

EK25BMH

SERVICE MANUAL

290404

69T-28197-ZA-11

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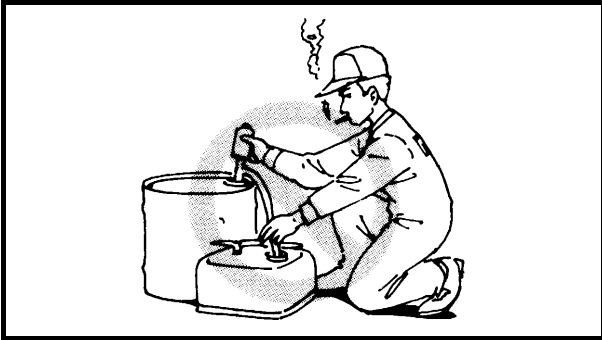
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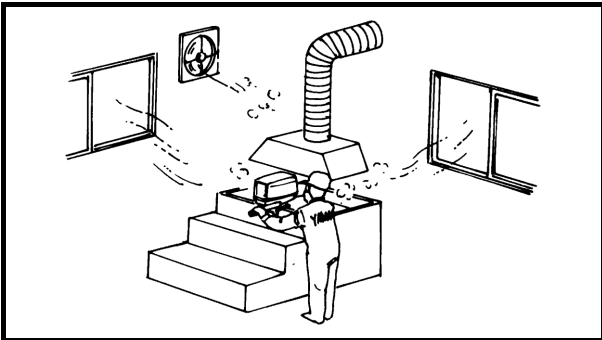
SAFETY WHILE WORKING

The procedures given in this manual are those recommended by Yamaha to be followed by Yamaha dealers and their mechanics.



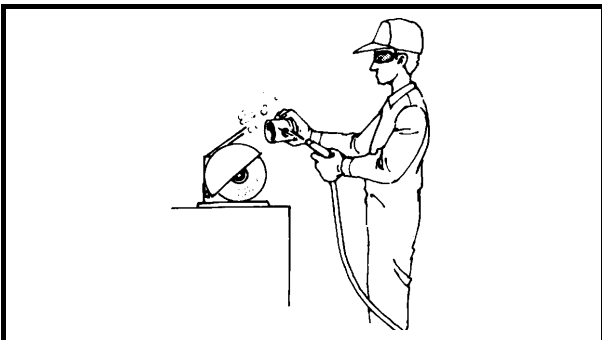
FIRE PREVENTION

Gasoline (petrol) is highly flammable. Petroleum vapor is explosive if ignited. Do not smoke while handling gasoline and keep it away from heat, sparks and open flames.



VENTILATION

Petroleum vapor is heavier than air and is deadly if inhaled in large quantities. Engine exhaust gases are harmful to breathe. When test-running an engine indoors, maintain good ventilation.



SELF-PROTECTION

Protect your eyes with suitable safety glasses or safety goggles, when grinding or when doing any operation which may cause particles to fly off. Protect hands and feet by wearing safety gloves or protective shoes if appropriate to the work you are doing.



OILS, GREASES AND SEALING FLUIDS

Use only genuine Yamaha oils, greases and sealing fluids or those recommended by Yamaha.

COOLING SYSTEM

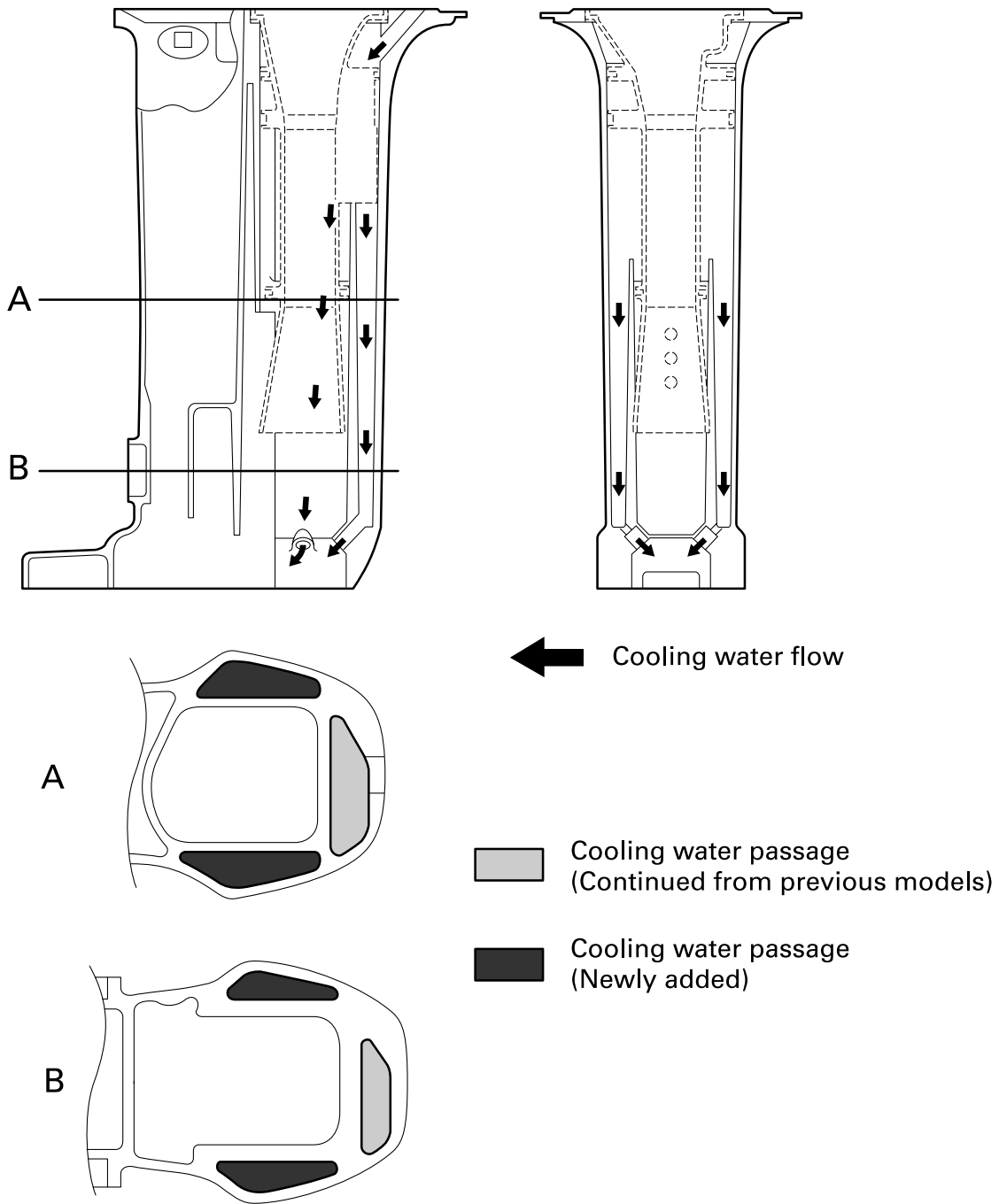


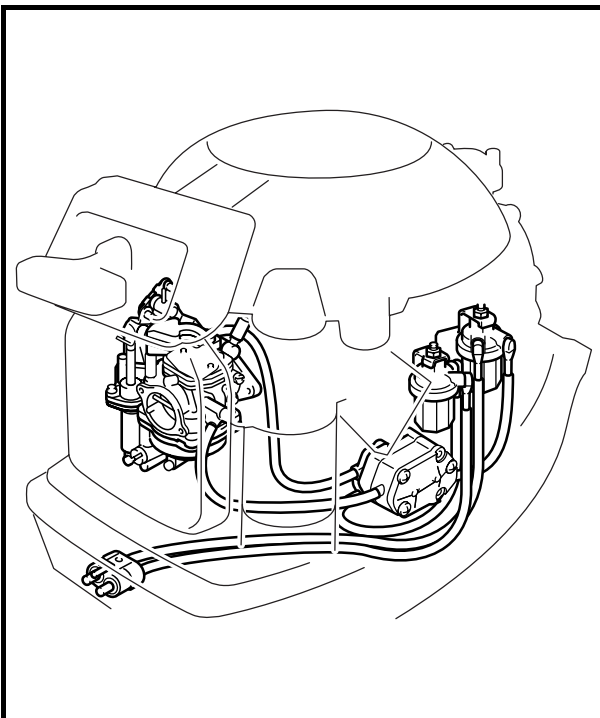
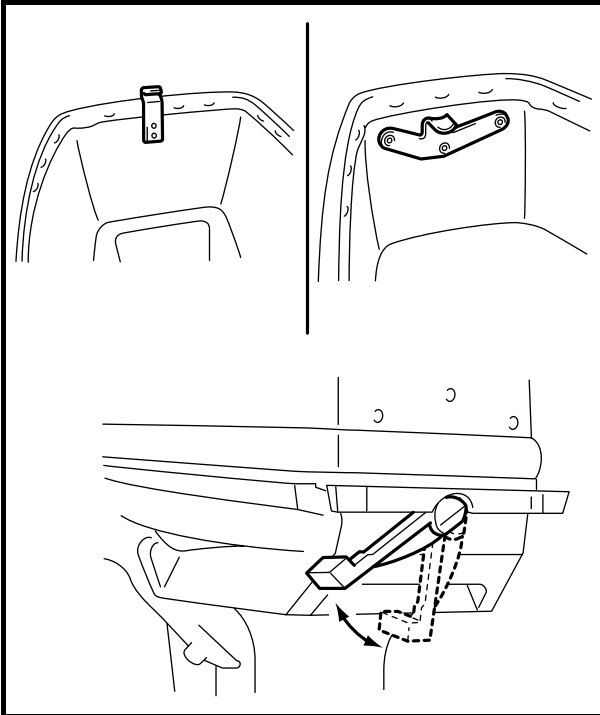
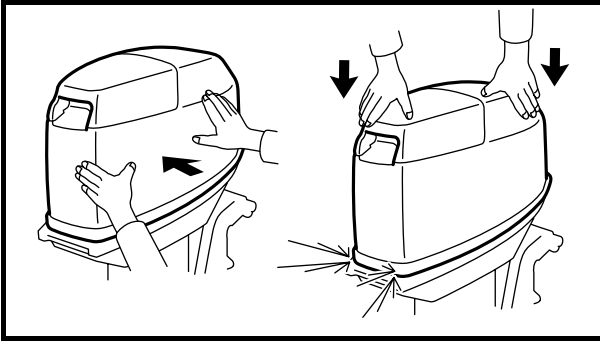
Fig. 5



