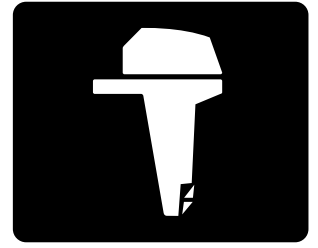




YAMAHA



Z250C
LZ250C

SERVICE MANUAL



LIT-18616-02-78

60V-28197-1F-11

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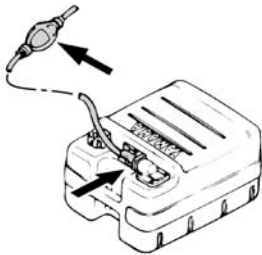
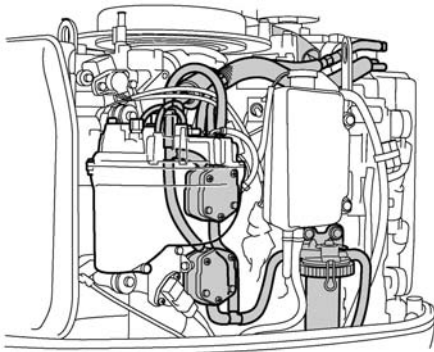


Predelivery checks

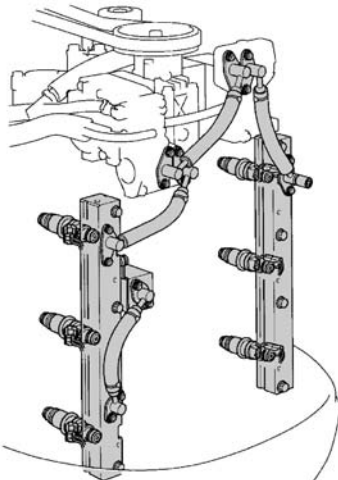
To make the delivery process smooth and efficient, the predelivery checks should be completed as explained below.

Checking the fuel system

1. Check that the fuel hoses are securely connected and that the fuel tank is full with fuel.



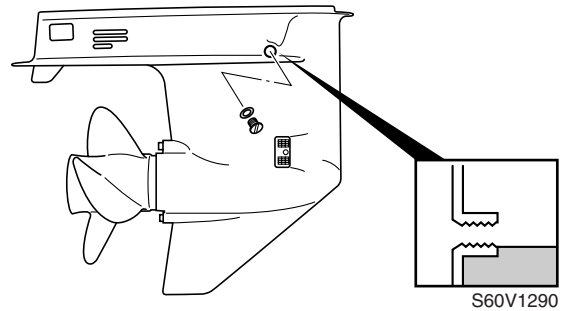
S6D01010



S60V1020

Checking the gear oil level

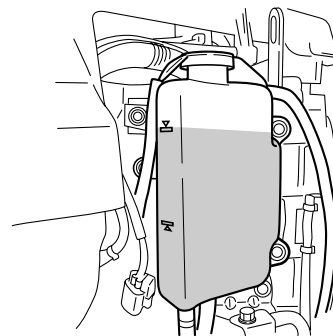
1. Check the gear oil level.



S60V1290

Checking the engine oil level

1. Check the engine oil level.
2. Make sure the oil level is between the upper and lower level marks.



S60V3260



Recommended engine oil:
YAMALUBE 2-stroke outboard
motor oil

CAUTION:

- Use unleaded straight gasoline only.
- Do not use gasoline mixed with oil (pre-mixed fuel).

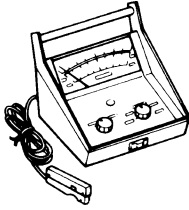
Electrical

Item	Unit	Model	
		Z250TR	LZ250TR
Ignition and ignition control system			
Ignition timing			
Cylinder #1			
at engine idle speed	Degree	ATDC 9	
at 5,500 r/min	Degree	BTDC 19	
Spark plug gap	mm (in)	1.5–1.6 (0.059–0.063)	
Ignition coil resistance			
Primary coil (R – B/W)			
at 20 °C (68 °F)	Ω	1.36–1.84	
Secondary coil (B/W – spark plug wire)			
at 20 °C (68 °F)	kΩ	7.31–9.89	
ECM output peak voltage (R – B/W)			
at cranking (loaded)	V	160	
at 1,500 r/min (loaded)	V	260	
at 3,500 r/min (loaded)	V	260	
Pulser coil output peak voltage (W/R, W/B, W/Y, W/G, W/L, W/Br – B)			
at cranking (unloaded)	V	3.5	
at cranking (loaded)	V	3.5	
at 1,500 r/min (loaded)	V	20.0	
at 3,500 r/min (loaded)	V	30.0	
Pulser coil resistance ^(*) (W/R, W/B, W/Y, W/G, W/L, W/Br – B)	Ω	294–398	
Throttle position sensor			
Input voltage (O – R)	V	5	
Output voltage (P – O)			
at engine idle speed	V	0.58–0.62	
Crank position sensor output peak voltage (G/L – G/W)			
at cranking (unloaded)	V	1.5	
at cranking (loaded)	V	1.5	
at 1,500 r/min (loaded)	V	8.0	
at 3,500 r/min (loaded)	V	10.0	

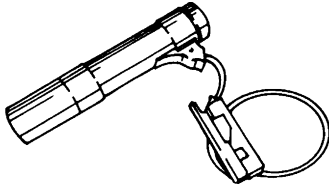
^(*) The figures are for reference only.



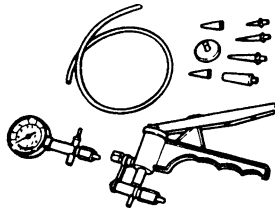
Special service tools



Inductive self-powered tachometer
YU-08036-B



Battery powered timing light
YM-33277-A



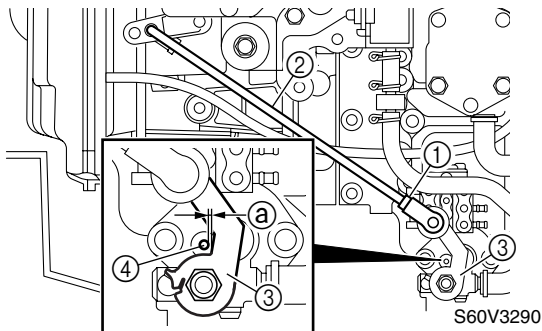
Pressure/vacuum tester
YB-35956-A



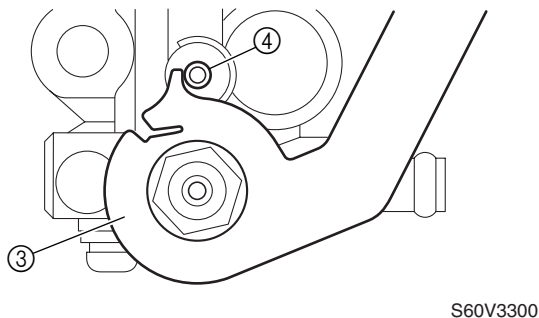
Oil injection system

Adjusting the oil pump link rod

1. Loosen the locknut ① and then disconnect the oil pump link rod ②.
2. Fully close the throttle valves.
3. Adjust the oil pump link rod so that the gap ③ between the oil pump lever ③ (in the fully closed position) and the stopper ④ is less than 0.5 mm (0.02 in).



4. Connect the oil pump link rod.
5. Check that the oil pump lever ③ contacts the stopper ④ when the throttle valve is in the fully open position.



Power trim and tilt unit

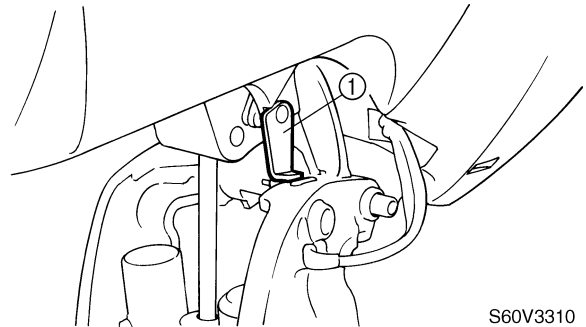
Checking the power trim and tilt operation

1. Fully tilt the outboard motor up and down a few times and check the entire trim and tilt range for smooth operation. Check the power trim and tilt fluid level if necessary.

NOTE:

Be sure to listen to the winding sound of the power trim and tilt motor for smooth operation.

2. Fully tilt the outboard motor up, and then support it with the tilt stop lever ① to check the lock mechanism of the lever.



Checking the power trim and tilt fluid level

1. Fully tilt the outboard motor up, and then support it with the tilt stop lever ①.



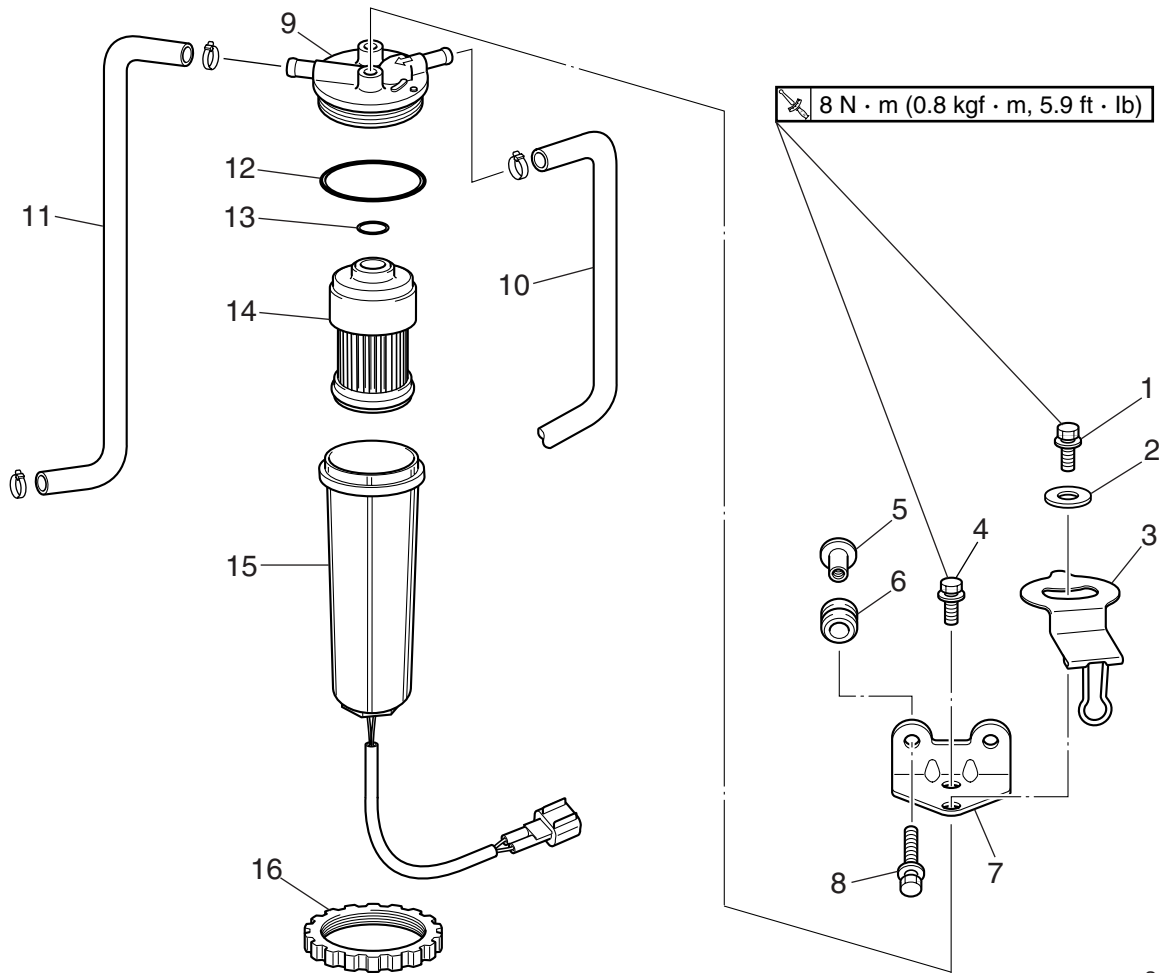
⚠ WARNING

After tilting up the outboard motor, be sure to support it with the tilt stop lever. Otherwise, the outboard motor could suddenly lower if the power trim and tilt unit should lose fluid pressure.

2. Remove the reservoir cap ②, and then check the fluid level in the reservoir.

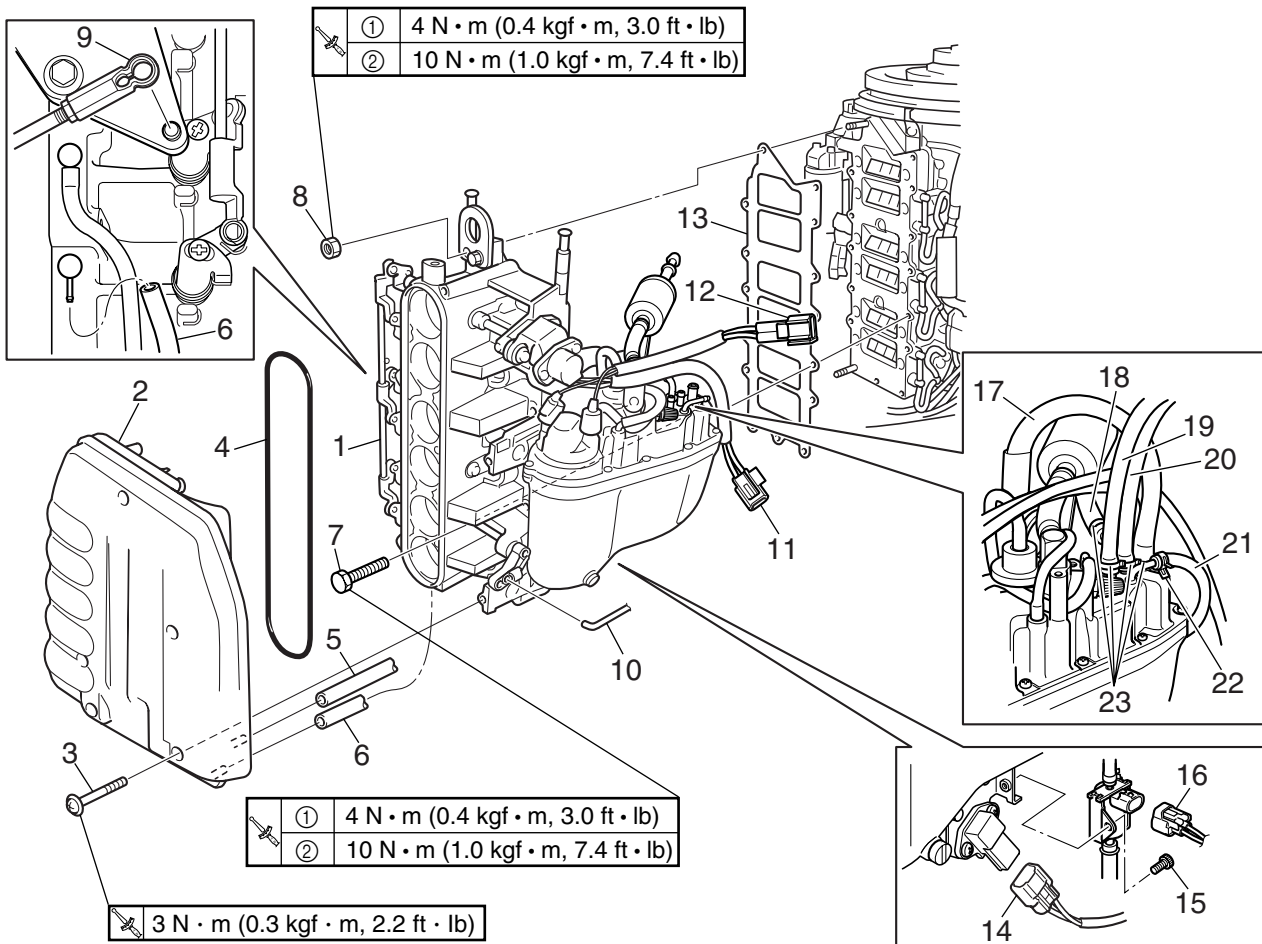


Fuel filter



S6D04010

No.	Part name	Q'ty	Remarks
1	Bolt	1	M6 × 16 mm
2	Washer	1	
3	Holder	1	
4	Bolt	1	M6 × 14 mm
5	Collar	2	
6	Grommet	2	
7	Bracket	1	
8	Bolt	2	M6 × 25 mm
9	Cap	1	
10	Fuel hose	1	
11	Fuel hose	1	
12	O-ring	1	Not reusable
13	O-ring	1	Not reusable
14	Fuel filter element	1	
15	Cup	1	
16	Nut	1	



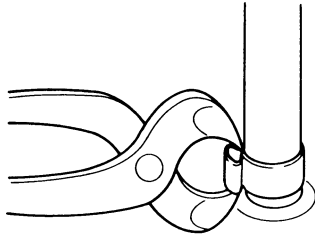
S60V4010

No.	Part name	Q'ty	Remarks
18	Fuel hose	1	
19	Fuel hose	1	
20	Fuel hose	1	
21	Oil hose	1	
22	Clamp	1	
23	Plastic tie	4	Not reusable



Removing the medium-pressure fuel hose clamps

1. Remove the medium-pressure fuel hose clamps by cutting the crimped section of the clamp.



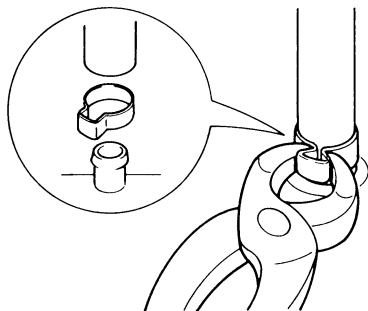
S69J4030

CAUTION:

If the medium-pressure fuel hose clamps are removed without cutting the crimp first, the fuel hose could be damaged.

