



YAMAHA

OWNER'S SERVICE MANUAL

TZ250L1/(L)

LIT-11626-12-55

4TW-28199-13

TZ250L1/(L)
OWNER'S SERVICE MANUAL
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1st Edition, September 1998
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Printed in Japan
P/N LIT-11626-12-55

INTRODUCTION

Congratulations on your purchase of a Yamaha TZ250L1/(L). This model is the culmination of Yamaha's vast experience in the production of pacesetting racing machines. It represents the highest grade of craftsmanship and reliability that have made Yamaha a leader.

This manual explains operation, inspection, basic maintenance and tuning of your machine. If you have any questions about this manual or your machine, please contact your Yamaha dealer.

NOTE: _____

As improvements are made on this model, some data in this manual may become outdated. If you have any questions, please consult your Yamaha dealer.

WARNING _____

PLEASE READ THIS MANUAL CAREFULLY AND COMPLETELY BEFORE OPERATING THIS MACHINE. DO NOT ATTEMPT TO OPERATE THIS MACHINE UNTIL YOU HAVE ATTAINED A SATISFACTORY KNOWLEDGE OF ITS CONTROLS AND OPERATING FEATURES AND UNTIL YOU HAVE BEEN TRAINED IN SAFE AND PROPER RIDING TECHNIQUES. REGULAR INSPECTIONS AND CAREFUL MAINTENANCE, ALONG WITH GOOD RIDING SKILLS, WILL ENSURE THAT YOU SAFELY ENJOY THE CAPABILITIES AND THE RELIABILITY OF THIS MACHINE.

WARRANTY INFORMATION

This model is sold AS IS, WITHOUT ANY WARRANTIES EXPRESSED OR IMPLIED REGARDLESS OF THE INTENDED USE.

THE PURCHASER OF THIS MACHINE, which is intended for competition purposes, IS RESPONSIBLE FOR ALL COSTS SERVICE AND/OR REPAIR.

IMPORTANT NOTICE

THIS MACHINE IS DESIGNED STRICTLY FOR COMPETITION USE, ONLY ON A CLOSED COURSE. It is illegal for this machine to be operated on any public street, road, or highway. Off-road use on public lands may also be illegal. Please check local regulations before riding.

SAFETY INFORMATION

1. THIS MACHINE IS TO BE OPERATED BY AN EXPERIENCED RIDER ONLY.

Do not attempt to operate this machine at maximum power until you are totally familiar with its characteristics.

2. THIS MACHINE IS DESIGNED TO BE RIDDEN BY THE OPERATOR ONLY.

Do not carry passengers on this machine.

3. ALWAYS WEAR PROTECTIVE APPAREL.

When operating this machine, always wear an approved helmet with goggles or a face shield. Also wear heavy boots, gloves, and protective clothing. Always wear proper fitting clothing that will not be caught in any of the moving parts or controls of the machine.

4. ALWAYS MAINTAIN YOUR MACHINE IN PROPER WORKING ORDER.

For safety and reliability, the machine must be properly maintained.

Always perform the pre-operation checks indicated in this manual.

Correcting a mechanical problem before you ride may prevent an accident.

5. GASOLINE IS HIGHLY FLAMMABLE.

Always turn off the engine while refueling. Take care to not spill any gasoline on the engine or exhaust system. Never refuel in the vicinity of an open flame, or while smoking.

6. GASOLINE CAN CAUSE INJURY.

If you should swallow some gasoline, inhale excess gasoline vapors, or allow any gasoline to get into your eyes, contact a doctor immediately. If any gasoline spills onto your skin or clothing, immediately wash skin areas with soap and water, and change your clothes.

7. ONLY OPERATE THE MACHINE IN AN AREA WITH ADEQUATE VENTILATION.

Never start the engine or let it run for any length of time in an enclosed area. Exhaust fumes are poisonous. These fumes contain carbon monoxide, which by itself is odorless and colorless. Carbon monoxide is a dangerous gas which can cause unconsciousness or can be lethal.

8. PARK THE MACHINE CAREFULLY; TURN OFF THE ENGINE.

Always turn off the engine if you are going to leave the machine. Do not park the machine on a slope or soft ground as it may fall over.

9. PROPERLY SECURE THE MACHINE BEFORE TRANSPORTING IT.

When transporting the machine in another vehicle, always be sure it is properly secured and in an upright position and that the fuel cock is in the "OFF" position. Otherwise, fuel may leak out of the carburetor or fuel tank.

TO THE NEW OWNER

This manual will provide you with a good basic understanding of features, operation, and basic maintenance and inspection items of this machine. Please read this manual carefully and completely before operating your new machine. If you have any questions regarding the operation or maintenance of your machine, please consult your Yamaha dealer.

NOTE:

This manual should be considered a permanent part of this machine and should remain with it even if the machine is subsequently sold.

NOTICE

Some data in this manual may become outdated due to improvements made to this model in the future. If there is any question you have regarding this manual or your machine, please consult your Yamaha dealer.

F.I.M MACHINE WEIGHTS:

Weights of machines without fuel

The minimum weights for road race machines are:

for the class 125 ccminimum
70 kg (154 lb)

for the class 250 ccminimum
95 kg (209 lb)

for the class 500 ccminimum
130 kg (287 lb)

In modifying your machine (e.g., for weight reduction), take note of the above limits of weight.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

WARNING

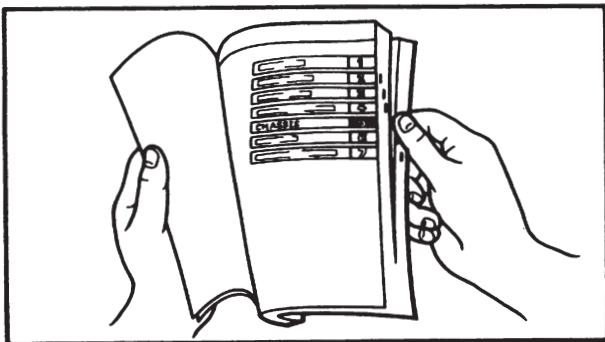
Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

NOTE:

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



FINDING THE REQUIRED PAGE

1. This manual consists of seven chapters; "General Information", "Specifications", "Regular inspection and adjustments", "Engine", "Chassis", "Electrical" and "Tuning".
2. The table of contents is at the beginning of the manual. Look over the general layout of the book before finding then required chapter and item.

Bend the book at its edge, as shown, to find the required fore edge symbol mark and go to a page for required item and description.

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.

HOW TO READ DESCRIPTIONS

1. An easy-to-see disassembly illustration is mainly provided for a disassembly job.
2. Numbers are given in the order of a disassembly job in the disassembly illustration.
3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks. The meanings of the symbol marks are given on the next page.
4. A job instruction chart accompanies the assembly illustration, providing the order of jobs, names of parts, notes in jobs, etc.
5. In addition to the disassembly illustration, "Points for Removal" is provided to supplement in detail the explanation which does or cannot necessarily cover the main jobs.
6. Jobs necessary before and after those which are not included in the disassembly illustration are explained before the same illustration as related jobs.

- ① Section
- ② Order of removal
- ③ Note on removal and reassembly
- ④ Part name
- ⑤ Q'ty

- ⑥ Remarks
- ⑦ Removal point
- ⑧ Extent of removal
- ⑨ Symbol mark
- ⑩ Exploded diagram

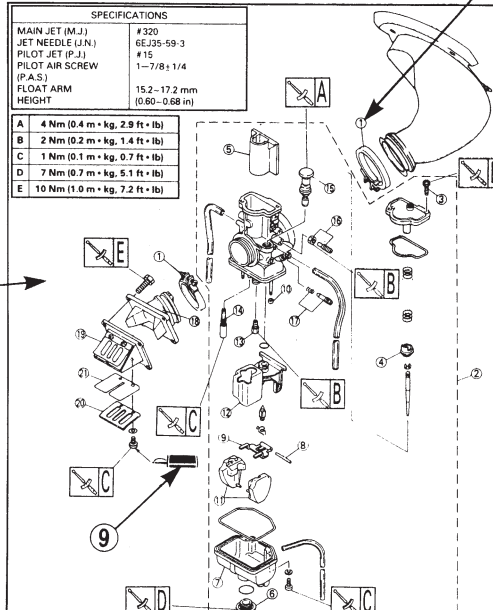
CARBURETOR AND REED VALVE ENG 


CARBURETOR AND REED VALVE PREPARATION FOR REMOVAL

- * Turn the fuel cock to "OFF".
- * Disconnect the fuel hose at carburetor side.
- * Remove the fuel tank.

SPECIFICATIONS	
MAIN JET (M.J.)	#320
JET NEEDLE (J.N.)	6EJ35-59-3
PILOT JET (P.J.)	#15
PILOT AIR SCREW (P.A.S.)	1-7/8 ± 1/4
FLOAT ARM HEIGHT	15.2-17.2 mm (0.60-0.68 in)

A	4 Nm (0.4 m • kg, 2.9 ft • lb)
B	2 Nm (0.2 m • kg, 1.4 ft • lb)
C	1 Nm (0.1 m • kg, 0.7 ft • lb)
D	7 Nm (0.7 m • kg, 5.1 ft • lb)
E	10 Nm (1.0 m • kg, 7.2 ft • lb)



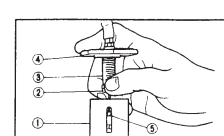
CARBURETOR AND REED VALVE ENG 

NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the machine and take care so that foreign material do not enter the engine.
- Remove the gasket adhered on the contacting surface.
- Before inspection, the removed parts should be cleaned and blow out all passages and jets with compressed air.
- After removing the carburetor, cover the carburetor joint not to enter foreign material.

Extent of removal

Order	Part name	Q'ty	Remarks
1	Clamp (carburetor joint)	2	Loosen the screws (carburetor joint).
2	Carburetor	1	
3	Screw	2	
4	Ring	1	Refer to "REMOVAL POINTS".
5	Throttle valve	1	
6	Drain plug	1	Refer to "REMOVAL POINTS".
7	Float chamber	1	
8	Pin (float)	1	
9	Float arm	1	
10	Cap	2	
11	Float	2	
12	Needle jet cover	1	
13	Main jet	1	
14	Pilot jet	1	
15	Starter plunger	1	
16	Throttle stop screw	1	
17	Air screw	1	
18	Carburetor joint	1	
19	Reed valve assembly	1	
20	Stopper (reed valve)	2	
21	Reed valve	2	



REMOVAL POINTS

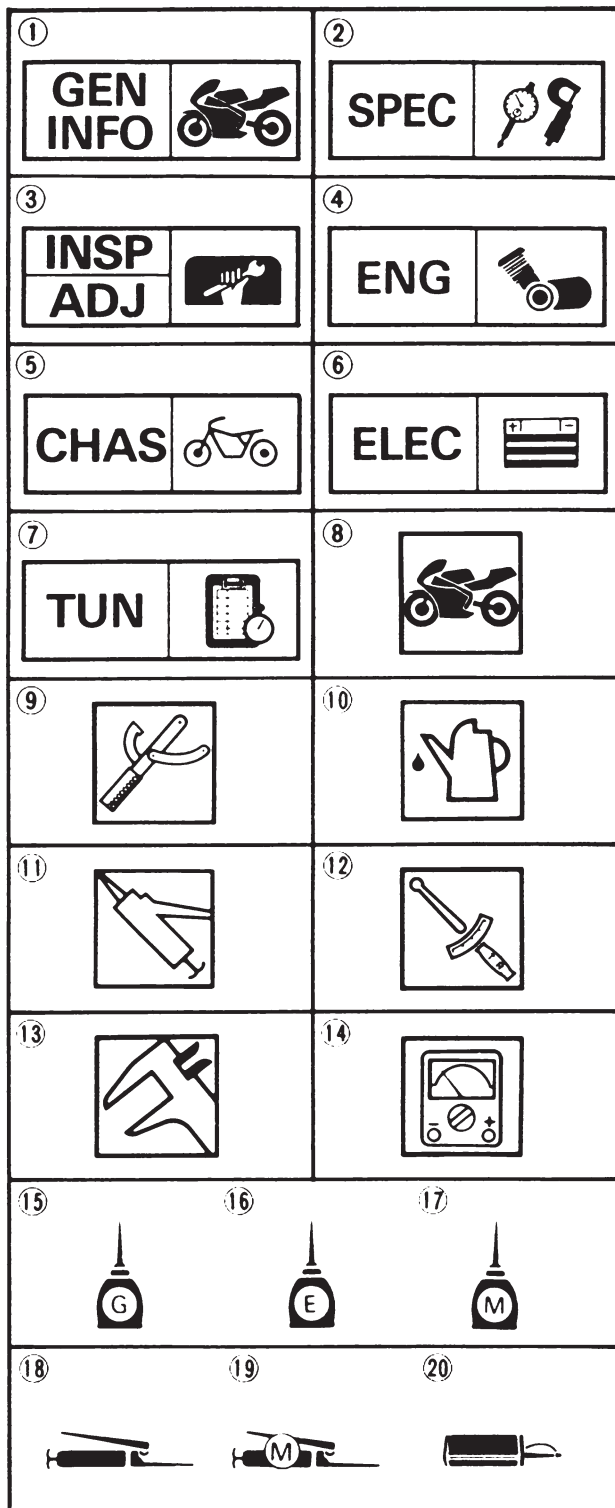
Throttle valve

1. Remove:

- Throttle valve ①
- Ring ②
- Spring (throttle valve) ③
- Mixing chamber top ④
- Throttle cable ⑤

NOTE:

While compressing the spring (throttle valve), disconnect the throttle cable.



ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑦ are designed as thumb tabs to indicate the chapter's number and content.

- ① General information
- ② Specifications
- ③ Regular inspection and adjustments
- ④ Engine
- ⑤ Chassis
- ⑥ Electrical
- ⑦ Tuning








Illustrated symbols ⑧ to ⑭ are used to identify the specifications appearing in the text.

- ⑧ With engine mounted
- ⑨ Special tool
- ⑩ Filling fluid
- ⑪ Lubricant
- ⑫ Tightening
- ⑬ Specified value, Service limit
- ⑭ Resistance (Ω), Voltage (V), Electric current (A)

Illustrated symbols ⑮ to ⑳ in the exploded diagram indicate grade of lubricant and location of lubrication point.

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

INDEX

GENERAL INFORMATION	
	GEN INFO 1
SPECIFICATIONS	
	SPEC 2
REGULAR INSPECTION AND ADJUSTMENTS	
	INSP ADJ 3
ENGINE	
	ENG 4
CHASSIS	
	CHAS 5
ELECTRICAL	
	ELEC 6
TUNING	
	TUN 7

CONTENTS

CHAPTER 1

GENERAL INFORMATION

DESCRIPTION.....	1-1
MACHINE IDENTIFICATION	1-2
VEHICLE IDENTIFICATION NUMBER (For USA, CDN, AUS, NZ and E)	1-2
FRAME SERIAL NUMBER (Except for USA, CDN, AUS, NZ and E)	1-2
ENGINE SERIAL NUMBER.....	1-2
MODEL LABEL.....	1-2
IMPORTANT INFORMATION.....	1-3
PREPARATION FOR REMOVAL AND DISASSEMBLY	1-3
ALL REPLACEMENT PARTS	1-4
GASKETS, OIL SEALS AND O-RINGS.....	1-4
LOCK WASHERS, PLATES AND COTTER PINS	1-4
BEARINGS AND OIL SEALS	1-4
CIRCLIPS	1-5
SPECIAL TOOLS.....	1-5
FOR TUNE UP.....	1-5
FOR ENGINE SERVICE	1-5
FOR CHASSIS SERVICE	1-7
FOR ELECTRICAL SERVICE	1-8
CONTROL FUNCTIONS	1-9
MAIN SWITCH.....	1-9
CLUTCH LEVER	1-9
SHIFT PEDAL	1-9
THROTTLE GRIP.....	1-9
FRONT BRAKE LEVER.....	1-9
REAR BRAKE PEDAL.....	1-10
FUEL COCK.....	1-10
STARTER LEVER (CHOKE)	1-10
WATER TEMPERATURE GAUGE.....	1-10
VALVE JOINT	1-10
BATTERY	1-11
INDUCTION BOX INTAKE SYSTEM..	1-11
FUEL PUMP	1-11
FUEL PUMP STOP SWITCH, FUEL PUMP RELAY	1-12
CATCH TANK	1-12

DETACHABLE MAINSTAND	1-13
DETACHABLE SIDESTAND.....	1-13
FIRE RETARDANT MATERIAL	1-13
COUPLER FOR SPEED SHIFT	1-13

FUEL AND ENGINE MIXING OIL	1-14
----------------------------------	------

INFORMATION BEFORE

PRE-OPERATION.....	1-15
PRE-OPERATION CHECK	1-15

PRE-OPERATION CHECK LIST	1-17
--------------------------------	------

STARTING AND BREAK-IN	1-18
STARTING A COLD ENGINE.....	1-18
WARMING UP.....	1-18
STARTING A WARM ENGINE.....	1-19
BREAK-IN PROCEDURES.....	1-19
BREAKING IN AFTER REPLACEMENT	1-20

TORQUE-CHECK POINTS.....	1-21
--------------------------	------

CLEANING AND STORAGE.....	1-22
CLEANING	1-22
STORAGE.....	1-23

CHAPTER 2 SPECIFICATIONS

SPECIFICATIONS	2-1
GENERAL SPECIFICATIONS.....	2-1
MAINTENANCE SPECIFICATIONS.....	2-3
Engine.....	2-3
Chassis	2-7
Electrical	2-11

GENERAL TORQUE SPECIFICATIONS ...	2-12
-----------------------------------	------

DEFINITION OF UNITS	2-12
---------------------------	------

CABLE ROUTING DIAGRAM.....	2-13
----------------------------	------

SETTING PARTS	2-17
CARBURETOR	2-17
CYLINDER GASKET.....	2-18
TRANSMISSION.....	2-18
DRIVE, DRIVEN SPROCKET	2-19

CHAPTER 3 REGULAR INSPECTION AND ADJUSTMENTS

MAINTENANCE INTERVALS.....	3-1
LOCKING WIRE INSTALLATION GUIDE...	3-4
COOLING WATER LEVEL	
INSPECTION	3-5
COOLING WATER REPLACEMENT	3-5
RADIATOR CAP INSPECTION.....	3-7
RADIATOR CAP OPENING	
PRESSURE INSPECTION	3-7
COOLING SYSTEM INSPECTION.....	3-8
CLUTCH CARE	3-8
CLUTCH ADJUSTMENT	3-9
PILOT AIR SCREW ADJUSTMENT.....	3-9
THROTTLE CABLE ADJUSTMENT.....	3-9
YPVS OPEN SIDE CABLE	
ADJUSTMENT.....	3-11
YPVS CLOSE SIDE CABLE	
ADJUSTMENT.....	3-12
YPVS COMPONENTS	
RETIGHTENING	3-12
TRANSMISSION OIL LEVEL	
CHECK.....	3-13
TRANSMISSION OIL	
REPLACEMENT	3-14
STARTER CABLE ADJUSTMENT	3-14
BRAKE SYSTEM AIR BLEEDING	3-15
FRONT BRAKE ADJUSTMENT.....	3-16
REAR BRAKE ADJUSTMENT	3-16
FRONT BRAKE PAD INSPECTION	
AND REPLACEMENT	3-17
REAR BRAKE PAD INSPECTION	
AND REPLACEMENT	3-19
BRAKE FLUID LEVEL INSPECTION	3-21
SPROCKETS INSPECTION.....	3-21
DRIVE CHAIN INSPECTION	3-22
DRIVE CHAIN SLACK	
ADJUSTMENT.....	3-23
WHEEL ALIGNMENT	
ADJUSTMENT.....	3-24
FRONT FORK INSPECTION	3-26
FRONT FORK TOP END	
ADJUSTMENT.....	3-26
FRONT FORK SPRING	
PRELOAD ADJUSTMENT	3-29
FRONT FORK REBOUND	
DAMPING FORCE ADJUSTMENT.....	3-29

FRONT FORK COMPRESSION	
DAMPING FORCE ADJUSTMENT.....	3-30
REAR SHOCK ABSORBER	
INSPECTION	3-31
SEAT HEIGHT ADJUSTMENT	3-32
REAR SHOCK ABSORBER SPRING	
PRELOAD ADJUSTMENT	3-32
REAR SHOCK ABSORBER REBOUND	
DAMPING FORCE ADJUSTMENT.....	3-33
REAR SHOCK ABSORBER	
COMPRESSION DAMPING FORCE	
ADJUSTMENT.....	3-34
TIRE PRESSURE CHECK	3-35
TIRE INSPECTION	3-35
WHEEL INSPECTION.....	3-36
STEERING HEAD INSPECTION AND	
ADJUSTMENT.....	3-36
STEERING DAMPER ADJUSTMENT	3-38
WIRES, CABLES	3-38
MUFFLER INSPECTION	3-38
SILENCER INSPECTION.....	3-39
COWLING INSTALLATION	
INSPECTION	3-39
LUBRICATION.....	3-40
SPARK PLUG INSPECTION.....	3-41
IGNITION TIMING CHECK	3-42
BATTERY INSPECTION	3-44
RECHARGING BATTERY	3-45

CHAPTER 4

ENGINE

COWLING, INDUCTION GUIDE, SEAT,	
FUEL TANK, EXHAUST PIPE AND	
SILENCER	4-1
PREPARATION FOR REMOVAL	4-1
REMOVAL POINTS	4-2
Induction guide (right cylinder)	4-2
RADIATOR	4-3
PREPARATION FOR REMOVAL	4-3
NOTE ON REMOVAL AND	
REASSEMBLY	4-3
REMOVAL POINTS	4-4
Radiator	4-4
INSPECTION	4-5
Radiator	4-5
ASSEMBLY AND INSTALLATION.....	4-5
Radiator	4-5

CARBURETOR AND REED VALVE	4-7
PREPARATION FOR REMOVAL	4-7
NOTE ON REMOVAL AND	
REASSEMBLY	4-8
HANDLING NOTE	4-9
REMOVAL POINTS	4-9
Throttle valve	4-9
INSPECTION	4-9
Carburetor	4-9
Needle valve	4-10
Throttle valve	4-10
Jet needle	4-10
Fuel level	4-10
Float	4-11
Reed valve	4-11
Induction box	4-12
ASSEMBLY AND INSTALLATION	4-12
Reed valve	4-12
Carburetor	4-13
Carburetor installation	4-16

CYLINDER HEAD, CYLINDER AND

PISTON	4-19
PREPARATION FOR REMOVAL	4-19
NOTE ON REMOVAL AND	
REASSEMBLY	4-20
REMOVAL POINTS	4-20
YPVS cable	4-20
Piston and piston ring	4-21
Power valve	4-22
INSPECTION	4-22
Cylinder head	4-22
Cylinder	4-22
Piston	4-23
Piston pin and small end	
bearing	4-24
Piston ring	4-25
Piston clearance	4-26
Combination of piston and	
cylinder	4-26
Power valve	4-27
Power valve hole on cylinder	4-27
ASSEMBLY AND INSTALLATION	4-28
Power valve	4-28
Piston ring and piston	4-29
Cylinder head and cylinder	4-30

CLUTCH	4-33
PREPARATION FOR REMOVAL	4-33

NOTE ON REMOVAL AND REASSEMBLY	4-34
REMOVAL POINTS	4-34
Clutch boss.....	4-34
INSPECTION	4-35
Clutch housing and boss	4-35
Clutch housing.....	4-35
Clutch spring.....	4-35
Friction plate	4-35
Clutch plate	4-36
Push rod axle	4-36
ASSEMBLY AND INSTALLATION.....	4-36
Clutch.....	4-36

PRIMARY DRIVE GEAR, PRIMARY DRIVEN GEAR AND BALANCER SHAFT	4-41
PREPARATION FOR REMOVAL	4-41
NOTE ON REMOVAL AND REASSEMBLY	4-42
REMOVAL POINTS	4-42
Primary drive gear and balancer weight gear	4-42
INSPECTION	4-43
Primary drive gear, primary driven gear and oil pump drive gear	4-43
Balancer drive gear and balancer weight gear.....	4-43
Crankcase cover (right)	4-43
Balancer shaft	4-44
ASSEMBLY AND INSTALLATION.....	4-44
Balancer shaft and primary drive gear	4-44
Primary driven gear.....	4-45

SHIFT SHAFT.....	4-47
PREPARATION FOR REMOVAL	4-47
NOTE ON REMOVAL AND REASSEMBLY	4-48
REMOVAL POINTS	4-48
Drive sprocket	4-48
Transmission housing	4-49
Shift shaft	4-49
Shift guide and shift lever assembly	4-49
Stopper lever	4-49
INSPECTION	4-50
Shift shaft	4-50

Shift guide and shift lever assembly	4-50
Stopper lever	4-50
ASSEMBLY AND INSTALLATION.....	4-50
Stopper lever	4-50
Shift guide and shift lever assembly	4-51
Shift shaft	4-52
Transmission housing	4-53

TRANSMISSION, SHIFT CAM AND

SHIFT FORK	4-55
PREPARATION FOR REMOVAL	4-55
NOTE ON REMOVAL AND REASSEMBLY	4-56
REMOVAL POINTS	4-56
Transmission	4-56
Segment	4-57
INSPECTION	4-57
Gears	4-57
Shift fork groove	4-57
Thrust clearance	4-58
Dog clearance	4-58
Bearing	4-59
Shift fork, shift cam and segment.....	4-59
ASSEMBLY AND INSTALLATION.....	4-60
Shift cam	4-60
Transmission	4-61

OIL PUMP	4-65
PREPARATION FOR REMOVAL	4-65
NOTE ON REMOVAL AND REASSEMBLY	4-65
INSPECTION	4-66
Oil pump.....	4-66
Strainer	4-66
Oil pump gear shaft.....	4-66
Oil delivery pipe.....	4-66
ASSEMBLY AND INSTALLATION.....	4-66
Oil pump.....	4-66

CDI MAGNETO	4-69
PREPARATION FOR REMOVAL	4-69
NOTE ON REMOVAL AND REASSEMBLY	4-69
REMOVAL POINTS	4-70
Rotor	4-70
INSPECTION	4-70

CDI magneto	4-70
Woodruff key.....	4-70
ASSEMBLY AND INSTALLATION.....	4-70
CDI magneto	4-70
ENGINE REMOVAL	4-73
PREPARATION FOR REMOVAL	4-73
NOTE ON REMOVAL AND REASSEMBLY	4-74
REMOVAL POINTS	4-74
Engine removal.....	4-74
ASSEMBLY AND INSTALLATION.....	4-75
Engine removal.....	4-75
 CRANKCASE AND CRANKSHAFT	4-77
PREPARATION FOR REMOVAL	4-77
NOTE ON REMOVAL AND REASSEMBLY	4-78
REMOVAL POINTS	4-78
Crankcase	4-78
INSPECTION	4-79
Crankcase	4-79
Crankshaft	4-79
Push lever axle.....	4-80
ASSEMBLY AND INSTALLATION.....	4-80
Crankshaft	4-80
Push lever axle.....	4-82
 WATER PUMP	4-83
PREPARATION FOR REMOVAL	4-83
NOTE ON REMOVAL AND REASSEMBLY	4-83
REMOVAL POINTS	4-84
Impeller shaft	4-84
Oil seal	4-84
INSPECTION	4-84
Impeller shaft	4-84
Oil seal	4-85
ASSEMBLY AND INSTALLATION.....	4-85
Oil seal	4-85
Impeller shaft	4-85

CHAPTER 5

CHASSIS

FRONT WHEEL	5-1
PREPARATION FOR REMOVAL	5-1
REMOVAL POINTS	5-2
Collar	5-2
Wheel bearing (if necessary)	5-2
INSPECTION	5-2

Front wheel	5-2
Front wheel axle	5-3
Brake disc	5-3
ASSEMBLY AND INSTALLATION.....	5-4
Front wheel	5-4
REAR WHEEL	5-7
PREPARATION FOR REMOVAL	5-7
REMOVAL POINTS	5-8
Rear wheel	5-8
Collar	5-8
Wheel bearing (if necessary)	5-8
INSPECTION	5-8
Rear wheel	5-8
Rear wheel axle	5-9
Brake disc	5-9
Clutch hub	5-10
ASSEMBLY AND INSTALLATION.....	5-10
Rear wheel	5-10
FRONT BRAKE	5-15
PREPARATION FOR REMOVAL	5-15
NOTE ON REMOVAL AND	
REASSEMBLY	5-16
HANDLING NOTE	5-16
REMOVAL POINTS	5-17
Caliper	5-17
Caliper piston	5-17
Piston seal kit	5-18
Master cylinder kit	5-18
INSPECTION	5-18
Master cylinder	5-18
Caliper	5-19
Brake hose.....	5-19
ASSEMBLY AND INSTALLATION.....	5-19
Caliper piston	5-20
Caliper	5-20
Master cylinder kit	5-21
Master cylinder	5-22
Brake hose.....	5-23
Brake fluid	5-24
REAR BRAKE	5-27
PREPARATION FOR REMOVAL	5-27
NOTE ON REMOVAL AND	
REASSEMBLY	5-28
HANDLING NOTE	5-28
REMOVAL POINTS	5-29
Caliper	5-29

Caliper piston	5-29
Piston seal kit	5-29
Master cylinder kit	5-30
INSPECTION	5-30
Master cylinder	5-30
Caliper	5-31
Brake hose	5-31
ASSEMBLY AND INSTALLATION	5-31
Caliper piston	5-31
Caliper	5-32
Master cylinder kit	5-33
Master cylinder	5-34
Brake hose	5-34
Brake fluid	5-36
FRONT FORK	5-37
PREPARATION FOR REMOVAL	5-37
HANDLING NOTE	5-38
REMOVAL POINTS	5-39
Cap bolt	5-39
Oil seal	5-39
Damper rod	5-40
INSPECTION	5-40
Damper rod	5-40
Fork spring	5-41
Inner tube	5-41
Outer tube	5-41
Cap bolt	5-42
ASSEMBLY AND INSTALLATION	5-42
Front fork assembly	5-42
Installation	5-48
STEERING	5-51
PREPARATION FOR REMOVAL	5-51
REMOVAL POINTS	5-52
Ring nut	5-52
INSPECTION	5-52
Bearing	5-52
Steering shaft	5-53
Steering damper	5-53
ASSEMBLY AND INSTALLATION	5-53
Under bracket	5-53
SWINGARM	5-59
PREPARATION FOR REMOVAL	5-59
NOTE ON REMOVAL AND	
REASSEMBLY	5-60
REMOVAL POINTS	5-60
Swingarm	5-60

INSPECTION	5-61
Swingarm	5-61
Relay arm	5-61
Connecting rod	5-61
Swingarm side clearance.....	5-62
ASSEMBLY AND INSTALLATION.....	5-63
Swingarm.....	5-63

REAR SHOCK ABSORBER.....	5-65
PREPARATION FOR REMOVAL	5-65
HANDLING NOTE.....	5-66
NOTES ON DISPOSAL (YAMAHA DEALERS ONLY).....	5-67
REMOVAL POINTS	5-67
Rear shock absorber.....	5-67
Spring (rear shock absorber)	5-68
INSPECTION	5-68
Rear shock absorber.....	5-68
ASSEMBLY AND INSTALLATION.....	5-69
Spring (rear shock absorber)	5-69
Rear shock absorber.....	5-70

CHAPTER 6 ELECTRICAL

ELECTRICAL COMPONENTS AND WIRING DIAGRAM.....	6-1
ELECTRICAL COMPONENTS.....	6-1
WIRING DIAGRAM	6-1
IGNITION SYSTEM	6-2
INSPECTION STEPS	6-2
FUSE INSPECTION.....	6-3
SPARK GAP TEST.....	6-3
SPARK PLUG CAP INSPECTION	6-3
COUPLERS AND LEADS	
CONNECTION INSPECTION	6-4
MAIN SWITCH INSPECTION	6-4
IGNITION COIL INSPECTION.....	6-4
CDI MAGNETO INSPECTION	6-5
CDI UNIT INSPECTION	6-6
CHARGING SYSTEM	6-7
INSPECTION STEPS.....	6-7
COUPLERS AND LEADS	
CONNECTION INSPECTION	6-8
CHARGING VOLTAGE INSPECTION ...	6-8
VOLTAGE REGULATOR INSPECTION...	6-8

YPVS SYSTEM	6-10
INSPECTION STEPS.....	6-10
COUPLERS AND LEADS	
CONNECTION INSPECTION	6-11
SERVOMOTOR OPERATION.....	6-11
SERVOMOTOR INSPECTION	6-11
 SOLENOID VALVE SYSTEM	 6-12
INSPECTION STEPS.....	6-12
COUPLERS AND LEADS	
ONNECTION INSPECTION	6-13
SOLENOID VALVE OPERATION.....	6-13
SOLENOID VALVE INSPECTION.....	6-13
 FUEL PUMP SYSTEM	 6-14
INSPECTION STEPS.....	6-14
COUPLERS AND LEADS	
CONNECTION INSPECTION	6-15
FUEL PUMP SWITCH INSPECTION ..	6-15
FUEL PUMP RELAY INSPECTION	6-15
FUEL PUMP OPERATION.....	6-16
FUEL PUMP COIL INSPECTION	6-17
FUEL PUMP INSPECTION.....	6-17

CHAPTER 7

TUNING

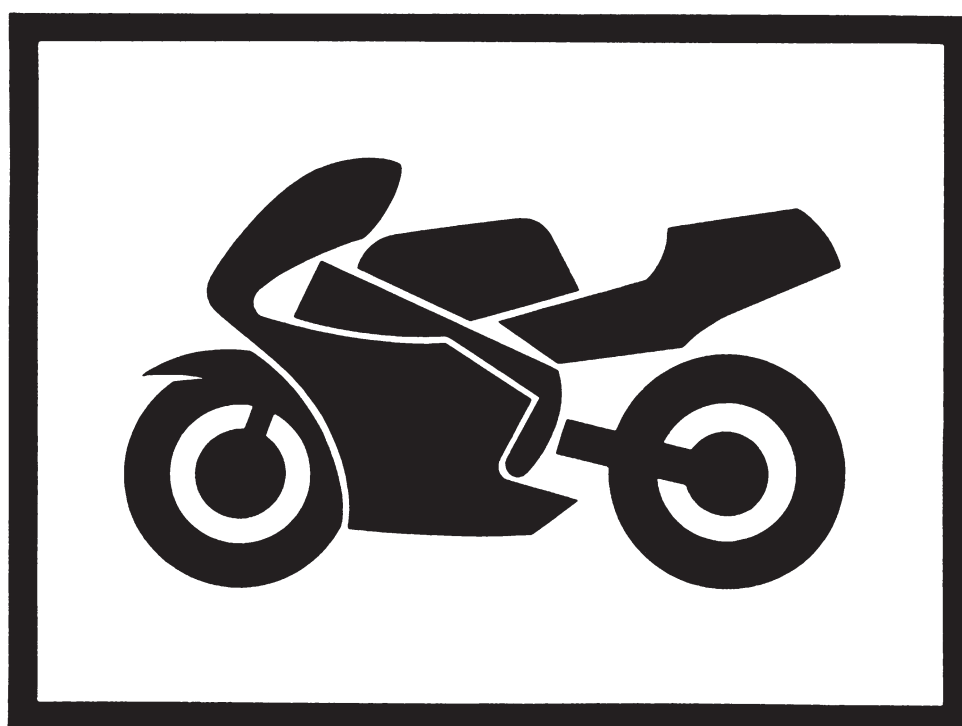
Carburetor setting.....	7-1
Atmospheric conditions and carburetor setting	7-2
Effects of setting parts in relation to throttle valve opening	7-2
Basic process of carburetor setting.....	7-3
Carburetor settings by correction coefficient.....	7-5
Table of correction coefficients for carburetor setting	7-6
Other setting parts.....	7-7
Plug chop.....	7-8
Setting of cylinder gasket	7-9
Measuring piston protrusion	7-10
Selection of transmission gear ratio	7-11
Suspension setting	7-12
Tire and machine's posture.....	7-13
Settings.....	7-14
Symptom.....	7-16
Setting record table	7-18

MEMO

CHAPTER 1

GENERAL INFORMATION

1



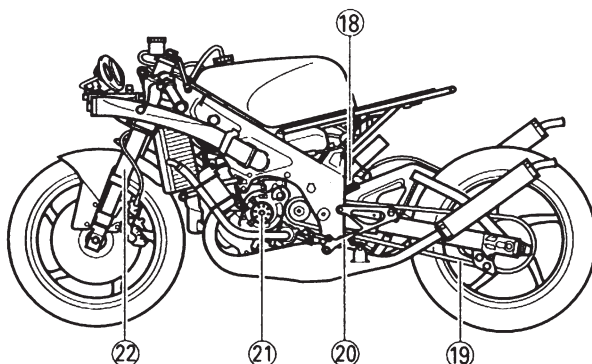
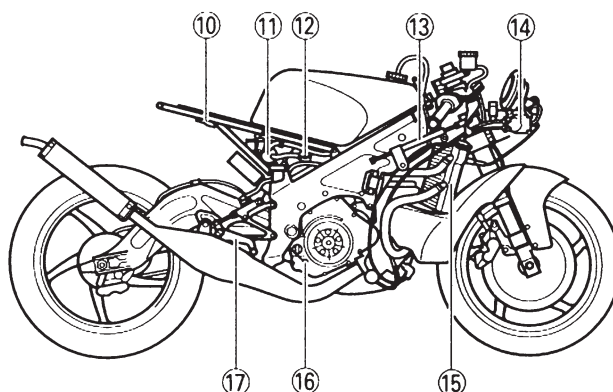
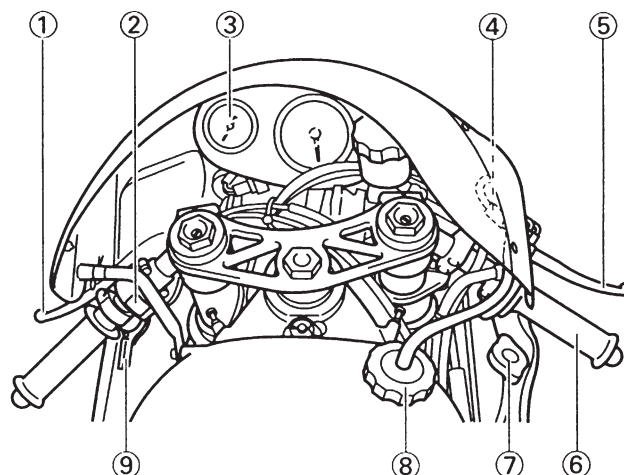


DESCRIPTION

- ① Clutch lever
- ② Main switch
- ③ Water temperature gauge
- ④ Valve joint
- ⑤ Front brake lever
- ⑥ Throttle grip
- ⑦ Radiator cap
- ⑧ Fuel tank cap
- ⑨ Starter lever (Choke)
- ⑩ Battery
- ⑪ Fuel pump
- ⑫ Fuel cock
- ⑬ Steering damper
- ⑭ Servomotor
- ⑮ Radiator
- ⑯ Check bolt (Transmission oil level)
- ⑰ Rear brake pedal
- ⑱ Rear shock absorber
- ⑲ Drive chain
- ⑳ Shift pedal
- ㉑ CDI magneto
- ㉒ Front fork

NOTE:

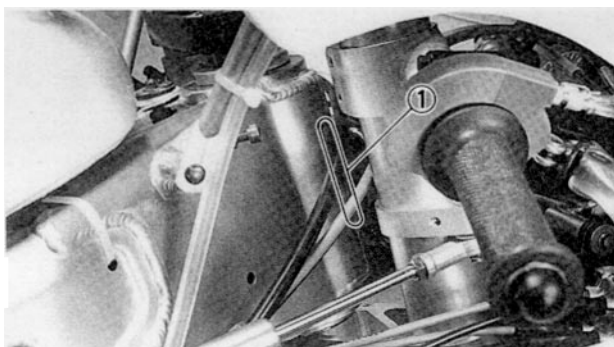
- The machine you have purchased may differ slightly from those shown in the photographs.
- Designs and specifications are subject to change without notice.



MACHINE IDENTIFICATION

There are two significant reasons for knowing the serial number of your machine:

1. When ordering parts, you can give the number to your Yamaha dealer for positive identification of the model you own.
2. If your machine is stolen, the authorities will need the number to search for and identify your machine.

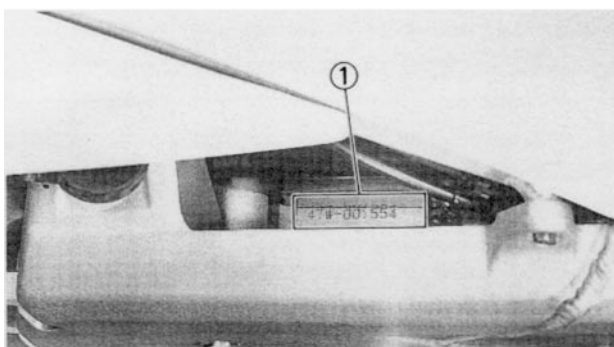
1

VEHICLE IDENTIFICATION NUMBER (For USA, CDN, AUS, NZ and E)

The vehicle identification number ① is stamped on the right of the steering head pipe.

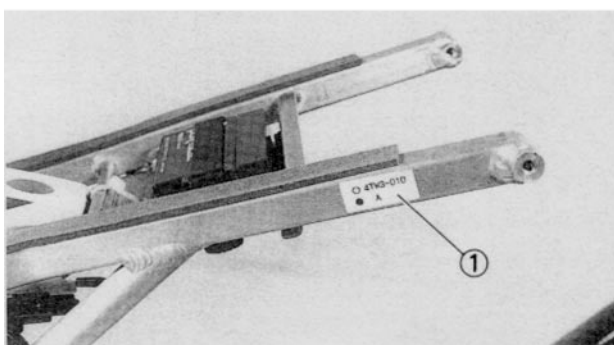
FRAME SERIAL NUMBER (Except for USA, CDN, AUS, NZ and E)

The frame serial number ① is stamped on the right of the steering head pipe.



ENGINE SERIAL NUMBER

The engine serial number ① is stamped into the elevated part of the right-side of the engine.



MODEL LABEL

The model label ① is affixed to the frame under the rider's seat. This information will be needed to order spare parts.

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

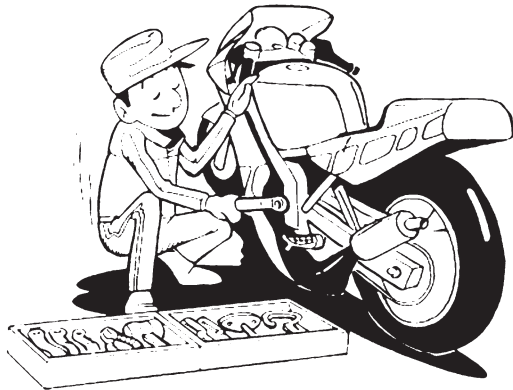
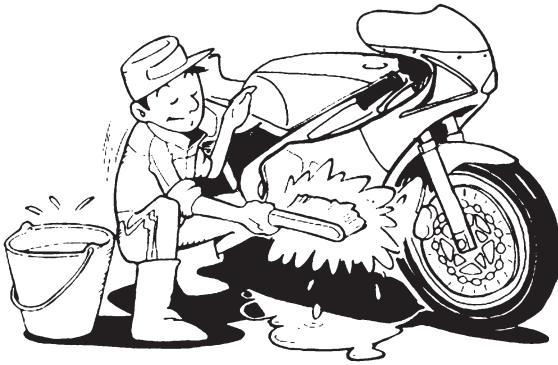
1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.

2. Use proper tools and cleaning equipment. Refer to "SPECIAL TOOL".

3. When disassembling the machine, keep mated parts together. They include gears, cylinders, pistons, and other mated 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.

5. Keep away from fire.

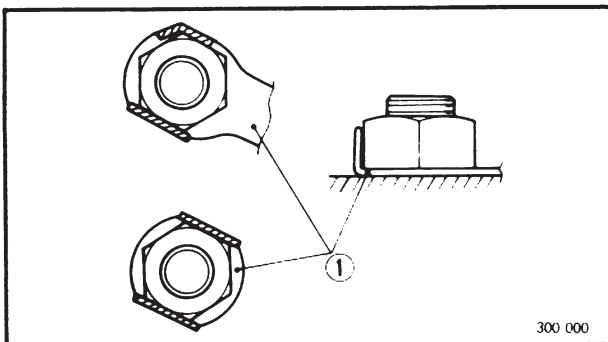


ALL REPLACEMENT PARTS

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

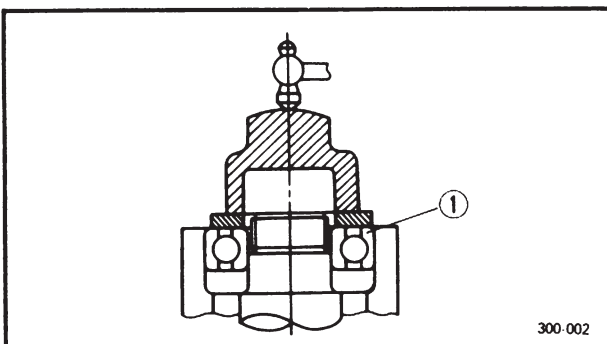
GASKETS, OIL SEALS AND O-RINGS

1. All gaskets, oil 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.



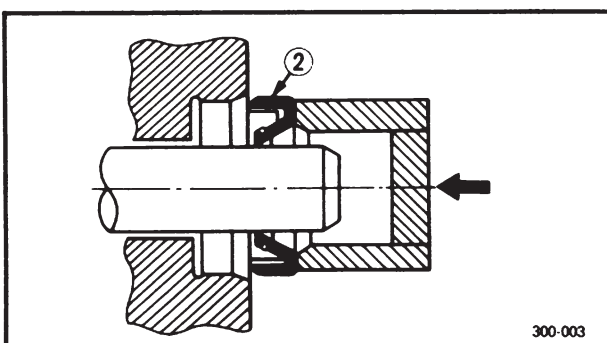
LOCK WASHERS, PLATES AND COTTER PINS

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.



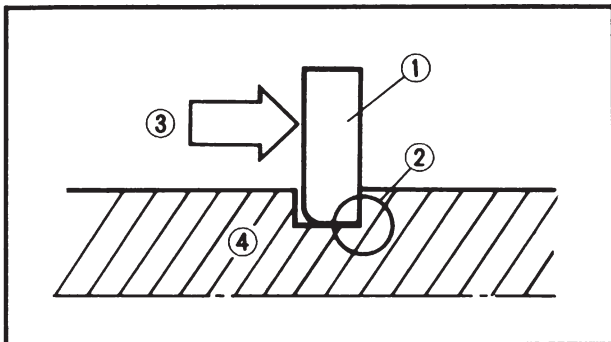
BEARINGS AND OIL SEALS

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.

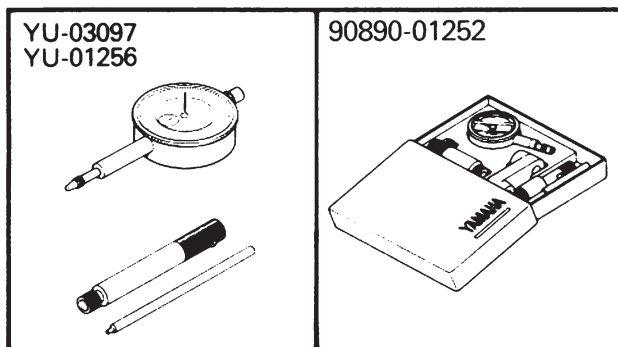
④ Shaft

SPECIAL TOOLS

The following special tools are required to perform maintenance, adjustments, and repairs on your machine. These tools can be obtained through your Yamaha dealer.

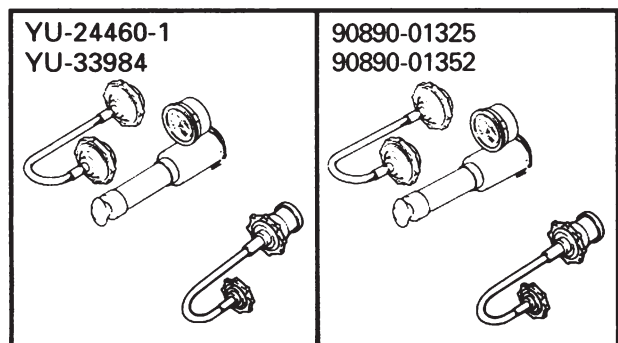
NOTE:

- For U.S.A. and Canada, use part number starting with "YM-" or "YU-".
- For others, use part number starting with "90890-".

**FOR TUNE UP**

1. Dial gauge and stand
P/N. YU-03097, YU-01256
90890-01252

These tools are used to set the ignition timing.

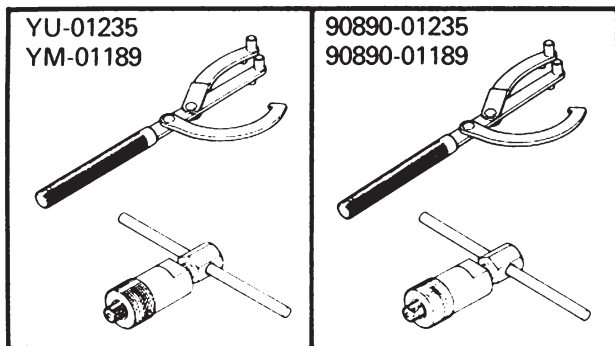
**FOR ENGINE SERVICE**

1. Radiator cap tester and adapter
Radiator cap tester P/N. YU-24460-1
90890-01325
Adapter P/N. YU-33984
90890-01352

These tools are used for checking the cooling system.

SPECIAL TOOLS

**GEN
INFO**



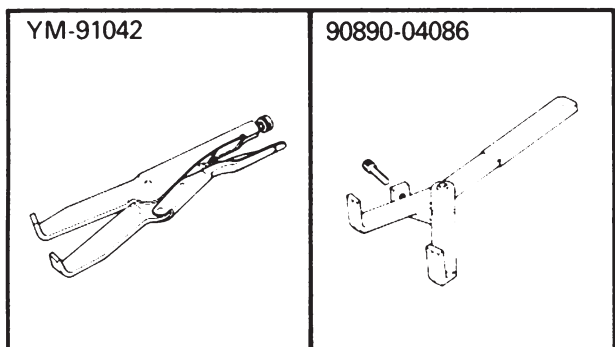
2. Rotor holder and rotor puller

Holder P/N. YU-01235
90890-01235

This tool is used when loosening or tightening the flywheel magneto securing nut.

Puller P/N. YM-01189
90890-01189

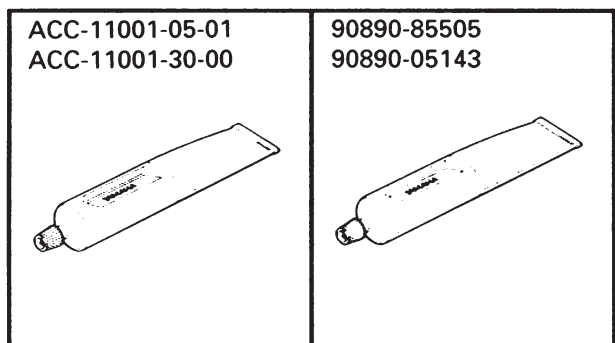
This tool is used to remove the magneto.



3. Clutch holder

P/N. YM-91042
90890-04086

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

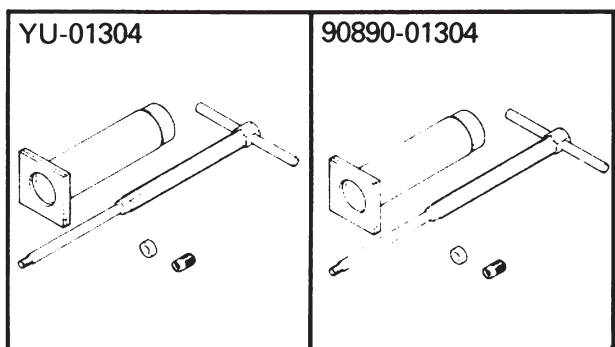


EC142810

4. Quick gasket®

P/N. ACC-11001-05-01
P/N. ACC-11001-30-00
YAMAHA Bond No. 1215
P/N. 90890-85505
YAMAHA Bond No. 4
P/N. 90890-05143

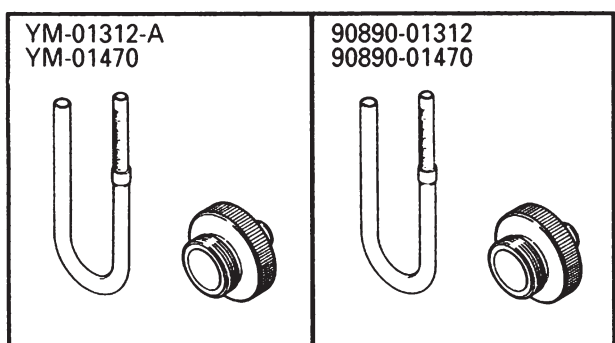
This seaiant (Bond) is used for crankcase mating surfaces, etc.



5. Piston pin puller

P/N. YU-01304
90890-01304

This tool is used to pull up the piston pin.



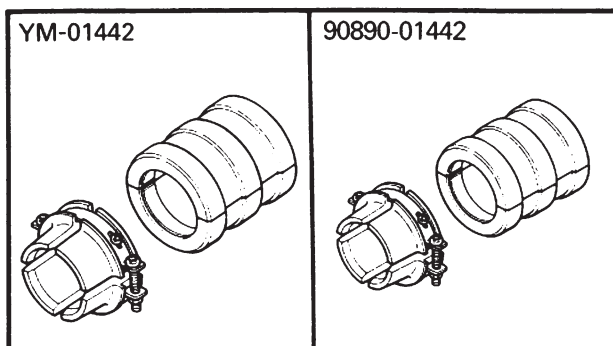
6. Fuel level gauge and fuel level gauge adapter

Gauge P/N. YM-01312-A
90890-01312
Adapter P/N. YM-01470
90890-01470

These tools are used to measure the fuel level in the float chamber.

1

1



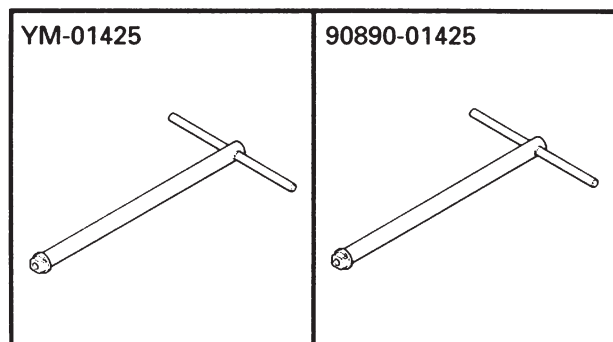
FOR CHASSIS SERVICE

1. Fork seal driver

P/N. YM-01442

90890-01442

This tool is used when install the fork oil seal.



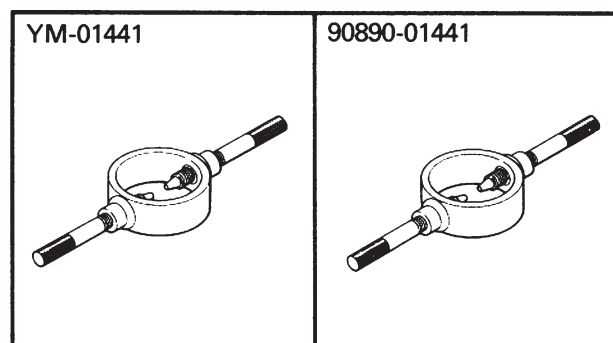
EC143221

2. Damper rod holder

P/N. YM-01425

90890-01425

Use this tool to remove and install the damper rod.

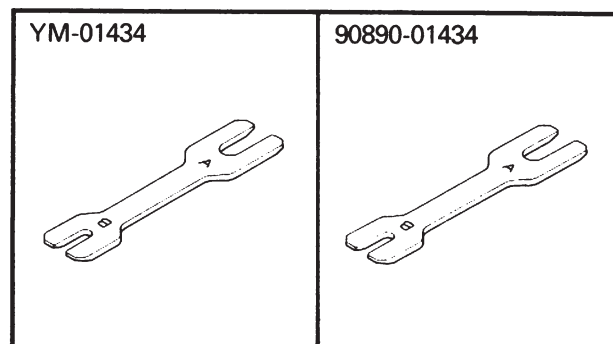


3. Fork spring compressor

P/N. YM-01441

90890-01441

This tool is used to compress the fork spring.

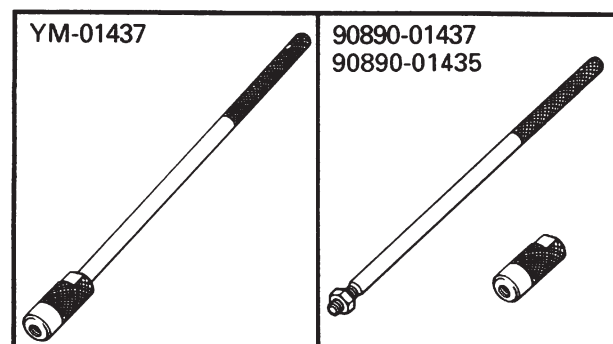


4. Rod holder

P/N. YM-01434

90890-01434

This tool is used to hold the fork spring.



5. Rod puller and rod puller attachment

Rod puller

P/N. YM-01437

90890-01437

Rod puller attachment P/N. 90890-01435

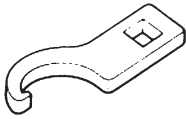
These tools are used to pull up the fork damper rod.

SPECIAL TOOLS

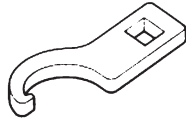


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YU-33975



90890-01403



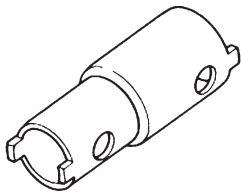
6. Ring nut wrench

P/N. YU-33975

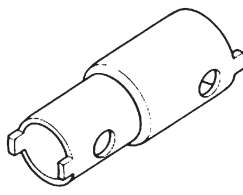
90890-01403

This tool is used when tighten the steering ring nut to specification.

YM-01455



90890-01455



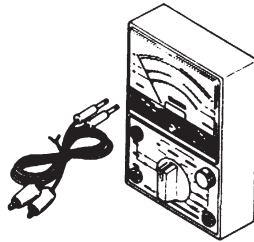
7. Pivot shaft wrench

P/N. YM-01455

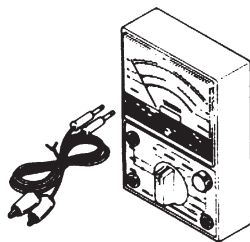
90890-01455

This tool is used to loosen or tighten the pivot adjust bolt.

YU-03112



90890-03112



FOR ELECTRICAL SERVICE

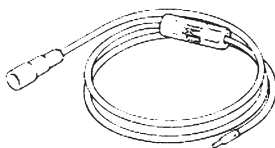
1. Yamaha pocket tester

P/N. YU-03112

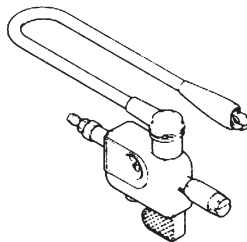
90890-03112

Use this tool to inspect the coil resistance, output voltage and amperage.

YM-34487



90890-06754



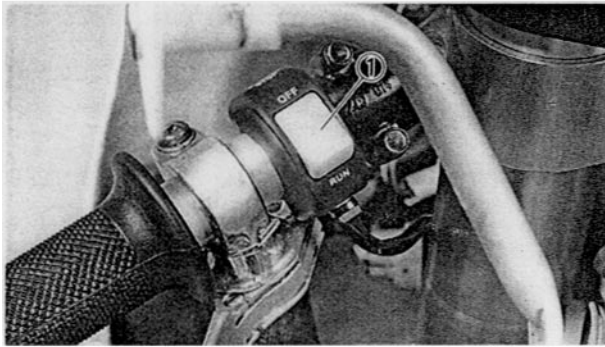
2. Dynamic spark tester

P/N. YM-34487

Ignition checker

P/N. 90890-06754

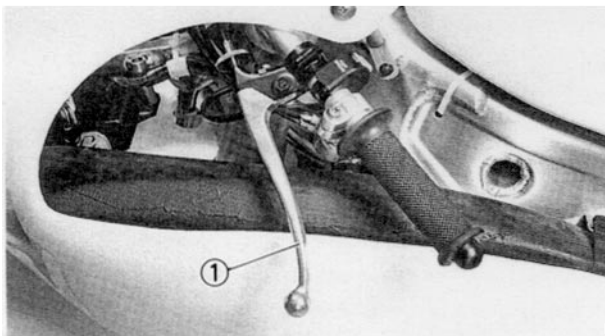
This instrument is necessary for checking the ignition system components.



CONTROL FUNCTIONS

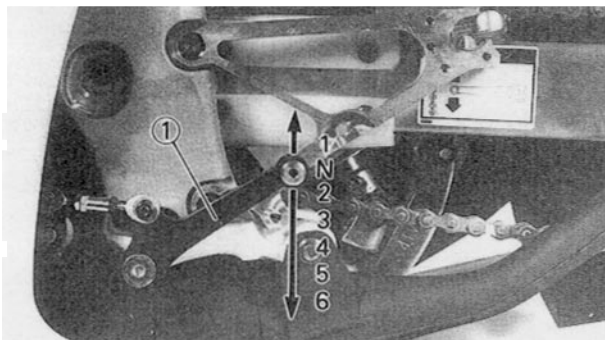
MAIN SWITCH

While the battery is connected, moving the main switch ① to "RUN" causes the servomotor, fuel pump and solenoid valves to be initially activated. To prevent the battery from being discharge, do not move the main switch to "RUN" except when the engine is started or when electric parts are checked.



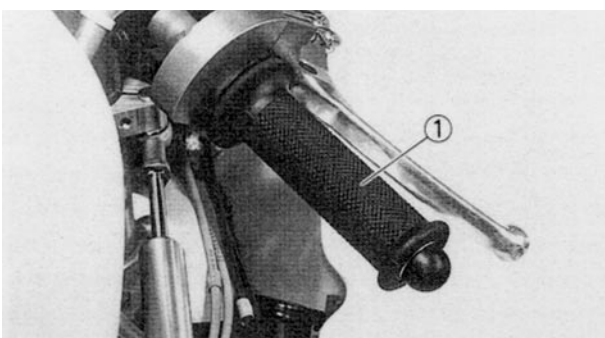
CLUTCH LEVER

The clutch lever ① is located on the left handlebar; it disengages or engages the clutch. Pull the clutch lever to the handlebar to disengage the clutch, and release the lever to engage the clutch. The lever should be pulled rapidly and released slowly for smooth starts.



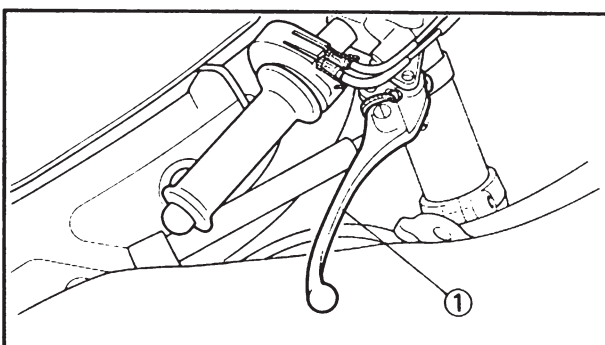
SHIFT PEDAL

The gear ratios of the constant-mesh 6-speed transmission are ideally spaced. The gears can be shifted by using the shift pedal ① on the left side of the engine.



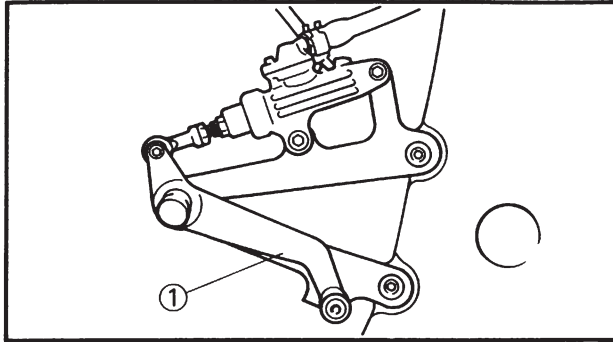
THROTTLE GRIP

The throttle grip ① is located on the right handlebar; it accelerates or decelerates the engine. For acceleration, turn the grip toward you; for deceleration, turn it away from you.



FRONT BRAKE LEVER

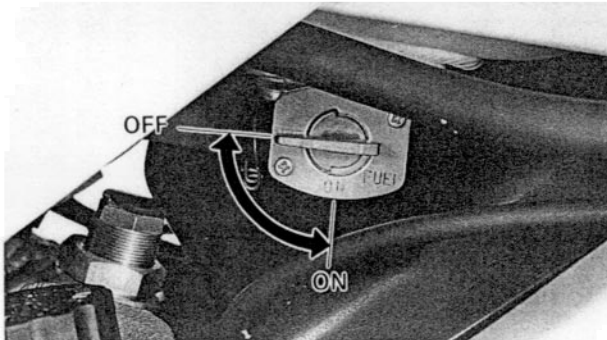
The front brake lever ① is located on the right handlebar. Pull it toward the handlebar to activate the front brake.



REAR BRAKE PEDAL

The rear brake pedal ① is located on the right side of the machine. Press down on the brake pedal to active the rear brake.

1

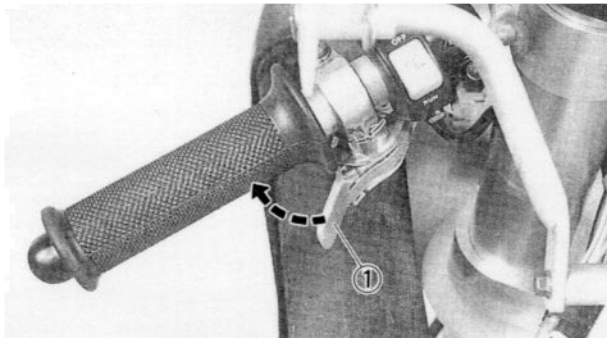


FUEL COCK

The fuel cock supplies fuel from the tank to the carburetor while filtering the fuel. The fuel cock has two positions:

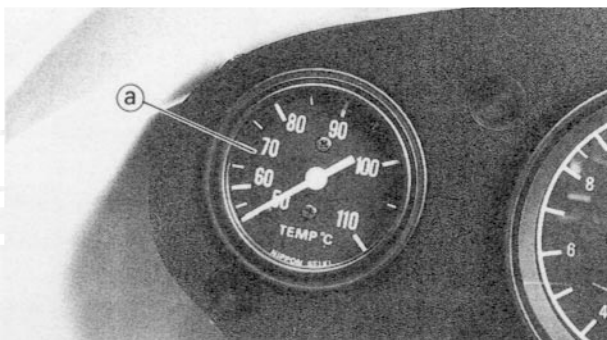
OFF: With the lever in this position, fuel will not flow. Always return the lever to this position when the engine is not running.

ON: With the lever in this position, fuel flows to the carburetor. Normal riding is done with the lever in this position.



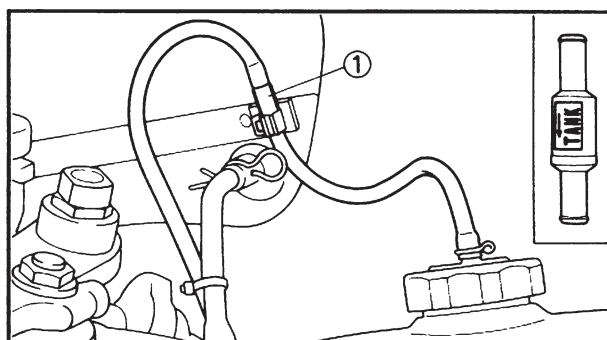
STARTER LEVER (CHOKE)

When cold, the engine requires a richer air-fuel mixture for starting. A separate starter circuit, which is controlled by the starter lever ①, supplies this mixture. Push the starter lever ① out to open the circuit for starting. When the engine has warmed up pull it in to close the circuit.



WATER TEMPERATURE GAUGE

This gauge indicates the cooling water temperature. Water temperature may be 70°C (158°F) a when engine is operated in good conditions.



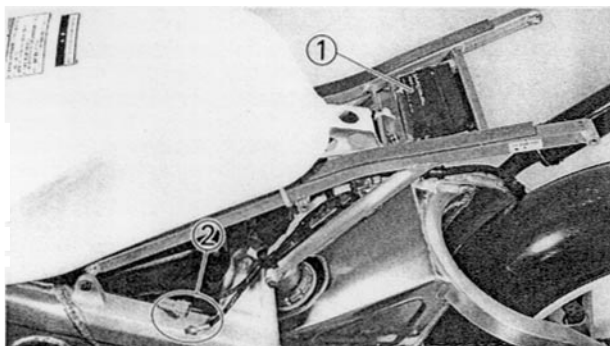
VALVE JOINT

This valve joint ① prevents fuel from flowing out and is installed to the fuel tank breather hose.

CAUTION:

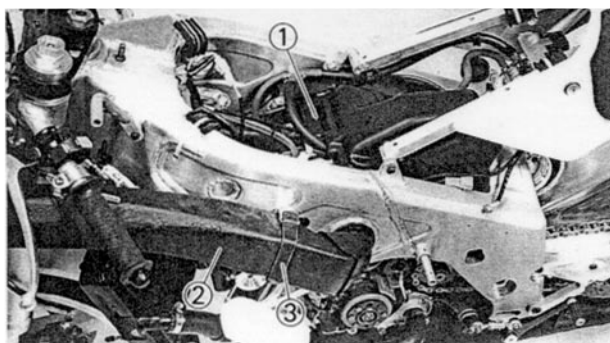
In this installation, make sure the arrow faces the fuel tank and also downward.

1



BATTERY

The battery ① is provided as power supply for the electric parts. Except when the machine is run, disconnect the power supply coupler ② of the wireharness to prevent battery discharge.

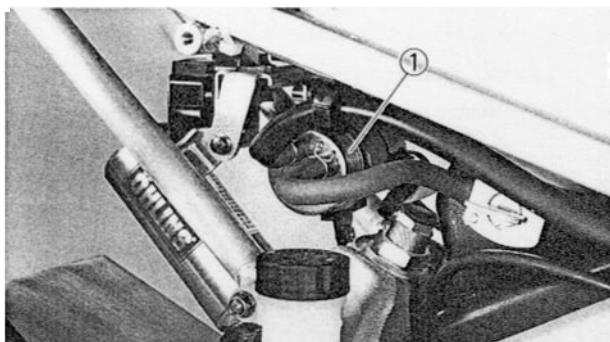
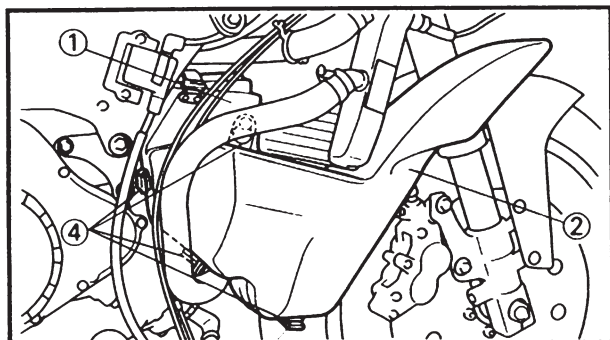


INDUCTION BOX INTAKE SYSTEM

The induction boxes ① and induction guides ② are provided for the purpose of applying pressure inside the carburetor float chamber and thereby improving the intake performance. If the machine is run without them, the carburetor settings will become faulty.

NOTE:

Be sure to fix the induction guides with band ③ or hooks ④ so that they do not come off by wind pressure while running.



FUEL PUMP

The fuel pump ① is provided in order to provide steady supply of fuel even when the pressure inside the carburetor float chamber becomes higher than inside the fuel tank because of the induction box intake system. If the fuel level is not up to the specified level in the float chamber, this pump is activated (with an operation sound) and stops operating when the specified level is reached.

CAUTION:

Do not idle run the fuel pump with no fuel flowing as when the fuel tank is empty or when the fuel cock is "OFF". It may damage the fuel pump.



If the machine is turned over, the fuel pump stop switch is turned "ON" which allow electric current to flow in the coil ③ inside the relay, causing the relay switch ④ to turn "OFF" and shutting of the electric current flow to the fuel pump ⑤. Thus, the fuel pump comes to a stop.

	Fuel pump stop switch ①	Fuel pump Relay switch ④	Fuel pump ⑤
During run	OFF	ON	ON
During turnover	ON	OFF	OFF

- When the machine is picked up from turnover, the fuel pump is restored to an operation condition.
- Install the fuel pump stop switch so that "UPPER" mark (a) faces upward.



- ③ Radiator breather hose
- ④ Fuel tank breather hose
- ⑤ Transmission oil breather hose

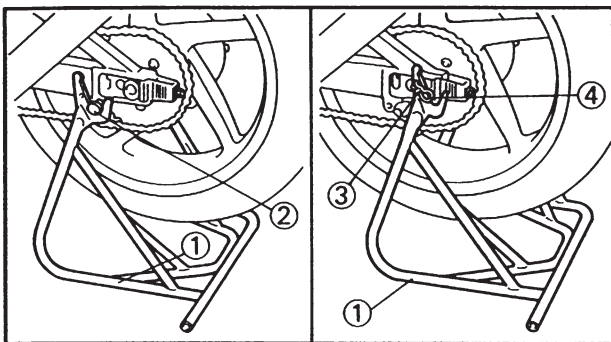


When putting in the transmission oil breather hose, its tip having a cut (a) should be on the frame side.





1

**DETACHABLE MAINSTAND**

This mainstand ① is used to support only the machine when standing or transporting it.

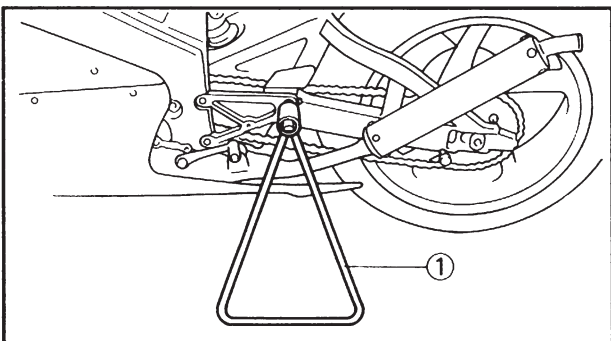
NOTE:

The mainstand can be used to support the machine two ways.

1. Hook the bracket of the mainstand onto the swingarm hooks ②.
2. Stand shaft (with supplying parts):
Insert the stand shaft ③ through the hole of the mainstand and rear wheel axle. Be sure to install the clip ④ in the end of the stand shaft.

⚠ WARNING

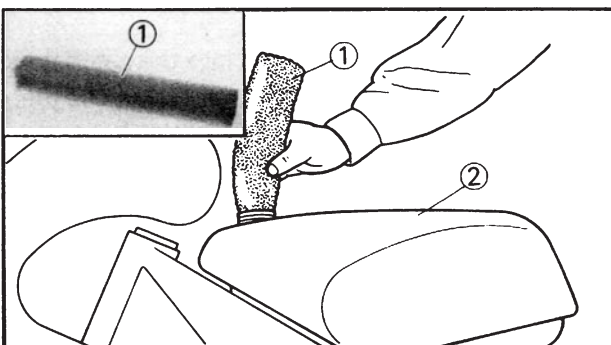
- Never apply additional force to the mainstand.
- Remove this mainstand before starting out.

**DETACHABLE SIDESTAND**

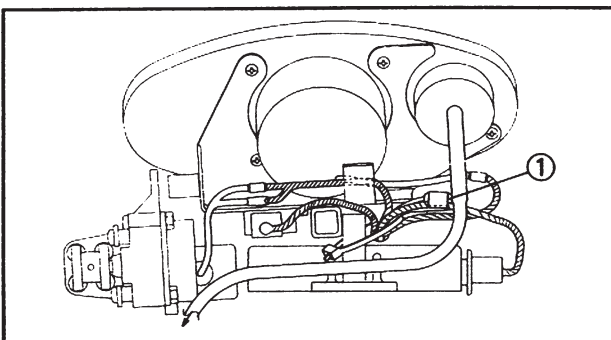
This sidestand ① is used to support only the machine when standing or transporting it.

⚠ WARNING

- Never apply additional force to the sidestand.
- Remove this sidestand before starting out.

**FIRE RETARDANT MATERIAL**

For racing, be sure to fill the fuel tank ② completely with fire retardant material (with supplying parts) ①.

**COUPLER FOR SPEED SHIFT**

If an after-market speed shift is installed, the coupler ① should be used.

NOTE:

If the speed shift is not installed, be sure to fix the coupler to the wireharness using a vinyl tape, for protection against water entry as well because if the coupler contacts the frame, sparks will be shut off, causing the engine to stop.



FUEL AND ENGINE MIXING OIL

Mix oil with the gas at the ratio specified below. Always use fresh, name-brand gasoline, and mix the oil and gas the day of the race. Do not use premix that is more than a few hours old.



Recommended fuel:

Except for AUS:

**Premium unleaded fuel with
a research octane number of
95 or higher.**

For AUS:

Unleaded fuel only

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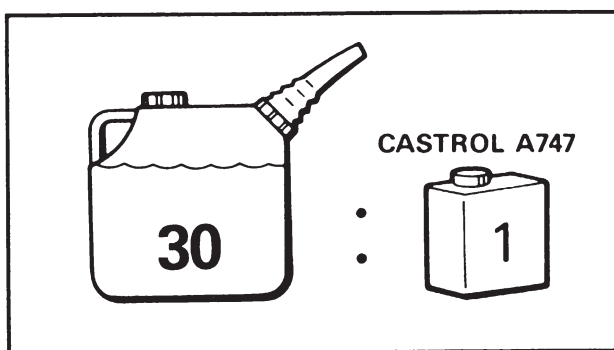
NOTE: _____

Except for AUS:

1. If knocking or pinging occurs, use a different brand of gasoline or higher octane grade.
2. If unleaded gasoline is not available, then leaded gasoline can be used.

CAUTION: _____

Never mix two types of oil in the same batch; clotting of the oil could result. If you wish to change oil types, be sure to drain the fuel tank and the carburetor float bowl of old premix prior to filling with the new type.



Fuel tank capacity:

23.0 L

(5.06 Imp gal, 6.08 US gal)

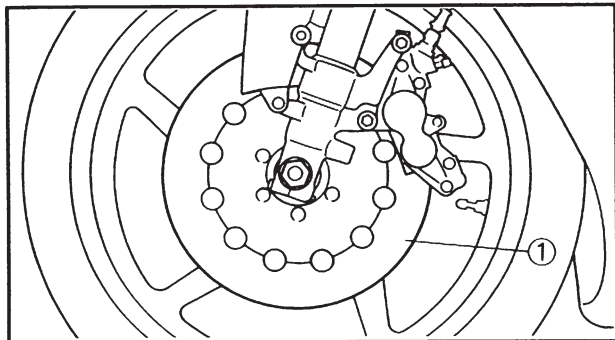


Mixing oil

Recommended oil:

Castrol A747

Mixing ratio : 30 : 1



INFORMATION BEFORE PRE-OPERATION

PRE-OPERATION CHECK

1. The brake disc ① is coated with a rust-inhibiter.

Before riding the machine, thoroughly remove it using a lacquer thinner.

⚠ WARNING

- **LACQUER THINNER IS HIGHLY FLAMMABLE.**

Always turn off the engine while using lacquer thinner. Take care not to spill any lacquer thinner on the engine or exhaust system.

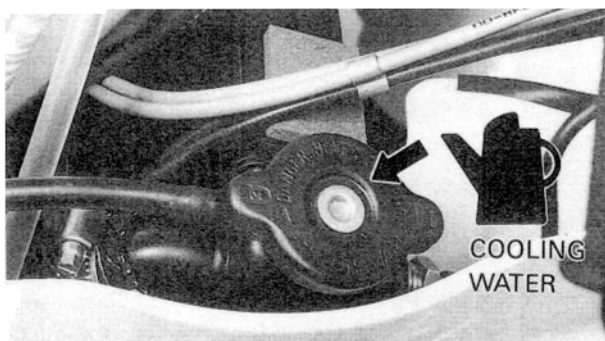
Never use it in the vicinity of an open flame, or while smoking.

- **LACQUER THINNER CAN CAUSE INJURY.**

Always use lacquer thinner in a well ventilated area. If you should swallow some lacquer thinner, inhale excess lacquer thinner vapors, or allow any lacquer thinner to get into your eyes, contact a doctor immediately.

NOTE:

- When the machine is not in use for a long time, apply a rust-inhibiter to the brake disc.
- After riding in the rainy weather, wipe the moisture completely off the disc.
- If rust appears on the brake disc, carefully remove it using #400 sand paper.



2. The cooling system is filled with coolant at the factory to prevent rusting. Be sure to replace coolant with soft water before riding.

CAUTION:

Hard water or salt water is harmful to the engine parts. You may use distilled water, if you can't get soft water.

MEMO

1

PRE-OPERATIONS CHECK LIST



PRE-OPERATION CHECK LIST

Before riding for break-in operation, practice or a race, make sure the machine is in good operating condition.

Before using this machine, check the following points.

NOTE:

1. The brake disc is coated with a rust inhibitor. Before pre-operation thoroughly remove it using a lacquer thinner.
2. For storage, a coolant is used. Before riding the machine remove it with cooling water. Refer to "INFORMATION BEFORE PRE-OPERATION".

Item	Routine	Page
Cooling water	Check that cooling water filled up to the radiator filler cap. Check the cooling system for leakage.	3-5 ~ 3-8
Fuel	Check that a fresh mixture of oil and gasoline is filled in the fuel tank. Check the fuel line for leakage.	1-14
Transmission oil	Check that the oil level is correct. Check the crankcase for leakage.	3-13 ~ 3-14
Gear shifter and clutch	Check that gears can be shifted correctly in order and that the clutch operates smoothly.	3-8 ~ 3-9
Throttle grip/Housing	Check that the throttle grip operation and free play are correctly adjusted. Lubricate the throttle grip and the housing, if necessary.	3-9 ~ 3-10
Brakes	Check the play of both front and rear brakes and their braking effect. Check brake disc surface.	3-15 ~ 3-21
Chain	Check chain slack and alignment. Check that the chain is lubricated properly.	3-22 ~ 3-24
Wheels	Check for excessive wear, tire pressure, tire wear.	3-35 ~ 3-36
Steering	Check that the handlebars can be turned smoothly and have no excessive play.	3-36 ~ 3-38
Front forks and Rear shock absorber	Check that they operate smoothly and there is no oil leakage.	3-26 ~ 3-35
Cables (wires)	Check that the clutch and throttle cables move smoothly. Check that they are not caught when the handlebars are turned or when the frontforks travel up and down.	3-38
Muffler	Check that the muffler is tightly mounted and has no cracks.	3-38 ~ 3-39
Sprocket	Check that the driven sprocket tightening bolt is not loose.	3-21
Lubrication	Check for smooth operation. Lubricate if necessary.	3-40
Bolts and nuts	Check the chassis and engine for loose bolts and nuts.	1-21
Lead connectors	Check that the CDI magneto, CDI unit, and ignition coil are connected tightly.	6-1
Battery	Check the battery voltage.	3-44 ~ 3-46
Settings	Taking into account the result of pre race test-runs, — is the machine set suitably for the weather conditions and race course? Is inspection and maintenance completed?	—
Y.P.V.S.	Check operation.	3-11 ~ 3-12

STARTING AND BREAK-IN

CAUTION:

Before starting the machine, perform the checks in the pre-operation check list.

⚠ WARNING

Never start or run the engine in a closed area. The exhaust fumes are poisonous; they can cause loss of consciousness and death in a very short time. Always operate the machine in a well-ventilated area.

1

STARTING A COLD ENGINE

1. Connect the power supply coupler.
2. Turn the fuel cock to "ON" and push the starter lever (CHOKE).
3. Move the main switch to "RUN".
4. Shift the transmission into "1st" gear.
5. Apply the clutch lever and push the machine.
6. After gaining some momentum, release the clutch lever.
7. As soon as the engine starts, quickly apply the clutch lever again and open the throttle grip slightly at the same time so as to sustain idling of the engine. Then, shift the transmission into neutral.
8. After applying full-throttle a few times, turn the choke lever to the original position. Take some time to allow the engine to warm up.

WARMING UP

Run the engine at varying speeds 5,000 ~ 6,000 r/min for 1 ~ 2 minutes. Fully warm up until the water temperature gauge reads 70°C (158°F) or so.

CAUTION:

Do not warm up the engine for extended periods.

STARTING A WARM ENGINE

Do not push the starter lever. Open throttle slightly.

CAUTION:

Observe the following break-in procedure during initial operation to ensure optimum performance and avoid engine damage.

BREAK-IN PROCEDURES

- Before starting the engine, fill the fuel tank with a break-in oil-fuel mixture as follows.

	Mixing oil:	Mixing ratio:
	Castrol A747	30:1

- Perform the pre-operation checks on the machine.
- Start and warm up the engine. Check the operation of the controls and check that the engine comes to a stop when moving the main switch to "OFF".

NOTE:

During break-in, mask part of the radiator core so that the water temperature is 55~65°C (131~149°F).

- Operate the machine under 8,000 r/min and run on a course about 10 km (6 miles). While making a straight-line run, open the throttle from time to time, taking care not to exceed the revolution limit.
- Go back to the pit to check for looseness, leakage, and other failures in installation.
- Next, operate the machine under 9,000 r/min and run about 10 km (6miles). (While running in this way, get an idea of the riding position and approximate settings.)
- Go back to the pit again, check the machine fully for looseness, leakage, and other failures in installation, especially for loose cables and wires, excessive brake free play, and a chain slack. Also make adjustment for a riding position according to your preference.

CAUTION:

After the break-in or before each race, you must check the entire machine for loose fittings and fasteners as per "TORQUE-CHECK POINTS".

Tighten all such fasteners as required.

8. Increase the engine speed up to 10,000 r/min and run about 10 km (6 miles).
9. Increase the engine speed up to 11,000 r/min and run about 10 km (6 miles).
10. Increase the engine speed up to 12,000 r/min and run about 10 km (6 miles). Then do the plug chop. Check the piston head for burning to see if there is any problem. Refer to "SETTING" section in the CHAPTER 7.
11. Run about 10 km (6 miles) in a usual manner. Then do the plug chop. Check the piston head for burning to see if there is any problem.

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EC195001

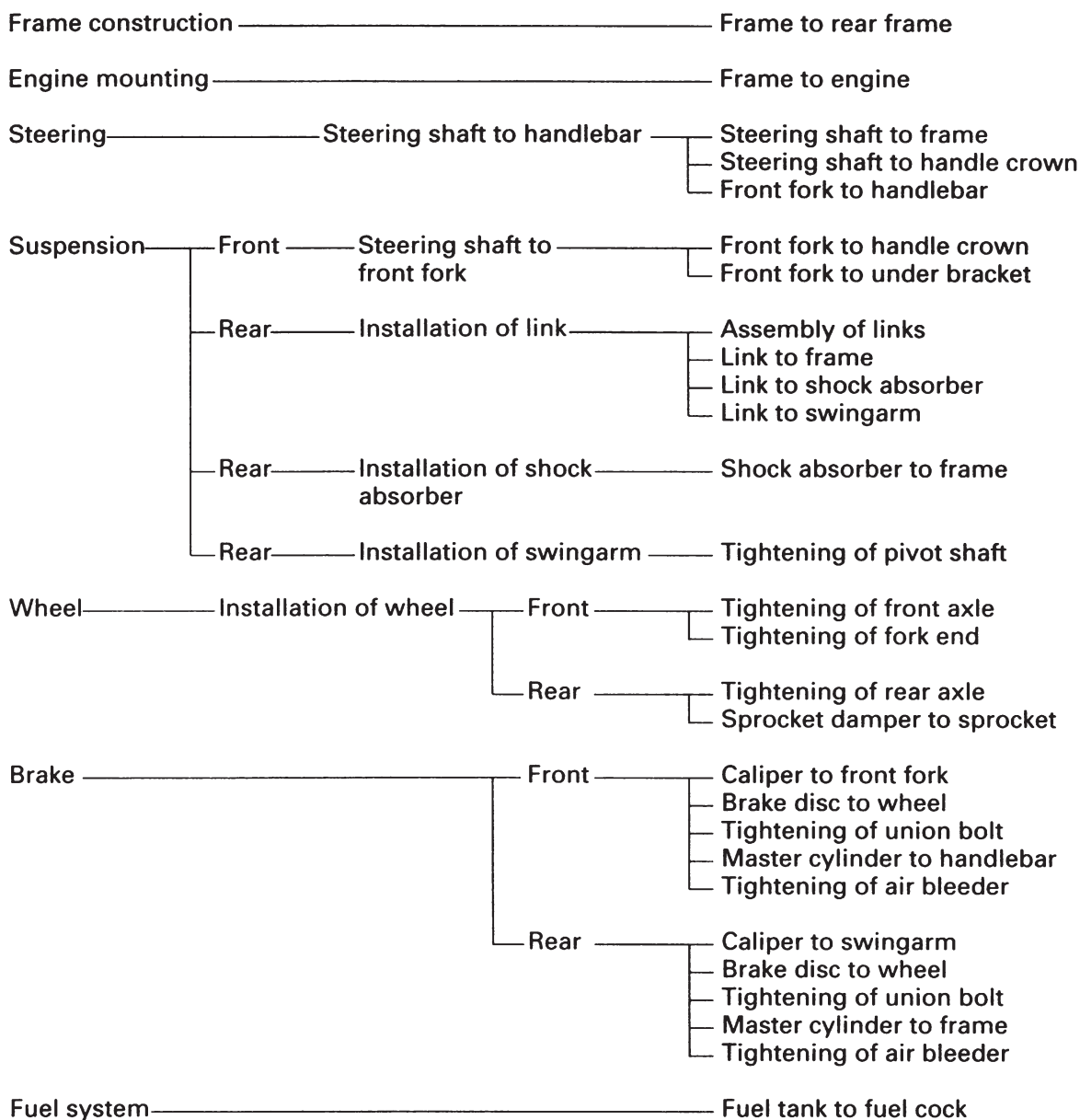
BREAKING IN AFTER REPLACEMENT

After a part is replaced with a new one, it is necessary to break it in as in a new machine. This is required especially when the following engine-related parts are replaced.

- Cylinder ○ Piston ○ Piston ring
- Crankshaft ○ Clutch ○ Transmission gear
- Shift fork

* For warming up and inspection during break-in, refer to "PRE-OPERATION CHECK LIST" and if there is any problem, stop the engine immediately and check.

TORQUE-CHECK POINTS



NOTE: _____

Concerning the tightening torque, refer to the
MAINTENANCE SPECIFICATIONS in **CHAPTER 2 SPECIFICATIONS**.

CLEANING AND STORAGE

CLEANING

Frequent cleaning of your machine will enhance its appearance, maintain good overall performance, and extend the life of many components.

1. Before washing the machine, block off the end of the exhaust pipe to prevent water from entering. A plastic bag secured with a rubber band may be used for this purpose.
2. If the engine is excessively greasy, apply some degreaser to it with a paint brush. Do not apply degreaser to the chain, sprockets, or wheel axles.
3. Rinse the dirt and degreaser off with a garden hose; use only enough pressure to do the job.

1

CAUTION:

Excessive hose pressure may cause water seepage and contamination of wheel bearings, front forks, brakes and transmission seals. Many expensive repair bills have resulted from improper high pressure detergent applications such as those available in coin-operated car washers.

4. After the majority of the dirt has been hosed off, wash all surfaces with warm water and a mild detergent. Use an old toothbrush to clean hard-to-reach places.
5. Rinse the machine off immediately with clean water, and dry all surfaces with a soft towel or cloth.
6. Immediately after washing, remove excess water from the chain with a paper towel and lubricate the chain to prevent rust.
7. Clean the seat with a vinyl upholstery cleaner to keep the cover pliable and glossy.
8. Automotive wax may be applied to all painted or chromed surfaces. Avoid combination cleaner-waxes, as they may contain abrasives.
9. After completing the above, start the engine and allow it to idle for several minutes.

STORAGE

If your machine is to be stored for 60 days or more, some preventive measures must be taken to avoid deterioration. After cleaning the machine thoroughly, prepare it for storage as follows:

1. Drain the fuel tank, fuel lines, and the carburetor float chambers.
2. Remove the spark plugs, pour a tablespoon of SAE 10W30 motor oil in the spark plug hole, and reinstall the plug. With the engine stop switch pushed in, kick the engine over several times to coat the cylinder walls with oil.
3. Remove the drive chain, clean it thoroughly with solvent, and lubricate it. Reinstall the chain or store it in a plastic bag tied to the frame.
4. Lubricate all control cables.
5. Block the frame up to raise the wheels off the ground.
6. Tie a plastic bag over the exhaust pipe outlet to prevent moisture from entering.
7. If the machine is to be stored in a humid or salt-air environment, coat all exposed metal surfaces with a film of light oil. Do not apply oil to rubber parts or the seat cover.
8. Drain the cooling water completely. And then fill the coolant and water (50% : 50%) in the engine and radiator.

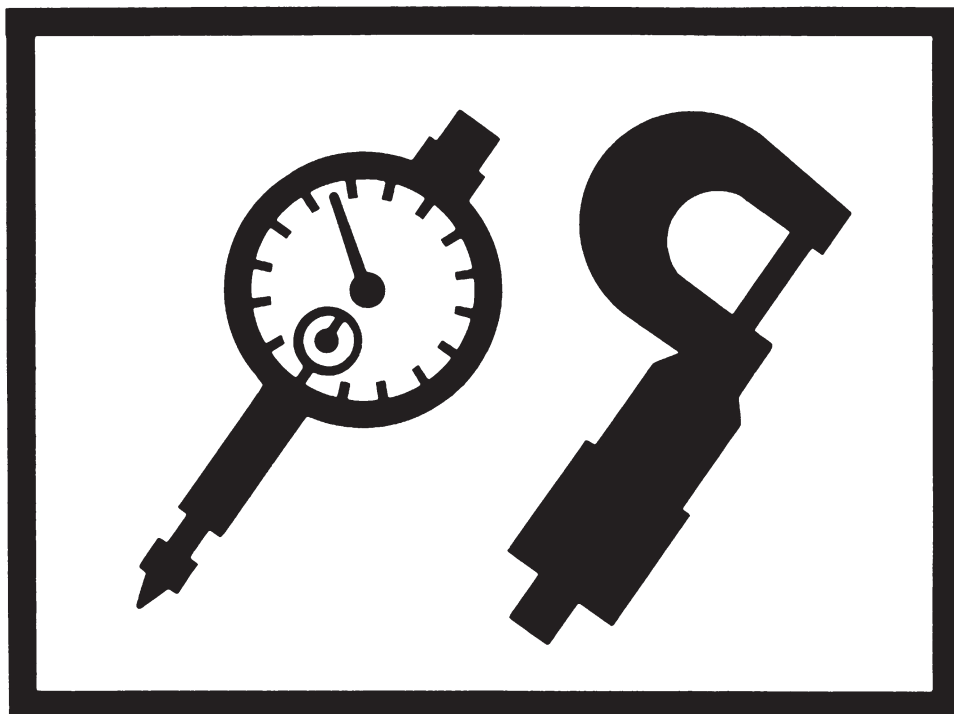
NOTE: _____

Make any necessary repairs before the machine is stored.



CHAPTER 2 SPECIFICATIONS

2





SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	TZ250
Model name:	TZ250L1 (USA) TZ250(L) (OTHERS)
Model code number:	4TW4
Dimensions:	
Overall length	1,957 mm (77.0 in)
Overall width	650 mm (25.6 in)
Overall height	1,077 mm (42.4 in)
Seat height	773 mm (30.4 in)
Wheelbase	1,345 mm (53.0 in)
Minimum ground clearance	119 mm (4.7 in)
Basic weight:	
With oil and full fuel tank	121.5 kg (268 lb)
Engine:	
Engine type	Liquid cooled 2-stroke, gasoline
Cylinder arrangement	V-type, 2-cylinder
Displacement	249 cm ³ (8.76 Imp oz, 8.42 US oz)
Bore × stroke	56.0 × 50.7 mm (2.205 × 1.996 in)
Compression ratio	7.5 : 1
Starting system	Push to start
Lubrication system	Premix (30 : 1) (Castrol A747)
Oil type or grade (2-Cycle):	
Transmission oil	Castrol R30
Periodic oil change	0.30 L (0.26 Imp qt, 0.32 US qt)
Total amount	0.50 L (0.44 Imp qt, 0.53 US qt)
Cooling water capacity (including all routes)	1.6 L (1.41 Imp qt, 1.69 US qt)
Fuel:	
Type	Premium unleaded gasoline with a research octane number of 95 or higher
Tank capacity	23.0 L (5.06 Imp gal, 6.08 US gal)
Carburetor:	
Type/Manufacturer	TMX λ 38/MIKUNI

SPECIFICATIONS

SPEC



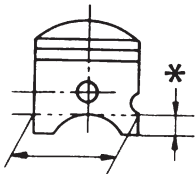
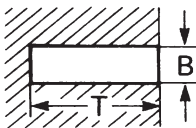
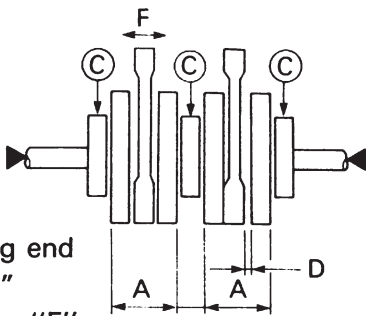
Model	TZ250
Spark plug: Type/Manufacturer Gap	R6179A-105P/NGK 0.5~0.6 mm (0.020~0.024 in)
Clutch type:	Dry, multiple-disc
Transmission: Primary reduction system Primary reduction ratio Secondary reduction system Secondary reduction ratio Transmission type Operation Gear ratio: 1st 2nd 3rd 4th 5th 6th	Spur gear 52/20 (2.600) Chain drive 35/14 (2.500) Constant mesh, 6-speed Left foot operation 34/18 (1.889) 31/21 (1.476) 29/23 (1.261) 27/25 (1.080) 26/27 (0.963) 20/22 (0.909)
Chassis: Frame type Caster angle Trail	Delta Box 22° 79.8 mm (3.14 in)
Tire: Type Size (F) Size (R) Tire pressure (front and rear)	Tubeless 120/60-R17 165/55-R17 200 kPa (2.0 kg/cm ² , 29 psi)
Brake: Front brake type Operation Rear brake type Operation	Dual disc brake Right hand operation Single disc brake Right foot operation
Suspension: Front suspension Rear suspension	Telescopic fork Swingarm (link type monocross suspension)
Shock absorber: Front shock absorber Rear shock absorber	Coil spring/oil damper Coil spring/gas, oil damper
Wheel travel: Front wheel travel Rear wheel travel	110 mm (4.33 in) 113 mm (4.45 in)
Electrical: Ignition system	CDI Magneto

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MAINTENANCE SPECIFICATIONS

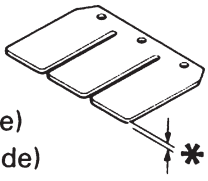
ENGINE

Model	TZ250
Cylinder: Bore size Wear limit Taper limit Out of round limit	56.000 ~ 56.020 mm (2.2047 ~ 2.2055 in) 56.1 mm (2.209 in) < 0.05 mm (0.0020 in) > < 0.01 mm (0.0004 in) >
Piston: Piston size/ Measuring point* Piston clearance < Limit > Piston offset	 55.935~55.955 mm (2.2022~2.2029 in)/ 15 mm (0.95 in) 0.060~0.070 mm (0.0024~0.0028 in) < 0.1 mm (0.004 in) > 1.0 mm (0.039 in), EX-side
Piston pin: Piston pin outside diameter/ < Limit >	15.995 ~ 16.000 mm (0.6297 ~ 0.6299 in)/ < 15.975 mm (0.6289 in) >
Piston ring: Sectional sketch  End gap (installed)/ < Limit > Side clearance (installed)/ < Limit >	Plain B = 1.0 mm (0.039 in) T = 2.2 mm (0.087 in) 0.20~0.35 mm (0.008~0.014 in)/ < 0.55 mm (0.022 in) > 0.03~0.07 mm (0.0012~0.0028 in)/ < 0.1 mm (0.004 in) >
Crankshaft:  Crank width "A" Run out limit "C" Connecting rod big end side clearance "D" Small end free play "F"	49.975 ~ 50.025 mm (1.968 ~ 1.969 in) < 0.05 mm (0.0020 in) 0.25 ~ 0.75 mm (0.010 ~ 0.030 in) 0.8 ~ 1.0 mm (0.031 ~ 0.039 in)
Clutch: Friction plate thickness/Quantity < Wear limit > Clutch plate thickness/Quantity < Warp limit >	2.9 ~ 3.1 mm (0.114 ~ 0.122 in) × 5 < 2.7 mm (0.106 in) > 2.2 ~ 2.4 mm (0.087 ~ 0.094 in) × 4 < 0.1 mm (0.004 in) >

SPECIFICATIONS

SPEC



Model	TZ250
Clutch spring free length/Quantity < Limit > Clutch housing thrust clearance Clutch housing radial clearance Clutch release method	36.4 mm (1.433 in) × 6 < 35.4 mm (1.394 in) > 0.07 ~ 0.18 mm (0.003 ~ 0.007 in) 0.009 ~ 0.071 mm (0.0004 ~ 0.0028 in) Inner push, cam push
Transmission: Main axle deflection limit Drive axle deflection limit	 < 0.01 mm (0.0004 in) > < 0.01 mm (0.0004 in) >
Shifter: Shifting type Guide bar bending limit	Cam drum and guide bar < 0.04 mm (0.0016 in) >
Carburetor: Type/Manufacturer I.D. Mark (left side/right side) Main jet (M.J.) Jet needle-clip position (J.N.) Main nozzle (N.J.) Cutaway (C.A.) Pilot jet (P.J.) Pilot air screw (P.A.S.) Valve seat size (V.S.) Starter jet (G.S.) Power jet (P.W.J.) Float level (F.L.)	TMX38/MIKUNI 4TW4 10L/4TW4 10R #640 6EG02-60-3 S-3 5.0 #30 1-1/2 1.5 #80 #80 6.0 ~ 7.0 mm (0.24 ~ 0.28 in)
Reed valve: Thickness* reed valve 1 reed valve 2 Valve stopper height (left side) (right side) Valve bending limit	 0.42 mm (0.017 in) 0.34 mm (0.013 in) 2.8 ~ 3.0 mm (0.110 ~ 0.118 in) 6.5 ~ 6.9 mm (0.256 ~ 0.272 in) 0.2 mm (0.008 in)
Cooling: Radiator core size: Width Height Thickness Radiator cap opening pressure Radiator capacity Water pump: Type	 380 mm (14.96 in) 198 mm (7.80 in) 24 mm (0.94 in) 95 ~ 125 kPa (0.95 ~ 1.25 kg/cm ² , 13.5 ~ 17.8 psi) 0.5 L (0.44 Imp qt, 0.53 US qt) Single-suction centrifugal pump

2

SPECIFICATIONS

SPEC

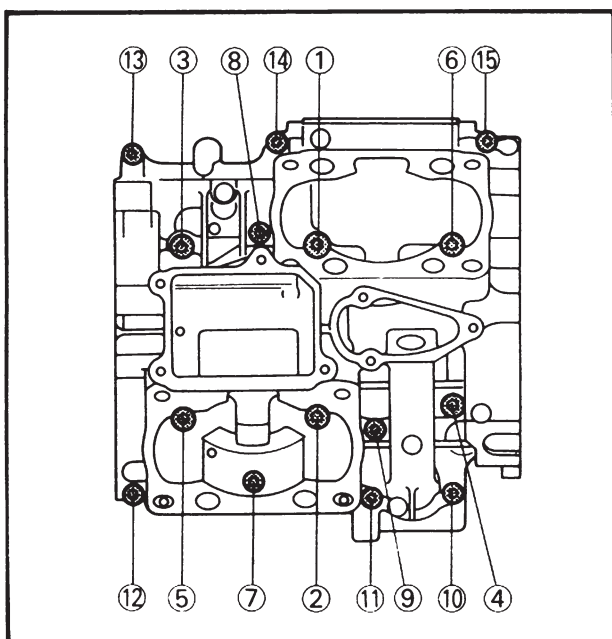


Parts to be tightened	Thread size	Q'ty	Tightening torque		
			Nm	m•kg	ft•lb
Spark plug	M14S × 1.25	2	19	1.9	13
Cylinder head (bolt)	M 6 × 1.0	12	11	1.1	8.0
Cylinder (nut)	M 8 × 1.25	8	20	2.0	14
Cylinder (stud)	M 8 × 1.25	8	15	1.5	11
Power valve cover	M 5 × 0.8	8	4	0.4	2.9
holder 1	M 5 × 0.8	2	4	0.4	2.9
pulley	M 5 × 0.8	2	4	0.4	2.9
cable stay	M 5 × 0.8	4	7	0.7	5.1
Air bleed bolt (cylinder)	M 6 × 1.0	2	12	1.2	8.7
Balance weight gear	M14 × 1.0	1	50	5.0	36
Water pump housing cover	M 6 × 1.0	5	11	1.1	8.0
Radiator	M 6 × 1.0	3	7	0.7	5.1
Radiator and thermo sensor	M16 × 1.5	1	7	0.7	5.1
Radiator hose clamp	—	6	2	0.2	1.4
Oil pump cover	M 5 × 0.8	3	8	0.8	5.8
Oil delivery pipe	M 5 × 0.8	2	4	0.4	2.9
Union bolt (oil delivery hose)	M 6 × 1.0	2	9	0.9	6.5
Carburetor joint	M 6 × 1.0	8	11	1.1	8.0
Clamp (carburetor joint)	M 4 × 0.7	2	2	0.2	1.4
Reed valve	M 3 × 0.5	12	1	0.1	0.7
Exhaust pipe	M 8 × 1.25	2	21	2.1	15
Silencer	M 6 × 1.0	4	11	1.1	8.0
Crankcase	M 8 × 1.25	6	Refer to NOTE		
Crankcase	M 6 × 1.0	9			
Transmission housing	M 6 × 1.0	7	14	1.4	10
Oil check bolt	M 6 × 1.0	1	9	0.9	6.5
Oil drain bolt	M12 × 1.25	1	23	2.3	17
Crankcase cover (right)	M 6 × 1.0	10	11	1.1	8.0
Crankcase cover (front)	M 6 × 1.0	3	11	1.1	8.0
Primary drive gear	M10 × 1.25	1	55	5.5	40
Clutch boss	M20 × 1.0	1	75	7.5	54
Clutch spring	M 6 × 1.0	6	9	0.9	6.5
Push rod adjuster	M 6 × 1.0	1	6	0.6	4.3
Seat plate (push lever)	M 5 × 0.8	1	7	0.7	5.1
Clutch cable holder	M 6 × 1.0	2	8	0.8	5.8
Bearing plate cover	M 6 × 1.0	3	8	0.8	5.8
Oil seal plate cover	M 5 × 0.8	2	7	0.7	5.1
Drive sprocket	M20 × 1.0	1	75	7.5	54
Bearing plate cover (shift cam)	M 5 × 0.8	1	4	0.4	2.9
Segment	M 8 × 1.25	1	23	2.3	17
Shift guide	M 6 × 1.0	2	11	1.1	8.0
Shift lever adjuster and locknut	M 6 × 1.0	1	9	0.9	6.5



Parts to be tightened	Thread size	Q'ty	Tightening torque		
			Nm	m•kg	ft•lb
Stopper bolt (torsion spring)	M 8×1.25	1	8	0.8	5.8
Shift arm	M 6×1.0	1	14	1.4	10
Joint rod 1 and shift rod	M 6×1.0	1	9	0.9	6.5
Joint rod 2 and shift rod	M 6×1.0	1	9	0.9	6.5
Joint rod 1, 2	M 6×1.0	2	11	1.1	8.0
Shift pedal pivot bolt	M 8×1.25	1	22	2.2	16
Front pedal	M 6×1.0	1	10	1.0	7.2

Crankcase tightening sequence



NOTE:

Tighten all bolts in 2 steps as follows and be sure to tighten in numbered order as shown.