ELECTRICAL

Item	Worldwide	Unit	Model
			EK25BMH
IGNITION SYSTEM			
Ignition timing (Full retard)		Degree	ATDC 2 ± 2
(Full advanced)		Degree	BTDC 22 ± 2
Spark plug gap		mm (in)	0.9 - 1.0 (0.035 - 0.039)
Ignition spark gap (Minimum)		mm (in)	8.0 (0.31)
Ignition coil resistance (Primary)		Ω	0.18 - 0.24
(Secondary)		k Ω	2.70 - 3.70
Charge coil resistance (Br - L)		Ω	342 - 418
Charge coil output peak voltage (Br - L)			
@ cranking 1 ^{*1}		V	146
@ cranking 2 ^{*1}		V	146
@ 1,500 r/min		V	150
@ 3,500 r/min		V	150
Pulser coil resistance (W/R - B , W/B - B)		Ω	311 - 381
Pulser coil output peak voltage (W/R - B , W/B - B)			
@ cranking 1 ^{*1}		V	6.8
@ cranking 2 ^{*1}		V	6.7
@ 1,500 r/min		V	16.0
@ 3,500 r/min		V	26.0
CDI unit resistance		Ω	Refer to the "CDI UNIT" on page 8-10
CDI unit output peak voltage (B/O - B , B/W - B)			
@ cranking 1 ^{*1}		V	5.5
@ cranking 2 ^{*1}		V	130.0
@ 1,500 r/min		V	135.0
@ 3,500 r/min		V	135.0

*1 Cranking 1: Open circuit.
Cranking 2: Related parts are connected.



TOP COWLING

CHECKING THE TOP COWLING FIT

Check:

- Top cowling
Cracks/damage → Replace.
- Hook
Bent → Correct.
- Rivet
Damage → Repair.
- Rubber of trim
Peel/tear → Repair.

NOTE:

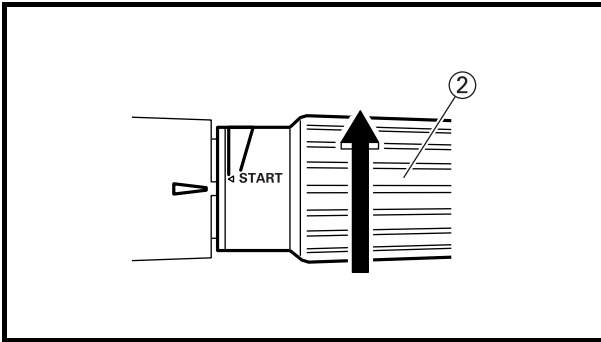
Hooks and latches are unadjustable.

FUEL SYSTEM

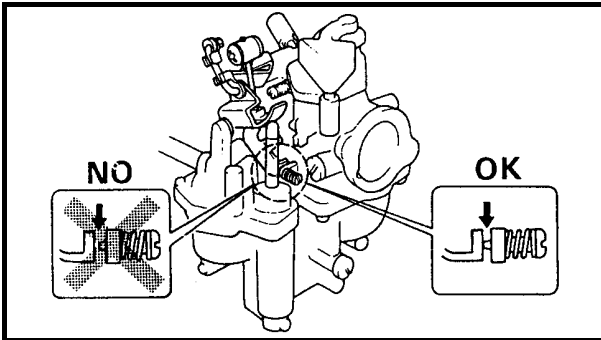
CHECKING THE FUEL LINE

Check:

- Fuel hose
Cracks/damage/leak → Replace.
Refer to "FUEL JOINT, FUEL FILTER,
AND FUEL PUMP" on page 4-1.



(11) Move the throttle ② to full-close position.

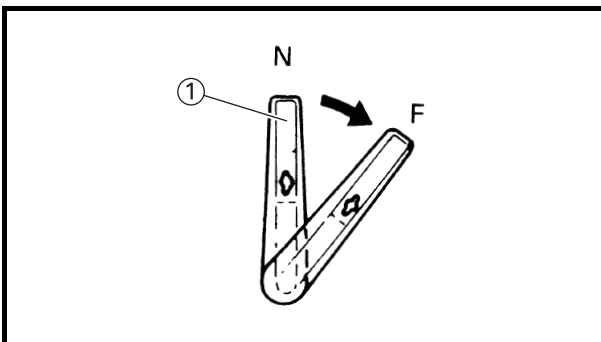


(12) At this point, make sure that the throttle lever is in contact with the throttle stop screw on the carburetor.

NOTE:

- After adjustment, open and close the throttle for several times for reassurance.
- If they are not in contact, adjust the carburetor control link.

Refer to "Adjusting the carburetor control link:" on page 3-7.

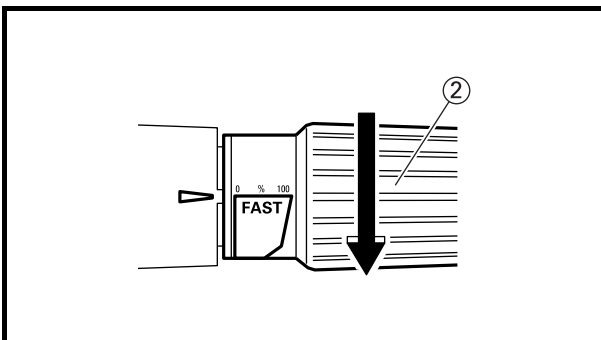


6. Adjusting the throttle control lever:

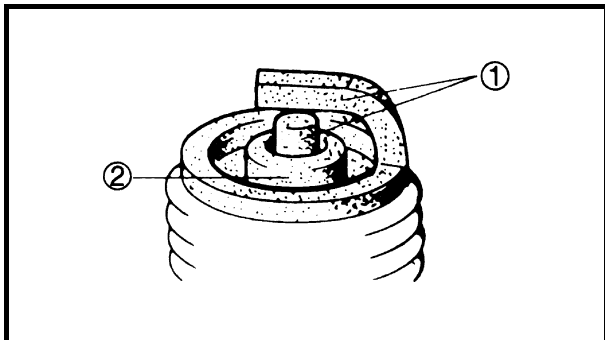
- Throttle control lever

Adjustment steps

(1) Set the shift lever ① at the forward position.



(2) Move the throttle ② to full-open position.



CHECKING THE SPARK PLUGS

1. Check:
 - Electrodes ①
Cracks/excessive wear → Replace.
 - Insulator color ②
Distinctly different color → Check the engine condition.

Color guide:

Medium to light tan color

Normal

Whitish color

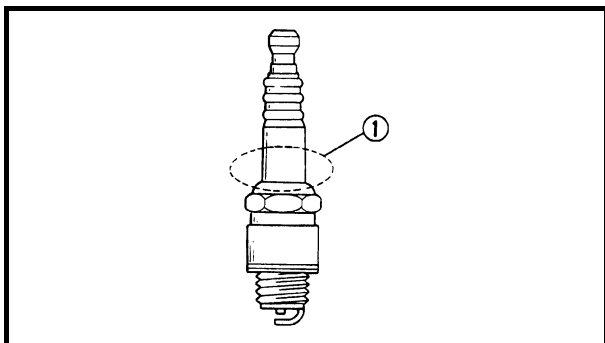
- Lean fuel mixture
- Plugged jet (s)
- Wrong setting

Blackish color

- Rich mixture
- Excessive oil usage
- Defective ignition system
- Defective spark plug

2. Clean:

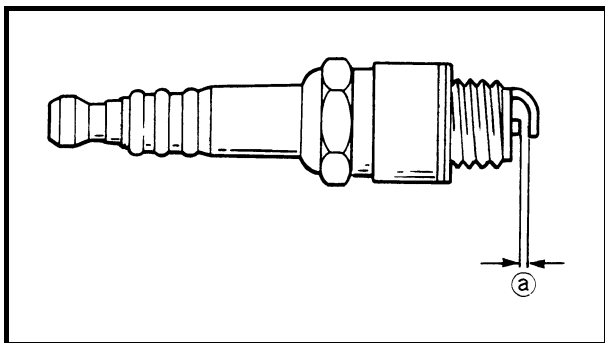
- Spark plug
(use a spark plug cleaner or wire brush)



3. Check:

- Spark plug type ①
Incorrect → Replace.

