

# SUZUKI

SUZUKI AMERICA CORPORATION  
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## SUZUKI DT30 (Prior To 1988)

### CONDENSED SERVICE MANUAL

NOTE: Metric fasteners are used throughout outboard motor.

#### TUNE-UP

Hp/rpm .....	30/4800-5500
Bore .....	.71 mm (2.80 in.)
Stroke .....	.63 mm (2.48 in.)
Number of Cylinders .....	2
Displacement .....	.499 cc (30.45 cu. in.)
Spark Plug:	
NGK .....	BR7HS
Electrode Gap .....	0.9-1.0 mm (0.035-0.039 in.)
Ignition Type .....	CDI
Carburetor Make .....	Mikuni
Idle Speed (in gear) .....	650-700 rpm
Fuel:Oil Ratio .....	50:1

#### SIZES - CLEARANCES

Piston Ring End Gap .....	0.2-0.4 mm (0.008-0.016 in.)
Piston-to-Cylinder Clearance:	
Prior To 1987 .....	0.067-0.082 mm (0.0026-0.0032 in.)
After 1986 .....	0.087-0.102 mm (0.0034-0.0040 in.)
Piston Pin Diameter .....	17.995-18.000 mm (0.7085-0.7087 in.)
Max. Crankshaft Runout at Main Bearing Journal .....	0.05 mm (0.002 in.)
Max. Connecting Rod Small End Side Shake .....	5.0 mm (0.020 in.)

#### TIGHTENING TORQUES

Power Head Mounting Screws .....	15-20 N·m (11-14 ft.-lbs.)
Crankcase:	
6 mm .....	8-12 N·m (6-8 ft.-lbs.)
8 mm .....	20-26 N·m (14-19 ft.-lbs.)

#### TIGHTENING TORQUES CONT.

Flywheel Nut .....	130-150 N·m (94-108 ft.-lbs.)
Cylinder Head Screws:	
6 mm .....	8-12 N·m (6-8 ft.-lbs.)
8 mm .....	20-26 N·m (14-19 ft.-lbs.)
Gearcase Pinion Nut .....	18-22 N·m (13-16 ft.-lbs.)
Propeller Shaft Nut .....	27-30 N·m (19-21 ft.-lbs.)
Standard Screws:	
Unmarked or Marked "4"	
5 mm .....	2-4 N·m (2-3 ft.-lbs.)
6 mm .....	4-7 N·m (3-5 ft.-lbs.)
8 mm .....	10-16 N·m (7-12 ft.-lbs.)
10 mm .....	22-35 N·m (16-26 ft.-lbs.)
Stainless Steel	
5 mm .....	2-4 N·m (2-3 ft.-lbs.)
6 mm .....	6-10 N·m (5-7 ft.-lbs.)
8 mm .....	15-20 N·m (11-15 ft.-lbs.)
10 mm .....	34-41 N·m (25-30 ft.-lbs.)
Marked "7" or SAE Grade 5	
5 mm .....	3-6 N·m (2-5 ft.-lbs.)
6 mm .....	8-12 N·m (6-9 ft.-lbs.)
8 mm .....	18-28 N·m (13-20 ft.-lbs.)
10 mm .....	40-60 N·m (29-44 ft.-lbs.)

## LUBRICATION

The power head is lubricated by oil mixed with the fuel. On models prior to 1987, fuel:oil ratio should be 30:1 during break-in (first five hours of operation) of a new or rebuilt engine and 50:1 for normal service. On models after 1986, fuel:oil ratio during engine break-in should be 25:1 and 100:1 for normal service. Recommended oil is Suzuki Outboard Motor Oil or a suitable equivalent NMMA (formerly BIA) certified TC-WII oil. Recommended fuel is regular or unleaded gasoline with a minimum pump octane rating of 85.

The lower unit gears and bearings are lubricated by approximately 230 mL (7.77 ozs.) of SAE 90 hypoid outboard gear oil. Reinstall vent and fill plugs se-

curally using a new gasket, if necessary, to ensure a water-tight seal.

## FUEL SYSTEM

**CARBURETOR.** A Mikuni B32-28 carburetor is used. Refer to Fig. SZ11-1 for exploded view. Initial setting of pilot air screw (6) from a lightly seated position should be  $1\frac{1}{4}$  to  $1\frac{3}{4}$  turns open on models prior to 1987 and  $1\frac{1}{2}$  to 2 turns open on models after 1986. Final carburetor adjustment should be made with engine at normal operating temperature and running in forward gear. Adjust idle speed screw (2) so engine idles at approximately 650-700 rpm. Adjust pilot air screw so engine idles smoothly and will accelerate cleanly without hesitation. If necessary, readjust idle speed screw to obtain 650-700 rpm idle speed.

Main fuel metering is controlled by main jet (10). Standard main jet size for normal operation is #160. Standard pilot jet (4) size is #77.5 on models prior to 1987 and #85 on models after 1986.

To check float level, remove float bowl (14) and invert carburetor body (1). Distance (D—Fig. SZ11-2) between main jet and bottom of float should be 10-12 mm ( $\frac{25}{64}$  to  $\frac{15}{32}$  in.). Bend float tang to adjust float level.

**FUEL FILTER.** A fuel filter assembly is used to filter the fuel prior to entering the fuel pump assembly. Periodically unscrew cup (5—Fig.

SZ11-3) from base (1) and withdraw filter element (4). Clean cup (5) and filter element (4) in a suitable solvent and blow dry with clean compressed air. Inspect filter element (4). If excessive blockage or damage is noted, then the element must be renewed.

Reassembly is reverse order of disassembly. Renew "O" ring (3) and, if needed, seal (2) during reassembly.

**FUEL PUMP.** A diaphragm fuel pump (Fig. SZ11-4) is mounted on the side of power head cylinder block and is actuated by pressure and vacuum pulsations from the engine crankcase.

