YAMAHA

YFM400FW

Service Manual

LIT-11616-KD-40

YAMAHA

YFM400FWH '96

SUPPLEMENTARY SERVICE MANUAL

LIT-11616-10-01

FOREWORD

This Supplementary Service Manual has been prepared to introduce new service and new data for the YFM400FW(H) '96. For complete information on service procedures, it is necessary to use this Supplementary Service Manual together with the following manual.

YFM400FW (EUR) '93 SERVICE MANUAL: 4GB-ME1
YFM400FW '93 SUPPLEMENTARY SERVICE MANUAL: 4GB-AE1

YFM400FW(H) '96
SUPPLEMENTARY
SERVICE MANUAL

1st Edition, June 1995

NOTICE

This manual was written by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so persons using this book to perform maintenance and repairs on Yamaha machines should have a basic understanding of the mechanical concepts and procedures inherent in machine repair technology. Without such knowledge, attempted repairs or service to the machine may render it unfit to use and/or unsafe.
Yamaha Motor Company, Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

⚠	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.

HOW TO USE THIS MANUAL

CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See "Illustrated symbols")

1st title ①: This is a chapter with its symbol on the upper right of each page.

2nd title ②: This title appears at the top of each page, on the left of the chapter symbol. (For the chapter "Periodic inspection and adjustment" the 3rd title appears.)

3rd title ③: This is a final title.

MANUAL FORMAT

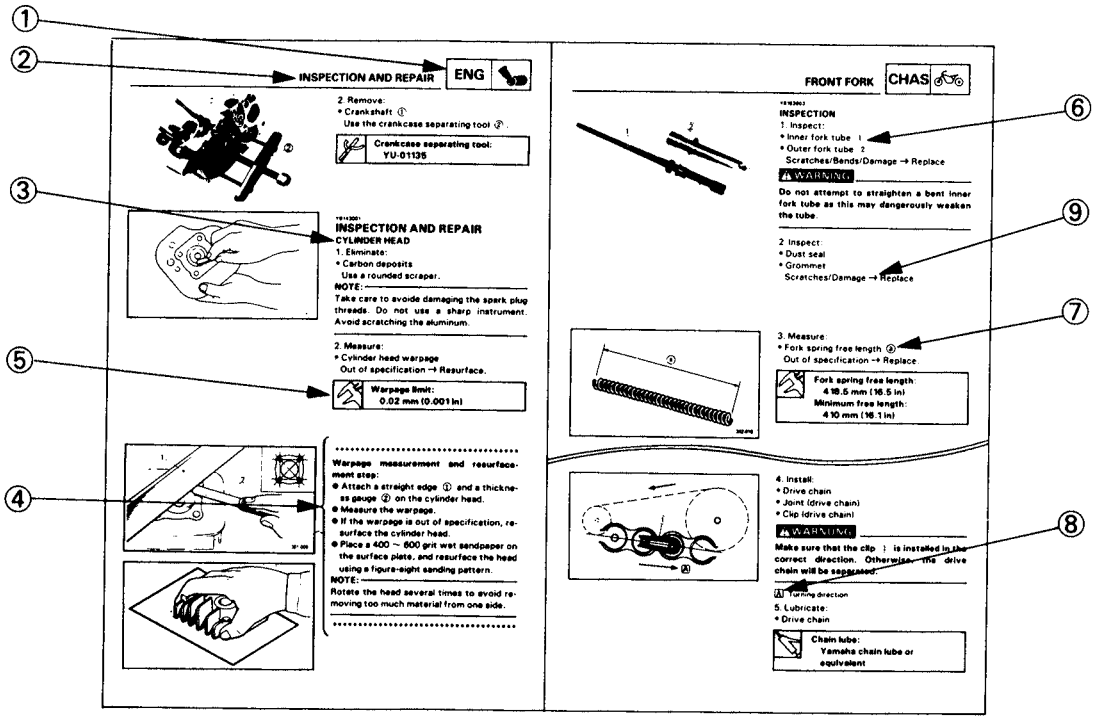
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections. A set of particularly important procedure ④ is placed between a line of asterisks "*" with each procedure preceded by "●".

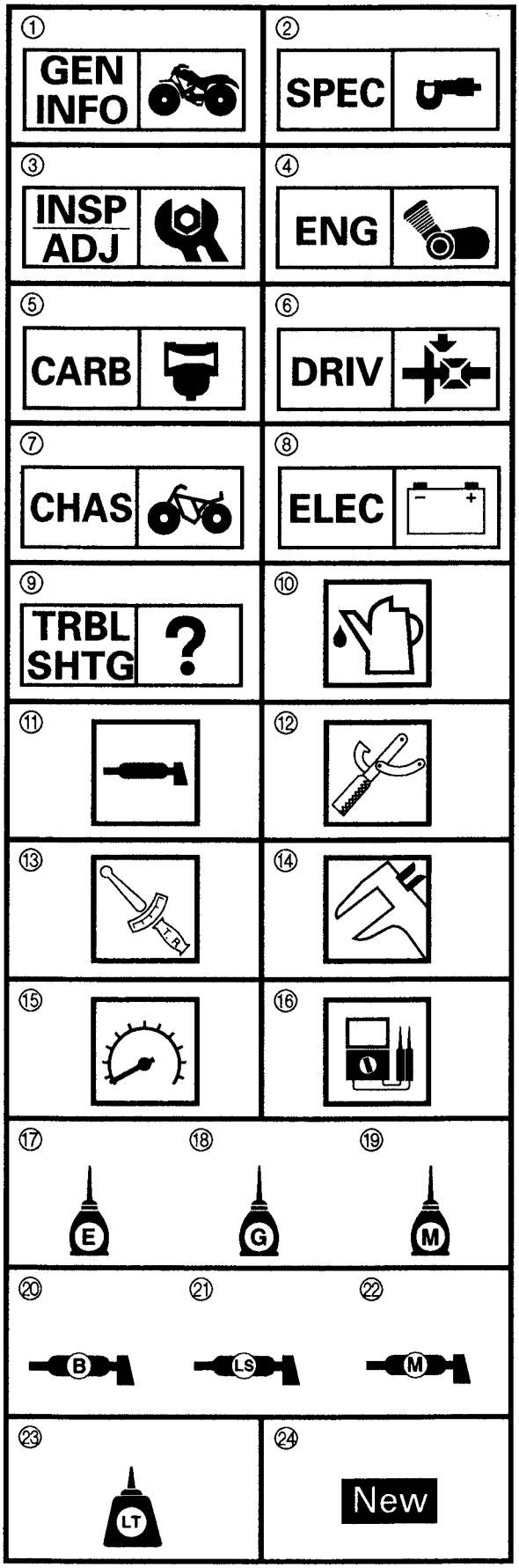
IMPORTANT FEATURES

- Data and a special tool are framed in a box preceded by a relevant symbol ⑤.
- An encircled numeral ⑥ indicates a part name, and an encircled alphabetical letter data or an alignment mark ⑦, the others being indicated by an alphabetical letter in a box ⑧.
- A condition of a faulty component will precede an arrow symbol and the course of action required the symbol ⑨.

EXPLODED DIAGRAM

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





ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑨ are designed as thumb tabs to indicate the chapter's number and content.

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

Illustrated symbols ⑩ to ⑯ are used to identify the specifications appearing in the text.

⑩ Filling fluid
⑪ Lubricant
⑫ Special tool
⑬ Tightening
⑭ Wear limit, clearance
⑮ Engine speed
⑯ Ω, V, A

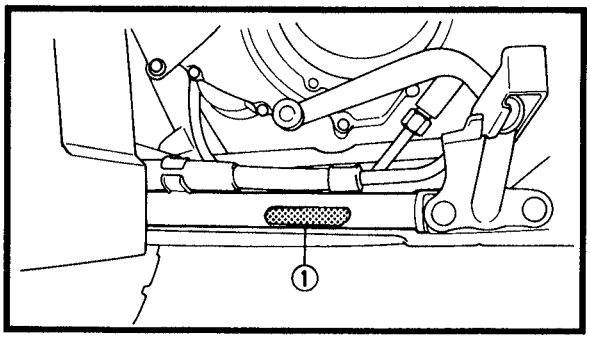
Illustrated symbols ⑰ to ㉔ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑰ Apply engine oil
⑱ Apply gear oil
⑲ Apply molybdenum disulfide oil
⑳ Apply wheel bearing grease
㉑ Apply lightweight lithium-soap base grease
㉒ Apply molybdenum disulfide grease
㉓ Apply locking agent (LOCTITE®)
㉔ Use new one

CONTENTS

GENERAL INFORMATION

MACHINE IDENTIFICATION



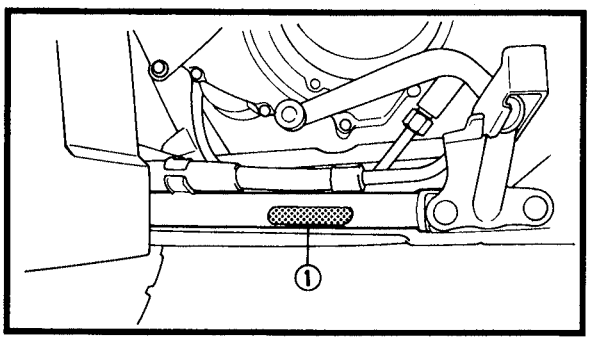
VEHICLE IDENTIFICATION NUMBER (FOR USA, CDN, AND OCE)

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

NOTE:

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

Starting serial number:
JY44SHA0*TA000101 (USA)
JY44SHN0*TA028101 (CDN)
JY44SHT0*TA035101 (OCE)



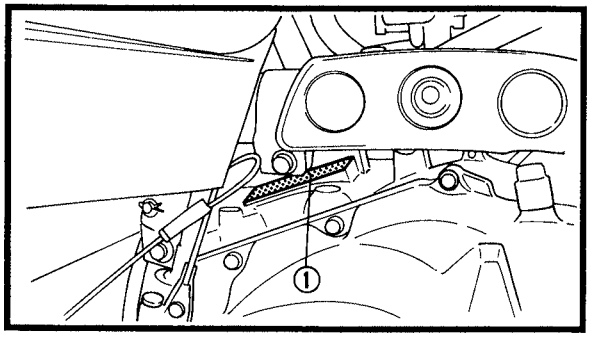
FRAME SERIAL NUMBER (FOR EUR)

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

NOTE:

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

Starting serial number:
4SH-033101



ENGINE SERIAL NUMBER

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

NOTE:

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

Starting serial number:
4SH-000101 (USA)
4SH-028101 (CDN)
4SH-033101 (EUR)
4SH-035101 (OCE)

NOTE:

Designs and specifications are subject to change without notice.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	YFM400FW
Model code:	4SH1
Engine starting number:	4SH-000101
Vehicle identification number:	JY44SHA0*TA000101
Dimensions:	
Overall length	1,956 mm (77.0 in)
Overall width	1,155 mm (45.5 in)
Overall height	1,144 mm (45.0 in)
Seat height	830 mm (32.7 in)
Wheelbase	1,210 mm (47.6 in)
Minimum ground clearance	215 mm (8.46 in)
Minimum turning radius	3,500 mm (137.8 in)
Basic weight:	
With oil and full fuel tank	286 kg (631 lb)
Maximum load-except motorcycle	210 kg (463 lb)
Fuel:	
Type	UNLEADED FUEL
Fuel tank capacity	13.5 L (2.9 Imp gal, 3.6 US gal)
Fuel reserve amount	1.3 L (0.29 Imp gal, 0.34 US gal)
Spark plug:	
Type	D8EA/X24ES-U
Manufacturer	NGK/NIPPONDENSO
Tire pressure (cold tire):	
Off-road riding	
Front	22 ~ 27 kPa (0.22 ~ 0.27 kg/cm^2, 3.2 ~ 3.9 psi)
Rear	22 ~ 27 kPa (0.22 ~ 0.27 kg/cm^2, 3.2 ~ 3.9 psi)
Electrical:	
Ignition system	C.D.I.
Generator system	A.C. magneto
Battery capacity	12 V 18 AH
Battery type	YTX20L-BS
Headlight type:	Bulb type (krypton bulb)
Bulb wattage × quantity:	
Headlight	12 V 30 W/30 W × 2
Taillight	12 V 7.5 W × 1
Meter light	12 V 3.4 W × 1
Indicator light:	
NEUTRAL	12 V 1.7 W × 1
REVERSE	12 V 1.7 W × 1
OIL TEMPERATURE	12 V 3.4 W × 1

MAINTENANCE SPECIFICATIONS

ENGINE

Model		YFM400FW
Clutch:		
Friction plate thickness		2.94 ~ 3.06 mm (0.116 ~ 0.120 in)
Quantity		7
<Friction plate wear limit>		<2.8 mm (0.11 in)>
Clutch plate thickness		1.5 ~ 1.7 mm (0.059 ~ 0.067 in)
Quantity		4
<Warp limit>		<0.2 mm (0.008 in)>
Clutch plate thickness		1.9 ~ 2.1 mm (0.075 ~ 0.083 in)
Quantity		2
Clutch spring free length		44 mm (1.73 in)
Quantity		5
<Minimum length>		<42.8 mm (1.69 in)>
Clutch release method		Outer push, cam push
Automatic centrifugal clutch:		
Clutch shoe thickness		2 mm (0.08 in)
<Wear limit>		<1.5 mm (0.06 in)>
Clutch shoe spring free length		42.5 mm (1.67 in)
Clutch-in revolution		1,750 ~ 2,050 r/min
Clutch-stall revolution		3,000 ~ 3,400 r/min
Carburetor:		
I.D. mark		4SH 00
Main jet	(M.J)	#105
Main air jet	(M.A.J)	0.7
Jet needle	(J.N)	5H26-3
Needle jet	(N.J)	N-8
Pilot air jet	(P.A.J.1)	1.0
Pilot air jet	(P.A.J.2)	0.9
Pilot outlet	(P.O)	0.75
Pilot jet	(P.J)	#45
Bypass 1	(B.P.1)	0.8
Bypass 2	(B.P.2)	0.8
Bypass 3	(B.P.3)	1.0
Pilot screw	(P.S)	3-1/4
Valve seat size	(V.S)	2.5
Starter jet	(G.S.1)	#60
Throttle valve size	(Th.V)	#130
Float height	(F.H)	11.4 ~ 13.4 mm (0.45 ~ 0.53 in)
Fuel level	(F.L)	1 ~ 2 mm (0.04 ~ 0.08 in)
		Below the float chamber mating surface
Engine idle speed		1,350 ~ 1,450 r/min
Intake vacuum		33.3 kPa (250 mmHg, 9.843 inHg)

CHASSIS

Model		YFM400FW
Rear suspension:		
Shock absorber travel		75 mm (2.95 in)
Spring free length		258.8 mm (10.19 in)
Fitting length		221.3 mm (8.71 in)
Spring rate	(K1)	31.0 N/mm (3.1 kg/mm 173.6 lb/in)
Stroke	(K1)	0 ~ 123 mm (0.00 ~ 4.84 in)
Optional spring		No
Front brake lever:		
Front brake lever free play (at lever end):		
Brake lever free play (just before adjuster contacts master cylinder piston)		2 ~ 5 mm (0.08 ~ 0.19 in)
Brake lever free play (just before brake is actually applied)		25 ~ 30 mm (0.98 ~ 1.18 in)

Tightening torque

Parts to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Steering shaft holder and frame	Bolt	M8 × 1.25	2	23	2.3	17	
Tie rod and locknut	Nut	M10 × 1.25	4	35	3.5	25	
Steering knuckle and lower arm	Nut	M10 × 1.25	2	48	4.8	35	
Front carrier and frame	Bolt	M8 × 1.25	2	31	3.1	22	
Rear carrier and frame	Bolt	M8 × 1.25	2	31	3.1	22	

ELECTRICAL

Model	YFM400FW
C.D.I.:	
Magneto model / manufacturer	F3T43575/MITSUBISHI
Pickup coil resistance / color	459 ~ 561 Ω at 20°C (68°F) / (Red-White)
Source coil resistance / color	270 ~ 330 Ω at 20°C (68°F) / (Brown/Green)
C.D.I. unit model / manufacturer	F8T32372/MITSUBISHI
Charging system:	
Type	A.C. magneto
Model / manufacturer	F3T43575/MITSUBISHI
Nominal output	12 V 17 A at 3,000 r/min
Stator coil resistance / color	0.70 ~ 0.86 Ω at 20°C (68°F) / (White-White)
Rectifier:	
Model / manufacturer	SH640-12/SHINDENGEN
Capacity	14A
Withstand voltage	200V
Electric starter system:	
Type	Constant mesh type
Starter motor:	
Model / manufacturer	DBED3/NIPPONDENSO
I.D. number	DBED3
Output	0.7 kW
Armature coil resistance	0.011 ~ 0.013 Ω at 20°C (68°F)
Brush overall length	12 mm (0.47 in)
<Limit>	<8.5 mm (0.33 in)>
Spring force	650 ~ 950 g (22.9 ~ 33.5 oz)
Commutator diameter	28 mm (1.10 in)
<Wear limit>	<27 mm (1.06 in)>
Mica undercut	0.6 mm (0.02 in)
Starter relay:	
Model / manufacturer	MS5F-541/JIDECO
Amperage rating	100 A
Coil winding resistance / color	4.18 ~ 4.62 Ω at 20°C (68°F)/ (Blue/White-Red/White)

EXCLUSIVE SPECIFICATIONS

The following specifications are exclusive for the below listed countries.

For specifications other than below, please refer to the General and maintenance specifications.

For Canada

Model code:	4SH2
Engine starting number:	4SH-028101
Vehicle identification number:	JY44SHNO*TA028101
Dimensions:	
Seat height	835 mm (32.9 in)
Fuel:	
Type	Regular unleaded gasoline
Spark plug:	
Type	DR8EA
Manufacturer	NGK

For Europe

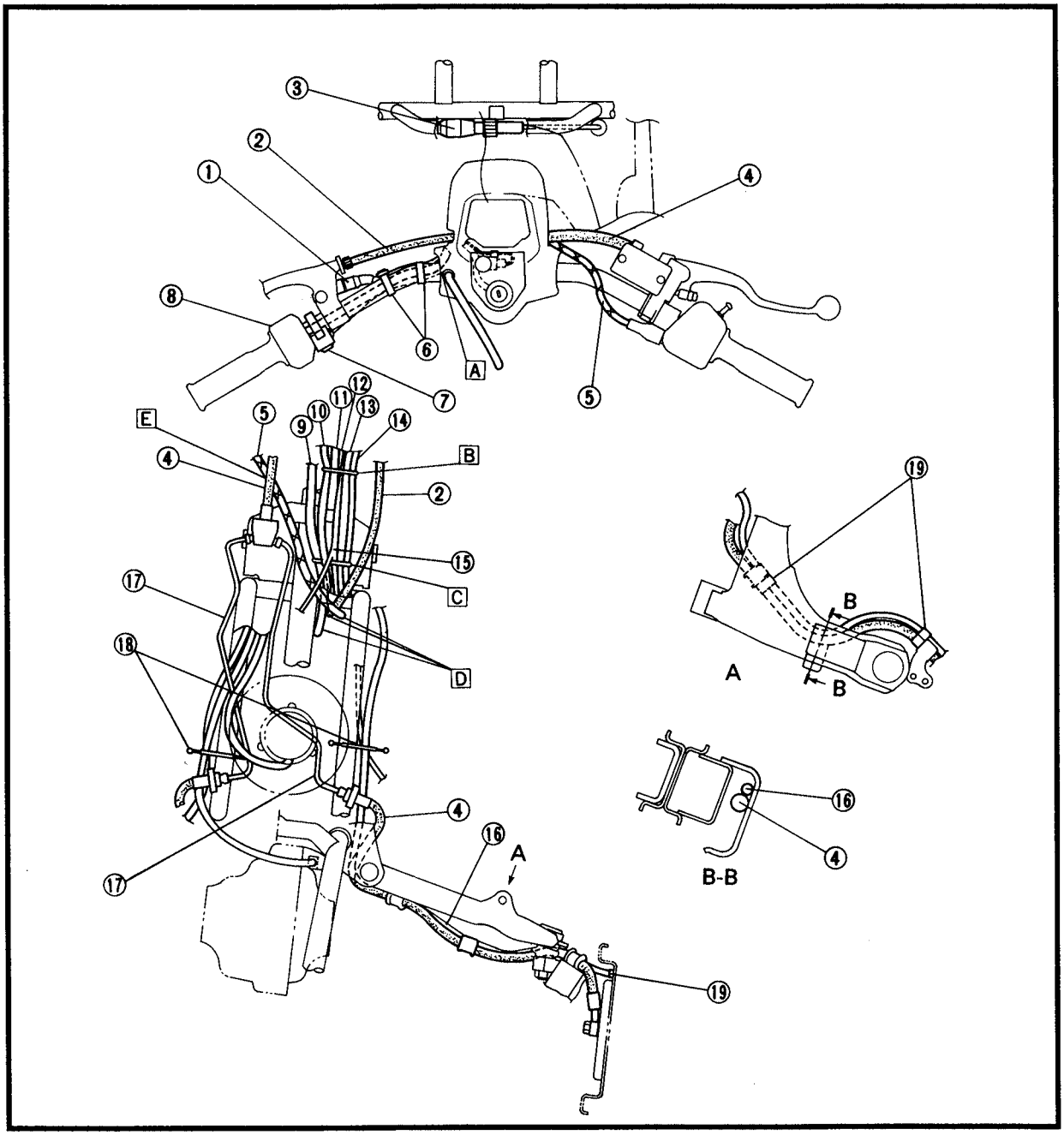
Model code:	4SH3
Engine starting number:	4SH-033101
Frame starting number:	4SH-033101
Dimensions:	
Seat height	835 mm (32.9 in)
Fuel:	
Type	Regular unleaded gasoline with a research octane number of 91 or higher.
Spark plug:	
Type	DR8EA
Manufacturer	NGK
Carburetor:	
I.D. mark	4SH10
Horn:	
Type	Plane type
Quantity	1
Model / manufacturer	MF-12/NIKKO
Maximum amperage	1.5 A

For Oceania

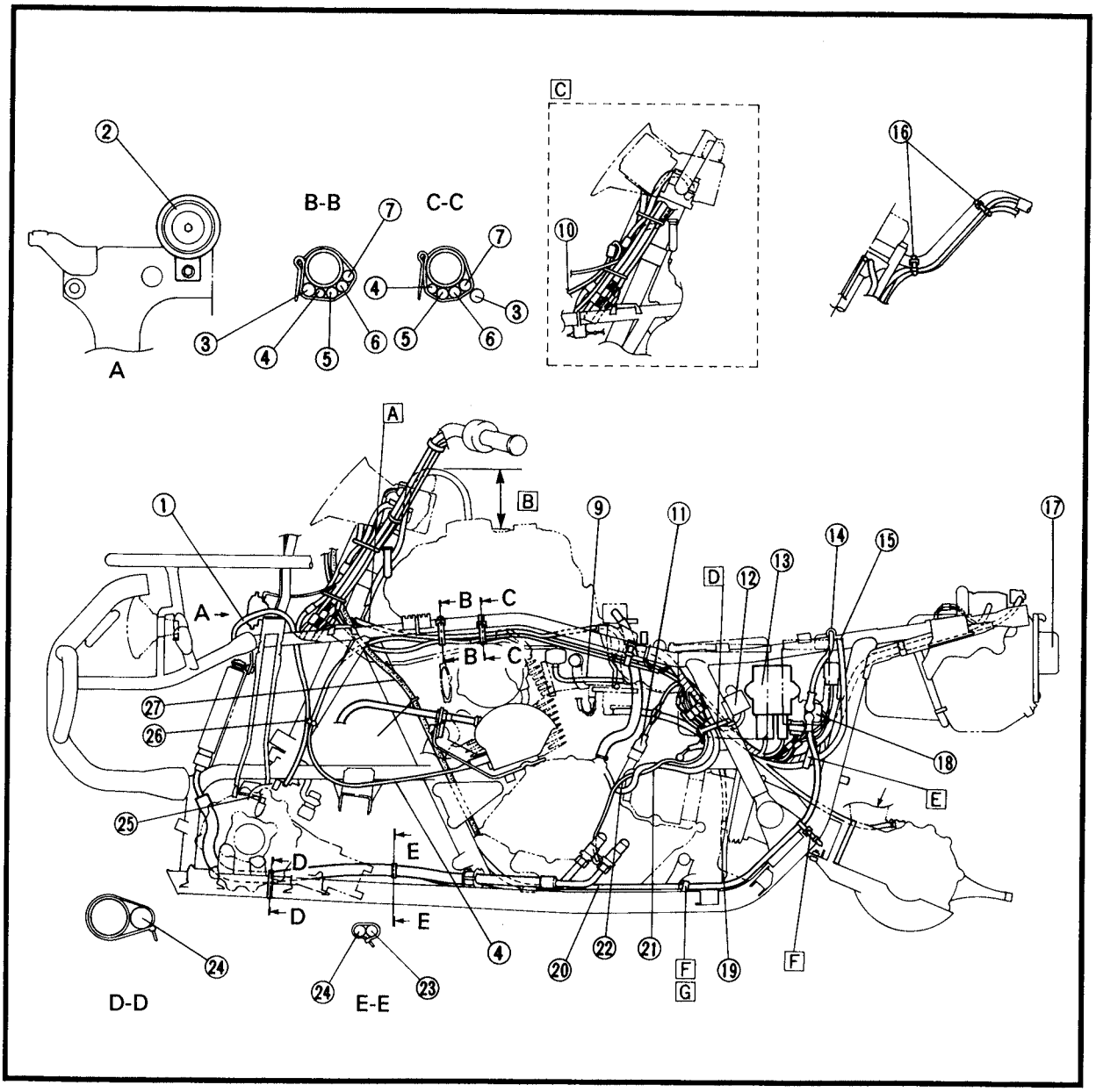
Model code:	4SH4
Engine starting number:	4SH-035101
Vehicle identification number:	JY44SHTO*TA035101
Fuel:	
Type	Unleaded fuel only (for Australia) Regular gasoline (for other)
Electrical:	
Battery type	GM14AZ-4A
Battery capacity	12 V 14AH
Specific gravity	1,280
Carburetor:	
I.D. mark	4SH10
Horn:	
Type	Plane type
Quantity	1
Model / manufacturer	MF-12/NIKKO
Maximum amperage	1.5 A

CABLE ROUTING

① Rear brake switch
② Rear brake cable
③ Terminal (option)
④ Front brake hose
⑤ Throttle cable
⑥ Band
⑦ Horn switch (for EUR, OCE)
⑧ Handlebar switch
⑨ Speedometer cable
⑩ Speedometer lead
⑪ Main switch lead
⑫ Indicator light lead
⑬ Handlebar switch lead
⑭ Front brake switch lead
⑮ Horn switch lead (for EUR, OCE)
⑯ Breather hose
⑰ Brake pipe
⑱ Clamp
⑲ Clip
[A] Insert the breather hose into the hole of the handlebar protector.
[B] Clamp the speedometer lead, main switch lead, indicator light lead, handlebar switch lead, front brake switch lead and horn switch lead.
[C] Clamp the speedometer cable, front brake switch lead, handlebar switch lead, indicator light lead main switch lead and horn switch lead.
[D] Pass the speedometer cable, rear brake cable and throttle cable in order from the inside.
[E] Pass the throttle cable under the brake hose.

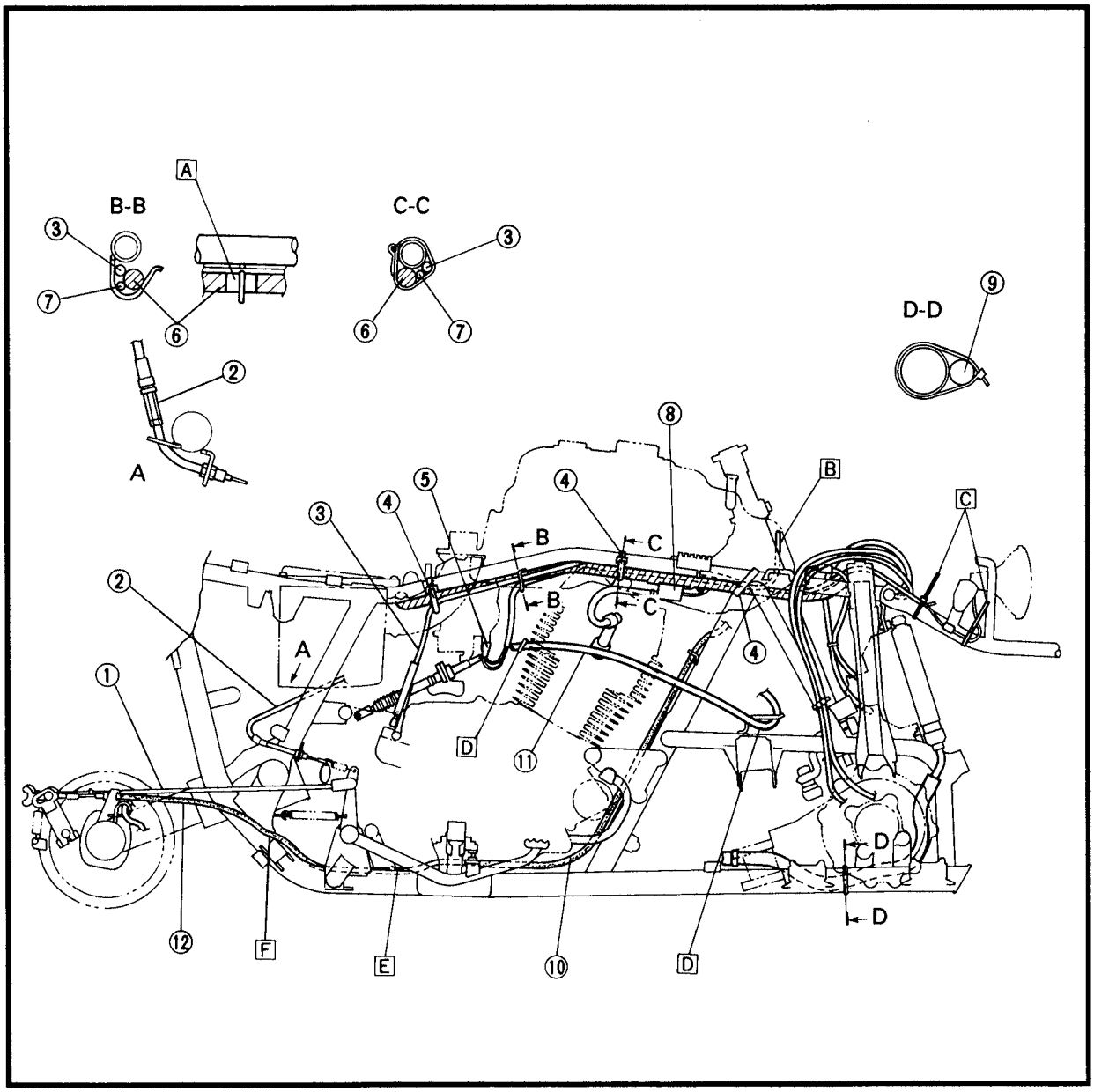


① Breather hose (front brake)
② Horn (for EUR, OCE)
③ Throttle cable
④ Select lever control cable 2
⑤ Air bent hose
⑥ Breather hose (rear final gear case)
⑦ Breather hose (rear brake)
⑧ Fuel tank breather hose
⑨ Fuel hose
⑩ Carburetor heater lead
⑪ Thermo unit
⑫ Fan motor control unit
⑬ CDI unit
⑭ Battery positive lead
⑮ Battery negative lead
⑯ Band
⑰ Taillight
⑱ Starter relay
⑲ Carburetor overflow hose
⑳ Starter motor lead
㉑ Neutral switch lead
㉒ CDI magneto lead
㉓ Oil cooler hose 2
㉔ Oil cooler hose 1
㉕ Breather hose (differential gear case)
㉖ Clamp
㉗ Rear brake cable
[A] Pass the air vent hose, breather hose (rear brake) and breather hose (rear final gear case) through the bracket hole.
[B] 120 mm (4.72 in)
[C] Option
[D] Clamp the CDI magneto leads, neutral switch lead reverse switch lead, wireharness and fan motor control unit lead.
[E] Clamp the wireharness and battery negative lead.
[F] Clamp the starter motor lead.
[G] Pass the starter motor lead outside of the front drive shaft protector.
[H] Pass the rear brake cable through the guide.



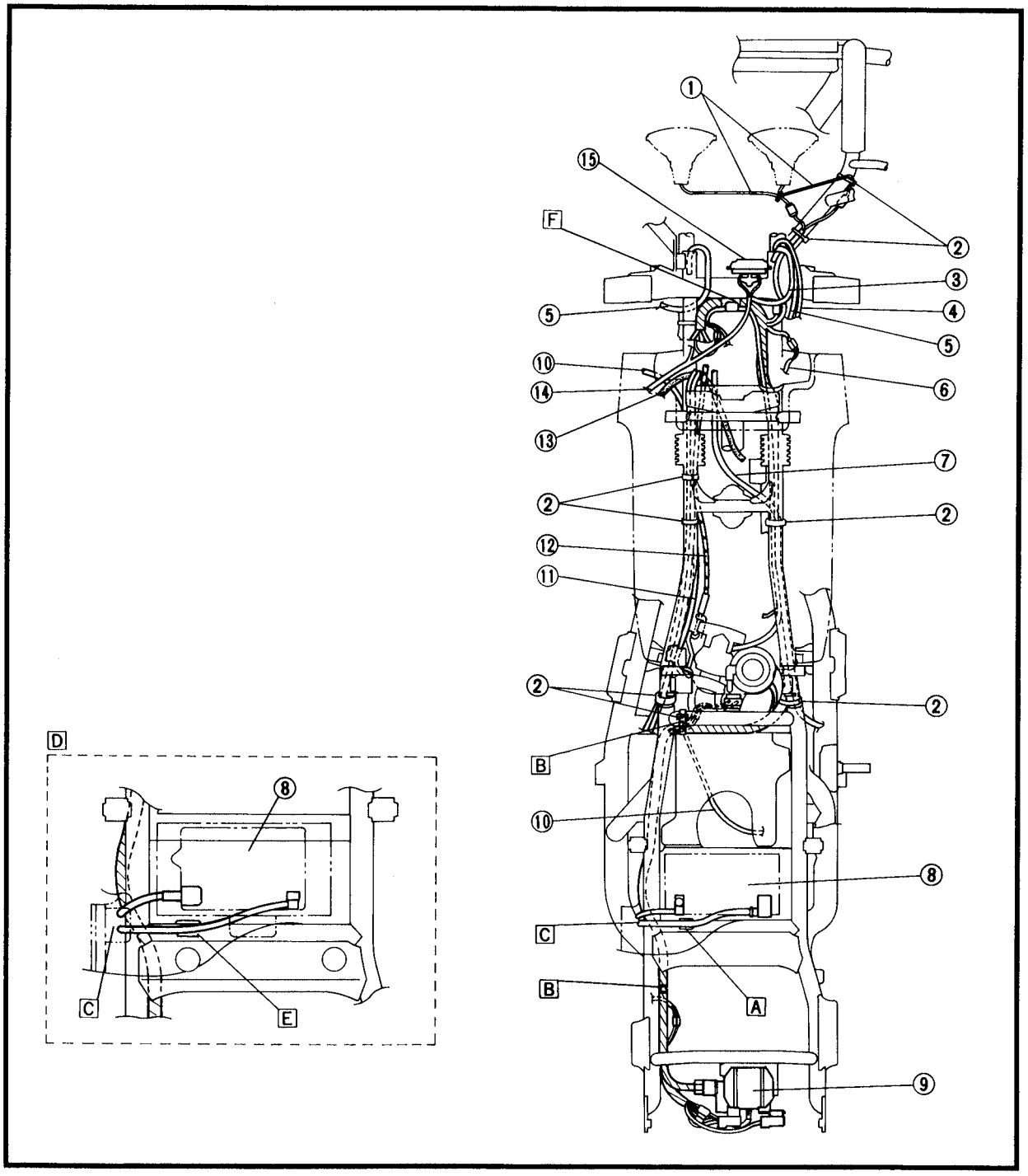
① Brake rod
② Select lever control cable 2
③ Speedometer cable
④ Band
⑤ Carburetor heater (option)
⑥ Wireharness
⑦ Carburetor heater lead (option)
⑧ Ignition coil
⑨ Oil cooler hose 2
⑩ Starter motor lead
⑪ Select lever control cable 1
⑫ Rear brake cable

[A] White taped
[B] To speedometer.
[C] Clamp the headlight lead.
[D] Pass the select lever control cable 1 through the guide.
[E] Clamp the rear brake cable.
[F] Pass the rear brake cable over the fender stay.



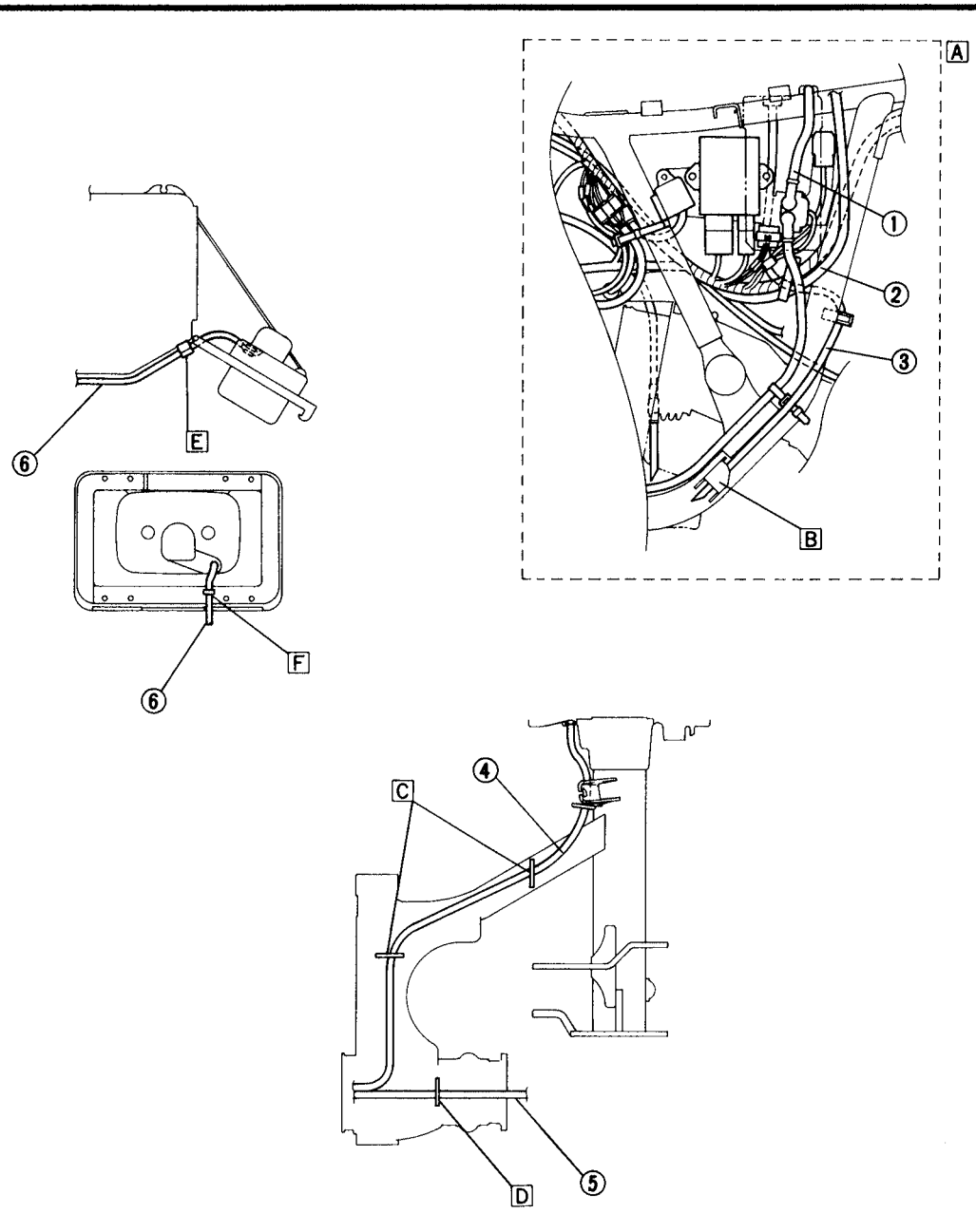
① Headlight lead
② Band
③ Breather hose (fan motor)
④ Breather hose (bearing housing)
⑤ Breather hose (front brake)
⑥ Terminal lead (option)
⑦ Speedometer cable
⑧ Battery
⑨ Rectifier/regulator
⑩ Select lever control cable 2
⑪ Air vent hose
⑫ Throttle cable
⑬ Rear brake cable
⑭ Horn switch lead (for EUR, OCE)
⑮ Horn (for EUR, OCE)

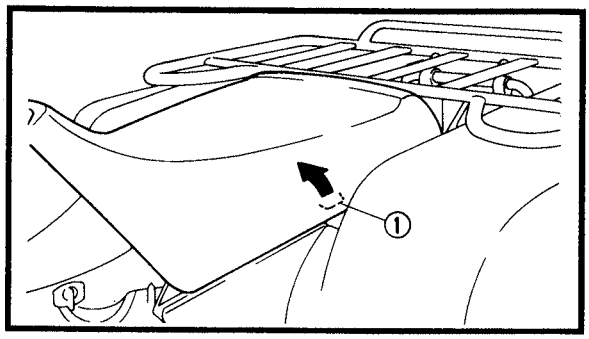
[A] Pass the battery positive lead through the guide.
[B] Clamp the wireharness.
[C] Pass the battery leads through the fender hole.
[D] For OCE
[E] Pass the battery negative lead through the guide.
[F] White taped

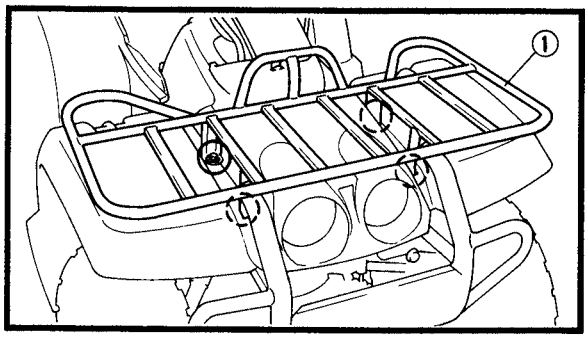


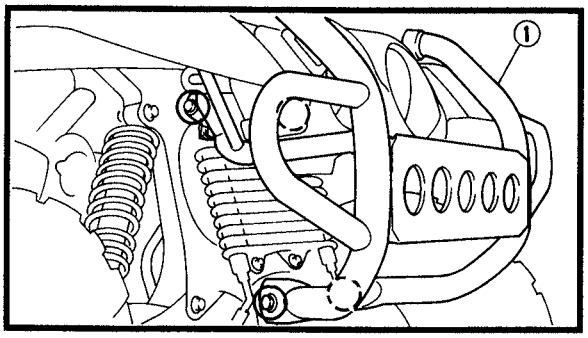
① Battery positive lead
② Battery negative lead
③ Battery breather hose
④ Breather hose (rear brake)
⑤ Breather hose (rear final gear case)
⑥ Taillight lead

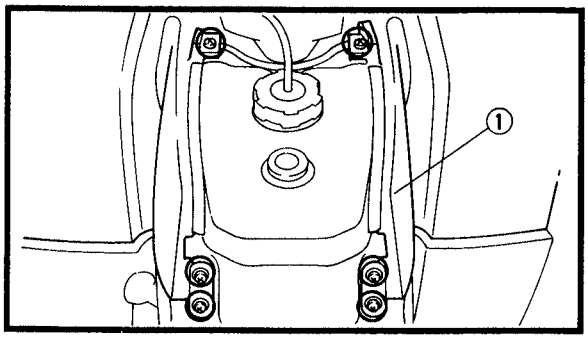
[A] For OCE
[B] Pass the battery breather hose through the guide.
[C] Pass the breather hose (rear brake) through the guide.
[D] Pass the breather hose (rear final gear case) through the guide.
[E] Clamp the taillight lead.
[F] Pass the taillight lead through the guide.

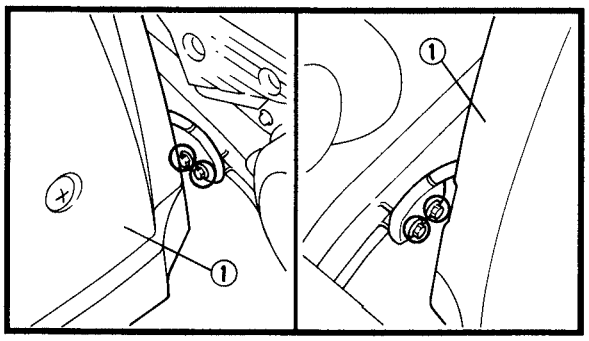












PERIODIC INSPECTION AND ADJUSTMENT

SEAT, CARRIERS, FENDERS AND FUEL TANK

REMOVAL

1. Place the machine on a level place.
2. Remove:
   - Seat

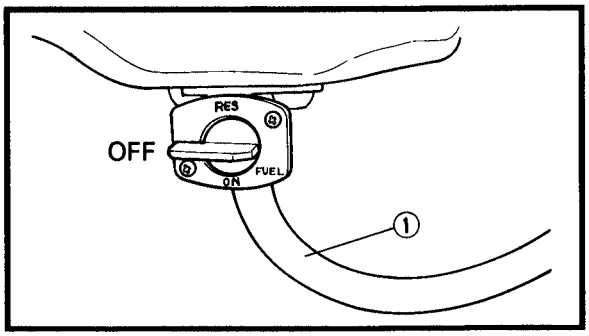
NOTE:

Pull up the seat lock lever ①, then remove by pulling up on the rear of the seat.

3. Remove:
   - Front carrier ①

4. Disconnect:
   - Headlight couplers
5. Remove:
   - Front bumper ①

6. Remove:
   - Front Fender ①



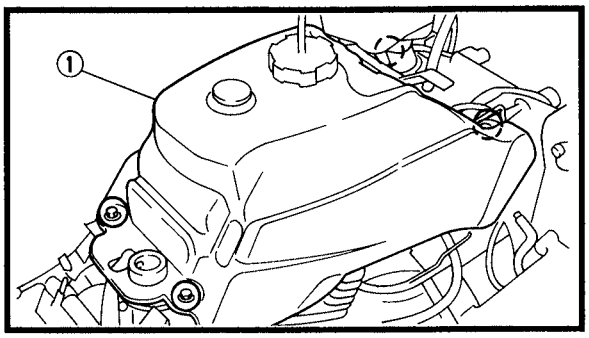
7. Turn the fuel cock lever to "OFF".

8. Disconnect:
- Fuel hose ①

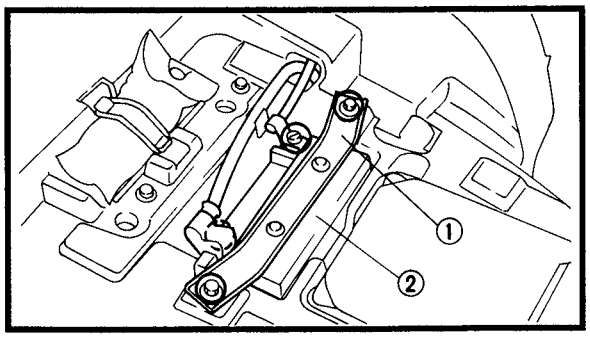
NOTE:
Place a rug on the engine to absorb a split fuel.

⚠ WARNING

Gasoline is highly flammable.
Avoid spilling fuel on the hot engine.



9. Remove:
- Fuel tank ①



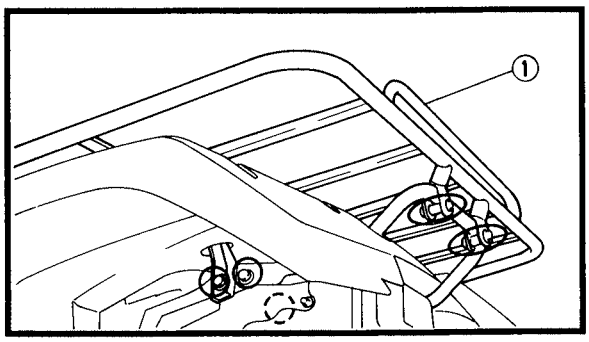
10. Remove:
- Battery holder ①

11. Disconnect:
- Battery leads
- Battery breather hose (for OCE)

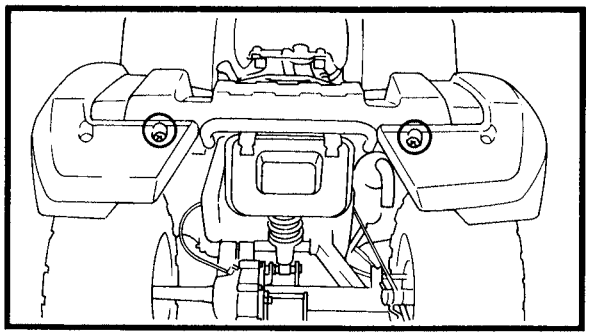
CAUTION:

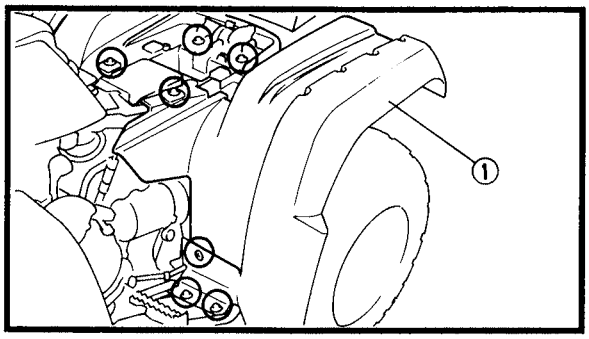
Disconnect the negative lead first and then disconnect the positive lead.

