HOW TO USE THIS MANUAL

TO LOCATE WHAT YOU ARE LOOKING FOR:

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2. The section titles are listed on the previous page in a GROUP INDEX. Select the section needed for reference.
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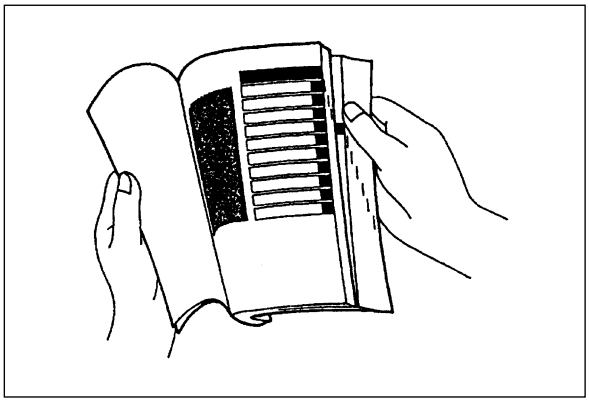
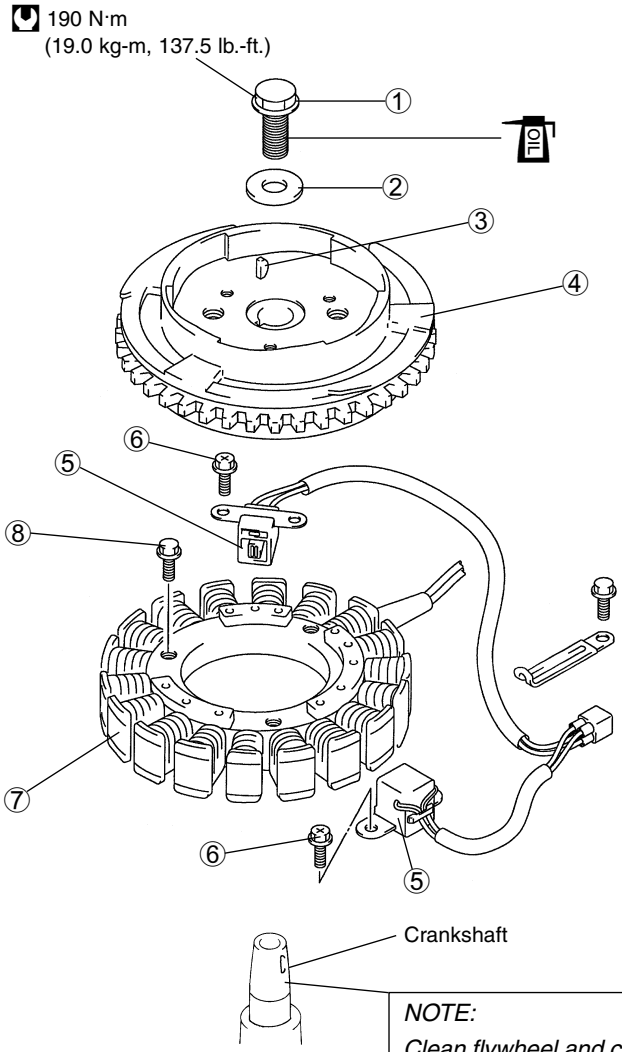


COMPONENT PARTS AND IMPORTANT ITEM ILLUSTRATIONS

Under the name of each system or unit, an exploded view is provided with work instructions and other service information such as the tightening torque, lubrication and locking agent points.

Example :

① **Flywheel bolt**
② **Washer**
③ **Key**
④ **Flywheel**
⑤ **CKP sensor**
⑥ **Screw**
⑦ **Battery charge & Power source coil**
⑧ **Bolt**



NOTE:
Clean flywheel and crankshaft mating surfaces with cleaning solvent.

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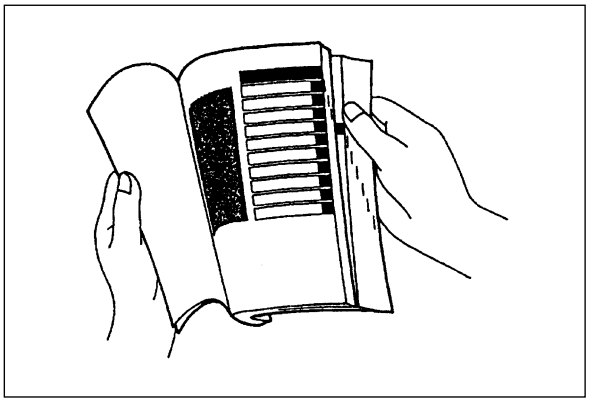

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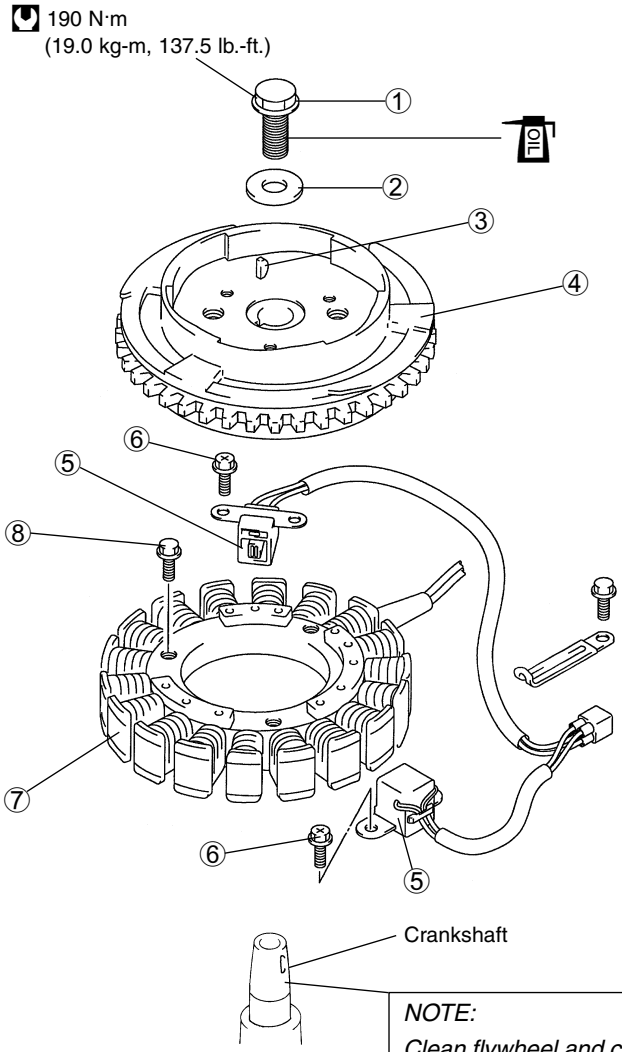