**Standard spark plug
NGK B7HS-10**

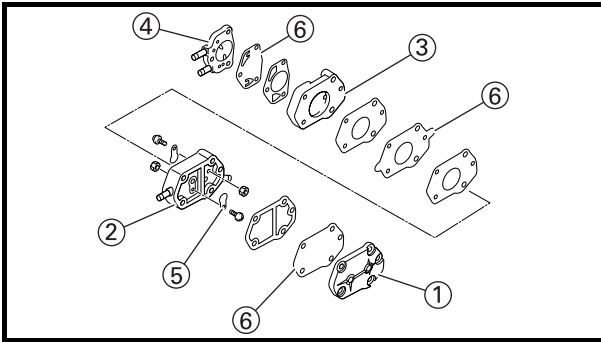


4. Measure:

- Spark plug gap ①
Out of specification → Replace.



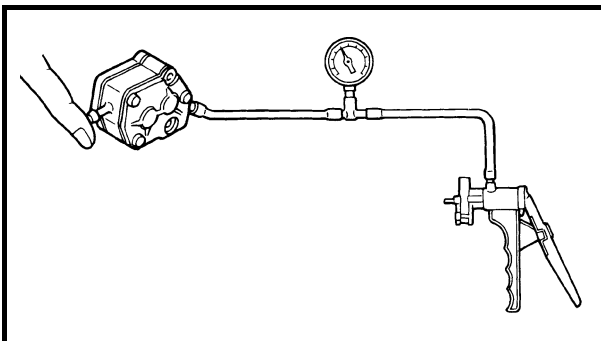
**Spark plug gap
0.9-1.0 mm (0.035-0.039 in)**



CHECKING THE FUEL PUMP

1. Check:

- Body ①
Cracks/damage/leak → Replace.
Foreign matters → Clean.
- Body ②
- Body ③
- Body ④
- Seat valve ⑤
Cracks/ damage → Replace.
- Diaphragm ⑥
Damage → Replace.



2. Check:

- Fuel pump
Reverse air flow → Replace.

Checking steps

NOTE: _____
Do not overpressurize the fuel pump. Excessive pressure may cause air to leak out.

(1) Install the Vacuum/pressure pump gauge set onto the fuel pump as shown.

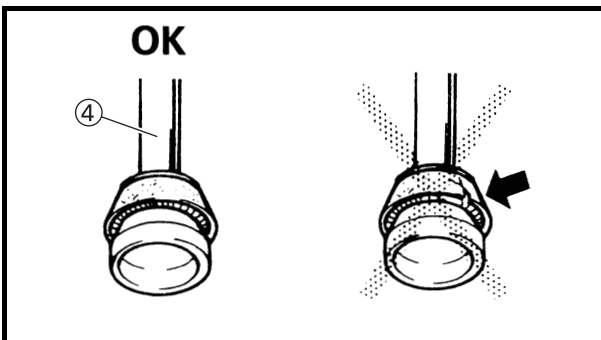
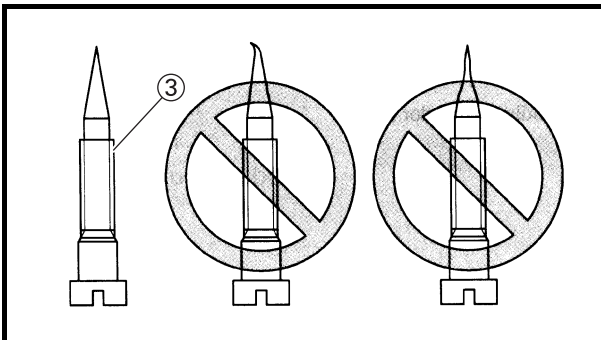
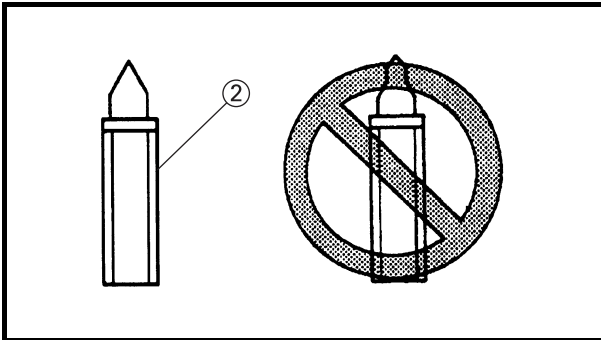
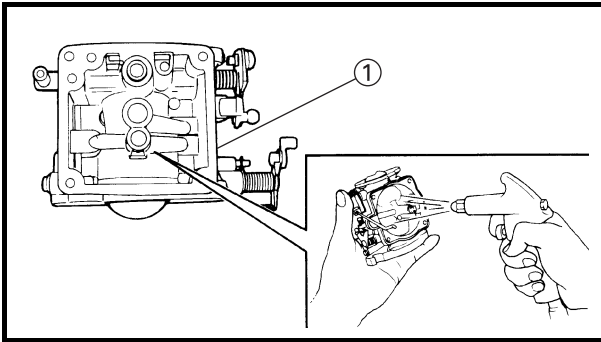
	Vacuum/pressure pump gauge set 90890-06756
--	---

(2) Apply the specified pressure with the Vacuum/pressure pump gauge set.

	Fuel pump pressure 50 kPa (0.5 kg/cm², 7.25 psi)
--	--

NOTE: _____

- Make sure no air comes out of the opposite side of the fuel pump.
- Start the engine and confirm the proper function.



CHECKING THE CARBURETOR

CAUTION:

Do not use steel-wire to clean the jets. This may enlarge the jet diameters and seriously affect performance.

Check:

- Carburetor body ①
Cracks/damage → Replace.
Contamination → Clean.
- Needle valve ②
Grooved wear → Replace.
- Pilot screw ③
Bent/wear → Replace.
- Main jet
Contamination → Clean.
- Pilot jet
Contamination → Clean.
- Main nozzle
Contamination → Clean.
- Float
Cracks/damage → Replace.
- Pump plunger ④
Cracks/damage → Replace.
- Fuel passage
Clog → Clean.
- Air passage
Clog → Clean.

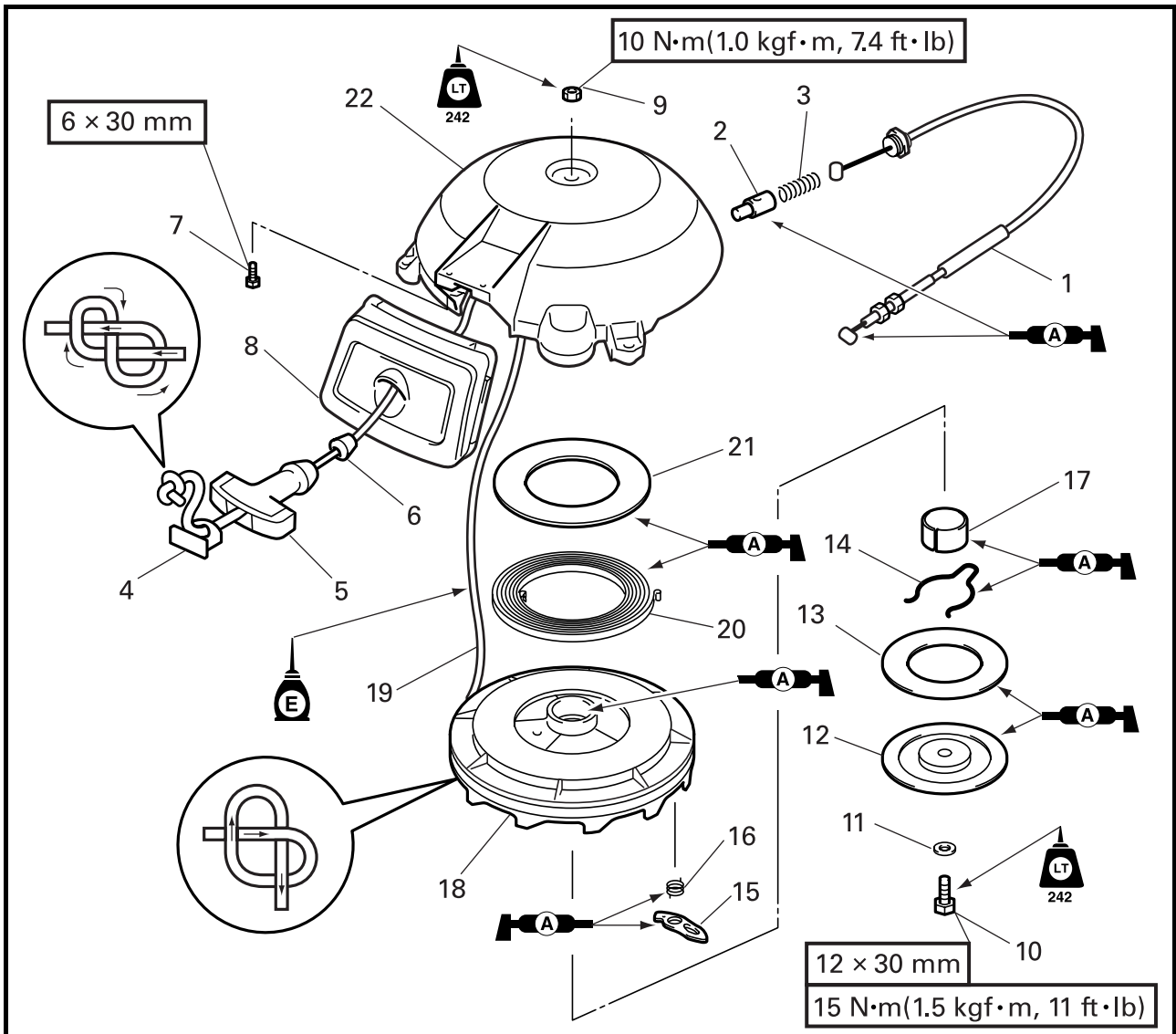
NOTE:

Use a suitable cleaning solvent and blow out clogged passages with compressed air.

