YAMAHA

BW80S

Service Manual

LIT-11616-05-23

1RY-28197-10

BW80S
SERVICE MANUAL

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LIT-11616-05-23

NOTICE

This manual was written by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual so it is assumed that persons using this book to perform maintenance and repairs on Yamaha machines have a basic understanding of the mechanical concepts and procedures inherent in machine repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit to use and/or unsafe.

Yamaha Motor Company, Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

TECHNICAL PUBLICATIONS
SERVICE DIVISION
MOTORCYCLE OPERATIONS
YAMAHA MOTOR CO., LTD.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

NOTE: **A NOTE** provides key information to make procedures easier or clearer.

CAUTION: **A CAUTION** indicates special procedures that must be followed to avoid damage to the machine.

WARNING: **A WARNING** indicates special procedures that must be followed to avoid injury to a machine operator or person inspecting or repairing the machine.

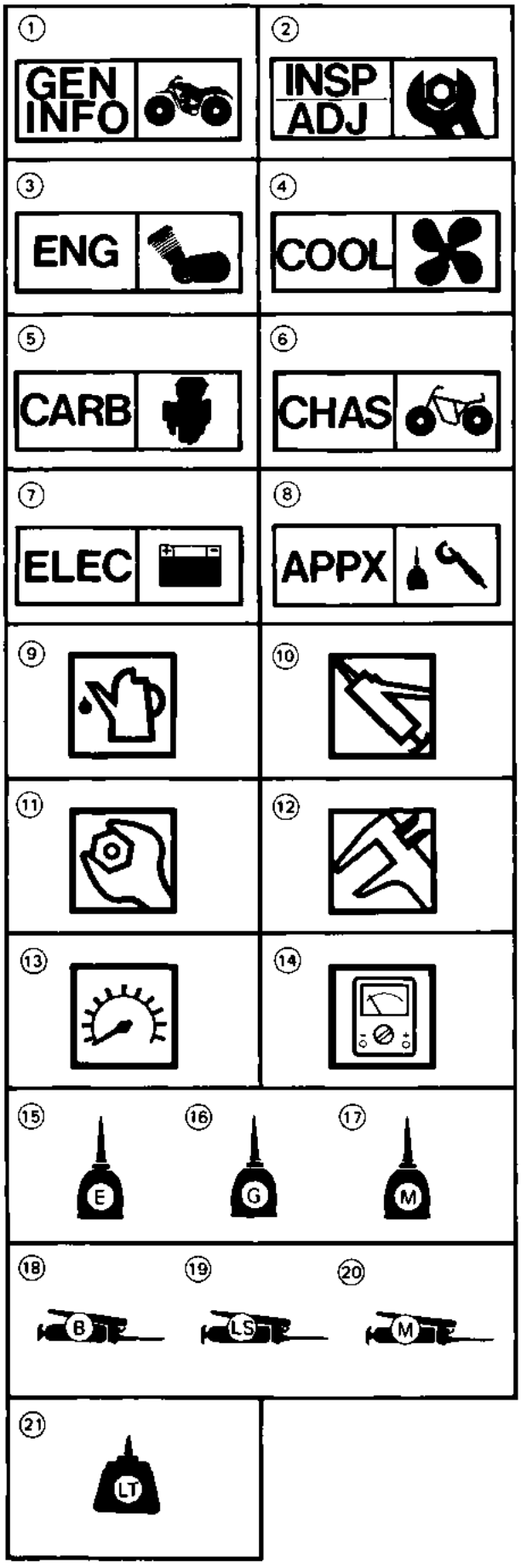
MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
  Pitting/Damage → Replace.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.



ILLUSTRATED SYMBOLS
(Refer to the illustration)

Illustrated symbols ① to ⑧ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Periodic inspection and adjustment
③ Engine
④ Cooling system
⑤ Carburetion
⑥ Chassis
⑦ Electrical
⑧ Appendices

Illustrated symbols ⑨ to ⑭ are used to identify the specifications appearing in the text.

⑨ Filling fluid
⑩ Lubricant
⑪ Tightening
⑫ Wear limit, clearance
⑬ Engine speed
⑭ Ω, V, A

Illustrated symbols ⑮ to ㉑ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑮ Apply engine oil
⑯ Apply gear oil
⑰ Apply molybdenum disulfide oil
⑱ Apply wheel bearing grease
⑲ Apply lightweight lithium-soap base grease
⑳ Apply molybdenum disulfide grease
㉑ Apply locking agent (LOCTITE®)

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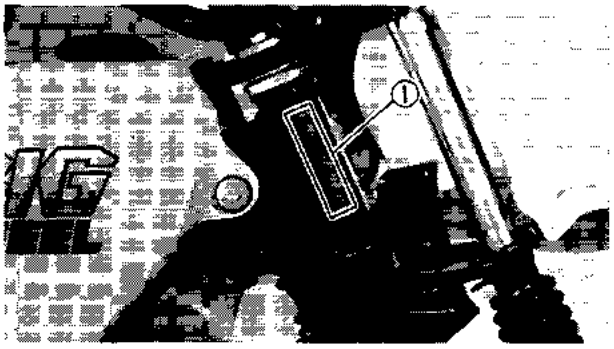
CHAPTER 1.
GENERAL INFORMATION



GENERAL INFORMATION

MACHINE IDENTIFICATION

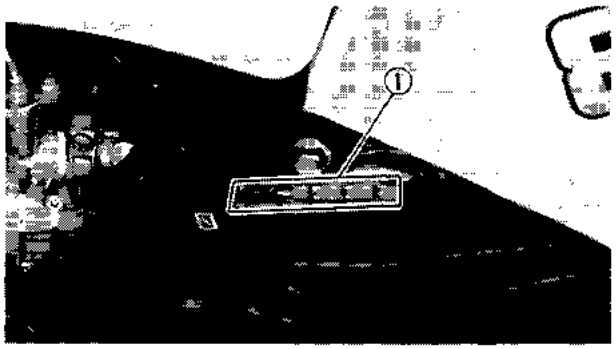
VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the steering head pipe.

NOTE:

The vehicle identification number is used to identify your machine and may be used to register your machine with the licensing authority in your state.

Starting Serial Number:
JYA1RY00 * GC000101



ENGINE SERIAL NUMBER

The engine serial number ① is stamped into the left side of the engine.

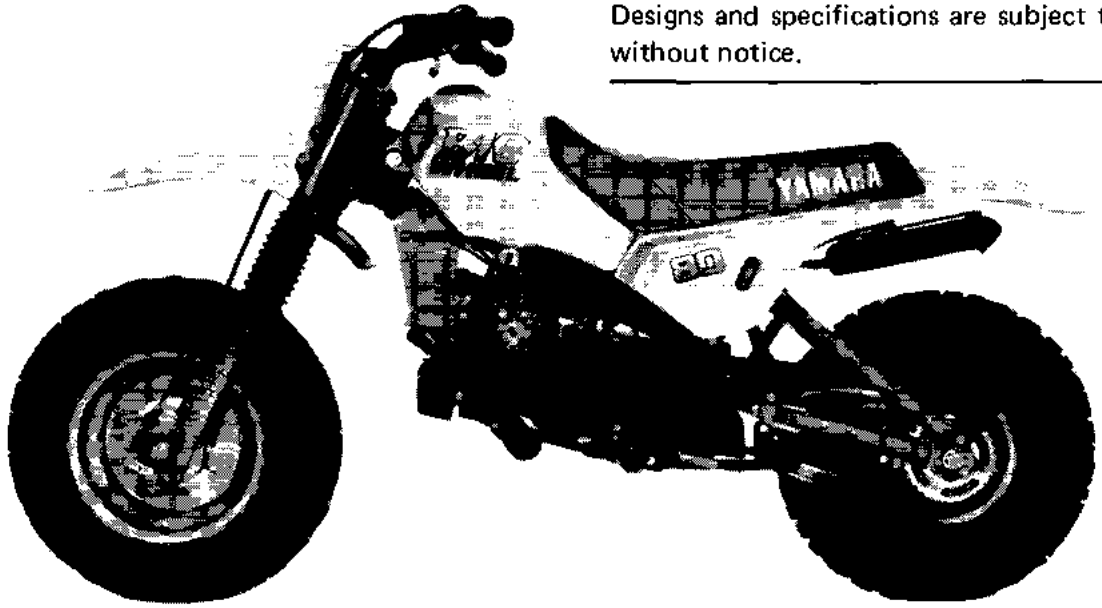
NOTE:

The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.

Starting Serial Number:
1RY-000101

NOTE:

Designs and specifications are subject to change without notice.



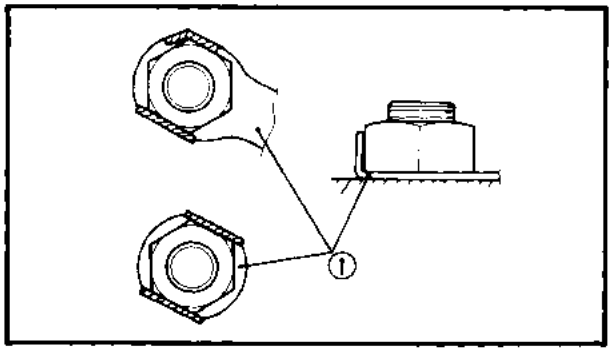
IMPORTANT INFORMATION

ALL REPLACEMENT PARTS

1. We recommend to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment.

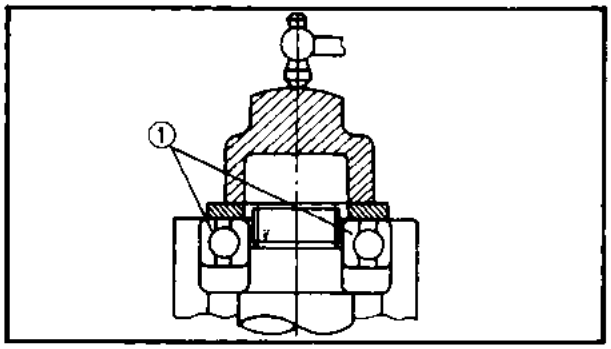
GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.



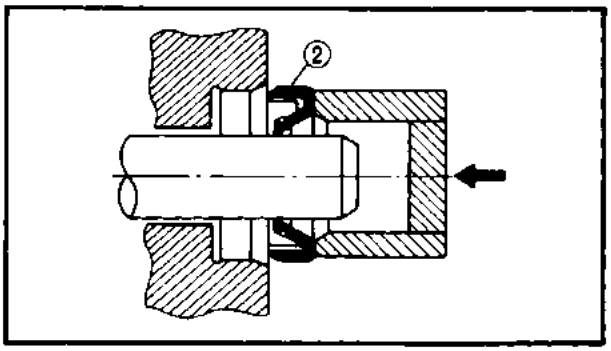
LOCK WASHERS/PLATES AND COTTER PINS

1. All lock washers/plates ① and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.



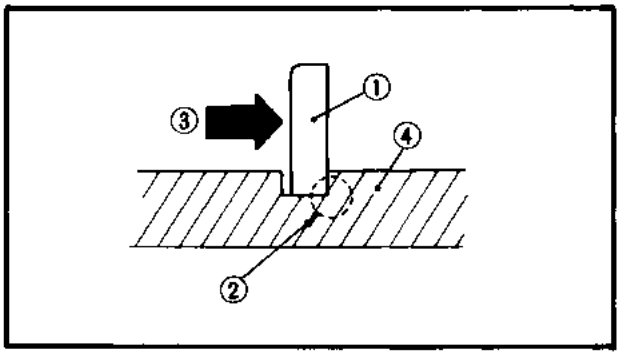
BEARINGS AND OIL SEALS

1. Install the bearing(s) ① and oil seal(s) ② with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of light-weight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.



CAUTION:

Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.



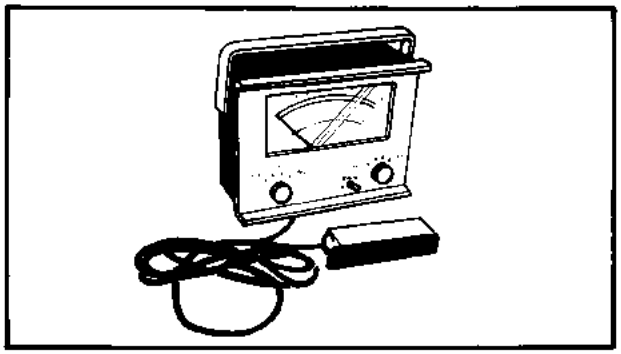
CIRCLIPS

1. All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip ① , make sure that the sharp-edged corner ② is positioned opposite to the thrust ③ it receives. See the sectional view.

④ Shaft

SPECIAL TOOLS

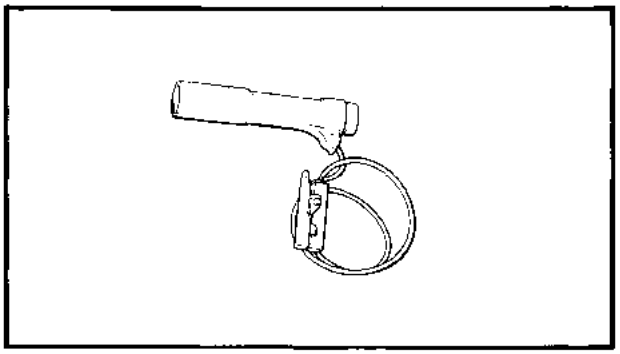
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.



FOR TUNE UP

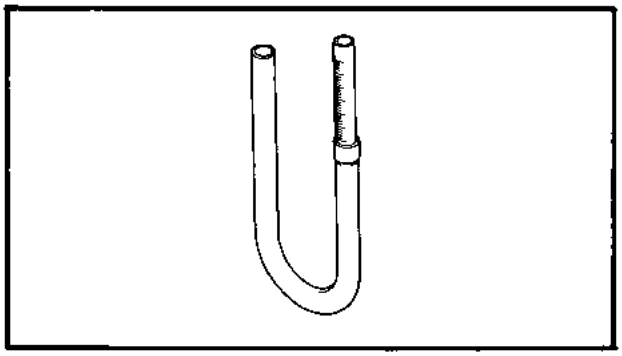
1. Inductive Tachometer
   P/N YU-08036

This tool is needed for detecting engine rpm.



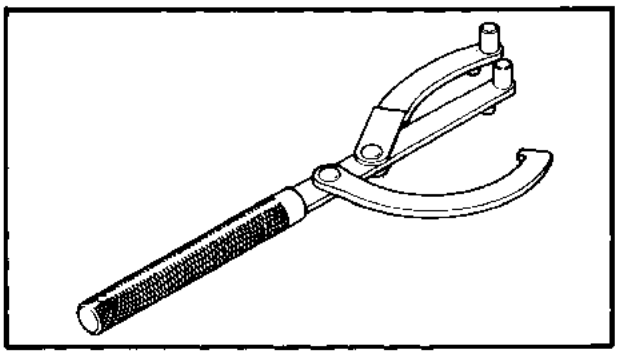
2. Inductive Timing Light
   P/N YM-33277

This tool is necessary for checking ignition timing.



3. Fuel Level Gauge
   P/N YM-01312

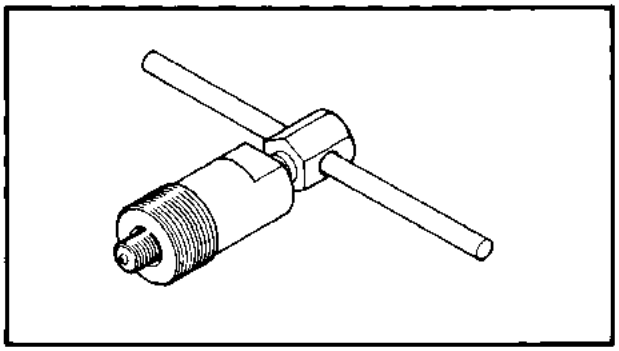
This gauge is used to measure the fuel level in the float chamber.



FOR ENGINE SERVICE

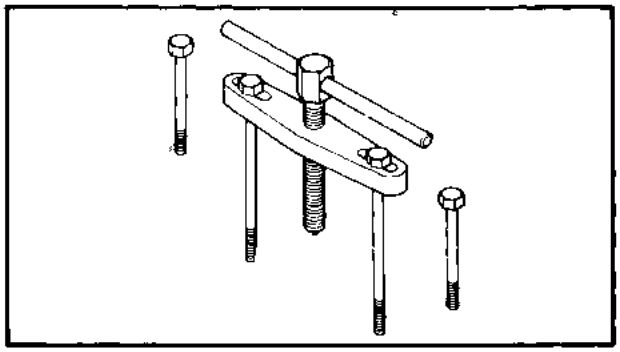
1. Rotor Holding Tool
   P/N YU-01235

This tool is used to hold the clutch when removing or installing the clutch boss locknut.



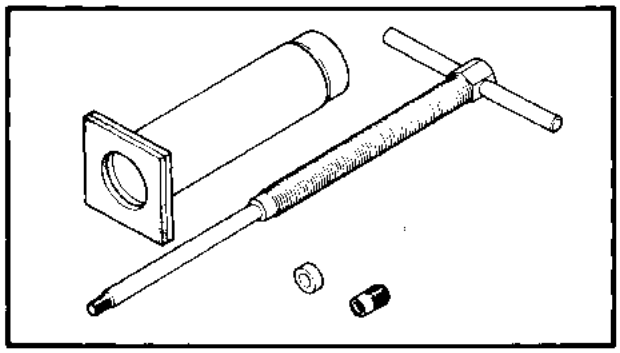
2. Rotor Puller
   P/N YM-01189

This tool is needed to remove the flywheel magneto.



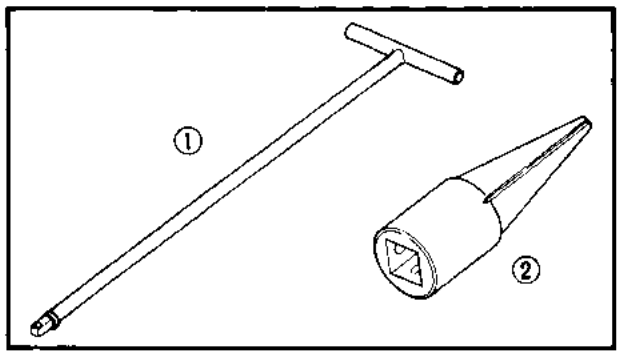
3. Crankcase Separating Tool
   P/N YU-01135

This tool is needed to separate the crankcases.



4. Piston Pin Puller
   P/N YU-01304

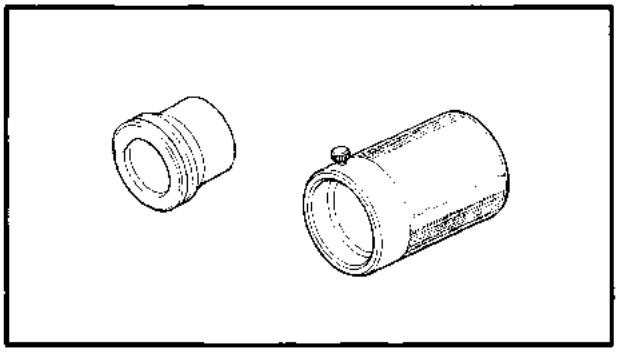
This tool is used to remove the piston pin.



FOR CHASSIS SERVICE

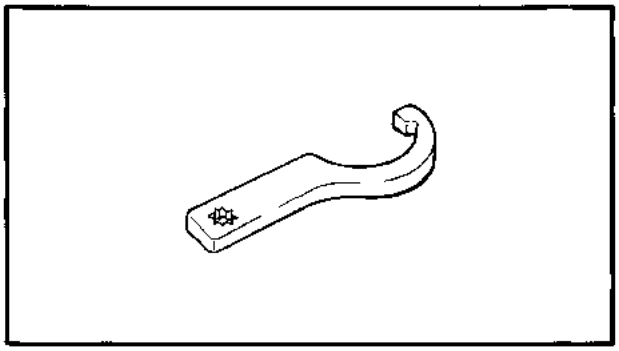
1. T-Handle
   P/N YM-01326 – ①
   Damper Rod Holder
   P/N YM-01300-1 – ②

This tool is used to loosen and tighten the front fork cylinder holding bolt.



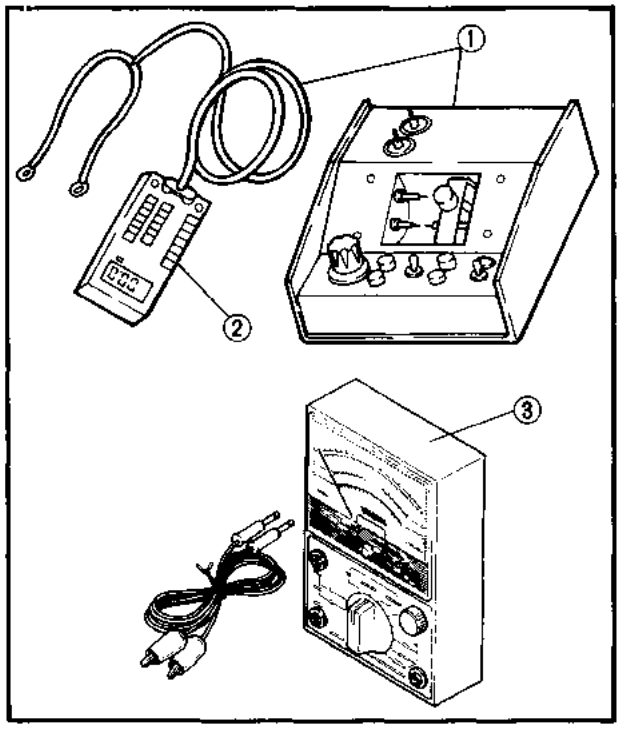
2. Front Fork Seal Driver Set
   P/N YM-33963

These tools are used when installing the fork seal.



3. Ring Nut Wrench
   P/N YU-33975

This tool is used to loosen and tighten the steering ring nut.



FOR ELECTRICAL COMPONENTS

1. Electro Tester
   P/N YU-33260 – ①

This instrument is necessary for checking the ignition system components.

2. Pocket Tester
   P/N YU-33263 – ② or
   P/N YU-03112 – ③

This instrument is invaluable for checking the electrical system.

CHAPTER 2.
PERIODIC INSPECTIONS AND ADJUSTMENTS

PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

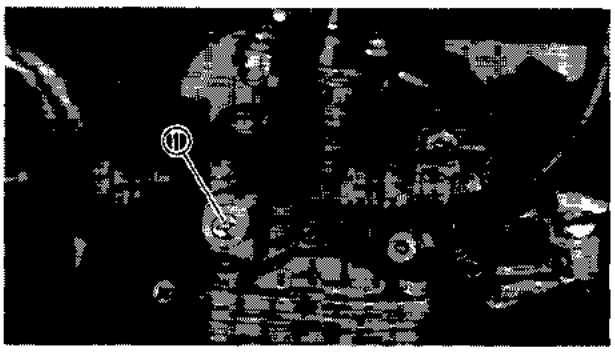
This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service as well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

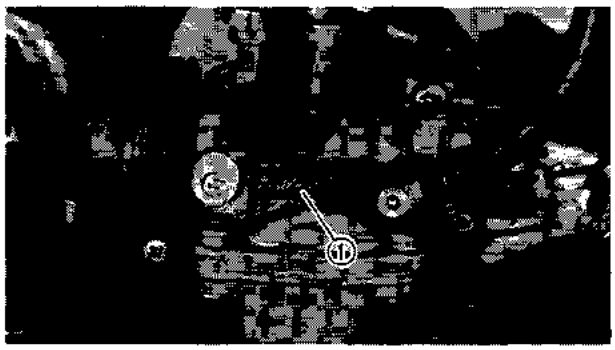
PERIODIC MAINTENANCE/LUBRICATION

Unit: km (miles)

ITEM	REMARKS	BREAK-IN	EVERY	
		1 month	6 months	12 months
Spark plug(s)	Check condition. Clean or replace if necessary.	O	O	O
Air filter	Clean. Replace if necessary.		O	O
Carburetor*	Check idle speed/starter operation. Adjust if necessary.	O	O	O
Fuel line*	Check fuel hose for cracks or damage. Replace if necessary.		O	O
Fuel filter*	Check condition. Replace if necessary.			O
Transmission oil*	Check oil level/oil leakage. Correct if necessary. Replace very 24 months. (Warm engine before draining.)	REPLACE	O	O
Autolube pump*	Check operation. Correct if necessary. Air bleeding.	O	O	O
Brake	Check operation. Adjust if necessary.		O	O
Rear arm pivot*	Check rear arm assembly for looseness. Correct if necessary. Moderately repack every 24 months.***			O
Wheels*	Check balance/damage/runout. Repair if necessary.		O	O
Wheel bearings*	Check bearings assembly for looseness/damage. Replace if damaged.		O	O
Steering bearing*	Check bearings assembly for looseness. Correct if necessary. Moderately repack every 24 months.**	O		O
Front forks*	Check operation/oil leakage. Repair if necessary.		O	O
Rear shock absorber*	Check operation/oil leakage. Repair if necessary.		O	O
Drive chain	Check chain slack/alignment. Adjust in necessary. Clean and lube.	EVERY 1 month		
Fittings/Fasteners*	Check all chassis fittings and fasteners. Correct if necessary.	O	O	O
Sidestand*	Check operation. Repair if necessary.	O	O	O

*: It is recommended that these items be serviced by a Yamaha dealer.
**: Medium weight wheel bearing grease.
***: Lithium soap base grease





ENGINE

IDLING SPEED ADJUSTMENT

1. Tighten:
   - Air screw (lightly) ①
2. Loosen:
   - Air screw ①

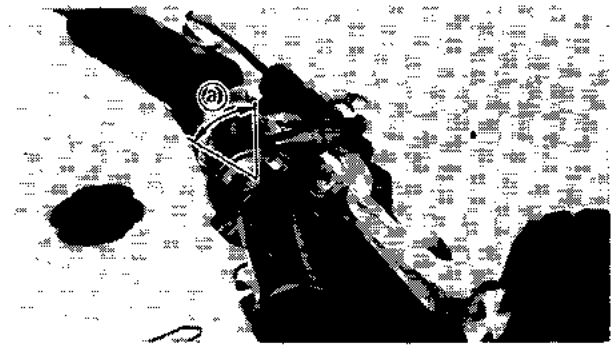
   Back it out from its lightly seated position.

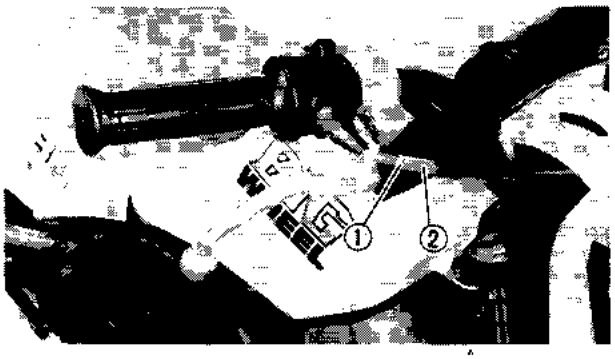
Standard Turned Out: 1 and 1/4

3. Start the engine, and let it warm up.
4. Adjust:
   - Idling speed

   Turn the throttle stop screw ① to adjust.

Idling Speed: 1,650 ~ 1,750 r/min





THROTTLE CABLE ADJUSTMENT

NOTE:

Before adjusting the throttle cable free play, the engine idling speed should be adjusted.

1. Check:
   - Throttle lever free play ⓐ

   Out of specification → Adjust.

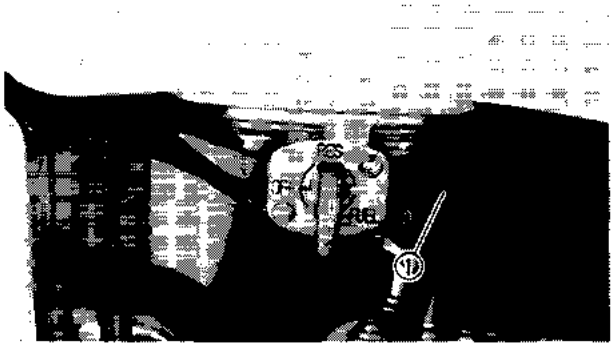
Throttle Lever Free Play ⓐ :
5 mm (0.2 in)

2. Adjust:
   - Throttle lever free play

   By the following adjustment steps.

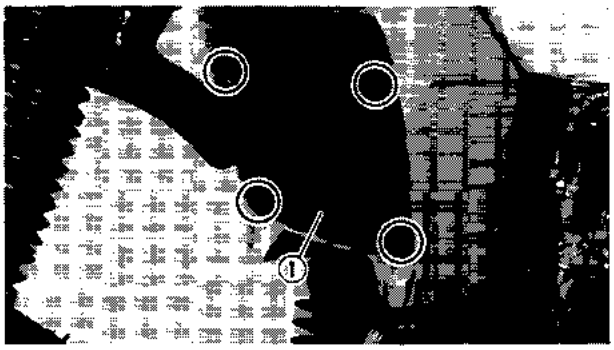
Throttle cable free play adjustment steps:
- Loosen the locknut ① .
- Turn the adjuster ② clockwise or counter-clockwise until proper free play is attained.
- Tighten the locknut.

FUEL LINE INSPECTION/AIR FILTER CLEANING



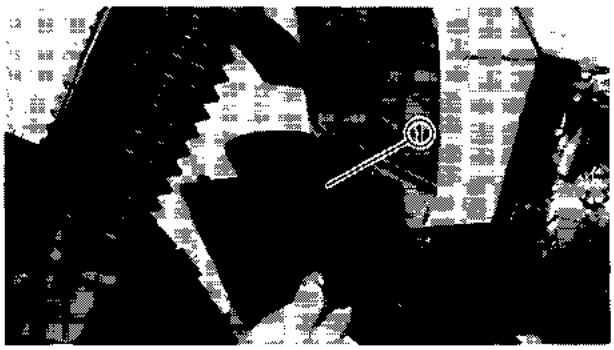
FUEL LINE INSPECTION

1. Inspect:
   - Fuel hose ①
     Cracks/Damage → Replace.



AIR FILTER CLEANING

1. Remove:
   - Filter case cover ①



2. Remove:
   - Air filter element ①

CAUTION:

The engine should never be run without the air filter element; excessive piston and/or cylinder wear may result.

3. Clean:
   - Air filter element
     Clean it with solvent.

NOTE:

After cleaning, remove the remaining solvent by squeezing the element.

CAUTION:

Do not twist the filter element when squeezing the filter element.

WARNING:

Never use low flash point solvents such as gasoline to clean the air filter element. Such solvent may lead to a fire or explosion.

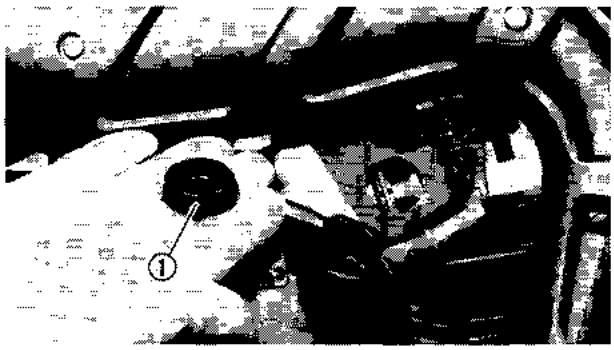
4. Inspect:
   - Element
     Damage → Replace.

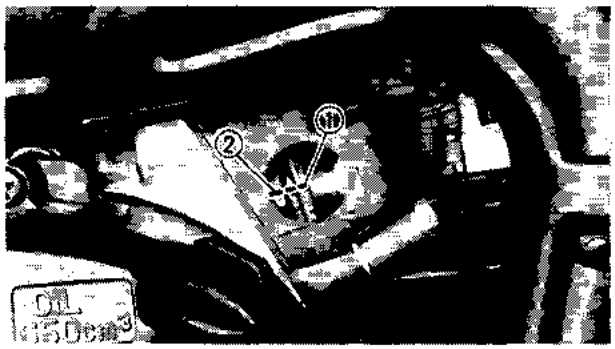
5. Apply:
   - Air cooled 2-stroke oil
6. Squeeze out the excess oil.

NOTE:
The element should be wet but not dripping.

7. Apply:
   - All-purpose grease
   To the air filter seat.
8. Install:
   - Air filter element

NOTE:
Make sure its sealing surface matches the sealing surface of the case so there is no air leak.





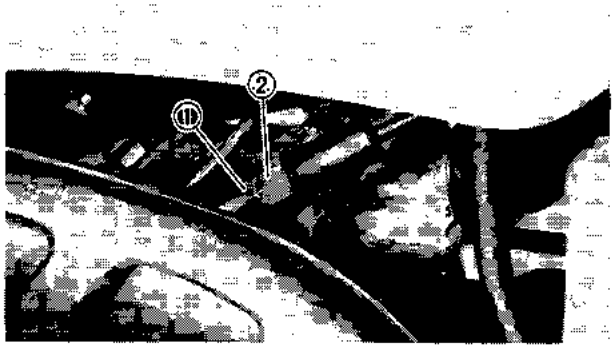
AUTOLUBE PUMP CABLE ADJUSTMENT

1. Remove:
   - Grommet (Oil pump cover) ①
2. Check:
   - Autolube pump cable free play
   By the following steps.

Autolube pump cable free play checking steps:
- Start the engine.
- Hold the throttle grip steady when the throttle cable becomes tight and engine begins to run faster.
- Check to see that the match mark ① on the adjust pulley is aligned with the pump case mark ② .
- If not, adjust the free play.

3. Adjust:
   - Autolube pump cable free play
   By the following steps.

AUTOLUBE PUMP AIR BLEEDING

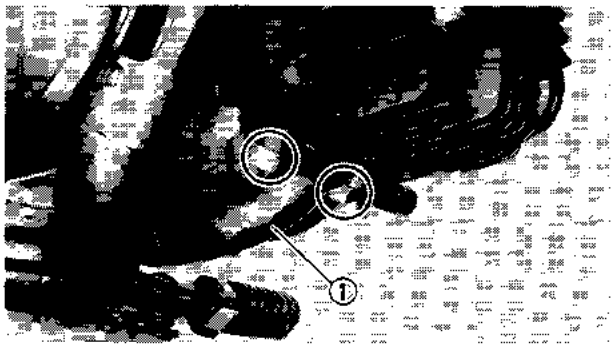


Autolube pump cable free play adjustment steps:

WARNING:

The exhaust pipe and muffler are heated up. Do not touch any heated areas.

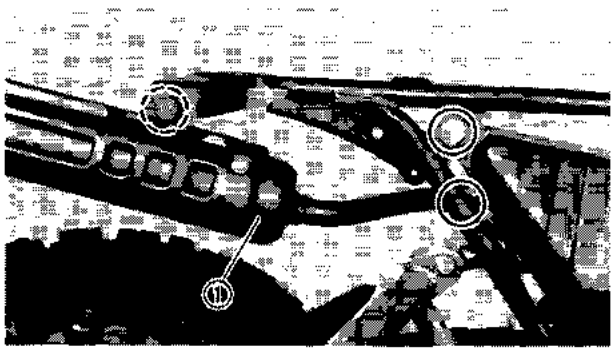
- Loosen the locknut ① .
- Turn the adjuster ② clockwise or counterclockwise until proper free play is attained.
- Tighten the locknut.
- Check the free play.
- If the free play is incorrect, repeat above steps until the proper free play is obtained.



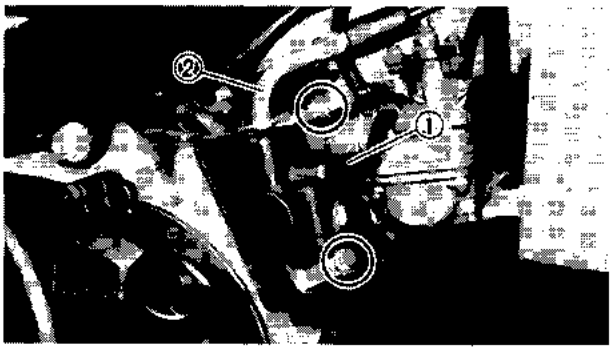
AUTOLUBE PUMP AIR BLEEDING

The Autolube pump and delivery line must be bled on the following occasions:

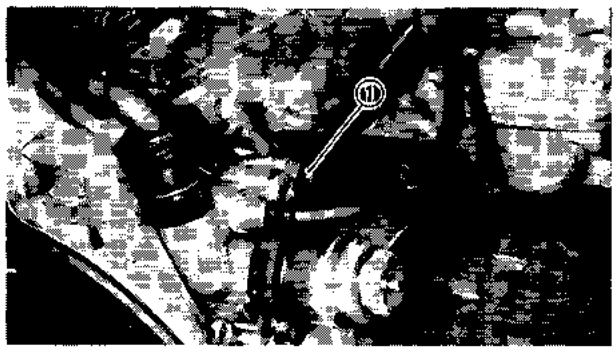
- Setting up a new machine out of the crate.
- Whenever the Autolube tank has run dry.
- Whenever any portion of the Autolube system is disconnected.

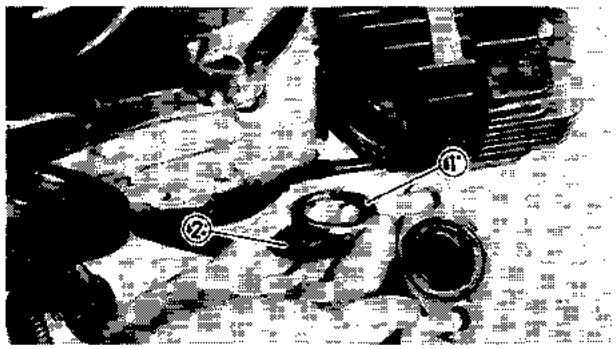


1. Remove:
   - Seat
   - Rear fender
   - Muffler and exhaust pipe ①



2. Remove:
   - Oil pump cover ①
3. Disconnect:
   - Oil pump cable ②





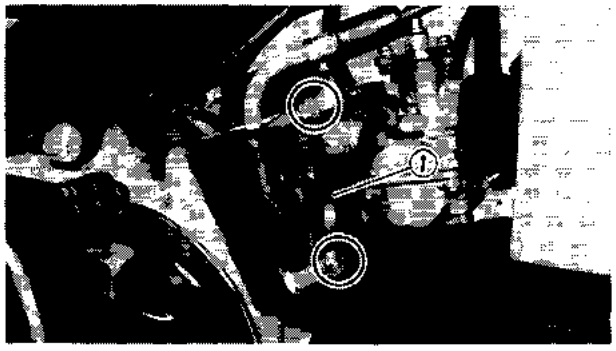
4. Remove:
   - Bleed screw ①
5. Keep the oil running out until air bubbles disappear.

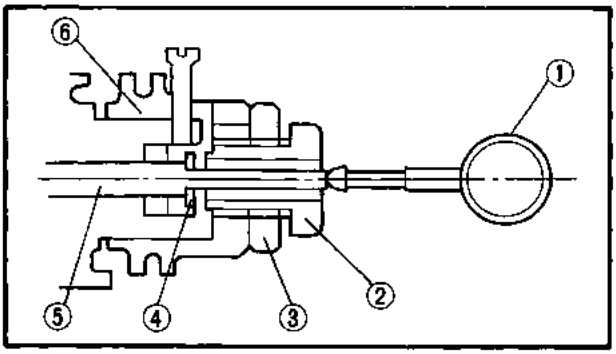
NOTE:
- Place a rag or oil pan under the engine.
- Add the Autolube oil to the oil tank before bleeding.
- Thoroughly clean the engine exterior of oil.

6. Inspect:
   - Bleed screw gasket
     Damage → Replace.
7. Install:
   - Components in above list (steps "1 ~ 4")

NOTE:
Do not forget to fit the gasket ① and power reduction plate ② .

Exhaust Pipe:
18 Nm (1.8 m·kg, 13 ft·lb)
Muffler:
15 Nm (1.5 m·kg, 11 ft·lb)





MINIMUM PUMP STROKE ADJUSTMENT

1. Remove:
   - Seat
   - Rear fender
   - Muffler and exhaust pipe
2. Remove:
   - Oil pump cover ①
3. Measure:
   - Minimum pump stroke
     By the following measurement steps.

Minimum pump stroke measurement steps:
- Set the Dial Gauge ① as illustrated.
- Measure the plunger stroke while keeping the engine idling.

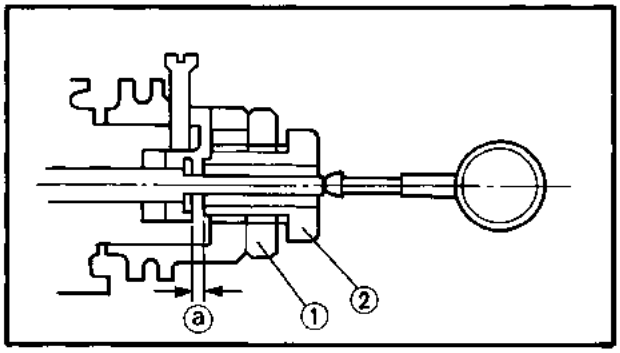
② Adjuster
③ Locknut
④ Adjusting plate
⑤ Plunger
⑥ Adjust pulley

ENGINE OIL LEVEL INSPECTION

Minimum Stroke:
0.40 ~ 0.45 mm (0.016 ~ 0.018 in)

- If the minimum stroke is incorrect, adjust the minimum stroke.

4. Adjust:
   - Minimum pump stroke
     By the following adjustment steps.



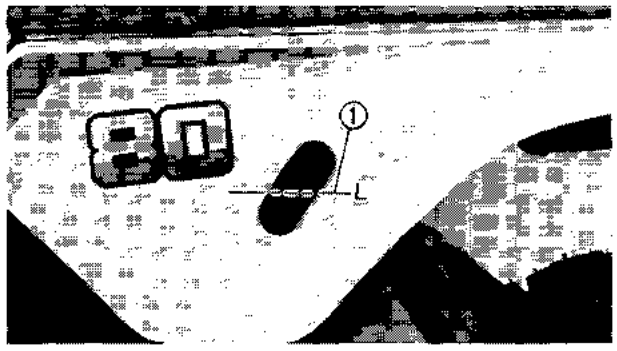
Minimum pump stroke adjustment steps:
- Loosen the locknut ① .
- Turn the adjuster ② clockwise or counter-clockwise until proper minimum stroke ⓐ is attained.
- Tighten the locknut.
- Measure the minimum stroke.
- If the minimum stroke is incorrect, repeat above steps until the proper free play is obtained.

