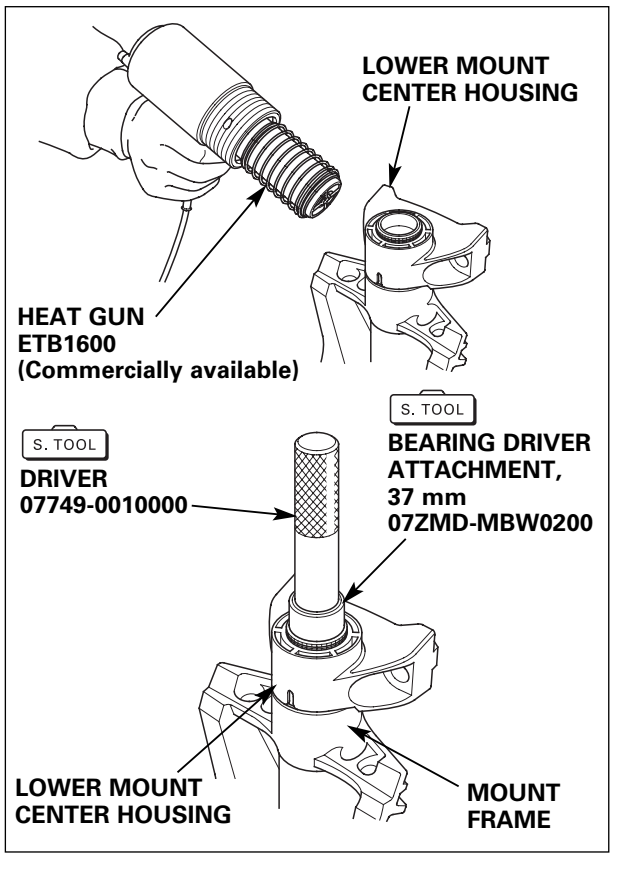


3) Warm up the lower mount center housing using a heat gun or equivalent tool.
   Wear gloves to protect your hands when handling the lower mount center housing.

4) Drive out the mount frame from the lower mount center housing using the special tools as shown.

   TOOLS:

Driver	**07749-0010000**
Bearing driver attachment, 37 mm	**07ZMD-MBW0200**

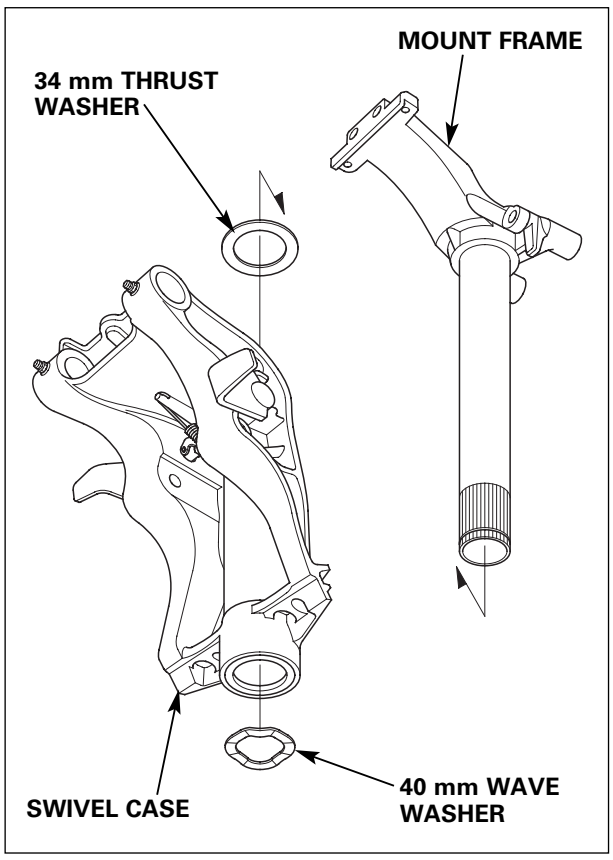


© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-20

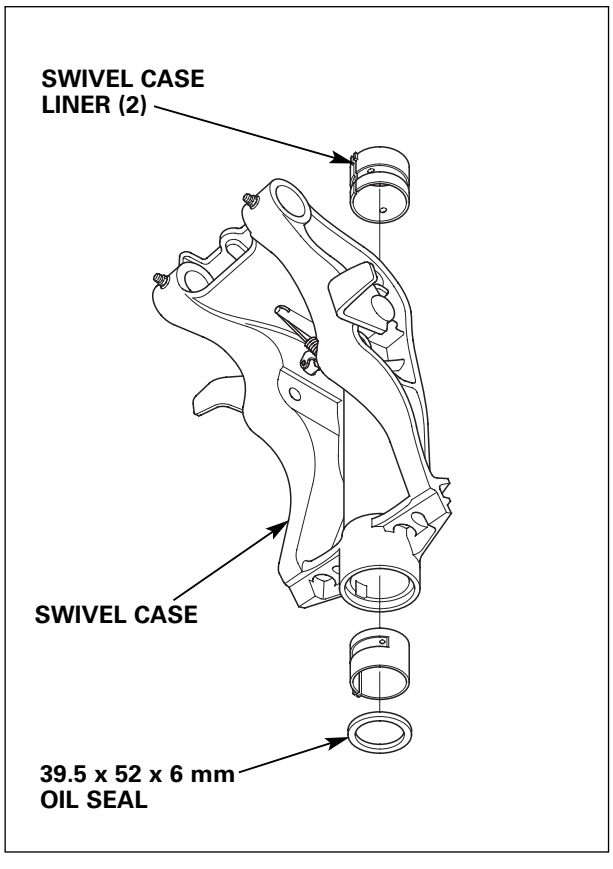
5) Remove the mount frame from the swivel case.

6) Remove the 34 mm thrust washer and the 40 mm wave washer from the swivel case.



7) Remove the 39.5 x 52 x 6 mm oil seal from the swivel case. Replace the 39.5 x 52 x 6 mm oil seal with a new one on reassembly.

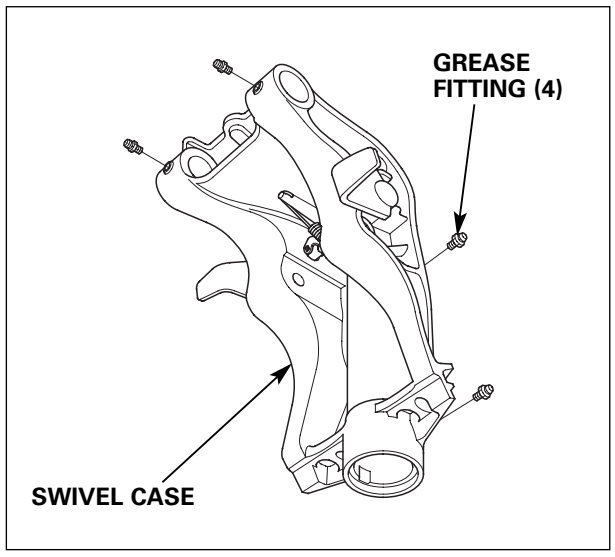
8) Remove the two swivel case liners from the swivel case. Check the swivel case liners for wear, damage or deformation, and replace them with new ones if necessary.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-21

9) Remove the four grease fittings from the swivel case.



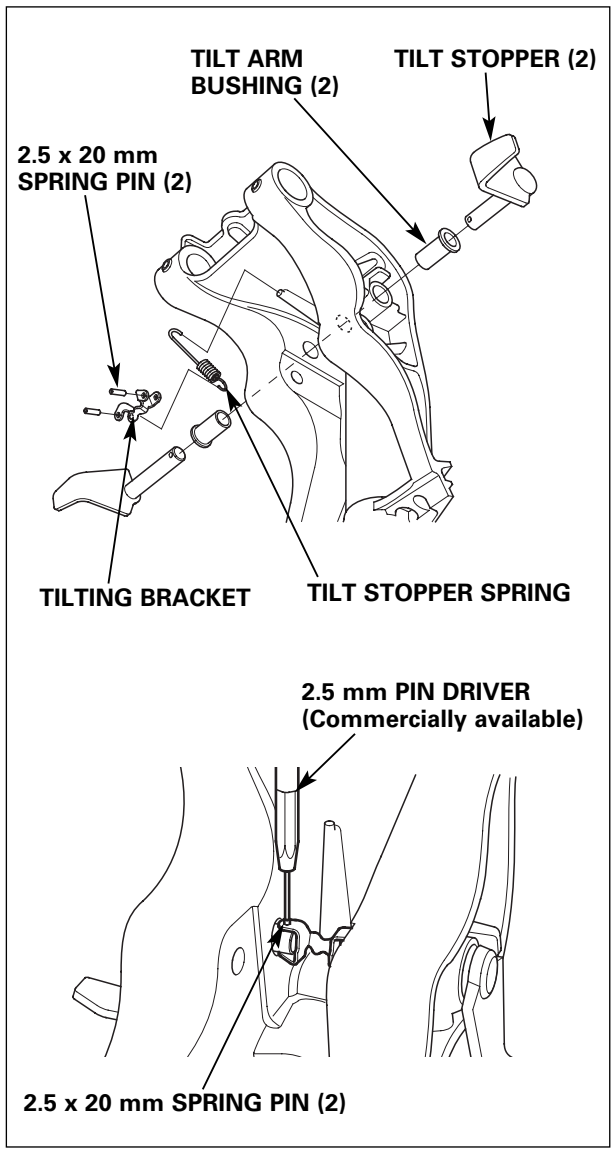
10) Remove the tilt stopper spring from the swivel case.

11) Position the tilting bracket so you can drive out the two 2.5 x 20 mm spring pins. Drive out the spring pins using a commercially available pin driver.

12) Remove the two 2.5 x 20 mm spring pins using pliers.

13) Remove the two tilt stoppers and the tilting bracket from the swivel case.

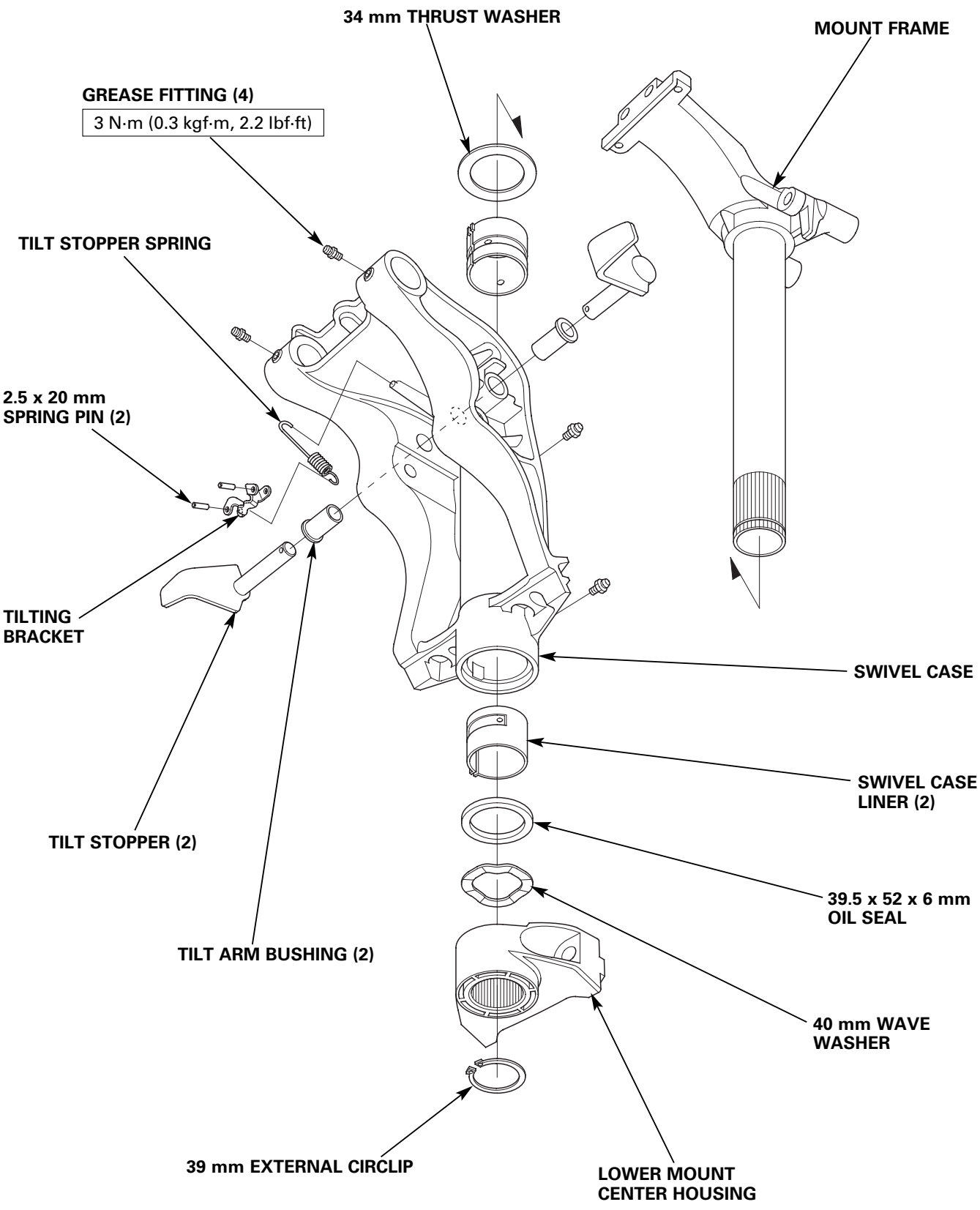
14) Remove the two tilt arm bushings from the swivel case. Check the tilt arm bushings for wear, damage or deformation, and replace them with new ones if necessary.



© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-22

e. COMPONENT DRAWING



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-23

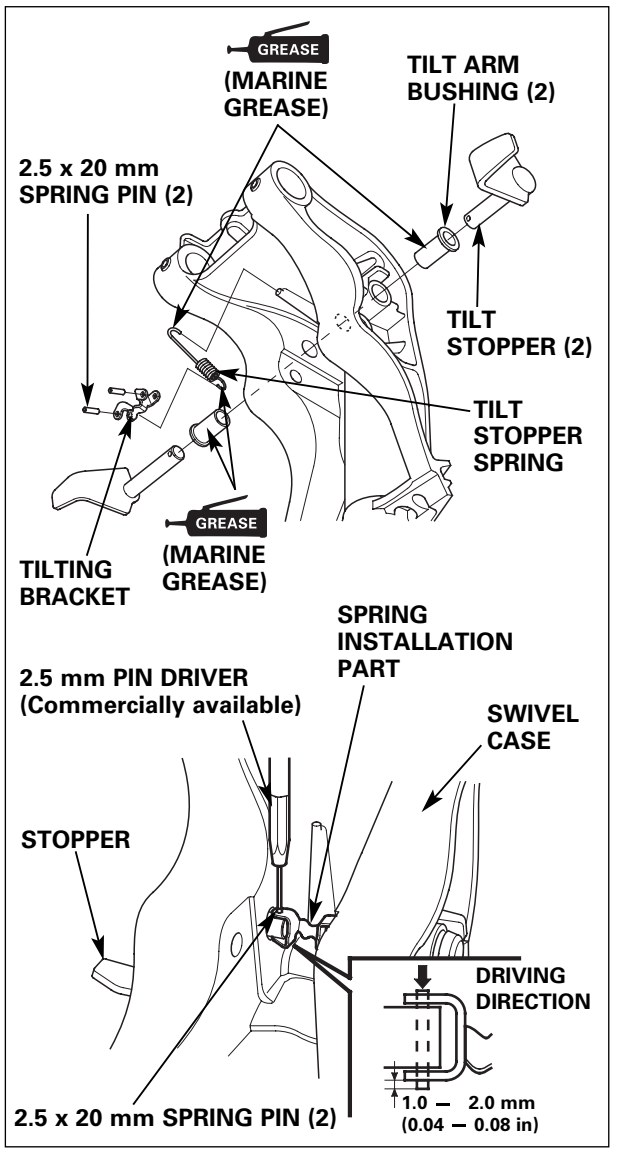
f. SWIVEL CASE REASSEMBLY

1) Apply marine grease to the outer surface of the two tilt arm bushings, and install them on the swivel case.

2) Set the spring installation part of the tilting bracket on the swivel case with the stopper of the tilt stopper facing down as shown.

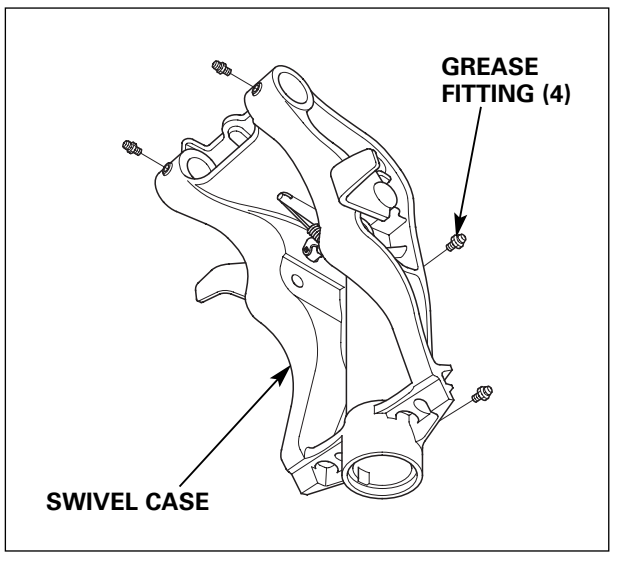
3) Drive in the 2.5 x 20 mm spring pins using a commercially available 2.5 mm pin driver as shown.
After driving the 2.5 x 20 mm spring pin, check that the end of the spring pin is protruding by 1.0 — 2.0 mm (0.04 — 0.08 in) on the opposite side.

4) Apply marine grease to the hooks of the tilt stopper spring and install it on the swivel case.



5) Install the four grease fittings on the swivel case, and tighten them to the specified torque.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

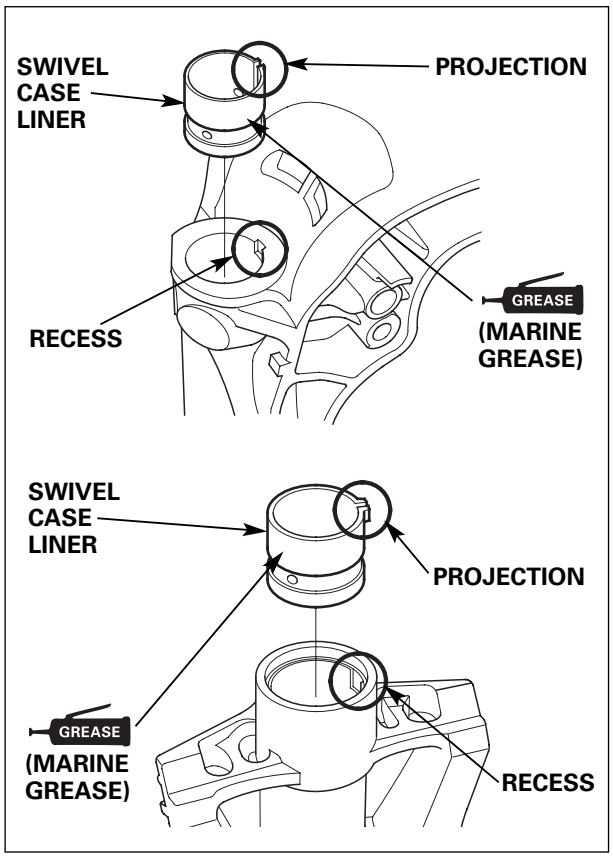


© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-24

6) Apply marine grease to the outer surface of the two swivel case liners.

7) Install the swivel case liners on the swivel case by aligning the projection on each swivel case liner with the recess in the swivel case.



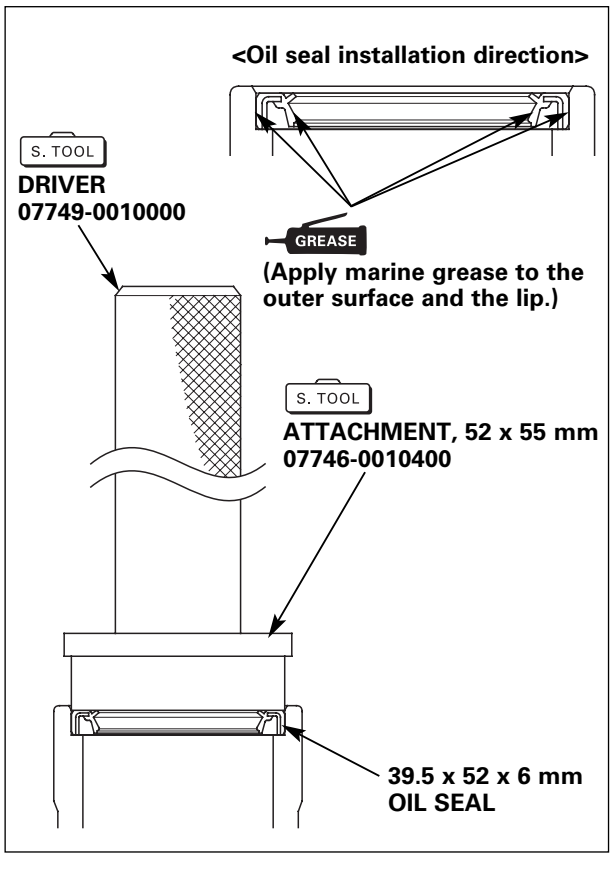
8) Apply marine grease to the outer surface of a new 39.5 x 52 x 6 mm oil seal.

9) Install the oil seal using the special tools as shown. Note the installation direction of the oil seal.

TOOLS:

Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**

10) After installing the oil seal, apply marine grease to the lip of the oil seal.



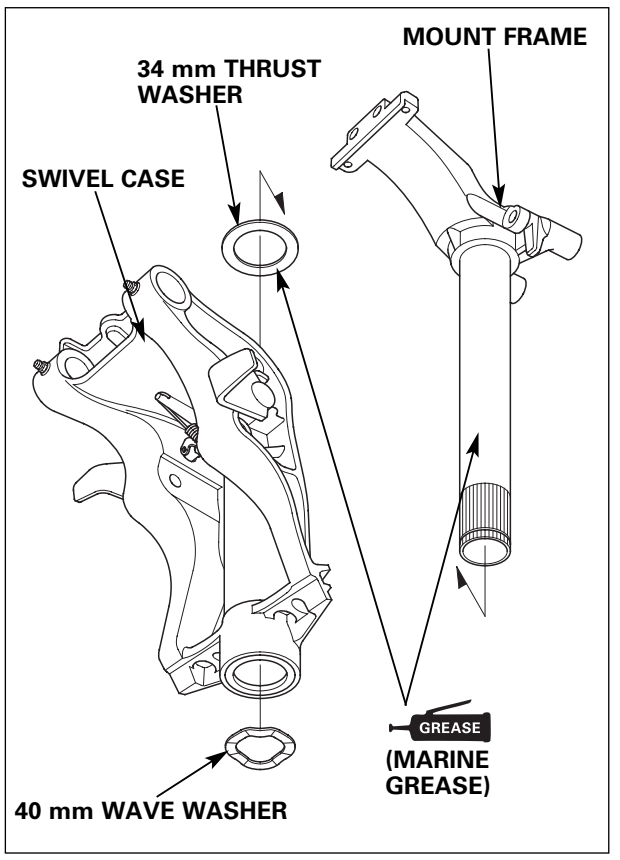
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-25

11) Apply marine grease to the entire surface of the 34 mm thrust washer, and install it on the mount frame.

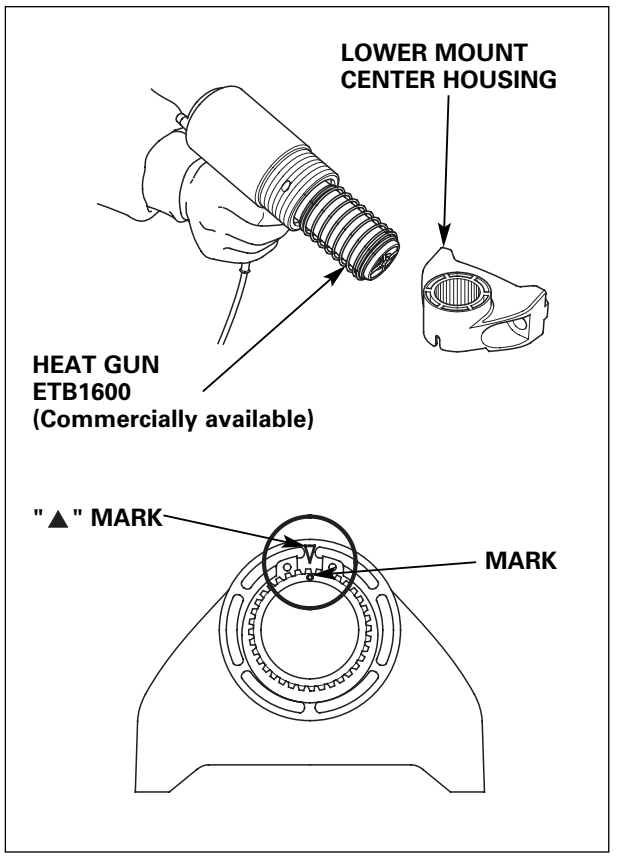
12) Apply marine grease to the rotating part of the mount frame shaft, and install the mount frame on the swivel case.

13) Install the 40 mm wave washer on the mount frame.



14) Warm up the lower mount center housing using a heat gun or equivalent tool.
Wear gloves to protect your hands when handling the lower mount center housing.

15) Install the lower mount center housing on the mount frame by aligning the "▲" mark on the lower mount center housing with the mark on the mount frame that was made during disassembly.



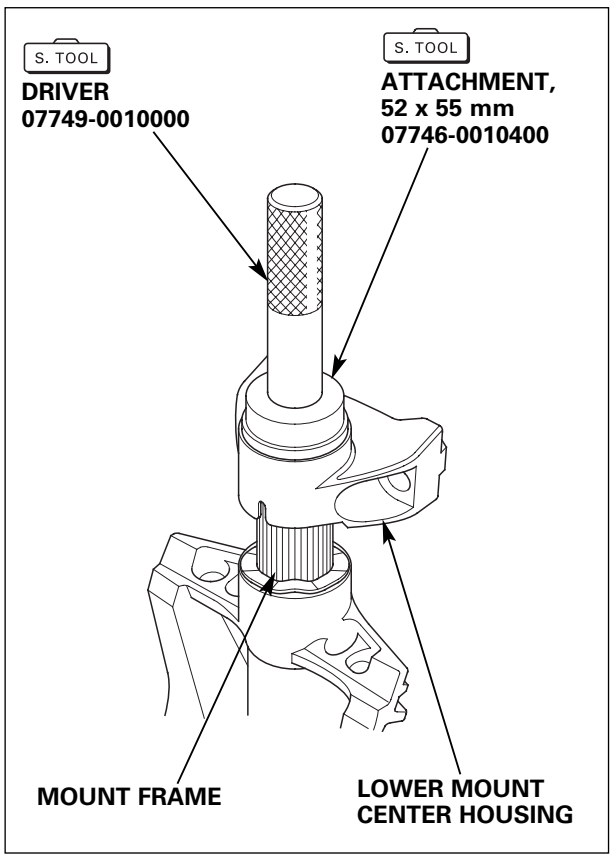
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-26

16) Drive in the lower mount center housing until it does not come off using the special tools as shown.
Drive in the lower mount center housing at right angles to the mount frame.

TOOLS:

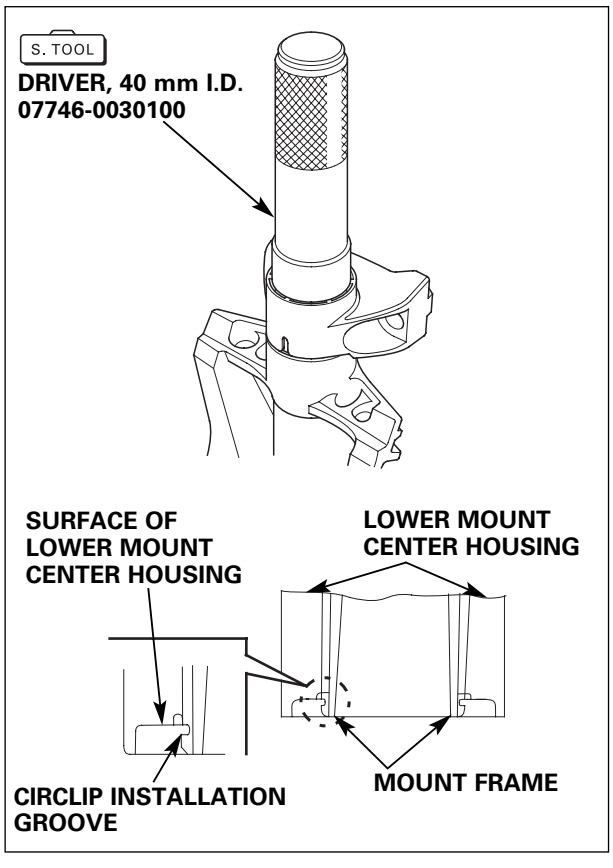
Driver	**07749-0010000**
Attachment, 52 x 55 mm	**07746-0010400**



17) Using the special tool, drive in the lower mount center housing in several steps until the 39 mm external circlip installation groove aligns with the surface of the lower mount center housing as shown.
If the lower mount center housing has been driven in excessively and the mount frame does not turn smoothly, adjust by tapping the mount frame (P. 13-19).

TOOL:

Driver, 40 mm I.D.	**07746-0030100**

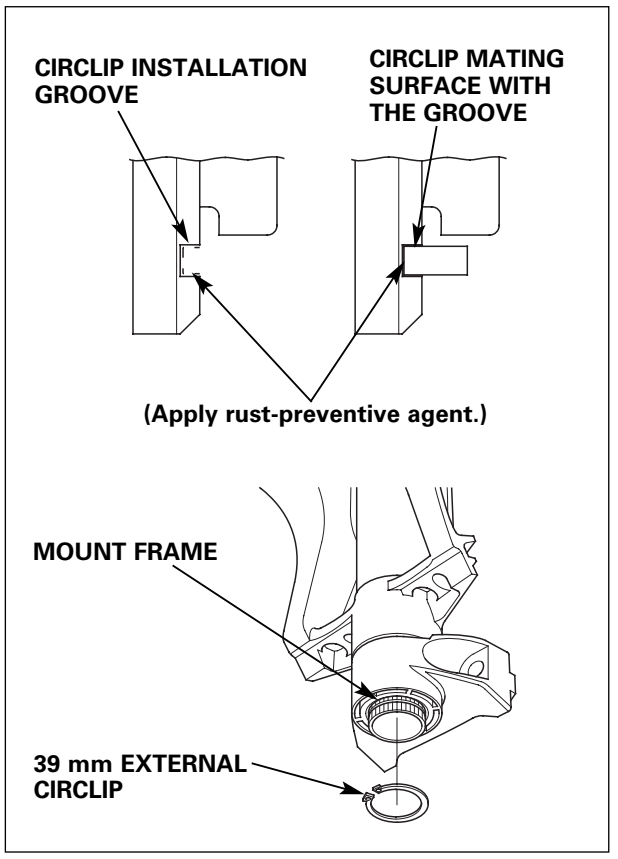


Date of Issue: May 2008
© Honda Motor Co., Ltd.

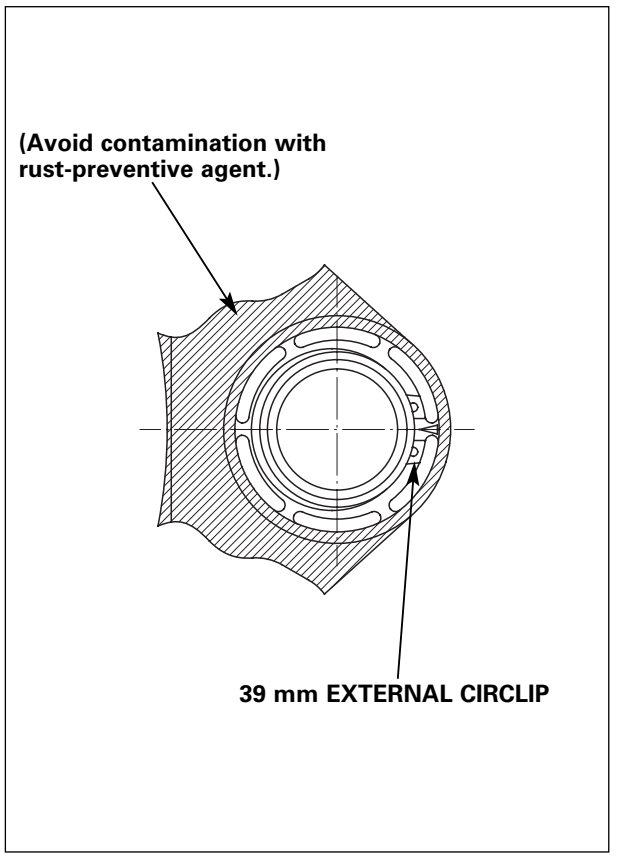
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-27

18) Apply rust-preventive agent to the 39 mm external circlip installation groove in the mount frame and to the external circlip mating surface with the groove.

19) Install the 39 mm external circlip on the mount frame.



20) After installing the 39 mm external circlip, check the lower mount center housing for freedom from the rust-preventive agent in the part shown.
Wipe up the rust-preventive agent from the area shown if necessary.

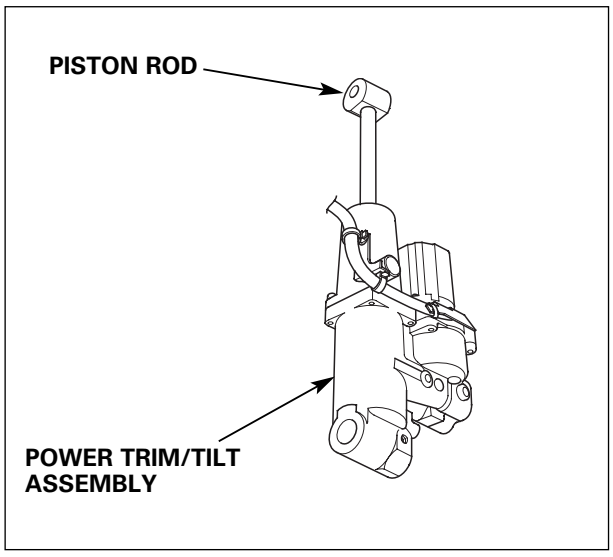


© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:28 ページ 13-28

g. INSTALLATION
[POWER TRIM/TILT TYPE]

Check that the piston rod of the power trim/tilt assembly is fully extended (P. 13-6).



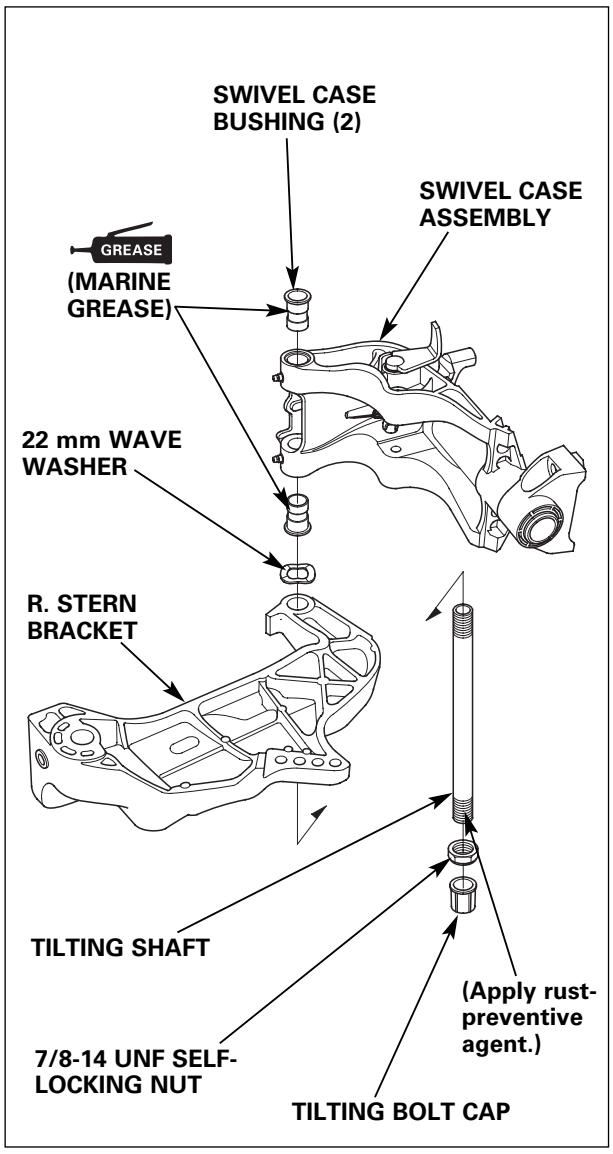
1) Apply marine grease to the outer surface of the two swivel case bushings, and install them on the swivel case assembly.

2) Install a new 7/8-14 UNF self-locking nut on the R. stern bracket side of the tilting shaft.
   Tighten the 7/8-14 UNF self-locking nut fully to the end of the threads of the tilting shaft.

3) Apply rust-preventive agent to the threads on the R. stern bracket side of the tilting shaft, and install the tilting bolt cap.

4) Install the R. stern bracket and the 22 mm wave washer on the tilting shaft.

5) Install the swivel case assembly on the tilting shaft.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:29 ページ 13-29

6) Install the 22 mm wave washer on the tilting shaft.

7) Apply marine grease to the outer surface of the two lower cylinder bushings, and install them on the power trim/tilt assembly.

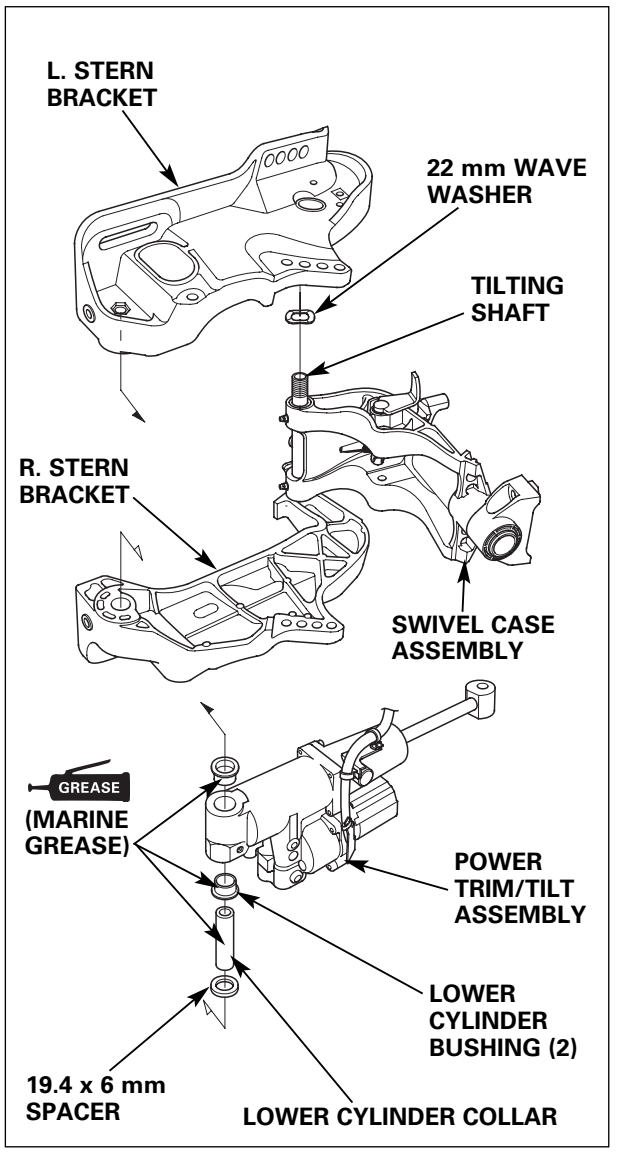
8) Apply marine grease to the outer surface of the lower cylinder collar, and install it on the power trim/tilt assembly.

9) Install the 19.4 x 6 mm spacer on the lower cylinder collar.

10) Raise the swivel case assembly to the uppermost position and hold it in the position.

11) Install the power trim/tilt assembly on the R. stern bracket.

12) Install the L. stern bracket on the tilting shaft and the lower cylinder collar.

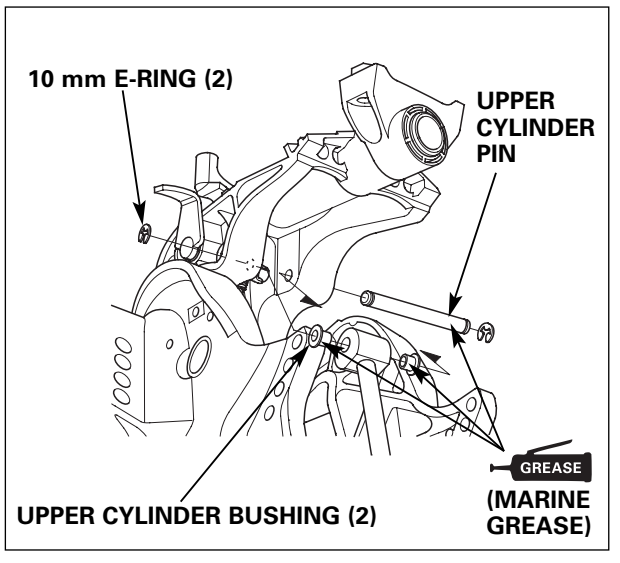


13) Apply marine grease to the outer surface of the two upper cylinder bushings, and install them on the piston rod.

14) Apply marine grease to the outer surface of the upper cylinder pin.

15) Align the hole in the piston rod with the hole in the swivel case assembly, and insert the upper cylinder pin into the holes.

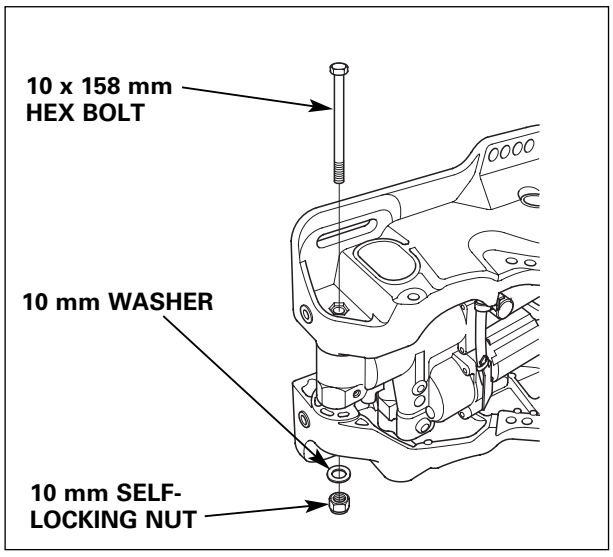
16) Secure the upper cylinder pin by installing the two 10 mm E-rings in the grooves in the upper cylinder pin.



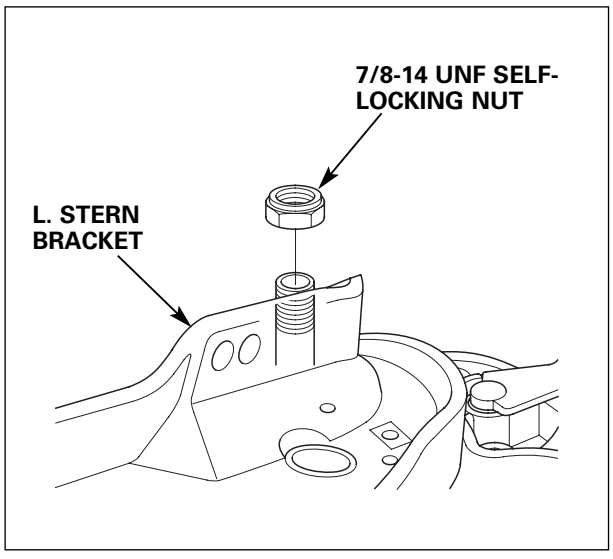
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:29 ページ 13-30

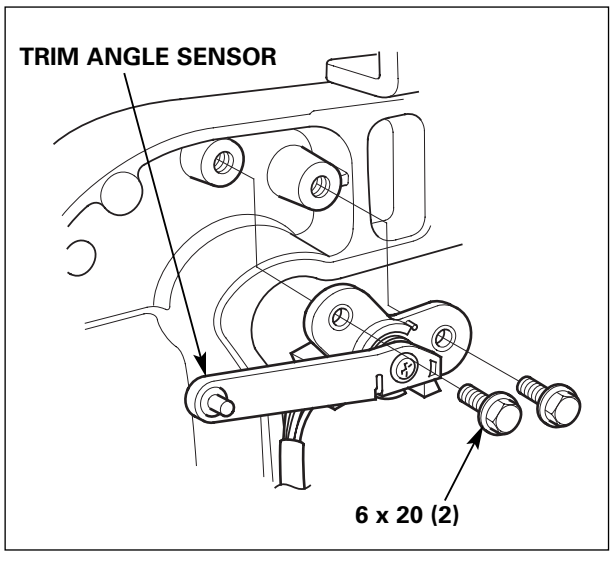
17) Set the 10 x 158 mm hex bolt and the 10 mm washer as shown, and loosely tighten a new 10 mm self-locking nut.



18) Loosely tighten a new 7/8-14 UNF self-locking nut.



19) Install the trim angle sensor as shown, and tighten the 6 x 20 mm flange bolts securely.



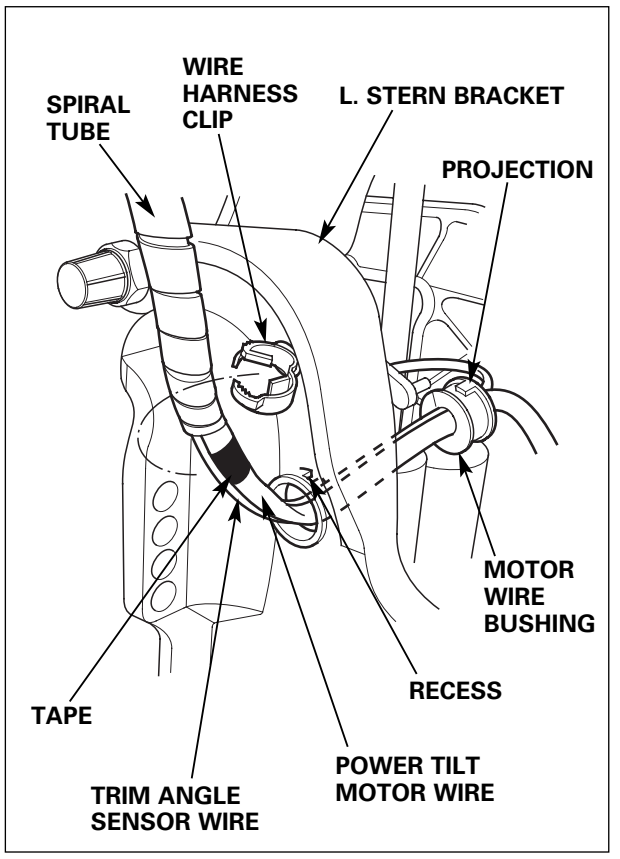
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:29 ページ 13-31

20) Set the power tilt motor wire and the trim angle sensor wire in the motor wire bushing.

21) Install the motor wire bushing on the L. stern bracket, aligning the projection on the motor wire bushing with the recess in the L. stern bracket.
Check that the power tilt motor wire and the trim angle sensor wire on the backside of the L. stern bracket are not slack.

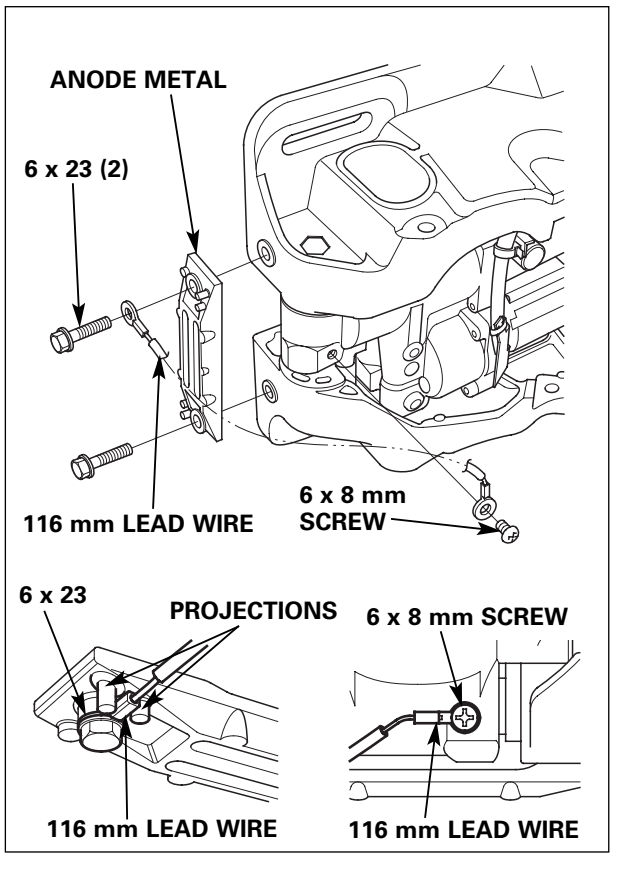
22) Clamp the power tilt motor wire and the trim angle sensor wire at the taped part using the wire harness clip.
Clamp the wires with care not to pinch the spiral tube.



23) Check the anode metal for corrosion. Replace the anode metal with a new one if it is corroded excessively.

24) Set the 116 mm lead wire between the projections on the anode metal as shown, and install the anode metal by tightening the two 6 x 23 mm flange bolts.

25) Set the 116 mm lead wire as shown, and tighten the 6 x 8 mm screw securely.



© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:29 ページ 13-32

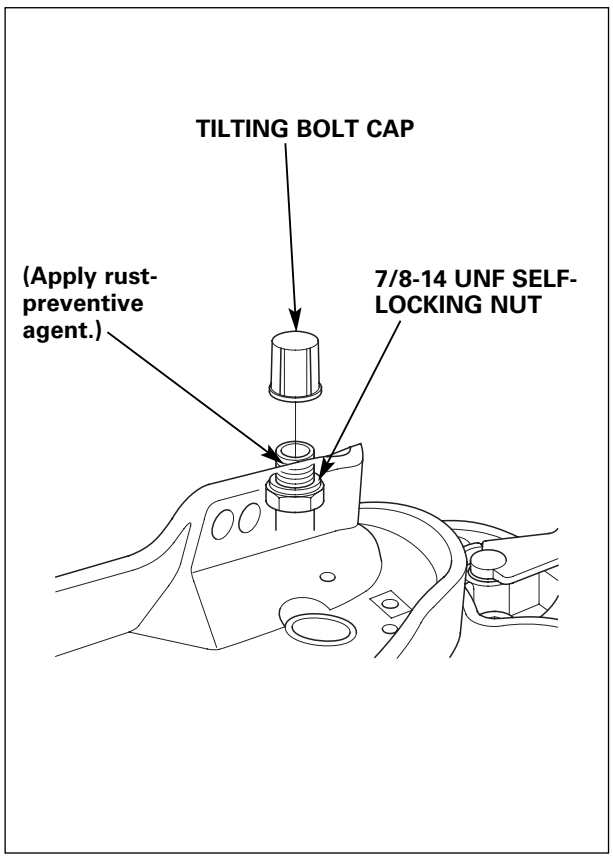
26) Tighten the new 7/8-14 UNF self-locking nut to the specified torque.

TORQUE: 40 N·m (4.1 kgf·m, 30 lbf·ft) – 180°—210°

27) Apply rust-preventive agent to the threads of the tilting shaft, and install the tilting bolt cap.

28) Install the new 10 mm self-locking nut to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)



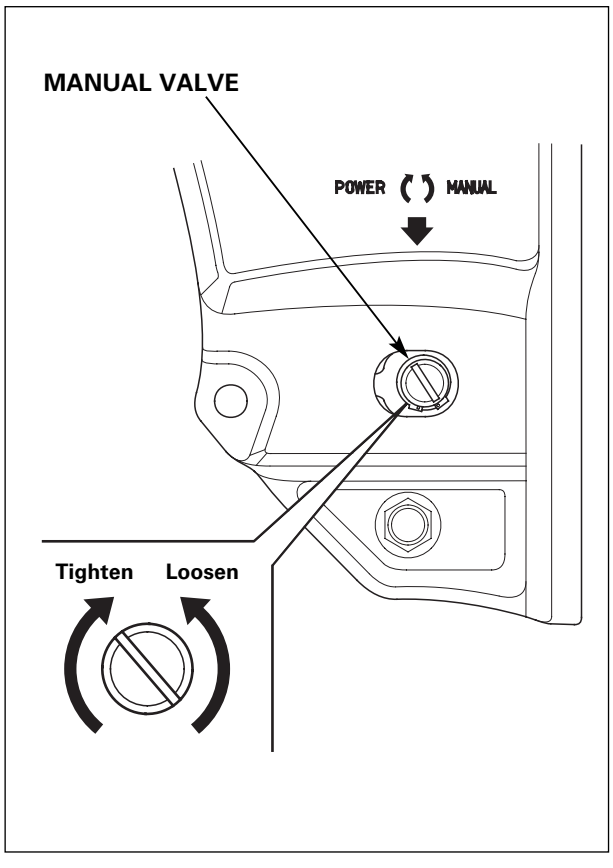
29) Loosen the manual valve fully.

30) Lift up the swivel case a little, and unlock the tilt stopper to lower the swivel case to the lowermost position.

31) Tighten the manual valve to the specified torque.

TORQUE: 1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)

Install the following parts.
- Mount case (P. 13-5)
- Engine under case (P. 12-4)
- Engine assembly (P. 6-9)

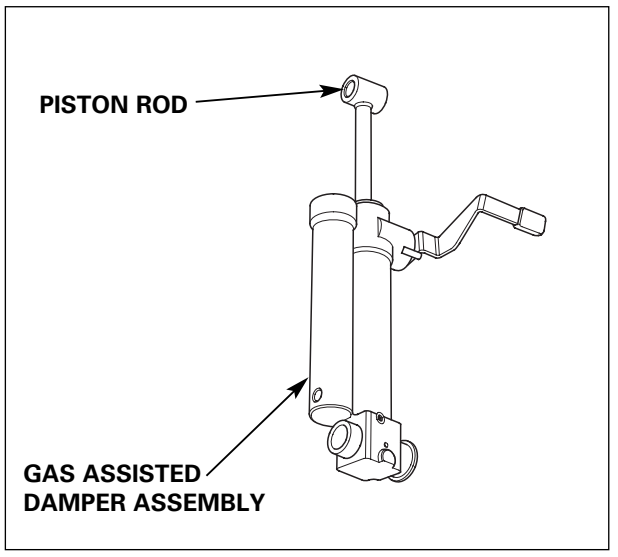


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:29 ページ 13-33

[GAS ASSISTED TYPE]

Check that the piston rod of the gas assisted damper assembly is fully extended (P. 13-11).



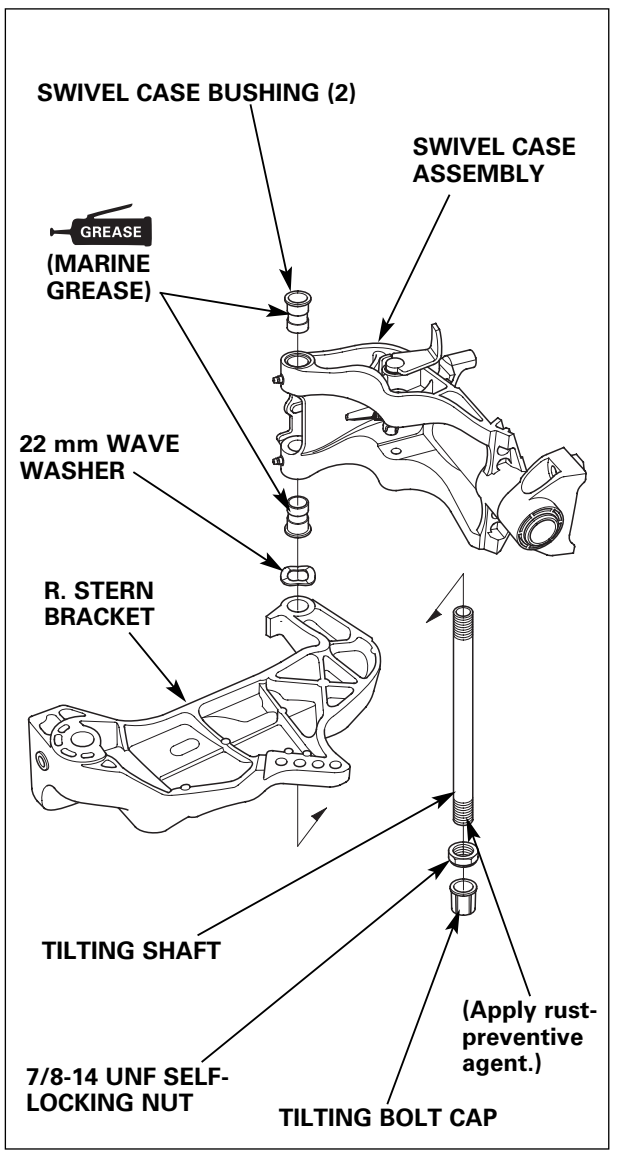
1) Apply marine grease to the outer surface of the two swivel case bushings, and install them on the swivel case assembly.

2) Install a new 7/8-14 UNF self-locking nut on the R. stern bracket side of the tilting shaft.
   Tighten the 7/8-14 UNF self-locking nut fully to the end of the threads on the tilting shaft.

3) Apply rust-preventive agent to the threads on the R. stern bracket side of the tilting shaft, and install the tilting bolt cap.

4) Install the R. stern bracket and the 22 mm wave washer on the tilting shaft.

5) Install the swivel case assembly on the tilting shaft.



© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:29 ページ 13-34

6) Install the 22 mm wave washer on the tilting shaft.

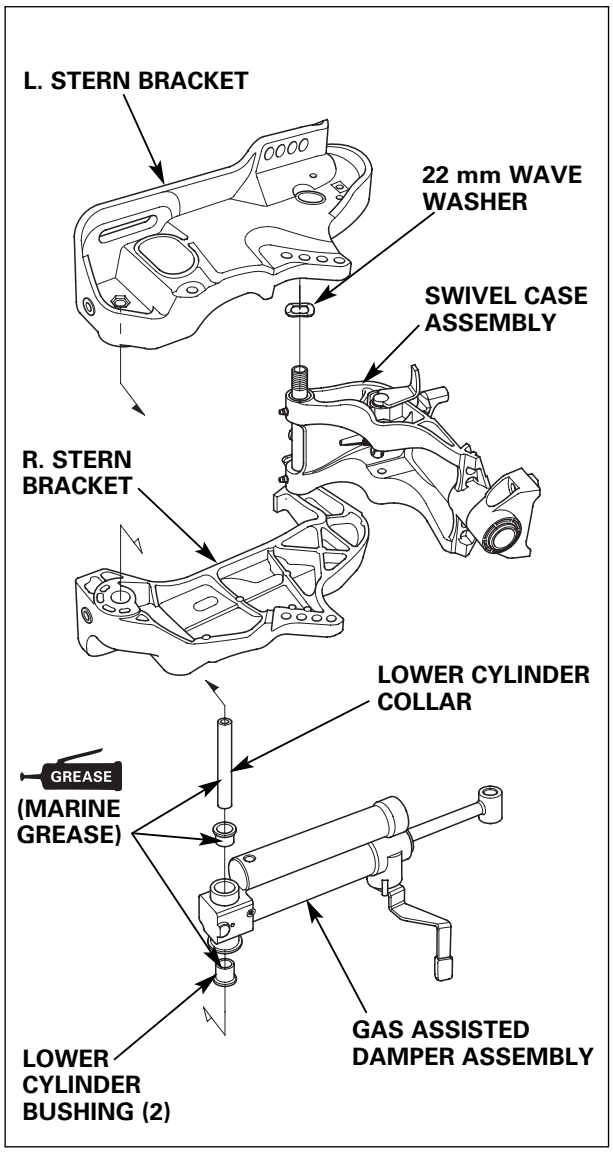
7) Apply marine grease to the outer surface of the two lower cylinder bushings, and install them on the gas assisted damper assembly.

8) Apply marine grease to the outer surface of the lower cylinder collar, and install it on the gas assisted damper assembly.

9) Raise the swivel case assembly to the uppermost position and hold it in position.

10) Install the gas assisted damper assembly to the R. stern bracket.

11) Install the L. stern bracket on the tilting shaft and the lower cylinder collar.

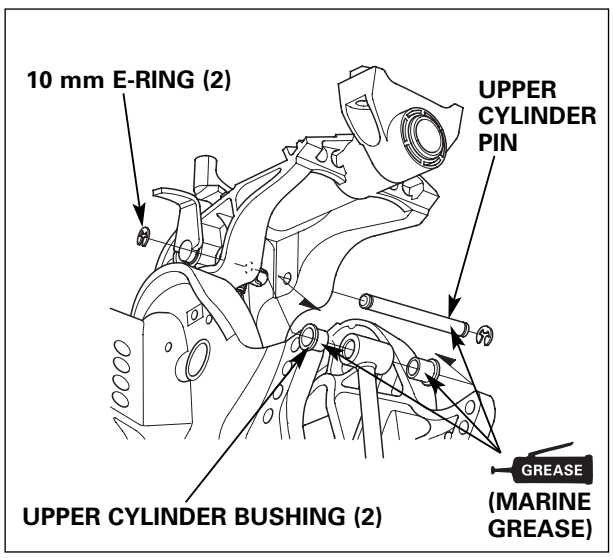


12) Apply marine grease to the outer surface of the two upper cylinder bushings, and install them on the piston rod.

13) Apply marine grease to the outer surface of the upper cylinder pin.

14) Align the hole in the piston rod with the hole in the swivel case assembly, and insert the upper cylinder pin into the holes.

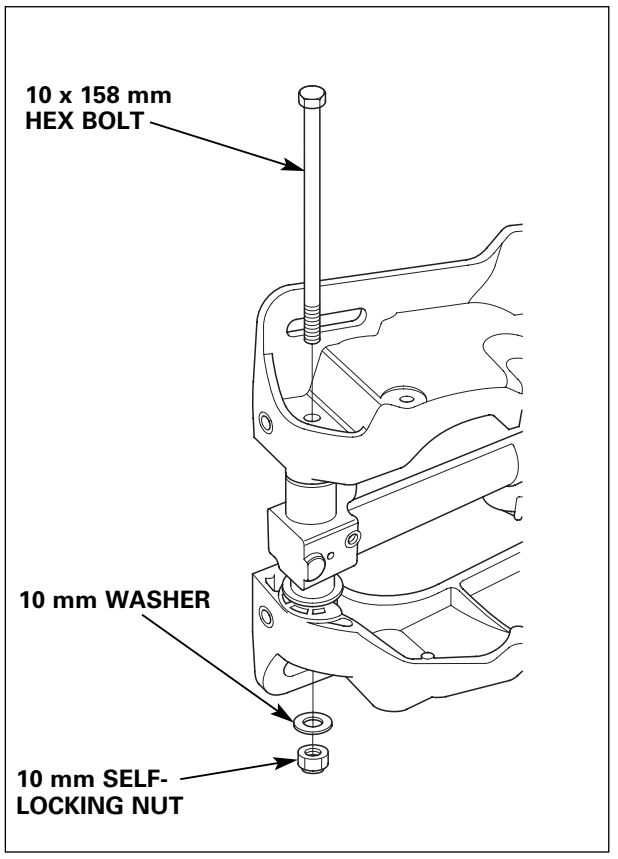
15) Secure the upper cylinder pin by installing the two 10 mm E-rings in the grooves in the upper cylinder pin.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

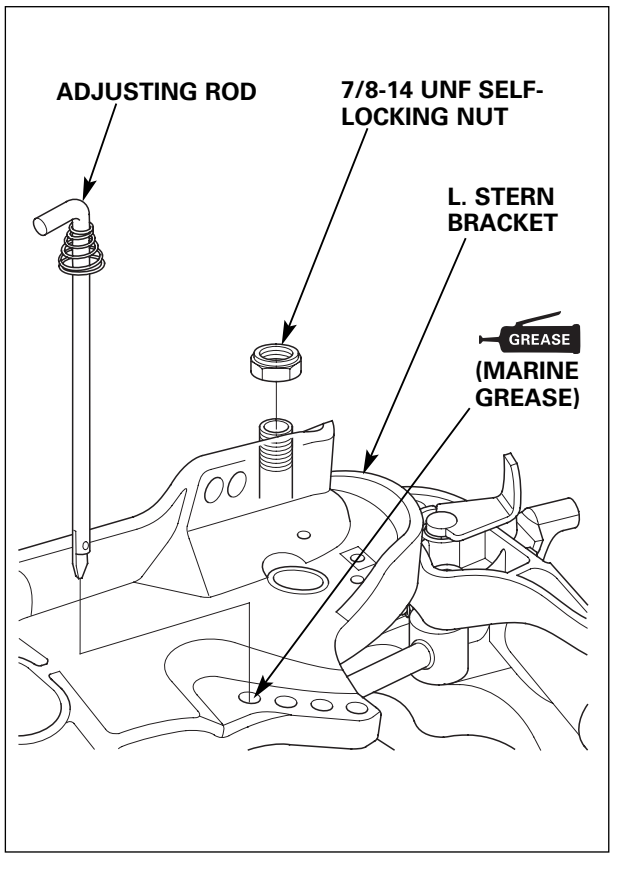
cap.13 BF40D 50D (AH).qxp 2008/04/10 16:29 ページ 13-35

16) Set the 10 x 158 mm hex bolt and the 10 mm washer as shown, and loosely tighten a new 10 mm self-locking nut.



17) Loosely tighten a new 7/8-14 UNF self-locking nut.

18) Apply marine grease to the adjusting rod installation hole in the L./R. stern bracket, and insert the adjusting rod into the hole.



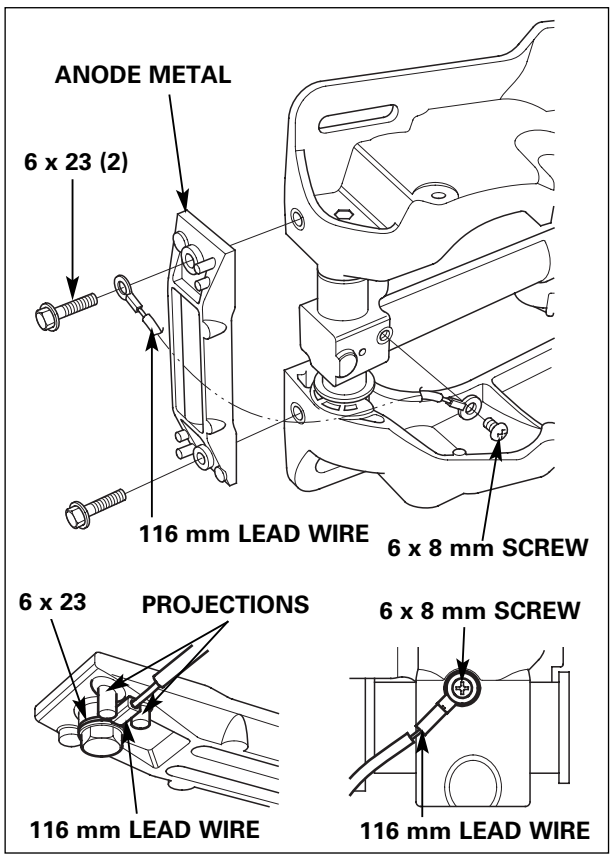
© Honda Motor Co., Ltd.

cap.13 BF40D 50D (AH).qxp 2008/04/10 16:29 ページ 13-36

19) Check the anode metal for corrosion. Replace the anode metal with a new one if it is corroded excessively.

20) Set the 116 mm lead wire between the projections on the anode metal as shown, and install the anode metal by tightening the two 6 x 23 mm flange bolts.

21) Set the 116 mm lead wire as shown, and tighten the 6 x 8 mm screw securely.



22) Tighten the new 7/8-14 UNF self-locking nut to the specified torque.

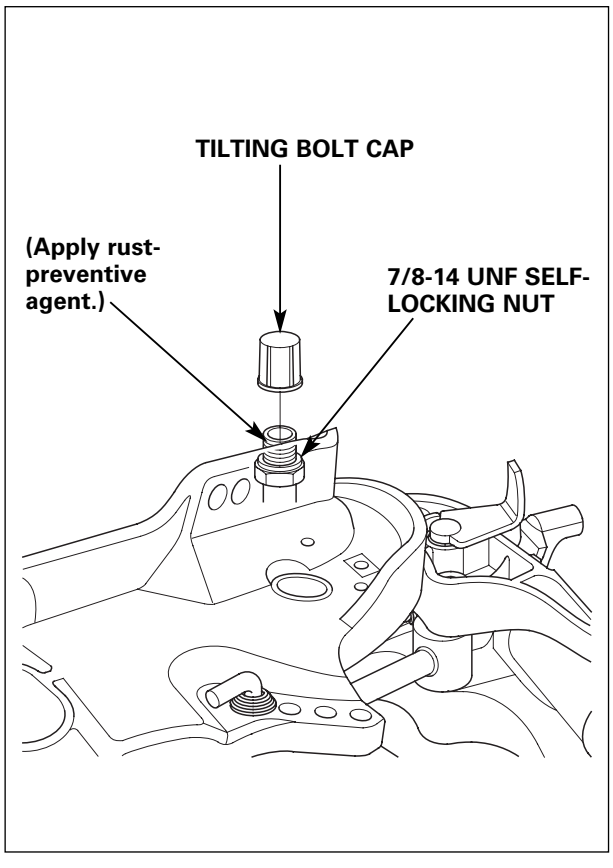
TORQUE: 40 N·m (4.1 kgf·m, 30 lbf·ft) – 180°—210°

23) Apply rust-preventive agent to the threads on the tilting shaft, and install the tilting bolt cap.

24) Tighten the new 10 mm self-locking nut to the specified torque (P. 13-35).

TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)

Install the following parts.
- Mount case (P. 13-5)
- Engine under case (P. 12-4)
- Engine assembly (P. 6-9)



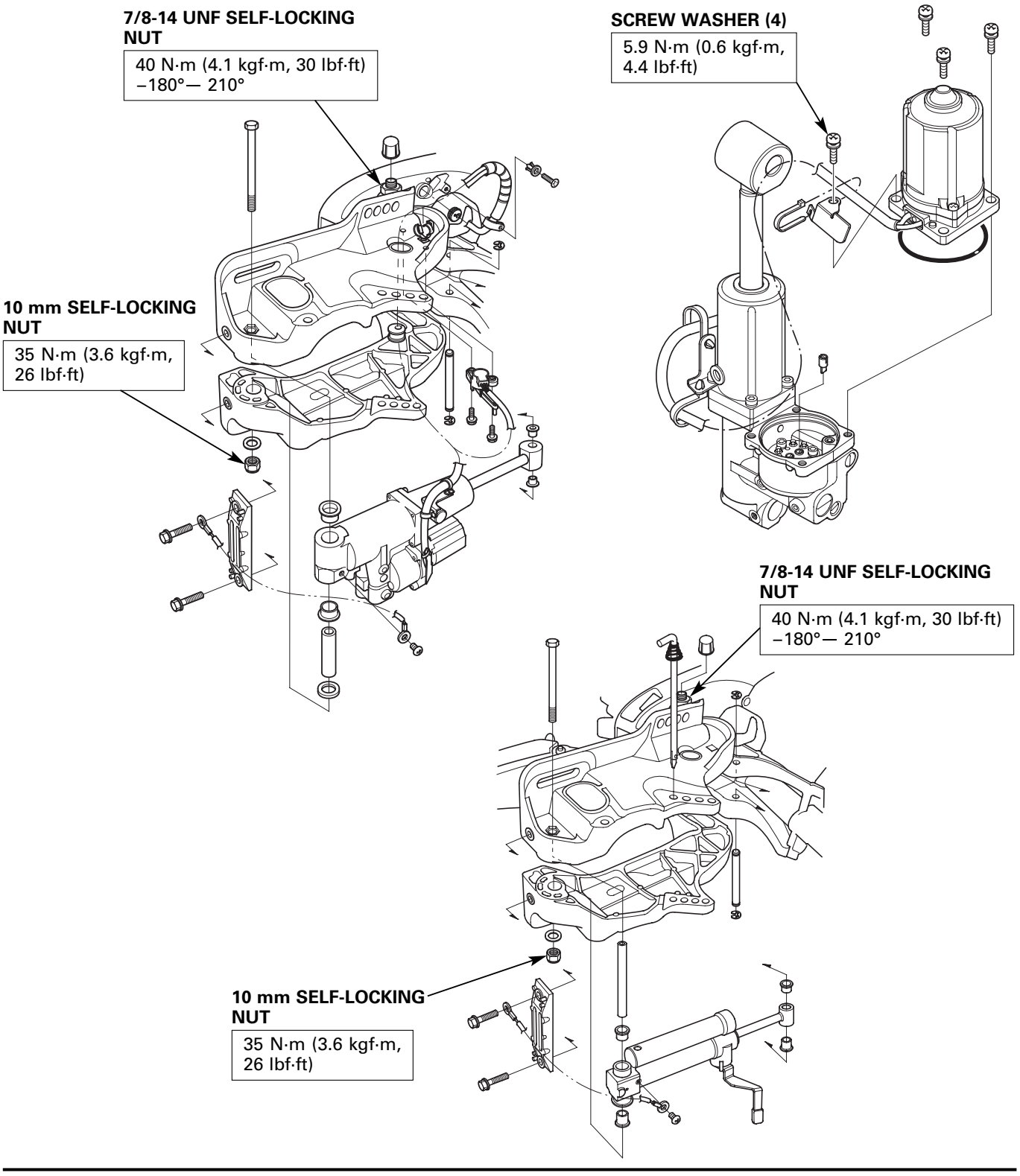
Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-1

14. POWER TRIM/TILT ASSEMBLY/ GAS ASSISTED DAMPER ASSEMBLY

BF40D·BF50D

1. POWER TRIM/TILT ASSEMBLY [POWER TRIM/TILT TYPE ONLY] ... 14-2
2. POWER TILT MOTOR [POWER TRIM/TILT TYPE ONLY]..... 14-45
3. GAS ASSISTED DAMPER ASSEMBLY [GAS ASSISTED TYPE ONLY]..... 14-54



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-2

1. POWER TRIM/TILT ASSEMBLY [POWER TRIM/TILT TYPE ONLY]

⚠WARNING

Gasoline is highly flammable and explosive.

You can be burned or seriously injured when handling fuel.

- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

a. REMOVAL

Remove the following parts.
- Engine cover (P. 4-2)
- Electric parts cover (P. 18-19)

1) Drain the gasoline from the vapor separator and the fuel strainer (low pressure side).

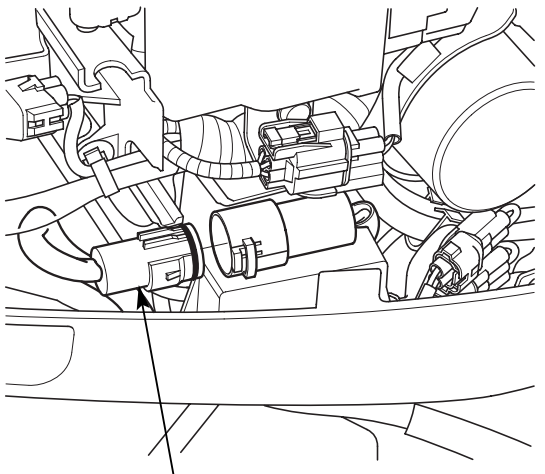
2) Lift up the outboard motor using a hoist, then place the outboard motor on its right side (with the intake manifold side toward down) on material to prevent scratching the outer surface.

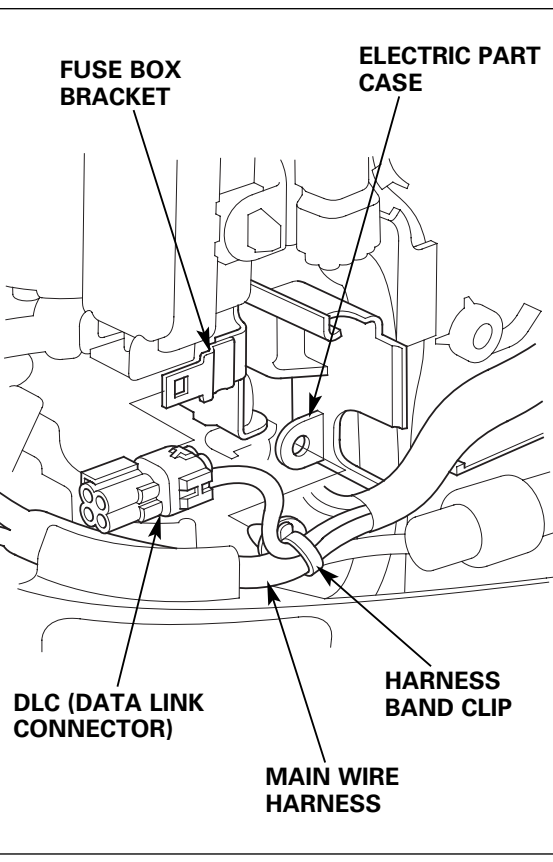
3) Connect the battery positive (+) cable to the green terminal of the power tilt motor 2P connector and the battery negative (–) cable to the blue terminal. Raise the swivel case assembly to the uppermost position (the piston rod of the power trim/tilt assembly is fully extended).

4) After raising the swivel case assembly to the uppermost position, disconnect the battery cables from the power tilt motor 2P connector terminals.

5) Remove the ECM (P. 7-6).

6) Remove the DLC (Data Link Connector) from the fuse box bracket, and remove the main wire harness's harness band clip from the electric part case.



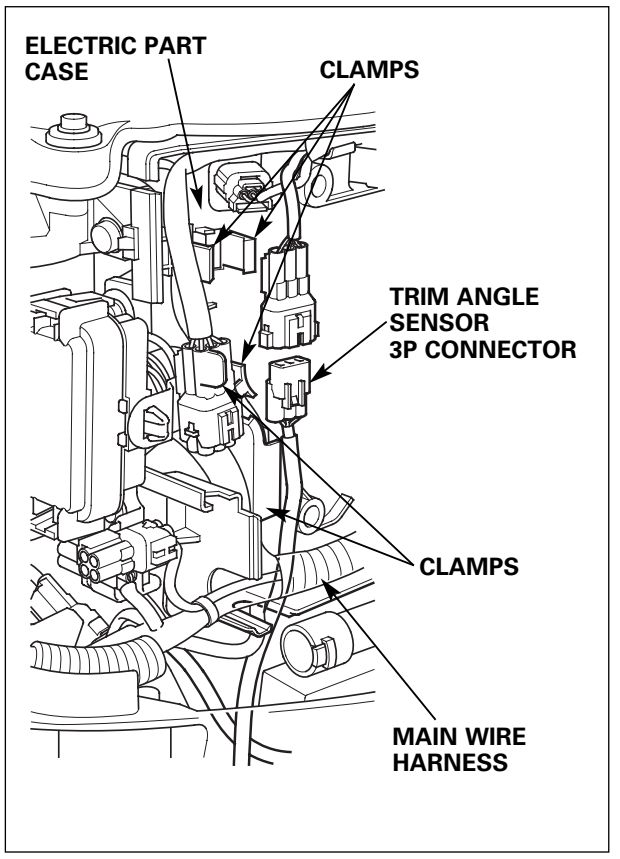


Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-3

7) Remove the trim angle sensor 3P connector from the electric part case.
   Disconnect the trim angle sensor 3P connector, and release the trim angle sensor wire from the clamps on the electric part case.

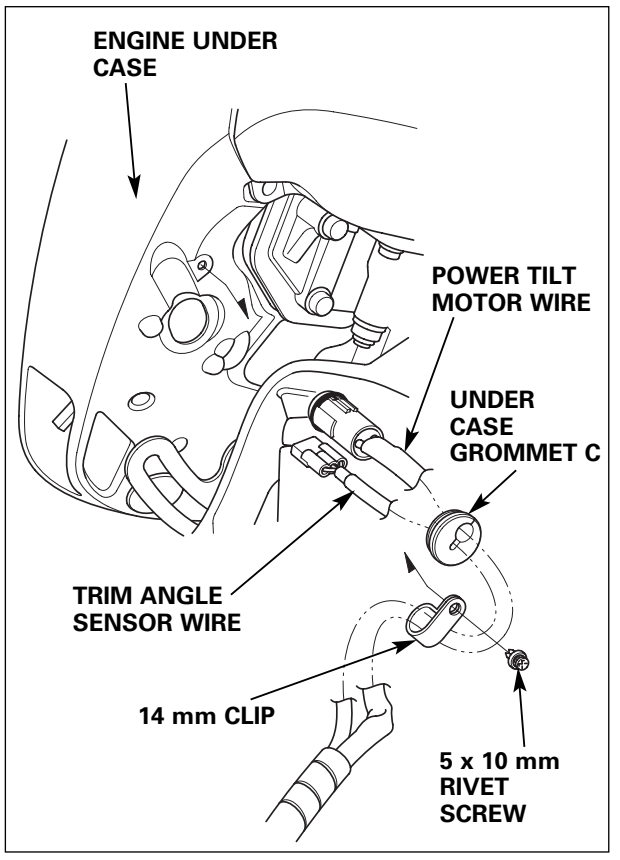
8) Pull out the trim angle sensor wire between the electric part case and the main wire harness while pulling the main wire harness toward you.



9) Loosen the 5 x 10 mm rivet screw and remove the 14 mm clip from the engine under case.

   Remove under case grommet C from the engine under case.

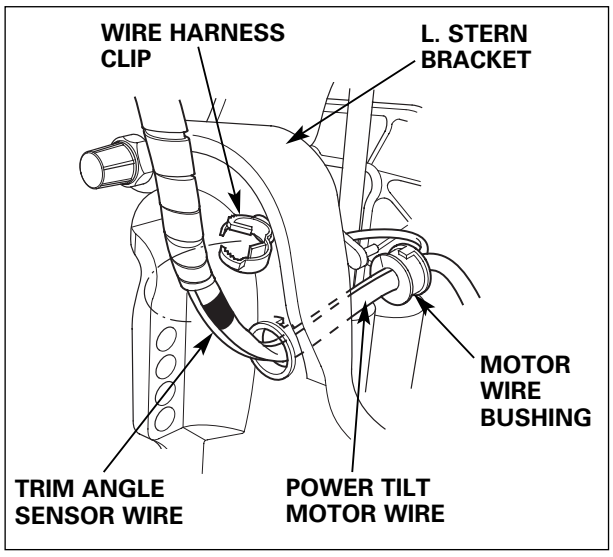
   Pull out the power tilt motor wire and the trim angle sensor wire through the hole in the engine under case.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-4

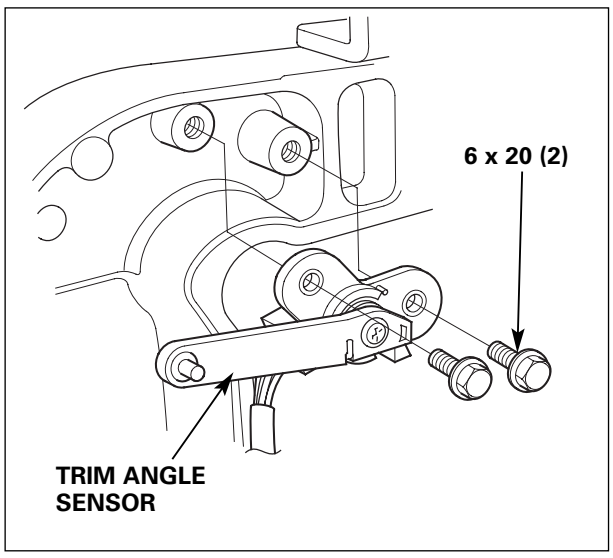
10) Open the wire harness clip and release the power tilt motor wire and the trim angle sensor from the clip.
Remove the motor wire bushing from the L. stern bracket.



11) Remove the two 6 x 20 mm flange bolts from the trim angle sensor, and remove the trim angle sensor.

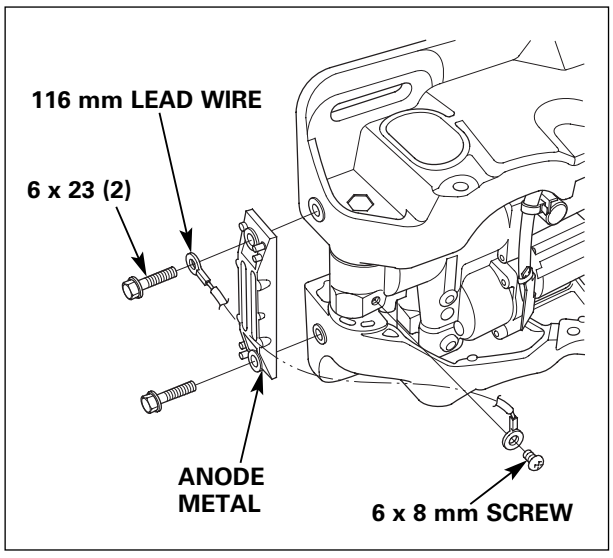
Pull the power tilt motor wire and the trim angle sensor wire out of the hole in the L. stern bracket.

See P. 13-14 for trim angle sensor inspection.



12) Remove the two 6 x 23 mm flange bolts and remove the anode metal.
Check the anode metal for corrosion. Replace the anode metal with a new one if it is corroded excessively.

Loosen the 6 x 8 mm screw and remove the 116 mm lead wire.



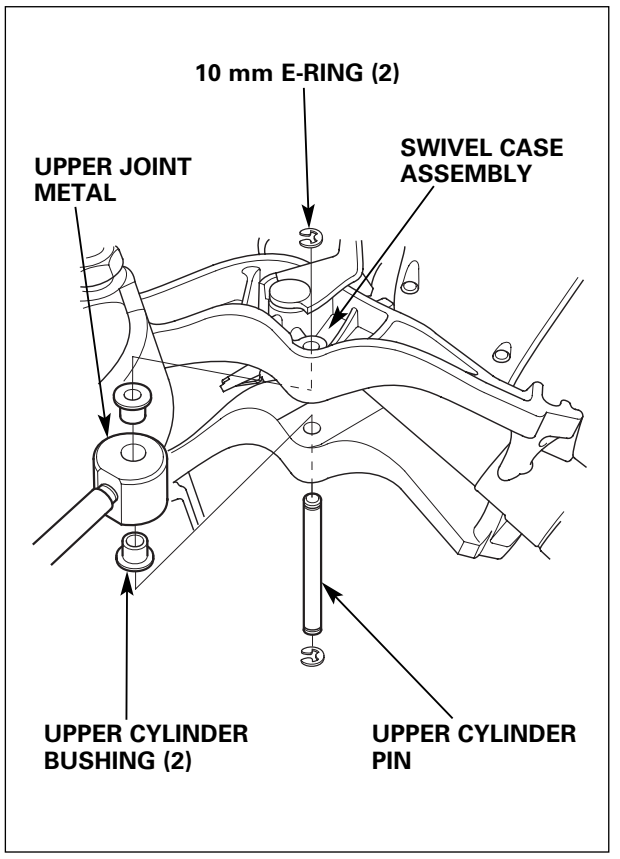
Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-5

13) Remove the 10 mm E-rings from the upper cylinder pin, and remove the upper cylinder pin.