Installing the medium-pressure fuel hose clamps

1. Crimp the medium-pressure fuel hose clamps properly to securely fasten them.



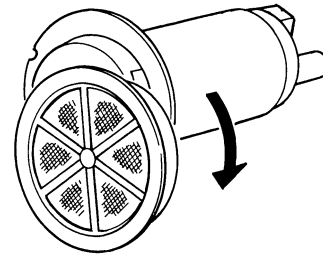
S69J4040

⚠ WARNING

Do not reuse the fuel hose clamps, always replace them with new ones.

Removing the electric fuel pump filter

1. Remove the electric fuel pump filter, damper holder, and rubber damper from the electric fuel pump.



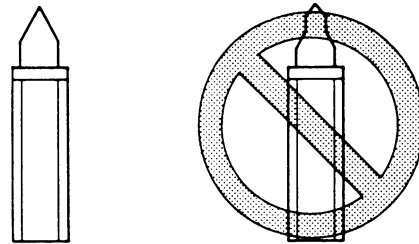
S60V4335

NOTE:

To remove the filter, turn it clockwise.

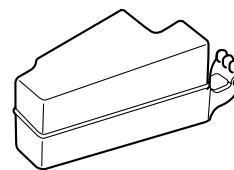
Checking the vapor separator

1. Check the needle valve for bends or wear. Replace if necessary.



S69J4080

2. Check the float for deterioration. Replace if necessary.



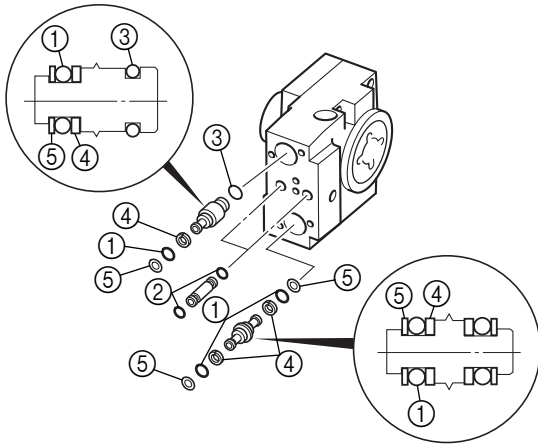
S60V4340

3. Check the filter for dirt or residue. Clean if necessary.

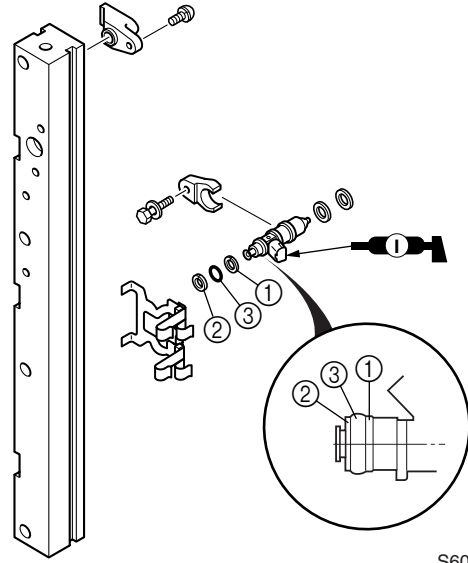


Installing the joints

1. Install new O-rings ①, ②, and ③, and new backup rings ④ and ⑤ onto the joints.
2. Install the joints into the high-pressure fuel pump.



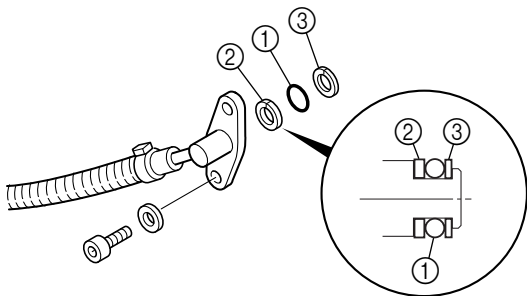
S60V4400



S60V4420

Installing the fuel pipes

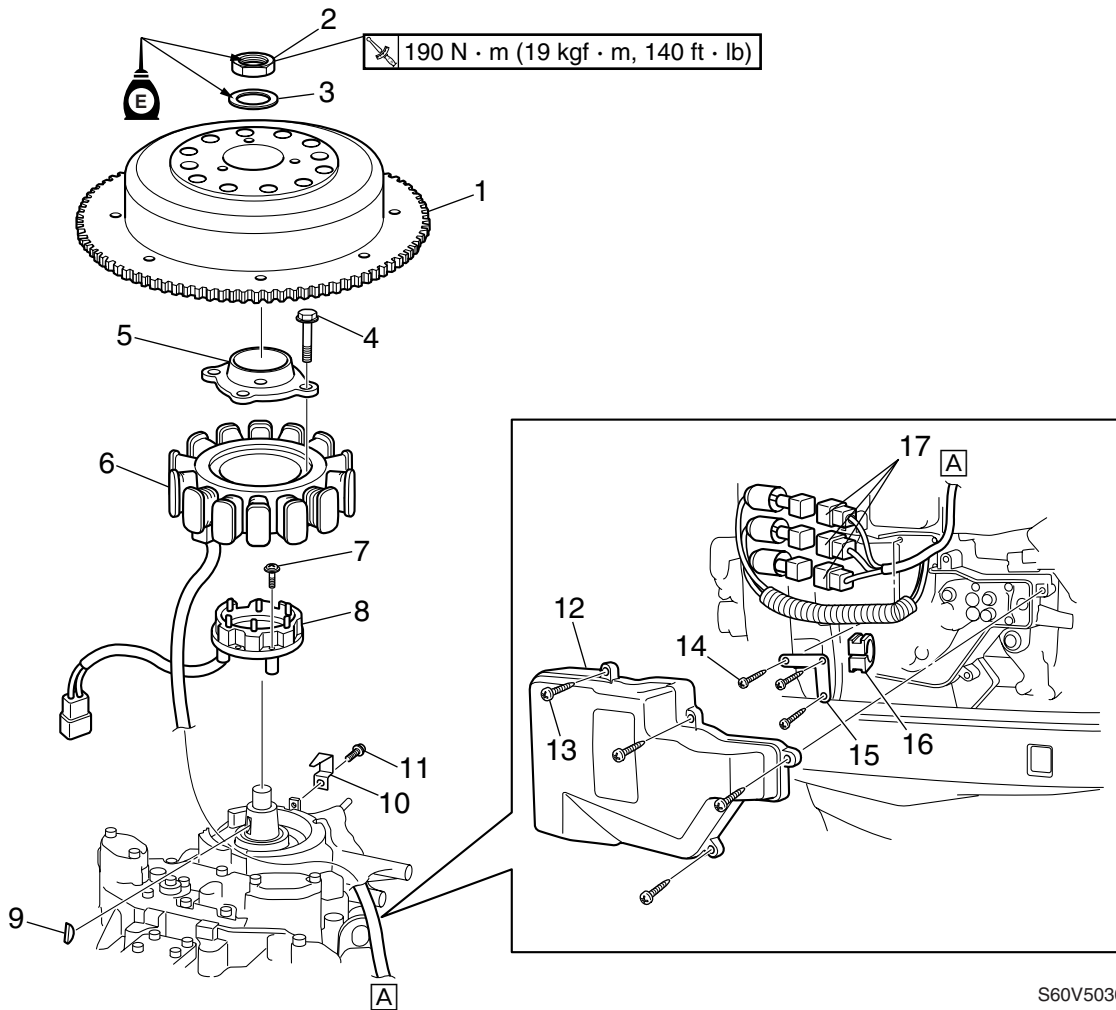
1. Install new O-rings ① and new backup rings ② and ③ into the fuel pipes.
2. Install the fuel pipes onto the high-pressure fuel pump and fuel rails.



S60V4410

Installing the fuel injectors

1. Install new gaskets ① and ②, and new O-ring ③.
2. Install the fuel injectors onto the fuel rails.

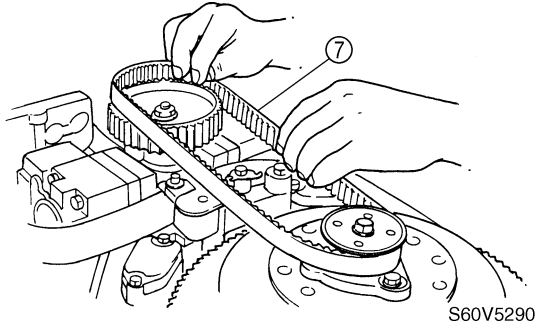


S60V5030

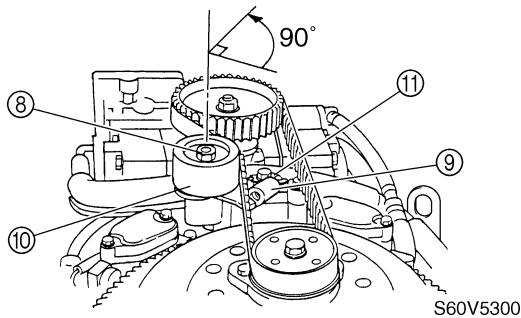
No.	Part name	Q'ty	Remarks
1	Flywheel magnet	1	
2	Nut	1	
3	Washer	1	
4	Bolt	4	M6 × 35 mm
5	Holder	1	
6	Stator coil	1	
7	Screw	3	ø5 × 30 mm
8	Pulser coil	1	
9	Woodruff key	1	
10	Pointer	1	
11	Screw	1	ø6 × 10 mm
12	Cover	1	
13	Screw	4	
14	Screw	3	ø5 × 16 mm
15	Holder	1	
16	Grommet	1	
17	Stator coil coupler	3	



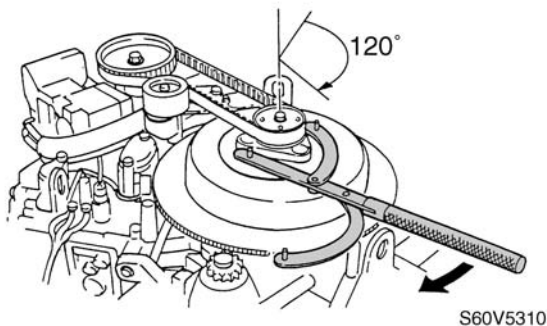
4. Install the drive belt ⑦ from the drive sprocket side with its part number in the upright position, and then turn the belt a half turn counterclockwise to align it.



5. Finger tighten the drive belt tensioner bolt ⑧, and then loosen it 90°.
6. Install the tensioner spring ⑨ onto the drive belt tensioner ⑩ and spring holder ⑪.



7. Turn the flywheel magnet 120° clockwise to take up the drive belt slack.

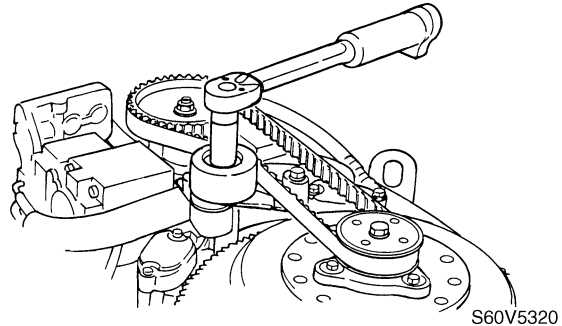


NOTE: _____
Do not turn the flywheel magnet counter-clockwise.



Universal magnet and rotor holder:
YU-01235

8. Tighten the drive belt tensioner bolt to the specified torque.

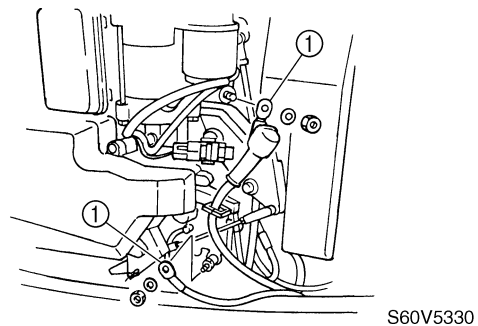


Drive belt tensioner bolt:
39 N·m (3.9 kgf·m, 28.8 ft·lb)