5. Install:
   - Component in above list (Steps "1 and 2")
     Refer to "AUTOLUBE PUMP AIR BLEEDING" section.

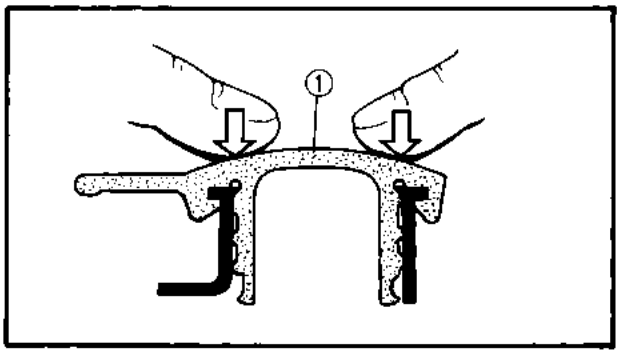
ENGINE OIL LEVEL INSPECTION

1. Inspect:
   - Engine oil level
     Oil level low → Add sufficient oil.
     By the following inspection steps.

Engine oil level inspection steps:
- Place the machine on a level place.
- Warm up the engine for several minutes, and stop it.
- Inspect the oil level whether it is above the minimum level ("L" position) ① .
- If the level is lower, add the oil up to the proper level.



Recommended Oil:
Yamalube 2-cycle Oil or
Air cooled 2-stroke Oil

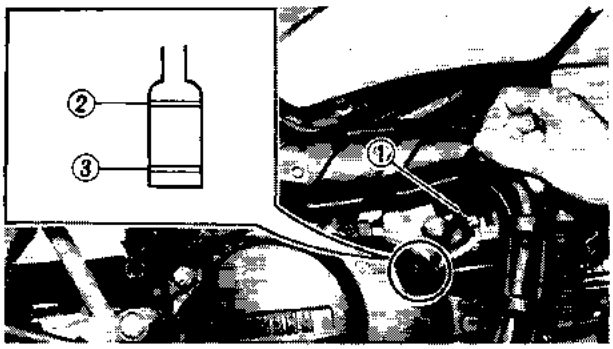


NOTE:
Install the oil tank filler cap ① and push it fully into the filler.

CAUTION:
Always use the same type of engine oil; mixing oils may result in a harmful chemical reaction and lead to poor performance.

TRANSMISSION OIL LEVEL INSPECTION

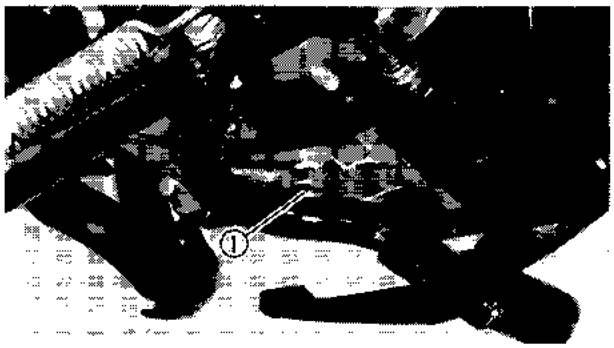
1. Inspect:
   - Transmission oil level
     Oil level low → Add sufficient oil.
     By the following inspection steps.



Transmission oil level inspection steps:
- Place the machine on a level place.
- Warm up the engine for several minutes, and stop it.
- Screw the dipstick ① completely out, and then just rest the dipstick in the hole.
- Pull up the dipstick, and inspect the oil level whether or not it is between maximum ② and minimum level ③.
- If the level is lower, add the oil up to the proper level.

Recommended Oil:
Yamalube 4-cycle Oil or SAE 10W30 Type SE Motor Oil

CAUTION:
- **Do not add any chemical additives. Transmission oil also lubricates the clutch and additives could cause clutch slippage.**
- **Be sure no foreign material enters the crankcase.**



TRANSMISSION OIL REPLACEMENT

1. Place the machine on a level place.
2. Warm up the engine for several minutes, and stop it.
3. Place an oil pan under the engine.
4. Remove:
   - Dip stick
   - Drain plug ①

   Drain the transmission oil.
5. Inspect:
   - Gasket (Drain plug)

   Damage → Replace.
6. Tighten:
   - Drain plug

Drain Plug:
20 Nm (2.0 m·kg, 14 ft·lb)

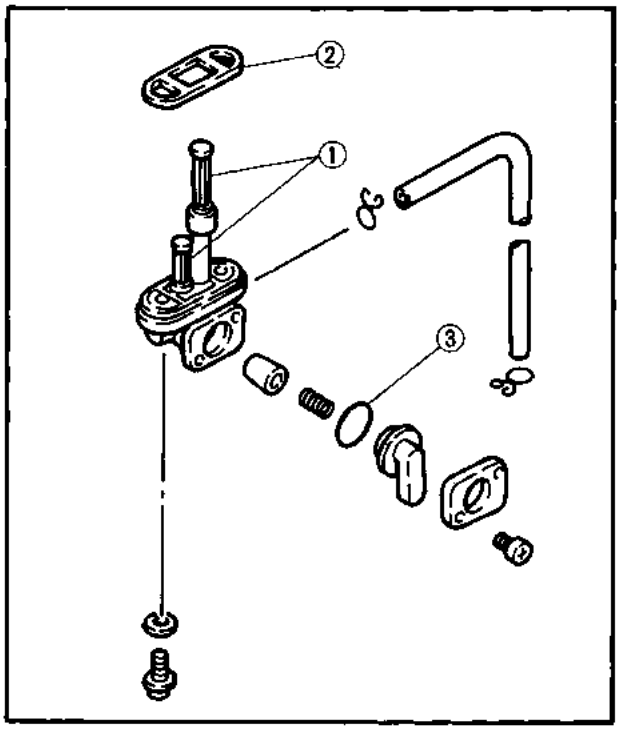
7. Fill:
   - Transmission oil

Recommended Oil:
Yamalube 4-cycle Oil or SAE 10W30 Type SE Motor Oil
Oil Capacity:
Periodic Oil Change:
0.65 L (0.57 Imp qt, 0.69 US qt)

NOTE:
Recommended engine oil classification; API Service "SE", "SF" type or equivalent (e.g. "SF-SE", "SF-SE-CC", "SF-SE-SD" etc.).

CAUTION:
- **Do not add any chemical additives. Transmission oil also lubricates the clutch and additives could cause clutch slippage.**
- **Be sure no foreign material enters the crankcase.**

8. Install:
   - Dip stick
9. Inspect:
   - Oil leaks
   - Oil level



CHASSIS

FUEL COCK CLEANING

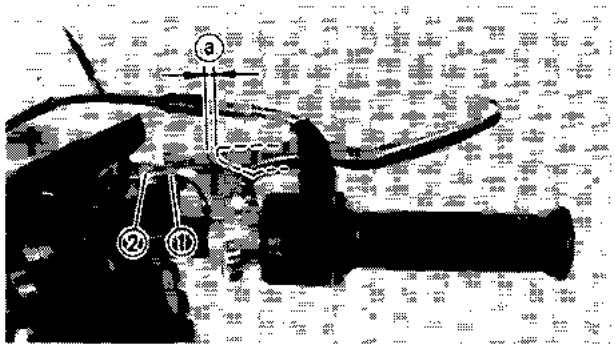
1. Turn the fuel cock lever to the "OFF".
2. Disconnect:
   - Fuel pipe
3. Remove:
   - Seat
   - Rear fender
   - Fuel tank
   - Fuel cock
4. Clean:
   - Filter screen ①

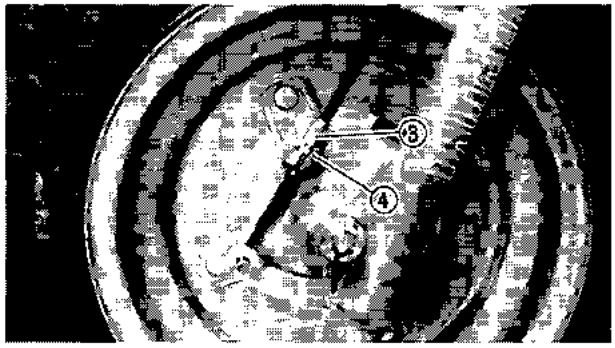
   Clean it with solvent.
5. Inspect:
   - Gasket ②
   - Filter screen ①
   - O-ring ③

   Damage → Replace.
6. Install:
   - Components in above list (steps "3 and 2")

NOTE:

Be careful not to clamp the fuel cock too tightly as this may unseat the O-ring and gasket, and lead to a fuel leak.





FRONT BRAKE ADJUSTMENT

1. Adjust:
   - Free play ⓐ

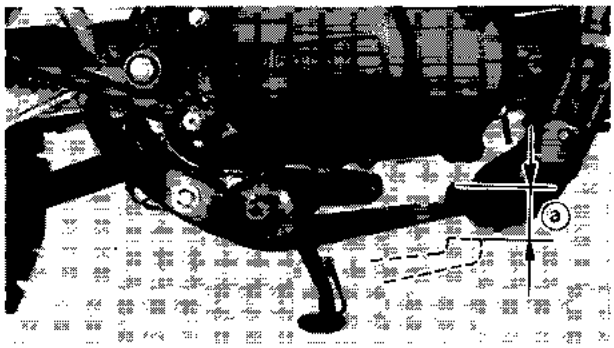
   By the following adjustment steps.

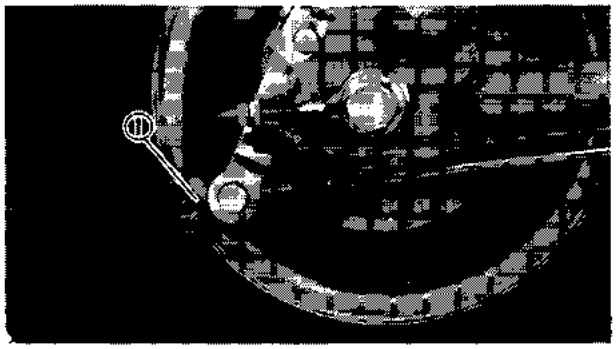
Steps for front brake lever free play adjustment:

- Loosen the locknut (handlebar) ① , and fully turn in the adjuster (handlebar) ② .
- Loosen the pinch screw (brake cable holder) and locknut (brake shoe plate) ④ .
- Turn the adjuster (brake shoe plate) ③ in or out until proper adjustment is achieved.

Front Brake Lever Free Play ⓐ :
5 ~ 8 mm (0.2 ~ 0.3 in)

- Unless the adjuster (brake shoe plate) ③ helps bring a proper play, turn the adjuster (handlebar) ② in or out until proper adjustment is achieved.
- Tighten the locknuts ① , ④ .
- Tighten the pinch screw (brake cable holder).





REAR BRAKE ADJUSTMENT

1. Adjust:
   - Free play ⓐ
     By the following adjustment steps.

Step for brake pedal free play adjustment:
- Turn the adjuster ① in or out until proper adjustment is achieved.

Rear Brake Pedal Free Play ⓐ :
20 ~ 30 mm (0.8 ~ 1.2 in)

DRIVE CHAIN SLACK CHECK

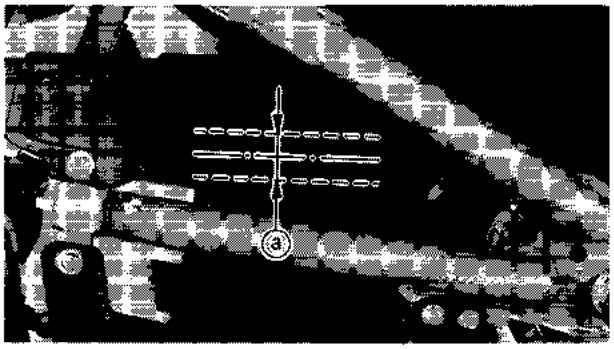
NOTE:

Before checking and/or adjusting the chain slack, rotate the rear wheel through several revolutions. Check the chain slack several times to find the point where the chain is the tightest. Check and/or adjust the chain slack where the rear wheel is in this "tight chain" position.

1. Place the machine on a level place, and hold it in an upright position.

NOTE:

The both wheels on the ground without rider on it.



2. Check:
   - Drive chain slack ⓐ
     Out of specification → Adjust.

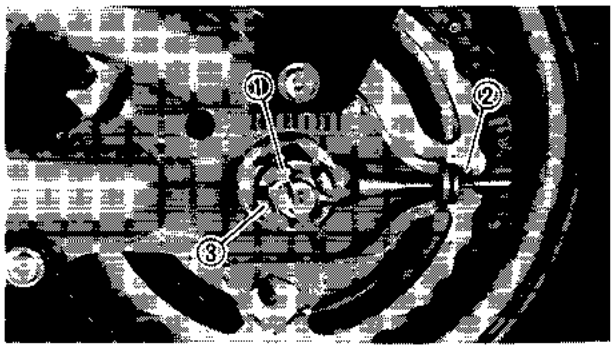
Drive Chain Slack: 15 ~ 20 mm (0.6 ~ 0.8 in)

DRIVE CHAIN SLACK ADJUSTMENT

CAUTION:

Excessive chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

1. Remove:
   - Cotter pin ①
2. Loosen:
   - Adjuster (rear brake)
   - Axle nut ③
3. Adjust:
   - Drive chain slack
     By the following adjustment steps.



Drive chain slack adjustment steps:
- Turn the adjusters (drive chain) ② in or out until proper adjustment is achieved.

Drive Chain Slack: 15 ~ 20 mm (0.6 ~ 0.8 in)

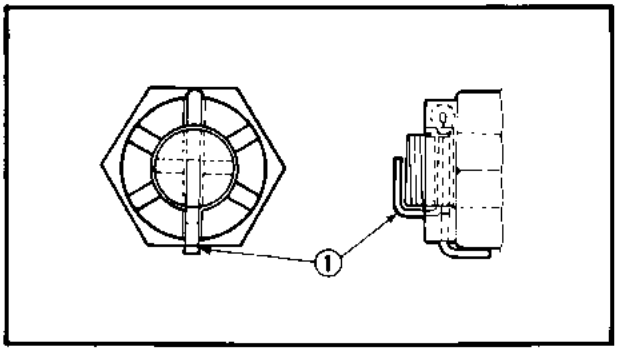
NOTE:
Turn each adjuster exactly the same amount to maintain correct axle alignment.

- Check the drive chain slack.
- If the slack is incorrect, repeat above steps until the proper slack is obtained.

4. Tighten:
   - Axle nut

Rear Wheel Axle Nut: 85 Nm (8.5 m·kg, 61 ft·lb)

DRIVE CHAIN LUBRICATION



5. Install:
   - Cotter pin (New) ①

NOTE:
Bend the end of the cotter pin.

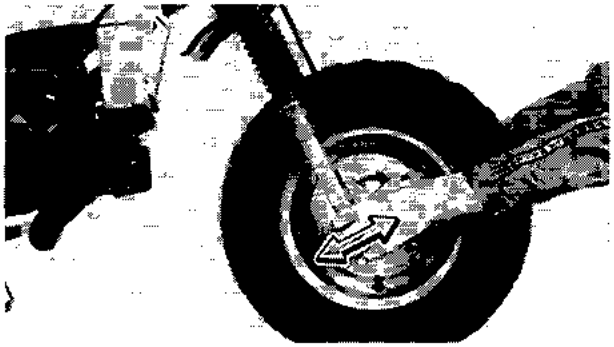
WARNING:
Always use a new cotter pin on the axle nut.

6. Adjust:
   - Rear brake free play

DRIVE CHAIN LUBRICATION

The chain consists of many parts which work against each other. If the chain is not maintained properly, it will wear out rapidly, therefore, form the habit of periodically servicing the chain. This service is especially necessary when riding in dusty conditions.

1. Use any of the many brands of spray type chain lubricant. First, remove dirt and mud from the chain with a brush or cloth and then spray the lubricant between both rows of side plates and on all center rollers.
2. To clean the entire chain, first remove the chain from the machine, dip it in solvent and clean out as much dirt as possible. The take the chain out of the solvent and dry it. After drying, lubricate the chain to prevent the formation of rust.

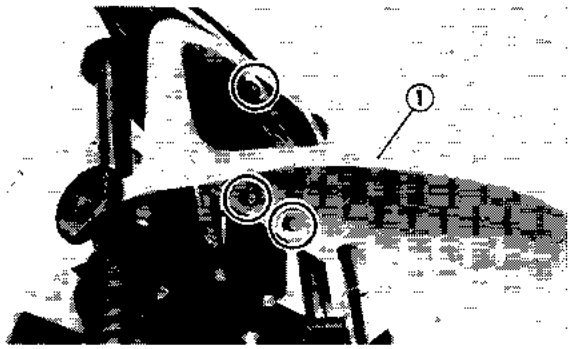


STEERING HEAD INSPECTION

WARNING:

Securely support the machine so there is no danger of it falling over.

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Check:
   - Steering assembly bearings
     Grasp the bottom of the forks and gently rock the fork assembly back and forth.
     Looseness → Adjust steering head.



STEERING HEAD ADJUSTMENT

WARNING:

Securely support the machine so there is no danger of it falling over.

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Remove:
   - Front fender ①
3. Adjust:
   - Ring nut tightening condition
     By the following adjustment steps.

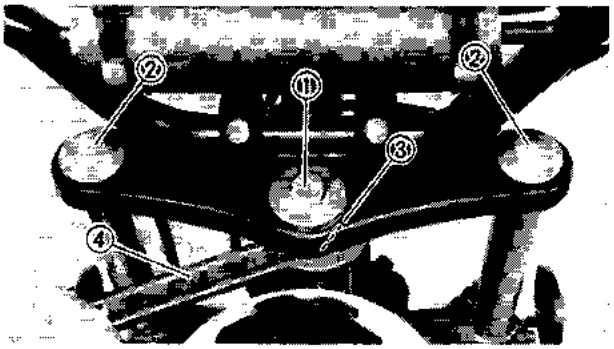
Steps for ring nut tightening condition adjustment:

- Loosen the steering stem bolt ① and cap bolts ② .
- Pull up the handle crown.
- Loosen the ring nut ③ .
- Tighten the ring nut using the Ring Nut Wrench (YU-33975) ④ .

NOTE:

Set the Torque Wrench to the Ring Nut Wrench so that they form a right angle.

Ring Nut:
38 Nm (3.8 m·kg, 27 ft·lb)



- Loosen the ring nut 1/4 turn.
- Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the bearings.
- Tighten the steering stem bolt and cap bolts.

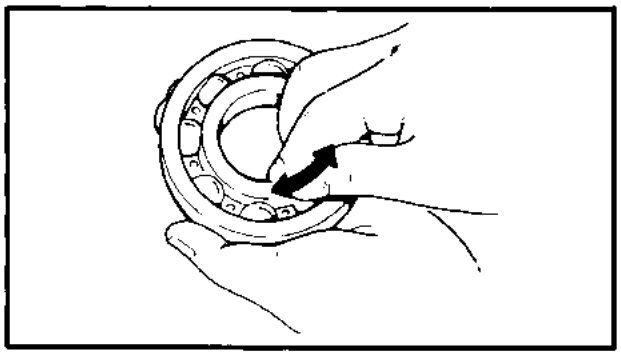
Steering Stem Bolt:
40 Nm (4.0 m·kg, 29 ft·lb)
Cap Bolt:
40 Nm (4.0 m·kg, 29 ft·lb)

4. Install:
   - Front fender

WHEEL BEARINGS CHECK

Front Wheel

1. Check:
   - Front wheel bearings
     Raise the front end of the machine, and spin the wheel by hand. Touch the axle or front fender while spinning the wheel. Excessive vibration → Replace bearings.



Rear Wheel

1. Remove:
   - Rear wheel
2. Check:
   - Bearing movement
     With the fingers.
     Roughness/Wear → Replace.

CABLE INSPECTION AND LUBRICATION

1. Damage to the outer housing of the various cables may cause corrosion. Often free movement will be obstructed. An unsafe condition may result. Replace such cables as soon as possible.

2. If the inner cables do not operate smoothly lubricate or replace them.

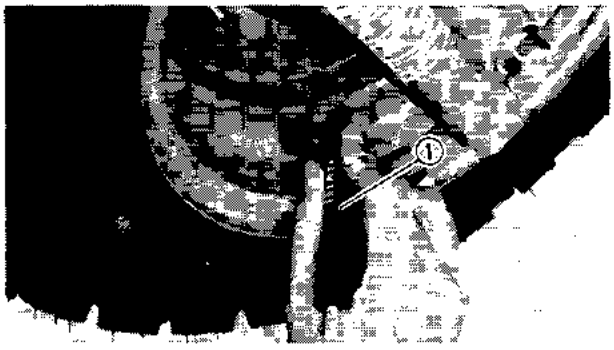
Yamaha Chain and Cable Lube or SAE 10W30 Motor Oil

TIRES CHECK

WARNING:

This model is equipped with low pressure tires. Pay attention to the following points:
Recommended tire pressure:
29.4 kPa (0.3 kg/cm², 4.3 psi)
Vehicle load limit: 40 kg (88 lb)
Tire size: Front 19 x 7.00 – 10
Rear 19 x 9.00 – 7

- **Excessive tire pressure (over 206 kPa (2.1 kg/cm², 30 psi)) may cause tire to burst. Inflate tires very slowly. Fast inflation could cause tire to burst.**
- **Too low a pressure (Front: below 24.5 kPa (0.25 kg/cm², 3.6 psi) Rear: below 29.4 kPa (0.3 kg/cm², 4.3 psi)) could cause the tire to dislodge from the rim.**
- **Set tire pressures cold.**



1. Measure:
   - Tire pressure (cold tire pressure)
     Out of specification → Adjust.
     Use an appropriate low-pressure tire gauge ①.

Cold Tire Pressure	Front	Rear
Standard	29.4 kPa (0.3 kg/cm², 4.3 psi)	29.4 kPa (0.3 kg/cm², 4.3 psi)
Minimum	24.5 kPa (0.25 kg/cm², 3.6 psi)	29.4 kPa (0.3 kg/cm², 4.3 psi)

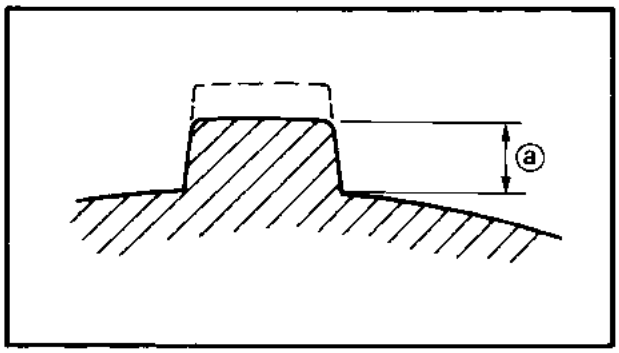
CAUTION:

Never use a tire pressure below minimum specification. The tire could separate from the wheel under severe operating conditions.

WARNING:

Tire inflation pressure should be checked and adjusted when the temperature of the tire equals the ambient air temperature.

2. Inspect:
   - Tire surfaces
     Wear/Damage → Replace.



Tire Wear Limit ⓐ :
Front and Rear: 3.0 mm (0.12 in)

WARNING:

It is dangerous to ride with a wornout tire. When a tire wear is out of specification, replace the tire immediately.

WHEELS CHECK

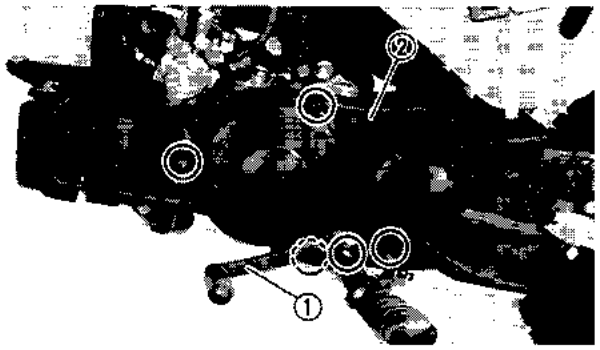
1. Inspect:
   - Wheels
     Crack/Bend/Warpage → Replace.

NOTE:

Always balance the wheel a tire or wheel has been changed or replaced.

WARNING:

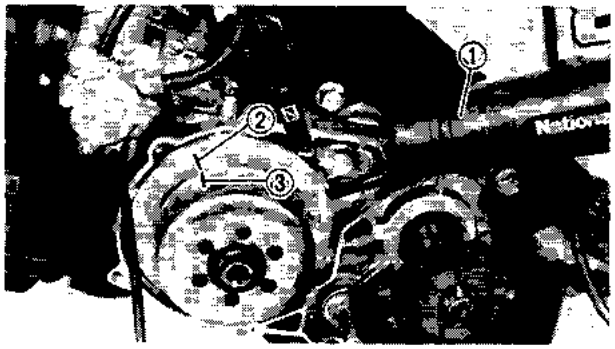
Never attempt even small repairs to the wheel.



ELECTRICAL

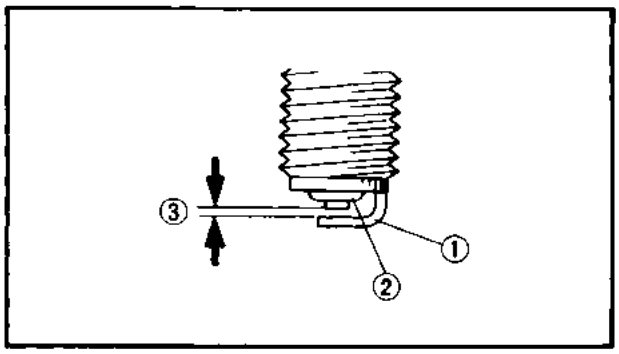
IGNITION TIMING CHECK

1. Remove:
   - Change pedal ①
   - Crankcase cover (Left) ②



2. Check:
   • Ignition timing
   By the following steps.

Ignition timing check steps:
- Connect the Timing Light ① (YM-33277) to the spark plug lead.
- Warm up the engine and keep it running at the specified speed of 4,000 r/min. Use the tachometer for checking.
- Visually check the stationary pointer ② on the crankcase to verify it is aligned the timing mark ③ on the flywheel.
  Incorrect → Check flywheel and/or source coil (tightness and/or damage).
  Refer to "CHAPTER 6. ELECTRICAL" for further information.



SPARK PLUG INSPECTION

1. Inspect:
   • Electrode ①
   Wear/Damage → Replace.
   • Insulator color ②
   Normal condition is a medium to light tan color.
   Distinctly different color → Check the engine condtion.

③ Spark plug gap

2. Clean:
   • Spark plug
   Clean the spark plug with a spark plug cleaner or wire brush.
3. Inspect:
   • Spark plug type
   Incorrect → Replace.

Standard Spark Plug:
BP7HS (NGK)

4. Measure:
   • Spark plug gap
   Out of specification → Regap.
   Use a wire gauge.

Spark Plug Gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

5. Tighten:
   - Spark plug

NOTE:
Before installing a spark plug, clean the gasket surface and plug surface.

Spark Plug:
20 Nm (2.0 m·kg, 14 ft·lb)

NOTE:
If a torque wrench is not available when you are installing a spark plug, a good estimate of the correct torque is 1/4 to 1/2 turns part finger tight. Have the spark plug torqued to the correct value as soon as possible with a torque wrench.

CHAPTER 3.
ENGINE OVERHAUL

ENGINE OVERHAUL

ENGINE REMOVAL

NOTE:

It is not necessary to remove the engine in order to remove the following components:

- Cylinder head
- Cylinder
- Piston

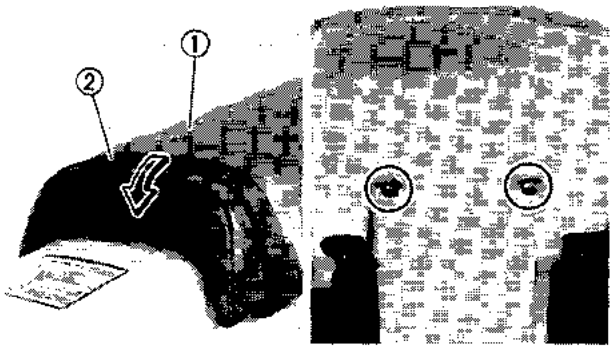
PREPARATION FOR REMOVAL

1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to "CHAPTER 1. GENERAL INFORMATION-SPECIAL TOOLS" section.

NOTE:

When disassembling the engine, keep mated parts together. This includes gears, cylinder, piston and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.

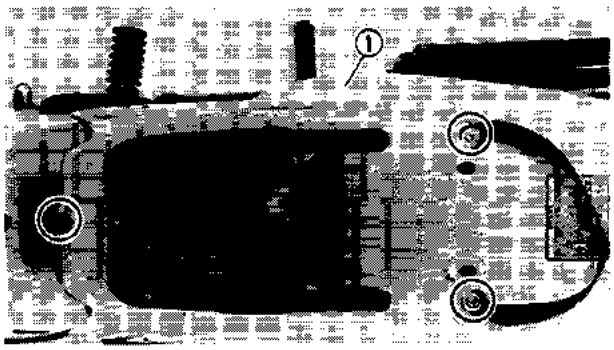
3. During engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.
4. Place the machine on a suitable stand.
5. Start the engine and allow it to warm up.
6. Drain the transmission oil completely. Refer to "CHAPTER 2. PERIODIC INSPECTIONS AND ADJUSTMENTS – TRANSMISSION OIL REPLACEMENT" section.



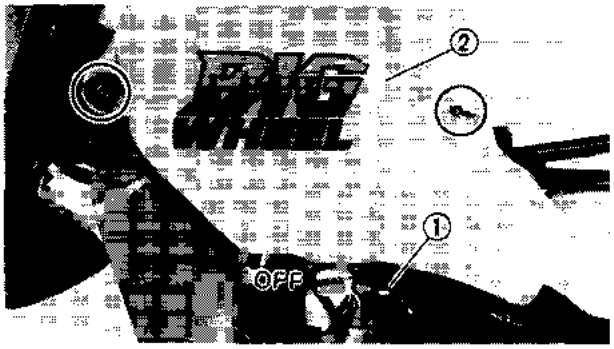
FUEL TANK

1. Remove:
   - Seat ①

   Unhook the band ② .

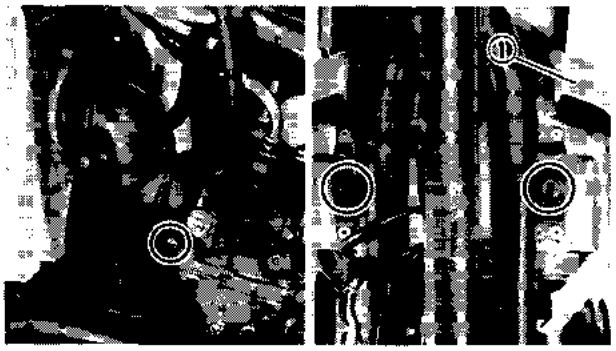


2. Remove:
   - Rear fender ①



3. Disconnect:
   - Fuel pipe ①

   Turn the fuel cock lever to "OFF" position.
4. Remove:
   - Fuel tank ②



AIR FILTER CASE

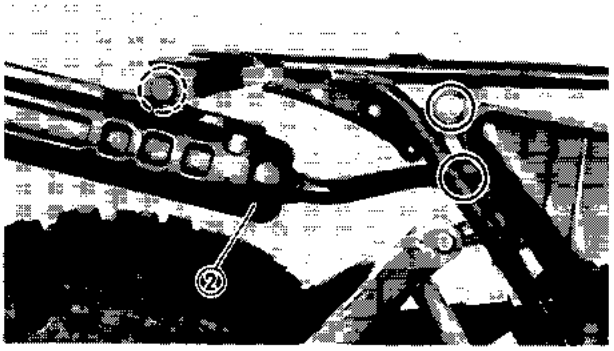
1. Loosen:
   - Screw (Intake manifold)
2. Remove:
   - Bolts (Air filter case)
   - Air filter case ①

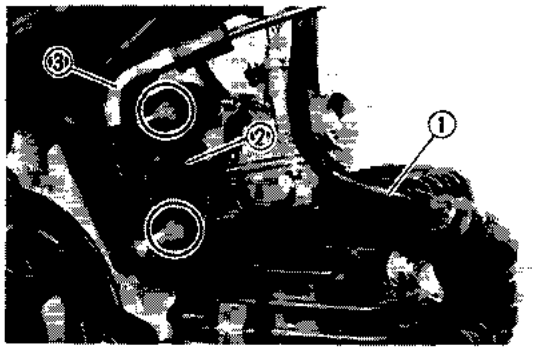
EXHAUST PIPE AND MUFFLER

1. Remove:
   - Exhaust pipe ①
   - Muffler ②

NOTE:

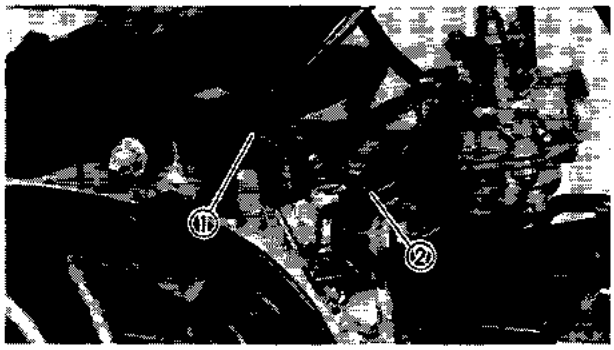
When removing the exhaust pipe, the gasket ③ and power reduction plate ④ will fall off. Take care not to lose these parts.





WIRING AND CABLES

1. Disconnect:
   - Spark plug lead ①
2. Remove:
   - Bolts (Oil pump cover)
   - Oil pump cover ②
3. Disconnect:
   - Oil pump cable ③

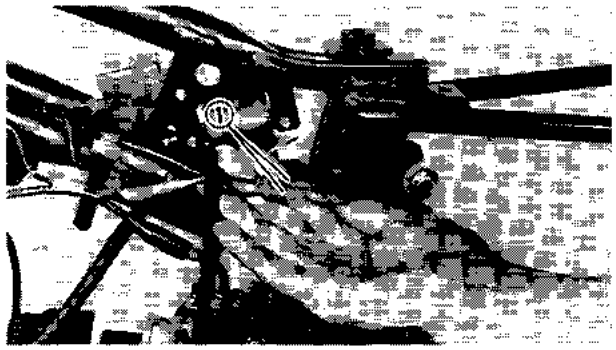


4. Disconnect:
   - Oil pipe ①

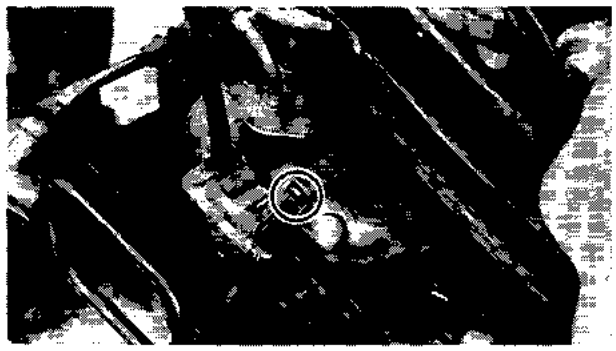
NOTE:

Plug the oil pipe so that the oil will not run out of the oil tank.

   - Oil delivery pipe ②



5. Disconnect:
   - CDI magneto leads ①

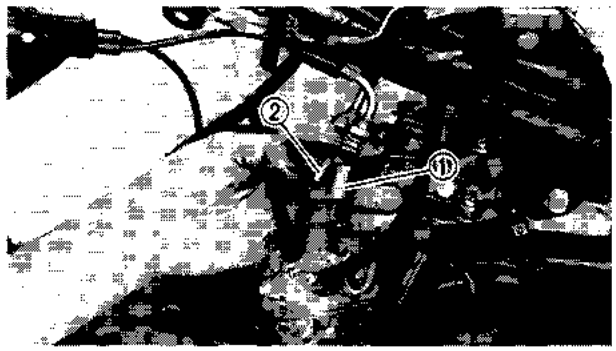


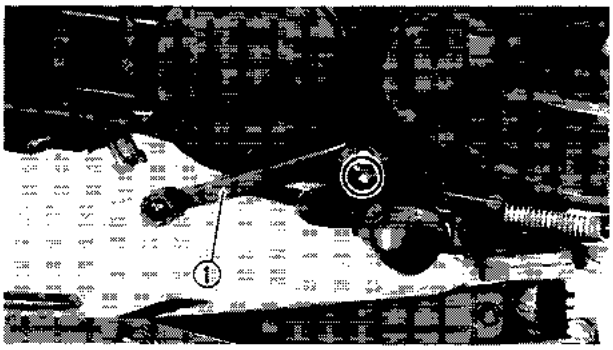
CARBURETOR

1. Loosen:
   - Screw (Carburetor joint)
2. Remove:
   - Throttle valve ①
   - Starter plunger ②

NOTE:

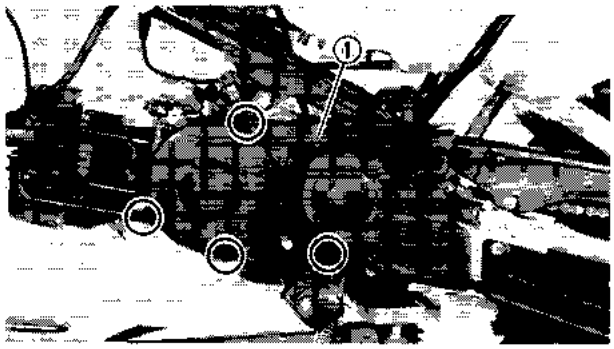
Cover the carburetor with a clean rag to prevent dirt or foreign matter into the carburetor.





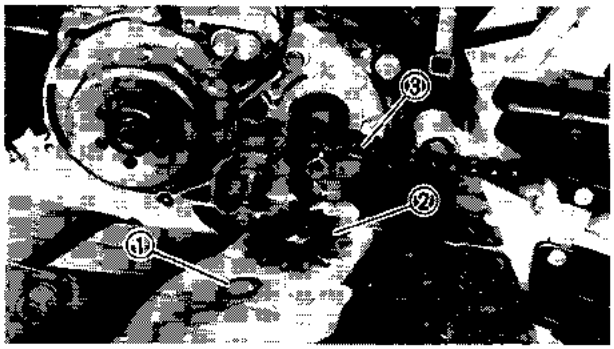
CHANGE PEDAL

1. Remove:
   - Change pedal ①

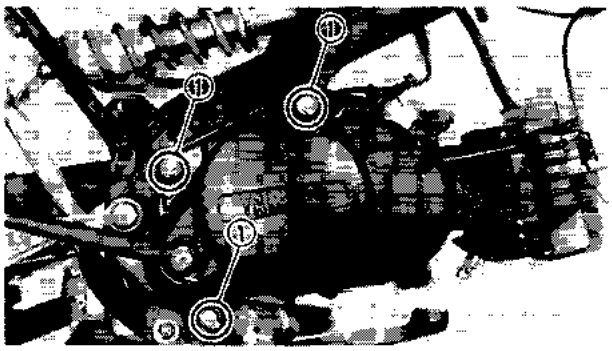


DRIVE CHAIN

1. Remove:
   - Crankcase cover (Left) ①



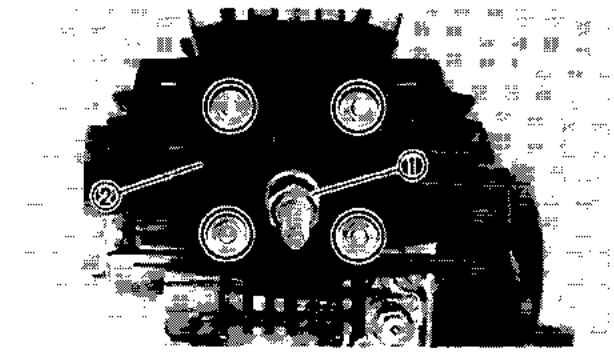
2. Remove:
   - Circlip ①
   - Drive sprocket ②
   - Drive chain ③

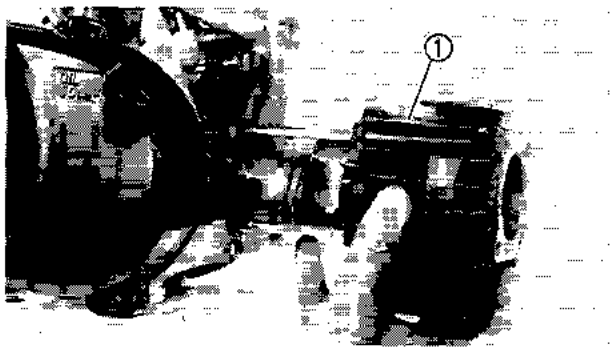


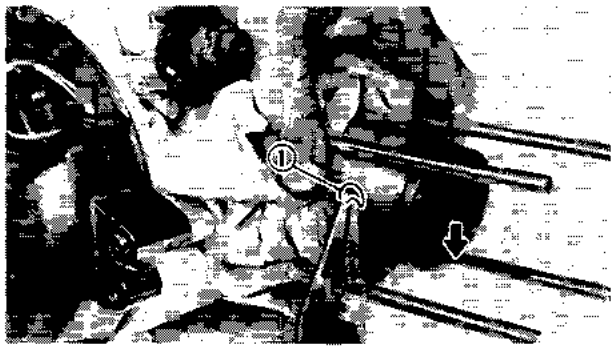
ENGINE REMOVAL

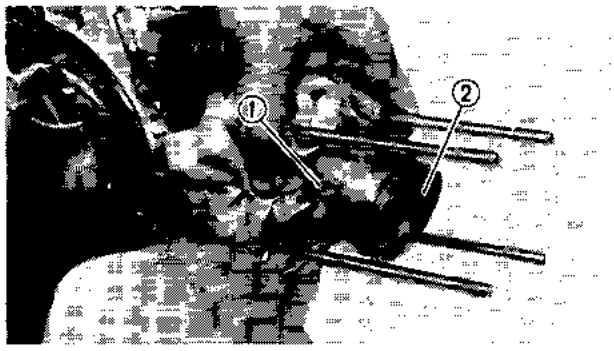
1. Remove:
   - Engine mounting bolts ①
2. Remove:
   - Engine

   To the right.









DISASSEMBLY

CYLINDER HEAD AND CYLINDER

1. Remove:
   - Spark plug ①
   - Cylinder head ②
   - Gasket (Cylinder head)

NOTE:
Working in a crisscross pattern, loosen nut 1/4 turn each. Remove them after all are loosened.

2. Remove:
   - Cylinder ①
   - Gasket (Cylinder)

PISTON

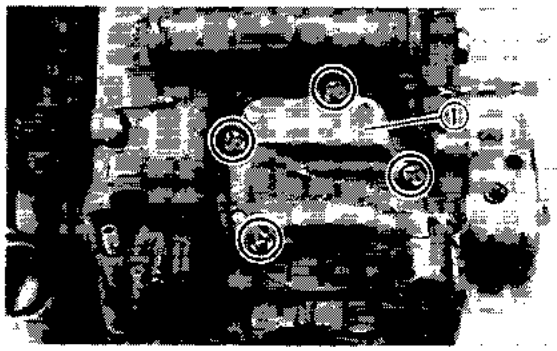
1. Remove:
   - Piston pin clip ①

NOTE:
Before removing the piston pin clip, cover the crankcase with a clean rag so you will not accidentally drop the clip into the crankcase.