When servicing pump, scribe reference marks across pump body to aid in reassembly. Defective or questionable parts should be renewed. Diaphragm should be renewed if air leaks or cracks are found, or if deterioration is evident.

**REED VALVES.** The reed valves are located on a reed plate that is located behind the intake manifold. The intake manifold must be removed in order to remove reed plate and service reed valves.

Renew reed valves (2—Fig. SZ11-5) if petals are broken, cracked, warped, rusted or bent. Tip of reed petal must not stand open more than 0.2 mm (0.008 in.) from contact surface. Reed stop

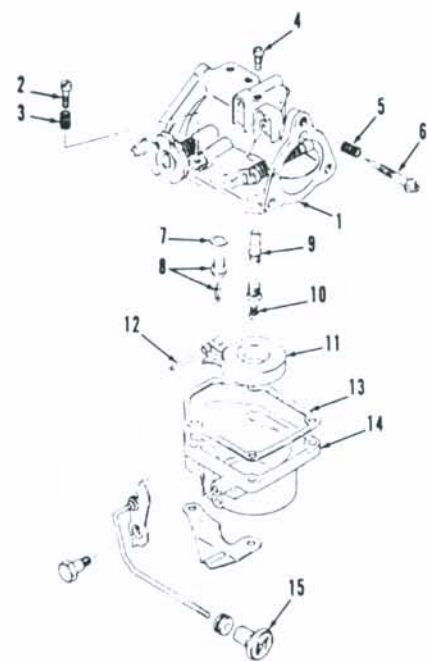


Fig. SZ11-1—Exploded view of Mikuni B32-28 carburetor.

- |                     |                |
|---------------------|----------------|
| 1. Body             | 9. Main nozzle |
| 2. Idle speed screw | 10. Main jet   |
| 3. Spring           | 11. Float      |
| 4. Pilot jet        | 12. Pin        |
| 5. Spring           | 13. Gasket     |
| 6. Pilot air screw  | 14. Float bowl |
| 7. Gasket           | 15. Choke knob |
| 8. Needle & seat    |                |

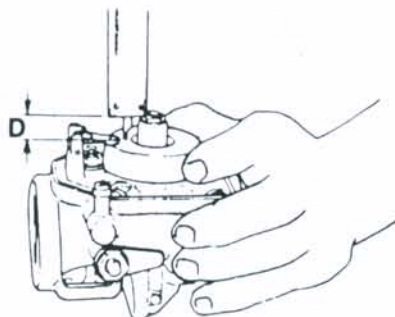


Fig. SZ11-2—Distance (D) for correct float level should be 10-12 mm (0.394-0.472 in.).

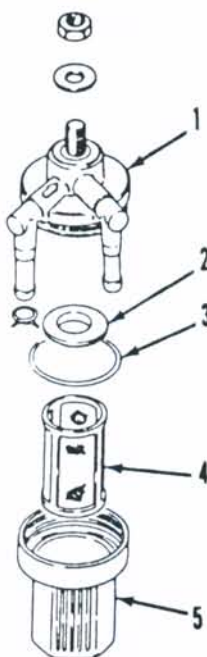


Fig. SZ11-3—Exploded view of fuel filter assembly.

- |             |            |
|-------------|------------|
| 1. Base     | 4. Element |
| 2. Seal     | 5. Cup     |
| 3. "O" ring |            |

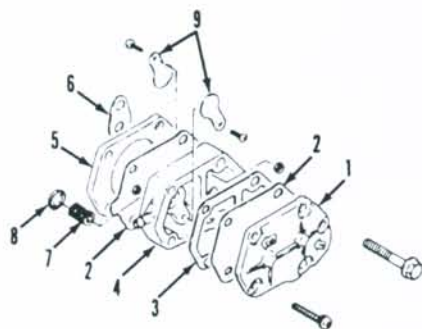


Fig. SZ11-4—Exploded view of diaphragm type fuel pump.

- |               |                |
|---------------|----------------|
| 1. Cover      | 6. Gasket      |
| 2. Diaphragm  | 7. Spring      |
| 3. Gasket     | 8. Spring seat |
| 4. Valve body | 9. Check valve |
| 5. Plate      |                |

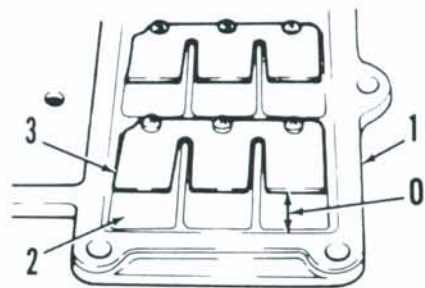


Fig. SZ11-5—View identifying reed plate (1), reed valves (2) and reed stops (3). Reed stop opening (0) should be 6.0-6.4 mm (0.24-0.25 in.).

opening (O) should be 6.0-6.4 mm (0.24-0.25 in.).

**SPEED CONTROL LINKAGE.**

Place twist grip in the full closed position. Stator plate stopper (P—Fig. SZ11-8) should be in contact with cylinder block boss (D). Adjust rod (A—Fig. SZ11-6) length until mark (M) on throttle cam (C) is centered with roller (R). Rotate twist grip to the full throttle position. Stator plate stopper should be in contact with cylinder block boss. Adjust rod (B) length until throttle limiter (L) contacts stopper (S) on bottom engine cover.

**IGNITION**

A breakerless, capacitor discharge ignition system is used. Refer to Fig. SZ11-7 for wiring diagram.

Full throttle and full ignition advance should occur simultaneously. Ignition timing is mechanically advanced and must be synchronized with throttle opening.

To check ignition timing, first immerse lower unit of outboard motor in water. Connect a suitable tachometer to engine. Connect a power timing light to upper spark plug. Start engine and allow it to run until it reaches normal operating temperature. Shift into forward gear and note ignition timing. Timing pointer (T—Fig. SZ11-8) should be aligned with 2 degree ATDC mark (A) on flywheel. Loosen locknut and rotate screw (S) until idle speed timing is as recommended. Maximum advance timing should be 25 degrees BTDC (M) at 5000 rpm. Stop engine and loosen cap screws (C) and slide stator plate stopper (P) in slots to adjust maximum advance timing. Retighten cap screws (C) after recommended maximum advance tim-

ing is obtained. Reset idle speed timing as previously recommended.

