

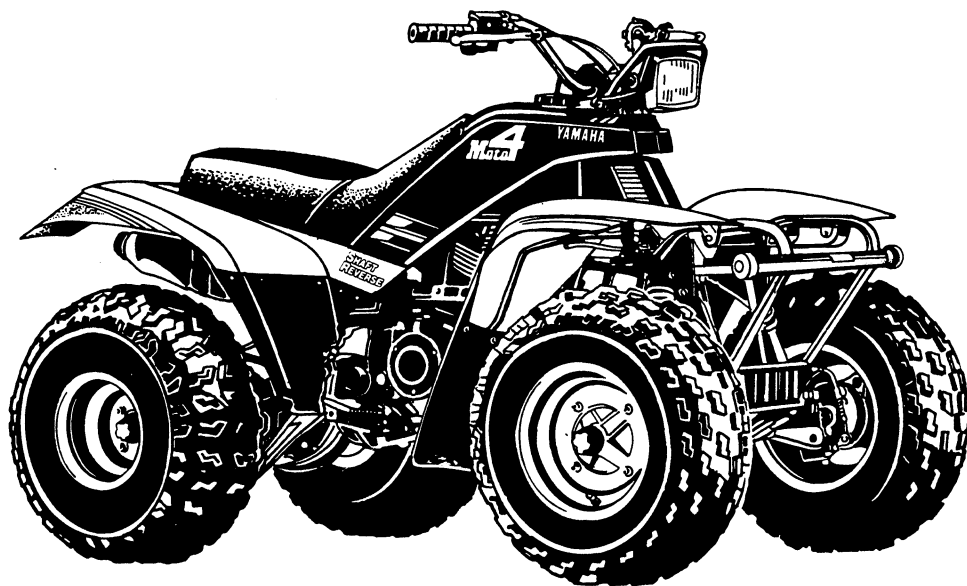


YAMAHA

YFM 200 DXW

GENUINE YAMAHA

Service Manual



LIT-11616-06-63



YAMAHA

YFM200DXW

SERVICE MANUAL

**YFM200DXW
SERVICE MANUAL**

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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 GROUP
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





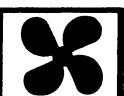


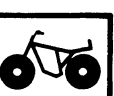















All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.

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.

① GEN INFO 	② SPEC 	
③ INSP ADJ 	④ ENG 	
⑤ COOL 	⑥ CARB 	
⑦ DRIV 	⑧ CHAS 	
⑨ ELEC 	⑩ TRBL SHTG ?	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	
⑰ 	⑱ 	
⑲ 	⑳ 	㉑ 
㉒ 	㉓ 	㉔ 

ILLUSTRATED SYMBOLS

(Refer to the illustration)

Illustrated symbols ① to ⑩ are designed as thumb tabs to indicate the chapter's number and content.

- ① General information
- ② Specifications
- ③ Periodic inspection and adjustment
- ④ Engine
- ⑤ Cooling system
- ⑥ Carburetion
- ⑦ Drive train
- ⑧ Chassis
- ⑨ Electrical
- ⑩ Troubleshooting








Illustrated symbols ⑪ to ⑰ are used to identify the specifications appearing in the text.

- ⑪ Filling fluid
- ⑫ Lubricant
- ⑬ Special tool
- ⑭ Tightening
- ⑮ Wear limit, clearance
- ⑯ Engine speed
- ⑰ Ω , V, A

Illustrated symbols ⑱ to ㉔ in the exploded diagram indicate grade of lubricant and location of lubrication point.

- ⑱ Apply locking agent (LOCTITE®)
- ⑲ Apply engine oil
- ⑳ Apply gear oil
- ㉑ Apply molybdenum disulfide oil
- ㉒ Apply wheel bearing grease
- ㉓ Apply lightweight lithium-soap base grease
- ㉔ Apply molybdenum disulfide grease

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**GEN
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SPEC **2**



**INSP
ADJ** **3**



ENG **4**



CARB **5**



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GENERAL INFORMATION

1



MACHINE IDENTIFICATION

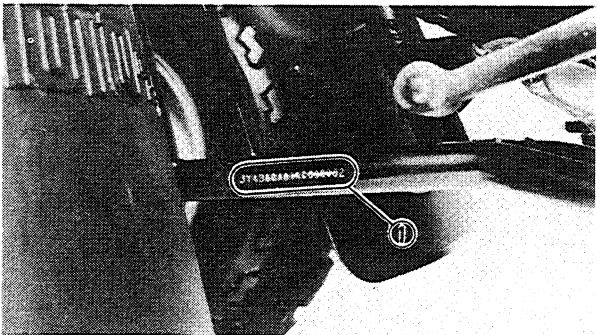
**VEHICLE IDENTIFICATION NUMBER
(FOR USA AND CANADA)**

The vehicle identification number ① is stamped into the left side of the frame.

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:
JY43GCW0 * KC016101



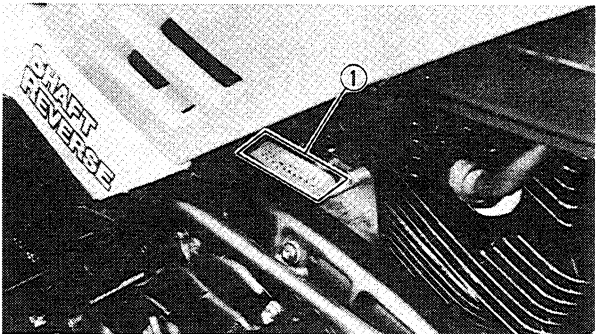
**FRAME SERIAL NUMBER
(EXCEPT FOR USA AND CANADA)**

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

NOTE: _____

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

Starting Serial Number:
3GC-016101



ENGINE SERIAL NUMBER

The engine serial number ① is stamped into the right 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:
3GC-016101

NOTE: _____

Designs and specifications are subject to change without notice.



IMPORTANT INFORMATION**PREPARATION FOR REMOVAL AND DIS-ASSEMBLY**

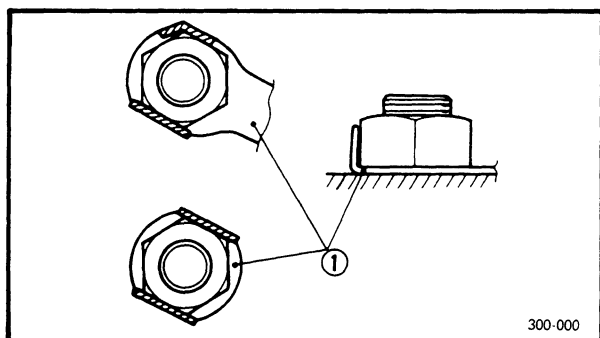
1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to "CHAPTER 1. GENERAL INFORMATION-SPECIAL TOOLS" section.
3. When disassembling the machine, keep mated parts together. This includes gears, cylinder, piston and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.
4. During the machine 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.

ALL REPLACEMENT PARTS

1. We recommended to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment. Other brands may be similar in function and appearance, but inferior in quality.

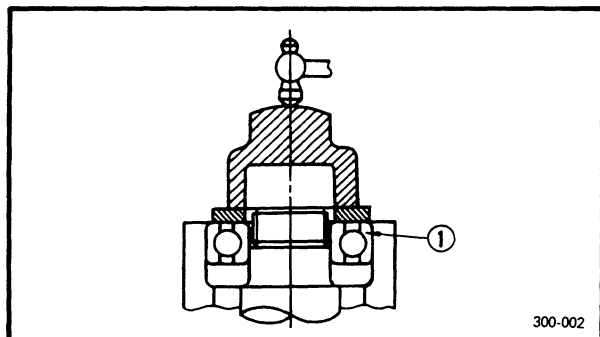
GASKETS, OIL SEALS, AND O-RINGS

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.



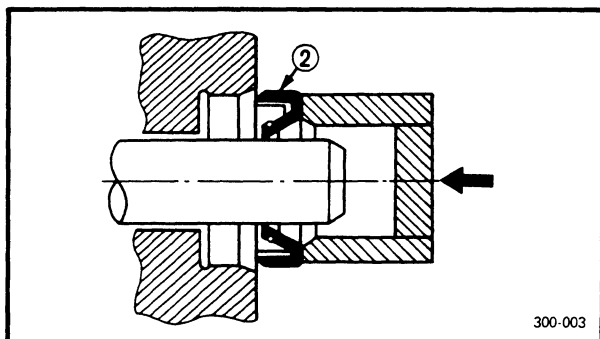
LOCK WASHERS/PLATES AND COTTER PINS

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.



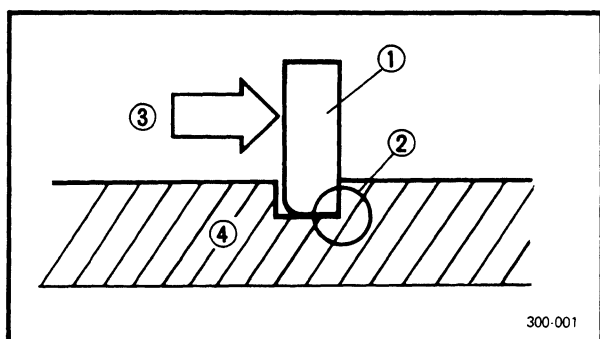
BEARINGS AND OIL SEALS

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.



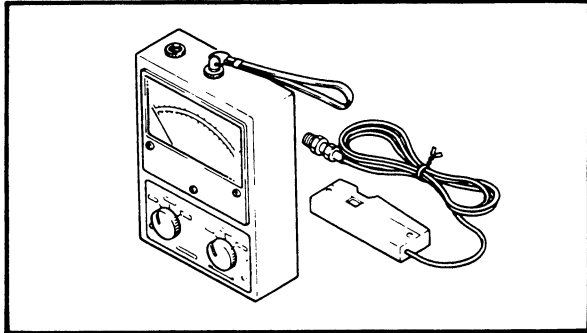
CIRCLIPS

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

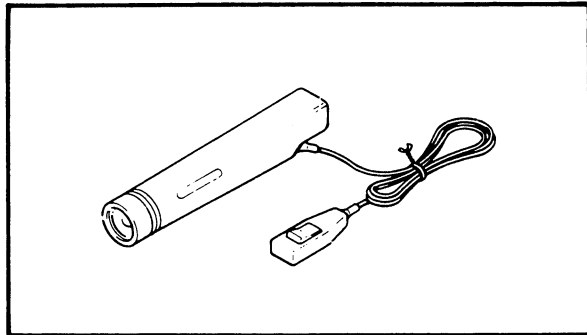
SPECIAL TOOLS

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**

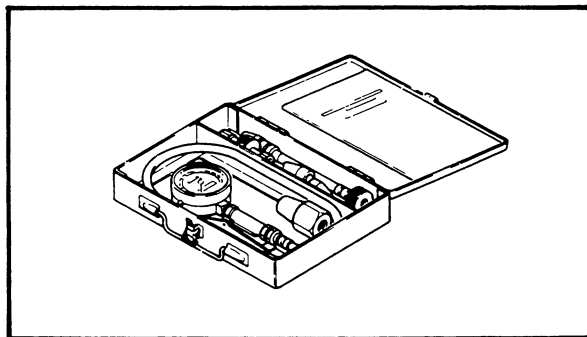
1. Inductive Tachometer
P/N YU-8036
P/N 90890-03113

This tool is needed for detecting engine rpm.



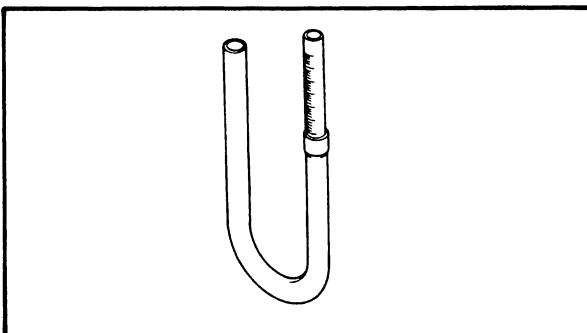
2. Inductive Timing Light
P/N YM-33277
P/N 90890-03109

This tool is necessary for checking ignition timing.



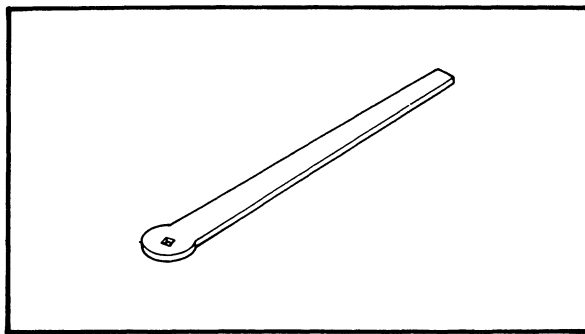
3. Compression Gauge
P/N YU-33223
P/N 90890-03081

This gauge is used to measure the engine compression.



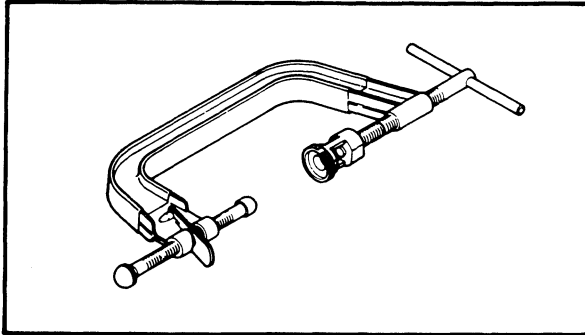
4. Fuel Level Gauge
P/N YM-01312-A
P/N 90890-01312

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



5. Valve Adjusting Tool
P/N YM-08035
P/N 90890-01311

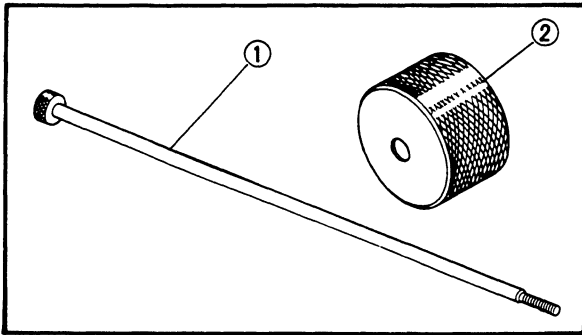
This tool is necessary for adjusting the valve clearance.



FOR ENGINE SERVICE

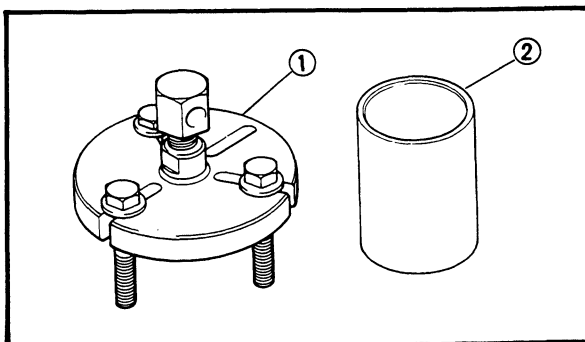
1. Valve Spring Compressor
P/N YM-04019
P/N 90890-04019

This tool is needed to remove and install the valve assemblies.



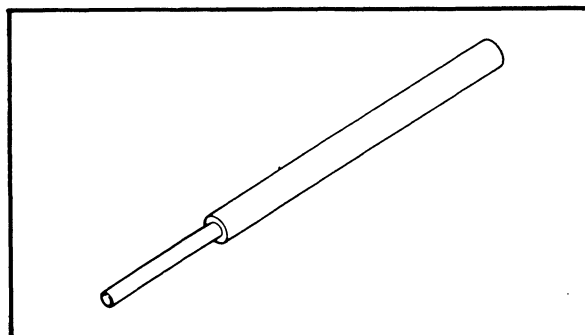
2. Slide Hammer Bolt
P/N YU-01083-1 – ①
P/N 90890-01083 – ①
Weight
P/N YU-01083-3 – ②
P/N 90890-01084 – ②

These tools are used when removing the rocker arm shaft.



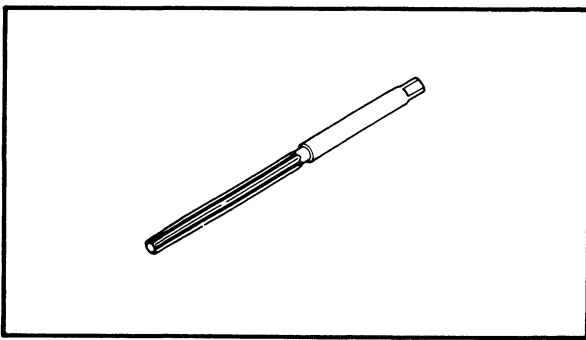
3. Flywheel Puller
P/N YU-33270 – ①
P/N 90890-01362 – ①
Attachment
P/N YM33278 – ②
P/N 90890-04087 – ②

These tools are used to remove the flywheel magneto.



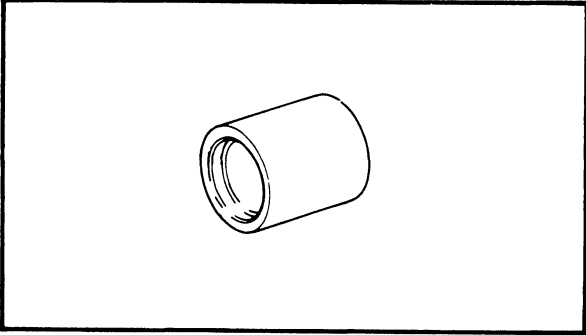
4. Valve Guide Remover (6.0 mm)
P/N YM-04064-A
P/N 90890-04064

This tool is used to remove the valve guides.



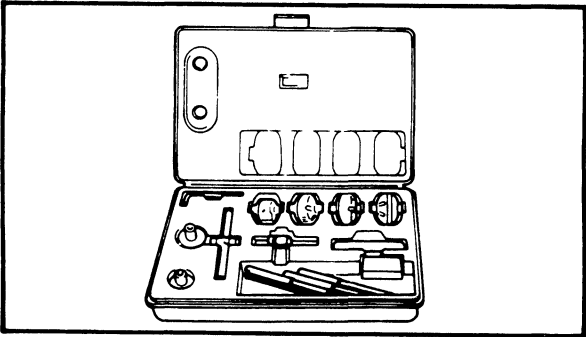
5. Valve Guide Reamer (6.0 mm)
P/N YM-04066
P/N 90890-04066

This tool is used to rebore the new valve guide.



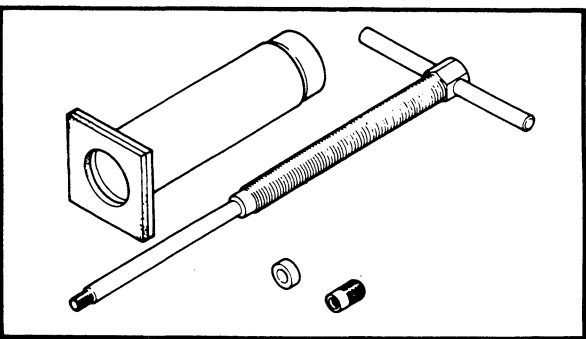
6. Valve Guide Installer
P/N YM-04065-A
P/N 90890-04065

This tool is needed to install the valve guides properly.



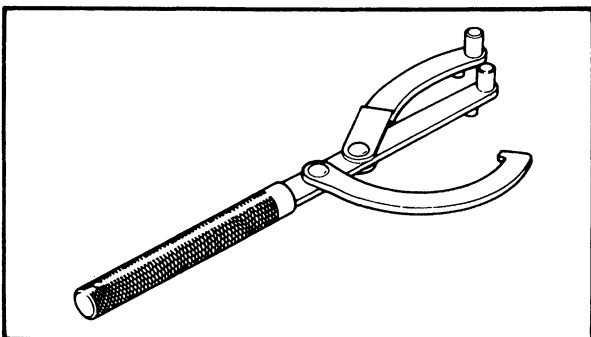
7. Valve Seat Cutter Set
P/N YM-91043

This tool is needed to resurface the valve seat.



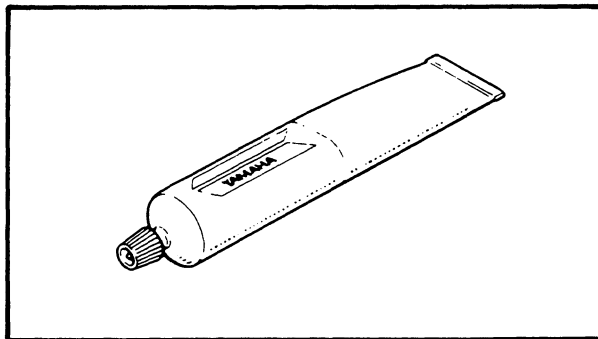
8. Piston Pin Puller
P/N YU-01304
P/N 90890-01304

This tool is used to remove the piston pin.



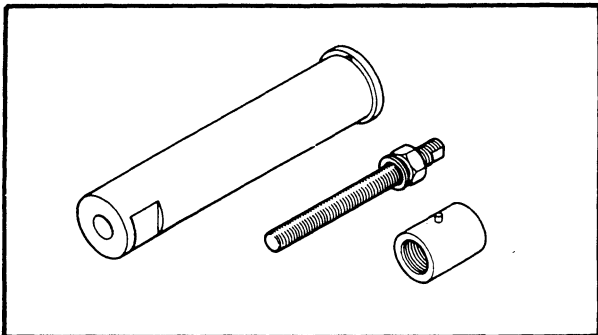
9. Rotor Holder
P/N YU-01235
P/N 90890-01235

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



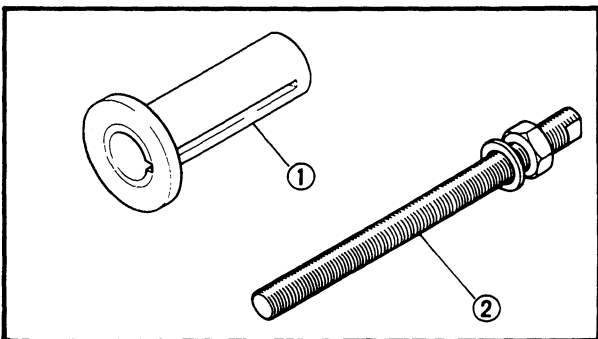
10. Sealant (Quick Gasket®)
 P/N ACC-11001-05-01
 Yamaha Bond No. 1215
 P/N 90890-85505

This sealant (bond) is used for crankcase mating surfaces, etc.



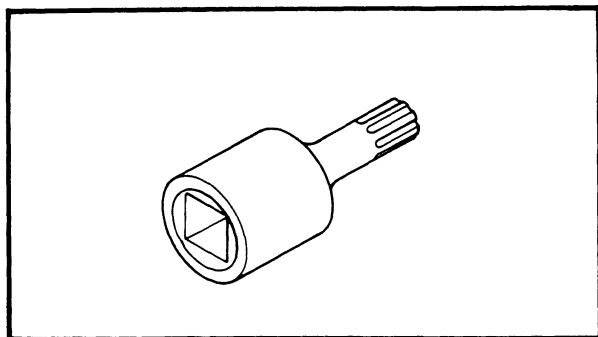
11. Buffer Boss Installer Set
 P/N 90890-04088

These tools are used to install the buffer boss.



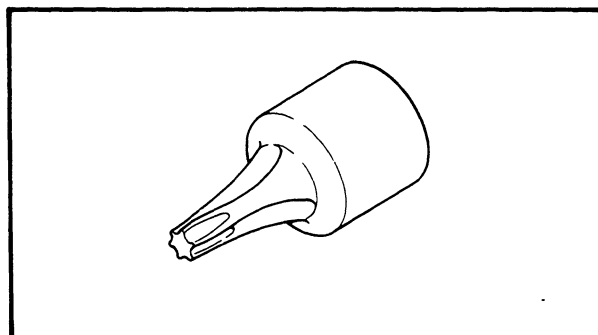
12. Crankshaft Installer Set
 P/N YU-90050
 Crankshaft Installer Pot
 P/N 90890-01274 – ①
 Crankshaft Installer Bolt
 P/N 90890-01275 – ②

These tools are used to install the crankshaft and buffer boss.



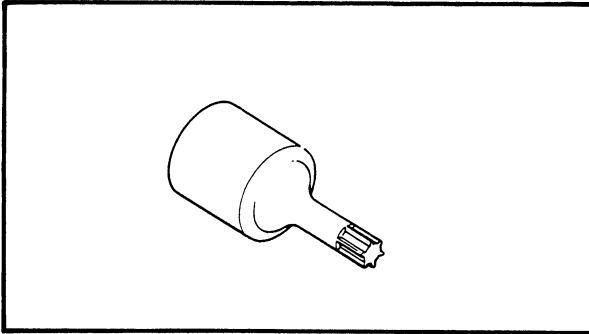
13. # 40 Torx Driver
 P/N YM-04049
 P/N 90890-04049

This tool is used to loosen or tighten the middle gear bearing retainer bolt.



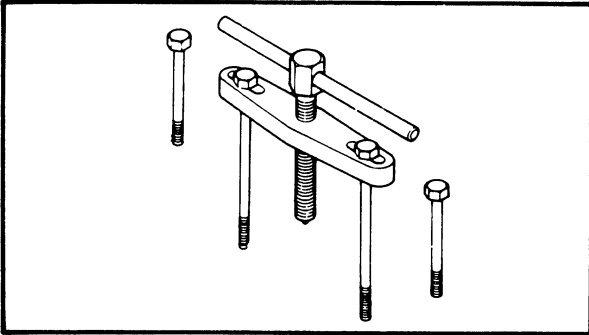
14. # 30 Torx Driver
 P/N YU-29843-6

This tool is used to loosen or tighten the drive axle bearing retainer bolt.



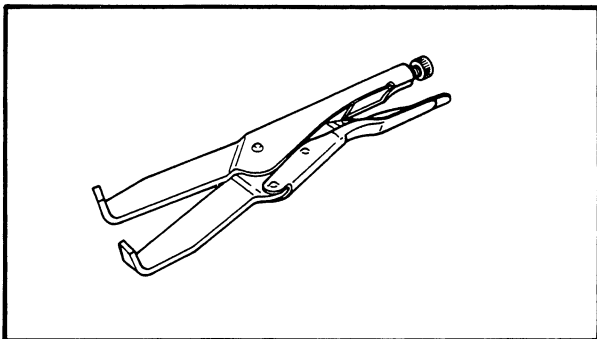
15. #25 Torx Driver
P/N YU-29843-4

This tool is used to loosen or tighten the shift cam segment securing bolt.



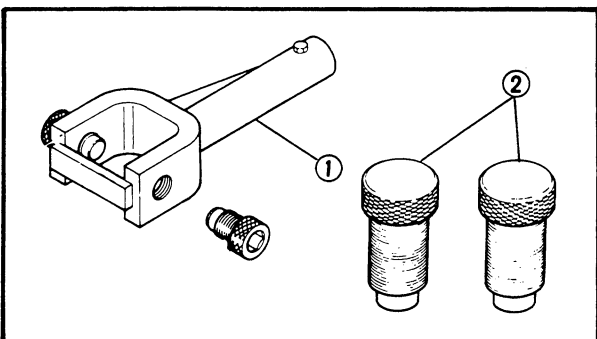
16. Crankcase Separating Tool
P/N YU-01135
P/N 90890-01135

This tool is used when removing the crankshaft.



17. Universal Clutch Holder
P/N YM-91042
P/N 90890-04086

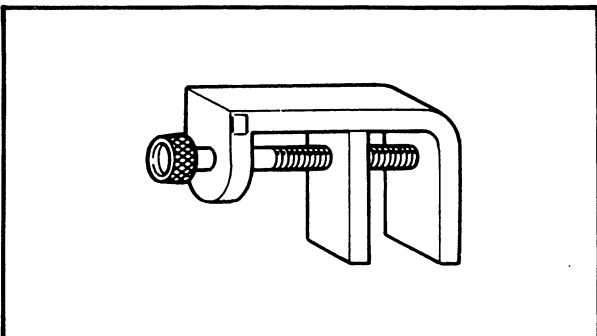
This tool is used to hold the starter pulley boss when removing or installing the starter pulley boss securing bolt.



FOR MIDDLE GEAR SERVICE

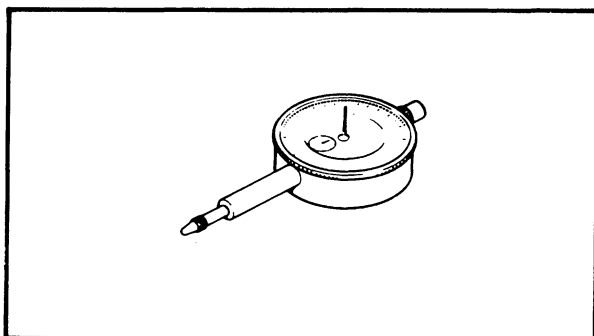
- 1. Universal Joint Holder
P/N YM-04062 – ①
P/N 90890-04062 – ①
Attachment
P/N YM-33291 – ②
P/N 90890-04096 – ②

These tools are used to remove and install the universal joint.



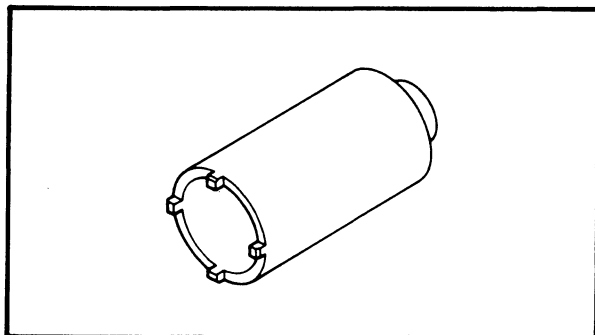
- 2. Damper Spring Compressor
P/N YM-33286
P/N 90890-04090

This tool is used to disassemble and reassemble the middle gear damper.



3. Dial Gauge
P/N YM-03097
P/N 90890-03097

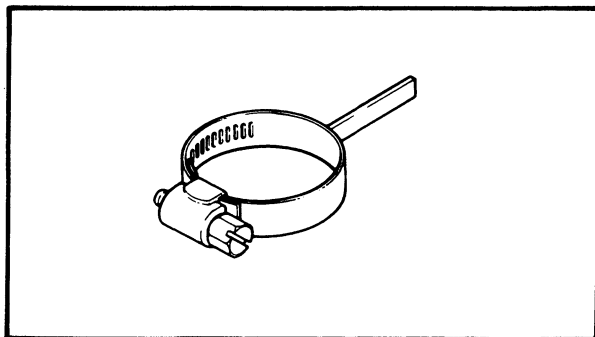
This tool is used to measure the gear lash for the middle gear and final gear.



FOR FINAL GEAR SERVICE

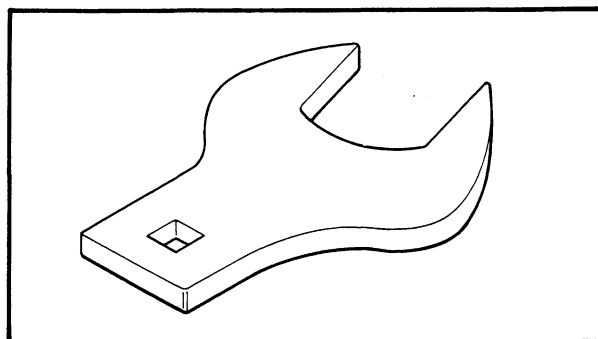
1. Final Drive Shaft Bearing Retainer Wrench
P/N YM-33214
P/N 90890-04077

This tool is used to remove and install the final gear bearing retainer.



2. Gear Lash Measurement Tool
YM-01230
P/N 90890-01230

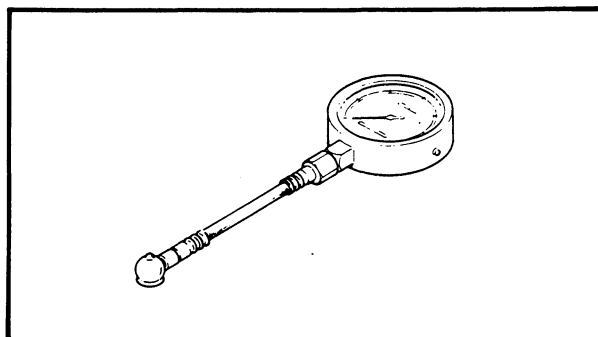
This tool is used to measure the gear lash .



FOR CHASSIS SERVICE

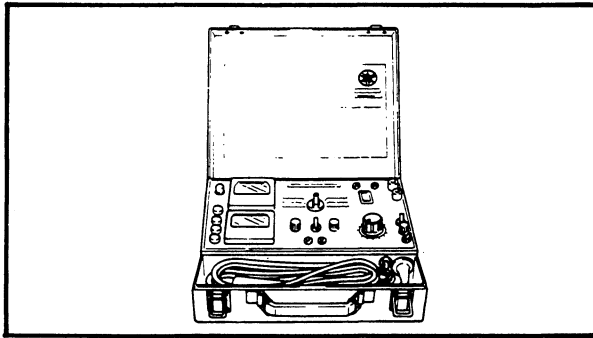
1. Ring Nut Wrench
P/N 90890-01419

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



2. Tire Pressure Gauge
P/N 90890-03118

This gauge is used for low pressure tire measurement.



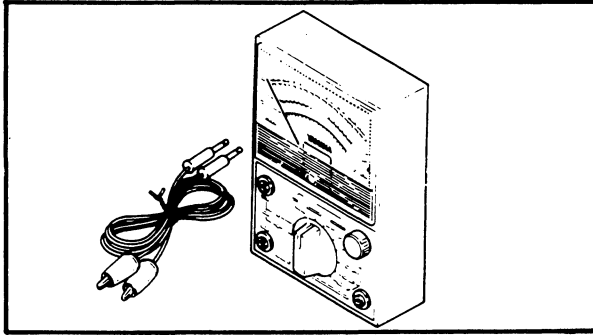
FOR ELECTRICAL COMPONENTS

1. Electro Tester

P/N YU-33260 – ①

P/N 90890-03021

This instrument is necessary for checking the ignition system components.



2. Pocket Tester

P/N YU-33263 – ② or

P/N YU-03112 – ③

P/N 90890-03104

This instrument is invaluable for checking the electrical system.



SPECIFICATIONS

GENERAL SPECIFICATIONS

2

Model	YFM200DXW
Model Code Number	3GC1
Engine Starting Number	3GC-016101
Frame Starting Number (Except for USA and Canada)	3GC-016101
Vehicle Identification Number (For USA and Canada)	JY43GCW0 * KC016101
Dimensions:	
Overall Length	1,750 mm (68.9 in) (For USA and Canada) 1,850 mm (72.8 in) (Except for USA and Canada)
Overall Width	1,045 mm (41.1 in)
Overall Height	1,015 mm (40.0 in)
Seat Height	725 mm (28.5 in)
Wheelbase	1,120 mm (44.1 in)
Minimum Ground Clearance	210 mm (8.3 in)
Basic Weight:	
With Oil and Full Fuel Tank	184 kg (406 lb) (For USA and Canada) 192 kg (423 lb) (Except for USA and Canada)
Minimum Turning Radius:	2,300 mm (90.6 in)
Engine:	
Engine Type	4-stroke, Air-cooled, SOHC
Cylinder Arrangement	Single cylinder, Forward inclined
Displacement	196 cm ³
Bore x Stroke	67.0 x 55.7 mm (2.638 x 2.193 in)
Compression Ratio	8.5 : 1
Compression Pressure	883 kPa (9.0 kg/cm ² , 128 psi)
Starting System	Electric starter
Lubrication System:	Wet sump
Oil Type or Grade:	
Engine Oil	YAMALUBE 4 (20W40) or SAE 20W40 type SE motor oil
<p>The chart shows temperature ranges for three oil grades. The top scale is in Fahrenheit (0, 10, 30, 50, 70, 90°F) and the bottom scale is in Celsius (-20, -10, 0, 10, 20, 30°C). SAE 10W30 is indicated for temperatures from approximately -10°F to 30°F. SAE 10W40 is indicated for temperatures from approximately -10°F to 70°F. Yamaha 4-cycle oil or SAE 20W40 (20W50) is indicated for temperatures from 0°F to 90°F.</p>	
Final Gear Case Oil	SAE 80 API GL-4 Hypoid gear oil
Oil Capacity:	
Engine Oil:	
Periodic Oil Change	1.5 L (1.3 Imp qt, 1.6 US qt)
Total Amount	1.8 L (1.6 Imp qt, 1.9 US qt)
Final Gear Case:	
Total Amount	0.13 L (0.11 Imp qt, 0.14 US qt)
Periodic Oil Change	0.12 L (0.11 Imp qt, 0.13 US qt)
Air Filter	Wet type element

GENERAL SPECIFICATIONS

SPEC



Model	YFM200DXW
Fuel: Type Tank Capacity Reserve Amount	Regular gasoline 9.5 L (2.1 Imp gal, 2.5 US gal) 1.9 L (0.4 Imp gal, 0.5 US gal)
Carburetor: Type/Manufacturer	VM22SH/MIKUNI
Spark Plug: Type/Manufacturer Gap	D7EA (N.G.K.) or X22ES-U (N.D.) (For USA and Oceania) DR7ES (N.G.K.) (Except for USA and Oceania) 0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Clutch Type:	Wet, Centrifugal automatic
Transmission : Primary Reduction System Primary Reduction Ratio Secondary Reduction System Secondary Reduction Ratio Transmission Type Operation Gear Ratio: 1st 2nd 3rd 4th 5th Reverse	Gear 73/22 (3.318) Shaft drive 19/18 x 46/11 (4.114) Constant mesh, 5-speed forward, 1-speed reverse Left foot operation, Left hand operation 34/12 (2.833) 34/19 (1.780) 29/22 (1.318) 26/25 (1.040) 23/28 (0.821) 34/12 (2.833)
Chassis: Frame Type Caster Angle Trail Toe-in Tread (F) Tread (R)	Steel tube frame 2.5° 11.2 mm (0.44 in) 0 ~ 10 mm (0 ~ 0.39 in) 770 mm (30.3 in) 775 mm (30.5 in)
Tire: Type Size (F) Size (R)	Tubeless 22 x 8 – 10 DUNLOP KT982 22 x 10 – 8 DUNLOP KT988
Tire Pressure (Cold Tire): Front and Rear: Standard Minimum Wear Limit	19.6 kPa (0.20 kg/cm ² , 2.8 psi) 16.7 kPa (0.17 kg/cm ² , 2.4 psi) 3 mm (0.12 in)

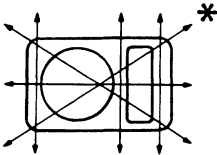
MAINTENANCE SPECIFICATIONS

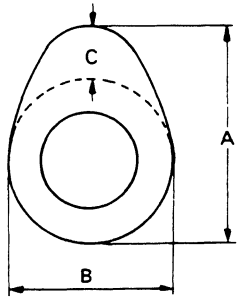
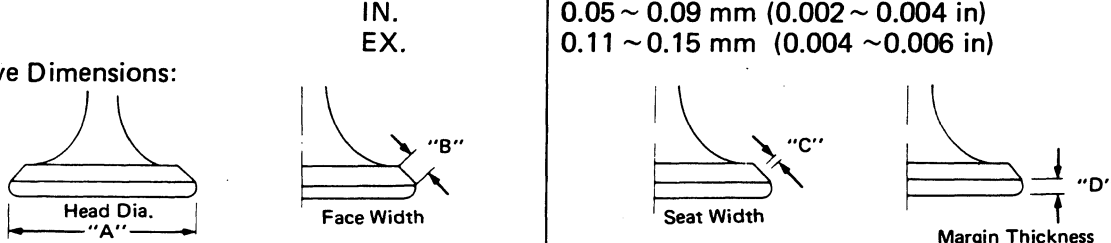


Model	YFM200DXW
Brake: Front Brake: Type Operation Rear Brake: Type Operation	Drum brake Right hand operation Single, disc brake Left hand operation and Right foot operation
Suspension: Front Rear	Swing axle Swing arm (Monocross)
Shock Absorber: Front Rear	Coil spring, Oil damper Gas/Coil spring, Oil damper
Wheel Travel: Front Rear	70 mm (2.76 in) 110 mm (4.33 in)
Electrical: Ignition System Generator System Battery Type/Capacity	CDI Magneto A.C. Magneto Generator GM14AZ-4A/12V, 14AH
Headlight Type	Bulb
Bulb Wattage x Quantity: Headlight Taillight	12V, 45W/45W x 1 12V, 7.5W x 1
Indicator Light Wattage x Quantity: "NEUTRAL" "REVERSE"	12V, 3.4W x 1 12V, 3.4W x 1

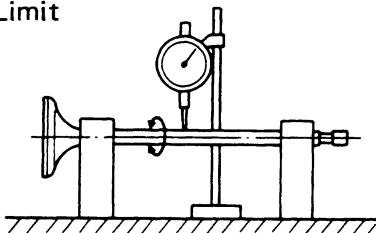
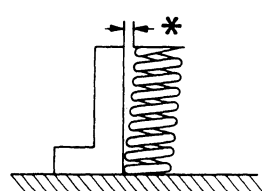
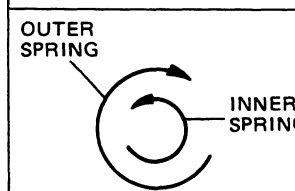
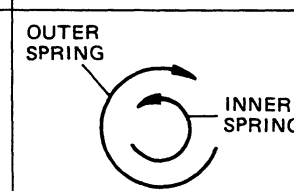
MAINTENANCE SPECIFICATIONS

ENGINE

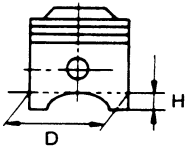
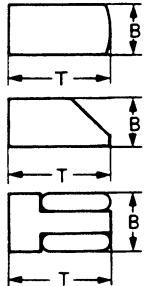
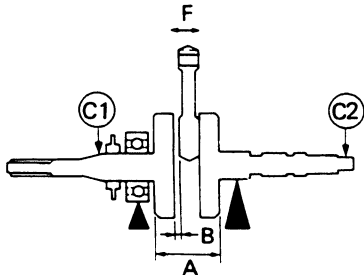
Model	YFM200DXW
Cylinder Head: Warp Limit 	<0.03 mm (0.0012 in)> *Lines indicate straightedge measurement.
Cylinder: Bore Size Taper Limit Out-of-round Limit	66.97 ~ 67.02 mm (2.637 ~ 2.639 in) <0.05 mm (0.002 in) > <0.01 mm (0.0004 in) >

Model	YFM200DXW
<p>Camshaft: Drive Method Camshaft Bearing Inside Diameter Camshaft Outside Diameter Shaft-to-cap Clearance Cam Dimensions: Intake: "A" < Limit > "B" < Limit > "C" < Limit > Exhaust: "A" < Limit > "B" < Limit > "C" < Limit > Camshaft Runout Limit Cam Chain Type/Number of Links Cam Chain Adjustment Method</p> 	<p>Chain (Left) 25.000 ~ 25.021 mm (0.984 ~ 0.985 in) 24.96 ~ 24.98 mm (0.983 ~ 0.984 in) 0.020 ~ 0.061 mm (0.0008 ~ 0.0024 in) 36.537 ~ 36.637 mm (1.439 ~ 1.442 in) < 36.507 mm (1.437 in) > 30.131 ~ 30.231 mm (1.186 ~ 1.190 in) < 30.101 mm (1.185 in) > 6.587 mm (0.259 in) < 6.567 mm (0.258 in) > 36.577 ~ 36.677 mm (1.440 ~ 1.444 in) < 36.547 mm (1.439 in) > 30.214 ~ 30.314 mm (1.189 ~ 1.193 in) < 30.184 mm (1.188 in) > 6.627 mm (0.261 in) < 0.607 mm (0.260 in) > < 0.03 mm (0.0012 in) > DID25SH/104 Links Automatic</p>
<p>Rocker Arm/Rocker Arm Shaft: Rocker Arm Inside Diameter < Limit > Shaft Outside Diameter < Limit > Arm-to-shaft Clearance < Limit ></p>	<p>12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in) < 12.078 mm (0.4755 in) > 11.985 ~ 11.991 mm (0.4718 ~ 0.4721 in) < 11.955 mm (0.4707 in) > 0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in) < 0.08 mm (0.0032 in) ></p>
<p>Valve, Valve Seat, Valve Guide: Valve Clearance (Cold):</p> <p>Valve Dimensions:</p>  <p>"A" Head Dia. "B" Face Width "C" Seat Width "D" Margin Thickness Limit Stem Outside Diameter</p>	<p>IN. EX. 0.05 ~ 0.09 mm (0.002 ~ 0.004 in) 0.11 ~ 0.15 mm (0.004 ~ 0.006 in) 33.9 ~ 34.1 mm (1.335 ~ 1.343 in) 28.4 ~ 28.6 mm (1.118 ~ 1.126 in) 2.26 mm (0.089 in) 2.26 mm (0.089 in) 0.9 ~ 1.1 mm (0.035 ~ 0.043 in) < 1.6 mm (0.063 in) > 0.9 ~ 1.1 mm (0.035 ~ 0.043 in) < 1.6 mm (0.063 in) > 0.8 ~ 1.2 mm (0.031 ~ 0.047 in) 0.8 ~ 1.2 mm (0.031 ~ 0.047 in) 5.975 ~ 5.990 mm (0.2352 ~ 0.2358 in) < 5.95 mm (0.2343 in) > 5.960 ~ 5.975 mm (0.2346 ~ 0.2352 in) < 5.95 mm (0.2343 in) ></p>



Model		YFM200DXW
Guide Inside Diameter	IN. < Limit > EX.	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in) < 6.03 mm (0.2374 in) > 6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)
Stem-to-guide Clearance	< Limit > IN. < Limit > EX.	< 6.03 mm (0.2374 in) > 0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in) < 0.08 mm (0.0031 in) > 0.025 ~ 0.052 mm (0.0010 ~ 0.0021 in)
Stem Runout Limit	< Limit >	< 0.1 mm (0.0039 in) > 0.02 mm (0.0008 in)
		
Valve Seat Width		0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
< Limit >		< 1.6 mm (0.063 in) >
Valve Spring:		
Free Length:		
Inner Spring	IN. < Limit > EX.	35.5 mm (1.40 in) < 33.5 mm (1.32 in) > 35.5 mm (1.40 in)
Outer Spring	< Limit > IN. < Limit > EX.	< 33.5 mm (1.32 in) > 37.2 mm (1.46 in) < 35.2 mm (1.39 in) > 37.2 mm (1.46 in)
Compressed Length (Valve Closed):	< Limit >	< 35.2 mm (1.39 in) >
Inner Spring	IN. EX.	30.5 mm (1.201 in) 30.5 mm (1.201 in)
Outer Spring	IN. EX.	32.0 mm (1.260 in) 32.0 mm (1.260 in)
Tilt Limit * :	IN. & EX.	2.5° or 1.6 mm (0.063 in)
		
Direction of Winding (Top view)		
	IN	EX
		

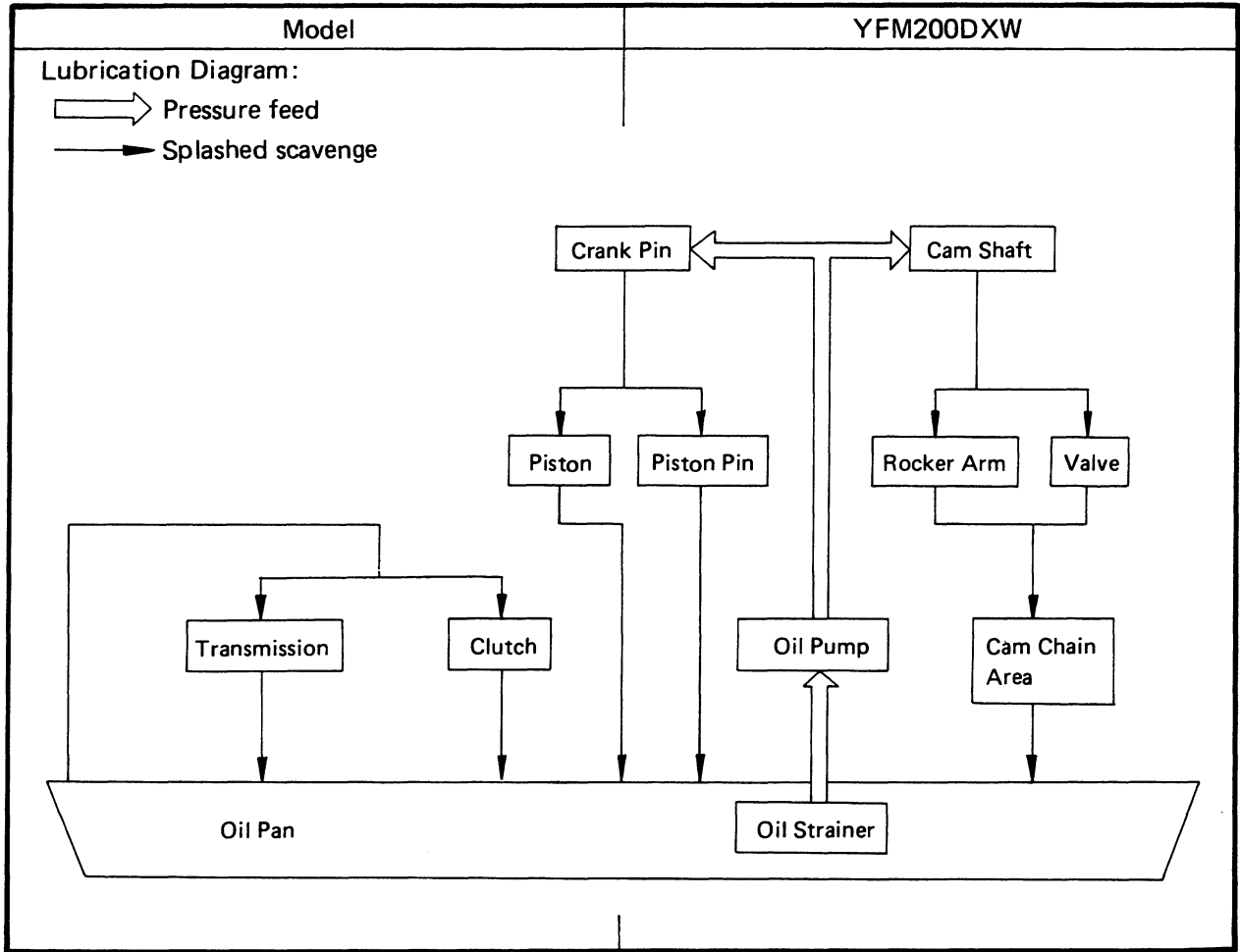


Model	YFM200DXW	
Piston: Piston Size "D" / Measuring Point "H" Piston Over Size: 2nd 4th Piston Clearance	 66.935 ~ 66.985 mm (2.6352 ~ 2.6372 in)/ 7.5 mm (0.30 in) (From bottom line of piston skirt) 67.50 mm (2.6575 in) 68.00 mm (2.6772 in) 0.025 ~ 0.045 mm (0.0010 ~ 0.0018 in)	
Piston Ring: Sectional Sketch: Top Ring 2nd Ring Oil Ring End Gap (Installed): < Limit > : Side Clearance: < Limit > :	 Plain B = 1.2 mm (0.05 in) T = 2.7 mm (0.11 in) Plain B = 1.2 mm (0.05 in) T = 2.7 mm (0.11 in) Expander B = 2.5 mm (0.10 in) T = 2.8 mm (0.11 in) Top Ring 0.15 ~ 0.30 mm (0.006 ~ 0.012 in) 2nd Ring 0.15 ~ 0.30 mm (0.006 ~ 0.012 in) Oil Ring 0.3 ~ 0.9 mm (0.012 ~ 0.036 in) Top Ring < 0.4 mm (0.016 in) > 2nd Ring < 0.4 mm (0.016 in) > Oil Ring - Top Ring 0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in) 2nd Ring 0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in) Top Ring < 0.12 mm (0.0047 in) > 2nd Ring < 0.12 mm (0.0047 in) >	
Crankshaft:  Crank Width "A" Big End Side Clearance "B" < Limit > Runout Limit: "C1" "C2" Small End Free Play "F" < Limit >	55.95 ~ 56.00 mm (2.203 ~ 2.205 in) 0.35 ~ 0.65 mm (0.014 ~ 0.026 in) < 0.7 mm (0.028 in) > < 0.02 mm (0.0008 in) > < 0.06 mm (0.0024 in) > 0.8 ~ 1.0 mm (0.03 ~ 0.04 in) < 2.0 mm (0.08 in) >	
Balancer Drive Method:	Gear	
Clutch: Clutch Shoe: Thickness Quantity Wear Limit	2.0 mm (0.08 in) 3 < 1.5 mm (0.06 in) >	

MAINTENANCE SPECIFICATIONS



Model	YFM200DXW
Friction Plate: Thickness Quantity Wear Limit Clutch Plate: Thickness Quantity Warp Limit Clutch Spring: Free Length Quantity Wear Limit Clutch Release Method Clutch-In Revolution Clutch-Stall Revolution	2.92 ~ 3.08 mm (0.115 ~ 0.121 in) 5 < 2.8 mm (0.110 in)> 1.45 ~ 1.75 mm (0.057 ~ 0.069 in) 4 < 0.2 mm (0.008 in)> 34.9 mm (1.37 in) 4 < 32.9 mm (1.30 in)> Outer push 1,850 ~ 2,150 r/min 2,900 ~ 3,300 r/min
Transmission: Main Axle Deflection Limit Drive Axle Deflection Limit	< 0.08 mm (0.0031 in)> < 0.08 mm (0.0031 in)>
Shifter: Shifter Type	Guide bar
Air Filter Oil Grade (Oiled Filter):	Foam-air-filter oil or SAE 10W30 type SE motor oil
Carburetor: Type/Manufacturer/Quantity I.D. Mark Main Jet (M.J.) Main Air Jet (M.A.J.) Jet Needle-clip Position (J.N.) Needle Jet (N.J.) Cutaway (C.A.) Pilot Jet (P.J.) Pilot Outlet (P.O.) Pilot Screw (P.S.) Valve Seat (V.S.) Fuel Level (F.L.) Float Height (F.H.) Engine Idling Speed	VM22SH/MIKUNI/1 1NU00 #117.5 ϕ 1.7 4D11-3 N-6 4.0 #20 ϕ 0.7 2.0 ϕ 1.8 2.5 ~ 3.5 mm (0.10 ~ 0.14 in) 21.0 ~ 22.0 mm (0.83 ~ 0.87 in) 1,350 ~ 1,450 r/min
Lubrication System: Oil Filter Type Oil Pump Type Tip Clearance < Limit > Side Clearance Bypass Valve Setting Pressure	Wire mesh Trochoid pump 0.15 mm (0.0059 in) < 0.20 mm (0.0079 in) > 0.04 ~ 0.09 mm (0.0016 ~ 0.0035 in) 78 ~ 118 kPa (0.8 ~ 1.2 kg/cm ² , 11.4 ~ 17.1 psi)
Middle Gear Lash:	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
Final Gear Lash: Actual Gear Lash on the Gear Teeth Gear Lash when using the Measurement Tool	0.1 ~ 0.2 mm (0.004 ~ 0.008 in) 0.2 ~ 0.4 mm (0.008 ~ 0.016 in)



MAINTENANCE SPECIFICATIONS

SPEC



TIGHTENING TORQUE:							
Parts to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Cylinder Head	Bolt	M6	1	7	0.7	5.1	
Cylinder Head	Flange bolt	M8	4	22	2.2	16	
	Bolt	M8	2	22	2.2	16	
Cam Sprocket Cover	Screw	M6	2	7	0.7	5.1	
Tappet Cover	Bolt	M6	5	10	1.0	7.2	
Rocker Arm Shaft Stopper	Bolt	M6	2	8	0.8	5.8	Use lock washer
Spark Plug	—	M12	1	17.5	1.75	12.5	
Cylinder	Bolt	M6	2	10	1.0	7.2	
Balancer Shaft	Nut	M14 x 1.0	1	50	5.0	36	Use lock washer
Rotor	Bolt	M10 x 1.25	1	50	5.0	36	
Valve Adjusting Nut	Nut	M6	2	14	1.4	10	
Cam Sprocket	Bolt	M10	1	60	6.0	43	
Chain Tensioner	Bolt	M6	2	12	1.2	8.7	
Chain Tensioner Cap	Cap Nut	M14	1	5	0.5	3.6	
Chain Guide #2	Bolt	M6	2	8	0.8	5.8	
Oil Pump	Screw	M6	3	7	0.7	5.1	
Drain Plug	Plug	M35	1	43	4.3	31	
Oil Filter Cover (Drain)	Bolt	M6	1	10	1.0	7.2	
Oil Filter Cover	Bolt	M6	2	10	1.0	7.2	
Carburetor Joint	Bolt	M6	2	12	1.2	8.7	
Carburetor	Nut	M6	2	8	0.8	5.8	
	Screw	M5	1	2	0.2	1.4	
Air Filter	Screw	M5	3	2	0.2	1.4	
Muffler	Bolt	M8	2	27	2.7	19	
Muffler and Exhaust Pipe	Bolt	M8	1	20	2.0	14	
Exhaust Pipe	Bolt	M6	2	10	1.0	7.2	
Crankcase	Screw	M6	11	7	0.7	5.1	
Recoil Starter	Screw	M6	6	7	0.7	5.1	
Crankcase Spacer (Right)	Screw	M6	8	7	0.7	5.1	
Bearing Retainer (Right)	Screw	M6	3	10	1.0	7.2	
(Left)	Screw	M5	3	7	0.7	5.1	
Crankcase Spacer (Left)	Screw	M6	8	7	0.7	5.1	
Clutch Cover Protector	Screw	M6	3	7	0.7	5.1	
Clutch Cover	Screw	M6	9	7	0.7	5.1	
Primary Clutch	Nut	M22	1	78	7.8	56	Use lock washer
Clutch Spring	Screw	M5	4	6	0.6	4.3	
Clutch Boss	Nut	M14	1	50	5.0	36	Use lock washer
Shift Cam Segment	Screw	M6	1	12	1.2	8.7	
Clutch Adjuster	Nut	M8	1	15	1.5	11	
Bearing Retainer (Drive Axle)	Screw	M8	3	25	2.5	18	
(Housing)	Bolt	M8	4	25	2.5	18	
Middle Drive Axle	Nut	M20 x 1.0	1	120	12.0	85	Stake
Middle Driven Axle (U-Joint)	Nut	M14 x 1.5	1	90	9.0	65	
Change Pedal	Bolt	M6	1	10	1.0	7.2	
Magneto Base	Screw	M6	3	7	0.7	5.1	
Neutral Switch	—	M10	1	20	2.0	14	
Final Gear Case	Nut	M10	4	23	2.3	17	
Bearing Housing	Bolt	M10	2	40	4.0	29	
	Bolt	M8	6	23	2.3	17	
Bearing Retainer (Final Gear)	—	—	1	100	10.0	72	Left-hand thread



CHASSIS

Model	YFM200DXW
Steering System: Lock to Lock Angle: Inside Outside	40° 40°
Front Suspension: Cushion Stroke Suspension Spring Free Length < Limit > Fitting Length Spring Rate/Stroke	38.5 mm (1.52 in) 161 mm (6.34 in) < 160 mm (6.30 in) > 147 mm (5.79 in) K1 29.4 N/mm (3.00 kg/mm, 168 lb/in)/0 ~ 46.0 mm (0 ~ 1.81 in) K2 49.0 N/mm (5.00 kg/mm, 280 lb/in)/46.0 ~ 66.5 mm (1.81 ~ 2.62 in)
Rear Suspension: Cushion Stroke Suspension Spring Free Length < Limit > Fitting Length Spring Rate/Stroke: K1 K2 Enclosed Gas Pressure	47 mm (1.85 in) 201 mm (7.91 in) 199 mm (7.83 in) 189 mm (7.44 in) 98.1 N/mm (10.0 kg/mm, 560 lb/in)/ 0 ~ 39 mm (0 ~ 1.54 in) 191.2 N/mm (19.5 kg/mm, 1,092 lb/in)/ 39 ~ 62 mm (1.54 ~ 2.44 in) 1,177 ~ 1,765 kPa (12 ~ 18 kg/cm ² , 171 ~ 256 psi)
Swingarm: Free Play Limit: Side	< 1.0 mm (0.04 in) >
Wheel: Front Wheel Type Rear Wheel Type Front Rim Size/Material Rear Rim Size/Material Rin Runout Limit: Vertical Lateral	Panel Wheel Panel Wheel 6 x 10/Steel 8.25 x 8/Steel < 2.0 mm (0.08 in) > < 2.0 mm (0.08 in) >
Front Drum Brake: Type Drum Inside Diameter < Limit > Lining Thickness < Limit > Shoe Spring Free Length	Leading and trailing 110 mm (4.33 in) < 111 mm (4.37 in) > 4 mm (0.16 in) < 2 mm (0.08 in) > 34.5 mm (1.36 in)
Rear Disc Brake: Type Disc Outside Diameter x Thickness < Limit > Pad Thickness < Limit >	Single disc 224 x 4.0 mm (8.82 x 0.16 in) < 3.0 mm (0.12 in) > 8.0 mm (0.31 in) 1.5 mm (0.06 in)
Brake Lever & Brake Pedal: Brake Lever Free Play Brake Pedal Position Brake Pedal Free Play	5 ~ 8 mm (0.2 ~ 0.3 in) at lever end 5 mm (0.2 in) 20 ~ 30 mm (0.8 ~ 1.2 in)

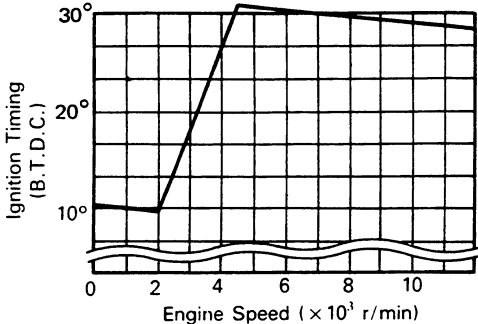
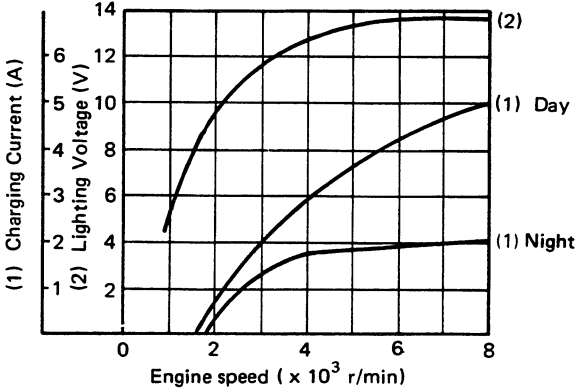


TIGHTENING TORQUE:								
Parts to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks	
				Nm	m·kg	ft·lb		
Steering Knuckle and Nut	Nut	M14 x 1.5	2	85	8.5	61	Use lock washer	
Front Panel Wheel and Wheel Hub	Nut	M8 x 1.25	8	28	2.8	20		
Front Brake Cam Lever	Bolt	M6 x 1.0	2	9	0.9	6.5		
Steering Knuckle and Lower Arm	Bolt	M10 x 1.25	2	35	3.5	25		
Tie-rod End and Steering Knuckle	Nut	M10 x 1.25	2	40	4.0	29		
Tie-rod End and Steering Shaft	Nut	M10 x 1.25	2	40	4.0	29		
Tie-rod and Locknut	Nut	M10 x 1.25	4	30	3.0	22		
Steering Shaft and Frame	Nut	M10 x 1.25	1	30	3.0	22		
Steering Shaft Holder and Frame	Bolt	M8 x 1.25	2	23	2.3	17		
Steering Shaft and Lower Handlebar Holder	Nut	M10 x 1.25	2	30	3.0	22		
Lower Handlebar Holder and Upper Handlebar Holder	Bolt	M8 x 1.25	4	20	2.0	14		
Lower Arm and Frame	Nut	M12 x 1.25	2	68	6.8	49		
Front Suspension and Frame	Nut	M10 x 1.25	2	45	4.5	32		
Front Suspension and Lower Arm	Nut	M10 x 1.25	2	45	4.5	32		
Engine Mounting (Top)	Nut	M8 x 1.25	3	33	3.3	24		
Engine Mounting (Front)	Nut	M8 x 1.25	1	33	3.3	24		
Engine Mounting (Rear)	Nut	M8 x 1.25	2	33	3.3	24		
Footrest and Frame	Bolt	M12 x 1.25	4	85	8.5	61		
Front Bumper (Bottom)	Bolt	M8 x 1.25	2	23	2.3	17		
Front Bumper (Top)	Bolt	M10 x 1.25	2	45	4.5	32		
Rear Bumper	Bolt	M8 x 1.25	4	23	2.3	17		
Rear Axle and Nut	Nut	M14 x 1.5	2	120	12.0	85		See NOTE
Rear Axle and Ring Nut	Ring nut	M40 x 1.5	2	—	—	—		
Rear Panel Wheel and Wheel Collar	Bolt	M10 x 1.25	6	43	4.3	31		
Caliper and Rear Arm	Nut	M10 x 1.25	2	50	5.0	36		
Pad Adjuster and Locknut	Nut	M8 x 1.25	1	16	1.6	11		
Brake Caliper	Nut	M6 x 1.0	3	9	0.9	6.5		
Bearing Housing and Rear Arm	Bolt	M10 x 1.25	4	45	4.5	32		
Rear Gear Housing and Rear Arm	Bolt	M10 x 1.25	4	23	2.3	17		
Rear Suspension and Frame	Bolt	M10 x 1.25	1	25	2.5	18		
Fuel Tank and Fuel Cock	Screw	M6 x 1.0	2	5	0.5	3.6		
Pivot Shaft	—	—	2	6	0.6	4.3		
Pivot Shaft Nut	—	—	2	130	13.0	94		

NOTE:

1. Finger tighten the inside-ring nut.
2. Hold the inside-ring nut, and tighten the outside-ring nut to 190 Nm (19 m·kg, 140 ft·lb).
3. Hold the outside-ring nut, and tighten the inside-ring nut to 240 Nm (24 m·kg, 170 ft·lb).

ELECTRICAL

Model	YFM200DXW
<p>Voltage: Ignition System: Ignition Timing (B.T.D.C.) Advanced Timing (B.T.D.C.) Advancer Type</p>	<p>12V</p> <p>10° at 1,000 r/min 30° at 6,000 r/min Electrical</p> 
<p>CDI: Magneto-Model/Manufacturer Pickup Coil Resistance (Color) Source Coil Resistance (Color) CDI Unit-Model/Manufacturer</p>	<p>F3T16471/MITSUBISHI 176.4 ~ 215.6Ω at 20°C (68°F) (W/G – W/R) 342.9 ~ 352Ω at 20°C (68°F) (Br – B) F8T07272/MITSUBISHI</p>
<p>Ignition Coil: Model/Manufacturer Minimum Spark Gap Primary Winding Resistance Secondary Winding Resistance</p>	<p>F6T50972/MITSUBISHI 6 mm (0.24 in) 0.72 ~ 0.98Ω at 20°C (68°F) 5.02 ~ 6.79Ω at 20°C (68°F)</p>
<p>Charging System/Type</p>	<p>A.C. Magneto Generator</p>
<p>F.W. Magneto: Charging Current Charging Coil Resistance (Color) Lighting Voltage Lighting Coil Resistance (Color)</p>	<p>Day: 1.8A or more at 3,000 r/min 4.5A or less at 8,000 r/min</p> <p>Night: 0.7A or more at 3,000 r/min 1.7A or less at 8,000 r/min</p> <p>0.36 ~ 0.50Ω at 20°C (68°F) (W – B)</p> <p>11.3V or more at 3,000 r/min 13.5V or less at 8,000 r/min</p> <p>0.31 ~ 0.37Ω at 20°C (68°F) (Y – B)</p> 

MAINTENANCE SPECIFICATIONS



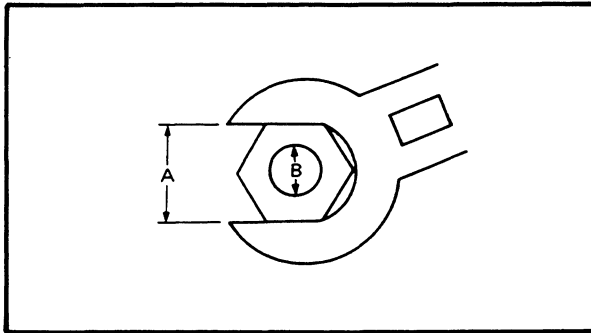
Model	YFM200DXW
Voltage Regulator: Type Model/Manufacturer No Load Regulated Voltage	Short circuit type TR-30/MATSUSHITA 13.0 ~ 14.0V
Rectifier: Model/Manufacturer Capacity Withstand Voltage	TR-30/MATSUSHITA 5.5A 240V
Battery: Capacity Specific Gravity	12V, 14AH 1.280
Electrical Starter System: Amperage Rating Starter Motor: Model/Manufacturer Output Armature Coil Resistance Brush: Overall Length < Limit > Spring Pressure Commutator: Diameter < Wear Limit > Mica Undercut Starter Relay: Model/Manufacturer Amperage Rating Coil Winding Resistance/Color	Constant mesh type SM-7255/MITSUBA 0.4kW 0.023Ω at 20°C (68° F) 10.5 mm (0.41 in) < 5.0 mm (0.20 in) > 400 ~ 660 g (14.1 ~ 23.2 oz) 23 mm (0.91 in) < 22 mm (0.87 in) > 0.55 mm (0.022 in) A104-132/HITACHI 100A 3.87 ~ 4.73Ω (68° F)/(R/W – B)
Starting Circuit Cut-off Relay: Model/Manufacturer Coil Winding Resistance Diode	G4MW-121T/TATEISHI 68 ~ 83Ω at 20°C (68° F) Yes
Circuit Breaker: Type Amperage for Individual Circuit/Quantity: Main (MAIN) Reserve (MAIN)	Fuse 10A x 1 10A x 1



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

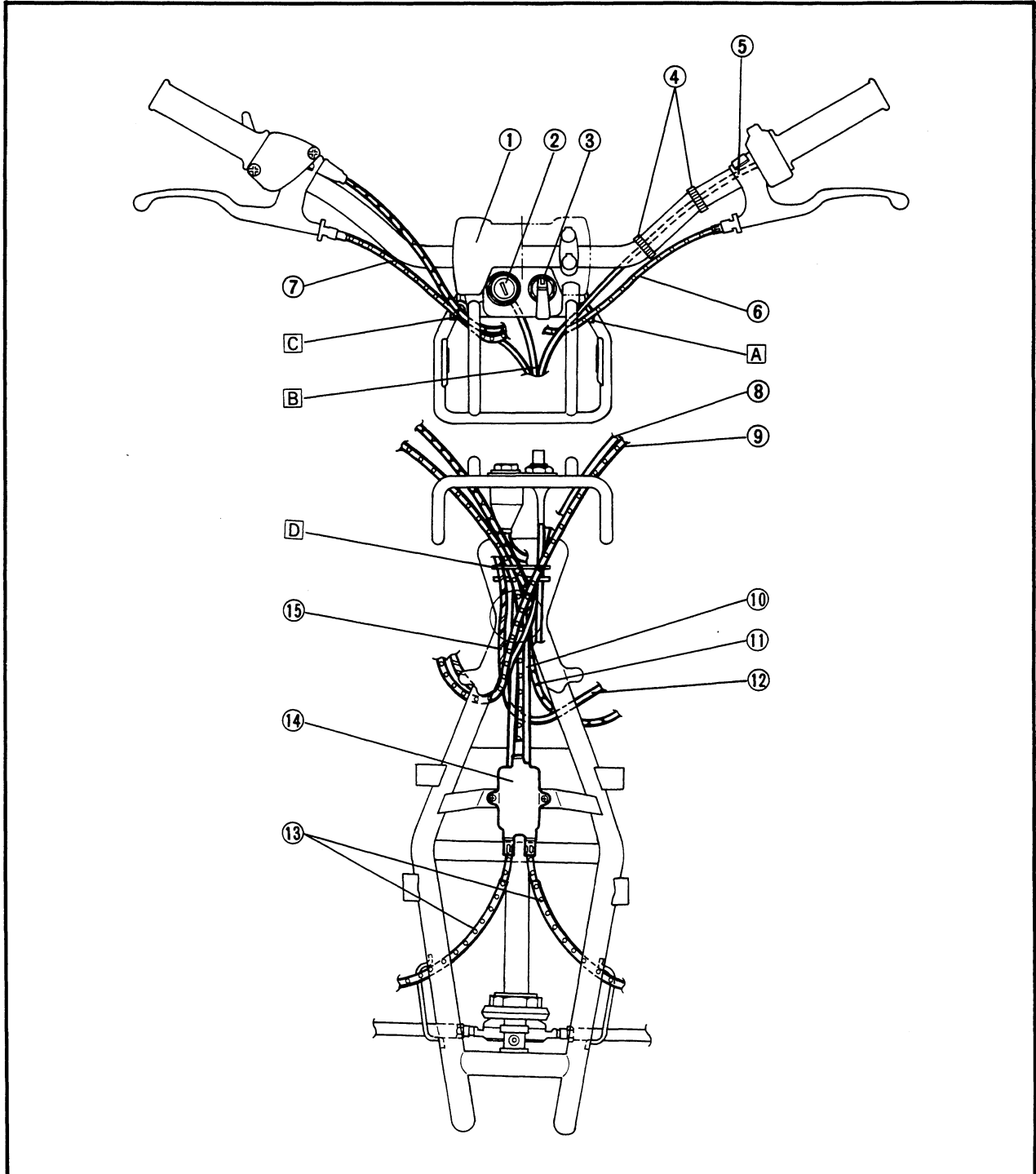
Unit	Read	Definition	Measure
mm	Millimeter	10^{-3} meter	Length
cm	Centimeter	10^{-2} meter	Length
kg	Kilogram	10^3 gram	Weight
N	Newton	1 kg x m/sec	Force
Nm	Newton Meter	N x m	Torque
m·kg	Meter Kilogram	m x kg	Torque
Pa	Pascal	N/m^2	Pressure
N/mm	Newton per Millimeter	N/mm	Spring Rate
L	Liter	—	Volume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

CABLE ROUTING

- ① Handlebar protector
- ② Main switch
- ③ Starter lever
- ④ Band
- ⑤ Handlebar switch lead
- ⑥ Rear brake cable
- ⑦ Front brake cable

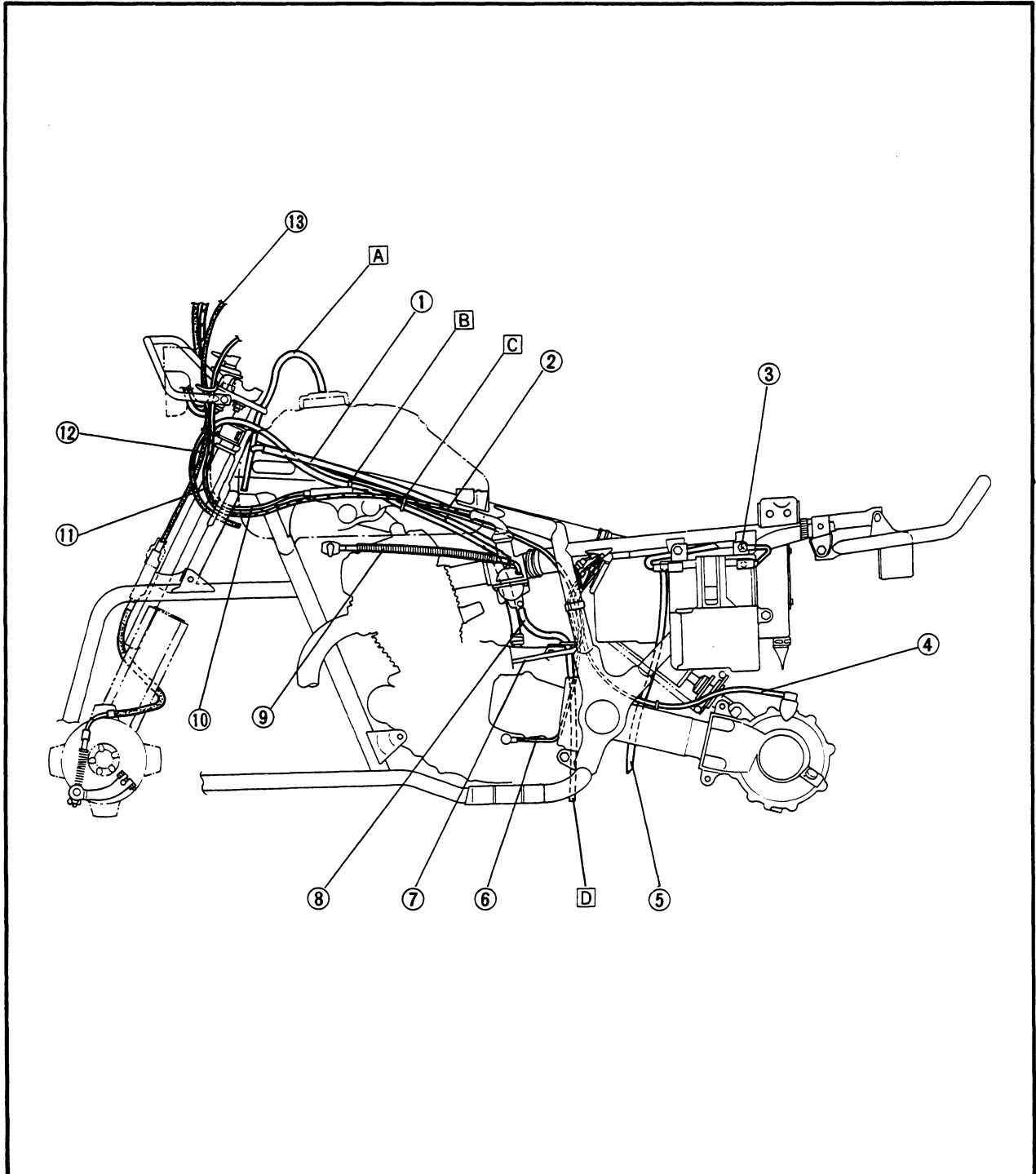
- ⑧ Handlebar switch lead
- ⑨ Rear brake cable
- ⑩ Front brake cable
- ⑪ Throttle cable
- ⑫ Starter cable
- ⑬ Brake cable
- ⑭ Equalizer
- ⑮ Wire harness

- A Clamp the rear brake cable and handlebar switch lead.
- B Connect the main switch leads, handlebar switch lead and wire harness in the headlight body.
- C Clamp the throttle cable and front brake cable.
- D Pass the wire harness, rear brake cable, front brake cable, throttle cable and air bleed pipe into the cable holder.

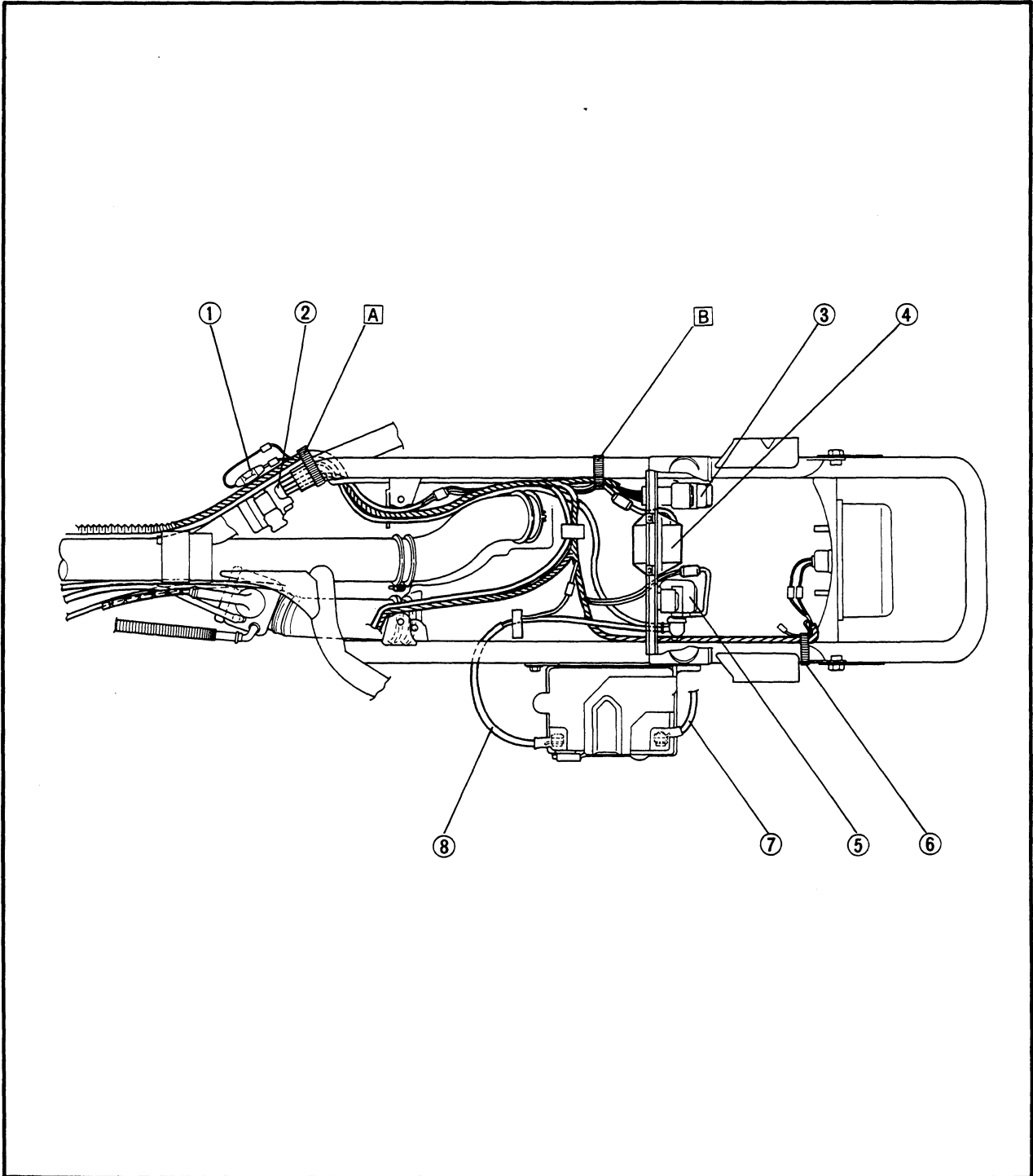


- ① Crankcase bleeder hose
- ② Throttle cable
- ③ Ground lead
- ④ Final gear case breather hose
- ⑤ Battery breather hose
- ⑥ Neutral switch lead
- ⑦ CDI magneto lead
- ⑧ Overflow pipe
- ⑨ Fuel pipe
- ⑩ Starter cable
- ⑪ Throttle cable
- ⑫ Front brake cable
- ⑬ Rear brake cable

- A Pass the fuel tank breather hose through the handlebar protector hole and left side the frame.
- B Clamp the air bleeder pipe and final gear case breather hose.
- C Clamp the all cables and pipes.

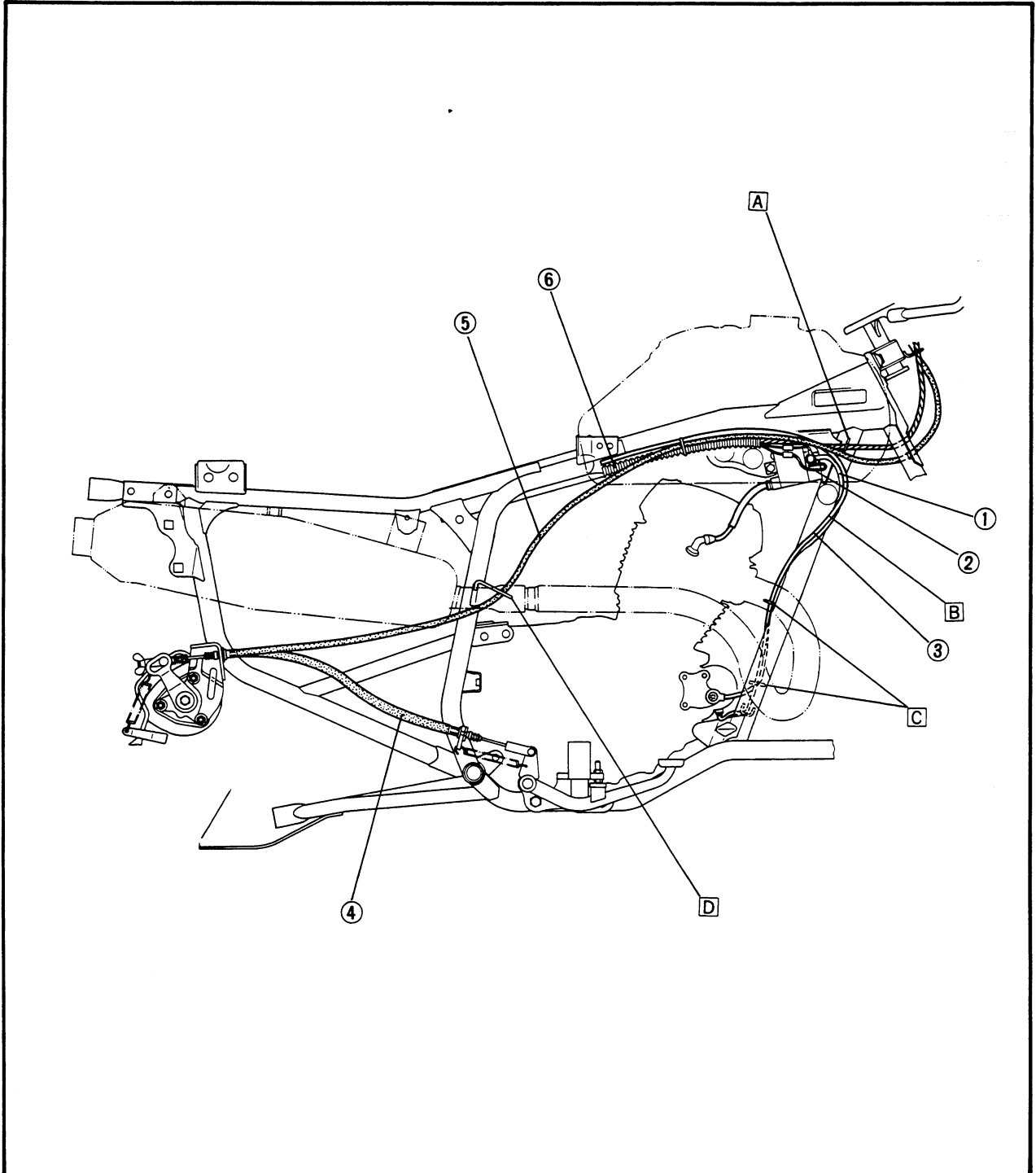


- ① Fuse
- ② CDI unit
- ③ Starting circuit cut-off relay
- ④ Rectifier with regulator
- ⑤ Starter relay
- ⑥ Band
- ⑦ Battery negative (-) lead
- ⑧ Battery positive (+) lead
- A Clamp the wire harness.
- B Clamp the all leads and cables.



- ① Negative lead
- ② Ignition coil lead
- ③ Starter motor cable
- ④ Rear brake cable (Brake pedal)
- ⑤ Rear brake cable (Handlebar)
- ⑥ Wire harness

- A Clamp the wire harness only.
- B Pass the starter motor lead upper side ignition coil.
- C Pass the starter motor cable into the cable guides.
- D Clamp the brake cable.