2. Remove:
   - Piston pin ①
   - Piston ②
   - Bearing (Small end)

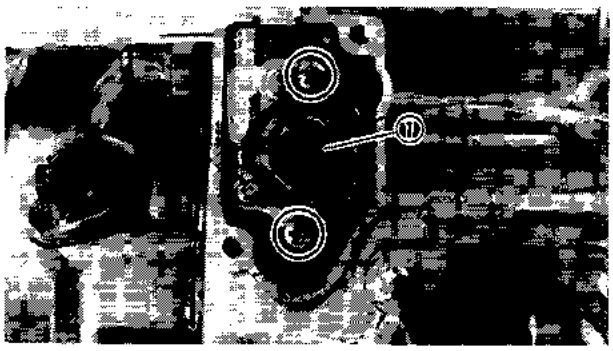
NOTE:
Before removing the piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and piston pin is still difficult to remove, use Piston Pin Puller (YU-01304).

CAUTION:
Do not use a hammer to drive the piston pin out.



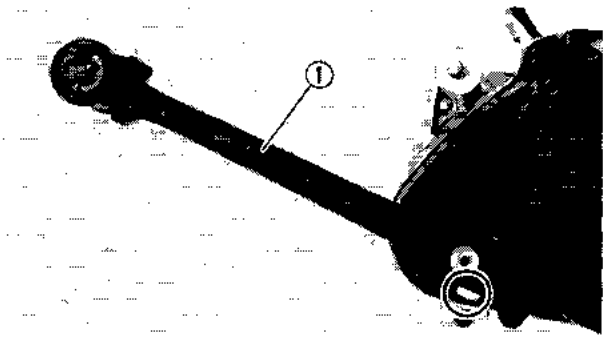
REED VALVE

1. Remove:
   - Reed valve housing ①
   - Gaskets
   - Reed valve



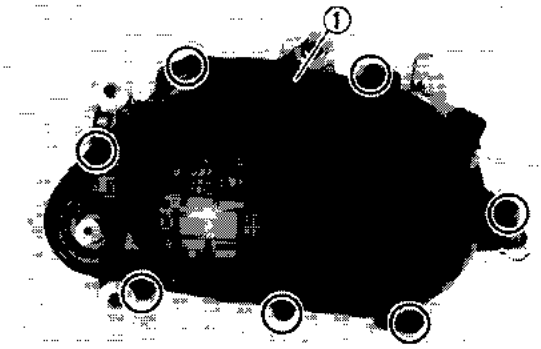
OIL PUMP

1. Remove:
   - Oil pump assembly ①



KICK CRANK

1. Remove:
   - Kick crank ①

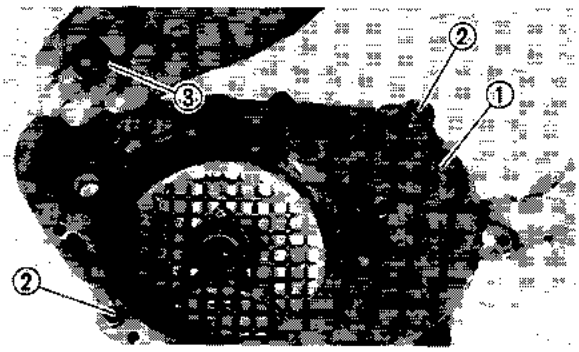


CRANKCASE COVER (RIGHT)

1. Remove:
   - Crankcase cover (Right) ①

NOTE:

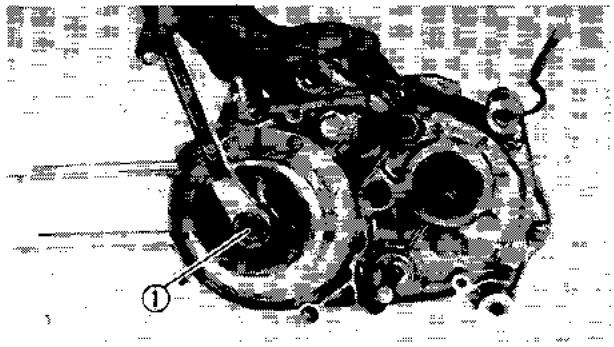
Working in a crisscross pattern, loosen screw 1/4 turn each. Remove them after all are loosened.



2. Remove:
   - Gasket ①
   - Dowel pins ②
   - Washer ③

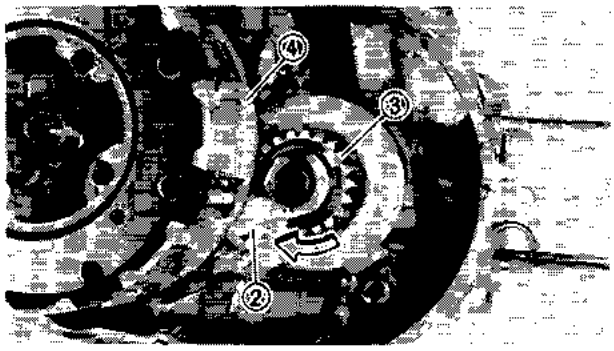
NOTE:

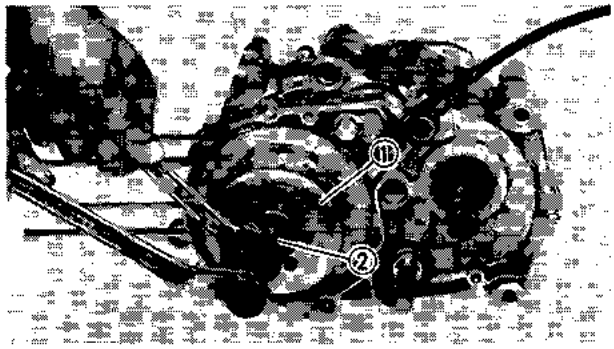
When removing the crankcase cover (right), the washer ③ will fall off. Take care not to lose this part.



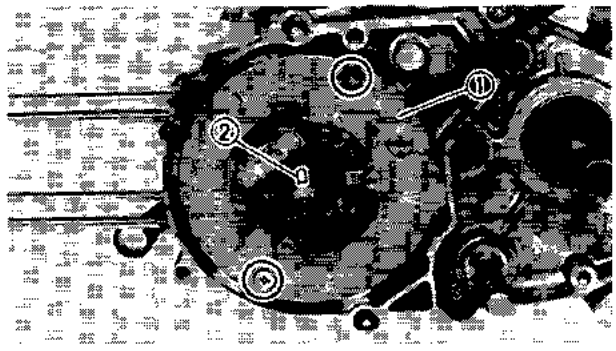
CDI MAGNETO

1. Remove:
   - Nut (CDI magneto) ①
     Place a folded rag ② between the teeth of the drive gear ③ and driven gear ④ to lock them.
   - Spring washer
   - Plain washer

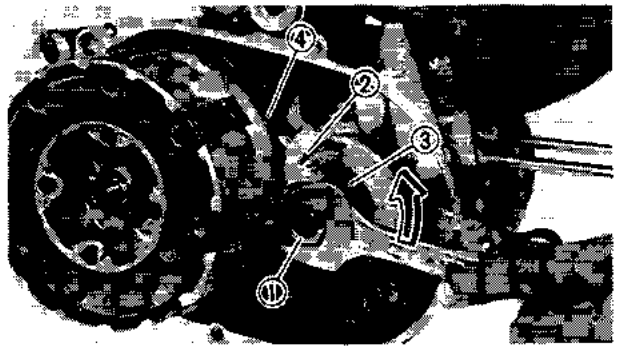




2. Remove:
   - CDI magneto ①
     Use the Rotor Puller (YM-01189) ② .

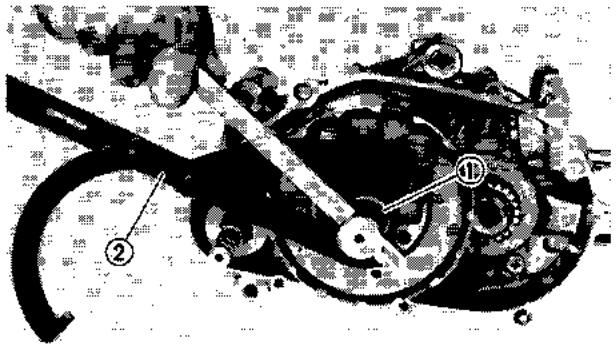


3. Remove:
   - Stator assembly ①
   - Woodruff key ②

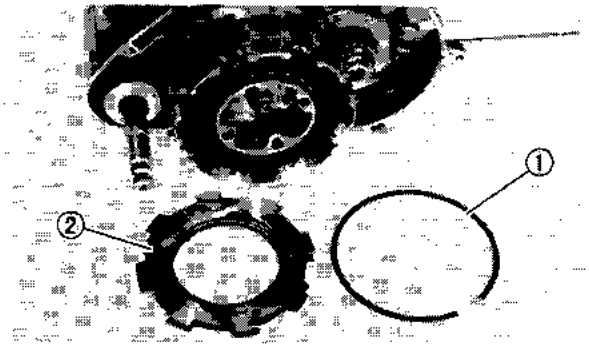


CLUTCH

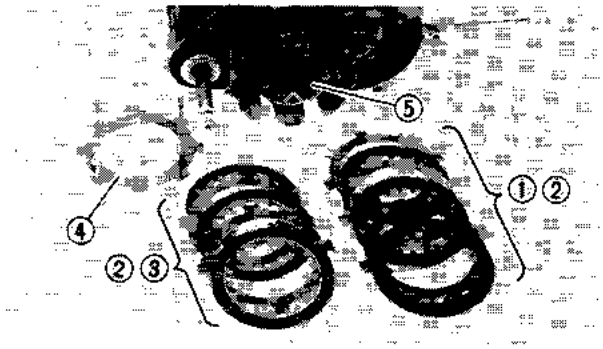
1. Loosen:
   - Nut (Primary drive gear) ①
     Place a folded rag ② between the teeth of the drive gear ③ and driven gear ④ to lock them.



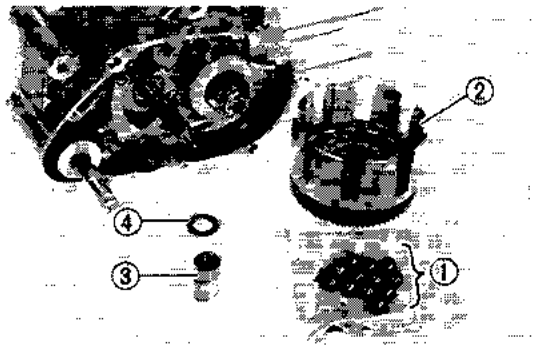
2. Remove:
   - Nut (Clutch boss) ①
     Use the Rotor Holding Tool (YU-01235) ② to hold the clutch boss.
   - Plain washer



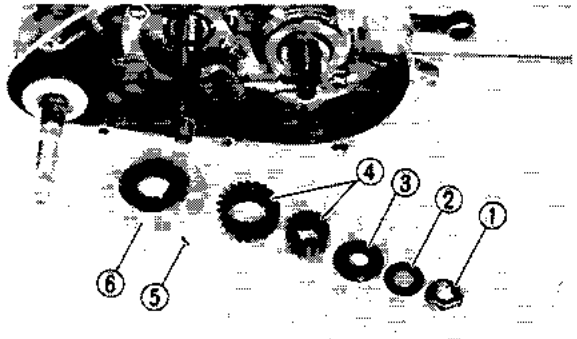
3. Remove:
   - Circlip ①
   - Pressure plate ②



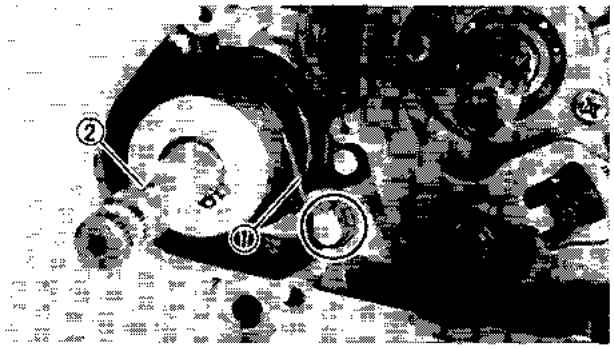
4. Remove:
   - Friction plates (Silver) ①
   - Clutch plates ②
   - Friction plates (Brown) ③
   - Thrust weight plate ④
   - Clutch boss ⑤



5. Remove:
   - Balls ①
   - Primary drive gear comp. ②
   - Spacer ③
   - Thrust plate ④

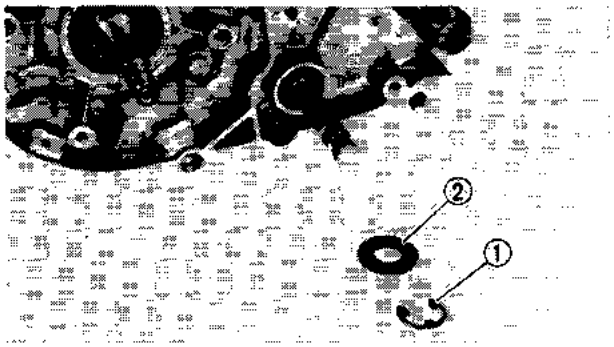


6. Remove:
   - Nut (Primary drive gear) ①
   - Conical spring washer ②
   - Special washer ③
   - Primary drive gear assembly ④
   - Pin (Pump drive gear) ⑤
   - Oil pump drive gear ⑥



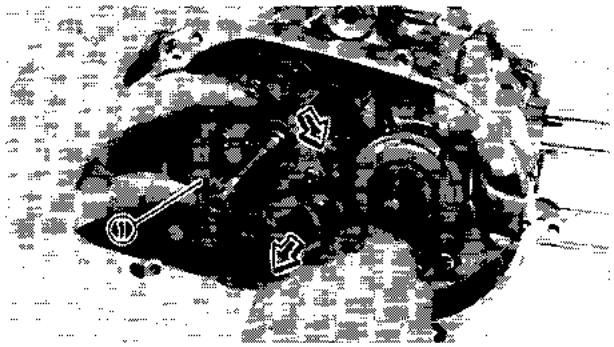
KICK AXLE

1. Unhook the kick spring ① from its position.
2. Remove:
   - Kick axle assembly ②

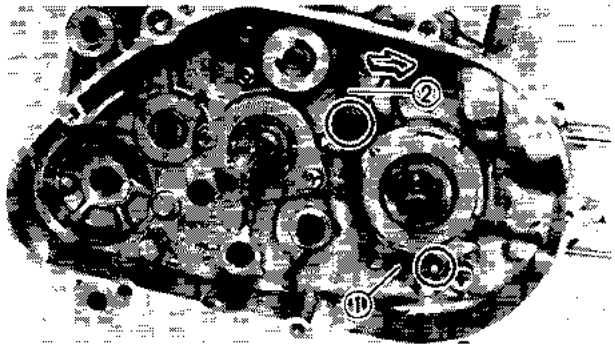


CHANGE SHAFT

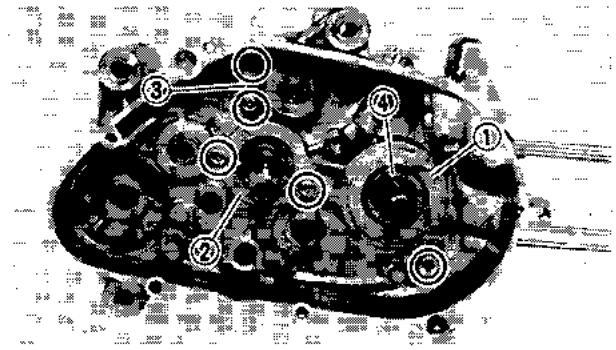
1. Remove:
   - Circlip ①
   - Plain washer ②



2. Remove:
   - Change lever assembly ①

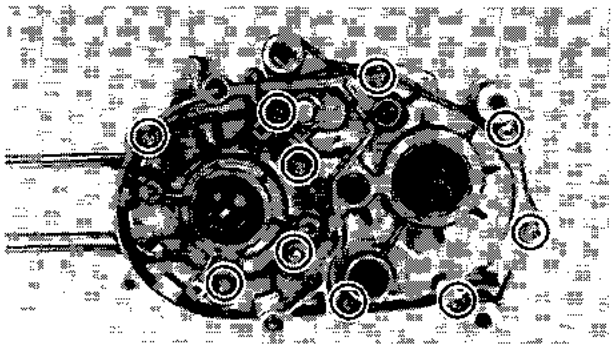


3. Unhook the torsion spring ① from its position.
4. Remove:
   - Stopper lever ②



STOPPER PLATE

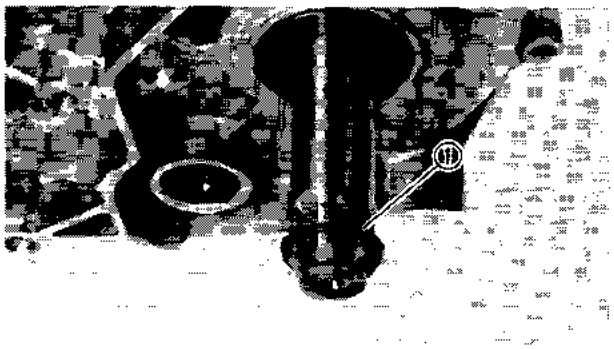
1. Remove:
   - Stopper plate (Oil seal) ①
   - Stopper plate (Bearing) ②
   - Stopper plate (Segment) ③
   - Collar ④



CRANKCASE

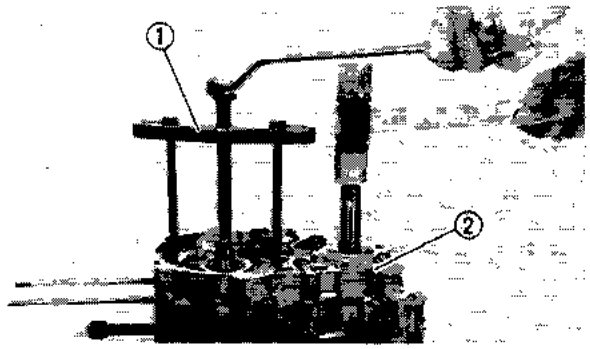
1. Remove:
   - Screws (Crankcase)

NOTE:
Working in a crisscross pattern, loosen screw 1/4 each. Remove them after all are loosened.



2. Install:
   - O-ring ①

NOTE:
While removing the crankcase from the drive axle, pay careful attention to the oil seal lip.
A recommended practice is to fit the O-ring and to apply grease over the fitted area.

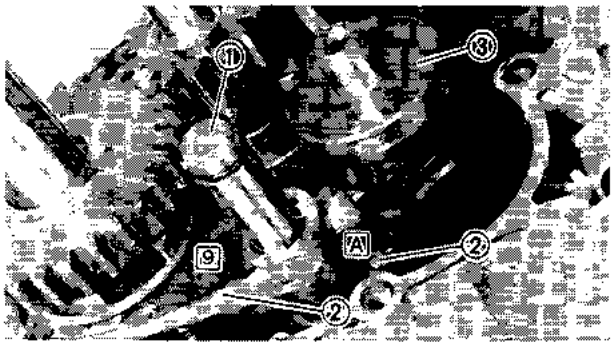


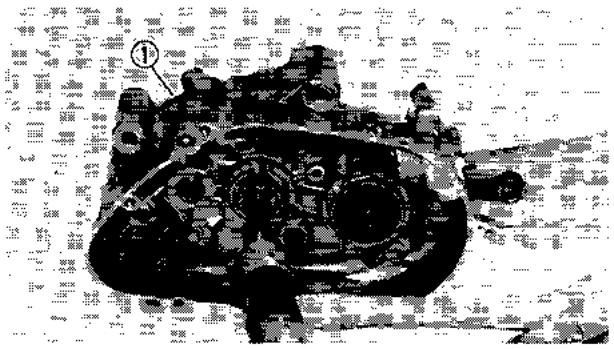
3. Attach:
   Crankcase Separating Tool (YU-01135) ①
4. Remove:
   - Crankcase (Left) ②
   - Dowel pins

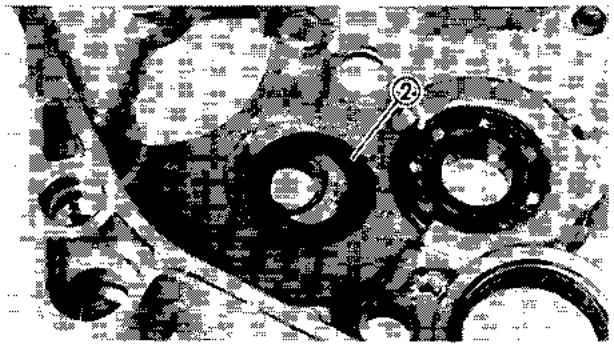
NOTE:
Fully tighten the tool holding bolts, but make sure the tool body is parallel with the case. If necessary, one screw may be backed out slightly to level tool body.

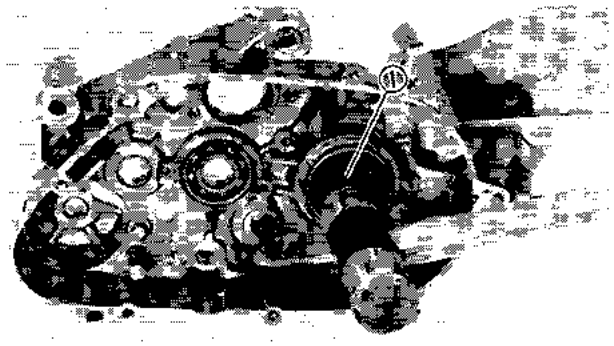
5. As pressure is applied, alternately tap on the engine mounting boss and transmission shafts.

CAUTION:
Use soft hammer to tap on the case half. Tap only on reinforced portions of case. Do not tap on gasket mating surface. Work slowly and carefully. Make sure the case halves separate evenly. If one end "hangs up", take pressure off the push screw, realign, and start over. If the cases do not separate, check for a remaining case screw or fitting. Do not force.









SHIFTER AND TRANSMISSION

1. Remove:
   - Guide bar ①
   - Shift forks ②
   - Shift cam ③

NOTE:

Note the position of each part. Pay particular attention to the location and direction of shift forks.

2. Remove:
   - Transmission assembly ①

   Tap lightly on the transmission drive shaft with a soft hammer.

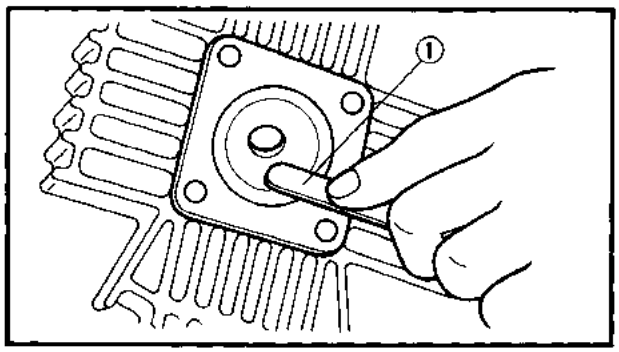
NOTE:

When removing the transmission assembly, the washer ② will fall off. Take care not to lose this part.

CRANKSHAFT

1. Remove:
   - Crankshaft ①

   Tap lightly on the crankshaft with a soft hammer.



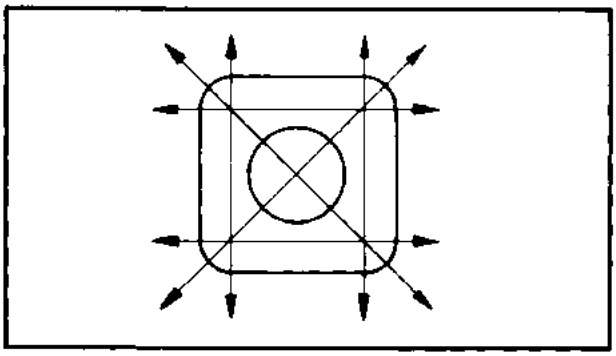
INSPECTION AND REPAIR

CYLINDER HEAD

1. Remove:
   - Carbon deposits
     Use a rounded scraper ① .

NOTE:
Take care to avoid damaging the spark plug threads. Do not use a sharp instrument. Avoid scratching the aluminum.

2. Measure:
   - Cylinder head warpage
     Out of specification → Resurface/Replace.
     By the following steps.

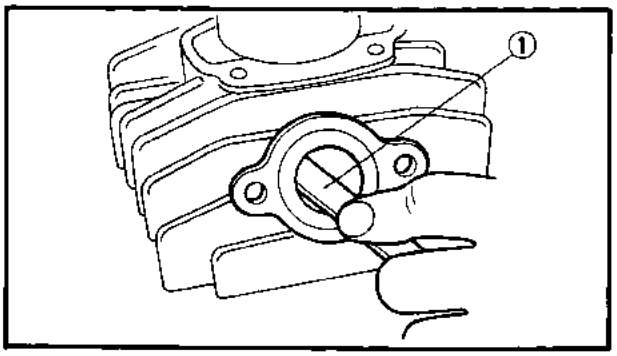


Warpage measurement and re-surfacement steps:
- Attach a straight edge and a thickness gauge on the cylinder head.
- Measure the warpage limit.

Warpage Limit:
0.03 mm (0.0012 in)

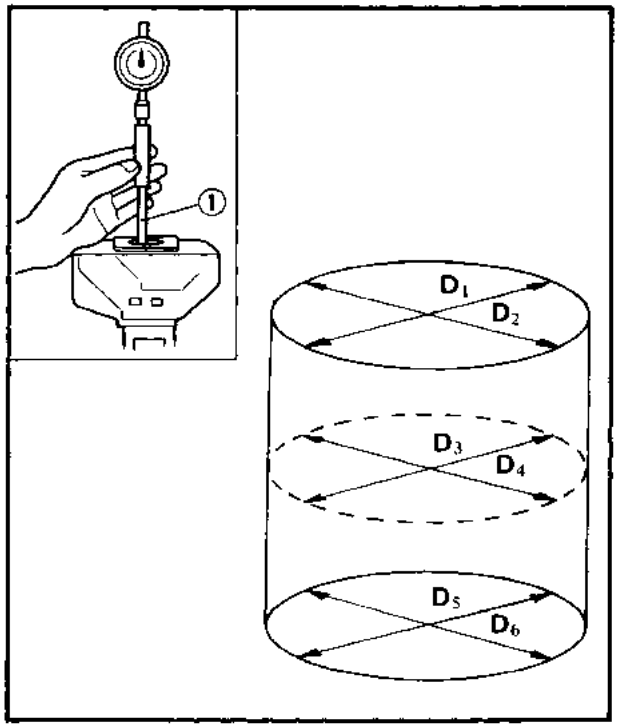
- If the warpage is out of specification, re-surface the cylinder head.
- Place a #400 ~ 600 grit wet sandpaper on the surface plate, and re-surface the head using a figure-eight sanding pattern.

NOTE:
Rotate the head several times to avoid removing too much material from on side.



CYLINDER

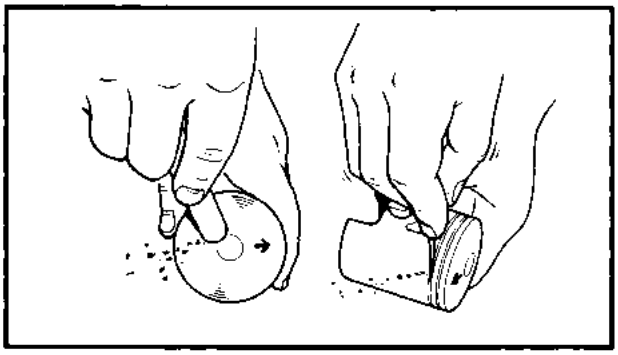
1. Remove:
   - Carbon deposits
     Use a rounded scraper ① .
2. Inspect:
   - Cylinder wall
     Wear/Scratches → Rebore or replace.



3. Measure:
   - Cylinder bore "C"
     Out of specification → Rebore.
     Use a Cylinder Bore Gauge ① .

	Standard	Wear Limit
Cylinder Bore "C"	47.00 ~ 47.02 mm (1.850 ~ 1.851 in)	47.10 mm (1.854 in)
Taper "T"	—	0.05 mm (0.002 in)
Out of Round "R"	—	0.01 mm (0.0004 in)

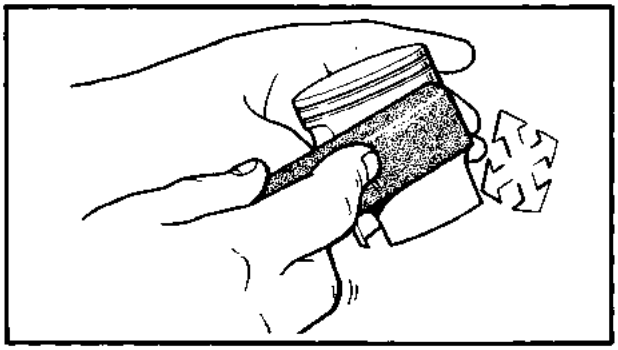
C = Maximum D
T = (Maximum D_1 or D_2) – (Minimum D_5 or D_6)
R = (Maximum D_1, D_3 or D_5) – (Minimum D_2, D_4 or D_6)



PISTON, PISTON RING, AND PISTON PIN

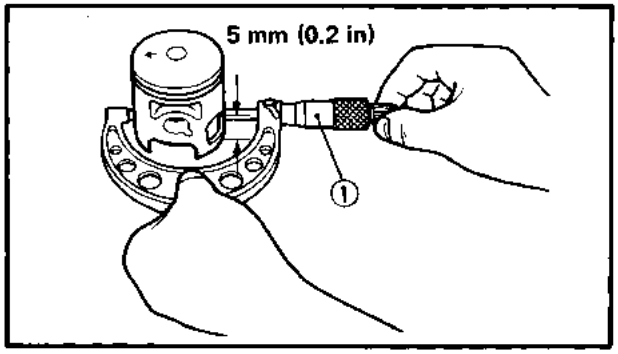
Piston

1. Remove:
   - Carbon deposits
     From the piston crown and ring grooves.



2. Remove:
   - Score markes and lacquer deposits
     From the sides of piston.
     Use a #600 ~ 800 grit wet sandpaper.

NOTE:
Sand in a crisscross pattern. Do not sand excessively.



3. Inspect:
   - Piston wall
     Wear/Scratches/Damage → Replace.
4. Measure:
   - Piston outside diameter "P"
     Out of specification → Replace.
     Use a Micrometer ① .

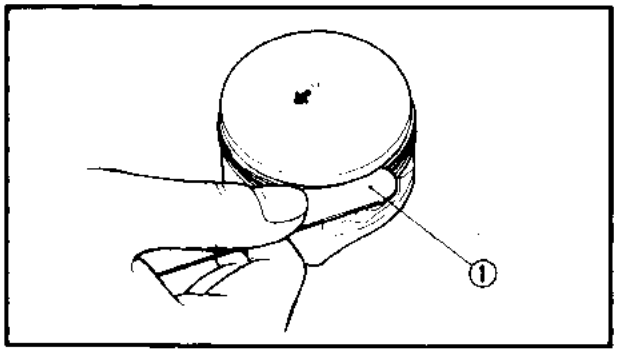
NOTE:
Measurement should be made at a point 5 mm (0.2 in) above the bottom edge of the piston.

Piston Outside Diameter "P"	
Standard	46.94 ~ 47.00 mm (1.848 ~ 1.850 in)
Oversize 1	47.25 mm (1.860 in)
Oversize 2	47.50 mm (1.870 in)

5. Measure:
   • Piston Clearance
   Out of specification → Rebore cylinder or replace piston.

Piston Clearance:
0.045 ~ 0.050 mm
(0.0018 ~ 0.0020 in)

A = C – P
A: Piston Clearance
C: Cylinder Bore
P: Piston Outside Diameter

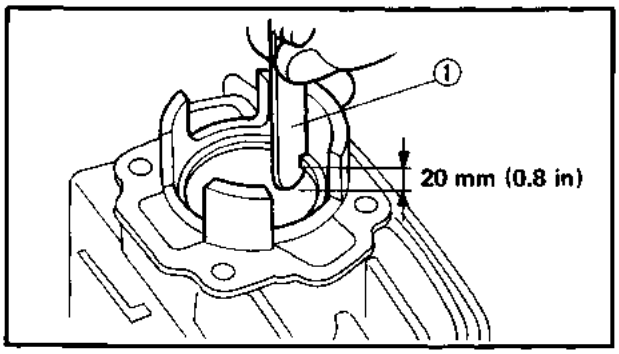


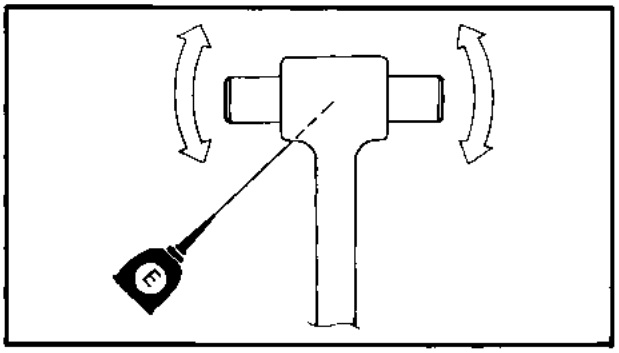
Piston Rings

1. Measure:
   • Side clearance
   Out of specification → Replace piston and/or rings.
   Use a Feeler Gauge ① .

Side Clearance		
	Top	0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in)
	2nd	0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in)

2. Position:
   • Piston ring
   (Into the cylinder)
   Push the ring with the piston crown.





3. Measure:
   - End gap

   Out of specification → Replace rings as a set.

   Use a Feeler Gauge ①.

End Gap	Top	0.15 ~ 0.30 mm (0.006 ~ 0.012 in)
	2nd	0.15 ~ 0.30 mm (0.006 ~ 0.012 in)

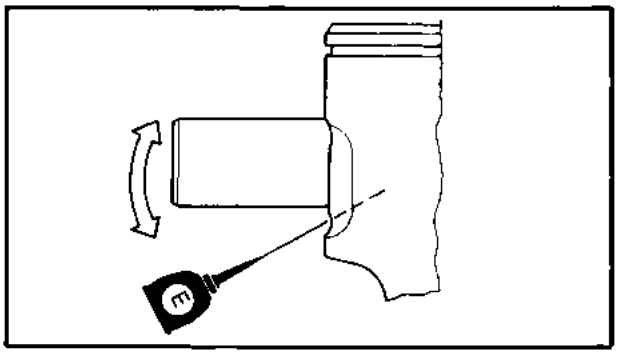
Piston Pin and Bearing

1. Lubricate:
   - Piston Pin (Lightly)
2. Install:
   - Piston pin

   (Into the small end of connecting rod)
3. Check:
   - Free play

   There should be no noticeable for the play.

   Free play exists → Inspect the connecting rod for wear/Replace the pin and/or connecting rod as required.



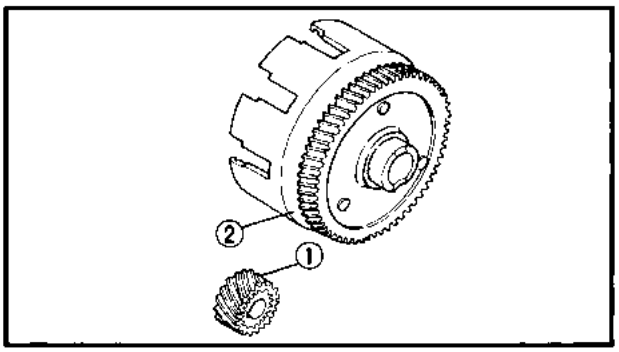
4. Install:
   - Piston Pin

   (Into the piston pin hole).
5. Check:
   - Free play (when the piston pin is in place in the piston)

   There should be no noticeable for the play.

   Free play exists → Replace piston pin and/or piston.
6. Inspect:
   - Piston pin and bearing

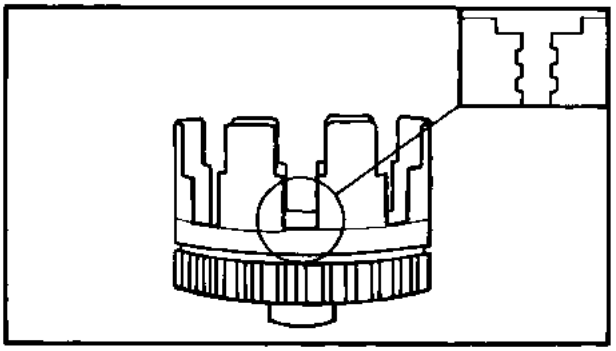
   Signs of heat discoloration → Replace.



PRIMARY GEARS

1. Inspect:
   - Drive gear ①
   - Driven gear ②

   Scratches/Wear/Damage → Replace.



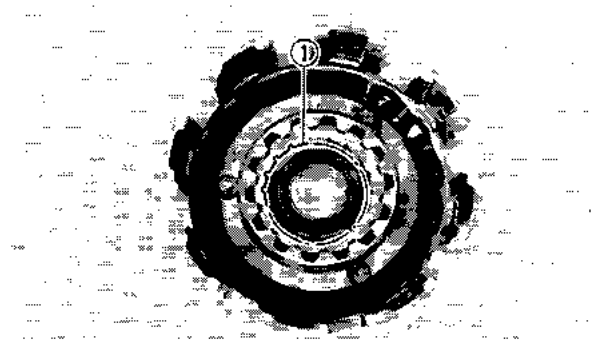
CLUTCH

Clutch Housing

1. Inspect:
   - Dogs on the housing

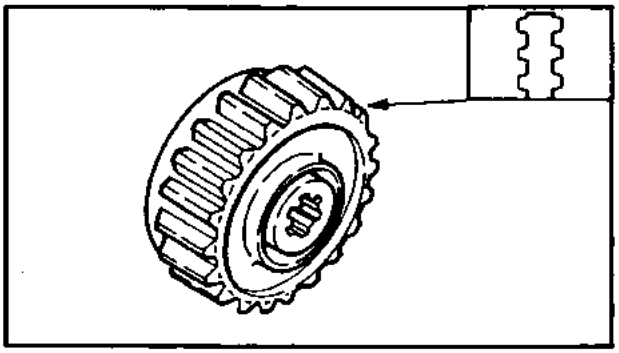
     Cracks/Wear/Damage → Deburr or replace.
   - Clutch housing bearing

     Chafing/Wear/Damage → Replace.



2. Inspect:
   - Clutch housing cam grooves ①

     Wear/Damage → Replace.



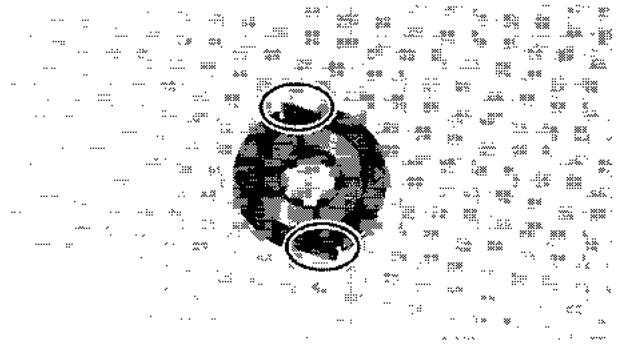
Clutch Boss

1. Inspect:
   - Clutch boss splines

     Scoring/Wear/Damage → Replace clutch boss assembly.

NOTE:

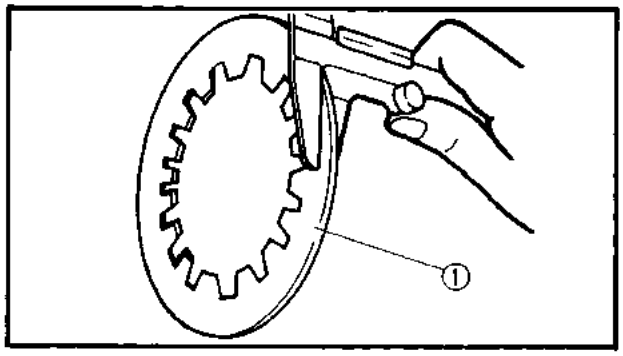
Scoring on the clutch plate splines will cause erratic operation.



One Way Boss

1. Inspect:
   - One way boss cams

     Wear/Damage → Replace.



Friction Plates

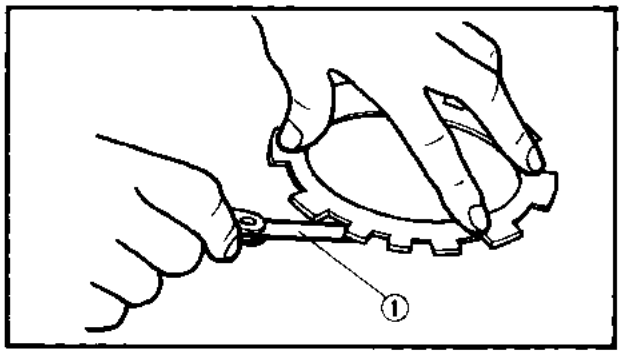
1. Inspect:
   - Friction plate ①

   Damage/Wear → Replace friction plate as a set.
2. Measure:
   - Friction plate thickness

   Measure at all four points.

   Out of specification → Replace friction plate as a set.

	Friction Plate Thickness
Standard	3.00 mm (0.118 in)
Wear Limit	2.9 mm (0.114 in)



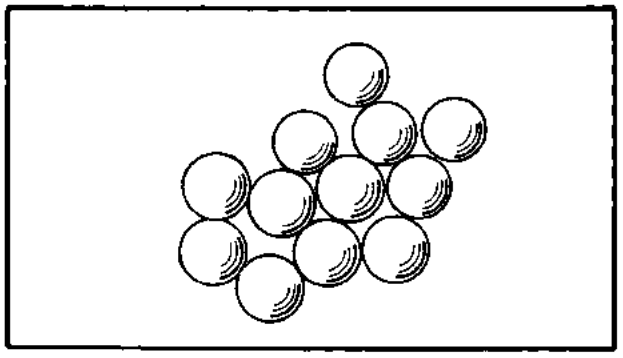
Clutch Plates

1. Measure:
   - Clutch plate warpage

   Use surface plate and Feeler Gauge ① .

   Out of specification → Replace.

Warp Limit: 0.05 mm (0.002 in)



Clutch Balls

1. Inspect:
   - Balls

   Pitting/Wear/Damage → Replace as a set.

Clutch Spring

1. Inspect:
   - Clutch spring

   Wear/Damage → Replace.

2. Measure:
   - Clutch spring free length
     Out of specification → Replace springs as a set.

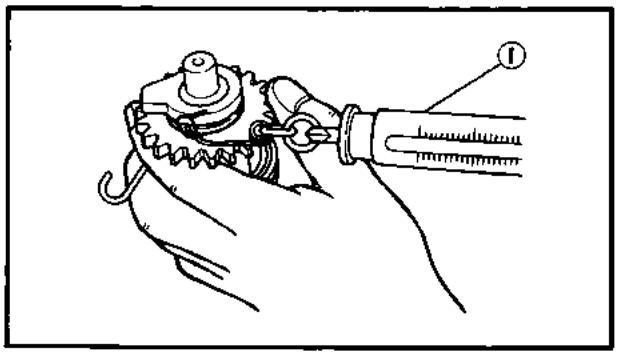
Clutch Spring Minimum Length:
12.0 mm (0.47 in)

AUTOLUBE PUMP

Wear or an internal mulfunction may cause pump output to vary from the factory setting. This situation is, however, extremely rare. If improper output is suspected, inspect the following:

1. Inspect:
   - Delivery line
     Obstructions → Blow out.
   - Pump body seal/Crankcase cover seal
     Wear/Damage → Replace.
   - Check ball/Spring
     Miss/Improper → Repair.
2. Inspect:
   - Allowing air
     Air exists → Air bleed.
3. Check:
   - Pump output
     Out of specification → Adjust.