If ignition malfunction occurs, check condition of spark plugs, and all wires and connections before troubleshooting ignition circuit. Using Suzuki pocket tester 09900-25002 or a suitable ohmmeter, refer to the following test specifications and procedures to aid trouble-shooting.

To check secondary coil resistance of CDI unit, detach spark plug wires at spark plugs. Connect a tester lead to terminal end of each spark plug wire. Secondary coil resistance should be 2136-3204 ohms at 20°C (68°F).

Remove top cover of electrical parts holder for access to wire connectors. Remove top three-wire coupler and separate. To check charge coil (Fig. SZ11-7), connect a tester lead to black wire with red tracer and black wire of three-wire connector leading to stator plate. Charge coil can be considered satisfactory if resistance reading is within the limits of 102-154 ohms at 20°C (68°F).

To check pulser coil, connect a tester lead to red wire with white tracer and black wire of three-wire connector leading to stator plate. Pulser coil can be considered satisfactory if resistance reading is within the limits of 27.9-41.9 ohms at 20°C (68°F).

Check condition of battery lighting coil by separating connectors of yellow wire and red wire. Connect a tester lead to terminal end of wires leading to stator plate. Lighting coil can be considered satisfactory if resistance reading is within the limits of 0.24-0.36 ohms at 20°C (68°F).

If no component is found faulty in the previous tests, then the CDI unit must be renewed.

**COOLING SYSTEM**

**WATER PUMP.** A rubber impeller type water pump is mounted between the drive shaft housing and gearcase. A key in the drive shaft is used to turn the pump impeller. If cooling system problems are encountered, check water intakes for plugging or partial stoppage. If water intakes are clear, remove gearcase as outlined under LOWER UNIT and check condition of the water pump, water passages and sealing surfaces.

When water pump is disassembled, check condition of impeller (8—Fig. SZ11-19) and plate (9) for excessive wear. Turn drive shaft clockwise (viewed from top) while placing pump housing over impeller. Avoid turning drive shaft in opposite direction when water pump is assembled.

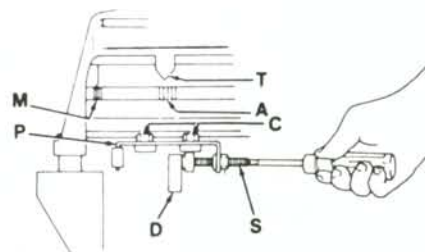


Fig. SZ11-8—Adjust idle speed timing and maximum advance timing as outlined in text.

- A. 2° ATDC mark
- C. Cap screws
- D. Cylinder block boss
- M. 25° BTDC mark
- P. Stator plate stopper
- S. Idle speed timing adjustment screw
- T. Timing pointer

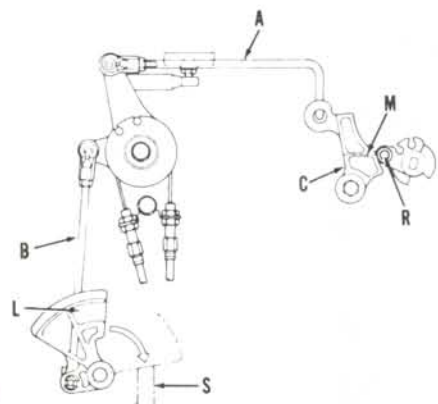


Fig. SZ11-6—View of speed control linkage. Adjust components as outlined in text.

- A. Rod
- B. Rod
- C. Throttle cam
- L. Throttle limiter
- M. Mark
- R. Roller
- S. Stopper

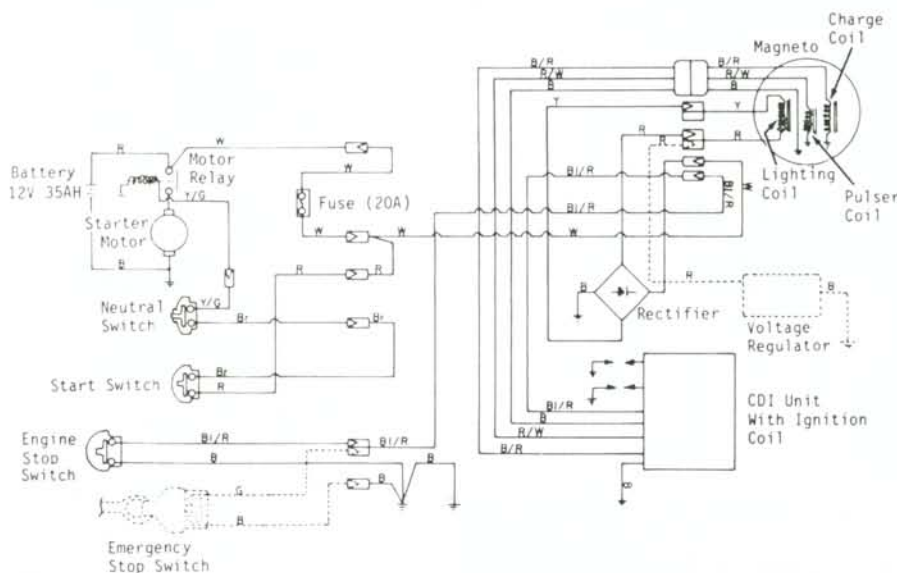


Fig. SZ11-7—Wiring diagram of electrical system on models with electric starter.

