

SERVICE MANUAL

GRASS TRIMMERS / BRUSH CUTTERS



- TROUBLE SHOOTING
- SERVICE / TORQUE LIMITS
- TECHNICAL DATA

Introduction

How To Use Your Service Manual

This Service Manual is arranged for quick, easy reference and is divided into numbered sections.

NOTE:

Read all information for servicing a part or system before repair work is started to avoid needless assembly.

Preparation For Service

Proper preparation is very important for efficient service work. A clean work area at the start of each job will allow you to perform the repair as easily and quickly as possible, and reduce incidence of misplaced tools and parts. A unit that is excessively dirty should be cleaned before work starts. Cleaning will occasionally uncover trouble sources. Tools, instruments and parts needed for the job should be gathered before work is started.

Interrupting a job to locate tools or parts is a needless delay. Special tools required for a job are listed in this manual.

Replacement Parts

When replacement parts are required, use only approved parts. Failure to do so may result in product malfunction and possible injury to operator and/or bystander.

NOTE: All reference to "Left", "Right", "Front" and "Back" are given from operators position.

NOTE: The descriptions and specifications contained in this manual were in effect at the time this manual was approved for printing. We reserve the right to discontinue models without notice and without incurring obligation. The equipment identified as either standard or optional and the various illustrations may not all be applicable to your unit. If you have question, always check with your dealer.

Safety Alert Symbol and Notations

The following safety notations are used throughout this manual to call attention to special information or operating procedures. Understand the message in each notation and be alert to unsafe conditions and the possibility of personal injury.

NOTE: A NOTE points out general reference information regarding proper operation and maintenance practices.

IMPORTANT: An IMPORTANT statement indicates specific procedures or information that is required to prevent damage to the machine or its attachments.



This safety alert symbol is used to attract your attention! PERSONAL SAFETY IS INVOLVED! When you see this symbol - BECOME ALERT - HEED ITS MESSAGE.



CAUTION: A CAUTION identifies safe operating practices or indicates unsafe conditions that could result in personal injury.



WARNING: A WARNING describes a condition where failure to follow the instructions could result in severe personal injury.



DANGER: A DANGER designates a condition where failure to follow instructions or heed warning will most likely result in serious injury or death.

Safety Precautions

Before test operating or making repairs or adjustments to the unit, read and understand the operating and safety instructions in the Owner's Manual.

DO NOT make any adjustment or perform any maintenance or repair procedures while engine is running unless specifically instructed to do so in this manual.

DO NOT touch parts which might be hot from operation. Before attempting to maintain, adjust or service, allow such parts to cool.

Open doors if engine is run in garage, exhaust fumes are dangerous.

DO NOT run engine in an enclosed area.

Do repair work in a well-lighted, ventilated area.

To prevent accidental starting, disconnect wire to spark plug and position wire away from plug.

Always wear safety goggles when cleaning or making repairs to parts or machine.

When unit is tipped to perform service procedures in this manual, remove all fuel so that no spillage will occur.

Gasoline is highly flammable and its vapors are explosive. Handle with care. Use an approved fuel container. DO NOT smoke or allow open flame (match, pilot light, etc.) or sparks near equipment or fuel container when refueling or servicing fuel system.

Use non-flammable solvent to clean parts - DO NOT use gasoline.

Use only approved replacement parts when making repairs.

After all repair procedures are performed, make sure that unit is in good operating condition and all safety devices and shields are in place and in good working condition. Be sure all fasteners are tight, all adjustments are correct and all tools are removed.

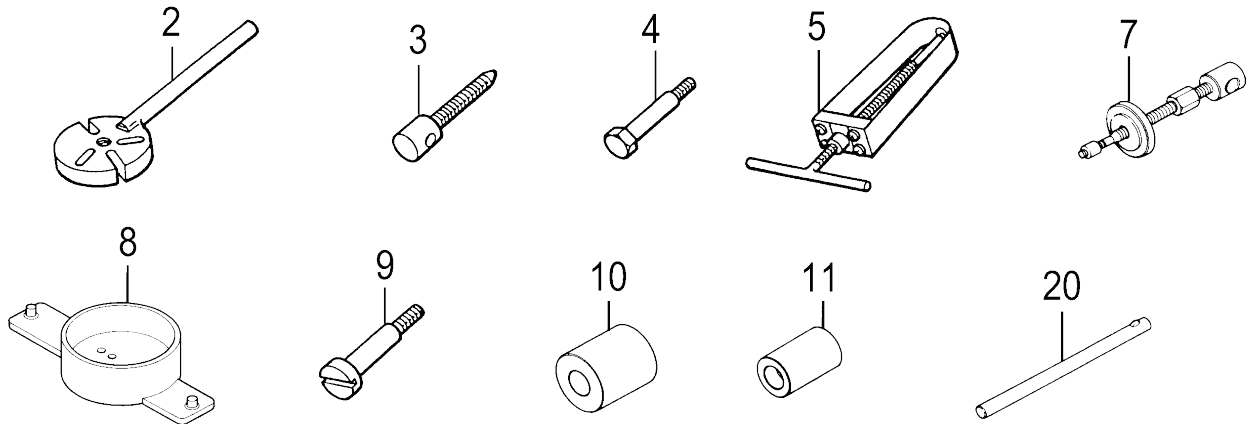
DO NOT change engine governor setting or over speed engine.

Never store equipment with fuel in tank inside a building where fuel fumes may reach an open flame or spark. Allow engine to cool before storing in any enclosure.

CONTENTS

| | page |
|---|------|
| 1. Special tools | 1 |
| 2. Technical Data | 2 |
| 3. Service Limits | 4 |
| 4. Torque Limits | 5 |
| 5. General Components & Inspections | 6 |
| 1. Crankcase | 6 |
| 2. Cylinder | 6 |
| 3. Piston | 6 |
| 4. Piston pin bore | 6 |
| 5. Piston ring end gap | 6 |
| 6. Piston ring side clearance | 7 |
| 7. Piston pin | 7 |
| 8. Crankshaft journal | 7 |
| 9. Connecting rod/big end side clearance | 7 |
| 10. Eccentricity of crank shaft | 7 |
| 11. Centrifugal clutch | 7 |
| 12. Spark plug | 8 |
| 13. Ignition coil inspection | 8 |
| 14. Inspection of cylinder compression | 8 |
| 15. Tank cap | 9 |
| 6. Engine side | 10 |
| 6-1 Recoil starter system | 10 |
| 6-2 Checking air gap | 10 |
| 6-3 Carburetor adjustment and maintenance | 11 |
| 6-4 Disassembling and assembling engine | 12 |
| 7. Drive side | 15 |
| 7-1 Removing and assembling clutch drum | 15 |
| 7-2 Removing drive shaft | 15 |
| 7-3 Disassembling gear case | 15 |
| 7-4 Assembling gear case | 16 |
| 8. Trouble Shooting | 17 |

1. Special Tool List



| Ref.# | Description | Parts# | TBC-230/2501 TBC-250PF/260PF TBC-270 | TBC-290 | TBC-340 TBC-340PF TBC-420PF | TBC-4200DX | TBC-4200D TBC-4200DLV TBC-430PFLV | TBC-550DX | TBC-550/600 |
|-------|------------------------|--------------|--|---------|-----------------------------------|------------|---|-----------|-------------|
| 2 | Fly-wheel remover | 006-29326-00 | x | x | x | | x | x | x |
| 3 | Center bolt | 007-29326-00 | x | x | x | | x | x | x |
| 4 | Step bolt 6 x 42 | 008-29326-00 | 2 | 2 | | | | | |
| 5 | Piston pin remover | 009-29323-50 | x | x | x | | | | |
| 5 | Piston pin remover | 009-29326-00 | | | | | x | x | x |
| 7 | Pinion remover | 016-29338-00 | | | x | | x | x | x |
| 7 | Pinion remover | 016-29373-00 | x | x | | | | | |
| 8 | Coil locator | 020-29371-14 | | | | | | x | x |
| 9 | Remover bolt 8 x 42 | 021-29355-00 | | | 2 | 2 | 2 | 2 | 2 |
| 10 | Gear shaft inserter 28 | 031-29339-00 | x (except TBC230) | x | x | | | | |
| 10 | Gear shaft inserter 32 | 031-29338-00 | | | | x | x | x | x |
| 11 | Pinion inserter 26 | 032-29335-60 | | x | x | | | | |
| 11 | Pinion inserter 28 | 032-29338-00 | | | | x | | x | |
| 11 | Pinion inserter 24 | 032-29339-00 | x | | | | | | |
| 11 | Pinion inserter 30 | 032-29371-00 | | | | | x | | x |
| 20 | Handle bar 8 x 120 | 951-20000-20 | x | x | x | | x | x | x |