Minimum Output/200 Stroke:
0.077 ~ 0.087 cm^3
(0.0027 ~ 0.0031 Imp oz,
0.0026 ~ 0.0029 US oz)
Maximum Output/200 Stroke:
0.192 cm^3 (0.0068 Imp oz,
0.0065 US oz)



KICK STARTER

1. Inspect:
   - Kick axle
     Damage/Wear → Replace.
2. Measure:
   - Kick spring tension
     Out of specification → Replace.
     Use a spring balance ① .

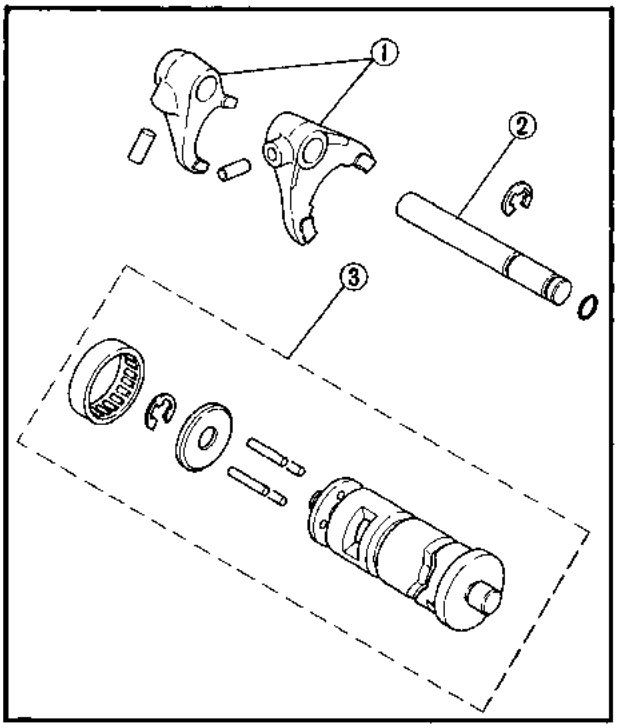
Kick Spring Tension:
Minimum: 0.8 kg (1.8 lb)
Maximum: 1.2 kg (2.6 lb)

CAUTION:

Do not try to bend the clip.

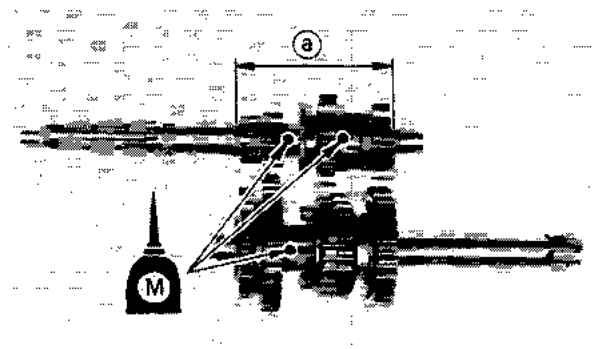
SHIFTER

1. Inspect:
   - Shift return spring
     Damage → Replace.
   - Change shaft
     Damage/Bends/Wear → Replace.



TRANSMISSION

1. Inspect:
   - Shift forks ① (Gear and shift cam contact surfaces)
     Wear/Chafing/Bends/Damage → Replace.
   - Guide bar ②
     Bends/Wear → Replace.
2. Check:
   - Shift fork movement
     (on its guide bar)
     Unsmooth operation → Replace shift fork and/or guide bar.
3. Inspect:
   - Shift cam ③ grooves
     Wear/Damage/Scratches → Replace.
   - Shift cam ③ segment
     Damage/Wear → Replace.

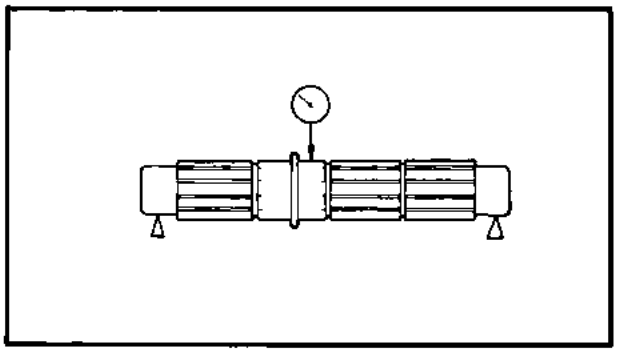


4. Measure:
   • Drive axle (Assembled)

Drive Axle Length ⓐ :
71.5 ~ 71.8 mm (2.815 ~ 2.827 in)

5. Lubricate:
   • Main axle
   • Drive axle

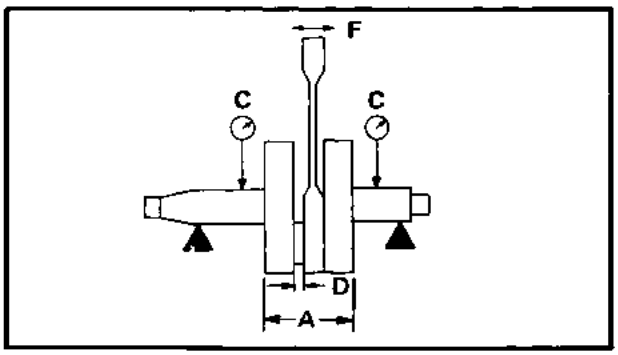
Molybdenum Disulfide Oil



6. Measure:
   • Axle runout
   Out of specification → Replace.
   Use centering device and Dial Gauge.

Runout Limit: 0.08 mm (0.0031 in)

7. Inspect:
   • Gears
   Damage/Wear → Replace.
8. Check:
   • Gear movement
   Unsmooth operation → Replace.
9. Inspect:
   • Mating dogs
   Cracks/Wear/Damage → Replace.



CRANKSHAFT

1. Measure:
   • Assembly width "A"
   Use the V-blocks.
   Out of specification → Replace.

Assembly Width "A":
47.90 ~ 47.95 mm
(1.886 ~ 1.888 in)

   • Big end radial clearance "D"
   Use a Feeler Gauge.
   Out of specification → Disassemble the crankshaft and replace worn parts, then reassemble the crankshaft.

Big End Radial Clearance "D":
0.3 ~ 0.8 mm (0.012 ~ 0.031 in)

- Runout "C"
  Use the V-blocks and Dial Gauge.
  Out of specification → Correct any misalignment.

Runout Limit "C":
0.03 mm (0.0012 in)

- Small end free play "F"
  Use the V-blocks and Dial Gauge.
  Out of specification → Disassemble the crankshaft, and replace the defective parts, then reassemble the crankshaft.

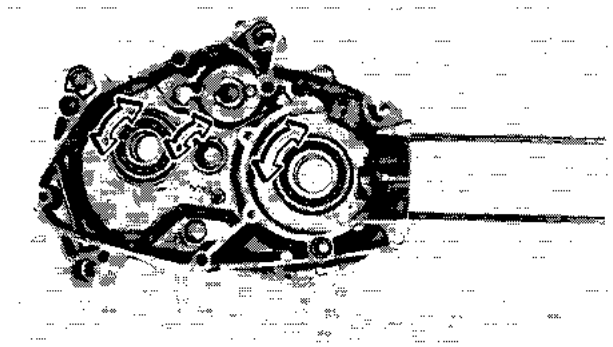
Small End Free Play Limit "F":
1.0 mm (0.04 in)

2. Inspect:
   - Crankshaft bearing surfaces
     Wear/Scratches/Rust spots → Replace.

NOTE:
Lubricate the bearing immediately after examining then to prevent rust.

CRANKCASE

1. Thoroughly wash the case halves in mild solvent.
2. Clean all the gasket mating surfaces and crankcase mating surfaces thoroughly.
3. Inspect:
   - Crankcase
     Cracks/Damage → Replace.
   - Oil delivery passages
     Clog → Blow out with compressed air.



BEARINGS AND OIL SEALS

1. Inspect:
   - Bearings
     Pitting/Damage → Replace.
   - Oil seal lips
     Damage/Wear → Replace.

CIRCLIPS AND WASHERS

1. Inspect:
   - Circlips
   - Washers

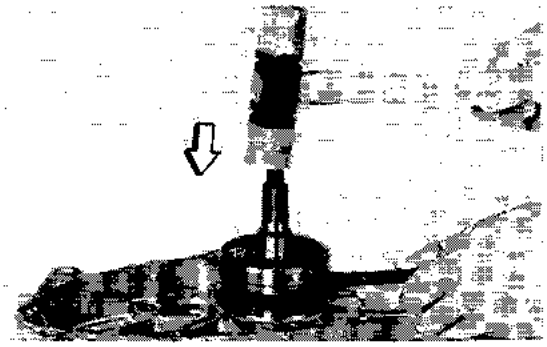
   Damage/Looseness/Bends → Replace.

ENGINE ASSEMBLY AND ADJUSTMENT

CRANKSHAFT

CAUTION:

To protect the crankshaft against scratches or to facilitate the operation of the installation.
Apply the grease to the oil seal lips, and apply the engine oil to each bearing.

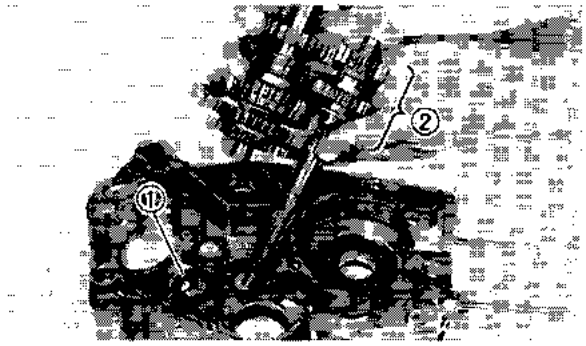


1. Install:
   - Crankshaft
     To the left-side crankcase.

NOTE:

Hold the connecting rod at top dead center with one hand while installing the crankshaft.

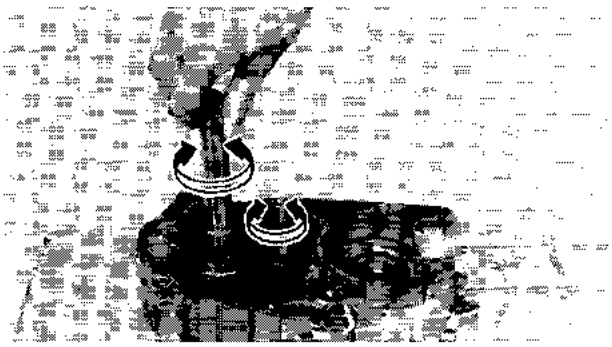
TRANSMISSION AND SHIFTER



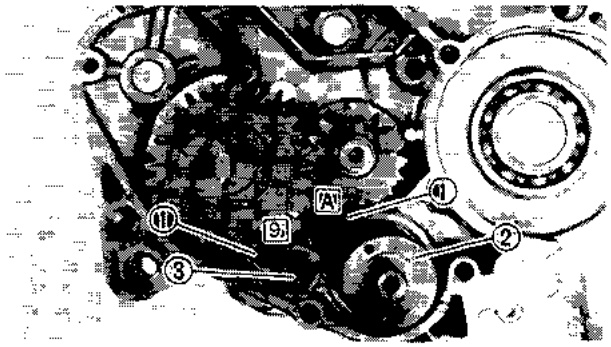
1. Install:
   - Washer ①
   - Transmission assembly ②

NOTE:

Before installing the transmission assembly ② , do not forget to fit the washer ① .



2. Check:
   - Transmission operation
     Unsmooth operation → Repair.



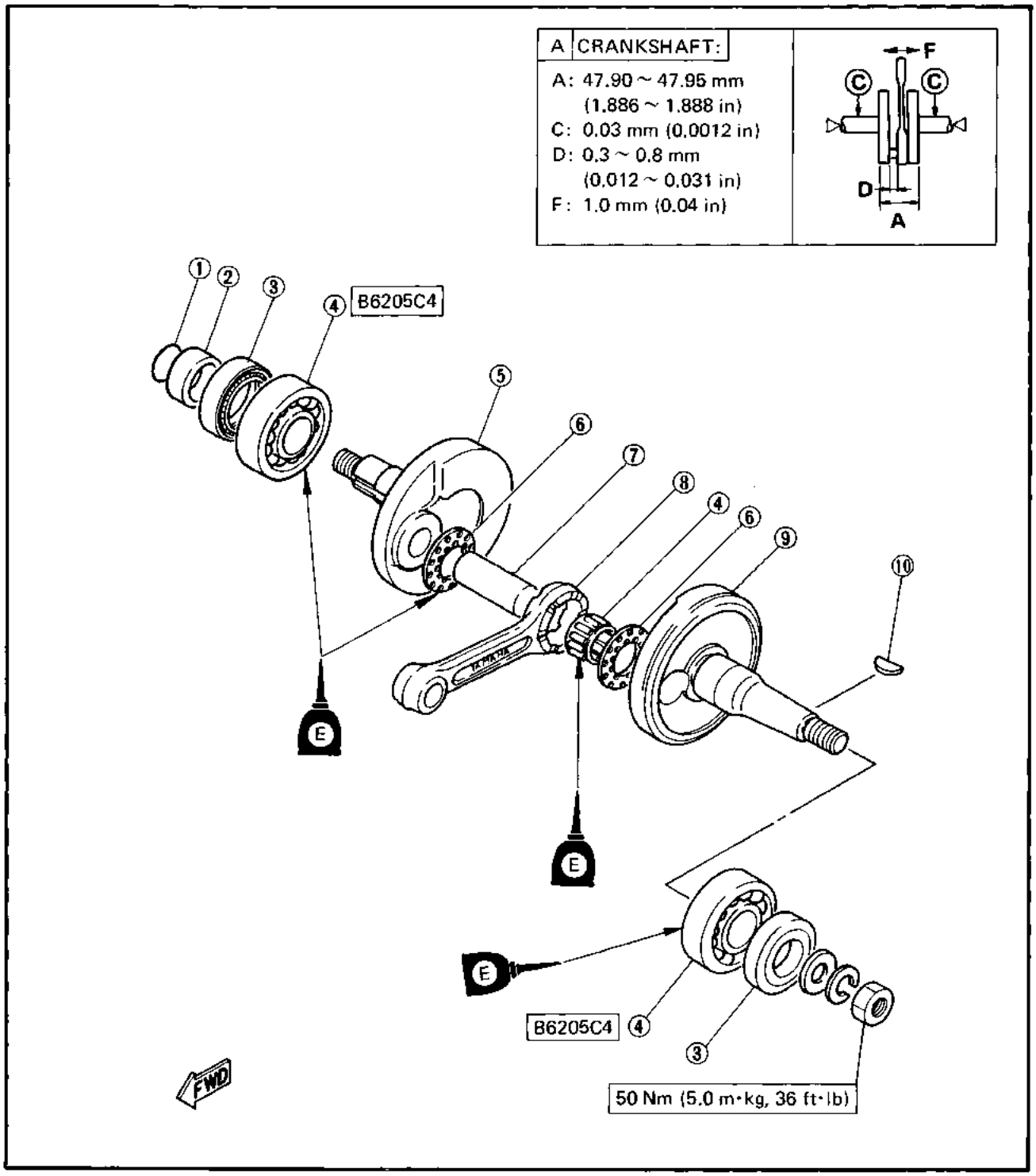
3. Install:
   - Shift forks ①
   - Shift cam ②
   - Guide bar ③

NOTE:

Each shift forks is identified by a number cast on its side. All the numbers should face the left side.

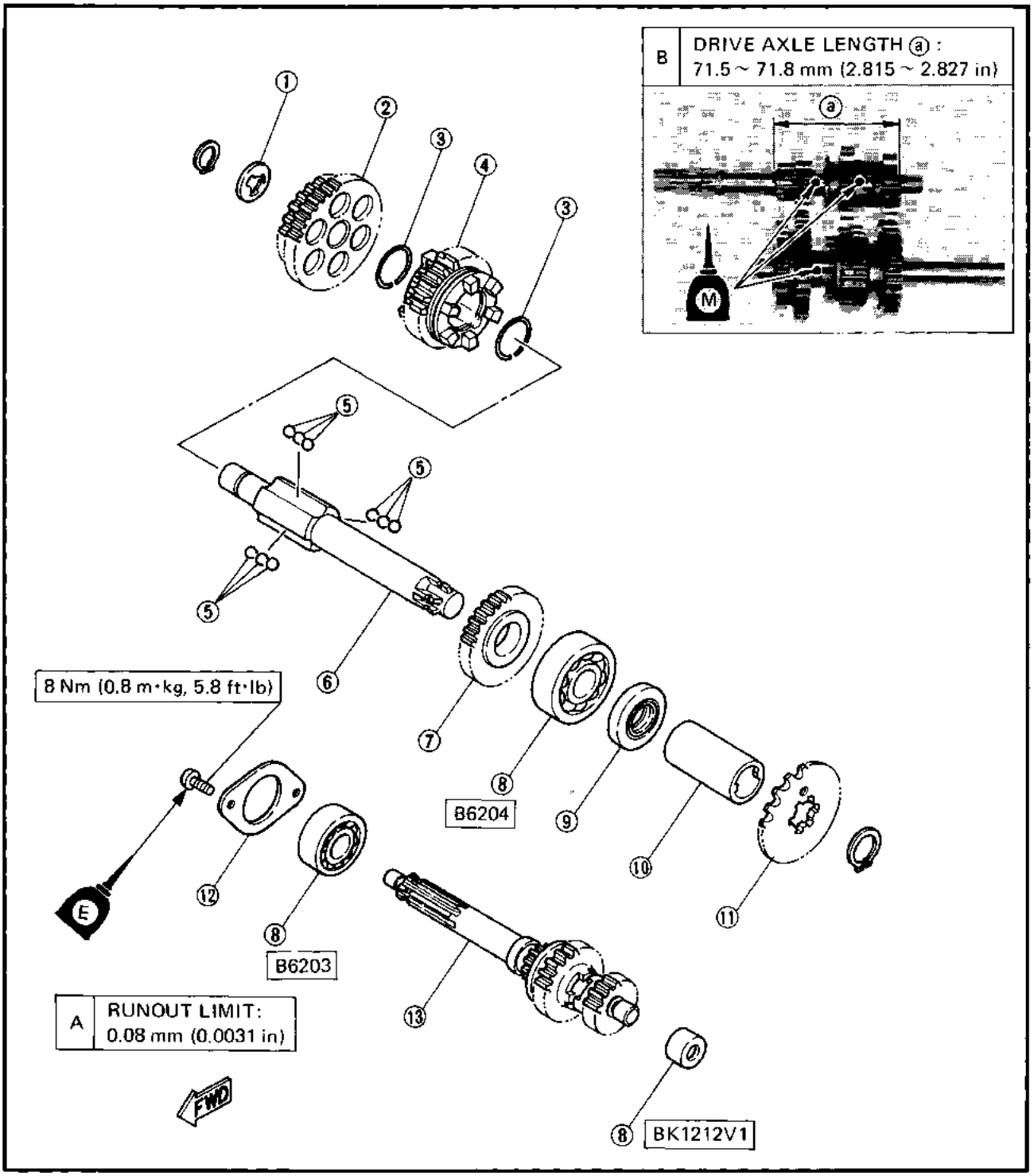
CRANKSHAFT

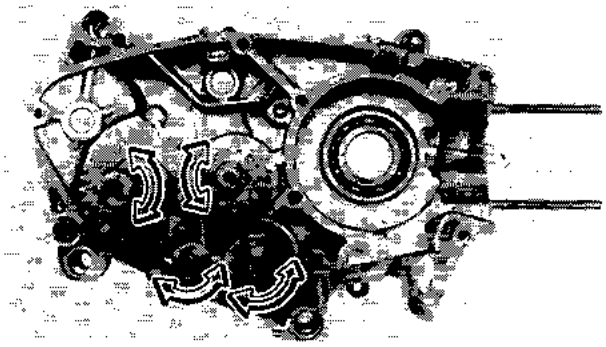
① O-ring
② Collar
③ Oil seal
④ Bearing
⑤ Crank (Right)
⑥ Washer
⑦ Crank pin
⑧ Connecting rod
⑨ Crank (Left)
⑩ Woodruff key



TRANSMISSION

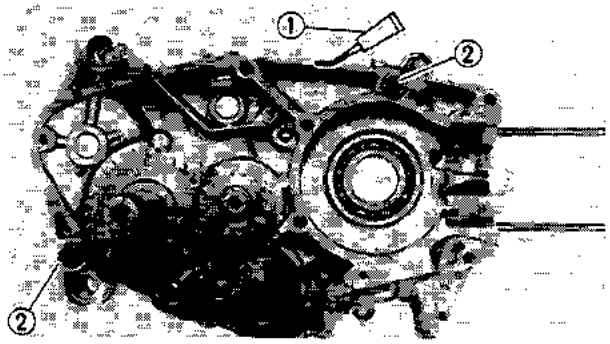
① Washer
② 1st wheel gear (39T)
③ Circlip
④ 3rd wheel gear (26T)
⑤ Ball
⑥ Drive axle
⑦ 2nd wheel gear (30T)
⑧ Bearing
⑨ Oil seal
⑩ Collar
⑪ Drive sprocket (15T)
⑫ Stopper plate (Bearing)
⑬ Main axle complete (12T/15T/18T)





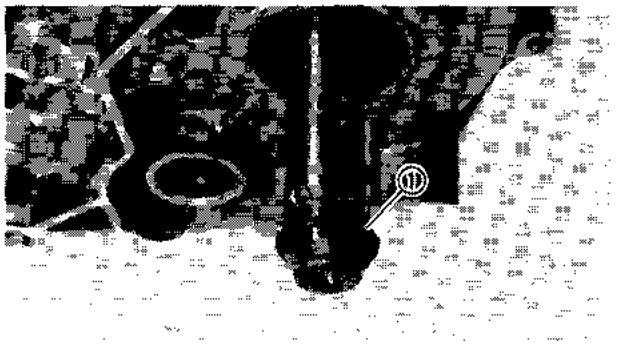
4. Check:
   • Transmission and shifter operation
   Unsmooth operation → Repair.

NOTE:
Oil each gear and bearing thoroughly.



CRANKCASE

1. Apply:
   • Sealant (Quick Gasket®) (ACC-11001-05-01) ①
   To the mating surfaces of both case halves.
2. Install:
   • Dowel pins ②

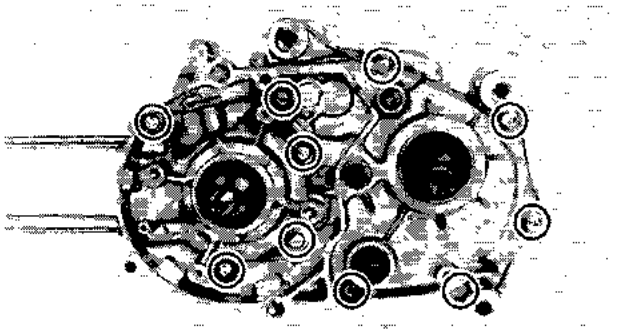


3. Install:
   • O-ring ①

NOTE:
While installing the drive axle into the crankcase, pay careful attention to the oil seal lip.
A recommended practice is to fit the O-ring ① and apply grease over the fitted area.

4. Fit the left crankcase onto the right case. Tap lightly on the case with a soft hammer.

CAUTION:
Before installing and torquing the crankcase holding screws, be sure to check whether the transmission is functioning properly by manually rotating the shift cam either way.

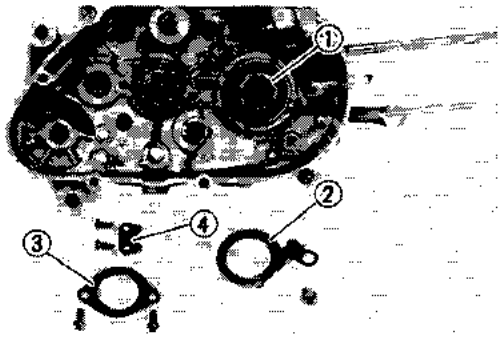


5. Tighten:
   • Screws (Crankcase)

	Screws (Crankcase): **8 Nm (0.8 m·kg, 5.8 ft·lb)**

NOTE:
Tighten the crankcase holding screws in stage, using a crisscross pattern.

6. Apply:
   - 2-stroke oil
     To the crank pin, bearing and oil delivery hole.
7. Check:
   - Crankshaft and transmission operation
     Unsmooth operation → Repair.



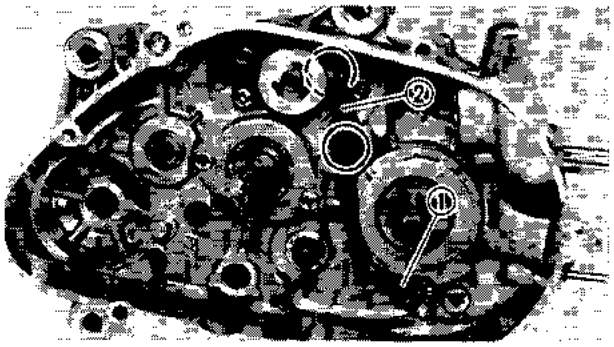
STOPPER PLATE

1. Install:
   - Collar ①
   - Stopper plate (Oil seal) ②
   - Stopper plate (Bearing) ③
   - Stopper plate (Segment) ④

Stopper Plate (Oil Seal):
16 Nm (1.6 m·kg, 11 ft·lb)
Stopper Plate (Bearing):
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®
Stopper Plate (Segment):
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®

CHANGE SHAFT

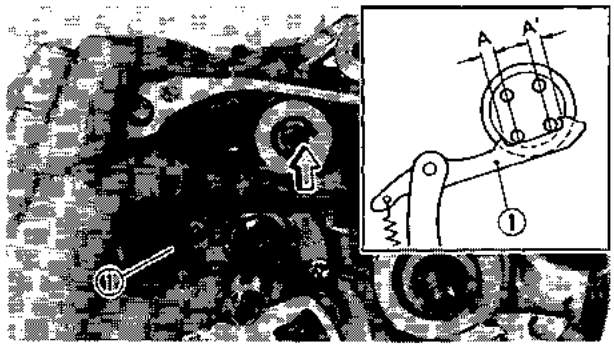
1. Install:
   - Spring ①
   - Stopper lever ②



NOTE:
Set the stopper lever and torsion spring as properly position.

2. Tighten:
   - Screw (Stopper lever)

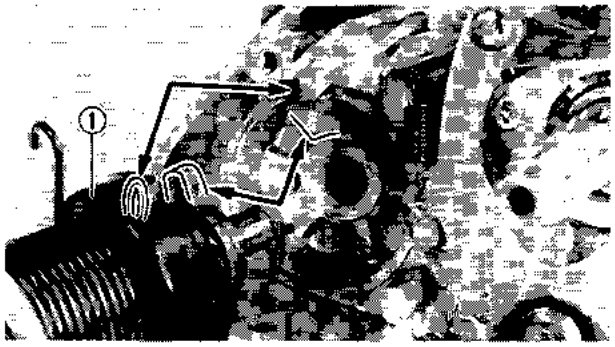
Screw (Stopper Lever):
14 Nm (1.4 m·kg, 10 ft·lb)
LOCTITE®



3. Install:
   - Change lever assembly ①

NOTE:
Make sure that the clearances A and A' (between the prongs of change lever and shift drum pins) are equal.

4. Install:
   - Plain washer ①
   - Circlip ②
5. Check:
   - Change operation
     Unsmooth operation → Repair.

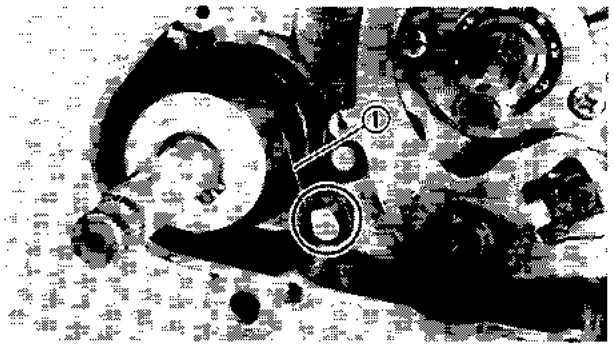


KICK AXLE

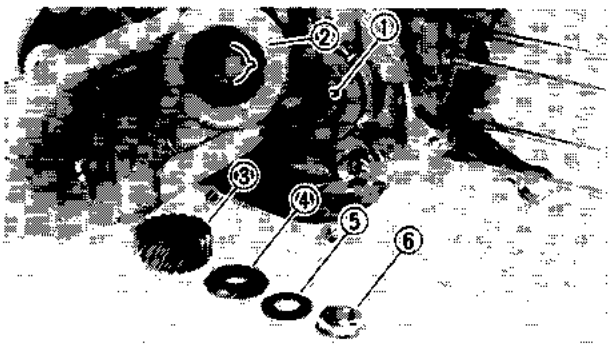
1. Install:
   - Kick axle assembly ①
     Rotate the shaft clockwise.

NOTE:

- Make sure that the kick stopper is stopped at the projection of the crankcase.
- Make sure that the spring is engaged with the crankcase hole.



2. Set the kick spring ① to the spring hook.
3. Check:
   - Kick axle operation
     Unsmooth operation → Repair.



CLUTCH

1. Install:
   - Pin (Pump drive gear) ①
   - Oil pump drive gear ②

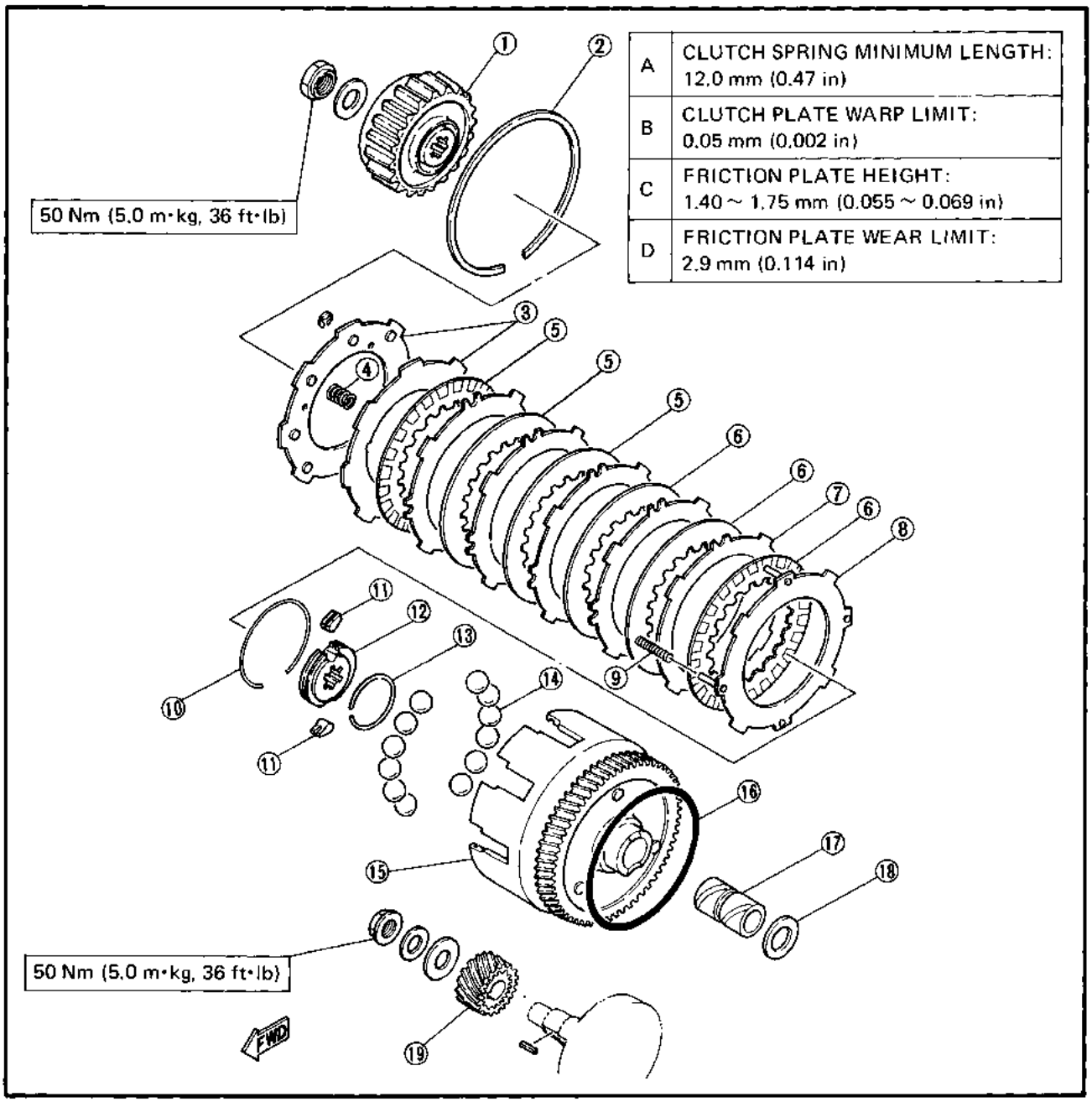
NOTE:

Be sure the pin ① on the crankshaft correctly engages with the slot on the oil pump drive gear ② .

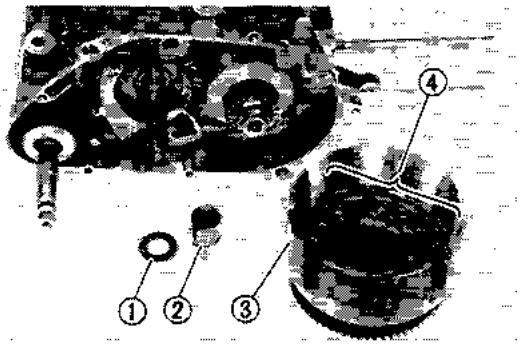
- Primary drive gear assembly ③
- Special washer ④
- Conical spring washer ⑤
- Nut (Primary drive gear) ⑥
  Temporarily tighten the nut.

CLUTCH

① Clutch boss
② Circlip
③ Pressure plate
④ Clutch spring
⑤ Friction plate (Silver)
⑥ Friction plate (Brown)
⑦ Clutch plate
⑧ Thrust weight plate
⑨ Compression spring
⑩ Clip
⑪ One way boss cam
⑫ One way boss
⑬ Spring
⑭ Clutch balls (12 pcs.)
⑮ Primary driven gear comp.
⑯ O-ring
⑰ Spacer
⑱ Thrust plate
⑲ Primary drive gear



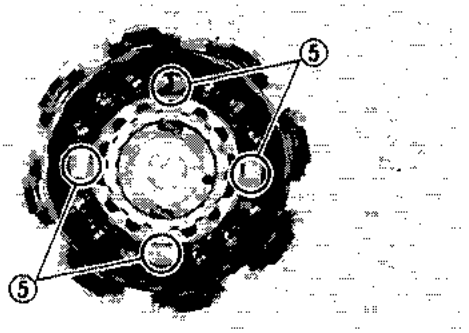
A	CLUTCH SPRING MINIMUM LENGTH: 12.0 mm (0.47 in)
B	CLUTCH PLATE WARP LIMIT: 0.05 mm (0.002 in)
C	FRICTION PLATE HEIGHT: 1.40 ~ 1.75 mm (0.055 ~ 0.069 in)
D	FRICTION PLATE WEAR LIMIT: 2.9 mm (0.114 in)



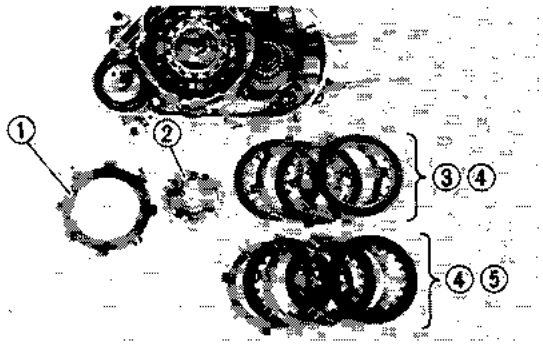
2. Install:
   - Thrust plate ①
   - Spacer ②
   - Primary driven gear comp. ③
   - Balls ④

NOTE:
Place the balls as illustrated position [A] .

Clutch Ball Q'ty:
12 pcs.



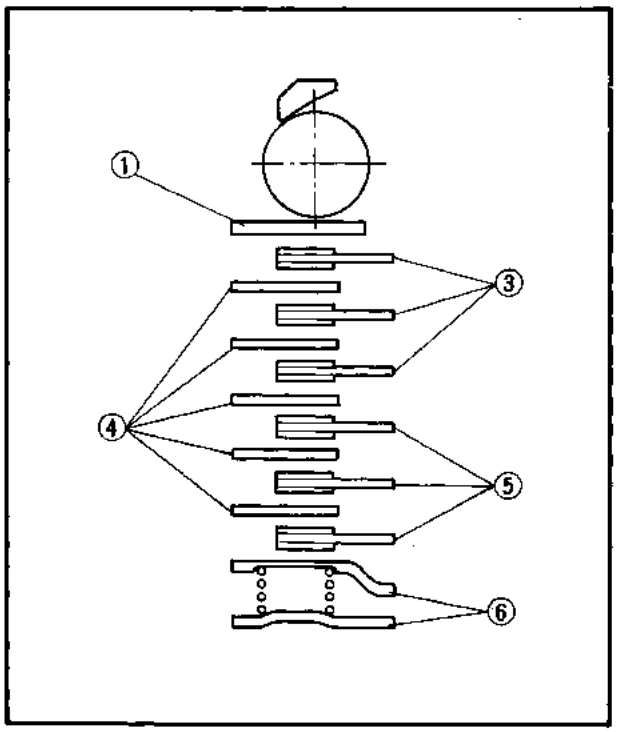
⑤Spaces without ball



3. Install:
   - Thrust weight plate ①
   - Clutch boss ②
   - Friction plates (Brown) ③
   - Clutch plates ④
   - Friction plates (Silver) ⑤

NOTE:
Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.

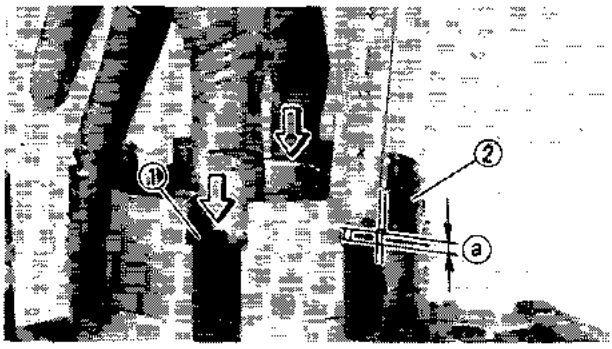
CAUTION:
The friction plates (Brown) ③ must be placed on the outside of the friction plates (Silver) ⑤ .



⑥Pressure plate

4. Adjust:
   - Friction plate height
     By the following adjustment steps.

Friction plate height adjustment steps:
- Push the friction plates ① down by hand.
- Measure the friction plate height ⓐ (distance between the driven gear housing ② and friction plate ①).



Friction Plate Height ⓐ :
1.40 ~ 1.75 mm
(0.055 ~ 0.069 in)

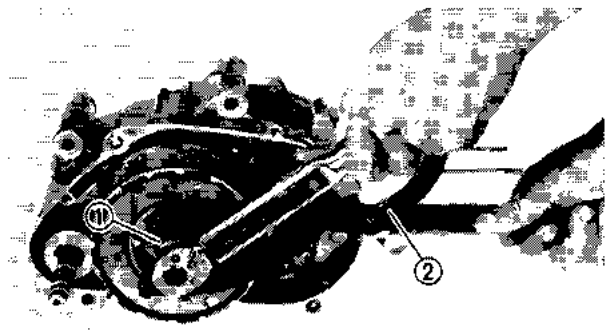
- If the height is out of specification, adjust the friction plate height.
- Remove the following parts.
  1) Pressure plate
  2) Friction plates (Silver and brown)
  3) Clutch plates
- Select the suitable clutch plates by the following chart.

Clutch Plates

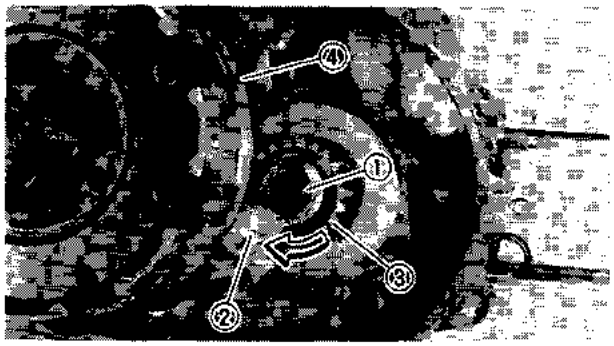
Thickness (mm)	**1.2**	**1.4**
	1.6	–

- Install all parts. Refer to aforementioned step 3.
- Remeasure the friction plate height.

5. Install:
   - Pressure plate
   - Circlip
   - Plain washer
   - Nut (Clutch boss)

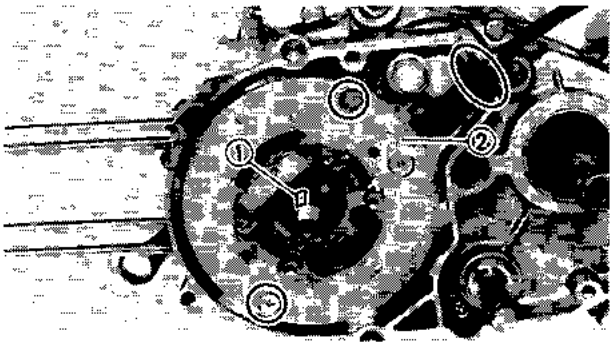


6. Tighten:
   - Locknut (Clutch boss) ①
     Use the Rotor Holding Tool ② (YU-01235) to hold the clutch boss.



7. Tighten:
   - Nut (Primary drive gear) ①
     Place a folded rag ② between the teeth of the drive gear ③ and driven gear ④ to lock them.