- First: ①~⑥ (M8) 10 Nm (1.0 m•kg, 7.2 ft•lb)
⑦~⑮ (M6) 5 Nm (0.5 m•kg, 3.6 ft•lb)
- Final: ①~⑥ (M8) 24 Nm (2.4 m•kg, 17 ft•lb)
⑦~⑮ (M6) 12 Nm (1.2 m•kg, 8.7 ft•lb)

2



CHASSIS

Model	TZ250
Steering system: Steering bearing type	Taper roller bearing
Front suspension: Front fork travel Fork spring free length/ < Limit > Spring rate, STD Optional spring Oil capacity Oil level <Min.~Max.> (From top of outer tube with inner tube and damper rod fully compressed without spring.) Oil grade Inner tube outer diameter Front fork top end	110 mm (4.33 in) 212.5 mm (8.37 in)/<210.5 mm (8.29 in)> K = 7 N/mm (0.7 kg/mm, 39 lb/in) No 387 cm ³ (13.6 Imp oz, 13.1 US oz) 135 mm (5.31 in) 97 ~ 157 mm (3.82 ~ 6.18 in) Suspension oil "01" 41 mm (1.61 in) 10 mm (0.39 in)
Rear suspension: Shock absorber travel Spring free length Fitting length < Min. ~ Max. > Spring rate, STD Optional spring Enclosed gas pressure	50 mm (1.97 in) 160 mm (6.30 in) 148.5 mm (5.85 in) 145.5~152.0 mm (5.73~5.98 in) 75 N/mm (7.5 kg/mm, 420 lb/in) No 1,200 kPa (12 kg/cm ² , 171 psi)
Swingarm: Swingarm free play limit End Side clearance	 < 1.0 mm (0.04 in) > <0.05~0.35 mm (0.002~0.014 in)>
Wheel: Front wheel type Rear wheel type Front rim size/Material Rear rim size/Material Wheel runout limit: Vertical Lateral	Cast wheel Cast wheel MT3.75 × 17/Magnesium MT5.50 × 17/Magnesium < 1.0 mm (0.04 in) > <0.5 mm (0.02 in) >

SPECIFICATIONS

SPEC



Model	TZ250
Drive chain: Type/Manufacturer Number of links Chain slack	RKGB520TRU/RK EXCEL 109 links+Joint 40~50 mm (1.6~2.0 in)
Front disc brake: Disc outside dia.xThickness/<Limit> Pad thickness <Limit> Master cylinder inside dia. Caliper cylinder inside dia. Brake fluid type	298×5.0 mm (11.73×0.20 in)/<4.5 mm (0.18 in)> 5.3 mm (0.21 in) <1.0 mm (0.04 in)> 15.87 mm (0.625 in) 33.96+30.23 mm (1.337+1.190 in) DOT #4
Rear disc brake: Disc outside dia.xThickness/<Limit> Deflection limit Pad thickness <Limit> Master cylinder inside dia. Caliper cylinder inside dia. Brake fluid type	185×4.0 mm (7.28×0.16 in)/<3.5 mm (0.14 in)> 0.15 mm (0.006 in) 4.0 mm (0.16 in) <1.0 mm (0.04 in) 12.7 mm (0.500 in) 25.4 mm (1.000 in) DOT #4
Brake pedal: Brake pedal position	148~152 mm (5.8~6.0 in)
Clutch lever free play/Position:	2~3 mm (0.08~0.12 in)/at lever pivot

2

SPECIFICATIONS

SPEC



Parts to be tightened	Thread size	Q'ty	Tightening torque		
			Nm	m•kg	ft•lb
△ Handle crown and outer tube	M 8 × 1.25	2	20	2.0	14
△ Under bracket and outer tube	M 8 × 1.25	4	23	2.3	17
△ Steering shaft and steering shaft nut	M22 × 1.0	1	80	8.0	58
△ Handlebar and outer tube	M 6 × 1.0	4	7	0.7	5.1
△ Steering ring nut	M25 × 1.0	1	Refer to NOTE		
Steering damper bracket and fame	M 8 × 1.25	1	18	1.8	13
Steering damper and damper bracket	M 6 × 1.0	1	5	0.5	3.6
Steering damper stay and outer tube	M 6 × 1.0	1	7	0.7	5.1
Steering stopper bolt and locknut	M 6 × 1.0	2	11	1.1	8.0
Fuel tank fitting bolt and locknut	M 8 × 1.25	1	20	2.0	14
Clutch lever holder	M 5 × 0.8	2	5	0.5	3.6
△ Front master cylinder and master cylinder bracket	M 6 × 1.0	2	8	0.8	5.8
Brake lever (bolt)	M 6 × 1.0	1	1	0.1	0.7
Brake lever (nut)	M 6 × 1.0	1	6	0.6	4.3
Front fork and cap bolt	M44 × 1.0	2	23	2.3	17
Front fork and damper rod	M12 × 1.25	2	40	4.0	29
Cap bolt and damper rod	M12 × 1.25	2	29	2.9	21
Front fork and front fender	M 6 × 1.0	4	8	0.8	5.8
Brake hose holder and swingarm	M 6 × 1.0	2	8	0.8	5.8
△ Brake hose (front and rear) and union bolt (master cylinder)	M10 × 1.25	2	30	3.0	22
△ Brake hose (front and rear) and adapter	M10 × 1.25	3	14	1.4	10
△ Brake caliper (front and rear) and adapter	M10 × 1.25	3	26	2.6	19
△ Front brake caliper and front fork	M10 × 1.25	4	35	3.5	25
△ Front brake union bolt and bleed screw	M 8 × 1.25	1	7	0.7	5.1
△ Brake caliper (front and rear) and pad pin	M10 × 1.25	3	18	1.8	13
△ Brake caliper (front and rear) and bleed screw	M 8 × 1.25	4	6	0.6	4.3
△ Front wheel axle and nut	M18 × 1.5	1	80	8.0	58
△ Front wheel axle holder	M 6 × 1.0	4	11	1.1	8.0
△ Front brake disc and wheel hub	M 8 × 1.25	12	20	2.0	14
△ Footrest bracket and frame	M 8 × 1.25	4	20	2.0	14
Footrest bracket and plate (left and right)	M 5 × 0.8	4	8	0.8	5.8
△ Footrest and footrest bracket	M 6 × 1.0	2	12	1.2	8.7
△ Brake pedal and master cylinder	M 6 × 1.0	1	12	1.2	8.7
△ Rear master cylinder and footrest bracket	M 8 × 1.25	2	20	2.0	14
Rear master cylinder and reservoir connector	M 4 × 0.7	1	2	0.2	1.4
Rear brake reservoir tank and bolt (rear frame)	M 6 × 1.0	1	7	0.7	5.1
△ Rear brake caliper and caliper bracket	M 8 × 1.25	2	23	2.3	17
△ Rear wheel axle and nut	M18 × 1.5	1	80	8.0	58
△ Driven sprocket and sprocket damper	M 8 × 1.25	5	32	3.2	23
△ Rear brake disc and wheel hub	M 8 × 1.25	3	23	2.3	17
Chain puller adjust bolt and locknut	M 8 × 1.25	2	16	1.6	11
Chain puller adjust bolt	M 8 × 1.25	2	2	0.2	1.4

NOTE:

1. First, tighten the ring nut approximately 46 Nm (4.6 m•kg, 33 ft•lb) by using the torque wrench, then loosen the ring nut one turn.
2. Retighten the ring nut 1 Nm (0.1 m•kg, 0.7 ft•lb).

SPECIFICATIONS

SPEC



Parts to be tightened	Thread size	Q'ty	Tightening torque		
			Nm	m•kg	ft•lb
Engine mounting:					
△ Engine and frame (upper)	M10 × 1.25	1	35	3.5	25
△ Engine and frame (lower)	M10 × 1.25	1	35	3.5	25
△ Engine bracket and frame	M10 × 1.25	2	35	3.5	25
△ Engine bracket and engine	M 8 × 1.25	4	23	2.3	17
△ Pinch bolt (engine mounting bolt)	M 6 × 1.0	3	11	1.1	8.0
△ Pivot shaft and nut	M18 × 1.5	1	115	11.5	85
△ Relay arm and frame	M10 × 1.25	1	34	3.4	24
△ Relay arm and connecting rod	M10 × 1.25	1	34	3.4	24
△ Connecting rod and swingarm	M10 × 1.25	1	34	3.4	24
△ Rear shock absorber and upper bracket	M10 × 1.25	1	34	3.4	24
△ Rear shock absorber and relay arm	M10 × 1.25	1	34	3.4	24
Seal guard and swingarm	M 6 × 1.0	4	5	0.5	3.6
Swingarm and hook	M 6 × 1.0	2	10	1.0	7.2
Swingarm and chain guard	M 6 × 1.0	2	7	0.7	5.1
Rear shock absorber and locknut (preload)	M52 × 1.5	1	20	2.0	14
Radiator stay and frame	M 6 × 1.0	1	8	0.8	5.8
△ Seat height adjuster and locknut	M22 × 1.0	1	38	3.8	27
△ Seat height adjuster and upper bracket	M10 × 1.25	1	40	4.0	29
Cowling stay bracket and frame	M 6 × 1.0	2	8	0.8	5.8
Cowling stay and cowling stay bracket	M 6 × 1.0	2	8	0.8	5.8
Cowling stay (left and right) and frame	M 6 × 1.0	2	8	0.8	5.8
Upper cowl and scteen	M 4 × 0.7	6	4	0.4	2.9
△ Fuel tank and fuel cock	M 6 × 1.0	2	7	0.7	5.1
Seat and rear frame	M 6 × 1.0	4	8	0.8	5.8
△ Rear frame and frame	M 6 × 1.0	4	11	1.1	8.0
Fuel pump bracket and rear frame	M 6 × 1.0	2	7	0.7	5.1
Front brake reservoir tank and stay	M 6 × 1.0	1	5	0.5	3.6

NOTE:

△ - marked portion shall be checked for torque tightening after break-in or before each race.

2



ELECTRICAL

Model	TZ250
Ignition system: Ignition timing (B.T.D.C.) Advancer type	1.7 mm (0.067 in) Electrical
CDI: Magneto-model/Manufacturer Source coil resistance (color) Pickup coil resistance (color) (left cylinder) (right cylinder) CDI unit-model/Manufacturer	4DP-20 (TLGZ01)/DENSO 2.3~3.5Ω at 20°C (68°F) (White-White) 94~140Ω at 20°C (68°F) (White/Black-White/Blue) 94~140Ω at 20°C (68°F) (White/Black-White/Green) 4DP-40/DENSO
Ignition coil: Model/Manufacturer (left cylinder) (right cylinder) Minimum spark gap Primary winding resistance Secondary winding resistance	TJ0285/DENSO TJ0277/DENSO 5 mm (0.20 in) or more 0.14~0.18Ω at 20°C (68°F) 5.0~7.4kΩ at 20°C (68°F)
Battery: Model/Manufacturer Capacity Voltage when charged	PE12V0.8/JAPAN STORAGE BATTERY 12V0.8Ah 12.8V or more
Fuel pump: Model/Manufacturer Coil resistance	UC-Z6V/MITSUBISHI 1~3Ω at 20°C (68°F)
Fuel pump relay: Model/Manufacturer Coil resistance	1UY-92/MATSUSHITADENKO 72~88Ω at 20°C (68°F)
Circuit breaker: Type Main	Fuse 10A × 1

Parts to be tightened	Thread size	Q'ty	Tightening torque		
			Nm	m•kg	ft•lb
Stator	M 6 × 1.0	2	7	0.7	5.1
Rotor	M 12 × 1.0	1	53	5.3	38
Pickup coil (right cylinder)	M 4 × 0.7	2	2	0.2	1.4
CDI unit	M 6 × 1.0	2	8	0.8	5.8
Servomotor pulley	M 5 × 0.8	1	8	0.8	5.8
Servomotor	M 6 × 1.0	2	7	0.7	5.1
Voltage regulator	M 6 × 1.0	2	7	0.7	5.1
Clamp (fuel pump)	M 5 × 0.8	1	5	0.5	3.6

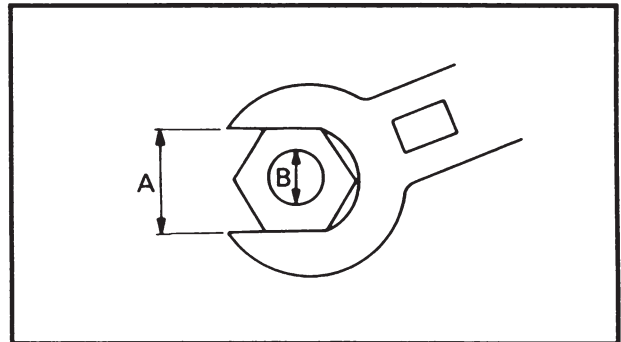
GENERAL TORQUE SPECIFICATIONS/ DEFINITION OF UNITS

SPEC



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: Distance across flats
B: Outside thread diameter

A (Nut)	B (Bolt)	TORQUE SPECIFICATION		
		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	94

2

DEFINITION OF UNITS

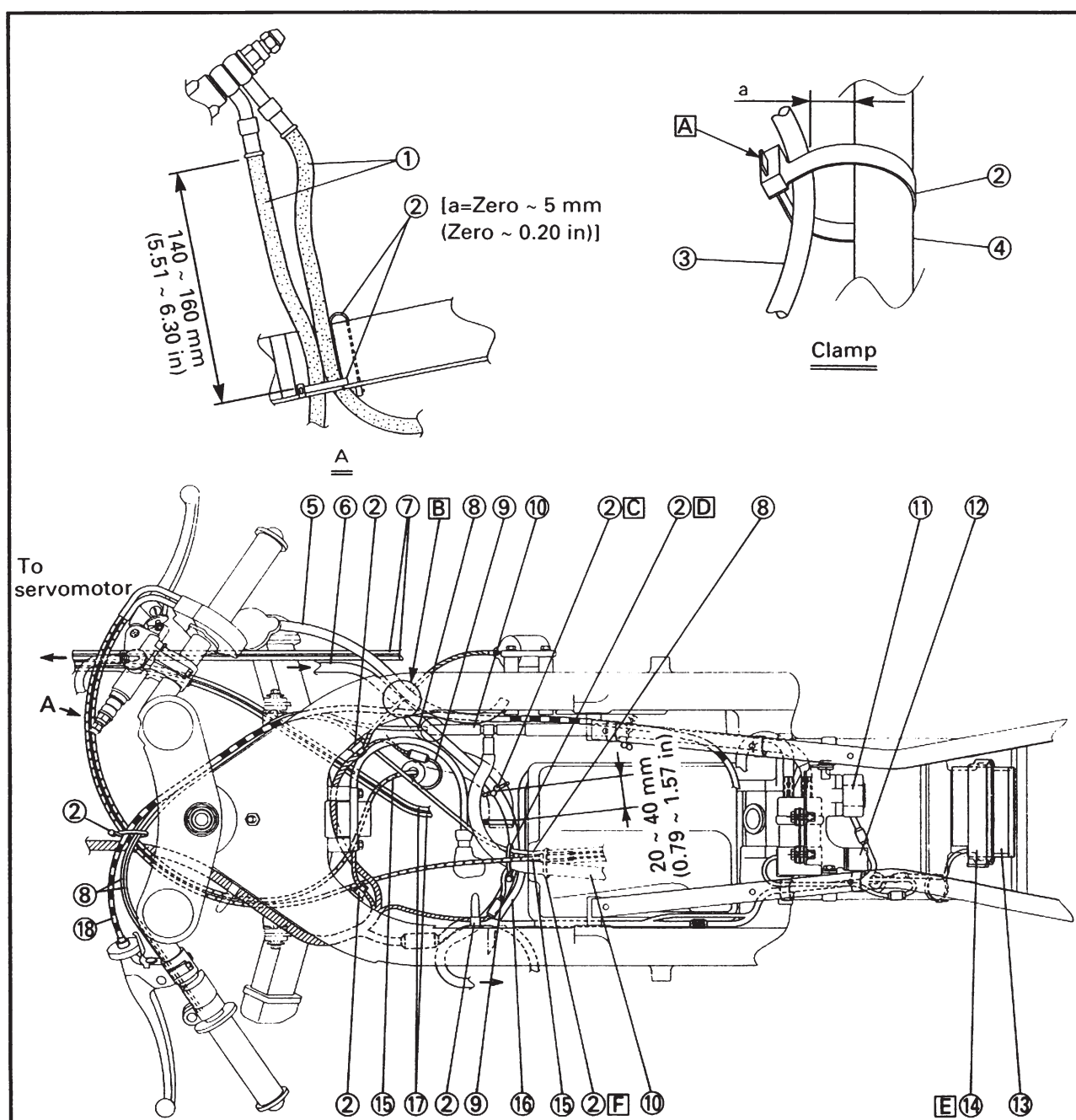
Unit	Read	Definition	Measure
mm	millimeter	10^{-3} meter	Length
cm	centimeter	10^{-2} meter	Length
kg	kilogram	10^3 gram	Weight
N	Newton	$1 \text{ kg} \times \text{m}/\text{sec}^2$	Force
Nm	Newton meter	$\text{N} \times \text{m}$	Torque
m•kg	Meter kilogram	$\text{m} \times \text{kg}$	Torque
Pa	Paskal	N/m^2	Pressure
N/mm	Newtom per millimeter	N/mm	Spring rate
L	Liter	—	Volume or Capacity
cm^3	Cubic centimeter	—	Volume or Capacity
r/min	Revolution per minute	—	Engine speed



CABLE ROUTING DIAGRAM

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> ① Brake hose ② Clamp ③ Cable ④ Frame ⑤ Radiator breather hose ⑥ Fuel tank breather hose ⑦ YPVS cable 1, 2 (right cylinder) ⑧ Starter cable ⑨ Solenoid valve lead ⑩ Fuel hose ⑪ Fuel pump stop switch ⑫ Fuel pump relay ⑬ Battery ⑭ Battery band | <ul style="list-style-type: none"> ⑮ Throttle cable ⑯ Transmission oil breather hose ⑰ YPVS cable 3, 4 (left cylinder) ⑱ Clutch cable [A] Cut the clamp so that the protruding portion is less than 5 mm (0.20 in). [B] Position the cables from top to bottom in the following order. <ul style="list-style-type: none"> • Radiator breather hose • Ignition coil lead • Clutch cable • Fuel tank breather hose | <ul style="list-style-type: none"> [C] Clamp the radiator hose 3 and fuel tank breather hose. [D] Clamp the fuel hose, starter cable, and solenoid valve lead. [E] Position the handhold of the battery band on the left side of the chassis. [F] Clamp the throttle cable, fuel hose, starter cable, and solenoid valve lead. Position the ends of the clamp downward. |
|--|---|---|

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CABLE ROUTING DIAGRAM

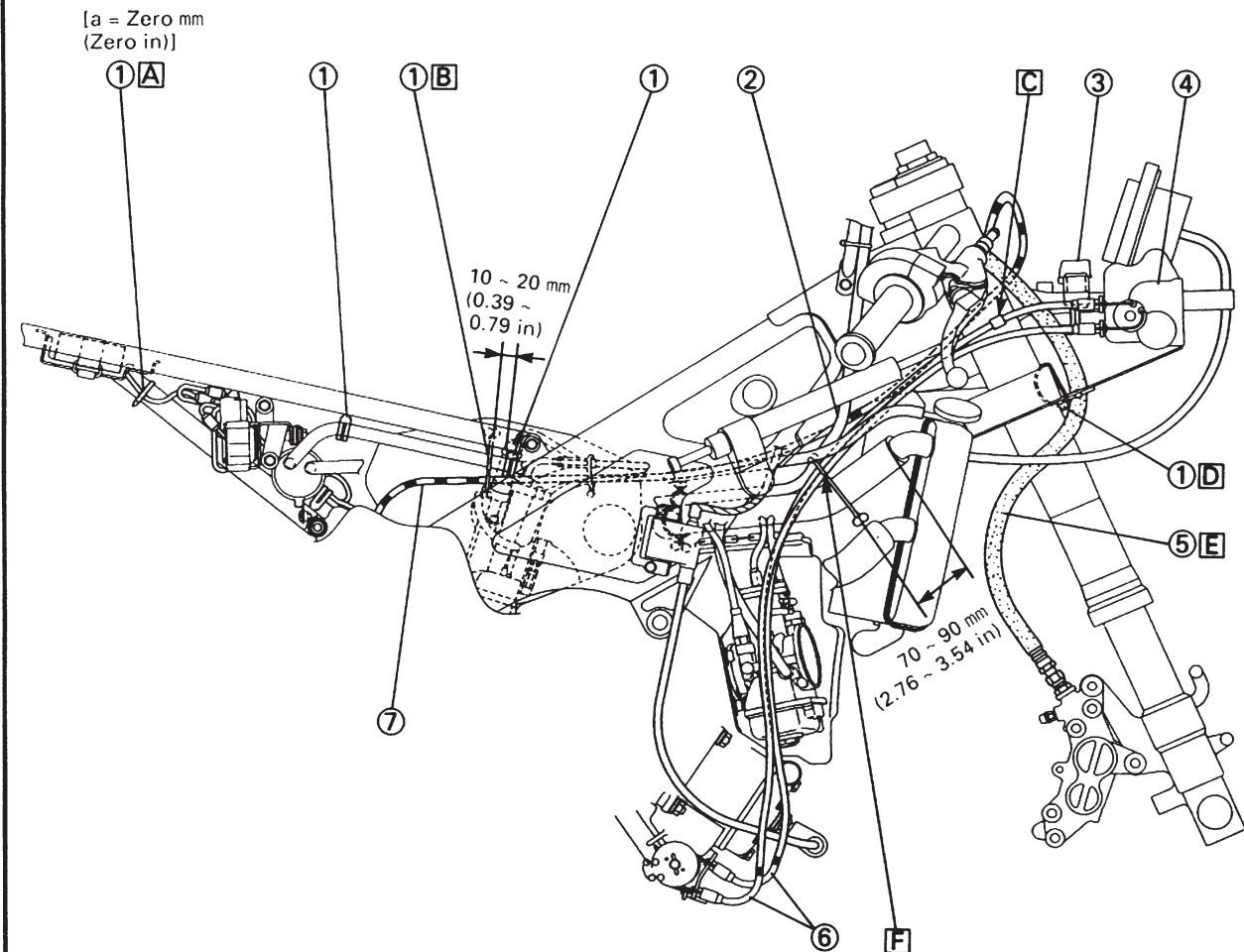
SPEC



- ① Clamp
- ② Fuel tank breather hose
- ③ Fuse holder
- ④ Servomotor
- ⑤ Front brake hose (right)
- ⑥ YPVS cable 1, 2 (right cylinder)
- ⑦ Clutch cable

- A** Position the ends of the clamp outside of the chassis.
- B** Clamp the fuel hose and clutch cable. Position the upside ends of the clamp inside of the seat rail.
- C** Connect the left cylinder YPVS cables (silver cables) to the inner YPVS servomotor pulley and right cylinder YPVS cables (black cables) to the outer. The sleeved cables must be connected to the top side (open side) of the YPVS servomotor.

- D** Position the ends of the clamp on the under portion of the under bracket.
- E** Be sure the brake hose is not twisted.
- F** Clamp the radiator hose 3 and YPVS cable (right cylinder).



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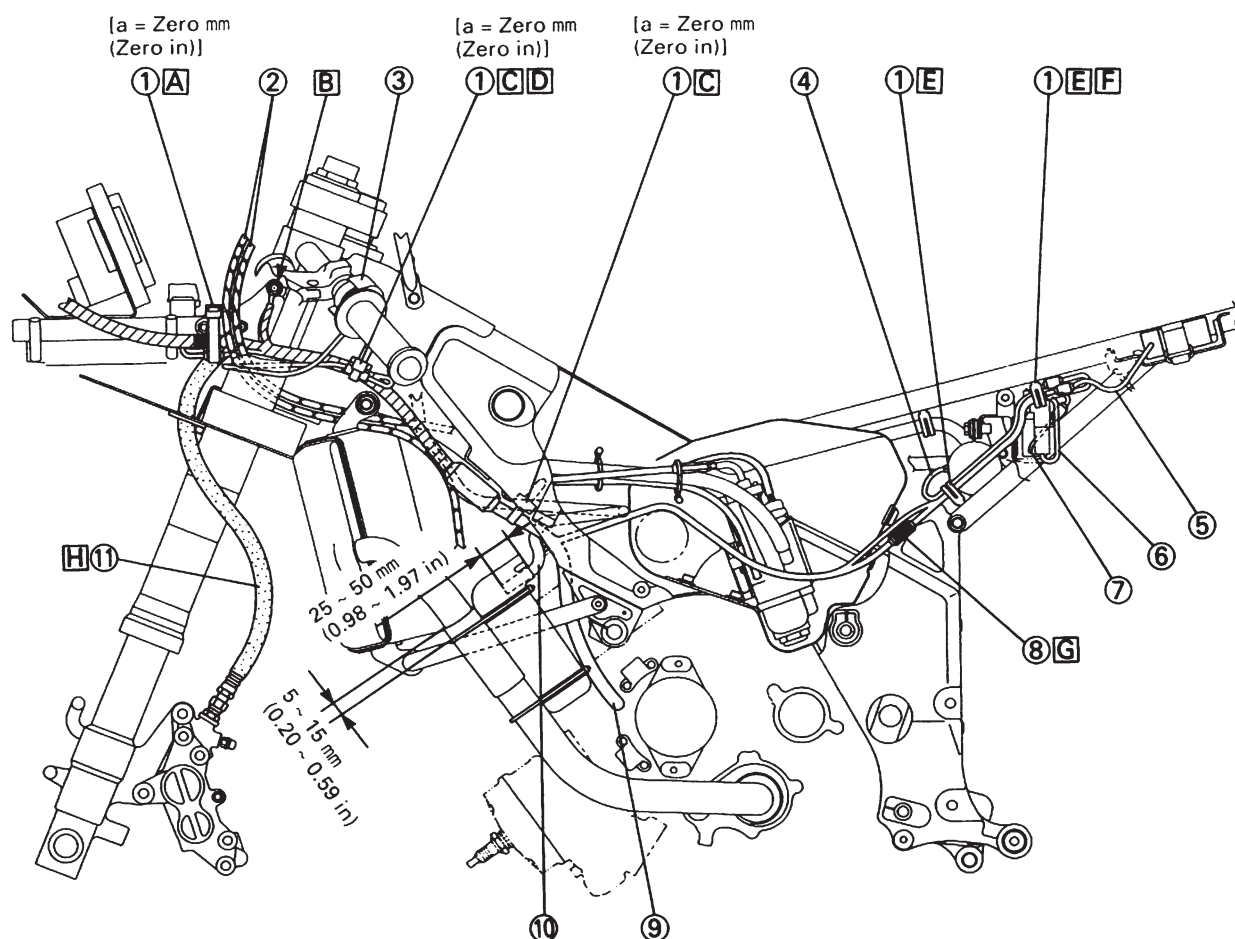
CABLE ROUTING DIAGRAM

SPEC



- ① Clamp
- ② Throttle cable
- ③ Main switch
- ④ Fuel pump lead
- ⑤ Battery lead
- ⑥ Fuel pump relay lead
- ⑦ Fuel pump stop switch lead
- ⑧ Power supply coupler
- ⑨ CDI magneto lead
- ⑩ Fuel tank breather hose
- ⑪ Front brake hose (left)

- [A] Clamp the wireharness together with couplers of the fuse lead under the cowling stay mounting bolt so that the tape on the wireharness aligns with the bolt.
- [B] Fasten the primary ground lead together with the cowling stay bracket mounting bolt.
- [C] Do not cut the end of the clamp.
- [D] Clamp the couplers of the main switch lead together with the wireharness.
- [E] Clamp the wireharness and fuel pump lead. Position the ends of the clamp outside of the chassis.
- [F] Clamp the wireharness with its branch portion 5 mm (0.20 in) to 10 mm (0.39 in) backward of the clamp.
- [G] Disconnect the power supply coupler except when the engine is started or when electric parts are checked.
- [H] Be sure the brake hose is not twisted.



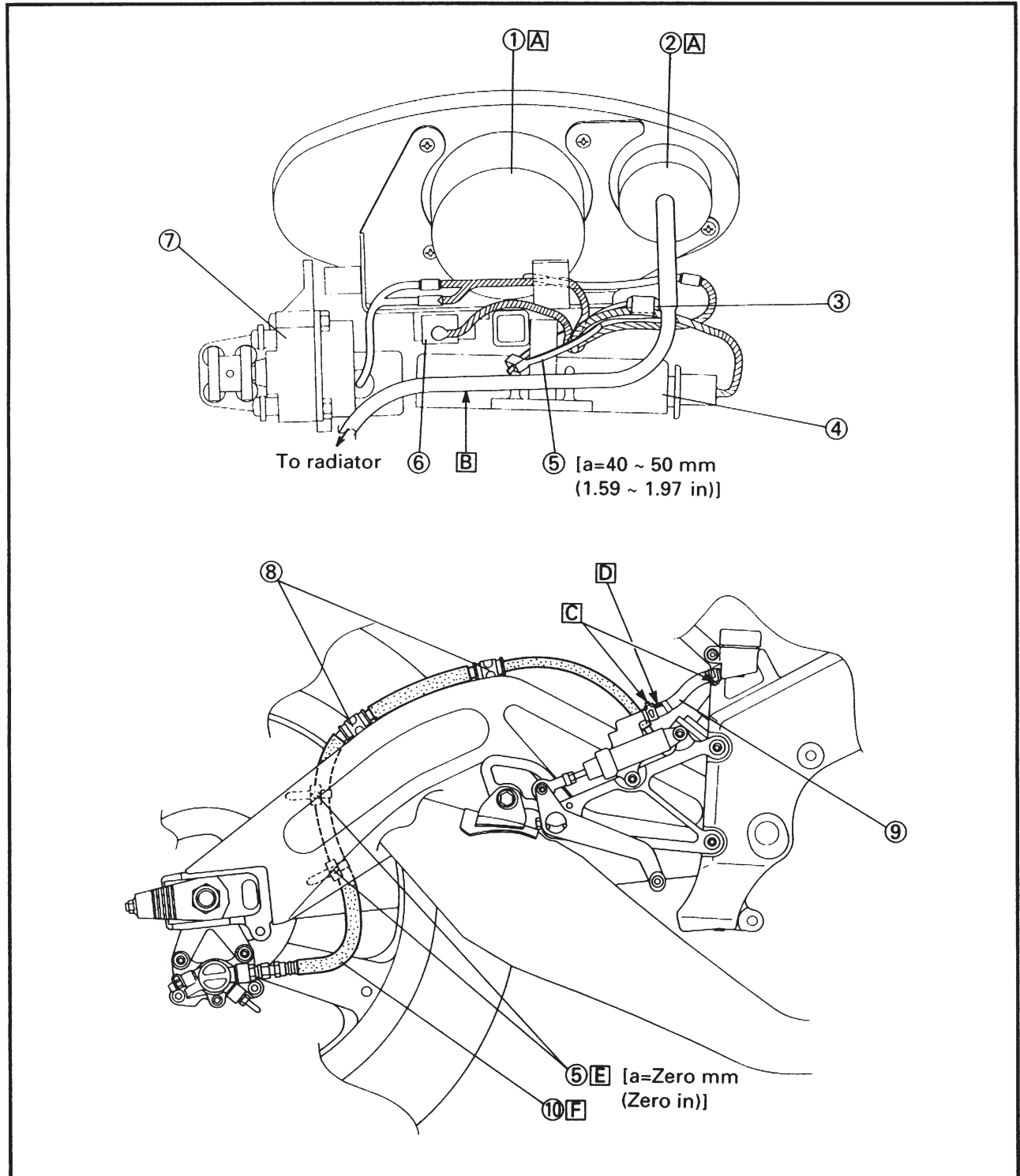
CABLE ROUTING DIAGRAM

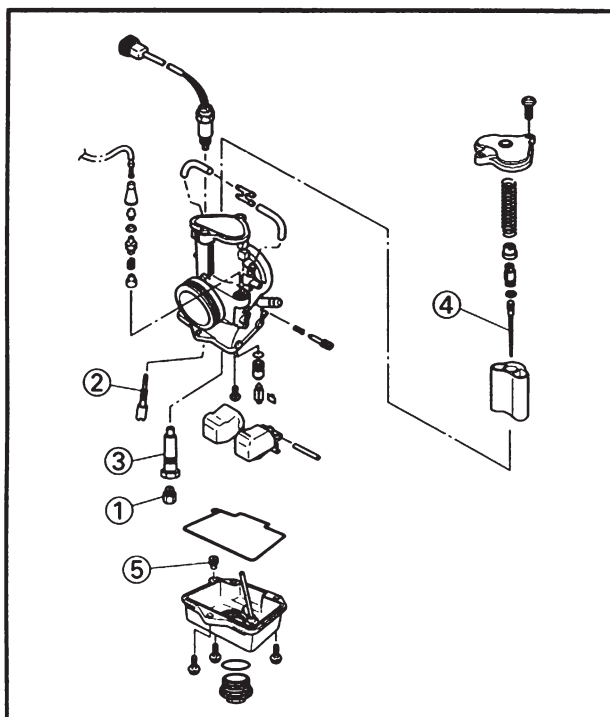
SPEC



- ① Tachometer
- ② Water temperature gauge
- ③ Coupler for speed shift
- ④ CDI unit
- ⑤ Clamp
- ⑥ Voltage regulator
- ⑦ Servomotor
- ⑧ Brake hose holder
- ⑨ Reservoir hose
- ⑩ Rear brake hose

- [A] Install the tachometer and water temperature gauge with their figures standing upright.
- [B] Route the water temperature gauge conductor so that the conductor does not contact the cowling and others.
- [C] Do not make the clamp grip face outside of the chassis.
- [D] Position the reservoir hose with its white paint mark upward.
- [E] Do not cut the end of the clamp.
- [F] Be sure the brake hose is not twisted.





SETTING PARTS

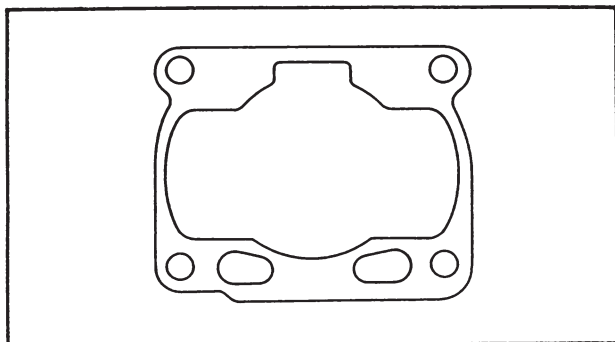
NOTE:

- For detail setting, refer to TUNING section in CHAPTER 7.
- The parts marked \triangle are not supplied together. These are available on order as YAMAHA genuine parts.
- Use a #500 main jet when selecting a next smaller size jet than a #540.

CARBURETOR

Part name	Size	Part number
Main jet ①	#340	137-14143-68
	#350	137-14143-70
	#360	137-14143-72
	#370	137-14143-74
	#380	137-14143-76
	#390	137-14143-78
	#400	137-14143-80
	#410	137-14143-82
	#420	137-14143-84
	#430	137-14143-86
	#440	137-14143-88
	#450	137-14143-90
	#460	137-14143-92
	#470	137-14143-94
	#480	137-14143-96
	#490	137-14143-98
	#500	137-1414K-00
	#540	137-1414K-08
	#560	137-1414K-12
	#580	137-1414K-16
*	#600	137-1414K-20
	#620	137-1414K-24
*	#640	137-1414K-28
Pilot jet ②	#27.5	4KM-14142-27
	#30	4KM-14142-30
Main nozzle ③	R-6	3TC-14141-R6
	\triangle R-7	3TC-14141-R7
	R-8	3TC-14141-R8
	\triangle R-9	3TC-14141-R9
	S-0	3TC-14141-S0
	S-1	3TC-14141-S1
	S-2	3TC-14141-S2
	* S-3	3TC-14141-S3
Jet needle ④	* 6EG02-60	3JD-14116-E1
Power jet ⑤	#75	18M-14144-15
	* #80	18M-14144-16

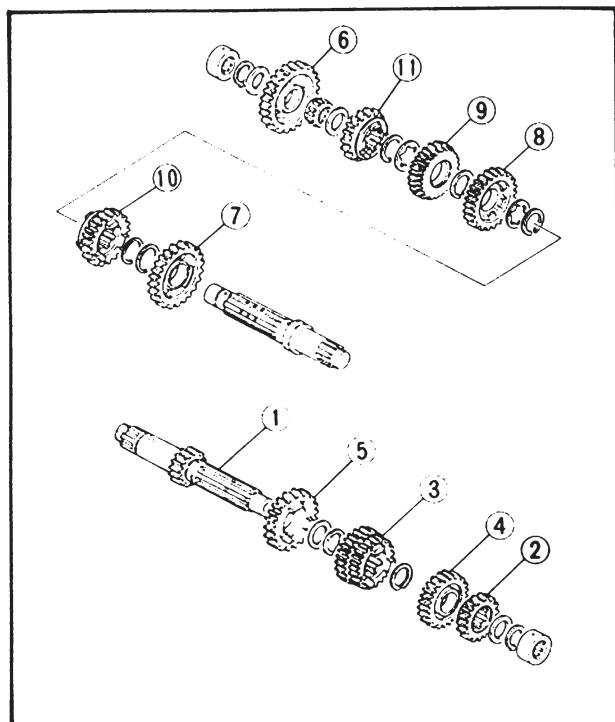
* Factory installed



CYLINDER GASKET

Part number		Size (thickness)
4JT-11351-02	*	t=0.8 mm
4JT-11351-12		t=0.7 mm
4JT-11351-22		t=0.6 mm
4DP-11351-31		t=0.5 mm

* Factory installed



TRANSMISSION

Part name	Size	Part number
Main axle ①	△ 14T	3YL-17411-10
	* 15T	3YL-17411-00
	* 18T	3YL-17411-20
2nd pinion gear ②	△ 18T	5F7-17121-00
	△ 19T	5F7-17121-21
	* 21T	4DP-17121-11
3rd / 4th pinion gear ③	△ 21T/25T (ø 53.8)	5F7-17131-11
	△ 21T/25T (ø 53.1)	5F7-17131-20
	* 23T/25T (ø 52.7)	5F7-17131-00
5th pinion gear ④	* 27T	5F7-17151-01
6th pinion gear ⑤	* 22T	5F7-17161-02
	25T	5F7-17161-11
1st wheel gear ⑥	28T	5F7-17211-10
	△ 31T	5F7-17211-01
	* 34T	5F7-17211-20
2st wheel gear ⑦	27T	5F7-17211-21
	△ 28T	5F7-17211-00
	* 31T	4DP-17211-11
3rd wheel gear ⑧	△ 25T	5F7-17231-20
	△ 26T	5F7-17231-11
	* 29T	5F7-17231-00
4th wheel gear ⑨	* 27T	3YL-17241-00
5th wheel gear ⑩	* 26T	3YL-17251-00
6th wheel gear ⑪	* 20T	3YL-17261-01
	22T	3YL-17261-11

* Factory installed

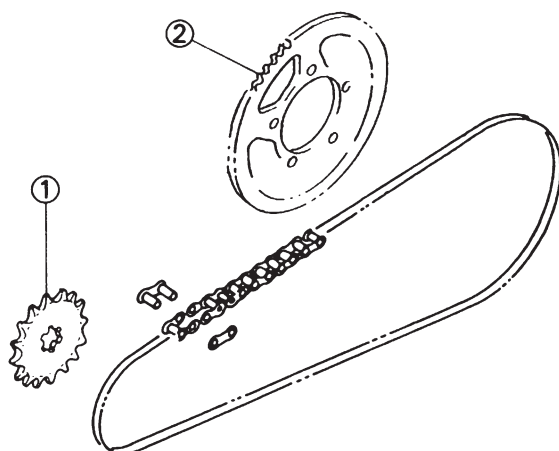
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DRIVE, DRIVEN SPROCKET

Part name	Size	Part number
Drive sprocket ① *	14T	93834-14178
	15T	93834-15079
	16T	93834-16104
Driven sprocket ② *	35T	4TW-25435-01
	36T	4TW-25436-01
	37T	4TW-25437-01
	38T	4TW-25438-01
	39T	4TW-25439-01
	40T	4TW-25440-01

* Factory installed



2

CHAPTER 3

REGULAR INSPECTION AND ADJUSTMENTS

3



MAINTENANCE INTERVALS

The following schedule is intended as a general guide to maintenance and lubrication. Bear in mind that such factors as weather, terrain, geographical location, and individual usage will alter the required maintenance and lubrication intervals. If you are a doubt as to what intervals to follow in maintaining and lubricating your machine, consult your Yamaha dealer.

Item	After break-in	Every race	Every 500 km	Every 1,000 km	As required	Recommend lubricant
PISTON Inspect and clean Replace	●	●	●		●	Inspect crack Remove carbon
PISTON PIN, SMALL END BEARING Inspect Replace	●	●	(Piston pin) ●	(Bearing) ●		
PISTON RING Inspect Replace	●	●	●		●	Check ring end gap
CYLINDER HEAD Inspect and clean Retighten	● ●	● ●				Remove carbon Check O-ring
CYLINDER Inspect and clean Replace Retighten	● ●	● ●			●	Seizure Wear
Y.P.V.S Inspect Retighten	● ●	● ●				
CLUTCH Inspect and adjust Replace	●	●			●	
TRANSMISSION Replace oil Inspect transmission	●		●		●	Castrol R-30
OIL PUMP STRAINER Clean	●		●			
SHIFT FORK, SHIFT CAM, GUIDE BER Inspect					●	Inspect wear
ROTOR NUT Retighten				●		
MUFFLER Inspect Clean	●	●			●	Inspect crack
CRANK Inspect and replace				(1,500 km) ●	●	
CARBURETOR Inspect, adjust and clean	●	●				
SPARK PLUG Inspect and clean Replace	●	●			●	
PLUG CAP Inspect and replace				(1,500 km) ●	●	

MAINTENANCE INTERVALS

INSP
ADJ



Item	After break- in	Every race	Every 500 km	Every 1,000 km	As re- quired	Recommend lubricant
DRIVE CHAIN Lubricate, slack, alignment Replace	●	●			●	Use chain lube Chain slack: 40 ~ 50 mm (1.6 ~ 2.0 in)
DRIVE SPROCKET Inspect and replace					●	Wear
COOLING SYSTEM Check cooling level and leakage Check radiator caap operation Replace cooling water Replace hoses	●	●			● ● ●	
OUTSIDE NUTS AND BOLTS Retighten	●	●				Refer to the "STARTING AND BREAK-IN" in CHAPTER 1. GENERAL INFORMATION.
FRAME Clean and inspect	●	●				Inspect crack
FUEL TANK, COCK Clean and inspect	●	●				
BRAKES Adjust lever position and pedal height Check brake disc surface Check brake fluid level and leakage Retighten brake disc bolts, caliper bolts and master cylinder bolts Replace pads Replace brake fluid	● ● ● ●	● ● ●			● ●	Every one year
FRONT FORKS Inspect Replace oil Replace oil seal	●	●		●	●	Suspension oil "01"
REAR SHOCK ABSORBER Inspect and adjust Lube Retighten	● ●	● ●			(After rain race) ●	Lithium base grease
SWINGARM Inspect and retighten Lube	●	●			●	Lithium base grease
RELAY ARM, CONNECTING ROD Inspect and retighten Lube	●	●			●	Lithium base grease
CHAIN GUARD Replace					●	
STEERING HEAD Inspect free play and retighten Clean and lube Replace bearings	●	●		●	●	Lithium base grease

3

MAINTENANCE INTERVALS

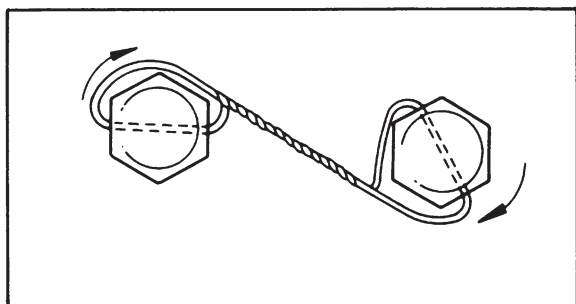


Item	After break-in	Every race	Every 500 km	Every 1,000 km	As required	Recommend lubricant
TIRE, WHEELS Inspect air pressure, wheel run-out and tire wear Inspect bearings and sprocket damper Clean and lube Retighten sprocket damper Replace bearings, sprocket and sprocket damper	●	●				Lithium base grease
THROTTLE, CONTROL CABLE Check routing and connection Lubricate	●	●				Yamaha cable lube or SAE 10W30 motor oil
BATTERY Check battery voltage Replace	●	●			●	12.5 V or more

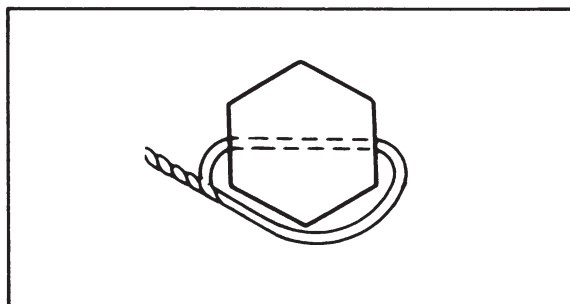
3



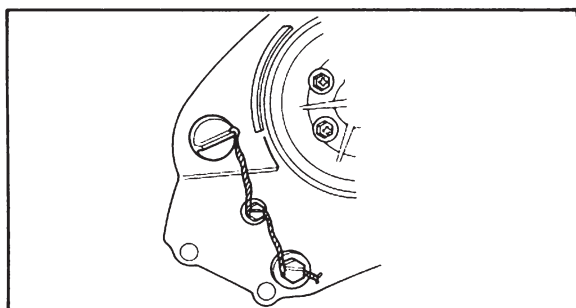
LOCKING WIRE INSTALLATION GUIDE



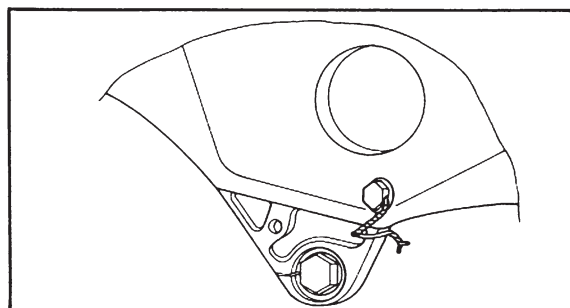
Bolt to bolt



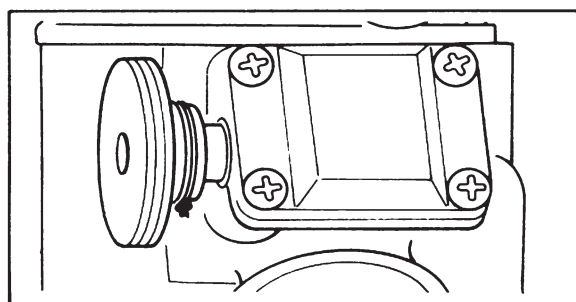
Bolt



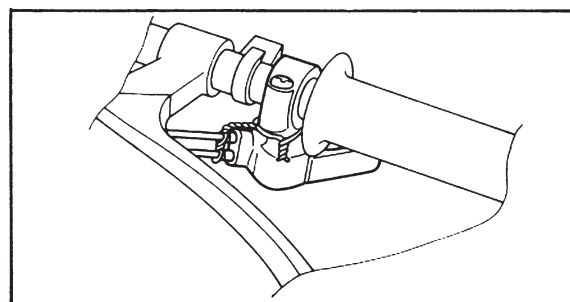
Oil filler cap, check bolt and drain bolt



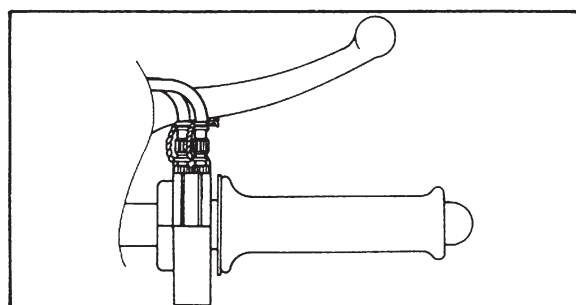
Tank rail drain bolt



YPVS pulley



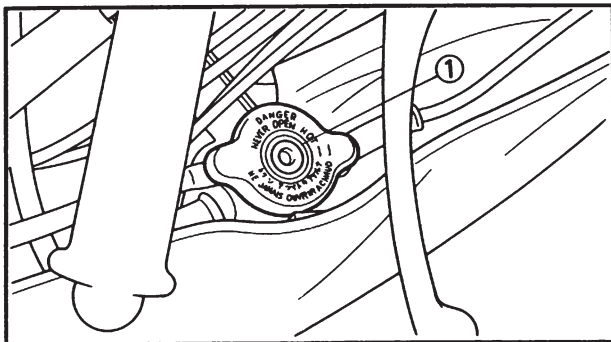
Starter cable



Throttle cable adjuster

3

COOLING WATER LEVEL INSPECTION/ COOLING WATER REPLACEMENT



COOLING WATER LEVEL INSPECTION

CAUTION:

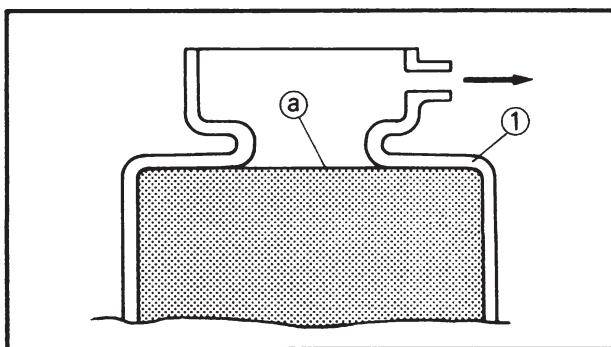
- The cooling system is filled with coolant at the factory to prevent rusting. Be sure to replace coolant with soft water before riding.
- Hard water or salt water is harmful to the engine parts. You may use distilled water, if you can't get soft water.

WARNING

Do not remove the radiator cap ①, drain bolt and hoses when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury.

When the engine has cooled, place a thick towel over the radiator cap, slowly rotate the cap counterclockwise to the detent. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.

3



1. Place the machine on a level place, and hold it in an upright position.
2. Remove:
 - Radiator cap
3. Check:
 - Cooling water level (a)Cooling water level low→Add cooling water.

① Radiator

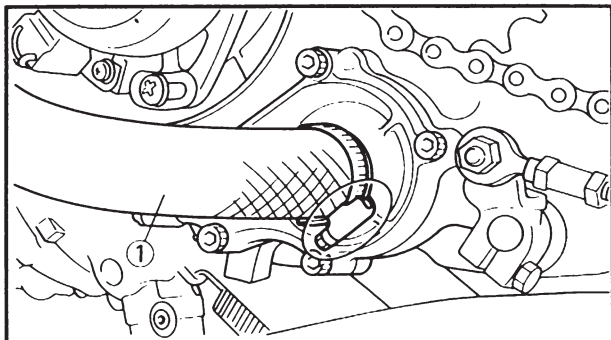
COOLING WATER REPLACEMENT

WARNING

Do not remove the radiator cap when the engine is hot.

COOLING WATER REPLACEMENT

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ADJ



CAUTION:

Take care so that cooling water does not splash on painted surfaces. If it splashes wash it away with water.

1. Remove the lower cowl.
2. Place a container under the radiator hose.
3. Disconnect:
 - Radiator hose 2 ①
4. Remove:
 - Radiator capDrain the cooling water completely.
5. Clean:
 - Cooling systemThoroughly flush the cooling system with clean tap water.
6. Connect:
 - Radiator hose 2

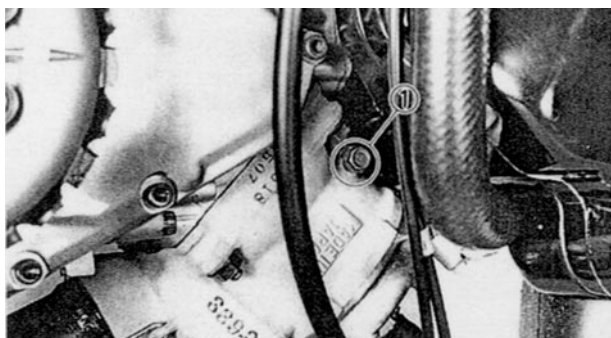
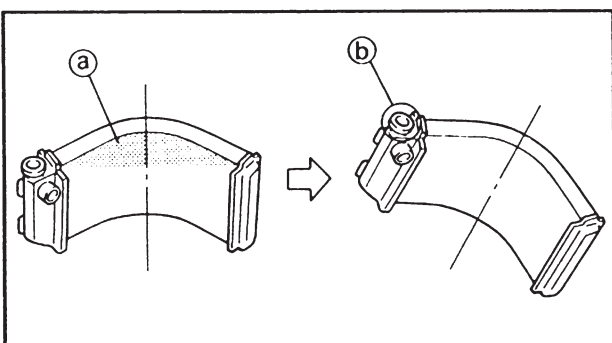


Radiator hose clamp:
2 Nm (0.2 m•kg, 1.4 ft•lb)

7. Fill:
 - Radiator
 - EngineTo specified level.



Recommended cooling water:
Soft water
Cooling water capacity:
1.6 L (1.41 Imp qt, 1.69 US qt)



CAUTION:

- When filling the radiator with anti-freeze, tilt the motorcycle so that the filler hole ① is at the highest position. If the radiator is positioned upright, air ② is difficult to escape which may result in excessive engine heating.
- Hard water or salt water is harmful to the engine parts. You may use distilled water, if you can't get soft water.

8. Remove:
 - Air bleeding bolt (right cylinder) ①Bleed the air until coming out the cooling water.
9. Install:
 - Air bleeding bolt (right cylinder) ①



Air bleeding bolt:
12 Nm (1.2 m•kg, 8.7 ft•lb)

3

RADIATOR CAP INSPECTION/RADIATOR CAP OPENING PRESSURE INSPECTION

INSP
ADJ



10. Fill:

- Radiator
 - Engine
- To specified level.

11. Install:

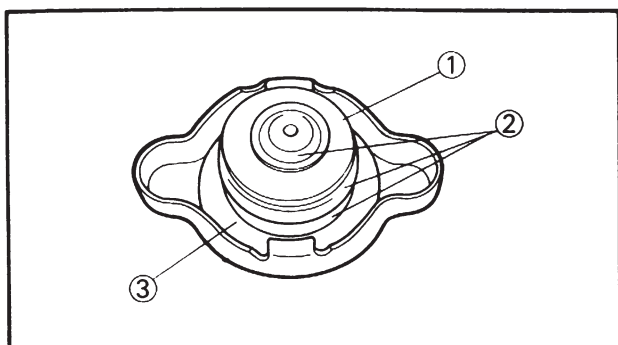
- Radiator cap
- Start the engine and warm it up for a several minute.

12. Check:

- Cooling water level
- Cooling water level low→Add cooling water.

13. Install the lower cowl.

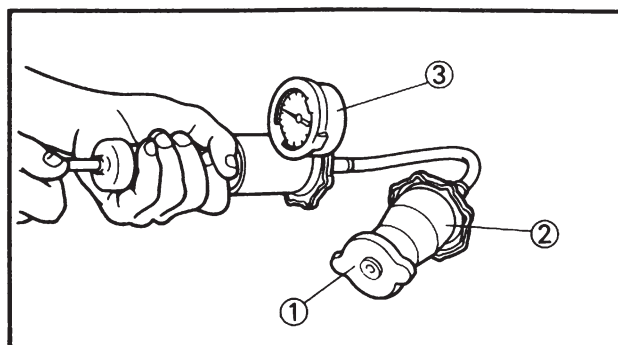
3



RADIATOR CAP INSPECTION

1. Inspect:

- Seal (radiator cap) ①
 - Valve and valve seat ②
- Crack/Damage→Replace.
Exist fur deposits ③→Clean or replace.



RADIATOR CAP OPENING PRESSURE INSPECTION

1. Attach:

- Radiator cap tester ③ and adapter ②



Radiator cap tester:
YU-24460-1/90890-01325
Adapter:
YU-33984/90890-01352

NOTE:

Apply water on the radiator cap seal.

① Radiator cap

2. Apply the specified pressure.



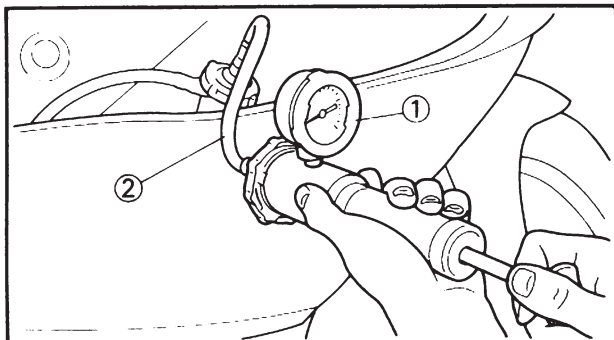
Radiator cap opening pressure:
**95~125 kPa (0.95~1.25 kg/cm²,
13.5~17.8 psi)**



3. Inspect:

- Pressure

Impossible to maintain the specified pressure for 10 seconds → Replace.



COOLING SYSTEM INSPECTION

1. Inspect:

- Coolant level

2. Attach:

- Radiator cap tester ① and adapter ②



Radiator cap tester:

YU-24460-1/90890-01325

Adapter:

YU-33984/90890-01352

3. Apply the specified pressure.

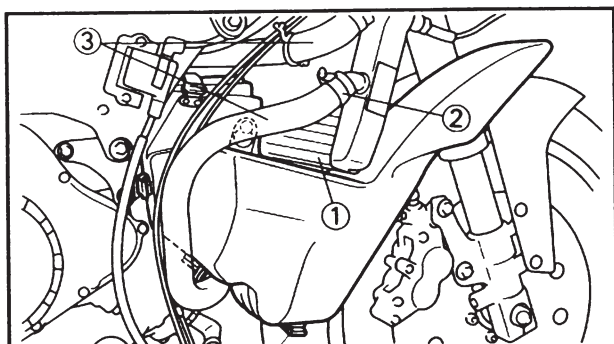


Standard pressure:

180 kPa (1.8 kg/cm², 25.6 psi)

NOTE:

- Do not apply pressure more than specified pressure.
- Radiator should be filled fully.

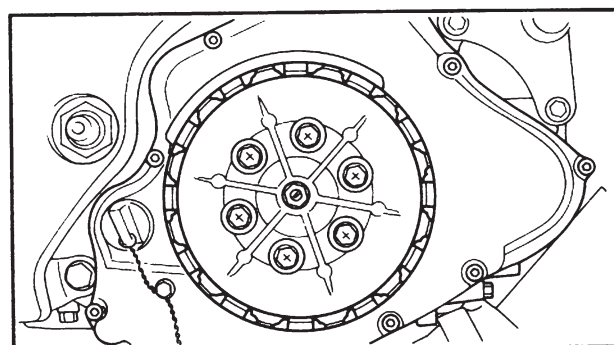


4. Inspect:

- Pressure

Impossible to maintain the specified pressure for 10 seconds → Repair.

- Radiator ①
 - Radiator hose joints ②
 - Radiator hoses ③
- Swelling → Replace.



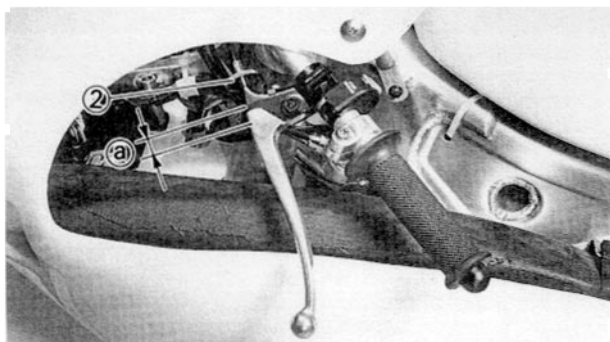
CLUTCH CARE

NOTE:

This machine is equipped with a dry type clutch. Be sure to clean with solvent or replace if grease or oil contacts either clutch or friction plates.

CLUTCH ADJUSTMENT/PILOT AIR SCREW ADJUSTMENT/ THROTTLE CABLE ADJUSTMENT

**INSP
ADJ**



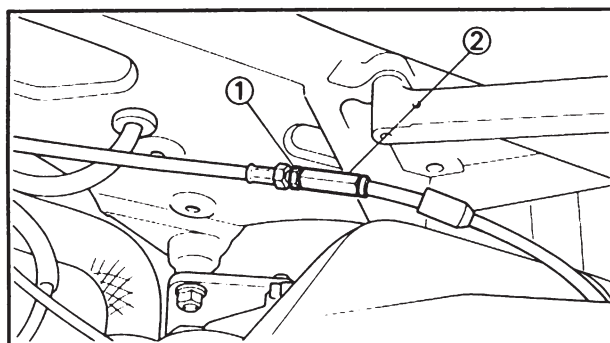
CLUTCH ADJUSTMENT

1. Check:
 - Clutch lever free play (a)
Out of specification → Adjust



Clutch lever free play (a):
2 ~ 3 mm (0.08 ~ 0.12 in)

2. Adjust:
 - Clutch lever free play

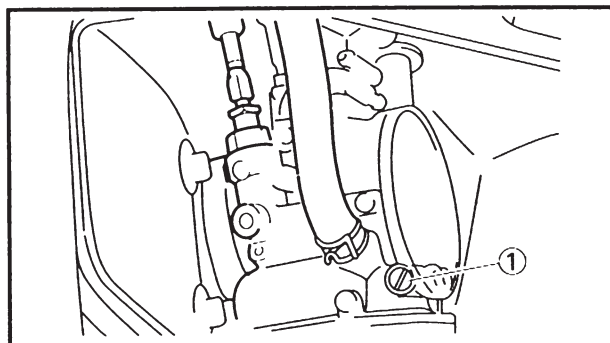


Clutch lever free play adjustment steps:

- Loosen the locknut (1).
- Turn the adjuster (2) until free play (a) is within the specified limits.
- Tighten the locknut.

NOTE:

After adjustment, check proper operation of clutch lever.



PILOT AIR SCREW ADJUSTMENT

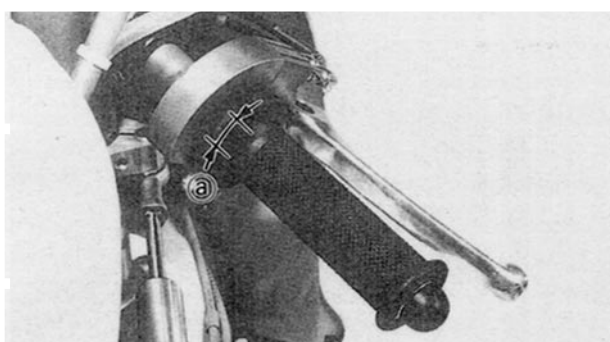
1. Adjust:
 - Pilot air screw (1)

Adjusting steps:

- Screw in the pilot air screw (1) until it is lightly seated.
- Back out by the specified number of turns.

Pilot air screw:

1-1/2 turns out



THROTTLE CABLE ADJUSTMENT

1. Check:
 - Throttle grip free play (a)
Out of specification → Adjust.

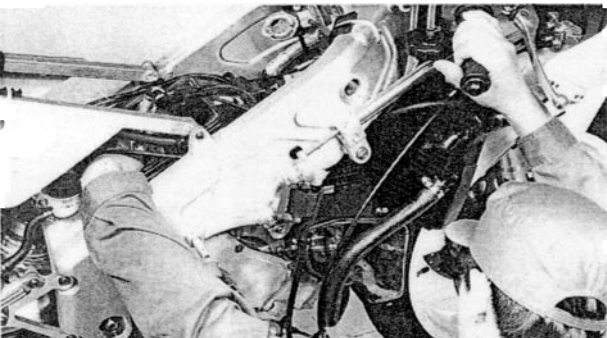
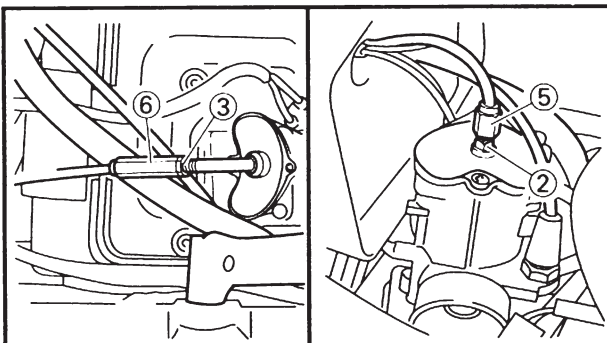
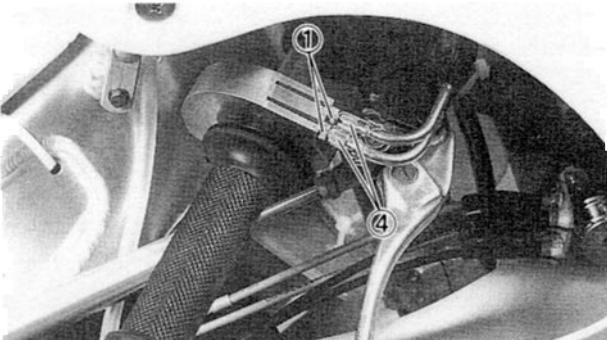
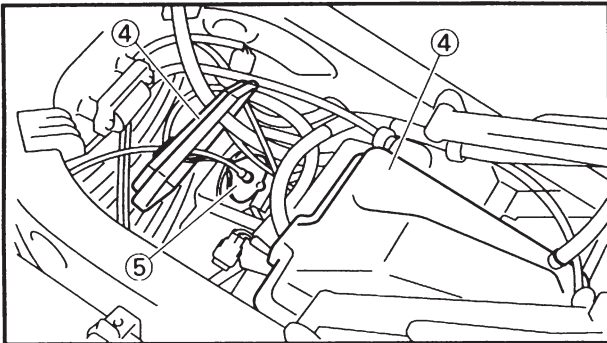
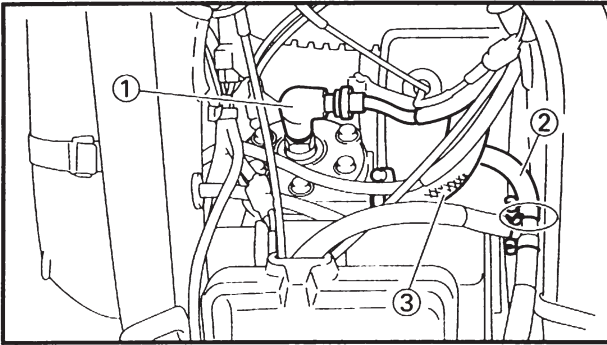


Throttle grip free play (a):
2 ~ 4 mm (0.08 ~ 0.16 in)

3

THROTTLE CABLE ADJUSTMENT

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2. Drain the cooling water.
3. Remove:
 - Lower cowl
 - Fuel tank
 - Induction guide (right cylinder)
 - Plug cap (left cylinder) ①
 - Fuel hose ②
 - Radiator hose 3 ③
 - Induction cap ④
4. Loosen the screw (right carburetor joint clamp), then take out the carburetor ⑤.

5. Adjust:
 - Throttle grip free play

Throttle grip free play adjustment steps:

- Loosen the locknuts ①, ②, ③.
- Turn the adjusters ④, ⑤, ⑥ fully in.
- Turn out the right carburetor adjuster ⑤ until the specified free play is obtained.
- Tighten the right carburetor locknut ②.
- Turn out the left carburetor adjuster ⑥ until the left throttle valve moves together with the right throttle valve.
- Install the carburetor (right cylinder).

NOTE:

- When adjusting left throttle cable, watch the right throttle valve and touch the left throttle valve.
- After adjusting the throttle cables, open the throttle grip and check that both throttle valves are completely open.

- Tighten the left carburetor locknut ③.
- Tighten the locknuts ①.

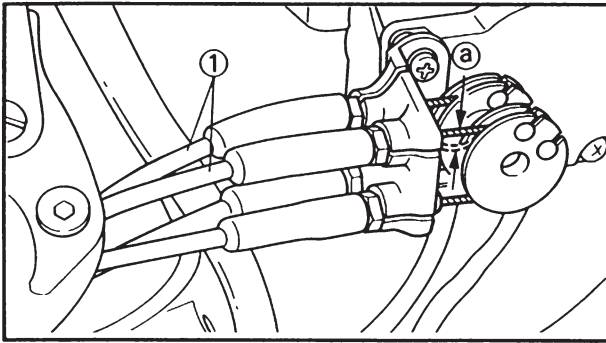
⚠ WARNING

After adjusting, turn the handlebar to right and left and make sure that the engine idling does not run faster.

3

YPVS OPEN SIDE CABLE ADJUSTMENT

INSP
ADJ



YPVS OPEN SIDE CABLE ADJUSTMENT

1. Disconnect the fuel pump coupler to prevent the fuel pump operating.
2. Check:
 - YPVS open side cable free play

Checking steps:

- Move the main switch to "RUN".
- The servomotor will be fully opened.

NOTE:

After the main switch is moved to "RUN", the servomotor will be operated as follows:

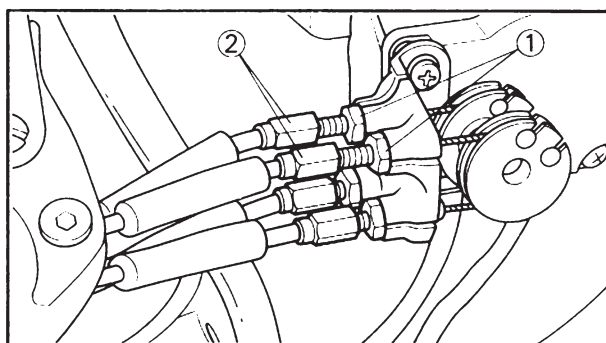
1. The servomotor will be fully closed about 1 second.
2. And then, it will be kept fully opened.

- Check the free play (a) for the YPVS open side cables ①.
- Out of specification → Adjust.



**YPVS open side cable
free play (a):**

2 ~ 3 mm (0.08 ~ 0.12 in)



3. Adjust:
 - YPVS open side cable free play

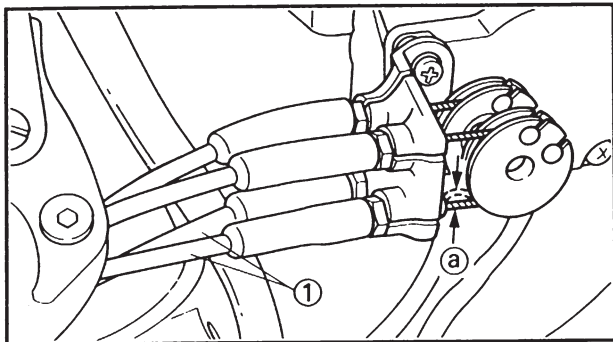
Adjusting steps:

- Fully open the servomotor.
- Loosen the locknuts ①.
- Turn the adjusters ② until the specified free play is obtained.
- Tighten the locknuts.

3

YPVS CLOSE SIDE CABLE ADJUSTMENT/ YPVS COMPONENTS RETIGHTENING

INSP
ADJ



YPVS CLOSE SIDE CABLE ADJUSTMENT

1. Disconnect the fuel pump coupler to prevent the fuel pump operating.
2. Check:
 - YPVS close side cable free play

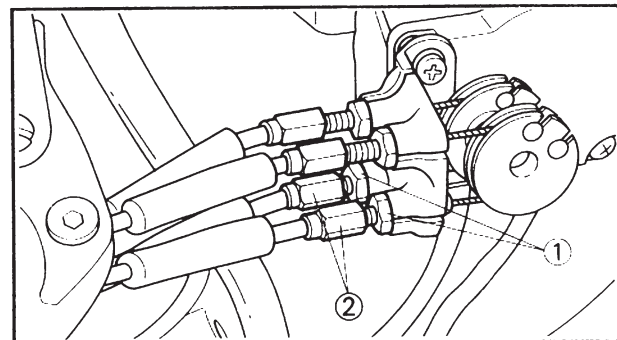
Checking steps:

- Move the main switch to "RUN".
 - The servomotor will be fully closed about 1 second.
 - During this 1 second, move the main switch to "OFF".
 - The servomotor will be kept fully closed.
 - Check the free play (a) for the YPVS close side cables (1).
- Out of specification → Adjust.



YPVS close side cable free play (a):

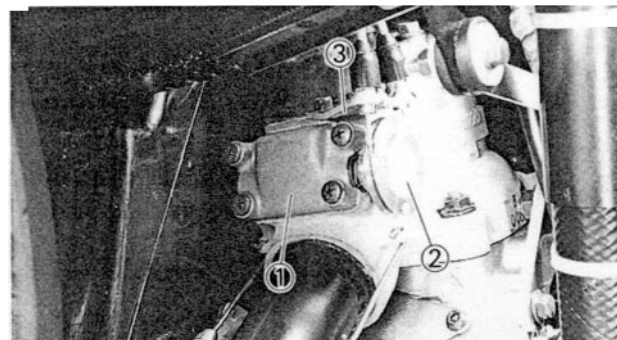
2 ~ 3 mm (0.08 ~ 0.12 in)



3. Adjust:
 - YPVS close side cable free play

Adjusting steps:

- Fully close the servomotor.
- Loosen the locknuts (1).
- Turn the adjusters (2) until the specified free play is obtained.
- Tighten the locknuts.



YPVS COMPONENTS RETIGHTENING

NOTE:

Before riding the machine, retighten all YPVS components.

1. Retighten:
 - Valve cover (1)
 - Pulley (2)
 - Cable stay (3)



Screw (valve cover):

4 Nm (0.4 m•kg, 2.9 ft•lb)

Screw (pulley):

4 Nm (0.4 m•kg, 2.9 ft•lb)

Bolt (cable stay):

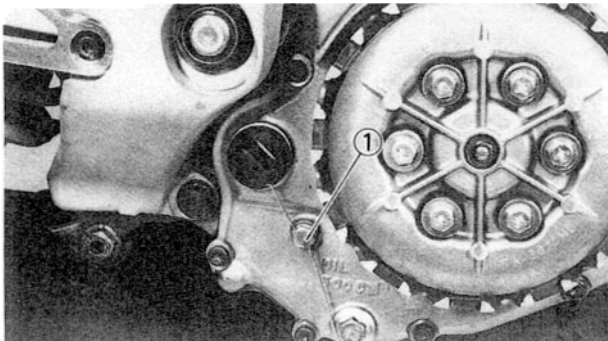
7 Nm (0.7 m•kg, 5.1 ft•lb)

3



TRANSMISSION OIL LEVEL CHECK

1. Start the engine, warm it up for several minutes and wait for five minutes.
2. Place the machine on a level place and hold it up on upright position by placing the suitable stand.



3. Check:

- Transmission oil level

Transmission oil level checking steps:

- Remove the checking bolt ①.
- Inspect the oil level.

NOTE:

Be sure the machine is positioned straight up when inspecting the oil level.

⚠ WARNING

Never attempt to remove the checking bolt just after high speed operation. The heated oil could spout out, causing danger. Wait until the oil cools down.

Oil flows out→Oil level is correct.

Oil does not flow out→Oil level is low.
Add transmission oil until oil flows out.

- Inspect the gasket (oil check bolt), replace if damaged.
- Tighten the oil check bolt.

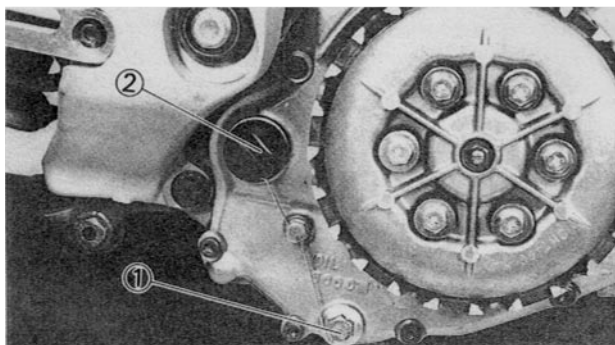


Oil check bolt:

9 Nm (0.9 m•kg, 6.5 ft•lb)

TRANSMISSION OIL REPLACEMENT

INSP
ADJ



TRANSMISSION OIL REPLACEMENT

1. Start the engine and warm it up for several minutes and wait for five minute.
2. Place the machine on a level place and hold it on upright position by placing the suitable stand.
3. Place a suitable container under the engine.
4. Remove:
 - Drain bolt ①
 - Oil filler cap ②
 Drain the transmissin oil.
5. Install:
 - Drain bolt ①



Drain bolt:

23 Nm (2.3 m•kg, 17 ft•lb)

6. Fill:
 - Transmission oil



Recommended oil:

Castrol R30

Oil capacity

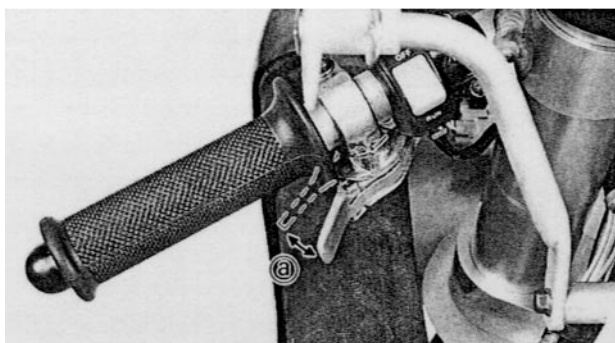
(periodic oil change):

0.30 L (0.26 Imp qt, 0.32 US qt)

7. Check:
 - Oil leakage

8. Check:
 - Transmission oil level

9. Install:
 - Oil filler cap ②



STARTER CABLE ADJUSTMENT

1. Check:
 - Starter lever free play ①
 Out of specification ›Adjust.



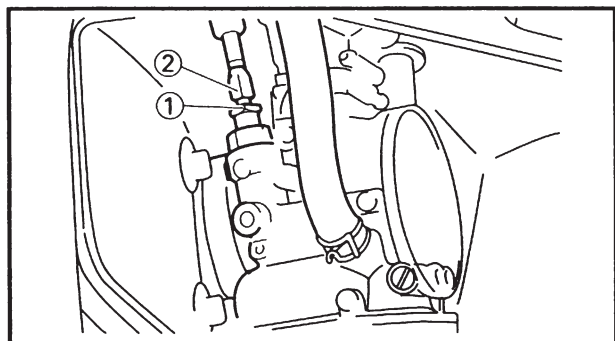
Starter lever free play ① :

5~10 mm (0.20~0.39 in)

2. Adjust:
 - Starter cable free play ②

Starter cable free play adjustment steps:

- Loosen the locknuts ①.
- Turn the adjusters ② until the specified free play is obtained.
- Tighten the locknuts.



3



BRAKE SYSTEM AIR BLEEDING

⚠ WARNING

Bleed the brake system if:

- The system has been disassembled.
- A brake hose has been loosened or removed.
- The brake fluid is very low.
- The brake operation is faulty.

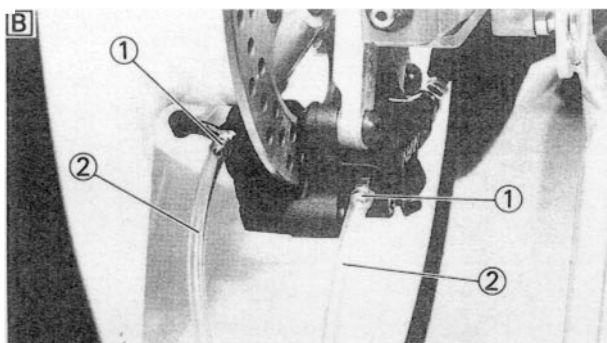
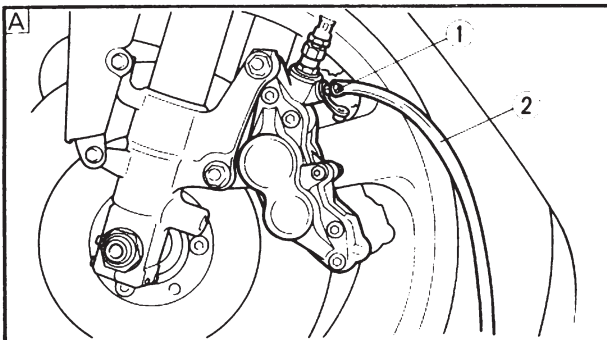
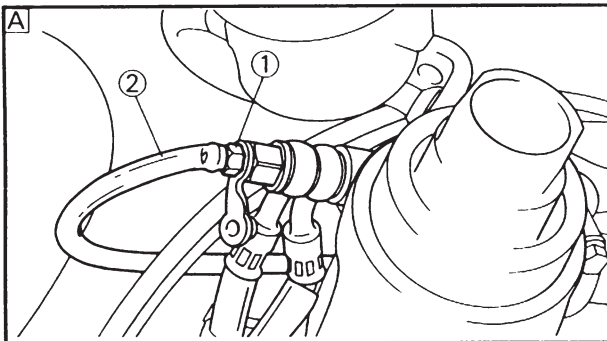
A dangerous loss of braking performance may occur if the brake system is not properly bled.

1. Bleed:

- Brake fluid

A Front

B Rear



Air bleeding steps:

- Add proper brake fluid to the reservoir.
- Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
- Connect the clear plastic tube (2) tightly to the caliper bleed screw (1).
- Place the other end of the tube into a container.
- Slowly apply the brake lever or pedal several times.
- Pull the lever in or push down on the pedal. Hold the lever or pedal in position.
- Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
- Tighten the bleed screw when the lever or pedal limit has been reached; then release the lever or pedal.



Bleed screw (master cylinder):

7 Nm (0.7 m·kg, 5.1 ft·lb)

Bleed screw (caliper):

6 Nm (0.6 m·kg, 4.3 ft·lb)

- Repeat steps (e) to (h) until the air bubbles have been removed from the system.

NOTE:

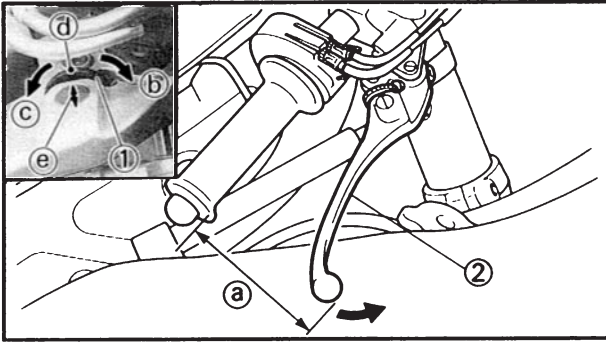
If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours.

Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

- Add brake fluid to the level line on the reservoir.

FRONT BRAKE ADJUSTMENT/ REAR BRAKE ADJUSTMENT

INSP
ADJ



FRONT BRAKE ADJUSTMENT

1. Adjust:

- Brake lever position (a)

Adjustment steps:

- Turn the adjuster (1) while pushing the brake lever (2) forward until the desired lever position is obtained.

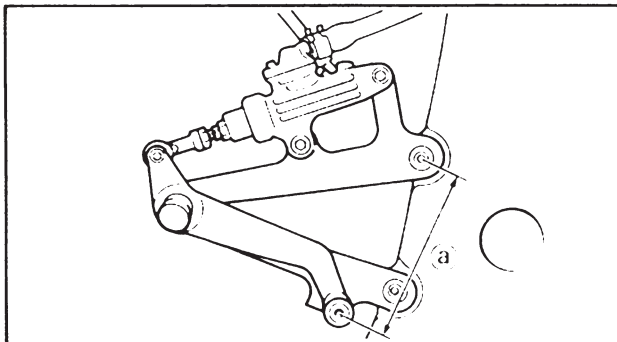
Closer → Turn the adjuster in (b).

Farther → Turn the adjuster out (c).

NOTE:

Align the mating mark (d) on the adjuster with the arrow mark (e) on the brake lever.

3



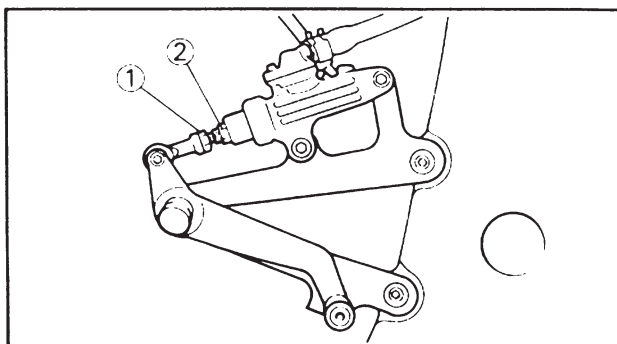
REAR BRAKE ADJUSTMENT

1. Check:

- Brake pedal height (a)
- Out of specification → Adjust.



Brake pedal height (a):
148~152 mm (5.8~6.0 in)



2. Adjust:

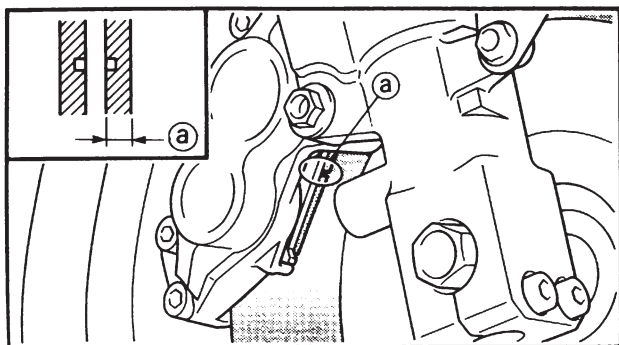
- Brake pedal height

Pedal height adjustment steps:

- Loosen the locknut (1).
- Turn the adjusting nut (2) until the pedal height (a) is within specified height.
- Tighten the locknut.

FRONT BRAKE PAD INSPECTION AND REPLACEMENT

INSP
ADJ



FRONT BRAKE PAD INSPECTION AND REPLACEMENT

1. Inspect:

- Brake pad thickness ①

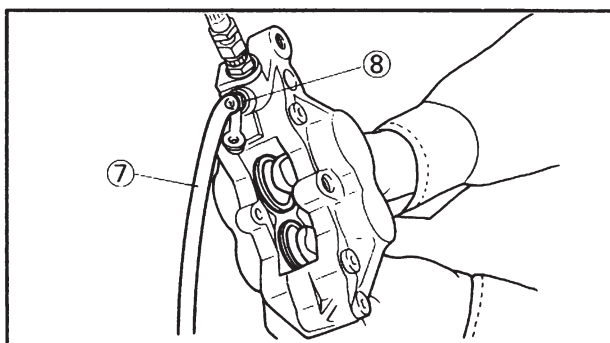
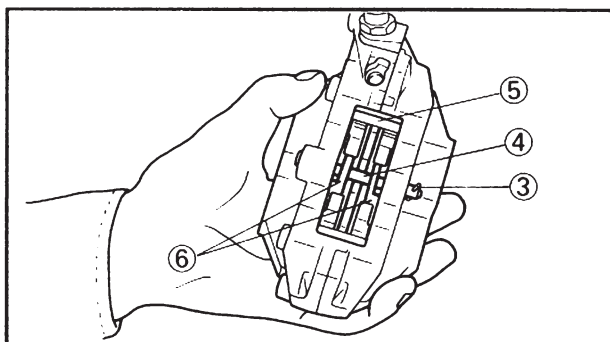
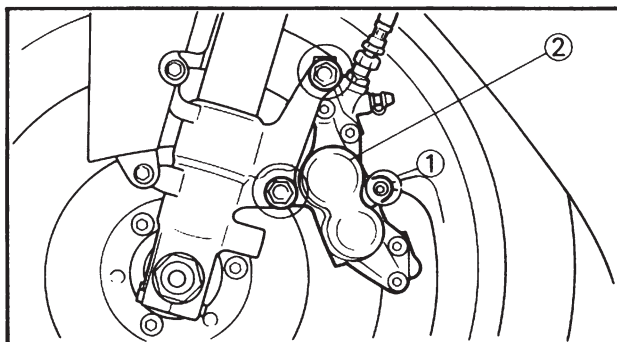
Out of specification → Replace as a set.



Brake pad thickness ①:

Standard	<Limit>
5.3 mm (0.21 in)	1.0 mm (0.04 in)

3



2. Replace:

- Brake pad

Brake pad replacement steps:

- Loosen the pad pin ① and remove the caliper ②.
- Remove the cotter pin ③, pad pin ④, pad support ⑤ and brake pads ⑥.
- Connect the transparent hose ⑦ to the bleed screw ⑧ and place the suitable container under its end.
- Loosen the bleed screw and push the caliper piston in.

CAUTION:

Do not reuse the drained brake fluid.

- Tighten the bleed screw.

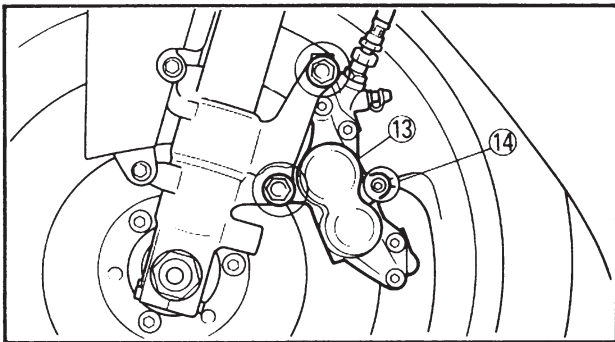
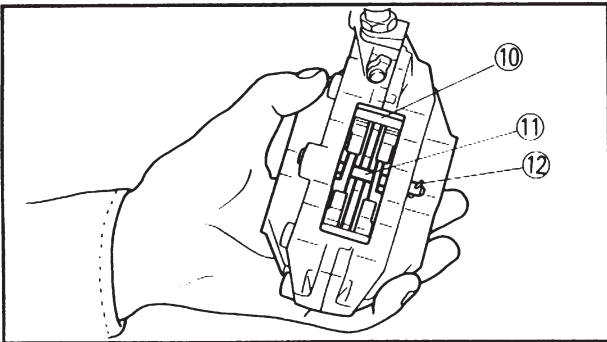
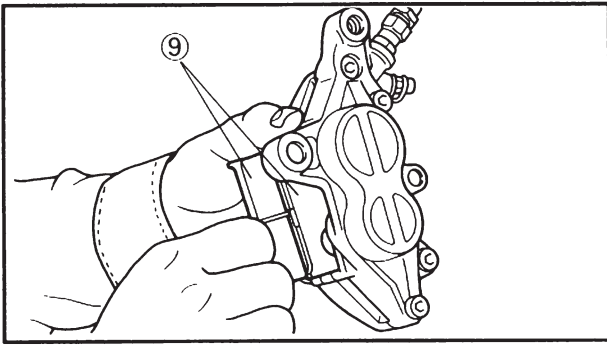


Bleed screw:

6 Nm (0.6 m·kg, 4.3 ft·lb)

FRONT BRAKE PAD INSPECTION AND REPLACEMENT

INSP
ADJ



- Install the brake pads (9), pad support (10), pad pin (11) and cotter pin (12).

NOTE:

- Always use a new cotter pin.
- Temporarily tighten the pad pin at this point.
- Install the caliper (13) and tighten the pad pin (14).



Bolt (caliper):

35 Nm (3.5 m•kg, 25 ft•lb)

Pad pin:

18 Nm (1.8 m•kg, 13 ft•lb)

3

3. Inspect:

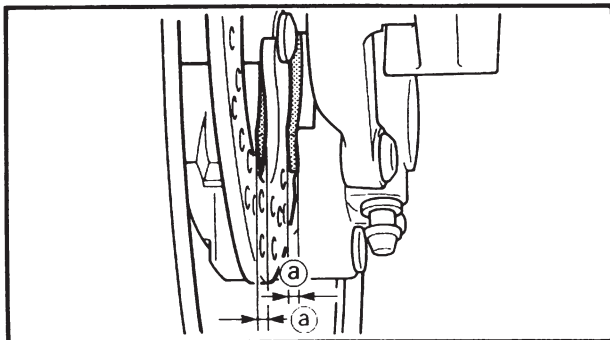
- Brake fluid level
Refer to "BRAKE FLUID LEVEL INSPECTION" section.

4. Check:

- Brake lever operation
A softy or spongy feeling → Bleed brake system.
Refer to "BRAKE SYSTEM AIR BLEEDING" section.

REAR BRAKE PAD INSPECTION AND REPLACEMENT

INSP
ADJ



REAR BRAKE PAD INSPECTION AND REPLACEMENT

1. Inspect:

- Brake pad thickness ①

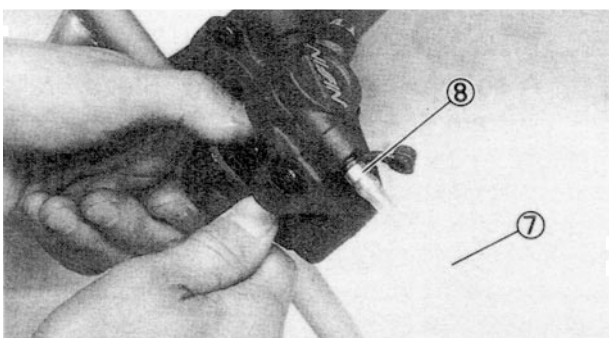
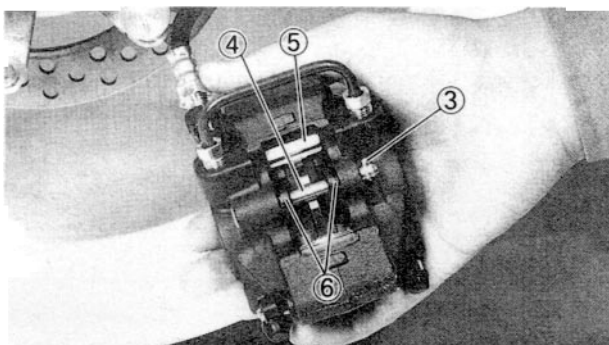
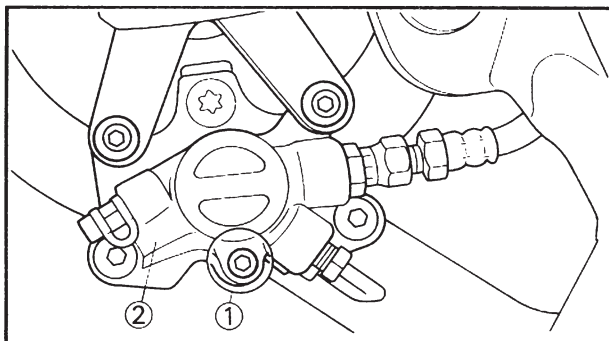
Out of specification → Replace as a set.



Brake pad thickness ①:

Standard	<Limit>
4.0 mm (0.16 in)	1.0 mm (0.04 in)

3



2. Replace:

- Brake pad

Brake pad replacement steps:

- Loosen the pad pin ① and remove the caliper ②.
- Remove the cotter pin ③, pad pin ④, pad support ⑤ and brake pads ⑥.
- Connect the transparent hose ⑦ to the bleed screw ⑧ and place the suitable container under its end.
- Loosen the bleed screw and push the caliper piston in.

CAUTION:

Do not reuse the drained brake fluid.

- Tighten the bleed screw.

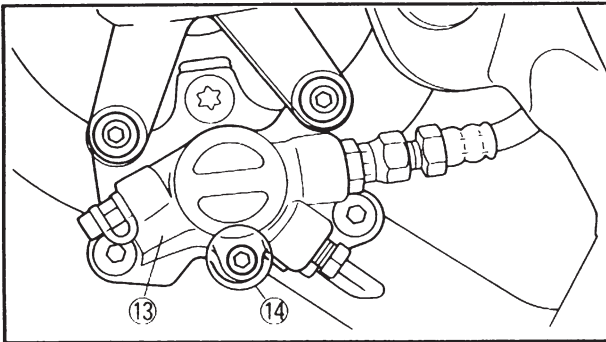
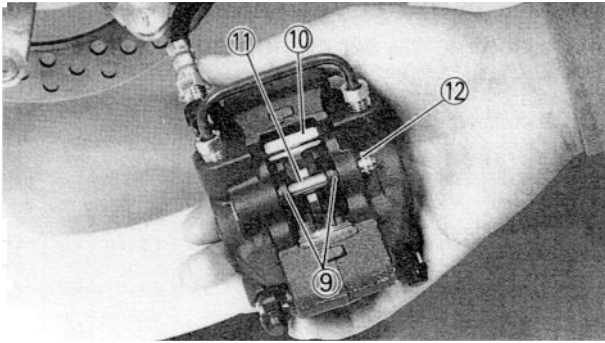


Bleed screw:

6 Nm (0.6 m·kg, 4.3 ft·lb)

REAR BRAKE PAD INSPECTION AND REPLACEMENT

INSP
ADJ



- Install the brake pads ⑨, pad support ⑩, pad pin ⑪ and cotter pin ⑫.

NOTE:

- Always use a new cotter pin.
- Temporarily tighten the pad pin at this point.
- Install the caliper ⑬ and tighten the pad pin ⑭.



Bolt (caliper):

23 Nm (2.3 m•kg, 17 ft•lb)

Pad pin:

18 Nm (1.8 m•kg, 13 ft•lb)

3

3. Inspect:

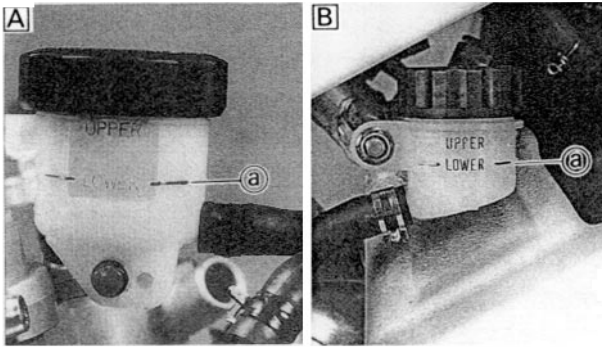
- Brake fluid level
Refer to "BRAKE FLUID LEVEL INSPECTION" section.

4. Check:

- Brake pedal operation
A softy or spongy feeling → Bleed brake system.
Refer to "BRAKE SYSTEM AIR BLEEDING" section.

BRAKE FLUID LEVEL INSPECTION/ SPROCKETS INSPECTION

INSP
ADJ



BRAKE FLUID LEVEL INSPECTION

1. Place the master cylinder so that its top is in a horizontal position.
2. Inspect:
 - Brake fluid level
 Fluid at lower level → Fill up.

Ⓐ Lower level

Ⓐ Front
Ⓑ Rear

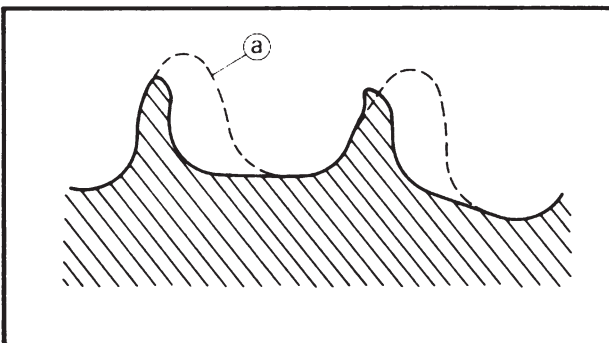


Recommended brake fluid:
DOT #4

⚠ WARNING

- Use only designated quality brake fluid to avoid poor brake performance.
- Refill with same type and brand of brake fluid; mixing fluids could result in poor brake performance.
- Be sure that water or other contaminants do not enter master cylinder when refilling.
- Clean up spilled fluid immediately to avoid erosion of painted surfaces or plastic parts.

3

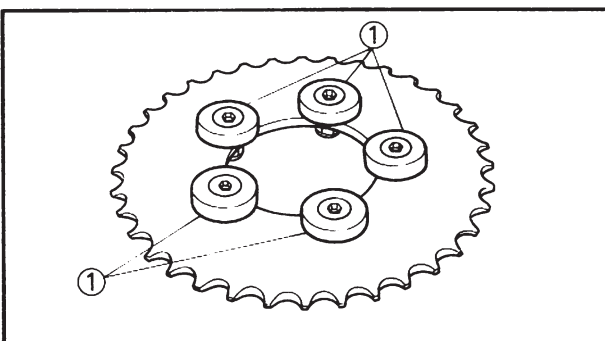


SPROCKETS INSPECTION

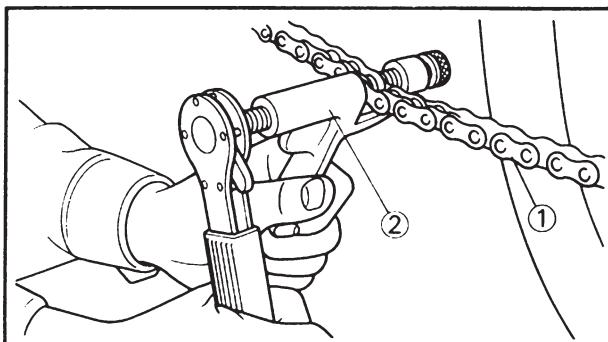
1. Inspect:
 - Sprocket teeth Ⓐ
 Excessive wear → Replace.

NOTE:

Replace the drive, driven sprockets and drive chain as a set.



2. Inspect:
 - Sprocket damper ①
 Wear/Damage → Replace.

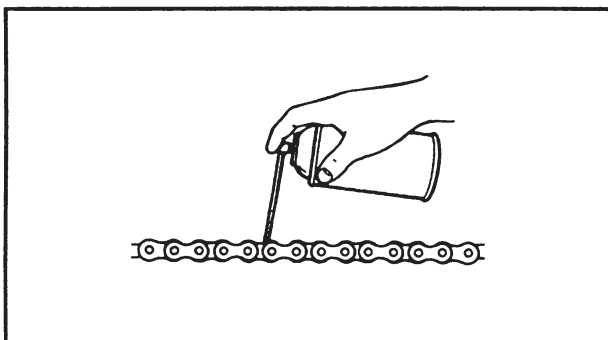


DRIVE CHAIN INSPECTION

1. Remove:
 - Drive chain ①

NOTE:

Remove the drive chain using a chain cutter ②.



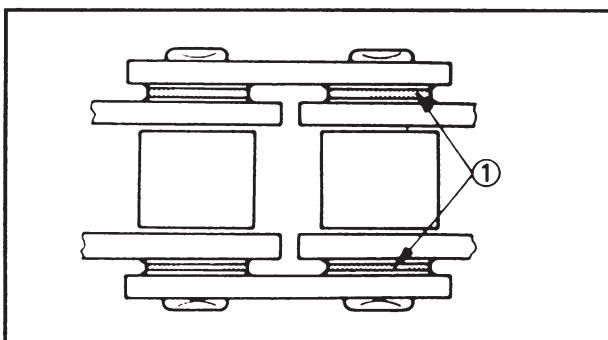
2. Clean:
 - Drive chain

Brush off as much dirt as possible. Then clean the chain using the chain cleaner.

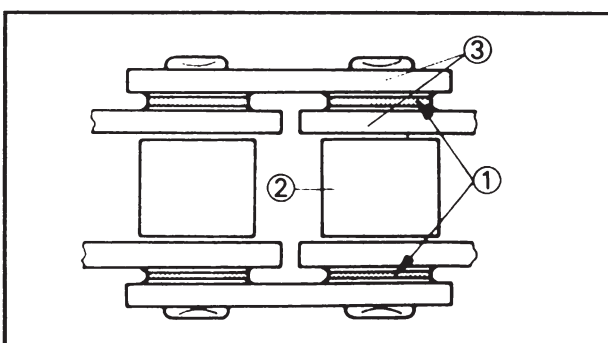
CAUTION:

This machine has a drive chain with small rubber O-rings ① between the chain plates. Steam cleaning, high-pressure washes, certain solvent and kerosene can damage these O-rings.

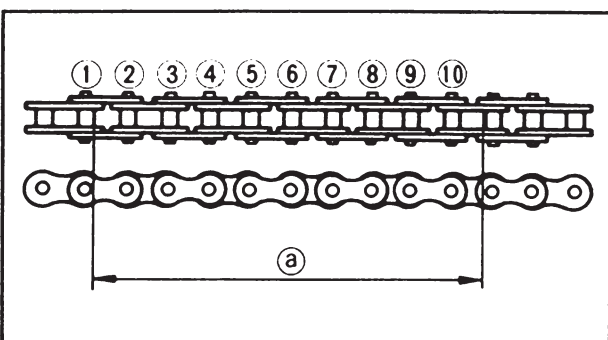
3



3. Inspect:
 - O-rings ① (drive chain)
Damage ›Replace drive chain.
 - Rollers ②
 - Side plates ③
Damage/Wear ›Replace drive chain.



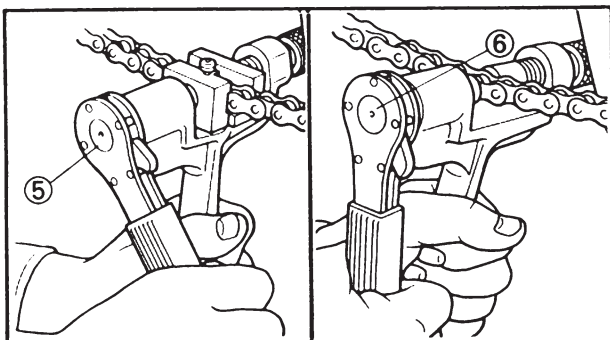
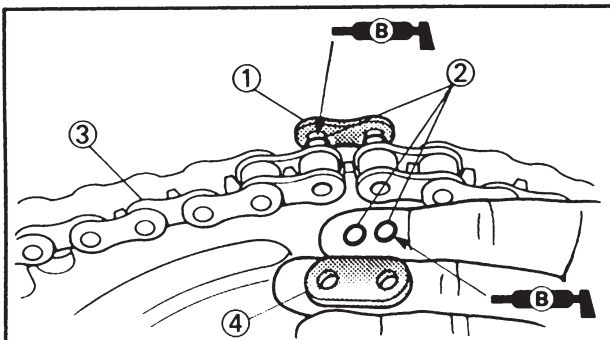
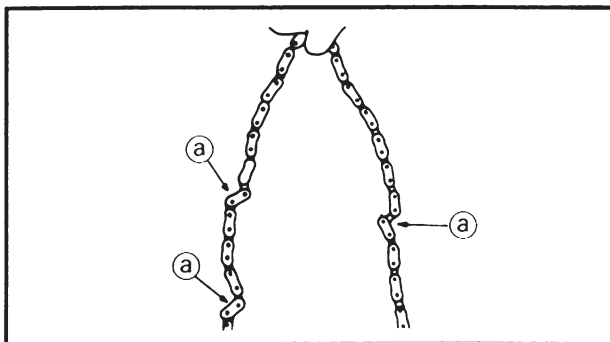
4. Measure:
 - Drive chain length (10 links) ①a
Out of specification ›Replace.



Drive chain length (10 links):
Limit: 150.1 mm (5.909 in)

DRIVE CHAIN INSPECTION

INSP
ADJ



5. Check:

- Drive chain stiffness (a)

Clean and oil the chain and hold as illustrated.

Stiff → Replace drive chain.

6. Install:

- Chain joint (1)
- O-ring (2)
- Drive chain (3)

NOTE:

- Always use a new chain joint.
- When installing the drive chain, apply the lithium soap base grease onto the chain joint and O-rings.

7. Install:

- Link plate (4)

NOTE:

- Press the link plate onto the chain joint using a chain rivetter (5).
- Rivet the end of the chain joint using a chain rivetter (6).
- After rivetting the chain joint, make sure its movement is smooth.

8. Lubricate:

- Drive chain



Drive chain lubricant:

SAE 30~50W motor oil or chain lubricants suitable for "O-ring" chains

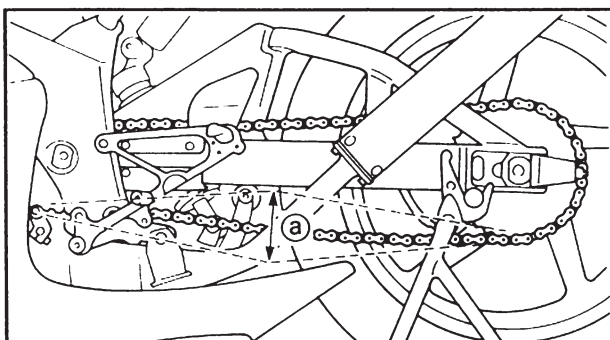
DRIVE CHAIN SLACK ADJUSTMENT

1. Hold the machine on upright position by placing the suitable stand.

2. Check:

- Drive chain slack (a)

Out of specification → Adjust.



Drive chain slack:

40~50 mm (1.6~2.0 in)

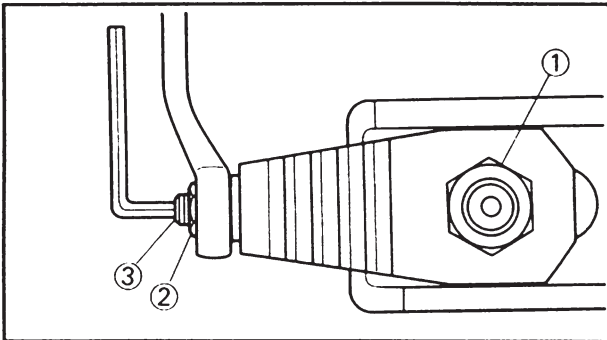
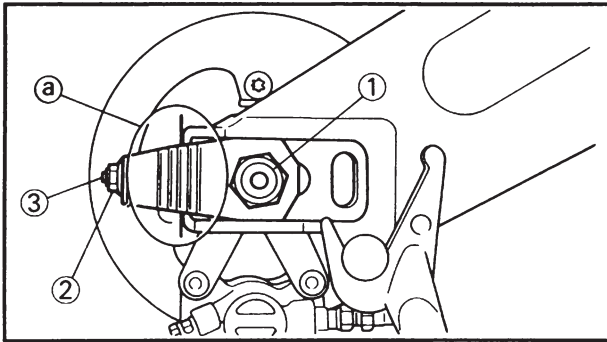
NOTE:

Before checking and/or adjusting, rotate the rear wheel through several revolutions and check the slack several times to find the tightest point.

Check and/or adjust chain slack with rear wheel in this "tight chain" position.

WHEEL ALIGNMENT ADJUSTMENT

INSP
ADJ



3. Adjust:

- Drive chain slack

Drive chain slack adjustment steps:

- Loosen the axle nut ① and locknuts ②.
- Adjust chain slack by turning the adjusters ③.

To Tighten→Turn adjuster ③ counter-clockwise.

To Loosen→Turn adjuster ③ clockwise.

- Turn each adjuster exactly the same amount to maintain correct axle alignment. (There are marks (a) on each side of chain puller alignment.)

NOTE:

Turn the adjusters so that the chain is in line with the sprocket, as viewed from the rear.

CAUTION:

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

- Tighten the axle nut while pushing down the drive chain.



Axle nut:
80 Nm (8.0 m•kg, 58 ft•lb)

- Turn out the adjusters to the specified torque.



Adjuster:
2 Nm (0.2 m•kg, 1.4 ft•lb)

- Tighten the locknuts.