12. Remove:
- Battery ②

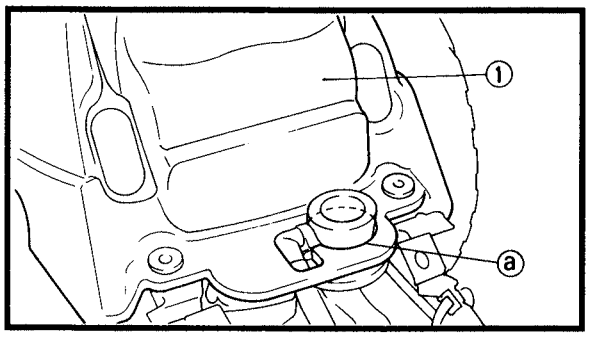


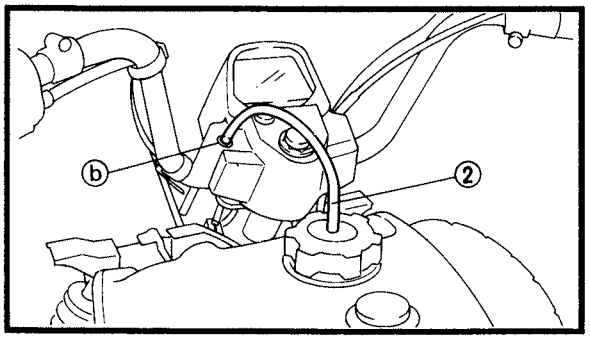
13. Remove:
- Rear carrier ①





14. Remove:
- Rear fender ①





INSTALLATION

Reverse the "REMOVAL" procedure.
Note the following points.

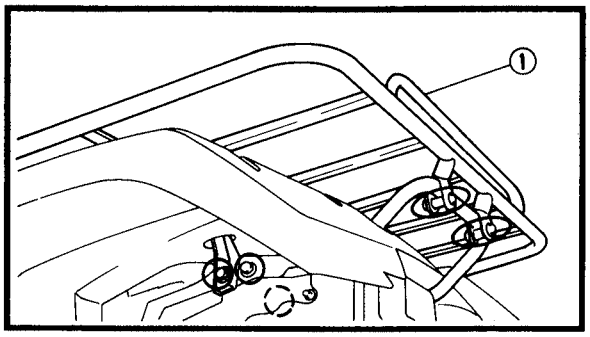
1. Install:
- Fuel tank ①

NOTE:
- Insert the air intake manifold into the fuel tank hole ⓐ.
- Insert the fuel tank breather hose ② into the handlebar protector hole ⓑ. Refer to "CABLE ROUTING" section.

2. Install:
- Rear fender
- Battery
- Battery holder

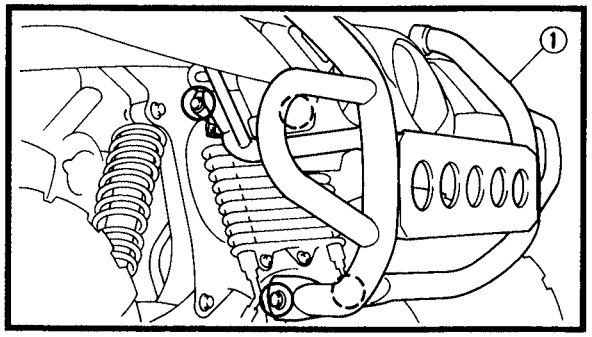
3. Connect:
- Battery leads
- Battery breather hose (for OCE)

CAUTION:
- **Connect the positive lead first and then connect the negative lead.**
- **Be sure the breather hose is properly attached and routed (for OCE).**



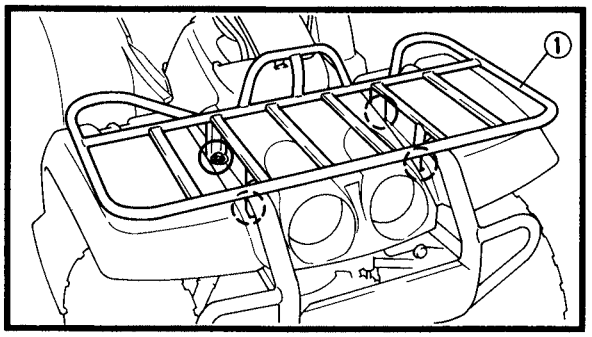
4. Install:
- Rear carrier ①

Bolt (rear carrier and frame):
31 Nm (3.1 m • kg, 22 ft • lb)
Bolt (rear carrier and rear bumper):
9 Nm (0.9 m • kg, 6.5 ft • lb)



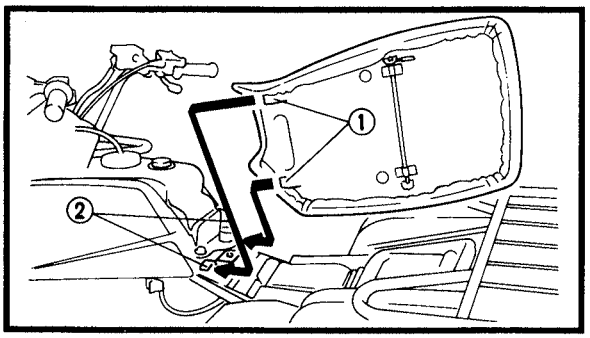
5. Install:
- Front fender
- Front bumper ①

Bolt (front bumper):
23 Nm (2.3 m • kg, 17 ft • lb)



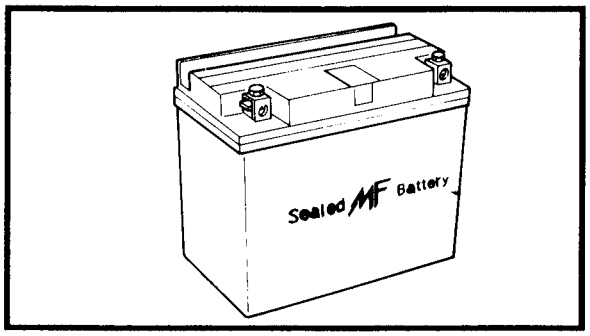
6. Install:
- Front carrier ①

Bolt (front carrier and frame):
31 Nm (3.1 m • kg, 22 ft • lb)
Bolt (front carrier and front bumper):
10 Nm (1.0 m • kg, 7.2 ft • lb)



7. Install:
- Seat

NOTE:
Insert the lobe ① on the seat front into the receptacle ② on the frame, then push down the seat at the rear.



ELECTRICAL

BATTERY INSPECTION (EXCEPT FOR OCE)

NOTE:

Since the MF battery is a sealed type battery, it is not possible to measure the specific gravity of the electrolyte in order to check the state of charge of the battery. Therefore the charge of the battery has to be checked by measuring the voltage at the battery terminals.

CAUTION:

CHARGING METHOD

- **This is a sealed type battery. Never remove the sealing caps. If the sealing caps have been removed, the balancing will not be maintained, and battery performance will deteriorate.**
- **Never add water, as this will affect the chemical reaction in the battery and cause loss of performance.**
- **Charging time, charging current and charging voltage for the MF battery are different from general type batteries.**
  The MF battery should be charged as explained in "CHARGING METHOD". If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.
- **Never use an electrolyte other than specified. The specific gravity of the MF battery electrolyte is 1.32 at 20°C, whereas the specific gravity of a general type battery electrolyte is 1.28. If electrolyte with a specific gravity lower than 1.32 is used, the concentration of sulfuric acid will decrease, resulting in poor battery performance. If an electrolyte with a specific gravity higher than 1.32 is used, the battery plates will corrode and battery life will be shortened.**

⚠ WARNING

Battery electrolyte is dangerous; it contains sulfuric acid which is poisonous and highly caustic.
Always follow these preventive measures:
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**
- **Wear protective eye gear when handling or working near batteries.**

Antidote (EXTERNAL):
- **SKIN - Flush with water.**
- **EYES - Flush with water for 15 minutes and get immediate medical attention.**

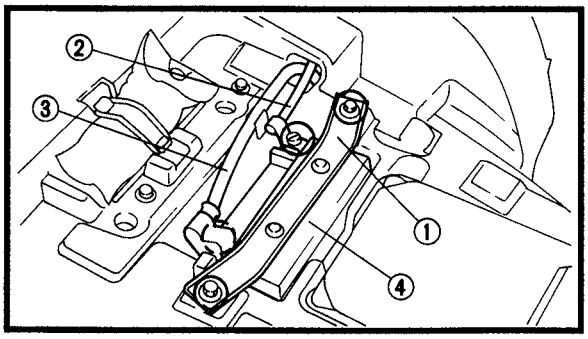
Antidote (INTERNAL):
- **Drink large quantities of water or milk follow with milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.**

Batteries generate explosive hydrogen gas. Always follow the following preventive measures:
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.)**
- **DO NOT SMOKE when charging or handling batteries.**

KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.

1. Remove:
- Seat
  Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" section.

2. Remove:
- Battery holder ①

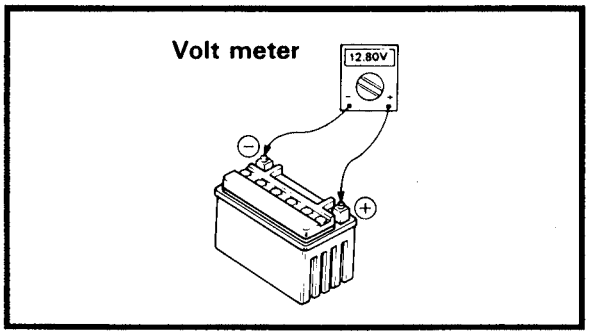


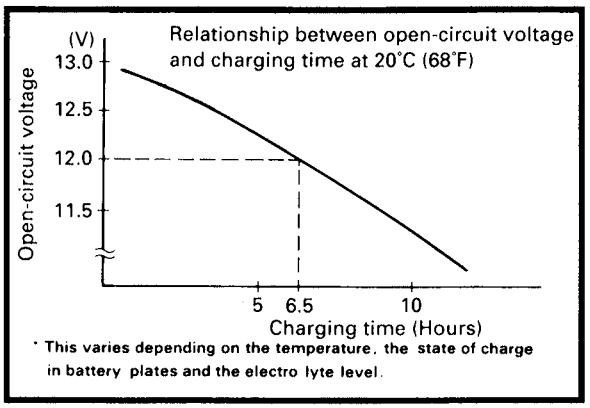
3. Disconnect:
- Battery leads

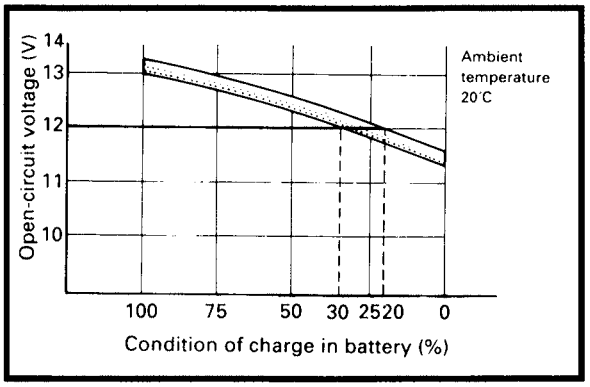
CAUTION:

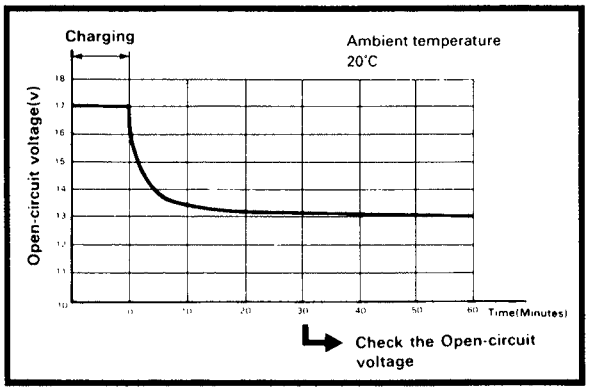
Disconnect the negative lead ② first, then the positive lead ③.

4. Remove:
- Battery ④









5. Check:
- Battery condition

****

Battery condition checking steps:
- Connect a digital voltmeter to the battery terminals.

Tester (+) lead → Battery (+) terminal
Tester (–) lead → Battery (–) terminal

NOTE:

The charge state of an MF battery can be checked by measuring the open-circuit voltage (i.e. when the positive terminal is disconnected).

Open-circuit voltage	Charging time
12.8 V or higher	No charging is necessary.

- Check the condition of the battery using the charts.

Example:
- Open-circuit voltage = 12.0V
- Charging time = 6.5 hours
- Charge condition of the battery = 20 ~ 30%
- Charging method of MF batteries

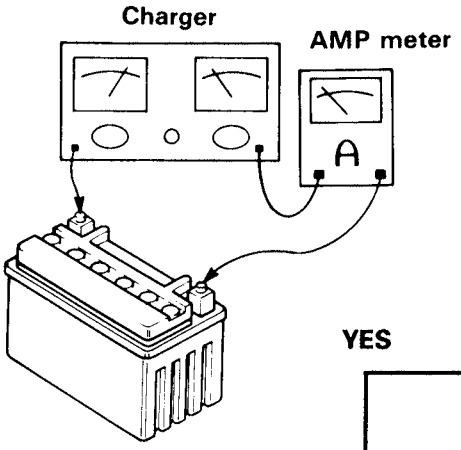
CAUTION:

- **If it is impossible to set the standard charging current, be careful not to overcharge.**
- **When charging the battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle for some reason, be sure to disconnect the wire at the negative terminal.)**
- **Never remove the sealing caps of an MF battery.**
- **Take care that the charging clips are in a full contact with the terminal and that they are not shorted. (A corroded clip of the charger may cause the battery to generate heat at the contact area. A weak clip spring may cause sparks.)**

- **Before removing the clips from the battery terminals, be sure to turn off the power switch of the charger.**
- **The open-circuit voltage variation of the MF battery after charging is shown below. As shown in the figure, the open-circuit voltage stabilizes about 30 minutes after charging has been completed.**
  Therefore, to check the condition of the battery after charging, wait 30 minutes before measuring the open-circuit voltage.

****

Charging method using a variable-current (voltage) type charger



Measure the open-circuit voltage prior to charging.

NOTE:
Voltage should be measured 30 minutes after the machine is stopped.

Connect a charger and AMP meter to the battery and start charging.

NOTE:
Set the changing voltage at 16 ~ 17 V. (If the setting is lower, charging will be insufficient. If too high, the battery will be over charged.)

Make sure the current is higher than the standard charging current written on the battery.

YES

NO

By turning the charging voltage adjust dial, set the charging voltage at 20 ~ 25 V.

Monitor the amperage for 3 ~ 5 minutes to check if the standard charging current is reached.

YES

Adjust the voltage so that current is at standard charging level.

NO

If current does not exceed standard charging current after 5 minutes, replace the battery.

Set the timer according to the charging time suitable for the open-circuit voltage.
Refer to "Battery condition checking steps".

In case that charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.

Measure the battery open-circuit voltage after having left the battery unused for more than 30 minutes.
12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

Charging method using a constant-voltage type charger

Measure the open-circuit voltage prior to charging.

NOTE:
Voltage should be measured 30 minutes after the machine is stopped.

Connect a charger and AMP meter to the battery, and start charging.

Make sure the current is higher than the standard charging current written on the battery.

YES

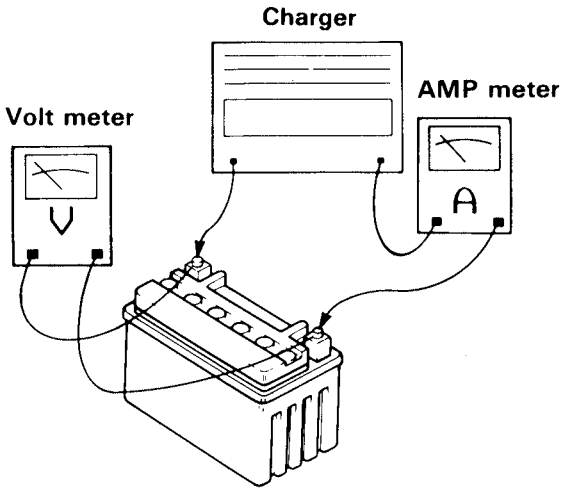
Charge the battery until the battery's charging voltage is 15 volts.

NOTE:
Set the charging time at 20 hours (maximum).

Check the open-circuit voltage after having left the battery for 30 minutes after charging.
12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is necessary.
Under 12 V --- Replace the battery.

NO

This type of battery charger cannot charge the MF battery. A variable voltage charger is recommended.

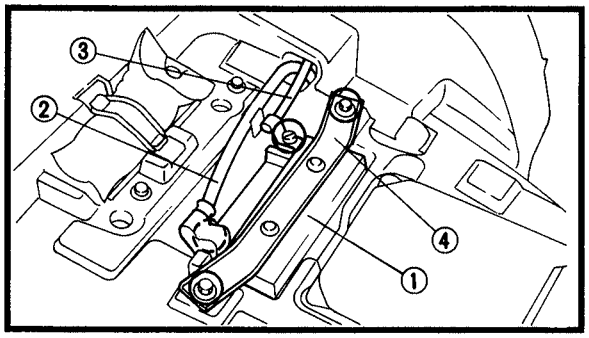


Charging method using a constant current type charger

This type of battery charger cannot charge the MF battery.

6. Inspect:
- Battery terminal
  Dirty → Clean with a wire brush.
  Poor connection → Correct.

NOTE:
After cleaning the terminals, grease them lightly.



7. Install:
- Battery ①

8. Connect:
- Battery leads

CAUTION:
Connect the positive lead ② first, then the negative lead ③.

9. Install:
- Battery holder ④
- Seat

BATTERY INSPECTION (FOR OCE)

⚠ WARNING

Battery electrolyte is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.
Always follow these preventive measures:
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**
- **Wear protective eye gear when handling or working near batteries.**

Antidote (EXTERNAL):
- **SKIN-Flush with water.**
- **EYE-Flush with water for 15 minutes and get immediate medical attention.**

Antidote (INTERNAL):

- **Drink large quantities of water or milk follow with milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.**

  Batteries also generate explosive hydrogen gas. You should always follow these preventive measures:
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.)**
- **DO NOT SMOKE when charging or handling batteries.**

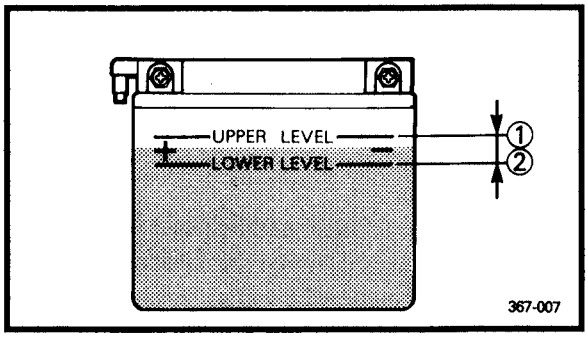
KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.

1. Remove:
- Seat

  Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" section.

2. Remove:
- Battery holder

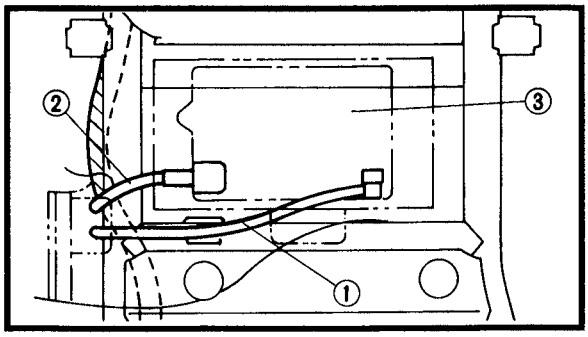
3. Disconnect:
- Battery leads
- Battery breather hose



CAUTION:

Disconnect the negative lead ① first and then disconnect the positive lead ②.

4. Remove:
- Battery ③



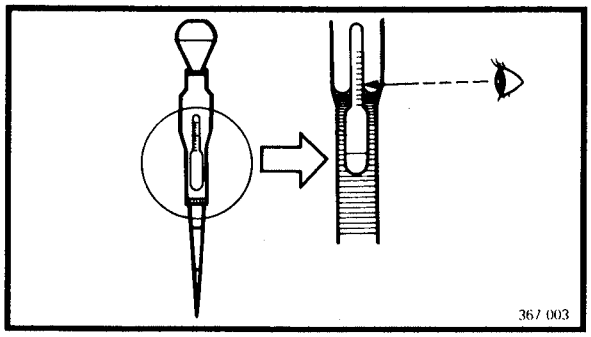
5. Inspect:
- Fluid level

  Fluid level should be between upper ① and lower ② level marks.

  Incorrect → Refill.

CAUTION:

Refill with distilled water only; tap water contains minerals harmful to a battery.



6. Check:
- Specific gravity
  Less than 1.280 → Recharge battery.

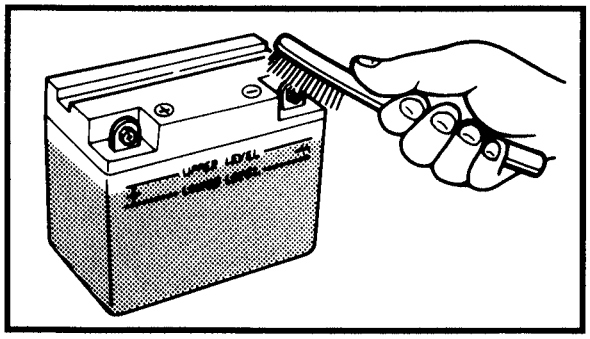
Charging current:	**1.4 amps/10 hrs**
Specific gravity:	**1.280 at 20°C (68°F)**

****

Replace the battery it:
- Battery voltage will not rise to a specific value or bubbles fail to rise even after many hours of charging.
- Sulfation of one or more cells occurs, as indicated by the plates turning white, or an accumulation of material exists in the bottom of the cell.
- Specific gravity readings after a long, slow charge indicate one cell to be lower than the rest.
- Warpage or buckling of plates or insulators is evident.

CAUTION:
- **Always charge a new battery before using it to ensure maximum performance.**
- **When removing the battery leads, the negative lead first and then disconnect the positive lead.**

****



7. Inspect:
- Battery terminal
  Dirty terminal → Clean with wire brush.
  Poor connection → Correct.

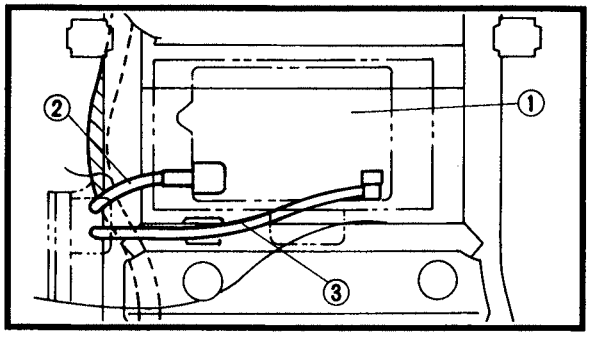
NOTE:
After cleaning the terminals ,apply grease lightly to the terminals.

CAUTION:
When installing the battery, connect the positive lead first and then connect the negative lead.

8. Inspect:
- Breather hose
  Obstruction → Remove.
  Damage → Replace.

CAUTION:

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

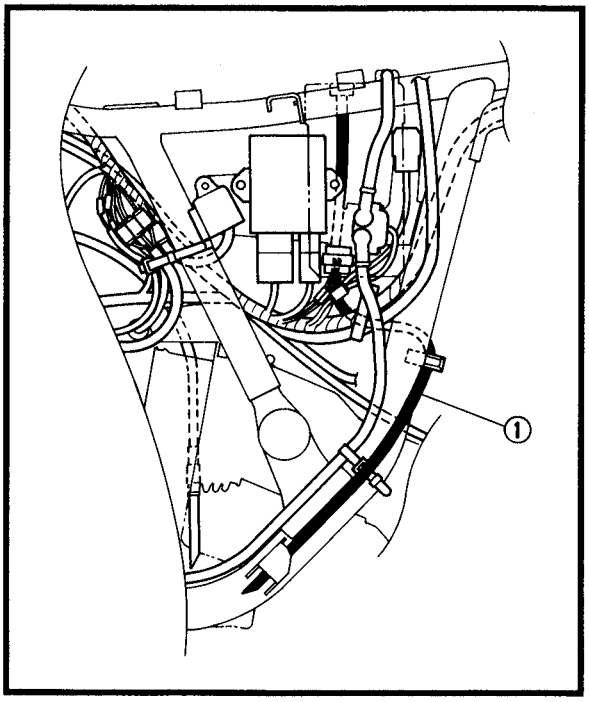


9. Install:
- Battery ①

10. Connect:
- Battery leads

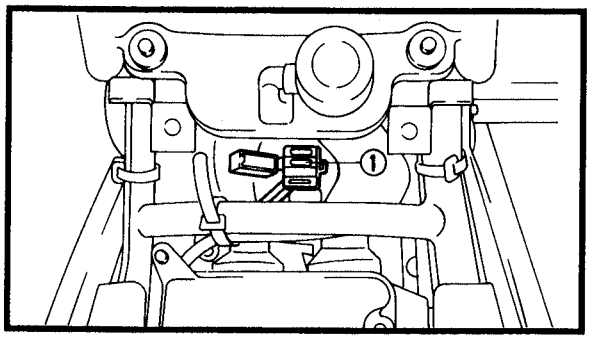
CAUTION:

Connect the positive lead ② first and then connect the negative lead ③.



11. Connect:
- Battery breather hose ①

12. Install:
- Battery holder
- Seat



FUSE INSPECTION

CAUTION:

Always turn off the main switch when checking or replacing a fuse. Otherwise, a short circuit may occur.

1. Remove:
- Seat
  Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" section.
2. Inspect:
- Fuse ①

****

Inspection steps:

- Connect the pocket tester to the fuse and check it for continuity.

NOTE:

Set the tester selector to "Ω × 1" position.

	Pocket tester: **P/N. YU-03112, 90890-03112**

- If the tester is indicated at ∞, replace the fuse.

****

3. Replace:
- Blown fuse

****

Replacement steps:

- Turn off the ignition.
- Install a new fuse of proper amperage.

	Fuse: **30 amps × 1pc**

- Turn on switches to verify operation of related electrical devices.
- If the fuse immediately blows again, check the electrical circuit.

****

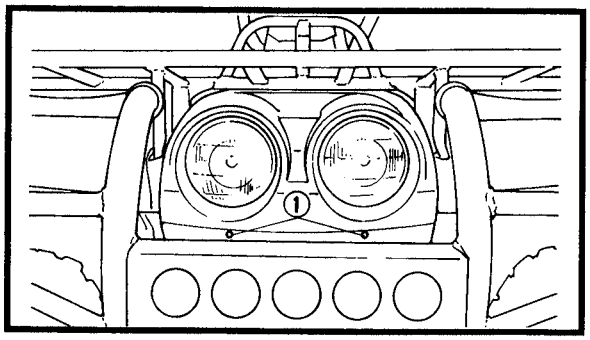
⚠ WARNING

Never use a fuse with a rating other then specified. Never use other materials in place of a fuse. An improper fuse may cause extensive damage to the electrical system, malfunction of lighting and ignition and possibly cause a fire.

4. Install:
- Seat

HEADLIGHT BEAM ADJUSTMENT

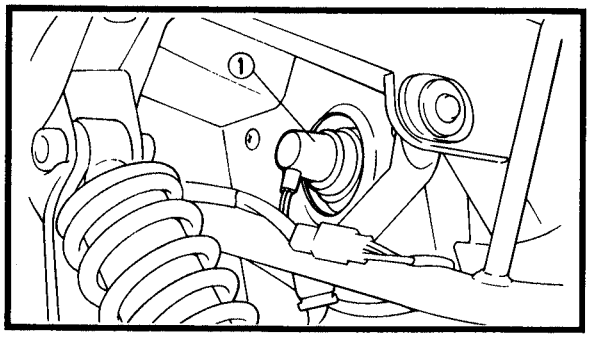
1. Adjust:
- Headlight beam (vertically)
  Turn the adjuster ① in or out.



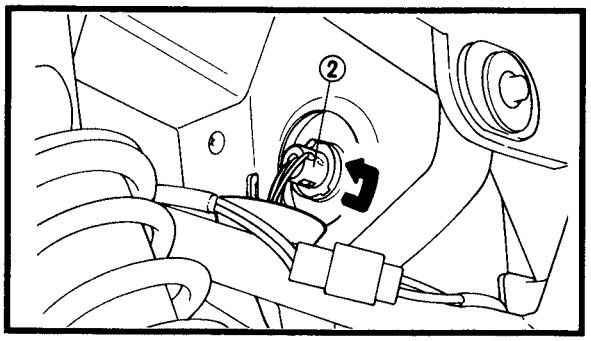
Turning in → Headlight beam higher.
Turning out → Headlight beam lower.

HEADLIGHT BULB REPLACEMENT

1. Remove:
- Cover ①



2. Remove:
- Bulb holder ②
- Bulb



NOTE:

Turn the bulb holder counterclockwise and remove the defective bulb.

⚠ WARNING

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

3. Install:
- Bulb (new)
  Secure the new bulb with the headlight unit.

CAUTION:

Avoid touching the glass part of the bulb. Keep it free from oil; otherwise, the transparency of the glass, life of the bulb, and luminous flux will be adversely affected. If oil gets on the bulb, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

4. Install:
- Bulb holder
- Cover

YAMAHA MOTOR CO.,LTD.

PRINTED IN U.S.A.

YAMAHA

YFM400FWE

SERVICE MANUAL

LIT-11616-08-73

YFM400FWE
SERVICE MANUAL

2nd Edition, March 1993

NOTICE

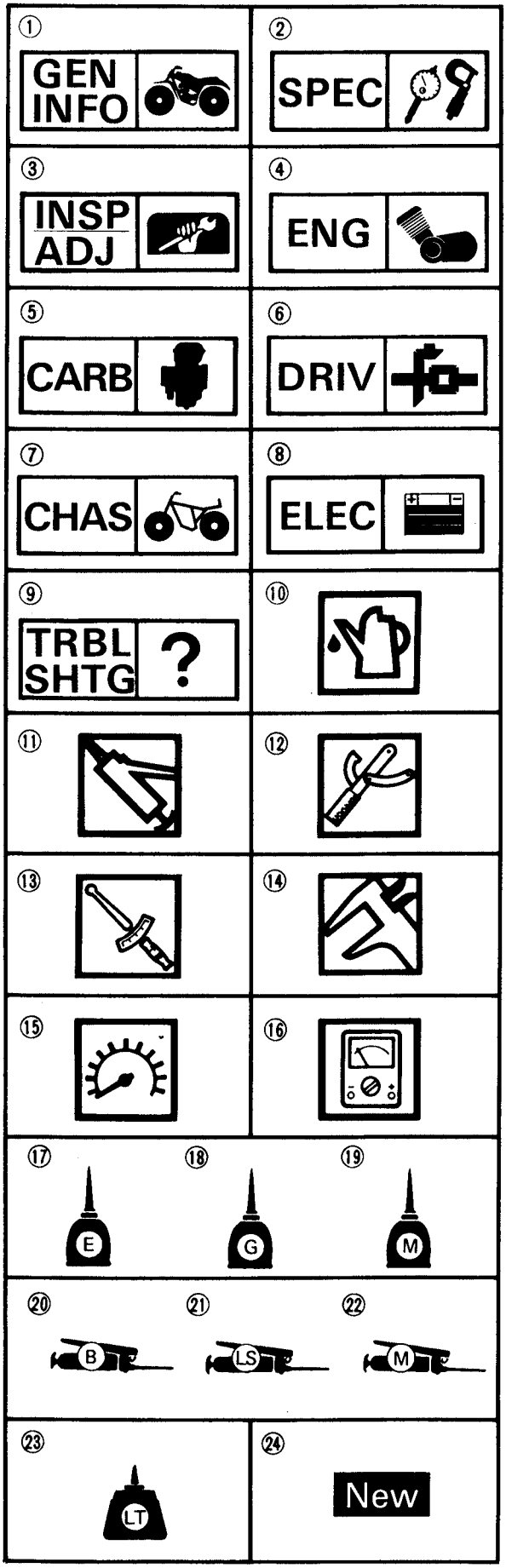
This manual was written by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so persons using this book to perform maintenance and repairs on Yamaha machines should have a basic understanding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

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

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

⚠	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 indecates special precautions that must be taken to avoid damage to the machine.
NOTE:	A NOTE provides key information to make procedures easier or clearer.



ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑨ are designed as thumb tabs to indicate the chapter's number and content.

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

Illustrated symbols ⑩ to ⑯ are used to identify the specifications appearing in the text.

⑩ Filling fluid
⑪ Lubricant
⑫ Special tool
⑬ Tightening
⑭ Wear limit, clearance
⑮ Engine speed
⑯ Ω, V, A

Illustrated symbols ⑰ to ㉔ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑰ Apply engine oil
⑱ Apply gear oil
⑲ Apply molybdenum disulfide oil
⑳ Apply wheel bearing grease
㉑ Apply lightweight lithium-soap base grease
㉒ Apply molybdenum disulfide grease
㉓ Apply locking agent (LOCTITE®)
㉔ Use new one

HOW TO USE THIS MANUAL

CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See "Illustrated symbols")

1st title ①: This is a chapter with its symbol on the upper right of each page.

2nd title ②: This title appears on the upper of each page on the left of the chapter symbol. (For the chapter "Periodic inspection and adjustment" the 3rd title appears.)

3rd title ③: This is a final title.

MANUAL FORMAT

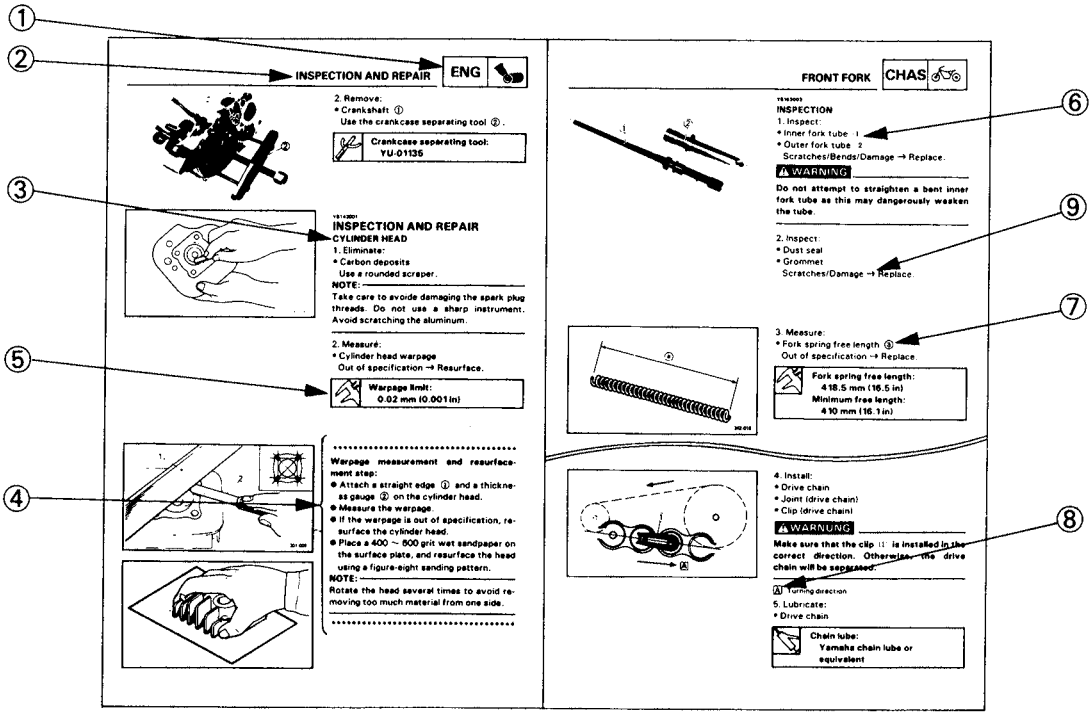
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections. A set of particularly important procedure ④ is placed between a line of asterisks " * " with each procedure preceded by "●".

IMPORTANT FEATURES

- Data and a special tool are framed in a box preceded by a relevant symbol ⑤.
- An encircled numeral ⑥ indicates a part name, and an encircled alphabetical letter data or an alignment mark ⑦, the others being indicated by an alphabetical letter in a box ⑧.
- A condition of a faulty component will precede an arrow symbol and the course of action required the symbol ⑨.

EXPLODED DIAGRAM

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



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CHAPTER 6.
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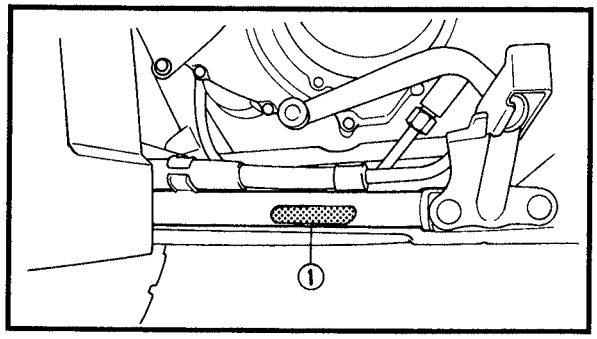
GENERAL INFORMATION

MACHINE IDENTIFICATION



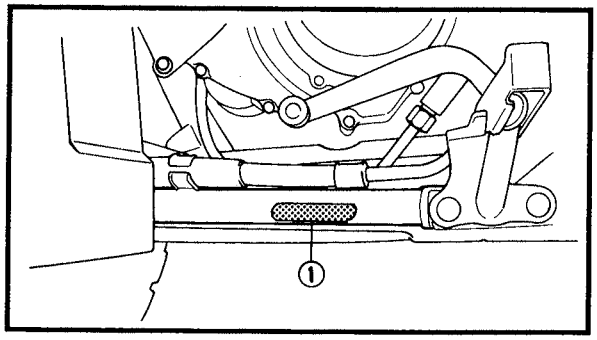
VEHICLE IDENTIFICATION NUMBER (FOR USA AND CDN)

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

NOTE:

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

Starting Serial Number:
For USA
JY44GBA0*PA000101
For CDN
JY44GBN0*PA016101



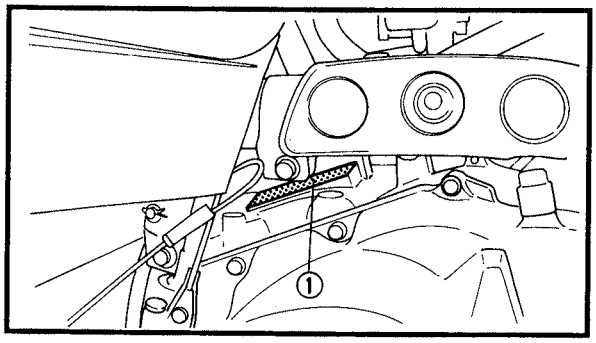
FRAME SERIAL NUMBER (EXCEPT FOR USA AND CDN)

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

NOTE:

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

Starting Serial Number:
4GB-016101



ENGINE SERIAL NUMBER

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

NOTE:

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

Starting Serial Number:
For USA
4GB-000101
Except for USA
4GB-016101

NOTE:

Designs and specifications are subject to change without notice.

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL

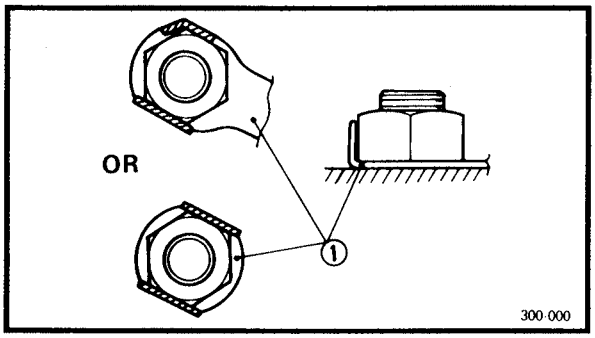
1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to "CHAPTER 1. GENERAL INFORMATION-SPECIAL TOOLS" section.
3. When disassembling the machine, keep mated parts together. This includes gears, cylinder, piston and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.
4. During the machine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled.
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.

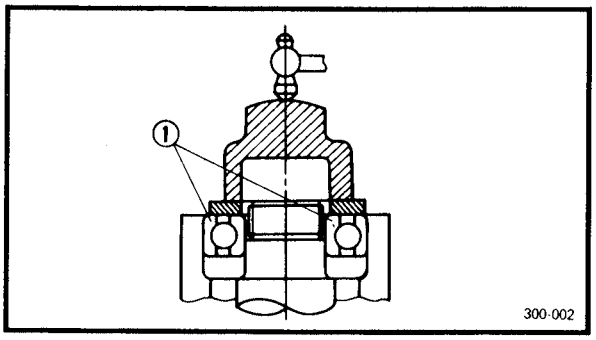
GASKETS, OIL SEALS, AND O-RINGS

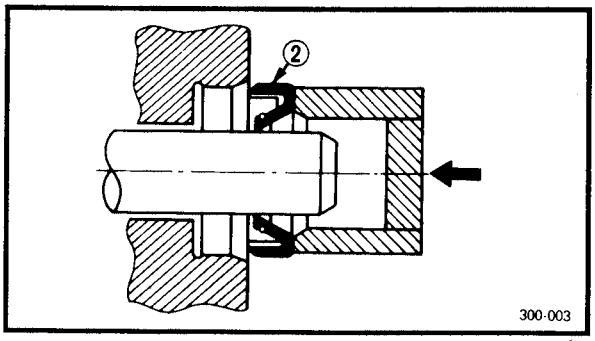
1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.

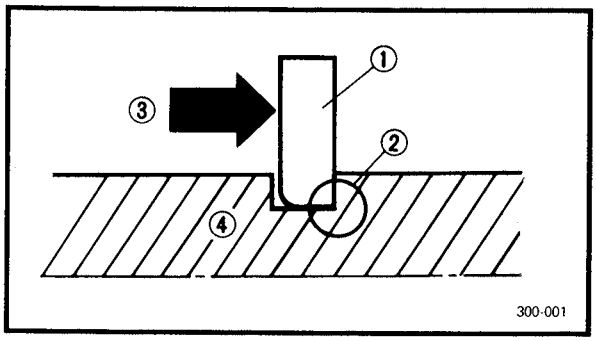


LOCK WASHERS/PLATES AND COTTER PINS

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.







SPECIAL TOOLS

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

The shape and part number used for the special tool differ by country, so two types are provided.

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 bearings surface.

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

Refer to the list provided to avoid errors when placing an order.

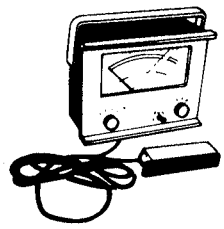
P/N. YM- □□□□□ , YU-□□□□□ For
YS- □□□□□ , YK-□□□□□ USA,
ACC-□□□□□ CDN

P/N. 90890- □□□□□ Except for USA, CDN

FOR TUNE UP

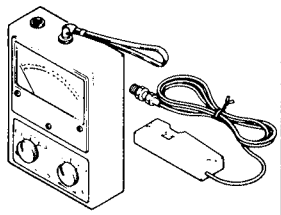
1-A

Inductive tachometer
P/N. YU-08036-A



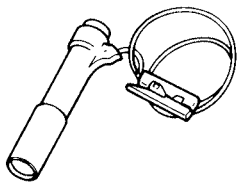
This tool is needed to measure engine rpm.

1-B
Inductive tachometer
P/N. 90890-03113



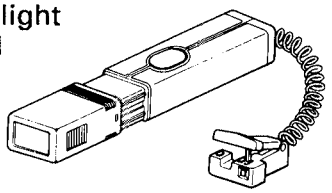
This tool is needed to measure engine rpm.

2-A
Inductive timing light
P/N. YM-33277-A



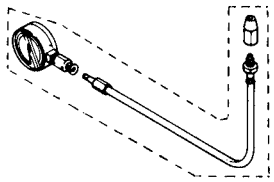
This tool is necessary for checking ignition timing.

2-B
Inductive timing light
P/N. 90890-03141



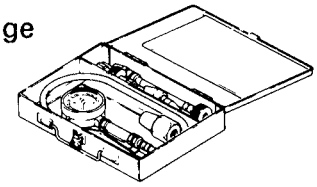
This tool is necessary for checking ignition timing.

3-A
Compression gauge
P/N. YU-33223
Adapter (M12)
P/N. YU-33223-3



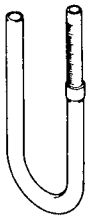
These gauge are used to measure the engine compression.

3-B
Compression gauge
P/N. 90890-03081
Extension
P/N. 90890-04082



This gauge is used to measure the engine compression.

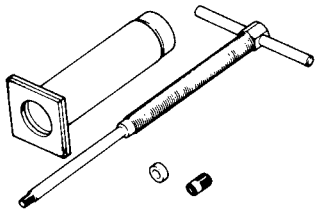
4
Fuel level gauge
P/N. YM-01312-A
P/N. 90890-01312



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

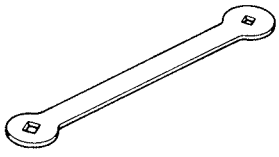
FOR ENGINE SERVICE

1
Piston pin puller
P/N. YU-01304
P/N. 90890-01304



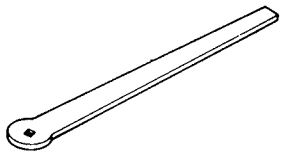
This tool is used to remove the piston pin.

2-A
Valve adjusting tool 4 mm (0.16 in)
P/N. YM-08035



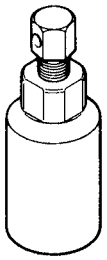
This tool is necessary for adjusting the valve clearance.

2-B
Valve adjusting tool 4 mm (0.16 in)
P/N. 90890-05260



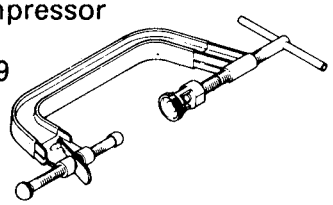
This tool is necessary for adjusting the valve clearance.

3
Flywheel puller
P/N. YM-01404
P/N. 90890-01404



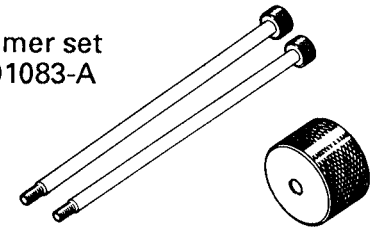
This tool is used to remove the CDI rotor.

4
Valve spring compressor
P/N. YM-04019
P/N. 90890-04019



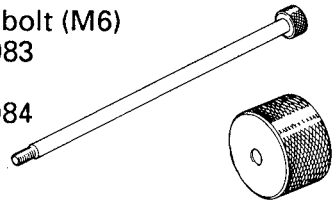
This tool is needed to remove and install the valve assemblies.

5-A
Slide hammer set
P/N. YU-01083-A



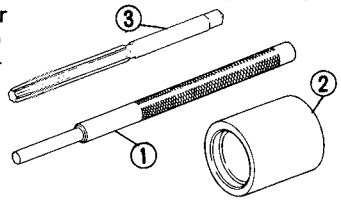
These tools are used when removing the rocker arm shaft.

5-B
Slide hammer bolt (M6)
P/N. 90890-01083
Weight
P/N. 90890-01084



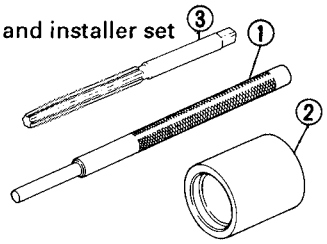
These tools are used when removing the rocker arm shaft.

6-A
Valve guide remover and installer 7 mm (0.28 in)
Valve guide remover
P/N. YM-01225-A-①
Valve guide installer
P/N. YM-04017-②
Valve guide reamer
P/N. YM-01227-③



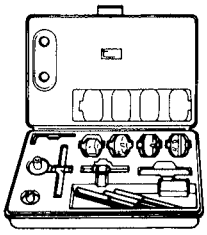
These tools are used to remove, install and rebore the valve guide.

6-B
Valve guide remover and installer set
7 mm (0.28 in)
Valve guide remover
P/N. 90890-01225-①
Valve guide installer
P/N. 90890-04017-②
Valve guide reamer
P/N. 90890-01227-③



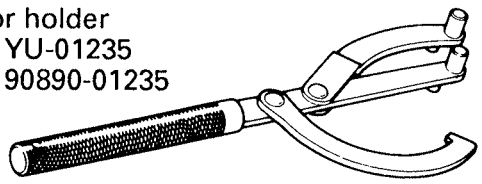
These tools are used to remove, install and rebore the valve guide.