2. Technical Data



| Model | TBC-230B series | TBC-230 series | TBC-250PF series | TBC-2501 series |
|----------------------------|-----------------------------------|-----------------------------------|---|-----------------------------------|
| Displacement (cc) | 21.1 | 21.1 | 23.9 | 25.0 |
| Bore x Stroke (mm) | 31 x 28 | 31 x 28 | 33 x 28 | 34 x 27 |
| Compression ratio | 6.0 : 1 | 6.0 : 1 | 7.3 : 1 | 7.2 : 1 |
| Max. kW/rpm | 0.63/7500 | 0.63/7500 | 0.82/8000 | 0.90/7500 |
| Max. kg Em/rpm | 0.086/5500 | 0.086/5500 | 0.12/5500 | 0.13/5500 |
| Max. rpm | 11000 | 11000 | 11000 | 11000 |
| Idling rpm | 3000±200 | 3000±200 | 3000±200 | 3000±200 |
| Clutch-meet rpm | 3800±200 | 3800±200 | 3800±200 | 3800±200 |
| Carburetor (maker/type) | WYL182 | WYL182 | WYJ318 | WYJ296 |
| Fixed Jet (main jet #) | #38 | #38 | #38 | #43 |
| L/H needle set | N/A | N/A | N/A | N/A |
| Metering lever height (mm) | 1.50±0.16 (frm face of pump body) | 1.50±0.16 (frm face of pump body) | 1.50±0.16 (frm face of pump body) | 1.50±0.16 (frm face of pump body) |
| Ignition system | TCl (Transistorized Solid State) | TCl (Transistorized Solid State) | CDI (Capacitor Discharge Ignition System) | TCl (Transistorized Solid State) |
| Air gap (mm) | 0.30 - 0.35 | 0.30 - 0.35 | 0.30 - 0.35 | 0.30 - 0.35 |
| Ignition timing (t) | ----- | ----- | 25 | ----- |
| Spark plug(maker) | CJ8Y(CHPN) or RCJ8Y(CHPN) | CJ8Y(CHPN) or RCJ8Y(CHPN) | RCJ6Y(CHPN) | CJ6(CHPN) or BMR7A(NGK) |
| Gap (mm) | 0.6 | 0.6 | 0.6 | 0.6 |
| Clutch drum diameter (mm) | 54 | 54 | 54 | 54 |
| Gear Ratio | 1.25 : 1 (Curved shaft 1:1) | 1.25 : 1 | 1.25 : 1 (Curved shaft 1:1) | 1.25: 1 |

| Model | TBC-270PF series | TBC-270 series | TBC-290 series | TBC-340 series |
|----------------------------|---|-----------------------------------|-----------------------------------|-----------------------------------|
| Displacement (cc) | 25.6 | 26.9 | 28.0 | 32.2 |
| Bore x Stroke (mm) | 33 x 30 | 35 x 28 | 34.5 x30 | 37 x 30 |
| Compression ratio | 8.0 : 1 | 6.0 : 1 | 6.8 : 1 | 6.5 : 1 |
| Max. PS/rpm | 1.23/8000 | 1.24/7000 | 1.42/8000 | 1.6/8000 |
| Max. kW/rpm | 0.90/8000 | 0.92/7000 | 1.05/8000 | 1.17/8000 |
| Max. kg Em/rpm | 0.12/6000 | 0.14/5000 | 0.14/4000 | 0.16/6000 |
| Max. rpm | 11000 | 11000 | 11000 | 11000 |
| Idling rpm | 3000±200 | 3000±200 | 3000±200 | 3000±200 |
| Clutch-meet rpm | 3800±200 | 3800±200 | 3800±200 | 3800±200 |
| Carburetor (maker/type) | WYJ243 A | WYJ431 | WYJ392 | WYJ296 |
| Fixed Jet (main jet #) | #38 | #42 | #43 | #43 |
| L/H needle set | N/A | N/A | N/A | N/A |
| Metering lever height (mm) | 1.50±0.16 (frm face of pump body) | 1.50±0.16 (frm face of pump body) | 1.50±0.16 (frm face of pump body) | 1.50±0.16 (frm face of pump body) |
| Ignition system | CDI (Capacitor Discharge Ignition System) | TCl (Transistorized Solid State) | TCl (Transistorized Solid State) | TCl (Transistorized Solid State) |
| Air gap (mm) | 0.30 - 0.35 | 0.30 - 0.35 | 0.30 - 0.35 | 0.30 - 0.35 |
| Ignition timing (t) | 32 | N/A | N/A | N/A |
| Spark plug(maker) | CJ6Y(CHPN) or RCJ6Y(CHPN) | BPM6A (NGK) or RCY8Y(CHPN) | RCY8Y(CHPN) | RCY8Y(CHPN) |
| Gap (mm) | 0.6 | 0.6 | 0.6 | 0.6 |
| Clutch drum Diameter (mm) | 54 | 54 | 54 | 78 |
| Gear Ratio | 1.286 : 1 | 1.25 : 1 | 1.28 : 1 | 1.28 : 1 |

2. Technical Data

| Model | TBC-420PF 430PF series | TBC-4200D series | TBC-550 series | TBC-600 |
|----------------------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
| Displacement (cc) | 39.8 | 39.8 | 46.5 | 46.5 |
| Bore x Stroke (mm) | 39.8 x 32 | 39.8 x 32 | 43 x 32 | 43 x 32 |
| Compression ratio | 7.2 : 1 | 6.95:1 | 7.0 : 1 | 7.0 : 1 |
| Max. PS/rpm | 1.7/6500 | 1.78/7000 | 2.38/7000 | 2.38/7000 |
| Max. kW/rpm | 1.25/6000 | 1.31/7000 | 1.75/7000 | 1.75/7000 |
| Max. kg m/rpm | 0.22/5000 | 0.21/5000 | 0.26/6000 | 0.26/6000 |
| Max. rpm | 11000 | 11500 | 11500 | 11500 |
| Idling rpm | 3000±200 | 2800±200 | 2800±200 | 2800±200 |
| Clutch-meet rpm | 3800±200 | 3500±200 | 3800±200 | 3800±200 |
| Carburetor (maker/type) | WYJ224B | WYJ389 | HDA180 | HDA180 |
| Fixed Jet (main jet #) | # 44 | # 51 | N/A | N/A |
| L/H needle set | N/A | N/A | 90° | 90° |
| Metering lever height (mm) | 1.50±0.16 (frm face of pump body) | 1.50±0.16 (frm face of pump body) | -0.13~0.25 (frm face of carb. body) | -0.13~0.25 (frm face of carb. body) |
| Ignition system | TCI (Transistorized Solid State) | TCI (Transistorized Solid State) | TCI (Transistorized Solid State) | TCI (Transistorized Solid State) |
| Air gap (mm) | 0.30 - 0.35 | 0.30 - 0.35 | 0.30 - 0.35 | 0.30 - 0.35 |
| Ignition timing (°) | 30 | 23 | 23 | 23 |
| Spark plug(maker) | CJ8Y(CHPN) or RCJ8Y(CHPN) | BPMR-6A (NGK) | BPM-6A(NGK) or BPMR-6A(NGK) | BPMR-6A(NGK) or BPM-6A(NGK) |
| Gap (mm) | 0.6 | 0.6 | 0.6 | 0.6 |
| Clutch drum Diameter (mm) | 78 | 78 | 78 | 78 |
| Gear Ratio | 1.313 : 1 | 1.313 : 1 | 1.313 : 1 | 1.313 : 1 |