- B. Black
- G. Green
- R. Red
- W. White
- Y. Yellow
- Bl. Blue
- Br. Brown
- B/R. Black with red tracer
- Bl/R. Blue with red tracer
- R/W. Red with white tracer
- Y/G. Yellow with green tracer

**THERMOSTAT.** A thermostat (7—Fig. SZ11-14) is used to regulate operating temperature. Thermostat should start to open within the temperature

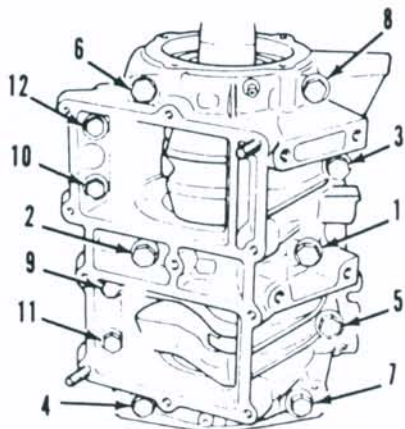


Fig. SZ11-9—Tighten crankcase screws in the sequence shown. Refer to **CONDENSED SERVICE DATA** for screw torques.

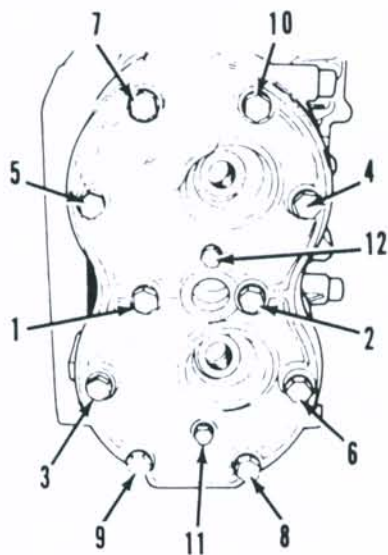


Fig. SZ11-10—Tighten cylinder head screws in sequence shown. Refer to **CONDENSED SERVICE DATA** for screw torques.

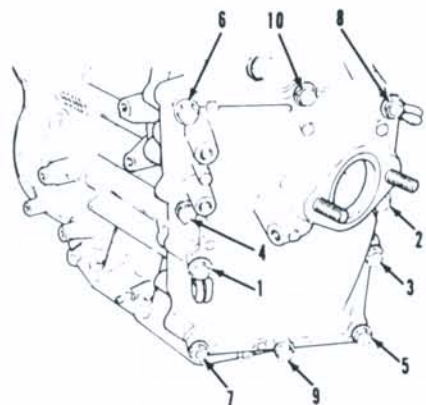


Fig. SZ11-11—Securely tighten intake manifold screws in sequence shown.

range of 48.5°-51.5° C (119°-125° F). Thermostat can be removed for inspection or renewal by removing cylinder head cover (6).

## POWER HEAD

**REMOVE AND REINSTALL.** To remove the power head, first remove engine's top cover. Disconnect throttle cables, throttle limiting rod, fuel inlet hose at lower engine cover connector, choke knob and wires which will interfere with power head removal. Label wires, if needed, for later reference. Remove and carburetor's air intake cover, carburetor, rewind starter, starter motor relay and electric starter motor. Remove eight screws which secure power head assembly to drive shaft housing and lift off power head.

Before reinstalling power head, make certain drive shaft splines are clean then coat them with a light coating of water resistant grease. Install power head on drive shaft housing. Coat threads of retaining cap screws with silicone sealer and tighten screws to 15-20 N·m (11-14 ft.-lbs.). The remainder of installation is the reverse of removal procedure. Refer to **SPEED CONTROL LINKAGE** for synchronizing throttle opening with ignition advance.

**DISASSEMBLY.** Disassembly and inspection may be accomplished in the

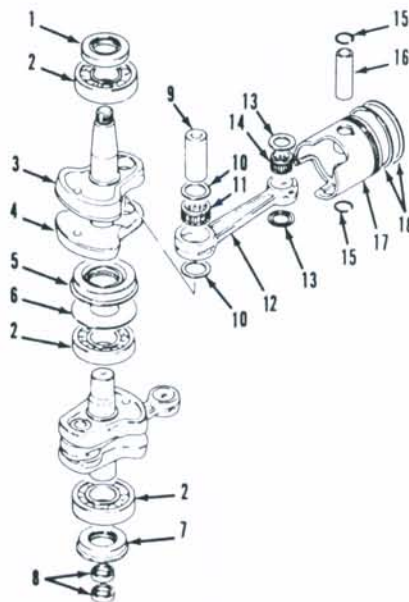


Fig. SZ11-12—Exploded view of piston and crankshaft assembly.

- |                   |                    |
|-------------------|--------------------|
| 1. Seal           | 10. Thrust washers |
| 2. Ball bearings  | 11. Roller bearing |
| 3. Crank half     | 12. Connecting rod |
| 4. Crank half     | 13. Thrust washers |
| 5. Labyrinth seal | 14. Roller bearing |
| 6. Washer         | 15. Circlips       |
| 7. Seal           | 16. Piston pin     |
| 8. Seals          | 17. Piston         |
| 9. Crank pin      | 18. Piston rings   |

following manner. Remove electric starter bracket, exhaust tube, fuel filter and fuel pump. Remove flywheel and key, stator plate with pulser, charge and lighting coils. Remove electrical parts holder, speed control linkage, upper oil seal housing and stator retainer ring. Remove intake manifold, reed valve plate, exhaust cover and exhaust plate with gaskets. Remove cylinder head and cover with gaskets. Remove the twelve crankcase cap screws, then separate crankcase from cylinder block. Lift crankshaft assembly with pistons and connecting rod assemblies from cylinder block.

Engine components are now accessible for overhaul as outlined in the appropriate following paragraphs. Clean carbon from cylinder head and combustion chambers and remove any foreign material accumulation in water passages. Inspect components for damage and renew if needed. Refer to the following section for assembly procedure.

**ASSEMBLY.** Refer to specific service sections when assembling the crankshaft, connecting rods, pistons and reed valves. Make sure all joint and gasket surfaces are clean and free from nicks and burrs. Make sure all carbon, salt, dirt and sand are cleaned from the combustion chambers, exhaust ports and water passages.

