

SUZUKI OUTBOARD MOTOR

DT25K/30

SUPPLEMENTARY SERVICE MANUAL

Use this manual:

DT20/25/30

Service manual (99500-96303-01E)



99501-91L00-01E

DT25K/30 (Serial No. 510001 and later)

FOREWORD

This SUPPLEMENTARY SERVICE MANUAL is a supplement to SUZUKI DT25K, DT30 SERVICE MANUAL.

It has been prepared exclusively for the following models.

Applicable Model and Effective Serial Number:

DT25K (02503K) – 510001 and later

DT30 (03005) – 510001 and later

This supplementary service manual describes only service information which differ from that of the main manual.

Therefore, whenever servicing the above applicable model, consult this supplementary service manual first.

And for any section, item or description not found in this manual, refer to the main manual below.

Main Manual:

Manual Name	Manual No.
DT20/25/30, DT25K SERVICE MANUAL	99500-96303-01E

SUZUKI MOTOR CORPORATION

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***SPECIFICATIONS**

*: These specifications are subject to change without notice.
For DT30 specification, see page 5.

Item	Unit	Data
		DT25K

PRE-FIX	02503K
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DIMENSIONS & WEIGHT

Overall length (front to back)		mm (in)	870 (34.2)
Overall width (side to side)		mm (in)	500 (19.7)
Overall height	L	mm (in)	1275 (50.2)
Weight	L	kg (lbs)	56 (123.3)
Transom height [Trim position: 3]	L	mm (inch type)	550 (20)

PERFORMANCE

Maximum output	kW (PS)	18.4 (25)
Recommended operating range	r/min	5250 – 5750
Idle speed	r/min	950 ± 50 (in-gear: approx. 800 ± 50)

POWERHEAD

Engine type		2-stroke
Number of cylinders		2
Bore	mm (in)	71.0 (2.80)
Stroke	mm (in)	63.0 (2.48)
Total displacement	cm³ (cu in)	499 (30.5)
Compression ratio	: 1	5.2
Standard spark plug	NGK	B7HS-10
Intake system		Reed valve
Exhaust system		Through prop exhaust
Cooling system		Water cooled
Starting system		Manual
Choke system		Manual
Ignition system		SUZUKI PEI
Throttle control		Twist grip

Item	Unit	Data
		DT25K

FUEL & OIL

Fuel	Gasoline	Suzuki highly recommends that you use alcohol-free unleaded gasoline with a minimum pump octane rating of 87 ((R + M)/2 method) or 91 (Research method). However, blends of unleaded gasoline and alcohol with equivalent octane content may be used.
	Kerosene	Kerosene
Mixing ratio	Gasoline	Premixture of gasoline and oil at 30:1
	Kerosene	Premixture of kerosene and oil at 30:1
Fuel tank capacity	L (US/Imp. gal)	12 (3.2/2.6): Gasoline
		25 (6.6/5.5): Kerosene
Engine oil		SUZUKI CCI OIL, or NMMA (National Marine Manufacturers Association) certified TC-W3™ 2-cycle outboard motor oil.
Gear oil		SUZUKI Outboard Motor Gear Oil or SAE 90 hypoid gear oil, API classification GL-5
Gearcase oil amounts	ml (US/Imp. oz)	330 (11.1/11.6)

BRACKET

Trim angle	Degree	4.0 – 20.0
Number of trim positions		5
Maximum tilt angle	Degree	78

LOWER UNIT

Reversing system	Gear
Transmission	Forward-Neutral-Reverse
Reduction system	Bevel gear
Gear ratio	11 : 23 (2.09)
Drive line impact protection	Spline drive rubber hub
Propeller	Blade × Diam. (in) × Pitch (in) (I.D. No.)
	3 × 10-1/4 × 10 (P1001) 3 × 10-1/4 × 11 (P1101) 3 × 10-1/4 × 12 (P1201) 3 × 10-1/4 × 13 (P1301) 3 × 10-1/4 × 14 (P1401) • 3 × 10-1/4 × 9 (P911) • 3 × 10-1/4 × 10 (P1011) • 3 × 10-1/4 × 12 (P1211)
• Thick-blade type	

***SPECIFICATIONS**

*: These specifications are subject to change without notice.
For DT25K specification, see page 3.

Item	Unit	Data		
		DT30	DT30E	DT30R

PRE-FIX	03005
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DIMENSIONS & WEIGHT

Overall length (front to back)		mm (in)	870 (34.2)	
Overall width (side to side)		mm (in)	500 (19.7)	
Overall height	S	mm (in)	1150 (45.3)	
	L	mm (in)	1275 (50.2)	
Weight	S	kg (lbs)	55 (121.1)	59 (130.0)
	L	kg (lbs)	56 (123.3)	60 (132.2)
Transom height [Trim position: 3]	S	mm (inch type)	423 (15)	
	L	mm (inch type)	550 (20)	

PERFORMANCE

Maximum output	kW (PS)	22.1 (30)
Recommended operating range	r/min	5000 – 5600
Idle speed	r/min	950 ± 50 (in-gear: approx. 800 ± 50)

POWERHEAD

Engine type		2-stroke	
Number of cylinders		2	
Bore	mm (in)	71.0 (2.80)	
Stroke	mm (in)	63.0 (2.48)	
Total displacement	cm³ (cu in)	499 (30.5)	
Compression ratio	: 1	6.5	
Standard spark plug	NGK	BR7HS-10	
Intake system		Reed valve	
Exhaust system		Through prop exhaust	
Cooling system		Water cooled	
Starting system		Manual	Electric
Choke system		Manual	Electric
Ignition system		SUZUKI PEI	
Throttle control		Twist grip	Remote control

Item	Unit	Data		
		DT30	DT30E	DT30R

FUEL & OIL

Fuel		Suzuki highly recommends the use of alcohol-free unleaded gasoline with a minimum pump octane rating of 87 ((R + M)/2 method) or 91 (Research method). However, blends of unleaded gasoline and alcohol with equivalent octane content may be used.		
Mixing ratio		Premixture of gasoline and oil at 50:1		
Fuel tank capacity	L (US/Imp. gal)	25 (6.6/5.5)		
Engine oil		SUZUKI CCI OIL, or NMMA (National Marine Manufacturers Association) certified TC-W3™ 2-cycle outboard motor oil.		
Gear oil		SUZUKI Outboard Motor Gear Oil or SAE 90 hypoid gear oil, API classification GL-5		
Gearcase oil amounts	ml (US/Imp. oz)	330 (11.1/11.6)		

BRACKET

Trim angle	Degree	4.0 – 20.0
Number of trim positions		5
Maximum tilt angle	Degree	78

LOWER UNIT

Reversing system	Gear
Transmission	Forward-Neutral-Reverse
Reduction system	Bevel gear
Gear ratio	11 : 23 (2.09)
Drive line impact protection	Spline drive rubber hub
Propeller	Blade × Diam. (in) × Pitch (in) (I.D. No.)
	3 × 10-1/4 × 10 (P1001) 3 × 10-1/4 × 11 (P1101) 3 × 10-1/4 × 12 (P1201) 3 × 10-1/4 × 13 (P1301) 3 × 10-1/4 × 14 (P1401) • 3 × 10-1/4 × 9 (P911) • 3 × 10-1/4 × 10 (P1011) • 3 × 10-1/4 × 12 (P1211)
• Thick-blade type	

***SERVICE DATA**

*: These service data are subject to change without notice.
For DT30 service data, see page 10.

Item	Unit	Data
		DT25K

POWERHEAD

Recommended operating range		r/min	5250 – 5750
Idle speed		r/min	950 ± 50 (in-gear: approx. 800 ± 50)
* Cylinder compression		kPa (kg/cm ² , psi)	550 (5.5, 78)
** Crankshaft runout	STD	mm (in)	0.00 – 0.05 (0.000 – 0.002)
	Limit	mm (in)	0.10 (0.004)
Conrod deflection	Limit	mm (in)	5.0 (0.20)
Cylinder head distortion	Limit	mm (in)	0.10 (0.004)
Cylinder distortion	Limit	mm (in)	0.10 (0.004)
Piston diameter	STD	mm (in)	70.905 – 70.920 (2.7915 – 2.7921)
Cylinder bore	STD	mm (in)	71.000 – 71.015 (2.7953 – 2.7959)
Piston to cylinder clearance	STD	mm (in)	0.087 – 0.102 (0.0034 – 0.0040)
	Limit	mm (in)	0.182 (0.0072)
Piston measuring position		mm (in)	24 (0.94) from piston skirt end
Cylinder measuring position		mm (in)	40 (1.6) from cylinder top surface
Wear on cylinder bore	Limit	mm (in)	0.10 (0.004)
Piston pin diameter	STD	mm (in)	17.995 – 18.000 (0.7085 – 0.7087)
	Limit	mm (in)	17.980 (0.7079)
Piston pin hole diameter	STD	mm (in)	18.002 – 18.010 (0.7087 – 0.7091)
	Limit	mm (in)	18.030 (0.7098)
Piston ring end gap	STD	mm (in)	0.20 – 0.40 (0.008 – 0.016)
	Limit	mm (in)	0.80 (0.031)
Maximum reed stop opening		mm (in)	6.0 – 6.4 (0.24 – 0.25)
Reed to seat clearance	Limit	mm (in)	0.20 (0.008)
Thermostat operating temperature		°C (°F)	58 – 62 (136 – 144)

* Figures shown are guidelines only, not absolute service limits.

** Total indicator reading.

Item	Unit	Data
		DT25K

LOWER UNIT

Gearcase oil amounts	ml (US/Imp. oz)	330 (11.1/11.6)
Gear ratio		2.09 (23/11)
Preliminary gear shim & thrust washer		
Pinion back up shim	mm (in)	2.1 (0.08)
Forward back up shim	mm (in)	1.2 (0.05)
Reverse back up shim	mm (in)	1.3 (0.05)
Forward thrust washer	mm (in)	1.5 (0.06)
Reverse thrust washer	mm (in)	1.8 (0.07)

Initial selection-shim adjustment may be required.

CARBURETOR

Type		MIKUNI	BK34I-24
I.D. mark			96461
Main jet		#	147.5
Main air jet		ø (mm)	1.4
Pilot jet	Gasoline	#	50
	Kerosene	#	150
Pilot screw		Turns open	3/4
Float height	Gasoline	mm	6 ± 1
	Kerosene	mm	12 ± 2

NOTE: Hold carburetor vertical (bore up) and slowly rotate to an inverted horizontal position until float adjustment tab contacts inlet needle valve. Holding carburetor in this position, measure with vernier caliper from the float to the top of the main jet at 180° from the needle valve.

Item	Unit	Data
		DT25K

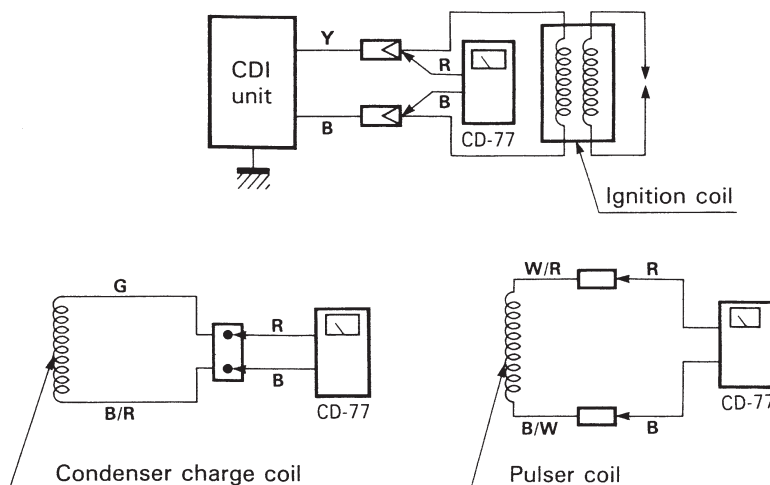
ELECTRICAL

Ignition timing		Degree at r/min	BTDC 5 ± 2 at 1000, BTDC 20 ± 2 at 5000
Condenser charge coil resistance		Ω at 20 °C	304 – 456 (G–B/R)
Pulser coil resistance		Ω at 20 °C	81 – 123 (W/R–B/W)
Ignition coil resistance (Without spark plug cap)	Primary	Ω at 20 °C	0.14 – 0.21 (Y–B)
	Secondary	k Ω at 20 °C	4.5 – 6.1 (High-tension cord – High-tension cord)
Spark plug cap resistance		k Ω at 20 °C	No resistor type
Battery charge coil resistance		Ω at 20 °C	0.24 – 0.38 (Y–R/Y) 0.11 – 0.17 (Y–R)
Battery charge coil output (12 V)		Watt	30/80
Standard spark plug	Type	NGK	B7HS-10
	Gap	mm (in)	0.9 – 1.0 (0.035 – 0.039)

PEAK VOLTAGE

- Remove all spark plugs to eliminate the variables at cranking speed.
- Crank with recoil starter.
- Use a STEVENS peak voltage tester, Model CD-77.

Testing sequence	Tester probe connection		Peak voltage	Tester range	Remarks
	⊕ (Red)	⊖ (Black)			
CDI output	Yellow	Black	110 V or over	NEG 500	With ignition coil connected
Condenser charge coil output	Green	Black/Red	100 V or over	POS 500	With CDI unit disconnected
Pulser coil output	White/Red	Black/White	1 V or over	SEN 5	With CDI unit disconnected
Battery charge coil output	Yellow	Red	0.4 V or over	POS 5	With rectifier disconnected
	Yellow	Red/Yellow	1.7 V or over		



***SERVICE DATA**

*: These service data are subject to change without notice.
For DT25K service data, see page 7.