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Item	Unit	Data			
		DF25Q/25QE	DF25QR/25T	DF30Q/30QE	DF30QR/30T

ELECTRICAL

Ignition timing		Degrees at r/min	BTDC 5° – 31°	BTDC 5° – 29°
Over revolution limiter		r/min	6300	6500
CKP sensor resistance		Ω at 20°C	148 – 222 [R – B, W/B – R/W]	
Power source coil resistance		Ω at 20°C	10.1 – 15.1 [Br – G, W – G]	
Ignition coil resistance	Primary	Ω at 20°C	0.17 – 0.23	
	Secondary	kΩ at 20°C	3.3 – 5.0	
Spark plug cap resistance		kΩ at 20°C	4 – 6	
Battery charge coil resistance		Ω at 20°C	Manual start model : 0.20 – 0.30 [R – Y] Electric start model : 0.27 – 0.40 [R – Y]	
Battery charge coil output (12V)		Watt	Manual start model : 80 Electric start model : 180	
Standard spark plug	Type	NGK	DCPR6E	
	Gap	mm (in)	0.8 – 0.9 (0.031 – 0.035)	
Fuse amp. rating		A	25 (Applicable model)	
Recommended battery capacity (12V)		Ah (kC)	40 (144) or larger	
Cylinder temp. sensor resistance (Thermistor characteristic)		kΩ at 25°C	1.8 – 2.3	
Choke solenoid coil resistance		Ω at 20°C	3.8 – 4.2 (Applicable model)	
Starter motor relay coil resistance		Ω at 20°C	3.5 – 5.1 (Applicable model)	
PTT motor relay coil resistance		Ω at 20°C	3.0 – 4.5 (Applicable model)	

STARTER MOTOR (Applicable model)

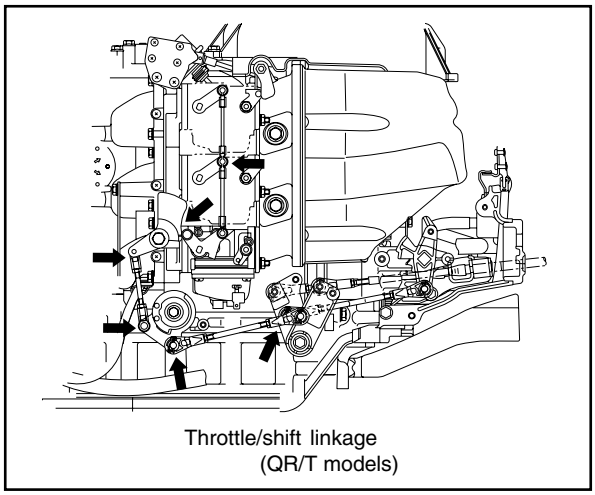
Max. continuous time of use		Sec	30
Motor output		kW	0.6
Brush length	STD	mm (in)	12.5 (0.49)
	Limit	mm (in)	9.0 (0.35)
Commutator undercut	STD	mm (in)	0.5 – 0.8 (0.02 – 0.03)
	Limit	mm (in)	0.2 (0.01)
Commutator outside diameter	STD	mm (in)	30.0 (1.18)
	Limit	mm (in)	29.0 (1.14)
Commutator outside diameter difference	STD	mm (in)	0.05 (0.002)
	Limit	mm (in)	0.40 (0.016)
Pinion to ring gear gap	STD	mm (in)	3.0 – 5.0 (0.12 – 0.20)

LUBRICATION

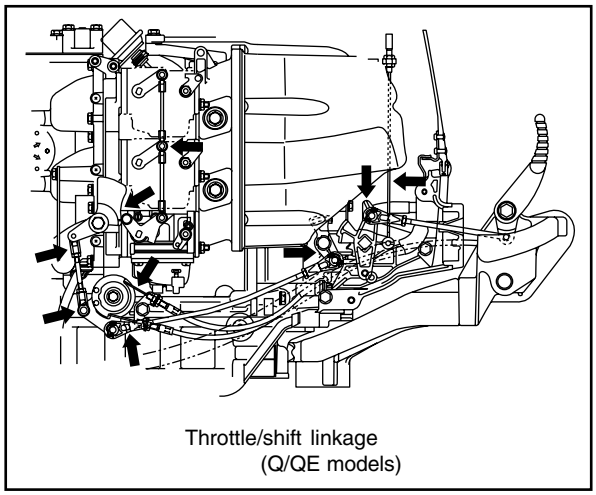
Inspect every 50 hours (3 months).

Apply Suzuki Water Resistant Grease to the following points.

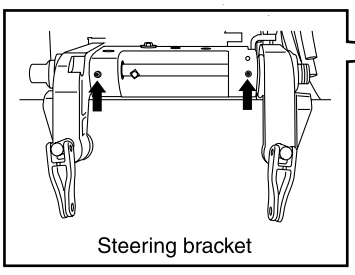
W/R G's 99000-25160 : Water Resistant Grease



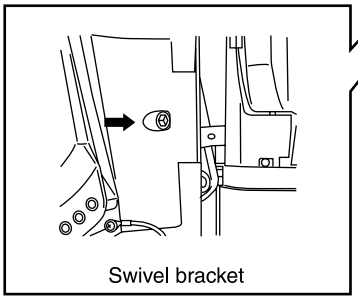
Throttle/shift linkage (QR/T models)



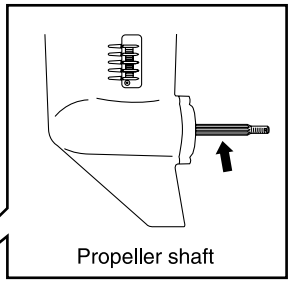
Throttle/shift linkage (Q/QE models)



Steering bracket



Swivel bracket

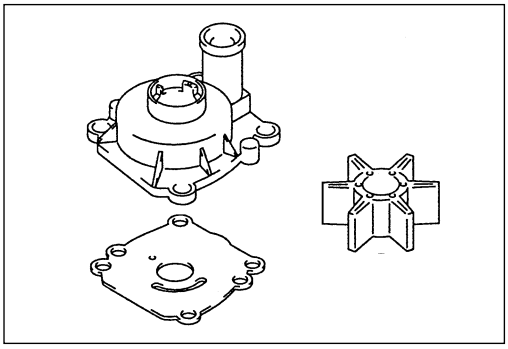


Propeller shaft

WATER PUMP / WATER PUMP IMPELLER

WATER PUMP
Inspect every 200 hours (12 months).