Locknut:
16 Nm (1.6 m•kg, 11 ft•lb)

WHEEL ALIGNMENT ADJUSTMENT

1. Remove:

- Lower cowl

2. Place the machine on a level place and hold it up on upright position.

3. Sit 1~2 m (3.3~6.6 ft) behind the machine and look at both sides of the wheels below the rear wheel axle.

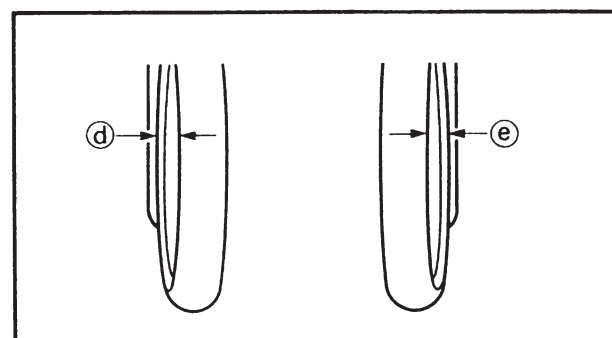
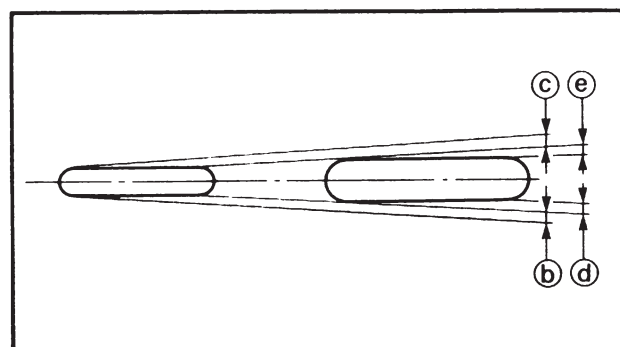
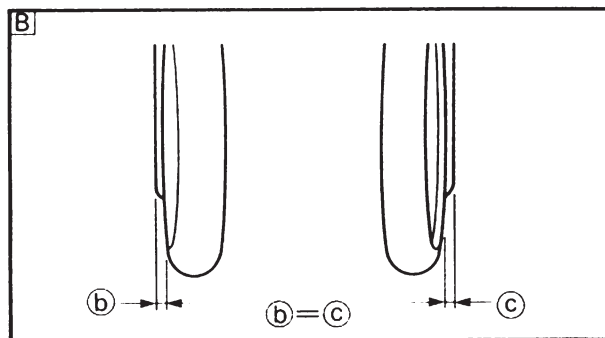
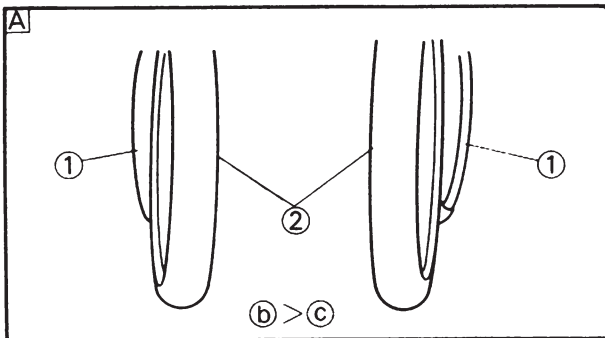
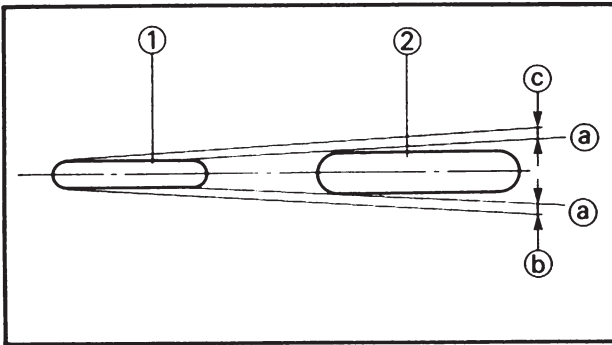
3



4. Turn the handlebar left and right to make the front wheel straight.

NOTE:

- To make the front wheel straight, provide (b) and (c) with the same distance as seen along the extension of the line (a) connecting the rear end of the front wheel (1) and the front end of the rear wheel (2).
- Figure [A] shows that the front wheel is turned clockwise ($b > c$).
- Figure [B] shows that the front wheel is straight ($b = c$).



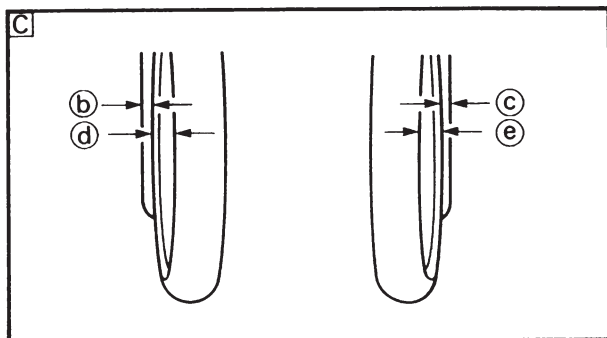
5. Check:

•Wheel alignment

With the front wheel straight ($b = c$), check whether the distances (d) and (e) are equal.

If not → Adjust.

FRONT FORK INSPECTION/ FRONT FORK TOP END ADJUSTMENT



6. Adjust:

•Wheel alignment

Turn the chain puller adjuster while paying attention to the drive chain slack and make adjustment while moving the rear wheel.

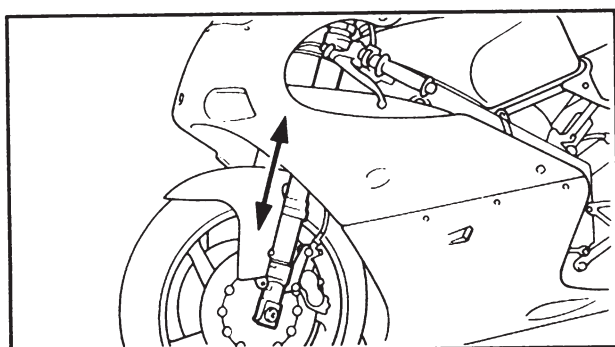
NOTE:

- Figure [C] shows that the wheel alignment has been correctly made ($\textcircled{b} = \textcircled{c}$ and $\textcircled{d} = \textcircled{e}$).
- After the adjustment, record the difference in the graduation between the left and right chain pullers as it will provide convenience in your future similar adjustment.

7. Install:

- Lower cowl

3



FRONT FORK INSPECTION

1. Inspect:

•Front fork smooth action

Operate the front brake and stroke the front fork.

Unsmooth action/oil leakage → Repair or replace.

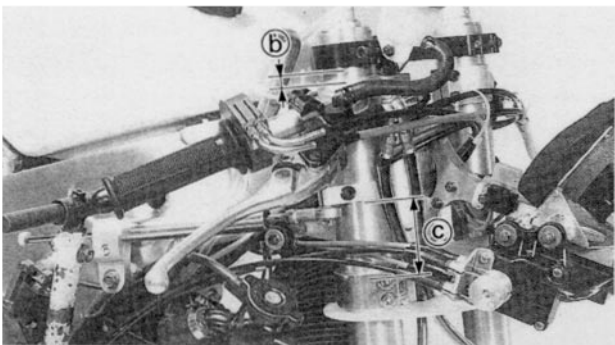
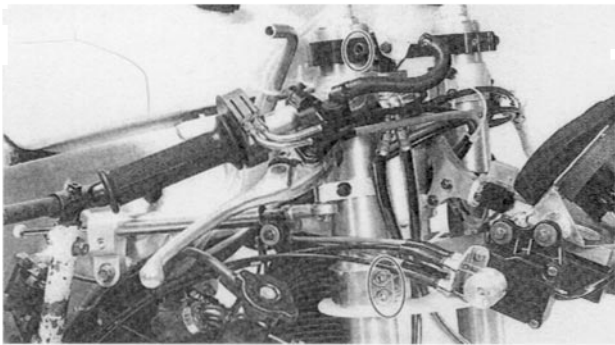
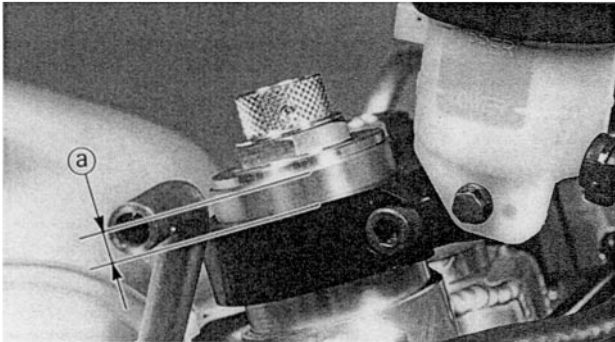
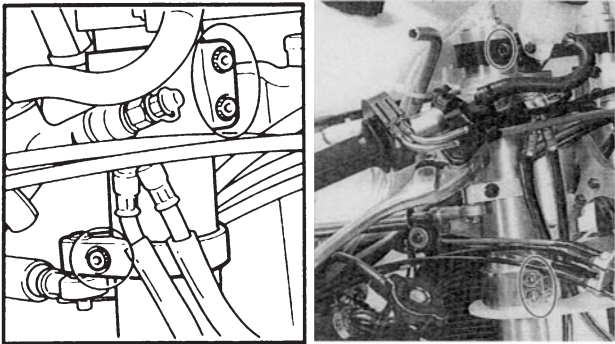
FRONT FORK TOP END ADJUSTMENT

1. Hold the machine on upright position by placing the suitable stand.

2. Remove:

- Cowling
- Induction guide (left cylinder)
- Front wheel
- Front fender

FRONT FORK TOP END ADJUSTMENT



3. Adjust:
- Front fork top end

- Adjustment steps:**
- Loosen the pinch bolts (handlebar and steering damper stay).
 - Loosen the pinch bolts (handle crown and under bracket).
 - Adjust the front fork top end (a).



Front fork top end (a):

Standard	Extent of adjustment
10 mm (0.39 in)	Zero ~ 16 mm (Zero ~ 0.63 in)

CAUTION:

Never attempt to install the front fork beyond the maximum or minimum setting.

! WARNING

Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.

- Tighten the pinch bolts (handle crown and under bracket).



Pinch bolt (handle crown):
20 Nm (2.0 m•kg, 14 ft•lb)
Pinch bolt (under bracket):
23 Nm (2.3 m•kg, 17 ft•lb)

CAUTION:

Tighten the under bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.

- Adjust the handlebar position (b) and steering damper stay position (c).

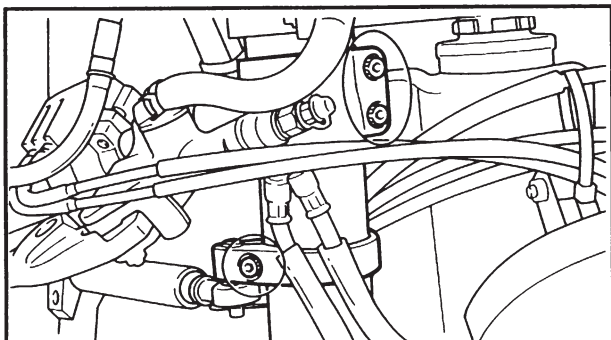


Handlebar position (b):
9 mm (0.35 in)
Steering damper stay position
(c):
73 mm (2.87 in)

3

FRONT FORK TOP END ADJUSTMENT

INSP
ADJ



- Tighten the pinch bolts (handlebar and steering damper stay).

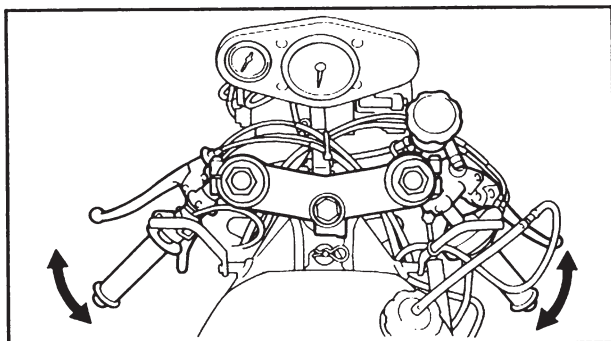


Pinch bolt (handlebar):
7 Nm (0.7 m•kg, 5.1 ft•lb)
Pinch bolt (steering damper stay):
7 Nm (0.7 m•kg, 5.1 ft•lb)

CAUTION:

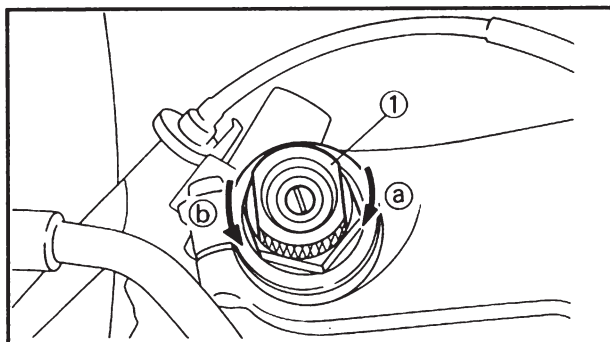
Tighten the pinch bolts to specified torque. If torque too much, it may cause the front fork to malfunction.

3



4. Check:
 - Steering smooth action
Turn the handlebar to make sure no parts are being contacted with others.
Contact→Repair.
5. Install:
 - Front fender
 - Front wheel
 - Induction guide (left cylinder)
 - Cowling

FRONT FORK SPRING PRELOAD ADJUSTMENT/ FRONT FORK REBOUND DAMPING FORCE ADJUSTMENT



FRONT FORK SPRING PRELOAD ADJUSTMENT

- Adjust:
 - Spring preload
By turning the adjuster ①.

Stiffer ① → Increase the spring preload.
(turn the adjuster ① in.)
Softer ② → Decrease the spring preload.
(turn the adjuster ① out.)



Extent of adjustment:

Maximum	Minimum
Fully turned in position	21 clicks out (from maximum position)

•STANDARD POSITION:

This is the position which is back by the specific number of clicks from the fully turned-out position.



Standard position:
9 clicks in

CAUTION:

Do not force the adjuster past the minimum or maximum extent of adjustment.
The adjuster may be damaged.

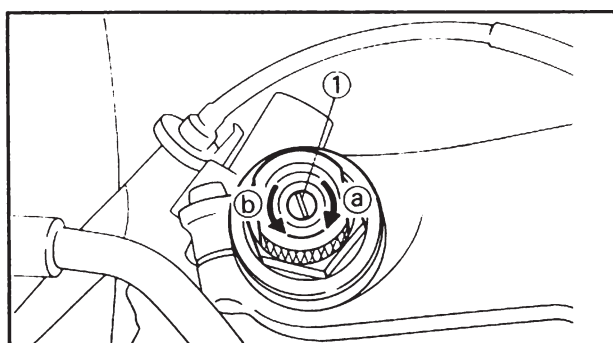


WARNING

Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.

FRONT FORK REBOUND DAMPING FORCE ADJUSTMENT

- Adjust:
 - Rebound damping force
By turning the adjuster ①.



Stiffer ① → Increase the rebound damping force. (turn the adjuster ① in.)
Softer ② → Decrease the rebound damping force. (turn the adjuster ① out.)

FROT FORK COMPRESSION DAMPING FORCE ADJUSTMENT

INSP
ADJ



Extent of Adjustment:

Maximum	Minimum
Fully turned in position	20 clicks out (from maximum position)

•STANDARD POSITION:

This is the position which is back by the specific number of clicks from the fully turned-in position.



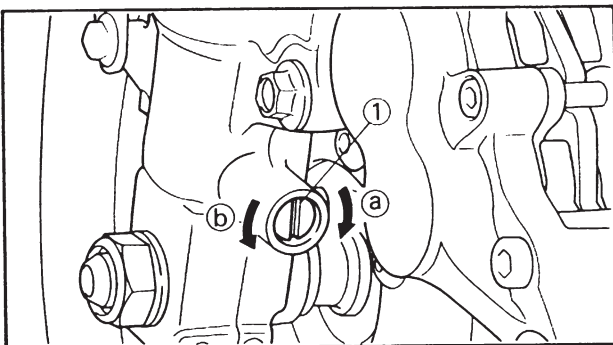
Standard position:
18 clicks out

CAUTION:

Do not force the adjuster past the minimum or maximum extent of adjustment.
The adjuster may be damaged.

⚠ WARNING

Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.



FRONT FORK COMPRESSION DAMPING FORCE ADJUSTMENT

1. Adjust:

- Compression damping force
By turning the adjuster ①.

Stiffer ① → Increase the compression damping force. (turn the adjuster ① in.)

Softer ② → Decrease the compression damping force. (turn the adjuster ① out.)

REAR SHOCK ABSORBER INSPECTION

INSP
ADJ



Extent of adjustment:

Maximum	Minimum
Fully turned in position	10 clicks out (from maximum position)

•STANDARD POSITION:

This is the position which is back by the specific number of clicks from the fully turned-in position.



Standard position:
6 clicks out

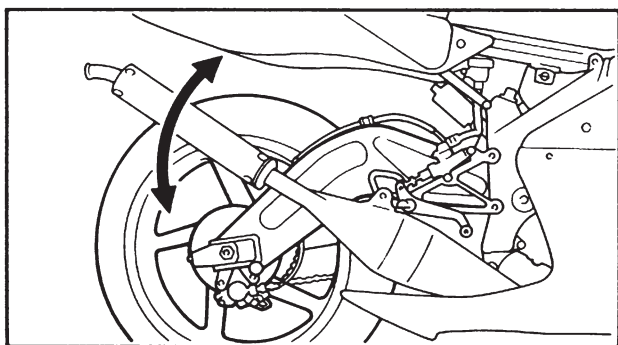
CAUTION:

Do not force the adjuster past the minimum or maximum extent of adjustment.
The adjuster may be damaged.



WARNING

Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.



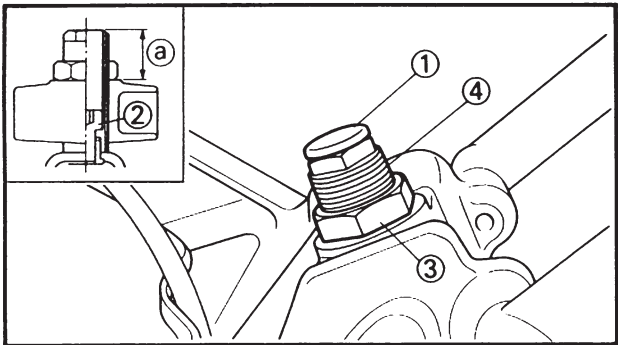
REAR SHOCK ABSORBER INSPECTION

1. Inspect:

- Swingarm smooth action
Abnormal noise/Unsmooth action → Grease the pivoting points or repair the pivoting points.
Damage/Oil leakage → Replace.

SEAT HEIGHT ADJUSTMENT

1. Remove:
- Fuel tank
 - Induction cap (left cylinder)
2. Adjust:
- Seat height



Seat height adjustment steps:

- Remove the cap ①.
- Loosen the lock bolt ② and locknut ③.
- Turn the adjuster ④ in or out.



Seat height ④:

Standard length	Extent of adjustment
24 mm (0.94 in)	17~29 mm (0.67~1.14 in)

NOTE:

If the adjuster set length ④ is changed, the seat height will be increased or decreased by twice the change.

CAUTION:

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

- Tighten the lock bolt and locknut.



Lock bolt:
40 Nm (4.0 m•kg, 29 ft•lb)

Locknut:
38 Nm (3.8 m•kg, 27 ft•lb)

- Install the cap.

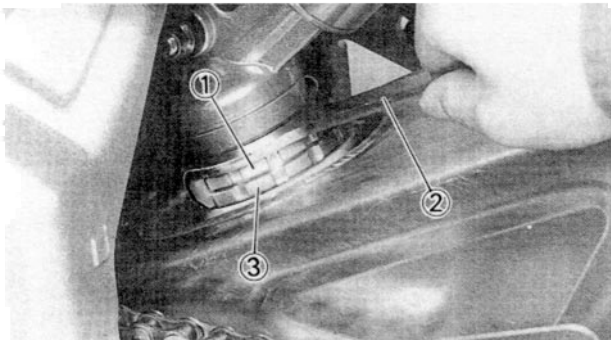
3. Install:
- Induction cap (left cylinder)
 - Fuel tank

REAR SHOCK ABSORBER SPRING
PRELOAD ADJUSTMENT

1. Hold the machine on upright position by plac-
- ing the suitable stand.
2. Loosen:
- Locknut ①

NOTE:

When loosening the locknut, use the special tool ② which is included in the owner's tool kit.



REAR SHOCK ABSORBER REBOUND DAMPING FORCE ADJUSTMENT



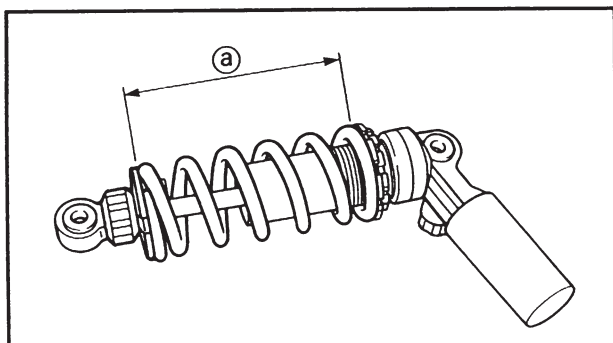
3. Adjust:

- Spring preload

By turning the adjuster ③.

Stiffer → Increase the spring preload.
(turn the adjuster ③ in.)

Softer → Decrease the spring preload.
(turn the adjuster ③ out.)



Spring length (installed):

Standard length ③	Extent of adjustment
148.5 mm (5.85 in)	145.5~152.0 mm (5.73~5.98 in)

NOTE:

The length of the spring (installed) changes 1.5 mm (0.06 in) per turn of the adjuster.

CAUTION:

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

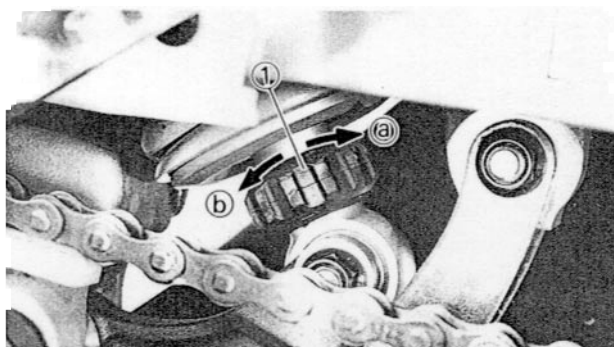
4. Tighten

- Locknut



Locknut:

20 Nm (2.0 m•kg, 14 ft•lb)



REAR SHOCK ABSORBER REBOUND DAMPING FORCE ADJUSTMENT

1. Adjust:

- Rebound damping force

By turning the adjuster ①.

Stiffer ① → Increase the rebound damping force. (turn the adjuster ① in.)

Softer ② → Decrease the rebound damping force. (turn the adjuster ① out.)

REAR SHOCK ABSORBER COMPRESSION DAMPING FORCE ADJUSTMENT



Extent of adjustment:	
Maximum	Minimum
Fully turned in position	30 clicks out (from maximum position)

•STANDARD POSITION:

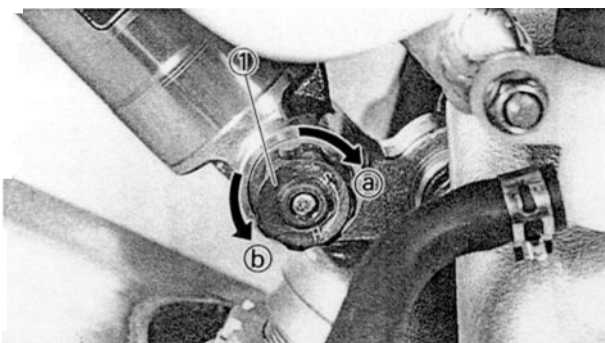
This is the position which is back by the specific number of clicks from the fully turned-in position.

Standard position:
25 clicks out

CAUTION:

Do not turn out (in) the adjuster from the damping force minimum (maximum) setting.

3



REAR SHOCK ABSORBER COMPRESSION DAMPING FORCE ADJUSTMENT

1. Adjust:

- Compression damping force
By turning the adjuster ①.

Stiffer (a) → Increase the compression damping force. (turn the adjuster ① in.)

Softer (b) → Decrease the compression damping force. (turn the adjuster ① out.)

Extent of adjustment:	
Maximum	Minimum
Fully turned in position	20 clicks out (from maximum position)

TIRE PRESSURE CHECK/ TIRE INSPECTION

INSP
ADJ



•STANDARD POSITION

This is the position which is back by the specific number of clicks from the fully turned-in position.

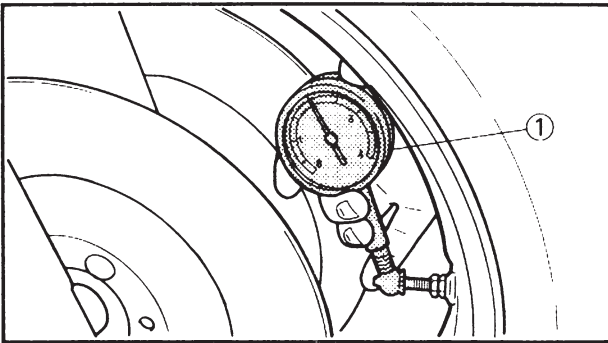


Standard position:
10 clicks out

CAUTION:

Do not turn out (in) the adjuster from the damping force minimum (maximum) setting:

3



TIRE PRESSURE CHECK

1. Measure:

- Tire pressure
- Out of specification → Adjust.



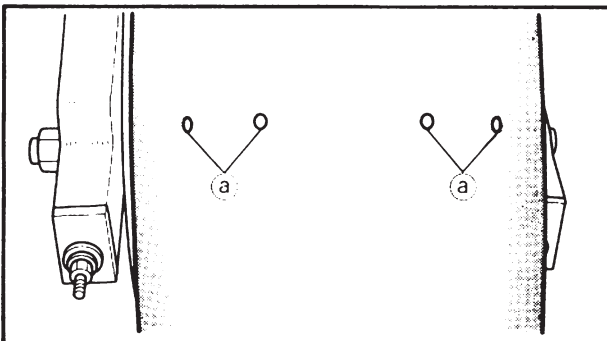
Standard tire pressure:

Front	Rear
200 kPa (2.0 kg/cm ² , 29 psi)	200 kPa (2.0 kg/cm ² , 29 psi)

NOTE:

Check the tire while it is cold.

① Air gauge



TIRE INSPECTION

1. Inspect:

- Tire surfaces
- Wear/Damage → Replace.



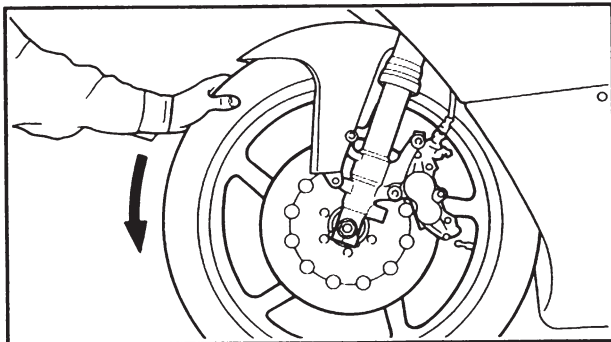
Minimum tire tread depth (a):
2 mm (0.08 in)

WHEEL INSPECTION/STEERING HEAD INSPECTION AND ADJUSTMENT

INSP
ADJ



3



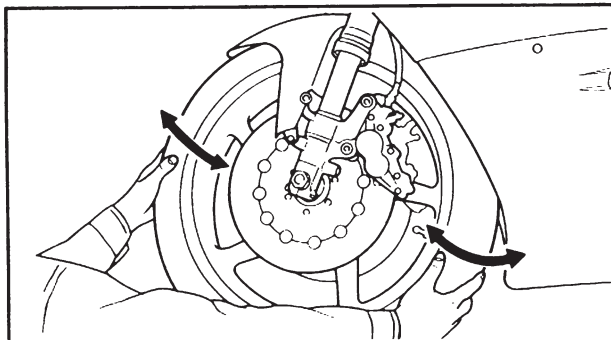
WHEEL INSPECTION

1. Inspect:

•Wheel runout

Elevate the wheel and turn it.

Abnormal runout→Replace.



2. Inspect:

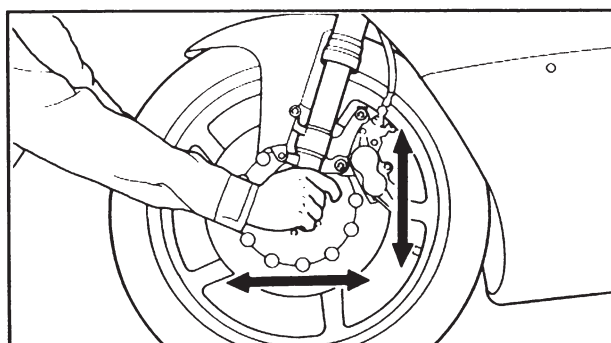
•Bearing free play

Exist play→Replace.

STEERING HEAD INSPECTION AND ADJUSTMENT

1. Remove the steering damper at front fork side.

2. Elevate the front wheel by placing a suitable stand.

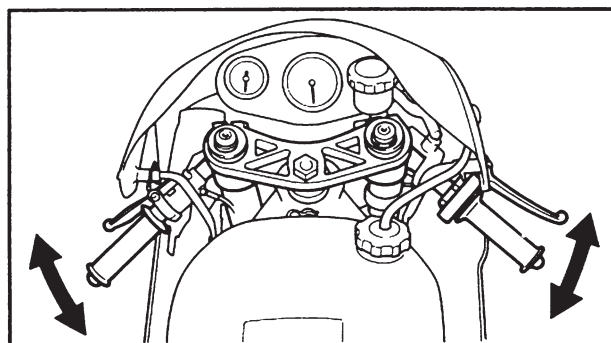


3. Check:

•Steering stem

Grasp the bottom of the forks and gently rock the fork assembly back and forth.

Free play→Adjust steering head.



4. Check:

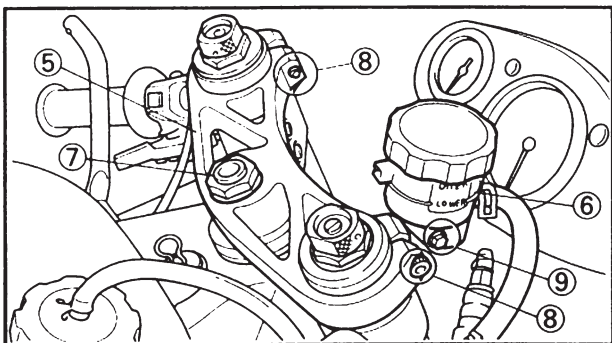
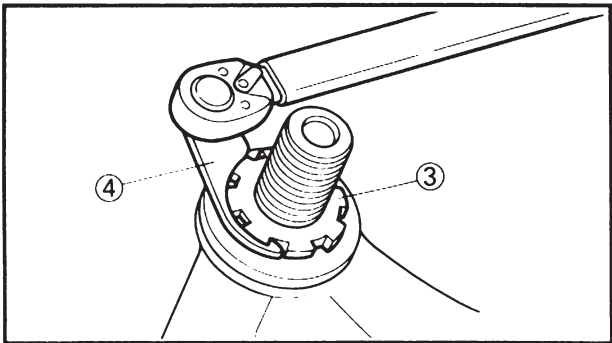
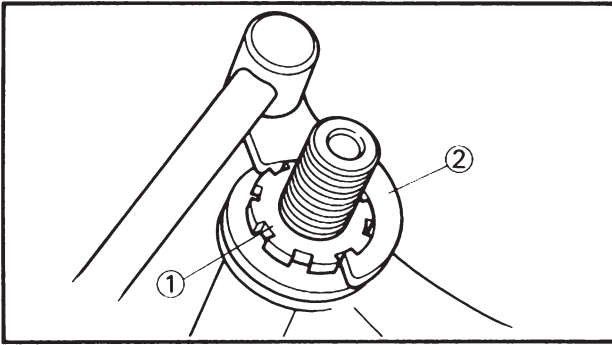
•Steering smooth action

Turn the handlebar lock to lock.

Unsmooth action→Adjust steering ring nut.

STEERING HEAD INSPECTION AND ADJUSTMENT

INSP
ADJ



5. Adjust:

- Steering ring nut

Steering ring nut adjustment steps:

- Remove the cowling.
- Remove the reservoir tank and handle crown.
- Loosen the ring nut (1) using ring nut wrench (2).
- Tighten the ring nut (3) using ring nut wrench (4).

NOTE:

Set the torque wrench to the ring nut wrench so that they form a right angle.



Ring nut wrench:

YU-33975/90890-01403



Ring nut (initial tightening):

46 Nm (4.6 m•kg, 33 ft•lb)

- Loosen the ring nut one turn.
- Retighten the ring nut using the ring nut wrench.

⚠ WARNING

Avoid over-tightening.



Ring nut (final tightening):

1 Nm (0.1 m•kg, 0.7 ft•lb)

- Check the steering shaft by turning it lock to lock. If there is any binding, remove the steering shaft assembly and inspect the steering bearings.
- Install the handle crown (5) and reservoir tank (6).



Steering nut (7):

80 Nm (8.0 m•kg, 58 ft•lb)

Pinch bolt (front fork) (8):

20 Nm (2.0 m•kg, 14 ft•lb)

Bolt (reservoir tank) (9):

5 Nm (0.5 m•kg, 3.6 ft•lb)

- Install the cowling.

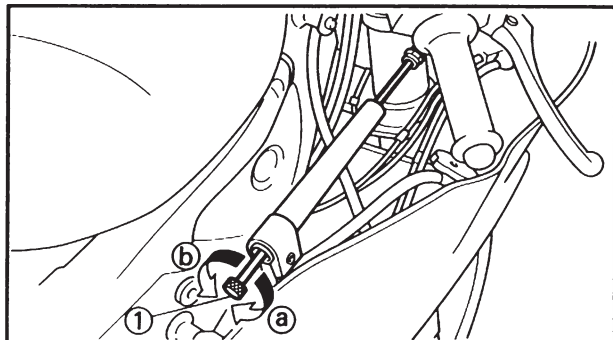
6. Install:

- Steering damper

3

STEERING DAMPER ADJUSTMENT/ WIRES, CABLES/MUFFLER INSPECTION

INSP
ADJ



STEERING DAMPER ADJUSTMENT

1. Adjust:

- Damping force
By turning the adjuster ①.

Stiffer (a) → Increase the compression damping force. (turn the adjuster ① in.)

Softer (b) → Decrease the compression damping force. (turn the adjuster ① out.)



Extent of adjustment:

Maximum	Minimum
Fully turned in position	7 clicks out (from maximum position)

•STANDARD POSITION

This is the position which is back by the specific number of clicks from the fully turned-in position.

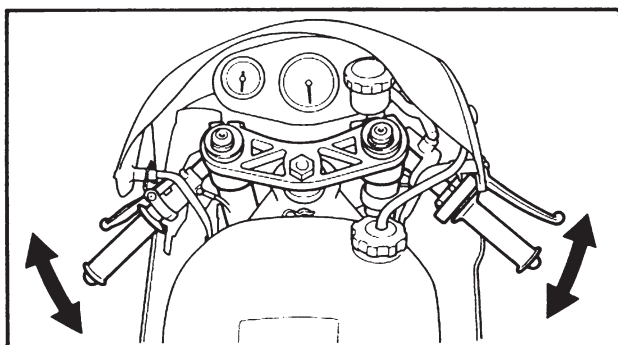


Standard position:
7 clicks out

CAUTION:

Do not turn out (in) the adjuster from the damping force minimum (maximum) setting.

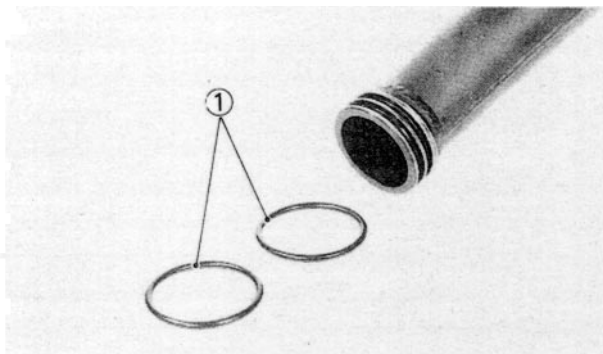
3



WIRES, CABLES

1. Inspect:

- Smooth movement for steering handle
By turning the handlebar lock to lock.
If any caught/rubbed → Repair/Replace.

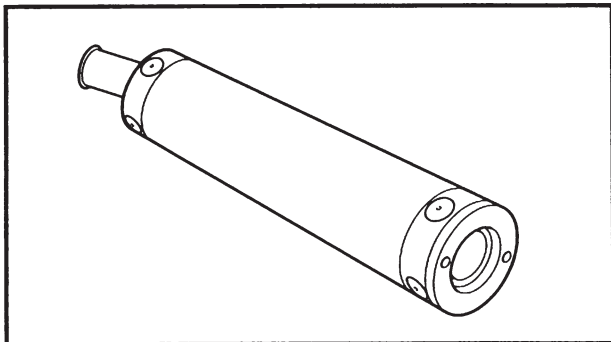


MUFFLER INSPECTION

1. Inspect:

- O-ring ①
Damage → Replace.

SILENCER INSPECTION/ COWLING INSTALLATION INSPECTION



SILENCER INSPECTION

1. Inspect:

- Silencer
Inside of silencer loose→Repair.

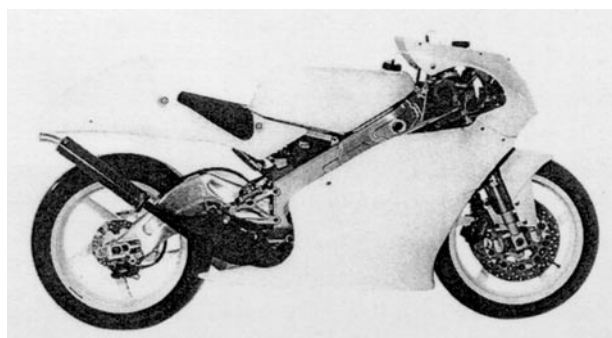
Silencer repair steps:

- Drill the silencer for rivetting.
- Rivet the silencer using the rivet.

NOTE: _____

Rivet the silencer in a different area than previously riveted.

3



COWLING INSTALLATION INSPECTION

1. Inspect:

- Cowling
Loosen→Tighten.
Stroke the front fork to make sure no parts are being contacted with others.
Contact→Repair or replace.
- Screen
Scratches/fogging→Clean or replace.



LUBRICATION

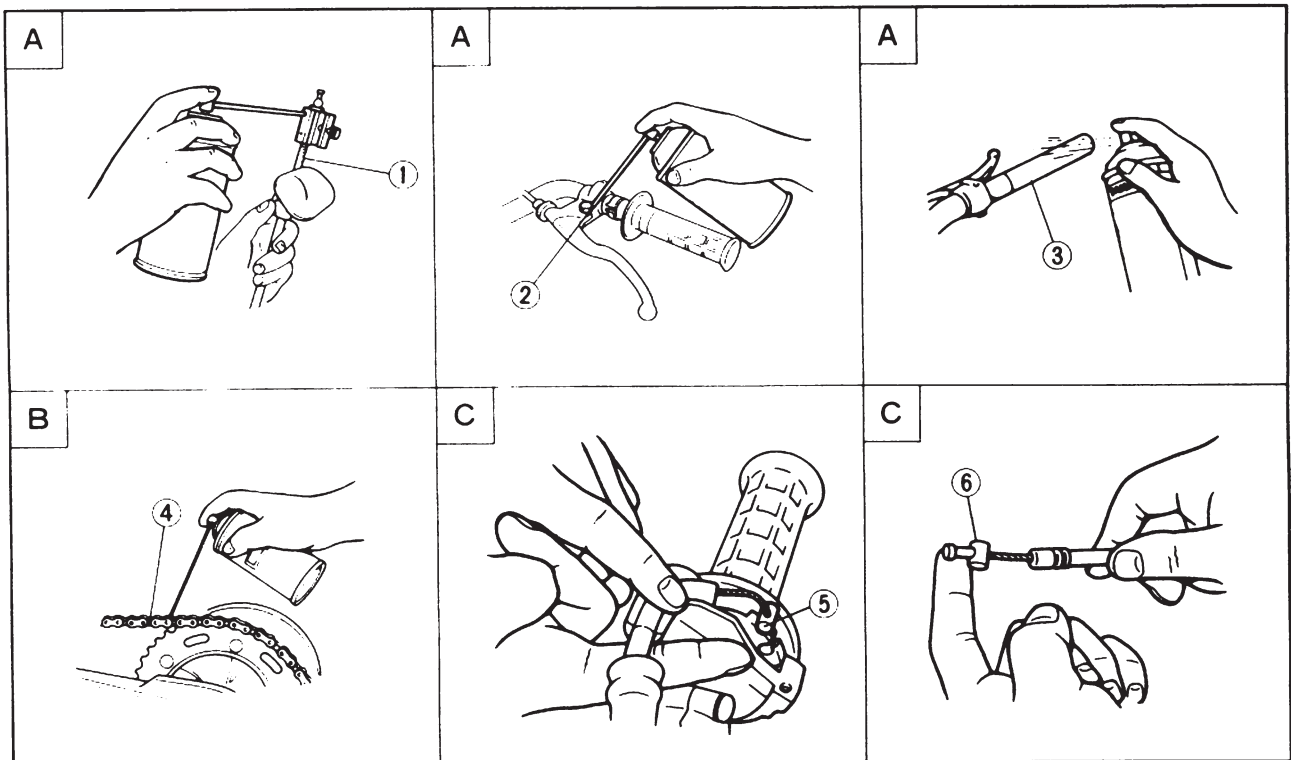
To ensure smooth operation of all components lubricate your machine during setup, after break-in, and after every race.

- ① All control cable
- ② Brake and clutch lever pivots
- ③ Throttle-to-handlebar contact
- ④ Drive chain
- ⑤ Throttle guide and cable end
- ⑥ Clutch cable end

- A Use Yamaha cable lube or equivalent on these areas.
- B Use SAE 30~50W motor oil or chain lubricants suitable for "O-ring" chains.
- C Lubricate the following areas with highquality, lightweight lithium-soap base grease.

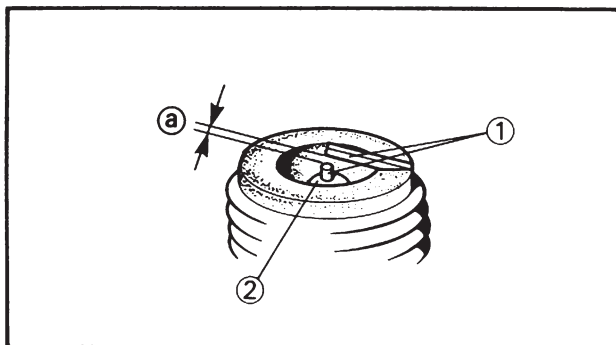
CAUTION:

Wipe off any excess grease, and avoid getting grease on the brake discs.



SPARK PLUG INSPECTION

INSP
ADJ



SPARK PLUG INSPECTION

1. Remove:
 - Spark plug
2. 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.

NOTE: _____

When the engine runs for many hours at low speeds, the spark plug insulator will become sooty, even if the engine and carburetor are in good operating condition.

3. Measure:
 - Plug gap (a)
Use a wire gauge or thickness gauge.
Out of specification → Regap.



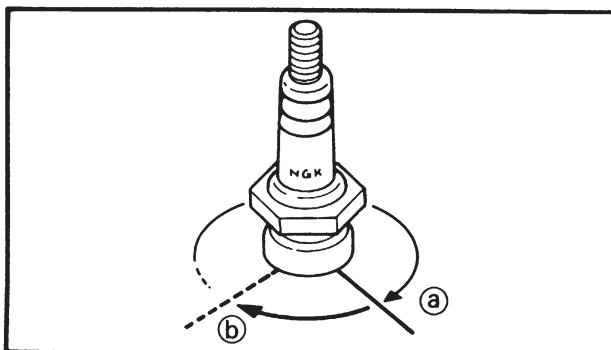
Spark plug gap:
0.5 ~ 0.6 mm (0.020 ~ 0.024 in)

Standard spark plug:
R6179A-105P (NGK)

4. Clean the plug with a spark plug cleaner if necessary.
5. Tighten:
 - Spark plug



Spark plug:
19 Nm (1.9 m•kg, 13 ft•lb)



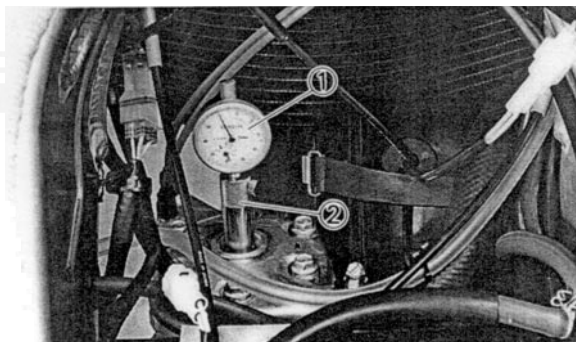
NOTE: _____

- Before installing a spark plug, clean the gasket surface and plug surface.
- Finger-tighten (a) the spark plug before torquing to specification (b).

3

IGNITION TIMING CHECK

INSP
ADJ



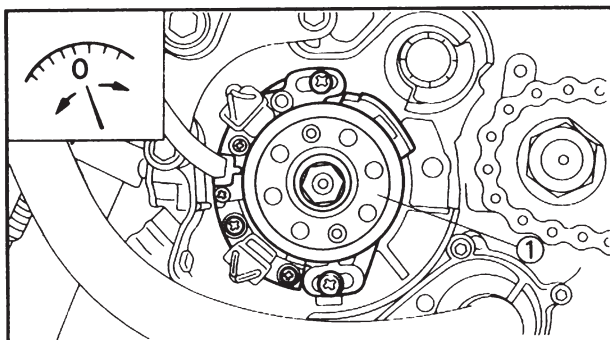
IGNITION TIMING CHECK

1. Remove:
 - Cowling
 - Fuel tank
 - Spark plugs (left and right)
2. Attach:
 - Dial gauge ①
 - Dial gauge stand ②
 To left cylinder head.



Dial gauge:
YU-03097/90890-01252
Stand:
YU-01256

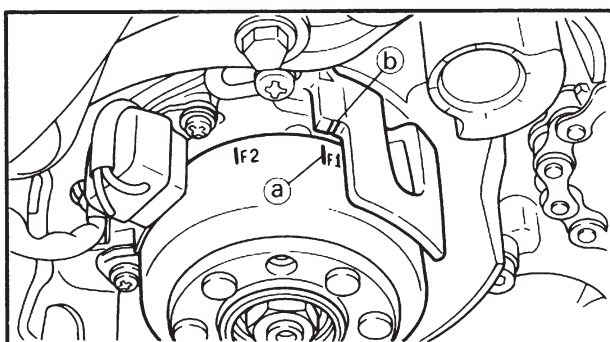
3



3. Rotate the magneto rotor ① until the piston reaches top dead center (TDC). When this happens, the needle on the dial gauge will stop and reverse directions even though the rotor is being turned in the same direction.
4. Set the dial gauge to zero at TDC.
5. From TDC, rotate the rotor clockwise until the dial gauge indicates that the piston is at a specified distance from TDC.



Ignition timing (left cylinder):
1.7 mm (0.067 in)



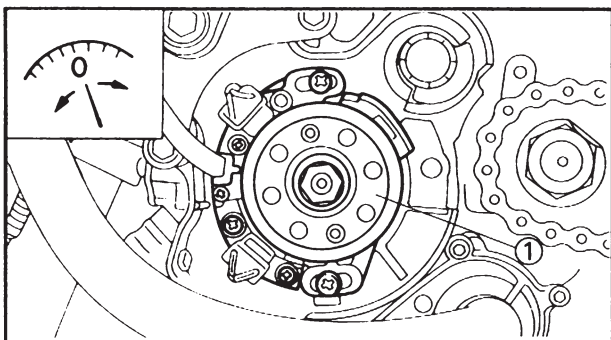
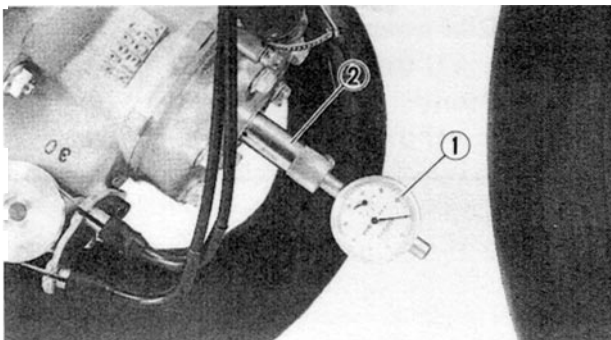
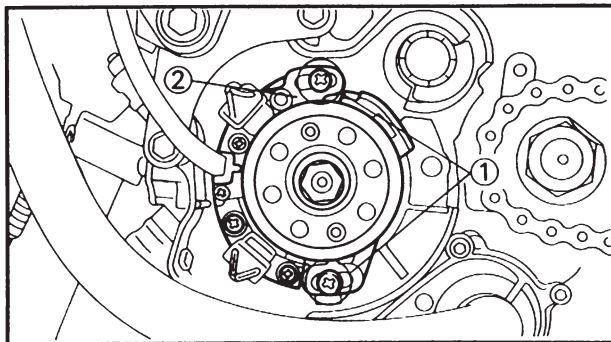
6. Check:
 - Ignition timing (left cylinder)
 Punch mark ① on rotor should be aligned with punch mark ② on stator.
Not aligned → Adjust.

NOTE: _____

Be sure to use the punch mark "F1", not "F2".

IGNITION TIMING CHECK

INSP
ADJ



7. Adjust:

- Ignition timing (left cylinder)

Adjustment steps:

- Loosen the screws (stator) ①.
- Align the punch marks by turning the stator ②.
- Tighten the screws.



Screw (stator):

7 Nm (0.7 m•kg, 5.1 ft•lb)

8. Attach:

- Dial gauge ①
 - Dial gauge stand ②
- To right cylinder head.



Dial gauge:

YU-03097/90890-01252

Stand:

YU-01256

9. Rotate the magneto rotor ① until the piston reaches top dead center (TDC). When this happens, the needle on the dial gauge will stop and reverse directions even though the rotor is being turned in the same direction.

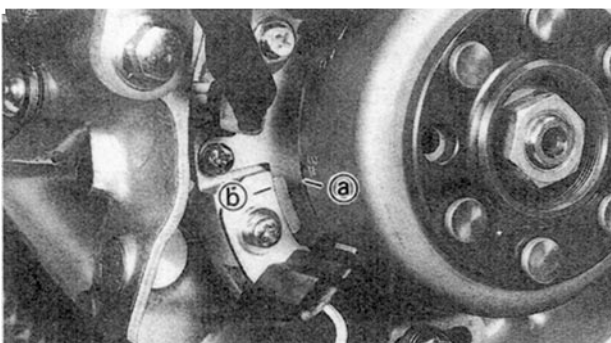
10. Set the dial gauge to zero at TDC.

11. From TDC, rotate the rotor clockwise until the dial gauge indicates that the piston is at a specified distance from TDC.



Ignition timing (right cylinder):

1.7 mm (0.067 in)



12. Check:

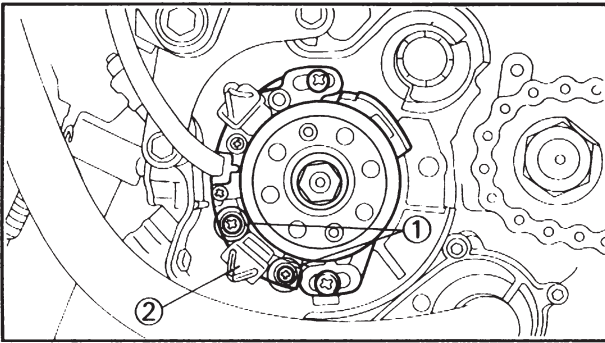
- Ignition timing (right cylinder)
- Punch mark ① on rotor should be aligned with punch mark ② on right pick-up coil.
- Not aligned → Adjust.

NOTE: _____

Be sure to use the punch mark "F2", not "F1".

BATTERY INSPECTION

INSP
ADJ



13. Adjust:

- Ignition timing (right cylinder)

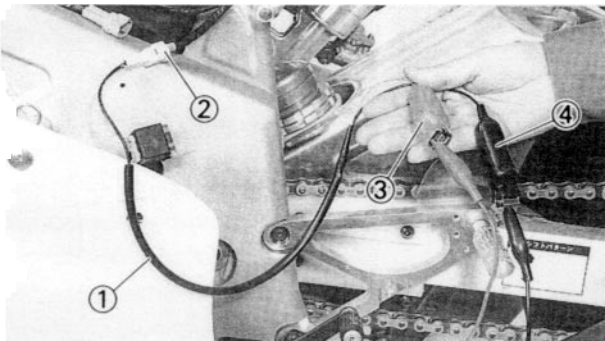
Adjusting steps:

- Loosen the screws (right pick-up coil) ①.
- Align the punch marks by turning the right pick-up coil ②.
- Tighten the screws.



Screw (pick-up coil):

2 Nm (0.2 m•kg, 1.4 ft•lb)



BATTERY INSPECTION


⚠ WARNING

To prevent danger, read the battery label carefully before handling the battery.

1. Connect the checking lead (accompanying parts) ① to the power supply coupler ②.
2. Check:
 - Battery voltage
 - Out of specification → Recharge.

Tester (+) lead → Red lead ③

Tester (–) lead → Black lead ④

 Battery voltage	Tester selector position
12.5V or more	DCV-20

3

RECHARGING BATTERY

⚠ WARNING

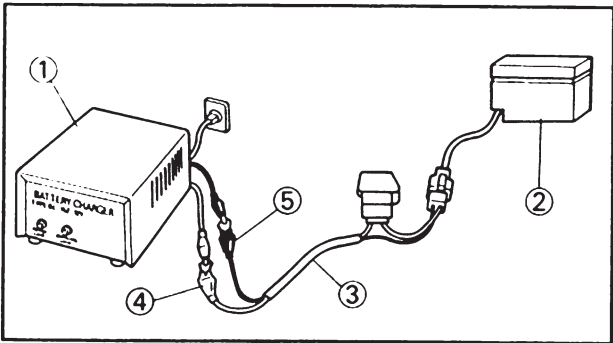
- Keep the battery away from fire.
- When charging the battery, be sure to remove it from the chassis and use the checking lead (accompanying parts).
- Be sure to use the specific charging current and voltage when charging the battery.
- Do not quick charge the battery.
- For battery replacement, be sure to use a sealed type specified for the TZ250.

NOTE:

Battery can be recharged using either an MF battery devoted charger or an automobile battery.

[Using the MF battery devoted charger]

1. Remove:
 - Seat
 - Battery
2. Connect the battery charger ① for MF batteries to the battery ② using the checking lead (accompanying parts) ③, and recharge the battery.



Battery charger (+) lead ▶ Red lead ④
 Battery charger (-) lead ▶ Black lead ⑤

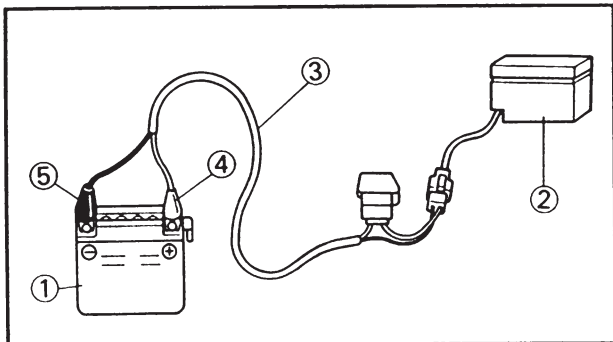
	Battery charger for MF batteries: GS TYPE BC-152-12V
	Charging current × Charging time: 0.2A × 5 hours
	Voltage when charged: 12.8V or more

CAUTION:

Make sure that the red and black leads do not contact each other during recharge.

RECHARGING BATTERY

INSP
ADJ



[Using the automobile battery]

1. Remove:
 - Seat
 - Battery
2. Connect an automobile battery (1) to the battery (2) using the checking lead (accompanying parts) (3), and recharge the battery.

Automobile battery (+) lead >

Red lead (4)

Automobile battery (-) lead >

Black lead (5)



Charging time:
3 hours



Voltage when charged:
12.8V or more
(or 12.5V or more)

Voltage of the automobile battery
for power supply:
12.8 ~ 13.2V (maximum 14.9V)

NOTE: _____

If the battery is recharging using an automobile battery, the charge may not exceed 12.8V. Then, 12.5V or more will be OK.

CAUTION: _____

- For an automobile battery for power supply, use a battery with a capacity of 12V20Ah or more with a voltage of 12.8 to 13.2.
- During the battery recharge, do not recharge the power supply battery by starting or running the engine.
- Connect only one battery for recharge.

3

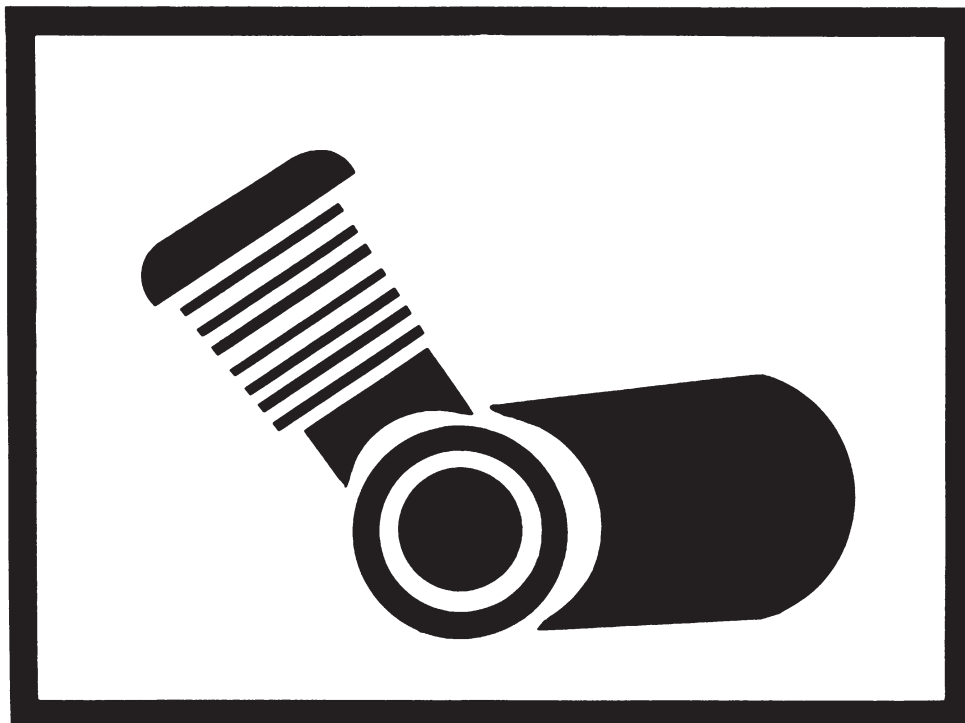
MEMO

3



CHAPTER 4

ENGINE





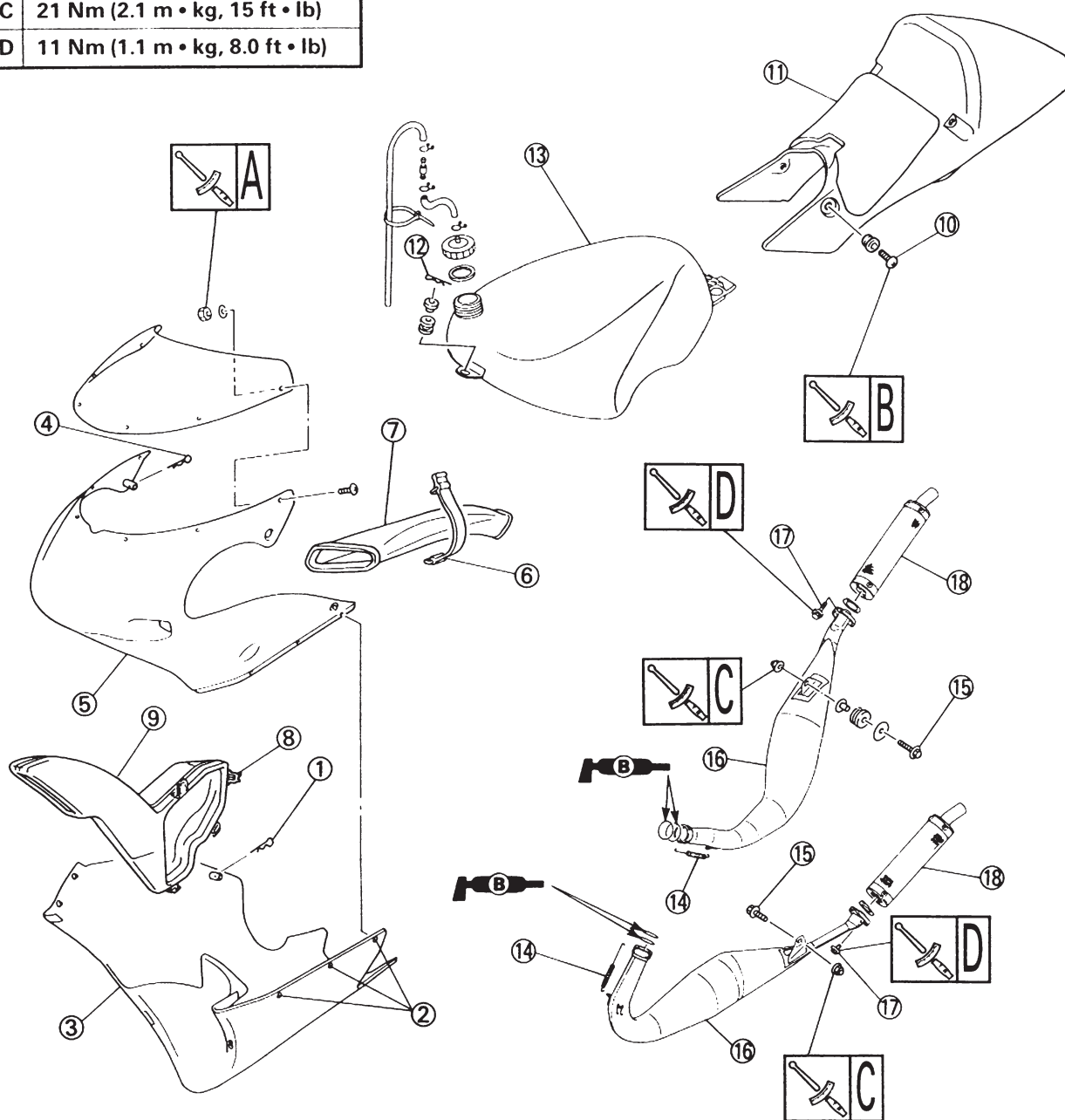
COWLING, INDUCTION GUIDE, SEAT, FUEL TANK, EXHAUST PIPE AND SILENCER



PREPARATION FOR REMOVAL

- * Turn the fuel cock to "OFF".
- * Disconnect the fuel hose.
- * Disconnect the fuel tank breather hose.

A	4 Nm (0.4 m•kg, 2.9 ft•lb)
B	8 Nm (0.8 m•kg, 5.8 ft•lb)
C	21 Nm (2.1 m•kg, 15 ft•lb)
D	11 Nm (1.1 m•kg, 8.0 ft•lb)



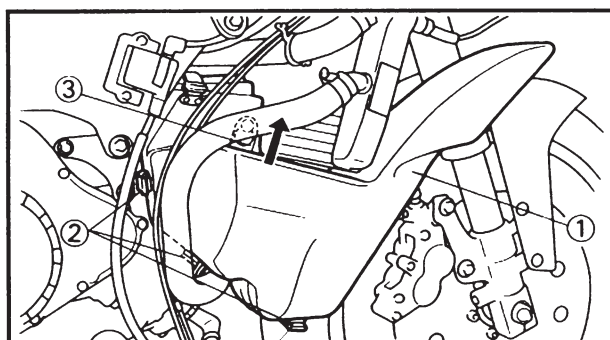
COWLING, INDUCTION GUIDE, SEAT, FUEL TANK, EXHAUST PIPE AND SILENCER

ENG



Extent of removal: ① Cowling removal ② Induction guide removal ③ Seat removal
④ Fuel tank removal ⑤ Exhaust pipe and silencer removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Clip (lower cowl)	1	
	2	Quick fastener	5	
	3	Lower cowl	1	
	4	Clip (upper cowl)	3	
	5	Upper cowl	1	
	6	Band	1	Refer to "REMOVAL POINTS".
	7	Induction guide (left cylinder)	1	
	8	Hook	3	
	9	Induction guide (right cylinder)	1	
	10	Screw (seat)	4	
	11	Seat	1	
	12	Clip (fuel tank)	1	
	13	Fuel tank	1	
	14	Tension spring	2ea.	
	15	Bolt (exhaust pipe)	1ea.	
	16	Exhaust pipe	1ea.	
	17	Bolt (silencer)	2ea.	
	18	Silencer	1ea.	



REMOVAL POINTS

Induction guide (right cylinder)

1. Remove:

- Induction guide (right cylinder) ①

NOTE:

Unhook the hooks ②, then slide the induction guide upward and remove it from the upper hook ③.

4



RADIATOR PREPARATION FOR REMOVAL



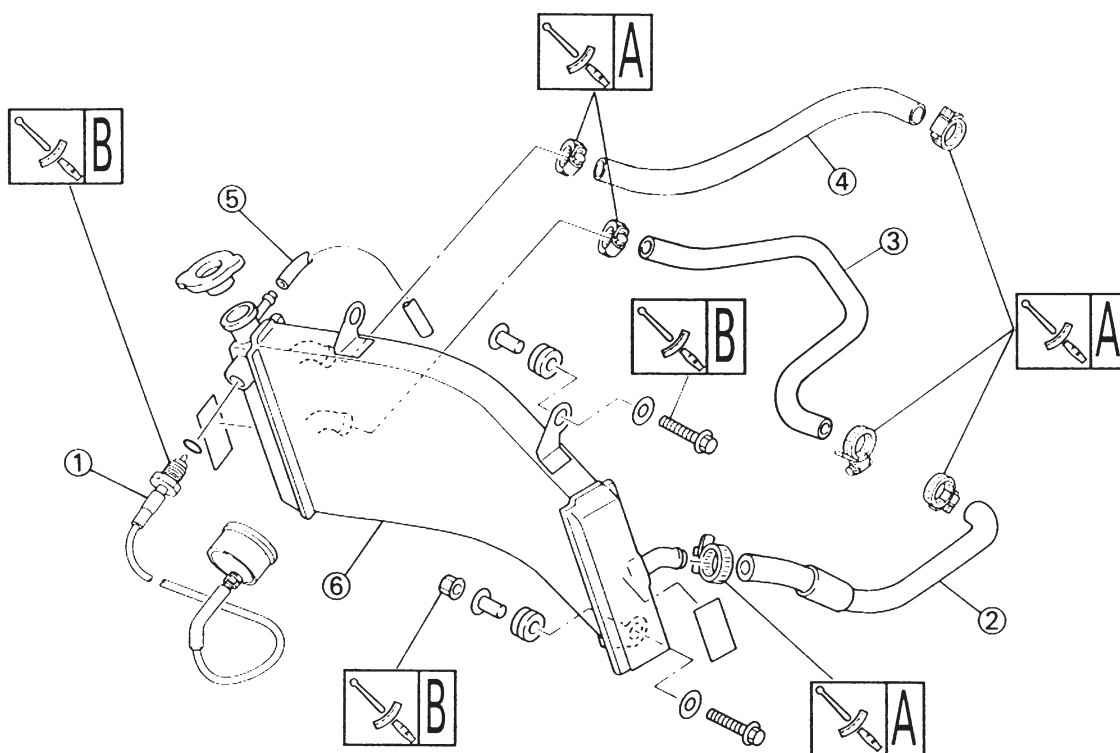
- *Remove the cowling.
- *Remove the induction guides.
- *Remove the fuel tank.
- *Drain the cooling water.

COOLING WATER CAPACITY:
1.6 L (1.41 Imp qt, 1.69 US qt)

**RADIATOR CAP OPENING
PRESSURE:**
95 ~ 125 kPa
(0.95 ~ 1.25 kg/cm², 13.5 ~ 17.8 psi)

A 2 Nm (0.2 m•kg, 1.4 ft•lb)

B 7 Nm (0.7 m•kg, 5.1 ft•lb)



NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that the foreign material does not enter the crankcase.
- For reassembly, the removed parts should be cleaned with solvent.

Extent of removal: ① Radiator removal

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Thermo sensor	1	Refer to "REMOVAL POINTS".
	2	Radiator hose 2	1	
	3	Radiator hose 4	1	
	4	Radiator hose 3	1	
	5	Radiator breather hose	1	
	6	Radiator	1	



REMOVAL POINTS

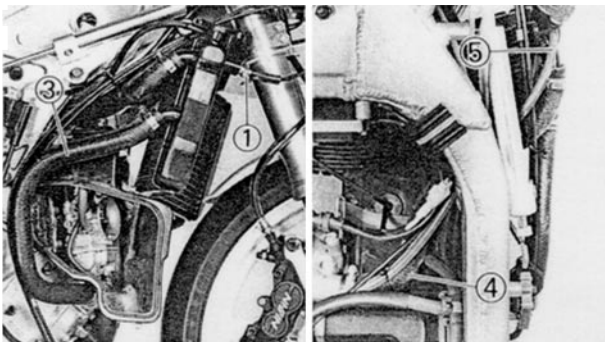
⚠ WARNING

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury.

When the engine has cooled, open the radiator cap by the following procedure:

Remove the radiator cover by removing the screw. Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detent. This procedure allows any residual pressure to escape.

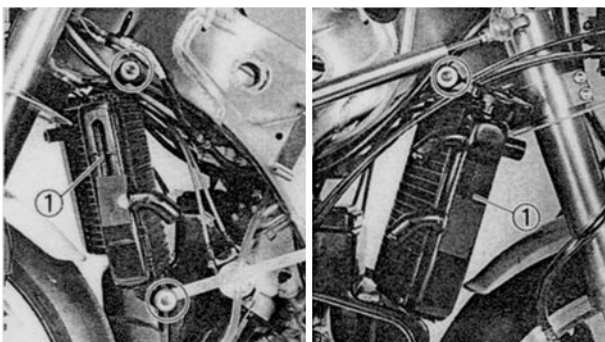
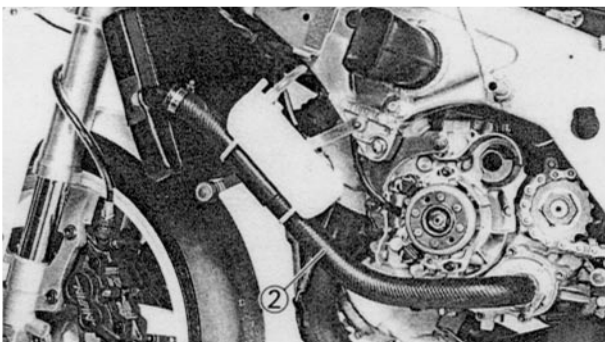
When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.



Radiator

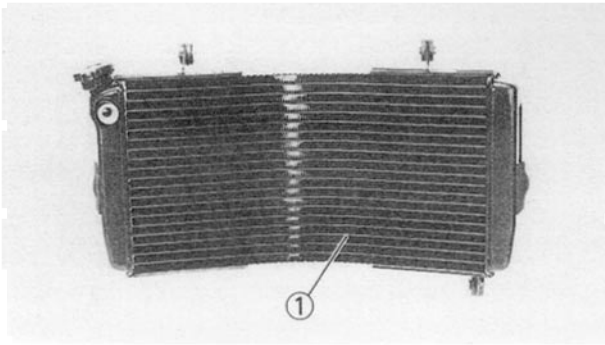
1. Remove:

- Thermo sensor ①
- Radiator hose 2 ②
- Radiator hose 4 ③
- Radiator hose 3 ④
- Radiator breather hose ⑤



2. Remove:

- Radiator ①

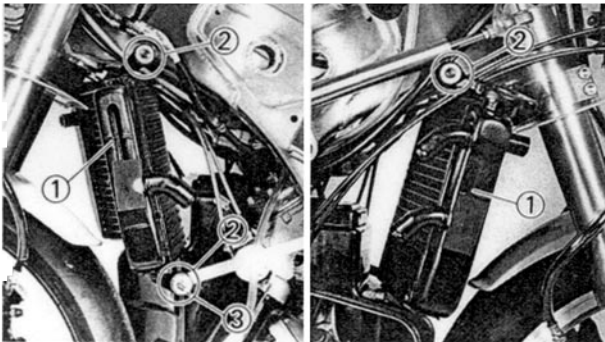


INSPECTION

Radiator

1. Inspect:

- Radiator core ①
Obstruction → Blow out with compressed air through rear of the radiator.
- Bent fin → Repair/replace.



ASSEMBLY AND INSTALLATION

Radiator

1. Install:

- Radiator ①
- Bolt (radiator) ②
- Nut (radiator) ③



Bolt (radiator):

7 Nm (0.7 m•kg, 5.1 ft•lb)

Nut (radiator):

7 Nm (0.7 m•kg, 5.1 ft•lb)

2. Install:

- Radiator breather hose ①
- Radiator hose 3 ②
- Radiator hose 4 ③
- Radiator hose 2 ④
- Thermo sensor ⑤

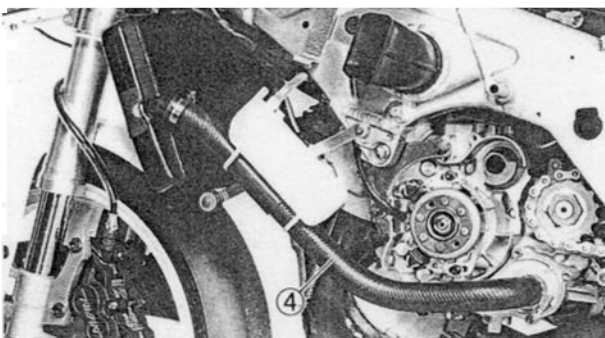
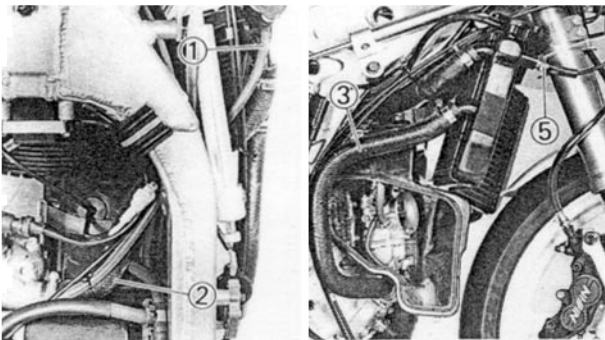


Radiator hose clamp

2 Nm (0.2 m•kg, 1.4 ft•lb)

Thermo sensor:

7 Nm (0.7 m•kg, 5.1 ft•lb)



NOTE:

Insert the end of the radiator breather hose into the frame.

Refer to "CONTROL FUNCTIONS" section in the CHAPTER 1.



MEMO



CARBURETOR AND REED VALVE PREPARATION FOR REMOVAL

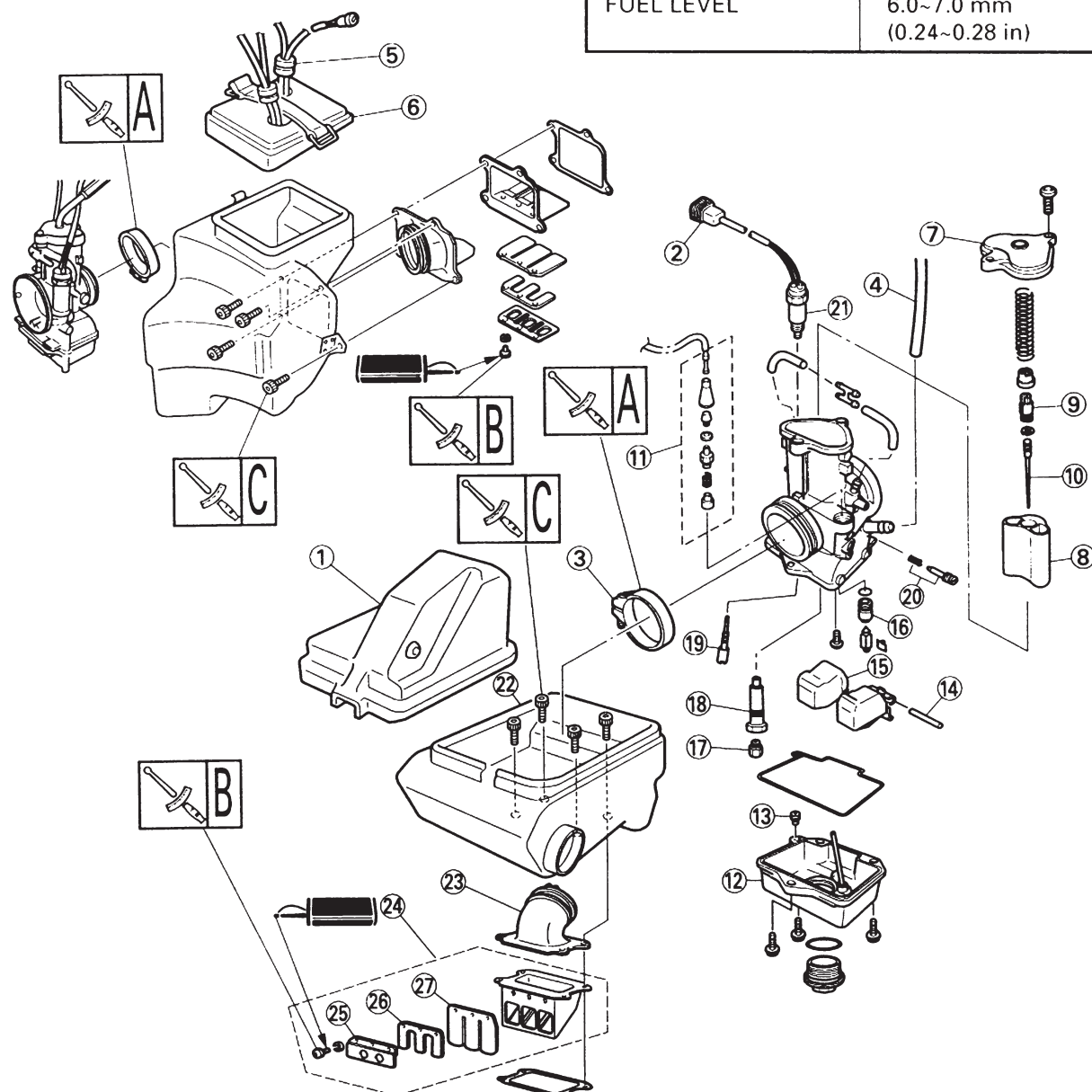


- *Turn the fuel cock to "OFF".
- *Remove the cowling.
- *Remove the fuel tank.

- [Servicing the right cylinder]
- *Remove the induction guide (right cylinder).
 - *Remove the plug cap (left cylinder).
 - *Drain the cooling water.
 - *Remove the radiator hose 3.
 - *Remove the radiator installation bolts, then shift the radiator forward.

A	2 Nm (0.2 m•kg, 1.4 ft•lb)
B	1 Nm (0.1 m•kg, 0.7 ft•lb)
C	11 Nm (1.1 m•kg, 8.0 ft•lb)

SPECIFICATIONS	
MAIN JET (M.J.)	#640
JET NEEDLE (J.N.)	6EG02-60-3
PILOT JET (P.J.)	#30
PILOT AIR SCREW (P.A.S.)	1-1/2
MAIN NOZZLE (N.J.)	S-3
POWER JET (P.W.J.)	#80
FUEL LEVEL	6.0~7.0 mm (0.24~0.28 in)



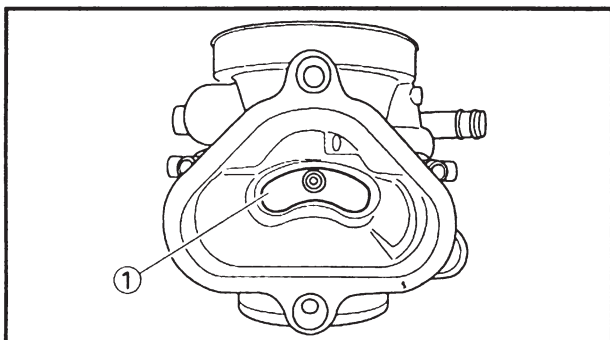


NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the machine and take care so that foreign material does not enter the engine.
- Remove any gasket adhered to the contacting surfaces.
- Before inspection, the removed parts should be cleaned and blow out all passages and jets with compressed air.
- After removing the carburetor, cover the carburetor joint not to foreign material.

Extent of removal: ① Carburetor removal ② Carburetor disassembly
③ Reed valve removal and disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Induction cap (left cylinder)	1	Servicing the left cylinder. Disconnect the solenoid valve coupler. Loosen the screw (carburetor joint).
	2	Solenoid valve lead	1ea.	
	3	Clamp (carburetor joint)	1ea.	
	4	Fuel hose	1ea.	
	5	Grommet	2	
	6	Induction cap (right cylinder)	1	Pull up by slit end. } Servicing the right cylinder.
	7	Mixing chamber top	1ea.	
	8	Throttle valve	1ea.	
	9	Needle holder	1ea.	
	10	Jet needle	1ea.	
	11	Starter plunger	1ea.	Refer to "REMOVAL POINTS".
	12	Float chamber	1ea.	
	13	Power jet	1ea.	
	14	Pin (float)	1ea.	
	15	Float	1ea.	
	16	Valve seat	1ea.	
	17	Main jet	1ea.	
	18	Main nozzle	1ea.	
	19	Pilot jet	1ea.	
	20	Pilot air screw	1ea.	
	21	Solenoid valve	1ea.	
	22	Induction box	1ea.	
	23	Carburetor joint	1ea.	
	24	Reed valve assembly	1ea.	
	25	Stopper (reed valve)	2ea.	
	26	Reed valve 2	2ea.	
	27	Reed valve 1	2ea.	

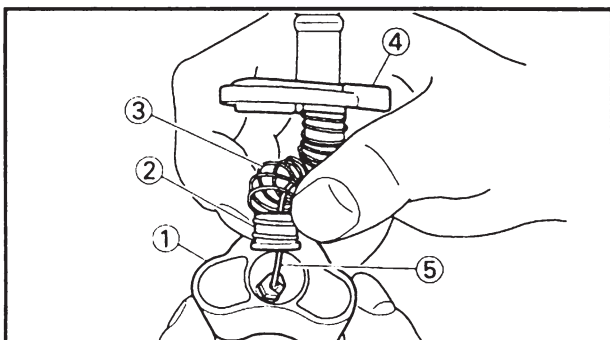


EC466010

HANDLING NOTE

CAUTION:

Do not disassemble the venturi block ① because it will cause a drop in carburetor performance.



EC463000

REMOVAL POINTS

EC463110

Throttle valve

1. Remove:
 - Throttle valve ①
 - Ring ②
 - Spring (throttle valve) ③
 - Mixing chamber top ④
 - Throttle cable ⑤

NOTE:

While compressing the spring (throttle valve), disconnect the throttle cable.

EC464000

INSPECTION

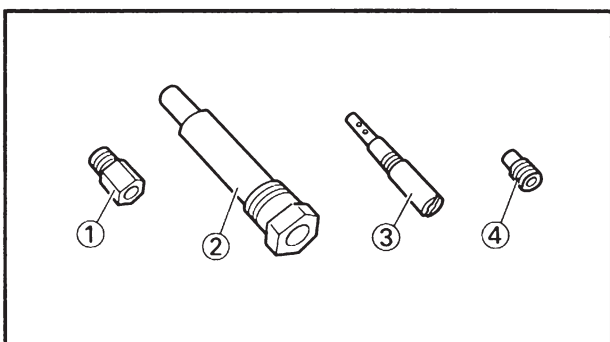
EC464120

Carburetor

1. Inspect:
 - Carburetor body
 Contamination → Clean.

NOTE:

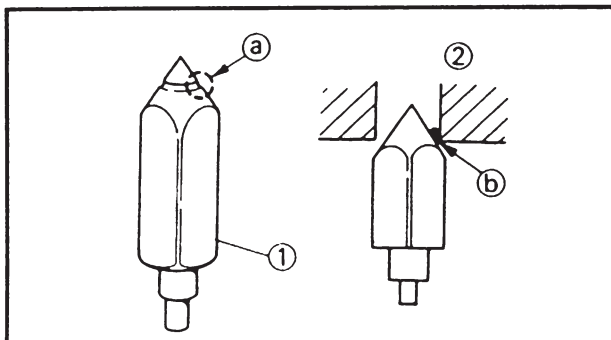
- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.



2. Inspect:
 - Main jet ①
 - Main nozzle ②
 - Pilot jet ③
 - Power jet ④
 Contamination → Clean.

NOTE:

- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.



EC464200

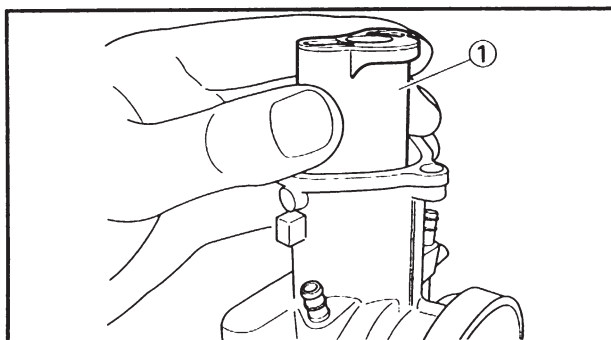
Needle valve

- Inspect:
 - Needle valve ①
 - Valve seat ②

Grooved wear (a) → Replace.
Dust (b) → Clean.

NOTE:

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



EC464300

Throttle valve

- Check:
 - Free movement

Stick → Repair or replace.

Insert the throttle valve ① into the carburetor body, and check for free movement.

EC464401

Jet needle

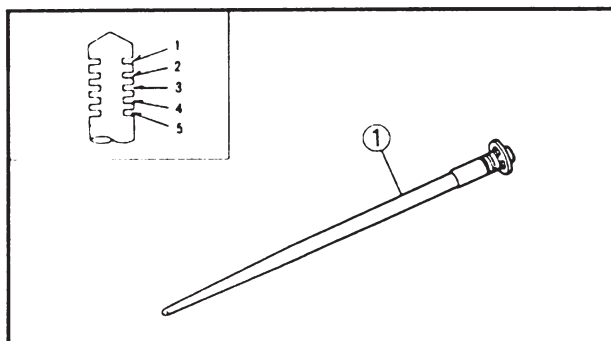
- Inspect:
 - Jet needle ①

Bends/Wear → Replace.

 - Clip groove

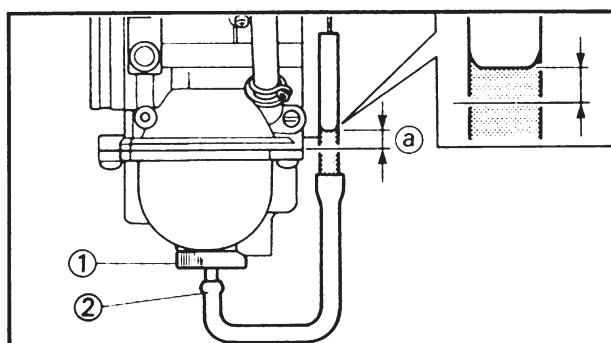
Free play exists/Wear → Replace.

 - Clip position



Standard clip position:
No.3 Groove

4



EC464800

Fuel level

- Measure:
 - Fuel level (a)

Out of specification → Adjust.



Fuel level:
6.0~7.0 mm (0.24~0.28 in)
Above the float chamber
mating surface

Measurement and adjustment steps:

- Remove the drain plug.
- Connect the fuel level gauge adapter ① and fuel level gauge ② to the float chamber.



Fuel level gauge adapter:
YM-01470/90890-01470

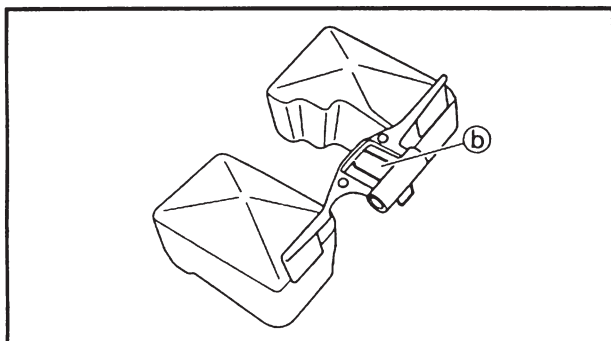
Fuel level gauge:
YM-01312-A/90890-01312

- Hold the fuel level gauge vertically next to the float chamber mating surface.
- Measure the fuel level with the fuel level gauge.

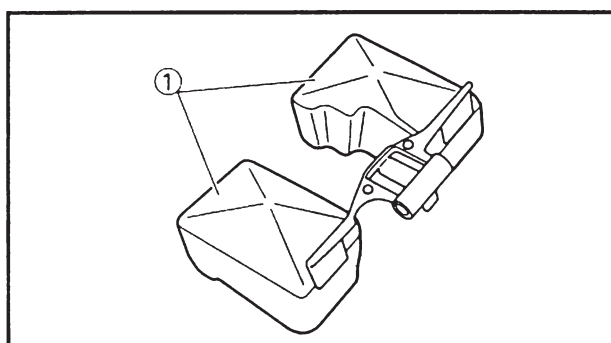
NOTE: _____

Keep the carburetor and fuel level gauge vertically when measuring the fuel level.

- If the fuel level is not within specification, inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the fuel level by bending the float tab ⑥ on the float.
- Recheck the fuel level.



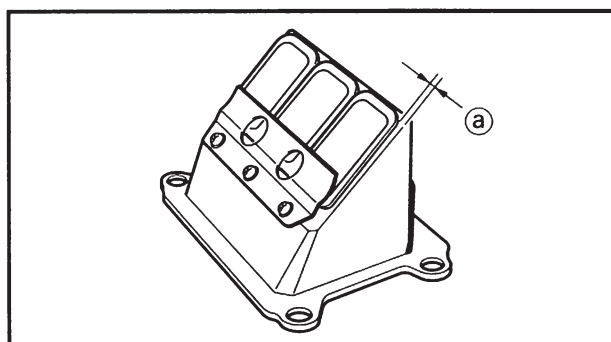
4



EC464600

Float

- Inspect:
 - Float ①
 - Damage → Replace.

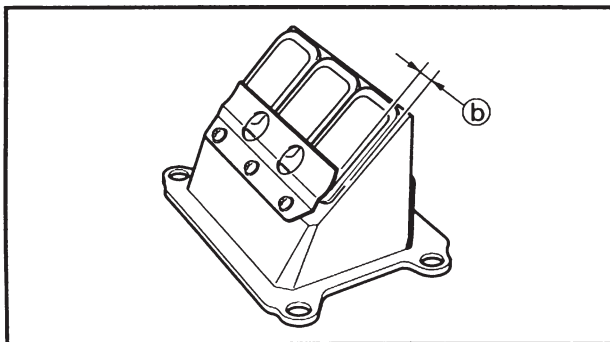


Reed valve

- Measure:
 - Reed valve bending ②
 - Out of specification → Replace.



Reed valve bending limit:
0.2 mm (0.008 in)

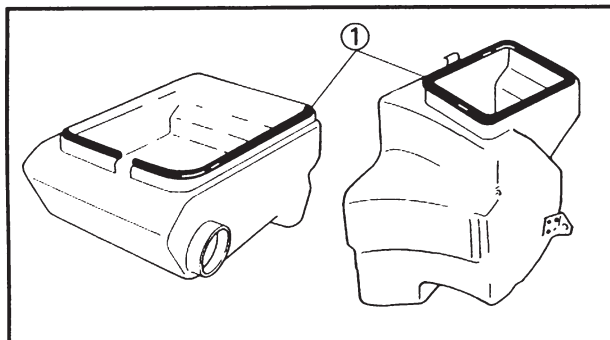


- Valve Stopper Height (b)
Out of specification → Adjust stopper/Replace valve stopper.



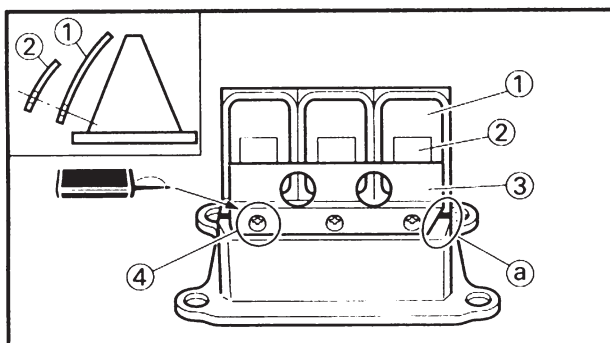
Valve stopper height:

Left side	Right side
2.8 ~ 3.0mm (0.110 ~ 0.118 in)	6.5 ~ 6.9 mm (0.256 ~ 0.272 in)



Induction box

1. Inspect:
 - Seal (1)
Peeled → Stick using the instantaneous adhesive.
Crack/Wear/Damage → Replace.



ASSEMBLY AND INSTALLATION

Reed valve

1. Install:
 - Reed valve 1 (1)
 - Reed valve 2 (2)
 - Stopper (reed valve) (3)
 - Screw (reed valve) (4)

NOTE:

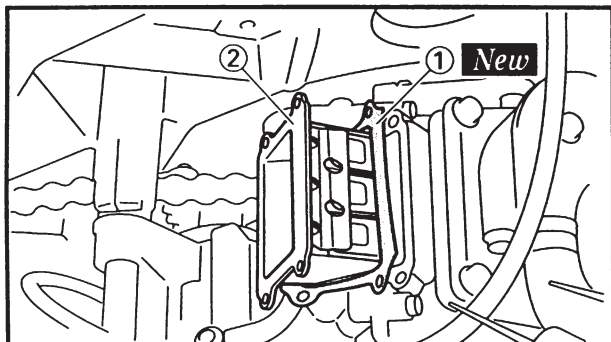
- Install the reed valve with the reed valve bending as shown.
- Note the cut (a) in the lower corner of the reed and stopper plate.



Screw (reed valve):
1 Nm (0.1 m•kg, 0.7 ft•lb)
LOCTITE®

CAUTION:

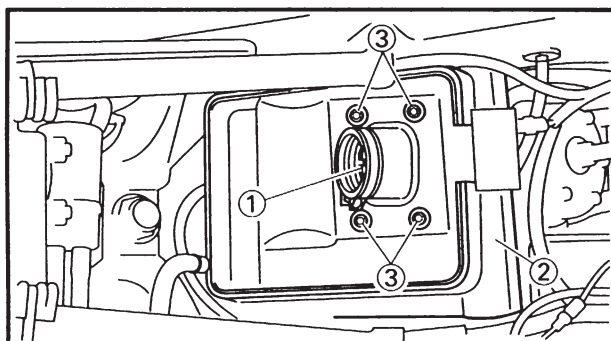
Tighten each screw gradually to avoid warping.



2. Install:
 - Gasket (reed valve assembly) ①
 - Reed valve assembly ②

NOTE:

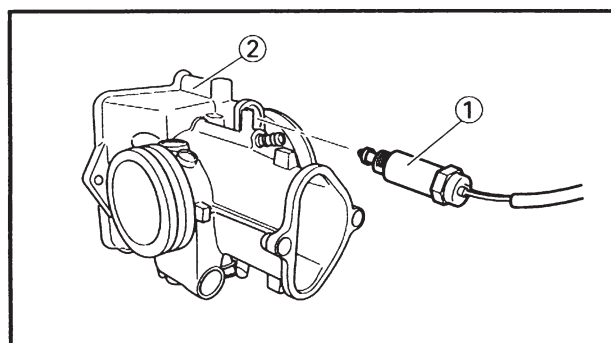
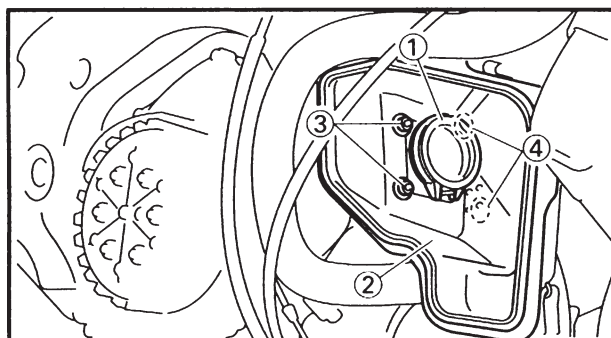
Always use a new gasket.



3. Install:
 - Carburetor joint ①
 - Induction box ②
 - Bolt {carburetor joint ($\ell=25$ mm (0.98 in))} ③
 - Bolt {carburetor joint ($\ell=20$ mm (0.79 in))} ④

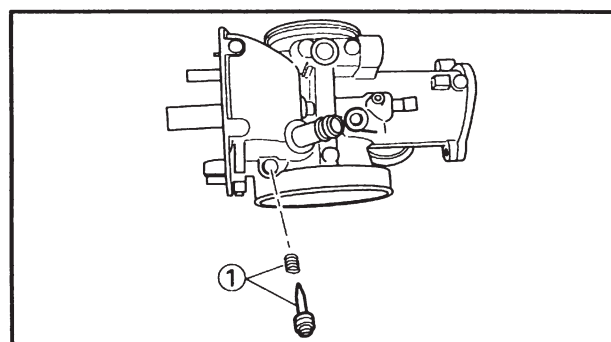


Bolt (carburetor joint):
11 Nm (1.1 m·kg, 8.0 ft·lb)



Carburetor

1. Install:
 - Solenoid valve ①
 - To carburetor ②.



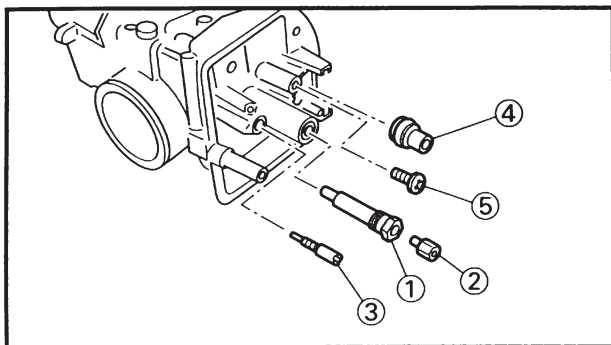
2. Install:
 - Pilot air screw ①

Note the following installation points:

- Screw in the pilot air screw until it is lightly seated.
- Back out it by the specified number of turns.

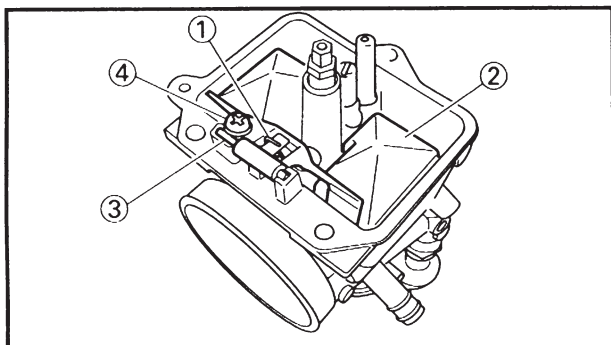


Pilot air screw:
1-1/2 turns out



3. Install:

- Main nozzle ①
- Main jet ②
- Pilot jet ③
- Valve seat ④
- Screw (valve seat) ⑤



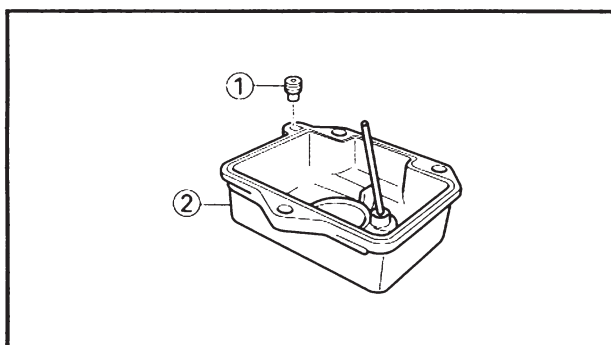
4. Install:

- Needle valve ①
- Float ②
- Float pin ③
- Screw (float pin) ④

NOTE:

- After installing the needle valve to the float, install them to the carburetor.
- Check the float for smooth movement.

4

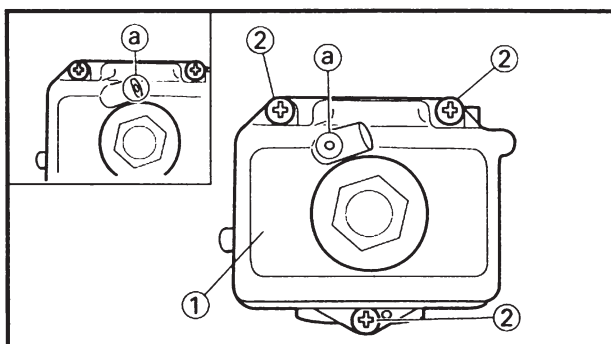


5. Install:

- Power jet ①
- To float chamber ②.

CAUTION:

Do not tighten the power jet too hard, or you may not remove it when checking and replacing it.

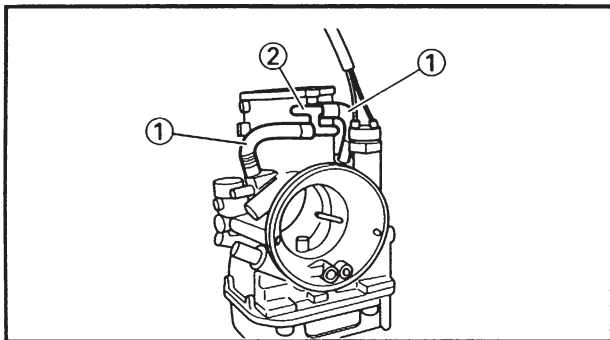


6. Install:

- Float chamber ①
- Screw (float chamber) ②

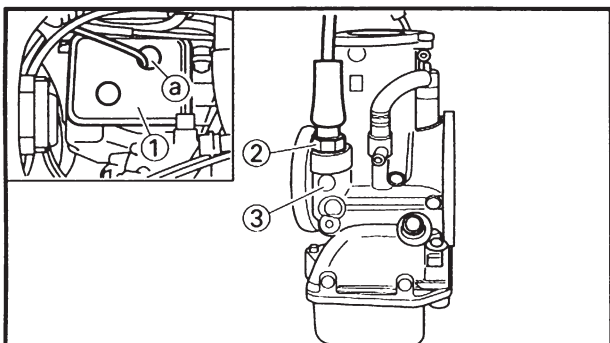
CAUTION:

Do not confuse the left and right float chambers in installation because they are different from each other. The overflow hole (a) is in the bottom of the float chamber for the left cylinder and for the right one in the side.



7. Install:

- Air vent hose ①
- Joint ②



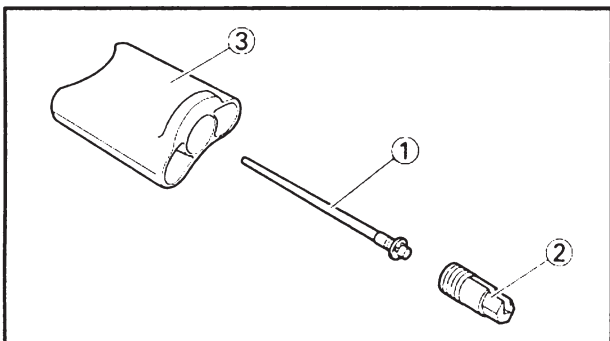
8. Install:

- Induction cap ① (right cylinder only)
 - Starter plunger ②
- To carburetor ③.

NOTE:

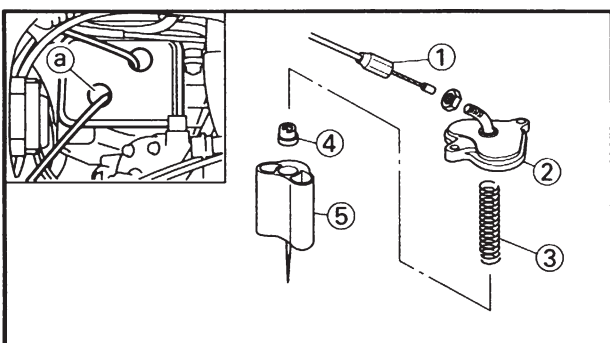
Install the starter plunger (right cylinder) after passing it through the hole ① of the induction cap.

(Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.)



9. Install:

- Jet needle ①
 - Needle holder ②
- To throttle valve ③.



10. Install:

- Throttle cable ①
- Mixing chamber top ②
- Spring (throttle valve) ③
- Ring ④
- Throttle Valve ⑤

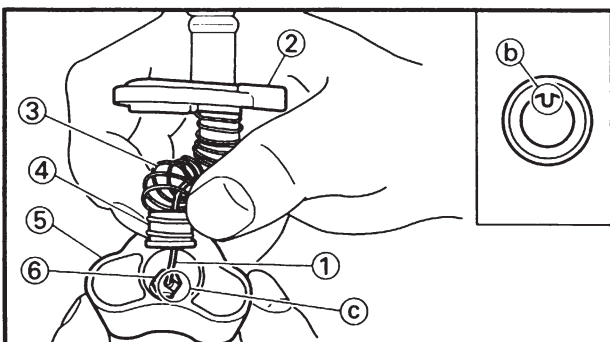
NOTE:

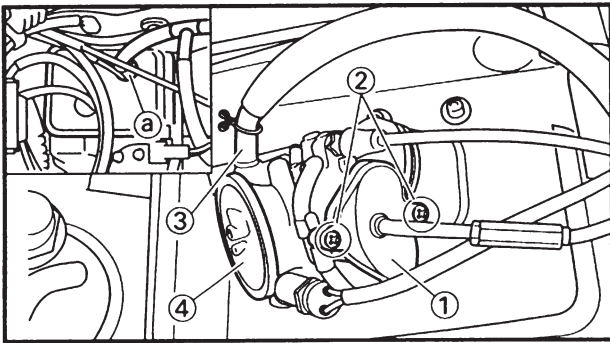
•Install the throttle cable (right cylinder) after passing it through the hole ① of the induction cap.

(Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.)

•While compressing the spring, connect the throttle cable.

•Align the projection ① on the ring with the groove ② in the needle holder ③.



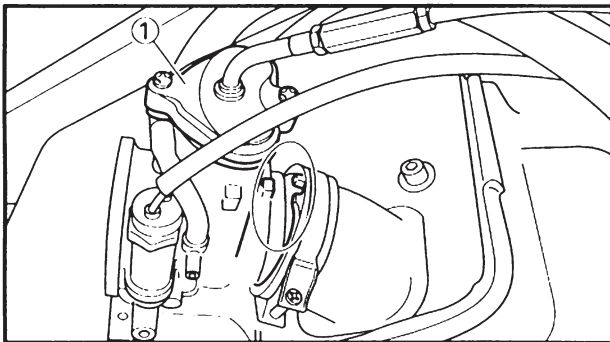


11. Install:

- Mixing chamber top ①
- Screw (mixing chamber top) ②
- Fuel hose ③
- To carburetor ④.

NOTE:

- Install the fuel hose (right cylinder) after passing it through the hole ① of the induction cap.
- (Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.)
- After installing, check the throttle grip for smooth movement.



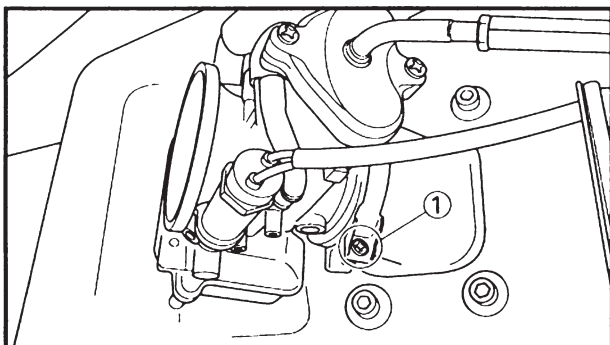
Carburetor installation

1. Install:

- Carburetor ①

NOTE:

Install the projection between the carburetor joint slots.

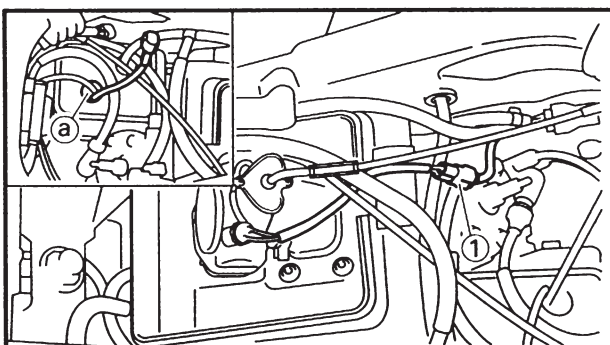


2. Tighten:

- Clamp (carburetor joint) ①



Clamp (carburetor joint):
2Nm (0.2 m•kg, 1.4•ft lb)



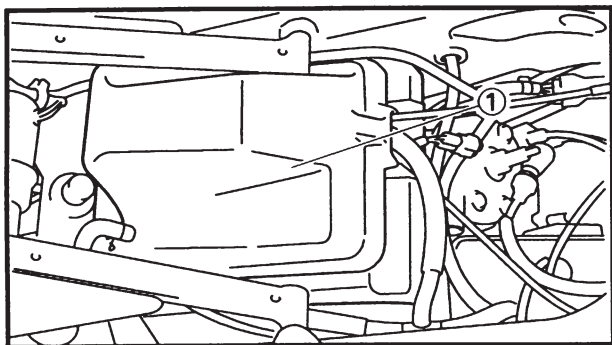
3. Connect:

- Solenoid valve lead ①

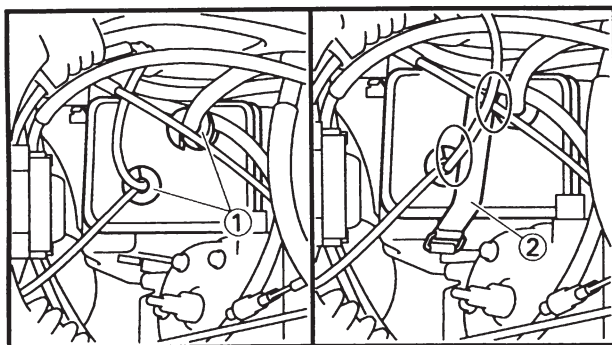
NOTE:

Install the solenoid valve lead (right cylinder) after passing it through the hole ① of the induction cap.

(Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.)



4. Install:
- Induction cap ① (left cylinder only)



5. Install:
- Grommet ① (right cylinder only)
 - Band ② (right cylinder only)

NOTE:

Install the band so that it does not contact the cables, hose and lead.



MEMO



CYLINDER HEAD, CYLINDER AND PISTON PREPARATION FOR REMOVAL



* Remove the cowling.

* Drain the cooling water.

* Remove the following parts:

• Fuel tank

• Exhaust pipe

• Plug cap and spark plug

* Disconnect the radiator hose 3 and 4 at cylinder head side.