3. Service Limit

| MODEL | For ALL MODELS PISTON RING END GAP MAX. 0.80 mm  | | PISTON RING SIDE CLEARANCE MAX. 0.15 mm  | | CYLINDER BORE | PISTON / SKIRT OUTER DIA. | PISTON PIN BORE | PISTON PIN OUTER DIA. | CON-ROD BIG END SIDE CLEARANCE | CON-ROD SMALL END SIDE CLEARANCE | CRANKSHAFT ECCENTRICITY | CRANKSHAFT JOURNAL DIA. (PTO) | CRANKSHAFT JOURNAL DIA. (STARTER) | CLUTCH DRUM INNER DIA. | CLUTCH DRUM SHAFT DIA. |
|-------------------------------|--|-------|---|------|---------------|------------------------------|--------------------|--------------------------|--------------------------------------|--|----------------------------|-------------------------------------|---|---------------------------|---------------------------|
| | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MAX. | MAX. | MAX. | MIN. | MIN. | MAX. | MIN. | |
| TBC-230B series | 31.04 | 30.80 | 8.05 | 7.96 | 0.50 | - | 0.10 | 11.90 | 11.90 | 55.00 | 11.95 | | | | |
| TBC-230 series | 31.04 | 30.80 | 8.05 | 7.96 | 0.50 | - | 0.10 | 11.90 | 11.90 | 55.00 | 11.95 | | | | |
| TBC-250PF series | 33.04 | 32.80 | 8.05 | 7.96 | 0.50 | - | 0.10 | 11.90 | 11.90 | 55.00 | 11.95 | | | | |
| TBC-2501 series | 34.04 | 33.80 | 10.05 | 9.96 | 0.50 | - | 0.10 | 11.90 | 11.90 | 55.00 | 11.95 | | | | |
| TBC-270PF series | 33.04 | 32.80 | 9.05 | 8.96 | 0.50 | - | 0.10 | 11.90 | 11.90 | 55.00 | 11.95 | | | | |
| TBC-270series | 35.03 | 34.80 | 8.05 | 7.96 | 0.50 | - | 0.10 | 11.90 | 11.90 | 55.00 | 11.95 | | | | |
| TBC-290 series | 34.53 | 34.30 | 9.05 | 8.96 | 0.50 | - | 0.10 | 11.90 | 11.90 | 55.00 | 11.95 | | | | |
| TBC-340 series | 37.03 | 36.80 | 9.05 | 8.96 | 0.50 | - | 0.10 | 11.90 | 11.90 | 79.00 | 11.95 | | | | |
| TBC-420PF TBC-430PF series | 39.84 | 39.60 | 10.05 | 9.96 | 0.50 | - | 0.10 | 14.90 | 14.90 | 79.00 | 14.95 | | | | |
| TBC-4200 series | 39.84 | 39.60 | 10.05 | 9.96 | 0.50 | - | 0.10 | 14.90 | 14.90 | 79.00 | 14.95 | | | | |
| TBC-550 series | 43.04 | 42.80 | 10.05 | 9.96 | - | 0.50 | 0.10 | 14.90 | 14.90 | 79.00 | 14.95 | | | | |
| TBC-600 | 43.04 | 42.80 | 10.05 | 9.96 | - | 0.50 | 0.10 | 14.90 | 14.90 | 79.00 | 14.95 | | | | |

Grass trimmers/Brush cutters

4. Torque Limits

SPECIAL FASTENERS

| Reference | kg-cm | In-lb |
|-----------------------|-----------|---------------|
| Flywheel nut | 200 - 230 | 173.6 - 199.6 |
| Clutch or Special nut | 200 - 250 | 173.6 - 217.0 |
| Spark plug | 150 - 200 | 130.2 - 173.6 |
| Carb. insulator | 50 - 60 | 43.4 - 52.1 |
| | | |
| Cylinder | 45 - 50 | 39.1 - 43.4 |
| Crankcase | 40 - 50 | 34.7 - 43.4 |
| | | |

ORDINARY NUTS AND BOLTS

| Reference | kg-cm | In-lb |
|------------------|-----------|---------------|
| M4 Screw | 20 - 30 | 17.3 - 26.0 |
| M5 Screw | 40 - 50 | 34.7 - 43.4 |
| M6 Screw | 60 - 70 | 52.1 - 60.7 |
| M4 Nut | 20 - 30 | 17.3 - 26.0 |
| M5 Nut | 40 - 50 | 34.7 - 43.4 |
| M6 Nut | 60 - 70 | 52.1 - 60.7 |
| M4 Hex hole bolt | 25 - 30 | 21.7 - 26.0 |
| M5 Hex hole bolt | 45 - 50 | 39.1 - 43.4 |
| M6 Hex hole bolt | 80 - 100 | 69.4 - 86.8 |
| M8 Bolt | 200 - 250 | 173.4 - 216.8 |
| | | |

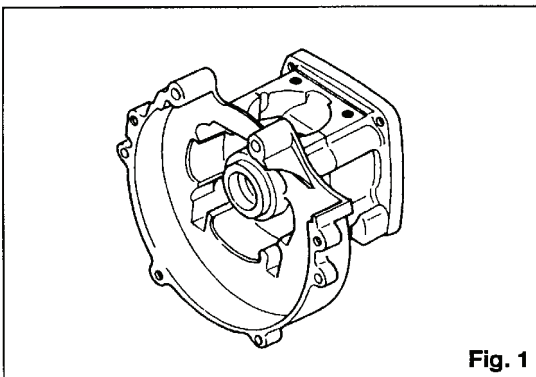
5. GENERAL INSPECTION

1. Use genuine TANAKA replacement parts.
2. Use special tools where specified.
3. Always use new packings, gaskets, and O-rings during reassembly.
4. Tighten screws, bolts, and nuts according to the specified torques.
5. Clean and apply a small amount of oil to moving parts before reassembly.
6. After assembly, check for correct construction before attempting to start the engine.

1) CRANKCASE

The crankcase is made of diecast aluminum and consists of two pieces which are tooled together and supplied together as replacement parts. The crankcase induces an air-fuel mixture from the carburetor and compresses the mixture in the crankcase and forces it into the cylinder.

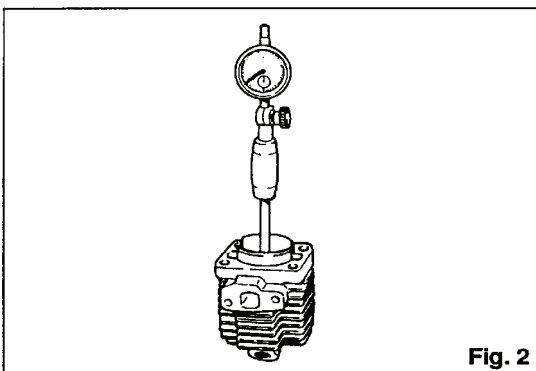
Sealing is essential. Fig. 1



2) CYLINDER

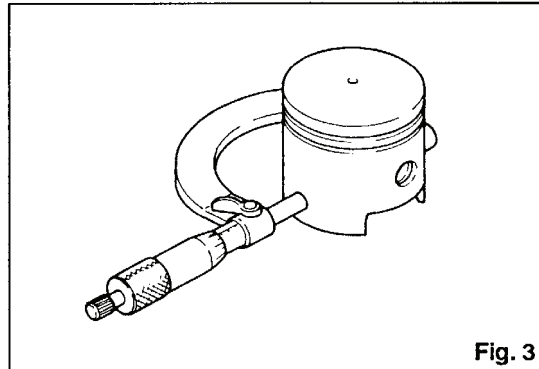
The cylinder wall must be smooth in order to provide compression therefore if scratches or scoring exists, the cylinder must be replaced.