Item	Unit	Data		
		DT30	DT30E	DT30R

POWERHEAD

Recommended operating range		r/min	5000 – 5600
Idle speed		r/min	950 ± 50 (in-gear: approx. 800 ± 50)
* Cylinder compression		kPa (kg/cm ² , psi)	670 (6.7, 95)
** Crankshaft runout	STD	mm (in)	0.00 – 0.05 (0.000 – 0.002)
	Limit	mm (in)	0.10 (0.004)
Conrod deflection	Limit	mm (in)	5.0 (0.20)
Cylinder head distortion	Limit	mm (in)	0.10 (0.004)
Cylinder distortion	Limit	mm (in)	0.10 (0.004)
Piston diameter	STD	mm (in)	70.905 – 70.920 (2.7915 – 2.7921)
Cylinder bore	STD	mm (in)	71.000 – 71.015 (2.7953 – 2.7959)
Piston to cylinder clearance	STD	mm (in)	0.087 – 0.102 (0.0034 – 0.0040)
	Limit	mm (in)	0.182 (0.0072)
Piston measuring position		mm (in)	24 (0.94) from piston skirt end
Cylinder measuring position		mm (in)	40 (1.6) from cylinder top surface
Wear on cylinder bore	Limit	mm (in)	0.10 (0.004)
Piston pin diameter	STD	mm (in)	17.995 – 18.000 (0.7085 – 0.7087)
	Limit	mm (in)	17.980 (0.7079)
Piston pin hole diameter	STD	mm (in)	18.002 – 18.010 (0.7087 – 0.7091)
	Limit	mm (in)	18.030 (0.7098)
Piston ring end gap	STD	mm (in)	0.20 – 0.40 (0.008 – 0.016)
	Limit	mm (in)	0.80 (0.031)
Maximum reed stop opening		mm (in)	6.0 – 6.4 (0.24 – 0.25)
Reed to seat clearance	Limit	mm (in)	0.20 (0.008)
Thermostat operating temperature		°C (°F)	48 – 52 (118 – 128)

* Figures shown are guidelines only, not absolute service limits.

** Total indicator reading.

Item	Unit	Data		
		DT30	DT30E	DT30R

LOWER UNIT

Gearcase oil amounts	ml (US/Imp. oz)	330 (11.1/11.6)		
Gear ratio		2.09 (23/11)		

Preliminary gear shim & thrust washer

Pinion back up shim	mm (in)	2.1 (0.08)		
Forward back up shim	mm (in)	1.2 (0.05)		
Reverse back up shim	mm (in)	1.3 (0.05)		
Forward thrust washer	mm (in)	1.5 (0.06)		
Reverse thrust washer	mm (in)	1.8 (0.07)		

Initial selection-shim adjustment may be required.

CARBURETOR

Type	MIKUNI	B32-28
I.D. mark		964J0
Main jet	#	160
Pilot jet	#	70
Air screw	Turns open	1-1/4 ± 1/4
Float height	mm	12 ± 2

NOTE: Hold carburetor vertical (bore up) and slowly rotate to an inverted horizontal position until float adjustment tab contacts inlet needle valve. Holding carburetor in this position, measure with vernier caliper from the float to the top of the main jet at 180° from the needle valve.

Item	Unit	Data		
		DT30	DT30E	DT30R

ELECTRICAL

Ignition timing		Degree at r/min	TDC 0 ± 3 at 1300, BTDC 25 ± 2 at 4000	
Condenser charge coil resistance		Ω at 20 °C	304 – 456 (G–B/R)	
Pulser coil resistance		Ω at 20 °C	81 – 123 (W/R–B/W)	
Ignition coil resistance (Without spark plug cap)	Primary	Ω at 20 °C	0.2 – 0.3 (O–B)	
	Secondary	k Ω at 20 °C	4.0 – 6.1 [High-tension cord – High-tension cord]	
Spark plug cap resistance		k Ω at 20 °C	8 – 12	
Battery charge coil resistance		Ω at 20 °C	0.24 – 0.38 (Y–R/Y) 0.11 – 0.17 (Y–R)	0.24 – 0.38 (Y–R)
Battery charge coil output (12 V)		Watt	30/80	80
Standard spark plug	Type	NGK	BR7HS-10	
	Gap	mm (in)	0.9 – 1.0 (0.035 – 0.039)	
Fuse amp rating		A	—	20
Recommended battery capacity (12 V)		Ah (kC)	—	35 (126) or over
Choke solenoid coil resistance		Ω at 20 °C	—	3.5 – 5.1 (O–B)
Starter motor relay coil resistance		Ω at 20 °C	—	3.5 – 5.1 (Y/G–B)

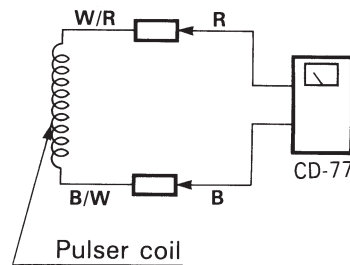
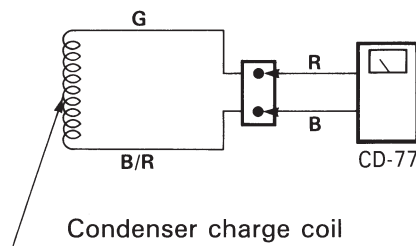
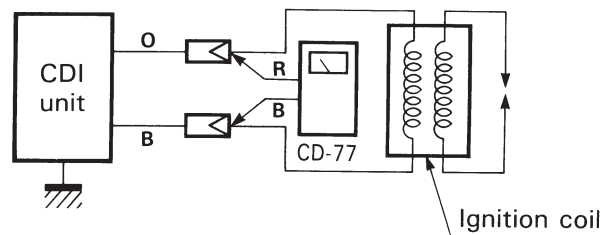
STARTER MOTOR

Max. continuous time of use		Sec	—	30
Motor output		kW	—	0.6
Starter motor brush length	STD	mm (in)	—	12.5 (0.49)
	Limit	mm (in)	—	9 (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 (1.18)
	Limit	mm (in)	—	29 (1.14)
Allowable commutator taper	STD	mm (in)	—	0.05 (0.002)
	Limit	mm (in)	—	0.40 (0.016)
Pinion to ring gear gap		mm (in)	—	3.5 – 5.0 (0.12 – 0.20)

PEAK VOLTAGE

- Remove all spark plugs to eliminate the variables at cranking speed.
- Crank with recoil starter.
- Use a STEVENS peak voltage tester, Model CD-77.

Testing sequence		Tester probe connection		Peak voltage	Tester range	Remarks
		⊕ (Red)	⊖ (Black)			
CDI output		Orange	Black	110 V or over	NEG 500	With ignition coil connected
Condenser charge coil output		Green	Black/Red	100 V or over	POS 500	With CDI unit disconnected
Pulser coil output		White/Red	Black/White	1 V or over	SEN 5	With CDI unit disconnected
Battery charge coil output	Manual start	Yellow	Red	0.4 V or over	POS 5	With rectifier disconnected
		Yellow	Red/Yellow	1.7 V or over		
	Electric start	Yellow	Red	1.7 V or over		



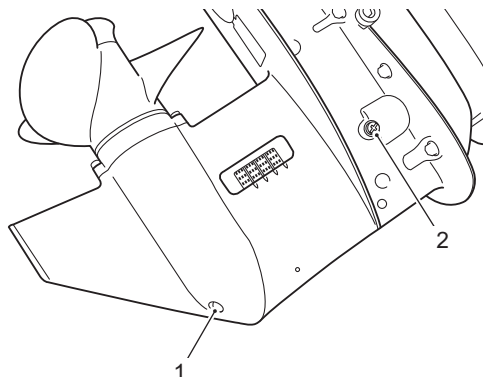
MAINTENANCE AND SERVICING

Gear Oil Change

Change gear oil

Initially after 20 hours (1 month) and every 100 hours (12 months)

- 1) Place outboard motor upright on a level surface.
- 2) Raise the outboard motor in full tilt up position.
- 3) Place a container under the lower unit.
- 4) Remove lower gear oil drain plug (1) first, then remove gear oil level plug (2) and drain gear oil.



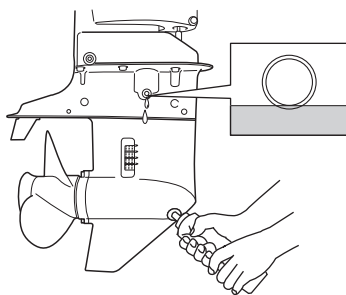
- 5) Lower the motor in full trim down (upright) position.
- 6) With the outboard motor in a vertical position, fill with recommended gear oil through oil drain hole until oil just starts to flow out from oil level hole.

Recommended gear oil

- Suzuki Outboard Motor Gear Oil or API classification GL-5, Viscosity rating SAE #90 Hypoid gear oil.

Gear oil amount

330 ml (11.1/11.6 US/Imp. oz)



- 7) Install oil level plug before removing oil filler tube from drain hole.
- 8) Install oil drain plug.

NOTICE

An used gasket may leak and allow water to enter the gearcase causing severe damage.

**Do not reuse gaskets once removed.
Always use a new gaskets.**

NOTE

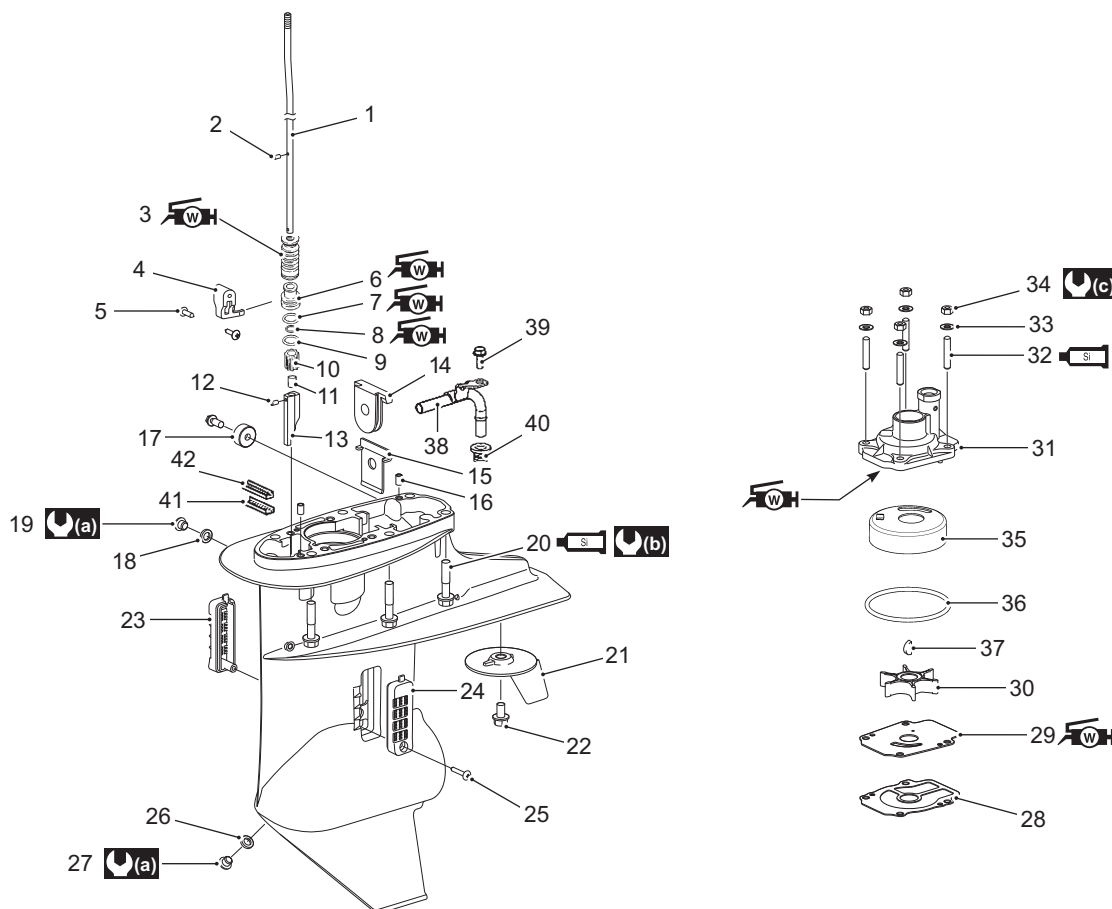
To avoid a possible low gear oil level, recheck gear oil level 10 minutes after doing procedure in step 8. If oil level is low, add additional gear oil until level is correct.

LOWER UNIT

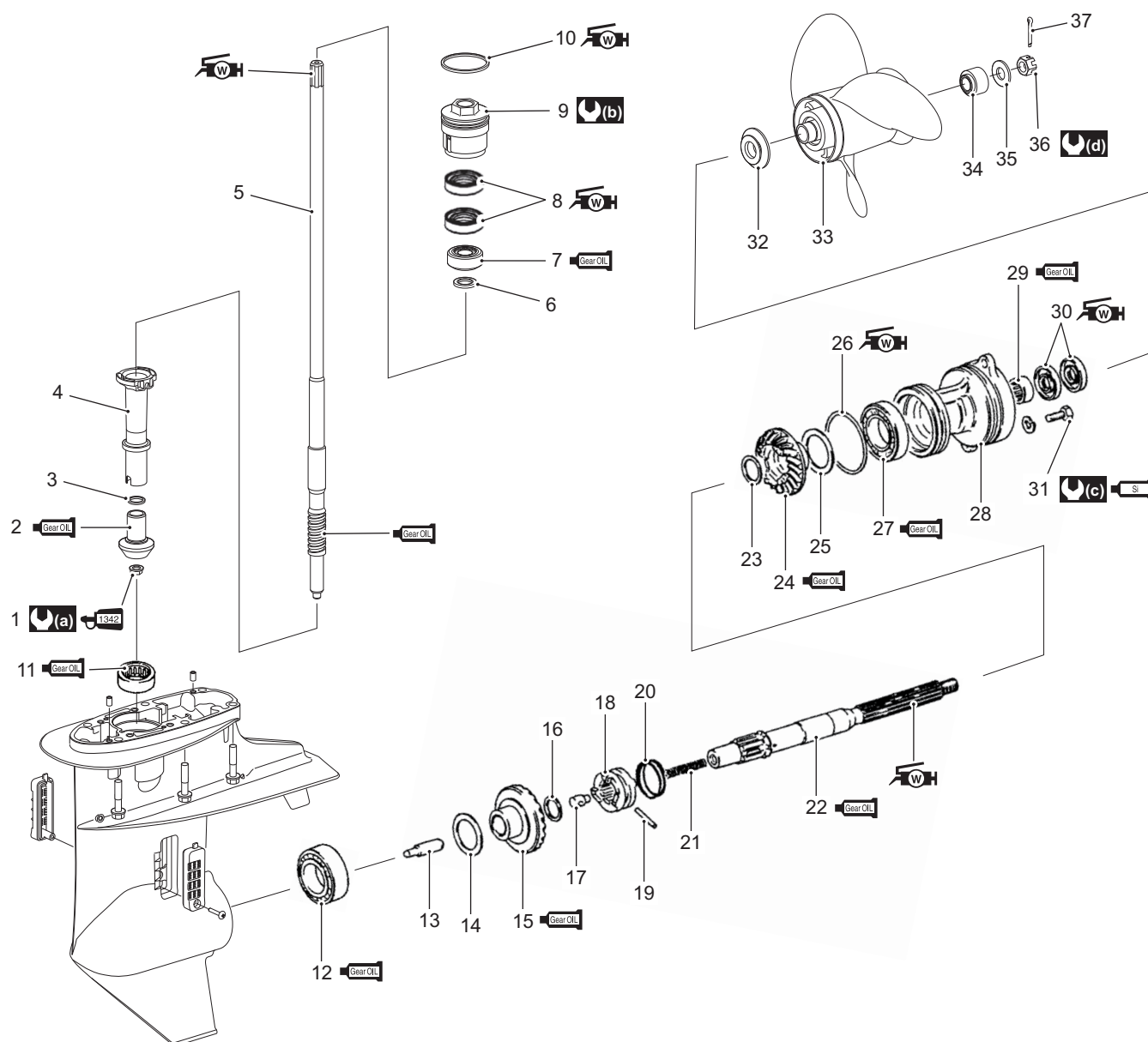
Outline

The lower unit for DT25/30 has newly been designed on all of lower case and internal component parts.