Inspect case and under panel.
Replace If wear, cracks, distortion or corrosion is found.



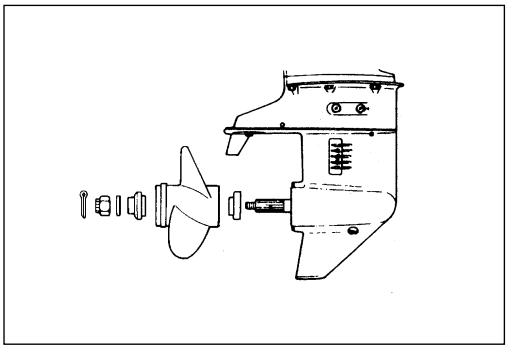
WATER PUMP IMPELLER
Replace every 200 hours (12 months).

Inspect water pump impeller.
Replace if vanes are cut, torn or worn.

PROPELLER / NUT / COTTER PIN

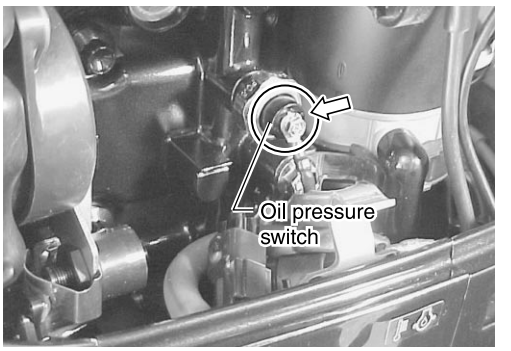
Inspect initially after 20 hours (1 month) and every 100 hours (6 months) thereafter.

- Inspect the propeller for bent ,chipped or broken blades. Replace propeller if damage noticeably affects operation.
- Inspect propeller splines. Replace propeller if splines are worn or damaged.
- Inspect propeller bush for slippage. Replace if necessary.
- Make sure the propeller nut is torqued to specification and cotter pin is installed securely.



TESTING OIL PRESSURE CAUTION SYSTEM

To check the oil pressure caution circuit, follow the procedure below.

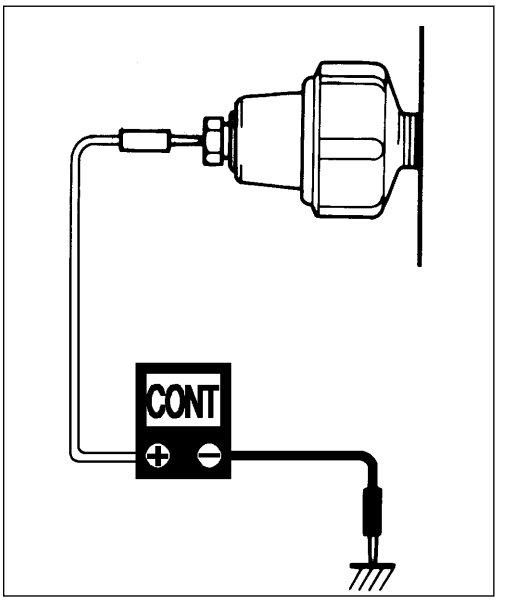


NOTE:
Before checking the oil pressure caution circuit, make sure the engine oil pressure is within specification.

OIL PRESSURE SWITCH

1. Remove the blue/yellow lead wire from the oil pressure switch.
2. Check the continuity between the switch terminal and the engine body ground.

09930-99320 : Digital circuit tester
Tester range : continuity



During engine running	Infinity
At engine stop	Continuity

If measurement exceeds specification, replace oil pressure switch.

OIL LAMP CIRCUIT

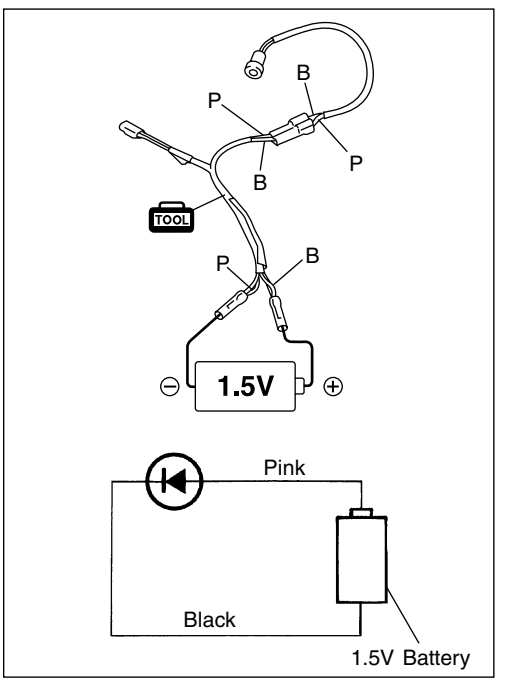
1. Remove the blue/yellow lead wire from the oil pressure switch.
2. Start the engine.
3. Touch the blue/yellow lead wire to the engine body ground. If the caution lamp comes on, the oil pressure switch circuit and the oil pressure caution lamp are normal.

CAUTION LAMP

Check for illumination of the caution lamp.

09930-89210 : 2 pin connector test cord

1. Disconnect lamp lead wires from engine harness.
2. Connect the test cord as shown.
3. For tests using 1.5V power source (or battery), connect the lamp lead wire to the 1.5V power source (or battery) as shown below.



CAUTION

Do not use Battery larger than 2V.

Pink lead wire → Battery (+)
Black lead wire → Battery (–)

When 1.5 V applied → Lamp ON

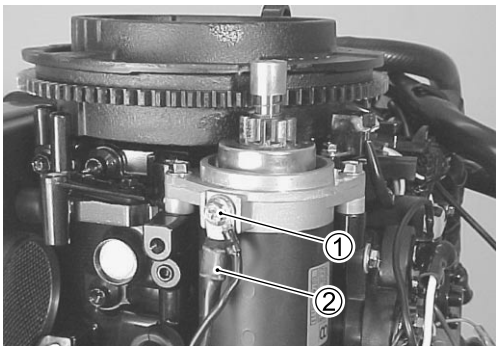
If out of specification, replace the caution lamp.