Measure the cylinder bore with a cylinder gauge. If it exceeds the limit, replace. Fig. 2



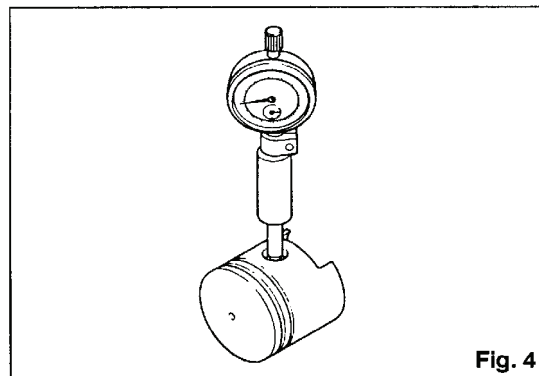
3) PISTON

Measure the lower surface (skirt) of the piston. If it exceeds the limit, replace. Fig. 3



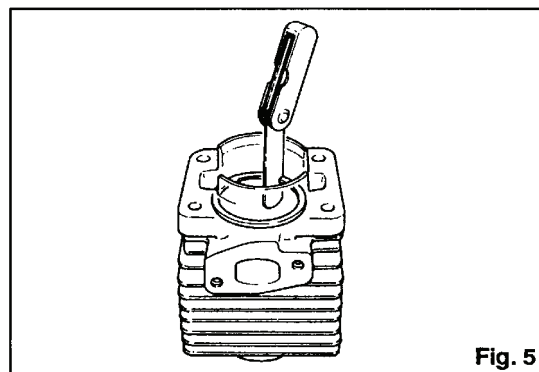
4) PISTON PIN BORE

Measure the piston pin bore of the piston with a cylinder gauge. If it exceeds the limit, replace piston. Fig. 4



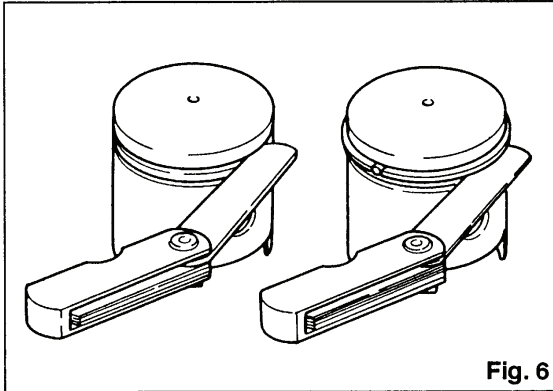
5) PISTON RING END GAP

Piston rings are made of special metal and to improve anti-wear capabilities, surface treatment is applied. Insert the ring into the lower part of the cylinder. Measure the piston ring end gap with a thickness gauge. If it exceeds the limit, replace. Fig. 5



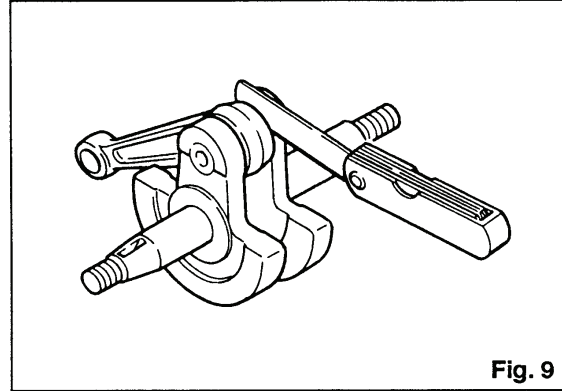
6) PISTON RING SIDE CLEARANCE

Measure with a thickness gauge. If it exceeds the limit, replace piston and/or piston rings. Fig. 6



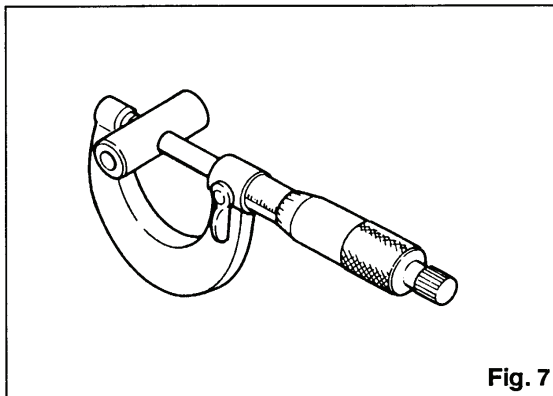
9) CONECTING ROD/BIG END SIDE CLEARANCE

Measure with thickness gauge. If it exceeds the limit, replace crankshaft comp. Fig. 9



7) PISTON PIN

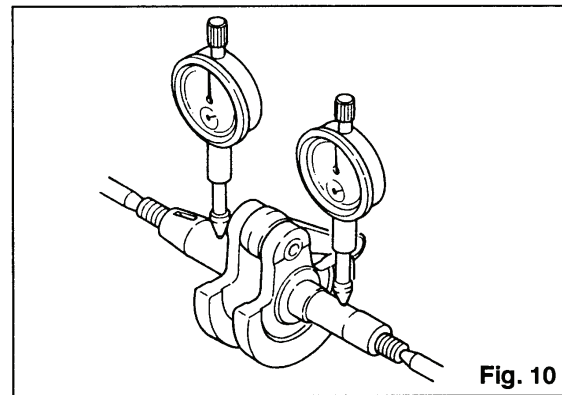
Measure with a micrometer at the center of the piston pin. If it exceeds the limit, replace. Fig. 7



10) ECCENTRICITY OF CRANKSHAFT

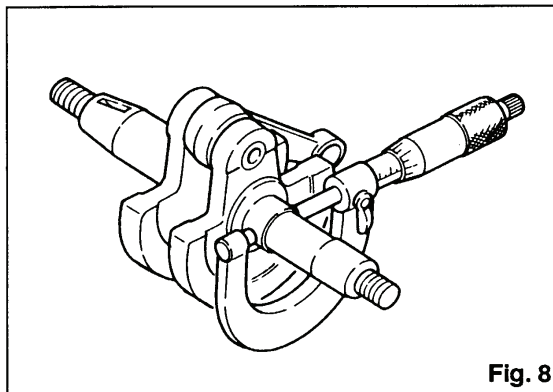
Measure runout with dial indicator. If over limit, replace crankshaft comp. Fig. 10

NOTE: When the crankshaft needs replacement it must be replaced as a crankshaft comp. The crankshaft and connecting rod are preassembled.



8) CRANKSHAFT JOURNAL

Measure with a micrometer. If it exceeds the limit, replace crankshaft comp. Fig. 8

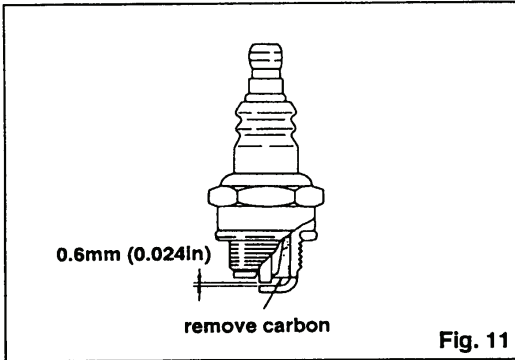


11) CENTRIFUGAL CLUTCH

This clutch consists two weights (shoes) supported by springs individually. These weights expand and engage the clutch. Standard clutch in rpm is showing on Technical Data.