⚠ WARNING

Protect your eyes with suitable safety spectacles or safety goggles when using compressed air.

DISASSEMBLING THE RECOIL STARTER

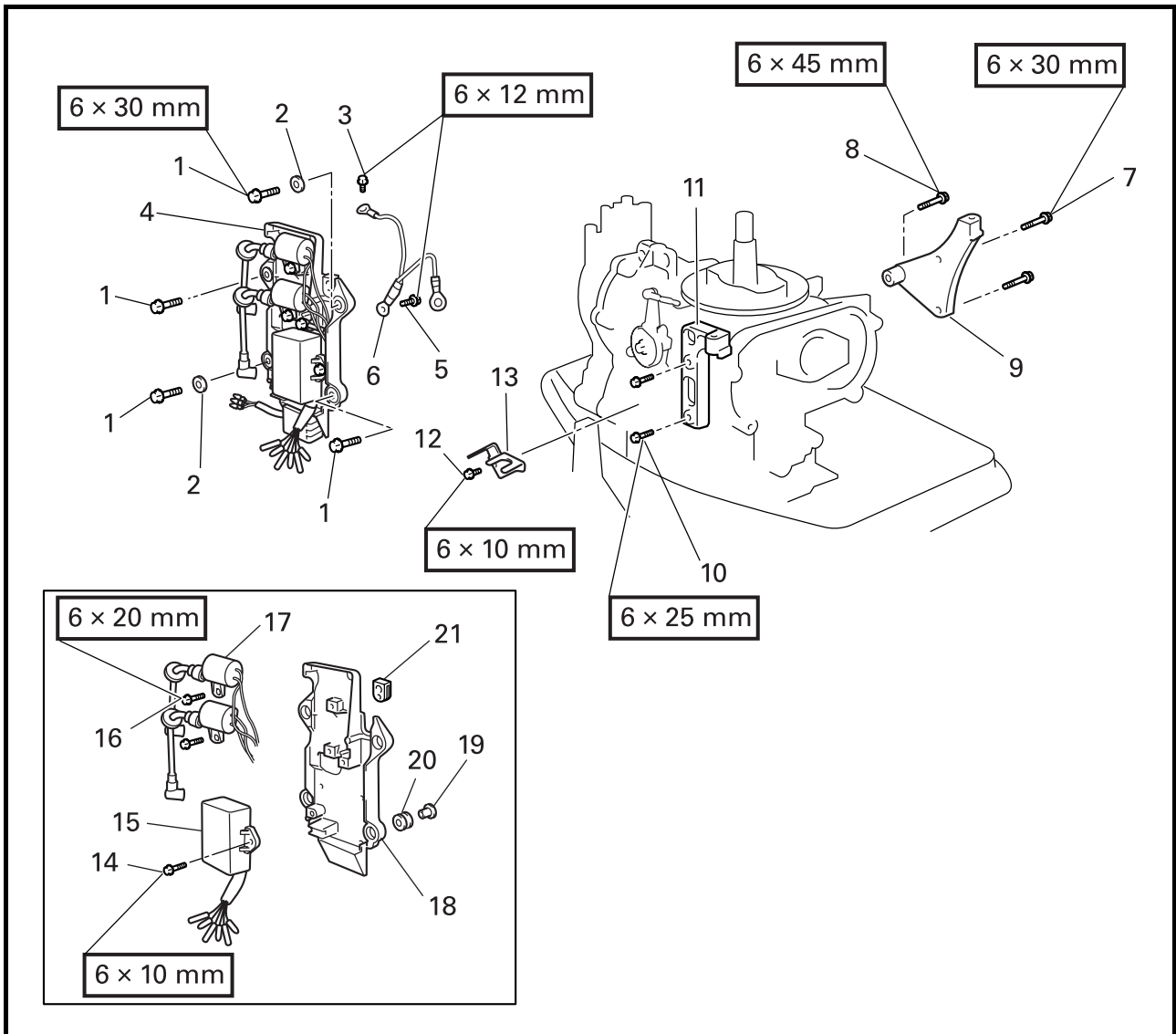


Step	Job/Parts	Q'ty	Remarks
1	Starter stop wire	1	
2	Starter stop plunger	1	
3	Spring	1	
4	Cover	1	
5	Starter handle-grip	1	
6	Damper	1	
7	Bolt (with washer)	2	
8	Rope guide	1	
9	Nut	1	
10	Center bolt	1	
11	Thrust washer	1	
12	Friction plate	1	
13	Collar 1	1	

Continued on next page.

POWER UNIT

DISCONNECTING THE LEADS AND STAYS



Step	Job/Part	Q'ty	Remarks
1	Bolt	4	
2	Washer	2	
3	Bolt	1	
4	Electrical unit	1	
5	Bolt	1	
6	Earth lead	1	
7	Bolt	2	
8	Bolt	1	
9	Stay	1	
10	Bolt	2	
11	Stay	1	
12	Bolt	1	
13	Stay	1	

Continued on next page.

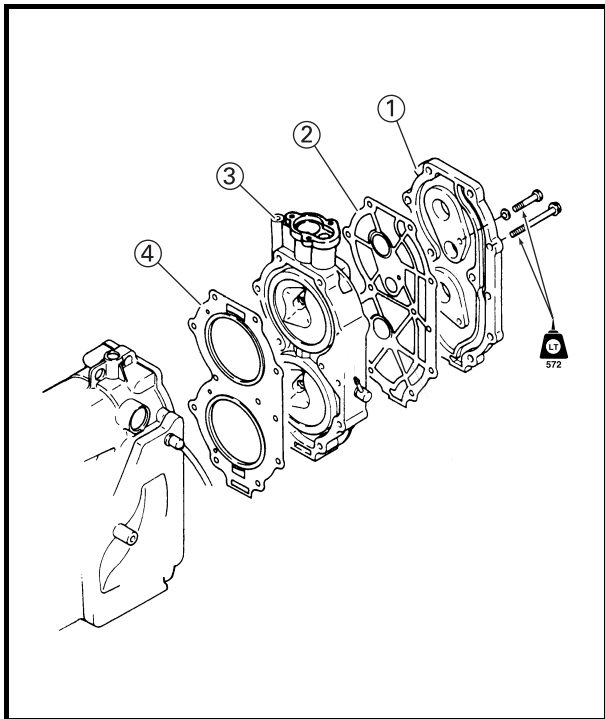
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INSTALLING THE CYLINDER HEAD AND CYLINDER HEAD COVER

Install:

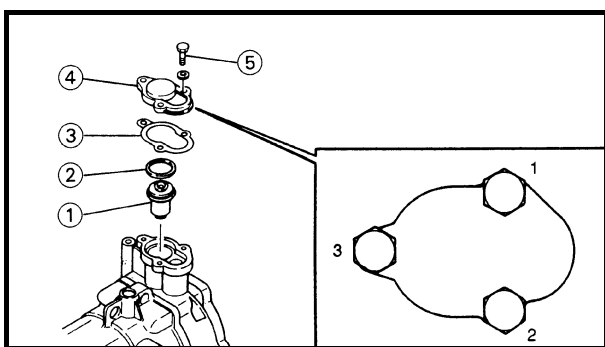
- Cylinder head (3) and cylinder head cover (1)

NOTE:

- Temporarily assemble; cylinder head cover (1), cylinder head cover gasket (2), cylinder head (3), and cylinder head gasket (4) in that order, and then install the assembled parts onto the crankcase.
- Apply LOCTITE® No.572 on the bolts.
- Tighten the cylinder head mounting bolts and nut in sequence and in two steps of torque.