STARTER MOTOR

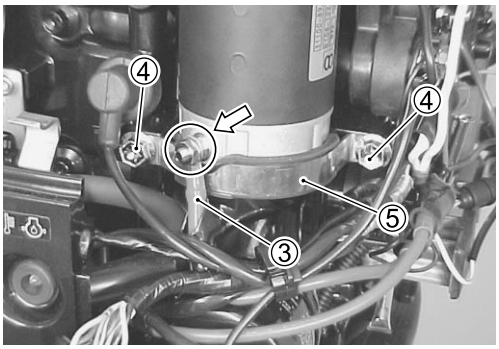
REMOVAL

Prior to removing starter motor :
- **Disconnect battery cables from battery.**

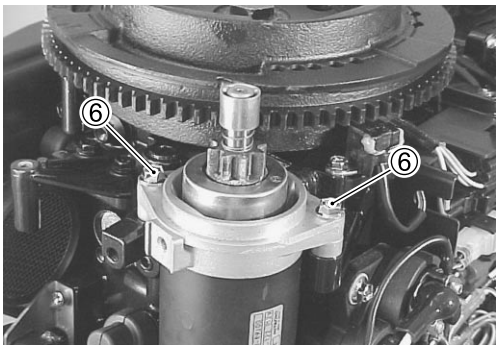
1. Remove three bolts and flywheel cover.
2. Remove bolt ① and negative ⊖ battery cable ②.

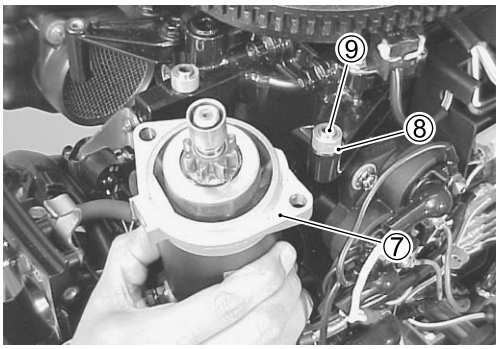


3. Remove starter motor sub cable ③.
4. Remove two bolts ④ and starter motor band ⑤.



5. Remove two bolts ⑥ , starter motor ⑦ , spacers ⑧ and dowel pins ⑨.



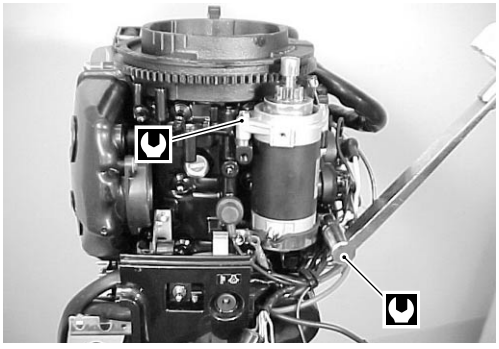


INSTALLATION

Installation is reverse order of removal with special attention to the following steps.
- Install starter motor and tighten starter motor mounting bolts securely.

Starter motor mounting bolt :

6 mm	**11 N · m (1.1 kg-m, 8.0 lb.-ft.)**
8 mm	**23 N · m (2.3 kg-m, 16.5 lb.-ft.)**