Remove the upper joint metal of the power trim/tilt assembly from the swivel case assembly.

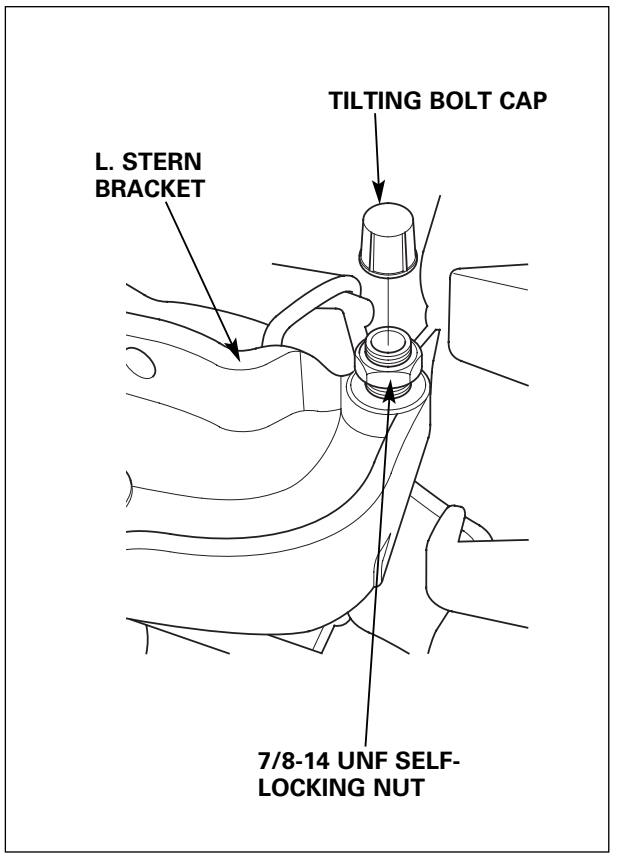
Check the upper cylinder bushings of the power trim/tilt assembly for wear, damage or deformation. Replace the upper cylinder bushings with new ones if necessary.
If the upper cylinder bushings have been removed, replace them with new ones on reassembly.



14) Remove the tilting bolt cap.

Holding the 7/8-14 UNF self-locking nut on the R. stern bracket side, loosen the 7/8-14 UNF self-locking nut on the L. stern bracket side.

- Loosen the 7/8-14 UNF self-locking nut with care not to remove it from the tilting shaft.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-6

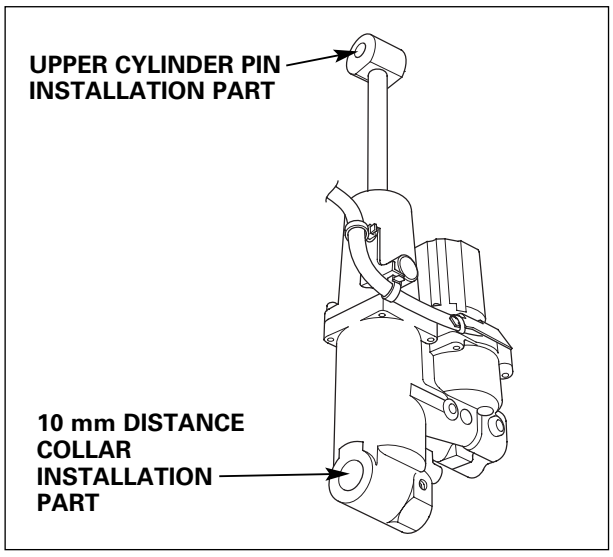
15) Loosen the 10 mm self-locking nut, and remove the 10 mm washer and the 10 x 158 mm hex bolt.
Pull the power tilt motor wire and the trim angle sensor wire out of the hole in the L. stern bracket.

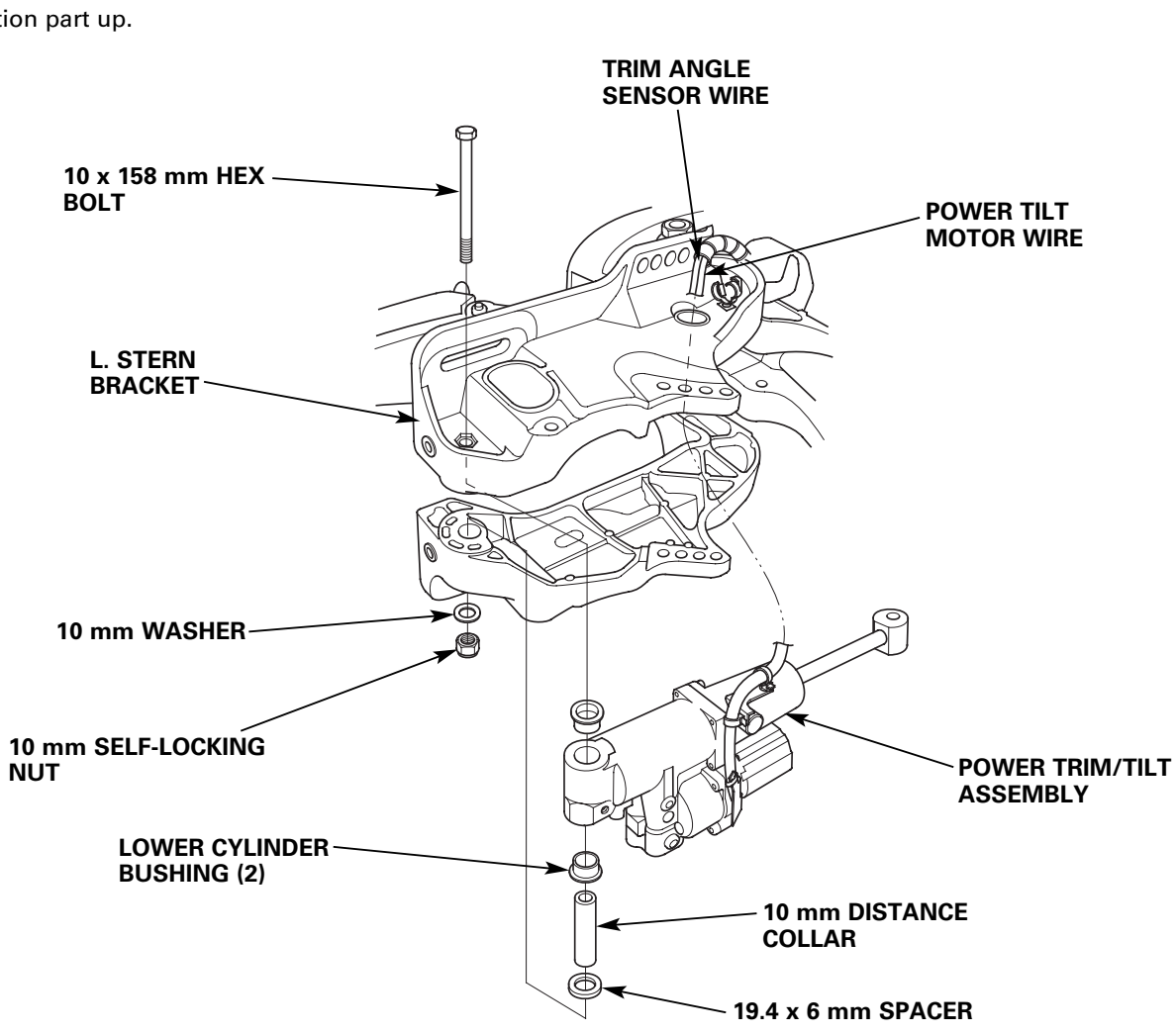
16) Move the L. stern bracket toward the engine a little while lifting the L. stern bracket up.

Remove the 10 mm distance collar, 19.4 x 6 mm spacer and the power trim/tilt assembly.

Check the lower cylinder bushings mounted on the power trim/tilt assembly for wear, damage or deformation. Replace the lower cylinder bushings with new ones if it necessary.
If the lower cylinder bushings have been removed, replace them with new ones on reassembly.

- Do not push the piston rod in after removing the power trim/tilt assembly.
- If the piston rod has been pushed in, set it in the fully extended position (P. 14-33).
- After removing the power trim/tilt assembly, store it in an upright position with the upper cylinder pin installation part up. Do not lay the power trim/tilt assembly on its side and do not hold it with the 10 mm distance collar installation part up.

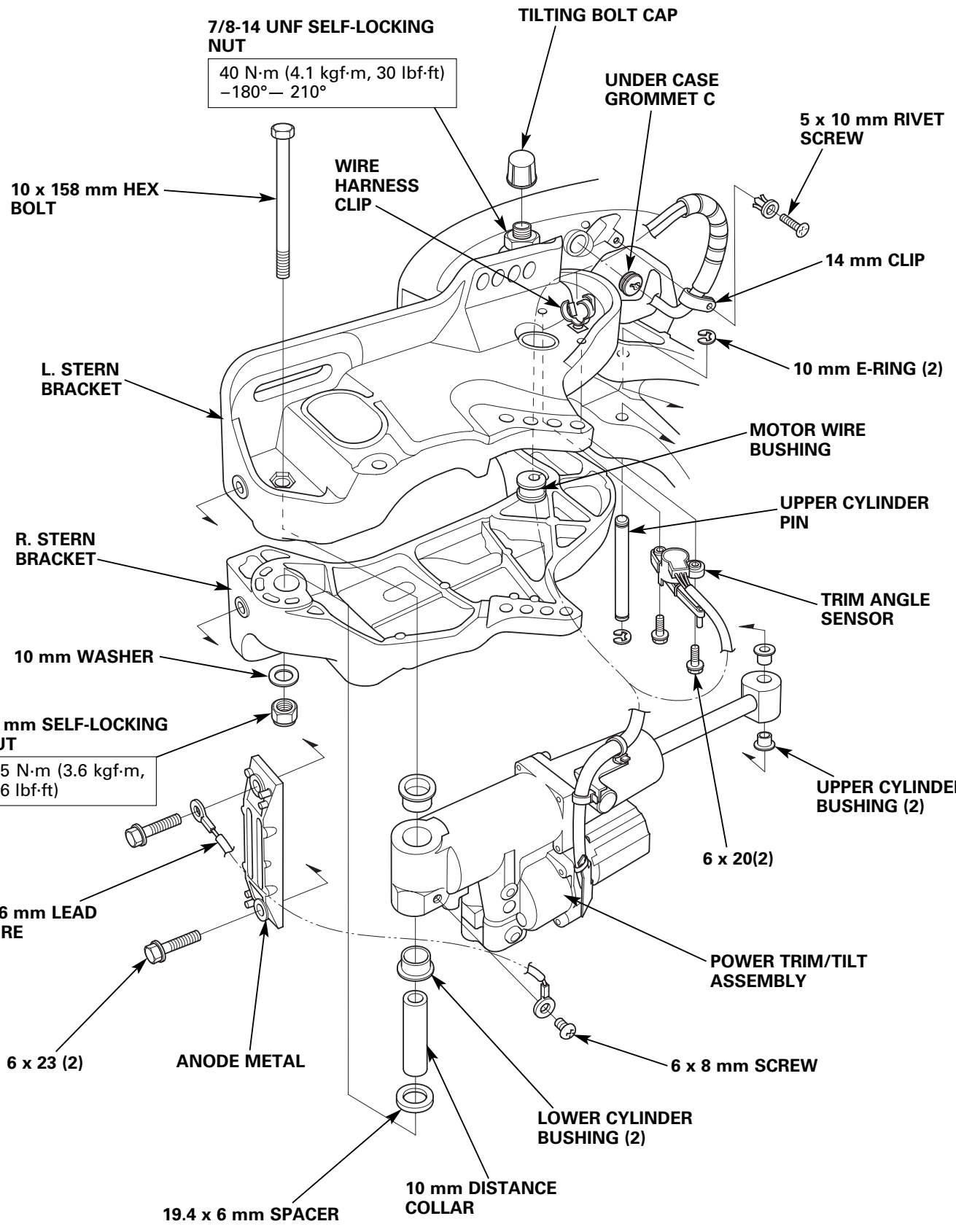




Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-7

b. COMPONENT DRAWING



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-8

c. DISASSEMBLY

NOTICE

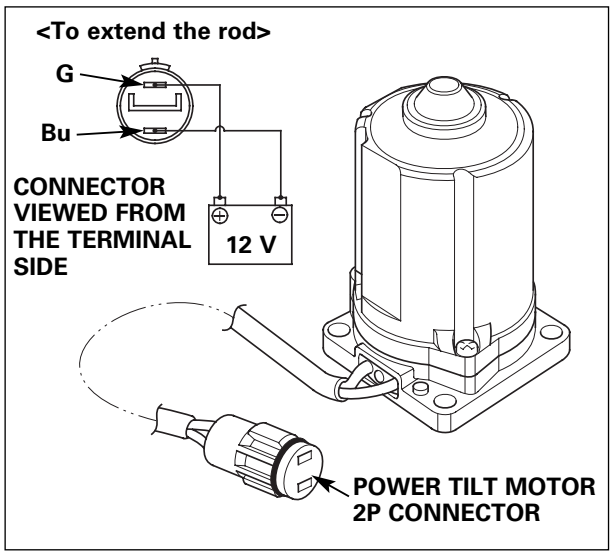
When using a vise to disassemble the power trim/tilt assembly, do not tighten the vise excessively. The cylinder comp. can be damaged. Be sure to set the vise on the specified positions of the power trim/tilt assembly (P. 14-9).

- Do not disassemble the gear pump assembly. If it is faulty, replace it as an assembly.
- Do not use a shop towel, cloth or gloves during disassembly.
- Do not reuse the drained ATF (automatic transmission fluid).
- Clean the removed parts in fresh ATF and blow each port of the parts with compressed air. Set the parts neatly in a suitable container with care not to contaminate them with lint, dust or dirt. The internal parts are easily contaminated.
- Do not reuse the O-rings and oil seals.
- Remove the piston rod, valves and sleeve with care not to damage the sliding surfaces.

Check that the piston rod of the power trim/tilt assembly is fully extended.
If the piston rod has been pushed in, remove the power trim/tilt assembly from the outboard motor. Connect the battery positive (+) cable to the green terminal of the power tilt motor 2P connector and connect the battery negative (–) cable to the blue terminal. Start the motor assembly until the piston rod fully extends.

NOTICE

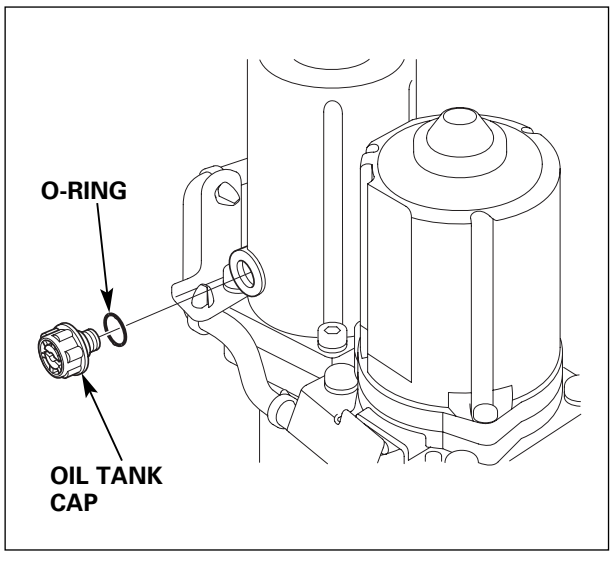
Connect the battery cables to the power tilt motor 2P connector terminals with care not to short-circuit the connector.



1) Loosen the manual valve fully (P. 13-32).

2) Remove the oil tank cap and drain the residual AFT (automatic transmission fluid) from the oil tank through the bolt hole.

   - Check the O-ring on the oil tank cap for deterioration or cuts, and replace it with a new one if necessary.
   - Do not push in the piston rod while draining the ATF.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-9

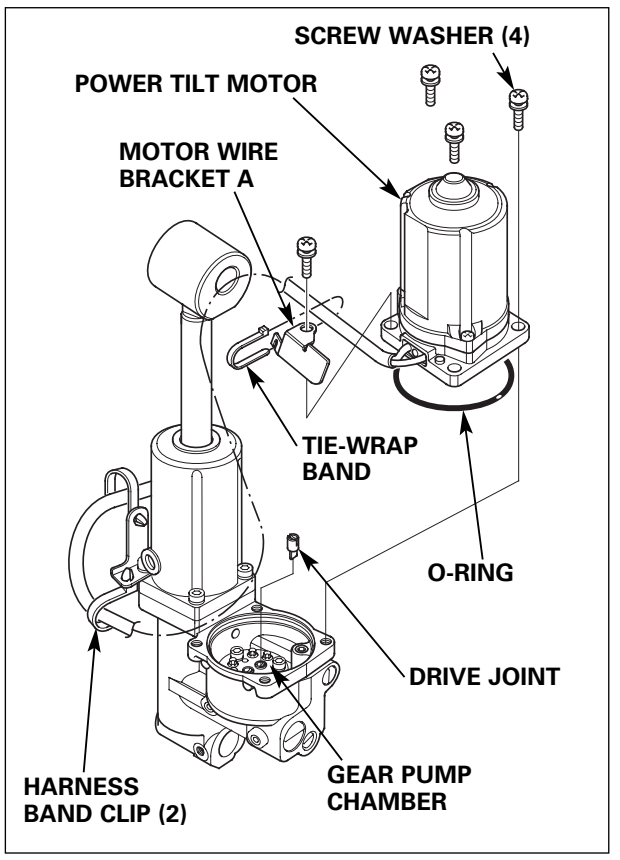
3) Open the tie-wrap band and the harness band clips to release the motor wire.

4) Remove the four screw washers, and remove the power tilt motor assembly and motor wire bracket A.
See P. 14-45 for disassembly, inspection and reassembly of the power tilt motor assembly.

5) Drain the ATF (automatic transmission fluid) from the gear pump chamber.

6) Remove the O-ring from the power tilt motor assembly. Replace the O-ring with a new one on reassembly.

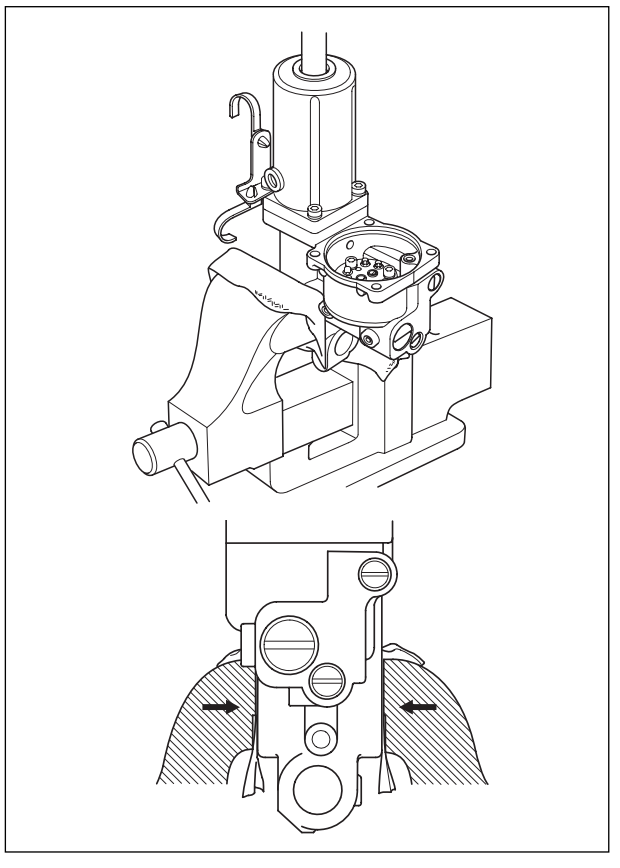
7) Remove the drive joint from the gear pump assembly.



8) Hold the cylinder comp. in a vise using a shop towel or equivalent material as shown.

NOTICE

Do not tighten the vise excessively, as it can damage the cylinder comp.



© Honda Motor Co., Ltd.

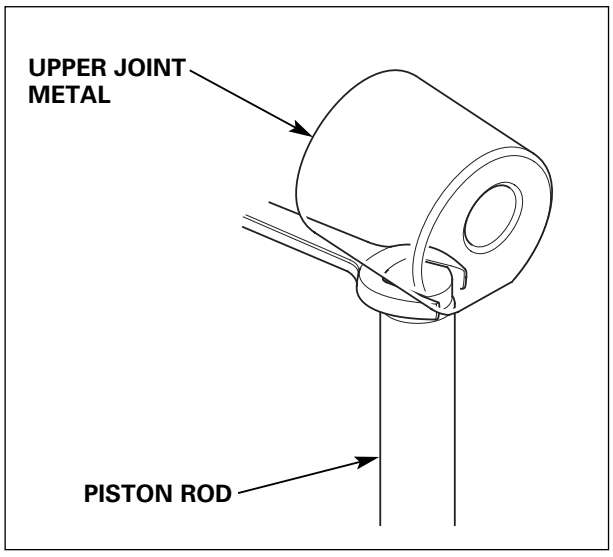
00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-10

9) Check that the piston rod is fully extended.
Warm up the upper joint metal/piston rod connecting area with a heat gun [ETB1600 (commercially available)], and remove the upper joint metal while holding the piston rod.

NOTICE

Do not warm up the upper joint metal/piston rod connecting area excessively, as it can damage the oil tank and/or the oil seal.

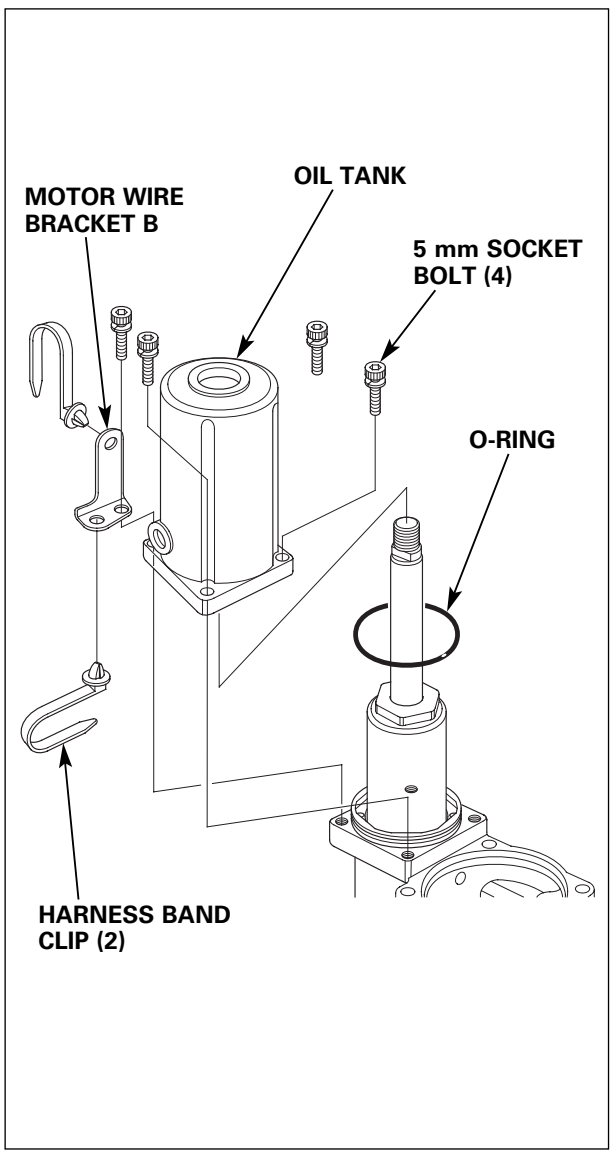
- Wear gloves during this operation.
- After the piston rod cools down, remove the thread locking agent from the threads and clean.



10) Remove the four 5 mm socket bolts, and remove the oil tank and the motor wire bracket B.

- Remove the oil tank after the piston rod cools down.

11) Remove the O-ring from the cylinder comp.
Replace the O-ring with a new one on reassembly.



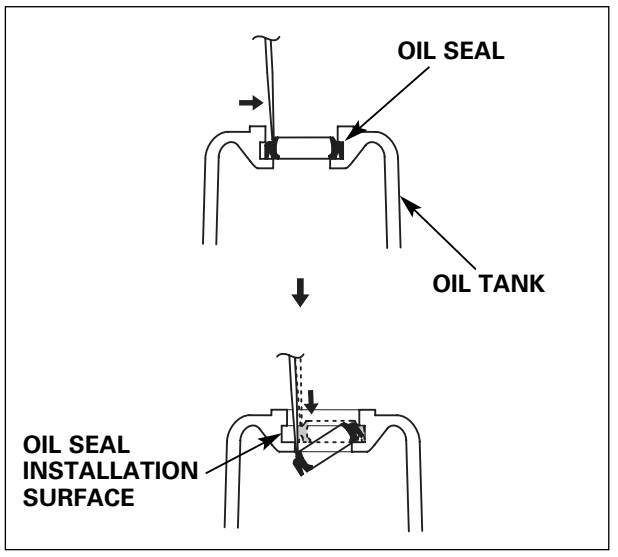
Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-11

12) Remove the oil seal from the inside of the oil tank using a sharp end screwdriver.
Replace the oil seal with a new one on reassembly.

NOTICE

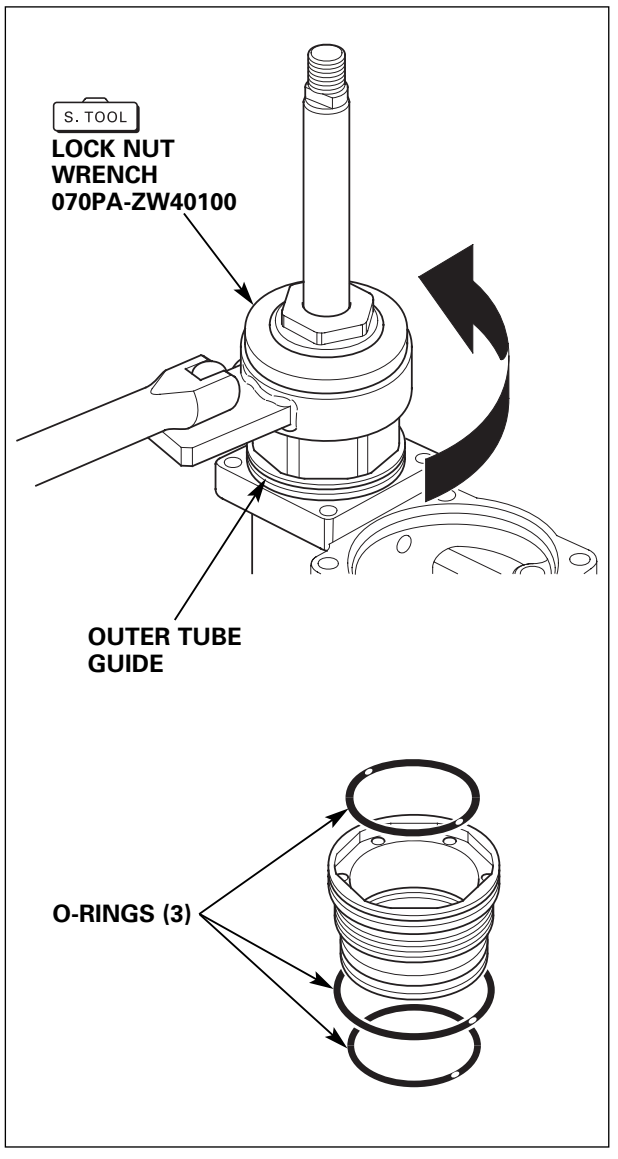
Take care not to damage the oil seal installation surface inside the oil tank.
If it is damaged, replace the oil tank with a new one.



13) Remove the outer tube guide using the special tool as shown.

TOOL:
Lock nut wrench **070PA-ZW40100**

Remove the three O-rings from the outer tube guide.
Replace the O-rings with new ones on reassembly.



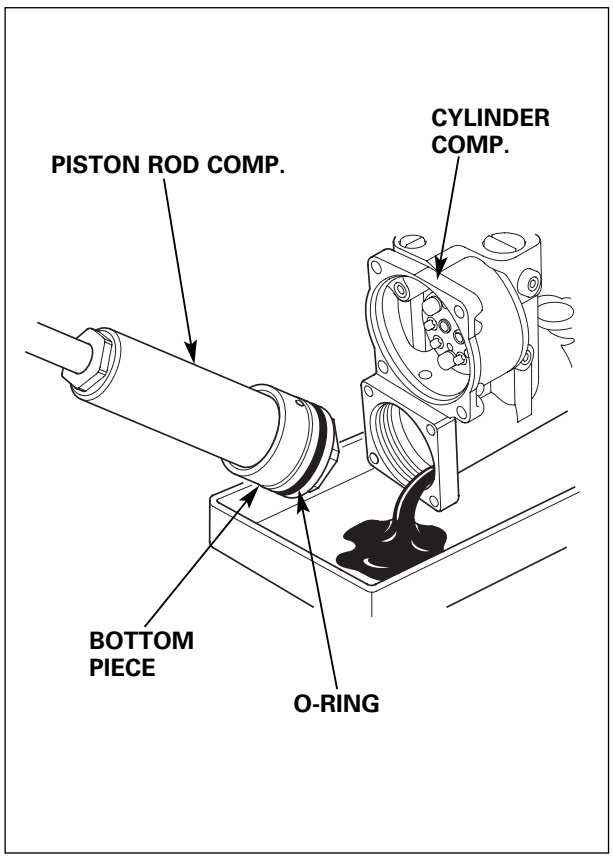
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-12

14) Remove the cylinder comp. from the vise.

15) Remove the piston rod comp., and drain the ATF (automatic transmission fluid) from the cylinder comp. in a suitable container.

16) Remove the O-ring from the bottom piece.
Replace the O-ring with a new one on reassembly.



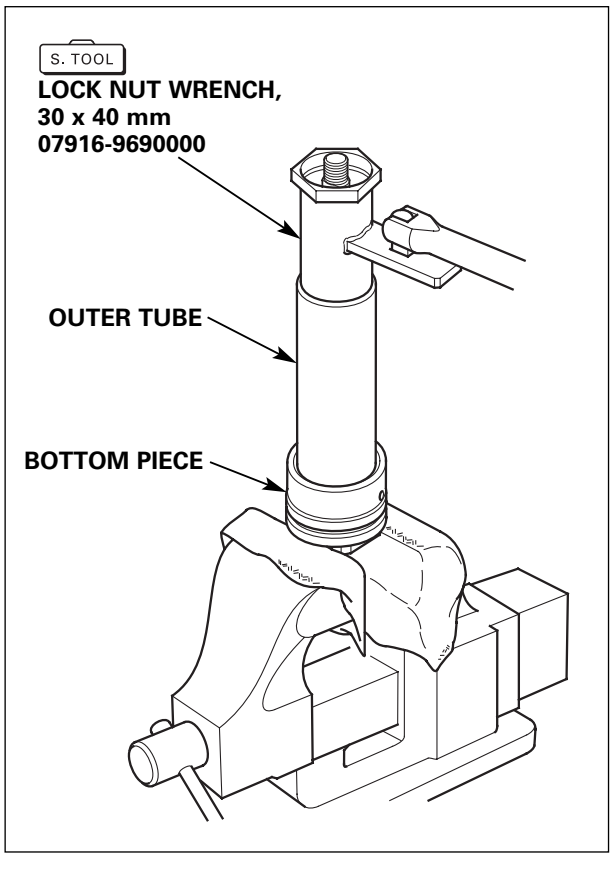
17) Hold the bottom piece of the piston rod comp. in a vise using a shop towel or equivalent material as shown, and loosen the outer tube using the special tool.

TOOL:
Lock nut wrench, 30 x 40 mm 07916-9690000

Remove the piston rod comp. from the vise.

NOTICE

Do not tighten the vise excessively, as it can damage the bottom piece.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-13

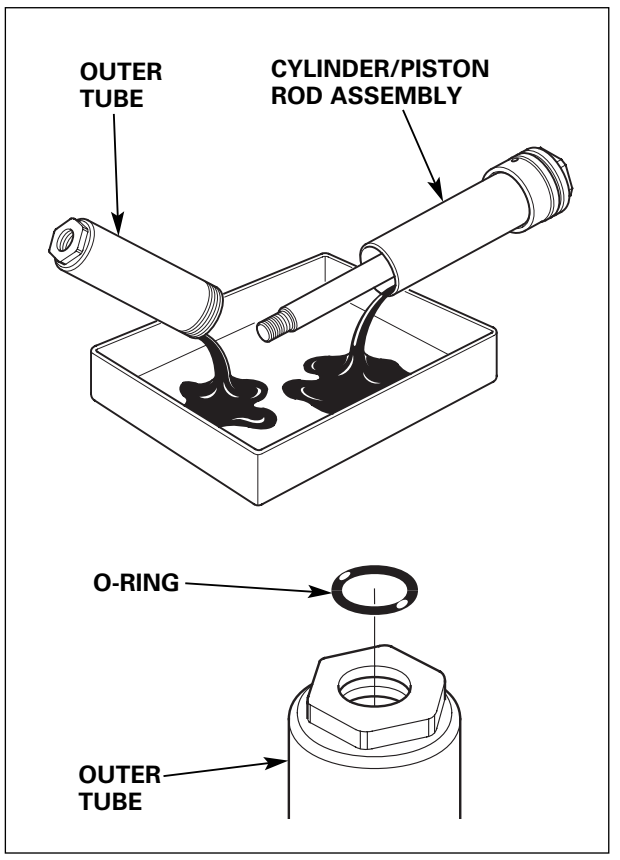
18) Drain the ATF (automatic transmission fluid) from the outer tube by turning it slowly. Catch the drained ATF in a suitable container.

• Clean the threads of the outer tube.

Remove the O-ring from the outer tube using a sharp end screwdriver.
Replace the O-ring with a new one on reassembly.

NOTICE

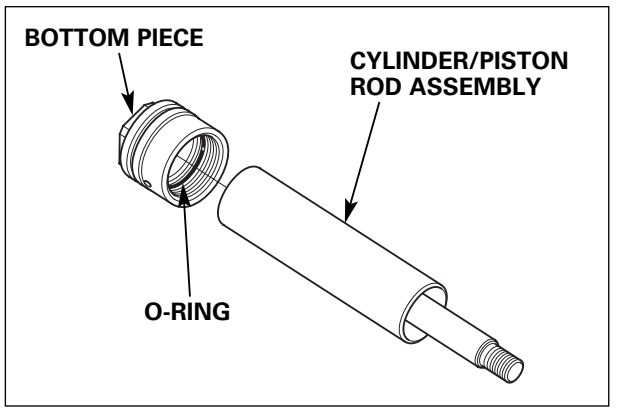
Take care not to damage the O-ring installation groove in the outer tube.



19) Remove the bottom piece from the cylinder/piston rod assembly.

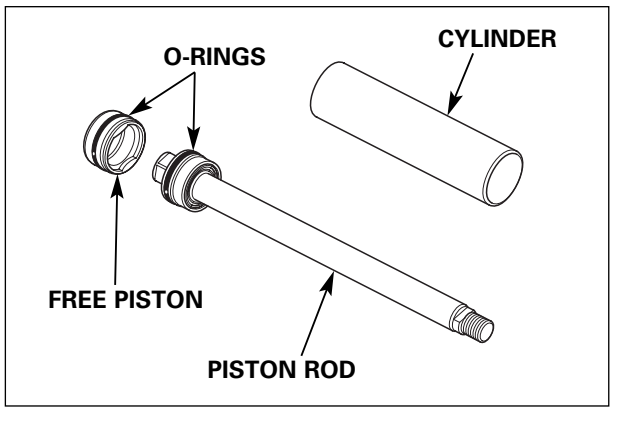
• Clean the threads of the bottom piece.

Remove the O-ring from the bottom piece.
Replace the O-ring with a new one on reassembly.



20) Remove the piston rod and the free piston from the cylinder.

Remove the O-rings from the piston rod and free piston.
Replace the O-rings with new ones on reassembly.



© Honda Motor Co., Ltd.

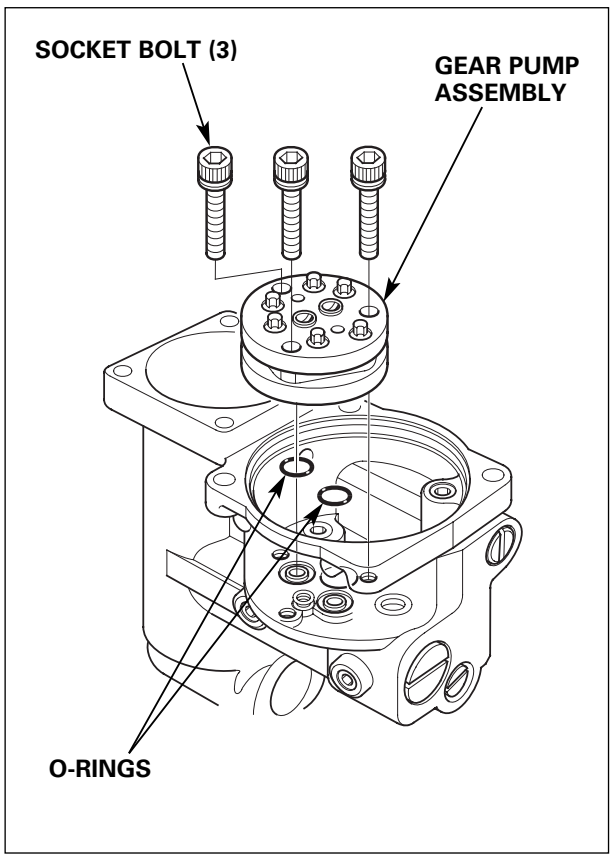
00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-14

21) Remove the three socket bolts, and remove the gear pump assembly.

NOTICE

Do not disassemble the gear pump assembly. If it is faulty, replace it as an assembly.

22) Remove the two O-rings from the cylinder comp. Replace the O-rings with new ones on reassembly.

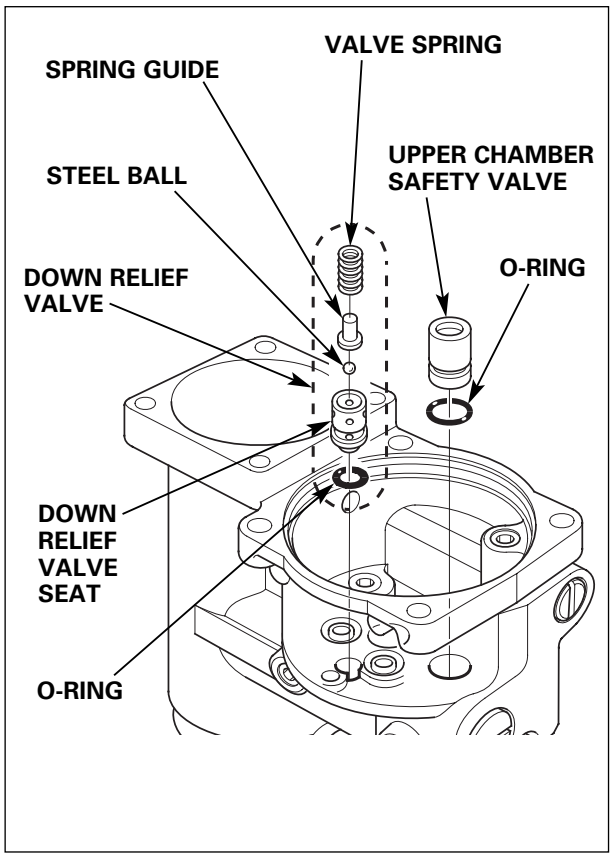


23) Remove the valve spring, spring guide, steel ball and the down relief valve seat from the cylinder comp.

Remove the O-ring from the down relief valve seat. Replace the O-ring with a new one on reassembly.

24) Remove the upper chamber safety valve from the cylinder comp.

Remove the O-ring from the upper chamber safety valve. Replace the O-ring with a new one on reassembly.

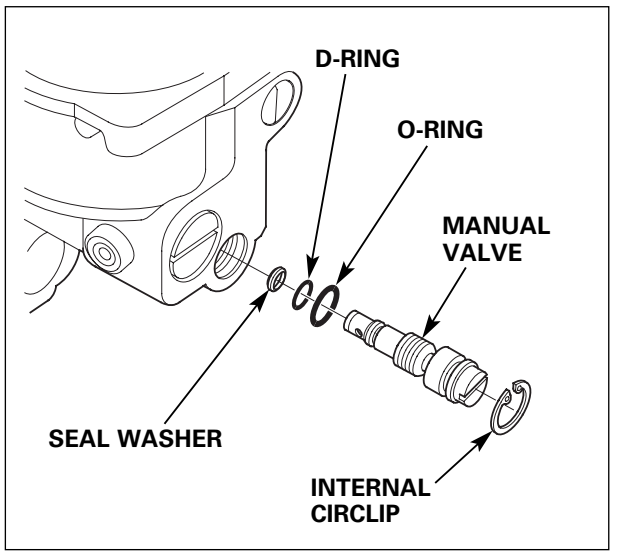


Date of Issue: May 2008
© Honda Motor Co., Ltd.

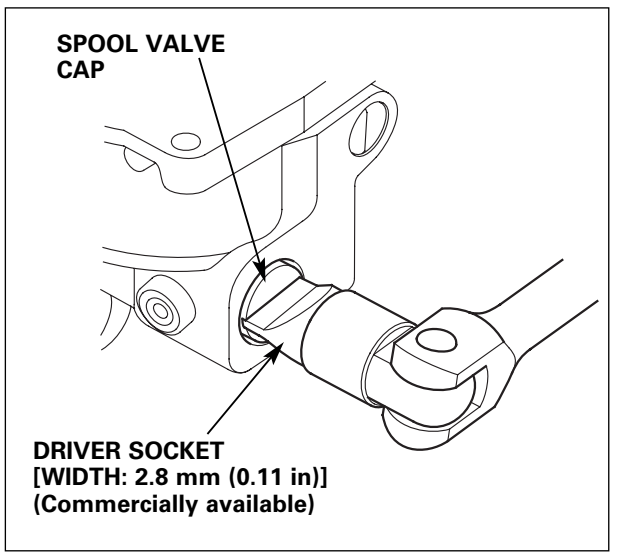
00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-15

25) Remove the internal circlip, and remove the manual valve and the seal washer.

Remove the O-ring and the D-ring from the manual valve. Replace the O-ring and the D-ring with new ones on reassembly.

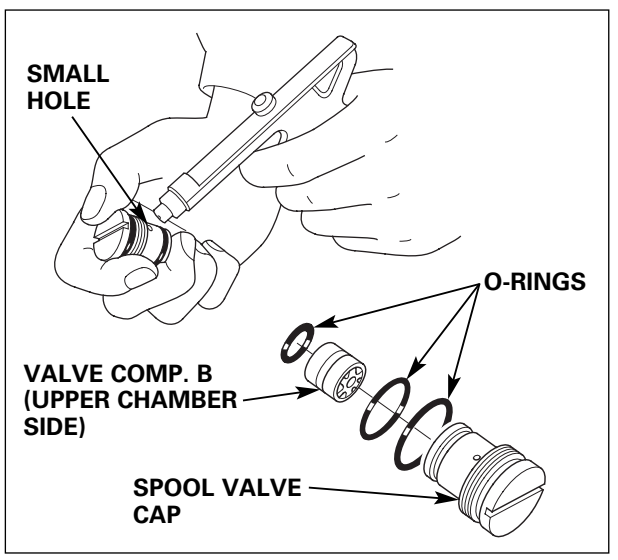


26) Remove the spool valve cap using a commercially available driver socket [width: 2.8 mm (0.11 in)].



27) Holding the valve side of the spool valve cap as if it is wrapped in your hand as shown, blow the compressed air through the small hole in the spool valve cap and remove valve comp. B from the spool valve cap.

Remove the O-rings from the spool valve cap and valve comp. B.
Replace the O-rings with new ones on reassembly.

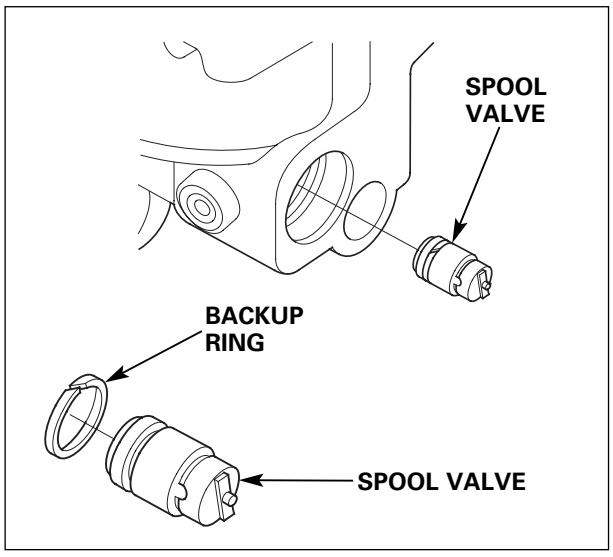


© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-16

28) Remove the spool valve from the inside of the cylinder comp.

Remove the backup ring from the spool valve.
Replace the backup ring with a new one on reassembly.



29) Bend a piece of piano wire [O.D.: 1.5 mm (0.06 in)] as shown.

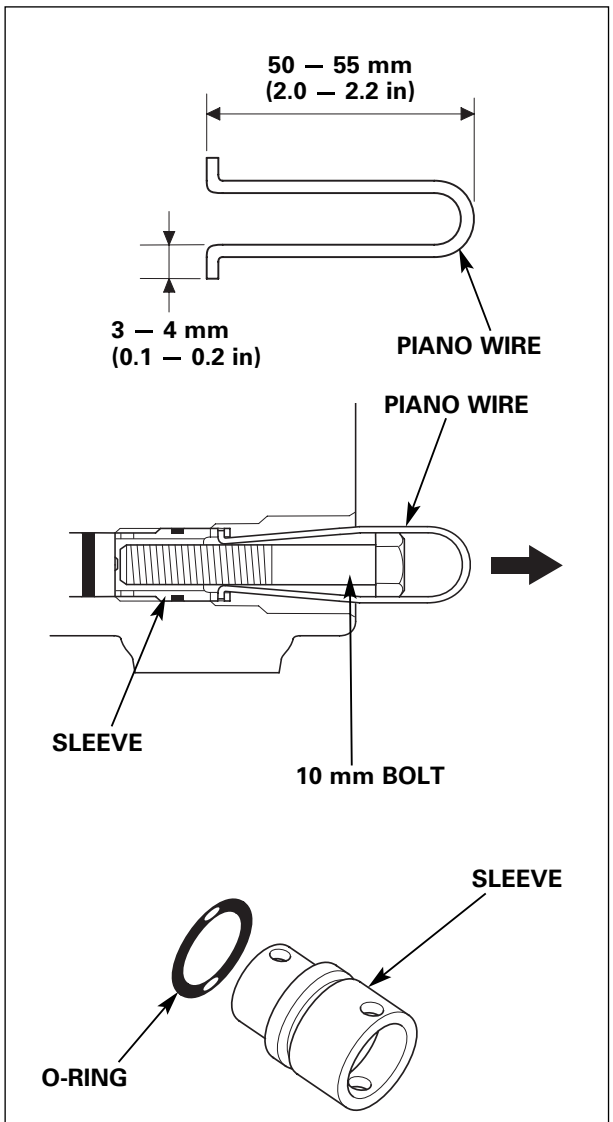
30) Set the piano wire in the holes on both ends of the sleeve, and insert a 10 mm bolt into the sleeve cylinder to secure the piano wire as shown.

31) Remove the sleeve from the cylinder comp. by pulling the piano wire.

Remove the O-ring from the sleeve.
Replace the O-ring with a new one on reassembly.

NOTICE

- *If it is hard to remove the sleeve from the cylinder comp., wrap a shop towel or equivalent material around a screwdriver, end so you will not damage the outer casing, and then hook it through the piano wire and remove the cylinder comp. with care not to damage it.*
- *Take care not to damage the inner wall of the cylinder comp. and sleeve.*

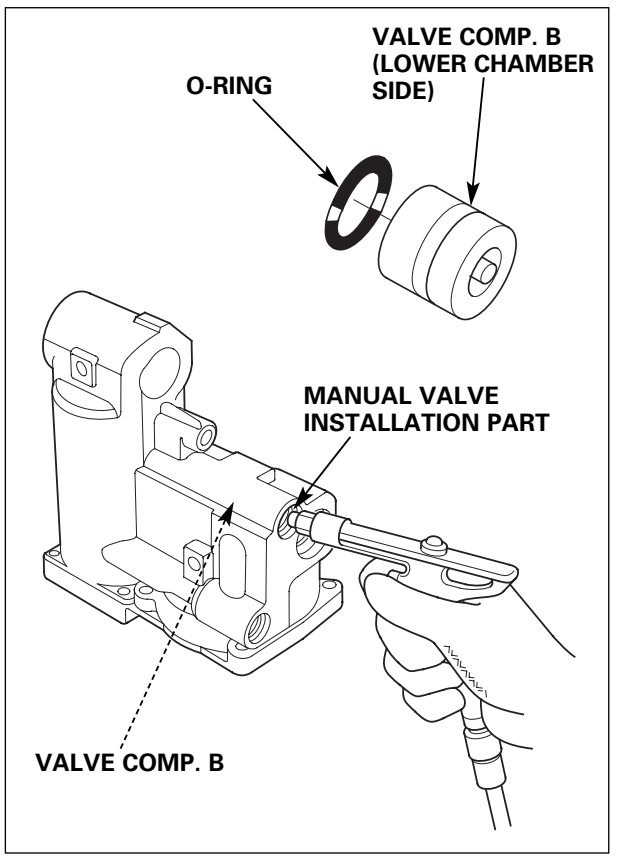


Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-17

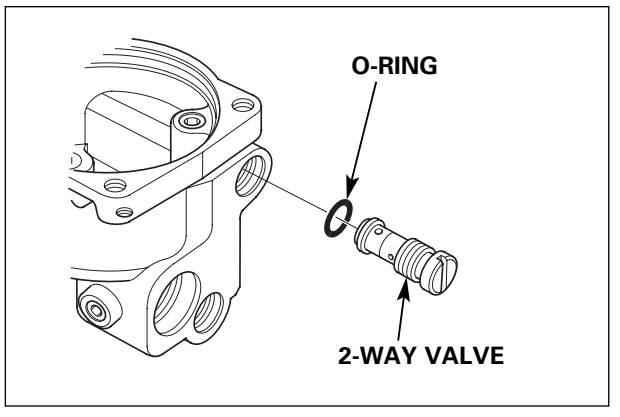
32) Set the cylinder comp. as shown, and blow compressed air through the manual valve installation part to remove valve comp. B from the cylinder comp.

Remove the O-ring from valve comp. B.
Replace the O-ring with a new one on reassembly.



33) Remove the 2-way valve from the cylinder comp.

Remove the O-ring from the 2-way valve.
Replace the O-ring with a new one on reassembly.

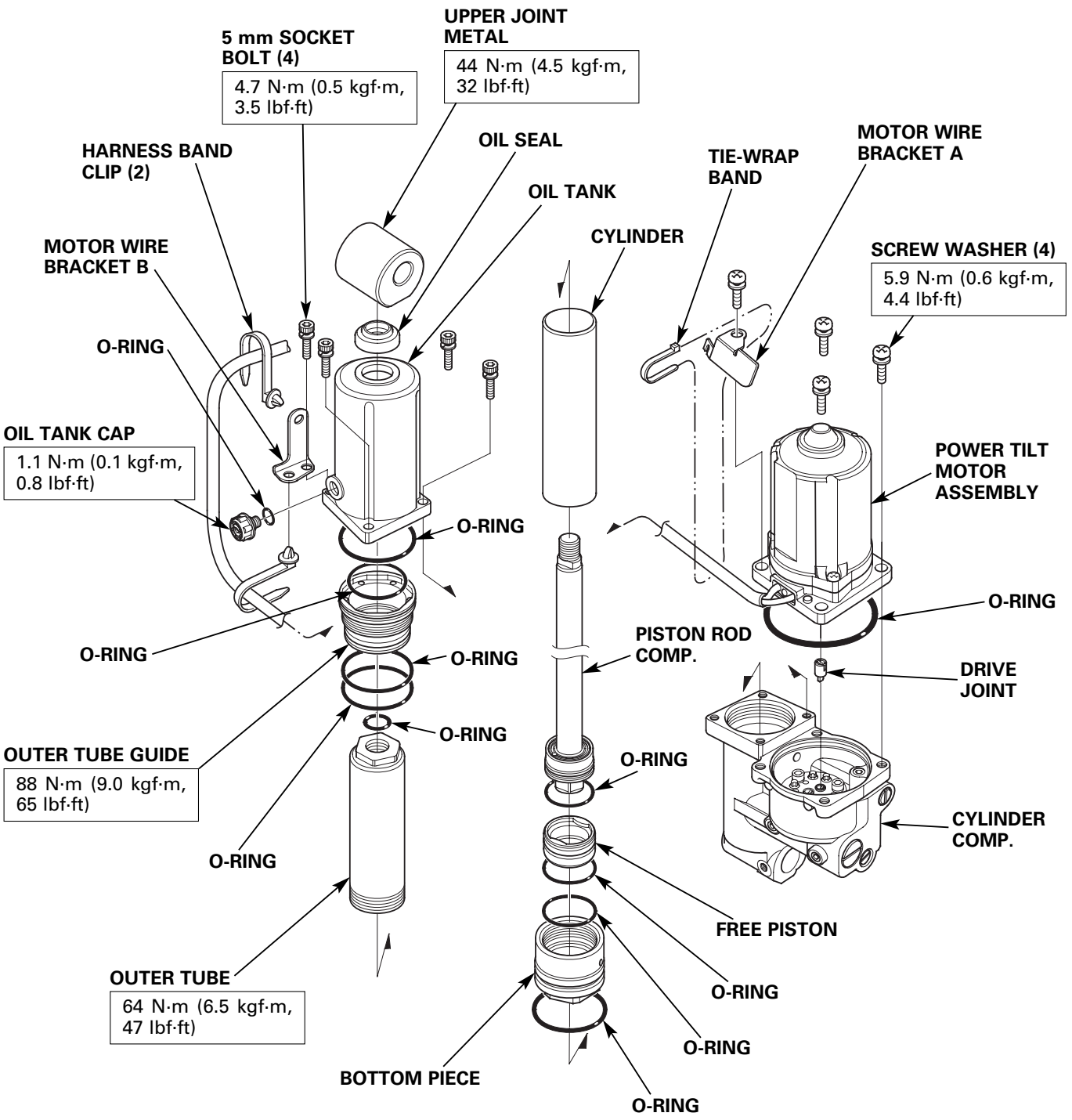


© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-18

d. COMPONENT DRAWING

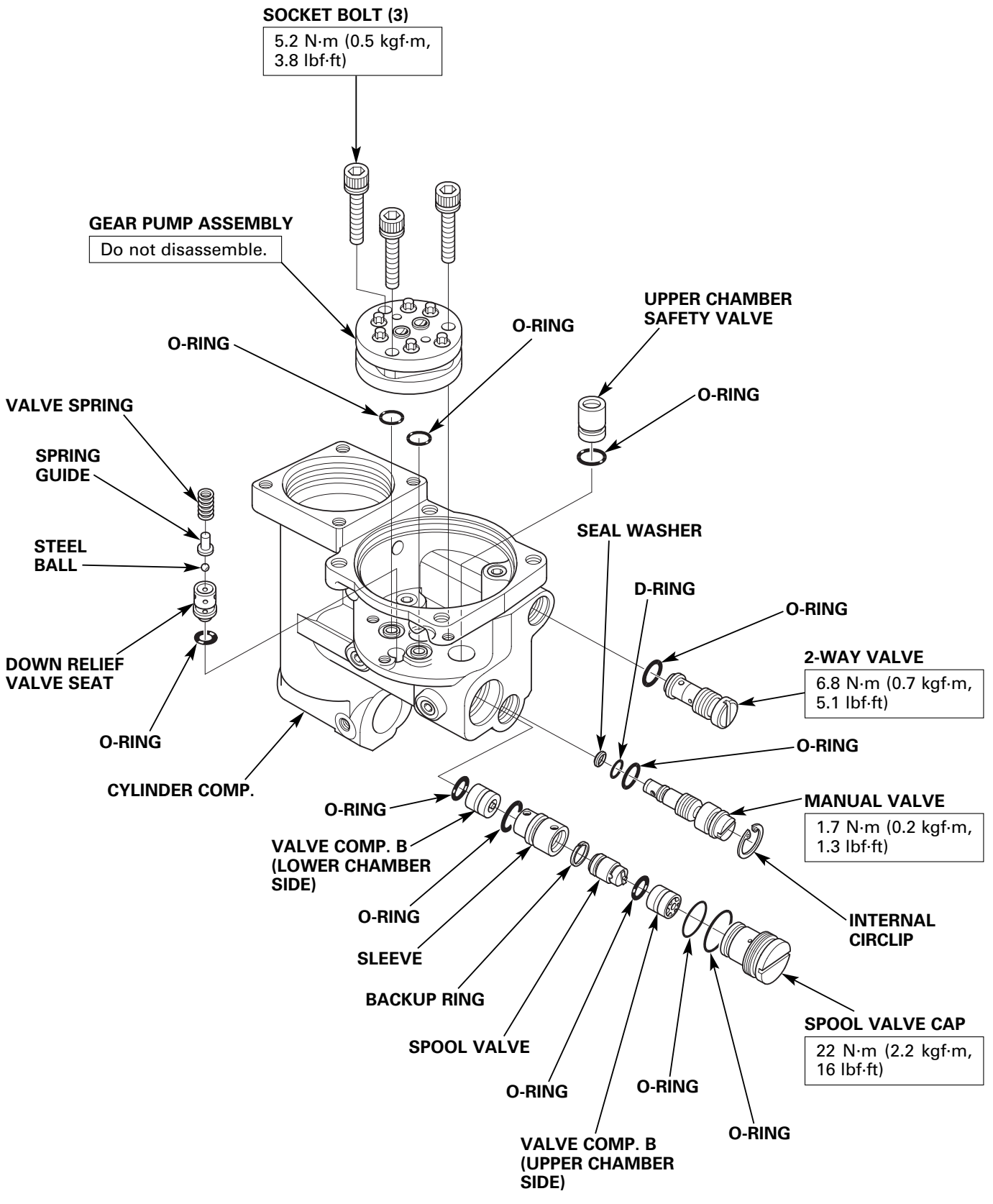
• PISTON/CYLINDER/OIL TANK



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-19

• CYLINDER COMP.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-20

e. INSPECTION

Clean the valves, piston and cylinder with fresh ATF (automatic transmission fluid) and blow them with compressed air before inspection. Place them in a clean environment free of lint, dust and dirt.

• DOWN RELIEF VALVE

Check the down relief valve seat, valve spring, steel ball and the spring guide for wear or damage. Replace the part(s) with new one(s) if necessary.

• UPPER CHAMBER SAFETY VALVE

Check the upper chamber safety valve for wear or damage. Replace the upper chamber safety valve with a new one if necessary.

• PISTON ROD COMP./FREE PISTON

Check the piston rod comp. for wear or bent rod.
Replace the piston rod comp. with a new one if necessary.

- Do not disassemble the piston rod comp. Replace it as an assembly.

Check the outer surface of the free piston for scores, scratches or wear.
Replace the free piston with a new one if necessary.

• CYLINDER

Check the inner wall of the cylinder for damage.
Replace the cylinder with a new one if necessary.

• MANUAL VALVE/SEAL WASHER

Check the manual valve for wear or damage.
Replace the manual valve with a new one if necessary.

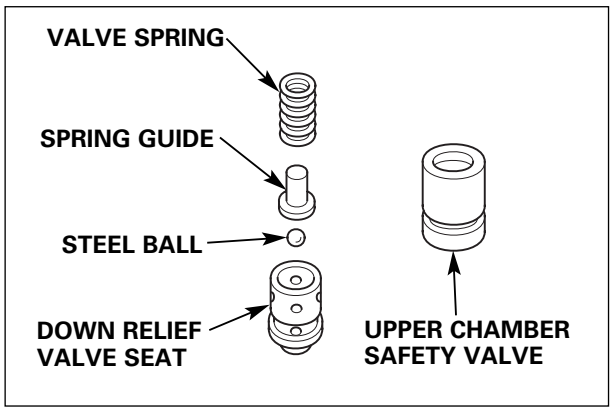
Check the seal washer for cuts or deterioration.
Replace the seal washer with a new one if necessary.

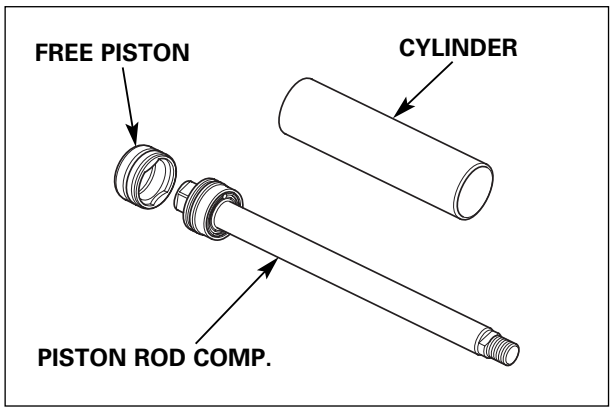
• SPOOL VALVE/SLEEVE/VALVE COMP. B

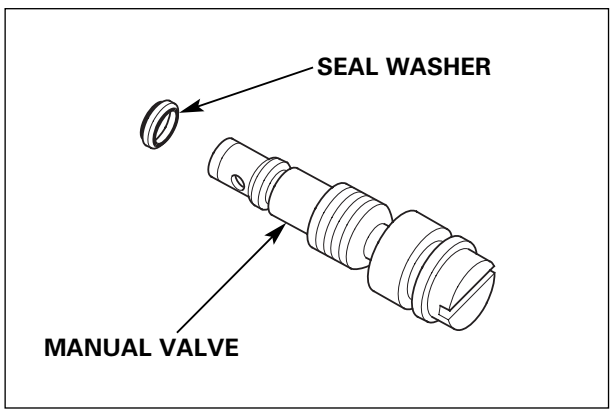
Check the spool valve for wear, damage or blockage with foreign material.
Replace the spool valve with a new one if necessary.

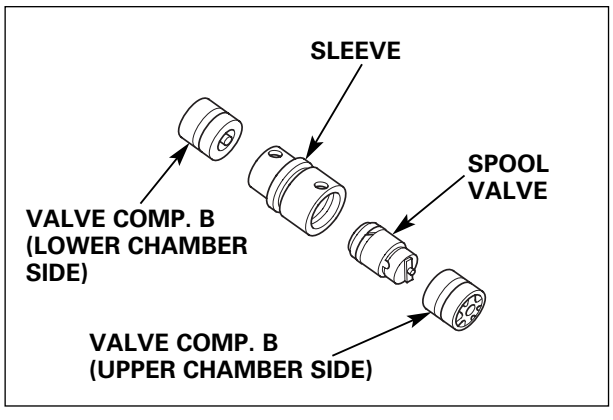
Check the sleeve for wear or damage.
Replace the sleeve with a new one if necessary.

Check both valve comp. B's for wear, damage or blockage with foreign material.
Replace the valve comp. B with a new one if necessary.







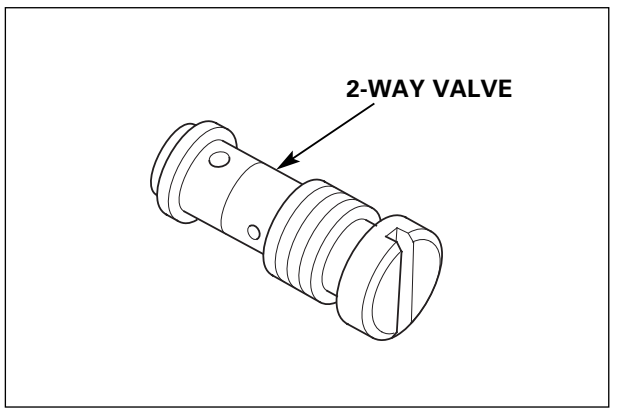


Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-21

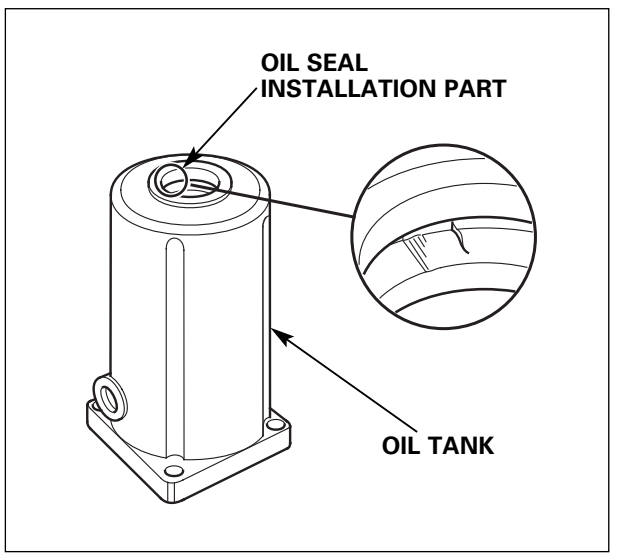
• 2-WAY VALVE

Check the 2-way valve for wear, damage or blockage with foreign material.
Replace the 2-way valve with a new one if necessary.



• OIL TANK

Visually check the oil seal installation part of the oil tank for damage.
Replace the oil tank with a new one if necessary.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-22

f. REASSEMBLY

NOTICE

When using a vise to reassemble the power trim/tilt assembly, do not tighten the vise excessively. The cylinder comp. can be damaged. Be sure to set the vise on the specified positions of the power trim/tilt assembly (P. 14-9).

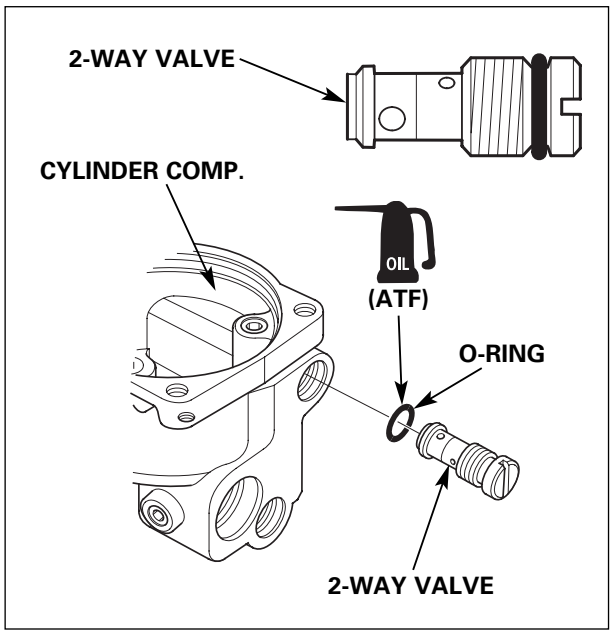
- Do not reuse the O-rings and the oil seals.
- Do not use a shop towel, cloth or gloves during reassembly.
- Do not reuse the drained ATF (automatic transmission fluid).
- Reassemble the power trim/tilt assembly with care not to let lint, dust, dirt or foreign material enter the cylinder comp. or gear pump assembly.
- Pour the ATF (automatic transmission fluid) into the power trim/tilt assembly slowly so it does not foam.
- Clean the removed parts in fresh ATF and blow each port of the parts with compressed air. Check that the parts are not contaminated with lint, dust or dirt before reassembly.

1) Clean the cylinder comp. with fresh ATF (automatic transmission fluid) and blow each port with compressed air. Check that the cylinder comp. is free from any foreign material.

2) Apply ATF to a new O-ring and install it on the 2-way valve.

3) Tighten the 2-way valve to the specified torque.

   TORQUE: 6.8 N·m (0.7 kgf·m, 5.1 lbf·ft)



4) Apply ATF to a new O-ring and install it on valve comp. B.

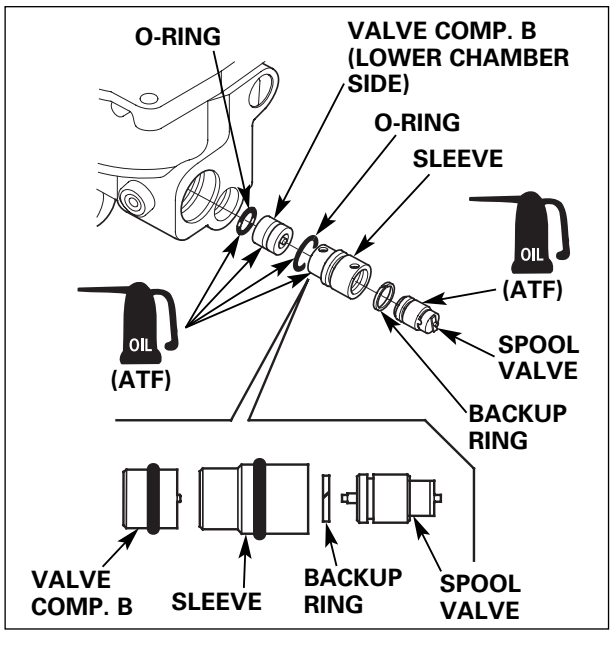
5) Apply ATF to the outer surface of valve comp. B, and install it in the cylinder comp.
   Note the installation direction of valve comp. B.

6) Apply ATF to a new O-ring and install it on the sleeve.

7) Install a new backup ring in the spool valve, and apply ATF to the outer surface of the spool valve.

8) Install the spool valve in the sleeve.
   Note the installation direction of the spool valve.

9) Apply ATF to the outer surface of the sleeve, and install it in the cylinder comp.
   Note the installation direction of the sleeve.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-23

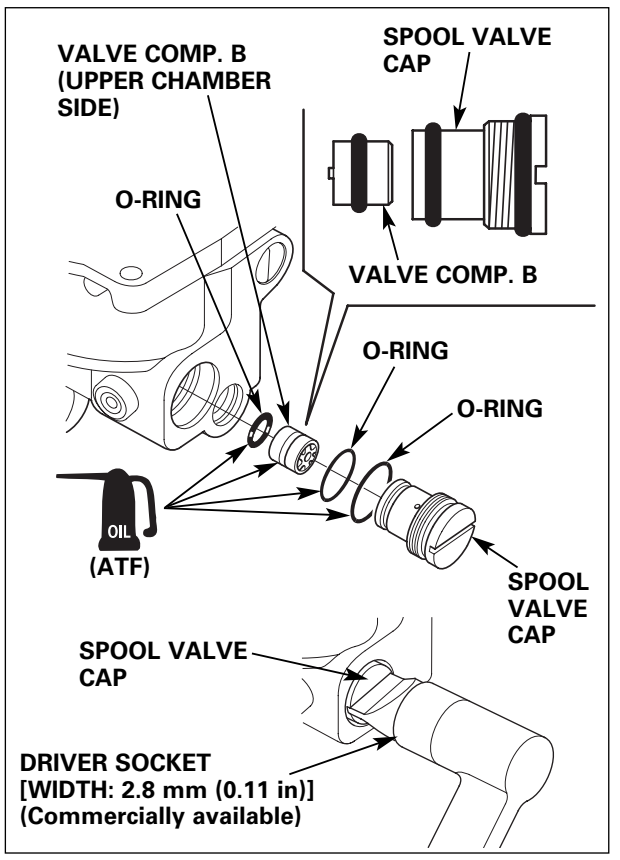
10) Apply ATF to a new O-ring and install it on valve comp. B.

11) Apply ATF to the outer surface of valve comp. B, and install it in the spool valve.
Note the installation direction of valve comp. B.

12) Apply ATF to a new O-ring and install it on the spool valve cap.

13) Tighten the spool valve cap to the specified torque using a commercially available driver socket [width: 2.8 mm (0.11 in)].

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



14) Apply ATF to the seal washer and install it in the cylinder comp.

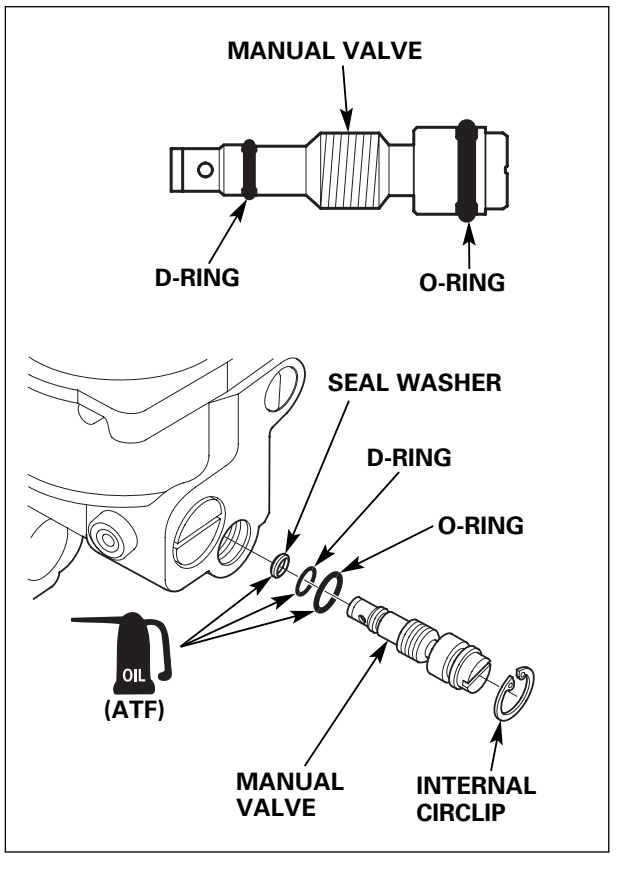
NOTICE

Install the seal washer with care not to move it out of position or collapse it in the cylinder comp.

15) Apply ATF to a new O-ring and D-ring, and install them on the manual valve.

16) Tighten the manual valve to the specified torque, and install the internal circlip in the groove inside the cylinder comp. securely.

TORQUE: 1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-24

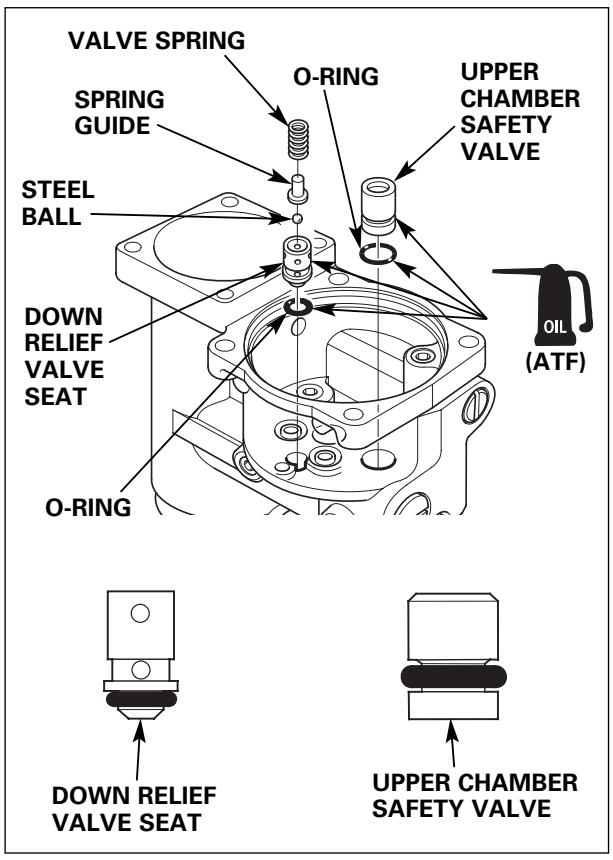
17) Apply ATF to a new O-ring and install it on the down relief valve seat.

18) Apply ATF to the outer surface of the down relief valve seat, and install it on the cylinder comp.

19) Install the steel ball, spring guide and the valve spring in the down relief valve seat.

20) Apply ATF to a new O-ring, and install it on the upper chamber safety valve.

21) Apply ATF to the outer surface of the upper chamber safety valve, and install it in the cylinder comp.



22) Apply ATF to the two new O-rings, and install them in the cylinder comp. in the positions shown.

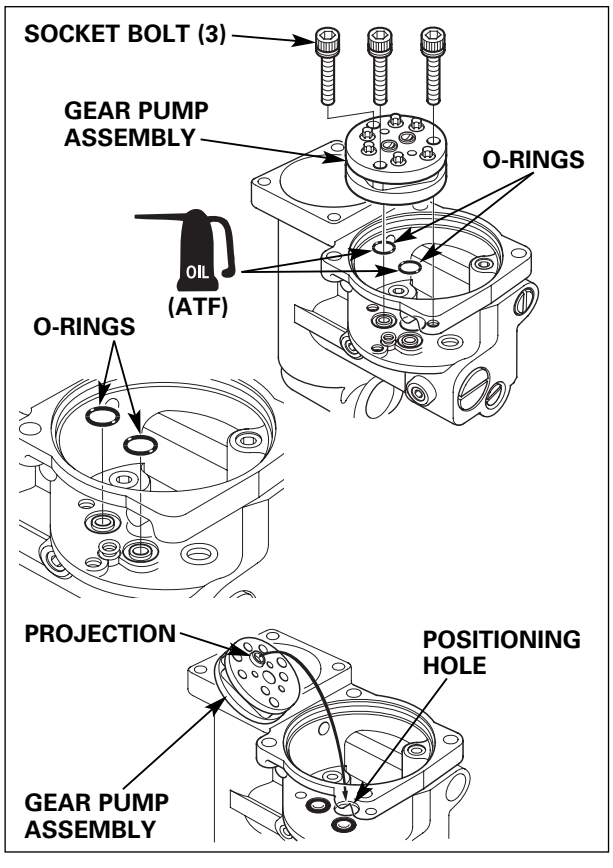
23) Install the gear pump assembly in the cylinder comp. aligning the projection on the bottom of the gear pump assembly with the positioning hole in the cylinder comp.

NOTICE

Install the gear pump assembly with care not to move the two O-rings in the cylinder comp. out of position.

24) Tighten the three socket bolts to the specified torque.

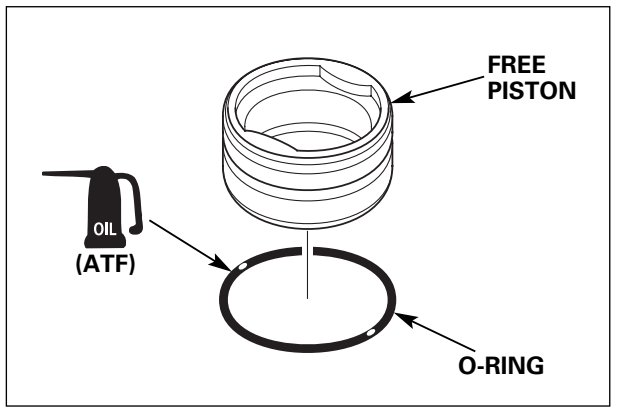
TORQUE: 5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-25

25) Apply ATF to a new O-ring and install it on the free piston.



26) Apply ATF to a new O-ring and install it on the piston.

27) Apply ATF to the inner wall of the cylinder.

28) Install the free piston in the cylinder, and fill the free piston with the ATF.

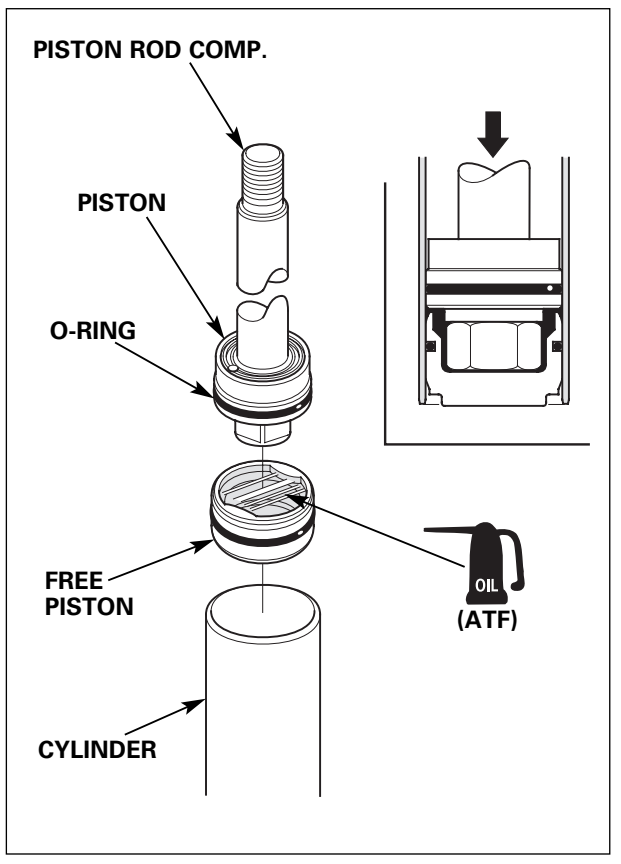
29) Install the piston rod comp. in the cylinder.

- Install the piston rod comp. by pushing the free piston in with the end of the piston.

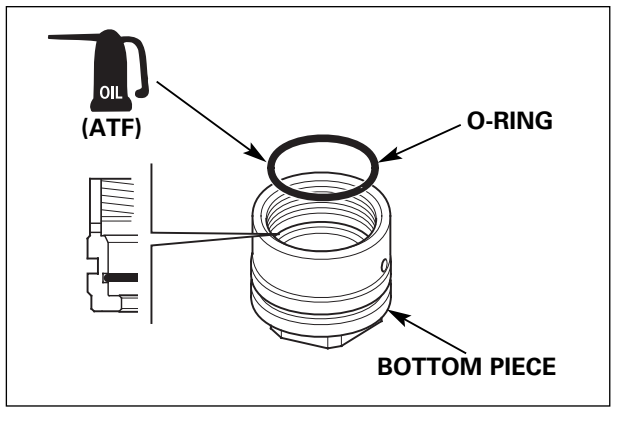
NOTICE

Install the piston rod comp. with care not to damage the O-ring on the free piston and the O-ring on the piston rod.

30) Push the piston rod into the cylinder until the free piston reaches the bottom of the cylinder.



31) Apply ATF to a new O-ring and install it on the bottom piece.



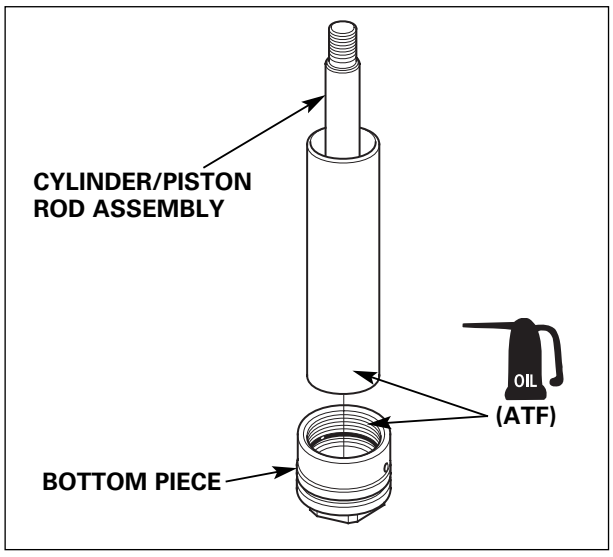
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-26

32) Apply ATF to the outer surface of the lower part of the cylinder and to the inner wall of the bottom piece.
Install the cylinder/piston rod assembly on the bottom piece.

NOTICE

Do not damage the O-rings during installation.

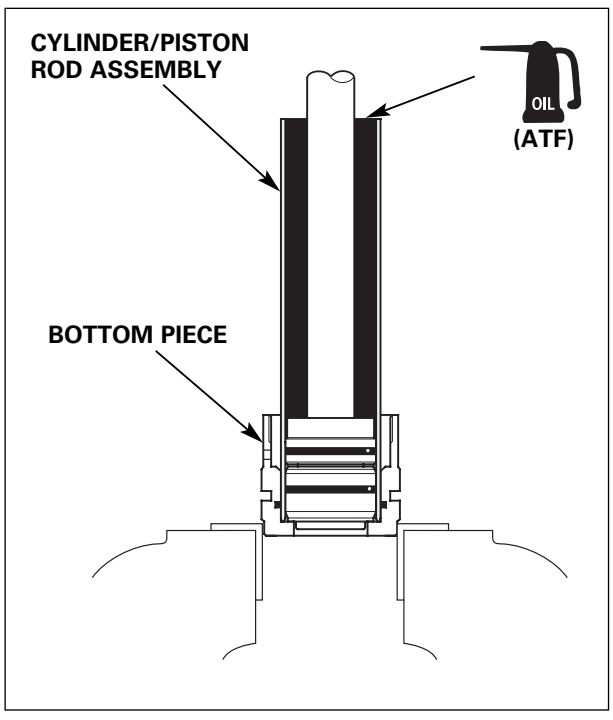


33) Hold the bottom piece in a vise using a shop towel or equivalent material, and hold the cylinder/piston rod assembly upright.

NOTICE

Do not tighten the vise excessively, as it can damage the bottom piece.

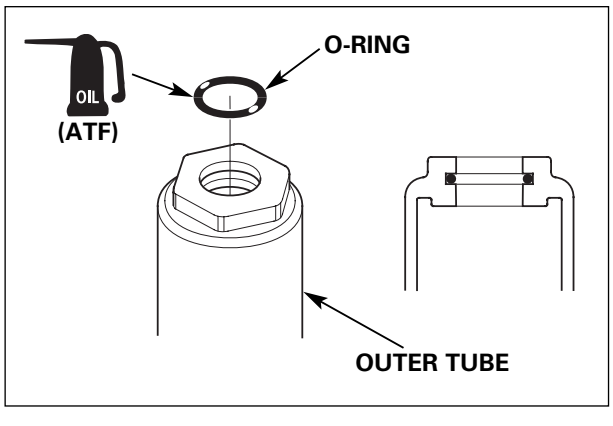
34) Slowly fill the cylinder with ATF, taking care so the ATF does not foam.



35) Apply ATF to a new O-ring, and install it in the groove inside the outer tube.

NOTICE

Install the O-ring with care not to damage it.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-27

36) Wind commercially available sealing tape onto the threads at the end of the piston rod to protect the outer tube O-ring.

37) Apply ATF to the end of the piston rod and the O-ring on the outer tube, and install the outer tube on the cylinder/piston rod assembly.

- Install the outer tube while turning it with care not to damage the O-ring.

38) Screw in the outer tube two or three ridges of the threads, and then apply the thread locking agent (LOCTITE® 241 or equivalent) to the remaining threads.

39) Tighten the outer tube to the specified torque.

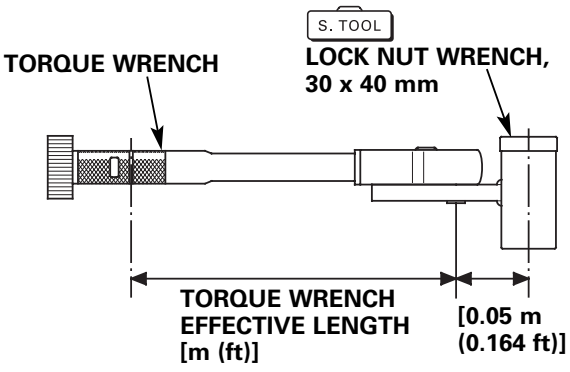
TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

NOTICE

To tighten the outer tube, use the special tool and read the torque as follows.