Cylinder head mounting bolts
 1st: 15 N·m (1.5 kgf·m, 11 ft·lb)
 2nd: 30 N·m (3.0 kgf·m, 22 ft·lb)



INSTALLING THE THERMOSTAT

Install:

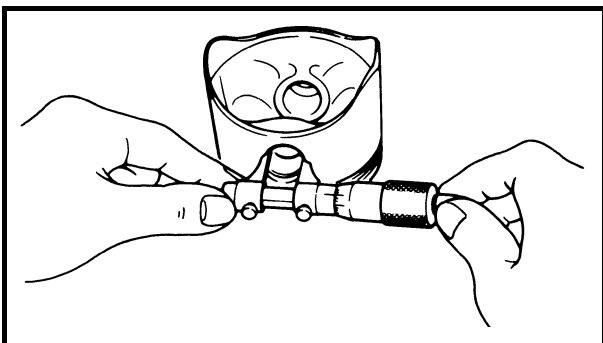
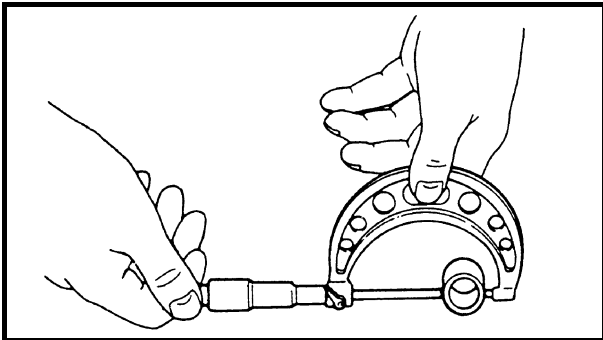
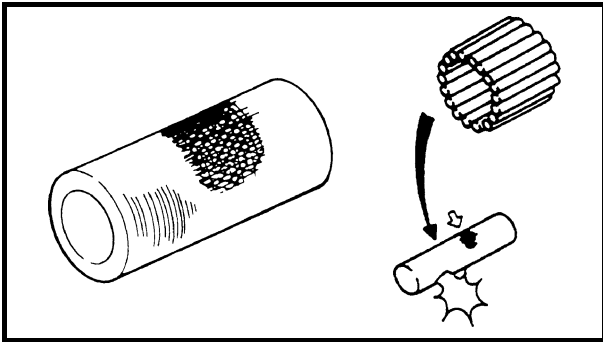
- Thermostat (1)
- Plain washer (2)
- Gasket (3)
- Thermostat cover (4)
- Bolt (5)

NOTE:

- Always use the new gasket.
- Tighten the bolts in sequence.



Thermostat cover bolts
 8 N·m (0.8 kgf·m, 5.9 ft·lb)



CHECKING THE PISTON PINS AND SMALL-END BEARINGS

1. Check:
 - Piston pin
 - Small-end bearing

Heat discoloration → Replace.
 Damage/scratches → Replace.

2. Measure:
 - Piston pin outside diameter
 (use an outside micrometer)
 Out of specification → Replace.

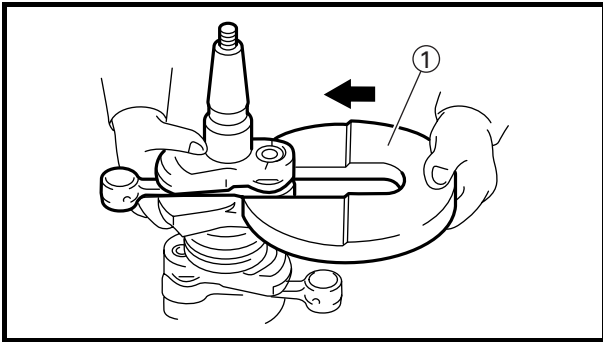
	<p>Outside micrometer 90890-03006</p>
--	--

	<p>Piston pin outside diameter 19.895 – 19.900 mm (0.7833 – 0.7835 in)</p>
--	---

3. Measure:
 - Piston pin boss inside diameter
 (use an inside micrometer)
 Out of specification → Replace.

	<p>Inside micrometer 90890-03010</p>
--	---

	<p>Piston pin boss inside diameter 19.904 - 19.915 mm (0.7836 - 0.7841 in)</p>
--	---

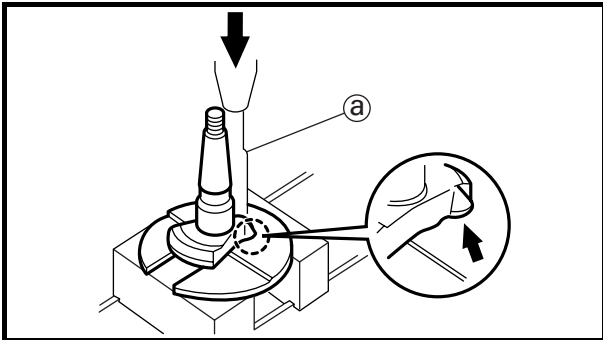


Crank 1 and crank 4 removal

Remove:

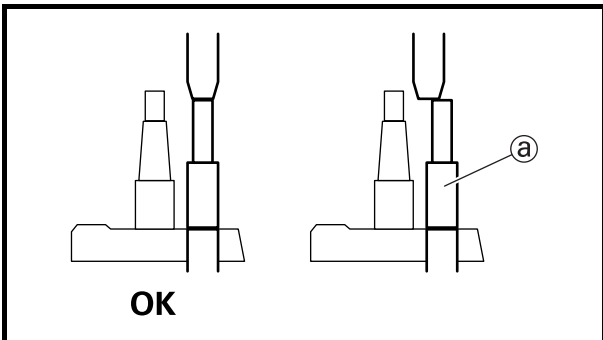
- Crank 1
- Crank 4

	Plate A.....①
	90890-02386
	Pressure pin Bⓐ
	90890-02390



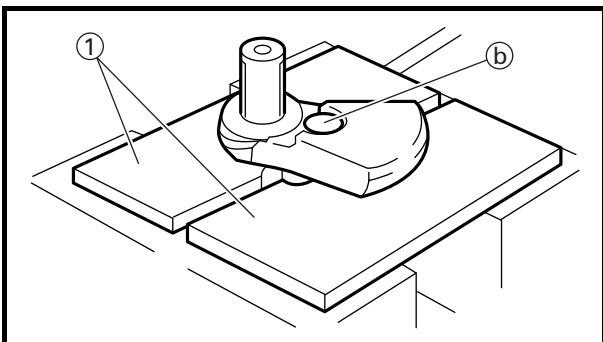
Removing steps

- (1) By forcing the pressure pin B ⓐ with a hydraulic press, remove the crank pin.
- (2) When forcing out the crank pin, use care so that the crankshaft does not fall off.
- (3) To remove crank 4, follow the same procedure.



CAUTION:

- Apply pressure to the pressure pin B ⓐ slowly.
- Hold the pressure pin B ⓐ in line with the press screw spindle.