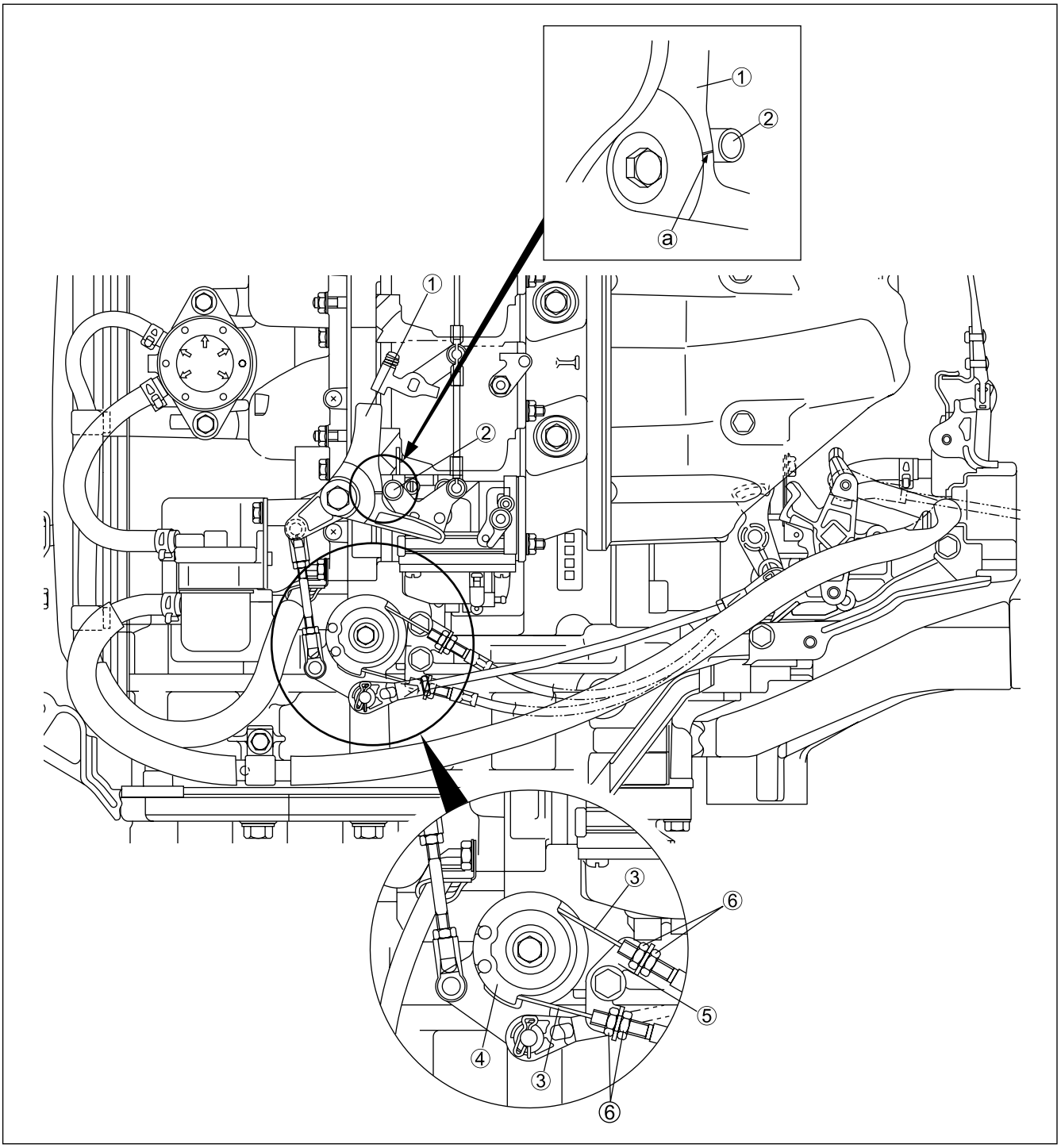


THROTTLE CONTROL CABLE

Installation and Adjustment

1. Rotate throttle control grip to bring the throttle to full close.
2. Align the match mark ⓐ on throttle cam ① with the center of throttle lever roller ② and hold this position.
3. Install throttle control cables ③ to throttle drum ④ and cable holder ⑤.
4. Turn lock nut ⑥ in the appropriate direction to install inner cable with no sag.
5. Tighten the lock nut to secure throttle cable to cable bracket.
6. Rotate the throttle control grip from fully closed position to fully open position several times.

With the throttle control grip at full close, make sure the match mark ⓐ on throttle cam ① aligns with the center of throttle lever roller ②.

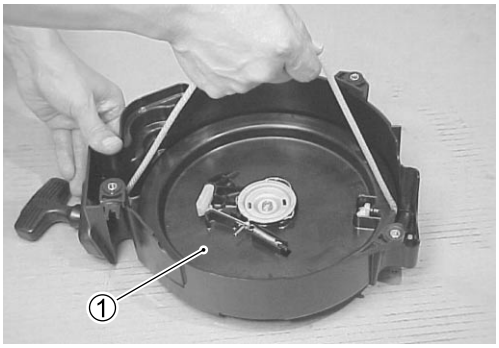


DISASSEMBLY

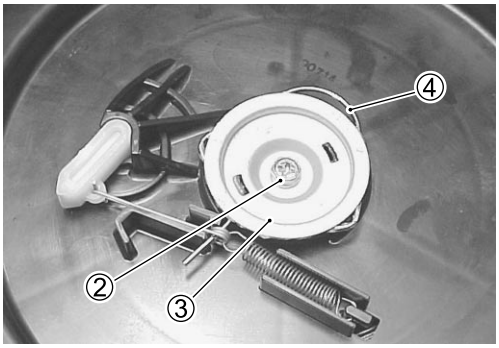
CAUTION

Because of the coiled tension in the recoil spring, wear safety glasses and hand protection when winding or unwinding this component.

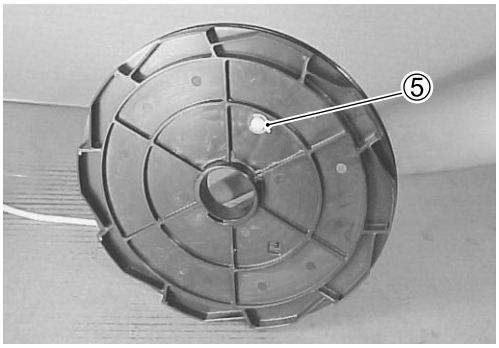
1. Turn the reel ① clockwise to release the coiled tension in the recoil spring.