TOOL:
Lock nut wrench, 30 x 40 mm 07916-9690000

- Tighten the outer tube with care not to move the bottom piece out of the vise.



- **Formula:**

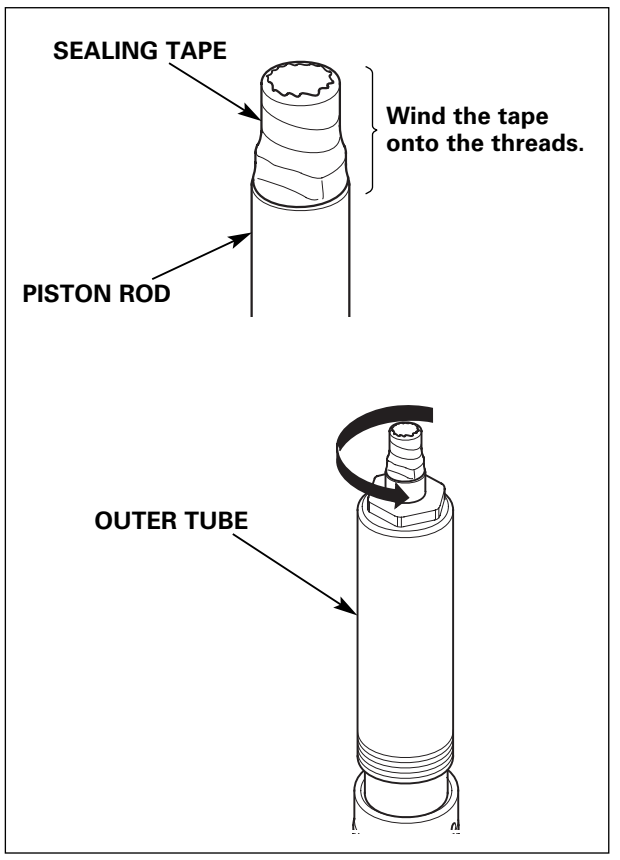
$$\text{Torque wrench reading} = \frac{\text{Torque wrench effective length [m (ft)]} \times \text{Specified torque [N·m (kgf·m, lbf·ft)]}}{\text{Torque wrench effective length [m (ft)]} + 0.05 \text{ [m (0.164 ft)]}}$$

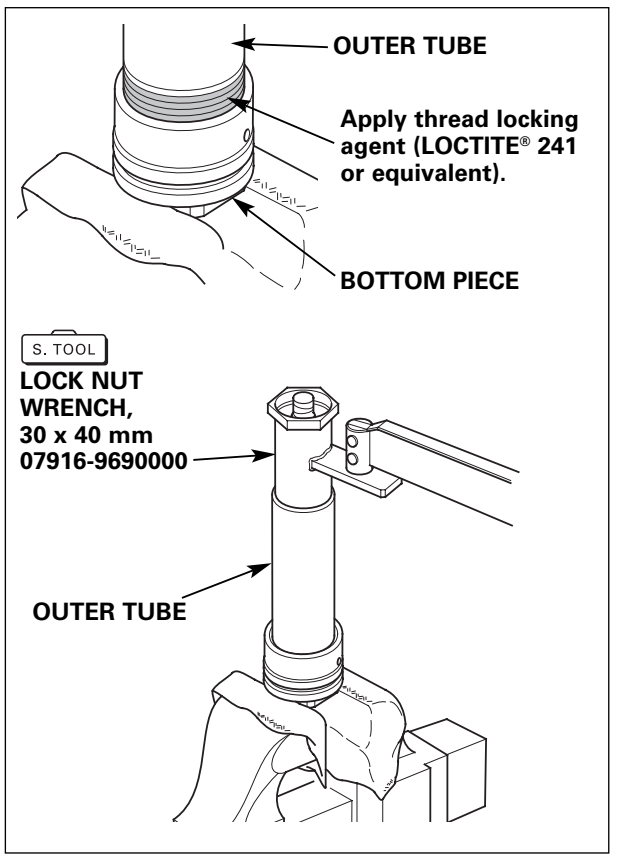
- **Example:**

Torque wrench reading using a torque wrench with an effective length of 0.4 m (1.31 ft)

$$\frac{0.4 \text{ [m (1.31 ft)]} \times 64 \text{ [N·m (6.5 kgf·m, 47 lbf·ft)]}}{0.4 \text{ [m (1.31 ft)]} + 0.05 \text{ [m (0.164 ft)]}} = 57 \text{ [N·m (5.8 kgf·m, 42 lbf·ft)]}$$

40) Remove the piston rod/outer tube assembly from the vise, and wipe off any excess thread locking agent.

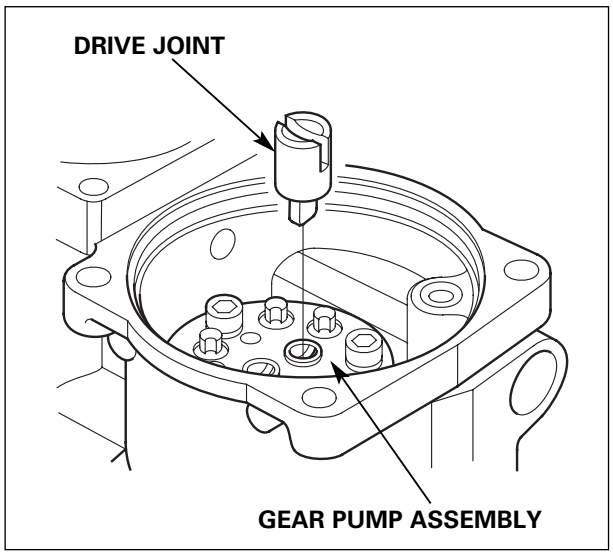




© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-28

41) Install the drive joint in the gear pump assembly in the position shown.



42) Hold the cylinder comp. in a vise using a shop towel or equivalent material.

NOTICE

Do not tighten the vise excessively, as it can damage the cylinder comp.

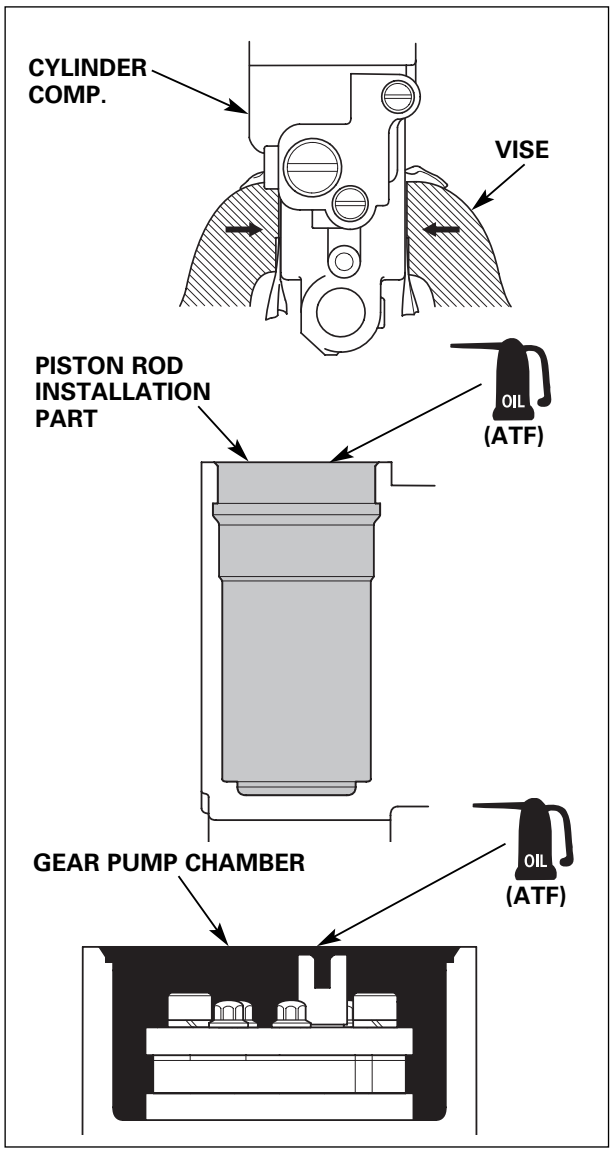
Loosen the manual valve, turning it 2-1/2 turns or more.

43) Pour the ATF into the cylinder comp. slowly taking care not to produce any foam. Pour the ATF from the piston rod installation part of the cylinder comp. until it flows out of the gear pump chamber of the cylinder comp.

NOTICE

After pouring the ATF, check the ATF in the gear pump chamber for air bubbles. If the ATF contains bubbles, remove them using an oil bottle or equivalent tool. Note that the bubbles in the ATF will have to be bled from the system.

After removing the bubbles, pour fresh ATF into the cylinder comp. again until the gear pump chamber is filled with ATF.



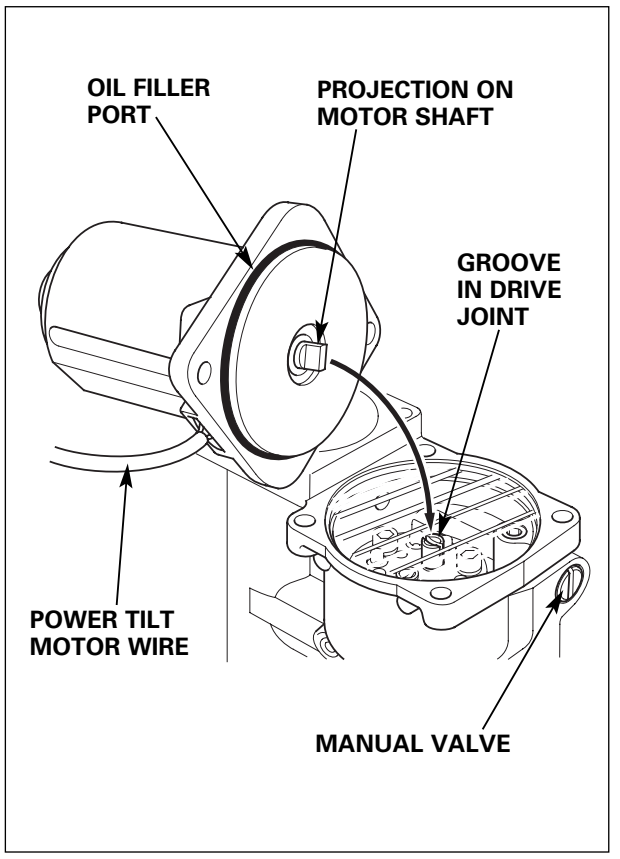
Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-29

44) Apply ATF to a new O-ring and install it on the power tilt motor.

Install the power tilt motor by aligning the projection on the motor shaft with the groove in the drive joint.

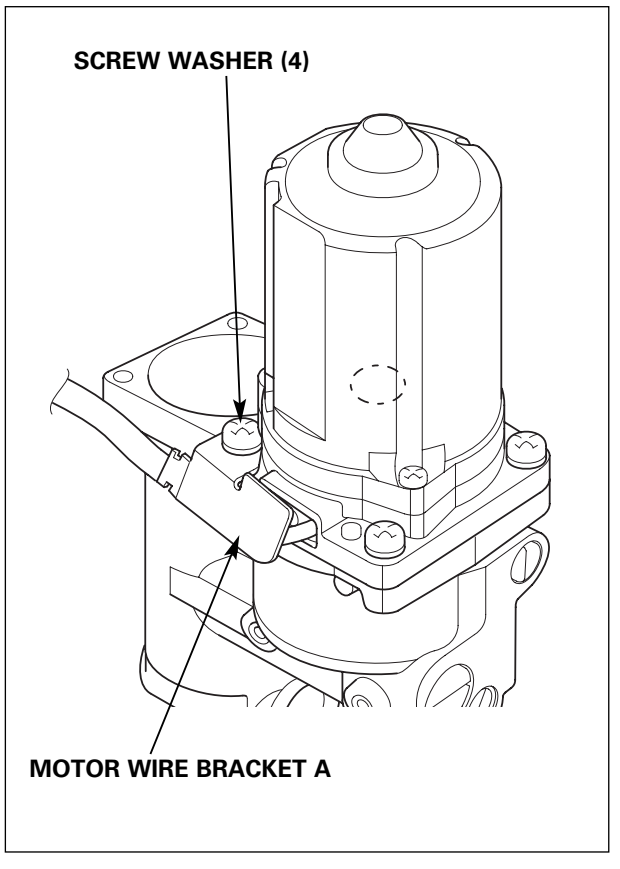
- Install the power tilt motor with the power tilt motor wire in the direction shown.



45) Tighten the four screw washers to the specified torque.

- Install and tighten motor wire bracket A in the position shown.

TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)



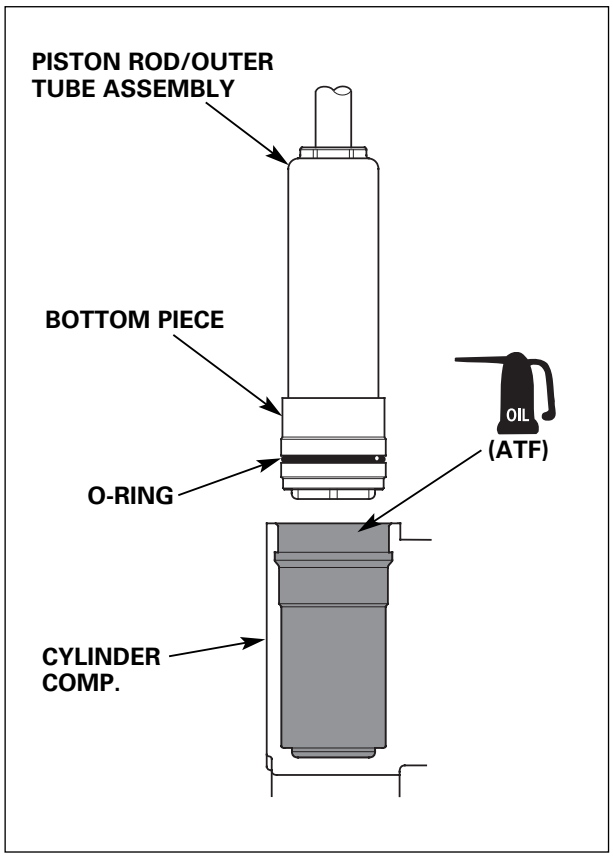
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-30

46) Apply ATF to a new O-ring and install it on the bottom piece.

47) Pour the fresh ATF into the cylinder comp. slowly taking care not to produce any foam. Fill to the top of the cylinder comp.

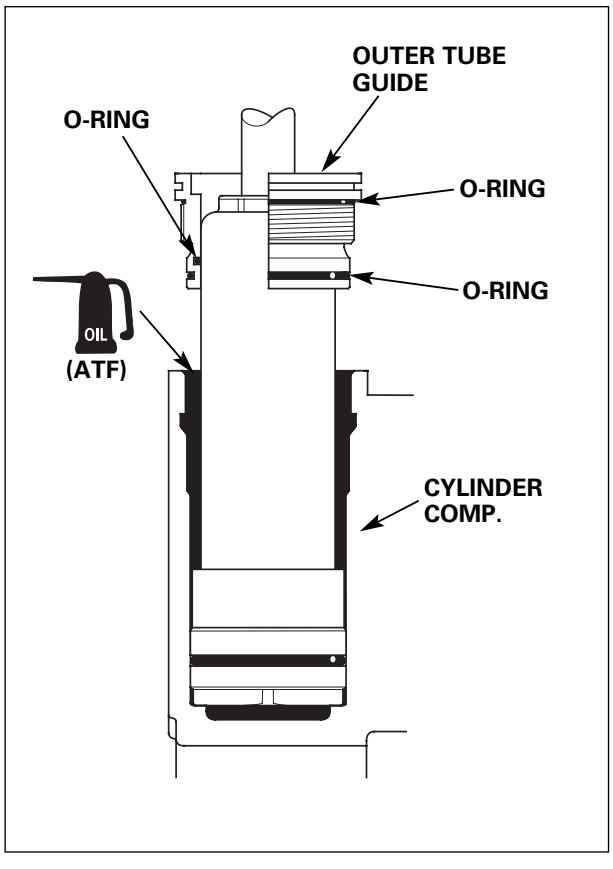
48) Install the piston rod/outer tube assembly on the cylinder comp.



49) Apply ATF to a new O-ring and install it on the outer tube guide.

50) Top off the cylinder comp. with fresh ATF taking care not to produce any foam.

51) Apply ATF to the outer surface of the outer tube, and install the outer tube guide.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-31

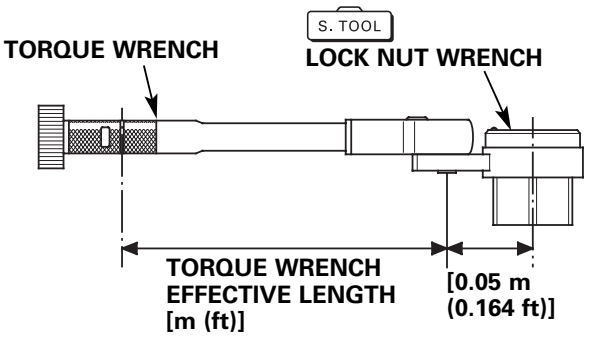
52) Tighten the outer tube guide to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

NOTICE

To tighten the outer tube guide, use the special tool and read the torque as follows.

TOOL:
Lock nut wrench 070PA-ZW40100



• Formula:

$$\text{Torque wrench reading} = \frac{\text{Torque wrench effective length [m (ft)]} \times \text{Specified torque [N·m (kgf·m, lbf·ft)]}}{\text{Torque wrench effective length [m (ft)]} + 0.05\ \text{[m (0.164 ft)]}}$$

• Example:
Torque wrench reading using a torque wrench with an effective length of 0.4 m (1.31 ft)

$$\frac{0.4\ \text{[m (1.31 ft)]} \times 88\ \text{[N·m (9.0 kgf·m, 65 lbf·ft)]}}{0.4\ \text{[m (1.31 ft)]} + 0.05\ \text{[m (0.164 ft)]}} = 78\ \text{[N·m (8.0 kgf·m, 58 lbf·ft)]}$$

53) Tighten the manual valve to the specified torque.

TORQUE: 1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)

54) Apply ATF to a new oil seal and install it in the groove in the oil tank.
Do not damage the oil seal during installation.

55) Apply ATF to a new O-ring and install it on the outer tube guide.

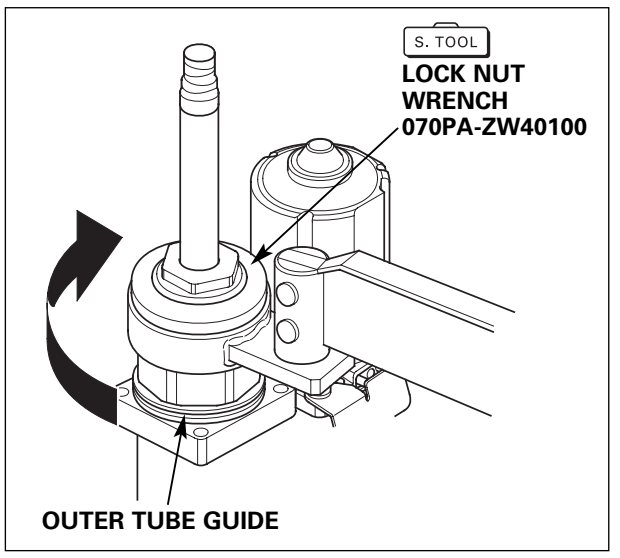
56) Apply ATF to the piston rod, and install the oil tank while turning it.
Do not damage the oil seal during installation.

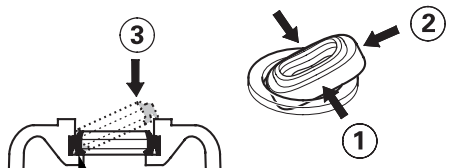
57) Set the oil tank in the direction shown, and tighten the 5 mm socket bolts to the specified torque.

• Install and tighten motor wire bracket B in the position shown.

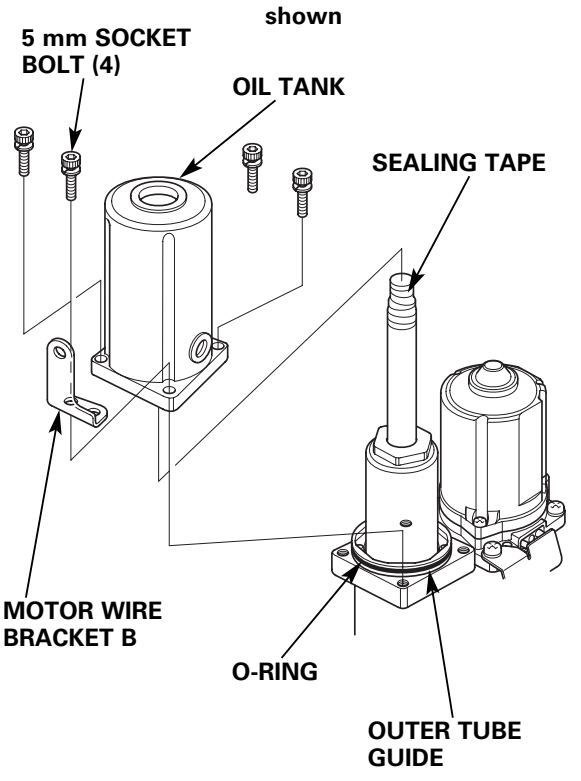
TORQUE: 4.7 N·m (0.5 kgf·m, 3.5 lbf·ft)

58) Remove the sealing tape from the threads at the end of the piston rod.





① Squeeze the seal; then ② push it in one side, then ③ work it round the groove in the tank as shown



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-32

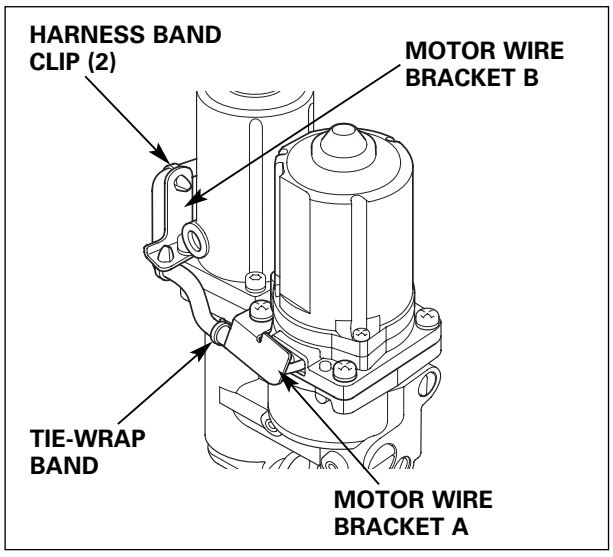
59) Clamp the motor wire on motor wire bracket A using a tie-wrap band.

- If a new tie-wrap band is used, cut off the excess of the band at 3 — 5 mm (0.1 — 0.2 in) from the fastener end.

60) Clamp the motor wire at the two points on motor wire bracket B using the harness band clips.

- If a new harness band clip is used, cut off the excess of the band at 3 — 5 mm (0.1 — 0.2 in) from the fastener end.

61) Perform air bleeding (P. 14-33) and hydraulic pressure inspection (P. 14-36) after assembly.

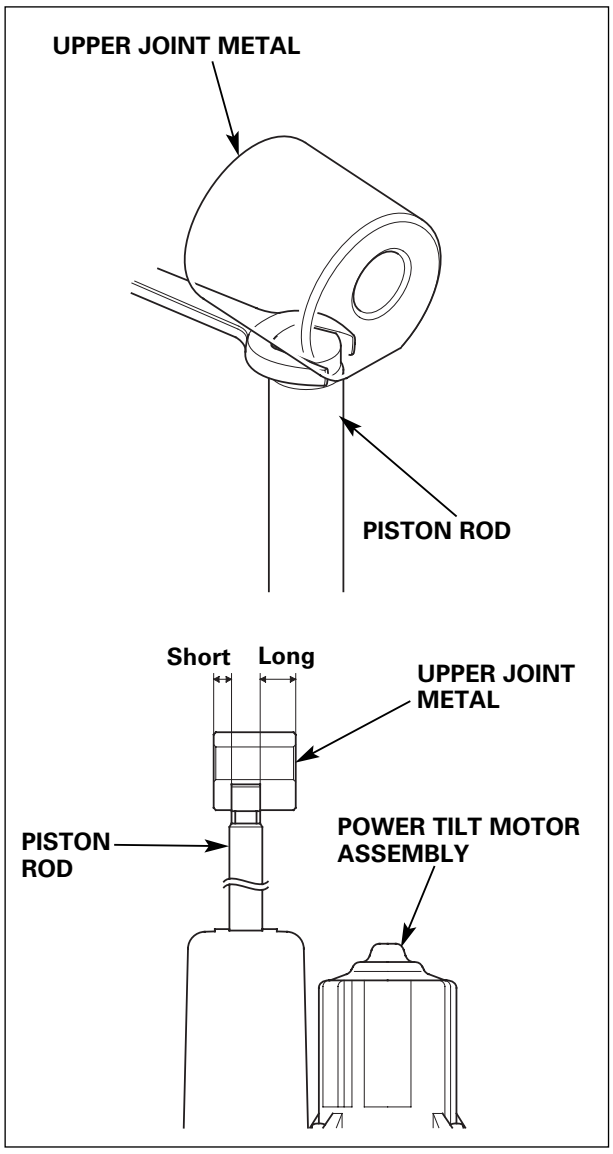


62) Apply thread locking agent (LOCTITE® 271 or equivalent) to the threads at the end of the piston rod.

63) Holding the piston rod with a wrench, tighten the upper joint metal to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)

After tightening the upper joint metal to the specified torque, position the upper joint metal so that the longer side between the end of the upper joint metal and the piston rod is toward the power tilt motor assembly as shown.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-33

g. AIR BLEEDING

<With the unit removed from the outboard motor>

- Bleed air from the unit whenever the power trim/tilt assembly is reassembled.
- Perform air bleeding in the following sequence:
  - Air bleeding with the unit removed from the outboard motor
  - Hydraulic pressure inspection
  - Air bleeding with the unit mounted on the outboard motor

Connect the battery cables to the power tilt motor 2P connector terminals.

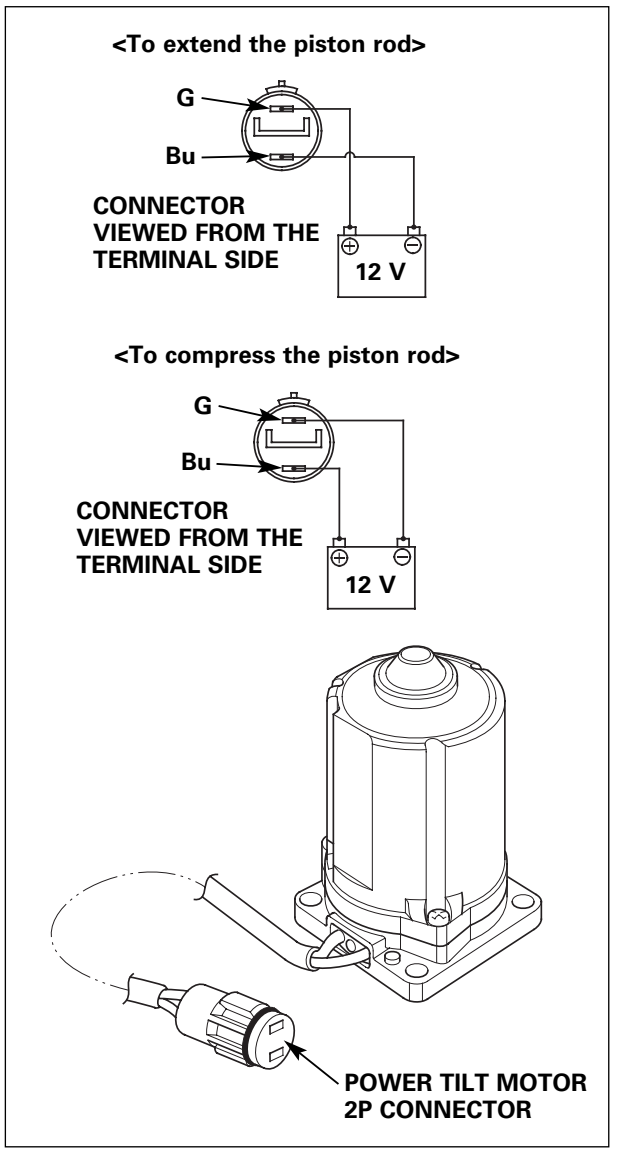
<To extend the piston rod>
Connect the battery positive (+) cable to the green terminal of the 2P connector, and the battery negative (–) cable to the blue terminal.

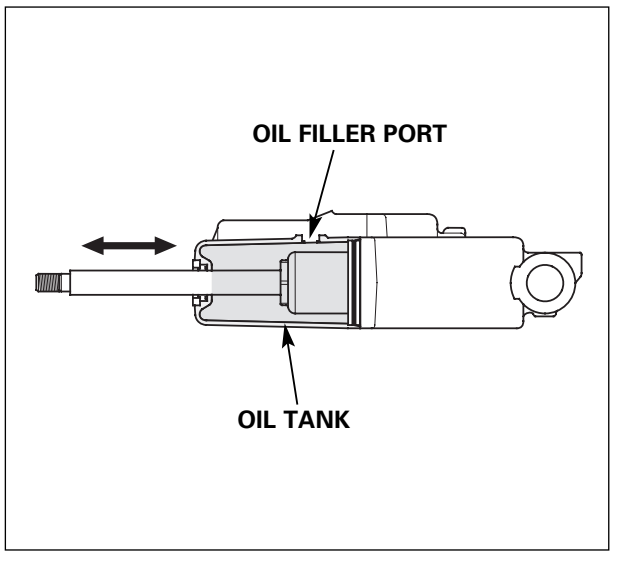
<To compress the piston rod>
Connect the battery negative (–) cable to the green terminal of the 2P connector, and the battery positive (+) cable to the blue terminal.

NOTICE

Connect the battery cables to the power tilt motor 2P connector terminals with care not to short-circuit the connector.

1) Place the power trim/tilt assembly on its side with the oil filler port toward up.
2) Check that the manual valve is loosened. Using a syringe, slowly add ATF (automatic transmission fluid) into the oil tank until it is full. Be sure to pour the ATF through the oil filler port slowly so it does not produce foam.
3) After filling, tighten the manual valve securely.
   - Leave the oil filler port open at this time.
4) Connect the battery cables to the power tilt motor 2P connector terminals and fully extend the piston rod. (Perform <To extend the piston rod> shown above.)
   - While extending the piston rod, pour ATF through the oil filler port to keep the oil tank full.
5) Connect the battery cables to the power tilt motor 2P connector terminals and fully compress the piston rod. (Perform <To compress the piston rod> shown above.)
   - Let the ATF flow out the oil filler hole.
6) Repeat the step 4 and 5 several times.
   - Repeat the procedure until the piston rod moves smoothly.
7) After checking that the piston rod moves smoothly, connect the battery cables to the power tilt motor 2P connector terminals to fully extend the piston rod. (Perform <To extend the piston rod> shown above.)
   - While extending the piston rod, pour ATF through the oil filler port to keep the oil tank full.





© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-34

8) Hold the power trim/tilt assembly upright with the piston rod fully extended, and bring the ATF level to the edge of the oil filler port. Loosely tighten the oil tank cap.

   Set the power trim/tilt assembly on its side with the oil filler port toward up.

   Hold the power trim/tilt assembly upright again, and remove the oil tank cap.
   Check that ATF flows out of the oil filler port.

   If it does not, add ATF with a syringe or equivalent until it flows out of the oil filler port.

9) Repeat the step 8 several times and check that the ATF flows out of the oil filler port. Loosely tighten the oil tank cap.

10) Connect the battery cables to the power tilt motor terminals and repeat fully compressing and extending the piston rod two or three times (P. 14-33).

    Hold the power trim/tilt assembly upright with the piston rod fully extended, and check the ATF level.

    - Check the ATF level with the piston rod fully extended.
    - Note that the ATF will spurt out if the oil tank cap is removed with the piston rod fully compressed.

11) Connect the battery cables to the power tilt motor 2P connector terminals again to fully extend the piston rod. (Perform <To extend the piston rod> on P. 14-33.)

12) Remove the oil tank cap and check the ATF level. If the level is low, add ATF with a syringe or equivalent until it flows out of the oil filler port.

    - Check the ATF level with the piston rod fully extended.
    - Note that the ATF will spurt out if the oil tank cap is removed with the piston rod fully compressed.

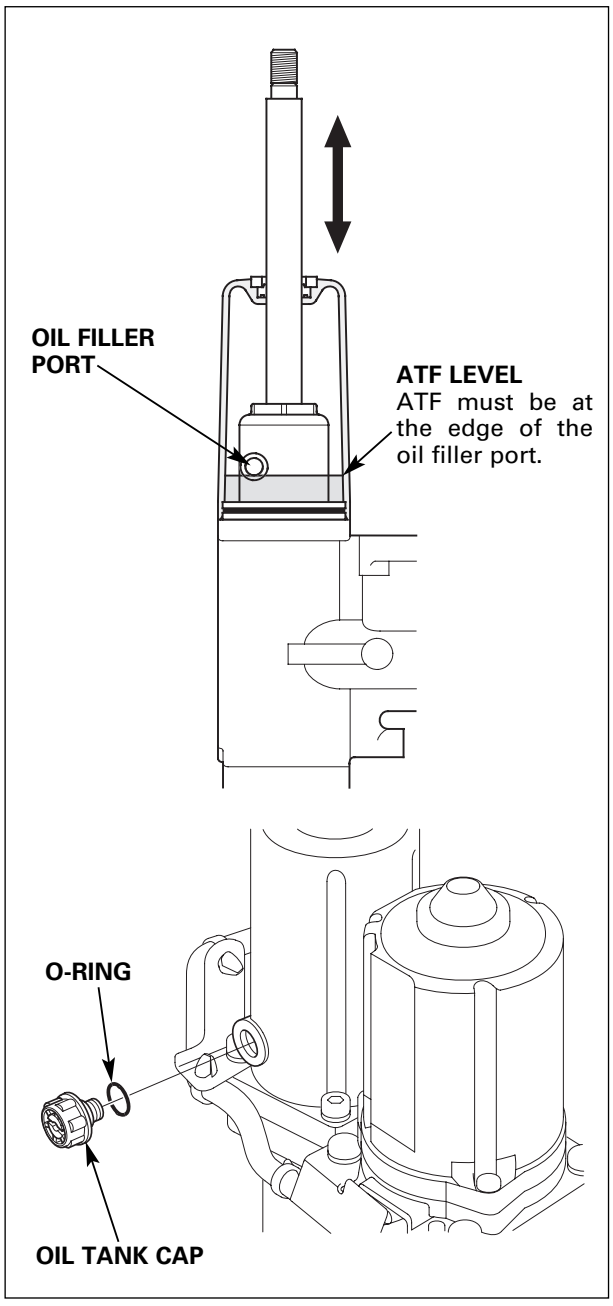
13) Repeat the procedure from the step 10 through the step 12 several times and check that the ATF flows out of the oil filler port. Loosely tighten the oil tank cap.

14) Install a new O-ring on the oil tank cap, and tighten the oil tank cap to the specified torque.

    TORQUE: 1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

15) Thoroughly wipe up any ATF spilled from the cylinder comp.. Operate the power tilt motor and check that the piston rod moves smoothly.

16) Perform hydraulic pressure inspection (P. 14-36).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-35

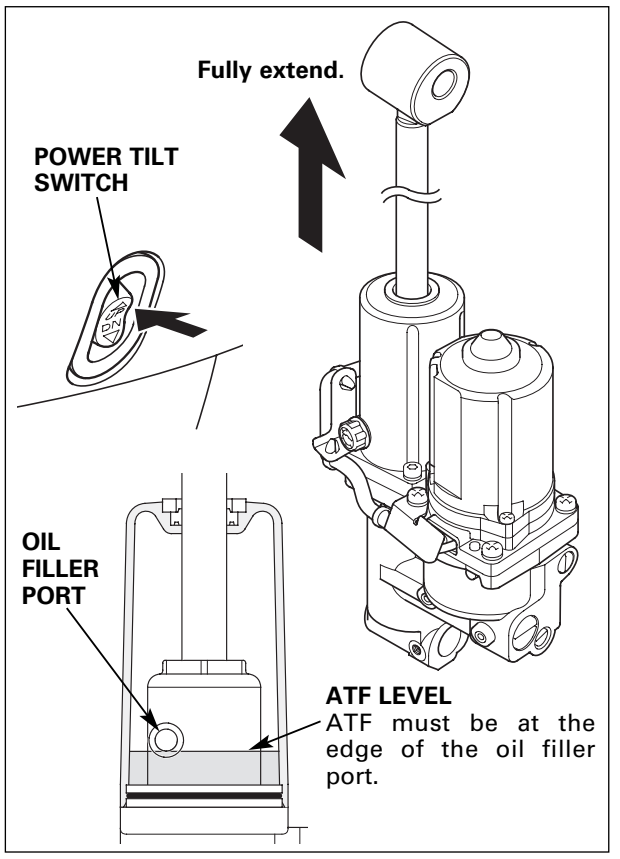
<With the unit mounted on the outboard motor>
Perform the following procedure after bleeding air with the unit removed from the outboard motor (P. 14-33) and hydraulic pressure inspection (P. 14-36).

1) Install the power tilt/trim assembly on the outboard motor (P. 14-39).

   Push the "UP" side of the power tilt switch to raise the outboard motor to the uppermost position.

2) Remove the oil tank cap, and check that the ATF level is at the edge of the oil filler port.

   If the ATF does not flow out of the oil filler port, add ATF until it flows out.



3) Lower the outboard motor slowly to the lowermost position by loosening the manual valve.

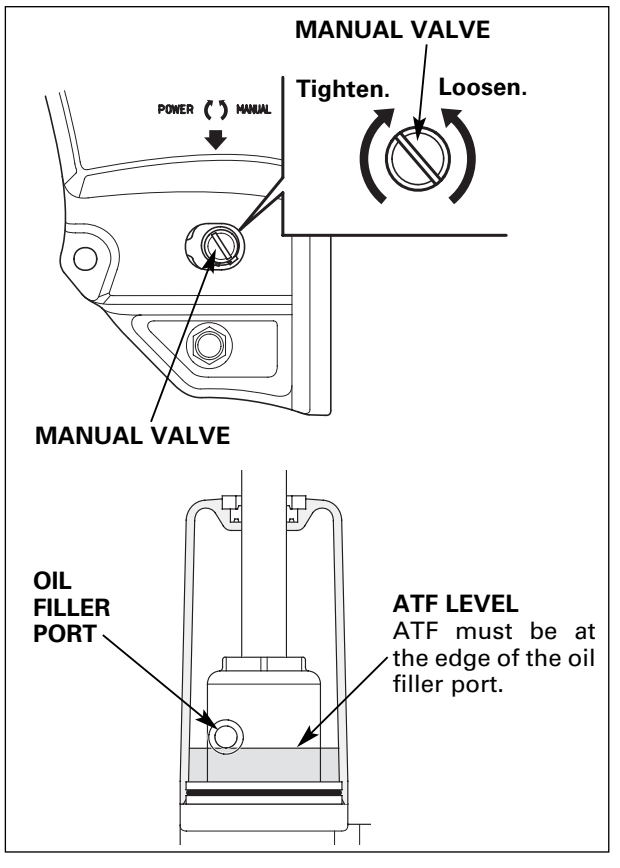
4) Tighten the manual valve securely.

   Hold the outboard motor in the lowermost position for five minutes.

5) Push the "UP" side of the power tilt switch to raise the outboard motor to the uppermost position.
   Hold the outboard motor in the uppermost position for five minutes.
   Remove the oil tank cap and check that the ATF level is at the edge of the oil filler port.
   Check that the milky color ATF (bubbles in the ATF) does not flow out of the oil filler port.

   - Check the ATF level with the piston rod fully extended.
   - Note that the ATF will spurt out if the oil tank cap is removed with the piston rod fully compressed.

6) Repeat the procedure from the step 3 through the step 5 several times.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-36

h. HYDRAULIC PRESSURE INSPECTION

- Perform hydraulic pressure inspection after bleeding air with the unit removed from the outboard motor.
- When the power trim/tilt assembly has been disassembled and reassembled, perform hydraulic pressure inspection before installation.
- When the power trim/tilt assembly is mounted on the outboard motor, remove the power trim/tilt assembly.
- Perform the following before starting the hydraulic pressure inspection.

- Connect the battery cables to the power tilt motor 2P connector terminals in the same manner as described under AIR BLEEDING.
- Operate the piston rod of the power trim/tilt assembly several times, then fully extend the piston rod.
- Check the ATF level with the piston rod fully extended (P. 14-34).
- Perform UPPER CHAMBER SIDE HYDRAULIC PRESSURE INSPECTION and LOWER CHAMBER SIDE HYDRAULIC PRESSURE INSPECTION using the special tools .

TOOLS:

Gauge joint A (Upper chamber side)	**070PJ-V15A100**
Gauge joint B (Lower chamber side)	**070PJ-V15A200**

• LOWER CHAMBER SIDE HYDRAULIC PRESSURE INSPECTION

1) Remove the internal circlip and the manual valve from the cylinder comp.

   - The ATF will spurt out when the manual valve is removed unless the piston rod is fully extended. Be sure to fully extend the piston rod before removing the manual valve.
   - A small quantity of ATF will flow out when the manual valve is removed. Install the special tool (gauge joint B) quickly.

2) Install the special tool (gauge joint B) and tighten it to the specified torque to measure the lower chamber side hydraulic pressure.

   TORQUE: 1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)

   TOOL:

Gauge joint B (Lower chamber side)	**070PJ-V15A200**

   - Take care not to move the seal washer out of position or collapse it inside the cylinder comp.

3) Install the special tool (pressure gauge 10000 PSI) on the special tool (gauge joint B).

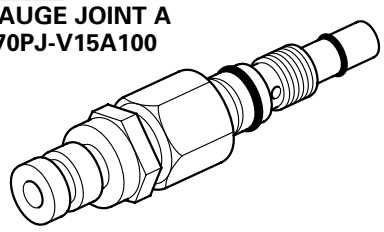
   TOOL:

Pressure gauge 10000 PSI	**07APJ-ZW4A100**

4) Check the ATF level with the piston rod fully extended. It must be at the edge of the oil filler port.

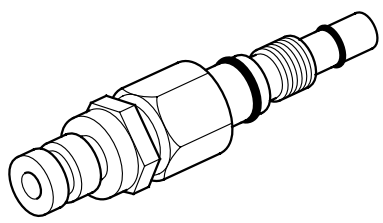
For upper chamber side:

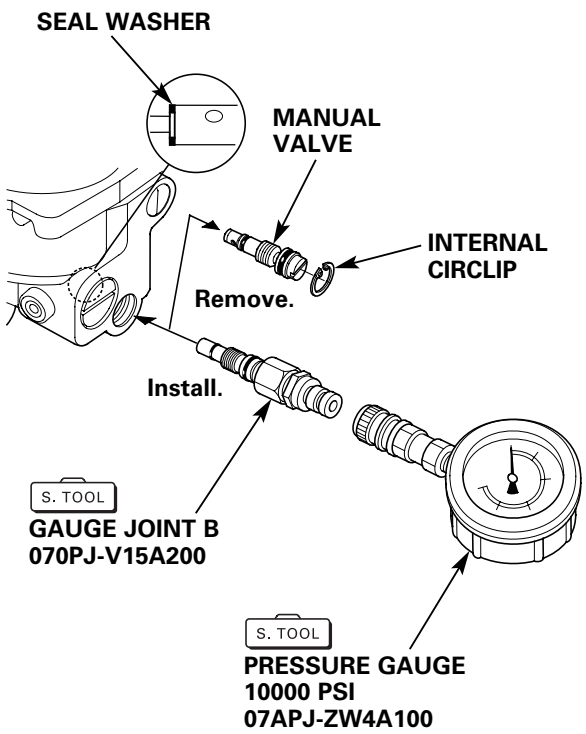
S. TOOL
GAUGE JOINT A
070PJ-V15A100



For lower chamber side:

S. TOOL
GAUGE JOINT B
070PJ-V15A200





Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-37

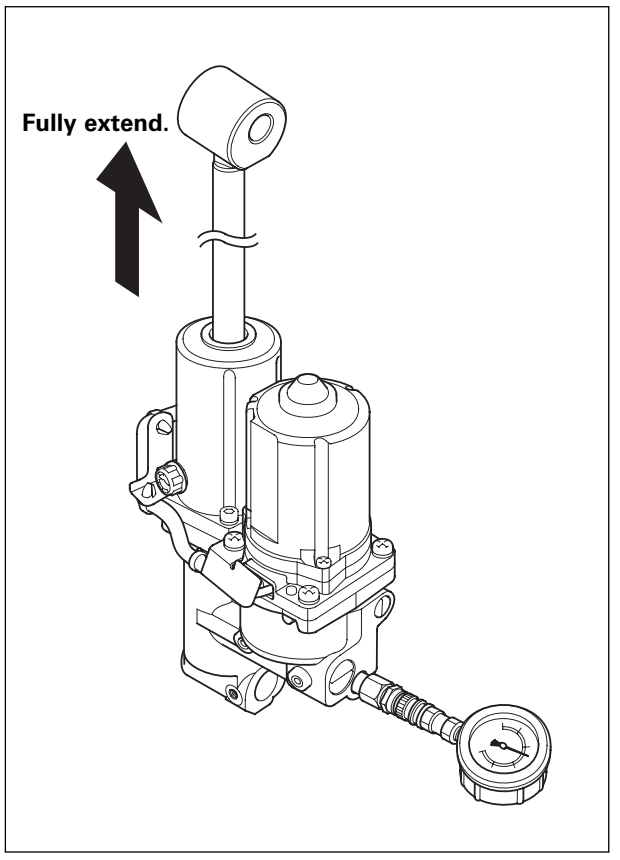
5) Connect the battery cables to the power tilt motor 2P connector terminals to fully compress the piston rod once. (Perform <To compress the piston rod> on P. 14-33.)

6) Connect the battery cables to the power tilt motor 2P connector terminals to fully extend the piston rod again. (Perform <To extend the piston rod> on P. 14-33.)
Read the pressure gauge to measure the lower chamber side hydraulic pressure with the piston rod fully extended.

Lower chamber hydraulic pressure	19.3 – 23.0 MPa (197 – 235 kgf/cm², 2,802 – 3,342 psi)

- If the measurement is outside the specification, check the power trim/tilt assembly for oil leakage.
- If the oil is not leaking but the hydraulic pressure dropped sharply below the specification, oil can be leaking through the oil seal inside the power tilt motor assembly. Disassemble the power tilt motor assembly (P. 14-46) and check it, then measure the lower chamber hydraulic pressure again (P. 14-36).

7) Measure the upper chamber side hydraulic pressure.



• UPPER CHAMBER SIDE HYDRAULIC PRESSURE INSPECTION

1) After measuring the lower chamber hydraulic pressure, remove the special tool (gauge joint B) with the piston rod fully extended and replace it with the special tool (gauge joint A).
Tighten the special tool (gauge joint A) to the specified torque.

TORQUE: 1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)

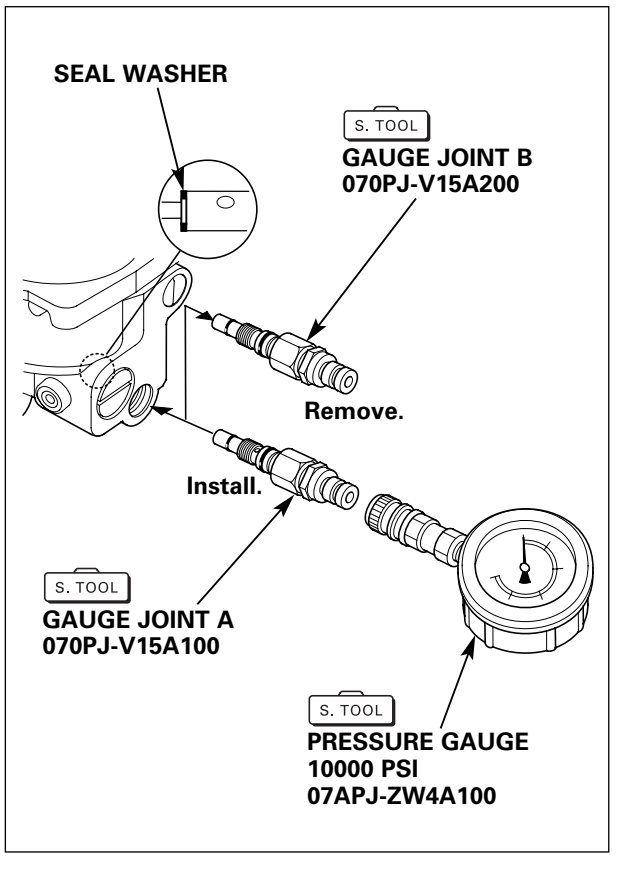
TOOLS:
Gauge joint A (Upper chamber side) 070PJ-V15A100
Gauge joint B (Lower chamber side) 070PJ-V15A200

- The ATF will spurt out when the special tool (gauge joint B) is removed unless the piston rod is fully extended. Be sure to fully extend the piston rod before removing the special tool (gauge joint B).
- A small quantity of ATF will flow out when the special tool (gauge joint B) is removed. Install the special tool (gauge joint A) quickly.
- Take care not to move the seal washer out of position or collapse it inside the cylinder comp.

2) Install the special tool (pressure gauge 10000 PSI) to the special tool (gauge joint A).

TOOL:
Pressure gauge 10000 PSI 07APJ-ZW4A100

3) Check the ATF level with the piston rod fully extended (P. 14-34).
It must be at the edge of the oil filler port.



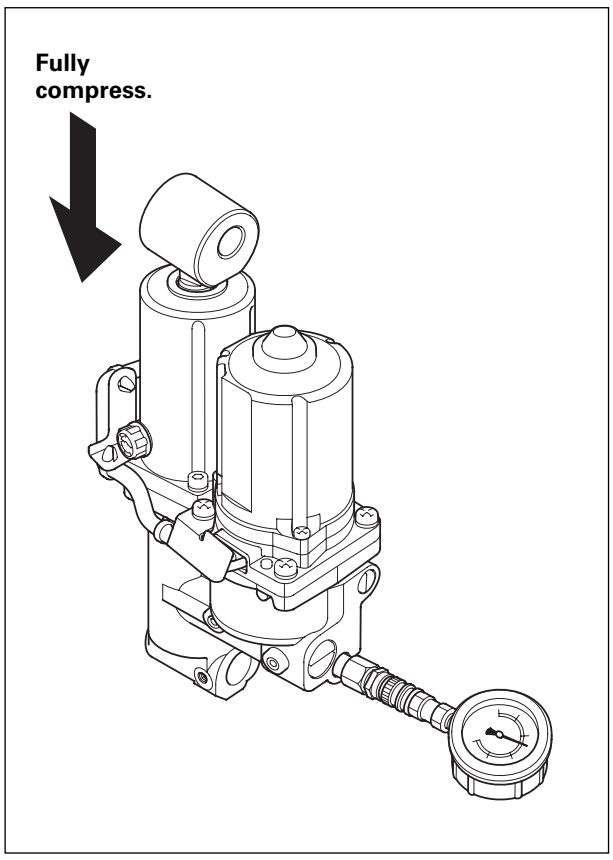
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-38

4) Connect the battery cables to the power tilt motor 2P connector terminals to fully compress the piston rod. (Perform <To compress the piston rod> on P. 14-33.)
Read the pressure gauge to measure the upper chamber side hydraulic pressure with the piston rod fully compressed.

Upper chamber hydraulic pressure	27.9 – 34.8 MPa (285 – 355 kgf/cm², 4,054 – 5,049 psi)

- If the measurement is outside the specification, check the power trim/tilt assembly for oil leakage.
- If the oil is not leaking but the hydraulic pressure dropped sharply below the specification, oil can be leaking through the oil seal inside the power tilt motor assembly. Disassemble the power tilt motor assembly (P. 14-46) and check it, then measure the upper chamber side hydraulic pressure again (P. 14-37).



5) Connect the battery cables to the power tilt motor 2P connector terminals to fully extend the piston rod. (Perform <To extend the piston rod> on P. 14-33.) Hold the piston rod fully extended.

6) Remove the special tool (gauge joint A) and the special tool (pressure gauge 10000 PSI), and install the seal washer, manual valve and the internal circlip as shown.

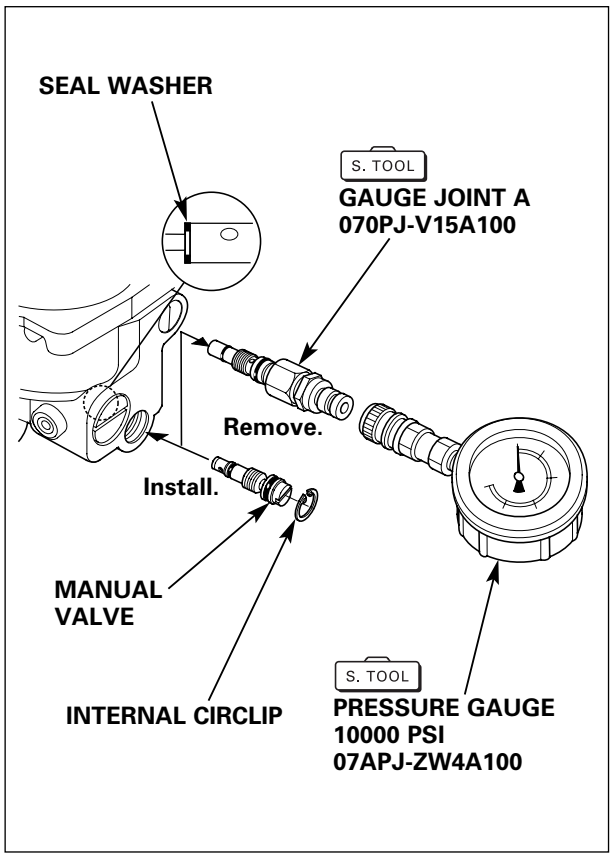
TOOL:
Gauge joint A (Upper chamber side) 070PJ-V150100

- The ATF will spurt out when the special tool (gauge joint A) is removed unless the piston rod is fully extended. Be sure to fully extend the piston rod before removing the special tool (gauge joint A).
- A small quantity of ATF will flow out when the special tool (gauge joint A) is removed. Install the manual valve quickly.
- Take care not to move the seal washer out of position or collapse it inside the cylinder comp.

7) Tighten the manual valve to the specified torque.

TORQUE: 1.7 N·m (0.2 kgf·m, 1.3 lbf·ft)

8) Check the ATF level with the piston rod fully extended (P. 14-34).
It must be at the edge of the oil filler port.
If the ATF level is low, add ATF to the specified level.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-39

i. INSTALLATION

Raise the swivel case assembly to the uppermost position.

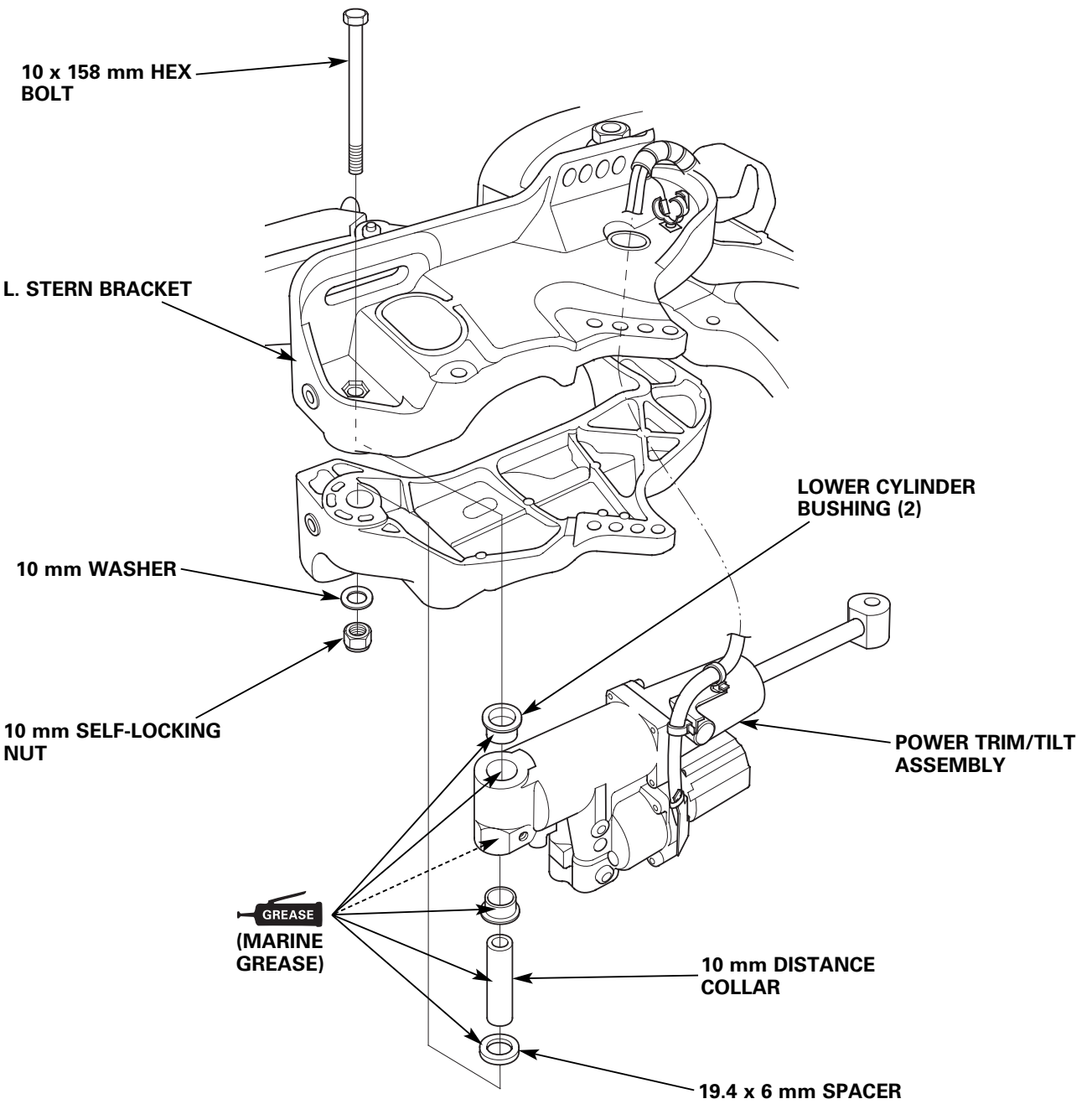
1) When the lower cylinder bushings have been removed from the power trim/tilt assembly, apply marine grease to the outer surface of the new lower cylinder bushings and install them on the power trim/tilt assembly.

2) Pass the power tilt motor wire and the trim angle sensor wire through the hole in the L. stern bracket.

3) Apply marine grease to the outer surface of the 10 mm distance collar and to the entire surface of the 19.4 x 6 mm spacer.
Raise the L. stern bracket and install the 10 mm distance collar of the power trim/tilt assembly in the L./R. stern brackets.

4) Install the 10 x 158 mm hex bolt and the 10 mm washer, and loosely tighten the 10 mm self-locking nut.

   • Loosely tighten the 10 mm self-locking nut so it does not come out of the 10 x 158 mm hex bolt.



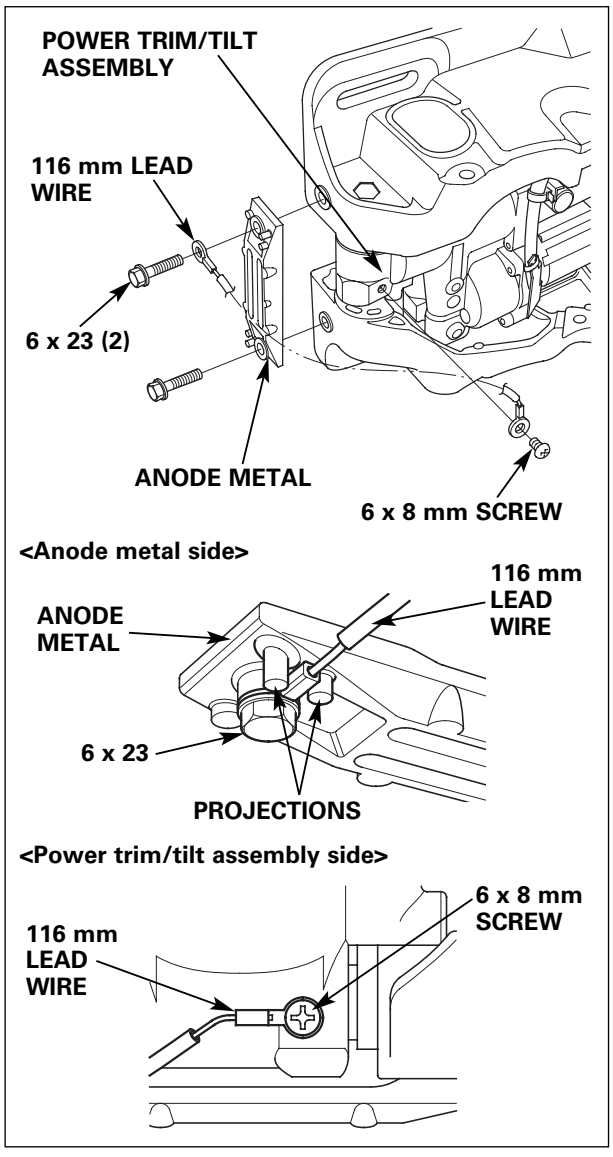
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-40

5) Check the anode metal for corrosion. Replace the anode metal with a new one if it is corroded excessively.

6) Set the 116 mm lead wire between the projections on the anode metal as shown, and install the anode metal with the two 6 x 23 mm flange bolts securely.

7) Tighten the 6 x 8 mm screw securely so that the 116 mm lead wire on the power trim/tilt assembly side is installed at the angle shown.



8) While holding the 7/8-14 UNF self-locking nut on the R. stern bracket side, tighten the 7/8-14 UNF self-locking nut on the L. stern bracket side to the specified torque.

   TORQUE: 40 N·m (4.1 kgf·m, 30 lbf·ft)

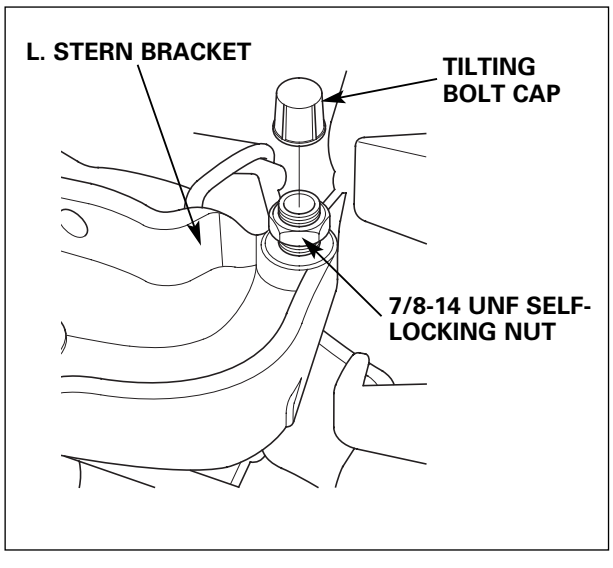
9) After tightening to the specified torque, loosen the 7/8-14 UNF self-locking nut on the L. stern bracket side by 180°—210°.

   After installing the 7/8-14 UNF self-locking nut, apply rust-preventive agent to the threads of the tilting shaft.

   Tighten the 10 mm self-locking nut of the 10 x 158 mm hex bolt to the specified torque (P. 14-39).

   TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)

   Install the tilting bolt cap.



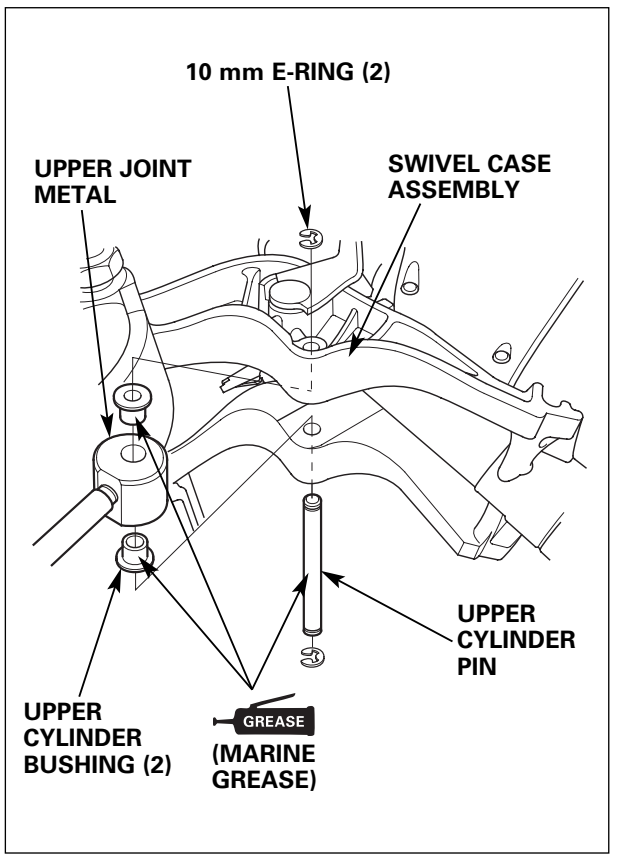
Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-41

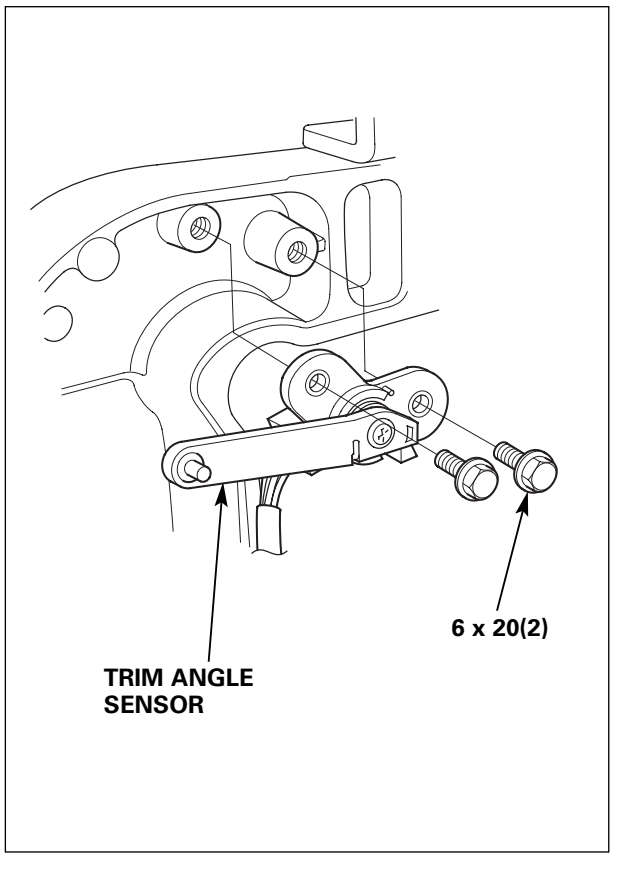
10) When the upper cylinder bushings have been removed from the power trim/tilt assembly, apply marine grease to the new upper cylinder bushings and install them on the upper joint metal.

11) Set the upper joint metal of the power trim/tilt assembly on the swivel case assembly.

    Apply marine grease to the outer surface of the upper cylinder pin. Insert the upper cylinder pin into the swivel case assembly and secure it with the 10 mm E-rings as shown.



12) Install the trim angle sensor using the two 6 x 20 mm flange bolts.



© Honda Motor Co., Ltd.

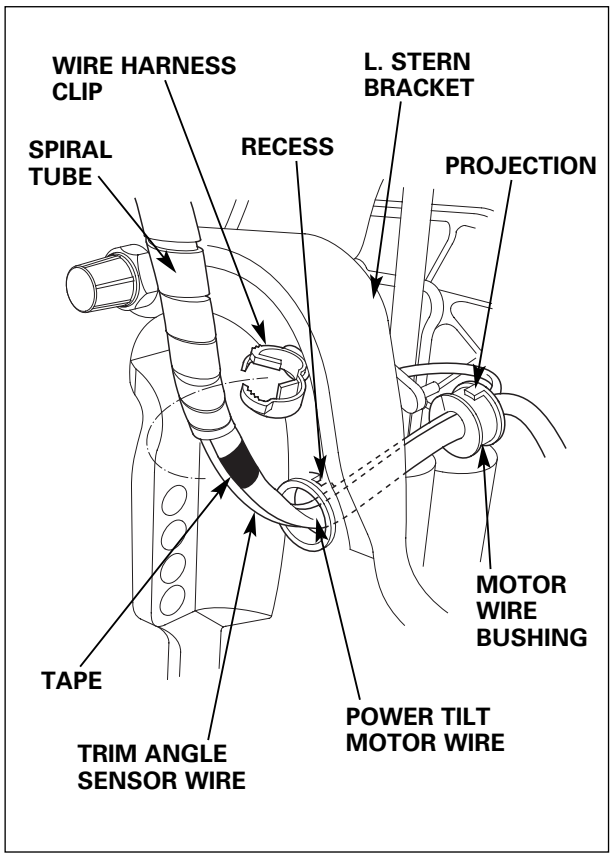
00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-42

13) Set the power tilt motor wire and the trim angle sensor wire in the motor wire bushing.

    Install the motor wire bushing on the L. stern bracket, aligning the projection on the motor wire bushing with the recess in the L. stern bracket.

    • Check that the power tilt motor wire and the trim angle sensor wire are not slack on the backside of the L. stern bracket.

14) Clamp the power tilt motor wire and the trim angle sensor wire at the taped part on the power tilt motor wire using the wire harness clip. Take care not to pinch the spiral tube.

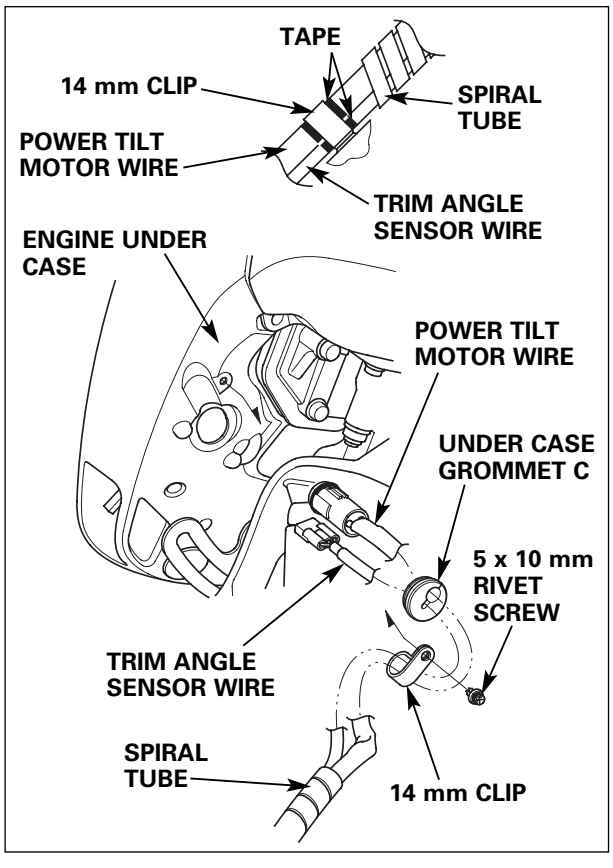


15) Pass the power tilt motor wire and the trim angle sensor wire through the hole in the engine under case.

    Route the power tilt motor wire and the trim angle sensor wire through under case grommet C, and install under case grommet C on the engine under case.

16) Set the trim angle sensor wire on the opening side of the 14 mm clip and set the power tilt motor wire on the inner side of the 14 mm clip as shown.

17) Set the 14 mm clip on the taped part of the power tilt motor wire and the trim angle sensor wire, and secure the clip to the engine under case using the 5 x 10 mm rivet screw as shown. Take care not to pinch the spiral tube.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-43

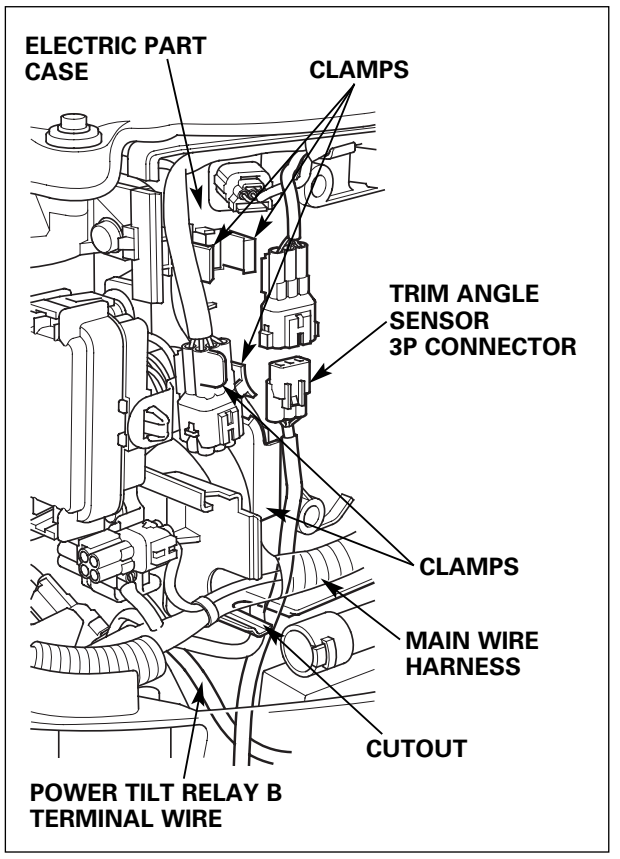
18) Route the trim angle sensor wire through the cutout in the electric part case.

While pulling the main wire harness toward you, route the trim angle sensor wire between the electric part case and the main wire harness.

- Route the trim angle sensor wire on your side of the power tilt relay B terminal wire.

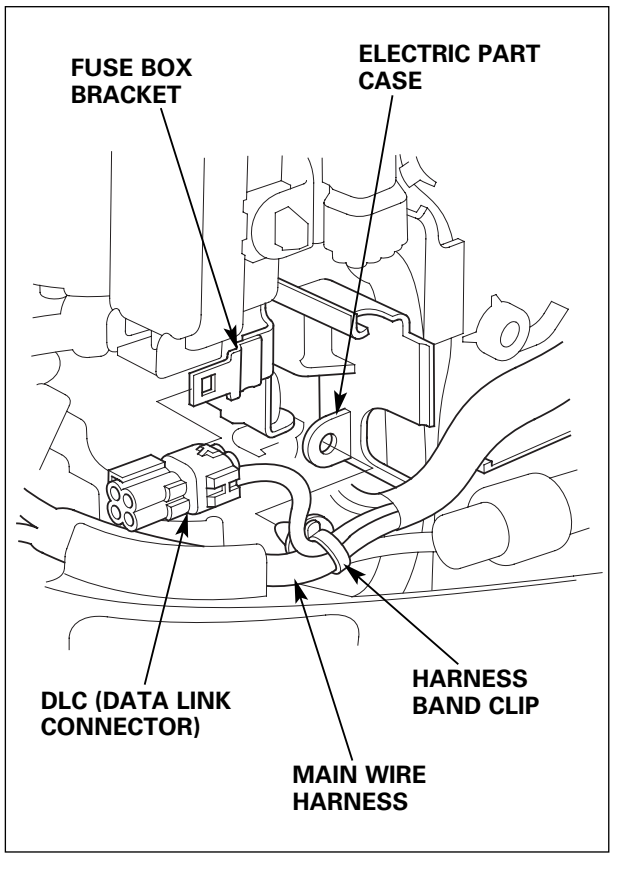
Set the trim angle sensor wire in the clamps of the electric part case.

Connect the trim angle sensor 3P connector, and install it on the electric part case.



19) Install the harness band clip of the main wire harness on the electric part case.

Install the DLC (data link connector) on the fuse box bracket.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-44

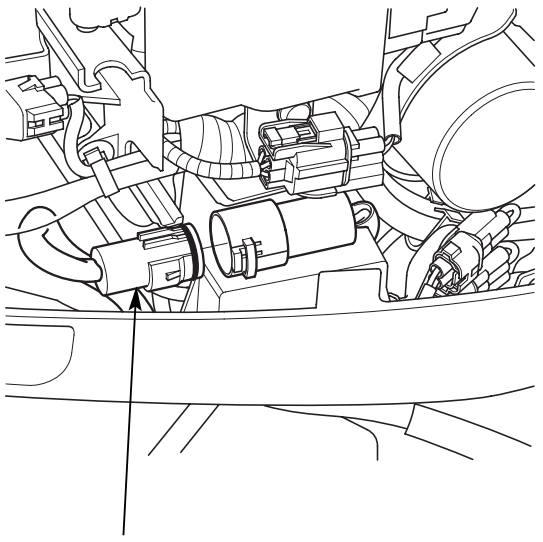
20) Connect the battery positive (+) cable to the green terminal of the power tilt motor 2P connector and the battery negative (–) cable to the blue terminal. Lower the swivel case assembly to the lowermost position (the piston rod of the power trim/tilt assembly is fully compressed).

21) After lowering the swivel case assembly to the lowermost position, disconnect the battery cables from the power tilt motor 2P connector terminals.

22) Connect the power tilt motor 2P connector.

23) Lift up the outboard motor with a hoist and install it on the boat.

24) Install the following parts.
- ECM (P. 7-19)
- Electric part cover (P. 18-19)
- Engine cover (P. 4-2)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-45

2. POWER TILT MOTOR [POWER TRIM/TILT TYPE ONLY]

a. REMOVAL

- Do not use a shop towel, cloth or gloves during removal.
- Do not reuse the drained ATF (automatic transmission fluid).
- Clean the removed parts in fresh ATF and blow each port of the parts with compressed air. Set the parts neatly in a suitable container with care not to contaminate them with lint, dust or dirt.
- Do not reuse the O-rings and oil seals.

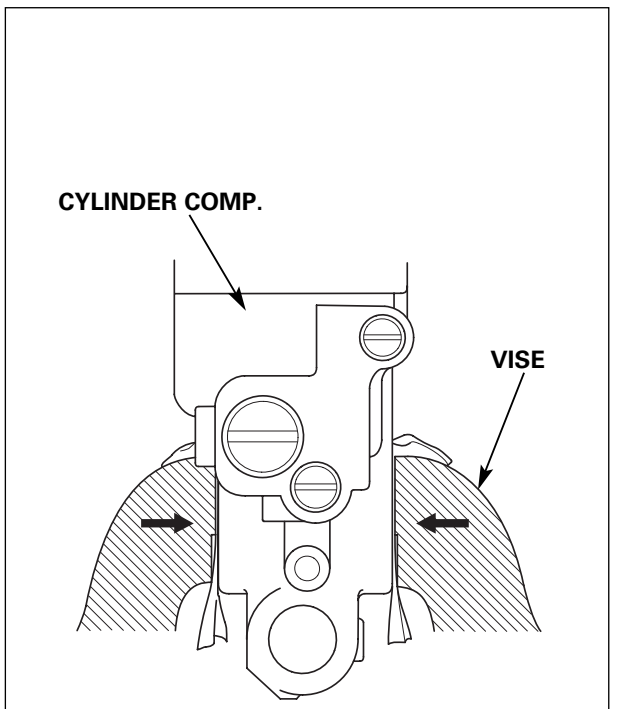
Check that the piston rod of the power trim/tilt assembly is fully extended.
If the piston rod has been pushed in, operate the motor assembly until the piston rod fully extends.

1) Remove the power trim/tilt assembly from the outboard motor (P. 14-2).

2) Hold the cylinder comp. in a vise.

NOTICE

When holding the cylinder comp. in a vise, do not tighten the vise excessively. The cylinder comp. can be damaged.



3) Open the tie-wrap band and the harness band clip to release the motor wire.

4) Remove the four screw washers, and remove the power tilt motor assembly and motor wire bracket A.

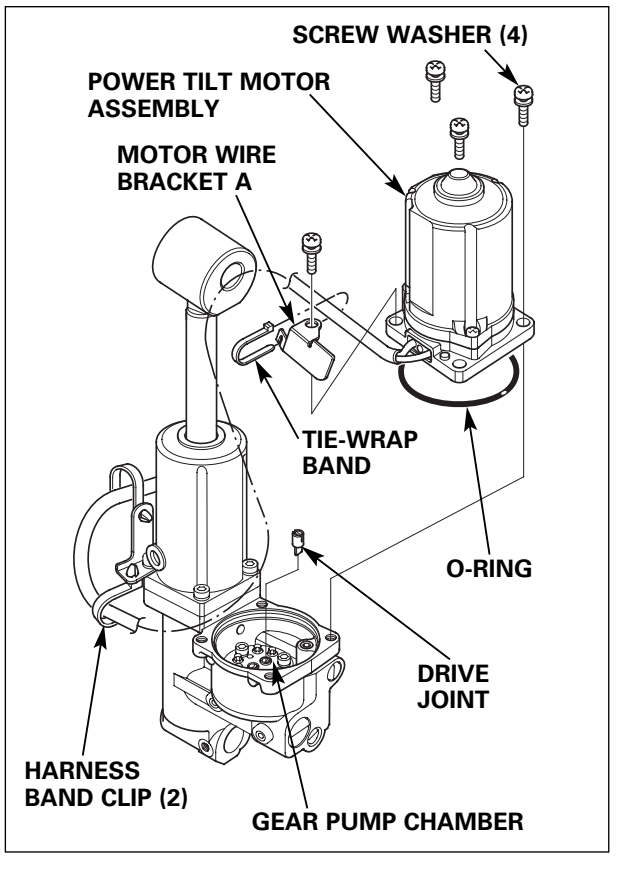
5) Drain the ATF (automatic transmission fluid) from the gear pump chamber.

   - Do not push the piston rod in during draining.

6) Remove the O-ring from the power tilt motor assembly. Replace the O-ring with a new one on reassembly.

7) Remove the drive joint from the gear pump assembly.

8) After removing the power tilt motor assembly, store the power tilt assembly in a clean vinyl bag or equivalent material to protect it from lint, dust and dirt.

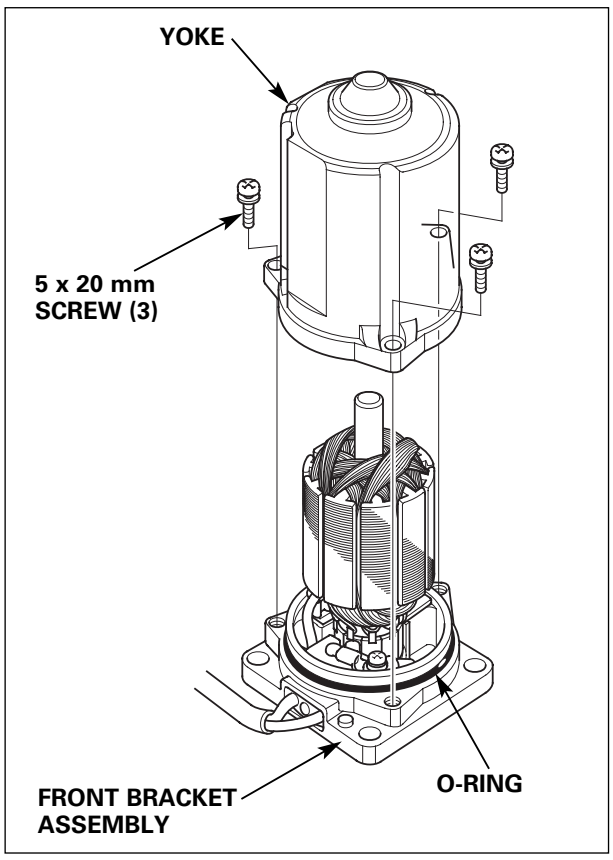


© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-46

b. DISASSEMBLY

1) Remove the three 5 x 20 mm screws, and remove the yoke and the O-ring.
   Replace the O-ring with a new one on reassembly.



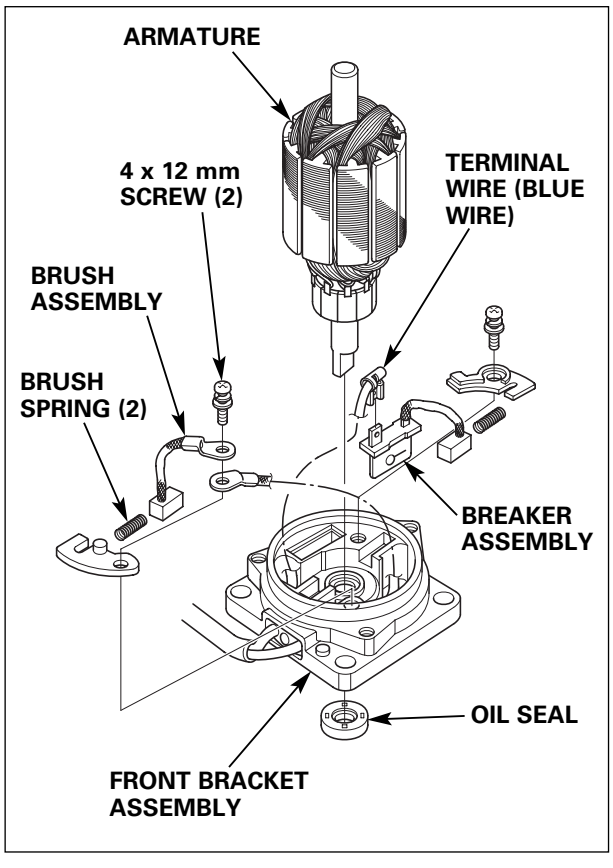
2) Remove the armature, and remove the brush springs.

3) Remove the 4 x 12 mm screw, and remove the brush assembly.

4) Disconnect the terminal wire (blue wire) from the breaker assembly.
   Remove the 4 x 12 mm screw, and remove the breaker assembly.

5) Check the oil seal for damage and replace it with a new one if necessary.
   Remove the oil seal. If necessary.