Nut (Primary Drive Gear): 50 Nm (5.0 m·kg, 36 ft·lb)



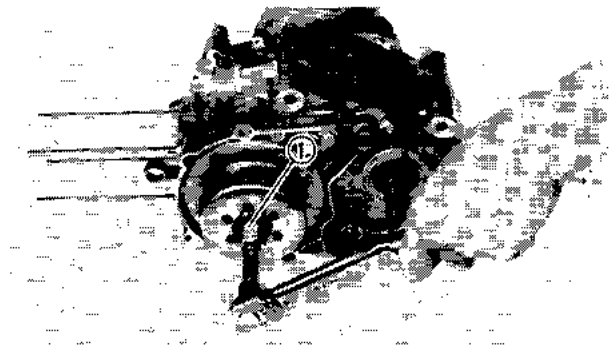
CDI MAGNETO

1. Install:
   - Woodruff key ①
   - Stator assembly ②

Stator: 10 Nm (1.0 m·kg, 7.2 ft·lb)

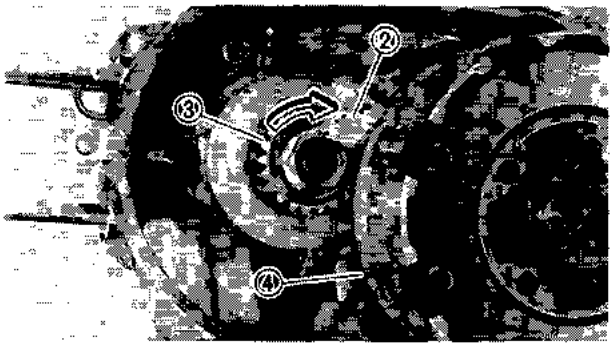
2. Install:
   - CDI magneto
   - Plain washer
   - Spring washer
   - Nut (CDI magneto)

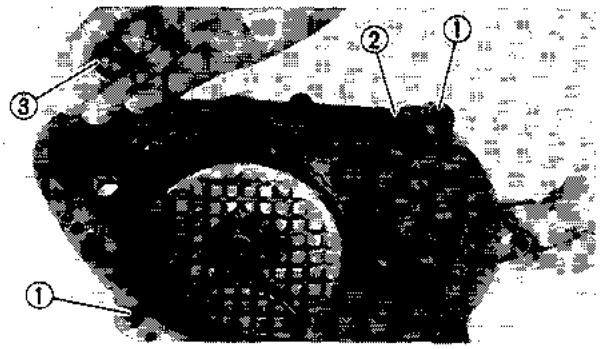
NOTE:
When installing the CDI magneto, make sure the woodruff key is properly seated in the key way of the crankshaft. Apply a light coating of lithium soap base grease to the tapered portion of the crankshaft end.

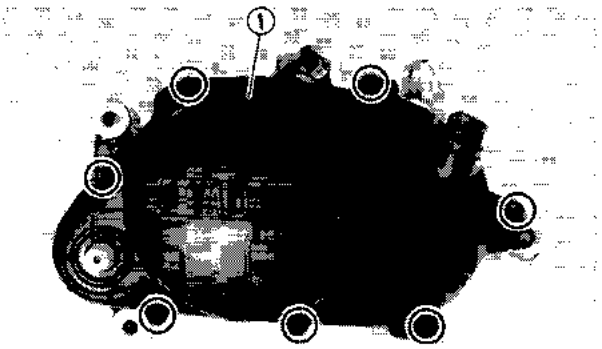


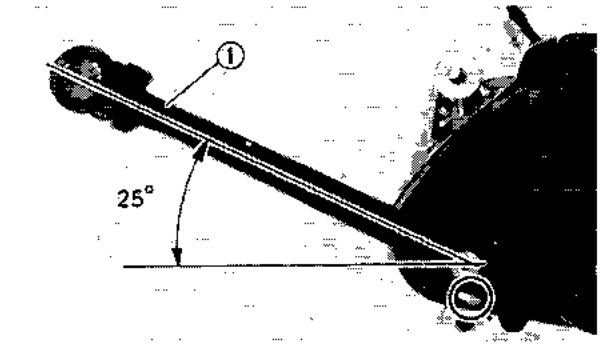
3. Tighten:
   - Nut (CDI magneto) ①
     Place a folded rag ② between the teeth of the drive gear ③ and driven gear ④ to lock them.

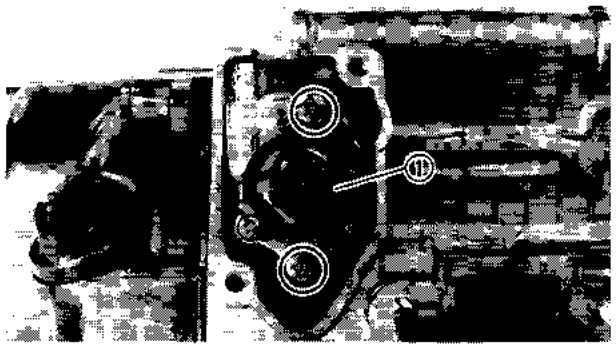
Nut (CDI magneto): 50 Nm (5.0 m·kg, 36 ft·lb)











CRANKCASE COVER (RIGHT)

1. Install:
   - Dowel pins ①
   - Gasket (New) ②
   - Washer ③

NOTE:

Do not forget to fit the washer ③ on the kick axle.

2. Install:
   - Crankcase cover (Right) ①

NOTE:

Tighten the screws in a crisscross pattern.

Crankcase Cover:
8 Nm (0.8 m·kg, 5.8 ft·lb)

KICK CRANK

1. Install:
   - Kick crank ①

NOTE:

Form an angle of so that 25° with the horizontal line.

Kick Crank:
12 Nm (1.2 m·kg, 8.7 ft·lb)

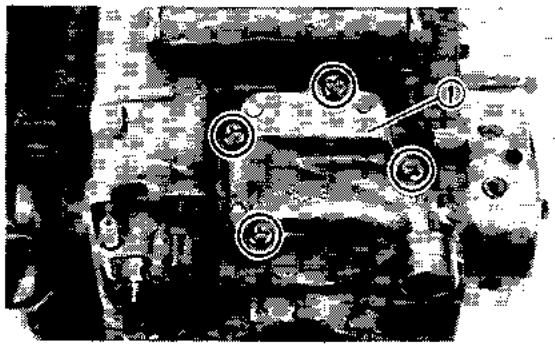
OIL PUMP

1. Install:
   - Oil pump assembly ①

CAUTION:

Before installing and torquing the oil pump holding screws, be sure to check whether the oil pump plunger is functing properly.

Oil Pump:
5 Nm (0.5 m·kg, 3.6 ft·lb)



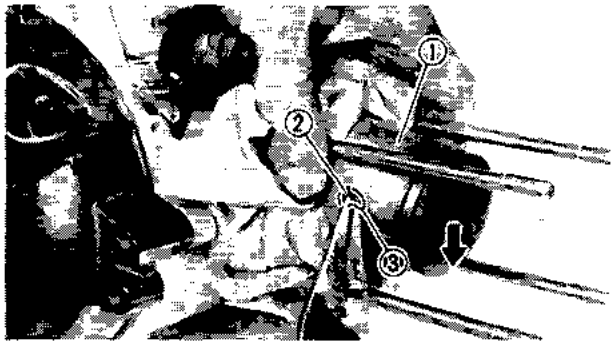
REED VALVE

1. Install:
   - Reed valve
   - Gaskets (New)
   - Reed valve housing ①

NOTE:

- Tighten the screws in a crisscross pattern.
- Make sure that the reed valve housing sealing surface matches the sealing surface of the crankcase so there is not air leak.

Reed Valve:
8 Nm (0.8 m·kg, 5.8 ft·lb)



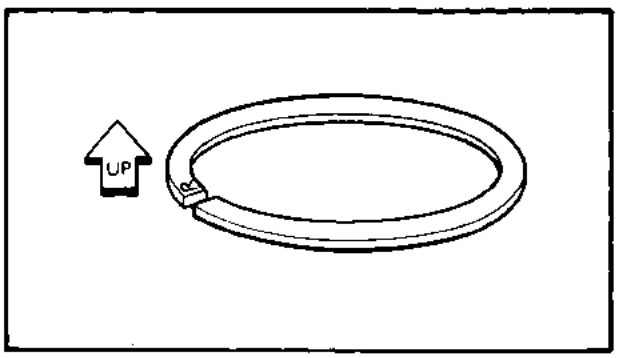
PISTON

1. Install:
   - Bearing (Small end)
   - Piston ①
   - Piston pin ②
   - Piston pin clip (New) ③

NOTE:

- The arrow on the piston must point to the front of the engine.
- Before installing the piston pin clip, cover the crankcase with a clean towel or rag so you will not accidentally drop the pin clip and material into the crankcase.
- Always use a new piston pin clip.

2. Apply:
   - 2-stroke engine oil
     To the piston pin, bearing, piston ring grooves and piston skirt areas.



CYLINDER AND CYLINDER HEAD

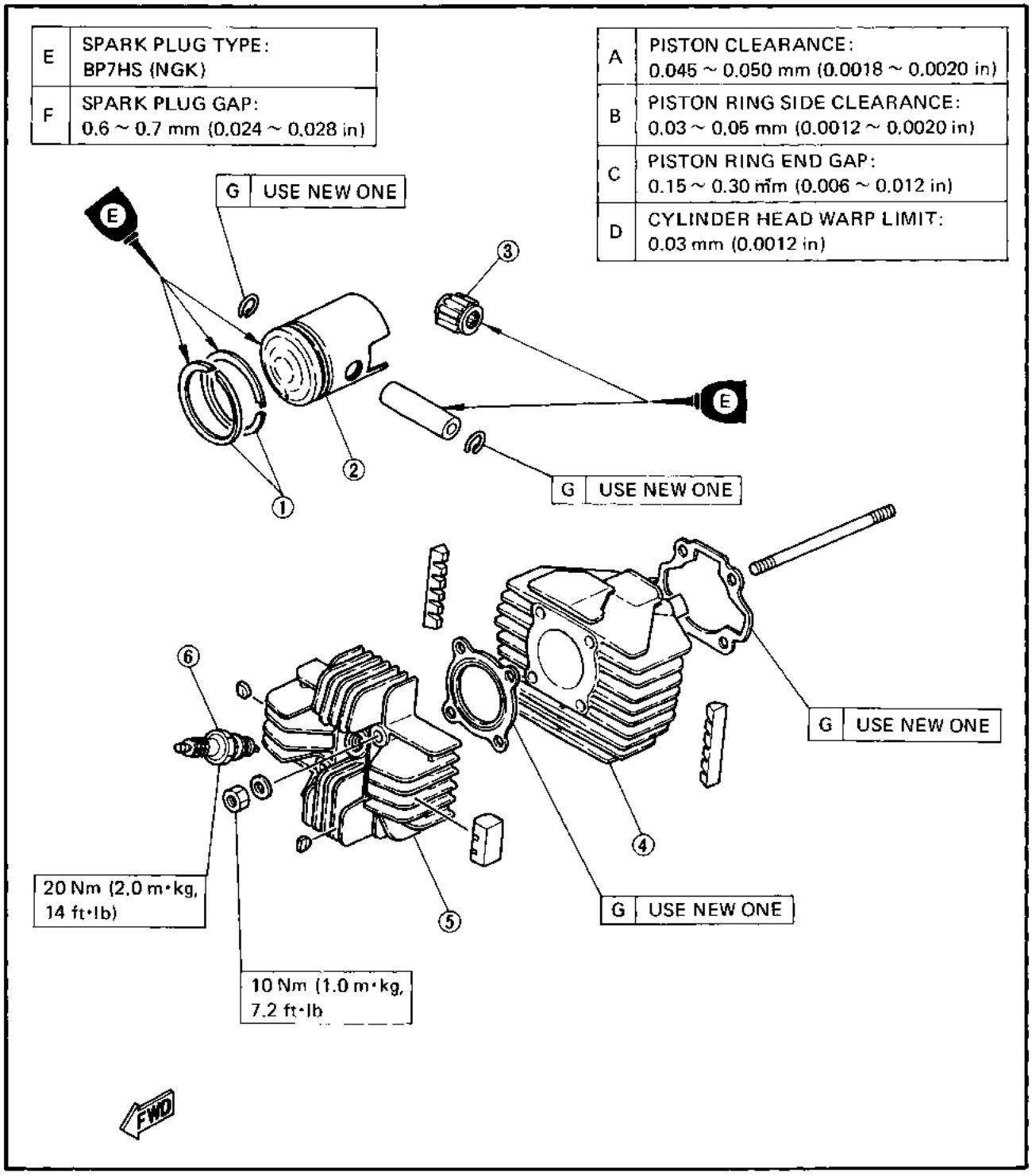
1. Install:
   - Piston rings
     Onto the piston.

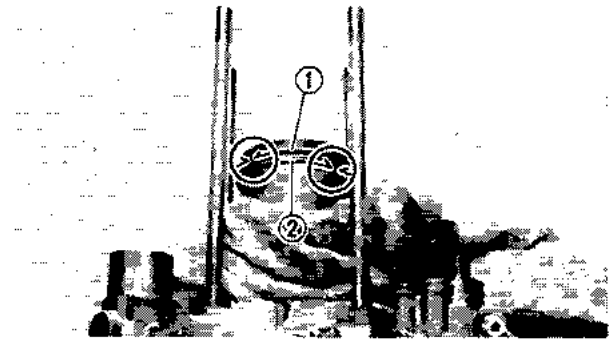
NOTE:

Be sure to install the rings so that Manufacturer's marks or numbers are located on the top side of the rings.

PISTON, CYLINDER AND CYLINDER HEAD

① Piston ring set
② Piston
③ Cylindrical bearing
④ Cylinder
⑤ Cylinder head
⑥ Spark plug

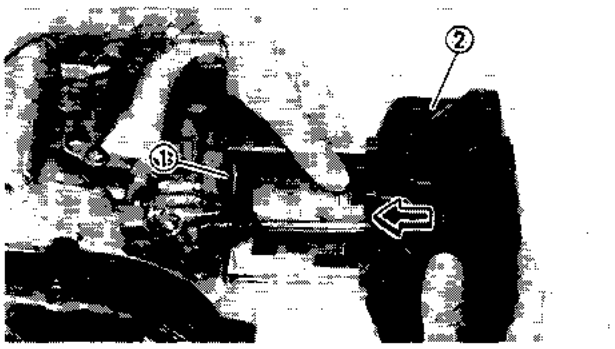




2. Oil liberally:
   - Piston/Rings/Cylinder
3. Set:
   - Piston ring ends

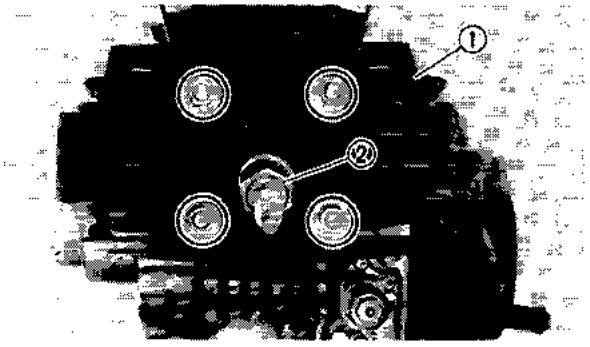
NOTE:
Offset the piston ring end gaps as shown.

① TOP
② 2ND



4. Install:
   - Gasket (Cylinder) (New) ①
   - Cylinder ②

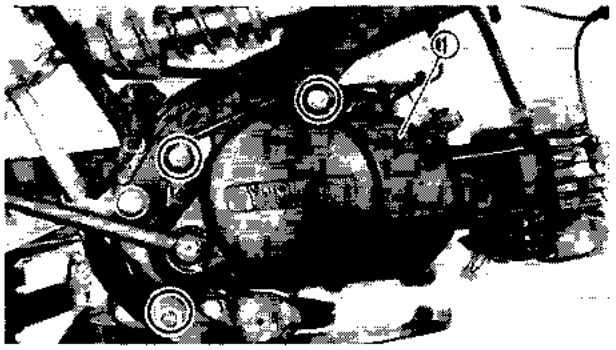
NOTE:
Install the cylinder with one hand while compressing the piston rings with the other hand.



5. Install:
   - Gasket (Cylinder head) (New)
   - Cylinder head ①
   - Spark plug ②
6. Tighten:
   - Nuts (Cylinder head)
   - Spark plug

NOTE:
Tighten the nuts in stage, using a crisscross pattern.

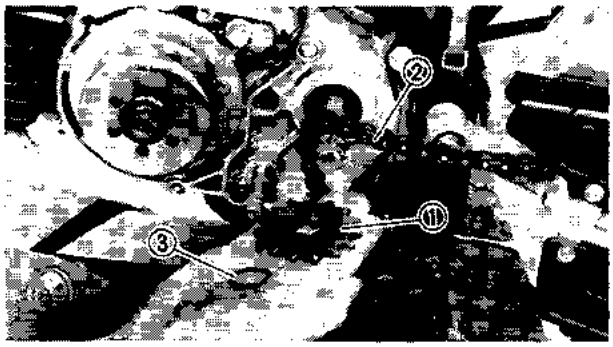
Nuts (Cylinder Head):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Spark Plug:
20 Nm (2.0 m·kg, 14 ft·lb)



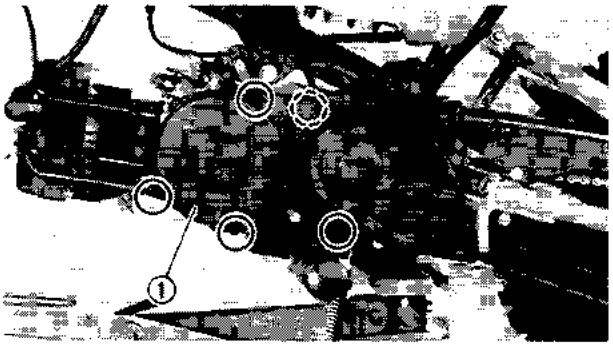
REMOUNTING ENGINE
When removing the engine, reverse the removal procedure. Note the following points.

1. Install:
   - Engine ①

Engine Mounting:
25 Nm (2.5 m·kg, 17 ft·lb)



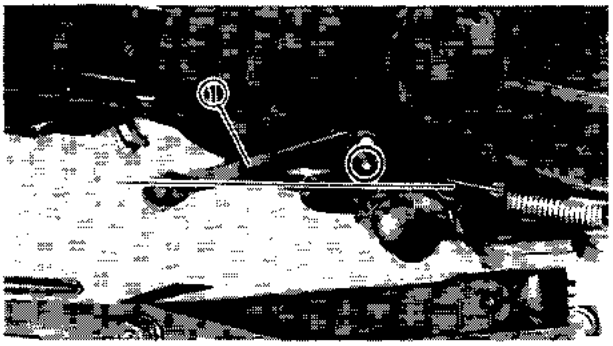
2. Install:
   - Drive sprocket ①
   - Drive chain ②
   - Clip ③
3. Adjust:
   - Drive chain slack
   - Rear brake free play



4. Install:
   - Crankcase cover (Left) ①

NOTE:
- Be sure the pin on the crankcase cover correctly engages with the locating hole on the crankcase.
- Tighten the screws in a crisscross pattern.

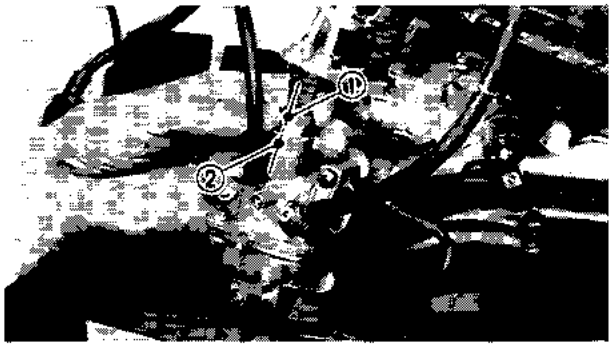
Crankcase Cover (Left):
8 Nm (0.8 m·kg, 5.8 ft·lb)



5. Install:
   - Change pedal ①

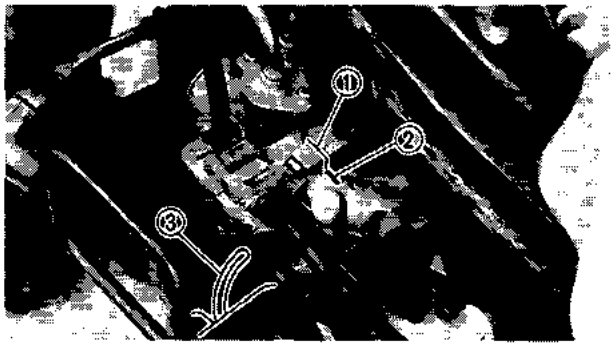
NOTE:
Be sure to position the change pedal so that the its top is flush with the footrest top.

Change Pedal:
10 Nm (1.0 m·kg, 7.2 ft·lb)



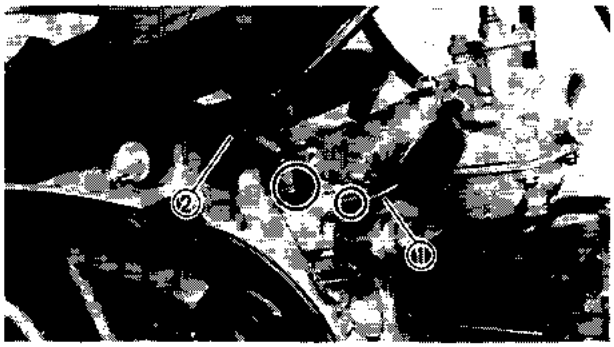
6. Install:
   - Starter plunger
   - Throttle valve

NOTE:
Align the punch mark ① on the throttle valve with the projection mark ② on the carburetor body.



7. Install:
   - Carburetor

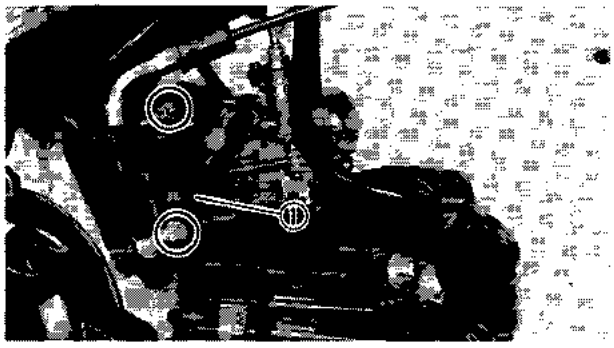
NOTE:
- Align the slit ① on the carburetor with the projection mark ② on the reed valve housing.
- Pass the bleed pipe ③ into the guide on the crankcase cover (right). Refer to "CABLE ROUTING" section.



Carburetor Joint:
6 Nm (0.6 m·kg, 4.3 ft·lb)

8. Connect:
   - Oil delivery pipe ①
   - Oil pipe ②

NOTE:
After connect the pipes, bleed the air.

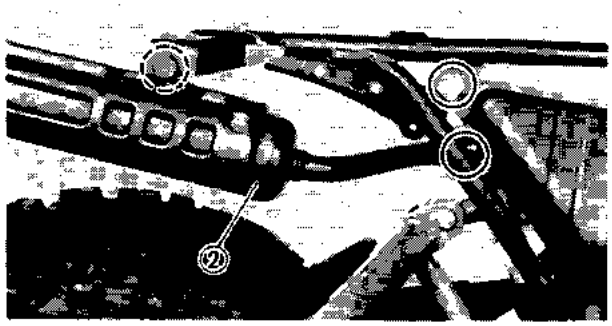


9. Install:
   - Oil pump cover ①

Oil Pump Cover:
8 Nm (0.8 m·kg, 5.8 ft·lb)

10. Install:
    - Exhaust pipe ①
    - Muffler ②

NOTE:
Do not forget to fit the gasket ③ and power reduction plate ④ on the cylinder.



Exhaust Pipe:
18 Nm (1.8 m·kg, 13 ft·lb)
Muffler:
15 Nm (1.5 m·kg, 11 ft·lb)

11. Tighten:
    - Screw (Intake manifold)

NOTE:
The screw of the intake manifold should face downward.

Screw (Intake Manifold):
6 Nm (0.6 m·kg, 4.3 ft·lb)

12. Apply:
    - Transmission oil

Recommended Oil:
Yamalube 4-cycle oil or
SAE 10W30, Type SE Motor Oil
Total Amount:
0.75 L (0.66 Imp qt, 0.79 US qt)

Refer to "CHAPTER 2. TRANSMISSION OIL REPLACEMENT" section.

13. Inspect:
    - Oil leakage

CHAPTER 4.
CARBURETION

CARBURETION

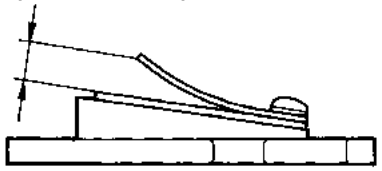
CARBURETOR

① Throttle valve spring
② Jet needle holder
③ Clip
④ Jet needle
⑤ Throttle valve
⑥ Throttle stop screw
⑦ Pilot air screw
⑧ Starter plunger
⑨ Needle valve assembly
⑩ Pilot jet
⑪ Main jet
⑫ Main nozzle
⑬ Float
⑭ Float chamber cover
⑮ Drain screw
⑯ Reed valve
⑰ Reed valve stopper

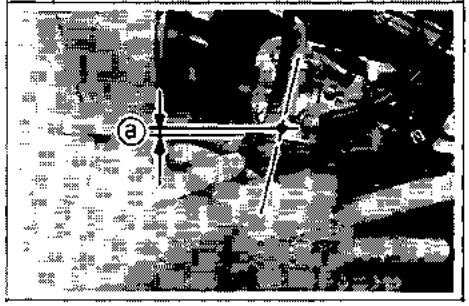
SPECIFICATIONS	
Main Jet (M.J.)	#82.5
Air Jet (A.J.)	ϕ2.5
Jet Needle (J.N.)	3X8-4
Needle Jet (N.J.)	D-8
Pilot Jet (P.J.)	#20
Air Screw (A.S.)	1 and 1/4
Float Height (F.H.)	22.5 ~ 23.5 mm (0.89 ~ 0.93 in)
Fuel Level (F.L.)	0 ~ 1.0 mm (0 ~ 0.04 in)
Engine Idling Speed	1,650 ~ 1,750 r/min

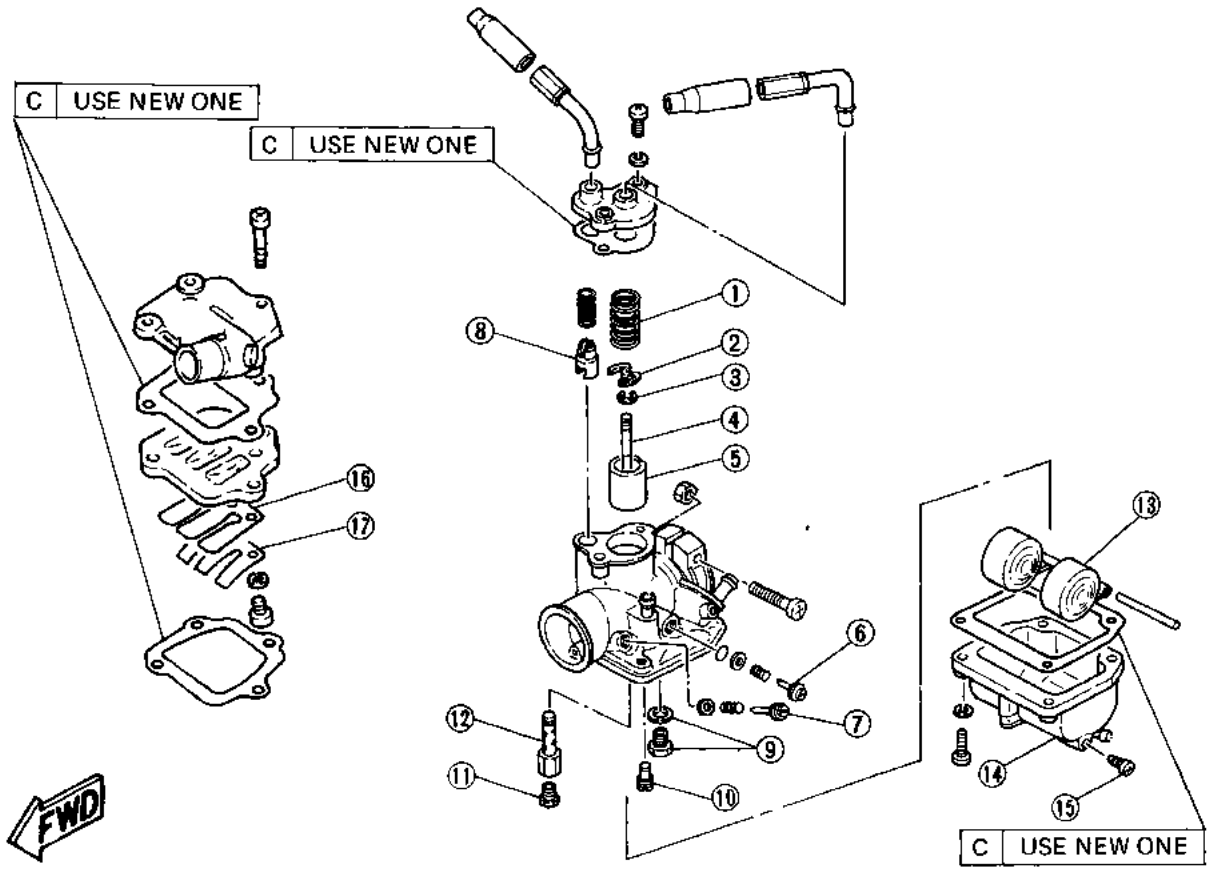
B VALVE STOPPER HEIGHT

6.3 ~ 6.7 mm
(0.25 ~ 0.26 in)



A FUEL LEVEL





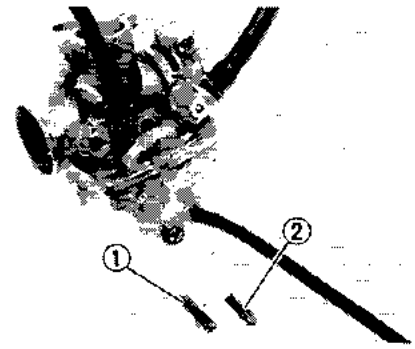
REMOVAL

1. Remove:
   - Carburetor assembly
     Refer to engine removal section.

NOTE:

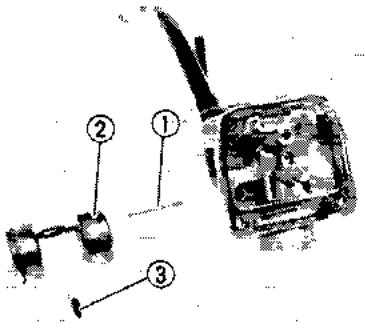
The following parts can be cleaned and inspected without disassembly.

- Throttle valve
- Air screw
- Starter plunger
- Throttle stop screw

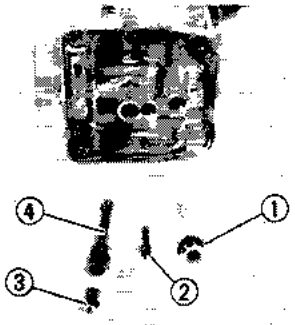


DISASSEMBLY

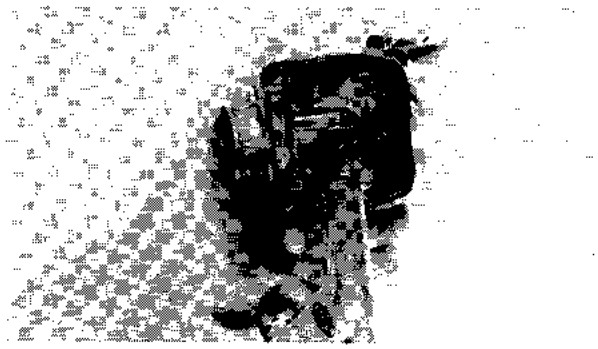
1. Remove:
   - Air screw ①
   - Throttle stop screw ②



2. Remove:
   - Float chamber cover
   - Float pin ①
   - Float ②
   - Needle valve ③



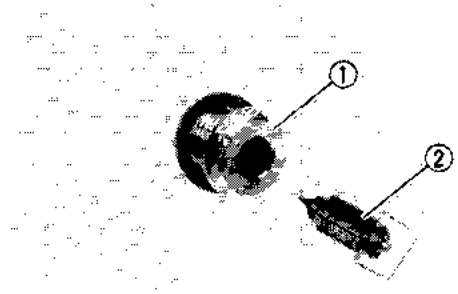
3. Remove:
   - Valve seat ①
   - Pilot jet ②
   - Main jet ③
   - Main nozzle ④



INSPECTION

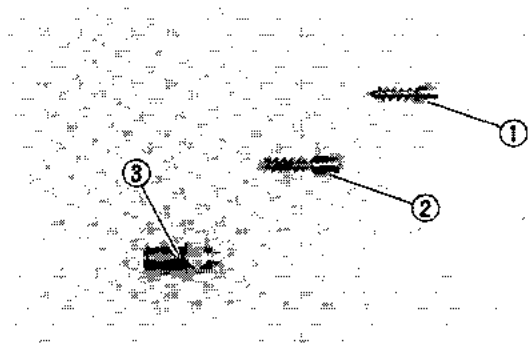
1. Inspect:
   - Carburetor body
     Contamination → Clean.

NOTE:
Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.

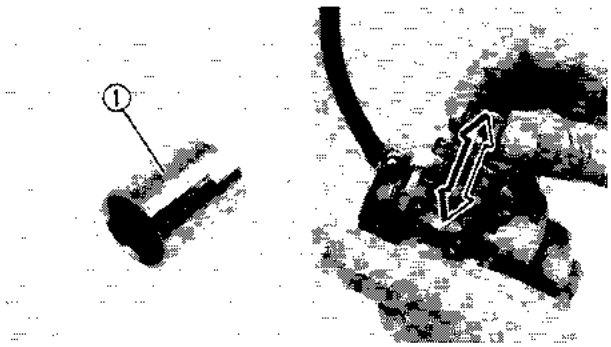


2. Inspect:
   - Valve seat ①
   - Needle valve ②
     Wear/Contamination → Replace.

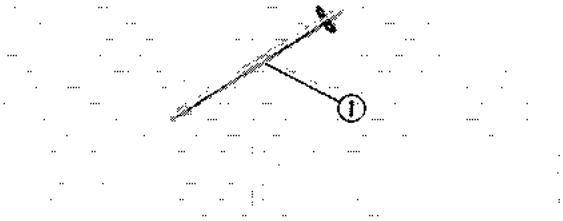
NOTE:
Always replace the needle valve and valve seat as a set.



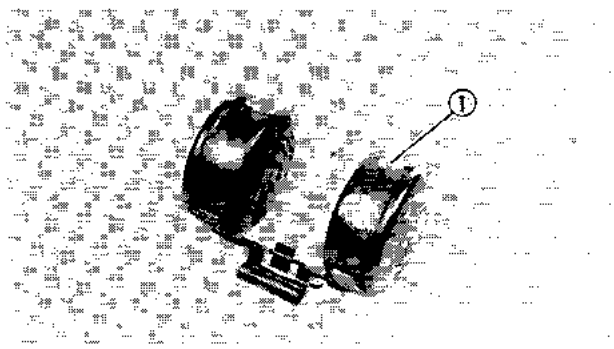
3. Inspect:
   - Air screw ①
   - Throttle stop screw ②
   - Starter plunger ③
     Wear/Contamination → Replace.



4. Inspect:
   - Throttle valve ①
     Wear/Damage → Replace.
5. Check:
   - Free movement
     Stick → Replace.
     Insert the throttle valve into the carburetor body, and check for free movement.



6. Inspect:
   - Jet needle ①
     Bends/Wear → Replace.



7. Inspect:
   - Float ①
     Damage → Replace.
   - Gasket/O-ring
     Damage → Replace.

ASSEMBLY

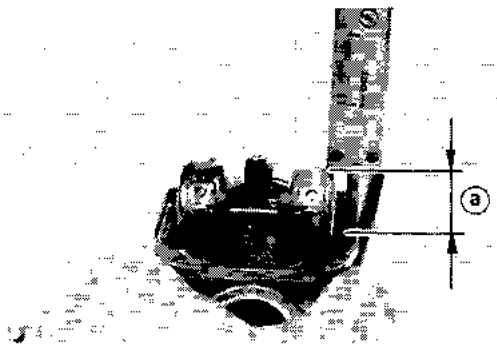
To assembly the carburetor, reverse the disassembly procedures. Note the following points.

CAUTION:

- **Before reassembling, wash all parts in clean gasoline.**
- **Always use a new gasket.**

1. Measure:
   - Float height
     Out of specification → Adjust.
     By the following steps.

Float Height:
22.5 ~ 23.5 mm (0.89 ~ 0.93 in)



Float height measurement and adjustment steps:

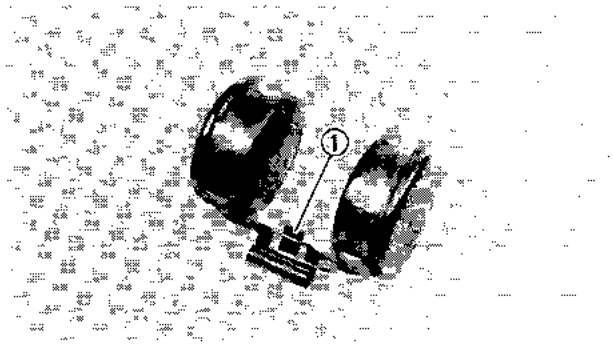
- Hold the carburetor in an upside down position.
- Measure the distance between the mating surface of the float chamber (gasket removed) and top of the float using a gauge.

ⓐ Float height

NOTE:

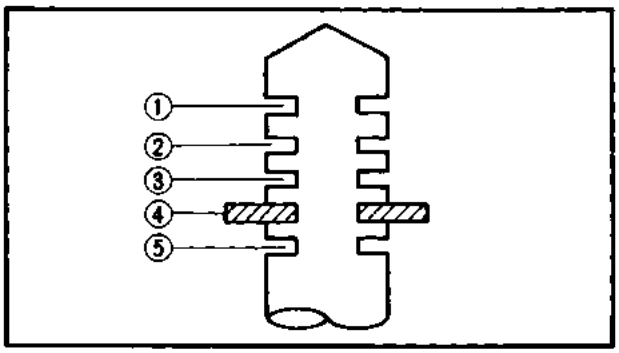
The float arm should be resting on the needle valve, but not compressing the needle valve.

- If the float height is not within specification, inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tang ① on the float.
- Recheck the float height.



2. Adjust:
   • Jet needle clip position
   Mid-range air/fuel mixture characteristics of the machine.
   Poor condition → Jet needle position change.

Jet Needle Type: 3X8 Standard Clip Position: No. 4 Groove	
Up	**Leaner condition**
Down	**Richer condition**



① 1st
② 2nd
③ 3rd
④ 4th (Standard position)
⑤ 5th

INSTALLATION

1. Install:
   • Carburetor assembly
   Reserve the removal procedure.

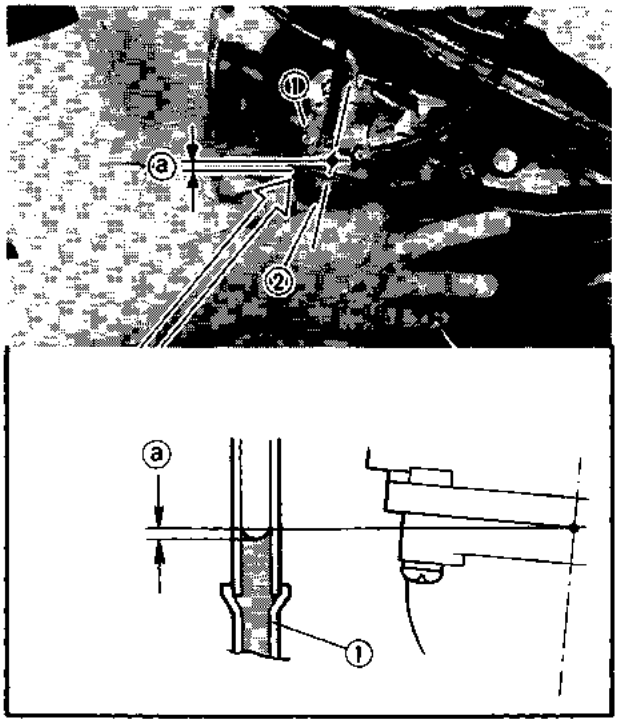
ADJUSTMENT

NOTE:

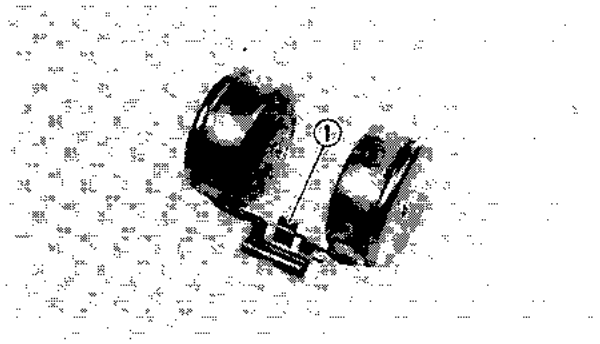
Before adjusting the fuel level, the float height should be adjusted.

1. Measure:
   • Fuel level
   Ouf of specification → Adjust.
   By the following measurement steps.

Fuel Level:
Zero ~ 1.0 mm (Zero ~ 0.4 in)
Below the Carburetor Body Edge.



Fuel level measurement steps:
- Place the machine on a level place.
- Use a garage jack under the engine to ensure that the carburetor is positioned vertically.
- Attach the Fuel Level Gauge ① (YM-01312) to the float chamber nozzle.
- Loosen the drain screw ② and start the engine.
- Measure the fuel level a with gauge.
- If the fuel level is incorrect adjust the fuel level.



2. Adjust:
   - Fuel level

   By the following adjustment steps.

Fuel level adjustment steps:
- Remove the carburetor.
- Inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tang ① on the float.
- Recheck the fuel level.

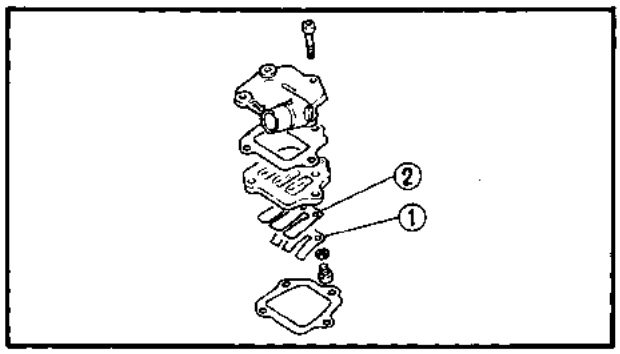
4

REED VALVE

REMOVAL

1. Remove:
   - Reed valve assembly

   Refer to engine removal section.



DISASSEMBLY

1. Remove:
   - Reed valve stopper ①
   - Reed valve ②

INSPECTION

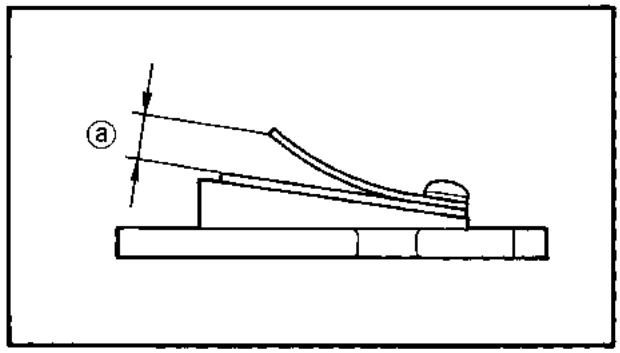
1. Inspect:
   - Rubber intake manifold
     Weathering/Other Deterioration → Replace.
   - Reed petals
     Fatigue Cracks → Replace.