Lower Unit Components



1. Shift rod	17. Anode	33. Washer
2. Pin	18. Gasket	34. Nut
3. Boot	19. Plug	35. Inner sleeve
4. Stopper	20. Bolt	36. O-ring
5. Screw	21. Trim tab	37. Key
6. Shift rod guide	22. Bolt	38. Sub-water tube
7. O-ring	23. Water filter (STBD)	39. Bolt
8. O-ring	24. Water filter (PORT)	40. Grommet
9. Washer	25. Screw	41. Ex. seal core
10. Magnet	26. Gasket	42. Seal rubber
11. Holder	27. Plug	: 5 N·m (0.5 kgf-m, 3.6 lbf-ft)
12. Pin	28. Gasket	: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
13. Shift cam	29. Under panel	: 6 N·m (0.6 kgf-m, 4.3 lbf-ft)
14. Exhaust seal rubber	30. Water pump impeller	: Apply SUZUKI Silicone Seal.
15. Exhaust seal plate	31. Water pump case	: Apply SUZUKI Water Resistant Grease.
16. Dowel pin	32. Stud bolt	



1. Nut	16. Thrust washer	31. Bolt
2. Pinion gear	17. Push pin	32. Stopper
3. Washer	18. Clutch dog shifter	33. Propeller
4. Collar	19. Dog pin	34. Spacer
5. Driveshaft	20. Dog spring	35. Washer
6. Thrust washer	21. Return spring	36. Nut
7. Bearing	22. Propeller shaft	37. Pin
8. Oil seal	23. Thrust washer	: 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
9. Oil seal housing	24. Reverse gear	: 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
10. O-ring	25. Shim	: 10 N·m (1.0 kgf-m, 7.2 lbf-ft)
11. Bearing	26. O-ring	: 25 N·m (2.5 kgf-m, 18.0 lbf-ft)
12. Bearing	27. Bearing	: Apply SUZUKI Outboard Motor Gear Oil.
13. Push rod	28. Propeller shaft bearing housing	: Apply SUZUKI Thread Lock 1342.
14. Shim	29. Bearing	: Apply SUZUKI Water Resistant Grease.
15. Forward gear	30. Oil seal	: Apply SUZUKI Silicone Seal.

Propeller Removal and Installation

⚠ WARNING

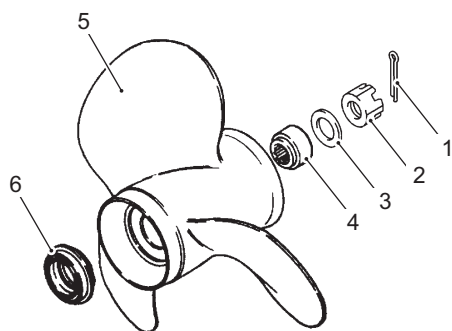
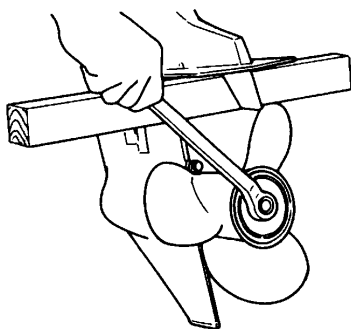
Failure to take proper precautions when installing or removing the propeller can result in severe personal injury.

When installing or removing the propeller:

- Shift into “Neutral” and remove the emergency stop switch lock plate so that the motor cannot be started accidentally.
- Wear gloves to protect hands, and lock the propeller by placing a block of wood between the propeller blade tips and the anti-cavitation plate before attempting to remove or install propeller nut.

Removal

- 1) Shift to “Neutral” position.
- 2) Remove cotter pin (1) from propeller nut and remove propeller nut (2).
- 3) Remove washer (3), spacer (4), propeller (5) and stopper (6) from the propeller shaft.



Installation

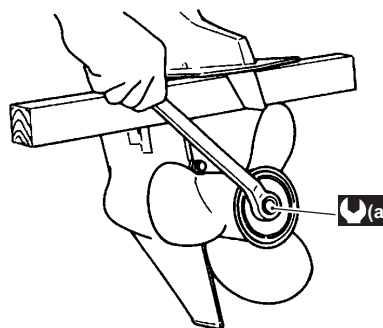
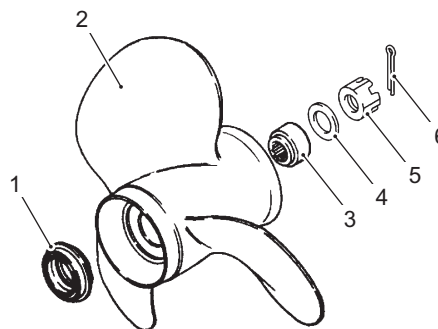
- 1) Coat the propeller shaft splines liberally with Suzuki water resistant grease.

 **Grease 99000–25350 (SUZUKI Water Resistant Grease EP2 (250 g))**

- 2) Install propeller stopper (1) onto propeller shaft, then slide on the propeller (2).
- 3) Fit spacer (3), washer (4) and nut (5), then tighten nut to specified torque.
- 4) Push cotter pin (6) through nut and shaft, then bend to secure.

Tightening torque

Propeller nut (a): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)



Lower Unit Removal and Installation

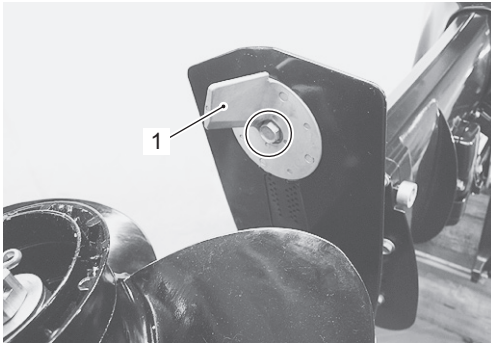
Removal

⚠ WARNING

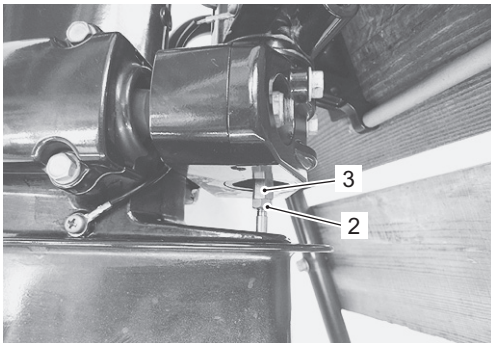
Failure to take proper precautions when removing or installing the lower unit can result in severe personal injury.

Always disconnect the battery cable, before removing lower unit.

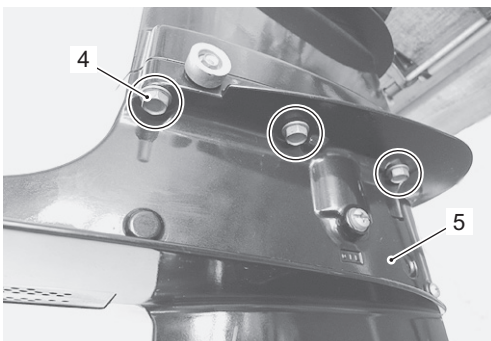
- 1) Shift to Neutral position.
Remove the bolt and trim tab (1) (if necessary).



- 2) Loosen the clutch rod lock nut (2).
- 3) To separate the clutch rod from the shift rod, unscrew the connector (3).



- 4) Remove six bolts (4) and separate gearcase (5) from driveshaft housing.



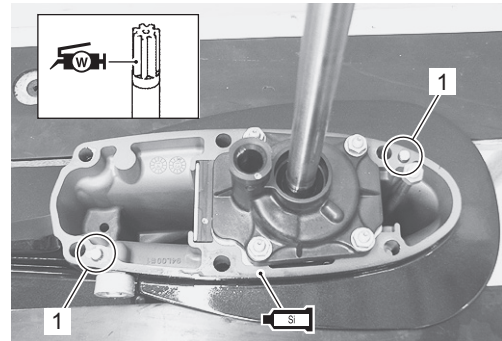
Installation

- 1) Insert two dowel pins (1).
- 2) Apply water resistant grease to driveshaft splines.

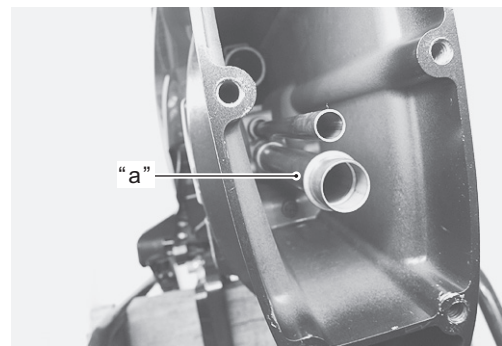
 **Grease 99000-25350 (SUZUKI Water Resistant Grease EP2 (250 g))**

- 3) Apply a light coating of Suzuki silicone seal to mating surfaces of gearcase and driveshaft housing.

 **Sealant 93691-80030 (SUZUKI Silicone Seal (100 g))**



- 4) Make sure that seal pipe @ is installed.



- 5) Slide the lower unit (2) into place, making sure that the top of the driveshaft engages properly with the crankshaft and that water tube locates in the water pump case outlet.

Apply SUZUKI SILICONE SEAL to the retaining bolts (3) and tighten them to specified torque.

 : Sealant 93691-80030 (SUZUKI Silicone Seal (100 g))

Tightening torque

Gearcase bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

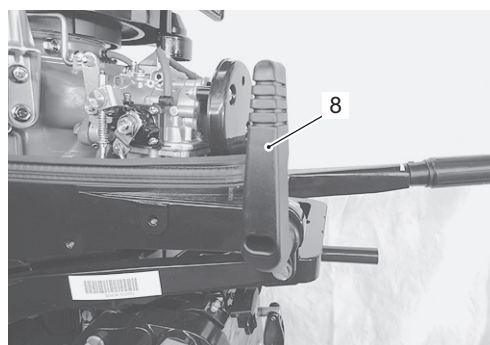
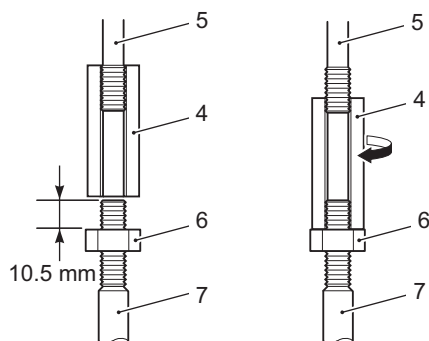


- 6) Connect the clutch rod and the shift rod using the clutch rod connector in the following procedure:

NOTE

The clutch rod connector is not a turnbuckle but just a long nut with right-hand thread.

- Screw the clutch rod connector (4) onto the clutch rod (5) all the way to the end of its thread.
- Screw the lower nut (6) onto the shift rod (7) with the specified amount (10.5 mm) from the top end of its thread as shown in the figure. Hold the nut (6) at this position.
- Locate the shift cam at Neutral position by moving shift rod (7) up or down and then hold it at the position.
- While holding the shift lever (8) and shift cam at neutral position, screw the clutch rod connector (4) onto the shift rod (7) until the connector contacts the lower nut (6).

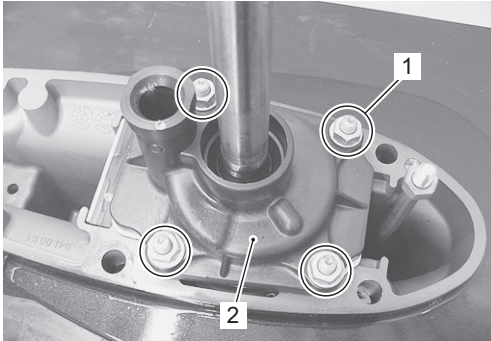


- With the clutch rod connector (4) securely held, tighten the lower nut (6) firmly against the connector.
- Shift the shift lever from Neutral to Forward and Reverse to check that the gear starts engagement of both gears are at an equal angle from Neutral.

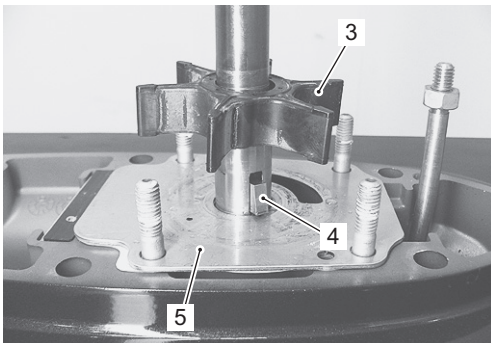
Water Pump Removal and Installation

Removal

- 1) Remove the lower unit. Refer to "Lower Unit Removal and Installation".
- 2) Loosen four nuts (1), then remove water pump case (2).



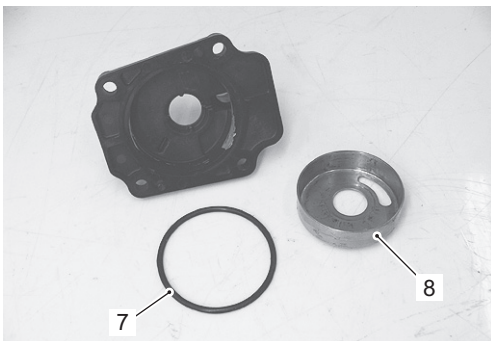
- 3) Remove impeller (3), impeller key (4) and pump under plate (5).
Keep impeller key (4) for reuse and discard the plate gasket.