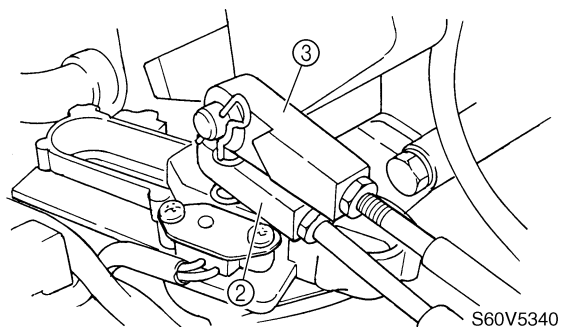
Removing the power unit

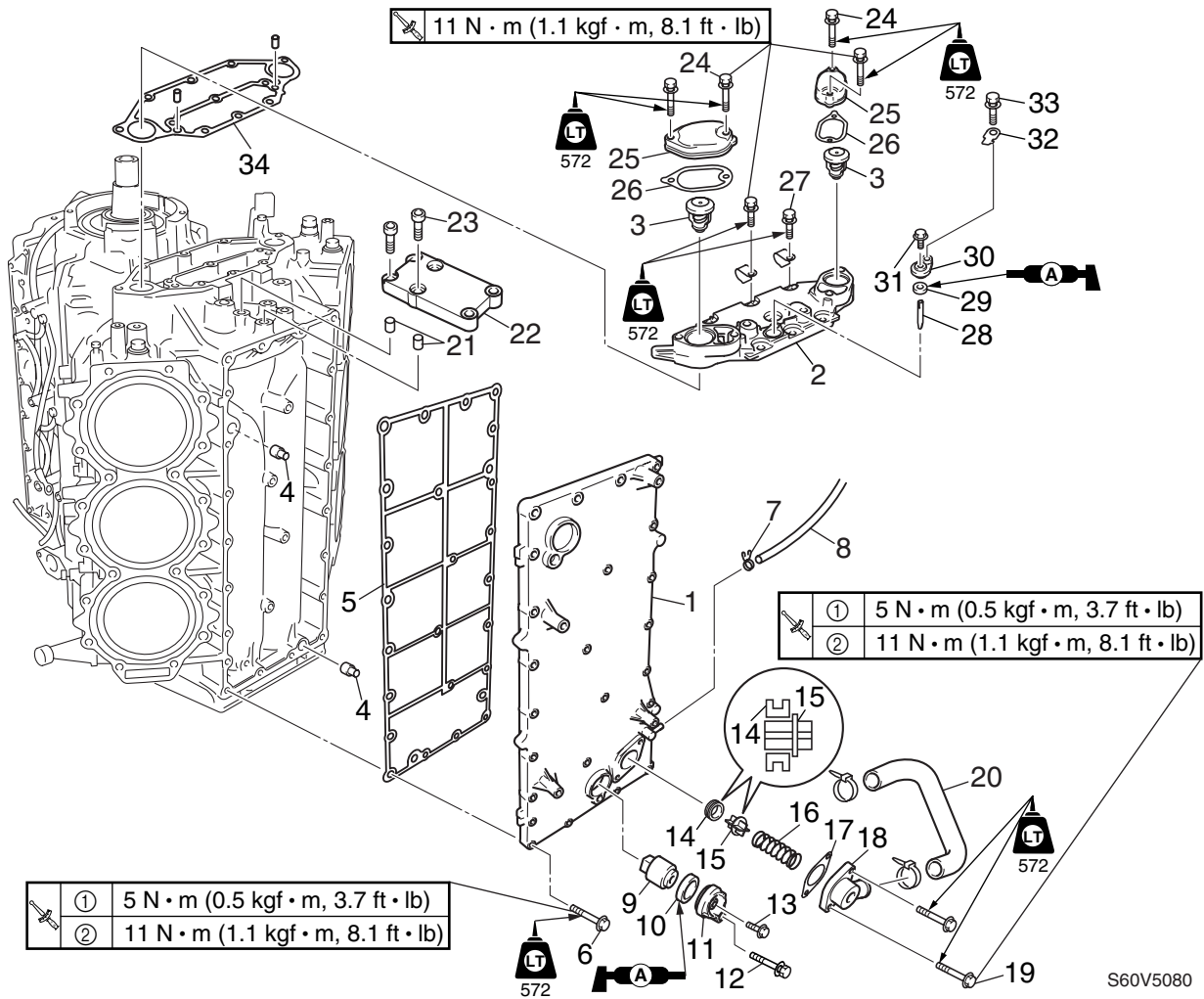
NOTE: _____
It is recommended to loosen the flywheel magnet nut before removing the power unit to improve working efficiency.

1. Disconnect the battery leads ①.



2. Disconnect the shift cable ② and the throttle cable ③.



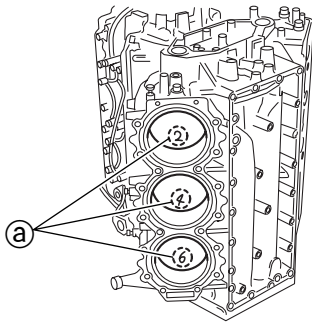


No.	Part name	Q'ty	Remarks
18	Cover	1	
19	Bolt	2	M6 × 20 mm
20	Hose	1	
21	Dowel	2	
22	Bracket	1	
23	Bolt	4	M8 × 25 mm
24	Bolt	4	M6 × 55 mm
25	Cover	2	
26	Gasket	2	Not reusable
27	Bolt	7	M6 × 20 mm
28	Anode	1	
29	Grommet	1	
30	Cover	1	
31	Bolt	1	M5 × 12 mm
32	Plate	1	
33	Bolt	1	M6 × 20 mm
34	Gasket	1	Not reusable

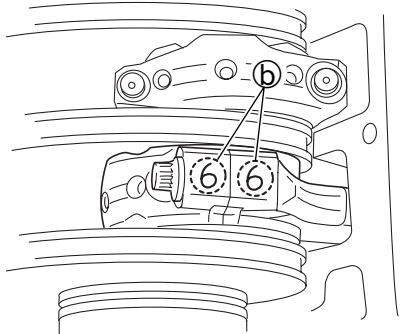


Removing the piston and connecting rod assemblies and crankshaft assembly

1. Remove the connecting rod bolts and the connecting rod caps, and then remove the piston and connecting rod assemblies.



S60V5710

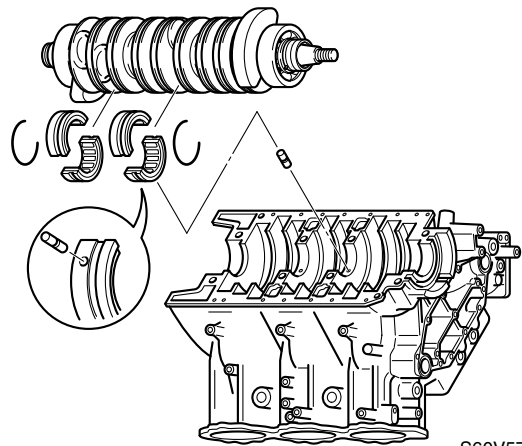


S60V5720

NOTE: _____

- Be sure to keep the bearings in the order as they were removed.
- Mark each piston with the identification number ① of the corresponding cylinder. Also, mark each connecting rod and connecting rod cap with an identification number ② as shown.
- Do not mix the connecting rods and caps. Keep them organized in their proper groups.

2. Remove the crankshaft assembly.



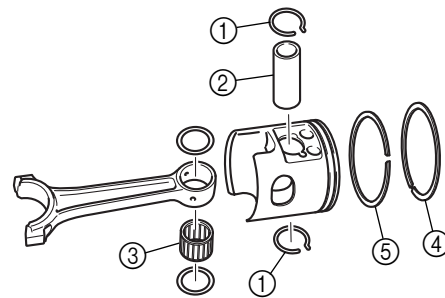
S60V5730

NOTE: _____

Be sure to keep the bearings in the order as they were removed.

Disassembling the piston and connecting rod assemblies

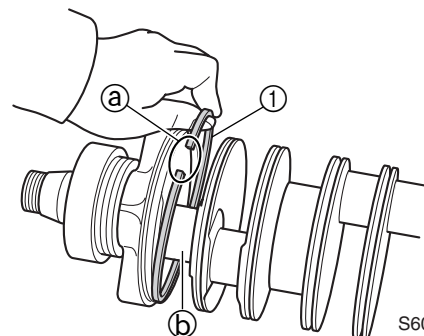
1. Remove the clips ① with pliers, and then remove the piston pin ② and needle bearing ③.
2. Remove the top ring ④ and 2nd piston ring ⑤.



S60V5740

Disassembling the crankshaft

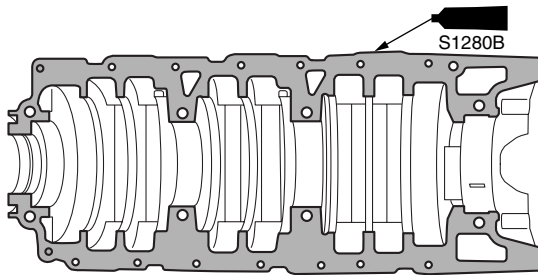
1. Remove the seal rings ①.



S60V5750



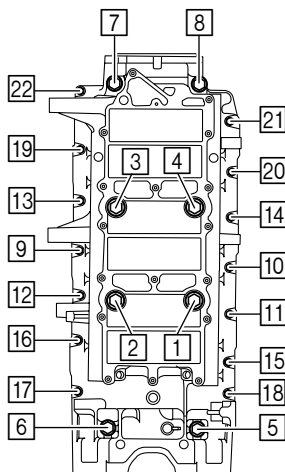
6. Apply sealant to the mating surface of the crankcase.



S60V5B20U

NOTE: _____
Do not get any sealant on the journals.

7. Install the crankcase onto the cylinder block, and then tighten the crankcase bolts to the specified torques in two stages and in the sequence shown.



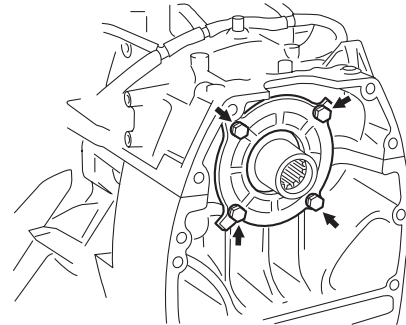
S60V5B30

- NOTE:** _____
- Apply engine oil to the crankcase bolts before installation.
 - Tighten crankcase bolts [1]–[8] to the specified torques in two stages first, and then tighten crankcase bolts [9]–[22] to the specified torques in two stages.

	[1]–[8] Crankcase bolt (M10): 1st: 17 N·m (1.7 kgf·m, 12.5 ft·lb) 2nd: 34 N·m (3.4 kgf·m, 25.1 ft·lb)
	[9]–[22] Crankcase bolt (M8): 1st: 4 N·m (0.4 kgf·m, 3.0 ft·lb) 2nd: 9 N·m (0.9 kgf·m, 6.6 ft·lb)

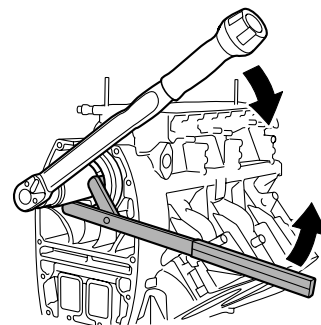
	[1]–[4] Crankcase bolt: M10 × 130 mm
	[5]–[8] Crankcase bolt: M10 × 90 mm

8. Tighten the oil seal housing bolts.



S60V5690

9. Install the crankshaft balancer, and then tighten the crankshaft balancer nut to the specified torque.



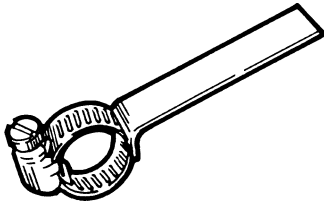
S60V5B40

CAUTION: _____
Apply force in the direction of the arrows shown, to prevent the flywheel magnet holder from slipping off easily.

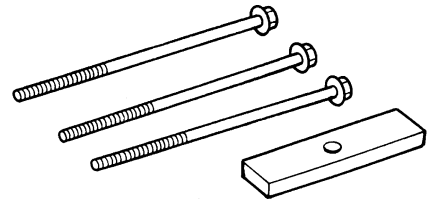
- NOTE:** _____
Apply engine oil to the crankshaft and the crankshaft balancer nut before installation.

	Flywheel magnet holder: YB-06139
--	----------------------------------

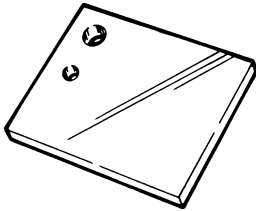
	Crankshaft balancer nut: 100 N·m (10 kgf·m, 73.8 ft·lb)
--	--



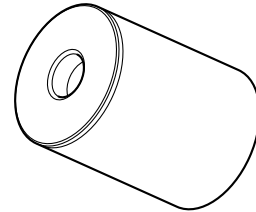
Backlash indicator gauge
YB-06265



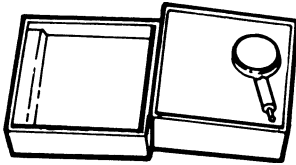
Puller bolt
YB-41707



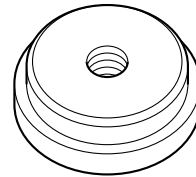
Magnetic plate
YB-07003



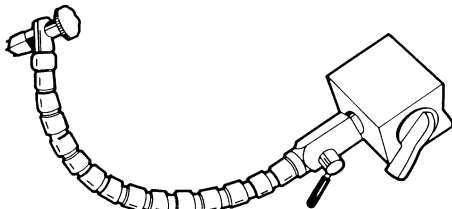
Shimming gauge
YB-06440-A



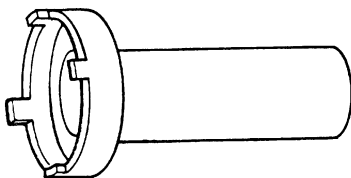
Dial gauge
YU-03097



Needle bearing installer
YB-06434



Magnetic flexible stand
YU-34481

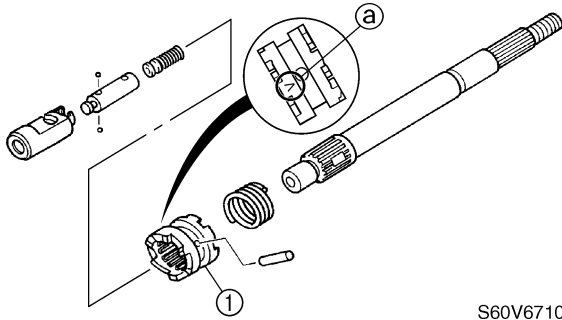


Ring nut wrench
YB-06578



Assembling the propeller shaft assembly

1. Install the dog clutch ① as shown.

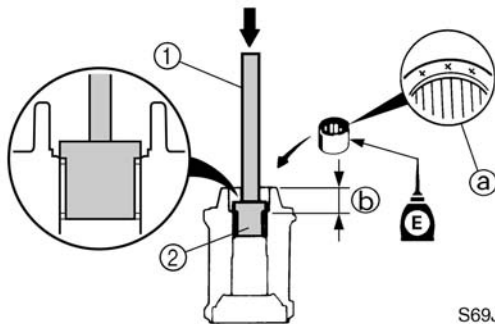


S60V6710

NOTE:
Install the dog clutch ① with the “V” mark ② facing toward the shift plunger.

Assembling the propeller shaft housing

1. Install the needle bearing into the propeller shaft housing to the specified depth.



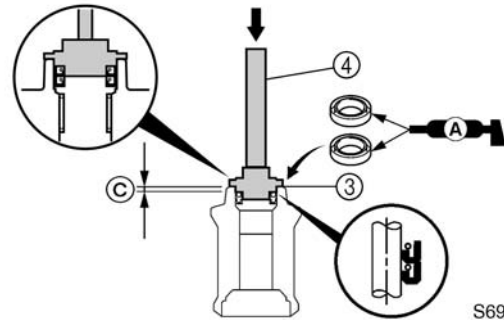
S69J6135

NOTE:
Install the needle bearing with the manufacture identification mark ② facing toward the oil seal (propeller side).

	Driver handle ①: YB-06071 Drive shaft needle bearing remover and installer ②: YB-06196
--	--

	Depth ③: 25.05–25.55 mm (0.986–1.006 in)
--	---

2. Apply grease to the new oil seals, and then install them into the propeller shaft housing to the specified depth.



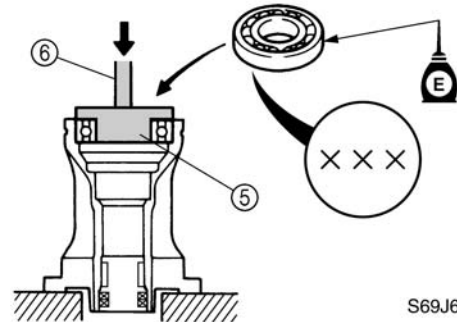
S69J6145

NOTE:
Install an oil seal halfway into the propeller shaft housing, then the other oil seal.