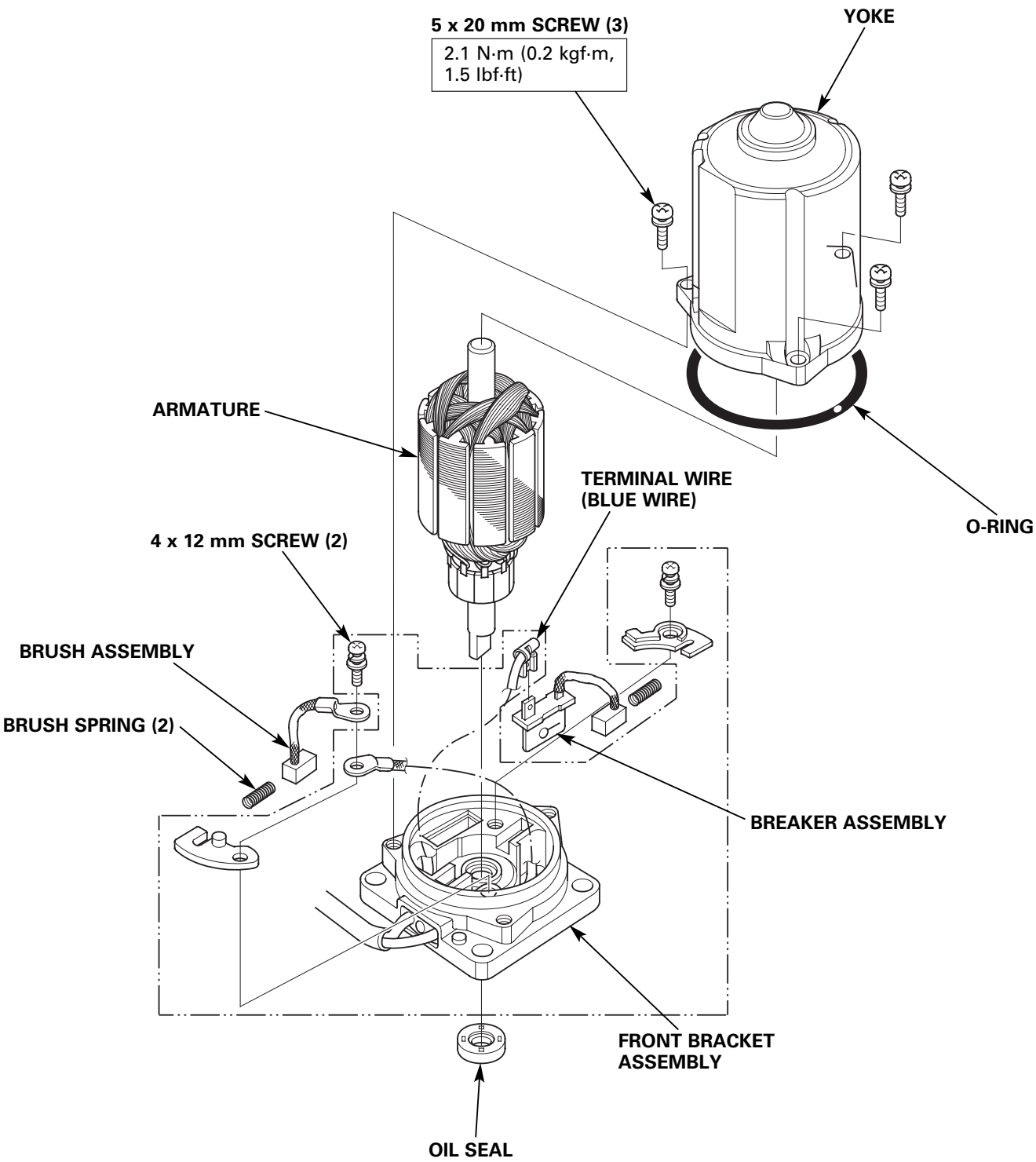
   • Always replace the oil seal with a new one if you have to remove it.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-47

c. COMPONENT DRAWING



© Honda Motor Co., Ltd.

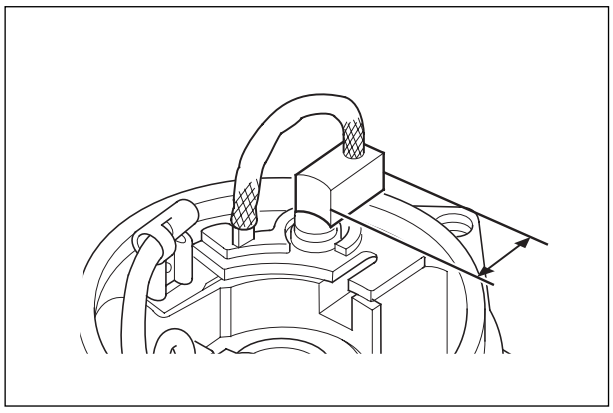
00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-48

d. INSPECTION

• BRUSH LENGTH

Measure the brush length.
If the measurement is less than the service limit, replace the breaker assembly and/or brush assembly.

Standard	Service limit
9.75 mm (0.384 in)	5.5 mm (0.22 in)

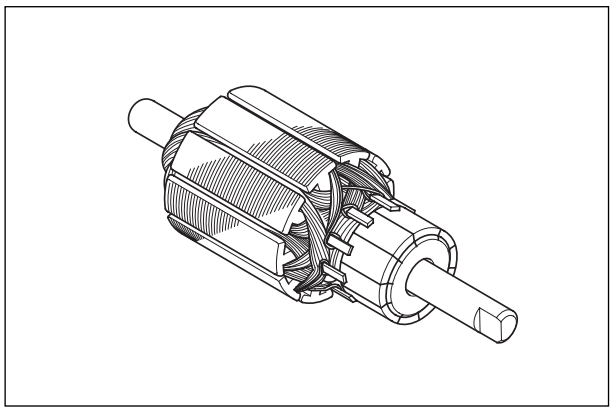


• ARMATURE

Check the armature for discoloration or damage, and replace it with a new one if necessary.

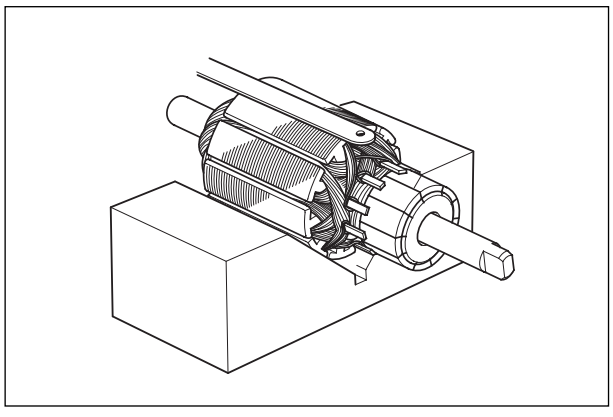
Check the armature shaft for burrs, and correct it with a fine emery paper if necessary.

Check the commutator surface for rust or damage, and correct it with a fine emery paper if necessary.



Armature short-circuit test using an armature tester:
Place the armature on a V-block type armature tester and hold a hacksaw blade close to the armature core.

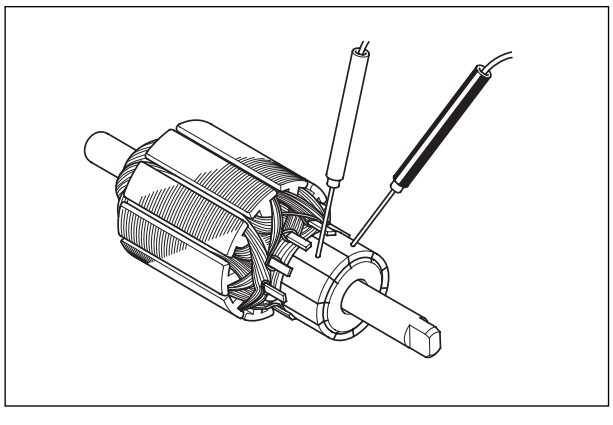
Check the armature by turning the core. If the hacksaw blade attaches to the core or if it vibrates, it indicates the short-circuit in the armature.
Replace the armature with a new one.



Test without using armature tester:

1) Check for continuity between the segments. If an open circuit exists between any two segments, replace the armature.

   • If the resistance between the given segments is extremely low compared to the resistance between the other segments, there can be a short-circuit between the segments caused by blockage with brush particles. Remove the brush particles and recheck. If the resistance is still extremely low, replace the armature with a new one.

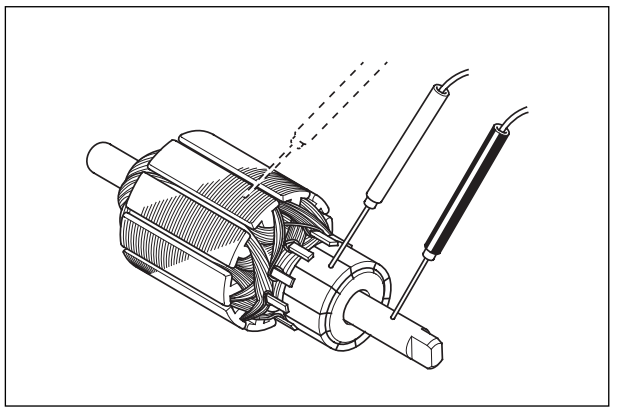


Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-49

2) Check for continuity between the armature core and the commutator. If there is continuity between any segments, replace the armature.

3) Check for continuity between the commutator and the shaft. If there is continuity between any segment and shaft, replace the armature.

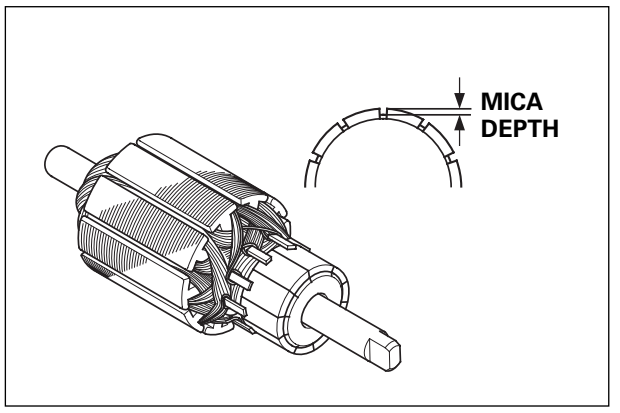


Commutator:

1) Check the commutator and clean it with a clean shop towel if necessary.

2) Measure the mica depth. If the measurement is less than the service limit, recut the groove using a hacksaw blade or small file and measure the mica depth again. If the measurement is still less than the service limit, replace the armature.

Service limit	1.3 mm (0.05 in)



• BREAKER ASSEMBLY

1) Install the breaker assembly and tighten the 4 x 12 mm screw.

2) Connect the terminal wire (blue wire) to the breaker assembly.

3) Install the brush assembly and tighten it with the 4 x 12 mm screw.

4) Set the brush spring on the front bracket.
While pushing the brush in, install the armature on the front bracket assembly with care not to damage the oil seal.

NOTICE

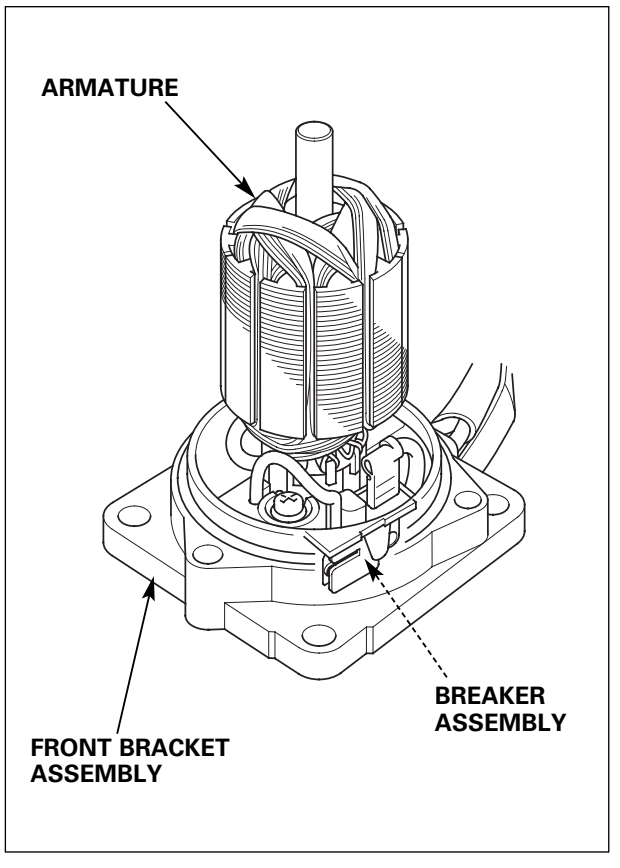
Install the armature on the front bracket assembly with care not to damage the brushes.

5) Connect the battery cables to the power tilt motor 2P connector terminals (P. 14-33).

NOTICE

Connect the battery cables to the power tilt motor 2P connector terminals with care not to short-circuit the connector.

6) Apply battery voltage to the power tilt motor and check the breaker assembly. The breaker assembly is normal if there is operation sound from it.
If there is no operation sound, replace the breaker assembly with a new one.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-50

e. REASSEMBLY

1) Apply grease to the oil seal lip.

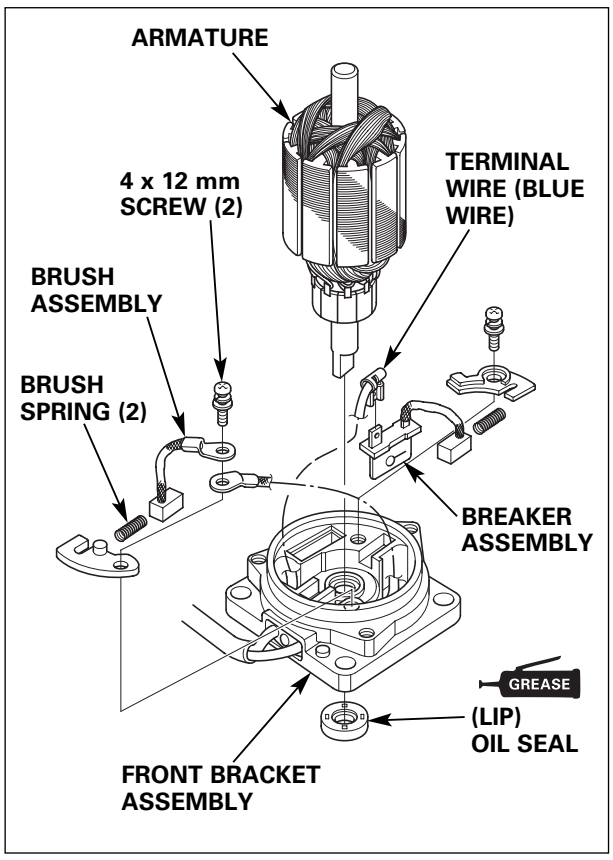
   • Check the oil seal lip. If it is cut or damaged, replace the front bracket assembly.

2) Install the breaker assembly and tighten the 4 x 12 mm screw.
   Connect the terminal wire (blue wire) to the breaker assembly.

3) Install the brush assembly and tighten it with the 4 x 12 mm screw.

4) Set the brush spring on the front bracket.
   While pushing the brush in, install the armature on the front bracket assembly with care not to damage the oil seal.

   • Check the armature shaft for burrs, and correct it with a fine emery paper if necessary.
   • Check that the brush springs are set properly.



5) Apply grease to a new O-ring, and install it on the front bracket assembly.

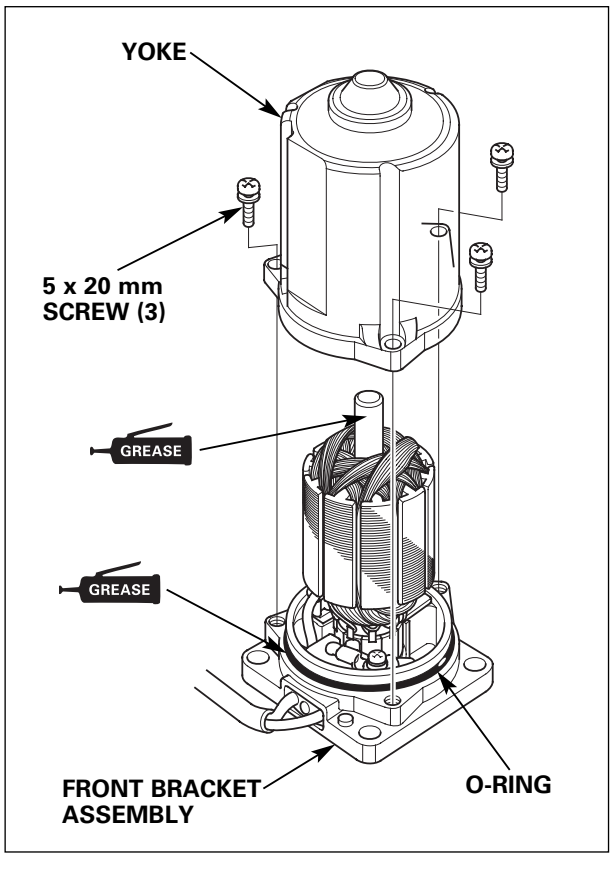
6) Check for foreign material (washer, etc.) on the magnetic part inside the yoke.

7) Apply grease to the end of the armature shaft, and install the yoke while holding the armature shaft.

8) Tighten the three 5 x 20 mm screws to the specified torque.

   TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)

9) After installation, tap the yoke lightly with a plastic hammer and check that the armature turns smoothly.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-51

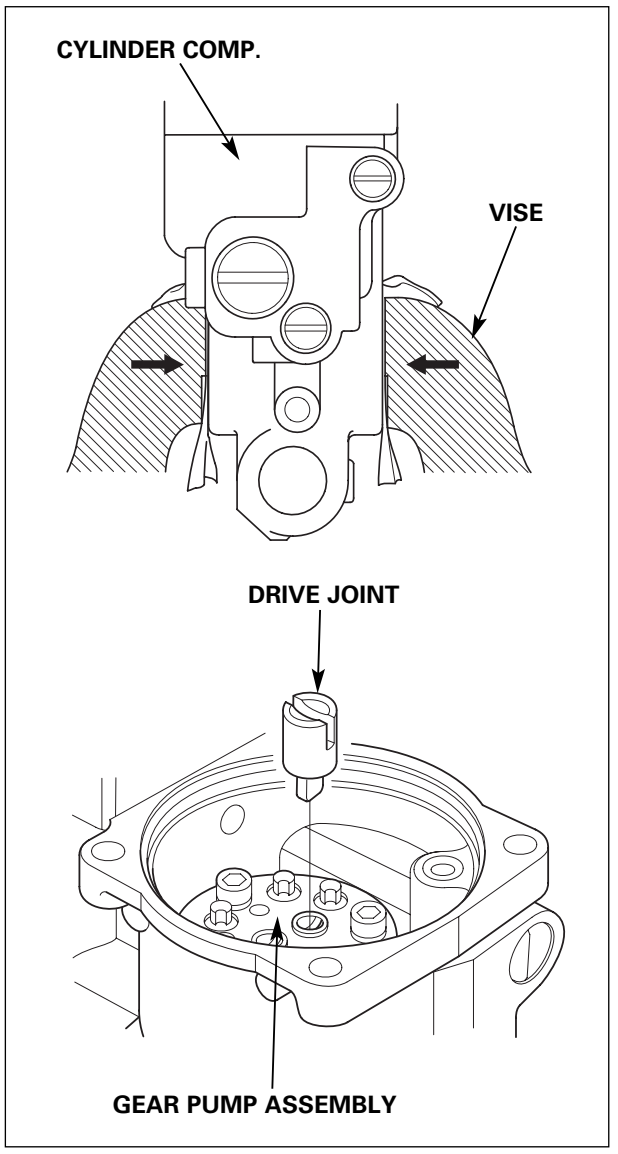
f. INSTALLATION

1) Set the cylinder comp. in a vise.

NOTICE

Do not tighten the vise excessively, as it can damage the cylinder comp.

2) Install the drive joint in the gear pump assembly in the position shown.

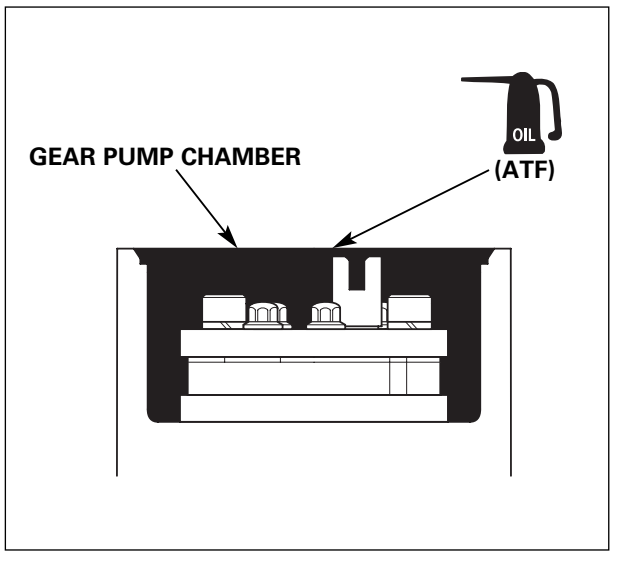


3) Slowly pour ATF into the gear pump chamber in the cylinder comp. until it flows out.

NOTICE

After pouring the ATF, check the ATF in the gear pump chamber for air bubbles. If the ATF contains bubbles, remove them using an oil bottle or equivalent tool. Note that the bubbles in the ATF will have to be bled from the system.

After removing the bubbles, fill the gear pump chamber with fresh ATF again.



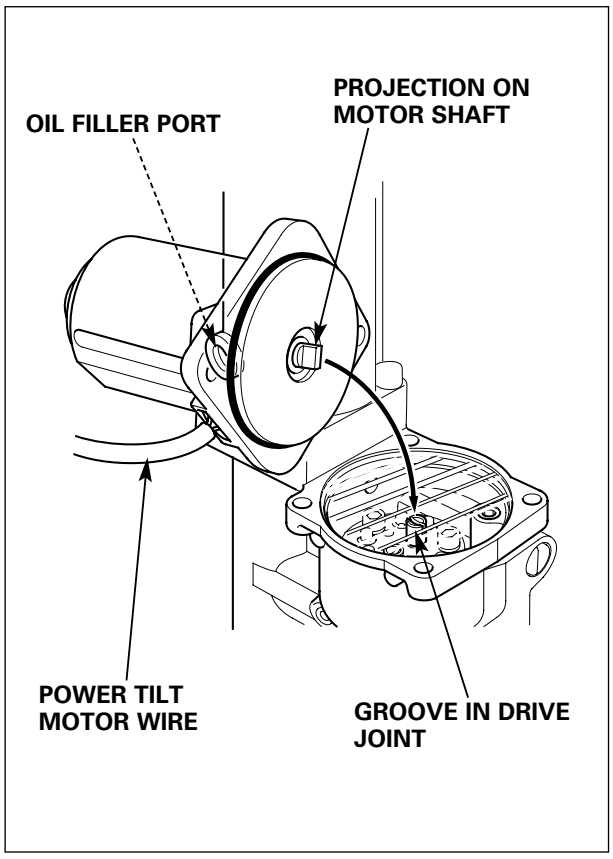
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-52

4) Apply ATF to a new O-ring and install it on the power tilt motor.

   Install the power tilt motor, aligning the projection on the motor shaft with the groove in the drive joint.

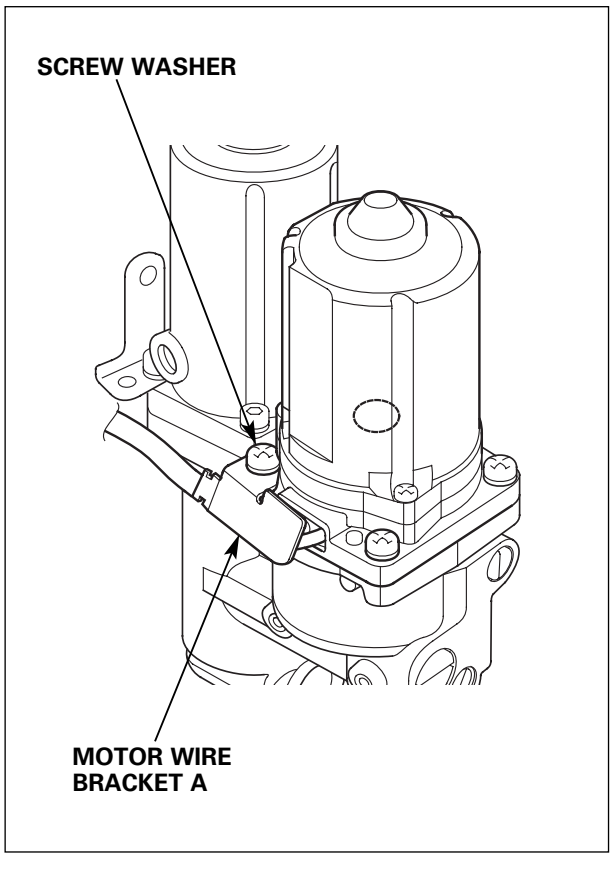
   • Install with the power tilt motor wire on the same side as the oil tank filler port.



5) Tighten the four screw washers to the specified torque.

   • Install and tighten motor wire bracket A in the position shown.

   TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)



Date of Issue: May 2008
© Honda Motor Co., Ltd.

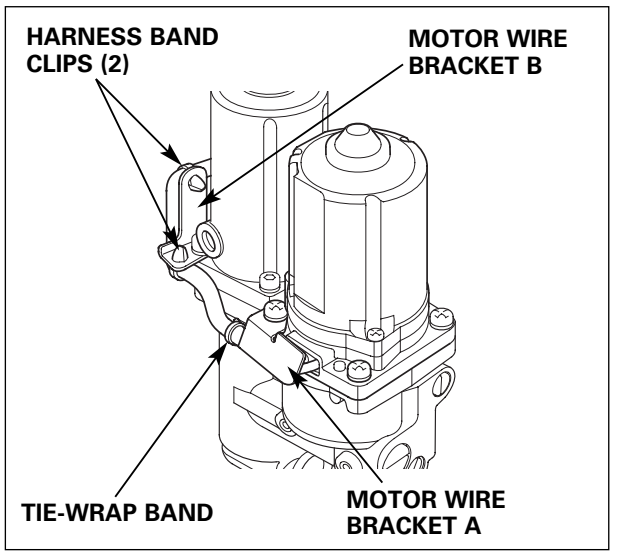
00 cap.14 BF40D 50D (A).qxp 2008/04/14 10:37 ページ 14-53

6) Clamp the motor wire on motor wire bracket A using the tie-wrap band.

   • When a new tie-wrap band is used to clamp the motor wire, cut off the excess of the band at 3 — 5 mm (0.1 — 0.2 in) from the fastener end.

7) Clamp the motor wire on motor wire bracket B at the two points using the harness band clips.

   • When the new harness band clips are used to clamp the motor wire, cut off the excess of the band at 3 — 5 mm (0.1 — 0.2 in) from the fastener end.



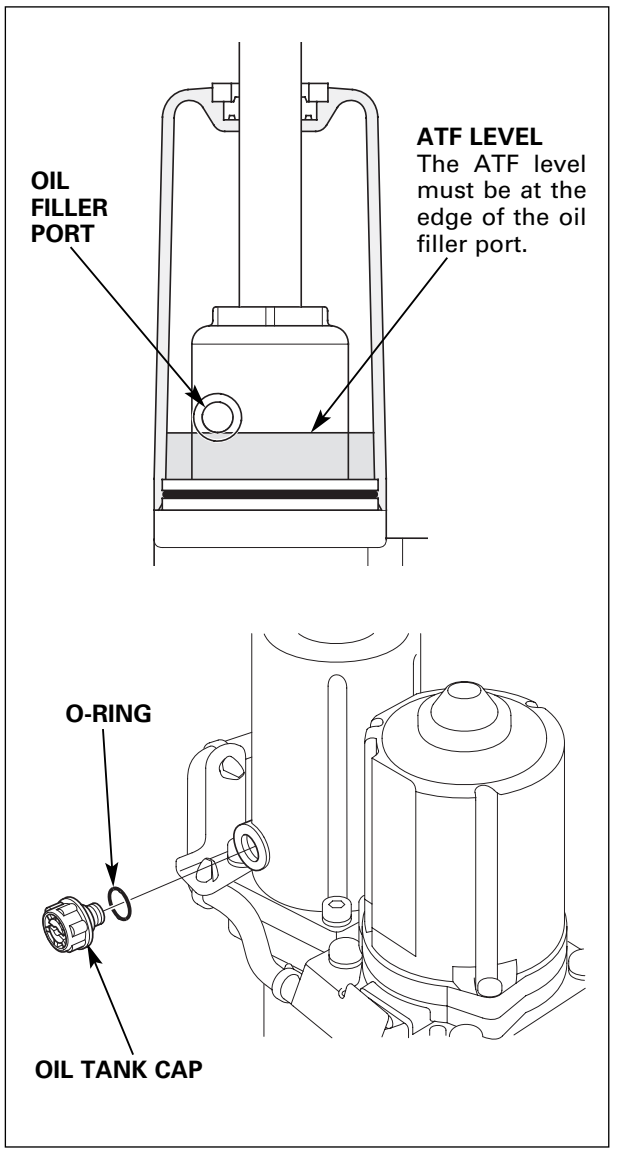
8) Slowly pour ATF into the oil tank until it flows out of the oil filler port.

   Tighten the oil tank cap to the specified torque.

   TORQUE: 1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

9) After assembly, perform air bleeding (P. 14-33) and hydraulic pressure inspection (P. 14-36).

   Install the power trim/tilt assembly on the outboard motor (P. 14-39), then perform air bleeding on the outboard motor (P. 14-35).



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-54

3. GAS ASSISTED DAMPER ASSEMBLY [GAS ASSISTED TYPE ONLY]

⚠WARNING

Gasoline is highly flammable and explosive.

You can be burned or seriously injured when handling fuel.

- Keep heat, sparks and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

a. REMOVAL

Remove the following part.
- Engine cover (P. 4-2)

1) Drain the gasoline from the vapor separator and the fuel strainer (low pressure side).

2) Lift the outboard motor up with a hoist, and place it on its right side (intake manifold side) on material to prevent scratching the outer surface.

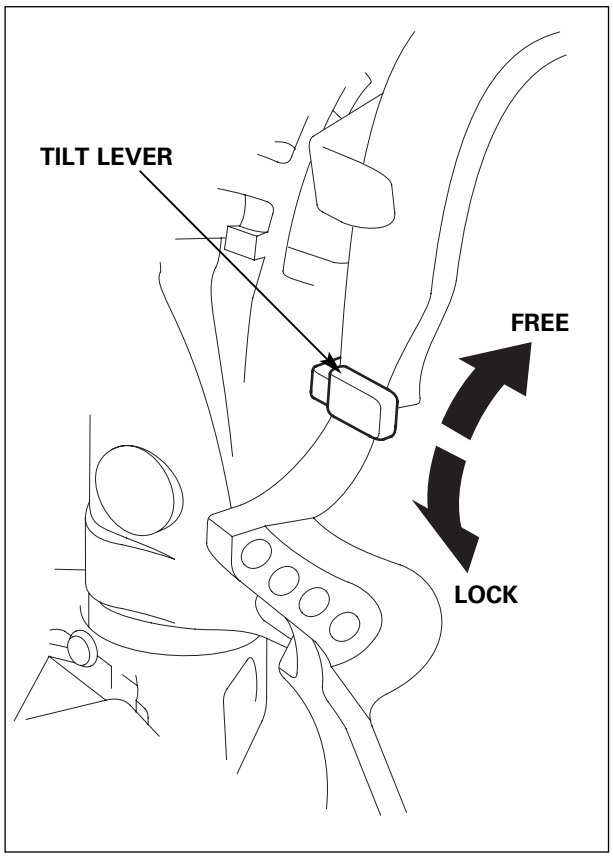
3) Move the tilt lever to the "FREE" position, and raise the outboard motor to the uppermost position. Hold the outboard motor in the uppermost position.

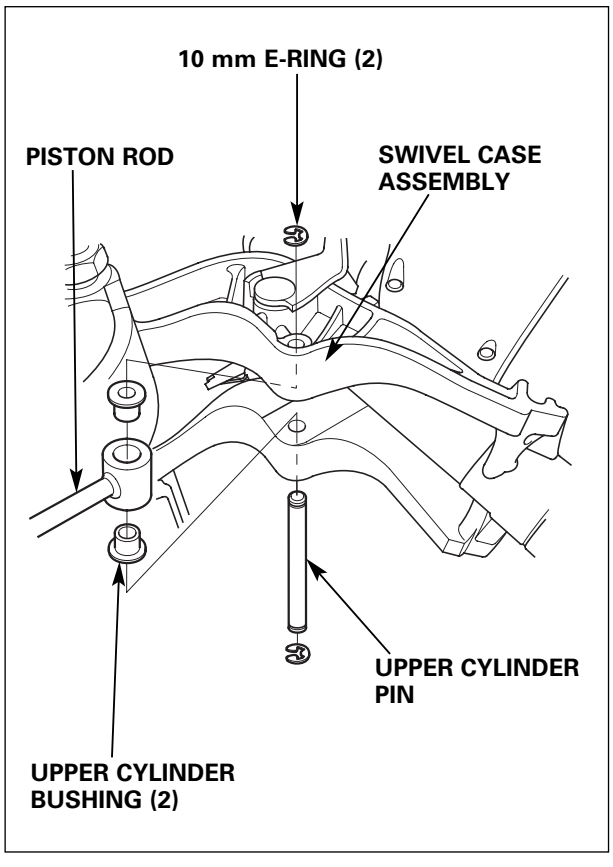
   Move the tilt lever to the "LOCK" position.

4) Remove the 10 mm E-rings from the upper cylinder pin, and remove the upper cylinder pin.

   Remove the piston rod of the gas assisted damper assembly from the swivel case assembly.

   Check the upper cylinder bushings on the piston rod of the gas assisted damper assembly for wear, damage or deformation. Replace the upper cylinder bushings with new ones if necessary.
   If the upper cylinder bushings have been removed, replace them with new ones on reassembly.





Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-55

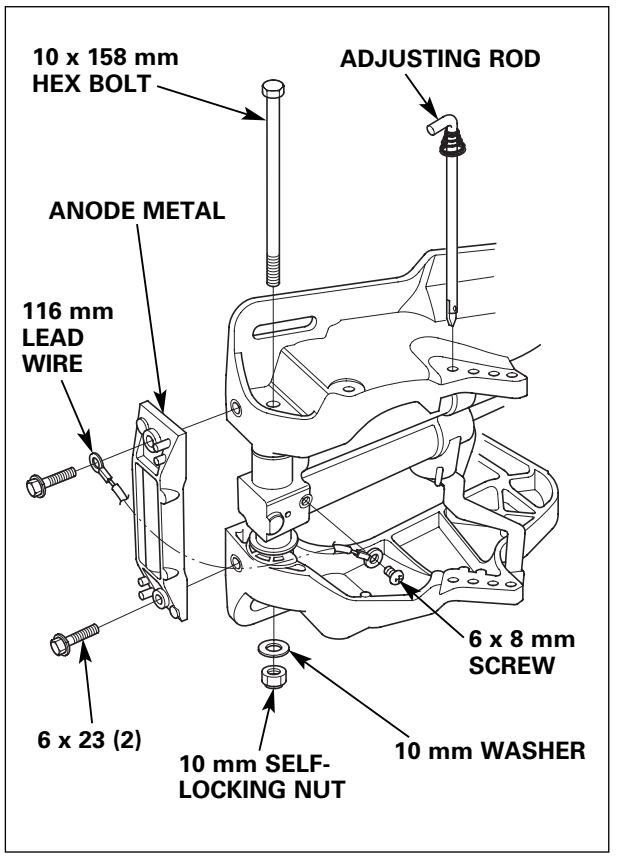
5) Remove the adjusting rod.

6) Remove the two 6 x 23 mm flange bolts, and remove the anode metal.

   Check the anode metal. Replace the anode metal with a new one on reassembly if it is corroded excessively.

   Loosen the 6 x 8 mm screw and remove the 116 mm lead wire.

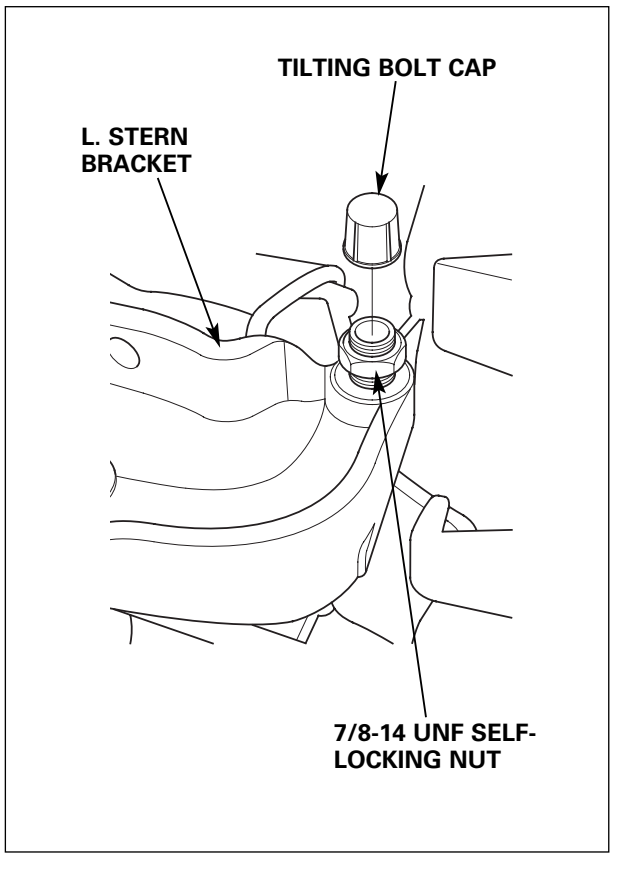
7) Loosen the 10 mm self-locking nut, and remove the 10 mm washer and the 10 x 158 mm hex bolt.



8) Remove the tilting bolt cap.

   Holding the 7/8-14 UNF self-locking nut on the R. stern bracket side, loosen the 7/8-14 UNF self-locking nut on the L. stern bracket side.

   • Loosen the 7/8-14 UNF self-locking nut with care not to let it come off of the tilting shaft.



© Honda Motor Co., Ltd.

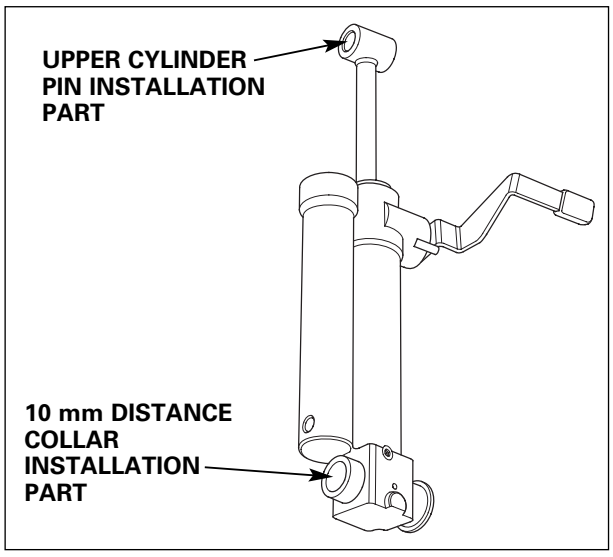
00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-56

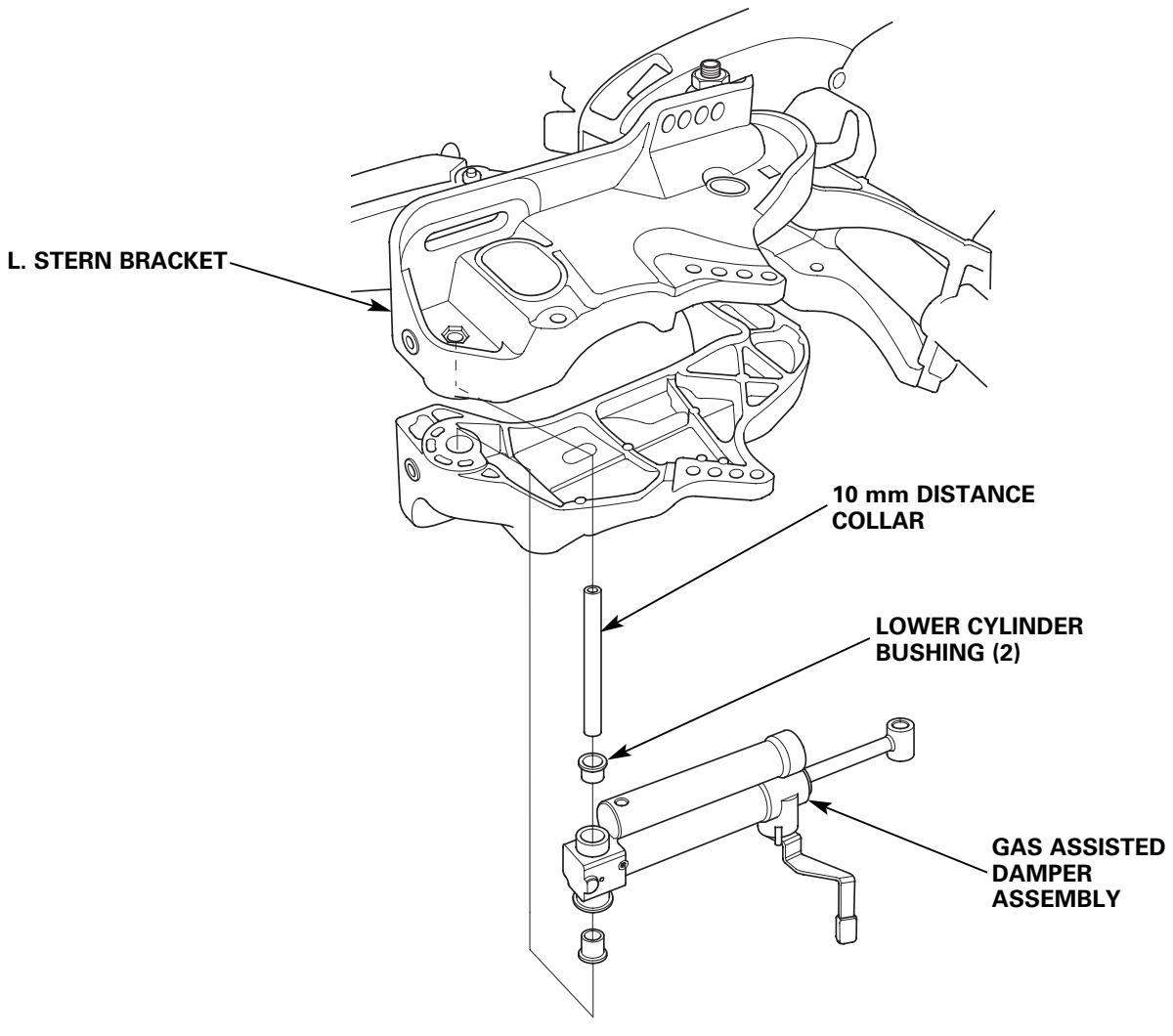
9) While raising the L. stern bracket, move the L. stern bracket a little toward the engine.

   Remove the 10 mm distance collar and the gas assisted damper assembly.

   Check the lower cylinder bushings mounted on the gas assisted damper assembly for wear, damage or deformation, and replace them with new ones if necessary. If the lower cylinder bushings have been removed, replace them with new ones on reassembly.

   - After removing the gas assisted damper assembly, take care not to push in the piston rod by operating the tilt lever.
   - If the piston rod has been pushed in, fully extend it.
   - After removing the gas assisted damper assembly, hold it upright with the upper cylinder pin installation part up during storage. Do not lay the gas assisted damper assembly on its side or hold it with the 10 mm distance collar installation part up.





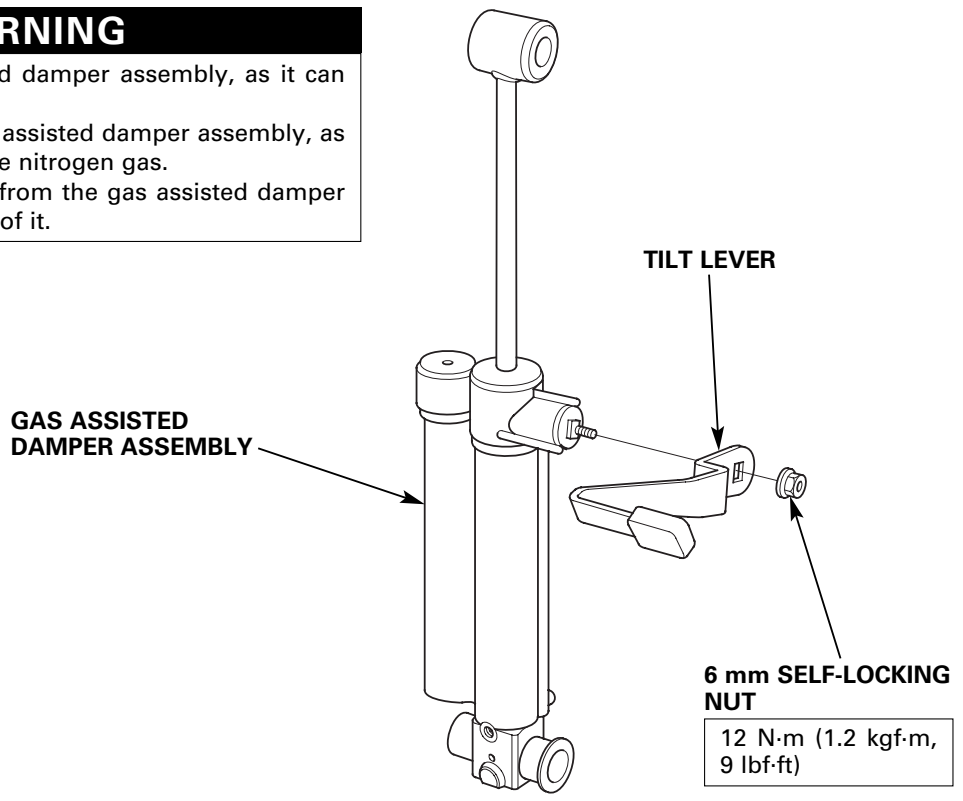
Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-57

b. DISASSEMBLY/REASSEMBLY

⚠WARNING

- Never heat the gas assisted damper assembly, as it can explode.
- Never disassemble the gas assisted damper assembly, as it is filled with high-pressure nitrogen gas.
- Be sure to release the gas from the gas assisted damper assembly before disposing of it.



c. DISPOSAL

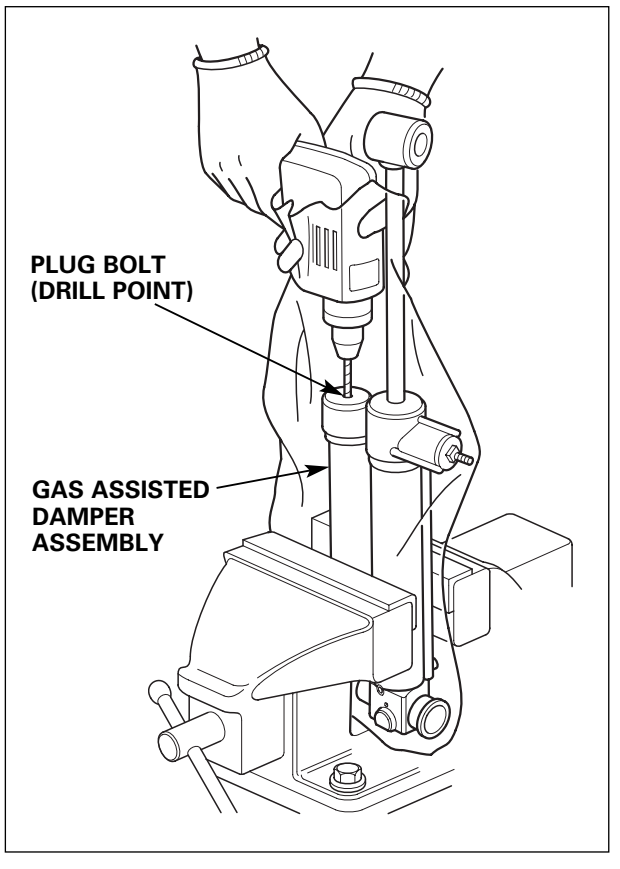
The gas assisted damper assembly is filled with high-pressure gas. Observe the following instructions.

1) Move the tilt lever to the "FREE" position with the piston rod of the gas assisted damper assembly fully extended.

2) Wrap the gas assisted damper assembly in a vinyl bag, and hold it upright in a vise as shown.

3) Inflate the vinyl bag with the cooling air from the drill motor. While releasing air from the bag to prevent the bag from bursting, release the gas from the gas assisted damper assembly by drilling it at the plug bolt (specified drill point). Wear safety goggles during drilling and drill with care not to let the vinyl bag get caught in the drill bit.

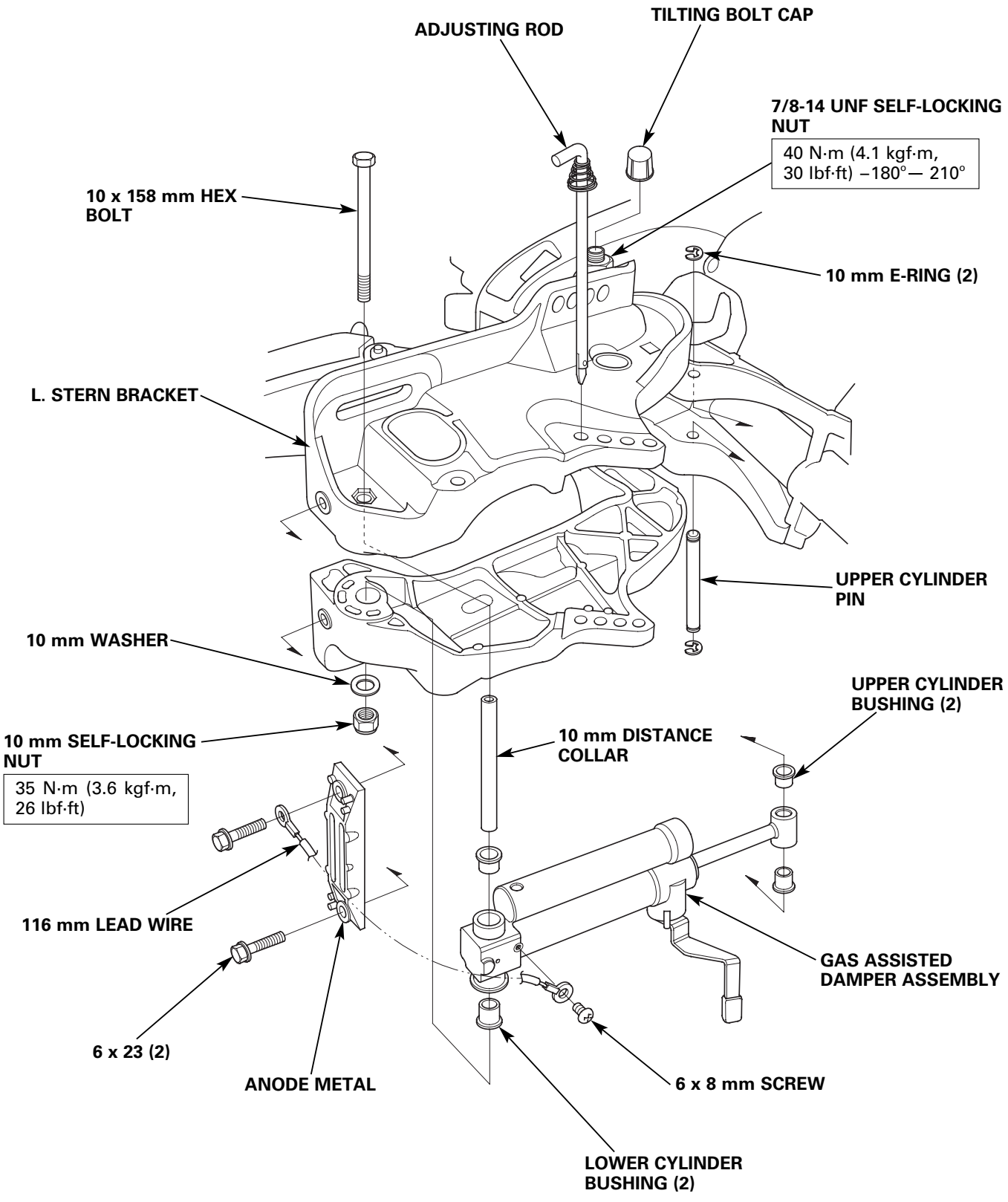
   - Drill the gas assisted damper assembly at the specified drill point.
   - Be sure to wear safety goggles when drilling. The gas and drill chips will spurt out and scatter when drilling through the gas assisted damper assembly.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-58

d. COMPONENT DRAWING



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-59

e. INSTALLATION

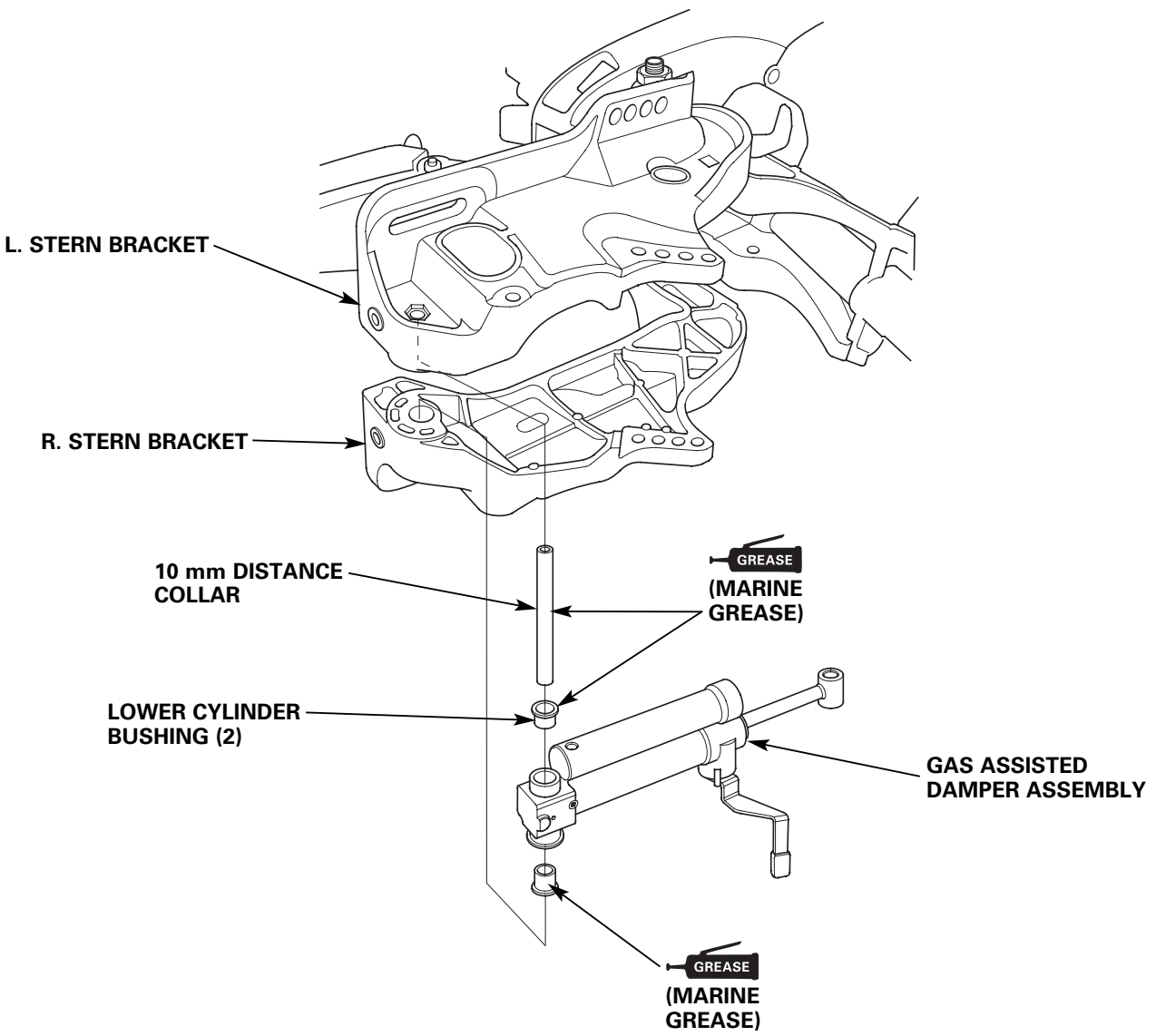
Raise the swivel case assembly to the uppermost position.

1) When the lower cylinder bushings have been removed from the gas assisted damper assembly, apply marine grease to the new lower cylinder bushings and install them on the gas assisted damper assembly.

2) Apply marine grease to the outer surface of the 10 mm distance collar.

   Install the 10 mm distance collar on the gas assisted damper assembly.

   Raise the L. stern bracket, and install the 10 mm distance collar of the gas assisted damper assembly on the L./R. stern brackets.



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-60

3) Install the adjusting rod.

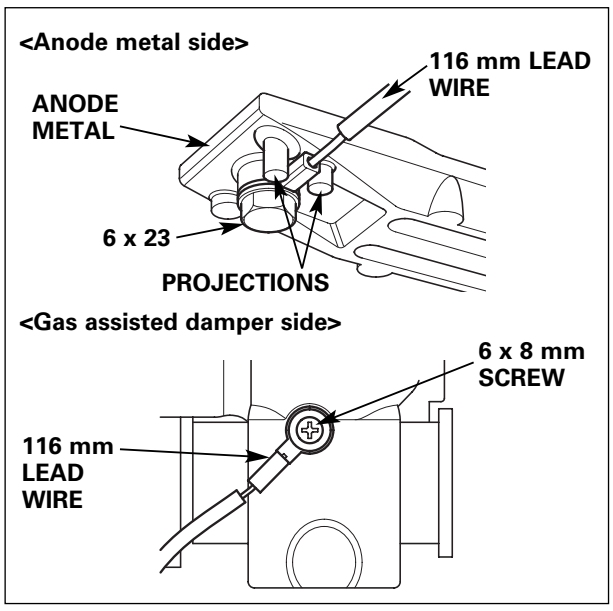
4) Check the anode metal. Replace the anode metal with a new one if it is corroded excessively.

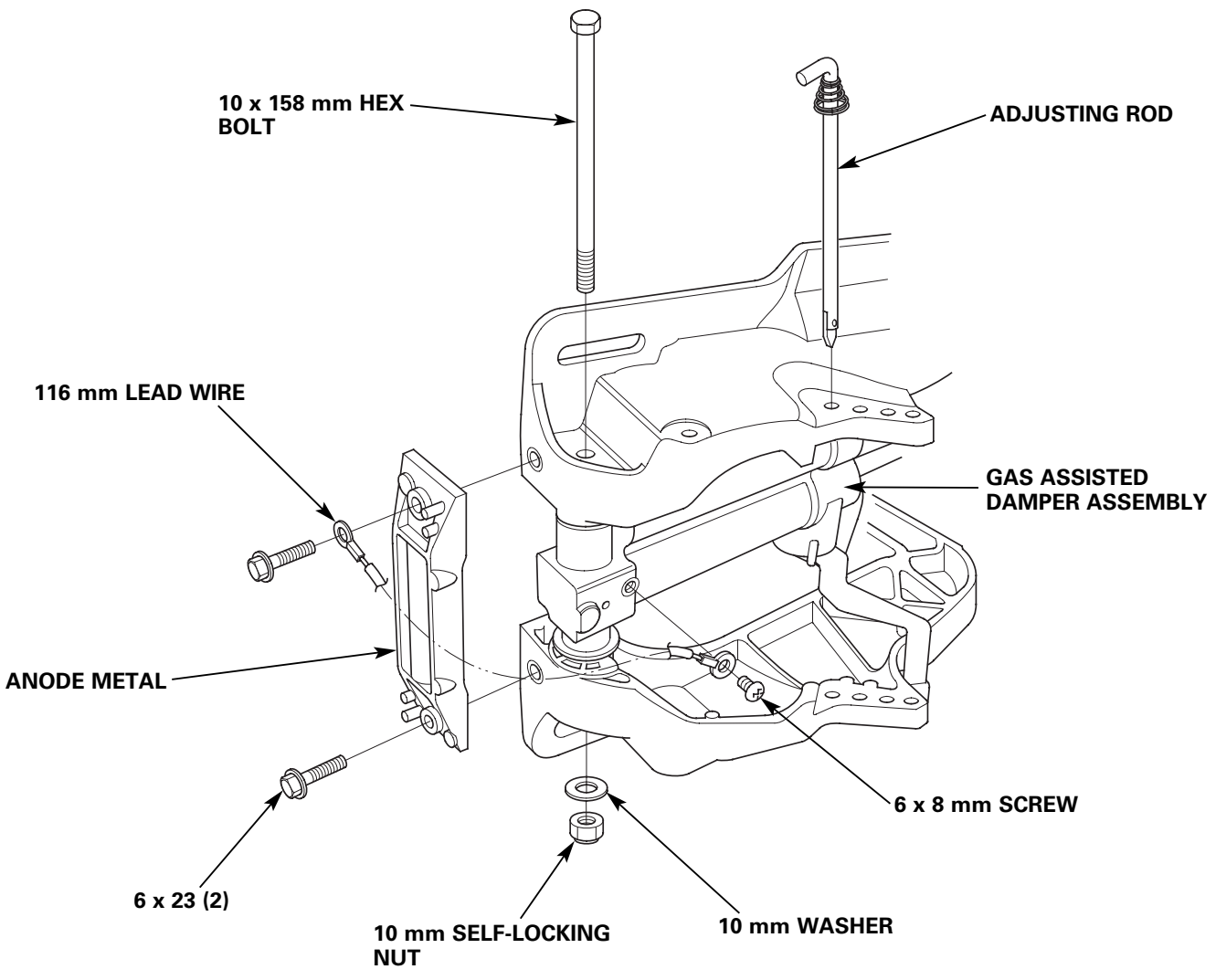
5) Set the 116 mm lead wire between the projections on the anode metal, and install the anode metal using the two 6 x 23 mm flange bolts.

   Tighten the 6 x 8 mm screw securely so that the 116 mm lead wire on the gas assisted damper assembly side is installed at the angle shown.

6) Install the 10 x 158 mm hex bolt and the 10 mm washer, and tighten the 10 mm self-locking nut to the specified torque.

   TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)





Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-61

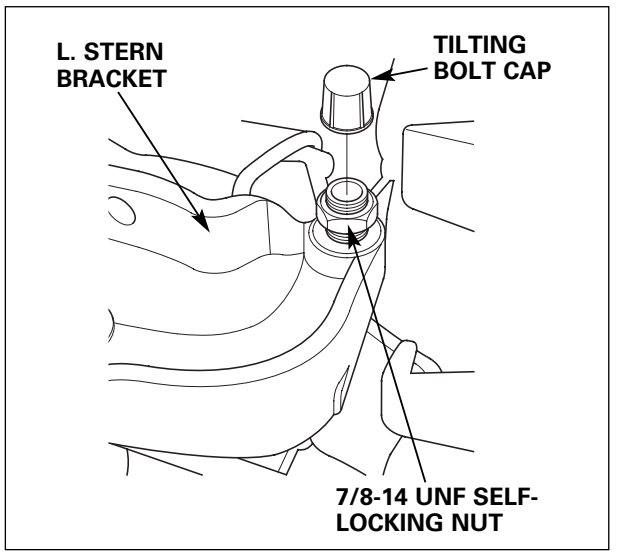
7) Holding the 7/8-14 UNF self-locking nut on the R. stern bracket side, tighten the 7/8-14 UNF self-locking nut on the L. stern bracket side to the specified torque.

   TORQUE: 40 N·m (4.1 kgf·m, 30 lbf·ft)

8) After tightening to the specified torque, loosen the 7/8-14 UNF self-locking nut on the L. stern bracket side by 180°—210°.

   Apply rust-preventive agent to the threads of the tilting shaft.

   Install the tilting bolt cap.



9) When the upper cylinder bushings have been removed from the gas assisted damper assembly, apply marine grease to the outer surface of the new upper cylinder bushings and install them on the piston rod.

   Set the piston rod of the gas assisted damper assembly on the swivel case assembly.

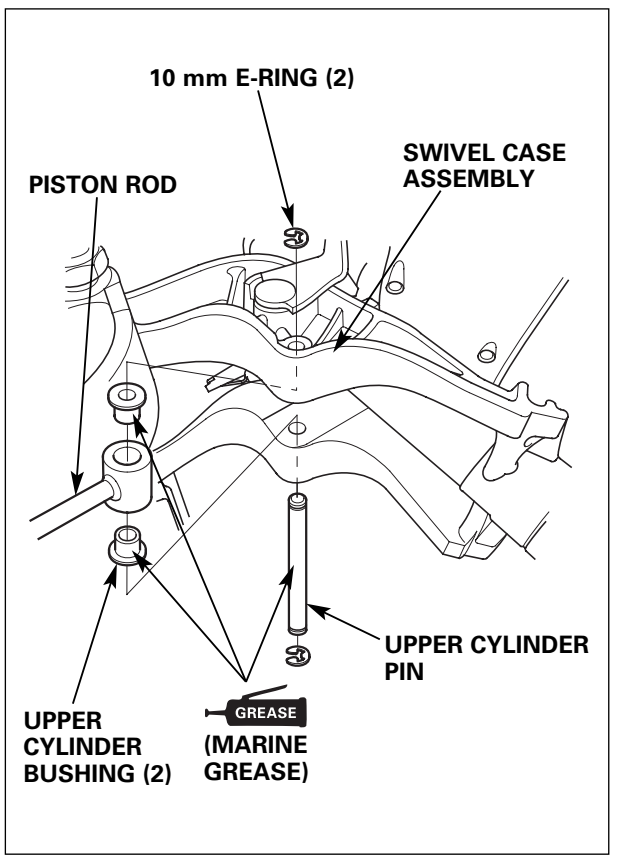
   Apply marine grease to the outer surface of the upper cylinder pin. Insert the upper cylinder pin into the swivel case assembly and secure it with the 10 mm E-rings.

10) When the outboard motor is locked with the tilt stopper, move the tilt stopper to the "FREE" position.

    Operate the tilt lever to lower the outboard motor to the lowermost position, and move the tilt lever to the "LOCK" position.

11) Lift up the outboard motor with a hoist and install it on the boat.

12) Install the following part.
    - Engine cover (P. 4-2)



© Honda Motor Co., Ltd.

00 cap.14 BF40D 50D (A).qxp 2008/04/11 14:02 ページ 14-62

Date of Issue: May 2008
© Honda Motor Co., Ltd.

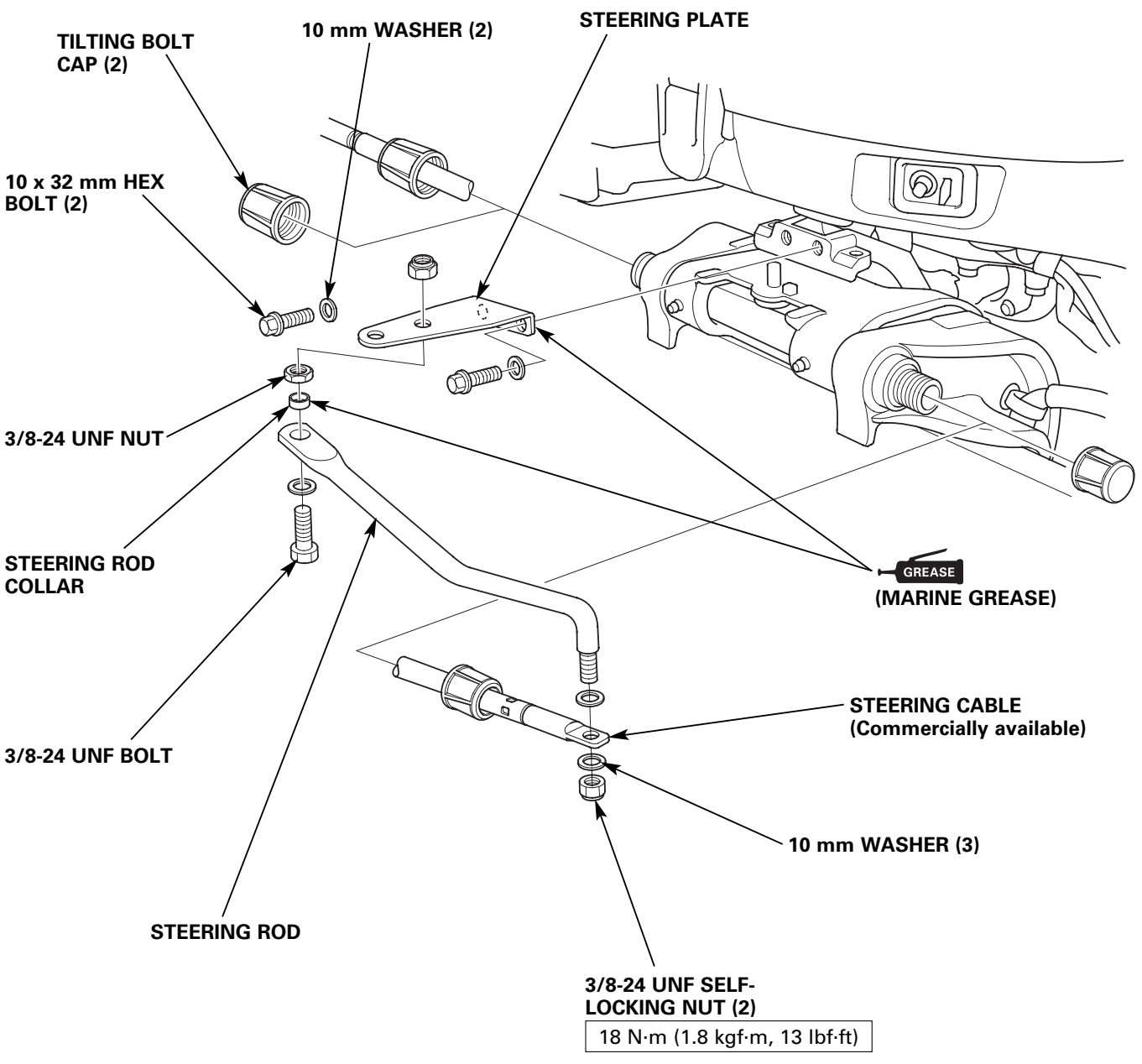
cap.15 BF40D 50D (A).qxp 2008/04/10 18:52 ページ 15-1

15. STEERING ROD [REMOTE CONTROL TYPE]

1. STEERING ROD 15-1

1. STEERING ROD

a. REMOVAL/INSTALLATION



© Honda Motor Co., Ltd.

cap.15 BF40D 50D (A).qxp 2008/04/10 18:52 ページ 15-2

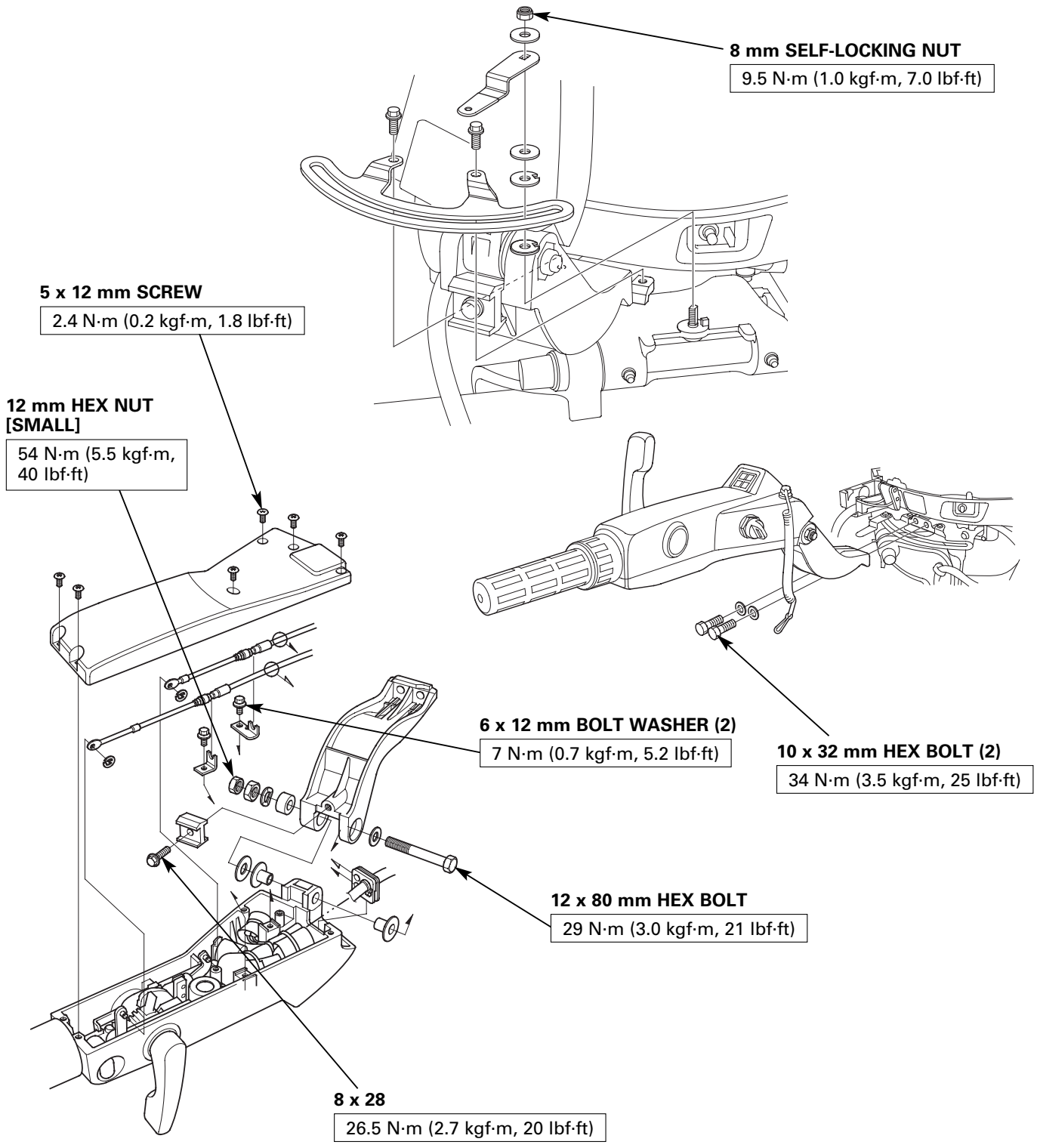
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-1

16. TILLER HANDLE [TILLER HANDLE TYPE]

BF40D·BF50D

1. STEERING FRICTION LEVER 16-2
2. TILLER HANDLE..... 16-6
3. INSPECTION..... 16-35

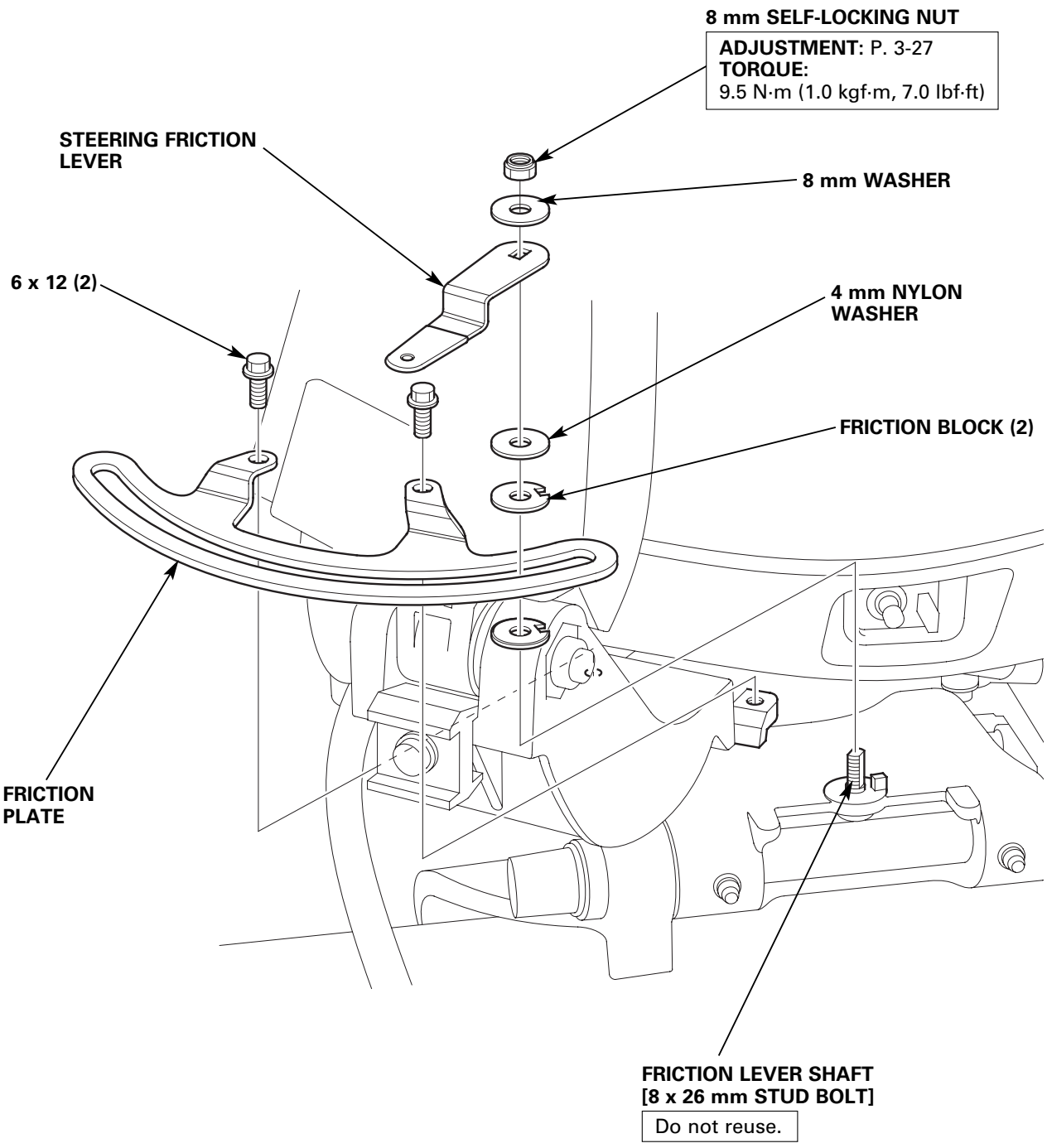


© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-2

1. STEERING FRICTION LEVER

a. DISASSEMBLY

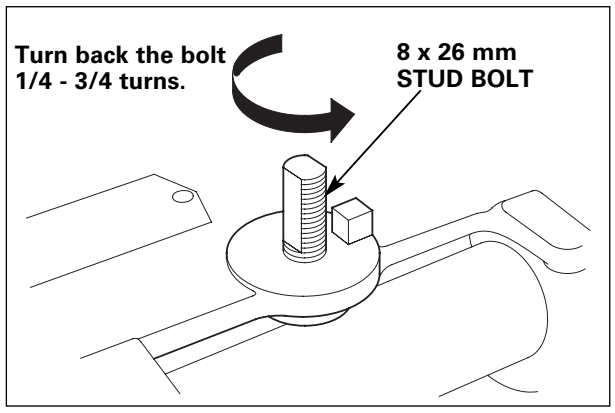


Date of Issue: May 2008
© Honda Motor Co., Ltd.

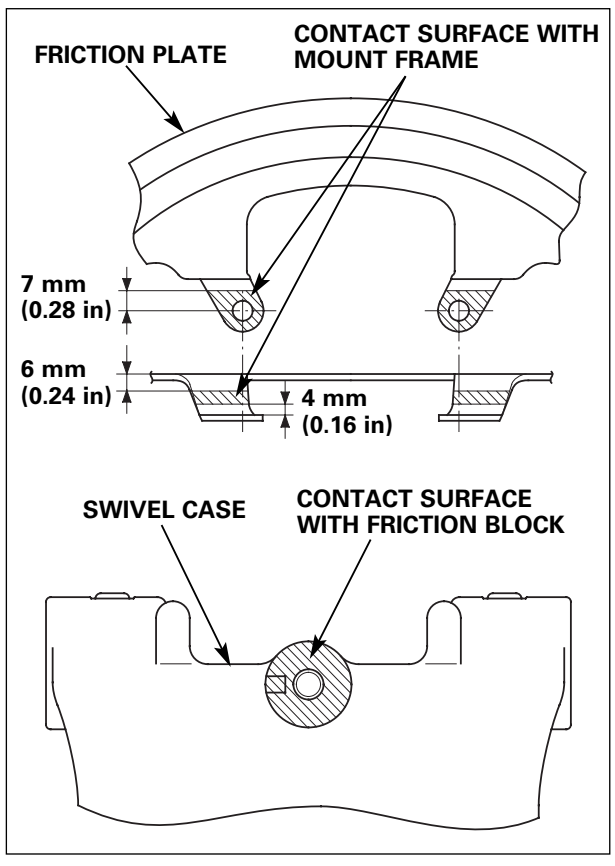
cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-3

b. REASSEMBLY

1) Tighten a new 8 x 26 mm stud bolt fully, then turn it back 1/4 to 3/4 turns from the fully tightened position.

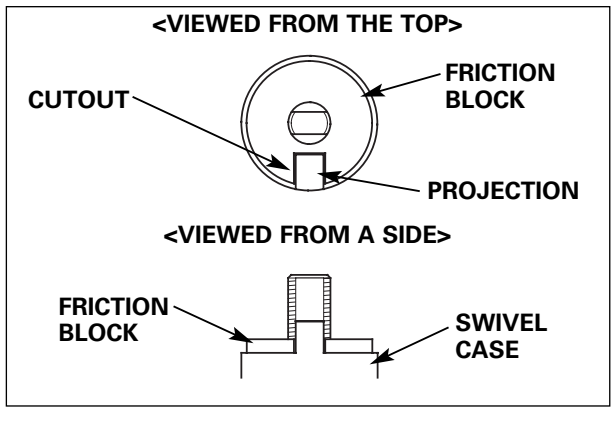


2) Apply rust-preventive agent to the hatched parts of the friction plate where it contacts the mount frame and to the hatched part of the swivel case where it contacts the friction block shown.



3) Align the projection on the swivel case with the cutout in the friction block, and install the friction block on the swivel case with the friction block's disc surface facing up (toward the engine under case).

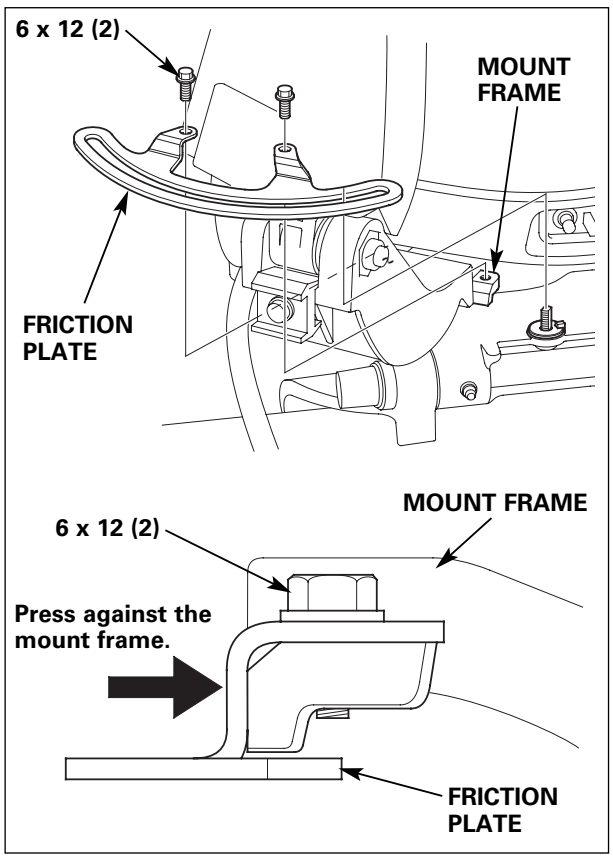
- When the disc surface of either or both the friction blocks is worn out, replace the friction blocks with new ones as a set.
- Check the friction block's disc surface for contamination with oil or grease. Clean the disc surface thoroughly if necessary.



© Honda Motor Co., Ltd.

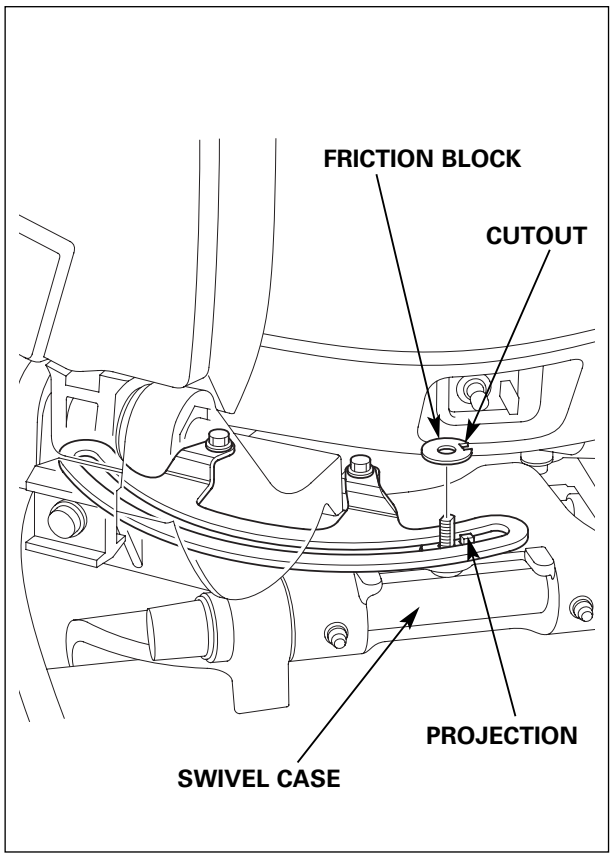
cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-4

4) Loosely tighten the friction plate on the mount frame. Then tighten the two 6 x 12 mm flange bolts securely while pressing the friction plate against the mount frame as shown.



5) Align the projection on the swivel case with the cutout in the friction block, and install the friction block on the swivel case with the friction block's disc surface facing down (toward the friction plate).

   • Check the friction block's disc surface for contamination with oil or grease. Clean the disc surface thoroughly if necessary.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-5

6) Install the 8 mm nylon washer, steering friction lever and the 8 mm washer as shown.

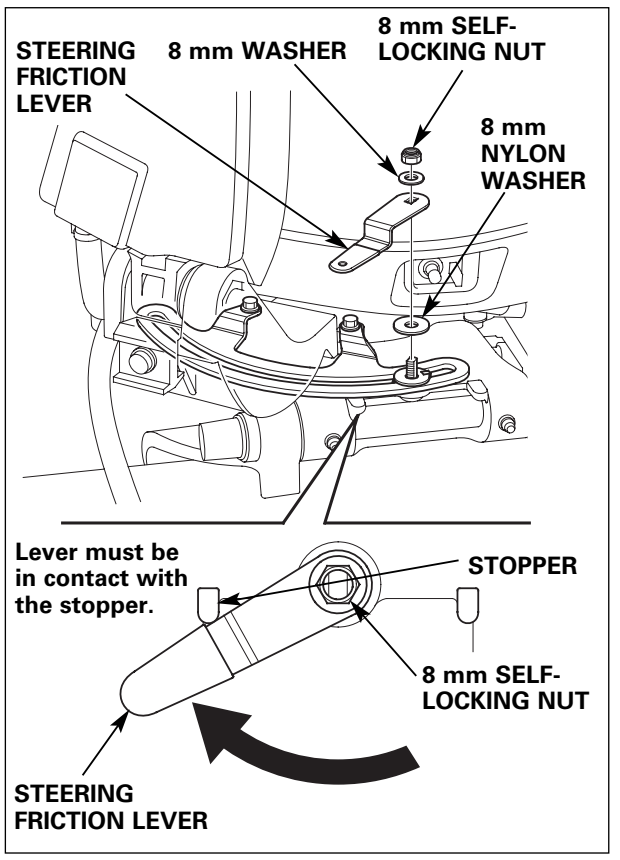
   • Check the 8 mm nylon washer, steering friction lever and the 8 mm washer for contamination with oil or grease. Clean the parts thoroughly if necessary.
   • Note the steering friction lever installation direction.