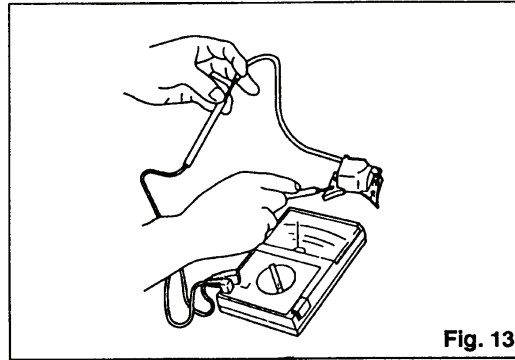
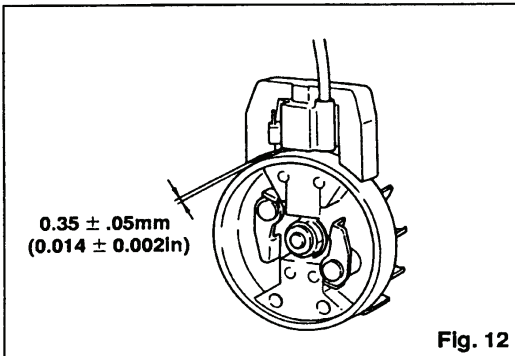
12) SPARK PLUG

This generates spark between the center electrode and the outer electrode in order to ignite the fuel in the cylinder. If the electrode burns out or excessive carbon accumulates around the electrodes, it will cause reduced power and/or hard starting. In this case replace or clean and regap according to its condition. Standard spark plug gap is 0.6mm/0.024in. Fig. 11



13) IGNITION COIL INSPECTION

- The gap between the ignition coil and the fly-wheel magneto should be $0.35 \pm 0.05\text{mm}$ ($0.012 \sim 0.016$ in). Fig. 12
 - To check the ignition coil, check the ground wire to the core and primary cord for soldering, the secondary cord for damage and connection to the spark plug cap.
 - Attach the tester terminal to the iron core of ignition coil and to plug cap or primary cord and measure both resistance.
- If the resistance is not within the Technical Data, replace ignition coil. Fig. 13



INSPECTION

A. Check for spark by removing the spark plug from the engine and hooking the plug cap to it, then ground the spark plug body to the engine and pull the recoil start forcibly.

NOTE: It is recommended to use a new spark plug.

B. If no sparks jump, replace ignitor if using on the unit or ignition coil.



CAUTION: There are electronic parts installed within ignitor. Do not heat ignitor or apply excessive force to it.

14) INSPECTION OF CYLINDER COMPRESSION

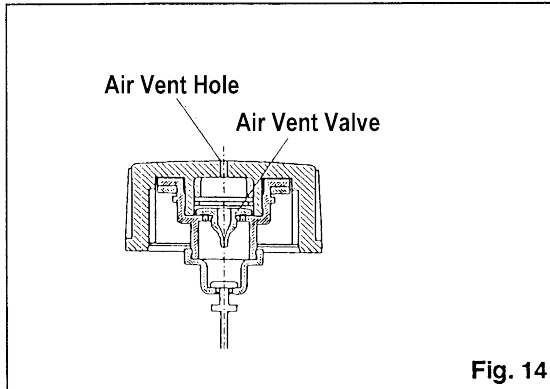
Remove the spark plug, install a compression gauge to the plug opening and pull the recoil starter several times to stabilize reading. When the compression pressure is excessively low, check the piston rings, piston and cylinder, and, if necessary, replace. When the compression pressure is excessively high, check inside of the combustion chamber and exhaust port for carbon build up, and remove it if necessary.

STANDARD COMPRESSION $7.0 \sim 9.5\text{kg/cm}^2$

15) TANK CAP



WARNING: Gasoline is highly flammable and must be handled with care. Allow engine to cool several minutes before removing fuel tank cap. Never fill tank when engine is running or hot from operation. DO NOT allow open flame, matches, or smoking in area. DO NOT overfill. Wipe up any spills and allow vapors to dissipate. Use approved (Red) gasoline container.



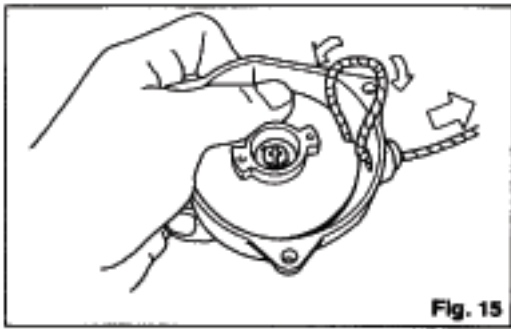
The fuel cap is designed to allow air to get into the tank while not allowing fuel to leak out, at the same time it has a pressure relief-feature to help avoid carburetor flooding due to heat induced expansion in fuel tank. Fig. 14

NOTE: When assembling the individual parts, make sure in order. If it is assembled incorrectly, engine may stop or fuel leaks from the vent hole. Check any damage or crack and replace as necessary.

6. ENGINE SIDE

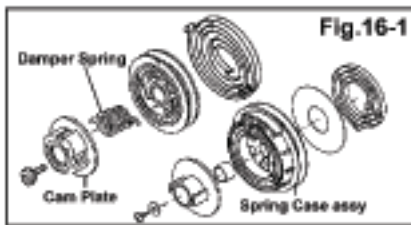
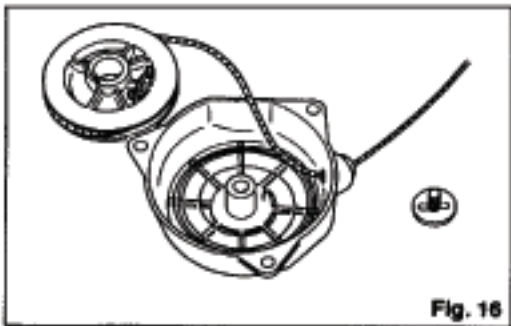
6-1 Recoil Starter System

- 1) Remove recoil starter body assy from unit.
- 2) Pull starter handle, then hold rope reel and pull starter rope out from rope reel. Fig. 15



- 3) While holding rope reel, let recoil spring unwind slowly. Then remove the holding screw from the center of the recoil body Fig. 16

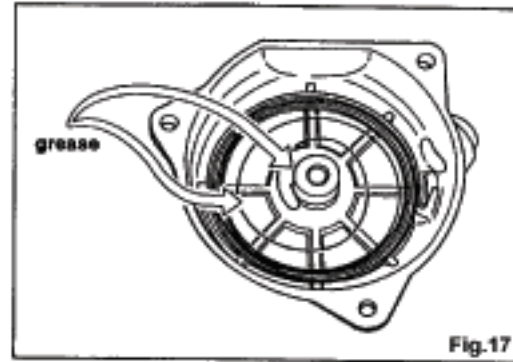
Caution: When removing starter pully or starter reel, The recoil spring may fly out. Eye/Face protection is recommended when replacing recoil spring.



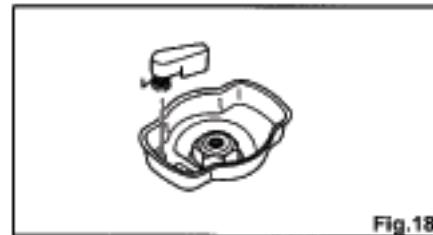
- 4) Check for any wear and/or damage on the individual recoil parts (rope reel, recoil spring, starter rope, damper spring, cam plate, spring case assy. , ect.) and replace as necessary. Fig. 16
- 5) When assembling the recoil spring to the recoil body, insert hook of recoil spring into the groove within the recoil starter body. Fig. 17

NOTE: Be sure to install recoil spring so shape spring winding is clockwise from the center to out.

NOTE: Never disassemble Spring Case Assy. You may get hurt.