	Oil seal installer ③: YB-06085 Driver handle ④: YB-06071
--	---

	Depth ⑤: 4.75–5.25 mm (0.187–0.207 in)
--	---

3. Install the ball bearing into the propeller shaft housing.

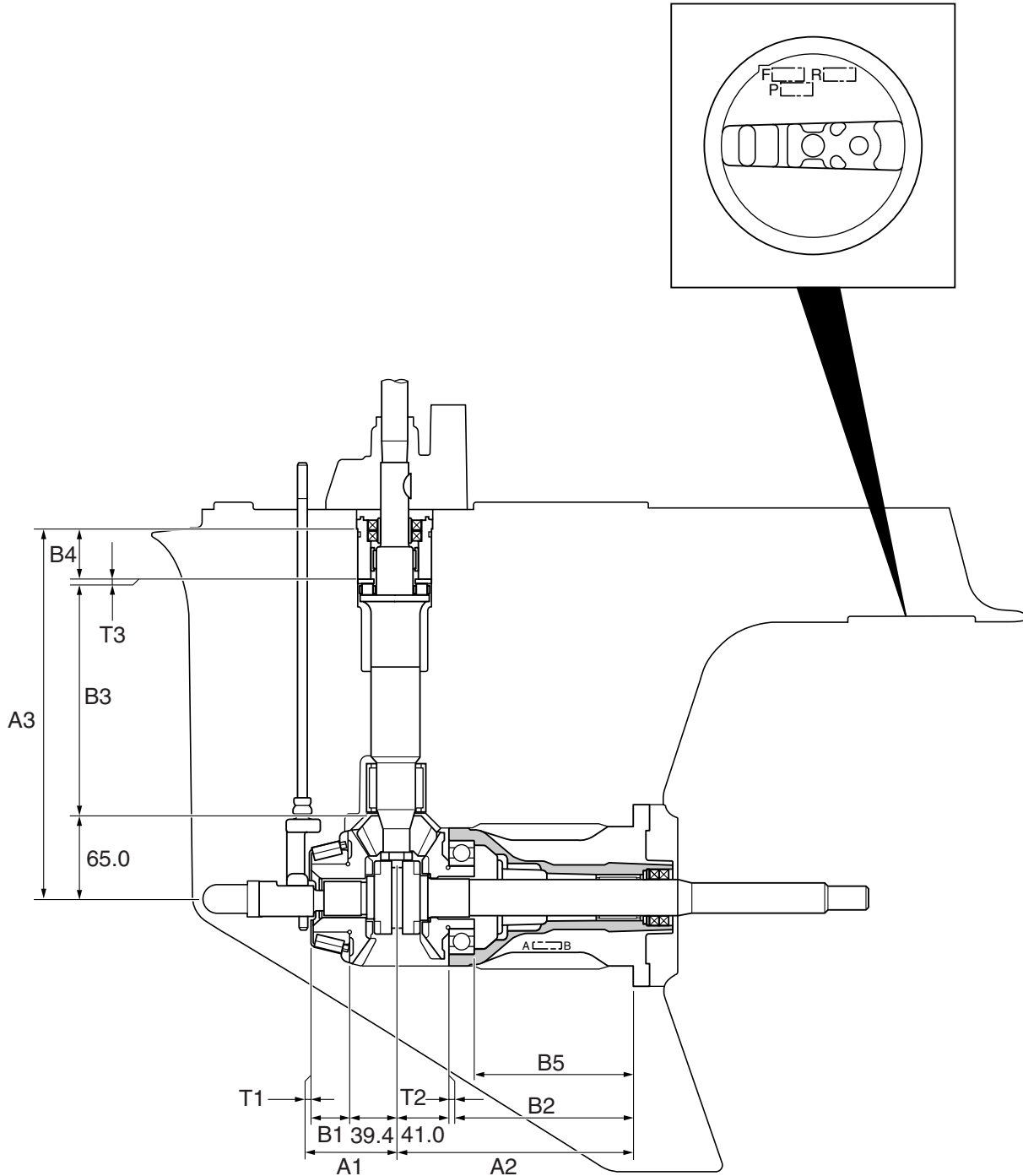


S69J6155

NOTE:
Install the ball bearing with the manufacture identification mark facing toward the propeller shaft housing.

	Forward bearing installer ⑤: YB-06430 Driver handle ⑥: YB-06071
--	---

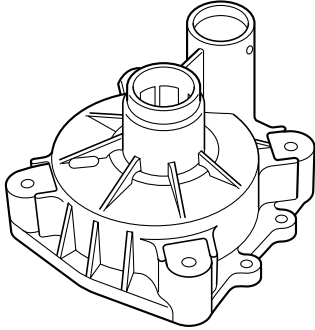
Shimming (regular rotation model)



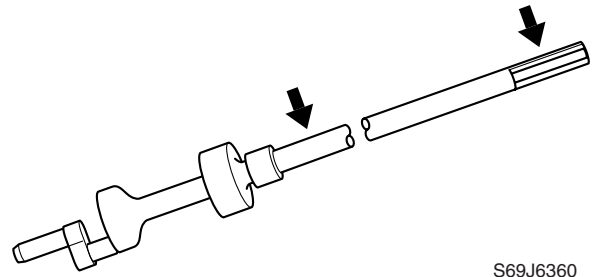
S6D06020

Checking the water pump and shift rod

1. Check the water pump housing for deformation. Replace if necessary.

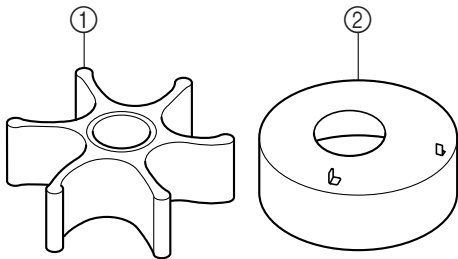


S69J6030



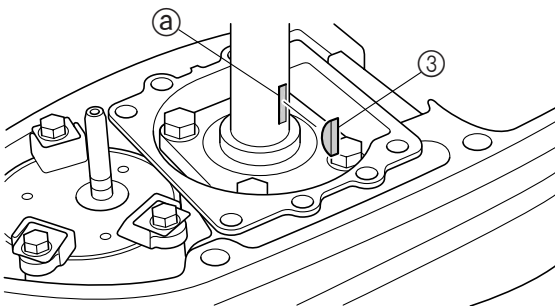
S69J6360

2. Check the impeller ① and insert cartridge ② for cracks or wear. Replace if necessary.



S69J6035

3. Check the Woodruff key ③ and the groove ④ on the drive shaft for wear. Replace if necessary.



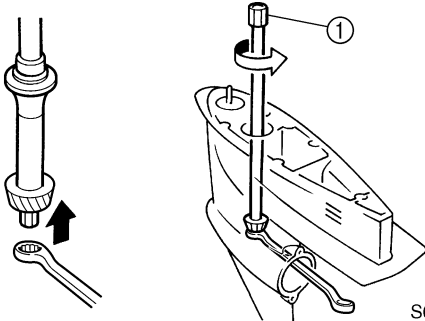
S69J6040

4. Check the shift rod for cracks or wear. Replace if necessary.



Removing the drive shaft

1. Remove the drive shaft assembly and pinion, and then pull out the reverse gear and thrust bearing.

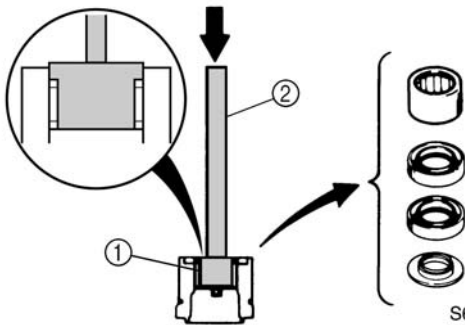


S69J6175


 Drive shaft holder ①: YB-06201

Disassembling the drive shaft housing

1. Remove the cover, oil seals, and needle bearing.

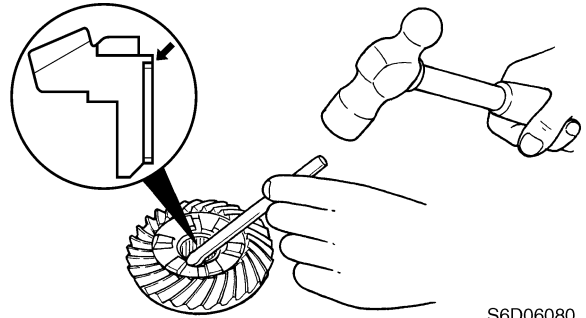


S69J6185

 Drive shaft needle bearing remover and installer ①:
YB-06196
Driver handle ②: YB-06071

Disassembling the reverse gear

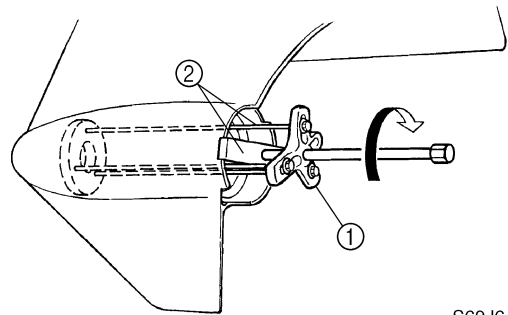
1. Remove the needle bearing from the reverse gear using a chisel.




S6D06080

Disassembling the lower case

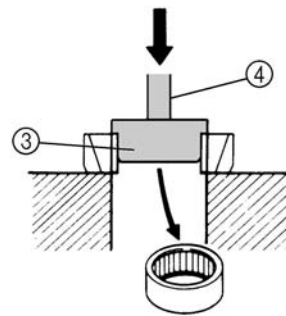
1. Remove the retainer and shim(s).




S69J6460

 Universal puller ①: YB-06117
Puller bolt ②: YB-41707

2. Remove the needle bearing from the retainer.



S69J6470

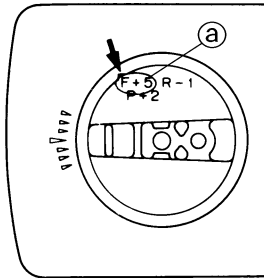
 Needle bearing installer ③:
YB-06434
Driver handle ④: YB-06071



Available shim thicknesses:
0.10, 0.12, 0.15, 0.18, 0.30, 0.40, and
0.50 mm

Selecting the reverse gear shims

1. Calculate the specified value (M0) as shown in the examples below.



S69J6570

NOTE:

“F” is the deviation of the lower case dimension from standard. The “F” mark **Ⓐ** is stamped on the trim tab mounting surface of the lower case in 0.01 mm units. If the “F” mark is unreadable, assume that “F” is zero and check the backlash when the unit is assembled.

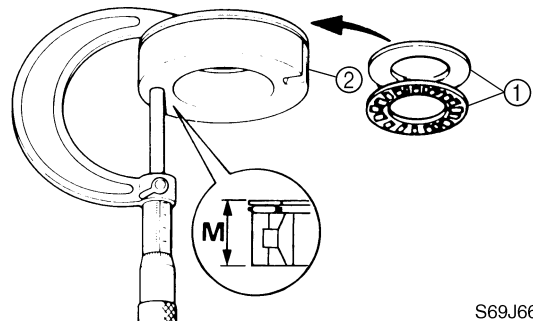
Calculation formula:
Specified value (M0) = 30.60 + F/100 mm

Example:

If “F” is (+5), then
M0 = 30.60 + (+5)/100 mm = 30.60 + 0.05 mm
= 30.65 mm

If “F” is (-3), then
M0 = 30.60 + (-3)/100 mm = 30.60 - 0.03 mm
= 30.57 mm

2. Set the thrust bearing ① to the bearing retainer ② as shown.
3. Turn the thrust bearing two or three times to seat the bearing retainer, and then measure the bearing height (M).

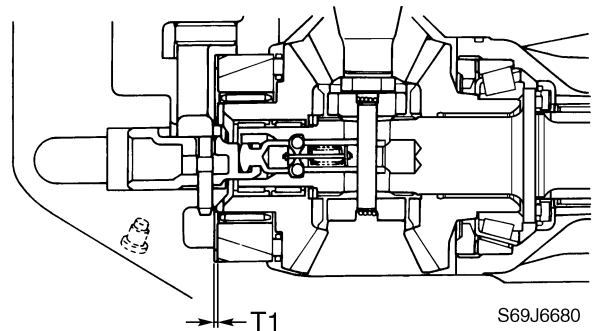


S69J6675

NOTE:

Measure the bearing retainer at three points to find the clearance average.

4. Select the reverse gear shim(s) (T1).



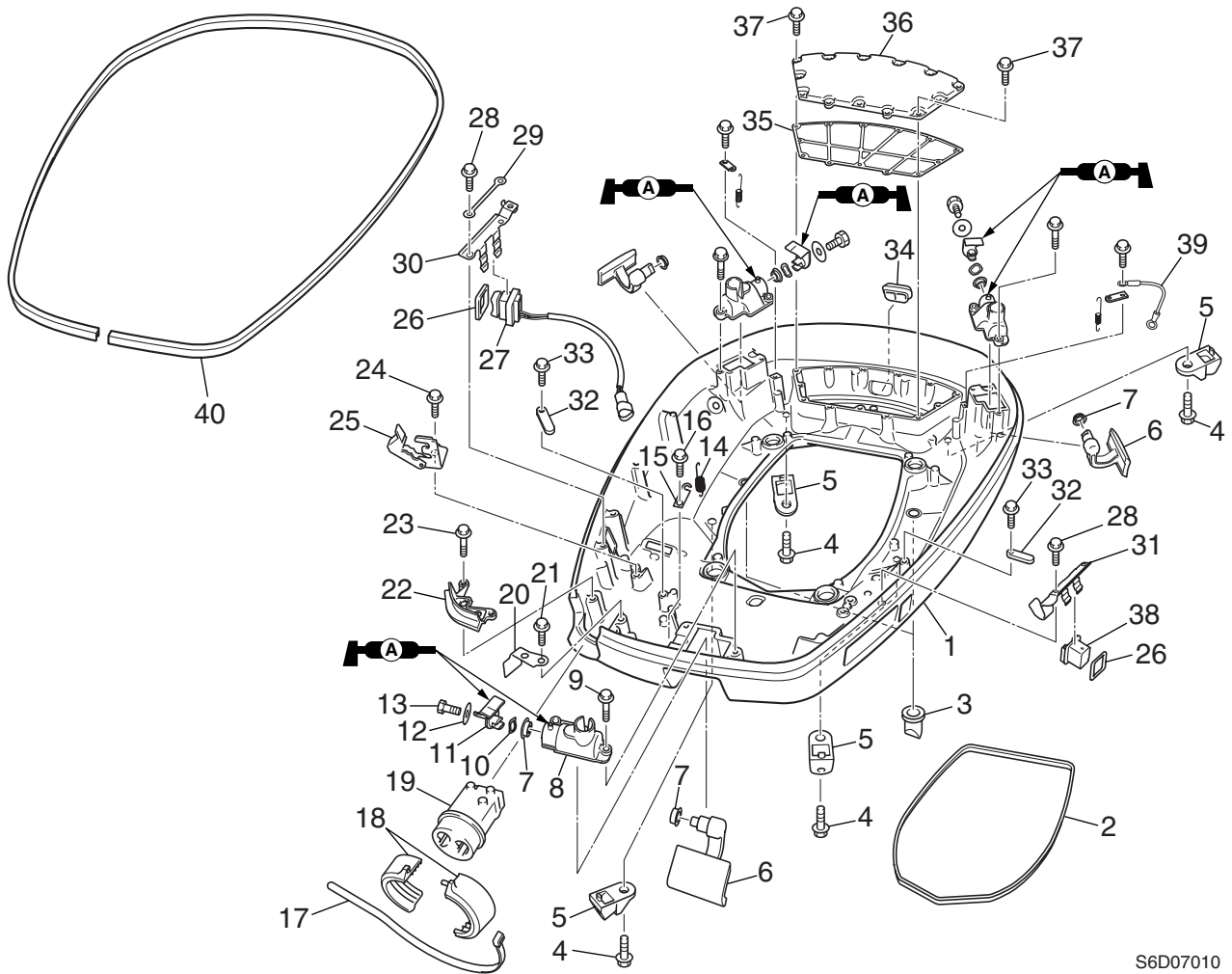
S69J6680

NOTE:

The sum of T1 and M should not be more than M0.