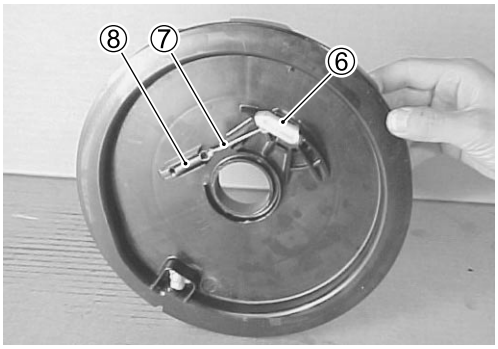


2. Unscrew and remove the bolt ②, then remove the friction plate ③ with the friction spring ④.
3. Remove the reel ①.



4. Remove the E-ring ⑤ first, and then take off the ratchet (pawl) ⑥, ratchet guide ⑦ and return spring ⑧.



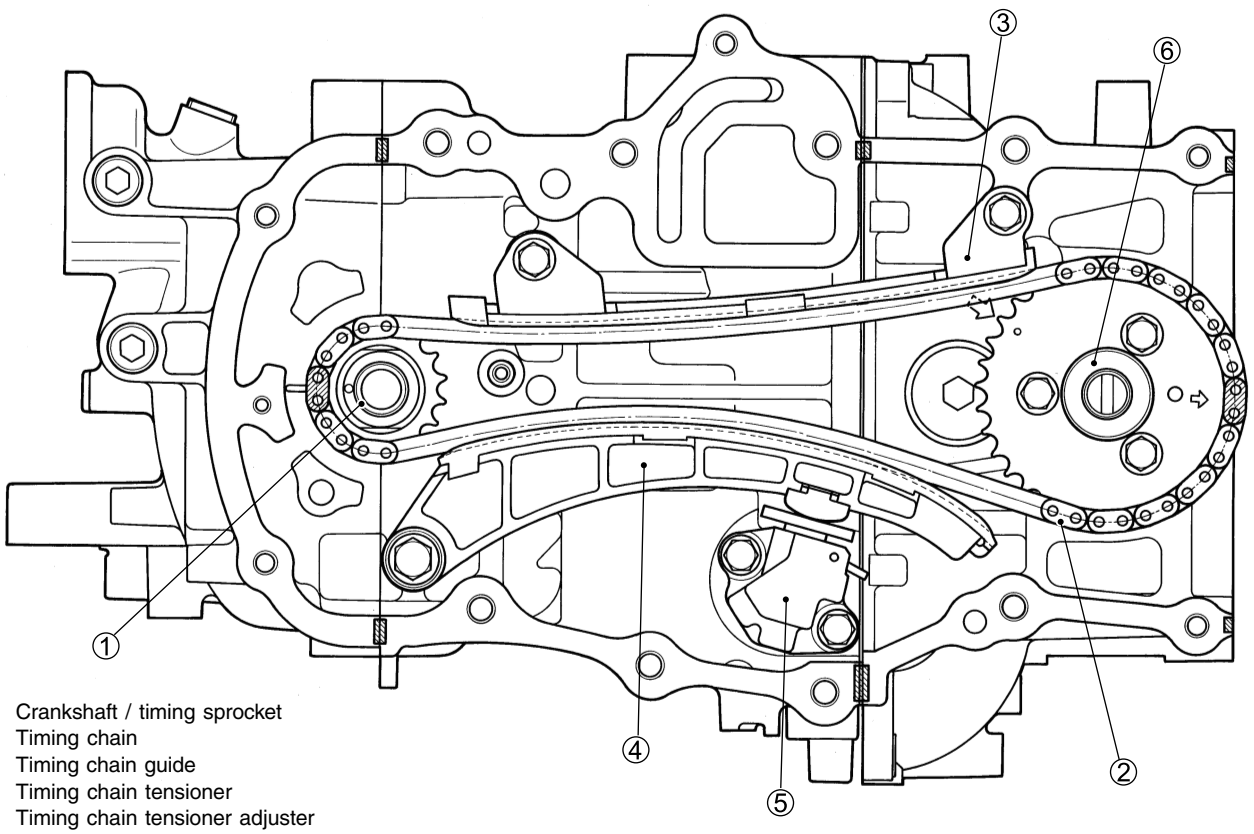


TIMING CHAIN / TENSIONER

REMOVAL

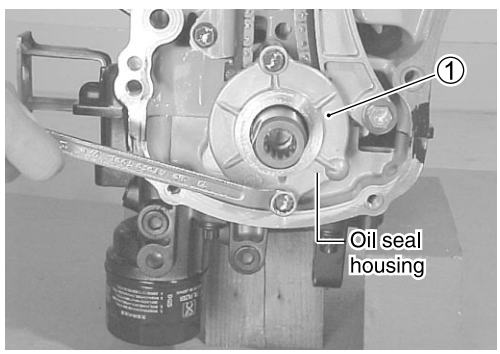
Prior to this service work :

• remove the power unit. (see page 7-2 to 7-6)

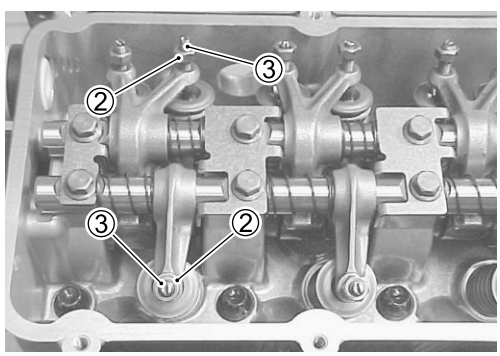


① Crankshaft / timing sprocket
② Timing chain
③ Timing chain guide
④ Timing chain tensioner
⑤ Timing chain tensioner adjuster
⑥ Camshaft and timing sprocket

1. Remove the two (2) bolts securing the under oil seal housing ① , then remove the under oil seal housing.



2. Loosen all valve adjusting lock nuts ② .
   Loosen the nine (9) valve adjusting screws ③ fully.
   Leave the screws in place.

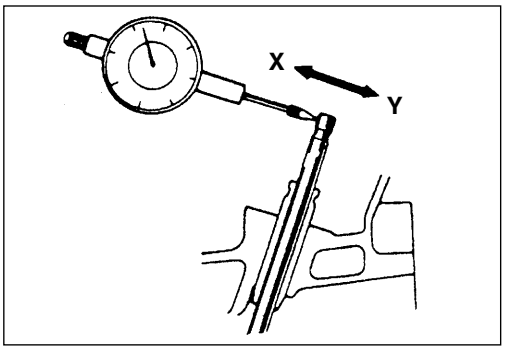


CAUTION

To prevent valve damage, loosen valve adjusting screws fully before removing timing chain.

Valve stem end deflection

If unable to measure valve guide inside diameter, check “Valve stem end deflection”.



TOOL **09900-20602 : Dial gauge**
09900-20701 : Magnetic stand

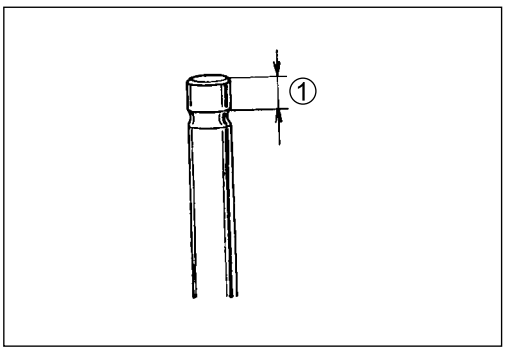
Measure valve stem end deflection as follows:
(1) Install valve into valve guide.
(2) Position valve head at approx. 5mm away from valve seat.
(3) Move stem end in the directlon “X-Y”, and measure deflection.

Valve stem end deflection
Service limit :
IN 0.14 mm (0.006 in.)
EX 0.18 mm (0.007 in.)

If measurement exceeds service limit, replace valve.
If measurement still exceeds service limit with newv alve, replace valve guide.

Valve stem end length

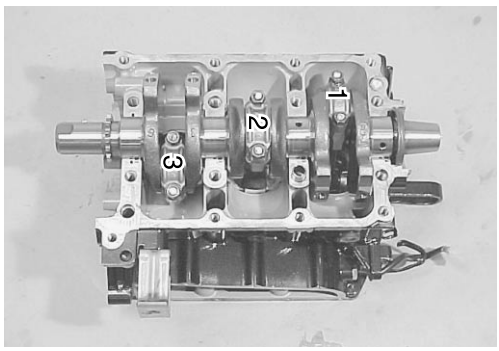
Inspect valve stem end face for pitting and wear.
If pitting or wear is found, valve stem end may be resurfaced.
Use caution when resurfacing, do not grind away stem end chamfer.
When chamfer has been worn away, replace valve.



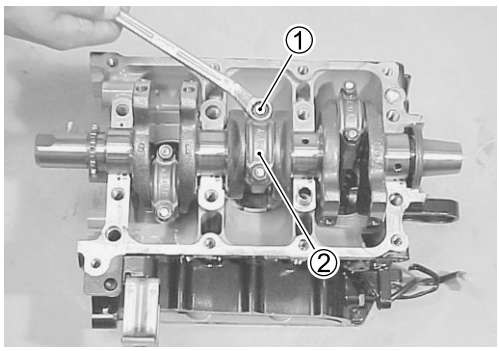
TOOL **09900-20101 : Vernier calipers**

Valve stem end length ①
Service limit :
IN 7.00 mm (0.276 in.)
EX 6.00 mm (0.236 in.)