Lubricate crankpin bearings and cylinder walls of cylinder block with Suzuki engine oil or a suitable NMMA certified two-stroke engine oil. Install crankshaft assembly in crankcase. Make sure flange of lower oil seal (7—Fig. SZ11-12) and middle labyrinth seal (5) fits properly in crankcase grooves. Make sure bearing pins engage notches in crankcase. Spread a coat of Suzuki Bond No. 1215 or a suitable equivalent on the mating surfaces of the crankcase and the cylinder block. Position crankcase half on cylinder block and tighten the crankcase screws in the sequence shown in Fig. SZ11-9 to torques shown in **CONDENSED SERVICE DATA**. Tighten the cylinder head screws in the sequence shown in Fig. SZ11-10 to torques shown in **CONDENSED SERVICE DATA**. Tighten the intake manifold screws in the sequence shown in Fig. SZ11-11.

**PISTONS, PINS, RINGS AND CYLINDERS.** Each piston is fitted with two piston rings. Piston ring end gap should be 0.2-0.4 mm (0.008-0.016 in.) with a maximum allowable ring end gap of 0.8 (0.031 in.). Piston rings are retained in position by locating pins. Standard piston pin diameter is 17.995-18.000 mm (0.7085-0.7087 in.). Install marked side of piston ring toward top of piston. Piston to cylinder

wall clearance should be 0.067-0.082 mm (0.0026-0.0032 in.). Piston and rings are available in standard size as well as 0.25 mm (0.010 in.) and 0.50 mm (0.020 in.) oversizes. Cylinders should be bored to an oversize if either of the cylinders is out-of-round or taper exceeds 0.10 mm (0.004 in.). Install pistons on connecting rods so arrow on piston crown points toward exhaust port side of cylinder bore.

**CONNECTING RODS, BEARINGS AND CRANKSHAFT.** Connecting rods, bearings and crankshaft are a press together unit. Crankshaft should be disassembled **ONLY** by experienced service personnel and with suitable service equipment.

Caged roller bearings are used at both large and small ends of the connecting rods. Determine rod bearing wear from side to side as shown in Fig. SZ11-13. Normal side to side movement is 5.0 mm (0.20 in.) or less. Maximum limit of crankshaft runout is 0.05 mm (0.002 in.) measured at bearing surfaces with crankshaft ends supported.

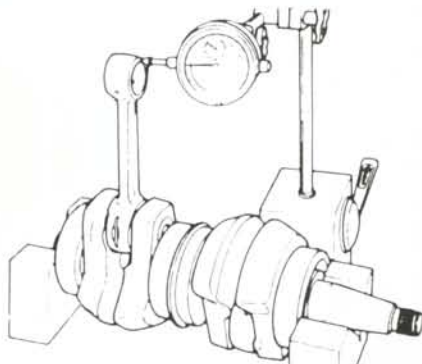


Fig. SZ11-13—Move connecting rod small end to side to determine connecting rod, bearing and crank pin wear. Refer to text.

Apply Suzuki Super Grease "A" or a suitable high temperature grease to lip portion of lower crankshaft seal prior to installation.

**MANUAL STARTER**

Refer to Fig. SZ11-15 for an exploded view of manual starter assembly. Starter may be removed as a complete unit by detaching the neutral start cable and removing the three cap screws securing starter assembly to power head. To disassemble starter, proceed as follows: Remove starter handle (16—Fig. SZ11-15) and allow starter rope (14) to slowly wind onto pulley (4). Detach neutral start components. Invert starter housing (1) and remove cap screw (17). Withdraw plate (10) and spring (9).

Remove drive pawl (6) and return spring (5). Remove snap ring (8). Lift pulley (4) with starter rope (14) from starter housing. Use suitable hand and eye protection, and withdraw rewind spring (2) from starter housing (1). Be careful when removing rewind spring (2); a rapidly uncoiling starter spring could cause serious injury.

To reassemble, coat rewind spring area of starter housing (1) with a suitable water resistant grease. Install rewind spring (2) in starter housing. Rewind spring (2) must wind in a counter-clockwise direction from the outer end. Wrap starter rope (14) in a clockwise direction 2½ turns onto pulley (4) when viewed from the flywheel side. Reassemble starter assembly by reversing disassembly procedure making certain rewind spring's hook properly engages groove in pulley (4). Apply water resistant grease to friction side of drive plate (10). Make sure slot (S—Fig. SZ11-16) in

drive plate properly engages tab (T) on starter housing boss and spring (9) fits into groove (G) in pulley (4).

To place tension on rewind spring (2—Fig. SZ11-15), pass starter rope (14) through rope outlet in housing (1),

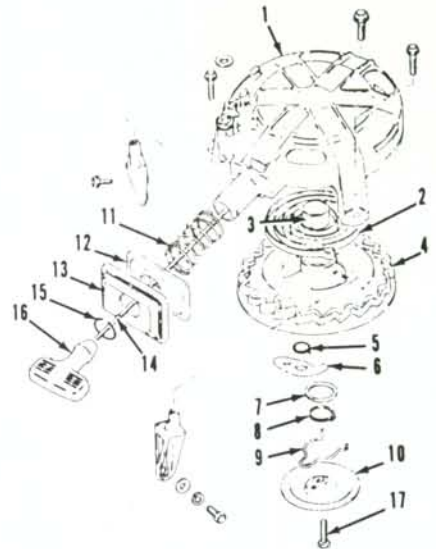


Fig. SZ11-15—Exploded view of manual starter assembly.