- 6) Check for wear and/or damage to the starter pawl and spring on the starter pulley and replace as necessary. Fig. 18



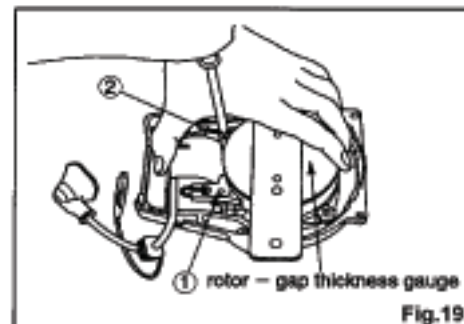
6-2 Checking Air Gap

- 1) Check if the gap between the ignition coil and the rotor is 0.3 mm (With two 0.15 mm thickness gauge's)
- 2) If the measured gap is not 0.3 mm, adjust the gap to 0.3 mm using the rotor gap thickness gauge on both cores.

Rotor gap thickness gauge
020-29371-14 TBC-550/DX/600

NOTE: The screws must be fastened in ① to ② order to prevent the air gap from widening.

NOTE: Never rotate magneto rotor clockwise to avoid recoil starter damage when it is installed.



6-3 Carburetor Adjustment and Maintenance

1) Precautions for disassembling and assembling carburetor.

- A. Handle parts with care. Clean all parts throughly. Replace any wore and damaged parts. Be sure to use new gaskets when assembling carburetor.
- B. Wash the parts with fresh clean fluid and blow the fluid away with air. Put the parts in a clean place that is free of dust, cloth, fibers, dirt, etc.
- C. When assembling carburetor, take care not to over tighten the bolts, nuts, etc., and once again, keep it clean.

NOTE: Do not use wire to clean jets. It may cause damage, which could effect engine performance.

NOTE: Saturate element with 2 cycle oil after cleaning, squeeze out all excess oil before put it back.

2) Carburetor Adjustment

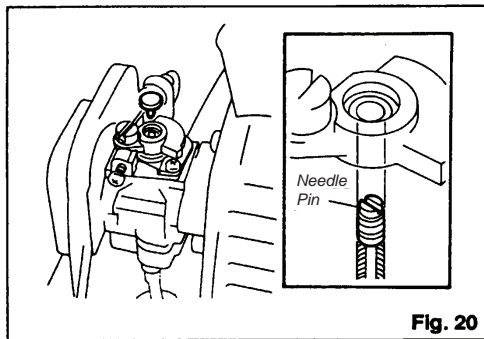
CAUTION: Blades may move during carburetor adjustment. Wear protective equipment and observe all safety instructions.

A. Idle needle pin adjustment speed screw adjustment

- a) Turn needle pin counterclockwise until needle pin threads disengage from throttle valve.

Find out the screwing in position by turning needle pin counterclockwise slowly till feel like dropping needle pin.

Then turn it clockwise 14 -15 turns. Fig. 20

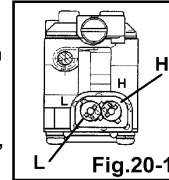


- b) Start engine and allow to run a few minutes to warm up. Turn idle adjust screw in or out to get the Idle speed 3500 - 3600 rpm (just before clutch engage), then turn needle pin clockwise or counterclockwise until highest rpm is achieve. Then turn needle pin counterclockwise to get idle speed 3000 rpm (turn counterclockwise 1/8 - 1/4). At this setting, check acceleration and stability at idling position.

NOTE: Idle limiter also adjust idling carburetor with engine idling, turn idle limiter clockwise or counterclockwise to achieve maximum engine rpm. then turn idle limiter counterclockwise one notch.

NOTE: Do not screw needle pin in until seated, because it will damage the point of needle pin and/or main nozzle.

- B. To adjust L & H screw, turn L & H screw in or out to obtain maximum speed, and then turn counterclockwise 1/8 - 1/4. Fig.20-1



- C. For area with Emission Regulation, it can not adjust needle pin or L & H screw.

L & H screw can ONLY adjust 90 degrees.

NOTE: Lean carburetor adjustment can cause serious engine damage.

3) Carburetor Maintenance

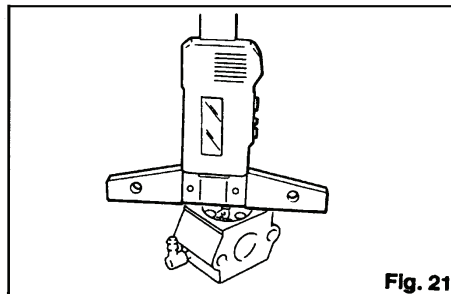
If the running or acceleration of unit is poor or rough after adjusting the setting, check following.

- A. Valve hinge adjustment. Valve hinge must be 1.5 ± 0.16 mm (check Technical date for each model) below carburetor body. Place a straightedge across pump dody casting. Valve hinge should be 1.5 ± 0.16 mm below straightedge.

Slight pressure will bend valve hinge up or down. Fig. 21

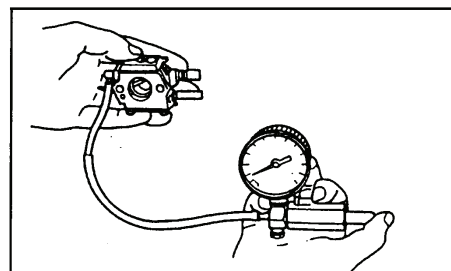
NOTE: This adjustment is very important for operating performance.

When valve hinge is too high, the mixture become too rich and when too low, the mixture become too lean.



- B. Carburetor leakage. Connect pressure tester to carburetor fuel inlet and apply pressure 1.5 - 3.5 kg/cm² with hand pump. Pressure will drop then become stable at approximately 0.6 - 0.8 kg/cm² (check Technical data for each model). Fig. 22

If significant leakage is noted or pressure is not dropped, check any wear or damage or dust and replace individual compornents as needed.



- C. To maintain carburetor performance, it is recommended that rubber parts be inspected periodically or whenever disassembled. Check diaphragm for deterioration or damage, valve hinge for deformation and needle valve for wear.

Always use fresh fuel. Fuel which has been stored for an extended periods of time will damage carburetor parts and decrease performance.

Carburetor performance is effected slightly by weather, altitude, break-in, etc. But it is generally not necessary to adjust the carburetor.

If carburetor floods, check the needle valve for wear. Also check valve hinge adjustment and carburetor adjustment (see section A and B).

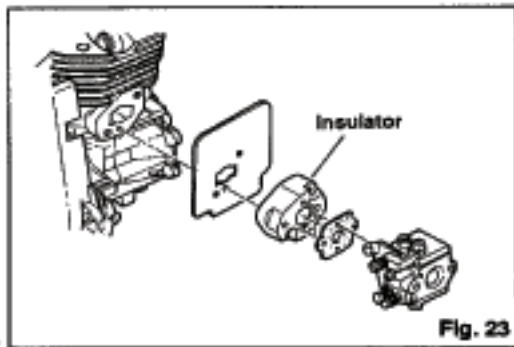
4) Carburetor Insulator

If the engine will not run smoothly after checking and adjusting the carburetor, check insulator. Fig 23

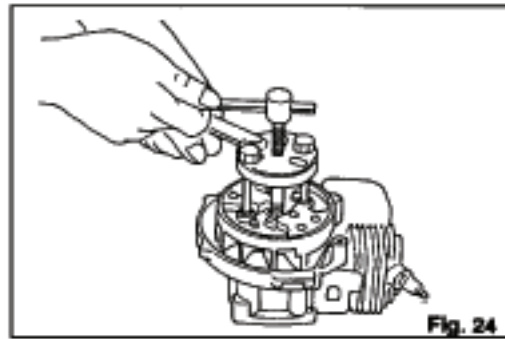
- A. Check alignment for pulse hole of insulator, inlet manifold gasket and cylinder. Check for any damage and replace as needed.

- B. Check flat surface of insulator where the cylinder and carburetor are installed. If uneven, make flat by using fine sandpaper or replace as needed.

NOTE: When assembling insulator on the unit, always replace inlet manifold and carburetor gasket.