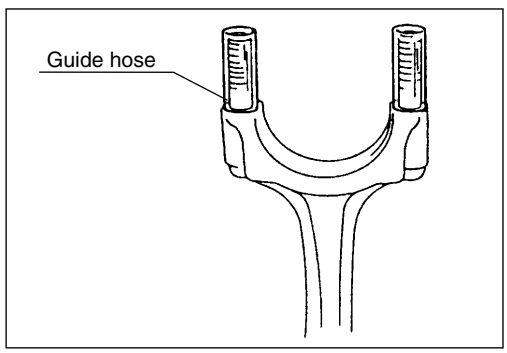
NOTE:
For proper assembly, mark cylinder number on all pistons, conrods, and conrod caps, using quick drying paint.



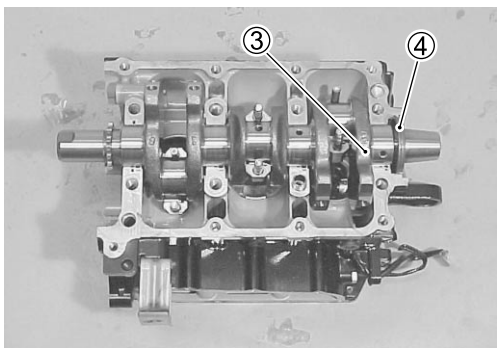
Remove all conrod cap nuts ① and conrod caps ②.



NOTE:
To prevent damage to crank pin and cylinder walls, install a piece of hose over threads of rod bolts.

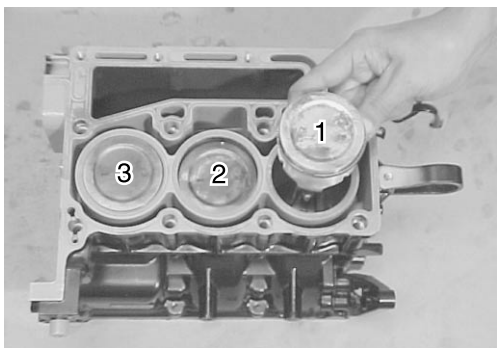


Remove cranckshaft ③.
Remove oil seal ④ form cranckshaft.



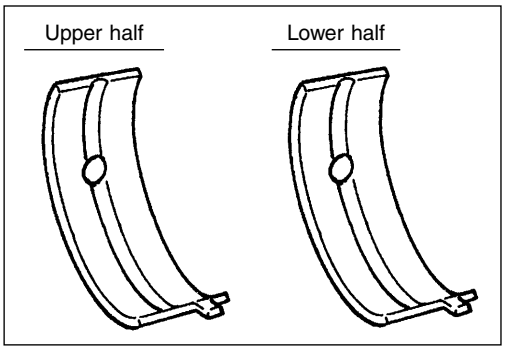
Mark cylinder number on pistons using quick dry paint.
Push piston (with conrod) out through the top of cylinder bore.
NOTE:

- *To prevent damage to piston rings, decarbon top of cylinder bore wall before removing piston.*
- *Reassemble each conrod cap to its original position after removing piston form boer.*



CRANKSHAFT MAIN BEARING

Check bearings for pitting, scratches, wear or damage.
If any improper condition is found, replace both upper and lower halves.
Always replace both bearing halves, never only one half of a bearing set.

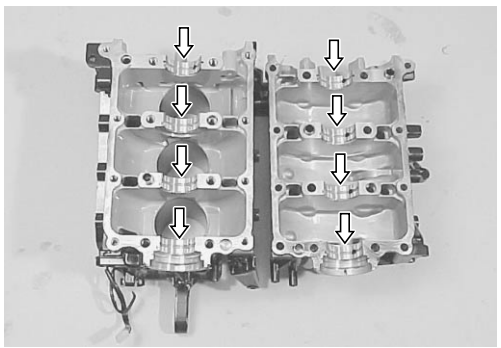


CRANKSHAFT JOURNAL OIL CLEARANCE

Check clearance using Plastigauge according to the following procedure.

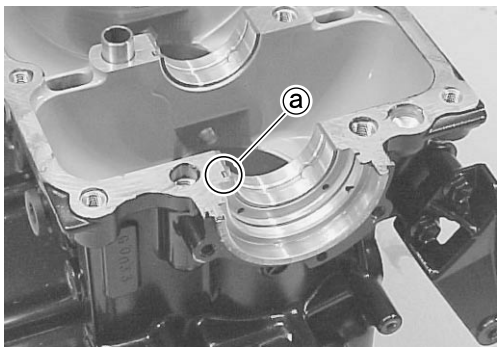
NOTE:
Assemble each bearing in its original position before checking clearance.

(1) Clean surface of bearing holder (crankcace, and cylinder), bearing, and main bearing journal.



(2) Install main bearing to cylinder and crankcase.

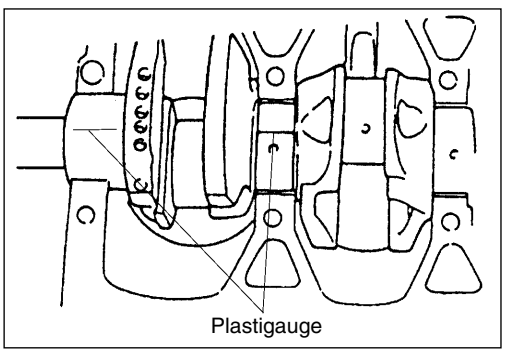
NOTE:
- *Align the tab ⓐ of bearing with notch in cylinder and crankcase.*
- *Do not apply engine oil to bearing.*



(3) Install crankshaft to cylinder.

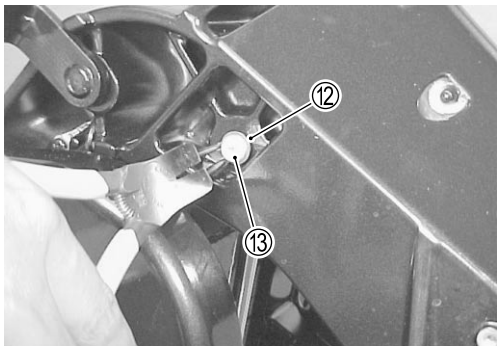
(4) Place piece of Plastigauge across full width of bearing (paralel to crankshaft) on journal.
Do not place Plastigauge over oil hole.