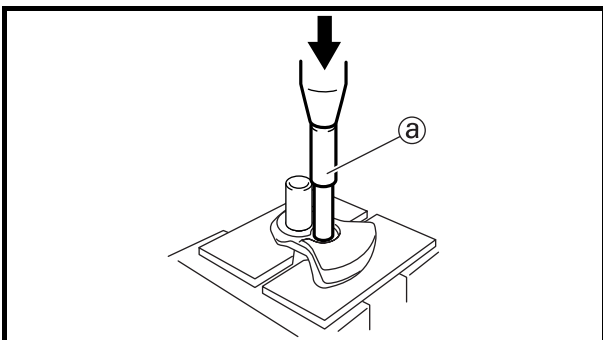


Crank 2 and crank 3 removal

1. Remove:

- Crank 2
- Crank 3

	Support.....①
	90890-02394
	Pressure pin Bⓐ
	90890-02390

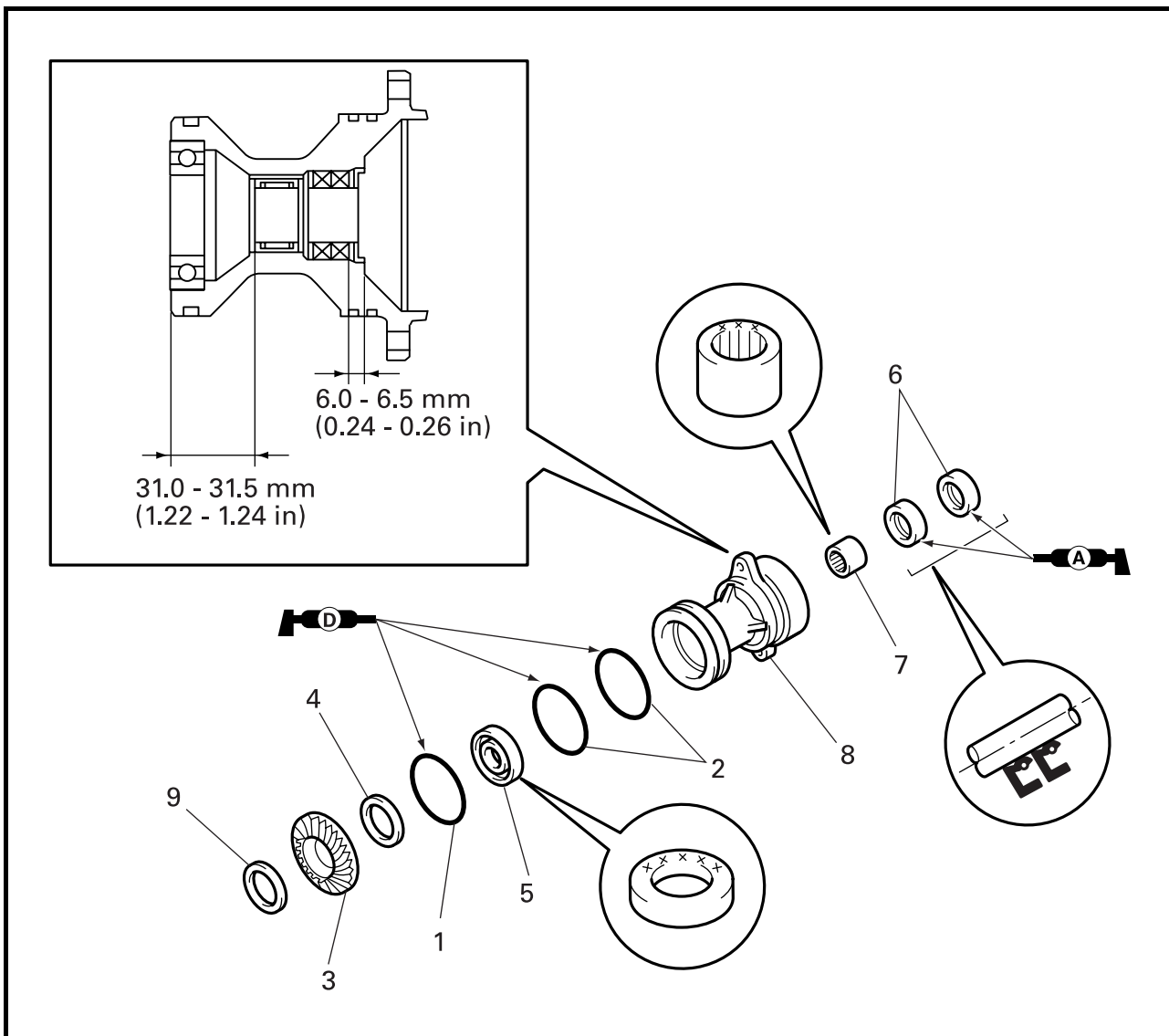


NOTE:

- Place the pressure pin B ⓐ on the crank 2 center shaft ⓑ, and force it out using a press.
- When forcing out the crank pin, use care so that the crank does not fall off.



DISASSEMBLING THE PROPELLER SHAFT HOUSING

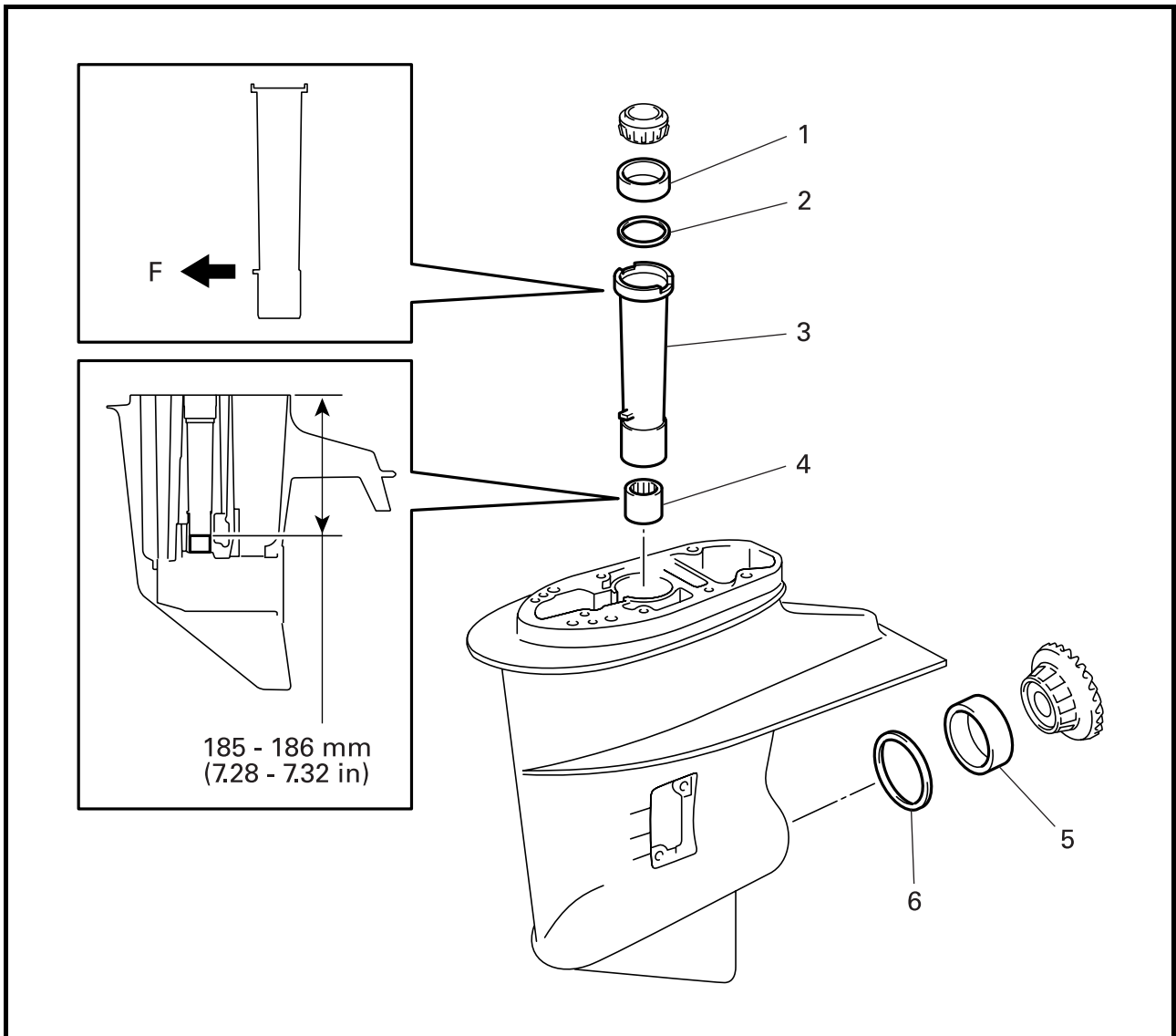


Step	Job/Part	Q'ty	Remarks
1	O-ring	1	Not reusable
2	O-ring	2	Not reusable
3	Reverse gear	1	
4	Reverse gear shim	*	
5	Ball bearing	1	
6	Oil seal	2	
7	Needle bearing	1	
8	Propeller shaft housing	1	
9	Washer	1	

* As required

LOWER CASE

DISASSEMBLING THE LOWER CASE



Step	Job/Part	Q'ty	Remarks
1	Drive shaft bearing outer race	1	
2	Pinion gear shim	*	
3	Drive shaft sleeve	1	
4	Needle bearing	1	
5	Tapered roller bearing outer race	1	
6	Forward gear shim	*	

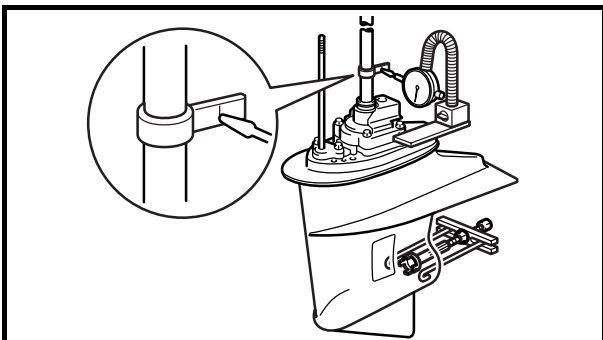
* As required



BACKLASH

NOTE:

- Do not install the water pump components when measuring the backlash.
- Measure both the forward and reverse gear backlashes.
- If both the forward and reverse gear backlashes are larger than specification, the pinion gear may be too high.
- If both the forward and reverse gear backlashes are smaller than specification, the pinion gear may be too low.



MEASURING THE FORWARD GEAR BACKLASH

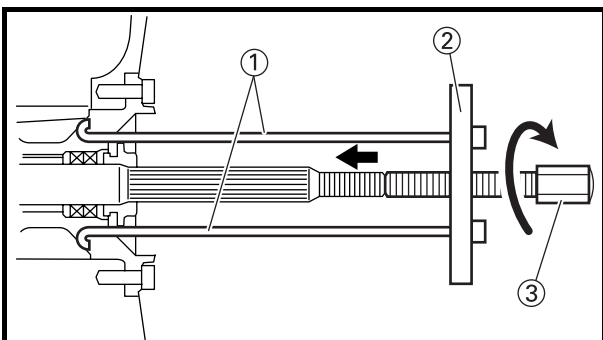
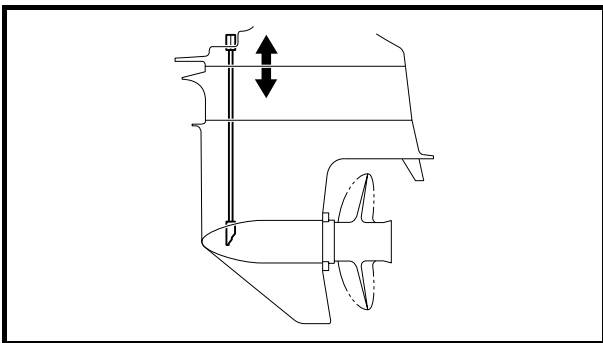
1. Measure:
 - Forward gear backlash
 Out of specification → Adjust.