Inspection Steps:
- Visually inspect the reed petals.

NOTE:
Correct reed petals should fit flush or nearly flush against neoprene seats.

- If in doubt as to sealing ability, apply suction to carburetor side of assembly.
- Leakage should be slight to moderate.

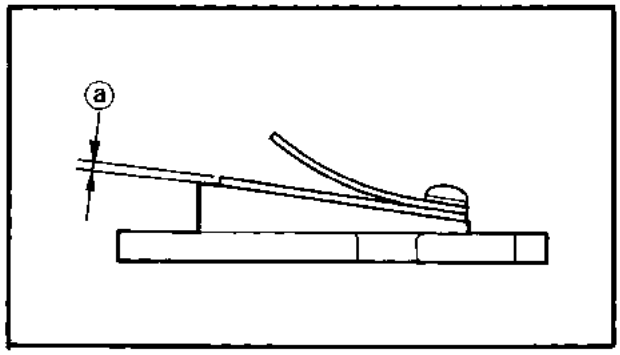
2. Measure:
   - Valve stopper clearance ⓐ
     Out of specification → Adjust stopper/ Replace valve stopper.



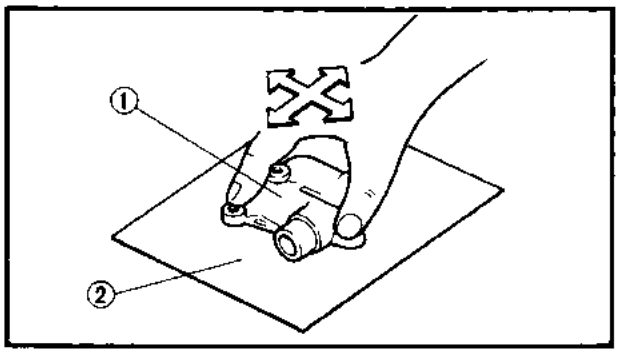
Valve Stopper Clearance:
6.3 ~ 6.7 mm (0.25 ~ 0.26 in)

NOTE:
If it is 0.4 mm (0.016 in) more or less than specified, replace the valve stopper.

3. Measure:
   - Reed valve bending limit ⓐ
     Out of specification → Replace.



Reed Valve Bending Limit:
0.3 mm (0.012 in)



4. Measure:
   • Manifold warpage
   Out of specification → Resurface/Replace.

Manifold Warp Limit:
0.1 mm (0.004 in)

① Manifold
② Sandpaper (#600)

ASSEMBLY

When assembling the reed valve, reserve the disassembly procedure. Note the following points.

1. Tighten:
   • Screw (Reed valve stopper)

Reed Valve Stopper:
1 Nm (1.0 m·kg, 0.7 ft·lb)
LOCTITE®

NOTE:
Tighten each screw gradually to avoid warping.

4

INSTALLATION

When installing the reed valve, reverse the removal procedure. Note the following points.

1. Install:
   • Gasket (New)
2. Tighten:
   • Screws (Reed valve)

Reed Valve:
8 Nm (0.8 m·kg, 5.8 ft·lb)

NOTE:
Tighten each bolt gradually to avoid warping.

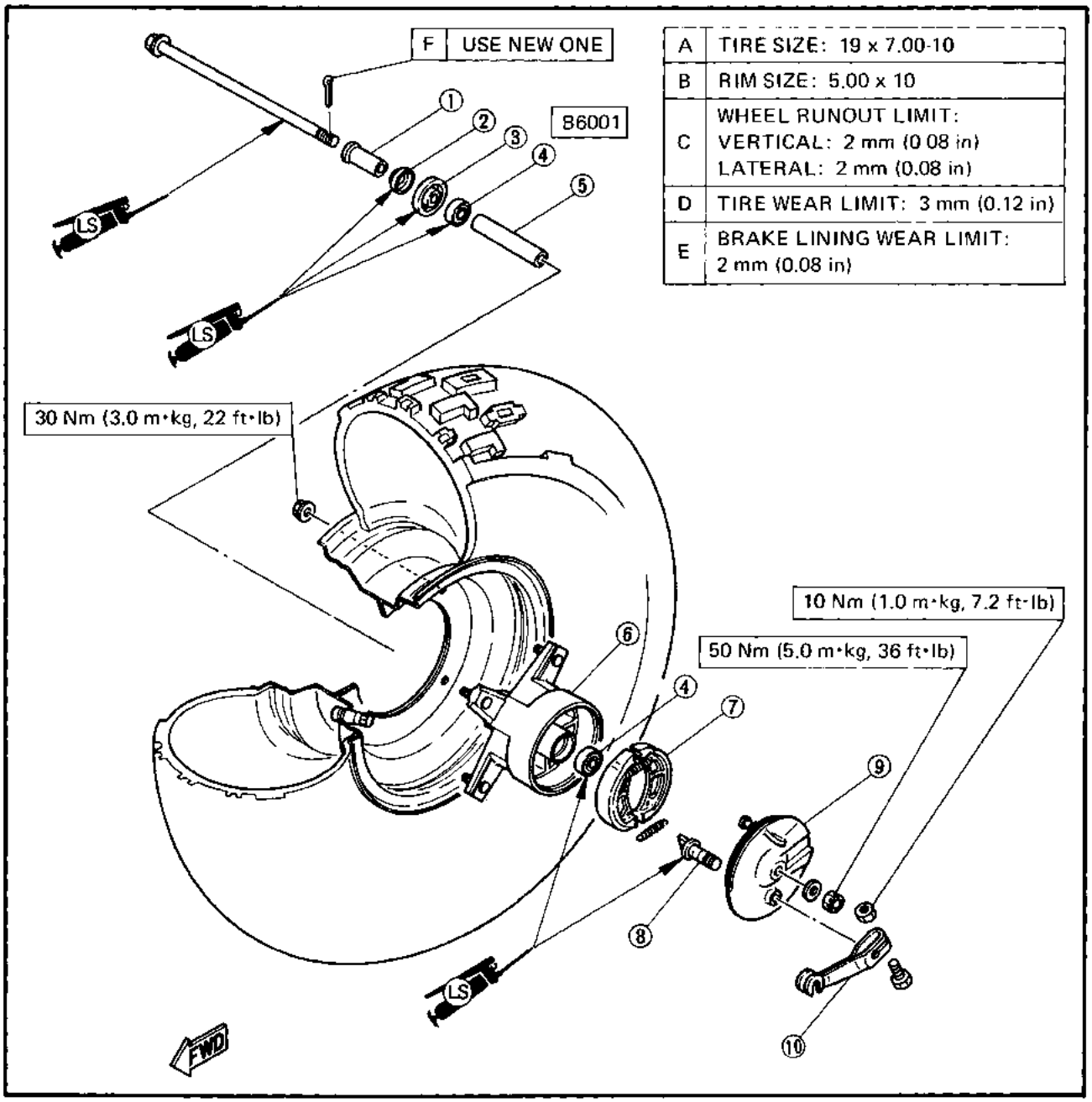
CHAPTER 5.
CHASSIS

CHASSIS

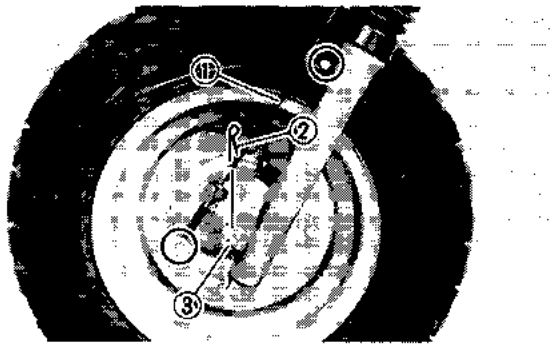
FRONT WHEEL

① Collar
② Dust cover
③ Oil seal
④ Bearing
⑤ Spacer
⑥ Front hub
⑦ Brake shoe complete
⑧ Camshaft
⑨ Brake shoe plate
⑩ Camshaft lever

TIRE AIR PRESSURE		
Cold Tire Pressure	Front	Rear
Standard	29.4 kPa (0.3 kg/cm², 4.3 psi)	29.4 kPa (0.3 kg/cm², 4.3 psi)
Minimum	24.5 kPa (0.25 kg/cm², 3.6 psi)	29.4 kPa (0.3 kg/cm², 4.3 psi)

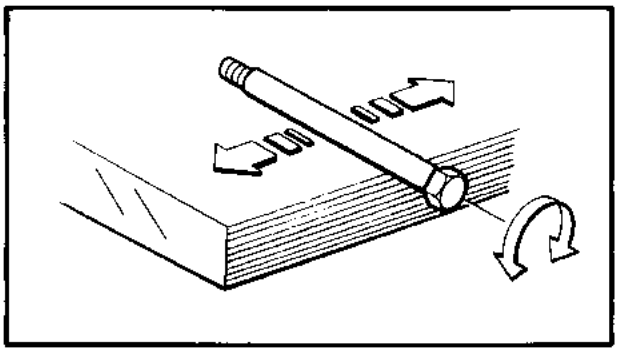


A	TIRE SIZE: 19 x 7.00-10
B	RIM SIZE: 5.00 x 10
C	WHEEL RUNOUT LIMIT: VERTICAL: 2 mm (0.08 in) LATERAL: 2 mm (0.08 in)
D	TIRE WEAR LIMIT: 3 mm (0.12 in)
E	BRAKE LINING WEAR LIMIT: 2 mm (0.08 in)



REMOVAL

1. Place the machine on a level place.
2. Remove:
   - Front brake cable ①
   - Cotter pin ②
   - Axle nut ③
3. Elevate the front wheel by placing the suitable stand under the engine.
4. Remove:
   - Front axle
   - Front wheel

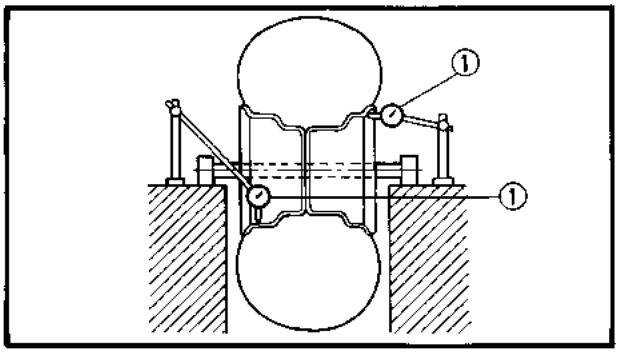


INSPECTION

1. Inspect:
   - Front axle
     Roll the axle on a flat surface.
     Bends → Replace.

WARNING:

Do not attempt to straighten a dent axle.



2. Inspect:
   - Wheel
     Cracks/Bends/Warpage → Replace.
3. Measure:
   - Wheel runout
     Out of specification → Replace.

① Dial gauge

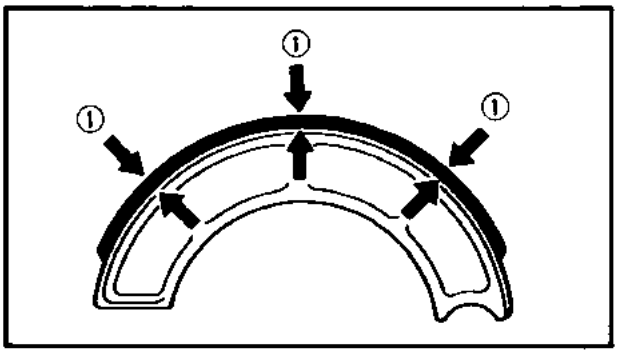
Rim Runout Limit:
Vertical: 2.0 mm (0.08 in)
Lateral: 2.0 mm (0.08 in)

4. Check:
   - Wheel balance
     Out of balance → Adjust.
5. Inspect:
   - Brake lining surface
     Glazed areas → Remove.
     Use a coarse sand paper.

NOTE:
After using the sandpaper, clean of the polished particles with cloth.

6. Measure:
   • Brake lining thickness
   Out of specification → Replace.

Brake Lining Thickness:
4 mm (0.16 in)
Wear Limit:
2 mm (0.08 in)



①Measuring points

NOTE:
Replace the brake shoes as a set if either is found to be worn to the wear limit.

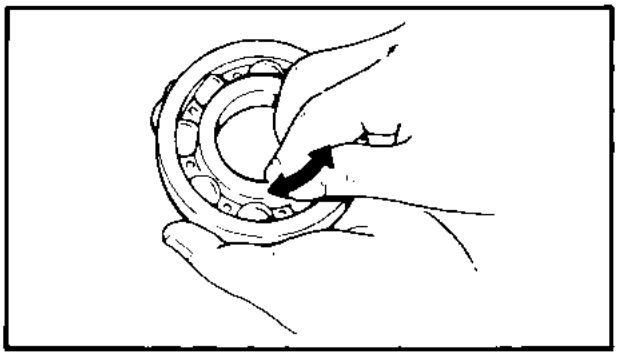
7. Measure:
   • Brake drum inside diameter
   Out of specification → Replace.

Brake Drum Inside Diameter:
Standard: 95 mm (3.74 in)
Limit: 96 mm (3.78 in)

8. Inspect:
   • Brake drum inner surface
   Oil/Scratches → Remove.

Oil	**Use a rag soaked in lacquer thinner or solvent.**
Scratches	**Use a emery cloth (lightly and evenly polishing)**

9. Inspect:
   • Camshaft face
   Wear → Replace.
10. Check:
   • Wheel bearings
   Bearing allow play in the wheel hub or wheel turns roughly → Replace.
   By the following replacement steps.



Wheel bearing replacement steps:
• Clean the outside of the wheel hub.
• Drive out the bearing.

WARNING:

Eye protection is recommended when using striking tools.

- Install the new bearing by reversing the previous steps.

NOTE:

Use a socket that matches the outside diameter of the race of the bearing.

CAUTION:

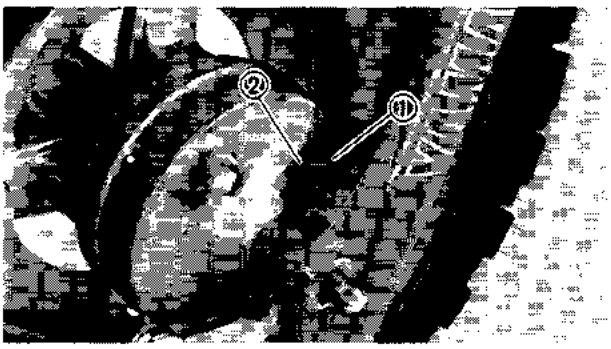
Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

INSTALLATION

When installing the front wheel, reserve the removal procedure. Note the following points.

1. Apply:
   - Lighium base grease

   Lightly grease to the oil seal and bearing.
2. Install:
   - Front wheel assembly



NOTE:

Be sure the boss ① on the front fork correctly engages with the projecting portion (torque stopper) ② on the brake shoe plate.

3. Tighten:
   - Axle nut

Axle Nut:
50 Nm (5.0 m·kg, 36 ft·lb)

4. Install:
   - Cotter pin (New)

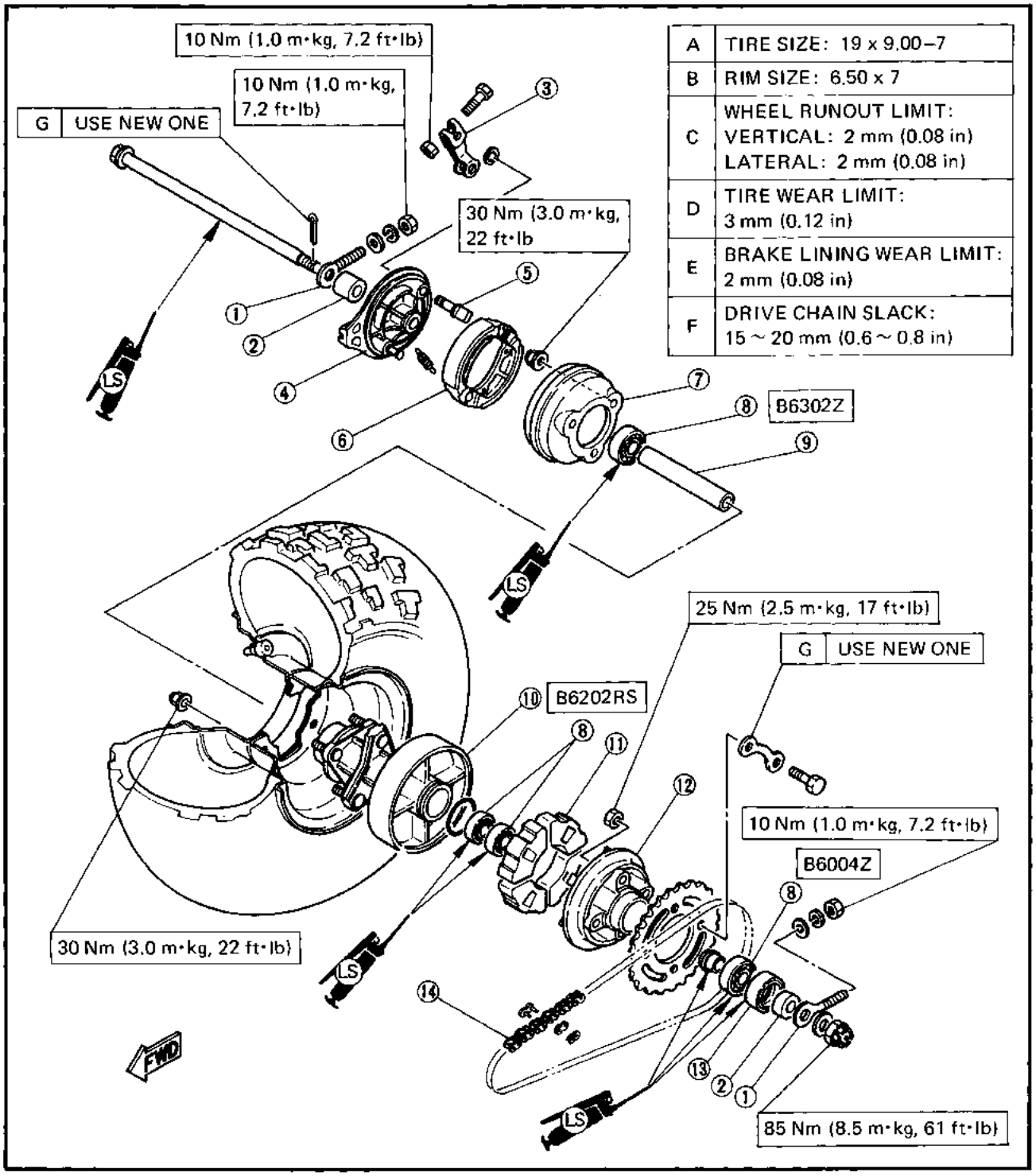
WARNING:

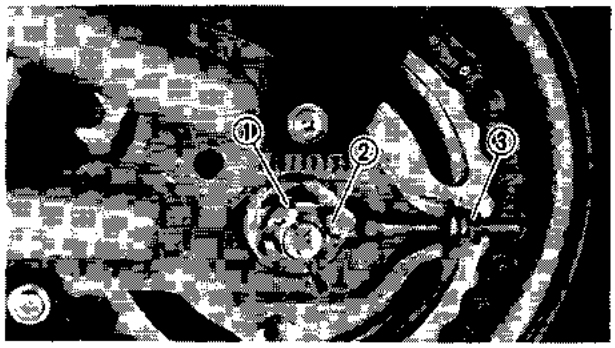
Always use a new cotter pin.

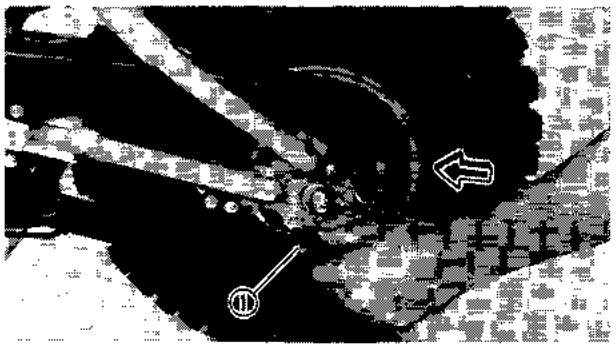
5. Adjust:
   - Front brake free play

REAR WHEEL

① Chain puller
② Collar
③ Camshaft lever
④ Brake shoe plate
⑤ Camshaft
⑥ Brake shoe complete
⑦ Brake drum
⑧ Bearing
⑨ Spacer
⑩ Wheel hub
⑪ Damper
⑫ Clutch hub
⑬ Oil seal
⑭ Drive chain







REMOVAL

1. Place the machine on a level place.
2. Remove:
   - Adjuster (Brake rod)
   - Brake rod
   - Cotter pin ①
   - Axle nut ②
3. Loosen:
   - Locknut (Chain puller) ③
4. Elevate the rear wheel by placing a suitable stand under the engine.
5. Remove:
   - Drive chain ①

NOTE:

Before removing the drive chain, push the wheel forward.

6. Remove:
   - Rear axle
   - Rear wheel

INSPECTION

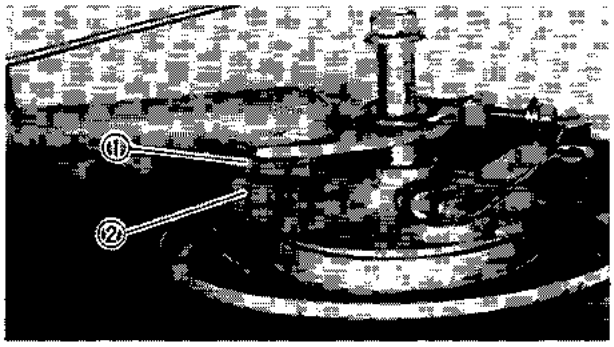
1. Inspect:
   - Front axle
   - Wheel
   - Brake lining surface
   - Brake drum inner surface
   - Camshaft face

   Refer to "FRONT WHEEL—INSPECTION" section.
2. Measure:
   - Wheel runout
   - Brake lining thickness
   - Brake drum inside diameter

   Refer to "FRONT WHEEL—INSPECTION" section.
3. Check:
   - Wheel balance
   - Wheel bearings

   Refer to "FRONT WHEEL—INSPECTION" section.

5



INSTALLATION

When installing the rear wheel, reserve the removal procedure. Note the following points.

1. Apply:
   - Lighium base grease
     Lightly grease to the oil seal and bearing.
2. Install:
   - Rear wheel assembly
   - Drive chain

NOTE:

Be sure the boss ① on the swingarm correctly engages with the projecting portion (torque stopper) ② on the brake shoe plate.

3. Adjust:
   - Drive chain slack
4. Tighten:
   - Axle nut

Axle Nut:
85 Nm (8.5 m·kg, 61 ft·lb)

5. Install:
   - Cotter pin (New)

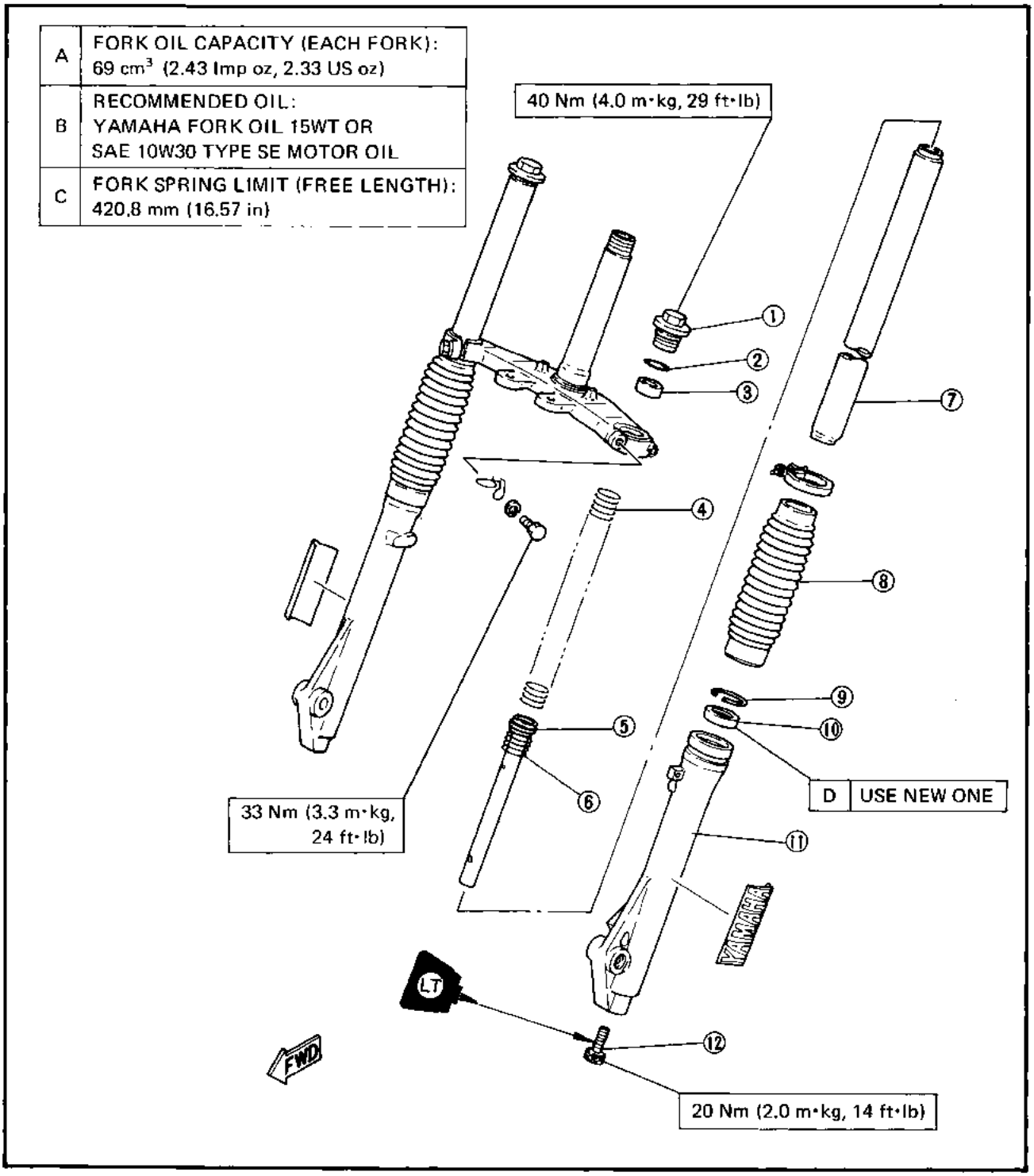
WARNING:

Always use a new cotter pin.

6. Adjust:
   - Rear brake free play

FRONT FORK

① Cap bolt
② O-ring
③ Spring seat
④ Fork spring
⑤ Damper rod (Cylinder complete)
⑥ Rebound spring
⑦ Inner tube
⑧ Rubber boot
⑨ Retaining clip
⑩ Oil seal
⑪ Outer tube
⑫ Drain bolt

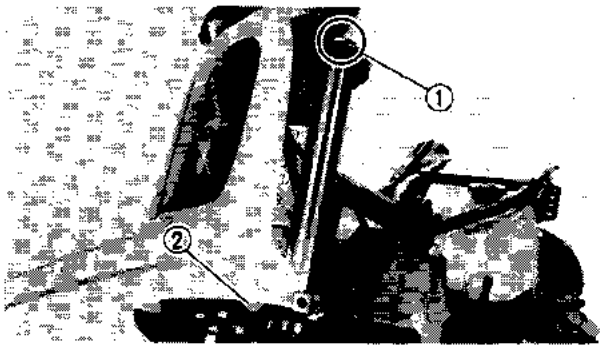


REMOVAL

WARNING:

Securely support the machine so there is no danger of it falling over.

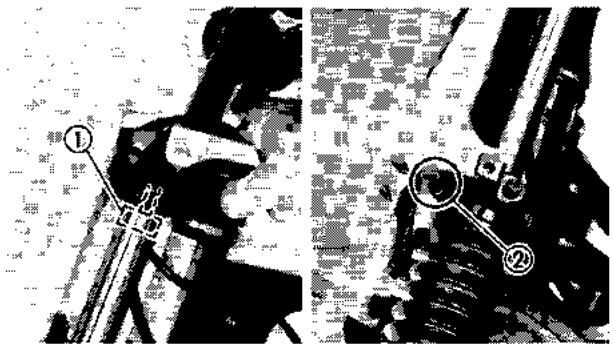
1. Remove:
   - Brake hose holder
   - Front wheel



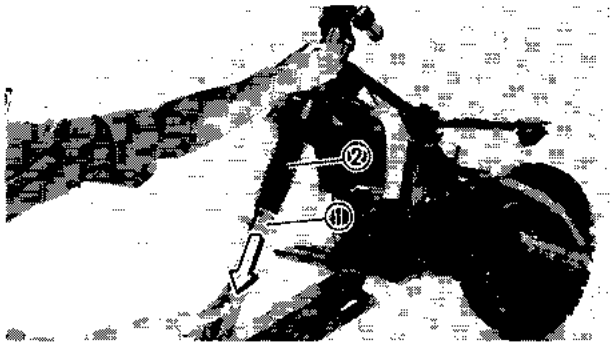
2. Remove:
   - Cap bolt (Front fork) ①

NOTE:

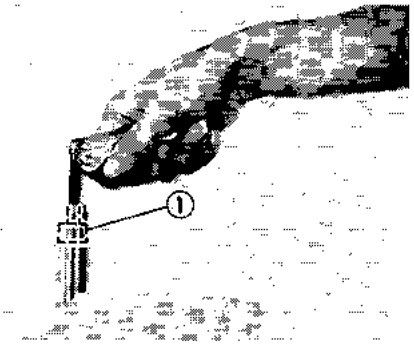
Do not loosen the pinch bolts ② in this stage.



3. Loosen:
   - Spring seat (Upper) ①
   - Pinch bolt (Front fork) ②



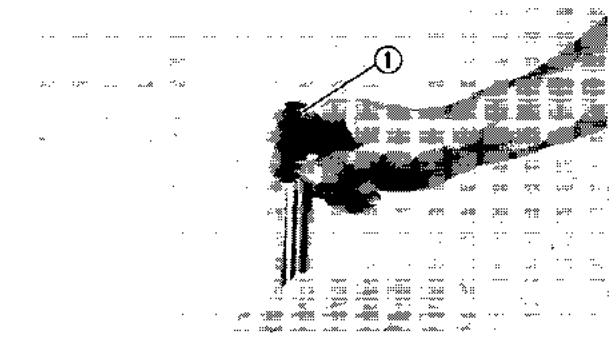
4. Remove:
   - Front fork ①
   - Rubber boot ②



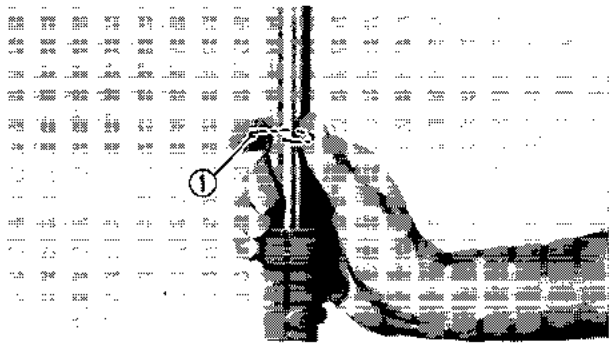
DISASSEMBLY

1. Remove:
   - Spring seat (Upper) ①

   Hold the inner tube vertically.



2. Remove:
   • Fork spring ①



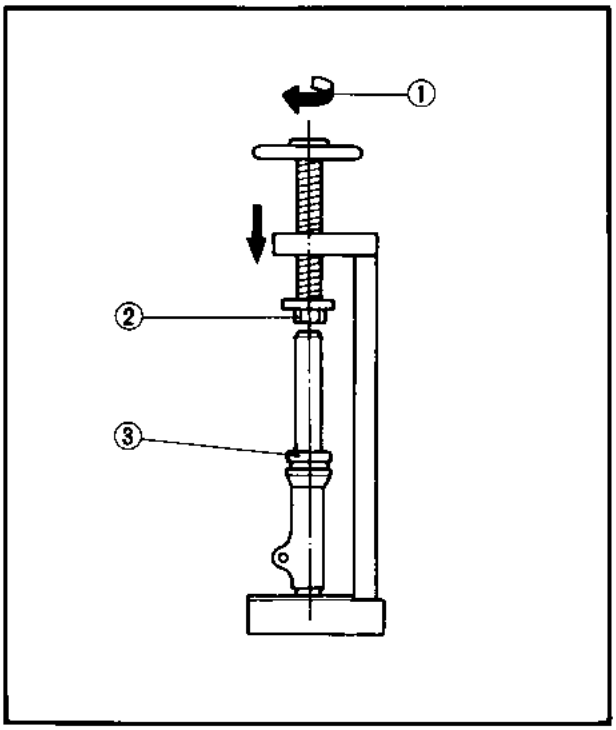
3. Remove:
   • Retaining clip ①

NOTE:
Take care not to scratch the inner fork tube.

4. Remove:
   • Oil seal
   By the following steps.

Oil seal removal steps:
The oil seal in the fork leg must be removed hydraulically.
• Fill the fork completely with the fork oil.
• Reinstall the cap bolt (with O-ring).

CAUTION:
Take care so that no air remains in the inner tube.

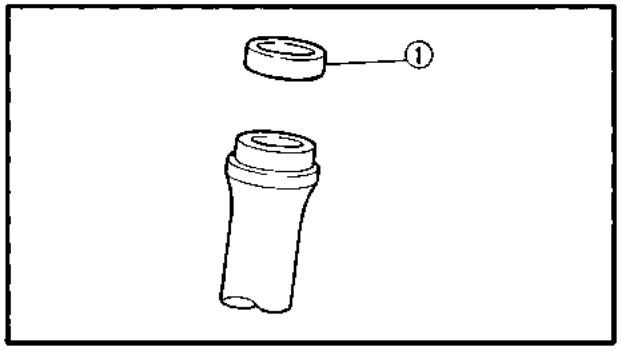


• Place the socket on the top of the cap bolt, and place the fork leg in a hand press as illustrated.

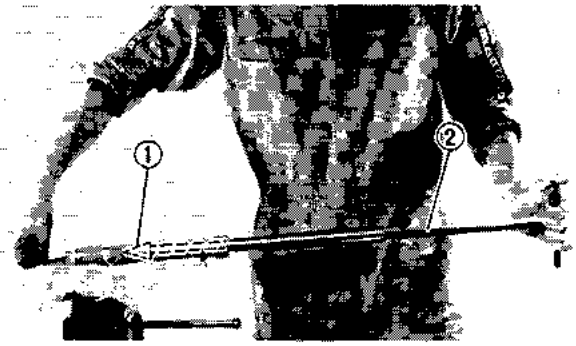
① Turn slowly
② Socket
③ Wrap with rag

CAUTION:
If the inner tube is abruptly contracted or air enters the inner tube, the oil may spurt out or oil seal may spring out. Never touch the inner tube during removal procedure. Also wrap the oil seal with a rag for safety.

5

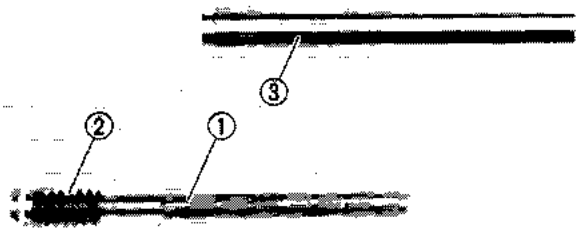


- Remove the cap bolt.
- Place an open container under the fork and turn the fork upside down and drain the oil.
- Remove the oil seal ① .



5. Remove:
   - Bolt (Damper rod)

   Use the Damper Rod Holder (YM-01300-1) ① and the T-Handle (YM-01326) ② to lock the damper rod.



6. Remove:
   - Damper rod (Cylinder complete) ①
   - Rebound spring ②
   - Inner tube ③

INSPECTION

1. Inspect:
   - Inner fork tube

   Scratches/Bends → Replace.

WARNING:

Do not attempt to straighten a bent inner fork tube as this may dangerously weaken the tube.

   - Outer fork tube

   Scratches/Bends/Damage → Replace.
2. Measure:
   - Fork spring

   Over specified limit → Replace.

Fork Spring Free Length (Limit): 420.8 mm (16.57 in)

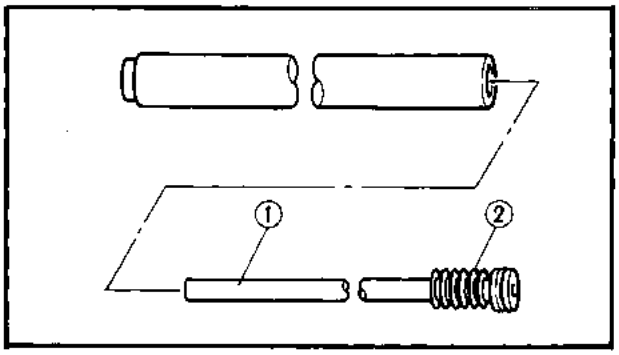
3. Inspect:
   - O-ring (Cap bolt)
     Damage → Replace.
   - Damper rod
     Wear/Damage → Replace.
     Contamination → Blow out all oil passages with compressed air.

ASSEMBLY

Before assembling, clean and inspect all parts and replace when necessary.

NOTE:

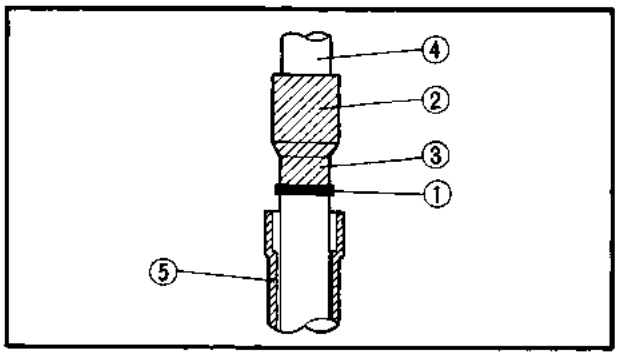
In front fork assembly, be sure to use following new parts.
- Oil seal



1. Install:
   - Rebound spring ①
   - Damper rod ②
     Slide the damper rod into inner fork tube from its top.
2. Install:
   - Inner fork tube
     (Into outer tube)
3. Tighten:
   - Bolt (Damper rod)
     Use the Damper Rod Holder (YM-01300-1) and the T-Handle (YM-01326) to lock the damper rod.

Bolt (Damper Rod):
20 Nm (2.0 m·kg, 14 ft·lb)
LOCTITE®

4. Apply:
   - Oil
     To oil seal ① .
5. Install:
   - Oil seal ①
     Use the Fork Seal Driver Set (YM-33963) ② , ③ .
   - Retaining clip



④ Inner tube
⑤ Outer tube

6. Install:
   • Fork spring
7. Fill:
   • Front fork

Fork Oil Capacity (Each Fork):
69 cm³ (2.43 Imp oz, 2.33 US oz)
Recommended Oil:
Yamaha Fork Oil 15Wt or SAE 10W30 Type SE Motor Oil

NOTE:
After filling slowly pump the forks up and down to distribute the oil.

8. Install:
   • Spring seat (Upper)
     Tighten the spring seat securely.
   • Rubber boot

INSTALLATION

1. Install:
   • Front fork

NOTE:
Fit the front fork by pushing it up until its top is flush with the handle crown top end. Holding the front fork in this position, temporarily tighten the pinch bolts with fingers.

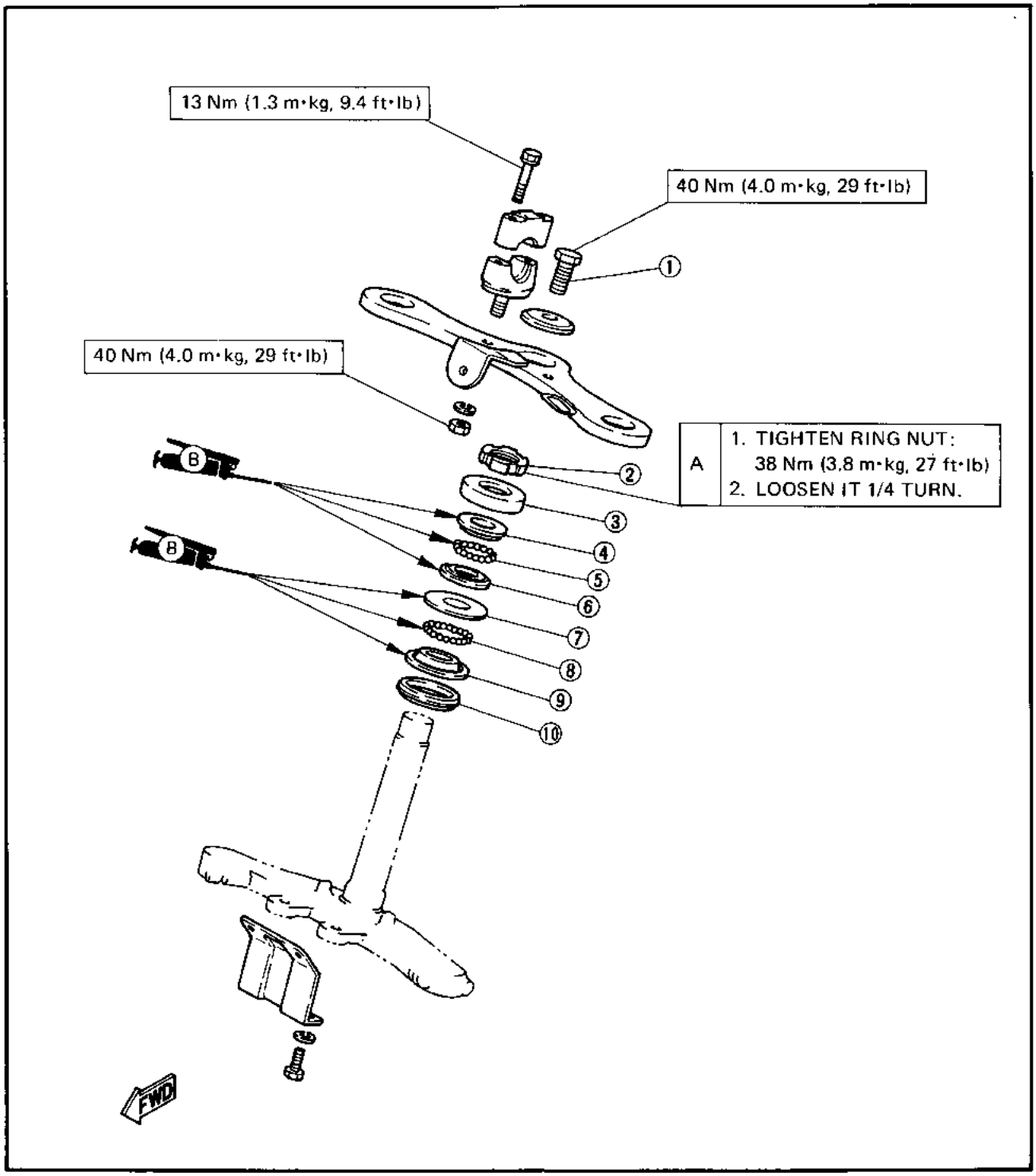
2. Tighten:
   • Pinch bolts
   • Cap bolts

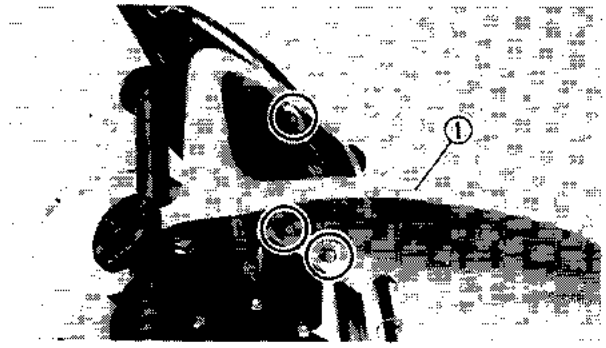
Pinch Bolts (Under Bracket):
33 Nm (3.3 m·kg, 24 ft·lb)
Cap Bolt (Front Fork):
40 Nm (4.0 m·kg, 29 ft·lb)

3. Install:
   • Brake cable holder
   • Front wheel
     Refer to "FRONT WHEEL" section.

STEERING HEAD

① Steering stem bolt
② Ring nut
③ Ball race cover
④ Ball race (Upper-top)
⑤ Balls (Upper)
⑥ Ball race (Upper-bottom)
⑦ Ball race (Lower-top)
⑧ Balls (Lower)
⑨ Ball race (Lower-bottom)
⑩ Steering seal



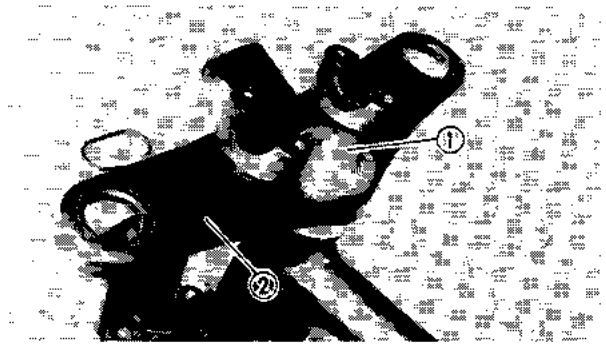


REMOVAL

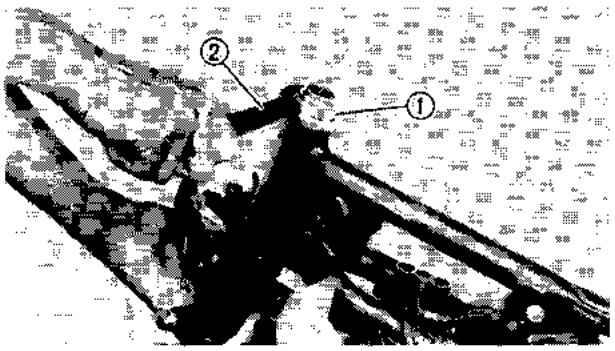
WARNING:

Securely support the machine so there is no danger of it falling over.