NOTE

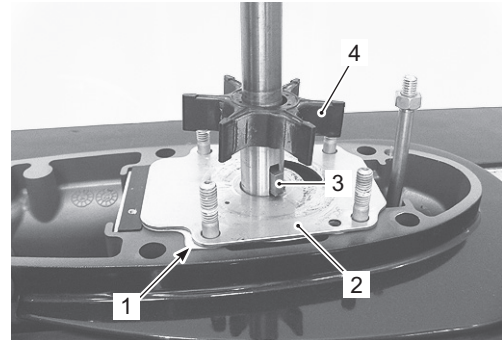
To facilitate the removal of inner sleeve from pump case, warm up the entire case using a heater like hair dryer.

- 4) Remove O-ring (7) and inner sleeve (8) from pump case.



Installation

- 1) Place the under panel gasket (1) and under panel (2) into position.
- 2) Insert the key (3) in the driveshaft and slide the impeller (4) onto driveshaft, ensuring that key and keyway is aligned.

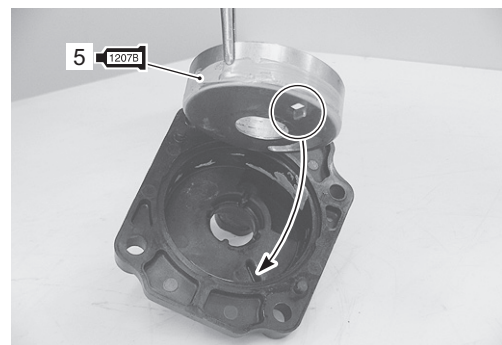


NOTE

- Before installing pump inner sleeve, apply **SUZUKI Bond 1207B** lightly between inner sleeve and pump case mating surfaces.
- Do not apply bond to inner sleeve top surfaces.

- 3) Install inner sleeve (5) into the pump case, ensuring that projection of inner sleeve and groove of pump case are aligned.

■ **1207B** : Sealant 99000-31140 (SUZUKI Bond 1207B (100 g))



NOTE

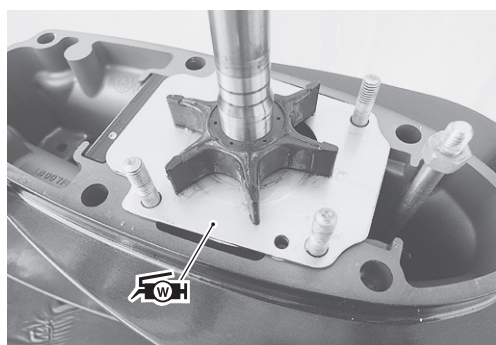
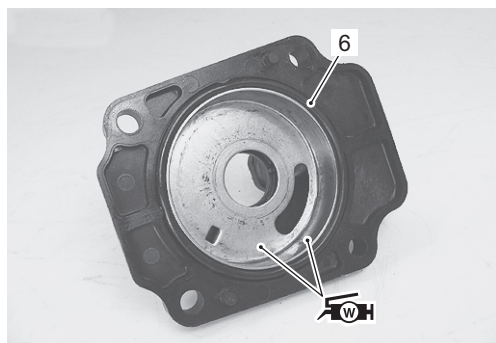
It is recommended that O-ring should be replaced with new one on assembly.

4) Place the O-ring (6) into position.

NOTE

Before installing water pump case assembly, apply water resistant grease lightly on pump case inner sleeve and under panel for initial lubrication.

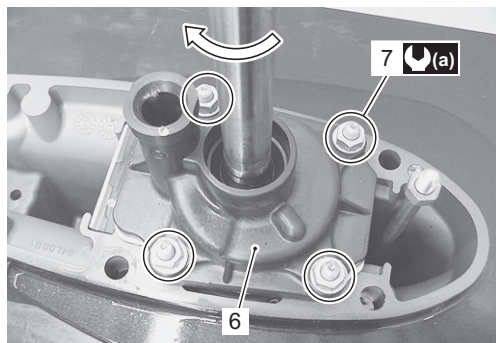
 : Grease 99000-25350 (SUZUKI Water Resistant Grease EP2 (250 g))



5) Install the pump case assembly (6) while rotating driveshaft clockwise to flex the impeller vanes in the correct direction. Securely tighten the four pump case nuts (7) to the specified torque.

Tightening torque

Water pump case nut (a): 6 N·m (0.6 kgf-m, 4.3 lbf-ft)

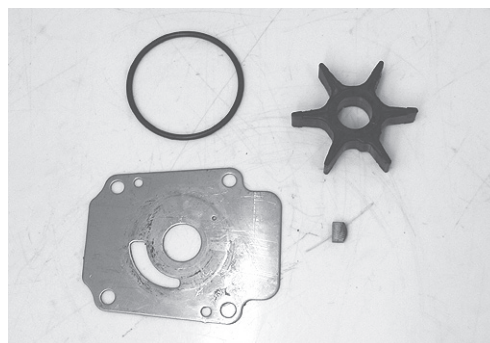
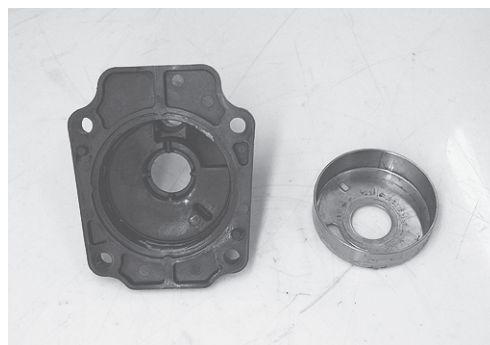


6) Install the Lower Unit. Refer to "Lower Unit Removal and Installation".

Water Pump and Related Items Inspection

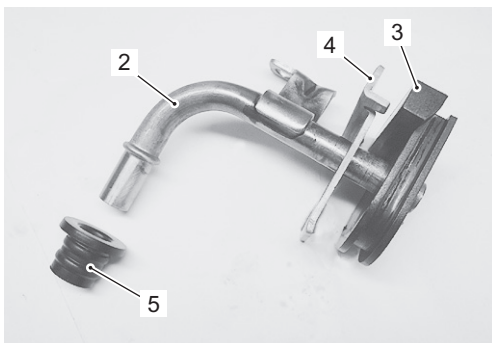
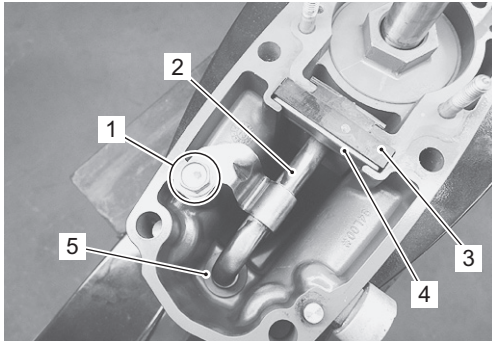
Inspect the following parts.

- Inspect impeller. Replace if vanes are cut, torn, worn or other abnormal conditions.
- Inspect pump case. Replace if cracked, distorted or other abnormal conditions are noted.
- Inspect pump inner sleeve. Replace if worn, cracked, distorted, corroded or other abnormal conditions are noted.
- Inspect under panel. Replace if cracked, distorted, corroded or other abnormal conditions are noted.
- Check condition of O-ring.
Replace O-ring if nicked, cut, worn or other abnormal condition.



Sub-Water Tube Removal and Installation

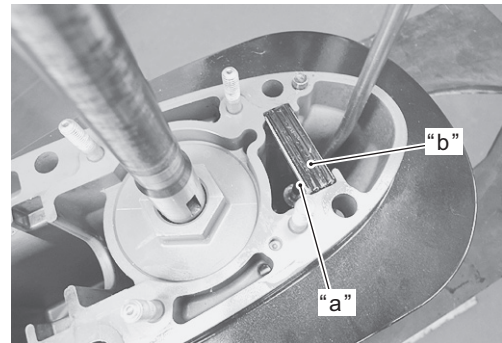
- 1) Remove the water pump and related parts.
Refer to "Water Pump Removal and Installation".
- 2) Remove the bolt (1) securing sub-water tube (2), then remove the exhaust seal rubber (3), exhaust seal plate (4), sub-water tube (2) and grommet (5).



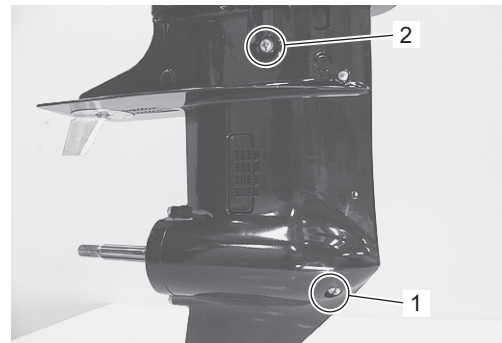
- 3) Installation is reverse order of removal.

Lower Unit Disassembly

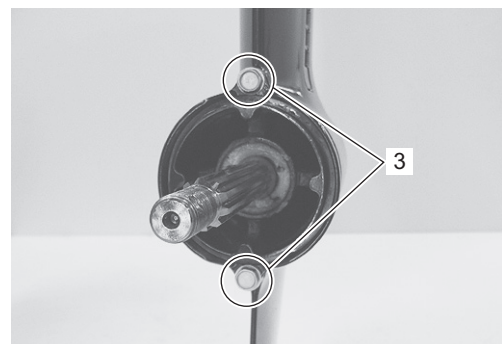
- 1) Remove the lower unit. Refer to "Lower Unit Removal and Installation".
- 2) Remove the propeller. Refer to "Propeller Removal and Installation".
- 3) Remove the water pump and related parts. Refer to "Lower Unit Removal and Installation" and "Water Pump Removal and Installation".
Remove the exhaust seal core (a) and seal rubber (b).



- 4) Place a drain pan under oil drain plug. Remove oil drain plug (1) first then oil level plug (2) and allow gear oil to drain.
Inspect oil for water, contaminants or metal.



- 5) Remove the two bolts (3) securing the propeller shaft bearing housing to the gearcase.

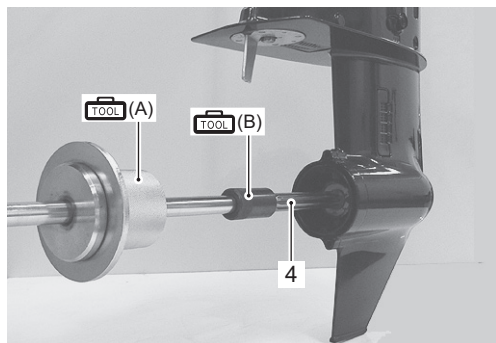


- 6) Using special tools, pull out the propeller shaft bearing housing.
Remove the propeller shaft and bearing housing assembly (4).

Special tool

 (A): 09930-30104 (Sliding hammer)

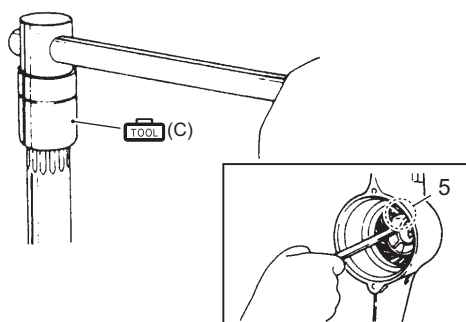
 (B): 09950-59310 (Propeller shaft remover)



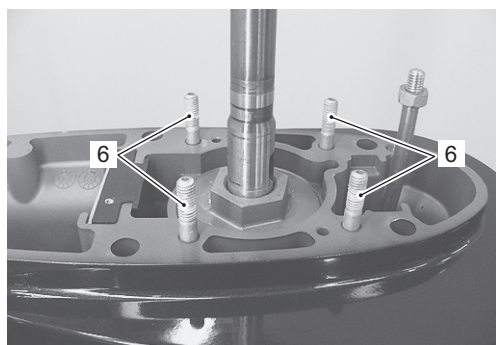
- 7) Hold the pinion nut (5) securely, then fit special tool to the driveshaft and loosen the pinion nut. Remove pinion nut.

Special tool

 (C): 09921-29511 (Driveshaft holder)



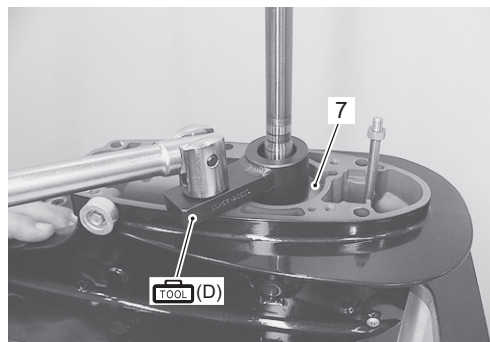
- 8) Remove the water pump stud bolts (6).



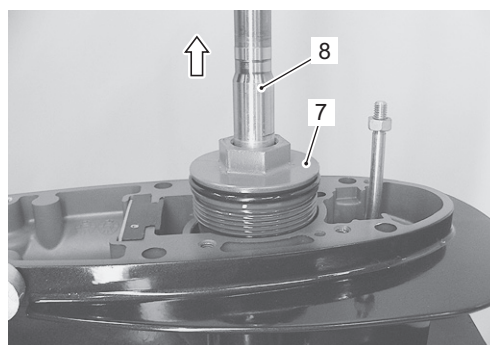
- 9) Use special tool to unscrew driveshaft oil seal housing (7), then remove oil seal housing from drive shaft.

Special tool

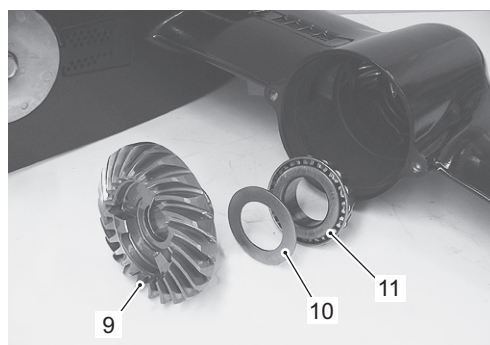
 (D): 09926-29400 (Driveshaft oil seal housing remover)



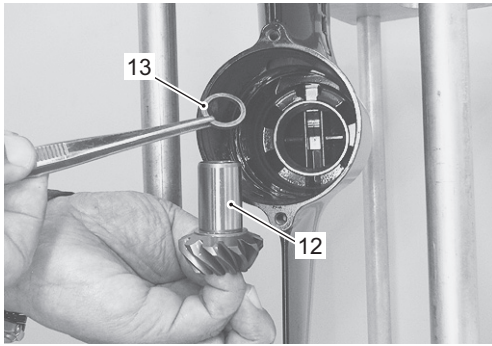
- 10) Lift out driveshaft (8).
Remove the driveshaft oil seal housing (7) from driveshaft.