7) Set the steering friction lever in the locked position (i.e. the lever is in contact with the stopper) by turning it counterclockwise fully as shown.

8) Tighten the 8 mm self-locking nut to the specified torque.

   TORQUE: 9.5 N·m (1.0 kgf·m, 7.0 lbf·ft)

9) Perform the steering friction adjustment (P. 3-27).



© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-6

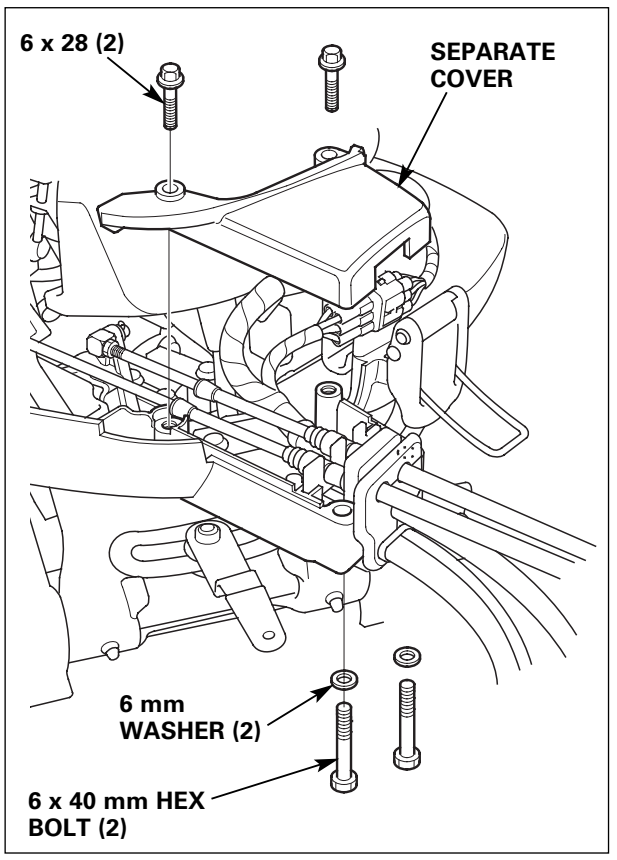
2. TILLER HANDLE

a. REMOVAL

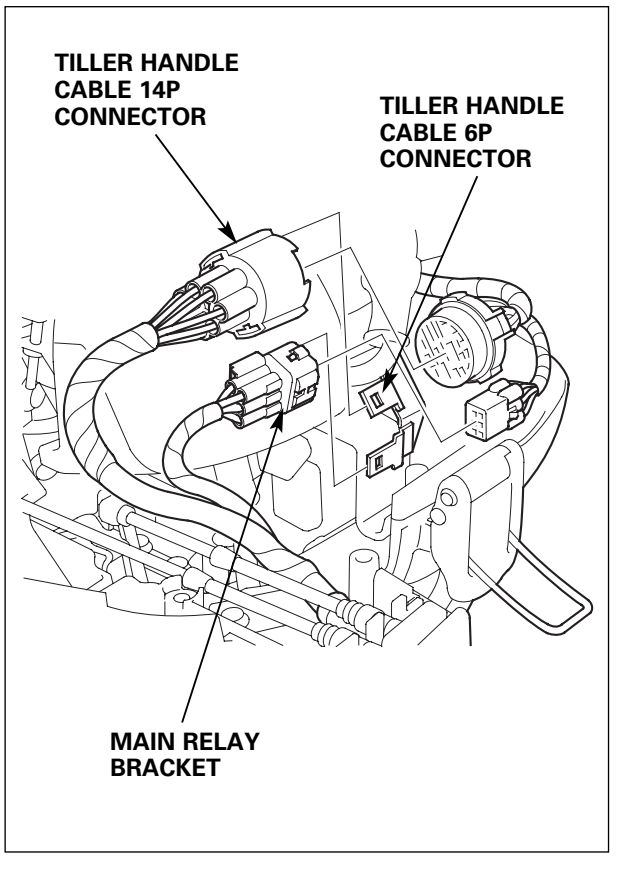
1) Remove the engine cover (P. 4-2).

2) Move the tiller handle shift lever to the "N" (Neutral) position.

3) Remove the two 6 x 28 mm flange bolts, two 6 x 40 mm hex bolts and the two 6 mm washers, and remove the separate cover.



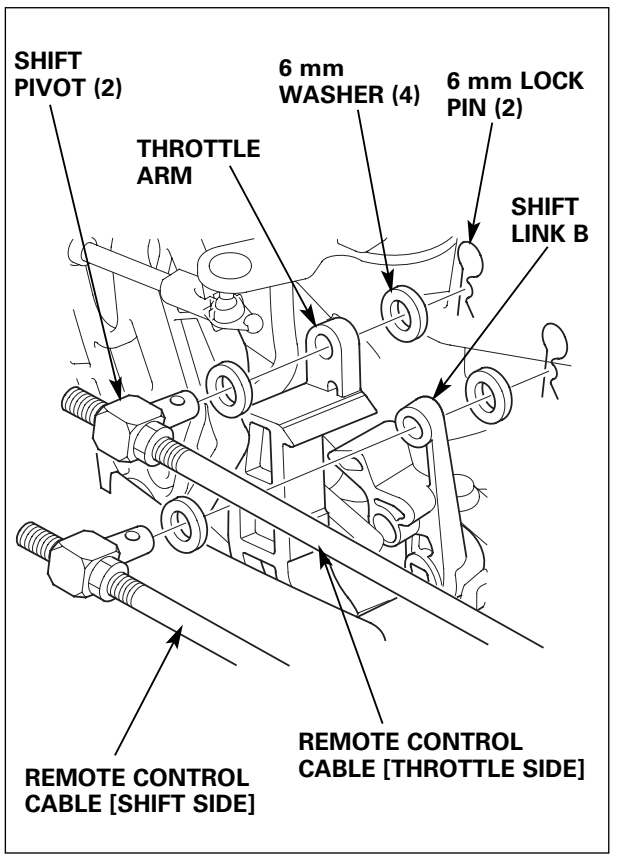
4) Remove the tiller handle cable 14P and 6P connectors from the main relay bracket, and disconnect the 14P and 6P connectors.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-7

5) Remove the two 6 mm lock pins and the two 6 mm washers from the two remote control cables, and remove the remote control cables from the throttle arm and shift link B. Remove the two 6 mm washers from the shift pivot of the respective remote control cables.

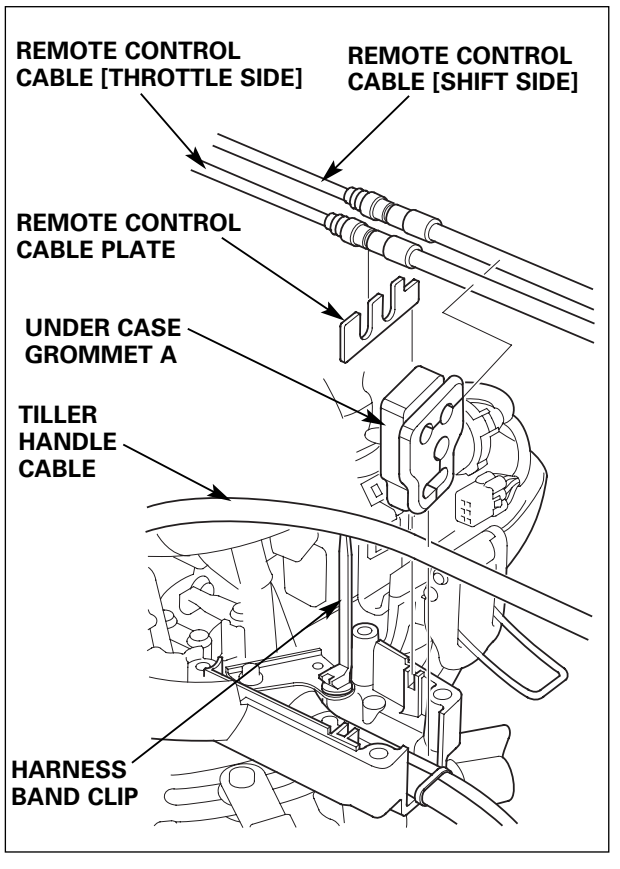


6) Remove the two remote control cables from under case grommet A and the remote control cable plate.

7) Remove the remote control cable plate.

8) Open the harness band clip.

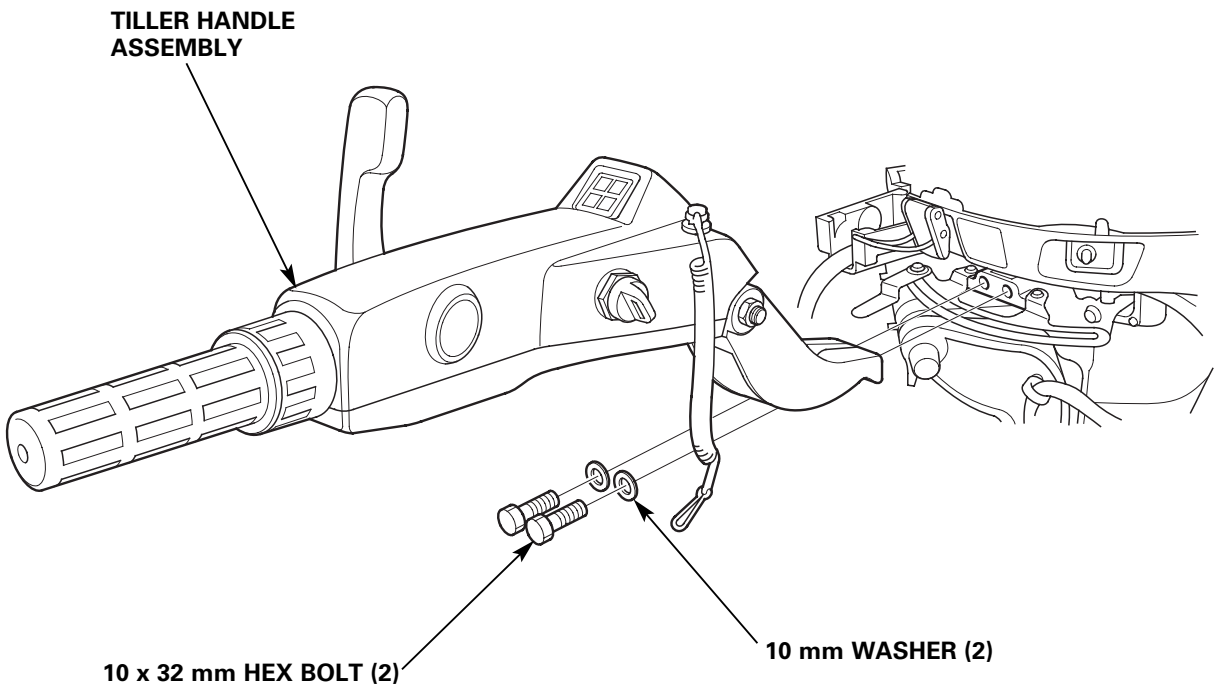
9) Remove under case grommet A from the engine under case, and remove the starter cable and the tiller handle cable from under case grommet A.



© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-8

10) Remove the two 10 x 32 mm hex bolts and the two 10 mm washers, and remove the tiller handle assembly from the outboard motor.

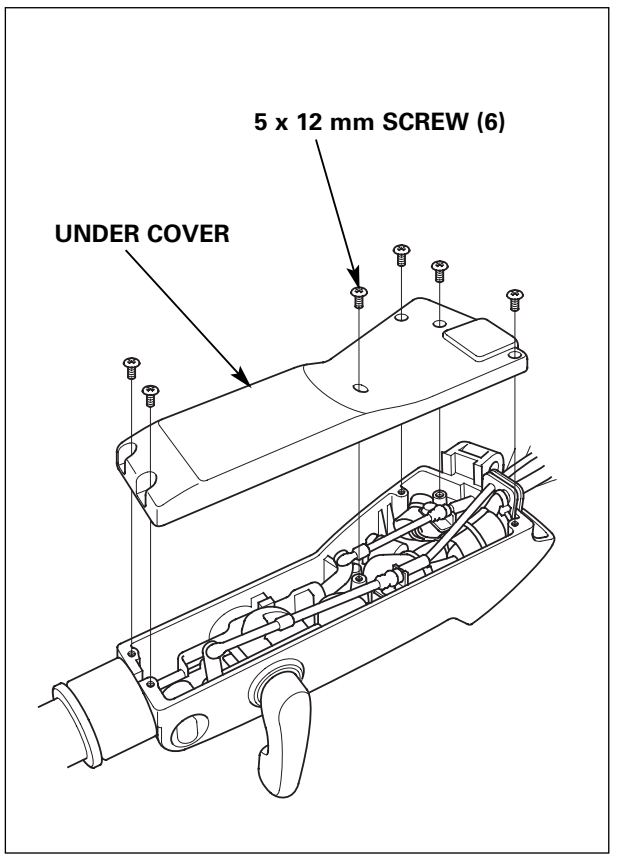


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-9

b. DISASSEMBLY

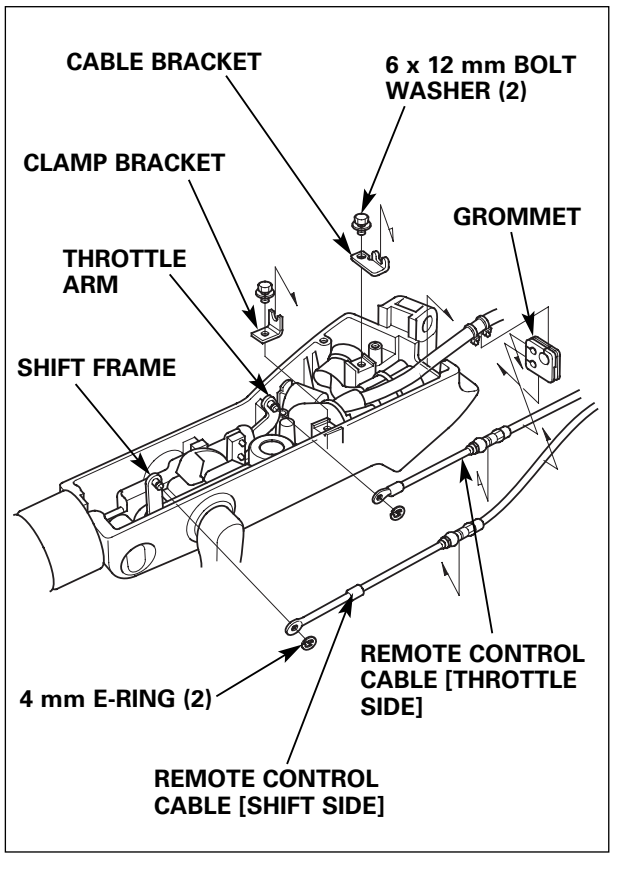
1) Remove the six 5 x 12 mm screws, and remove the under cover from the tiller handle assembly.



2) Remove the grommet from the tiller handle assembly, and remove the grommet from the two remote control cables.

3) Remove the two 4 mm E-rings from each of the two remote control cables, and disconnect the remote control cables from the throttle arm and the shift frame.

4) Remove the two 6 x 12 mm bolt washer and remove the cable bracket and clamp bracket.

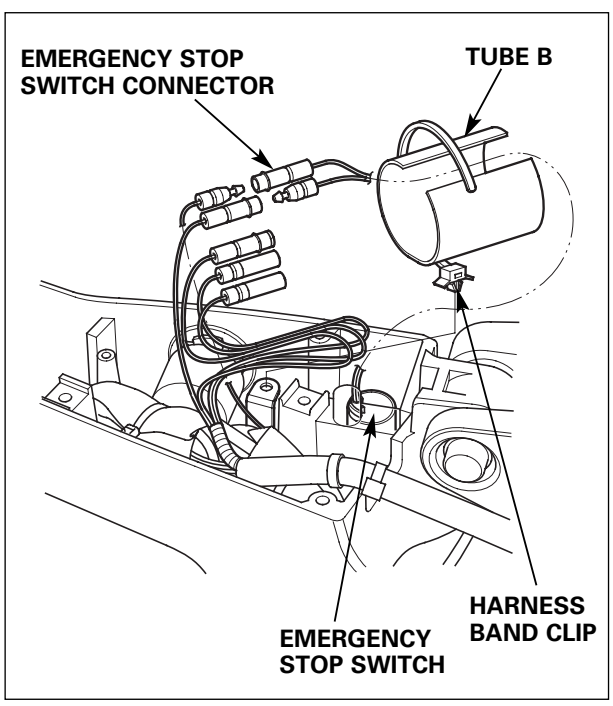


© Honda Motor Co., Ltd.

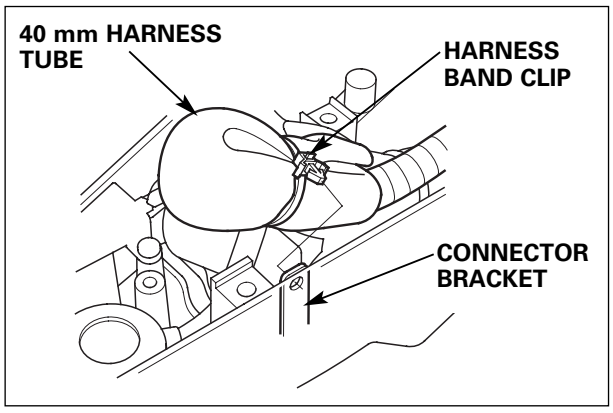
cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-10

5) Open the harness band clip that clamps tube B.
Replace the harness band clip with a new one on reassembly.

Disconnect the two emergency stop switch connectors.



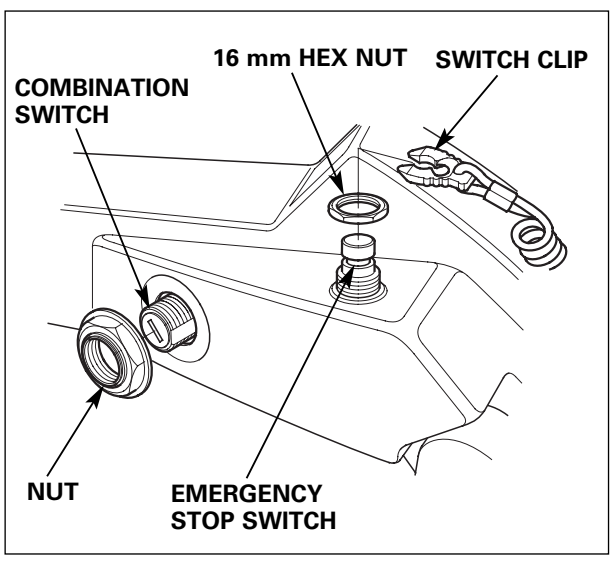
6) Remove the harness band clip that clamps the 40 mm harness tube from the connector bracket as shown.



7) Remove the switch clip from the emergency stop switch.

Remove the 16 mm hex nut from the emergency stop switch, and push the emergency stop switch into the housing.

8) Remove the nut from the combination switch, and push the combination switch into the housing.



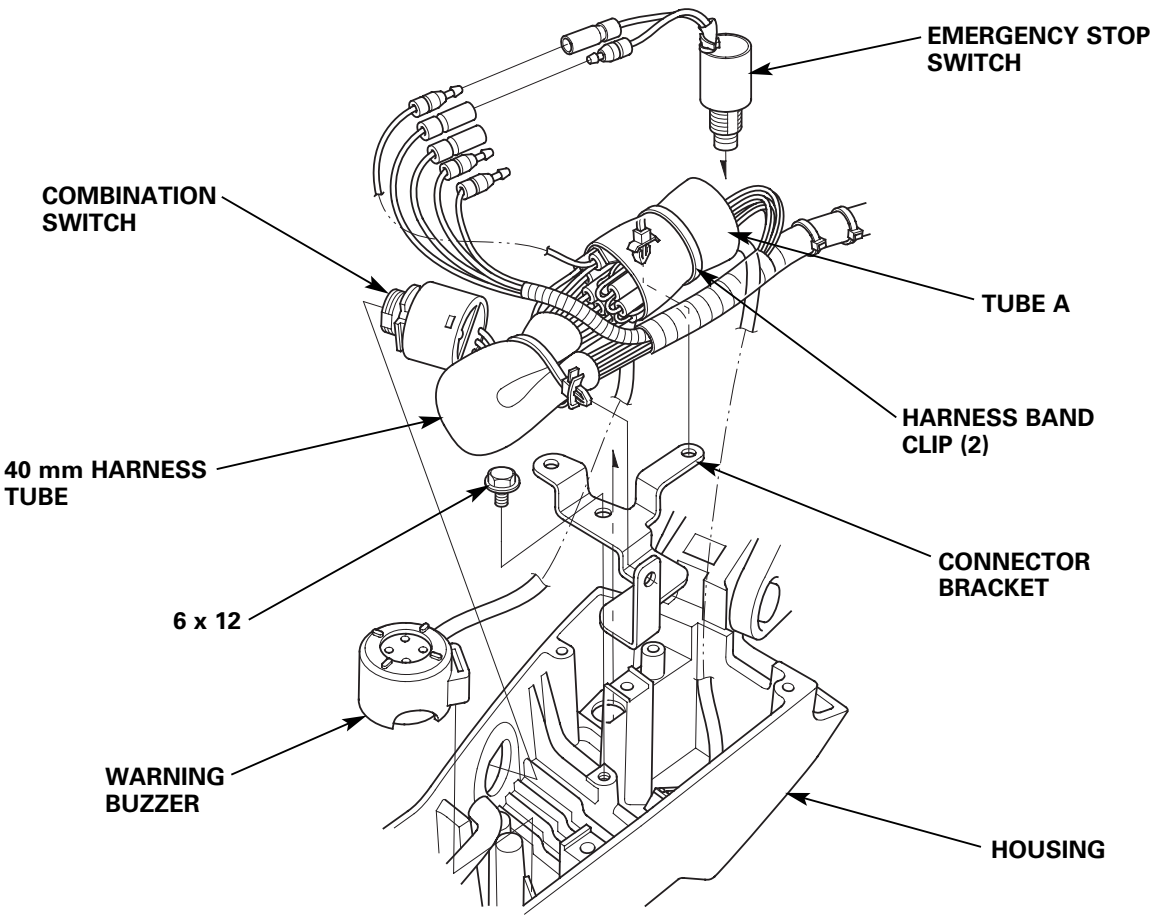
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-11

9) Remove the 6 x 12 mm flange bolt from the connector bracket, and remove the harness and the connector bracket as a set from the tiller handle assembly.

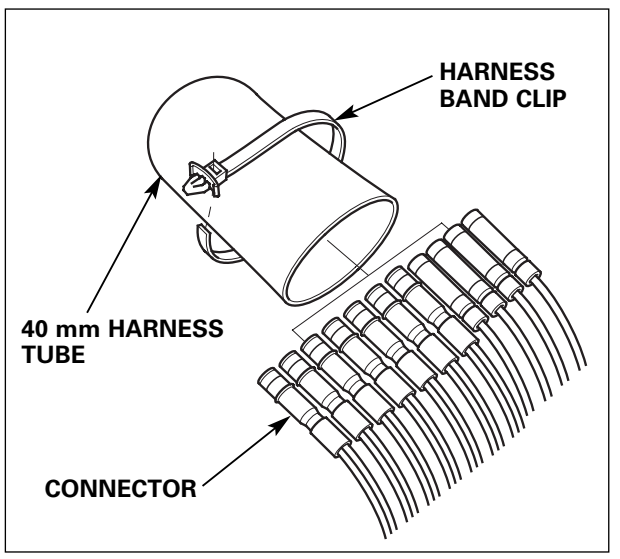
   Remove the harness band clip, which clamps tube A, from the connector bracket.

10) Remove the warning buzzer from the housing.



11) Open the harness band clip that clamps the 40 mm harness tube.
   Replace the harness band clip with a new one on reassembly.

   Remove all the connectors from the 40 mm harness tube.



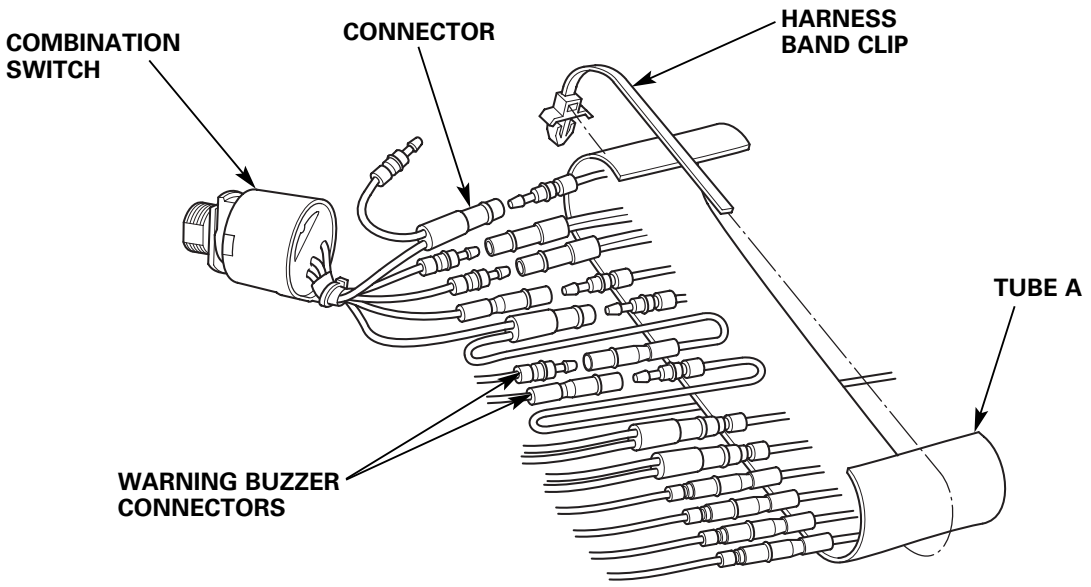
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-12

12) Open the harness band clip that clamps tube A.

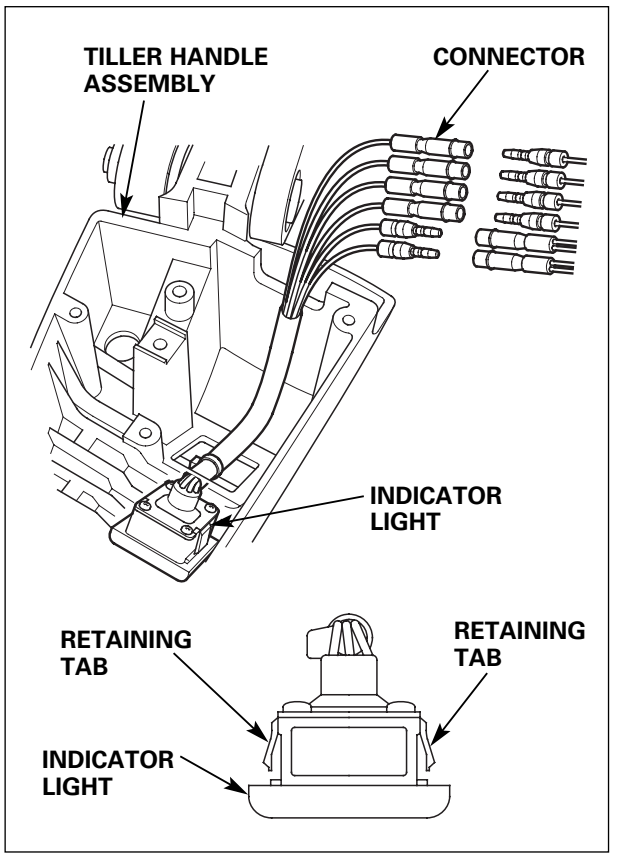
Replace the harness band clip with a new one on reassembly.

Disconnect all of the combination switch connectors.
Disconnect the two warning buzzer connectors.



13) Disconnect all of the indicator light connectors.

Remove the indicator light from the tiller handle assembly by pushing the retaining tabs on the right and left sides of the indicator light as shown.



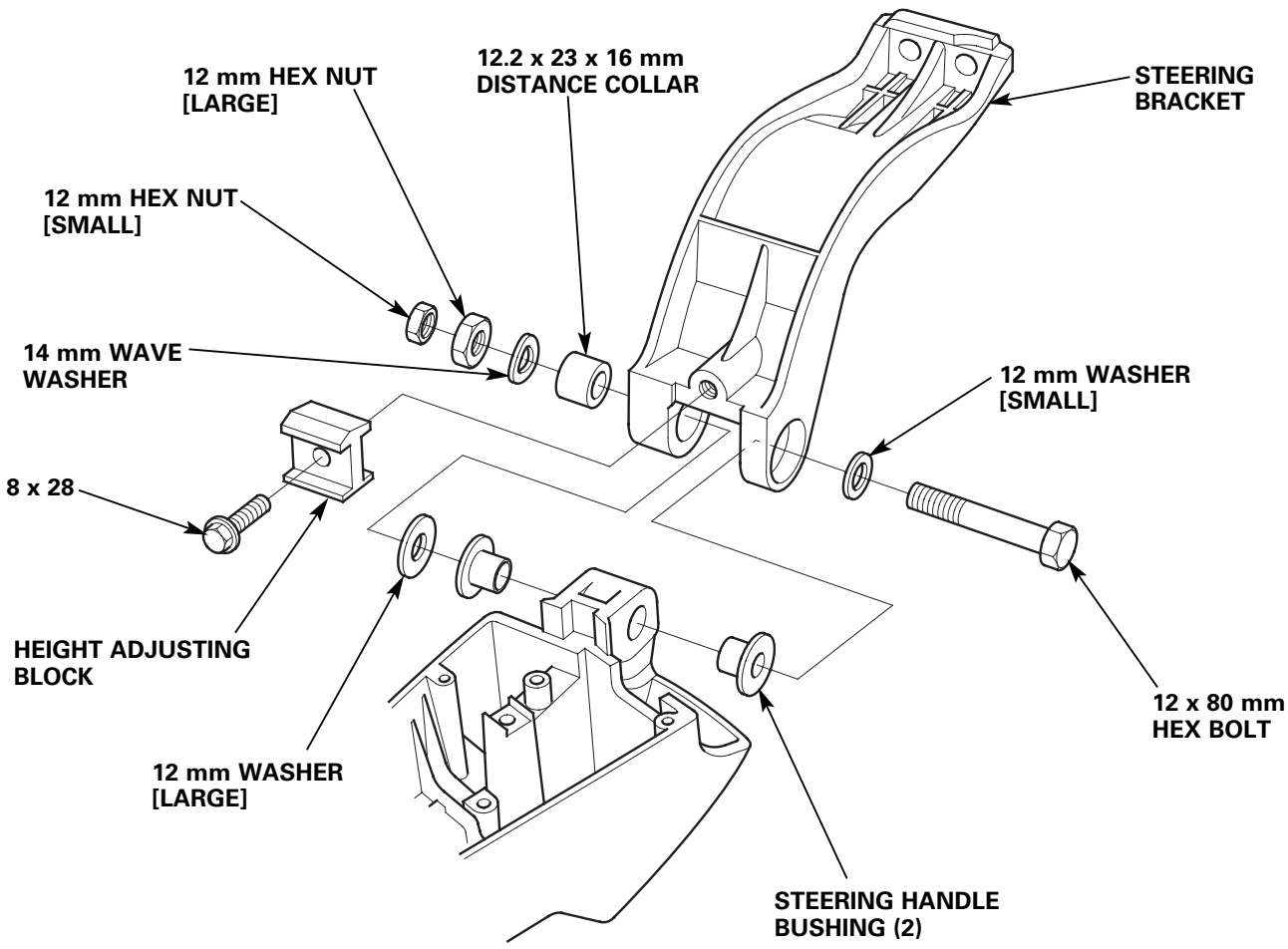
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-13

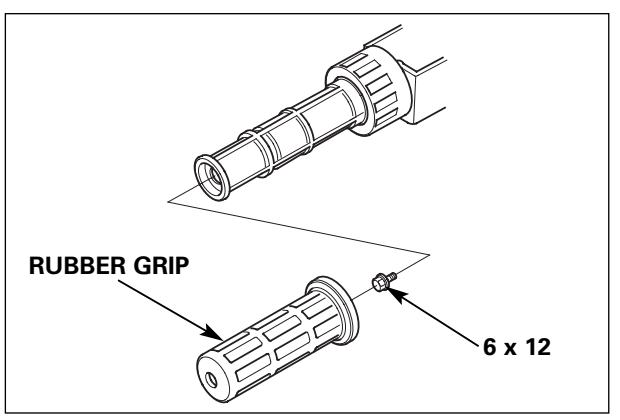
14) Remove the 8 x 28 mm flange bolt and remove the height adjusting block.

15) Remove the 12 mm hex nut [small] from the steering bracket.
Loosen the 12 x 80 mm hex bolt, and remove the 12 mm hex nut [large], 14 mm wave washer, 12.2 x 23 x 16 mm distance collar, 12 x 80 mm hex bolt and the 12 mm washer [small].
Remove the steering bracket and the 12 mm washer [large].

16) Check the steering handle bushings mounted on the steering bracket installation part of the tiller handle assembly for wear, damage or deformation. Replace the bushings with new ones if necessary.



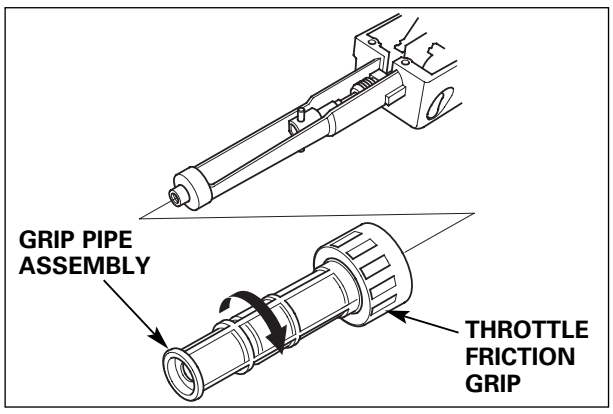
17) Remove the rubber grip and remove the 6 x 12 mm flange bolt.



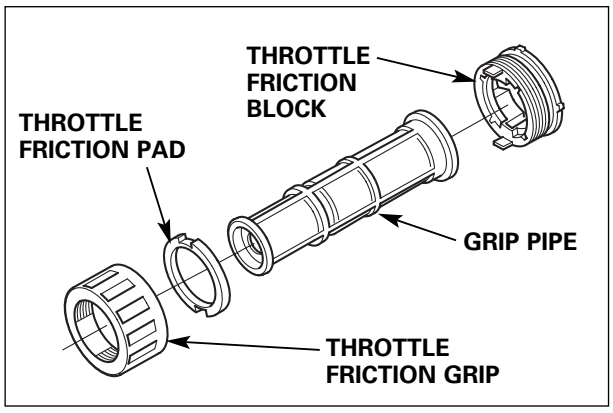
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-14

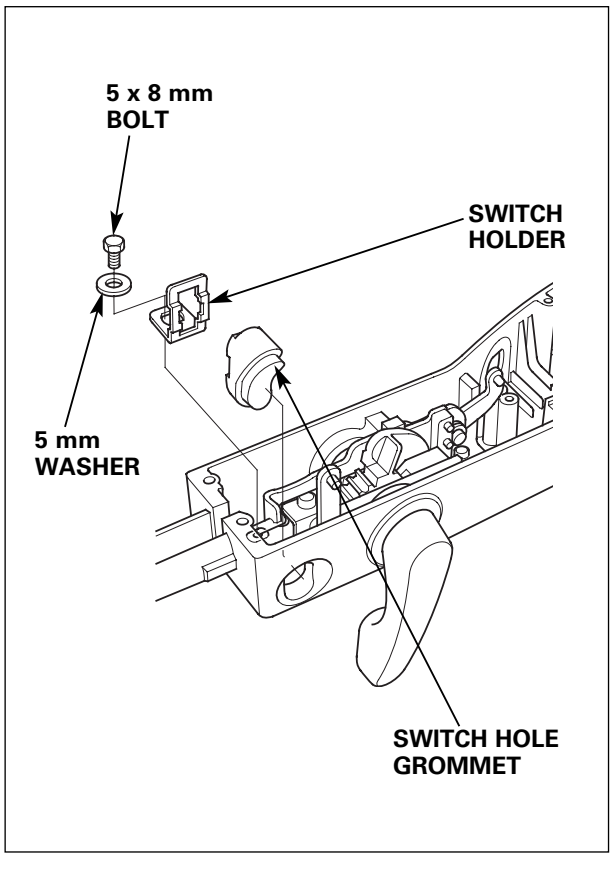
18) Loosen the throttle friction grip on the grip pipe assembly, and turn the grip pipe assembly clockwise to remove it from the tiller handle assembly.



19) Remove the throttle friction grip, throttle friction pad and the throttle friction block from the grip pipe.



20) Remove the 5 x 8 mm bolt and the 5 mm washer, and remove the switch holder.
Remove the switch hole grommet.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-15

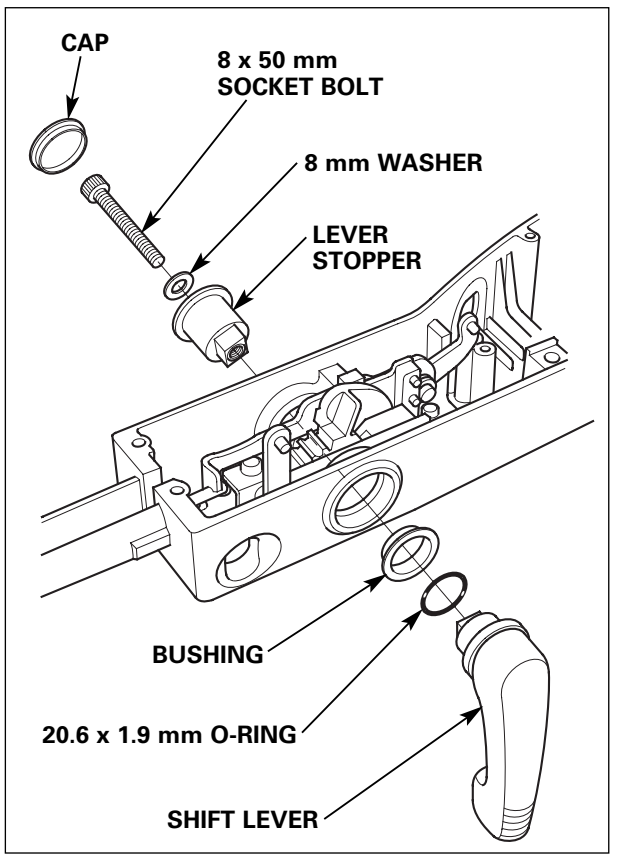
21) Remove the cap from the tiller handle assembly, and loosen the 8 x 50 mm socket bolt by approx. 10 mm (0.4 in).

    Remove the shift lever from the tiller handle assembly by tapping the bolt head with a plastic hammer.

22) Loosen the 8 x 50 mm socket bolt and the 8 mm washer from the shift lever, and remove the lever stopper and the shift lever from the tiller handle assembly.

    Remove the 20.6 x 1.9 mm O-ring from the shift lever. Replace the O-ring with a new one.

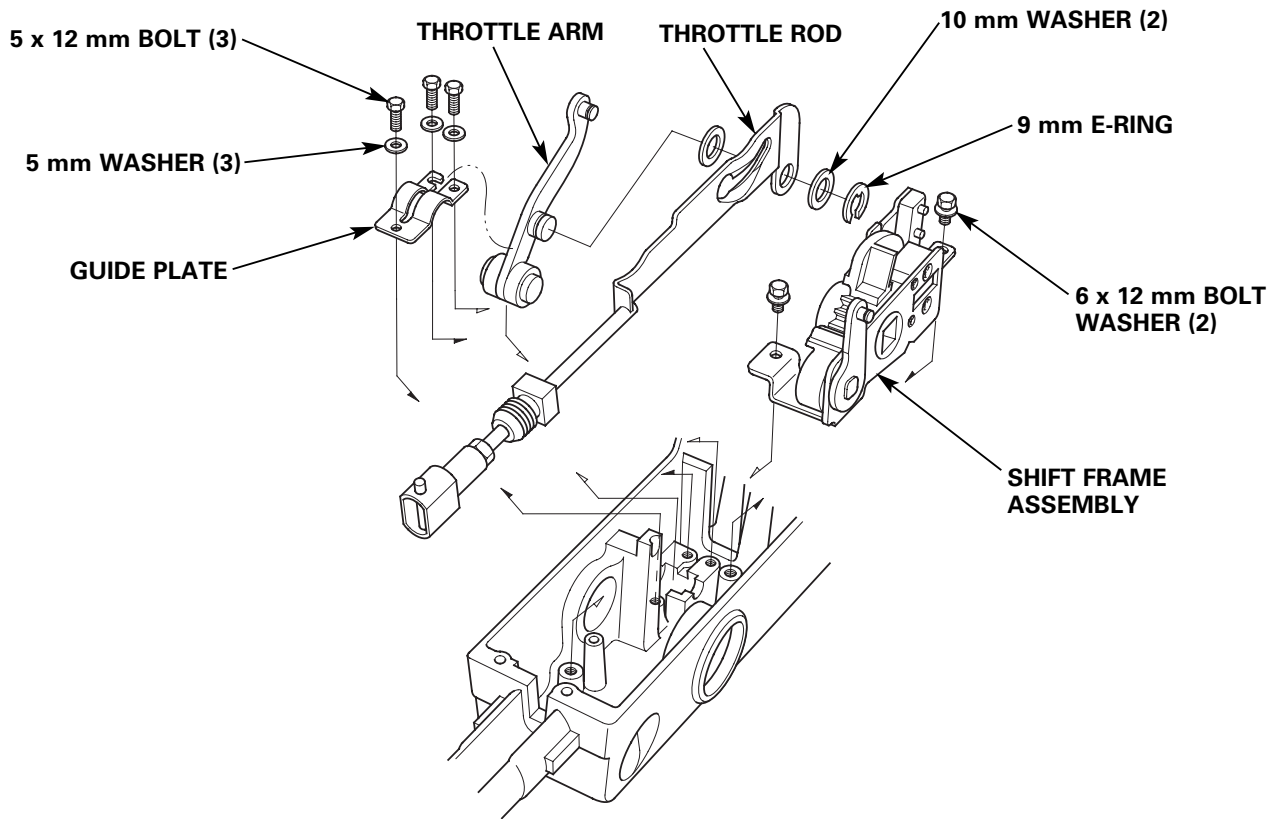
    Check the bushing for wear or damage and replace it with a new one if necessary.



23) Remove the two 6 x 12 mm bolt washers from the shift frame assembly.

24) Remove the three 5 x 12 mm bolts and the three 5 mm washers, and remove the throttle arm/throttle rod assembly and the shift frame assembly as a set.

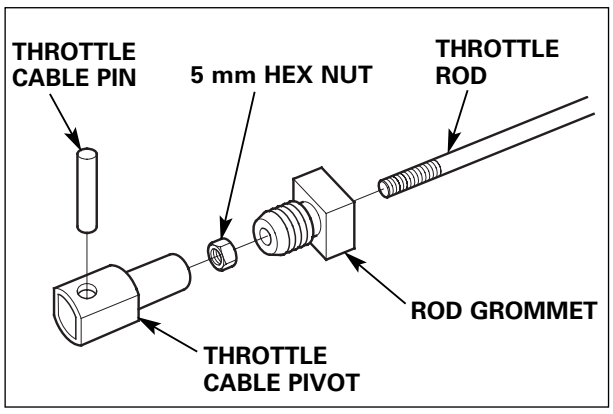
25) Remove the 9 mm E-ring, and remove the throttle rod and the two 10 mm washers.



© Honda Motor Co., Ltd.

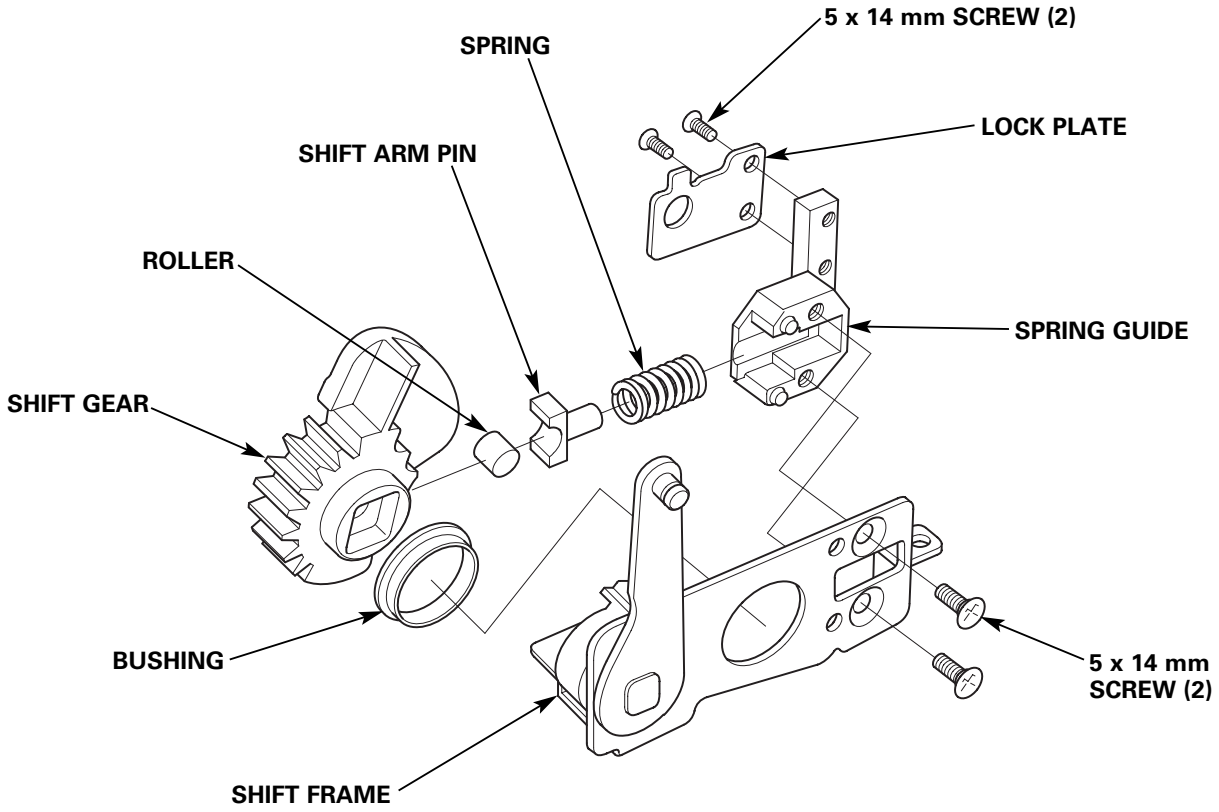
cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-16

26) Remove the throttle cable pin from the throttle cable pivot. Loosen the 5 mm hex nut from the throttle cable pivot, and remove the throttle cable pivot, 5 mm hex nut and rod grommet from the throttle rod.



27) Remove the two 5 x 14 mm screws and remove the lock plate.
Remove the two 5 x 14 mm screws, and remove the spring guide, spring, shift arm pin and the roller.

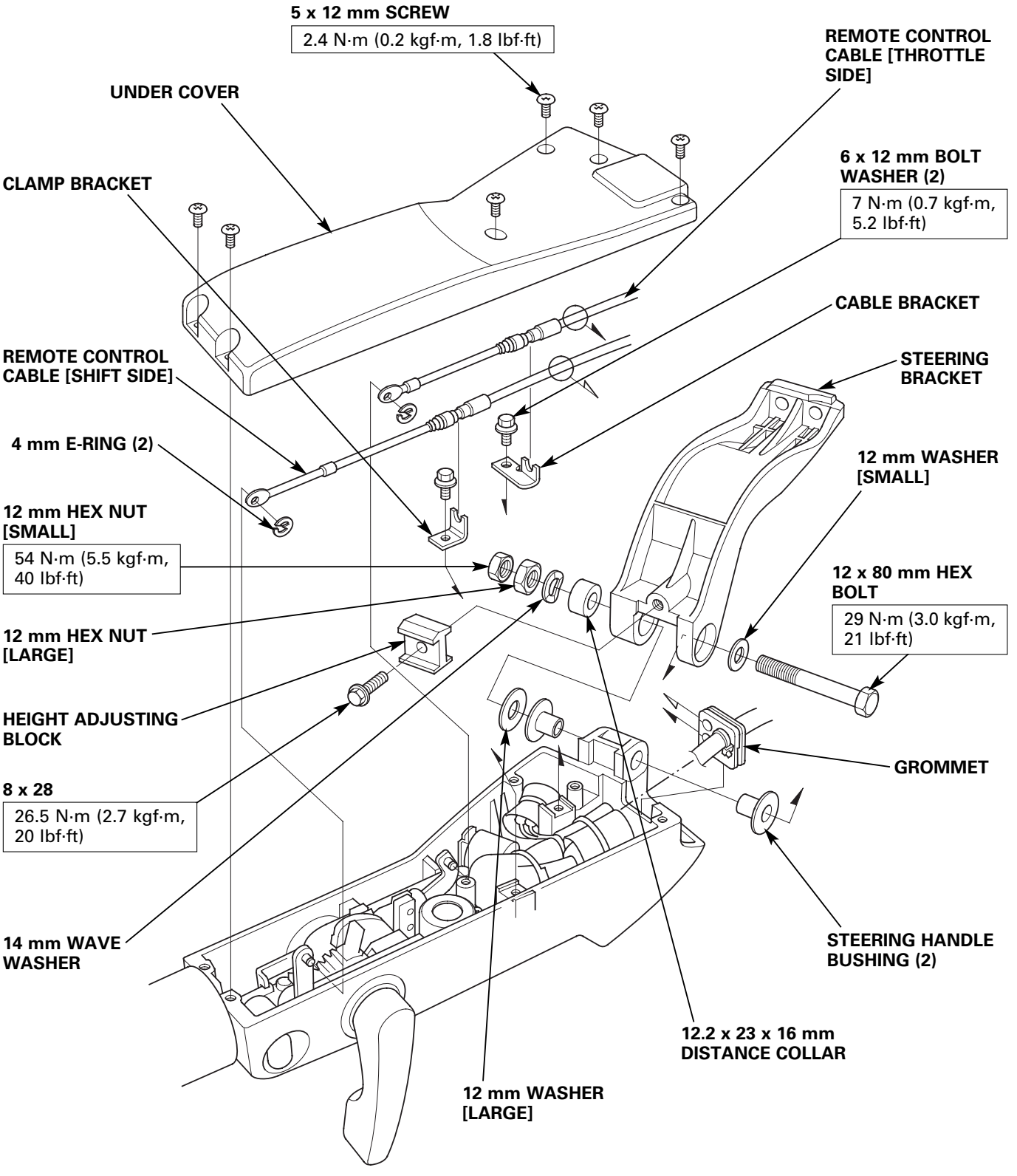
28) Remove the shift gear and the bushing from the shift frame.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-17

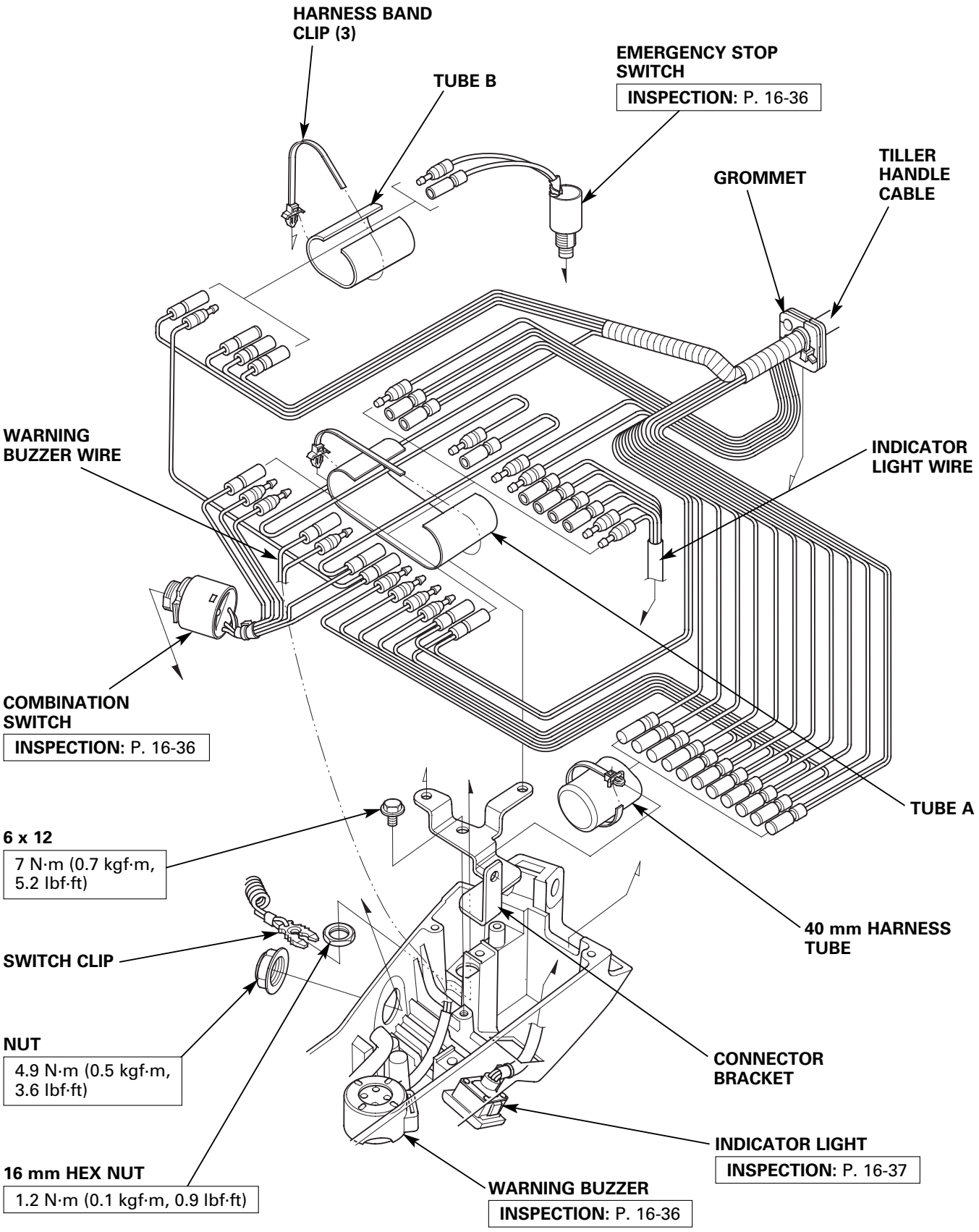
c. COMPONENT DRAWING
• UNDER COVER/REMOTE CONTROL CABLE/STEERING BRACKET



© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-18

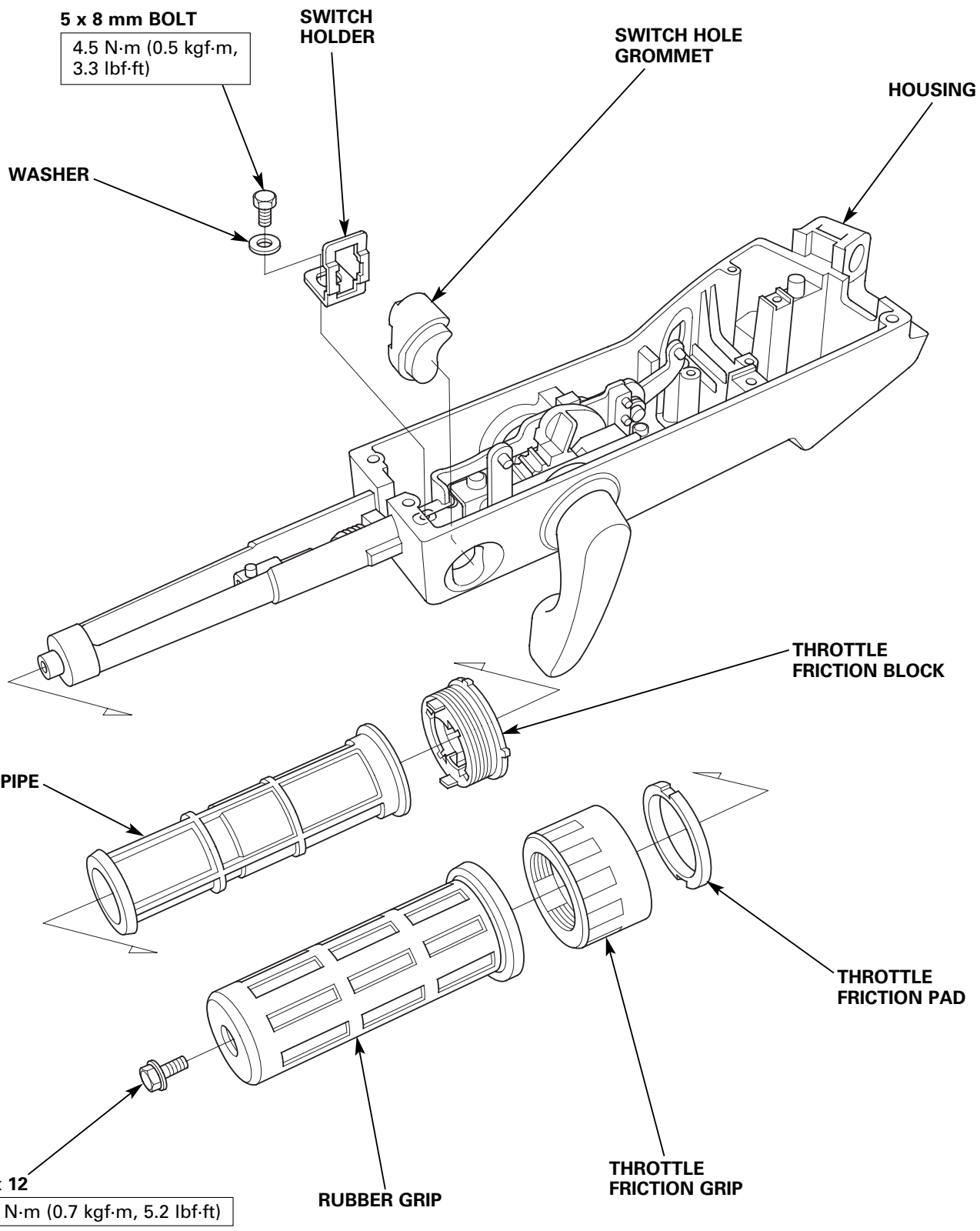
• ELECTRIC PARTS



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-19

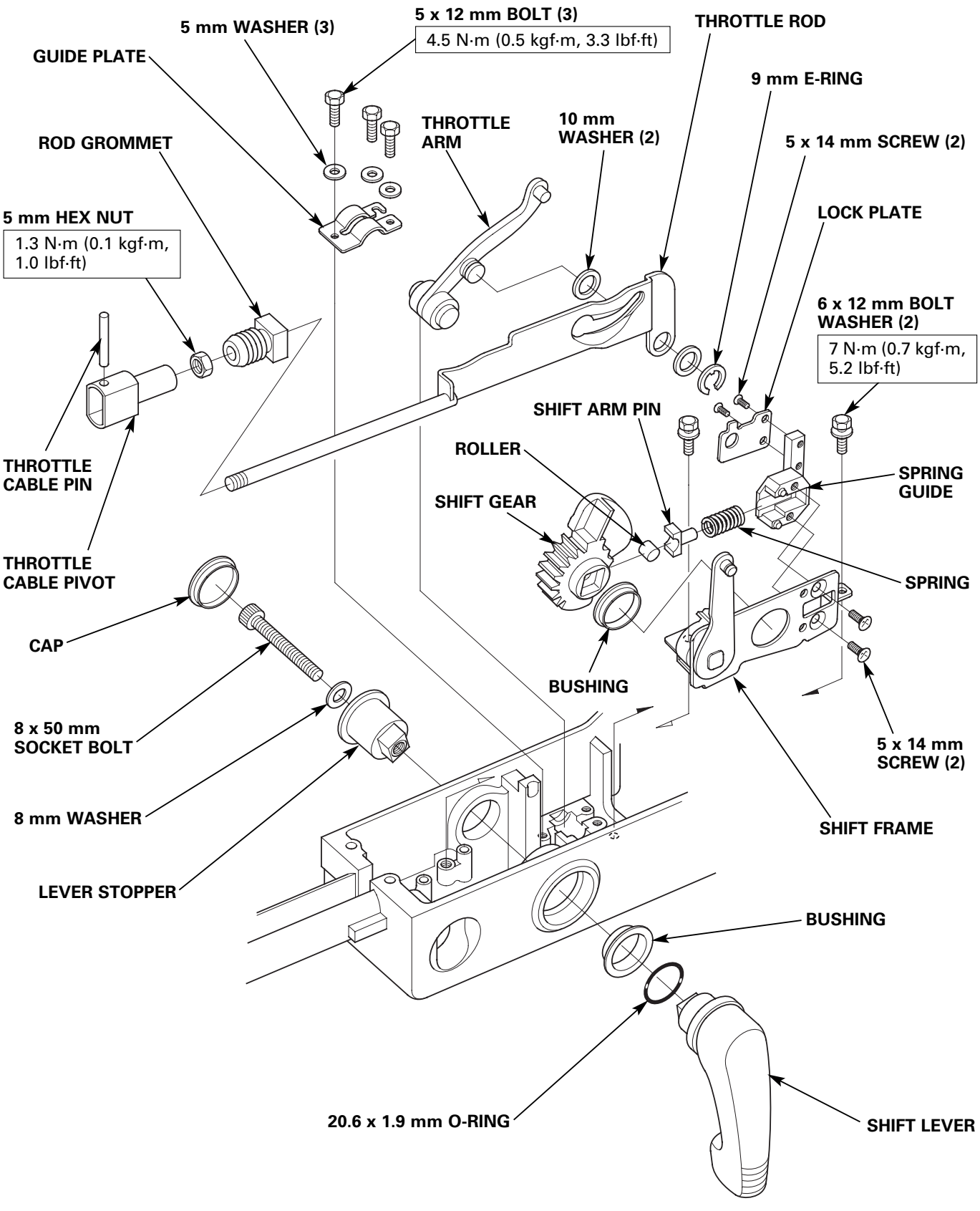
• POWER TILT SWITCH/THROTTLE



© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-20

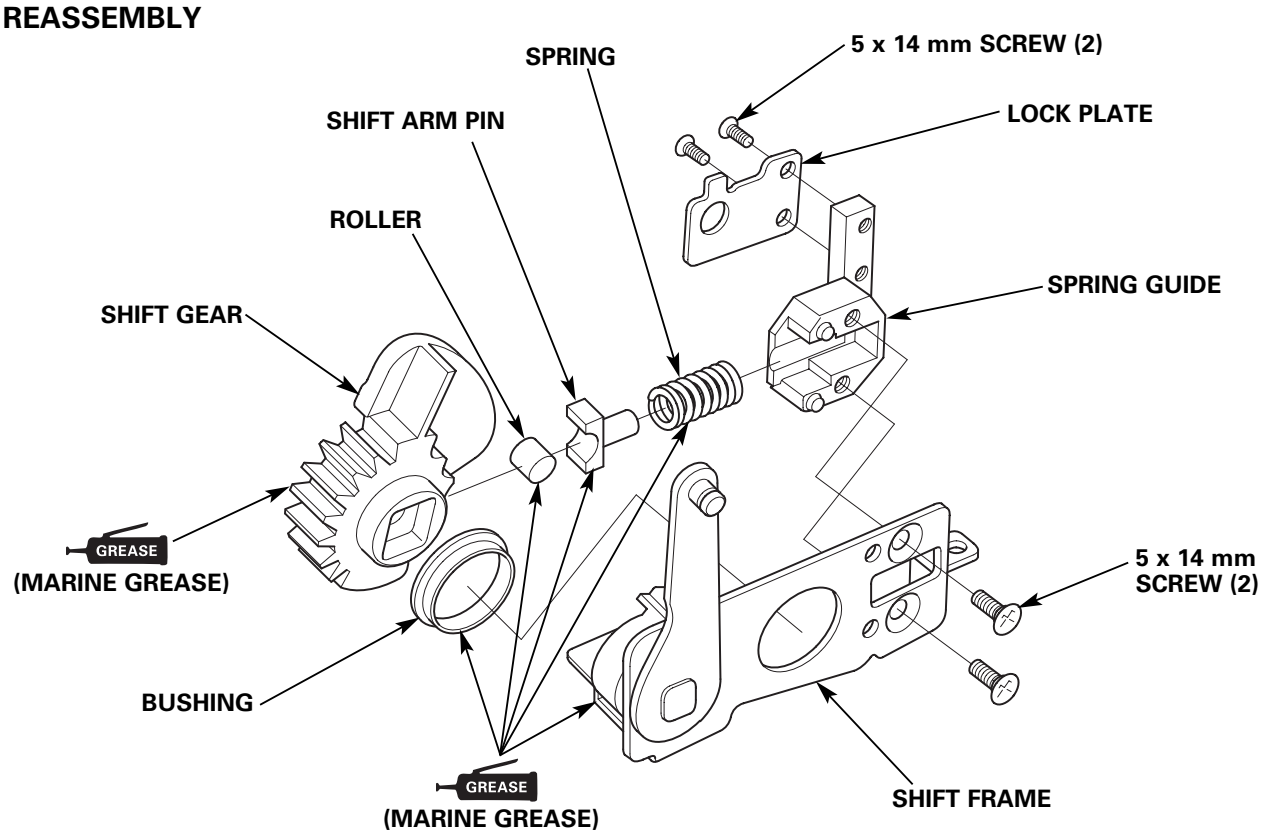
• SHIFT LEVER/SHIFT GEAR



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-21

d. REASSEMBLY

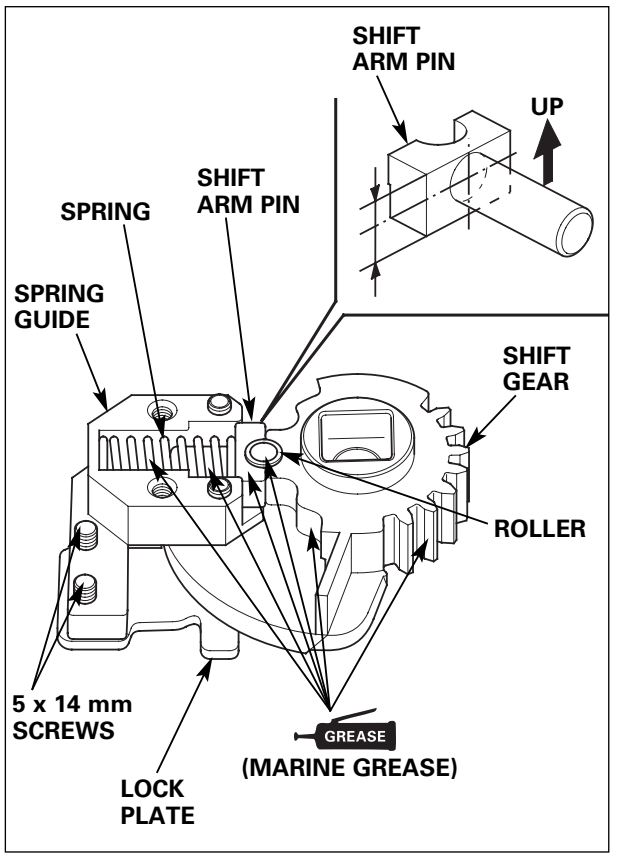


1) Install the lock plate on the spring guide. Tighten the two 5 x 14 mm screws.

2) Apply marine grease to the outer surface of the spring, shift arm pin and the roller.
   Install the spring and the shift arm pin on the spring guide noting the installation direction as shown.

3) Apply marine grease to the outer surface of the bushing, and install it on the shift frame.
   Apply marine grease to the shift gear in the positions shown.

4) Slide the shift gear between the spring guide and lock plate as shown, locating the roller between the shift gear and shift arm pin.



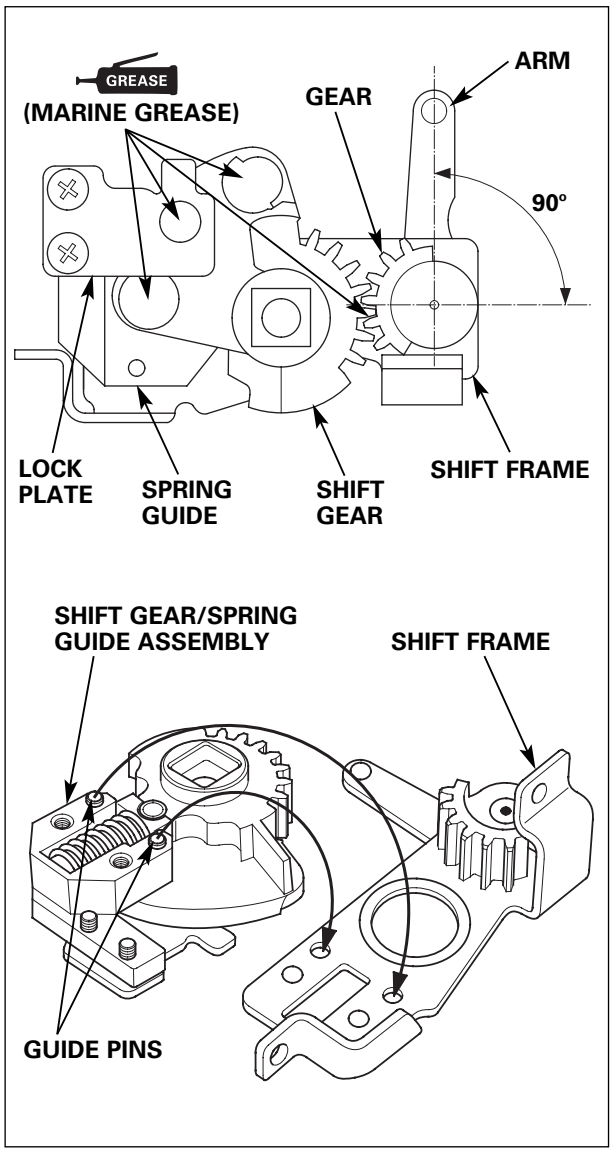
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-22

5) Apply marine grease to the gear on the shift frame arm. Rotate the sift frame arm so that it is at a right angle (90°) to the horizontal line as shown. Install the shift gear/spring guide assembly, assembled in step 4, on the shift frame, aligning the guide pins to the holes on the shift frame. Take care not to move the shift frame arm.

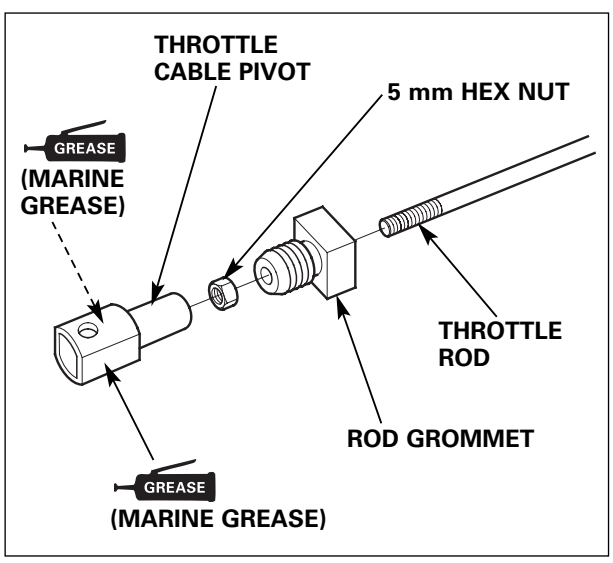
   • Repeat step 5 if the shift frame arm moved during installation.

6) Tighten the two 5 x 14 mm screws on the shift frame (P. 16-21).



7) Apply marine grease to the sliding surface of the throttle cable pivot.

8) Install the rod grommet on the throttle rod and tighten the 5 mm hex nut on the throttle rod.
   Tighten the throttle cable pivot on the throttle rod.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-23

9) Apply marine grease to the pin of the throttle arm. Set the two 10 mm washers and the throttle rod on the throttle arm, and install the 9 mm E-ring securely as shown.
   Apply marine grease to the fulcrum of the throttle arm.
   Set the throttle arm in the guide plate cutout as shown.

10) Set the throttle arm/throttle rod assembly in the housing and tighten the three 5 x 12 mm bolts and 5 mm washers to the specified torque. Note that the throttle arm does not interfere with the cutout in the guide plate this time.

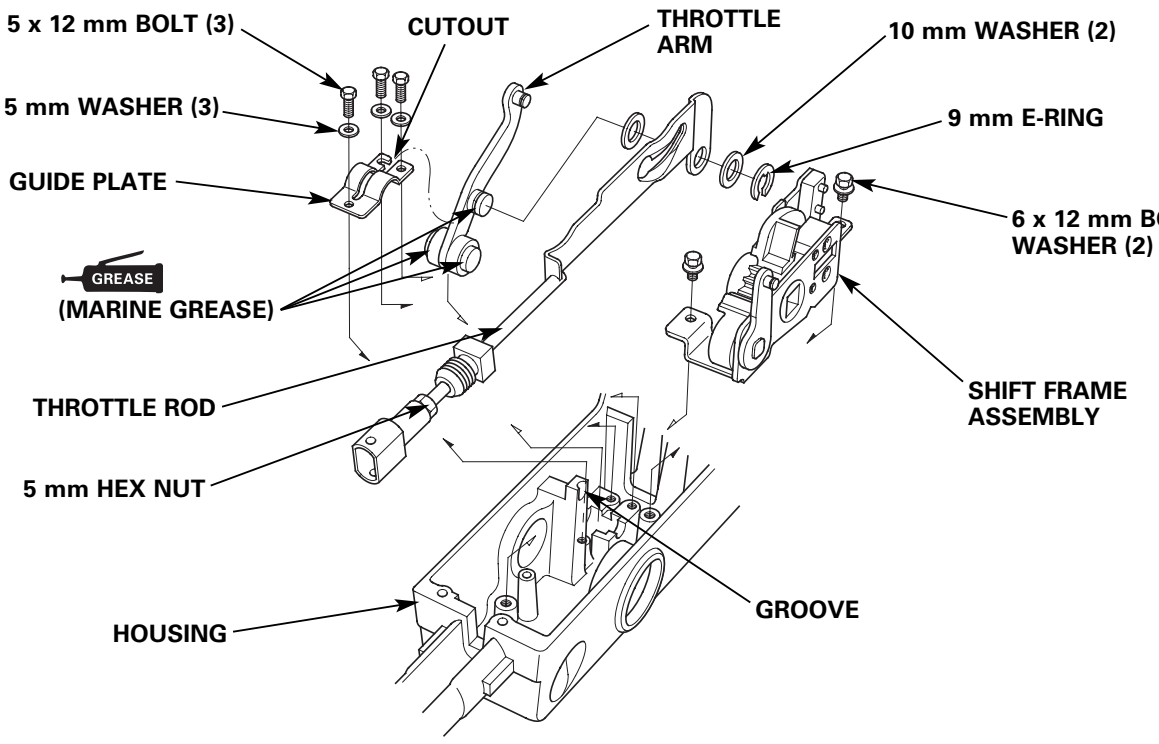
    TORQUE: 4.5 N·m (0.5 kgf·m, 3.3 lbf·ft)

11) Set the shift frame assembly in the housing and tighten the two 6 x 12 mm bolt washers to the specified torque.

    TORQUE: 7 N·m (0.7 kgf·m, 5.2 lbf·ft)

12) Tighten the 5 mm hex nut of the throttle rod to the specified torque.

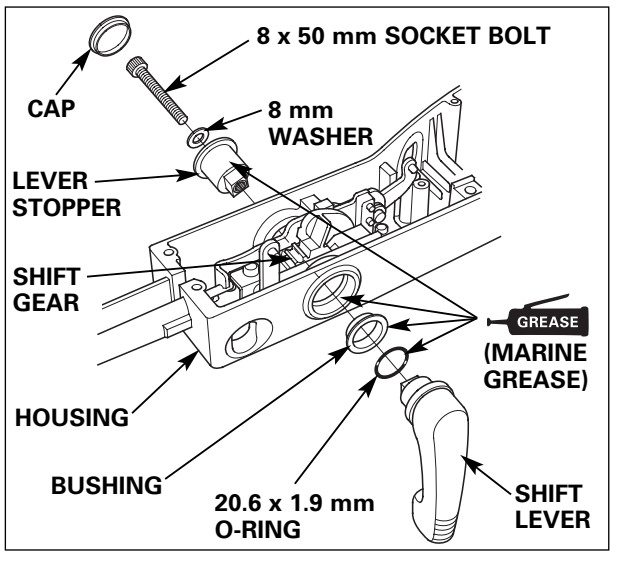
    TORQUE: 1.3 N·m (0.1 kgf·m, 1.0 lbf·ft)



13) Apply marine grease to the indicated position of the housing and to the outer surface of the bushing, then install the bushing on the housing.
    Install the new 20.6 x 1.9 mm O-ring on the shift lever.
    Apply marine grease to the sliding surfaces of the shift lever and lever stopper.

14) Install the shift lever and the lever stopper, aligning the square parts of both the shift lever and lever stopper with the square holes in the shift gear as shown. Tighten the 8 x 50 mm socket bolt securely.

    Install the cap on the housing.

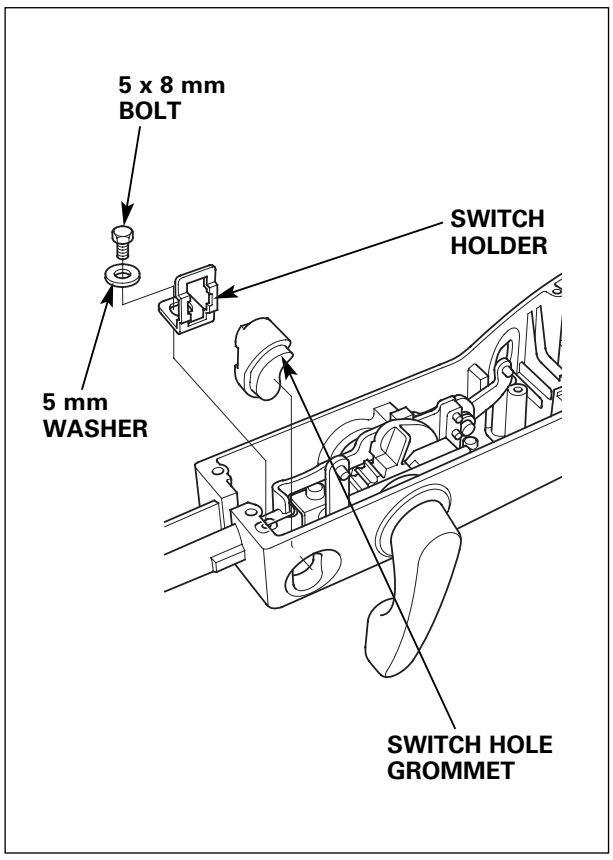


© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-24

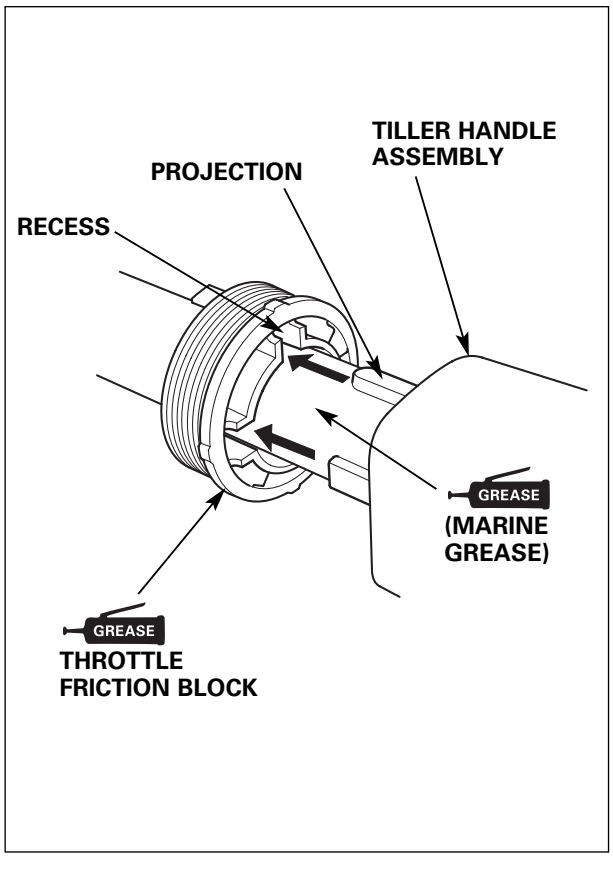
15) Set the switch hole grommet on the switch holder. Install the switch holder, and tighten the 5 x 8 mm bolt and 5 mm washer to the specified torque.

TORQUE: 4.5 N·m (0.5 kgf·m, 3.3 lbf·ft)



16) Apply marine grease to the grip pipe installation part of the tiller handle assembly and to the outer surface of the throttle friction block.

17) Install the throttle friction block on the tiller handle assembly, aligning the projections on the tiller handle assembly with the recesses in the friction block.

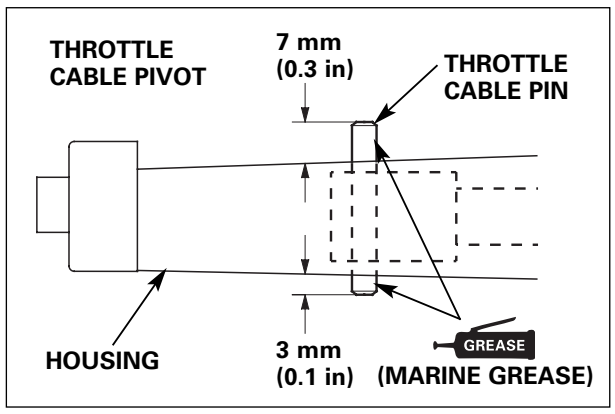


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-25

18) Apply marine grease to the outer surface of the throttle cable pin.

19) Install the throttle cable pin on the throttle cable pivot so that the pin ends protrude from the throttle cable pivot by the dimensions shown.

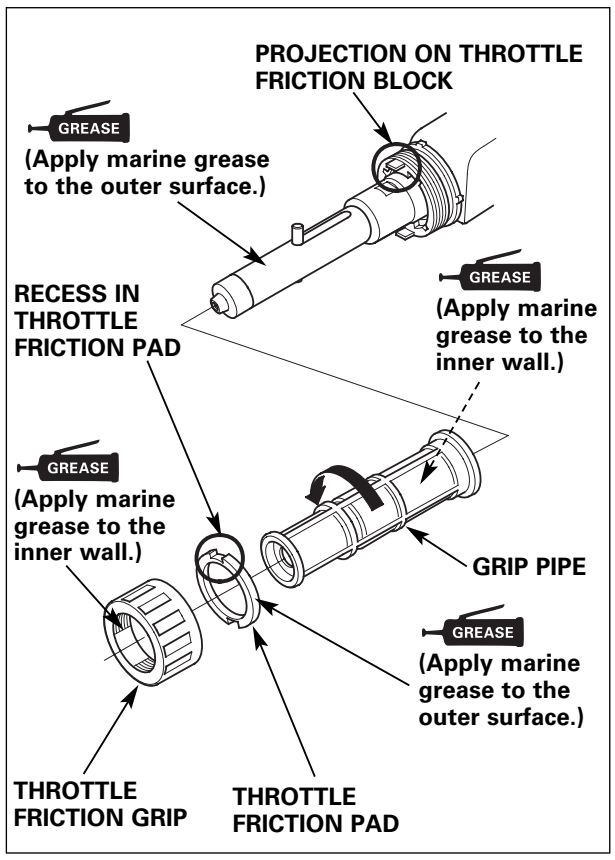


20) Apply marine grease to the inner wall of the grip pipe, circumference of the throttle friction pad and to the inner wall of the throttle friction grip.

Install the throttle friction pad on the grip pipe.

Install the grip pipe assembly on the tiller handle assembly by turning the grip pipe assembly counterclockwise slowly.

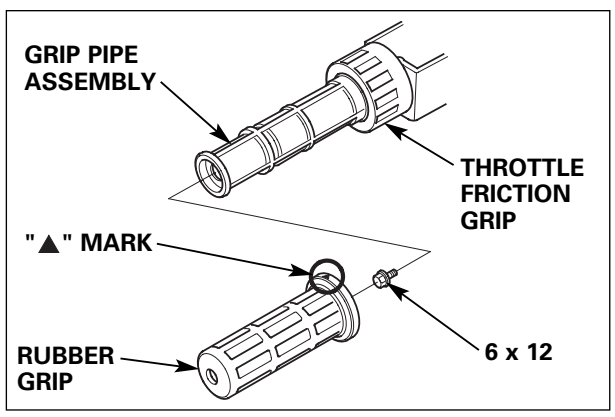
21) Tighten the throttle friction grip against the throttle friction block, aligning the recess in the throttle friction pad with the projection on the throttle friction block.



22) Tighten the 6 x 12 mm flange bolt to the specified torque.

TORQUE: 7 N·m (0.7 kgf·m, 5.2 lbf·ft)

23) Check that the grip pipe is tightened securely by turning it clockwise fully (full close position), and tighten the throttle friction grip securely.
Install the rubber grip on the grip pipe with the "▲" mark toward up.

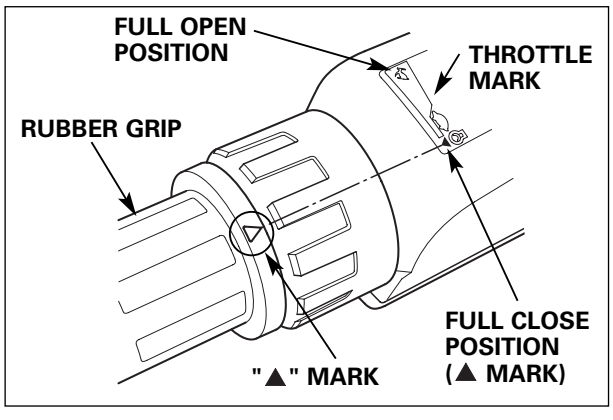


© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-26

24) After installing the rubber grip, operate the throttle grip and check that the "▲" mark on the rubber grip aligns with the fully open position or full close position ("▲" mark) of the throttle mark.

If not, remove the rubber grip and reinstall it.



25) Apply marine grease to the side and outer surface of the steering handle bushings and to the inner wall of the housing. Install the steering handle bushings on the tiller handle assembly.
Apply marine grease to the 12 mm washer [large]. Set the 12 mm washer [large] in the position shown, and install the steering bracket on the tiller handle assembly.