7
Valve seat cutter
P/N. YM-91043



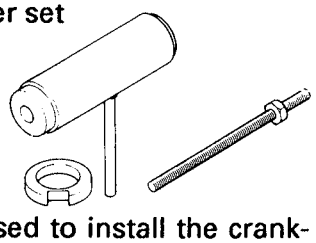
This tool is used to adjust the valve clearance.

8
Rotor holder
P/N. YU-01235
P/N. 90890-01235



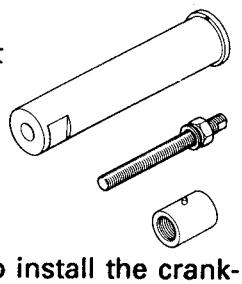
This tool is used to hold the clutch when removing or installing the clutch boss securing nut.

9-A
Crankshaft installer set
P/N. YU-90050



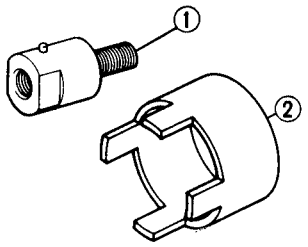
These tools are used to install the crankshaft, buffer boss and oil pump drive gear.

9-B
Buffer boss installer set
P/N. 90890-04088



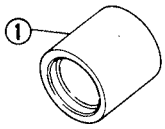
These tools are used to install the crankshaft, buffer boss and oil pump drive gear.

10
Adapter #12
P/N. YM-01383-①
P/N. 90890-01383
Spacer
P/N. YM-91044-②
P/N. 90890-04081



These tools are used to install the crankshaft.

11
Pot extension
P/N. YM-33280-①

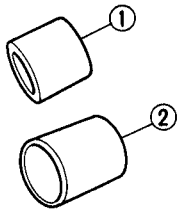


This tool is used to install the crankshaft.

Adapter #11
P/N. YM-33279-②

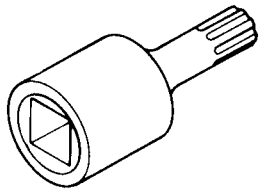
This tool is used to install the buffer boss.

12
Pot extension
P/N. YM-90070-A①
P/N. 90890-04060 ②



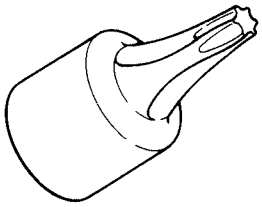
This tool is used to install the oil pump drive gear, and install the buffer boss.

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



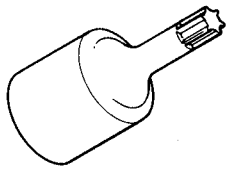
This tool is used to loosen or tighten the middle gear bearing retainer bolt.

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



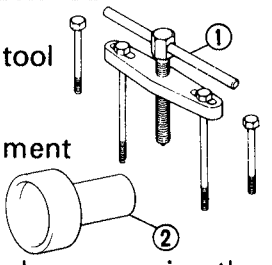
This tool is used to loosen or tighten the drive axle bearing retainer bolt.

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



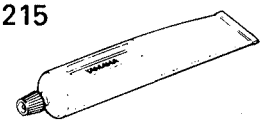
This tool is used to loosen or tighten the shift cam segment securing bolt.

16
Crankcase separating tool
P/N. YU-01135-A-①
P/N. 90890-01135
Flywheel puller attachment
P/N. YM-01382-②
P/N. 90890-01382



These tools are used when removing the crankshaft.

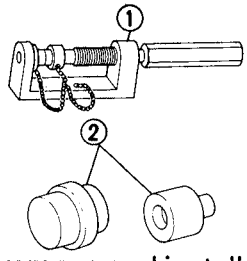
17
Sealant (Quick Gasket®)
P/N. ACC-11001-15-01
YAMAHA bond No. 1215
P/N. 90890-85505



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

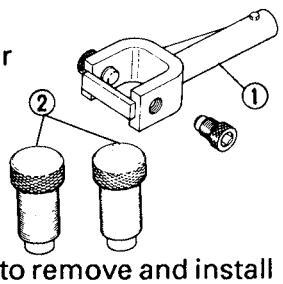
FOR DRIVE TRAIN SERVICE

1-A
Universal joint holder
P/N. YM-04062-①
Attachment
P/N. YM-33291-②



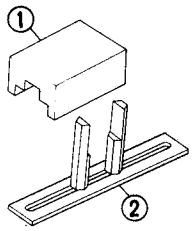
These tools are used to remove and install the universal joint.

1-B
Universal joint holder
P/N. 90890-04062-①
Attachment
P/N. 90890-04096-②



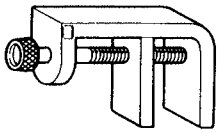
These tools are used to remove and install the universal joint.

2-A
Damper spring compressor (push plate)
P/N. YM-33286-①
Middle drive gear holder
P/N. YM-33222-②



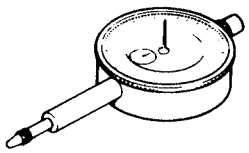
These tools are used to disassemble and reassemble the middle drive gear damper.

2-B
Damper spring compressor (push plate)
P/N.90890-04090



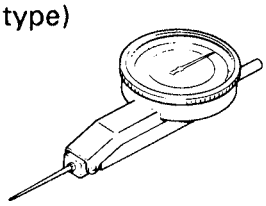
These tools are used to disassemble and reassemble the middle driven gear damper.

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



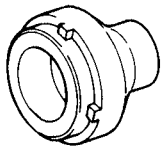
This tool is used to measure the gear lash for the middle gear and final gear.

4
Dial gauge (for lever type)
P/N. YM-03110



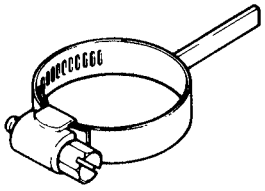
This tool is used to measure the gear lash for the differential gear.

5
Final drive shaft bearing retainer wrench
P/N. YM-04050
P/N. 90890-04050



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

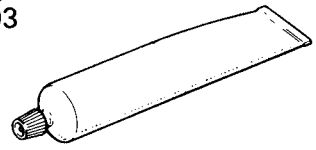
6
Gear lash measurement tool
P/N. YM-01230
P/N. 90890-01230



This tool is used to measure the gear lash.

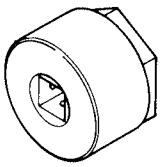
FOR CHASSIS SERVICE

1
Yamaha brake grease
P/N. 90793-40003



This Yamaha brake grease is used for front and rear brake dust seal.

2
Damper rod holder
P/N. YM-01327
P/N. 90890-01327



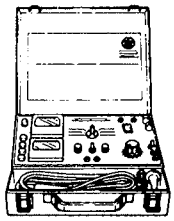
This tool is used to remove and install the bearing retainer for the steering shaft holder bearing.

FOR ELECTRICAL COMPONENTS

1-A
Electro tester
P/N. YU-33260-A

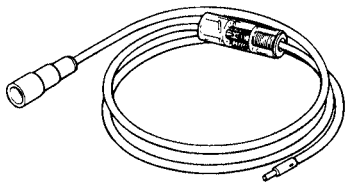
This instrument is necessary for checking the ignition system components.

1-B
1. Electro tester
P/N. 90890-03021



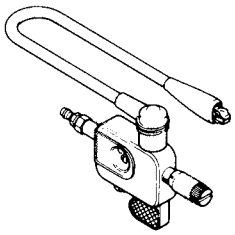
This instrument is necessary for checking the ignition system components.

2-A
Dynamic spark tester
P/N. YM-34487



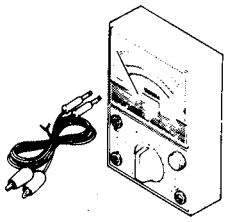
This instrument is necessary for checking the ignition system components.

2-B
Ignition checker
P/N. 90890-06754



This instrument is necessary for checking the ignition system components.

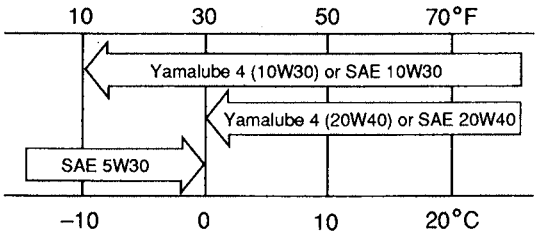
3
Pocket tester
P/N. YU-03112
P/N. 90890-03112



This instrument is invaluable for checking the electrical system.

SPECIFICATIONS

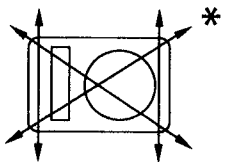
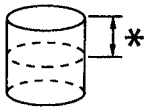
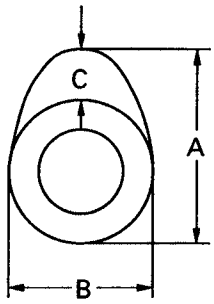
GENERAL SPECIFICATIONS

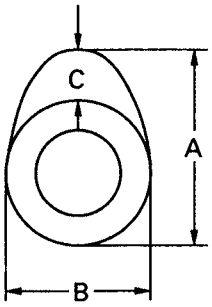
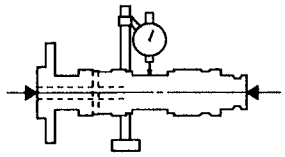
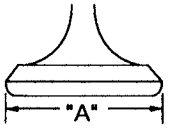
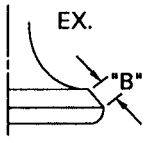
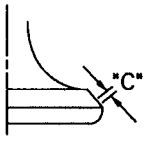
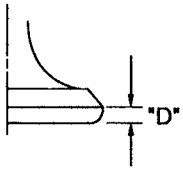
Model	YFM400FWE
Model code:	4GB1
Engine starting number:	4GB-000101
Vehicle identification number:	JY44GBA0*PA000101
Dimensions:	
Overall length	1,925 mm (75.8 in)
Overall width	1,155 mm (45.5 in)
Overall height	1,130 mm (44.5 in)
Seat height	830 mm (32.7 in)
Wheelbase	1,210 mm (47.6 in)
Minimum ground clearance	180 mm (7.09 in)
Minimum turning radius	3,500 mm (137.8 in)
Basic weight:	
With oil and full fuel tank	286 kg (631 lb)
Maximum load-except motorcycle	200 kg (441 lb)
Engine:	
Engine type	Air-cooled 4-stroke, SOHC
Cylinder arrangement	Forward-inclined single cylinder
Displacement	386 cm^3
Bore x stroke	83.0 x 71.5 mm (3.27 x 2.81 in)
Compression ratio	8.6:1
Compression pressure (STD)	920 kPa (9.2 kg/cm^2, 131 psi) at 350 r/min
Starting system	Electric and recoil starter
Lubrication system:	Wet sump
Oil type or grade:	
Engine oil	
Final gear oil and differential gear oil:	SAE80API "GL-4" Hypoid Gear Oil
Oil capacity:	
Engine oil and transfer gear oil:	
Periodic oil change (Engine oil)	2.4 L (2.1 Imp qt, 2.5 US qt)
Periodic oil change (Transfer gear oil)	0.3 L (0.26 Imp qt, 0.32 US qt)
Periodic oil change (Engine oil and transfer gear oil)	2.7 L (2.4 Imp qt, 2.9 US qt)
Periodic oil change (Engine oil and transfer gear oil with oil filter replacement)	2.8 L (2.5 Imp qt, 3.0 US qt)
Total amount	3.7 L (3.3 Imp qt, 3.9 US qt)

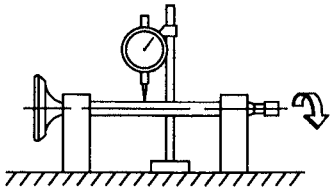
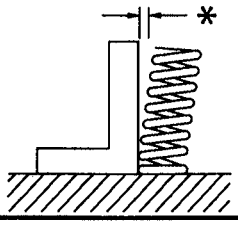
Model		YFM400FWE
Final gear case oil:		
Periodic oil change		0.19 L (0.17 Imp qt, 0.20 US qt)
Total amount		0.25 L (0.22 Imp qt, 0.26 US qt)
Differential gear case oil:		
Periodic oil change		0.47 L (0.41 Imp qt, 0.50 US qt)
Total amount		0.5 L (0.44 Imp qt, 0.53 US qt)
Air filter:		Wet type element
Fuel:		
Type		Unleaded fuel recomended
Fuel tank capacity		10 L (2.20 Imp gal, 2.64 US gal)
Fuel reserve amount		1.3 L (0.29 Imp gal, 0.34 US gal)
Carburetor:		
Type / quantity		BTM32SH x 1
Manufacturer		MIKUNI
Spark plug:		
Type		D8EA/X24ES-U
Manufacturer		NGK/NIPPONDENSO
Spark plug gap		0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Clutch type:		Wet, centrifugal automatic
Transmission:		
Primary reduction system		Spur gear
Primary reduction ratio		76/24 (3.167)
Secondary reduction system		Shaft drive
Secondary reduction ratio		24/18X33/09 (4.889)
Transmission type		Constant mesh 5-speed
Operation		Left foot operation
High range	1st	38/13X24/23X23X24 (2.923)
	2nd	34/18X24/23X23/24 (1.889)
	3rd	30/22X24/23X23/24 (1.364)
	4th	26/25X24/23X23/24 (1.040)
	5th	24/29X24/23X23/24 (0.828)
Low range	1st	38/13X24/23X27/19 (4.335)
	2nd	34/18X24/23X27/19 (2.801)
	3rd	30/22X24/23X27/19 (2.022)
	4th	26/25X24/23X27/19 (1.542)
	5th	24/29X24/23X27/19 (1.227)
Reverse gear		36/13X27/16 (4.673)
Chassis:		
Frame type		Steel tube frame
Caster angle		2.5°
Trail		15 mm (0.59 in)
Tread (STD)	Rear	820 mm (32.28 in)
Tread (STD)	Front	840 mm (33.07 in)
Toe-in		5 ~ 15 mm (0.20 ~ 0.59 in)

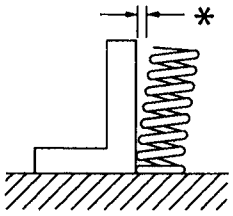
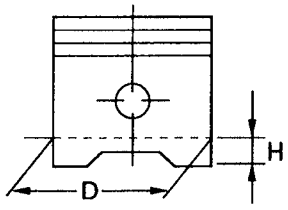
Model		YFM400FWE
Tire:		
Type		Tubeless
Size	(front)	AT25X8-12
	(rear)	AT25X10-12
Manufacturer	(front)	DUNLOP
	(rear)	DUNLOP
Type	(front)	KT402
	(rear)	KT406
Tire pressure (cold tire):		
Off-road riding		
	Font	17 ~ 23 kPa (0.17 ~ 0.23 kg/cm^2, 2.4 ~ 3.3 psi)
	Rear	22 ~ 28 kPa (0.22 ~ 0.28 kg/cm^2, 3.6 ~ 3.9 psi)
Brake:		
Front brake	Type	Drum brake
	Operation	Right hand operation
Rear brake	Type	Drum brake
	Operation	Left hand and right foot operation
Suspension:		
Front suspension		Double wishbone
Rear suspension		Swingarm (monocross)
Shock absorber:		
Front shock absorber		Coil spring / Oil damper
Rear shock absorber		Coil spring / Oil damper
Wheel travel:		
Front wheel travel		100 mm (3.94 in)
Rear wheel travel		110 mm (4.33 in)
Electrical:		
Ignition system		C.D.I.
Generator system		A.C. magneto generator
Battery capacity		12 V 14 AH
Battery type		GM14AZ-4A
Headlight type:		Bulb type
Bulb wattage x quantity:		
Headlight		12 V 25 W / 25 W
Tail / brake light		12 V 7.5 W
Meter light		12 V 3.4 W x 1
Indicator light:		
NEUTRAL		12 V 3.4 W x 1
REVERSE		12 V 3.4 W x 1
OIL TEMPERATURE		12 V 3.4 W x 1

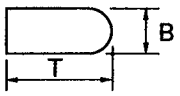
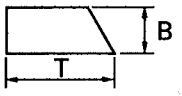
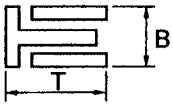
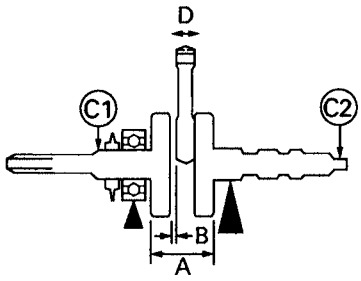
MAINTENANCE SPECIFICATIONS
ENGINE

Model		YFM400FWE
Cylinder head:		
Warp limit		0.03 mm (0.0012 in)
		* Lines indicate straightedge measurement.
Cylinder:		
		
Bore size		82.97 ~ 83.02 mm (3.2665 ~ 3.2685 in)
Out of round limit		0.01 mm (0.0004 in)
*Measuring point		40 mm (1.57 in)
<Wear limit>		<83.15 mm (3.2736 in)>
Camshaft:		
Drive method		Chain drive (left)
Cam dimensions		
		
Intake	"A"	40.29 ~ 40.39 mm (1.586 ~ 1.590 in)
	<Limit>	<40.26mm (1.585 in)>
	"B"	32.14 ~ 32.24 mm (1.265 ~ 1.269 in)
	<Limit>	<32.11 mm (1.264 in)>
	"C"	8.28 ~ 8.40 mm (0.326 ~ 0.331 in)

Model		YFM400FWE
Exhaust	"A"	40.28 ~ 40.38 mm (1.586 ~ 1.590 in)
		
	<limit>	<40.25 mm (1.585 in)>
	"B"	32.14 ~ 32.24 mm (1.265 ~ 1.269 in)
	<limit>	<32.11 mm (1.264 in)>
	"C"	8.28 ~ 8.40 mm (0.326 ~ 0.331 in)
Camshaft runout limit		0.03 mm (0.0012 in)
		
Cam chain:		
Cam chain type / No. of links		BF05M/92
Cam chain adjustment method		Automatic
Rocker arm / rocker arm shaft:		
Bearing inside diameter		12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in)
<Limit>		<12.078 mm (0.4755 in)>
Shaft outside diameter		11.981 ~ 11.991 mm (0.4717 ~ 0.4721 in)
<Limit>		<11.951 mm (0.4705 in)>
Arm-to-shaft clearance		0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)
<Limit>		<0.08 mm (0.0031 in)>
Valve, valve seat, valve guide:		
Valve clearance (cold)	IN	0.06 ~ 0.10 mm (0.0024 ~ 0.0039 in)
	EX	0.16 ~ 0.20 mm (0.0063 ~ 0.0079 in)
Valve dimensions:		
 Head Dia	 Face Width	 Seat Width	 Margin Thickness
"A" head diameter	IN	39.9 ~ 40.1 mm (1.571 ~ 1.579 in)
	EX	33.9 ~ 34.1 mm (1.335 ~ 1.343 in)
"B" face width	IN	2.26 mm (0.089 in)
	EX	2.26 mm (0.089 in)

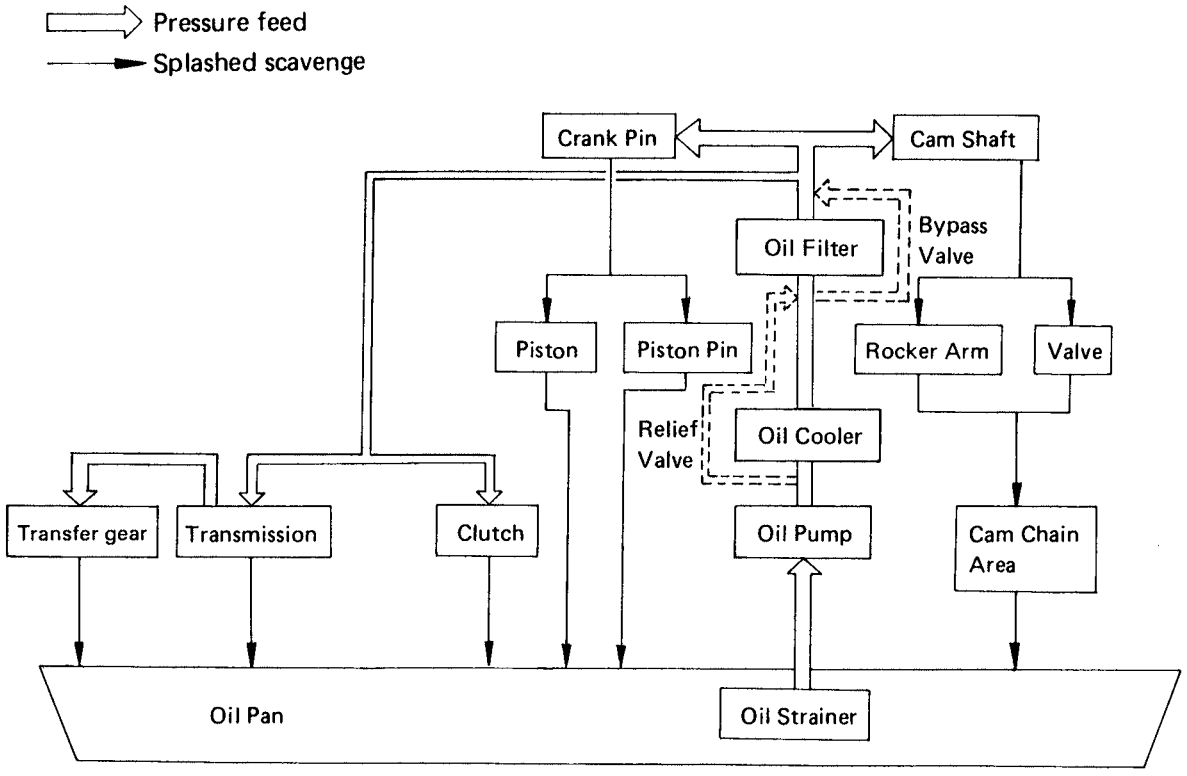
Model		YFM400FWE
"C" seat width	IN	1.2 ~ 1.4 mm (0.047 ~ 0.055 in)
	EX	1.2 ~ 1.4 mm (0.047 ~ 0.055 in)
<Limit>	IN	<1.6 mm (0.06 in)>
	EX	<1.6 mm (0.06 in)>
"D" margin thickness	IN	1.0 ~ 1.4 mm (0.0394 ~ 0.0551 in)
	EX	0.8 ~ 1.2 mm (0.0315 ~ 0.0472 in)
Stem outside diameter	IN	6.975 ~ 6.990 mm (0.2746 ~ 0.2752 in)
	EX	6.955 ~ 6.970 mm (0.2738 ~ 0.2744 in)
<Limit>	IN	<6.95 mm (0.274 in)>
	EX	<6.915 mm (0.272 in)>
Guide inside diameter	IN	7.000 ~ 7.012 mm (0.2756 ~ 0.2761 in)
	EX	7.000 ~ 7.012 mm (0.2756 ~ 0.2761 in)
<Limit>	IN	<7.03 mm (0.277 in)>
	EX	<7.03 mm (0.277 in)>
Stem-to-guide clearance	IN	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
	EX	0.030 ~ 0.057 mm (0.0012 ~ 0.0022 in)
<Limit>	IN	<0.08 mm (0.0031 in)>
	EX	<0.1 mm (0.004 in)>
Stem runout limit		0.02 mm (0.0008 in)
		
Valve seat width	IN	1.2 ~ 1.4 mm (0.0472 ~ 0.0551in)
	EX	1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)
<Limit>	IN	<1.6 mm (0.06 in)>
	EX	<1.6 mm (0.06 in)>
Valve spring:		
Inner spring:		
Free length	IN	39.9 mm (1.57 in)
	EX	39.9 mm (1.57 in)
<Limit>	IN	<37.9 mm (1.49 in)>
	EX	<37.9 mm (1.49 in)>
Set length (valve closed)	IN	33.6 mm (1.3 in)
	EX	33.6 mm (1.3 in)
Tilt limit	IN	2.5°/1.6 mm (2.5°/0.06 in)
	EX	2.5°/1.6 mm (2.5°/0.06 in)
		

Model		YFM400FWE
Direction of winding (top view)	IN	Counterclockwise
	EX	Counterclockwise 
Outer spring:		
Free length	IN	43.27 mm (1.70 in)
	EX	43.27 mm (1.70 in)
<Limit>	IN	<41.27 mm (1.62 in)>
	EX	<41.27 mm (1.62 in)>
Set length (valve closed)	IN	36.6 mm (1.4 in)
	EX	36.6 mm (1.4 in)
Tilt limit	IN	2.5°/1.6 mm (2.5°/0.06 in)
	EX	2.5°/1.6 mm (2.5°/0.06 in)
		
Direction of winding (top view)	IN	Clockwise
	EX	Clockwise 
Piston:		
Piston to cylinder clearance		0.04 ~ 0.06 mm (0.0016 ~ 0.0024 in)
<Limit>		<0.1 mm (0.0039 in)>
Piston size "D"		82.92 ~ 82.97 mm (3.265 ~ 3.267 in)
		
Measuring point "H"		5.5 mm (0.217 in)
Piston off-set		0.5 mm (0.02 in)
Piston off-set direction		IN side
Piston pin bore inside diameter		19.004 ~ 19.015 mm (0.7482 ~ 0.7486 in)
Piston pin outside diameter		18.990 ~ 18.995 mm (0.7476 ~ 0.7478 in)

Model	YFM400FWE
Piston rings:	
Top ring:	
	
Type	Barrel
Dimensions (B x T)	1.2 x 3.3 mm (0.047 x 0.130 in)
End gap (installed)	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
<Limit>	<0.5 mm (0.020 in)>
Side clearance (installed)	0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)
<Limit>	<0.12 mm (0.0047 in)>
2nd ring:	
	
Type	Taper
Dimensions (B x T)	1.5 x 3.4 mm (0.059 x 0.134 in)
End gap (installed)	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
<Limit>	<0.5 mm (0.020 in)>
Side clearance	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
<Limit>	<0.12 mm (0.0047 in)>
Oil ring:	
	
Dimensions (B x T)	2.8 x 2.8 mm (0.110 x 0.110 in)
End gap (installed)	0.3 ~ 0.9 mm (0.012 ~ 0.035 in)
Crankshaft:	
	
Crank width "A"	58.95 ~ 59.00 mm (2.321 ~ 2.323 in)
Runout limit "C"	0.06 mm (0.0024 in)
Big end side clearance "D"	0.35 ~ 0.85 mm (0.014 ~ 0.033 in)
<Limit>	<0.7 mm (0.028 in)>
Big end radial clearance "E"	0.010 ~ 0.025 mm (0.0004 ~ 0.0010 in)
Small end free play "F"	0.8 ~ 1.0 mm (0.0315 ~ 0.0394 in)
<Limit>	<2 mm (0.0787 in)>
Balancer:	
Balancer drive method	Gear

Model		YFM400FWE
Clutch:		
Friction plate thickness		2.94 ~ 3.06 mm (0.116 ~ 0.120 in)
Quantity		7
Friction plate wear limit		2.8 mm (0.11 in)
Clutch plate thickness		1.5 ~ 1.7 mm (0.059 ~ 0.067 in)
Quantity		4
Warp limit		0.2 mm (0.008 in)
Clutch plate thickness		1.9 ~ 2.1 mm (0.075 ~ 0.083 in)
Quantity		2
Clutch spring free length		44 mm (1.73 in)
Quantity		5
Minimum length		42.8 mm (1.69 in)
Clutch release method		Outer push, cam push
Automatic centrifugal clutch		
Clutch shoe thickness		2 mm (0.08 in)
<Wear limit>		<1.5 mm (0.06 in)>
Clutch shoe spring free length		42.5 mm (1.67 in)
Clutch-in revolution		1,850 ~ 2,150 r/min
Clutch-stall revolution		3,050 ~ 3,450 r/min
Transmission:		
Main axle deflection limit		0.08 mm (0.003 in)
Drive axle deflection limit		0.08 mm (0.003 in)
Shifter:		
Shifter type		Cam drum and guide bar
Air filter oil grade:		Foam-air-filter oil or SAE10W30 type SE motor oil
Carburetor:		
I. D. mark		4GB 00
Main jet	(M.J)	#122.5
Main air jet	(M.A.J)	0.7
Jet needle	(J.N)	5H26-3
Needle jet	(N.J)	N-8
Pilot air jet	(P.A.J.1)	1.0
Pilot air jet	(P.A.J.2)	0.9
Pilot outlet	(P.O)	0.75
Pilot jet	(P.J)	#45
Bypass 1	(B.P.1)	0.8
Bypass 2	(B.P.2)	0.8
Bypass 3	(B.P.3)	1.0
Pilot screw	(P.S)	2
Valve seat size	(V.S)	2.5
Starter jet	(G.S.1)	#60
Throttle valve size	(Th.V)	#130
Float height	(F.H)	11.4 ~ 13.4 mm (0.45 ~ 0.53 in)

Model	YFM400FWE
Fuel level (F.L)	1 ~ 2 mm (0.04 ~ 0.08 in) Below the float chamber mating surface
Engine idle speed	1,350 ~ 1,450 r/min
Intake vacuum	32.9 kPa (250 mmHg, 9.843 inHg)
Lubrication system:	
Oil filter type	Wire mesh type
Oil pump type	Trochoid type
Tip clearance "A" or "B"	0.15 mm (0.006 in)
<Limit>	<0.2 mm (0.008 in)>
Side clearance	0.04 ~ 0.09 mm (0.002 ~ 0.004 in)
Bypass valve setting pressure	80 ~ 120 kPa (0.8 ~ 1.2 kg/cm², 11.38 ~ 17.07 psi)
Relief valve operating pressure	60 kPa (0.6 kg/cm², 8.53 psi)
Oil pressure (hot)	8 kPa (0.08 kg/cm², 1.14 psi) at 1,400 r/min
Pressure check location	HEAD CYLINDER
Lubrication chart:	
Shaft drive:	
Middle gear backlash	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
Final gear backlash	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
Differential gear backlash	0.10 ~ 0.35 mm (0.004 ~ 0.014 in)



TIGHTENING TORQUE

Parts to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Cylinder head	Bolt	M10	4	40	4.0	29	E
	Bolt	M8	2	20	2.0	14	E
Cylinder	Bolt	M6	1	10	1.0	7.2	
Cylinder head cover:							
Tappet cover	Bolt	M6	5	10	1.0	7.2	
Cam sprocket cover	Screw	M6	2	10	1.0	7.2	
Oil checking bolt	Bolt	M6	1	7	0.7	5.1	
Bearing retainer (camshaft)	Bolt	M6	2	8	0.8	5.8	Use lock washer
Cam chain guide	Bolt	M6	2	10	1.0	7.2	
Cam sprocket and camshaft	Bolt	M10	1	60	6.0	43	
Cam chain tensioner:							
Tensioner body	Bolt	M6	2	10	1.0	7.2	
Tensioner cap	Plug	M12	1	23	2.3	17	
Valve adjusting nut	Nut	M7	2	20	2.0	14	
Spark plug	—	M12	1	18	1.8	13	
Crank case	Bolt	M6	16	10	1.0	7.2	
Crank case cover (left)	Bolt	M6	9	10	1.0	7.2	
Crank case cover (right)	Bolt	M6	15	10	1.0	7.2	
Recoil starter	Bolt	M6	1	10	1.0	7.2	
Clutch adjuster	Nut	M8	1	15	1.5	11	
Oil filter cover	Bolt	M6	3	10	1.0	7.2	
Oil drain plug	Plug	M35	1	32	3.2	23	
Bearing retainer (main axle)	Screw	M6	2	7	0.7	5.1	LT
Bearing retainer (balancer shaft)	Screw	M6	3	7	0.7	5.1	LT
Shift cam segment	Screw	M6	1	12	1.2	8.7	LT
Oil pump	Screw	M6	3	7	0.7	5.1	
Clutch boss	Nut	M16	1	80	8.0	58	Use lock washer
Pressure plate	Bolt	M6	5	8	0.8	5.8	
Clutch carrier	Nut	M16	1	140	14	56	Stake
Balancer shaft and driven gear	Nut	M16	1	60	6.0	43	Use lock washer
Bearing retainer (middle drive axle)	Screw	M8	4	25	2.5	18	Stake
Middle drive axle and middle gear	Nut	M20	1	120	12.0	85	Stake
Transfer gear assembly	Bolt	M8	4	25	2.5	18	
Middle driven axle and U-joint	Nut	M14	1	90	9.0	65	LT
Starter coil assembly	Screw	M6	3	8	0.8	5.8	LT
Pickup coil	Screw	M5	2	5	0.5	3.6	
CDI magneto	Bolt	M10	1	50	5.0	36	
Neutral switch	—	M10	1	20	2.0	14	
Reverse switch	—	M10	1	20	2.0	14	
Thermo switch	—	M12	1	20	2.0	1.4	
Starter motor	Bolt	M6	2	10	1.0	7.2	
Oil cooler	Bolt	M6	2	7	0.7	5.1	
Oil cooler hose:							
Oil hose and oil cooler	Nut	—	2	35	3.5	25	
Oil hose and crankcase	Nut	—	2	35	3.5	25	
Hose clamp	Screw	M6	2	7	0.7	5.1	

Parts to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Carburetor joint and cylinder head	Bolt	M8	2	20	2.0	14	
Carburetor and carburetor joint	Nut	M8	2	16	1.6	11	
Carburetor joint band	Screw	M5	1	2	0.2	1.4	
Select lever body and crank case cover (left)	Bolt	M6	3	12	1.2	8.7	
Select lever body and select lever cover	Bolt	M6	3	10	1.0	7.2	
Rink shaft and control cable (rock nut)	Nut	M6	1	7	0.7	5.1	
Control cable bracket	Bolt	M10	1	35	3.5	25	
Muffler and frame	Bolt	M8	2	27	2.7	19	
Muffler and exhaust pipe	Bolt	M8	1	20	2.0	14	
Exhaust pipe and cylinder head	Nut	M6	2	12	1.2	8.7	
Exhaust pipe and protector	Bolt	M6	2	11	1.1	8.0	G
Shift pedal	Bolt	M5	1	10	1.0	7.2	
Rear final gear case and swingarm							
Front	Nut	M10	4	23	2.3	17	
Rear	Bolt	M10	4	45	4.5	32	
Drain plug (rear final gear case)	Plug	—	2	23	2.3	17	
Bearing housing (rear final gear case)	Bolt	M10	2	40	4.0	29	
Bearing housing (rear final gear case)	Bolt	M8	6	23	2.3	17	
Bearing retainer (rear final gear)	—	—	1	100	10.0	72	
Ring gear stopper (rear final gear)	Bolt	M10	1	9	0.9	6.5	G
Transfer gear case	Bolt	M6	9	10	1.0	7.2	
Drain plug (transfer gear case)	Plug	M8	1	20	2.0	14	
Filler plug (transfer gear case)	Plug	M14	1	23	2.3	17	
Differential gear case and frame:							
Front	Bolt	M10	4	55	5.5	40	
Rear	Bolt	M8	2	28	2.8	20	
Drain plug: Front	Plug	M14	2	23	2.3	17	
(differential gear case) Rear	Plug	M8	1	16	1.6	11	
Bearing housing (differential gear case)	Bolt	M10	2	40	4.0	29	
	Bolt	M8	6	23	2.3	17	
Ring gear stopper (differential gear case)	Nut	M8	1	16	1.6	11	
Differential assembly and ring gear	Bolt	M8	6	64	6.4	46	Use lock washer
U-joint (differential case) and nut	Nut	M14	1	—	—	—	See NOTE G Stake

NOTE:

Starting torque: 0.8 ~ 1.3 Nm (0.08 ~ 0.13 m • kg, 0.58 ~ 0.94 ft • lb)

CHASSIS

Model		YFM400FWE
Steering system:		
Steering bearing type		Ball bearing
Front suspension:		
Shock absorber travel		67.5 mm (2.66 in)
Fork spring free length		240 mm (9.4 in)
Spring rate	(K1)	17.0 N/mm (1.7 kg/mm 95.2 lb/in)
Stroke	(K1)	0 ~ 138.5 mm (0.00 ~ 5.45 in)
Optional spring		No
Rear suspension:		
Shock absorber travel		75 mm (2.95 in)
Spring free length		258.8 mm (10.19 in)
Fitting length		221.3 mm (8.71 in)
Spring rate	(K1)	27.0 N/mm (2.7 kg/mm 151.2 lb/in)
Stroke	(K1)	0 ~ 123 mm (0.00 ~ 4.84 in)
Optional spring		No
Swingarm:		
Free play limit	End	1 mm (0.04 in)
	Side	1 mm (0.04 in)
Front wheel:		
Type		Disc wheel
Rim size		12X6.5AT
Rim material		Steel
Rim runout limit	Radial	2 mm (0.08 in)
	Lateral	2 mm (0.08 in)
Rear wheel:		
Type		Disc wheel
Rim size		12X8.0AT
Rim material		Steel
Rim runout limit	Radial	2 mm (0.08 in)
	Lateral	2 mm (0.08 in)
Master cylinder inside diameter		14 mm (0.55 in)
Brake fluid type		DOT #3 or DOT #4
Front drum brake:		
Type		Two leading
Brake drum inside diameter		160 mm (6.30 in)
<Limit>		<161 mm (6.34 in)>
Lining thickness		4 mm (0.16 in)
<Limit>		<1 mm (0.04 in)>
Shoe spring free length		104 mm (4.09 in)

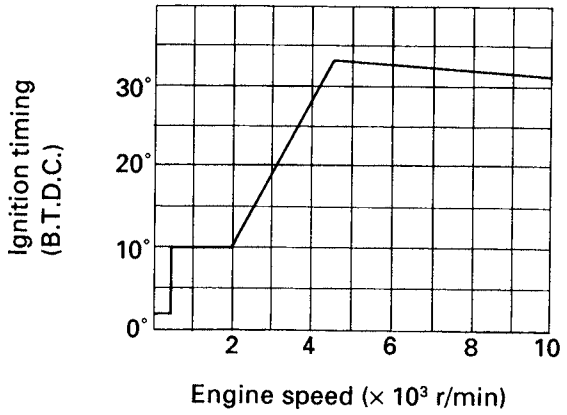
Model	YFM400FWE
Rear drum brake:	
Type	Leading, tailing
Brake drum inside diameter	160 mm (6.30 in)
<Limit>	<161 mm (6.34 in)>
Lining thickness	4 mm (0.16 in)
<Limit>	<1 mm (0.04 in>
Front brake lever:	
Front brake lever free play (at lever end):	
Brake lever free play (just before adjuster contacts master cylinder piston)	3 ~ 5 mm (0.1 ~ 0.2 in)
Brake lever free play (just before brake is actually applied)	25 ~ 30 mm (1.0 ~ 1.2 in)
Rear brake lever & brake pedal:	
Brake lever free play (at lever pivot)	4 ~ 8 mm (0.16 ~ 0.31 in)
Brake pedal position	5 mm (0.2 in)
Brake pedal free play	20 ~ 30 mm (0.8 ~ 1.2 in)
Throttle cable:	
Throttle cable free play	3 ~ 5 mm (0.1 ~ 0.2 in)

TIGHTENING TORQUE

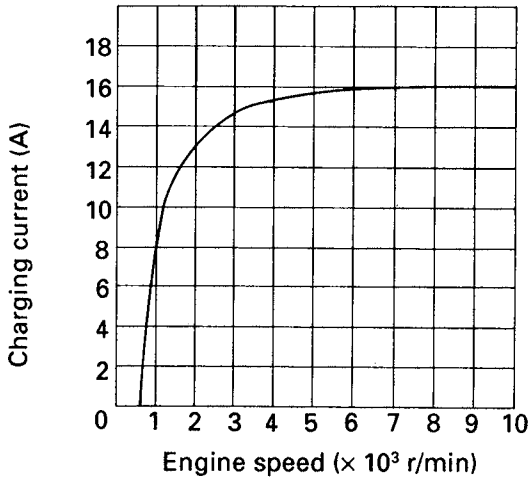
Parts to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Engine stay (front-upper) and frame	Bolt	M8 × 1.25	2	33	3.3	24	
Engine stay (front-lower) and frame	Nut	M8 × 1.25	2	33	3.3	24	
Engine stay (front-upper) and engine	Nut	M8 × 1.25	1	33	3.3	24	
Engine stay (front-lower) and engine	Nut	M10 × 1.25	1	42	4.2	30	
Engine and frame (rear - upper)	Nut	M10 × 1.25	1	42	4.2	30	
Engine and frame (rear - under)	Nut	M10 × 1.25	1	42	4.2	30	
Frame and bearing retainer (steering shaft holder bearing)	Nut	M42 × 1	1	40	4.0	29	
Pivot shaft and frame	Bolt	M22 × 1.5	2	6	0.6	4.3	
Pivot shaft and nut	Nut	M22 × 1.5	2	130	13.0	94	
Rear shock absorber and frame	Nut	M12 × 1.25	1	50	5.0	36	
Upper arm and frame	Nut	M10 × 1.25	4	45	4.5	32	
Lower arm and frame	Nut	M10 × 1.25	4	45	4.5	32	
Front shock absorber and frame	Nut	M10 × 1.25	2	45	4.5	32	
Front shock absorber and upper arm	Nut	M10 × 1.25	2	45	4.5	32	
Steering shaft and frame	Nut	M10 × 1.25	1	30	3.0	22	
Steering shaft holder and frame	Bolt	M8 × 1.25	2	20	2.0	14	Use lock washer
Tie rod end and steering shaft	Nut	M10 × 1.25	2	25	2.5	18	
Tie rod and locknut	Nut	M10 × 1.25	4	30	3.0	22	
Tie rod end and steering knuckle	Nut	M10 × 1.25	2	25	2.5	18	
Steering knuckle and upper arm	Nut	M10 × 1.25	2	25	2.5	18	
Steering knuckle and lower arm	Nut	M10 × 1.25	2	35	3.5	25	
Fuel tank and fuel cock	Screw	M6 × 1.0	2	5	0.5	3.6	
Front wheel and front wheel hub	Nut	M10 × 1.25	8	55	5.5	40	
Front axle and front wheel hub	Nut	M16 × 1.5	2	130	13.0	94	
Rear wheel and wheel hub	Nut	M10 × 1.25	4	55	5.5	40	
Rear wheel and brake drum	Nut	M10 × 1.25	4	55	5.5	40	
Rear axle and nut	Nut	M16 × 1.5	2	150	15.0	110	
Rear brake cam shaft and cam shaft lever	Nut	M6 × 1.0	1	9	0.9	6.5	
Swingarm and rear brake plate	Bolt	M8 × 1.25	4	28	2.8	20	
Steering knuckle and front brake plate	Bolt	M8 × 1.25	8	28	2.8	20	
Brake pipe	Nut	M10 × 1.0	4	18	1.8	13	
Brake hose and wheel cylinder	Bolt	M10 × 1.25	2	27	2.7	19	
Caliper bleed screw	Screw	M8 × 1.25	2	6	0.6	4.3	
Master cylinder and handlebar	Bolt	M6 × 1.0	2	10	1.0	7.2	
Speedometer cable and speedometer	—	M12 × 1.0	1	3	0.3	2.2	
Footrest and frame	Bolt	M10 × 1.25	4	55	5.5	40	
Front bumper and frame (bottom)	Bolt	M8 × 1.25	2	23	2.3	17	
Front bumper and frame (top)	Bolt	M8 × 1.25	2	23	2.3	17	
Rear bumper and frame	Bolt	M8 × 1.25	4	33	3.3	24	
Rear carrier and frame	Bolt	M8 × 1.25	2	33	3.3	24	
Rear bumper and rear carrier	Bolt	M6 × 1.0	2	9	0.9	6.5	

ELECTRICAL

Model	YFM400FWE
Voltage:	12 V
Ignition system:	
Ignition timing (B.T.D.C.)	10° at 1,000 r/min
Advanced timing (B.T.D.C.)	33° at 5,000 r/min
Advancer type	Electrical type



C.D.I.:	
Magneto model / manufacturer	F3T43573/MITSUBISHI
Pickup coil resistance / color	171 ~ 209 Ω at 20°C (68°F) / (Red-White)
Source coil resistance / color	270 ~ 330 Ω at 20°C (68°F) / (Brown-Green)
C.D.I. unit model / manufacturer	F8T30571C/MITSUBISHI
Ignition coil:	
Model / manufacturer	F6T53573/MITSUBISHI
Minimum spark gap	6 mm (0.24 in)
Primary winding resistance	0.36 ~ 0.48 Ω at 20°C (68°F)
Secondary winding resistance	5.44 ~ 7.36 kΩ at 20°C (68°F)
Spark plug cap:	
Type	Resin type
Resistance	10 kΩ
Charging system:	
Type	A.C. magneto generator
Model / manufacturer	F3T43573/MITSUBISHI
Nominal output	12 V 17 A at 3,000 r/min

Model	YFM400FWE
	
Stator coil resistance / color	0.70 ~ 0.86 Ω at 20°C (68°F)/(White-White)
Rectifier:	
Model / manufacturer	SH235/SHINDENGEN
Capacity	15 A
Withstand voltage	200 V
Battery:	
Specific gravity	1.280
Electric starter system:	
Type	Constant mesh type
Starter motor:	
Model / manufacturer	DB5DV/NIPPONDENSO
I.D. number	DB5DV
Output	0.7 kW
Armature coil resistance	0.011 ~ 0.013 Ω at 20°C (68°F)
Brush overall length	12 mm (0.47 in)
<Limit>	<8.5 mm (0.33 in)>
Spring force	650 ~ 950 g (22.9 ~ 33.5 oz)
Commutator diameter	28 mm (1.10 in)
<Wear limit>	<27 mm (1.06 in)>
Mica undercut	0.6 mm (0.02 in)
Starter relay:	
Model / manufacturer	A104-132/HITACHI
Amperage rating	150 A
Coil winding resistance / color	3.06 ~ 3.74 Ω at 20°C (68°F)/ (Blue/White-Red/White)
Circuit breaker:	
Type:	
MAIN	Fuse
FAN MOTOR	Circuit breaker
Amperage for individual circuit:	
MAIN	30 A x 1
FAN MOTOR	20 A x 1

EXCLUSIVE SPECIFICATIONS

The following specifications are exclusive for the below listed countries.

For specifications other than below, please refer to the General and maintenance specifications.