Calculation formula:
Reverse gear shim thickness (T1) =
M0 - M

Available shim thicknesses:
0.10, 0.12, 0.15, 0.18, 0.30, 0.40, and
0.50 mm



S6D07010

No.	Part name	Q'ty	Remarks
1	Bottom cowling	1	
2	Rubber seal	1	
3	Grommet	2	
4	Bolt	4	M6 × 16 mm
5	Bracket	4	
6	Cowling lock lever	3	
7	Bushing	6	
8	Plate	3	
9	Bolt	6	M6 × 30 mm
10	Wave washer	3	
11	Lever	3	
12	Washer	3	
13	Bolt	3	M6 × 16 mm
14	Spring	3	
15	Hook	3	
16	Bolt	3	M6 × 16 mm
17	Plastic tie	1	

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- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below

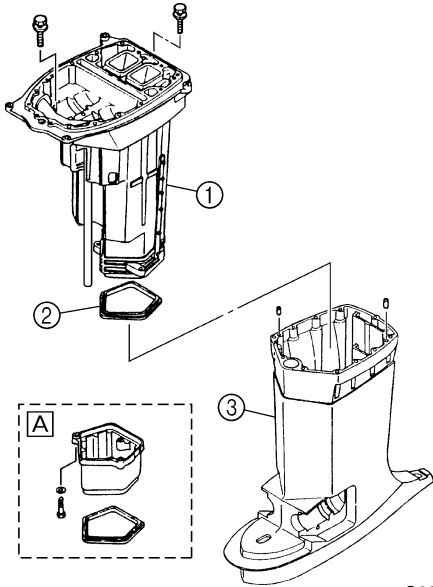


- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

Disassembling the upper case

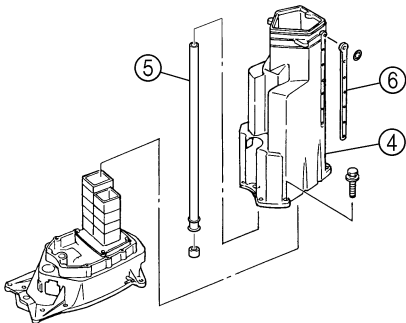
1. Remove the muffler assembly ① and gasket ② from the upper case ③.



S60V7120

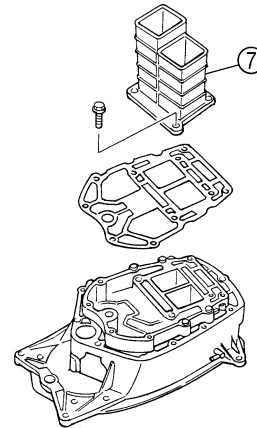
A U-transom model

2. Remove the muffler ④, cooling water pipe ⑤, and rubber damper ⑥.



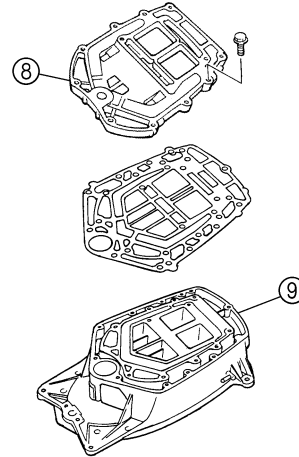
S60V7130

3. Remove the exhaust manifold ⑦.



S60V7140

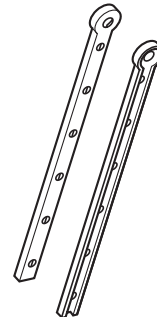
4. Remove the lower exhaust guide ⑧ from the upper exhaust guide ⑨.



S60V7150

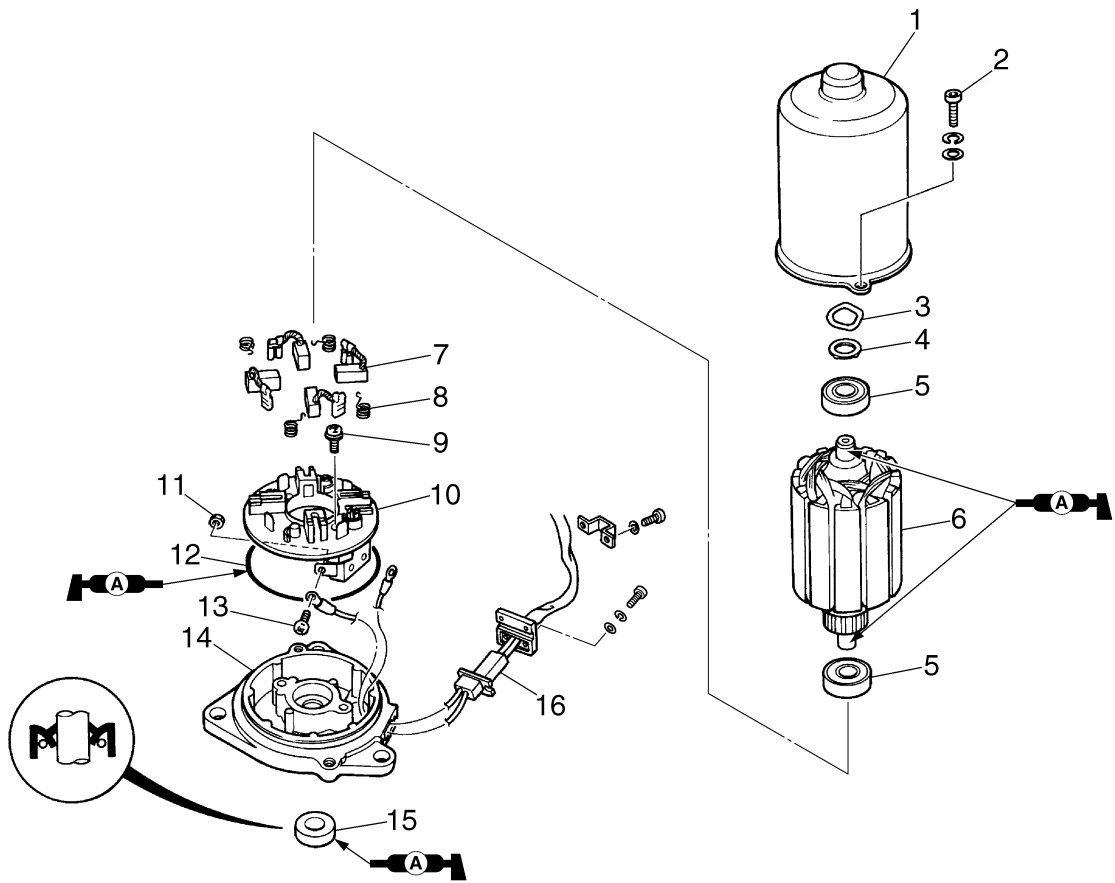
Checking the upper case

1. Check the rubber damper for deterioration. Replace if necessary.



S60V7160

2. Check the cooling water pipe for deformation or corrosion. Replace if necessary.

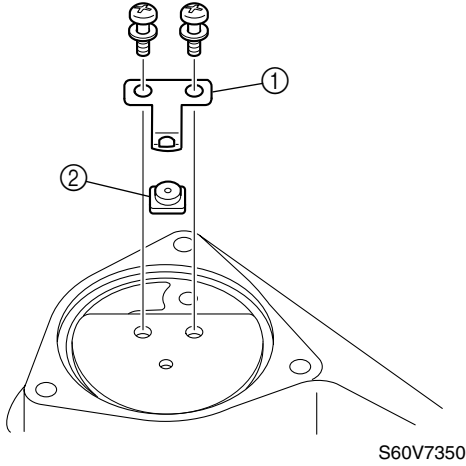


S60V7090

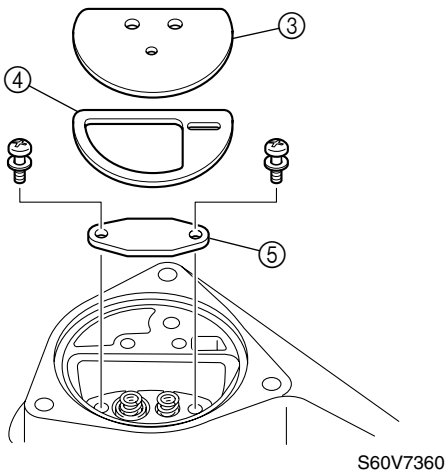
No.	Part name	Q'ty	Remarks
1	Yoke	1	
2	Bolt	2	M5 × 12 mm
3	Wave washer	1	
4	Washer	1	
5	Bearing	2	
6	Armature	1	
7	Brush	4	
8	Spring	4	
9	Screw	2	ø4 × 12 mm
10	Brush holder	1	
11	Nut	2	
12	O-ring	1	Not reusable
13	Screw	2	ø4 × 6 mm
14	PTT motor base	1	
15	Oil seal	1	Not reusable
16	PTT motor lead	1	

Disassembling the relief valve

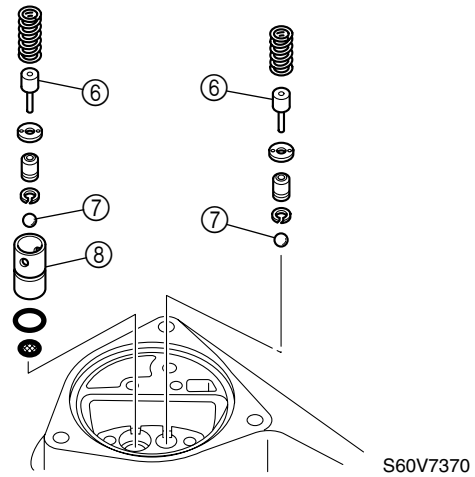
1. Remove the trim down spring ① and valve seal ②.



2. Remove the trim down plate ③ and seal ④, then the relief valve plate ⑤.

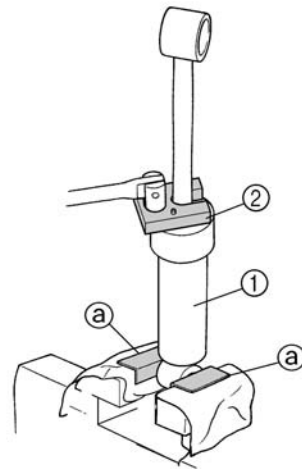


3. Remove the pins ⑥, balls ⑦, and relief valve ⑧.



Disassembling the tilt cylinder and trim cylinders

1. Hold the tilt cylinder ① in a vise using aluminum plates ② on both sides.
2. Loosen the tilt cylinder end screw ③, and then remove the tilt piston assembly.



⚠ WARNING

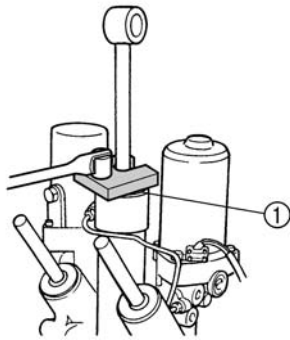
Make sure that the rams are fully extended before removing the end screw.



Trim and tilt cylinder wrench:
YB-06175-2B

3. Drain the power trim and tilt fluid.
4. Blow compressed air through the hole ④ to remove the free piston ⑤.

3. Install the tilt piston assembly into the tilt cylinder, and then tighten the tilt cylinder end screw ① to the specified torque.




S69J7495


⚠ WARNING

To prevent the power trim and tilt fluid from spurting out due to internal pressure, the tilt ram should be kept at full length.

NOTE:

Place the tilt cylinder end screw at the bottom of the tilt ram and install the tilt piston assembly into the tilt cylinder.

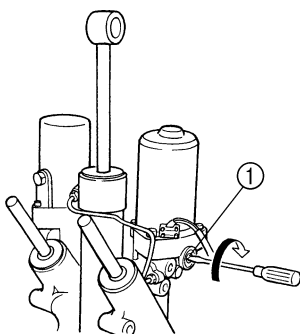
 Trim and tilt cylinder wrench:
YB-06175-2B

 Tilt cylinder end screw:
90 N·m (9.0 kgf·m, 66.4 ft·lb)

Bleeding the power trim and tilt unit

Not installed

1. Tighten the manual valve ① by turning it clockwise.




S69J7500

2. Place the power trim and tilt unit in an upright position.
3. Check the fluid level in the reservoir.

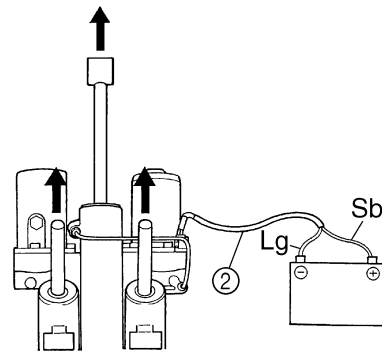
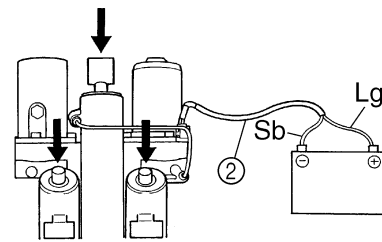
NOTE:

The fluid level should be at the brim of the filler hole.

4. If necessary, add sufficient fluid of the recommended type to the correct level.

 Recommended power trim and tilt fluid:
ATF Dexron II

5. Install the reservoir cap.
6. Connect the PTT motor leads ② to the battery terminals.



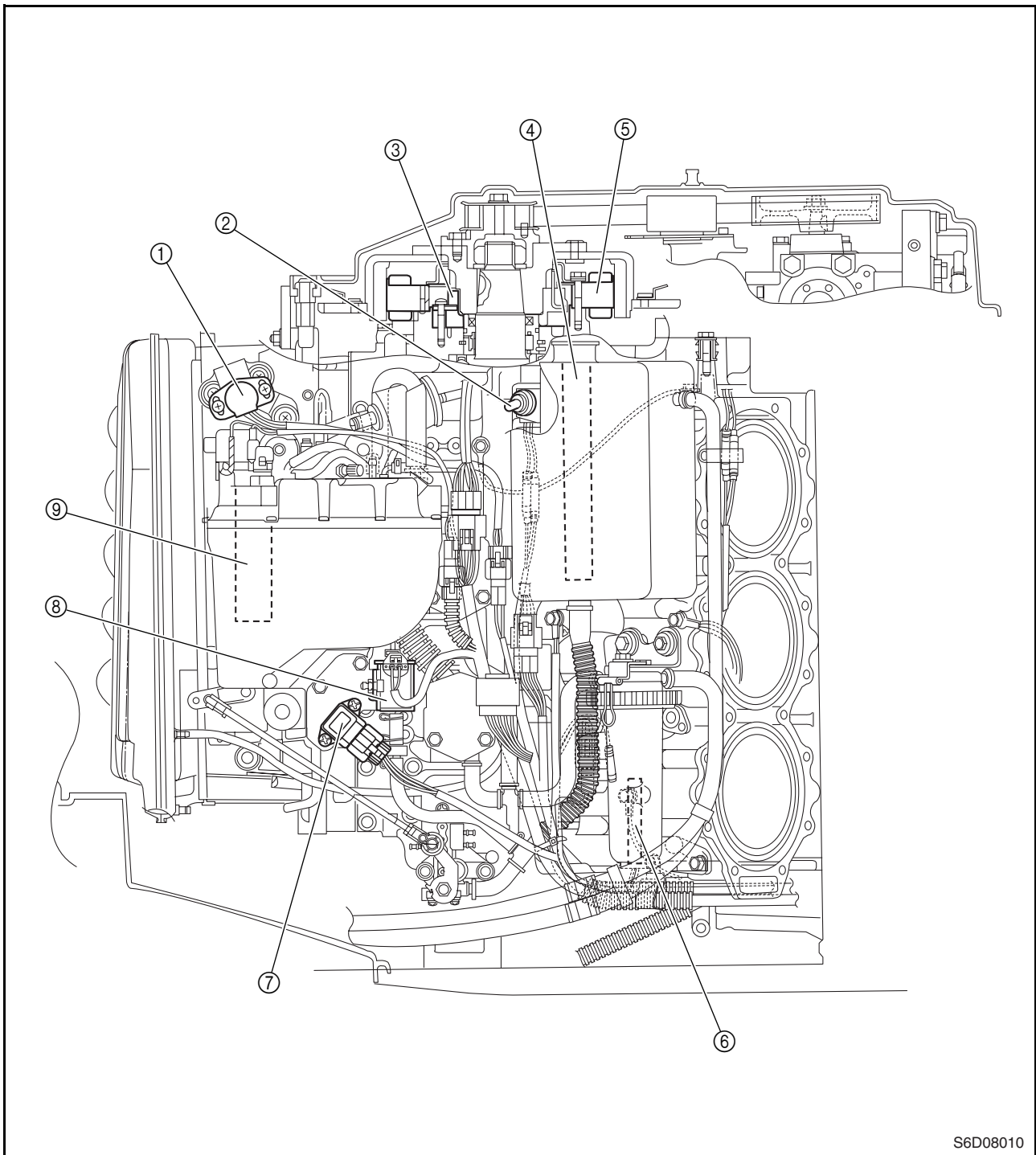
S69J7505

Ram	PTT motor lead	Battery terminal
Up	Sky blue (Sb)	⊕
	Light green (Lg)	⊖
Down	Light green (Lg)	⊕
	Sky blue (Sb)	⊖