26) Install the 12 mm washer [small], 12 x 80 mm hex bolt, 12.2 x 23 x 16 mm distance collar, 14 mm wave washer and the 12 mm hex nut [large], and tighten the 12 x 80 mm hex bolt to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 21 lbf·ft)

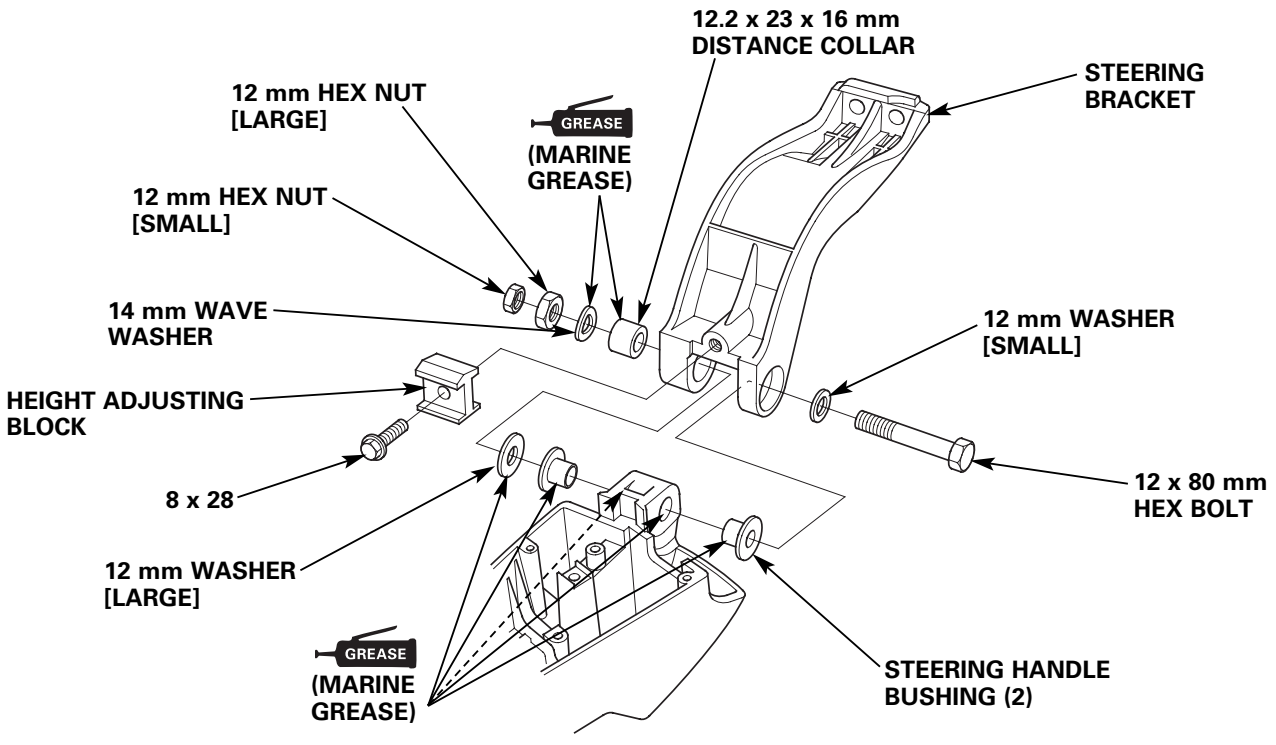
- Check that the threads of the 12 x 80 mm hex bolt are not contaminated with marine grease.

27) Tighten the 12 mm hex nut [small] against the 12 x 80 mm hex bolt.
Holding the 12 x 80 mm hex bolt, tighten the 12 mm hex nut [small] to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

28) Set the height adjusting block on the steering bracket, and tighten the 8 x 28 mm flange bolt to the specified torque.

TORQUE: 26.5 N·m (2.7 kgf·m, 20 lbf·ft)

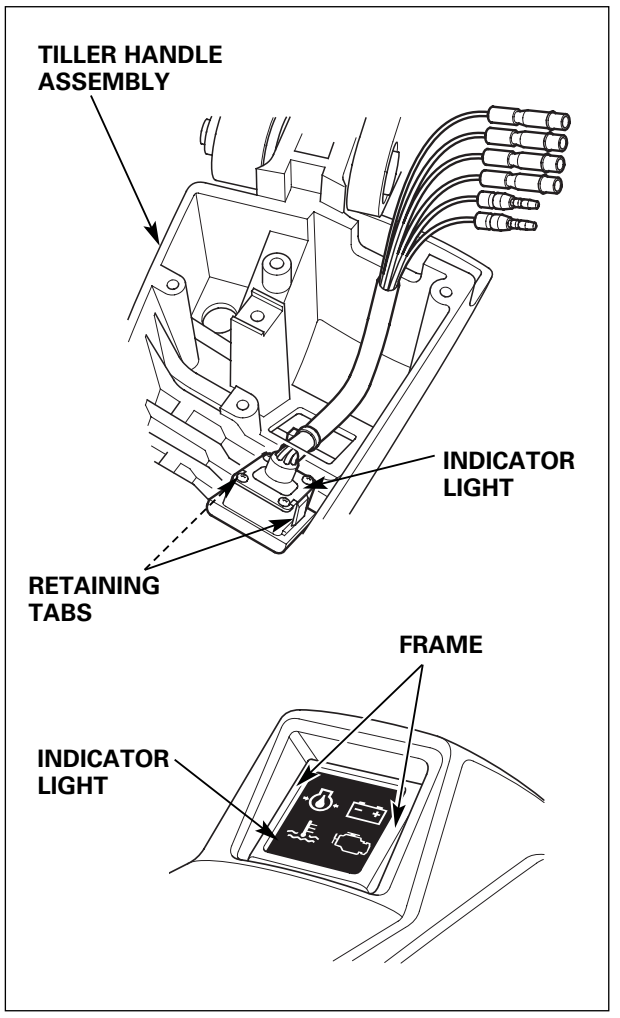


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:55 ページ 16-27

29) Install the indicator light on the tiller handle assembly so the display appears as shown.

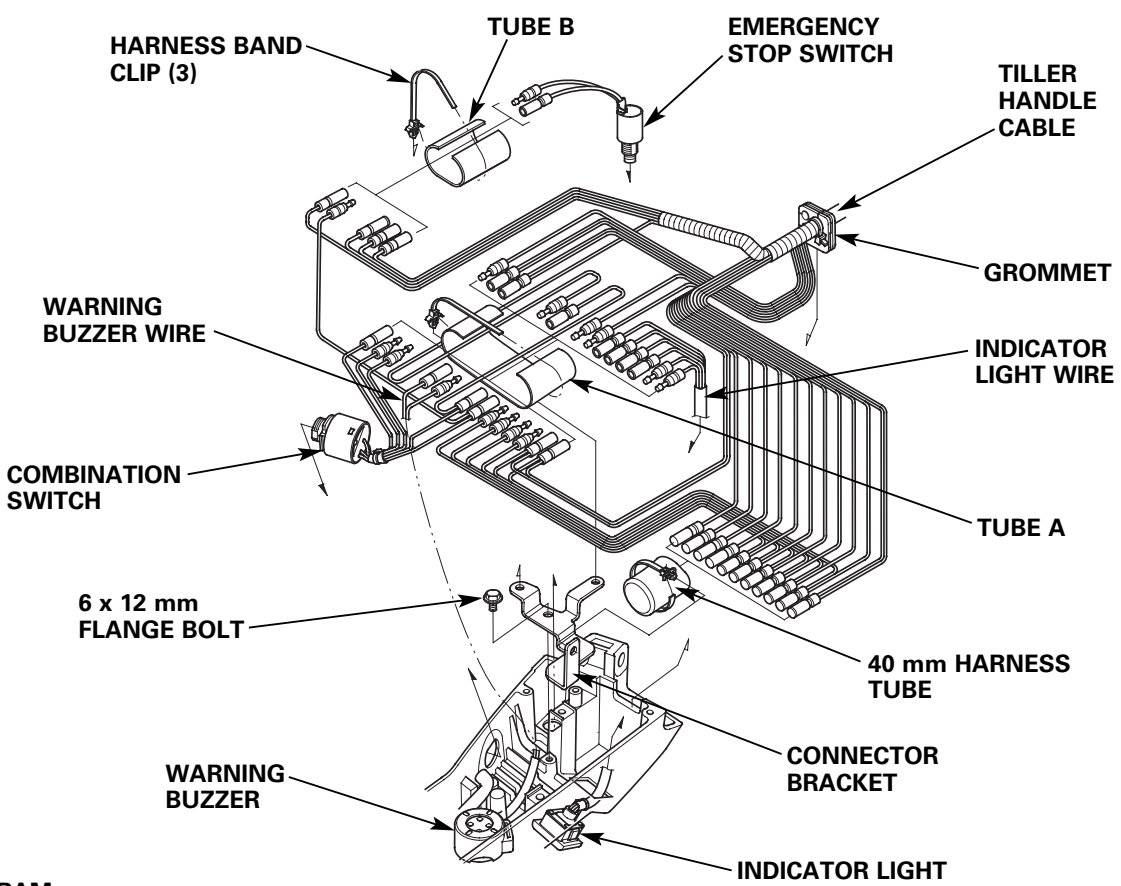
- Install the indicator light by pushing the frame on both ends of the display. Do not install the indicator light by pushing the center of the display.
- After installation, check that the retaining tabs of the indictor light are locked on the tiller handle assembly securely.



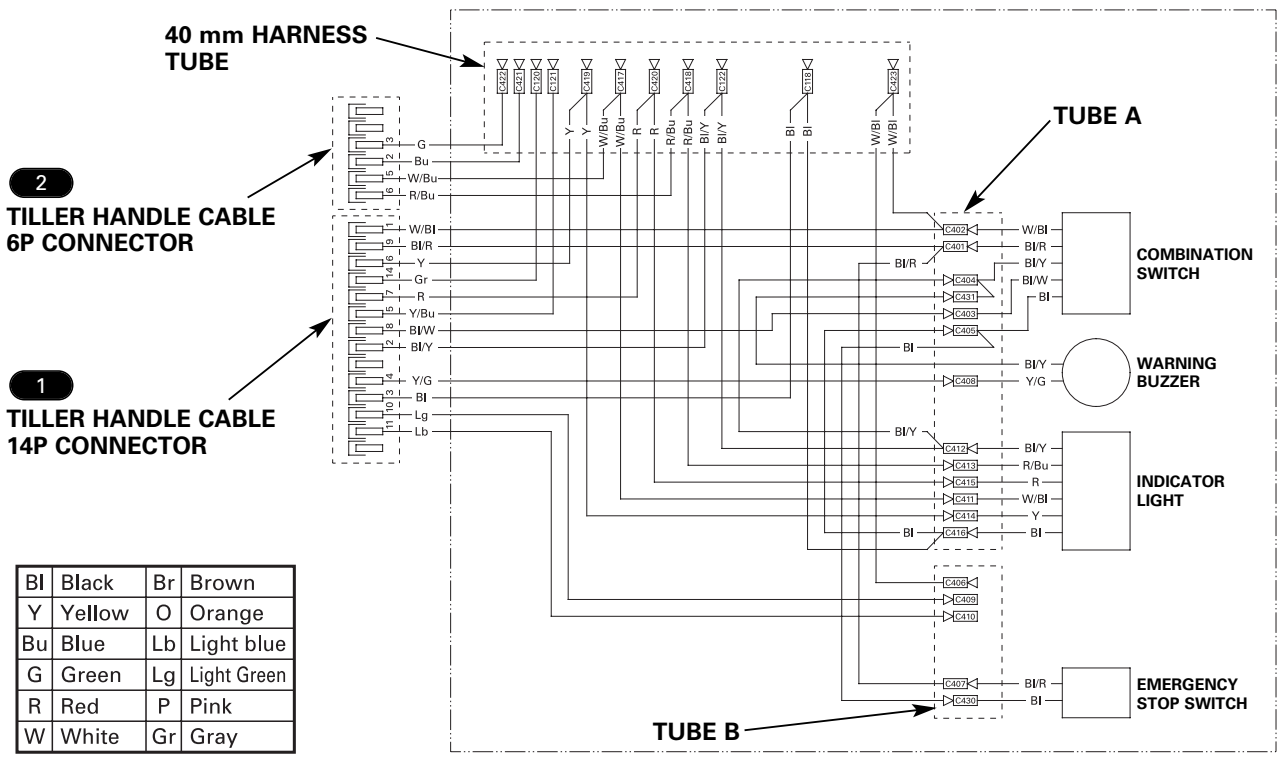
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-28

30) Install all of the connectors as shown.



<WIRING DIAGRAM>



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

Date of Issue: May 2008
© Honda Motor Co., Ltd.

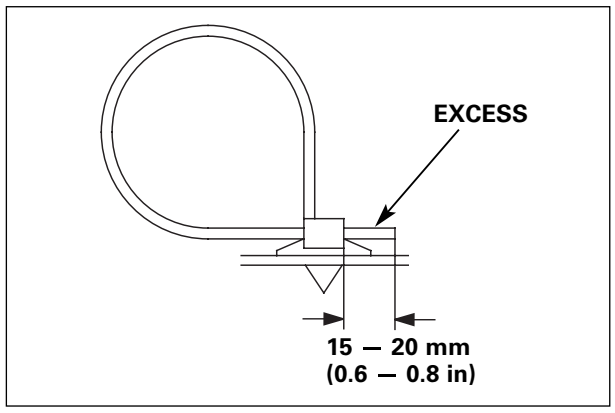
cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-29

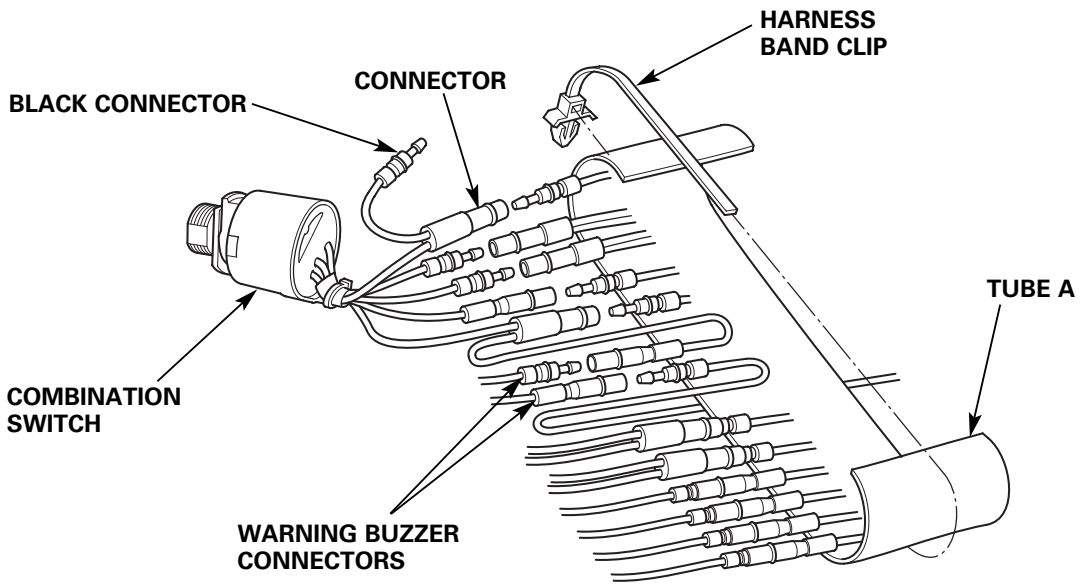
31) Connect the connectors to the indicator light connector (P. 16-28).
Connect the connectors to the combination switch connector (P. 16-28).
Connect the two warning buzzer connectors (P. 16-28).

Set tube A over the connectors that were just connected and clamp tube A at the connectors securely using a new harness band clip.

After clamping with the harness band clip, cut off the excess of the band at 15 to 20 mm (0.6 to 0.8 in) from the fastener end.

- Do not set the combination switch black connector in tube A.

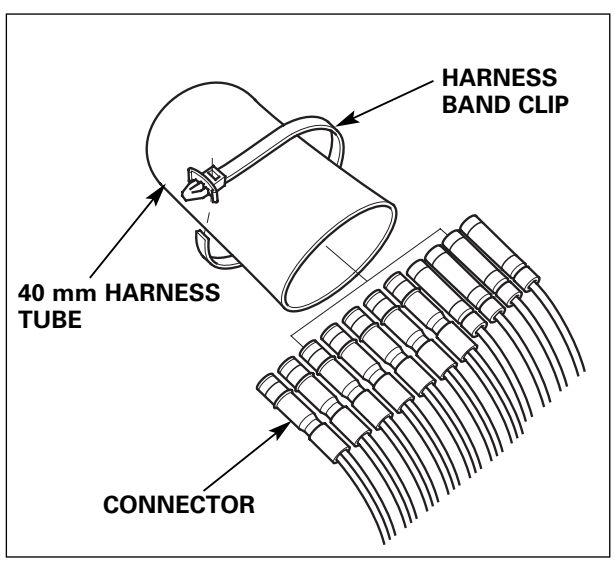




32) Set the connectors in the 40 mm harness tube and clamp the tube using a new harness band clip as shown.

- See P. 16-28 for the wire colors.

After fastening the harness band clip, cut off the excess of the band at 15 to 20 mm (0.6 to 0.8 in) from the fastener end.



© Honda Motor Co., Ltd.

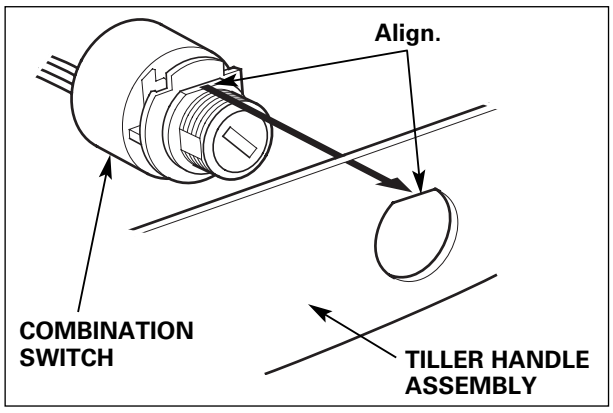
cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-30

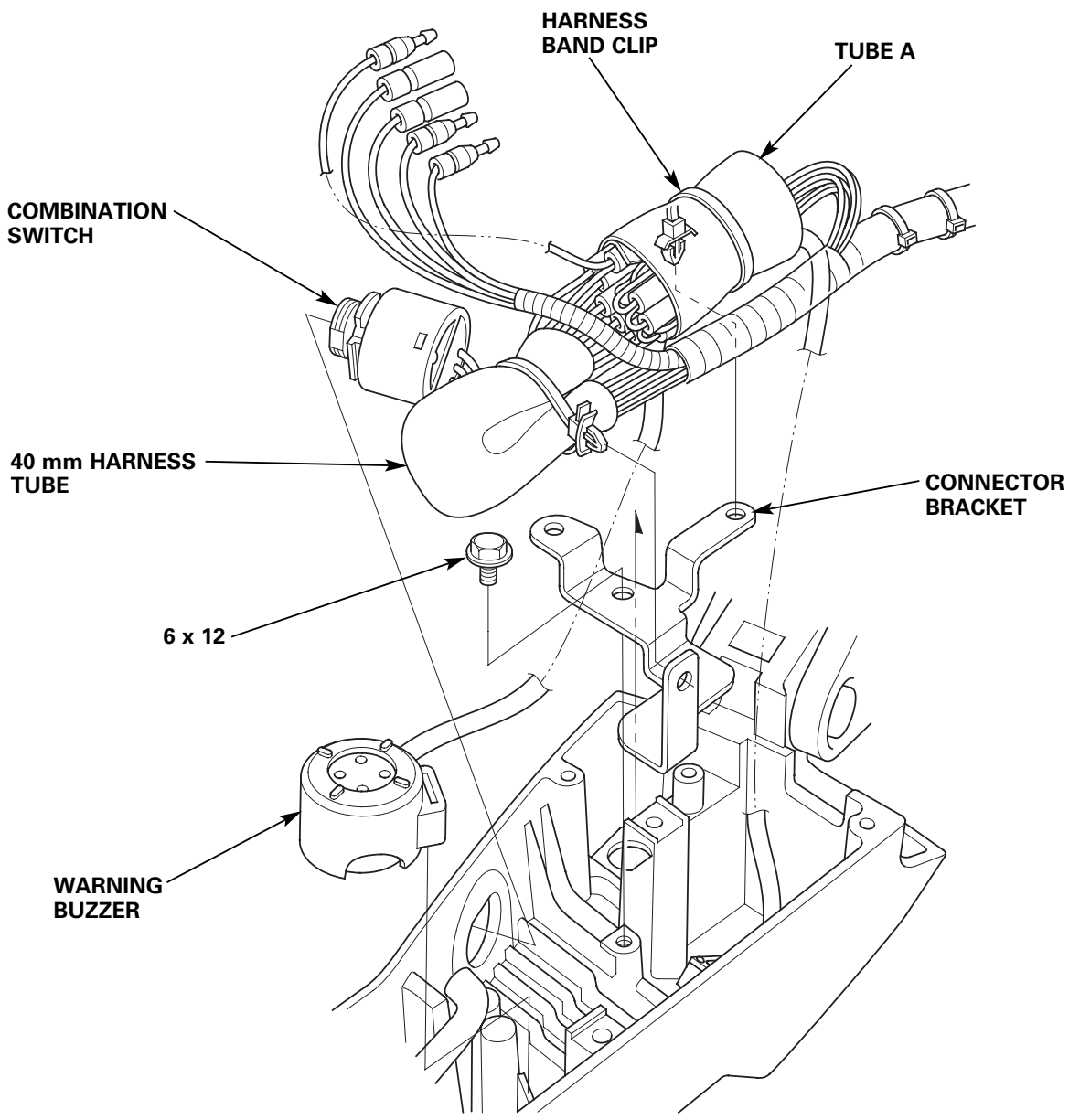
33) Install the combination switch on the tiller handle assembly, aligning the cutout in the combination switch with the flat part of the mounting hole in the tiller handle assembly as shown.

34) Install the connector bracket and tighten the 6 x 12 mm flange bolt to the specified torque.

TORQUE: 7 N·m (0.7 kgf·m, 5.2 lbf·ft)

Install tube A and the 40 mm harness tube on the connector bracket.





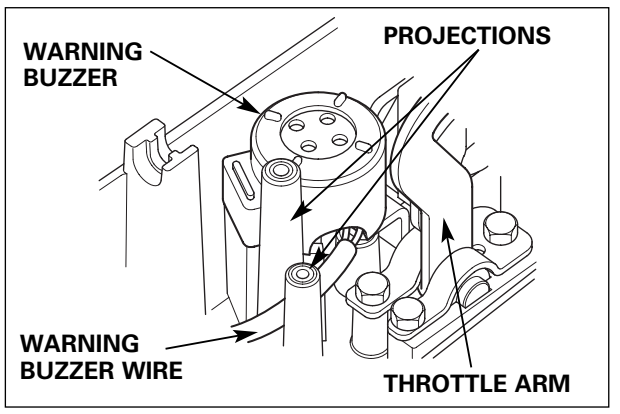
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-31

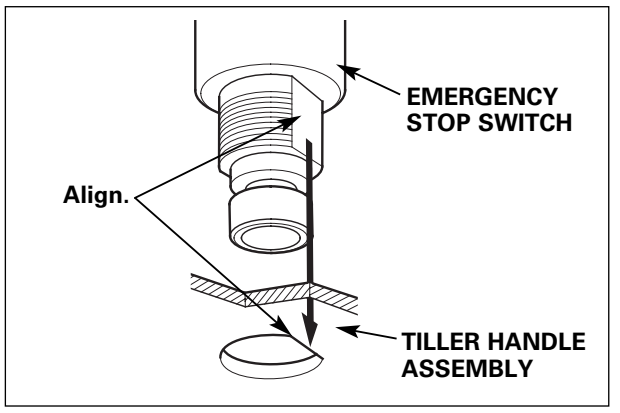
35) Install the warning buzzer in the housing.

Route the warning buzzer wire between the projections in the housing as shown.

- Operate the throttle arm and make sure it does not interfere with the warning buzzer wire.



36) Install the emergency stop switch on the tiller handle assembly, aligning the cutout in the emergency stop switch with the flat part of the mounting hole in the tiller handle assembly as shown.

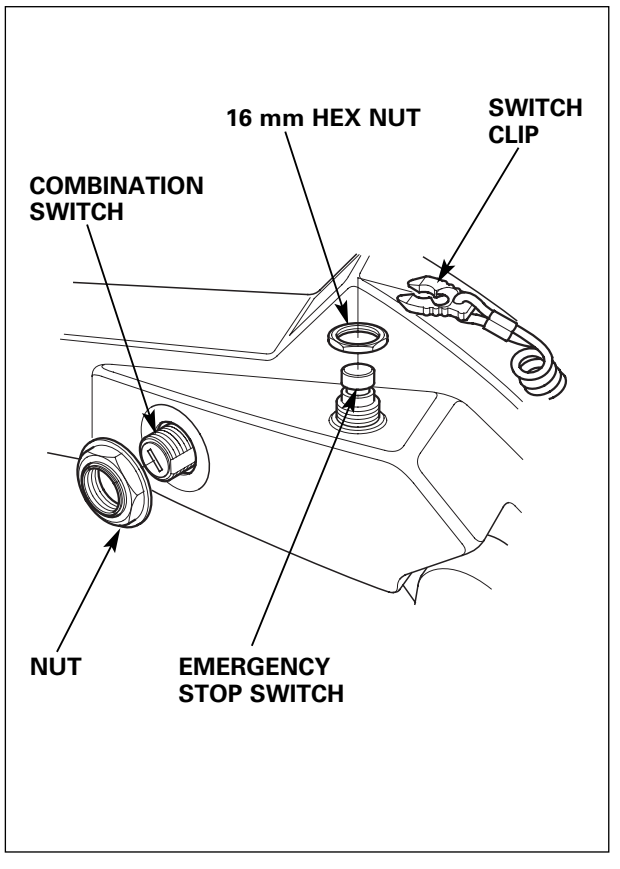


37) Install the nut on the combination switch and tighten the nut to the specified torque.

TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

38) Install the 16 mm hex nut on the emergency stop switch and tighten the 16 mm hex nut to the specified torque.

TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)



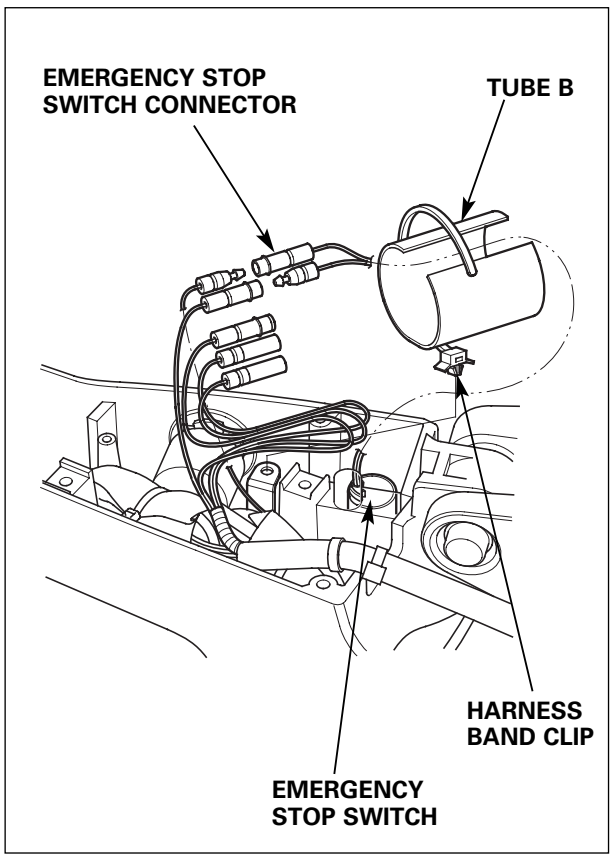
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-32

39) While holding the emergency stop switch connectors in tube B, clamp tube B at the connectors securely using a new harness band clip.

40) After fastening the harness band clip, cut off the excess of the band at 15 to 20 mm from the fastener end (P. 16-29).

- Check that the wires are not interfering with the tiller handle assembly.



41) Apply thread locking agent (LOCTITE® 242 or equivalent) to the threads of the two 6 x 12 mm bolt washers.
Install the cable bracket and clamp bracket, and tighten the two 6 x 12 mm bolt washers to the specified torque.

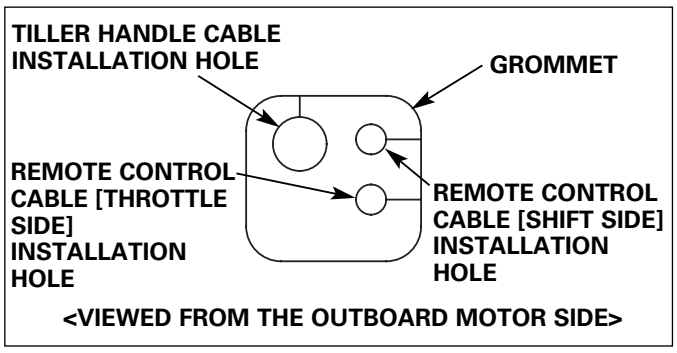
TORQUE: 7 N·m (0.7 kgf·m, 5.2 lbf·ft)

42) Apply marine grease to the installation part of each cable.
Set the shift side remote control cable in the upper right hole in the grommet, and set the throttle side remote control cable in the lower right hole by viewing the grommet from the outboard motor side as shown.
Install the grommet on the tiller handle assembly.

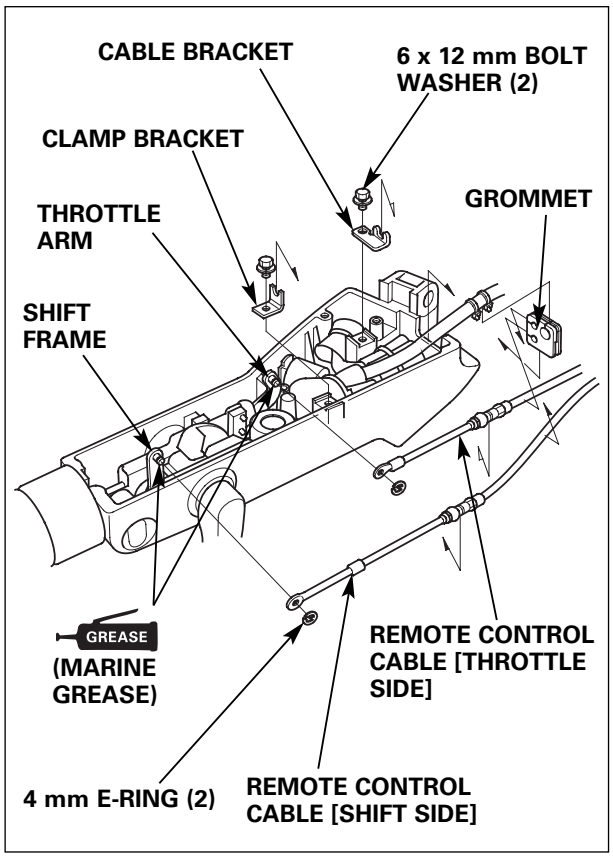
- Note that the longer remote control cable is the shift side cable, while the shorter cable is the throttle side cable.

43) Set the shift side and throttle side remote control cables on the shift frame and the throttle arm respectively, and install the two 4 mm E-rings securely.

- Check that the throttle side remote control cable does not interfere with the power tilt switch.



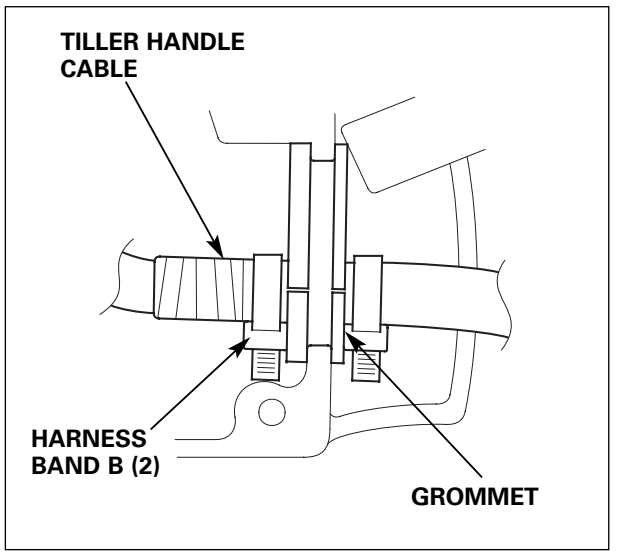
<VIEWED FROM THE OUTBOARD MOTOR SIDE>



Date of Issue: May 2008
© Honda Motor Co., Ltd.

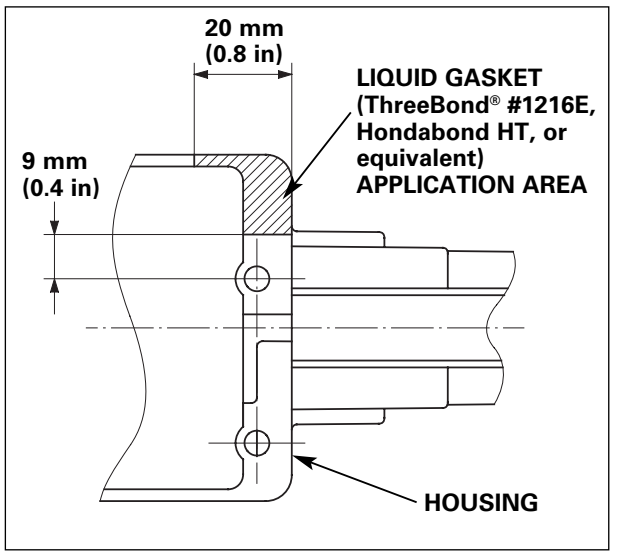
cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-33

44) Set the grommet between the harness band Bs on the tiller handle cable as shown.



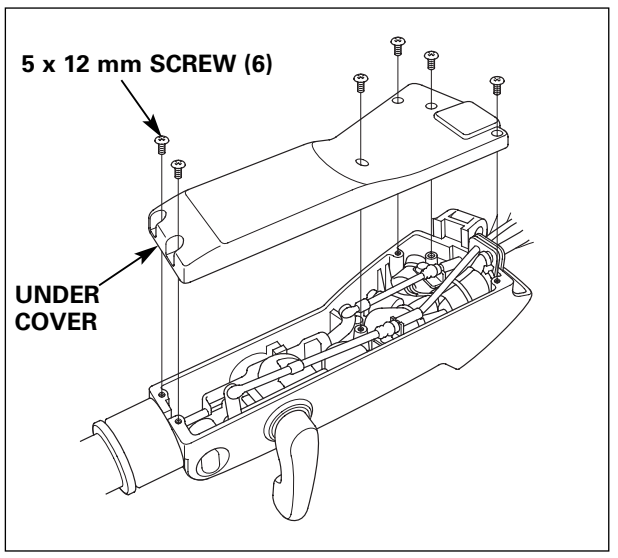
45) Clean the housing and under cover mating surfaces thoroughly using a shop towel and degreasing cleaning solvent.

46) Apply liquid gasket (ThreeBond® #1216E, Hondabond HT, or equivalent) to the housing in the areas shown.



47) Install the under cover and tighten the six 5 x 12 mm screws to the specified torque.

TORQUE: 2.4 N·m (0.2 kgf·m, 1.8 lbf·ft)



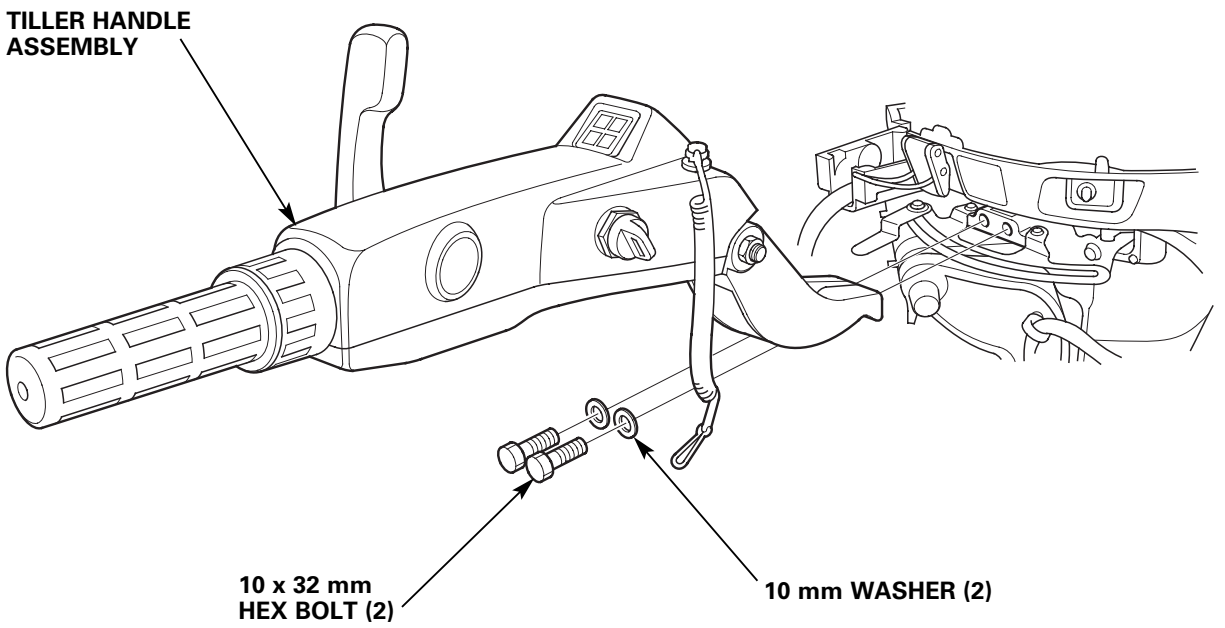
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-34

e. INSTALLATION

1) Set the tiller handle assembly on the outboard motor, and tighten the two 10 mm washers and the two 10 x 32 mm hex bolts to the specified torque.

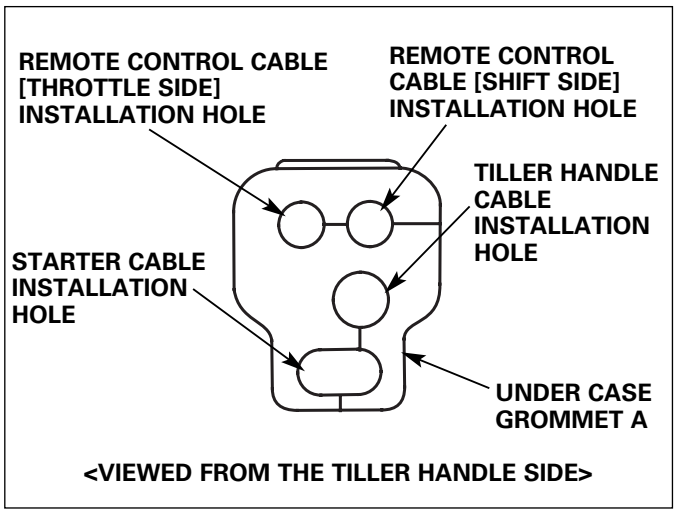
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

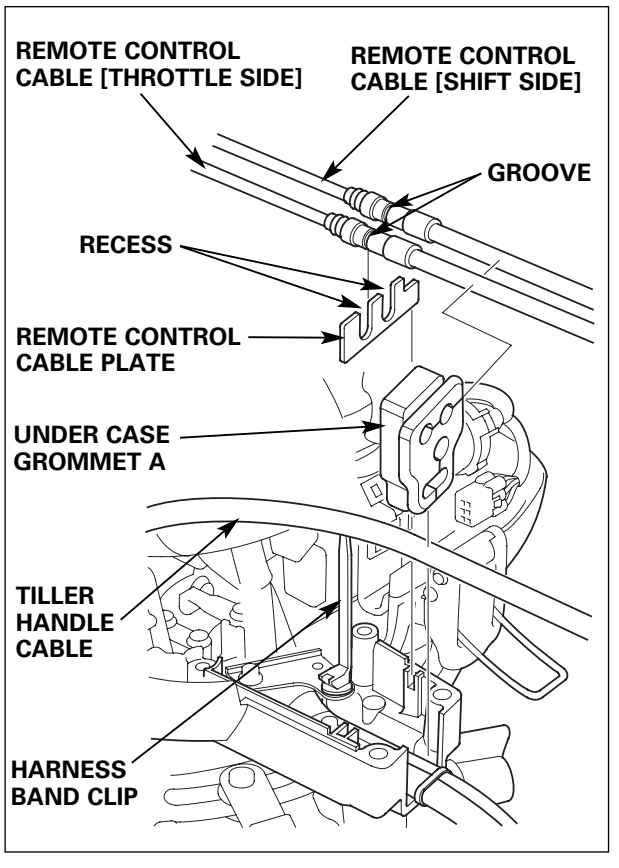


2) Clamp the tiller handle cable using the harness band clip. Install the remote control cable plate.

3) Pass the tiller handle cable, starter cable and the two remote control cables through under case grommet A in the positions shown.
Install under case grommet A on the engine under case.

4) Install the remote control cables on the remote control cable plate, aligning the groove in each cable with the corresponding recess in the cable plate.



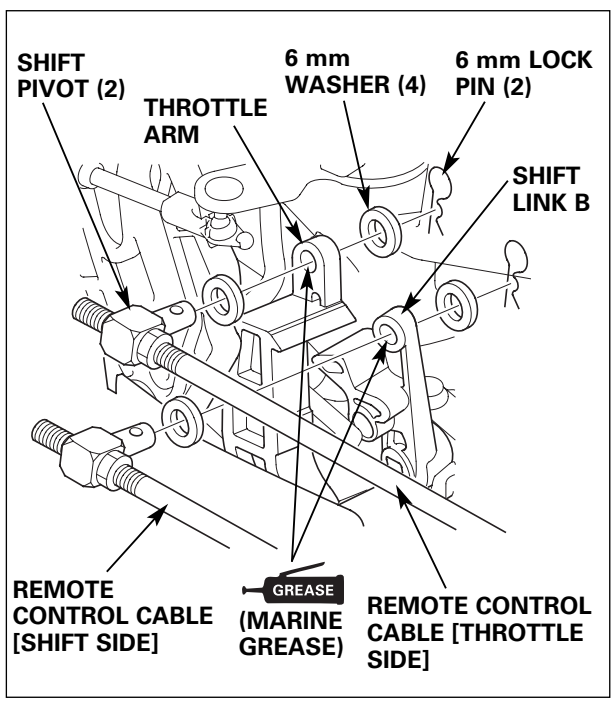


Date of Issue: May 2008
© Honda Motor Co., Ltd.

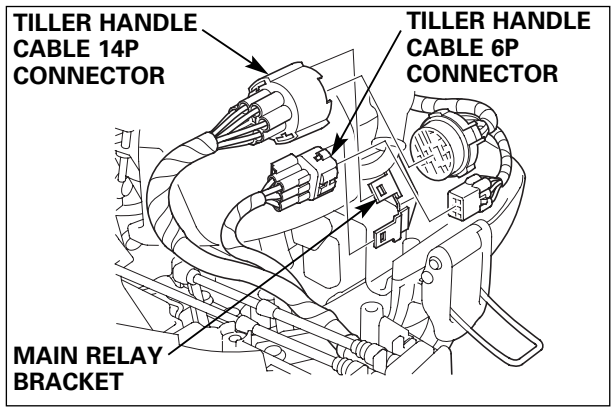
cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-35

5) Apply marine grease to the shift pivot installation hole in the throttle arm and shift link B.

6) Set the 6 mm washer on the shift pivot on each remote control cable.
Set the shift side and throttle side remote control cables on the throttle arm and shift link B respectively, and install the 6 mm washers and the 6 mm lock pins.



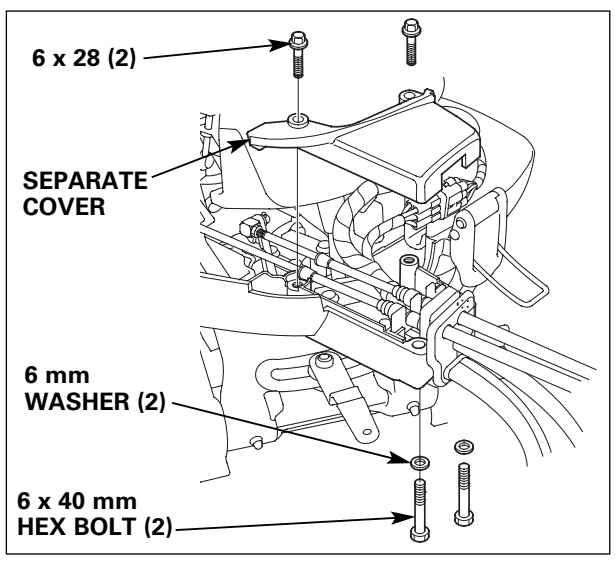
7) Connect the tiller handle cable 14P and 6P connectors, and install the connectors on the main relay bracket.



8) Install the separate cover, and tighten the two 6 x 28 mm flange bolts, two 6 mm washers and the two 6 x 40 mm hex bolts securely.

9) Perform the following adjustment.
- Throttle cable (P. 3-18)
- Shift cable (P. 3-21)

10) Install the engine cover (P. 4-2).



© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-36

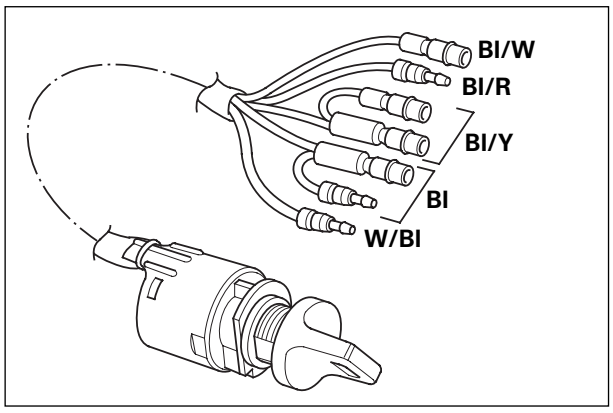
3. INSPECTION

• COMBINATION SWITCH

Check for continuity between the terminals with the switch in the position shown.
If there is any abnormality, replace the combination switch with a new one.

Position \ Wire	E (Bl)	IG (Bl/R)	BAT (W/Bl)	LO (Bl/Y)	ST (Bl/W)
OFF (Stop)	○——○				
ON (Armed)			○——○		
START			○——○	○——○	

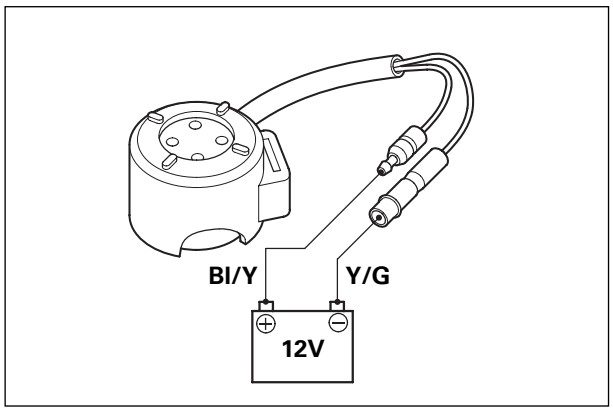
○——○ : Continuity



• WARNING BUZZER

• Use a known-good battery to check the warning buzzer.

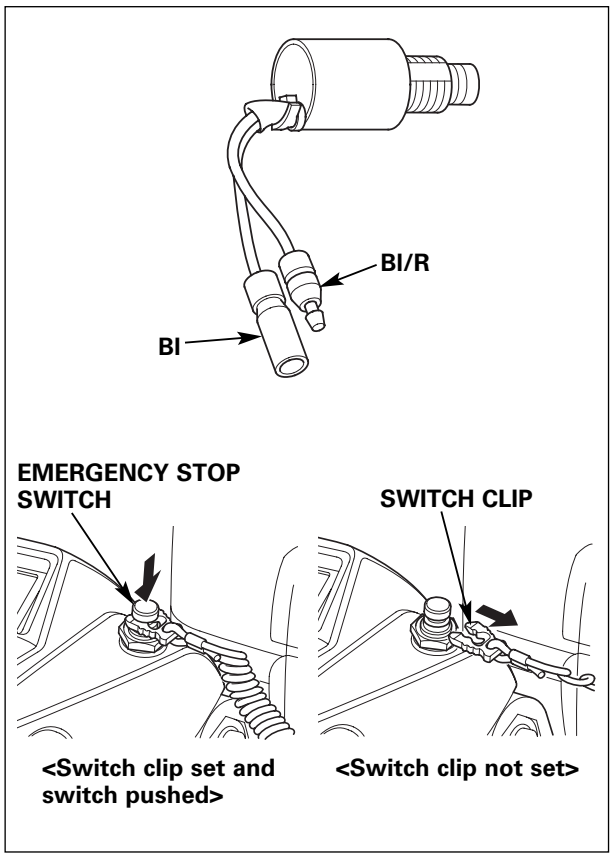
Connect the battery positive (+) cable to the Black/Yellow terminal of the warning buzzer and the battery negative (–) cable to the Yellow/Green terminal as shown. The buzzer should sound.
If it does not, replace the warning buzzer with a new one.



• EMERGENCY STOP SWITCH

Attach the tester probes to the terminals and check for continuity.
If there is any abnormality, replace the emergency stop switch with a new one.

Switch clip position	Continuity
Switch clip set	No
Switch clip not set	Yes
Switch clip set and switch pushed	Yes



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-37

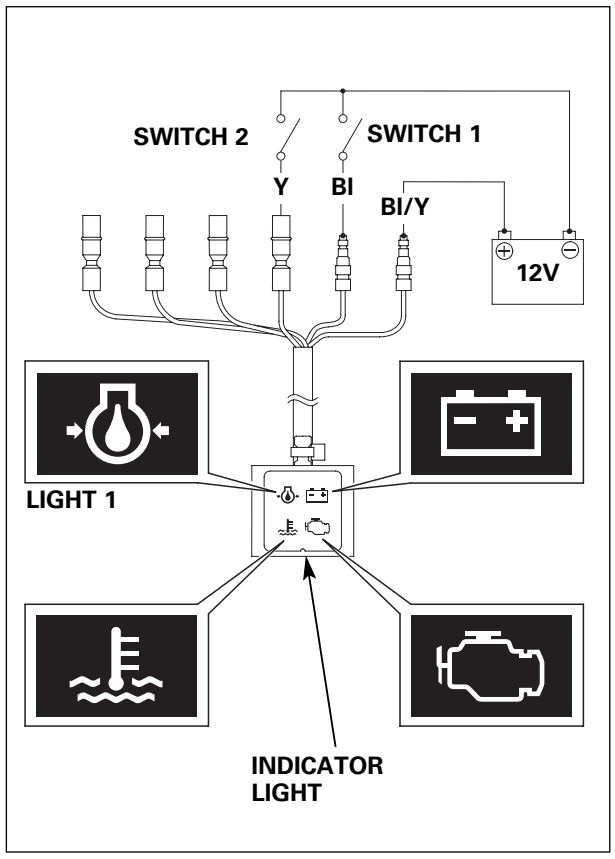
• INDICATOR LIGHT

• Use a known-good battery to check the indicator light.

1) Route the indicator light wires as shown. Connect switch 1 and switch 2, which are connected to the battery negative (–) cable, to the Black and Yellow terminals.
Connect the battery positive (+) cable to the Black/Yellow terminal.

   Check that light 1 (Green light) comes ON when switch 1 is ON.

   Check that light 1 (Green light) goes OFF when switch 1 and switch 2 are ON.

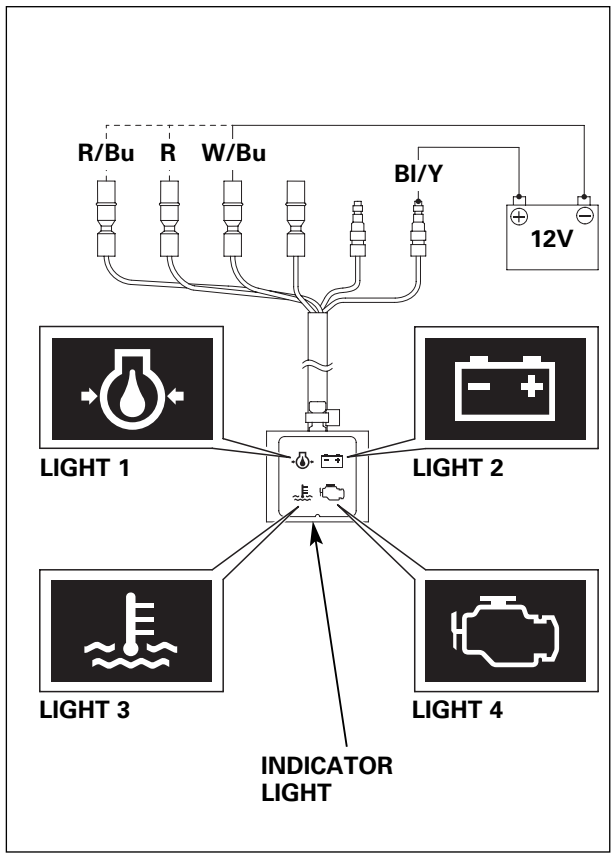


2) Connect the battery positive (+) cable to the indicator light Black/Yellow terminal and the battery negative (–) cable to the White/Blue terminal as shown. Light 2 (Red light) should come ON.

3) Connect the battery positive (+) cable to the indicator light Black/Yellow terminal and the battery negative (–) cable to the Red terminal as shown. Light 3 (Red light) should come ON.

4) Connect the battery positive (+) cable to the indicator light Black/Yellow terminal and the battery negative (–) cable to the Red/Blue terminal as shown. Light 4 (Red light) should come ON.

5) If there is any abnormality, replace the indicator light with a new one.



© Honda Motor Co., Ltd.

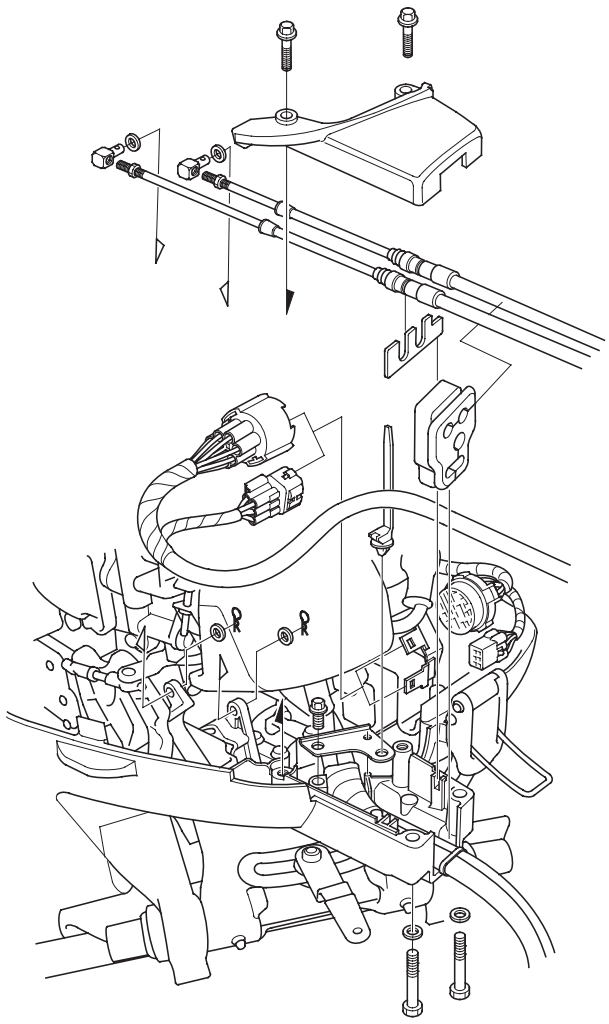
cap.16 BF40D 50D (A).qxp 2008/04/10 18:56 ページ 16-38

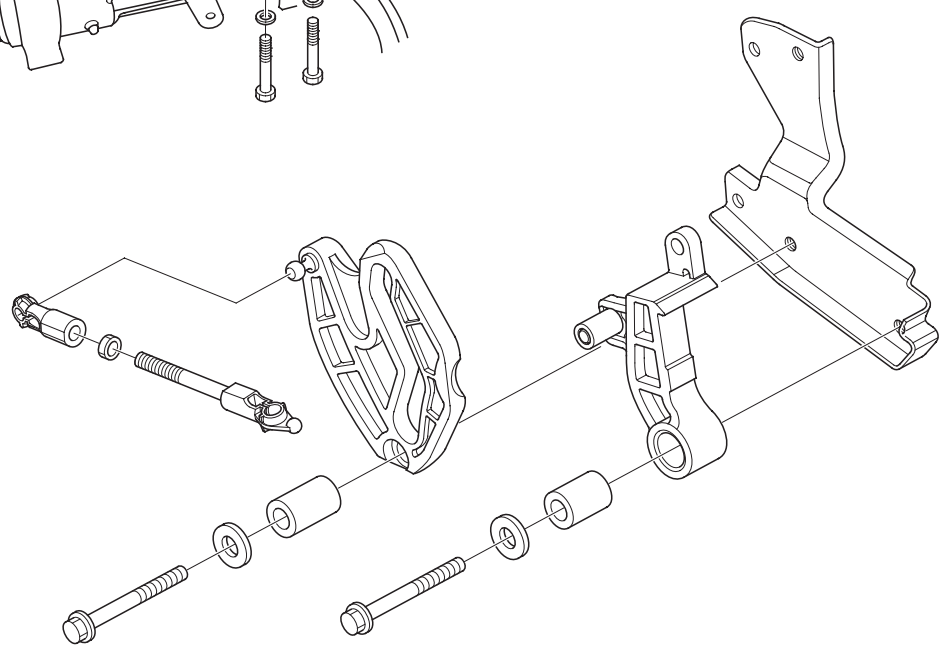
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-1

17. CABLE/THROTTLE ARM BRACKET

1. REMOTE CONTROL CABLE/ GROMMET 17-2
2. THROTTLE ARM BRACKET..... 17-8





© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-2

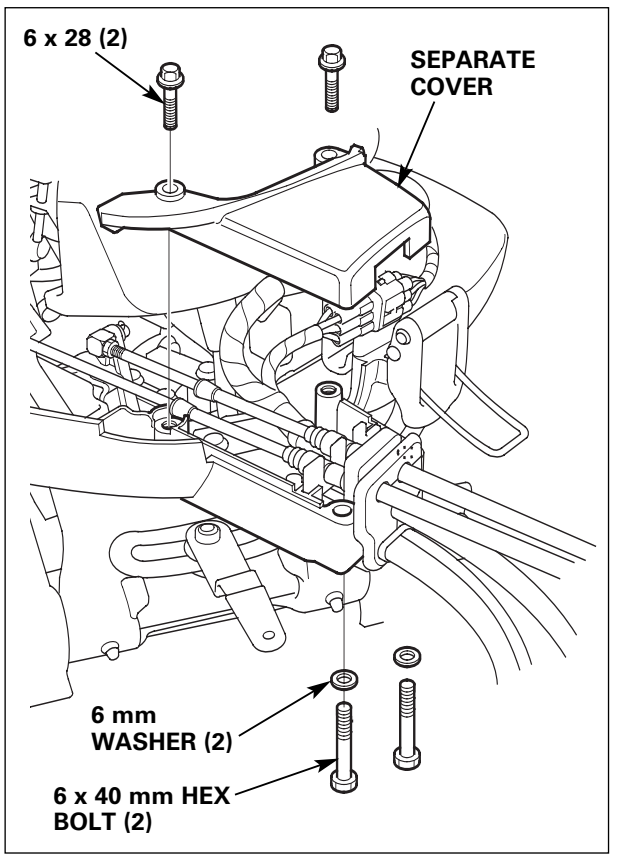
1. REMOTE CONTROL CABLE/GROMMET

a. REMOVAL

• Move the shift to the "N" (Neutral) position before removing the remote control cables/grommet.

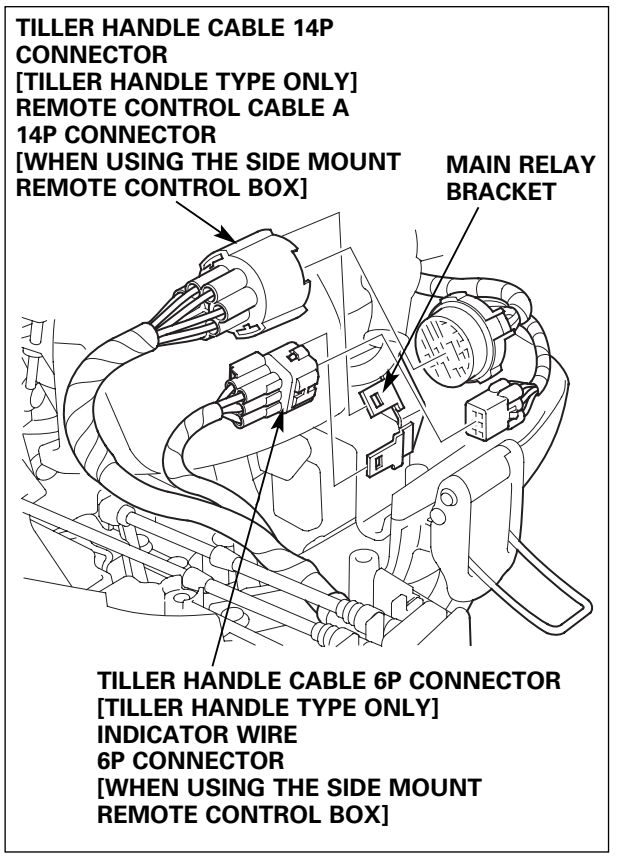
1) Remove the engine cover (P. 4-2).

2) Remove the two 6 x 28 mm flange bolts, two 6 x 40 mm hex bolts and the two 6 mm washers, and remove the separate cover.



3) Remove the tiller handle cable 14P and 6P connectors from the main relay bracket, and disconnect the tiller handle cable 14P and 6P connectors [Tiller handle type only].

Remove the remote control cable A 14P connector and the indicator wire 6P connector from the main relay bracket, and then disconnect them [When using the side mount remote control box].

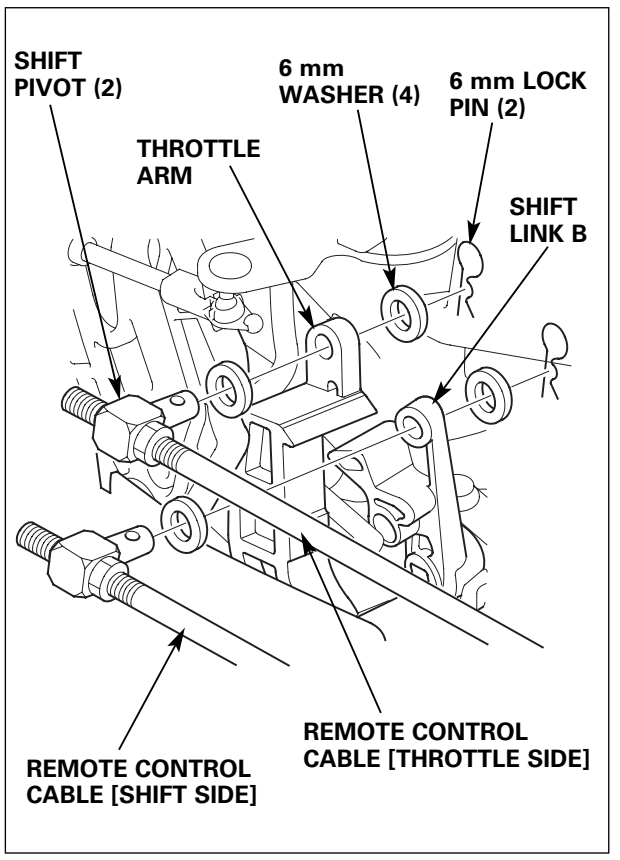


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-3

4) Remove the two 6 mm lock pins and the two 6 mm washers from the two remote control cables, and remove the remote control cables from the throttle arm and shift link B.

   Remove the two 6 mm washers from the shift pivot of each remote control cable.



5) Remove the two remote control cables from under case grommet A.

6) Remove the remote control cable plate.

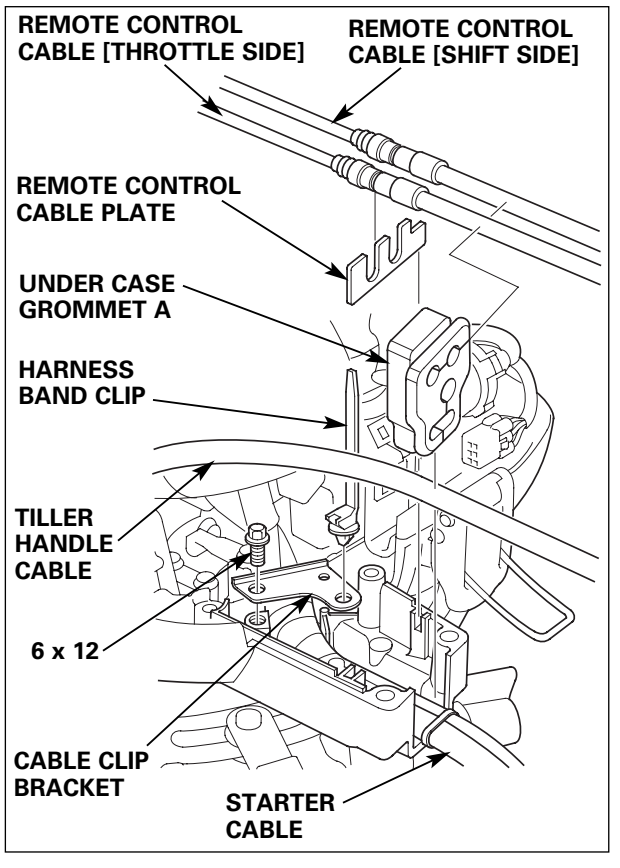
7) Open the harness band clip.

8) Remove the 6 x 12 mm flange bolt, and remove the cable clip bracket from the engine under case.

9) Remove under case grommet A from the engine under case.

10) Remove the starter cable and the tiller handle cable from under case grommet A [Tiller handle type only].

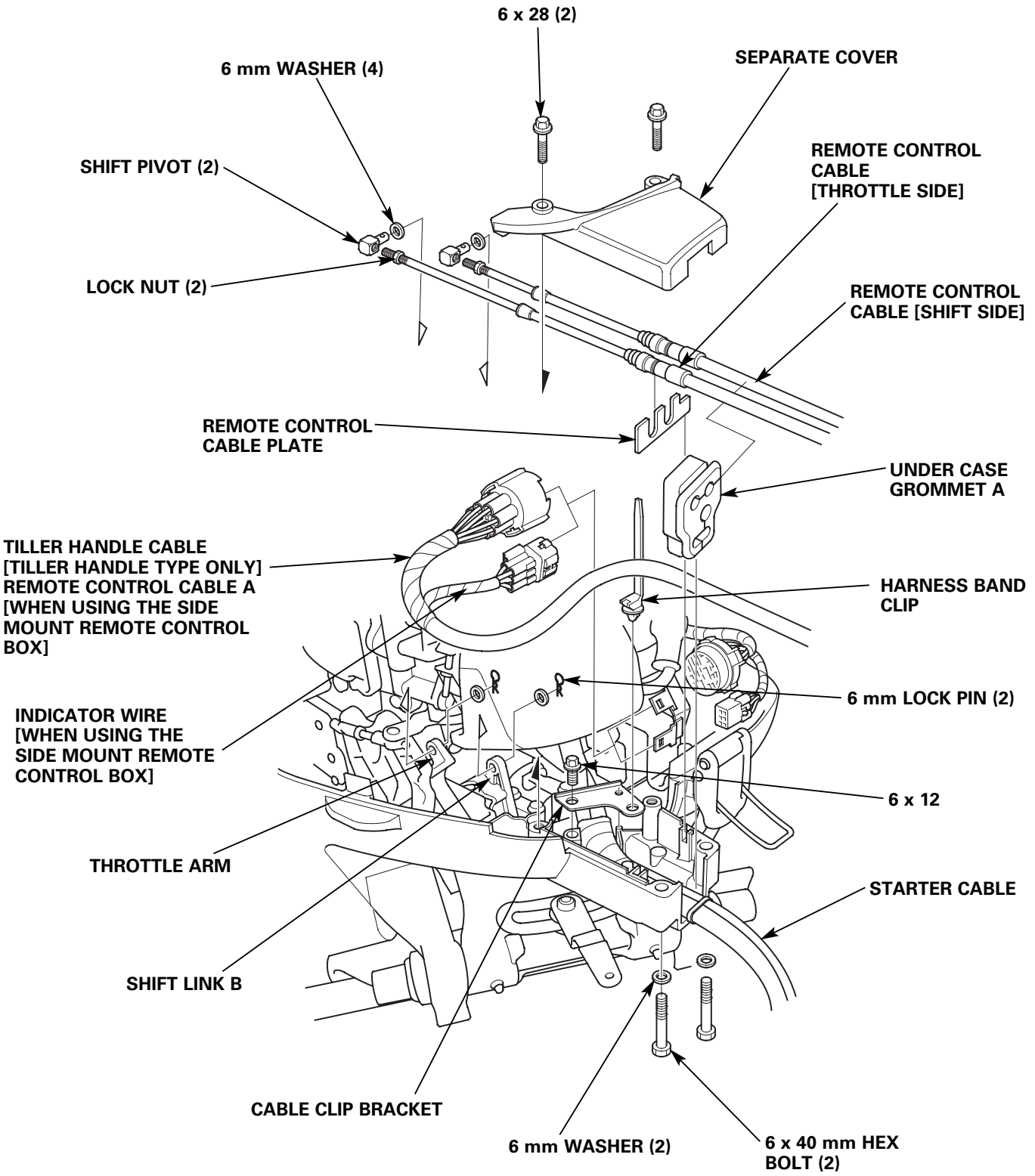
    Remove the starter cable and remote control cable A from the under case grommet A [When using the side mount remote control box].



© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-4

b. COMPONENT DRAWING



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-5

c. INSTALLATION

1) Install the cable clip bracket on the engine under case, aligning the hole in the cable clip bracket with the projection on the engine under case, and tighten the 6 x 12 mm flange bolt securely.

2) Clamp the tiller handle cable using the harness band clip [Tiller handle type only].

   Clamp the remote control cable A and the indicator wire using the harness band clip [When using the side mount remote control box].

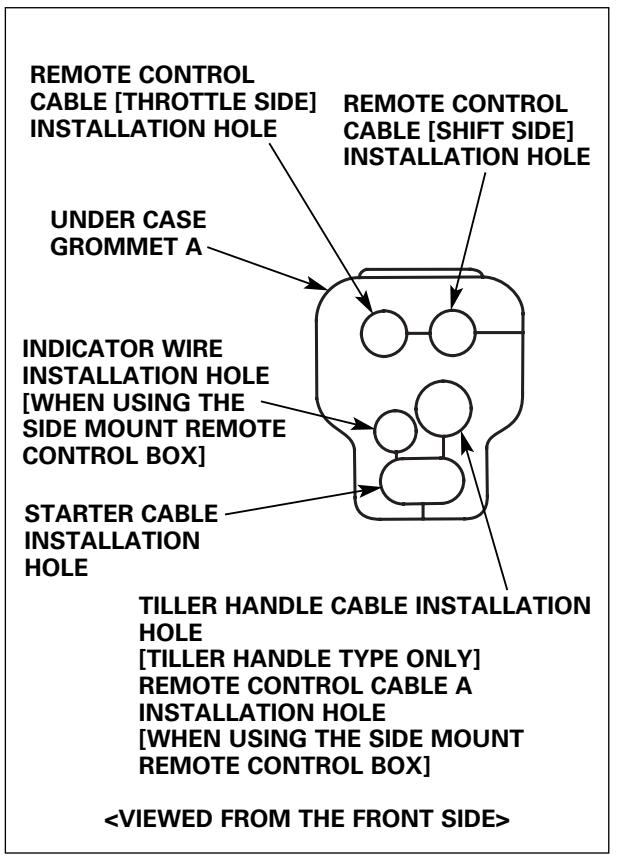
3) Set the harness band clip on the cable clip bracket, and install the remote control cable plate on the engine under case.

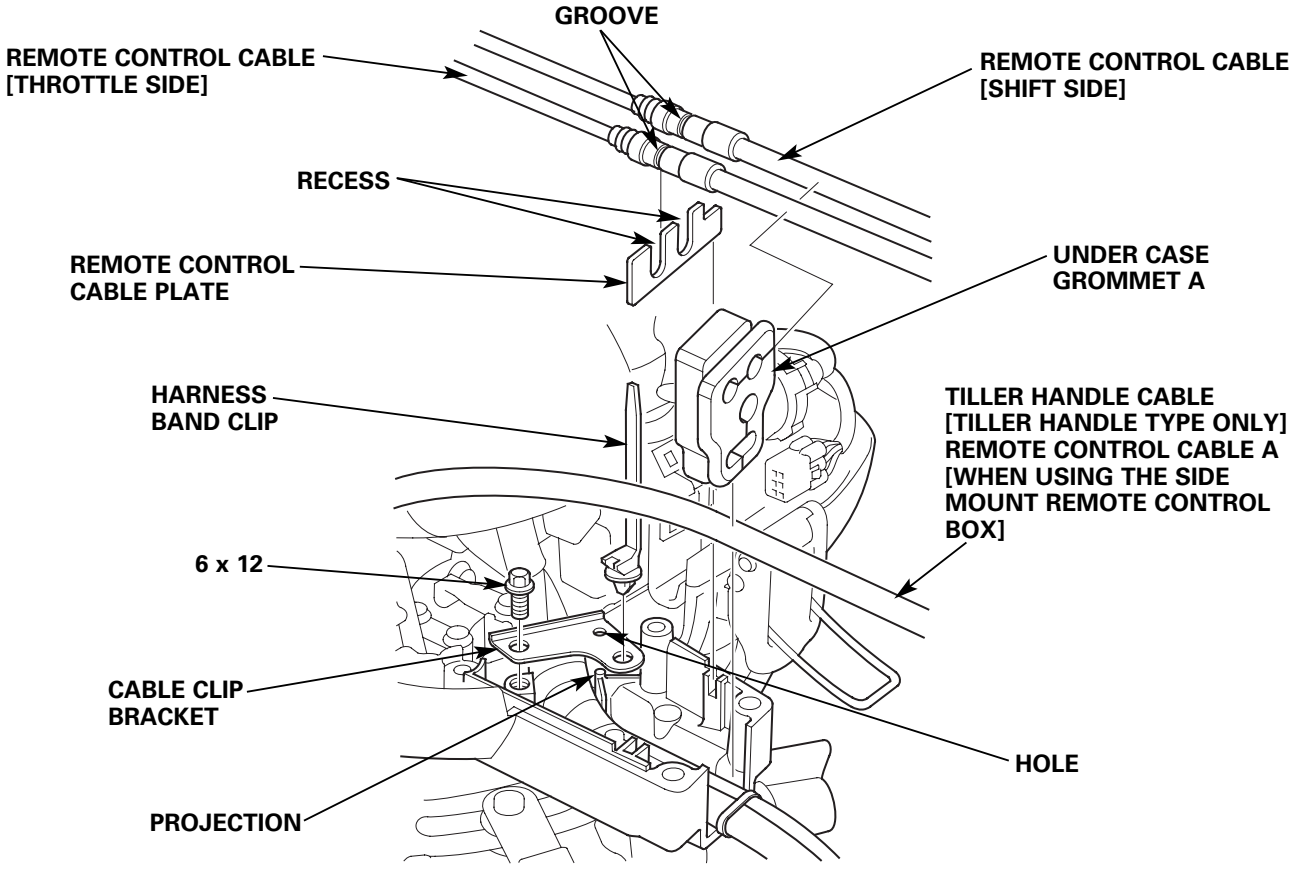
4) Set the tiller handle cable and the starter cable in under case grommet A in the position shown [Tiller handle type only].

   Set the indicator wire, remote control cable A and the starter cable in under case grommet A in the positions shown [When using the side mount remote control box].

5) Set the two remote control cables in under case grommet A in the positions shown, and install under case grommet A on the engine under case.

6) Set the remote control cables on the remote control cable plate, aligning the groove in each cable with the corresponding recess in the remote control cable plate.





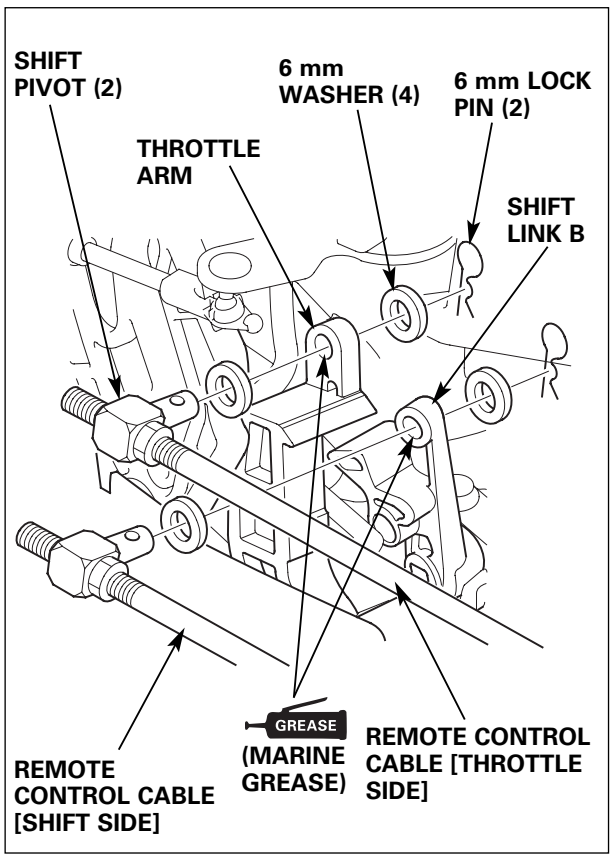
© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-6

7) Apply marine grease to shift pivot installation hole in the throttle arm and the shift link B.

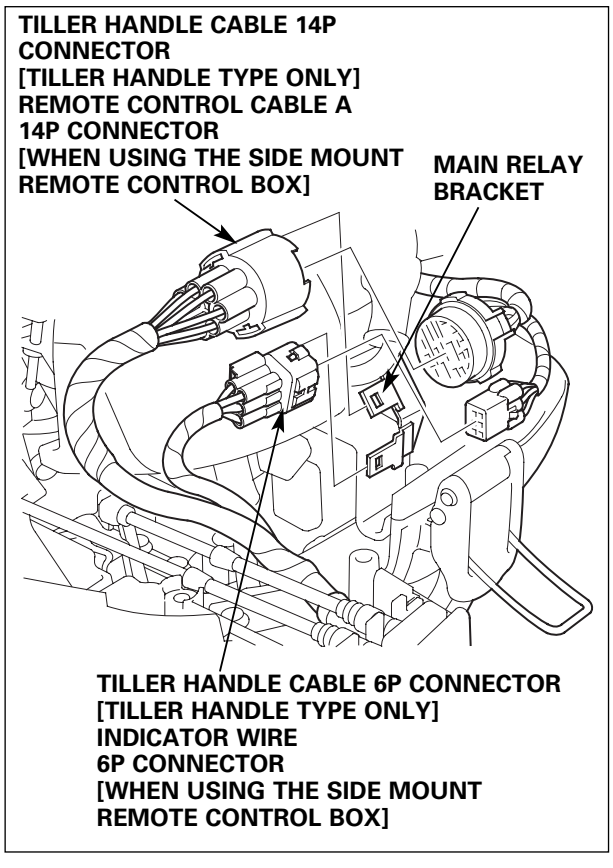
8) Set the 6 mm washers on the shift pivot of the respective remote control cables.

   Set the remote control cables on the throttle arm and shift link B, and install the 6 mm washers and the 6 mm lock pins.



9) Connect the tiller handle cable 14P and 6P connectors, and install the 14P and 6P connectors on the main relay bracket [Tiller handle type only].

   Connect the remote control cable A 14P connector and the indicator wire 6P connector, and install the 14P and 6P connectors on the main relay bracket [When using the side mount remote control box].



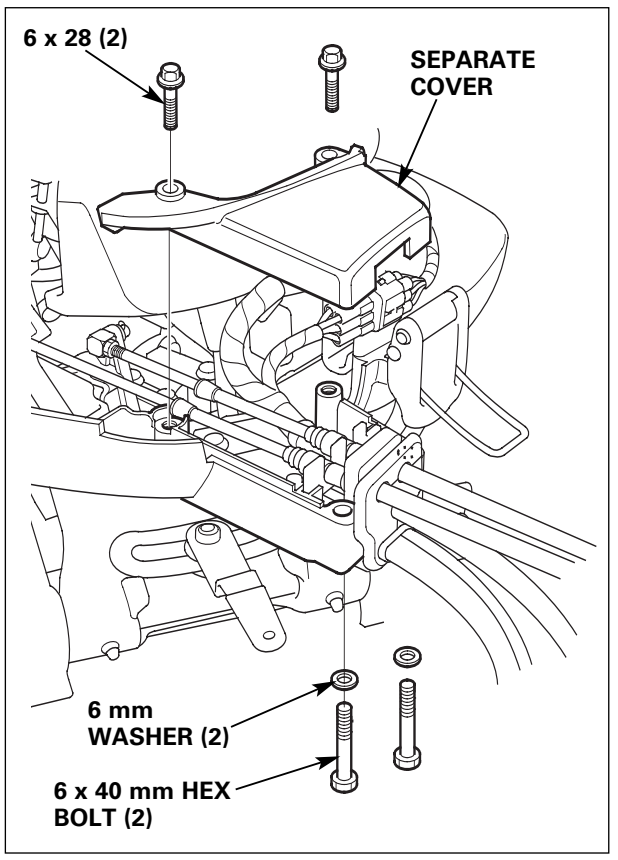
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-7

10) Install the separate cover, and tighten the two 6 x 28 mm flange bolts, two 6 mm washers and the two 6 x 40 mm hex bolts securely.

11) Perform the following adjustments.
- Throttle cable (P. 3-18)
- Shift cable (P. 3-21)

12) Install the engine cover (P. 4-2).



© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-8

2. THROTTLE ARM BRACKET

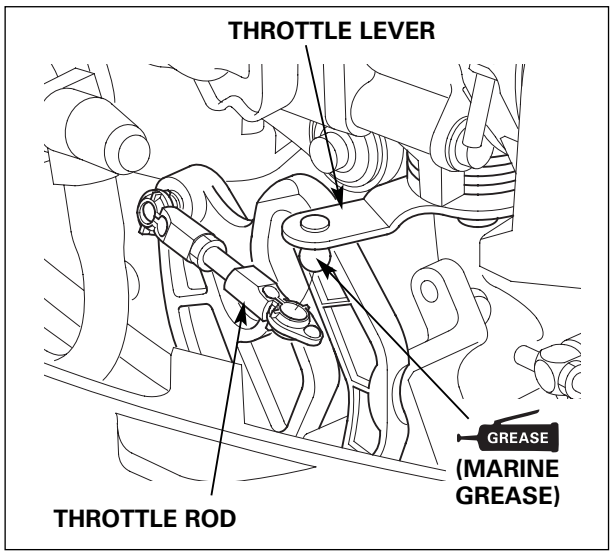
a. REMOVAL/INSTALLATION

1) Remove the throttle rod from the throttle lever.

2) Remove the intake manifold/throttle body/silencer assembly (P. 5-89).

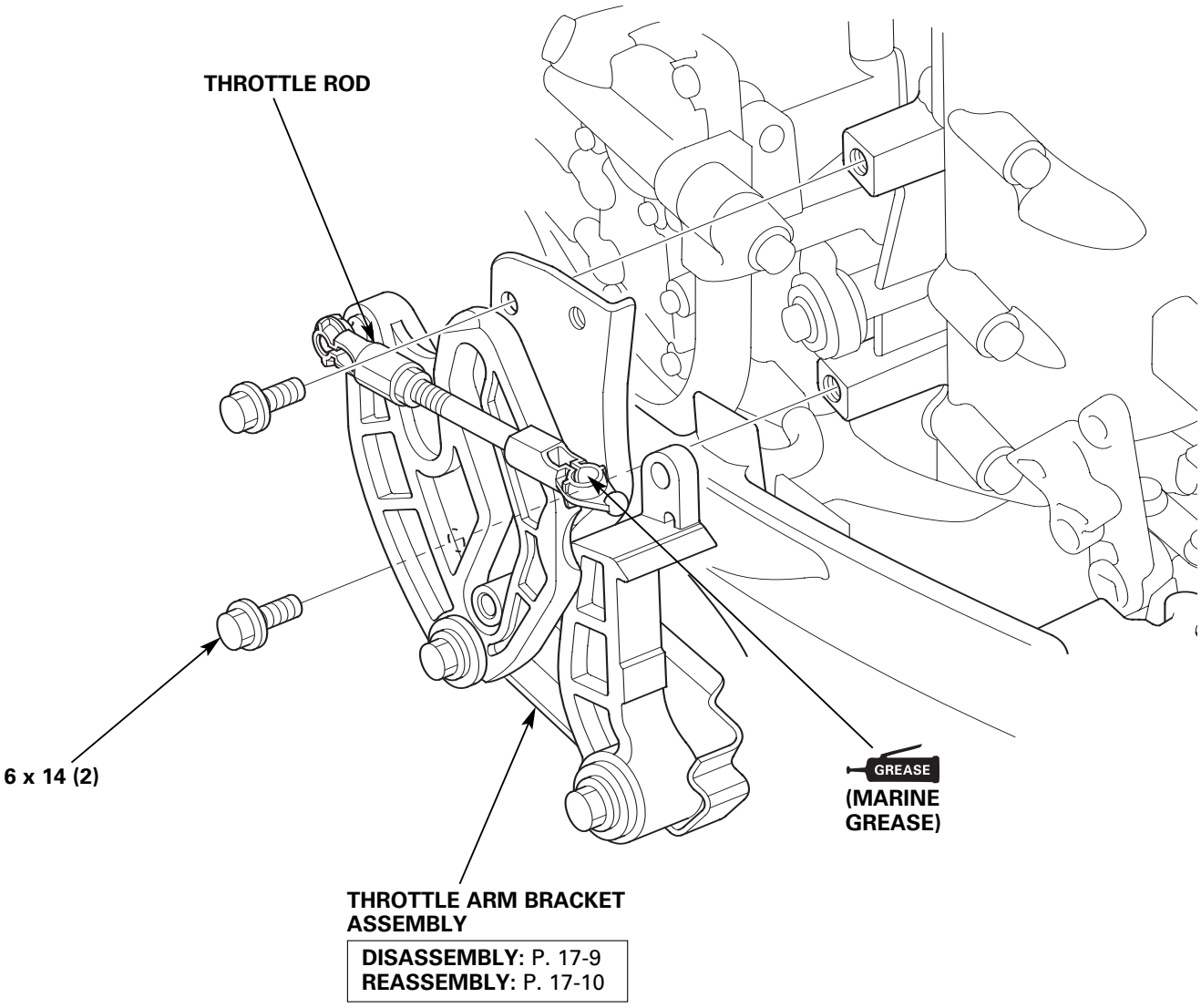
3) Remove the remote control cable [throttle side] from the throttle arm (P. 17-3).