PERIODIC INSPECTION AND ADJUSTMENT

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

Item	Remarks	Initial			Every	
		1 month	3 months	6 months	6 months	1 year
Valve(s) *	Check valve clearance. Adjust if necessary.	○		○	○	○
Spark plug(s)	Check condition. Clean or replace if necessary.	○	○	○	○	○
Air filter	Clean. Replace if necessary.		○	○	○	○
Carburetor *	Check idle speed/starter operation. Adjust if necessary.		○	○	○	○
Fuel line *	Check fuel hose for cracks or damage. Replace if necessary.			○	○	○
Engine oil	Replace (Warm engine before draining).	○		○	○	○
Engine oil filter	Clean	○		○		○
Engine oil strainer	Clean	○		○		○
Final gear oil	Check oil level/oil leakage. Replace every 12 months.	○				○
Brake *	Check operation. Adjust if necessary.	○	○	○	○	○
Clutch *	Check operation. Adjust if necessary.	○		○	○	○
Decompression system *	Check operation. Adjust if necessary.			○	○	○
Wheels *	Check balance/damage/runout. Repair if necessary.	○		○	○	○
Wheel bearings *	Check bearings assembly for looseness/damage. Replace if damaged.	○		○	○	○
Steering system *	Check operation/replace if damaged. Check toe-in/adjust if necessary.	○	○	○	○	○
Knuckle shaft* / Lower arms* / Steering shaft *	Lubricate every 6 months.**			○	○	○
Fittings/Fasteners *	Check all chassis fittings and fasteners. Correct if necessary.	○	○	○	○	○
Battery *	Check specific gravity. Check breather pipe for proper operation. Correct if necessary.	○	○	○	○	○

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

ENGINE

CAM CHAIN TENSION ADJUSTMENT

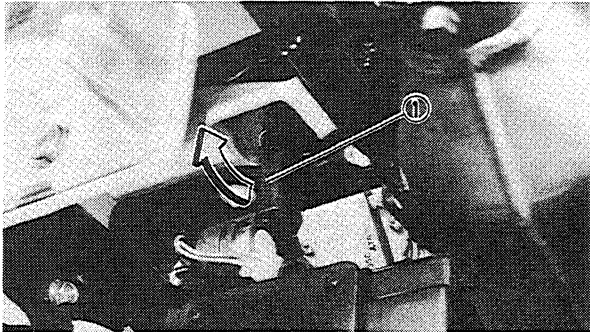
This model is has been equipped the automatic cam chain tensioner. No adjustment is necessary.

VALVE CLEARANCE ADJUSTMENT

Removal

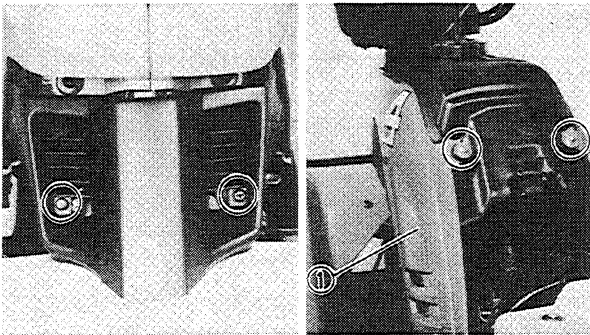
1. Remove:

- Seat
- Pull up the seat lock lever ①



2. Remove:

- Fuel tank cover ①



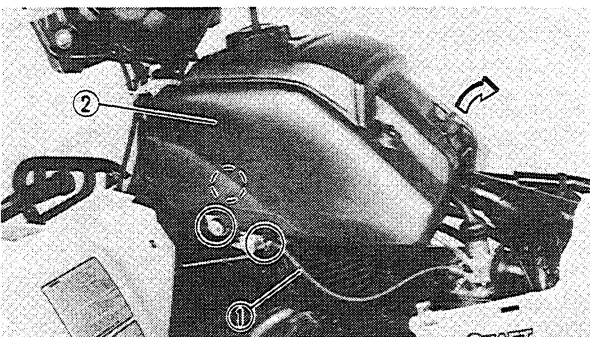
3. Turn the fuel cock lever to "OFF".

4. Disconnect:

- Fuel pipe ①

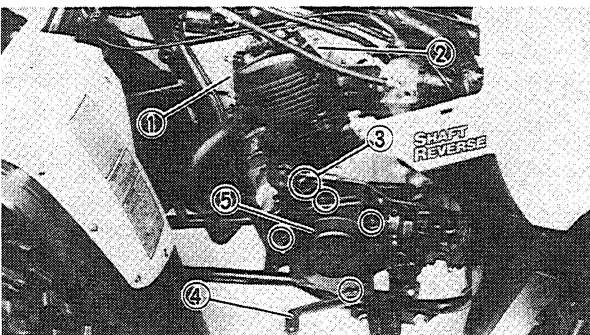
5. Remove:

- Fuel tank ②



6. Remove:

- Tappet cover (exhaust) ①
- Tappet cover (intake) ②
- Timing plug ③
- Change pedal ④
- Cover (starter pulley) ⑤



Adjustment

1. Measure:

- Valve clearance

Valve clearance measurement steps:

- Turn the starter pulley counterclockwise with wrench.

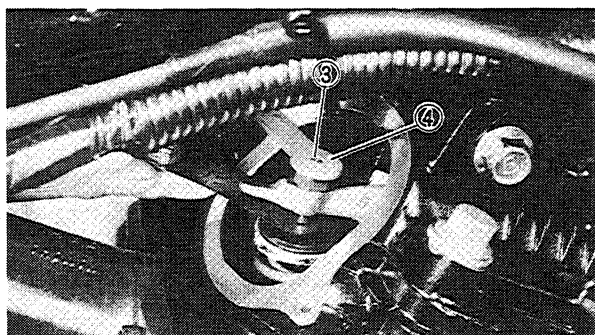
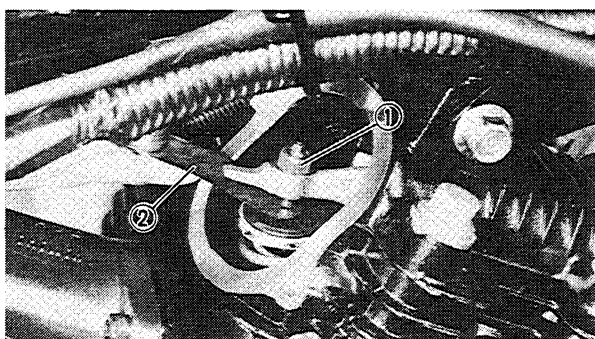
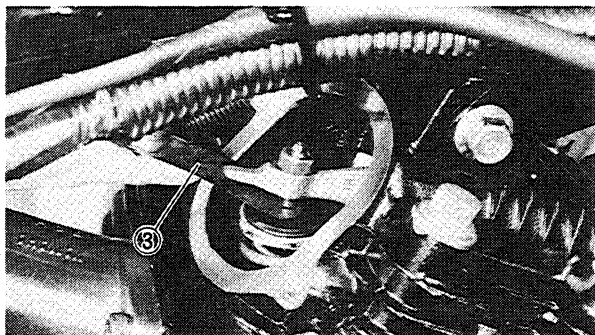
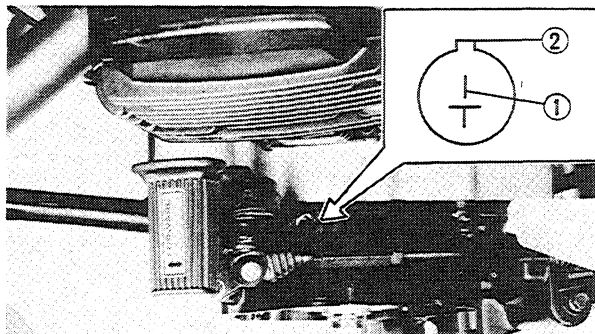
NOTE:

Valve clearance must be measured when the engine is cold to touch.

- Align the "T" mark ① on the flywheel with the stationary pointer ② on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

- Measure the valve clearance using a Feeler Gauge ③.

Out of specification → Adjust clearance.



Intake Valve (Cold):

0.05 ~ 0.09 mm (0.002 ~ 0.004 in)

Exhaust Valve (Cold):

0.11 ~ 0.15 mm (0.004 ~ 0.006 in)

2. Adjust:

- Valve clearance

Valve clearance adjustment steps:

- Loosen the locknut ①.
- Insert a Feeler Gauge ② between the adjuster end and the valve end.
- Turn the adjuster ③ clockwise or counterclockwise with the Valve Adjusting Tool ④ until proper clearance is attained.



Valve Adjusting Tool:

P/N YM-08035

P/N 90890-01311



Intake Valve (Cold):

0.05 ~ 0.09 mm (0.002 ~ 0.004 in)

Exhaust Valve (Cold):

0.11 ~ 0.15 mm (0.004 ~ 0.006 in)

VALVE CLEARANCE ADJUSTMENT/ IDLE SPEED ADJUSTMENT



- Hold the adjuster to prevent it from moving and thoroughly tighten the locknut.



Valve Clearance Adjusting Locknut:
14 Nm (1.4 m·kg, 10 ft·lb)

- Measure the valve clearance.
- If the clearance is incorrect, repeat above steps until the proper clearance is obtained.

Installation

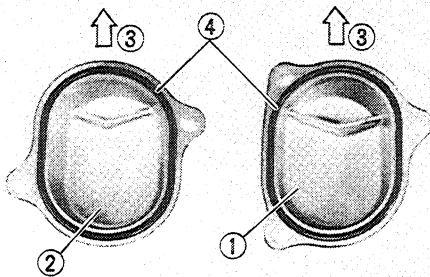
When installing the handlebar, reverse the removal procedure. Note the following points.

1. Install:
 - Cover (starter pulley)

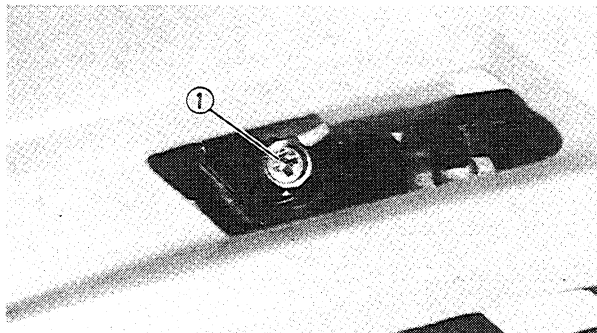
2. Install:
 - Tappet cover (exhaust) ①
 - Tappet cover (intake) ②

NOTE:

- Install the tappet covers with its ridge facing upward ③.
- Check the O-rings ④ for damage. If damaged, replace.



Tappet Cover:
10 Nm (1.0 m·kg, 7.2 ft·lb)

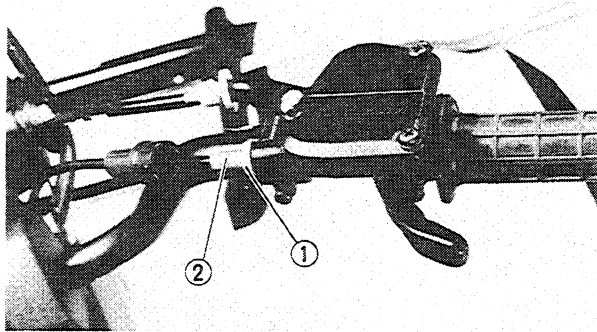
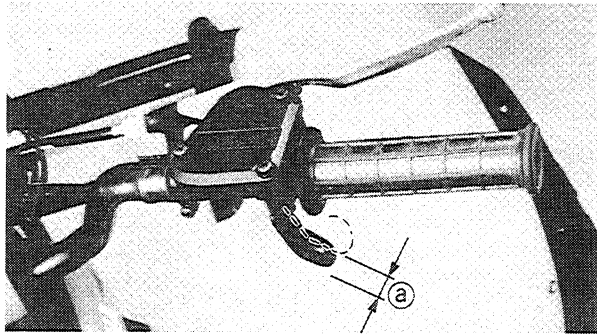


IDLE SPEED ADJUSTMENT

1. Adjust:
 - Idle speedWarm up the engine and turn the throttle stop screw ① to adjust.



Idle Speed:
1,350 ~ 1,450 r/min



THROTTLE LEVER ADJUSTMENT

NOTE: _____

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

1. Check:

- Throttle lever free play (a)
Out of specification → Adjust.



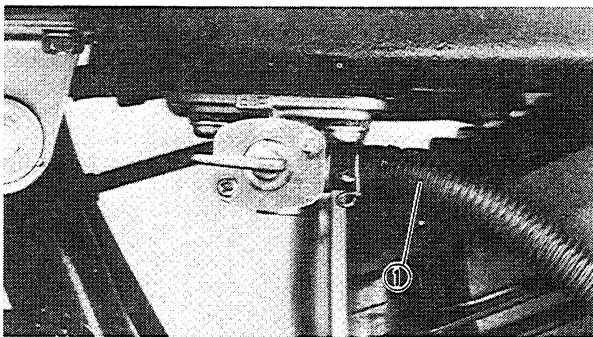
Throttle Lever Free Play (a) :
3 ~ 5 mm (0.12 ~ 0.20 in)

2. Adjust:

- Throttle lever free play

Throttle lever free play adjustment steps:

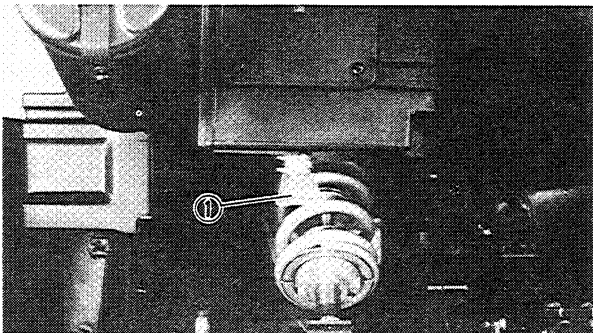
- Loosen the locknut (1).
- Turn the adjuster (2) clockwise or counter-clockwise until proper free play is attained.
- Tighten the locknut.



FUEL LINE INSPECTION

1. Inspect:

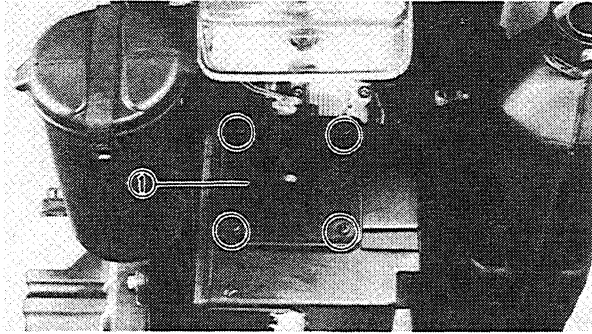
- Fuel hose (1)
Cracks/Damage → Replace.



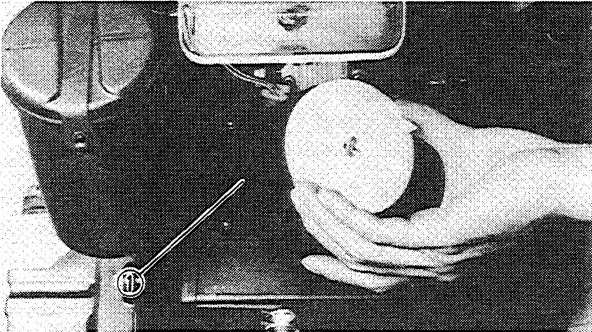
AIR FILTER CLEANING

NOTE: _____

There is a check hose (1) at the bottom of the air filter case. If dust and/or water collects in this hose, clean the air filter element and air filter case.



1. Remove:
 - Filter case ①



2. Remove:
 - Air filter element ②

⚠ 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:
 - SAE 10W30 motor 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:

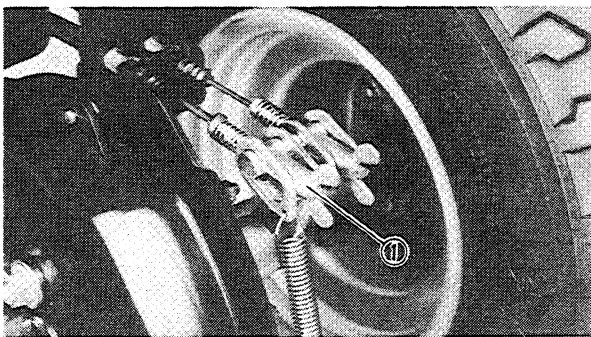
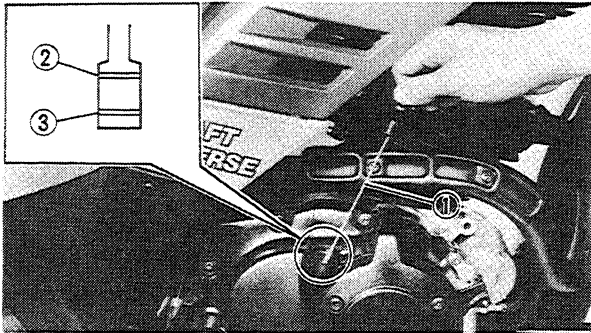
Make sure its sealing surface matches the sealing surface of the case so there is no air leak.

ENGINE OIL LEVEL INSPECTION

1. Inspect:
 - Engine oil level
Oil level low → Add sufficient oil.

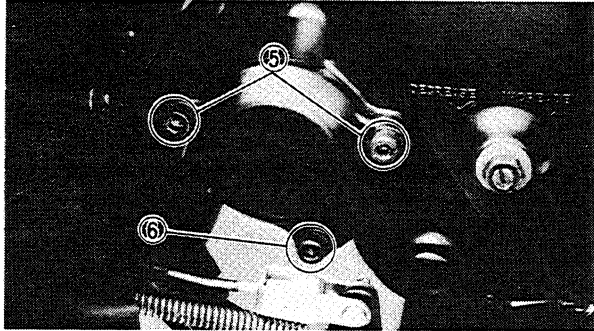
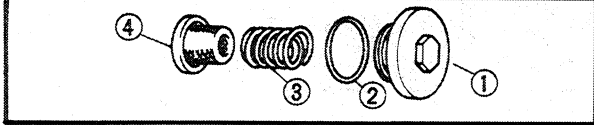
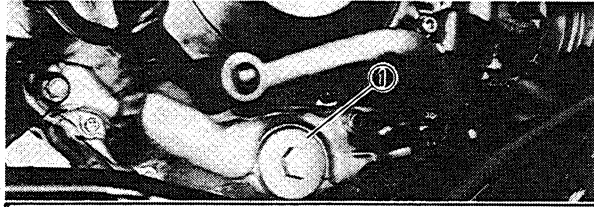
Engine oil level inspection steps:

- 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.



ENGINE 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. Loosen:
 - Adjuster (brake pedal) ①



5. Remove:

- Dip stick
- Drain plug ①
- Drain bolt ⑥

Drain the engine oil.

NOTE:

The oil filter cover is secured by two filter bolts ⑤ and the drain bolt ⑥. The drain bolt should be loosened until the thread portion comes out completely.

CAUTION:

When removing the drain plug ①, the compression spring ③, oil strainer ④ and O-ring ② will fall off. Take care not to lose these parts.

6. Inspect:

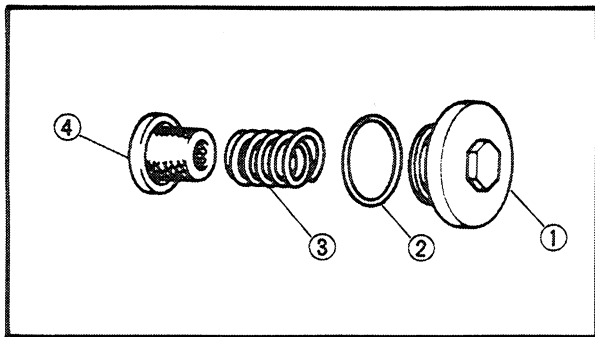
- O-rings
- Damage → Replace.



7. Tighten:

- Drain plug
- Drain bolt

CAUTION:


Before reinstalling the drain plug ①, do not forget to fit the O-ring ②, compression spring ③ and oil strainer ④.

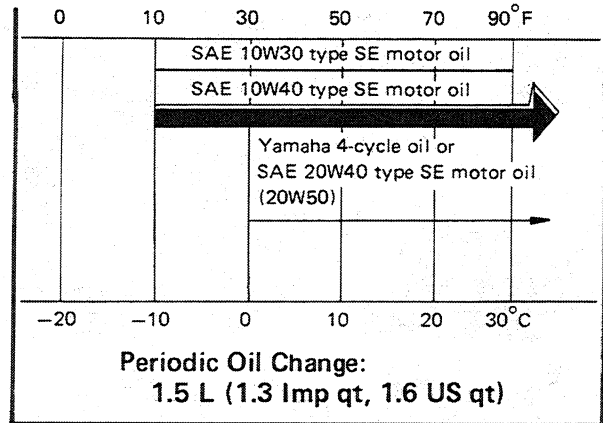


	Drain Plug:
	43 Nm (4.3 m·kg, 31 ft·lb)
	Drain Bolt:
	10 Nm (1.0 m·kg, 7.2 ft·lb)

8. Fill:

- Engine

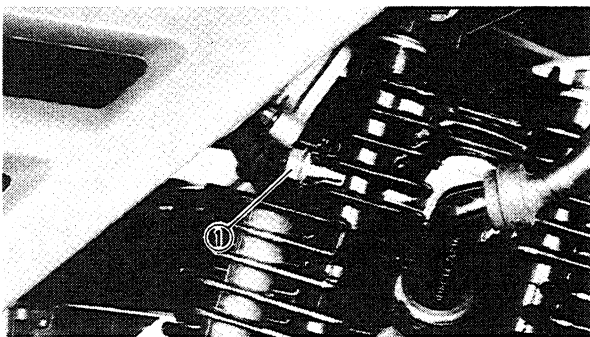
	Recommended Oil:
	YAMALUBE 4 (20W40) or
	SAE20W40 type SE motor oil



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 allow foreign material to enter the engine.

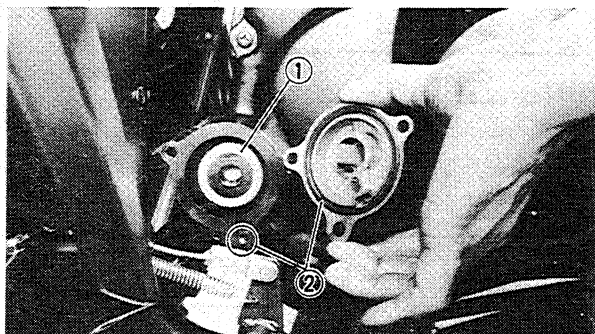
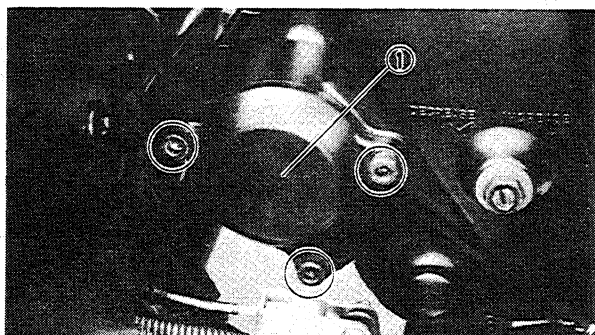
9. Install:
 - Dipstick
10. Inspect:
 - Oil leaks
 - Oil level
11. Inspect:
 - Oil flow



Oil flow inspection steps:

- Slightly loosen the oil gallery bolt ① in the cylinder head.
- Start the engine and keep it idling until oil begins to seep from the oil gallery bolt. If no oil comes out after one minute, turn the engine off so it will not seize.
- Restart the engine after solving the problem(s), and recheck the oil pressure.
- Tighten the oil gallery bolt to specification.

 **Oil Gallery Bolt:**
7 Nm (0.7 m·kg, 5.1 ft·lb)



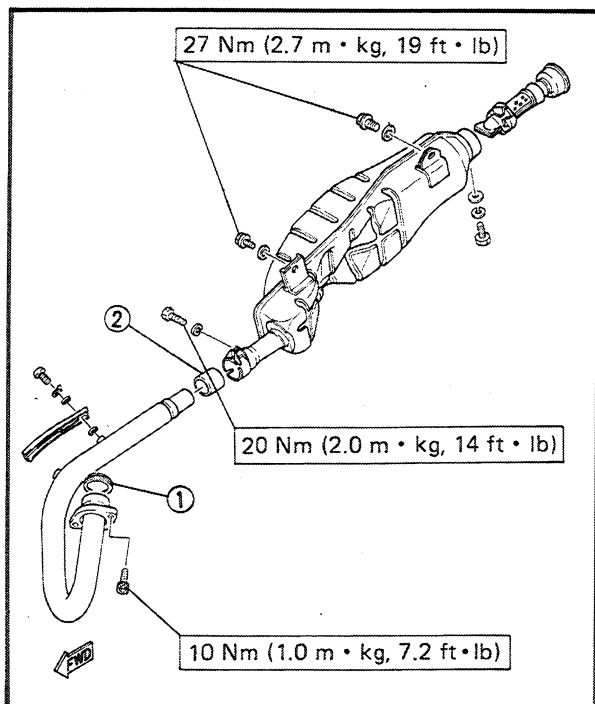
OIL FILTER REPLACEMENT

When replacing the oil filter, repeat the engine oil replacement procedure. However, note the following points.

1. Remove:
 - Oil filter cover ①
 - Drain the engine oil.
2. Remove:
 - Oil filter element ①
3. Clean:
 - Oil filter element
 - Clean it with solvent.
4. Inspect:
 - O-rings ②
 - Oil filter element
 - Damage → Replace.
5. Tighten:
 - Drain plug
 - Drain bolt
 - Bolts (filter cover)




- Drain Plug:**
43 Nm (4.3 m·kg, 31 ft·lb)
- Drain Bolt:**
10 Nm (1.0 m·kg, 7.2 ft·lb)
- Bolts (Filter Cover):**
10 Nm (1.0 m·kg, 7.2 ft·lb)



EXHAUST SYSTEM INSPECTION

1. Inspect:
 - Exhaust pipe gasket ①
 - Muffler clamp gasket ②
 - Damage → Replace.
 - Exhaust gas leakage → Repair.

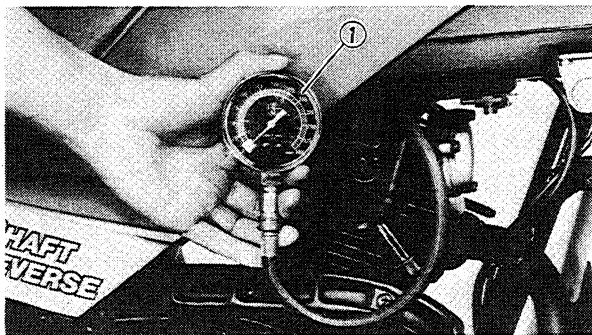
2. Tighten:
- Bolts (exhaust pipe)
 - Bolts (muffler)

	Bolts (Exhaust Pipe): 10 Nm (1.0 m·kg, 7.2 ft·lb)
	Bolt (Muffler and Exhaust Pipe): 20 Nm (2.0 m·kg, 14 ft·lb)
	Bolts (Muffler): 27 Nm (2.7 m·kg, 19 ft·lb)

COMPRESSION PRESSURE MEASUREMENT


NOTE: _____
Insufficient compression pressure will result in performance loss.

1. Measure:
 - Valve clearance
Out of specification → Adjust.
2. Warm up the engine, and stop it.
3. Remove:
 - Spark plug
4. Measure:
 - Compression pressure



Compression pressure measurement steps:

- Install the Compression Gauge ① .

	Compression Gauge: P/N YU-33223 P/N 90890-03081
---	--

- Crank over the engine with the electric starter (be sure the battery is fully charged) with the throttle wide-open until the compression reading on the gauge stabilizes.
- Check readings with specified levels (See chart).



Compression Pressure (at sea level):

Standard:
883 kPa (9 kg/cm², 128 psi)

Minimum:
785 kPa (8 kg/cm², 114 psi)

Maximum:
981 kPa (10 kg/cm², 142 psi)

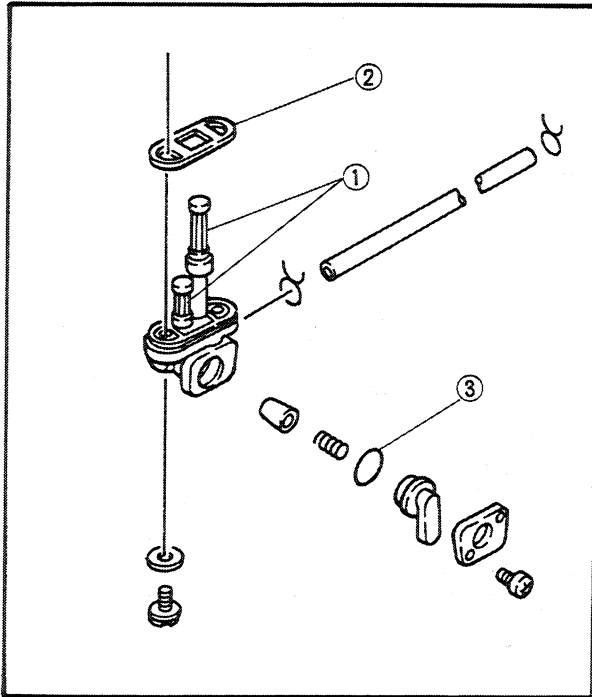
⚠ WARNING:

When cranking the engine, ground all of the spark plug lead to prevent sparking.

- If pressure falls below the minimum level:
 - 1) Squirt a few drops of oil into the affected cylinder.
 - 2) Measure the compression again.

**Compression Pressure
(with oil introduced into cylinder)**

Reading	Diagnosis
Higher than without oil	Worn or damaged pistons
Same as without oil	Defective ring(s), valves, cylinder head gasket or piston is possible.
Above maximum level	Inspect cylinder head, valve surfaces, or piston crown for carbon deposit.



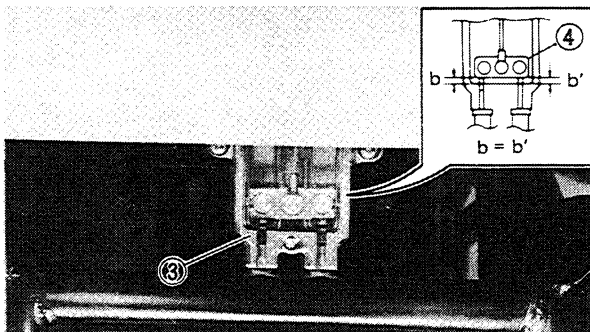
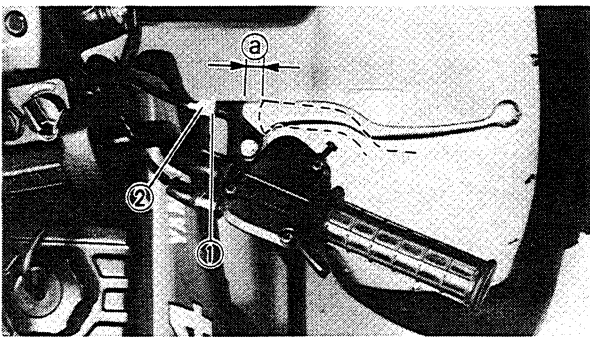
CHASSIS

FUEL COCK CLEANING

1. Turn the fuel cock lever to the "OFF".
2. Disconnect:
 - Fuel pipe
3. Remove:
 - Seat
 - 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.

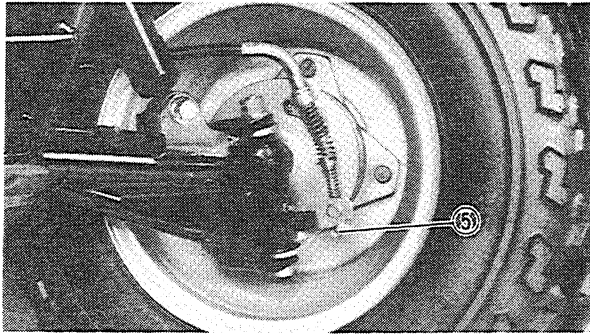


FRONT BRAKE LEVER ADJUSTMENT

1. Adjust:
 - Free play ①

Steps for front brake lever free play adjustment:

- Loosen the locknut ①, and fully turn in the adjuster (handlebar) ②.
- Visually check the cable joint ④ in the equalizer ③ to verify it is horizontal.
- If not, turn both adjusters (front hubs) ⑤ until the cable joints ④ is horizontal.
- If it is, turn the adjuster (handlebar) ② until the free play ① is within the specified limits.



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

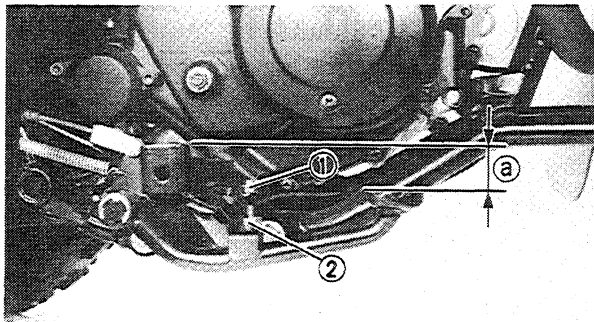
- Tighten the locknut (1).

REAR BRAKE LEVER AND PEDAL ADJUSTMENT

⚠ WARNING:

Always adjust both the brake pedal and the brake lever whenever adjusting the rear brake.

1. Adjust:
 - Pedal height (a)



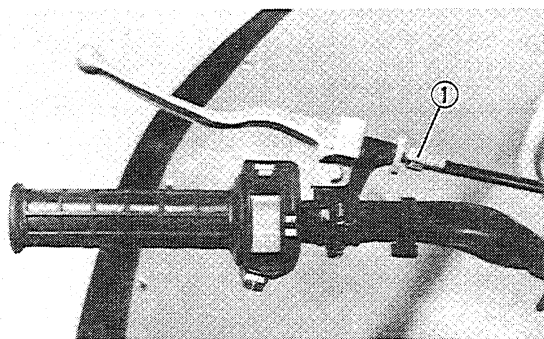
Brake pedal height adjustment steps:

- Loosen the locknut (1).
- Turn the adjuster (2) until the pedal height (a) is within the specified limits.



Pedal Height (a) :
5 mm (0.2 in)
Below the Footrest Top End

- Tighten the locknut.

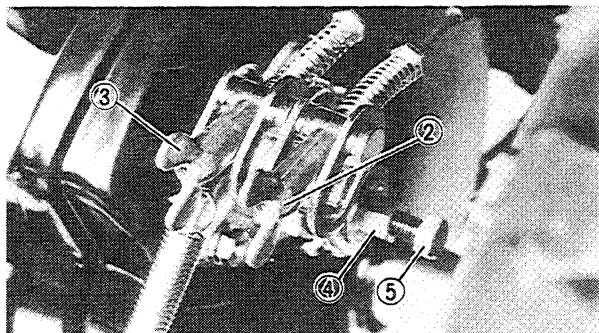


2. Adjust:
 - Free play (brake lever)
 - Free play (brake pedal)

Step for brake lever and brake pedal free play adjustment:

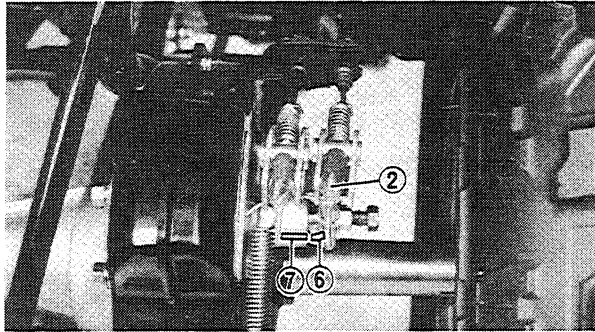
NOTE:

Before adjusting the free plays, pump the brake pedal 2 to 3 times.



- Fully loosen the brake lever cable adjuster (handlebar) (1).
- Fully loosen both brake lever cable adjuster (caliper) (2) and brake pedal cable adjuster (caliper) (3).
- Loosen the locknut (caliper) (4) and the adjusting bolt (caliper) (5).

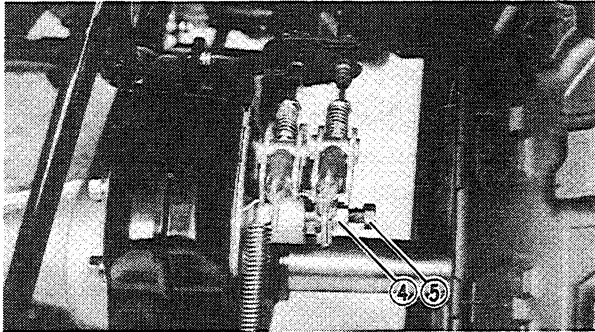
REAR BRAKE LEVER AND PEDAL ADJUSTMENT



- Screw in the brake lever cable adjuster ② to align the caliper lever match mark ⑥ with the caliper projection ⑦ .
- Slowly turn the adjusting bolt ⑤ clockwise by hand until resistance is felt.
- Turn it 1/4 counterclockwise.
- Tighten the locknut ④ .

⚠ CAUTION:

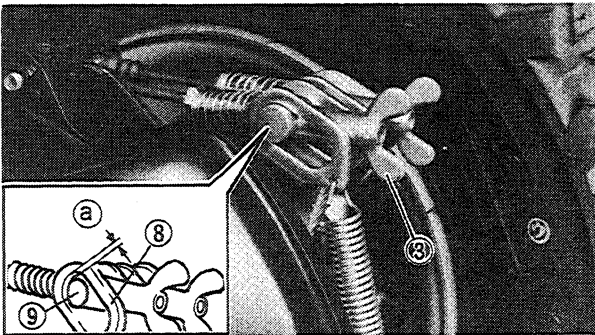
When tightening the locknut ④ , hold the adjusting bolt ⑤ with a spanner so that the adjusting bolt is not turned together with the locknut.



- Turn the brake pedal cable adjuster ③ clockwise until the gap ① is within the specified limits.



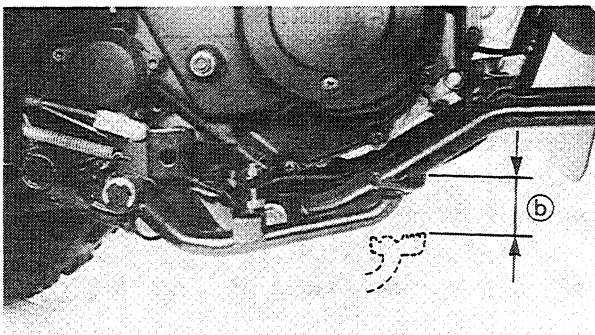
Gap ① :
0 ~ 1 mm (0 ~ 0.04 in)



- ⑧ Brake caliper lever ⑨ Pin

⚠ WARNING:

After this adjustment is performed, block the rear of the machine off the ground, and spin the rear wheels to ensure there is no brake drag. If any brake drag is noticed, perform the above steps again.

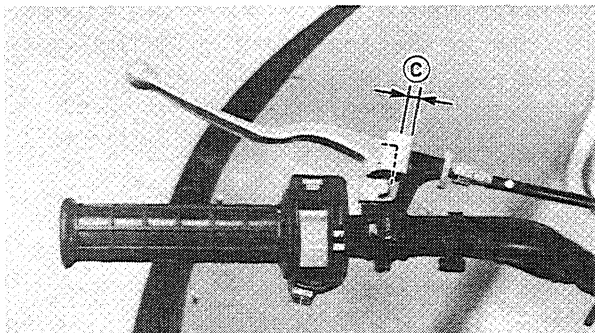


- Inspect the free play (brake pedal) ⑥ and then the free play (brake lever) ⑦ whether they are within specification. If the free play (brake pedal) ⑥ is not, perform the aforementioned steps again. If the free play (brake pedal) ⑥ is within specification and the free play (brake lever) ⑦ is not, go to the next steps.



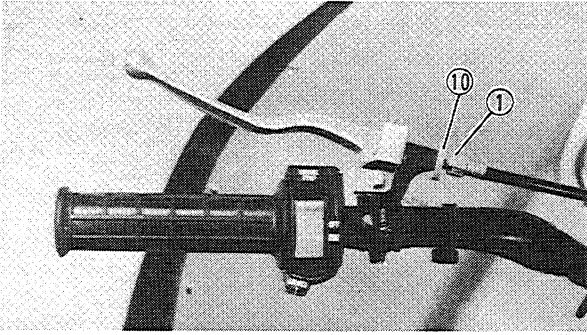
Free Play (Brake Pedal) ⑥ :
20 ~ 30 mm (0.8 ~ 1.2 in)

Free Play (Brake Lever) ⑦ :
5 ~ 8 mm (0.2 ~ 0.3)

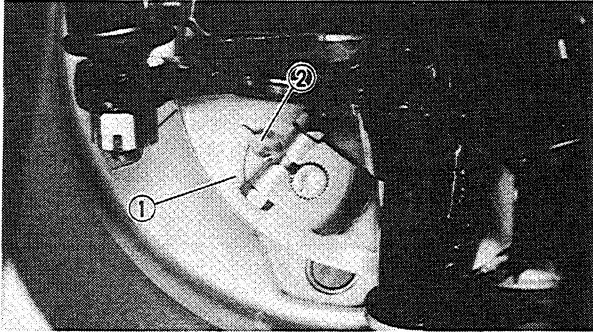


REAR BRAKE LEVER AND PEDAL ADJUSTMENT/ BRAKE LINING INSPECTION/BRAKE PADS INSPECTION/ CLUTCH ADJUSTMENT

INSP
ADJ

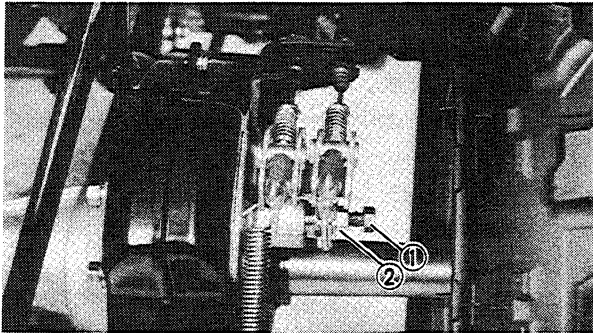


- Loosen the locknut (handlebar) ⑩ , and turn the brake lever cable adjuster (handlebar) ① until the free play (brake lever) is within the specification.
- Tighten the locknut (handlebar).



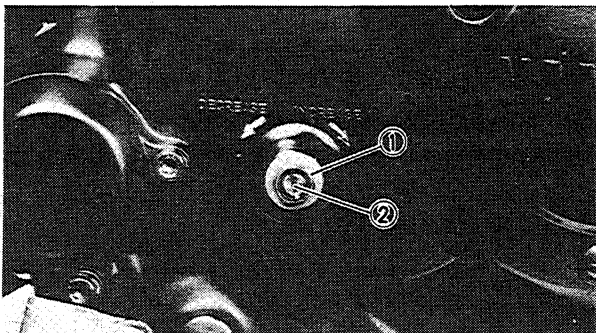
BRAKE LINING INSPECTION

1. Apply the front brake.
2. Inspect:
 - Wear indicator ②Indicator reaches the wear limit ① → Replace shoes.



BRAKE PADS INSPECTION

1. Inspect:
 - Brake padsAdjusting bolt ① comes close to touching the locknut ② due to use → Replace pads as a set.



CLUTCH ADJUSTMENT

1. Adjust:
 - Free play

Clutch free play adjustment steps:

- Loosen the locknut ① .
- Slowly turn the adjuster ② counterclockwise until resistance is felt.
- Turn it 1/8 clockwise.

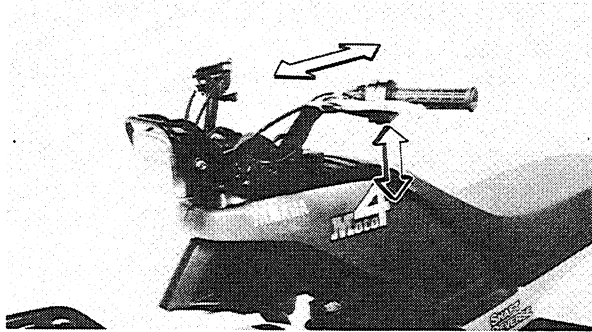
NOTE:

Turn the adjuster counterclockwise to decrease the clutch free play and turn it clockwise to increase the free play.

- Tighten the locknut.

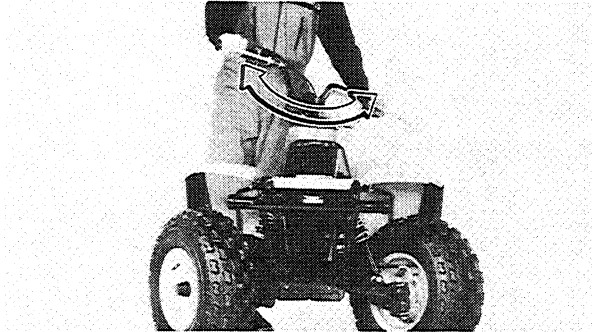


Clutch Locknut:
15 Nm (1.5 m·kg, 11 ft·lb)

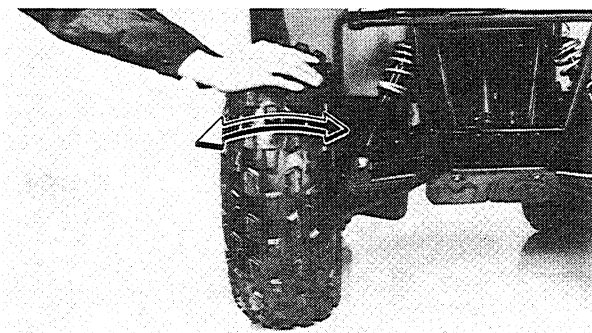
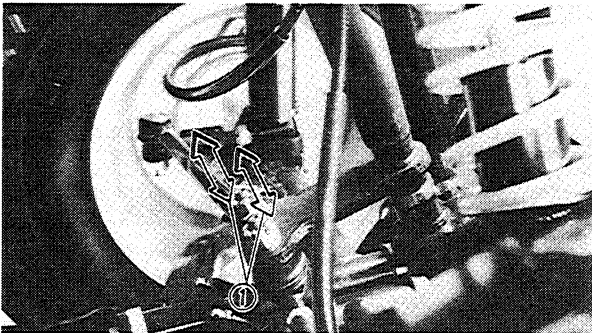


STEERING SYSTEM INSPECTION

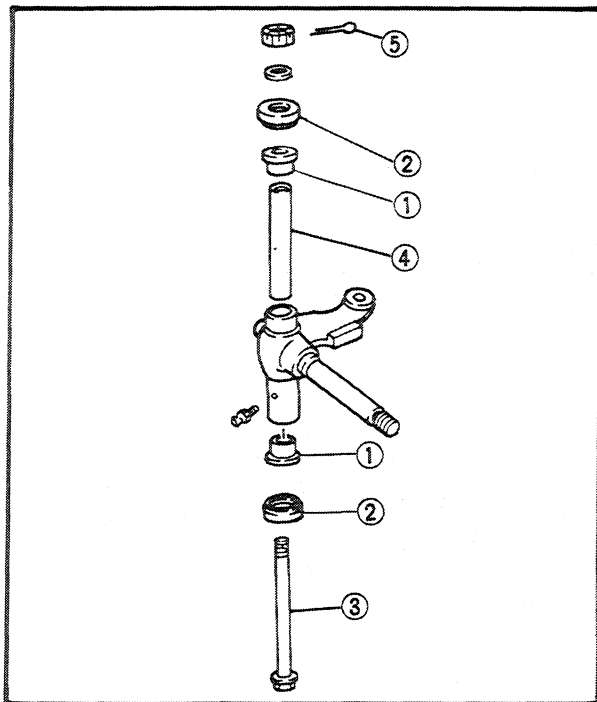
1. Place the machine on a level place.
2. Check:
 - Steering assembly bushings
Move the handlebar up and down, and/or back and forth.
Excessive play → Replace the steering shaft bushings.



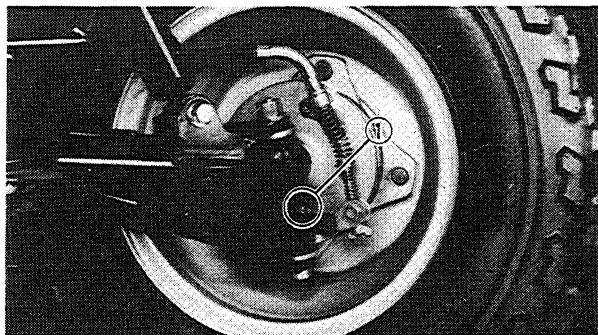
3. Check:
 - Tie-rod ends
Turn the handlebar to the left and/or right until it stops completely, then slightly move the handlebar from left to right.
Tie-rod end ① has any vertical play → Replace the tie-rod end(s).




4. Raise the front end of the machine so that there is no weight on the front wheels.
5. Check:
 - Knuckles and/or wheel bearings
Move the wheels laterally back and forth.
Excessive free play → Replace the following parts.

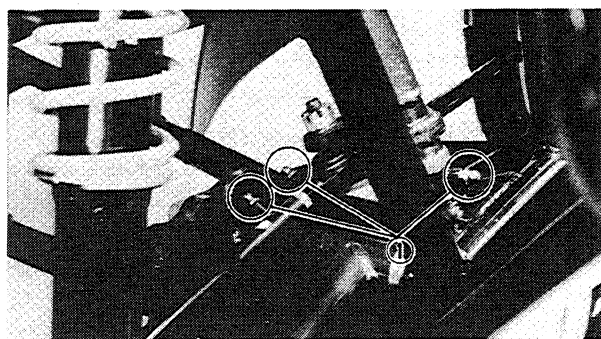


- 1) Wheel bearings and/or knuckle bushings ①
- 2) Thrust cover ②
- 3) Knuckle shaft(s) ③
- 4) Collar(s) ④
- 5) Cotter pin(s) ⑤



6. Lubricate:
- Pivot points (knuckle and steering shaft) ①
- Use a grease gun.

 Lithium Base Grease



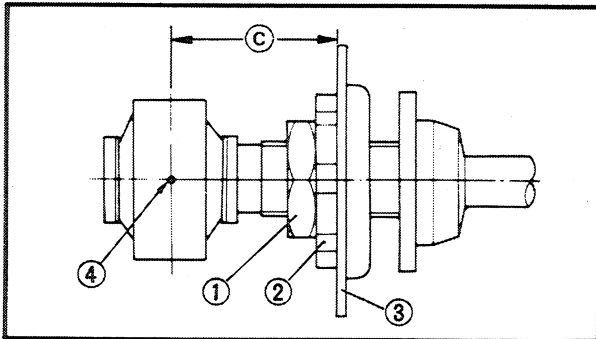
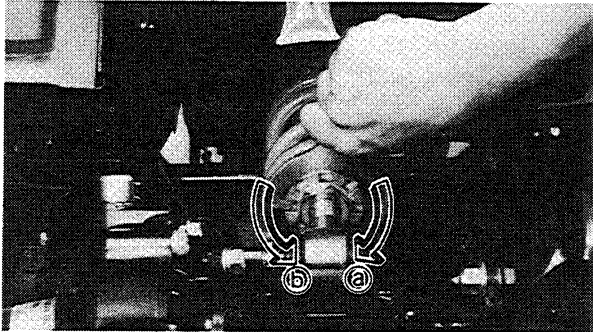
REAR SHOCK ABSORBER ADJUSTMENT

1. Adjust:

- Spring preload

NOTE:

The spring preload of the rear shock absorber can be adjusted to suit rider's preference, weight, and the course conditions.



Spring preload adjustment steps:

- Loosen the locknut ① .
- Adjust the spring preload with the adjuster ② .

Stiffer (a) → Increase the spring preload.
(Turn the adjuster clockwise.)

Softer (b) → Decrease the spring preload.
(Turn the adjuster counter-clockwise.)

NOTE:

- The spring preload is adjusted by changing the set length (c) of the spring seat ③ . When adjusting, use the special wrench which is included in the owner's tool kit.
- One complete turn of the adjuster will change the set length 1 mm (0.04 in). Make changes in increments of 10 mm (0.4 in) at a time.



Standard Set Length:

70 mm (2.76 in)

Minimum Set Length:

65 mm (2.56 in)

Maximum Set Length:

75 mm (2.95 in)

⚠ CAUTION:

Never attempt to turn the adjuster beyond the maximum or minimum setting.

- Tighten the locknut.



Locknut:

42 Nm (4.2 m·kg, 30 ft·lb)

⚠ CAUTION:

Always tighten the locknut against the spring adjuster and torque the locknut to specification.

WHEEL BEARINGS CHECK

1. Check:

- Front wheel bearings

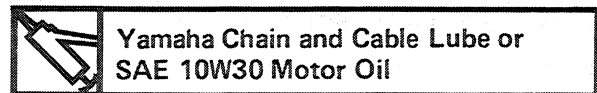
Raise the front end of the machine, and spin the wheel by hand. Touch the front frame or knuckle while spinning the wheel.

Excessive vibration → Replace bearings.

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.

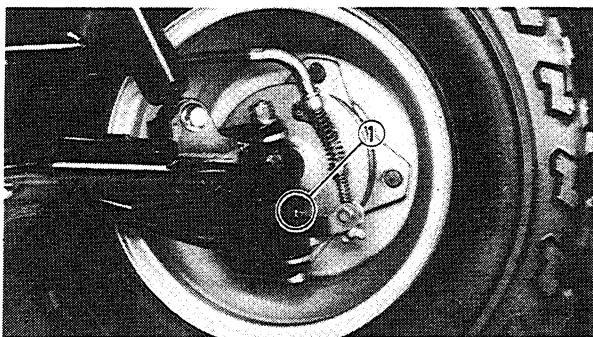
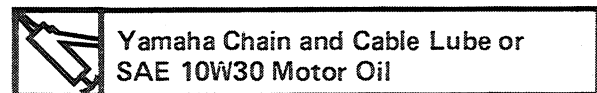
2. If the inner cables do not operate smoothly lubricate or replace them.



LEVERS, PEDAL, ETC. LUBRICATION

1. Lubricate:

- Pivot points

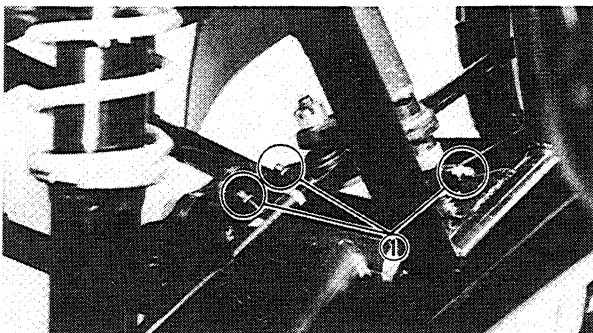
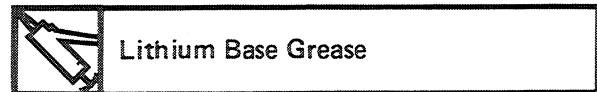


KNUCKLE SHAFTS, LOWER ARMS AND STEERING SHAFT LUBRICATION

1. Lubricate:

- Pivot points (knuckle shafts, lower arms and steering shaft) ①

Use a grease gun.





TIRES CHECK

⚠ WARNING:

This model is equipped with low pressure tires. Pay attention to the following points:

Recommended tire pressure:

19.6 kPa (0.2 kg/cm², 2.8 psi)

Vehicle load limit: 110 kg (243 lb)

Tire size: Front 22 x 8 – 10

Rear 22 x 10 – 8

- Excessive tire pressure (over 137 kPa (1.4 kg/cm², 20 psi)) may cause tire to burst. Inflate tires very slowly. Fast inflation could cause tire to burst.
- Too low a pressure (below 16.7 kPa (0.17 kg/cm², 2.4 psi)) could cause the tire to dislodge from the rim.
- Put the same pressure in both front and rear tires. Uneven tire pressure will severely affect the handling.
- Set tire pressures cold.

1. Measure:

- Tire pressure (cold tire pressure)

Out of specification → Adjust.

Use an appropriate low-pressure tire gauge.

Cold Tire Pressure	Front	Rear
Standard	19.6 kPa (0.2 kg/cm ² , 2.8 psi)	19.6 kPa (0.2 kg/cm ² , 2.8 psi)
Minimum	16.7 kPa (0.17 kg/cm ² , 2.4 psi)	16.7 kPa (0.17 kg/cm ² , 2.4 psi)

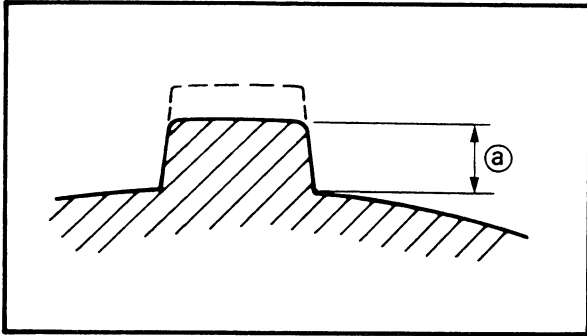
⚠ CAUTION:

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.

TIRES CHECK/WHEELS CHECK



2. Inspect:

- Tire surfaces

Wear/Damage → Replace.



Tire Wear Limit (a) :
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/Warping → Replace.

NOTE: _____

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

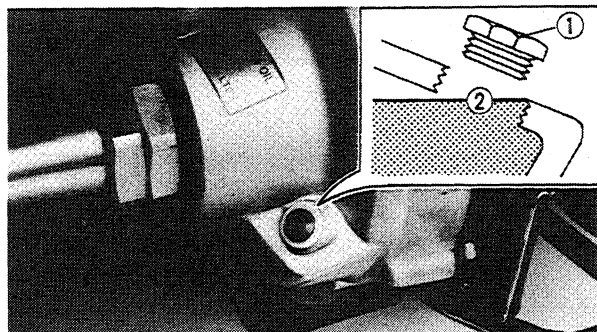
⚠ WARNING: _____

Never attempt even small repairs to the wheel.

FINAL GEAR OIL LEVEL INSPECTION

1. Inspect:

- Final gear oil level
Oil level low → Add sufficient oil.



Final gear oil level visual inspection steps:

- Place the machine on a level place.

NOTE:

The engine should be cool (at atmospheric temperature).

- Remove the oil filler cap ①.
- Visually check the oil level. Correct oil level ② should be at the brim of the hole.
- If the oil level is low, add sufficient oil.

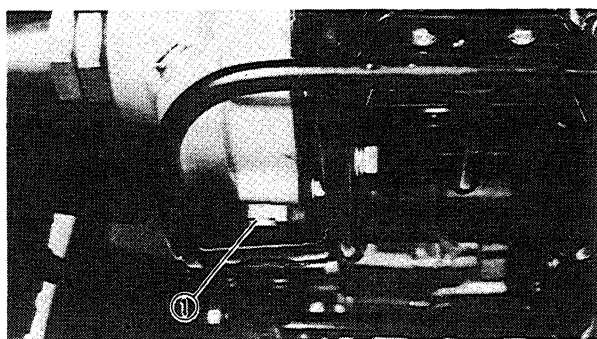
WARNING:

Take care not to allow foreign material to enter the final gear case.

- Tighten the oil filler cap.



Oil Filler Cap (Final Gear):
23 Nm (2.3 m·kg, 17 ft·lb)



FINAL GEAR OIL REPLACEMENT

1. Place an oil pan under the final gear case.

2. Remove:

- Oil filler cap
- Drain plug ①
Drain the oil.

3. Install:


- Drain plug



Drain Plug (Final Gear):
23 Nm (2.3 m·kg, 17 ft·lb)

4. Fill:

- Final gear case


	<p>Oil Quantity: 0.12 L (0.11 Imp qt, 0.13 US qt)</p> <p>Final Gear Oil: SAE 80 API "GL-4" Hypoid Gear Oil If desired, an SAE 80W90 Hypoid gear oil may be used for all conditions.</p>
---	---

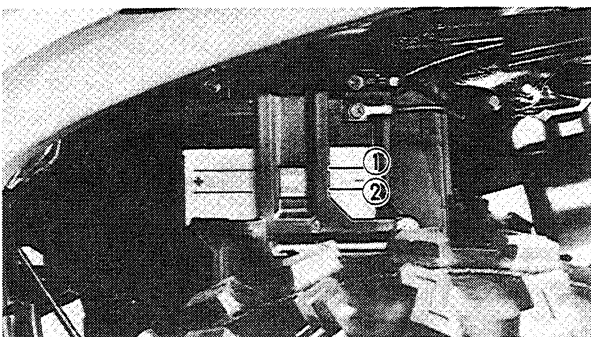
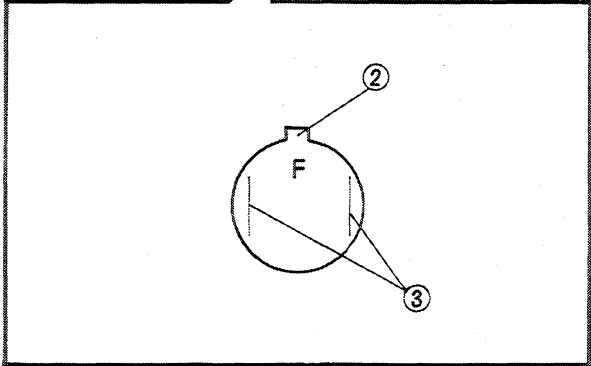
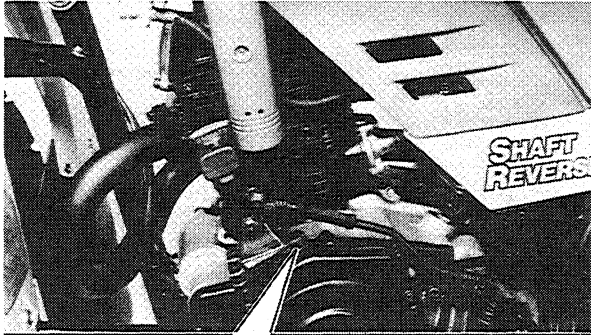
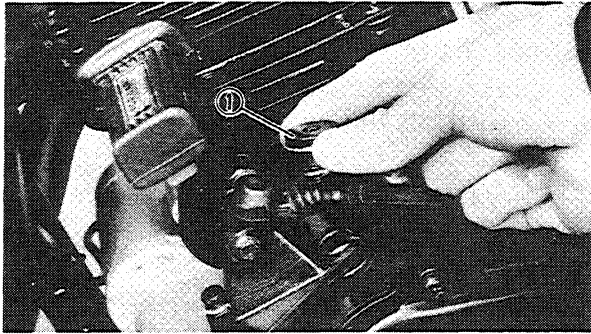
WARNING:

Take care not to allow foreign material to enter the final gear case.

5. Install:

- Oil filler cap

	<p>Oil Filler Cap (Final Gear): 23 Nm (2.3 m·kg, 17 ft·lb)</p>
---	---



ELECTRICAL

IGNITION TIMING CHECK

1. Remove:
 - Timing plug ①

2. Check:
 - Ignition timing

Ignition timing check steps:

- Connect the Timing Light ① to the spark plug lead.



Timing Light:
P/N YM-33277
P/N 90890-03109

- Warm up the engine and let it idle at the specified idle speed of 1,400 r/min.
- Visually check the stationary pointer ② on the crankcase cover to verify it is within the firing range ③ indicated on the flywheel.

Incorrect → Check flywheel and/or pick-up assembly (tightness and/or damage).

Refer to "CHAPTER 7. ELECTRICAL" for further information.

BATTERY INSPECTION

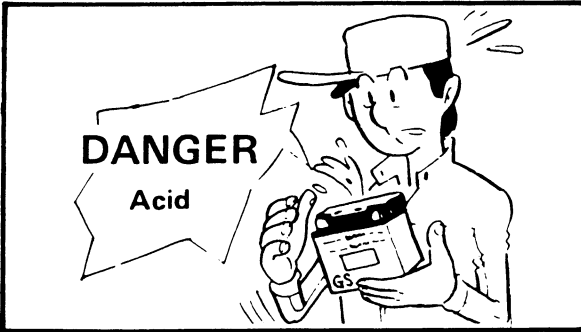
1. Inspect:
 - Battery fluid level
Battery fluid level low → Fill.
Fluid level should be between upper ① and lower ② level marks.

⚠ CAUTION:

Normal tap water contains minerals which are harmful to a battery; therefore, refill only with distilled water.

⚠ WARNING:

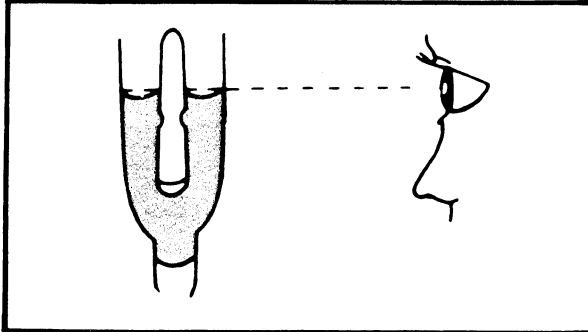
Battery electrolyte is poisonous and dangerous, causing severe burns, etc. It contains sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote: EXTERNAL-Flush with water. INTERNAL-Drink large quantities of water or milk.



Follow with milk of magnesia, beaten egg, or vegetable oil. Call a physician immediately.

Eyes: Flush with water for 15 minutes and get prompt medical attention. Batteries produce explosive gases. Keep sparks, flame, cigarettes etc., away. Ventilate when charging or using in an enclosed space. Always shield your eyes when working near batteries.

KEEP OUT OF REACH OF CHILDREN.



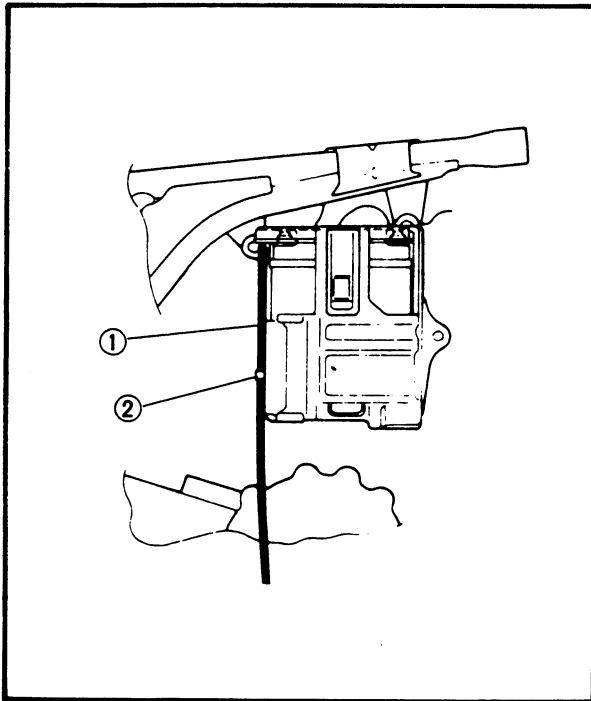
2. Remove:

- Rear fender
- Rear carrier
- Battery

3. Inspect:

- Battery fluid specific gravity
Out of specification → Charge.

Charging Current:
1.4 Amps/10 Hrs.
Specific Gravity:
1,280 at 20°C (68° F)



4. Install:

- Battery

5. Connect/Inspect:

- Battery breather hose ①

Be sure the hose is properly attached and routed.

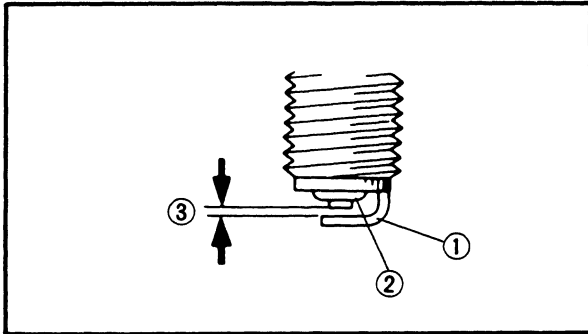
② Pass the battery breather hose through the clamp.

CAUTION:

When inspecting the battery, be sure the breather hose is routed correctly. If the breather hose touches the frame or exits in such a way as to cause battery electrolyte or gas to exit onto the frame, structural and cosmetic damage to the machine can occur.

6. Inspect:

- Battery breather hose
Obstruction → Remove.
Damage → Replace.



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 condition.

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.

For USA and Oceania:
D7EA (NGK) or
X22ES-U (NIPPON DENSO)
Except for USA and Oceania:
DR7ES (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)

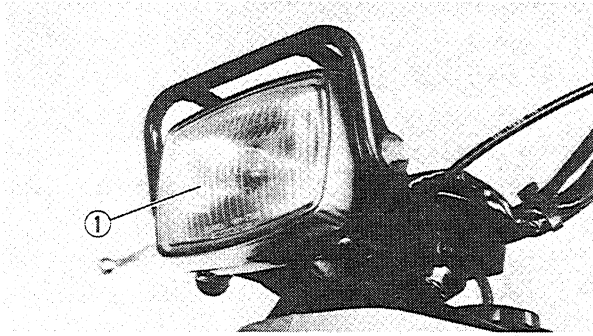
5. Tighten:

- Spark plug

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

 **Spark Plug:**
17.5 Nm (1.75 m·kg, 12.5 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.



HEADLIGHT BULB REPLACEMENT

1. Remove:
 - Headlight unit ①

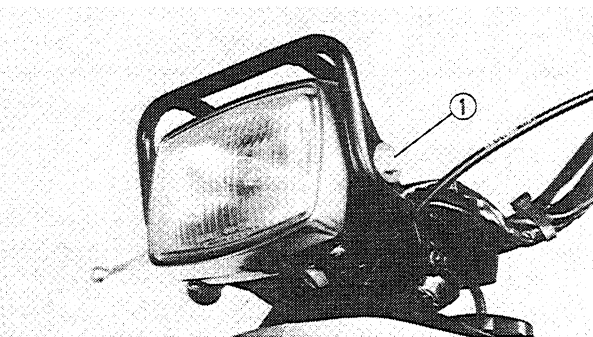


2. Remove:
 - Bulb
 - Turn the bulb holder ① counterclockwise to release bulb.

⚠ WARNING:

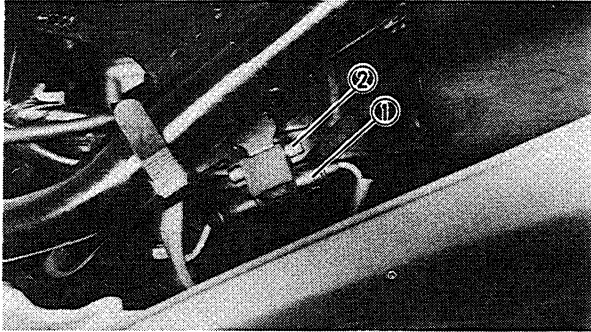
Keep flammable products or your hands away from the bulb while it is on, it will be hot. Do not touch the bulb until it cools down.

3. Install:
 - Bulb (new)
 - Secure the new bulb with the bulb holder.
4. Install:
 - Headlight unit



HEADLIGHT BEAM ADJUSTMENT

1. Adjust:
 - Headlight beam (vertically) ①



FUSE INSPECTION

1. Remove:
 - Rear fender
2. Inspect:
 - Fuse ①
Defective → Replace.
Blow fuse (new) → Inspect circuit.

② Spare fuse

⚠ CAUTION:

Do not use fuses of higher amperage rating than those recommended.

Substitution of a fuse of improper rating can cause extensive electrical system damage and possibly a fire.

Description	Amperage	Quantity
Main	10A	1
Reserve	10A	1

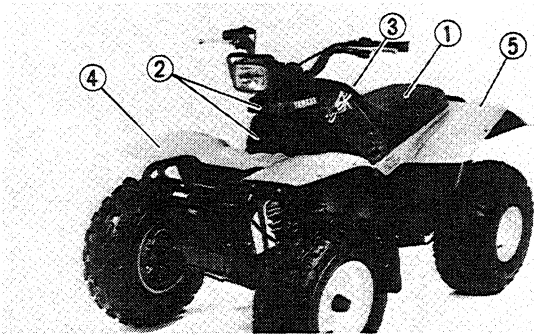


ENGINE OVERHAUL

ENGINE REMOVAL

NOTE:

- It is not necessary to remove the engine in order to remove the cylinder and/or the fly-wheel magneto assembly.
- It is necessary to remove the rear wheel drive assembly in order to remove the engine assembly.



FRONT FENDER AND REAR FENDER

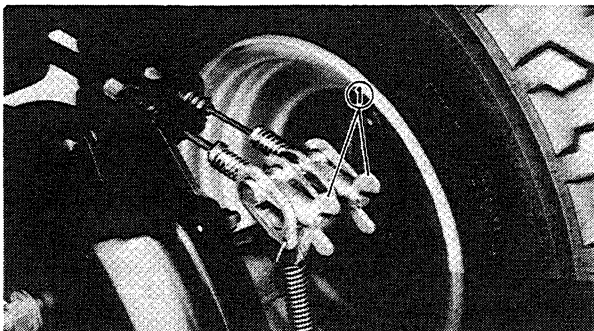
1. Remove:

- Seat ①
- Fuel tank cover ②
- Fuel tank ③
- Front fender ④
- Rear fender ⑤
- Front carrier (Except for USA)
- Rear carrier (Except for USA)

ENGINE OIL

1. Drain:

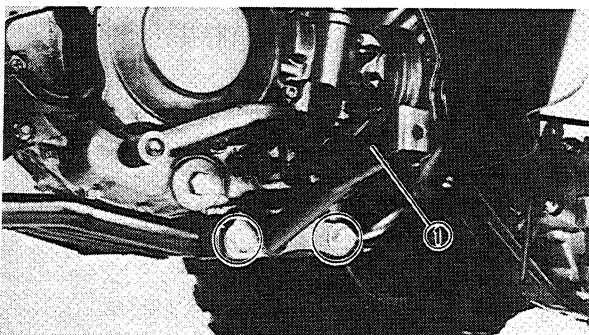
- Engine oil
- Refer to "ENGINE OIL REPLACEMENT" section in CHAPTER 3.



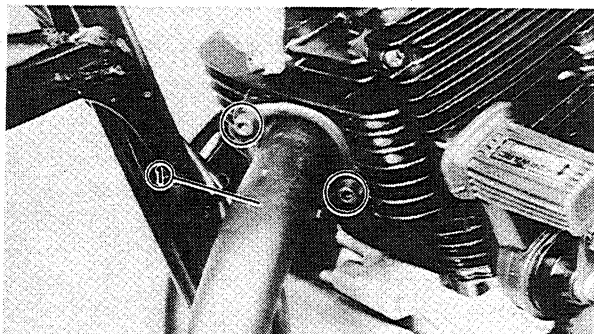
REAR BRAKE

1. Remove:

- Adjusters (brake lever and brake pedal) ①

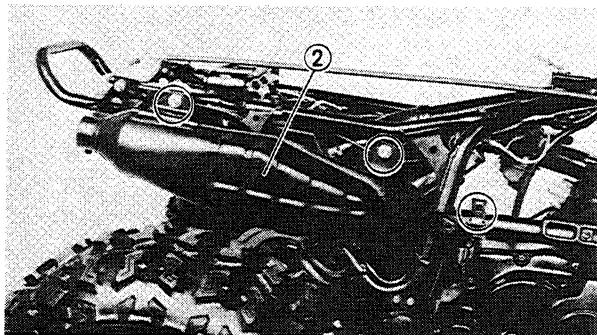


2. Remove:
- Footrest (left) ①



EXHAUST PIPE AND MUFFLER

1. Remove:
- Exhaust pipe ①
 - Muffler ②

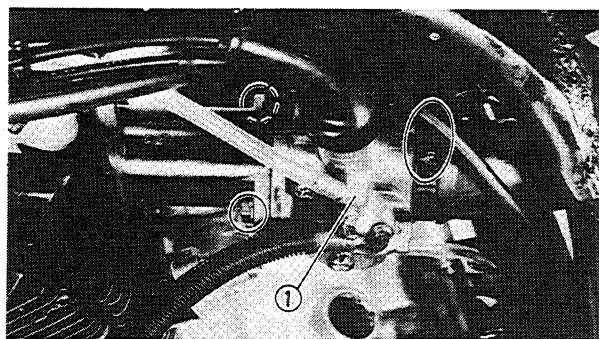


CARBURETOR

1. Remove:
- Carburetor ①

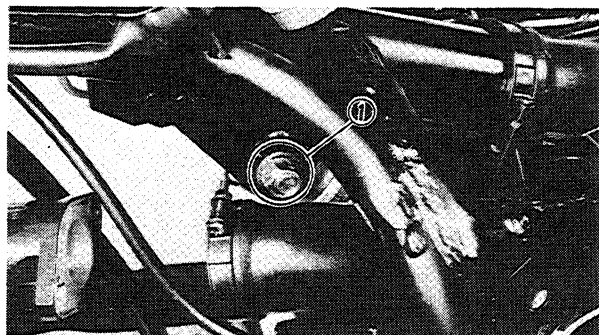
NOTE:

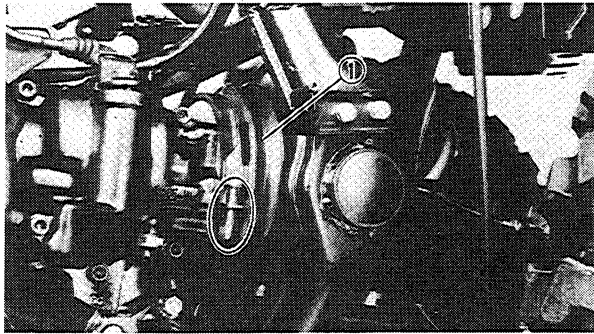
Noting the presence, location, and routing of all pipes, remove the carburetor.



REAR WHEEL DRIVE ASSEMBLY AND SWINGARM

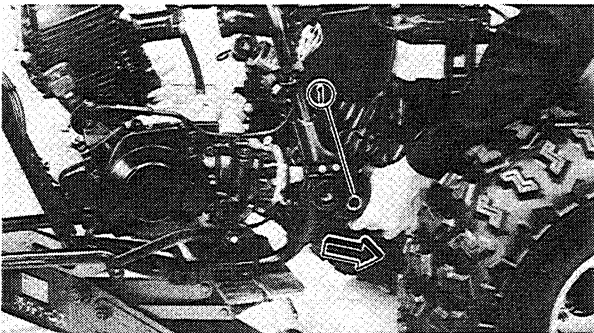
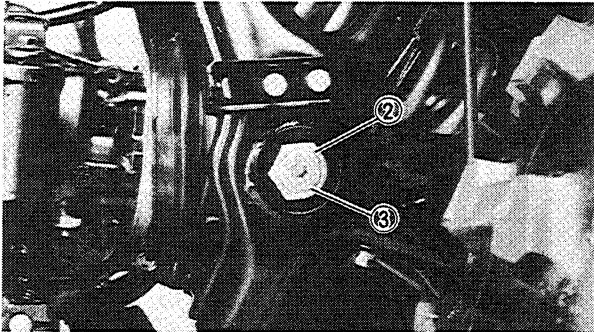
1. Remove:
- Bolts (rear shock absorber top) ①
2. Disconnect:
- Breather pipe (final gear housing)
3. Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.





4. Remove:

- Rubber boot ①
- Pivot shaft caps
- Locknuts (swingarm) ②
- Pivot shafts (swingarm) ③



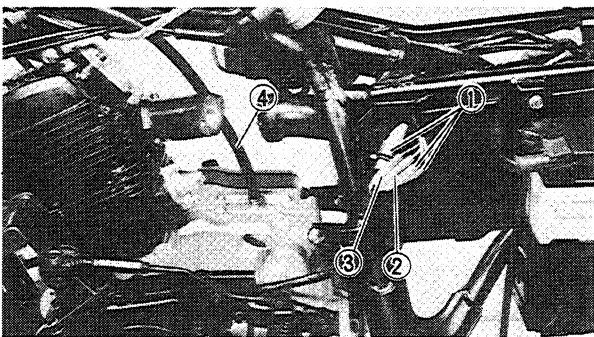
5. Remove:

- Rear wheel drive assembly and swingarm ①

NOTE:

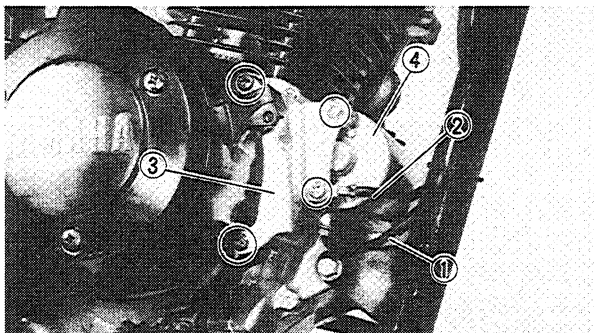
When removing the swingarm, the drive shaft, coupling gear, and spring will fall off.

Take care not to lose these parts.

**WIRINGS AND PIPE**

1. Disconnect:

- Spark plug lead
- CDI magneto leads ①
- "REVERSE" switch lead ②
- "NEUTRAL" switch lead ③
- Breather hose ④

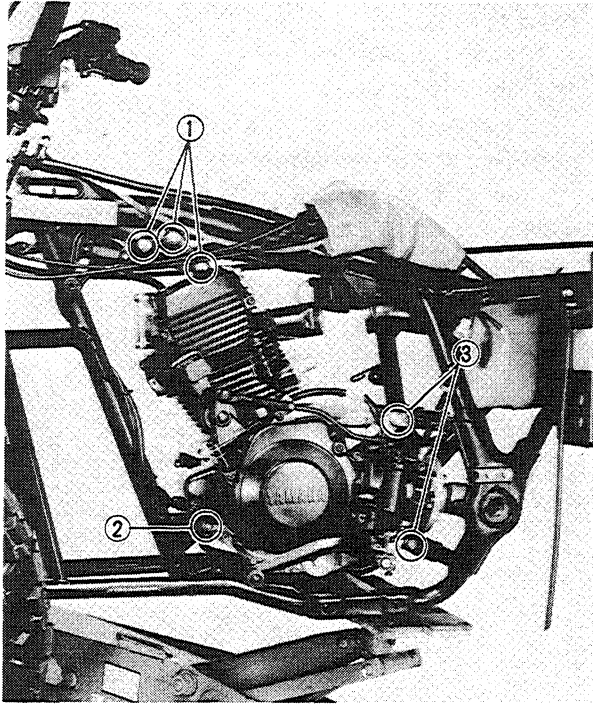
**STARTER MOTOR**

1. Disconnect:

- Starter motor lead ①
- Ground lead ②

2. Remove:

- Starter motor bracket ③
- Starter motor ④



ENGINE REMOVAL

1. Remove:

- Bolts (engine mounting-top) ①
- Bolts (engine mounting-front) ②
- Bolts (engine mounting-rear) ③

2. Remove:

- Engine
To the left.



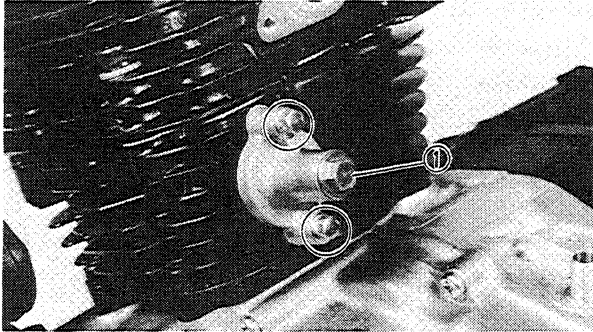
DISASSEMBLY

CYLINDER HEAD, CYLINDER AND PISTON

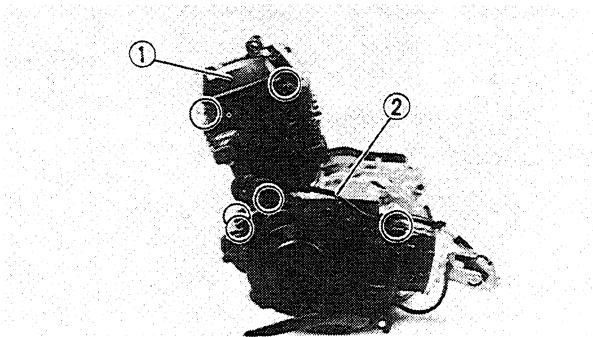
NOTE:

With the engine mounted, the cylinder head, cylinder and piston can be maintained by removing the following parts.

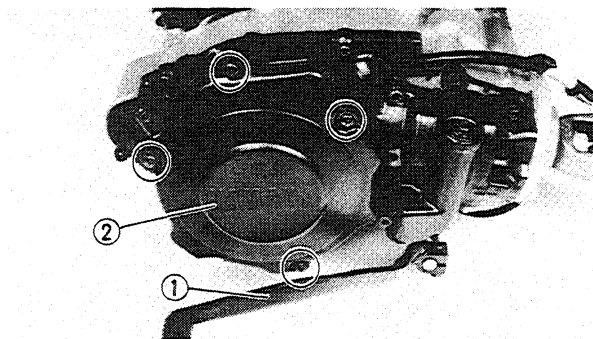
- Exhaust pipe
- Carburetor



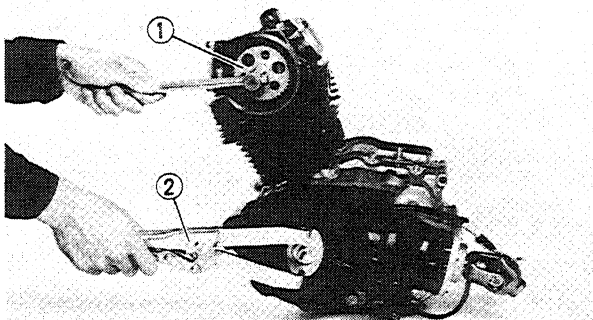
1. Remove:
 - Spark plug
 - Timing chain tensioner assembly ①



2. Remove:
 - Side cover (cylinder head) ①
 - Drive select lever assembly ②



3. Remove:
 - Change pedal ①
 - Starter pulley cover ②



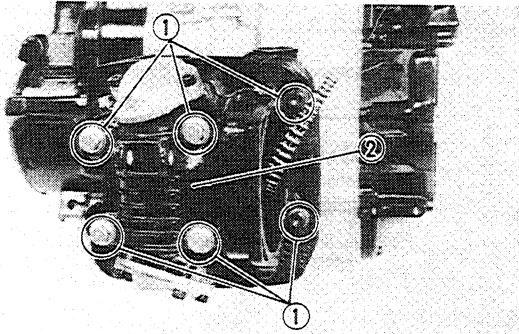
4. Remove:
 - Cam sprocket ①

NOTE:

- Use a Clutch Holder ② to hold the starter pulley when loosening the bolt (cam sprocket).
- When removing the cam sprocket, it is not necessary to separate the timing chain.