Electrical components

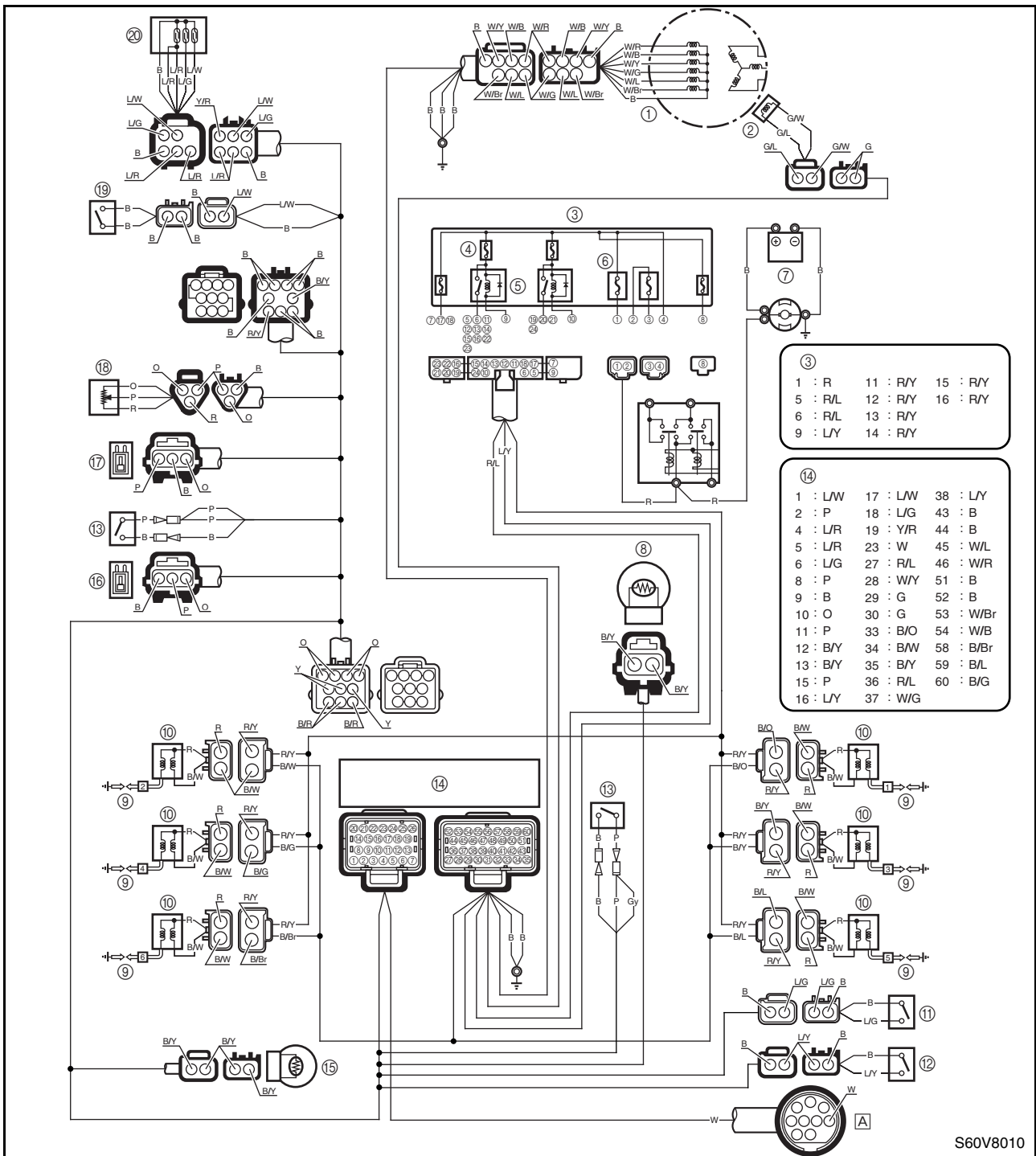
Port view



S6D08010

- ① Throttle position sensor
- ② Emergency switch
- ③ Pulser coil
- ④ Oil level sensor
- ⑤ Stator coil
- ⑥ Water detection switch
- ⑦ Atmospheric pressure sensor
- ⑧ Electric oil pump

- ⑨ Electric fuel pump



S60V8010

B : Black
 G : Green
 O : Orange
 P : Pink
 R : Red
 W : White
 Y : Yellow
 B/Br : Black/brown
 B/G : Black/green
 B/L : Black/blue

B/O : Black/orange
 B/R : Black/red
 B/W : Black/white
 B/Y : Black/yellow
 G/L : Green/blue
 G/W : Green/white
 L/G : Blue/green
 L/R : Blue/red
 L/W : Blue/white
 L/Y : Blue/yellow

R/L : Red/blue
 R/Y : Red/yellow
 W/B : White/black
 W/Br : White/brown
 W/G : White/green
 W/L : White/blue
 W/R : White/red
 W/Y : White/yellow
 Y/R : Yellow/red



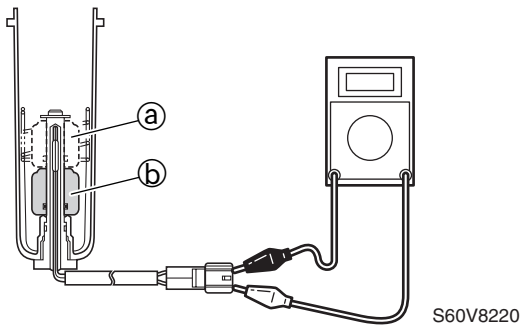
- Start the engine and warm it up for 5 minutes, and then measure the fuel pressure sensor output voltage. If out of specification, check the high-pressure fuel line and the mechanical fuel pump or replace the fuel pressure sensor.



Fuel pressure sensor output voltage (use as reference):
 Orange (O) – Pink (P)
 3.2 V at 670–730 r/min

Checking the water detection switch

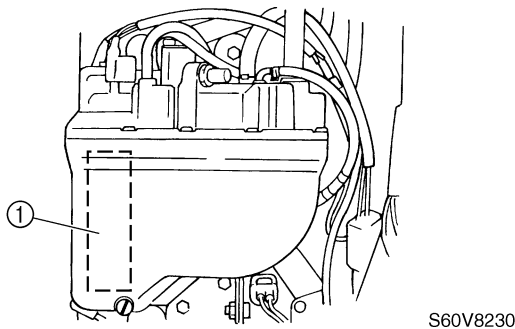
- Check the water detection switch for continuity. Replace if there is no continuity.



Float position	Lead color	
	Black (B)	Black (B)
On (a)	○	○
Off (b)		

Checking the electric fuel pump

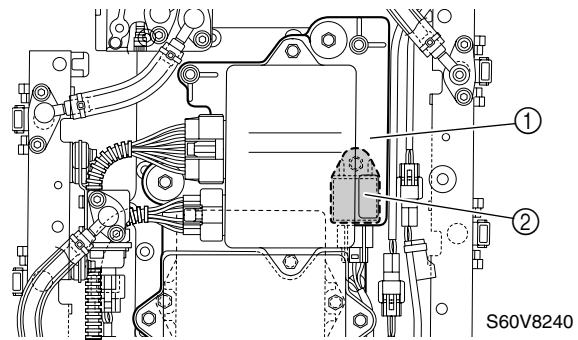
- Turn the engine start switch to ON.
- Listen for the operating sound of the electric fuel pump (1).



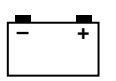
NOTE:
 After the engine start switch is turned to ON, the electric fuel pump will operate for 5 seconds.

Checking the electric fuel pump relay

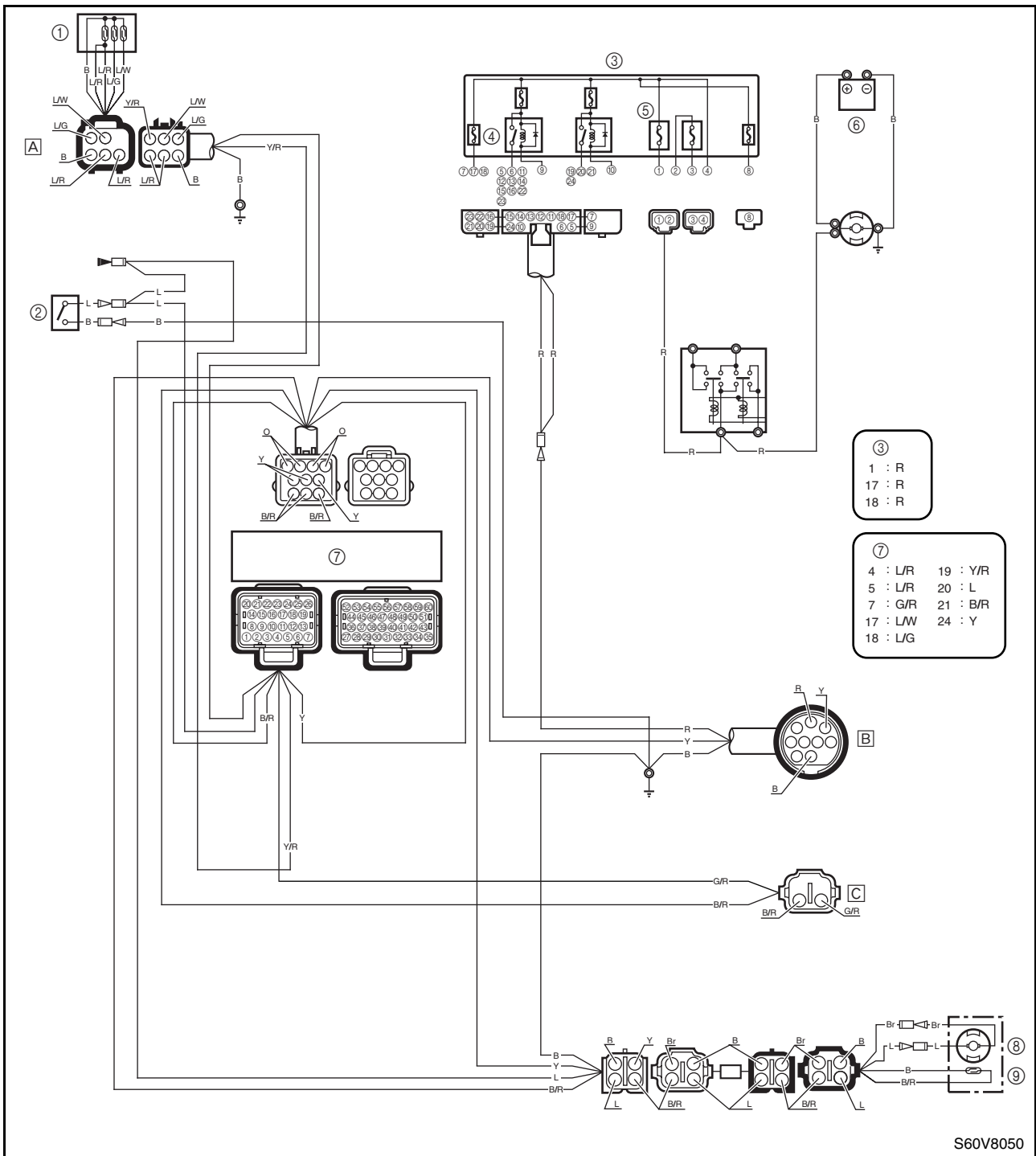
- Remove the ignition coil cover.
- Remove the bracket (1), then the electric fuel pump relay (2).



- Connect the digital circuit tester leads to electric fuel pump relay terminals (3) and (4).
- Connect the positive battery terminal to the electric fuel pump relay terminal (5).
- Connect the negative battery terminal to the electric fuel pump relay terminal (6).
- Check for continuity between the electric fuel pump relay terminals. Replace if there is no continuity.
- Check that there is no continuity between the relay terminals after disconnecting a battery terminal from electric fuel pump relay terminal (5) or (6). Replace if there is continuity.



Oil feed pump control system



S60V8050

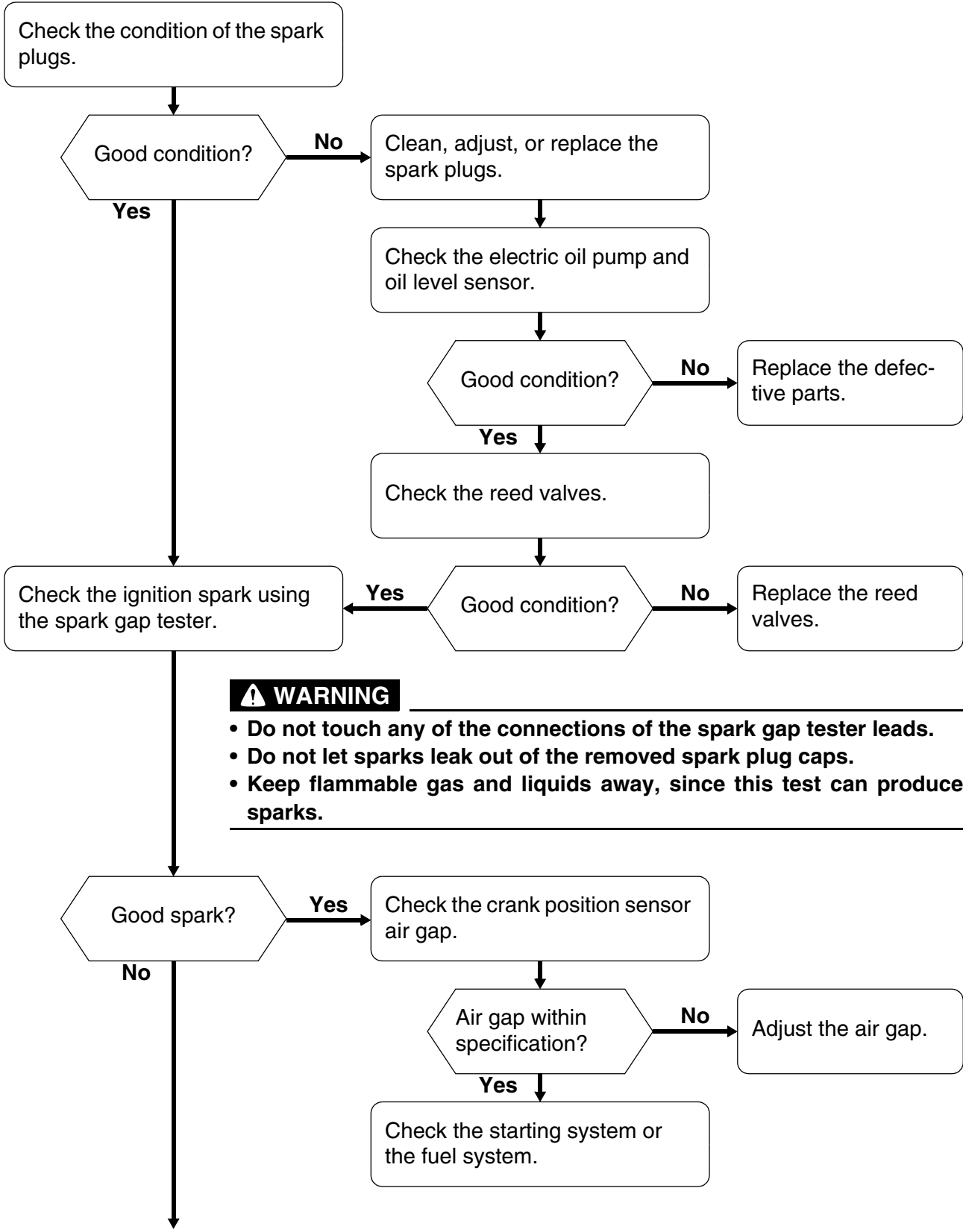
- ① Oil level sensor
- ② Emergency switch
- ③ Fuse holder
- ④ Fuse (20 A)
- ⑤ Fuse (100 A)
- ⑥ Battery
- ⑦ ECM
- ⑧ Oil pump (remote oil tank)