Forward gear backlash
0.31 - 0.72 mm (0.012 - 0.028 in)

Measuring steps

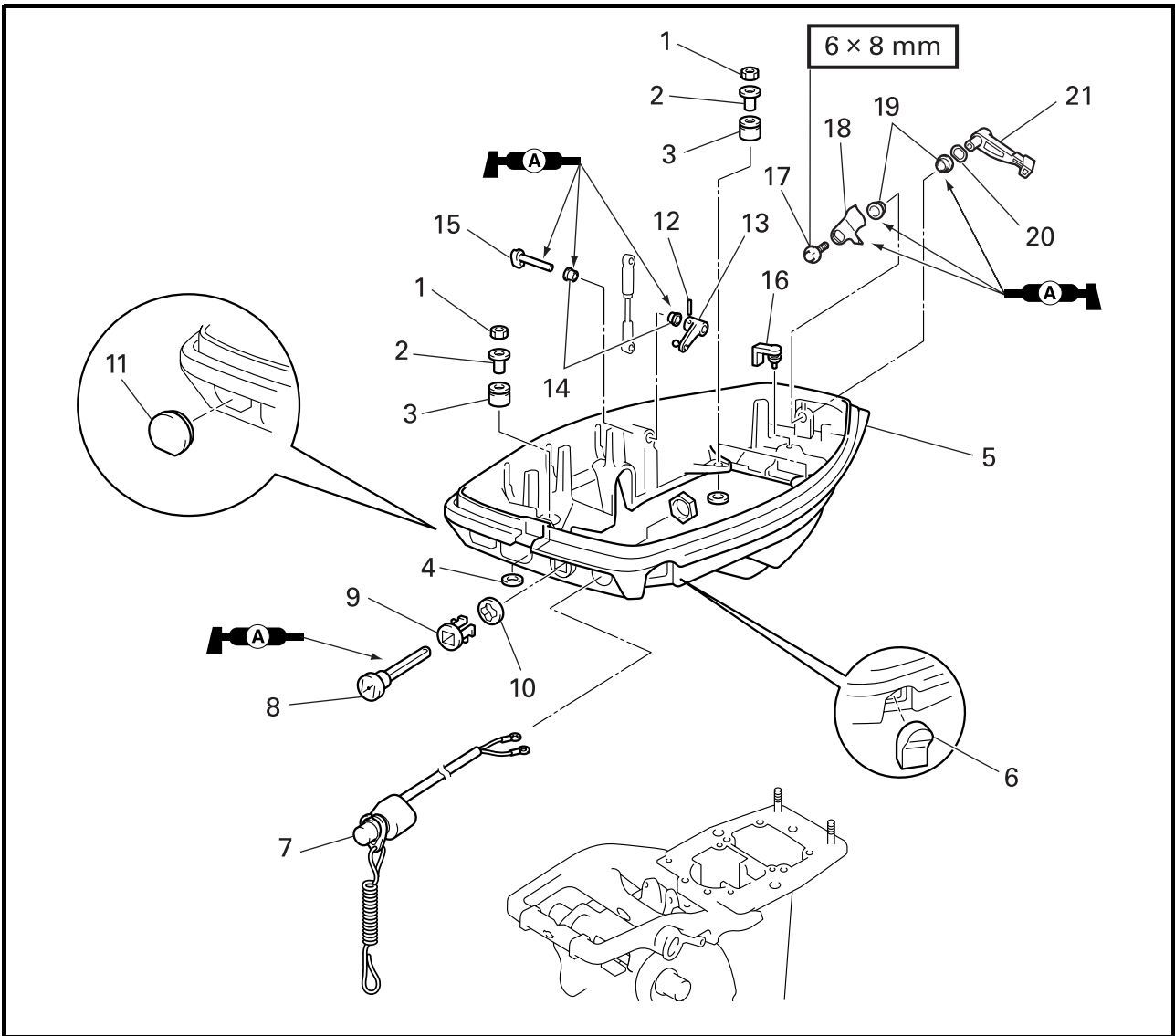
- (1) Set the shift rod into the neutral position.
- (2) Install the propeller shaft housing puller so it pushes against the propeller shaft.



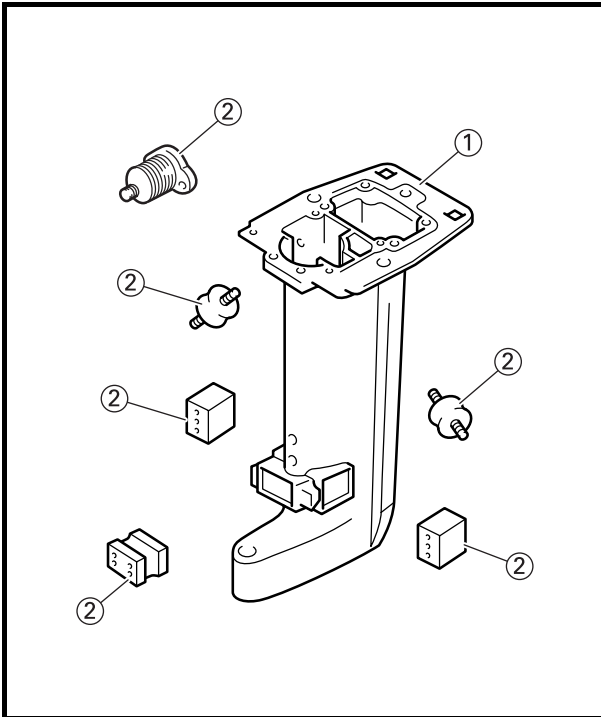
Bearing housing puller claw ①
90890-06564
Stopper guide plate..... ②
90890-06501
Center bolt..... ③
90890-06504



Center bolt
5 N·m (0.5 kgf·m, 3.7 ft·lb)



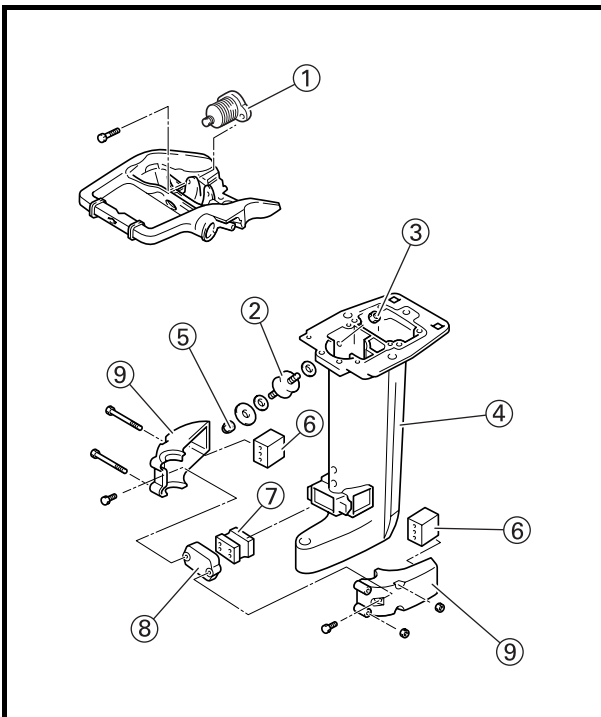
Step	Job/Part	Q'ty	Remarks
14	Bushing	2	
15	Throttle control shaft	1	
16	Friction spacer	1	
17	Bolt (with washer)	1	
18	Clamp lever 2	1	
19	Bushing	2	
20	Wave washer	1	
21	Clamp lever 1	1	



CHECKING THE UPPER CASE

Check:

- Upper case ①
Crack/damage → Replace.
- Mount rubber ②
Wear/crack/damage → Replace.



INSTALLING THE UPPER CASE

Install:

- Mount rubber ① (front upper)
- Mount rubber ② (side upper) – with gaskets
- Nut ③
- Upper case ④ (to swivel bracket)
- Nut ⑤ (side upper)
- Mount rubber ⑥ (side lower)
- Mount rubber ⑦ (front lower)
- Lower mount cover ⑧
- Lower mount rubber housing ⑨