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Remove:
   - Front fender ①
   - Front wheel
   - Front forks
   - Handlebars



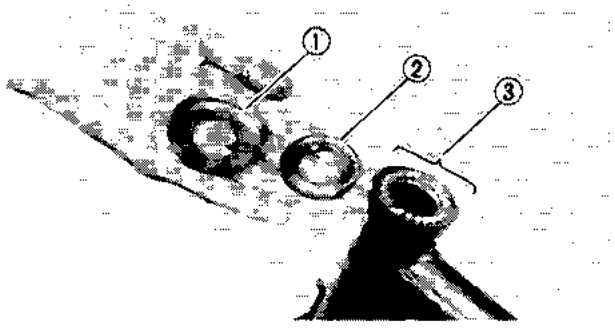
3. Remove:
   - Steering stem bolt ①
   - Handle crown ②



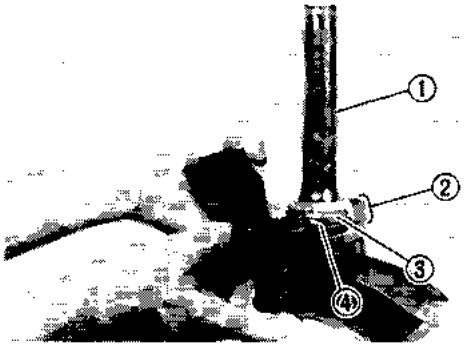
4. Remove:
   - Ring nut ①
     Use the Ring Nut Wrench (YU-01268) ② .

WARNING:

Support the under bracket so that it may not fall down.



5. Remove:
   - Ball race cover ①
   - Ball race (Upper-top) ②
   - Balls (Upper) ③



6. Remove:
   - Under bracket ①
   - Balls (Lower) ②
   - Ball race (Lower-bottom) ③
   - Steering seal ④
7. Remove:
   - Ball race (Upper-bottom)
   - Ball race (Lower-top)

   Use a drift pinch and a hammer.

NOTE:
Work the race out gradually by tapping lightly around its complete backside diameter.

INSPECTION

1. Wash the bearings in a solvent.
2. Inspect:
   - Bearings
   - Bearing races

   Pitting/Damage → Replace.

NOTE:
Always replace bearing and race as a set.

INSTALLATION

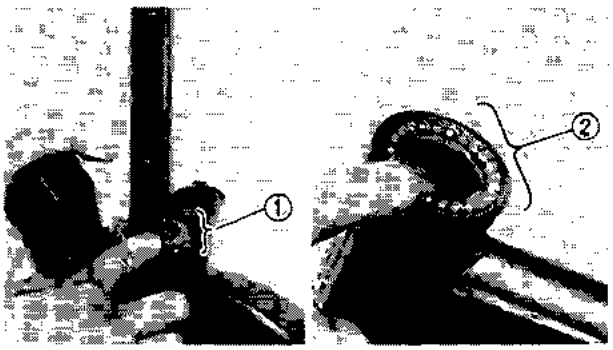
1. Install:
   - Ball race (Upper-bottom)
   - Ball race (Lower-top)

   Tap in the new race.

2. Apply:
   - Grease

   To the ball race (Lower-bottom) and ball race (Upper-bottom).

	Wheel Bearing Grease



3. Install:
   - Balls (Lower) ①
   - Balls (Upper) ②

   Arrange the balls around race, and apply more grease.

Ball Quantity/Size:
Upper: 22 pcs./ 3/16 in
Lower: 19 pcs./ 1/4 in

4. Install:
   - Under bracket

CAUTION:

Hold the under bracket until it is secured.

   - Ball race (Upper-top)
   - Ball race cover
   - Ring nut

   Temporarily tighten the ring nut.

5. Tighten:
   - Ring nut

   By the following tightening steps.

Ring nut tightening steps:
- Tighten the ring nut using the Ring Nut Wrench (YU-33975).

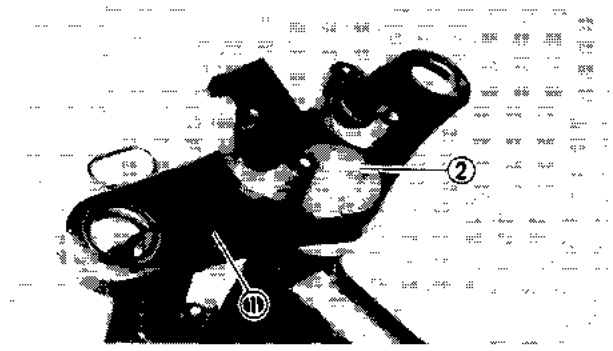
Ring Nut:
38 Nm (3.8 m·kg, 27 ft·lb)

NOTE:
Set the Torque Wrench to the Ring Nut Wrench so that they form a right angle.

WARNING:

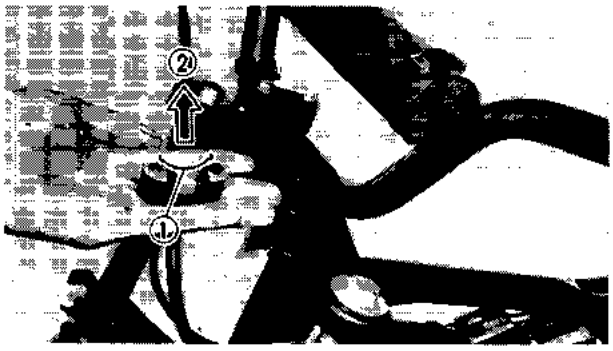
Do not over-tightening.

- Loosen the ring nut 1/4 turn.
- Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the bearings.



6. Install:
   - Handle crown ①
   - Steering stem bolt ②

Steering Stem Bolt:
40 Nm (4.0 m·kg, 29 ft·lb)



7. Install:
   - Components in above list (Removal step "2")
     Refer to "FRONT WHEEL, FRONT FORK" section.

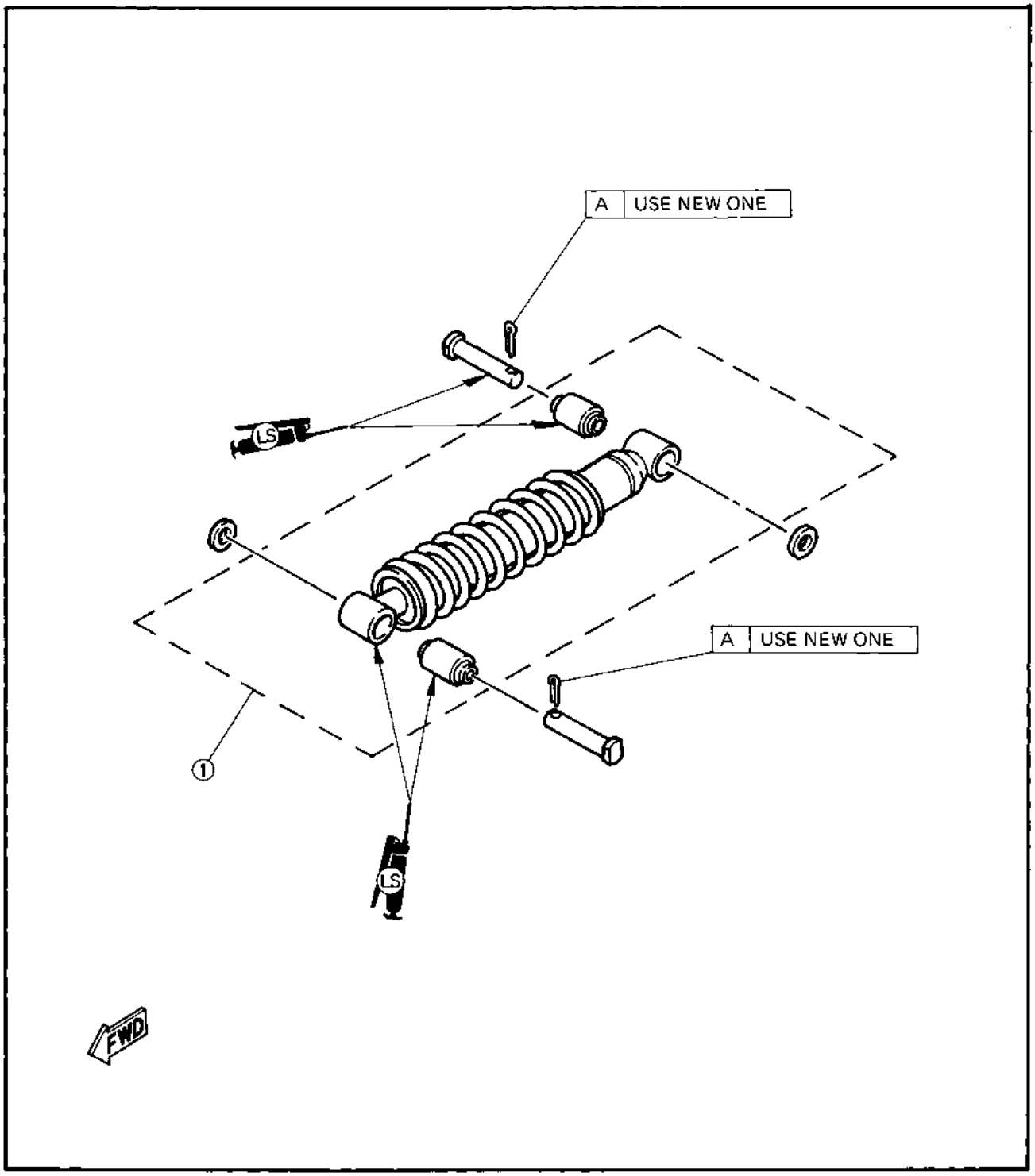
NOTE:
The handlebar holder (upper) should be installed so that the slot ① on the holder faces inward ② .

Handlebar Holder (Upper):
13 Nm (1.3 m·kg, 9.4 ft·lb)

5

REAR SHOCK ABSORBER (MONOCROSS SUSPENSION "DE CARBN" SYSTEM)

① Rear shock absorber assembly

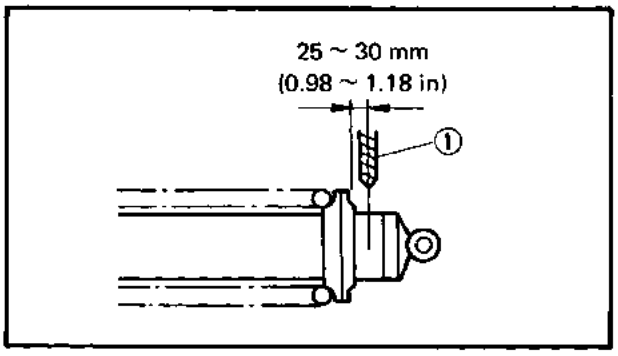


HANDLING NOTES

WARNING:

This shock absorber contains highly compressed nitrogen gas. Read and understand the following information before handling the shock absorber. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.

- **Do not tamper or attempt to open the cylinder assembly.**
- **Do not subject shock absorber to an open flame or other high heat. This may cause the unit to explode due to excessive gas pressure.**
- **Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.**



NOTES ON DISPOSAL

Shock absorber disposal steps:

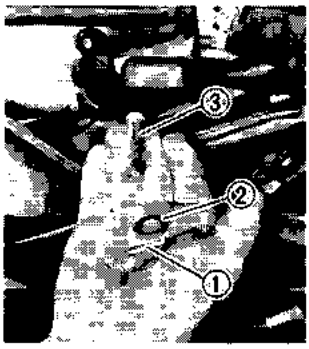
Gas pressure must be released before disposing shock absorber. To do so, drill ① a 2 ~ 3 mm (0.08 ~ 0.12 in) hole through the cylinder wall at a point 25 ~ 30 mm (0.98 ~ 1.18 in) under the spring seat.

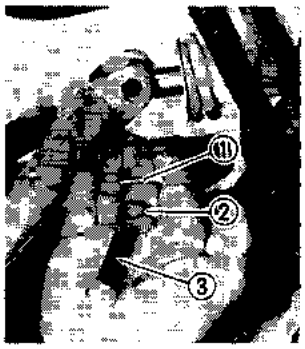
CAUTION:

Wear eye protection to prevent eye damage from escaping gas and/or metal chips.

5

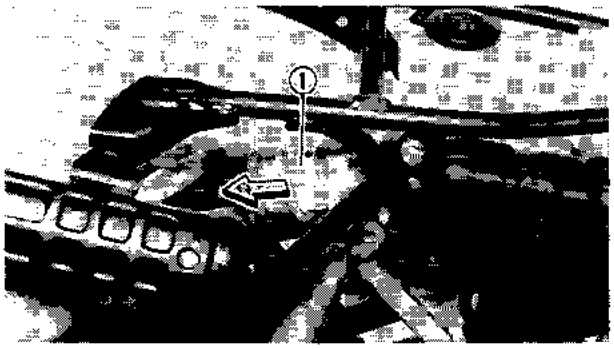
REAR SHOCK ABSORBER



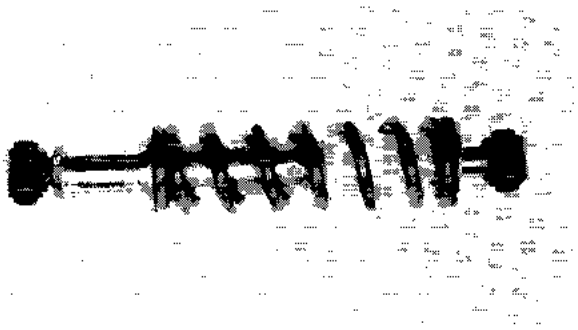


REMOVAL

1. Remove:
   - Seat
   - Rear fender
   - Fuel tank
   - Cotter pins (Upper and lower) ①
   - Washers (Upper and lower) ②
   - Pins (Upper and lower) ③



2. Remove:
   - Rear shock absorber ①



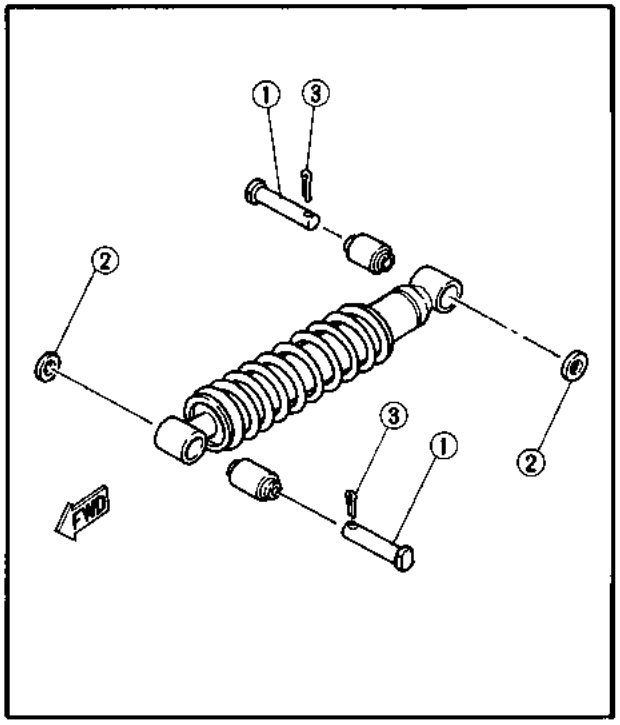
INSPECTION

1. Inspect:
   - Shock absorber rod
     Bends/Damage → Replace absorber assembly.
   - Shock absorber
     Oil leakes → Replace absorber assembly.
   - Spring
     Fatigue → Replace absorber assembly.
     Move spring up and down.

INSTALLATION

When installing the rear shock absorber, reserve the removal procedure. Note the following points.

1. Apply:
   - Lithium base grease
     To pivot points.



2. Install:
   - Pins (Upper and lower) ①
   - Washers (Upper and lower) ②
   - Cotter pins (Upper and lower) ③

NOTE:

- Make sure the pin (upper) is inserted on the left-side.
- Make sure the pin (lower) is inserted on the right-side.

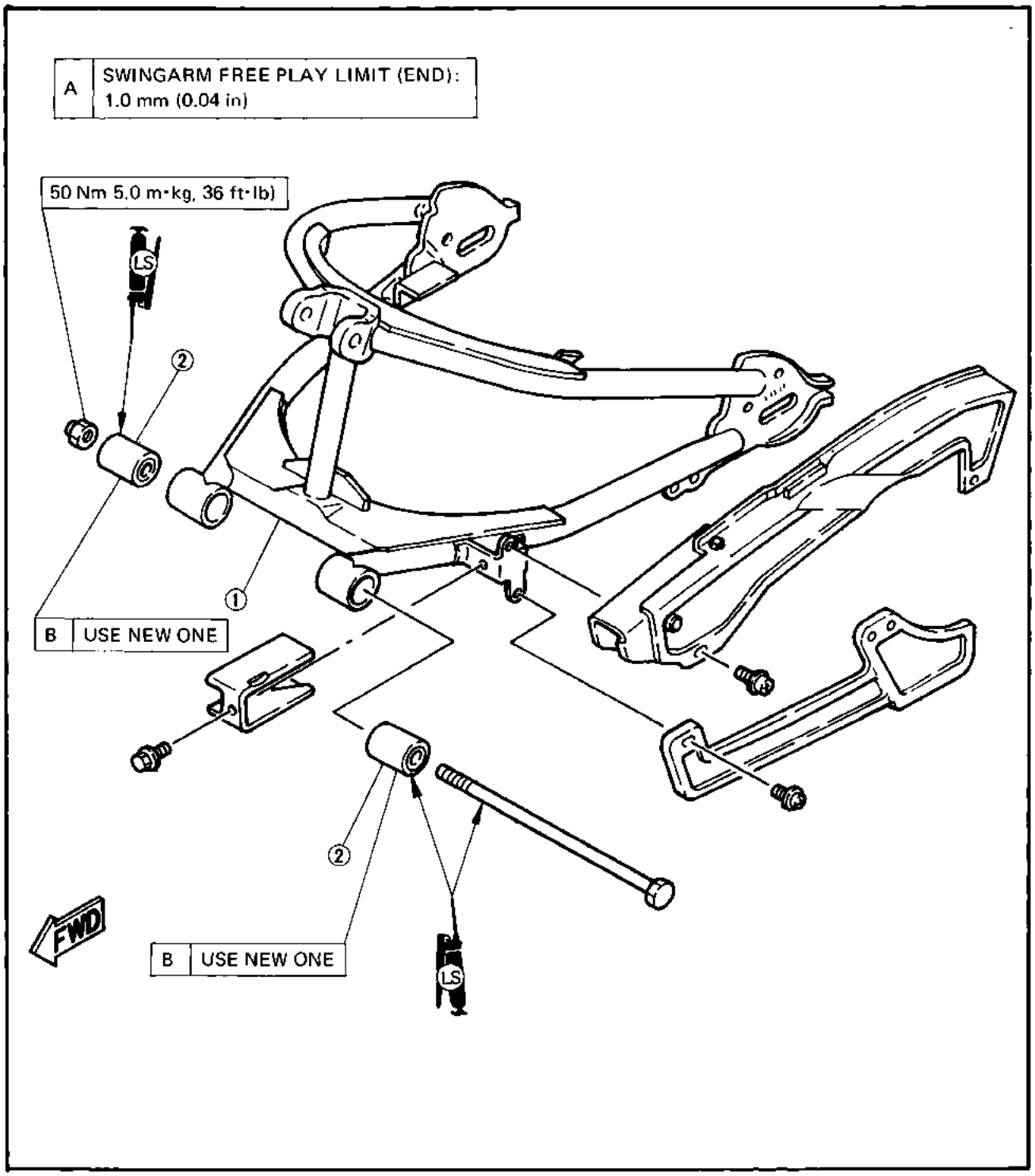
WARNING:

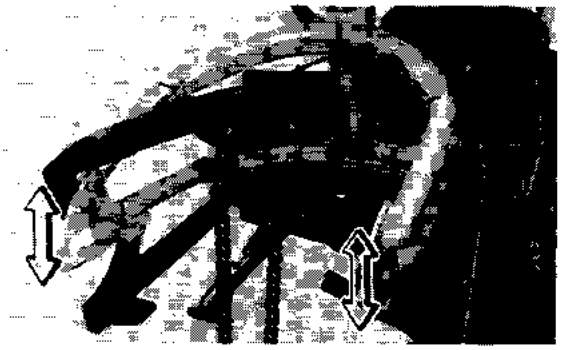
Always use the new cotter pins.

5

SWINGARM

① Swingarm
② Bush



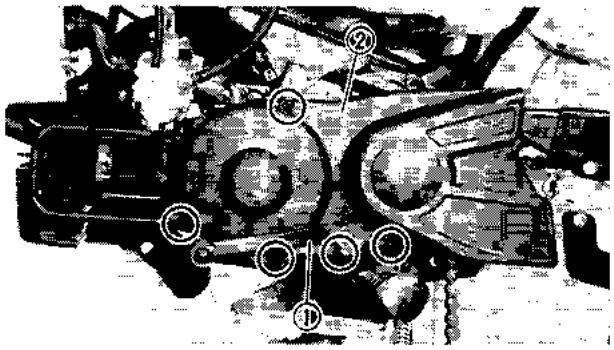


INSPECTION

1. Remove:
   - Rear shock absorber
   - Rear wheel
2. Check:
   - Swingarm (Free play)
     Over specified limit → Tighten the pivot shaft or replace the bushings.
     Move swingarm from side to side.

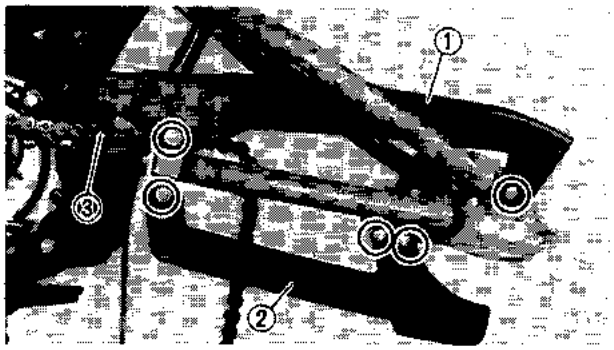
Free Play (At End of Swingarm):
1.0 mm (0.04 in)

3. Check:
   - Swingarm (Vertical movement)
     Tightness/Binding/Rough Spots → Replace bushings.
     Move swingarm up and down.

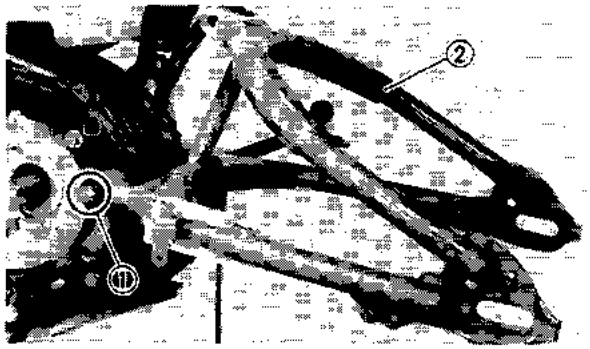


REMOVAL

1. Remove:
   - Rear shock absorber
   - Rear wheel
2. Remove:
   - Change pedal ①
   - Crankcase cover (Left) ②

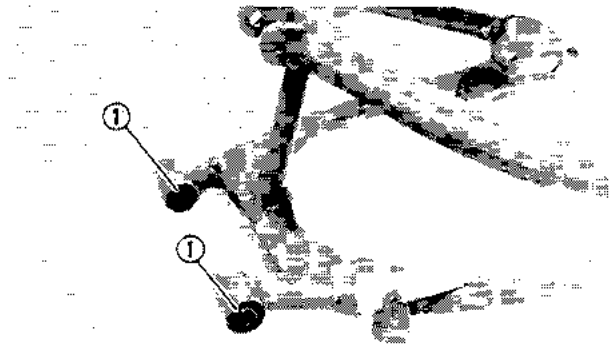


3. Remove:
   - Chain case (Upper) ①
   - Chain case (Lower) ②
4. Disconnect:
   - Drive chain ③



5. Remove:
   - Pivot shaft ①
   - Swingarm ②

5



INSPECTION AND LUBRICATION

1. Inspect:
   - Bushings ①
     Scratches/Damage → Replace.
2. Apply:
   - Pivot points

NOTE:
Grease them liberally with lithium base waterproof wheel bearing grease.

INSTALLATION

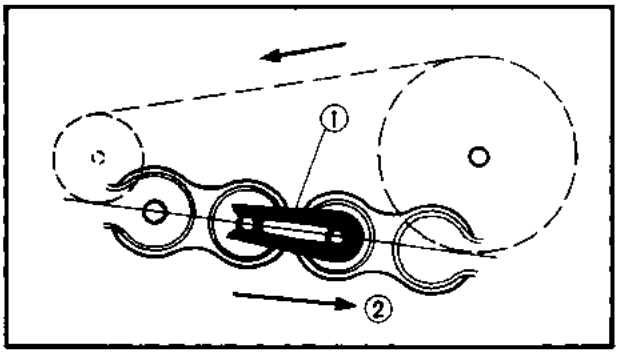
When installing the swingarm, reverse the removal procedure. Note the following points.

1. Lubricate:
   - Bushings
   - Pivot shaft

Lithium Base Waterproof Wheel Bearing Grease

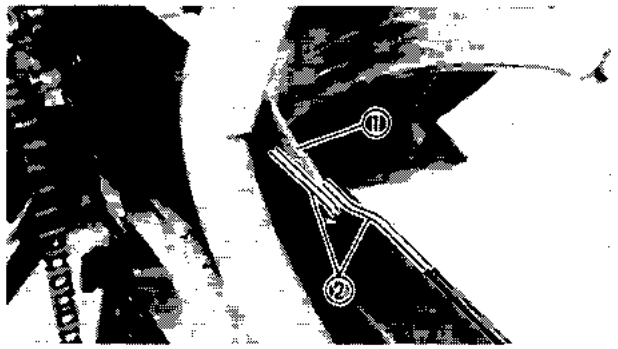
2. Install:
   - Swingarm
   - Pivot shaft

Pivot Shaft:
50 Nm (5.0 m·kg, 36 ft·lb)



3. Connect:
   - Drive chain

NOTE:
When connecting the chain, make certain the closed end of the master link clip ① is facing direction of rotation ② .



4. Install:
   - Chain case (Upper)

NOTE:
Be sure the guide plate ① on the swingarm correctly engages with the projecting portion ② on the chain case.

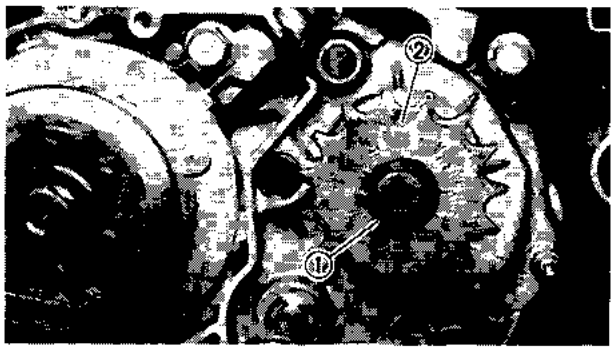
5. Install:
   - Crankcase cover (Left)
   - Change pedal

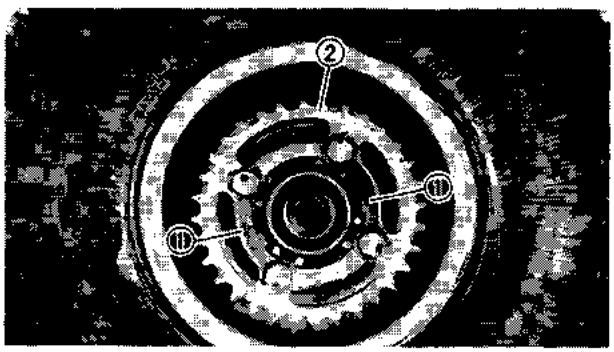
Crankcase Cover:
8 Nm (0.8 m·kg, 5.8 ft·lb)
Change Pedal:
10 Nm (1.0 m·kg, 7.2 ft·lb)

Refer to "CHAPTER 3. ENGINE OVERHAUL – ENGINE ASSEMBLY AND ADJUSTMENT" section.

6. Check:
   - Swingarm free play
   - Swingarm movement
7. Install:
   - Rear wheel
   - Rear shock absorber

   Refer to "REAR WHEEL and REAR SHOCK ABSORBER" section.





DRIVE CHAIN AND SPROCKETS

5

REMOVAL

Drive Sprocket

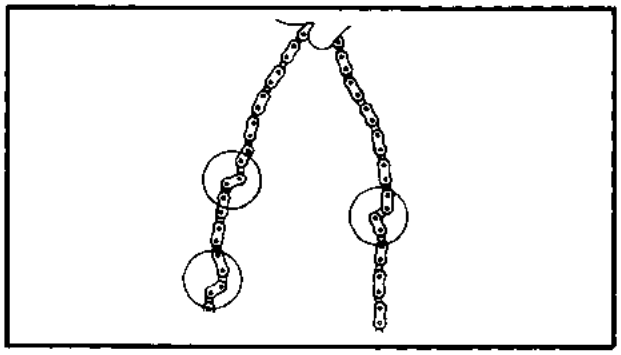
1. Remove:
   - Circlip ①
   - Drive sprocket ②

Driven Sprocket

1. Straighten:
   - Lock washer tab

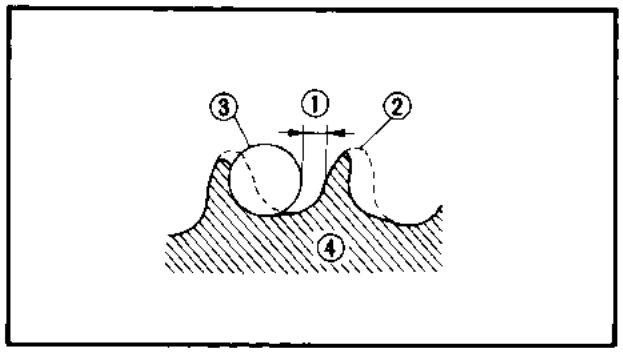
   Use a blunt chisel.
2. Remove:
   - Nuts (Sprocket wheel)
   - Lock washers ①
   - Driven sprocket ②

DRIVE CHAIN AND SPROCKETS



INSPECTION

1. Inspect:
   - Drive chain
     Stiff → Lubricate or replace.
   - Rollers and side plates
     Damage/Wear → Replace.



2. Inspect:
   - Drive and driven sprockets
     Wear/Damage → Replace.

① 1/4 tooth
② Correct
③ Roller
④ Sprocket

INSTALLATION

When installing the sprockets, reverse the removal procedure. Note the following points.

1. Tighten:
   - Nuts (Driven sprocket)

Nuts (Driven Sprocket):
25 Nm (2.5 m·kg, 17 ft·lb)

2. Bend:
   - Lock washer tabs (New)
3. Adjust:
   - Drive chain slack
   - Rear brake free play

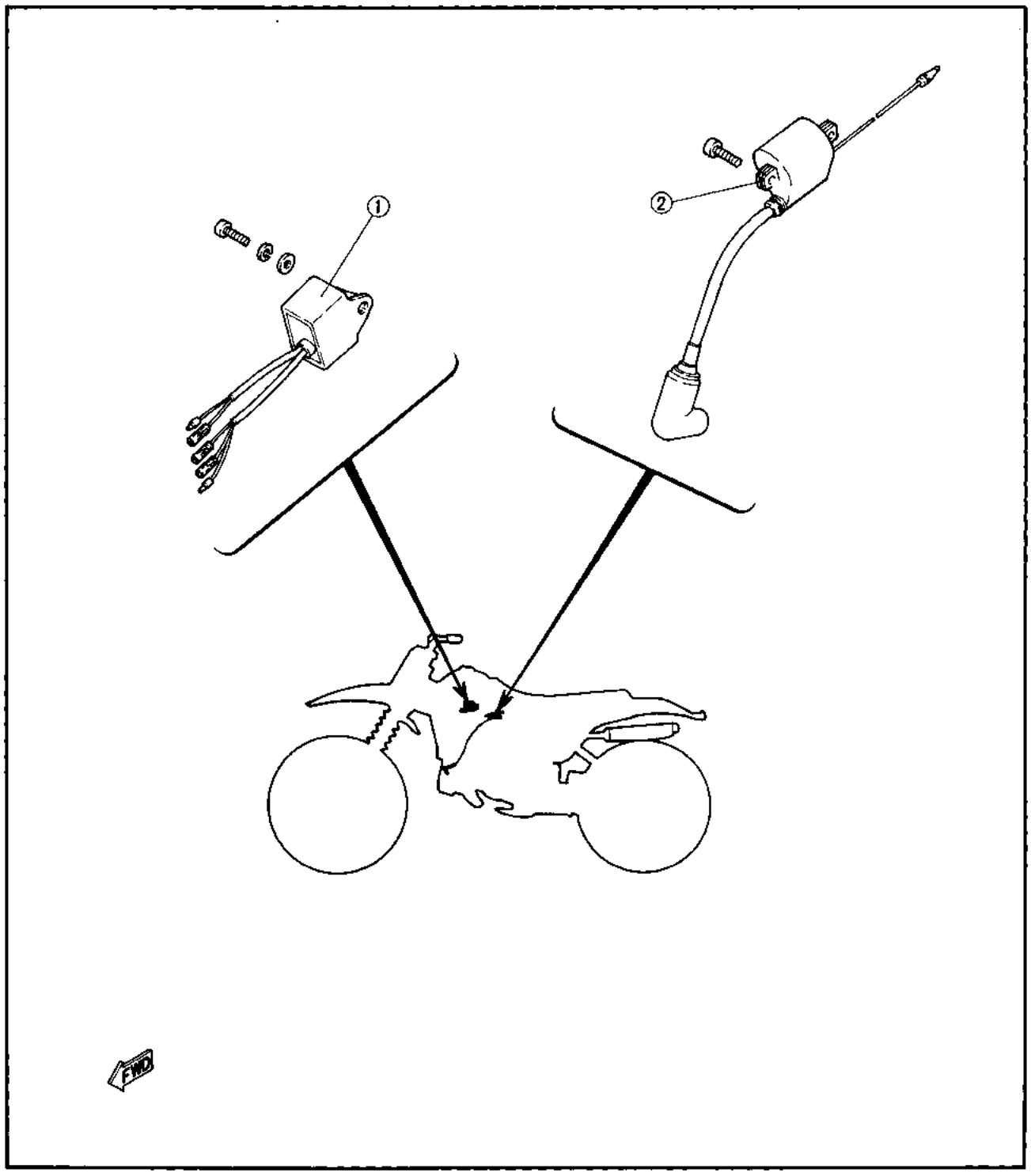
CHAPTER 6.
ELECTRICAL

ELECTRICAL

ELECTRICAL COMPONENTS

① CDI unit
② Ignition coil

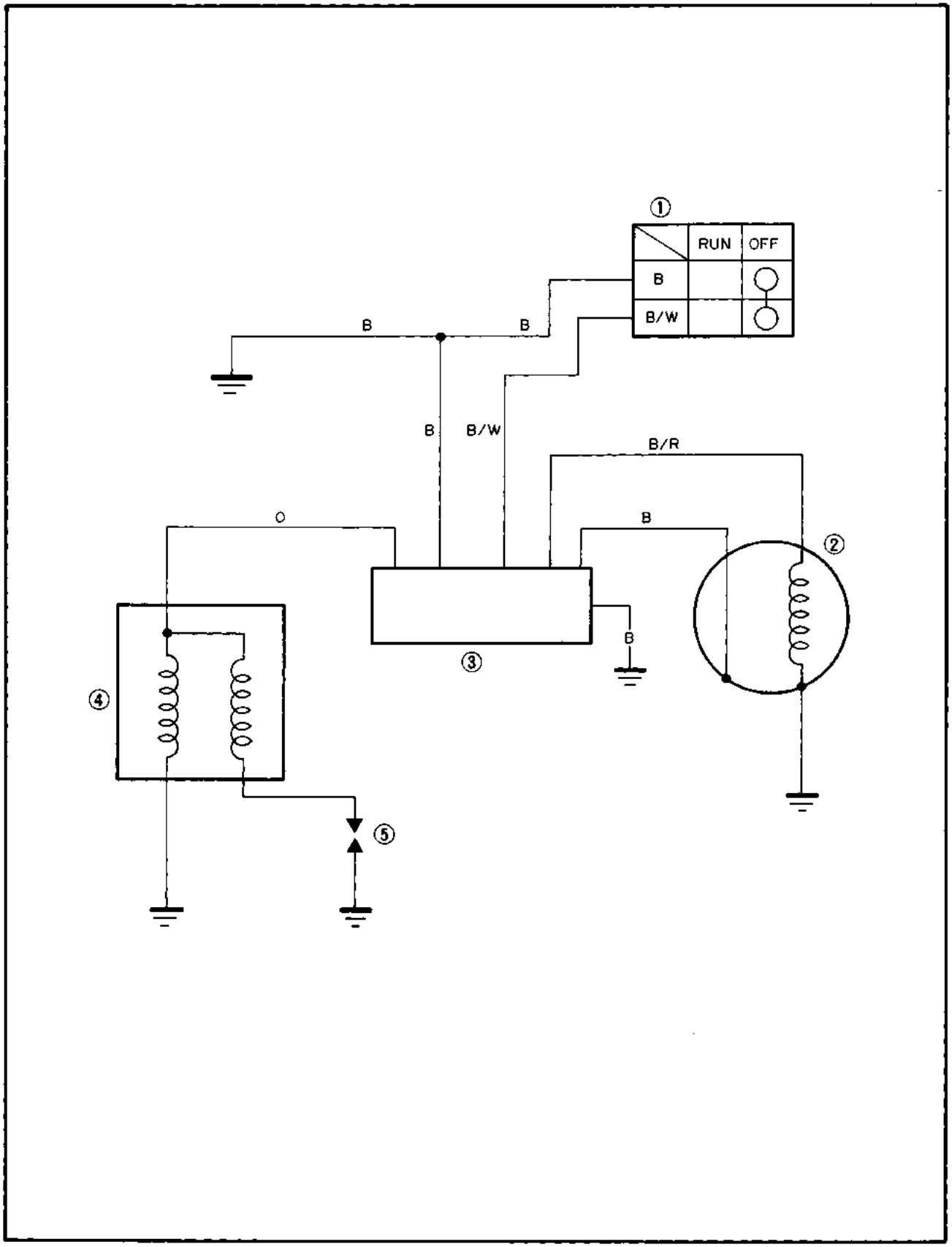
SPECIFICATIONS	RESISTANCE
IGNITION COIL:	
PRIMARY	0.85 ~ 1.15Ω
SECONDARY	5.0 ~ 6.8kΩ
SOURCE COIL	360 ~ 440Ω



— MEMO —

IGNITION SYSTEM

CIRCUIT DIAGRAM

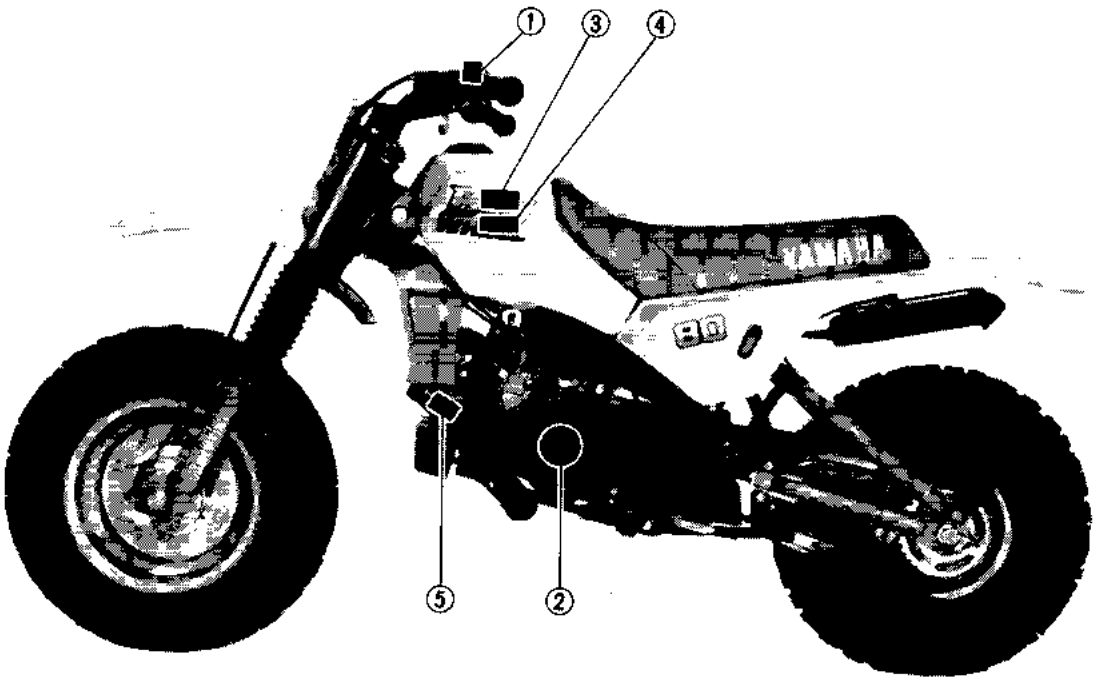


Aforementioned circuit diagram shows ignition circuit in circuit diagram.