4) Remove the two 6 x 14 mm flange bolts and remove the throttle arm bracket assembly.



Installation is the reverse order of removal.
- Apply marine grease to the throttle rod installation part of the throttle lever.

Perform the following adjustment.
- Throttle cable (P. 3-18)



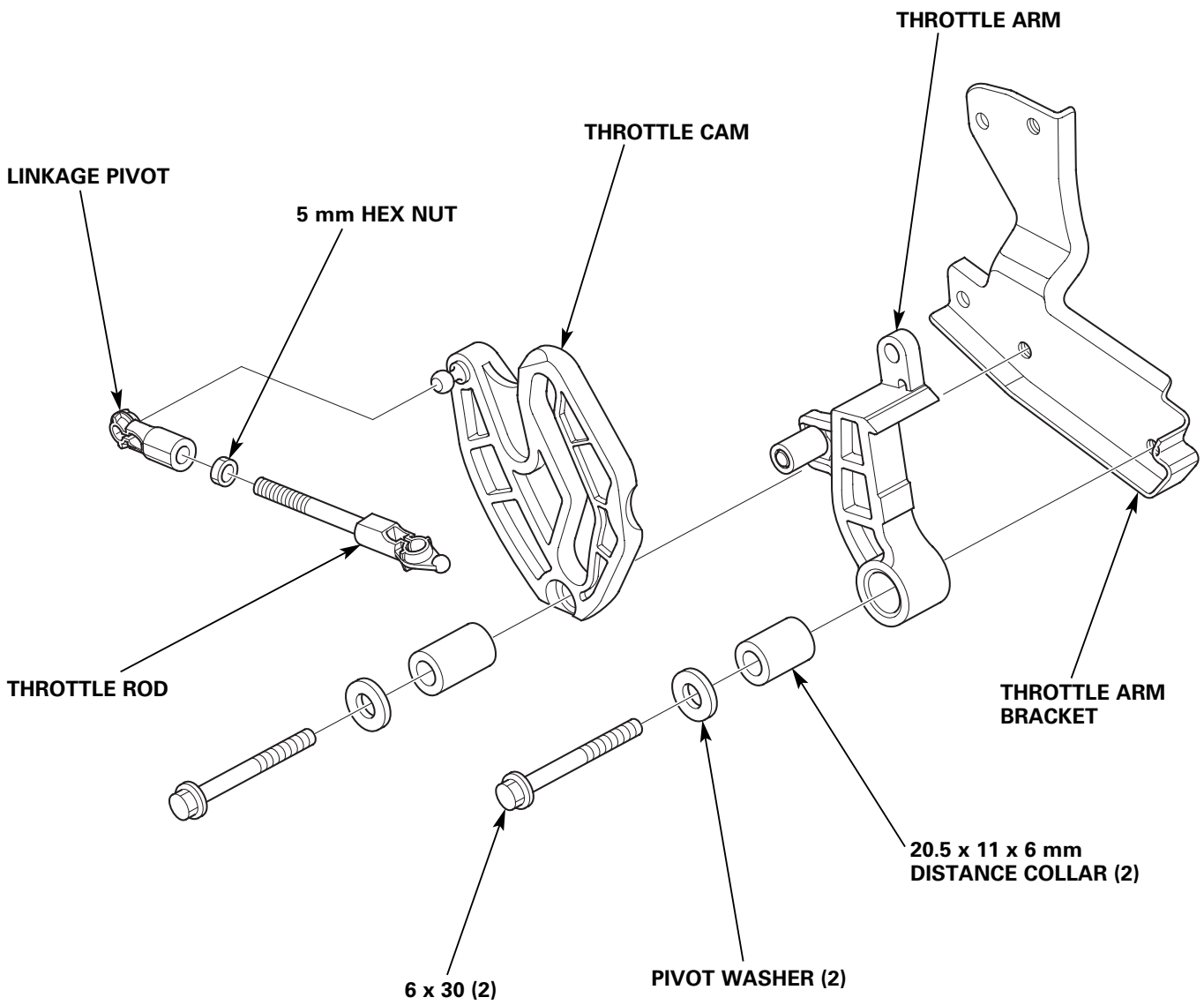
DISASSEMBLY: P. 17-9
REASSEMBLY: P. 17-10

Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-9

b. DISASSEMBLY

Remove the throttle arm bracket assembly (P. 17-8).



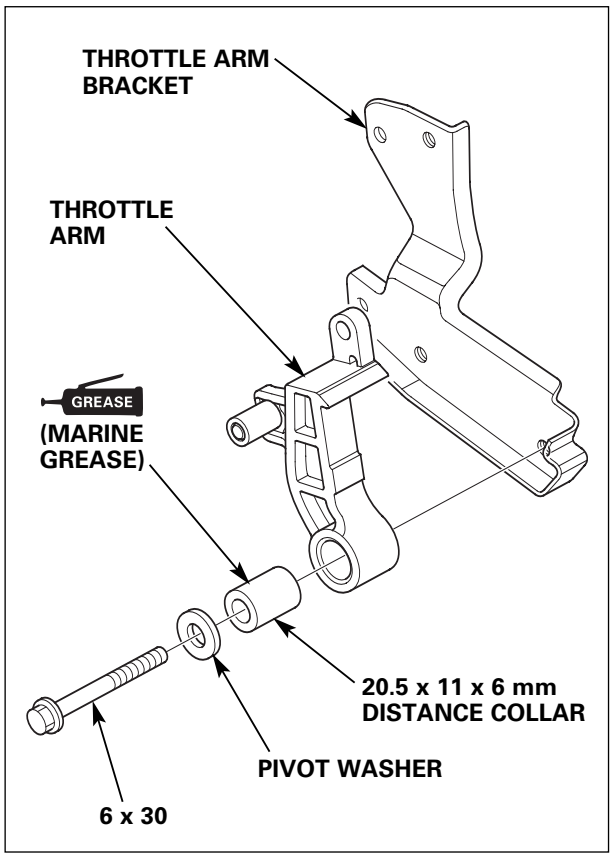
© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-10

c. REASSEMBLY

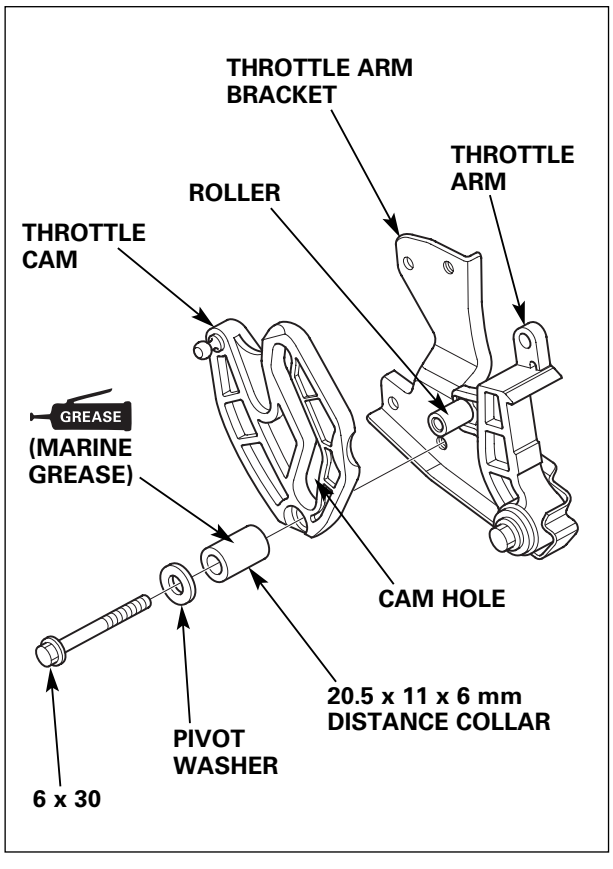
1) Apply marine grease to the distance collar installation hole in the throttle arm.
   Install the 20.5 x 11 x 6 mm distance collar on the throttle arm.

2) Set the throttle arm on the throttle arm bracket, and tighten the pivot washer and the 6 x 30 mm flange bolt securely.



3) Apply marine grease to the distance collar installation hole in the throttle cam.
   Install the 20.5 x 11 x 6 mm distance collar on the throttle cam.

4) Set the throttle cam on the throttle arm bracket, aligning the cam hole in the throttle cam with the roller of the throttle arm, then tighten the pivot washer and the 6 x 30 mm flange bolt securely.



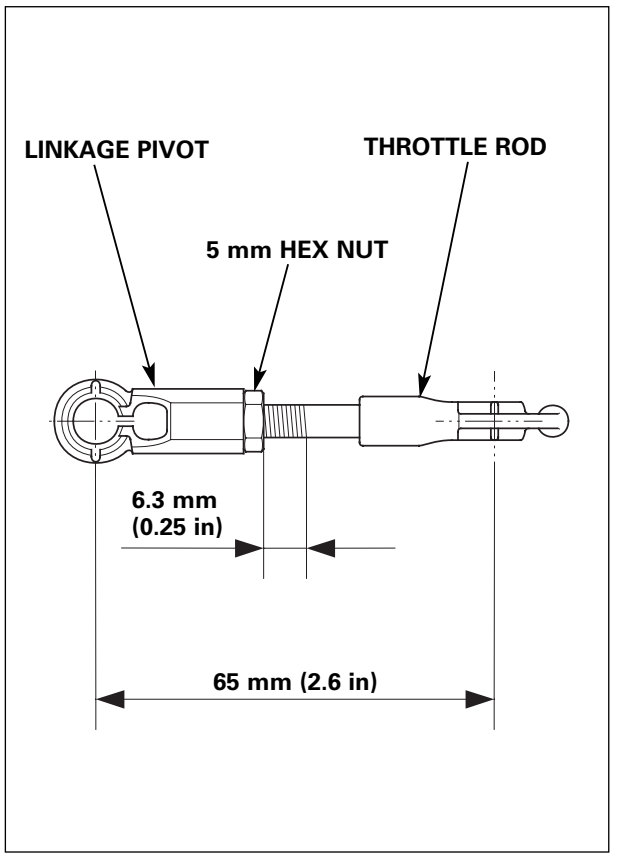
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-11

5) Tighten the 5 mm hex nut on the throttle rod until the visible threads on the throttle rod are the dimension shown.

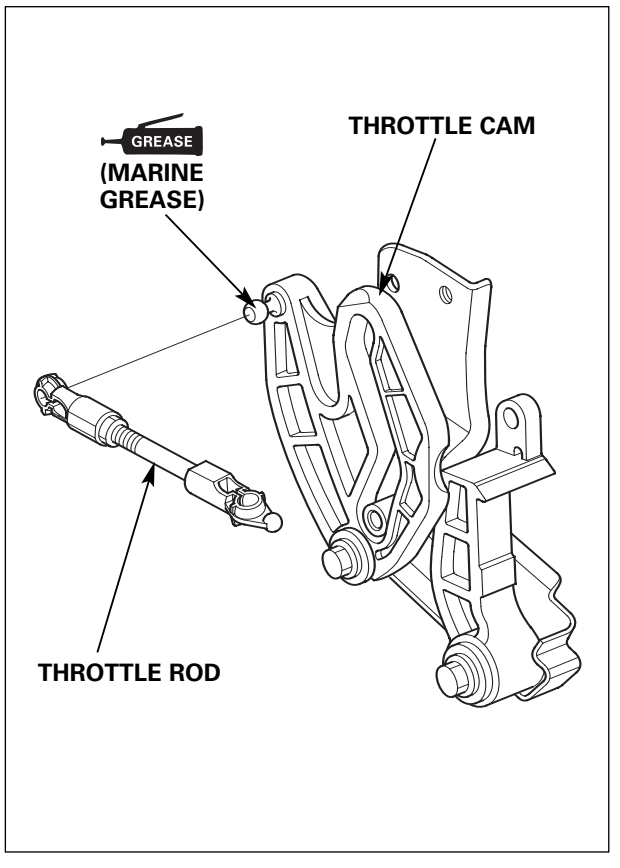
6) Install the linkage pivot on the throttle rod so that the distance between the linkage pivot hole and the throttle rod hole is the dimension shown, and tighten the 5 mm hex nut securely.

   • After installation, check that the holes in the throttle rod and linkage pivot are oriented perpendicular to each other as shown.



7) Apply marine grease to the throttle rod installation part of the throttle cam.
   Install the throttle rod on the throttle cam.

8) Install the throttle arm bracket assembly (P. 17-8).



© Honda Motor Co., Ltd.

cap.17 BF40D 50D (A).qxp 2008/04/10 18:58 ページ 17-12

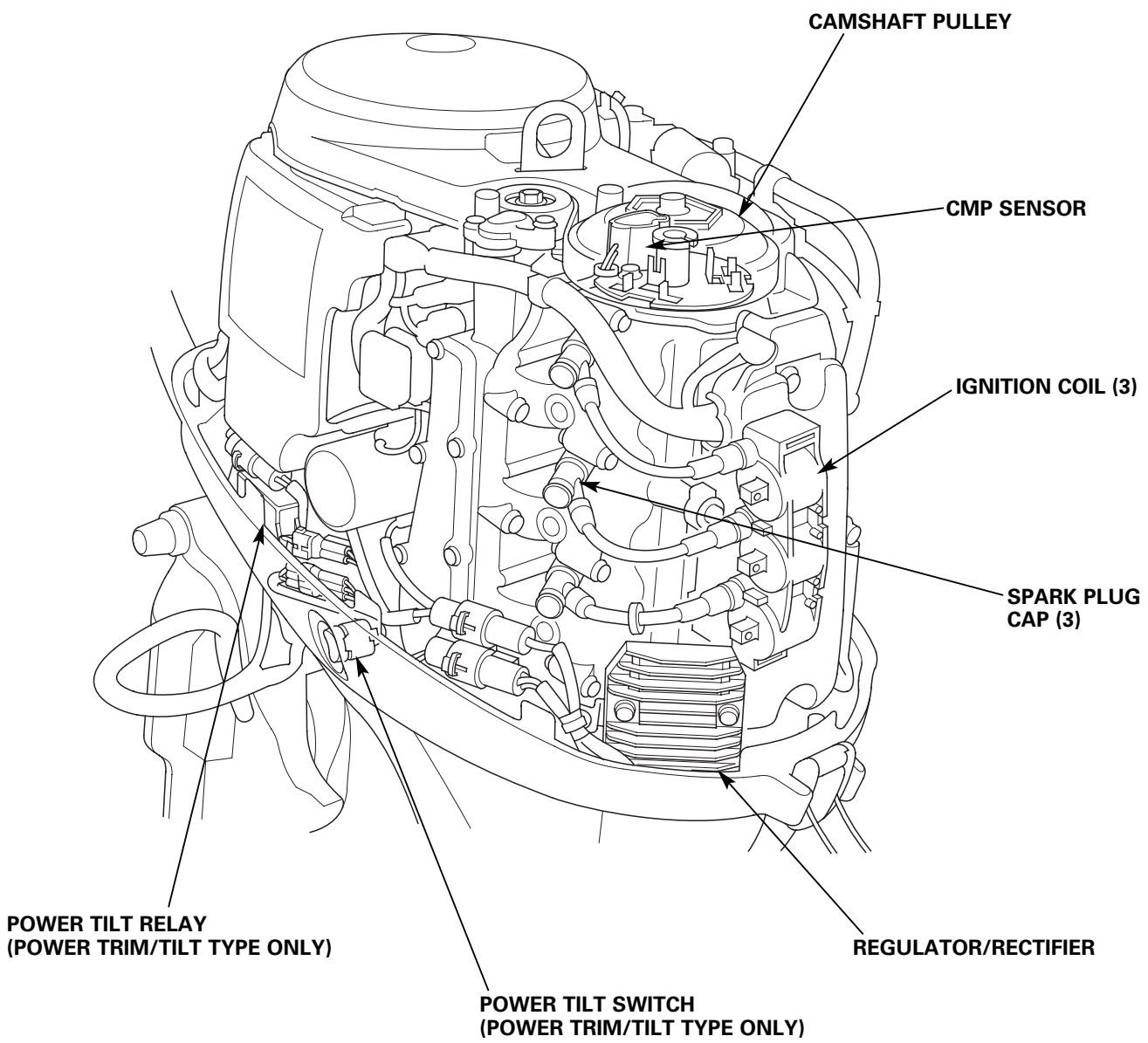
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-1

18. ELECTRICAL EQUIPMENT

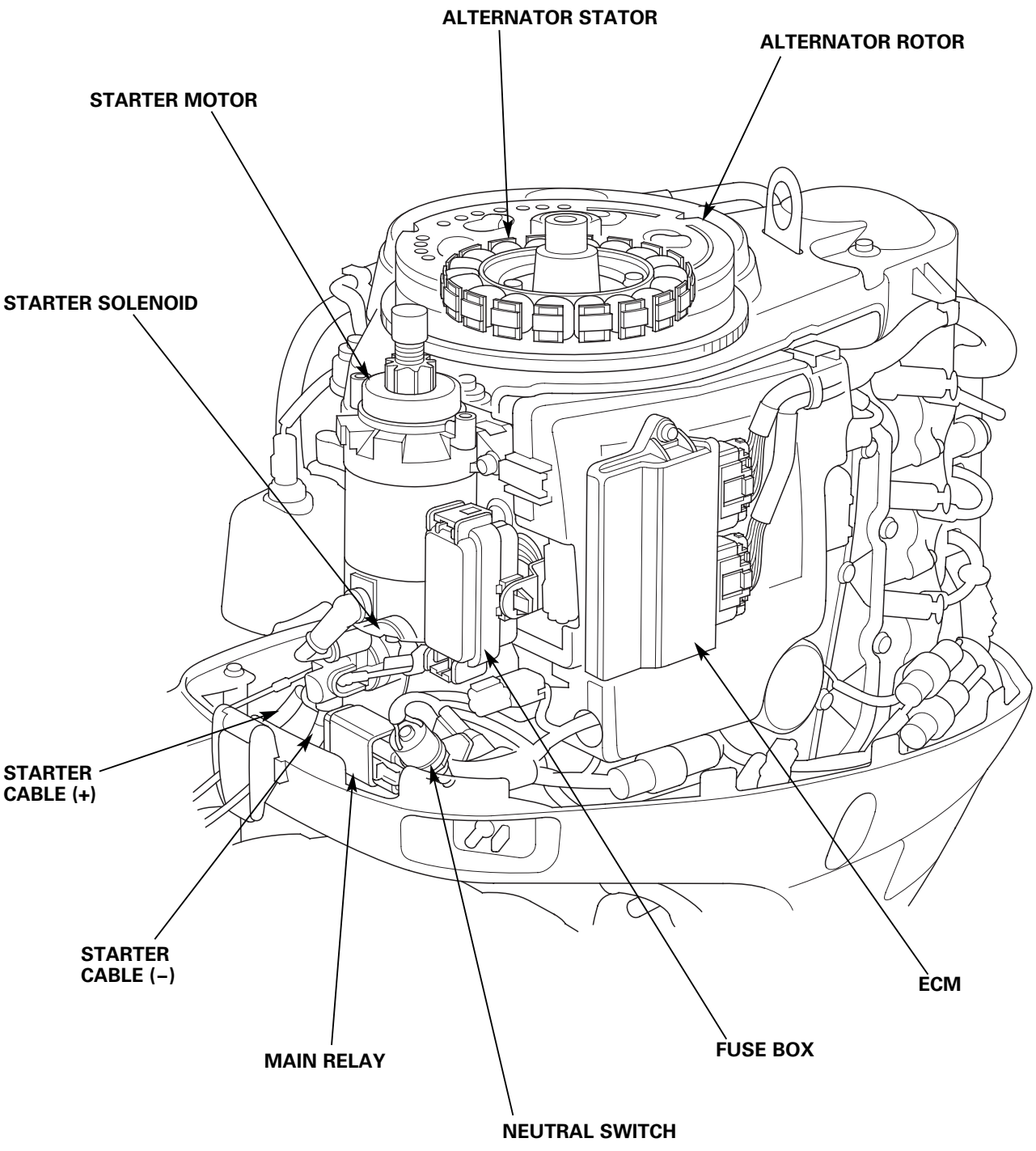
1. LAYOUT DRAWING..... 18-1
2. STARTER MOTOR 18-4
3. STARTER CABLE/STARTER SOLENOID/MAIN RELAY/ NEUTRAL SWITCH 18-15
4. FUSE BOX 18-18
5. ELECTRIC PART COVER/ECM 18-19
6. ELECTRIC PART CASE 18-20
7. POWER TILT RELAY/POWER TILT SWITCH [POWER TRIM/ TILT TYPE ONLY]..... 18-21
8. IGNITION COIL/ REGULATOR/RECTIFIER..... 18-23

1. LAYOUT DRAWING



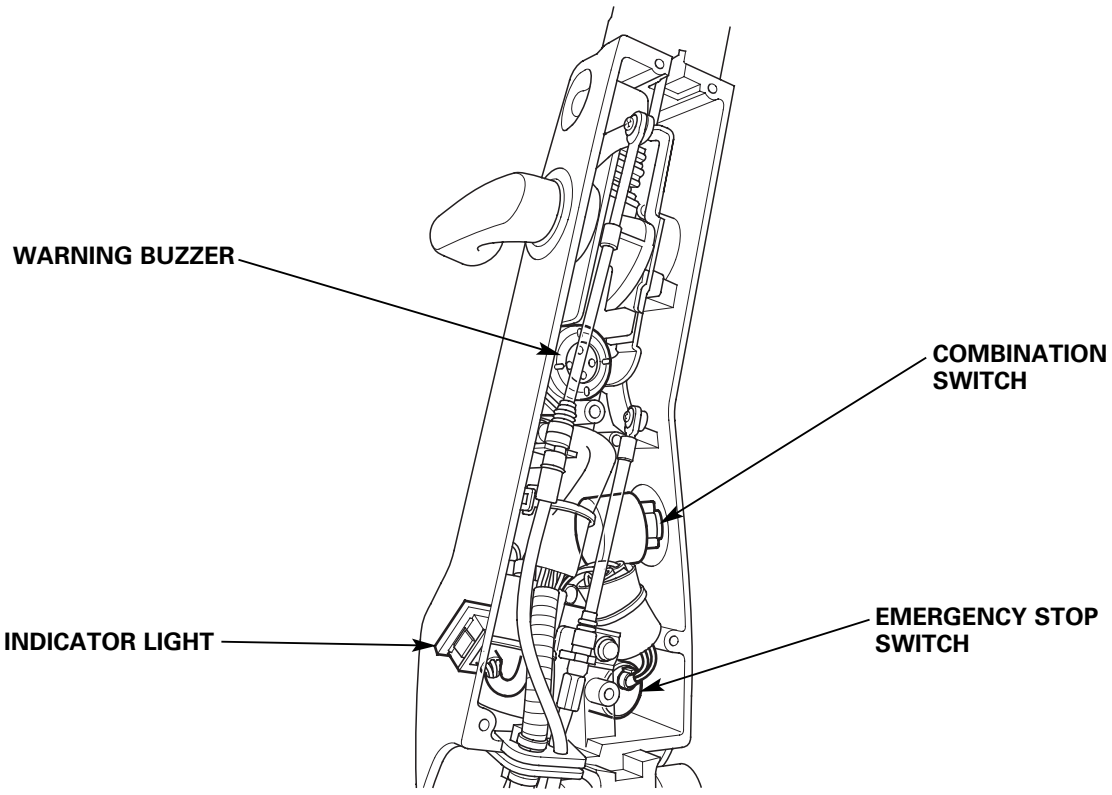
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-2



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-3



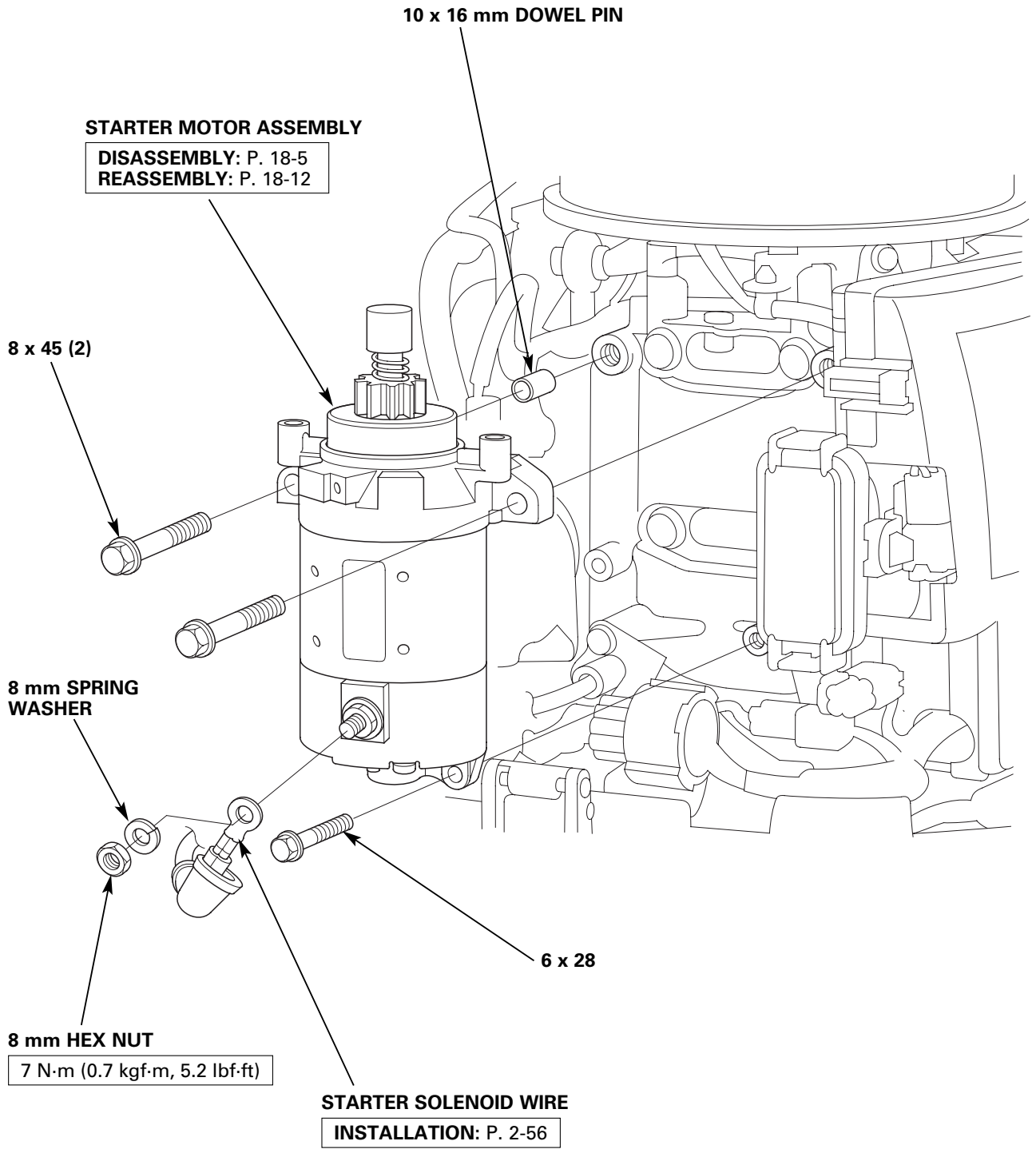
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-4

2. STARTER MOTOR

a. REMOVAL/INSTALLATION

Remove the following parts.
- Engine cover (P. 4-2)
- Alternator cover (P. 7-2)

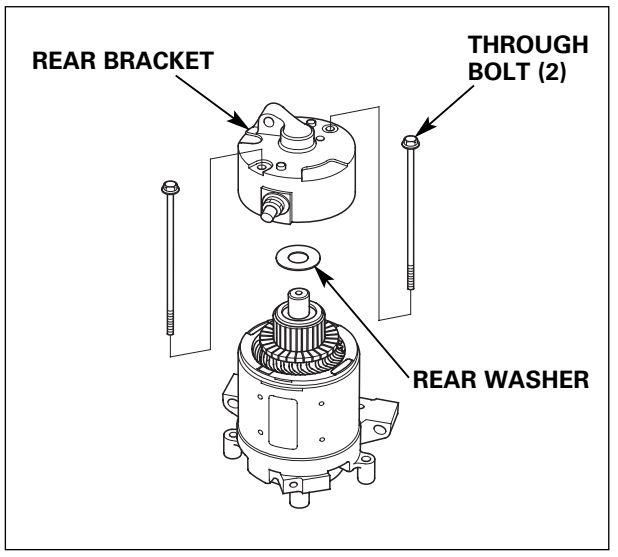


Date of Issue: May 2008
© Honda Motor Co., Ltd.

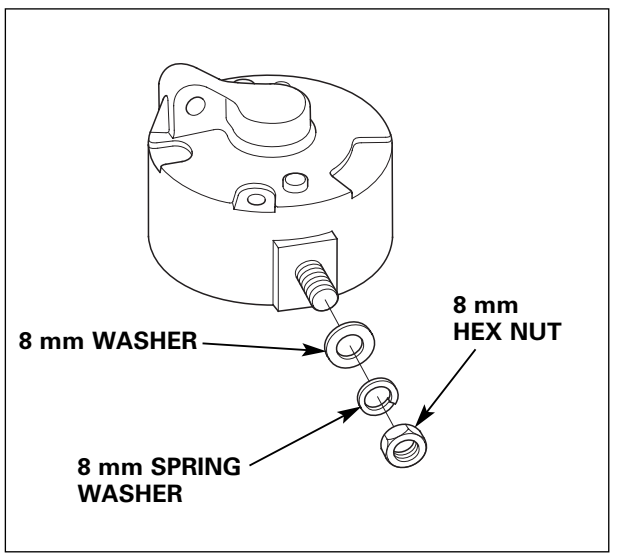
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-5

b. DISASSEMBLY

1) Remove the two through bolts, and remove the rear bracket and the rear washer.

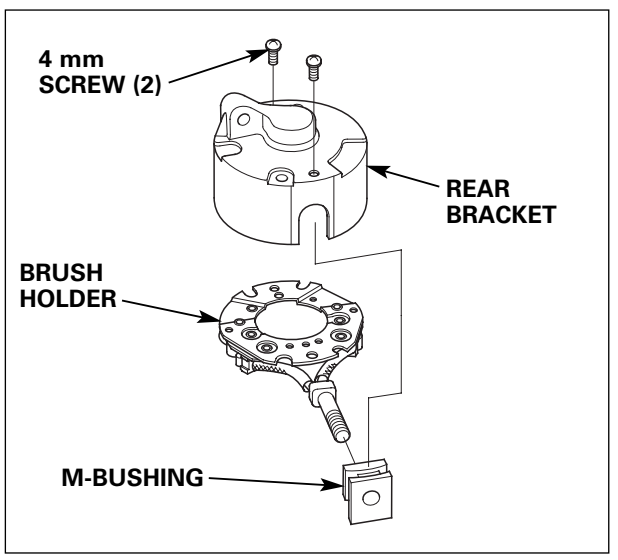


2) Remove the 8 mm hex nut, and remove the 8 mm spring washer and the 8 mm washer.



3) Remove the two 4 mm screws, and remove the brush holder.

4) Remove the M-bushing from the rear bracket.

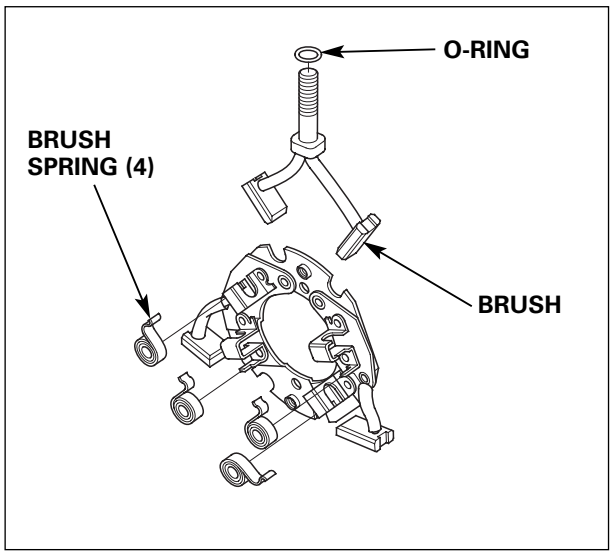


© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-6

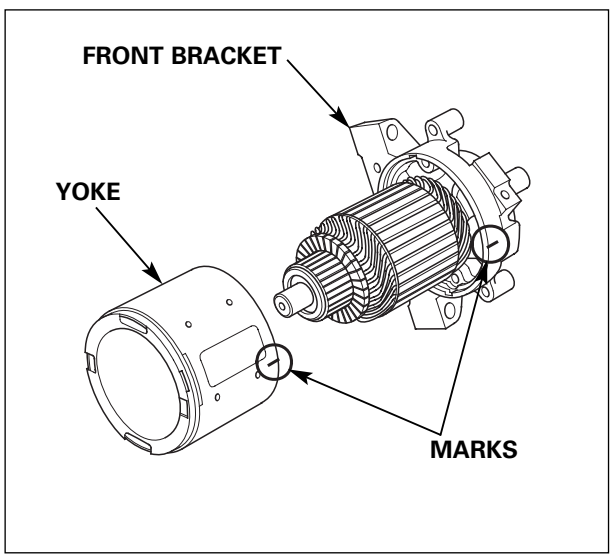
5) Remove the four brush springs, and remove the brush.

6) Remove the O-ring from the brush.

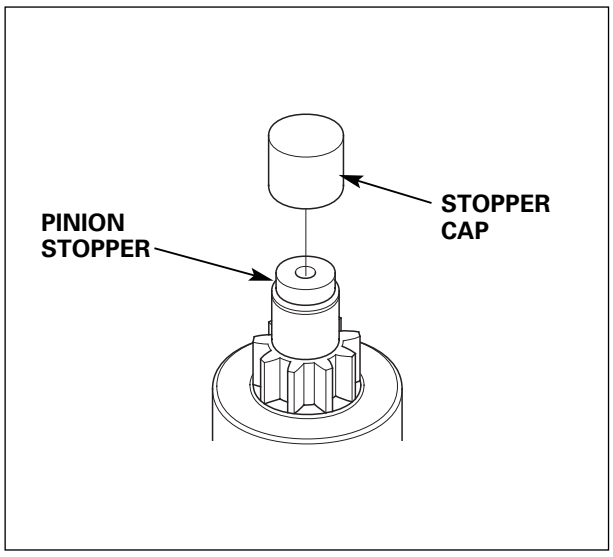


7) Mark the front bracket and the yoke on the mating parts for reassembly.

8) Remove the yoke from the front bracket.



9) Remove the stopper cap from the pinion stopper.



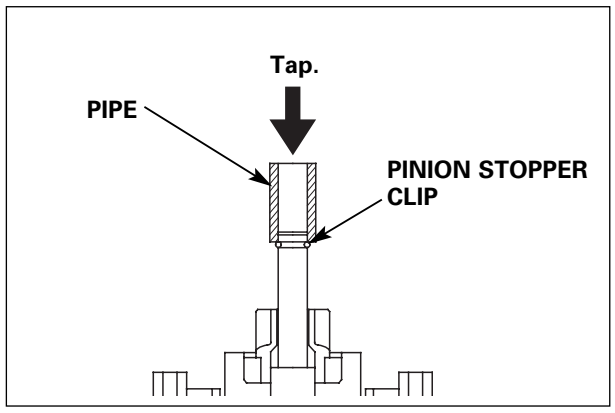
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-7

10) Set a pipe of the following dimensions on the stopper clip, and push in the pinion stopper clip by tapping the pipe.

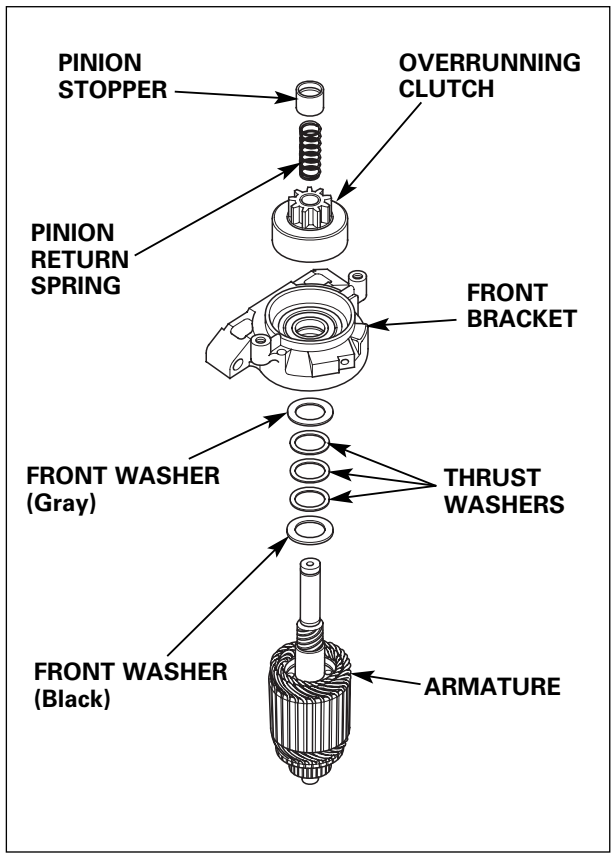
    I.D.: approx. 18 mm (0.7 in), O.D.: approx. 22 mm (0.9 in), Length: approx. 20 mm (0.8 in)

11) Remove the pinion stopper clip using a screwdriver or equivalent tool.
    Replace the pinion stopper clip as a set (pinion stopper set) on reassembly.



12) Remove the pinion stopper, pinion return spring, overrunning clutch, front bracket, front washer (gray), thrust washers and the front washer (black) from the armature in this order.

    • Replace the pinion stopper and the pinion return spring as a set (pinion stopper set) on reassembly (P. 18-11).

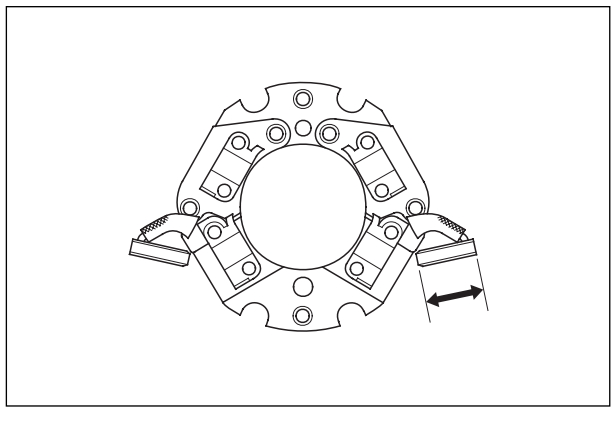


c. INSPECTION

• BRUSH LENGTH

Measure the brush length. If the measurement is less than the service limit, replace the brush and the brush holder as a set.

Standard	Service limit
16 mm (0.6 in)	12 mm (0.5 in)

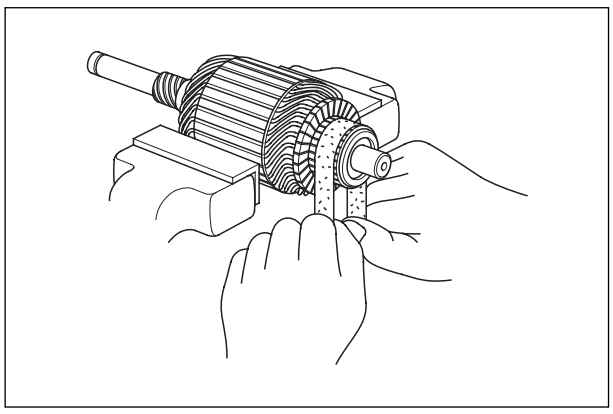


© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-8

• COMMUTATOR

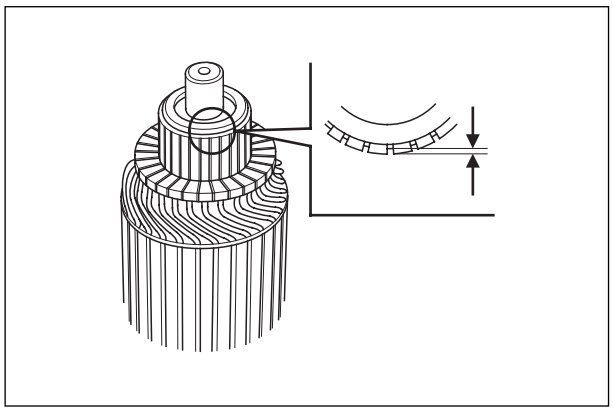
Check the commutator (insulator) for damage, dust, dirt or metal particles.
If there is stain, any irregularities and/or evidence of burning, clean with emery paper #500 or #600.



• MICA DEPTH

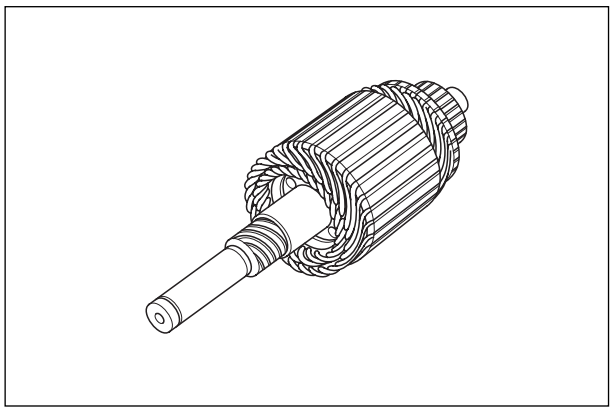
Measure the mica depth. If the measurement is less than the service limit, replace the armature.

Service limit	0.2 mm (0.08 in)



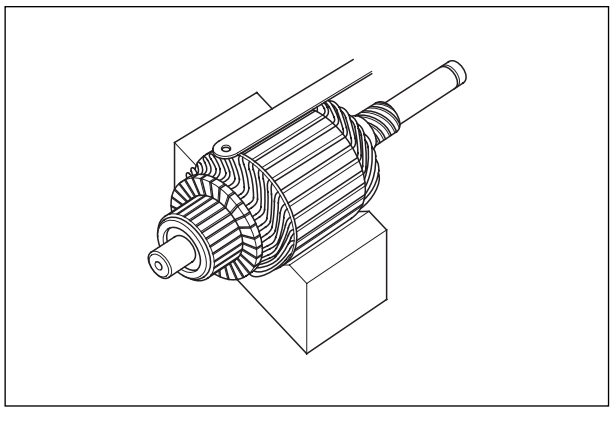
• ARMATURE

Check the armature and the spline for wear or damage. Replace the armature if necessary.



• SHORT-CIRCUIT TEST USING AN ARMATURE TESTER

Place the armature on a commercially available V-block armature tester and hold the hacksaw blade close to the armature core.
Turn the armature to check for short-circuit.
If the blade is attracted to the core or if it vibrates when the core turns, replace the armature.

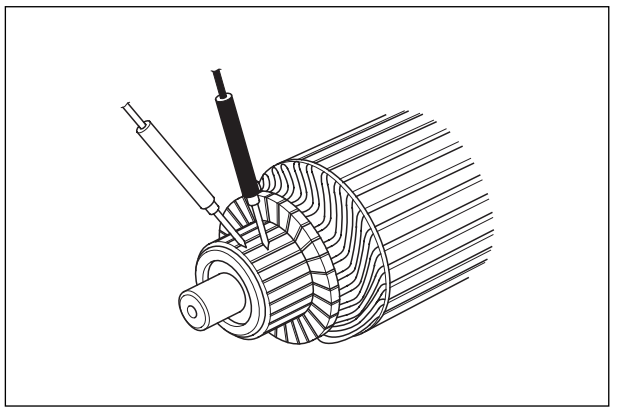


Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-9

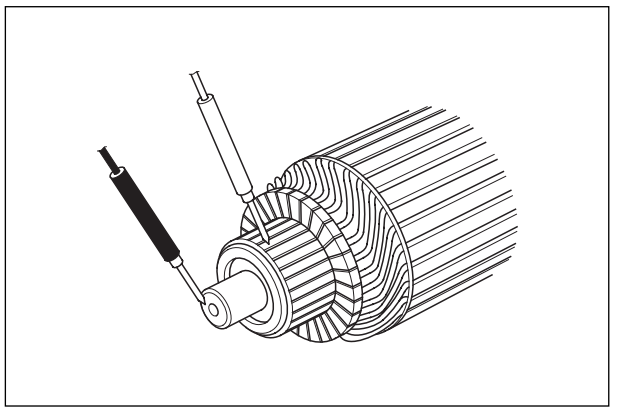
• CONTINUITY CHECK - SEGMENTS

Check for continuity between the segments. If an open circuit exists between any two segments, replace the armature.



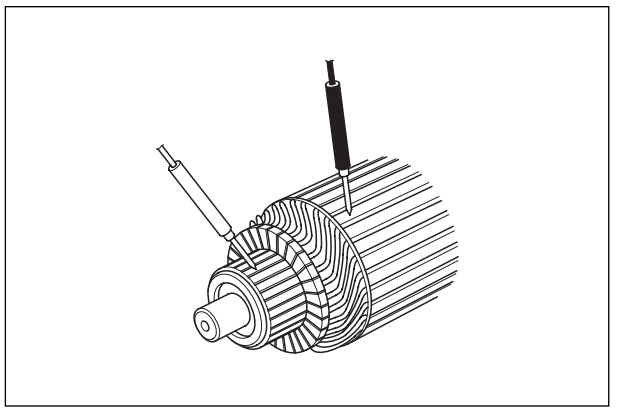
• SHORT-CIRCUIT TEST - SHAFT-TO-COMMUTATOR

Check for continuity between the commutator and the armature shaft. If there is continuity, replace the armature.



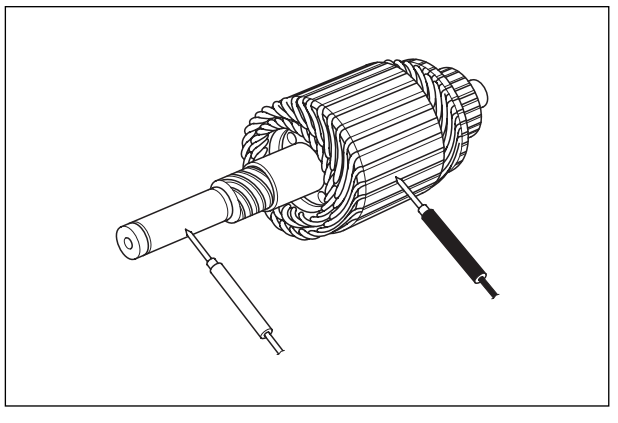
• SHORT-CIRCUIT TEST - CORE-TO-COMMUTATOR

Check for continuity between the commutator and the armature coil core. If continuity exists, replace the armature.



• SHORT-CIRCUIT TEST - SHAFT-TO-ARMATURE

Check for continuity between the armature and the armature shaft. If there is continuity, replace the armature.



© Honda Motor Co., Ltd.

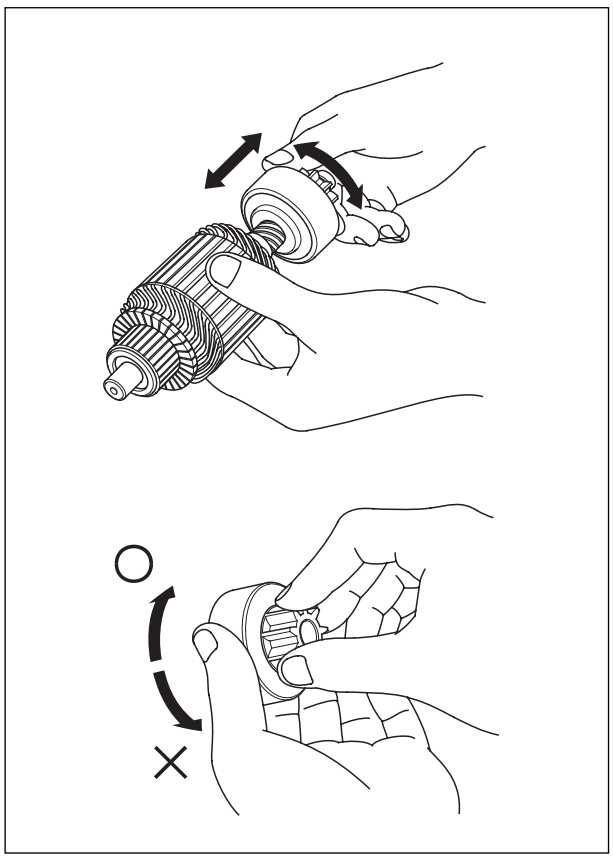
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-10

• OVERRUNNING CLUTCH

1) Install the overrunning clutch on the armature as shown. Turn the overrunning clutch right and left and check for smooth axial movement.
   If it does not move smoothly, clean the spline and coat it with grease, then check the overrunning clutch again.

2) Turn the pinion gear while holding the overrunning clutch. The gear should turn only clockwise.
   If the pinion gear turns in both directions, or if it does not turn at all, replace the overrunning clutch.

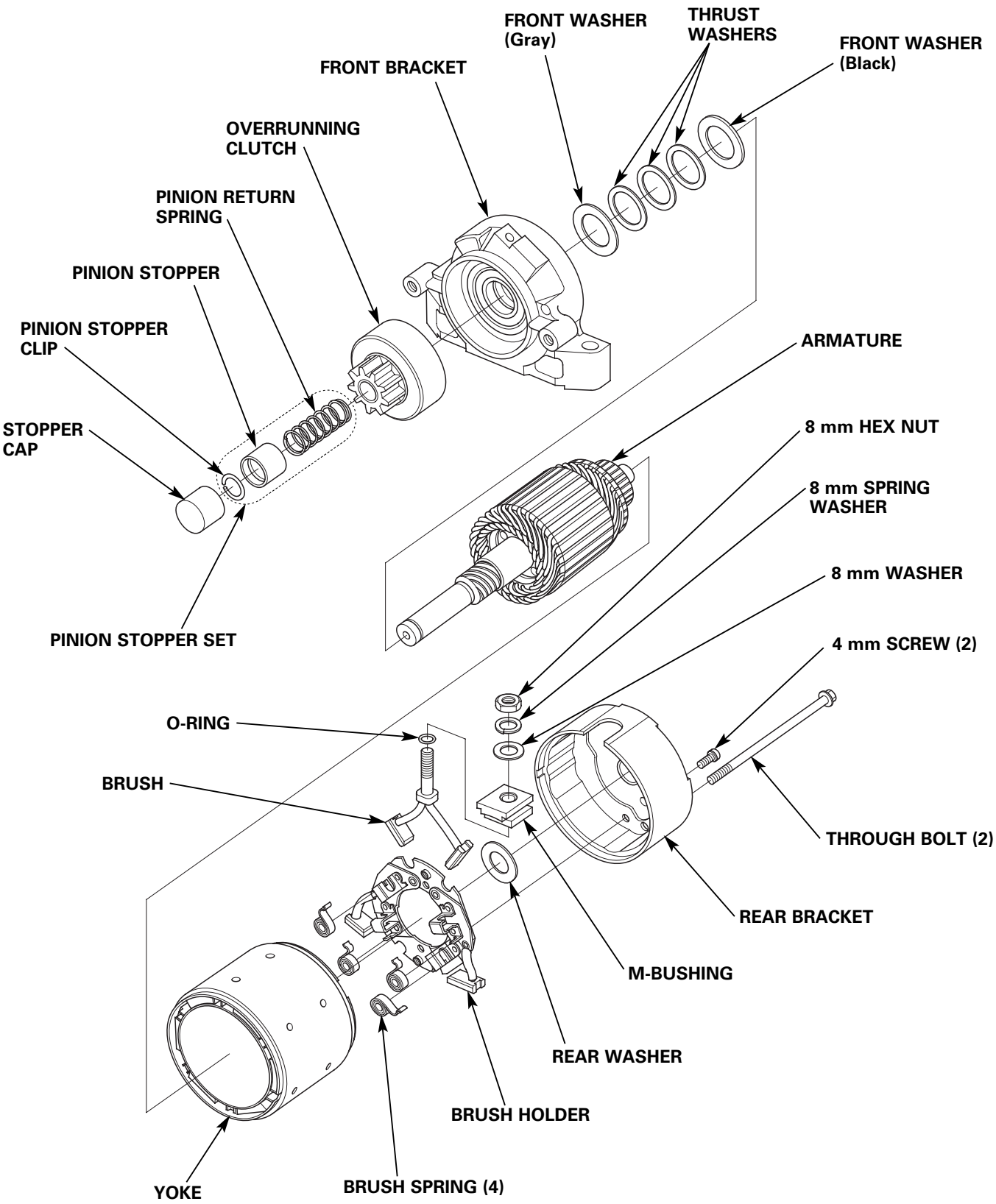
3) Check the pinion gear teeth for wear or damage, and replace the overrunning clutch if necessary.
   If the pinion gear teeth are worn or damaged, check the alternator ring gear teeth, too.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-11

d. COMPONENT DRAWING



© Honda Motor Co., Ltd.

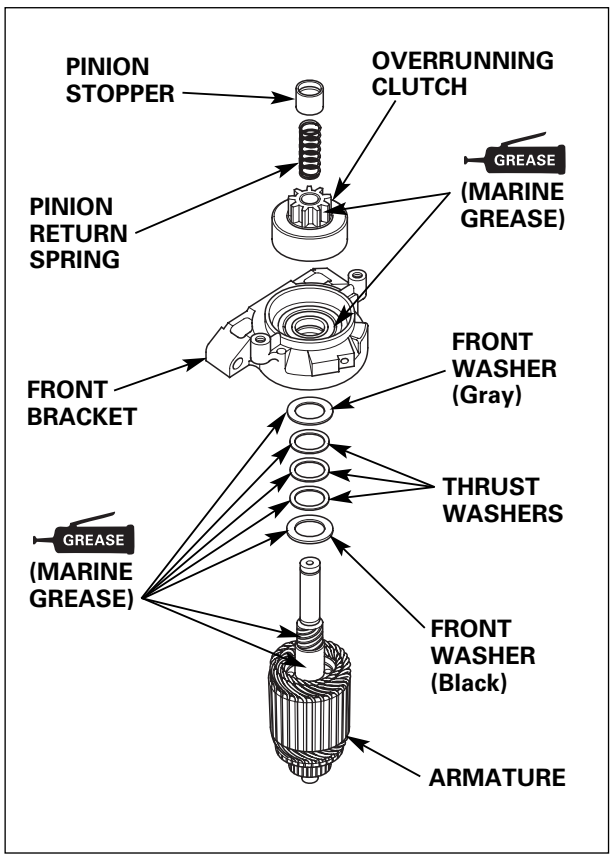
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-12

e. REASSEMBLY

1) Apply marine grease to the armature spline, armature shaft, front washer (black), thrust washers and front washer (gray).

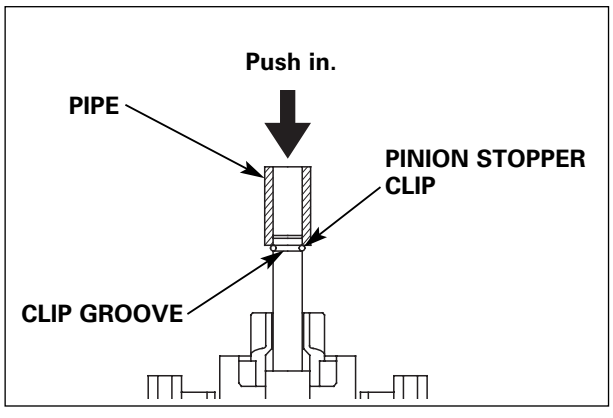
2) Apply marine grease to the pinion gear and the circumference of the ball bearing in the front bracket.

3) Install the front washer (black), thrust washers, front washer (gray), front bracket, overrunning clutch, a new pinion return spring and a new pinion stopper on the armature in this order.

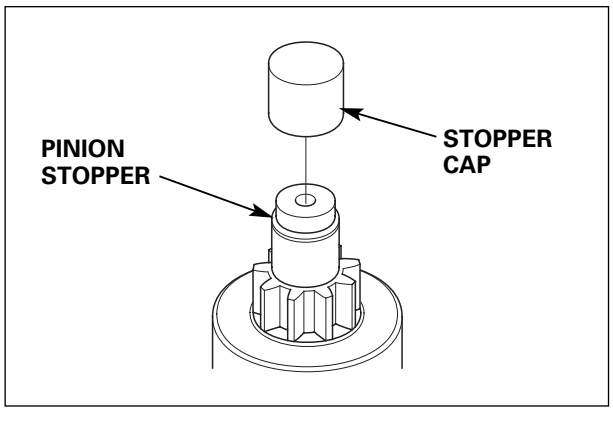


4) Push a new pinion stopper clip into the clip groove using a pipe having the dimensions shown below.

   I.D.: approx. 18 mm (0.7 in), O.D.: approx. 22 mm (0.9 in), Length: approx. 20 mm (0.8 in)



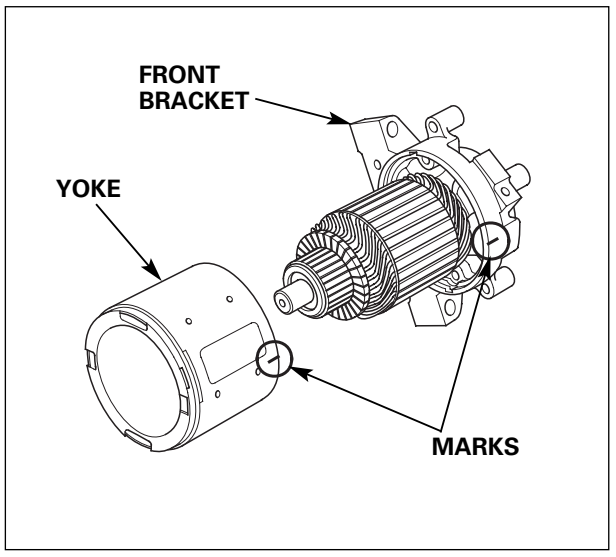
5) Install the stopper cap on the pinion stopper.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

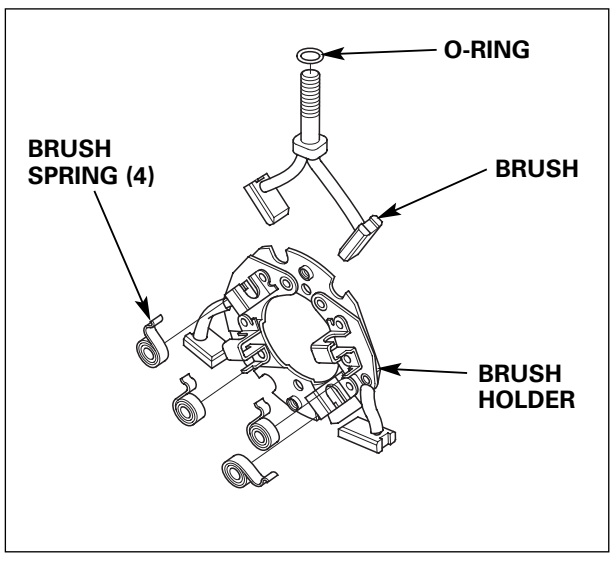
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-13

6) Install the yoke on the front bracket, aligning the marks made on disassembly.
Before installation, check that the magnetic part on the inner side of the yoke is free of any foreign material.



7) Install the o-ring on the brush.

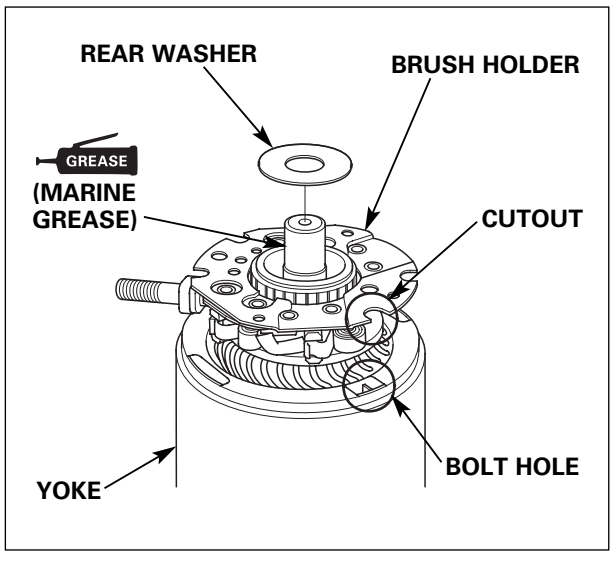
8) Set the brush on the brush holder, and install the four brush springs.



9) Install the brush holder, aligning the cutout in the brush holder with the bolt hole in the yoke as shown.

10) Apply marine grease to the armature.

11) Install the rear washer on the armature shaft.



© Honda Motor Co., Ltd.

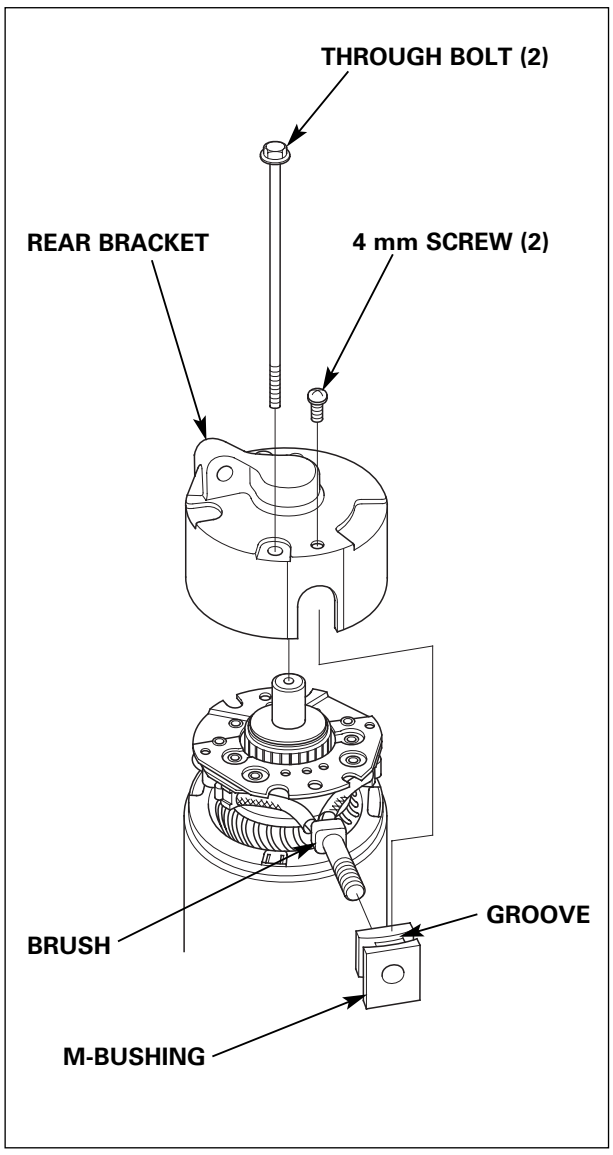
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-14

12) Install the M-bushing on the brush.

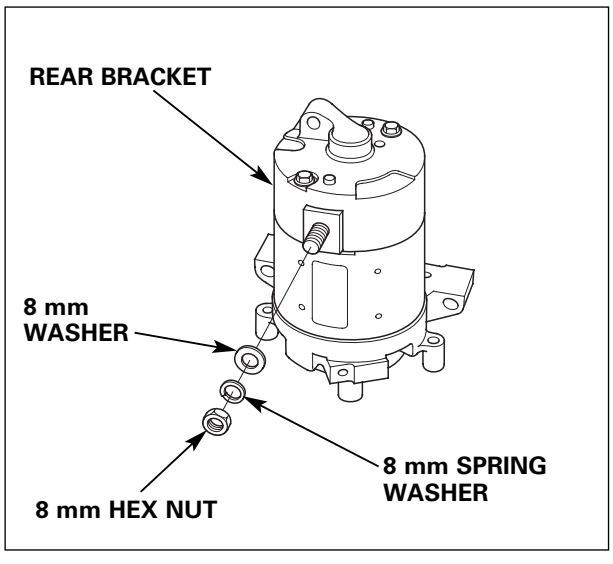
13) Apply adhesive agent (Cemedine #575 or equivalent) to the rear bracket installation groove in the M-bushing.

14) Install the rear bracket and tighten the two 4 mm screws securely.

15) Tighten the two through bolts securely.



16) Set the 8 mm washer and the 8 mm spring washer on the rear bracket, and tighten the 8 mm hex nut securely.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

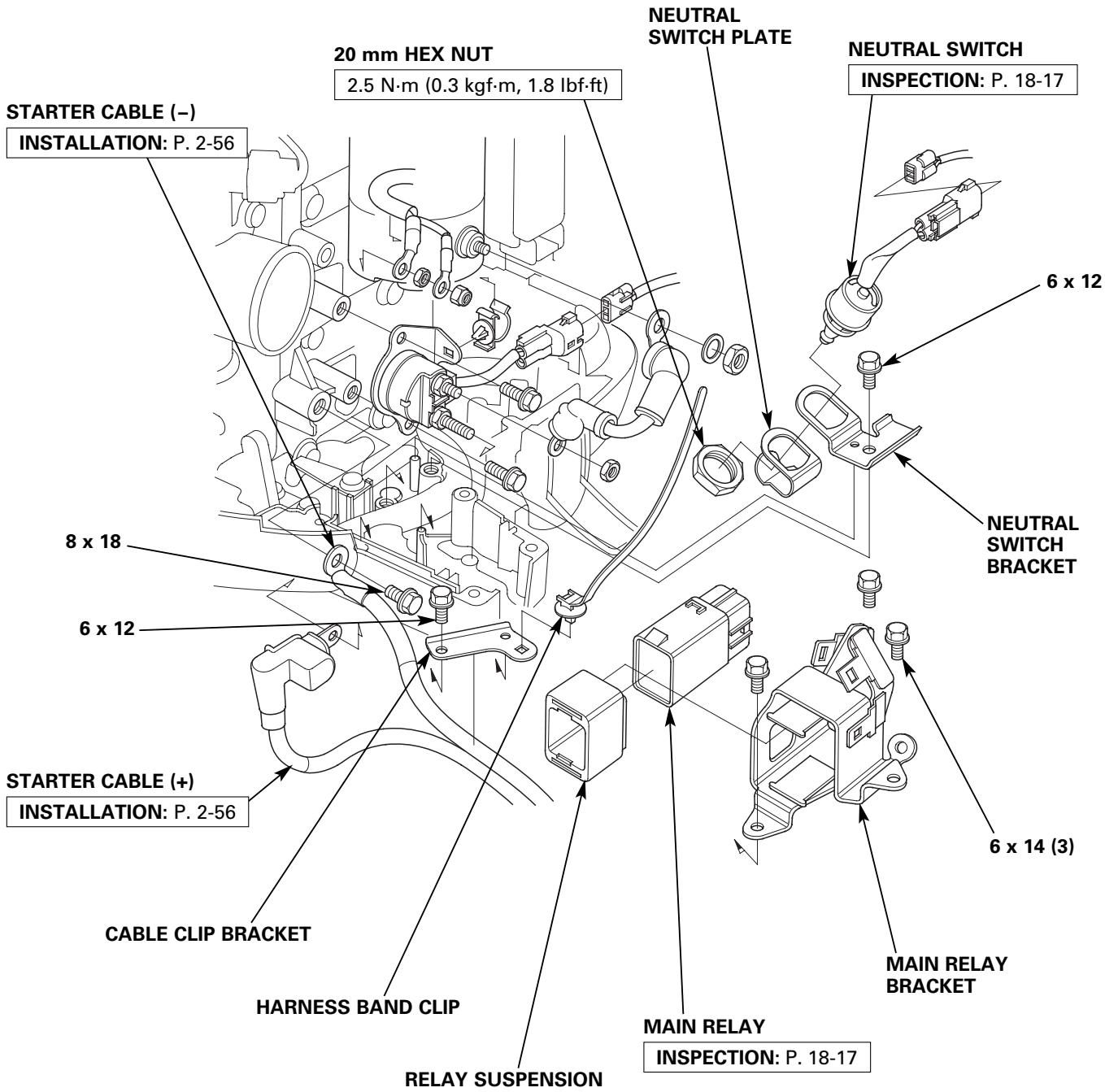
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-15

3. STARTER CABLE/STARTER SOLENOID/MAIN RELAY/ NEUTRAL SWITCH

a. REMOVAL/INSTALLATION

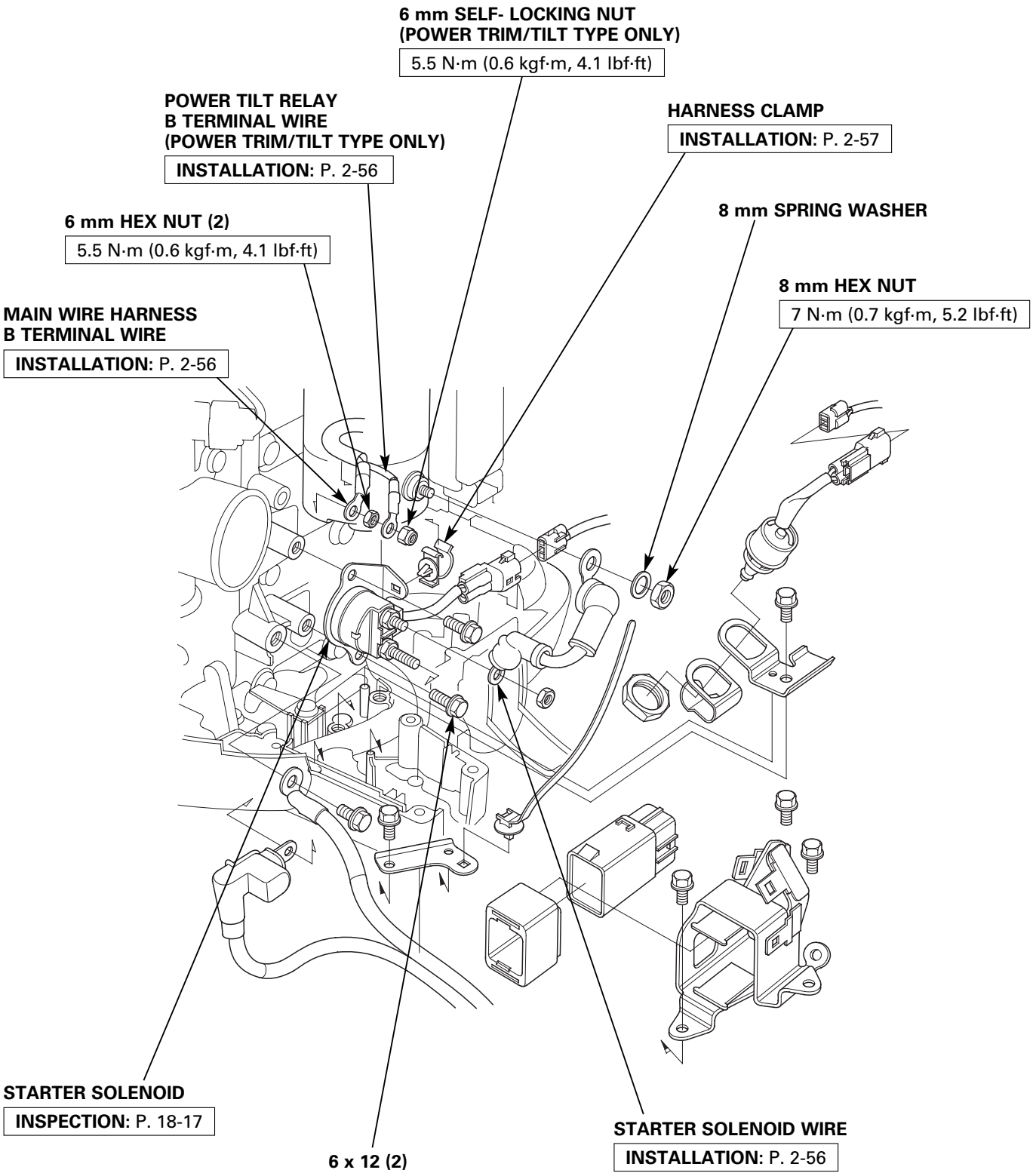
Remove the following parts.
- Engine cover (P. 4-2)
- Silencer (P. 5-88)
- Tiller handle (P. 16-6)

Install and route the connectors and harnesses in the proper positions (P. 2-55).



© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-16



Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-17

b. INSPECTION

• MAIN RELAY

NOTICE

Use a known-good battery and connect it to the main relay terminals with care not to short-circuit the main relay.

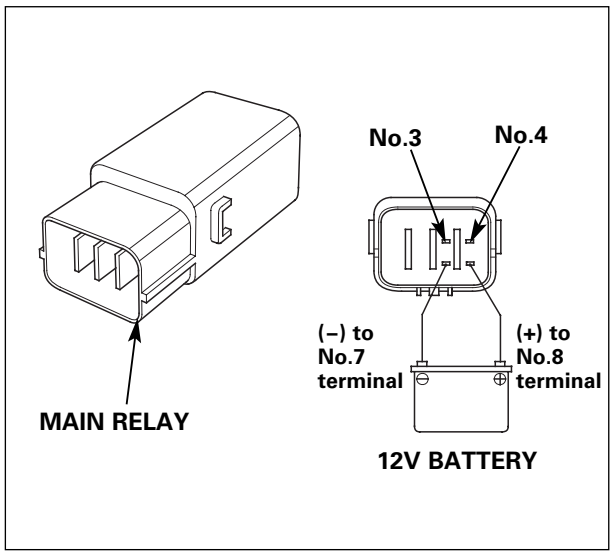
1) Connect the battery cables to the main relay terminals as shown, and check for continuity between the terminals.

Between No.3 and No.4 terminals	Continuity

2) Disconnect the battery cables from the main relay terminals, and check for continuity between the terminals.

Between No.3 and No.4 terminals	No continuity

3) If there is any abnormality, replace the main relay.



• STARTER SOLENOID

NOTICE

Use a known-good battery and connect it to the starter solenoid terminals with care not to short-circuit the starter solenoid.

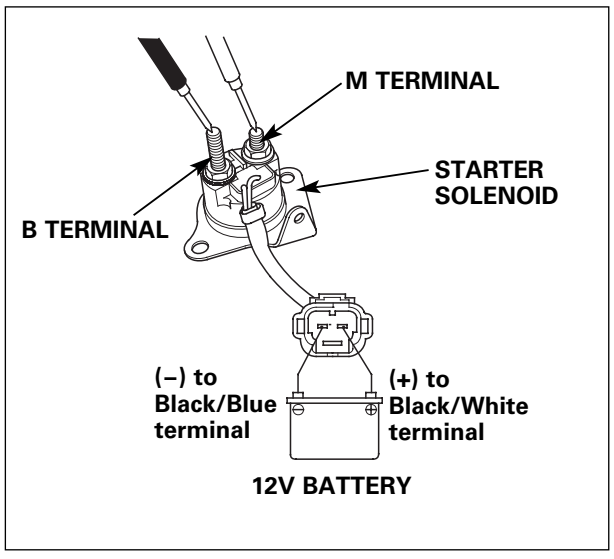
1) Connect the battery cables to the starter solenoid terminals as shown, and check for continuity between the terminals.

Between B and M terminals	Continuity

2) Disconnect the battery cables from the terminals, and check for continuity between the terminals.

Between B and M terminals	No continuity

3) If there is any abnormality, replace the starter solenoid.



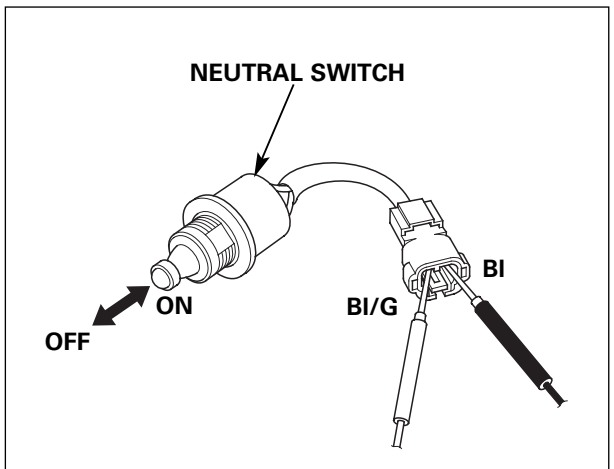
• NEUTRAL SWITCH

1) Check for continuity between the terminals with the switch in each position.

	Bl/G	Bl
ON	○——○	
OFF		

○——○ : Continuity

2) If there is any abnormality, replace the neutral switch.



© Honda Motor Co., Ltd.

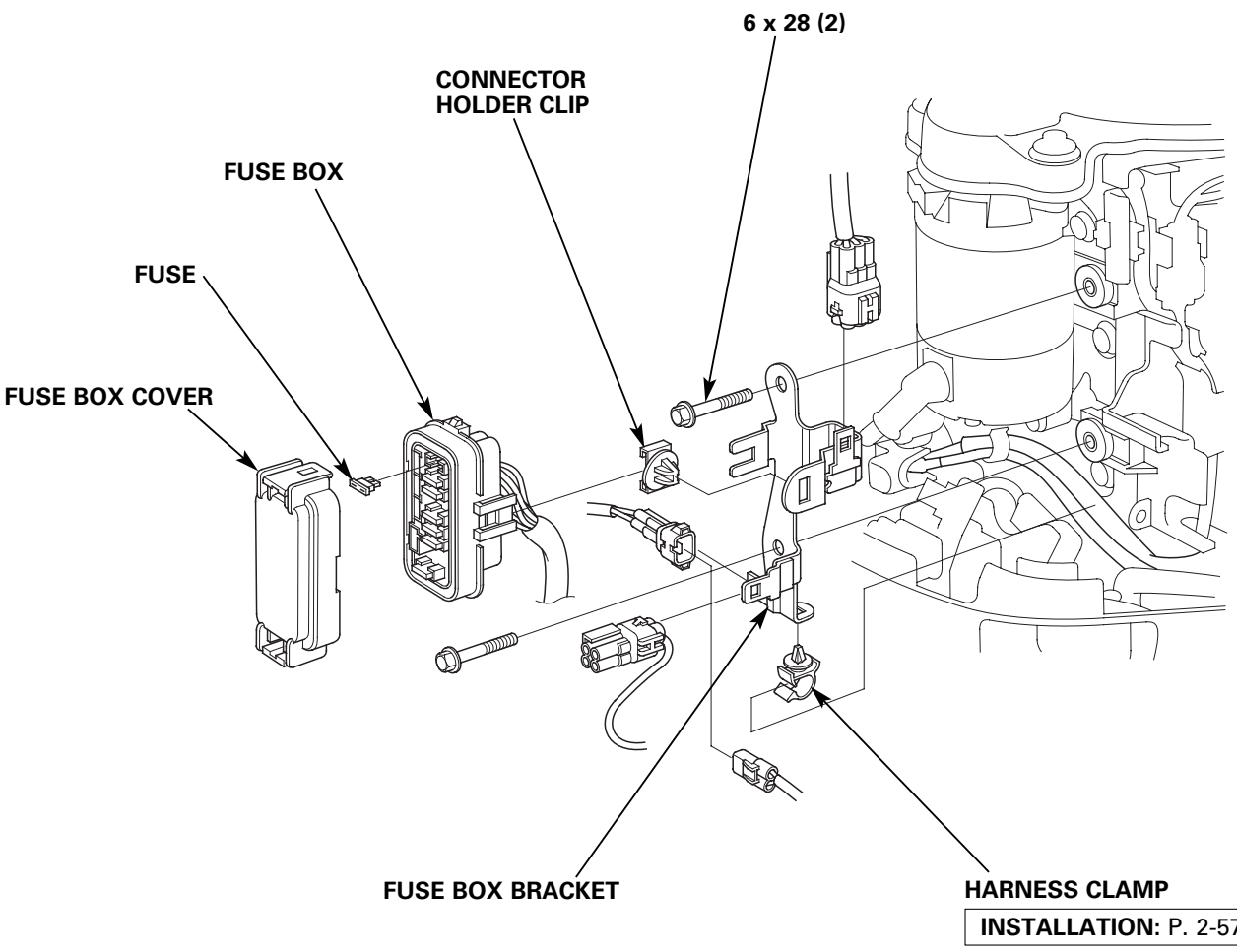
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-18

4. FUSE BOX

• REMOVAL/INSTALLATION

Remove the following parts.
- Engine cover (P. 4-2)
- Electric part cover (P. 18-19)

Install and route the connectors and harnesses in the proper positions (P. 2-57).



INSTALLATION: P. 2-57

Date of Issue: May 2008
© Honda Motor Co., Ltd.

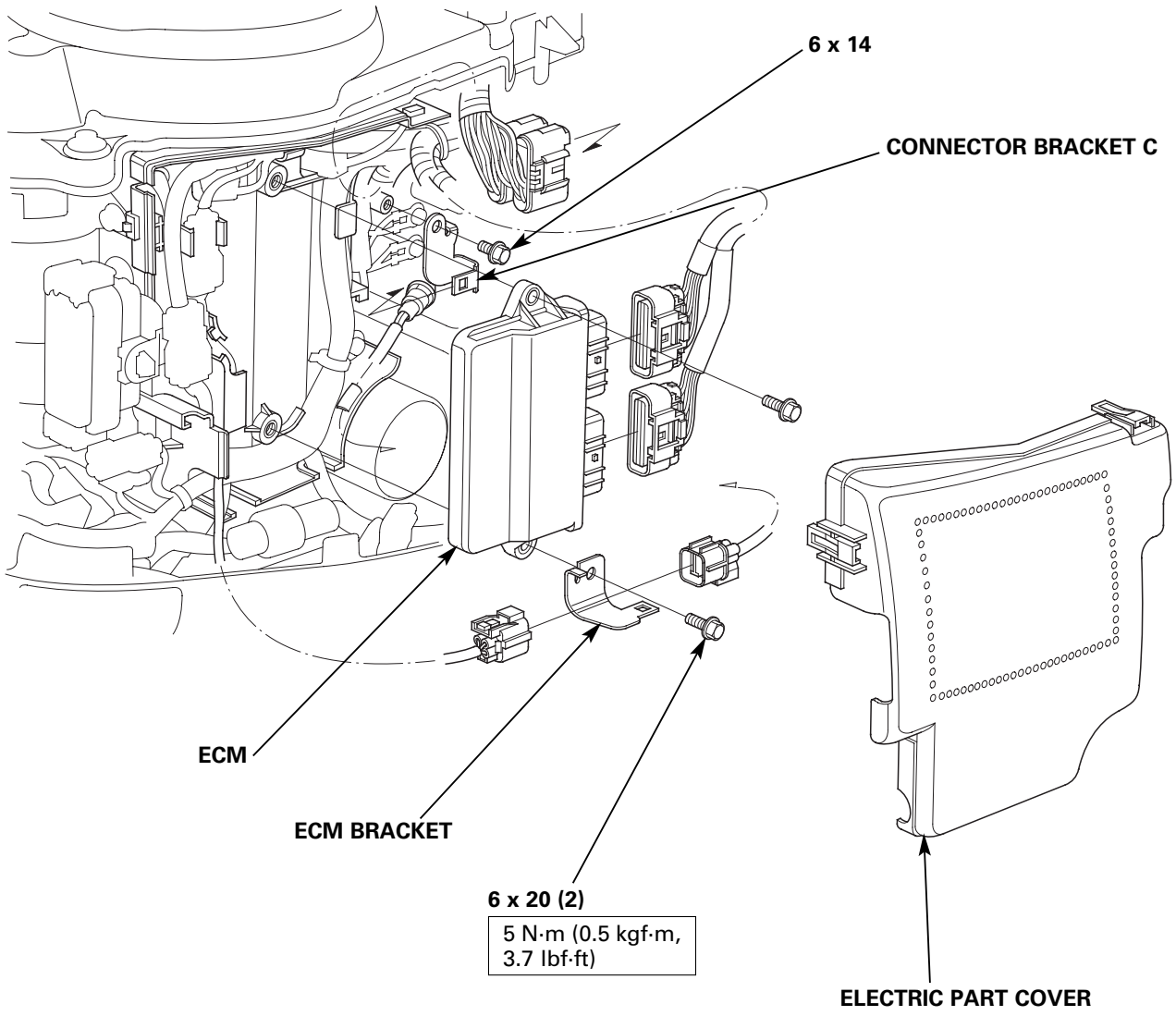
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-19

5. ELECTRIC PART COVER/ECM

• REMOVAL/INSTALLATION

Remove the engine cover (P. 4-2).

Install and route the connectors and harnesses in the proper positions (P. 2-60).



© Honda Motor Co., Ltd.

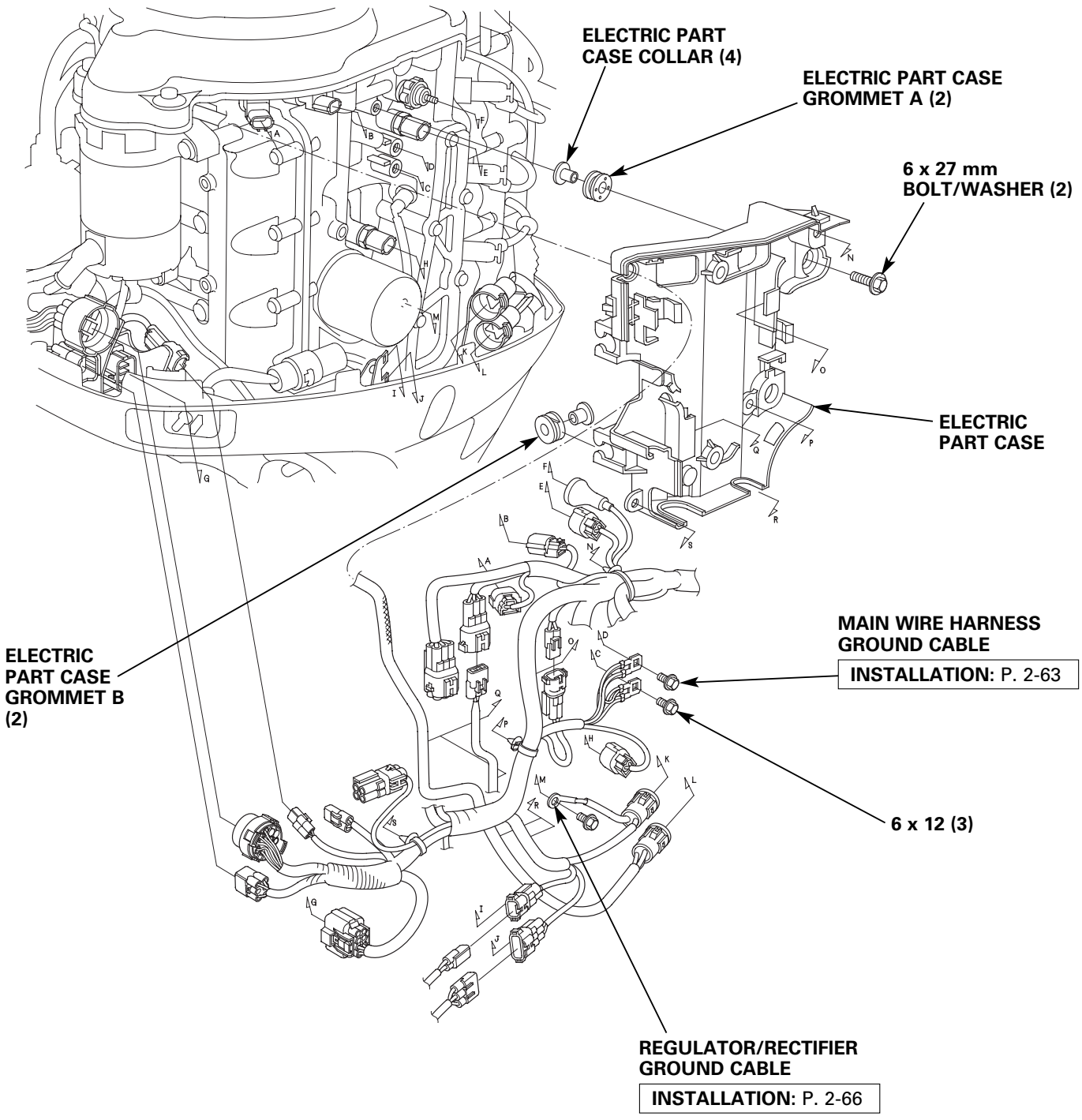
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-20

6. ELECTRIC PART CASE

• REMOVAL/INSTALLATION

Remove the following parts.
- Engine cover (P. 4-2)
- Fuse box (P. 18-18)
- Electric part cover/ECM (P. 18-19)

Install and route the connectors and harnesses in the proper positions (P. 2-61).