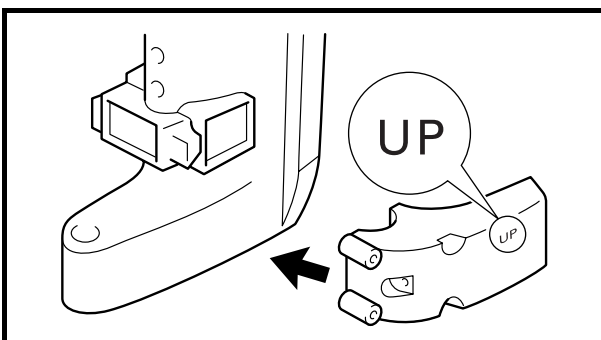
Nut ⑤

17 N•m (1.7 kgf•m, 13 ft•lb)

Bolt

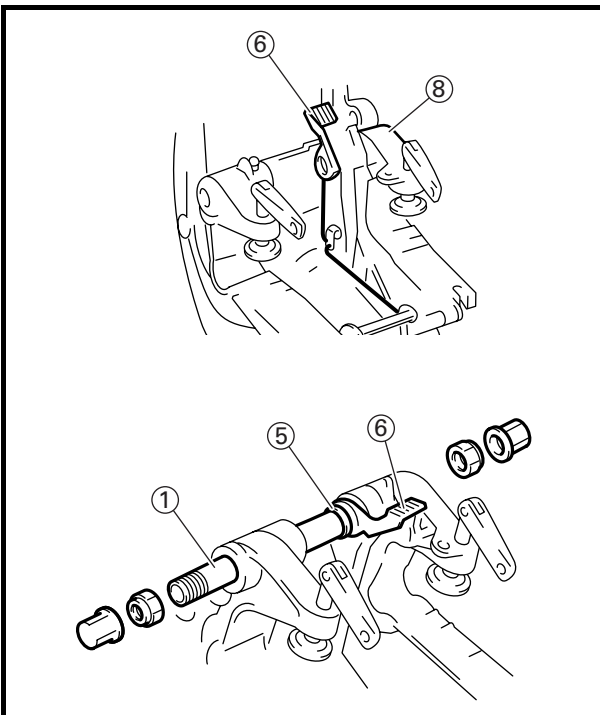
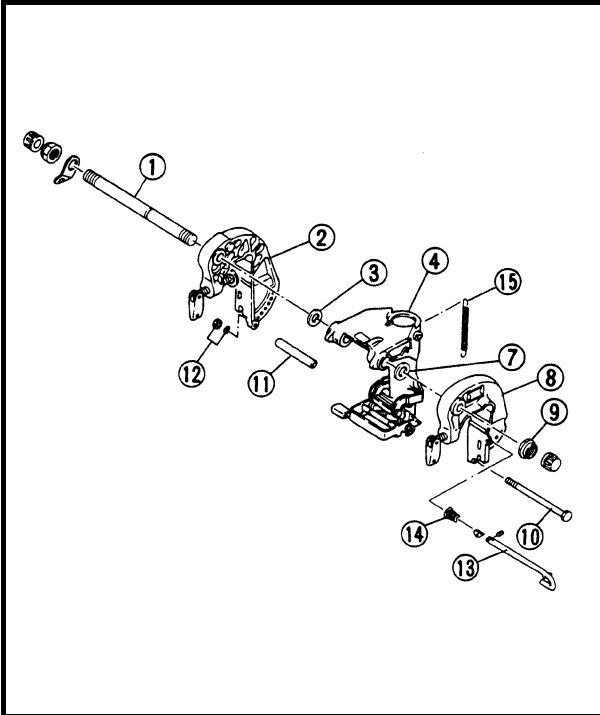
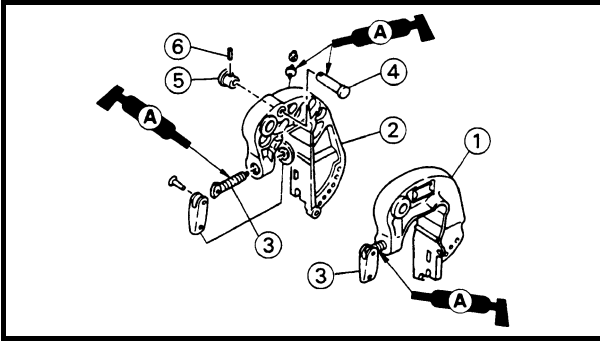
(lower mount rubber housing ⑨)

17 N•m (1.7 kgf•m, 13 ft•lb)



NOTE:

Make sure the lower mount rubber housing is installed with the "UP" mark pointing upward.



3. Install:

- Clamp bracket ① (port side)
- Clamp bracket ② (starboard side)
- Transom clamp handle ③
- Stopper shaft ④
- Stopper knob ⑤
- Spring pin ⑥

NOTE:

- Always use the new pin and a spring pin.
- Apply Yamaha grease A (water resistant grease) to the transom clamp screw, stopper shaft and the grease nipple.

4. Install:

- Clamp bracket bolt ①
- Clamp bracket ② (starboard side)
- Washer ③
- Swivel bracket ④
- Torsion spring ⑤
- Tilt lever ⑥
- Washer ⑦
- Clamp bracket ⑧ (port side)
- Nut ⑨ (clamp bracket bolt)
- Bolt ⑩
- Collar ⑪
- Nut ⑫
- Tilt rod ⑬ (with conical spring ⑭)
- Tension spring ⑮

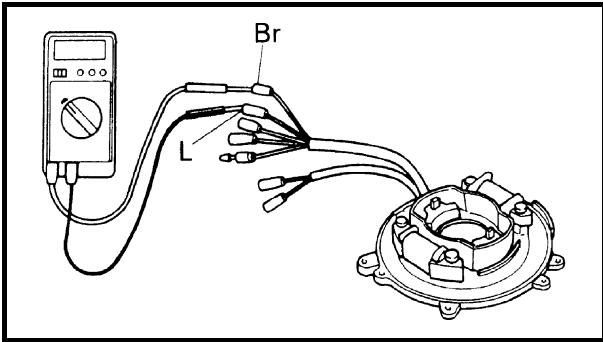
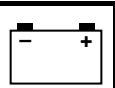
NOTE:

Place the tilt lever ⑥ inside the clamp bracket ⑧ (port side) as shown.



Nut ⑨

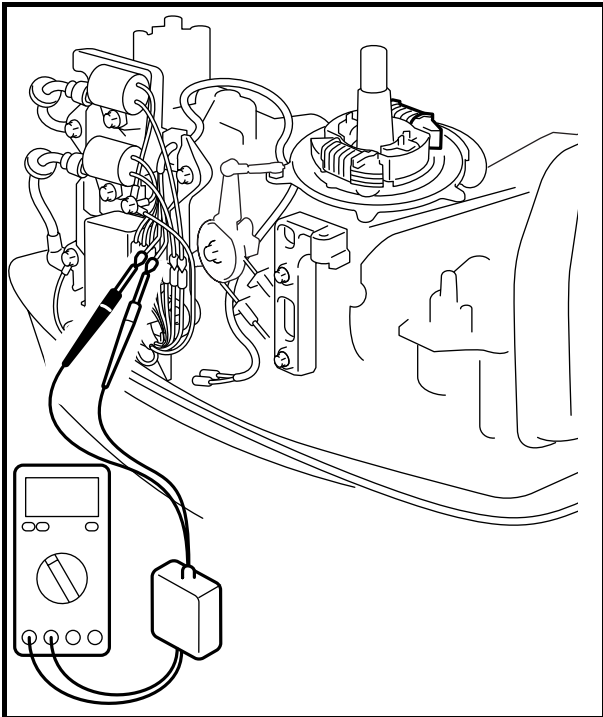
45 N·m(4.5 kgf·m, 33 ft·lb)



CHECKING THE CHARGE COIL

1. Measure:
 - Charge coil resistance
 Out of specification → Check the peak voltage.

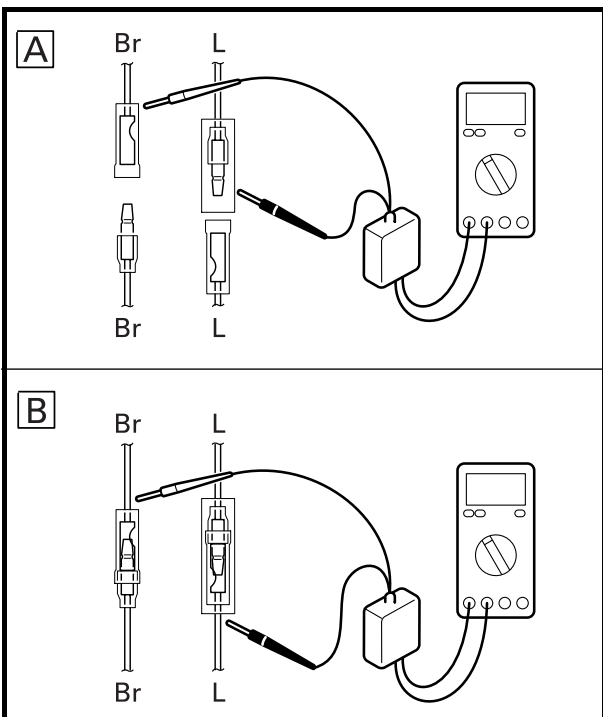
	Charge coil resistance
	Br - L
	342 - 418 Ω



Measuring steps

- (1) Disconnect the Brown (Br) and Blue (L) leads from the wire harness.
 - (2) Connect the tester to the charge coil as shown.
2. Measure:
 - Charge coil output peak voltage
 Below specification → Replace.

	Charge coil output peak voltage			
	Br - L			
	r/min	Cranking	1,500	3,500
	Opened	Closed		
D.C.V.	146	146	150	150



NOTE: For the peak voltage measurement, connect the adaptor as the illustration **A** for the open circuit, and as the illustration **B** for the closed circuit.

CHAPTER 9 TROUBLE ANALYSIS

TROUBLE ANALYSIS	9-1
TROUBLE ANALYSIS CHART	9-1
TROUBLE SHOOTING FOR PEAK VOLTAGE	9-4

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