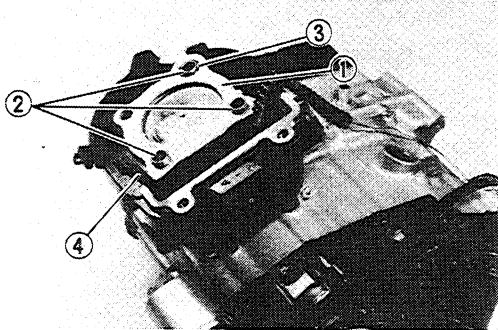


Universal Clutch Holder:
P/N YM-91042
P/N 90890-04086



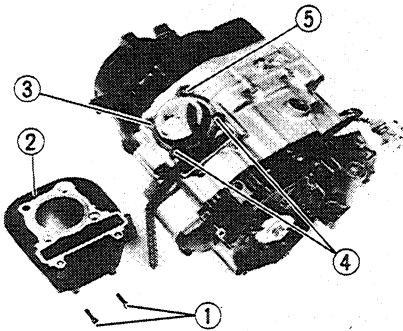
5. Remove:

- Bolts (cylinder head) ①
- Cylinder head ②



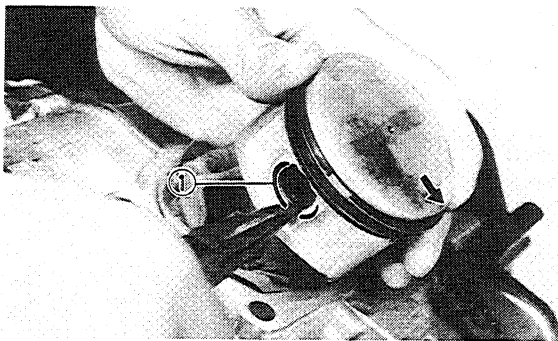
6. Remove:

- Gasket (cylinder head) ①
- Dowel pins ②
- O-ring ③
- Cam chain damper (exhaust) ④



7. Remove:

- Bolts (cylinder) ①
- Cylinder ②
- Gasket (cylinder) ③
- Dowel pins ④
- O-ring ⑤

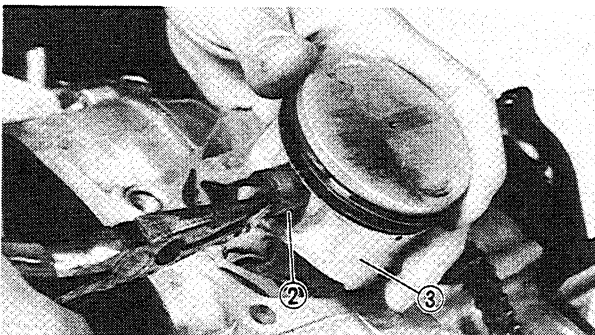


8. Remove:

- Piston pin clip ①
- Piston pin ②
- Piston ③

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.
- 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.



Piston Pin Puller:
P/N YU-01304
P/N 90890-01304

CAUTION:

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

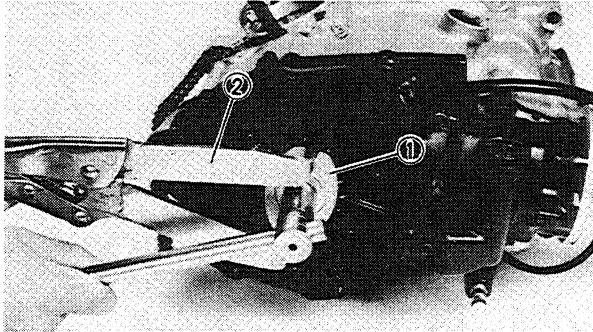


CDI MAGNETO

NOTE:

With the engine mounted, the CDI Magneto can be maintained by removing the following parts.

- Change pedal



1. Remove:

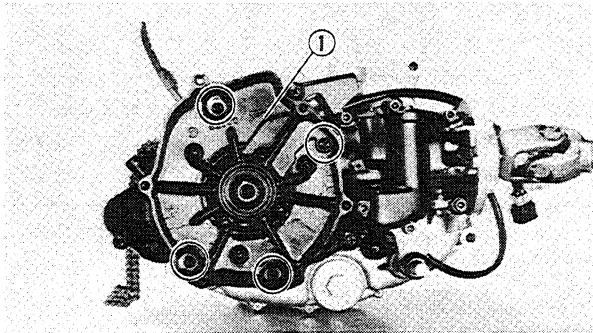
- Starter pulley ①

NOTE:

Use the clutch Holder ② to hold the starter pulley when loosening the bolt (starter pully).

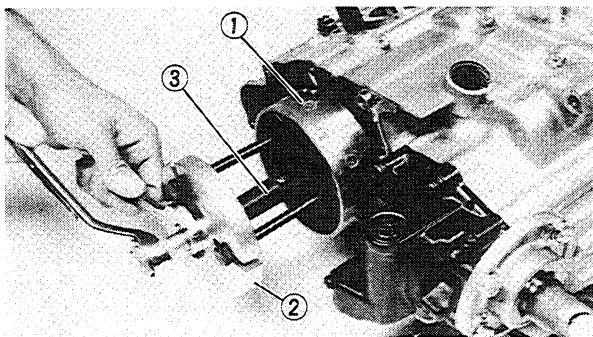


Universal Clutch Holder:
P/N YM-91042
P/N 90890-04086



2. Remove:

- Screws (spacer)
- Crankcase spacer (left) ①
- Gasket
- Dowel pins



3. Remove:

- CDI magneto ①

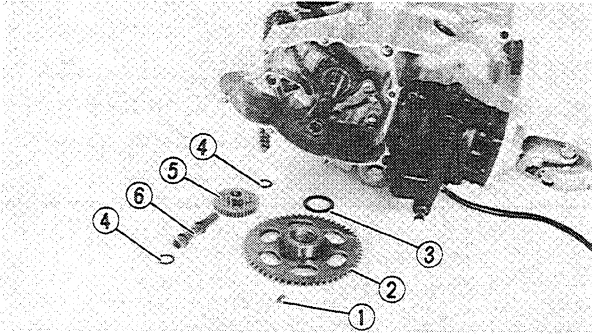
NOTE:

Use the Flywheel puller ② and Attachment ③ .



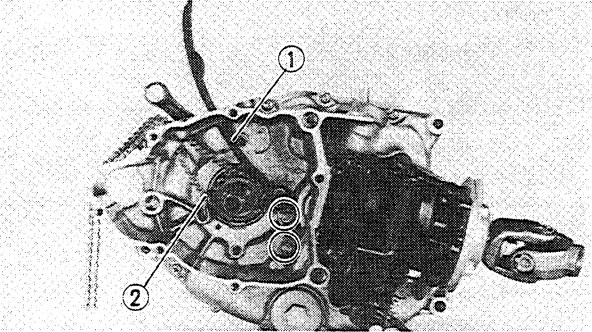
Flywheel Puller:
P/N YU-33270
P/N 90890-01362

Attachment:
P/N YU-33278
P/N 90890-04087



4. Remove:

- Woodruff key ①
- Starter idle gear # 2 ②
- Plain washer ③
- Washer ④
- Starter idle gear # 1 ⑤
- Shaft ⑥



5. Remove:

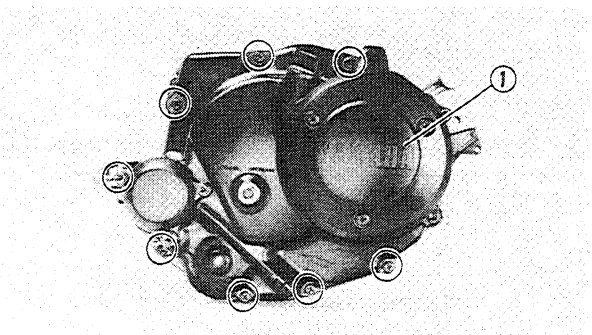
- Timing chain damper (intake) ①
- Timing chain ②

CLUTCH

NOTE:

With the engine mounted, the clutch can be maintained by removing the following parts.

- Footrest (Right)

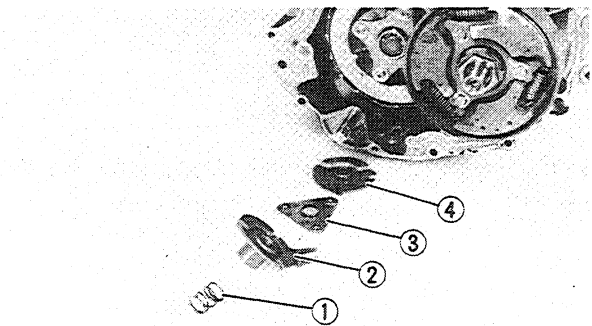


1. Remove:

- Clutch cover ①
- Dowel pins
- Gasket

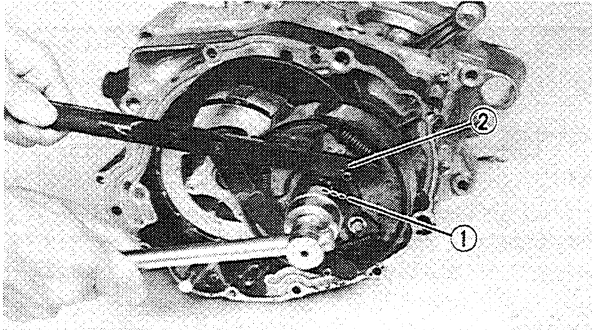
NOTE:

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



2. Remove:

- Clutch lever spring ①
- Shift guide #1 ②
- Pawl holder ③
- Shift guide #2 ④



3. Straighten:

- Lock washer tabs

4. Remove:

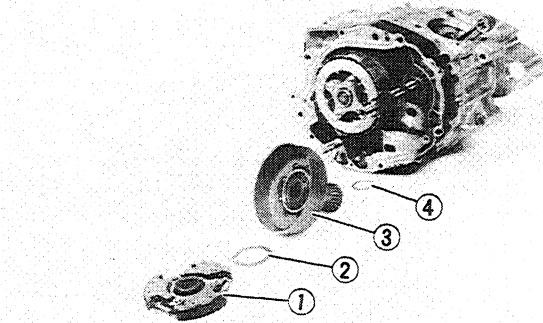
- Nuts (primary clutch) (1)

NOTE:

Use the Rotor Holder (2) to hold the clutch shoe assembly when loosening the nut (primary clutch).

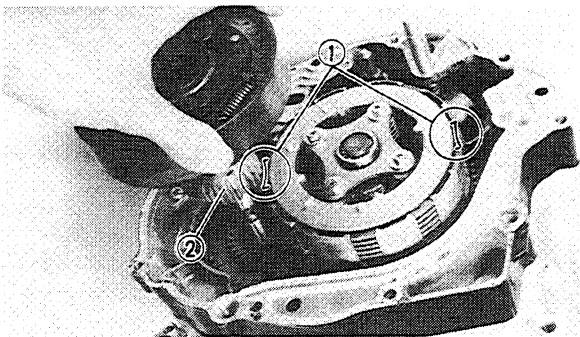


Rotor Holder:
P/N YU-01235
P/N 90890-01235

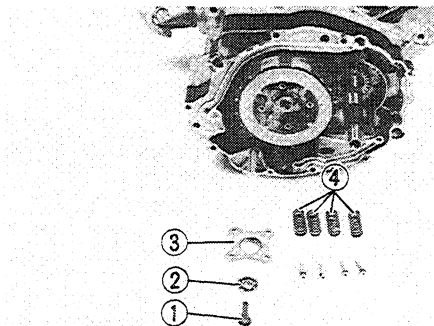


5. Remove:

- Lock washer
- Clutch carrier assembly (1)
- Plain washer (2)
- Clutch housing comp. (3)
- Plain washer (4)

**NOTE:**

The secondary clutch housing has two notches (1) machined into it to permit the primary drive gear behind the primary clutch to clear the secondary clutch. Align one of these notches with the primary gear (2) before removing the primary clutch assembly.

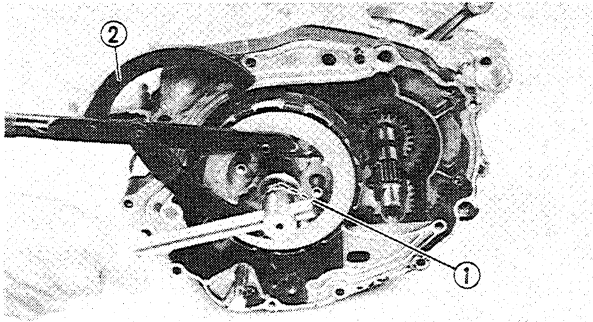


6. Remove:

- Push rod (1)
- Bearing (2)
- Clutch spring plate (3)
- Clutch springs (4)

7. Straighten:

- Lock washer tabs (clutch boss)



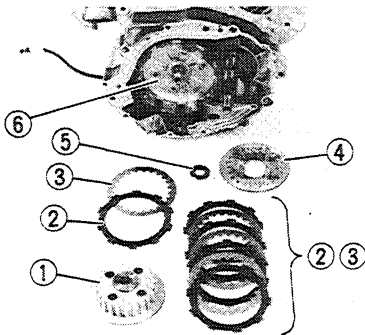
8. Remove:
- Nut (clutch boss) ①
 - Lock washer

NOTE:

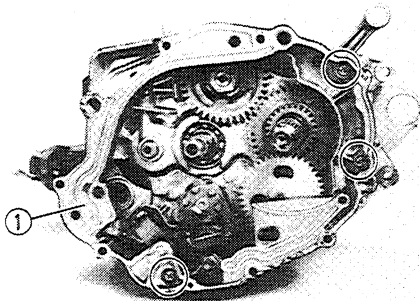
Use the Rotor Holder ② to hold the clutch boss when loosening the nut (clutch boss).



Rotor Holder:
P/N YU-01235
P/N 90890-01235



9. Remove:
- Clutch boss ①
 - Friction plates ②
 - Clutch plates ③
 - Pressure plate ④
 - Thrust washer ⑤
 - Clutch housing ⑥

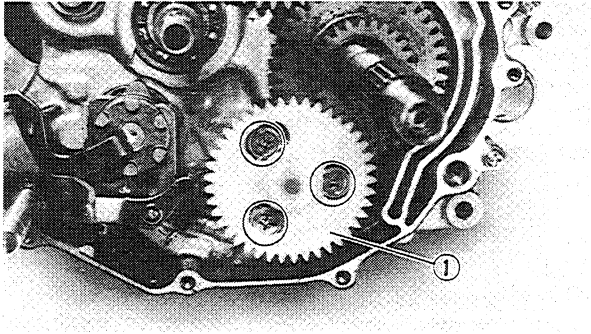


10. Remove:
- Crankcase spacer (right) ①
 - Dowel pins
 - Gasket

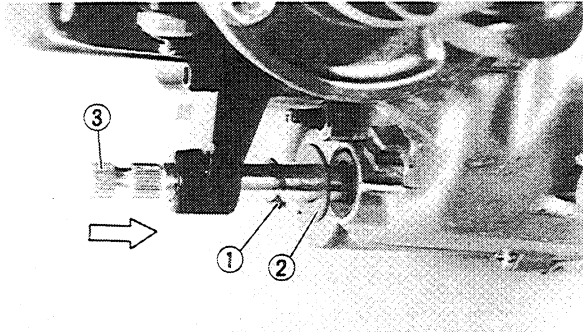
OIL PUMP AND SHIFTER**NOTE:**

With the engine mounted, the oil pump and shifter can be maintained by removing the following parts.

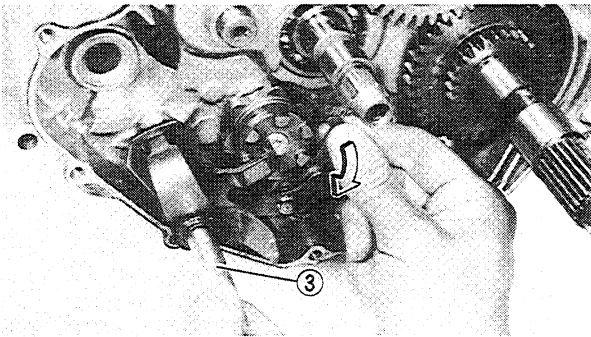
- Clutch cover (Right)
- Clutch
- Crankcase spacer



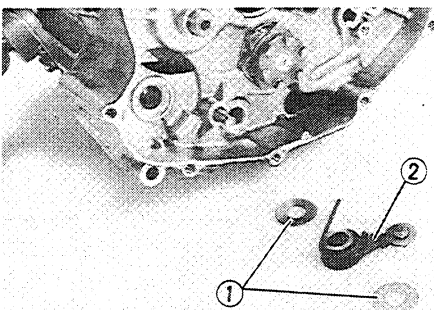
1. Remove:
 - Oil pump assembly ①



2. Remove:
 - Circlip (shift shaft) ①
 - Plain washer (shift shaft) ②
 - Shift shaft ③
 Pull the shift shaft out from to right side.



3. Remove:
 - Plain washers ①
 - Stopper lever with torsion spring ②

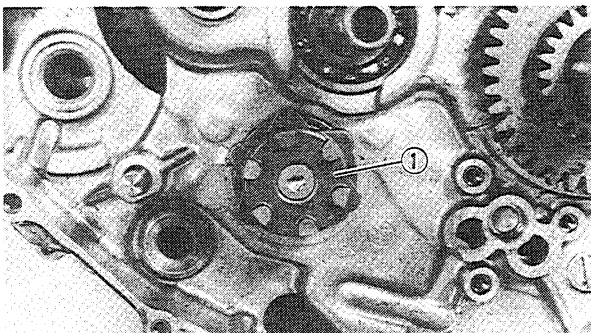


4. Remove:
 - Segment ①

NOTE:
Use the #25 Torx Driver.



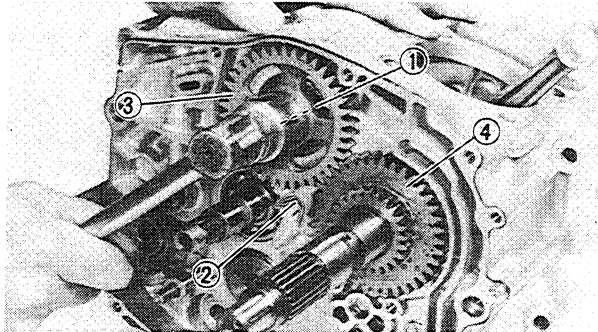
#25 Torx Driver:
P/N YU-29843-4
P/N 90890-05349



**BALANCER DRIVE AND DRIVEN GEARS****NOTE:**

With the engine mounted, the primary drive gear and balancer gear can be maintained by removing the following parts.

- Crankcase cover (Right)
- Clutch
- Crankcase spacer

**1. Straighten:**

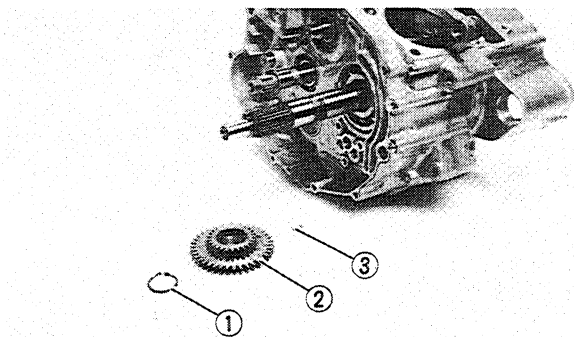
- Lock washer tabs (driven gear)

2. Remove:

- Nut (driven gear) ①
- Lock washer
- Balancer driven gear
- Woodruff key

NOTE:

Place a folded rag ② between the teeth of the driven gear ③ and drive gear ④ to lock them.

**3. Remove:**

- Circlip ①
- Balancer drive gear ②
- Woodruff key ③

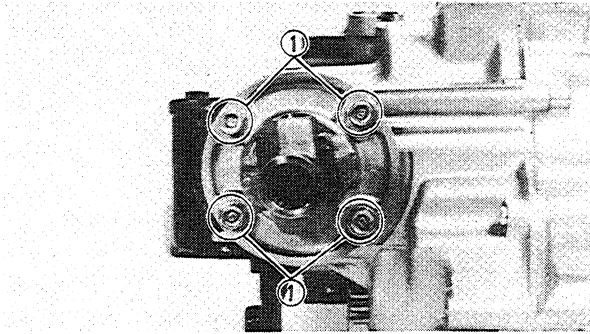
NOTE:

Use a general bearing puller to remove the boss of the balancer drive gear.

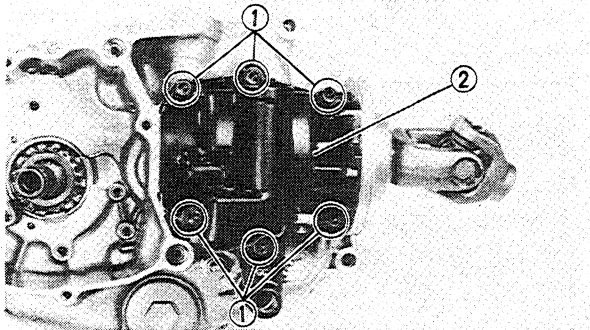
MIDDLE GEAR**NOTE:**

With the engine mounted, the middle gear can be maintained by removing the following parts.

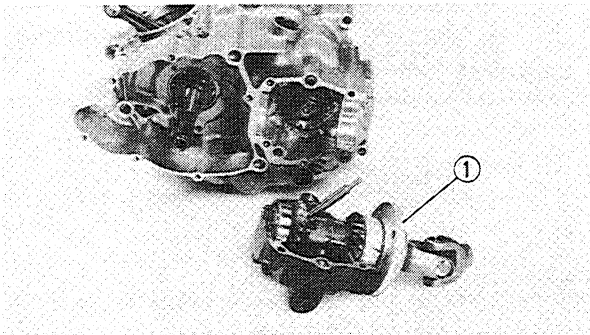
- Rear check absorber and swingarm.



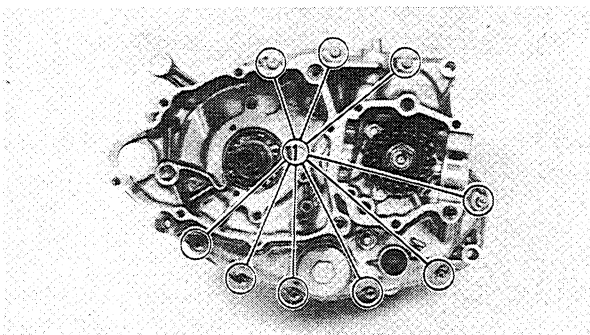
1. Remove:
 - Bolts (universal joint) ①



2. Remove:
 - Bolts (middle gear case) ①
 - Middle gear case ②
 - Dowel pins



3. Remove:
 - Middle driven gear assembly ①

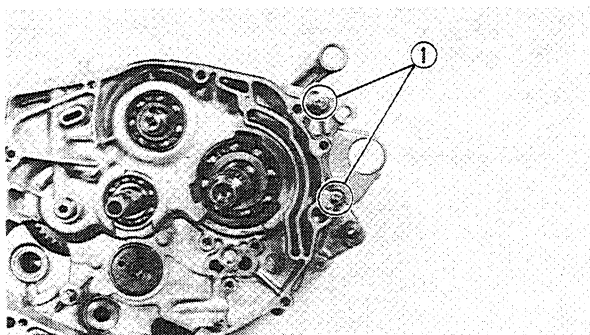


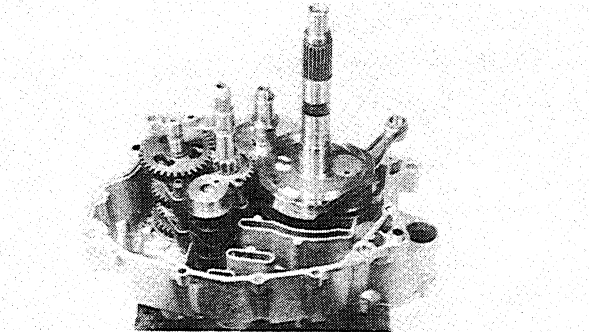
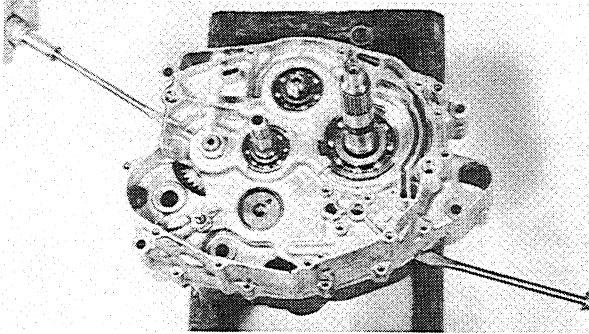
CRANKCASE

1. Remove:
 - Screws (crankcase) ①

NOTE:

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





2. Remove:

- Crankcase (Right)
- Dowel pins

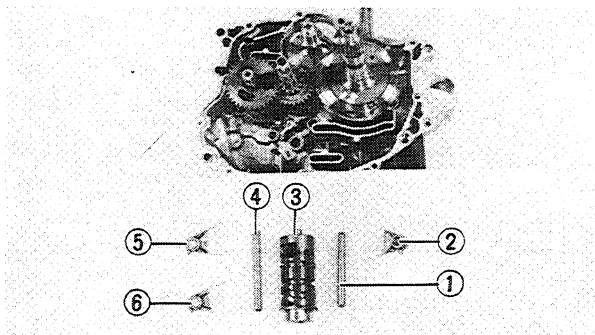
Alternately tap on the engine mounting boss, transmission shafts, shift cam, and crankshaft.

NOTE:

- For this removal, slits in the crankcase can be used as shown.
- Be sure not to give damages to the mating surface.

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.

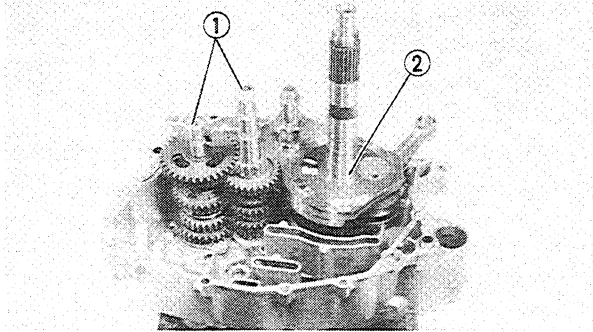
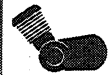
**TRANSMISSION AND CRANKSHAFT**

1. Remove:

- Balancer shaft
- Guide bar #2 ①
- Shift fork #1 ②
- Shift cam ③
- Guide bar #1 ④
- Shift fork #2 ⑤
- Shift fork #3 ⑥

NOTE:

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



2. Remove:
 - Transmission assembly (main axle and drive axle) ①
3. Remove:
 - Crankshaft ②
 - Use the oil press machine.

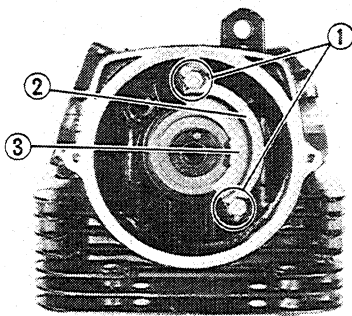
ROCKER ARMS

NOTE:

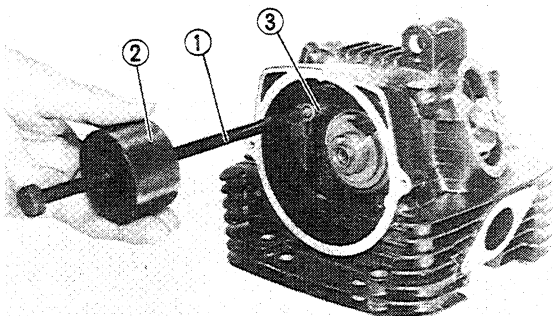
With the engine mounted, the rocker arm can be maintained by removing the following parts.

- Seat
- Fuel tank
- Fuel tank cover

1. Remove:
 - Tappet covers (intake and exhaust)
2. Loosen:
 - Locknuts
 - Adjusters
3. Straighten:
 - Lock washer tabs



4. Remove:
 - Bolts (camshaft) ①
 - Lock washer ②
 - Retainer ③



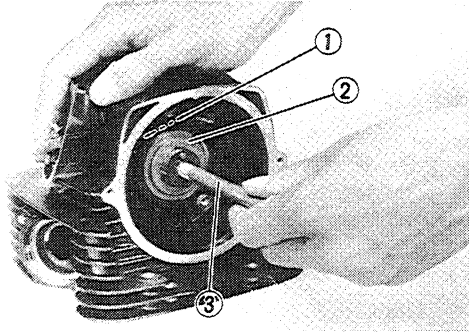
5. Attach:
 - Slide hammer bolt ①
 - Weight ②



Slide Hammer Bolt:
P/N YU-01083-1
P/N 90890-01083

Weight:
P/N YU-01083-3
P/N 90890-01084

6. Remove:
 - Rocker arm shafts ③



7. Remove:

- Camshaft ①
- Camshaft bushing ②

NOTE:

Screw in a suitable length of 10 mm bolt ③ into the thread hole on the camshaft, and pull out the camshaft.

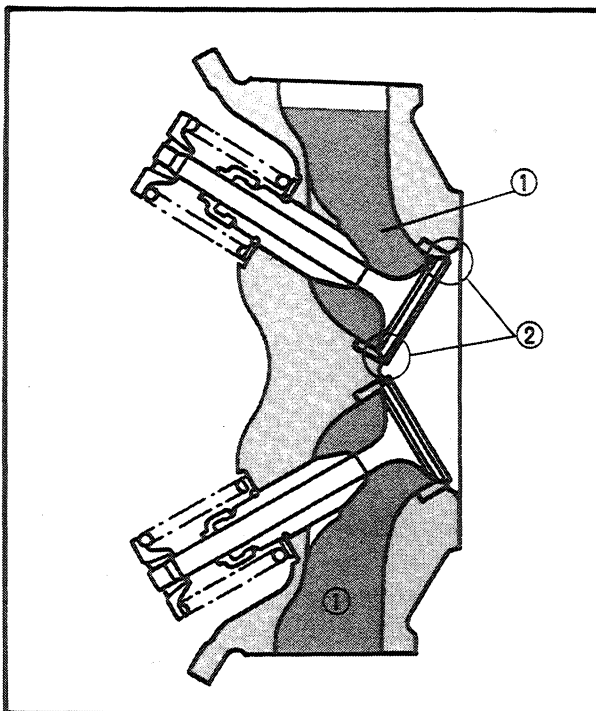
8. Remove:

- Rocker arms (intake and exhaust)

VALVES**NOTE:**

With the engine mounted, the valve can be maintained by removing the following parts.

- Seat
- Fuel tank
- Exhaust pipe
- Cylinder head



1. Check:

- Valve sealing

Leakage at valve seat → Inspect the valve face, valve seat and valve seat width.

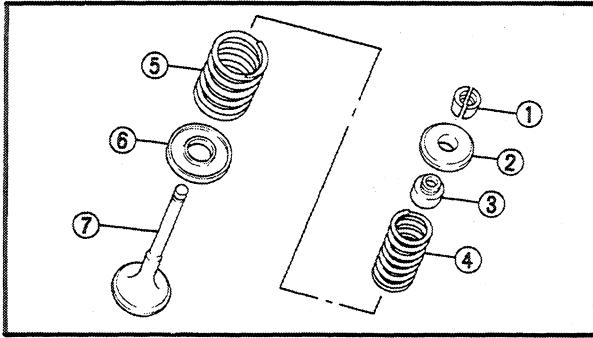
Refer to the "INSPECTION AND REPAIR – VALVE SEAT" section.

NOTE:

Before removing the internal parts (valve, valve spring, spring seat, etc.) of the cylinder head, the valve sealing should be checked.

Valve seal checking steps:

- Supply a clean solvent ① into the intake and exhaust ports.
- Check the valve sealing. There should be no leakage at the valve seats ② .

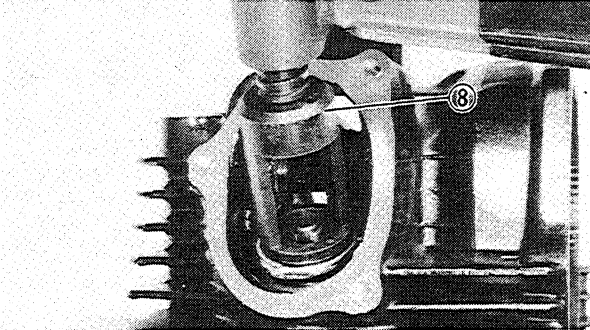


2. Remove:

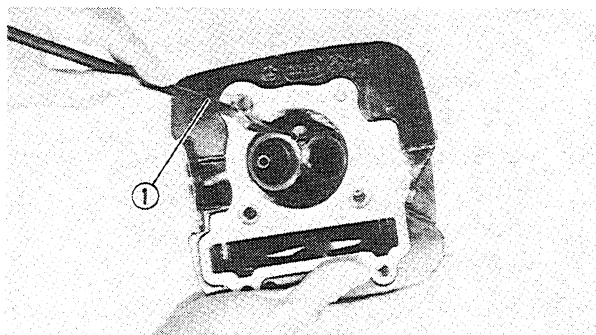
- Valve retainer ①
- Spring seat ② (Upper)
- Oil seal ③
- Inner spring ④
- Outer spring ⑤
- Spring seat ⑥ (Lower)
- Valve ⑦

NOTE:

Compress the valve spring to remove the valve retainer by the Valve Spring Compressor ⑧.



Valve Spring Compressor:
P/N YU-04019
P/N 90890-04019



INSPECTION AND REPAIR

CYLINDER HEAD

1. Eliminate:

- Carbon deposit
(from combustion chamber)
Use rounded scraper ① .

NOTE:

Do not use a sharp instrument and avoid damaging or scratching:

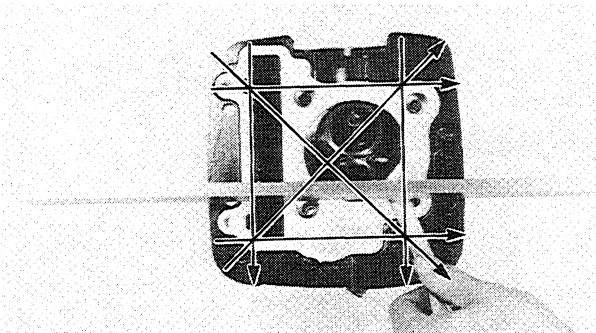
- Spark plug threads
- Valve seat

2. Inspect:

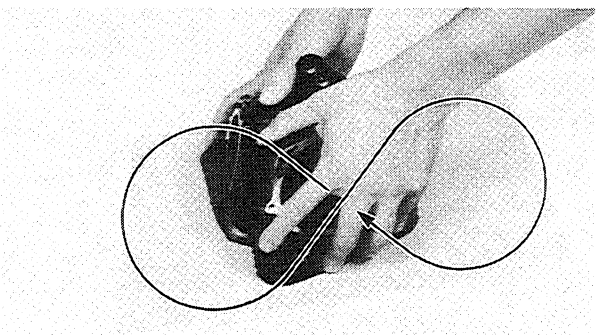
- Cylinder head
Scratches/Damage → Replace.

3. Measure:

- Warpage
Out of specification → Resurface.



Cylinder Head Warpage:
Less than 0.03 mm (0.0012 in)



4. Resurface:

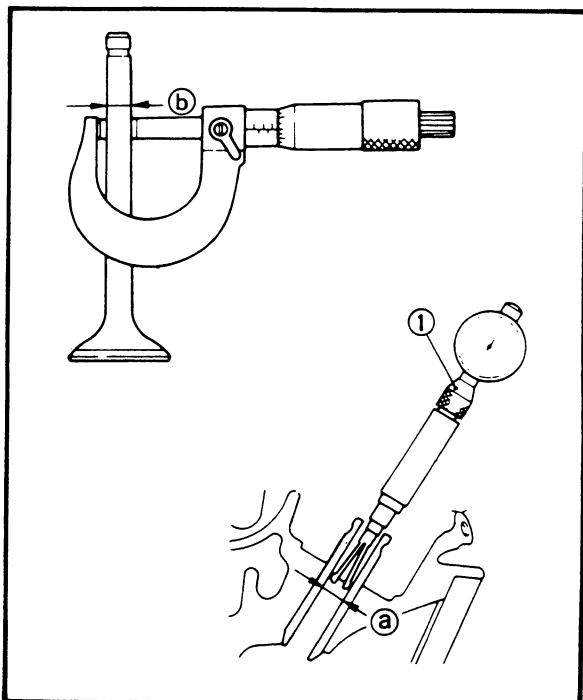
- Cylinder head

Resurfacement steps:

Place a 400 ~ 600 grit wet sandpaper on the surface plate, and resurface the head using a figure-eight sanding pattern.

NOTE:

Rotate the head several times to avoid removing too much material from one side.




VALVE AND VALVE GUIDE

1. Measure:

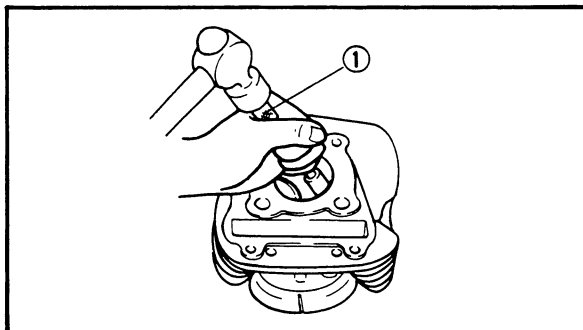
- Stem-to-guide clearance

Stem-to-guide clearance =
Valve guide inside diameter (a) –
Valve stem diameter (b)

Out of specification → Replace valve guide.

 Stem-to-guide Clearance:	
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0014 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)

① Bore gauge

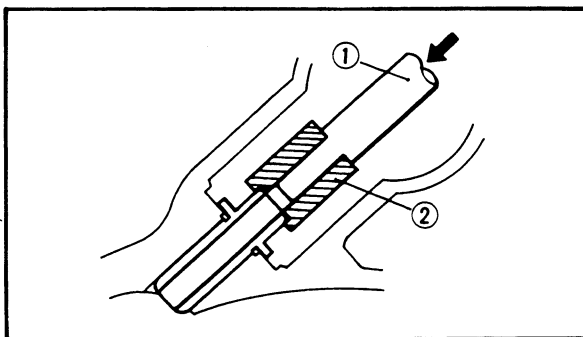


Valve guide replacement steps:

NOTE:

Heat the cylinder head in an oven to 100°C (212°F) to ease guide removal and installation and to maintain correct interference fit.

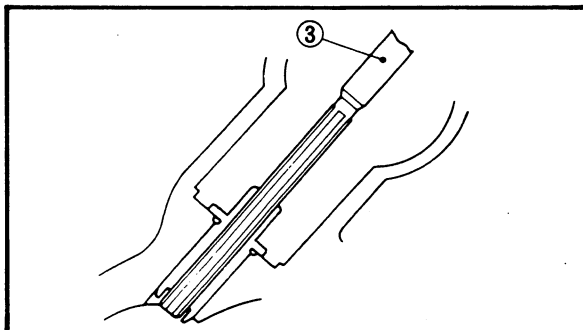
- Remove the valve guide using the Valve Guide Remover ① .
- Install the valve guide (New) using the Valve Guide Installer ② and Valve Guide Remover ① .
- After installing the valve guide, bore the valve guide using the Valve Guide Reamer ③ to obtain proper stem-to-guide clearance.



Valve Guide Remover:
P/N YM-04064-A
P/N 90890-04064

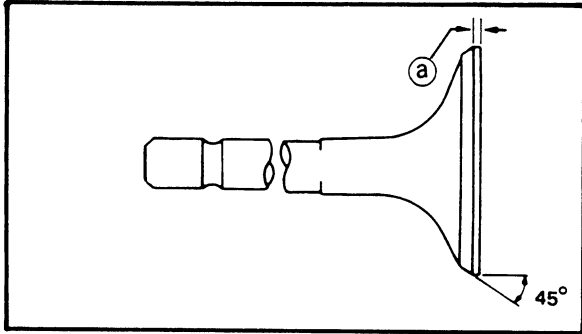
Valve Guide Installer:
P/N YM-04065
P/N 90890-04065

Valve Guide Reamer:
P/N YM-04066
P/N 90890-04066





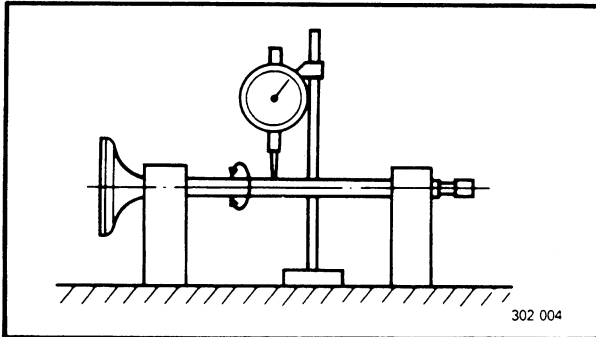
2. Clean the valve face to remove carbon deposits.
3. Inspect:
 - Valve face
Pitting/Wear → Grind the face.



4. Measure:
 - Margin thickness @
Out of specification → Replace.



Margin Thickness Limit:
0.8 mm (0.031 in)



5. Check:
 - Valve stem end
Mushroom shape or diameter larger than rest of stem → Replace.
 - Runout
Out of specification → Replace.



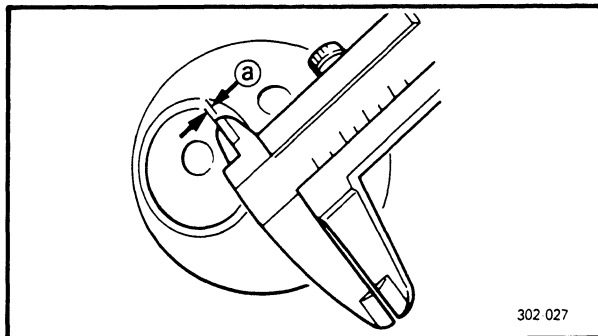
Maximum Valve Stem Runout:
0.02 mm (0.0008 in)

NOTE:

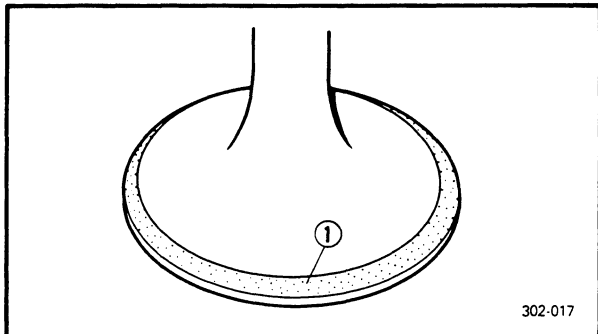
- Always replace the guide if the valve is replaced.
- Always replace the oil seal if the valve is removed.

VALVE SEAT

1. Clean the valve face and valve seat to remove carbon deposits.
2. Inspect:
 - Valve seat
Pitting/Wear → Reface the valve seat.



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3. Measure:

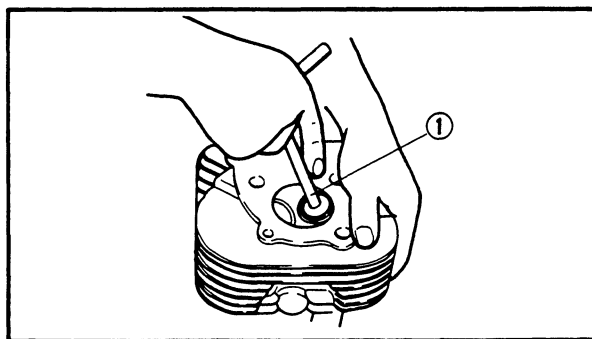
- Valve seat width (a)

Out of specification → Reface valve seat.

Valve Seat Width:	
Intake	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
Exhaust	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)

Measurement steps:

- Apply the Mechanic's bluing dye (Dykem) ① to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width. Wherever the valve seat and valve face made contact, bluing will have been removed.
- If the valve seat width is too wide, too narrow, or seat has not centered, the valve seat must be refaced.




4. Reface:

- Valve seat

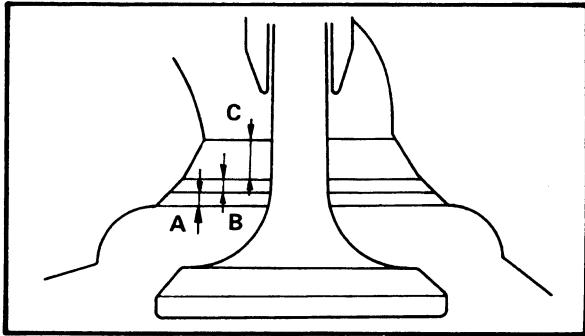
Use a 30°, 45° and 60° Valve Seat Cutter

① .

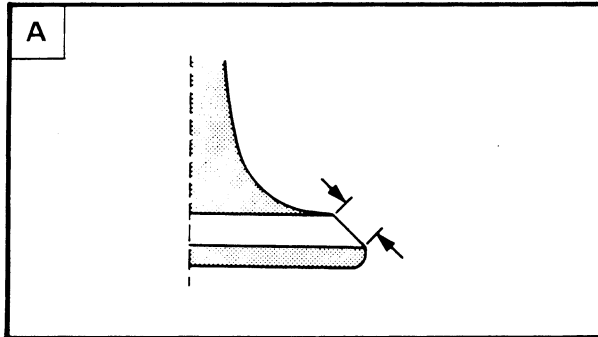
	Valve Seat Cutter: P/N. YM-91043
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CAUTION:

When twisting cutter, keep an even downward pressure (4 ~ 5 kg) to prevent chatter marks.

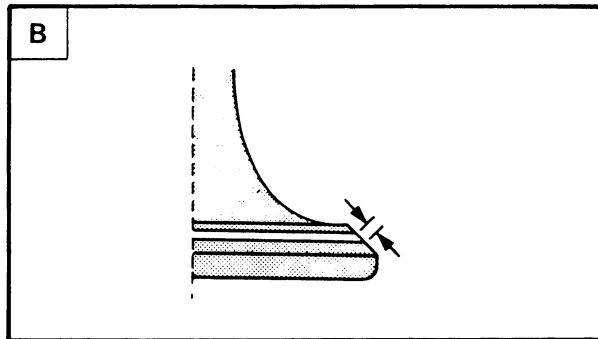


Cut sections as follows	
Section	Cutter
A	30°
B	45°
C	60°



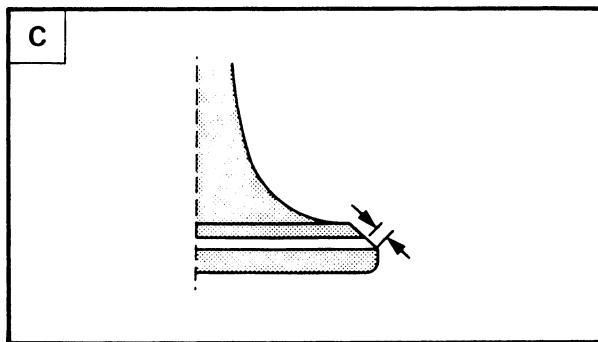
Valve seat refacing steps:
A Valve face indicates that valve seat is centered on valve face but is too wide.

Valve Seat Cutter Set		Desired Result
Use lightly	30° cutter	To reduce valve seat width to 1.0 mm (0.04 in)
	60° cutter	



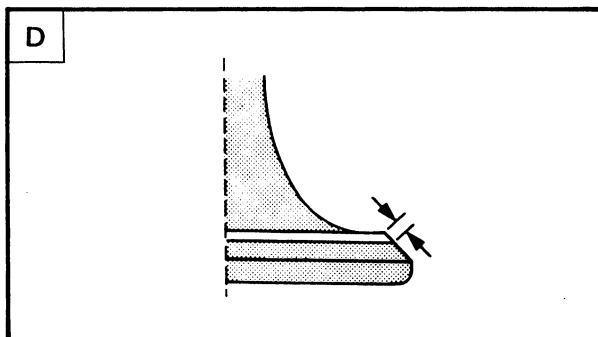
B Valve seat is in the middle of the valve face but too narrow.

Valve Seat Cutter Set		Desired Result
Use	45° cutter	To achieve a uniform valve seat width of 1.0 mm (0.04 in)



C Valve seat is too narrow and right up near valve margin.

Valve Seat Cutter Set		Desired Result
Use	30° cutter	To center the seat and to achieve its width of 1.0 mm (0.04 in)
	45° cutter	



D Valve seat is too narrow and is located down near the bottom edge of the valve face.

Valve Seat Cutter Set		Desired Result
Use	60° cutter, first	To center the seat and increase its width.
	45° cutter	

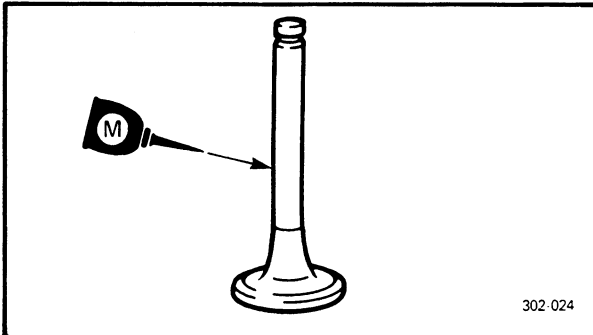
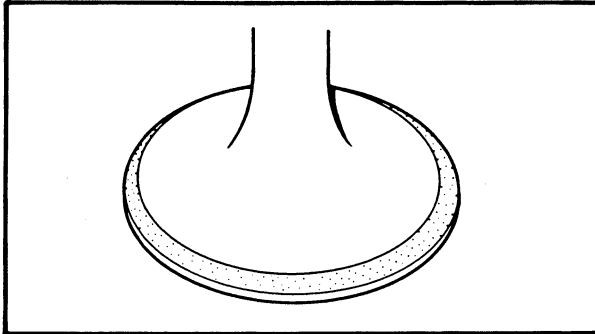


5. Lap:

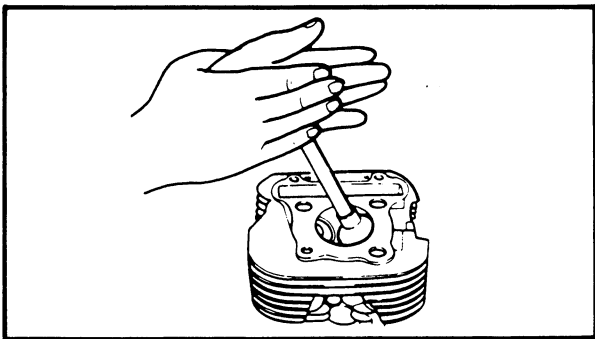
- Valve face
- Valve seat

NOTE:

After refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.



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Valve lapping steps:

- Apply a coarse lapping compound to the valve face.

⚠ CAUTION:

Be sure no compound enters the gap between the valve stem and guide.

- Apply a molybdenum disulfide oil to the valve stem.
- Install the valve into the cylinder head.
- Turn the valve until the valve face and valve seat are evenly polished, then clean off all compound.

NOTE:

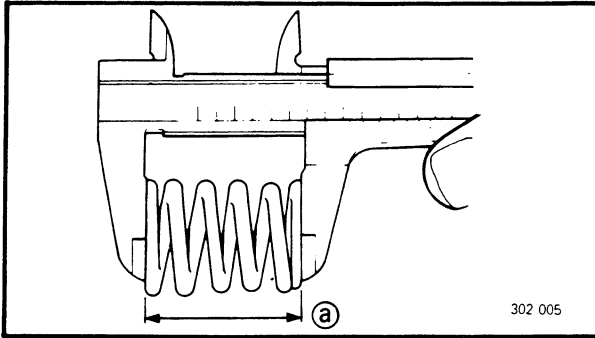
To obtain the best lapping result, lightly tap the valve seat while rotating the valve back and forth between your hand.

- Apply a fine lapping compound to the valve face and repeat the above steps.

NOTE:

Be sure to clean off all compound from the valve face and valve seat after every lapping operation.

- Apply the Mechanic's bluing dye (Dykem) to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width again.
If the valve seat width is out of specification, reface and lap the valve seat.

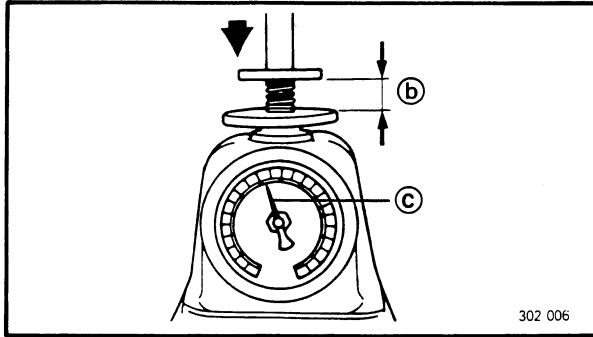


VALVE SPRING

1. Measure:

- Valve spring free length (a)
Out of specification → Replace.

Valve Spring Free Length:	
Inner spring	Outer spring
33.5 mm (1.32 in)	35.2 mm (1.39 in)

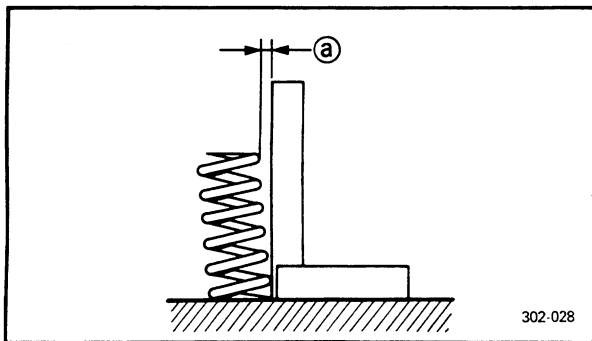


2. Measure:

- Valve spring installed force (c)
Out of specification → Replace.

(b) Installed length

Valve Spring Installed Force:			
Inner spring		Outer spring	
(b)	(c)	(b)	(c)
30.5 mm (1.201 in)	8.4 ~ 10.2 kg (18.5 ~ 22.5 lb)	32.0 mm (1.260 in)	16.6 ~ 20.4 kg (36.6 ~ 45.0 lb)



3. Measure:

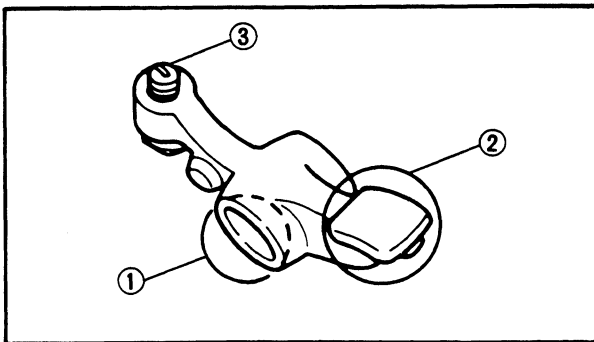
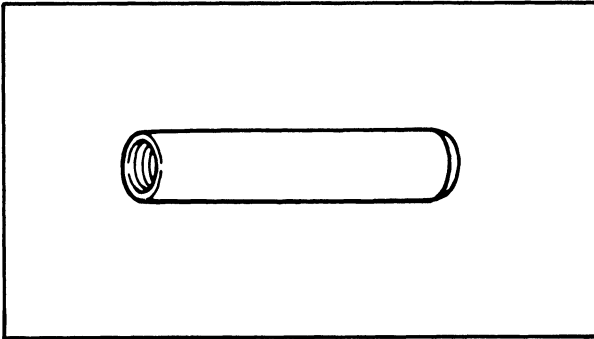
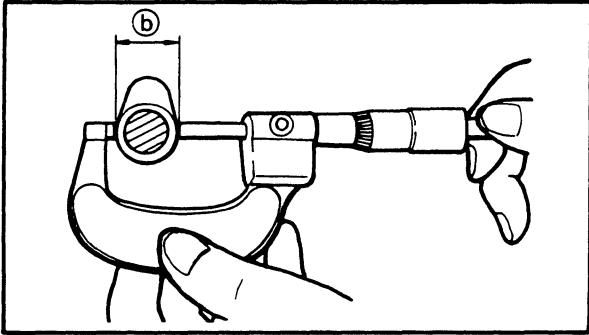
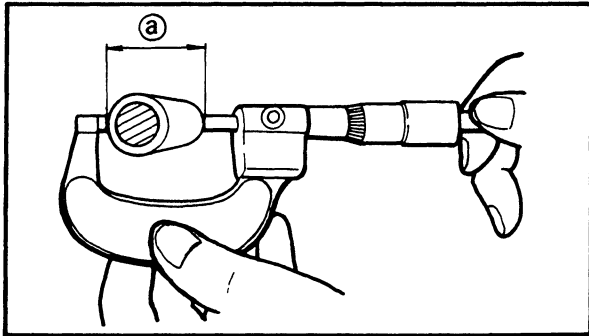
- Spring Tilt (a)
Out of specification → Replace.

Spring Tilt:	
Inner spring	Outer spring
Less than 1.6 mm (0.063 in)	Less than 1.6 mm (0.063 in)

CAMSHAFT

1. Inspect:

- Cam lobes
Pitting/Scratches/Blue discoloration → Replace.



2. Measure:

- Cam lobes

Out of specification → Replace.

	a	b
Intake	36.507 mm (1.437 in)	30.101 mm (1.185 in)
Exhaust	36.547 mm (1.439 in)	30.184 mm (1.188 in)

ROCKER ARM AND ROCKER ARM SHAFT

1. Inspect:

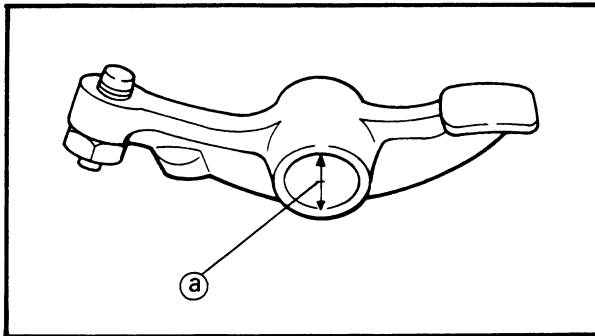
- Rocker arm shaft

Blue discoloration/Grooves → Replace, then, inspect lubrication system.

2. Inspect:

- Rocker arm shaft hole ①
- Cam lobe contact surface ②
- Adjuster surface ③

Wear/Pitting/Scratches/Blue discoloration → Replace, then inspect lubrication system.

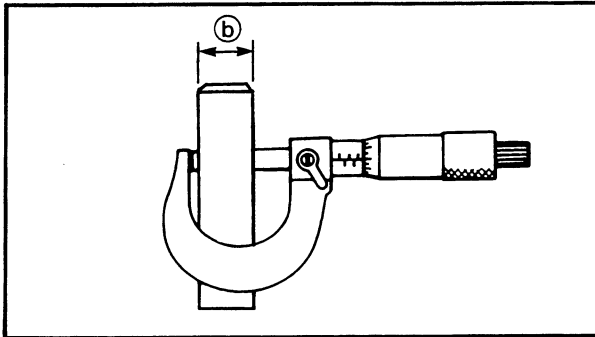


3. Measure:

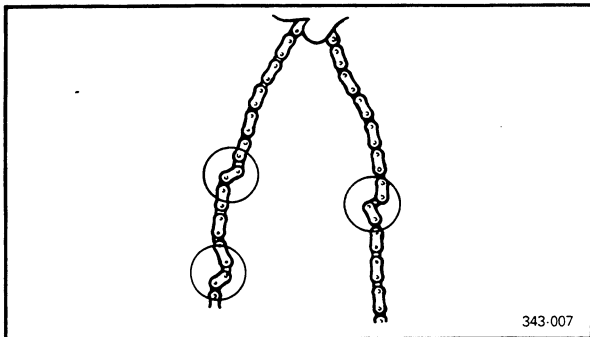
- Arm-to-shaft clearance

Arm-to-shaft clearance =
Rocker arm inside diameter (a) –
Rocker arm shaft outside diameter (b)

Out of specification → Replace as a set.



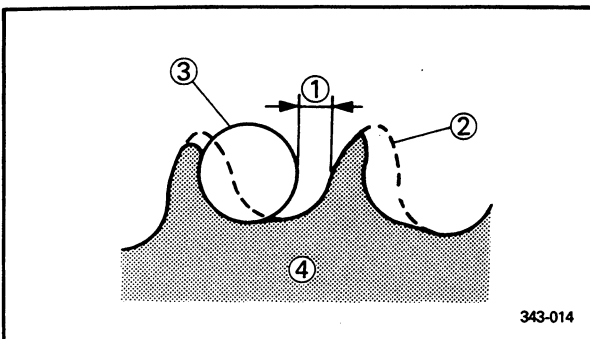
	Arm-to-shaft Clearance:
	0.009 ~ 0.037 mm
	(0.0003 ~ 0.0015 in)



TIMING CHAIN AND CAM SPROCKET

1. Inspect:

- Timing chain
 - Stiff/Cracks → Replace cam chain and cam sprocket as a set.



2. Inspect:

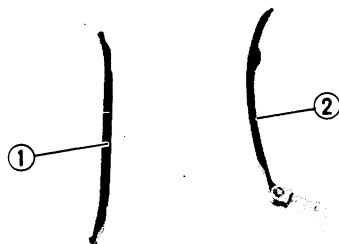
- Cam sprocket
 - Wear/Damage → Replace cam sprocket and timing chain as a set.

- ① 1/4 tooth
- ② Correct
- ③ Roller
- ④ Sprocket

TIMING CHAIN GUIDE

1. Inspect:

- Exhaust side chain guide 1
- Intake side chain guide 2
- Wear/Damage → Replace.

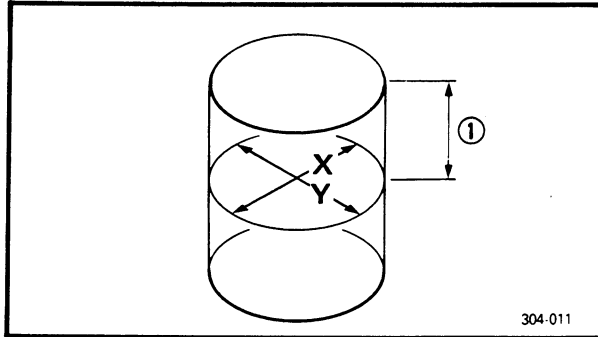




CYLINDER AND PISTON

1. Inspect:

- Cylinder and piston walls
Vertical scratches → Rebore or replace cylinder and piston.



304-011

2. Measure:

- Piston-to-cylinder clearance


Piston-to-cylinder clearance measurement steps:

First steps

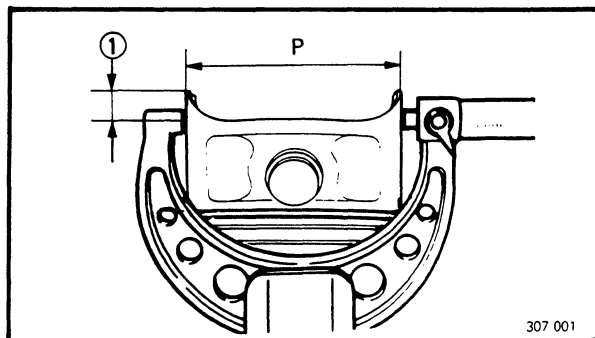
- Measure the cylinder bore "C" with a cylinder bore gauge.

① 40 mm (1.57 in) from the cylinder top

NOTE: _____
Measure the cylinder bore "C" in parallel to and at right angles to the crankshaft. Then, find the average of the measurements.

	Standard	Wear Limit
Cylinder Bore "C":	66.97 ~ 67.02 mm (2.637 ~ 2.639 in)	67.10 mm (2.640 in)
$C = \frac{X + Y}{2}$		

- If out of specification, rebore or replace the cylinder, and the piston and piston rings as a set.



307 001

2nd steps

- Measure the piston skirt diameter "P" with a micrometer.

① 7.5 mm (0.30 in) from the piston bottom edge



Piston Size P:

Standard	66.935 ~ 66.985 mm (2.635 ~ 2.637 in)
Oversize 2	67.5 mm (2.6575 in)
Oversize 4	68.0 mm (2.6772 in)

- If out of the specification, replace the piston and piston rings as a set.

3rd steps

- Find the piston-to-cylinder clearance with following formula.

Piston-to-cylinder clearance =

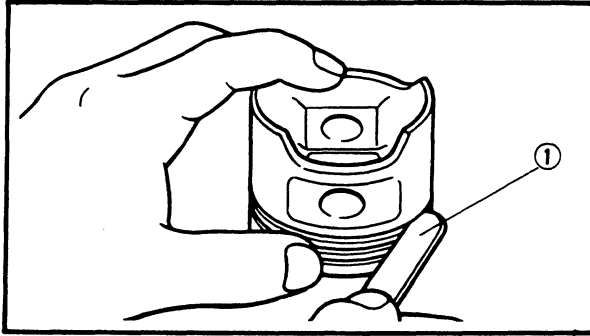
**Cylinder bore "C" –
Piston skirt diameter "P"**



**Piston-to-cylinder Clearance:
0.025 ~ 0.045 mm
(0.0010 ~ 0.0018 in)**

**Limit:
0.15 mm (0.006 in)**

- If out of the specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.



PISTON RING

1. Measure:

- Ring side clearance
Use a feeler gauge ①
Out of specification → Replace piston.

NOTE:

Eliminate carbon deposits from piston ring grooves and rings before measuring side clearance.

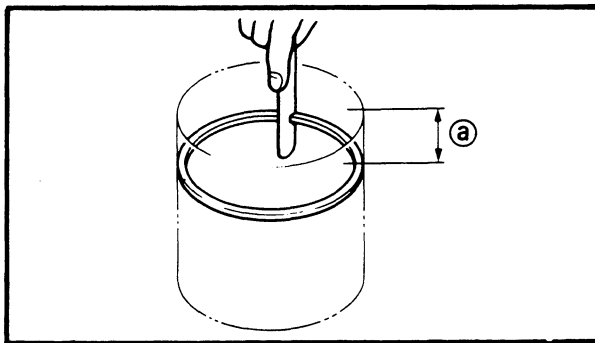
Piston Ring Side Clearance:	
Top	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
2nd	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)

2. Position:

- Piston ring
(in cylinder)

NOTE:

Insert a ring into cylinder, and push it approximately 20 mm (0.8 in) into cylinder. Push ring with piston crown so that ring will be at a right angle to cylinder bore.



① 20 mm (0.8 in)

3. Measure:

- Ring end gap
Out of specification → Replace.

NOTE:

You cannot measure end gap on expander spacer of oil control ring. If oil control ring rails show excessive gap, replace all three rings.

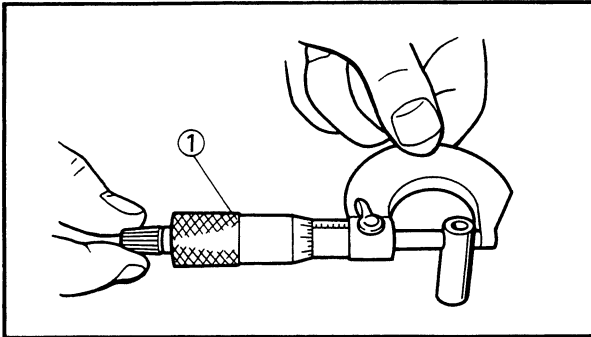
Piston Ring End Gap (Installed):	
Top ring	0.15 ~ 0.30 mm (0.006 ~ 0.012 in)
2nd ring	0.15 ~ 0.30 mm (0.006 ~ 0.012 in)
Oil ring	0.30 ~ 0.90 mm (0.012 ~ 0.036 in)



PISTON PIN

1. Inspect:

- Piston pin
Blue discoloration/Groove → Replace, then inspect lubrication system.

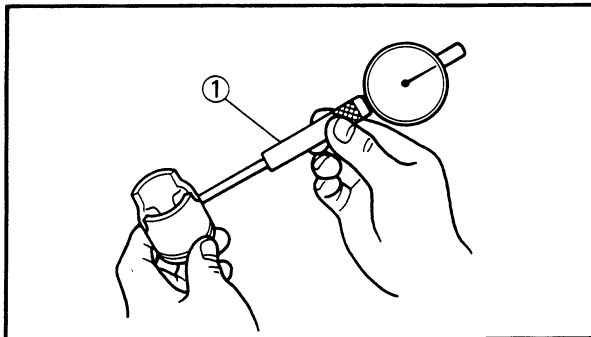


2. Measure:

- Outside diameter (a) (piston pin)
Out of specification → Replace.



Outside Diameter (Piston pin):
15.090 ~ 15.095 mm
(0.5940 ~ 0.5943 in)



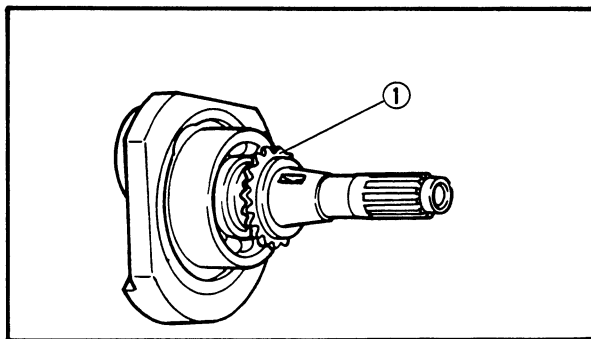
3. Measure:

- Piston pin-to-piston clearance
Out of specification → Replace piston.

Piston pin-to-piston clearance =
bore size (piston pin) (b) –
Outside diameter (piston pin) (a)



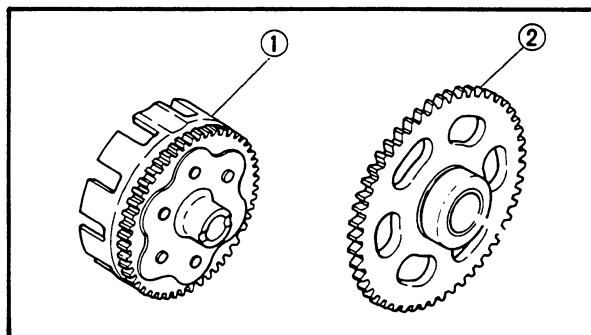
Piston pin-to-piston Clearance:
0.912 ~ 0.918 mm
(0.0359 ~ 0.0361 in)
< Limit: 0.07 mm (0.003 in) >



PRIMARY GEARS AND STARTER

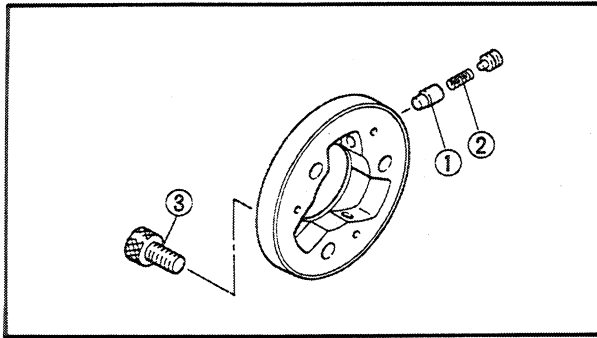
1. Inspect:

- Drive gear (1)
Scratches/Wear/Damage → Replace crankshaft.



2. Inspect:

- Driven gear (1)
Scratches/Wear/Damage → Replace clutch housing assembly.
- Idler gear (2)
Scratches/Wear/Damage → Replace.

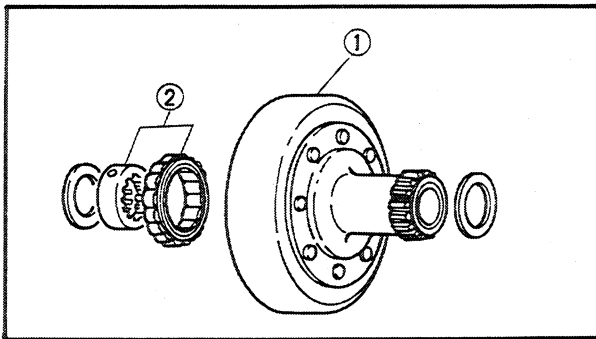


3. Inspect:

- Spring caps ①
- Springs ②
Deform/Damage → Replace.
- Bolts (starter clutch) ③
Loose → Replace with a new one, and clinch the end of the bolt.



Bolts (Starter clutch):
30 Nm (3.0 m·kg, 22 ft·lb)
LOCTITE®



PRIMARY CLUTCH

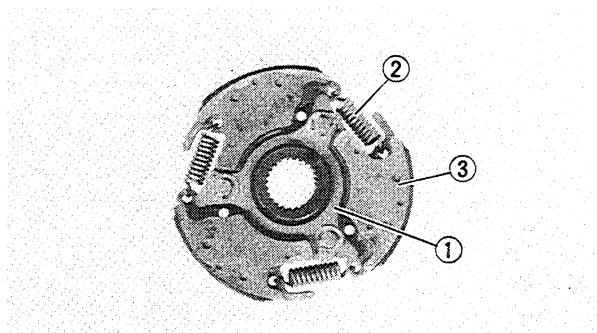
Clutch Housing

1. Inspect:

- Clutch housing ①
Heat damage/Wear/Damage → Replace.
- One way clutch assembly ②
Chafing/Wear/Damage → Replace.

NOTE:

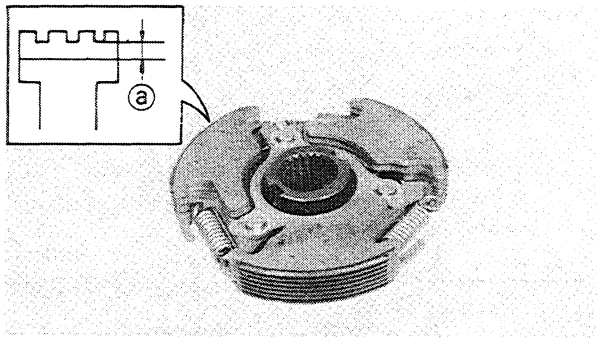
Replace the one way clutch assembly and clutch housing as a set.



Clutch Carrier

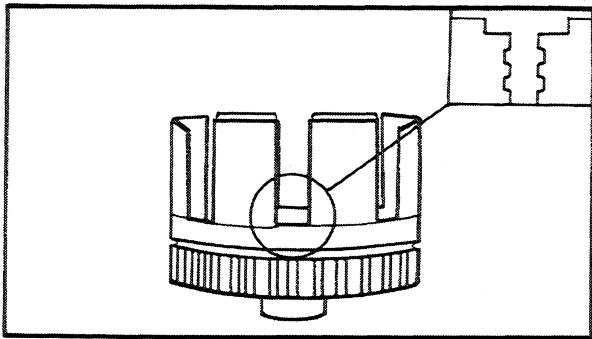
1. Inspect:

- Clutch body ①
- Clutch spring ②
- Clutch shoe ③
Damage → Replace as a set.



2. Measure:
- Clutch shoe thickness (a)
- Out of specification → Replace.

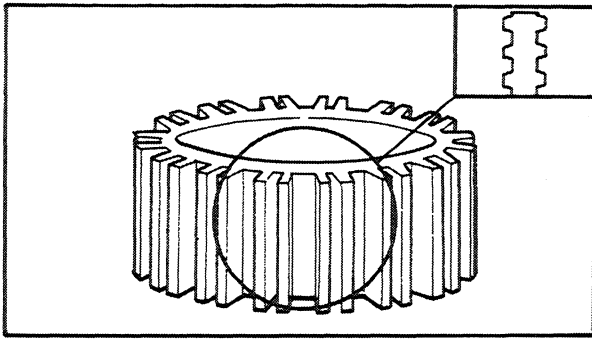
	Clutch Shoe Wear Limit (a) :
	1.5 mm (0.06 in)



SECONDARY CLUTCH

Clutch Housing

1. Inspect:
- Dogs on the housing
- Cracks/Wear/Damage → Deburr or replace.
- Clutch housing bearing
- Chafing/Wear/Damage → Replace.



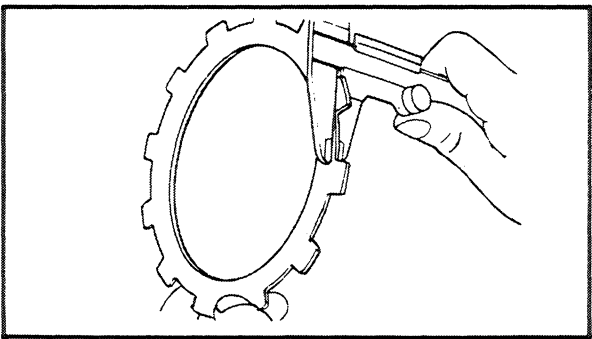
Clutch Boss and Pressure Plate #1

1. Inspect:
- Clutch boss splines
 - Pressure plate #1
- Scoring/Wear/Damage → Replace clutch boss assembly and/or pressure plate #1.

NOTE: _____
 Scoring on the clutch plate splines will cause erratic operation.

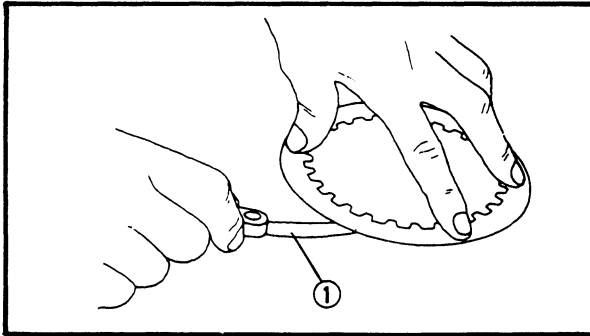
Friction Plates

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
	Wear Limit 2.8 mm (0.110 in)

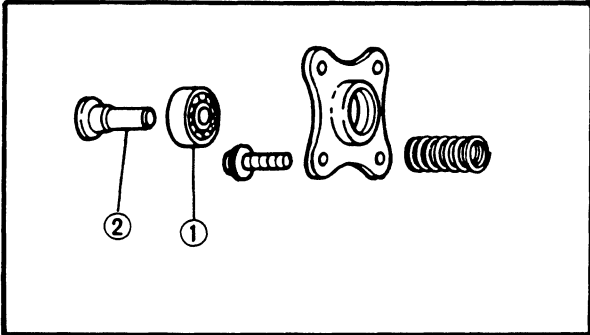
**Clutch Plates**

1. Measure:

- Clutch plate warpage
Use surface plate and Feeler Gauge ①.
Out of specification → Replace.

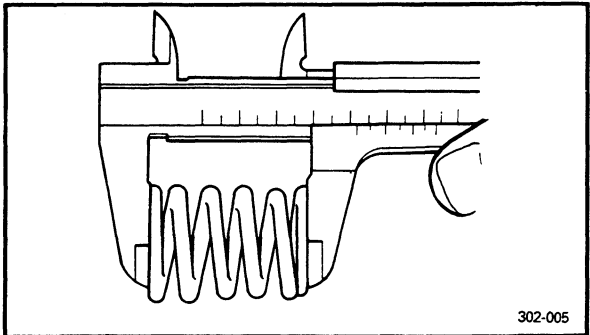


Warp Limit:
0.2 mm (0.008 in)

**Pressure Plate #2**

1. Inspect:

- Pressure plate bearing ①
 - Push rod ②
- Wear/Damage → Replace.

**Clutch Spring**

1. Inspect:

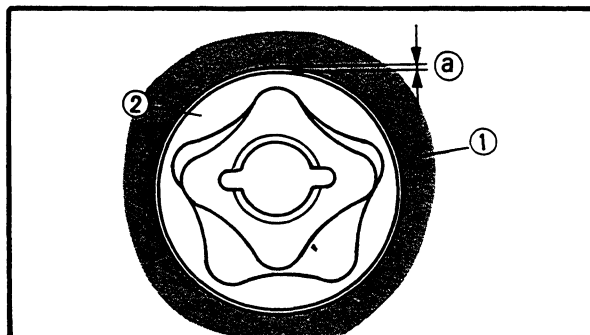
- Clutch spring
Wear/Damage → Replace.

2. Measure:

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



Clutch Spring Minimum Length:
32.9 mm (1.30 in)

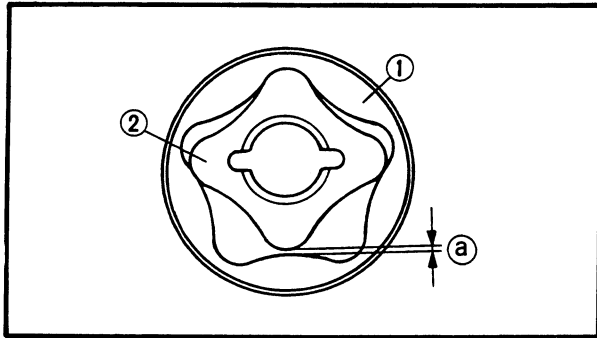
**OIL PUMP**

1. Measure:

- Housing ① / Outer rotor ② clearance
Use a Feeler Gauge.
Out of specification → Replace oil pump assembly.



Side Clearance (a) :
0.04 ~ 0.09 mm
(0.0016 ~ 0.0035 in)



2. Measure:

- Outer rotor ① / Inner rotor ② clearance
Use a Feeler Gauge.

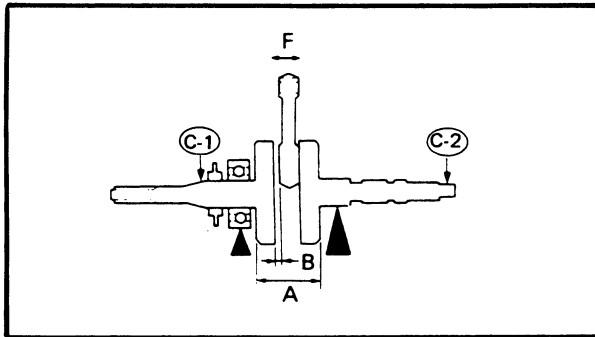
Out of specification → Replace oil pump assembly.



Tip Clearance (a) :
0.15 mm (0.0059 in)
Limit:
0.20 mm (0.0079 in)

3. Inspect:

- Oil pump drive gear
- Oil pump driven gear
Wear/Damage → Replace.



CRANKSHAFT

Crankshaft Inspection

1. Measure:

- Assembly width "A"
Use the V-blocks.

Out of specification → Replace.



Assembly Width "A":
55.95 ~ 56.00 mm
(2.203 ~ 2.205 in)

- Big end radial clearance "B"
Use a Feeler Gauge.

Out of specification → Disassemble the crankshaft and replace worn parts, then reassemble the crankshaft.



Big End Radial Clearance Limit "B":
0.7 mm (0.028 in)

- Runout "C"

Use the V-blocks and Dial Gauge.

Out of specification → Correct any misalignment.



Runout Limit:
C1: 0.02 mm (0.0008 in)
C2: 0.06 mm (0.0024 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 "F":

Standard: 0.8 ~ 1.0 mm
(0.03 ~ 0.04 in)

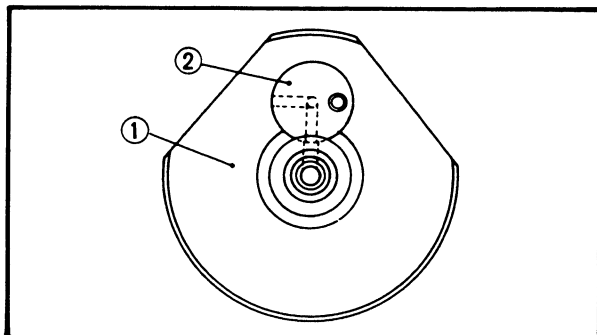
Limit: 2.0 mm (0.08 in)

2. Inspect:

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

NOTE:

Lubricate the bearing immediately after examining then to prevent rust.



Crankshaft Reassembling

1. Install:

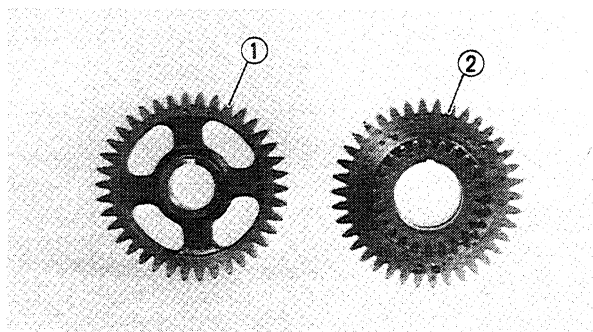
- Crank pin ②

NOTE:

The crankshaft ① and the crank pin ② oil passages must be properly interconnected with a tolerance of less than 1 mm (0.04 in).

CAUTION:

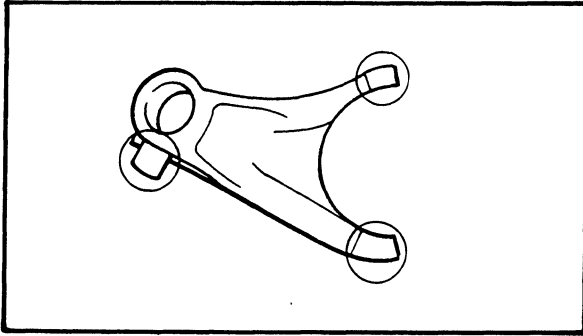
The buffer boss and woodruff key should be replaced when removed them from the crankshaft.



BALANCER DRIVE GEAR AND BALANCER GEAR

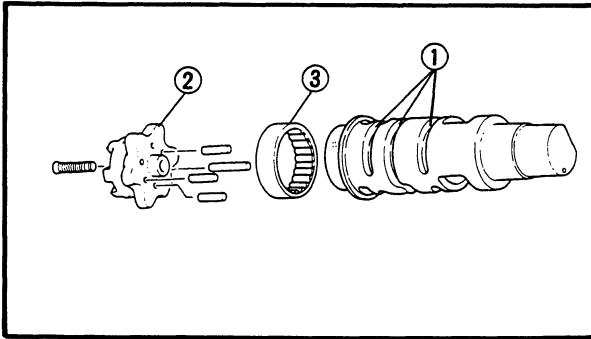
1. Inspect:

- Balancer drive gear teeth ①
- Balancer gear teeth ②
Wear/Damage → Replace both gears.



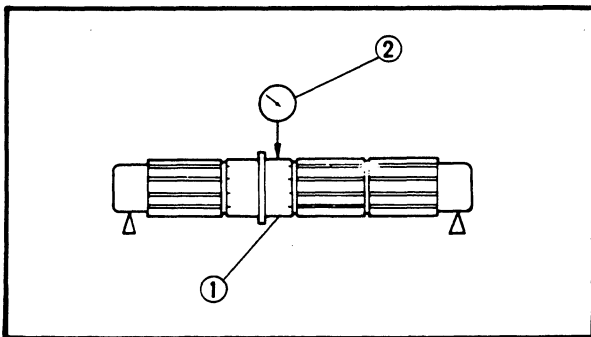
TRANSMISSION AND SUB TRANSMISSION Shift Fork

1. Inspect:
 - Shift forks
 - On the gear and shift cam contact surfaces.
 - Wear/Chafing/Bends/Damage → Replace.
2. Check:
 - Shift fork movement
 - On its guide bar.
 - Unsmooth operation → Replace fork and/or guide bar.



Shift Cam

1. Inspect:
 - Shift cam grooves ①
 - Wear/Damage/Scratches → Replace.
 - Shift cam segment ②
 - Damage/Wear → Replace.
 - Shift cam bearing ③
 - Pitting/Damage → Replace.