09900-22301 : Plastigauge

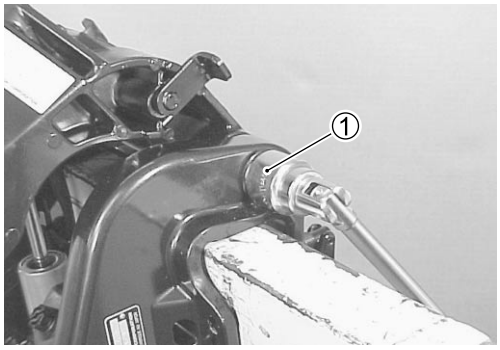


NOTE:
Do not rotate crankshaft while Plastigauge is installed.

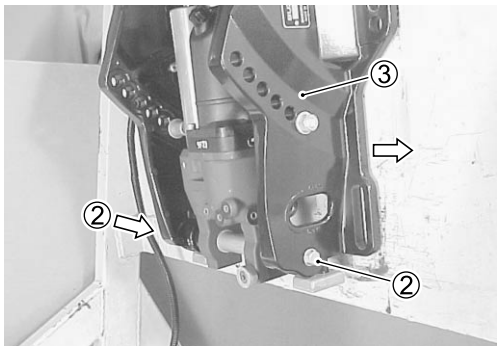
Remove circlip ⑫ and push out tilt cylinder upper rod ⑬.



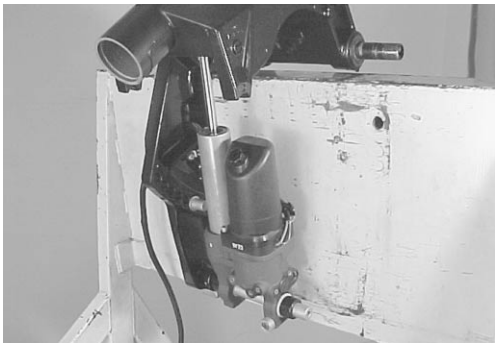
Remove nut ① from clamp bracket shaft.



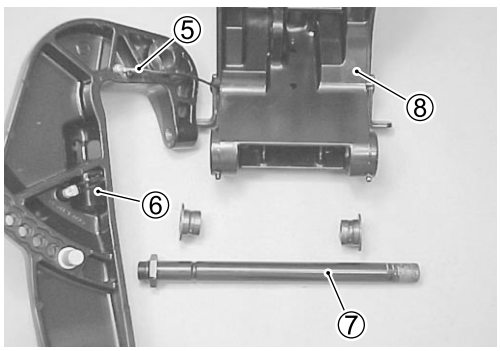
Remove tilt cylinder lower shaft bolts ②.
Slide STBD clamp bracket ③ off clamp bracket shaft.



Remove the PTT unit assembly. (T model)
Remove the gas assisted tilt cylinder. (Q model)



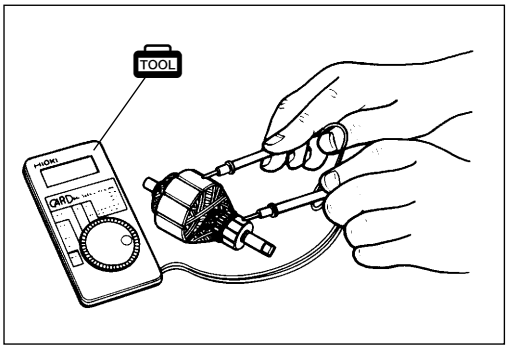
Remove bonding wire ⑤ from PORT clamp bracket.
Pull PORT clamp bracket ⑥ outward to remove clamp bracket and bracket shaft ⑦ from swivel bracket ⑧.
Remove bushings from each side of swivel bracket.



INSPECTION

Armature and Commutator

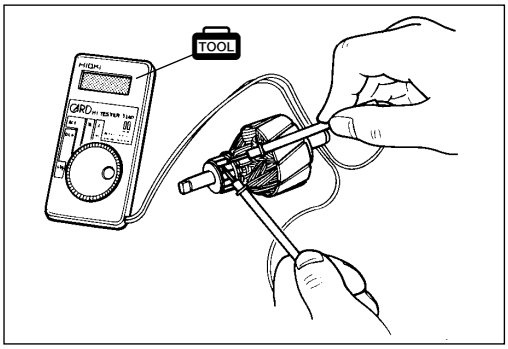
Check for continuity between the commutator and the armature core / shaft.
Replace armature if continuity is indicated.



09930-99320 : Digital tester

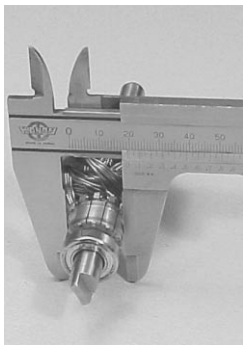
Tester range : (Continuity)

Check continuity between the adjacent commutator segments.
Replace armature if no continuity is indicated.



Inspect the commutator surface.
If surface is gummy or dirty, clean with 400 grit emery paper.

Measure commutator outside diameter.



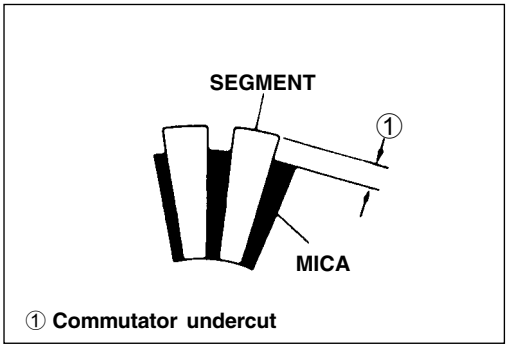
09900-20101 : Vernier calipers

Commutator outside diameter :

Standard	**19.5 mm (0.77 in.)**
Service limit	**18.5 mm (0.73 in.)**

If measurement exceeds service limit, replace armature.

Ensure that the mica (insulator) between the segments is undercut to specified depth.



① **Commutator undercut**

Commutator undercut :

Standard	**1.3 – 1.6 mm (0.05 – 0.06 in.)**
Service limit	**0.5 mm (0.02 in.)**

If undercut is less than service limit, cut to specified depth.

NOTE:
Remove all particles of mica and metal using compressed air.

⚠ WARNING

Wear safety grasses when using compressed air.