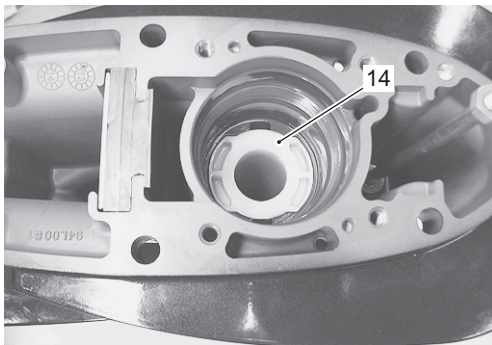
- 11) Remove the forward gear (9), back-up shim (10) and bearing (11).



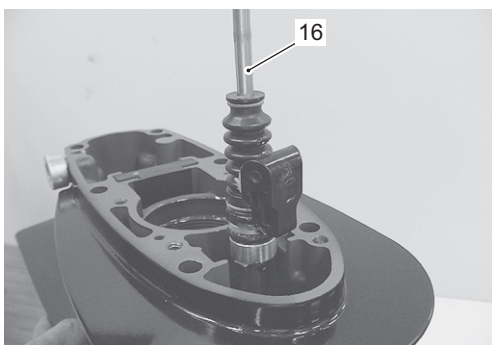
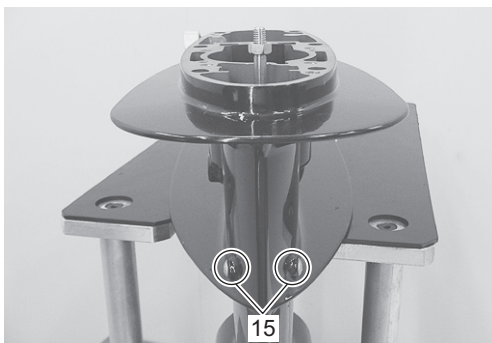
12) Remove the pinion gear (12) and pinion shim (13).



13) Remove the driveshaft collar (14).

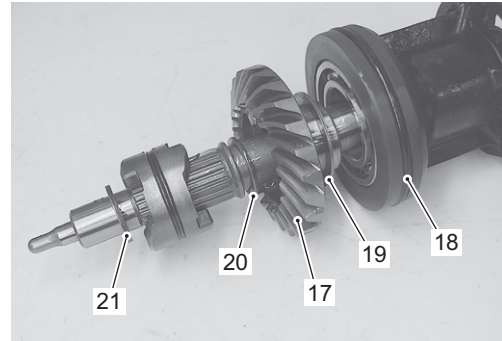


14) Remove the screws (15) securing the shift rod guide stopper.
Pull out the shift rod assembly (16).

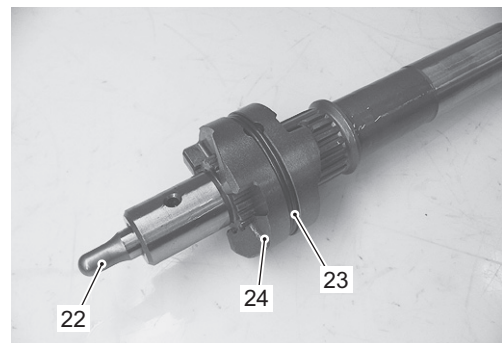


15) To disassemble propeller shaft components, refer to following.

- a) Slide propeller shaft away from reverse gear (17) and bearing housing assembly (18). Account for the reverse gear back-up shim (19) and reverse gear thrust washer (20). Remove the forward gear thrust washer (21).



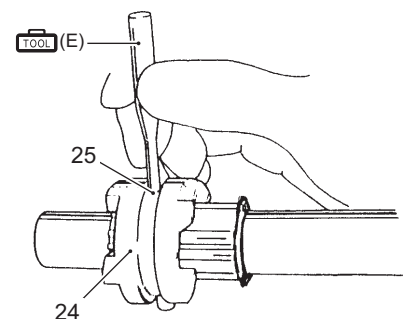
- b) Pull the push rod (22) out of the propeller shaft. Remove spring (23) from clutch dog shifter (24).



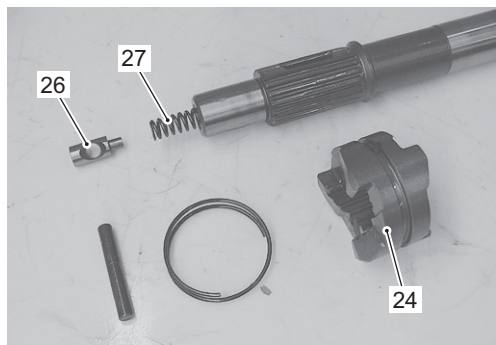
- c) Use special tool to push the dog pin (25) out of the clutch dog shifter (24).

Special tool

TOOL (E): 09922-89810 (Shift lock pin remover)

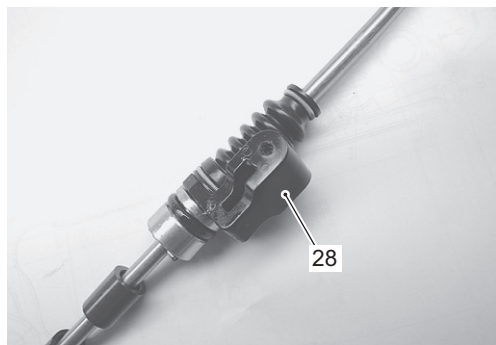


- d) Remove clutch dog shifter (24), push pin (26) and return spring (27) from propeller shaft.

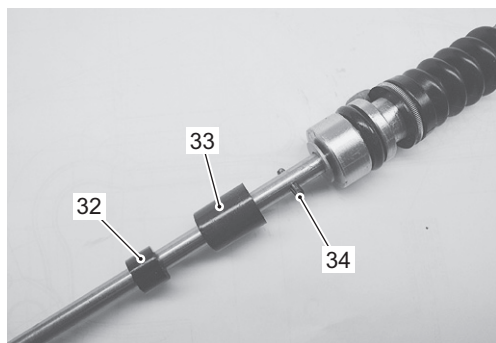
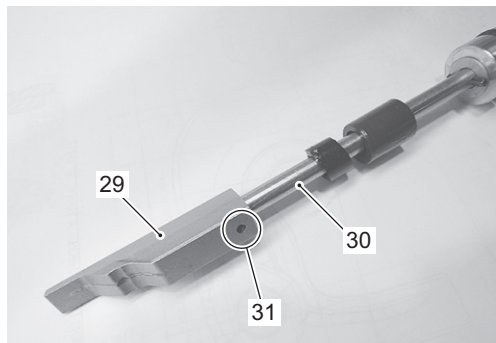


16) To disassemble shift rod components, refer to following;

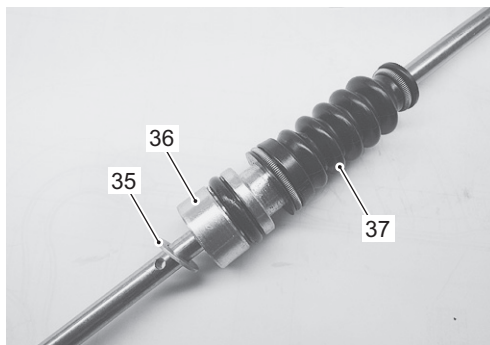
- a) Remove the shift rod guide stopper (28).



- b) Remove the shift cam (29) from the shift rod (30) by driving out the pin (31). Remove the magnet holder (32), magnet (33) and pin (34).



- c) Remove the washer (35), shift rod guide (36) and dust boot (37).



Pinion Bearing Removal and Installation

NOTICE

Removing the bearing can cause damage to needle rollers and outer race. If the removed bearing is re-used, problem will occur in the lower unit.

Do not reuse pinion bearings once removed.
Always use new ones.

Removal and Installation Tools

To remove the pinion bearing from the gearcase, use the following special tools.

Special tool

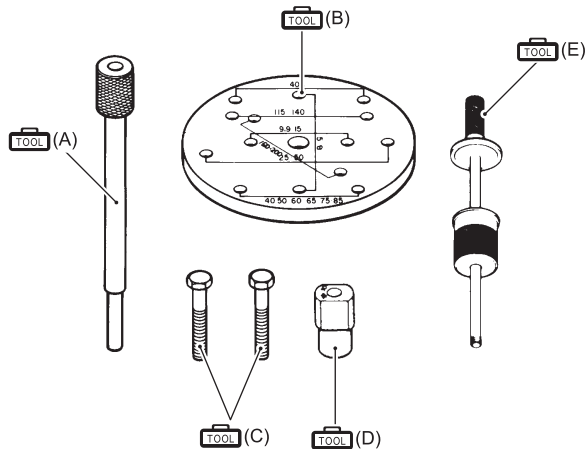
TOOL (A): 09951-59910 (Shaft (removal and installation))

TOOL (B): 09951-39914 (Plate)

TOOL (C): 01500-08403 (Bolt)

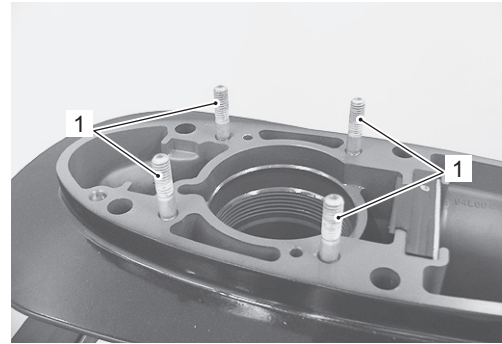
TOOL (D): 09951-19440 (Attachment)

TOOL (E): 09930-30104 (Sliding hammer)

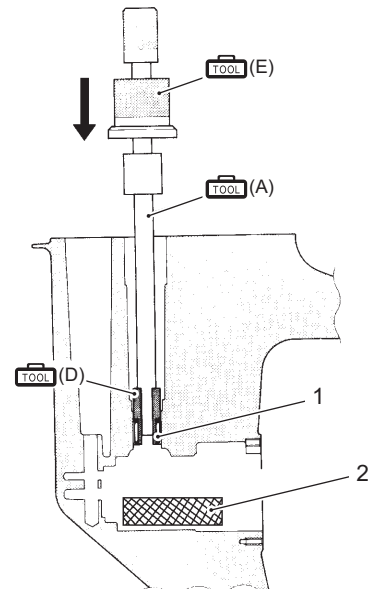


Removal

- 1) Disassemble the lower unit.
Refer to "Lower Unit Disassembly".
- 2) Remove the water pump stud bolts (1).



- 3) Place the attachment (D) inside the pinion bearing.
- 4) Insert the removal shaft (A) into attachment (D).
- 5) Thread sliding hammer (E) into top of removal shaft (A).
- 6) Put wood block under pinion bearing.
- 7) Drive the pinion bearing out downwards by striking top of shaft (A) with sliding hammer (E).



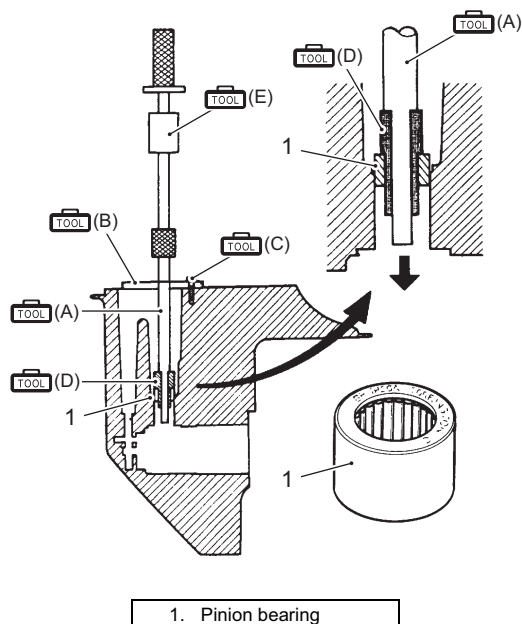
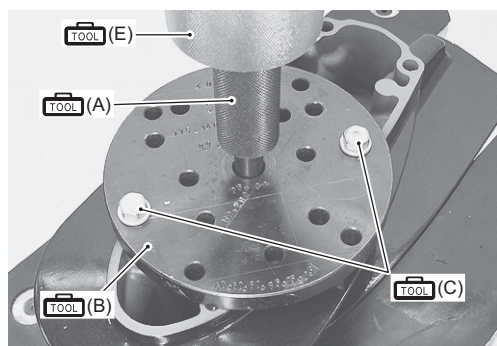
1. Pinion bearing	2. Wood block
-------------------	---------------

Installation

NOTE

- Before installing bearing, ensure that inside of gearcase is clean and free of debris.
- Ensure that the bearing stamped mark faces upward.

- 1) Set the installer shaft (A), plate (B), attachment (D), and pinion bearing as shown in the figure.
- 2) Place the installer shaft (A) (with pinion bearing on end of installer shaft) into the gearcase.
- 3) Secure the plate (B) by tightening the bolt (C).
- 4) Thread the sliding hammer (E) into the top of the installer shaft (A).
- 5) Drive the pinion bearing down into position by gently striking the installer shaft (A) until the coupler touches plate.
- 6) Assemble the lower unit.
Refer to "Lower Unit Assembly".



Lower Unit Related Items Inspection

⚠ WARNING

Failure to following proper precautions during use of the compressed air may cause severe personal injury.

Wear safety glasses when using compressed air.

NOTE

- If any component is worn excessively, cracked, defective or damaged in any way, it must be replaced.
- Thoroughly wash all metal components with cleaning solvent and dry with compressed air.

Gearcase

- Inspect the gearcase. Replace if cracked, damaged or other abnormal conditions are noted.
- Visually check the pinion bearing. Replace bearing if pitted, rough or other abnormal conditions are noted.