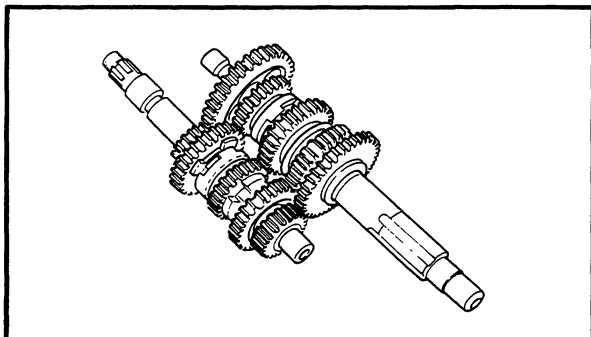


Main and Drive Axles

1. Measure:
 - Axle ① runout
 - Use centering device and Dial Gauge ②
 - Out of specification → Replace.

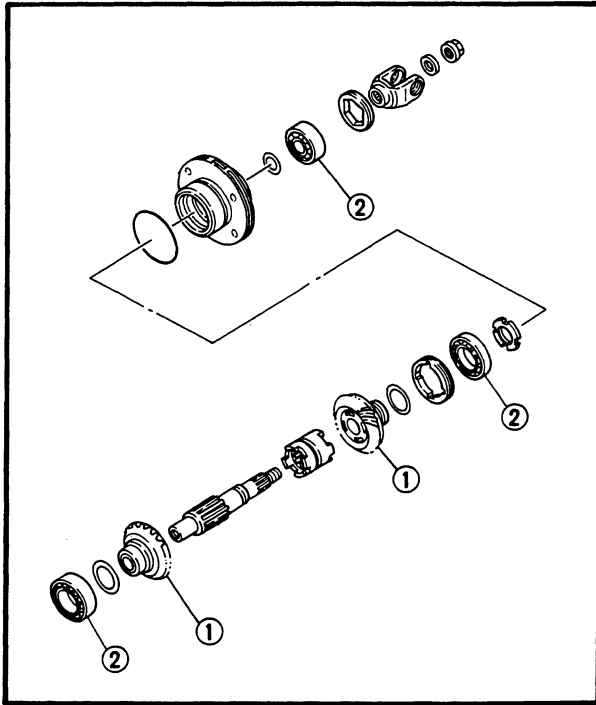


Runout Limit:
0.08 mm (0.0031 in)

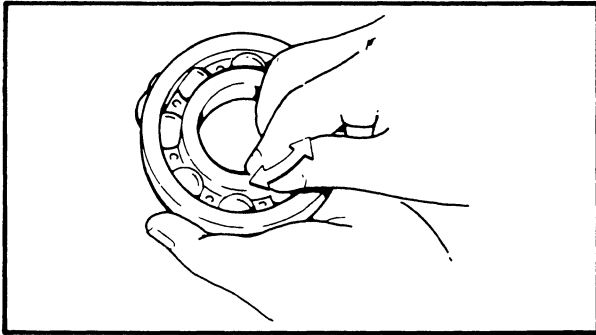


Gears

1. Inspect:
 - Gears
 - Mating dogs
 - Cracks/Damage/Wear → Replace.
2. Check:
 - Gear movement
 - Unsmooth operation → Replace.

**MIDDLE GEAR ASSEMBLY**

1. Inspect:
 - Gears ①
 - Bearings ②
Damage/Wear → Replace.
2. Check:
 - Bearing movement
Turns roughly → Replace.

**BEARING AND OIL SEAL**

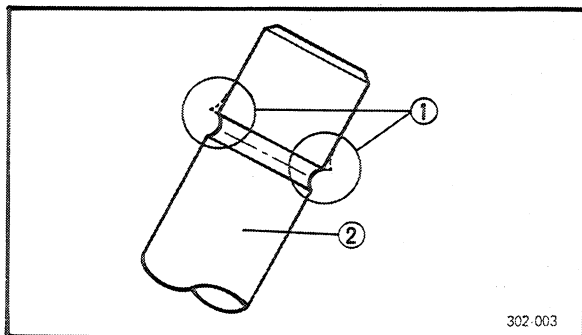
1. Inspect:
 - Bearing
Roughness/Pitting/Damage → Replace.
 - Oil seal lip
Damage/Wear → Replace.

CIRCLIPS AND WASHERS

1. Inspect:
 - Circlips
 - Washers
Damage/Looseness/Bends → Replace.

CRANKCASE

1. Inspect:
 - Crank halves
 - Bearing seat
Damage → Replace.



ENGINE ASSEMBLY AND ADJUSTMENT

VALVE

1. Deburr:

- Valve stem end
- Use an oil stone to smooth the stem end.

2. Lubricate:

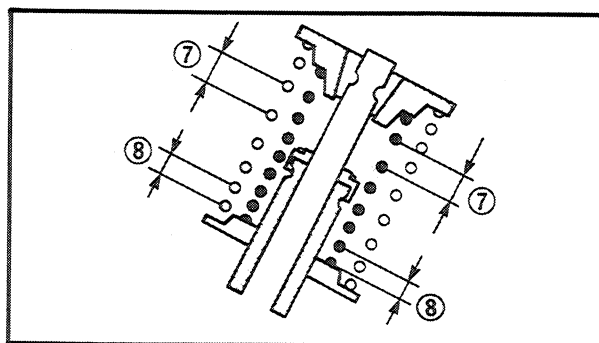
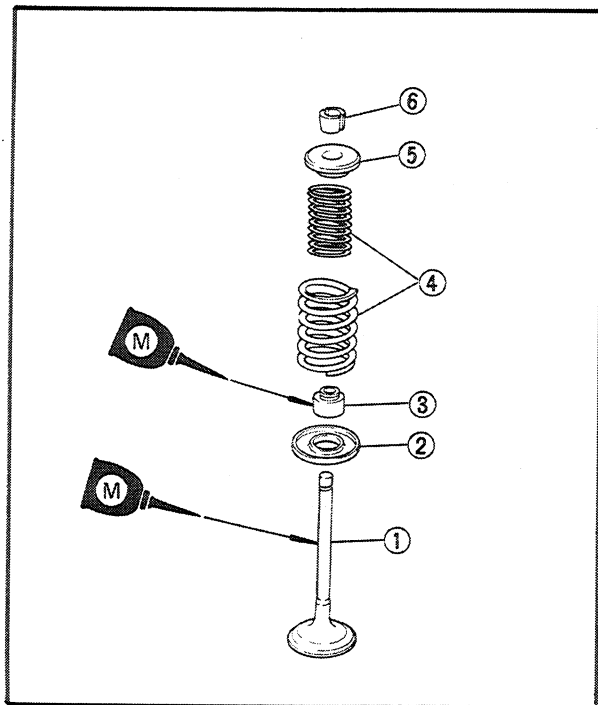
- Valve stem
- Oil seal



High-Quality Molybdenum Disulfide
Motor Oil or Molybdenum Disulfide
Grease

3. Install:

- Valve ①
- Valve spring seat ②
- Oil seal ③
- Valve springs ④
- Valve spring seat ⑤
- Valve retainers ⑥



NOTE:

Install the inner and outer springs with wider-gapped coils facing upwards as shown.

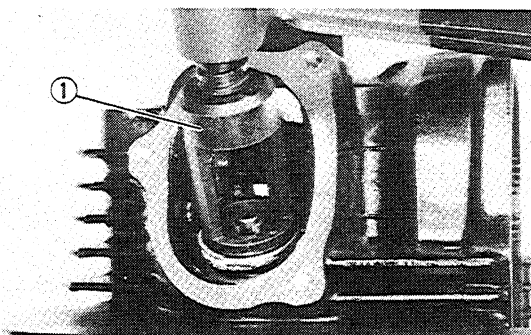
- ⑦ Larger pitch
- ⑧ Smaller pitch

4. Install:

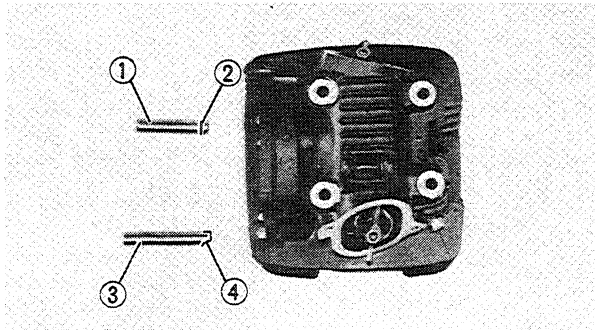
- Valve retainer

NOTE:

Compress the valve spring to remove the valve retainer by the Valve Spring Compressor ①.



Valve Spring Compressor:
P/N YM-04019
P/N 90890-04019

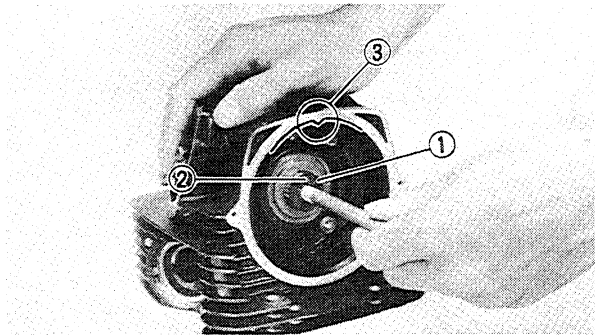
**ROCKER ARM**

1. Install:

- Rocker arms
- Rocker arm shafts

NOTE:

- Thread hole of the rocker arm shaft should be placed outside.
- Install the shorter rocker arm shaft ① (with O-ring ②) on the exhaust side and the longer shaft ③ (with cutaway ④) on the intake side.

**CAMSHAFT**

1. Install:

- Camshaft ①
- To the cylinder head.

NOTE:

The pin ② on the end of the camshaft must align with the timing mark ③ on the cylinder head.

2. Install:

- Camshaft bushing

NOTE:

The cut-out portion of the bushing must be flush with the cylinder head.

CAUTION:

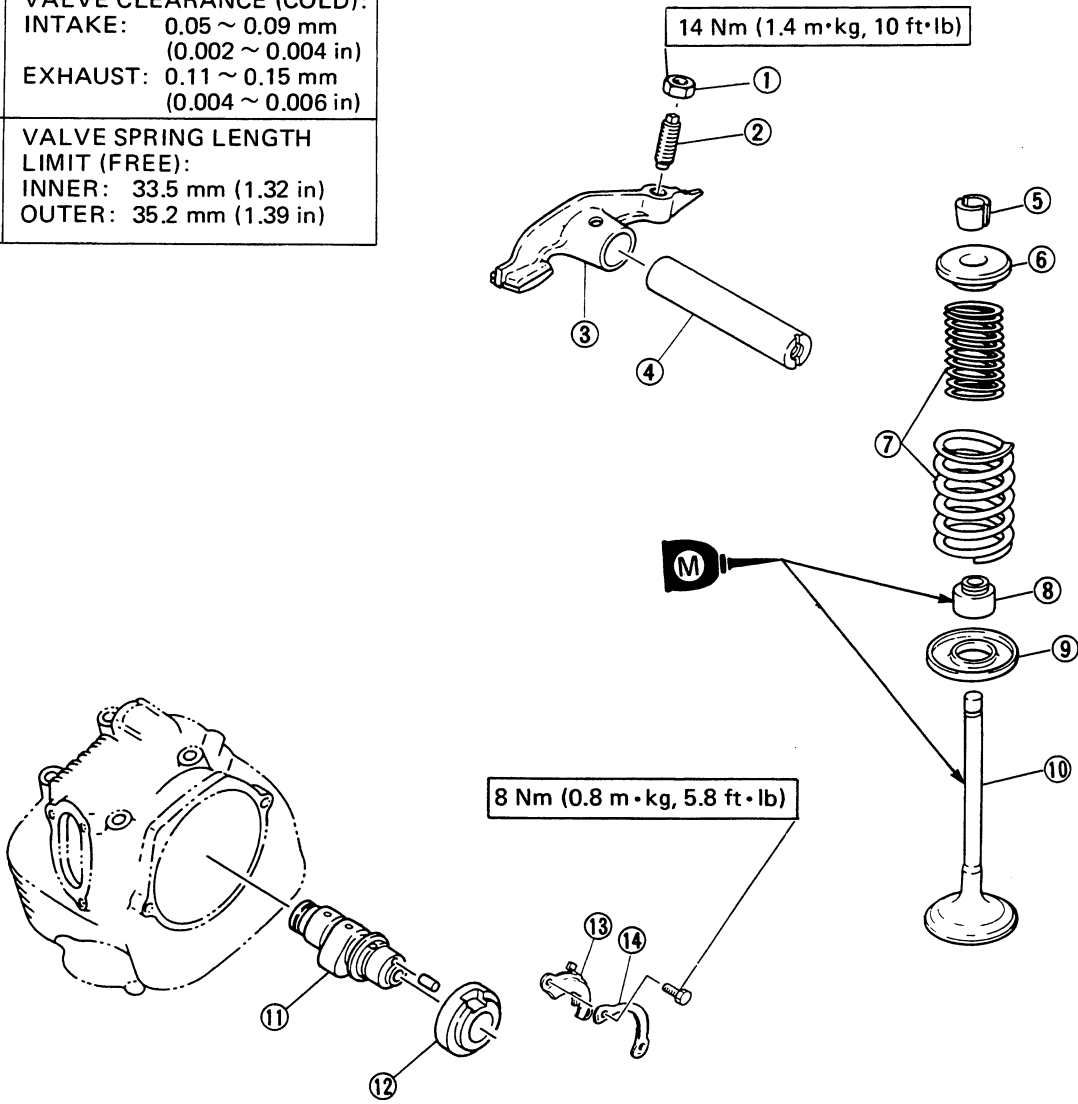
Do not cock the bushing during installation. The bushing must be perpendicular to the camshaft during installation.

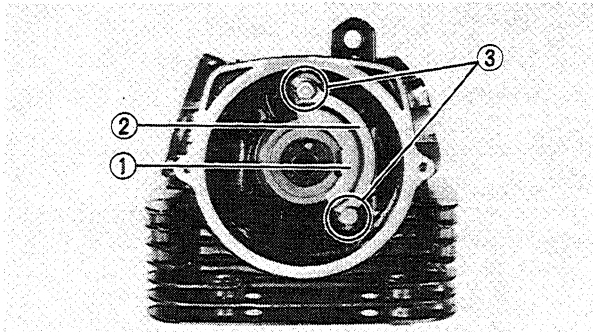


VALVE AND CYLINDER HEAD

- ① Locknuts (Valve adjusting)
- ② Adjuster (Valve adjusting)
- ③ Rocker arm
- ④ Rocker arm shaft
- ⑤ Valve retainers
- ⑥ Valve spring seat
- ⑦ Valve springs
- ⑧ Oil seal
- ⑨ Valve spring seat
- ⑩ Valve
- ⑪ Camshaft
- ⑫ Camshaft bushing
- ⑬ Bearing retainer
- ⑭ Lock washer


A	VALVE CLEARANCE (COLD): INTAKE: 0.05 ~ 0.09 mm (0.002 ~ 0.004 in) EXHAUST: 0.11 ~ 0.15 mm (0.004 ~ 0.006 in)
B	VALVE SPRING LENGTH LIMIT (FREE): INNER: 33.5 mm (1.32 in) OUTER: 35.2 mm (1.39 in)





3. Install:

- Retainer ①
- Lock washer (new) ②
- Bolts (camshaft) ③

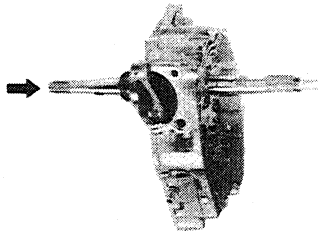
	Bolts (Camshaft): 8 Nm (0.8 m·kg, 5.8 ft·lb)
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4. Bend the lock washer tabs.

CRANKSHAFT AND TRANSMISSION

1. Install:

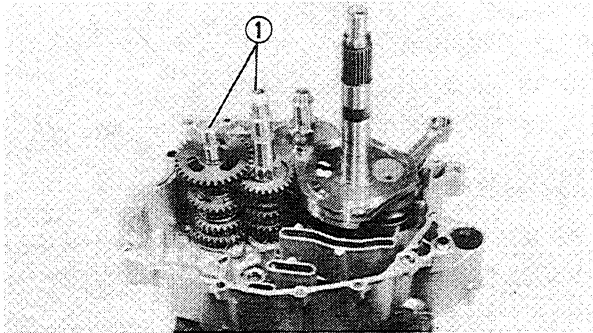
- Crankshaft
To the left side crankcase.
Use the Oil Press Machine.



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

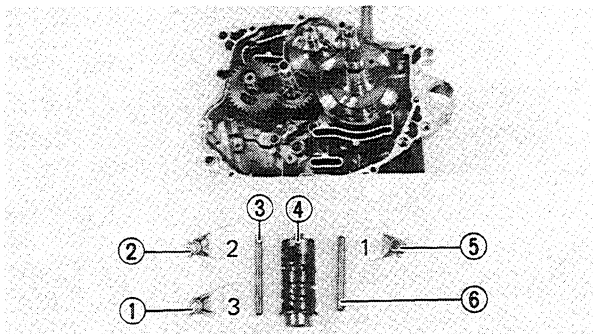
2. Install:

- Transmission assembly (main axle and drive axle) ①

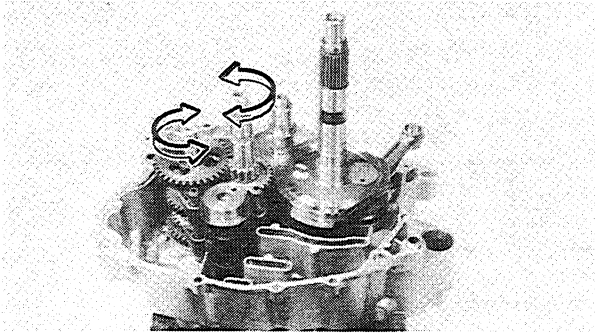


3. Install:

- Shift fork #3 ①
- Shift fork #2 ②
- Guide bar #1 ③
- Shift cam ④
- Shift fork #1 ⑤
- Guide bar #2 ⑥
- Balancer shaft



NOTE: _____
 Each shift fork is identified by a number cast on its side. All the numbers should face the left side.

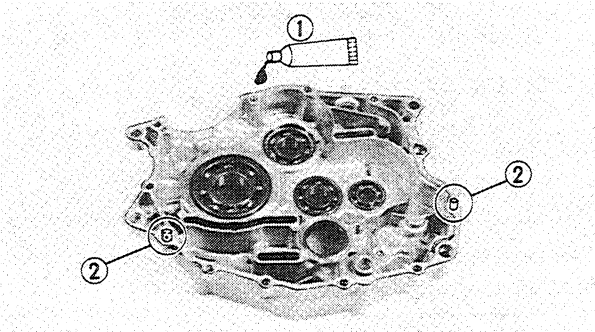


4. Check:

- Transmission and shifter operation
Unsmooth operation → Repair.

NOTE:

Oil each gear and bearing thoroughly.



CRANKCASE

1. Apply:

- Quick Gasket® (or Yamaha bond No. 1215)

①

To the mating surfaces of both case halves.



Quick Gasket®:

P/N ACC-11001-05-01

Yamaha bond No. 1215:

P/N 90890-85505

2. Install:

- Dowel pins ②

3. 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.



CRANKSHAFT/PISTON/BALANCER

- ① Balancer gear (36T)
- ② Bearing
- ③ Woodruff key
- ④ Balancer shaft
- ⑤ Drive gear (38T)
- ⑥ Bearing
- ⑦ Woodruff key
- ⑧ Crank (right)
- ⑨ Connecting rod
- ⑩ Cylindrical bearing
- ⑪ Crank pin
- ⑫ Crank (left)
- ⑬ Piston ring set
- ⑭ Piston

	E TOP RING	F 2ND RING
C SIDE CLEARANCE LIMIT	0.12 mm (0.0047 in)	0.12 mm (0.0047 in)
D END GAP LIMIT	0.40 mm (0.016 in)	0.40 mm (0.016 in)

A CRANKSHAFT:

A: 55.95 ~ 56.00 mm (2.203 ~ 2.205 in)

B: 0.35 ~ 0.65 mm (0.014 ~ 0.026 in)

C1: 0.02 mm (0.0008 in)

C2: 0.06 mm (0.0024 in)

F: 2.0 mm (0.08 in)

50 Nm (5.0 m·kg, 36 ft·lb)

B6306

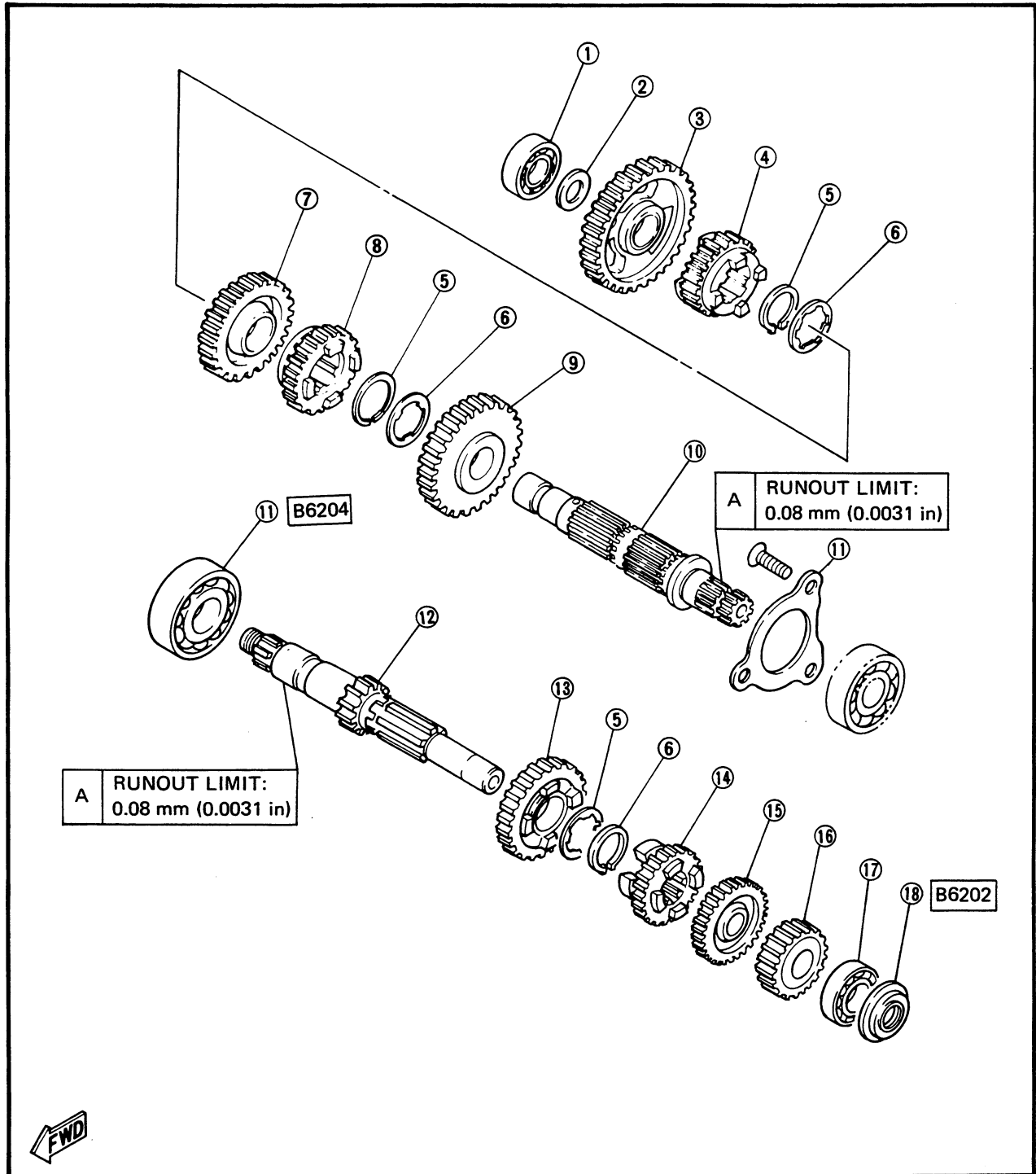
G USE NEW ONE

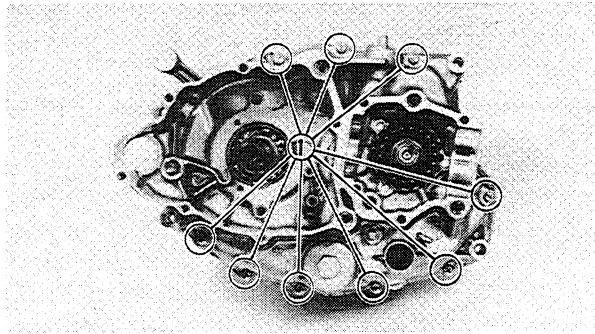
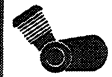
50 Nm (5.0 m·kg, 36 ft·lb)



TRANSMISSION

- ① Bearing
- ② Plain washer
- ③ 1st wheel gear (34T)
- ④ 5th wheel gear (23T)
- ⑤ Circlip
- ⑥ Washer
- ⑦ 3rd wheel gear (29T)
- ⑧ 4th wheel gear (26T)
- ⑨ 2nd wheel gear (34T)
- ⑩ Drive axle
- ⑪ Bearing retainer
- ⑫ Bearing
- ⑬ Main axle
- ⑭ 5th pinion gear (28T)
- ⑮ 3rd pinion gear (22T)
- ⑯ 4th pinion gear (25T)
- ⑰ 2nd pinion gear (19T)
- ⑱ Bearing
- ⑲ Oil seal





4. Tighten:

- Screws (crankcase) ①

NOTE:

Tighten the screw in stage, using a crisscross pattern.

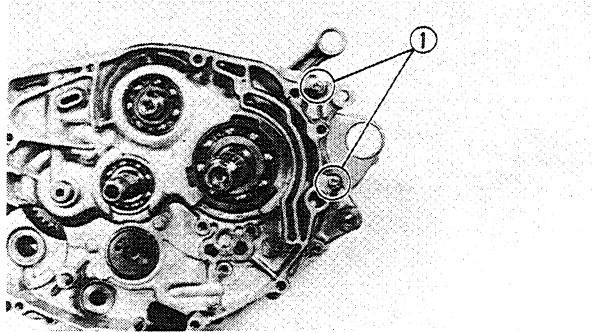


Screws (Crankcase):

7 Nm (0.7 m·kg, 5.1 ft·lb)

Bolt (Crankcase):

22 Nm (2.2 m·kg, 16 ft·lb)

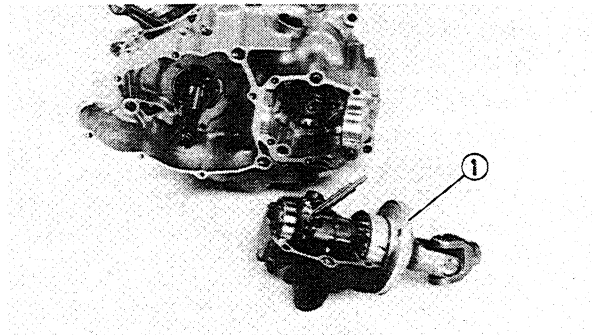


5. Apply:

- 4-stroke engine oil
To the crank pin, bearing and oil delivery hole.

6. Check:

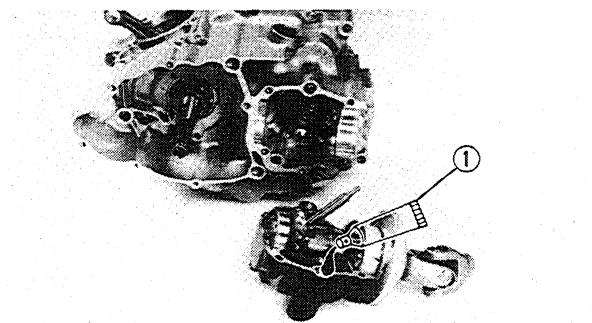
- Crankshaft and transmission operation
Unsmooth operation → Repair.



MIDDLE GEAR

1. Install:

- Middle driven gear assembly ①



2. Apply:

- Quick Gasket® (or Yamaha bond No. 1215) ①
To the mating surfaces of both case halves.



Quick Gasket®:

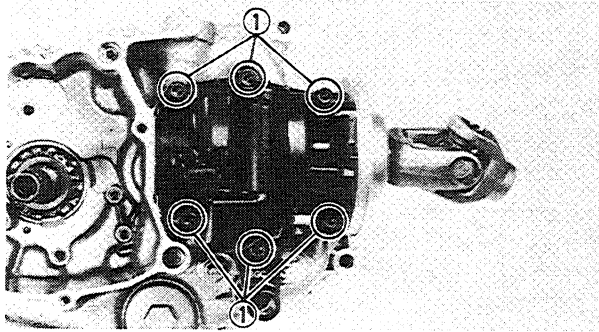
P/N ACC-11001-05-01

Yamaha bond No. 1215:

P/N 90890-85505

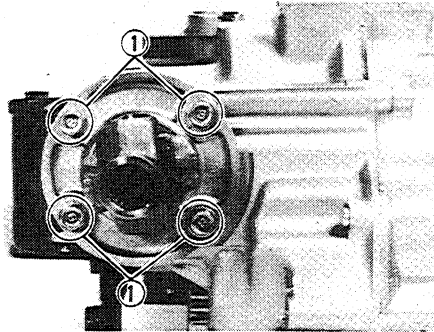
3. Install:

- Dowel pins
- Middle gear case



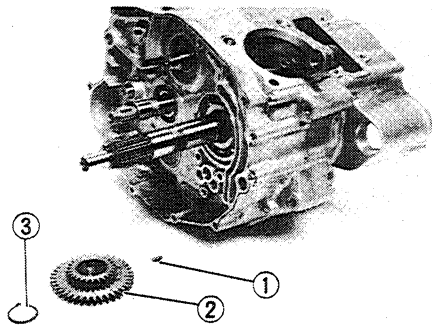
4. Tighten:
- Bolts (middle gear case) ①

	Bolts (Middle gear case): 10 Nm (1.0 m·kg, 7.2 ft·lb)
--	---



5. Tighten:
- Bolts (universal joint) ①

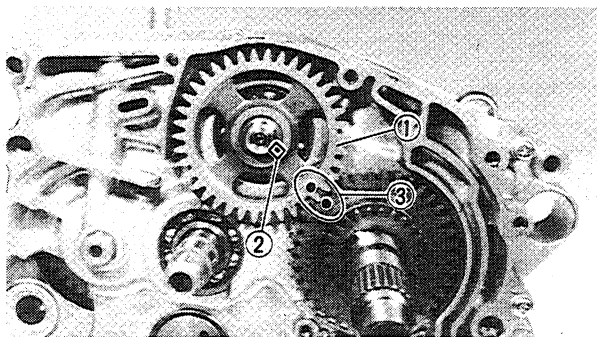
	Bolts (Universal joint): 25 Nm (2.5 m·kg, 18 ft·lb)
--	---



BALANCER DRIVE AND DRIVEN GEARS

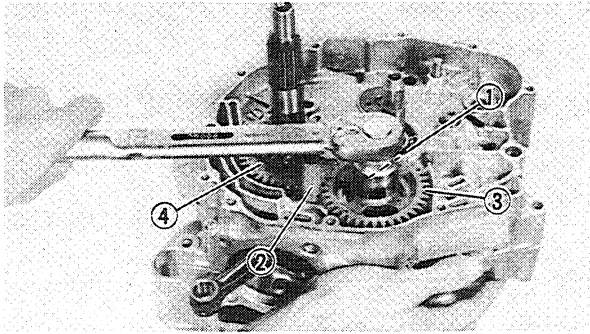
1. Install:
- Woodruff key ①
 - Balancer drive gear ②
 - Circlip ③

2. Install:
- Balancer driven gear ①
 - Woodruff key ②
 - Lock washer
 - Nuts (driven gear)
- Finger tighten the nut.




NOTE:

- Align the punch marks ③ on the drive and driven gear.
- Be sure the tab of the lock washer engages the slot in the balancer shaft.

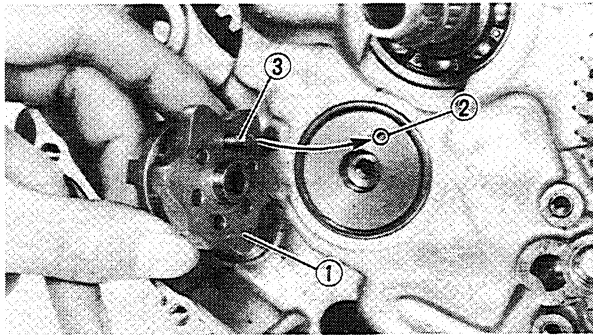


3. Tighten:
- Nut (driven gear) ①

NOTE: _____
Place a folded rag ② between the teeth of the driven gear ③ and drive gear ④ to lock them.

	<p>Nut (Balancer Driven Gear): 50 Nm (5.0 m·kg, 36 ft·lb)</p>
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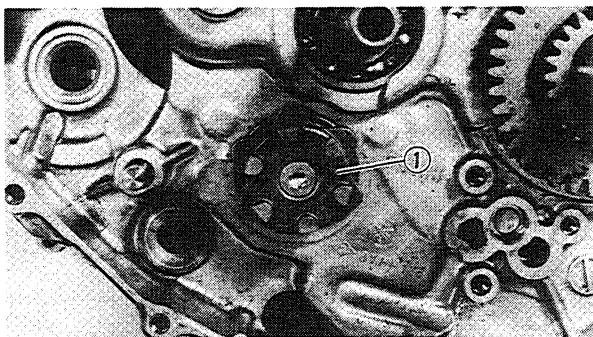
4. Bend the lock washer tabs.




OIL PUMP AND SHIFTER

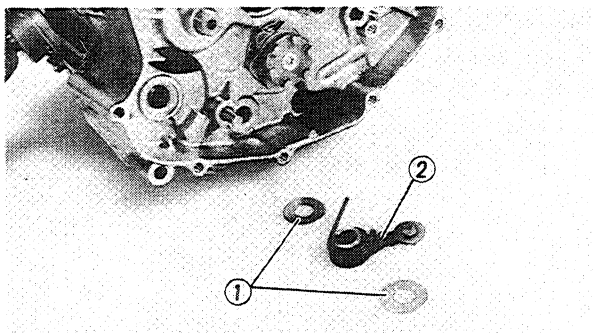
1. Install:
- Segment ①

NOTE: _____
Align the hole ② of the shift cam with the pin ③ of the segment.

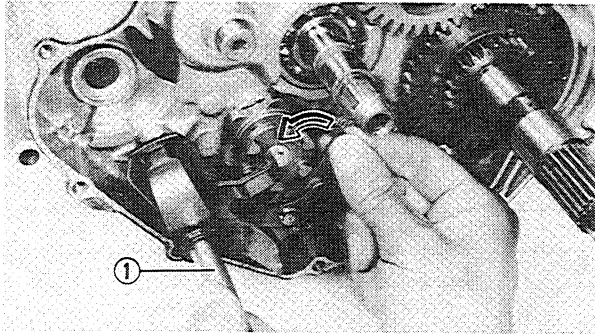


2. Tighten:
- Screw (segment) ①
- Use #25 Torx Driver.

	<p>Screw (Segment): 12 Nm (1.2 m·kg, 8.7 ft·lb) LOCTITE®</p>
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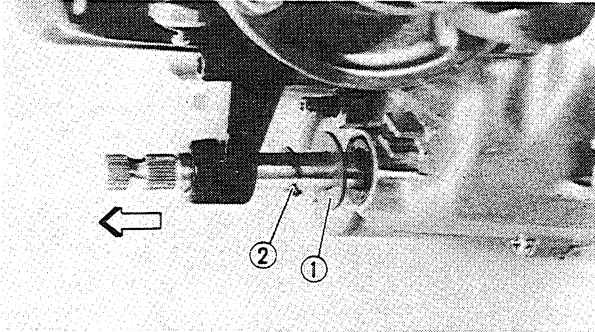
3. Install:
- Plain washers ①
 - Stopper lever with torsion spring ②



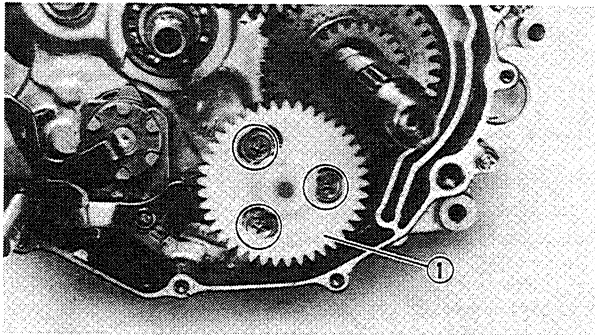
4. Install:
- Shift shaft ①

NOTE:

- Be sure the shift lever correctly engages the shift cam pins.
- Be sure the stopper shaft is placed between the spring hooks.

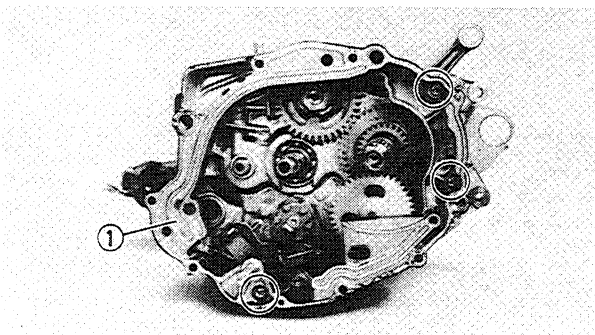


5. Install:
- Plain washer (shift shaft) ①
 - Circlip (shift shaft) ②



6. Install:
- Oil pump assembly ①

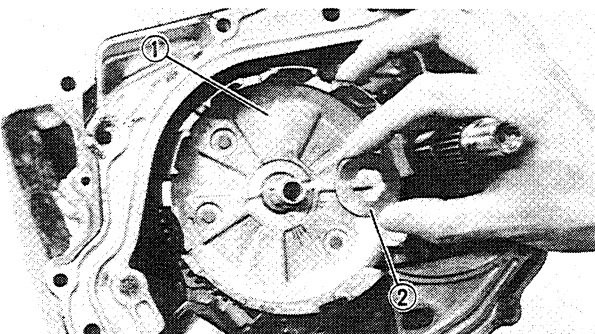
	<p>Oil Pump: 7 Nm (0.7 m·kg, 5.1 ft·lb)</p>
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CRANKCASE SPACER (RIGHT)

1. Install:
- Gasket (new)
 - Dowel pin
 - Crankcase spacer (right) ①

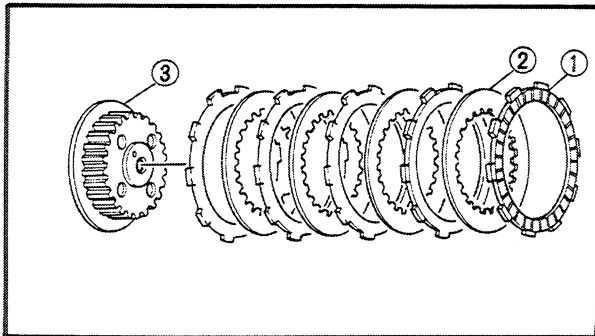
	<p>Crankcase Spacer (Right): 7 Nm (0.7 m·kg, 5.1 ft·lb)</p>
--	--



CLUTCH

Secondary Clutch and Primary Clutch

1. Install:
- Clutch housing ①
 - Thrust washer ②

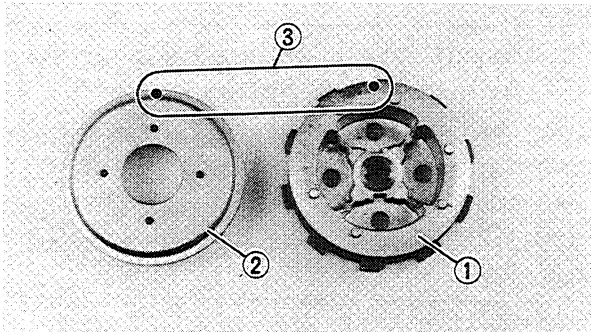


2. Install:

- Friction plates ①
- Clutch plates ②
- To clutch boss ③.

NOTE:

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

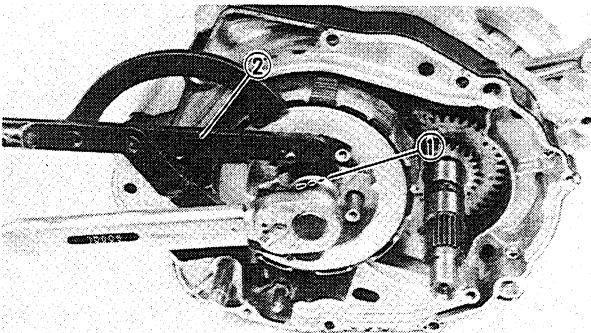


3. Install:

- Clutch boss ①
- To the pressure plate assembly ②.

NOTE:

Align the punch marks ③ on the clutch boss with the pressure plate assembly.



4. Install:

- Lock washer (new)
- Nut (clutch boss) ①

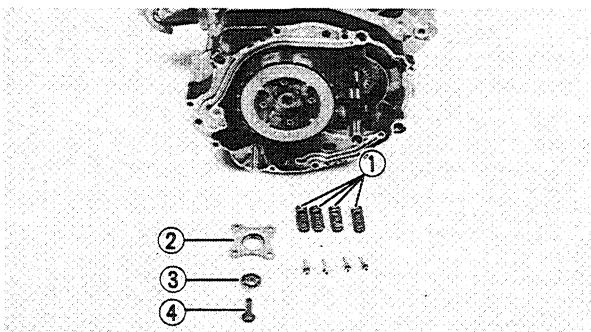
NOTE:

Use the Rotor Holder ② to hold the clutch boss when tightening the nut (Clutch boss).

	<p>Rotor Holder: P/N YU-01235 P/N 90890-01235</p>
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	<p>Nut (Clutch boss): 50 Nm (5.0 m·kg, 36 ft·lb)</p>
--	---

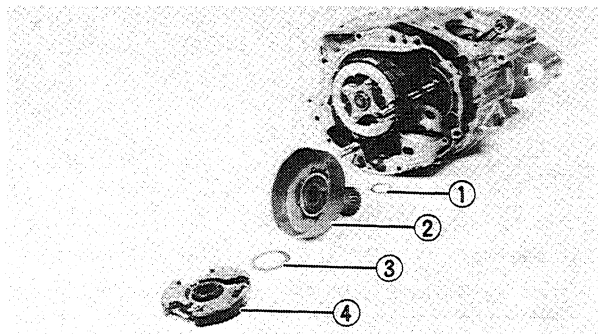
5. Bend the lock washer tabs.



6. Install:

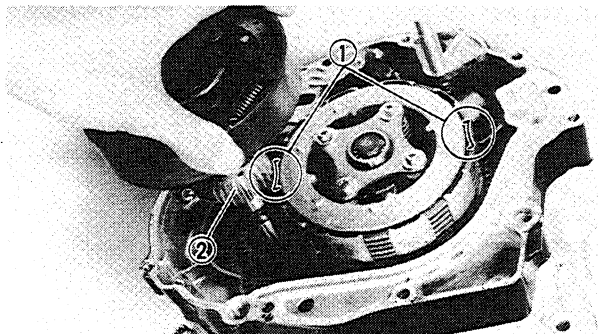
- Clutch springs ①
- Clutch spring plate ②
- Bearing ③
- Push rod ④

	<p>Bolts (Clutch spring): 6 Nm (0.6 m·kg, 4.3 ft·lb)</p>
--	---



7. Install:

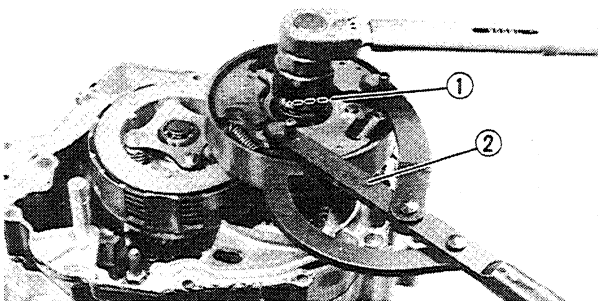
- Plain washer ①
- Clutch housing comp. ②
- Plain washer ③
- Clutch carrier assembly ④
- Lock washer (new)
- Nut (primary clutch)



NOTE:

The secondary clutch housing has two notches ① machines into it to permit the primary drive gear behind the primary clutch to clear the secondary clutch.

Align one of these notches with the primary gear ② before installing the primary clutch assembly.



8. Tighten:

- Nut (primary clutch) ①

NOTE:

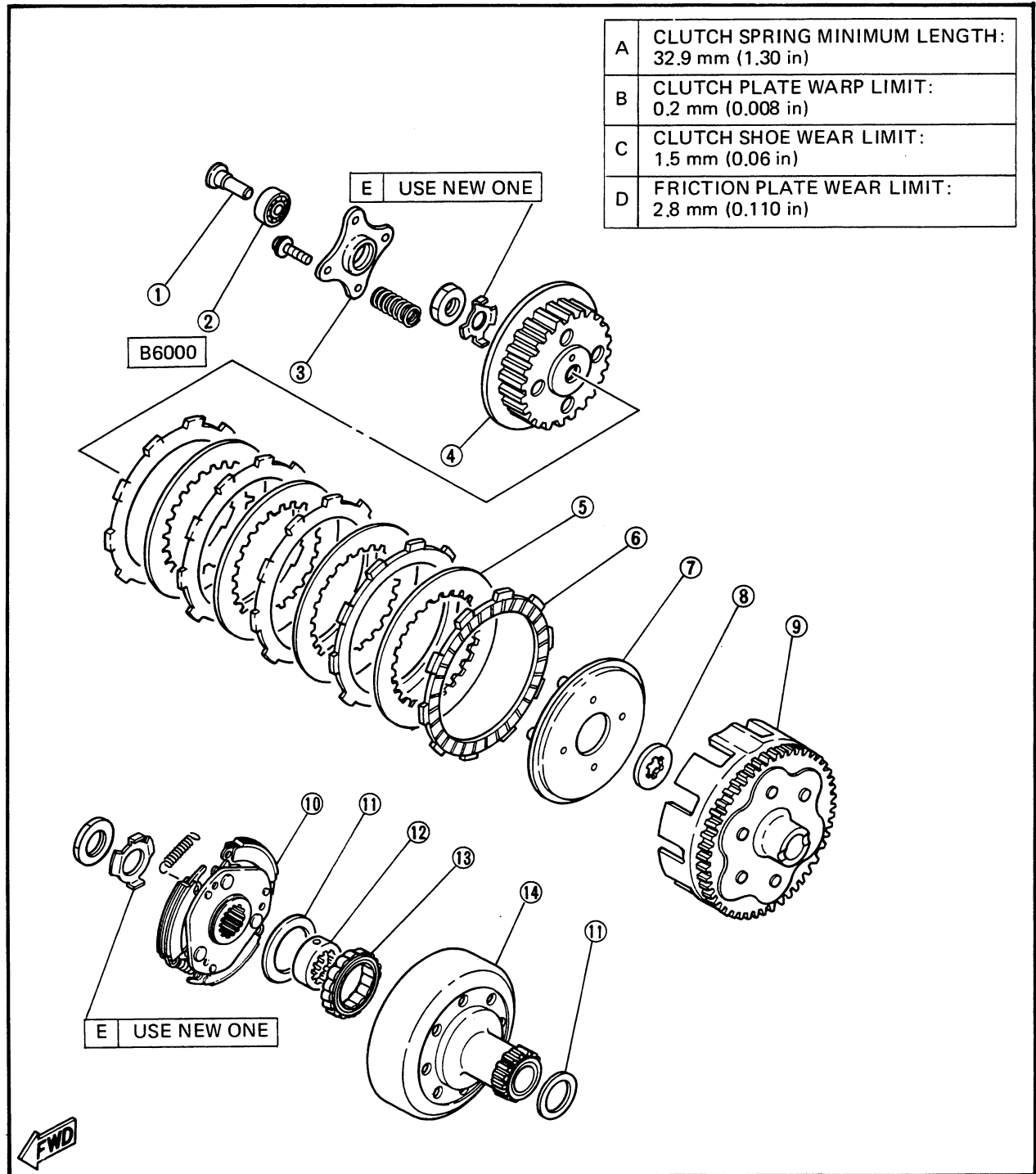
Use the Rotor Holder ② to hold the clutch shoe assembly when tightening the nut (primary clutch).



Rotor Holder:
 P/N YU-01235
 P/N 90890-01235

CLUTCH

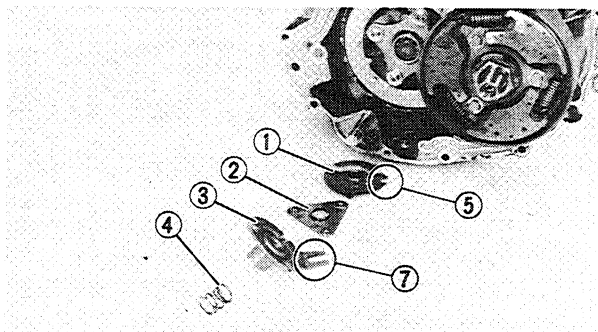
- ① Push rod
- ② Bearing
- ③ Clutch spring plate
- ④ Clutch boss
- ⑤ Clutch plate
- ⑥ Friction plate
- ⑦ Pressure plate
- ⑧ Thrust washer
- ⑨ Clutch housing
- ⑩ Clutch carrier assembly
- ⑪ Plain washer
- ⑫ Bearing
- ⑬ One way bearing
- ⑭ Clutch housing comp.





Nut (Primary clutch):
78 Nm (7.8 m·kg, 56 ft·lb)

9. Bend the lock washer tabs.



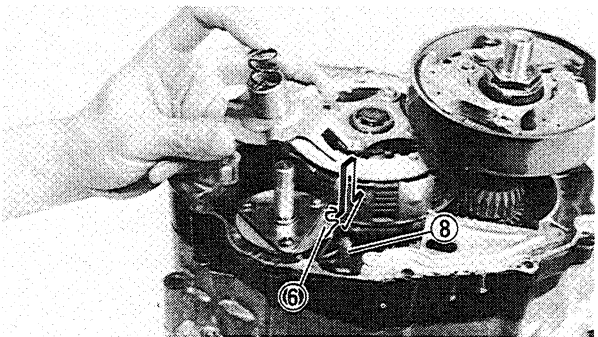
Shift Guide and Clutch Cover

1. Install:

- Shift guide #2 ①
- Pawl holder ②
- Shift guide #1 ③
- Clutch lever spring ④

NOTE:

- The slot ⑤ in the shift guide #2 must engage the shift shaft projection ⑥ .
- The slot ⑦ in the shift guide #1 must engage the stopper bolt ⑧ .

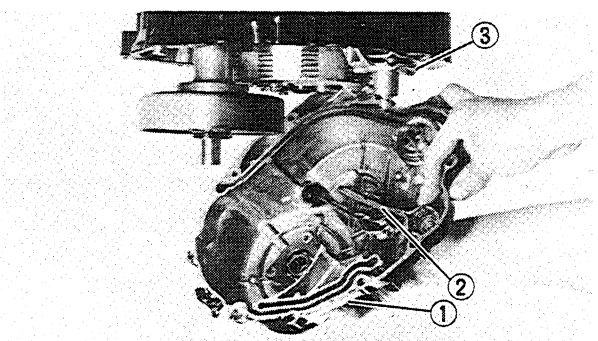


2. Install:

- Gasket (new)
- Clutch cover ①

NOTE:

The shift arm ② engages the shift guide #1 ③ .

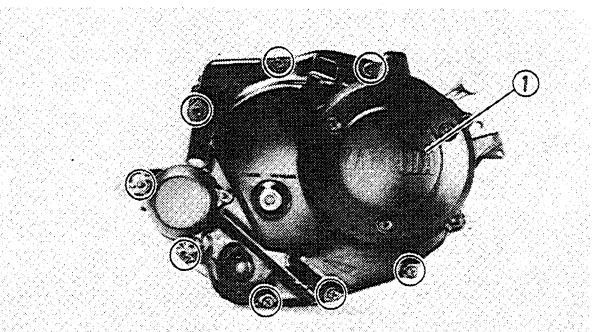


3. Tighten:

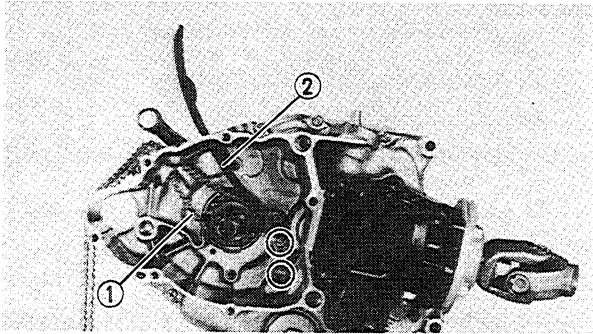
- Screws (clutch cover) ①

NOTE:

Tighten the screws in stage, using a crisscross pattern.



Screws (Clutch cover):
7 Nm (0.7 m·kg, 5.1 ft·lb)

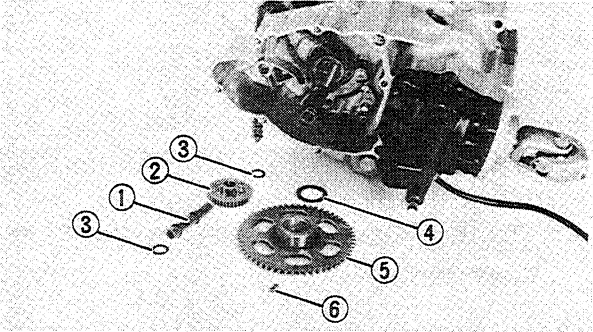


CDI MAGNETO

1. Install:

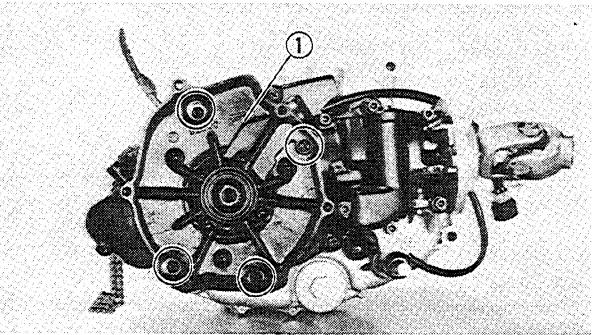
- Cam chain ①
- Cam chain damper (intake) ②

	Cam Chain Damper (Intake): 8 Nm (0.8 m·kg, 5.8 ft·lb)
--	---



2. Install:

- Shaft ①
- Starter idle gear # 1 ②
- Washer ③
- Plain washer ④
- Starter idle gear # 2 ⑤
- Woodruff key ⑥
- CDI magneto

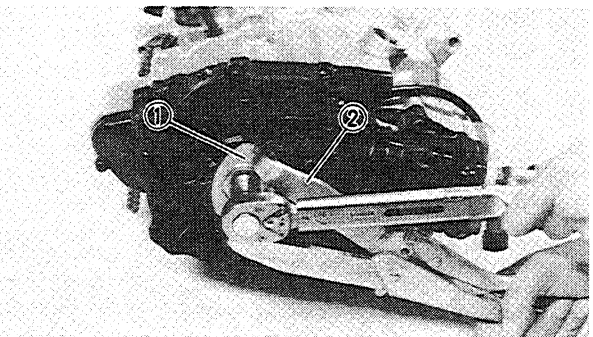


CRANKCASE SPACER (LEFT)

1. Install:

- Dowel pins
- Gasket (new)
- Crankcase spacer (left) ①
- Screws (spacer)

	Crankcase Spacer (Left): 7 Nm (0.7 m·kg, 5.1 ft·lb)
--	---



2. Install:

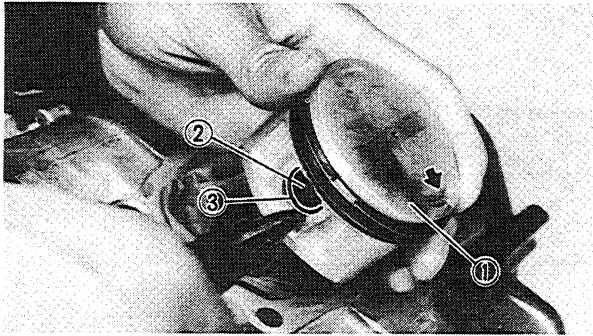
- Starter pulley ①

NOTE:

Use the clutch Holder ② to hold the starter pulley.

	Universal Clutch Holder: P/N YM-91042 P/N 90890-04086
--	--

	Starter Pulley: 50 Nm (5.0 m·kg, 36 ft·lb)
--	--



PISTON

1. Install:

- Piston ①
- Piston pin ②
- Piston pin clip ③

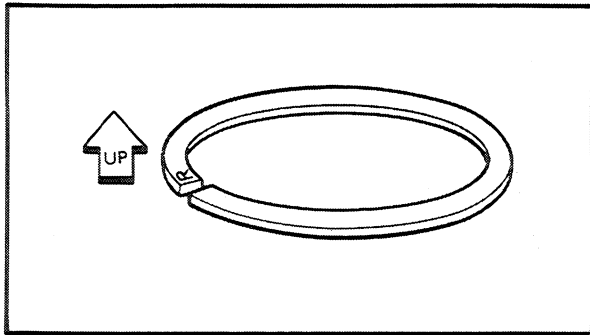
NOTE:

- 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:

- 4-stroke engine oil

To the piston pin, 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.

2. Oil liberally:

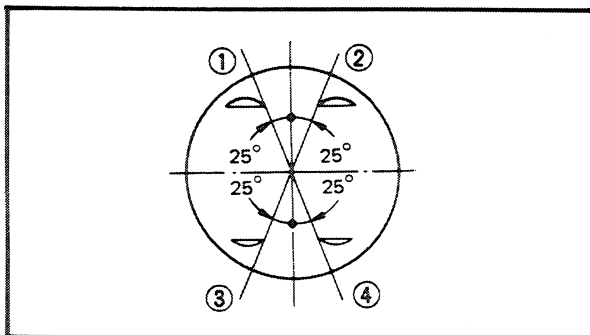
- Piston
- Rings
- Cylinder

3. Set:

- Piston ring ends

CAUTION:

Make sure the ends of the oil ring expanders do not overlap.

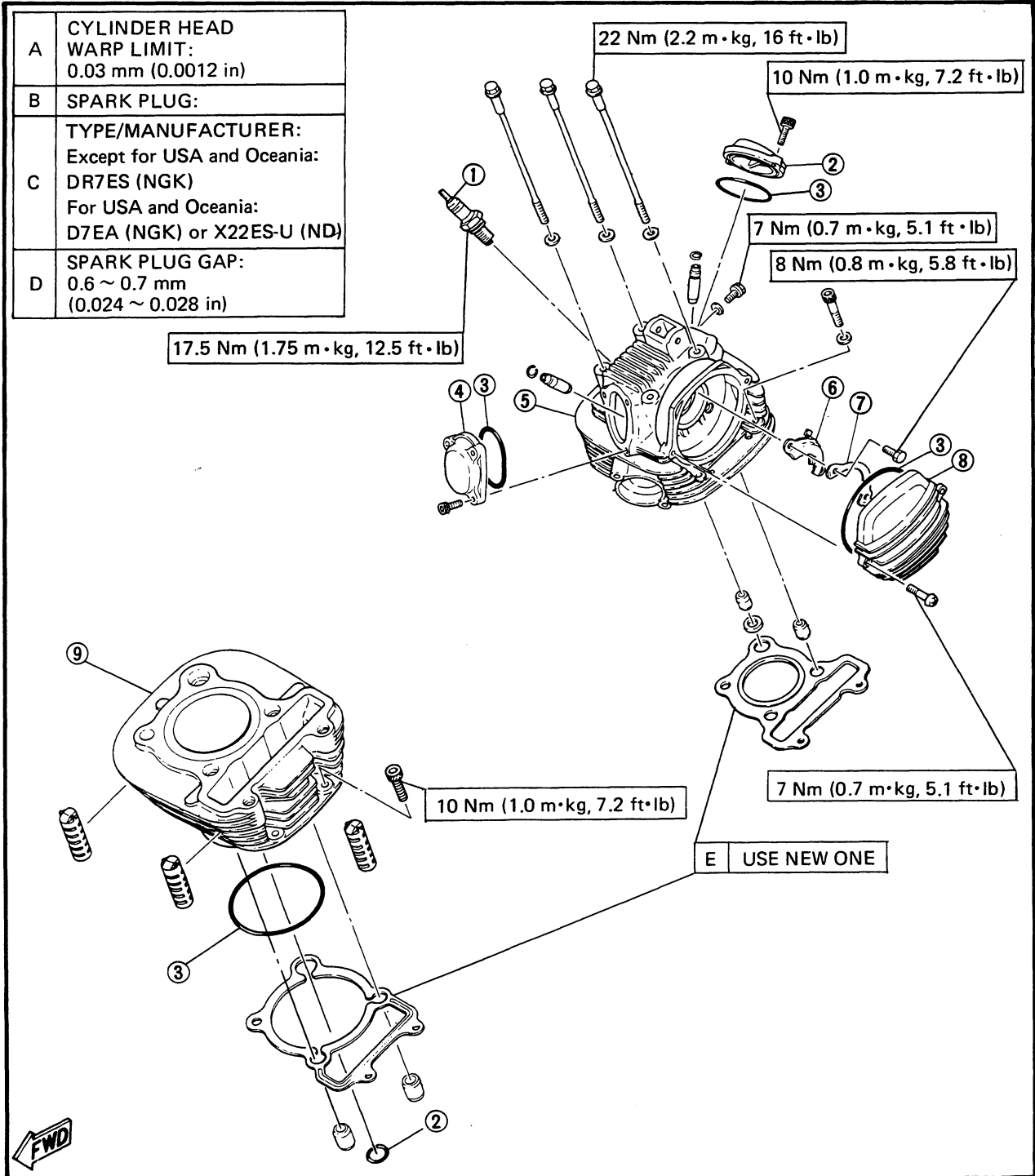


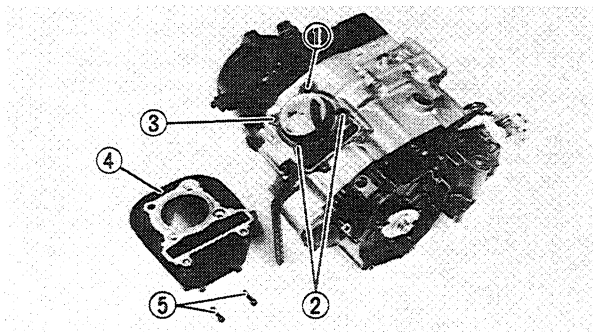
- ① TOP
- ② OIL RING (LOWER RAIL)
- ③ OIL RING (UPPER RAIL)
- ④ 2ND



CYLINDER AND CYLINDER HEAD (1)

- ① Spark plug
- ② Tappet cover (Intake)
- ③ O-ring
- ④ Tappet cover (Exhaust)
- ⑤ Cylinder head
- ⑥ Bearing retainer
- ⑦ Lock washer
- ⑧ Side cover
- ⑨ Cylinder



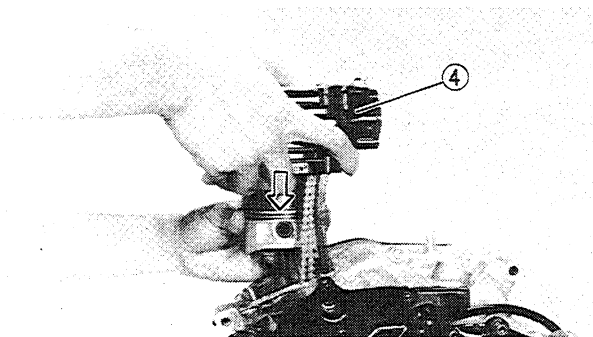


4. Install:

- O-ring ①
- Dowel pins ②
- Gasket (new) ③
- Cylinder ④
- Bolts (cylinder) ⑤

NOTE: _____

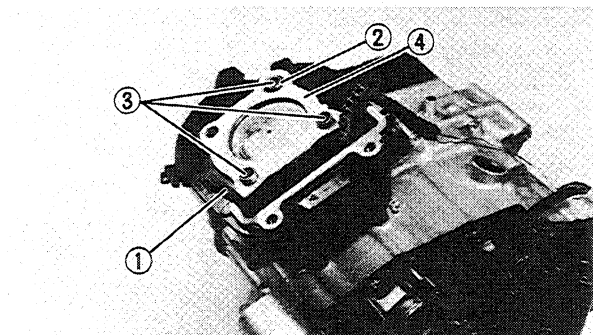
Install the cylinder with one hand while compressing the piston rings with the other hand.



CAUTION: _____

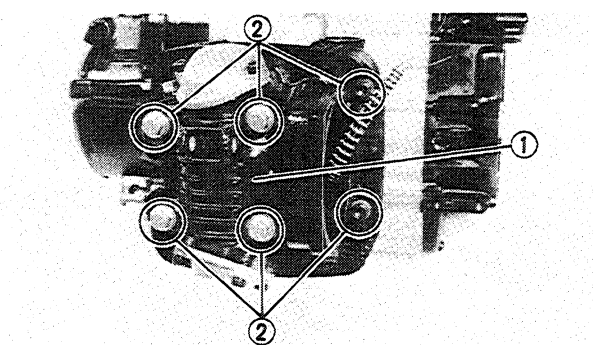
- Be careful not to damage the cam chain damper during installation.
- Pass the cam chain through the cam chain cavity.

	Bolts (Cylinder): 10 Nm (1.0 m·kg, 7.2 ft·lb)
--	---



5. Install:

- Cam chain damper (exhaust) ①
- O-ring ②
- Dowel pins ③
- Gasket (new) ④



6. Install:

- Cylinder head ①

NOTE: _____

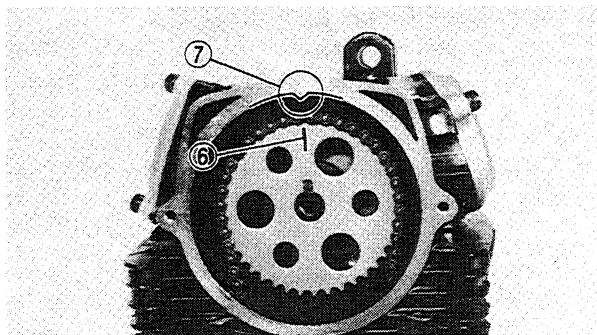
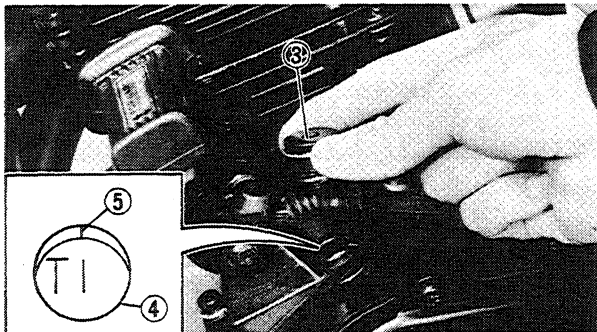
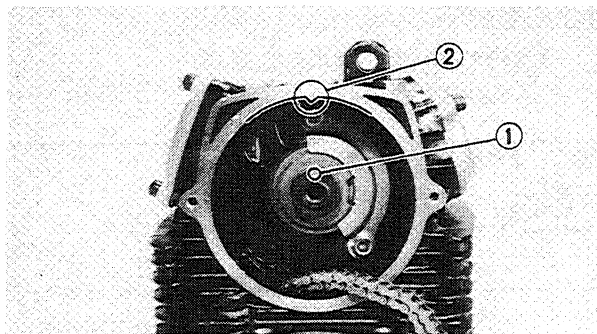
Tie the cam chain so that it does not fall into the crankcase.

- Bolts (cylinder head) ②

NOTE: _____

Tighten the nuts in stage, using a crisscross pattern.

	Bolts (Cylinder head): 22 Nm (2.2 m·kg, 16 ft·lb)
--	---



7. Install:
- Cam sprocket

Installing steps:

- Rotate the camshaft to align the camshaft pin ① with the cylinder head match mark ②.
- Remove the timing plug ③.
- Turn the starter pulley until the "T" mark ④ is aligned with the stationary pointer ⑤ on the crankcase.
- Place the cam chain onto the cam chain sprocket.
- Install the cam chain sprocket onto the camshaft, and finger tighten the sprocket bolt.

NOTE:

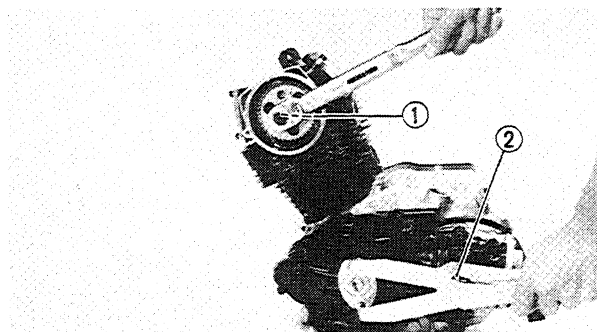
Be sure the match mark ⑥ on the cam chain sprocket is aligned with the match mark ⑦ on the cylinder head.

- Force the camshaft clockwise and counter-clockwise to remove the cam chain slack.
- Insert the screwdriver into the cam chain tensioner hole, and push the cam chain damper inward.
- While pushing the cam chain damper, be sure cam sprocket match mark ⑥ align the cylinder head match mark ⑦.
- If marks is aligned, tighten the cam sprocket bolt. If marks do not align, change the meshing position of sprocket and cam chain.


8. Tighten:
- Bolt (cam chain sprocket) ①

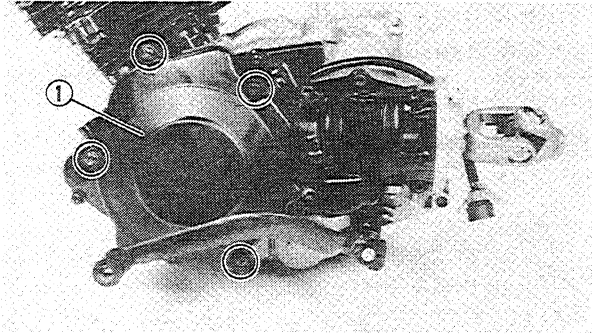
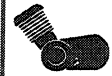
NOTE:

Use the clutch Holder ② to hold the starter pulley.



	<p>Universal Clutch Holder: P/N YM-91042 P/N 90890-04086</p>
---	---

	<p>Bolt (Cam chain sprocket): 60 Nm (6.0 m·kg, 43 ft·lb)</p>
---	--



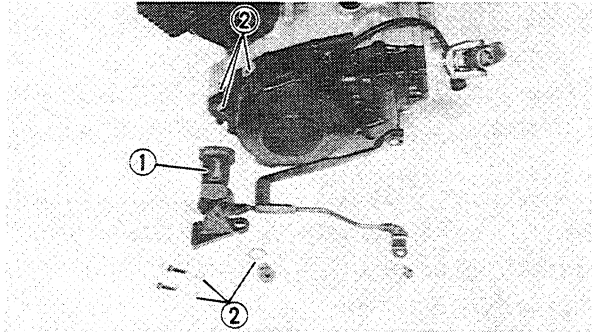
9. Install:

- Starter pulley cover ①
- Change pedal



Starter Pulley Cover:
7 Nm (0.7 m·kg, 5.1 ft·lb)

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



10. Install:

- Side cover (cylinder head)
- Drive select lever assembly ①

NOTE:

Before installing the drive select lever assembly, do not forget to fit the special washers ② .



Side Cover (Cylinder head):
7 Nm (0.7 m·kg, 5.1 ft·lb)

Drive Select Lever Assembly:

Shift Lever:
7 Nm (0.7 m·kg, 5.1 ft·lb)

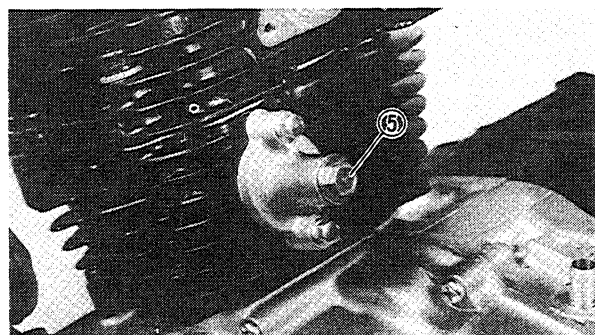
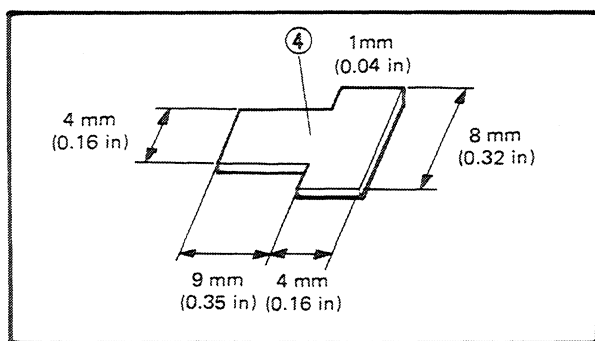
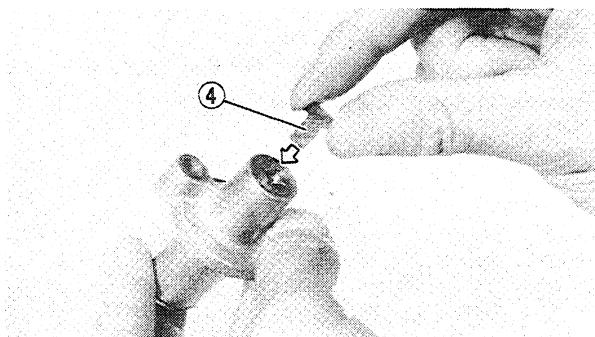
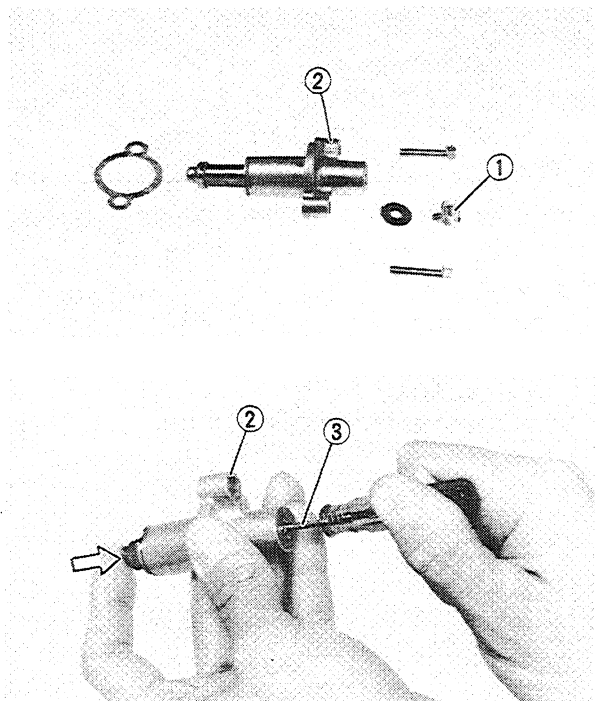
Cam Shift:
10 Nm (1.0 m·kg, 7.2 ft·lb)

11. Check:

- Drive select lever operation
Unsmooth operation → Repair.

12. Install:

- Spark plug
- Cam chain tensioner



Timing chain tensioner installing steps:


- Remove the chain tensioner cap ① from the chain tensioner assembly ② .
- Insert a small screwdriver ③ into the tensioner body slit. While pressing the tensioner rod, rotate the screwdriver counterclockwise until it stops turning.
- While still pressing the tensioner rod, remove the screwdriver.

- Insert a suitable plate (steel) ④ into the tensioner body slit.


NOTE: _____
 Cut a suitable plate out of a steel sheet 1 mm (0.04 in) thick, to the dimensions as shown.

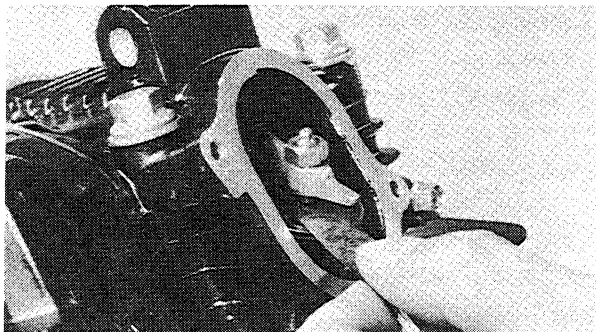
- Install the cam chain tensioner body (with a suitable plate) onto the cylinder.

NOTE: _____
 Always use a new gasket.

 **Cam Chain Tensioner Body:**
 12 Nm (1.2 m·kg, 8.7 ft·lb)

- Remove a suitable plate.
- Install the tensioner cap ⑤ .

 **Cam Chain Tensioner Cap:**
 7 Nm (0.7 m·kg, 5.1 ft·lb)



13. Adjust:

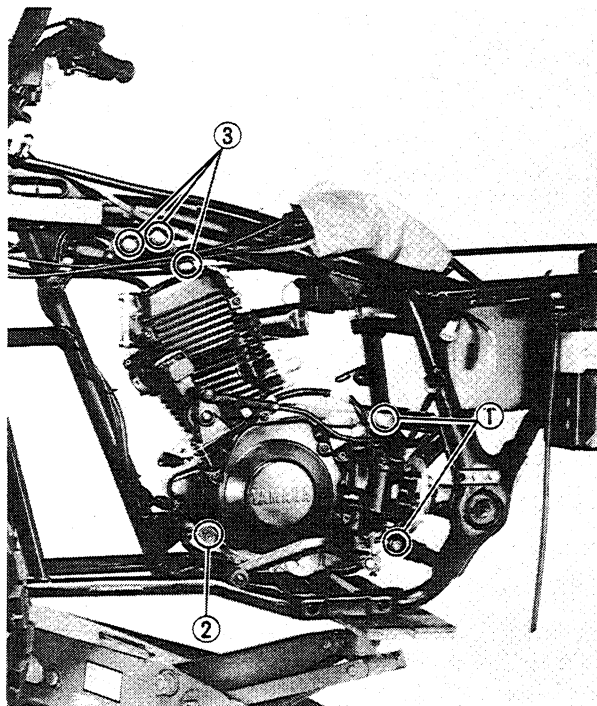
- Valve clearance

Refer to "CHAPTER 3. VALVE CLEARANCE ADJUSTMENT" section.

NOTE:

After adjusting the valve clearance, apply 4-stroke engine oil to the following parts.

- Camshaft
- Rocker arm shafts
- Rocker arms
- Valve assemblies



REMounting ENGINE

When remounting the engine, reverse the removal procedure. Note the following points.

1. Install:

- Engine
- From the left side.

2. Install:

- Bolts (engine mounting-rear) ①
- Bolts (engine mounting-front) ②
- Bolts (engine mounting-top) ③

NOTE:

- All mounting bolts ① , ② , ③ should be installed from the right of the machine.
- Finger tighten the nuts, do not torque them at this point.



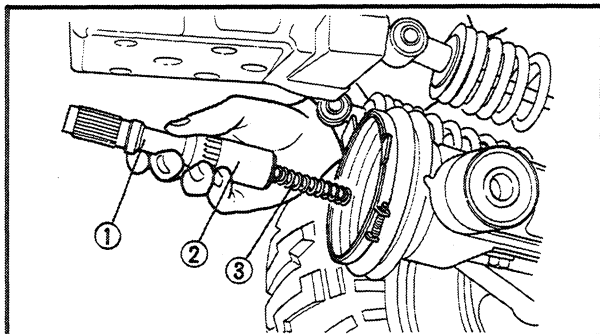
3. Install:

- Rear wheel drive assembly and swingarm.

NOTE:

- Before installing the swingarm, lubricate the following parts.

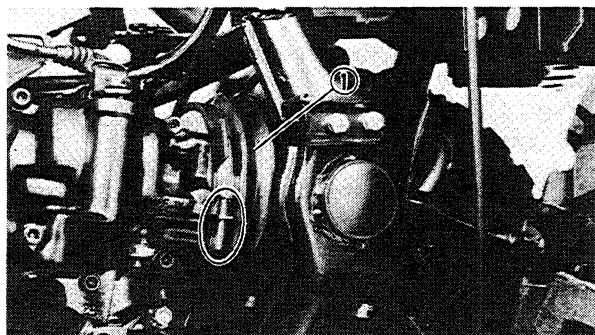
- 1) Bearings
- 2) Oil seals
- 3) Collars
- 4) Pivot shaft



Lithium Base Waterproof Wheel
Bearing Grease

- Before installing the swingarm, do not forget to fit the drive shaft ①, coupling gear ② and spring ③.

- Insert the drive shaft into the universal joint properly.



4. Install:

- Rubber boot ①

NOTE:

Be sure to position the rubber boot so that the tang face downward.

5. Install:

- Pivot shafts
- Locknuts (swingarm)

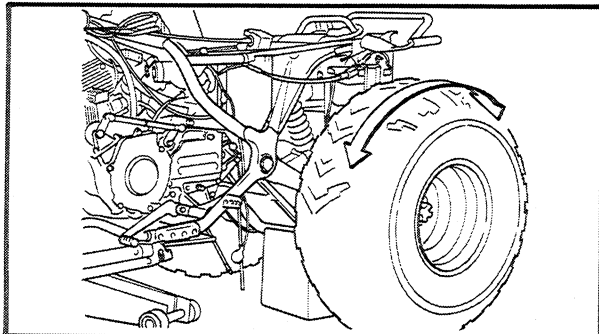
NOTE:

Finger tighten the pivot shafts and locknuts, do not torque them at this point.

- Pivot shaft caps

6. Check:

- Drive shaft operation

**Checking steps:**

- Block the front wheels, and elevate the rear wheels by placing the suitable stand under the swingarm.
- Move the rear wheels back and forth.
- Check the drive shaft operation. If there is unsmooth operation (rear wheels), repair.

7. Tighten:

- Bolts (engine mounting)
- Pivot shafts (swingarm)
- Locknuts (swingarm)
- Bolts (rear shock absorber)

Refer to "CHAPTER 6. REAR SHOCK ABSORBER AND SWINGARM – INSTALLATION" section.

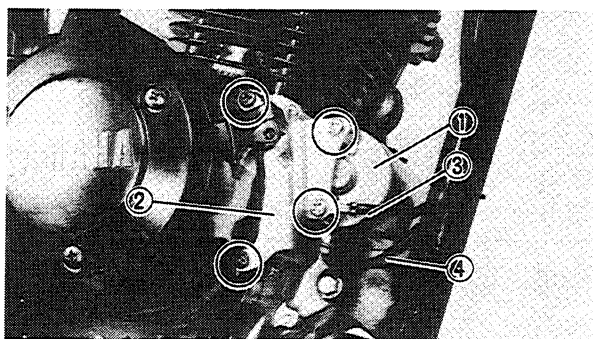


Bolts (Engine mounting):
33 Nm (3.3 m·kg, 24 ft·lb)

Pivot Shafts (Swingarm):
6 Nm (0.6 m·kg, 4.3 ft·lb)

Locknuts (Swingarm):
100 Nm (10.0 m·kg, 72 ft·lb)

Rear Shock Absorber:
45 Nm (4.5 m·kg, 32 ft·lb)

**8. Install/Connect:**

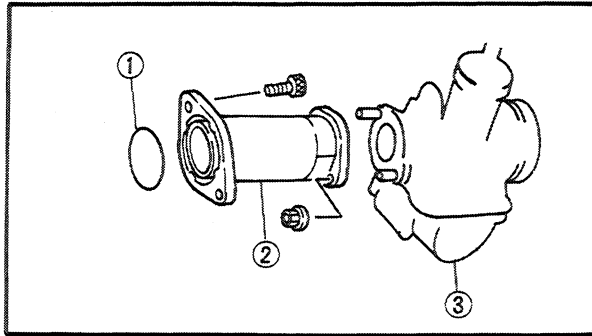
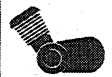
- Starter motor ①
- Starter motor bracket ②
- Ground lead ③
- Starter motor lead ④

NOTE:

- Be careful not to damage the O-ring during installation.
- The starter motor lead terminal should face downward.



Starter Motor Bracket:
7 Nm (0.7 m·kg, 5.1 ft·lb)



9. Install:

- O-ring (new) ①
- Carburetor joint ②
- Carburetor ③

Refer to "CHAPTER 3. THROTTLE LEVER ADJUSTMENT" section.



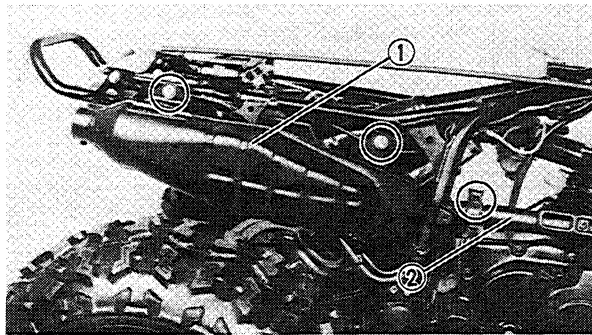
Carburetor Joint:

12 Nm (1.2 m·kg, 8.7 ft·lb)

Carburetor:

Nuts: 8 Nm (0.8 m·kg, 5.8 ft·lb)

Screw: 2 Nm (0.2 m·kg, 1.4 ft·lb)



10. Install:

- Muffler ①
- Exhaust pipe ②



Muffler:

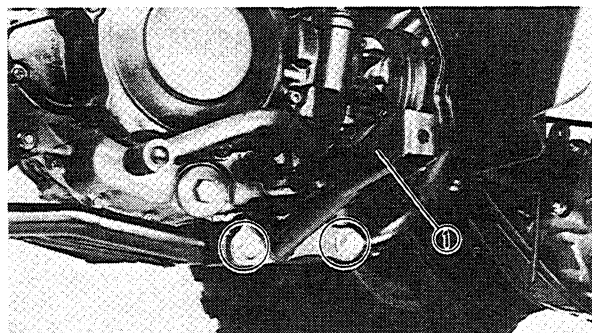
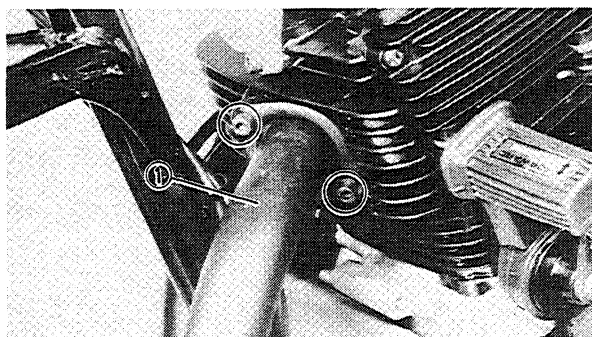
27 Nm (2.7 m·kg, 19 ft·lb)

Muffler and Exhaust Pipe:

20 Nm (2.0 m·kg, 14 ft·lb)

Exhaust Pipe:

10 Nm (1.0 m·kg, 7.2 ft·lb)



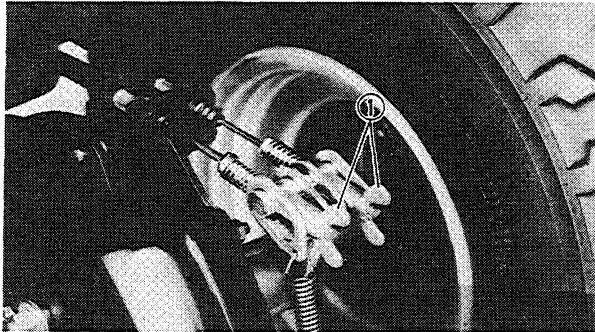
11. Install:

- Footrest (left) ①



Footrest (Left):

85 Nm (8.5 m·kg, 61 ft·lb)



12. Install:

- Adjuster (brake lever and brake pedal) ①
- Refer to "CHAPTER 3. REAR BRAKE LEVER AND PEDAL ADJUSTMENT" section.



13. Install:

- Rear fender ①
- Front fender ②
- Fuel tank ③
- Fuel tank cover ④
- Seat ⑤
- Front carrier (Except for USA)
- Front carrier (Except for USA)

14. Apply:

- Engine oil



Recommended Oil:

**YAMALUBE 4 (20W40) or
SAE 20W40 type SE motor oil**

Total Amount:

1.8 L (1.6 Imp qt, 1.9 US qt)

Refer to "CHAPTER 3. ENGINE OIL REPLACEMENT" section.