- |                  |                  |
|------------------|------------------|
| 1. Housing       | 10. Plate        |
| 2. Rewind spring | 11. Spring       |
| 3. Bushing       | 12. Rope guide   |
| 4. Pulley        | 13. Rubber plate |
| 5. Return spring | 14. Starter rope |
| 6. Drive pawl    | 15. Clip         |
| 7. Spacer        | 16. Handle       |
| 8. Snap ring     | 17. Cap screw    |
| 9. Spring        |                  |

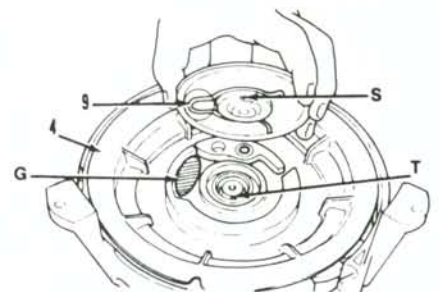


Fig. SZ11-16—During reassembly, slot (S) in drive plate must properly engage tab (T) on starter housing boss and spring (9) must fit into groove (G) in pulley (4).

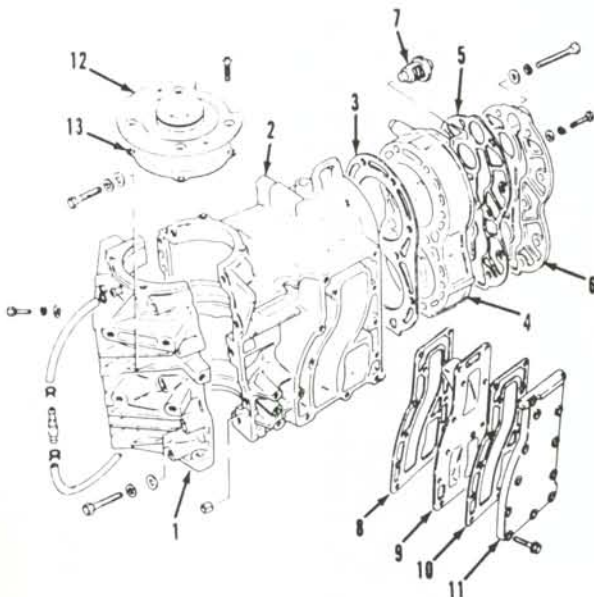


Fig. SZ11-14—Exploded view of cylinder block and crankcase assembly.

1. Crankcase
2. Cylinder block
3. Gasket
4. Cylinder head
5. Gasket
6. Cylinder head cover
7. Thermostat
8. Gasket
9. Exhaust plate
10. Gasket
11. Exhaust cover
12. Upper oil seal housing
13. Gasket

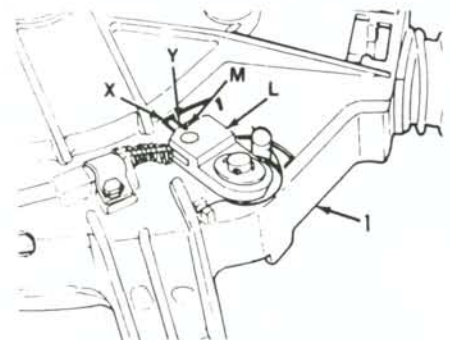


Fig. SZ11-17—For proper neutral start cable adjustment, mark (M) in lever (L) must be between marks (X and Y) on starter housing (1) when gear shift lever is in "Forward" or "Reverse" position.

LOWER UNIT

spring (11), rope guide (12), rubber plate (13) and install rope handle (16). With starter rope (14) inserted in slot of pulley (4), rotate pulley 4 turns counter-clockwise when viewed from the fly-wheel side. Secure pulley, then release starter rope (14) from slot in pulley and allow starter rope to slowly wind onto pulley. Do not place any more tension on rewind spring (2) than is necessary to draw rope handle up against housing.

Remount manual starter assembly and reassemble neutral start cable and associated components. With the gear shift lever in the "Forward" or "Reverse" position, mark (M-Fig. SZ11-17) in lever (L) must be between marks (X and Y) on starter housing (1). Adjust the length of the neutral start cable to obtain the correct adjustment.

ELECTRIC STARTER

Some models are equipped with electric starter shown in Fig. SZ11-18. Disassembly is evident after inspection of unit and reference to exploded view. Standard commutator outside diameter is 30 mm (1.18 in.) and should be renewed if worn to a diameter of 29 mm (1.14 in.) or less. Starter brushes have a

standard length of 12.5 mm (0.492 in.) and should be renewed if worn to 9 mm (0.354 in.) or less. During reassembly, make sure upper and lower alignment marks on frame (6-Fig. SZ11-18) align with notches in frame head (5) and frame end (12). After reassembly, bench test starter before installing on power head.

**PROPELLER AND RUBBER DAMPER.** A ratchet hub (50-Fig. SZ11-19) is used to provide shock protection for lower unit gears and shafts. Three-bladed propellers are used. Standard propeller has a 260.3 mm (10¼ in.) diameter and a 304.8 mm (12 in.)

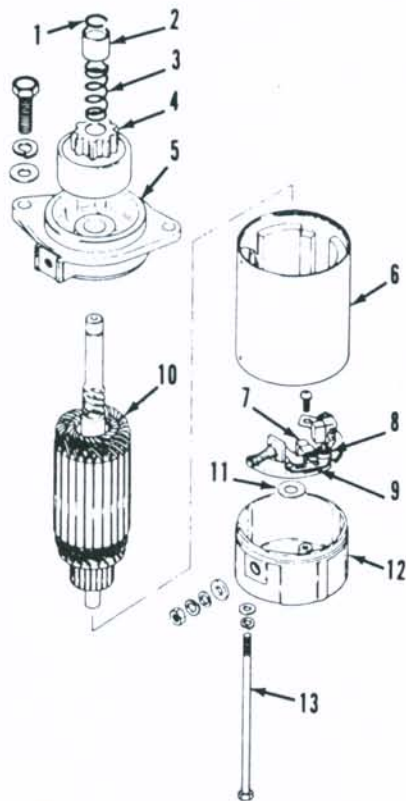


Fig. SZ11-18—Exploded view of electric start motor.