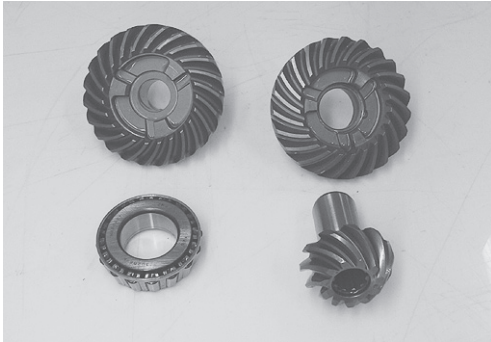
NOTE

If removal and replacement are required, refer to "Pinion Bearing Removal and Installation"



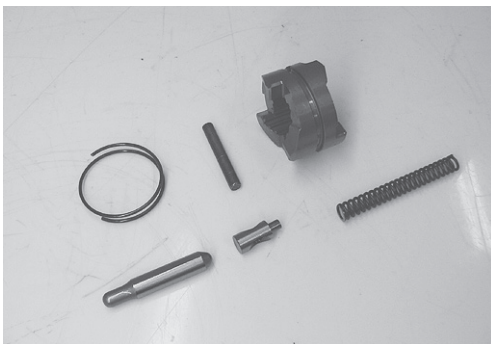
Gears / Bearing

- Inspect forward, reverse and pinion gear teeth and engaging dogs.
Replace gears if damaged, worn or other abnormal conditions are noted.
- Inspect forward gear bearing.
Replace bearing if pitted, noisy, rough or other abnormal conditions are noted.



Propeller Shaft Components

- Inspect push rod and push pin.
Replace if worn, damage or other abnormal condition are noted.
- Inspect clutch dog shifter. Replace if chipped, worn, damaged or other abnormal conditions are noted.
- Inspect dog pin. Replace if bent, worn or other abnormal conditions are noted.
- Inspect propeller shaft/splines. Replace if worn, twisted, damaged or other abnormal conditions are noted.

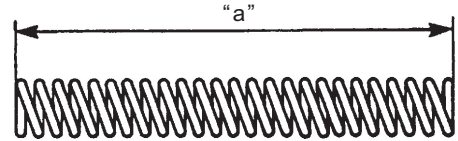


- Check clutch return spring by measuring its free length. If free length is not within specifications, replace clutch return spring.

Clutch return spring free length "a"

Standard: 58.5 mm (2.30 in.)

Service limit: 56.5 mm (2.22 in.)



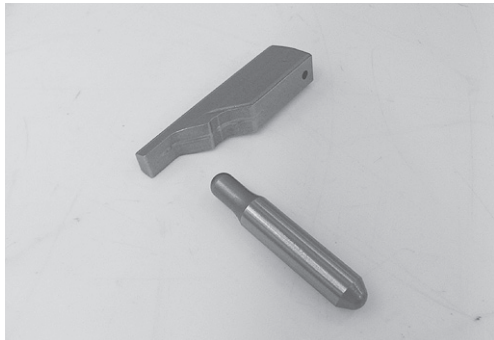
Propeller Shaft Bearing Housing

- Inspect housing. Replace if cracked, damaged or other abnormal conditions are noted.
- Inspect reverse gear bearing and propeller shaft bearing. Replace bearing if pitted, noisy, rough or other abnormal conditions are noted.
- Check condition of oil seal and O-ring. Replace oil seal and O-ring if nicked, cut, worn or other abnormal conditions are noted.



Shift Rod and Shift Cam Components

- Inspect the “stepped” surface of shift cam. Replace if worn, damaged or other abnormal condition are noted.
- Inspect shift rod guide. Replace if cracked, damaged or other abnormal conditions are noted.
- Inspect O-ring. Replace if nicked, cut, torn, swollen or other abnormal conditions are noted.
- Inspect dust boot. Replace if nicked, cut, worn or other abnormal conditions are noted.



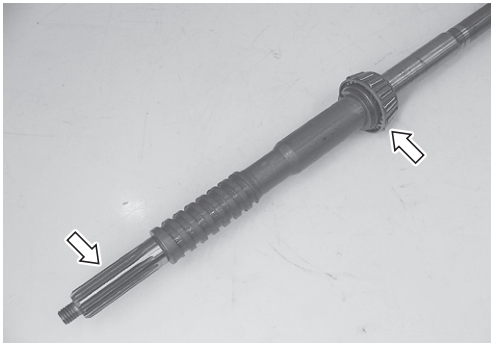
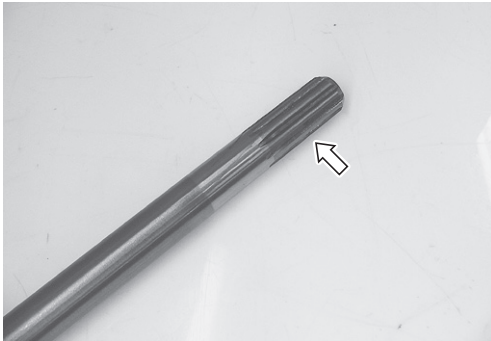
Driveshaft Oil Seal Housing

- Inspect housing. Replace if cracked, damaged or other abnormal conditions are noted.
- Check condition of oil seals. Replace if nicked, cut, worn or other abnormal conditions are noted.
- Inspect O-ring. Replace if worn, nicked, cut or other abnormal conditions are noted.



Driveshaft

- Inspect driveshaft/splines. Replace if worn, twisted, damaged or other abnormal conditions are noted.
- Inspect driveshaft bearing, replace if pitted, noisy, rough or other abnormal conditions are noted.



Propeller Shaft Oil Seal Replacement

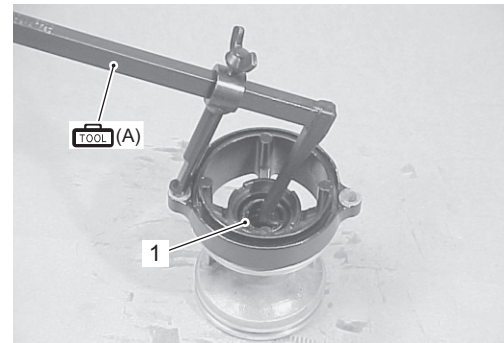
- 1) Remove the propeller shaft bearing housing. Refer to "Lower Unit Disassembly".
- 2) Extract seals (1) with oil seal remover.

NOTICE

Removing the oil seal can cause damage to the seal lips, causing oil to leak.
Do not reuse the oil seal once removed.
Always use new one.

Special tool

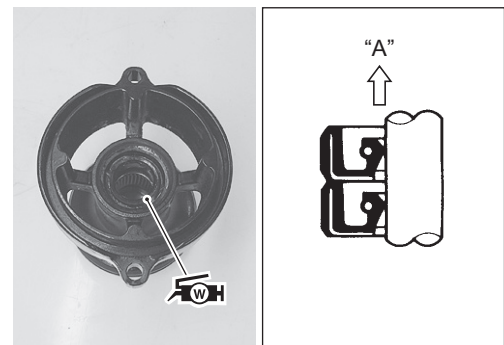
 (A): 09913-50121 (Oil seal remover)



- 3) Apply water resistant grease to the inner circumference of the housing.

 : Grease 99000-25350 (SUZUKI Water Resistant Grease EP2 (250 g))

- 4) Using an oil seal installer, drive the two oil seals (one at a time) into the propeller shaft bearing housing. The lipped portion of the seals must face towards the propeller. Apply water resistant grease to the seal lips.



"A": Direction of propeller

- 5) Assemble the propeller shaft bearing housing. Refer to "Lower Unit Assembly".

Driveshaft Oil Seal Replacement

- 1) Remove the driveshaft oil seal housing.
Refer to "Lower Unit Disassembly".
- 2) Using special tool, draw the two oil seals out of the driveshaft oil seal housing.

Special tool

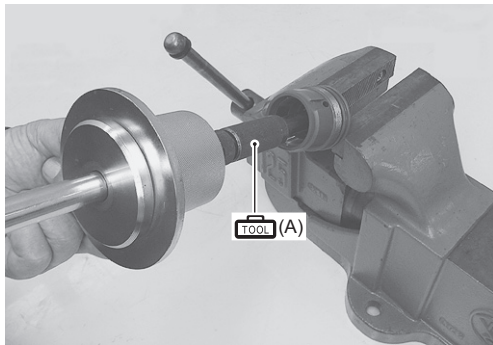
 (A): 09923-73210 (Bearing remover)

NOTICE

Removing the oil seal can cause damage to the seal lips, causing oil to leak.

Do not reuse the oil seal once removed.

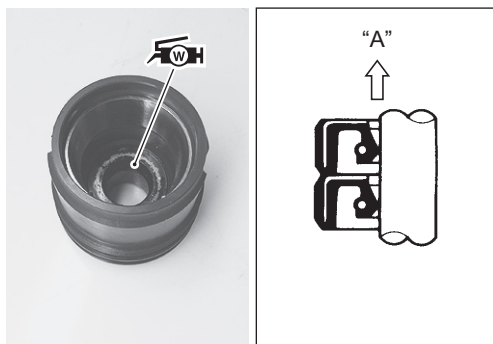
Always use new one.



- 3) Apply water resistant grease to inner circumference of driveshaft oil seal housing.

 : Grease 99000-25350 (SUZUKI Water Resistant Grease EP2 (250 g))

- 4) Grease the inner lips of oil seal.
With the lips facing away from driveshaft bearing, place seal in position and drive it into the oil seal housing.



"A": Direction of driveshaft bearing

- 5) Assemble the driveshaft oil seal housing.
Refer to "Lower Unit Assembly".

Lower Unit Assembly

Assembly is in reverse order of disassembly with special attention to the following steps.

NOTICE

Failure to correctly adjust the gear position will result in lower unit damage.

Before final assembly of lower unit, be absolutely certain that all gear contact, shim adjustments and tolerances are correct.

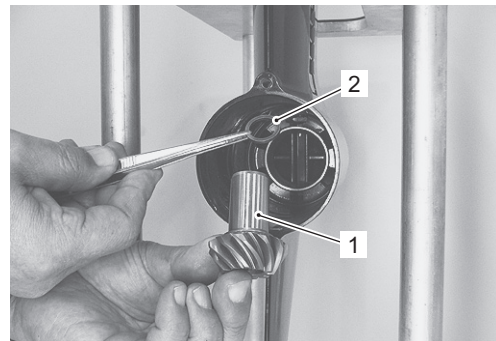
Refer to "Lower Unit Gears - Shimming and Adjustment".

NOTE

- Make sure that all parts used in assembly are clean and lubricated.
- It is recommended that all seals, gaskets and O-rings be replaced with new on assembly.
- After assembly, check parts for tightness and smoothness of operation.

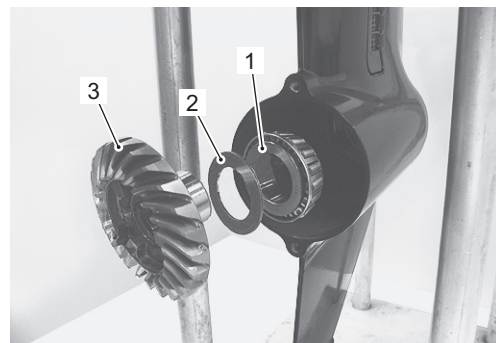
Pinion Gear

Place pinion gear (1) and pinion back-up shim (2) in gearcase.



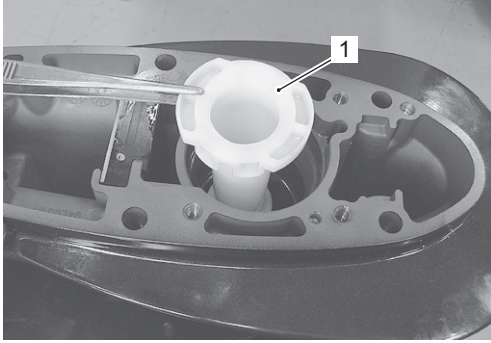
Forward Gear

Place the forward gear bearing (1) and back-up shim (2) in position, then install forward gear (3).



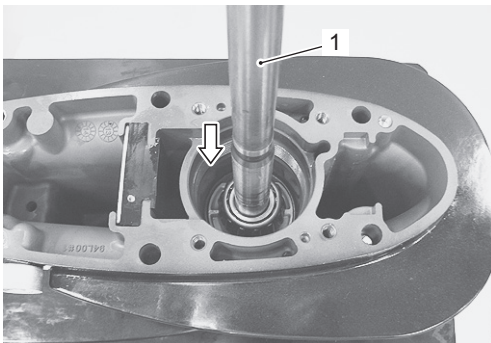
Driveshaft Collar

Install the driveshaft collar (1).



Driveshaft

- Lower the driveshaft assembly (1) down into the gearcase until the bottom of shaft protrudes through center of pinion gear.

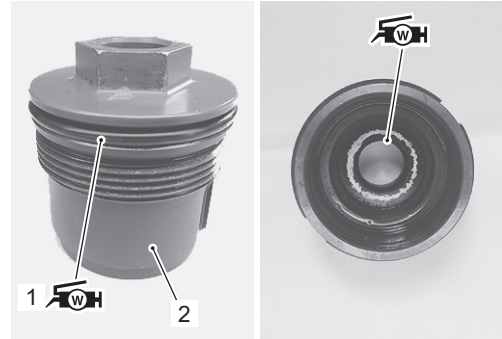


Driveshaft Oil Seal Housing

- Apply water resistant grease to the driveshaft oil seal.

 **Grease 99000-25350 (SUZUKI Water Resistant Grease EP2 (250 g))**

- Apply water resistant grease to O-ring (1), then install O-ring into groove on the driveshaft oil seal housing (2).



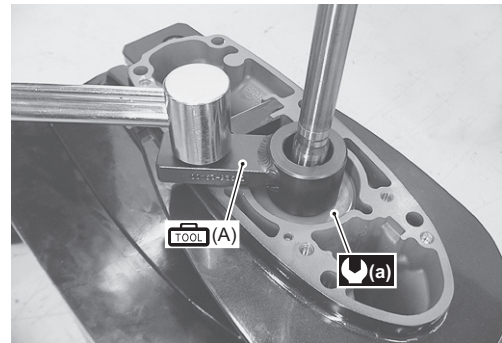
- Install the driveshaft oil seal housing on the gearcase, then tighten oil seal housing to specified torque.

Special tool

 (A): 09926-29400 (Driveshaft oil seal housing remover)

Tightening torque

Driveshaft oil seal housing (a): 50 N·m (5.0 kgf-m, 36 lbf-ft)



Pinion Nut

- Apply thread lock 1342 to the threads of pinion nut (1) before threading it onto driveshaft.