For Canada

Model Code	4GB2
Engine Start Number	4GB-016101
Vehicle Identification Number	JY44GBNO*PA016101
Fuel:	
Type	Regular Unleaded Gasoline
Spark Plug:	
Type	DR8ES-L
Manufacturer	NGK

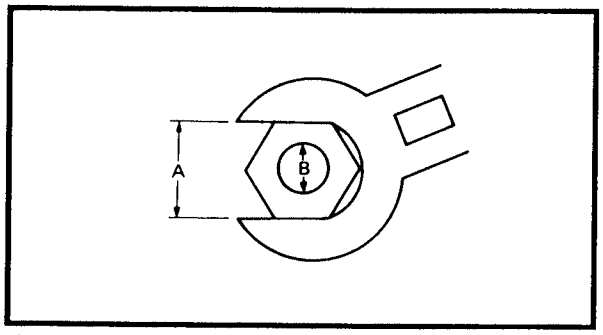
For Europe

Model Name	YFM400FW
Model Code	4GB2
Engine Start Number	4GB-016101
Frame Start Number	4GB-016101
Fuel:	
Type	Regular Unleaded Gasoline
Spark Plug:	
Type	DR8ES-L
Manufacturer	NGK

GENERAL TORQUE SPECIFICATIONS

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

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



A: Distance across flats
B: Outside thread diameter

LUBRICATION POINTS AND LUBRICANT TYPE

ENGINE

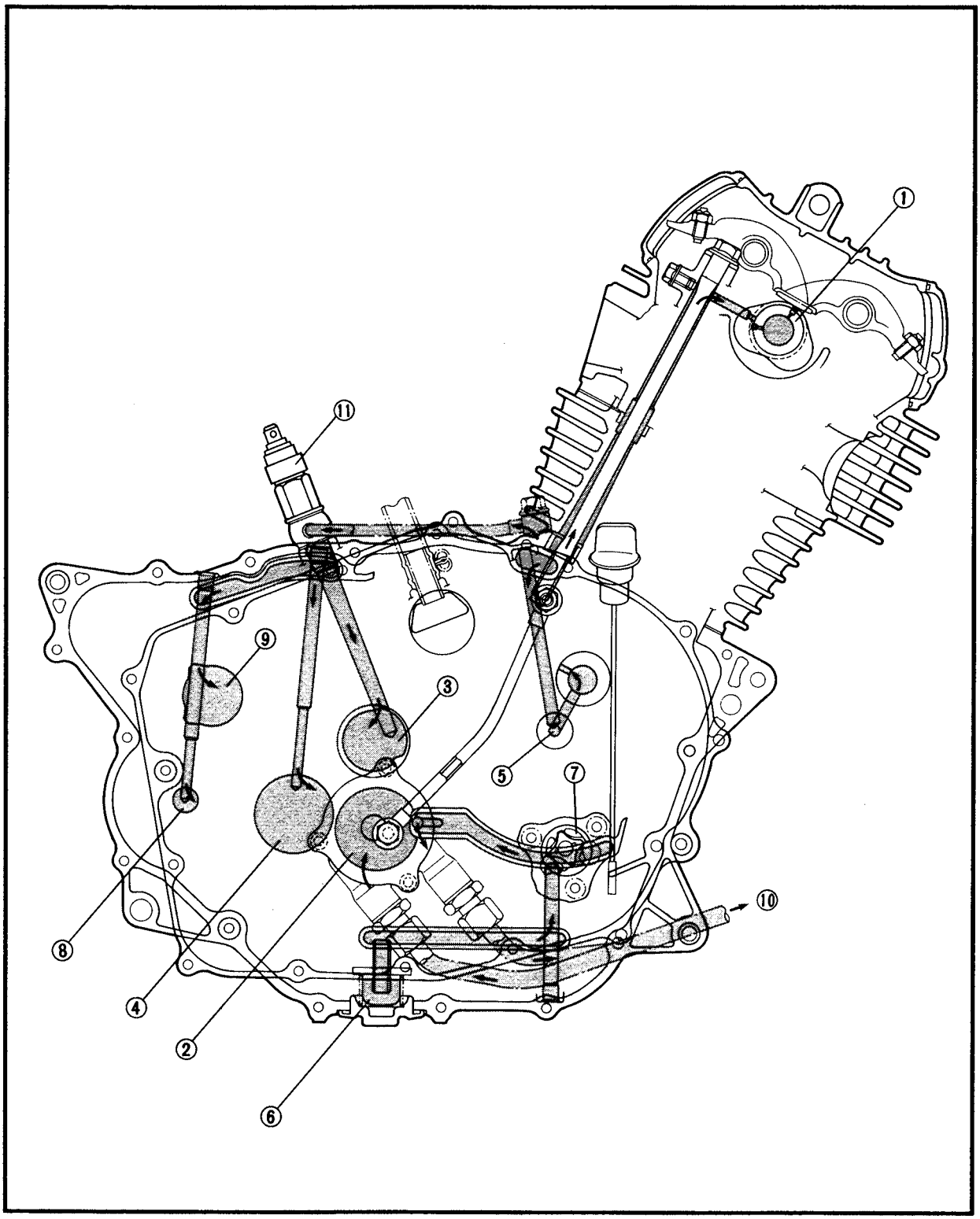
Lubrication points	Lubricant type
Oil seal lips (all)	LS
O-rings (all)	LS
Bearings (all)	E
Cylinder head bolt/washer	E
Rocker arm, rocker arm shaft	M
Crankshaft pin	E
Crankshaft journal	E
Connecting rod	E
Piston surface/piston rings	E
Piston pin	E
Camshaft (cam lobe/journal)	E
Valve stem	M
Valve stem end	M
Cam chain/cam sprocket	E
Oil pump shaft, rotor, housing	E
Starter idle gear/wheel gear	M
Primary driven gear	E
O-ring (push plate)	LS
Transmission gear (wheel/pinion)	M
Axle (main/drive)	M
Shift cam/shift shaft	E
Shift fork/guide bar	M
Shift ball holder/guide plate	M
Crankcase mating surfaces	Sealant (Quick Gasket®) Yamaha Bond No.1215
Middle drive axle cover	Sealant (Quick Gasket®) Yamaha Bond No.1215
Stator lead grommet (left side crankcase)	Sealant (Quick Gasket®) Yamaha Bond No.1215

CHASSIS

Lubrication points	Lubricant type
Oil seal lips (all)	LS
O-rings (all)	LS
Steering shaft (bushes)	LS
Backing plates (dust seal lips)	Yamaha brake grease
Wheel bearings	LS
Throttle cable end (at throttle lever)	LS
Brake cable ends	LS
Front arms (bushes)	LS
Pivot shafts	LS
Swingarm (bearings)	LS
Brake lever (pivoting point)	LS
Throttle lever (pivoting point)	LS
Brake pedal (pivoting point)	LS
Rear brake shoe plate and swingarm	Sealant (Quick Gasket®) Yamaha Bond No.1215
Front backing plate and steering knuckle	Sealant (Quick Gasket®) Yamaha Bond No.1215
Rear final gear and swingarm	Sealant (Quick Gasket®) Yamaha Bond No.1215

LUBRICATION DIAGRAMS

① Camshaft
② Oil cleaner
③ Main axle
④ Drive axle
⑤ Crankshaft
⑥ Oil filter
⑦ Oil pump
⑧ Idle axle
⑨ Middle drive axle
⑩ Oil cooler
⑪ Thermo unit



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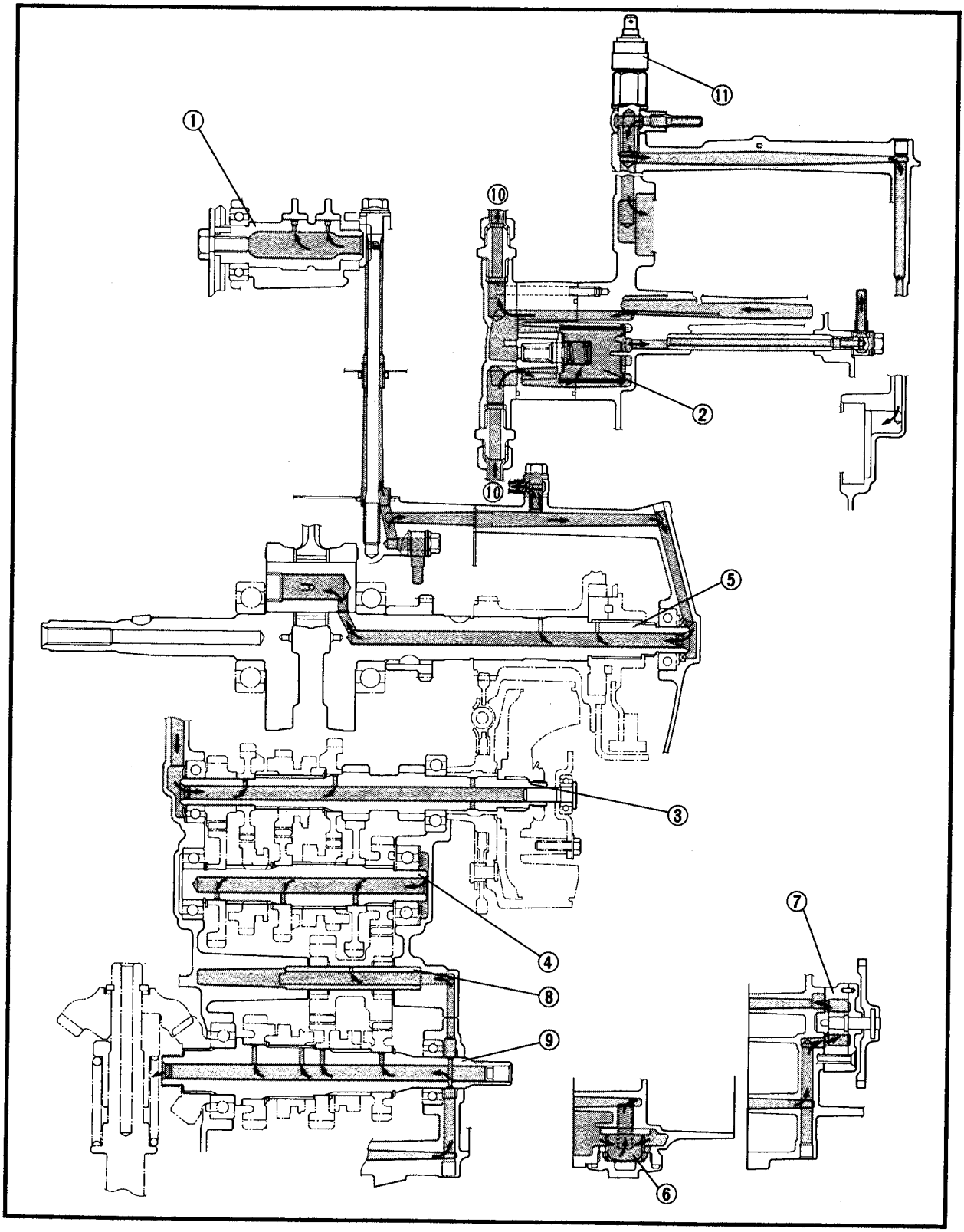
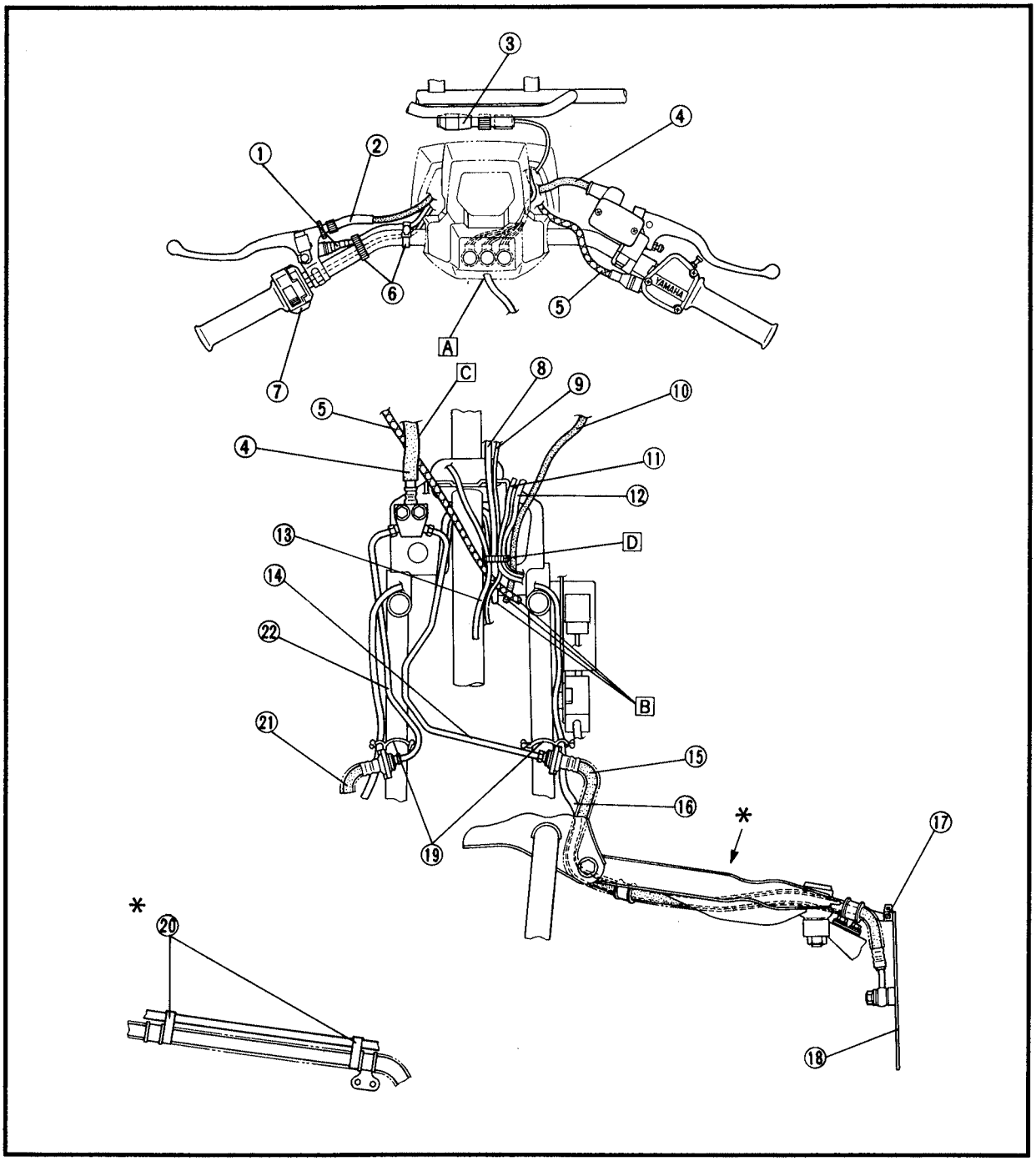


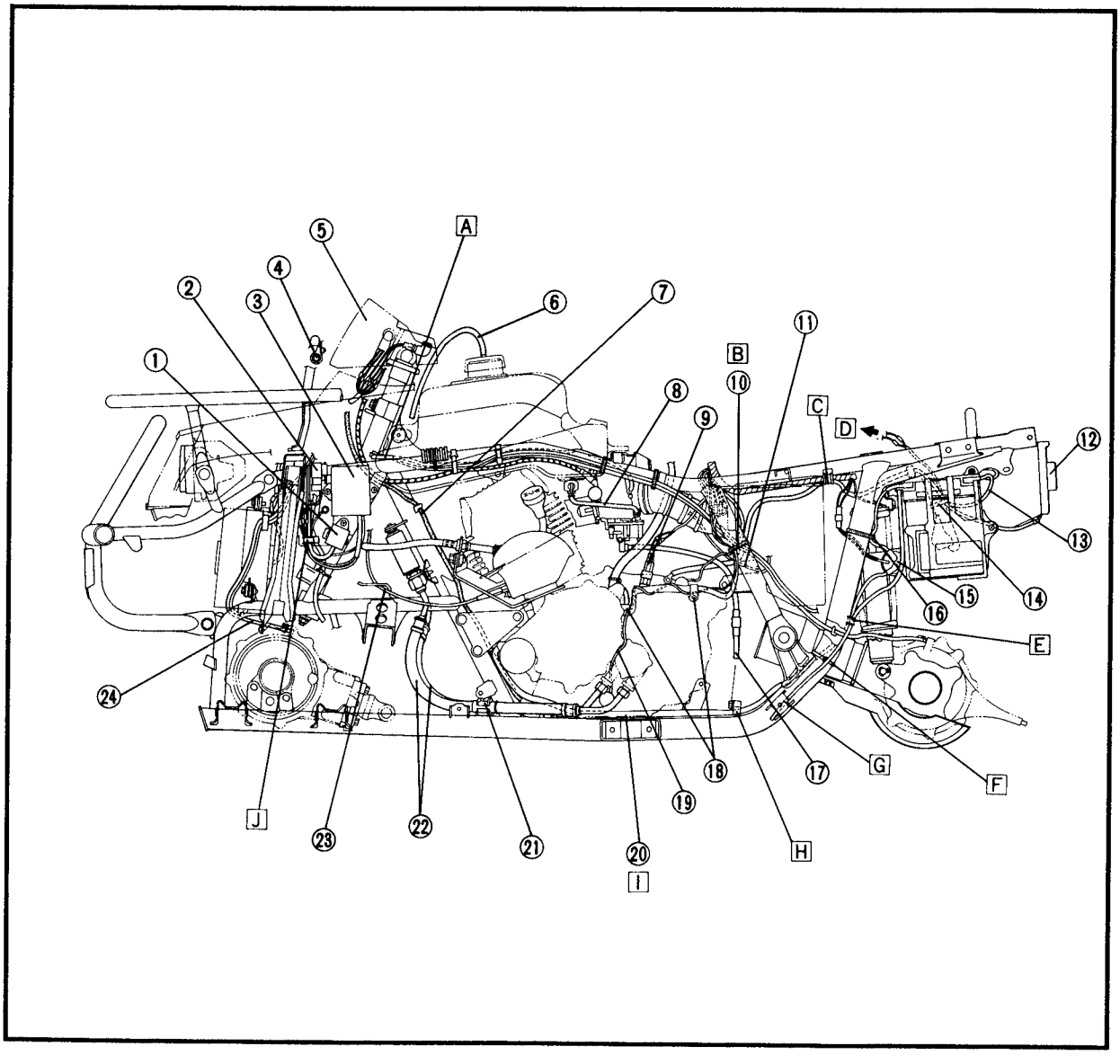
CABLE ROUTING

① Rear brake switch
② Rear brake cable
③ Terminal (option)
④ Front brake hose
⑤ Throttle cable
⑥ Band
⑦ Handlebar switch
⑧ Speedometer cable
⑨ Speedometer lead
⑩ Rear brake cable
⑪ Rear brake switch lead
⑫ Handlebar switch lead
⑬ Indicator lights lead
⑭ Brake pipe
⑮ Brake hose
⑯ Breather hose
⑰ Clip
⑱ Backing plate
⑲ Clamp
⑳ Clip
㉑ Brake hose
㉒ Brake pipe

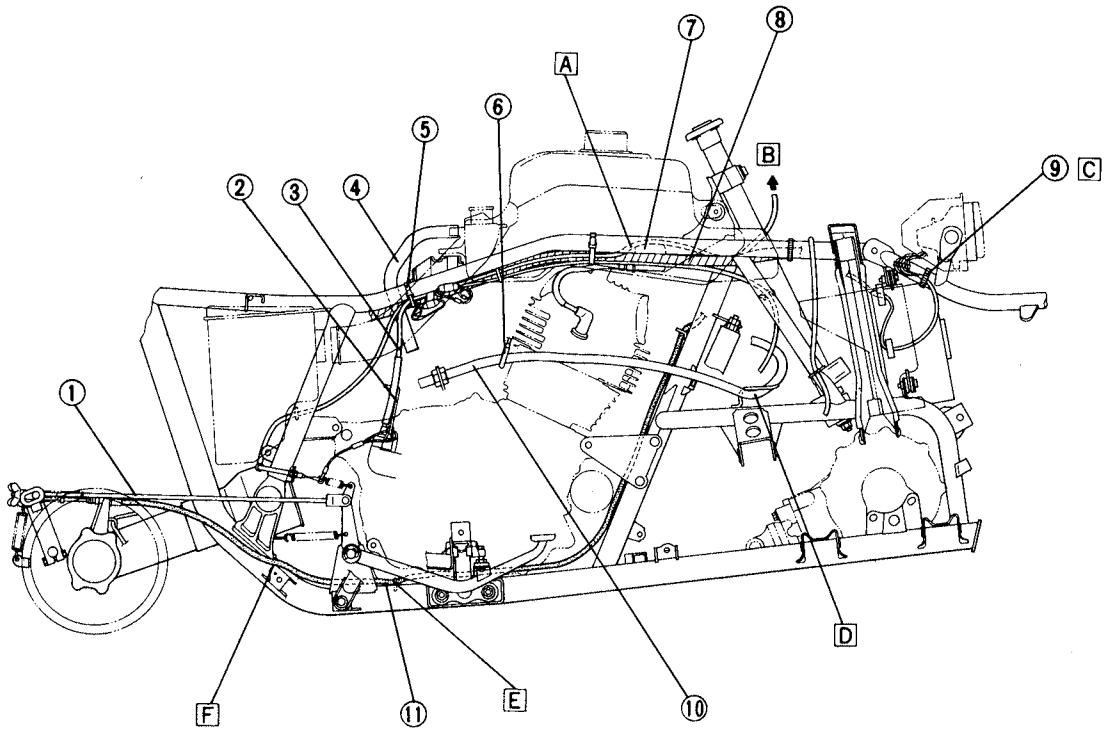
[A] Insert the breather hose into the hole of the handlebar protector.
[B] Pass the speedometer cable, rear brake cable and throttle cable in order from inside.
[C] Pass the throttle cable under the brake hose.
[D] Clamp the speedometer cable, brake switch lead, handlebar switch lead, indicator lights lead and speedometer lead.



① Fan motor control unit
② Fan motor relay
③ CDI unit
④ Option terminal
⑤ handlebar protector
⑥ Fuel tank breather hose
⑦ Rear brake cable
⑧ Fuel hose
⑨ Thermo unit
⑩ Band
⑪ Select lever control cable 2
⑫ Taillight
⑬ Battery lead (–)
⑭ Band
⑮ Starter relay
⑯ Band
⑰ Carburetor overflow hose
⑱ Clamp
⑲ Neutral switch lead
⑳ Starter motor lead
㉑ Clamp
㉒ Oil cooler hose
㉓ Select lever control cable 2
㉔ Breather hose (differential gear case)
[A] Pass the hoses into the holes. Left side: carburetor air vent hose, breather hose (rear brake) and breather hose (rear final gear case) Right side: breather hose (front brake), breather hose (differential gear case) and breather hose (fan motor)
[B] Clamp the flywheel magneto leads, battery lead (–), neutral switch lead and reverse switch lead.
[C] Clamp the battery lead (–) and wireharness.
[D] To wireharness.
[E] Clamp the starter motor lead and battery breather hose.
[F] Clamp the starter motor lead.
[G] Pass the battery breather hose through the bracket.
[H] Clamp the starter motor lead.
[I] Pass the starter motor lead outside of the front drive shaft protector.
[J] Clamp the fan motor control unit and CDI unit.

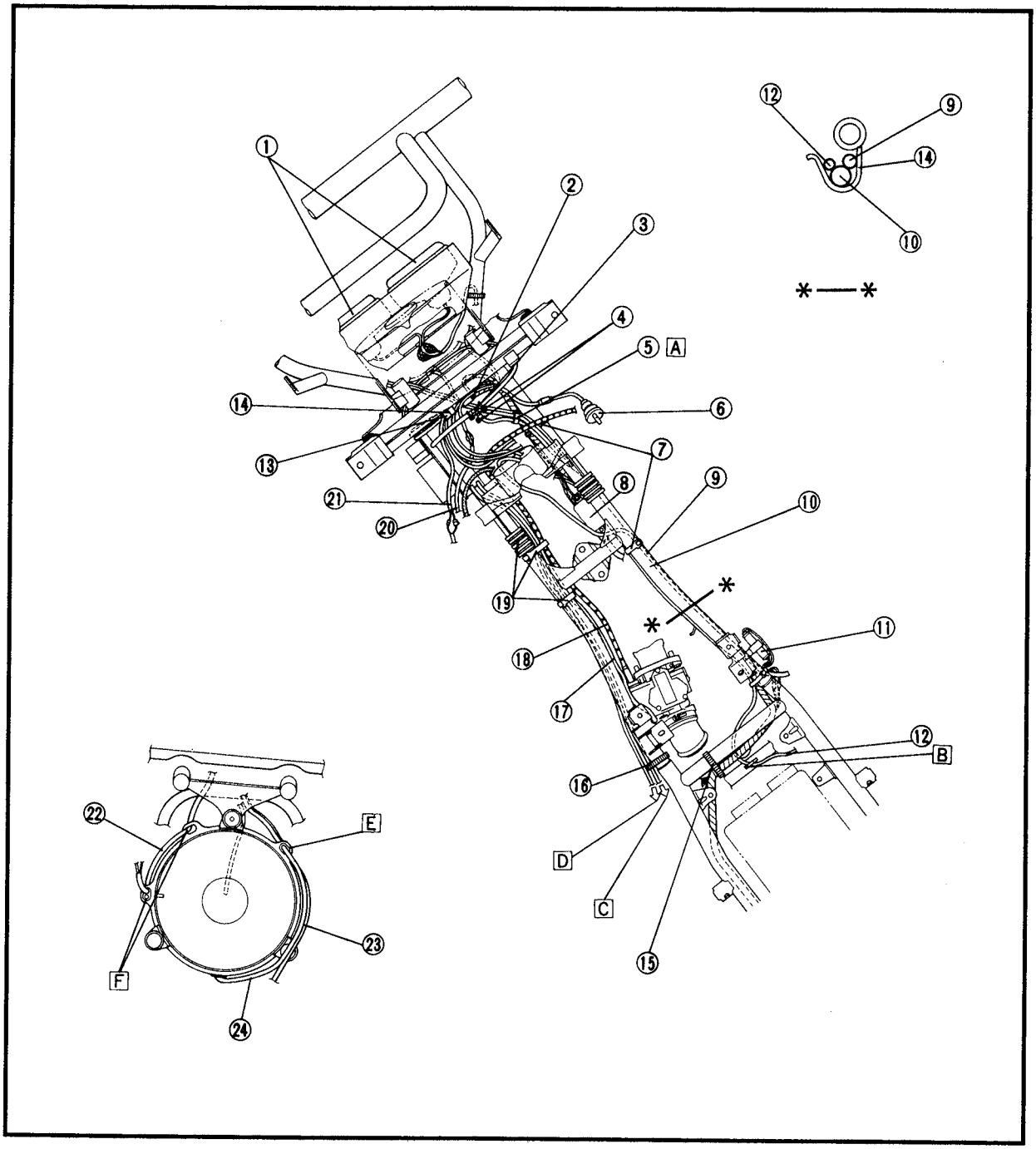


① Brake rod
② Speedometer cable guide
③ Speedometer cable
④ Crankcase breather hose
⑤ Band
⑥ Select lever control cable 1 guide
⑦ Ignition coil
⑧ Wireharness
⑨ Band
⑩ Select lever control cable 1
⑪ Rear brake cable
[A] Pass the speedometer cable over the wireharness at back of the ignition coil.
[B] To speedometer.
[C] Clamp the headlight lead.
[D] Pass the select lever control cable 1 through the guide.
[E] Clamp the rear brake cable.
[F] Pass the rear brake cable over the fender stay.



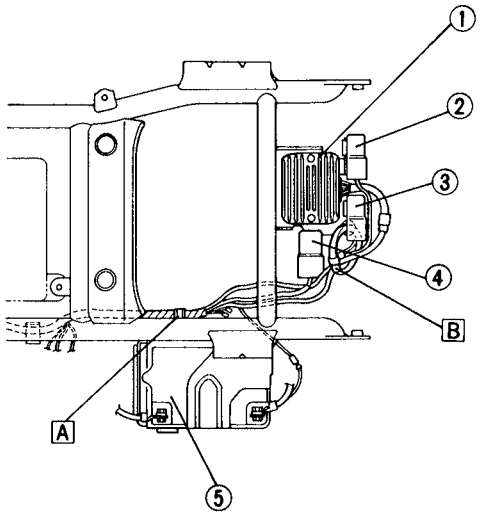
① Headlights
② Clamp
③ 3-way joint
④ Clip
⑤ Clamp
⑥ Main switch
⑦ Band
⑧ Ignition coil
⑨ Speedometer cable
⑩ Wireharness
⑪ Fuse
⑫ Select lever control cable 2
⑬ White tape
⑭ Clamp
⑮ Band
⑯ Band
⑰ Air vend hose
⑱ Throttle cable
⑲ Band
⑳ Rear brake switch lead
㉑ Handlebar switch lead
㉒ Headlight lead
㉓ Breather hose (differential gear case)
㉔ Breather hose (fan motor)

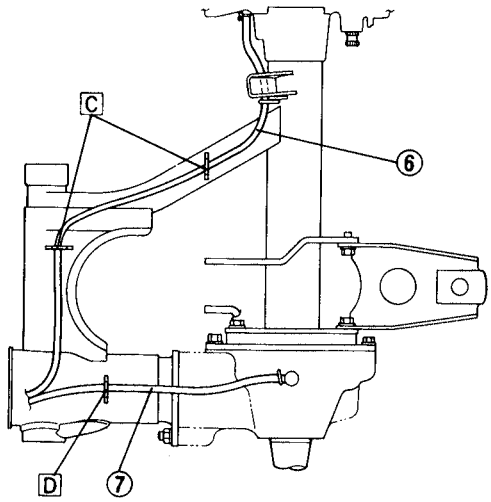
[A] Clamp the breather hose (front brake) and breather hose (differential gear case).
[B] Pass the select lever control cable 2 through the guide.
[C] To rear drum brake.
[D] To rear final gear case.
[E] Pass the breather hose (differential gear case) and breather hose (fan motor) through the guide.
[F] Pass the headlight lead through the guide.

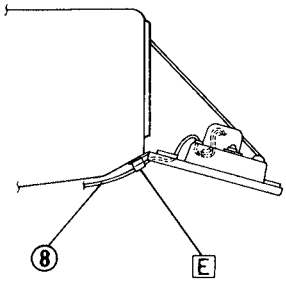


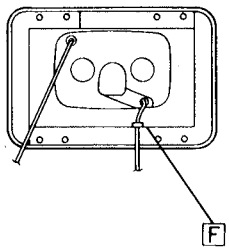
① Rectifier/regulator
② Neutral relay
③ Starting circuit cut-off relay
④ Reverse relay
⑤ Battery
⑥ Breather hose (rear brake)
⑦ Breather hose (rear final gear case)
⑧ Taillight lead

[A] Clamp the battery (–) lead and wireharness.
[B] Clamp the rectifier/regulator lead, starting circuit cut-off relay lead and neutral relay lead.
[C] Pass the breather hose (rear brake) through the guide.
[D] Pass the breather hose (rear final gear case) through the guide.
[E] Clamp the taillight lead.
[F] Pass the taillight lead through the guide.









PERIODIC INSPECTION AND ADJUSTMENT

INTRODUCTION

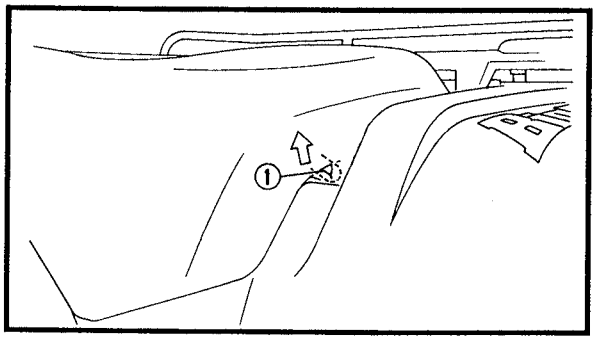
This chapter includes all information necessary to perform recommended inspections and adjustment. These preventive maintenance procedures, if followed, will ensure more reliable machine operation and a longer service life. In addition, the need for costly overhaul work will be greatly reduced. This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

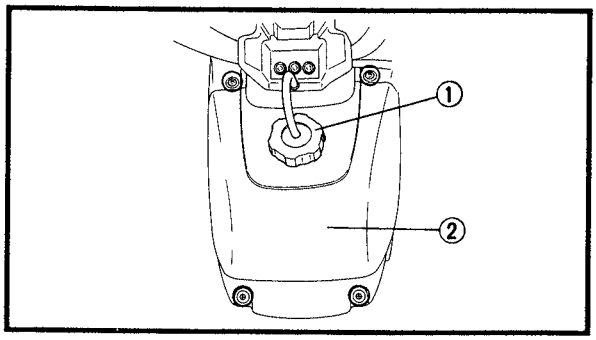
PERIODIC MAINTENANCE/LUBRICATION

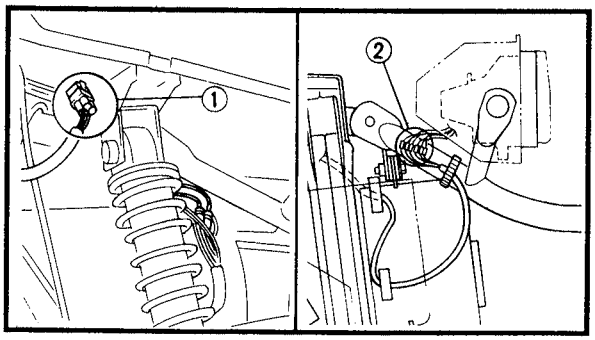
Item	Remarks	Initial			Every	
		1 months	3 months	6 months	6 months	1 year
Valve(s)*	Check valve clearance. Adjust if necessary.	○		○	○	○
Spark plug	Check condition. Clean or replace if necessary.	○	○	○	○	○
Air filter	Clean. Replace if necessary.	Every 20~40 hours (More often in wet or dusty areas.)				
Carburetor*	Check idle speed/starter operation. Adjust if necessary.		○	○	○	○
Fuel line*	Check fuel hose for cracks or damage. Replace if necessary.			○	○	○
Engine oil	Replace (Warm engine before draining).	○		○	○	○
Transfer gear oil						
Engine oil filter	Replace.	○		○		○
Engine oil strainer	Clean.	○		○		○
Final gear oil	Check oil level/oil leakage. Replace every 12 months.	○				○
Differential gear oil						
Front brake*	Check operation/fluid leakage/see NOTE. Correct if necessary.	○	○	○	○	○
Rear brake*	Check operation. Adjust if necessary.	○	○	○	○	○
Clutch*	Check operation. Adjust if necessary.	○		○	○	○
Drive select lever safety system	Check operation. Adjust if necessary.			○	○	○
Wheels*	Check balance/damage/runout. Repair if necessary.	○		○	○	○
Wheel bearings*	Check bearing assembly for looseness/damage. Replace if damaged.	○		○	○	○

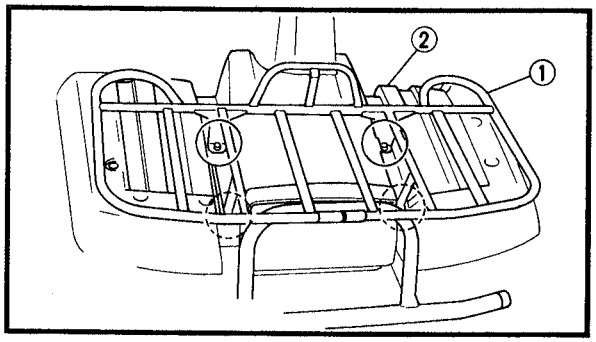
Item	Remarks	Initial			Every	
		1 months	3 months	6 months	6 months	1 year
Steering system*	Check operation/Replace if damaged. Check toe-in/Adjust if necessary.	○	○	○	○	○
Rubber boots*	Check operation./Replace if damged.	○				○
Fittings/Fasteners*	Check all chassis fittings and fasteners. Correct if necessary.	○	○	○	○	○
Battery*	Check specific gravity. Check that the breather pipe is working properly. Correct if necessary.	○	○	○	○	○

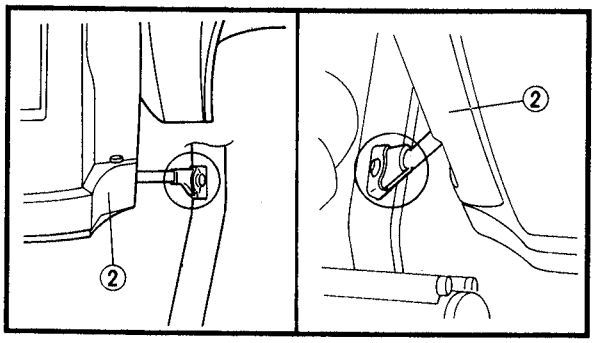
*It is recommended that these items be serviced by a Yamaha dealer or other qualified mechanic.











SEAT, CARRIERS, FENDERS AND FUEL TANK

REMOVAL

1. Place the machine on a level place.
2. Remove:
   - Seat

NOTE:

Pull up the seat lock lever ①, then remove by pulling up on the rear of the seat.

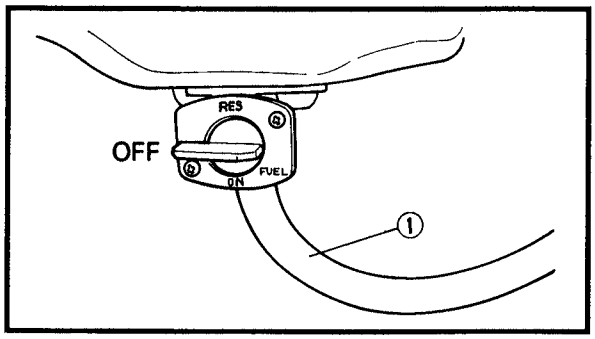
3. Remove:
   - Fuel tank cap ①
   - Fuel tank cover ②

NOTE:

After removing the fuel tank cover, install the fuel tank cap.

4. Disconnect:
   - Main switch lead ①
   - Headlight leads ②

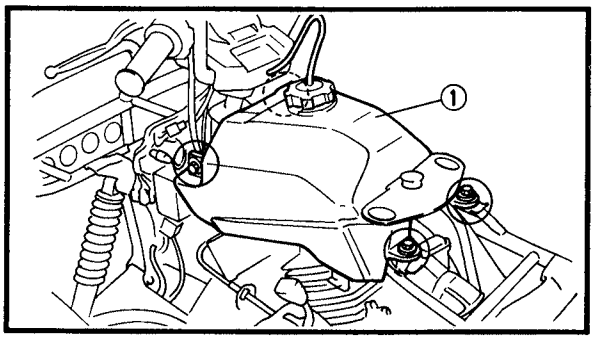
5. Remove:
   - Front carrier ①
   - Front fender ②



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

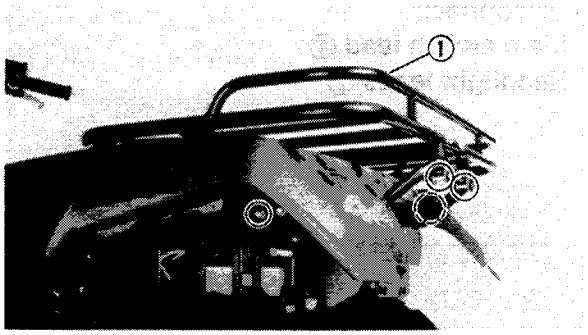
7. Disconnect:
• Fuel hose ①

NOTE:
Place a rug on the engine to absorb a split fuel.

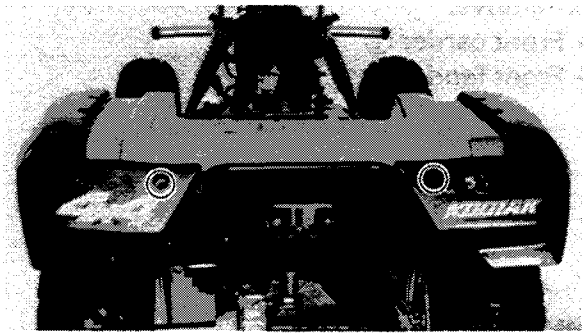


⚠ WARNING
Gasoline is highly flammable.
Avoid spilling fuel on the hot engine.

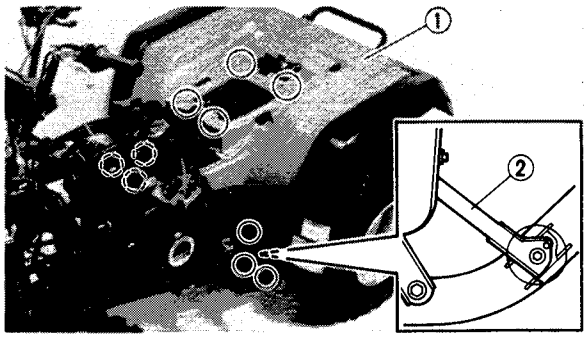
8. Remove:
• Fuel tank ①

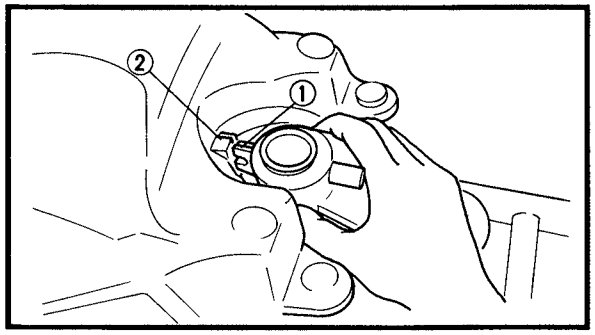


9. Remove:
• Rear carrier ①



10. Remove
• Rear fender ①
• Rear fender stay ② (left)
• Rear fender stay (right)





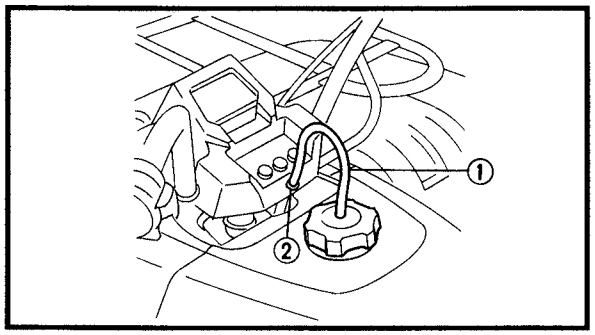
INSTALLATION

Reverse the "REMOVAL" procedure.
Note the following points.

1. Replace the fuel tank to its original position.

NOTE:

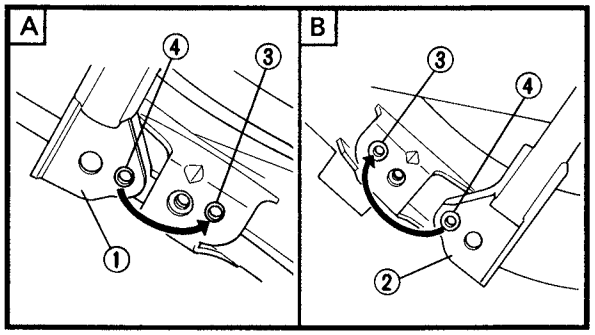
Insert the lobe ① on the air intake manifold into the receptacle ② on the fuel tank, then secure the tank.



2. Install:
- Fuel tank cap

NOTE:

Insert the fuel tank breather hose ① into the handlebar protector hole ②. Refer to the "CABLE ROUTING" section in the CHAPTER 2.



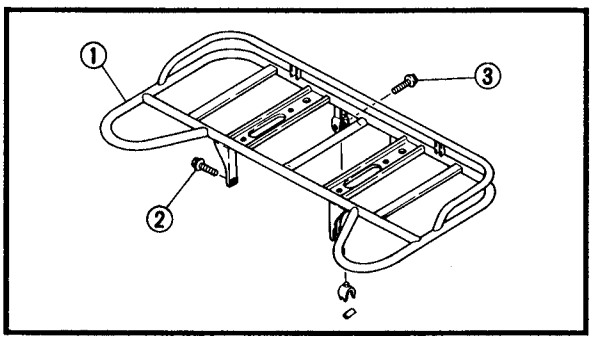
3. Install:
- Rear fender stay ① (left)
- Rear fender stay ② (right)

	Bolt (rear fender stay and frame): 13 Nm (1.3 m • kg, 9.4 ft • lb)

NOTE:

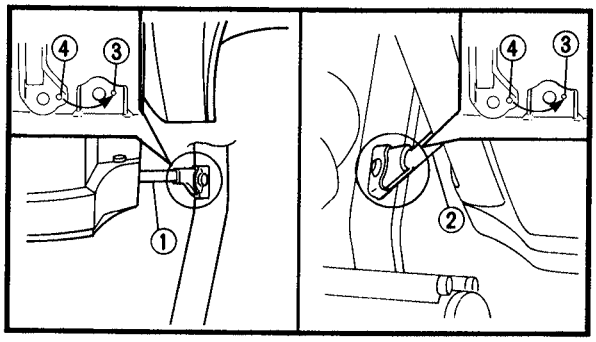
Be sure the projection ③ on the frame correctly engages with the hole ④ into the stay.

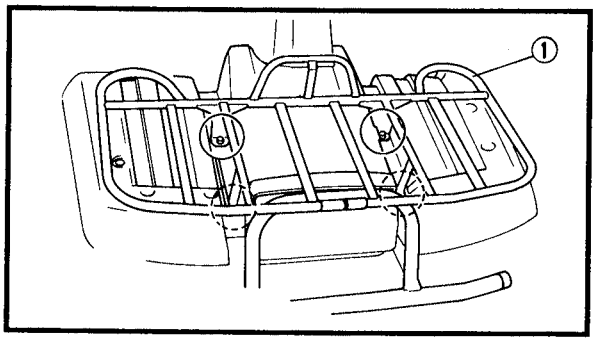
A Left
B Right

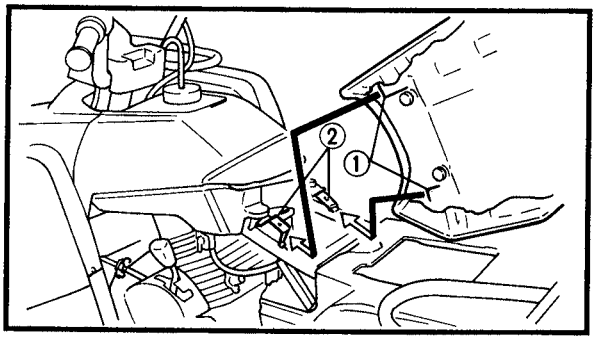


4. Install:
- Rear carrier ①

	Bolt ② (rear carrier and frame): 33 Nm (3.3 m • kg, 24 ft • lb) **Bolt ③ (rear carrier and rear bumper): 9 Nm (0.9 m • kg, 6.5 ft • lb)**







5. Install:
- Front fender stay ① (left)
- Front fender stay ② (right)

	Bolt (front fender stay and frame): 15 Nm (1.5 m • kg, 11 ft • lb)

NOTE:
Be sure the projection ③ on the frame correctly engages with the hole ④ into the stay.

6. Install:
- Front carrier ①

	Bolt (front carrier and frame): 20 Nm (2.0 m • kg, 14 ft • lb) **Bolt (front carrier and front bumper): 10 Nm (1.0 m • kg, 7.2 ft • lb)**

7. Install:
- Seat

NOTE:
Insert the lobe ① on the seat front into the receptacle ② on the frame, then push down the seat at the rear.

ENGINE

VALVE CLEARANCE ADJUSTMENT

NOTE:

- The valve clearance must be adjusted when the engine is cool to the touch.
- Adjust the valve clearance when the piston is at the Top Dead Center (T.D.C.) on compression stroke.

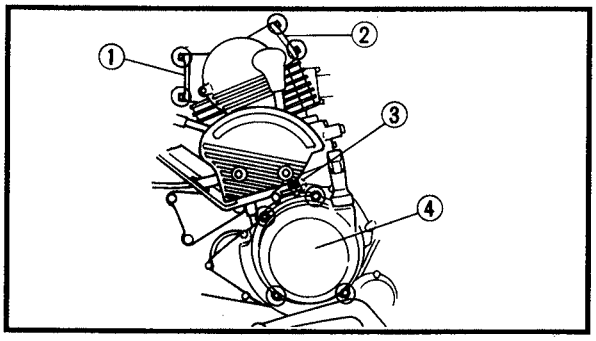
CAUTION:

When removing the spark plug and tappet covers, use caution to prevent anything from falling into the engine.

1. Place the machine on a level place.
2. Remove:
- Seat
- Fuel tank cover
- Front carrier
- Front fender
- Fuel tank

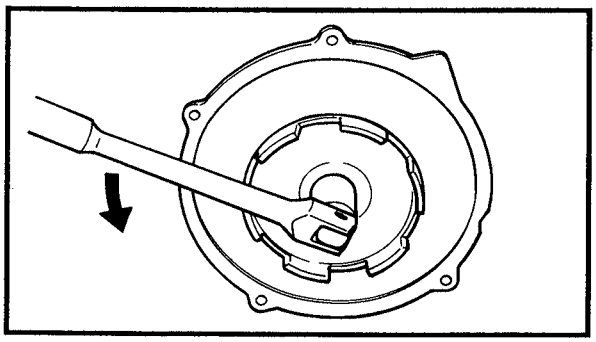
Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section.

3. Remove:
- Tappet cover ① (exhaust)
- Tappet cover ② (intake)
- Timing plug ③
- Recoil starter assembly ④
- Spark plug



4. Align:
- "T" mark on the rotor

With the stationary pointer on the crankcase cover.



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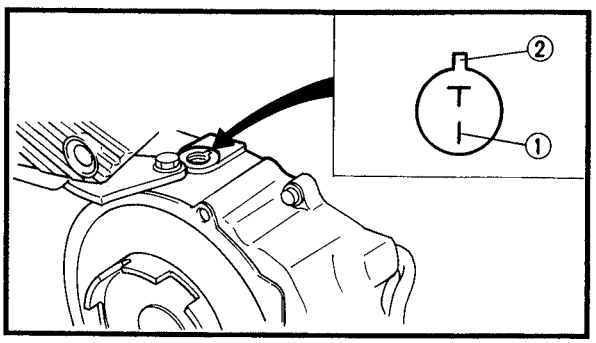
T.D.C. alignment steps:

- Turn the crankshaft counterclockwise with a wrench.
- Align the "T" mark ① on the rotor with stationary pointer ② on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (T.D.C.)



NOTE:

T.D.C. on compression stroke check:

- Both rocker arms must have a valve clearance when the rotor match mark ① is aligned with the stationary pointer match mark ②.

- If not, give the crankshaft one counterclockwise turn to meet above condition.

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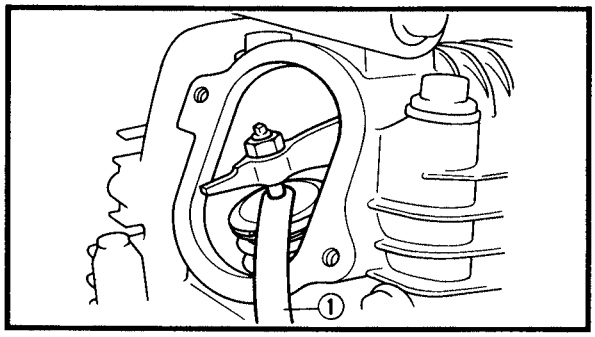
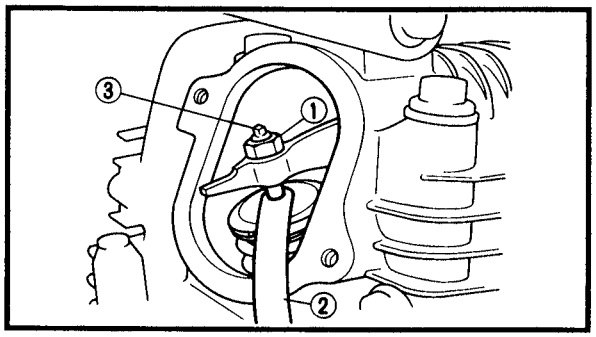
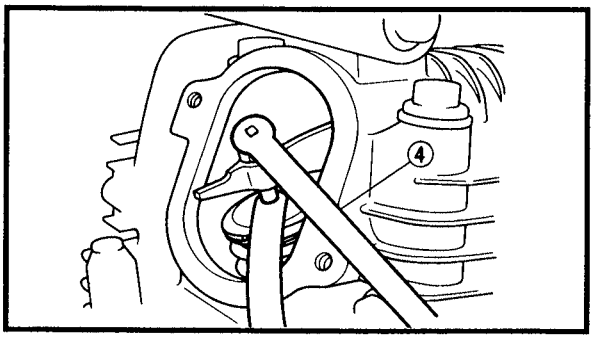






5. Check:
- Valve clearance
  Measure the valve clearance by using a feeler gauge ①.
  Out of specification → Adjust.

Valve clearance (cold):
Intake:
0.06 ~ 0.10 mm (0.002 ~ 0.004 in)
Exhaust:
0.16 ~ 0.20 mm (0.006 ~ 0.008 in)

6. Adjust:
- Valve clearance

****

Adjustment steps:
- Loosen the locknut ①.
- Insert a feeler gauge ② between the adjuster end and the valve end.
- Turn the adjuster ③ clockwise or counterclockwise with the valve adjusting tool ④ until proper clearance is obtained.