15. Install:

- Oil leakage

16. Check:

- "NEUTRAL" indicator light operation
 - "REVERSE" indicator light operation
- Poor operation → Repair.

17. Adjust:

- Clutch free play

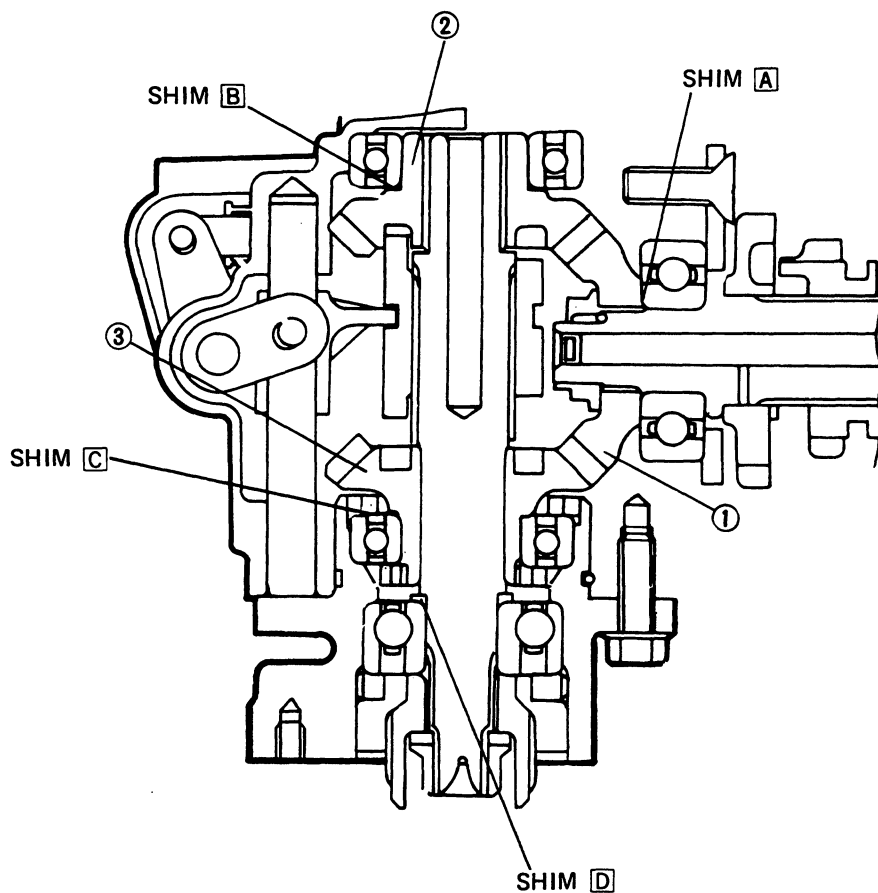
Refer to "CHAPTER 3. CLUTCH ADJUSTMENT" section.

**MIDDLE GEAR SERVICE****DRIVE AXLE POSITIONNING**

When the crankcase assembly and/or the drive axle are replaced, you must position the drive axle in place.

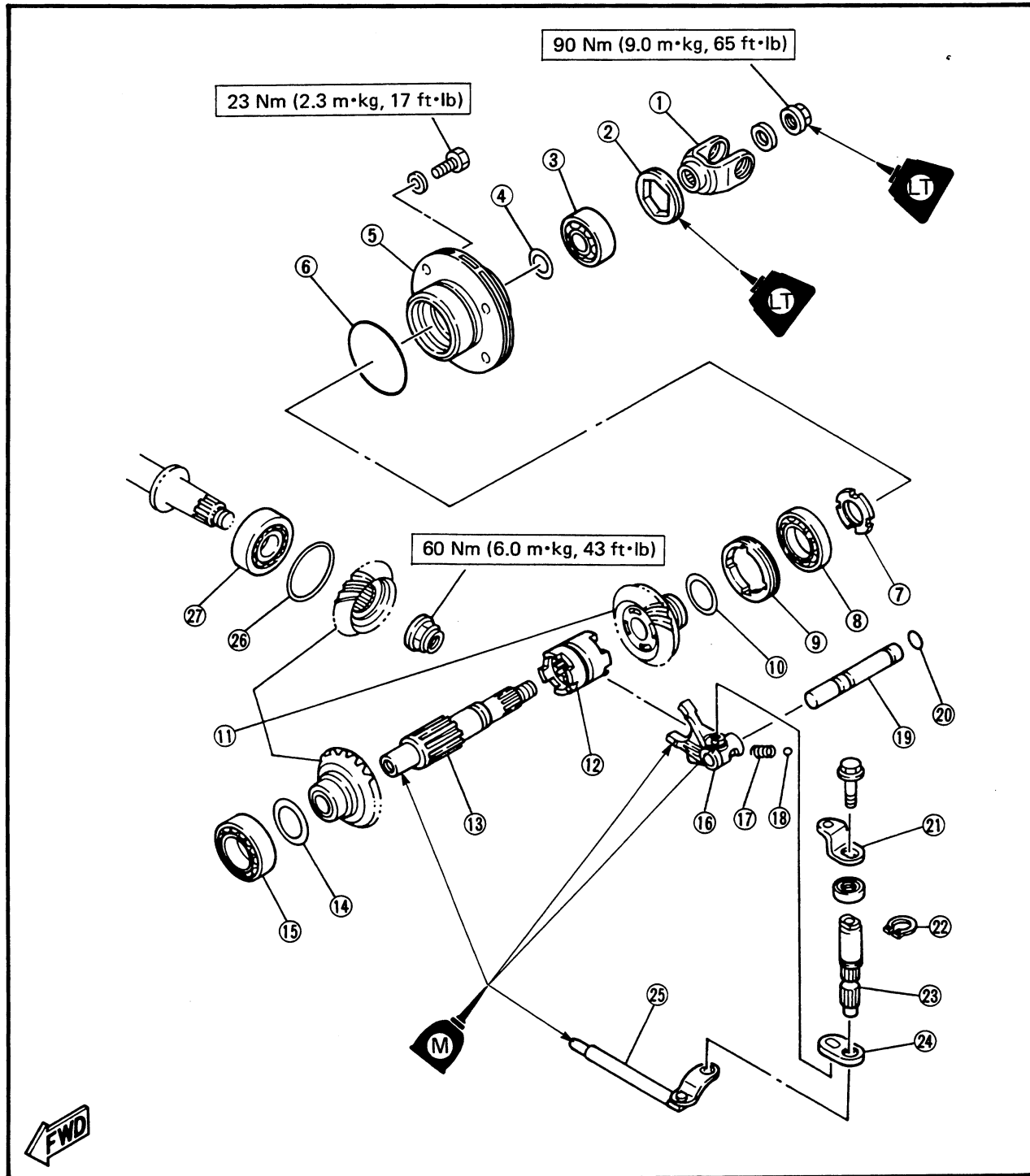
Refer to "Drive Pinion Gear Shim Selection and Middle Gear Lash Adjustment" section.

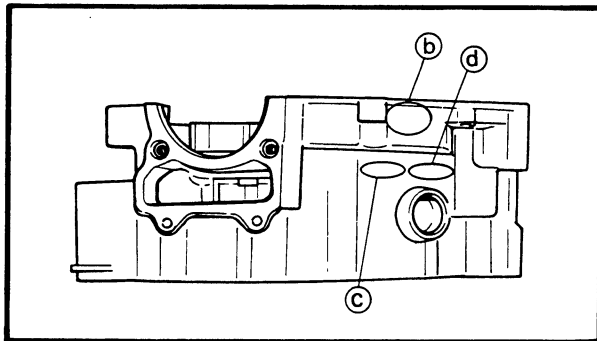
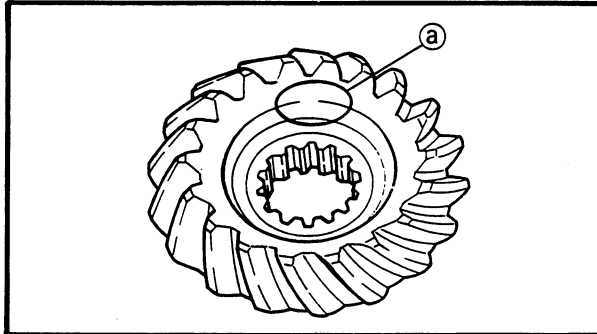
- ① Drive pinion gear
- ② Driven pinion gear (Forward gear)
- ③ Reverse gear
- A Drive pinion gear shim
- B Driven pinion gear shim
- C Reverse gear shim
- D Middle driven gear shim



MIDDLE GEAR SERVICE

- | | | |
|-----------------------------|-----------------------|---------------------|
| ① Universal joint | ⑪ Middle gear comp | ⑳ Lever |
| ② Bearing retainer 1 | ⑫ Dog clutch | ㉑ Circlip |
| ③ Bearing | ⑬ Middle driven shaft | ㉒ Shift lever shaft |
| ④ Shims | ⑭ Shims | ㉓ Shift lever |
| ⑤ Bearing housing | ⑮ Bearing | ㉔ Stopper shaft |
| ⑥ O-ring | ⑯ Shift fork | ㉕ Shims |
| ⑦ Reverse gear securing nut | ⑰ Spring | ㉖ Bearing |
| ⑧ Bearing | ⑱ Ball | |
| ⑨ Bearing retainer 2 | ㉚ Guide bar | |
| ⑩ Shims | ㉛ Oring | |





Drive axle shims selection steps:

- Position drive axle by using shim(s) with their respective thickness(es) calculated from information marked on drive pinion gear, crankcase, and bearing housing.

First steps

- To find drive pinion gear shim thickness "A" use following formula:

Drive pinion gear shim thickness:

$$A = a - b$$

Where:

- (a) = a numeral (usually a decimal number) on the drive pinion gear is either added to or subtracted from "42".
- (b) = a numeral (usually a decimal number) on the crankcase is added to from "41".

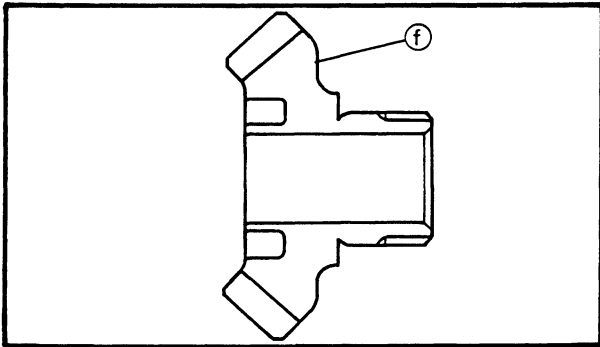
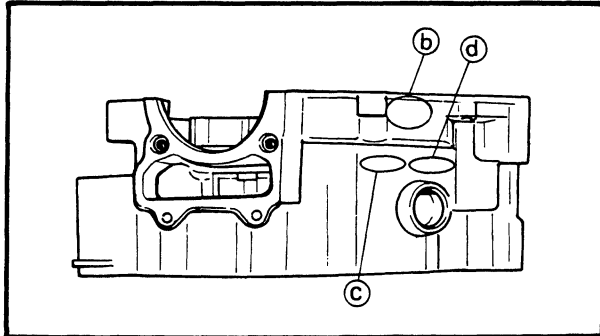
Example:

- 1) If the drive pinion gear is marked "+02" (a) is "42.02".
- 2) If the crankcase is marked "45" (b) is "41.45".
 $A = 42.02 - 41.45 = 0.57$
- 3) Therefore, shim thickness is 0.57 mm, shim sizes are supplied in following thickness:

	Drive pinion gear shim	
Thickness (mm)	0.15 0.20 0.30	0.40 0.50

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10



In the example above, the calculated shim thickness is 0.57 mm. The chart instructs you, however, to round off the 4 to 5.

Thus you may choose either 1 pc. – 0.40 mm shim and 1 pc. – 0.15 mm shim, 2 pcs. – 0.20 mm shims and 1 pc. – 0.15 mm shim.

2nd steps

- To find driven pinion gear shim thickness "B" use following formula:

Driven pinion gear shim thickness:

$$B = C - d - e - f$$

Where:

- Ⓒ = a numeral (usually a decimal number) on the crankcase is added to from "110".
- Ⓓ = a numeral (usually a decimal number) on the crankcase is subtracted from "59".
- Ⓔ = Numeral on crankcase (i.e. 13.00)
- Ⓕ = a numeral (usually a decimal number) on the driven pinion gear is added to or subtracted from "37.5".

Example:

- 1) If the drive pinion gear is marked "45" Ⓒ is "110.45".
- 2) If the crank case is marks "-02" Ⓓ is "58.98".
- 3) If the driven pinion gear is marked "+02" Ⓕ is "37.52".

$$B = 110.45 - 58.98 - 13.00 - 37.52 = 0.95$$
- 4) Therefore, shim thickness is 0.95 mm shim sizes are supplied in following thickness:

	Driven pinion gear shim	
Thickness (mm)	0.15	0.40
	0.20	0.50
	0.30	

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).



Hundredths	Round value
0, 1	0
2, 3	3
4, 5, 6	5
7, 8	8
9	10

In the example above, the calculated shim thickness is 0.95 mm. The chart instructs you, however, to round off the 4 to 5.

Thus you may choose either 2 pc. – 0.40 mm shim and 1 pc. – 0.15 mm shim, 1 pc. – 0.50 mm, 1 pc. – 0.30 mm and 1 pc. – 0.15 mm shim.

3rd steps

• To find reverse gear shim thickness “C” use following formula:

Reverse gear shim thickness:

$$C = d - g - h - i$$

Where:

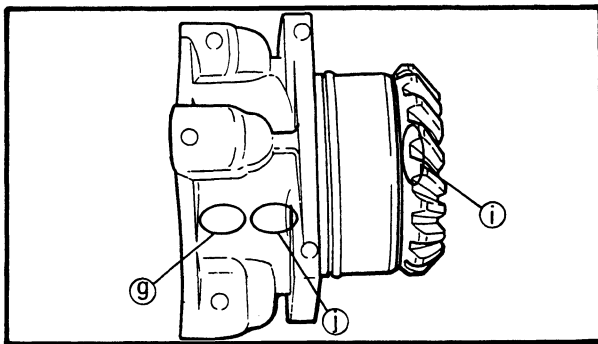
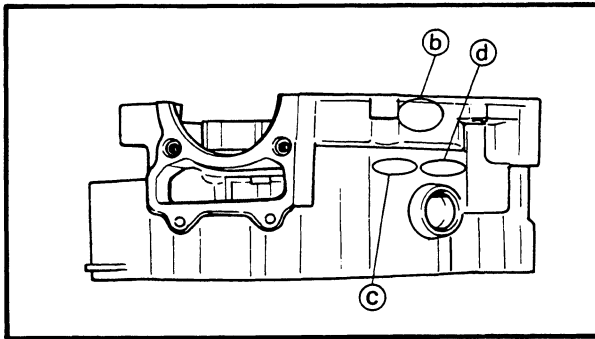
- ⓓ = a numeral (usually a decimal number) on the crankcase is subtracted from “59”.
- ⓖ = a numeral (usually a decimal number) on the bearing housing is subtracted from “7.5”.
- ⓓ = Numeral on reverse gear.
(i. e. 12.00)
- ⓞ = a numeral (usually a decimal number) on the reverse gear is added to or subtracted from “39”.

Example:

- 1) If the crank case is mark “-02”.
..... ⓓ is “58.98”.
- 2) If the bearing, hauging is mark “-01”.
..... ⓖ is “7.49”.

$$C = 58.98 - 7.49 - 12.00 - 38.98 = 0.51$$

- 3) Therefore, shim thickness is 0.50 mm shim sizes are supplied in following thickness:





Reverse gear shim

Thickness (mm)	0.15	0.40
	0.20	0.50
	0.30	

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

Hundredths	Round valve
0, 1	0
2, 3	3
4, 5, 6	5
7, 8	8
9	10

In the example above, the calculated shim thickness is 0.50 mm. The chart instructs you, however, to round off the 4 to 5. Thus you may choose either 1 pc. – 0.50 mm shim.

4th steps

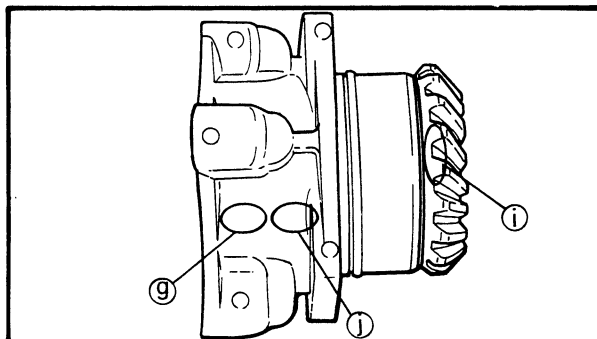
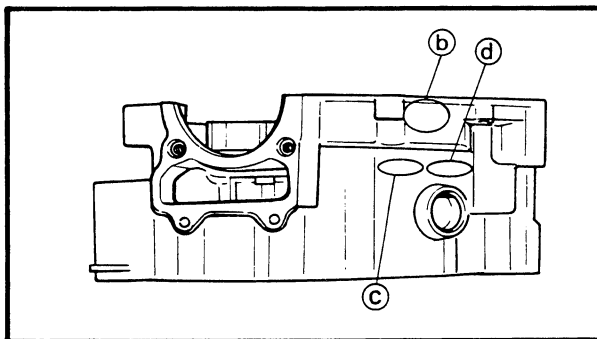
- To find reverse gear shim thickness "D" use following formula:

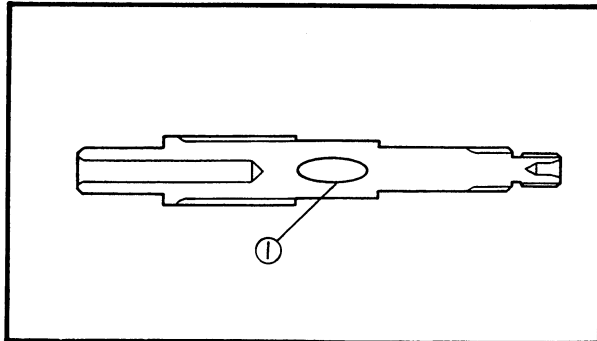
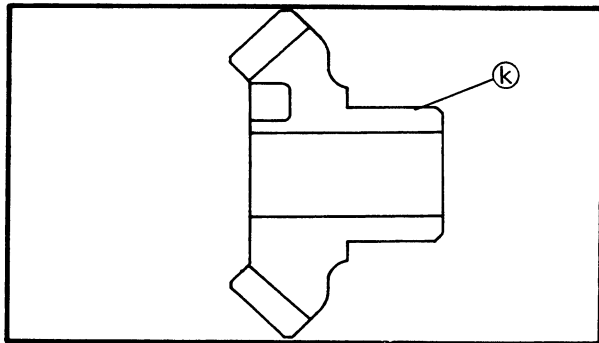
Middle driven gear thickness:

$$D = J + C - e - B - K - L - 0.25$$

Where:

- ① = a numeral (usually a decimal number) on the bearing hauging is subtracted from "1".
- Ⓒ = a numeral (usually a decimal number) on the crankcase is added to from "110".
- e = Numeral on crankcase (i.e. 13.00)
- Ⓚ = a numeral (usually a decimal number) on the driven pinion gear (forward gear) is subtracted from "14.5".
- Ⓛ = a numeral (usually a decimal number) on the middle drive shaft is either added to or subtracted from "80.5".





Example:

- 1) If the bearing hauging is mark "-03"
..... ① is "0.97".
- 2) If the crankcase mark "45"
..... ② is "110.45".
- 3) If the pinion gear is mark "-02"
..... ③ is "14.48".
- 4) If the middle drive shaft is mark "03"
..... ④ is "80.53".

$$D = 0.97 + 110.45 - 13.00 - 0.95 - 14.48 - 80.53 - 0.25 = 2.21$$

5) Therefore, shim thickness is 2.20 mm shim sizes are supplied in following thickness:

	Middle driven gear shim	
Thickness (mm)	1.0	1.1
	1.2	1.3
	1.4	1.5
	1.6	1.7
	1.8	1.9

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

Hundredths	Round valve
0, 1, 2, 3, 4	0
5, 6, 7, 8, 9	10

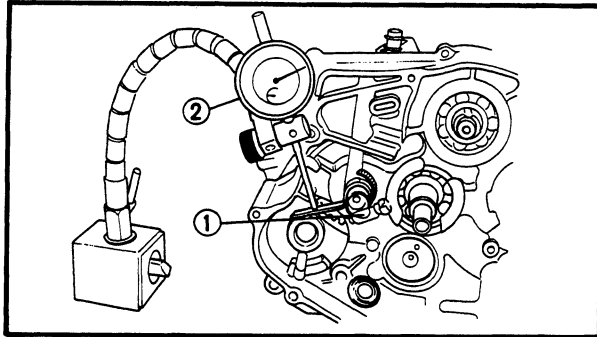
If the example above, the calculated shim thickness 00 mm. The chart instructs you, however, to round off the 4 to 5. Thus you may choose either 1 pc. - 1.0 mm shim and 1 pc. - 1.2 mm shim, 2 pcs. - 1.1 mm shims.



MIDDLE GEAR LASH ADJUSTMENT

NOTE:

When measuring backlash, tighten all securing bolts (middle gear case cover, bearing housing) with specified torque.



1. Attach:

- Gear Lash Measurement Tool ①
Onto the hand-made tool.
- Dial Gauge ②



Gear Lash Measurement Tool:
YM-01230

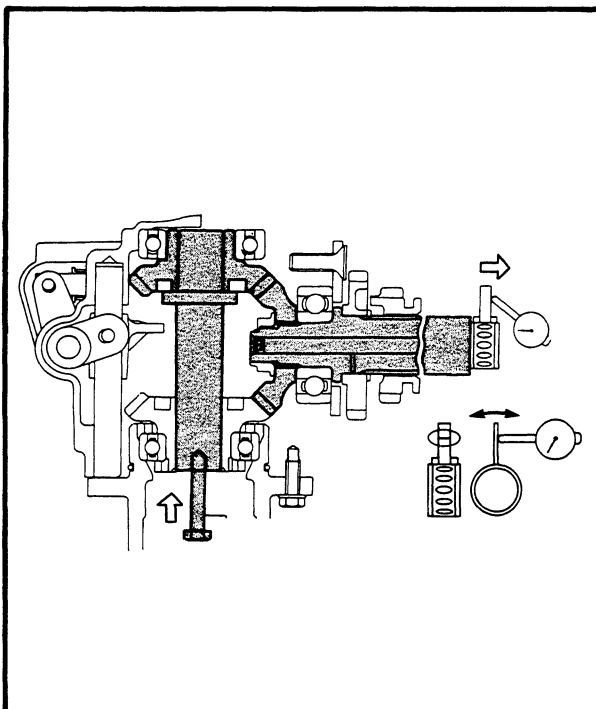
Dial Gauge:
YM-03097

2. Position:

- Dial Gauge
On the tang of Gear Lash Measurement Tool.

NOTE:

Be sure the gauge ① is positioned on the tank slit ②.



3. Shift:

- Drive select lever
For forward drive.

4. Rotate:

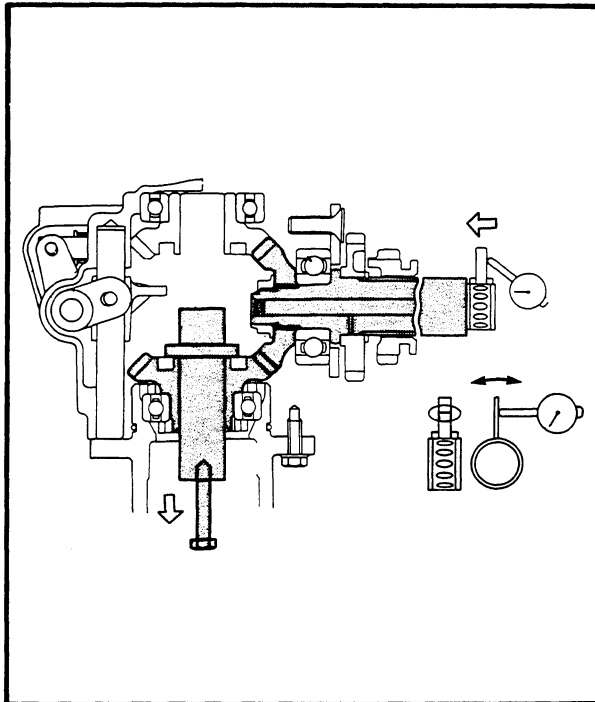
- Drive axle
Gently rotate it from engagement to engagement.

5. Measure:

- Gear lash
Gently rotate the gear coupling from engagement to engagement.
Over specified limit → Adjust.



Middle Gear Lash:
(Using Measurement Tool):
0.2 ~ 0.4 mm (0.008 ~ 0.016 in)



NOTE:

Check the gear lash at four positions. Rotate the pinion gear 90 degrees each time and repeat the gear lash check.

6. Shift:

- Drive select lever
For reverse drive

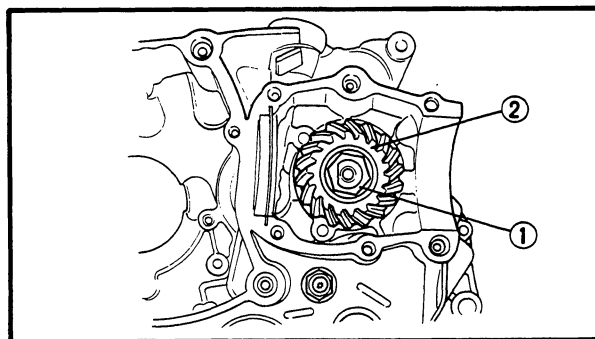
7. Repeat steps 4 to 5.

MIDDLE DRIVE GEAR

The following procedures should be performed only if the middle drive gear or crankcase must be replaced.

Removal

1. Secure the middle drive axle in a vice or other support.
2. Flatten the punched portion of the middle drive gear nut using the drift punch.
3. Remove:
 - Nut (middle drive gear) ①
 - Middle drive gear ②

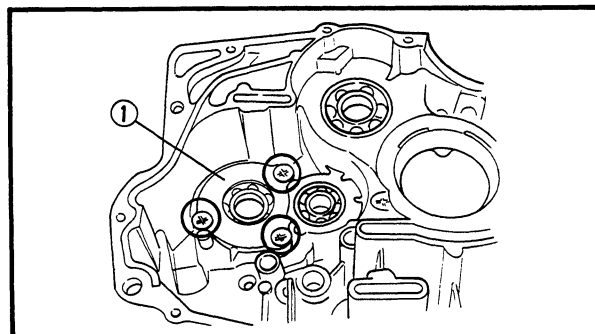


4. Remove:

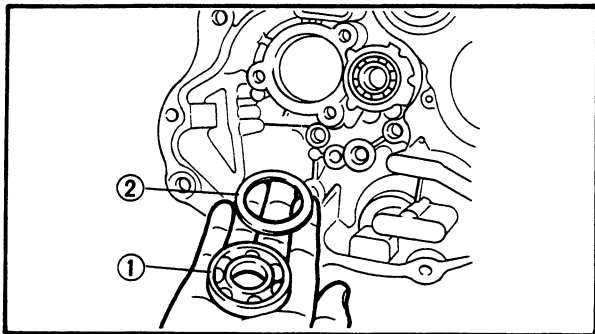
- Bearing retainers ①

NOTE:

- Use a # 40 Torx Driver.



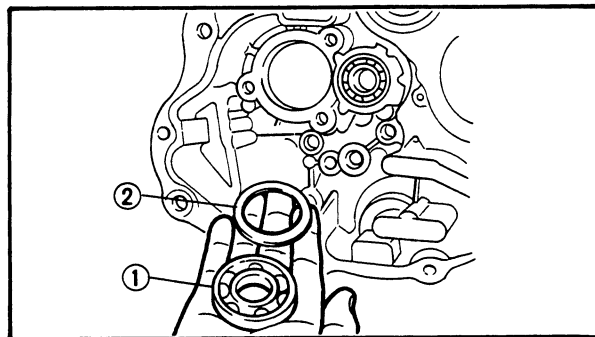
	<p># 40 Torx Driver: P/N YM-04049 P/N 90890-04049</p>
--	---



5. Remove:
- Bearing ①
 - Shim ②

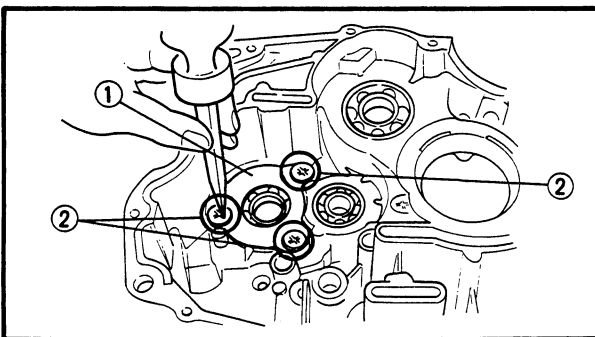
Inspection

1. Inspect:
- Gear teeth
Pitting/Galling/Wear → Replace middle gear as a set.
 - Bearing
Pitting/Damage → Replace.



Assembly

1. Install:
- Shim ②
 - Bearing ①




2. Install:
- Bearing retainers ①

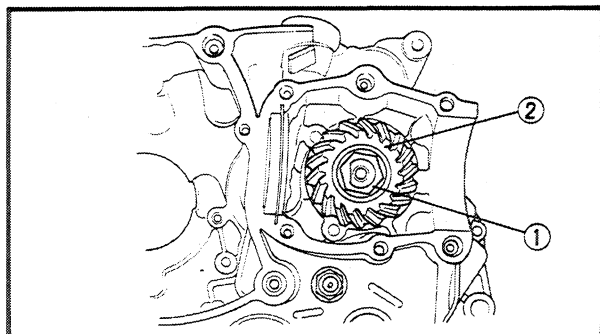
NOTE: _____

- Use a #40 Torx Driver.

	<p># 40 Torx Driver: P/N YM-04049 P/N 90890-04049</p>
---	---

	<p>Bearing Retainer: 25 Nm (2.5 m·kg, 18 ft·lb)</p>
---	---

3. Lock the screw head ② with drift punch.



4. Install:

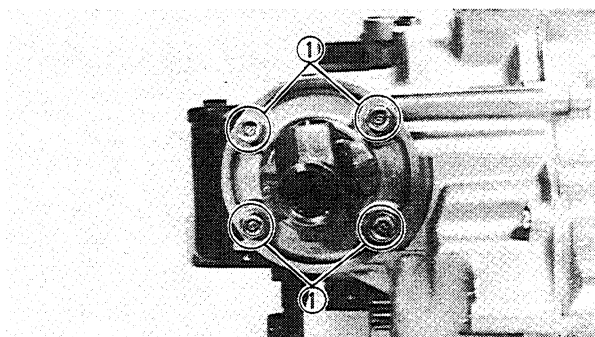
- Middle drive gear ②
- Nut (middle drive gear) ①

Secure the middle drive axle in a vice or other support.

5. Lock the threads with drift punch.

MIDDLE DRIVEN GEAR

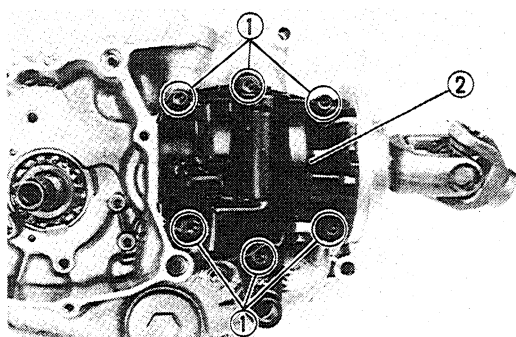
The following procedures should be performed only if the middle driven gear or middle driven shaft bearing(s) must be replaced.



Removal

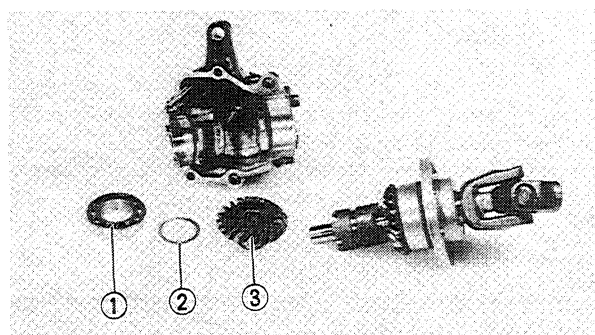
1. Remove:

- Bolts (universal joint) ①



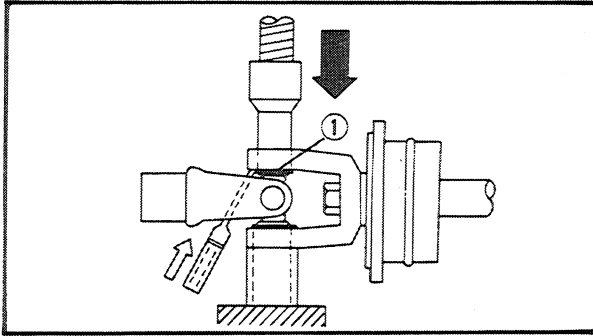
2. Remove:

- Bolts (middle gear case) ①
- Middle gear case ②
- Dowel pins



3. Remove:

- Bearing ①
- Shim ②
- Driven pinion gear ③



4. Remove:
- Universal joint

Universal joint removal steps:

- Remove the circlips ①.
- Place the U-joint in a press.
- With a suitable diameter pipe beneath the yoke, press the bearing into the pipe as shown.

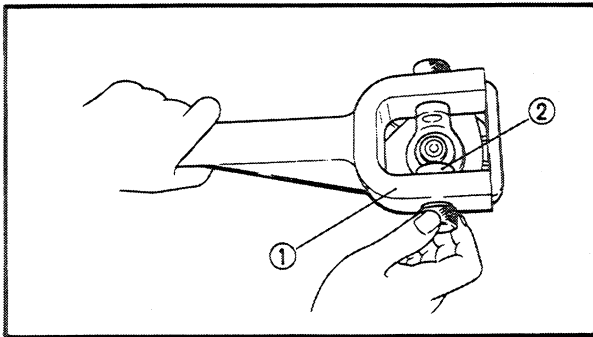
NOTE:

It may be necessary to lightly tap the yoke with a punch.

- Repeat the steps for the opposite bearing.
- Remove the yoke.

NOTE:

It may be necessary to lightly tap the yoke with a punch.



5. Attach:
- Use a Universal Joint Holder and Attachment.
 - Onto the universal joint yoke.

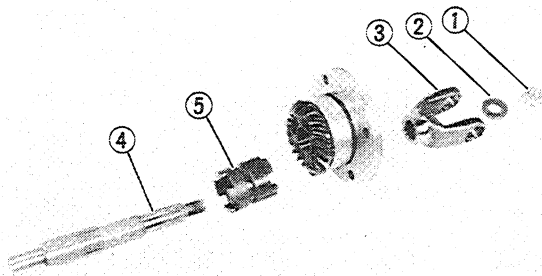


Universal Joint Holder ① :

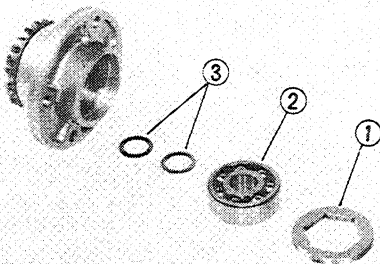
P/N YM-04062
P/N 90890-04062

Attachment ② :

P/N YM-33291
P/N 90890-04096



6. Remove:
- Nut (driven pinion gear) ①
 - Washer ②
 - Yoke ③
 - Middle driven axle ④
 - Dog clutch ⑤



7. Remove:
- Bearing retainer ①

NOTE:

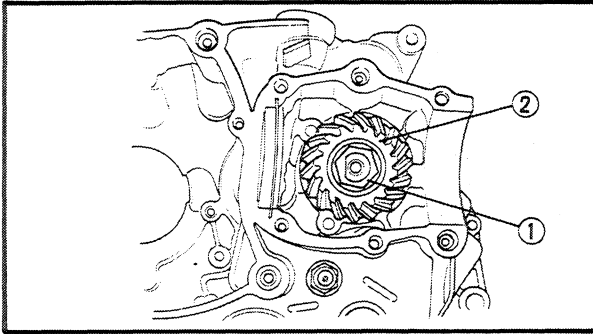
- Use a Bearing retainer wrench.



Bearing Retainer Wrench:

P/N YM-33289
P/N 90890-04104

- Bearing ②
- Shims ③



4. Install:

- Middle drive gear ②
- Nut (middle drive gear) ①

Secure the middle drive axle in a vice or other support.

5. Lock the threads with drift punch.

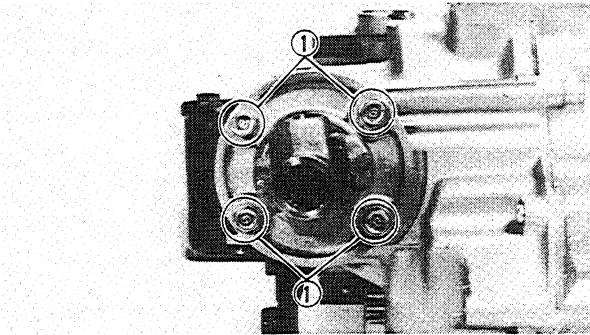
MIDDLE DRIVEN GEAR

The following procedures should be performed only if the middle driven gear or middle driven shaft bearing(s) must be replaced.

Removal

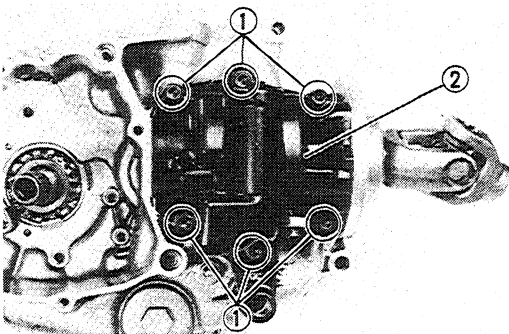
1. Remove:

- Bolts (universal joint) ①



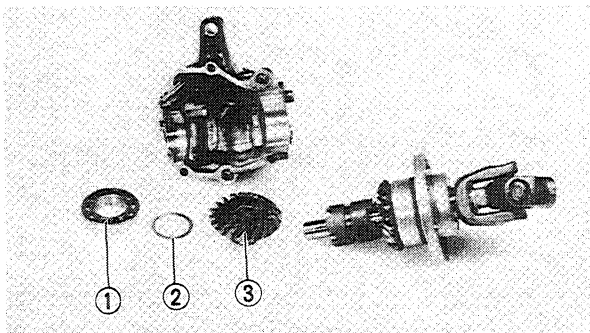
2. Remove:

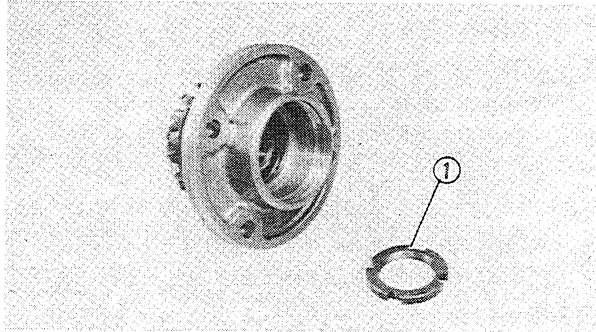
- Bolts (middle gear case) ①
- Middle gear case ②
- Dowel pins



3. Remove:

- Bearing ①
- Shim ②
- Driven pinion gear ③





8. Remove:
- Reverse gear securing nut ①

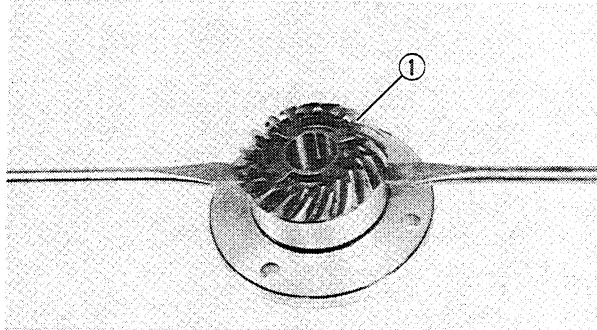
NOTE:

- The reverse gear securing nut has left-hand threads; turn the nut clockwise to loosen it.
- Use a Ring nut wrench.



Ring Nut Wrench:
P/N YM-1391
P/N 90890-04104

- Reverse gear ①
- Shims



9. Remove:
- Bearing retainer ①

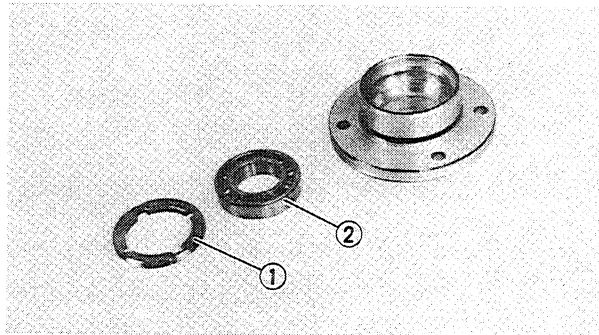
NOTE:

- Use a Ring nut wrench.

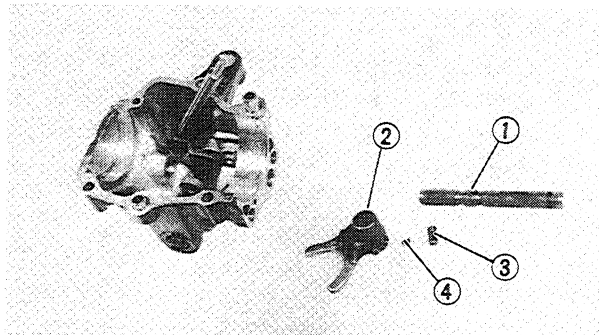


Ring Nut Wrench:
P/N YM-1391
P/N 90890-04104

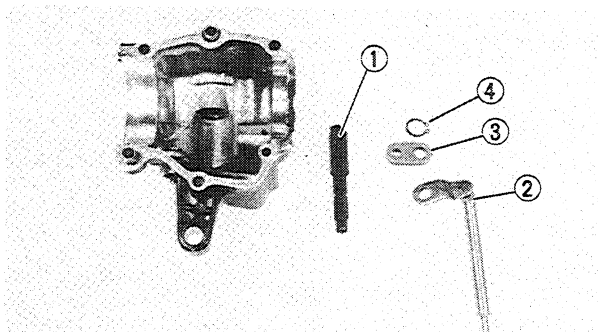
- Bearing ②

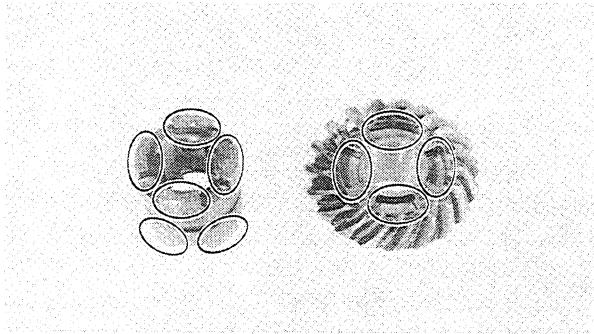


10. Remove:
- Shift fork guide bar ①
 - Shift fork ②
 - Spring ③
 - Ball ④



11. Remove:
- Shift lever shaft ①
 - Shift lever ②
 - Stopper lever ③
 - Circlip ④



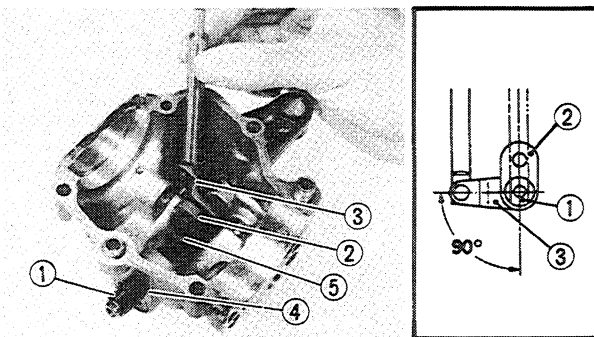


Inspection

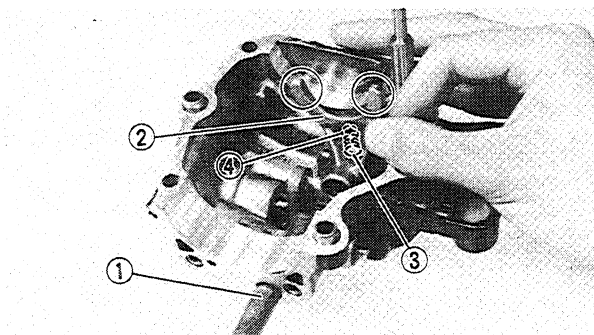
1. Inspect:
 - Dog clutch
 - Wear/Scratches → Replace dog clutch and drive pinion gear, reverse gear as a set.
2. Inspect:
 - On the gear and shift cam contact surfaces.
 - Wear/Chafing/Bends/Damage → Replace.
3. Inspect:
 - Gear teeth
 - Pitting/Galling/Wear → Replace middle gear as a set.
 - Bearings
 - Pitting/Damage → Replace.
4. Check:
 - U-joint movement
 - Roughness → Replace U-joint.

Assembly

1. Apply:
 - Lithium base grease
 - To the oil seal and oil ring.



2. Install:
 - Shift lever shaft ①
 - Shift lever ②
 - Stopper lever ③
 - Oil seal ④
 - Circlip ⑤



3. Install:
 - Shift fork guide bar ①
 - Shift fork ②
 - Spring ③
 - Ball ④

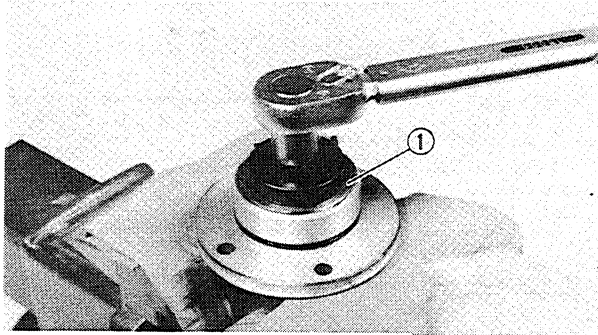


4. Lubricate:

- Apply the molybdenum disulfide oil to shift fork inner diameter and to the pin.



Molybdenum disulfide oil



5. Install:

- Bearing
- Bearing retainer ①

NOTE:

- Use a Ring nut wrench.



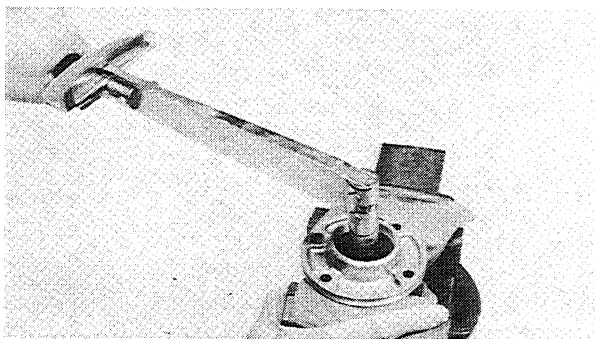
Ring Nut Wrench:
P/N YM-1391
P/N 90890-04104

6. Tighten:

- Bearing retainer



Bearing Retainer:
60 Nm (6.0 m·kg, 43 ft·lb)



7. Install:

- Shims
- Reverse gear
- Reverse gear securing nut

NOTE:

- The reverse gear securing nut has left-hand threads, turn the nut counterclockwise to tighten it.
- Use a Ring nut wrench.



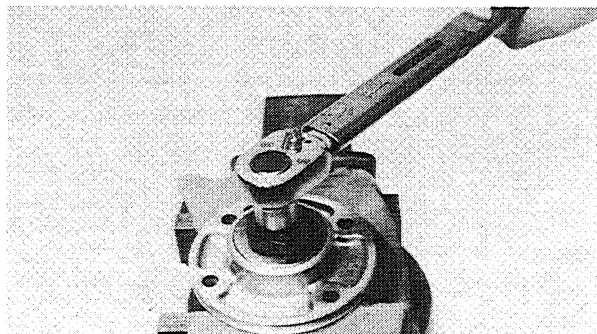
Ring Nut Wrench:
P/N YM-1391
P/N 90890-04104

8. Tighten:

- Reverse gear securing nut



Reverse Gear Securing Nut:
(LEFT-HAND-THREADS)
60 Nm (6.0 m·kg, 43 ft·lb)



9. Install:
- Shims
 - Bearing
 - Bearing retainer

NOTE: _____

- Use a Bearing retainer wrench.



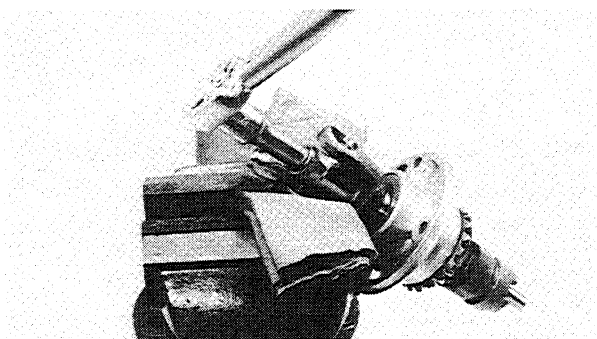
Bearing Retainer Wrench:
 P/N YM-33289
 P/N 90890-04104

10. Tighten:
- Bearing retainer



Bearing Retainer:
 60 Nm (6.0 m · kg, 43 ft · lb)
 LOCTITE®

11. Install:
- Middle driven axle
 - Dog clutch
 - Yoke
 - Washer
 - Nut (Driven pinion gear)



12. Attach:
- Yoke

NOTE: _____

- Use a Universal Joint Holder and Attachment.
- Onto the universal joint yoke.



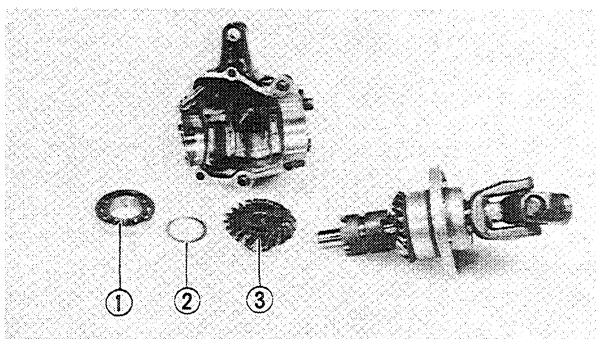
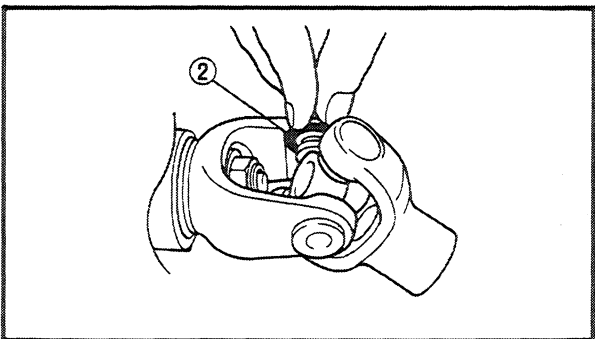
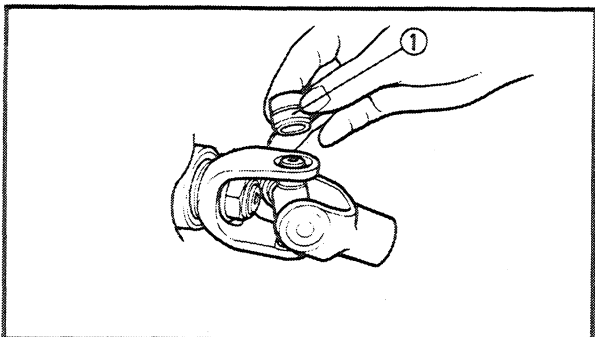
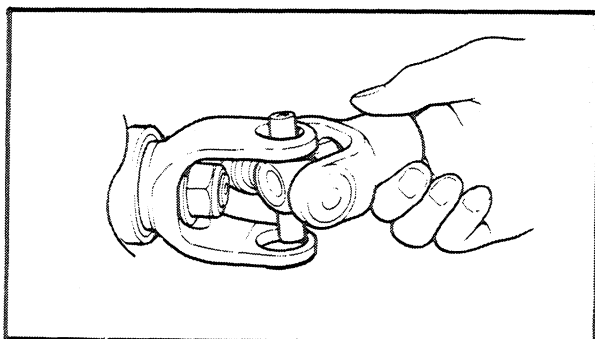
Universal Joint Holder:
 P/N YM-04062
 P/N 90890-04062

Attachment:
 P/N YM-33291
 P/N 90890-04096

13. Tighten:
- Nut (Driven pinion gear) torque nut carefully, little by little.



Nut (Driver Pinion Gear):
 90 Nm (9.0 m · kg, 65 ft · lb)
 LOCTITE®



14. Install:

- Universal joint (Middle drive shaft – For rear final gear)

Universal joint installation steps:

- Install the opposite yoke into the U-joint.
- Apply the wheel bearing grease to the bearings.
- Install the bearing ① onto the yoke.

CAUTION:

Check each bearing. The needles can easily fall out of their races. Slide the yoke back and forth on the bearings; the yoke will not go all the way onto a bearing if a needle is out of place.

- Press each bearing into the U-joint using a suitable socket.

NOTE:

Bearing must be inserted far enough into U-joint so that circlip can be installed.

- Install the circlips ② into the groove of each bearing.

15. Install:

- Bearing ①
- Shim ②
- Driven pinion gear ③

16. Install:

- Middle gear case

NOTE:

Before tightening the bolts;

- Adjust the gear lash of the middle gear.
Refer to "ADJUSTMENT" section.



Bolts (Middle Gear Case):
10 Nm (1.0 m · kg, 7.2 ft · lb)

Bolts (Universal Joint):
25 Nm (2.5 m · kg, 18 ft · lb)



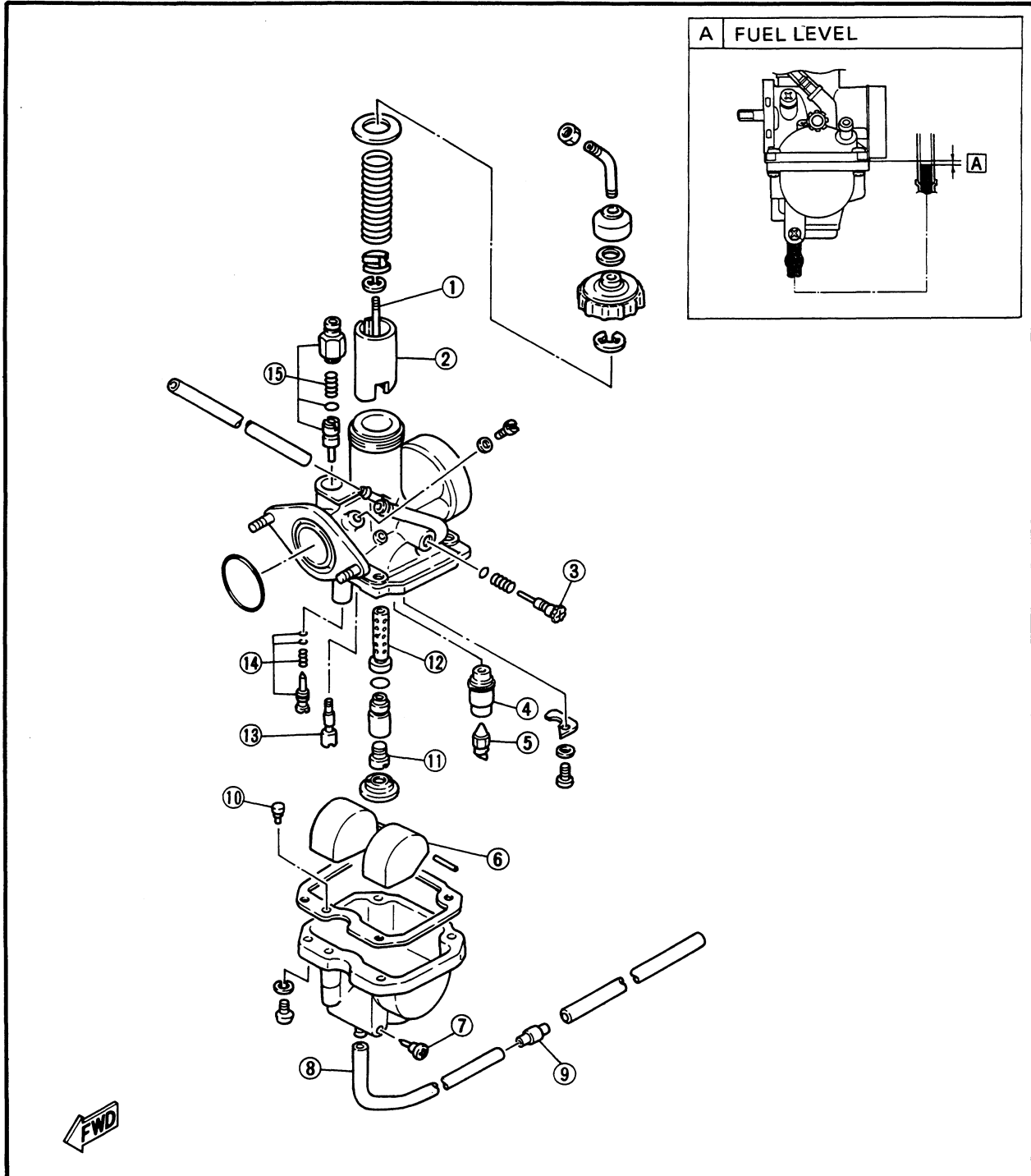
CARBURETION

SPECIFICATIONS

CARBURETOR

- ① Jet needle
- ② Throttle valve
- ③ Throttle stop screw set
- ④ Valve seat
- ⑤ Needle valve
- ⑥ Float
- ⑦ Drain screw
- ⑧ Drain pipe
- ⑨ Oneway valve
- ⑩ Starter jet
- ⑪ Main jet
- ⑫ Main nozzle
- ⑬ Pilot jet
- ⑭ Pilot screw set
- ⑮ Starter plunger set

Main jet	#117.5
Jet needle	4D11-3
Pilot jet	#20
Pilot screw	2.0
Fuel level	2.5 ~ 3.5 mm (0.10 ~ 0.14 in)
Float height	21.0 ~ 22.0 mm (0.83 ~ 0.87 in)
Engine idling speed	1,350 ~ 1,450 r/min

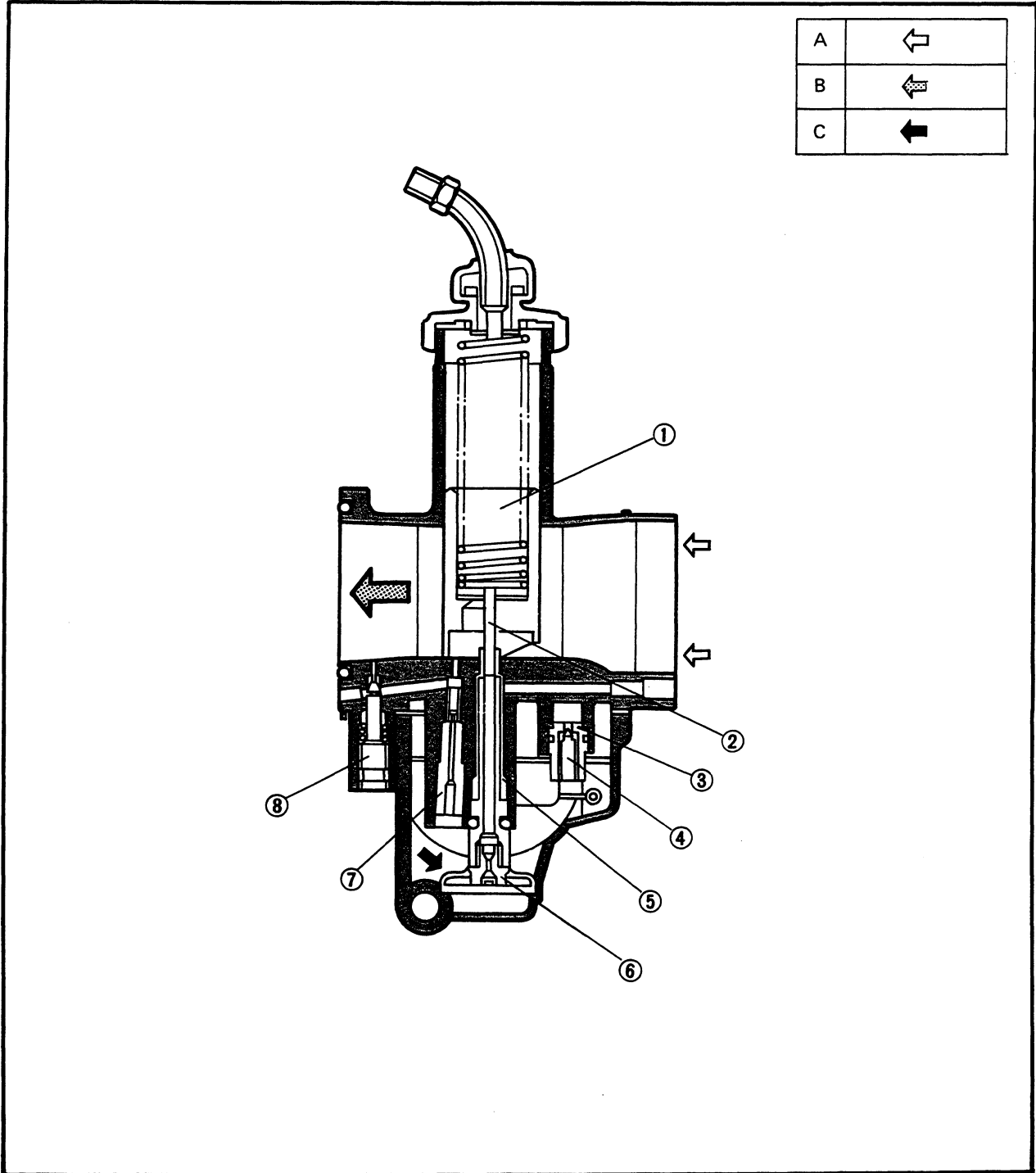




SECTIONAL VIEW

- ① Throttle valve
- ② Jet needle
- ③ Valve seat
- ④ Needle valve
- ⑤ Main nozzle
- ⑥ Main jet
- ⑦ Pilot jet
- ⑧ Pilot screw

- A Air
- B Mixture
- C Fuel



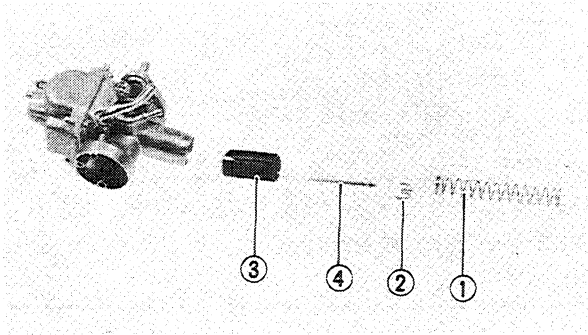


REMOVAL

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

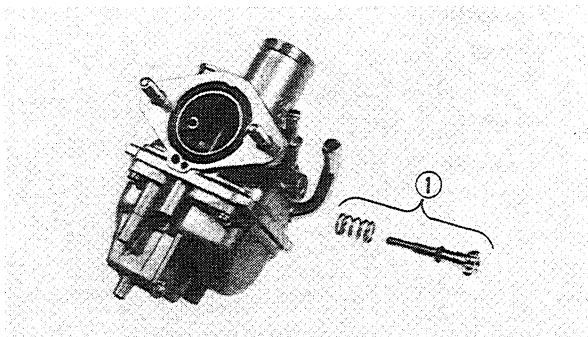
NOTE: _____
 The following parts can be cleaned and inspected without disassembly.

- Throttle stop screw set
- Pilot screw set

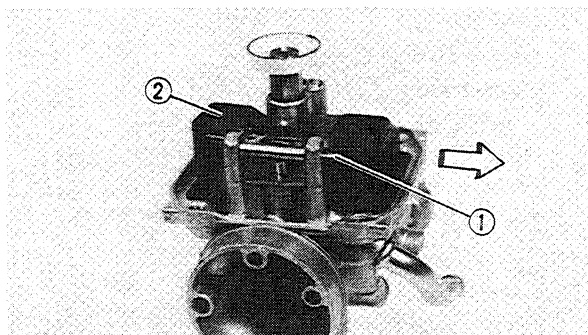


DISASSEMBLY

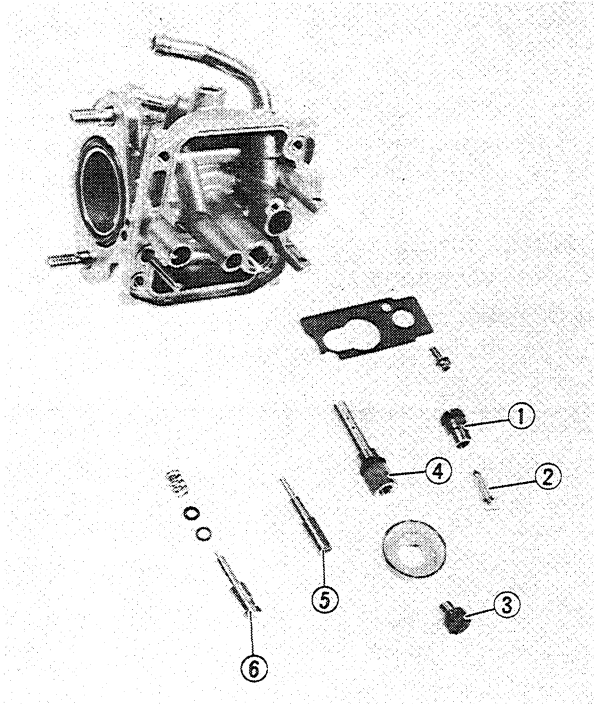
1. Remove:
 - Spring (throttle valve) ①
 - Spring (jet needle) ②
 - Throttle valve ③
 - Jet needle ④



2. Remove:
 - Throttle stop screw set ①



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

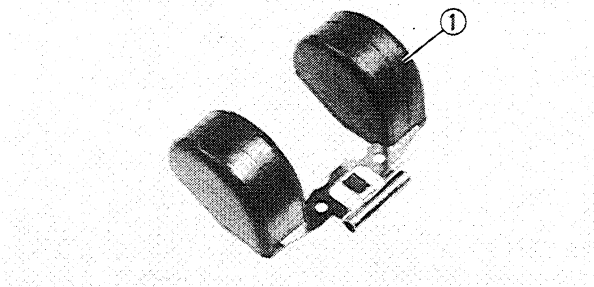


4. Remove:
- Valve seat ①
 - Needle valve ②
 - Main jet ③
 - Main nozzle ④
 - Pilot jet ⑤
 - Pilot screw ⑥

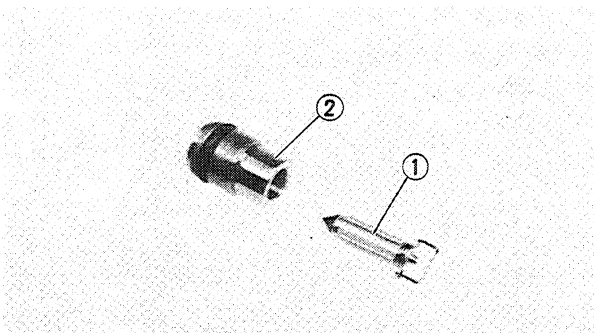
INSPECTION

1. Inspect:
- Carburetor body
Contamination → Clean.

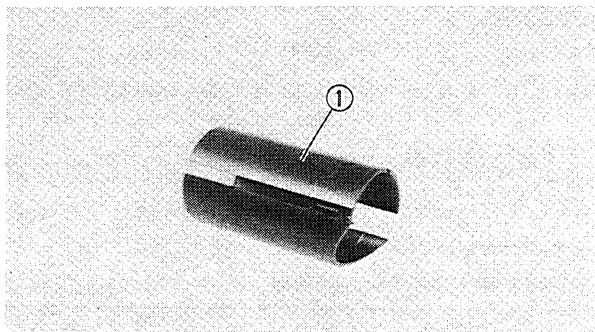
NOTE: _____
Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.



2. Inspect:
- Float ①
Damage → Replace.
 - Gasket/O-rings
Damage → Replace.

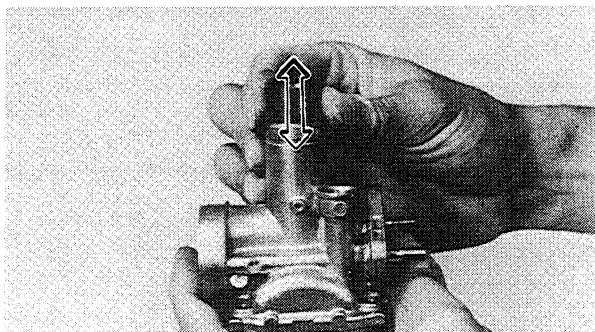


3. Inspect:
- Needle valve ①
 - Valve seat ②
Wear/Contamination → Replace.



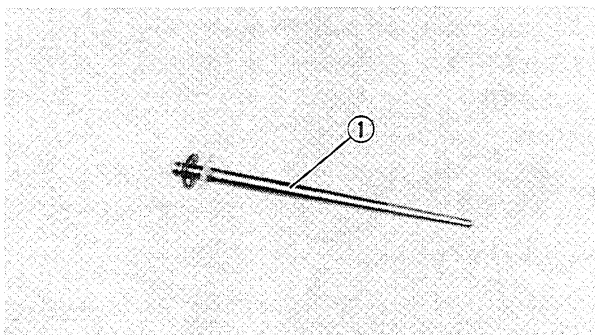
4. Inspect:

- Throttle valve ①
- Wear/Damage → Replace.



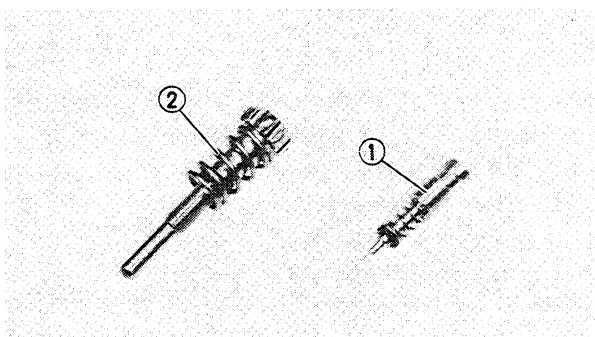
5. Check:

- Free movement
- Stick → Replace.
- Insert the throttle valve into the carburetor body, and check for free movement.



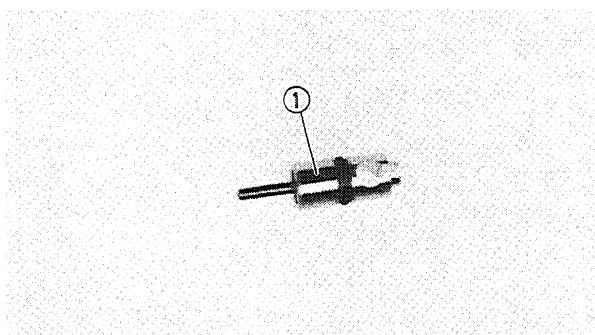
6. Inspect:

- Jet needle ①
- Bends/Wear → Replace.



7. Inspect:

- Pilot screw ①
 - Throttle stop screw ②
- Wear/Contamination → Replace.



8. Inspect:

- Starter plunger ①
- Wear/Contamination → Replace.



ASSEMBLY

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

⚠ CAUTION:

- Before reassembling, wash all parts in clean petroleum based solvent.
- Always use a new gasket.

1. Measure:

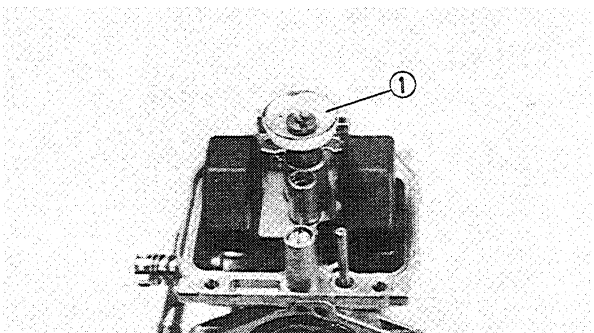
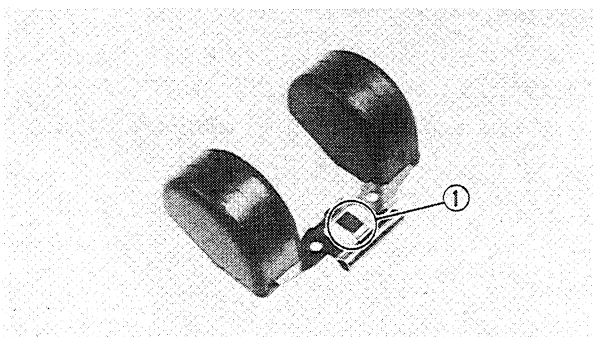
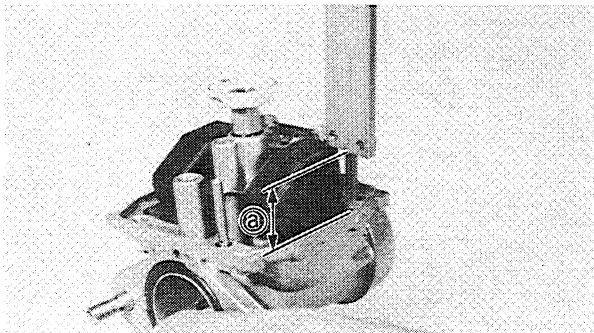
- Float height

Out of specification → Adjust.



Float Height:

21.0 ~ 22.0 mm (0.83 ~ 0.87 in)



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

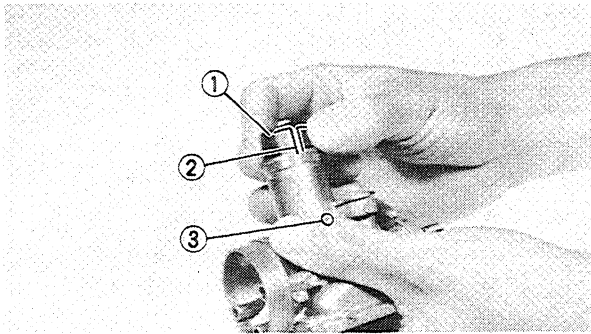
NOTE:

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. Install:

- Plastic cover ①
Over the main jet.



3. Install:

- Throttle valve ①

NOTE:

Align the groove ② of the throttle valve with the projection ③ of the carburetor body.

INSTALLATION

1. Install:

- Carburetor assembly
- Reserve the removal procedure.

ADJUSTMENT

NOTE:

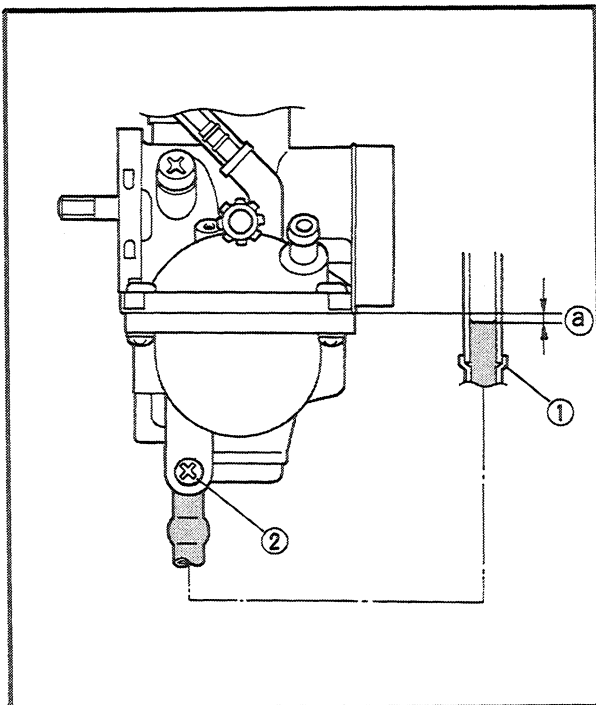
Before adjusting the fuel level, the float height should be adjusted.

1. Measure:

- Fuel level
- Out of specification → Adjust.



Fuel Level:
2.5 ~ 3.5 mm (0.10 ~ 0.14 in)
Below the Carburetor Body Edge.



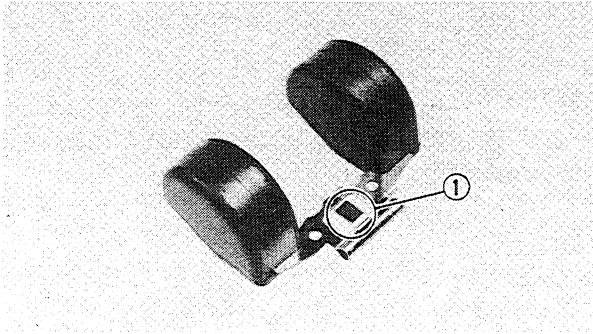
Measurement steps:

- Place the machine on a level place.
- Use a gauge jack under the engine to ensure that the carburetor is positioned vertically.
- Attach the Fuel Level Gauge ① to the float chamber nozzle.



Fuel Level Gauge:
P/N YM-01312-A/90890-01312

- Loosen the drain screw ② and start the engine.
- Measure the fuel level ① with gauge.
- If the fuel level is incorrect adjust the fuel level.



2. Adjust:

- Fuel level

Adjustment steps:

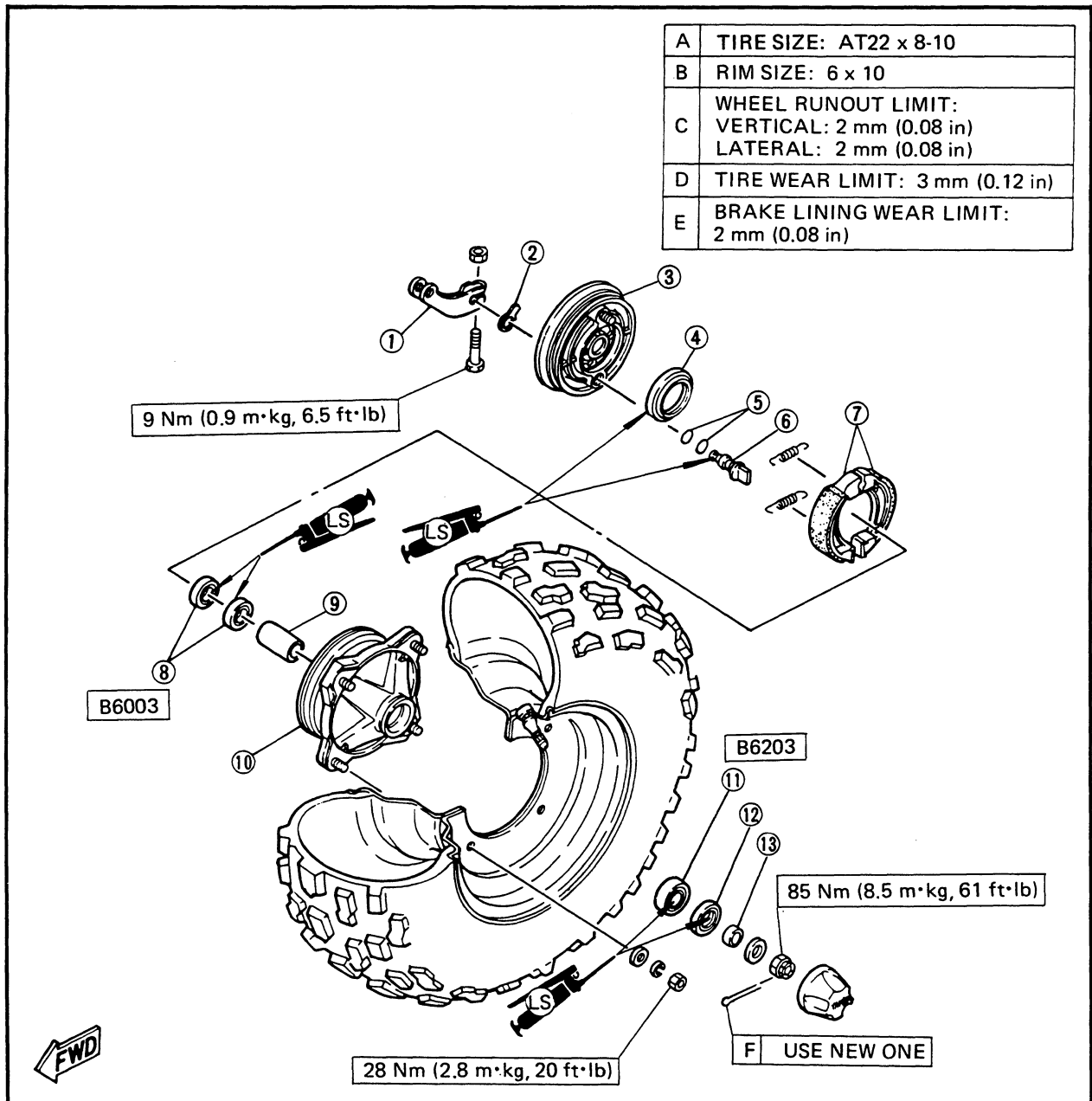
- Remove the carburetor.
- Inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tang ① on the float.
- Recheck the fuel level.

CHASSIS

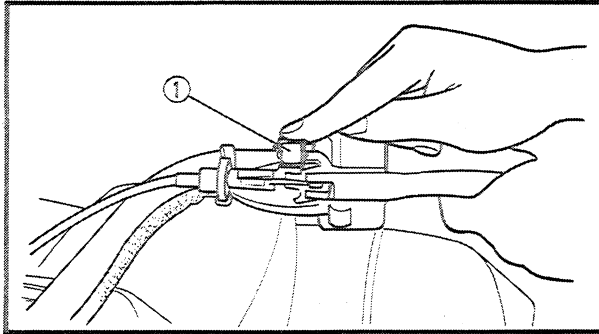
FRONT WHEEL

- ① Camshaft lever
- ② Wear indicator plate
- ③ Brake shoe plate
- ④ Oil seal
- ⑤ O-ring
- ⑥ Camshaft
- ⑦ Brake shoe complete
- ⑧ Bearing
- ⑨ Bearing spacer
- ⑩ Front hub
- ⑪ Bearing
- ⑫ Oil seal
- ⑬ Collar

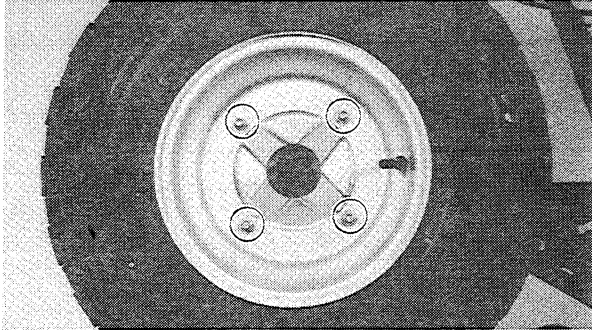
TIRE AIR PRESSURE		
Cold Tire Pressure	Front	Rear
Standard	20 kPa (0.2 kg/cm ² , 2.8 psi)	20 kPa (0.2 kg/cm ² , 2.8 psi)
Minimum	17 kPa (0.17 kg/cm ² , 2.4 psi)	17 kPa (0.17 kg/cm ² , 2.4 psi)
Maximum	23 kPa (0.23 kg/cm ² , 3.2 psi)	23 kPa (0.23 kg/cm ² , 3.2 psi)



6

**REMOVAL****Front Wheel Removal**

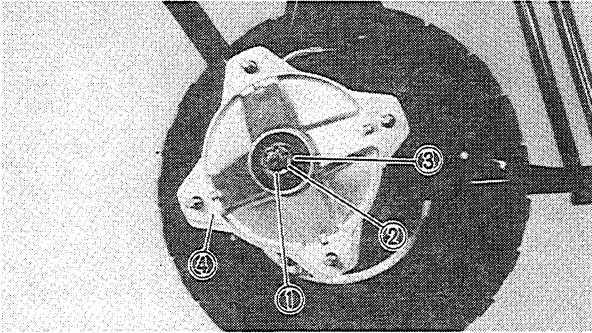
1. Place the machine on a level place.
2. Loosen:
 - Nuts (front wheel)
 Apply the parking brake ①.
3. Elevate the front wheels by placing the suitable stand under the frame.



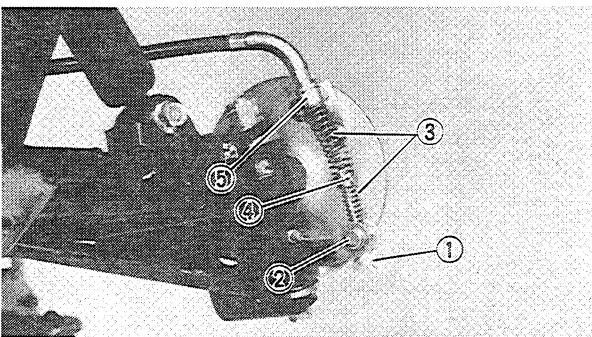
4. Remove:
 - Nuts (front wheel)
 - Front wheel

Front Wheel Hub Removal

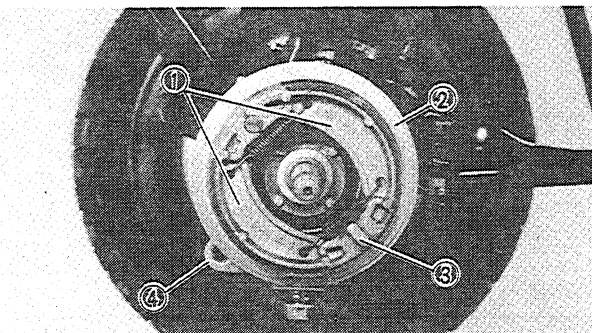
1. Remove:
 - Wheel cap
 - Cotter pin ①
 - Axle nut ② (wheel hub)
 - Plain washer ③
 - Wheel hub ④

**Front Brake Shoe Plate Removal**

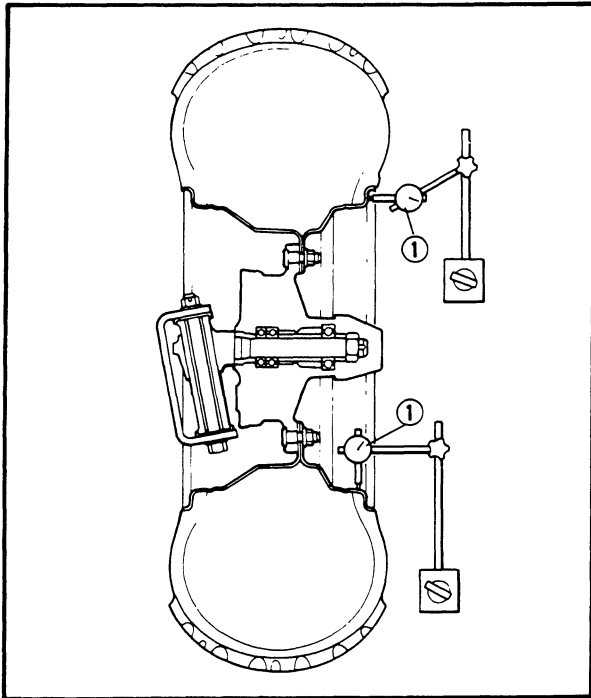
1. Remove:
 - Adjuster ①
 - Pin ②
 - Springs ③
 - Washer ④
 - Circlip ⑤
2. Disconnect:
 - Brake cable (from brake shoe plate)



3. Remove:
 - Brake linings ①
 - Brake shoe plate ②
 - Camshaft ③
 - Cam lever ④




NOTE: _____
 Before removing the cam lever, put a match mark (punches) on the cam lever and camshaft to indicate their positions for easy assembly.