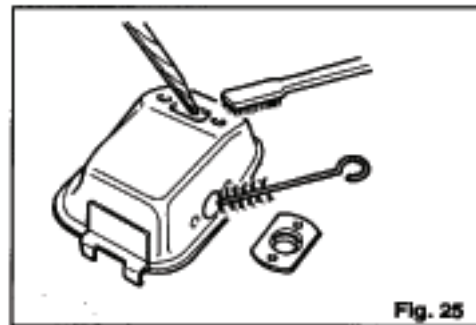


NOTE: Make sure not to damage the end of the crankshaft, when removing the magneto rotor.



- 3) After removing the muffler bolts, remove muffler and muffler gasket.

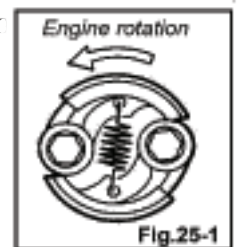
NOTE: Inspect muffler for carbon build-up and clean or replace as necessary. Fig. 25



- 4) When installing clutch assy onto the unit, make sure of the direction of the clutch. Fig. 25-1

NOTE: Check for any wear or damage before installation of clutch and replace as necessary.

NOTE: If clutch assy is installed in reverse on the unit, you will not get smooth engagement at low rpm.

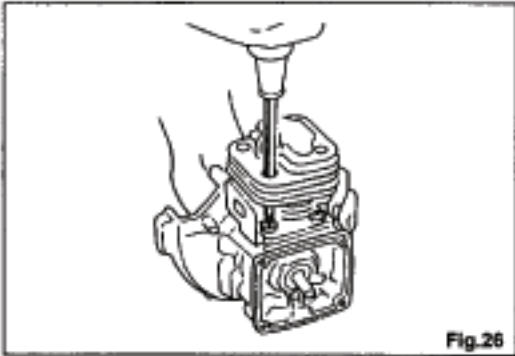


6-4 Disassembling and Assembling Engine

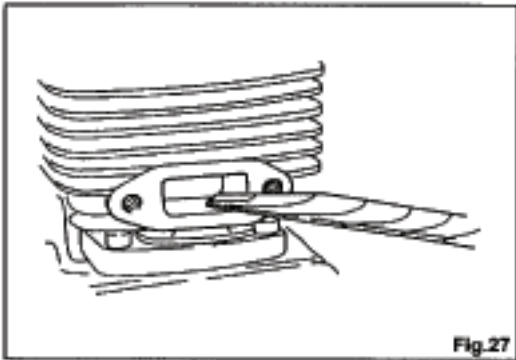
- 1) To separate engine side and drive side, disassemble at fan case or clutch case from drive shaft pipe and also disconnect stop cords and throttle wire.
- 2) Remove magneto rotor tightening nut and remove magneto rotor from the crankshaft by using the following special tools. Fig 24
 1. Fly-Wheel Remover
 2. Center Bolt
 3. Step Bolts or Remover Bolts
 4. Handle Bar 8 X 120

(See section 1. Special Tools List)

- 4) Remove the screws securing cylinder and pull cylinder off of the crankcase, before installing cylinder apply a thin coat of oil to the piston. Align each piston ring with the locator pin, slowly insert piston into cylinder while compressing the rings in with your fingers. Then install and tighten the cylinder screws. Fig. 26



CHECK: Cylinder for wear and damage, exhaust port for carbon build-up and cylinder fins for debris. Fig. 27



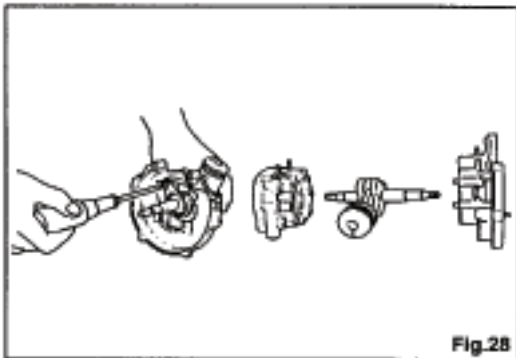
5) Disassembling and assembling crankcase

- A. Before separating crankcase, make sure woodruff key is removed, then remove the crankcase screws. To divide crankcase, lightly tap crankshaft with a soft hammer, taking care not to damage the crankcase fitting surface and remove the crankshaft. Fig. 28

CHECK:

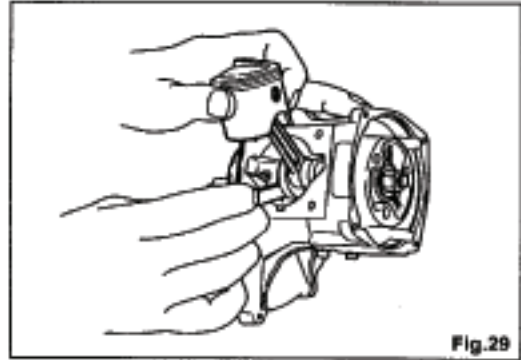
1. For any damage to the ball bearing and oil seal.
2. Rod bearing for damage and clearance.

NOTE: Use a new crankcase gasket and cut off excess gasket material when assembling.



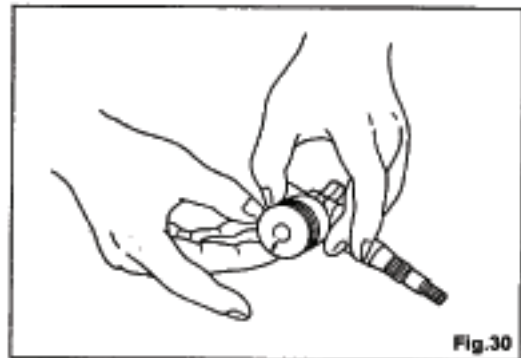
- B. Apply a coat of grease to the lip of each oil seal, then install shims on the starter side of the crankshaft and insert crankshaft into the crankcase.

NOTE: After tightening the crankcase screws, move the crankshaft to one side and measure the crankshaft side play with a feeler gauge. Install shims on the starter side of the crankshaft to adjust clearance, which should be 0.1 - 0.3mm. Fig. 29



- 6) Remove ring/s from the piston by separating the ring with your thumbs just enough to get it off of the piston.

CHECK: Wear on piston ring/s and replace as necessary. Fig. 30



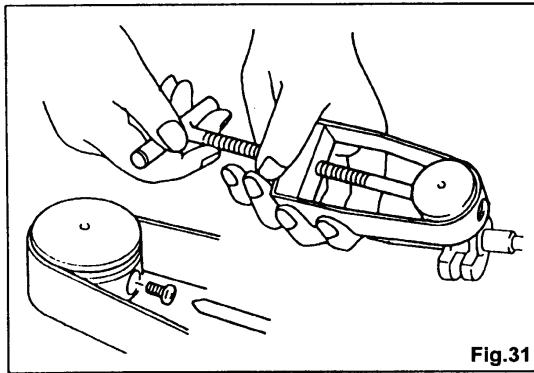
7) Remove circlips with a longnose pliers. Taking care not to scratch piston.

NOTE: Use new circlips when installing.

To remove piston pin, using the piston remover (# 009-29326-00), push piston pin out and remove piston. **Fig.31**

NOTE: You may need to use a 4mm screw in the end of piston pin to push against with the pin remover bolt.

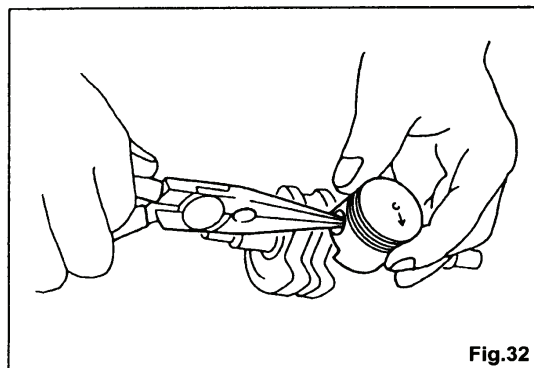
CHECK: Damage to piston, wear on piston or excessive carbon (clean off) and replace as necessary.