Valve adjusting tool:
P/N. YM-08035, 90890-05260

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

Locknut:
20 Nm (2.0 m • kg, 14 ft • lb)

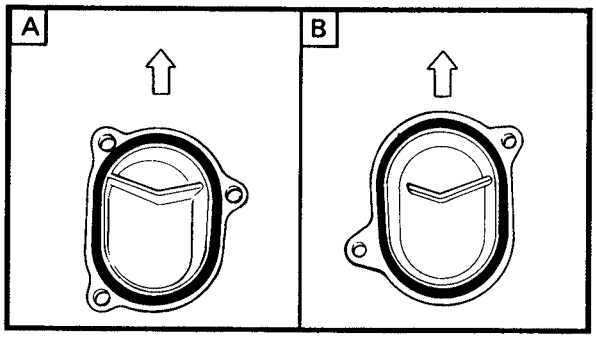
- Measure the valve clearance.
- If the clearance is incorrect, repeat above steps until the proper clearance is obtained.

****

7. Install:
Reverse the removal procedure.
- Spark plug
- Recoil starter assembly
- Timing plug
- Tappet cover (exhaust)
- Tappet cover (intake)

Spark plug:
18 Nm (1.8 m • kg, 13 ft • lb)
Bolts (recoil starter assembly):
10 Nm (1.0 m • kg, 7.2 ft • lb)
Bolts (tappet covers):
10 Nm (1.0 m • kg, 7.2 ft • lb)

NOTE:
Install the tappet covers with its ridge facing up ward ①.

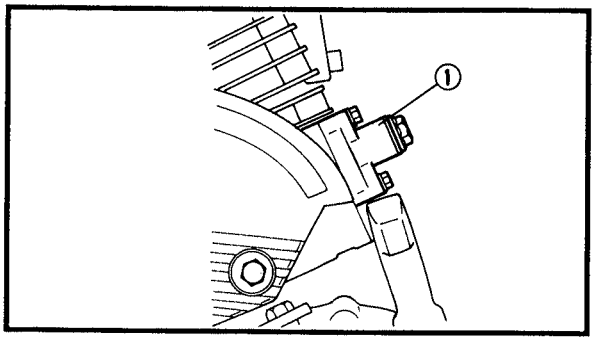


[A] Exhaust
[B] Intake

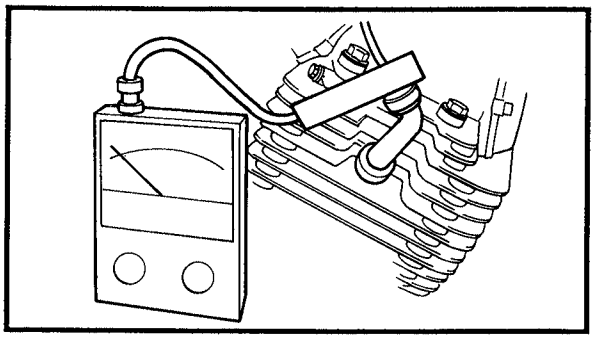
8. Install
- Fuel tank
- Front fender
- Front carrier
- Fuel tank cover
- Seat

Refer to the "SEAT CARRIERS, FENDERS AND FUEL TANK" section.

Bolts (front fender stay and frame):
15 Nm (1.5 m • kg, 11 ft • lb)
Bolts (front carrier and frame):
20 Nm (2.0 m • kg, 14 ft • lb)
Bolts (front carrier and front bumper):
10 Nm (1.0 m • kg, 7.2 ft • lb)



TIMING CHAIN ADJUSTMENT
Adjustment free.



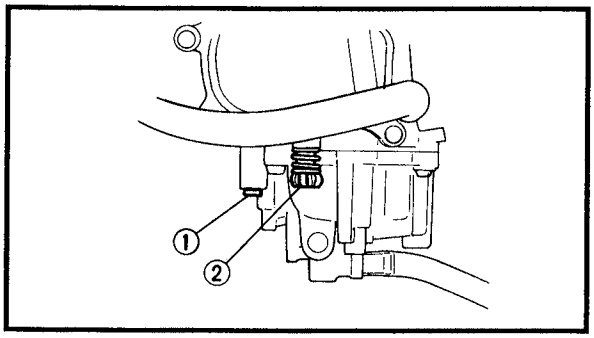
IDLING SPEED ADJUSTMENT

1. Place the machine on a level place.
2. Start the engine and let it warm up for several minutes.
3. Attach:
   - Inductive tachometer
     (to the spark plug lead)

	Inductive tachometer: **P/N. YU-08036-A, 90890-03113**

4. Check:
   - Engine idling speed
     Out of specification → Adjust.

	Engine idling speed: **1,350 ~ 1,450 r/min**



5. Adjust:
   - Engine idling speed

****

Adjustment steps:

- Turn in the pilot screw ① until it is lightly seated.
- Turn out the pilot screw for the specified number of turns.

Pilot screw: **2 turns out**

- Turn the throttle stop screw ② in or out until specified idling speed is obtained.

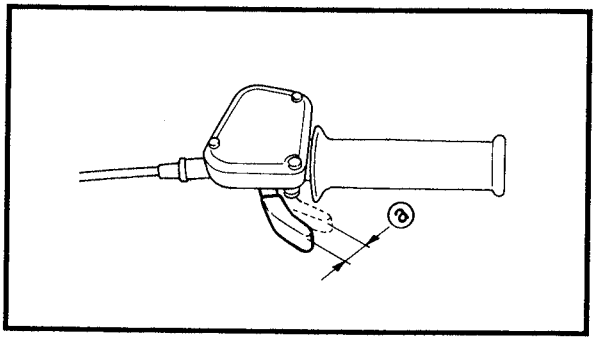
Turn in → Idling speed becomes higher.
Turn out → Idling speed becomes lower.

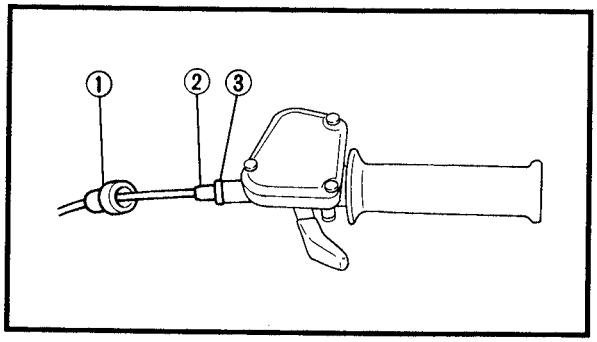
****

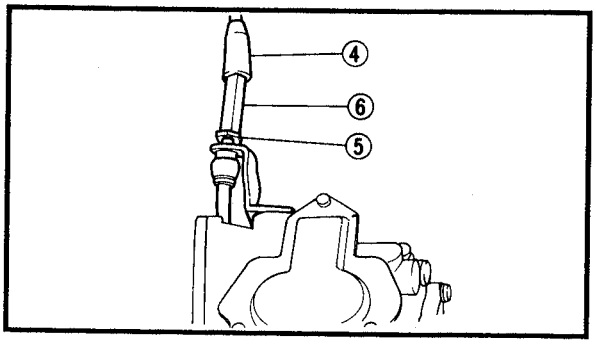
6. Detach
   - Inductive tachometer

7. Adjust:
   - Throttle cable free play
     Refer to the "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.

	Free play: **3 ~ 5 mm (0.12 ~ 0.20 in)**







THROTTLE CABLE FREE PLAY ADJUSTMENT

NOTE:

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

CAUTION:

Before adjusting the throttle cable free play, make sure that the adjusters and locknuts on the carburetor side are fully tightened. If not, the throttle does not operate properly.

1. Place the machine on a level place.
2. Remove:
- Seat
- Fuel tank cover
- Front carrier
- Front fender
- Fuel tank

  Refer to the "SEAT CARRIERS, FENDERS AND FUEL TANK" section.

3. Check:
- Throttle cable free play ⓐ

  Out of specification → Adjust.

Throttle cable free play ⓐ:
3 ~ 5 mm (0.12 ~ 0.20 in)

4. Adjust:
- Throttle cable free play

****

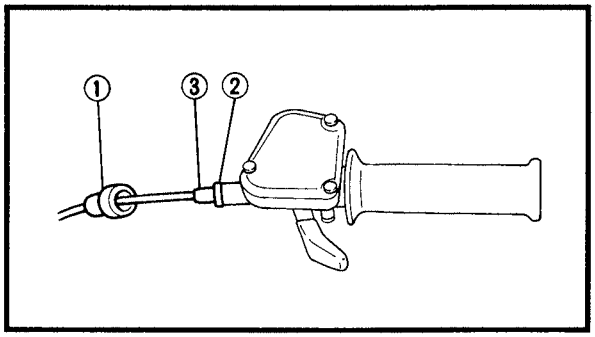
Adjustment steps:

First step:
- Pull back the adjuster cover ①
- Make sure that the adjuster ② and locknut ③ are fully tightened.
- Push in the adjuster cover ①
- Pull back the adjuster cover ④
- Loosen the locknut ⑤ on the carburetor side.
- Turn the adjuster ⑥ in or out until the correct free play is obtained.

Turning in	**Free play is increased.**
Turning out	**Free play is decreased.**

- Tighten the locknut ⑤.
- Push in the adjuster cover ④.

NOTE:
If the free play is incorrect, adjust the throttle cable free play with the adjuster (above the handlebar).



Second step:
- Pull back the adjuster cover ①.
- Loosen the locknut ②.
- Turn the adjuster ③ in or out until the correct free play is obtained.

Turning in	**Free play is increased.**
Turning out	**Free play is decreased.**

- Tighten the locknut ②.
- Push in the adjuster cover ①.

⚠ WARNING

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

****

5. Install:
- Fuel tank
- Front fender
- Front carrier
- Fuel tank cover
- Seat

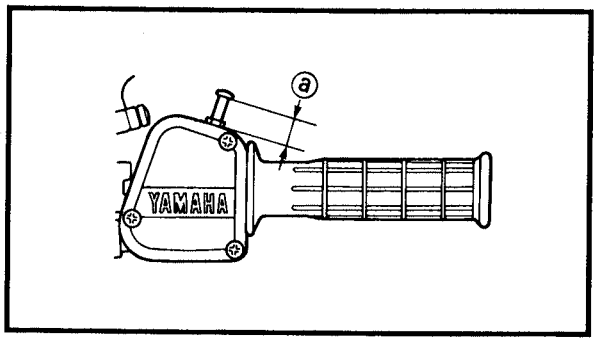
Refer to the "SEAT CARRIERS, FENDERS AND FUEL TANK" section.

Bolts (front fender stay and frame):
15 Nm (1.5 m • kg, 11 ft • lb)
Bolts (front carrier and frame):
20 Nm (2.0 m • kg, 14 ft • lb)
Bolts (front carrier and front bumper):
10 Nm (1.0 m • kg, 7.2 ft • lb)

SPEED LIMITER ADJUSTMENT

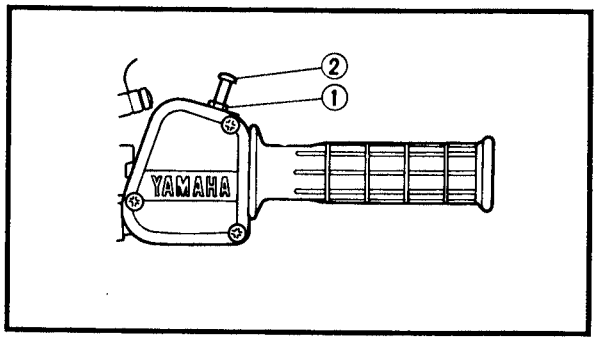
The speed limiter keeps the carburetor throttle from becoming full-open even when the throttle grip is turned to a maximum. Screwing in the adjuster stops the engine speed from increasing.

1. Place the machine on a level place.



2. Check:
- Speed limiter length ⓐ
  Out of specification → Adjust

Speed limiter length ⓐ:
12 mm (0.47 in)



3. Adjust:
- Speed limiter length

****

Speed limiter length adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② in or out until the specified speed limiter length is obtained.

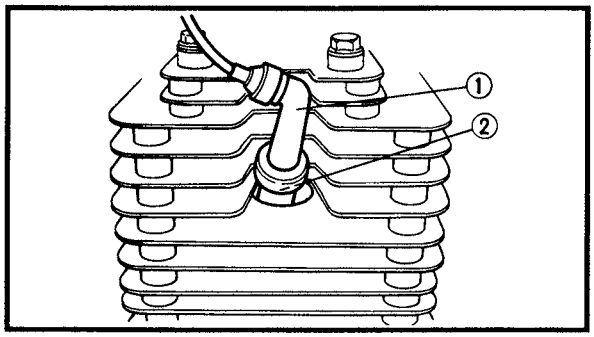
Turning in	→	**Speed limiter length is decreased.**
Turning out	→	**Speed limiter length is increased.**

- Tighten the locknut.

⚠ WARNING

- **Particularly for a beginner rider, the speed limiter should be screwed in completely. Screw it out little by little as his riding technique improves. Never remove the speed limiter from the outset.**
- **For proper throttle lever operation do not turn out the adjuster more than 12 mm (0.47 in). Also adjust the throttle lever free play always to 3 ~ 5 mm (0.12 ~ 0.20 in).**

****



SPARK PLUG INSPECTION

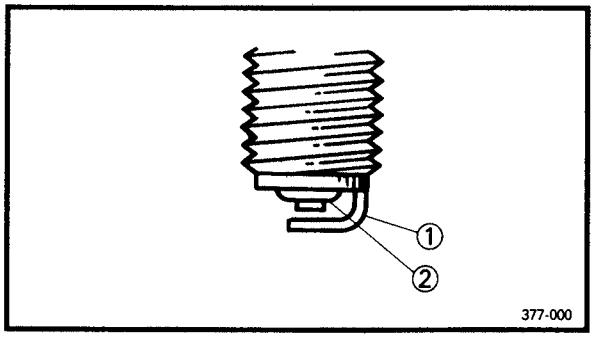
1. Place the machine on a level place.
2. Disconnect:
   - Spark plug cap ①
3. Remove:
   - Spark plug ②

CAUTION:

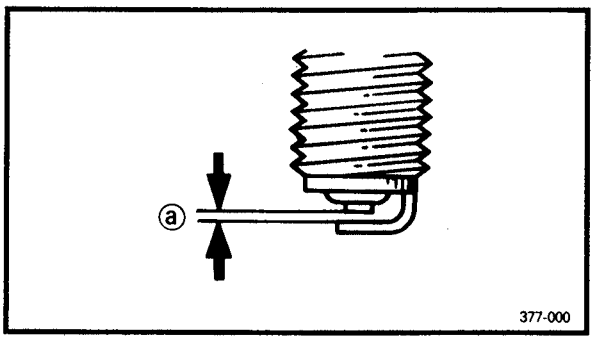
When removing the spark plug, use caution to prevent anything from falling into the engine.

4. Inspect:
   - Spark plug type
     Incorrect → Replace.

Standard spark plug:
For USA
D8EA (NGK)
X24ES-U(NIPPON DENSO)
Except for USA
DR8ES-L (NGK)



5. Inspect:
   - Electrode ①
     Wear/Damage → Replace.
   - Insulator ②
     Abnormal color → Replace.
     Normal color is a medium-to-light tan color.



6. Clean the spark plug with a spark plug cleaner or wire brush.
7. Measure:
   - Plug gap ⓐ
     Use a wire gauge or feeler gauge.
     Out of specification → Regap.

Spark plug gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

8. Tighten:
   - Spark plug

Spark plug:
18 Nm (1.8 m • kg, 13 ft • lb)

NOTE:

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

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

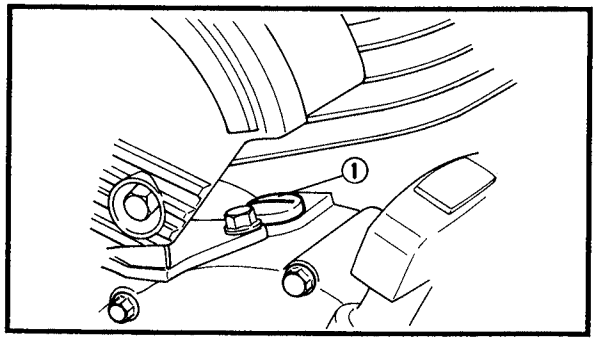
9. Connect:
- Spark plug cap

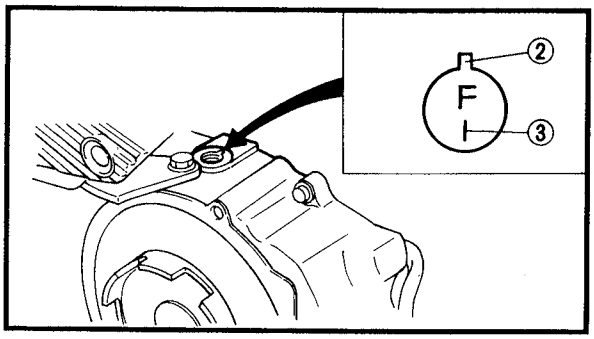
IGNITION TIMING CHECK

NOTE:
Engine idling speed and throttle cable free play should be adjusted properly before checking the ignition timing.

1. Place the machine on a level place.
2. Start the engine and let it warm up for several minutes, then stop the engine.
3. Attach:
- Inductive tachometer
- Timing light to spark plug lead.

Inductive tachometer:
P/N. YU-08036-A
P/N. 90890-03113
Timing light:
P/N. YM-33277-A
P/N. 90890-03141





4. Check:
- Ignition timing

****

Checking steps:
- Remove the plug ①.
- Start the engine and let it run at the specified speed.

Engine speed:
1,350 ~ 1,450 r/min

CAUTION:
Under extreme conditions, the oil may spurt out when running the engine. Therefore care should be used when running.

- Visually check the stationary pointer ② to verify it is within the required firing range ③ indicated on the flywheel.
  Incorrect firing range → Check pulser coil assembly.

NOTE:
Ignition timing is not adjustable.

****

5. Install:
- Plug

6. Detach:
- Timing light
- Inductive tachometer

COMPRESSION PRESSURE MEASUREMENT

NOTE:
Insufficient compression pressure will result in performance loss.

1. Place the machine on a level place.

2. Check:
- Valve clearance
  Out of specification → Adjust.
  Refer to the "VALVE CLEARANCE ADJUSTMENT" section.

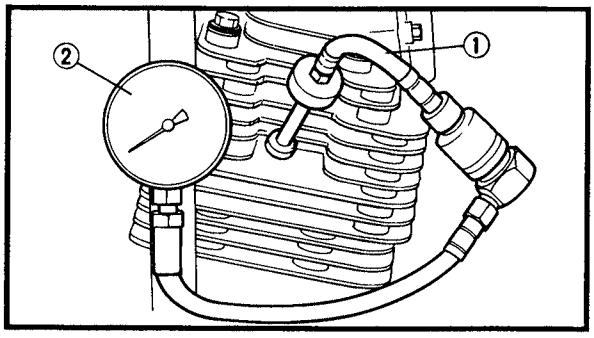
3. Start the engine and let it warm up for several minutes.

4. Stop the engine.

5. Disconnect:
- Spark plug cap

6. Remove:
- Spark plug
  Refer to the "SPARK PLUG INSPECTION" section.

7. Attach:
- Adapter ①
- Compression gauge ②



Compression gauge:
P/N. YU-33223, 90890-03081
Adapter:
P/N. YU-33223-3, 90890-04082

8. Check:
• Compression pressure
****

Checking steps:
● Crank over the engine with the electric starter (be sure the battery is fully charged) with the throttle wide-open until the compression reading on the gauge stabilizes.

⚠ WARNING

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

● Check reading with specified levels (see chart).

Compression pressure (at sea level):
Standard:
920 kPa (9.2 kg/cm², 131 psi)
Minimum:
740 kPa (7.4 kg/cm², 105 psi)
Maximum:
1,020 kPa (10.2 kg/cm², 145 psi)

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

Compression pressure (with oil introduced into cylinder)	
Reading	**Diagnosis**
Higher than without oil	**Worn or damaged pistons**
Same as without oil	**Defective ring(s), valves, cylinder head gasket or piston is possible.**
Above maximum level	**Inspect cylinder head, valve surface, or piston crown for carbon deposits.**

****

9. Detach:
• Compression gauge
• Adapter

10. Install:
- Spark plug

	Spark plug: 18 Nm (1.8 m • kg, 13 ft • lb)

Refer to the "SPARK PLUG INSPECTION" section.

11. Connect:
- Spark plug cap

ENGINE OIL/TRANSFER GEAR OIL LEVEL INSPECTION

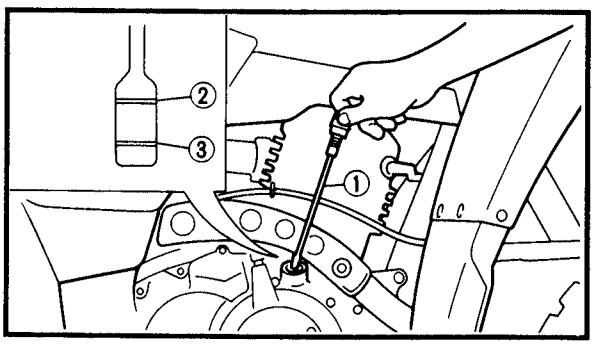
CAUTION:
- **Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.**
- **Do not allow foreign material to enter the crankcase.**

1. Place the machine on a level place.
2. Inspect:
- Engine oil level
  Oil level low → Add sufficient oil.

****

Engine oil/transfer gear oil level inspection steps:
- Warm up the engine for several minutes, and stop it.
- Screw the dipstick ① completely out, and then just rest the dipstick in the hole.
- Pull up the dipstick, and inspect the oil level whether or not it is between maximum ② and minimum level ③.
- If the level is lower, add the oil up to the upper level.

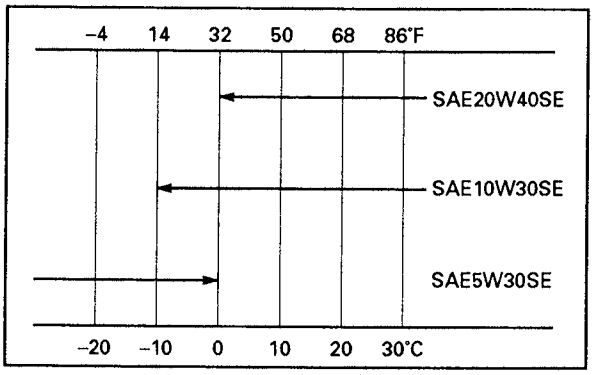
****



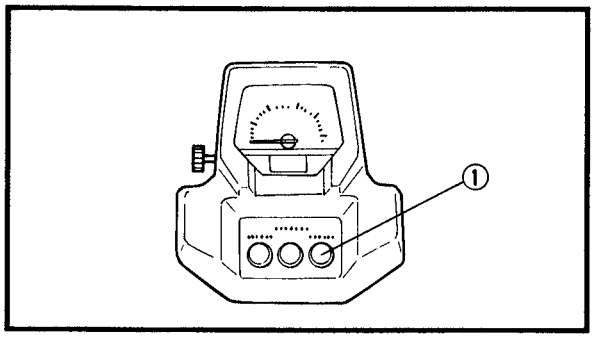
ENGINE OIL/TRANSFER GEAR OIL LEVEL INSPECTION

INSP ADJ

Oil quantity:
Periodic oil change (engine oil):
2.4 L (2.1 Imp qt, 2.5 US qt)
Periodic oil change (transfer gear oil):
0.3 L (0.26 Imp qt, 0.32 US qt)
Periodic oil change (engine oil and transfer gear oil):
2.7 L (2.4 Imp qt, 2.9 US qt)
Periodic oil change (engine oil and transfer gear oil with oil filter replacement):
2.8 L (2.5 Imp qt, 3.0 US qt)
Total amount:
3.7 L (3.3 Imp qt, 3.9 US qt)



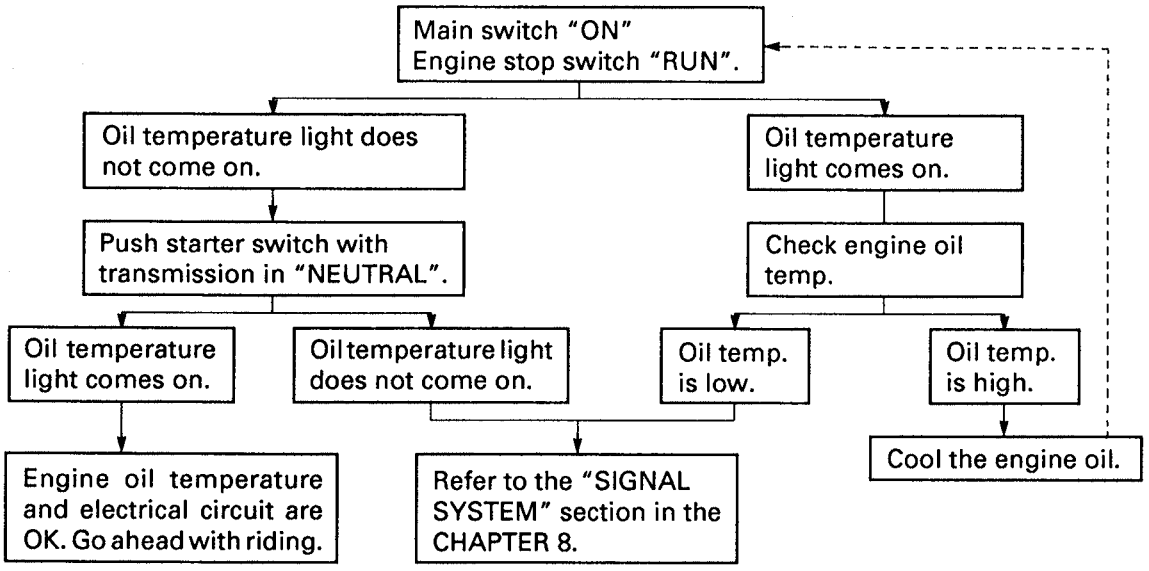
Recommended engine oil:
At 0°C (32°F) or higher:
SAE20W40 type SE motor oil
At -10°C (14°F) or higher:
SAE10W30 type SE motor oil
At 0°C (32°F) or lower:
SAE5W30 type SE motor oil



"OIL TEMP" INDICATOR LIGHT CHECK

① "OIL TEMP" indicator light

"OIL TEMP" indicator light checking method



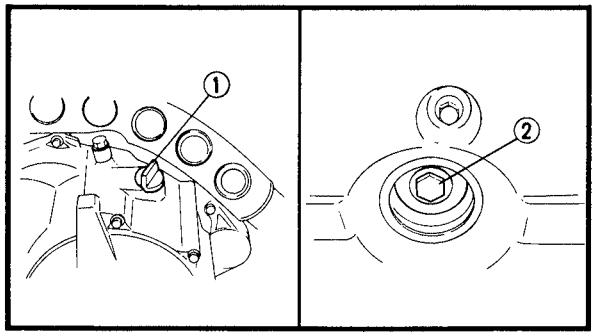
ENGINE OIL/TRANSFER GEAR OIL REPLACEMENT

CAUTION:

- **Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.**
- **Do not allow foreign material to enter the crankcase and transfer gear case.**

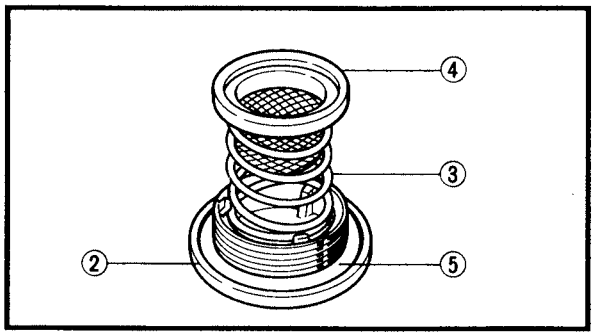
Engine oil/transfer gear oil replacement (without oil filter)

1. Place the machine on a level place.
2. Warm up the engine for several minutes, then stop the engine.
3. Place the receptacle under the engine oil drain plug and transfer gear oil drain plug.

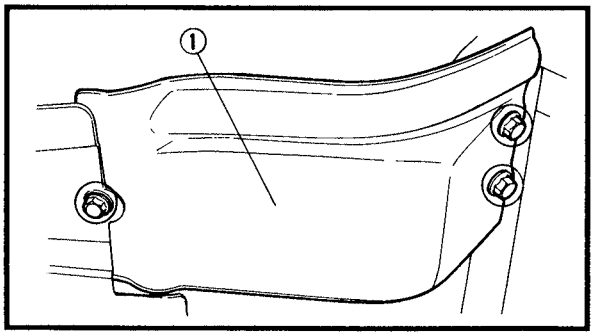


4. Remove:
- Dipstick ①
- Drain plug ② (engine oil)

NOTE:
When removing the drain plug ②, the compression spring ③, oil strainer ④ and O-ring ⑤ will fall off. Take care not to lose these party.



5. Drain:
- Engine oil



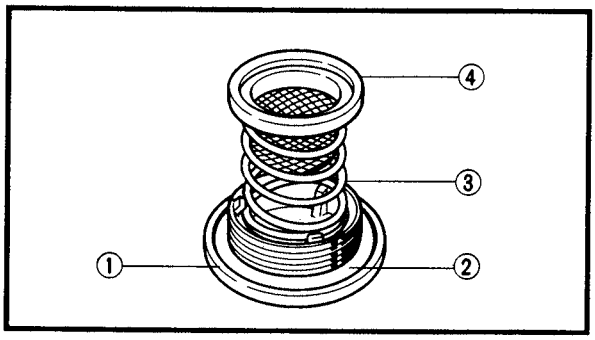
6. Remove:
- Engine guard ① (rear)

7. Remove:
- Drain plug ① (transfer gear oil)
- Oil filler bolt ②

8. Drain:
- Transfer gear oil

9. Inspect:
- O-ring (drain plug)
  Gasket (drain plug)
  Damage → Replace.

10. Clean:
- Oil strainer
  Clean it with solvent.
  Clog/Damage → Replace.



11. Install:
- Drain plug (crankcase)
- Drain plug (transfer gear case)

CAUTION:

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

Drain plug (crankcase):
32 Nm (3.2 m • kg, 23 ft • lb)
Drain plug (transfer gear):
20 Nm (2.0 m • kg, 14 ft • lb)

12. Fill:
- Crankcase
- Transfer gear case

Oil quantity:
Periodic oil change (engine oil):
2.4 L (2.1 Imp qt, 2.5 US qt)
Periodic oil change (transfer gear oil):
0.3 L (0.26 Imp qt, 0.32 US qt)
Periodic oil change (engine oil and transfer gear oil):
2.7 L (2.4 Imp qt, 2.9 US qt)
Periodic oil change (engine oil and transfer gear oil with oil filter replacement):
2.8 L (2.5 Imp qt, 3.0 US qt)
Total amount:
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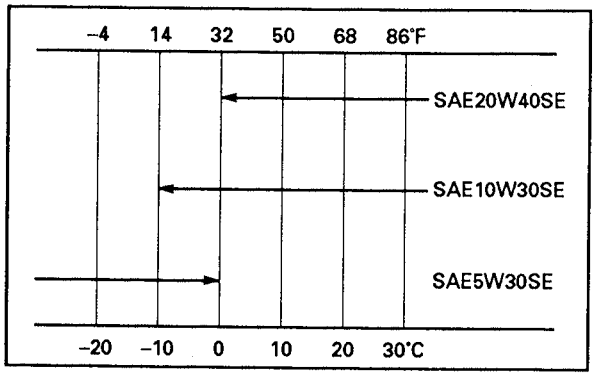


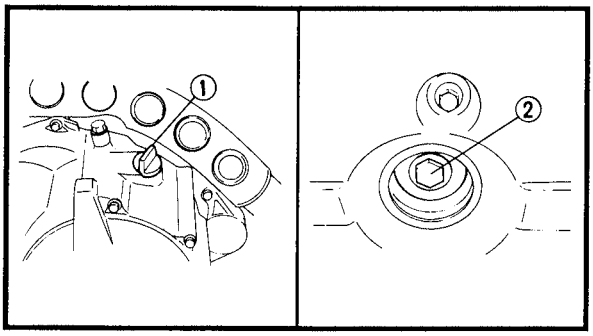
Recommended engine oil:
At 0°C (32°F) or higher:
SAE20W40 type SE motor oil
At -10°C (14°F) or higher:
SAE10W30 type SE motor oil
At 0°C (32°F) or lower:
SAE5W30 type SE motor oil

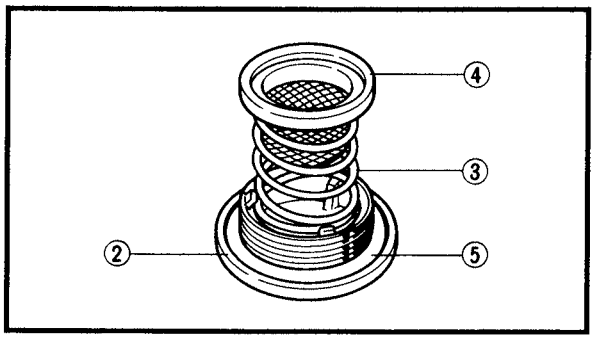
13. Install:
- Dipstick
- Oil filler bolt (transfer gear case)

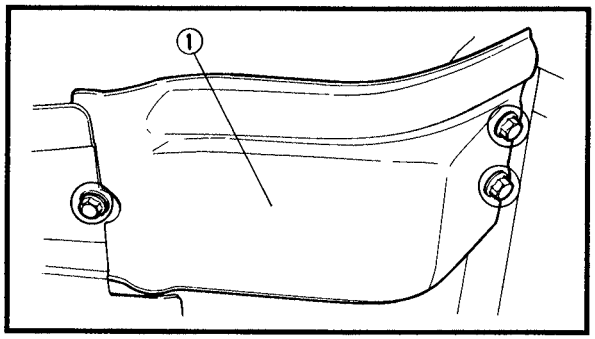
14. Install guard
- Engine (rear)

	Bolts (rear engine gaurd): 15 Nm (1.5 m • kg, 11 ft • lb)

15. Inspect:
- Oil level
  Refer to the "ENGINE OIL/TRANSFER GEAR OIL LEVEL INSPECTION" section.
- Oil pressure
  Refer to the "OIL PRESSURE INSPECTION" section.
- Oil leaks







Engine oil/transfer gear oil replacement (with oil filter)

1. Place the machine on a level place.

2. Warm up the engine for several minutes, then stop the engine.

3. Place a receptacle under the drain plug.

4. Remove:
- Dipstick ①
- Drain plug ②

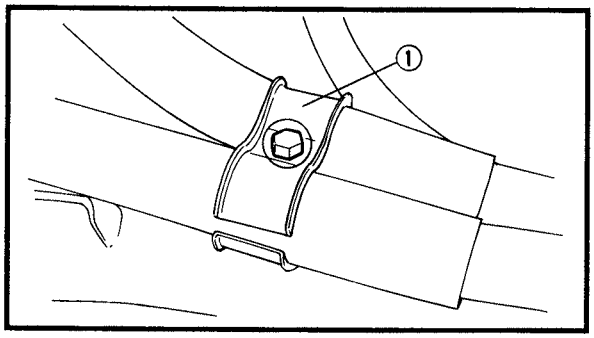
NOTE:
When removing the drain plug ②, the compression spring ③, oil strainer ④ and O-ring ⑤ will fall off. Take care not to lose these parts.

5. Drain:
- Engine oil

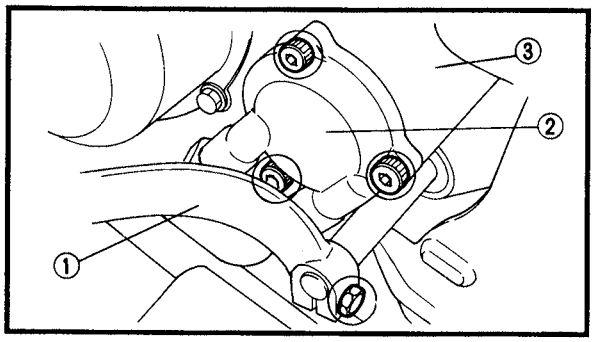
6. Remove:
- Engine guard ① (rear)

7. Remove:
- Drain plug ① (transfer gear oil)
- Oil filler bolt ②

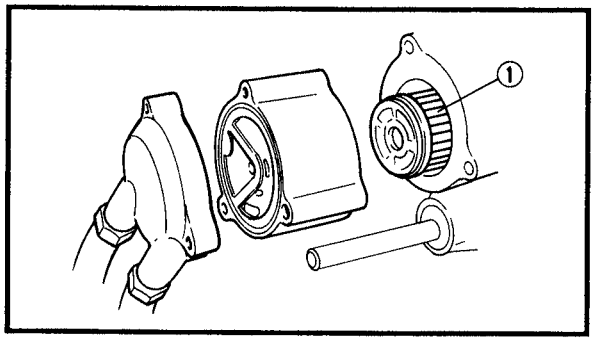
8. Drain:
- Transfer gear oil



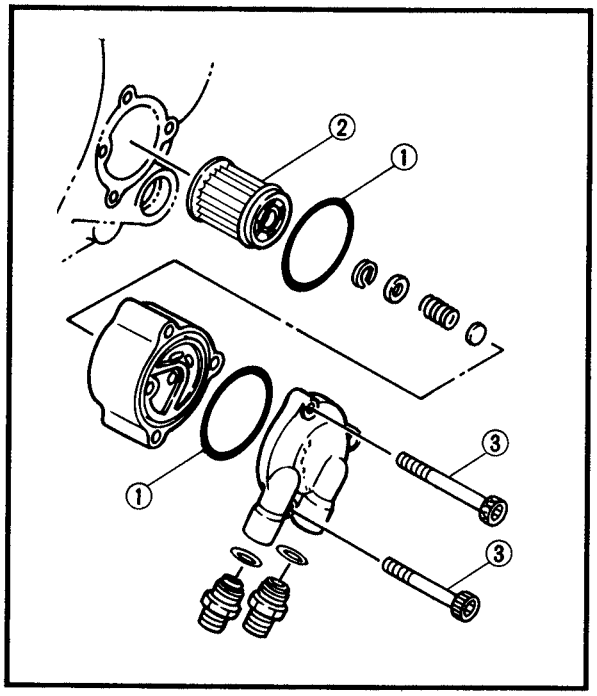
9. Remove:
- Clamp ① (oil hose)



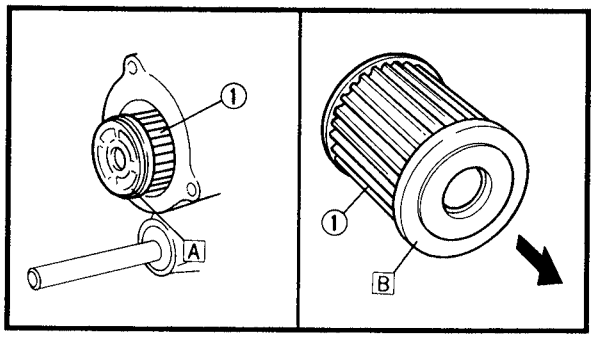
10. Remove:
- Shift pedal ①
- Oil filter cover ② (outside)
- Oil filter cover ③ (inside)



11. Remove:
- Oil filter element ①



12. Inspect:
- O-rings ①
  Damage → Replace.
- Oil filter ②
  Clean it with solvent
  Clog/Damage → Replace

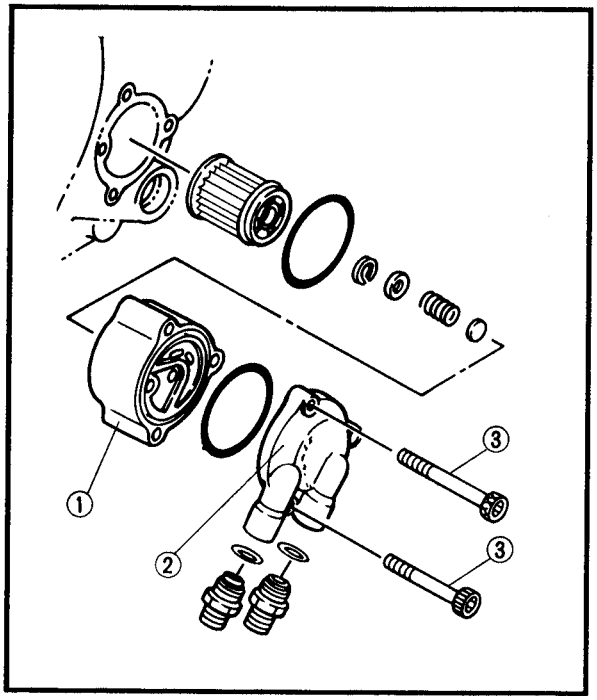


13. Install:
- Oil filter ①

CAUTION:

Install the oil filter as shown.

A Outside
B Inside

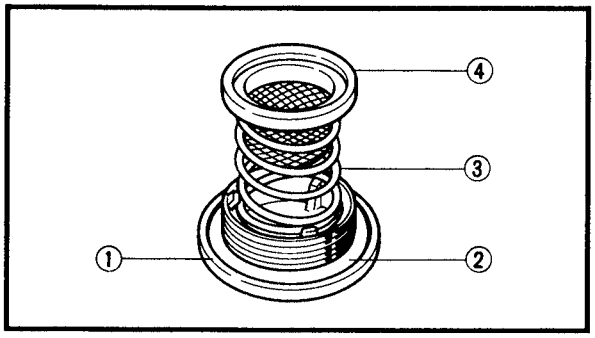


14. Install:
- Oil filter cover ① (inside)
- Oil filter cover ② (outside)

15. Apply:
- Sealant (Quick Gasket®)
  To the thread portion of the filter cover bolts ③.

Sealant (Quick Gasket®):
P/N. ACC-11001-01
Yamaha bond No. 1215®:
P/N. 90890-85505

16. Install:
- Clamp (oil hose)
- Shift pedal



17. Tighten:
- Bolts (filter cover)
- Bolt (change bolt)
- Screw (clamp)

Bolts (filter cover):
10 Nm (1.0 m • kg, 7.2 ft • lb)
Bolt (shift pedal):
10 Nm (1.0 m • kg, 7.2 ft • lb)
Screw (clamp):
7 Nm (0.7 m • kg, 5.1 ft • lb)

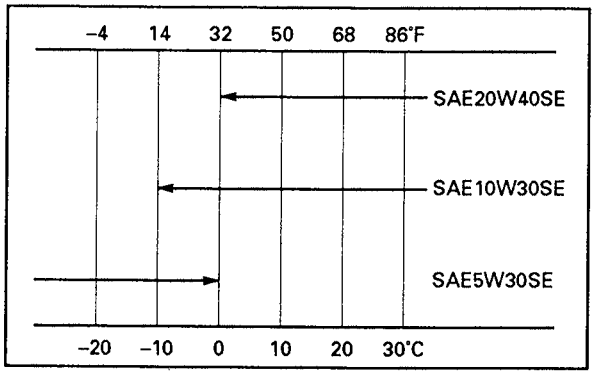
18. Install:
- Drain plug (crankcase)
- Drain plug (transfer gear case)

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

Drain plug (crankcase):
32 Nm (3.2 m • kg, 23 ft • lb)
Drain plug (transfer gear):
20 Nm (2.0 m • kg, 14 ft • lb)

19. Fill:
- Crankcase
- Transfer gear case

Oil quantity:
Periodic oil change (engine oil):
2.4 L (2.1 Imp qt, 2.5 US qt)
Periodic oil change (transfer gear oil):
0.3 L (0.26 Imp qt, 0.32 US qt)
Periodic oil change (engine oil and transfer gear oil):
2.7 L (2.4 Imp qt, 2.9 US qt)
Periodic oil change (engine oil and transfer gear oil with oil filter replacement):
2.8 L (2.5 Imp qt, 3.0 US qt)
Total amount:
3.7 L (3.3 Imp qt, 3.9 US qt)



Recommended engine oil:
At 0°C (32°F) or higher:
SAE20W40 type SE motor oil
At -10°C (14°F) or higher:
SAE10W30 type SE motor oil
At 0°C (32°F) or lower:
SAE5W30 type SE motor oil

CAUTION:

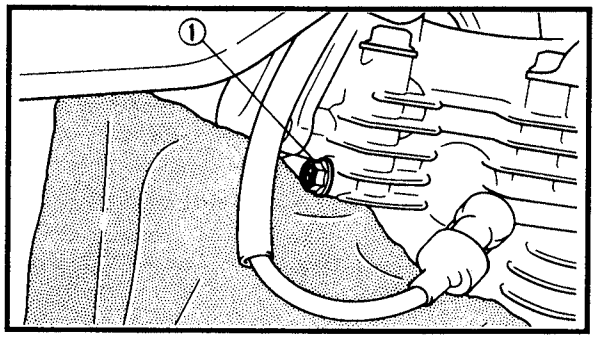
- **Do not allow foreign material to enter the crankcase.**
- **Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.**

20. Install:
- Dipstick
- Oil filler bolt (transfer gear case)

21. Install:
- Engine guard (rear)

Bolts (rear engine gaurd):
15 Nm (1.5 m • kg, 11 ft • lb)

22. Inspect:
- Oil level
  Refer to the "ENGINE OIL/TRANSFER GEAR OIL LEVEL INSPECTION" section.
- Oil pressure
  Refer to the "OIL PRESSURE INSPECTION" section.
- Oil leaks



OIL PRESSURE INSPECTION

1. Loosen:
   - Oil check bolt ①
     Slightly loosen.

2. Start the engine and keep it idling for several minutes.

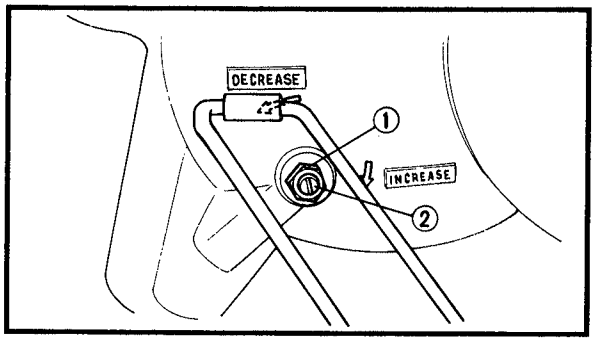
3. Inspect:
   - Oil begins to seep from the check bolt
     Oil flows out → Oil pressure is good.
     No oil comes out → Oil pressure is bad.

CAUTION:

If no oil comes out after a lapse of one minute, turn off the engine immediately so it will not seize.

4. Tighten:
   - Oil check bolt

	Oil check bolt: **7 Nm (0.7 m • kg, 5.1 ft • lb)**



CLUTCH ADJUSTMENT

1. Adjust:
   - Free play

****

Clutch free play adjustment steps:

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

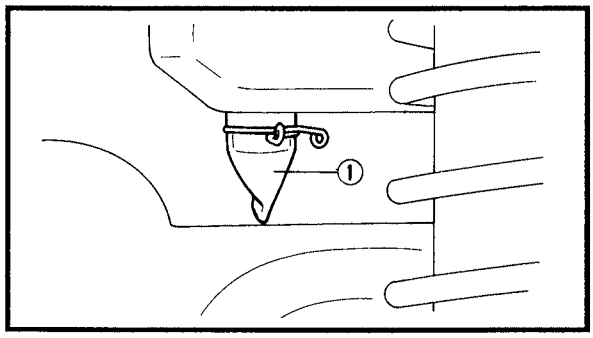
NOTE:

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

- Tighten the locknut.