• Carburetor (left cylinder only)

• Induction box (left cylinder only)

PISTON CLEARANCE:
0.060~0.070 mm (0.0024~0.0028 in)

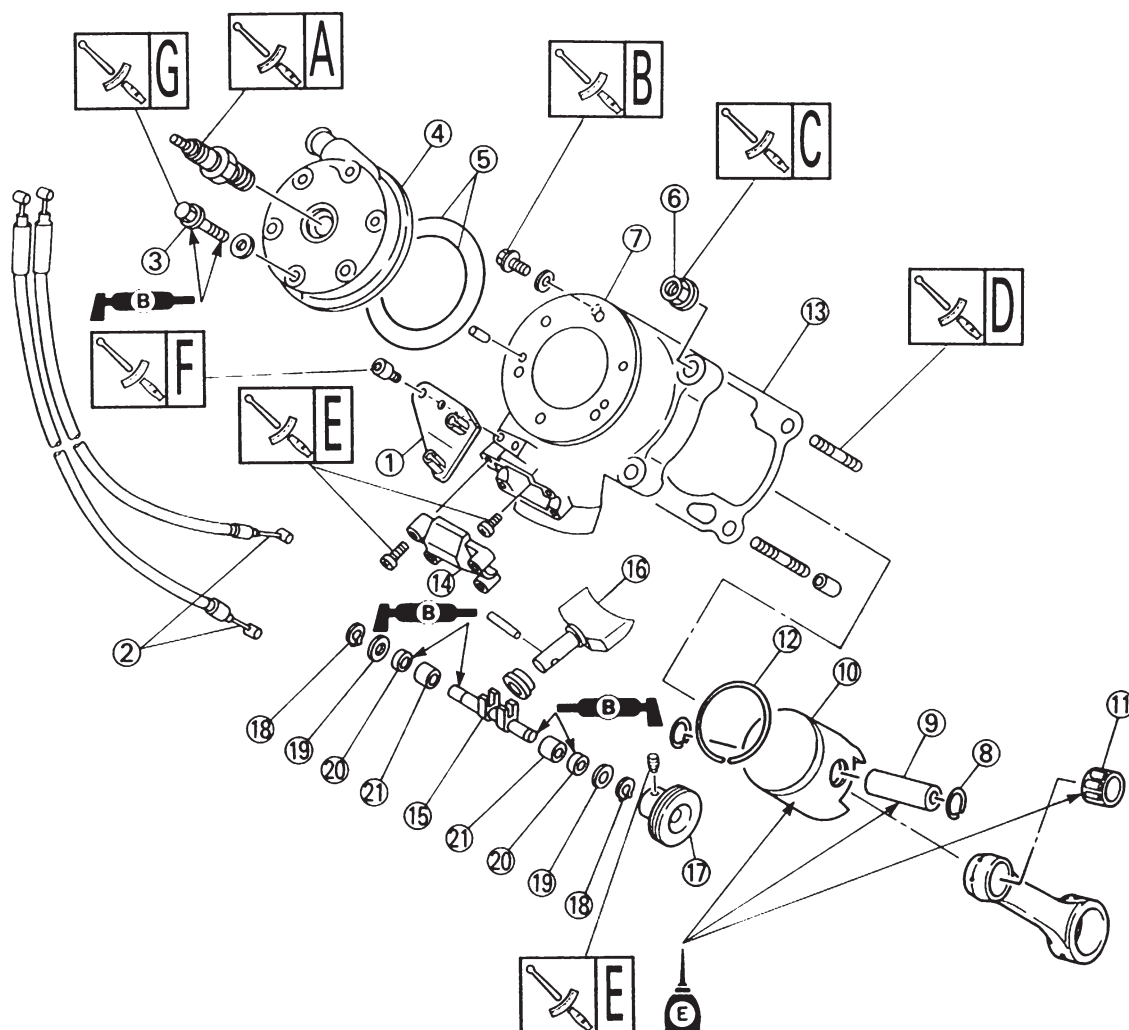
PISTON RING SIDE CLEARANCE:
0.03~0.07 mm (0.0012~0.0028 in)

**PISTON RING END GAP
(INSTALLED):**
0.20~0.35 mm (0.008~0.014 in)

SPARK PLUG:
R6179A-105P/NGK

SPARK PLUG GAP:
0.5~0.6 mm (0.020~0.024 in)

A	19 Nm (1.9 m•kg, 13 ft•lb)
B	12 Nm (1.2 m•kg, 8.7 ft•lb)
C	20 Nm (2.0 m•kg, 14 ft•lb)
D	15 Nm (1.5 m•kg, 11 ft•lb)
E	4 Nm (0.4 m•kg, 2.9 ft•lb)
F	7 Nm (0.7 m•kg, 5.1 ft•lb)
G	11 Nm (1.1 m•kg, 8.0 ft•lb)



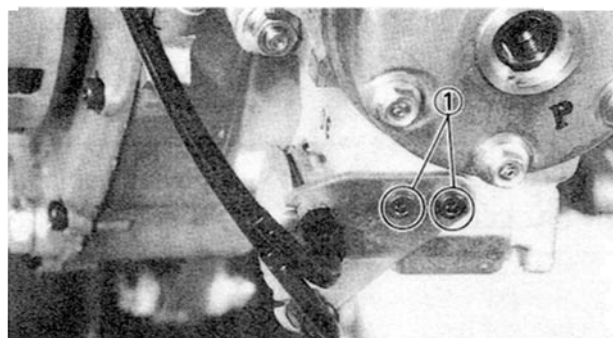


NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material does not enter the crankcase.
- Remove any gasket adhered to the contacting surface.
- Take care not to scratch the contacting surfaces when removing the cylinder and cylinder head.
- Take care not to scratch the cylinder and piston surfaces.
- For reassembly, the removed parts should be cleaned with solvent, and apply the engine oil to the sliding surfaces.
- Take care so that the coolant does not enter the crankcase. If the coolant enters the crankcase, clean the inside of the crankcase and apply oil on it.
- When removing the cylinder head, the piston should be positioned at TDC (top dead center).

Extent of removal: ① Cylinder head removal ② Cylinder removal
③ Piston and piston ring removal ④ Power valve removal

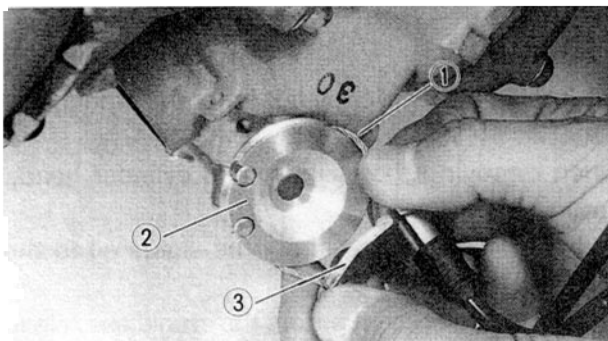
Extent of removal	Order	Part name	Q'ty	Remarks
	1	Cable stay	1ea.	Refer to "REMOVAL POINTS". Loosen the each bolt 1/4 turn, and remove them after all nuts are loosened.
	2	YPVS cable	2ea.	
	3	Bolt (cylinder head)	6ea.	
	4	Cylinder head	1ea.	Refer to "REMOVAL POINTS".
	5	O-ring	2ea.	
	6	Nut (cylinder)	4ea.	
	7	Cylinder	1ea.	
	8	Clip (piston pin)	2ea.	
	9	Piston pin	1ea.	Refer to "REMOVAL POINTS".
	10	Piston	1ea.	
	11	Small end bearing	1ea.	
	12	Piston ring	1ea.	Refer to "REMOVAL POINTS".
	13	Gascket (cylinder)	1ea.	
	14	Valve cover	1ea.	
	15	Valve shaft	1ea.	
	16	Power valve	1ea.	
	17	Valve pulley	1ea.	
	18	Circlip	2ea.	
	19	Plain washer	2ea.	
	20	Oil seal	2ea.	
	21	Solid bush	2ea.	



REMOVAL POINTS

YPVS cable

1. Remove:
 - Bolt (cable stay) ①

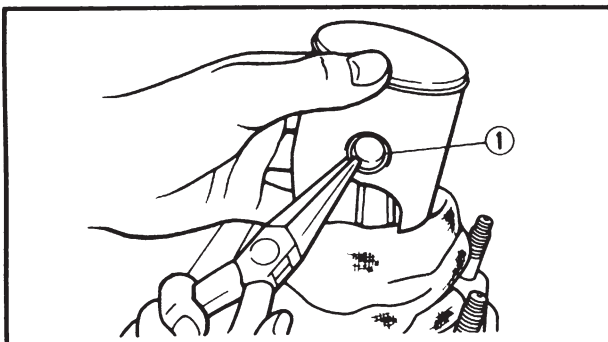


2. Remove:

- YPVS cable (1)
- From the valve pulley (2).

NOTE: _____

Remove the YPVS cable together with the cable stay (3).



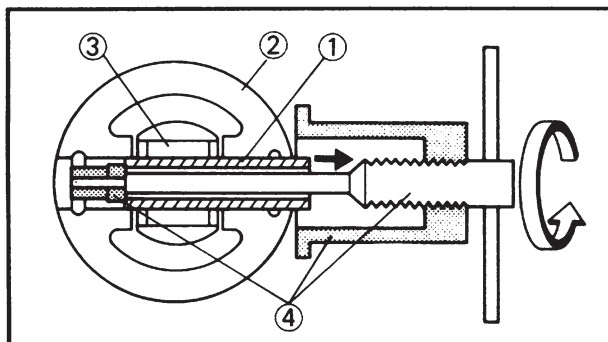
Piston and piston ring

1. Remove:

- Piston pin clip (1)

NOTE: _____

Before removing piston pin clip, cover crankcase with a clean rag to prevent piston pin clip from falling into crankcase cavity.



2. Remove:

- Piston pin (1)
- Piston (2)
- Small end bearing (3)

NOTE _____

Before removing the piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and piston pin is still difficult to remove, use the piston pin puller (4).

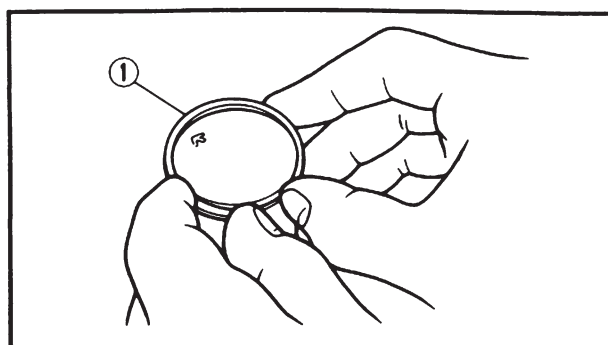


Piston pin puller:

YU-01304/90890-01304

CAUTION: _____

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

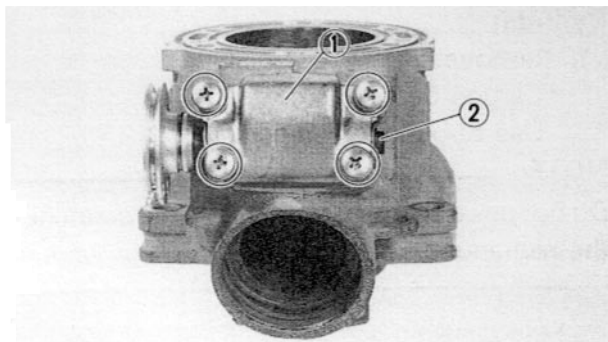


3. Remove:

- Piston ring (1)

NOTE: _____

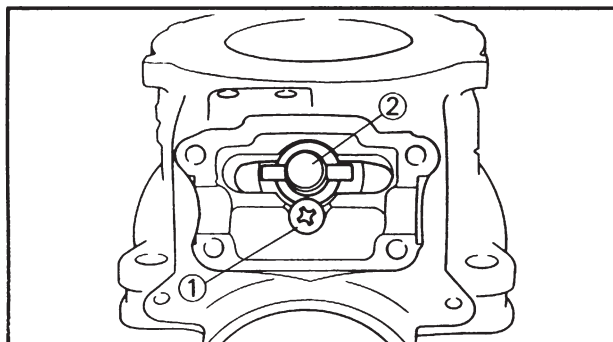
Take care not to scratch the piston and damage the piston ring.



Power valve

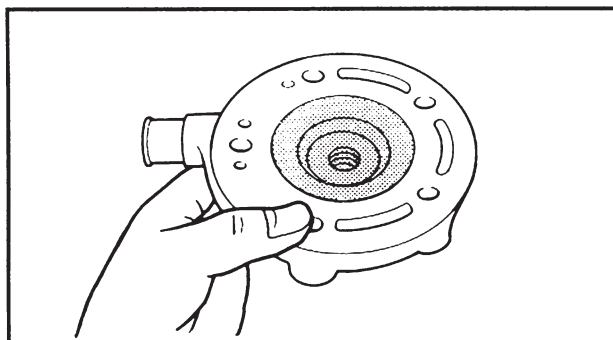
1. Remove:

- Valve cover ①
- Valve shaft ②



2. Remove:

- Screw (power valve) ①
- Power valve ②



EC474000

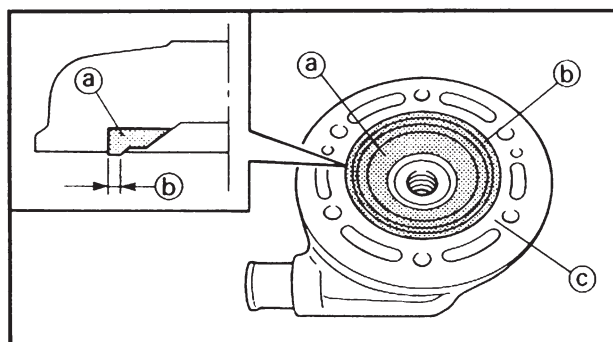
INSPECTION

EC474101

Cylinder head

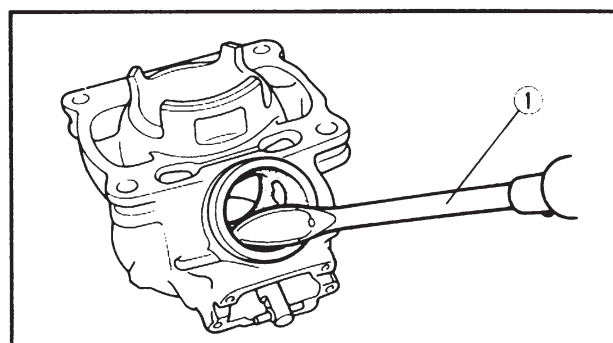
1. Remove:

- Carbon deposits
Use #400~600 grit wet sandpaper.



2. Inspect:

- Cylinder head water jacket
Crust of minerals/Rust→Remove.
- Cylinder head contact surface
Wear/Damage→Replace.
- Recess of insert portion ①
The contact surface ② of the insert portion is recessed below the aluminum portion ③→Replace.



EC474200

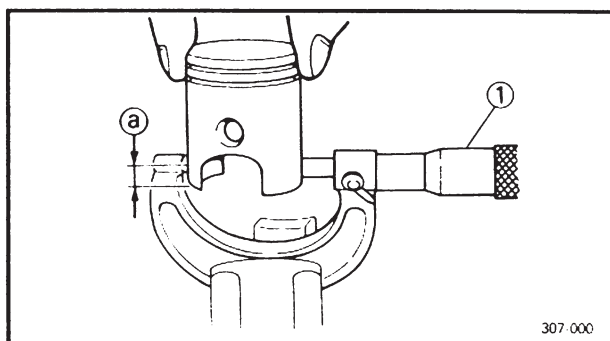
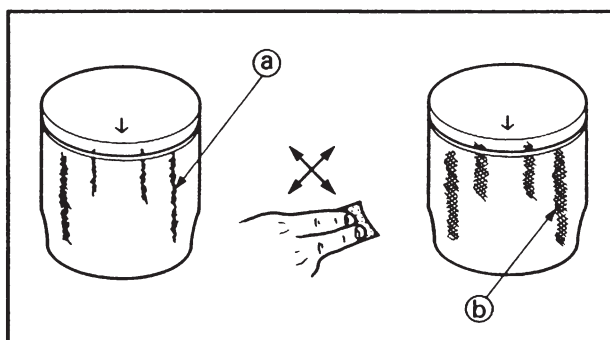
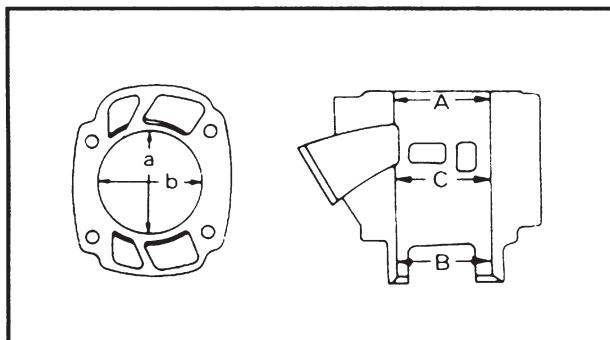
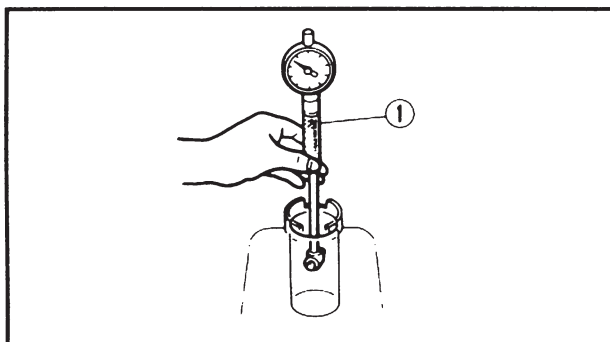
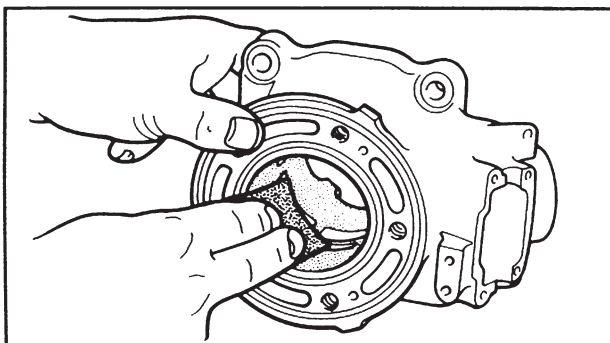
Cylinder

1. Remove:

- Carbon deposits
Use a rounded scraper ①.

NOTE:

Do not use a sharp instrument. Avoid scratching the aluminum.



2. Inspect:

- Cylinder inner surface
Score marks → Repair or replace.
Use #400~600 grit wet sandpaper.

CAUTION:

Do not rebore the cylinder.

3. Measure:

- Cylinder bore "C"
Use cylinder gauge (1).
Out of limit → Replace.

NOTE:

Measure the cylinder bore "C" in parallel (A, B, C) to and at right angles to the crankshaft (a, b). Then, find the average of the measurements.

	Standard	Wear limit
Cylinder bore "C"	56.000~56.020 mm (2.2047~2.2055 in)	56.1 mm (2.209 in)
Taper "T"	-	0.05 mm (0.0020 in)
C = Maximum Aa~Cb T = (Maximum Aa, or Ab)– (Maximum Ba, or Bb)		

Piston

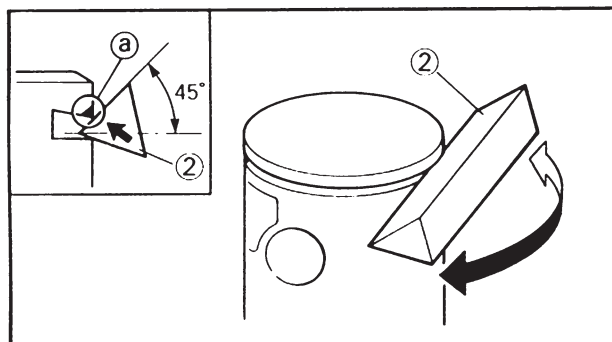
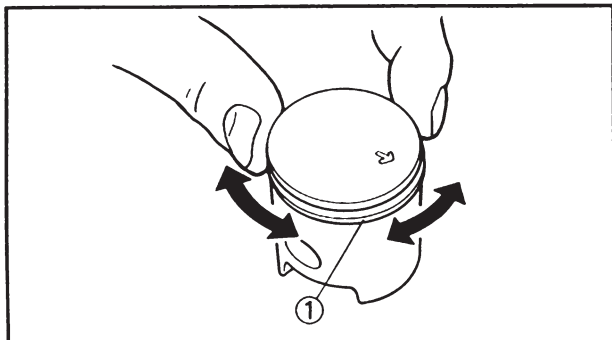
1. Inspect:

- Piston crown
Damage and crack due to detonation
→ Replace.
- Piston pin hole
Crack → Replace.
- Contact with cylinder
Excessive scuffing, score (a) → Use #400 ~ #600 grit wet sandpaper in a criss-cross manner (b).
- Heat discoloration → Replace.

2. Measure:

- Piston skirt diameter
Use micrometer (1).
Measure the specific distance (a) from the bottom edge in the intake-exhaust direction.
Out of specification → Replace.

	Distance (a)	Piston dia.
	15 mm (0.59 in)	55.935~55.955 mm (2.2022~2.2030 in)



3. Check:

- Piston ring free movement

Mechanical stick → Repair.

Install the piston ring ① to the piston, and check for free movement.

Repairing steps:

- Remove the piston ring.
- Chamfer the piston ring groove at its edge ① where the piston ring tends to stick, using a triangle oil stone ② with the engine mixing oil.

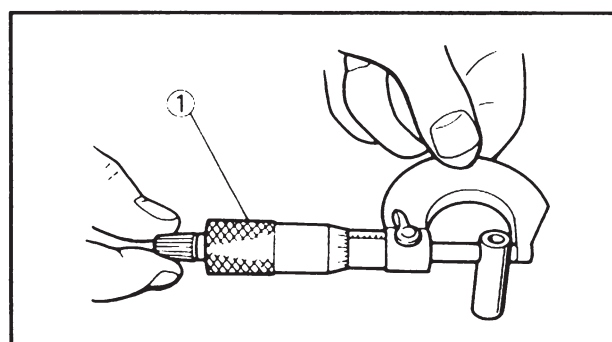
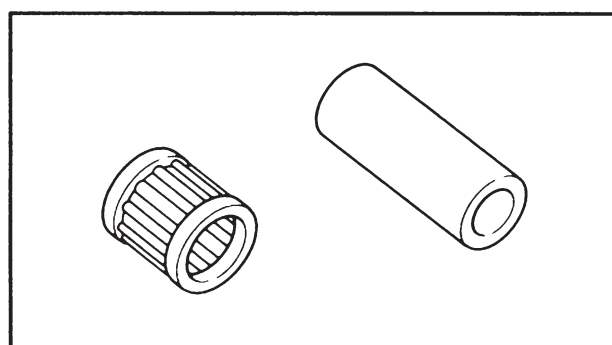
NOTE:

- Set the triangle oil stone to the piston ring groove to form an angle of 45°. Do the chamfering with force applied to this edge.
- Chamfer until the piston ring moves smoothly.

CAUTION:

Do not over-chamfer.

4



EC474402

Piston pin and small end bearing

1. Inspect:

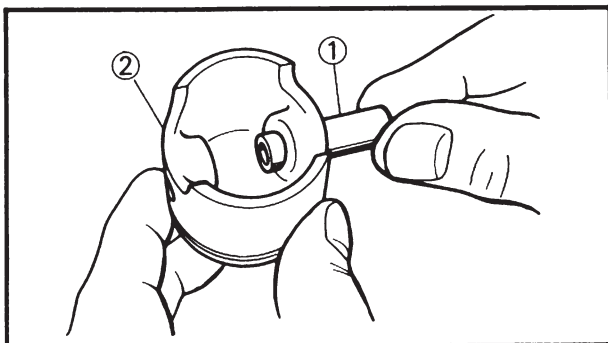
- Piston pin
 - Small end bearing
- Signs of heat discoloration → Replace.

2. Measure:

- Piston pin outside diameter
- Use micrometer ①.
Out of limit → Replace.

**Piston pin outside diameter:**

Standard	<Limit>
15.995~16.000 mm (0.6297~0.6299 in)	15.975 mm (0.6289 in)

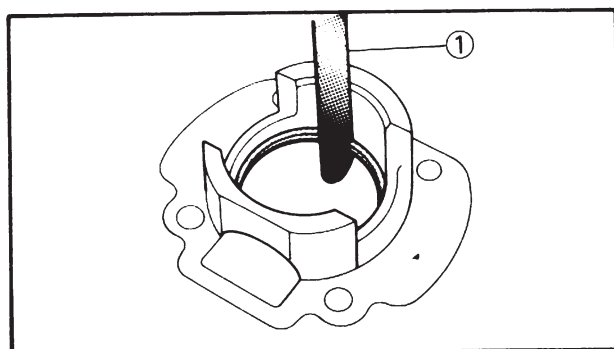
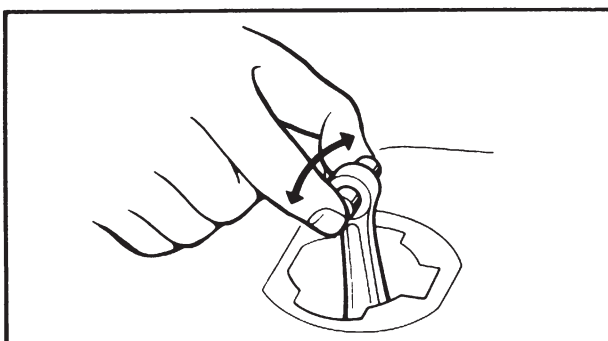


3. Check:

- Free play (when the piston pin ① is in place in the piston ②)
There should be no noticeable for the play.
Free play exists → Replace piston pin and/or piston.

4. Install:

- Small end bearing
- Piston pin
Into the small end of connecting rod.



5. Check:

- Free play
There should be no noticeable free play.
Free play exists → Inspect the connecting rod for wear/Replace the pin and/or connecting rod as required.

Piston ring

1. Install:

- Piston ring
Into the cylinder.
Push the ring with the piston crown.

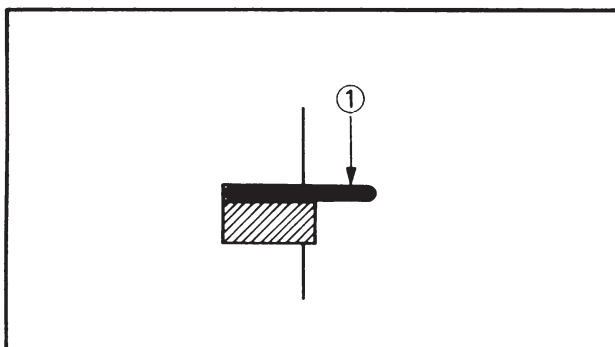
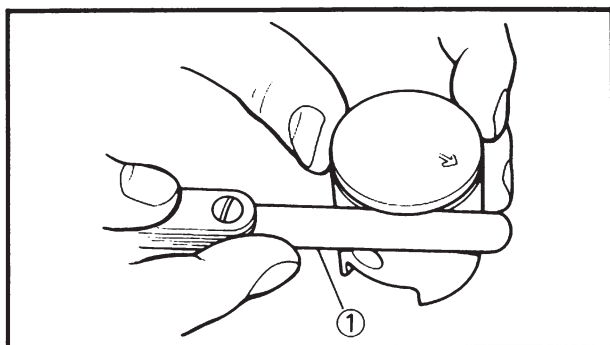
2. Measure:

- End gap
Out of specification → Replace.
Using a Thickness Gauge ①.



Ring end gap (installed):

Standard	< Limit >
0.20 ~ 0.35 mm (0.008 ~ 0.014 in)	0.55 mm (0.022 in)



3. Measure:

- Side clearance

Out of limit → Replace piston and/or ring.

Using a thickness gauge ①.

Side clearance:	
Standard	< Limit >
0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)	0.1 mm (0.004 in)

NOTE: _____

Check at several points.

Piston clearance

1. Calculate:

- Piston clearance

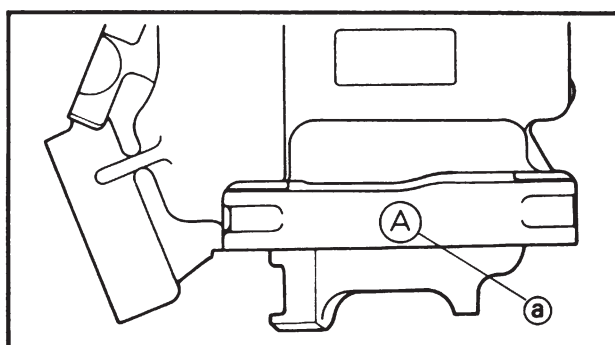
Out of limit → Replace piston, and piston ring and/or cylinder.

Refer to "CYLINDER BORE" and "PISTON DIAMETER".

PISTON CLEARANCE	=	CYLINDER BORE	-	PISTON DIAMETER
---------------------	---	------------------	---	--------------------

Piston clearance:	
Standard	< Limit >
0.060 ~ 0.070 mm (0.0024 ~ 0.0028 in)	0.1 mm (0.004 in)

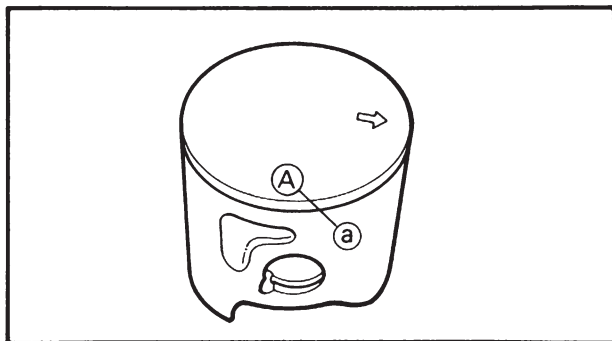
4



Combination of piston and cylinder

1. Cylinder mark:

Cylinder mark ①	Cylinder size
A	56.000 ~ 56.005 mm (2.2048 ~ 2.2049 in)
B	56.005 ~ 56.010 mm (2.2049 ~ 2.2051 in)
C	56.010 ~ 56.016 mm (2.2051 ~ 2.2054 in)
D	56.016 ~ 56.020 mm (2.2054 ~ 2.2055 in)



2. Piston mark:

Piston mark ①	Size
A	55.935~55.939 mm (2.2022~2.2023 in)
B	55.940~55.945 mm (2.2024~2.2026 in)
C	55.946~55.950 mm (2.2026~2.2028 in)
D	55.950~55.955 mm (2.2028~2.2030 in)

3. Combination:

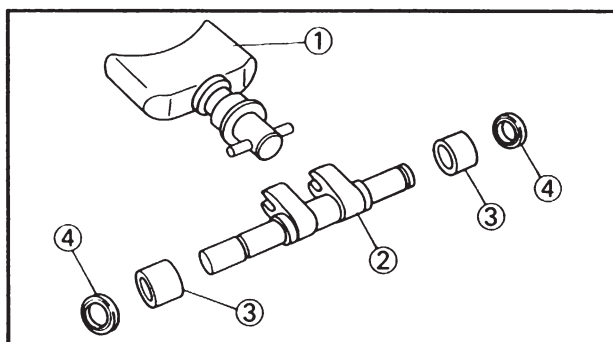
Combine the piston and cylinder by the following chart.

Cylinder mark	Piston mark
A	A (red)
B	B (orange)
C	C (green)
D	D (purple)

NOTE:

When you purchase a cylinder, you cannot designate its size. Choose the piston that matches the above chart.

4

**Power valve**

1. Inspect:

- Power valve ①
Wear/Damage → Replace.
Carbon deposits → Remove.
- Valve shaft ②
- Solid bush ③
- Oil seal ④
Wear/Damage → Replace.

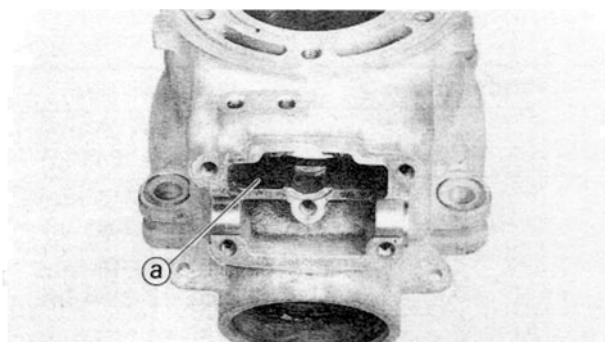
Power valve hole on cylinder

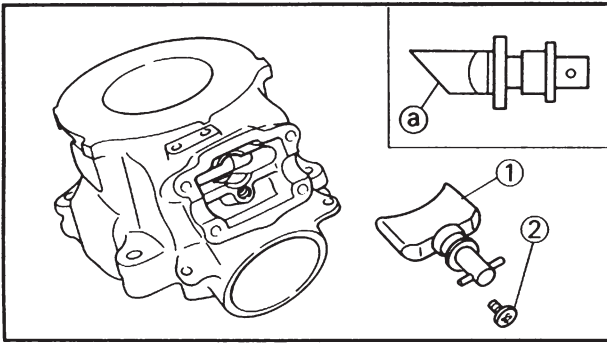
1. Remove:

- Carbon deposits
From power valve hole surface ①.

NOTE:

Do not use a sharp instrument. Avoid scratching the aluminum.



**ASSEMBLY AND INSTALLATION****Power valve**

1. Install:

- Power valve ①
- Screw (power valve) ②

NOTE:

Install the power valve at cut-away faced ① for down side.



Screw (power valve):
4 Nm (0.4 m•kg, 2.9 ft•lb)

2. Install:

- Solid bush ①
- Oil seal ②
- Plain washer ③
- Circlip ④
- Valve pulley ⑤
- Screw (valve pulley) ⑥
- To valve shaft ⑦.

NOTE:

- Apply the lithium soap base grease on the valve shaft and oil seal lip.
- Always use a new circlip.



Screw (valve pulley):
4 Nm (0.4 m•kg, 2.9 ft•lb)

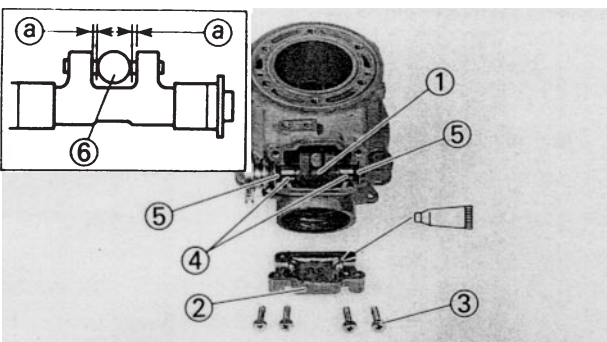
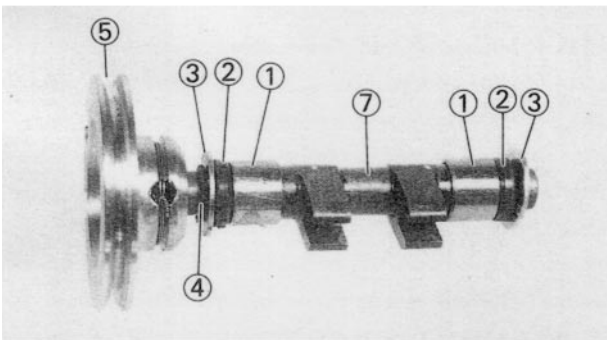
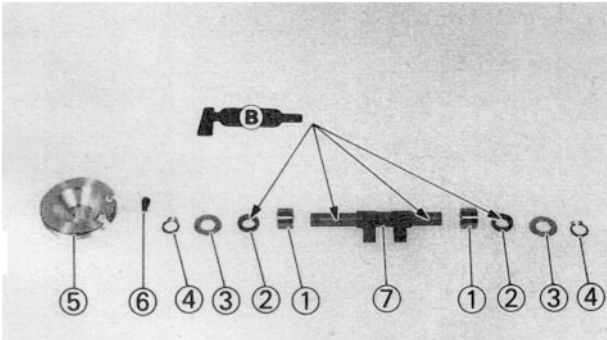
3. Lock the pulley holding screw using an appropriate wire around the groove on the valve pulley.

4. Install:

- Valve shaft ①
- Valve cover ②
- Screw (valve cover) ③

NOTE:

- Install the valve shaft so that its pulley faces left of the chassis for the left cylinder and right of the chassis for the right cylinder.
- When installing the valve shaft into the cylinder, lightly touch the solid bush ④ with the oil seal ⑤ and provide an equal gap ① for the power valve ⑥ and valve shaft.
- Clean the contacting surface of the valve cover and cylinder before applying the sealant.



**CAUTION:**

YAMAHA Bond No.4 dries quickly. If the engine is running soon after disassembly and reinstallation, use this YAMAHA Bond No.4.

**Quick gasket*:**

ACC-11001-05-01

ACC-11001-30-00

YAMAHA Bond No. 1215:

90890-85505

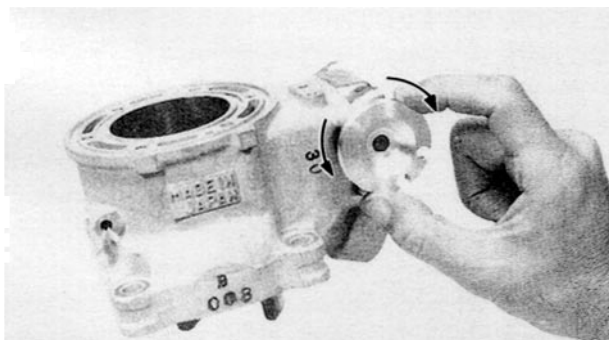
YAMAHA Bond No. 4

90890-05143

**Screw (valve cover):**

4 Nm (0.4 m•kg, 2.9 ft•lb)

4



5. Check:

- Power valve smooth movement
- Unsmooth movement ›Repair or replace.

EC475231

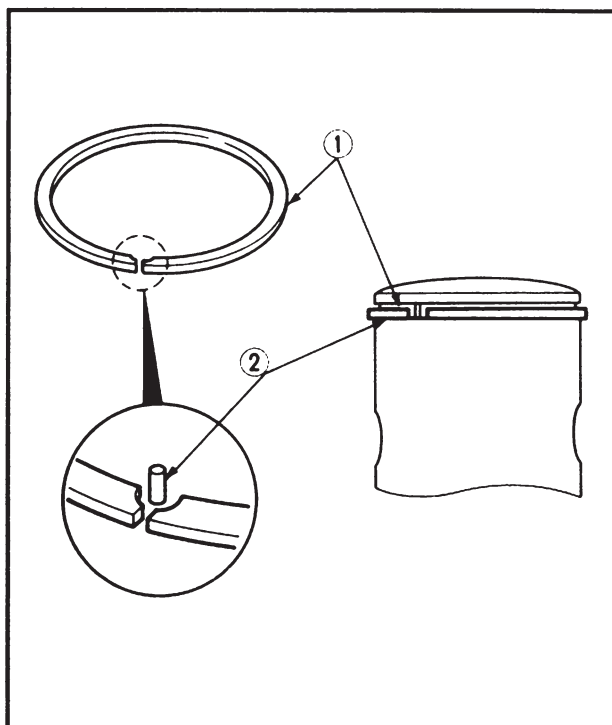
Piston ring and piston

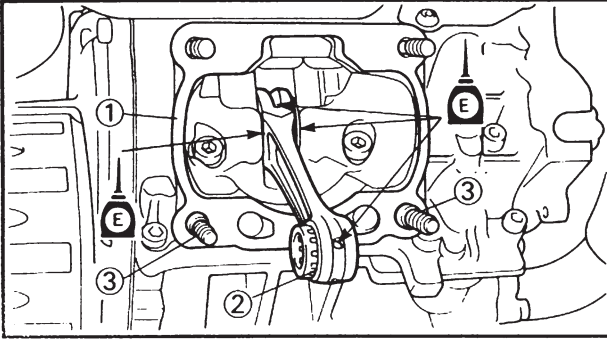
1. Install:

- Piston ring ①

NOTE:

- Take care not to scratch the piston or damage the piston ring.
- Align the piston ring gap with the pin ②.
- After installing the piston ring, check the smooth movement of it.



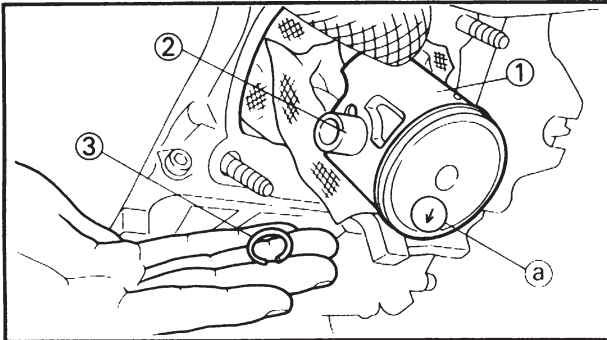


2. Install:

- Gasket (cylinder) ①
- Small end bearing ②
- Dowel pin ③

NOTE:

- Apply the engine oil onto the bearing (crankshaft and connecting rod) and connecting rod big end washers.
- Always use a new gasket.
- Install the gasket with the seal print side toward the crankcase.

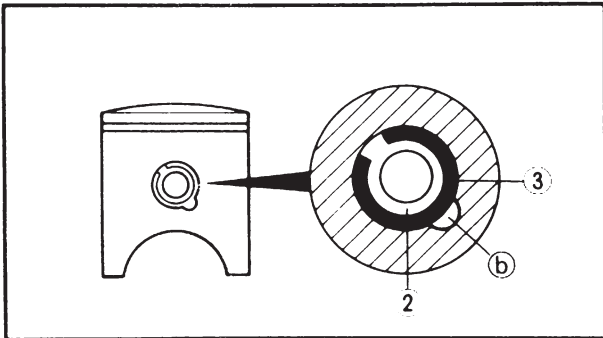


3. Install:

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

NOTE:

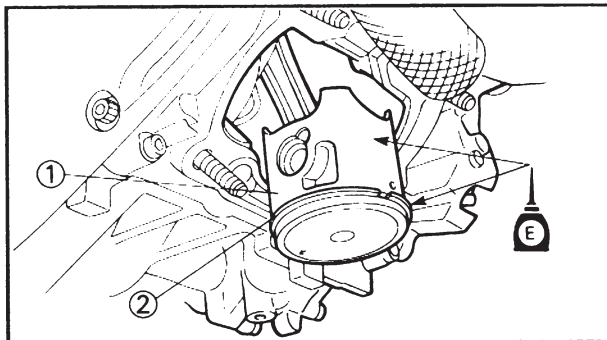
- The arrow (a) on piston must point to exhaust side.
- Before installing piston pin circlip, cover crankcase with a clean rag to prevent circlip from falling into crankcase cavity.



CAUTION:

- Do not allow the clip open ends to meet the Piston pin slot (b).
- Always use a new piston pin clip.

4



Cylinder head and cylinder

1. Apply:

- Engine oil
To piston ①, piston ring ② and cylinder inner surface.

2. Install:

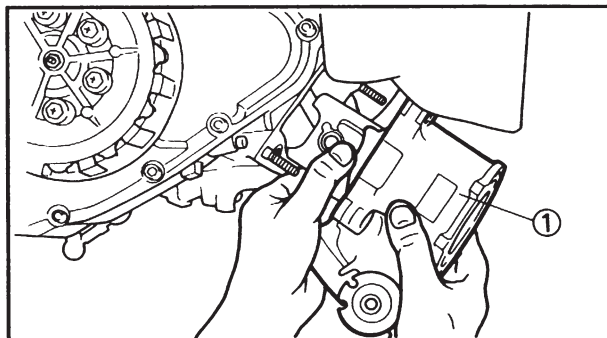
- Cylinder ①

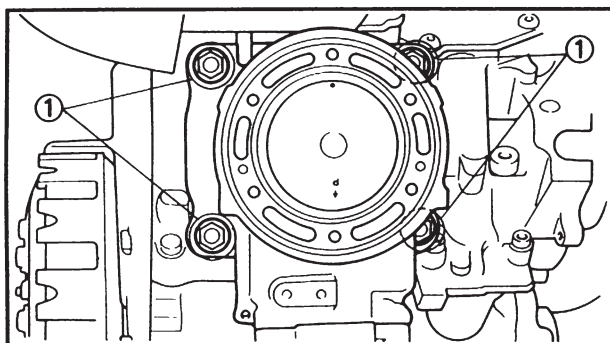
CAUTION:

Make sure the rings are properly positioned. Install the cylinder with one hand while compressing the piston ring with the other hand.

NOTE:

After installing, check the smooth movement of the piston.





3. Tighten:

- Nut (cylinder) ①

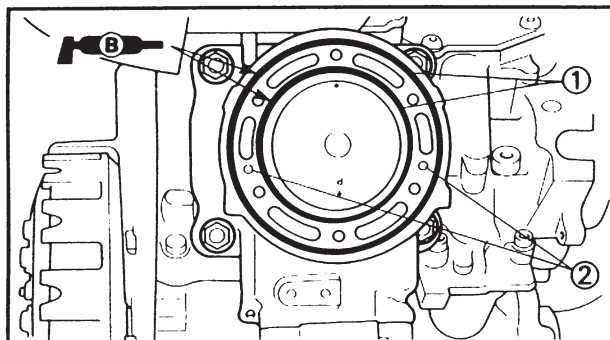
NOTE:

Tighten the nuts in stages, using a crisscross pattern.



Nut (cylinder):

20 Nm (2.0 m•kg, 14 ft•lb)



4. Install:

- O-ring ①
- Dowel pin ②

NOTE:

- Always use new O-rings.
- Apply the lithium soap base grease on the O-rings.

5. Install:

- Cylinder head ①
- Copper washer ②
- Bolt (cylinder head) ③

NOTE:

- Apply the lithium soap base grease on the thread and contact surface of the bolt (cylinder head).
- Tighten the bolts (cylinder head) in stage, using a crisscross pattern.



Bolt (cylinder head):

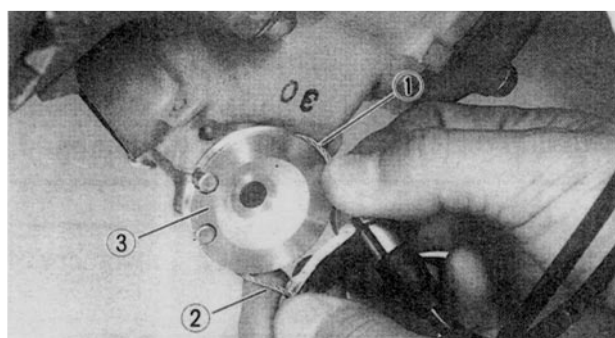
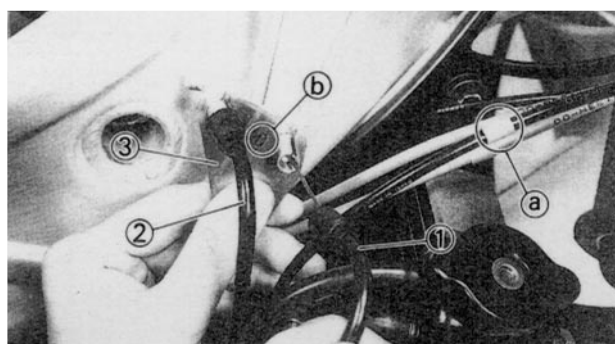
11 Nm (1.1 m•kg, 8.0 ft•lb)

6. Install:

- YPVS cable 2,4(open side) ①
- YPVS cable 1,3 (close side) ②
- To cable stay ③.

NOTE:

Install the open side cables(sleeved (a) cables) to the "O" marked (b) side of the cable stay.



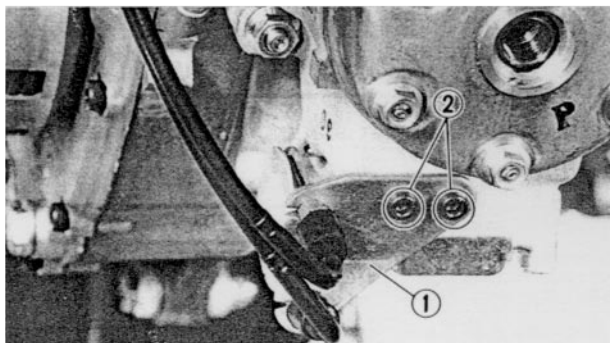
7. Connect:

- YPVS cable 2,4(open side) ①
- YPVS cable 1,3 (close side) ②
- To valve pulley ③.

NOTE:

Connect the silver cables to the left side cylinder and the black cables to the right cylinder.

Refer to "CABLE ROTUTING DIAGRAM" section in the CHAPTER 2.



8. Install:

- Cable stay ①
- Bolt (cable stay) ②

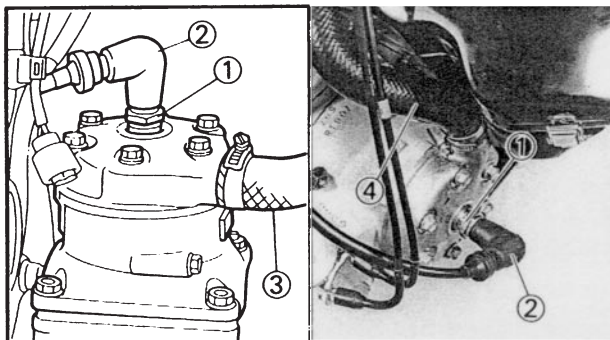
**Bolt (cable stay):**

7 Nm (0.7 m•kg, 5.1 ft•lb)

9. Adjust:

- YPVS cable

Refer to "YPVS OPEN SIDE CABLE ADJUSTMENT" and "YPVS CLOSE SIDE CABLE ADJUSTMENT" section in the CHAPTER 3.



10. Install:

- Spark plug ①
- Plug cap ②
- Radiator hose 3 ③
- Radiator hose 4 ④

**Spark plug:**

19 Nm (1.9 m•kg, 13 ft•lb)

Radiator hose clamp:

2 Nm (0.2 m•kg, 1.4 ft•lb)



CLUTCH

PREPARATION FOR REMOVAL



* Remove the lower cowl.

FRICTION PLATE WEAR LIMIT:
2.7 mm (0.106 in)

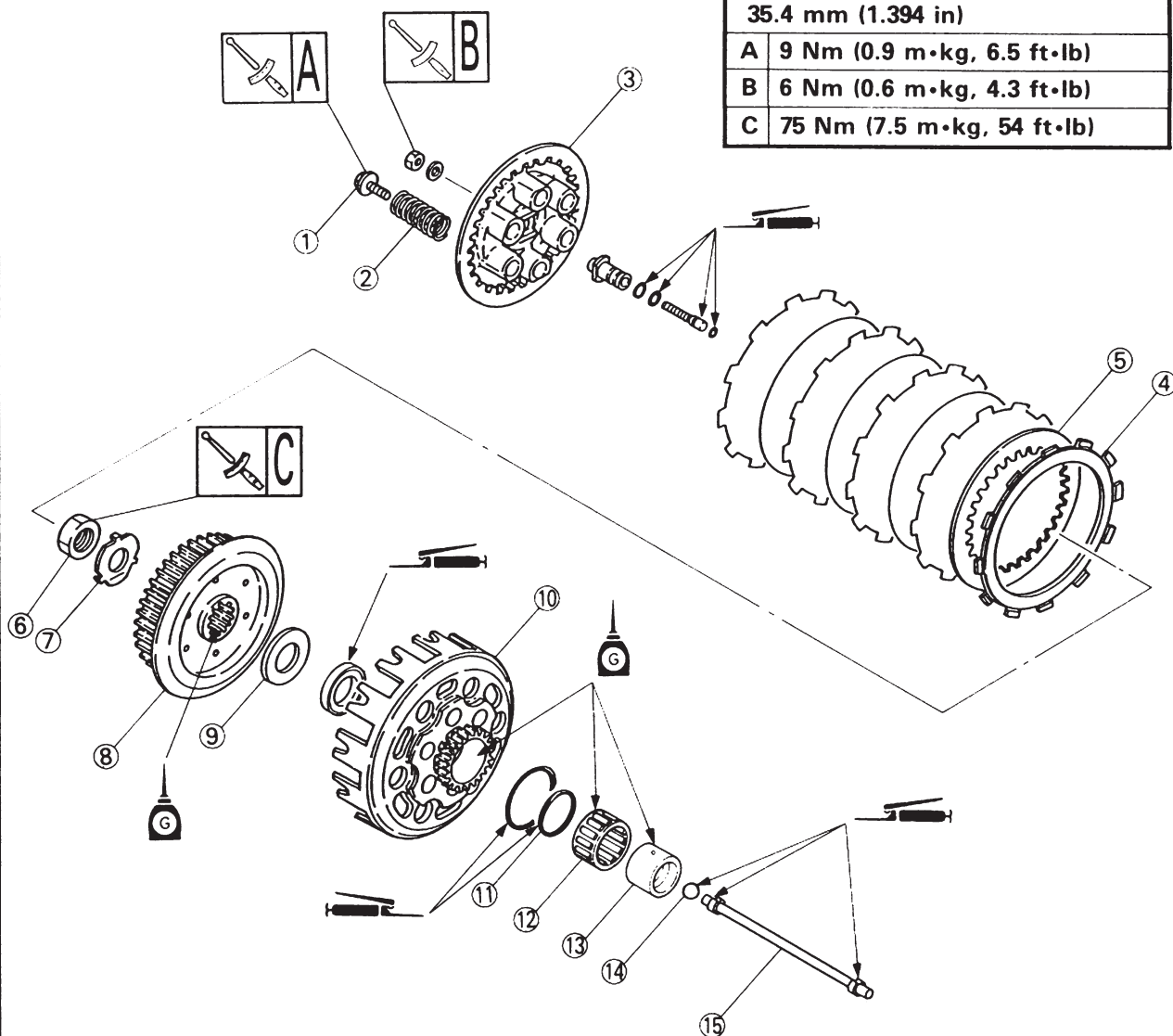
CLUTCH PLATE WARP LIMIT:
0.1 mm (0.004 in)

**CLUTCH SPRING FREE
LENGTH LIMIT:**
35.4 mm (1.394 in)

A 9 Nm (0.9 m•kg, 6.5 ft•lb)

B 6 Nm (0.6 m•kg, 4.3 ft•lb)

C 75 Nm (7.5 m•kg, 54 ft•lb)





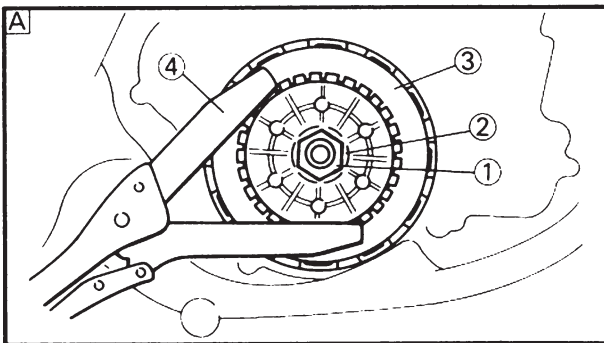
NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material does not enter the crankcase.
- For reassembly, the removed parts should be cleaned with solvent and apply the transmissioin oil to the sliding surface.

Extent of removal: ① Clutch plate and friction plate removal ② Clutch housing removal
③ Push rod removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Screw (clutch spring)	6	
	2	Clutch spring	6	
	3	Pressure plate	1	
	4	Friction plate	5	
	5	Clutch plate	4	
	6	Nut (clutch boss)	1	Use special tool. Refer to "REMOVAL POINTS".
	7	Lock washer	1	
	8	Clutch boss	1	
	9	Plain washer	1	
	10	Clutch housing	1	
	11	O-Ring	1	
	12	Bearing	1	
	13	Spacer 1	1	
	14	Ball	1	
	15	Push rod	1	

4



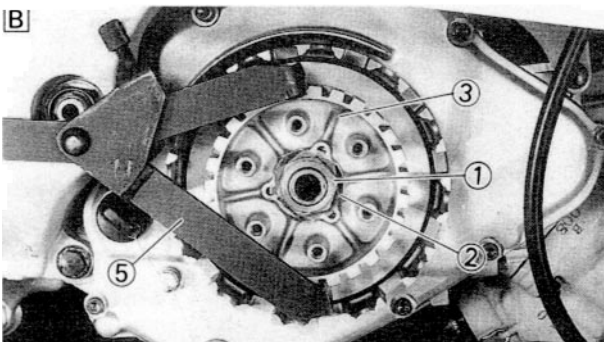
REMOVAL POINTS

Clutch boss

- Remove:
 - Nut ①
 - Lock washer ②
 - Clutch boss ③

NOTE:

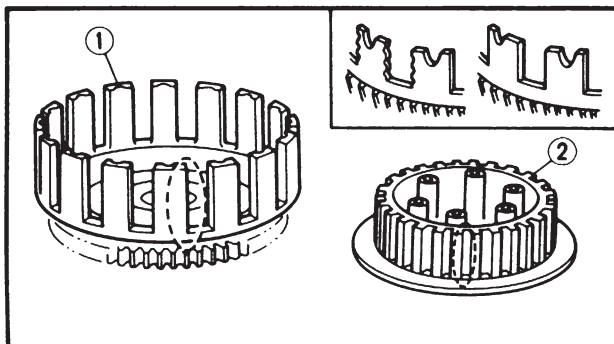
Straighten the lock washer tab and use the clutch holder ④, ⑤ to hold the clutch boss.



Clutch holder:

YM-91042 ④
90890-04086 ⑤

- ☐ A For USA and CDN
☐ B Except for USA and CDN

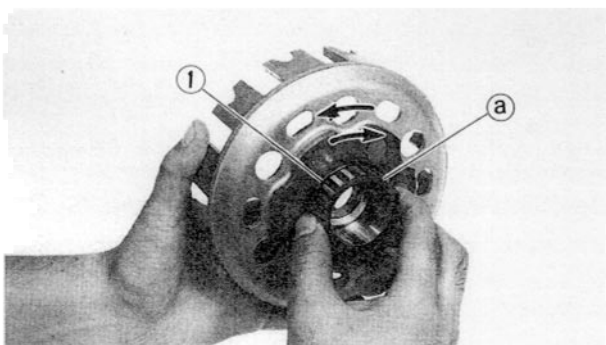


INSPECTION

Clutch housing and boss

1. Inspect:

- Clutch housing ①
Cracks/Wear/Damage → Replace.
- Clutch boss ②
Scoring/Wear/Damage → Replace.



Clutch housing

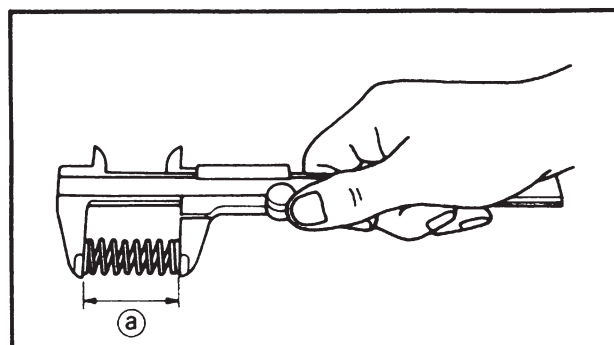
1. Check:

- Circumferential play
Free play exists → Replace.
- Gear teeth (a)
Wear/Damage → Replace.
- O-ring ①
Damage → Replace.

Clutch spring

1. Measure:

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



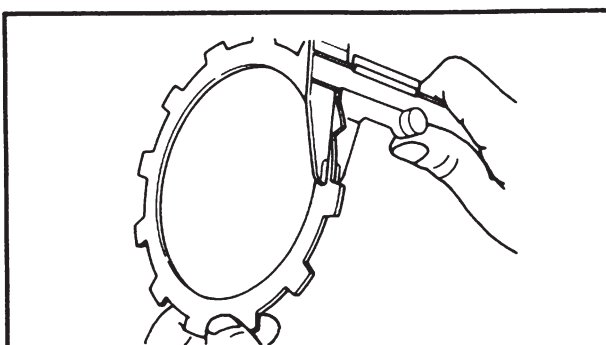
Clutch spring free length:

Standard	< Limit >
36.4 mm (1.433 in)	35.4 mm (1.394 in)

Friction plate

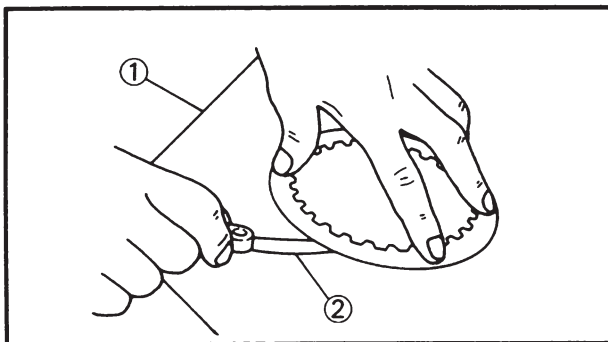
1. Measure:

- Friction plate thickness
Out of specification → Replace friction plate as a set.
Measure at all four points.



Friction plate thickness:

Standard	< Limit >
2.9 ~ 3.1 mm (0.114 ~ 0.122 in)	2.7 mm (0.106 in)

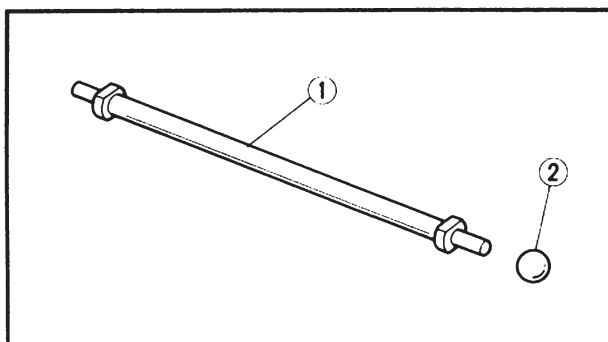
**Clutch plate**

1. Measure:

- Clutch plate warpage
Out of specification → Replace clutch plate as a set.
Use a surface plate ① and thickness gauge ②



Warp limit:
0.1 mm (0.004 in)

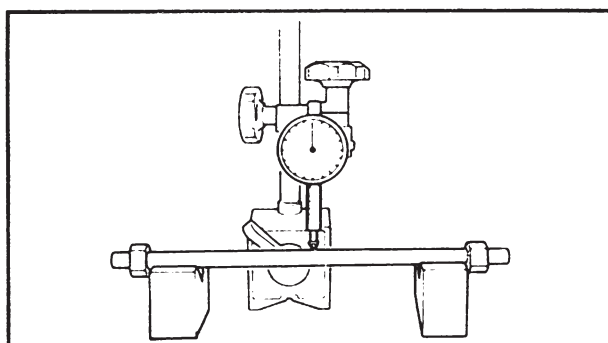
**Push rod axle**

1. Inspect:

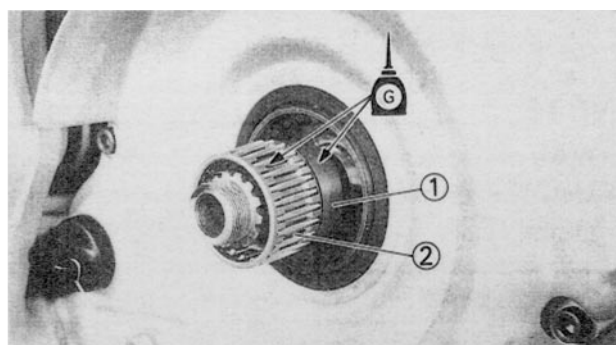
- Push rod ①
- Ball ②
Wear/Damage/Bend → Replace.



Bending limit:
0.2 mm (0.008 in)

**NOTE:**

The bending value is shown by one half of the dial gauge reading.

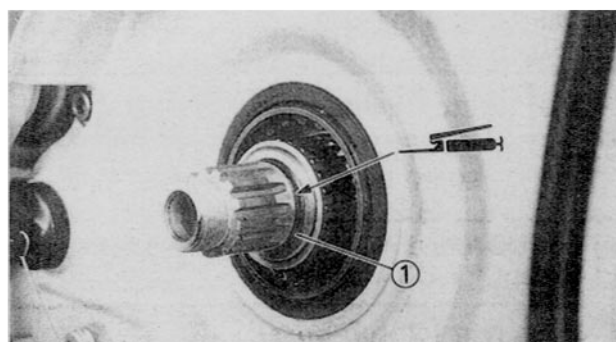
**ASSEMBLY AND INSTALLATION****Clutch**

1. Install:

- Spacer 1 ①
- Bearing ②

NOTE:

Apply the transmission oil onto the spacer 1 and bearing.

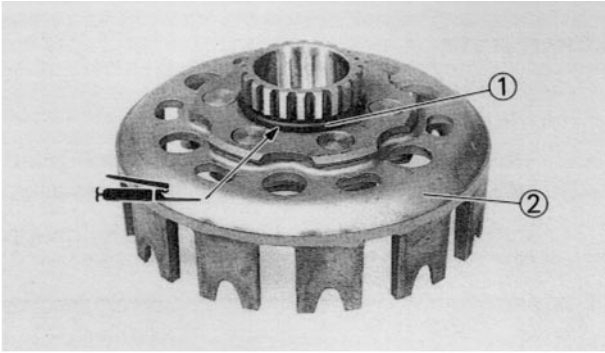


2. Install:

- O-ring ①

NOTE:

- Always use a new O-ring.
- Apply the lithium soap base grease on the O-ring.

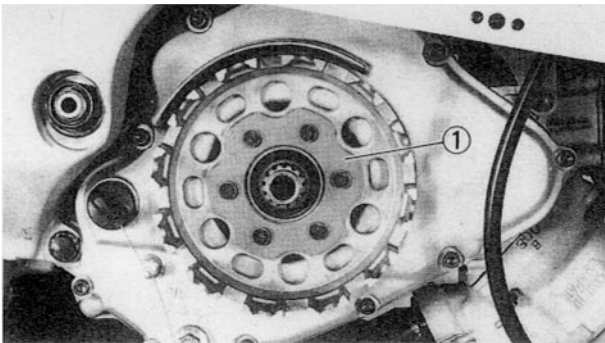


3. Install:

- O-ring ①
- To clutch housing ②

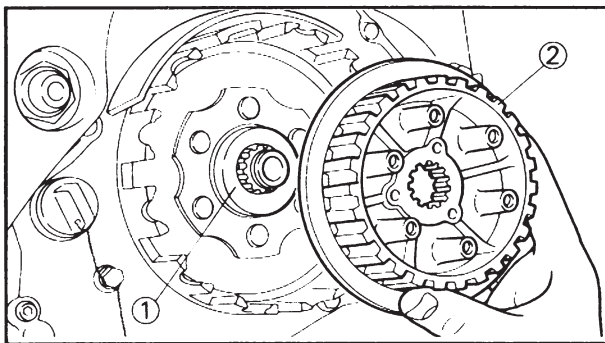
NOTE:

- Always use a new O-ring.
- Apply the lithium soap base grease on the O-ring.



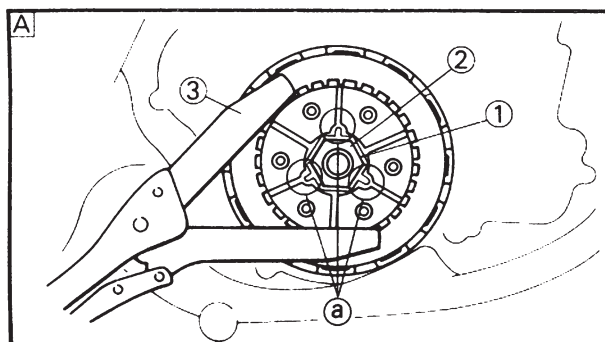
4. Install:

- Clutch housing ①



5. Install:

- Plain washer ①
- Clutch boss ②



6. Install:

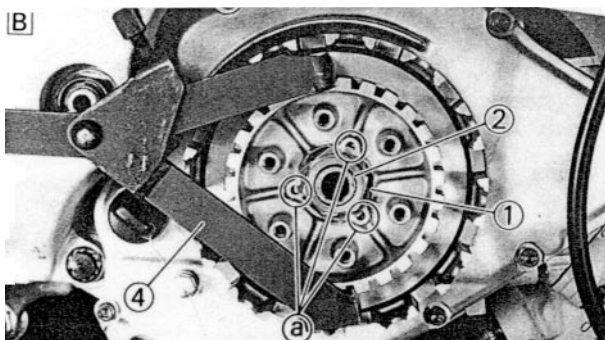
- Lock washer ①
- Nut (clutch boss) ②

NOTE:

- Always use a new lock washer.
- Use the clutch holder ③, ④ to hold the clutch boss.

CAUTION:

Align the projections on the lock washer with the holes ① in the clutch boss.



Clutch holder:

YM-91042 ③

90890-04086 ④

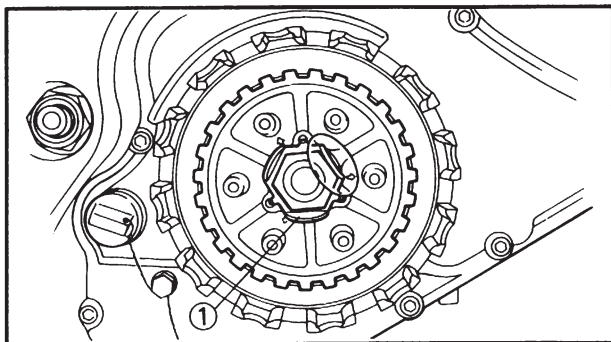
Ⓐ For USA and CDN

Ⓑ Except for USA and CDN

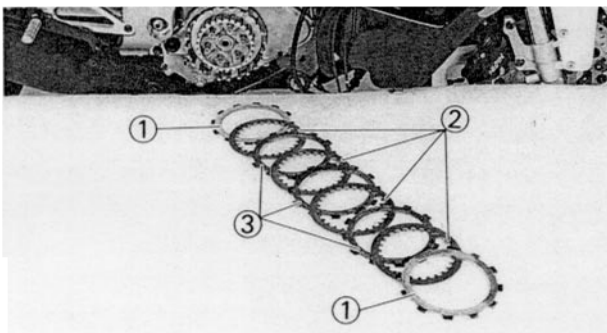


Nut (clutch boss):

75 Nm (7.5 m•kg, 54 ft•lb)



7. Bend the lock washer ① tab.



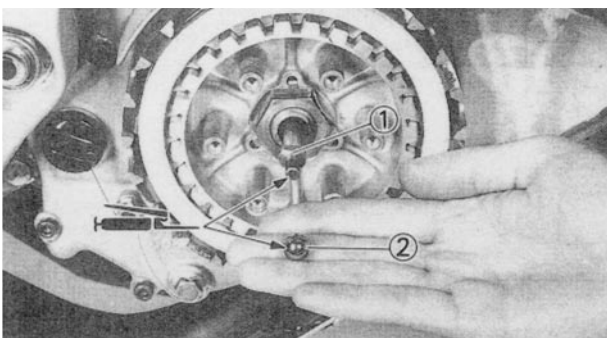
8. Install:

- Friction plate (yellow) ①
- Clutch plate ②
- Friction plate (brown) 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.
- Yellow colored friction plates are used for the first and final.
- This machine is equipped with a dry type clutch. Be sure to clean with solvent or replace if grease or oil contacts either clutch or friction plates.

4

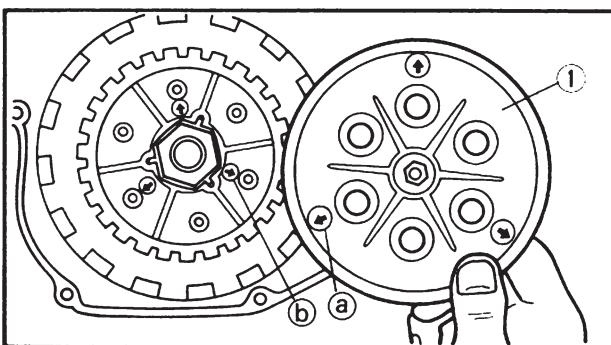


9. Install:

- Push rod ①
- Ball ②

NOTE:

Apply the lithium-soap base grease onto the push rod and ball.

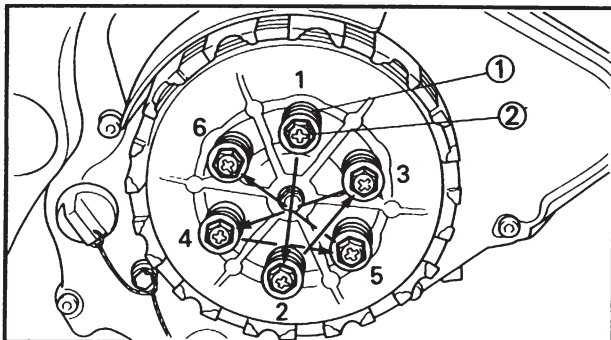


10. Install:

- Pressure plate ①

NOTE:

Align the arrow marks (a) on the pressure plate the arrow marks (b) on the clutch boss.



11. Install:

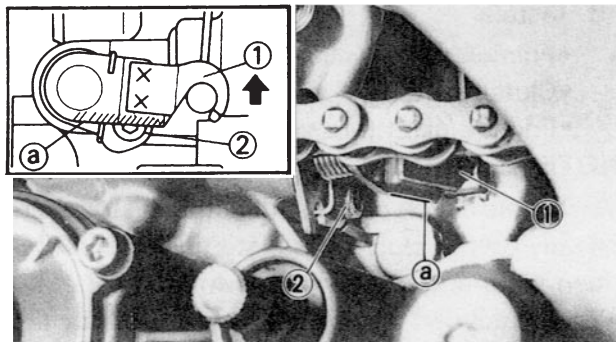
- Clutch spring ①
- Screw (clutch spring) ②

NOTE:

Tighten the screws in stages, using a crisscross pattern.



Screw (clutch spring):
9 Nm (0.9 m•kg, 6.5 ft•lb)



12. Check:

- Push lever position
Push the push lever ① upward until it stops. With the push lever in this position, the rear edge ① of the push lever should be aligned with the center of the push lever installation bolt ②.
- Not aligned → Adjust.

13. Adjust:

- Push lever position

Push lever position adjustment steps:

- Loosen the locknut ①.
- Turn the adjuster ② to align the rear edge of the push lever with the center of the push lever installation bolt.
- Tighten the locknut .



Locknut:
6 Nm (0.6 m•kg, 4.3 ft•lb)

CLUTCH

ENG



MEMO

4

PRIMARY DRIVE GEAR, PRIMARY DRIVEN GEAR AND BALANCER SHAFT

ENG

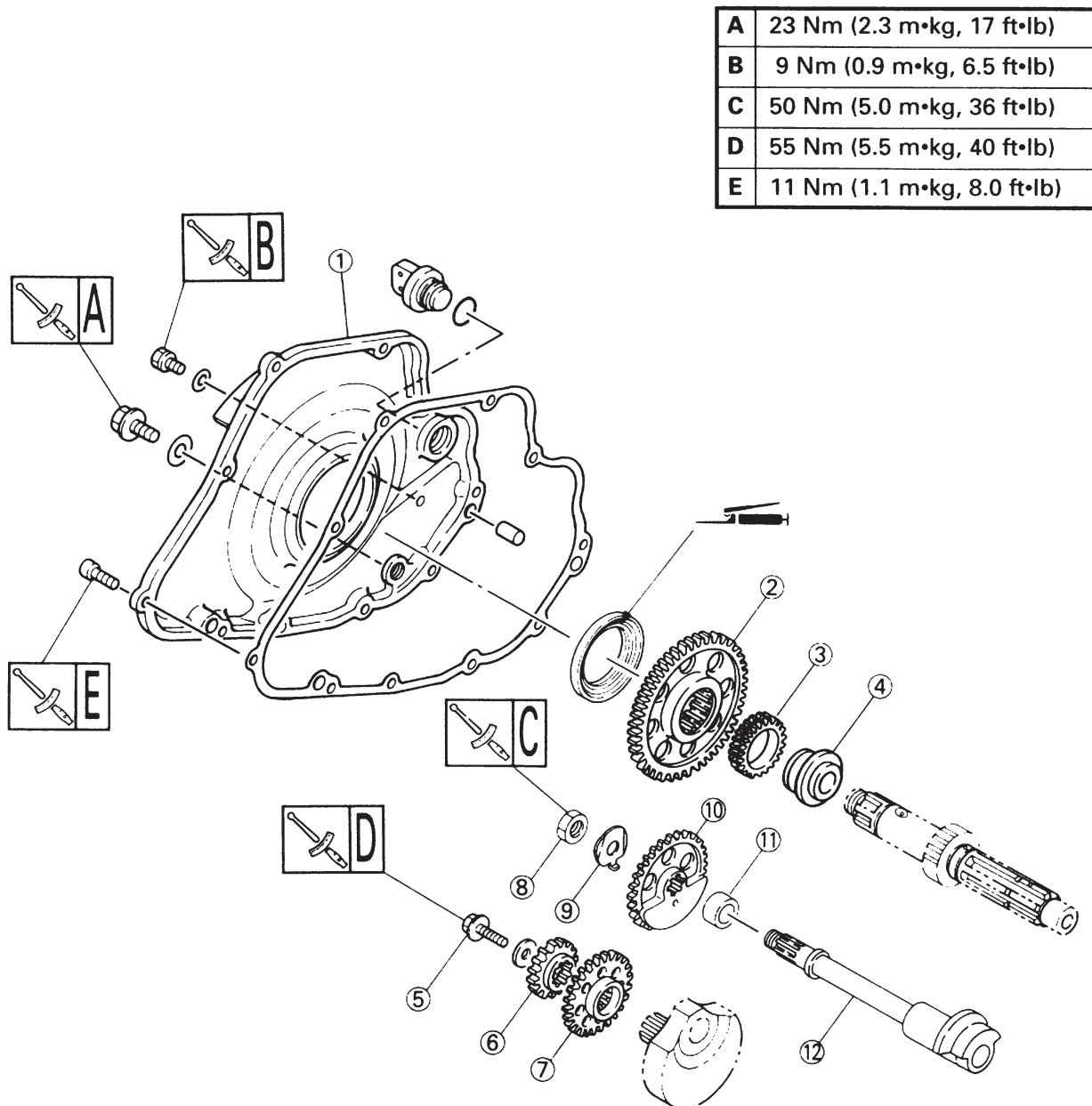


PRIMARY DRIVE GEAR, PRIMARY DRIVEN GEAR AND BALANCER SHAFT



PREPARATION FOR REMOVAL

- * Remove the cowling.
- * Drain the transmission oil.
- * Remove the clutch.



PRIMARY DRIVE GEAR, PRIMARY DRIVEN GEAR AND BALANCER SHAFT

ENG



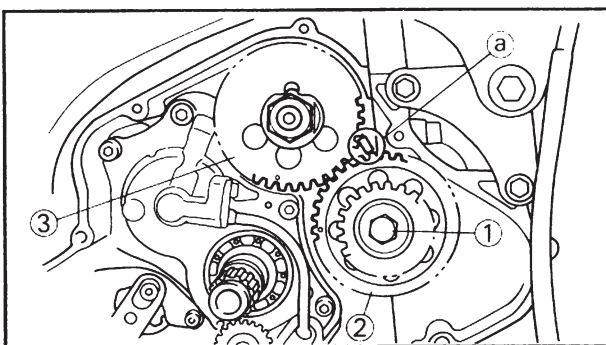
NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material does not enter the crankcase.
- Remove any gasket adhered to the contacting surfaces.
- For reassembly, the removed parts should be cleaned with solvent, and apply the transmission oil to the sliding surfaces.

Extent of removal: ① Primary driven gear removal ② Primary drive gear removal
③ Balancer shaft removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Crankcase cover (right)	1	
	2	Primary driven gear	1	
	3	Oil pump drive gear	1	
	4	Thrust plate	1	
	5	Bolt (primary drive gear)	1	
	6	Primary drive gear	1	Refer to "REMOVAL POINTS".
	7	Balancer drive gear	1	
	8	Nut (balancer weight gear)	1	
	9	Lock washer	1	
	10	Balancer weight gear	1	
	11	Collar	1	Remove on the rotor side.
	12	Balancer shaft	1	

4



REMOVAL POINTS

Primary drive gear and balancer weight gear

1. Loosen:

- Bolt (primary drive gear) ①

NOTE:

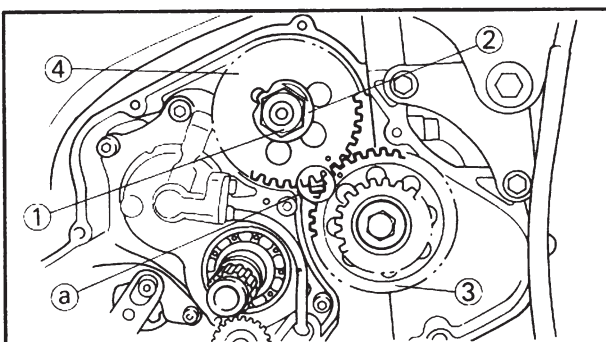
Place an aluminum plate ① between the teeth of the balancer drive gear ② and balancer weight gear ③.

2. Loosen:

- Nut (balancer weight gear) ①

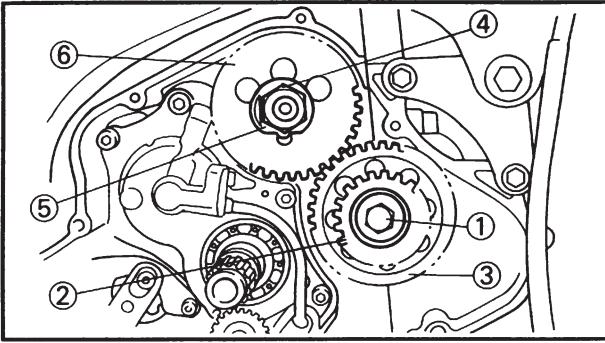
NOTE:

Straighten the lock washer ② tab and place an aluminum plate ① between the teeth of the balancer drive gear ③ and balancer weight gear ④.



PRIMARY DRIVE GEAR, PRIMARY DRIVEN GEAR AND BALANCER SHAFT

ENG



3. Remove:

- Bolt (primary drive gear) ①
- Primary drive gear ②
- Balancer drive gear ③
- Nut (balancer weight gear) ④
- Lock washer ⑤
- Balancer weight gear ⑥

NOTE:

It may sometimes happens that the primary drive gear and balancer drive gear are fitted too tight as in force fitting. In that case, use a general gear puller to remove them without too much force on the crankshaft.

INSPECTION

Primary drive gear, primary driven gear and oil pump drive gear

1. Inspect:

- Primary drive gear ①
 - Primary driven gear ②
 - Oil pump drive gear ③
- Wear/Damage → Replace.

Blancer drive gear and blancer weight gear

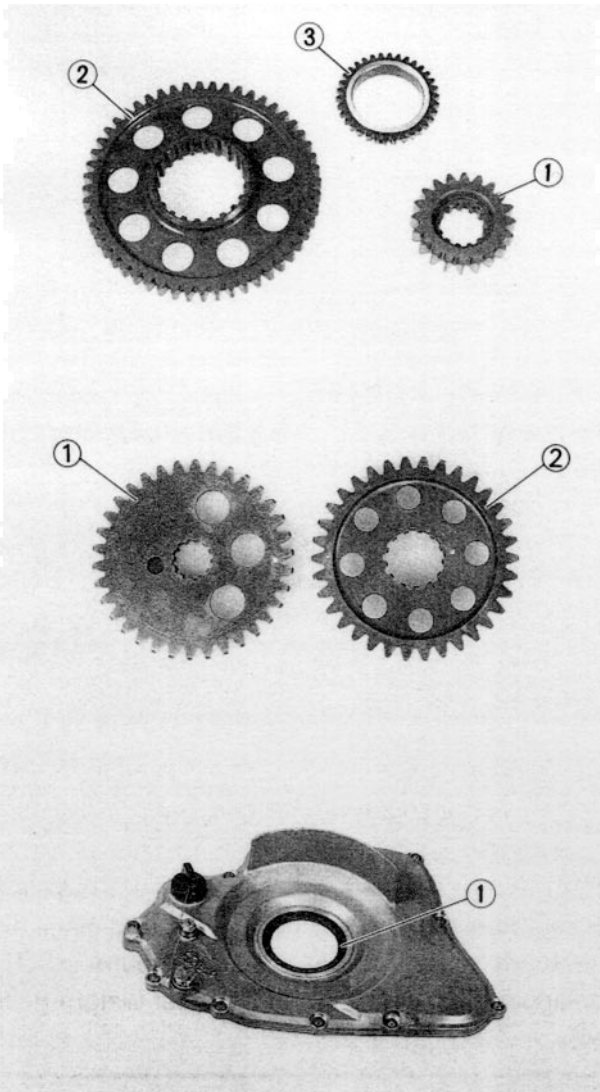
1. Inspect:

- Balancer weight gear ①
 - Balancer drive gear ②
- Wear/Damage → Replace.

Crankcase cover (right)

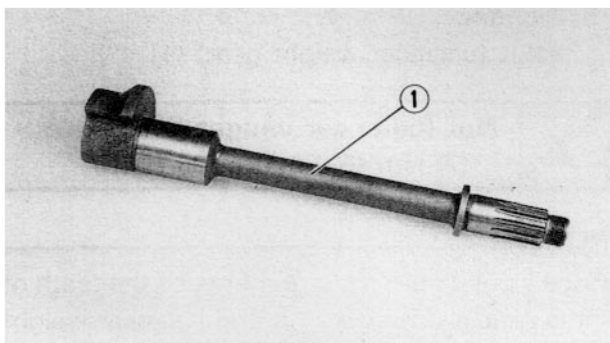
1. Inspect:

- Contacting surface
Scratches → Replace.
- Crankcase cover (right)
Cracks/Damage → Replace.
- Oil seal ①
Wear/Damage → Replace.



PRIMARY DRIVE GEAR, PRIMARY DRIVEN GEAR AND BALANCER SHAFT

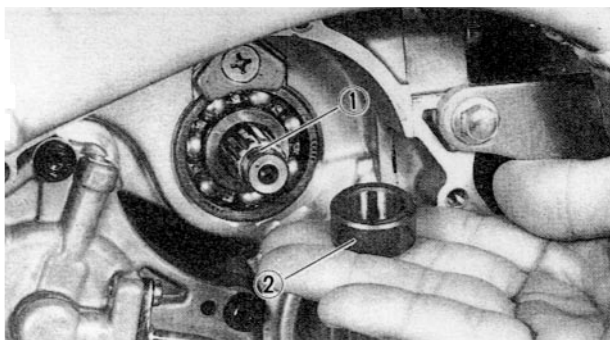
ENG



Balancer shaft

1. Inspect:

- Balancer shaft ①
Bend/Wear/Damage → Replace.

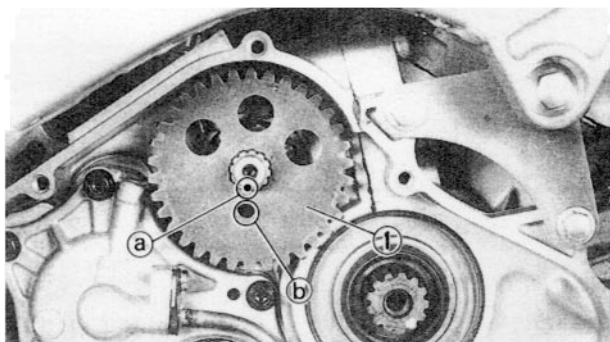


ASSEMBLY AND INSTALLATION

Balancer shaft and primary drive gear

1. Install:

- Balancer shaft ①
- Collar ②



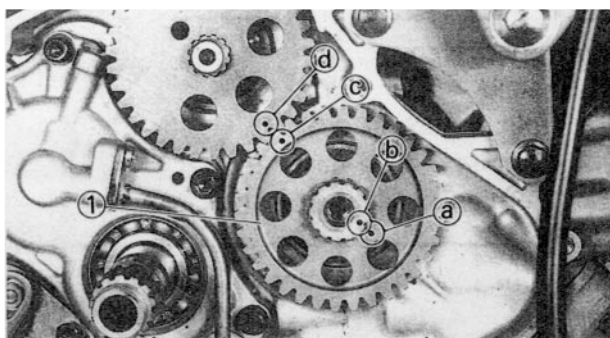
2. Install:

- Balancer weight gear ①

NOTE:

Align the punch mark (a) on the balancer shaft with the hole (b) of the balancer weight gear.

4

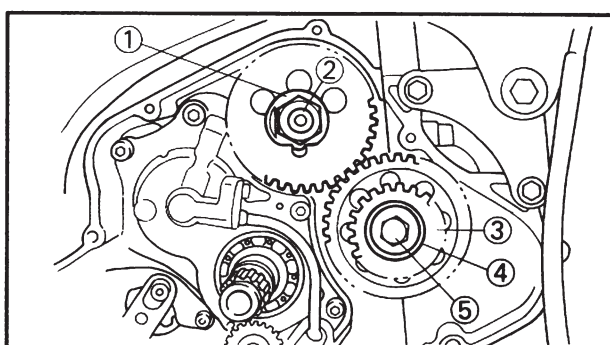


3. Install:

- Balancer drive gear ①

NOTE:

Align the punch marks, (a) (balancer drive gear) with (b) (crankshaft) and (c) (balancer drive gear) with (d) (balancer weight gear) as shown.



4. Install:

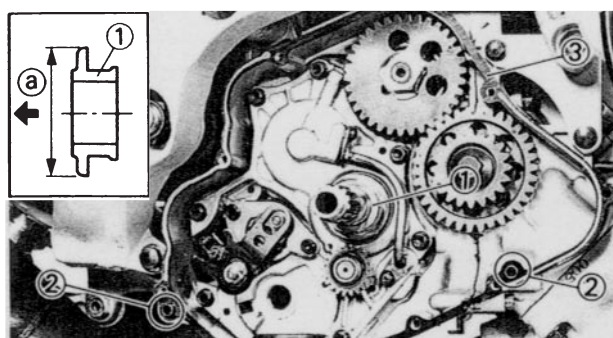
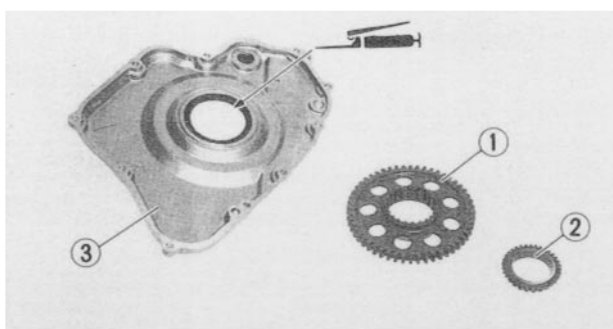
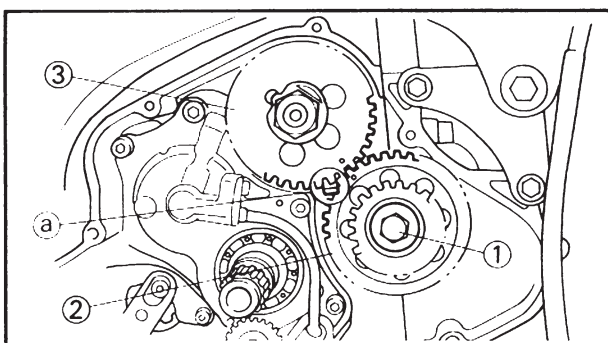
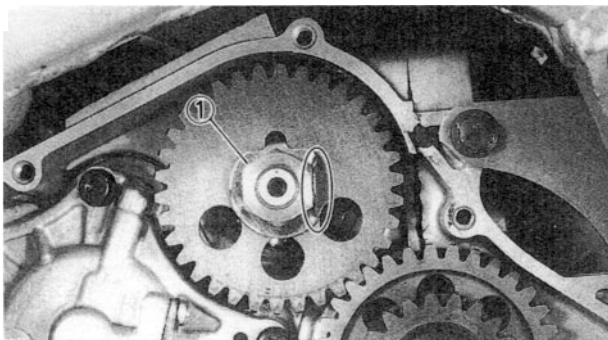
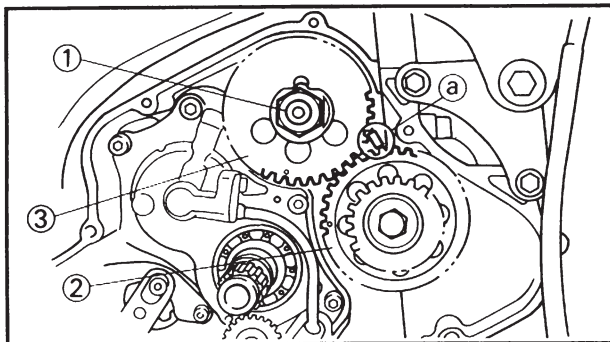
- Lock washer ①
- Nut (balancer weight gear) ②
- Primary drive gear ③
- Plain washer ④
- Bolt (primary drive gear) ⑤

NOTE:

Always use a new lock washer.

PRIMARY DRIVE GEAR, PRIMARY DRIVEN GEAR AND BALANCER SHAFT

ENG



5. Tighten:

- Nut (balancer weight gear) ①



Nut (balancer weight gear):
50 Nm (5.0 m·kg, 36 ft·lb)

NOTE:

Place an aluminum plate ① between the teeth of the balancer drive gear ② and balancer weight gear ③.

6. Bend the lock washer ① tab.

7. Tighten:

- Bolt (primary drive gear) ①



Bolt (primary drive gear):
55 Nm (5.5 m·kg, 40 ft·lb)

NOTE:

Place an aluminum plate ① between the teeth of the balancer drive gear ② and balancer weight gear ③.

Primary driven gear

1. Install:

- Primary driven gear ①
- Oil pump drive gear ②
- To crankcase cover (right) ③.

NOTE:

Apply the lithium soap base grease onto the oil seal lip.

2. Install:

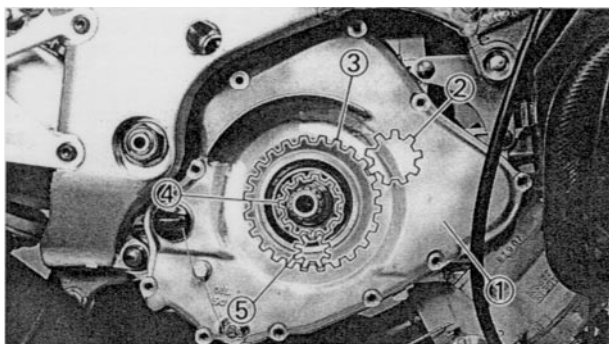
- Thrust plate ①
- Dowel pin ②
- Gasket (crankcase cover right) ③

NOTE:

- Always use a new gasket.
- Install the thrust plate with its larger diameter side ① toward the transmission.

PRIMARY DRIVE GEAR, PRIMARY DRIVEN GEAR AND BALANCER SHAFT

ENG

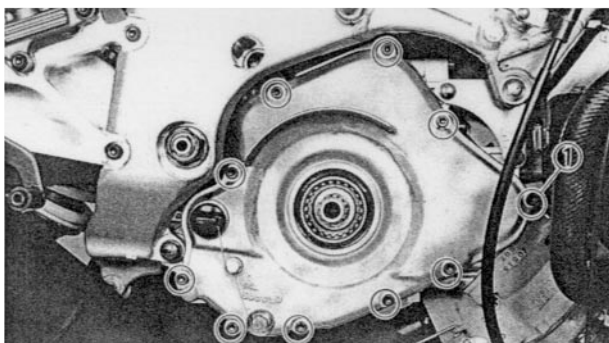


3. Install:

- Crankcase cover (right) ①

NOTE

Mesh the primary drive gear ② with the primary driven gear ③, and the oil pump drive gear ④ with the oil pump driven gear ⑤ by turning the rotor.



4. Install:

- Bolt (crankcase cover right) ①

NOTE

Tighten the bolts in stages, using a crisscross pattern.



Bolt (crankcase cover right):
11 Nm (1.1 m•kg, 8.0 ft•lb)

4



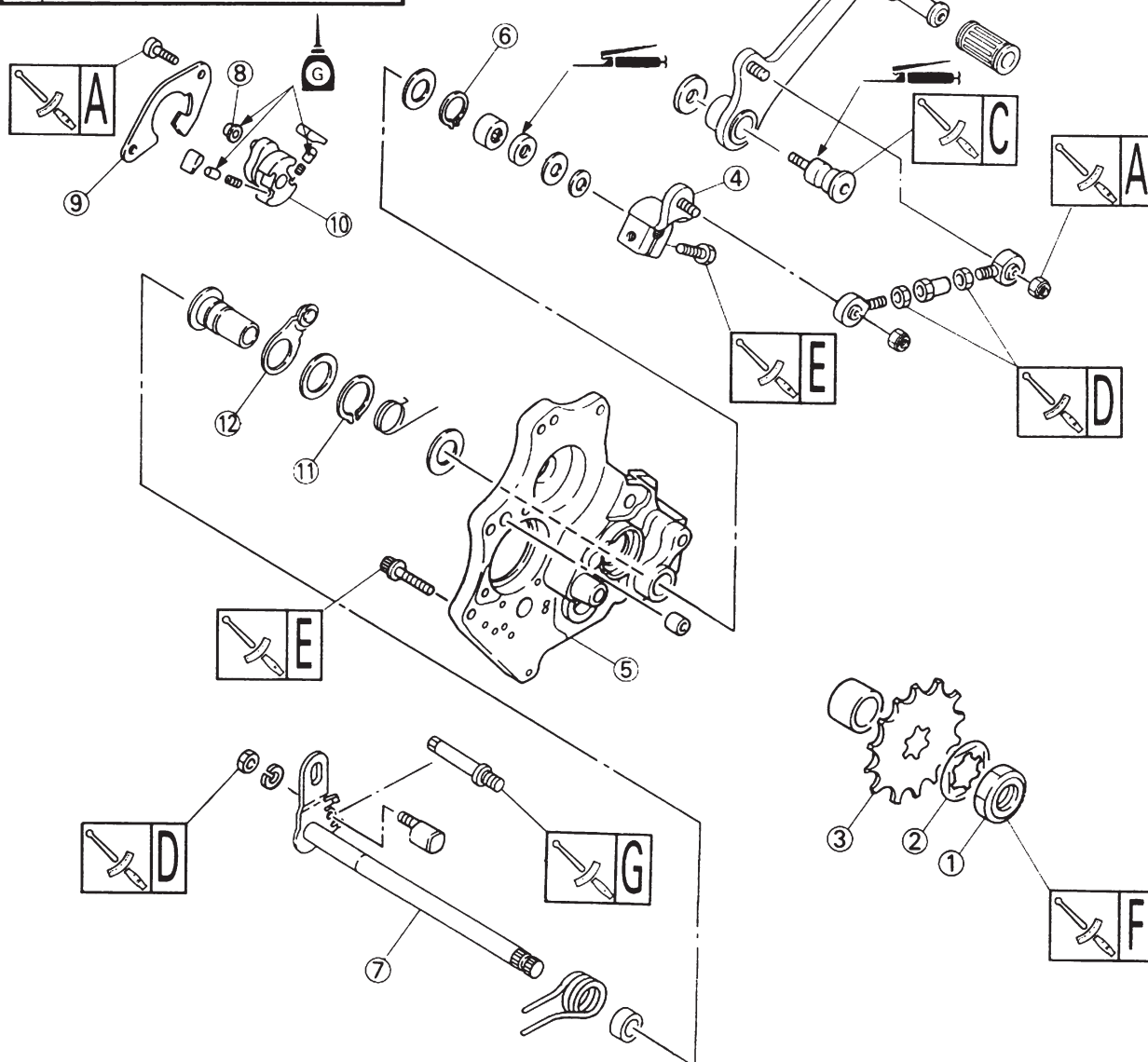
SHIFT SHAFT

PREPARATION FOR REMOVAL



- * Remove the cowling.
- * Remove the clutch.
- * Drain the transmission oil.
- * Remove the crankcase cover (right).

A	11 Nm (1.1 m·kg, 8.0 ft·lb)
B	10 Nm (1.0 m·kg, 7.2 ft·lb)
C	22 Nm (2.2 m·kg, 16 ft·lb)
D	9 Nm (0.9 m·kg, 6.5 ft·lb)
E	14 Nm (1.4 m·kg, 10 ft·lb)
F	75 Nm (7.5 m·kg, 54 ft·lb)
G	8 Nm (0.8 m·kg, 5.8 ft·lb)



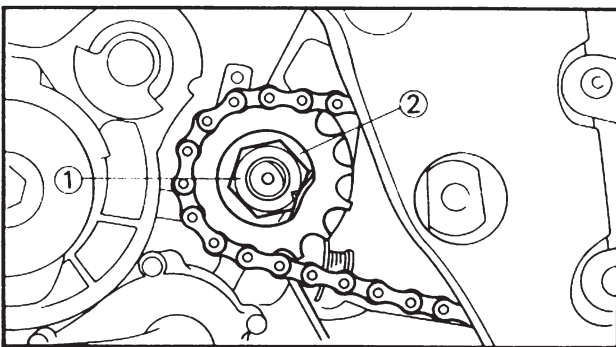
**NOTE ON REMOVAL AND REASSEMBLY**

- Before servicing, clean the parts, and take care so that foreign material does not enter the crankcase.
- Remove any gasket adhered to the contacting surfaces.
- For reassembly, the removed parts should be cleaned with solvent, and apply the transmission oil to the sliding surfaces.

Extent of removal: ① Shift shaft removal ② Stopper lever removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Nut (drive sprocket)	1	Refer to "REMOVAL POINTS".
	2	Lock washer	1	
	3	Drive sprocket	1	
	4	Shift arm	1	
	5	Transmission housing	1	Refer to "REMOVAL POINTS".
	6	Circlip	1	Refer to "REMOVAL POINTS".
	7	Shift shaft	1	
	8	Roller	1	Refer to "REMOVAL POINTS".
	9	Shift guide	1	
	10	Shift lever	1	
	11	Circlip	1	Refer to "REMOVAL POINTS".
	12	Stopper lever	1	

4

**REMOVAL POINTS****Drive sprocket**

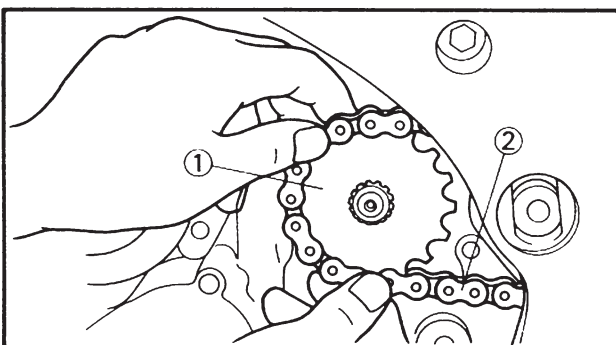
1. Straighten the lock washer tab.

2. Remove:

- Nut (drive sprocket) ①
- Lock washer ②

NOTE: _____

Loosen the nut while applying the rear brake.

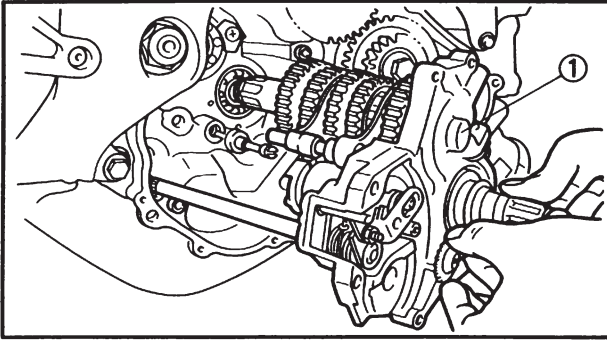


3. Remove:

- Drive sprocket ①

NOTE: _____

Remove the drive sprocket together with the drive chain ②.

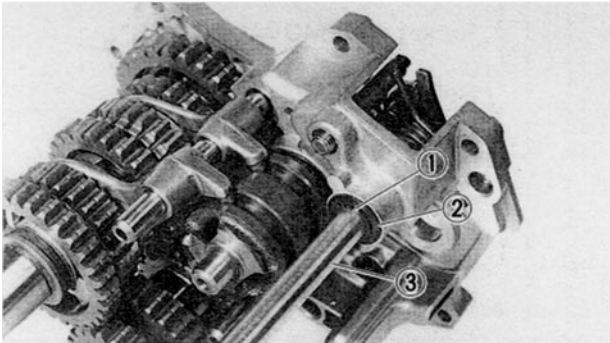


Transmission housing

1. Remove
 - Bolt (transmission housing)
 - Transmission housing ①

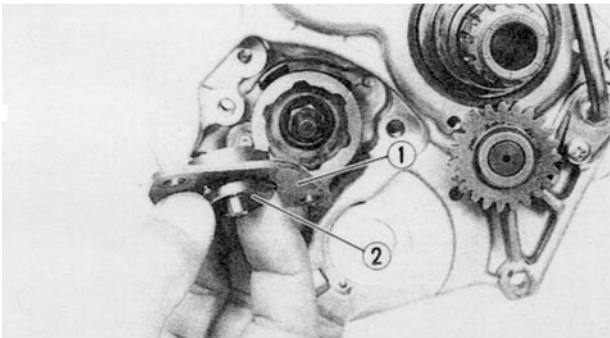
NOTE:

Remove the transmission housing together with the transmission, shift cam, shift fork and shift shaft.



Shift shaft

1. Remove:
 - Circlip ①
 - Plain washer ②
 - Shift shaft ③

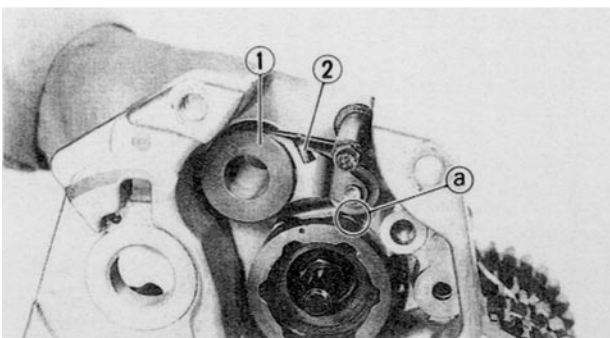


Shift guide and shift lever assembly

1. Remove:
 - Bolt (shift gauge)
 - Shift guide ①
 - Shift lever assembly ②

NOTE:

Remove the shift lever assembly together with the shift guide.

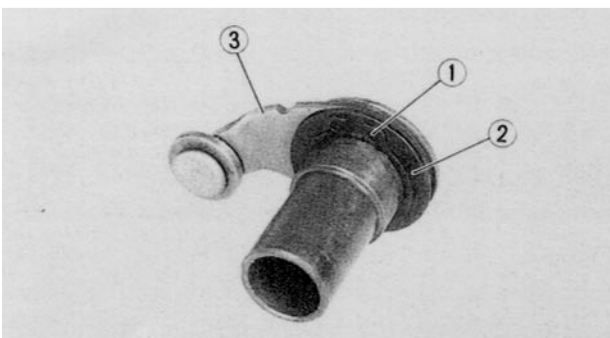


Stopper lever

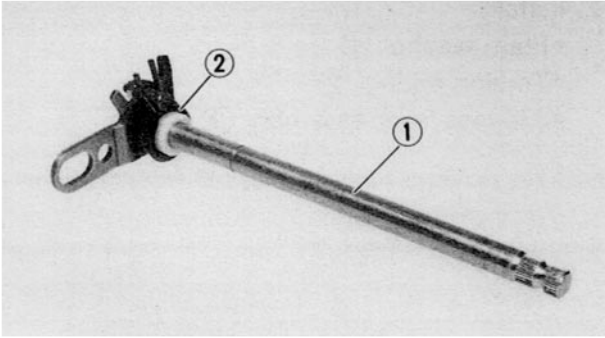
1. Remove
 - Stopper lever assembly ①
 - Torsion spring ②
 - Plain washer

NOTE:

Remove the stopper lever assembly with its roller aligning with the top (a) of the segment.



2. Remove
 - Circlip ①
 - Plain washer ②
 - Stopper lever ③

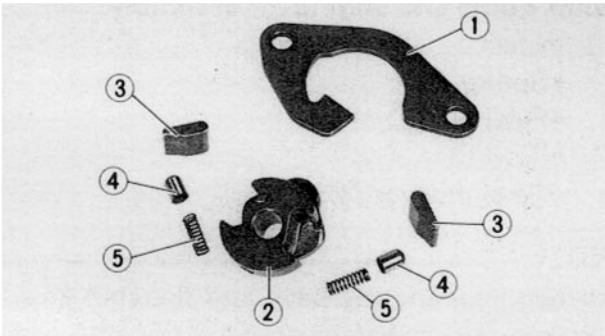


INSPECTION

Shift shaft

1. Inspect:

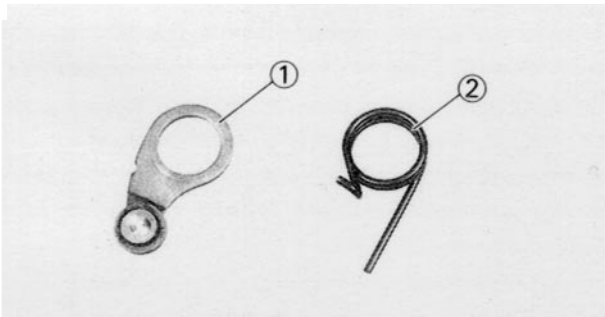
- Shift shaft ①
Bend/ Damage → Replace.
- Spring ②
Broken → Replace.



Shift guide and shift lever assembly

1. Inspect:

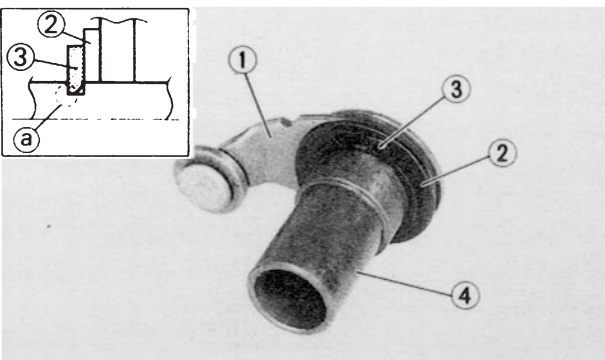
- Shift guide ①
- Shift lever ②
- Pawl ③
- Pawl pin ④
- Spring ⑤
Wear/ Damage → Replace.



Stopper lever

1. Inspect:

- Stopper lever ①
Wear/ Damage → Replace.
- Torsion spring ②
Broken/ Damage → Replace.



ASSEMBLY AND INSTALLATION

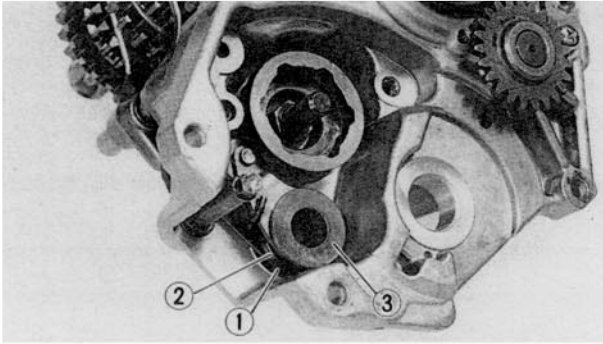
Stopper lever

1. Install:

- Stopper lever ①
- Plain washer ②
- Circlip ③
To collar ④.