 : Thread lock cement 99000–32050 (SUZUKI Thread Lock 1342 (50 g))

- Tighten pinion nut to specified torque.

NOTE

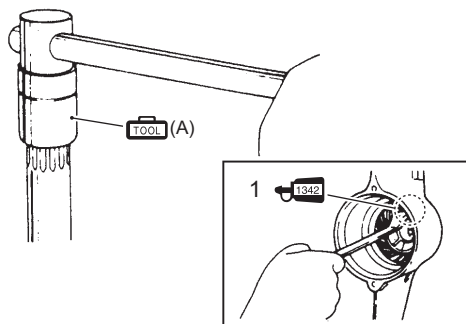
It is recommended the original pinion nut be used for the purposes of shimming during repair. A new pinion nut should be used on final assembly.

Special tool

 (A): 09921–29511 (Driveshaft holder)

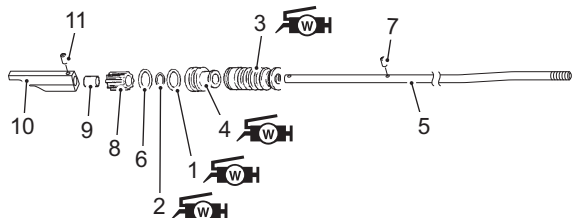
Tightening torque

Pinion nut (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



Shift Cam and Shift Rod

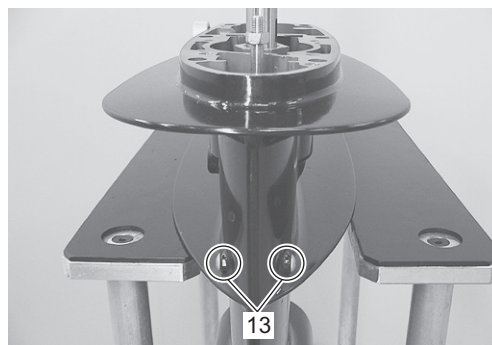
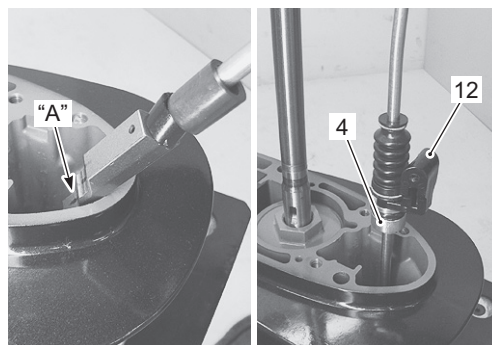
- Apply water resistant grease to the shift rod guide O-ring (1), (2) and the inside of the dust boot (3).
- Slide complete dust boot and shift rod guide (4) onto the shift rod (5).
- Install the washer (6) and pin (7).
- Attach the magnet (8) and magnet holder (9) to shift rod.
- Attach the shift cam (10) to shift rod, then insert the pin (11).



- Attach the stopper (12) to the shift rod guide (4).
- Install shift rod assembly to the gearcase and secure stopper to gearcase with screws (13).

NOTE

Be sure the stepped section “A” of shift cam faces towards propeller shaft.



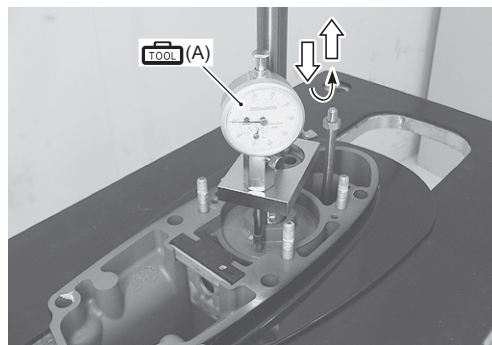
Checking Driveshaft Thrust Play

Before installing reverse gear, driveshaft thrust play should be checked.

Refer to “Lower Unit Gears - Shimming and Adjustment”.

Special tool

 (A): 09951–09530 (Gear adjusting gauge)

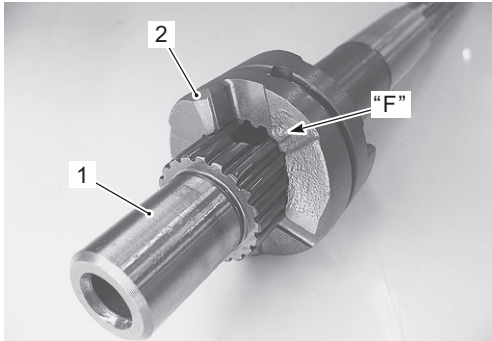


Propeller Shaft

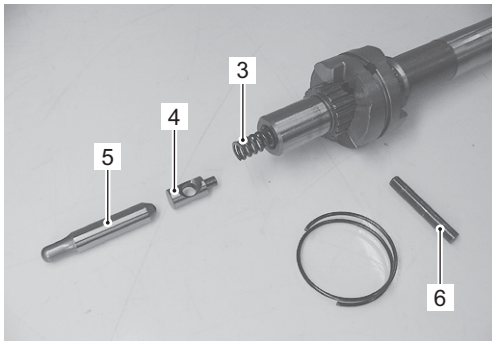
- Slide the clutch dog shifter (2) onto the propeller shaft (1).

NOTE

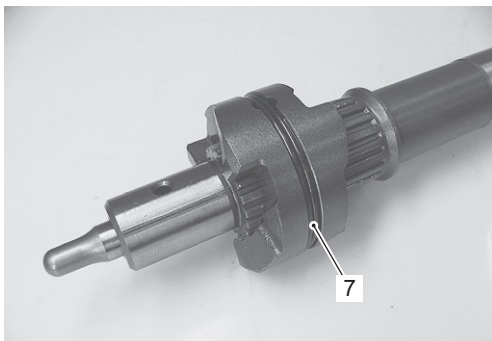
The side of the clutch dog shifter marked with the letter "F" must face towards forward gear.



- Insert the return spring (3), push pin (4) and push rod (5) into propeller shaft. Align the holes in the shifter dog and push pin. Depress the push rod and slide the dog pin (6) through both dog and push pin.



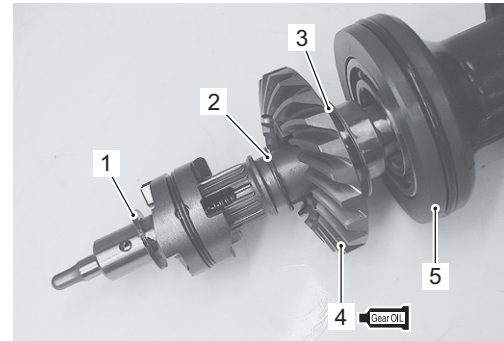
- Install the dog pin retaining spring (7), ensuring that it fits snugly into the groove on the dog shifter.



Propeller Shaft / Bearing Housing

- Place the forward thrust washer (1) and reverse thrust washer (2) on the propeller shaft.
- Install back-up shim (3) and reverse gear (4) to propeller shaft bearing housing (5).
- Slide propeller shaft into reverse gear and propeller shaft bearing housing.

 : Gear Oil 99000-22B22 (SUZUKI Outboard Motor Gear Oil)



- Apply water resistant grease to the bearing housing O-ring (6).

 : Grease 99000-25350 (SUZUKI Water Resistant Grease EP2 (250 g))



NOTE

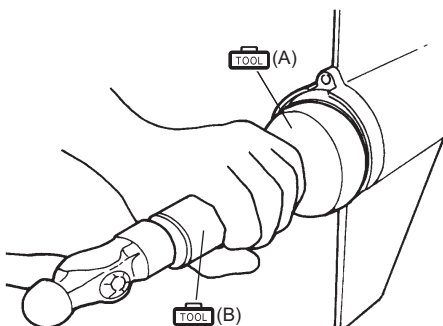
Before installing the propeller shaft/bearing housing assembly, bring the shift cam to the "Forward" position by moving shift rod up or down.

- Using special tools, install the propeller shaft and housing assembly in the gearcase.

Special tool

TOOL (A): 09922-59410 (Propeller shaft housing installer)

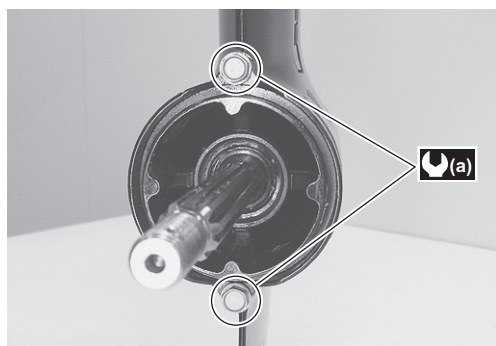
TOOL (B): 09922-59420 (Housing installer handle)



- When the housing is fully seated, tighten both retaining bolts to the specified torque.

Tightening torque

Bearing housing bolt (a): 10 N·m (1.0 kgf-m, 7.2 lbf-ft)



Rechecking Driveshaft Thrust Play

Recheck the driveshaft thrust play.

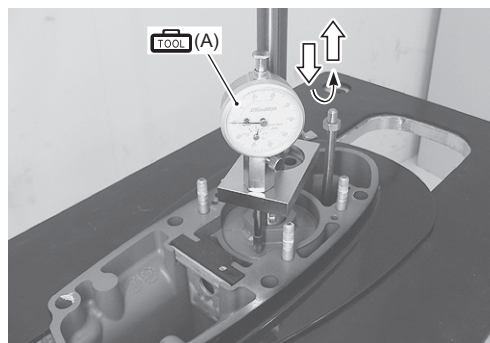
This should not be less than previously checked.

If less, reduce the number / thickness of the reverse gear back-up shims.

Refer to "Lower Unit Gears - Shimming and Adjustment".

Special tool

TOOL (A): 09951-09530 (Gear adjusting gauge)



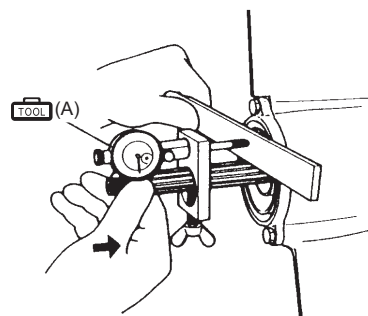
Checking Propeller Shaft Thrust Play

Check propeller shaft thrust play.

Refer to "Lower Unit Gears - Shimming and Adjustment".

Special tool

TOOL (A): 09951-09530 (Gear adjusting gauge)



Leakage Check

Check for leakage of oil seal and O-ring when applying specified pressure inside of the gearcase.

- 1) Install the test tool into the oil level hole.
- 2) Connect the air pump to the tester.
- 3) Rotate driveshaft and propeller shaft clockwise several times and then apply specified pressure for the test.

NOTICE

Failure to correctly apply the test pressure will result in oil seal damage.

Do not exceed pressure of 110 kPa (1.1 kg/cm², 15.6 psi.).

NOTE

Apply low initial pressure of 20 – 40 kPa (0.2 – 0.4 kg/cm², 2.8 – 5.7 psi.) first, then apply specified pressure.

Special tool

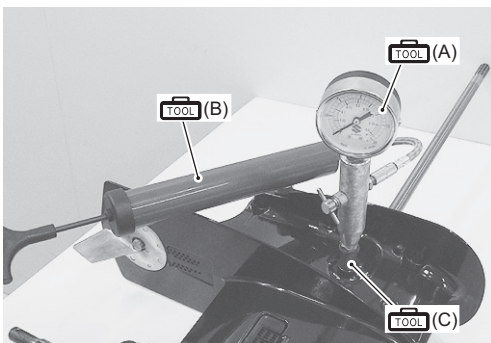
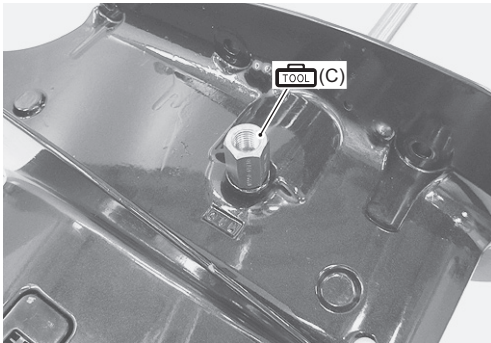
 (A): 09950–69512 (Gearcase oil leakage tester)

 (B): 09952–99320 (Hand air pump)

 (C): 09950–69710 (Attachment)

Leakage pressure test

100 kPa (1.0 kg/cm², 14.2 psi.)



- 4) Once stabilized, pressure should remain steady for at least 5 min.
If pressure does not fall, sealing performance is correct.

Water Pump

Install the water pump and related parts.

Refer to “Lower Unit Removal and Installation” and “Water Pump Removal and Installation”.

Propeller

Install the propeller.

Refer to “Propeller Removal and Installation”.

Lower Unit

Install the Lower Unit.

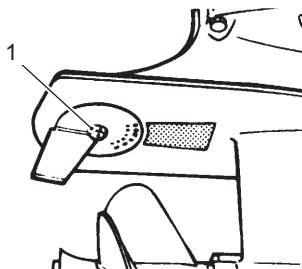
Refer to “Lower Unit Removal and Installation”.

Trim Tab Adjustment

The trim tab counteracts or minimizes propeller torque pull felt through the steering system.

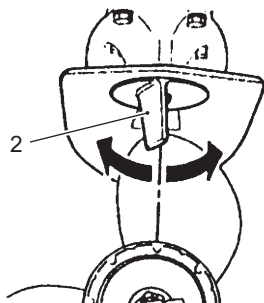
If the steering is pulled to the starboard or port side, adjust the trim tab with the following procedure.

- 1) Loosen the trim tab bolt (1).



- 2) Changing the trim tab setting.

- To compensate for a veer to starboard, set the trailing edge of tab (2) to the right (as viewed from behind).
- To compensate for a veer to port, set the trailing edge of tab to the left.



- 3) Tighten the bolt of trim tab.

- 4) Test drive the boat and repeat the procedure 1) – 3) to set the trim tab in the best position.