	Clutch locknut: **15 Nm (1.5 m • kg, 11 ft • lb)**

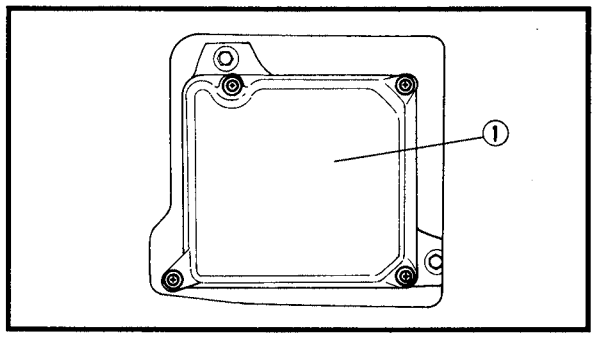
****



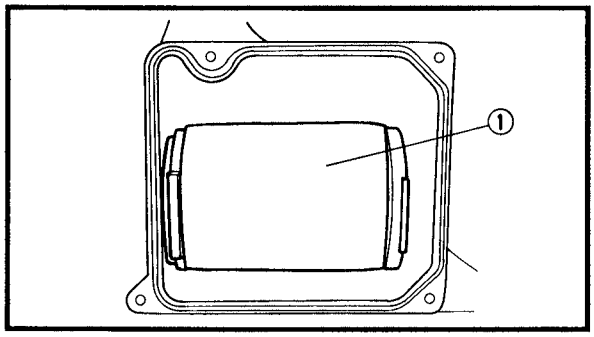
AIR FILTER CLEANING

NOTE:

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



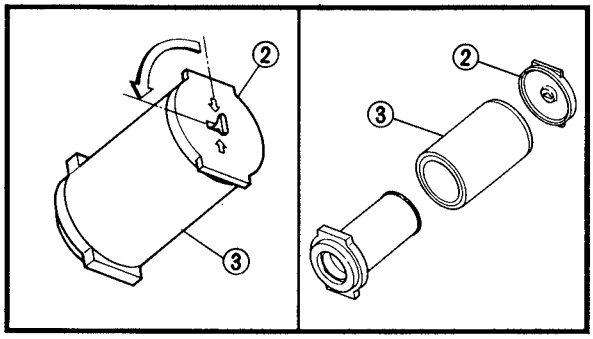
1. Remove:
- Seat
  Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section.
- Air filter case cover ①



2. Remove:
- Air filter element assembly ①
- Air filter element cap ②
- Air filter element ③

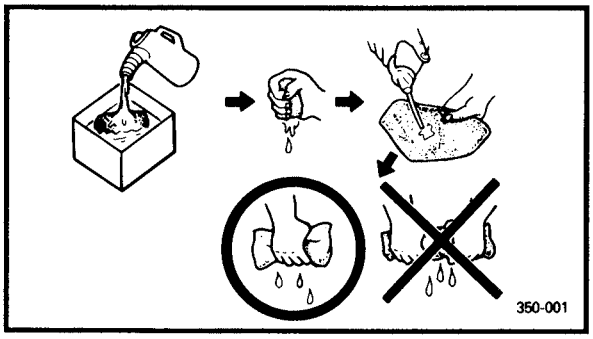
NOTE:

When removing the air filter element, rotate the air filter element cap 1/4 turn, and remove the element.



CAUTION:

Never operate the engine with the air filter element removed. This will allow unfiltered air to enter, causing rapid wear and possible engine damage. Additionally, operation without the filter element will affect carburetor tuning with subsequent poor performance and possible engine overheating.



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

NOTE:

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

CAUTION:

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

⚠ WARNING

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

4. Inspect:
- Element
  Damage → Replace.

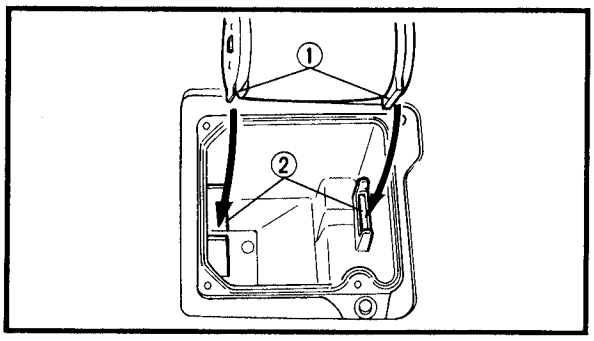
5. Apply:
- Yamaha filter oil or SAE 10W30 motor oil

6. Squeeze out the excess oil.

NOTE:

The element should be wet but not dripping.

7. Apply:
- All-purpose grease
  To the air filter seat.



8. Install:
- Air filter element

NOTE:

- Insert the lobes ① on the filter element into the receptacles ② on the filter case.
- Make sure its sealing surface matches the sealing surface of the case so there is no air leak.

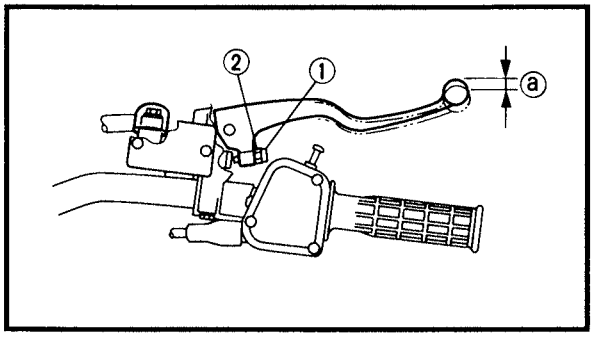
9. Install:
- Air filter case cover
- Seat
  Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section.

CHASSIS

FRONT BRAKE ADJUSTMENT

NOTE:
Before adjusting the front brake, the front brake linings should be inspected.

1. Place the machine on a level place.



2. Check:
- Free play (just before adjuster ① contacts master cylinder piston) ⓐ
  Out of specification → Adjust.

Free play (just before adjuster contacts master cylinder piston) ⓐ:
2 ~ 5 mm (0.08 ~ 0.20 in)

3. Adjust:
- Free play ⓐ

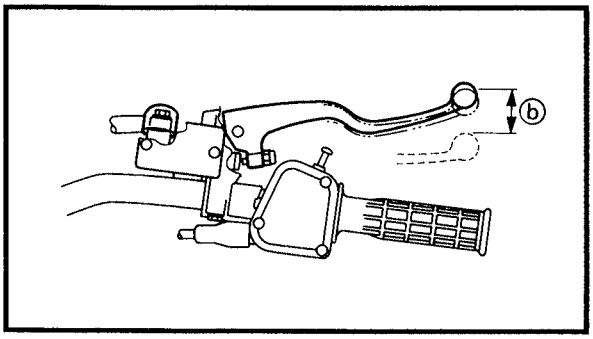
****

Brake lever free play (just before adjuster contacts master cylinder piston) adjustment steps:
- Loosen the locknut ②.
- Turn the adjuster ① in or out until the specified free play is obtained.

Turn in → Free play is decreased.
Turn out → Free play is increased.

- Tighten the locknut.

****



4. Check:
- Free play (just before brake is actually applied) ⓑ
  Out of specification → Adjust.

Free play (just before brake is actually applied) ⓑ:
25 ~ 30 mm (1.0 ~ 1.2 in)

****

Free play (just before brake is actually applied) checking steps:

- Place the machine on a level surface.
- Lift the front and rear wheels off the ground by placing a block under the engine.
- Spin the wheel by hand and apply the front brake.
- Check the free play (just before brake is actually applied) ⓑ is specified limit.
- If not, adjust the wheel cylinders.

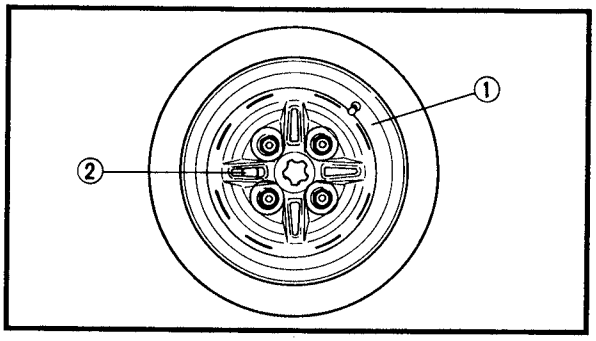
****

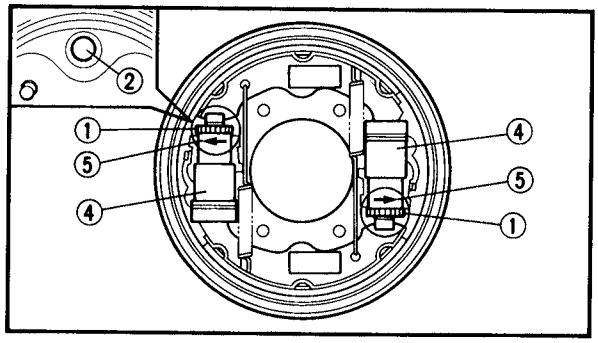
5. Adjust:
- Free play ⓑ

****

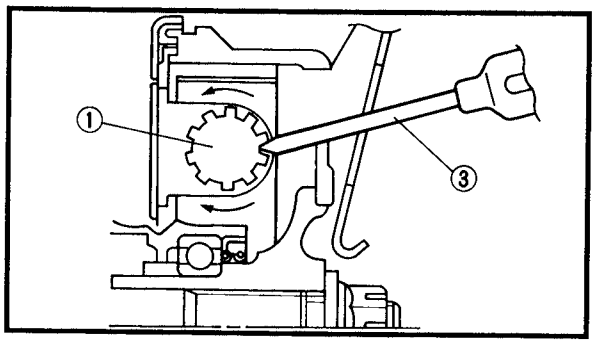
Brake lever free play (just before brake is actually applied) adjustment steps:

- Place the machine on a level surface.
- Lift the front and rear wheels off the ground by the placing a block under the engine.
- Remove the front wheel ①.
- Remove the rubber plug ②.

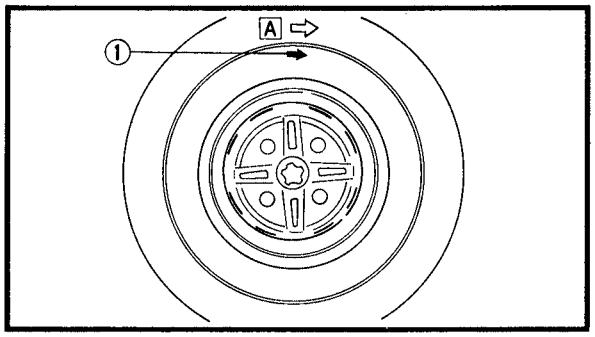




- Locate the wheel so that you can see either of the adjusters ① through the inspection hole ②.

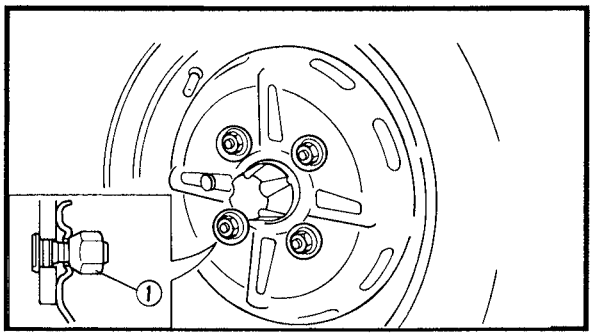


- Insert the screwdriver ③ through the hole and turn the adjuster ① of either wheel cylinder ④ in the direction shown by arrow ⑤ until the front brake locks.
- Turn back the adjuster ① THREE NOTCHES and squeeze the brake lever several times.
- Turn the wheel 180° and carry out the same adjustment on the other adjuster on the same wheel.
- Make sure there is no brake drag.
- Adjust the other front brake on the opposite wheel.
- Recheck the front brake free play ⓑ.



- Install the rubber plug.
- Install the front wheel.

NOTE:
The arrow mark ① on the tire must point toward the direction of rotation [A] of the wheel.



- Tighten the front wheel nuts ①.

⚠ WARNING

Tapered wheel nuts ① are used for both front and rear wheels. Install the nut with its tapered side towards the wheel.

	Nuts (front wheel): 55 Nm (5.5 m • kg, 40 ft • lb)

CAUTION:
Proper lever free play is essential to avoid excessive brake drag.

⚠ WARNING

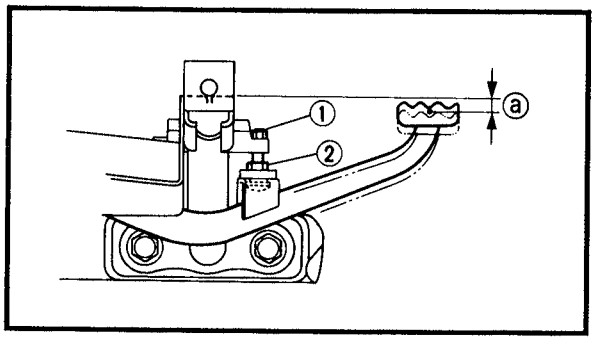
- **A soft or spongy feeling in the brake lever can indicate the presence of air in the brake system. This air must be removed by bleeding the brake system before the machine is operated. Air in the system will cause greatly diminished braking capability and can result in loss of control and an accident. Inspect and bleed the system if necessary.**
- **After this adjustment is performed, lift the front and rear wheels off the ground by the placing a block under the engine, and spin the front wheels to ensure there is no brake drag. If any brake drag is noticed, perform the above steps again.**

****

REAR BRAKE LEVER AND PEDAL ADJUSTMENT

⚠ WARNING

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



1. Check:
- Brake pedal height ⓐ
  Out of specification → Adjust.

Brake pedal height:
5 mm (0.2 in)
Below the footrest

2. Adjust:
- Brake pedal height

****

Adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② in or out until the specified pedal height is obtained.

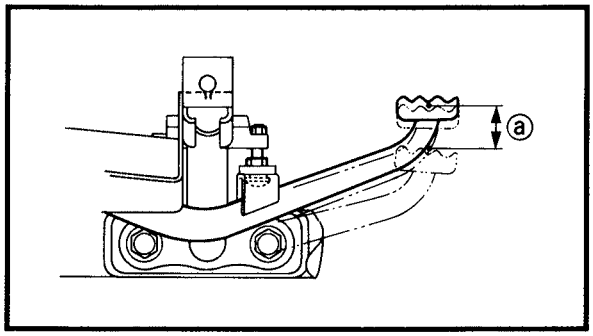
Turning in → Pedal height is upper.
Turning out → Pedal height is lower.

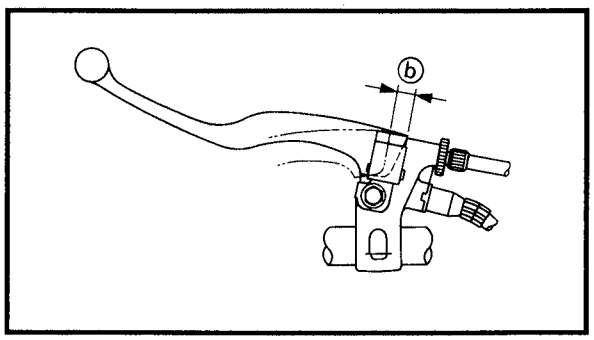
- Tighten the locknut.

⚠ WARNING

After adjusting the brake pedal height, adjust the rear brake lever and pedal free play.

****





3. Check:
- Rear brake pedal free play ⓐ
- Rear brake lever free play ⓑ
  Out of specification → Adjust.

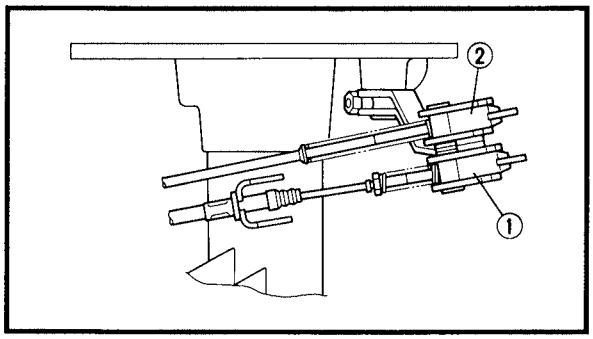
Rear brake pedal free play ⓐ:
20 ~ 30 mm (0.8 ~ 1.2 in)
Rear brake lever free play ⓑ:
5 ~ 8 mm (0.20 ~ 0.31 in)

4. Adjust:
- Free play (rear brake lever)
- Free play (brake pedal)

****

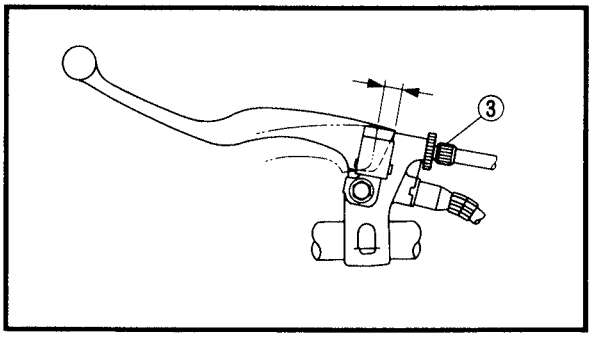
Rear brake lever and brake pedal free play adjustment steps:

NOTE:
Before adjusting the free play, pump the brake pedal 2 to 3 times.

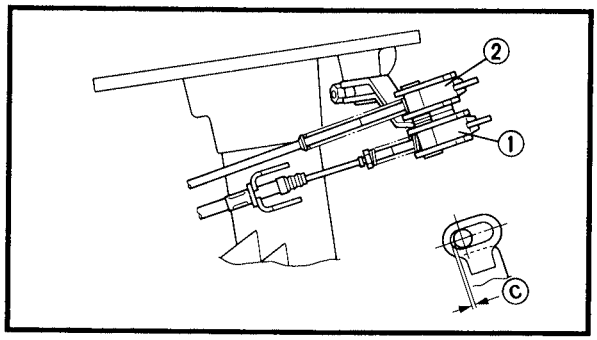


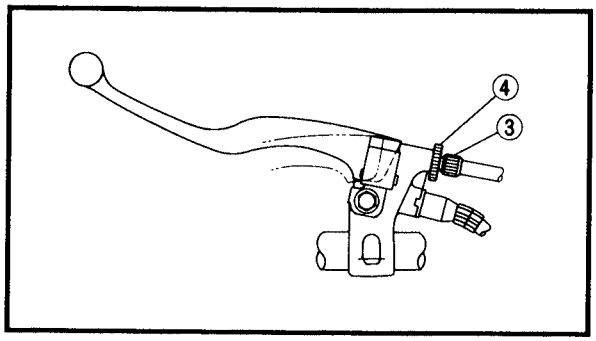
- Fully loosen the brake LEVER cable adjuster (drum) ①.
- Turn the rear brake PEDAL rod adjuster ② until the brake pedal free play is within the specified limits.

Free play (brake pedal):
20 ~ 30 mm (0.8 ~ 1.2 in)



- Fully screw in the brake LEVER cable adjuster (handlebar) ③.





- Turn the brake LEVER cable adjuster (drum) ① clockwise until the gap ⓒ is within the specified limits.

Gap ⓒ:
Zero ~ 1 mm (0.00 ~ 0.04 in)

- Inspect the free play (brake pedal) to see whether or not it is specified value. If not, perform the aforementioned steps again.

Free play (brake pedal):
20 ~ 30 mm (0.8 ~ 1.2 in)

- Loosen the locknut (handlebar) ④
- Turn the brake LEVER cable adjuster (handlebar) ③ until the free play (brake lever) is within the specified limits.

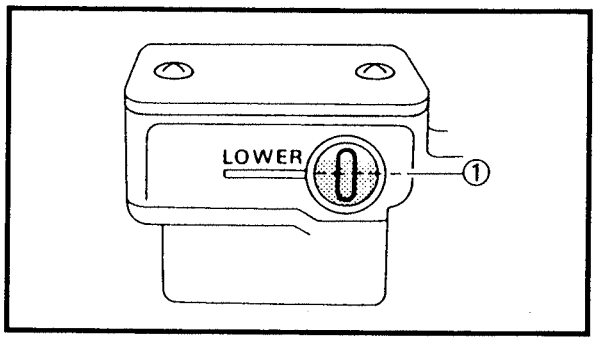
Free play (brake lever):
5 ~ 8 mm (0.20 ~ 0.31 in)

- Tighten the locknut (handlebar) ④

⚠ WARNING

After this adjustment is performed, lift the front and rear wheels off the ground by placing a block under the engine, and spin the rear wheels to ensure there is no brake drag. If any brake drag is noticed perform the above steps again.

****



FRONT BRAKE FLUID LEVEL INSPECTION

1. Place the machine on a level place.

NOTE:

When inspecting the front brake fluid level, make sure the master cylinder top is horizontal by turning the handlebars.

2. Inspect:
- Brake fluid level
  Fluid level is under "LOWER" level line ①
  → Fill up.

Recommended brake fluid:
Front: DOT No. 4 or DOT No. 3

CAUTION:

Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

⚠ WARNING

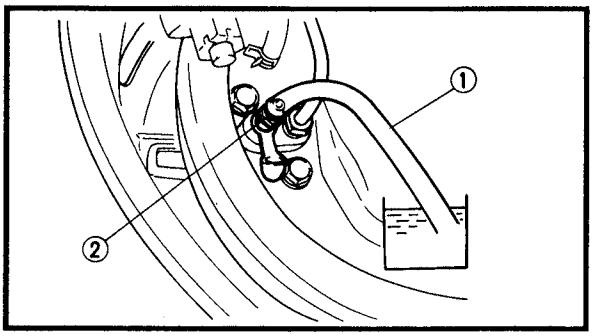
- **Use only the designed quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.**
- **Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.**

AIR BLEEDING (FRONT BRAKE SYSTEM)

⚠ WARNING

Bleed the brake system if:
- **The system has been disassembled.**
- **The brake hose or brake pipe have 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 system

****

Air bleeding steps:

a. Add proper brake fluid to the reservoir.
b. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
c. Connect the clear plastic tube ① tightly to the wheel cylinder bleed screw ②.
d. Place the other end of the tube into a container.
e. Slowly apply the brake lever several times.
f. Pull the lever in. Hold the lever in position.
g. Loosen the bleed screw and allow the lever to travel towards its limit.
h. Tighten the bleed screw when the lever limit has been reached; then release the lever.

	Bleed screw: **6 Nm (0.6 m • kg, 4.3 ft • lb)**

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

NOTE:

If the 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.

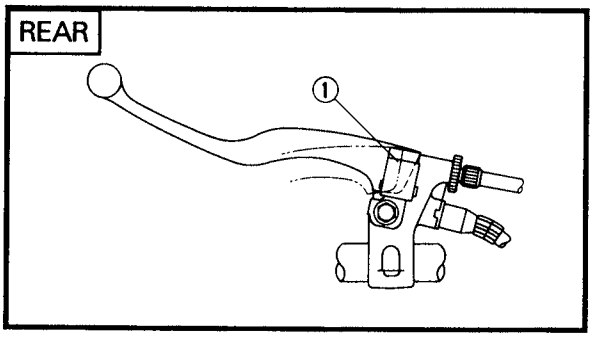
j. Add brake fluid to proper level.

Recommended brake fluid:
Front: DOT No. 4 or DOT No. 3

⚠ WARNING

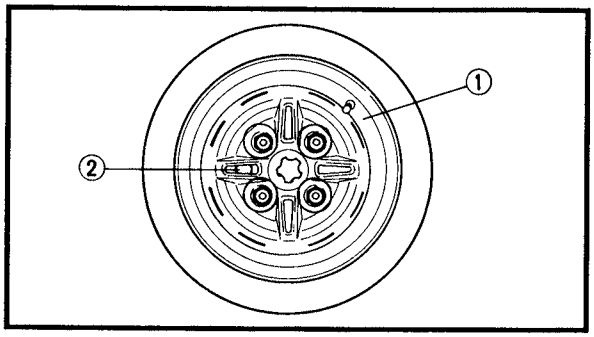
Check the operation of the brake after bleeding brake system.

****

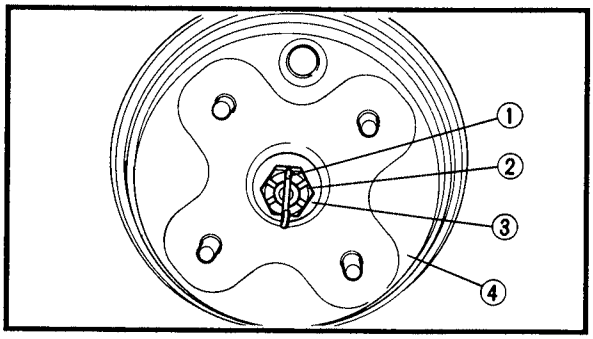


FRONT BRAKE LINING INSPECTION

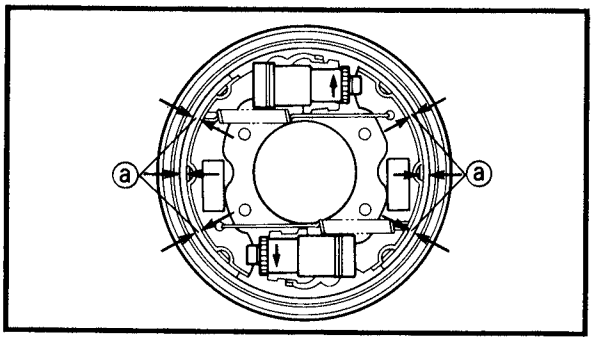
1. Place the machine on a level place.
2. Loosen:
   - Nuts (from wheel)
     Apply the parking brake ①
3. Block the rear wheels and elevate the front wheels by placing a suitable stand under the frame.



4. Remove:
   - Nuts (front wheel)
   - Front wheel ①
   - Rubber plug ②



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



6. Inspect:
   - Brake lining thickness
     Out of specification → Replace.

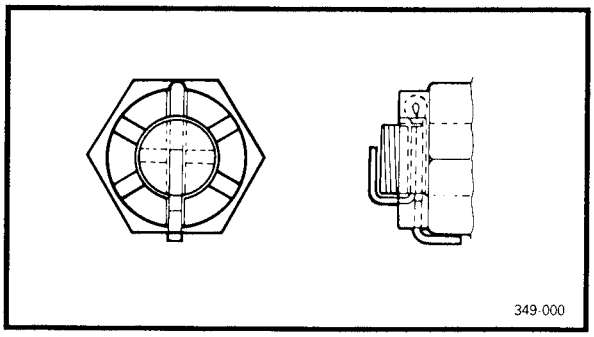
Brake lining thickness:
4 mm (0.16 in)
Wear limit:
1 mm (0.04 in)

ⓐ Measuring points

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

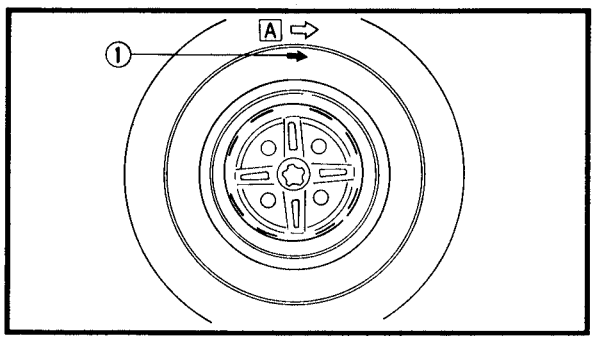
7. Install:
- Wheel hub
- Plain washer
- Axle nut
- Cotter pin (new)
- Wheel cap

Axle nut (front wheel):
130 Nm (13 m • kg, 94 ft • lb)



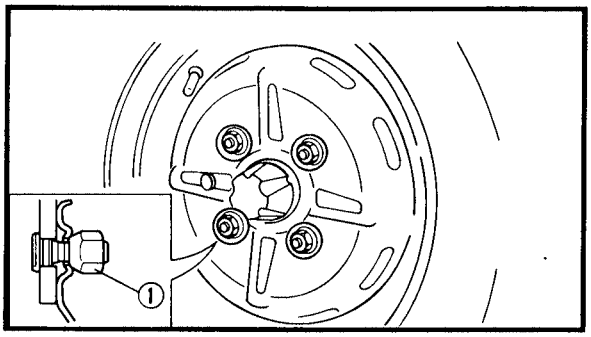
NOTE:
Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up the axle nut.

⚠ WARNING
Always use a new cotter pin.



8. Install:
- Rubber plug
- Front wheel

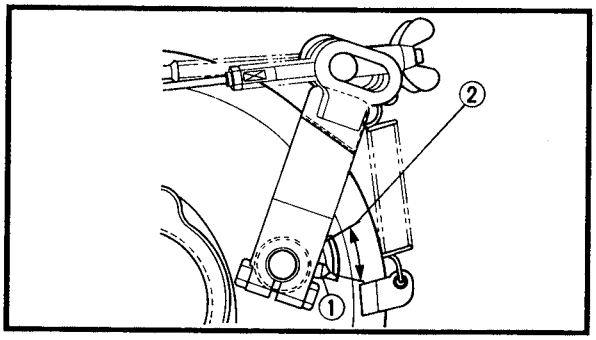
NOTE:
The arrow mark ① on the tire must point toward the direction of rotation [A] of the wheel.



9. Tighten:
- Nuts ① (front wheel)

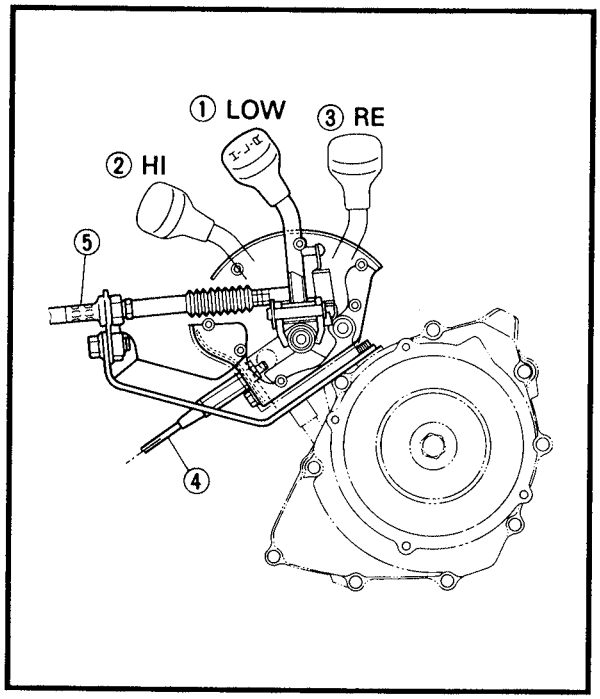
⚠ WARNING
Tapered wheel nuts ① are used for both front and rear wheel. Install the nut with its tapered side towards the wheel.

Nut (front wheel):
55 Nm (5.5 m • kg, 40 ft • lb)



REAR BRAKE SHOE INSPECTION

1. Depress the rear brake pedal.
2. Inspect:
- Pointer ① (wear indicator plate)
  Indicator at wear limit line ② → Replace rear brake shoes.
  Refer to the "REAR BRAKE" section in the CHAPTER 7.



SELECT LEVER CONTROL CABLE ADJUSTMENT

① LOW
② HIGH
③ REVERSE
④ Control cable 2
⑤ Control cable 1

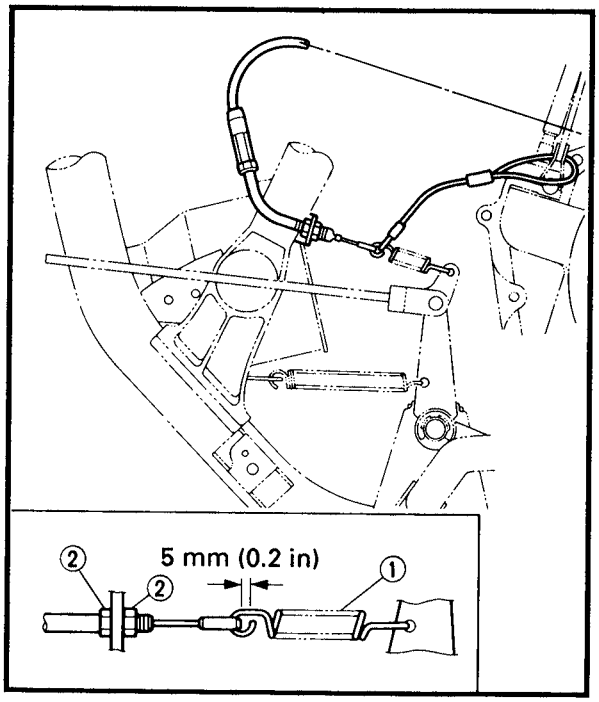
⚠ WARNING

Before moving the select lever, bring the machine to a complete stop and return the throttle lever to its closed position. Otherwise the transmission may be damaged.

2. Adjust:
- Select lever control cable 1
- Select lever control cable 2

****

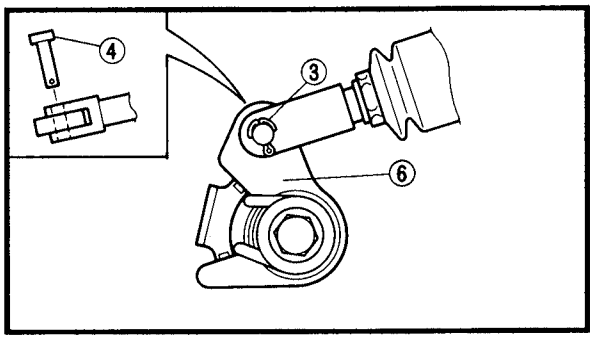
Select lever control cables adjustment steps:
Control cable 2:
- Make sure that the select lever is LOW.
- Adjust the control cable 2 so there is zero free play in the cable. When the adjustment is correct, slack in the return spring ① will be taken up.

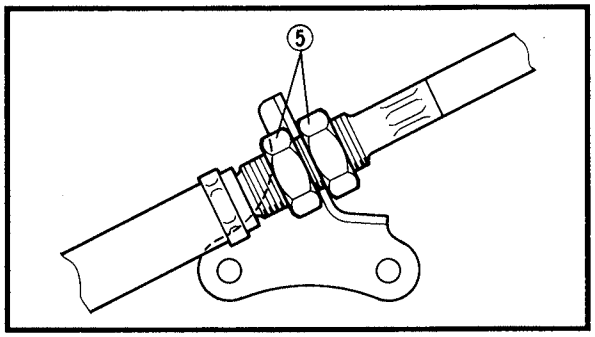


NOTE:

In some cases it will be necessary to further adjust the cable with the locknuts ② arrangement that holds the cable to its mount.

- Verify that the select lever cannot be shifted to REVERSE without operating the brake pedal. While operating the brake pedal make sure the control cable has at least 5 mm (0.2 in) travel.





Control cable 1:

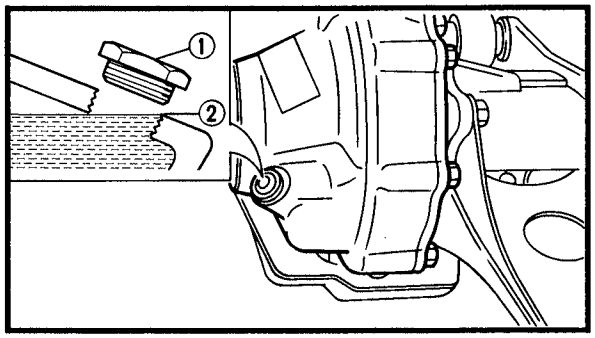
- Make sure that the select lever is LOW.
- Remove the small hitch pin ③ and clevis pin ④ from the engine end of control cable 1.
- Loosen both locknuts ⑤.
- Alternately turn the locknuts so the holes in the clevis are located exactly over the hole in the arm ⑥ (attached to shift cam 2), so the clevis pin slips easily through both the eyes and arm.
- With the clevis pin removed, carefully tighten the locknuts.

- Verify that the clevis pin still slips through easily, and with a silicone lubricant, lightly lubricate the clevis pin and install it and the hitch pin.
- Tighten the locknuts.

	Locknuts (control cable 1): 25 Nm (2.5 m • kg, 18 ft • lb)

- Slide the dust bellows on the control cable in both directions, applying grease to the areas exposed.
- Check the operation of the select lever, and verify that the brake pedal must be pressed before REVERSE can be engaged. Make sure there is a positive action as another range is engaged. Usually a distinct "Click" can be heard if engagement is positive.

****



FINAL GEAR OIL LEVEL INSPECTION

1. Place the machine on a level place.

2. Remove:
- Oil filler bolt ①

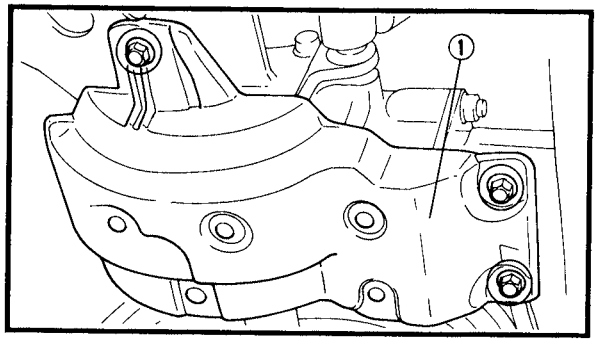
3. Inspect:
- Oil level
  Oil level should be up to bottom brim ② of hole
  Oil level low → Add oil to proper level

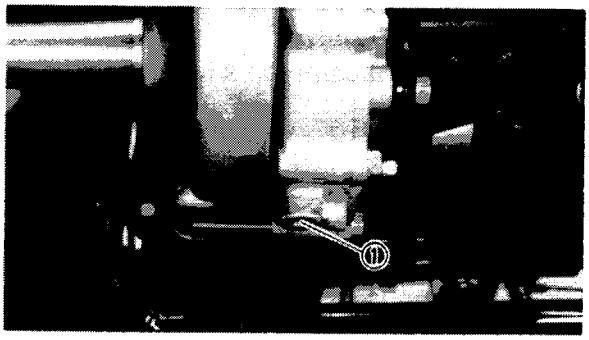
Periodic oil change:
0.19 L (0.17 Imp qt, 0.20 US qt)
Total amount:
0.25 L (0.22 Imp qt, 0.26 US qt)
Recommended oil:
SAE80 API GL-4 Hypoid gear oil

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

4. Install:
- Oil filler bolt

Oil filler bolt
23 Nm (2.3 m • kg, 17 ft • lb)





FINAL GEAR OIL REPLACEMENT
1. Place the machine on a level place.

2. Remove:
- Final gear case protector ①

3. Place the receptacle under the final gear case.

4. Remove:
- Oil filler bolt
- Drain plug ①

5. Drain:
- Final gear oil

6. Install:
• Drain plug

Drain plug:
23 Nm (2.3 m • kg, 17 ft • lb)

NOTE:
Check the gasket (drain plug). If damaged, replace it with a new one.

7. Fill:
• Final gear case

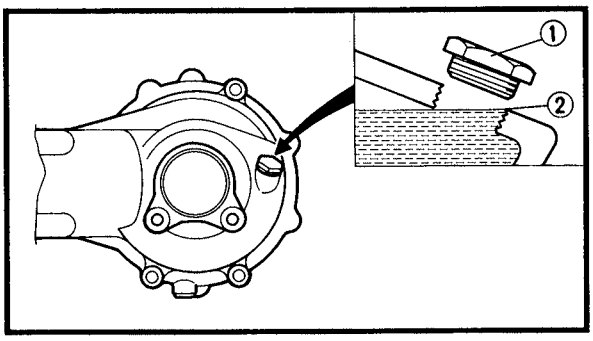
Periodic oil change:
0.19 L (0.17 Imp qt, 0.20 US qt)
Total amount:
0.25 L (0.22 Imp qt, 0.26 US qt)
Recommended oil:
SAE80 API GL-4 Hypoid gear oil

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

8. Inspect:
• Oil level
Refer to the "FINAL GEAR OIL LEVEL INSPECTION" section.

9. Install:
• Oil filler bolt
• Final gear case protector

Oil filler bolt:
20 Nm (2.0 m • kg, 14 ft • lb)
Bolts (final gear case protector):
15 Nm (1.5 m • kg, 11 ft • lb)



DIFFERENTIAL GEAR OIL LEVEL INSPECTION

1. Place the machine on a level place.
2. Oil filler bolt ①
3. Inspect:
• Oil level
Oil level should be up to bottom brim ② of hole
Oil level low → Add oil to proper level

Periodic oil change:
0.47 L (0.41 Imp qt, 0.50 US qt)
Total amount:
0.5 L (0.44 Imp qt, 0.53 US qt)
Recommended oil:
SAE80 API "GL-4" Hypoid gear oil

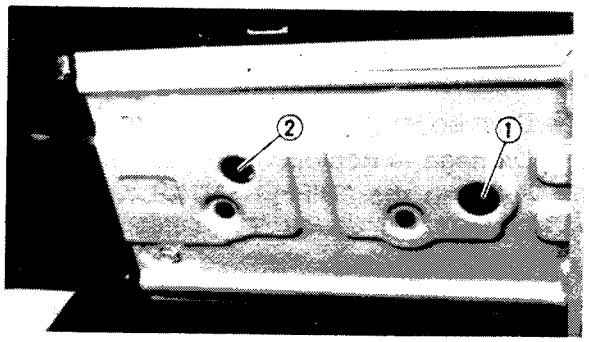
CAUTION:
Take care not allow foreign material to enter the final gear case.

4. Install:
- Oil filler bolt

Oil filler bolt:
23 Nm (2.3 m • kg, 17 ft • lb)

DIFFERENTIAL GEAR OIL REPLACEMENT
1. Place the machine on a level place.

2. Place the receptacle under the differential gear case.



3. Remove:
- Oil filler bolt
- Drain plug ① (front)
- Drain plug ② (rear)

4. Drain
- Differential gear oil

5. Install
- Drain plug (front)
- Drain plug (rear)

Drain plug (rear):
16 Nm (1.6 m • kg, 11 ft • lb)
Drain plug (front):
23 Nm (2.3 m • kg, 17 ft • lb)

NOTE:
Check the gaskets (drain plug). If damaged, replace it with a new one.

6. Fill:
• Differential gear case

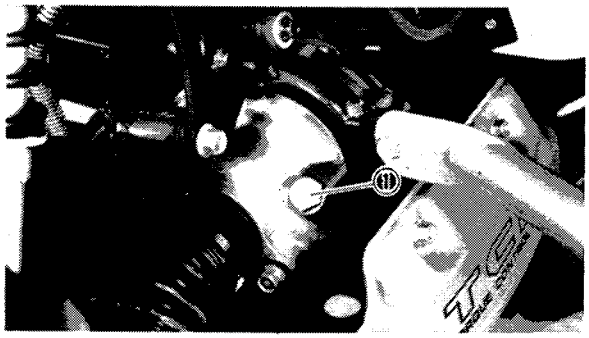
Periodic oil change:
0.47 L (0.41 Imp qt, 0.50 US qt)
Total amount:
0.5 L (0.44 Imp qt, 0.53 US qt)
Recommended oil:
SAE80 API "GL-4" Hypoid gear oil

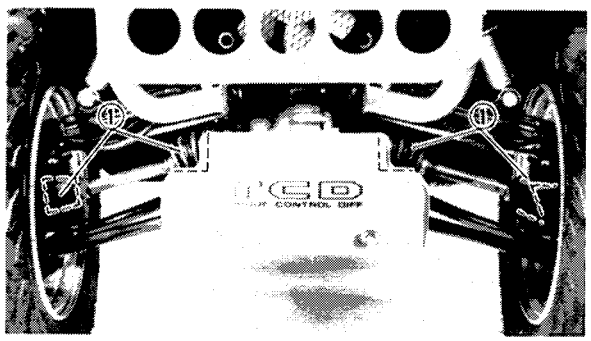
CAUTION:
Take care not allow foreign material to enter the differential gear case.

7. Inspect:
• Oil level
Refer to the "DIFFERENTIAL GEAR OIL LEVEL INSPECTION" section.

8. Install:
• Oil filler bolt ①

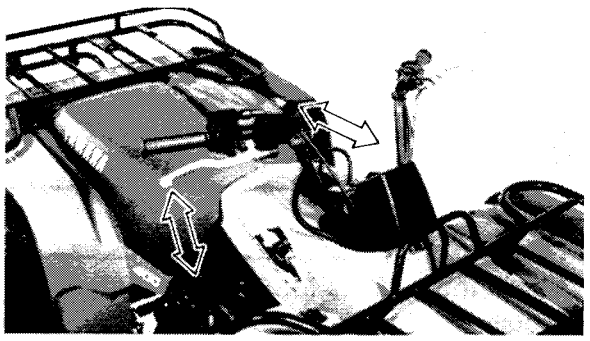
Oil filler bolt:
23 Nm (2.3 m • kg, 17 ft • lb)





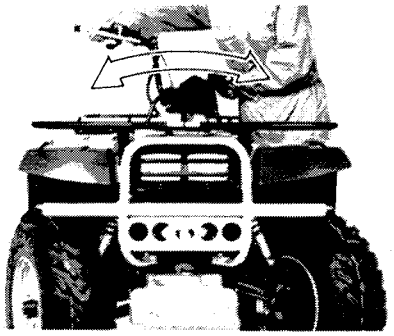
CONSTANT VELOCITY JOINT DUST BOOT INSPECTION

1. Inspect
• Dust boots ①
Damage → Replace
Refer to the "DIFFERENTIAL GEAR AND CONSTANT VELOCITY JOINT" section in the CHAPTER 6.

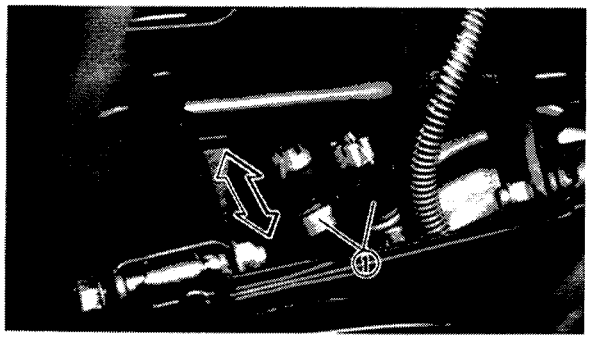


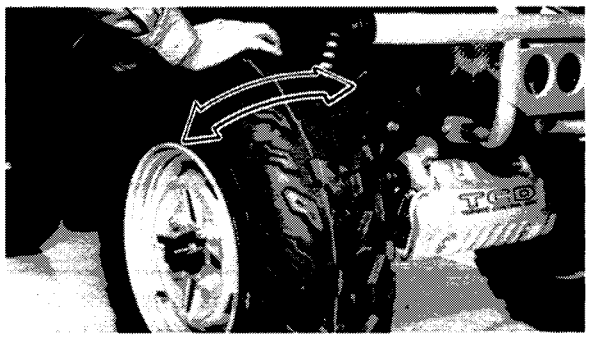
STEERING SYSTEM INSPECTION

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

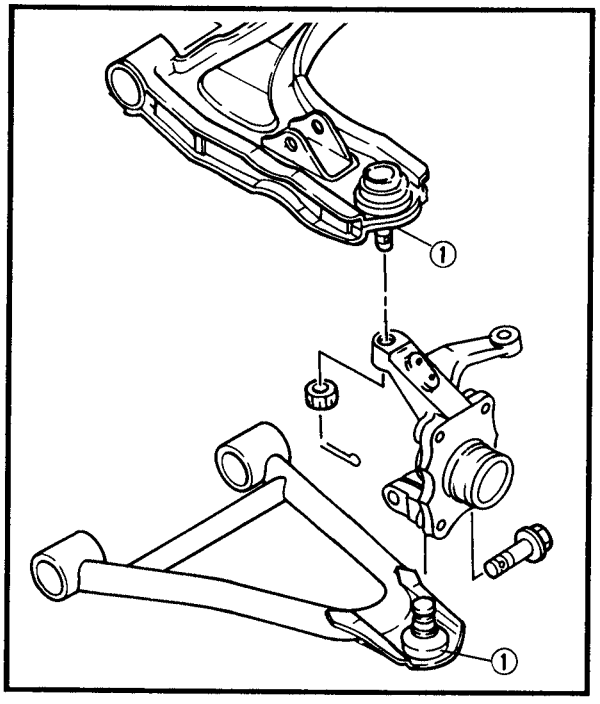


3. Check:
- Tie-rod ends
  Turn the handlebar to the left and/or right until it stops completely, then slightly move the handlebar from left to right. Tie-rod end ① has any vertical play → Replace the tie-rod end(s).

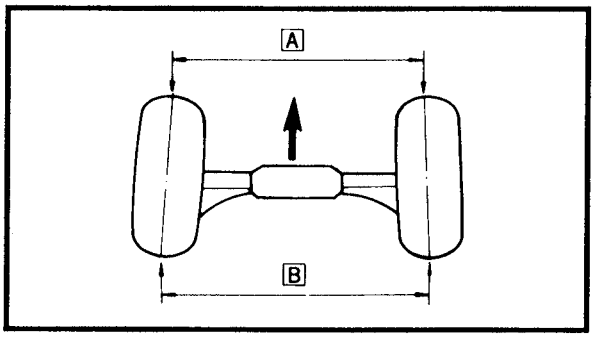


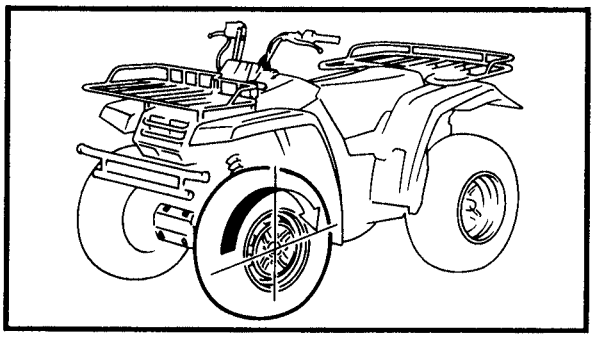


4. Raise the front end of the machine so that there is no weight on the front wheels.



5. Check:
- Ball joints ① and/or wheel bearings
  Move the wheels laterally back and forth. Excessive free play → Replace the front arms (upper and lower) and/or wheel bearings.