- |               |                   |
|---------------|-------------------|
| 1. Retainer   | 8. Spring         |
| 2. Stop       | 9. Brush holder   |
| 3. Spring     | 10. Armature      |
| 4. Drive      | 11. Thrust washer |
| 5. Frame head | 12. Seal          |
| 6. Frame      | 13. Through-bolt  |
| 7. Brush      |                   |

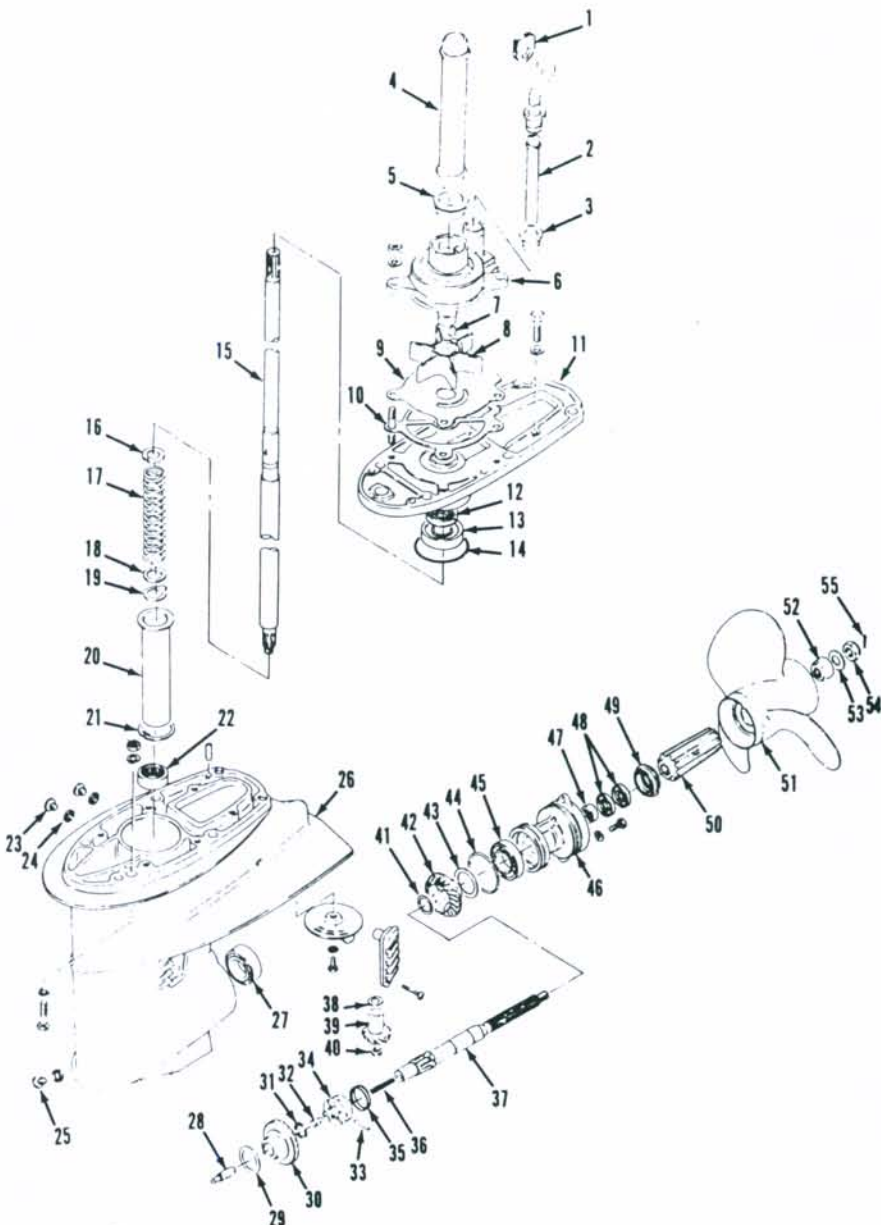


Fig. SZ11-19—Exploded view of lower unit gearcase assembly.

- |                           |                     |                     |
|---------------------------|---------------------|---------------------|
| 1. Grommet                | 15. Drive shaft     | 42. Reverse gear    |
| 2. Water tube             | 16. Washer          | 43. Shim            |
| 3. Grommet                | 17. Spring          | 44. "O" ring        |
| 4. Seal tube              | 18. Thrust washer   | 45. Bearing         |
| 5. Grommet                | 19. Washer          | 46. Bearing carrier |
| 6. Water pump housing     | 20. Collar          | 47. Bearing         |
| 7. Key                    | 21. Snap ring       | 48. Seals           |
| 8. Impeller               | 22. Bearing         | 49. Spacer          |
| 9. Plate                  | 23. Level plug      | 50. Ratchet hub     |
| 10. Gasket                | 24. Gasket          | 51. Propeller       |
| 11. Upper bearing housing | 25. Drain plug      | 52. Spacer          |
| 12. Seal                  | 26. Housing         | 53. Washer          |
| 13. Bearing               | 27. Bearing         | 54. Nut             |
| 14. "O" ring              | 28. Rod             | 55. Cotter pin      |
|                           | 29. Shim            |                     |
|                           | 30. Forward gear    |                     |
|                           | 31. Shim            |                     |
|                           | 32. Spring guide    |                     |
|                           | 33. Pin             |                     |
|                           | 34. Dog clutch      |                     |
|                           | 35. Retainer        |                     |
|                           | 36. Spring          |                     |
|                           | 37. Propeller shaft |                     |
|                           | 38. Shim            |                     |
|                           | 39. Pinion gear     |                     |
|                           | 40. Nut             |                     |
|                           | 41. Shim            |                     |

pitch on short shaft models and 279.4 mm (11 in.) pitch on long shaft models. Optional propellers are available from the manufacturer and should be selected to provide full throttle operation within the recommended limits of 4800-5500 rpm.