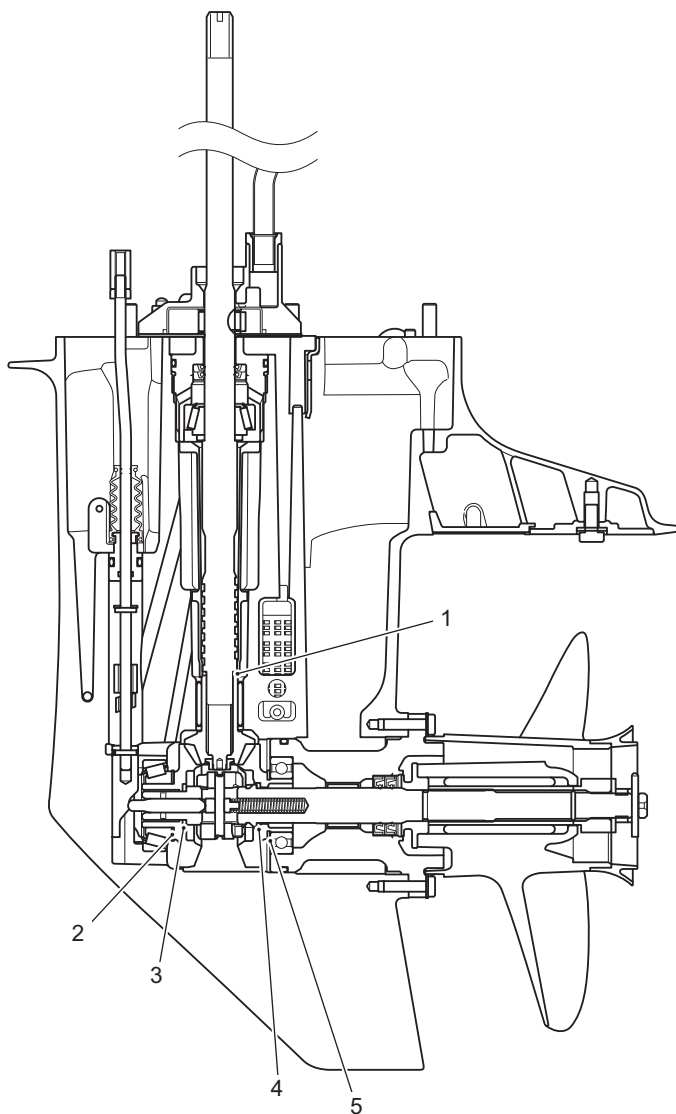
With a properly adjusted trim tab, steering should be neutral and there should be no tendency for the steering to be pulled to either port or starboard.

Lower Unit Gears - Shimming and Adjustment

If the lower unit has been rebuilt or has had components replaced, shimming for the correct gear contact and backlash will have to be checked and/or adjusted to ensure smooth, reliable operation.

Shim / Washer and mounting position

Item	Available thickness (mm)	Design specification thickness (mm)
Pinion gear back up shim	1.7, 1.8, 1.9, 2.0, 2.1, 2.2, 2.3, 2.4	2.1
Forward gear back up shim	0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5	1.2
Forward gear thrust washer	1.5	1.5
Propeller shaft reverse thrust washer	1.6, 1.8, 2.0, 2.2, 2.4, 2.6	1.8
Reverse gear back up shim	0.2, 0.5, 0.8	1.3



1. Pinion gear back up shim	3. Forward gear thrust washer	5. Reverse gear back up shim
2. Forward gear back up shim	4. Propeller shaft reverse thrust washer	

Forward Gear / Pinion Gear Back-Up Shim Adjustment

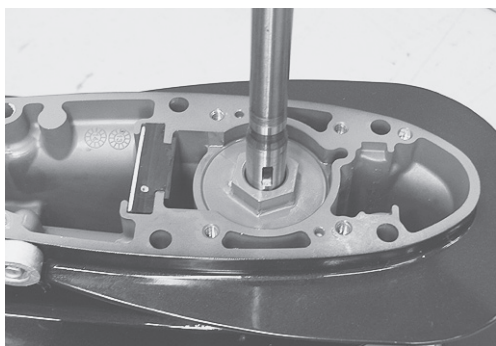
Follow the procedure below to adjust forward gear / pinion gear.

Prior to adjustment

- 1) Correctly assemble driveshaft oil seal housing, driveshaft, forward gear, pinion gear and related components. Refer to "Lower Unit Assembly". Do not install reverse gear at this time.
- 2) Tighten pinion nut to specified torque.

Tightening torque

Pinion nut: 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



Checking driveshaft thrust play

- 1) Affix the gear adjusting gauge to driveshaft.

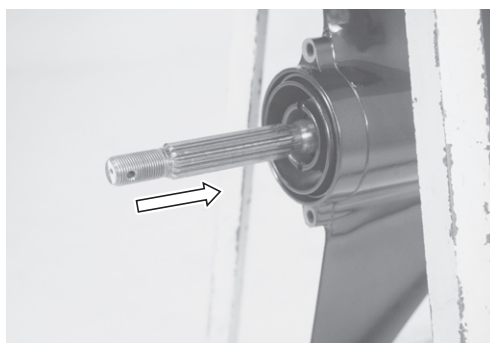
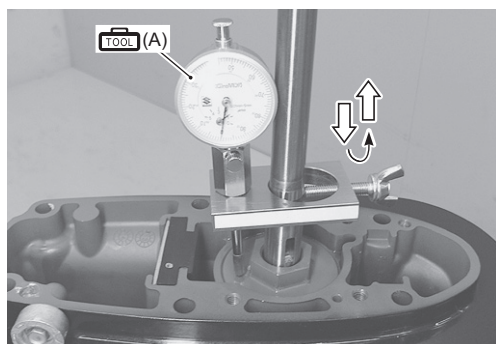
Special tool

TOOL (A): 09951-09530 (Gear adjusting gauge)

- 2) To check driveshaft thrust play, push the forward gear inward and hold it in this position. Slowly push the driveshaft downward completely, then slowly pull the driveshaft up and read the maximum thrust play.

Driveshaft thrust play

0.3 – 0.6 mm (0.012 – 0.023 in.)

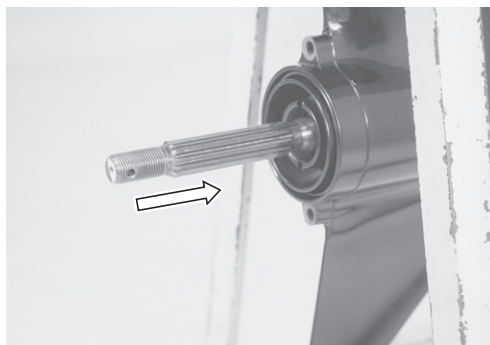


- If thrust play is larger than specified, the forward gear back-up shim thickness must be increased.
- If thrust play is smaller than specified, the forward gear back-up shim thickness must be decreased.

Checking and adjusting tooth contact pattern (Pinion and Forward gear)

Check tooth contact pattern using the following procedure.

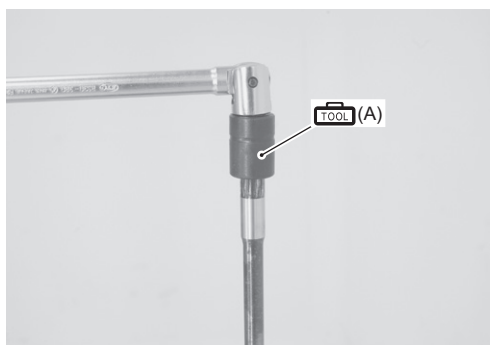
- 1) To assess tooth contact, apply a light coat of Prussian Blue on the convex surface of the forward gear.
- 2) Install the propeller shaft and housing assembly (minus reverse gear and internal components).
- 3) Push the propeller shaft inward and hold it in position.



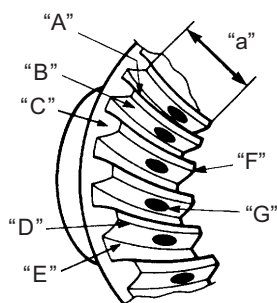
- 4) Using the driveshaft holder tool, rotate the driveshaft 5 – 6 times.

Special tool

TOOL (A): 09921-29511 (Driveshaft holder)



- 5) Carefully remove the propeller shaft and housing to check the tooth contact pattern.



"A": Concave side	"E": Tooth bottom
"B": Convex side	"F": Toe
"C": Heel	"G": Tooth contact pattern
"D": Tooth top	"a": Tooth width

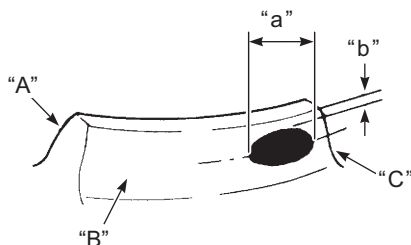
Optimum tooth contact

The optimum tooth contact is shown in the figure. A shim adjustment may be necessary to obtain this contact pattern.

NOTE

The driveshaft thrust play should be checked when increasing or decreasing shim thickness to adjust tooth contact.

Optimum tooth contact



"A": Heel	"a": Approx. 1/3 of tooth width
"B": Convex side	"b": Approx. 1 mm
"C": Toe	

Example [A]

Incorrect topside toe contact.

Correction measures.

- Decrease thickness of forward gear shim.
- Slightly increase pinion gear shim thickness.

NOTICE

Setting the tooth contact in the top side toe contact may cause damage and chipping on forward and pinion gears.

Do not set the tooth contact as such top side toe contact.

Example of incorrect



Example [B]

Incorrect bottom side toe contact.

Correction measures.

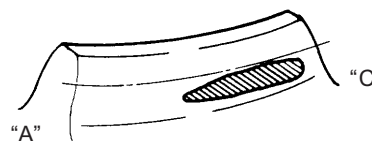
- Increase thickness of forward gear shim.
- Slightly decrease pinion gear shim thickness.

NOTICE

Setting the tooth contact in the bottom side toe contact may cause chipping on pinion gear.

Do not set the tooth contact as such bottom side toe contact.

Example of incorrect



Rechecking driveshaft thrust play

After obtaining optimum tooth contact, driveshaft thrust play should be measured.

- 1) Affix the gear adjusting gauge to the driveshaft.

Special tool

TOOL (A): 09951–09530 (Gear adjusting gauge)

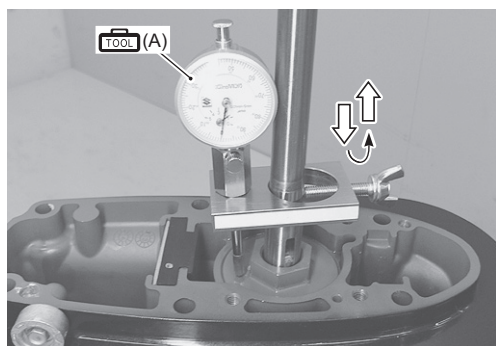
- 2) To check driveshaft thrust play, push the forward gear inward and hold it in this position. Push the driveshaft down completely, then slowly pull the driveshaft up and read the maximum thrust play. Designate this amount of play as “A”.

NOTE

Driveshaft thrust play “A” must be known to adjust reverse gear shim.

Driveshaft thrust play

0.3 – 0.6 mm (0.012 – 0.023 in.)

**Reverse Gear Back-Up Shim Adjustment**

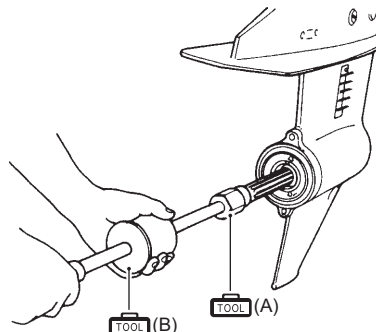
After adjusting the forward gear tooth contact pattern, follow the procedure below to adjust the reverse gear.

- 1) Correctly assemble and install reverse gear, propeller shaft, propeller shaft bearing housing and related components.
- 2) Screw a slide hammer assembly onto the propeller shaft and strike it a few gentle outward taps.

Special tool

TOOL (A): 09950–59310 (Propeller shaft remover)

TOOL (B): 09930–30104 (Sliding hammer)

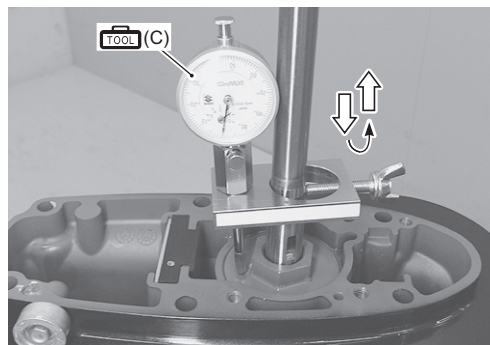


- 3) Affix the gear adjusting gauge to driveshaft.

Special tool

TOOL (C): 09951–09530 (Gear adjusting gauge)

- 4) Slowly push the driveshaft downward completely, then slowly pull the driveshaft up and read the maximum thrust play. Designate this measurement as play “B”.



- 5) Compare play “B” to play “A”. Refer to “Rechecking driveshaft thrust play” (Page 42).
- 6) Reverse gear back-up shim adjustment is correct if “B” is equal to “A”. If “B” is less than “A”, reduce reverse gear back-up shim thickness.

Checking propeller shaft thrust play

After adjusting all gear positions, measure the propeller shaft thrust play. If not within the following specification, a shim adjustment is required.

NOTE

Maintain the forward gear thrust washer at standard thickness (1.5 mm) and use only the propeller shaft reverse thrust washer to adjust thrust play.

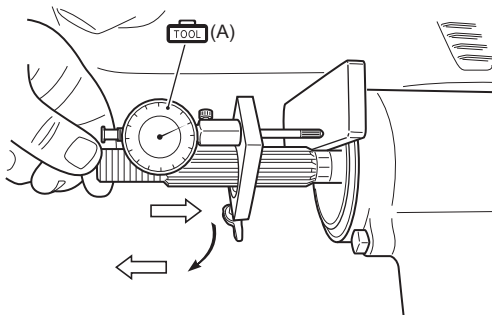
Propeller shaft thrust play

Approx. 0.2 – 0.4 mm (0.01 – 0.02 in.)

- 1) Assemble the gear adjusting gauge to the propeller shaft.

Special tool

 (A) 09951–09530 (Gear adjusting gauge)



- 2) Push propeller shaft inward.
- 3) Hold the shaft in and set the dial gauge pointer to zero.
- 4) Slowly pull the shaft outward and read the maximum thrust play on the dial gauge.
 - If the measurement is more than the specification, increase the propeller shaft reverse thrust washer thickness.
 - If the measurement is less than the specification, reduce the propeller shaft reverse thrust washer thickness.

Prepared by

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