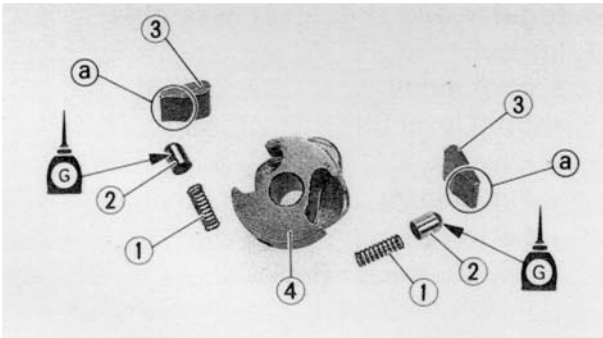
NOTE:

- Be sure the circlip sharp-edged corner ③ is positioned opposite side to the plain washer.
- Always use a new circlip.



2. Install:

- Plain washer ①
- Torsion spring ②
- Stopper lever assembly ③



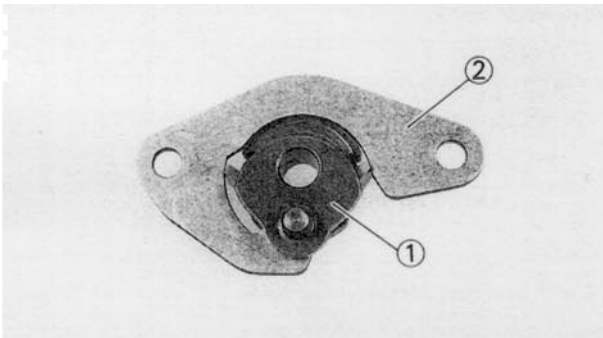
Shift guide and shift lever assembly

1. Install:

- Spring ①
 - Pawl pin ②
 - Pawl ③
- To shift lever ④.

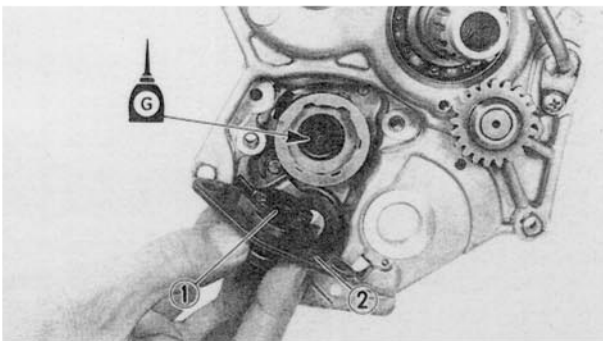
NOTE:

- When installing the pawl into the shift lever, make sure the chamfered side (a) face the pawl pin side.
- Apply the transmission oil onto the pawl pin.



2. Install:

- Shift lever assembly ①
- To shift guide ②.

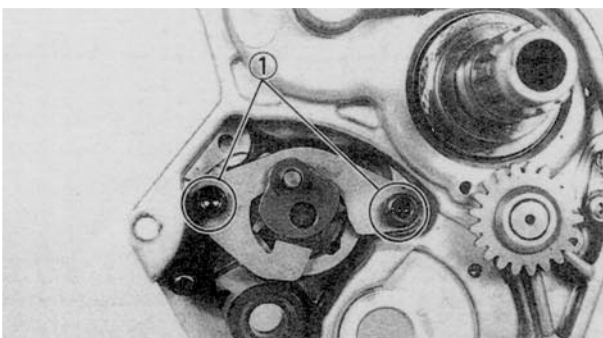


3. Install:

- Shift lever assembly ①
- Shift guide ②

NOTE:

- Install the shift lever assembly together with the shift guide.
- Apply the transmission oil onto the bolt (segment) shaft.



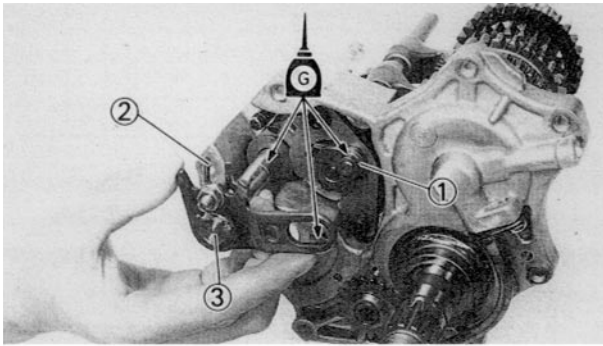
4. Install:

- Bolt (shift guide) ①



Bolt (shift guide):

11 Nm (1.1 m•kg, 8.0 ft•lb)



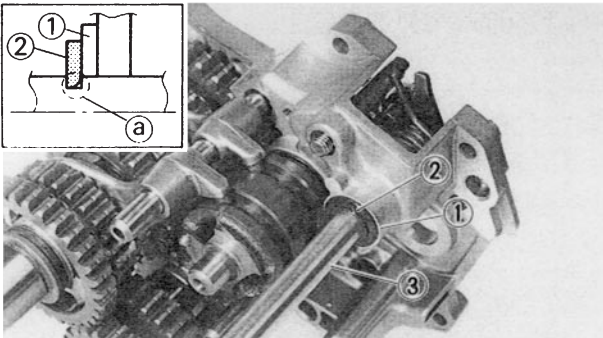
Shift shaft

1. Install:

- Roller ①
- Torsion spring ②
- Shift shaft ③

NOTE:

Apply the transmission oil onto the roller and shift shaft.

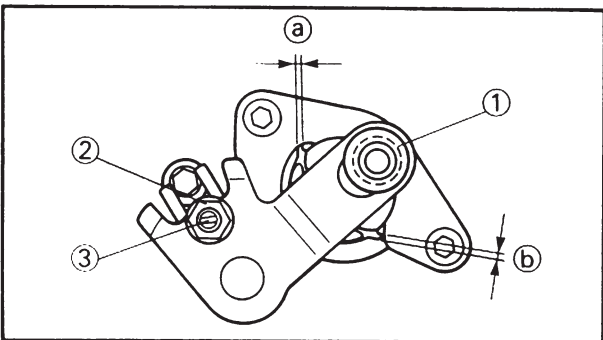


2. Install:

- Plain washer ①
- Circlip ②
- To shift shaft ③.

NOTE:

- Be sure the circlip sharp-edged corner (a) is positioned opposite side to the plain washer.
- Always use a new circlip.



3. Check:

- Shift lever position

Checking steps:

- Attach the collar (with supplying parts) ① onto the roller.
- Check the shift lever position.
- Gaps (a) and (b) are not equal → Adjust.

4. Adjust:

- Shift lever position

Adjusting steps:

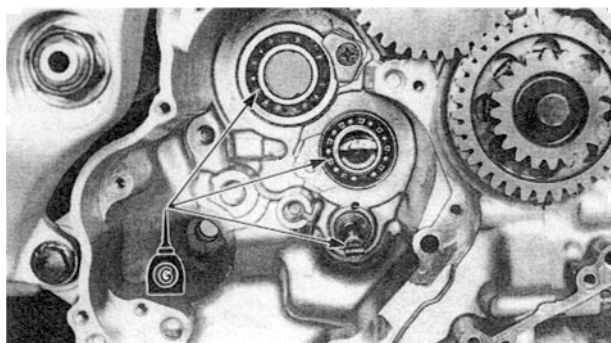
- Loosen the looknut ②.
- Turn the adjuster ③ in or out.
- Tighten the locknut .



Locknut:

9 Nm (0.9 m•kg, 6.5 ft•lb)

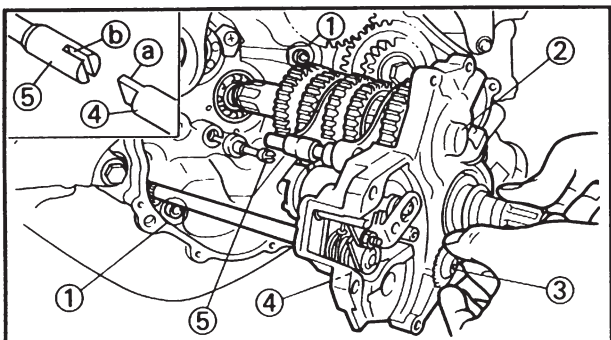
- Remove the collar .



Transmission housing

1. Apply:

- Transmission oil
Onto the bearing (crankcase lower) and impeller shaft.

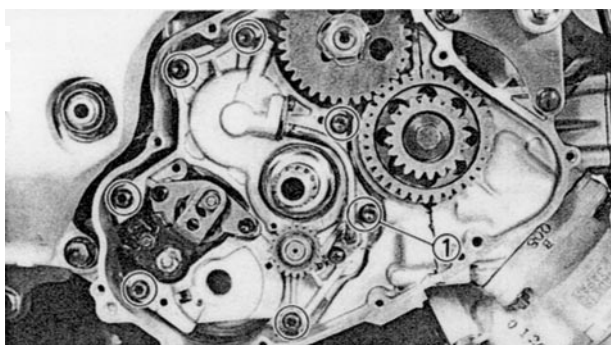


2. Install:

- Dowel pin ①
- Transmission housing ②

NOTE:

When installing the transmission housing, turn the oil pump driven gear ③ until the key end ④ of the oil pump gear shaft ④ is in the recess ⑤ of the impeller shaft ⑤.



3. Install:

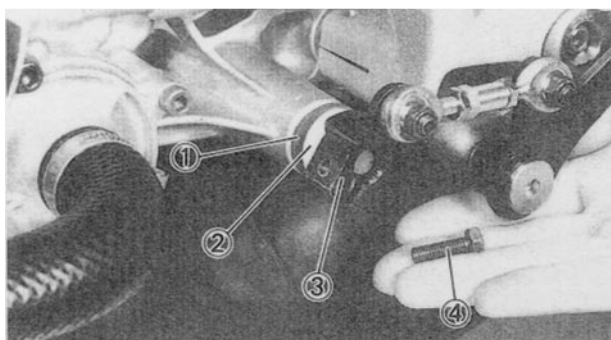
- Bolt (transmission housing) ①



Bolt (transmission housing):
14 Nm (1.4 m•kg, 10 ft•lb)

NOTE:

Tighten the bolts in stage, using a crisscross pattern.

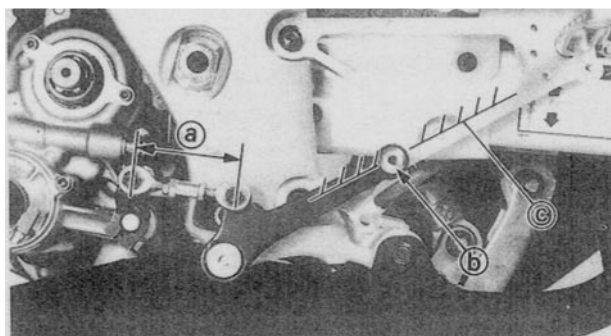


4. Install:

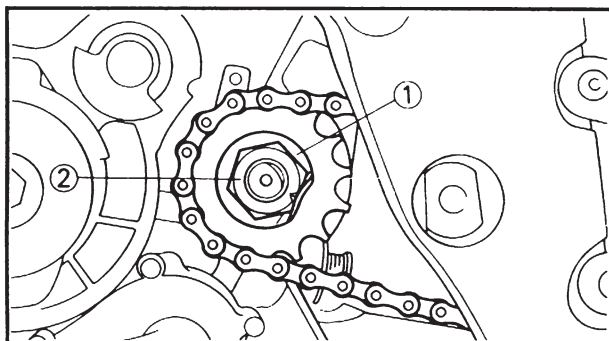
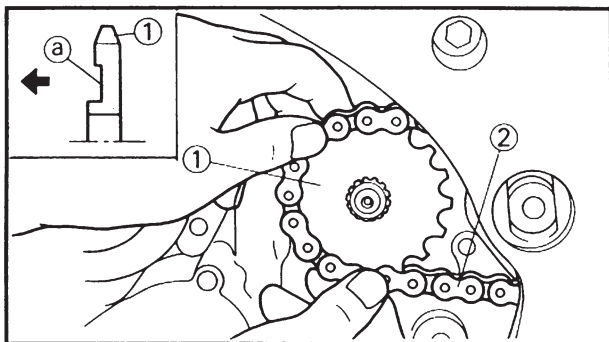
- Plain washer ①
- Spacer ②
- Shift arm ③
- Bolt (shift arm) ④

NOTE:

- Make sure that the joint rod distance ④ is 57 ~ 59 mm (2.2 ~ 2.3 in).
- Install the shift arm so that the shift pedal center ⑥ is highest without exceeding the inside line ⑦ of the footrest bracket.



Bolt (shift arm):
14 Nm (1.4 m•kg, 10 ft•lb)



5. Install:

- Drive sprocket ①

NOTE:

- Install the drive sprocket with its depressed side (a) facing the engine.
- Install the drive sprocket together with the drive chain ②.

6. Install:

- Lock washer ①
- Nut (drive sprocket) ②

NOTE:

- Always use a new lock washer.
- Tighten the nut while applying the rear brake.



Nut (drive sprocket):
75 Nm (7.5 m•kg, 54 ft•lb)

7. Bend the lock washer tab to lock the locknut.



TRANSMISSION, SHIFT CAM AND SHIFT FORK PREPARATION FOR REMOVAL



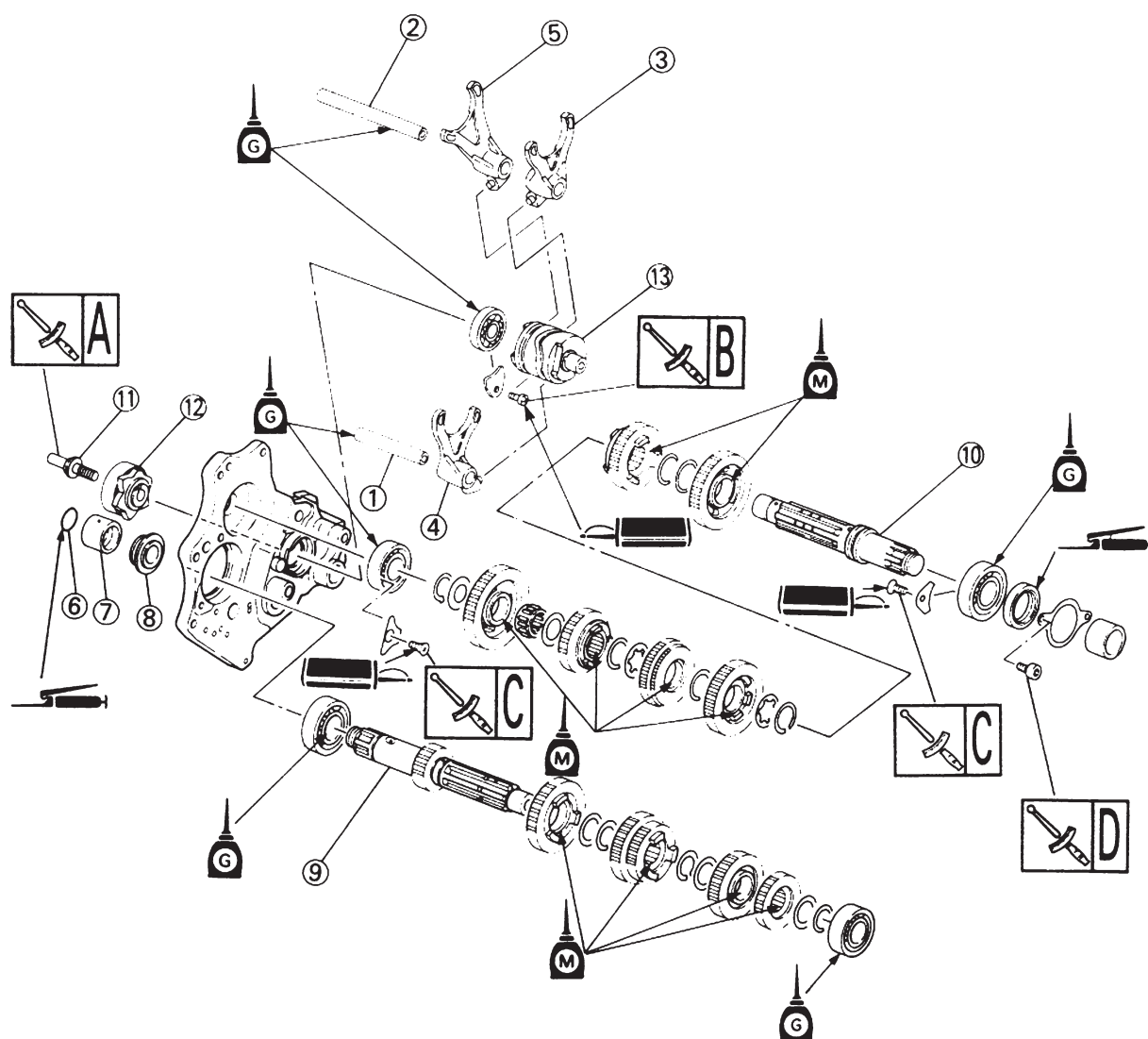
* Remove the cowling.

* Drain the transmission oil.

* Remove the following parts:

- Clutch
- Crankcase cover (right)
- Shift arm
- Drive sprocket
- Transmission housing
- Shift shaft, shift lever and stopper lever

A	23 Nm (2.3 m•kg, 17 ft•lb)
B	4 Nm (0.4 m•kg, 2.9 ft•lb)
C	8 Nm (0.8 m•kg, 5.8 ft•lb)
D	7 Nm (0.7 m•kg, 5.1 ft•lb)



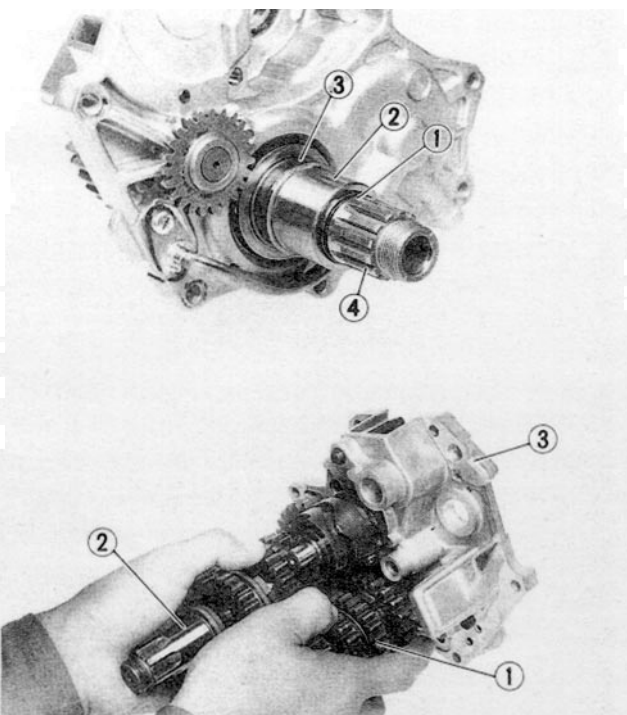


NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material does not enter the crankcase.
- Remove the gasket adhered on the contacting surface.
- For reassembly, the removed parts should be cleaned with solvent, and apply the transmission oil onto the sliding surface.

Extent of removal: ① Shift fork removal ② Main axle and drive axle removal
③ Shift cam removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Guide bar1 (short)	1	
	2	Guide bar2 (long)	1	
	3	Shift fork1	1	
	4	Shift fork 2	1	
	5	Shift fork 3	1	
	6	O-ring	1	Refer to "REMOVAL POINTS".
	7	Spacer 1	1	
	8	Thrust plate	1	
	9	Main axle	1	
	10	Drive axle	1	
	11	Bolt (segment)	1	Refer to "REMOVAL POINTS".
	12	Segment	1	
	13	Shift cam	1	



REMOVAL POINTS

Transmission

1. Remove:

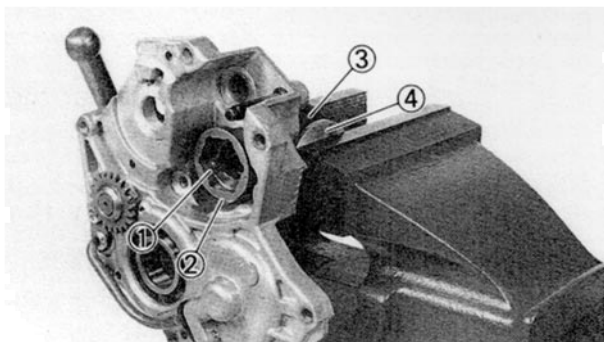
- O-ring ①
- Spacer 1 ②
- Thrust plate ③
- From main axle ④.

2. Remove:

- Main axle ①
- Drive axle ②

NOTE:

- Remove the main axle together with the drive axle from the transmission housing ③.
- Remove assembly carefully. Note the position of each part. Pay particular attention to the location and direction of shift forks.



Segment

1. Remove:

- Bolt (segment) ①
- Segment ②

NOTE:

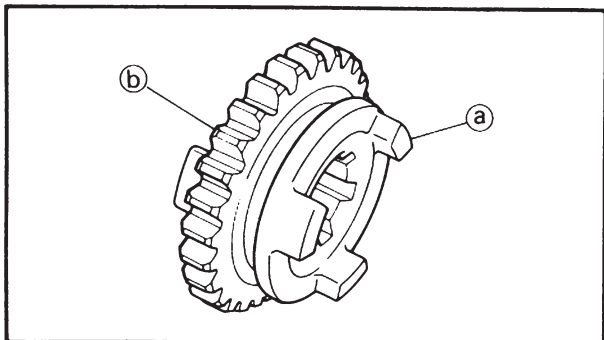
Clamp the shift cam ③ securely in a vise, using soft protecting material ④ to loosen the bolt (segment).

INSPECTION

Gears

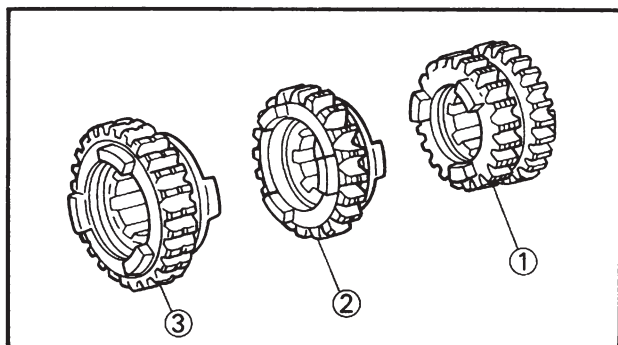
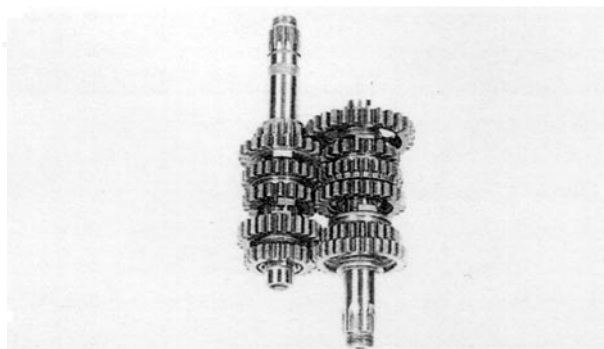
1. Inspect:

- Matching dog ①
 - Gear teeth ②
- Wear/Damage → Replace.



2. Check:

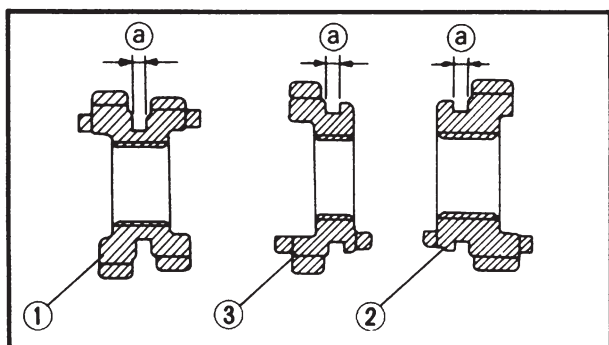
- Gears movement
- Unsmooth movement → Repair or replace.



Shift fork groove

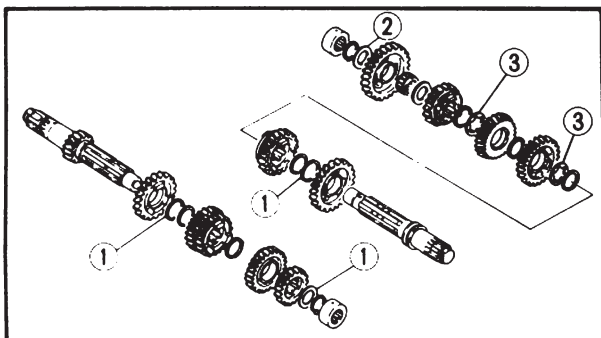
1. Measure:

- 3rd/4th pinion gear ①
 - 5th wheel gear ②
 - 6th wheel gear ③
 - Shift fork groove ①
- Out of specification → Replace.



Shift fork groove ①:

Standard	< Limit >
5.05 ~ 5.18 mm (0.199 ~ 0.204 in)	5.35 mm (0.211 in)



Thrust clearance

1. Check:

- After assembling the transmission, check whether the idle gear turns smoothly without a thrust.

If the thrust clearance is too large or the idle gear moves with difficulty → Replace the shim ①, ② and ③.

Chose the shims by the following chart.

Part name	Size (thickness)	Part number
Shim ① STD	t = 1.0 mm (0.039 in)	90201-253K0
	t = 0.9 mm (0.035 in)	90201-256E6
Shim ② STD	t = 1.0 mm (0.039 in)	90201-20276
	t = 0.9 mm (0.035 in)	90201-206E5
Shim ③ STD	t = 0.7 mm (0.028 in)	5F7-17136-00
	t = 0.5 mm (0.020 in)	90209-22082

NOTE:

It is necessary to adjust the thrust clearance when the transmission gear, axle, washer, circlip, bearing or crankcase is replaced.

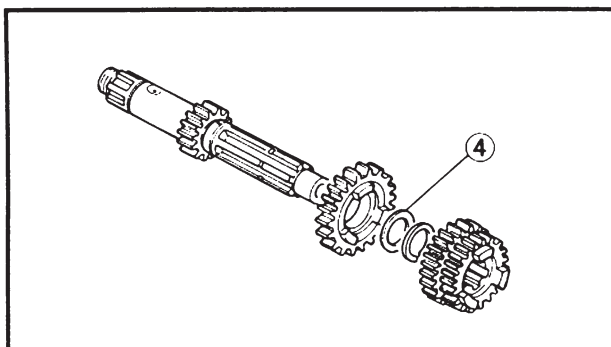
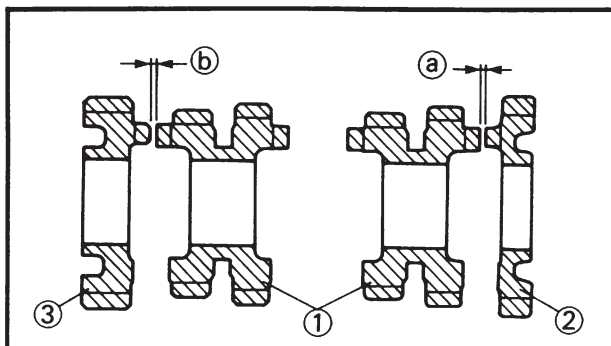
4

Dog clearance

NOTE:

- It is necessary to adjust the dog clearance when the transmission gear, axle, washer, circlip, bearing or crankcase is replaced.
- If there is any shifting trouble, it is necessary to check the shift fork, shift cam, shift lever and gears. But if there are in good condition, the dog clearance should be inspected.

1. Install the transmission, shift cam and shift fork into the transmission housing.
2. Position the transmission is neutral.
3. Pull the main axle toward the clutch side.



4. Bring the 3rd/4th pinion gear ① into light contact with the 6th pinion gear ② to the extent that they are not engaged, and measure the clearance ① between 3rd/4th pinion gear and 6th pinion gear.

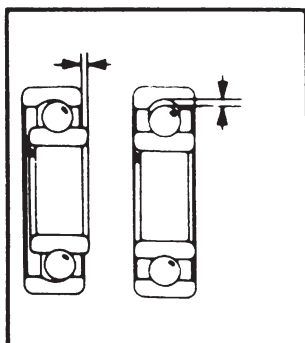
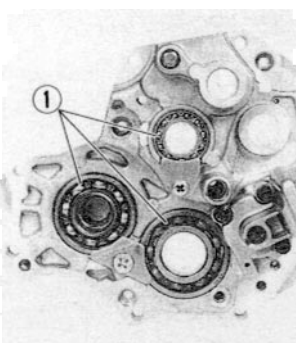
Bring the 3rd/4th pinion gear ① into light contact with the 5th pinion gear ③ to the extent that they are not engaged and measure the clearance ② between 3rd/4th pinion gear and 5th pinion gear.



Dog clearance ①, ②:
0.5 mm (0.020 in) or more

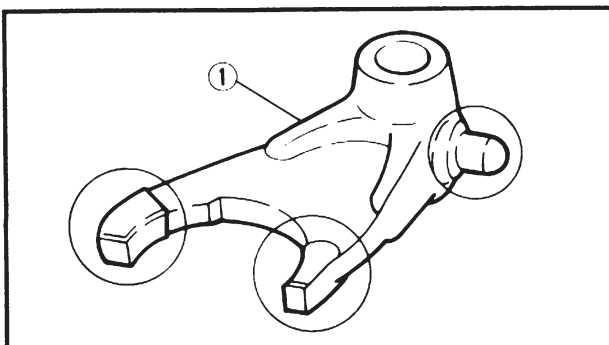
Out of specification or clearance ① and ② are not equal → Replace the shim ④.
Chose the shim by the following chart.

Part name	Size (thickness)	Part number
Shim ④ STD	t = 1.0 mm (0.039 in)	90201-253K0
	t = 0.9 mm (0.035 in)	90201-256E6



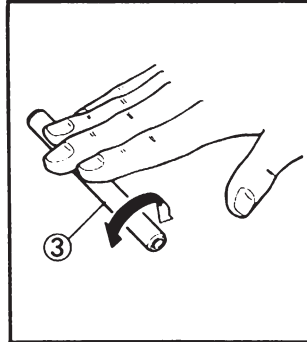
Bearing

- Inspect:
 - Bearing ①
Rotate inner race with a finger.
Rough spot/Seizure → Replace.



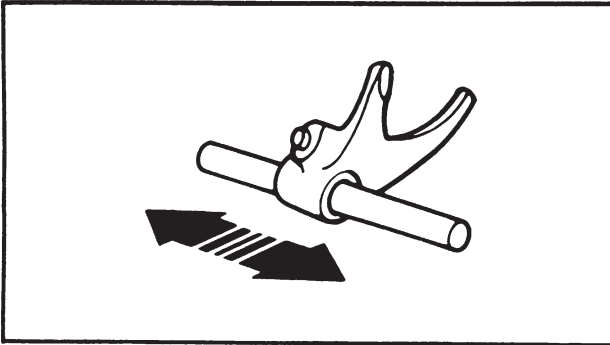
Shift fork, shift cam and segment

- Inspect:
 - Shift fork ①
Wear/Damage/Scratches → Replace.



2. Inspect:

- Shift cam ①
 - Segment ②
 - Guide bar ③
- Bend/Wear/Damage → Replace.

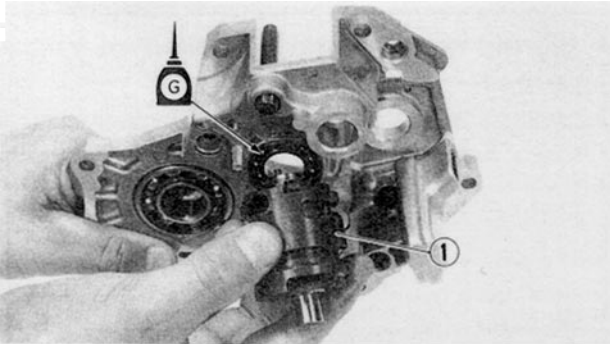


3. Check:

- Shift fork movement
- On its guide bar.
Unsmooth operation → Replace.
Shift fork and/or guide bar.

NOTE:

For a malfunctioning shift fork, replace not only the shift fork itself but the two gears each adjacent to the shift fork.



ASSEMBLY AND INSTALLATION

Shift cam

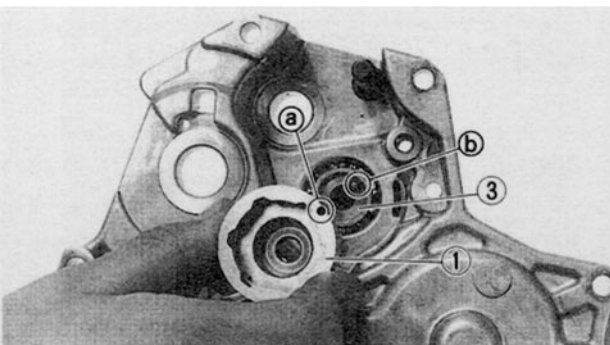
1. Install:

- Shift cam ①

NOTE:

Apply the transmission oil onto the shift cam bearing.

4

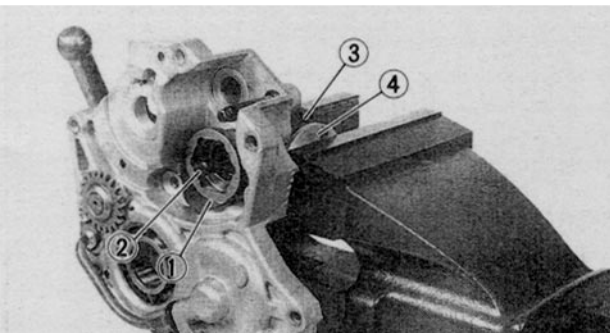


2. Install:

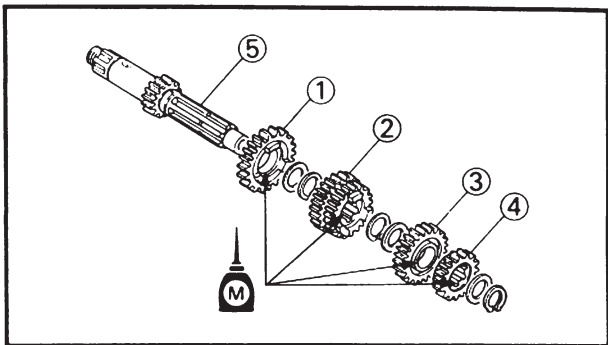
- Segment ①
- Bolt (segment) ②

NOTE:

- When installing the segment onto the shift cam ③, align the punch mark ④ with the dowel pin ⑤.
- Clamp the shift cam securely in a vise, using soft protecting material ⑥ to tighten the bolt (segment).



Bolt (segment):
23 Nm (2.3 m·kg, 17 ft·lb)



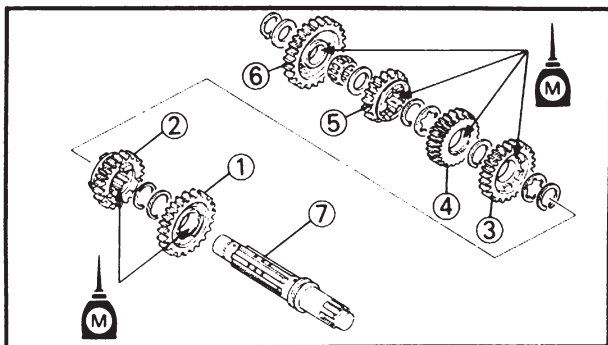
Transmission

1. Install:

- 6th pinion gear (22T) ①
- 3rd/4th pinion gear (23T/25T) ②
- 5th pinion gear (27T) ③
- 2nd pinion gear (21T) ④
- To main axle ⑤.

NOTE:

Apply the molybdenum disulfide oil onto the gears inner circumference.



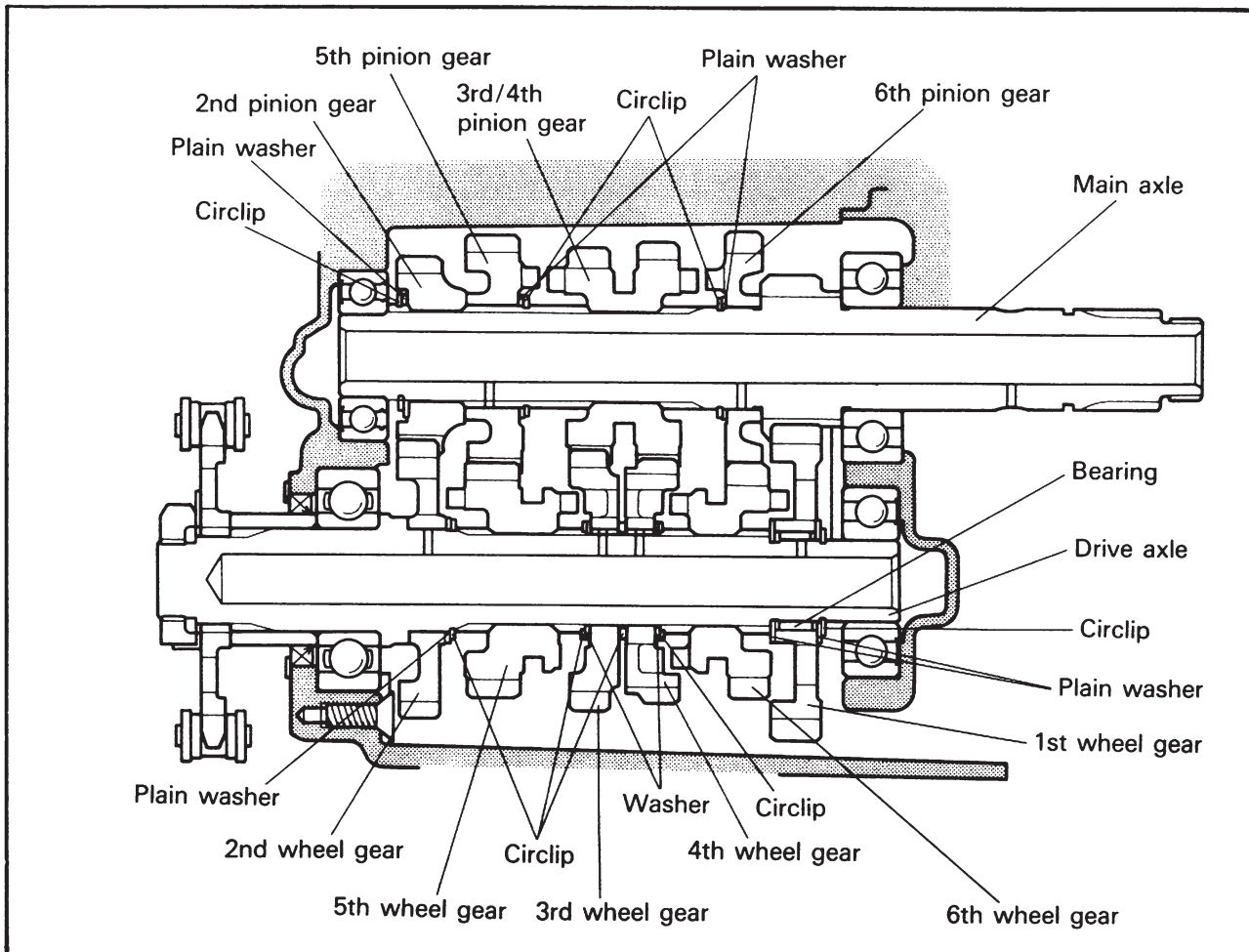
2. Install:

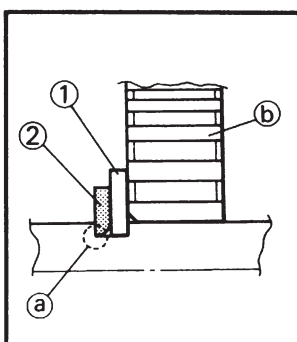
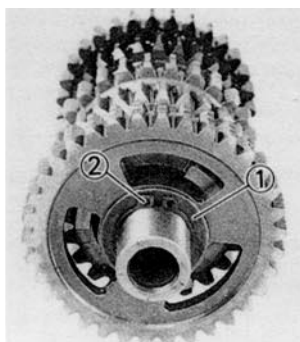
- 2nd wheel gear (31T) ①
- 5th wheel gear (26T) ②
- 3rd wheel gear (29T) ③
- 4th wheel gear (27T) ④
- 6th wheel gear (20T) ⑤
- 1st wheel gear (34T) ⑥
- To drive axle ⑦.

NOTE:

Apply the molybdenum disulfide oil onto the gears inner circumference.

4



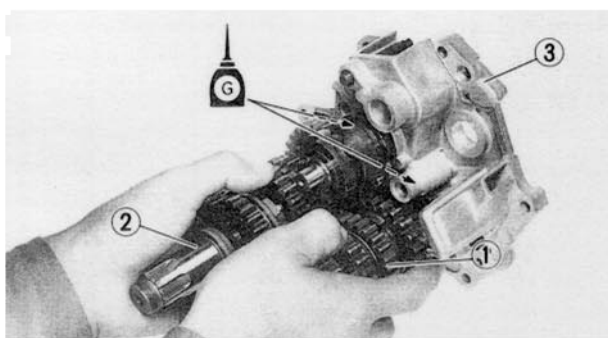
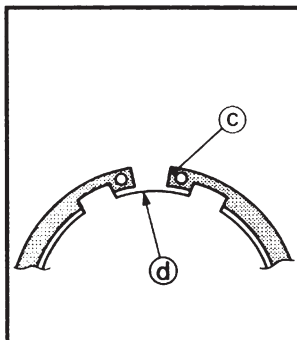
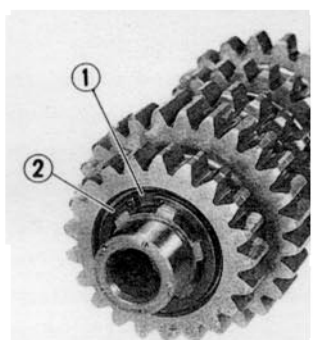


3. Install:

- Plain washer ①
- Circlip ②

NOTE:

- Be sure the circlip sharp-edged corner (a) is positioned opposite to the plain washer and gear (b).
- Always use new circlips.
- Be sure the circlip end (c) is positioned at axle spline groove (d).

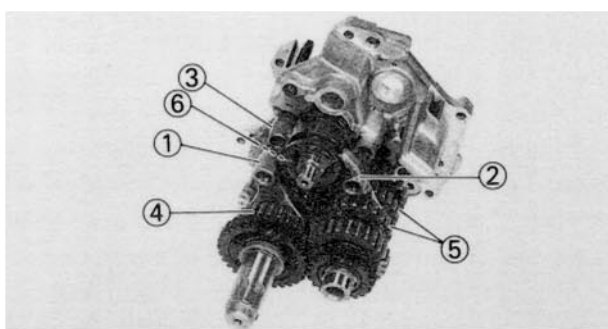


4. Install:

- Main axle ①
- Drive axle ②

NOTE:

- Apply the transmission oil onto the main axle and drive axle bearings.
- Install the main axle together with the drive axle into the transmission housing ③.

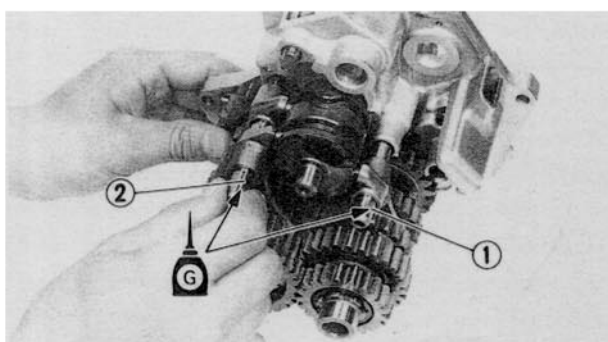


5. Install:

- Shift fork 1 ①
- Shift fork 2 ②
- Shift fork 3 ③

NOTE:

- Mesh the shift fork #1 with the 5th wheel gear ④ and #3 with the 6th gear ⑥ on the drive axle.
- Mesh the shift fork #2 with the 3rd/4th pinion gear ⑤ on the main axle.

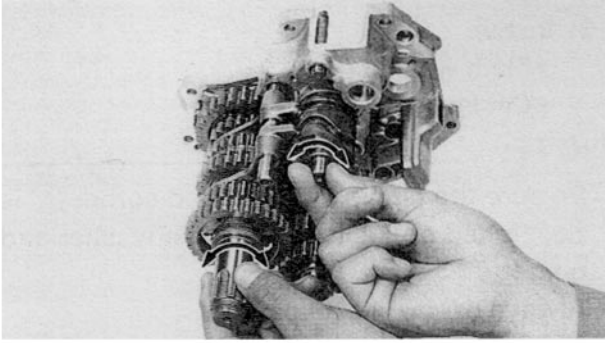


6. Install:

- Guide bar 1 (shorter) ①
- Guide bar 2 (longer) ②

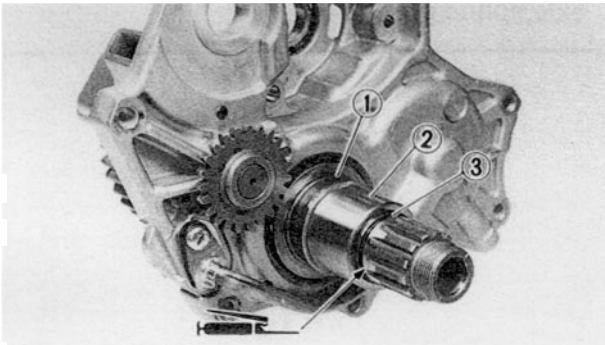
NOTE:

- Apply the transmission oil onto the guide bars.
- Be sure the short bar is inserted into the shift fork #2 and the long one into #1 and #3.



7. Check:

- Shift operation
- Transmission operation
- Unsmooth operation → Repair.



8. Install:

- Thrust plate ①
- Spacer 1 ②
- O-ring ③

NOTE:

- Always use a new O-ring.
- Apply the lithium soap base grease on the O-ring.



MEMO



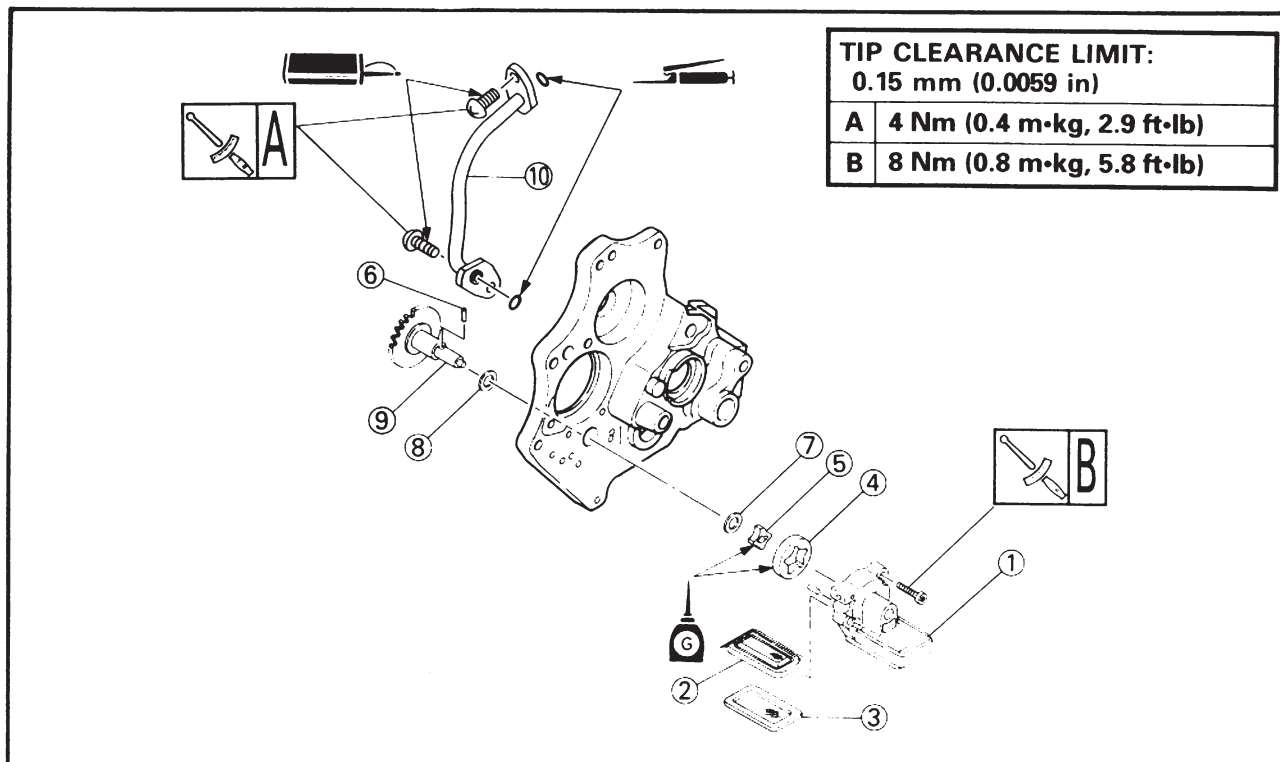
OIL PUMP

PREPARATION FOR REMOVAL



- * Remove the cowling.
- * Drain the transmission oil.
- * Remove the following parts:

- Clutch
- Crankcase cover (right)
- Shift arm
- Drive sprocket
- Transmission housing
- Shift shaft and shift lever
- Transmission
- Shift fork

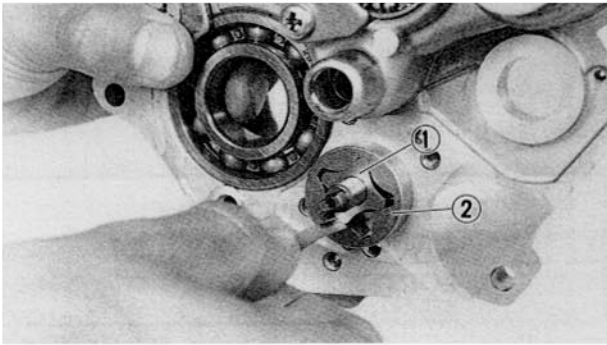


NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material does not enter the crankcase.
- Remove the gasket adhered on the contacting surface.
- For assembly, the removed parts should be cleaned with solvent, and apply the transmission oil onto the sliding surface.

Extent of removal: ① Oil pump removal and disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Oil pump cover	1	
	2	Strainer 1	1	
	3	Strainer 2	1	
	4	Outer rotor	1	
	5	Inner rotor	1	
	6	Dowel pin	1	
	7	Plain washer [D= ϕ 15mm (0.59in)]	1	
	8	Plain washer [D= ϕ 22mm (0.87in)]	1	
	9	Oil pump gear shaft	1	
	10	Oil delivery pipe	1	

**INSPECTION****Oil pump**

1. Measure:

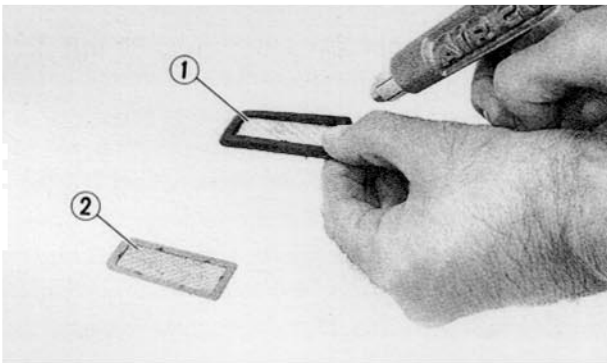
- Tip clearance

Measure the clearance between the inner rotor ① and outer rotor ②.

Out of limit → Replace the inner rotor and outer rotor as a set.



Tip clearance limit:
0.15 mm (0.0059 in)

**Strainer**

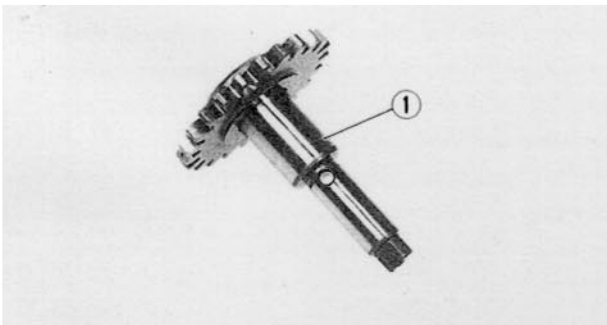
1. Clean:

- Strainer 1 ①
- Strainer 2 ②

Use compressed air.

NOTE:

- Clean the strainer every 500 km (300 miles).
- If a lot of metallic dust is noticed, disassemble the engine and check.

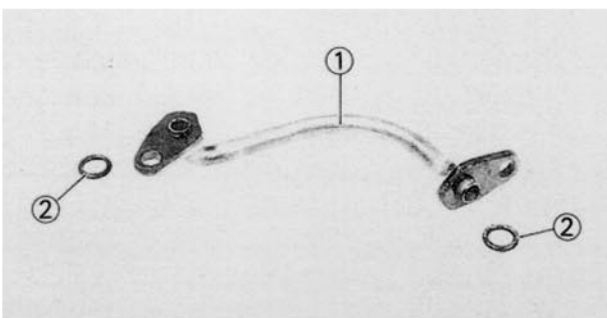
**Oil pump gear shaft**

1. Inspect:

- Oil pump gear shaft ①

Wear/Damage → Replace.

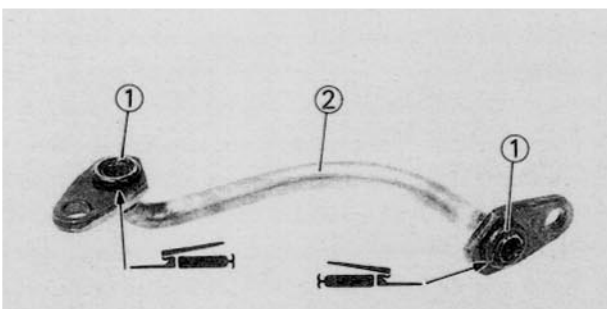
4

**Oil delivery pipe**

1. Inspect:

- Oil delivery pipe ①
- O-ring ②

Damage → Replace.

**ASSEMBLY AND INSTALLATION****Oil pump**

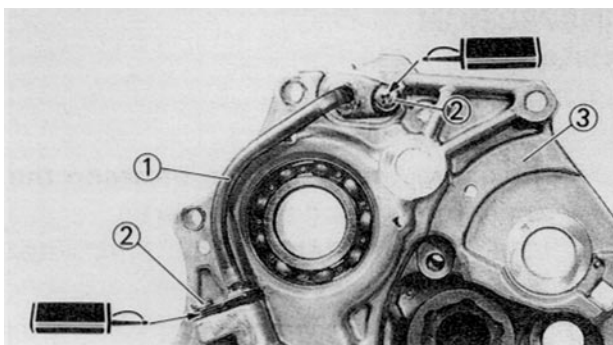
1. Install:

- O-ring ①

To oil delivery pipe ②.

NOTE:

Apply the lithium soap base grease on the O-rings.

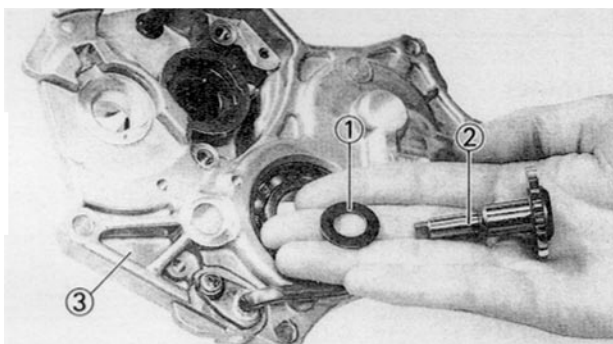


2. Install:

- Oil delivery pipe ①
- Screw (oil delivery pipe) ②
- To transmission housing ③.

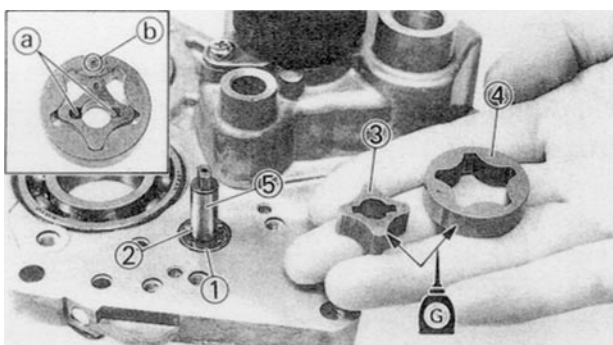


Screw (oil delivery pipe):
4 Nm (0.4 m•kg, 2.9 ft•lb)
LOCTITE®



3. Install:

- Plain washer [D= ϕ 22 mm (0.87 in)] ①
- Oil pump gear shaft ②
- To transmission housing ③.

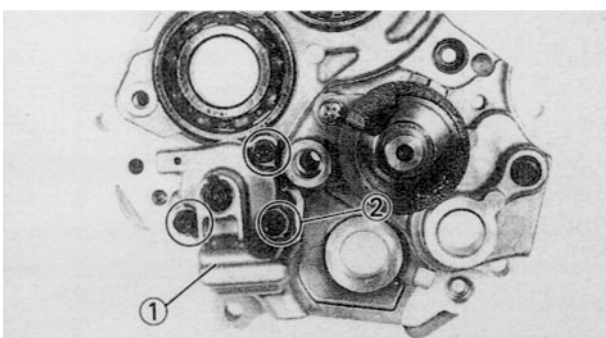
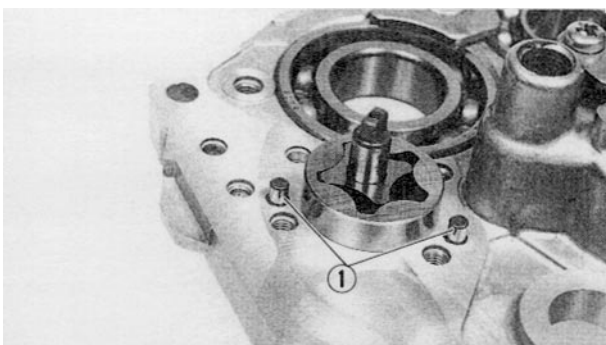
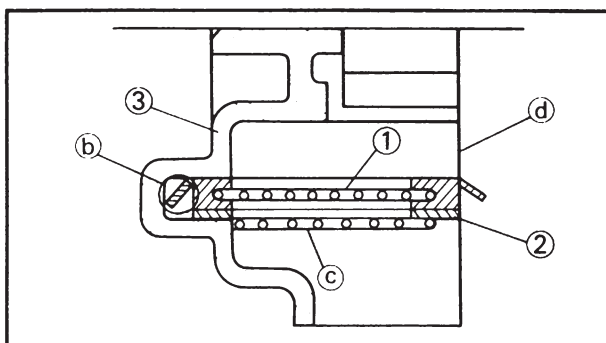
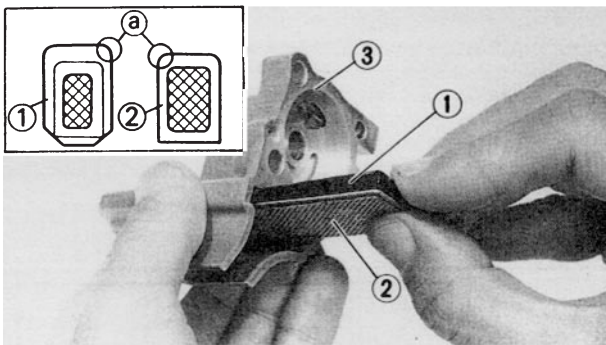


4. Install:

- Plain washer [D= ϕ 15 mm (0.59 in)] ①
- Dowel pin ②
- Inner rotor ③
- Outer rotor ④
- To oil pump gear shaft ⑤

NOTE: _____

- Apply the transmission oil onto the inner rotor and outer rotor.
- Make sure the dowel pin fits into the groove ① in the inner rotor.
- When installing the outer rotor, make sure the punch mark ② on the outer rotor face the transmission housing side.



5. Install:

- Strainer 1 ①
 - Strainer 2 ②
- To oil pump cover ③.

NOTE:

- Each strainer is installed with the rounded corner ① facing inward.
- Strainer 1 is installed with the flange ② facing downward.
- Strainer 2 is installed with the mesh ③ facing downward.
- After installing the strainers, make sure the strainer 2 is not protruding from the oil pump cover surface ④.

6. Install:

- Dowel pin ①

7. Install:

- Oil pump cover ①
- Bolt (oil pump cover) ②

NOTE:

While turning the oil pump gear shaft, install the oil pump cover.



Bolt (oil pump cover):
8 Nm (0.8 m·kg, 5.8 ft·lb)

CDI MAGNETO
PREPARATION FOR REMOVAL

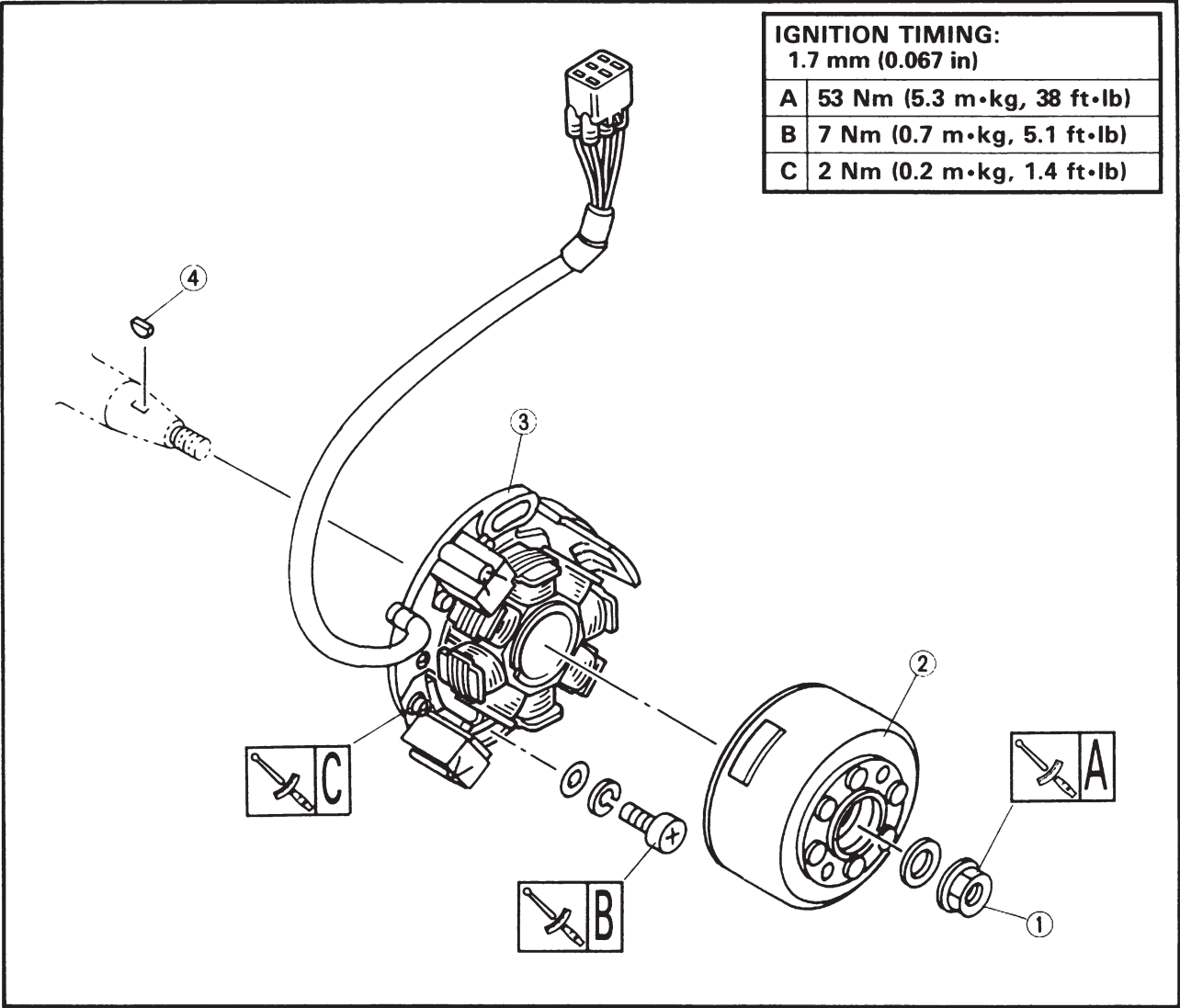


*Remove the following parts:

- Cowling
- Fuel tank

*Disconnect the CDI magneto lead.

4

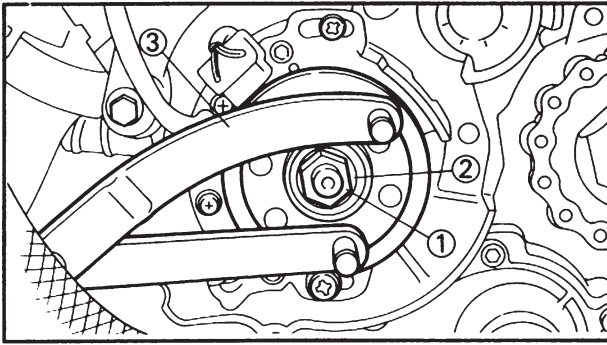


NOTE ON REMOVAL AND REASSEMBLY

•Before servicing, clean the parts, and take care so that foreign material does not enter the crankcase.

Extent of removal: ① CDI magneto removal

Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Nut (rotor)	1	Use special tool. Refer to "REMOVAL POINTS".
	2	Rotor	1	
	3	Stator	1	
	4	Woodruff key	1	



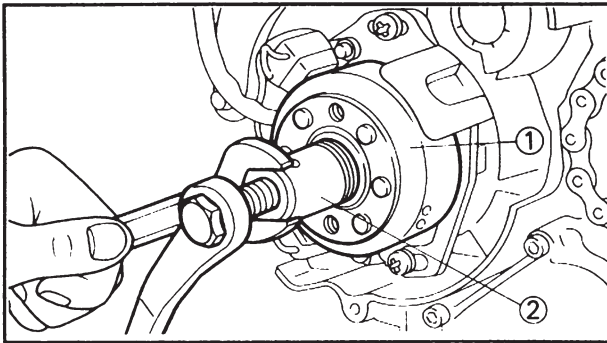
REMOVAL POINTS

Rotor

1. Remove:
 - Nut (rotor) ①
 - Plain washer ②
 Use the rotor holder ③.



Rotor holder:
YU-01235/90890-01235



2. Remove:
 - Rotor ①
 Use the rotor puller ②.



Rotor puller:
YM-01189/90890-01189

NOTE:

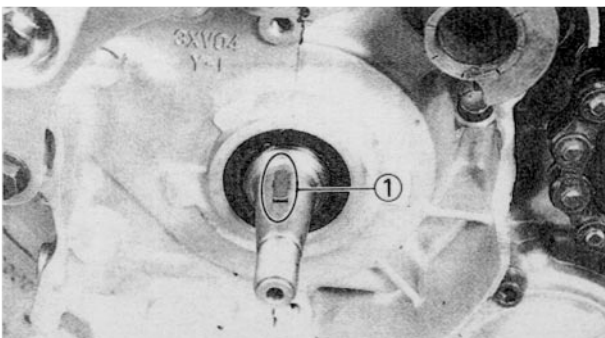
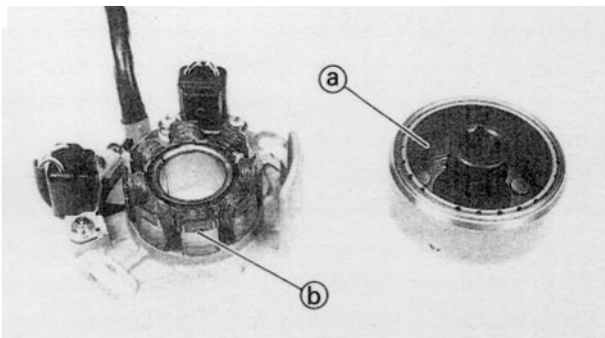
When installing the rotor puller, turn it counterclockwise.

INSPECTION

CDI magneto

1. Inspect:
 - Rotor inner surface (a)
 - Stator outer surface (b)
 Damage → Inspect the crankshaft runout and crankshaft bearing.
If necessary, replace CDI magneto/stator.

4



Woodruff key

1. Inspect:
 - Woodruff key ①
 Damage → Replace.

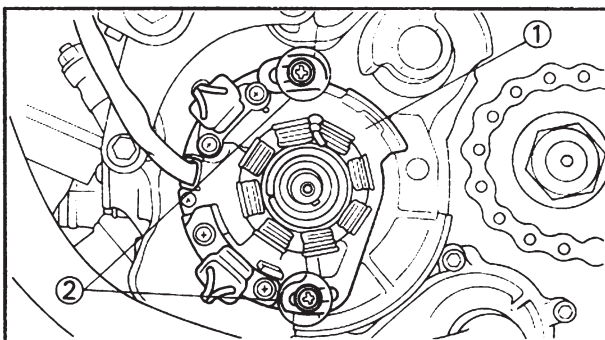
ASSEMBLY AND INSTALLATION

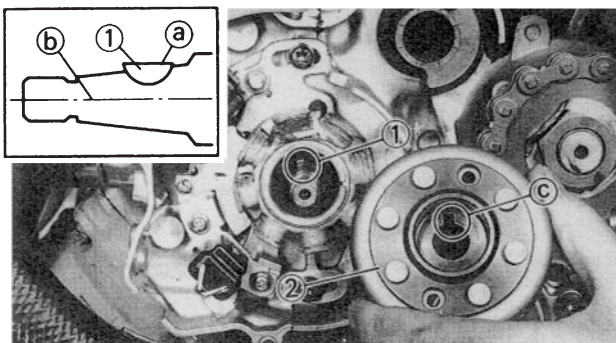
CDI magneto

1. Install:
 - Stator ①
 - Screw (stator) ②

NOTE:

Temporarily tighten the screw (stator) at this point.



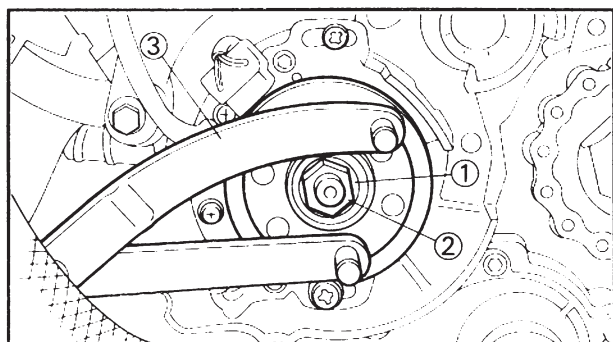


2. Install:

- Woodruff key ①
- Rotor ②

NOTE:

- Clean the tapered portions of the crankshaft and rotor.
- When installing the woodruff key, make sure that its flat surface (a) is in parallel with the crankshaft center line (b).
- When installing the rotor, align the keyway (c) of the rotor with the woodruff key.



3. Install:

- Plain washer ①
 - Nut (rotor) ②
- Use the rotor holder ③.



Rotor holder:

YU-01235/90890-01235



Nut (rotor):

53 Nm (5.3 m•kg, 38 ft•lb)

4. Adjust:

- Ignition timing



Ignition timing (left cylinder):

1.7 mm (0.067 in)

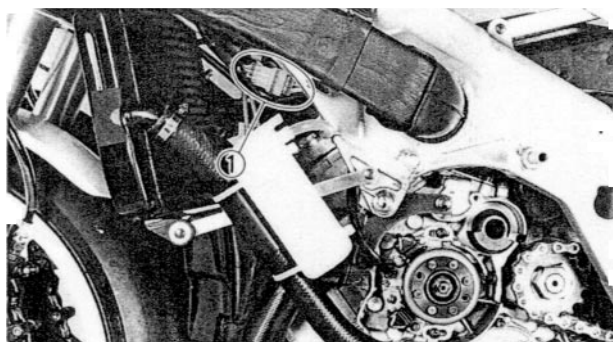
Ignition timing (right cylinder):

1.7 mm (0.067 in)

Refer to "IGNITION TIMING CHECK" section in the CHAPTER 3.

5. Connect:

- CDI magneto lead ①
- Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.



MEMO



ENGINE REMOVAL

PREPARATION FOR REMOVAL

* Hold the machine by placing suitable stand.

⚠ WARNING

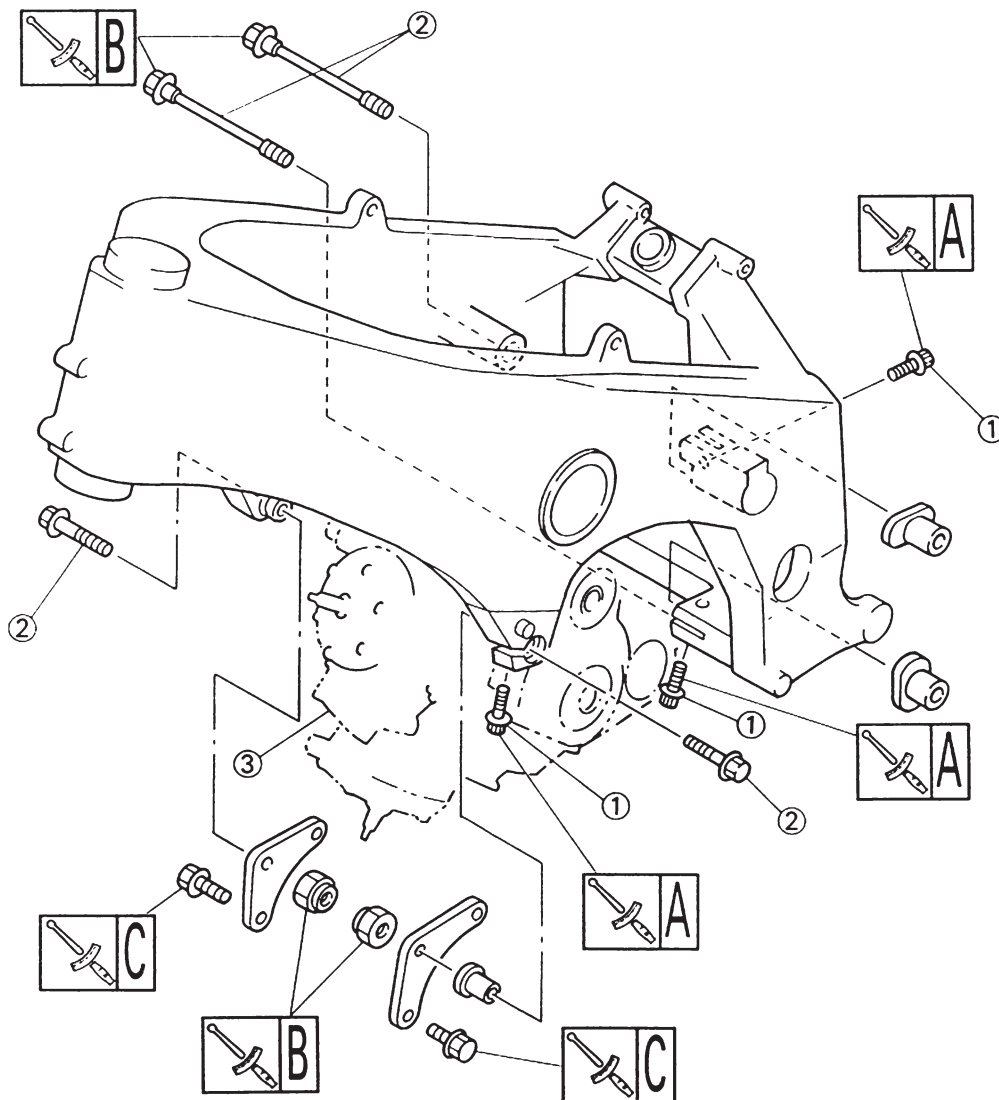
Securely support the machine so there is no danger of it falling over.

- * Remove the cowling.
- * Drain the cooling water.
- * Disconnect the clutch cable at engine side.
- * Disconnect the YPVS cable at engine side.
- * Disconnect the radiator hose 2~4 at engine side.
- * Disconnect the CDI magneto lead.
- * Disconnect the spark plug cap.

* Remove the following parts:

- Fuel tank
- Carburetor
- Induction box
- Exhaust pipe
- Drive sprocket
- Shift arm

A	11 Nm (1.1 m•kg, 8.0 ft•lb)
B	35 Nm (3.5 m•kg, 25 ft•lb)
C	23 Nm (2.3 m•kg, 17 ft•lb)



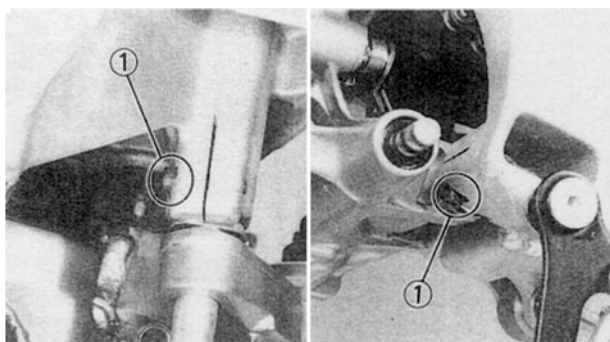


NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material does not enter the crankcase.

Extent of removal: ① Engine removal

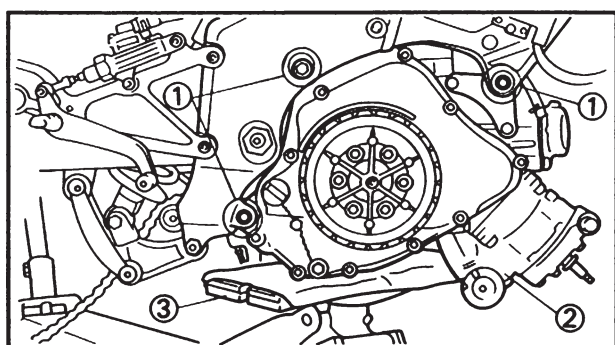
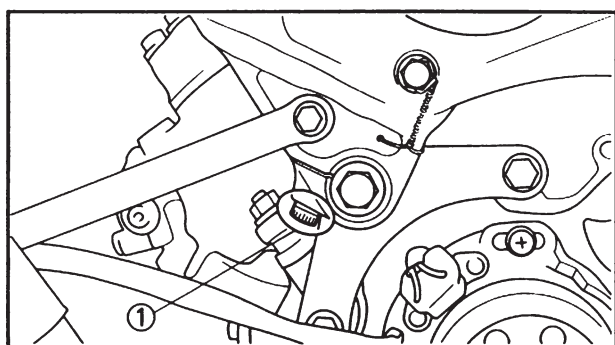
Extent of removal	Order	Part name	Q'ty	Remarks
①	1	Pinch bolt (engine mounting bolt)	3	Only loosening.
	2	Engine mounting bolt	4	Refer to "REMOVAL POINTS".
	3	Engine	1	



REMOVAL POINTS

Engine removal

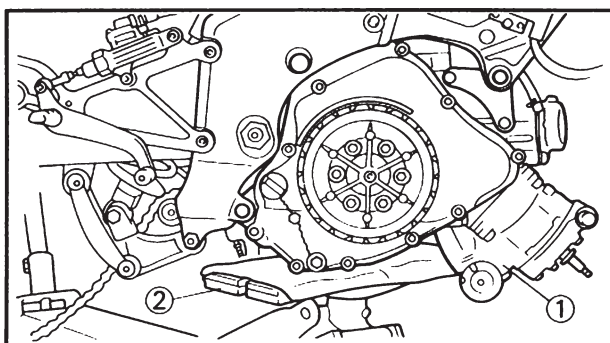
- Loosen:
 - Pinch bolt (engine mounting bolt) ①



- Remove:
 - Engine mounting bolt ①
 - Engine ②

NOTE:

- Before removing the engine, make sure that the couplers, hoses and cables are disconnected.
- Remove the engine by lowering it with a jack ③.



ASSEMBLY AND INSTALLATION

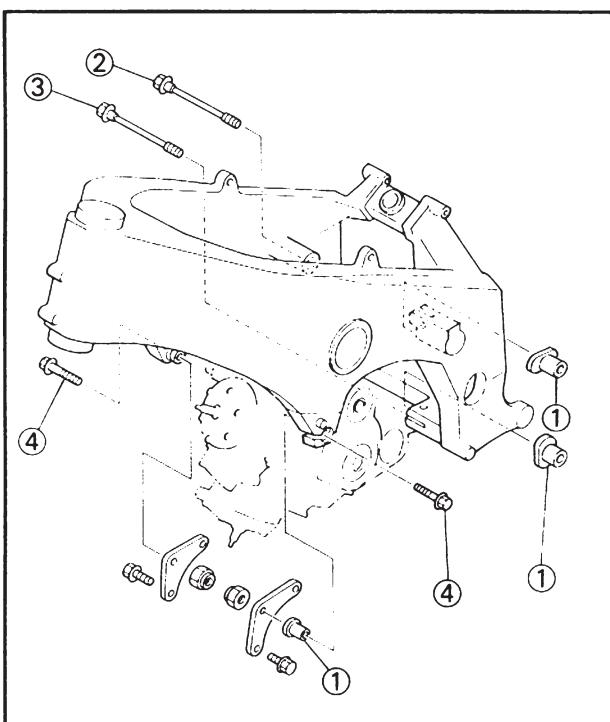
Engine installation

1. Install:

- Engine ①

NOTE:

Install the engine by raising it into the frame with a jack ②.



2. Install:

- Engine mounting collar ①
- Engine mounting bolt (upper) ②
- Engine mounting bolt (lower) ③
- Engine mounting bolt (front) ④



Engine mounting bolt (upper):

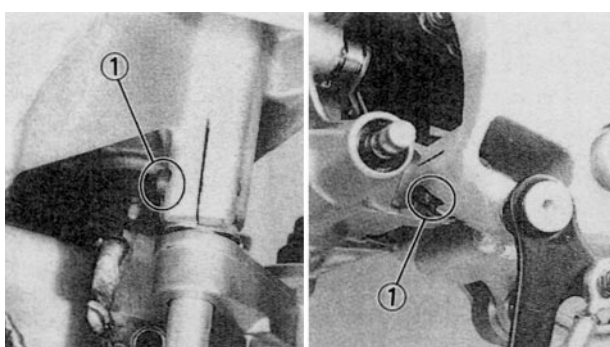
35 Nm (3.5 m·kg, 25 ft·lb)

Engine mounting bolt (lower):

35 Nm (3.5 m·kg, 25 ft·lb)

Engine mounting bolt (front):

35 Nm (3.5 m·kg, 25 ft·lb)

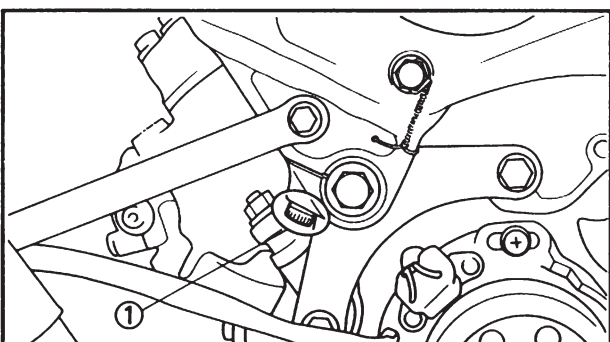


3. Tighten:

- Pinch bolt (engine mounting bolt) ①

CAUTION:

After tightening the engine mounting bolts, tighten the pinch bolts.



Pinch bolt (engine mounting bolt):

11 Nm (1.1 m·kg, 8.0 ft·lb)



MEMO



CRANKCASE AND CRANKSHAFT

PREPARATION FOR REMOVAL

- * Remove the cowling.
- * Remove the exhaust pipe.
- * Drain the transmission oil.
- * Drain the coolant.
- * Remove the engine.
- * Remove the following parts:
 - Cylinder head

- Cylinder
- Piston
- Clutch
- Crankcase cover (right)
- Primary drive gear
- Rotor and starter
- Engine bracket
- Reed valve

CRANKSHAFT RUNOUT LIMIT:
0.05 mm (0.0020 in)

CONNECTION ROD BIG END SIDE CLEARANCE:
0.25~0.75 mm (0.010~0.030 in)

CONNECTING ROD SMALL END FREE PLAY LIMIT:
2.0 mm (0.08 in)

CRANK WIDTH:
49.975~50.025 mm (1.968~1.969 in)

A 9 Nm (0.9 m·kg, 6.5 ft·lb)

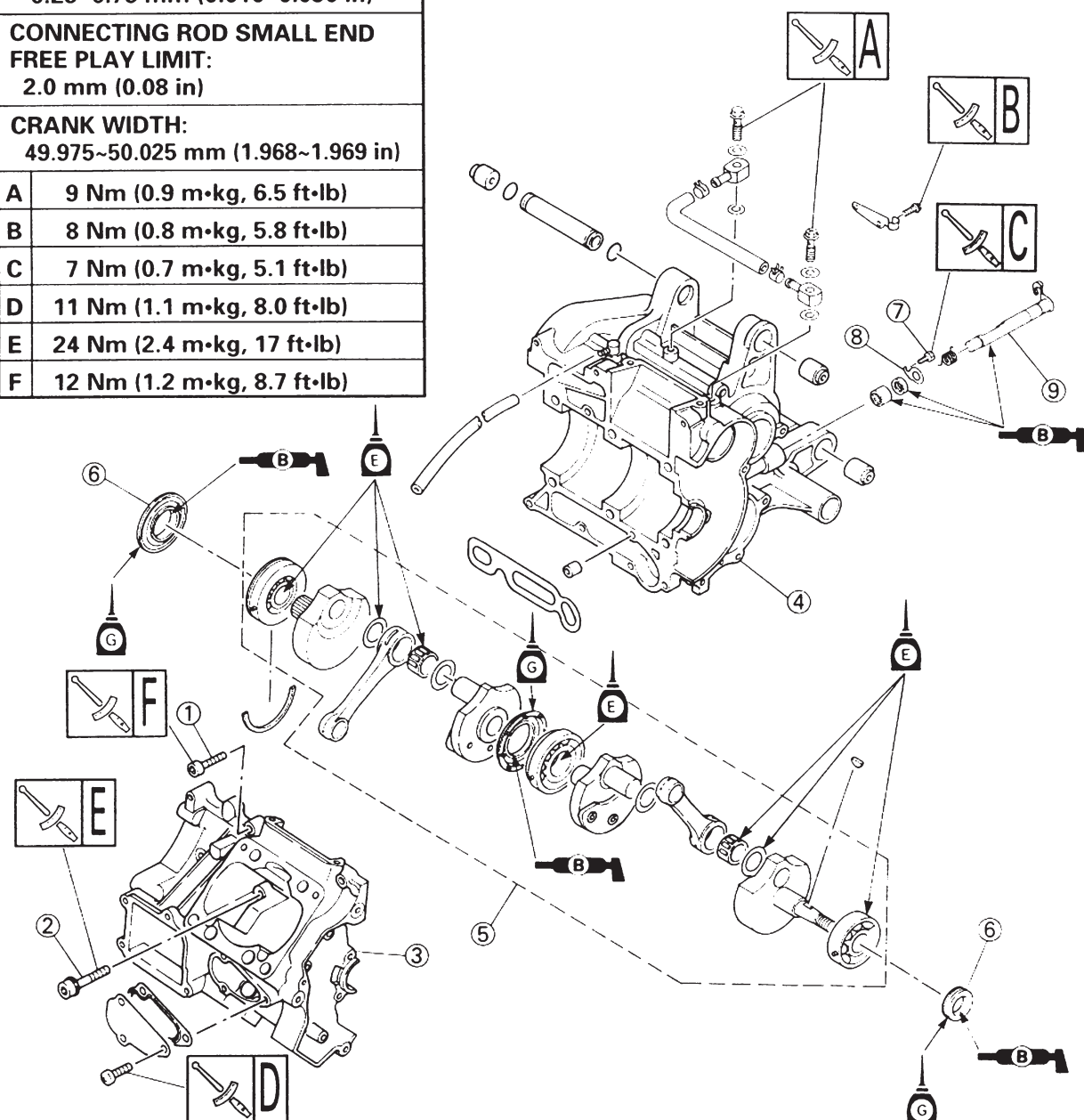
B 8 Nm (0.8 m·kg, 5.8 ft·lb)

C 7 Nm (0.7 m·kg, 5.1 ft·lb)

D 11 Nm (1.1 m·kg, 8.0 ft·lb)

E 24 Nm (2.4 m·kg, 17 ft·lb)

F 12 Nm (1.2 m·kg, 8.7 ft·lb)



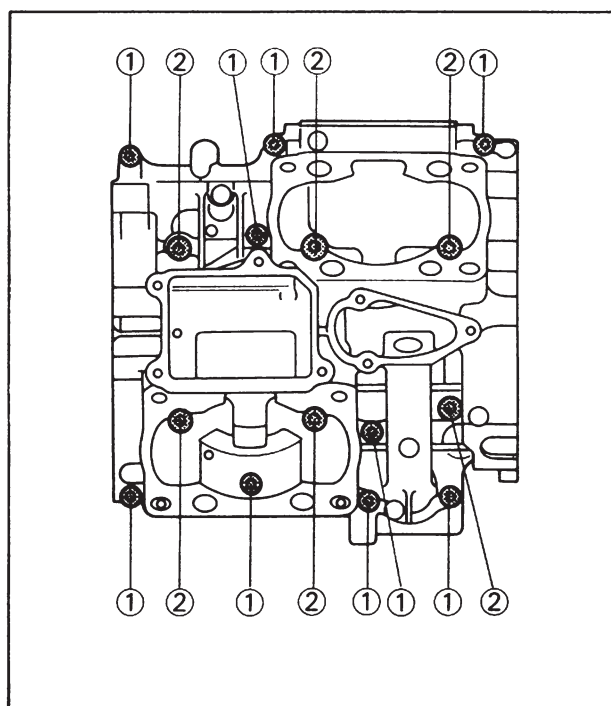


NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that foreign material do not enter the crankcase.
- Remove the gasket adhered on the contacting surface.
- For reassembly, the removed parts should be cleaned and apply the transmission oil onto the sliding surface.

Extent of removal: ① Crankcase separation ② Crankshaft removal
③ Oil seal (crank shaft) removal ④ Push lever axle removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Bolt [crankcase (M6)]	9	Refer to "REMOVAL POINTS".
	2	Bolt [crankcase (M8)]	6	
	3	Crankcase (upper)	1	
	4	Crankcase (lower)	1	
	5	Crankshaft	1	
	6	Oilseal (crankshaft)	2	
	7	Bolt (seat plate)	1	
	8	Seat plate	1	
	9	Push lever axle	1	



REMOVAL POINTS

Crankcase

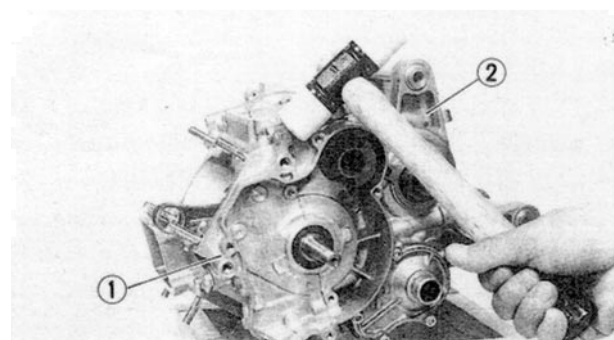
1. Remove:

- Bolt [crankcase (M6)] ①
- Bolt [crankcase (M8)] ②

NOTE:

- The M6 size bolts should be removed first.
- Loosen the bolts from the outer sides inward.

4

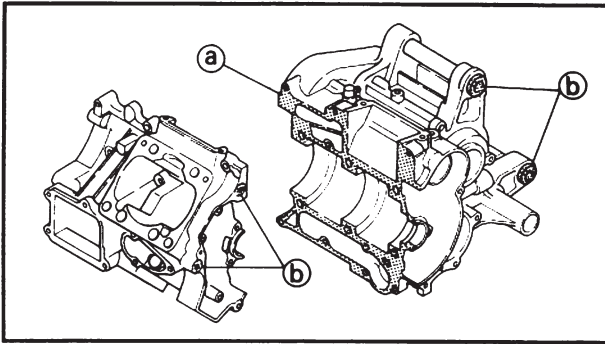


2. Remove:

- Crankcase (upper) ①
- From crankcase (lower) ②.

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. If the cases do not separate, check for a remaining case screw or fitting. Do not force.

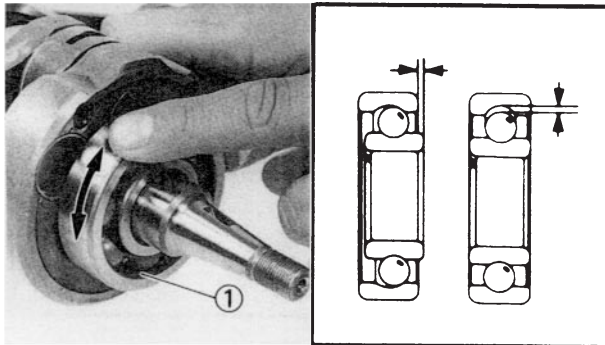


INSPECTION

Crankcase

1. Inspect:

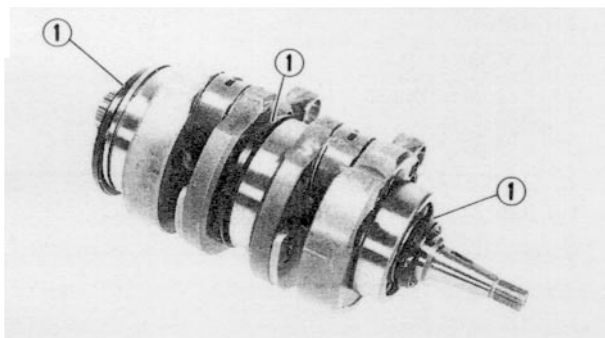
- Contacting surface (a)
Scratches → Replace as a set.
- Engine mount boss (b), crankcase
Cracks/Damage → Replace as a set.



Crankshaft

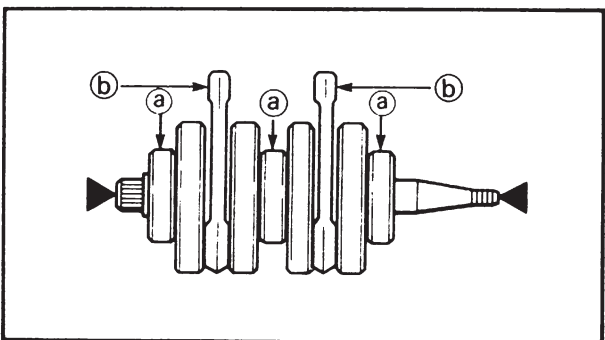
1. Inspect:

- Bearing (1)
Rotate outer race with a finger.
Rough spot/Seizure → Replace.



2. Inspect:

- Oil seal (1)
Wear/Damage → Replace.



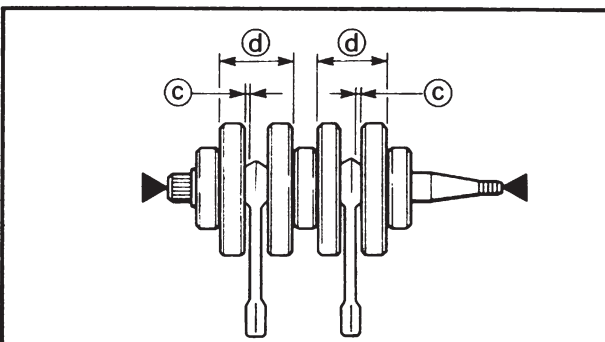
3. Measure:

- Runout limit (a)
- Small end free play (b)
- Connecting rod big end side clearance (c)
- Crank width (d)
Out of specification → Replace.
Use the dial gauge and thickness gage.

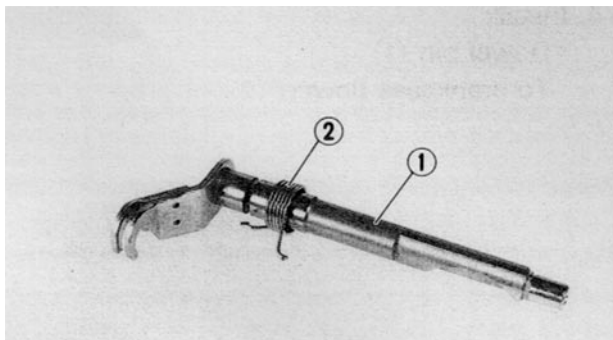


Dial gauge:

YU-03097/90890-01252



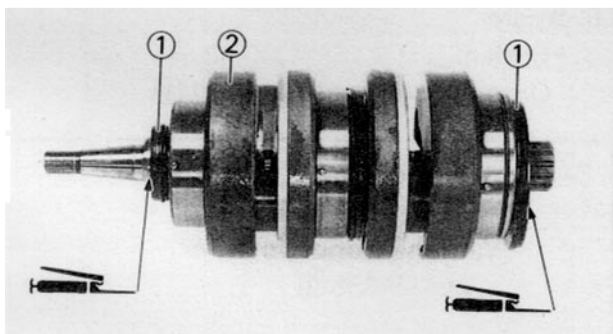
	Standard	< Limit >
Runout Limit (a)	0.03 mm (0.0012 in)	0.05 mm (0.0020 in)
Small End Free Play (b)	0.8 ~ 1.0 mm (0.031 ~ 0.039 in)	2.0 mm (0.08 in)
Side Clearance (c)	0.25 ~ 0.75 mm (0.010 ~ 0.030 in)	—
Crank Width (d)	49.975 ~ 50.025 mm (1.968 ~ 1.969 in)	—



Push lever axle

1. Inspect:

- Push lever axle ①
Wear/Damage → Replace.
- Torsion spring ②
Broken/Damage → Replace.



ASSEMBLY AND INSTALLATION

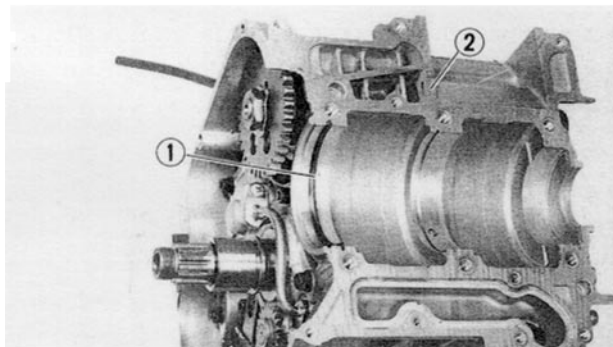
Crankshaft

1. Install:

- Oil seal ①
To crankshaft ②.

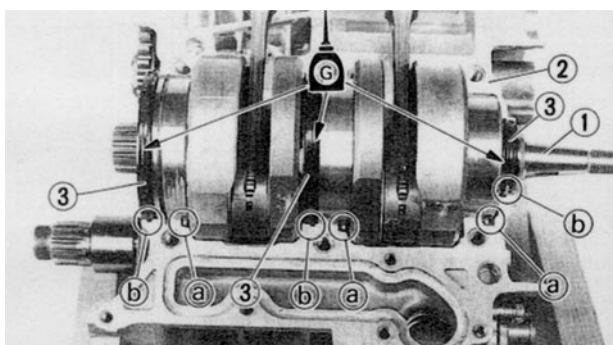
NOTE:

Apply the lithium soap base grease onto the oil seal lip.



2. Install:

- Circlip ①
To crankcase (lower) ②.

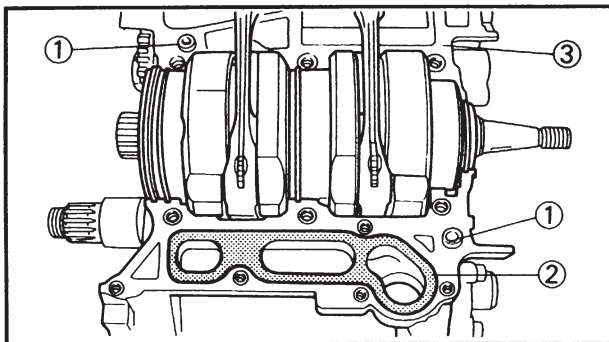


3. Install:

- Crankshaft ①
To crankcase (lower) ②.

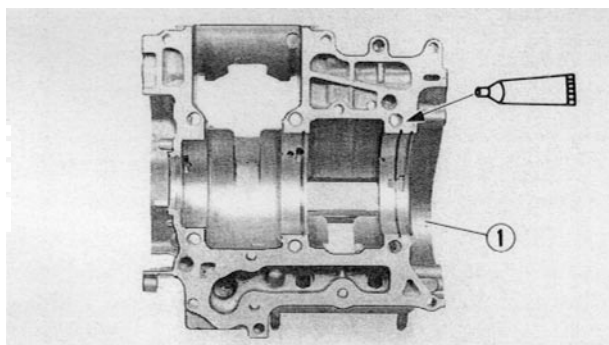
NOTE:

- When installing the crankshaft into the crankcase (lower), apply the transmission oil onto the oil seal ③ outer circumference.
- Align the bearing knock pin with the pin slot (a) in the crankcase (lower) and the projection of oil seal with the groove (b) in the crankcase (lower).
- After installing the crankshaft, push the oil seal to the crankcase (lower).



4. Install:

- Dowel pin ①
- Plate ②
- To crankcase (lower) ③.



5. Apply:

- Sealant
- Onto the crankcase (upper) ①.



Quick gasket*:

ACC-11001-05-01

ACC-11001-30-01

YAMAHA Bond No. 1215

90890-85505

YAMAHA Bond No. 4

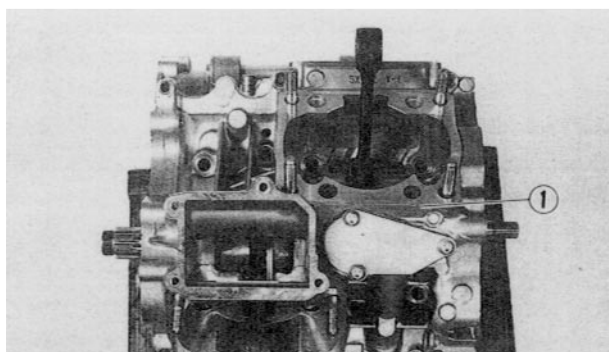
90890-05143

NOTE:

Clean the contacting surface of crankcase (upper and lower) before applying the sealant.

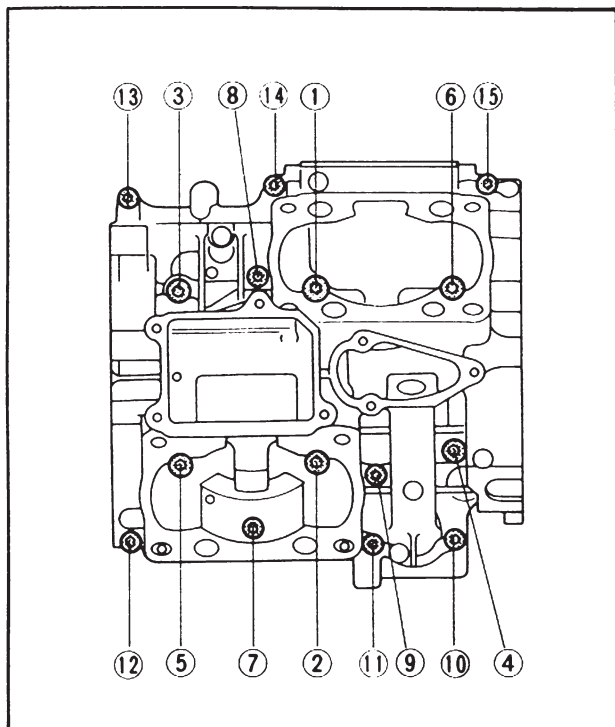
CAUTION:

YAMAHA Bond No.4 dries quickly. If the engine is used soon after disassembly and reinstallation, use this YAMAHA Bond No.4.



6. Install:

- Crankcase (upper) ①
- To crankcase (lower).



7. Tighten:

- Bolt [crankcase (M8)] ① ~ ⑥
- Bolt [crankcase (M6)] ⑦ ~ ⑮

NOTE:

Tighten all bolts in 2 steps as follows and be sure to tighten in numbered order as shown.

- First: ① ~ ⑥ (M8) 10 Nm (1.0 m•kg, 7.2 ft•lb)
- ⑦ ~ ⑮ (M6) 5 Nm (0.5 m•kg, 3.6 ft•lb)

- Final: ① ~ ⑥ (M8) 24 Nm (2.4 m•kg, 17 ft•lb)
- ⑦ ~ ⑮ (M6) 12 Nm (1.2 m•kg, 8.7 ft•lb)

8. Remove:

- Sealant

Forced out-on-the crankcase mating surface.

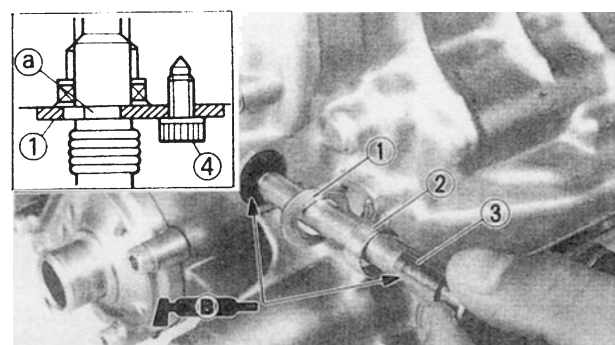
9. Apply:

- Engine oil

To the crank pin, bearing, oil delivery hole and connecting rod big end washer.

10. Check:

- Crankshaft operation
- Unsmooth operation→Repair.



Push lever axle

1.Install:

- Seat plate ①
- Torsion spring ②
- Push lever axle ③
- Bolt (seat plate) ④

NOTE:

- Apply the lithium soap base grease onto the push lever axle, oil seal lip and bearing.
- Fit the seat plate in the groove (a) of the push lever axle and tighten the installation bolt.



Bolt (seat plate):

7 Nm (0.7 m•kg, 5.1 ft•lb)



WATER PUMP

PREPARATION FOR REMOVAL

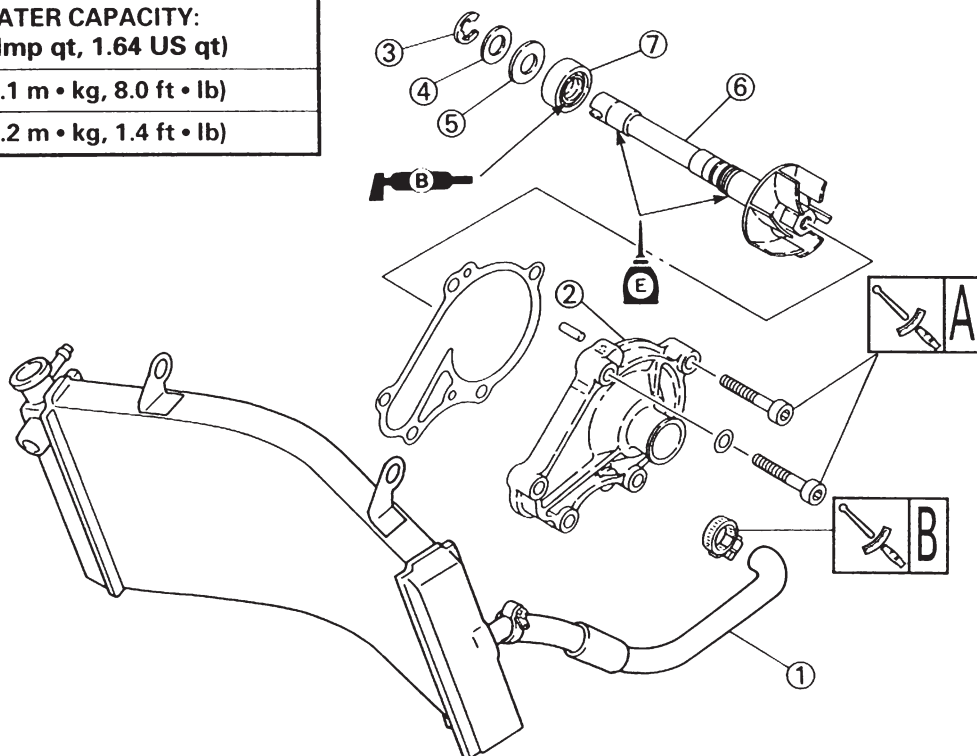


- * Remove the cowling.
- * Drain the cooling water.
- * Drain the transmission oil.
- * Remove the transmission.

COOLING WATER CAPACITY:
1.6 L (1.41 Imp qt, 1.64 US qt)

A 11 Nm (1.1 m • kg, 8.0 ft • lb)

B 2 Nm (0.2 m • kg, 1.4 ft • lb)



NOTE ON REMOVAL AND REASSEMBLY

- Before servicing, clean the parts, and take care so that the foreign material does not enter the crankcase.
- Remove any gasket adhered to the contacting surfaces.
- For reassembly, the removed parts should be cleaned with solvent, and apply the transmission oil to the sliding surfaces.

Extent of removal: ① Impeller shaft removal ② Oil seal removal

Extent of removal	Order	Part name	Q'ty	Remarks
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> ① ↑ ↓ </div> <div style="text-align: center;"> ② ↑ ↓ </div> </div>	1	Radiator hose 2	1	Refer to "REMOVAL POINTS".
	2	Water pump housing cover	1	
	3	Circlip	1	
	4	Plain washer [T = 1.0 mm (0.04 in)]	1	
	5	Plain washer [T = 2.0 mm (0.08 in)]	1	
	6	Impeller shaft	1	Refer to "REMOVAL POINTS".
	7	Oil seal	1	



REMOVAL POINTS

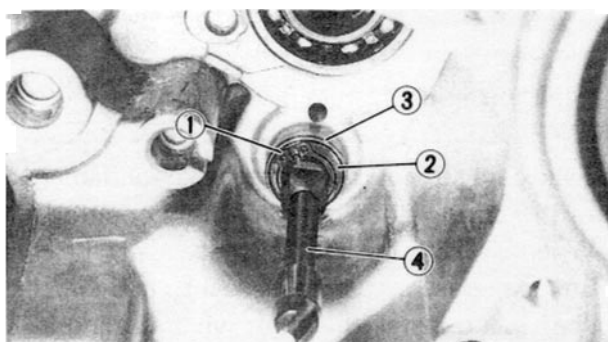
⚠ WARNING

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury.