**R&R AND OVERHAUL.** Refer to Fig. SZ11-19 for exploded view of lower unit gearcase assembly. During disassembly, note the location of all shims and washers to aid in reassembly. To remove gearcase, first remove drain plug (25) and level (vent) plug (23) and drain gear lubricant. Loosen shift rod locknut (9—Fig. SZ11-22) and turn adjustment nut (8) until upper and lower shift rods are separated. Remove cotter pin (55—Fig. SZ11-19), nut (54), washer (53), spacer (52) and withdraw propeller (53) with ratchet hub (50). Withdraw spacer (49). Remove six lower unit cap screws. Withdraw lower unit assembly from drive shaft housing.

Remove bearing carrier (46) retaining screws. Being careful, use a suitable slide hammer and extract bearing carrier with propeller shaft assembly. Disassemble water pump assembly. Remove pinion nut (40) and withdraw pinion gear (39) and shim (38). Remove cap screws securing upper bearing hous-

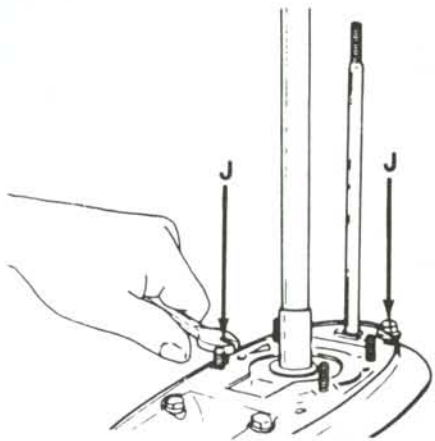


Fig. SZ11-20—Use two 6 mm jackscrews positioned as shown to withdraw upper bearing housing with drive shaft components.

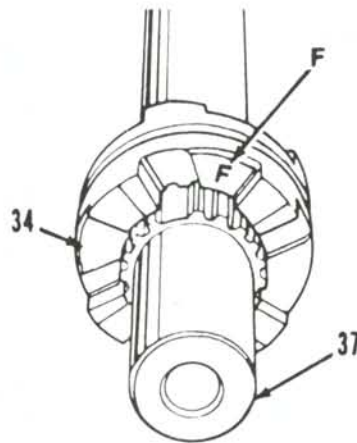


Fig. SZ11-21—Install dog clutch (34) on propeller shaft (37) so "F" mark is toward forward gear.

ing, then use two 6mm cap screws positioned as shown in Fig. SZ11-20 and tighten screws in equal increments to withdraw upper bearing housing with drive shaft components. Remove forward gear (30—Fig. SZ11-19) shim (29) and bearing (27). Remove screw from side of gearcase securing guide holder (13—Fig. SZ11-22) and withdraw lower shift linkage components.

Inspect all components for excessive wear and damage. Apply a water resistant grease to lip portion of all seals. All seals and "O" rings should be renewed when unit is reassembled.

Reassemble lower unit by reversing disassembly procedure while noting the following: Install dog clutch (34—Fig. SZ11-21) on propeller shaft (37) so "F" marked side is toward forward gear. Tighten pinion nut (40—Fig. SZ11-19) to 18-22 N·m (13-16 ft.-lbs.). Tighten water pump housing (6) cap screws to 6-10 N·m (4-7 ft.-lbs.). Tighten bearing carrier (46) cap screws to 6-10 N·m (4-7 ft.-lbs.). Tighten propeller retaining nut to 27-30 N·m (19-21 ft.-lbs.). Assembled backlash between pinion gear (39) and forward gear (30) should be 0.1-0.2 mm (0.004-0.008 in.). Adjust thickness of shim (38) or shim (29) until recommended backlash is obtained. Recheck mesh

pattern between pinion gear and forward gear to determine if correct tooth contact is being made. Adjust pinion gear shim (38) or forward gear shim (29), if needed, to obtain correct mesh pattern. Assembled propeller shaft end play should be 0.2-0.4 mm (0.008-0.016 in.). Adjust thickness of shim (41) until recommended end play is obtained. Apply silicone sealer to lower unit and drive shaft housing mating surfaces. Tighten lower unit cap screws to 15-20 N·m (11-15 ft.-lbs.).

Adjust shift rod adjustment nut (8—Fig. SZ11-22) until the proper engagement of "Forward," "Neutral" and "Reverse" is obtained. Tighten locknut (9) to secure adjustment nut (8) position. Fill gearcase with approximately 230 mL (7.77 ozs.) of SAE 90 hypoid outboard gear oil.

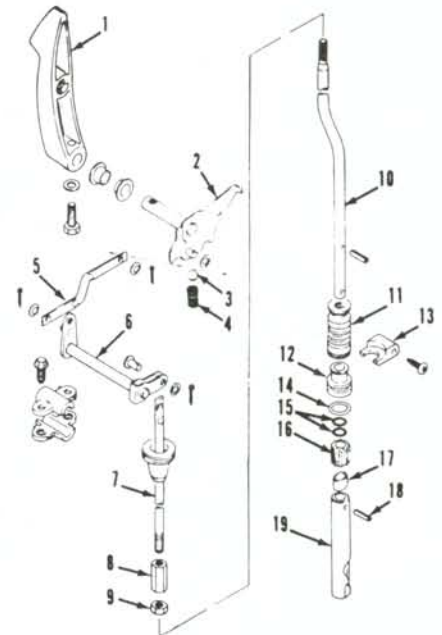


Fig. SZ11-22—Exploded view of shift control linkage components.

- |                     |                  |
|---------------------|------------------|
| 1. Shift lever      | 11. Dust seal    |
| 2. Cam              | 12. Rod guide    |
| 3. Detent ball      | 13. Guide holder |
| 4. Detent spring    | 14. "O" ring     |
| 5. Rod              | 15. "O" rings    |
| 6. Shaft            | 16. Guide        |
| 7. Upper shift rod  | 17. Spacer       |
| 8. Adjustment nut   | 18. Pin          |
| 9. Locknut          | 19. Shift cam    |
| 10. Lower shift rod |                  |

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