- ⑨ Oil level sensor (remote oil tank)
- Ⓐ To diagnostic indicator (special service tool)
- Ⓑ To remote control box/switch panel
- Ⓒ To oil level warning indicator

- B : Black
- Br : Brown
- L : Blue
- R : Red
- Y : Yellow
- B/R : Black/red
- G/R : Green/red
- L/G : Blue/green
- L/R : Blue/red

- L/W : Blue/white
- R/Y : Red/yellow
- W/B : White/black
- W/R : White/red
- Y/R : Yellow/red

Ignition system

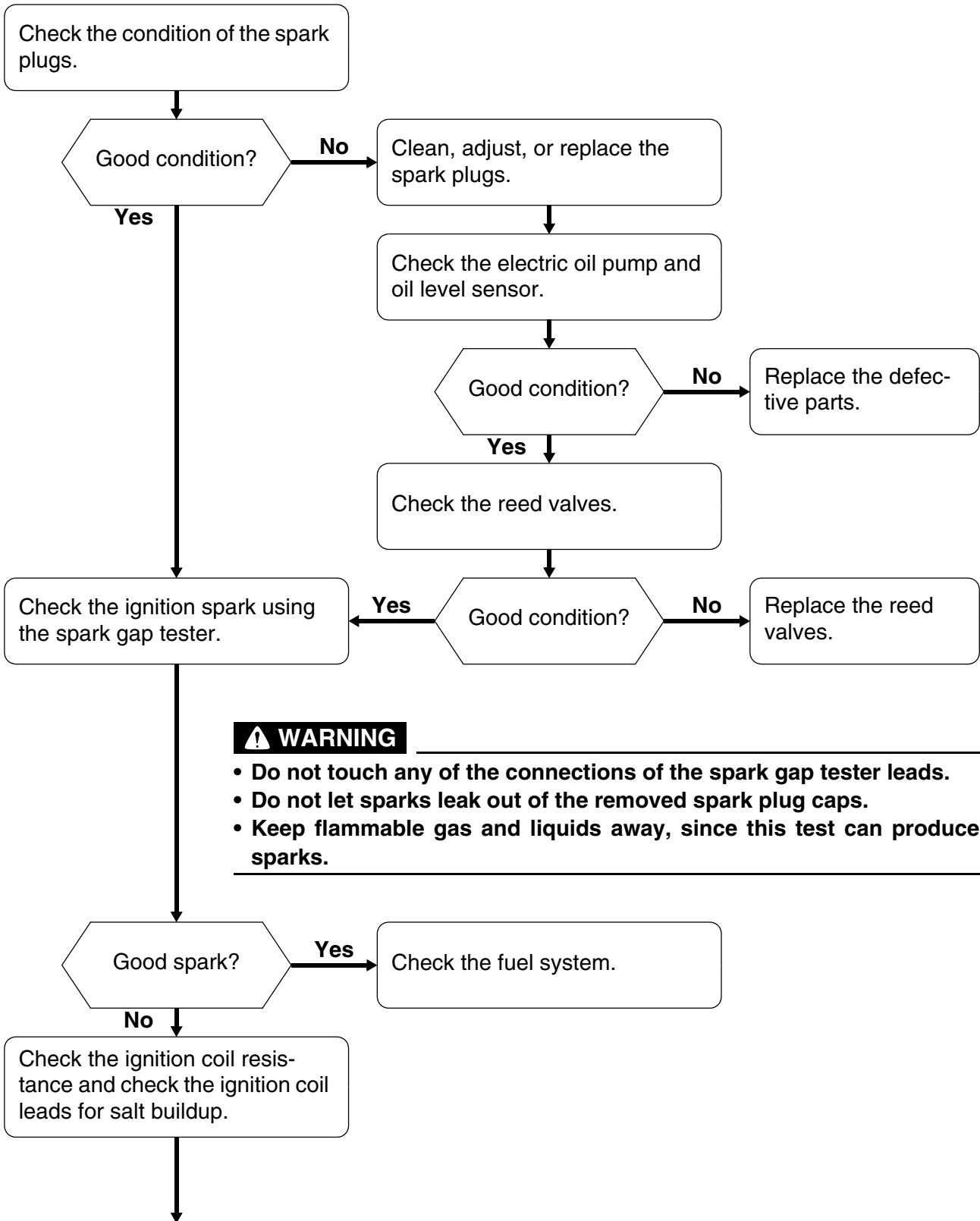


⚠ WARNING

- Do not touch any of the connections of the spark gap tester leads.
- Do not let sparks leak out of the removed spark plug caps.
- Keep flammable gas and liquids away, since this test can produce sparks.

Continued on next page.

Ignition system



⚠ WARNING

- Do not touch any of the connections of the spark gap tester leads.
- Do not let sparks leak out of the removed spark plug caps.
- Keep flammable gas and liquids away, since this test can produce sparks.

Continued on next page.

Index

R.

- Reducing the fuel pressure
(medium-pressure fuel line) 4-22
- Removing the clamp brackets 7-18
- Removing the crankcase 5-36
- Removing the cylinder head 5-25
- Removing the drive belt and sprockets 5-15
- Removing the drive shaft 6-16, 6-43
- Removing the electric fuel pump filter 4-23
- Removing the exhaust cover 5-28
- Removing the flywheel magnet 5-19
- Removing the intake manifold 5-22
- Removing the lower unit 6-7, 6-32
- Removing the medium-pressure fuel
hose clamps 4-23
- Removing the piston and connecting rod
assemblies and crankshaft assembly 5-37
- Removing the power trim and tilt unit 7-17
- Removing the power unit 5-17
- Removing the propeller shaft
housing assembly 6-11, 6-36
- Removing the starter motor 5-20
- Removing the starter motor pinion 8-29
- Removing the stator coil and pulser coil ... 5-20
- Removing the steering arm 7-15
- Removing the throttle body assembly 4-22
- Removing the water pump and
shift rod 6-7, 6-32
- Replacing the drive belt 3-6

S.

- Safety while working 1-3
- Selecting the forward gear shims 6-25, 6-54
- Selecting the pinion shims 6-24, 6-52
- Selecting the propeller shaft shims 6-55
- Selecting the reverse gear shims 6-26, 6-53
- Selection 1-6
- Self-diagnosis 9-22
- Self-protection 1-3
- Serial number 1-5
- Shimming 6-24, 6-52
- Shimming (counter rotation model) 6-51
- Shimming (regular rotation model) 6-23
- Special service
tools 3-1, 4-1, 5-1, 6-1, 7-1, 8-1, 9-1
- Specified torques 2-10
- Starboard view 8-4
- Starter motor 8-27
- Starting system 8-25
- Symbols 1-2
- Synchronizing the throttle valves 4-24

T.

- Test run 1-10
- Throttle body assembly and
vapor separator 4-12
- Tightening torques 2-10
- Top cowling 3-4
- Top view 8-7

U.

- Upper case, steering arm, swivel bracket,
and clamp brackets 7-6

V.

- Ventilation 1-3

W.

- Wiring harness 8-8

Y.

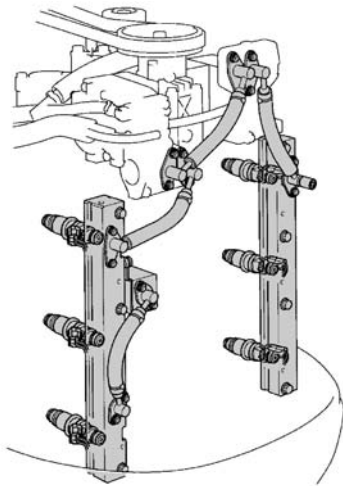
- Yamaha Diagnostic System 9-2

Specifications

General specifications	12
Maintenance specifications	14
Power unit.....	14
Lower unit	15
Electrical	16
Dimensions.....	19
Tightening torques	21
Specified torques	21
General torques.....	23

Periodic checks and adjustments

Special service tools	24
Maintenance interval chart	27
Power unit	29
Checking the cooling water passage	29
Power trim and tilt unit	29
Checking the power trim and tilt fluid level	29
Lower unit	30
Checking the gear oil level	30
Changing the gear oil	30
General	31
Checking the anodes	31
Lubricating the outboard motor.....	32



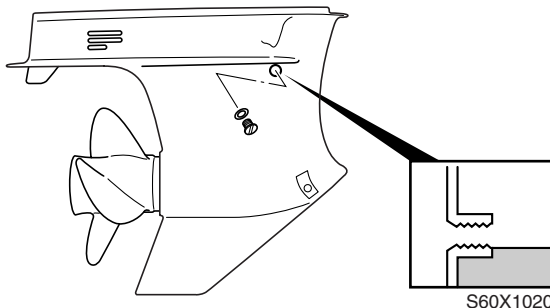
S60V1020

CAUTION:

- Use unleaded straight gasoline only.
- Do not use gasoline mixed with oil (pre-mixed fuel).

Checking the gear oil level

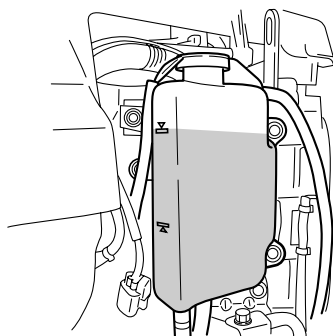
1. Check the gear oil level.



S60X1020

Checking the engine oil level

1. Check that the engine oil level is between the maximum and minimum level marks.



S60V3260

	Recommended engine oil: YAMALUBE 2-stroke outboard motor oil
--	---

Checking the battery

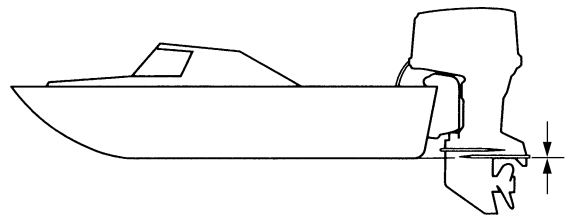
1. Check the capacity, electrolyte level, and specified gravity of the battery.

	Recommended battery capacity: CCA/SAE: 512 A MCA/ABYC: 675 A RC/SAE: 182 Minute Electrolyte specified gravity: 1.280 at 20 °C (68 °F)
--	--

2. Check that the positive and negative battery leads are securely connected.

Checking the outboard motor mounting height

1. Check that the anti-cavitation plate is aligned with the bottom of the boat. If the mounting height is too high, cavitation will occur and propulsion will be reduced. Also, the engine speed will increase abnormally and cause the engine to overheat. If the mounting height is too low, water resistance will increase and reduce engine efficiency.



S69J1160

NOTE:

The optimum mounting height is affected by the combination of the boat and the outboard motor. To determine the optimum mounting height, test run the outboard motor at different heights.

Maintenance specifications

Item	Unit	Model	
		VZ225TR	VZ250TR
Charging system			
Fuse	A	20, 30, 100	
Stator coil output peak voltage (G – G)			
at cranking (unloaded)	V	5.5	
at 1,500 r/min (unloaded)	V	40	
at 3,500 r/min (unloaded)	V	90	
Stator coil resistance ^(*1)			
at 20 °C (68 °F) (G – G)	Ω	0.11–0.17	
Rectifier Regulator output peak voltage ^(*1) (R – ground)			
at 1,500 r/min (unloaded)	V	14.5	
at 3,500 r/min (unloaded)	V	14.5	
Power trim and tilt system			
Trim sensor			
Setting resistance (P – B)	Ω	9–11	
Resistance (P – B)	Ω	9–378.8	
Fluid type		ATF Dexron II	

(*1) The figures are for reference only.

NOTE:

(*1) Be sure to change the high-pressure fuel pump oil every 1,000 hours of operation or every 5 years.

(*2) Be sure to replace the drive belt every 1,000 hours of operation or every 5 years.

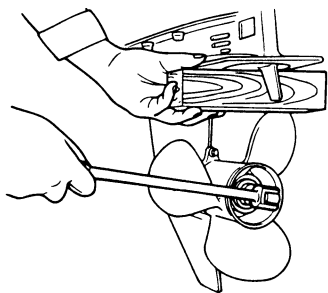
(*3) The engine should be flushed with fresh water after operating in salt, turbid, or muddy water.

CAUTION:

If the flywheel magnet cover is removed to service the outboard motor, be sure to check that the fuel hoses are routed correctly before installing it.

Removing the lower unit

1. Remove the cooling water inlet covers.
2. Drain the gear oil.
3. Set the gear shift to the neutral position, and place a block of wood between the anti-cavitation plate and propeller to keep the propeller from turning, and then remove the propeller nut and propeller.

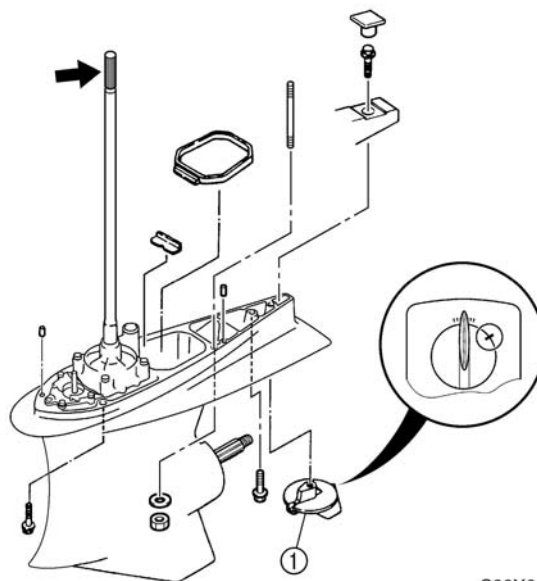


S69J6015

⚠ WARNING

- Do not hold the propeller with your hands when loosening or tightening it.
- Be sure to disconnect the battery leads from the battery and the clip from the engine stop lanyard switch.
- Put a block of wood between the anti-cavitation plate and propeller to keep the propeller from turning.

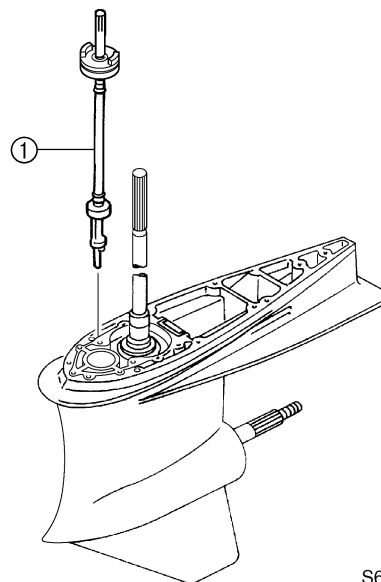
4. Mark the trim tab ① at the area shown, and then remove it.
5. Loosen the bolts and nuts, and then remove the lower unit from the upper case.