INSPECTION

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

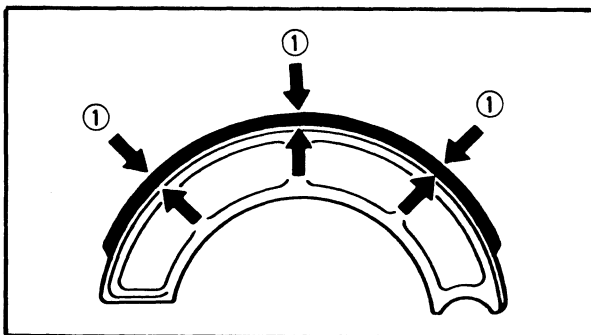
① Dial gauge


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

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

NOTE: _____
 After using the sand paper, clean of the polished particles with cloth.

5. Measure:
 - Brake lining thickness
Out of specification → Replace.



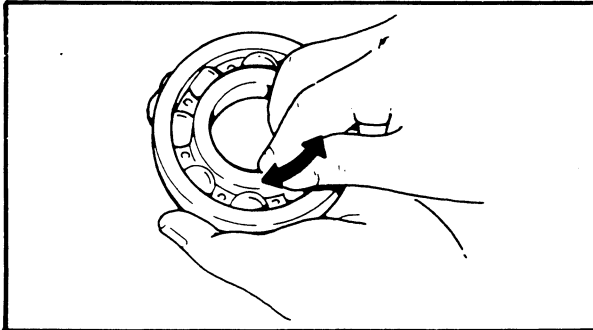
	Brake Lining Thickness:
	4 mm (0.16 in)
	Wear Limit: 2 mm (0.08 in)

① Measuring points

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

6. 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)



7. Inspect:
- Camshaft face
Wear → Replace.
8. Check:
- Wheel bearings
Bearing allow play in the wheel hub or wheel turns roughly → Replace.

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.

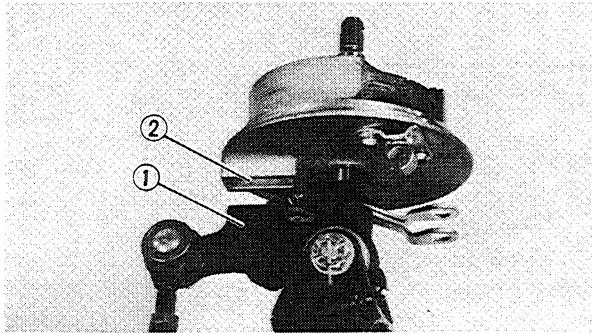
⚠ CAUTION: _____

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:
- Lithium base grease
Lightly grease to the oil seal and bearing.




2. Install:
 - Cam lever
 - Camshaft
 - Brake shoe plate
 - Brake linings

NOTE:

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

3. Tighten:
 - Axle nuts
 - Nuts (front wheel)

	Axle Nuts: 85 Nm (8.5 m·kg, 61 ft·lb)
	Nut (Front Wheel): 28 Nm (2.8 m·kg, 20 ft·lb)

4. Install:
 - Cotter pin (new)

⚠ WARNING:

Always use a new cotter pin.

5. Adjust:
 - Front brake free play

REAR WHEEL AND REAR AXLE

- ① Wheel hub
- ② Wheel axle
- ③ Hub dust cover
- ④ Bearing
- ⑤ Bearing
- ⑥ Sprocket axle collar
- ⑦ Oil seal
- ⑧ Rear axle nut

* Rear Axle Nut Tightening Steps:

Apply locking agent (LOCTITE®) to rear axle nuts threads.

1st: Tighten the nut (inside) while holding the rear axle.

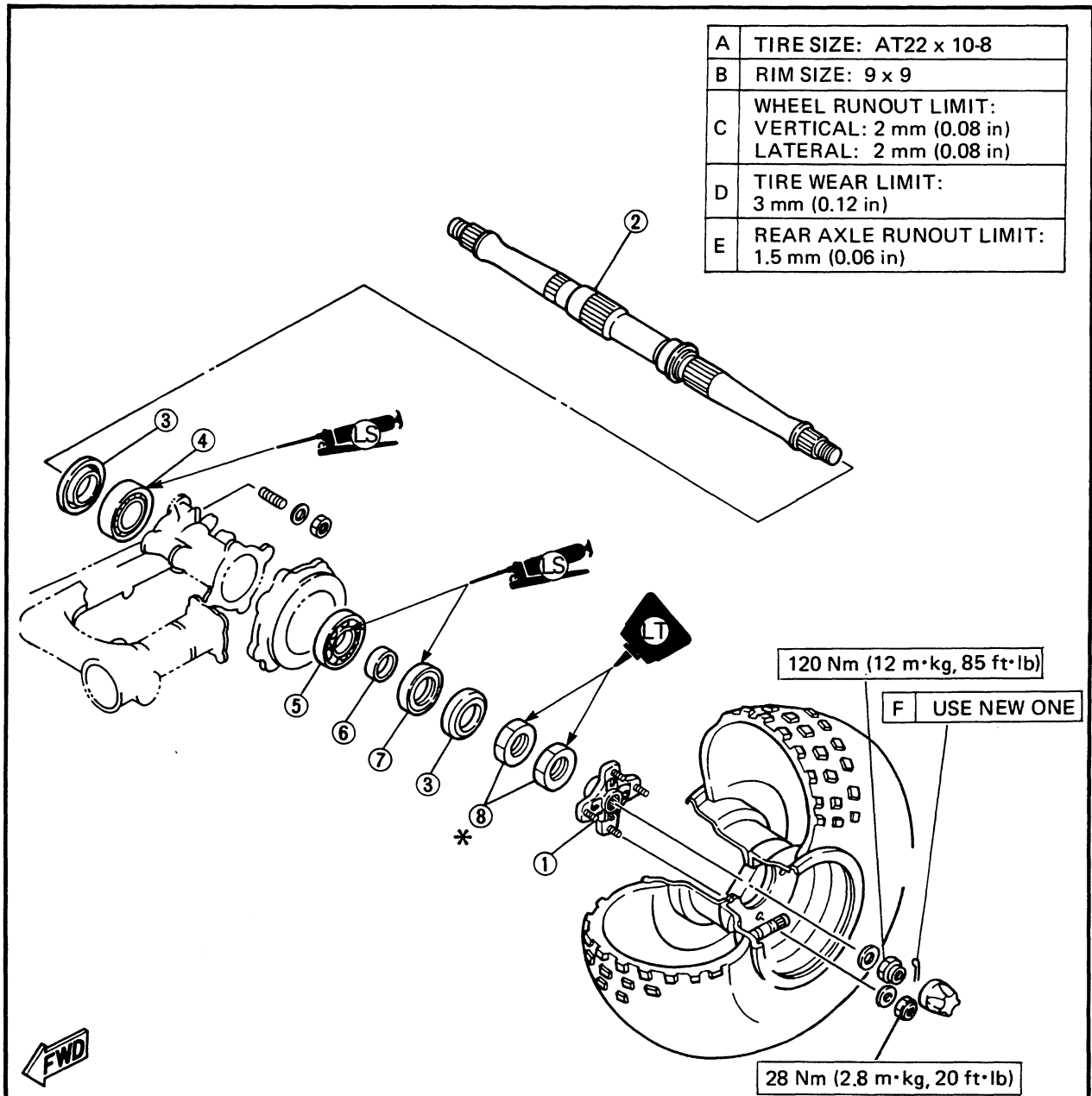
55 Nm (5.5 m·kg, 40 ft·lb)

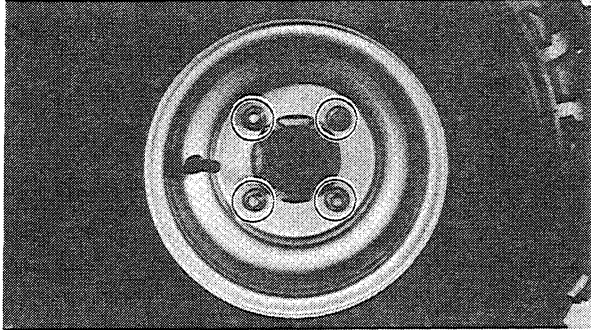
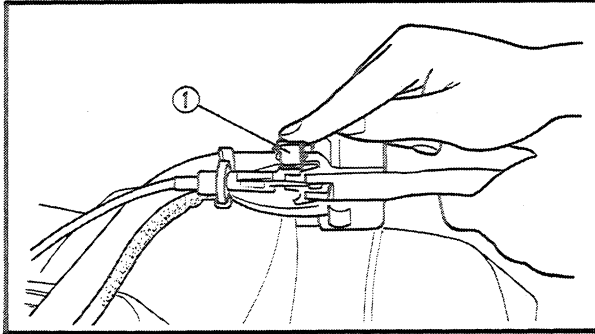
2nd: Tighten the nut (outside) while holding the nut (inside).

190 Nm (19.0 m·kg, 140 ft·lb)

3rd: Loosen the (inside) while holding the nut (outside)

240 Nm (24.0 m·kg, 170 ft·lb)





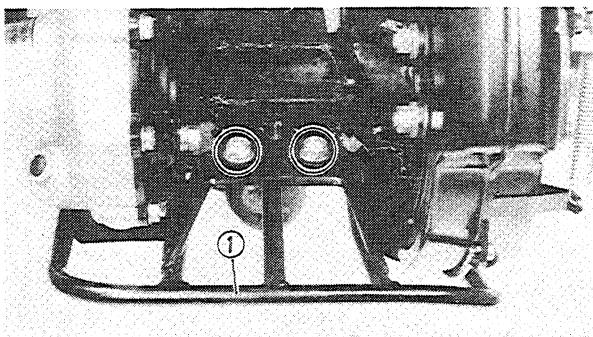
REMOVAL

Rear Wheel Removal

1. Place the machine on a level place.
2. Loosen:
 - Nuts (rear wheel)
 Apply the parking brake ①.
3. Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.
4. Remove:
 - Nuts (rear wheel)
 - Rear wheel

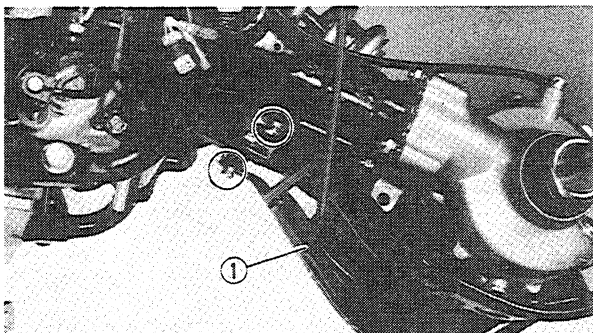
Rear Wheel Hub Removal

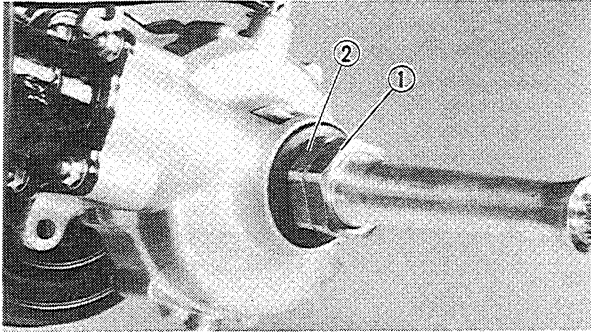
Refer to "FRONT WHEEL – REMOVAL" section.



Rear Wheel Axle Bearing Removal

1. Remove:
 - Trailer hitch bracket ①





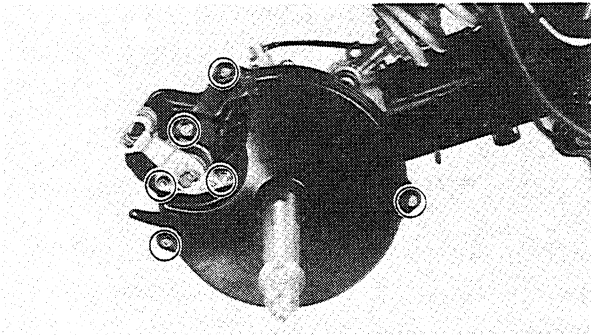
2. Remove:
- Nuts (rear axle) ①

NOTE: _____
When removing the rear axle nuts use the Nut Wrench.

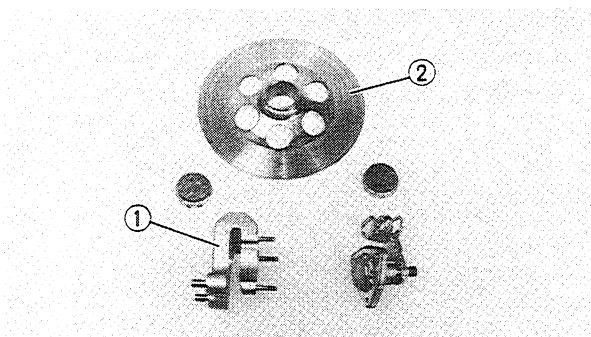


Nut Wrench:
YM-37132
90890-01419

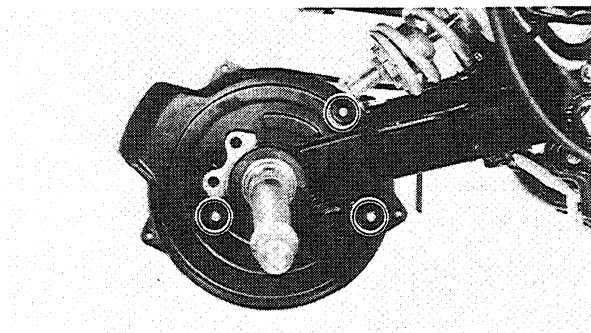
3. Remove:
- Adjusters (brake lever and brake pedal)
 - Pins
 - Springs
4. Disconnect:
- Brake cables
(from brake cable bracket)



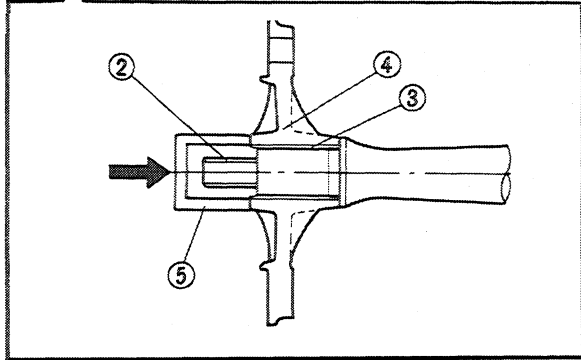
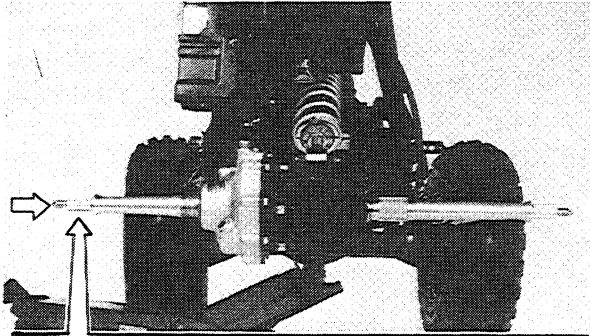
5. Remove:
- Caliper outer body assembly ①
 - Brake cable holder ②
 - Brake cover (outer) ③



6. Remove:
- Caliper inner body assembly ①
 - Brake disc ②



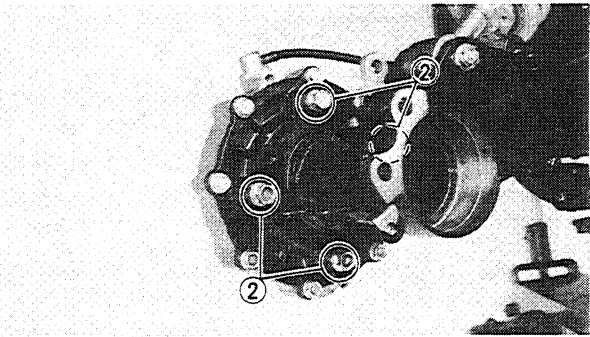
7. Remove:
- Brake cover (inner) ①



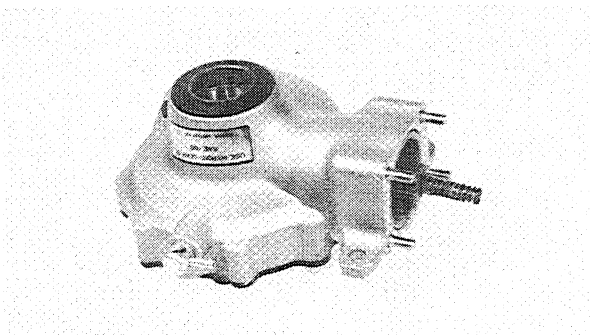
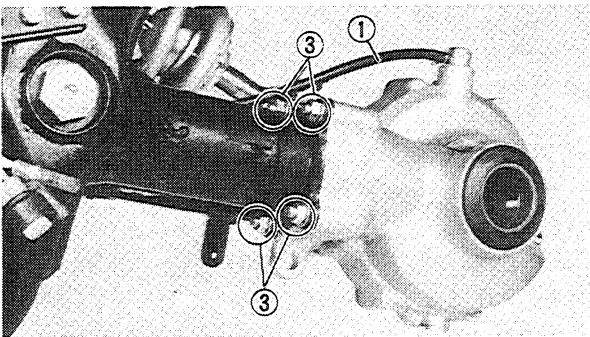
8. Remove:
- Rear axle
(from right side)

CAUTION:

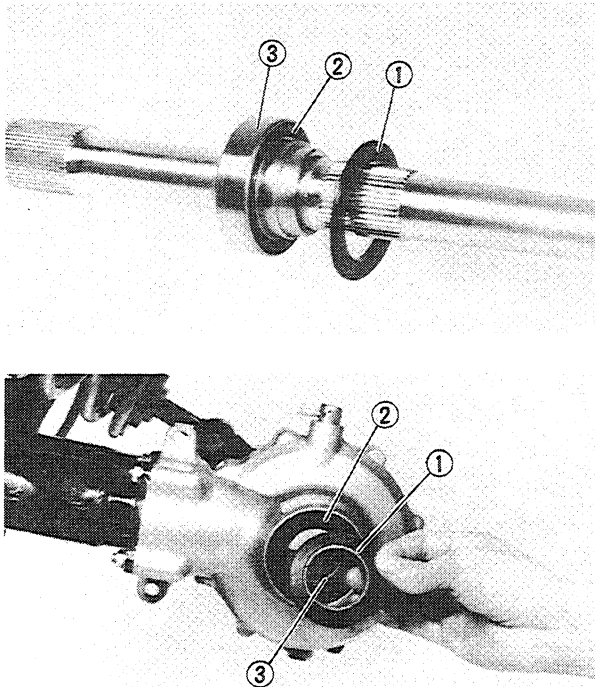
- Never directly tap the axle end with a hammer, this will result in damage to the axle thread (2) and spline (3).
- Install the wheel hub (4) and suitable socket (5) on the axle end to protect the thread and spline from damage.



9. Remove:
- Breather pipe (final gear housing) (1)
 - Bolts (final gear housing) (2)
 - Nuts (final gear housing) (3)



10. Remove:
- Final gear assembly with coupling gear



11. Remove:
- Hub dust cover ①
 - Oil seal ②
 - Bearing ③

Rear axle bearing replacement steps:

- Clean the outside of the drive shaft housing and rear axle.
- 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.

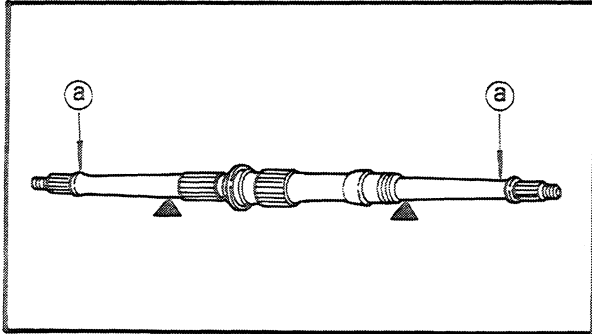
⚠ CAUTION:

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


- Install the oil seals (new) and hub dust covers.

INSPECTION

1. Inspect:
 - Wheel
 - Refer to "FRONT WHEEL – INSPECTION" section.
2. Measure:
 - Wheel runout
 - Refer to "FRONT WHEEL – INSPECTION" section.
3. Check:
 - Wheel balance
 - Refer to "FRONT WHEEL – INSPECTION" section.



4. Inspect:
- Rear axle runout (a)
Out of specification → Replace.

	Rear Axle Runout Limit: 1.5 mm (0.06 in)
---	--

⚠ WARNING:

Do not attempt to straighten a dent axle.

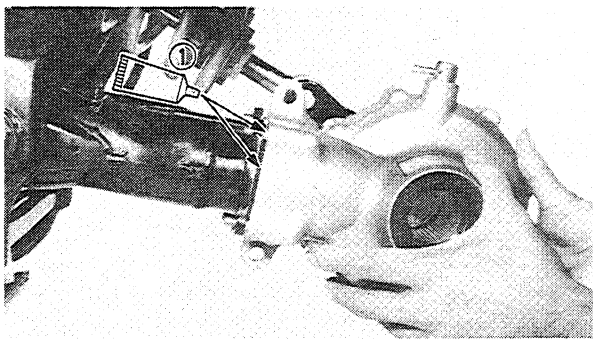
5. Inspect:
- Oil seals
Damage → Replace.
6. Check:
- Bearings
Bearings allow play in the final gear housing and rear hub or rear axle turns roughly → Replace.

INSTALLATION

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


Rear Axle Installation

1. Apply:
 - Lithium base grease
Lightly grease to the oil seals and bearing.
2. Apply:
 - Sealant (Quick Gasket® or Yamaha Bond No. 1215) ①




NOTE:

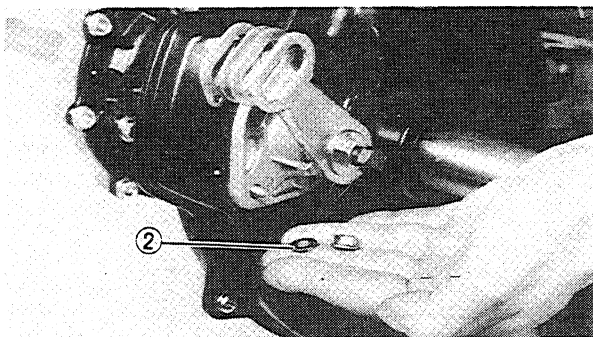
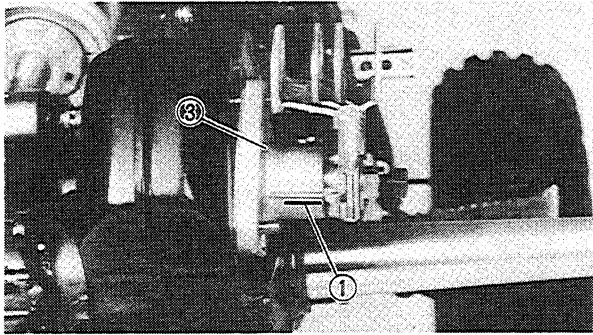
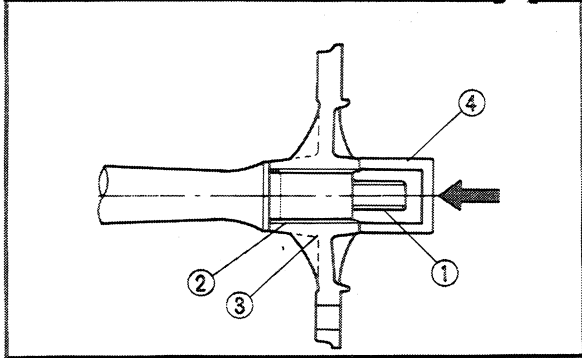
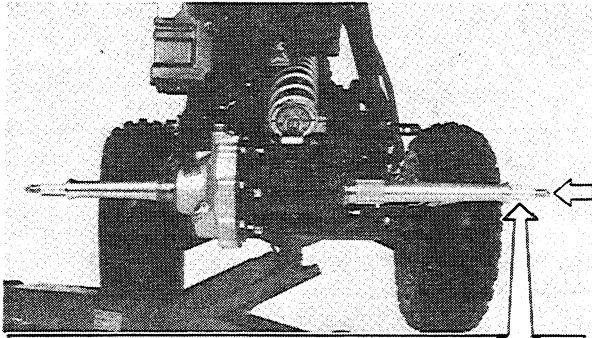
- Use the sealant.

	Sealant (Quick Gasket®) ACC-11001-05-01 Yamaha Bond No. 1215 90890-85505
---	---

- To the mating surfaces of both case halves.

3. Tighten:
- Nuts (final gear housing)
 - Bolts (final)

	Nuts (Final gear housing): 23 Nm (2.3 m·kg, 17 ft·lb) Bolts (Final gear housing): 45 Nm (4.5 m·kg, 32 ft·lb)
---	---



4. Install:

- Rear axle
Tap the right end axle.

CAUTION:

- Never directly tap the axle end with a hammer, this will result in damage to the axle thread (1) and spline (2).
- Install the wheel boss (3) and suitable socket (4) on the axle end to protect the thread and spline from damage.

5. Tighten:

- Nuts (caliper inner body)
- Nuts (caliper outer body)

NOTE:

- Be sure to position the caliper outer body (3) so that the caliper projection (1) face backward.
- Do not forget to fit the plain washer (2) as shown.



Nuts (Caliper inner body):
50 Nm (5.0 m·kg, 36 ft·lb)

Nuts (Caliper outer body):
9 Nm (0.9 m·kg, 6.5 ft·lb)

6. Install:

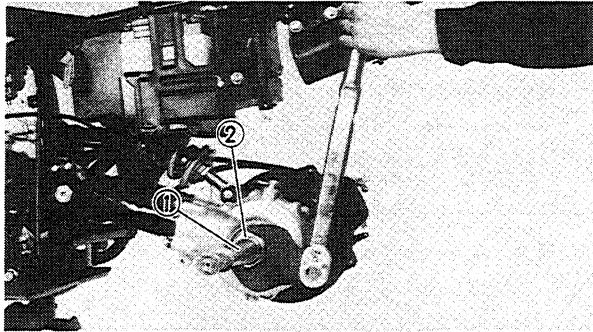
- Adjusters (brake pedal and brake lever)

7. Adjust:

- Brake lever free play
- Brake pedal free play





Refer to "CHAPTER 3. REAR BRAKE LEVER AND PEDAL ADJUSTMENT" section.

8. Apply the brake pedal and parking brake.




9. Tighten:

- Nuts (Rear axle – Inner) ①
- Nut (Rear axle – Outer) ②

Tightening steps:	
NOTE: _____ Before tightening the nuts, apply the LOCTITE® to the thread portion of the rear axle.	
• Tighten the nut (inner) ① with the Nut Wrench to specification while holding the rear axle.	
	Nut Wrench: YM-37132 90890-01419
	Nut (Inner) – (First Tightening): 55 Nm (5.5 m·kg, 40 ft·lb)
• Hold the nut (inner) ① and tighten the nut (outer) ② with the Nut Wrench to specification.	
	Nut (Outer): 190 Nm (19.0 m·kg, 140 ft·lb)
• Hold the nut (outer) ② and tighten back the nut (inner) ① with the Nut Wrench to specification.	
	Ring Nut (Inner) – (Final Tightening): 240 Nm (24.0 m·kg, 170 ft·lb)


11. Tighten:

- Trailer hitch bracket

	Trailer Hitch Bracket: 8 mm Bolts: 15 Nm (1.5 m·kg, 11 ft·lb) 10 mm Bolts: 30 Nm (3.0 m·kg, 22 ft·lb)
---	--

Rear Wheel Hub Installation

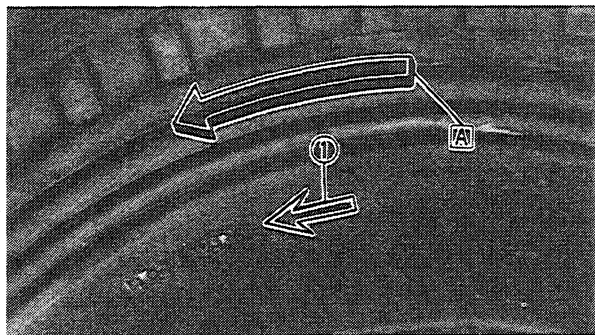
1. Tighten:
 - Axle nuts

	Axle Nuts: 120 Nm (12.0 m·kg, 85 ft·lb)
---	---

2. Install:
 - Cotter pins (new)

⚠ WARNING: _____

Always use a new cotter pin.




Rear Wheel Installation

1. Install:
 - Rear wheels

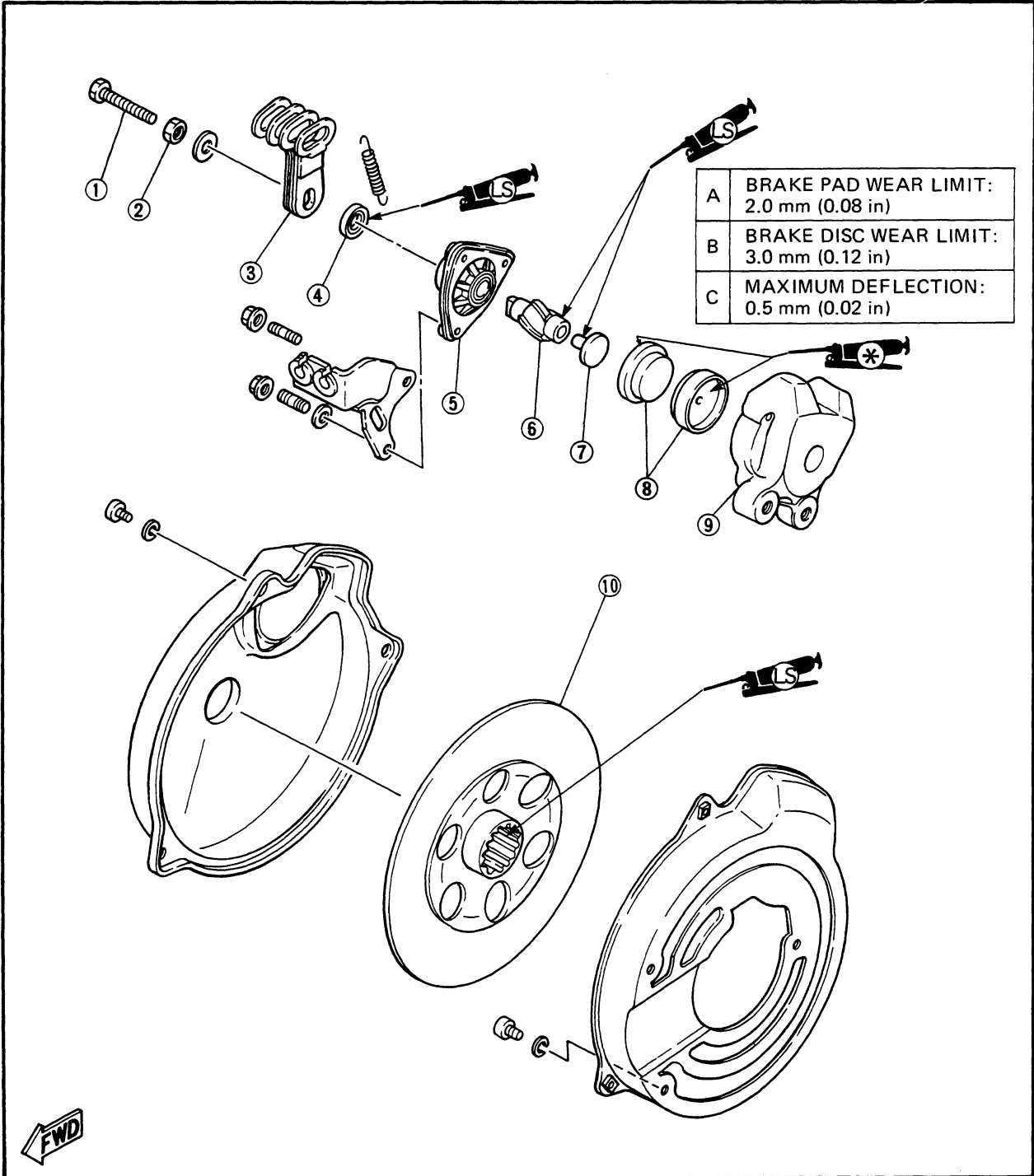
NOTE: _____
 The arrow mark ① on the tire must point toward the rotating direction A of the wheel.

2. Tighten:
 - Nuts (rear wheel)

	Nuts (Rear wheel): 28 Nm (2.8 m·kg, 20 ft·lb)
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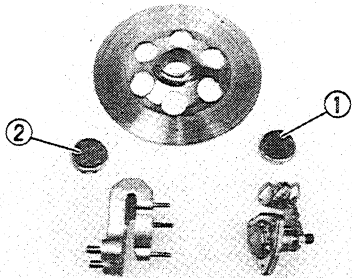
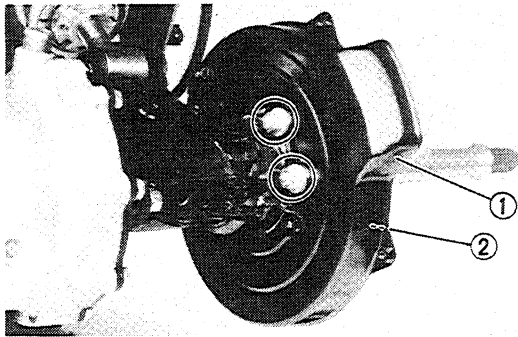
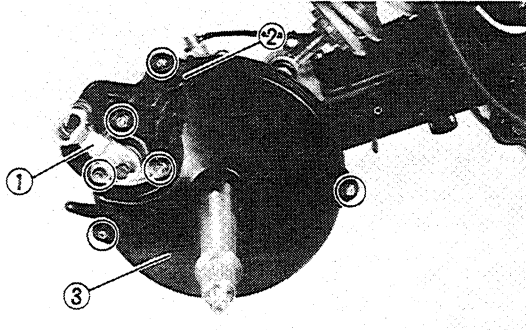
REAR BRAKE

- ① Adjusting bolt
- ② Locknut
- ③ Brake lever
- ④ Oil seal
- ⑤ Caliper outer body
- ⑥ Cam
- ⑦ Backup plate
- ⑧ Brake pads
- ⑨ Caliper inner body
- ⑩ Brake disc
- * Apply Yamaha brake grease



REMOVAL

1. Place the machine on a level place.
2. Apply the parking brake. Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.
3. Remove:
 - Rear wheel (left)
 - Rear wheel hub (left)
 - Adjusters (brake pedal and brake lever)
4. Unhook the brake lever spring.
5. Remove:
 - Caliper outer assembly ①
 - Brake cable holder ②
 - Brake cover (outer) ③



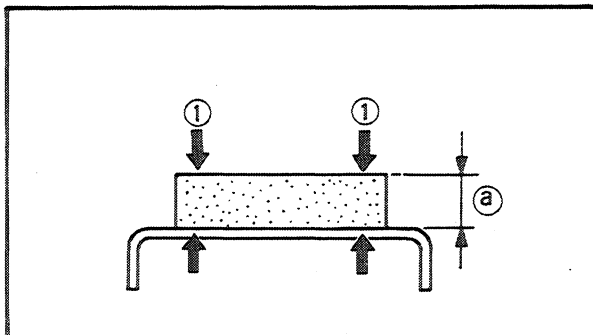
6. Remove:
 - Caliper inner body assembly ①
 - Brake disc ②


7. Remove:
 - Caliper pad (outer) ①
 - Caliper pad (inner) ②

INSPECTION

1. Measure:
 - Brake pad thickness
 Out of specification → Replace.

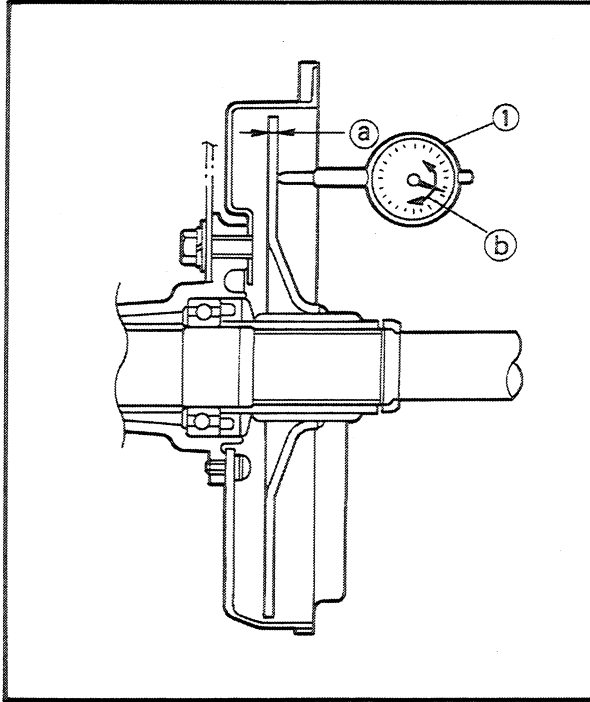
① Measuring point




 **Brake Pad Wear Limit (a) :**
2.0 mm (0.08 in)

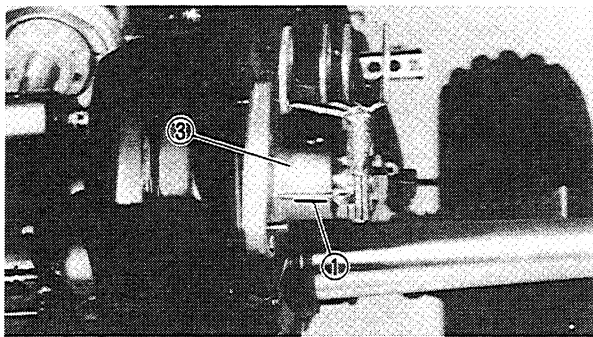
NOTE: _____
Always replace the brake pads as a set.

2. Inspect:
 - Caliper piston
Rust/Damage → Replace.
3. Measure:
 - Brake disc thickness
 - Brake disc deflection
Out of specification → Replace.



① Dial gauge

	Brake Disc Wear Limit (a) :
	3.0 mm (0.12 in)
	Brake Disc Maximum Deflection (b) :
	0.5 mm (0.02 in)

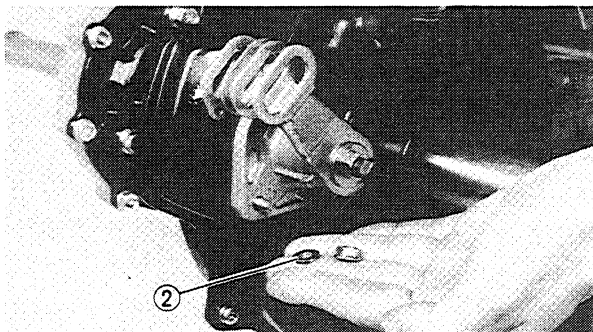


INSTALLATION

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

1. Tighten:
 - Nuts (caliper inner body)
 - Nuts (caliper outer body)

NOTE: _____
• Be sure to position the caliper outer body ③ so that the caliper projection ① face backward.
• Do not forget to fit the plain washer ② as shown.





Nuts (Caliper inner body):
50 Nm (5.0 m·kg, 36 ft·lb)

Nuts (Caliper outer body):
9 Nm (0.9 m·kg, 6.5 ft·lb)

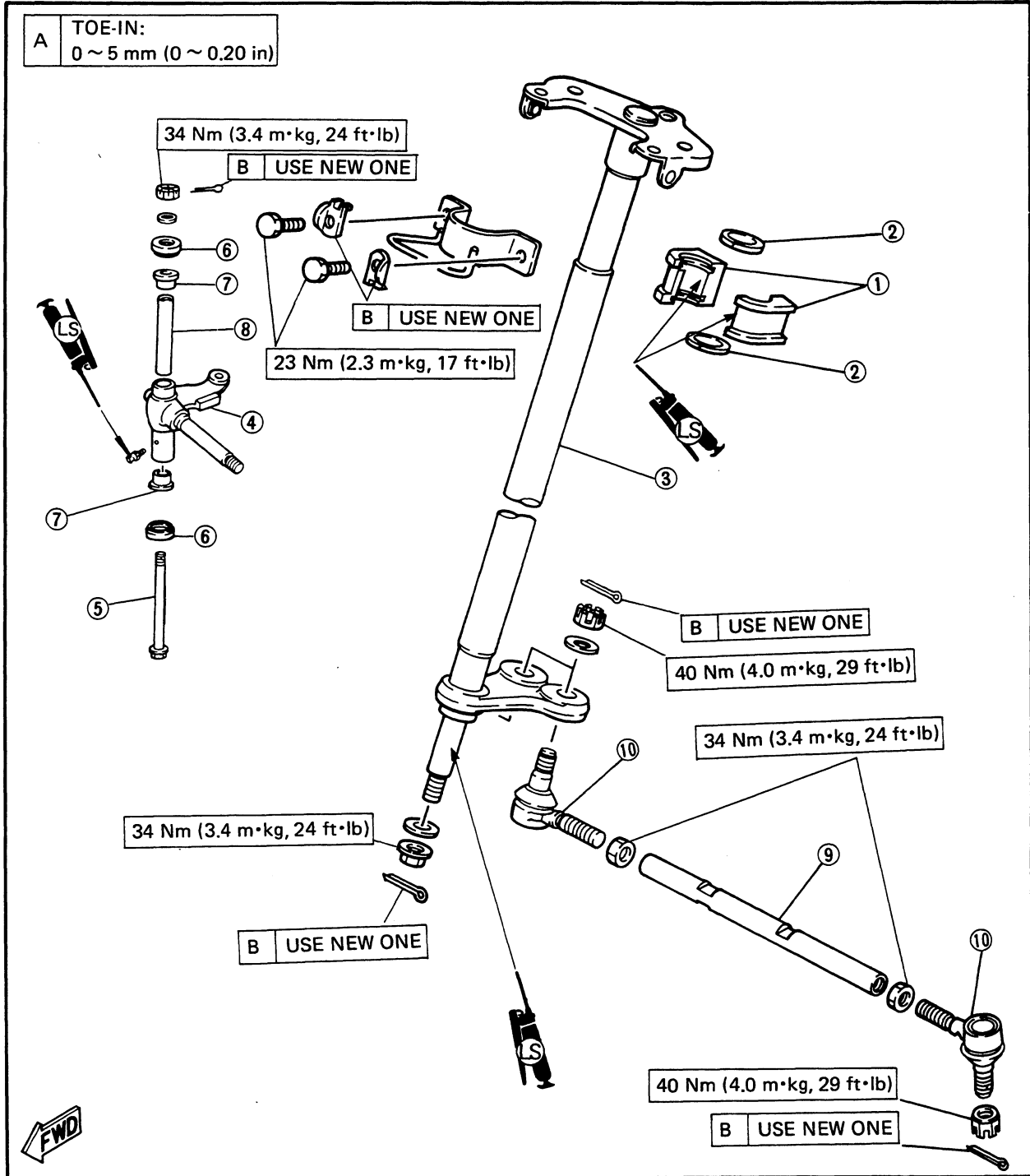
2. Install:
 - Adjusters (brake pedal and brake lever)
3. Adjust:
 - Brake lever free play
 - Brake pedal free play

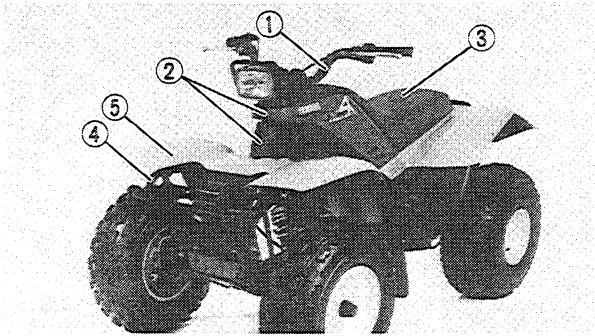
Refer to "CHAPTER 3. REAR BRAKE LEVER AND PEDAL ADJUSTMENT" section.
4. Install:
 - Rear wheel hubs
 - Rear wheels

Refer to "REAR WHEEL – INSTALLATION" section.

STEERING SYSTEM

- ① Steering shaft bushing
- ② Oil seal
- ③ Steering shaft
- ④ Knuckle
- ⑤ Knuckle shaft
- ⑥ Thrust cover
- ⑦ Bushing
- ⑧ Spacer
- ⑨ Tie-rod
- ⑩ Tie-rod end



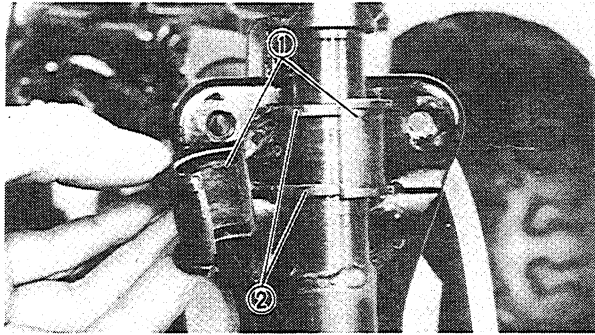


REMOVAL

1. Remove:

- Handlebar ①
- Fuel tank cover ②
- Seat ③
- Front carrier (Except for USA) ④
- Front fender ⑤

Refer to "CHAPTER 3. VALVE CLEARANCE ADJUSTMENT – Removal" section.

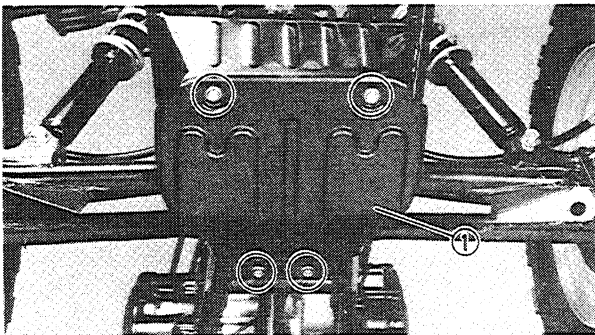


2. Straighten:

- Lock washer tabs

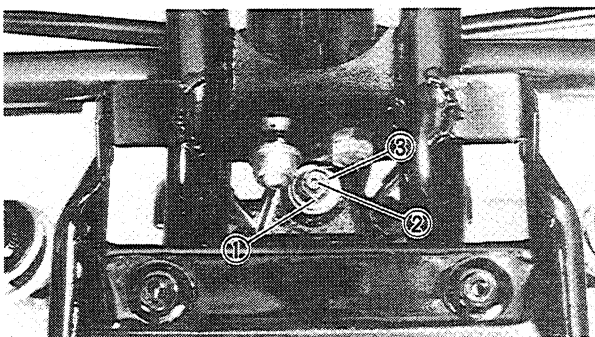
3. Remove:

- Steering shaft bracket
- Steering shaft bushings ①
- Oil seals ②



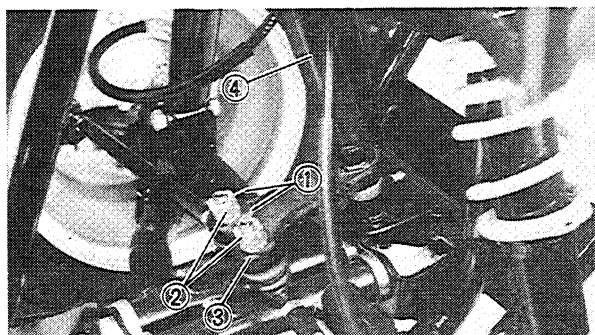
4. Remove:

- Under guard ①



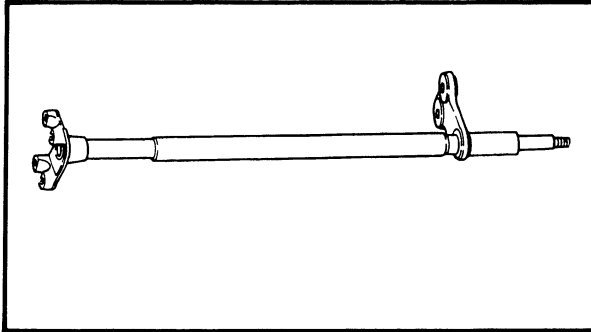
5. Remove:

- Cotter pin ①
- Nut (steering shaft) ②
- Plain washer ③



6. Remove:

- Cotter pins ①
- Nuts (tie-rod end) ②
- Tie-rod ends ③
- Steering shaft ④

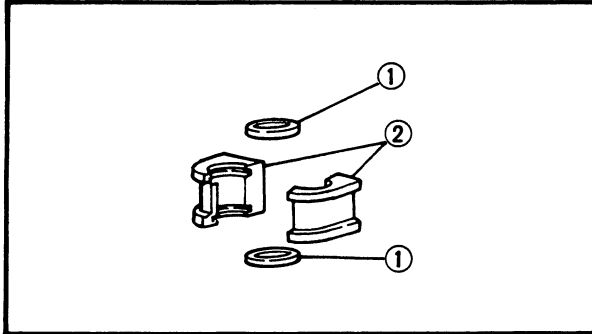


INSPECTION

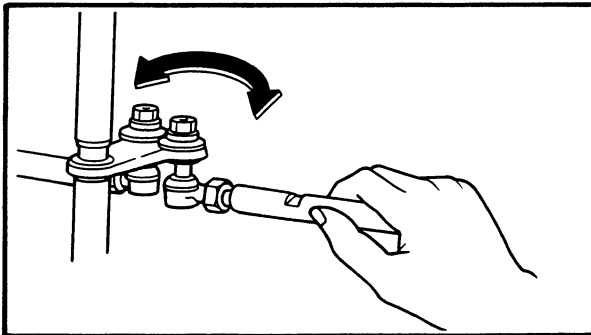
1. Inspect:
 - Steering shaft
 - Bends → Replace.

⚠ WARNING: _____

Do not attempt to straighten a bent shaft; this may dangerously weaken the shaft.



2. Inspect:
 - Oil seals ①
 - Steering shaft bushings ②
 - Wear/Damage → Replace.



3. Check:
 - Steering shaft free play
 - Steering shaft is loose → Replace bushings and O-rings.
 - Insert the steering shaft into the frame, and check for free play.

INSTALLATION


When installing the steering system, reverse the removal procedure. Note the following points.

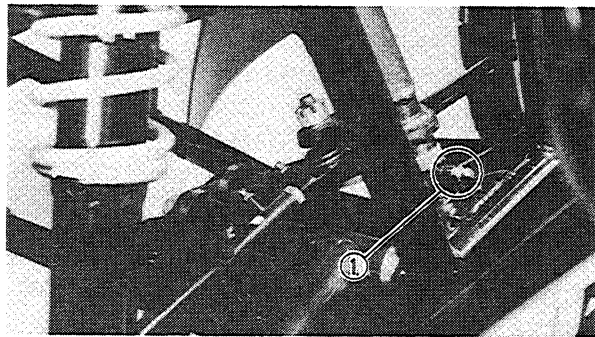
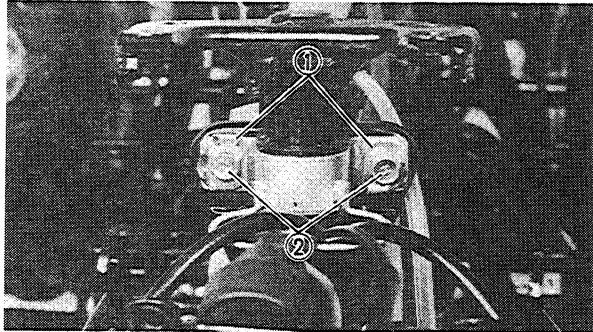
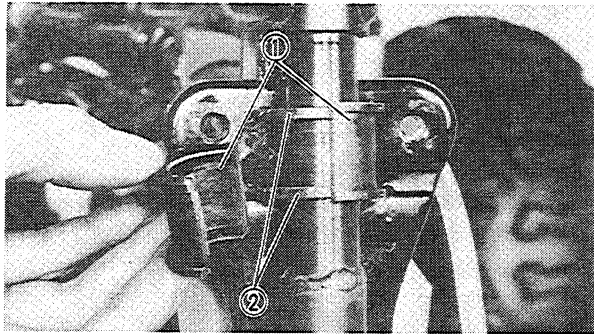
1. Install:
 - Steering shaft

⚠ WARNING: _____

Make sure the brake cables and leads are properly routed, and are not damaged or twisted.

2. Tighten:
 - Nuts (tie-rod end)
 - Nut (steering shaft)

	Nuts (Tie-rod end): 40 Nm (4.0 m·kg, 28 ft·lb)
	Nut (Steering shaft): 34 Nm (3.4 m·kg, 24 ft·lb)



3. Install:
- Cotter pin (new)

⚠ WARNING:

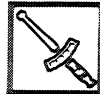
Always use a new cotter pin.

4. Install:
- Oil seals ②
 - Steering shaft bushings ①
 - Steering shaft bracket

NOTE:

- Lightly apply lithium soap base grease to the oil seals.
- Be careful not to damage the oil seals during installation.

5. Install:
- Lock washers (new) ①
 - Bolts (steering shaft bracket) ②



Bolts (Steering Shaft Bracket):
23 Nm (2.3 m·kg, 17 ft·lb)

6. Bend the lock washer tab along the bolt flats.

7. Lubricate:
- Pivot point (steering shaft) ①
- Use a grease gun.



Lithium Base Grease

8. Install:
- Components in aforementioned list (step "1")
- Refer to "CHAPTER 3. VALVE CLEARANCE ADJUSTMENT – Installation" section.

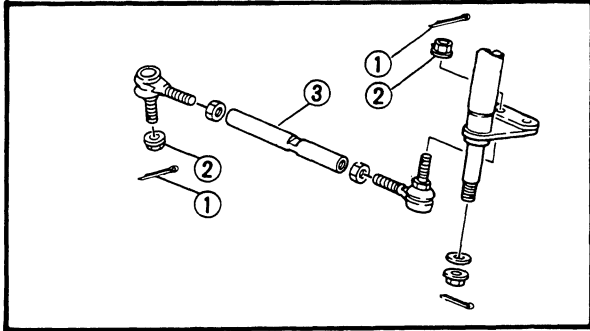
STEERING KNUCKLES AND TIE-ROD ENDS

REMOVAL

1. Remove:

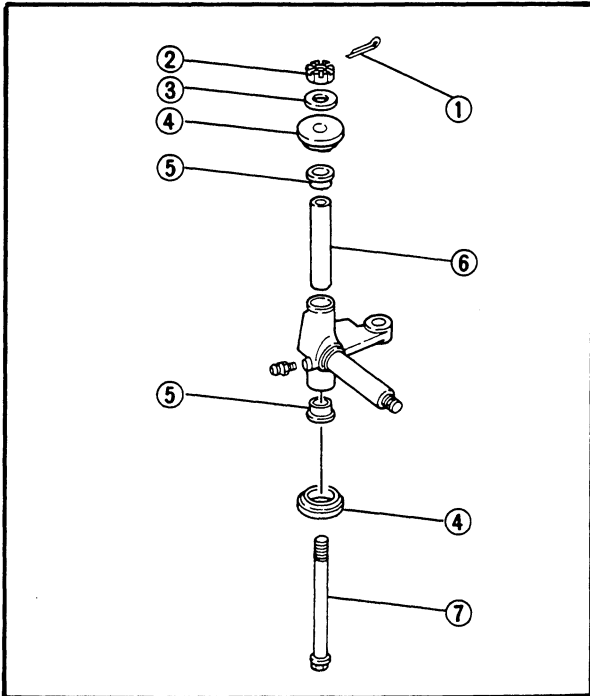
- Front wheels
- Front hubs

Refer to "FRONT WHEEL – REMOVAL" section.



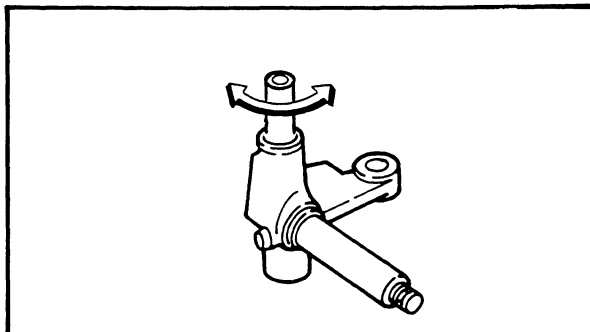
2. Remove:

- Cotter pins ①
- Nuts (tie-rod end) ②
- Tie-rod ③



3. Remove:

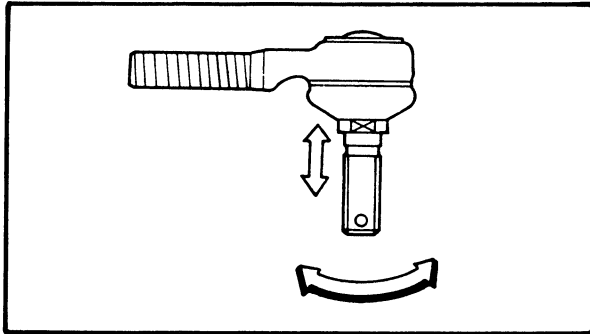
- Cotter pin ①
- Nut (steering knuckle) ②
- Plain washer ③
- Thrust covers ④
- Bushings ⑤
- Spacer ⑥
- Knuckle shaft ⑦



INSPECTION

1. Check:

- Spacer free play
Spacer is loose → Replace spacer and bushings as a set.
Insert the spacer into the knuckle, and check for free play.




2. Check:
 - Tie-rod free play and movement
Tie-rod is exists free play → Replace tie-rod end.
 - Tie-rod turns roughly → Replace tie-rod end.
3. Inspect:
 - Thrust cover
Wear/Damage → Replace.

INSTALLATION

When installing the tie-rod, reverse the removal procedure. Note the following points.

1. Apply:
 - Lithium base grease
Lightly grease to the knuckle shaft, bushings and thrust covers.
2. Tighten:
 - Nuts (steering knuckles)

	Nuts (Steering Knuckles): 34 Nm (3.4 m·kg, 24 ft·lb)
---	---

CAUTION:

Avoid over-tightening.


3. Install:
 - Cotter pin

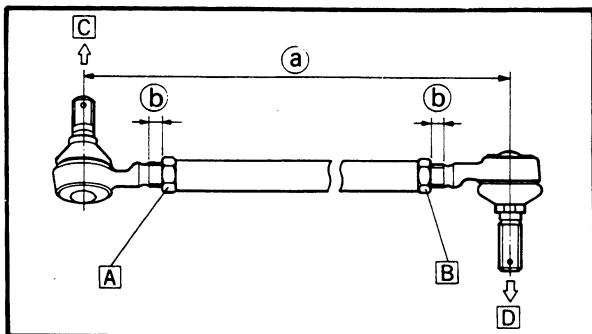
WARNING:

Always use a new cotter pin.

4. Adjust:
 - Tie-rod assembly length

Tie-rod assembly length adjustment steps:	
•	Loosen the locknuts.
•	Adjust tie-rod assembly length a by turning both tie-rod ends.

	Tie-rod Assembly Length (a) : 285 mm (11.2 in)
---	---



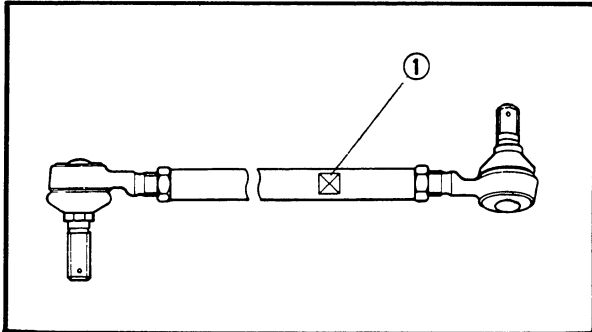
- A** Right-hand-threads
- B** Left-hand-threads
- C** To steering shaft
- D** To knuckle

NOTE: _____
 The threads (b) on both tie-rod ends must be of the same length.

- Tighten the locknuts.



Locknut (Tie-rod):
 34 Nm (3.4 m·kg, 24 ft·lb)



5. Install:
- Tie-rods (left and right)

NOTE: _____
 Be sure to position the tie-rod so that its white painted mark ① is right-hand rod.

6. Tighten:
- Nuts (tie-rod end)

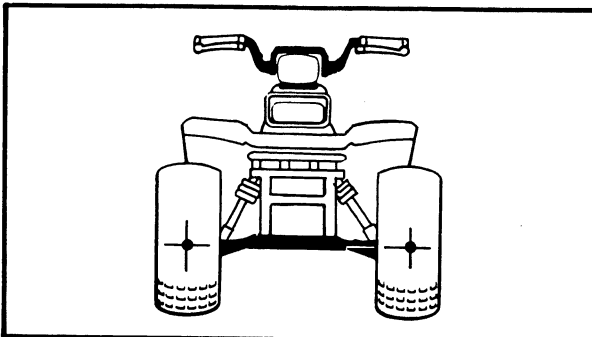


Nuts (Tie-rod end):
 40 Nm (4.0 m·kg, 29 ft·lb)

7. Install:
- Cotter pins

⚠ WARNING: _____

Always use a new cotter pin.



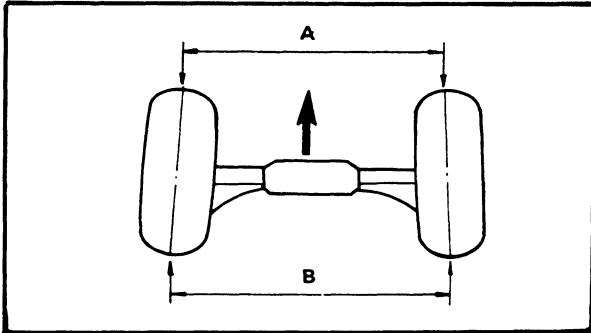
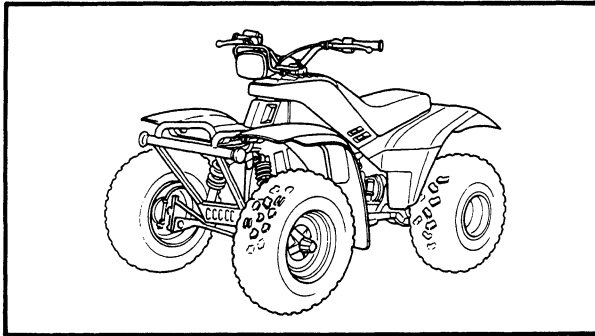
ADJUSTMENT

Toe-in Adjustment

1. Place the machine on a level place.
2. Measure:
 - Toe-in

Toe-in measurement steps:

- Mark both front tire tread centers.



- Measure the width **A** between the marks.
- Move the front tires 180 degrees either forward or backward until the marks come exactly opposite.
- Measure the width **B** between the marks.
- Calculate the toe-in using the formula given below.

$$\text{Toe-in} = \text{B} - \text{A}$$



Toe-in:
0 ~ 5 mm (0 ~ 0.20 in)

- If the toe-in is incorrect, adjust the toe-in.

3. Adjust:

- Toe-in
Refer to "Tie-rod assembly length adjustment steps" section.

⚠ WARNING:

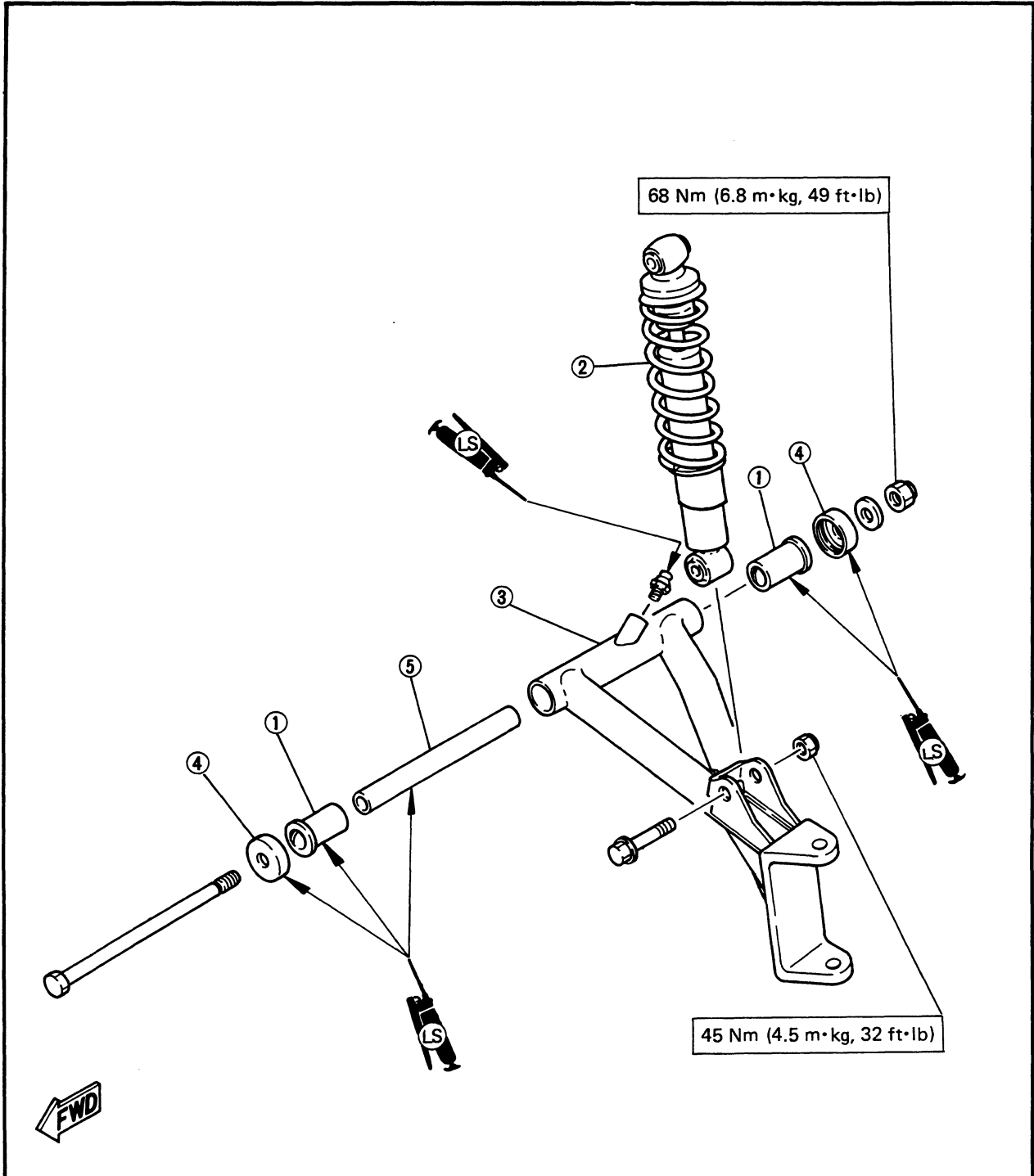
- Be sure that both tie-rod are turned by the same amount. If not, the machine will go right or left even though the handlebar is positioned straight and it may lead to mis-handling and accident.
- After setting the toe-in to specification, run the machine slowly for some distance with the hands lightly on the handlebar and check that the handlebar responds correctly. If not, turn either the right or left tie-rod within the toe-in specification.

4. Measure:

- Toe-in
Refer to "Toe-in Adjustment" section.

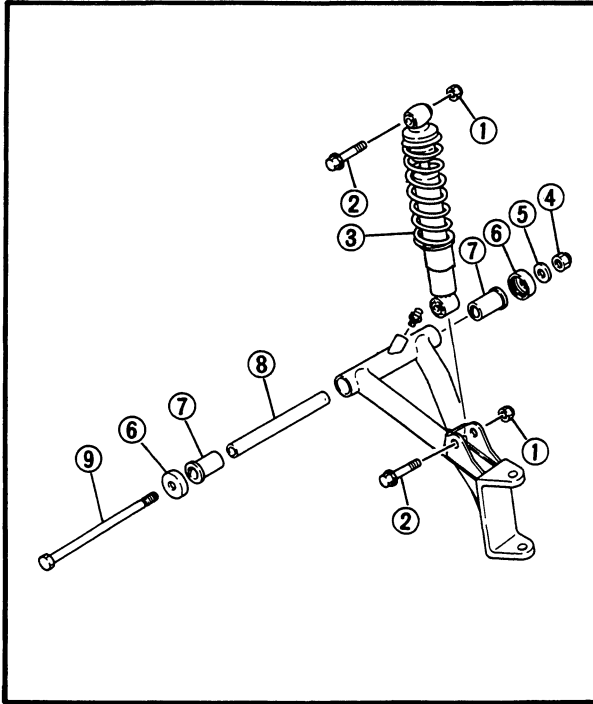
FRONT SHOCK ABSORBER AND LOWER ARM

- ① Bushing
- ② Front shock absorber
- ③ Lower arm
- ④ Thrust cover
- ⑤ Spacer



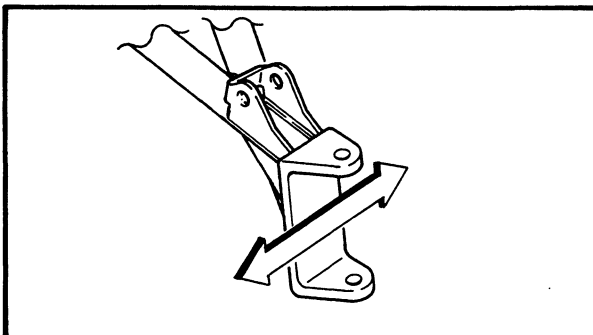
REMOVAL

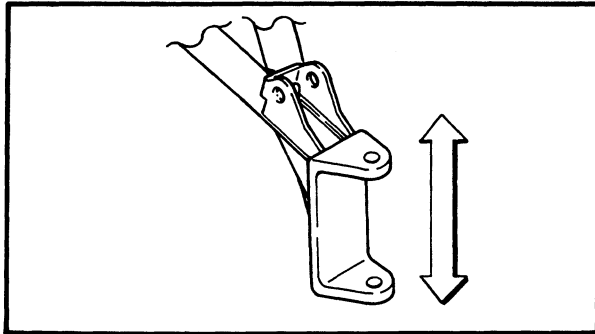
1. Remove:
 - Front wheels
 - Front hubs
 - Front brake shoe plates
 Refer to "FRONT WHEEL-REMOVAL" section.
2. Remove:
 - Tie-rods
 - Knuckle shafts
 Refer to "STEERING KNUCKLES AND TIE-ROD ENDS – REMOVAL" section.
3. Remove:
 - Nuts (front shock absorber) ①
 - Bolts (front shock absorber) ②
 - Front shock absorber ③
 - Nuts (lower arm) ④
 - Plain washer ⑤
 - Bolts (lower arm) ⑨
 - Thrust covers ⑥
 - Bushings ⑦
 - Spacer ⑧



FREE PLAY INSPECTION

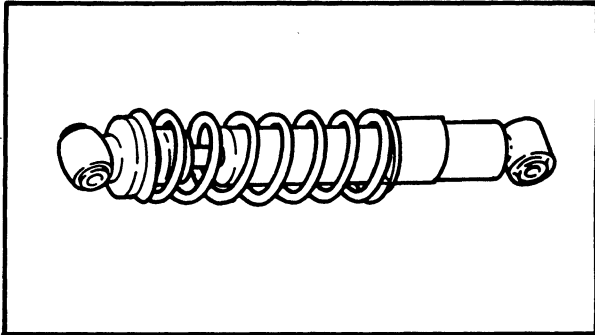
1. Remove:
 - Front wheels
 - Front hubs
 - Front brake shoe plates
 - Tie-rods
 - Knuckle shafts
 - Front shock absorber
2. Check:
 - Lower arm (side play)
 Side play → Replace spacer and bushings as a set.
 Move the lower arm from side to side.
 There should be no noticeable side play.





3. Check:

- Lower arm (vertical movement)
Tightness/Binding/Rough spots → Replace spacer and bushings as a set.
Move the lower arm up and down.

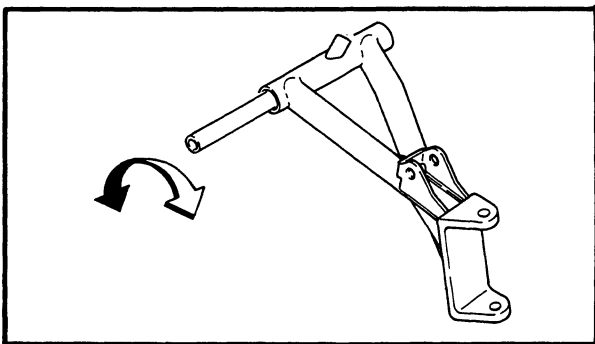


INSPECTION

Front Shock Absorber Inspection

1. Inspect:

- Shock absorber rod
Bends/Damage → Replace the shock absorber assembly.
- Shock absorber assembly
Oil leaks → Replace the shock absorber assembly.
- Spring
Fatigue → Replace the shock absorber assembly.
Move the spring up and down.



Lower Arm Inspection

1. Check:

- Spacer free play
Spacer is loose → Replace spacer and bushings as a set.
Insert the spacer into the lower arm, and check for free play.

2. Inspect:

- Thrust cover
- Bushings
Wear/Damage → Replace as a set.

INSTALLATION

When installing the front wheels, reverse the removal procedure. Note the following points.


1. Apply:
 - Lithium base grease
Lightly grease the lower arms, spacers, bushings and thrust covers.
2. Install:
 - Lower arms

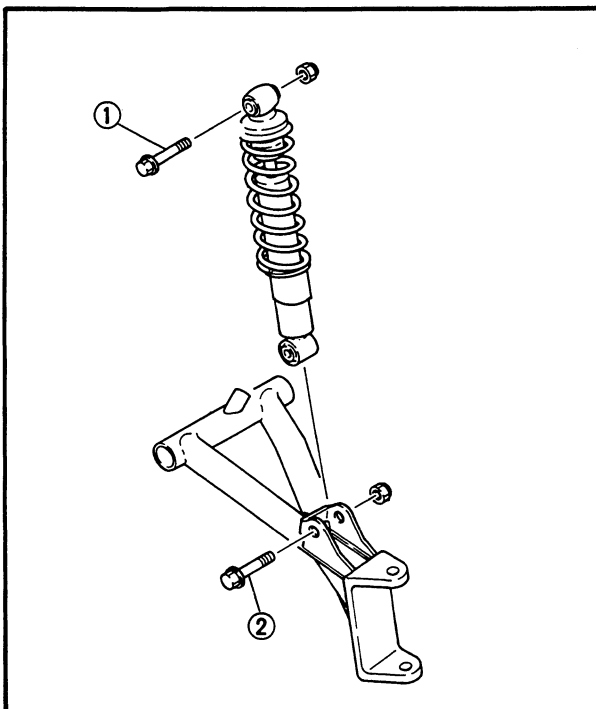
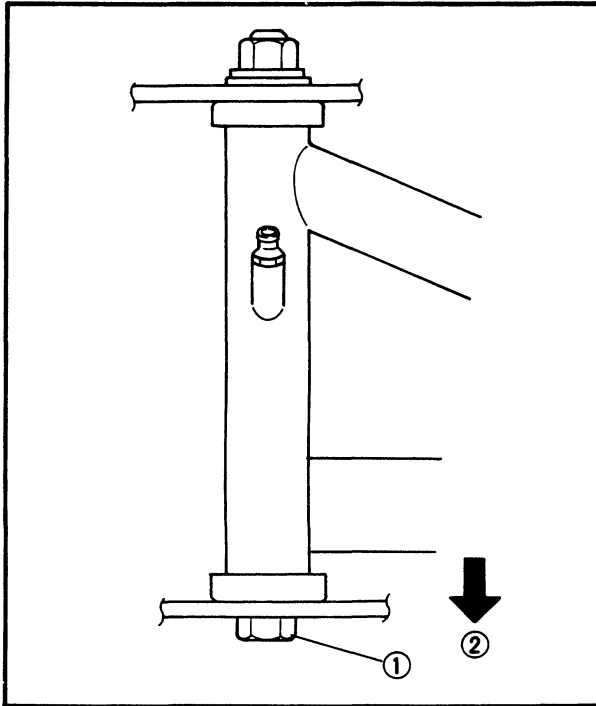
NOTE: _____

Be sure to position the bolt ① so that the bolt head face forward.

② Forward

3. Tighten:
 - Nuts (Lower arm)

	<p>Nuts (Lower arm): 68 Nm (6.8 m·kg, 49 ft·lb)</p>
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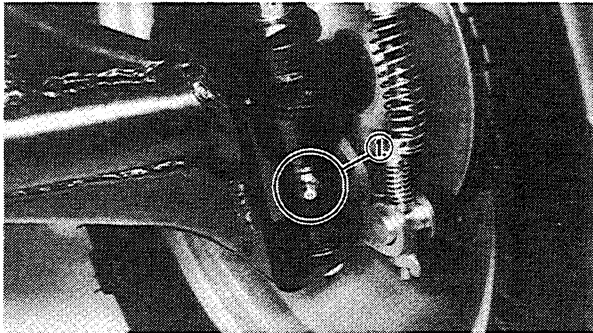


4. Install:
 - Front shock absorber

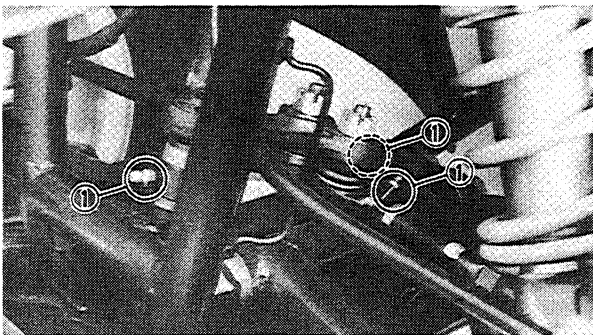
NOTE: _____

Be sure to position the bolts (upper and lower) ①, ② so that the bolt head face forward.

5. Adjust:
 - Front shock absorber
Refer to "CHAPTER 2. FRONT SHOCK ABSORBER ADJUSTMENT" section.
6. Install:
 - Knuckle shafts
 - Tie-rods
Refer to "STEERING KNUCKLE AND TIE-ROD ENDS – INSTALLATION" section.
7. Install:
 - Front brake shoe plates
 - Front hubs
 - Front wheels
Refer to "FRONT WHEEL – INSTALLATION" section.

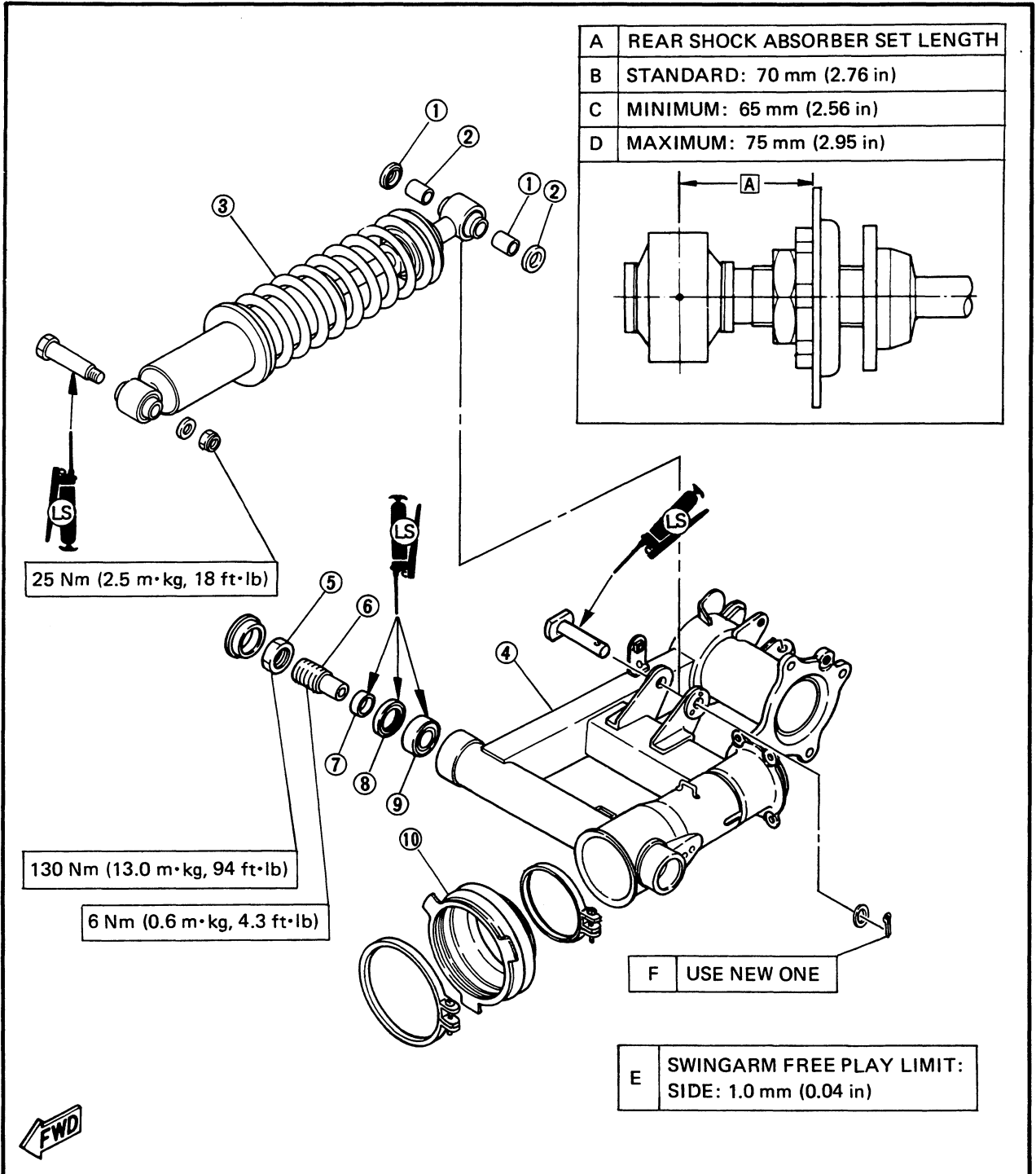


8. Lubricate:
 - Pivot points (lower arms and knuckle shafts) ①
Use a grease gun.



REAR SHOCK ABSORBER AND SWINGARM

- ① Dust cover
- ② Bushing
- ③ Rear shock absorber
- ④ Swingarm
- ⑤ Locknut
- ⑥ Pivot shaft
- ⑦ Collar
- ⑧ Oil seal
- ⑨ Taper roller bearing
- ⑩ Rubber boot

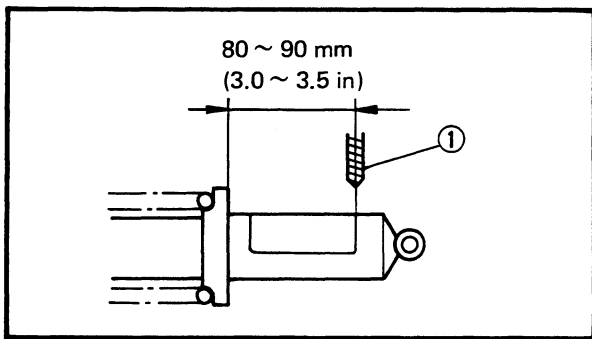


HANDLING NOTES

⚠ 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.



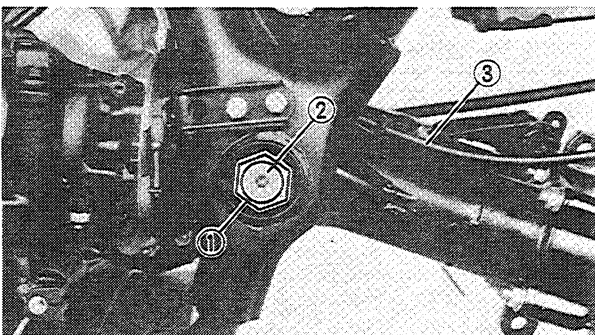
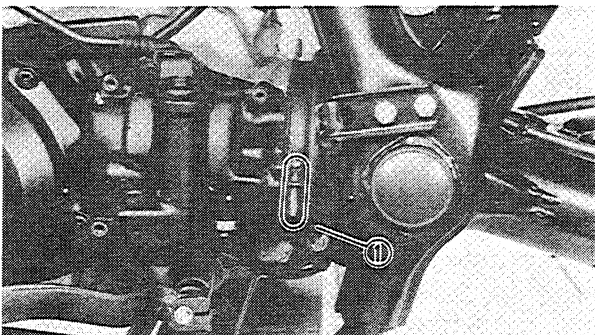
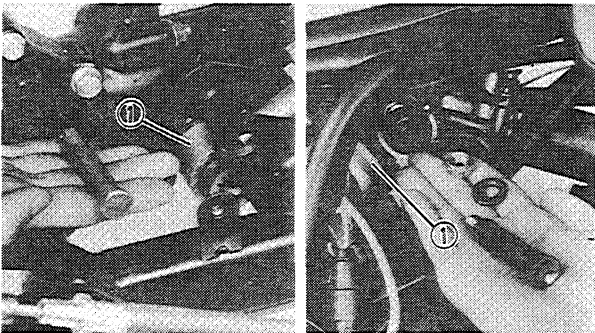
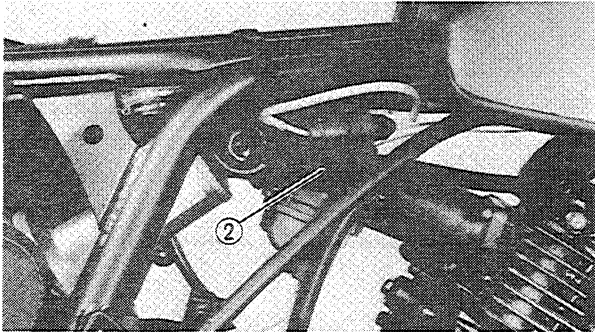
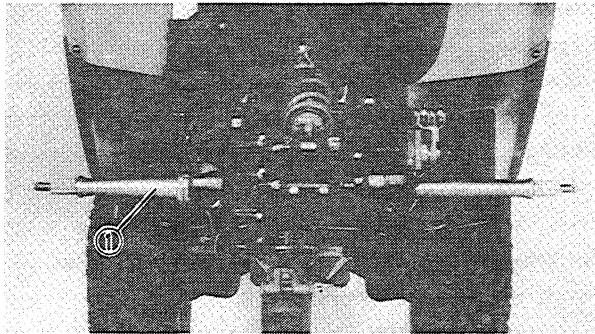
NOTES ON DISPOSAL

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 80 ~ 90 mm (3.0 ~ 3.5 in) under the spring seat.