TOE-IN ADJUSTMENT

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

   Out of specification → Adjust.

Toe-in:
0 ~ 10 mm (0 ~ 0.39 in)

****

Toe-in measurement steps:

NOTE:

Before measuring the toe-in, make sure that tire pressure is correct.

- Mark both front tire tread centers.
- Raise the front end of the machine so that there is no weight on the front tires.
- Fix the handlebar straight ahead.
- Measure the width [A] between the marks.
- Rotate the front tires 180 degrees until the marks come exactly opposite.
- Measure the width [B] between the marks.
- Calculate the toe-in using the formula given below.

Toe-in = [B] – [A]

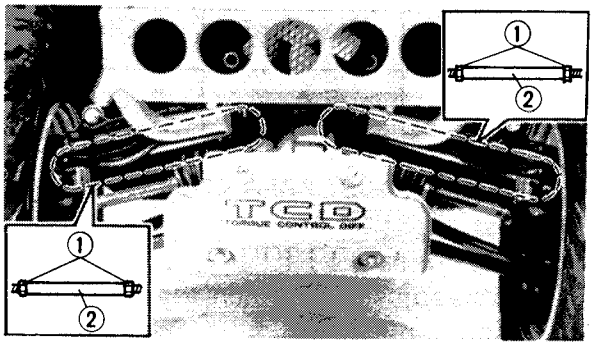
- If the toe-in is incorrect, adjust the toe-in.

****

3. Adjust:
   - Toe-in

⚠ WARNING

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



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Adjustment steps:

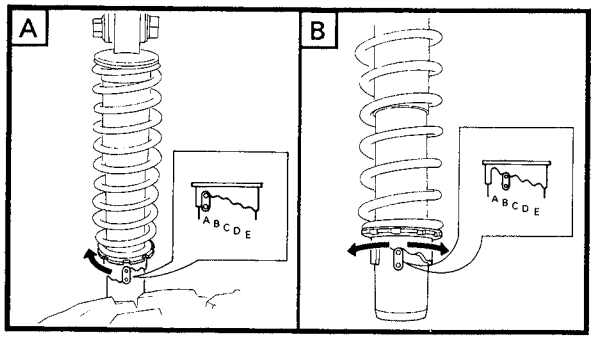
- Mark both tie-rods ends.
  This reference point will be needed during adjustment.
- Loosen the locknuts ① (tie-rod end) of both tie-rods.
- The same number of turns should be given to both tie-rods ② right and left until the specified toe-in is obtained, so that the lengths of the rods will be kept the same.
- Tighten the rod end locknuts of both tie rods.

	Locknut (rod end): **30 Nm (3.0 m • kg, 22 ft • lb)**

****

FRONT AND REAR SHOCK ABSORBERS INSPECTION

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

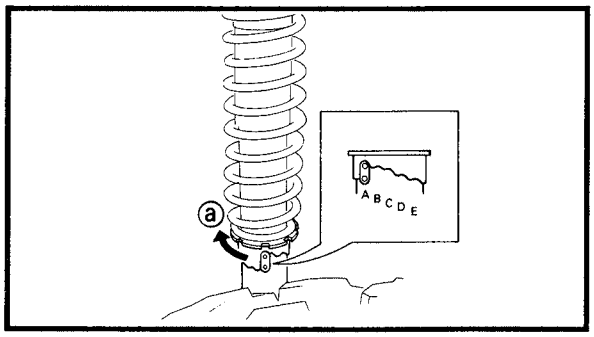


A Front
B Rear

FRONT SHOCK ABSORBER ADJUSTMENT

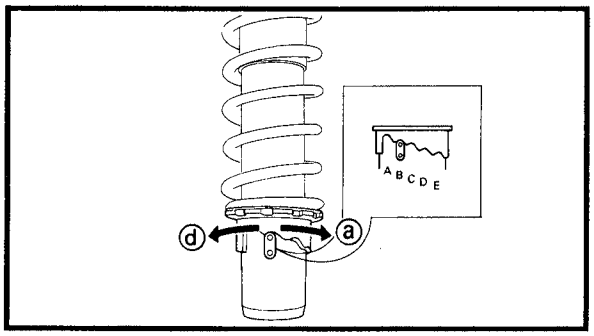
⚠ WARNING

Always adjust both front shock absorber spring preload to the same setting. Uneven adjustment can cause poor handling and loss of stability.



1. Adjust:
- Spring preload
  Turn the adjuster ① to increase or decrease the spring preload.

Front shock absorber preload		
Preload	Standard	Stiffer ⓐ →
Position	A	B, C, D, E



REAR SHOCK ABSORBER ADJUSTMENT

1. Adjust:
- Spring preload
  Turn the adjuster ① to increase or decrease the spring preload.

NOTE:

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

Rear shock absorber preload			
Preload	Softer ⓐ ←	Standard	Stiffer ⓑ →
Position	A	B	C, D, E

TIRES INSPECTION

⚠ WARNING

This model is equipped with low pressure tires. It is important that they be inflated correctly and maintained at the proper pressures.

- **TIRE CHARACTERISTICS**

1)Tire characteristics influence the handling of ATV's. The tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. If other tire combinations are used, they can adversely affect your machine's handling characteristics and are therefore not recommended.

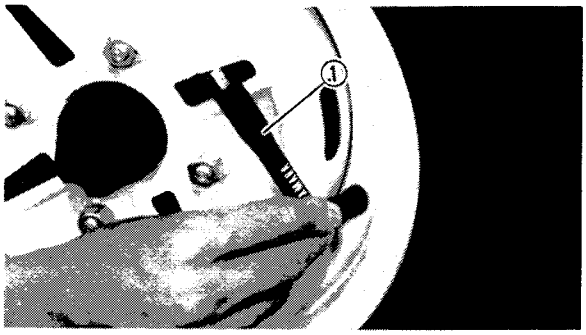
	Manufacturer	Size	Type
Front	DUNLOP	AT25 × 8-12	KT402
Rear	DUNLOP	AT25 × 10-12	KT406

- **TIRE PRESSURE**

1)Recommended tire pressure
Front 20 kPa (0.20 kg/cm², 2.9 psi)
Rear 25 kPa (0.25 kg/cm², 3.6 psi)
2)Tire pressure below the minimum specified could cause the tire to dislodge from the rim under severe riding conditions.
The following are minimums:
Front 17 kPa (0.17 kg/cm², 2.5 psi)
Rear 22 kPa (0.22 kg/cm², 3.2 psi)
3)Use no more than
Front 140 kPa (1.4 kg/cm², 20 psi)
Rear 140 kPa (1.4 kg/cm², 20 psi)
when seating the tire beads. Higher pressures may cause the tire to burst.
Inflate the tires very slowly and carefully. Fast inflation could cause the tire to burst.

- **MAXIMUM LOADING LIMIT**

1)Vehicle load limits: 200 kg (441 lb)*
*** Total weight of cargo, trailer hitch vertical load, rider, and accessories.**
2)Front carrier (If so equipped): 40 kg (88 lb)
3)Rear carrier: 70 kg (154 lb)
4)Storage box: 2 kg (4.4 lb)
5)Trailer hitch:
Horizontal load: 410 kg (904 lb)
Total weight of trailer and cargo.
Vertical load: 15 kg (33 lb)
Vertical weight on trailer hitch joint.
Be extra careful of the machine balance and stability when towing a trailer.



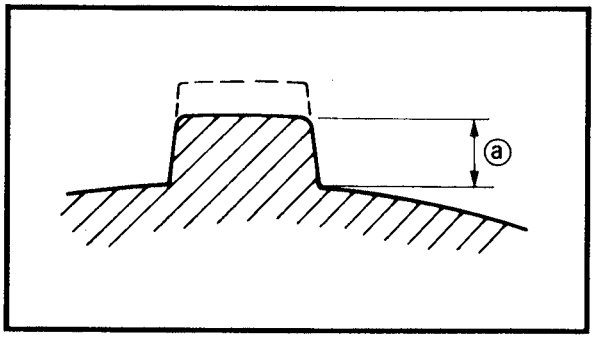
1. Measure:
- Tire pressure (cold tire pressure)
  Out of specification → Adjust.

NOTE:
- The low-pressure tire gauge ① is included in the standard equipment.
- If dust or the like is stuck to this gauge, it does not provide correct readings. Therefore, make two measurements on the tire pressure and get the second reading.

Cold tire pressure	Front	Rear
Standard	20 kPa (0.20 kg/cm², 2.8 psi)	25 kPa (0.25 kg/cm², 3.6 psi)
Minimum	17 kPa (0.17 kg/cm², 2.4 psi)	22 kPa (0.22 kg/cm², 3.2 psi)
Maximum	23 kPa (0.23 kg/cm², 3.3 psi)	28 kPa (0.28 kg/cm², 3.9 psi)

⚠ WARNING

Uneven or improper tire pressure may adversely affect the handling of this machine and may cause loss of control.
- **Maintain proper tire pressures.**
- **Set tire pressures when the tires are cold.**
- **Tire pressures must be equal in both front tires and equal in both rear tires.**

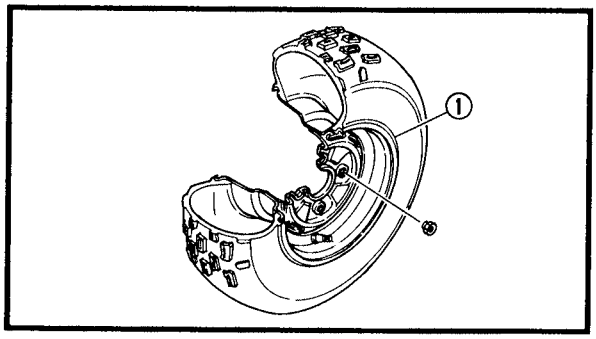


2. Inspect:
- Tire surfaces
  Wear/Damage → Replace.

Tire wear limit ⓐ:
Front and rear: 3.0 mm (0.12 in)

⚠ WARNING

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



WHEEL INSPECTION

1. Inspect:
- Wheels ①
  Damage/Bends → Replace.

NOTE:
Always balance the wheel when a tire or wheel has been changed or replace.

⚠ WARNING

- **Never attempt even small repairs to the wheel.**
- **Ride conservatively after installing a tire to allow it to seat itself properly on the rim.**

CABLE INSPECTION AND LUBRICATION

⚠ WARNING

Damaged cable sheath may cause corrosion and interfere with the cable movement. An unsafe condition may result to replace such cable as soon as possible.

1. Inspect:
- Cable sheath
  Damage → Replace.
2. Check:
- Cable operation
  Unsmooth operation → Lubricate or replace.

Recommended lubricant:
SAE 10W30 motor oil

NOTE:
Hold cable end high and apply several drops of lubricant to cable.

3. Apply:
- Lithium soap base grease
  (onto end of the cable)

LEVERS, PEDAL, ETC. LUBRICATION

1. Lubrication the pivoting parts.

Recommended lubricant:
SAE 10W30 motor oil

ELECTRICAL

BATTERY INSPECTION

⚠ WARNING

Battery electrolyte is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**
- **Wear protective eye gear when handling or working near batteries.**

Antidote (EXTERNAL):

- **SKIN-Flush with water.**
- **EYE-Flush with water for 15 minutes and get immediate medical attention.**

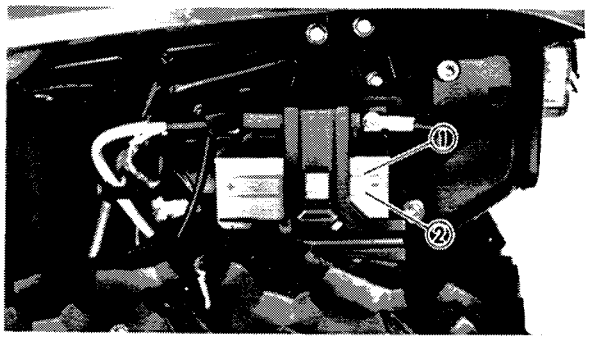
Antidote (INTERNAL):

- **Drink large quantities of water or milk follow with milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.**

Batteries also generate explosive hydrogen gas. You should always follow these preventive measures:

- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.)**
- **DO NOT SMOKE when charging or handling batteries.**

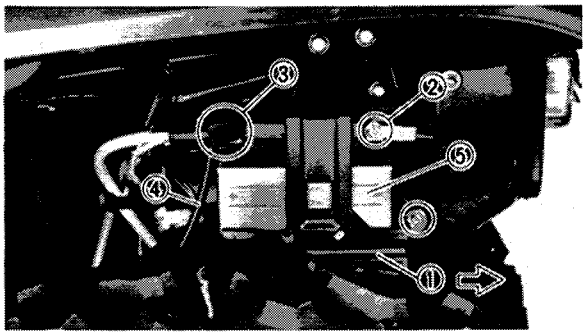
KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.



1. Inspect:
- Fluid level
  Fluid level should be between upper ① and lower ② level marks.
  Incorrect → Refill.

CAUTION:

Refill with distilled water only; tap water contains minerals harmful to a battery.

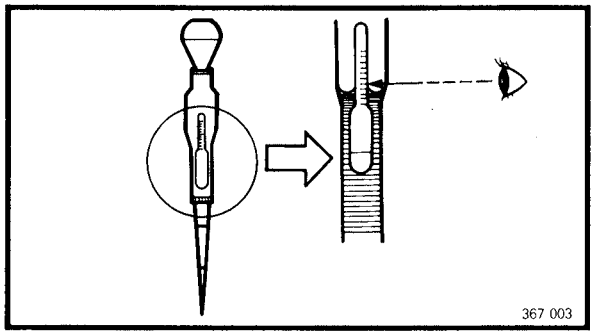


2. Remove:
- Battery cover ①

3. Disconnect:
- Battery leads
- Battery breather hose ④

CAUTION:

Disconnect the negative lead ② first and then disconnect the positive lead ③.



4. Remove:
- Battery ⑤

5. Check:
- Specific gravity

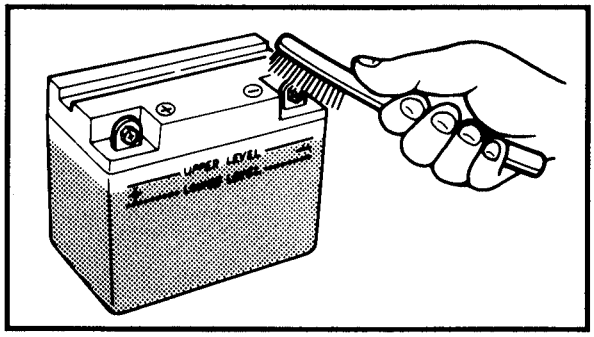
Less than 1.280 → Recharge battery.

Charging current:	**1.4 amps/10 hrs**
Specific gravity:	**1.280 at 20°C (68°F)**

****

Replace the battery it:
- Battery voltage will not rise to a specific value or bubbles fail to rise even after many hours of charging.
- Sulfation of one or more cells occurs, as indicated by the plates turning white, or an accumulation of material exists in the bottom of the cell.
- Specific gravity readings after a long, slow charge indicate one cell to be lower than the rest.
- Warpage or buckling of plates or insulators is evident.

CAUTION:
- **Always charge a new battery before using it to ensure maximum performance.**
- **When removing the battery leads, the negative lead first and then disconnect the positive lead.**



6. Inspect:
- Battery terminal

Dirty terminal → Clean with wire brush.
Poor connection → Correct.

NOTE:

After cleaning the terminals, apply grease lightly to the terminals.

CAUTION:

When installing the battery, connect the positive lead first and then connect the negative lead.

7. Inspect:
- Breather hose
  Obstruction → Remove.
  Damage → Replace.

CAUTION:

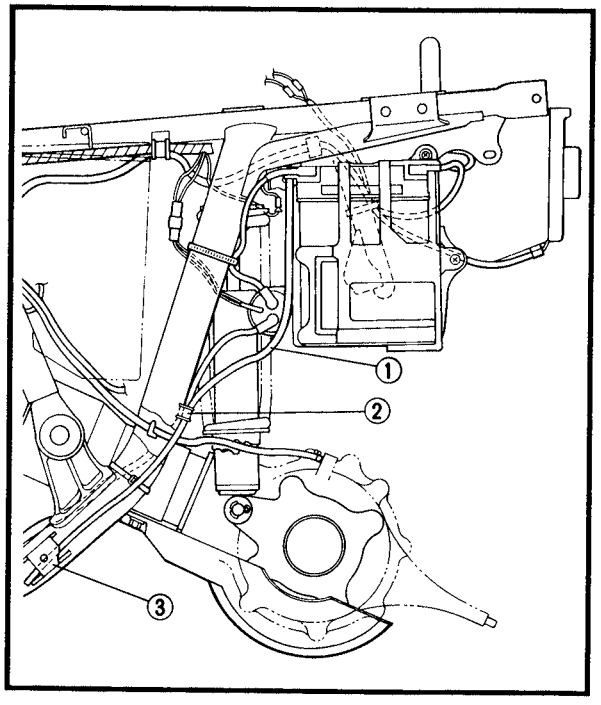
When inspecting the battery, be sure the breather hose is routed correctly. If the breather hose touches the frame or exits in such a way as to cause battery electrolyte or gas to exit onto the frame, structural and cosmetic damage to the machine can occur.

8. Install:
- Battery
- Battery cover

9. Connect:
- Battery leads

CAUTION:

Connect the positive lead first and then connect the negative lead.



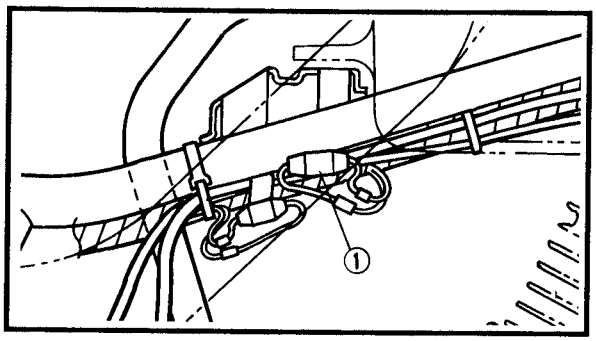
10. Connect:
- Battery breather hose ①
  Be sure the hose is properly attached and routed.

② Clamp the battery breather hose and starter motor cable
③ Pass the battery breather hose through the bracket.
Refer to the "CABLE ROUTING" section in the CHAPTER 2.

FUSE INSPECTION

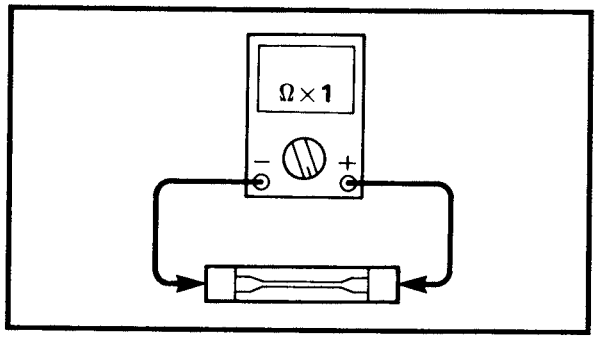
CAUTION:

Don't forget to turn off the main switch when checking or replacing the fuse. Otherwise, it may cause accidental shortcircuiting.



1. Remove:
- Seat

   Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section.
2. Remove:
- Fuse ①



3. Inspect:
- Fuse

****

Inspection steps:
- Connect the pocket tester to the fuse and check it for continuity.

NOTE:

Set the tester selector to "Ω x 1" position.

	Pocket tester: **P/N. YU-03112, 90890-03112**

- If the tester is indicated at ∞. The fuse is blown, replace it.

****

4. Replace:
- Blown fuse

****

Blown fuse replacement steps:
- Turn off ignition and the circuit.
- Install a new fuse of proper amperage.

	Fuse: **30 amps x 1pc.**

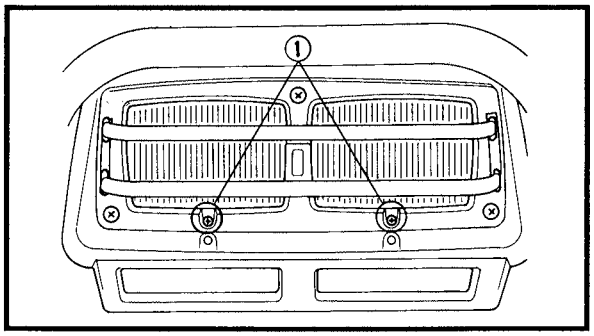
- Turn on switches to verify operation of electrical device.
- If fuse blows immediately again, check circuit in question.

****

⚠ WARNING

Never use a fuse with a rating other then specified, or other material in place of a fuse. An improper fuse may cause damage to the electrical system and possible cause a fire, or the lighting and/or ignition may cease to function.

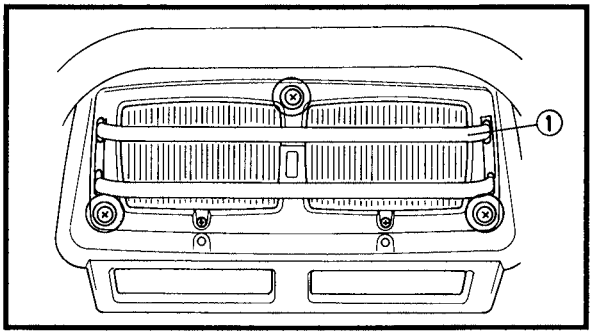
5. Install:
- Seat



HEADLIGHT BEAM ADJUSTMENT

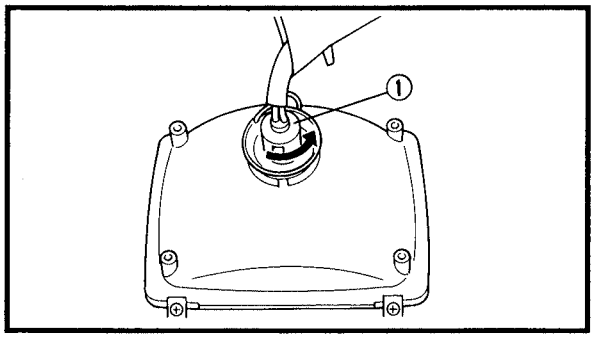
1. Adjust:
- Headlight beam (vertically)

Vertical adjustment	
To raise the beam	Turn the adjusting screw ① clockwise.
To lower the beam	Turn the adjusting screw ① counterclockwise.



HEADLIGHT BULB REPLACEMENT

1. Remove:
- Headlight cover ①



2. Remove:
- Bulb

  Turn the bulb holder ① counterclockwise to release bulb.

⚠ WARNING

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

3. Install:
- Bulb (new)

  Secure the new bulb with the bulb holder.

4. Install:
- Headlight cover

ENGINE OVERHAUL

ENGINE REMOVAL

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

PREPARATION FOR REMOVAL

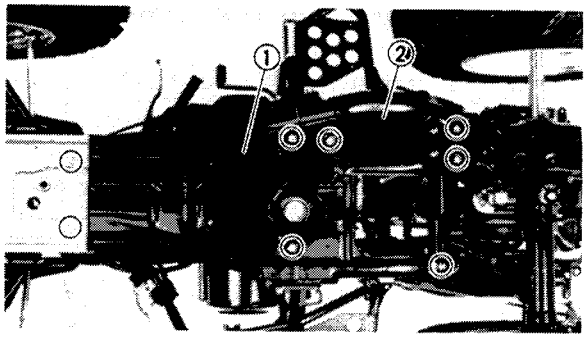
1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to the "SPECIAL TOOLS" section in the CHAPTER 1.

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

3. During engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.
4. Place the machine on a level place.

ENGINE GUARDS

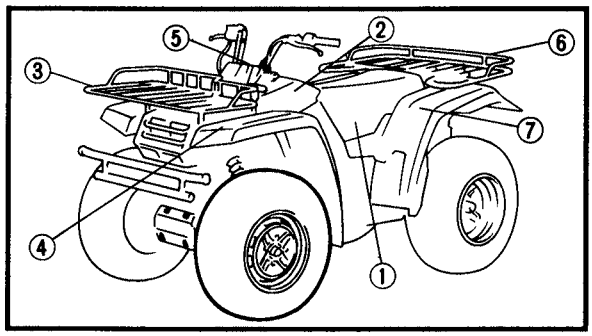
1. Remove:
- Engine guard ① (center)
- Engine guard ② (rear)

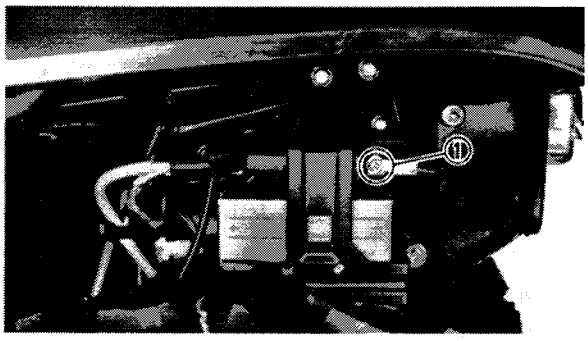


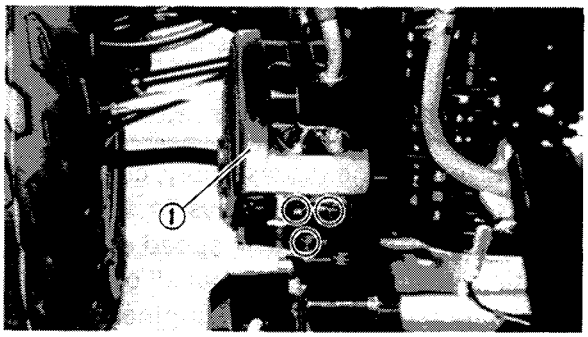
ENGINE OIL AND TRANSFER GEAR OIL

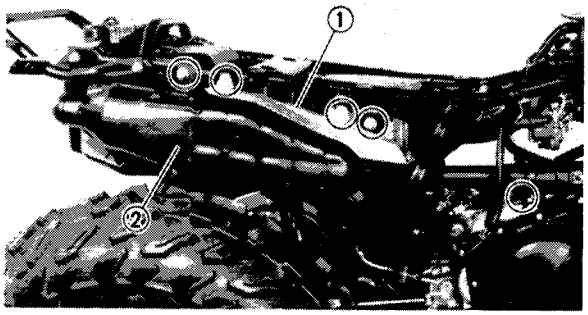
1. Drain:
- Engine oil
- Transfer gear oil

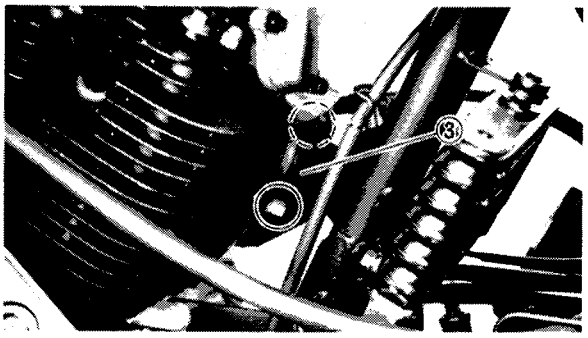
Refer to the "ENGINE OIL TRANSFER GEAR OIL REPLACEMENT" section in the CHAPTER 3.











SEAT, CARRIERS, FENDERS AND FUEL TANK

1. Remove:
- Seat ①
- Fuel tank cover ②
- Front carrier ③
- Front fender ④
- Fuel tank ⑤
- Rear carrier ⑥
- Rear fender ⑦
- Rear fender stay

Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

BATTERY LEAD

1. Disconnect:
- Battery negative lead ①

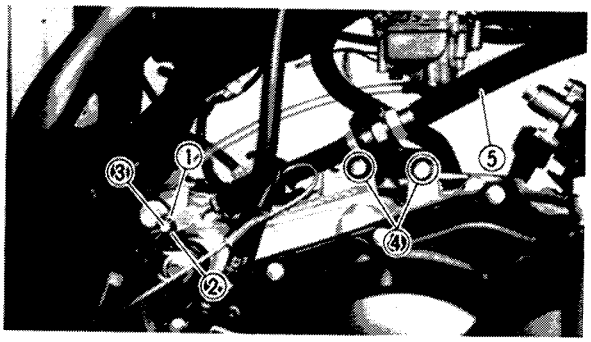
Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

SELECT LEVER

1. Remove:
- Select lever assembly ①

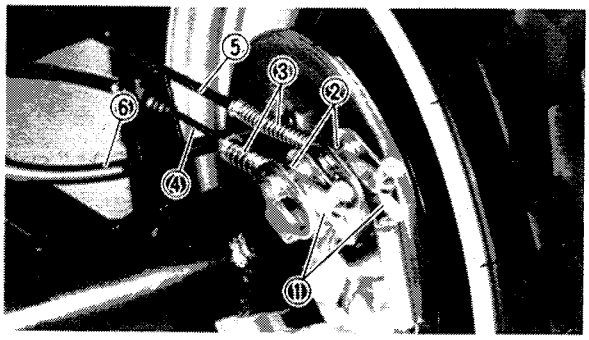
EXHAUST PIPE AND MUFFLER

1. Remove:
- Muffler protector ①
- Muffler ②
- Exhaust pipe ③



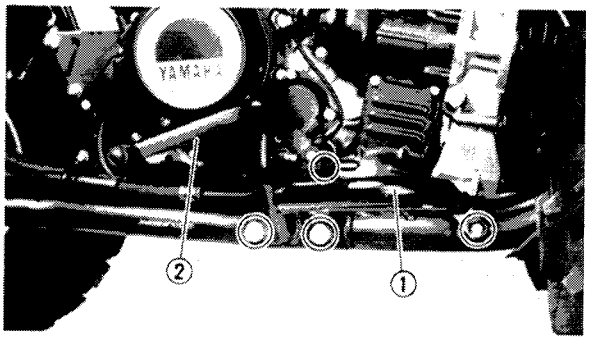
REAR BRAKE CABLE, ROD AND SELECT LEVER CABLES

1. Remove:
- Cotter pin ①
- Plain washer ②
- Pin ③
- Bolts ④
- Select lever control cable 1 ⑤

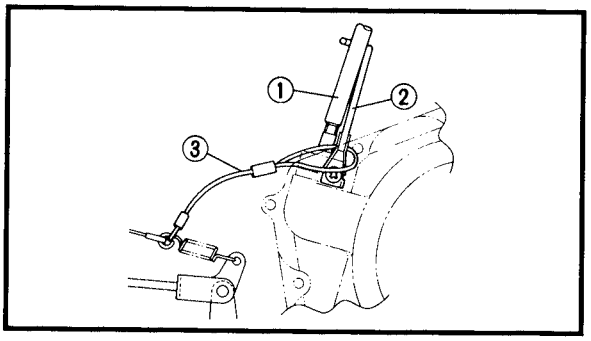


2. Remove:
- Adjusters ① (brake lever and brake pedal)
- Pins ②
- Compression springs ③

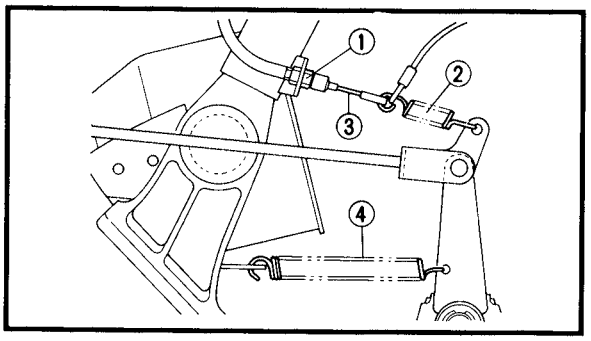
3. Disconnect:
- Brake cable ④ (brake lever)
- Brake rod ⑤ (brake pedal)
- Breather hose ⑥



4. Remove:
- Footrest ① (left)
- Shift pedal ②

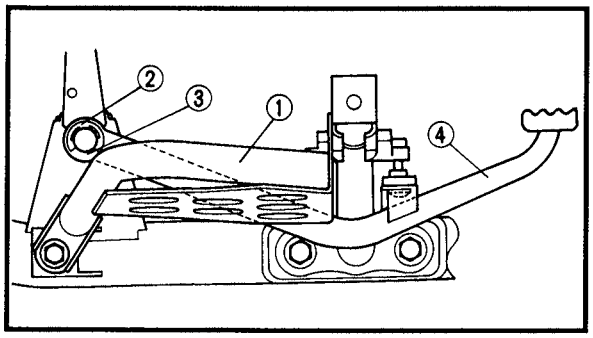


5. Remove:
- Speedometer cable ①
- Wire guide ②
- Reverse lock release wire ③

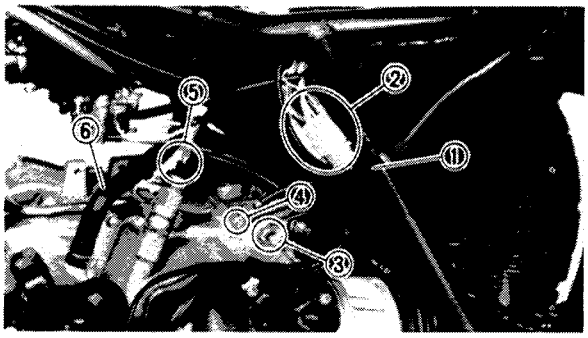


6. Loosen:
- Locknut ①

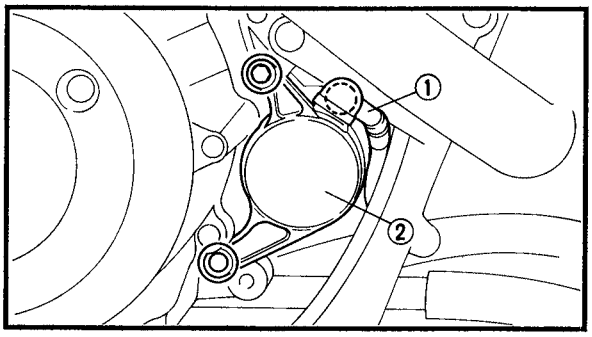
7. Remove:
- Spring ② (upper)
- Select lever control cable ③
- Spring ④ (lower)



8. Remove:
- Frontrest ① (right)
- Circlip ②
- Plain washer ③
- Brake pedal assembly ④



WIRING AND HOSE
1. Disconnect:
- Spark plug lead
- Band ①
- CDI magneto leads and "NEUTRAL" switch lead ②
- "REVERSE" switch lead ③
- Ground lead ④
- Thermo unit lead ⑤
- Ventilation hose ⑥



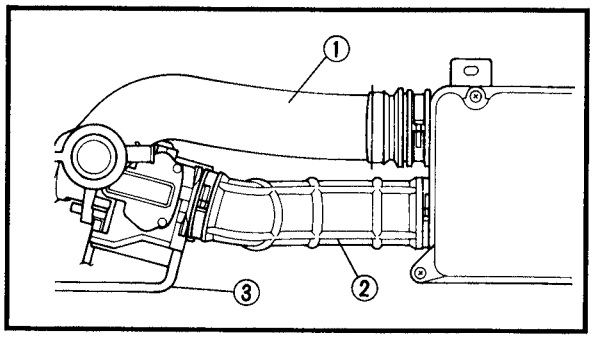
STARTER MOTOR
1. Disconnect:
- Starter motor lead ①

2. Remove:
- Starter motor ②

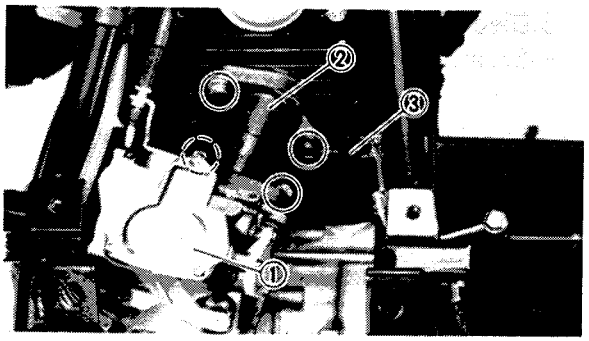
CARBURETOR
1. Drain:
- Fuel (float chamber)

NOTE:
Place a rag under the over flow hose to absorb a spilt fuel.

⚠ WARNING
Gasoline is highly flammable. Avoid spilling fuel on the hot engine.

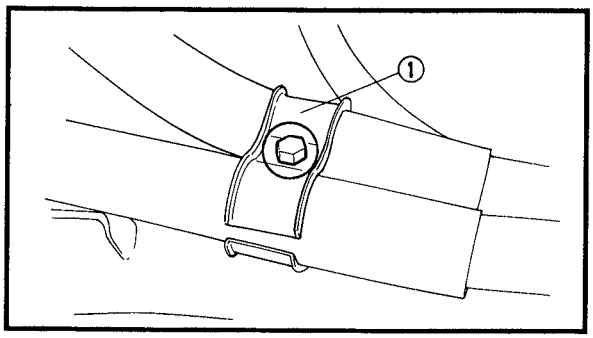


2. Remove:
- Air cleaner manifold ①
- Carburetor joint ②
- Air vent hose ③



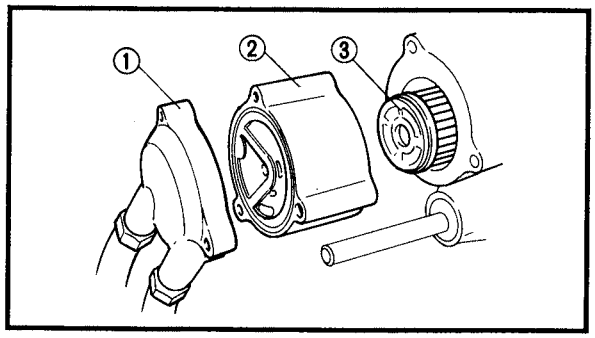
3. Remove:
- Carburetor ①
- Intake manifold ②
- Cable holder ③

NOTE:
Cover the carburetor with a clean rag to prevent dirt or foreign material from entering the carburetor.



OIL FILTER

1. Remove:
- Clamp ① (oil hoses)



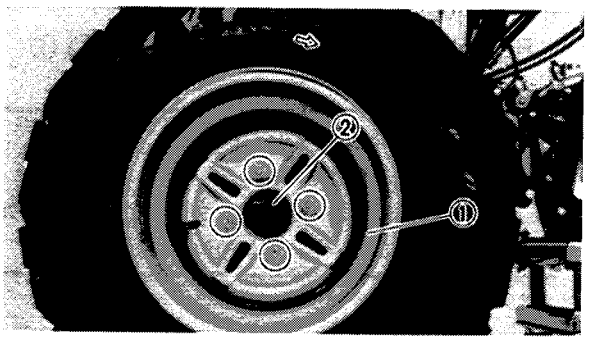
2. Remove:
- Oil filter cover ① (outside)
- Oil filter cover ② (inside)
- Oil filter element ③

REAR DRIVE ASSEMBLY AND SWINGARM

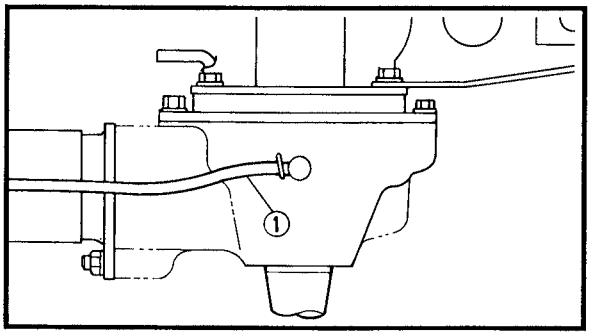
⚠ WARNING

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

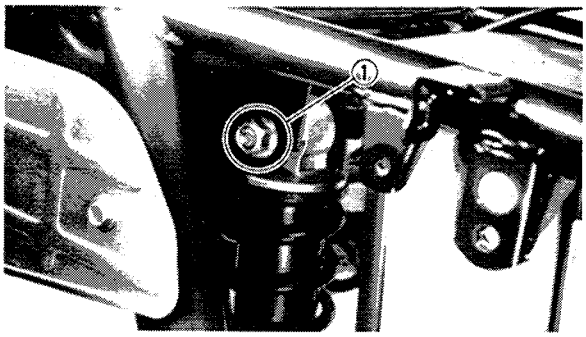
1. Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.



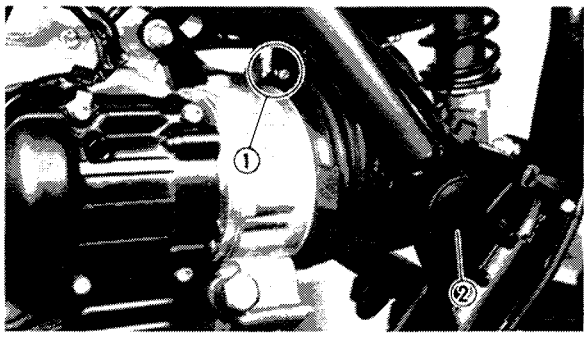
2. Remove:
- Rear wheels ①
- Caps ②



3. Disconnect:
- Breather hose ①

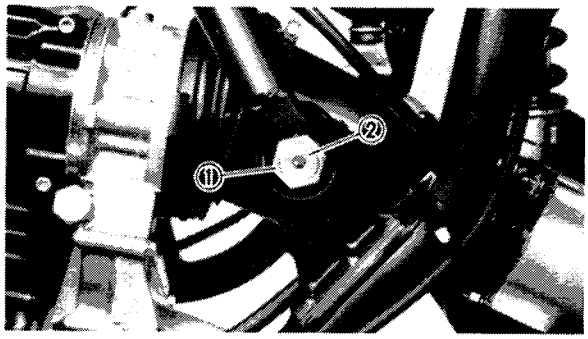


4. Remove:
- Bolt ① (rear shock absorber-top)

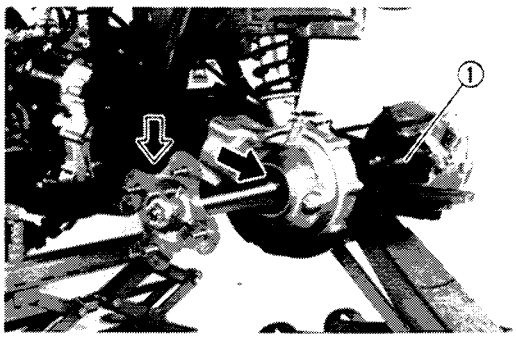


5. Loosen:
- Screw ① (rubber boot band)

6. Remove:
- Pivot shaft caps ②



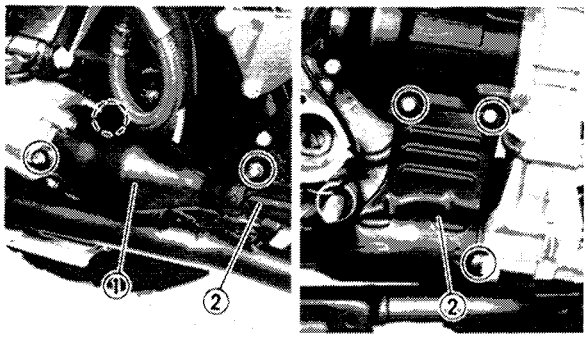
7. Remove:
- Locknuts ① (swingarm)
- Pivot shafts ② (swingarm)



8. Remove:
- Rear drive assembly and swingarm ①

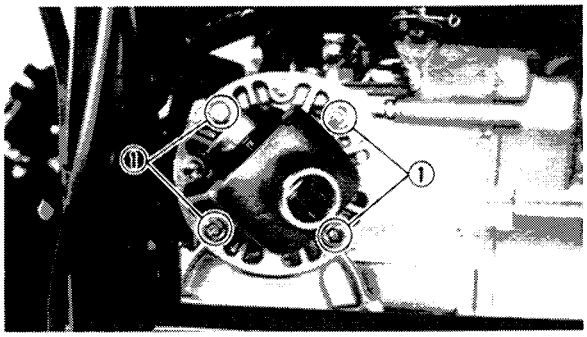
NOTE:

When removing the swingarm;
1) Tilt it to the left side.
2) The drive shaft and coupling gear will fall off. Take care not to loose these parts.



TRANSFER GEAR ASSEMBLY AND FRONT DRIVE SHAFT

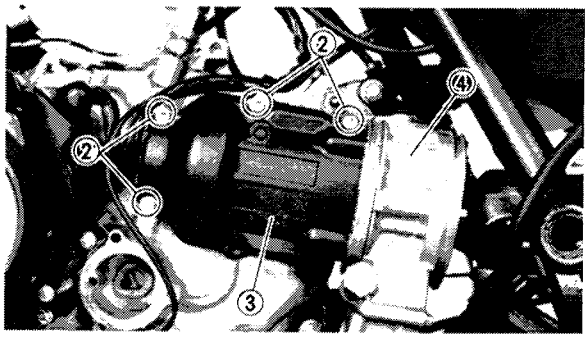
1. Remove:
- Front drive shaft protector ① (front half)
- Front drive shaft protector ② (rear half)

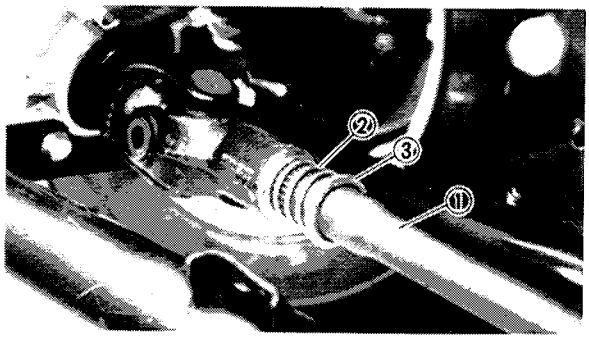


2. Remove:
- Bolts ① (transfer gear assembly)
- Bolts ② (middle gear case)
- Middle gear case ③
- Transfer gear assembly ④
  Move the transfer gear assembly to backward and pull it to outside.

NOTE:

When removing the middle gear case and transfer gear assembly, the dowel pins and shims will fall off. Take care not to lose these parts.

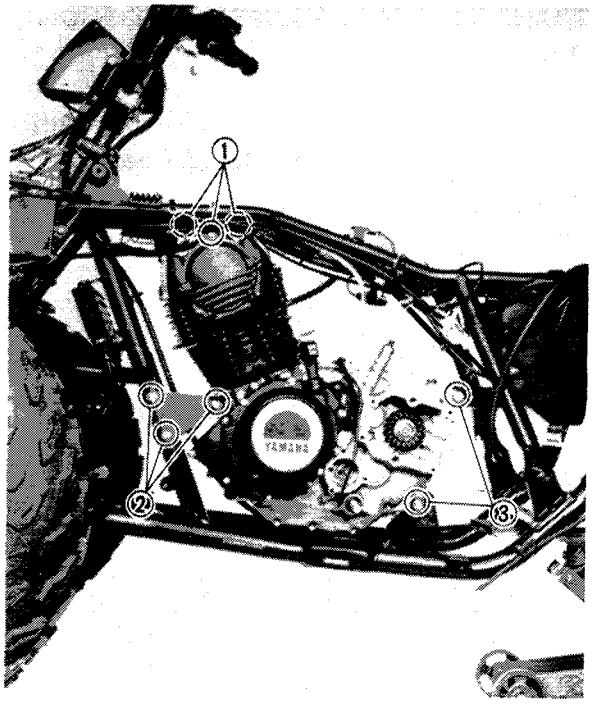




3. Remove
- Front drive shaft ①
  Pull out the drive shaft to backward.

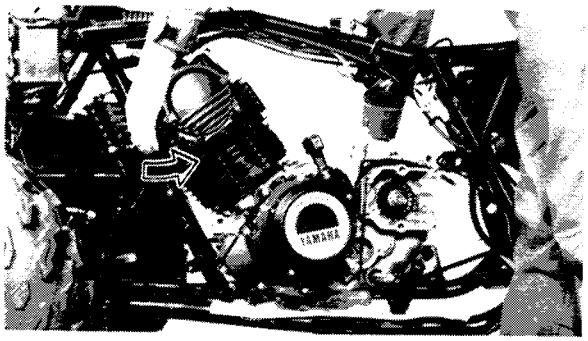
NOTE:

When disconnecting the drive shaft, the spring ② and spring seat ③ will fall off. Take care not to lose these parts.

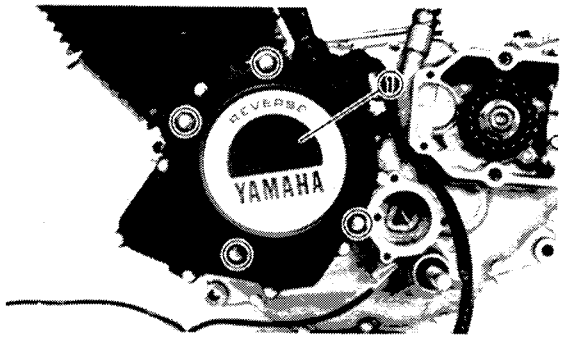


ENGINE REMOVAL

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



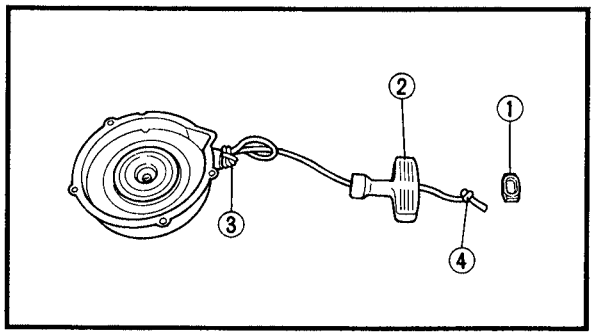
2. Remove:
- Engine
  To the left.