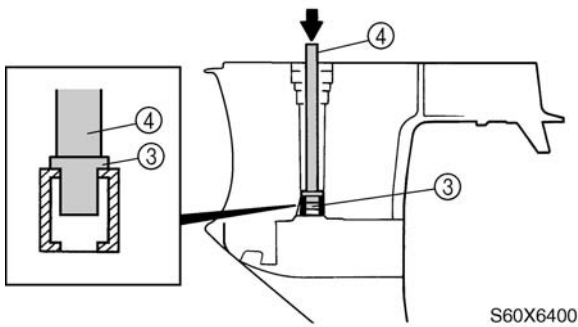
S60X6030

Removing the water pump and shift rod

1. Remove the water pump assembly and shift rod assembly ①.

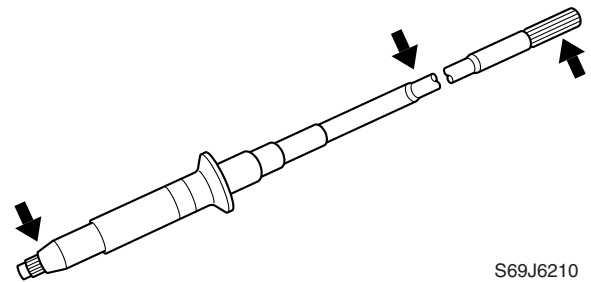


S60X6040



S60X6400

	Roller bearing installer/remover (3): YB-06432
	Driver handle (4): YB-06071



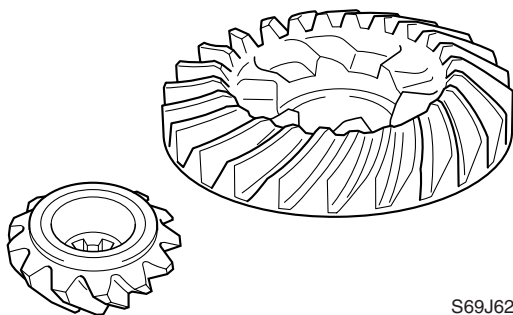
S69J6210

Checking the lower case

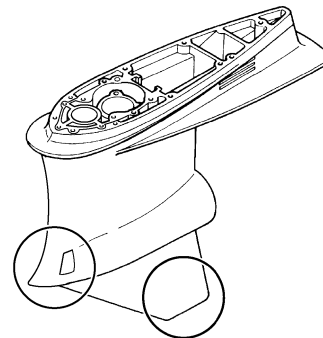
1. Check the skag and torpedo for cracks or damage. Replace the lower case if necessary.

Checking the pinion and forward gear

1. Check the teeth of the pinion, and the teeth and dogs of the forward gear for cracks or wear. Replace if necessary.



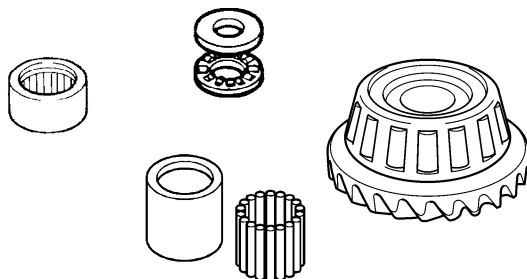
S69J6200



S60X6110

Checking the bearings

1. Check the bearings for pitting or rumbling. Replace if necessary.



S69J6205

Checking the drive shaft

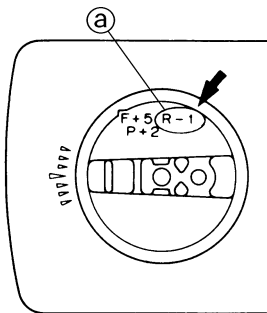
1. Check the drive shaft for bends or wear. Replace if necessary.

Calculation formula:
 Forward gear shim thickness (T1) =
 $M - M0$

Available shim thicknesses:
 0.10, 0.12, 0.15, 0.18, 0.30, 0.40, and
 0.50 mm

Selecting the reverse gear shims

1. Calculate the specified value (M0) as shown in the following example.




S69J6585

NOTE: _____
 “R” is the deviation of the lower case dimension from standard. The “R” mark (a) is stamped on the trim tab mounting surface of the lower case in 0.01 mm units. If the “R” mark is unreadable, assume that “R” is zero and check the backlash when the unit is assembled.

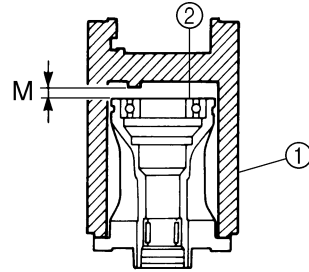
Calculation formula:
 Specified value (M0) = $0.00 + R/100$ mm

Example:
 If “R” is (+5), then
 $M0 = 0.00 + (+5)/100 \text{ mm} = 0.00 + 0.05 \text{ mm} = 0.05 \text{ mm}$
 If “R” is (–3), then
 $M0 = 0.00 + (-3)/100 \text{ mm} = 0.00 - 0.03 \text{ mm} = -0.03 \text{ mm}$

2. Set the special service tool on the ball bearing.

 Shimming gauge ①: YB-06439-2

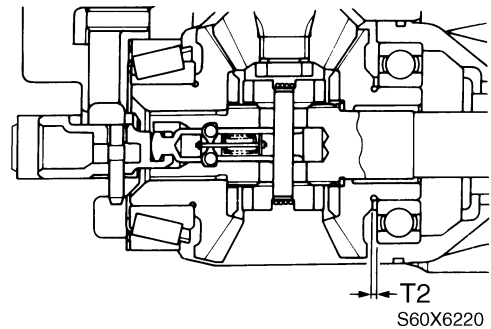
3. Measure the clearance (M) between the special service tool and the ball bearing ② as shown.



S69J6590

NOTE: _____
 Measure the ball bearing at three points to find the clearance average.

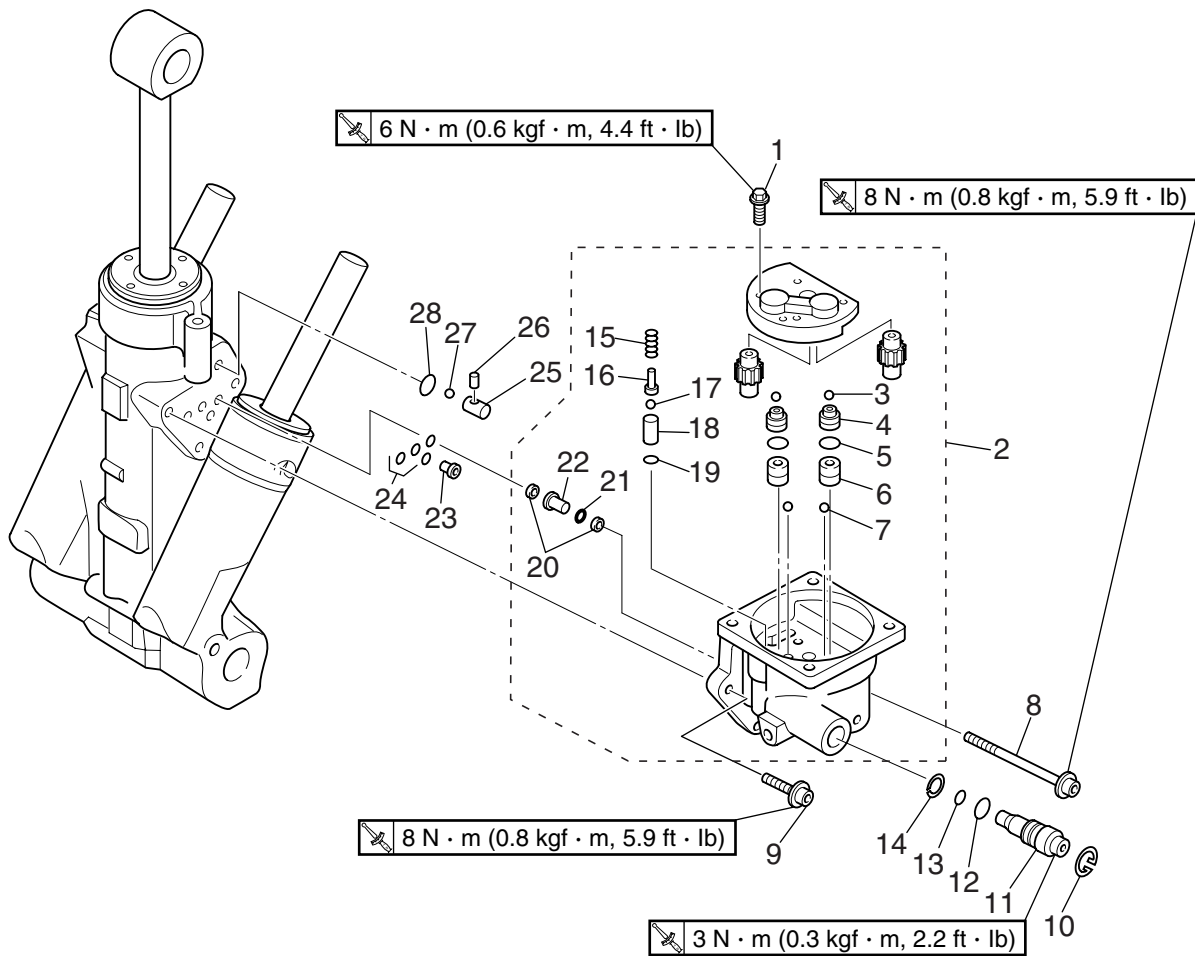
4. Select the reverse gear shim(s) (T2).



S60X6220

Calculation formula:
 Reverse gear shim thickness (T2) =
 $M + M0$

Available shim thicknesses:
 0.10, 0.12, 0.15, 0.18, 0.30, 0.40, and
 0.50 mm

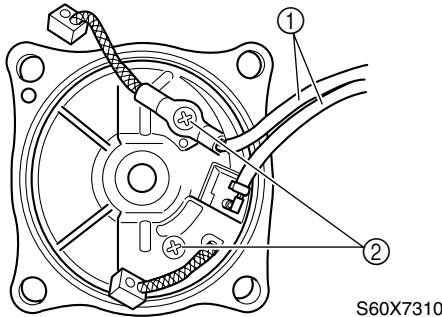


S60X7200

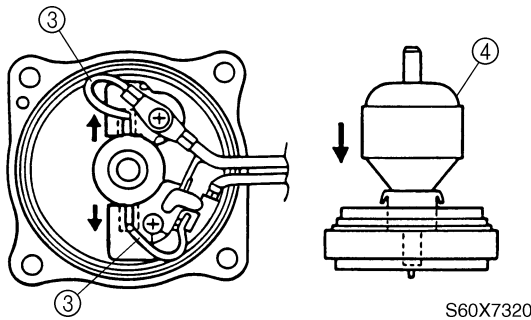
No.	Part name	Q'ty	Remarks
1	Bolt	2	M5 × 16 mm
2	Gear pump assembly	1	
3	Ball	2	
4	Shuttle piston	2	
5	O-ring	2	Not reusable
6	Main valve	2	
7	Ball	2	
8	Bolt	1	M8 × 85 mm
9	Bolt	2	M8 × 24 mm
10	Circlip	1	
11	Manual valve	1	
12	O-ring	1	Not reusable
13	O-ring	1	Not reusable
14	Backup ring	1	
15	Spring	1	
16	Absorber valve pin	1	
17	Ball	1	

Assembling the power trim and tilt motor

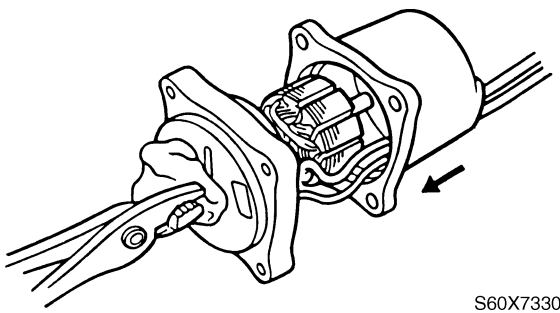
1. Connect the PTT motor leads ①, and then tighten the screws ②.



2. Push the brushes ③ into the brush holder, and then install the armature ④.



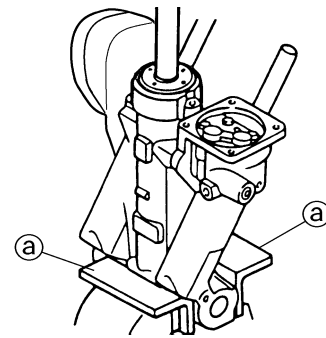
3. Install the stator onto the base.



NOTE: _____
Place a clean cloth over the end of the armature shaft, hold it with a pair of pliers, and then carefully slide the stator over the armature.

Removing the reservoir

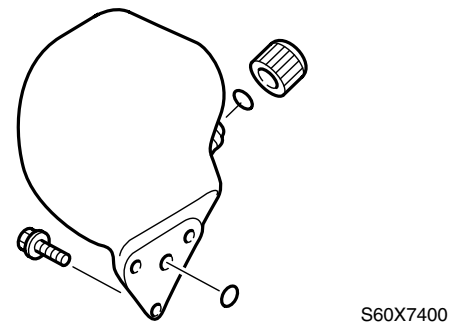
1. Hold the power trim and tilt unit in a vise using aluminum plates ① on both sides.



CAUTION: _____
Do not use rags or paper to clean the hydraulic system components. Small pieces of fibers remaining on them can cause the system to malfunction.

NOTE: _____
Place a container under the power trim and tilt unit to catch the fluid.

2. Remove the reservoir and O-rings.




CAUTION: _____

- Make sure that the trim and tilt rams are fully extended when removing the reservoir, otherwise fluid can spurt out from the unit due to internal pressure.
- Do not push the tilt and trim rams down while the power trim and tilt motor is removed from the power trim and tilt unit, otherwise fluid can spurt out.


3. Drain the fluid from the reservoir and check it for damage. Replace if necessary.

NOTE:
 If the fluid is at the correct level, the fluid should overflow out of the filler hole when the reservoir cap is removed.

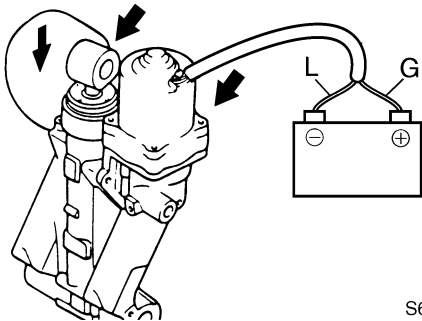
- If necessary, add sufficient fluid of the recommended type until it overflows out of the filler hole.

	Recommended power trim and tilt fluid: ATF Dexron II
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- Install the reservoir cap, and then tighten it to the specified torque.

	Reservoir cap: 0.7 N·m (0.07 kgf·m, 0.5 ft·lb)
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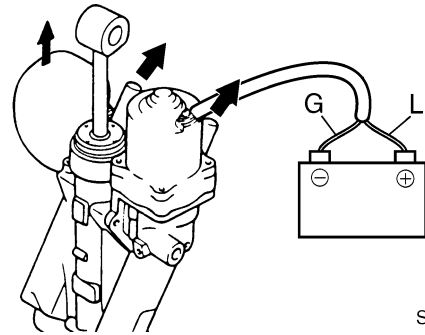
- Connect the PTT motor leads to the battery terminals to fully retract the trim and tilt rams.



S60X7800

Rams	PTT motor lead	Battery terminal
Down	Green (G)	⊕
	Blue (L)	⊖

- Reverse the PTT motor leads between the battery terminals to fully extend the trim and tilt rams.



S60X7810

Rams	PTT motor lead	Battery terminal
Up	Blue (L)	⊕
	Green (G)	⊖

- NOTE:**
- Repeat this procedure so that the rams go up and down four or five times (be sure to wait a few seconds before switching the leads).
 - If the rams do not move up and down easily, push and pull on the rams to assist operation.

- Check the fluid level when the tilt ram is fully extended. Add sufficient fluid if necessary.

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