Insert one circlip in piston. Face "Arrow" or "Dot" on the top of piston toward the exhaust, and using the piston pin remover, install piston pin through piston and conn-rod, being careful not to dislodge any of the rollers on the small end bearing.

Then install the other circlip. **Fig.32**

CHECK: Make sure circlips in place.



7. DRIVE SIDE

7-1 Removing and assembling clutch drum

- 1) Remove stop ring from clutch drum using long nose snap ring pliers.

Fig.33

- 2) Then remove clutch drum from fan case or clutch case using handle bar 8x120 from the stop ring side.
- 3) Some ball bearing holding clutch drums can be removed from fan case or clutch case using the snap ring pliers after removing clutch drum.

NOTE: Check for any wearing of the inner diameter of clutch drum and /or splines and/or any other parts and replace as necessary.

- 4) When assembling clutch drum on fan case or clutch case, always use a new stop ring.

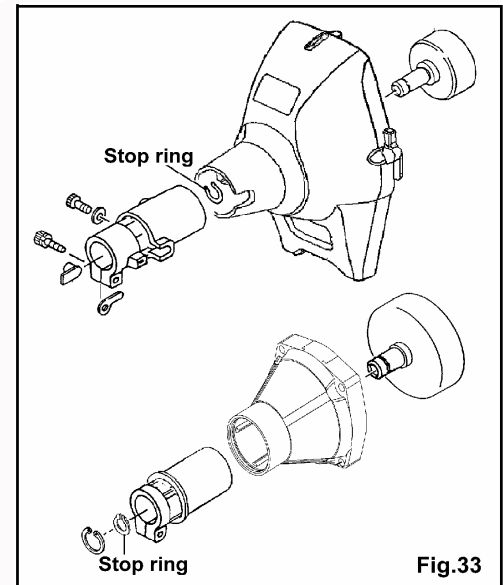


Fig.33

7-2 Removing drive shaft

- 1) Pull out drive shaft from drive shaft pipe and check any wear and/or damage and replace as necessary.
- 2) When installing drive shaft into drive shaft pipe, apply lithium based grease over drive shaft. To extend the drive shaft life, reverse drive shaft.

7-3 Disassembling gear case Fig.34

- 1) Remove fixing nut, cutter holder cap and cutter holder. And then remove stop ring using snap ring pliers.
- 2) Install fixing nut on gear shaft until fixing nut is flush with the end of gear shaft.
- 3) Hold fixing nut securely with the vice.
- 4) Hit gear case using soft hammer until gear shaft and ball bearing come out from gear case.
- 5) After removing gear shaft, remove stop ring which secures ball bearing. Fig.35

- 6) Remove pinion and ball bearings using one of the pinion removers shown on the special tool list.

NOTE: When replacing gear and pinion, replace gear and pinion as one set.

- 7) To remove pinion from bearings, remove stop ring first, then place pinion and bearings between a pair of suitable metal stands. Insert drive shaft which has been cut short into pinion, then tap the short drive shaft slightly to remove pinion from bearings.

① Fig.36

- 8) If bearing where it is installed in the bottom of gear case needs to be replaced, heat the bottom of gear case up to 100 degrees to 150 degrees and then tap gear case to wooden base so that bearing will come off. ② Fig.36

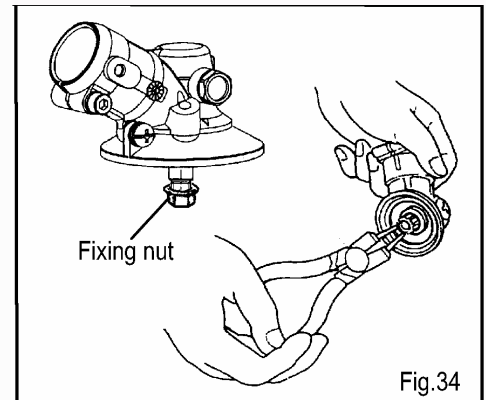


Fig.34

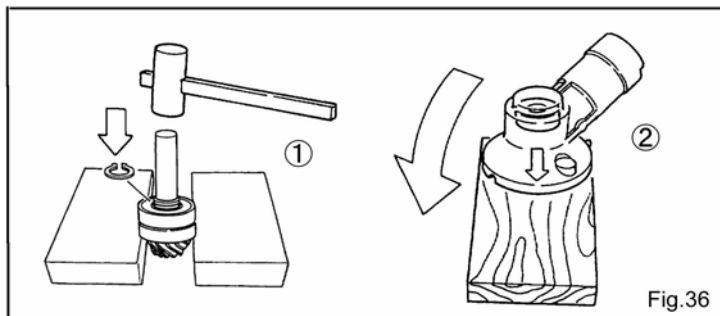


Fig.36

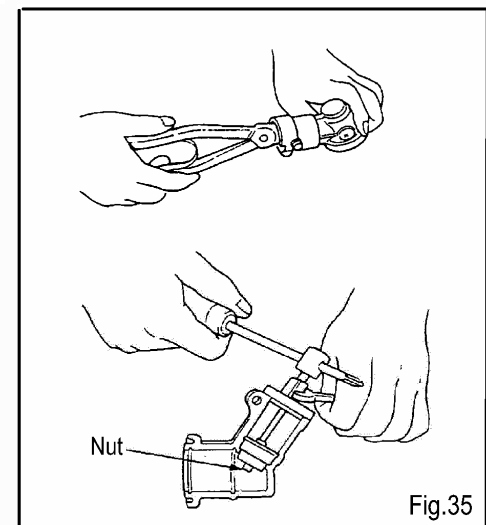


Fig.35

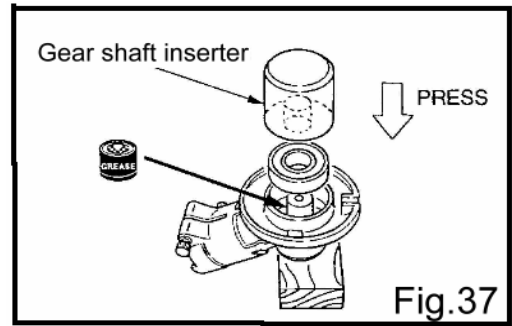
7- 4 Assembling gear case

1) Install ball bearing into the bottom of gear case using the proper diameter installer. See below for diameters.

Dia. 20mm ----- TBC-230 series

Dia. 24mm ----- TBC-2501/250PF/260PF/270 series, TBC420PF
TBC-4200D/DLV/430PFLV/550/600

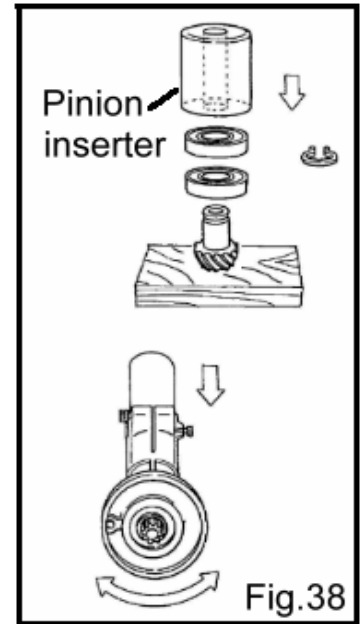
2) Apply grease on gear shaft and insert it into ball bearing which was installed in section 1) using one of gear shaft inserter's shown on the Special tool list. Fig.37



3) Insert ball bearing into pinion using one of the pinion inserters which are shown on the Special Tool List. Fig.38

4) Install the pinion installed bearings by gradually turning the gear shaft so that the pinion engages properly with gear, and then press in using pinion inserter and install the stop ring in place using long nose snap ring pliers.

NOTE: When installing the stop ring, always use a new stop ring.



4. Trouble Shooting