When the engine has cooled, open the radiator cap by the following procedure:

Remove the radiator cover by removing the screw. Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counter-clockwise to the detent. This procedure allows any residual pressure to escape.

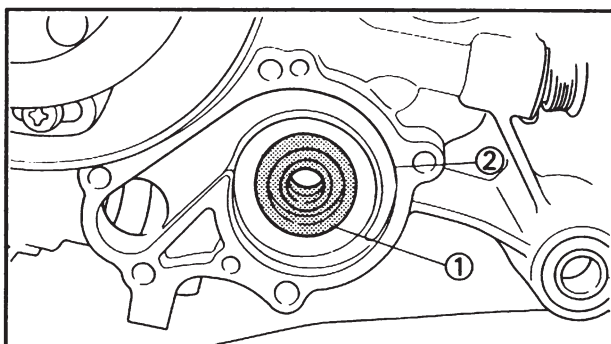
When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.



Impeller shaft

1. Remove:
 - Circlip ①
 - Plain washer [T=1.0 mm (0.04 in)] ②
 - Plain washer [T=2.0 mm (0.08 in)] ③
 - Impeller shaft ④

4



Oil seal

NOTE:

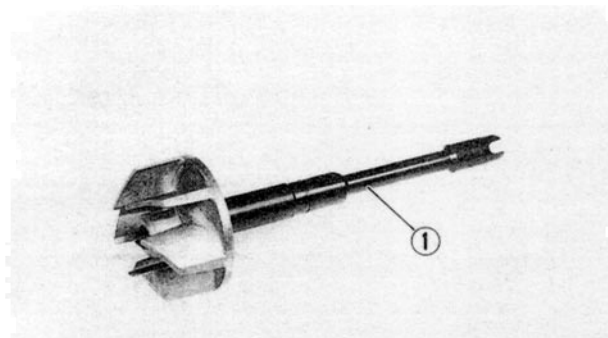
It is not necessary to disassembly the water pump, unless there is no abnormality such as excessive change in coolant level, discoloration of coolant, or milky transmission oil.

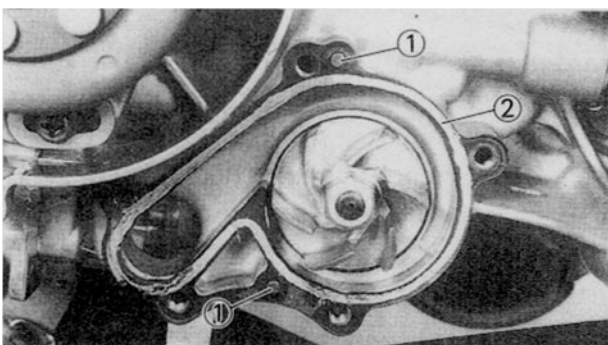
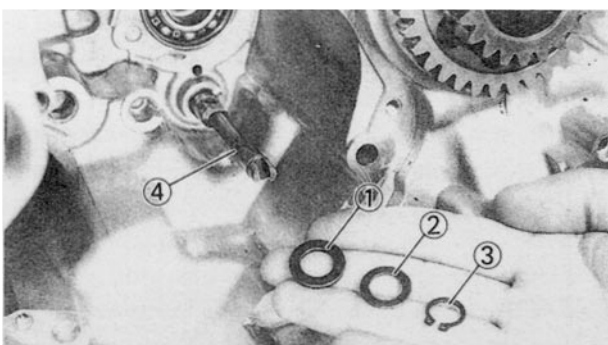
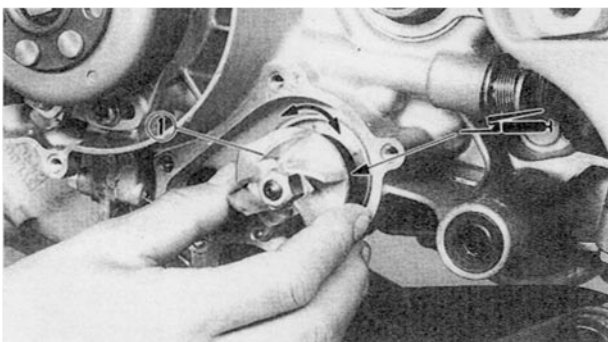
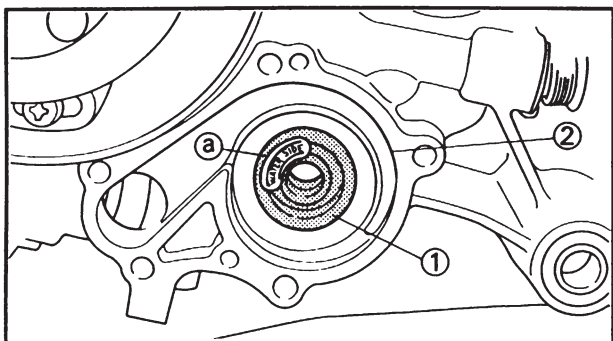
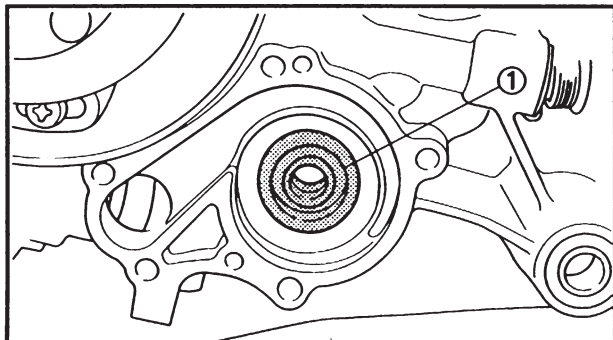
1. Remove:
 - Oil seal ①
 - From crankcase (lower) ②.

INSPECTION

Impeller shaft

1. Inspect:
 - Impeller shaft ①
 - Bend/Wear/Damage→ Replace.
 - Fur deposits→ Clean.





Oil seal

1. Inspect:

- Oil seal ①
- Wear/Damage → Replace.

ASSEMBLY AND INSTALLATION

Oil seal

1. Install:

- Oil seal ①
- To crankcase (lower) ②.

NOTE:

- Always use a new oil seal.
- Install the oil seal with the "WATER SIDE" mark (a) on the outside.

Impeller shaft

1. Install:

- Impeller shaft ①

NOTE:

- Take care so that the oil seal lip is not damaged or the spring does not slip off its position.
- When installing the impeller shaft, apply the lithium soap base grease to oil seal lip and impeller shaft. And install the shaft while turning it.

2. Install:

- Plain washer [T = 2.0 mm (0.08 in)] ①
- Plain washer [T = 1.0 mm (0.04 in)] ②
- Circlip ③
- To impeller shaft ④.

NOTE:

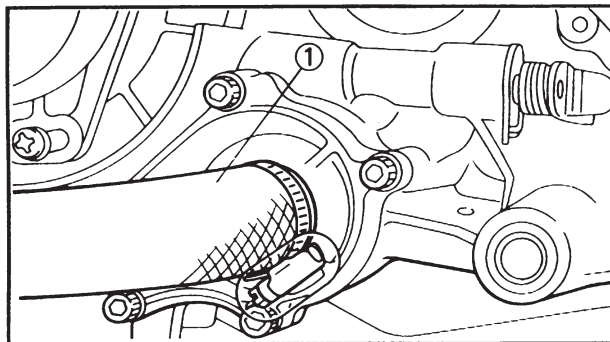
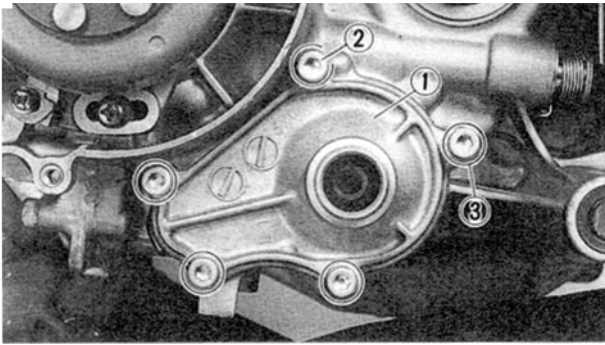
- Install the plain washer of 2 mm (0.08 in) thickness first.
- Always use a new circlip.

3. Install:

- Dowel pin ①
- Gasket (water pump housing cover) ②

NOTE:

Always use a new gasket.



4. Install:

- Water pump housing cover ①
- Copper washer ②
- Bolt (water pump housing cover) ③

NOTE:

Always use a new copper washer.



Bolt (water pump housing cover):
11 Nm (1.1 m•kg, 8.0 ft•lb)

5. Install:

- Radiator hose 2 ①



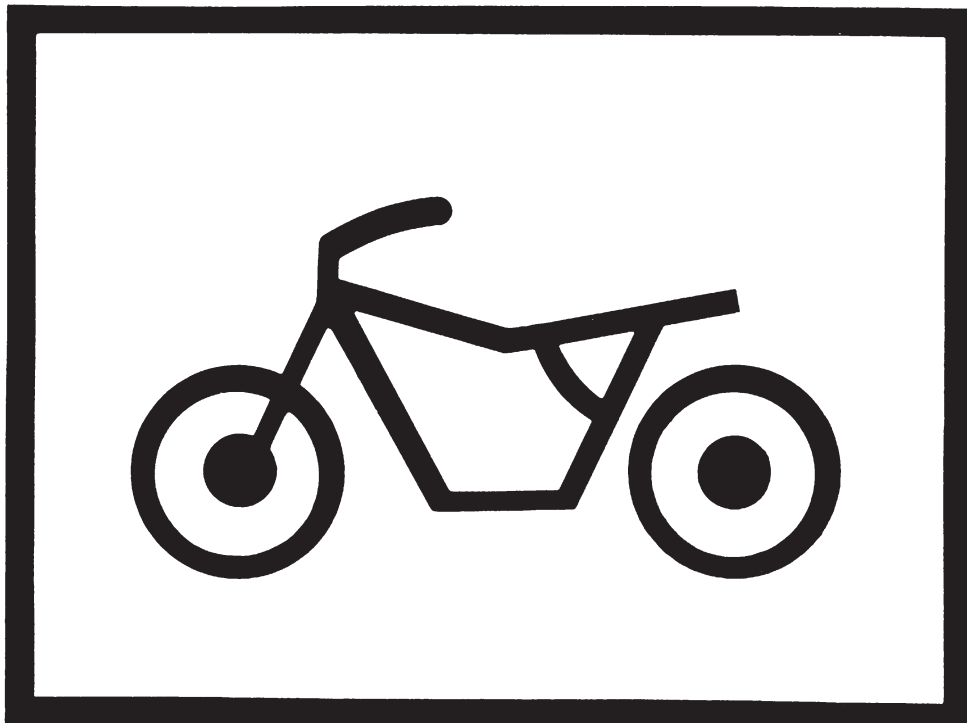
Radiator hose clamp:
2 Nm (0.2 m•kg, 1.4 ft•lb)



MEMO

CHAPTER 5

CHASSIS





FRONT WHEEL

PREPARATION FOR REMOVAL

* Hold the machine by placing the suitable stand.

⚠ WARNING

Support the machine securely so there is no danger of it falling over.

A	35 Nm (3.5 m·kg, 25 ft·lb)
B	11 Nm (1.1 m·kg, 8.0 ft·lb)
C	80 Nm (8.0 m·kg, 58 ft·lb)
D	20 Nm (2.0 m·kg, 14 ft·lb)

WHEEL RUNOUT LIMIT:

VERTICAL

1.0 mm (0.04 in)

LATERAL

0.5 mm (0.02 in)

WHEEL AXLE BENDING LIMIT:

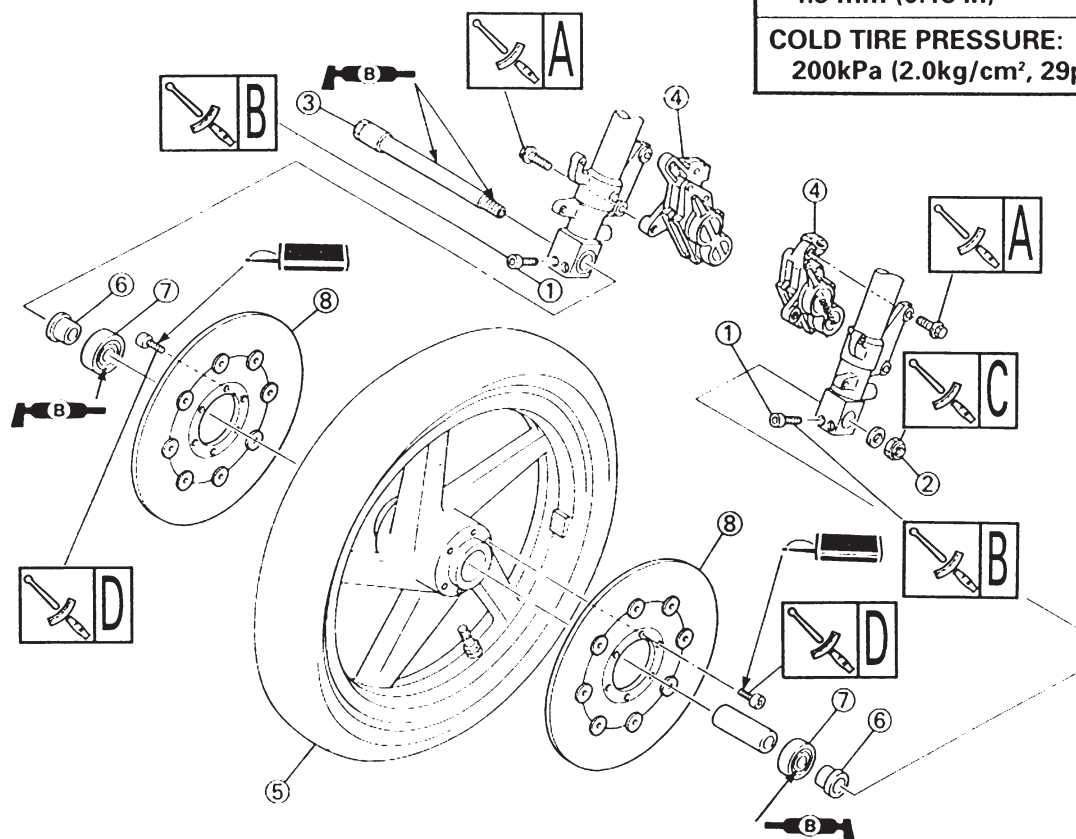
0.25 mm (0.010 in)

DISC WEAR LIMIT:

4.5 mm (0.18 in)

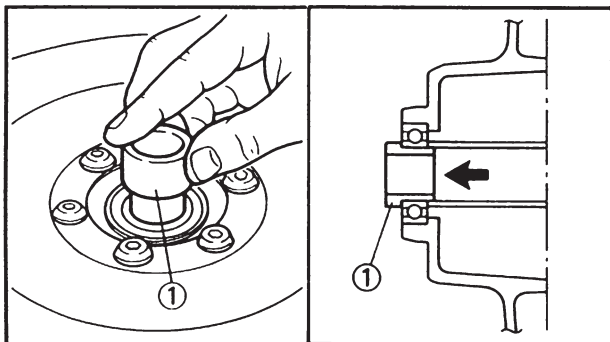
COLD TIRE PRESSURE:

200kPa (2.0kg/cm², 29psi)



Extent of removal: ① Front wheel removal ② Wheel bearing removal ③ Brake disc removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Bolt (axle holder)	4	Only loosening.
	2	Nut (front wheel axle)	1	
	3	Front Wheel axle	1	
	4	Front brake caliper	2	
	5	Front wheel	1	
	6	Collar	2	Refer to "REMOVAL POINTS". Refer to "REMOVAL POINTS".
	7	Bearing	2	
	8	Brake disk	2	



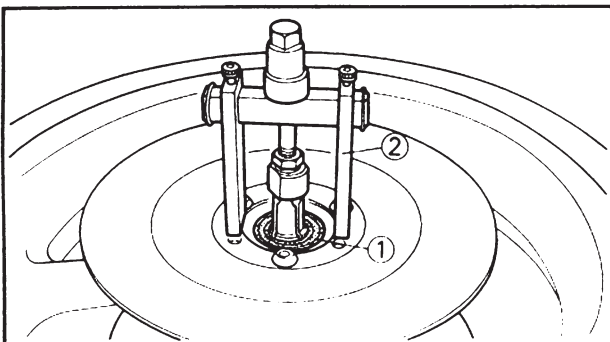
REMOVAL POINTS

Collar

1. Remove:
 - Collar ①
 Knock out of wheel on inside.

NOTE:

Knock the collar out of the wheel gradually not to deform it.

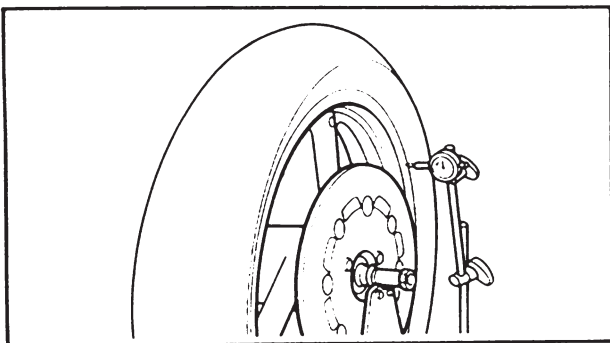


Wheel bearing (if necessary)

1. Remove:
 - Bearing ①

NOTE:

Remove the bearing ① using a general bearing puller ②.



INSPECTION

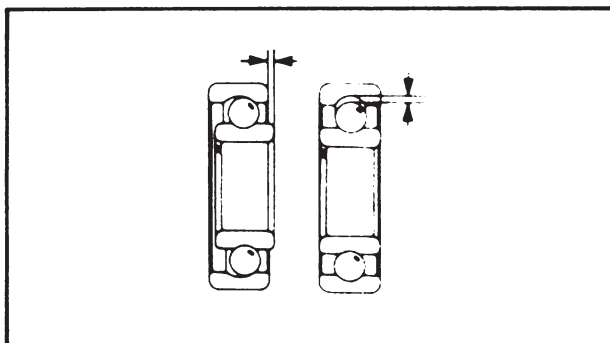
Front wheel

1. Measure:
 - Wheel runout
 Out of limit → Replace.



Wheel runout limits:

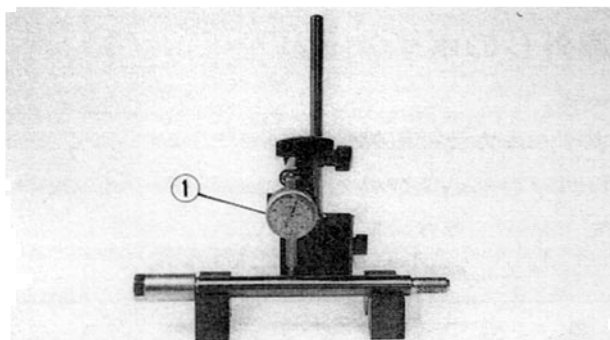
Radial: 1.0 mm (0.04 in)
Lateral: 0.5 mm (0.02 in)



2. Inspect:
 - Bearing
 Rotate inner race with a finger.
Rough spot/Seizure → Replace.

NOTE:

Replace the bearings and wheel collar as a set.



Front wheel axle

1. Inspect:
 - Wheel axle bends
 - Out of specification → Replace.
 - Use dial gauge ①.



Wheel axle bending limit:
0.25 mm (0.010 in)

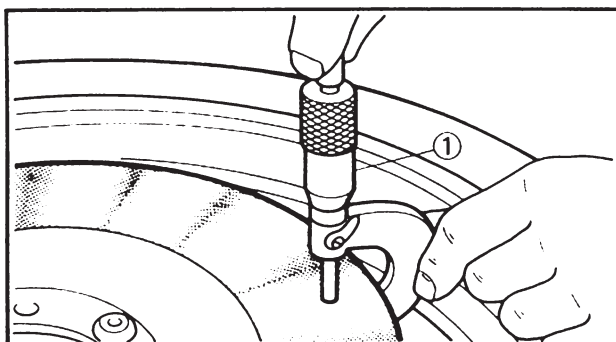
NOTE:

The bending value is shown by one half of the dial gauge reading.



WARNING

Do not attempt to straighten a bent axle.



Brake disc

1. Inspect:
 - Brake disc thickness
 - Use micrometer ①.
 - Out of limit → Replace.

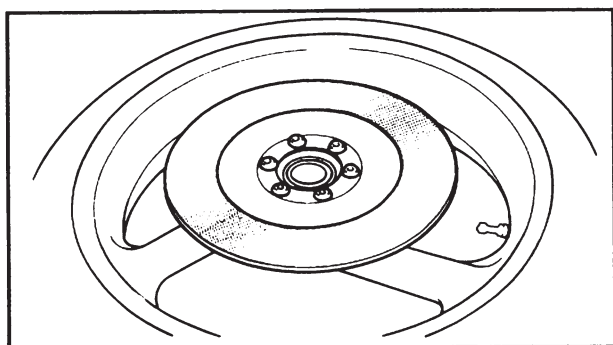


Disc wear limit:

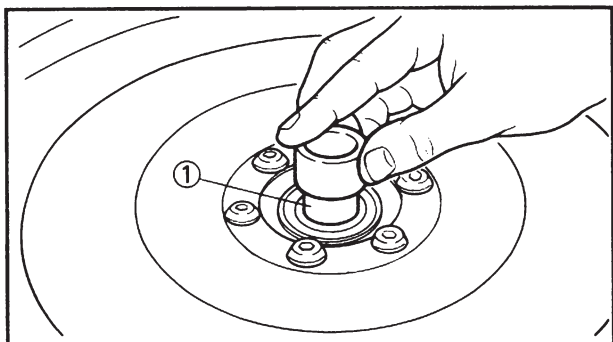
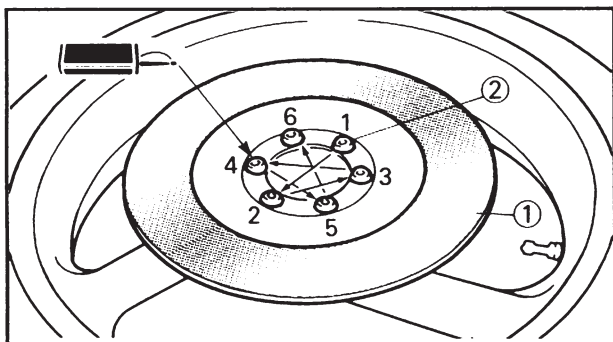
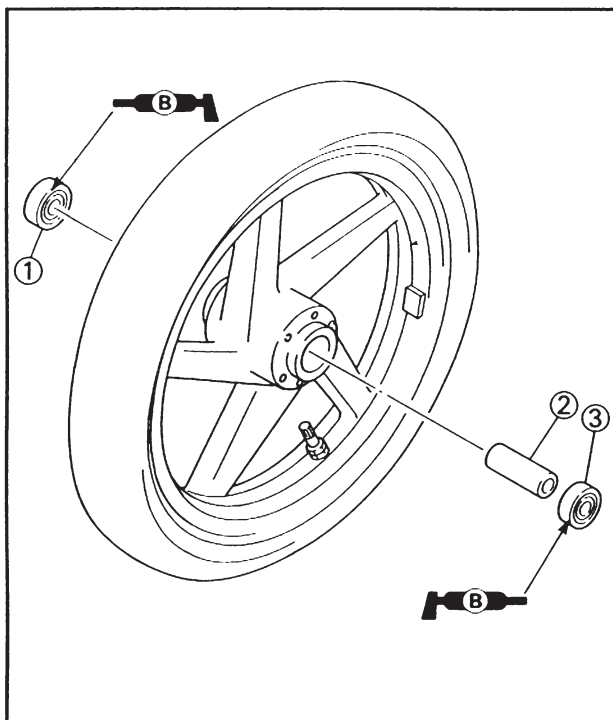
Standard	Limit
5.0 mm (0.20 in)	4.5 mm (0.18 in)

2. Inspect:

- Brake disc surface
- Score marks / Damage → Replace.



5



ASSEMBLY AND INSTALLATION

Front wheel

1. Install:

- Bearing (right) ①
- Spacer ②
- Bearing (left) ③

NOTE:

- Apply the lithium soap base grease on the bearing when installing.
- Use a socket that matches the outside diameter of the race of the bearing.
- Right side of bearing shall be installed first.

CAUTION:

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

2. Install:

- Brake disc ①
- Bolt (brake disc) ②

NOTE:

Tighten the bolts in stage, using a crisscross pattern.



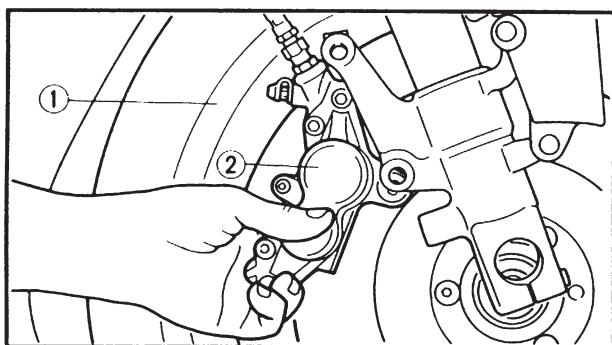
Bolt (brake disc):
20 Nm (2.0 m·kg, 14 ft·lb)
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3. Install:

- Collar ①

NOTE:

If the collar is hard to install, apply the lithium soap base grease on the collar and press it in.



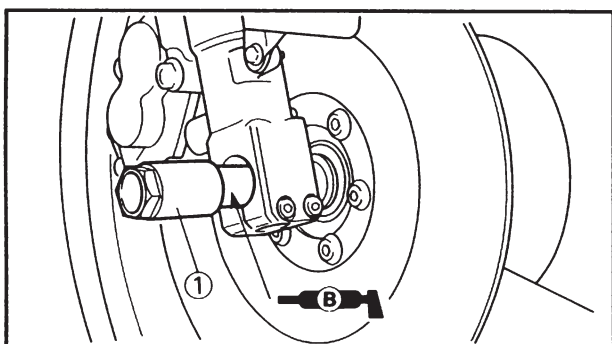
4. Install:
- Front wheel ①
 - Caliper ②
 - Bolt (caliper)

NOTE:

Before installing the wheel axle, install the caliper.



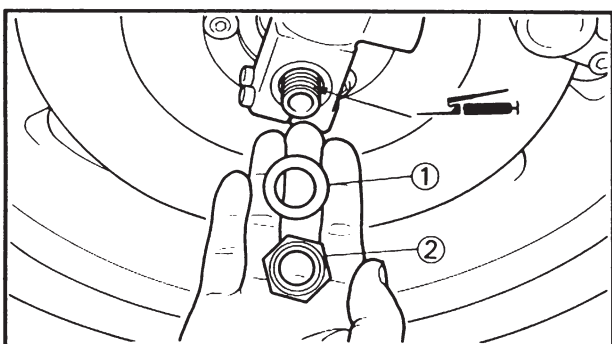
Bolt (caliper):
35 Nm (3.5 m•kg, 25 ft•lb)



5. Install:
- Front wheel axle ①

NOTE:

- Apply the lithium soap base grease onto the wheel axle.
- Insert the wheel axle from right side.



6. Install:
- Plain washer ①
 - Nut (front wheel axle) ②

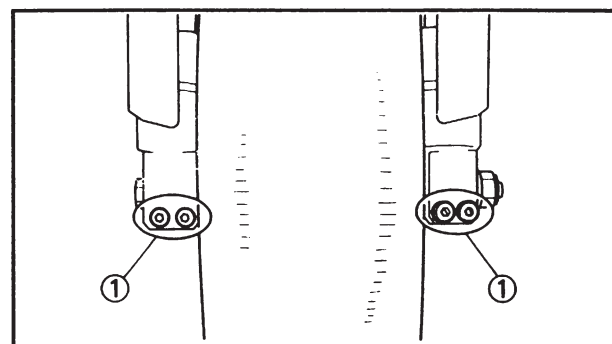
NOTE:

Apply the lithium soap base grease onto the wheel axle thread.



Nut (front wheel axle):
80 Nm (8.0 m•kg, 58 ft•lb)

5



7. Tighten:
- Bolt (axle holder) ①



Bolt (axle holder):
11 Nm (1.1 m•kg, 8.0 ft•lb)

FRONT WHEEL

CHAS



MEMO

5

REAR WHEEL
PREPARATION FOR REMOVAL

✳ Hold the machine by placing the suitable stand.

⚠ WARNING

Support the machine securely so there is no danger of it falling over.

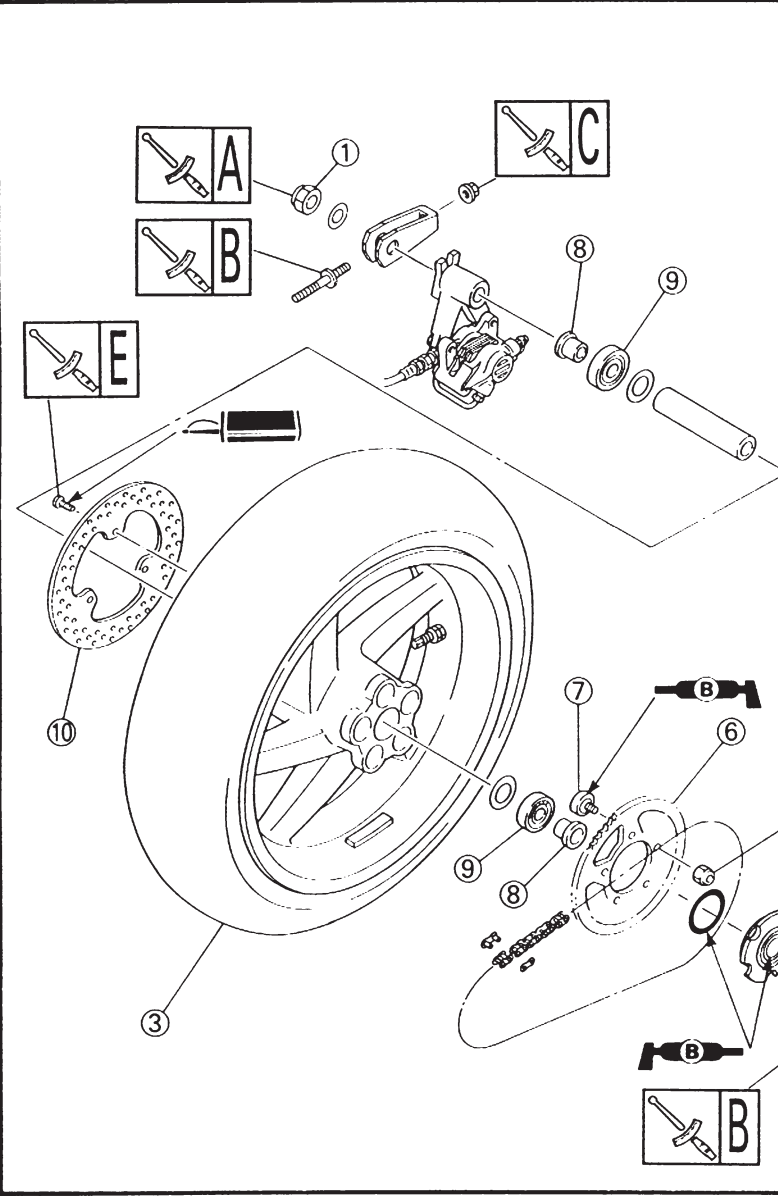


Diagram illustrating the rear wheel assembly components and their removal points. Components are numbered 1 through 10. Torque points are labeled A, B, C, D, and E.

WHEEL RUNOUT LIMIT:
VERTICAL
1.0 mm (0.04 in)
LATERAL
0.5 mm (0.02 in)

WHEEL AXLE BENDING LIMIT:
0.25 mm (0.010 in)

DISC WEAR LIMIT:
3.5 mm (0.14 in)

DISC DEFLECTION LIMIT:
0.15 mm (0.006 in)

COLD TIRE PRESSURE:
200kPa (2.0kg/cm², 29psi)

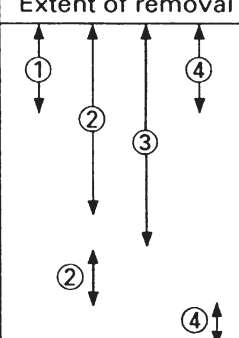
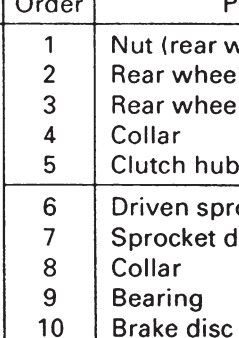
A	80 Nm (8.0 m·kg, 58 ft·lb)
B	2 Nm (0.2 m·kg, 1.4 ft·lb)
C	16 Nm (1.6 m·kg, 11 ft·lb)
D	32 Nm (3.2 m·kg, 23 ft·lb)
E	23 Nm (2.3 m·kg, 17 ft·lb)

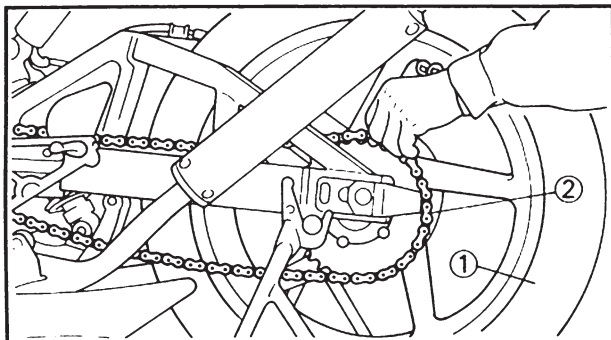
Extent of removal:

- ① Rear wheel removal

② Wheel bearing removal
- ③ Driven sprocket removal

④ Brake disc removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Nut (rear wheel axle)	1	Refer to "REMOVAL POINTS".
	2	Rear wheel axle	1	
	3	Rear wheel	1	
	4	Collar	1	
	5	Clutch hub	1	
	6	Driven sprocket	1	Refer to "REMOVAL POINTS". Refer to "REMOVAL POINTS".
	7	Sprocket damper	5	
	8	Collar	2	
	9	Bearing	2	
	10	Brake disc	1	



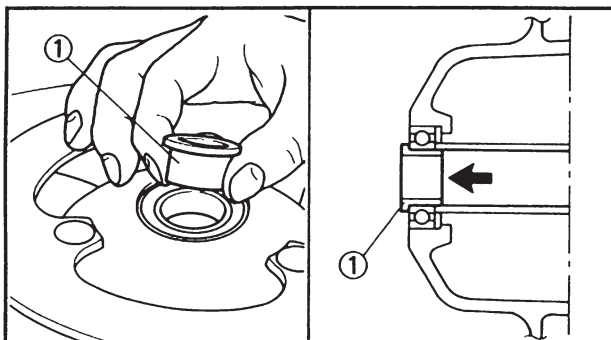
REMOVAL POINTS

Rear wheel

1. Remove:
 - Rear wheel ①

NOTE:

Push the rear wheel forward and remove the drive chain ②.

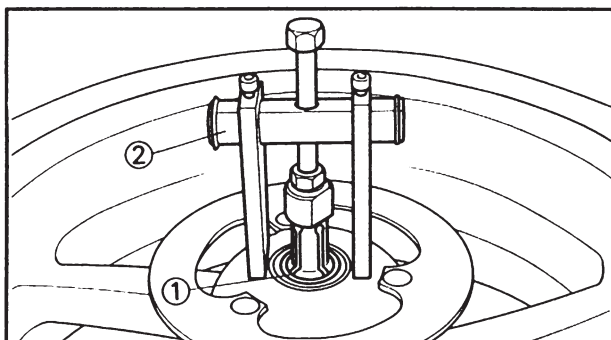


Collar

1. Remove:
 - Collar ①
 Knock out of wheel on inside.

NOTE:

Knock the collar out of the wheel gradually not to deform it.

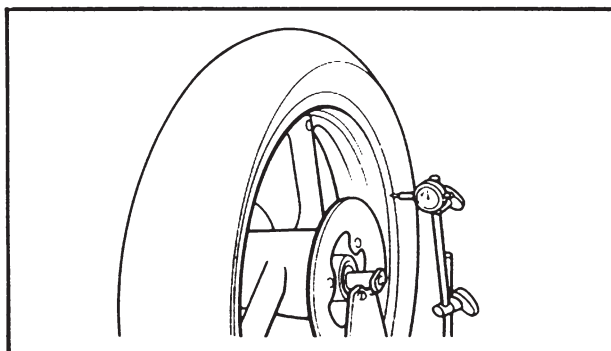


Wheel bearing (if necessary)

1. Remove:
 - Bearing ①

NOTE:

Remove the bearing using a general bearing puller ②.



INSPECTION

Rear wheel

1. Measure:
 - Wheel runout
 Out of limit → Replace.



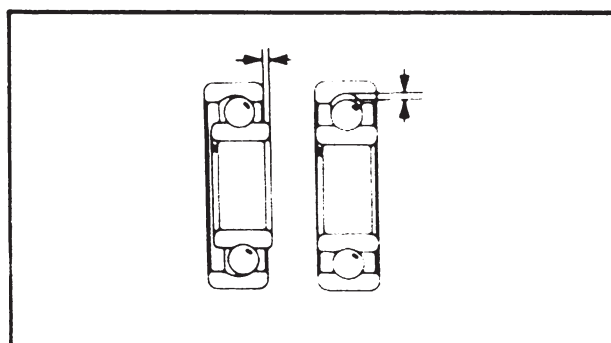
Wheel runout limits:

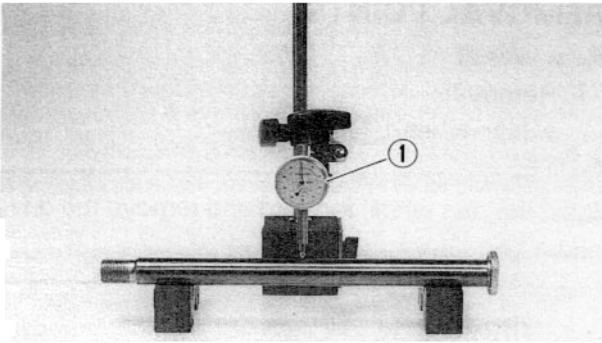
Radial: 1.0 mm (0.04 in)
Lateral: 0.5 mm (0.02 in)

2. Inspect:
 - Bearing
 Rotate inner race with a finger.
Rough spot/Seizure → Replace.

NOTE:

Replace the bearings and wheel collar as a set.





Rear wheel axle

1. Inspect:

- Wheel axle bends
Out of specification→Replace.
Use dial gauge ①.



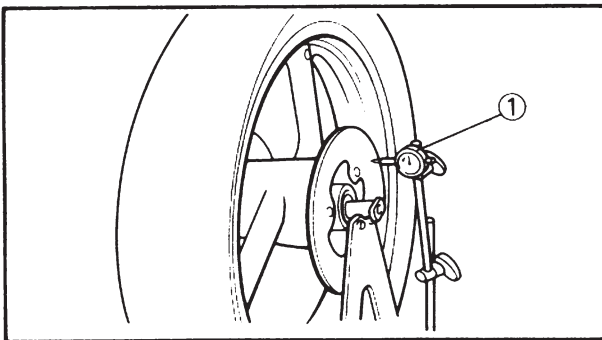
Wheel axle bending limit:
0.25 mm (0.010 in)

NOTE:

The bending value is shown by one half of the dial gauge reading.

⚠ WARNING

Do not attempt to straighten a bent axle.



Brake disc

1. Measure:

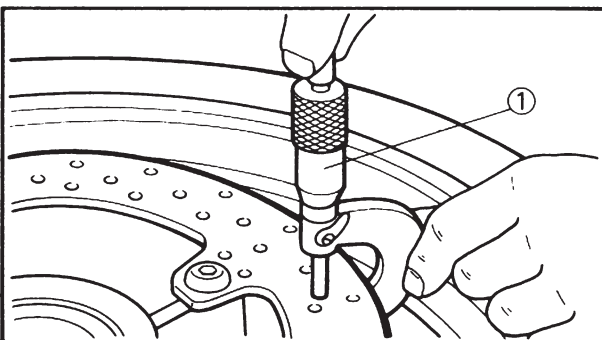
- Brake disc deflection
Use dial gauge ①.
Out of specification→Inspect wheel runout.
If wheel runout is in good condition,
replace the brake disc.



Disc deflection limit:
0.15 mm (0.006 in)

2. Measure:

- Brake disc thickness
Use micrometer ①.
Out of limit→Replace.

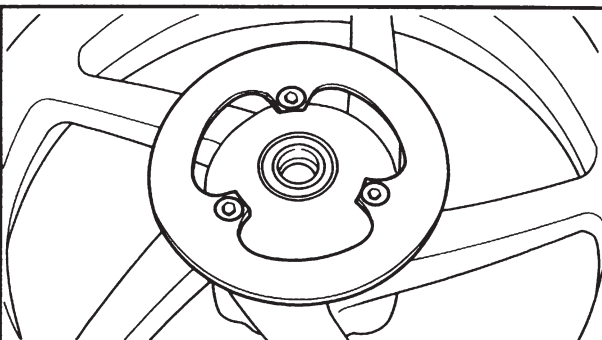


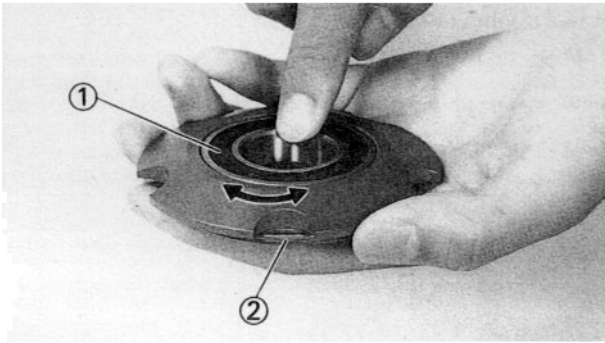
Disc wear limit:

Standard	Limit
4.0 mm (0.16 in)	3.5 mm (0.14 in)

3. Inspect:

- Brake disc surface
Score marks/Damage→Replace.

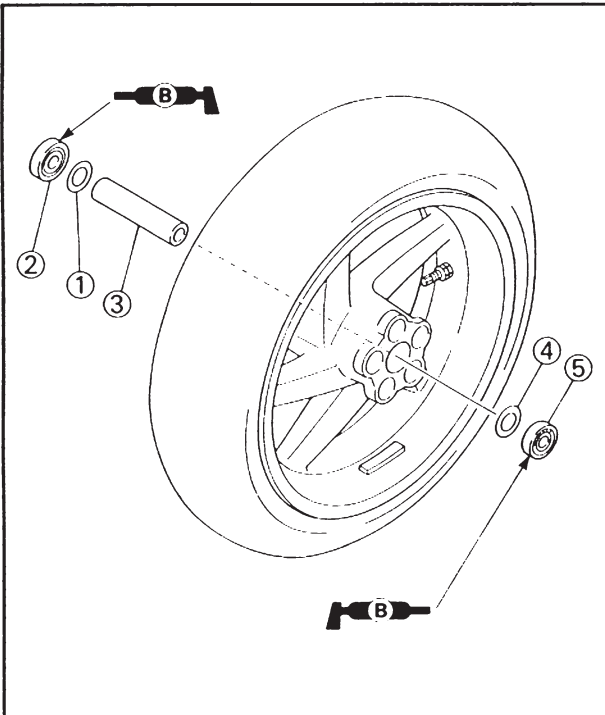




Clutch hub

1. Inspect:

- Bearing ①
Rotate inner race with a finger.
Rough spot/Seizure→Replace.
- O-ring ②
Wear/Damage→Replace.



ASSEMBLY AND INSTALLATION

Rear wheel

1. Install:

- Fitting plate (right) ①
- Bearing (right) ②
- Spacer ③
- Fitting plate (left) ④
- Bearing (left) ⑤

NOTE:

- Apply the lithium soap base grease on the bearing when installing.
- Use a socket that matches the outside diameter of the race of the bearing.
- Right side of bearing shall be installed first.

CAUTION:

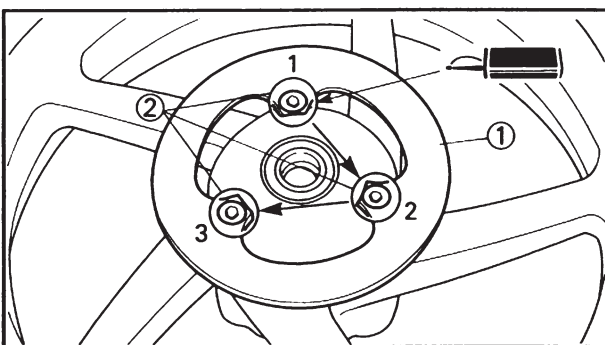
Do not strike the inner race of balls of the bearing. Contact should be made only with the outer race.

2. Install:

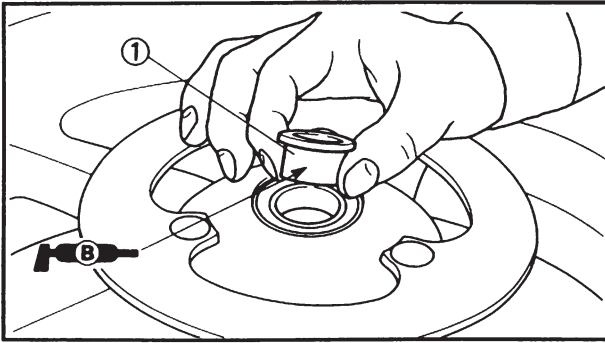
- Brake disc ①
- Bolt (brake disc) ②

NOTE:

Tighten the bolts in stage, using a crisscross pattern.



Bolt (brake disc):
23 Nm (2.3 m·kg, 17 ft·lb)
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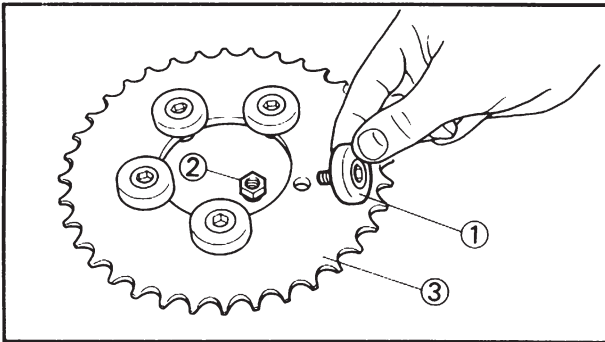


3. Install:

- Collar (1)

NOTE: _____

If the collar is hard to install, apply the lithium soap base grease on the collar and press it in.

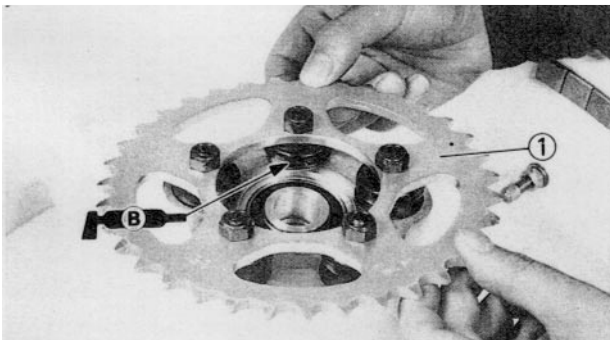


4. Install:

- Sprocket damper (1)
 - Nut (sprocket damper) (2)
- To driven sprocket (3).



Nut (sprocket damper):
32 Nm (3.2 m•kg, 23 ft•lb)

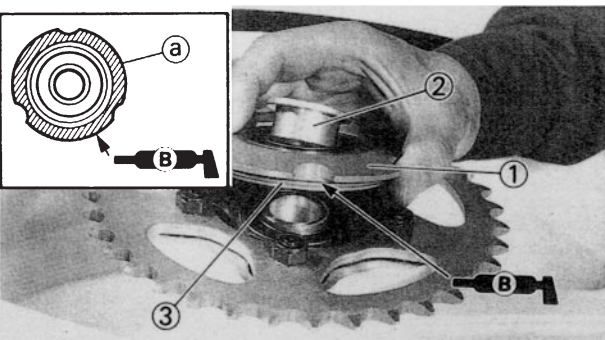


5. Install:

- Driven sprocket (1)
- To rear wheel.

NOTE: _____

Apply the lithium soap base grease onto the sprocket damper.

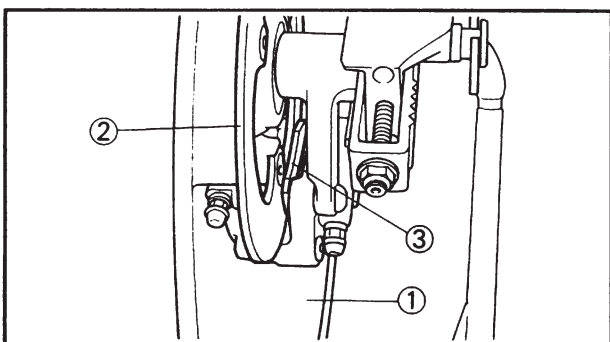


6. Install:

- Clutch hub (1)
 - Collar (2)
- To rear wheel.

NOTE: _____

Apply the lithium soap base grease onto the contacting surface (a) of the driven sprocket and O-ring (3).

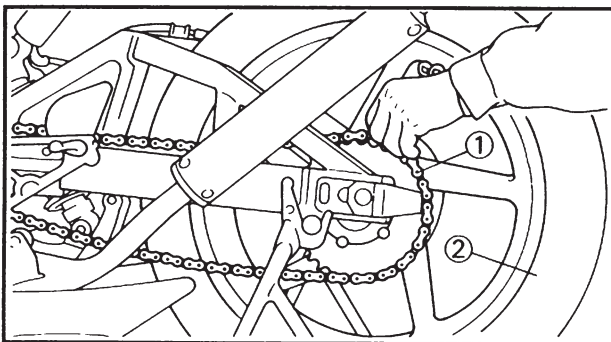


7. Install:

- Rear wheel (1)

NOTE: _____

Install the brake disc (2) between the brake pads (3) correctly.

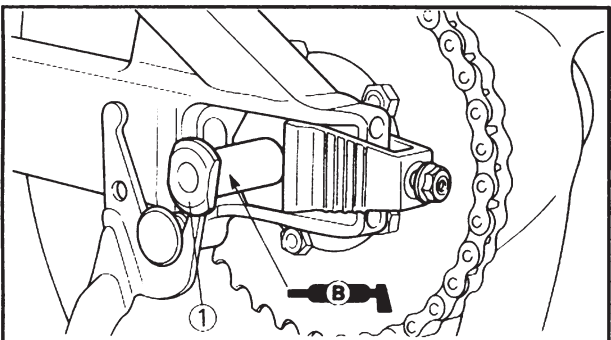


8. Install:

- Drive chain (1)

NOTE:

Push the rear wheel (2) forward and install the drive chain.

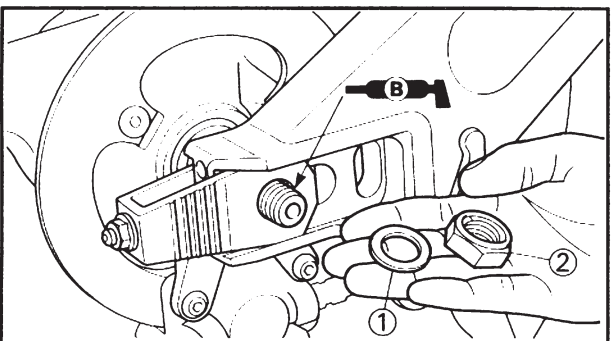


9. Install:

- Rear wheel axle (1)

NOTE:

- Apply the lithium soap base grease onto the wheel axle.
- Insert the wheel axle from left side.

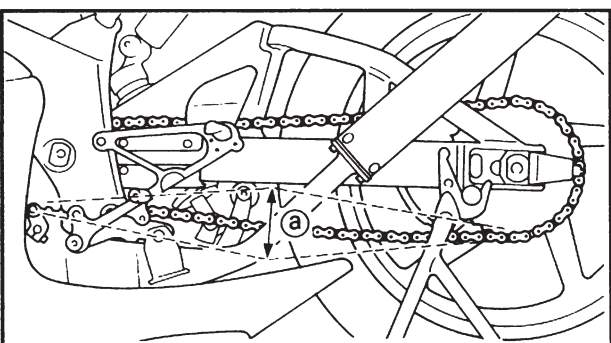


10. Install:

- Plain washer (1)
- Nut (wheel axle) (2)

NOTE:

- Apply the lithium soap base grease onto the wheel axle thread.
- Temporarily tighten the nut (wheel axle) at this point.



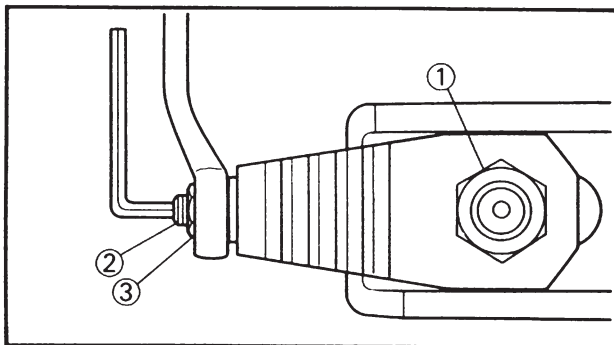
11. Adjust:

- Drive chain slack (a)



Drive chain slack (a):
40~50 mm (1.6~2.0 in)

Refer to "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.



12. Tighten:

- Nut (rear wheel axle) ①
- Adjuster ②
- Locknut ③

NOTE:

- Tighten the axle nut while pushing down the drive chain.
- After tightening the axle nut, tighten the locknut with the turned out the adjuster.



Nut (rear wheel axle):
80 Nm (8.0 m•kg, 58 ft•lb)

Adjuster:
2 Nm (0.2 m•kg, 1.4 ft•lb)

Locknut:
16 Nm (1.6 m•kg, 11 ft•lb)

13. Adjust:

- Wheel alignment
Refer to "WHEEL ALIGNMENT ADJUSTMENT" section in the CHAPTER 3.

REAR WHEEL

CHAS



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5

FRONT BRAKE PREPARATION FOR REMOVAL

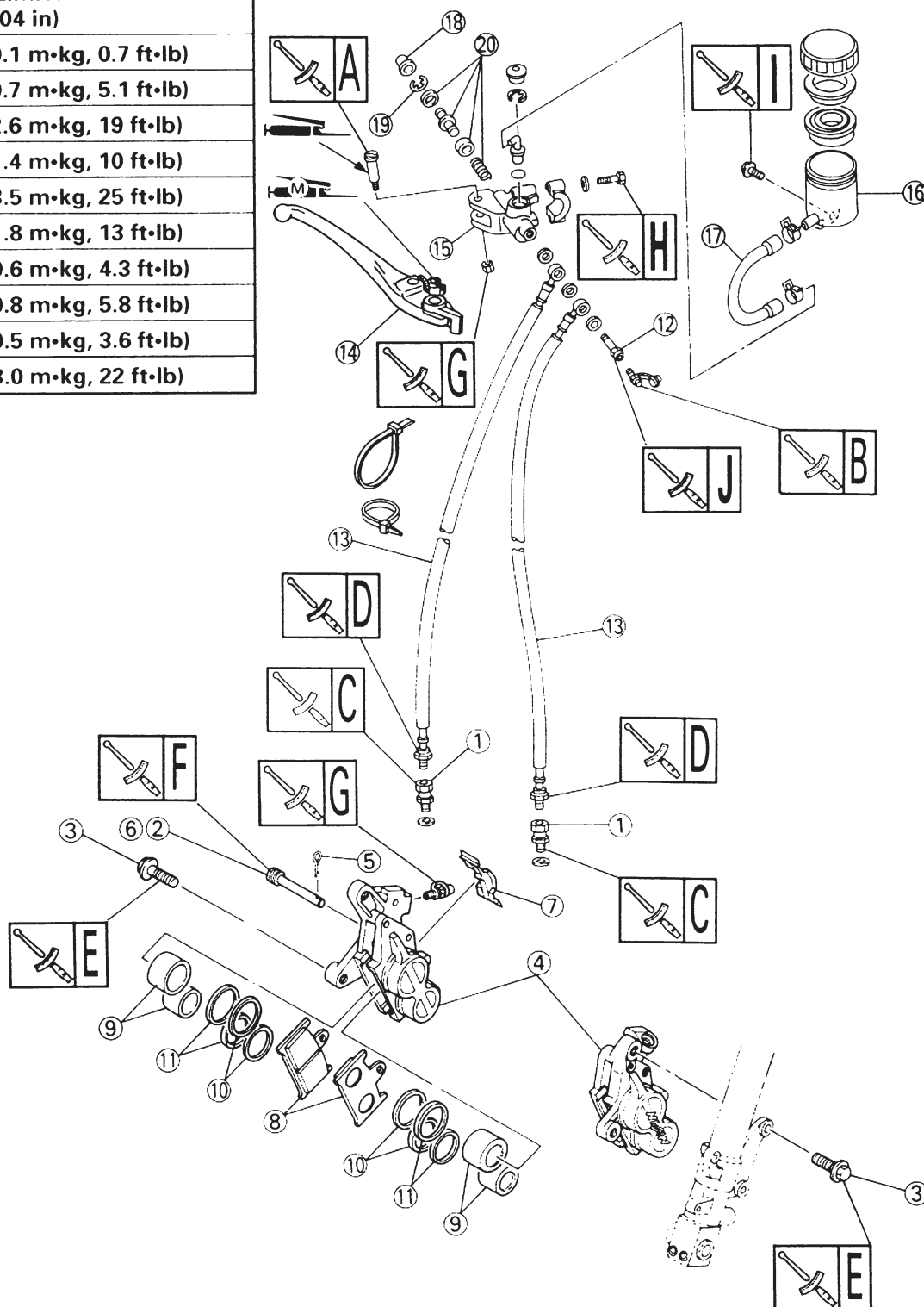
- * Hold the machine by placing the suitable stand.
- * Remove the cowling.
- * Remove the induction guide (left cylinder).

⚠ WARNING

Support the machine securely so there is no danger of it falling over.

PAD WEAR LIMIT: 1.0 mm (0.04 in)

A	1 Nm (0.1 m•kg, 0.7 ft•lb)
B	7 Nm (0.7 m•kg, 5.1 ft•lb)
C	26 Nm (2.6 m•kg, 19 ft•lb)
D	14 Nm (1.4 m•kg, 10 ft•lb)
E	35 Nm (3.5 m•kg, 25 ft•lb)
F	18 Nm (1.8 m•kg, 13 ft•lb)
G	6 Nm (0.6 m•kg, 4.3 ft•lb)
H	8 Nm (0.8 m•kg, 5.8 ft•lb)
I	5 Nm (0.5 m•kg, 3.6 ft•lb)
J	30 Nm (3.0 m•kg, 22 ft•lb)



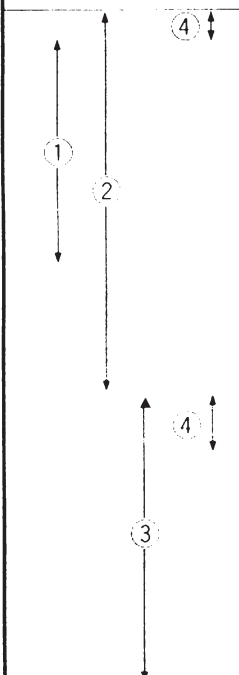
NOTE ON REMOVAL AND REASSEMBLY

⚠ WARNING

Disc brake components rarely require disassembly. DO NOT:

- Disassemble components unless absolutely necessary.
- Use solvents on internal brake component.
- Use contaminated brake fluid for cleaning.
Use only clean brake fluid.
- Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.
- Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.
- Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.

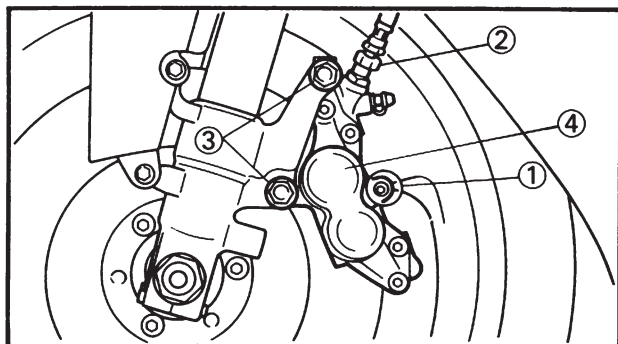
Extent of removal: ① Brake pads removal ② Caliper removal and disassembly
③ Master cylinder removal and disassembly ④ Brake hose removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Adapter	1ea.	Drain the brake fluid.
	2	Pad pin	1ea.	Only loosening.
	3	Bolt (caliper)	2ea.	Refer to "REMOVAL POINTS".
	4	Caliper	1ea.	
	5	Cotter pin	1ea.	
	6	Pad pin	1ea.	Use low compressed air. Refer to "REMOVAL POINTS".
	7	Pad support	1ea.	
	8	Brake pad	2ea.	
	9	Caliper piston	4ea.	Refer to "REMOVAL POINTS".
	10	Dust seal	4ea.	
	11	Piston seal	4ea.	Drain the brake fluid.
	12	Union bolt	1	
	13	Brake hose	2	Refer to "REMOVAL POINTS".
	14	Brake lever	1	
	15	Master cylinder	1	
	16	Reservoir tank	1	Refer to "REMOVAL POINTS".
	17	Reservoir hose	1	
	18	Master cylinder boot	1	
	19	Circlip	1	
	20	Master cylinder kit	1	

HANDLING NOTE

⚠ WARNING

The brake components of this machine are suit for closed circuit use only. Never use on any public road.



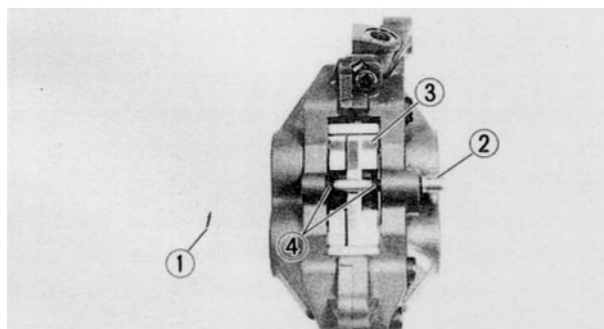
REMOVAL POINTS

Caliper

1. Loosen:
 - Pad pin ①
2. Remove:
 - Adapter ②
 - Bolt (caliper) ③
 - Caliper ④

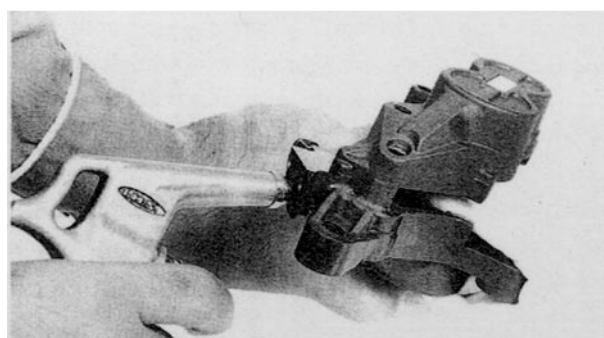
NOTE:

Loosen the pad pin before removing the caliper from the front fork.



3. Remove:
 - Cotter pin ①
 - Pad pin ②
 - Pad support ③
 - Brake pad ④

5



Caliper piston

1. Remove:
 - Caliper piston

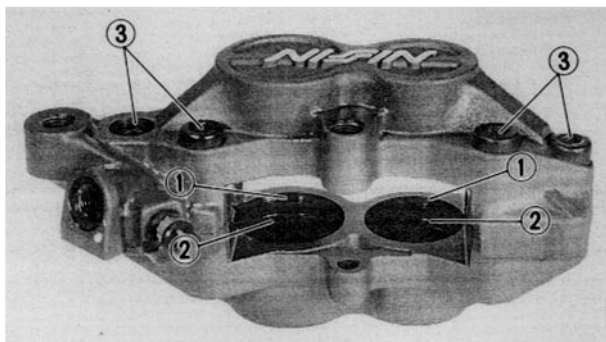
Use compressed air and proceed carefully.

⚠ WARNING

- Cover piston with rag and use extreme caution when expelling piston from cylinder.
- Never attempt to pry out piston.

Caliper piston removal steps:

- Insert a piece of rag into the caliper to lock one caliper.
- Carefully force the piston out of the caliper cylinder with compressed air.



Piston seal kit

1. Remove:

- Dust seal ①
- Piston seal ②

NOTE:

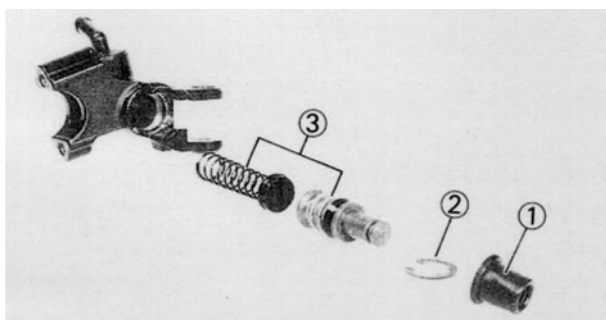
Remove the piston and dust seal by pushing it with a finger.

CAUTION:

- Never attempt to pry out piston and dust seals.
- Do not loosen the bolts ③.

⚠ WARNING

Replace the piston and dust seals whenever a caliper is disassembled.



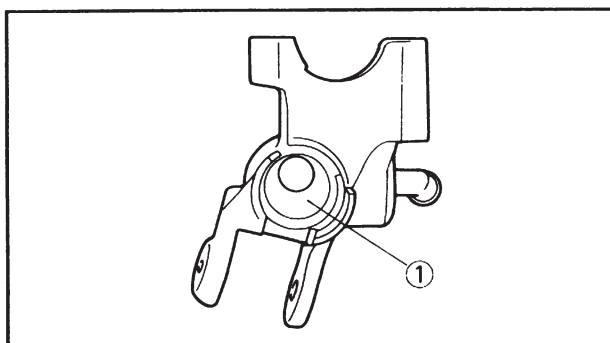
Master cylinder kit

1. Remove:

- Master cylinder boot ①
- Circlip ②
- Master cylinder kit ③

NOTE:

When removing the circlip, use a long nose circlip plier.



INSPECTION

Master cylinder

1. Inspect:

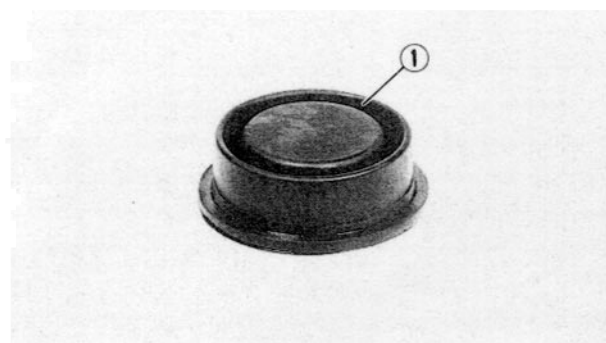
- Master cylinder body ①
 - Wear / Scratches → Replace master cylinder assembly.
 - Stains → Clean.

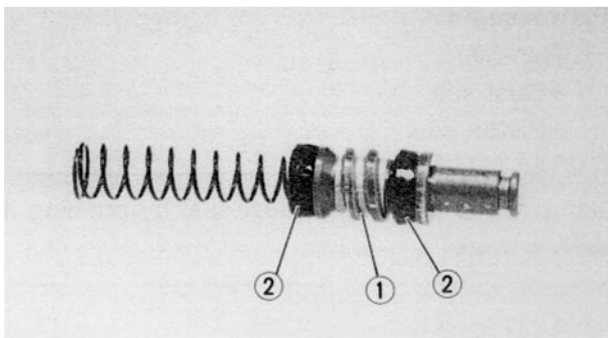
NOTE:

Use new brake fluid.

2. Inspect:

- Diaphragm ①
 - Crack / Damage → Replace.





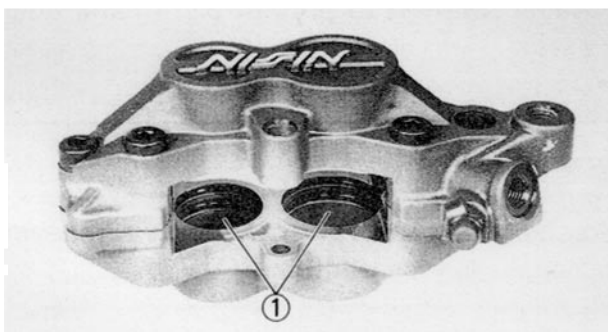
3. Inspect:

- Master cylinder piston ①
- Master cylinder cup ②

Wear/Damage/Score marks → Replace master cylinder kit.

NOTE:

Replace master cylinder piston and cup as a set.

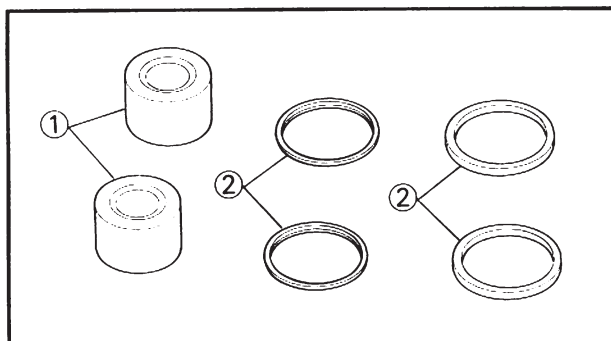


Caliper

1. Inspect:

- Caliper cylinder ①

Wear/Score marks → Replace caliper assembly.



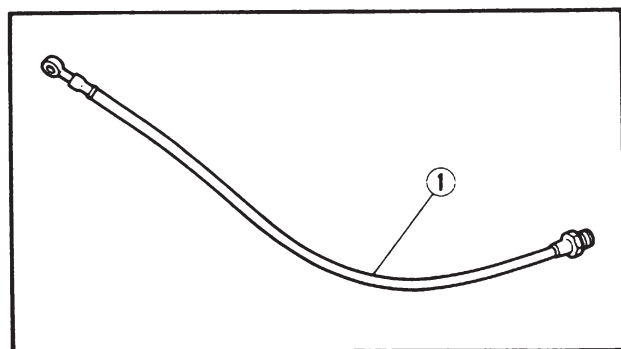
2. Inspect:

- Caliper piston ①

Wear/Score marks → Replace caliper piston assembly.

⚠ WARNING

Replace the piston and dust seals ② whenever a caliper is disassembled.



Brake hose

1. Inspect:

- Brake hose ①

Crack/Damage → Replace.

ASSEMBLY AND INSTALLATION

⚠ WARNING

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.
- Replace the piston seal and dust seal whenever a caliper is disassembled.

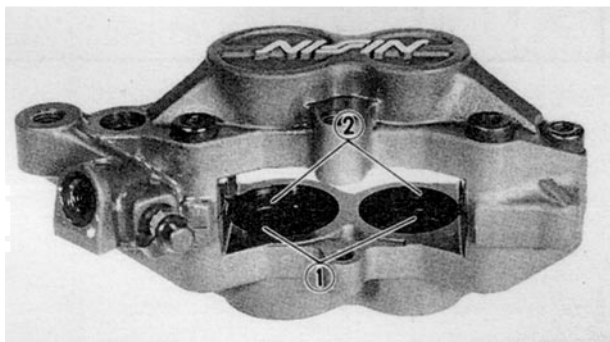


Caliper piston

1. Clean:

- Caliper
- Piston seal
- Dust seal
- Caliper piston

Clean them with brake fluid.



2. Install:

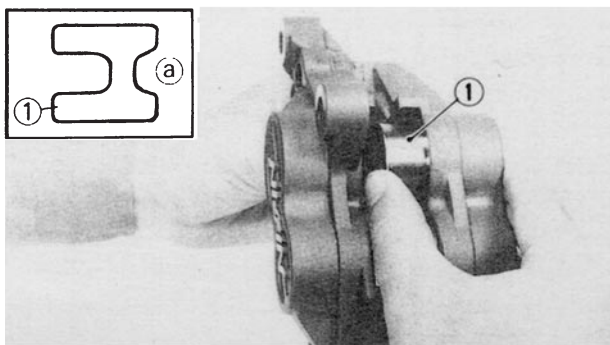
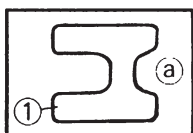
- Piston seal ①
- Dust seal ②

NOTE:

Fit the piston and dust seal onto the slot on caliper correctly.

⚠ WARNING

Always use new piston and dust seals.



3. Install:

- Caliper piston ①

NOTE:

Apply the brake fluid on the piston wall.

CAUTION:

- Be sure that the shallow depressed side ① face the caliper side.
- Never force to insert.

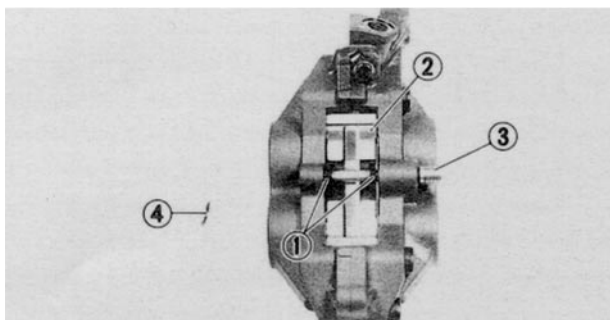
Caliper

1. Install:

- Brake pad ①
- Pad support ②
- Pad pin ③
- Cotter pin ④

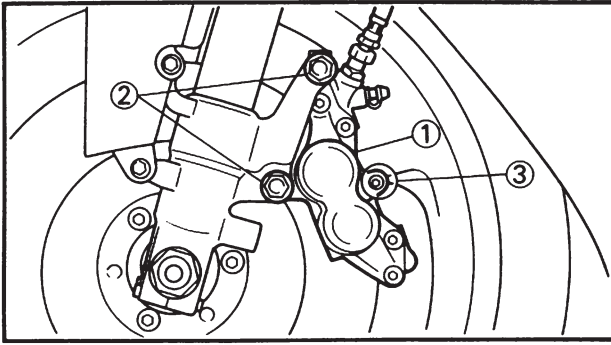
NOTE:

- Temporarily tighten the pad pin at this point.
- Always use a new cotter pin.



FRONT BRAKE

CHAS



2. Install:

- Caliper ①
- Bolt (caliper) ②



Bolt (caliper):

35 Nm (3.5 m•kg, 25 ft•lb)

3. Tighten:

- Pad pin ③



Pad pin:

18 Nm (1.8 m•kg, 13 ft•lb)

Master cylinder kit

1. Clean:

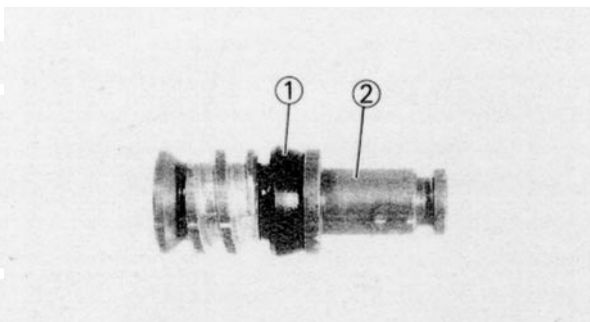
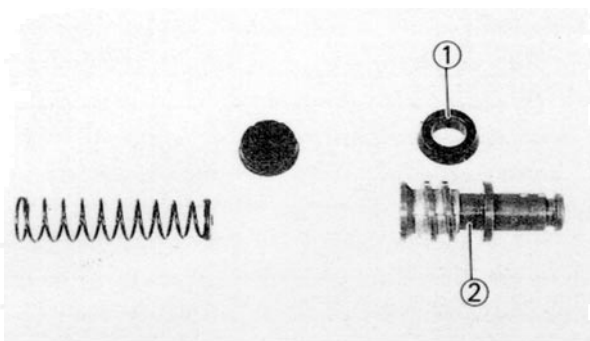
- Master cylinder
 - Master cylinder kit
- Clean them with brake fluid.

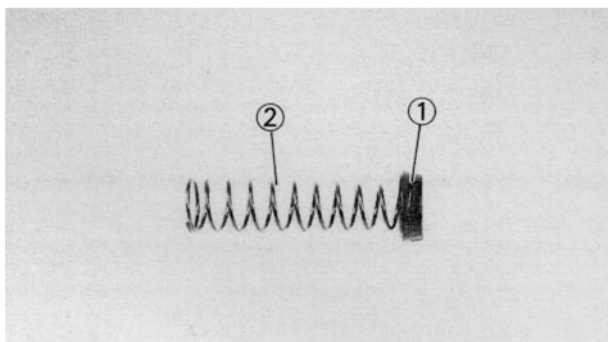
2. Install:

- Master cylinder cup (primary) ①
- To master cylinder piston ②.

NOTE:

- Apply the brake fluid on the master cylinder cup.
- After installing, cylinder cup should be installed as shown direction. Wrong installation cause improper brake performance.



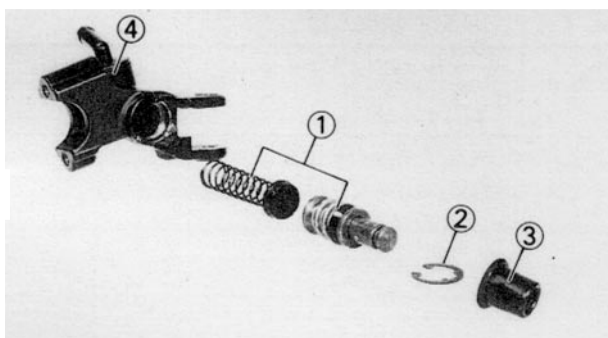


3. Install:

- Master cylinder cup (secondary) ①
- To spring ②

NOTE:

- Insert the spring at the smaller dia. side.
- After installing, cylinder cup should be installed as shown direction. Wrong installation cause improper brake performance.

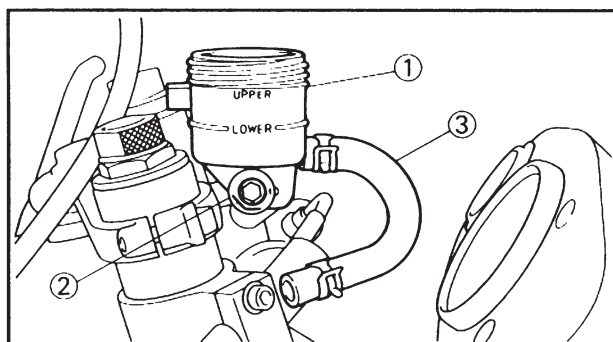


4. Install:

- Master cylinder kit ①
- Circlip ②
- Master cylinder boot ③
- To master cylinder ④.

NOTE:

- Apply the brake fluid on the master cylinder kit.
- When installing the circlip, use a long nose circlip plier.



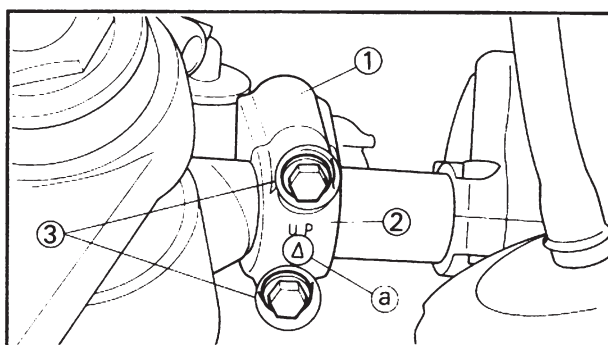
Master cylinder

1. Install:

- Reservoir tank ①
- Bolt (reservoir tank) ②
- Reservoir hose ③



Bolt (reservoir tank):
5 Nm (0.5 m·kg, 3.6 ft·lb)



2. Install:

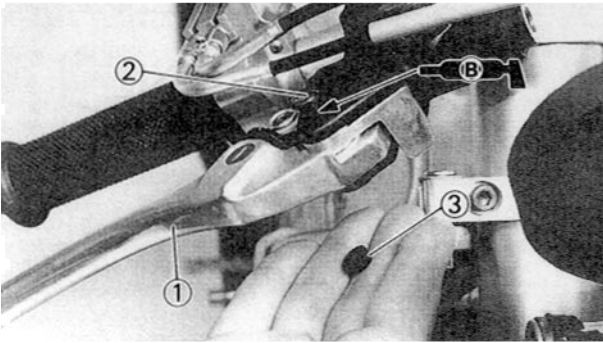
- Master cylinder ①
- Master cylinder bracket ②
- Bolt (master cylinder bracket) ③

NOTE:

Install the bracket so that the arrow mark ① face upward.



Bolt (master cylinder bracket):
8 Nm (0.8 m·kg, 5.8 ft·lb)



3. Install:

- Brake lever ①
- Bolt (brake lever) ②
- Nut (brake lever) ③

NOTE:

- Apply the lithium soap base grease on the bolt.
- When installing the brake lever, apply the molybdenum disulfide grease on the contacting surface of the master cylinder piston.

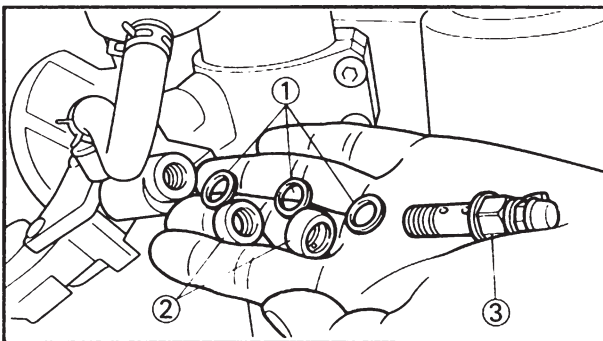


Bolt (brake lever):

1 Nm (0.1 m•kg, 0.7 ft•lb)

Nut (brake lever):

6 Nm (0.6 m•kg, 4.3 ft•lb)



Brake hose

1. Install:

- Copper washer ①
- Brake hose ②
- Union bolt ③

NOTE:

Always use new copper washers.

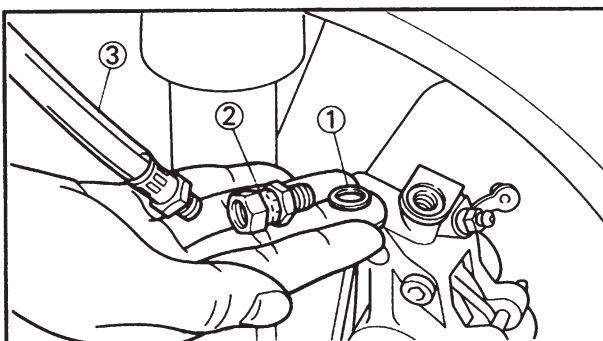
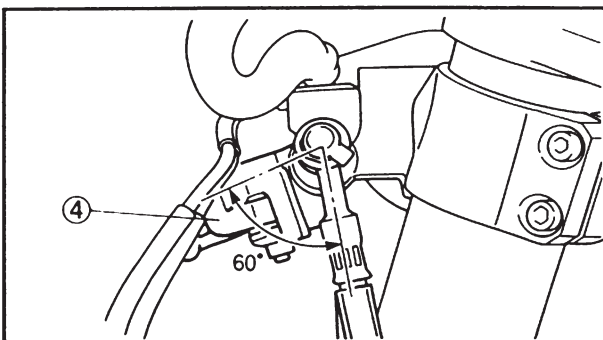
CAUTION:

Install both brake hoses so that they form an angle of 60° to the brake lever ④.



Union bolt:

30 Nm (3.0 m•kg, 22 ft•lb)



2. Install:

- Copper washer ①
- Adapter ②
- Brake hose ③

NOTE:

- Always use a new copper washer.
- When turning the adapter over the brake hose, hold the brake hose so that it may not be twisted.

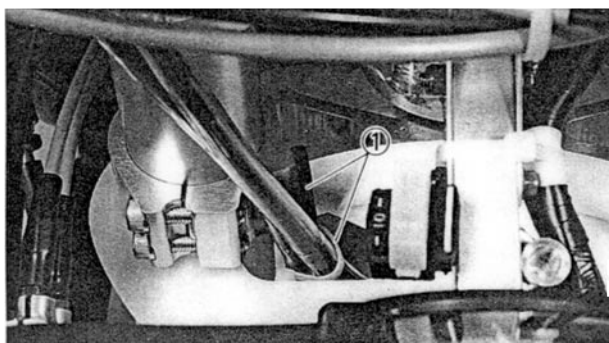


Adapter:

26 Nm (2.6 m•kg, 19 ft•lb)

Brake hose:

14 Nm (1.4 m•kg, 10 ft•lb)



3. Install:

- Clamp ①

Refer to "CABLE ROUTING DIAGRAM" section in the CHAPTER 2.

Brake fluid

1. Fill:

- Brake fluid



Recommended brake fluid:

DOT #4

CAUTION:

Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

! WARNING

- Use only the designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.



2. Air bleed:

- Brake system

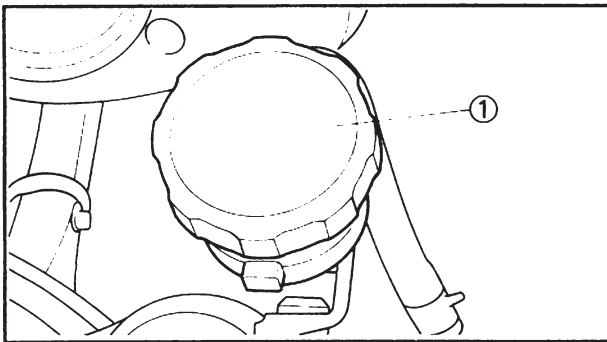
Refer to "BRAKE SYSTEM AIR BLEEDING" section in the CHAPTER 3.

3. Inspect:

- Brake fluid level

Fluid at lower level→Fill up.

Refer to "BRAKE FLUID LEVEL INSPECTION" section in the CHAPTER 3.



4. Install:

- Diaphragm
- Reservoir tank cap ①



MEMO

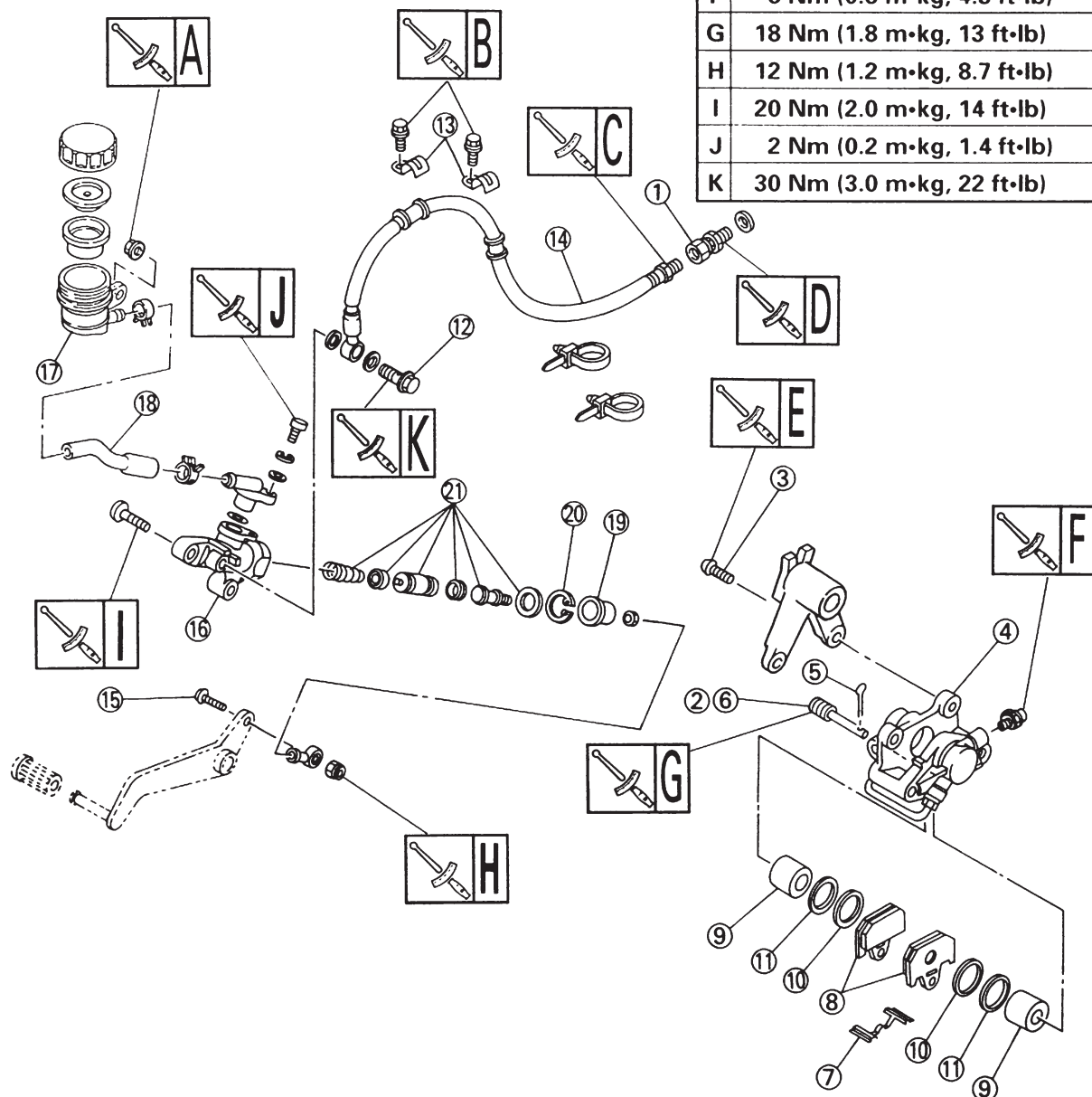
REAR BRAKE

PREPARATION FOR REMOVAL

- * Hold the machine by placing the suitable stand.
- * Remove the seat.

⚠ WARNING

Support the machine securely so there is no danger of it falling over.



PAD WEAR LIMIT: 1.0 mm (0.04 in)

A	7 Nm (0.7 m•kg, 5.1 ft•lb)
B	8 Nm (0.8 m•kg, 5.8 ft•lb)
C	14 Nm (1.4 m•kg, 10 ft•lb)
D	26 Nm (2.6 m•kg, 19 ft•lb)
E	23 Nm (2.3 m•kg, 17 ft•lb)
F	6 Nm (0.6 m•kg, 4.3 ft•lb)
G	18 Nm (1.8 m•kg, 13 ft•lb)
H	12 Nm (1.2 m•kg, 8.7 ft•lb)
I	20 Nm (2.0 m•kg, 14 ft•lb)
J	2 Nm (0.2 m•kg, 1.4 ft•lb)
K	30 Nm (3.0 m•kg, 22 ft•lb)

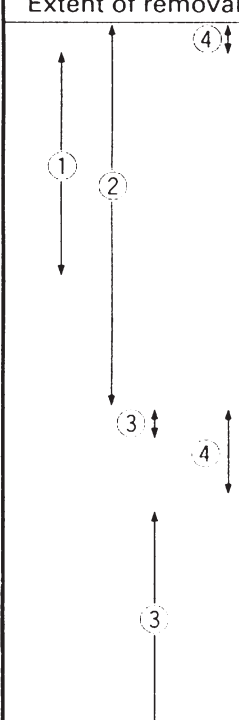
NOTE ON REMOVAL AND REASSEMBLY

⚠ WARNING

Disc brake components rarely require disassembly. DO NOT:

- Disassemble components unless absolutely necessary.
- Use solvents on internal brake component.
- Use contaminated brake fluid for cleaning.
Use only clean brake fluid.
- Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.
- Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.
- Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.

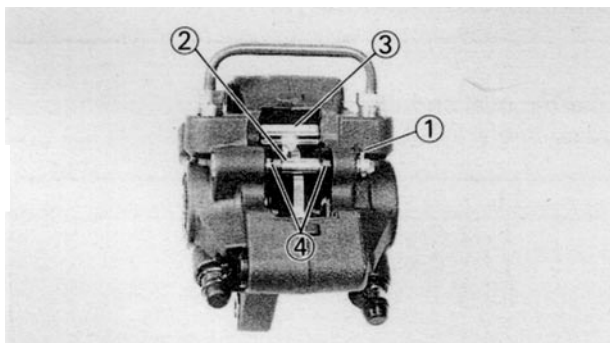
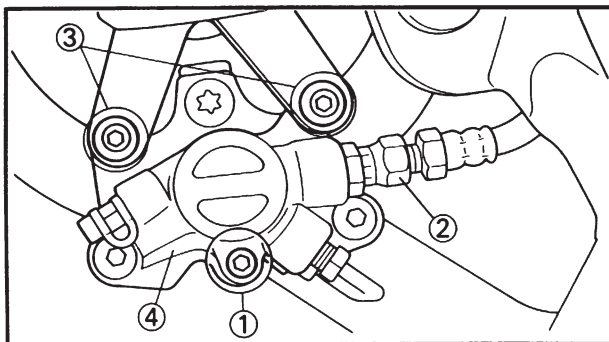
Extent of removal: ① Brake pad removal ② Caliper removal and disassembly
 ③ Master cylinder removal and disassembly ④ Brake hose removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Adapter	1	Drain the brake fluid. Only loosening.
	2	Pad pin	1	
	3	Bolt (caliper)	2	Refer to "REMOVAL POINTS".
	4	Caliper	1	
	5	Cotter pin	1	
	6	Pad pin	1	Use low compressed air. Refer to "REMOVAL POINTS".
	7	Pad support	1	
	8	Brake pad	2	
	9	Caliper piston	2	
	10	Dust seal	2	Refer to "REMOVAL POINTS".
	11	Piston seal	2	
	12	Union bolt	1	Drain the brake fluid.
	13	Brake hose holder	2	
	14	Brake hose	1	
	15	Brake pedal connecting bolt	1	Refer to "REMOVAL POINTS".
	16	Master cylinder	1	
	17	Reservoir tank	1	
	18	Reservoir hose	1	
	19	Master cylinder boot	1	
	20	Circlip	1	
	21	Master cylinder kit	1	

HANDLING NOTE

⚠ WARNING

The brake components of this machine are suit for closed circuit use only. Never use on any public road.



REMOVAL POINTS

Caliper

1. Loosen:
 - Pad pin ①
2. Remove:
 - Adapter ②
 - Bolt (caliper) ③
 - Caliper ④

NOTE:

Loosen the pad pin before removing the caliper from the swingarm.

3. Remove:

- Cotter pin ①
- Pad pin ②
- Pad support ③
- Brake pad ④

Caliper piston

1. Remove:
 - Caliper piston

Use compressed air and proceed carefully.

⚠ WARNING

- Cover piston with rag and use extreme caution when expelling piston from cylinder.
- Never attempt to pry out piston.

Caliper piston removal steps:

- Insert a piece of rag into the caliper to lock one caliper.
- Carefully force the piston out of the caliper cylinder with compressed air.

Piston seal kit

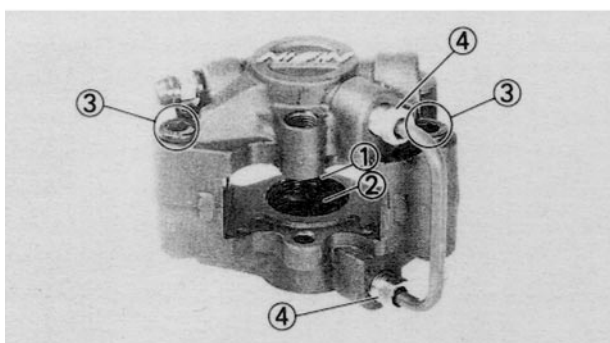
1. Remove:
 - Dust seal ①
 - Piston seal ②

NOTE:

Remove the piston and dust seal by pushing it with a finger.

CAUTION:

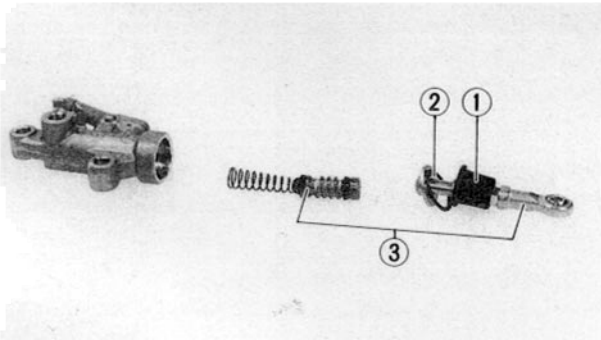
- Never attempt to pry out piston and dust seals.
- Do not loosen the bolts ③ and nuts ④.





⚠ WARNING

Replace the piston seals whenever a caliper is disassembled.



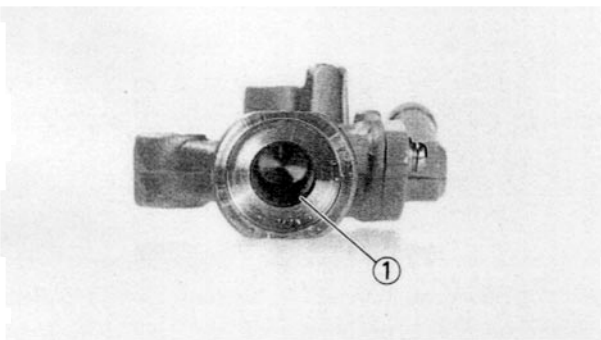
Master cylinder kit

1. Remove:

- Master cylinder boot ①
- Circlip ②
- Master cylinder kit ③

NOTE:

When removing the circlip, use a long nose circlip plier.



INSPECTION

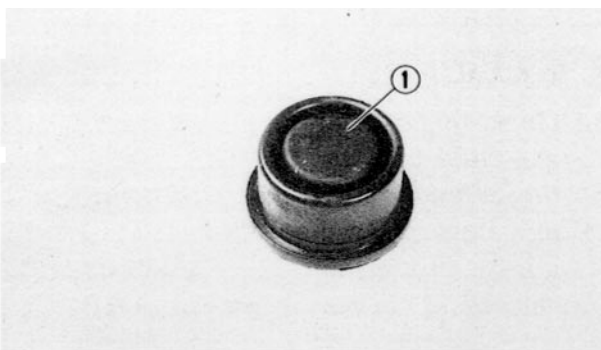
Master cylinder

1. Inspect:

- Master cylinder body ①
Wear/Scratches → Replace master cylinder assembly.
Stains → Clean.

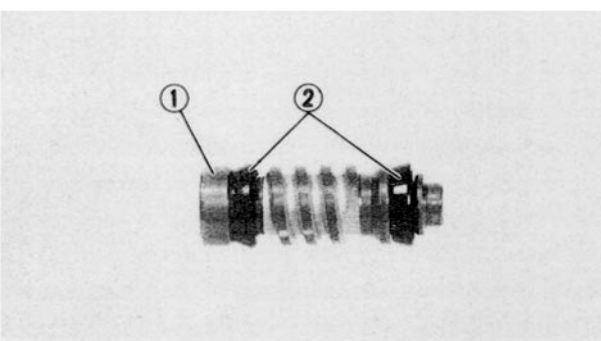
NOTE:

Use new brake fluid.



2. Inspect:

- Diaphragm ①
Crack/Damage → Replace.

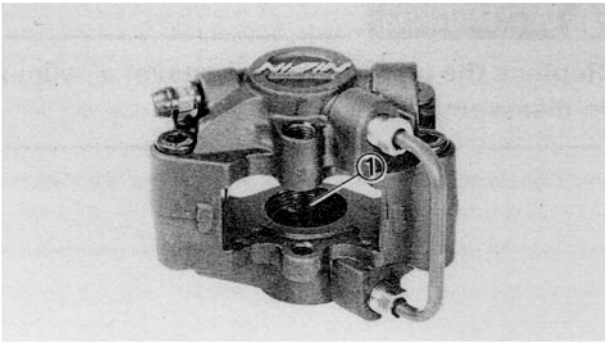


3. Inspect:

- Master cylinder piston ①
- Master cylinder cup ②
Wear/Damage/Score marks → Replace master cylinder kit.

NOTE:

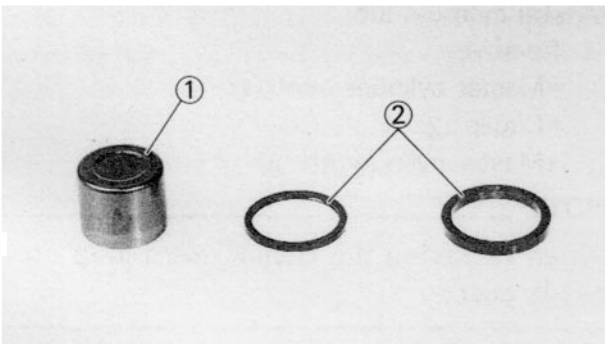
Replace master cylinder piston and cup as a set.



Caliper

1. Inspect:

- Caliper cylinder ①
Wear/Score marks → Replace caliper assembly.

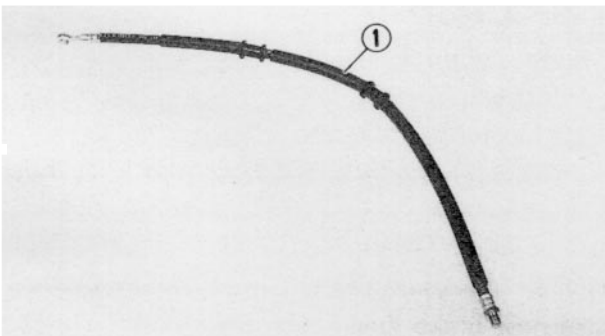


2. Inspect:

- Caliper piston ①
Wear/Score marks → Replace caliper piston assembly.

⚠ WARNING

Replace the piston and dust seals ② whenever a caliper is disassembled.



Brake hose

1. Inspect:

- Brake hose ①
Crack/Damage → Replace.

ASSEMBLY AND INSTALLATION

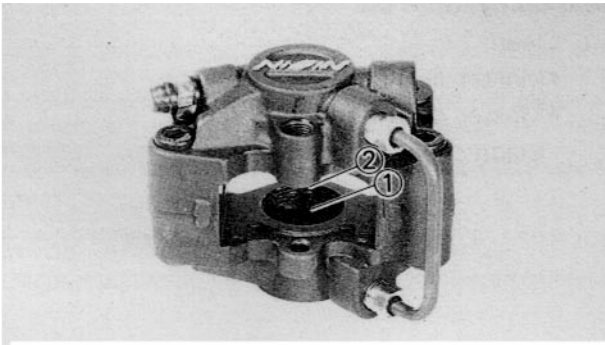
⚠ WARNING

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.
- Replace the piston seal and dust seal whenever a caliper is disassembled.

Caliper piston

1. Clean:

- Caliper
- Piston seal
- Dust seal
- Caliper piston
Clean them with brake fluid.



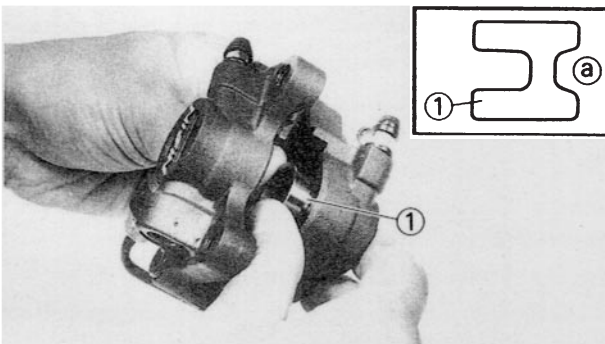
2. Install:
 - Piston seal ①
 - Dust seal ②

NOTE: _____

Fit the piston and dust seal onto the slot on caliper correctly.

⚠ WARNING

Always use new piston and dust seals.



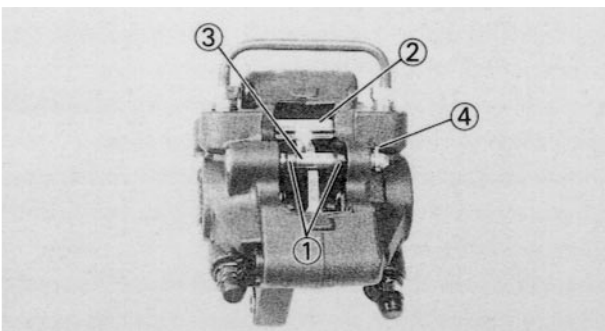
3. Install:
 - Caliper piston ①

NOTE: _____

Apply the brake fluid on the piston wall.

CAUTION:

- Be sure that the shallow depressed side ① face the caliper side.
- Never force to insert.

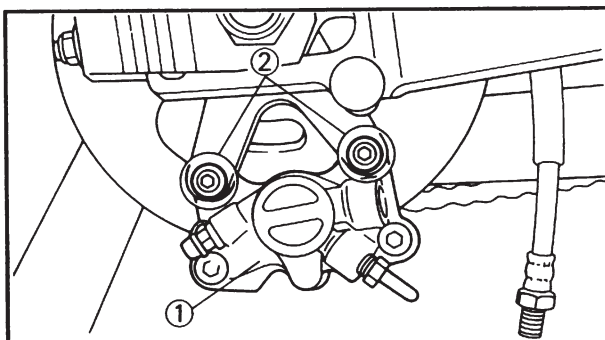


Caliper

1. Install:
 - Brake pad ①
 - Pad support ②
 - Pad pin ③
 - Cotter pin ④

NOTE: _____

- Temporarily tighten the pad pin at this point.
- Always use a new cotter pin.



2. Install:
 - Caliper ①
 - Bolt (caliper) ②



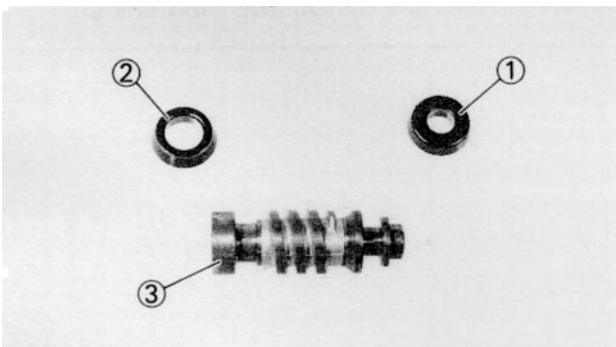
Bolt (caliper):
23 Nm (2.3 m•kg, 17 ft•lb)



Master cylinder kit

1. Clean:

- Master cylinder
 - Master cylinder kit
- Clean them with brake fluid.

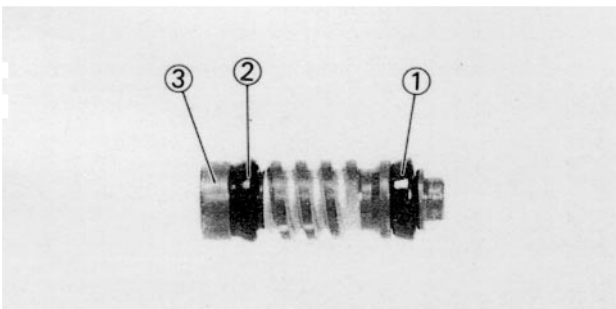


2. Install:

- Master cylinder cup (primary) (1)
 - Master cylinder cup (secondary) (2)
- To master cylinder piston (3).

NOTE:

- Apply the brake fluid on the master cylinder cup.
- After installing, cylinder cup should be installed as shown direction. Wrong installation cause improper brake performance.

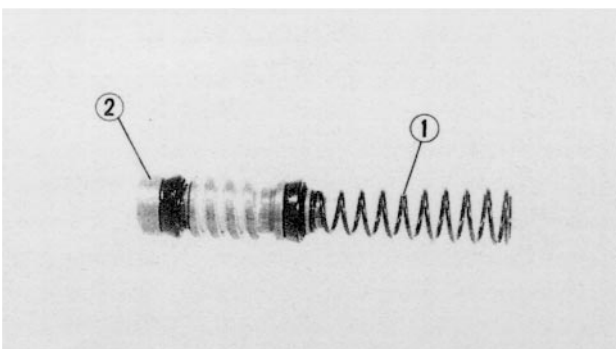


3. Install:

- Spring (1)
- To master cylinder piston (2).

NOTE:

Install the spring at the smaller dia. side.

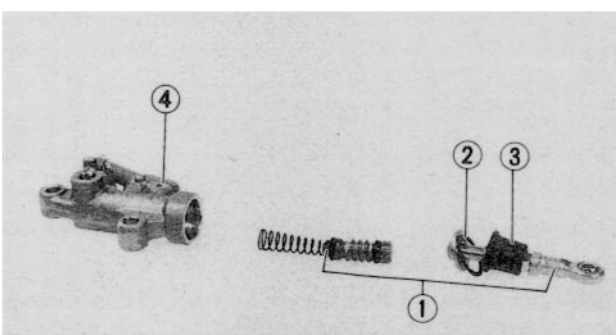


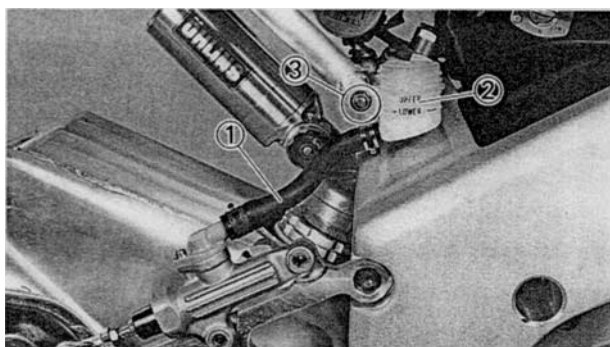
4. Install:

- Master cylinder kit (1)
 - Circlip (2)
 - Master cylinder boot (3)
- To master cylinder (4).

NOTE:

- Apply the brake fluid on the master cylinder kit.
- When installing the circlip, use a long nose circlip plier.