Date of Issue: May 2008
© Honda Motor Co., Ltd.

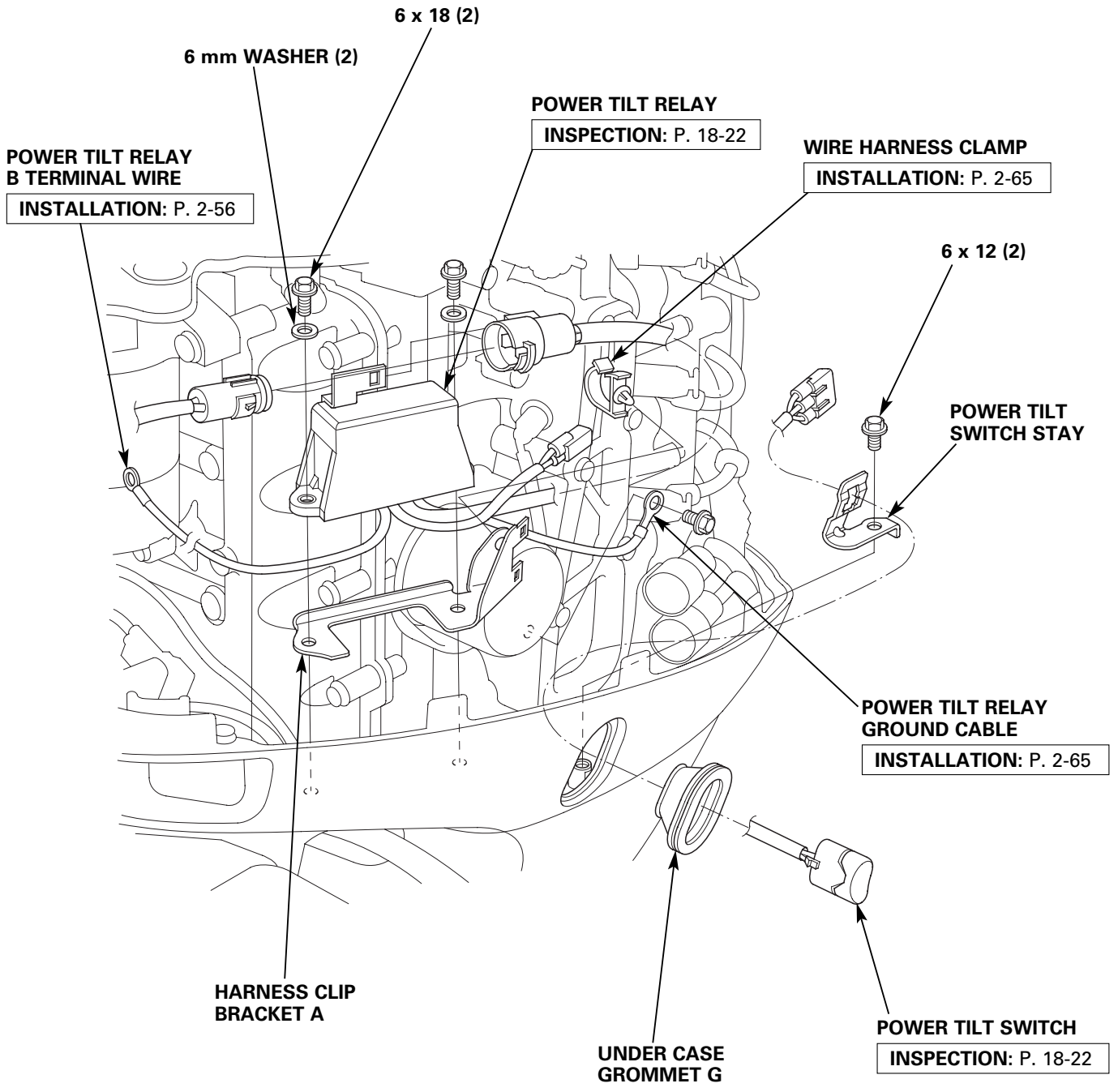
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-21

7. POWER TILT RELAY/POWER TILT SWITCH [POWER TRIM/TILT TYPE ONLY]

a. REMOVAL/INSTALLATION

Remove the following parts.
- Engine cover (P. 4-2)
- Electric part cover (P. 18-19)

Install and route the connectors and harnesses in the proper positions (P. 2-65).



© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-22

b. INSPECTION

• POWER TILT RELAY

NOTICE

Use a known-good battery and connect it to the power tilt relay terminals with care not to short-circuit the relay.

1) Connect the battery cables to the power tilt relay terminals as shown, and check for continuity between the terminals.

   • Battery positive (+) cable connected to Light green terminal:

Between Green and Black terminals	No continuity
Between Blue and Black terminals	Continuity
Between Green and White/Yellow terminals	Continuity
Between Blue and White/Yellow terminals	No continuity

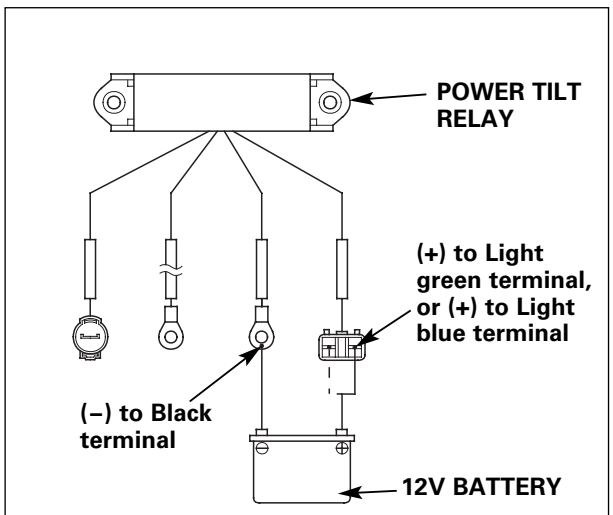
   • Battery positive (+) cable connected to Light blue terminal:

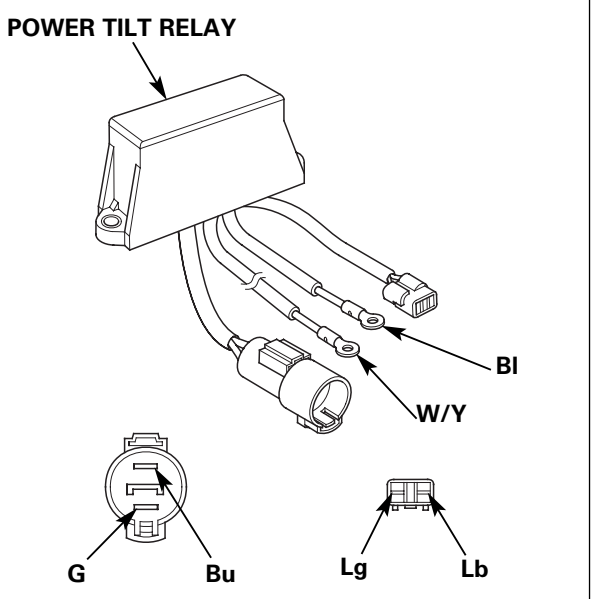
Between Green and Black terminals	Continuity
Between Blue and Black terminals	No continuity
Between Green and White/Yellow terminals	No continuity
Between Blue and White/Yellow terminals	Continuity

2) Disconnect the battery cables from the power tilt relay terminals, and check for continuity between the terminals.

Between Green and Black terminals	Continuity
Between Blue and Black terminals	Continuity
Between Green and White/Yellow terminals	No continuity
Between Blue and White/Yellow terminals	No continuity

3) If there is any abnormality, replace the power tilt relay.





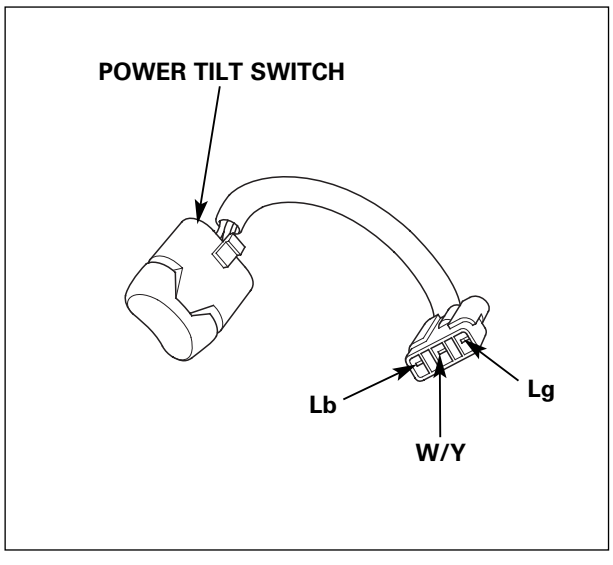
• POWER TILT SWITCH

1) Check for continuity between the terminals with the switch in each position.

	Lg	W/Bl	Lb
UP (Up)	○	○	
Neutral			
DN (Down)		○	○

○—○: Continuity

2) If there is any abnormality, replace the power tilt switch.



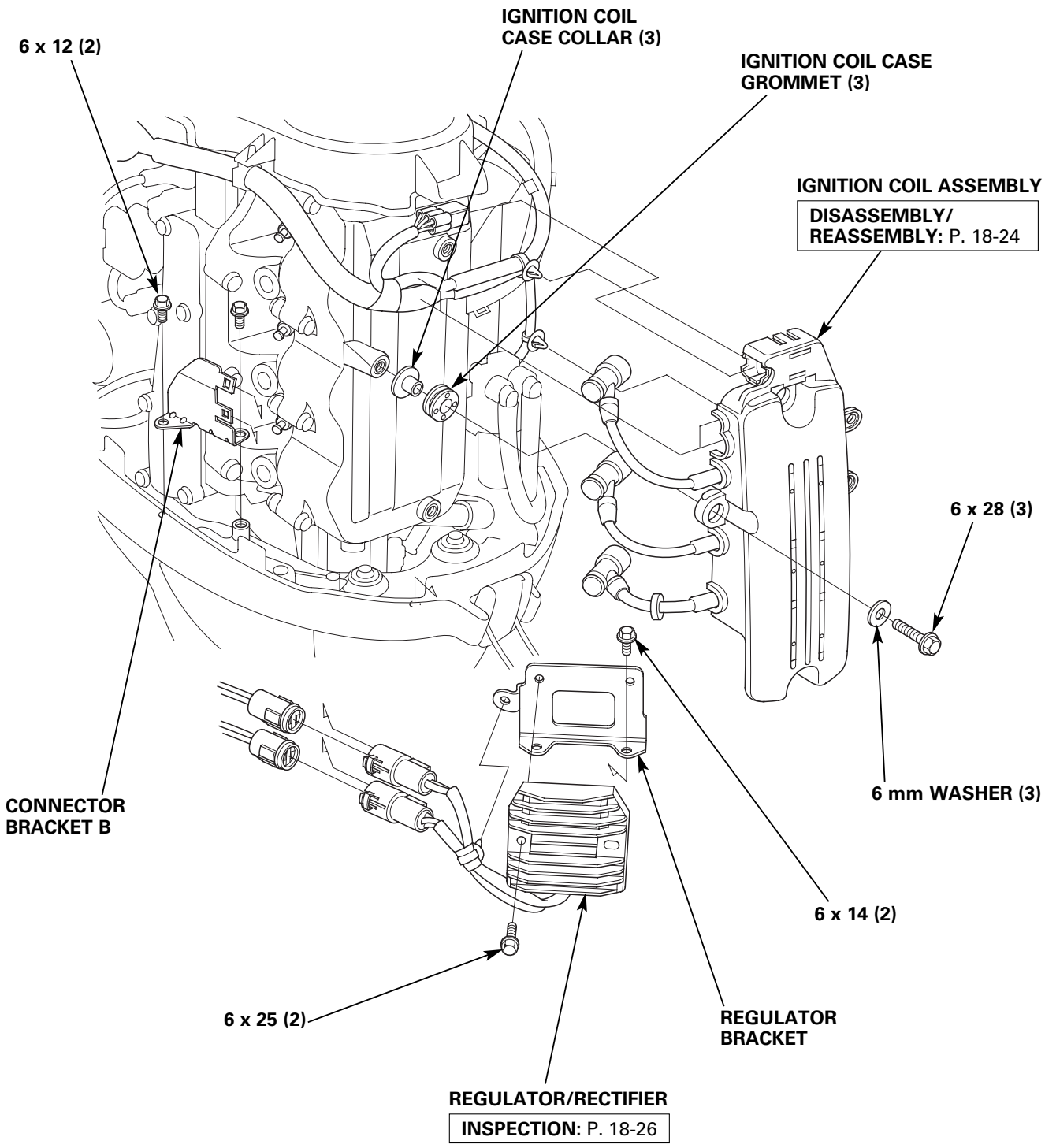
Date of Issue: May 2008
© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-23

8. IGNITION COIL/REGULATOR/RECTIFIER

a. REMOVAL/INSTALLATION

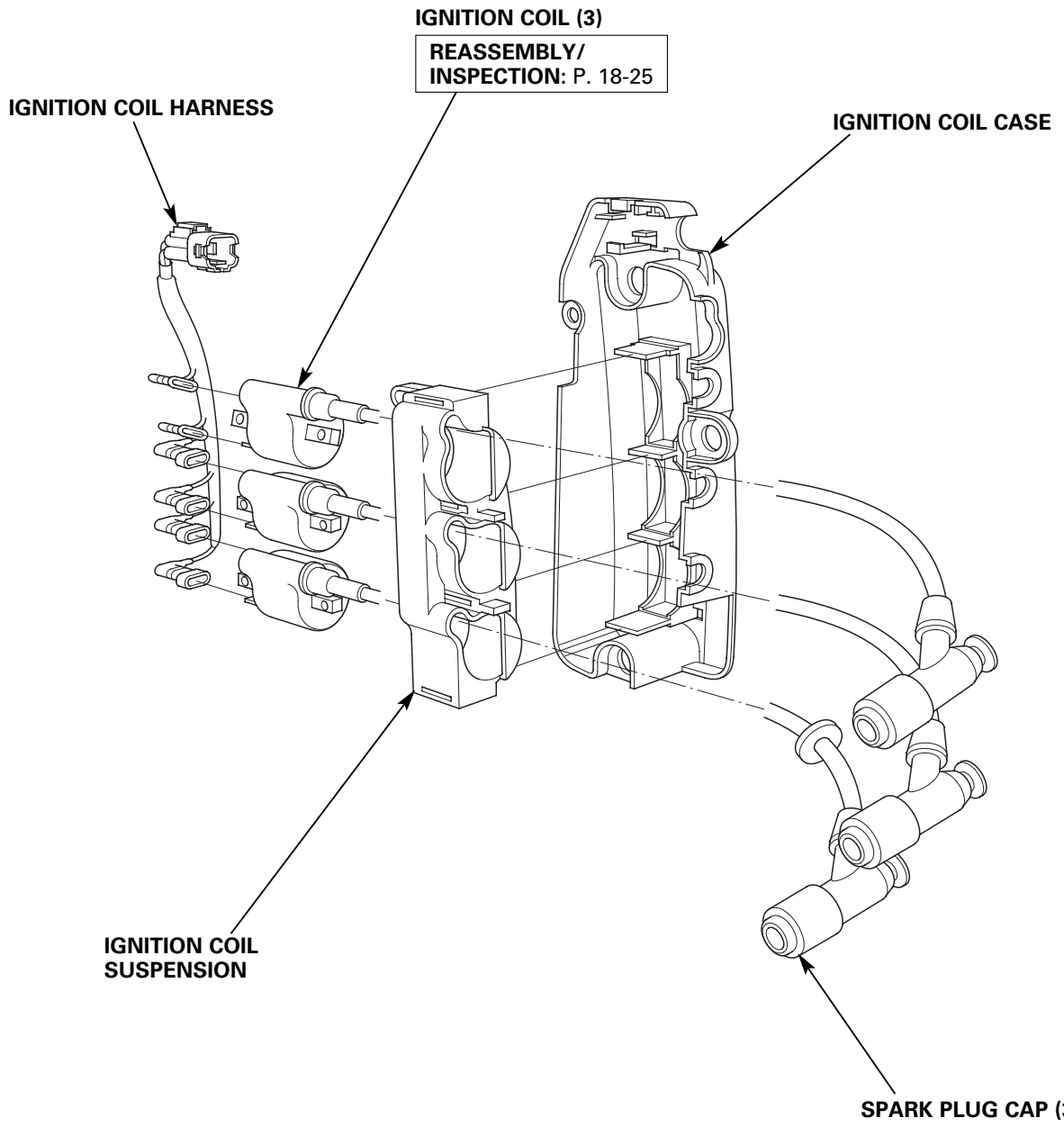
Remove the engine cover (P. 4-2).
Install and route the connectors and harnesses in the proper positions (P. 2-67).



© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-24

b. DISASSEMBLY/REASSEMBLY
• IGNITION COIL ASSEMBLY

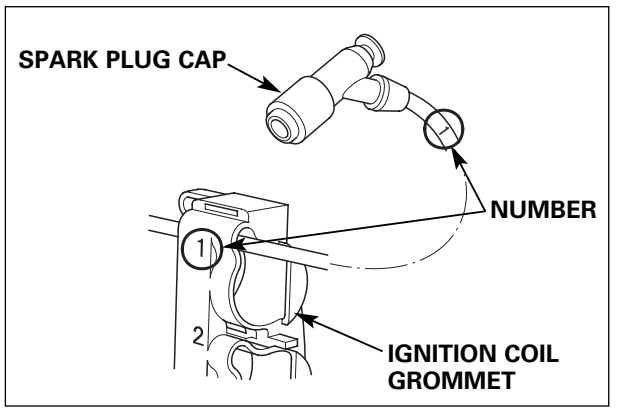


Date of Issue: May 2008
© Honda Motor Co., Ltd.

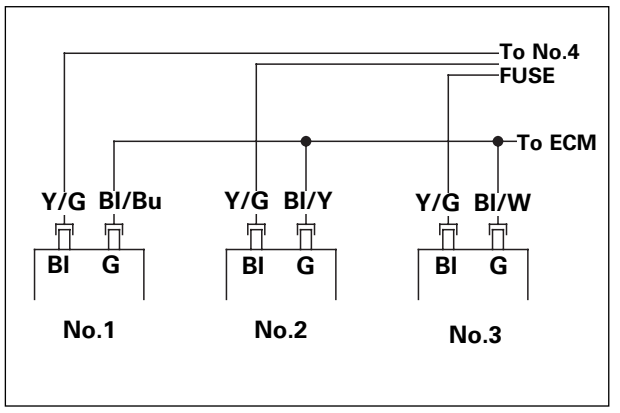
cap.18 BF40D 50D (AH).qxp 2008/04/09 15:38 ページ 18-25

REASSEMBLY:

1) Check the number on the spark plug cap, and set it in the corresponding number position of the ignition coil.



2) Connect the ignition coil harness to the ignition coil as shown.



c. INSPECTION

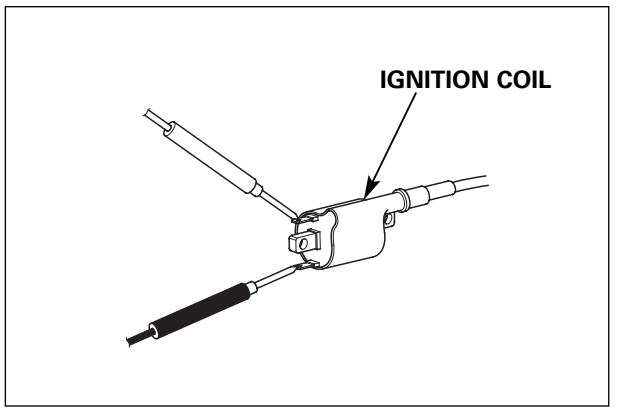
• IGNITION COIL

<Primary resistance>

1) Attach the tester leads to the ignition coil terminals as shown, and measure the primary resistance of the coil.

Resistance:	2.1 — 2.6 Ω

2) If the measurement is outside the specification, replace the ignition coil.

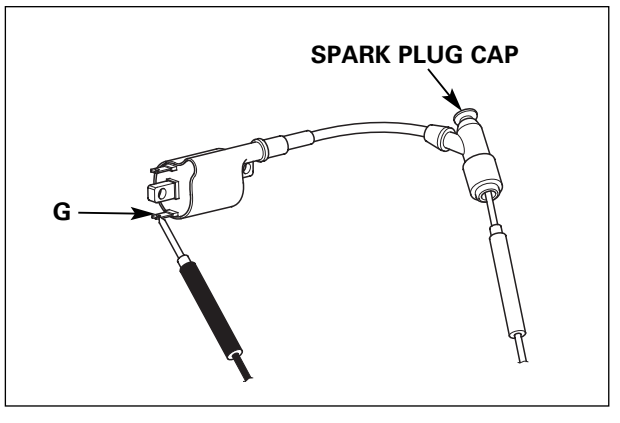


<Secondary resistance>

1) Attach the tester leads to the spark plug cap and the green terminal as shown, and measure the secondary resistance of the coil.

Resistance:	9 — 11 kΩ

2) If the measurement is outside the specification, replace the ignition coil.



© Honda Motor Co., Ltd.

cap.18 BF40D 50D (AH).qxp 2008/04/09 15:39 ページ 18-26

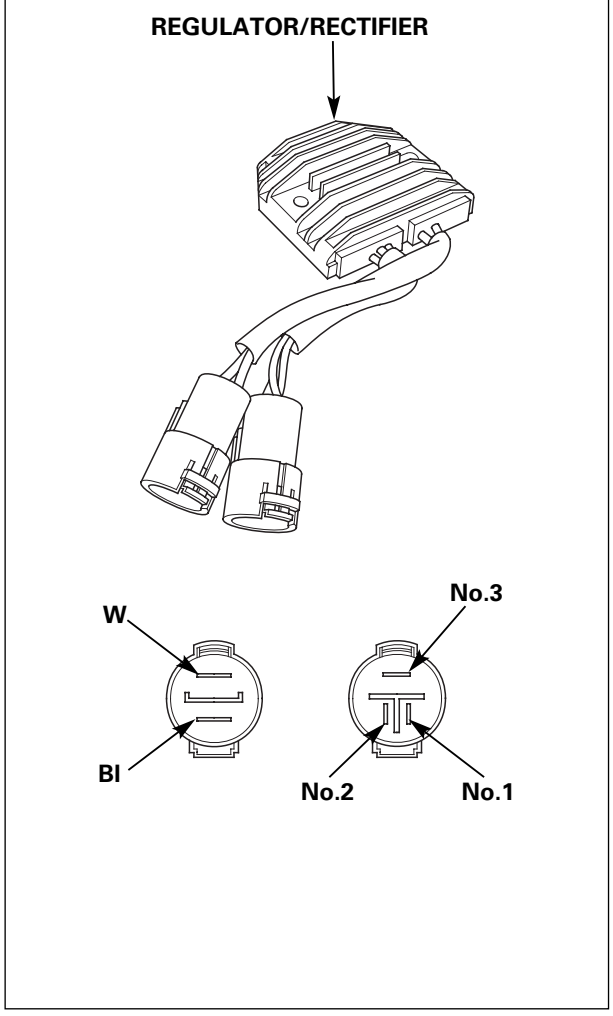
• REGULATOR/RECTIFIER

1) Measure the resistance between the terminals listed below.

Resistance (Ω)

		Tester (+) side				
		W	No.1	No.2	No.3	Bl
Tester (–) side	W		10k—100k	10k—100k	10k—100k	50k—500k
	No.1	5—5k		10k—100k	10k—100k	50k—500k
	No.2	5—5k	10k—100k		10k—100k	50k—500k
	No.3	5—5k	10k—100k	10k—100k		50k—500k
	Bl	500—10k	500—10k	500—10k	500—10k	

2) If any measurement is outside the specification, replace the regulator/rectifier.



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.19 BF40D 50D (A).qxp 2008/04/11 14:04 ページ 19-1

19. INDEX

A

ALTERNATOR/CAMSHAFT PULLEY/TIMING BELT 7-1
- ALTERNATOR COVER 7-2
- ALTERNATOR/TIMING BELT 7-3
- CAMSHAFT PULLEY/CMP SENSOR 7-22

C

CABLE/THROTTLE ARM BRACKET 17-1
- REMOTE CONTROL CABLE/GROMMET 17-2
- THROTTLE ARM BRACKET 17-8

COVER 4-1
- ENGINE COVER 4-2
- SEPARATE COVER 4-3

CRANKCASE/CYLINDER BLOCK/CRANKSHAFT/ PISTONS 10-1
- BEARING SELECTION 10-16
- DISASSEMBLY 10-2
- INSPECTION 10-10
- PRIMARY DRIVE GEAR SELECTION 10-20
- REASSEMBLY 10-21

CYLINDER HEAD/VALVES/OIL PUMP 9-1
- CYLINDER HEAD ASSEMBLY DISASSEMBLY 9-6
- CYLINDER HEAD ASSEMBLY INSTALLATION 9-29
- CYLINDER HEAD ASSEMBLY REASSEMBLY 9-23
- CYLINDER HEAD ASSEMBLY REMOVAL 9-4
- CYLINDER HEAD COVER INSTALLATION 9-31
- CYLINDER HEAD COVER REMOVAL 9-2
- INSPECTION 9-13
- OIL PUMP 9-34
- VALVE GUIDE REPLACEMENT 9-19
- VALVE SEAT RECONDITIONING 9-21

E

ELECTRICAL EQUIPMENT 18-1
- ELECTRIC PART CASE 18-20
- ELECTRIC PART COVER/ECM 18-19
- FUSE BOX 18-18
- IGNITION COIL/REGULATOR/RECTIFIER 18-23
- LAYOUT DRAWING 18-1
- POWER TILT RELAY/POWER TILT SWITCH [POWER TRIM/TILT TYPE ONLY] 18-21
- STARTER CABLE/STARTER SOLENOID/ MAIN RELAY/NEUTRAL SWITCH 18-15
- STARTER MOTOR 18-4

ENGINE REMOVAL/INSTALLATION 6-1
- INSTALLATION 6-9
- REMOVAL 6-2

M

MAINTENANCE 3-1
- ENGINE OIL 3-3
- FUEL STRAINER [HIGH PRESSURE SIDE] 3-16
- FUEL STRAINER [LOW PRESSURE SIDE] 3-12
- GEAR CASE OIL 3-6
- IDLE SPEED 3-17
- MAINTENANCE SCHEDULE 3-2
- OIL FILTER 3-5
- SHIFT CABLE 3-21
- SPARK PLUGS 3-8
- STEERING FRICTION [TILLER HANDLE TYPE ONLY] 3-27
- THROTTLE CABLE 3-18
- TIMING BELT 3-24
- VALVE CLEARANCE 3-9

MOUNT CASE/STERN BRACKET/SWIVEL CASE 13-1
- MOUNT CASE 13-2
- STERN BRACKET/SWIVEL CASE 13-6

P

POWER TRIM/TILT ASSEMBLY/GAS ASSISTED DAMPER ASSEMBLY 14-1
- GAS ASSISTED DAMPER ASSEMBLY [GAS ASSISTED TYPE ONLY] 14-54
- POWER TILT MOTOR [POWER TRIM/TILT TYPE ONLY] 14-45
- POWER TRIM/TILT ASSEMBLY [POWER TRIM/TILT TYPE ONLY] 14-2

PROGRAMMED-FUEL INJECTION 5-1
- AIR VENT STRAINER/AIR VENT TUBE 5-114
- CIRCUIT DIAGRAM 5-4
- CKP (CRANKSHAFT POSITION) SENSOR 1, 2 5-117
- COMPONENT LOCATION 5-6
  - ECM TERMINAL ARRANGEMENT 5-8
- EBT (ENGINE BLOCK TEMPERATURE) SENSOR 5-119
- ECT2 (ENGINE COOLANT TEMPERATURE) SENSOR 5-117
- EOP (ENGINE OIL PRESSURE) SWITCH 5-115
- FUEL STRAINER (LOW PRESSURE SIDE)/FUEL PUMP (LOW PRESSURE SIDE)/FUEL TUBE 5-111
- FUEL SUPPLY SYSTEM 5-75
  - TROUBLESHOOTING 5-75
  - Injector Inspection 5-76
  - How to Relieve Fuel Pressure 5-78
  - Fuel Pressure Measurement 5-79
  - Pressure Regulator Inspection 5-80
  - Fuel Pump (High Pressure Side) Inspection 5-81
  - Fuel Pump (High Pressure Side) Main Wire Harness Inspection 5-82
  - Fuel Line Inspection 5-84

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.19 BF40D 50D (A).qxp 2008/04/11 14:04 ページ 19-2

HO2S (HEATED OXYGEN SENSOR) 5-118
IAT (INTAKE AIR TEMPERATURE)SENSOR 5-116
IDLE CONTROL SYSTEM 5-72
TROUBLESHOOTING 5-72
Idle Adjusting Screw Adjustment 5-72
Throttle Body Inspection/Cleaning 5-73
IAC Valve Replacement 5-74
INJECTOR 5-85
MAP (MANIFOLD ABSOLUTE PRESSURE) SENSOR 5-116
SERVICE PRECAUTIONS 5-2
PGM-FI (PROGRAMMED FUEL INJECTION) TROUBLESHOOTING 5-2
FUEL LINE SERVICE 5-2
CHECK AFTER OPERATION 5-2
FUEL LEAK CHECK 5-2
WHEN THE BOAT IS EQUIPPED WITH RADIO EQUIPMENT/D-GPS 5-2
SILENCER/THROTTLE BODY/INTAKE MANIFOLD 5-88
TROUBLESHOOTING 5-10
HOW TO CARRY OUT TROUBLESHOOTING ... 5-10
TROUBLESHOOTING WITH THE HDS 5-11
DTC (DIAGNOSTIC TROUBLE CODE) CHECK... 5-11
TO CLEAR DTC 5-11
FINAL PROCEDURE (AFTER TROUBLESHOOTING) 5-11
TROUBLESHOOTING GUIDE BY DTC 5-12
ECM TROUBLESHOOTING 5-14
HO2S TROUBLESHOOTING 5-18
MAP SENSOR TROUBLESHOOTING 5-20
CKP SENSOR 1 TROUBLESHOOTING 5-22
EBT SENSOR TROUBLESHOOTING 5-24
TP SENSOR TROUBLESHOOTING 5-26
CKP SENSOR 2 TROUBLESHOOTING 5-28
IAT SENSOR TROUBLESHOOTING 5-30
IAC VALVE TROUBLESHOOTING 5-32
HO2S HEATER TROUBLESHOOTING 5-34
CMP SENSOR TROUBLESHOOTING 5-36
ECT2 SENSOR TROUBLESHOOTING 5-38
EOP SWITCH TROUBLESHOOTING 5-40
TROUBLESHOOTING WITHOUT THE HDS 5-42
NUMBER OF BLINKS OF MIL CHECK 5-42
ECM RESET PROCEDURE 5-42
FINAL PROCEDURE (AFTER TROUBLESHOOTING) 5-43
TROUBLESHOOTING GUIDE BY MIL BLINKS 5-44
ECM TROUBLESHOOTING 5-46
HO2S TROUBLESHOOTING 5-48
MAP SENSOR TROUBLESHOOTING 5-50
CKP SENOR 1 TROUBLESHOOTING 5-52
EBT SENSOR TROUBLESHOOTING 5-54
TP SENSOR TROUBLESHOOTING 5-56
CKP SENSOR 2 TROUBLESHOOTING 5-58
IAT SENSOR TROUBLESHOOTING 5-60
IAC VALVE TROUBLESHOOTING 5-62
ECT2 SENSOR TROUBLESHOOTING 5-64
EOP SWITCH TROUBLESHOOTING 5-66
HO2S HEATER TROUBLESHOOTING 5-68
CMP SENSOR TROUBLESHOOTING 5-70
VACUUM CONNECTIONS 5-3
VAPOR SEPARATOR/PRESSURE REGULATOR/ FUEL PUMP (HIGH PRESSURE SIDE) 5-98

PROPELLER/GEAR CASE/ EXTENSION CASE/OIL CASE 11-1
ANODE METAL/WATER SCREEN/ TRIM TAB 11-47
BACKLASH ADJUSTMENT 11-44
EXTENSION CASE/LOWER RUBBER MOUNT 11-48
GEAR CASE ASSEMBLY/EXTENSION SEPARATOR [EXTRA-LONG SHAFT TYPE ONLY] 11-3
GEAR CASE ASSEMBLY PRESSURE CHECK 11-45
OIL CASE 11-56
PROPELLER 11-2
PROPELLER SHAFT HOLDER ASSEMBLY 11-7
PROPELLER SHAFT/ PROPELLER SHAFT HOLDER 11-9
SHIM ADJUSTMENT 11-39
VERTICAL SHAFT/BEVEL GEAR 11-29
WATER PUMP/SHIFT ROD 11-19

S
SERVICE INFORMATION 2-1
CABLE/HARNESS ROUTING 2-54
LUBRICATION POINTS 2-82
MAINTENANCE STANDARDS 2-3
SERIAL NUMBER LOCATION 2-1
STARTING PROCEDURE AFTER INSTALLING MAJOR ASSEMBLIES 2-2
SYMBOLS USED IN THIS MANUAL 2-1
TOOLS 2-10
TORQUE VALUES 2-7
TROUBLESHOOTING 2-17
a. FUSE 2-18
FUSE BOX CONNECTION TABLE 2-18
FUSE LOAD CHART 2-19
b. ENGINE 2-20
HARD TO START OR DOES NOT START 2-20
ELECTRICAL POWER SYSTEM 2-22
STARTER SYSTEM 2-23
FUEL SYSTEM 2-25
IGNITION SYSTEM 2-27
ENGINE DOES NOT RUN SMOOTHLY 2-28
SPARK TEST 2-33
OIL PRESSURE CHECK 2-33
CYLINDER COMPRESSION CHECK 2-34

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 cap.19 BF40D 50D (A).qxp 2008/04/11 14:04 ページ 19-3

c. ALERT SYSTEM/WARNING SYSTEM 2-35
SYMPTOM CHART 2-35
SYSTEM DESCRIPTIONS 2-35
FUNCTION TEST USING THE HDS 2-36
FUNCTION TEST WITHOUT USING HDS 2-37
WARNING BUZZER SOUNDS CONTINUOUSLY 2-40
INTERMITTENT WARNING BUZZER SOUNDS CONTINUOUSLY 2-44
ECM IS ABNORMAL 2-46
d. SHIFT MECHANISM 2-47
HARD TO SHIFT 2-47
e. GAS ASSISTED DAMPER [GAS ASSISTED TYPE ONLY] 2-48
DIFFICULT TO TILT UP 2-48
DOES NOT HOLD IN POSITION 2-48
f. POWER TRIM/TILT [POWER TRIM/TILT TYPE ONLY] 2-49
POWER TRIM/TILT ASSEMBLY DOES NOT OPERATE 2-49
POWER TRIM/TILT ASSEMBLY DOES NOT HOLD IN POSITION 2-50
POWER TRIM/TILT MOTOR DOES NOT OPERATE 2-51
POWER TRIM/TILT ASSEMBLY QUICK REFERENCE CHART 2-52
TUBE ROUTING 2-74

SHIFT ROD/ENGINE UNDER CASE 12-1
ENGINE UNDER CASE 12-4
SHIFT ROD 12-2

SPECIFICATIONS 1-1
DIMENSIONAL DRAWINGS 1-4
SPECIFICATIONS 1-1

STEERING ROD [REMOTE CONTROL TYPE] 15-1
STEERING ROD 15-1

T
TILLER HANDLE [TILLER HANDLE TYPE] 16-1
INSPECTION 16-36
STEERING FRICTION LEVER 16-2
TILLER HANDLE 16-6

W
WATER JACKET COVER/THERMOSTAT 8-1
WATER JACKET COVER/THERMOSTAT 8-2

WIRING DIAGRAMS/SYSTEM DIAGRAM 20-1
CONNECTOR GENERAL LAYOUT DRAWING 20-6
HOW TO READ A WIRING DIAGRAM & RELATED INFORMATION 20-1
SYSTEM DIAGRAM 20-5
WIRING DIAGRAMS 20-3

© Honda Motor Co., Ltd.

00 cap.19 BF40D 50D (A).qxp 2008/04/11 14:04 ページ 19-4

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 Cap20 1 (A).qxd 08.04.10 19:05 ページ20-1

20. WIRING DIAGRAMS/SYSTEM DIAGRAM

1. HOW TO READ A WIRING DIAGRAM & RELATED INFORMATION 20-1
2. WIRING DIAGRAMS 20-3
3. SYSTEM DIAGRAM 20-5
4. CONNECTOR GENERAL LAYOUT DRAWING 20-6

1. HOW TO READ A WIRING DIAGRAM & RELATED INFORMATION

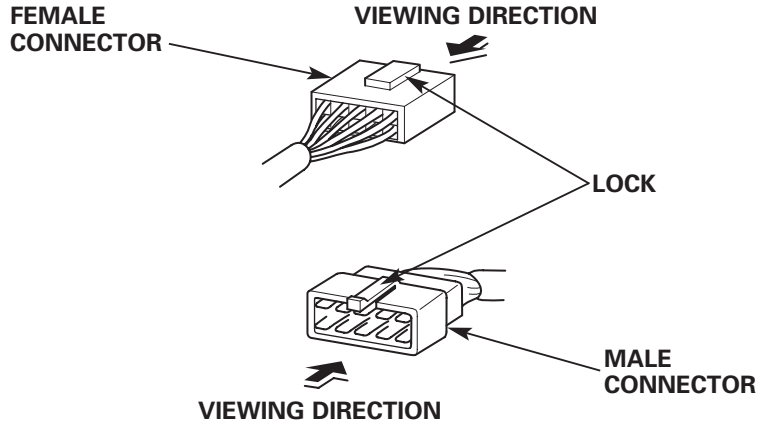
The wiring diagram, connector general layout drawing, connector drawings, and the symbols used in troubleshooting are explained in this section.

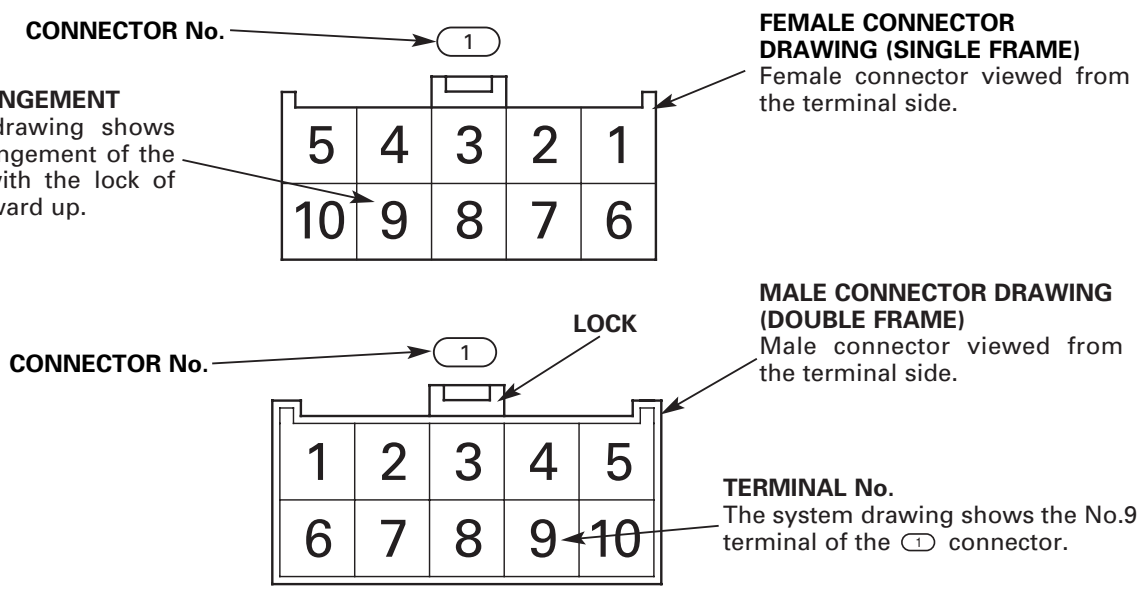
• HOW TO READ CONNECTOR DRAWINGS

Connector drawings show the terminal arrangement, terminal No., number of pins and the shape of terminal (male or female).

Both the male and female connectors are shown for the common connectors, while only the main wire harness side connectors are shown for the dedicated connectors.
The double frame connectors represent the male connectors and the single frame connectors represent the female connectors.

Both the male and female connectors are shown by viewing them from the terminal side.

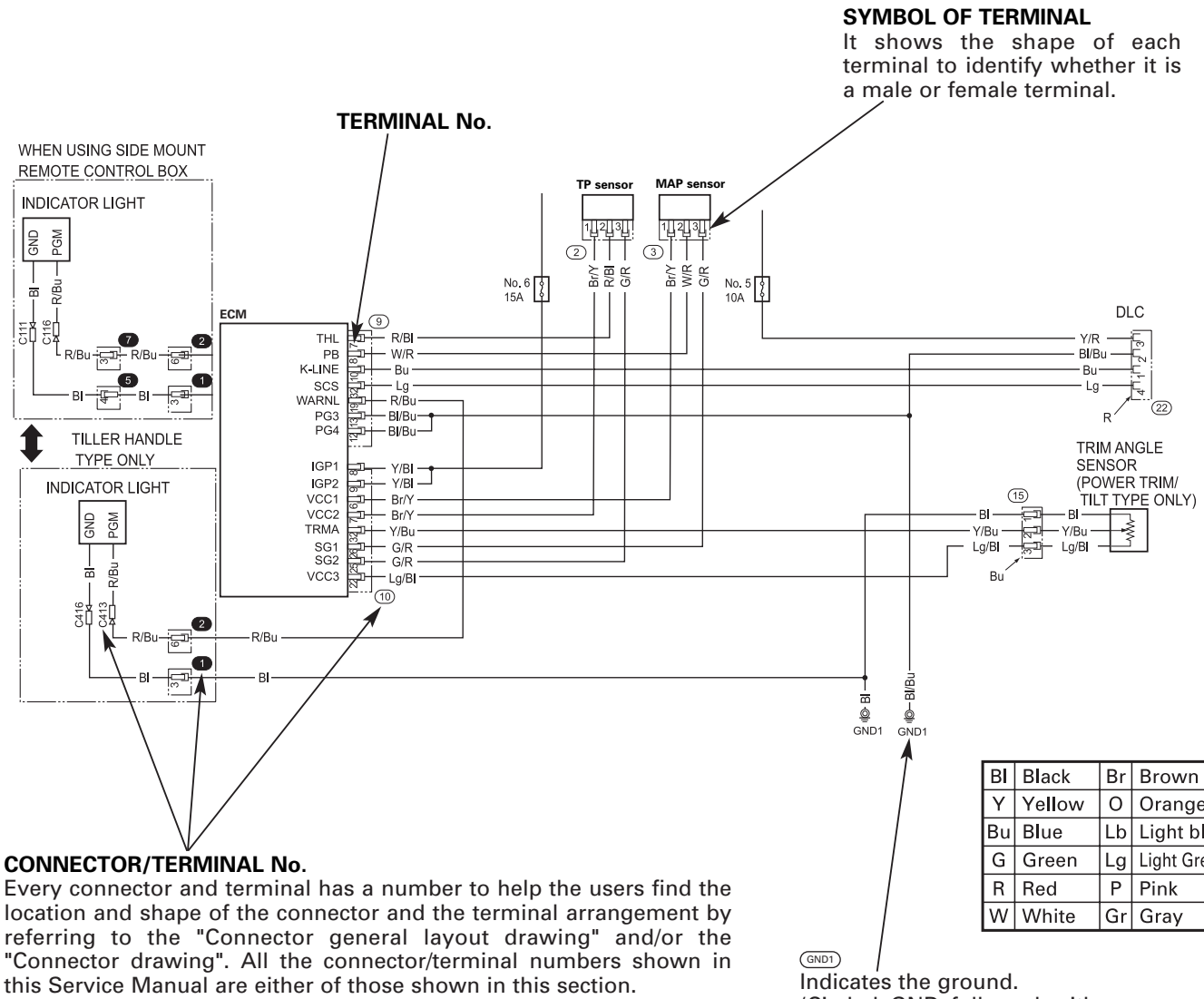




© Honda Motor Co., Ltd.

00 Cap20 1 (A).qxd 08.04.10 19:05 ページ20-2

• HOW TO READ WIRING DIAGRAM



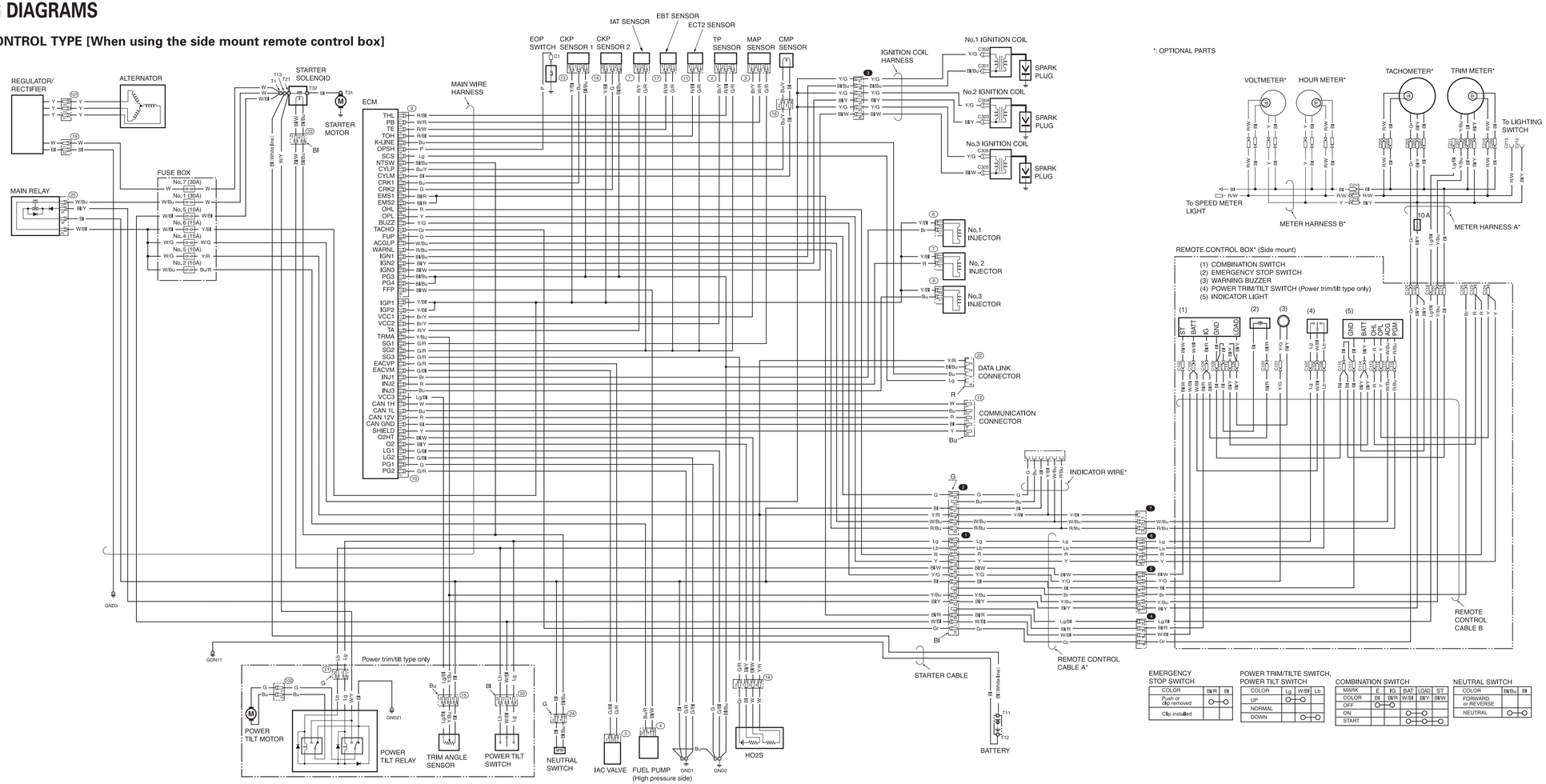
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 Cap20 2 (A) GS.qxd 08.04.14 11:32 ページ20-3

2. WIRING DIAGRAMS

• REMOTE CONTROL TYPE [When using the side mount remote control box]



EMERGENCY STOP SWITCH		
COLOR	B/R	BI
Push or clip removed		
Clip installed		

POWER TRIM/TILTE SWITCH, POWER TILT SWITCH			
COLOR	Lg	W/BI	Lb
UP			
NORMAL			
DOWN			

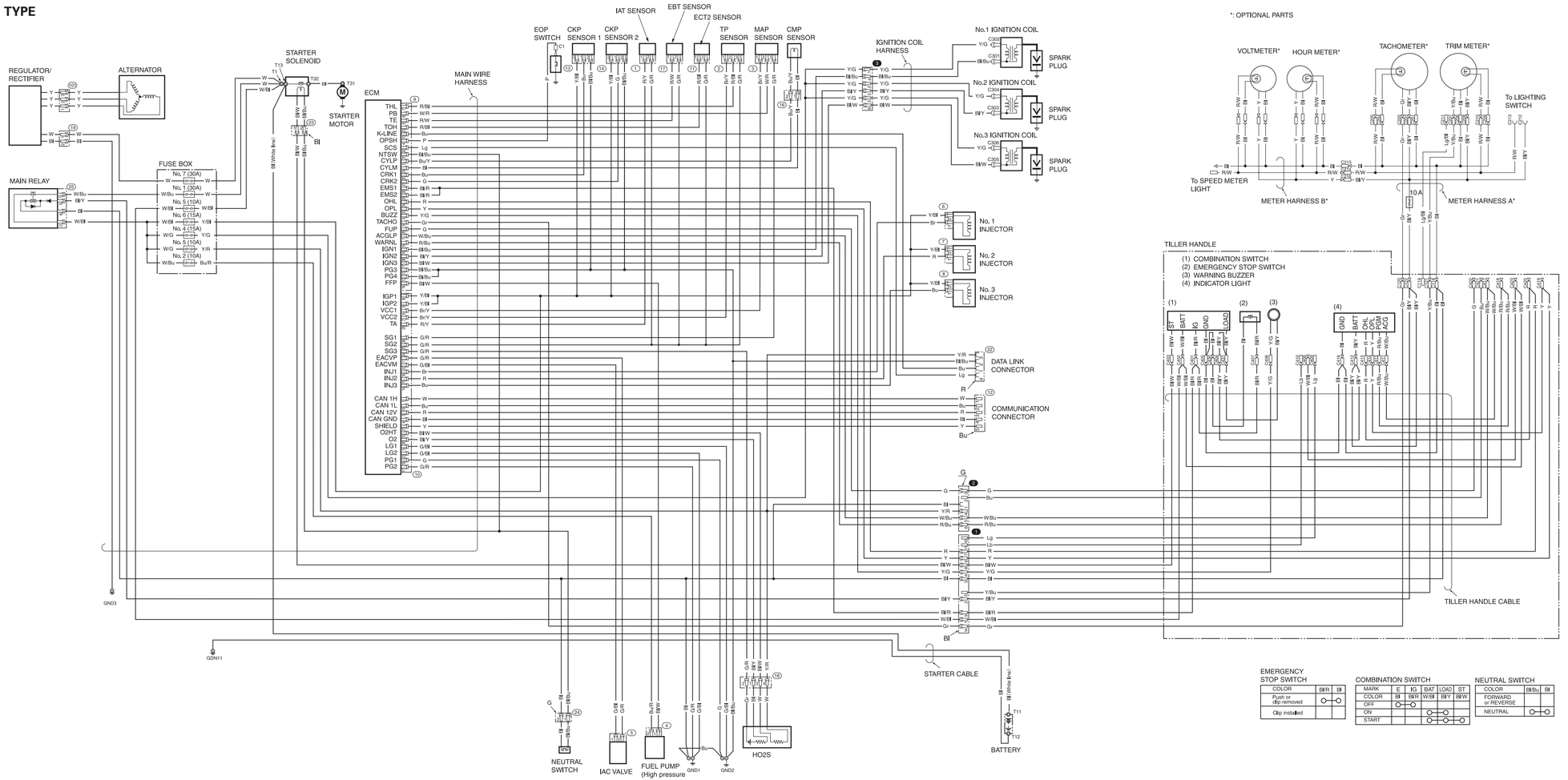
COMBINATION SWITCH						
MARK	E	IG	BAT	LOAD	ST	
COLOR	BI	B/R	W/BI	B/Y	B/W	
OFF						
ON						
START						

NEUTRAL SWITCH		
COLOR	BI/Bu	BI
FORWARD or REVERSE		
NEUTRAL		

© Honda Motor Co., Ltd.

00 Cap20 2 (A) GS.qxd 08.04.14 11:32 ページ20-4

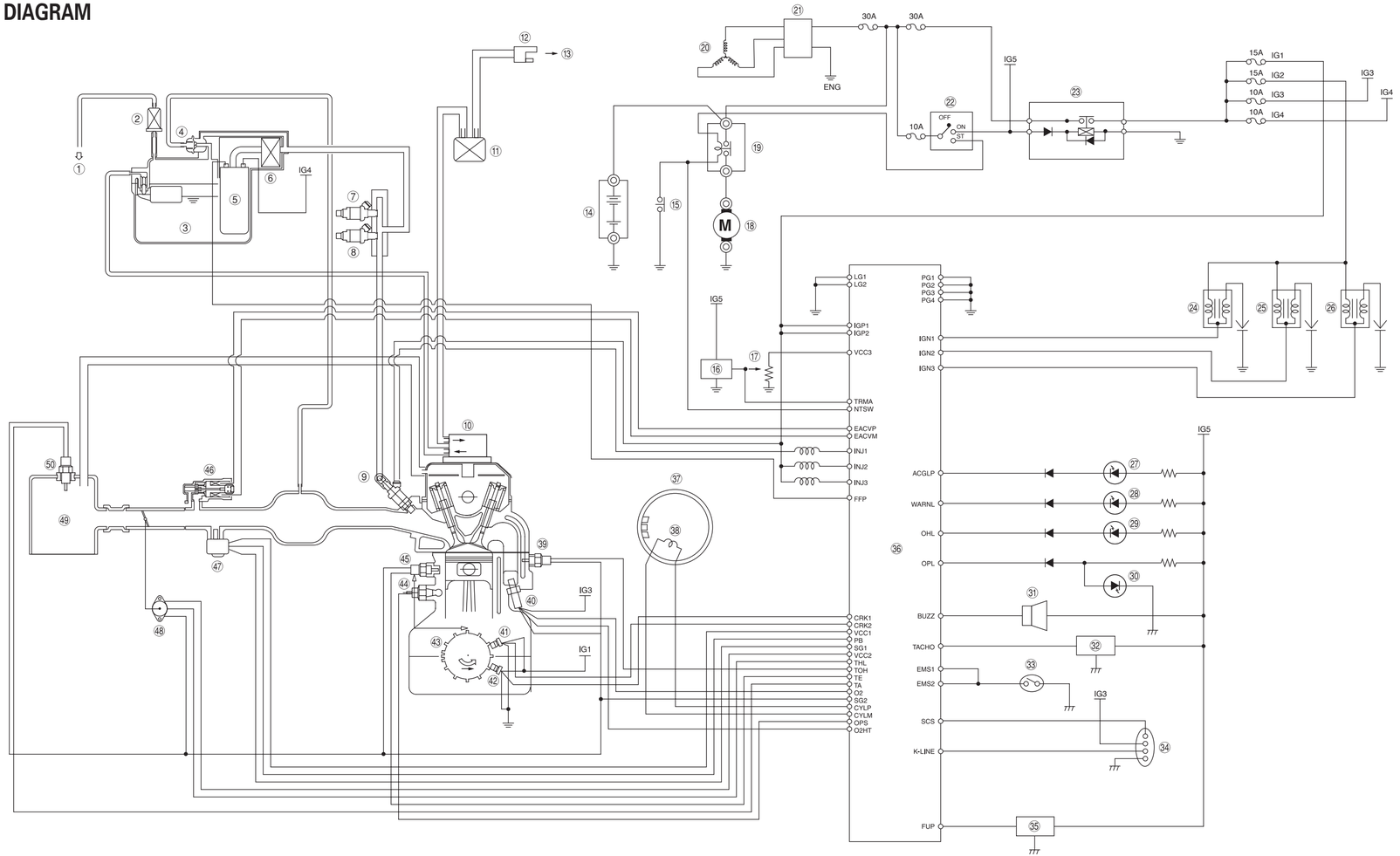
• TILLER HANDLE TYPE



Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 Cap20 2 (A) GS.qxd 08.04.14 11:32 ページ20-5

3. SYSTEM DIAGRAM

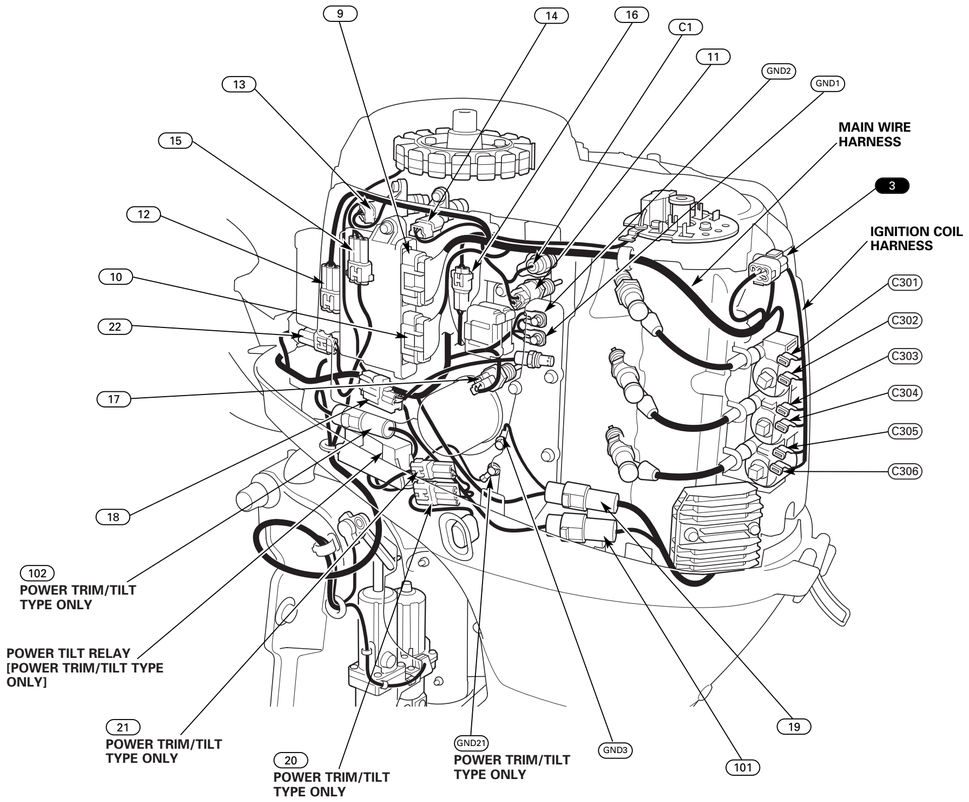


① To MOUNT CASE
② AIR VENT STRAINER
③ VAPOR SEPARATOR
④ PRESSURE REGULATOR
⑤ FUEL PUMP [High pressure side]
⑥ FUEL STRAINER [High pressure side]
⑦ No.3 INJECTOR
⑧ No.2 INJECTOR
⑨ No.1 INJECTOR
⑩ FUEL PUMP [Low pressure side]
⑪ FUEL STRAINER [Low pressure side]
⑫ FUEL CONNECTOR
⑬ To FUEL TANK
⑭ 12V BATTERY
⑮ NEUTRAL SWITCH
⑯ TRIM METER (Optional part)
⑰ TRIM ANGLE SENSOR [Power trim/tilt type only]
⑱ STARTER MOTOR
⑲ STARTER SOLENOID
⑳ ALTERNATOR
㉑ REGULATOR/RECTIFIER
㉒ COMBINATION SWITCH
㉓ MAIN RELAY
㉔ No.1 IGNITION COIL
㉕ No.2 IGNITION COIL
㉖ No.3 IGNITION COIL
㉗ ALTERNATOR INDICATOR LIGHT
㉘ MIL [MALFUNCTION INDICATOR LAMP]
㉙ OVERHEAT INDICATOR LIGHT
㉚ OIL INDICATOR LIGHT
㉛ WARNING BUZZER
㉜ TACHOMETER (Optional part)
㉝ EMERGENCY STOP SWITCH
㉞ DLC
㉟ FUEL METER (Optional part)
㊱ ECM
㊲ CAMSHAFT PULLEY
㊳ CMP SENSOR
㊴ ECT2 SENSOR
㊵ HO2S
㊶ CKP SENSOR 2
㊷ CKP SENSOR 1
㊸ GUIDE PLATE
㊹ EOP SWITCH
㊺ EBT SENSOR
㊻ IAC VALVE
㊼ MAP SENSOR
㊽ TP SENSOR
㊾ SILENCER
㊿ IAT SENSOR

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 Cap20 2 (A) GS.qxd 08.04.14 11:32 ページ19-6

4. CONNECTOR GENERAL LAYOUT DRAWING



• **Connectors are viewed from the terminal side.**

POWER TILT RELAY [POWER TRIM/TILT TYPE ONLY]

Terminal number	Wire color
GND21	Bl

MAIN WIRE HARNESS

Terminal number	Wire color
GND1	Bu Bl G/Bl G
GND2	Bu Bl G/R G/Bl
GND3	Bl

IGNITION COIL HARNESS

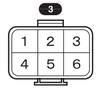
Terminal number	Wire color
C1	P
C301	Bl/Bu
C302	Y/G
C303	Bl/Y
C304	Y/G
C305	Bl/W
C306	Y/G

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



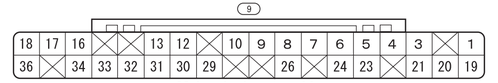
Main wire harness side

Terminal number	Wire color
1	Y/G
2	Y/G
3	Y/G
4	Bl/Bu
5	Bl/Y
6	Bl/W



Ignition coil harness side

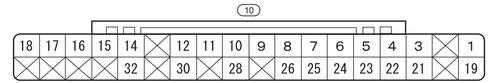
Terminal number	Wire color
1	Y/G
2	Y/G
3	Y/G
4	Bl/Bu
5	Bl/Y
6	Bl/W



Main wire harness side

Terminal number	Wire color	Terminal number	Wire color	Terminal number	Wire color	Terminal number	Wire color
1	Y/G	10	Bu	19	R/Bu	28	—
2	Y/G	11	—	20	Bu	29	Bl/R
3	Y/G	12	Bl/Bu	21	G	30	Bl/R
4	Bl/Bu	13	Bl/Bu	22	—	31	Bl/Bu
5	Bl/Y	14	—	23	R/Bl	32	Lg
6	Bl/W	15	—	24	Bl	33	Y
7	R/Bl	16	Bl/W	25	—	34	R
8	W/R	17	Bl/W	26	G	35	—
9	Gr	18	Bl/Bu	27	—	36	Bl/Y

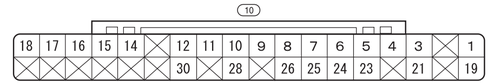
REMOTE CONTROL TYPE ONLY



Main wire harness side

Terminal number	Wire color	Terminal number	Wire color	Terminal number	Wire color	Terminal number	Wire color
1	W	10	Bl/W	19	Bu	28	R/Y
2	—	11	G/R	20	—	29	—
3	R	12	G/Bl	21	Y	30	Bl/Y
4	Bl	13	—	22	Lg/Bl	31	—
5	G/Bl	14	Bu	23	G/Bl	32	Y/Bu
6	Br/Y	15	R	24	G/R	33	—
7	Br/Y	16	Br	25	G/R	34	—
8	Y/Bl	17	G/R	26	G/R	35	—
9	Y/Bl	18	G	27	—	36	—

GAS ASSISTED TYPE ONLY



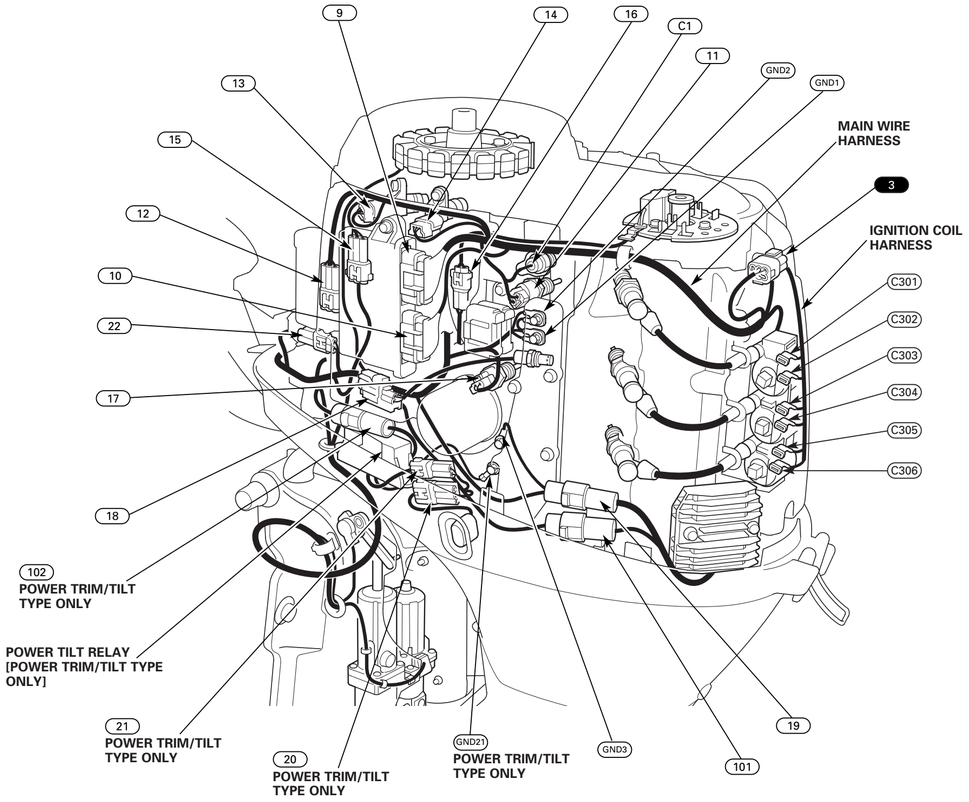
Main wire harness side

Terminal number	Wire color	Terminal number	Wire color	Terminal number	Wire color	Terminal number	Wire color
1	W	10	Bl/W	19	Bu	28	R/Y
2	—	11	G/R	20	—	29	—
3	R	12	G/Bl	21	Y	30	Bl/Y
4	Bl	13	—	22	—	31	—
5	G/Bl	14	Bu	23	G/Bl	32	—
6	Br/Y	15	R	24	G/R	33	—
7	Br/Y	16	Br	25	G/R	34	—
8	Y/Bl	17	G/R	26	G/R	35	—
9	Y/Bl	18	G	27	—	36	—

Date of Issue: May 2008
© Honda Motor Co., Ltd.

00 Cap20 2 (A) GS.qxd 08.04.14 11:32 ページ19-7

BF40D·BF50D



Date of Issue: May 2008
© Honda Motor Co., Ltd.

11
2 1
Main wire harness side

Terminal number	Wire color
1	R/Bl
2	G/R

12
2 3
4 5 6
Main wire harness side

Terminal number	Wire color
1	—
2	Bu
3	R
4	Bl
5	Y
6	W

13
3 2 1
Main wire harness side

Terminal number	Wire color
1	Bu
2	Bl/Bu
3	Y/Bl

14
3 2 1
Main wire harness side

Terminal number	Wire color
1	G
2	Bl/Bu
3	Y/Bl

POWER TRIM/TILT TYPE ONLY

15
1 2 3
Main wire harness side

Terminal number	Wire color
1	Bl
2	Y/Bu
3	Lg/Bl

POWER TRIM/TILT TYPE ONLY

15
3 2 1
Trim angle sensor side

Terminal number	Wire color
1	Bl
2	Y/Bu
3	Lg/Bl

16
1 2
Main wire harness side

Terminal number	Wire color
1	Bl
2	Bu/Y

16
2 1
CMP sensor side

Terminal number	Wire color
1	Bl
2	Bu/Y

17
2 1
Main wire harness side

Terminal number	Wire color
1	R/W
2	G/R

18
2 1
4 3
Main wire harness side

Terminal number	Wire color
1	Bl/Y
2	G/R
3	Bl/W
4	Y/R

18
1 2
3 4
HO2S

Terminal number	Wire color
1	Bl
2	Gr
3	W
4	W

19
1
2
Main wire harness side

Terminal number	Wire color
1	W
2	Bl

19
1
2
Regulator/rectifier side

Terminal number	Wire color
1	W
2	Bl

POWER TRIM/TILT TYPE ONLY

20
1 2 3
Main wire harness side

Terminal number	Wire color
1	Lg
2	W/Bl
3	Lb

POWER TRIM/TILT TYPE ONLY

20
3 2 1
Power tilt switch side

Terminal number	Wire color
1	Lg
2	W/Bl
3	Lb

POWER TRIM/TILT TYPE ONLY

21
1 2
Main wire harness side

Terminal number	Wire color
1	Lg
2	Lb

POWER TRIM/TILT TYPE ONLY

21
2 1
Power tilt relay side

Terminal number	Wire color
1	Lg
2	Lb

22
2 1
4 3
Main wire harness side

Terminal number	Wire color
1	Bu
2	Bl/Bu
3	Y/R
4	Lg

101
1
2 3
Alternator side

Terminal number	Wire color
1	Y
2	Y
3	Y

101
1
3 2
Regulator/rectifier side

Terminal number	Wire color
1	Y
2	Y
3	Y

POWER TRIM/TILT TYPE ONLY

102
1
2
Power tilt motor side

Terminal number	Wire color
1	G
2	Bu

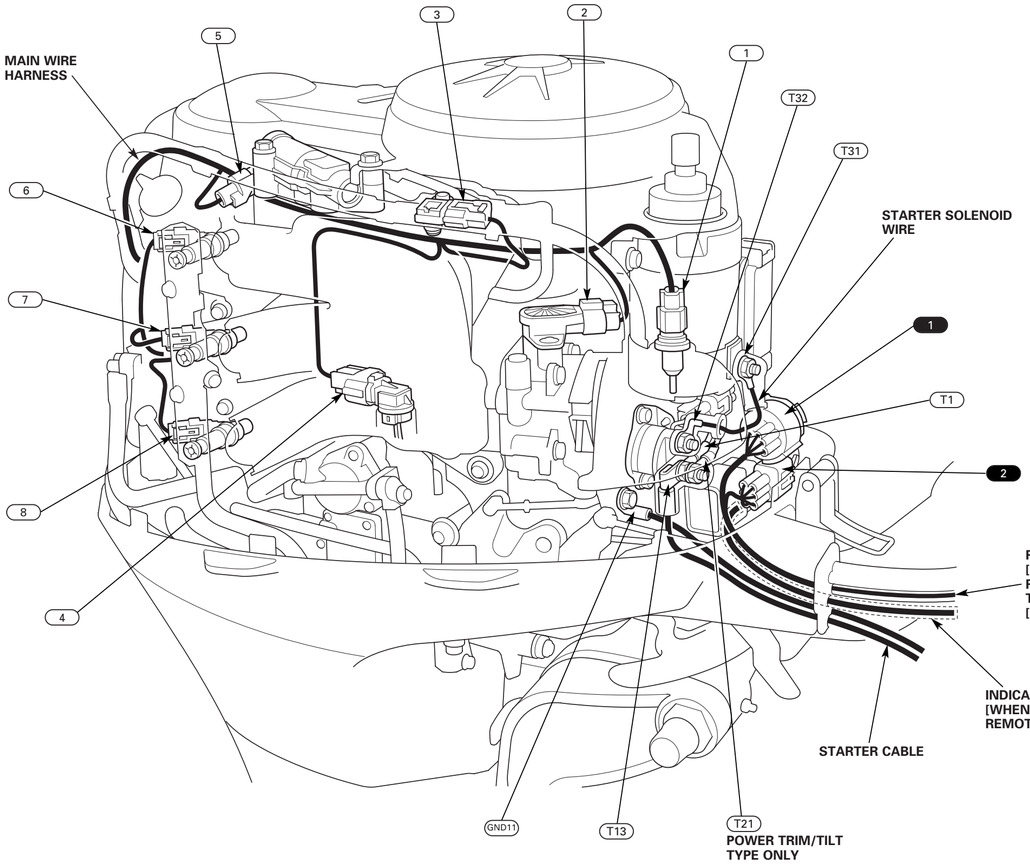
POWER TRIM/TILT TYPE ONLY

102
1
2
Power tilt relay side

[6] Terminal number	[7] Wire color
1	G
2	Bu

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

00 Cap20 2 (A) GS.qxd 08.04.14 11:32 ページ19-8



• Connectors are viewed from the terminal side.

MAIN WIRE HARNESS

Terminal number	Wire color
T1	W
T21	W/Y

STARTER SOLENOID WIRE

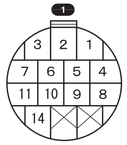
Terminal number	Wire color
T31	Bl
T32	Bl

STARTER CABLE

Terminal number	Wire color
T11	Bl (W line)
T12	Bl
T13	Bl (W line)
GND11	Bl

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

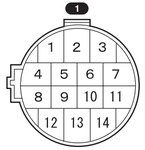
POWER TRIM/TILT TYPE ONLY



Main wire harness side

Terminal number	Wire color	Terminal number	Wire color
1	W/Bl	8	Bl/W
2	Bl/Y	9	Bl/R
3	Bl	10	Lg
4	Y/G	11	Lb
5	Y/Bu	12	—
6	Y	13	—
7	R	14	Gr

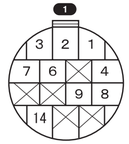
REMOTE CONTROL TYPE ONLY



Remote control cable A side

Terminal number	Wire color	Terminal number	Wire color
1	W/Bl	8	Bl/W
2	Bl/Y	9	Bl/R
3	Bl	10	Lg
4	Y/G	11	Lb
5	Y/Bu	12	Lg/Bl
6	Y	13	Br
7	R	14	Gr

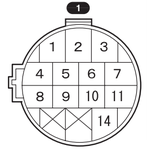
GAS ASSISTED TYPE ONLY



Main wire harness side

Terminal number	Wire color	Terminal number	Wire color
1	W/Bl	8	Bl/W
2	Bl/Y	9	Bl/R
3	Bl	10	Lg
4	Y/G	11	—
5	—	12	—
6	Y	13	—
7	R	14	Gr

TILLER HANDLE TYPE ONLY



Tiller handle cable side

Terminal number	Wire color	Terminal number	Wire color
1	W/Bl	8	Bl/W
2	Bl/Y	9	Bl/R
3	Bl	10	Lg
4	Y/G	11	Lb
5	Y/Bu	12	—
6	Y	13	—
7	R	14	Gr



Main wire harness side

Terminal number	Wire color
1	Bl
2	—
3	G
4	Y/R
5	W/Bu
6	R/Bu

REMOTE CONTROL TYPE ONLY



Indicator wire side

Terminal number	Wire color
1	Bl
2	Bu
3	G
4	Y/Bl
5	W/Bu
6	R/Bu

TILLER HANDLE TYPE ONLY



Tiller handle cable side

Terminal number	Wire color
1	—
2	Bu
3	G
4	—
5	W/Bu
6	R/Bu



Main wire harness side

Terminal number	Wire color
1	R/Y
2	G/R



Main wire harness side

Terminal number	Wire color
1	Br/Y
2	R/Bl
3	G/R



Main wire harness side

Terminal number	Wire color
1	Br/Y
2	W/R
3	G/R



Main wire harness side

Terminal number	Wire color
1	Bl/W
2	Bu/R



Main wire harness side

Terminal number	Wire color
1	G/Bl
2	G/R



Main wire harness side

Terminal number	Wire color
1	Br
2	Y/Bl



Main wire harness side

Terminal number	Wire color
1	R
2	Y/Bl

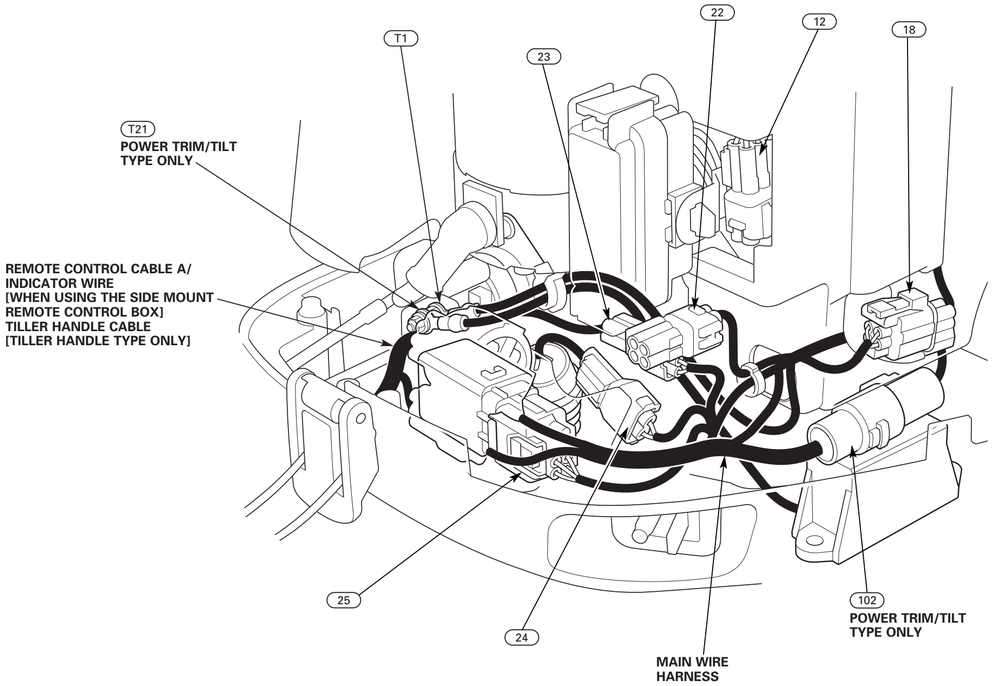


Main wire harness side

Terminal number	Wire color
1	Bu
2	Y/Bl

Date of Issue: May 2008
© Honda Motor Co., Ltd.

BF40D·BF50D



• **Connectors are viewed from the terminal side.**

MAIN WIRE HARNESS

[5] Terminal number	[6] Wire color
T1	W
T21	W/Y



Main wire harness side

Terminal number	Wire color
1	Bl
2	—
3	G
4	Y/R
5	W/Bu
6	R/Bu

REMOTE CONTROL TYPE ONLY



Indicator wire side

Terminal number	Wire color
1	Bl
2	Bu
3	G
4	Y/R
5	W/Bu
6	R/Bu

TILLER HANDLE TYPE ONLY



Tiller handle cable side

Terminal number	Wire color
1	—
2	Bu
3	G
4	—
5	W/Bu
6	R/Bu



Main wire harness side

Terminal number	Wire color
1	—
2	Bu
3	R
4	Bl
5	Y
6	W



Main wire harness side

Terminal number	Wire color
1	Bl/Y
2	G/R
3	Bl/W
4	Y/R



Main wire harness side

Terminal number	Wire color
1	Bu
2	Bl/Bu
3	Y/R
4	Lg



Main wire harness side

Terminal number	Wire color
1	Bl/W
2	Bl/Bu



Starter solenoid side

Terminal number	Wire color
1	Bl/W
2	Bl/Bu



Main wire harness side

Terminal number	Wire color
1	Bl/Bu
2	Bl



Neutral switch side

Terminal number	Wire color
1	Bl/Bu
2	Bl

POWER TRIM/TILT TYPE ONLY



Power tilt motor side

Terminal number	Wire color
1	G
2	Bu

POWER TRIM/TILT TYPE ONLY



Power tilt relay side

Terminal number	Wire color
1	G
2	Bu

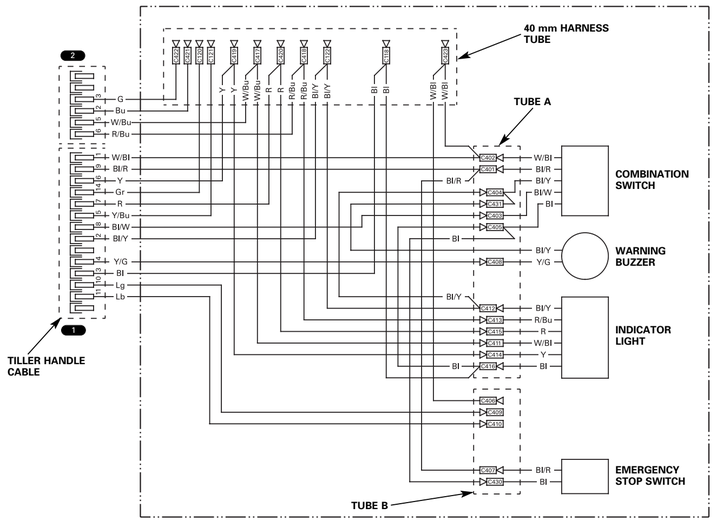
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

© Honda Motor Co., Ltd.

00 Cap20 2 (A) GS.qxd 08.04.14 11:32 ページ19-10

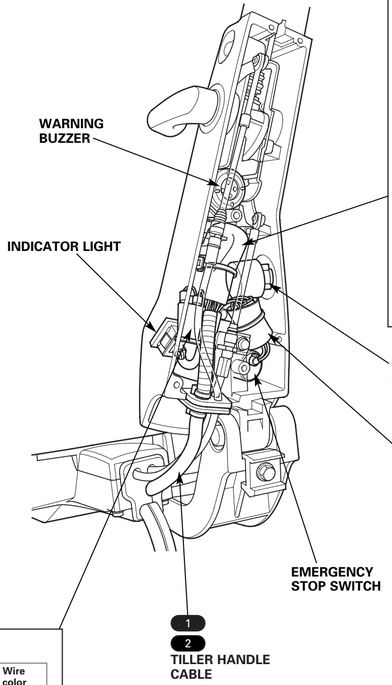
• TILLER HANDLE TYPE

WIRING DIAGRAM:

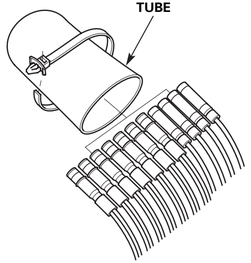


TILLER HANDLE CABLE

Terminal number	Wire color
C118	Bl
C119	Lg/Bl
C120	Gr
C121	Y/Bu
C122	Bl/Y
C401	Bl/R
C402	W/Bl
C403	Bl/W
C404	Bl/Y
C405	Bl
C406	W/Bl
C407	Bl/R
C408	Y/G
C409	Lg
C410	Lb
C411	W/Bu
C412	Bl/Y
C413	R/Bu
C414	Y
C415	R
C416	Bl
C417	W/Bu
C418	R/Bu
C419	Y
C420	R
C421	Bu
C422	G
C423	W/Bl
C430	Bl
C431	Bl/Y

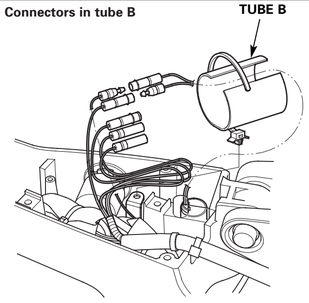


• Connectors in 40 mm harness tube



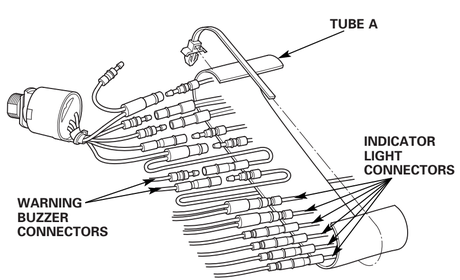
Terminal number	Wire color
C118	Bl
C119	Lg/Bl
C120	Gr
C121	Y/Bu
C122	Bl/Y
C417	W/Bu
C418	R/Bu
C419	Y
C420	R
C421	Bu
C422	G
C423	W/Bl

• Connectors in tube B



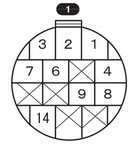
Terminal number	Wire color
C406	W/Bl
C407	Bl/R
C409	Lg
C410	Lb
C430	Bl

• Connectors in tube A



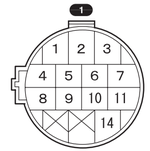
Terminal number	Wire color
C401	Bl/R
C402	W/Bl
C403	Bl/W
C404	Bl/Y
C405	Bl
C408	Y/G
C411	W/Bu
C412	Bl/Y
C413	R/Bu
C414	Y
C415	R
C416	Bl
C431	Bl/Y

• Connectors are viewed from the terminal side.



Main wire harness side

Terminal number	Wire color	Terminal number	Wire color
1	W/Bl	8	Bl/W
2	Bl/Y	9	Bl/R
3	Bl	10	Lg
4	Y/G	11	—
5	—	12	—
6	Y	13	—
7	R	14	Gr



Tiller handle cable side

Terminal number	Wire color	Terminal number	Wire color
1	W/Bl	8	Bl/W
2	Bl/Y	9	Bl/R
3	Bl	10	Lg
4	Y/G	11	Lb
5	Y/Bu	12	—
6	Y	13	—
7	R	14	Gr



Main wire harness side

Terminal number	Wire color
1	Bl
2	—
3	G
4	Y/R
5	W/Bu
6	R/Bu



Tiller handle cable side

Terminal number	Wire color
1	—
2	Bu
3	G
4	—
5	W/Bu
6	R/Bu

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

Date of Issue: May 2008
© Honda Motor Co., Ltd.