① "ENGINE STOP" switch
② CDI magneto
③ CDI unit
④ Ignition coil
⑤ Spark plug

COLOR CODE

B . . . . . .Black
O . . . . . .Orange
B/W . . . .Black/White
B/R . . . .Black/Red



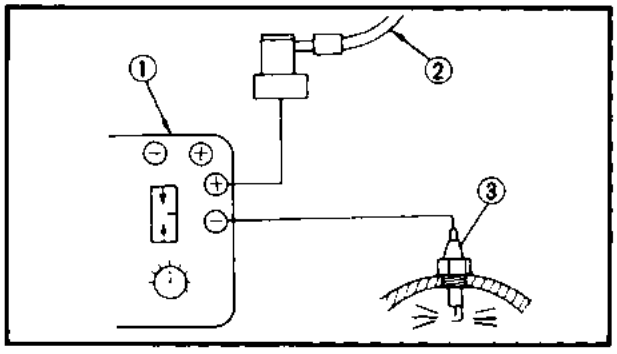
TROUBLESHOOTING

The entire ignition system can be checked for misfire and weak spark by using the Electro Tester.

1. Warm up engine thoroughly so that all electrical components are at operating temperature.
2. Connect:
   - Electro Tester ① (YU-33260)
3. Check:
   - Minimum spark gap

   Start the engine, and increase the spark gap until misfire occurs (Test at various revolution between 1,400 ~ 8,000 r/min). Faulty ignition system operation (at the minimum spark gap or smaller) → Follow the troubleshooting chart until the source of the problem is located.

Minimum Spark Gap:
5 mm (0.20 in)



②Spark plug lead
③Spark plug

CAUTION:

Do not run the engine in neutral above 6,000 r/min for more than 1 or 2 seconds.

TROUBLESHOOTING

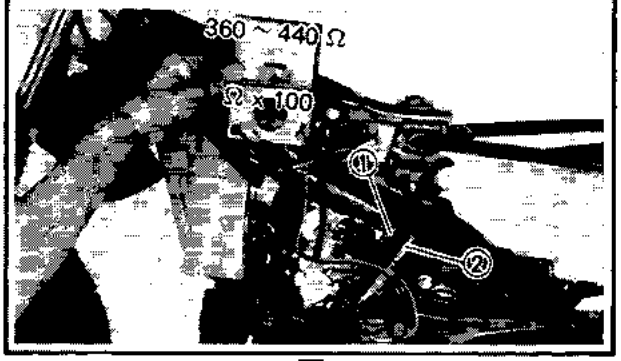
Check the entire ignition for connection.
→ Faulty → Correct.

↓ OK

Check spark plug condition.
→ Faulty → Replace spark plug.

↓ OK

Measure the source coil resistance.
Source coil: 360 ~ 440Ω at 20°C (68°F)
(Black ① – Black/Red ②)

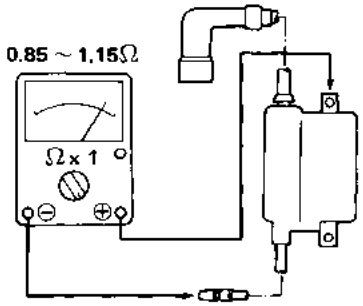


→ NO → Replace the stator coil.

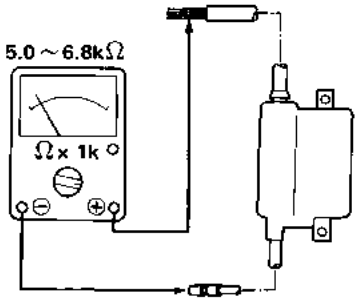
↓ OK

Check the ignition coil for resistance (primary and secondary).

Primary: 0.85 ~ 1.15Ω at 20°C (68°F)



Secondary: 5.0 ~ 6.8kΩ at 20°C (68°F)



↓ OK

CDI unit is faulty, replace the unit.

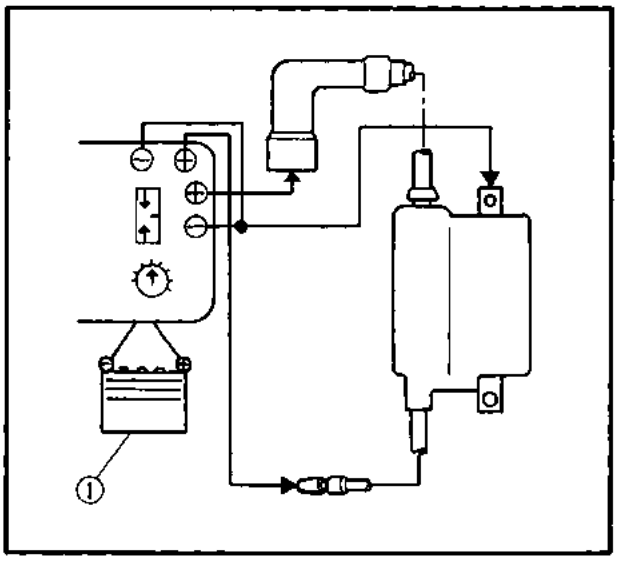
↓ NO

Replace the ignition coil.

6

IGNITION TIMING CHECK

Refer to "CHAPTER 2. IGNITION TIMING CHECK" section.



IGNITION SPARK GAP TEST

1. Remove:
   - Rear fender
   - Fuel tank
2. Disconnect:
   - Ignition coil lead
   - Spark plug lead
3. Connect:
   - Electro Tester (YU-33260)

NOTE:

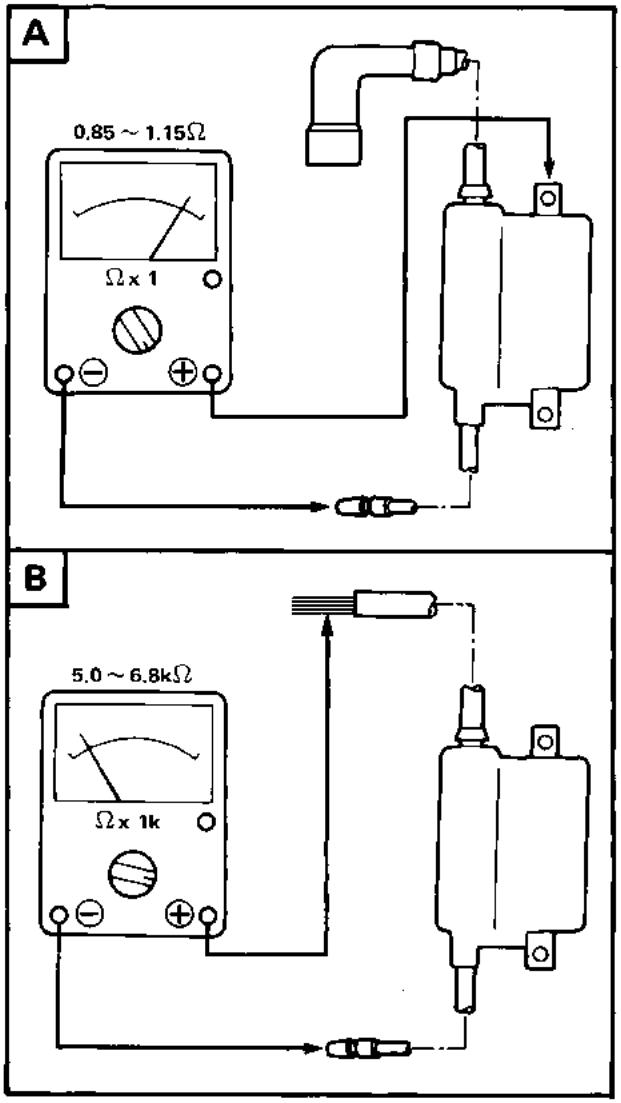
Be sure to use a fully charged (12V) battery ①.

4. Turn the spark plug gap adjuster and increase the gap to the maximum limit unless misfire occurs first.

Minimum Spark Gap:
5 mm (0.20 in)

SPARK PLUG INSPECTION

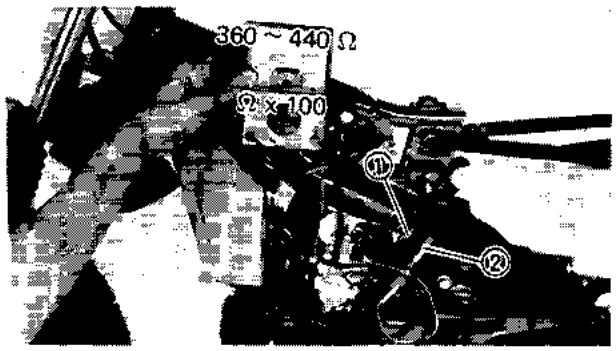
Refer to "CHAPTER 2. SPARK PLUG INSPECTION" section.



IGNITION COIL RESISTANCE TEST

1. Remove:
   - Seat
   - Rear fender
   - Fuel tank
2. Disconnect:
   - Ignition coil lead
   - Spark plug lead
3. Connect:
   - Pocket Tester (YU-03112)
     Set the tester selector to "Ohm x 1" (For primary winding resistance check) or "Ohm x 1K" (For secondary winding resistance check) position.
4. Measure:
   - Primary coil resistance [A]
   - Secondary coil resistance [B]
     Out of specification → Replace.

Primary Coil Resistance:
0.85 ~ 1.15Ω at 20°C (68°F)
Secondary Coil Resistance:
5.0 ~ 6.8kΩ at 20°C (68°F)



SOURCE COIL RESISTANCE TEST

1. Remove:
   - Rear fender
   - Fuel tank
2. Disconnect:
   - Two leads (Black and Black/Red) From CDI magneto.
3. Connect:
   - Pocket Tester (YU-03112)

① Black
② Black/Red

4. Measure:
   - Source coil resistance
     Out of specification → Replace.

Source Coil Resistance:
360 ~ 440Ω at 20°C (68°F)
(Black – Black/Red)

CHAPTER 7.
APPENDICES

APPENDICES

SPECIFICATIONS

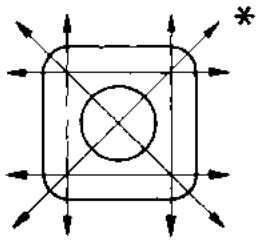
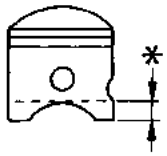
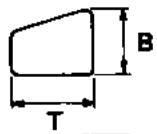
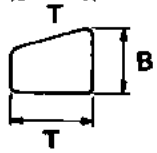
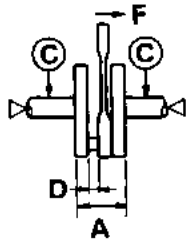
GENERAL SPECIFICATIONS

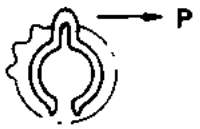
Model	BW80S
Model Code Number	1RY
Vehicle Identification Number	JYA1RY00*GC000101
Engine Starting Number	1RY-000101
Dimensions:	
Overall Length	1,575 mm (62.0 in)
Overall Width	640 mm (25.2 in)
Overall Height	875 mm (34.4 in)
Seat Height	630 mm (24.8 in)
Wheelbase	1,090 mm (42.9 in)
Minimum Ground Clearance	180 mm (7.1 in)
Basic Weight:	
With Oil and Full Fuel Tank	110 kg (243 lb)
Minimum Turning Radius	1,670 mm (65.7 in)
Engine:	
Engine Type	Air cooled, 2-stroke, gasoline, Reed valve
Cylinder Arrangement	Single cylinder, Forward inclined
Displacement	79 cm^3
Bore x Stroke	47.0 x 45.6 mm (1.850 x 1.795 in)
Compression Ratio	6.6 : 1
Compression Pressure	618 kPa (6.3 kg/cm^2, 90 psi)
Starting System	Kick starter
Lubrication System	Separate lubrication (Yamaha Autolube)
Oil Type or Grade:	
Engine Oil	Yamalube 2-cycle oil or Air cooled 2-stroke engine oil
Transmission Oil	Yamalube 4-cycle oil or SAE 10W30 type SE motor oil
Oil Capacity:	
Oil Tank (Engine Oil)	0.95 L (0.84 Imp qt, 1.00 US qt)
Transmission Oil:	
Periodic Oil Change	0.65 L (0.57 Imp qt, 0.69 US qt)
Total Amount	0.75 L (0.66 Imp qt, 0.79 US qt)
Air Filter	Wet type element
Fuel:	
Type	Regular gasoline
Tank Capacity	4.0 L (0.88 Imp gal, 1.06 US gal)
Reserve Amount	0.4 L (0.09 Imp gal, 0.11 US gal)
Carburetor:	
Type/Manufacturer	VM15/MIKUNI
Spark Plug:	
Type/Manufacturer	BP7HS/NGK
Gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Clutch Type	Wet, centrifugal automatic

Model	BW80S
Transmission:	
Primary Reduction System	Gear
Primary Reduction Ratio	66/21 (3.143)
Secondary Reduction System	Chain drive
Secondary Reduction Ratio	32/15 (2.133)
Transmission Type	Constant mesh, 3-speed
Operation	Left foot operation
Gear Ratio:	
1st	39/12 (3.250)
2nd	30/15 (2.000)
3rd	26/18 (1.444)
Chassis:	
Frame Type	Steel tube, Backbone
Cater Angle	26° 10′
Trail	54 mm (2.13 in)
Tire:	
Type	Tubeless
Size (F)	19 x 7.00-10
Size (R)	19 x 9.00-7
Tire Pressure (Cold tire):	
Front	29.4 kPa (0.3 kg/cm^2, 4.3 psi)
Rear	29.4 kPa (0.3 kg/cm^2, 4.3 psi)
Brake:	
Front Brake Type	Drum brake
Operation	Right hand operation
Rear Brake Type	Drum brake
Operation	Right foot operation
Suspension:	
Front Suspension	Telescopic fork
Rear Suspension	Swing arm (Monocross suspension)
Shock Absorber:	
Front Shock Absorber	Coil spring, Oil damper
Rear Shock Absorber	Gas, Coil spring, Oil damper
Wheel Travel:	
Front Wheel Travel	110 mm (4.3 in)
Rear Wheel Travel	110 mm (4.3 in)
Electrical:	
Ignition System	CDI Magneto
Generator System	Flywheel magneto

MAINTENANCE SPECIFICATIONS

ENGINE

Model	BW80S
Cylinder Head: Warp Limit 	< 0.03 mm (0.0012 in) > * Lines indicate straightedge measurement.
Cylinder: Bore Size Taper Limit Out of Round Limit	47.00 ~ 47.02 mm (1.850 ~ 1.851 in) < 0.05 mm (0.002 in) > < 0.01 mm (0.0004 in) >
Piston: Piston Size/Measuring Point*  Piston Clearance Oversize: 1st 2nd Piston offset	46.94 ~ 47.00 mm (1.848 ~ 1.850 in)/ 5 mm (0.2 in) 0.045 ~ 0.050 mm (0.0018 ~ 0.0020 in) 47.25 mm (1.860 in) 47.50 mm (1.870 in) 0.2 mm (0.008 in)/IN side
Piston Ring: Sectional Sketch: Top Ring  2nd Ring  End Gap (Installed): Top Ring 2nd Ring Side Clearance (Installed): Top Ring 2nd Ring	Keystone B = 1.99 mm (0.078 in) T = 2.00 mm (0.079 in) Keystone B = 1.99 mm (0.078 in) T = 2.00 mm (0.079 in) 0.15 ~ 0.30 mm (0.006 ~ 0.012 in) 0.15 ~ 0.30 mm (0.006 ~ 0.012 in) 0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in) 0.03 ~ 0.05 mm (0.0012 ~ 0.0020 in)
Crankshaft:  Crank Width "A" Runout Limit "C" Connecting Rod Big End Side Clearance "D" Small End Free Play Limit "F"	47.90 ~ 47.95 mm (1.886 ~ 1.888 in) < 0.03 mm (0.0012 in) > 0.3 ~ 0.8 mm (0.012 ~ 0.031) < 1.0 mm (0.04 in) >
Clutch: Friction Plate: Thickness/Quantity Wear Limit Clutch Plate: Thickness/Quantity Warp Limit Clutch Spring Free Length/Quantity Clutch Spring Minimum Length	3.0 mm (0.118 in) x 6 < 2.9 mm (0.114 in) > 1.4 mm (0.055 in) x 5 < 0.05 mm (0.002 in) > 12.9 mm (0.51 in) x 6 < 12.0 mm (0.47 in) >

Model	BW80S
Clutch Release Method	Inner push, Screw push
Push Rod Bending Limit	< 0.15 mm (0.006 in) >
Transmission:	
Main Axle Deflection Limit	0.08 mm (0.003 in)
Drive Axle Deflection Limit	0.08 mm (0.003 in)
Shifter:	
Shifting Type	Cam drum
Kick Starter Type:	Kick and mesh type
Kick Clip Friction Force <Min. ~ Max.> 	P = 1.0 kg (2.2 lb) < 0.8 ~ 1.2 kg (1.8 ~ 2.6 lb) >
Air Filter Oil Grade (Oiled Filter)	Air cooled 2-cycle oil
Carburetor:	
Type/Manufacturer/Quantity	VM15/MIKUNI/1
I.D. Mark	1RY00
Main Jet (M.J.)	#82.5
Air Jet (A.J.)	ϕ 2.5
Jet Needle-clip Position (J.N.)	3X8-4
Needle Jet (N.J.)	D-8
Cutaway (C.A.)	3.0
Pilot Jet (P.J.)	#20
Air Screw (A.S.)	1 and 1/4
Valve Seat Size (V.S.)	ϕ 1.2
Starter Jet (G.S.)	#30
Float Height (F.H.)	22.5 ~ 23.5 mm (0.89 ~ 0.93 in)
Fuel Level (F.L.)	Zero ~ 1.0 mm (Zero ~ 0.04 in)
Engine Idling Speed	1,650 ~ 1,750 r/min
Reed Valve:	
Thickness * 	0.2 mm (0.008 in)
Valve Stopper Height	6.3 ~ 6.7 mm (0.25 ~ 0.26 in)
Valve Bending Limit	0.3 mm (0.012 in)
Lubrication System:	Separate lubrication (Yamaha Autolube Pump)
Autolube Pump:	
Color Code	Brown
Minimum Stroke	0.40 ~ 0.45 mm (0.016 ~ 0.018 in)
Maximum Stroke	1.0 ~ 1.1 mm (0.039 ~ 0.043 in)
Minimum Output/200 Stroke	0.077 ~ 0.087 cm^3 (0.0027 ~ 0.0031 Imp oz, 0.0026 ~ 0.0029 US oz)
Maximum Output/200 Stroke	0.192 cm^3 (0.0068 Imp oz, 0.0065 US oz)
Adjusting mark (at idle)	Auto adjuster

Tightening Torque							
Parts to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
ENGINE:							
Spark plug	–	M14	1	20	2.0	14	
Cylinder head	Nut	M7	4	10	1.0	7.2	
CDI magneto	Nut	M14	1	50	5.0	36	
CDI base (Stator)	Screw	M7	2	10	1.0	7.2	
Stopper plate (Segment)	Screw	M6	2	8	0.8	5.8	Apply LOCTITE®
Clutch boss	Nut	M12	1	50	5.0	36	
Stopper plate (Oil seal)	Screw	M8	1	16	1.6	11	
Reed valve	Screw	M6	4	8	0.8	5.8	
Exhaust pipe	Bolt	M8	2	18	1.8	13	
Crankcase	Screw	M6	10	8	0.8	5.8	
Crankcase drain bolt	Bolt	M12	1	20	2.0	14	
Crankcase cover (Left and right)	Screw	M6	12	8	0.8	5.8	
Oil pump cover	Screw	M6	2	8	0.8	5.8	
Oil pump	Screw	M5	2	5	0.5	3.6	
Primary drive gear	Nut	M12	1	50	5.0	36	
Stopper lever	Screw	M8	1	14	1.4	10	Apply LOCTITE®
Stopper screw	Screw	M10	1	25	2.5	18	
Carburetor	Screw	M6	2	6	0.6	4.3	
Change pedal	Bolt	M6	1	10	1.0	7.2	
Kick crank	Bolt	M6	1	12	1.2	8.7	
Stopper plate (Bearing)	Screw	M8	2	8	0.8	5.8	Apply LOCTITE®

CHASSIS

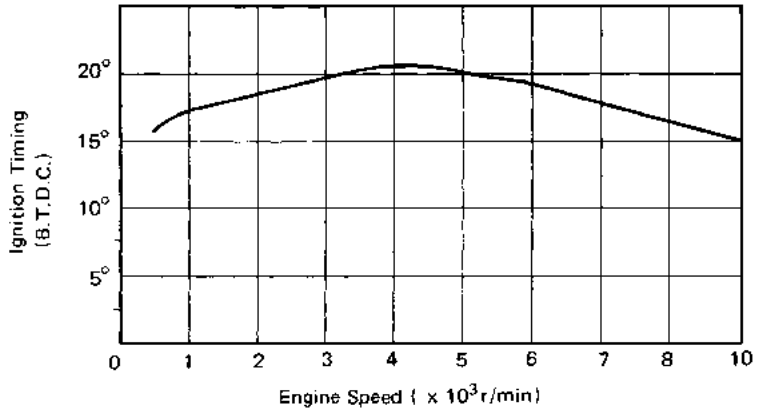
Model	BW80S
Steering System:	
Steering Bearing Type	Ball Bearing
No./Size of Steel Balls: Upper	22 pcs./3/16 in
Lower	19 pcs./1/4 in
Lock to Lock Angle: Left	45°
Right	45°
Front Suspension:	
Front Fork Travel	110 mm (4.33 in)
Fork Spring Free Length	425.1 mm (16.74 in)
< Limit >	< 420.8 mm (16.57 in) >
Spring Rate/Stroke	7.85 N/mm (0.8 kg/mm, 44.8 lb/in)/ 0 ~ 120 mm (0 ~ 4.72 in)
Optional Spring	No
Oil Capacity or Oil Level	69 cm^3 (2.43 Imp oz, 2.33 US oz) 171.6 mm (5.5 in) (From top of inner tube fully compressed with spring)
Oil Grade	Yamaha Fork Oil 15wt or SAE 10W30 type SE motor oil
Rear Suspension:	
Shock Absorber Travel	48 mm (1.89 in)
Spring Free Length	169 mm (6.65 in)
< Limit >	< 167 mm (6.57 in) >
Spring Rate/Stroke	66.2 N/mm (6.75 kg/mm, 378 lb/in)/ 0 ~ 52 mm (0 ~ 2.05 in)
Optional Spring	No
Enclosed Gas Pressure	1,961 kPa (20 kg/cm^2, 284 psi)
Wheel:	
Front Wheel Type	Panel Wheel
Rear Wheel Type	Panel Wheel
Front Rim Size/Material	5.00 x 10/Steel
Rear Rim Size/Material	6.50 x 7/Steel
Rim Runout Limit:	
Vertical	< 2.0 mm (0.08 in) >
Lateral	< 2.0 mm (0.08 in) >
Rear Arm:	
Swing Arm Free Play Limit:	
End	< 1.0 mm (0.04 in) >
Drive Chain:	
Type/Manufacturer	420M/DAIDO
Number of Links	89L + joint
Chain Free Play	15 ~ 20 mm (0.6 ~ 0.8 in)
Drum Brake (Front and Rear):	
Type	Leading, trailing
Drum Inside Dia.	95 mm (3.74 in)
< Limit >	< 96 mm (3.78 in) >
Lining Thickness	4 mm (0.16 in)
< Limit >	< 2 mm (0.08 in) >
Shoe Spring Free Length	32.7 mm (1.29 in)
Brake Lever & Brake Pedal:	
Brake Lever Free Play	5 ~ 8 mm (0.2 ~ 0.3 in)
Brake Pedal Free Play	20 ~ 30 mm (0.8 ~ 1.2 in)

Tightening Torque

Parts to be tightened	Thread size	Q'ty	Tightening torque			Remarks
			Nm	m·kg	ft·lb	
CHASSIS:						
Front wheel axle and nut	M12	1	50	5.0	36	
Brake cam lever and camshaft	M6	2	10	1.0	7.2	
Inner tube and handle crown	M20	2	40	4.0	29	
Inner tube and under bracket	M10	2	33	3.3	24	
Handle crown and steering shaft	M10	1	40	4.0	29	
Handle crown and under handlebar holder	M10	2	40	4.0	29	
Under handlebar holder and upper handlebar holder	M6	4	13	1.3	9.4	
Engine mounting: Upper	M8	1	25	2.5	17	
Center	M8	1	25	2.5	17	
Under	M8	1	25	2.5	17	
Fuel tank and frame	M6	2	10	1.0	7.2	
Pivot shaft and nut	M12	1	50	5.0	36	
Footrest (Left) and frame	M8	1	25	2.5	17	
Footrest (Right) and frame	M8	1	25	2.5	17	
Sidestand and footrest	M8	1	20	2.0	14	
Wheel sprocket and nut	M8	4	25	2.5	17	
Rear wheel axle and nut	M14	1	85	8.5	61	
Fuel tank and fuel cock	M6	2	7	0.7	5.1	
Front hub and front panel wheel	M8	4	30	3.0	22	
Rear hub and rear panel wheel	M8	3	30	3.0	22	
Rear hub and drum brake	M8	3	30	3.0	22	
Front fork drain bolt	M8	2	20	2.0	14	LT
Steering shaft and ring nut	M25	1	38	3.8	27	

ELECTRICAL

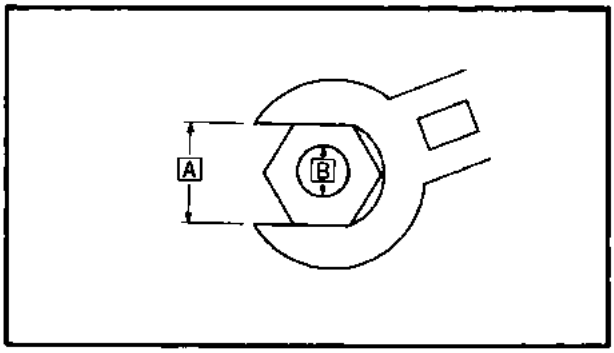
Model	BW80S
Ignition System:	
Ignition Timing (B.T.D.C.)	20.6° at 4,000 r/min
Advancer Type	Electrical
C.D.I.:	
Magneto-Model/Manufacture	F3T80771/MITSUBISHI
Source Coil Resistance (Color)	360 ~ 440Ω at 20°C (68°F) (B – B/R)
C.D.I. Unit-Model/Manufacturer	F8T06471/MITSUBISHI
Ignition Coil:	
Model/Manufacturer	F6T50577/MITSUBISHI
Minimum Spark Gap	5 mm (0.2 in)
Primary Winding Resistance	0.85 ~ 1.15Ω at 20°C (68°F)
Secondary Winding Resistance	5.0 ~ 6.8kΩ at 20°C (68°F)
Spark Plug Cap:	
Type	Rubber type
Resistance	4.0 ~ 6.0kΩ



GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

A (Nut)	B (Bolt)	General Torque Specifications		
		Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94



A Distance across flats
B Outside thread diameter

DEFINITION OF UNITS

Unit	Read	Definition	Measure
mm cm	Millimeter Centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	Kilogram	10^{3} gram	Weight
N	Newton	1 kg x m/sec	Force
Nm m·kg	Newton Meter Meter Kilogram	N x m m x kg	Torque Torque
Pa N/mm	Pascal Newton per Millimeter	N/m^2 N/mm	Pressure Spring Rate
L cm^3	Liter Cubic Centimeter	—	Volume or Capacity
r/min	Rotation per Minute	—	Engine Speed

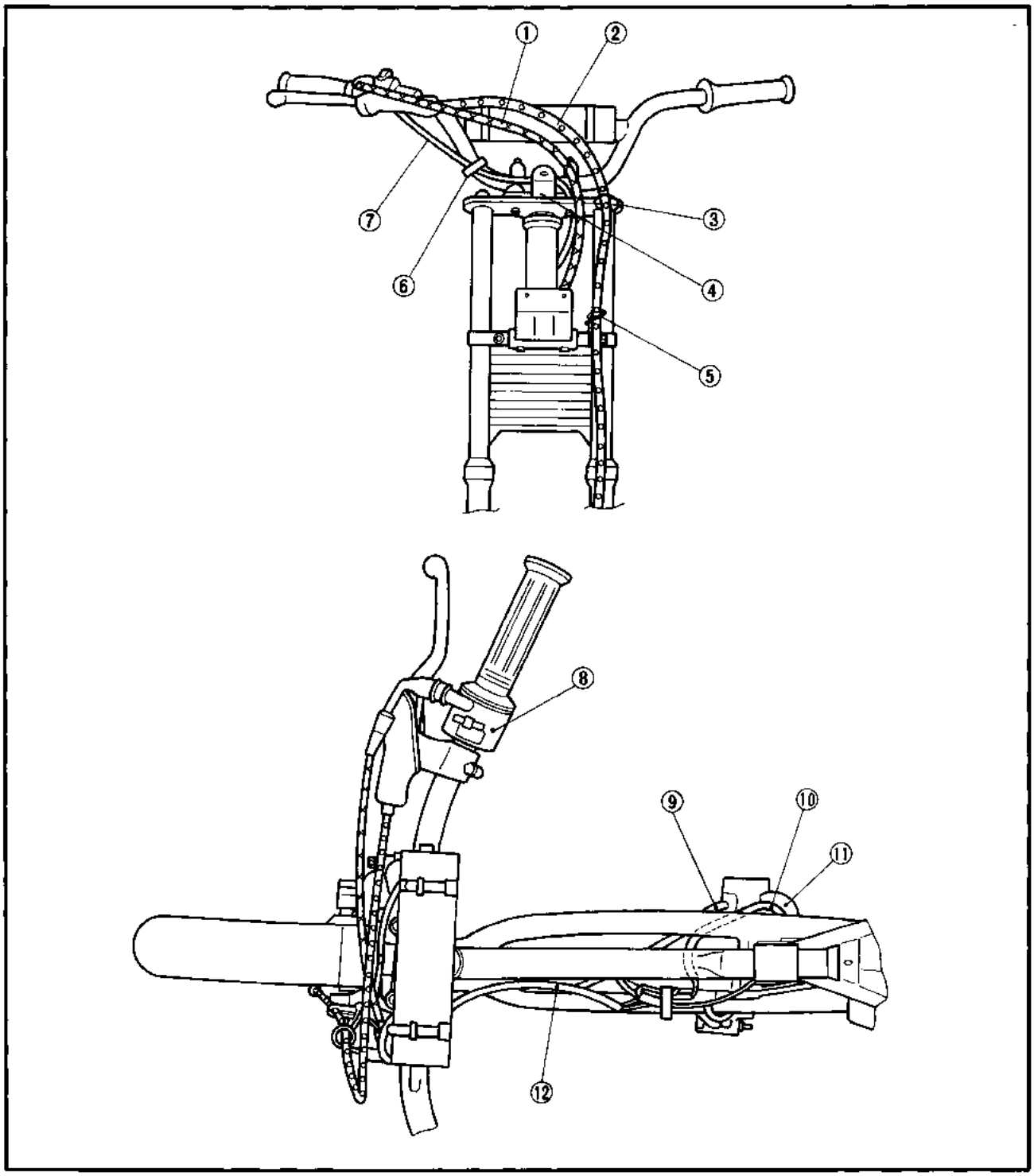
CONVERSION TABLES

Metric to inch system		
Known	Multiplier	Result
m·kg	7.233	ft·lb
m·kg	86.80	in·lb
cm·kg	0.0723	ft·lb
cm·kg	0.8680	in·lb
kg	2.205	lb
g	0.03527	oz
km/lit	2.352	mpg
km/hr	0.6214	mph
km	0.6214	mi
m	3.281	ft
m	1.094	yd
cm	0.3937	in
mm	0.03937	in
cc (cm^3)	0.03382	oz (US liq)
cc (cm^3)	0.06102	cu·in
lit (liter)	2.1134	pt (US liq)
lit (liter)	1.057	qt (US liq)
lit (liter)	0.2642	gal (US liq)
kg/mm	56.007	lb/in
kg/cm^2	14.2234	psi (lb/in^2)
Centigrade (°C)	9/5 (°C) + 32	Fahrenheit (°F)

Inch to metric system		
Known	Multiplier	Result
ft·lb	0.13826	m·kg
in·lb	0.01152	m·kg
ft·lb	13.831	cm·kg
in·lb	1.1521	cm·kg
lb	0.4535	kg
oz	28.352	g
mpg	0.4252	km/lit
mph	1.609	km/hr
mi	1.609	km
ft	0.3048	m
yd	0.9141	m
in	2.54	cm
in	25.4	mm
oz (US liq)	29.57	cc (cm^3)
cu·in	16.387	cc (cm^3)
pt (US liq)	0.4732	lit (liter)
qt (US liq)	0.9461	lit (liter)
gal (US liq)	3.785	lit (liter)
lb/in	0.017855	kg/mm
psi (lb/in^2)	0.07031	kg/cm^2
Fahrenheit (°C)	5/9 (°F − 32)	Centigrade (°F)

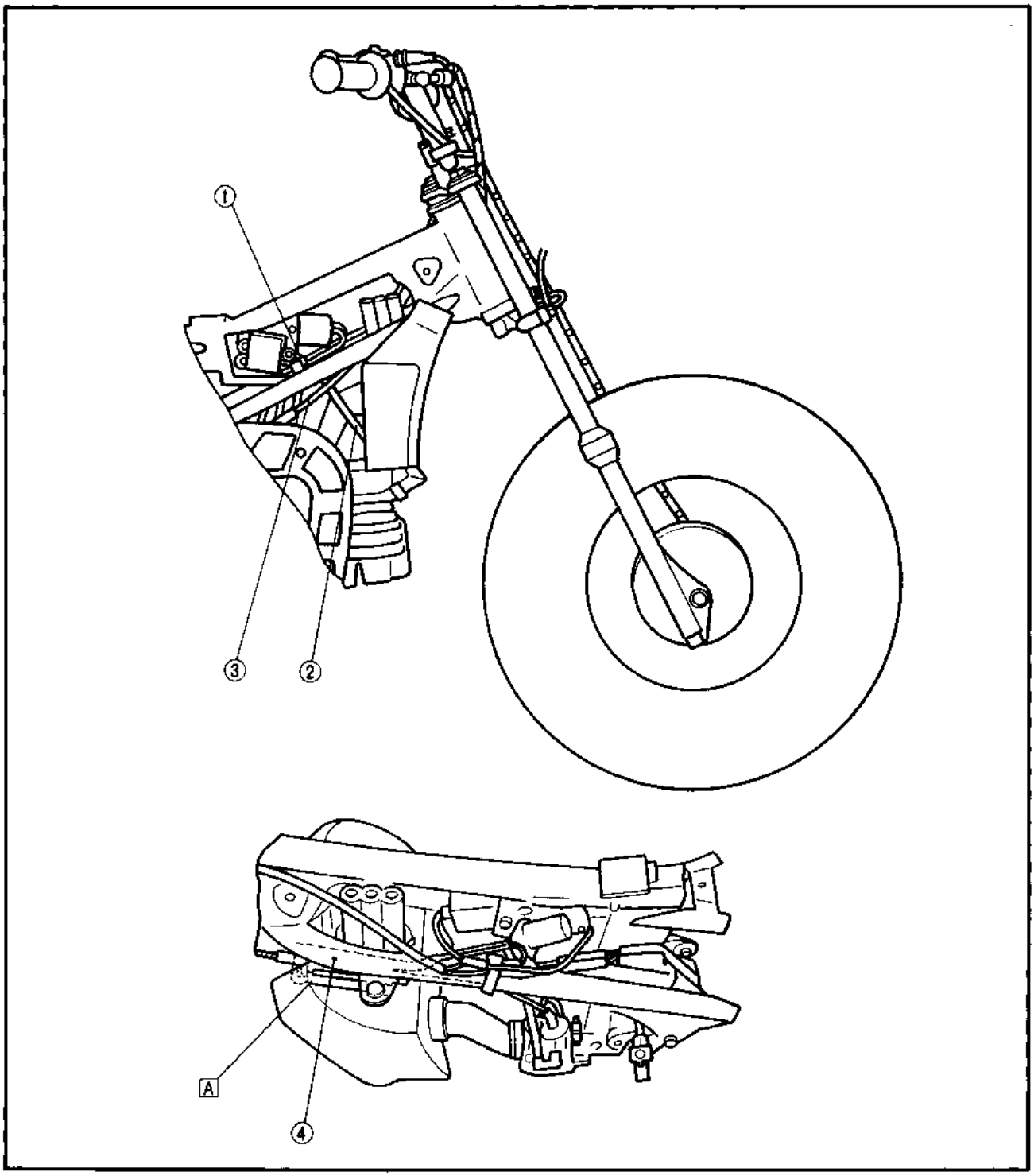
CABLE ROUTING

① Throttle cable 1
② Front brake cable
③ Guide
④ Front fender stay
⑤ Clamp
⑥ Band
⑦ "ENGINE STOP" switch lead
⑧ "ENGINE STOP" switch
⑨ Oil pump cable
⑩ Starter cable
⑪ Oil pipe
⑫ "ENGINE STOP" switch lead



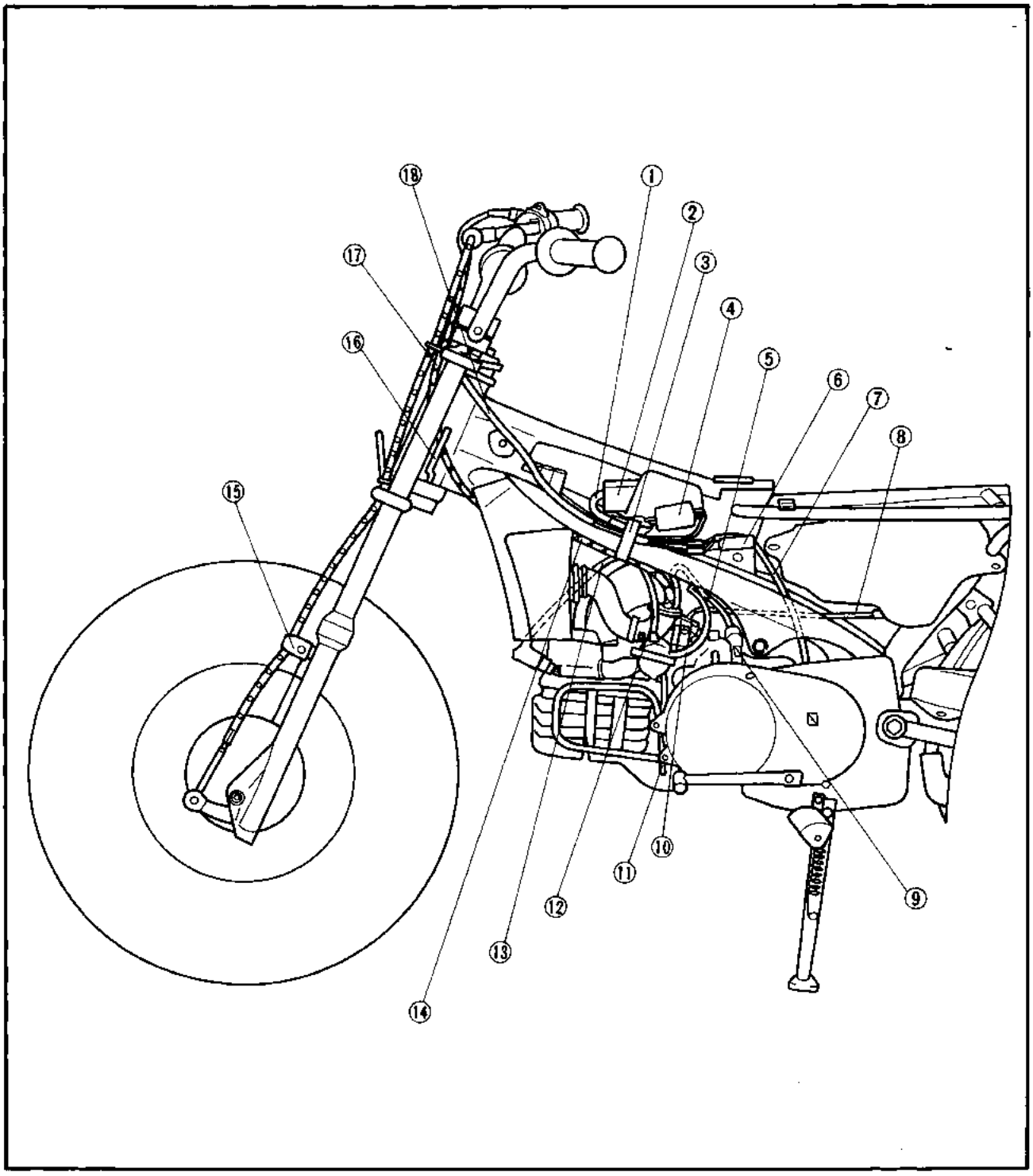
① Ground lead
② High tension cord
③ Oil pump cable
④ Wire cylinder

[A] BETWEEN AIR FILTER UPPER AND DOWN TUBE.



CABLE ROUTING

① CDI unit lead
② CDI unit
③ Band
④ Ignition coil
⑤ Starter cable
⑥ Locating damper
⑦ CDI magneto cord
⑧ Oil pipe
⑨ Starter lever
⑩ Fuel pipe
⑪ Breather pipe
⑫ Air bent pipe
⑬ High tension cord
⑭ Throttle cable 2
⑮ Clamp
⑯ Cable holder
⑰ Throttle cable 1
⑱ "ENGINE STOP" switch lead



WIRING DIAGRAM

① "ENGINE STOP" switch
② CDI magneto
③ CDI unit
④ Ignition coil
⑤ Spark plug

Color Code
B . . . . . .Black
O . . . . . .Orange
B/W . . . .Black/White
B/R . . . .Black/Red