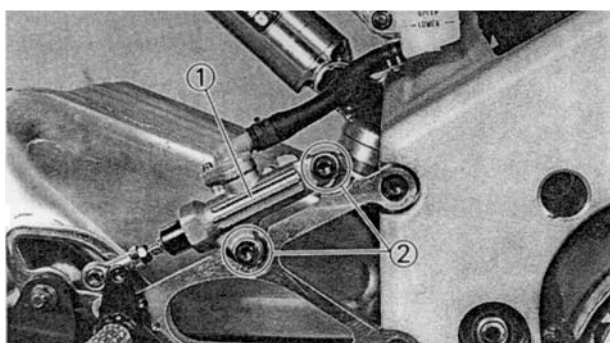
Master cylinder

1. Install:

- Reservoir hose ①
- Reservoir tank ②
- Nut (reservoir tank) ③



Nut (reservoir tank):
7 Nm (0.7 m•kg, 5.1 ft•lb)

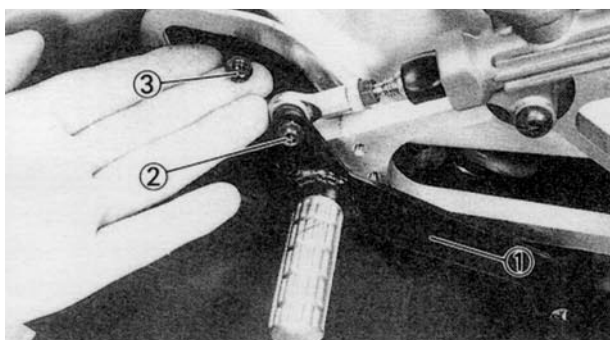


2. Install:

- Master cylinder ①
- Bolt (master cylinder) ②



Bolt (master cylinder):
20 Nm (2.0 m•kg, 14 ft•lb)



3. Install:

- Brake pedal ①
- Brake pedal connecting bolt ②
- Nut (brake pedal connecting bolt) ③

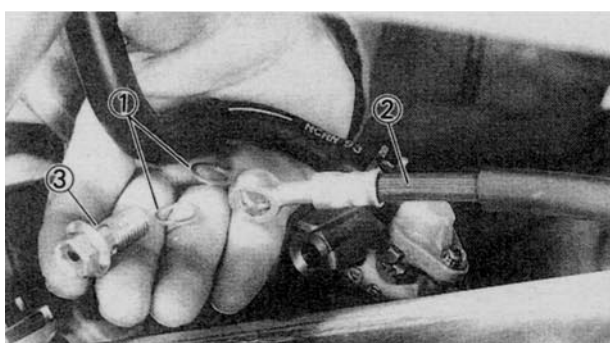


Nut (brake pedal connecting bolt):
12 Nm (1.2 m•kg, 8.7 ft•lb)

NOTE:

After installing, check the brake pedal height.
Refer to "REAR BRAKE ADJUSTMENT" section
in the CHAPTER 3.

5



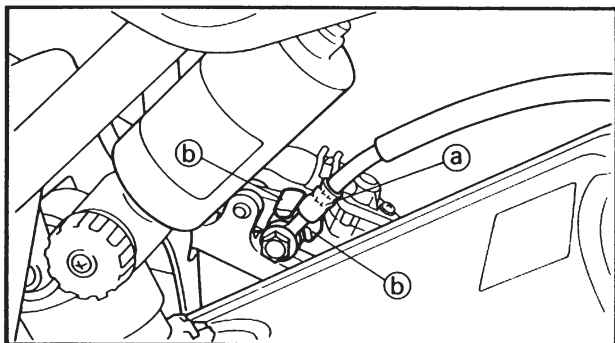
Brake hose

1. Install:

- Copper washer ①
- Brake hose ②
- Union bolt ③

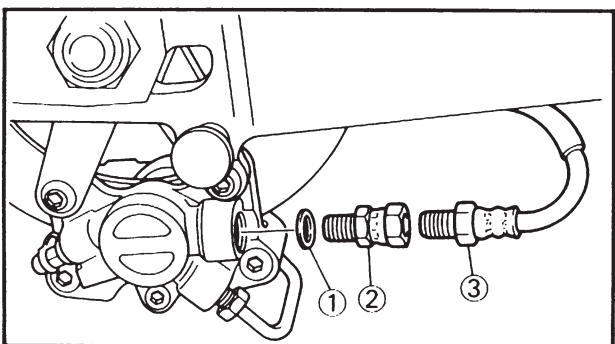
NOTE:

Always use new copper washers.



CAUTION:

When installing the brake hose to the master cylinder, lightly touch the brake pipe **a** with the projection **b** on the master cylinder.



Union bolt:

30 Nm (3.0 m•kg, 22 ft•lb)

2. Install:

- Copper washer **1**
- Adapter **2**
- Brake hose **3**

NOTE:

- Always use a new copper washer.
- When turning the adapter over the brake hose, hold the brake hose so that it may not be twisted.



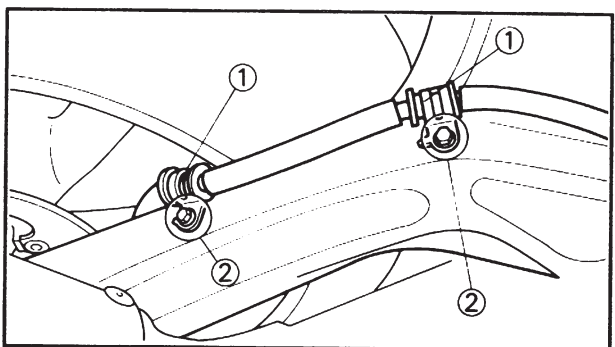
Adapter:

26 Nm (2.6 m•kg, 19 ft•lb)

Brake hose:

14 Nm (1.4 m•kg, 10 ft•lb)

5



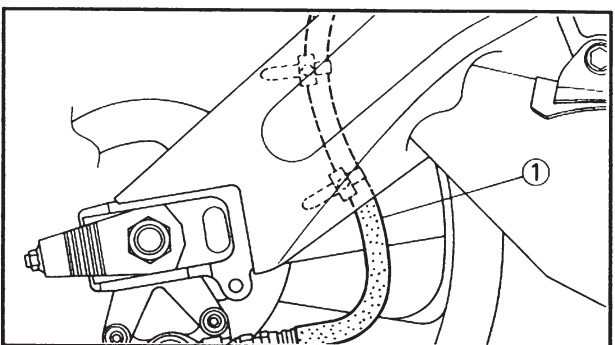
3. Install:

- Brake hose holder **1**
- Bolt (brake hose holder) **2**



Bolt (brake hose holder):

8 Nm (0.8 m•kg, 5.8 ft•lb)



4. Clamp:

- Brake hose **1**



Brake fluid

1. Fill:

- Brake fluid



Recommended brake fluid:
DOT #4

CAUTION:

Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

WARNING

- Use only the designated quality brake fluid; otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.

2. Air bleed:

- Brake system

Refer to "BRAKE SYSTEM AIR BLEEDING" section in the CHAPTER 3.

3. Inspect:

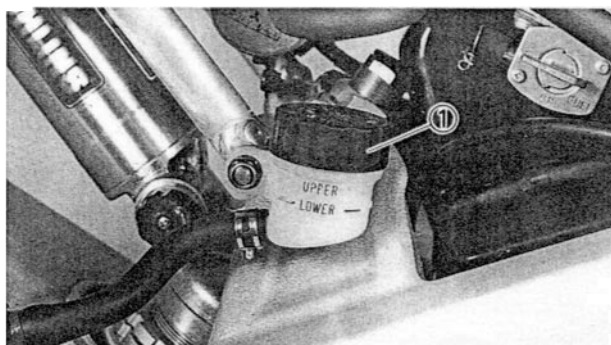
- Brake fluid level

Fluid at lower level → Fill up.

Refer to "BRAKE FLUID LEVEL INSPECTION" section in the CHAPTER 3.

4. Install:

- Diaphragm
- Reservoir tank cap ①



FRONT FORK PREPARATION FOR REMOVAL

* Hold the machine by placing the suitable stand.

⚠ WARNING

Support the machine securely so there is no danger of it falling over.

* Remove the following parts:

- Cowling
- Front brake caliper
- Front wheel
- Induction guide (left cylinder)

FORK OIL (EACH FORK) CAPACITY:
386 cm³ (13.6 Imp oz, 13.1 US oz)

RECOMMENDED OIL:
Suspension oil "01"

FORK OIL LEVEL

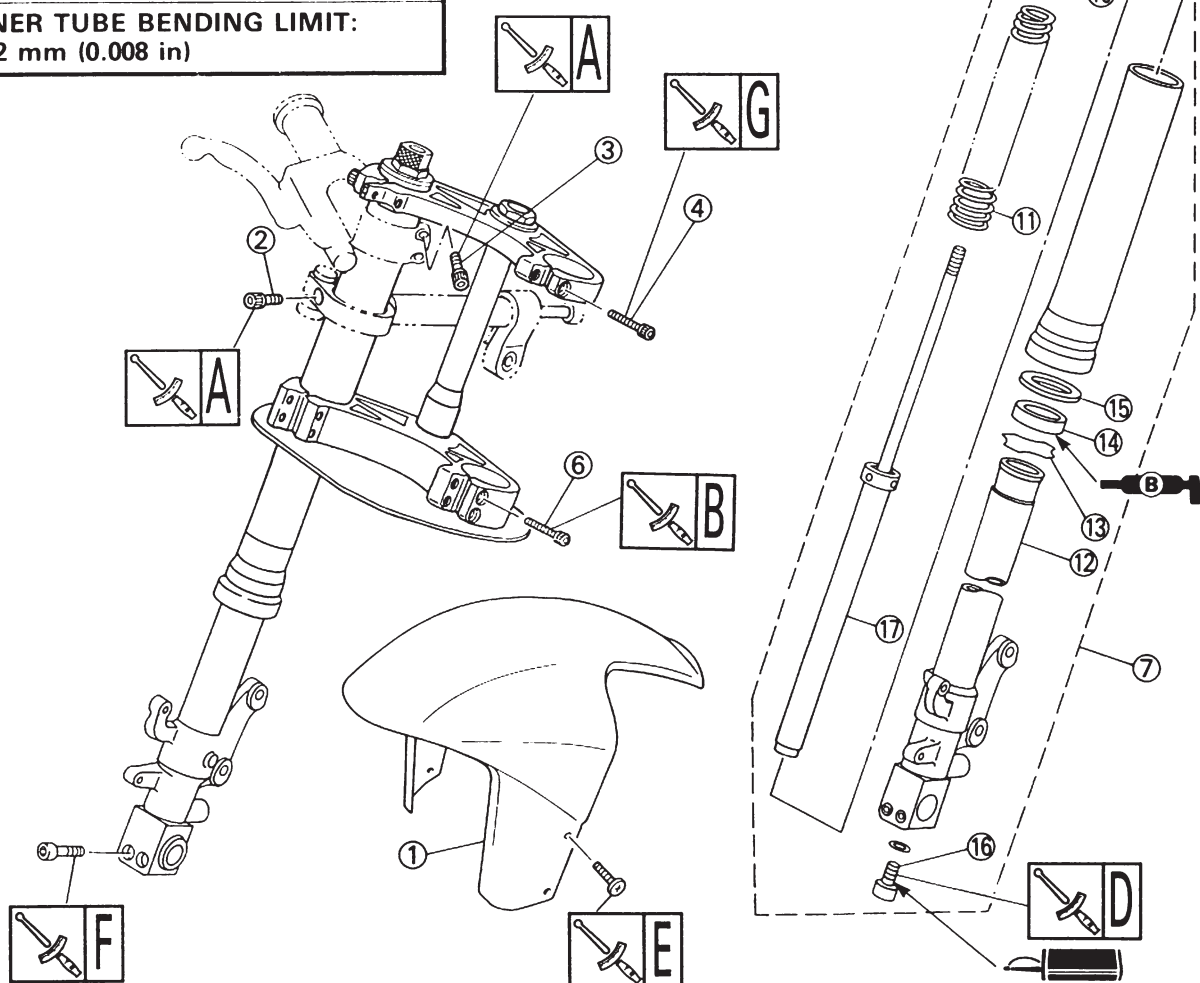
STANDARD	135 mm (5.31 in)
MINIMUM	157 mm (6.18 in)
MAXIMUM	97 mm (3.82 in)

From top of outer tube with inner tube and damper rod fully compressed without spring.

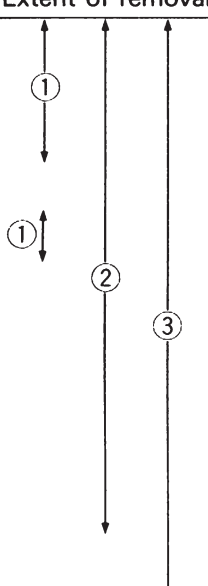
FORK SPRING FREE LENGTH LIMIT:
210.5 mm (8.29 in)

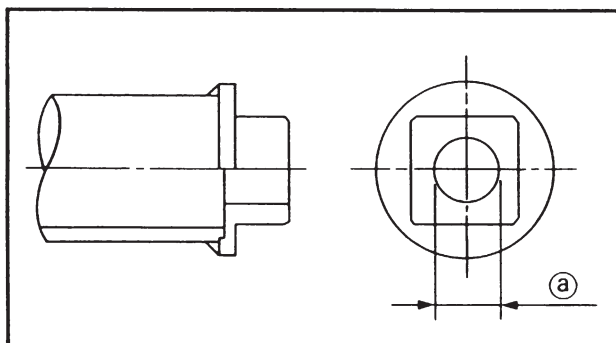
INNER TUBE BENDING LIMIT:
0.2 mm (0.008 in)

A	7 Nm (0.7 m•kg, 5.1 ft•lb)
B	23 Nm (2.3 m•kg, 17 ft•lb)
C	29 Nm (2.9 m•kg, 21 ft•lb)
D	40 Nm (4.0 m•kg, 29 ft•lb)
E	8 Nm (0.8 m•kg, 5.8 ft•lb)
F	11 Nm (1.1 m•kg, 8.0 ft•lb)
G	20 Nm (2.0 m•kg, 14 ft•lb)



Extent of removal: ① Front fork removal ② Oil seal removal ③ Front fork disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Front fender	1	
	2	Pinch bolt (steering damper stay)	1	Only loosening. (right side only)
	3	Pinch bolt (handlebar)	2	Only loosening.
	4	Pinch bolt (handle crown)	1	Only loosening.
	5	Cap bolt	1	Only loosening.
	6	Pinch bolt (under bracket)	2	Only loosening.
	7	Front fork	1	
	8	Cap bolt	1	Use special tool. Refer to "REMOVAL POINTS".
	9	Spacer	1	
	10	Spacer guide	1	
	11	Fork spring	1	Drain the fork oil.
	12	Inner tube	1	
	13	Stopper ring	1	Refer to "REMOVAL POINTS".
	14	Oil seal	1	
	15	Oil seal washer	1	
	16	Bolt (damper rod)	1	Use special tool.
	17	Damper rod	1	Refer to "REMOVAL POINTS".



HANDLING NOTE

NOTE:

- With the 97 or later models, the damper rod diameter is 12.5 mm (0.49 in). If the dimension ① of your damper rod holders is 12 mm (0.47 in), drill it to expand its diameter to 14 mm (0.55 in).
- The front fork requires careful attention. So it is recommended that the front fork be maintained at the dealers.

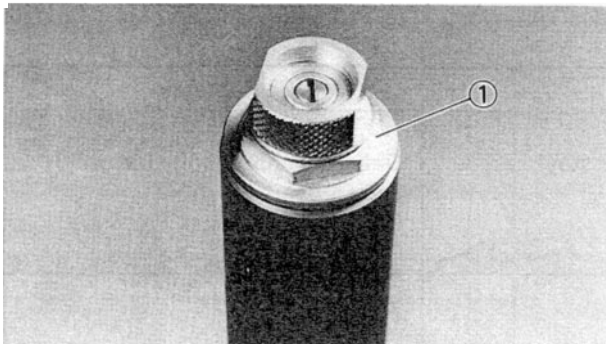
CAUTION:

To prevent an accidental explosion of air, the following instructions should be observed:

- The front fork with a built-in piston rod has a very sophisticated internal construction and is particularly sensitive to foreign material.

Use enough care not to allow any foreign material to come in when the oil is replaced or when the front fork is disassembled and reassembled.

- Before removing the cap bolts or front forks, be sure to extract the air from the air chamber completely.



EC553000

REMOVAL POINTS

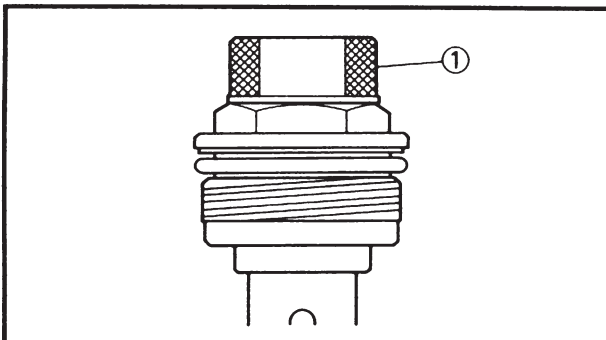
EC553141

Cap bolt

1. Remove:
 - Cap bolt ①
 From the outer tube.

NOTE:

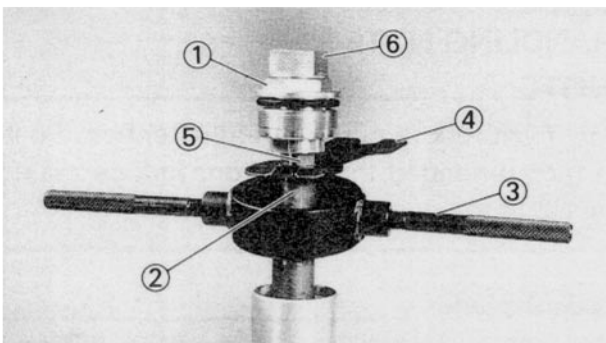
Before removing the front fork from the machine, loosen the cap bolt.



2. Loosen:
 - Spring preload adjuster ①

NOTE:

Record the set position of the adjuster (the amount of turning out the adjuster to the fully turned out position) before loosening it.

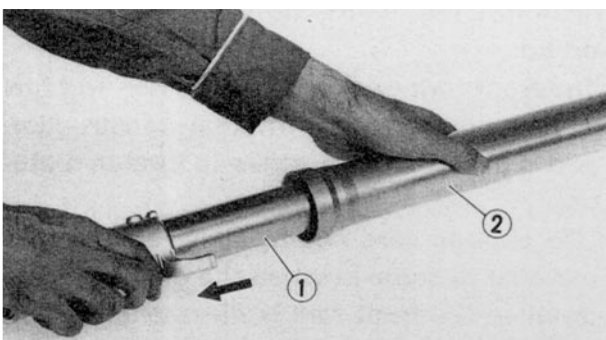


3. Remove:
 - Cap bolt ①

NOTE:

- While pressing down the spacer ② with the fork spring compressor ③ set the rod holder ④ between the locknut ⑤ and spacer.
- Hold the locknut and remove the cap bolt by turning the spring preload adjuster ⑥.

5

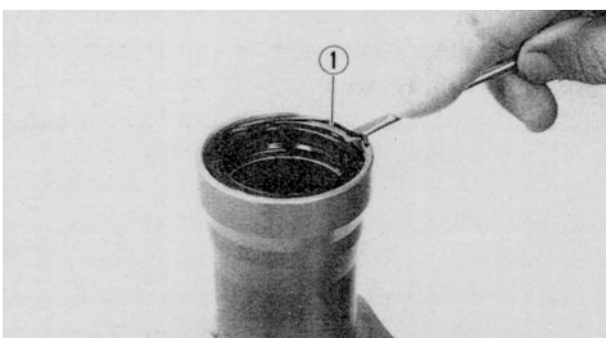


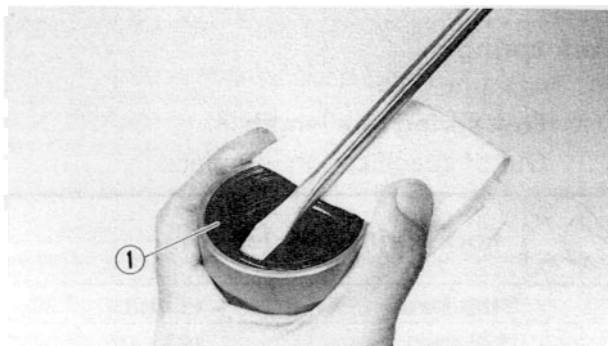
Fork spring compressor:
YM-01441/90890-01441
Rod holder:
YM-01434/90890-01434

EC553211

Oil seal

1. Remove:
 - Inner tube ①
 Pull out the inner tube from the outer tube ②.
2. Remove:
 - Stopper ring ①
 Using slotted-head screwdriver.





3. Remove:

- Oil seal ①

Using slotted-head screwdriver.

CAUTION:

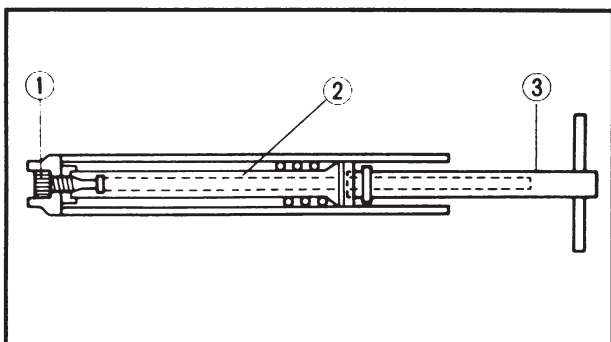
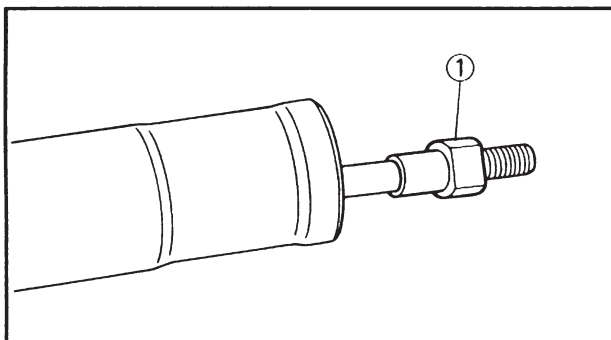
- Take care not to scratch the outer tube inner surface.
- Replace the oil seal whenever removed.

EC553321

Damper rod

1. Remove:

- Locknut ①



2. Remove:

- Bolt (damper rod) ①
- Damper rod ②

NOTE:

Use a damper rod holder ③ to lock the damper rod.



Damper rod holder:

YM-01425/90890-01425

EC554000

INSPECTION

EC554100

Damper rod

1. Inspect:

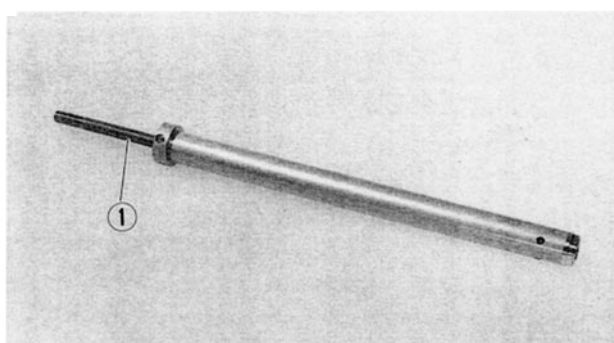
- Damper rod ①

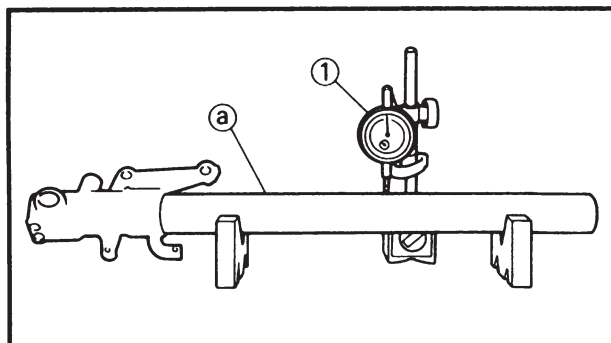
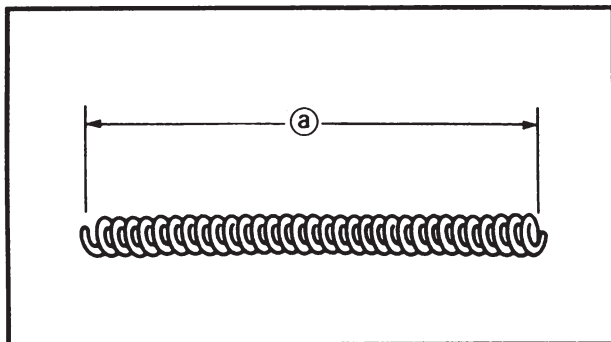
Bend/Damage→Replace damper rod.

CAUTION:

The front fork with a built-in piston rod has a very sophisticated internal construction and is particularly sensitive to foreign material.

Use enough care not to allow any foreign material to come in when the oil is replaced or when the front fork is disassembled and reassembled.





EC554400

Fork spring

1. Measure:

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



Fork spring free length:

Standard	<Limit>
212.5 mm (8.37 in)	210.5 mm (8.29 in)

EC554502

Inner tube

1. Inspect:

- Inner tube surface (a)
Score marks →Repair or replace.
Use #1,000 grit wet sandpaper.
Damaged oil lock piece →Replace.
- Inner tube bends
Out of specification →Replace.
Use the dial gauge (1).



Inner tube bending limit:
0.2 mm (0.008 in)

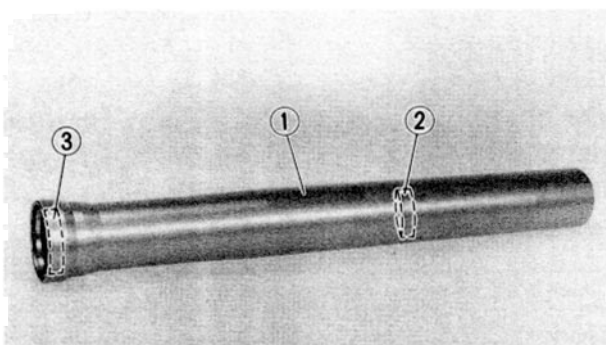
NOTE: _____

The bending value is shown by one half of the dial gauge reading.

⚠ WARNING _____

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

5

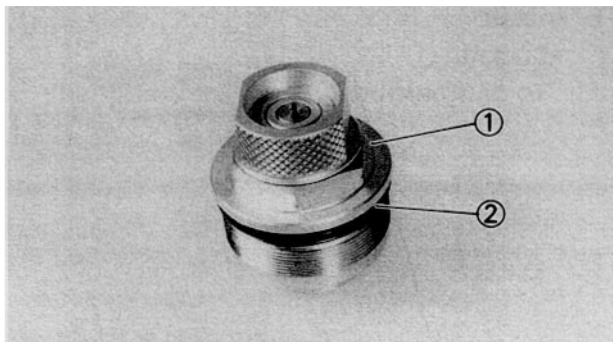


EC554610

Outer tube

1. Inspect:

- Outer tube (1)
Damage →Replace.
- Piston metal (2)
- Slide metal (3)
Score marks/Wear →Replace the outer tube.



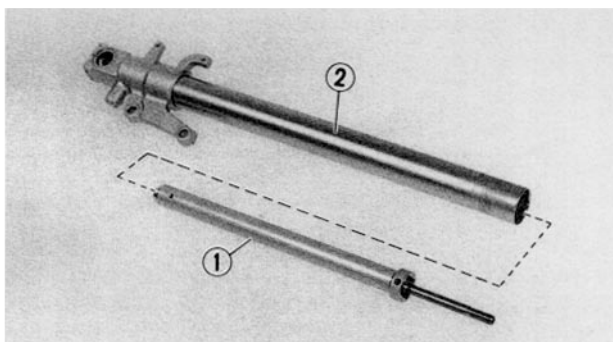
EC554710

Cap bolt

1. Inspect:

- Cap bolt ①
- O-ring ②

Wear/Damage→Replace.



EC555000

ASSEMBLY AND INSTALLATION

EC555161

Front fork assembly

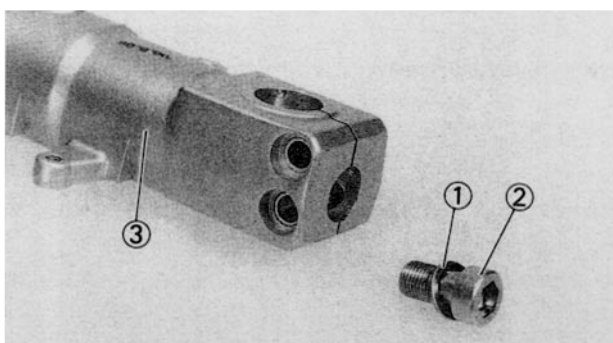
1. Wash the all parts in a clear solvent.

2. Install:

- Damper rod ①
- To inner tube ②.

CAUTION:

To install the damper rod into the inner tube, hold the inner tube aslant. If the inner tube is held vertically, the damper rod may fall into it, damaging the valve inside.



3. Install:

- Copper washer ①
- Bolt (damper rod) ②
- To inner tube ③.

NOTE:

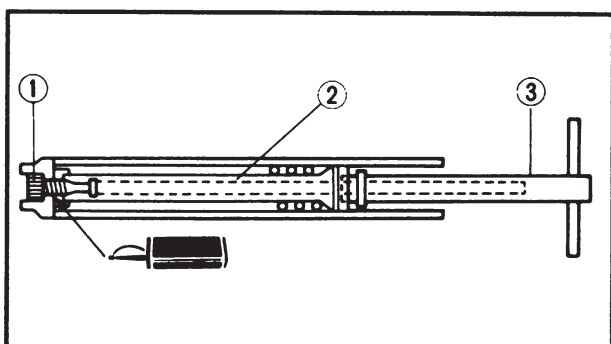
Always use a new copper washer.

4. Tighten:

- Bolt (damper rod) ①

NOTE:

Use a damper rod holder ③ to lock the damper rod ②.



Damper rod holer:

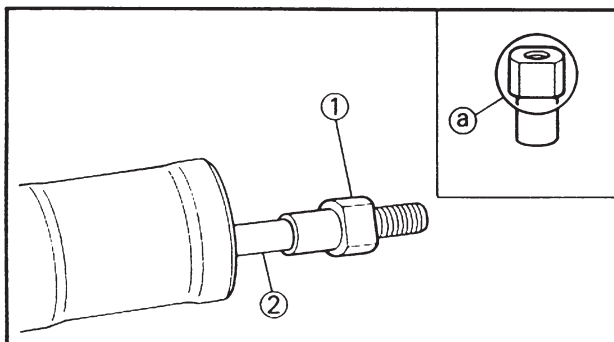
YM-01425/90890-01425



Bolt (damper rod):

40 Nm (4.0 m•kg, 29 ft•lb)

LOCTITE®

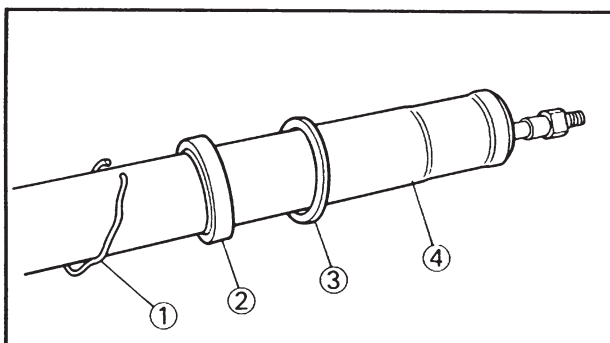


5. Install:

- Locknut ①
- To damper rod ②.

NOTE:

Install the locknut with its width across flat (a) facing upward.

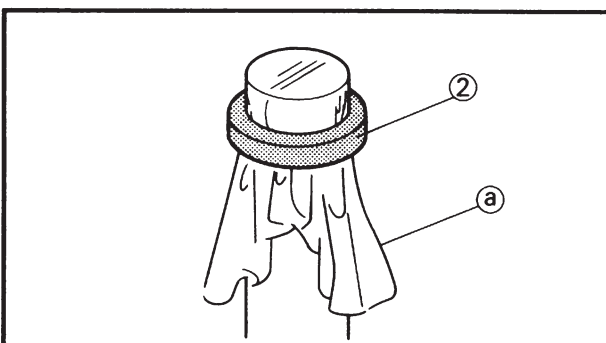


6. Install:

- Stopper ring ①
- Oil seal ②
- Oil seal washer ③
- To inner tube ④.

NOTE:

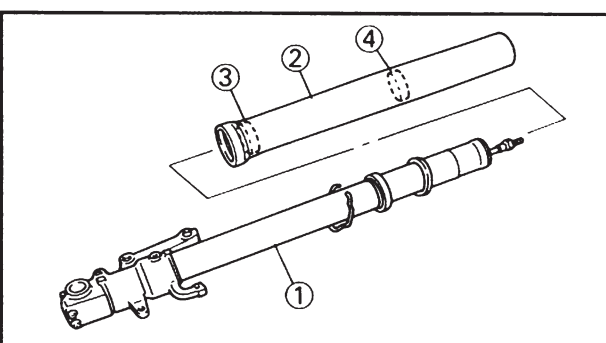
- Apply the fork oil on the inner tube.
- When installing the oil seal, use vinyl seat (a) with fork oil applied to protect the oil seal lip.
- Install the oil seal with its manufacture's marks or number facing the axle holder side.



CAUTION:

Always use a new oil seal.

5

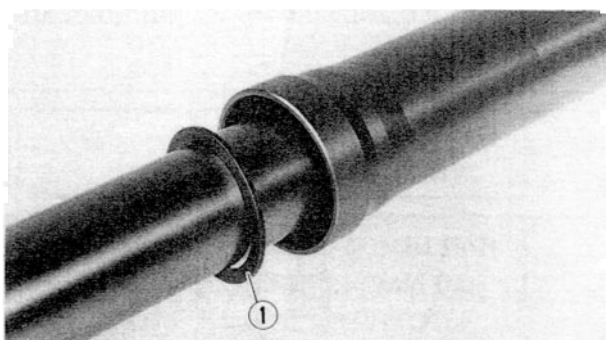


7. Install:

- Inner tube ①
- To outer tube ②.

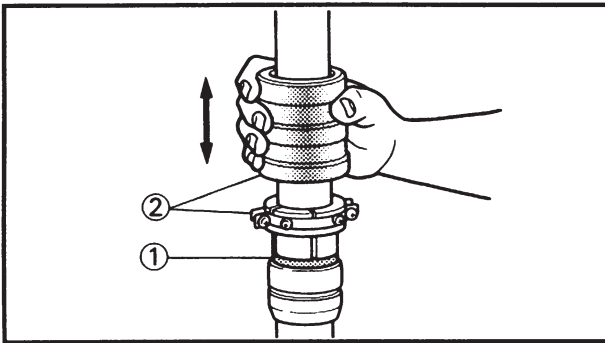
CAUTION:

When installing the inner tube, slowly and take care to insert it carefully so that the slide metal ③ and piston metal ④ will not be scratched.



8. Install:

- Oil seal washer ①
- To outer tube slot.



9. Install:

- Oil seal ①

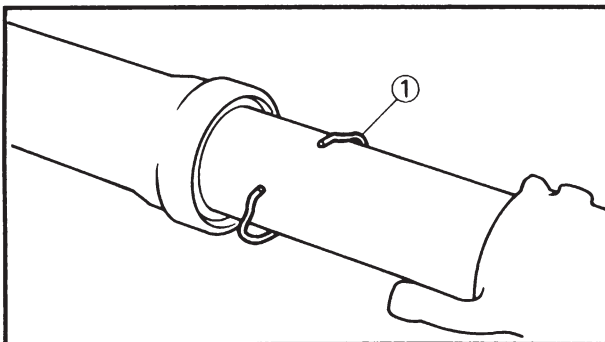
NOTE: _____

Press the oil seal into the outer tube with fork seal driver ②.



Fork seal driver:

YM-01442/90890-01442

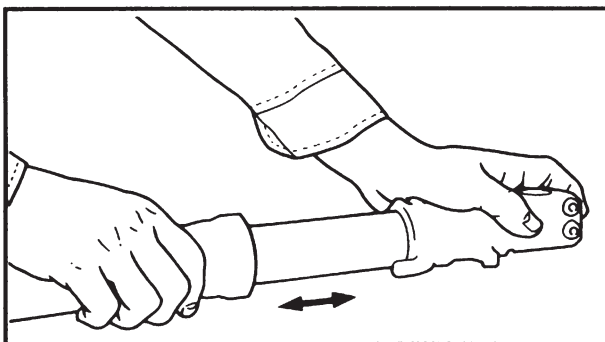


10. Install:

- Stopper ring ①

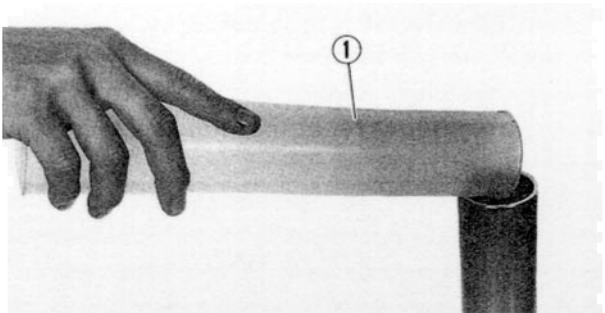
NOTE: _____

Fit the stopper ring correctly in the groove in the outer tube.



11. Check:

- Inner tube smooth movement
Tightness/Binding/Rough spots→Repeat the steps 2 to 10.



12. Compress the front fork fully.

13. Fill:

- Front fork oil
Until outer tube top surface with recommended fork oil ①.

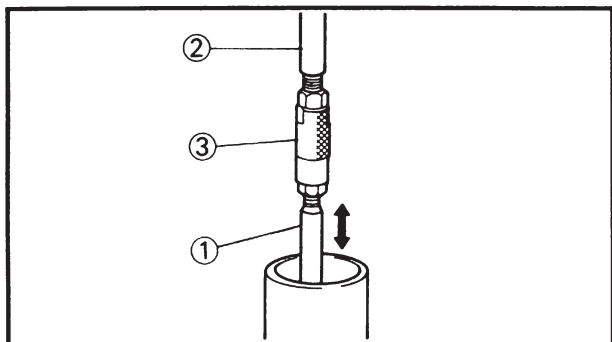


Recommended oil:

Suspension oil "01"

CAUTION: _____

- Be sure to use recommended fork oil. If other oils are used, they may have an excessively adverse effect on the front fork performance.
- Never allow foreign materials to enter the front fork.



14. After filling, pump the damper rod ① slowly up and down more than 10 times to distribute the fork oil.

NOTE:

Use the rod puller ② and rod puller attachment ③ to pull up and down the damper rod.



Rod puller:

YM-01437/90890-01437

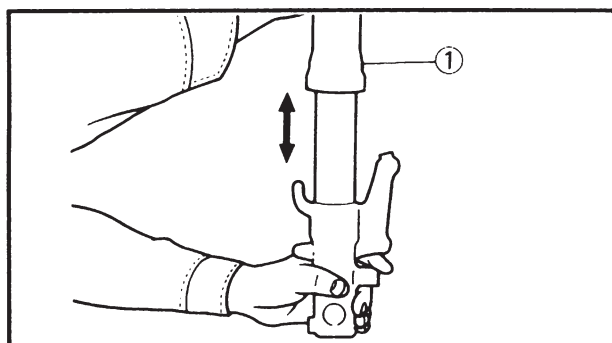
Rod puller attachment:

90890-01435

15. Fill:

- Front fork oil

Until outer tube top surface with recommended fork oil once more.



16. After filling, pump the outer tube ① slowly up and down (about 60 mm (2.4 in) stroke) to distribute the fork oil once more.

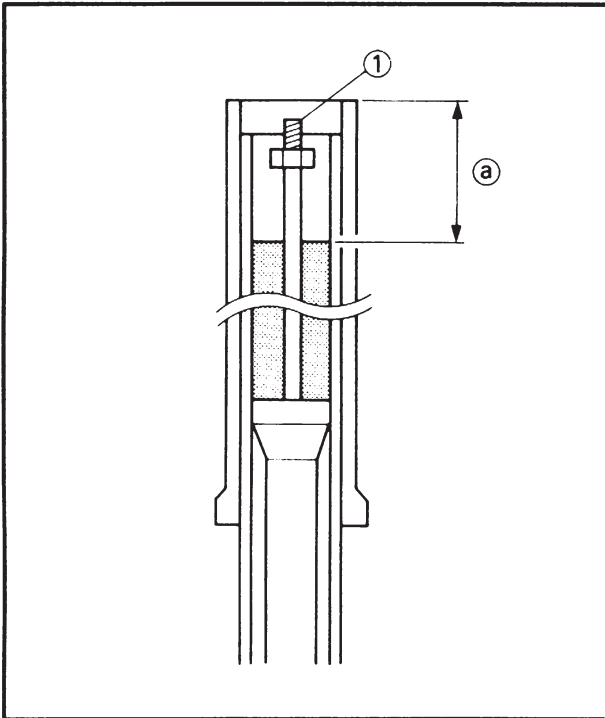
NOTE:

Be careful not to excessive full stroke. A stroke of 60 mm (2.4 in) or more will cause air to enter. In this case, repeat the steps 13 to 16.

17. Wait ten minutes until the air bubbles have been removed from the front fork, and the oil has dispense evenly in system before setting recommended oil level.

NOTE:

Fill with the fork oil up to the top end of the outer tube, or the fork oil will not spread over to every part of the front forks, thus making it impossible to obtain the correct level. Be sure to fill with the fork oil up to the top of the outer tube and bleed the front forks.



18. Measure:

- Oil level (left and right) ①
- Out of specifaicon→Adjust.



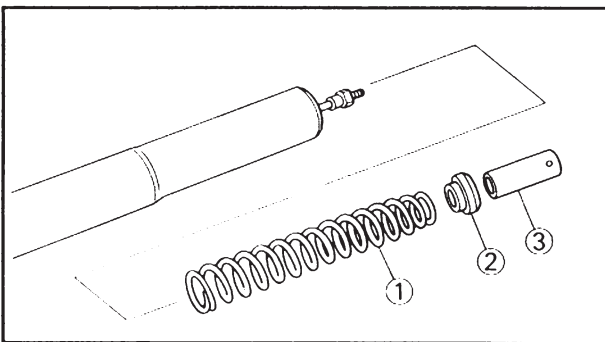
Fork oil level:

Standard	135 mm (5.31 in)
Minimum	157 mm (6.18 in)
Maximum	97 mm (3.82 in)

From top of outer tube with inner tube and damper rod ① fully compressed without spring.

⚠WARNING

Never fail to make the oil level adjustment between the maximum and minimum level and always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.

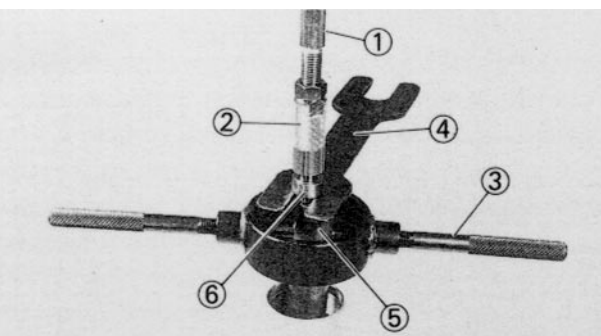


19. Install:

- Fork spring ①
- Spacer guide ②
- Spacer ③

NOTE:

Install the fork spring with its smaller dia. portion upward.



20. Attach:

- Rod puller ①
- Rod puller attachment ②
- Fork spring compressor ③
- Rod holder ④

NOTE:

- Pull up the damper rod with the rod puller and rod puller attachment.
- While pressing down the spacer ⑤ with the fork spring compressor, set the rod holder between the locknut ⑥ and spacer.



Rod puller:

YM-01437/90890-01437

Rod puller attachment:

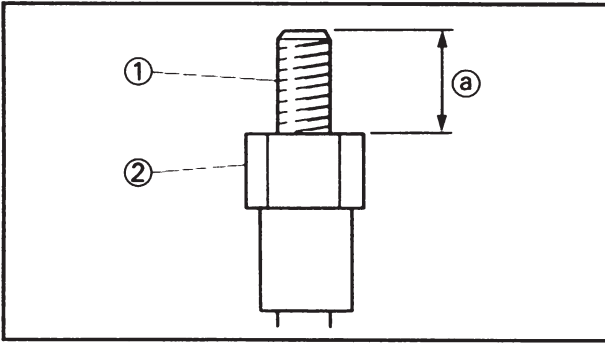
90890-01435

Fork spring compressor:

YM-01441/90890-01441

Rod holder:

YM-01434/90890-01434



21. Adjust:

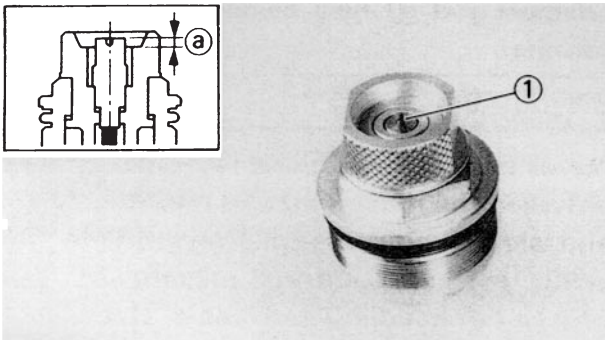
- Distance ①

Out of specification → Turn the locknut ② until the specified distance is obtained.



Distance ①:

12 mm (0.47 in) or more
Between damper rod ① top
and locknut ② top.



22. Adjust:

- Rebound damping adjuster position ①

Out of specification → Turn the adjuster ① until the specified position is obtained.



Rebound damping adjuster position ①:

Zero mm (Zero in)

NOTE:

Record the set position of the adjuster (the amount of turning in the adjuster to the fully turned in position) before adjusting it.

CAUTION:

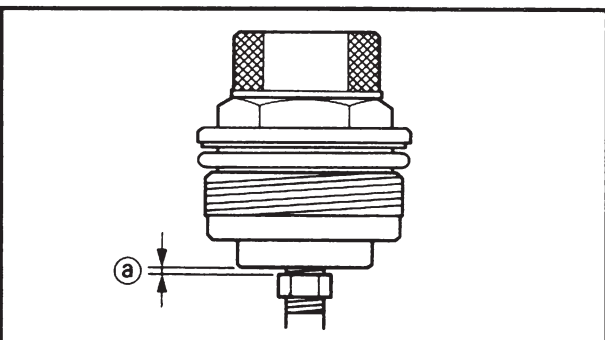
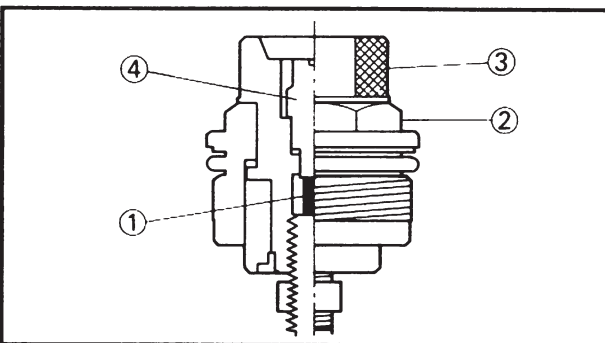
If the rebound damping adjuster position is out of specification, proper damping force cannot be obtained.

23. Install:

- Push rod ①
- Cap bolt ②

NOTE:

Turn in the cap bolt fully by holding the spring preload adjuster ③ with your hand until the rebound damping adjuster ④ hits the push rod tip.



24. Check:

- Cap bolt clearance ①

Out of specification → Repeat the steps 21 to 23.

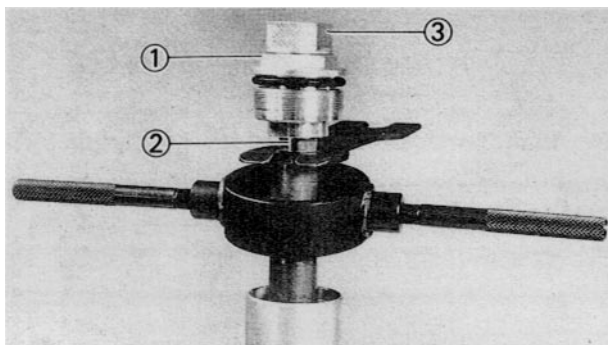


Cap bolt clearance ①:

Zero~2 mm (Zero~0.08 in)

CAUTION:

If the cap bolt is installed out of specification, proper damping force cannot be obtained.



25. Install:

- Cap bolt ①

NOTE:

Hold the locknut ② and tighten the cap bolt by turning the spring preload adjuster ③ with specified torque.

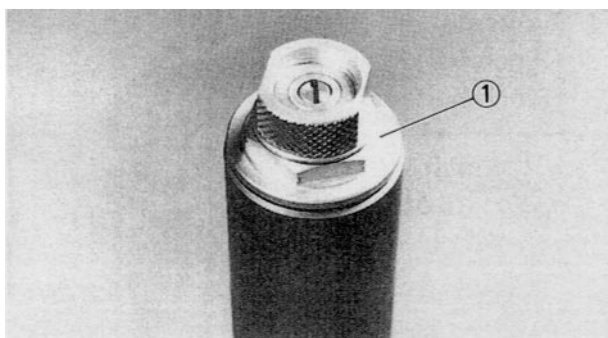
CAUTION:

Do not tighten the cap bolt. It may cause damage to the spring preload adjuster.



Cap bolt (locknut):

29 Nm (2.9 m•kg, 21 ft•lb)

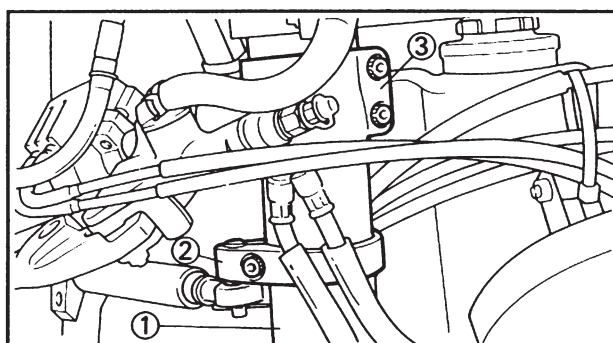


26. Install:

- Cap bolt ①
- To outer tube.

NOTE:

Temporarily tighten the cap bolt.



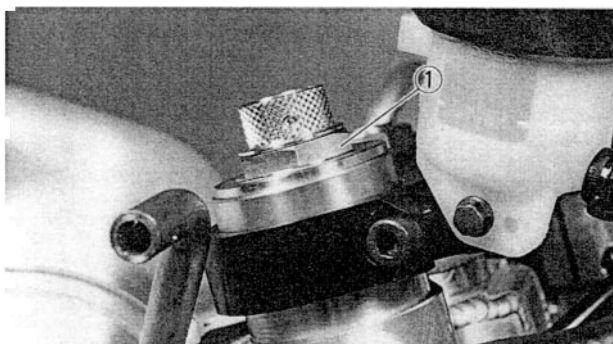
Installation

1. Install:

- Front fork ①
- Steering damper stay ② (right side only)
- Handlebar ③

NOTE:

- Temporarily tighten the pinch bolt (under bracket).
- Do not tighten the pinch bolts (handle crown, steering damper stay and handlebar) yet.



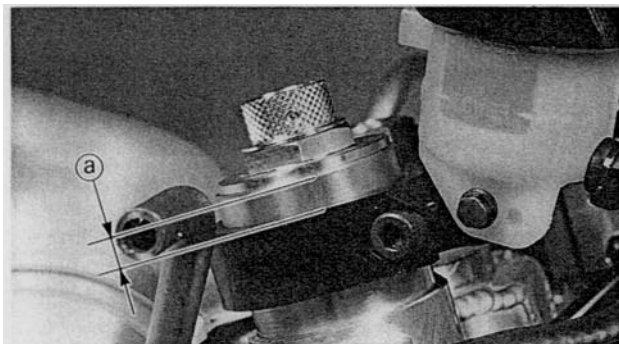
2. Tighten:

- Cap bolt ①



Cap bolt:

23 Nm (2.3 m•kg, 17 ft•lb)



3. Adjust:

- Front fork top end (a)



Front fork top end (a):

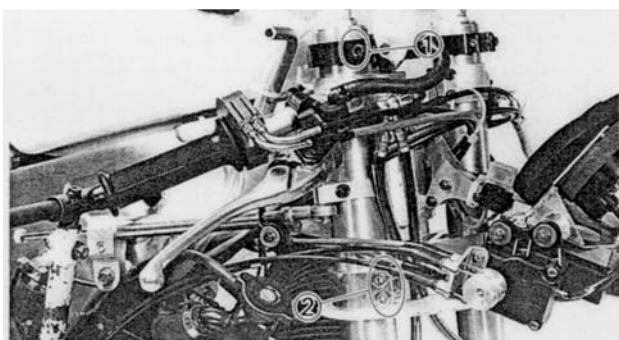
Standard	Extent of adjustment
10 mm (0.39 in)	Zero~16 mm (Zero~0.63 in)

CAUTION:

Never attempt to install the front fork beyond the maximum or minimum setting.

WARNING

Always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.



4. Tighten:

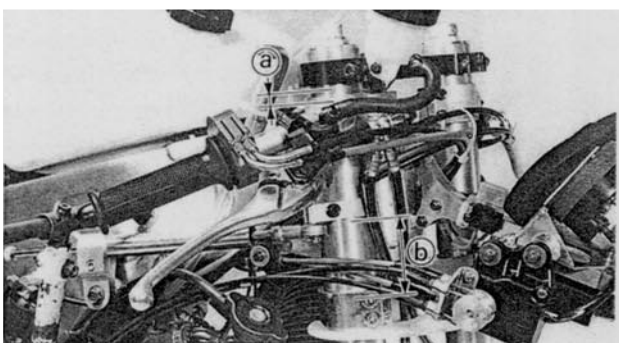
- Pinch bolt (handle crown) ①
- Pinch bolt (under bracket) ②



Pinch bolt (handle crown):
20 Nm (2.0 m·kg, 14 ft·lb)
Pinch bolt (under bracket):
23 Nm (2.3 m·kg, 17 ft·lb)

CAUTION:

Tighten the pinch bolts to specified torque. If torqued too much, it may cause the front fork to malfunction.

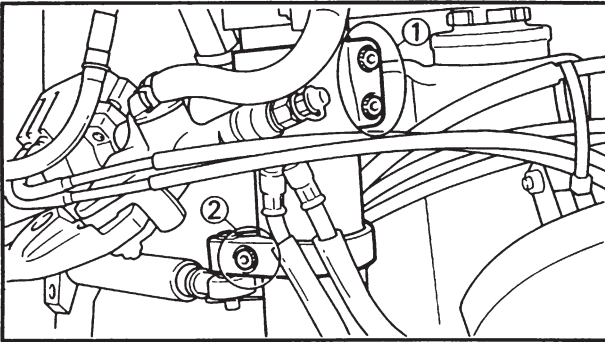


5. Adjust:

- Handlebar position (a)
- Steering damper stay position (b) (right side only)



Handlebar position (a):
9 mm (0.35 in)
Steering damper stay position (b):
73 mm (2.87 in)



6. Tighten:

- Pinch bolt (handlebar) ①
- Pinch bolt (steering damper stay) ② (right side only)



Pinch bolt (handlebar):

7 Nm (0.7 m·kg, 5.1 ft·lb)

Pinch bolt (steering damper stay):

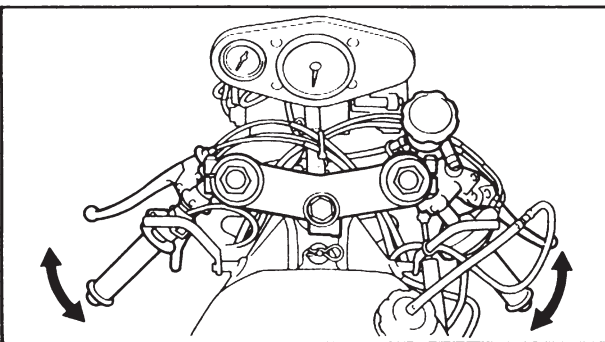
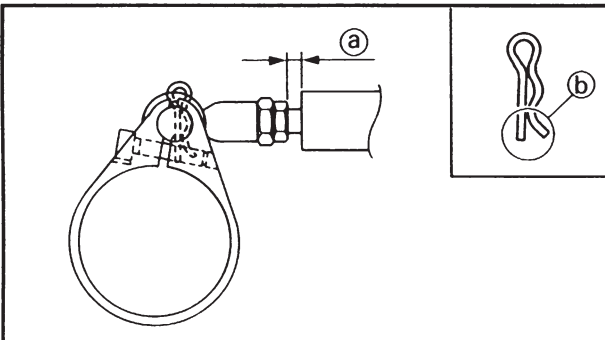
7 Nm (0.7 m·kg, 5.1 ft·lb)

CAUTION:

Tighten the pinch bolts to specified torque. If torqued too much, it may cause the front fork to malfunction.

NOTE:

Tighten the steering damper stay by adjusting the steering damper installation angle to bring the dimension ① between 3 mm (0.12 in) and 5 mm (0.20 in) when the handlebar is turned fully to the right and by causing the clip end ② to face inward.



7. Check:

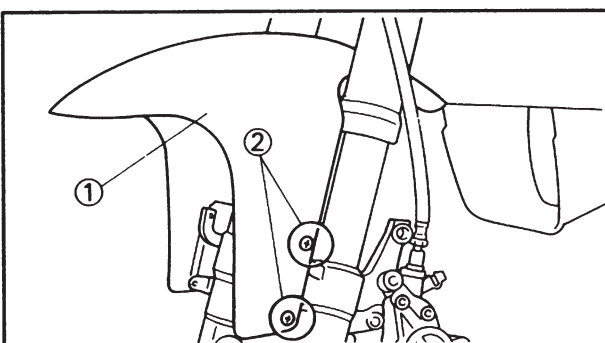
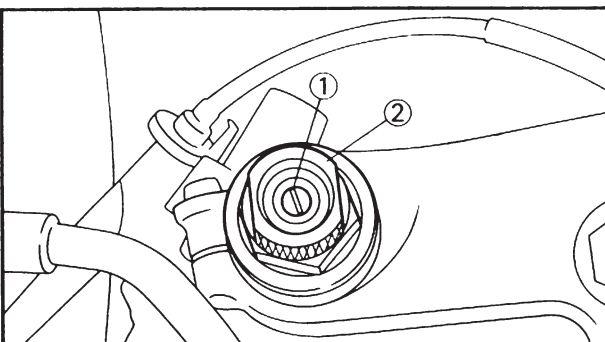
- Steering smooth action
Turn the handlebar to make sure no parts are being contacted with others.
Contact →Repair.

8. Adjust:

- Rebound damping force
- Spring preload

NOTE:

- Turn in the rebound damping adjuster ① fully, then turn out it to the originally set position.
- Turn in the spring preload adjuster ② to the originally set position.



9. Install:

- Front fender ①
- Screw (front fender) ②



Screw (front fender):

8 Nm (0.8 m·kg, 5.8 ft·lb)



STEERING

PREPARATION FOR REMOVAL

* Hold the machine by placing the suitable stand.

⚠ WARNING

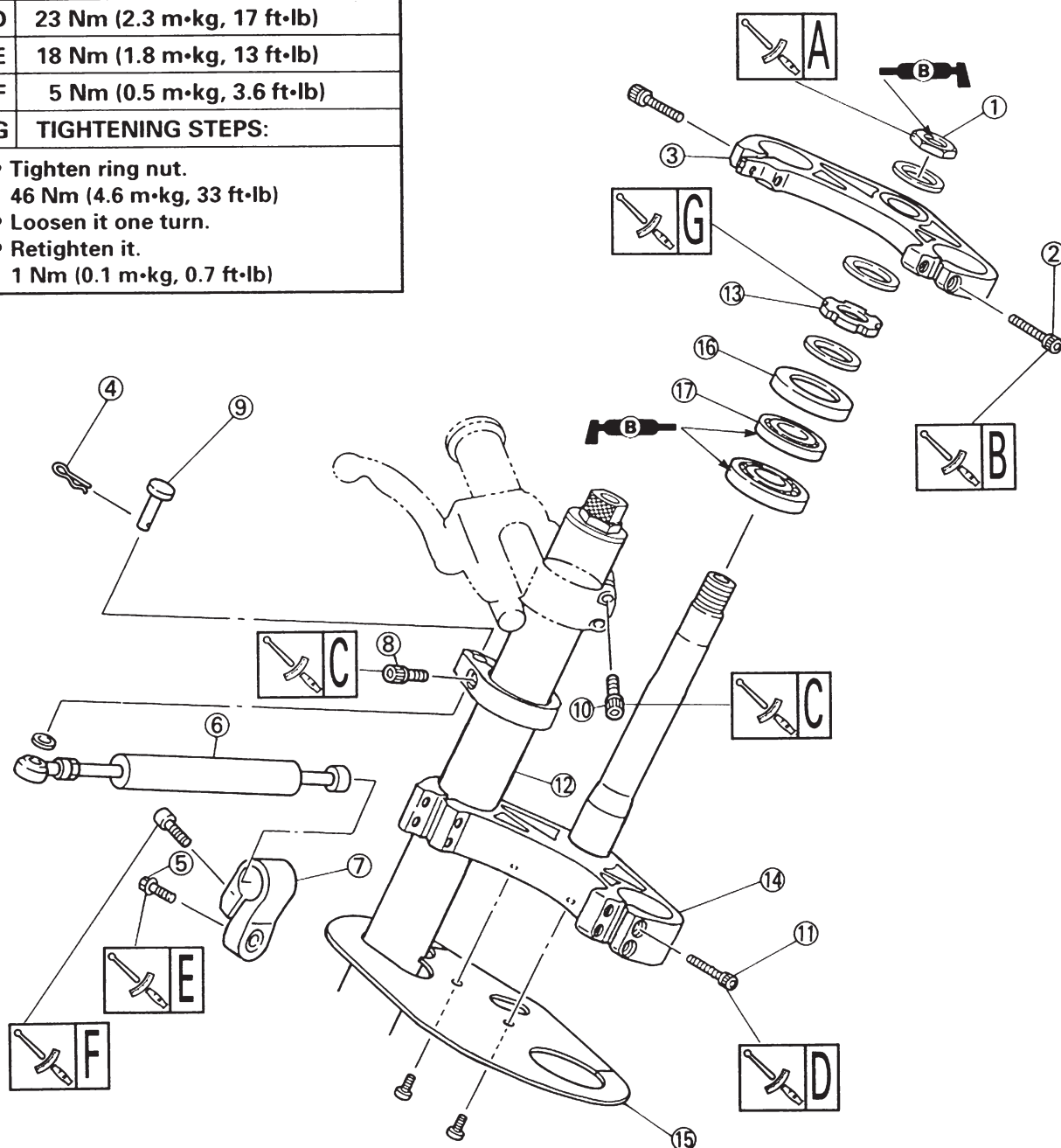
Support the machine securely so there is no danger of it falling over.

* Remove the following parts:

- Cowling
- Induction guide (left cylinder)
- Front wheel
- Front fender
- Front brake caliper

* Remove the front brake reservoir tank installation bolt.

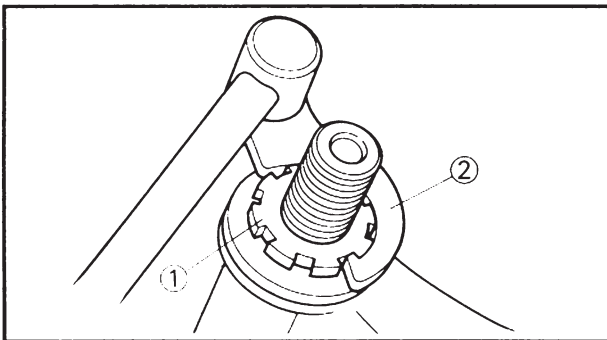
A	80 Nm (8.0 m•kg, 58 ft•lb)
B	20 Nm (2.0 m•kg, 14 ft•lb)
C	7 Nm (0.7 m•kg, 5.1 ft•lb)
D	23 Nm (2.3 m•kg, 17 ft•lb)
E	18 Nm (1.8 m•kg, 13 ft•lb)
F	5 Nm (0.5 m•kg, 3.6 ft•lb)
G	TIGHTENING STEPS:
<ul style="list-style-type: none"> • Tighten ring nut. 	
46 Nm (4.6 m•kg, 33 ft•lb)	
<ul style="list-style-type: none"> • Loosen it one turn. 	
<ul style="list-style-type: none"> • Retighten it. 	
1 Nm (0.1 m•kg, 0.7 ft•lb)	





Extent of removal: ① Steering damper removal ② Under bracket removal

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Steering nut	1	Only loosening.
	2	Pinch bolt (handle crown)	2	
	3	Handle crown	1	
	4	Clip	1	
	5	Bolt (steering damper)	1	
	6	Steering damper	1	Only loosening.
	7	Steering damper bracket	1	
	8	Pinch bolt (steering damper stay)	1	
	9	Pin	1	
	10	Pinch bolt (handlebar)	4	Only loosening.
	11	Pinch bolt (under bracket)	4	Only loosening. Refer to "FRONT FORK" section. Use special tool. Refer to "REMOVAL POINTS".
	12	Front fork	2	
	13	Ring nut	1	
	14	Under bracket	1	
	15	Inner fender	1	
	16	Ball race cover	1	
	17	Bearing	1	



REMOVAL POINTS

Ring nut

1. Remove:

- Ring nut ①

Use the ring nut wrench ②.



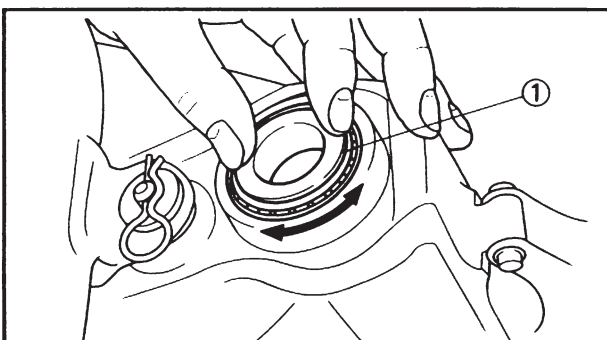
Ring nut wrench:

YU-33975/90890-01403

⚠ WARNING

Support the steering shaft so that it may not fall down.

5



INSPECTION

Bearing

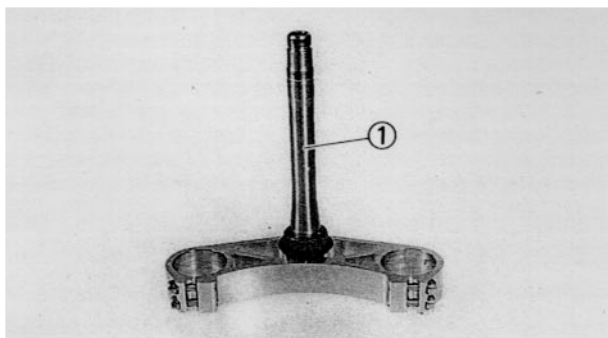
1. Wash the bearings in solvent.

2. Inspect:

- Bearing (upper and lower) ①

Pitting/Damage → Replace races and bearing.

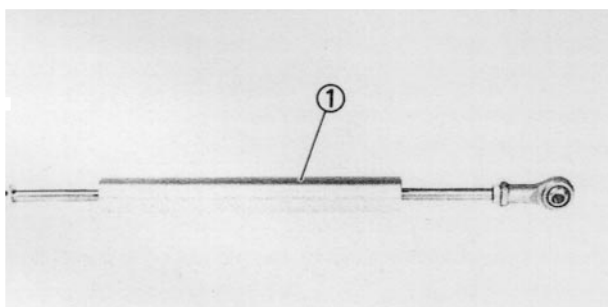
Install the bearing in the races. Spin the bearings by hand. If the bearings hang up or are not smooth in their operation in the races, replace bearings and races.



Steering shaft

1. Inspect:

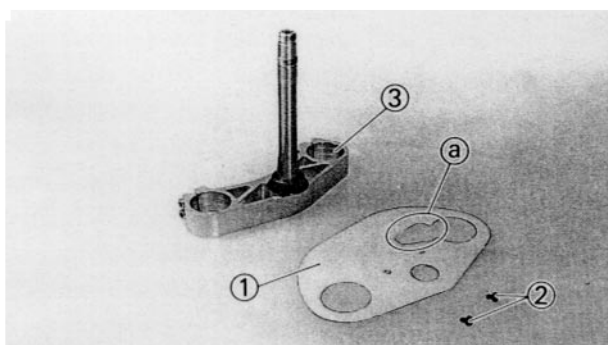
- Steering shaft ①
Bend/Damage → Replace.



Steering damper

1. Inspect:

- Steering damper ①
Bend/Damage → Replace.



ASSEMBLY AND INSTALLATION

Under bracket

1. Install:

- Inner fender ①
- Screw (inner fender) ②
To under bracket ③.

NOTE:

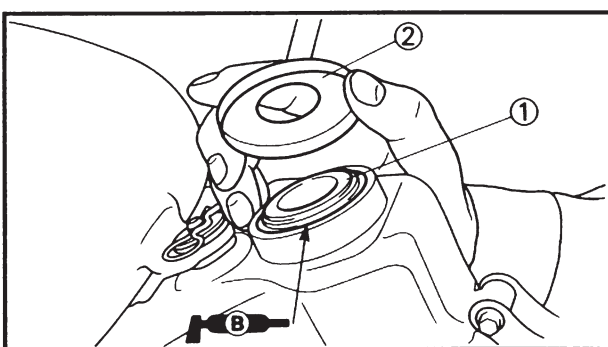
Install the inner fender with its brake hose through hole (a) facing right.

2. Install:

- Bearing ①
- Ball race cover ②

NOTE:

Apply the lithium soap base grease on the bearing.

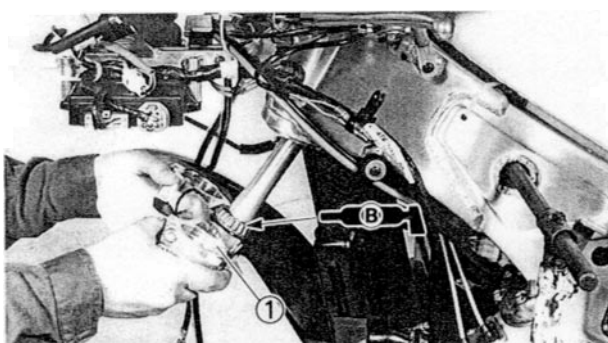


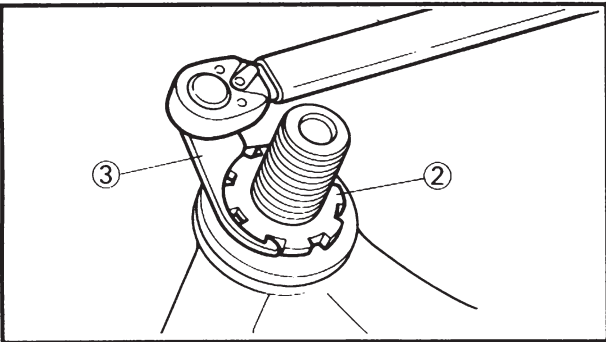
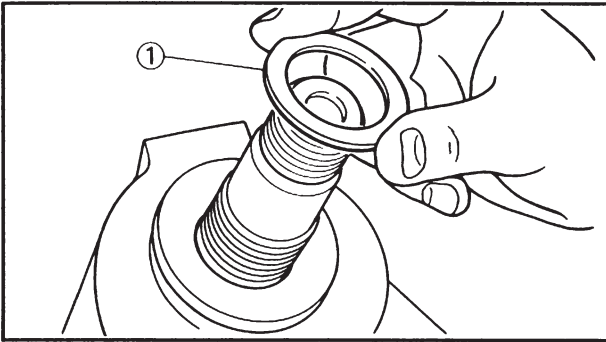
3. Install:

- Under bracket ①

NOTE:

Apply the lithium soap base grease on the bearing.





4. Install:

- Plain washer ①
- Ring nut ②

Ring nut tightening steps:

- Tighten the ring nut using the ring nut wrench ③.

NOTE:

Set the torque wrench to the ring nut wrench so that they form a right angle.

**Ring nut wrench:**

YM-33975/90890-01403

**Ring nut (initial tightening):**

46 Nm (4.6 m·kg, 33 ft·lb)

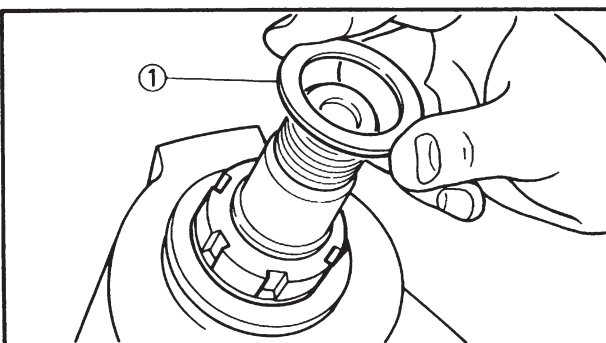
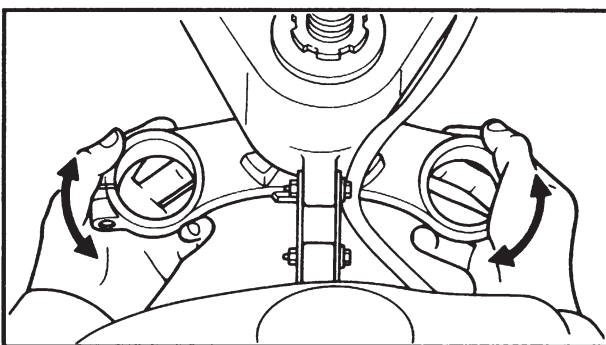
- Loosen the ring nut one turn and retighten it to specification.

⚠ WARNING

Avoid over-tightening.

**Ring nut (final tightening):**

1 Nm (0.1 m·kg, 0.7 ft·lb)

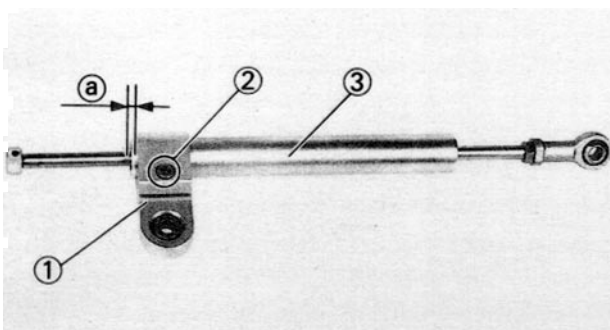
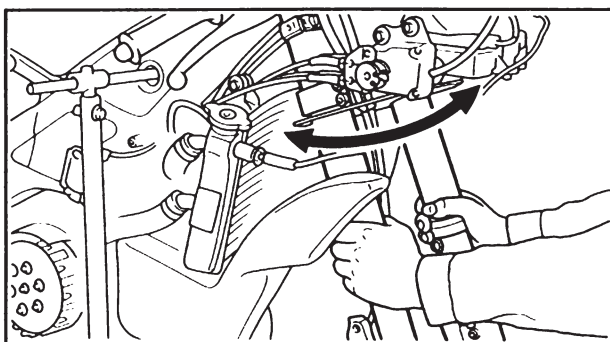
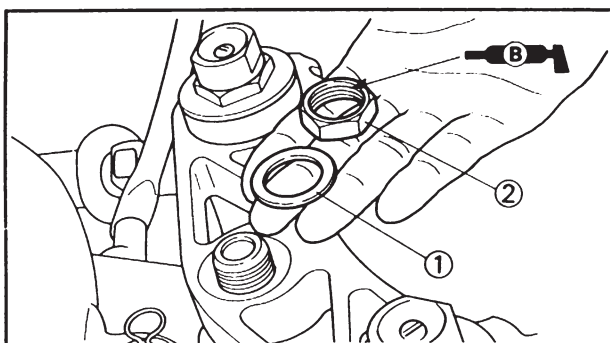
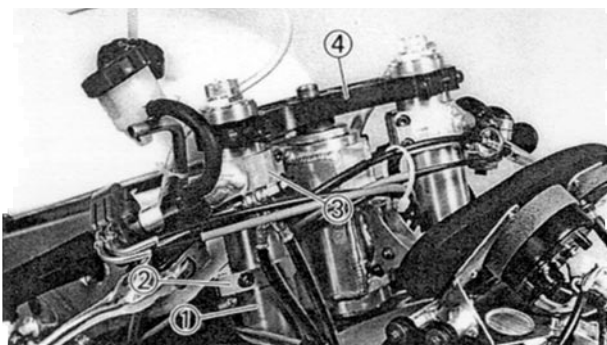


5. Check the steering shaft by turning it lock to lock. If there is any binding, remove the steering shaft assembly and inspect the steering bearings.

5

6. Install:

- Plain washer ①



7. Install:

- Front fork ①
- Steering damper stay ② (right side only)
- Handlebar ③
- Handle crown ④

NOTE:

- Temporarily tighten the pinch bolt (under bracket).
- Do not tighten the pinch bolts (handle crown, steering damper stay and handlebar) yet.

8. Install:

- Plain washer ①
- Steering nut ②

**Steering nut:**

80 Nm (8.0 m•kg, 58 ft•lb)

NOTE:

Apply the lithium soap base grease on the steering nut thread.

9. Check:

- Steering smooth action
Turn the handlebar lock to lock.
Unsmooth action → Adjust the steering ring nut.

10. Install:

- Steering damper bracket ①
- Pinch bolt (steering damper bracket) ②
To steering damper ③.

**Pinch bolt**

(steering damper bracket):

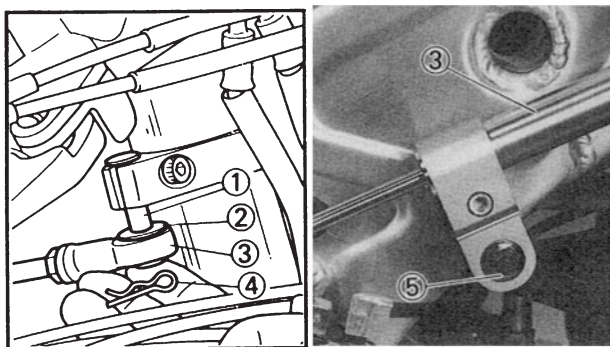
5 Nm (0.5 m•kg, 3.6 ft•lb)

NOTE:

When installing the steering damper bracket, provide a distance (a) of 2mm (0.08in) from its edge.

CAUTION:

Tighten the pinch bolt to specified torque. If torque too much, it may cause the steering damper to malfunction.



11. Install:

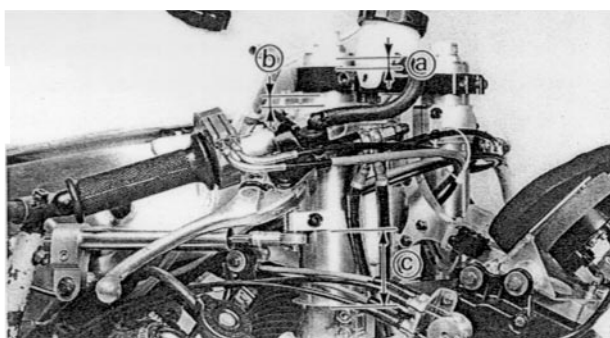
- Pin ①
- Plain washer ②
- Steering damper ③
- Clip ④
- Bolt (steering damper) ⑤



Bolt (steering damper):
18 Nm (1.8 m•kg, 13 ft•lb)

12. Adjust:

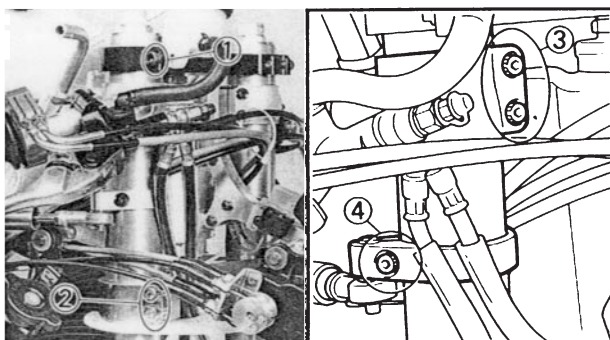
- Front fork top end ①
- Handlebar position ②
- Steering damper stay position ③
(right side only)



Front fork top end ① (standrad):
10 mm (0.39 in)

Handlebar position ②:
9 mm (0.35 in)

Steering damper stay position ③:
73 mm (2.87 in)



13. Tighten:

- Pinch bolt (handle crown) ①
- Pinch bolt (under bracket) ②
- Pinch bolt (handlebar) ③
- Pinch bolt (steering damper stay) ④

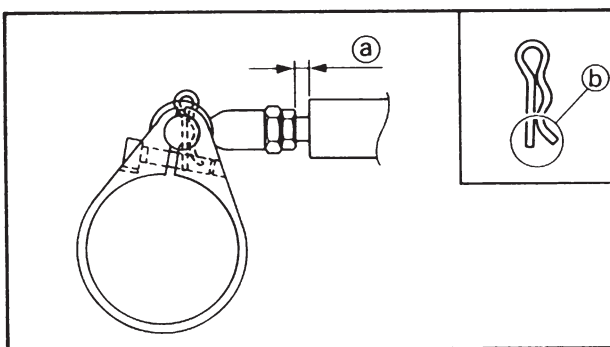


Pinch bolt (handle crown):
20 Nm (2.0 m•kg, 14 ft•lb)

Pinch bolt (under bracket):
23 Nm (2.3 m•kg, 17 ft•lb)

Pinch bolt (handlebar):
7 Nm (0.7 m•kg, 5.1 ft•lb)

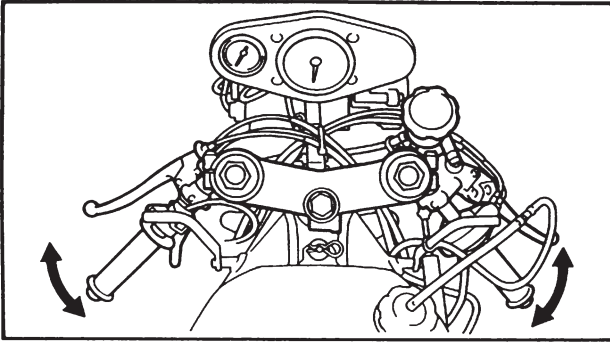
Pinch bolt (steering damper stay):
7 Nm (0.7 m•kg, 5.1 ft•lb)

**CAUTION:**

Tighten the pinch bolts to specified torque.
If torqued too much, it may cause the front fork to malfunction.

NOTE:

Tighten the steering damper stay by adjusting the steering damper installation angle to bring the dimension ① between 3 mm (0.12 in) and 5 mm (0.20 in) when the handlebar is turned fully to the right and by causing the clip end ② to face inward.



14. Check:

- Steering smooth action

Turn the handlebar to make sure no parts are being contacted with others.

Contact→Repair.



MEMO



SWINGARM

PREPARATION FOR REMOVAL

* Hold the machine by placing the suitable stand.

⚠ WARNING

Support the machine securely so there is no danger of it falling over.

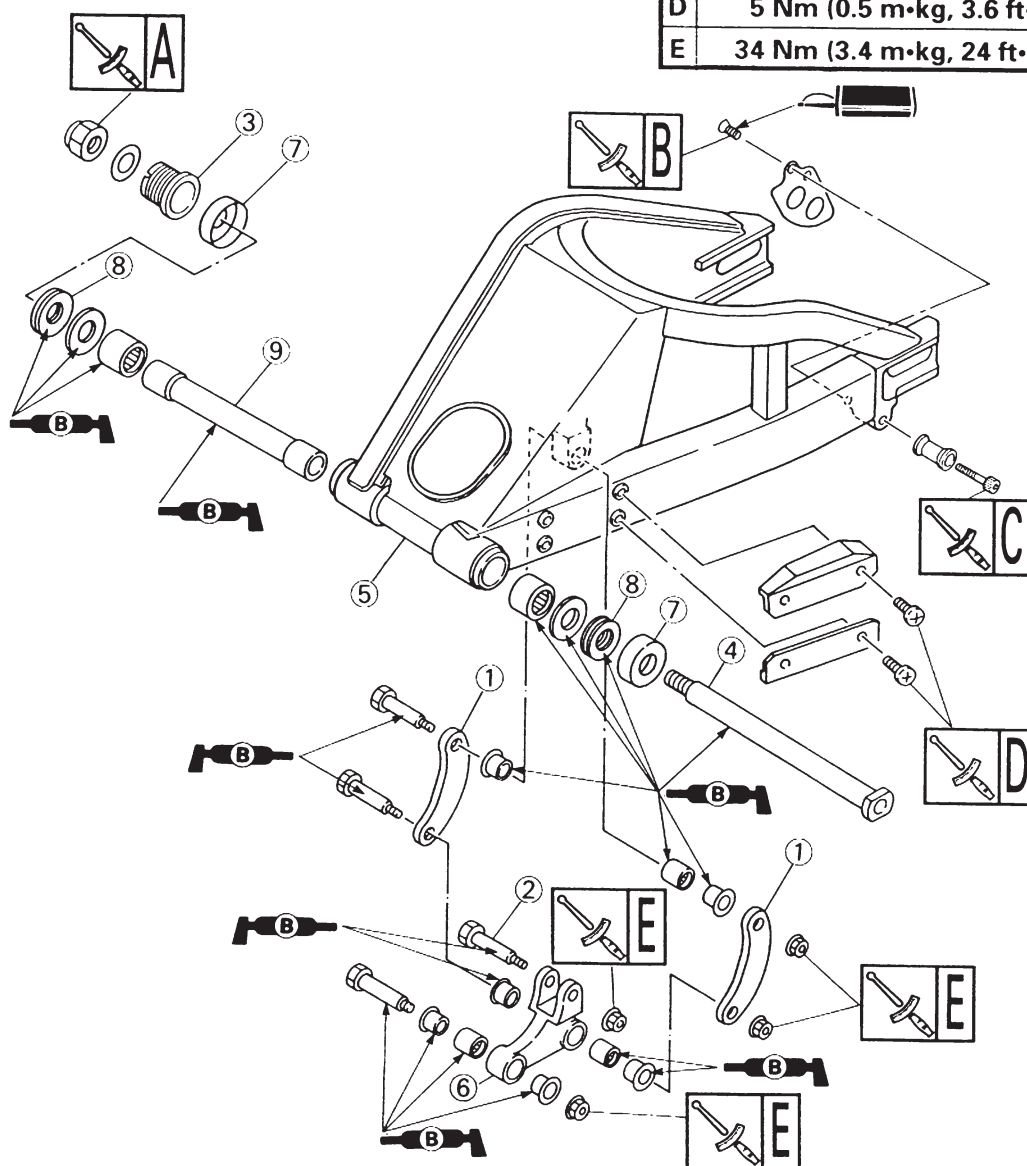
* Remove the following parts:

- Lower cowl
- Exhaust pipe
- Fuel tank
- Rear wheel
- Brake hose holder

* Disconnect the drive chain.

SWINGARM FREE PLAY LIMIT
END: 1.0 mm (0.04 in)
SIDE CLEARANCE:
0.05~0.35 mm (0.002~0.014 in)



A	115 Nm (11.5 m·kg, 85 ft·lb)
B	7 Nm (0.7 m·kg, 5.1 ft·lb)
C	10 Nm (1.0 m·kg, 7.2 ft·lb)
D	5 Nm (0.5 m·kg, 3.6 ft·lb)
E	34 Nm (3.4 m·kg, 24 ft·lb)

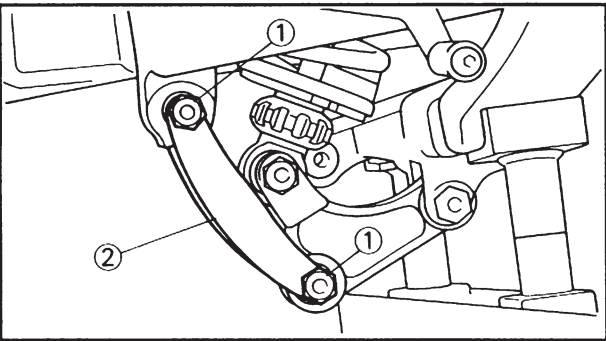


NOTE ON REMOVAL AND REASSEMBLY

•For reassembly, the removed parts should be cleaned with the solvent, and apply the grease on the sliding surface.

Extent of removal: ① Swingarm removal ② Swingarm disassembly

Extent of removal	Order	Part name	Q'ty	Remarks
	1	Connecting rod	2	Use special tool. Refer to "REMOVAL POINTS".
	2	Bolt (rear shock absorber)	1	
	3	Pivot shaft adjust bolt	1	
	4	Pivot shaft	1	
	5	Swingarm	1	
	6	Relay arm	1	
	7	Cover	2	
	8	Thrust bearing	2	
	9	Bush	1	



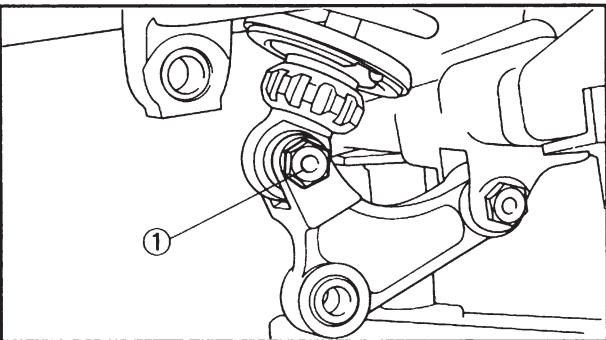
REMOVAL POINTS

Swingarm

1. Remove:
- Bolt (connecting rod) ①
 - Connecting rod ②

NOTE: _____

Remove the bolt while holding the swingarm.



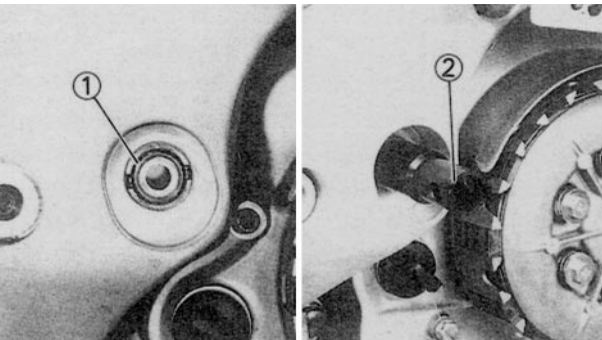
2. Remove:
- Bolt (rear shock absorber—relay arm) ①

5

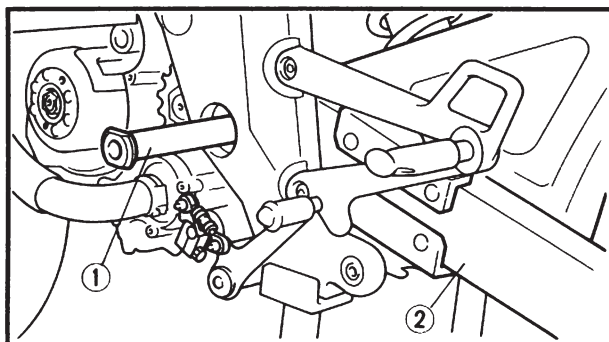
3. Loosen:
- Pivot shaft adjust bolt ①

NOTE: _____

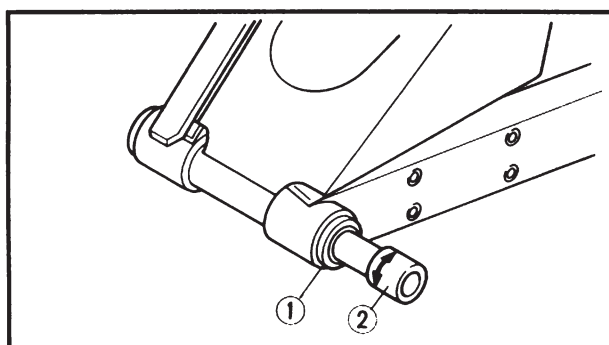
Loosen the pivot shaft adjust bolt using a pivot shaft wrench ②.



Pivot shaft wrench:
YM-01455/90890-01455



4. Remove:
 - Pivot shaft ①
 - Swingarm ②



INSPECTION

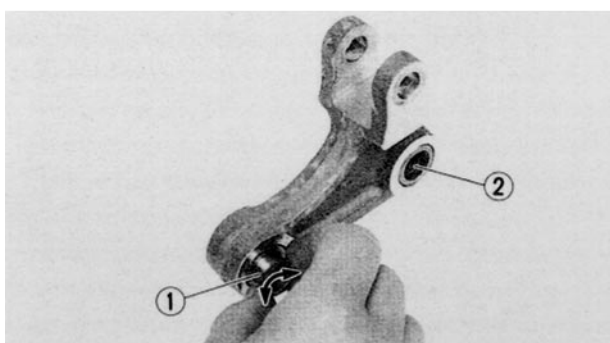
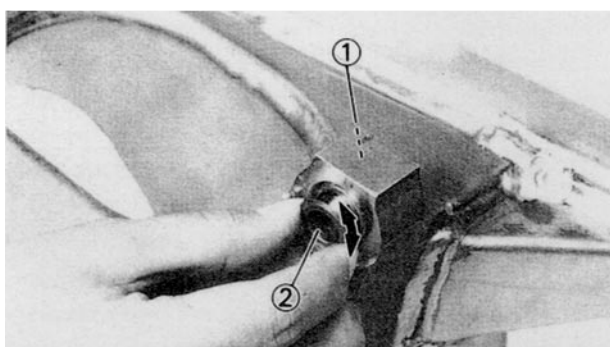
Wash the bearings, bush, collars, and thrust covers in a solvent.

Swingarm

1. Inspect:
 - Bearing (swingarm) ①
 - Bush (swingarm) ②

Free play exists/Unsmooth revolution/
Rust→Replace bearing and bush as a set.
2. Inspect:
 - Bearing (swingarm) ①
 - Collar (swingarm) ②

Free play exists/Unsmooth revolution/
Rust→Replace bearing and collar as a set.



Relay arm

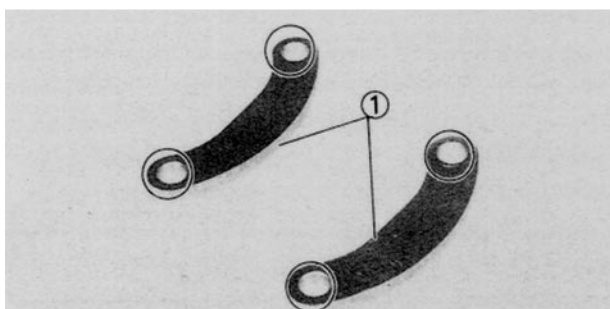
1. Inspect:
 - Bearing (relay arm) ①
 - Collar (relay arm) ②

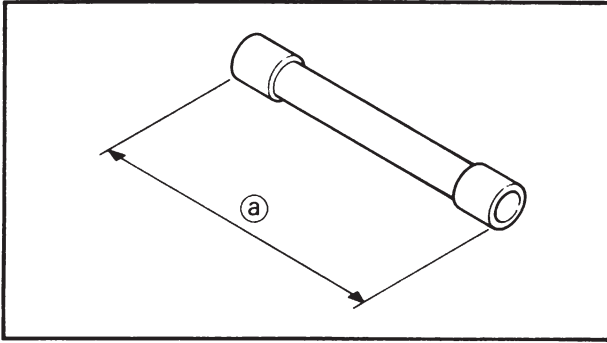
Free play exists/Unsmooth revolution/
Rust→Replace bearing and collar as a set.

Connecting rod

1. Inspect:
 - Connecting rod ①

Wear/Damage→Replace.

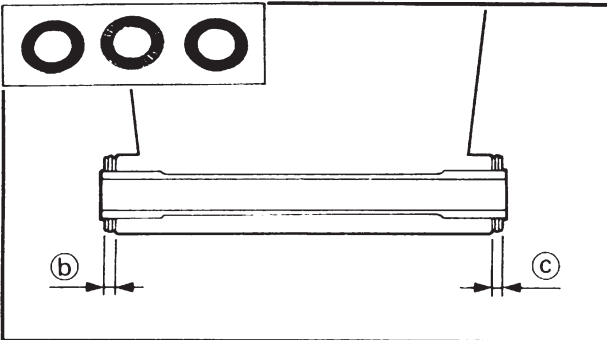




Swingarm side clearance

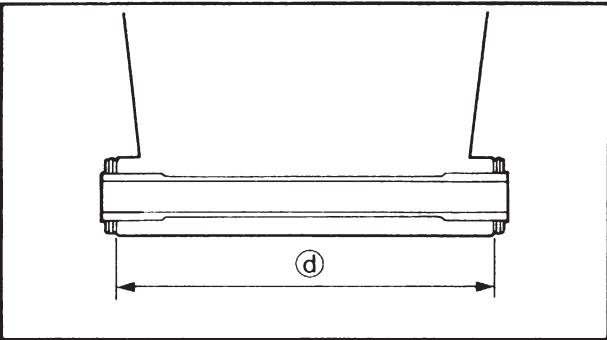
1. Measure:

- Bush length (a)



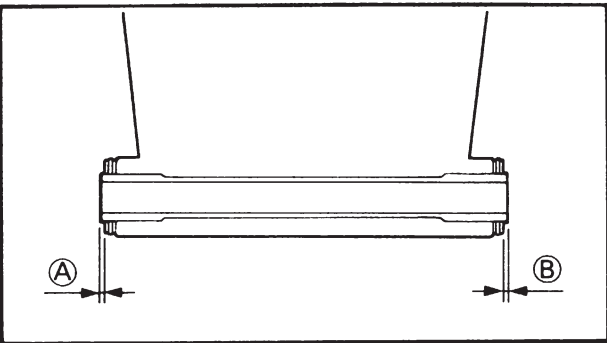
2. Measure:

- Thrust bearing (right) thickness (b)
- Thrust bearing (left) thickness (c)



3. Measure:

- Swingarm head pipe length (d)



4. Calculate:

- Swingarm side clearance "(A) + (B)"

Out of specification → Adjust side clearance using shim.

By using formula given below.

$$"(A) + (B)" = (a) - ((b) + (c) + (d))$$

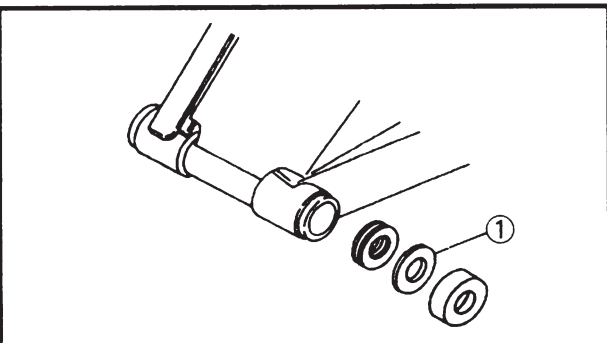


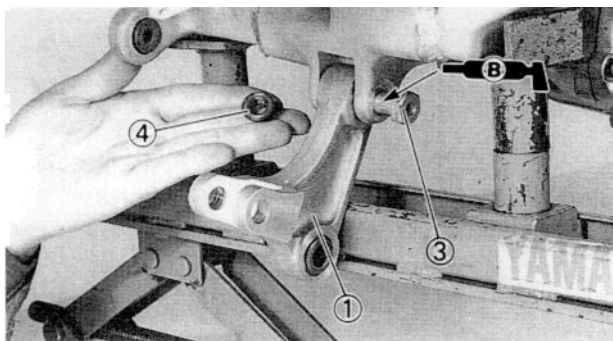
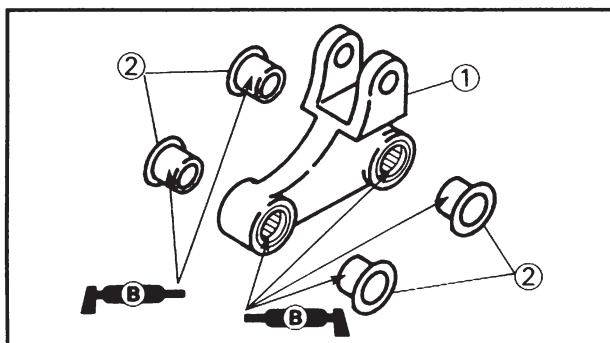
Side clearance "(A) + (B)":
0.05~0.35 mm (0.002~0.014 in)

If the thrust clearance is out of specification, adjust it to specification by installing the adjust shim ① at position, (A) and (B).

NOTE:

- The adjust shim is available only in the 0.2 mm (0.008 in)-thick type.
- When only one shim is required, install it on the left side, and when two shims are necessary, install them on both right and left sides.





ASSEMBLY AND INSTALLATION

Swingarm

1. Install:

- Relay arm ①
- Collar ②
- Bolt (relay arm) ③
- Nut (relay arm) ④

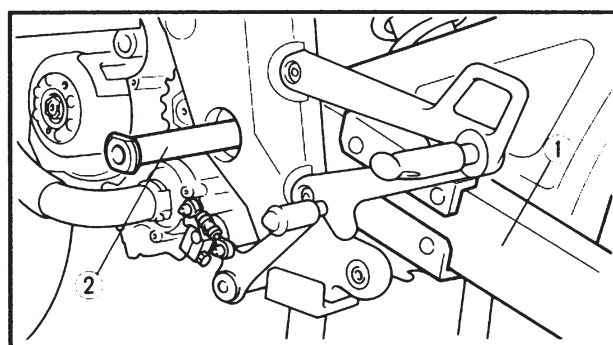
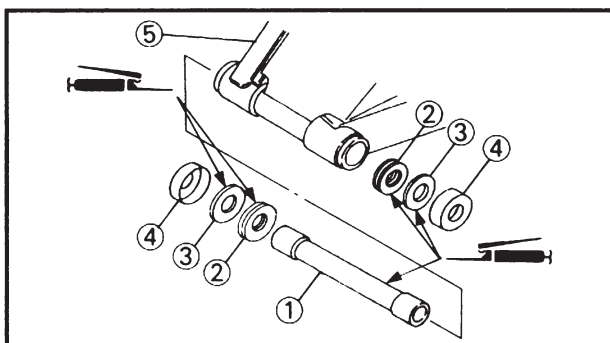
NOTE:

Apply the lithium soap base grease on the collars, bearings and bolt.



Nut (relay arm):

34 Nm (3.4 m·kg, 24 ft·lb)



2. Install:

- Bush ①
 - Thrust bearing ②
 - Shim ③ (if necessary)
 - Cover ④
- To swingarm ⑤.

NOTE:

Apply the lithium soap base grease on the bush and bearings.

3. Install:

- Swingarm ①
- Pivot shaft ②

NOTE:

- Apply the lithium soap base grease on the pivot shaft.
- Insert the pivot shaft from left side.

4. Tighten:

- Pivot shaft adjust bolt ①

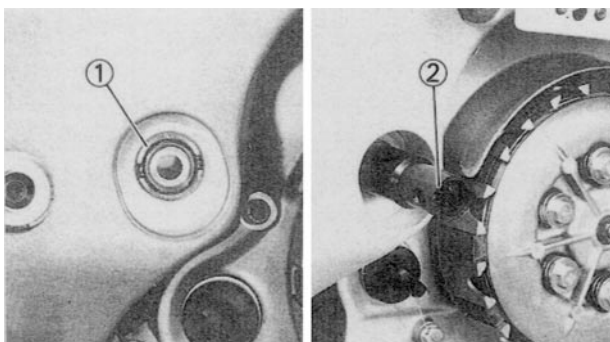
NOTE:

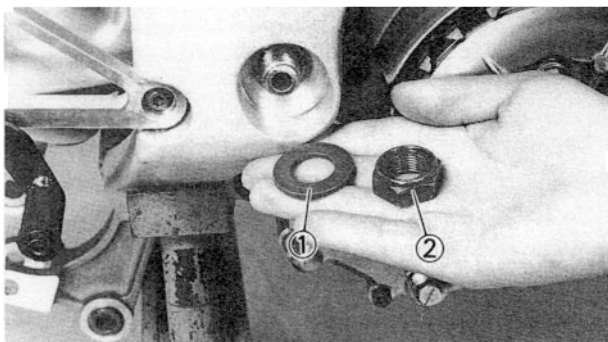
Use the pivot shaft wrench ② to tighten the pivot shaft adjust bolt to finger tightness.



Pivot shaft wrench:

YM-01455/90890-01455





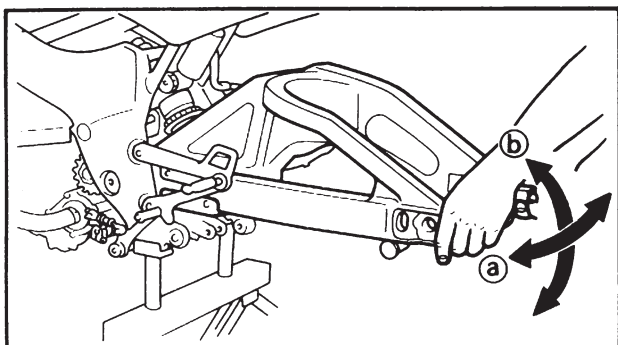
5. Install:

- Plain washer ①
- Nut (pivot shaft) ②



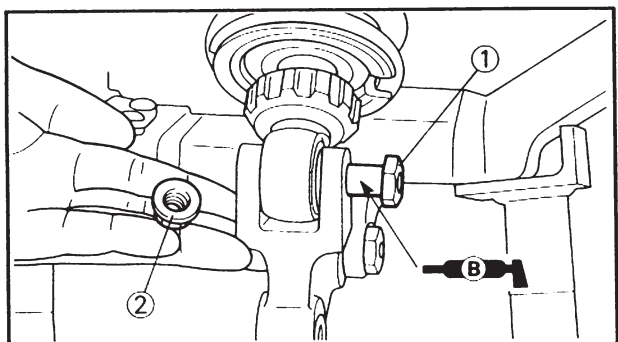
Nut (pivot shaft):

115 Nm (11.5 m•kg, 85 ft•lb)



6. Check:

- Swingarm side play ①
Free play exists → Check side clearance.
- Swingarm up and down movement ②
Unsmooth movement/Binding/Rough spots
→ Grease or replace bearings, solid bushes and collars.



7. Install:

- Bolt (rear shock absorber—relay arm) ①
- Nut (rear shock absorber—relay arm) ②

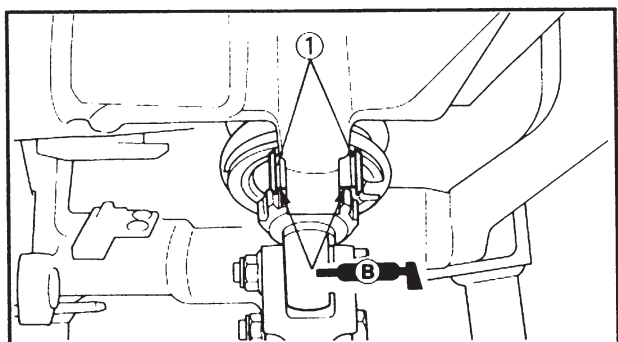
NOTE:

Apply the lithium soap base grease on the bolt.



Nut (rear shock absorber—relay arm):

34 Nm (3.4 m•kg, 24 ft•lb)

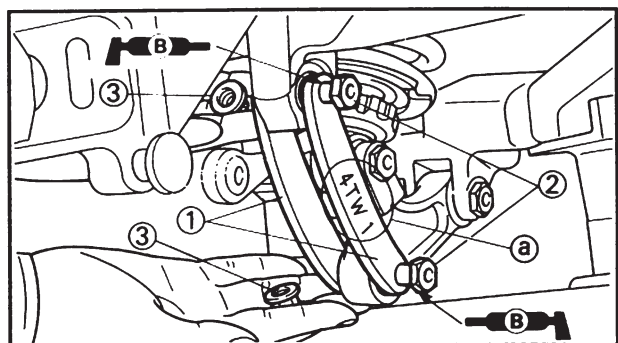


8. Install:

- Collar (swingarm) ①

NOTE:

Apply the lithium soap base grease on the bearing and collars



9. Install:

- Connecting rod ①
- Bolt (connecting rod) ②
- Nut (connecting rod) ③

NOTE:

- Install the connecting rods with the mark ① outward of the chassis.
- Apply the lithium soap base grease on the bolts.



Nut (connecting rod):

34 Nm (3.4 m•kg, 24 ft•lb)

REAR SHOCK ABSORBER PREPARATION FOR REMOVAL

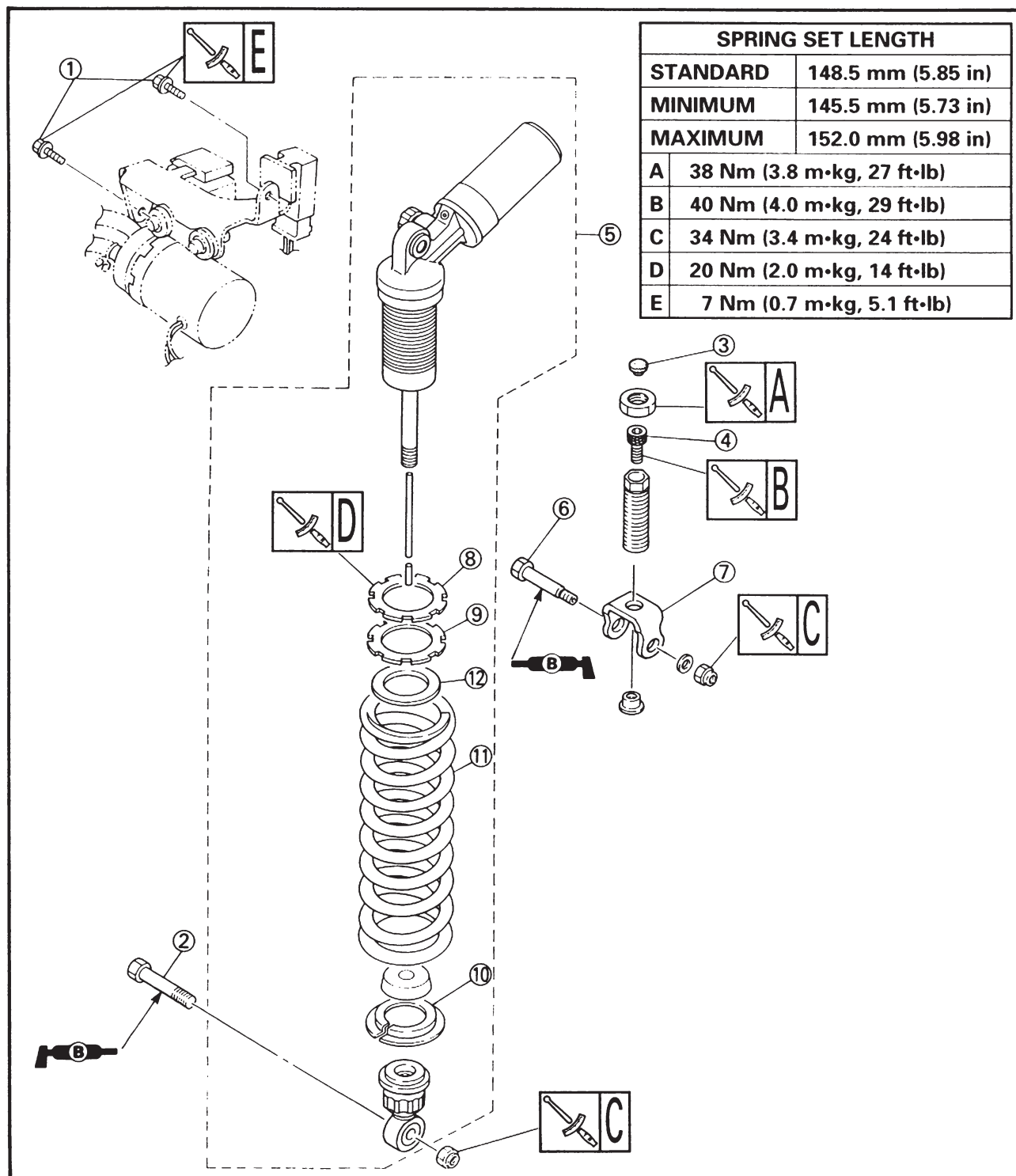
* Hold the machine by placing the suitable stand.