⚠ CAUTION:

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



REMOVAL

1. Remove:

- Rear wheels
- Rear wheel hubs
- Rear axle ①
Refer to "REAR WHEEL AND REAR AXLE – REMOVAL" section.
- Rear fender
- Side covers (Left and right)
- CDI unit ②

2. Remove:

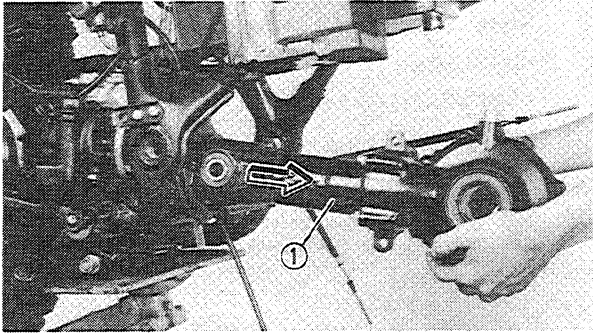
- Rear shock absorber ①

3. Remove:

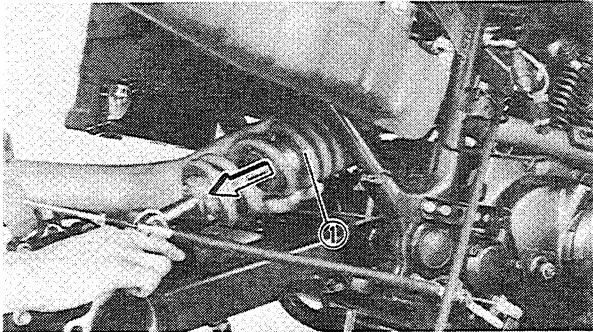
- Rubber boot ①

4. Remove:

- Pivot shaft caps
- Locknuts (swingarm) ①
- Pivot shafts (swingarm) ②
- Breather hose (Final gear) ③

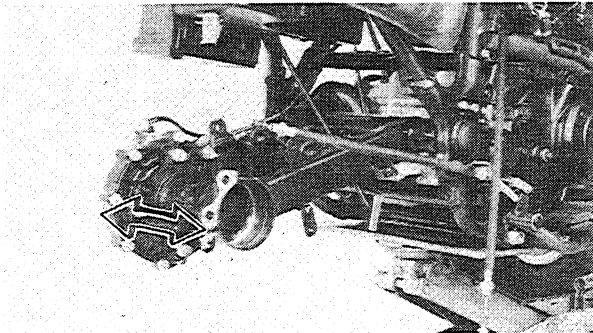


5. Remove:
- Swingarm ①




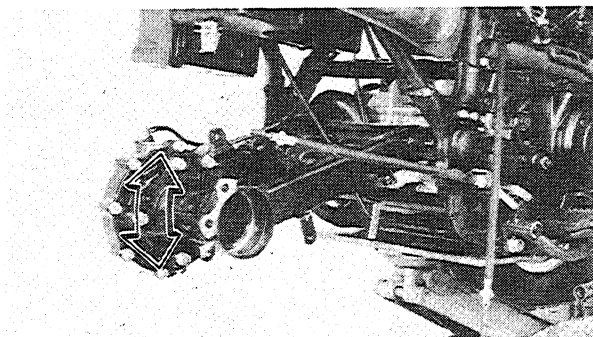
FREE PLAY INSPECTION

1. Remove:
- Rear wheels
 - Rear wheel hubs
 - Rear axle
 - Rear fender
 - Rear shock absorber ①

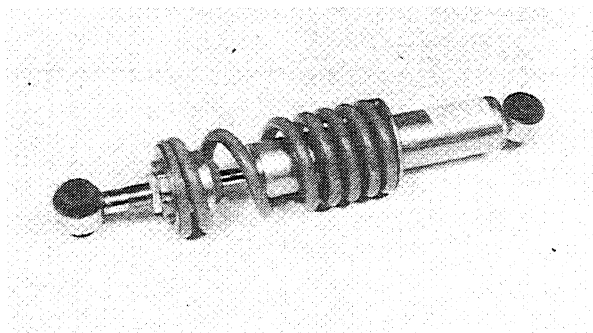


2. Check:
- Swingarm (side play)
Out of specification → Replace taper roller bearings and collars.
Move the swingarm from side to side.

 **Swingarm Side Free Play Limit:**
1.0 mm (0.04 in)



3. Check:
- Swingarm (vertical movement)
Tightness/Binding/Rough spots → Replace taper roller bearings and collars.
Move the swingarm up and down.

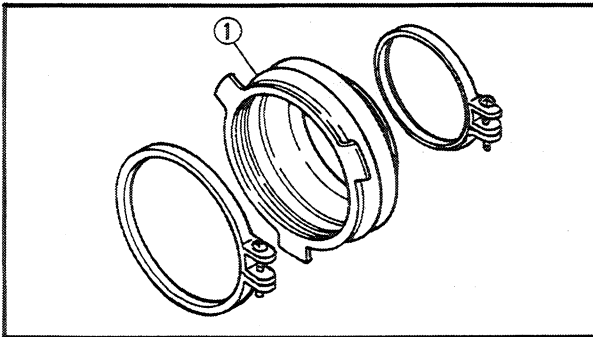
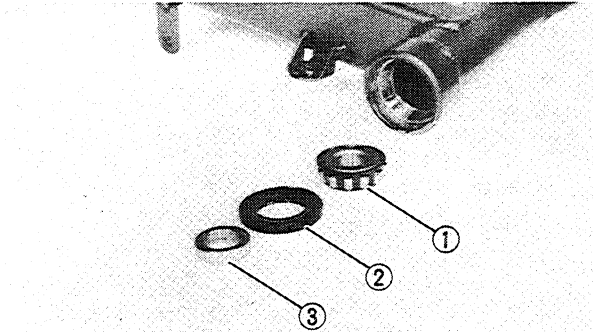


INSPECTION

Rear Shock Absorber Inspection

1. Inspect:
- Shock absorber rod
Bends/Damage → Replace the shock absorber assembly.

- Shock absorber
Oil leaks/Gas leaks → Replace the shock absorber assembly.
- Spring
Fatigue → Replace the shock absorber assembly.
Move the spring up and down.



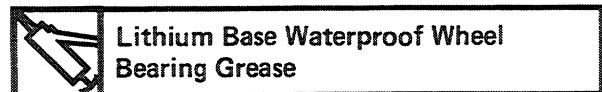
Swingarm Inspection

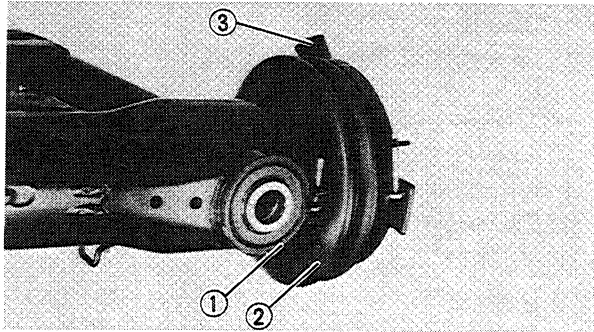
1. Wash the bearings in a solvent.
2. Inspect:
 - Bearings (race/rollers) ①
Pitting/Damage → Replace.
 - Oil seals ②
 - Collars ③
Damage → Replace.
3. Inspect:
 - Rubber boot ①
Damage → Replace.

INSTALLATION

When installing the rear wheels, reverse the removal procedures. Note the following points.

1. Lubricate:
 - Bearing
 - Oil seals
 - Collars
 - Pivot shafts



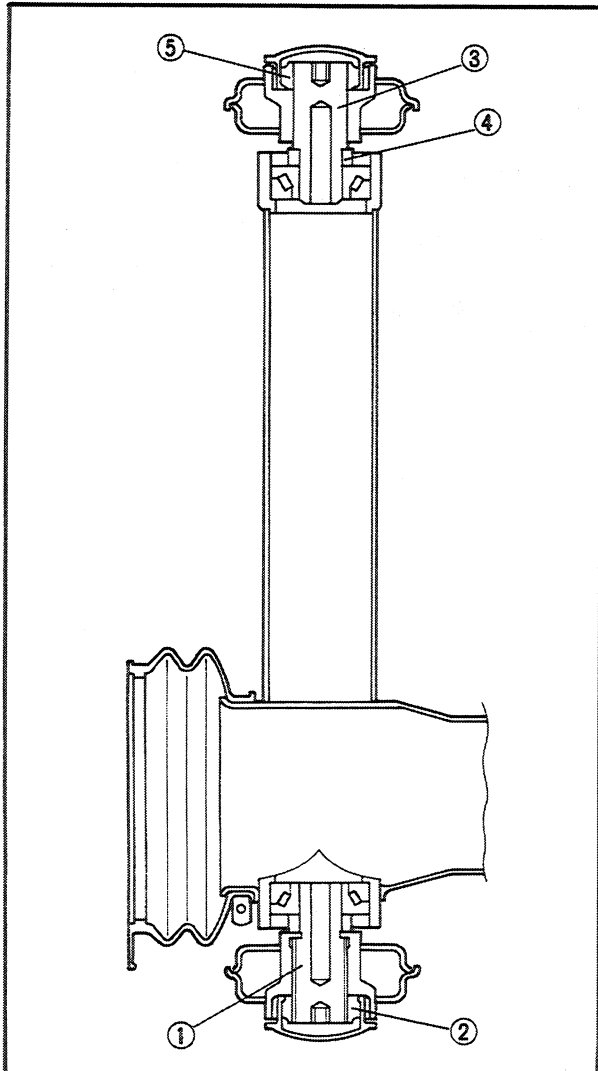


2. Apply:
 - Adhesive (for rubber)
 - To the swingarm end ①.
3. Install:
 - Rubber boot ②


NOTE: _____
 Be sure to position the rubber boot so that the tang ③ faces downward.

4. Install:
 - Swingarm
 - Pivot shafts


5. Tighten:
 - Pivot shafts




Pivot shaft tightening steps:
 • Tighten the pivot shaft (left) ① to specification.

 **Pivot Shaft (Left):**
 6 Nm (0.6 m·kg, 4.3 ft·lb)


• Tighten the locknut (left) ② to specification.

 **Locknut (Left):**
 130 Nm (13.0 m·kg, 94 ft·lb)

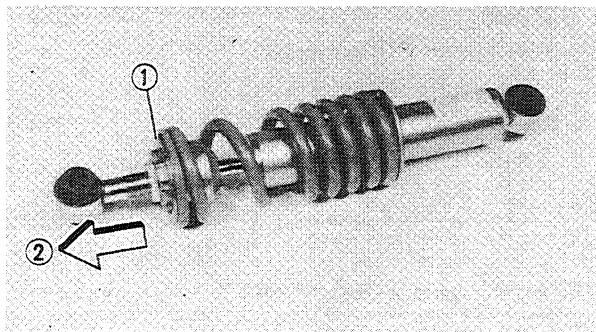
• Tighten the pivot shaft (right) ③ until it contacts the collar ④.

 **Pivot Shaft (Right):**
 6 Nm (0.6 m·kg, 4.3 ft·lb)

• Tighten the locknut (right) ⑤ to specification.

 **Locknut (Right):**
 130 Nm (13.0 m·kg, 94 ft·lb)

6. Check:
 - Swingarm (side play)
 - Swingarm (vertical movement)
 - Refer to "FREE PLAY INSPECTION" section.
7. Apply:
 - Lithium base grease
 - To the bolt (rear shock absorber) and pin (rear shock absorber).



8. Install:

- Rear shock absorber

NOTE:

The rear shock absorber should be installed so that the spring seat ① on the shock absorber faces downward ②.

9. Tighten:

- Bolts (rear shock absorbers)



Rear Shock Absorbers:
25 Nm (2.5 m·kg, 18 ft·lb)

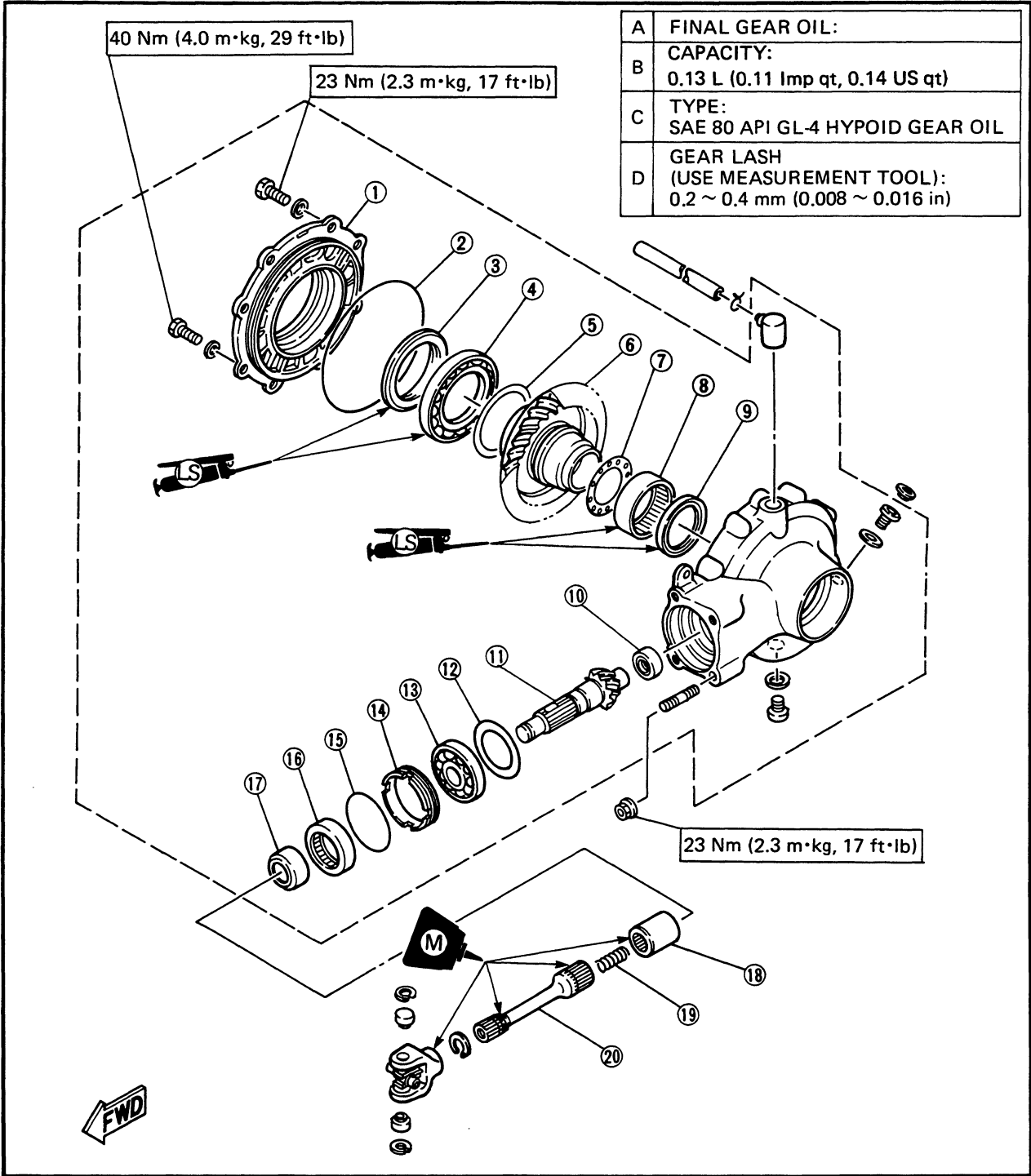
10. Install:

- CDI unit
- Side covers (Left and right)
- Rear fender
- Rear axle
- Rear wheel hubs
- Rear wheels

Refer to "REAR WHEEL AND REAR AXLE – INSTALLATION" section.

SHAFT DRIVE

- ① Bearing housing
- ② O-ring
- ③ Oil seal
- ④ Bearing
- ⑤ Ring gear shim
- ⑥ Ring gear
- ⑦ Thrust washer
- ⑧ Bearing
- ⑨ Oil seal
- ⑩ Bearing
- ⑪ Drive pinion gear
- ⑫ Final drive gear shim
- ⑬ Bearing
- ⑭ Bearing retainer
- ⑮ O-ring
- ⑯ Oil seal
- ⑰ Collar
- ⑱ Coupling gear
- ⑲ Spring
- ⑳ Drive shaft
- ㉑ Circlip
- ㉒ Universal joint
- ㉓ Bearing





TROUBLESHOOTING

The following conditions may indicate damage shaft drive components:

Symptoms	Possible Causes
<ol style="list-style-type: none"> 1. A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (This must not be confuse with engine surging or tansmission characteristics.) 2. A "rolling rumble" noticeable at low speed; a high-piched whine; a "clunk" from a shaft drive component or area. 3. A locked-up condition of the shaft drive mechanism; no power transmitted from engine to rear wheel. 	<ol style="list-style-type: none"> A. Bearing damage. B. Improper gear lash. C. Gear tooth damage. D. Broken drive shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G. Small foreign object lodged between moving parts.

NOTE:

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components for specific inspection.

**Inspection Notes**

1. Investigate any unusual noises

The following "Noises" may indicate a mechanical defect:

- A "rolling rumble" noise during coasting, acceleration, or deceleration. The noise increases with rear wheel speed, but it does not increase with higher engine or transmission speeds.

Diagnosis: Possible wheel bearing damage.

- A "whining" noise that varies with acceleration and deceleration.

Diagnosis: Possible incorrect reassembly, too-little gear lash.

⚠ CAUTION:

Too-little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.

- A slight "thunk" evident at low speed operation. This noise must be distinguished from normal machine operation.

Diagnosis: Possible broken gear teeth.

⚠ WARNING:

Stop riding immediately if broken gear teeth are suspected. This condition could result in a locking-up of the shaft drive assembly, causing loss of control of the bike and possible injury to the rider.

2. Inspect:

- Drained oil

Drain plug shows large amount of metal.

Particles → Check bearing for seizure.

NOTE:

A small amount of metal particles in the oil is normal.

3. Inspect:

- Oil leakage

By the following inspection steps.

**Oil leakage inspection steps:**

- Clean the entire motorcycle thoroughly, then dry it.
- Apply a leak-localizing compound or dry powder spray to the shaft drive.
- Road test the motorcycle for the distance necessary to locate the leak.

Leakage → Inspect component housing, gasket, and/or seal for damage.

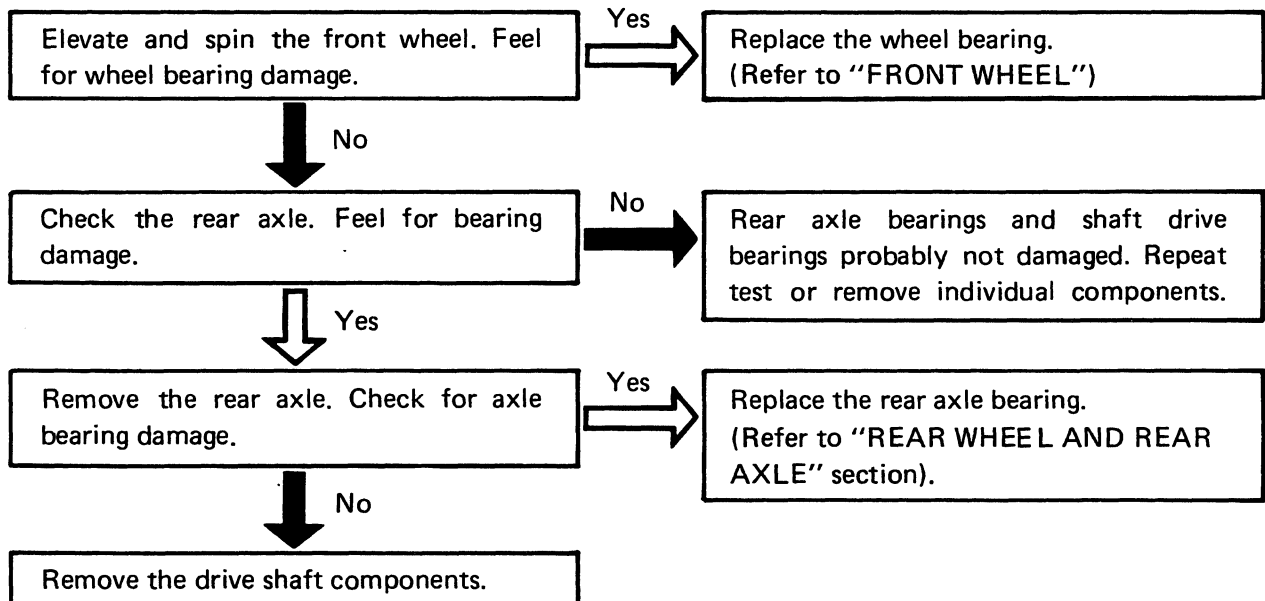
Damage → Replace component.

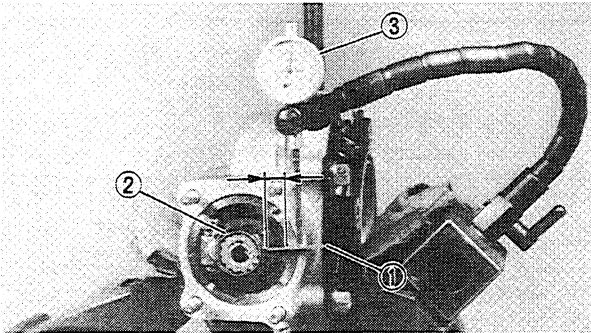
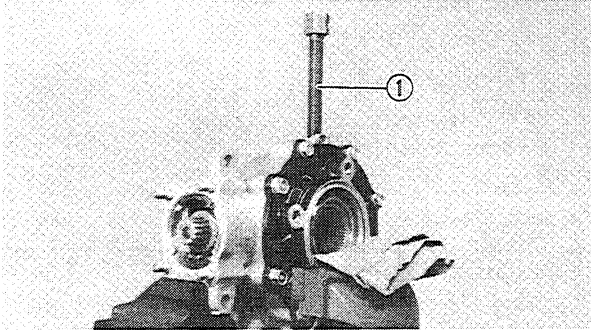
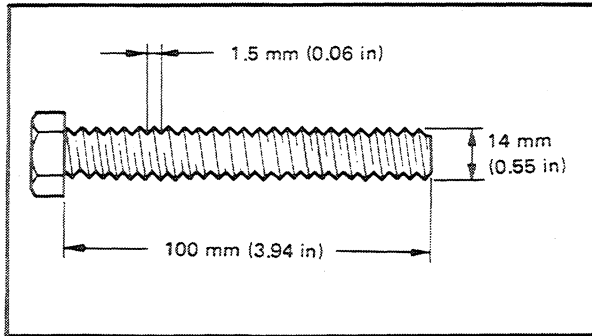
NOTE:

- An apparent oil leak on a new or nearly new machine may be the result of a rest-preventative coating or excessive seal lubrication.
- Always clean the machine and recheck the suspected location of an apparent leakage.

Troubleshooting Chart

When basic condition "a" and "b" above exist, check the following points:





FINAL DRIVE GEAR

Gear Lash Measurement

1. Secure the gear case in a vise or other support.
2. Remove:
 - Drain plug
 - Drain the oil.
3. Install:
 - A specified bolt ①
 - Into the drain plug hole.
4. Finger tighten the bolt until it holds the ring gear.

NOTE:

Do not over tighten the bolt; finger-tight is sufficient.

5. Attach:

- Gear Lash Measurement Tool ①
- Roll the rubber band ② around the coupling gear.
- Dial Gauge ③



Gear Lash Measurement Tool:

P/N YM-01230

P/N 90890-01230

Dial Gauge:

P/N YM-03097

P/N 90890-03097

④ Measuring point

6. Measure:

- Gear lash
- Gently rotate the gear coupling from engagement to engagement.
- Over specified limit → Adjust.



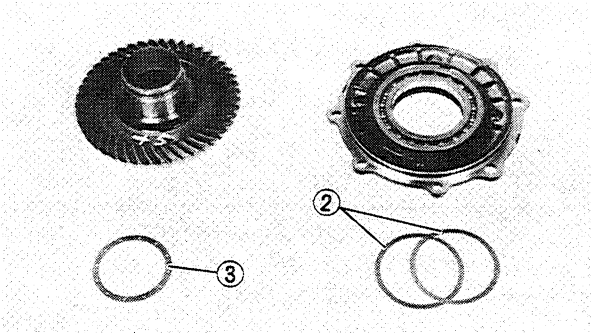
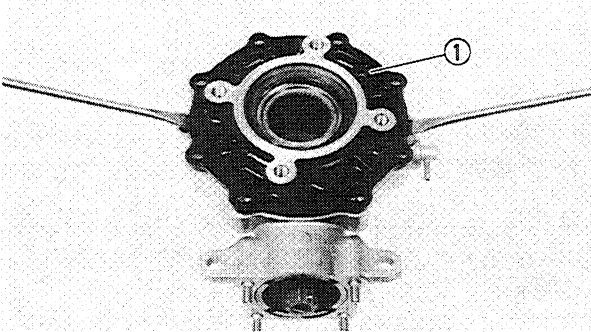
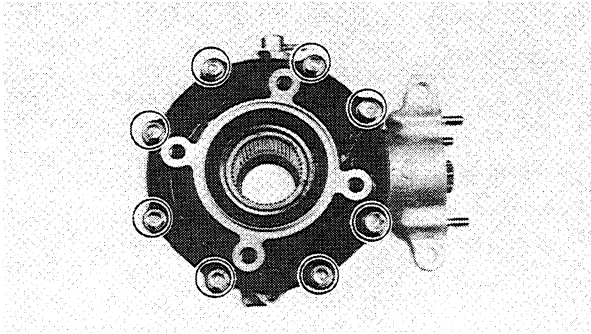
Final Gear Lash

(Using Measurement Tool):

0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

NOTE:

Measure the gear lash at ④ positions. Rotate the shaft 90° each time.



Gear Lash Adjustment

1. Remove:

- 8 mm bolts (bearing housing)
- 10 mm bolts (bearing housing)

NOTE:

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

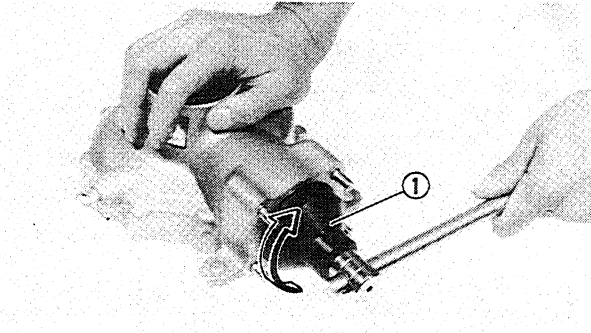
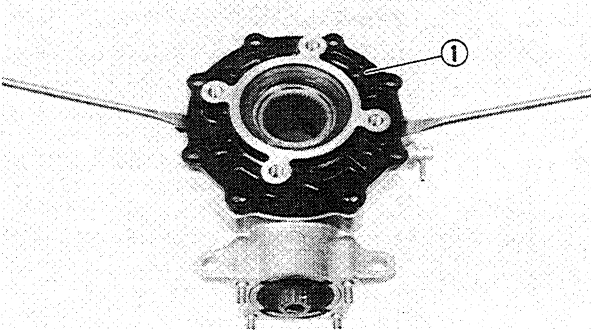
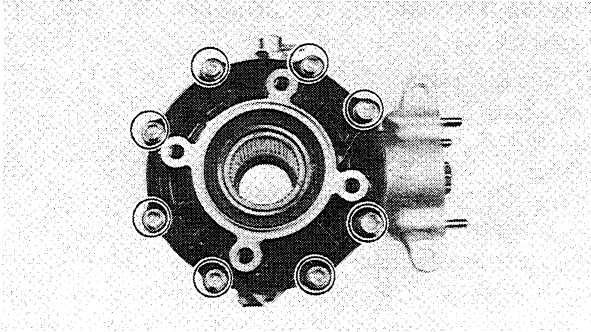
2. Remove:

- Bearing housing ①
- Ring gear
- Shim(s) ②
- Thrust washer ③

3. Adjust:

- Gear lash

Gear lash adjustment steps:	
• Select the suitable shims and thrust washer by the following chart.	
Too-little gear lash → Reduce shim thickness. Too-large gear lash → Increase shim thickness.	
To Add or Reduce Ring Gear Shim Thickness	
Increase by more than 0.1 mm (0.004 in)	Reduce by more than 0.1 mm (0.004 in)
↓ Reduce thrust washer thickness by 0.1 mm (0.004 in) for every 0.1 mm of ring gear shim increase.	↓ Reverse procedure
Ring Gear Shim	
Thickness (mm)	0.25 0.30 0.35 0.40 0.45 0.50
Thrust Washer	
Thickness (mm)	1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1



Final Drive Gear Disassembly

1. Remove:

- 8 mm bolts (bearing housing)
- 10 mm bolt (bearing housing)

NOTE:

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

2. Remove:

- Bearing housing ①
- Shim(s)
- Thrust washer

3. Remove:

- Coupling gear
- Bearing retainer (final drive shaft)
Use a Final Drive Shaft Bearing Retainer Wrench ①.



Final Drive Shaft Bearing Retainer Wrench:

P/N YM-33214

P/N 90890-04077

⚠ CAUTION:

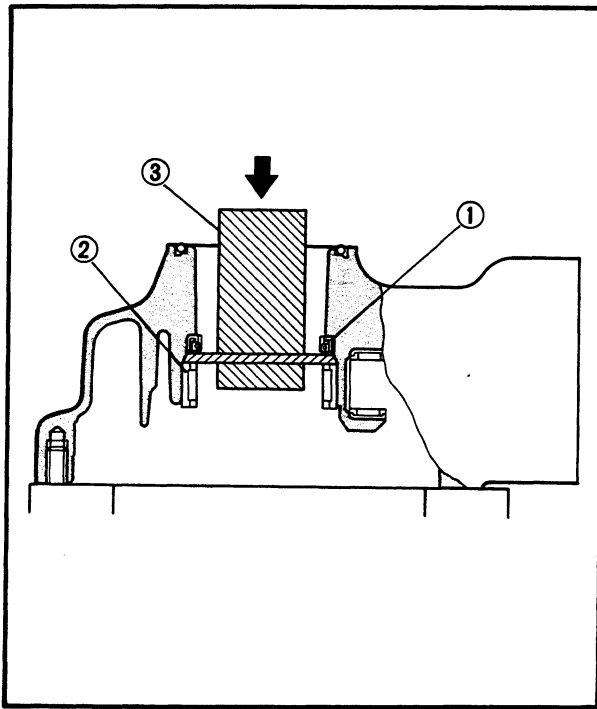
Final-drive-shaft-bearing-retainer has left-hand threads. Turn retainer clockwise to loosen it.

4. Remove:

- Final drive pinion gear assembly
Tap lightly on the final drive pinion gear end with a soft hammer.

⚠ CAUTION:

Final drive pinion gear removal should be performed only if gearing replacement is necessary. Do not reuse bearings or races after removal.



Bearing Removal and Reassembly

1. Remove:

- Oil seal ①
- Roller bearing ②

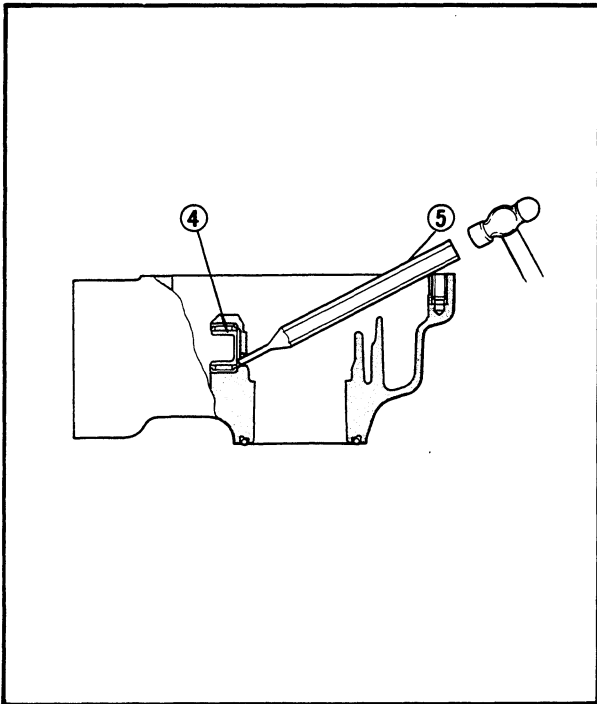
Use a suitable press tool ③ and an appropriate support for the main housing.

2. Inspect:

- Roller bearing
- Damage → Replace.

NOTE:

Reuse of roller bearing OK, but Yamaha recommends installation of new bearing. Do not reuse the oil seal.



3. Remove:

- Final drive shaft roller bearing ④
- By the following removal steps.

Final drive shaft roller bearing removal steps:

- Heat the bare housing to 150°C (302°F)
- Remove the roller bearing outer race with an appropriately shaped punch ⑤.
- Remove the inner race from the final drive shaft.

NOTE:

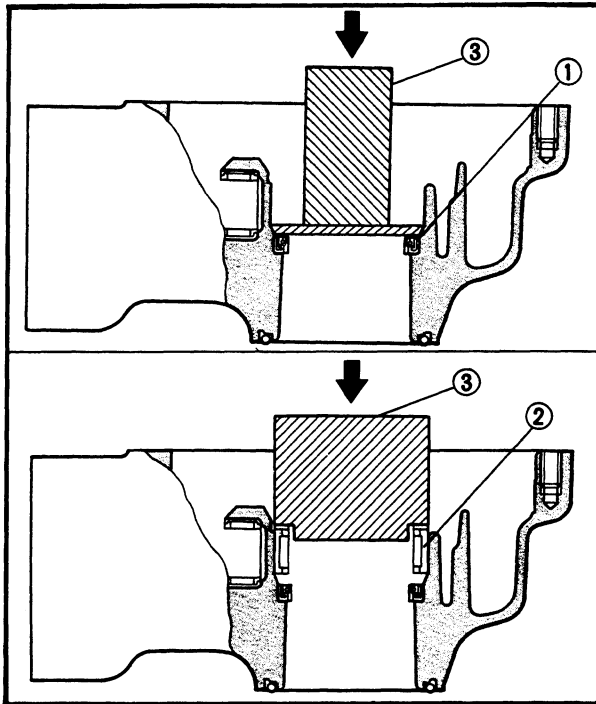
The removal of the final drive shaft roller bearing is difficult and seldom necessary.

4. Install:

- Rear final drive shaft roller bearing (new)
- By the following installation steps.

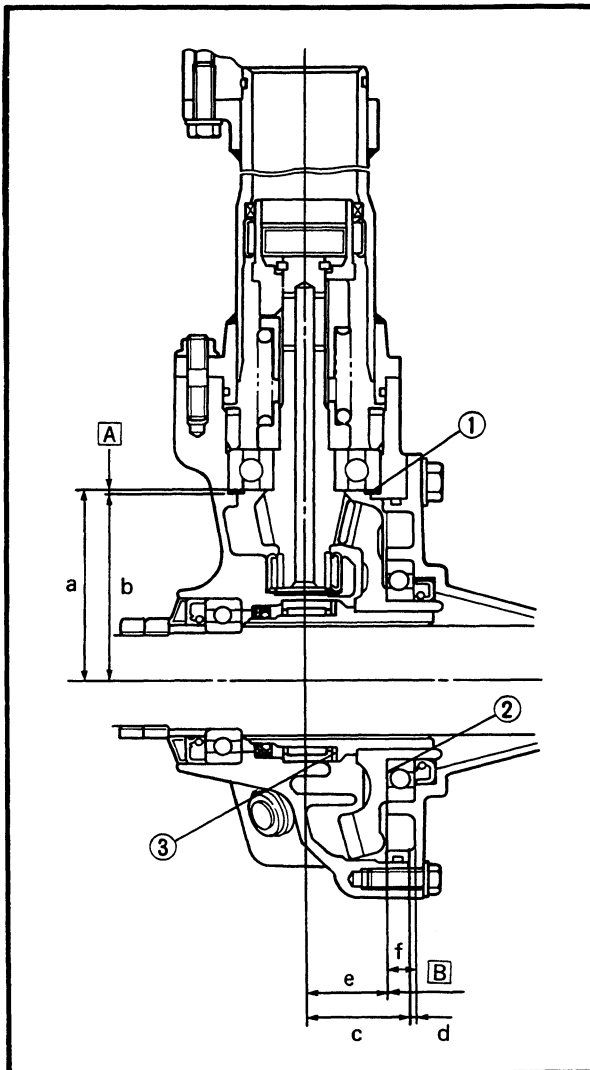
Final drive shaft roller bearing installation steps:

- Heat the bare bearing to 150°C (302°F)
- Install the roller bearing outer race using the proper adapted.
- Install the inner race onto the drive shaft.



5. Install:

- Oil seal (new) ①
 - Roller bearing (outer race) ②
- Use a suitable press tool ③ and a press to install the above components into the main housing.



Final Drive/Ring Gear Positioning

NOTE:

Gear positioning is necessary when any of the following parts are replaced:

- Final gear case
- Ring gear bearing housing
- Bearing(s)

1. Select:

- Final drive gear shim ①
- Ring gear shim ②

By the following selection steps.

Final drive/ring gear shim selection steps:

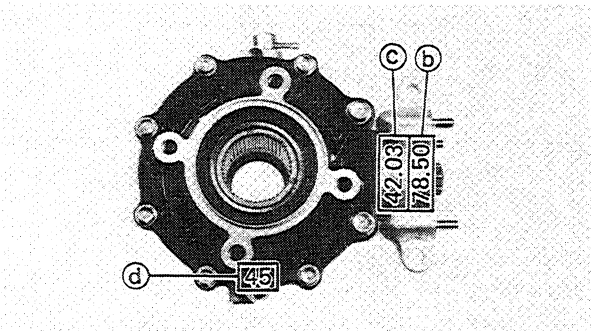
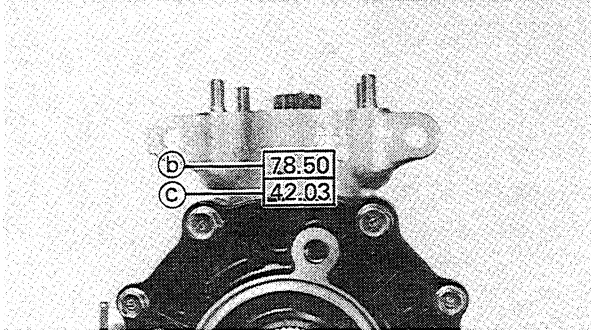
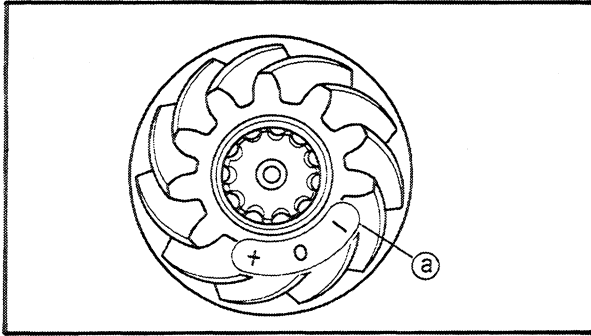
- Position final drive shaft gear and ring gear by using shims ① and ② with their respective thicknesses calculated from information marked on final gear case and drive gear end.

- ① Shim thickness "A"
- ② Shim thickness "B"
- ③ Thrust washer

- To find shim thickness "A" use following formula:

Final Drive Gear Shim Thickness:

$$A = a - b$$



Where:

Ⓐ = a numeral (usually a decimal number) on the gear is either added to or subtracted from "79".

Ⓑ = a numeral on the gear case (i.e. 78.50)

Example:

1) If final drive shaft gear is marked "+01" ... "Ⓐ" is 79.01.

2) If the gear case is marked "78.50" ... "Ⓑ" is 78.50.

$$A = 79.01 - 78.50 = 0.51$$

3) Therefore, shim thickness is 0.51 mm.

Shim sizes are supplied in following thicknesses:

	Final Drive Gear Shim	
Thickness (mm)	0.15	0.30
	0.40	0.50
	0.60	

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

In the example above, the calculated shim thickness is 0.51 mm. The chart instructs you, however, to round off the 1 to 0. Thus you should use a 0.50 mm shim.

• To find shim thickness "B", use following formula:

Ring Gear Shim Thickness:

$$B = \text{Ⓒ} + \text{Ⓓ} - (\text{Ⓔ} + \text{Ⓕ})$$

Where

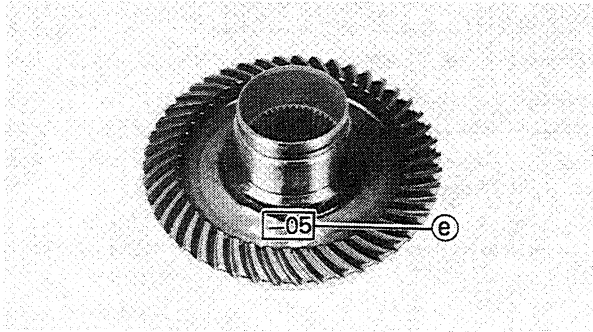
Ⓒ = numeral on gear case (i. e. 42.03)

Ⓓ = numeral (usually a decimal number) on outside of ring gear bearing housing and added to 2.

Ⓔ = numeral (usually a decimal number) on inside of ring gear either added to or subtracted from 33.00.

Ⓕ = bearing thickness (considered constant).

Bearing Thickness "Ⓕ" = 11.00 mm



Example:

- 1) If gear case is marked "42.03" ... "©" is 42.03.
- 2) If ring gear bearing housing is marked "45" ... "ⓓ" is $0.45 + 2 = 2.45$.
- 3) If ring gear is marked "-05" ... "ⓔ" is $33.00 - 0.05 = 32.95$.
- 4) "ⓕ" is 11.00.

$$B = \text{©} + \text{ⓓ} - (\text{ⓔ} + \text{ⓕ})$$

$$= 42.03 + 2.45 - (32.95 + 11.0)$$

$$= 44.48 - (43.95)$$

$$= 0.53$$
- 5) Therefore, shim thickness is 0.53 mm. Shim sizes are supplied in following thickness:



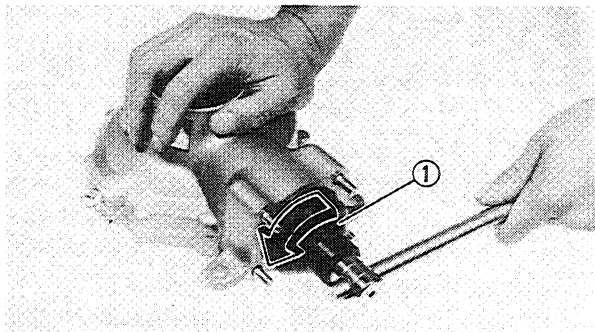
Ring Gear Shim

Thickness (mm)	0.25	0.30	0.35
	0.40	0.45	0.50

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

In the example above, the calculated shim thickness is 0.53 mm. The chart instructs you, however, to round off the 3 to 5. Thus you should use a 0.50 mm shims.



2. Install:

- Shims (proper size as calculated)
 - Final drive pinion gear assembly
 - Bearing retainer (final drive shaft)
- Use a Final Drive Shaft Bearing Retainer Wrench ①.



Final Drive Shaft Bearing Retainer Wrench:
 P/N YM-33214
 P/N 90890-04077

**NOTE:**

The bearing retainer has left-hand threads; turn retainer counterclockwise to tighten it.



Bearing Retainer:
100 Nm (10.0 m·kg, 72 ft·lb)

3. Install:

- Coupling gear
- Ring gear assembly (without thrust washer)

4. Adjust:

- Gear lash

Refer to "Gear Lash Measurement and Adjustment" section.

5. Measure/Select:

- Ring gear thrust clearance

Thrust clearance measurement steps:

- Remove the ring gear assembly.
- Place four pieces of Plastigage® between originally fitted thrust washer and ring gear.
- Install the ring gear assembly and tighten the bolts to specification.



10 mm Bolts (Bearing housing):
23 Nm (2.3 m·kg, 17 ft·lb)

10 mm Bolt (Bearing housing):
40 Nm (4.0 m·kg, 29 ft·lb)

NOTE:

Do not turn the shaft drive and ring gear when measuring clearance with Plastigage®.

- Remove the ring gear assembly.
- Measure the thrust clearance. Calculate width of flattened Plastigage® ①.

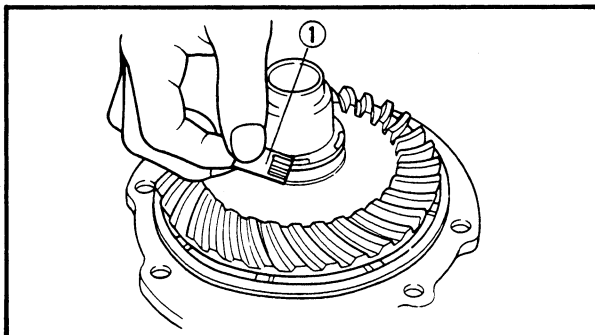


Ring Gear Thrust Clearance:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

- If the correct clearance, install the ring gear assembly.
- If the out of specification, select the correct washer.

Thrust washer selection steps:

- Select the suitable thrust washer by the following chart.





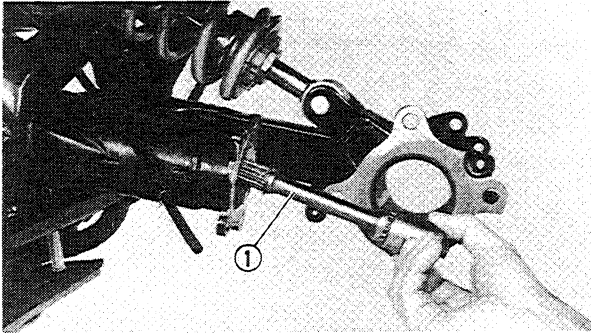
Thrust Washer

Thickness (mm)	1.2	1.3	1.4
	1.5	1.6	1.7
	1.8	1.9	2.0
	2.1		

- Repeat measurement steps until the ring gear thrust clearance is within the specified limits.



Ring Gear Thrust Clearance:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)



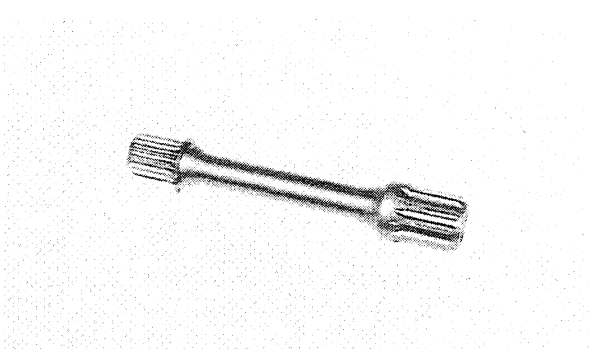
DRIVE SHAFT

Removal

1. Remove:
 - Rear wheel
 - Final gear assembly
 - Drive shaft ①

Inspection

1. Inspect:
 - Drive shaft splines
 Wear/Damage → Replace.



Installation

When installing the drive shaft, reverse the removal procedure. Note the following points.

1. Lubricate:
 - Shaft splines



Molybdenum Disulfide Grease

2. Install:


- Drive shaft

NOTE: _____

Before installing, first set the universal joint in place on the middle case side.

3. Apply:


- Sealant (Quick Gasket® or Yamaha Bond No. 1215)

	Sealant (Quick Gasket®): ACC-11001-05-01 Yamaha Bond No. 1215 90890-85505
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To the mating surfaces of both case halves.

4. Tighten:

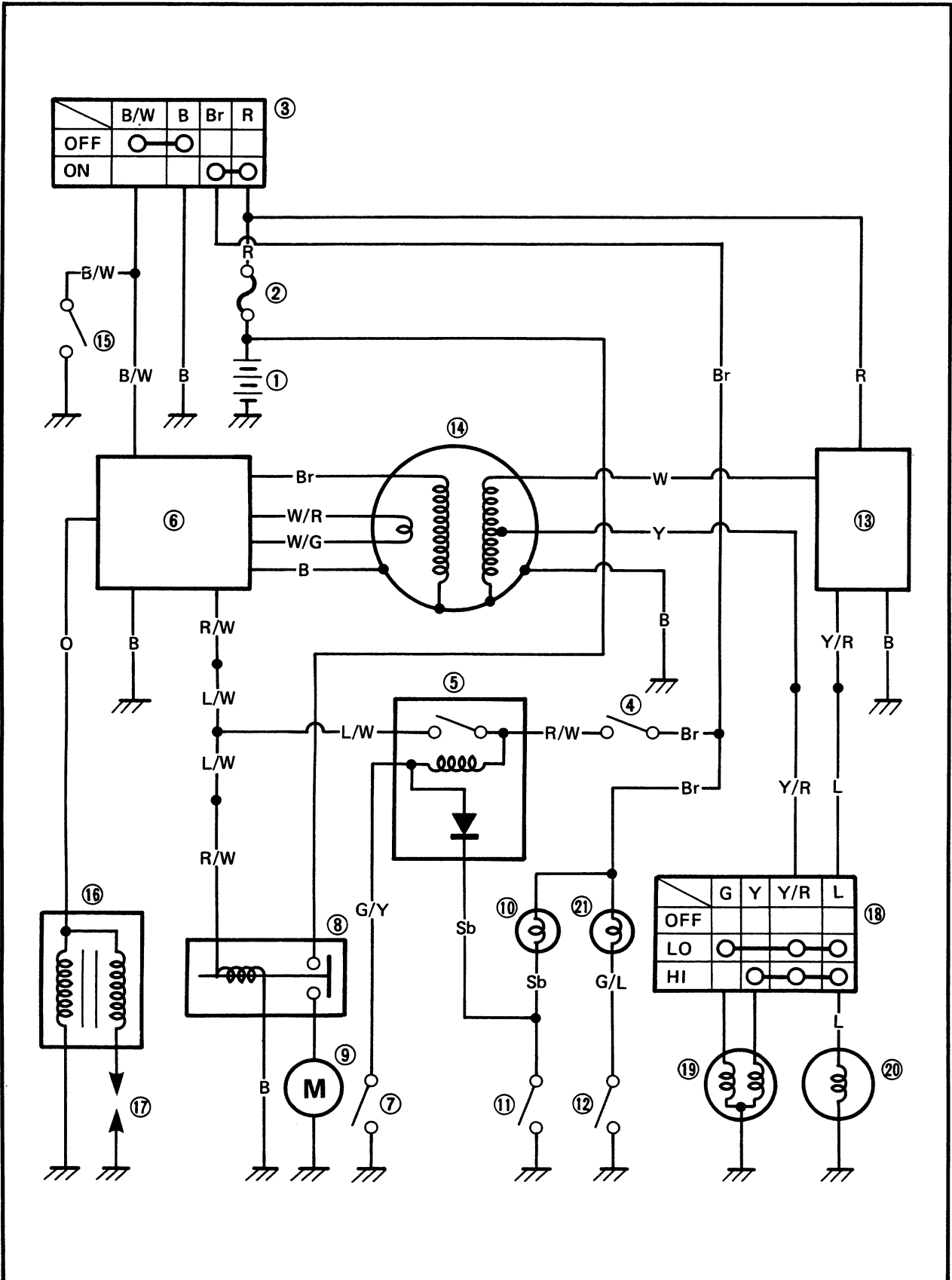
- Nuts (final gear case)

	Nuts (Final Gear Case): 23 Nm (2.3 m·kg, 17 ft·lb)
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ELECTRICAL

YFM200DXW CIRCUIT DIAGRAM



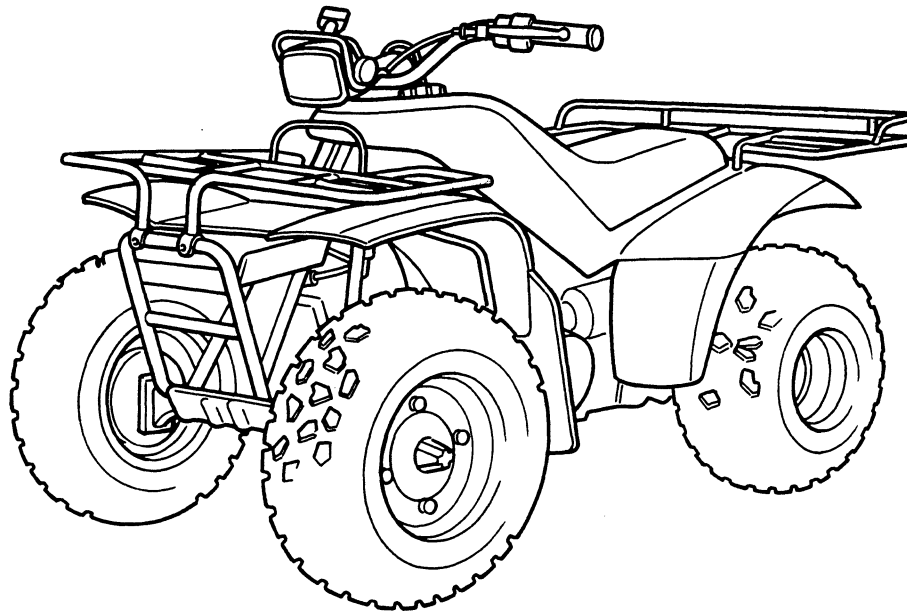
7



- ① Battery
- ② Main fuse
- ③ Main switch
- ④ Starter switch
- ⑤ Starting circuit cut-off relay
- ⑥ CDI unit
- ⑦ Brake switch
- ⑧ Starter relay
- ⑨ Starter motor
- ⑩ Neutral indicator
- ⑪ Neutral switch
- ⑫ Reverse switch
- ⑬ Rectifier/Regulator
- ⑭ CDI Magneto
- ⑮ "ENGINE STOP" switch
- ⑯ Ignition coil
- ⑰ Spark plug
- ⑱ "LIGHTS" (Dimmer) switch
- ⑲ Headlight
- ⑳ Taillight
- ㉑ Reverse indicator

COLOR CODE

B	.....	.Black
Br.	.....	.Brown
G	.....	.Green
L	.....	.Blue
O	.....	.Orange
R	.....	.Red
Sb	.....	.Skyblue
W	.....	.White
Y	.....	.Yellow
B/W	.....	.Black/White
G/L	.....	.Green/Blue
G/Y	.....	.Green/Yellow
L/W	.....	.Blue/White
R/W	.....	.Red/White
Y/R	.....	.Yellow/Red
W/G	.....	.White/Green
W/R	.....	.White/Red

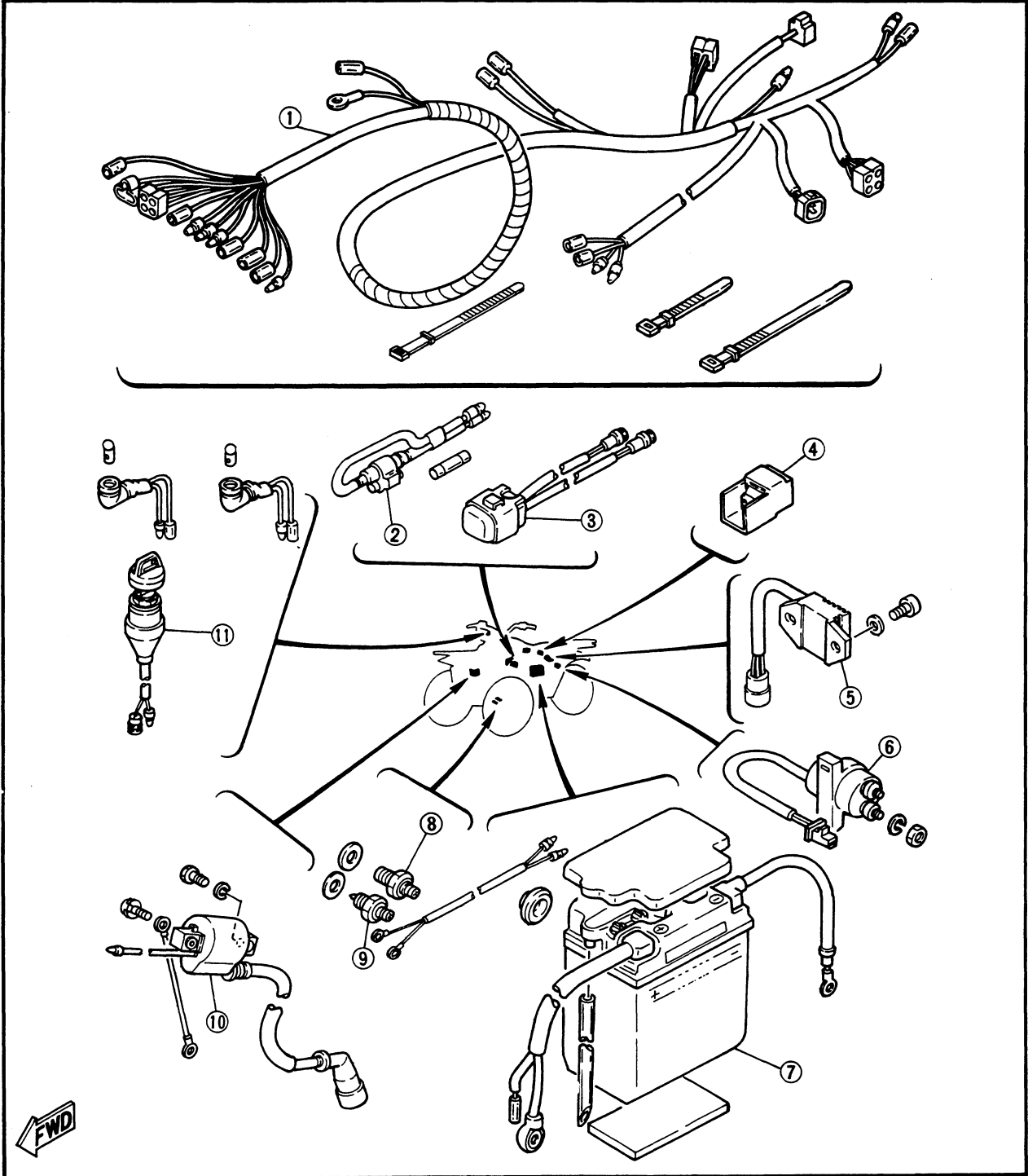


ELECTRICAL COMPONENTS

- ① Wireharness
- ② Fuse
- ③ CDI unit
- ④ Starting circuit cut-off relay
- ⑤ Rectifier with regulator
- ⑥ Starter relay
- ⑦ Battery
- ⑧ Neutral switch
- ⑨ Reverse switch
- ⑩ Ignition coil
- ⑪ Main switch

IGNITION COIL:
 PRIMARY COIL RESISTANCE:
 0.72 ~ 0.89Ω at 20°C (68°F)
 SECONDARY COIL RESISTANCE:
 5.02 ~ 6.79 kΩ at 20°C (68°F)

BATTERY:
 CAPACITY:
 12V 14AH
 SPECIFIC GRAVITY:
 1.280



CHECKING OF SWITCHES

Check the switches for the continuity between the terminals to determine correct connection.

Read the following for switch inspection.

SWITCH CONNECTION AS SHOWN IN MANUAL

The manual contains a connection chart as shown left showing the terminal connections of the switches (e.g., main switch, handlebar switch, brake switch, lighting switch, etc.)

The extreme left column indicates the switch positions and the top line indicates the colors of leads connected with the terminals in the switch component.

	B	B/W	R	Br	L/W	L/R
ON			○—○		○—○	
OFF	○—○					
LOCK	○—○					
P	○—○		○—○			○—○

“○—○” indicates the terminals between which there is a continuity of electricity; i.e., a closed circuit at the respective switch positions.

In this chart:

“R and Br” and “L/W and L/R” are continuous with the “ON” switch position.

“B and B/W” is continuous with the “OFF” switch position.

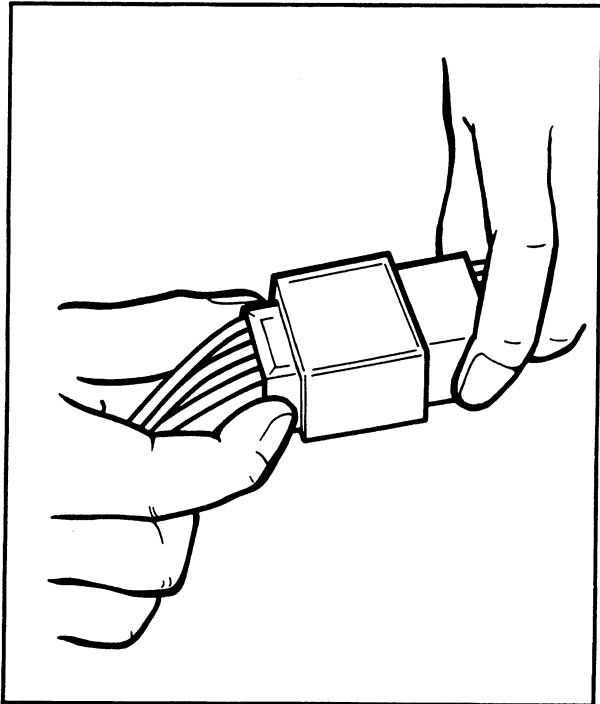
“B and B/W” is continuous with the “LOCK” switch position.

“B and B/W” and “R and L/R” are continuous with the “P” switch position.

CHECKING SWITCH FOR TERMINAL CONNECTION

Before checking the switch, refer to the connection chart as shown above and check for the correct terminal connection (closed circuit) by the color combination.

To explain how to check the switch, a main switch is taken for example in the following.



1. Disconnect the main switch coupler from the wireharness.

CAUTION:

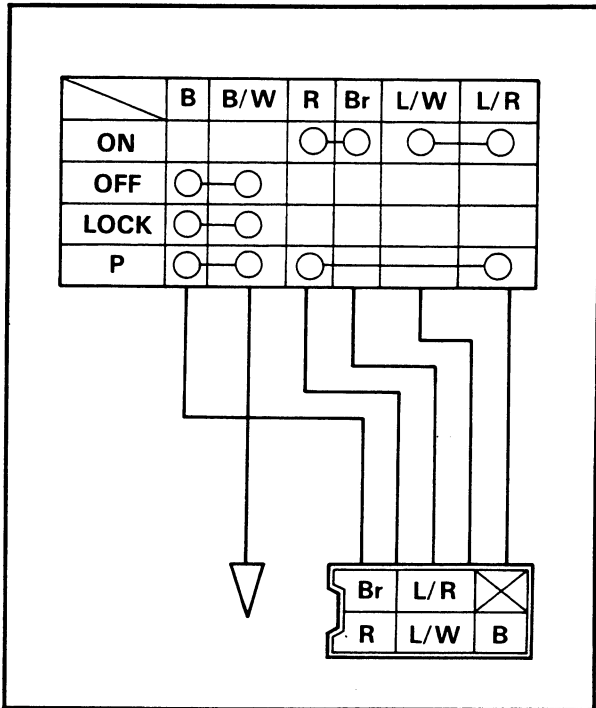
Never disconnect the main switch coupler by pulling the leads. Otherwise, leads may be pulled off the terminals inside the coupler.

2. Inspect whether any lead is off the terminal inside the coupler. If it is, repair it.

NOTE:

If the coupler is clogged with mud or dust, blow it off by compressed air.

3. Use the connection chart to check the color combination for continuity (a closed circuit). In this example, the continuity is as follows.



“R and Br” and “L/W and L/R” are continuous with the “ON” switch position.

“B and B/W” is continuous with the “OFF” switch position.

“B and B/W” is continuous with the “LOCK” switch position.

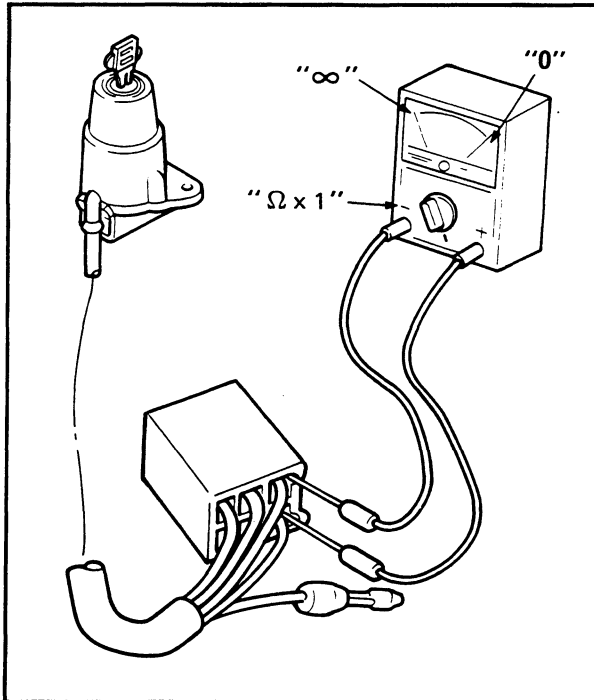
“B and B/W” and “R and L/R” are continuous with the “P” switch position.

Please note that there is no continuity (an open circuit) at all for the color combinations other than the above.

4. Check the switch component for the continuity between “R and Br”.

Checking steps:

- Turn the switch key to the “ON”, “OFF”, “LOCK”, and “P” several times.
- Set the pocket tester selector to the “ $\Omega \times 1$ ”.
- Connect the tester (+) lead to the “R” lead terminal in the coupler and the (-) lead to the “Br” lead terminal.

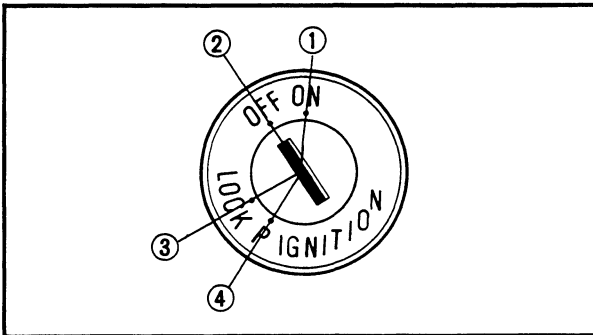
**NOTE:**

Use thin probes for checking the continuity. Otherwise, the probes may contact other terminals inside the coupler.

- Check the continuity between "R" and "Br" at the respective switch positions of "ON" ①, "OFF" ②, "LOCK" ③, and "P" ④. There must be continuity (the tester indicating "0") at the "ON" switch position, and there must be no continuity (the tester indicating "∞") at "OFF", "LOCK", or "P". There is something wrong between "R" and "Br" if there is no continuity at the "ON" position or if there is some continuity either at the "OFF" or "LOCK" or "P".

NOTE:

Check the switch for continuity several times.



5. Next go on to checking of the continuity between "B and B/W", "L/W and L/R", and "R and L/R" at the respective switch positions, as in the same manner mentioned above.

6. If there is something wrong with any one of the combinations, replace the switch component.

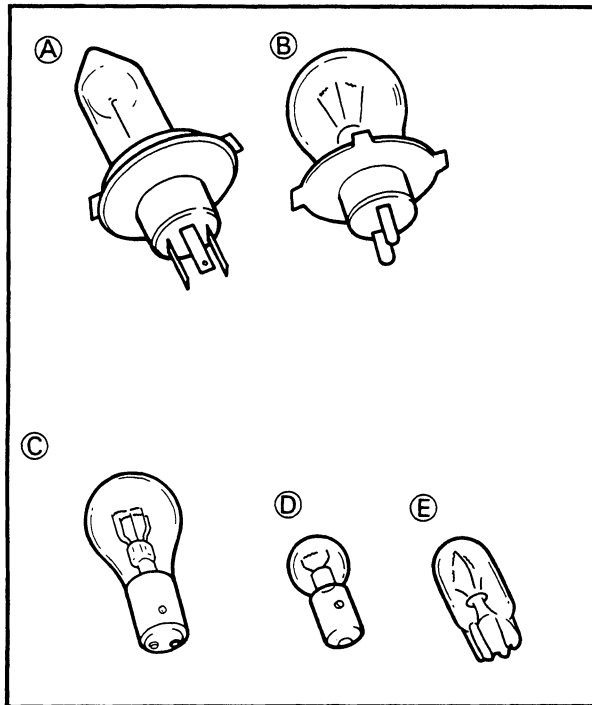


CHECKING OF BULBS (FOR HEADLIGHT, TAIL/BRAKE LIGHT, FLASHER LIGHT, METER LIGHT, ETC.)

Check the bulb terminal continuity for the condition of the bulb.

KINDS OF BULBS

The bulbs used in the machine are classified as shown left by the shape of the bulb socket.



Ⓐ and Ⓑ are mainly used for the headlight.

Ⓒ is mainly used for the flasher light and tail/brake light.

Ⓓ and Ⓔ are mainly used for the meter light and other indicator lights.

CHECKING BULB CONDITION

1. Remove the bulb.

NOTE:

- Bulbs of the Ⓐ and Ⓑ type uses a bulb holder. Remove the bulb holder before removing the bulb itself. Most of the bulb holders for this type can be removed by turning them counter-clockwise.
- Most of the bulbs of Ⓒ and Ⓓ type can be removed from the bulb sockets by pushing and turning them counterclockwise.
- Bulbs of the Ⓔ type can be removed from the bulb sockets by simply pulling them out.

⚠ CAUTION:

Be sure to hold the socket firmly when removing the bulb. Never pull the lead. Otherwise, the lead may be pulled off the terminal in the coupler.

⚠ WARNING:

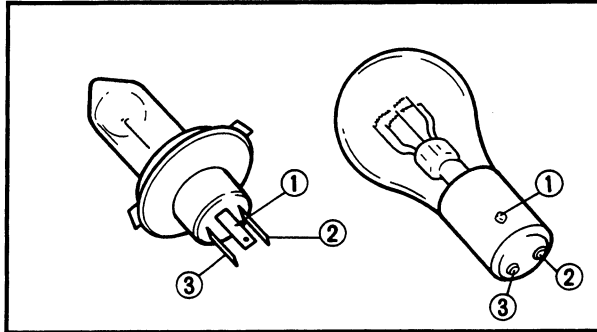
Keep flammable products or your hands away from the headlight bulb while it is on. It will be hot. Do not touch the bulb until it cools down.



2. Check the bulb terminals for continuity.

Checking steps:

- Set the pocket tester selector to the " $\Omega \times 1$ ".
- Connect the tester leads to the respective bulb terminals. Take for example a 3-terminal bulb as shown left. First check the continuity between the ① and ② terminals by connecting the tester (+) lead to the ① terminal and the tester (-) lead to the ② terminal. Then check the continuity between the ① and ③ terminals by connecting the tester (+) lead still to the ① terminal and the tester (-) lead to the ③ terminal. If the tester shows " ∞ " in either case, replace the bulb.

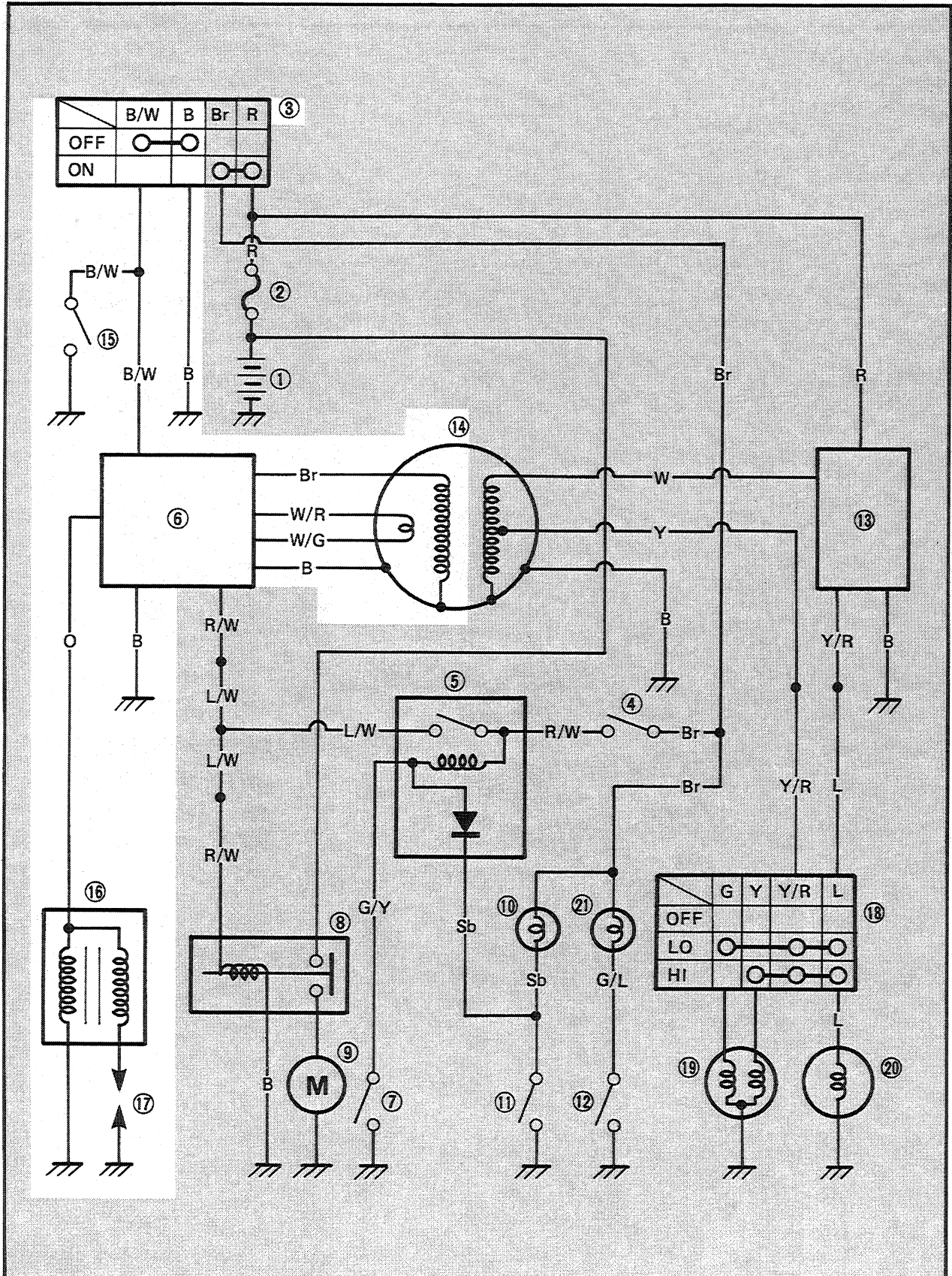


3. Check the bulb socket by installing a proven bulb to it. As in the checking of bulbs, connect the pocket tester leads to the respective leads of the socket and check for continuity in the same manner as mentioned above.



IGNITION SYSTEM

CIRCUIT DIAGRAM



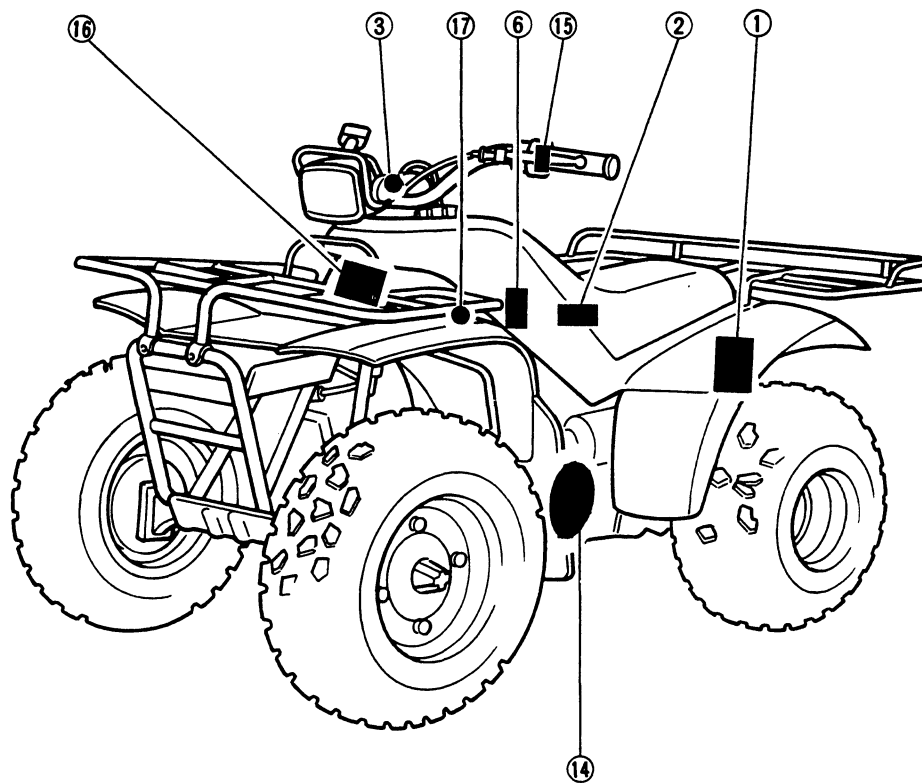


Aforementioned circuit diagram shows ignition circuit in circuit diagram.

NOTE:

For the encircled numbers and color codes, see page 7-2.

- ③ Main switch
- ⑥ CDI unit
- ⑭ CDI magneto
- ⑮ "ENGINE STOP" switch
- ⑯ Ignition coil
- ⑰ Spark plug



TROUBLESHOOTING

**IF IGNITION SYSTEM SHOULD BECOME INOPERATIVE
(NO SPARK OR INTERMITTENT SPARK)**

Procedure


Check;

- | | |
|------------------------------|--|
| 1. Spark plug | 6. "ENGINE STOP" switch |
| 2. Ignition spark gap | 7. Source coil resistance |
| 3. Spark plug cap resistance | 8. Pickup coil resistance |
| 4. Ignition coil resistance | 9. Wiring connection (Ignition system) |
| 5. Main switch | |


NOTE:

- Remove the following parts before troubleshooting.

1) Seat	4) Front fender
2) Handlebar	5) Fuel tank
3) Fuel tank cover	
- Use the following special tools in this troubleshooting.



Pocket Tester:
YU-03112
90890-03112




Dynamic Coil Tester:
YM-34487
90890-03144

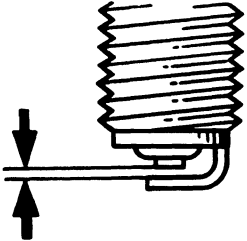
1. Spark plug

- Check the spark plug type condition and gap. Refer to the "SPARK PLUG INSPECTION" section in the CHAPTER 3.

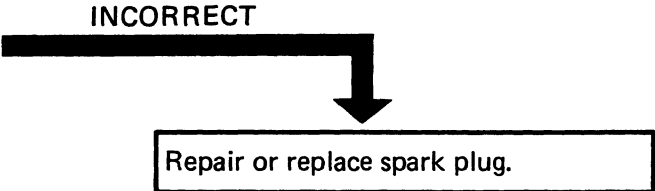
Standard Spark Plug:
For USA and Oceania:
D7ES (NGK) or X22ES-U (ND)
Except for USA and Oceania:
DR7ES (NGK)



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



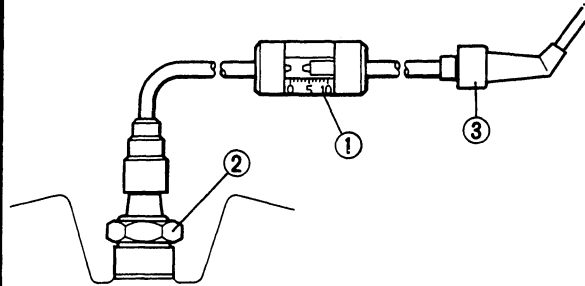
377-000





2. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the Dynamic Spark Tester ① between the spark plug ② and spark plug cap ③, and set the specified spark gap.



- Turn the main switch to "ON" and "ENGINE STOP" switch to "RUN" then, shift the gear in neutral.
- Start the engine.
- Check the ignition spark condition.



Minimum Spark Gap:
6 mm (0.24 in)

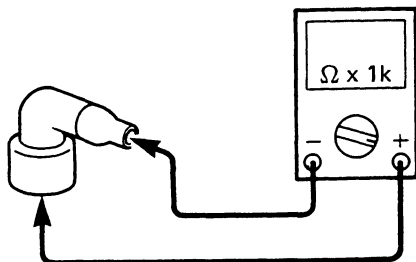
SPARK

Ignition circuit is good.

OUT OF SPECIFICATION

3. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the Pocket Tester ($\Omega \times 1k$) to the spark plug cap.



- Check the spark plug cap for specified resistance.



Spark Plug Cap Resistance:
10 k Ω at 20°C (68°F)

OUT OF SPECIFICATION

Replace spark plug cap.

MEETS SPECIFICATION

*




4. Ignition coil resistance

- Disconnect the ignition coil lead (Orange) from the wireharness.
- Connect the Pocket Tester to the ignition coil.

Primary Coil: ($\Omega \times 1$)
 Tester (+) Lead \rightarrow Orange ① Terminal
 Tester (-) Lead \rightarrow Ignition Coil Base

Secondary Coil: ($\Omega \times 1k$)
 Tester (+) Lead \rightarrow Spark Plug lead ②
 Tester (-) Lead \rightarrow Ignition Coil Base

- Measure the primary and secondary coil resistances.

 **Primary Coil Resistance A :**
 0.72 ~ 0.98 Ω at 20°C (68°F)

Secondary Coil Resistance B :
 5.02 ~ 6.79 k Ω at 20°C (68°F)

OUT OF SPECIFICATION

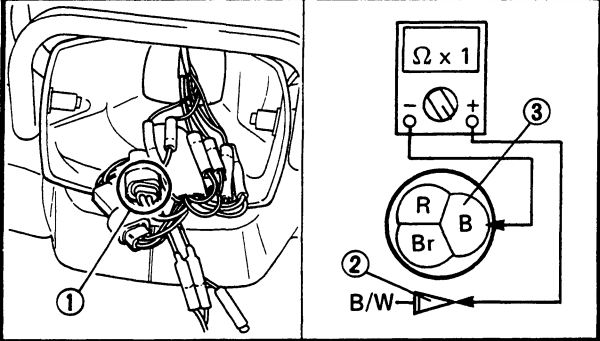
Replace ignition coil.

MEETS BOTH SPECIFICATIONS



5. Main switch

- Disconnect the main switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Black/White ② and Black ③ ". Refer to the "CHECKING OF SWITCHES" section.



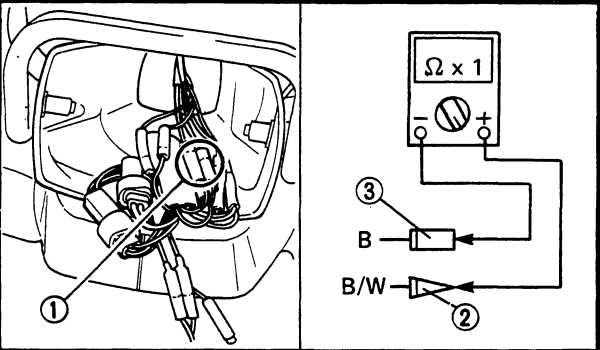
INCORRECT

Replace main switch.



6. "ENGINE STOP" switch

- Disconnect the "ENGINE STOP" switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Black/White ② and Black ③ ". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace handlebar switch.





7. Source coil resistance

- Disconnect the CDI magneto coupler ① from the wireharness.
- Connect the Pocket Tester ($\Omega \times 100$) to the source coil.

Tester (+) Lead → Brown ② Terminal
 Tester (-) Lead → Black ③ Terminal

- Measure the source coil resistance.

Source Coil Resistance:
 342.9 ~ 352 Ω at 20°C (68°F)

OUT OF SPECIFICATION

Replace source coil.

MEETS SPECIFICATION

8. Pickup coil resistance


- Disconnect the CDI magneto coupler ① from the wireharness.
- Connect the Pocket Tester ($\Omega \times 100$) to the pickup coil.

Tester (+) Lead → White/Green ② Terminal
 Tester (-) Lead → White/Red ③ Terminal

IGNITION SYSTEM



• Measure the pickup coil resistance.

 Pickup Coil Resistance:
176.4 ~ 215.6Ω at 20°C (68° F)

MEETS SPECIFICATION

9. Wiring connection

- Check the entire ignition system for connections.
- Refer to the "WIRING DIAGRAM" section.

CORRECT

CDI unit is faulty. Replace it.

OUT OF SPECIFICATION

Replace pickup coil.

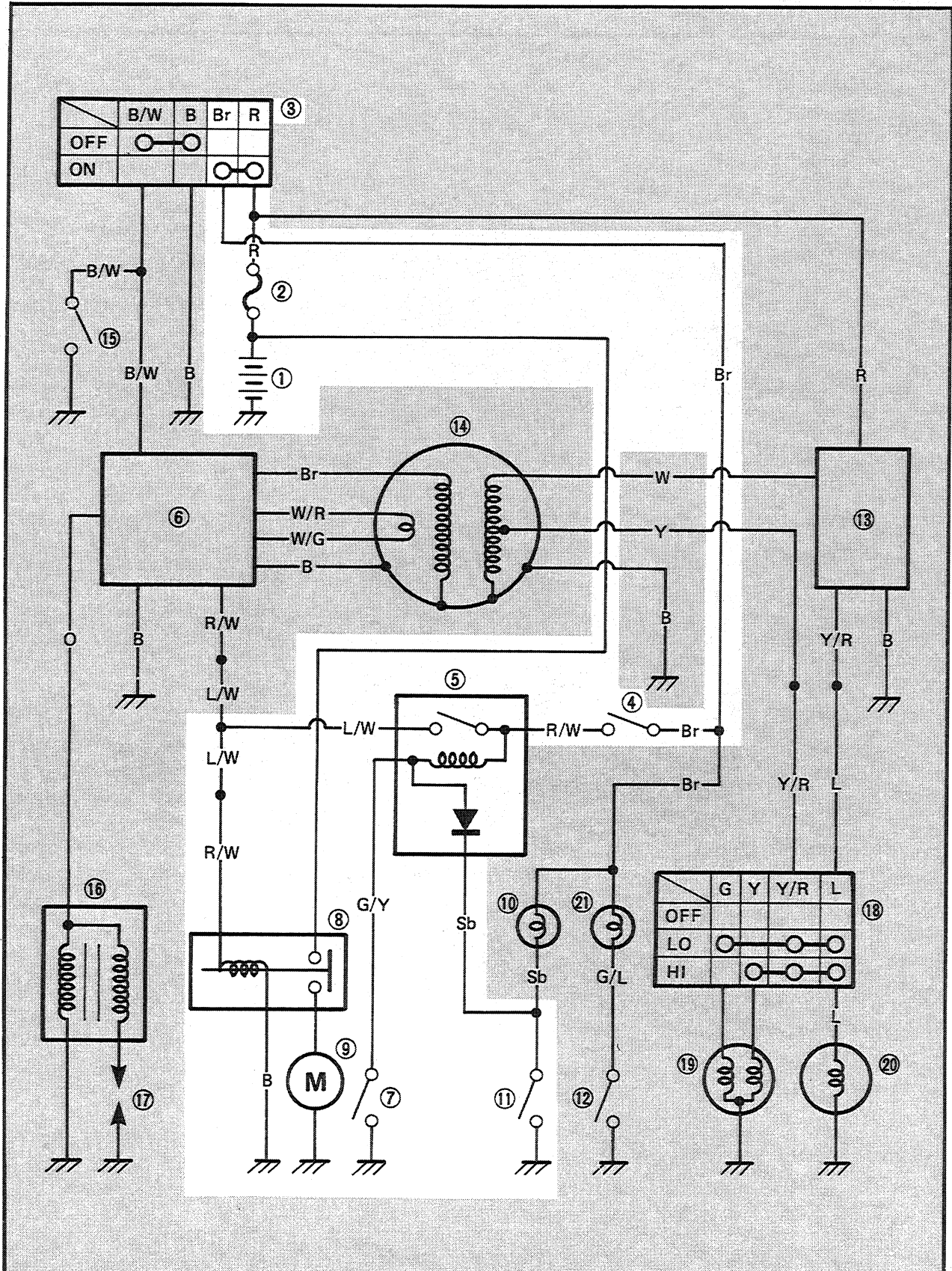
POOR CONNECTION

Correct.



ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM



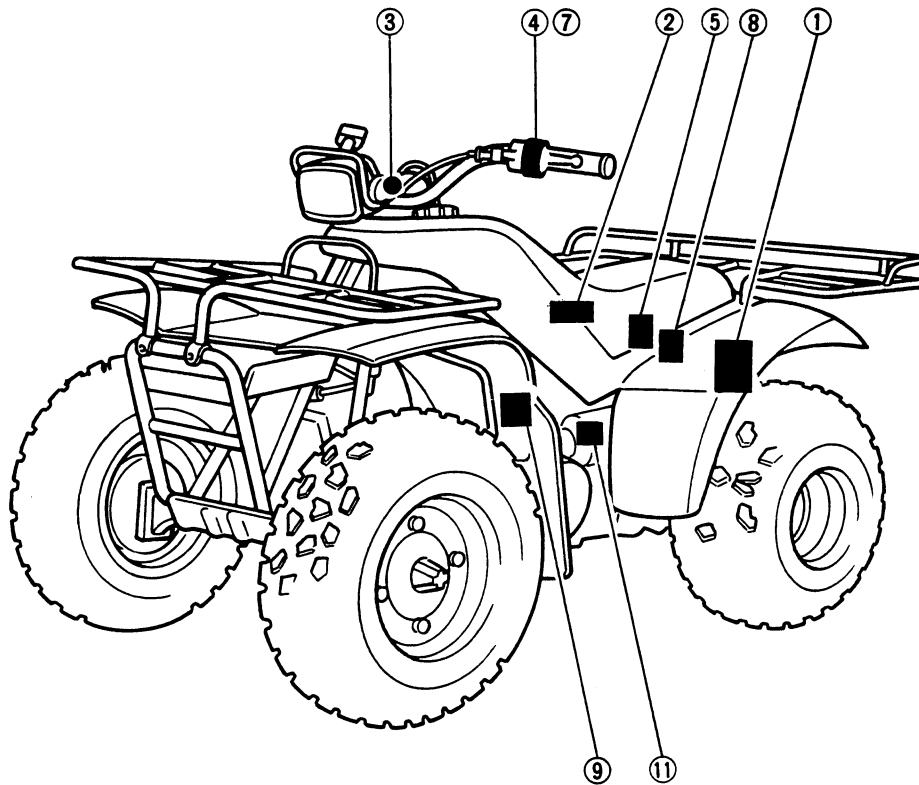


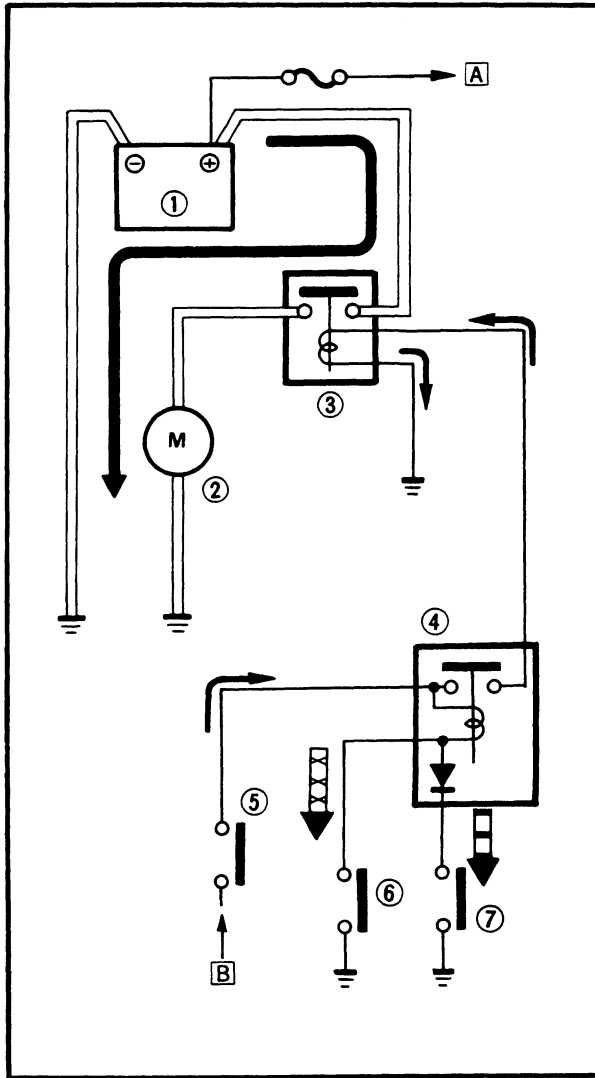
Aforementioned circuit diagram shows electrical starting circuit in circuit diagram.

NOTE:

For the color codes, see page 7-2.

- ① Battery
- ② Main fuse
- ③ Main switch
- ④ Starter switch
- ⑤ Starting circuit cut-off relay
- ⑦ Brake switch
- ⑧ Starter relay
- ⑨ Starter motor
- ⑪ Neutral switch





STARTING CIRCUIT OPERATION

The starting circuit on this model consist of the starter motor, starter relay, and the relay unit (starting circuit cut-off relay). If the engine stop switch and the main switch are both closed, the starter motor can operate only if:

The transmission is in neutral (the neutral switch is closed).

or if

The brake lever is pulled on the left handlebar (the brake switch is closed).

The starting circuit cut-off relay prevents the starter from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor.

When one of both of the above conditions have been met, however, the starting circuit cut-off relay is closed, and the engine can be started by pressing the starter switch.

- ◀ ◻ ◻ ◻ ◻ WHEN THE TRANSMISSION IS IN NEUTRAL
- ◀ ◻ ◻ ◻ ◻ WHEN THE BRAKE LEVER IS PULLED IN

- ① Battery
- ② Starter motor
- ③ Starter relay
- ④ Starting circuit cut-off relay (Relay assembly)
- ⑤ Starter switch
- ⑥ Brake switch
- ⑦ Neutral switch
- A To main switch
- B From main switch

TROUBLESHOOTING

STARTER MOTOR DOES NOT OPERATE.


Procedure

Check;

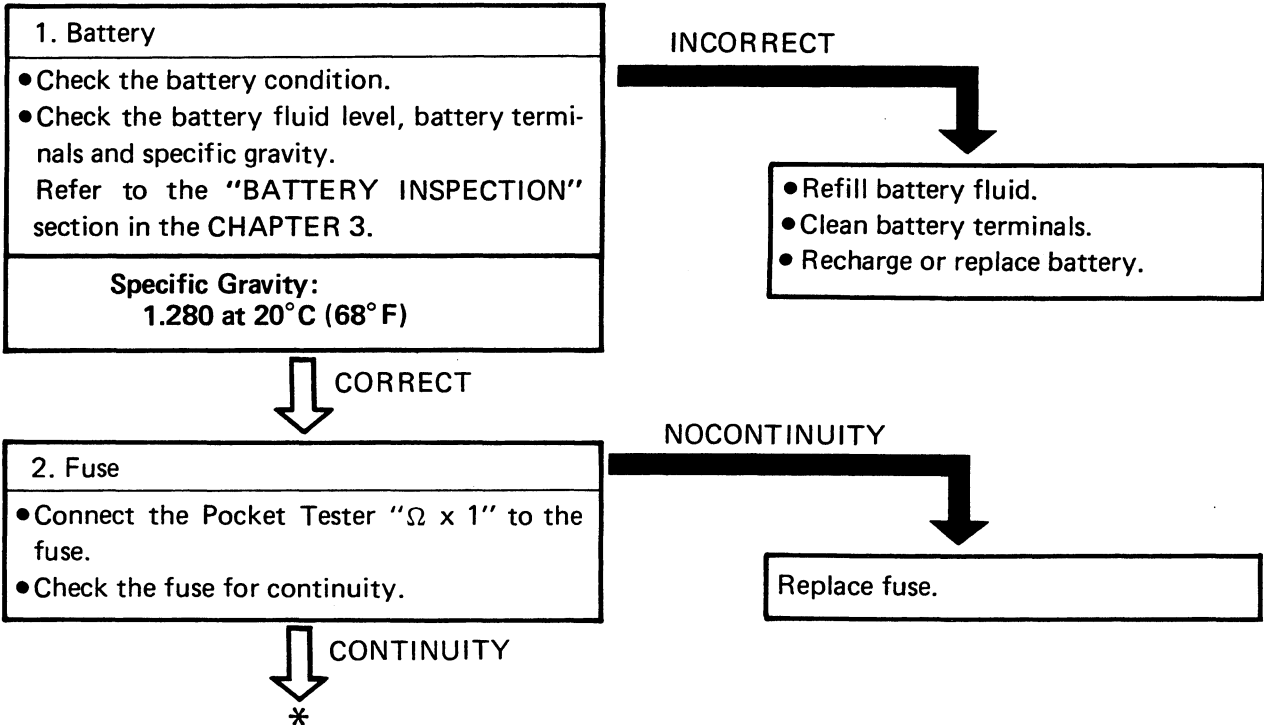
- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Battery 2. Fuse 3. Starter motor 4. Starter relay 5. Starting circuit cut-off relay | <ul style="list-style-type: none"> 6. Main switch 7. Starter switch 8. Neutral switch 9. Brake switch 10. Wiring connection (Starting system) |
|--|--|

NOTE:

- Remove the following parts before troubleshooting.
 - 1) Sheat
 - 2) Rear fender
- Use the following special tool in this troubleshooting.



Pocket Tester:
YU-03112
90890-03112





3. Starter motor

- Connect the battery positive terminal ① and starter motor cable ② using the jumper lead ③ * .
- Check the starter motor for operation.



4. Starter relay

- Disconnect the starter relay coupler ① from the wire harness.
- Connect the battery (12V) to the starter relay terminals, using the jumper leads ② * .

Battery (+) Lead → Red/White ③ Terminal
Battery (-) Lead → Black ④ Terminal

- Check the starter motor for operation.



*

⚠ WARNING:

- A wire for the jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

DOES NOT MOVES

Repair or replace starter motor.

*

⚠ WARNING:

- A wire for the jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

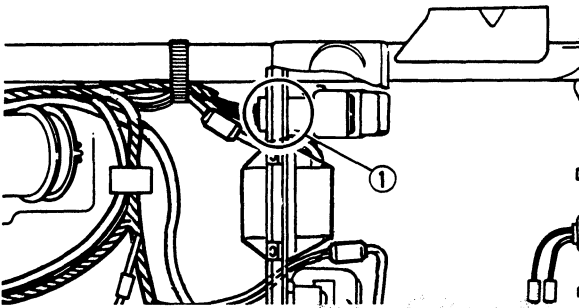
DOES NOT MOVES

Replace starter relay.



5. Starting circuit cut-off relay

- Disconnect the starting circuit cut-off relay coupler ① from the wire harness.

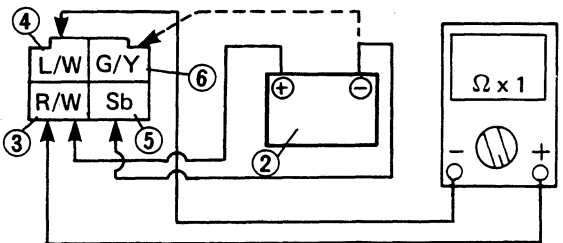



- Connect the Pocket Tester ($\Omega \times 1$) and battery (12V) ② to the relay terminals.

Tester (+) Lead → Red/White ③ Terminal
 Tester (-) Lead → Blue/White ④ Terminal

Battery (+) Lead → Red/White ③ Terminal
 Battery (-) Lead → Sky blue ⑤ Terminal

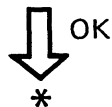
Battery (+) Lead → Red/White ③ Terminal
 Battery (-) Lead → Green/Yellow ⑥ Terminal



	Good Condition		Bad Condition	
Battery Connected	○	○	X	X
Battery Disconnected	X	○	X	○

○: Continuity X: Nocontinuity

- Check the relay for continuity.



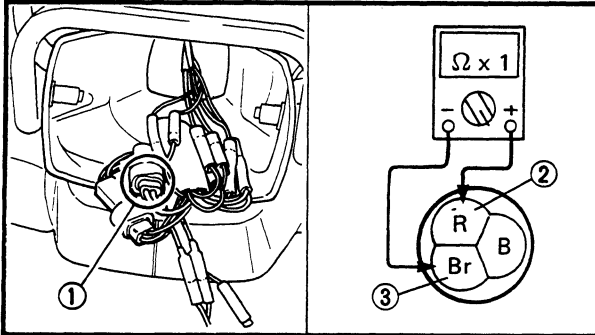
BAD CONDITION

Replace relay assembly.



6. Main switch

- Disconnect the main switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Red ② and Brown ③". Refer to the "CHECKING OF SWITCHES" section.



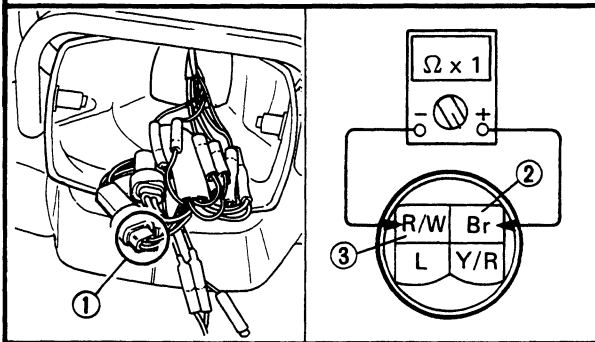
INCORRECT

Replace main switch.



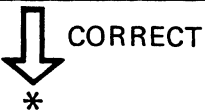
7. Starter switch

- Disconnect the starter switch couplers ① from the wireharness.
- Check the switch component for the continuity between "Brown ② and Red/White ③". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace handlebar switch.

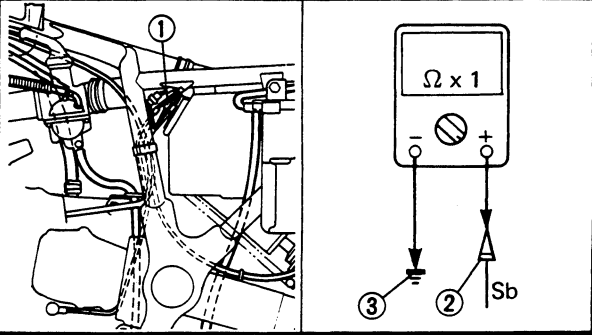




8. Neutral switch

- Disconnect the neutral switch lead ① from the wireharness.
- Check the switch component for the continuity between "Sky blue ② and Ground ③".

Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

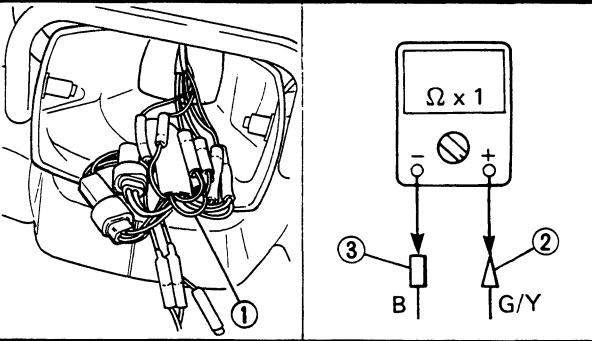
Replace neutral switch.



9. Brake switch

- Disconnect the brake switch leads ① from the wireharness.
- Check the switch component for the continuity between "Green/Yellow ② and Black ③".

Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace brake switch.



10. Wiring connection

- Check the entire electrical starting system for connections.

Refer to the "WIRING DIAGRAM" section.

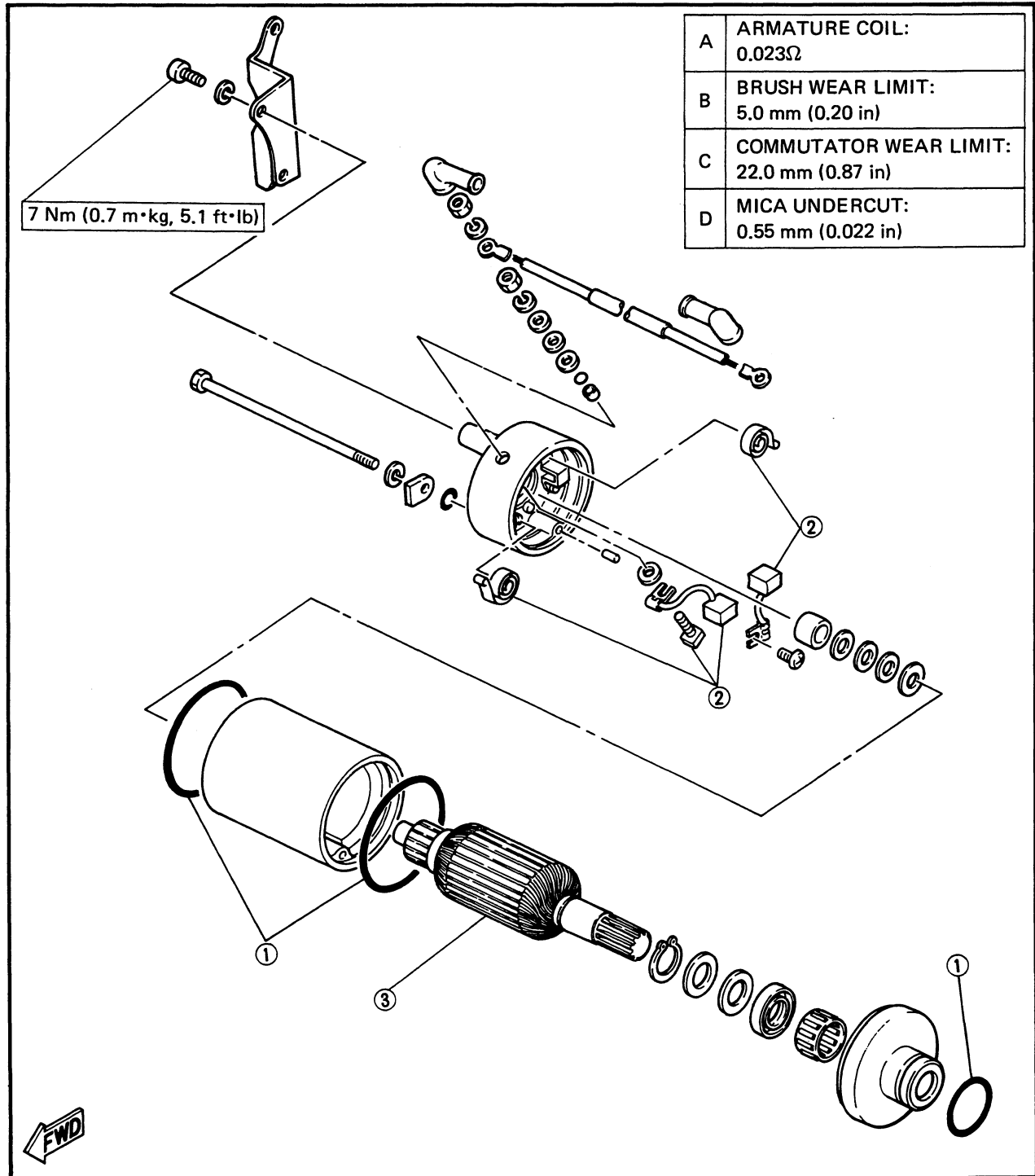
POOR CONNECTION

Correct.



STARTER MOTOR

- ① O-ring
- ② Brush set
- ③ Armature

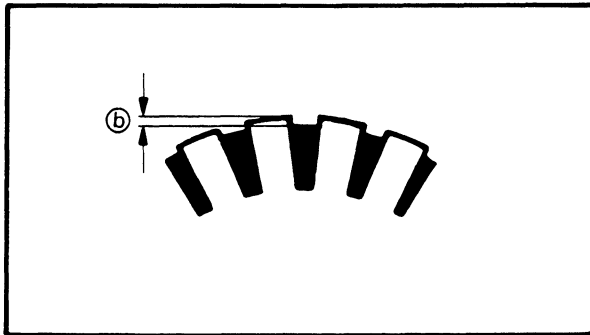
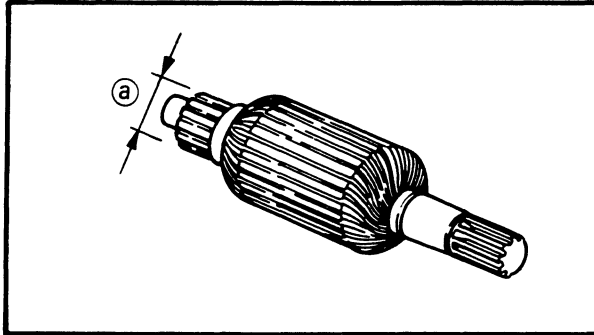


Removal

1. Remove:

- Starter motor

Refer to "ENGINE OVERHAUL – ENGINE REMOVAL" section in the CHAPTER 4.



Inspection and Repair

1. Inspect:


- Commutator

Dirty → Clean it with #600 grit sandpaper.

2. Measure:

- Commutator diameter (a)


Out of specification → Replace starter motor.

	Commutator Wear Limit: 22 mm (0.87 in)
---	--

3. Measure:

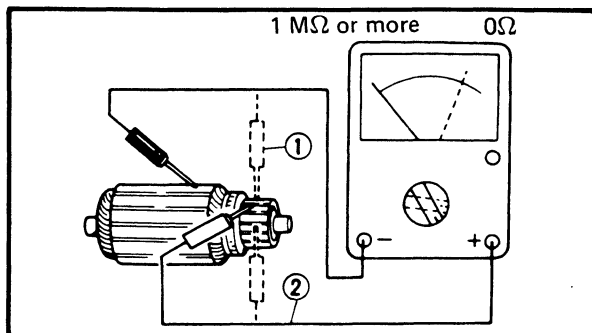
- Mica undercut (b)

Out of specification → Scrape the mica to proper value use a hacksaw blade can be ground to fit.

	Mica Undercut: 0.55 mm (0.022 in)
---	---

NOTE: _____


The mica insulation of the commutator must be undercut to ensure proper operation of commutator.



4. Inspect:

- Armature coil (continuity/insulation)

Defects(s) → Replace starter motor.

Inspecting steps:	
• Connect the Pocket Tester for continuity check ① and insulation check ② .	
	Pocket Tester: YU-03112 90890-03112

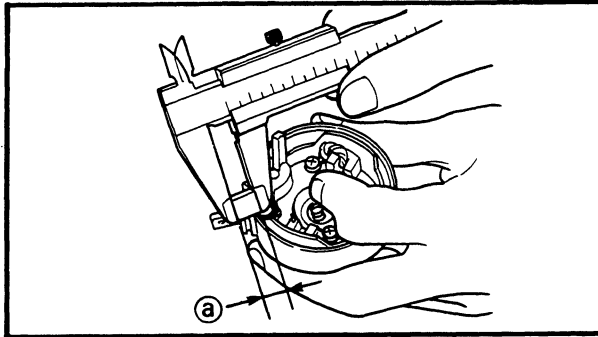


- Measure the armature coil resistances.



Armature Coil Resistance:
Continuity Check ①: ($\Omega \times 1$)
 0.023 Ω at 20°C (68°F)
Insulation Check ②: ($\Omega \times 1k$)
 More than 1M Ω at 20°C (68°F)

- If the resistance is incorrect, replace the starter motor.



5. Measure:

- Brush length ①
- Out of specification → Replace.



Brush Length Limit:
 5.0 mm (0.20 in)

6. Measure:

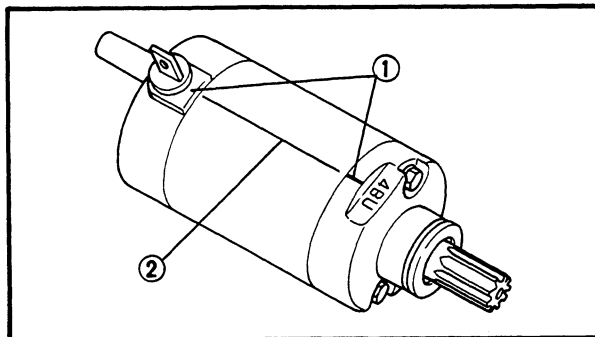
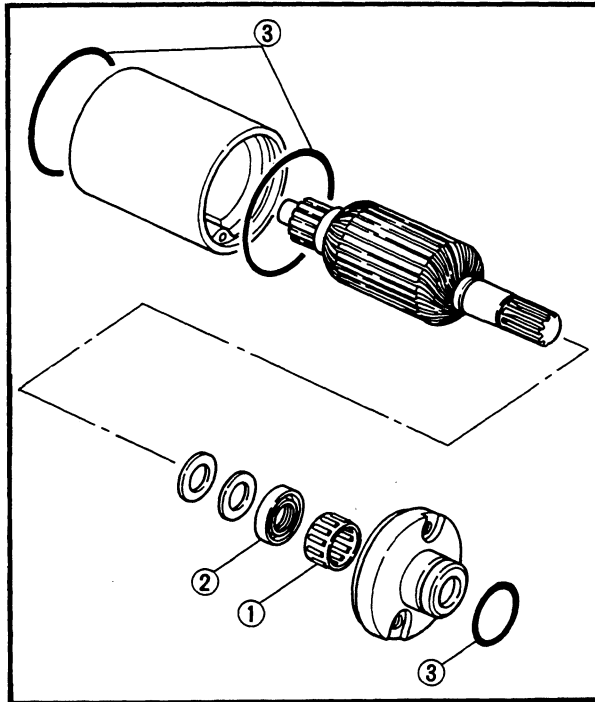
- Brush spring pressure
- Fatigue/Out of specification → Replace as a set.



Brush Spring Pressure:
 700 g (24.7 oz)

7. Inspect:

- Bearing ①
- Oil seal ②
- O-rings ③
- Wear/Damage → Replace.



Installation

1. Install:
 - Starter motor

NOTE:

Align the match marks ① on the bracket with the match marks ② on the housing.

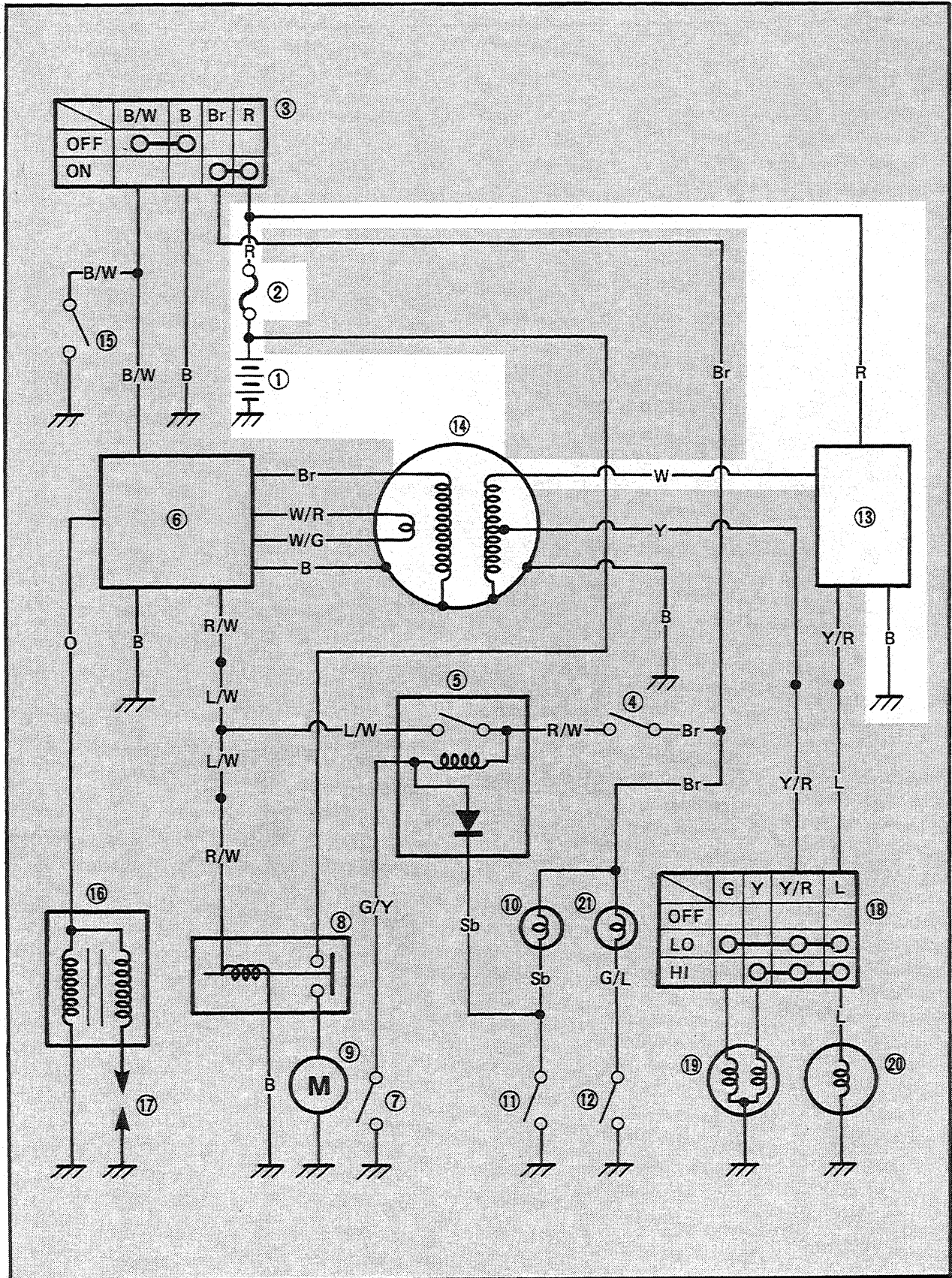


— MEMO —

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CHARGING SYSTEM
CIRCUIT DIAGRAM

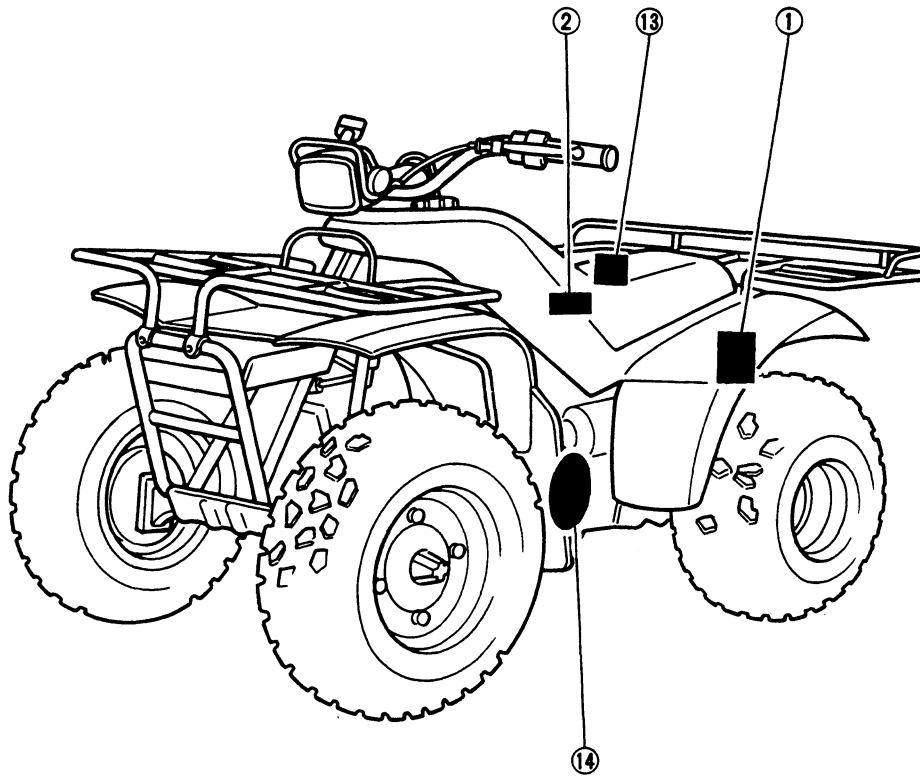


Aforementioned circuit diagram shows charging circuit in circuit diagram.

NOTE:

For the color codes, see page 7-2.

- ① Battery
- ② Main fuse
- ⑬ Rectifier/Regulator
- ⑭ CDI Magneto





TROUBLESHOOTING

THE BATTERY IS NOT CHARGED

Procedure

Check;

- | | |
|---------------------|-----------------------------|
| 1. Fuse | 4. Charging coil resistance |
| 2. Battery | 5. Wiring connection |
| 3. Charging voltage | (Charging system) |

NOTE:

- Remove the following parts before troubleshooting.
 - 1) Sheat
 - 2) Rear fender
- Use the following special tools in this troubleshooting

Pocket Tester:
YU-03112
90890-03112

Inductive Tachometer:
YU-08036
90890-03113

1. Fuse:

- Connect the Pocket Tester " $\Omega \times 1$ " to the fuse.
- Check the fuse for continuity.

NOCONTINUITY

Replace fuse.

CONTINUITY

2. Battery

- Check the battery condition.
- Check the battery fluid level, battery terminals and specific gravity. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

INCORRECT

- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

Specific Gravity:
1.280 at 20°C (68° F)

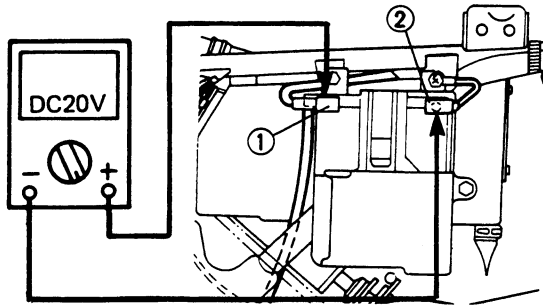
CORRECT
*



3. Charging voltage

- Connect the Inductive Tachometer to spark plug lead.
- Connect the Pocket Tester (DC20V) to the battery.

Tester (+) Lead → Battery (+) Terminal ①
Tester (-) Lead → Battery (-) Terminal ②



- Start the engine and accelerate to about 2,000 r/min.
- Measure the charging voltage.



Charging Voltage:
14 ~ 15V at 2,000 r/min

MEETS SPECIFICATION

Replace battery.

OUT OF SPECIFICATION

*




4. Charging coil resistance

- Disconnect the CDI magneto coupler ① and lead from the wireharness.
- Connect the Pocket Tester ($\Omega \times 1$) to the charging coil.

Tester (+) Lead → White ② Terminal
 Tester (-) Lead → Black ③ Terminal

- Measure the charging coil resistance.

 **Charging Coil Resistance:**
 0.36 ~ 0.50 Ω at 20°C (68°F)

OUT OF SPECIFICATION

Replace stator assembly.

MEETS SPECIFICATION

POOR CONNECTION

Correct.

5. Wiring connection

- Check the entire charging system for connections. Refer to the "WIRING DIAGRAM" section.

CORRECT

Replace rectifier/regulator.



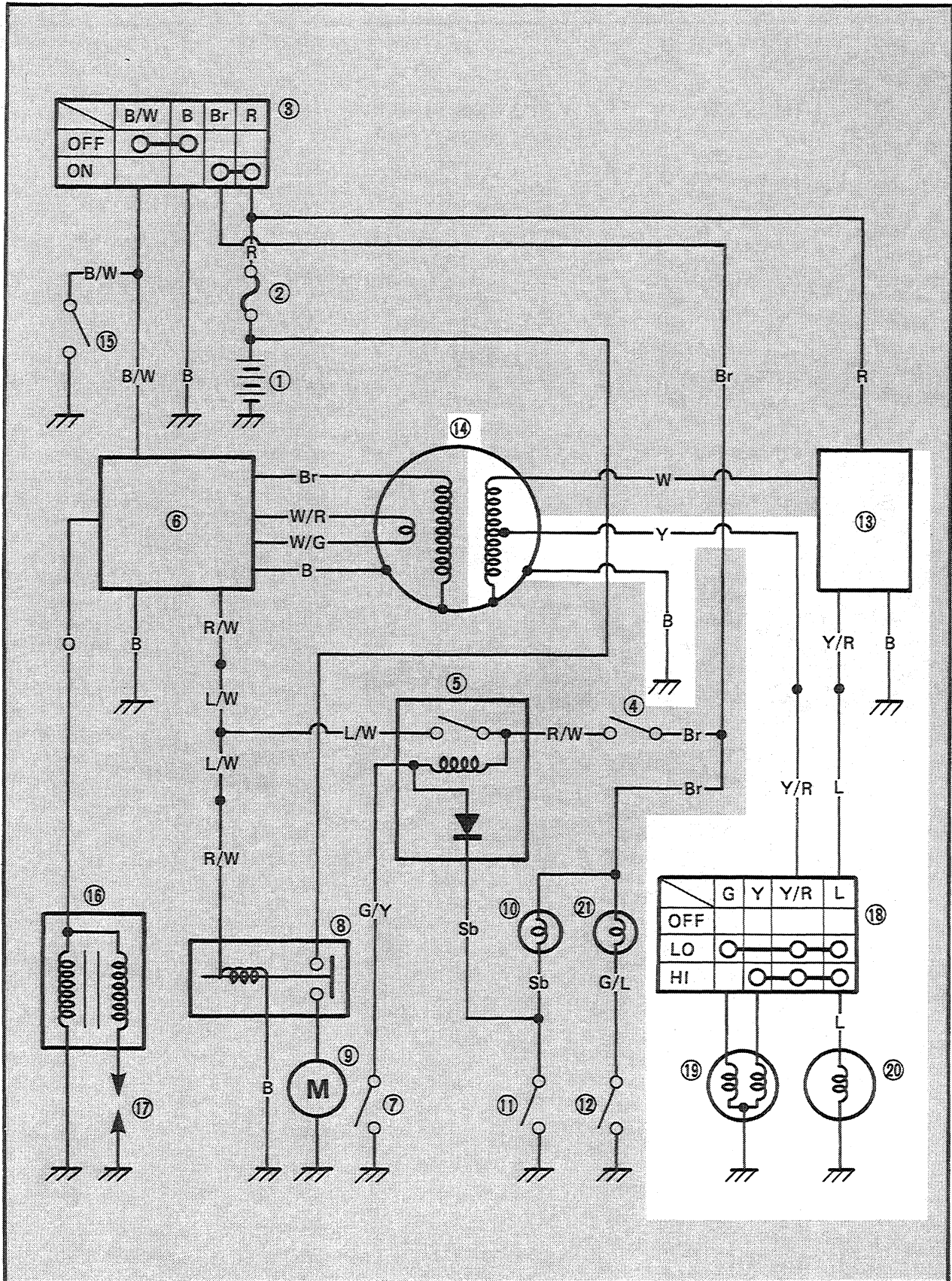
— MEMO —

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LIGHTING SYSTEM

CIRCUIT DIAGRAM



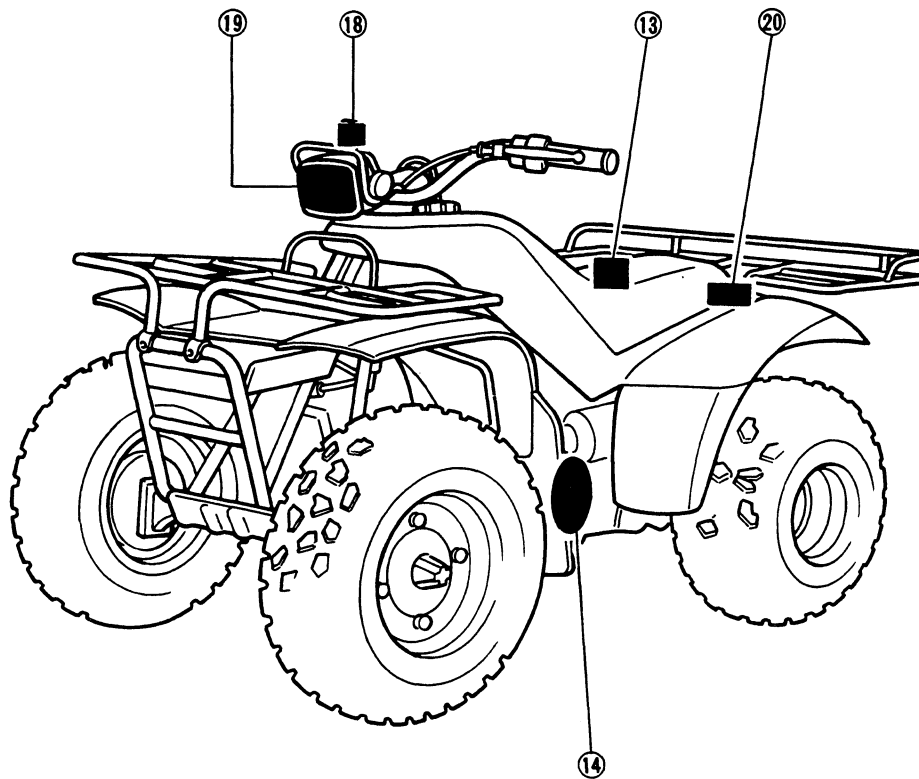


Aforementioned circuit diagram shows lighting circuit in circuit diagram.

NOTE: _____

For the color codes, see page 7-2.

- ⑬ Rectifier/Regulator
- ⑭ CDI magneto
- ⑱ "LIGHTS" (Dimmer) switch
- ⑲ Headlight
- ⑳ Taillight





TROUBLESHOOTING

HEADLIGHT OR TAILLIGHT DO NOT COME ON

Procedure

Check;

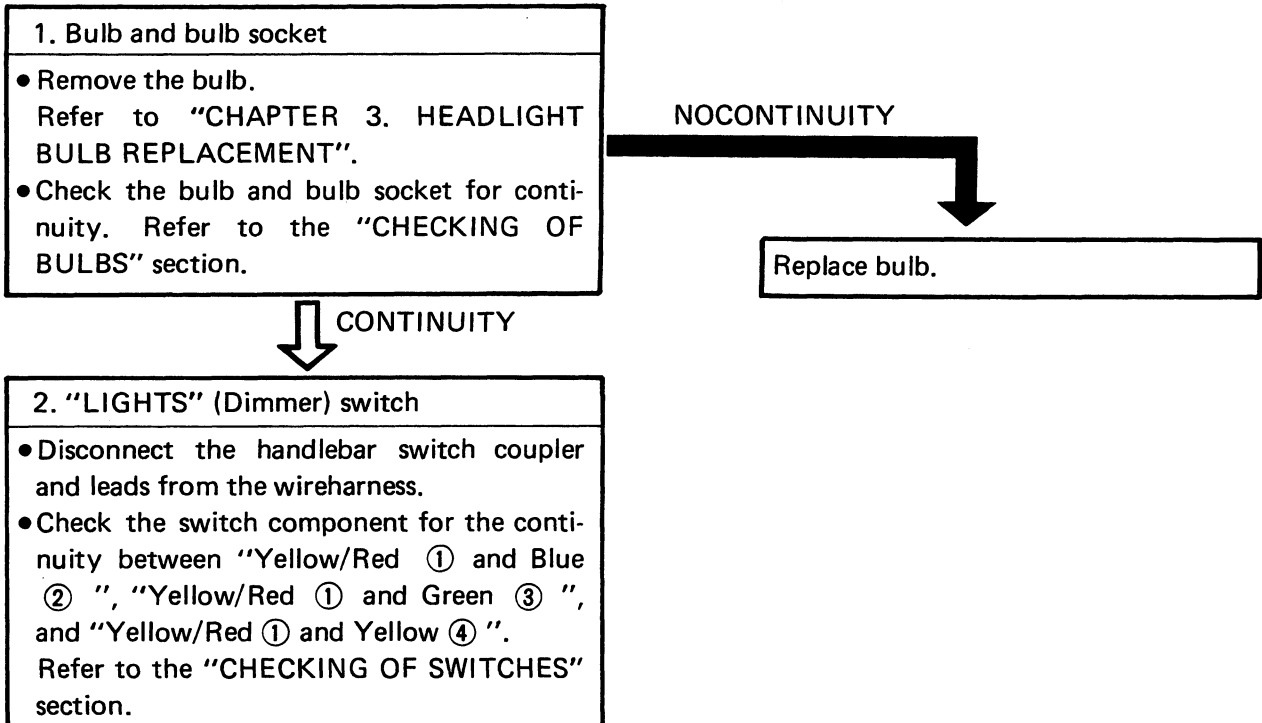
- | | |
|-----------------------------|--|
| 1. Bulb and bulb socket | 3. Lighting coil resistance |
| 2. "LIGHTS" (Dimmer) switch | 4. Wiring connection (Lighting system) |

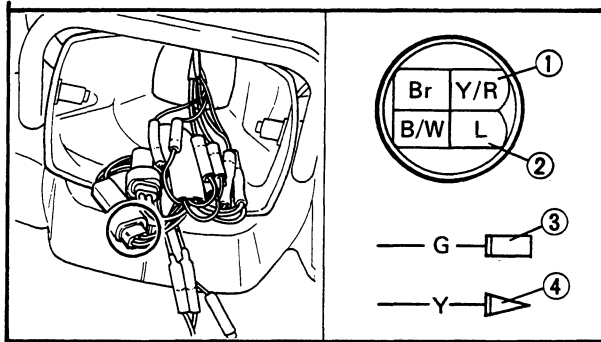
NOTE:

- Remove the following parts before troubleshooting.

1) Seat	4) Front fender
2) Handlebar	5) Rear fender
3) Fuel tank cover	
- Use the following special tool in this troubleshooting.

Pocket Tester:
YU-03112
90890-03112





INCORRECT

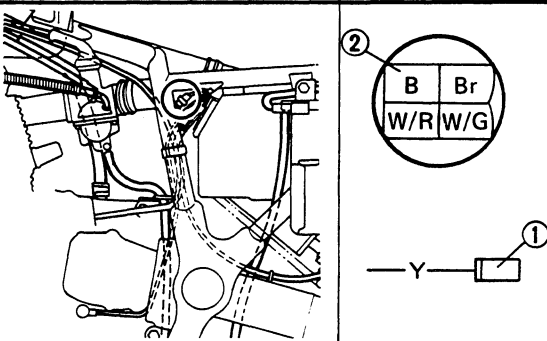
"LIGHTS" (Dimmer) switch is faulty, replace handlebar switch.

CORRECT

3. Lighting coil resistance

- Disconnect the CDI magneto coupler and lead from the wireharness.
- Connect the Pocket Tester ($\Omega \times 1$) to the lighting coil.

Tester (+) Lead → Yellow ① Terminal
 Tester (-) Lead → Black ② Terminal



OUT OF SPECIFICATION

Lighting coil is faulty, replace stator assembly.

- Measure the lighting coil resistance.



Lighting coil resistance:
 0.31 ~ 0.37 Ω at 20°C (68°F)

MEETS SPECIFICATION

4. Wiring connection.

- Check entire lighting system for connections. Refer to "WIRING DIAGRAM" section.

POOR CONNECTION

Correct.

OK

Rectifier/Regulator is faulty, replace it.

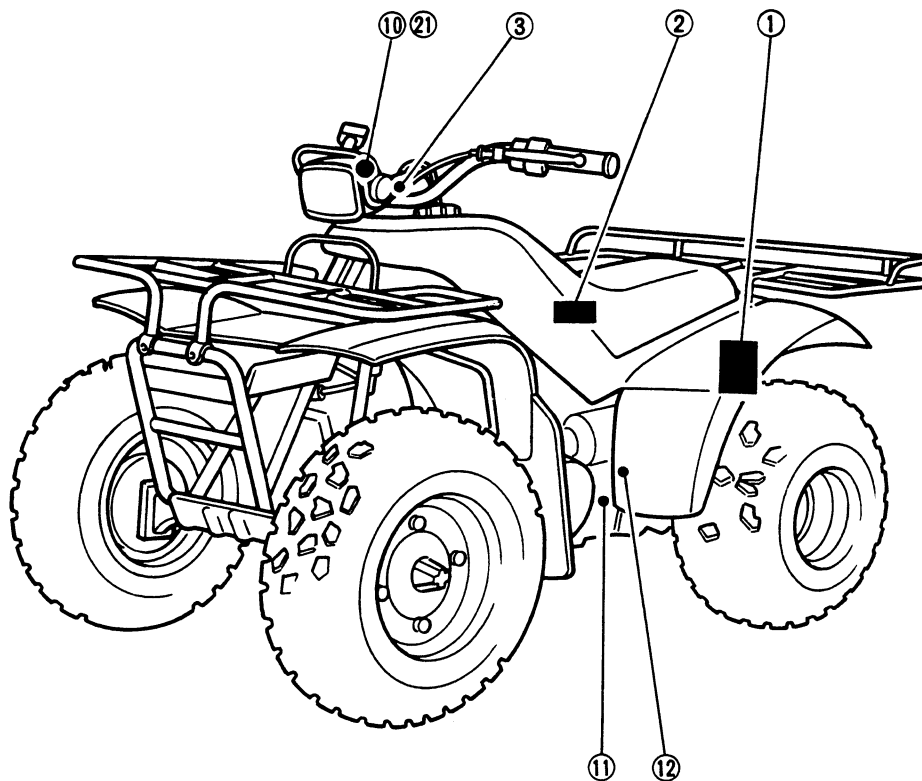


Aforementioned circuit diagram shows signal circuit in circuit diagram.

NOTE: _____

For the color codes, see page 7-2.

- ① Battery
- ② Main fuse
- ③ Main switch
- ⑩ Neutral indicator
- ⑪ Neutral switch
- ⑫ Reverse switch
- ⑰ Reverse indicator



TROUBLESHOOTING

"NEUTRAL" AND "REVERSE" INDICATOR LIGHT DO NOT COME ON

Procedure

Check;

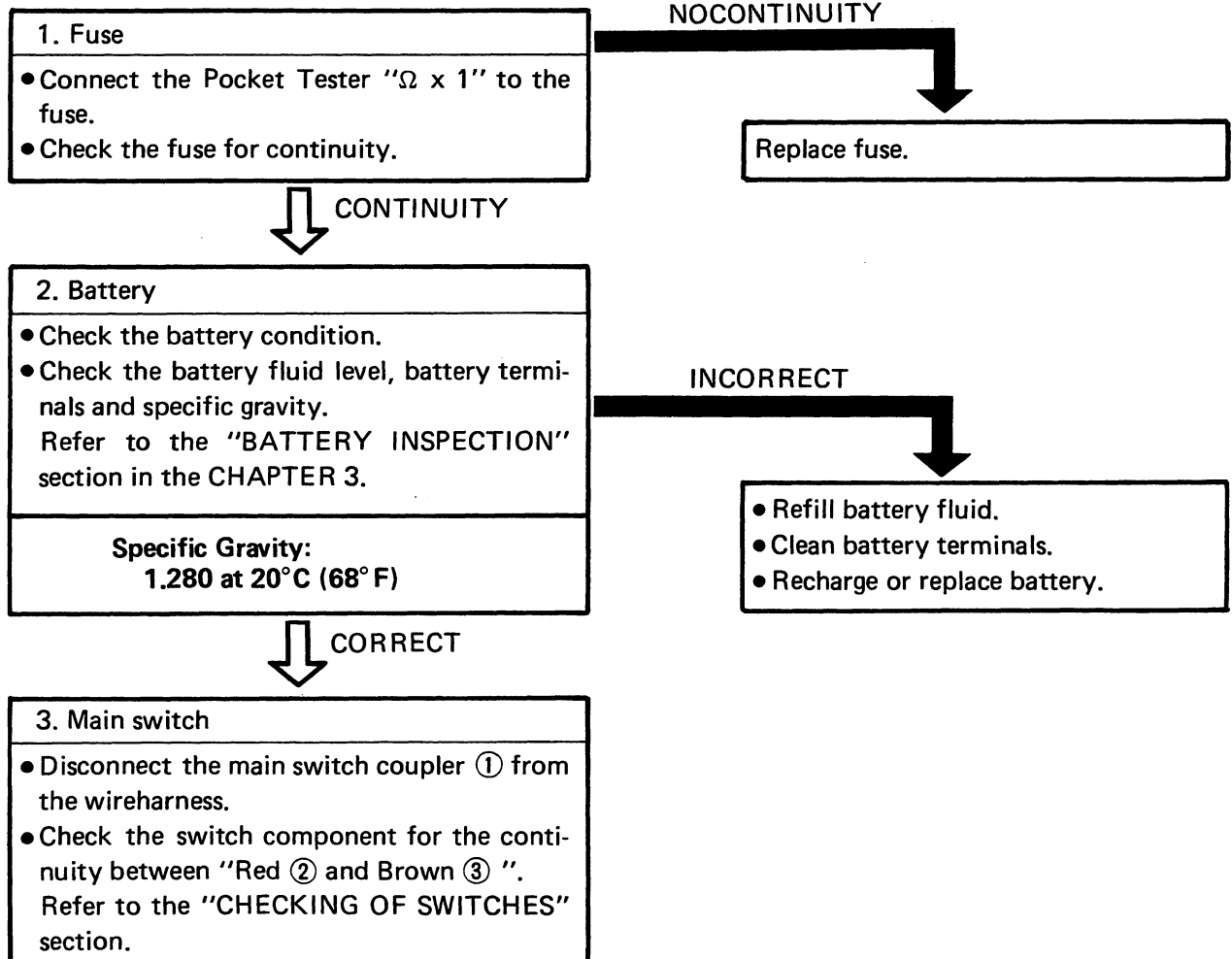
- | | |
|------------|--------------------------------------|
| 1. Fuse | 3. Main switch |
| 2. Battery | 4. Wiring connection (signal system) |

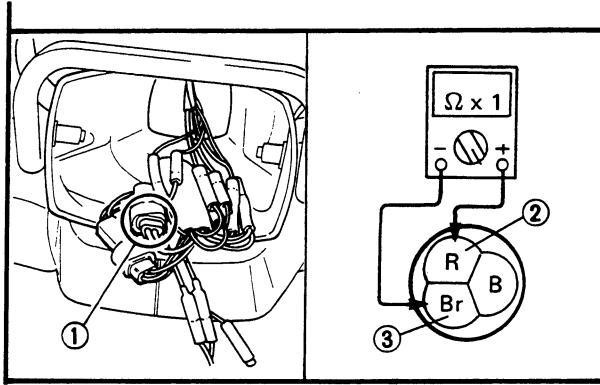
NOTE:

- Remove the following parts before troubleshooting.
 - 1) Seat
 - 2) Rear fender
- Use the following special tool in this troubleshooting.



Pocket Tester:
YU-03112
90890-03112





CORRECT

4. Wiring connection
• Check the entire signal system for connections.
Refer to the "WIRING DIAGRAM" section.

CORRECT

Go to the "SIGNAL SYSTEM TEST AND CHECK" section.

INCORRECT

Replace main switch.

POOR CONNECTION

Correct.

SIGNAL SYSTEM TEST AND CHECK

"NEUTRAL" INDICATOR LIGHT DOES NOT COME ON.

1. Bulb and bulb socket
 • Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

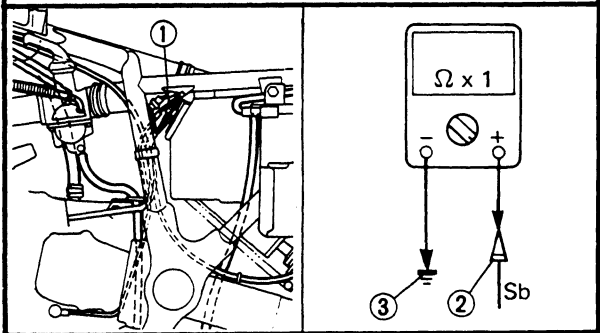
NOTE:
 Remove the front carrier, handlebar, fuel tank cover and front fender.

CONTINUITY

NOCONTINUITY

Bulb and/or bulb socket are faulty, replace.

2. Neutral switch
 • Disconnect the neutral switch lead ① from the wireharness.
 • Check the switch component for continuity between "Sky blue ② and Ground ③ ". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace neutral switch.

CORRECT

3. Wiring connection
 • Check the entire signal system for connections. Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION

Correct.

"REVERSE" INDICATOR LIGHT DOES NOT COME ON

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NOTE:
Remove the front carrier, handlebar, fuel tank cover and front fender.

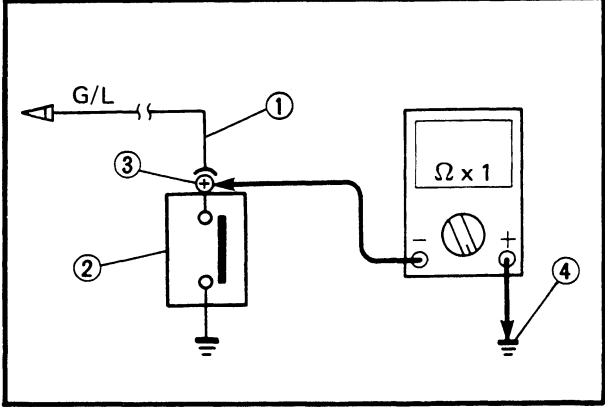
CONTINUITY

NOCONTINUITY

Bulb and/or bulb socket are faulty, replace.

2. Reverse switch

- Disconnect the reverse switch lead ① from the reverse switch ② .
- Check the switch component for continuity between "Green/Blue ③ and Ground ④ ". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace reverse switch.

CORRECT

3. Wiring connection

- Check the entire signal system for connections. Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION

Correct.

TROUBLESHOOTING

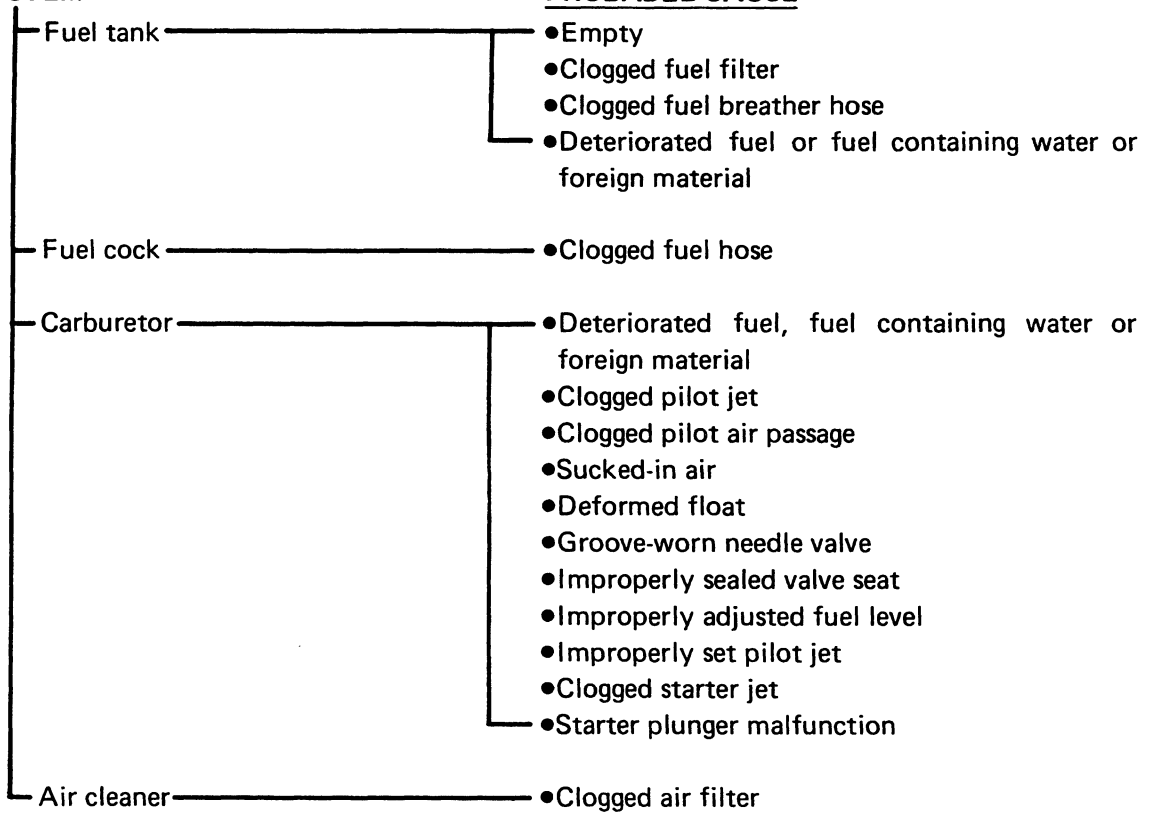
NOTE:

The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for inspection, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM

PROBABLE CAUSE



STARTING FAILURE/HARD STARTING



ELECTRICAL SYSTEM

PROBABLE CAUSE

- Spark plug
 - Improper plug gap
 - Worn electrodes
 - Wire between terminals broken
 - Improper heat range
 - Faulty spark plug cap
- Ignition coil
 - Broken or shorted primary/secondary
 - Faulty spark plug lead
 - Broken body
- CDI unit system
 - Faulty CDI unit
 - Faulty source coil
 - Faulty pick-up coil
 - Broken woodruff key
- Switches and wiring
 - Faulty main switch
 - Faulty "START" switch
 - Faulty "ENGINE STOP" switch
 - Faulty "NEUTRAL" switch
 - Faulty "BRAKE" switch
 - Broken or shorted wiring
- Starter motor
 - Faulty starter motor
 - Faulty starter relay
 - Faulty circuit cut-off relay

COMPRESSION SYSTEM

PROBABLE CAUSE

- Cylinder and cylinder head
 - Loose spark plug
 - Loose cylinder head or cylinder
 - Broken cylinder head gasket
 - Broken cylinder gasket
 - Worn, damaged or seized cylinder
 - Improperly sealed valve
 - Improperly contacted valve and valve seat
 - Improper valve timing
 - Broken valve spring
- Piston and piston rings
 - Improperly installed piston ring
 - Worn, fatigued or broken piston ring
 - Seized piston ring
 - Seized or damaged piston
- Crankcase and crankshaft
 - Improperly seated crankcase
 - Seized crankshaft

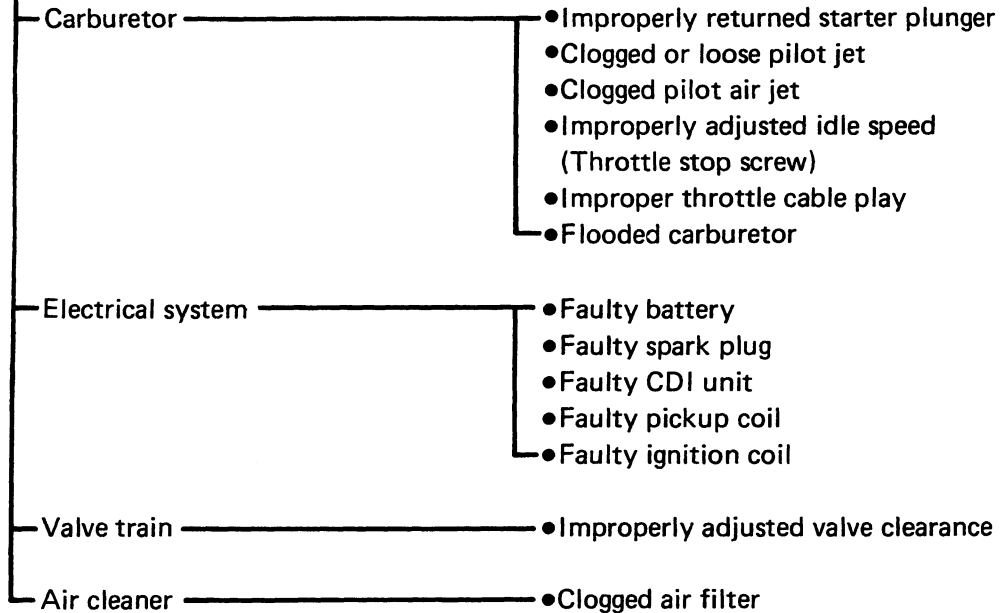
**POOR IDLE SPEED PERFORMANCE/POOR MEDIUM
AND HIGH SPEED PERFORMANCE**



POOR IDLE SPEED PERFORMANCE

POOR IDLE SPEED PERFORMANCE

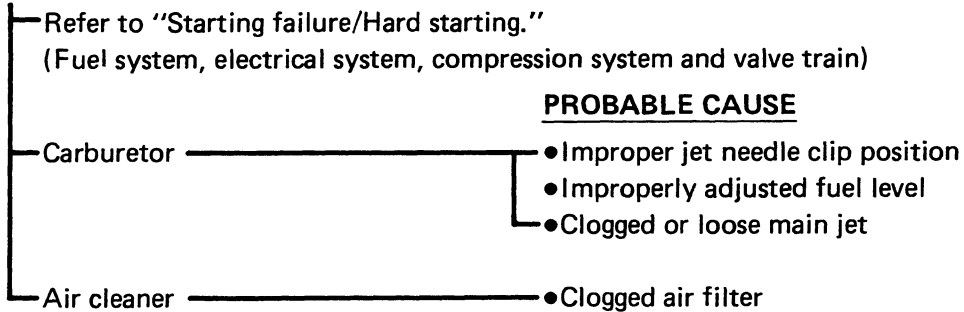
PROBABLE CAUSE



POOR MEDIUM AND HIGH SPEED PERFORMANCE

POOR MEDIUM AND HIGH SPEED PERFORMANCE

PROBABLE CAUSE



FAULTY DRIVE TRAIN

The following conditions may indicate damage drive train components:

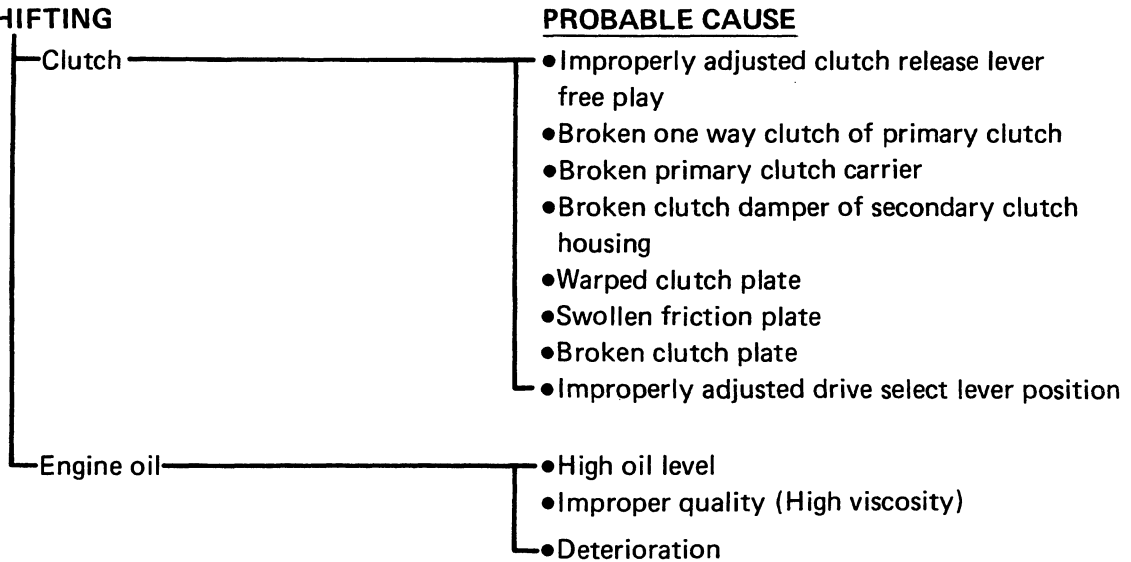
Symptoms	Possible Causes
<p>1. A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.)</p> <p>2. A "rolling rumble" noticeable at low speed; a high-pitched "whine"; a "clank" from a drive train component or area.</p> <p>3. A locked-up condition of the drive train mechanism, no power transmitted from engine to rear wheel.</p>	<p>A. Bearing damage.</p> <p>B. Improper gear lash.</p> <p>C. Gear tooth damage.</p> <p>D. Broken constant velocity joint.</p> <p>E. Broken gear teeth.</p> <p>F. Seizure due to lack of lubrication.</p> <p>G. Small foreign object lodged between moving parts.</p>

NOTE:

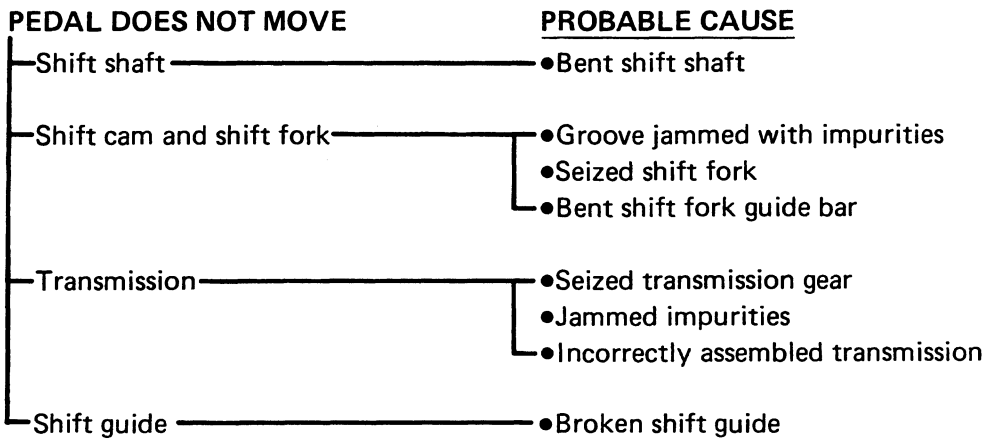
Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components for specific inspection.

FAULTY GEAR SHIFTING

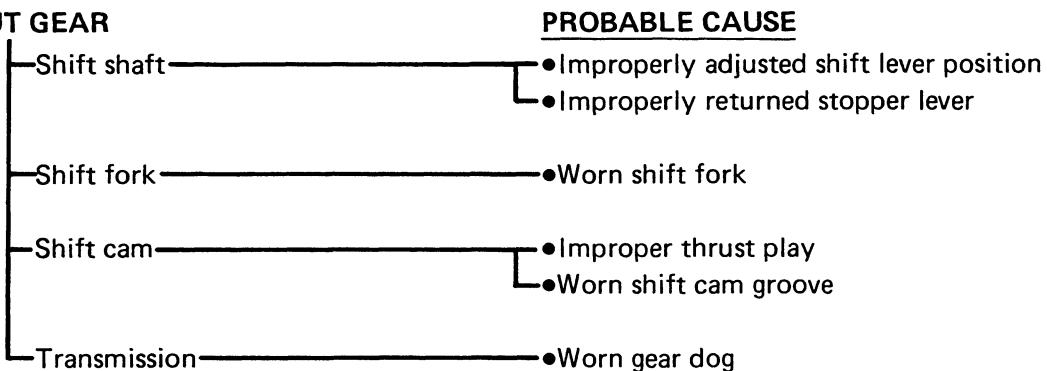
HARD SHIFTING



CHANGE PEDAL DOES NOT MOVE

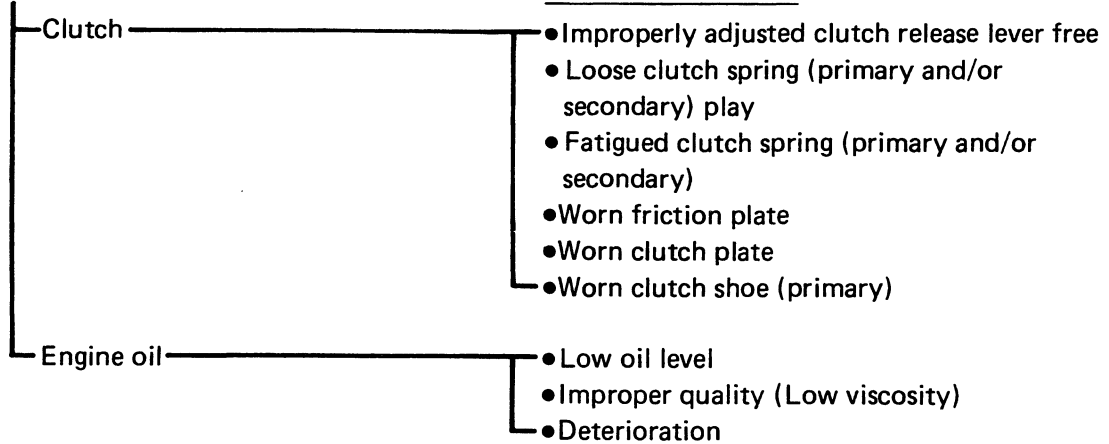


JUMP-OUT GEAR

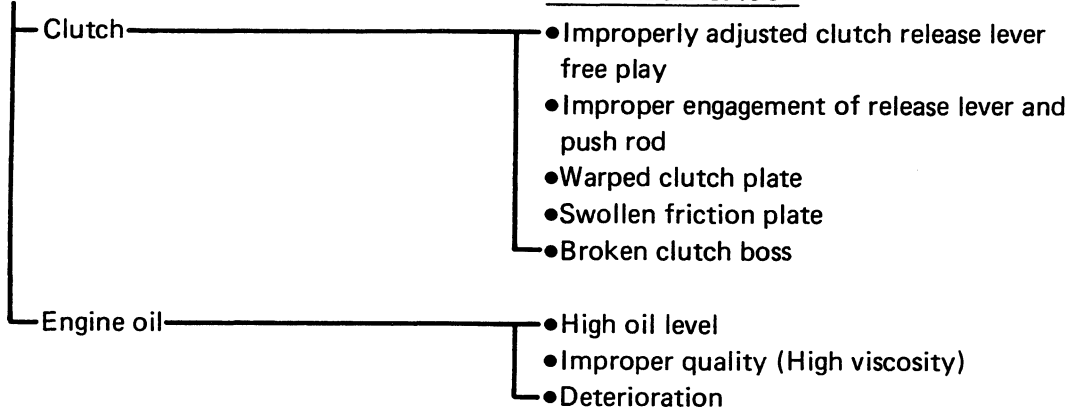


CLUTCH SLIPPING/DRAGGING

CLUTCH SLIPPING

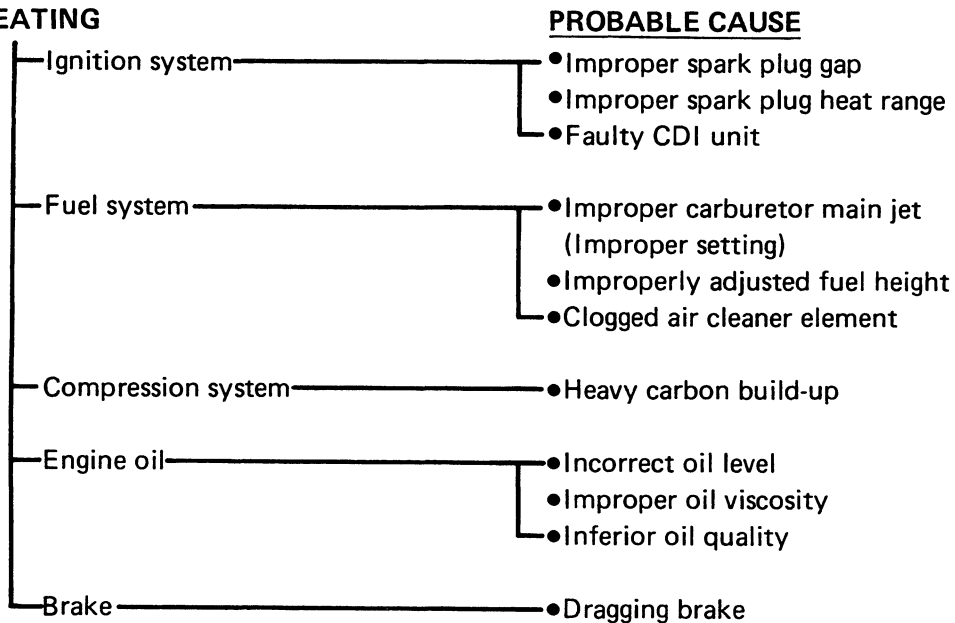


CLUTCH DRAGGING



OVERHEATING

OVERHEATING



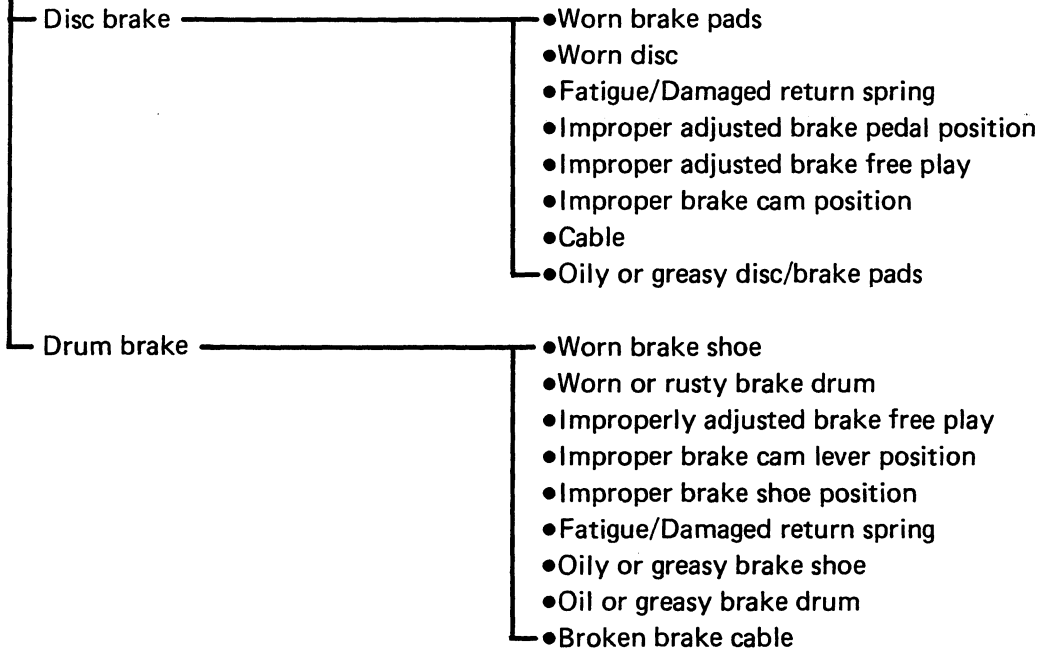
FAULTY BRAKE/SHOCK ABSORBER MALFUNCTION



FAULTY BRAKE

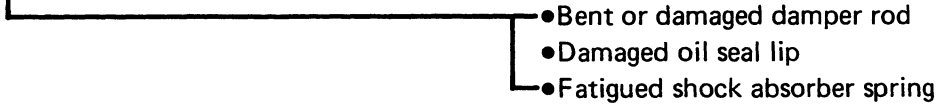
POOR BRAKING EFFECT

PROBABLE CAUSE



SHOCK ABSORBER MALFUNCTION

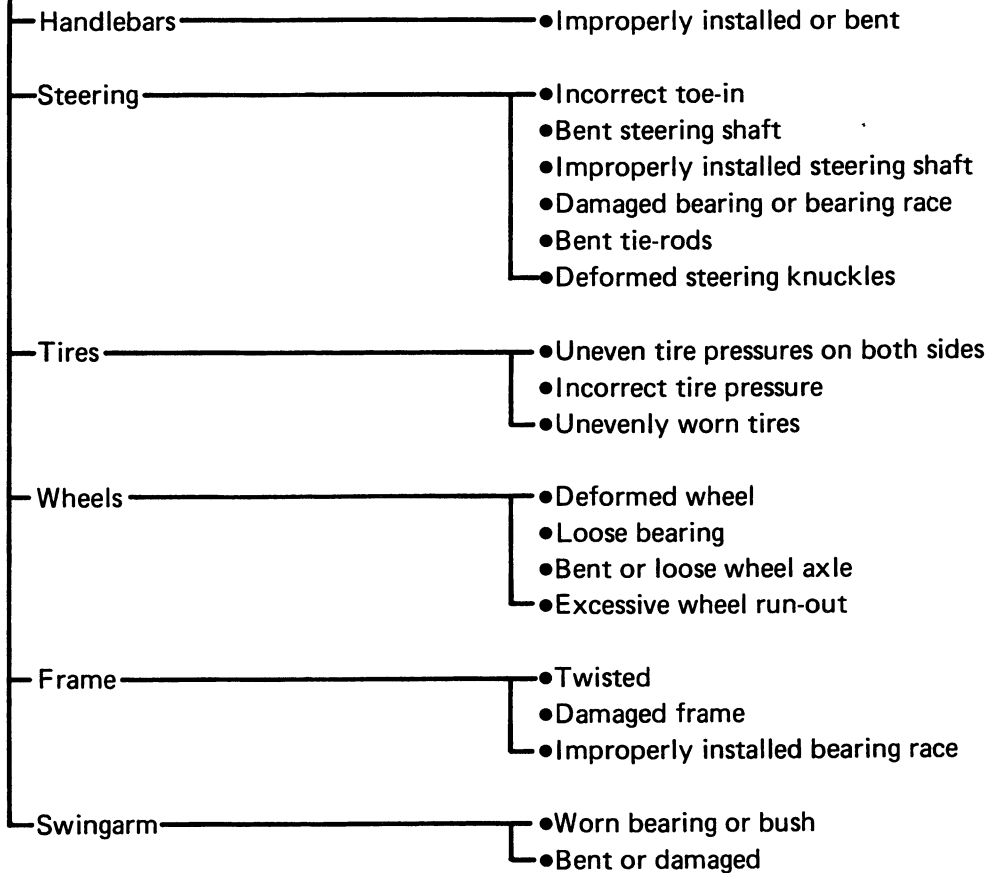
PROBABLE CAUSE



INSTABLE HANDLING

INSTABLE HANDLING

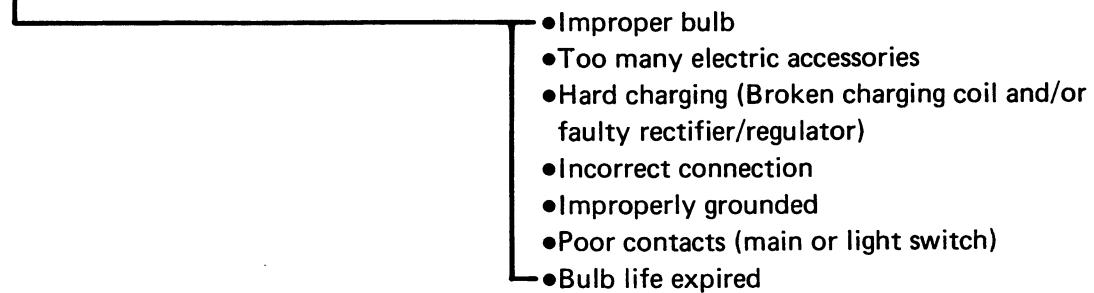
PROBABLE CAUSE



FAULTY LIGHTING SYSTEM

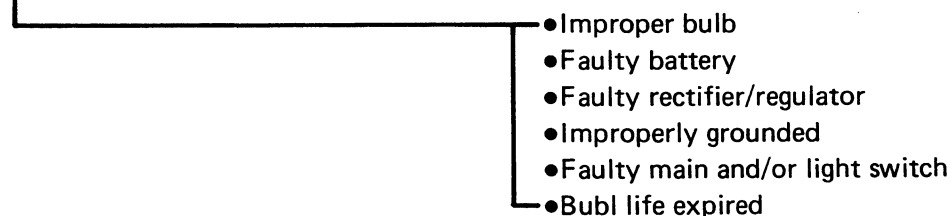
HEADLIGHT DARK

PROBABLE CAUSE

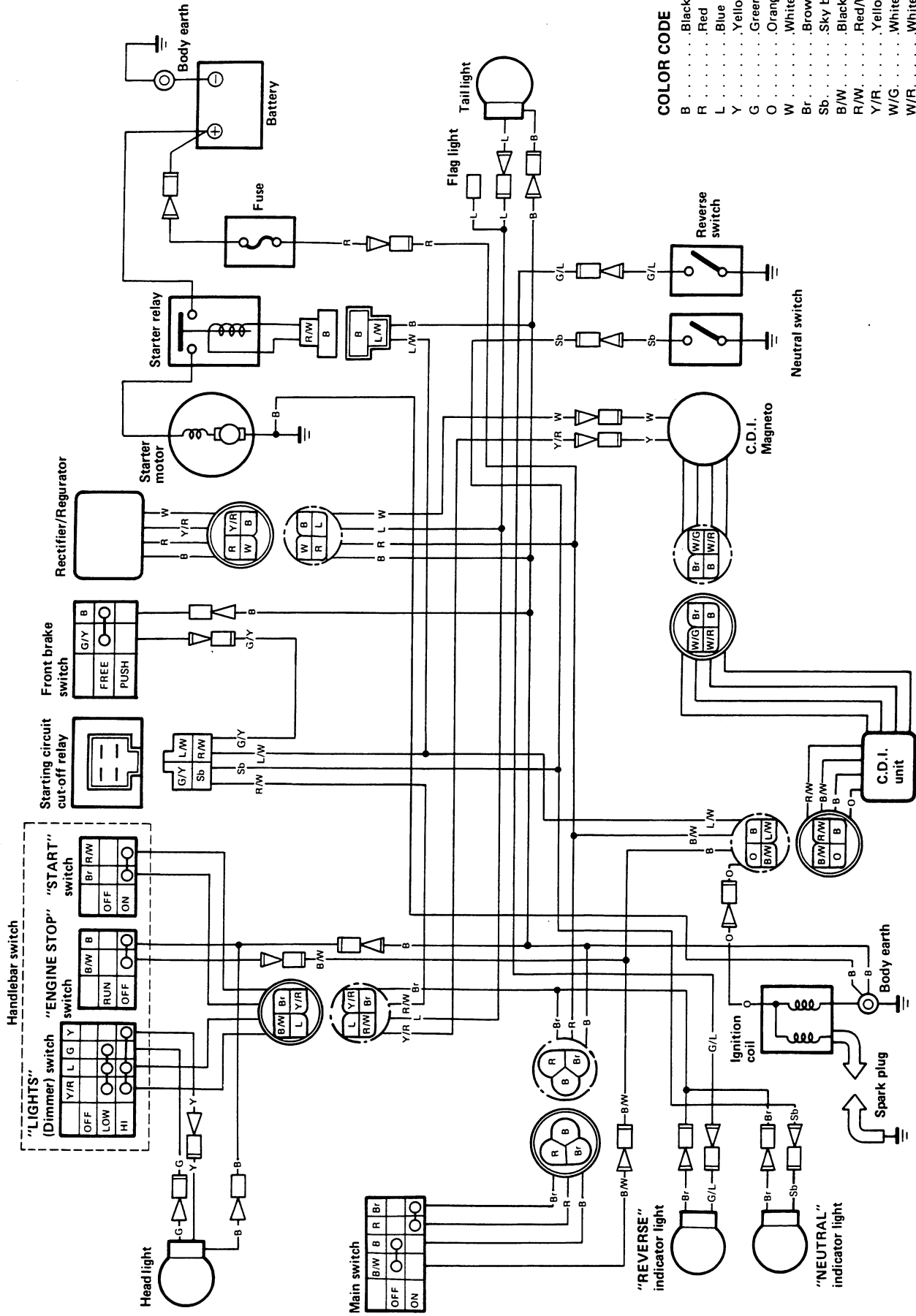


BULB BURNT OUT

PROBABLE CAUSE



YFM200DXW WIRING DIAGRAM



COLOR CODE

- B Black
- R Red
- L Blue
- Y Yellow
- G Green
- O Orange
- W White
- Br Brown
- Sb Sky blue
- B/W Black/White
- R/W Red/White
- Y/R Yellow/Red
- W/G White/Green
- W/R White/Red
- G/L Green/Blue
- G/Y Green/Yellow
- L/W Blue/White