⚠ WARNING

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

* Remove the following parts:

- Lower cowl
- Seat
- Exhaust pipe
- Fuel tank
- Induction cap (left cylinder)



REAR SHOCK ABSORBER



Extent of removal: ① Rear shock absorber removal ② Spring (rear shock absorber) removal

Extent of removal	Order	Part name	Q'ty	Remarks
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> ① ↑ ↓ </div> <div style="text-align: center;"> ② ↑ ↓ </div> </div>	1	Bolt (fuel pump bracket)	2	Refer to "REMOVAL POINTS".
	2	Bolt (rear shock absorber-relay arm)	1	
	3	Cap	1	
	4	Bolt (upper bracket)	1	
	5	Rear shock absorber	1	
	6	Bolt (rear shock absorber-upper bracket)	1	Refer to "REMOVAL POINTS".
	7	Upper bracket	1	
	8	Locknut	1	
	9	Adjuster	1	
	10	Spring guide	1	
	11	Spring (rear shock absorber)	1	
	12	Plate	1	

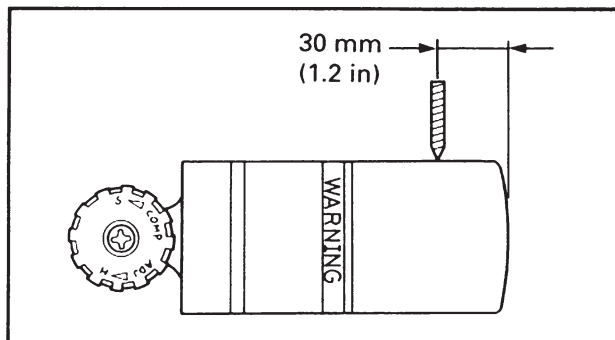
HANDLING NOTE

⚠ WARNING

This shock absorber is provided with a separate type tank filled with high-pressure nitrogen gas. To prevent the danger of explosion, read and understand the following information before handling the shock absorber.

The manufacturer can not be held responsible for property damage or personal injury that may result from improper handling.

1. Never tamper or attempt to disassemble the cylinder or the tank.
2. Never throw the shock absorber into an open flame or other high heat. The shock absorber may explode as a result of nitrogen gas expansion and/or damage to the hose.
3. Be careful not to damage any part of the gas tank. A damaged gas tank will impair the damping performance or cause a malfunction.
4. Take care not to scratch the contact surface of the piston rod with the cylinder; or oil could leak out.
5. Never attempt to remove the plug at the bottom of the nitrogen gas tank. It is very dangerous to remove the plug.
6. When scrapping the shock absorber, follow the instructions on disposal.

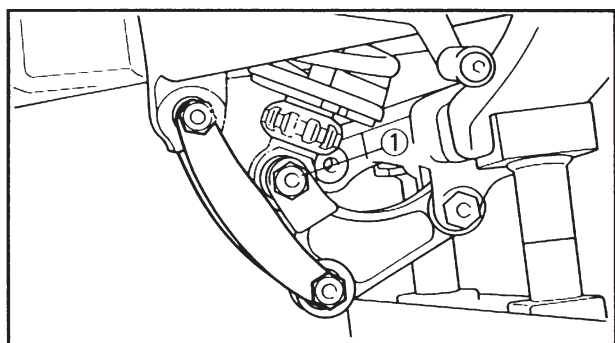


NOTES ON DISPOSAL (YAMAHA DEALERS ONLY)

Before disposing the shock absorber, be sure to extract the nitrogen gas. To do so, drill a 2 or 3 mm (0.08 ~ 0.12 in) hole through the tank at a position 30 mm (1.2 in) from the bottom end of the tank. At this time, wear eye protection to prevent eye damage from escaping gas and/or metal chips.

⚠ WARNING

To dispose of a damaged or worn-out shock absorber, take the unit to your Yamaha dealer for this disposal procedure.



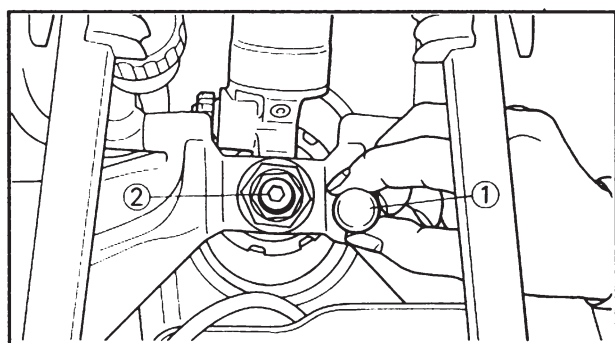
REMOVAL POINTS

Rear shock absorber

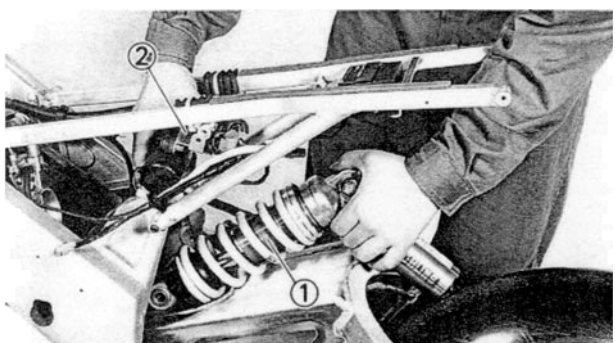
1. Remove:
 - Bolt (rear shock absorber – relay arm) ①

NOTE:

Remove the bolt while holding the swingarm.



2. Remove:
 - Cap ①
 - Bolt (upper bracket) ②



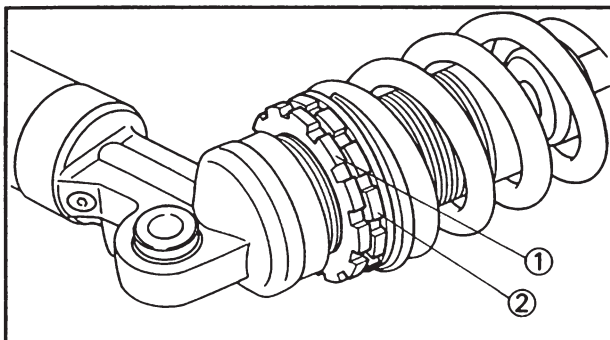
3. Remove:
 - Rear shock absorber ①

From upper side.

NOTE:

Remove the rear shock absorber between the rear frame and swingarm while raising the fuel pump bracket ②.

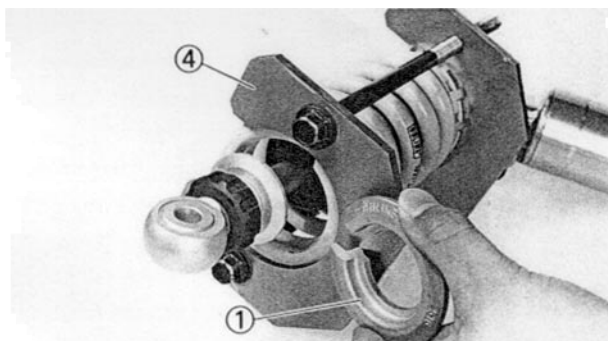
5



Spring (rear shock absorber)

1. Loosen:

- Locknut ①
- Adjuster ②

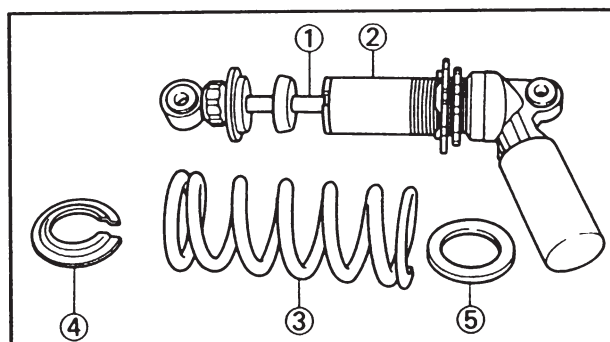
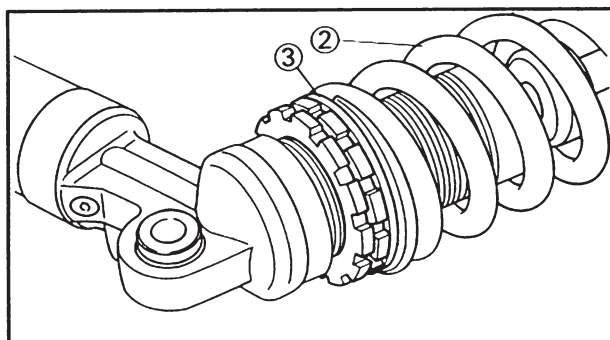


2. Remove:

- Spring guide ①
- Spring ②
- Plate ③

NOTE:

Remove the spring guide while compressing the spring by using the spring compressor ④.

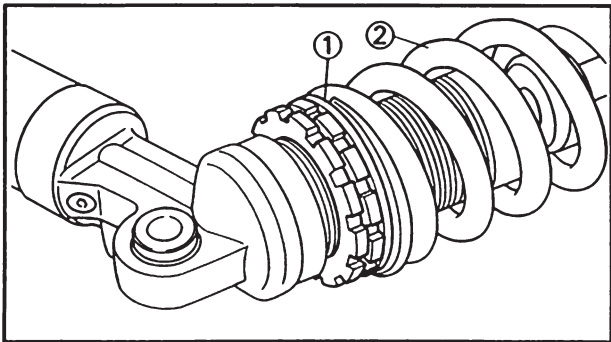


INSPECTION

Rear shock absorber

1. Inspect:

- Damper rod ①
Bends/Damage → Replace absorber assembly.
- Shock absorber ②
Oil leaks → Replace absorber assembly.
Gas leaks → Replace absorber assembly.
- Spring ③
Damage → Replace spring.
Fatigue → Replace spring.
Move spring up and down.
- Spring guide ④
Wear/Damage → Replace spring guide.
- Plate ⑤
Wear/Damage → Replace plate.



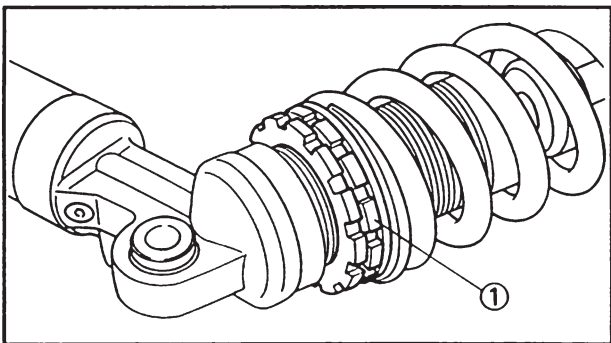
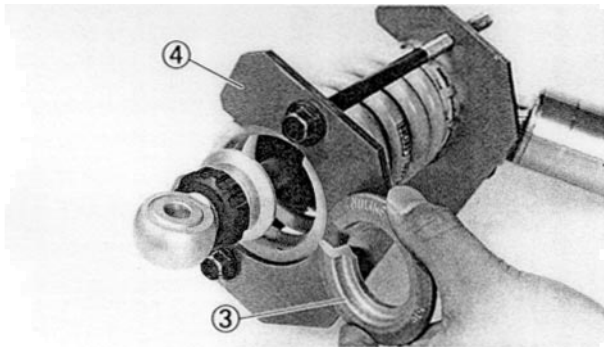
ASSEMBLY AND INSTALLATION

Spring (rear shock absorber)

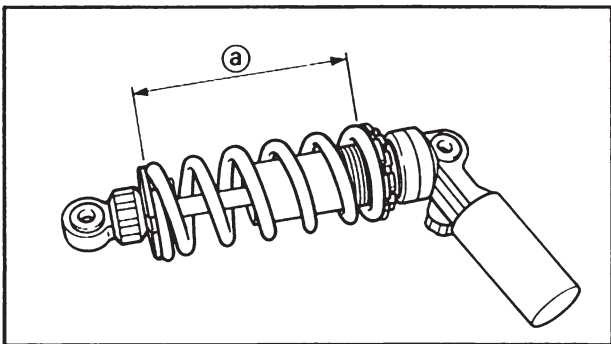
1. Install:
- Plate ①
 - Spring ②
 - Spring guide ③

NOTE: _____


Install the spring guide while compressing the spring by using the spring compressor ④.



2. Tighten:
- Adjuster ①



3. Adjust:
- Spring length ③

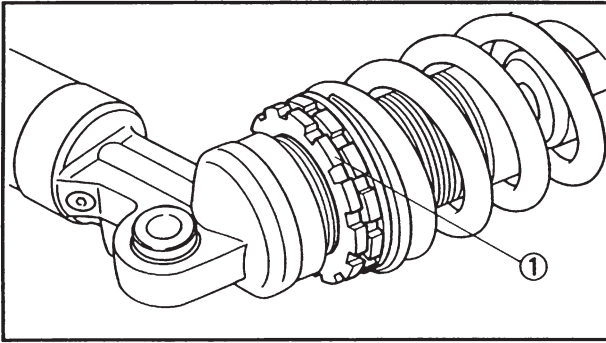
 Spring length (installed) :	
Standard length ③	Extent of adjustment
148.5 mm (5.85 in)	145.5~152.0 mm (5.73~5.98 in)

NOTE: _____

The length of the spring (installed) changes 1.5 mm (0.06 in) per turn of the adjuster.

CAUTION: _____

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



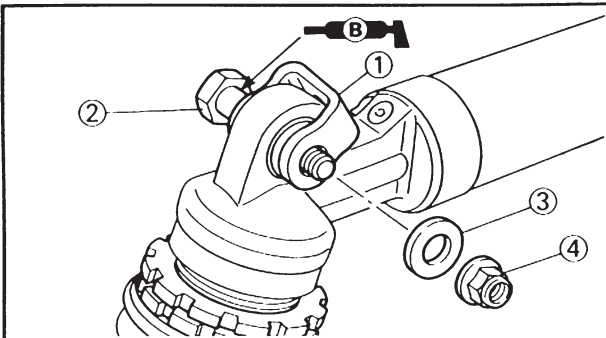
4. Tighten:

- Locknut (1)



Locknut:

20 Nm (2.0 m•kg, 14 ft•lb)



Rear shock absorber

1. Install:

- Upper bracket (1)
- Bolt (rear shock absorber—upper bracket) (2)
- Plain washer (3)
- Nut (rear shock absorber—upper bracket) (4)

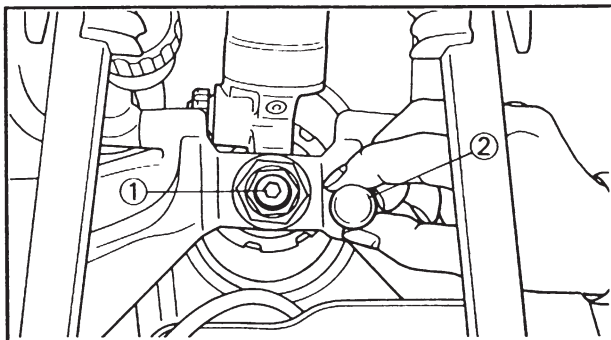
NOTE:

Apply the lithium soap base grease on the bolt.



Nut (rear shock absorber—upper bracket):

34 Nm (3.4 m•kg, 24 ft•lb)



2. Install:

- Rear shock absorber

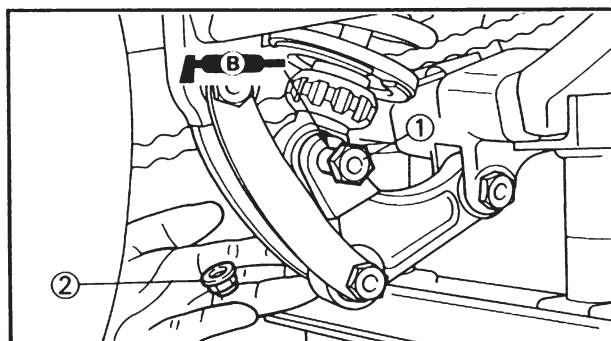
3. Install:

- Bolt (upper bracket) (1)
- Cap (2)



Bolt (upper bracket):

40 Nm (4.0 m•kg, 29 ft•lb)



4. Install:

- Bolt (rear shock absorber—relay arm) (1)
- Nut (rear shock absorber—relay arm) (2)

NOTE:

Apply the lithium soap base grease on the bolt.

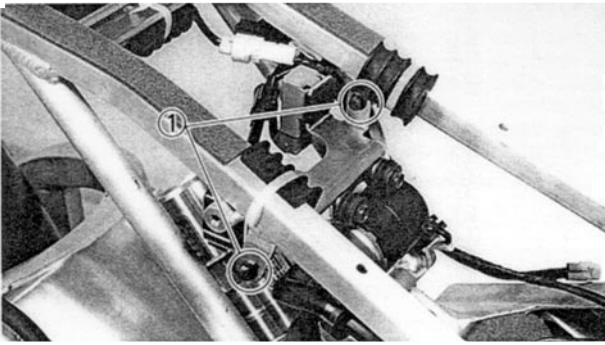


Nut (rear shock absorber—relay arm):

34 Nm (3.4 m•kg, 24 ft•lb)

REAR SHOCK ABSORBER

CHAS



5. Install:

- Bolt (fuel pump bracket) ①

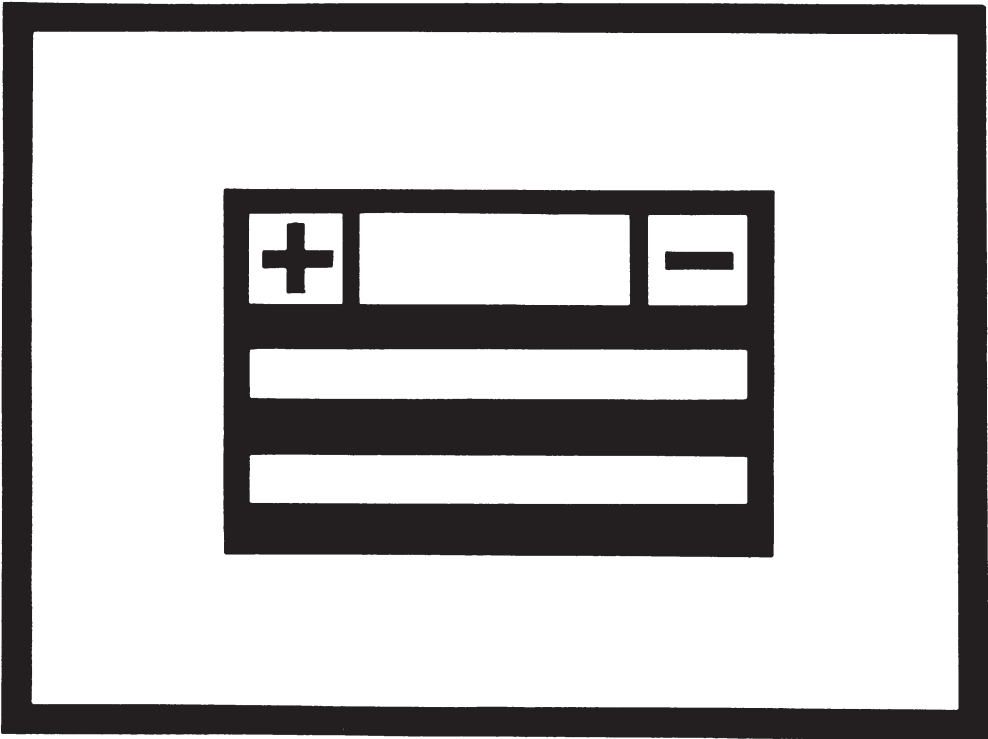


Bolt (fuel pump bracket):
7 Nm (0.7 m·kg, 5.1 ft·lb)

5

CHAPTER 6

ELECTRICAL





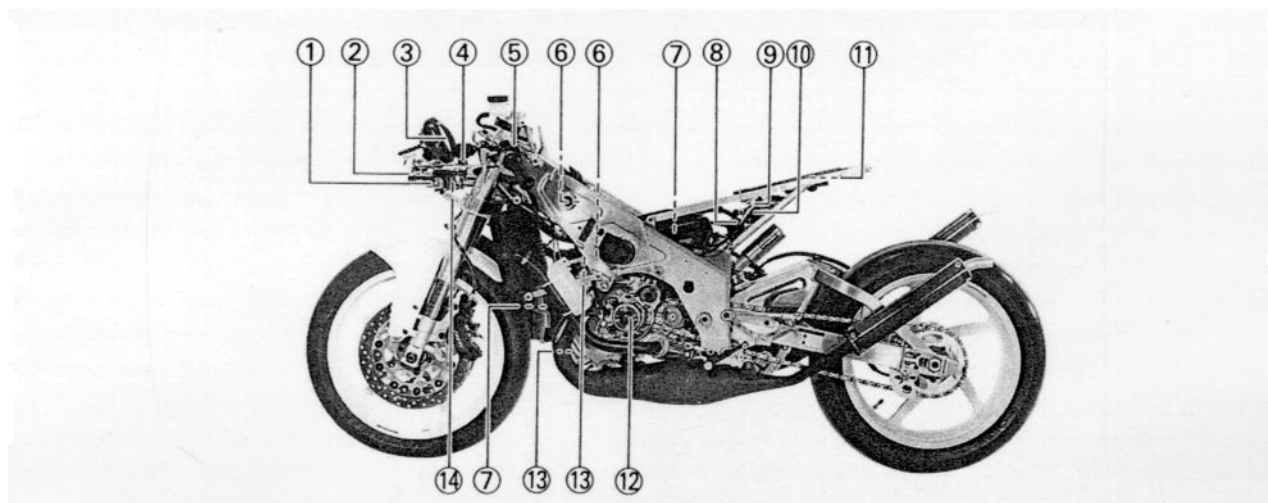
ELECTRICAL COMPONENTS AND WIRING DIAGRAM

ELECTRICAL COMPONENTS

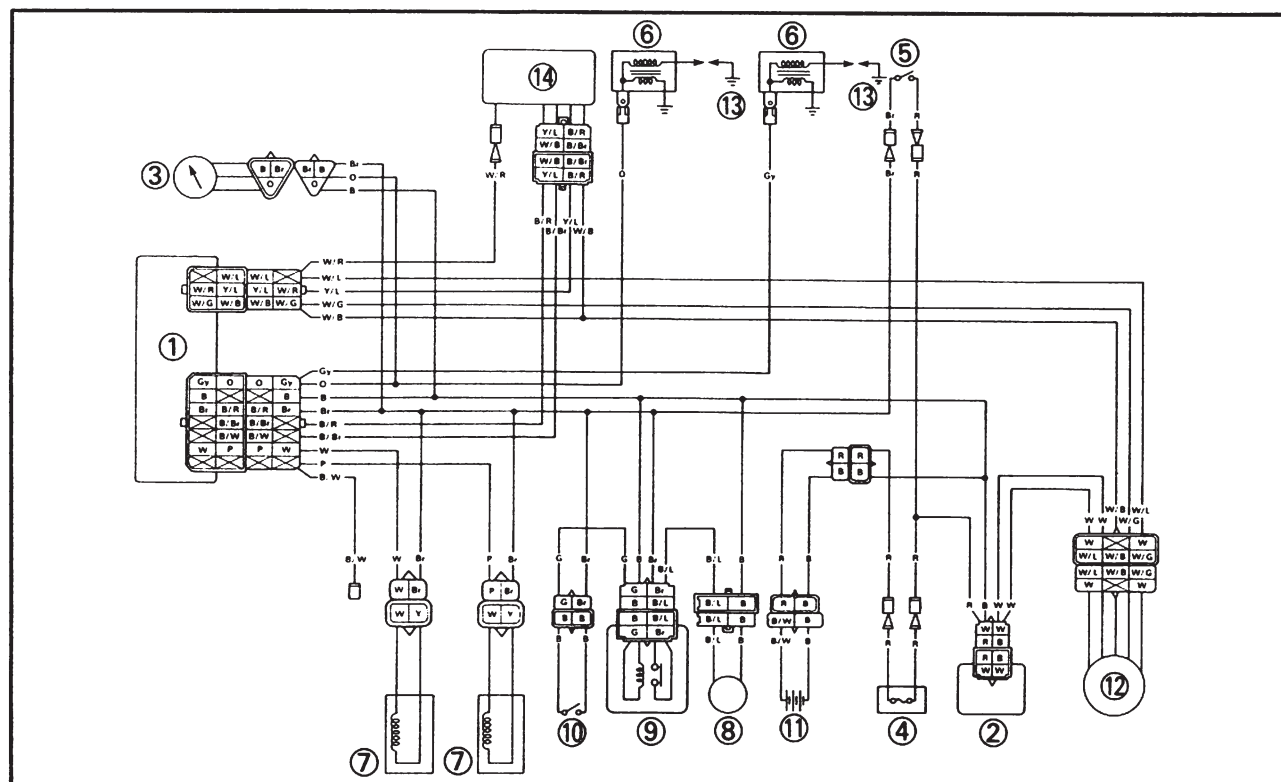
- | | |
|-------------------------|---------------|
| ① CDI unit | ⑪ Battery |
| ② Voltage regulator | ⑫ CDI magneto |
| ③ Tachometer | ⑬ Spark plug |
| ④ Fuse | ⑭ Servomotor |
| ⑤ Main switch | |
| ⑥ Ignition coil | |
| ⑦ Solenoid valve | |
| ⑧ Fuel pump | |
| ⑨ Fuel pump relay | |
| ⑩ Fuel pump stop switch | |

COLOR CODE

B	Black	B/Br.....	Black/Brown
Br.....	Brown	B/L	Black/Blue
G	Green	B/R	Black/Red
Gy.....	Gray	B/W	Black/White
O	Orange	W/B.....	White/Black
P.....	Pink	W/G	White/Green
R	Red	W/L	White/Blue
Y	Yellow	W/R.....	White/Red
W	White	Y/L	Yellow/Blue



WIRING DIAGRAM



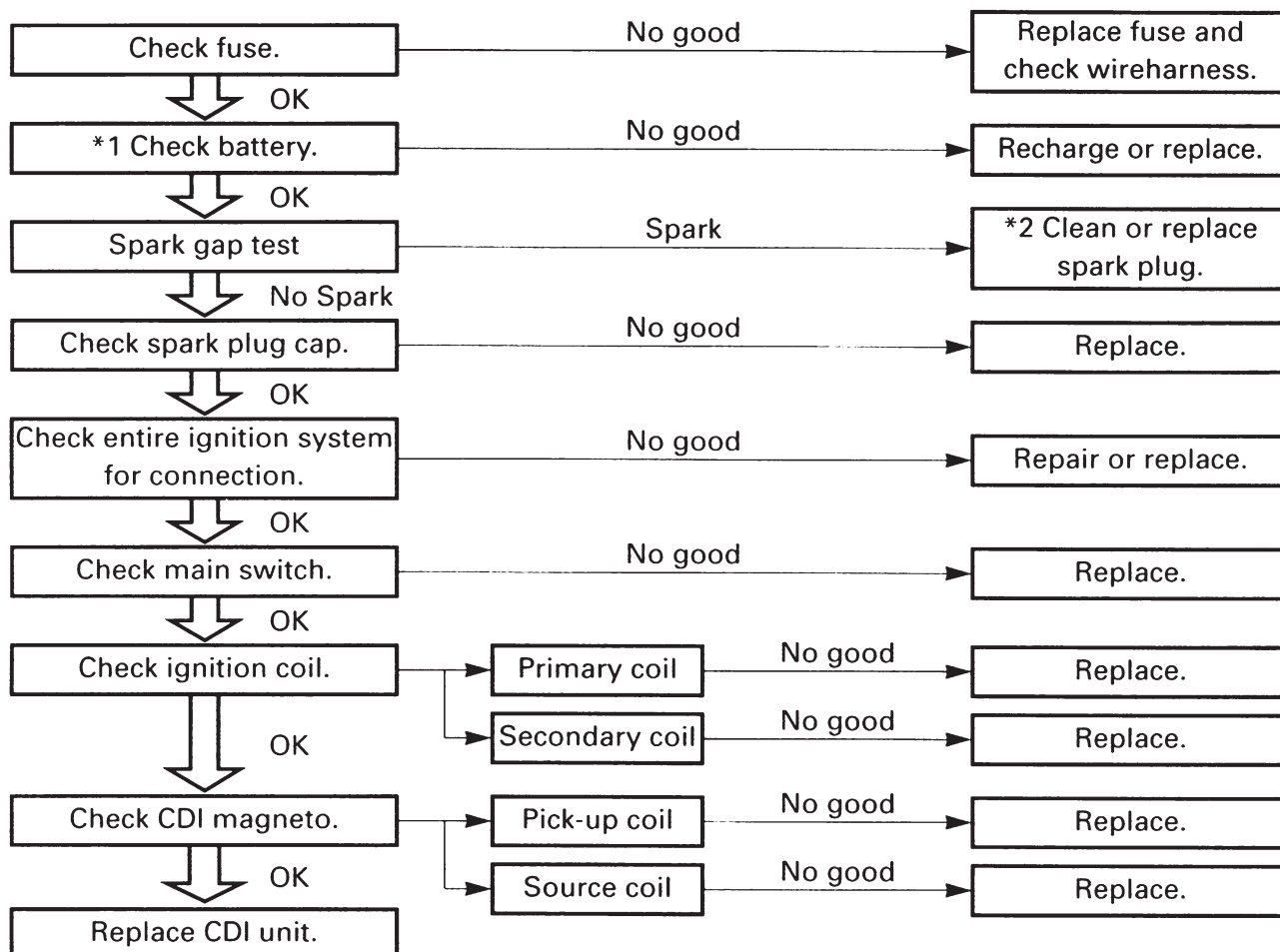


FC620009

IGNITION SYSTEM

INSPECTION STEPS

Use the following steps for checking the possibility of the malfunctioning engine being attributable to ignition system failure and for checking the spark plug which will not spark.



*1 marked: Refer to "BATTERY INSPECTION" section in the CHAPTER 3.

*2 marked: Only when the ignition checker is used.

NOTE:

•Remove the following parts before inspection.

- 1) Cowling
- 2) Fuel tank

3) Seat

•Use the following special tools in this inspection.



Dynamic spark tester:

YM-34487

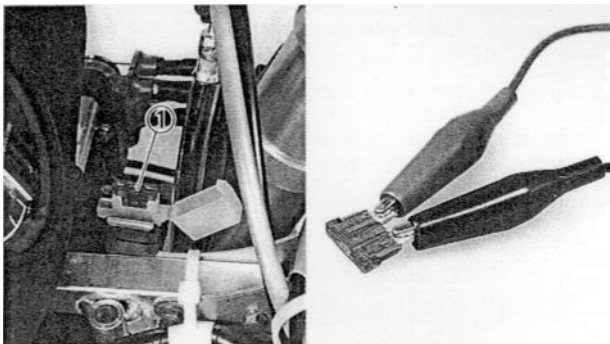
Ignition checker:

90890-06754



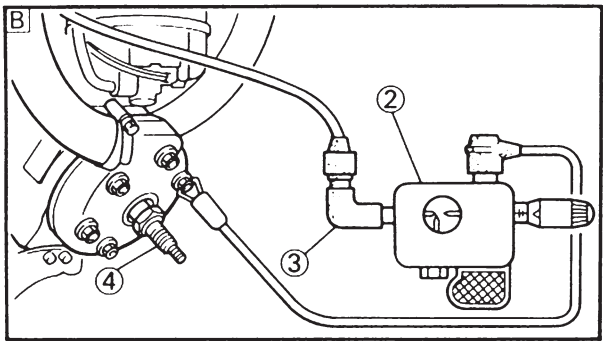
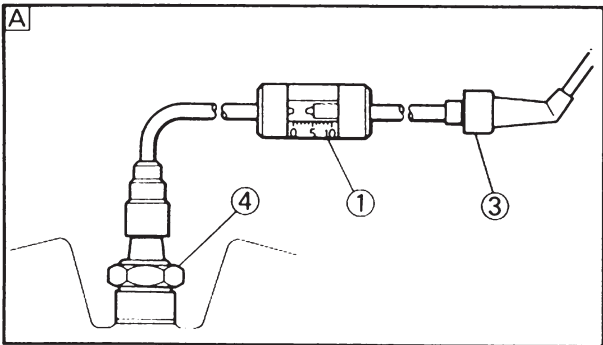
Pocket tester:

YU-03112/90890-03112



FUSE INSPECTION

1. Remove:
 - Fuse ①
2. Check:
 - Fuse conductUse pocket tester (tester selector position $\Omega \times 1$).
Not continuous→Replace fuse and check that the wireharness is not shorted.



SPARK GAP TEST

1. Disconnect the fuel pump coupler to prevent the fuel pump operating.
 2. Disconnect the spark plug cap from spark plug.
 3. Connect the dynamic spark tester ① (ignition checker ②) as shown.
 - Spark plug cap ③
 - Spark plug ④
- A

For USA and CDN
- B

Except for USA and CDN
4. Start the engine and increase the spark gap until misfire occurs. (for USA and CDN)
 5. Move the main switch to "RUN" and rotate the wheel with gear in 3rd and check the spark gap. (except for USA and CDN)



Minimum spark gap:
5.0 mm (0.20 in)


SPARK PLUG CAP INSPECTION

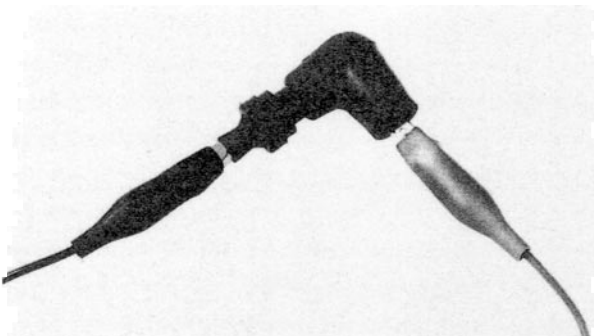
1. Remove:
 - Spark plug cap

CAUTION:

Do not pull the spark plug lead out of the spark plug cap. Turn the spark plug cap counterclockwise to remove it and clockwise to install it.

2. Check:
 - Spark plug cap resistanceOut of specification→Replace.

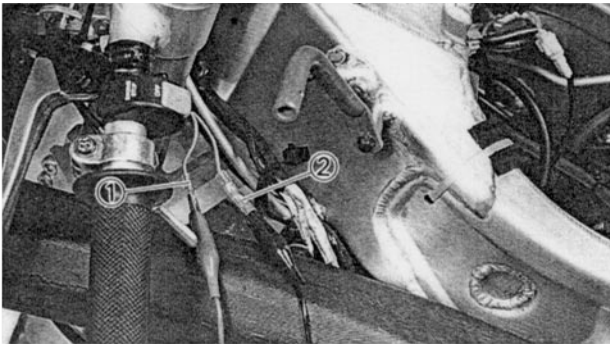
	Spark plug cap resistance	Tester selector position
	4~6k Ω at 20°C (68°F)	k Ω ×1





COUPLERS AND LEADS CONNECTION INSPECTION


- Check:
 - Couplers and leads connection
Rust/Dust/Looseness/Short-circuit
→Repair or replace.



MAIN SWITCH INSPECTION

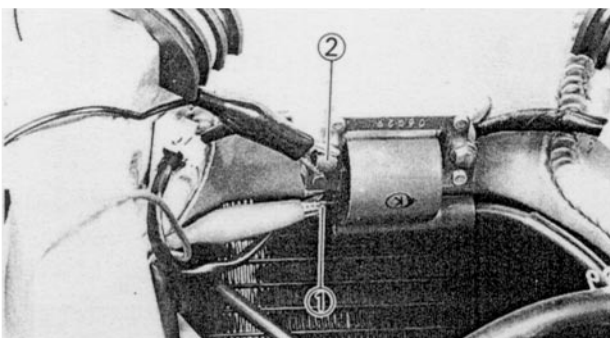
- Inspect:
 - Main switch conduct

Tester (+) lead →Red lead ①
Tester (–) lead→Brown lead ②

		R ①	Br ②	Tester selector position
	RUN	○	○	$\Omega \times 1$
	OFF			

Continuous while the main switch is moved to "OFF" →Replace.


Not continuous while the main switch is moved to "RUN" →Replace.

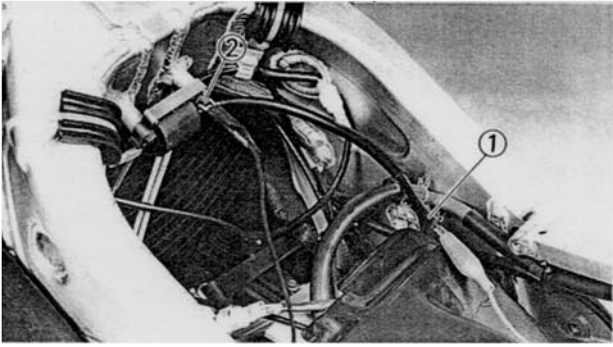


IGNITION COIL INSPECTION

- Inspect:
 - Primary coil resistance
Out of specification →Replace.

Tester (+) lead→Orange (Gray) lead ①
Tester (–) lead→Black lead ②


	Primary coil resistance	Tester selector position
	0.14 ~ 0.18 Ω at 20°C (68°F)	$\Omega \times 1$



2. Inspect:

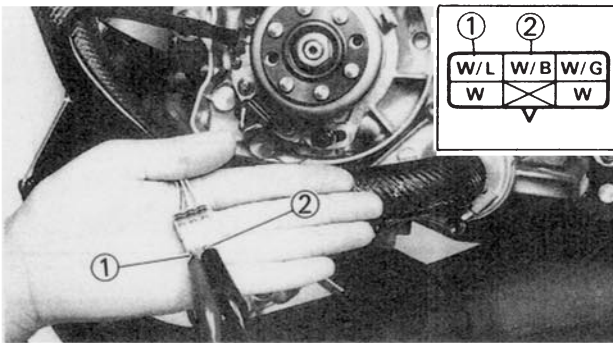
- Secondary coil resistance
Out of specification → Replace.

Tester (+) lead → Spark plug lead ①
Tester (–) lead → Orange (Gray) lead ②

	Secondary coil resistance	Tester selector position
	5.0~7.4kΩ at 20°C (68°F)	kΩ×1

NOTE:

When inspecting the secondary coil resistance, remove the spark plug cap.




CDI MAGNETO INSPECTION

1. Inspect:

- Pick-up coil resistance (left cylinder)
Out of specification → Replace.


Tester (+) lead → White/Blue lead ①
Tester (–) lead → White/Black lead ②

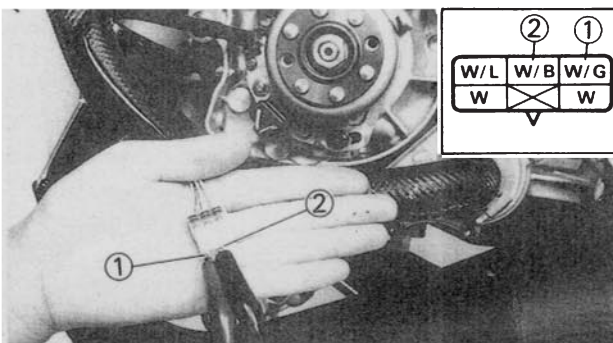
	Pick-up coil resistance	Tester selector position
	94 ~ 140Ω at 20°C (68°F)	Ω × 100

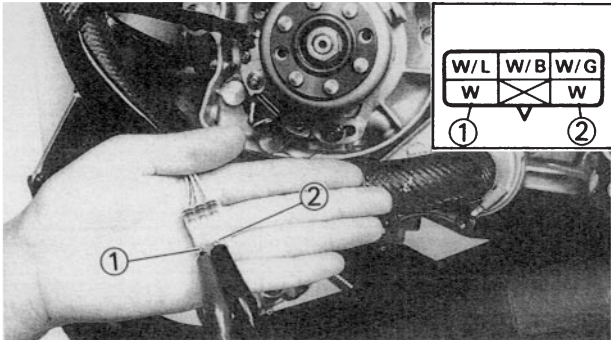
2. Inspect:

- Pick-up coil resistance (right cylinder)
Out of specification → Replace.

Tester (+) lead → White/Green lead ①
Tester (–) lead → White/Black lead ②


	Pick-up coil resistance	Tester selector position
	94 ~ 140Ω at 20°C (68°F)	Ω × 100





3. Inspect:
- Source coil resistance
- Out of specification→ Replace.

Tester (+) lead→White lead ①
Tester (–) lead→White lead ②

	Source coil resistance	Tester selector position
	2.3~3.5Ω at 20°C (68°F)	Ω × 1

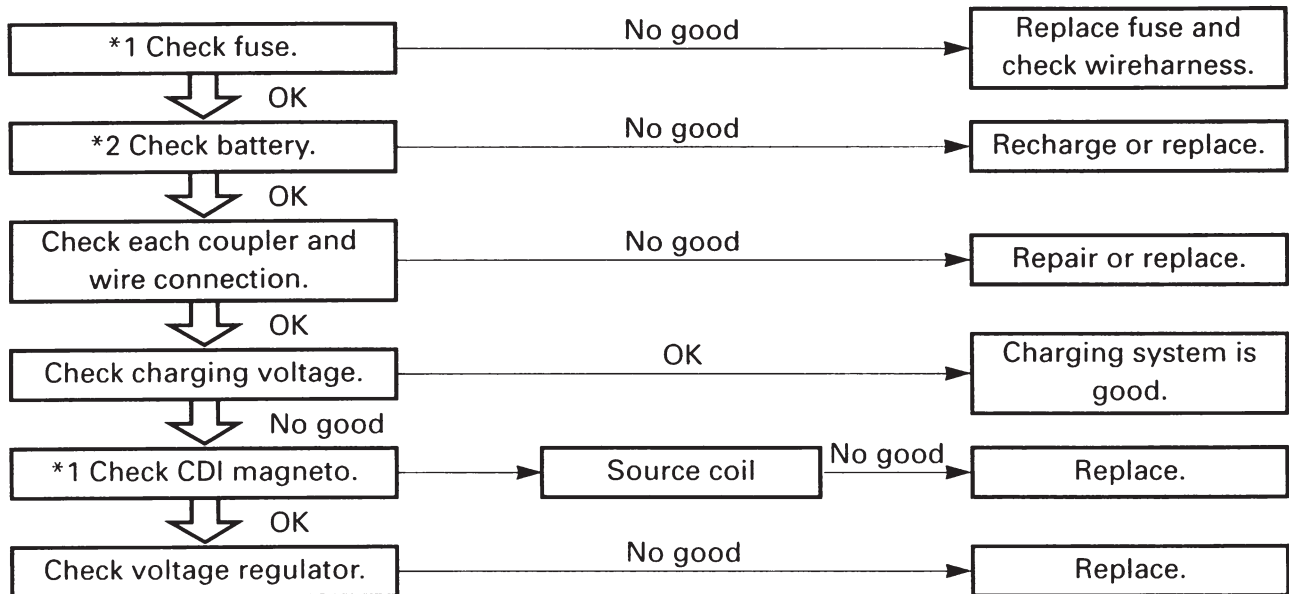
CDI UNIT INSPECTION

Check all electrical components. If no fault is found, replace the CDI unit. Then check the electrical components again.



CHARGING SYSTEM INSPECTION STEPS

If the battery is not charged, use the following inspection steps.



*1 marked: Refer to "IGNITION SYSTEM" section.

*2 marked: Refer to "BATTERY INSPECTION" section in the CHAPTER 3.

NOTE:

- Remove the following parts before inspection.
 - 1) Cowling
 - 2) Fuel tank
- Use the following special tool in this inspection.

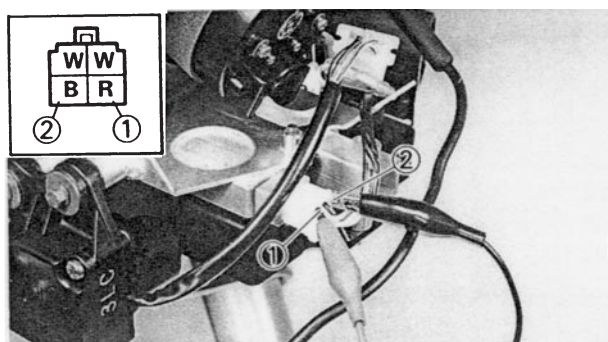


Pocket tester:
YU-03112/90890-03112



COUPLERS AND LEADS CONNECTION INSPECTION


- Check:
 - Couplers and leads connection
Rust/Dust/Looseness/Short-circuit
→Repair or replace.

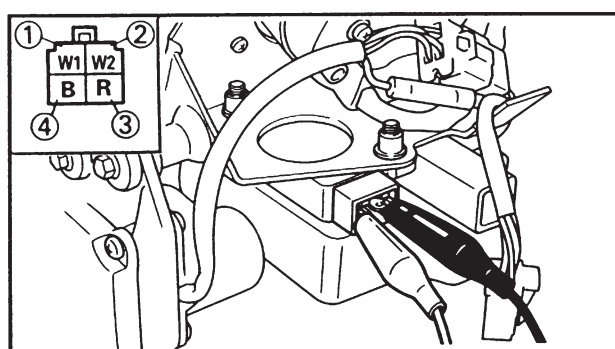


CHARGING VOLTAGE INSPECTION

- Start the engine.
- Inspect:
 - Charging voltage
Out of specification → If no failure is found in checking the source coil resistance, check the voltage regulator.

Tester (+) lead → Red lead ①
Tester (-) lead → Black lead ②

	Charging voltage	Tester selector position
	14.2~15.2V at 5,000 r/min	DCV-20



VOLTAGE REGULATOR INSPECTION

- Check:
 - Voltage regulator conduct
Use pocket tester (tester selector position $\Omega \times 1$).

Tester (+) Tester lead (-) lead	W1 ①	W2 ②	R ③	B ④
W1 ①		×	○	×
W2 ②	×		○	×
R ③	×	×		×
B ④	○	○	○	

"○" indicates continuity and "X" non-continuity.

In case of continuity for "X" → Replace.

In case of non-continuity for "○" → Replace.

**NOTE:** _____

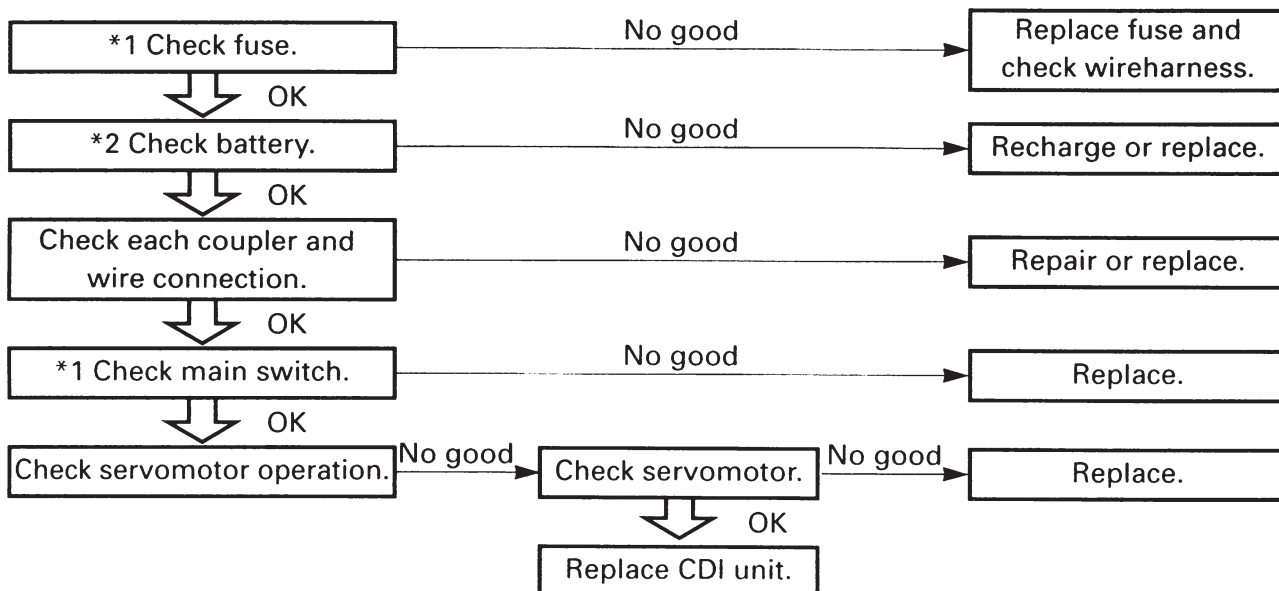
If nothing is wrong with the continuity of the voltage regulator and with all the others in the charging system, replace the voltage regulator.



YPVS SYSTEM

INSPECTION STEPS

If the servomotor will not turn, use the following inspection steps.



*1 marked: Refer to "IGNITION SYSTEM" section.

*2 marked: Refer to "BATTERY INSPECTION" section in the CHAPTER 3.

NOTE:

- Remove the following parts before inspection.

1) Cowling	3) Seat
2) Fuel tank	
- Use 12V battery in this inspection.
- Use the following special tool in this inspection.

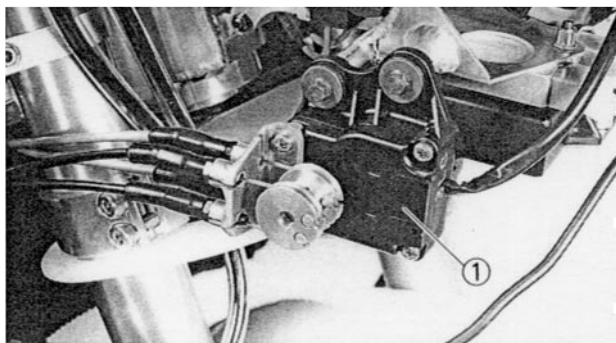


Pocket tester:
YU-03112/90890-03112



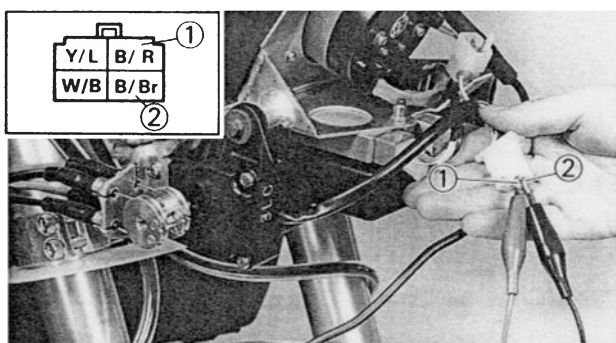
COUPLERS AND LEADS CONNECTION INSPECTION

1. Check:
 - Couplers and leads connection
 - Rust/Dust/Looseness/Short-circuit →
 - Repair or replace.



SERVOMOTOR OPERATION

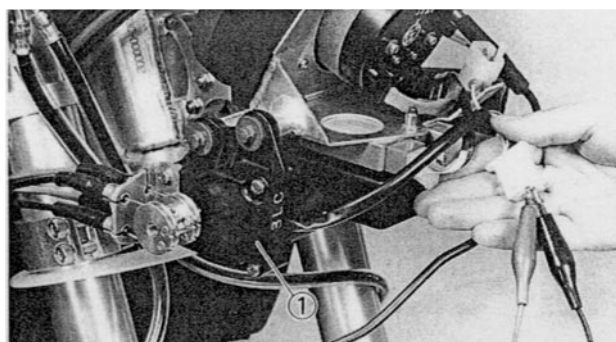
1. Disconnect the fuel pump coupler to prevent the fuel pump operating.
2. Inspect:
 - Servomotor ①
 - Operative when the main switch is moved to "RUN" → OK



SERVOMOTOR INSPECTION

1. Disconnect the YPVS cable from the servomotor.
2. Disconnect the servomotor coupler.
3. Connect 12V battery to the servomotor coupler.

Battery (+) lead → Black/Red lead ①
Battery (-) lead → Black/Brown lead ②



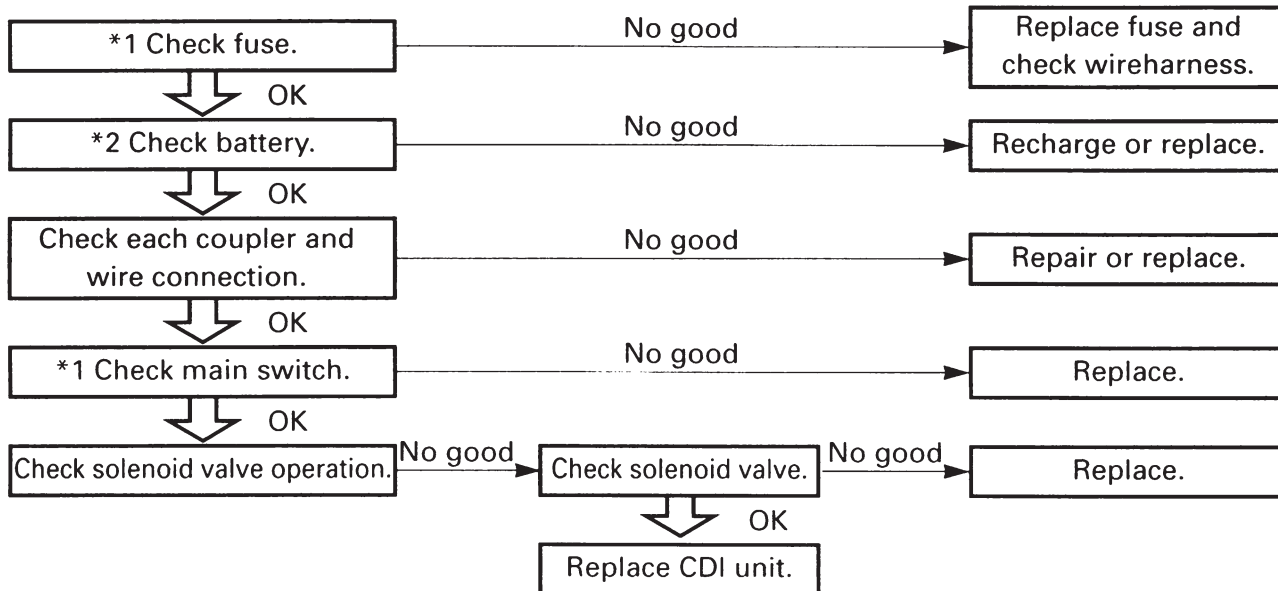
4. Inspect:
 - Servomotor ①
 - Not operative → Replace the servomotor.



SOLENOID VALVE SYSTEM

INSPECTION STEPS

If the solenoid valve will not operate, use the following inspection steps.



*1 marked: Refer to "IGNITION SYSTEM" section.

*2 marked: Refer to "BATTERY INSPECTION" section in the CHAPTER 3.

NOTE:

•Remove the following parts before inspection.

- | | |
|----------------------------------|-----------------------------------|
| 1) Cowling | 4) Induction cap (right cylinder) |
| 2) Fuel tank | 5) Seat |
| 3) Induction cap (left cylinder) | |

•Use 12V battery in this inspection.

•Use the following special tool in this inspection.



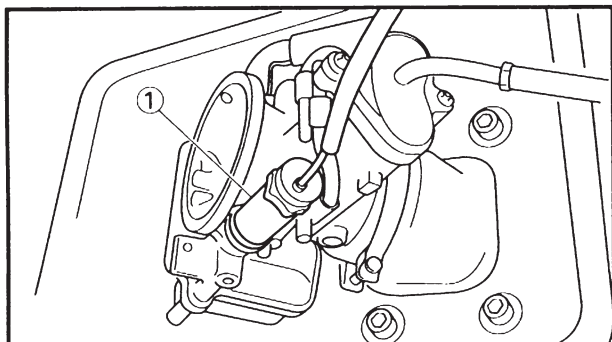
Pocket tester:

YU-03112/90890-03112



COUPLERS AND LEADS CONNECTION INSPECTION

1. Check:
 - Couplers and leads connection
Rust/Dust/Looseness/Short-circuit → Repair or replace.

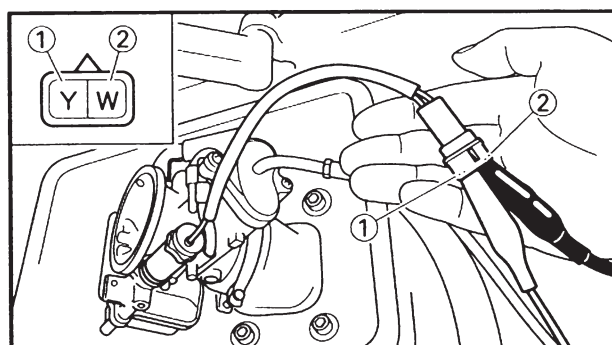


SOLENOID VALVE OPERATION

1. Disconnect the fuel pump and servomotor coupler to prevent the fuel pump and servomotor operating.
2. Inspect:
 - Solenoid valve ①
Click when the main switch is moved to "RUN" → OK

NOTE:


Before checking the solenoid valve, disconnect the other coupler.



SOLENOID VALVE INSPECTION

1. Insepct:
 - Solenoid resistance
Out of specification → Replace.

Tester (+) lead → Yellow lead ①
Tester (–) lead → White lead ②

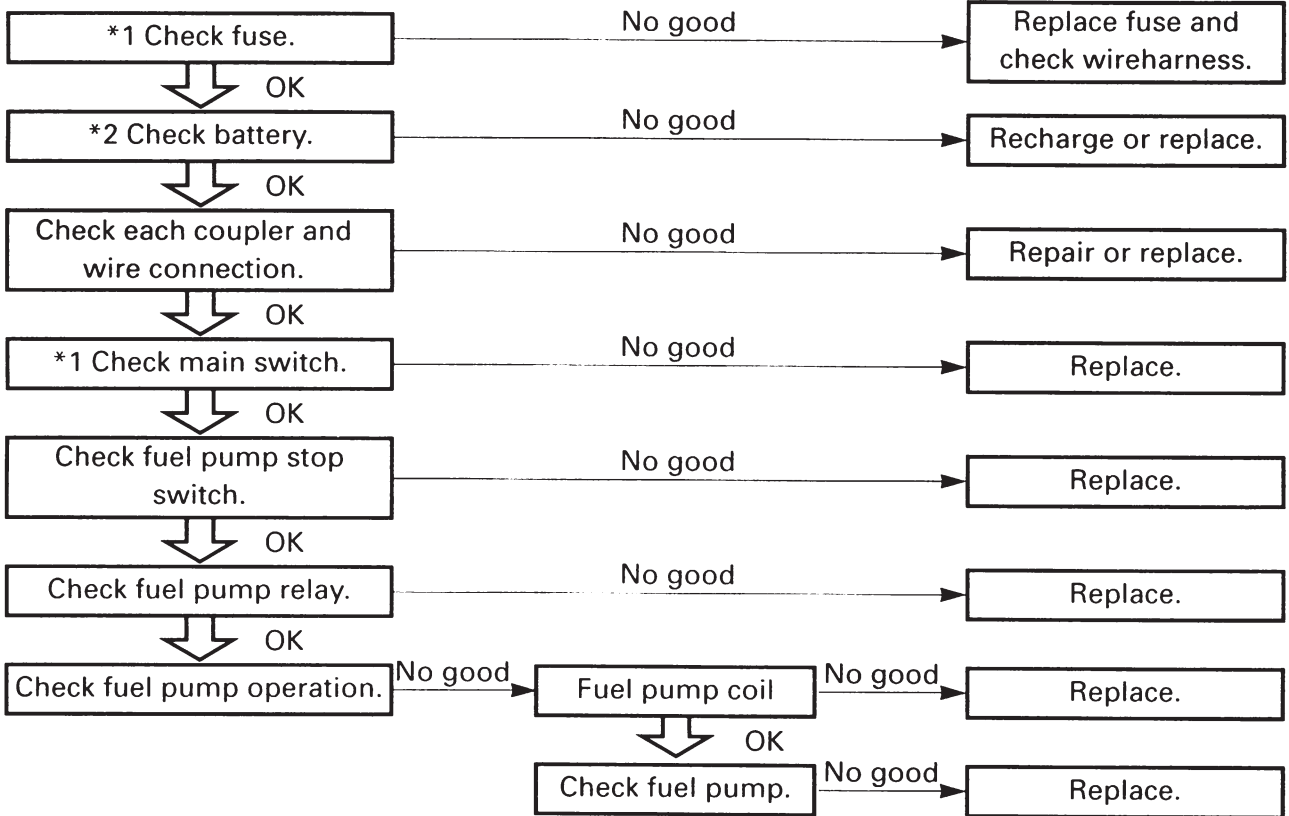
	Solenoid resistance	Tester selector position
	52.0 ~ 63.6Ω at 20°C (68°F)	Ω × 10



FUEL PUMP SYSTEM

INSPECTION STEPS

If the fuel pump will not operate, use the following inspection steps.



*1 marked: Refer to "IGNITION SYSTEM" section.

*2 marked: Refer to "BATTERY INSPECTION" section in the CHAPTER 3.

NOTE:

- Remove the following parts before inspection.
 - Cowling
 - Fuel tank
 - Seat
- Use 12V battery in this inspection.
- Use the following special tool in this inspection.



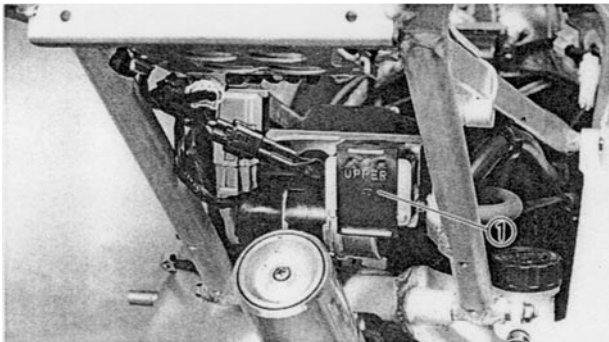
Pocket tester:
YU-03112/90890-03112

COUPLERS AND LEADS CONNECTION INSPECTION

1. Check:
- Couplers and leads connection

Rust/Dust/Looseness/Short-circuit→

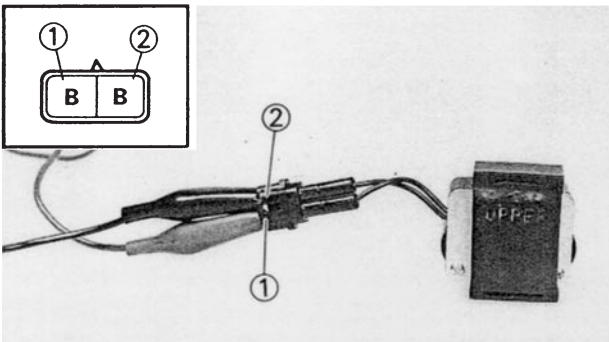
Repair or replace.



FUEL PUMP STOP SWITCH INSPECTION


1. Remove:
- Fuel pump stop switch ①
2. Inspect:
- Fuel pump stop switch conduct

To inspect, tilt the fuel pump stop switch to the right and left.



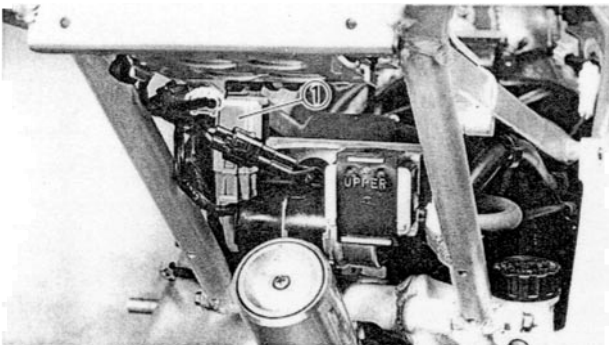
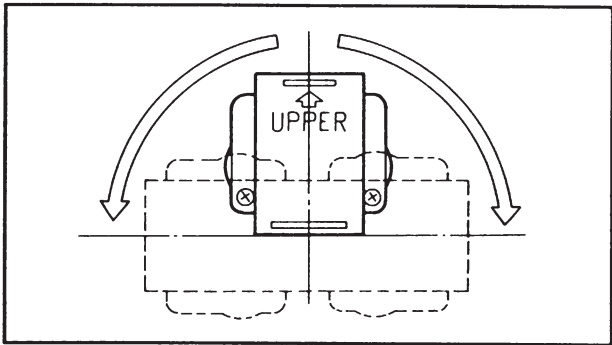
Tester (+) lead→Black lead ①

Tester (-) lead→Black lead ②

		B ①	B ②	Tester selector position
	Tilted 90°	○	○	Ω ×1
	Normal			

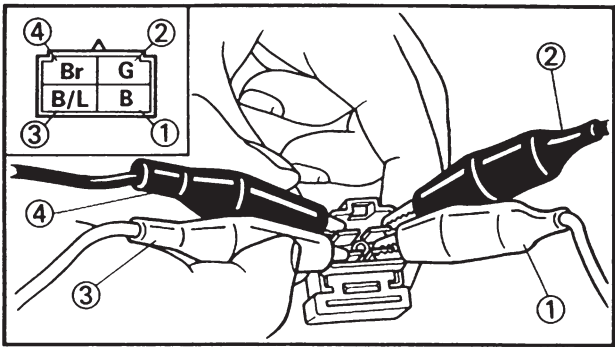
Continuous if normal→Replace.

Not continuous if tilted 90°→Replace.





FUEL PUMP RELAY INSPECTION

1. Remove:
- Fuel pump relay ①

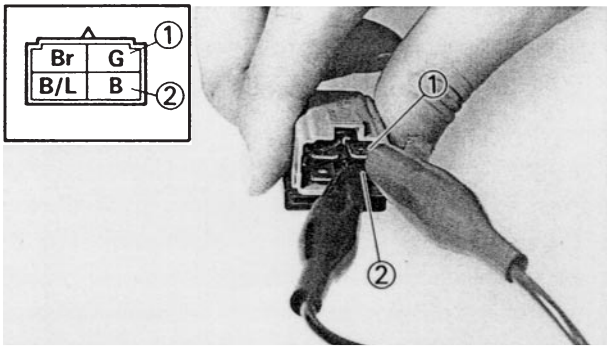


2. Inspect:
- Fuel pump relay conduct
- Use 12V battery.

Battery (+) lead→Black lead ①
Battery (-) lead→Green lead ②
Tester (+) lead→Black/Blue lead ③
Tester (-) lead→Brown lead ④


		B/L ③	Br ④	Tester selector position
	Connected to battery			$\Omega \times 1$
	Not connected to battery			

Continuous while connected to the battery→
Replace.
Not continuous while not connected to the
battery→Replace.



3. Inspect:
- Fuel pump relay resistance
- Out of specification→Replace.

Tester (+) lead→Green lead ①
Tester (-) lead→Black lead ②

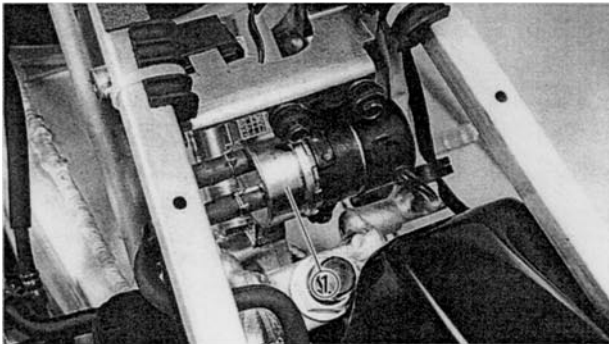
	Fuel pump relay resistance	Tester selector position
	72~80 Ω at 20°C (68°F)	$\Omega \times 10$

FUEL PUMP OPERATION

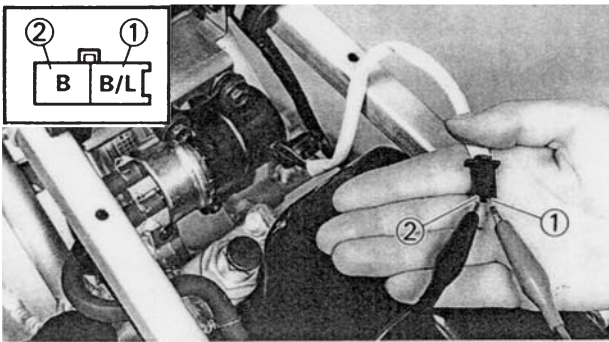
CAUTION: _____

Do not operate the fuel pump on an empty
fuel tank because it may damage the
pump.

1. Loosen the drain plug (carburetor) and
drain the fuel from the float chamber.




- 2. Install:
 - Drain plug
- 3. Turn the fuel cock to "ON".
- 4. Inspect:
 - Fuel pump ①
 - Operation sound when the main switch is moved to "RUN" → OK



FUEL PUMP COIL INSPECTION

- 1. Disconnect the fuel pump coupler.
- 2. Inspect:
 - Fuel pump coil resistance
 - Out of specification → Replace.

Tester (+) lead → Black/Blue lead ①
Tester (–) lead → Black lead ②

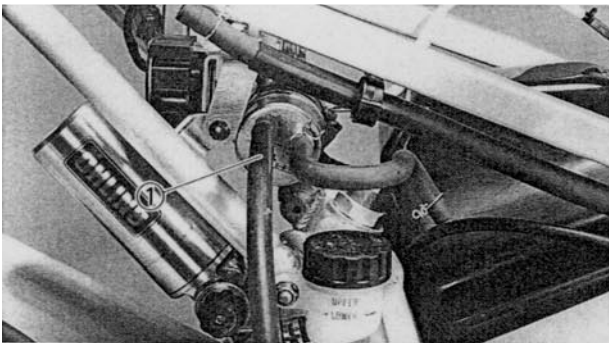
	Fuel pump coil resistance	Tester selector position
	1~3 Ω at 20°C (68°F)	Ω × 10

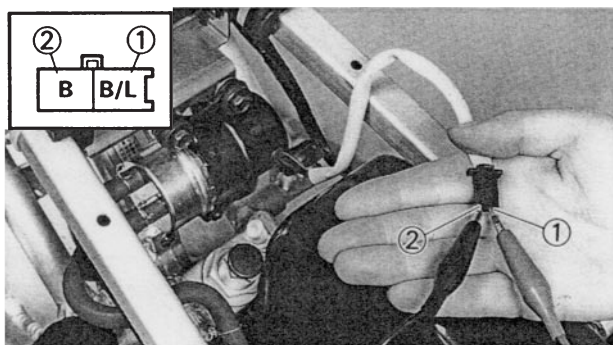
FUEL PUMP INSPECTION

CAUTION: _____

Do not operate the fuel pump on an empty fuel tank because it may damage the pump.

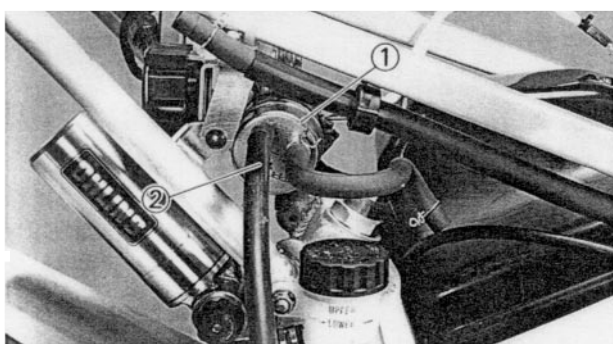
- 1. Remove the fuel outlet hose from the fuel pump.
- 2. Connect another plastic hose ① to the fuel pump and place its other end into a container.





3. Turn the fuel cock to "ON".
4. Disconnect the fuel pump coupler.
5. Connect 12V battery to the fuel pump coupler.

Battery (+) lead → Black/Blue lead ①
Battery (-) lead → Black lead ②



6. Inspect:
 - Fuel pump ①
 - No fuel flows from the plastic hose ②. → Replace.

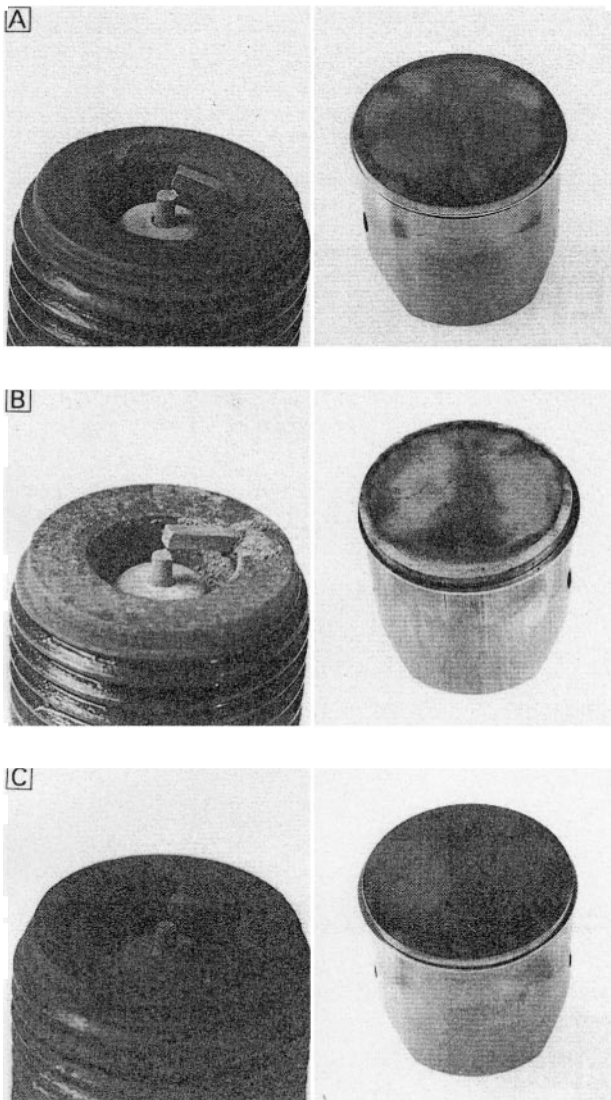


MEMO



CHAPTER 7 TUNING





Carburetor setting

- The role of fuel is not only to produce motive power but also to cool the engine and, in the case of a 2-stroke engine, to lubricate it. Therefore, too lean a mixture (of air and fuel) tends to cause an abnormal combustion (i.e., detonation), whereas too rich a mixture makes it difficult for the engine to develop its full performance, with the result that in some cases the spark plug may be fouled, causing the engine to stop running.
 - The richness of a fuel mixture varies with different weather conditions and thus the carburetor must be properly set to suit the atmospheric conditions (air pressure, humidity and temperature) of the day.
 - As a basic setting method, only the factory set main jet is first changed to check for the discoloration of the spark plug(s) and piston(s) at full throttle in 6th and then the setting is determined at mid-open throttle.
- *Recording and storing the data on the settings, weather conditions, road surface conditions of the circuit, lap times, etc. will enable quick setting under different conditions at a later time.

- [A] Normal
- [B] Over burned (too lean)
- [C] Oil fouled (too rich)



Atmospheric conditions and carburetor setting

Air temp.	Humidity	Air pressure (altitude)	Mixture	Setting
High	High	Low (high)	Richer	Leaner
Low	Low	High (low)	Leaner	Richer

The reason for the above tendency is that the richness or leanness of a fuel mixture depends on the density of the air (i.e. the concentration of oxygen in it).

That is:

- Higher temperature expands the air with its resultant reduced density.
- Higher humidity reduces the amount of oxygen in the air by so much of the water vapor in the same air.
- Lower atmospheric pressure (at a high altitude) reduces the density of the air.

Effects of setting parts in relation to throttle valve opening

Setting parts	Throttle valve opening							
	0	1/8	1/4	1/2	3/4	7/8	1	1
Pilot air screw								
Pilot jet								
Main nozzle Jet needle								
Main Jet								
Power Jet								

NOTE: _____

The power jet closes at 12,150 rpm of the engine, after which only the main jet dominates.



Basic process of carburetor setting

Ex-factory setting is on the richer side, which should basically have no problems with the brake-in procedure.

(Refer to "STARTING AND BREAK-IN" in the CHAPTER 1.)

1. Adjustment of main jet

Use a main jet with a smaller calibration number if the engine does not develop more than 12,000 rpm after a few laps of the circuit when the water temperature becomes stable [55°C (131°F) or more].

Example: #640→#620

Next run a few laps of the circuit with this setting and check for any difference in engine revolutions. If no difference is noticed, use a main jet with a much smaller calibration number.

Example: #620→#600

2. Checking of spark plug and piston for discoloration.

Repeat the adjustment in the above "1" several times. If the engine begins to run at more than 12,000 rpm at full throttle, proceed to the "spark plug chopping" step (refer to P7-8) to check for the discoloration of the spark plug(s) and piston(s). Refer to the photo on P7-1 for judgement on the discoloration.

As a novice will find it difficult to determine how much smaller number main jet can be used just by looking at discoloration, he should consult an experienced person for his own experience, too.

Whether the setting is proper or not can be judged by engine revolutions.

Approximate criteria for such judgement are given below, on condition that the secondary reduction ratio is fit for conditions of the circuit.

- 13,000 rpm in 1st and 2nd
- 12,500 rpm in 5th and 6th



3. Adjustment of main nozzle

The main nozzle adjustment follows the completion of the adjustment of the main jet. Check that engine revolutions smoothly respond to throttle opening from where throttle is about to be opened to 1/2 throttle opening. Use a main nozzle of a smaller size if engine revolutions appear to falter at the beginning of throttle opening and then suddenly respond to further throttle opening.

Example: S-3→S-2

If the main jet is fully adjusted with not much allowance for discoloration, use a main jet which is approximately #20 larger.

Run a few laps of the circuit to check the engine for response to revolutions. Also check for the discoloration of the spark plug(s) and piston(s).

Use a main jet of a smaller size if good response to engine revolutions is achieved with an allowance for the discoloration of the spark plug(s) and piston(s).

On the other hand, if the use of a different main nozzle appears to produce less power, change to a main nozzle of a larger size.

Example: S-0→S-1

NOTE: _____

Difference between individual riders or difference between circuit layouts greatly affect the main nozzle setting.

- Rider who frequently uses mid-open throttle
- Circuit that requires frequent throttle opening and closing
- Wet environment

Conditions as mentioned above require a longer period of throttle closing, resulting in the drawn in mixture staying longer in the crankcase. Such setting in turn will inevitably cause the mixture to be richer at the next throttle opening, a main jet of a smaller size has to be used.



Carburetor settings by correction coefficient

Now you should be able to understand the essentials of basic carburetor setting from an explanation given under "Basic process of carburetor setting" (P7-3).

Next is an explanation of how to select a main jet to deal with changes in weather conditions by means of a correction coefficient.

NOTE:

- Before this correction coefficient can be used, satisfactory carburetor setting must have been made.
- This correction coefficient can not be used if there is a change in specification (e.g., ignition timing, compression ratio, etc.).

Illustration:

Suppose the best setting was represented by a #450 main jet at an air pressure of 1013 hpa (760 mmHg) and an air temperature of 20°C (68°F) in the previous riding.

In this riding, there has been a substantial change in conditions; namely, an air pressure of 1007 hpa (755 mmHg) and an air temperature of 30°C (86°F).

1. Refer to a table of correction coefficients (P7-6) to find the correction coefficient for the previous riding.

The correction coefficient A=100.0

2. Find the correction coefficient for this time.

The correction coefficient B=96.1

3. Use the following equation to calculate the size of a main jet needed in this particular case.

$$\text{Previous main jet size} \times B/A \\ = \text{Currently required main jet size}$$

$$450 \times 96.1/100=432.5$$



Thus, a #430 main jet can be selected.

CAUTION:

If a change in conditions require a main jet of a larger size, use the size to which #20 is added for safety.

NOTE:

- Since this correction coefficient table lacks a column for humidity, it is advisable to check the degree of discoloration of the spark plug(s) for final selection according to an explanation under "Atmospheric conditions and carburetor setting" (P7-2).
- As the main nozzle is more susceptible to other than atmospheric conditions, no correction coefficient is used for main nozzle setting.

Table of correction coefficients for carburetor setting

Air pressure hpa(mmHg)	Air temperature °C (°F)										Altitude m (ft)
	-5 (23)	Zero (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	
1040 (780)	112.2	110.2	108.2	106.3	104.4	102.6	100.9	99.3	97.7	96.1	-220 (-722)
1033 (775)	111.5	109.4	107.5	105.6	103.7	102.0	100.3	98.6	97.0	95.5	-165 (-541)
1027 (770)	110.8	108.7	106.8	104.9	103.1	101.3	99.6	98.0	96.4	94.8	-110 (-361)
1020 (765)	110.0	108.0	106.1	104.2	102.4	100.7	99.0	97.3	95.8	94.2	-55 (-180)
1013 (760)	109.3	107.3	105.4	103.5	101.7	100.0	98.3	96.7	95.1	93.6	Zero (Zero)
1007 (755)	108.6	106.6	104.7	102.9	101.1	99.3	97.7	96.1	94.5	93.0	56 (184)
1000 (750)	107.9	105.9	104.0	102.2	100.4	98.7	97.0	95.4	93.9	92.4	112 (367)
993 (745)	107.2	105.2	103.3	101.5	99.7	98.0	96.4	94.8	93.3	91.8	168 (551)
987 (740)	106.5	104.5	102.6	100.8	99.1	97.4	95.7	94.2	92.6	91.1	224 (735)
980 (735)	105.7	103.8	101.9	100.1	98.4	96.7	95.1	93.5	92.0	90.5	281 (922)
973 (730)	105.0	103.1	101.2	99.4	97.7	96.1	94.4	92.9	91.4	89.9	338 (1,109)
967 (725)	104.3	102.4	100.5	98.8	97.1	95.4	93.8	92.2	90.7	89.3	396 (1,299)
960 (720)	103.6	101.7	99.8	98.1	96.4	94.7	93.1	91.6	90.1	88.7	453 (1,486)
953 (715)	102.9	101.0	99.2	97.4	95.7	94.1	92.5	91.0	89.5	88.1	512 (1,680)
947 (710)	102.1	100.3	98.5	96.7	95.0	93.4	91.9	90.3	88.9	87.5	570 (1,870)
940 (705)	101.4	99.6	97.8	96.0	94.4	92.8	91.2	89.7	88.2	86.8	629 (2,064)
933 (700)	100.7	98.9	97.1	95.4	93.7	92.1	90.6	89.1	87.6	86.2	688 (2,257)
927 (695)	100.0	98.1	96.4	94.7	93.0	91.4	89.9	88.4	87.0	85.6	747 (2,451)
920 (690)	99.3	97.4	95.7	94.0	92.4	90.8	89.3	87.8	86.4	85.0	807 (2,648)
913 (685)	98.5	96.7	95.0	93.3	91.7	90.1	88.6	87.2	85.7	84.4	867 (2,845)
907 (680)	97.8	96.0	94.3	92.6	91.0	89.5	88.0	86.5	85.1	83.8	928 (3,045)
900 (675)	97.1	95.3	93.6	92.0	90.4	88.8	87.3	85.9	84.5	83.1	989 (3,245)
893 (670)	96.4	94.6	92.9	91.3	89.7	88.2	86.7	85.2	83.9	82.5	1,050 (3,445)
887 (665)	95.7	93.9	92.2	90.6	89.0	87.5	86.0	84.6	83.2	81.9	1,111 (3,645)
880 (660)	94.9	93.2	91.5	89.9	88.3	86.8	85.4	84.0	82.6	81.3	1,173 (3,848)
873 (655)	94.2	92.5	90.8	89.2	87.7	86.2	84.7	83.2	82.0	80.7	1,236 (4,055)
867 (650)	93.5	91.8	90.1	88.5	87.0	85.5	84.1	82.7	81.4	80.1	1,299 (4,262)
860 (645)	92.8	91.1	89.4	87.9	86.3	84.9	83.4	82.1	80.7	79.4	1,362 (4,469)
853 (640)	92.1	90.4	88.8	87.2	85.7	84.2	82.8	81.4	80.1	78.8	1,425 (4,675)
847 (635)	91.3	89.7	88.1	86.5	85.0	83.6	82.2	80.8	79.5	78.2	1,489 (4,885)
840 (630)	90.6	89.0	87.4	85.8	84.3	82.9	81.5	80.2	78.9	77.6	1,554 (5,099)

**Other setting parts**

1. Jet needle

As a rule, the clip position is not changed. The mid-open setting basically depends on the main nozzle.

Standard clip position

No. 3 groove

2. Power jet

Power jet is not basically changed. Since the areas of the main jet and main nozzle overlap each other, special knowledge is required for a setting change.

A larger size results in a richer mixture and a smaller size in a leaner mixture.

Standard power jet

#80

3. Pilot jet

The pilot jet is used in relation to the engine response at small throttle opening. This is changed when the main nozzle setting is not enough.

A larger size results in a richer mixture and a smaller size in a leaner mixture.

Standard pilot jet

#30

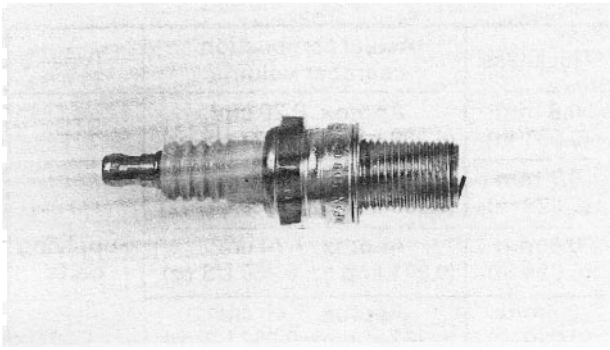
4. Pilot air screw

The pilot air screw relates to the engine response at a smaller opening than for the pilot jet.

This setting may be changed for want of time or in emergency, but it is basically set at the standard pilot air screw position.

Standard pilot air screw position
--

1-1/2 turns out



5. Spark plug

The spark plug heat range is not basically changed.

Constant attention to the discoloration of the spark plug and piston head will enable you to tell to some extent whether the setting is good or bad.

Standard spark plug	R6179A-105P/NGK
----------------------------	------------------------

NOTE: _____

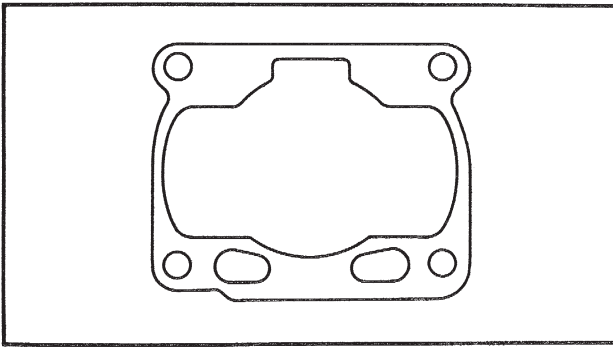
For the effects each setting part has, refer to "Effects of setting parts in relation to throttle valve opening" (P7-2).

Plug chop

When checking the discoloration of the spark plug and piston head, move the main switch to "OFF" while running along a straight lane at full throttle, disengage the clutch at the same time and stop the engine. Then let your machine go back to the pit by inertia. This is called a "plug chop".

CAUTION: _____

- When you do a "plug chop", pay attention to your surrounding environment to avoid interference with other riders.
- Do not shift down while riding your machine by inertia (as it may cause a seizure of the clutch push rod and ball).



Setting of cylinder gasket

The use of the supplied gaskets of different thicknesses makes it possible to change the combustion chamber volume to deal with changing weather conditions.

Not much torque is felt with slow engine acceleration → Reduce the combustion chamber volume.

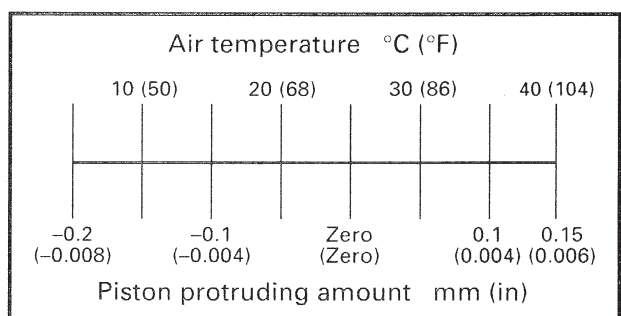
Torque is felt with no higher revolutions → Expand the combustion chamber volume.

Thickness	Actual combustion chamber volume	Type
0.8 mm (0.031 in)	Approx. 9.03 cm ³ (0.318 Imp oz, 0.305 US oz)	STD
0.7 mm (0.028 in)	Approx. 8.79 cm ³ (0.309 Imp oz, 0.297 US oz)	Supplying parts
0.6 mm (0.024 in)	Approx. 8.54 cm ³ (0.301 Imp oz, 0.289 US oz)	
0.5 mm (0.020 in)	Approx. 8.29 cm ³ (0.292 Imp oz, 0.280 US oz)	

NOTE:

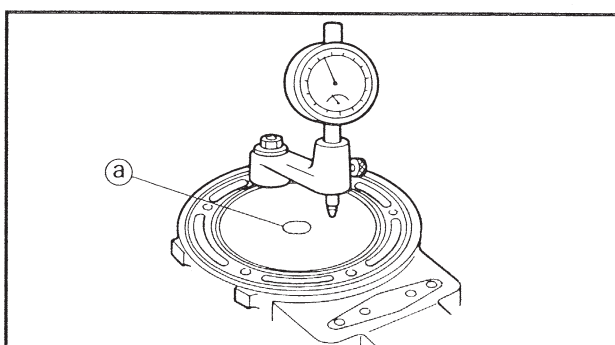
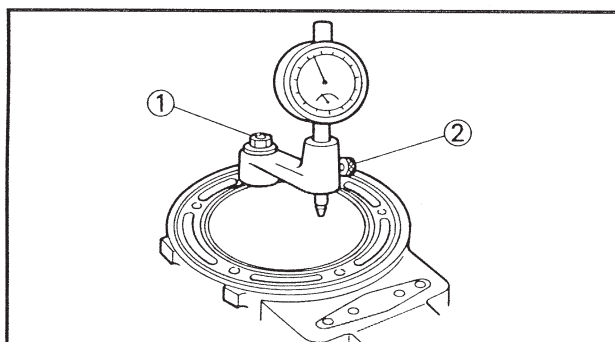
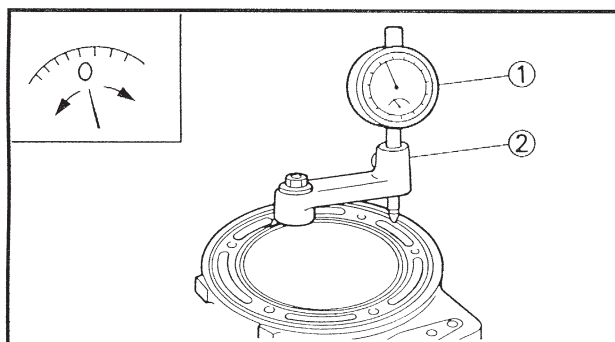
- Finish adjusting the carburetor setting before changing the gasket.
- A change of 0.1 mm (0.004 in) for the gasket causes a change of approximately 0.25 cm³ (0.009 Imp oz, 0.008 US oz) of the combustion chamber volume.

When the cylinder gasket is changed, measure the protruding (or sinking) amount of the piston above (below) the cylinder top and then change the cylinder gasket so that the following approximate relation can be achieved between the temperature and the piston protruding amount. (The table shows an example when the air pressure is 1013 hpa (760 mmHg).)



**CAUTION:**

- Piston protruding amount must be a maximum 0.15 mm (0.006 in). Above this value, the piston and cylinder head may contact each other.
- As the air pressure becomes lower at a higher altitude, slide to the right the temperature scale readings by 10°C (50°F) each for every change in the air pressure of 27 hpa (20 mmHg).
- Too much random piston protrusion at low temperature may develop an abnormal combustion (detonation), which may adversely affect the intended performance of the engine

**Measuring piston protrusion**

1. Install the dial gauge ① and dial gauge stand ② to the cylinder contact surface and set the scale of the dial gauge to zero.



Dial gauge:
YU-03097/90890-01252
Stand:
YU-01256

2. Loosen the stand installation bolt ①, then rotate the dial gauge stand and set it close to the center of the piston. Tighten the stand installation bolt again.

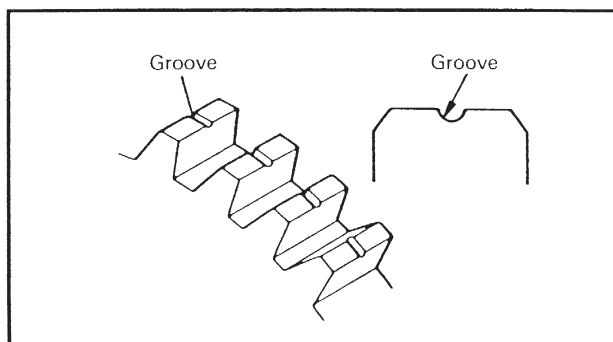
NOTE:

Do not loosen the dial gauge installation bolt ② while doing the above.

3. Set the piston at top dead center (TDC), then measure the piston protrusion.

NOTE:

For measurement, avoid the top center projected area (a) on the piston head but measure several positions above the piston pin as close to the center as possible. The average of these measurements indicates the piston protrusion.



Selection of transmission gear ratio

The following gear sets are contained in the accompanying (or optional) to allow the rider to change the gear ratios according to the circuit condition or rider's preference.

CAUTION:

Select the transmission gears so that the number of grooves in the wheel gear match that of the pinion gear as shown below. Trouble may be occurred if the selection is different than that listed below.

1st gear

	Gear ratio	Part number	Number of groove
Factory installed	34/18 (1.889)	5F7-17211-20/3YL-17411-20	2
Accompanying Part	28/14 (2.000)	5F7-17211-10/3YL-17411-10	1
Optional part	31/15 (2.067)	5F7-17211-01/3YL-17411-00	—

2nd gear

	Gear ratio	Part number	Number of groove
Factory installed	31/21 (1.476)	4DP-17221-11/4DP-17121-11	1
Accompanying Part	27/19 (1.421)	5F7-17221-21/3YL-17121-21	2
Optional part	28/18 (1.556)	5F7-17221-00/3YL-17121-00	—

3rd gear

	Gear ratio	Part number	Number of groove
Factory installed	29/23 (1.261)	5F7-17231-00/5F7-17131-00	—
Optional part	25/21 (1.190)	5F7-17231-20/5F7-17131-20	2
Optional part	26/21 (1.238)	5F7-17231-11/5F7-17131-11	1

6th gear

	Gear ratio	Part number	Number of groove
Factory installed	20/22 (0.909)	3YL-17261-01/5F7-17161-02	1
Accompanying Part	22/25 (0.880)	3YL-17261-11/5F7-17161-11	2



Suspension setting

How to go about setting the machine

- Measure the stroke of the front and rear suspension to get an idea of the operation.
- If the time increases, the stroke increases.
- If the tire grip becomes firmer, the stroke increases.
(On the other hand, the stroke decreases on rainy weather.)
- Rider's position and posture affect the stroke.
- Be careful not to allow the suspension to bottom out.
- Start the setting with the preload.

Next, go to the damping force adjustment, and if this is not enough, then adjust the machine height.
(On the side where the machine height is greater the stroke increases; whereas it decreases on the side with a smaller machine height.)

- If the damping force is increased either on the compression or the expansion side, it results in less smooth movement, so do not depart too far from the standard settings.
- Adjust the machine height in an increment of mm.
- If you lose your way while doing the setting, go back to the standard settings.
- Oil level adjustment in the front fork produces a greater effect in further stroke than in mid stroke.
(Increase or decrease the oil level in an approximately 5 to 10 mm (0.20~0.39 in) interval.)



EC72M000

Tire and machine's posture

If a non-designated tire is used, the difference in radius between the front and the rear tire may affect the machine's posture.

To keep the machine in a proper posture, adjust the front fork top end or seat height.

Example:

[Front]

Tire brand	Tire circumference	Tire radius	Front fork top end
*120/60-R17 DUNLOP KR106	About 1,875 mm (73.8 in)	About 298.5 mm (11.8 in)	10 mm (0.39 in)
3.25/4.70-R17 DUNLOP KR149	About 1,885 mm (74.2 in)	About 300 mm (11.8 in)	11.5 mm (0.45 in)

*Designated tire

[Rear]

Tire brand	Tire circumference	Tire radius	Front fork top end
*165/55-R17 DUNLOP KR108	About 1,975 mm (77.8 in)	About 314.5 mm (12.4 in)	24 mm (0.94 in)
165/65-R17 DUNLOP KR133	About 1,963 mm (77.3 in)	About 312.5 mm (12.3 in)	23 mm (0.91 in)

*Designated tire

NOTE:

Find the tire radius by calculating the measured circumference of the tire.

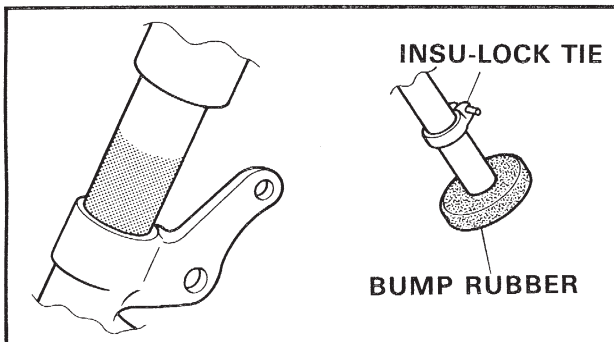


Settings

For full use of engine performance and safe riding, set the suspension as follows. (Ex-factory settings are intended for a rider approximately 170 cm (6.69 in) in height and approximately 60 kg (132 lb) in weight.)

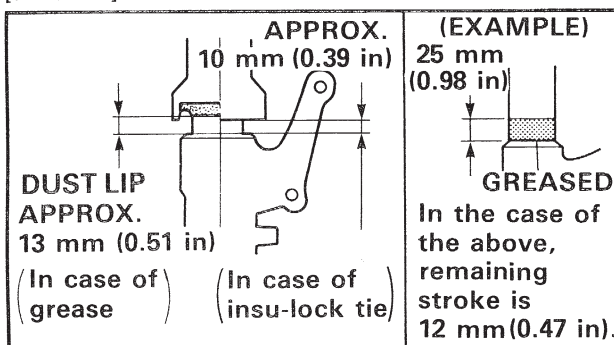
1. Preparations

To check for the remaining stroke in the front and rear suspension, either install a thin insu-lock tie or apply a small amount of grease at the front fork inner tube and at the rear shock absorber rod.

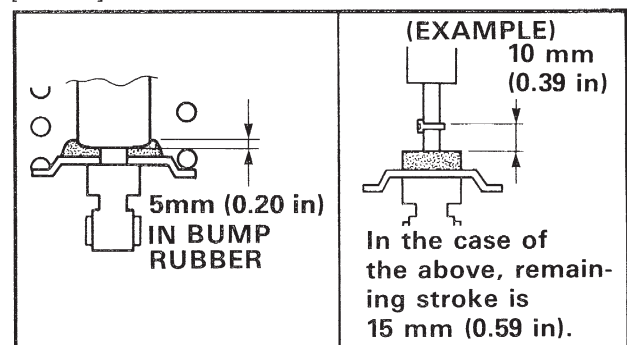


The figures below show the bottom-out positions of the front and rear suspension.

[FRONT]



[REAR]



2. Settings

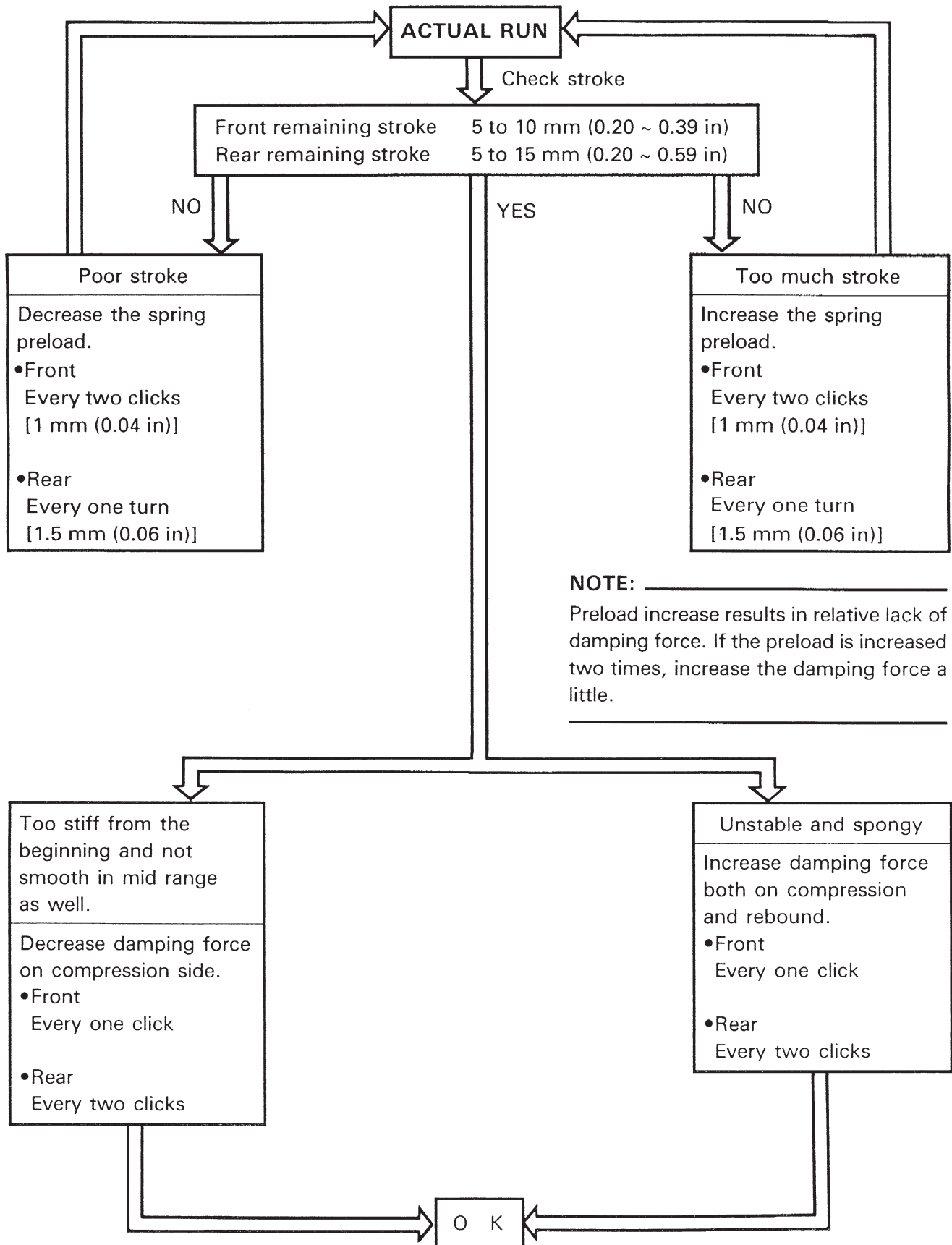
At the beginning of the break-in period, always record the remaining stroke as data.

To judge front and rear balance in relation to the machine height, the usual way is to shift from full braking to turning and get the feel when the clipper riding.

After making an actual run, proceed to the settings for a target of a 5 to 10 mm (0.20~0.39 in) remaining stroke for front and a 5 to 15 mm (0.20 ~ 0.59 in) remaining stroke for rear. Basically, the best settings can be obtained by repeating the following steps.



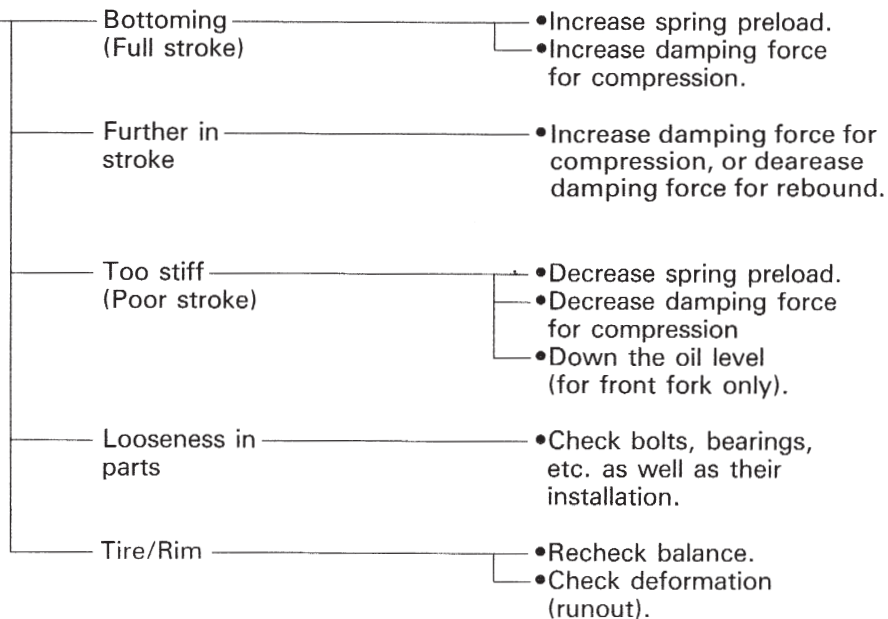
SETTING CHART



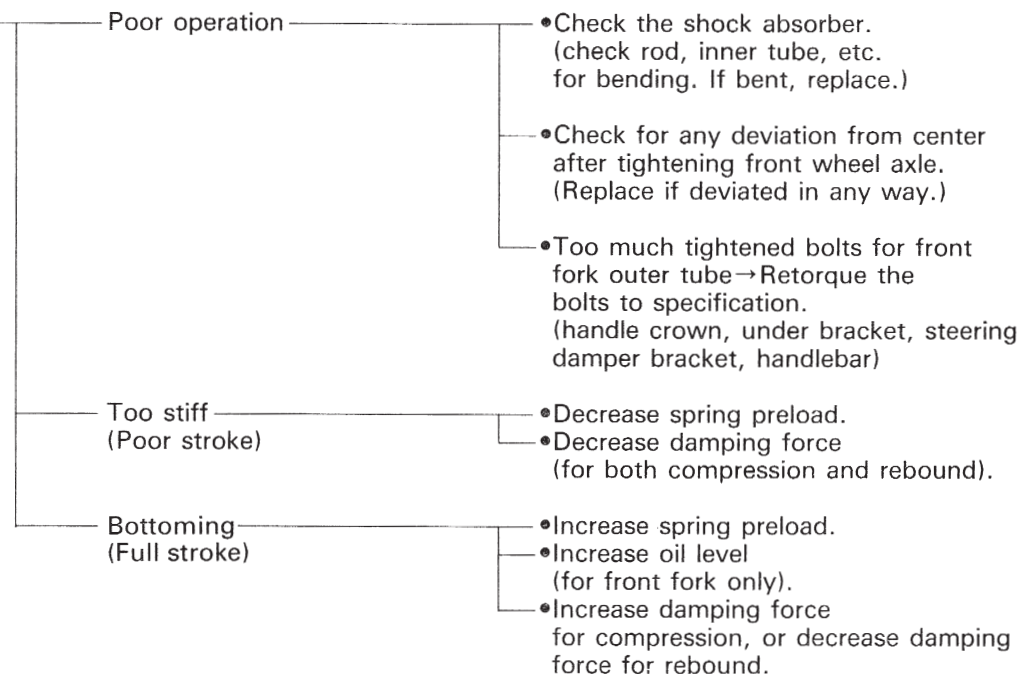


Symptom

Chattering
(Small
rebounds,
up-and-down
movements)



Too stiff
feeling





Spongy feeling

Poor of damping force

- Increase damping force (for both compression and rebound).

Too soft

- Increase spring preload.

Handlebar fluctuating

Poor of front load

- Decrease spring preload (for front).
- Increase front fork top end protrusion.
- Increase rear height.
- Increase spring preload (for rear).

Too soft of front

- Increase spring preload (for front).
- Increase damping force (for front).

Poor corner maneuvering

Machine tends to incline too much backward. (Too big caster angle)

- Increase rear height.
- Increase spring preload (for rear).
- Decrease damping force for rebound (for rear).
- Increase front fork top end protrusion.
- Decrease spring preload (for front).

Too much knifing at cornering

Machine tends to incline too much forward. (Too small caster angle)

- Decrease front fork top end protrusion.
- Decrease rear height.
- Increase spring preload (for front).
- Increase damping force for compression (for front).

Front dives in too early.

- Increase damping force for compression (for front).

Swinging on (bounding) over gaps

Too much damping force for rebound

- Decrease damping force for rebound.

Bottoming

- Increase spring preload.

**Setting record table**

The data shown here is an example of entry. For your actual use, copy the necessary data.

Event name				
Date				
Weather				
Place				

Setting specs.

Ignition timing				
Spark plug				
Carburetor				
Main jet				
Power jet				
Jet needle				
Main nozzle				
Pilot jet				
Air screw				
Float height				
Gearing				
1st				
2nd				
3rd				
Secondary				
Front fork				
Spring pre-load				
Rebound damping				
Compression damping				
Tube height				
Oil quantity				
Level				
Weight				
Rear shock				
Spring fitting length				
Rebound damping				
Compression damping				
Seat height				
Front tire (pressure)				
Rear tire (pressure)				
Fuel consumption				



Event name				
Date				
Weather				
Place				

Setting specs.

Ignition timing				
Spark plug				
Carburetor				
Main jet				
Power jet				
Jet needle				
Main nozzle				
Pilot jet				
Air screw				
Float height				
Gearing				
1st				
2nd				
3rd				
Secondary				
Front fork				
Spring pre-load				
Rebound damping				
Compression damping				
Tube height				
Oil quantity				
Level				
Weight				
Rear shock				
Spring fitting length				
Rebound damping				
Compression damping				
Seat height				
Front tire (pressure)				
Rear tire (pressure)				
Fuel consumption				

NOTE:

1. Make setting changes in small increments.
2. When the proper settings have been determined for a particular track, they should be written down for reference upon returning to that track.
3. Always make adjustment in cold state.

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