ENGINE DISASSEMBLY

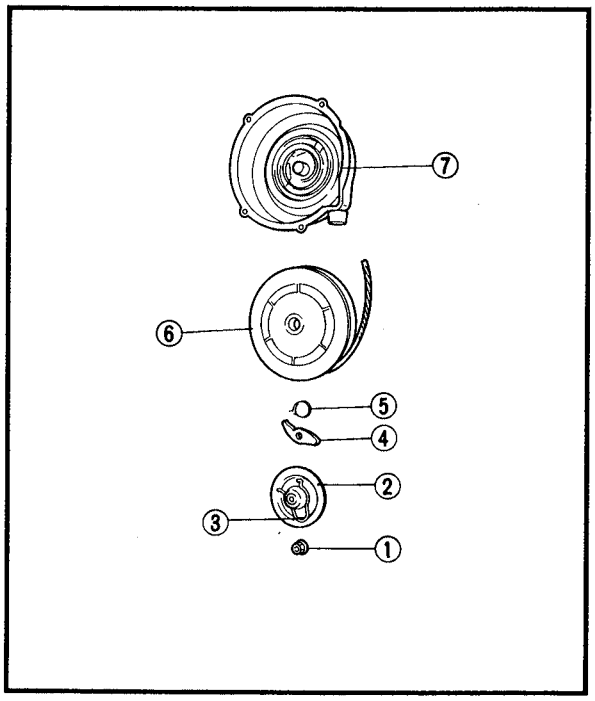
RECOIL STARTER

1. Remove:
- Recoil starter assembly ①
- Gasket

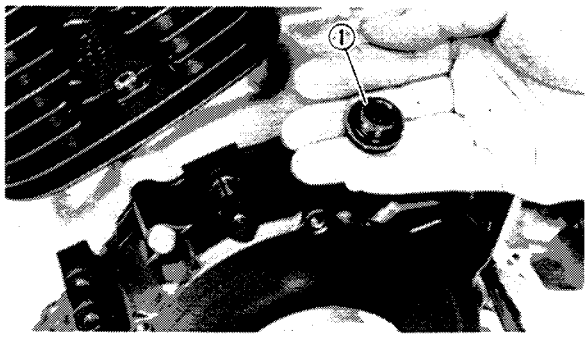


2. Remove:
- Cap ①
- Starter handle ②

NOTE:
Before untying knot ③, pull out the rope long enough to make knot ④ on the rope so that the rope is not pulled into the case.

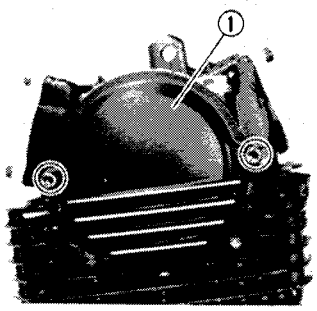


3. Remove:
- Nut ①
- Plate ②
- Spring ③
- Drive pawl ④
- Pawl spring ⑤
- Sheave drum ⑥
- Coil spring ⑦

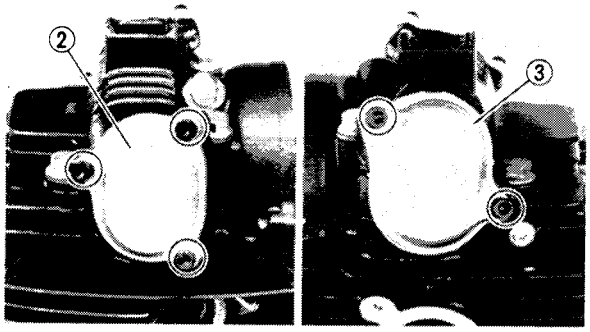


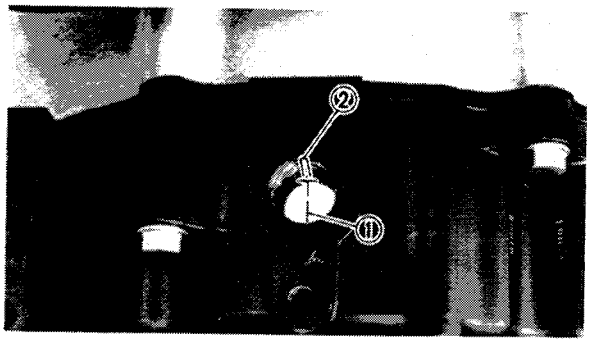
CYLINDER HEAD AND CYLINDER

1. Remove:
- Spark plug
- Timing plug ①



2. Remove:
- Side cover ① (cylinder head)
- O-ring (side cover)
- Tappet cover ② (exhaust)
- O-ring (exhaust cover)
- Tappet cover ③ (intake)
- O-ring (intake cover)

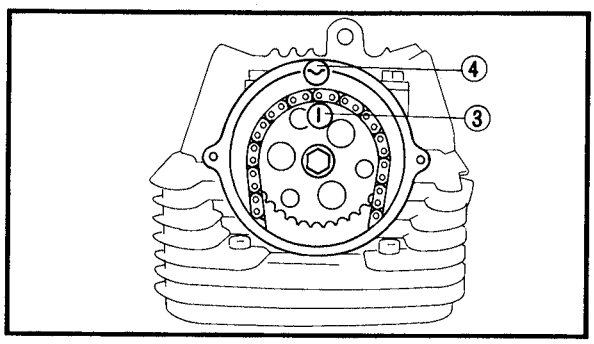




3. Align:
- "T" mark on the flywheel
  With the stationary pointer on the crankcase cover.

****

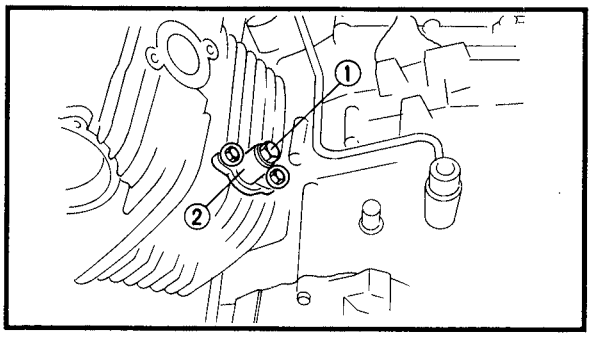
TDC alignment steps:
- Turn the starter pulley counterclockwise with wrench.
- Align the "T" mark ① on the flywheel with the stationary pointer ② on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).



NOTE:

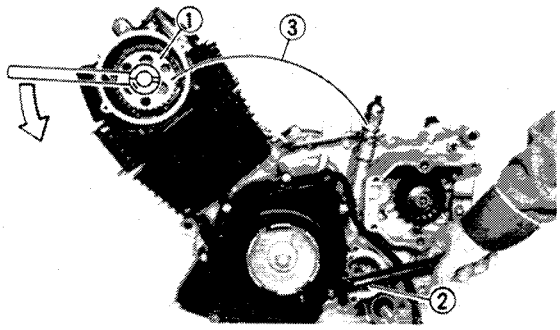
TDC on compression stroke check:
- Both rocker arms must have a valve clearance when the cam sprocket match mark ③ is aligned with the cylinder head match mark ④.
- If not, give the crankshaft one counterclockwise turn to meet the above condition.

****



4. Loosen:
- End plug (cam chain tensioner) ①

5. Remove:
- Cam chain tensioner body ②
- Gasket

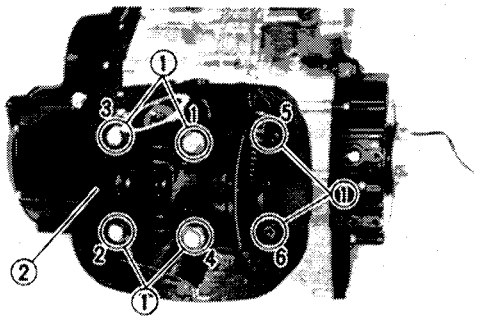


6. Remove:
- Cam sprocket ①

Use the rotor holder ② to hold the starter pulley.

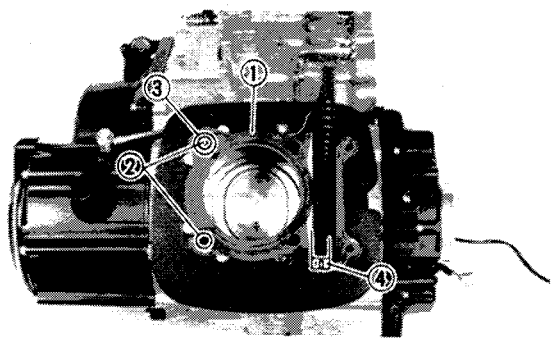
	Rotor holder: **P/N. YU-01235, 90890-01235**

NOTE:
- Fasten safety wire ③ to the cam chain to prevent it from failling into the crankcase.
- When removing the cam sprocket, it is not necessary to separate the cam chain.

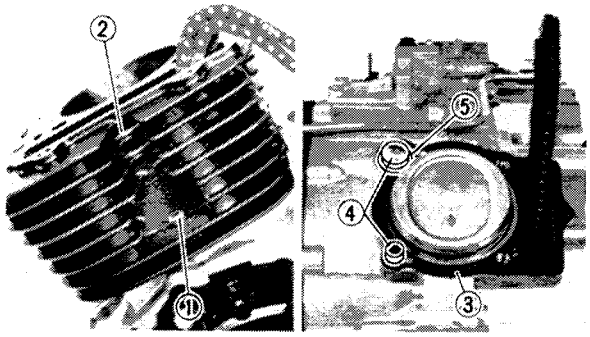


7. Remove:
- Bolts ① (cylinder head)
- Cylinder head ②

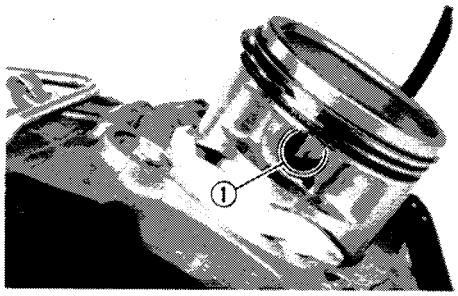
NOTE:
Loosen the bolts starting with the highest numbered one.



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



9. Remove:
- Bolt ① (cylinder)
- Cylinder ②
- Gasket ③ (cylinder)
- Dowel pins ④
- O-ring ⑤

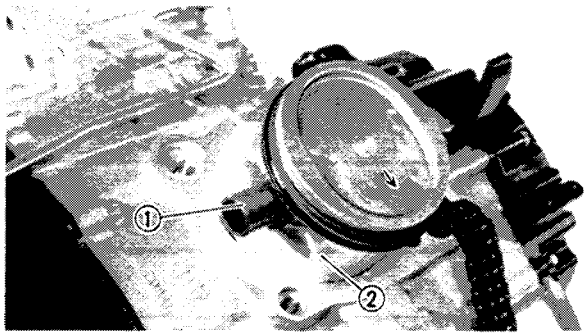


PISTON

1. Remove:
- Piston pin clip ①

NOTE:

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



2. Remove:
- Piston pin ①
- Piston ②

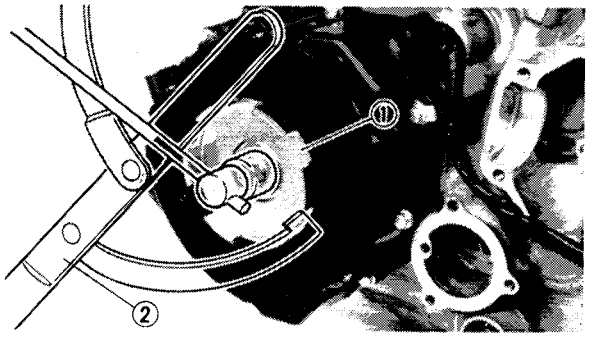
NOTE:

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

	Piston pin puller: **P/N. YU-01304, 90890-01304**

CAUTION:

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

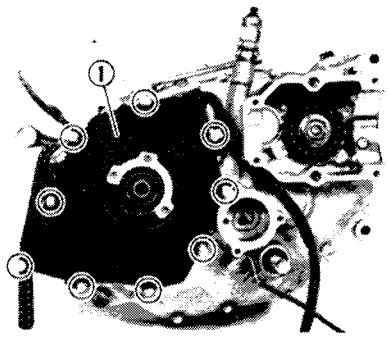


CRANKCASE COVER (LEFT)

1. Remove:
- Starter pulley ①

  Use the rotor holder ② to hold the starter pulley.

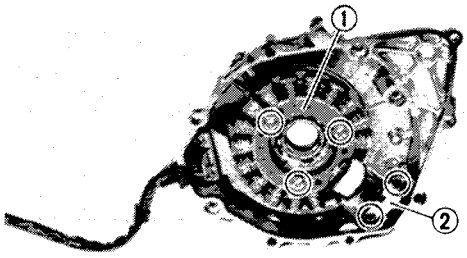
	Rotor holder **P/N. YU-01235, 90890-01235**



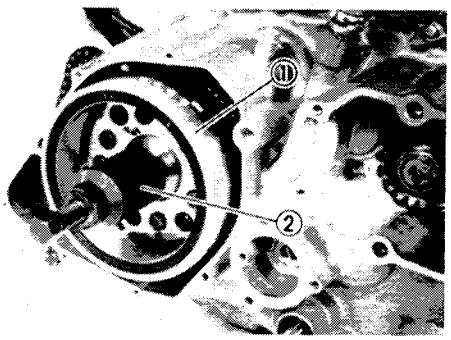
2. Remove:
- Crankcase cover ① (left)
- Gasket
- Dowel pins

NOTE:

When removing the crankcase cover, the plain washer will fall off. Take care not to lose it.



3. Remove:
- Startor assembly ①
- Pickup coil assembly ②

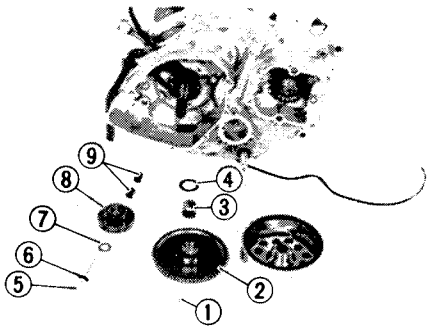


CDI ROTOR

1. Remove:
- CDI rotor ①

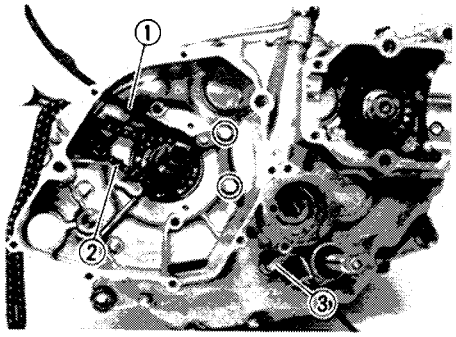
  Use the flywheel puller ②.

	Flywheel puller **P/N. YM-01404, 90890-01404**

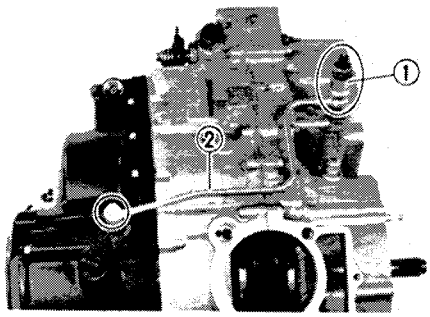


2. Remove:
- Woodruff key ①
- Starter idle gear #2 ②
- Bearing ③
- Plain washer ④
- Shaft ⑤
- Circlips ⑥
- Plain washer ⑦
- Starter idle gear #1 ⑧
- Bearings ⑨

CAM CHAIN AND OIL PIPE



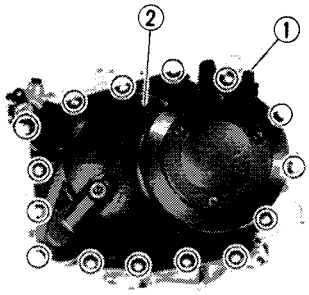
1. Remove:
- Cam chain damper ① (intake)
- Cam chain ②
- "NEUTRAL" switch lead ③



2. Remove:
- Thermo unit ①
- Oil pipe ②

CAUTION:

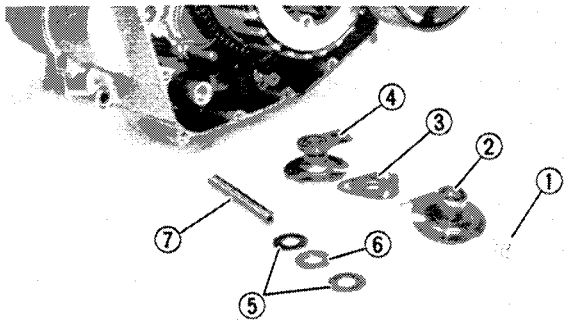
Handle the thermo unit with special care. Never subject it strong shock or allow it to be dropped. Should it be dropped, it must be replaced.



CRANKCASE COVER (RIGHT)

1. Remove:
- Dipstick ①
- Crankcase cover ② (right)
- Dowel pins
- Gasket

NOTE:
- Working in a crisscross pattern, loosen bolt 1/4 turn each. Remove them after all are loosened.
- Before removing the crankcase cover, remove the dip stick.



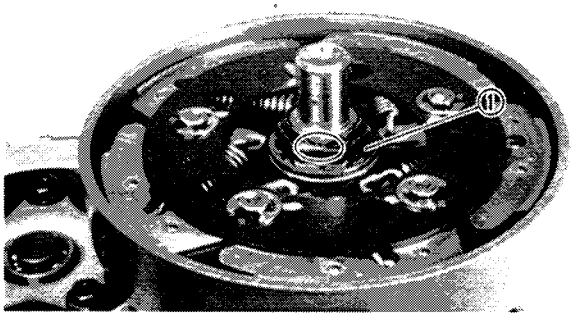
CLUTCH

Shift guide

1. Remove:
- Clutch lever spring ①
- Shift guide #1 ②
- Pawl holder ③
- Shift guide #2 ④
- Plain washers ⑤
- Bearing ⑥
- Shift shaft ⑦

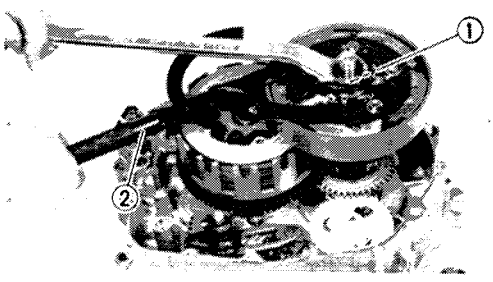
Primary clutch and secondary clutch

1. Straighten:
- Lock nut ①

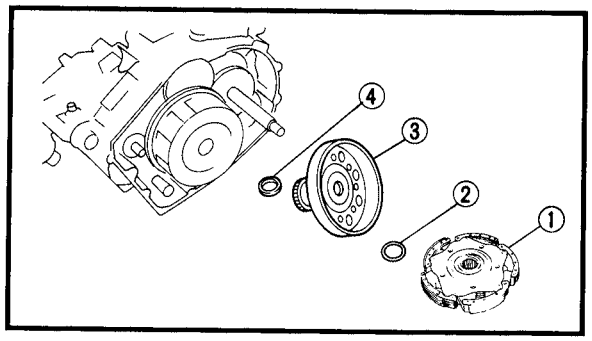


NOTE:
Flatten the punched portion of the primary clutch nut using the drift punch.

2. Remove:
- Nut ① (primary clutch)
  Use the rotor holder ② to hold the clutch shoe assembly.

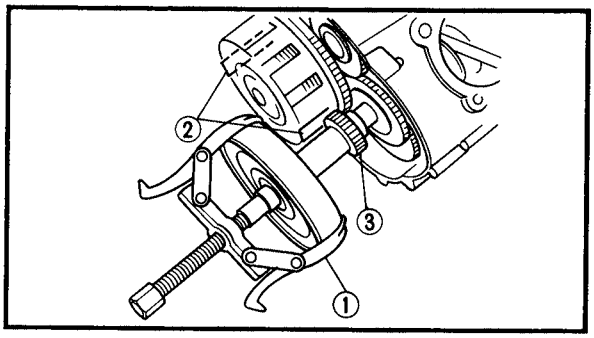


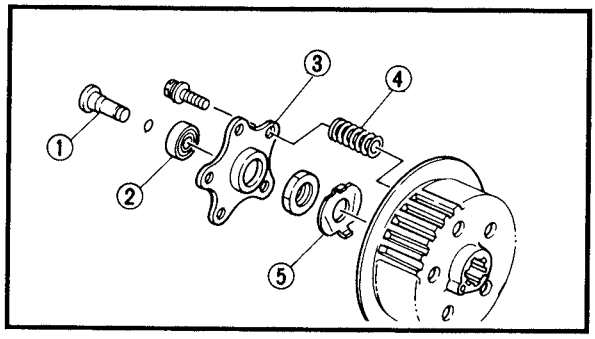
	Rotor holder: **P/N. YU-01235, 90890-01235**



3. Remove:
- Lock washer
- Clutch carrier assembly ①
- Plain washer ②
- Clutch housing comp. ③
- Plain washer ④

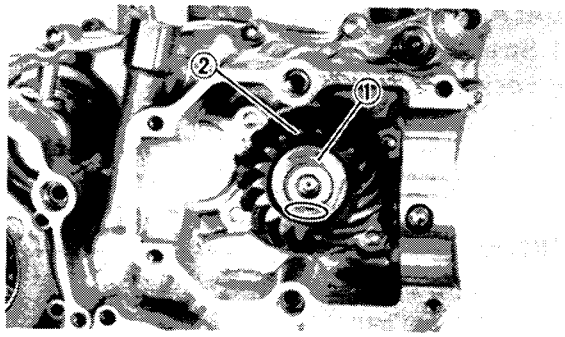
NOTE:
- Using the suitable two-leg puller ① when removing the clutch carrier assembly and chtch housing comp.
- The secondary clutch housing has two notches ② machines into it to permit the primary drive gear behind the primary clutch to clear the secondary clutch. Align one of these notches with the primary gear ③ before removing the primary clutch assembly.





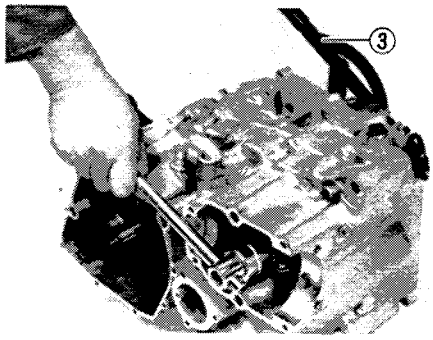
4. Remove:
- Push rod ①
- Bearing ②
- Clutch spring plate ③
- Clutch springs ④

5. Straighten:
- Lock washer tabs ⑤ (clutch boss)



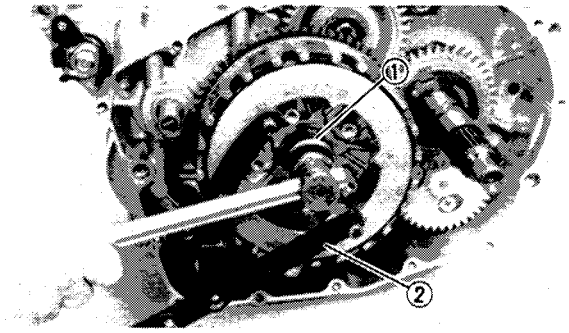
6. Remove:
- Nut ① (meddle drive pinion gear)
- Middle drive pinion gear ②

NOTE:
- Flatten the punched portion of the middle drive gear nut using the drift punch.
- Put the engine in 1st, and carry out the operation.



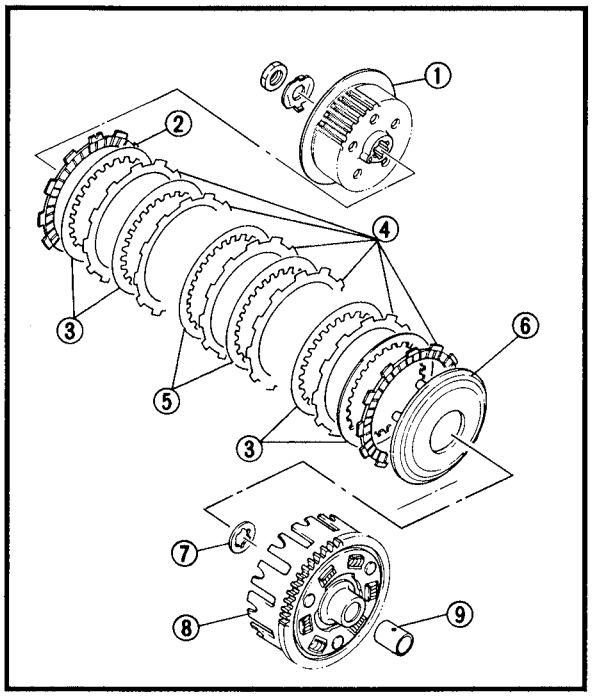
Use the rotor holder ③ hold the clutch boss.

	Rotor holder: **P/N. YU-01235, 90890-01235**

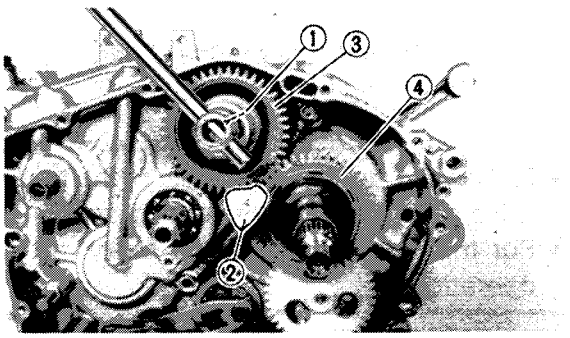


7. Remove:
- Nut ① (clutch boss)
  Use the rotor holder ② to hold the clutch boss.
- Lock washer

	Rotor holder: **P/N. YU-01235, 90890-01235**



8. Remove:
- Clutch boss ①
- Friction plate ② (cut - 1 pc.)
- Clutch plates ③
  (thickness: 1.6 mm - 4 pcs.)
- Friction plates ④ (red - 6 pcs.)
- Clutch plates ⑤
  (thickness: 2.0 mm - 2 pcs.)
- Pressure plate ⑥
- Thrust washer ⑦
- Clutch housing ⑧
- Collar ⑨



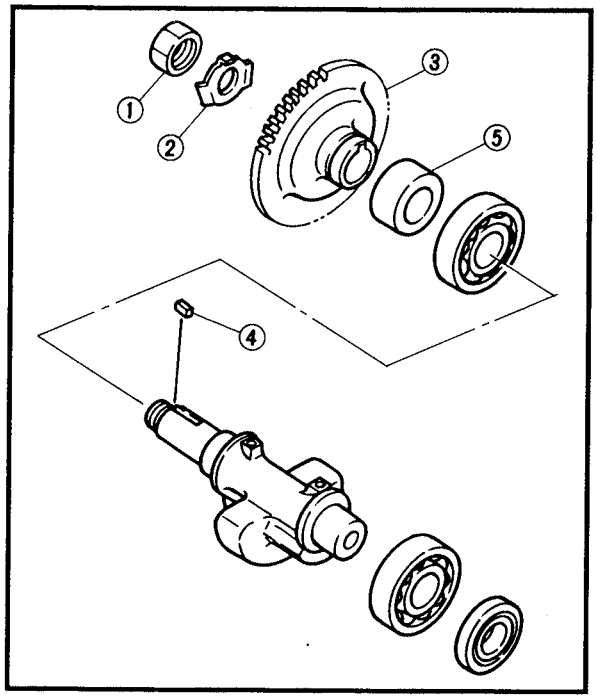
BALANCER DRIVE AND DRIVEN GEARS

1. Straighten:
- Lock washer tabs (driven gear)

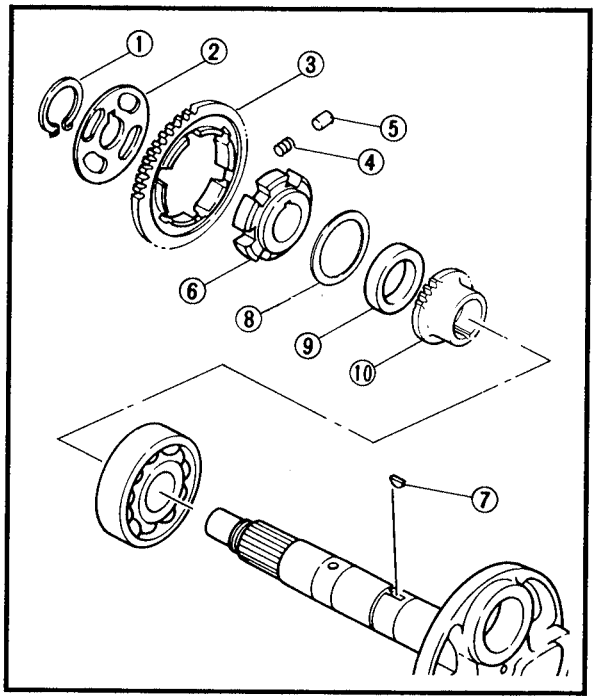
2. Loosen:
- Nut ① (driven gear)

NOTE:

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

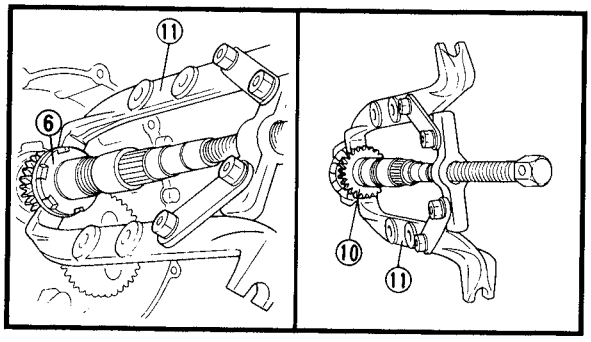


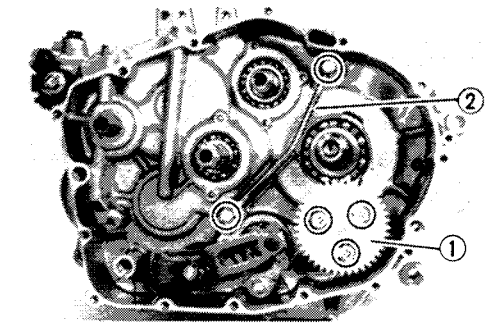
3. Remove:
- Nut ①
- Lock washer ②
- Balance driven gear ③
- Key ④ (straight)
- Collar ⑤



4. Remove:
- Circlip ①
- Holding plate ②
- Balancer drive gear ③
- Springs ④
- Pins ⑤
- Buffer boss ⑥
- Key ⑦ (woodruff)
- Plain washer ⑧
- Collar ⑨
- Oil pump drive gear ⑩

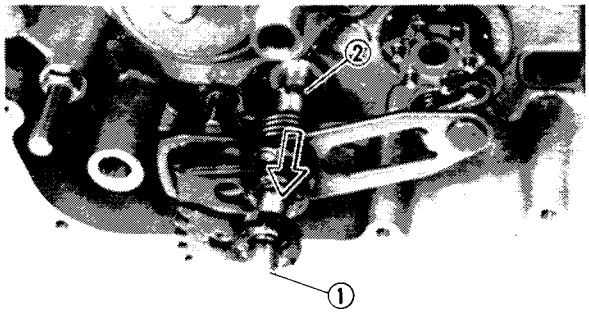
NOTE:
- The balancer drive gear has six springs and three pins. Use care so they do not fall out when removing the balancer drive gear.
- Using the suitable two-leg puller ⑪ when removing the buffer boss ⑥ and oil pump drive gear ⑩.



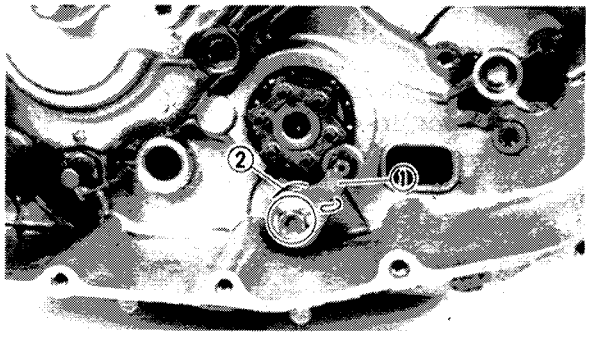


OIL PUMP AND SHIFTER

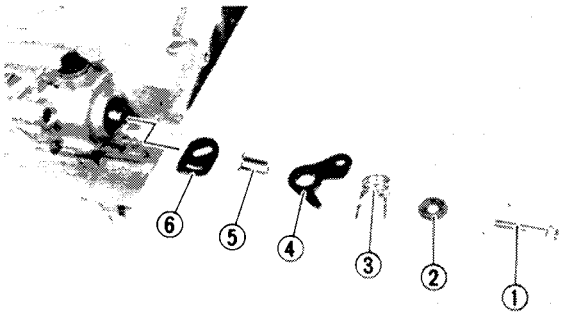
1. Remove:
- Oil pump assembly ①
- Gasket (oil pump)
- Oil pipe ②



2. Remove:
- Shift shaft ①
  Pull the shift shaft out from left to right.
- Plain washer ②

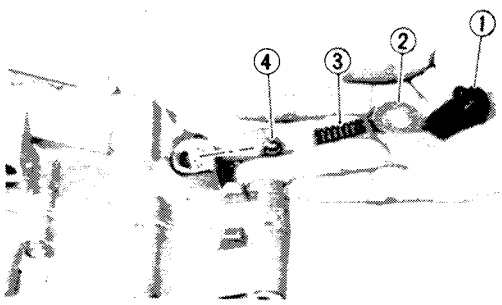


3. Remove:
- Stopper lever ①
- Spring ②



CRANKCASE

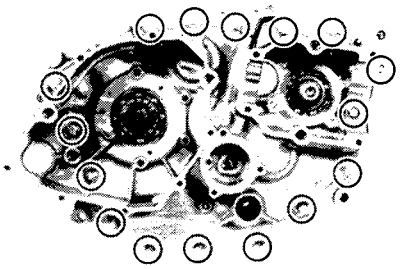
1. Remove:
- Bolt ①
- Plain washer ②
- Return spring ③
- Lever ④ (outside)
- Collar ⑤
- Lever ⑥ (inside)



2. Remove:
- Bolt ① (shift cam 2)
- Plain washer ②
- Spring ③
- Ball ④

NOTE:

When removing the bolt, the spring will fall out. Take care not to lose it.

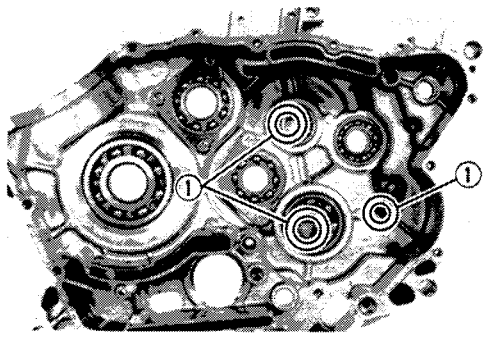


3. Remove:
- Bolts (crankcase)

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

4. Remove:
- Crankcase (right)
- Dowel pins

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



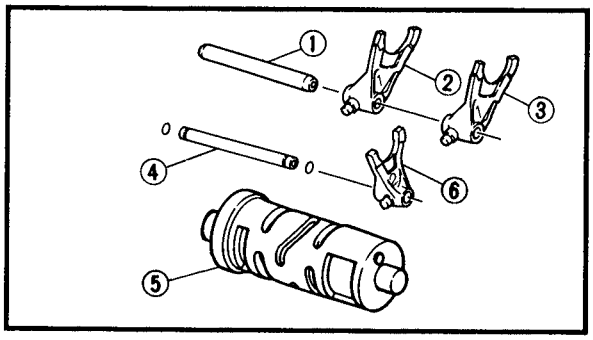
NOTE:
When removing the crankcase (right), the three plain washer ① will fall off. Take care not to lose these parts.

TRANSMISSION, MIDDLE DRIVE AXLE AND CRANKSHAFT

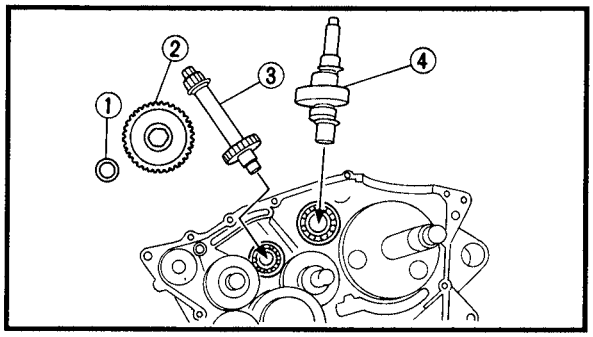
NOTE:
When removing the transmission gears, mark the gear tooth number to avoid confusion.

Shift fork and shift cam

1. Remove:
- Guide bar #2 ① (longer)
- Shift fork #1 ② (outside)
- Shift fork #1 ③ (inside)
- Guide bar #1 ④ (shorter)
- Shift cam #1 ⑤
- Shift fork #2 ⑥

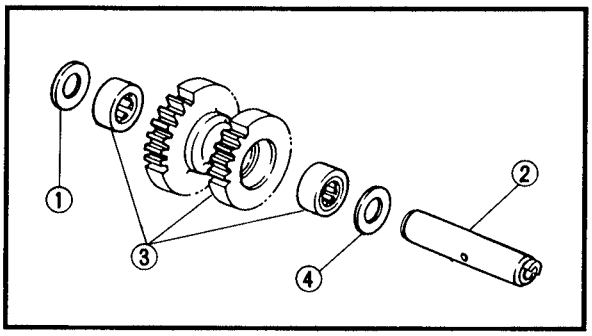


NOTE:
Note the position of each part. Pay particular attention to the location and direction of shift forks.



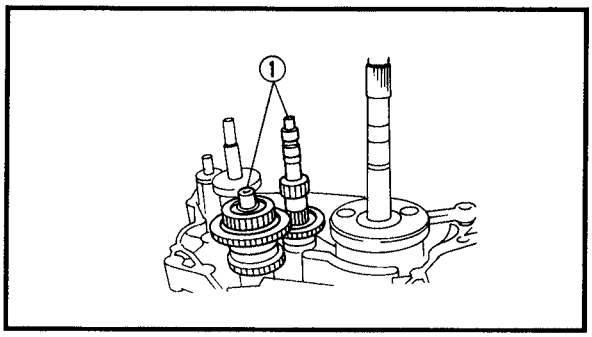
Reverse axle and balancer weight

1. Remove:
- Plain washer ① (reverse axle)
- Reverse wheel gear #1 ② (36T)
- Reverse axle ③
- Balancer weight ④



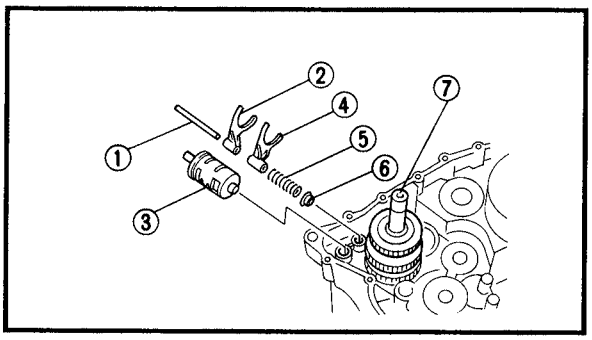
High wheel gear

1. Remove:
- Plain washer ①
- High wheel gear shaft ②
- High wheel gear ③
- Plain washer ④



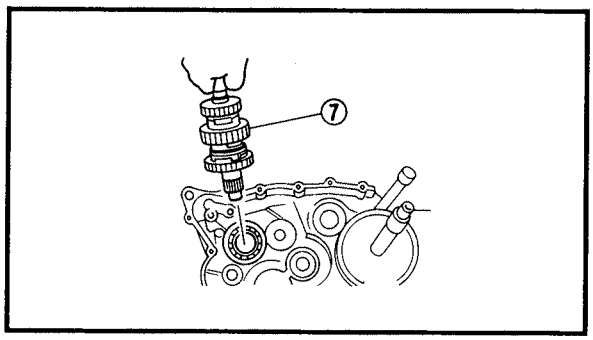
Transmission

1. Remove:
- Transmission ①



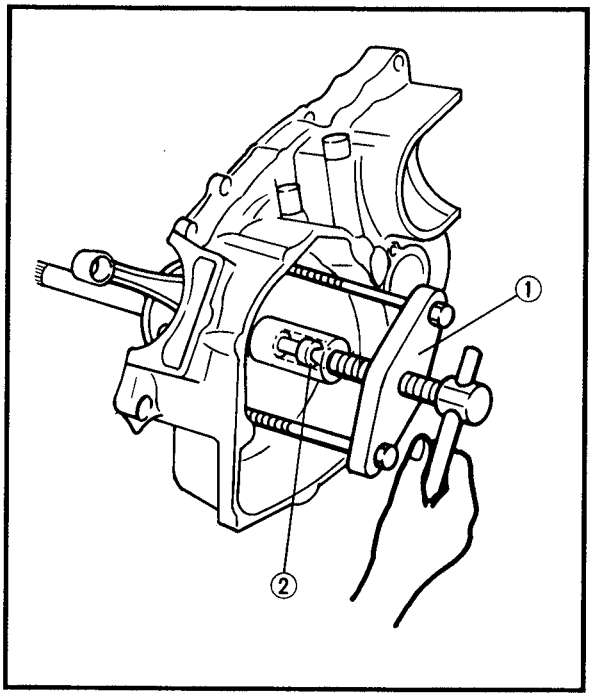
Middle drive axle

1. Remove:
- Guide bar #2 ①
- Shift fork #2 ②
- Shift cam #2 ③
- Shift fork #1 ④
- Spring ⑤
- Spring cap ⑥
- Middle drive axle assembly ⑦



NOTE:

When removing the shift fork #1 ④, raising the middle drive axle assembly ⑦ slightly will make removal easier.



Crankshaft

1. Remove:
- Crankshaft

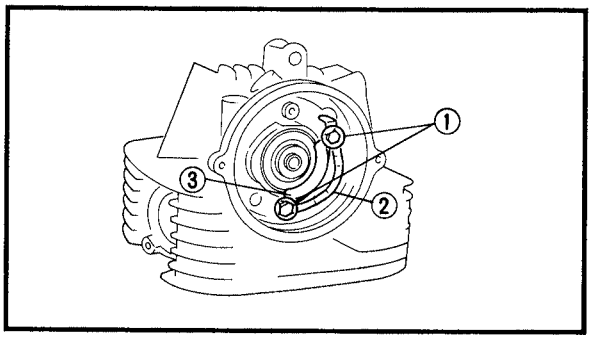
Use the crankcase separating tool ① and crankshaft protector ②.

Crankcase separating tool:
P/N. YU-01135-A, 90890-01135
Flywheel puller attachment:
P/N. YM-01382, 90890-01382

CAMSHAFT, ROCKER ARM AND VALVE

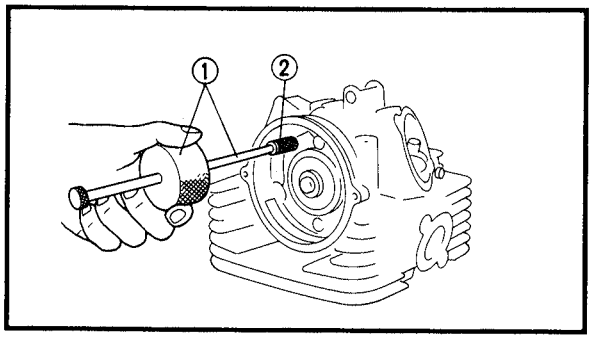
NOTE:

With the engine mounted, the camshaft, rocker arm and valve can be maintained by removing the following parts.
- Seat
- Front fender
- Fuel tank
- Exhaust pipe
- Carburetor



1. Straighten:
- Lock washer tabs

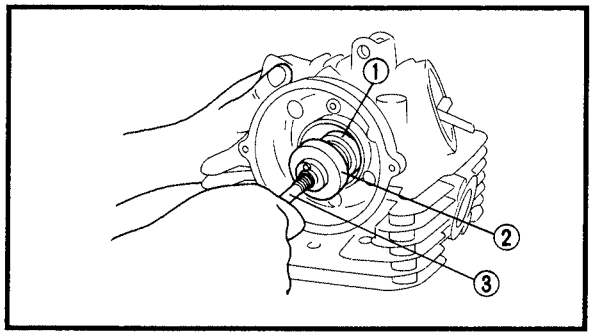
2. Remove:
- Bolts ① (camshaft)
- Lock washer ②
- Retainer ③



3. Attach:
- Slide hammer set ①

Slide hammer set:
P/N. YU-01083-A
Slide hammer bolt (M6):
P/N. 90890-01083
Weight:
P/N. 90890-01084

4. Remove:
- Rocker arm shafts ②
- Rocker arms

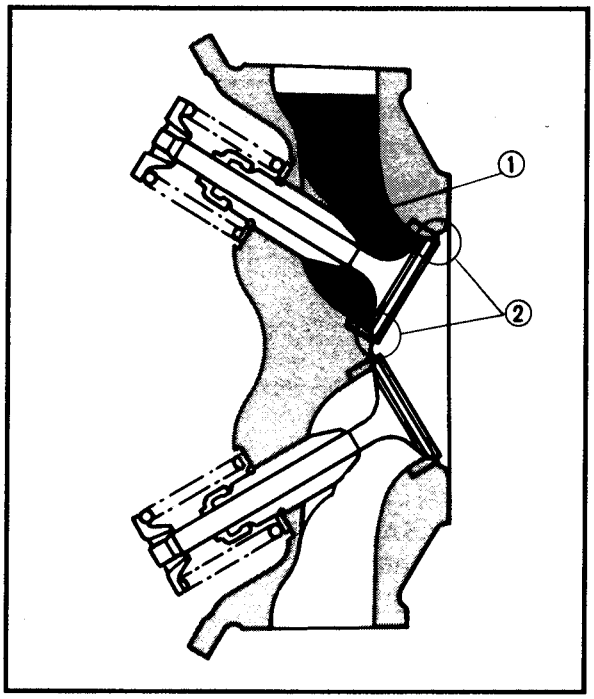


5. Remove:
- Camshaft ①
- Camshaft bearing ②

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

6. Check:
- Valve sealing
  Leakage at valve seat → Inspect the valve face, valve seat and valve seat width.
  Refer to the "INSPECTION AND REPAIR – VALVE SEAT" section.

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



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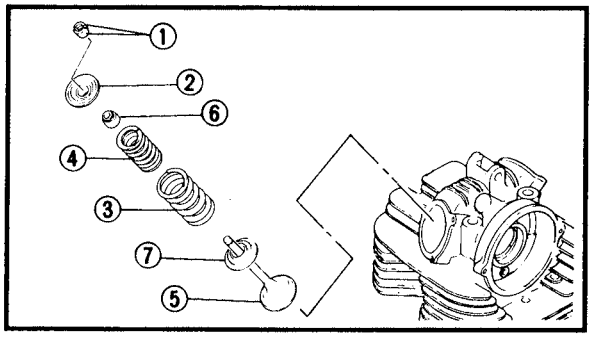
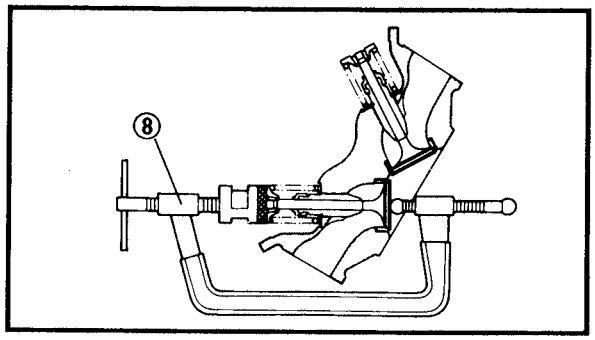
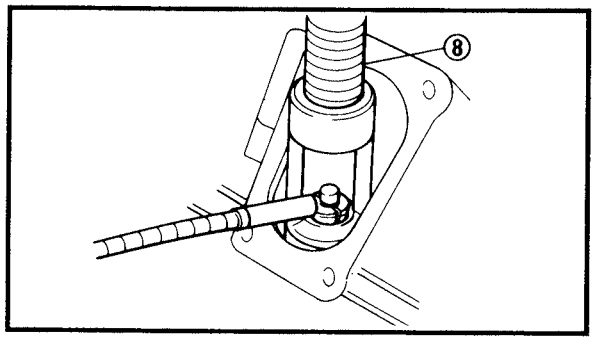
Checking steps:
- Supply a clean solvent ① into the intake and exhaust ports.
- Check the valve sealing. There should be no leakage at the valve seats ②.

****



7. Remove:
- Valve cotter ①
- Spring retainer ②
- Valve spring ③ (outer)
- Valve spring ④ (inner)
- Valve ⑤
- Oil seal ⑥
- Spring seat ⑦

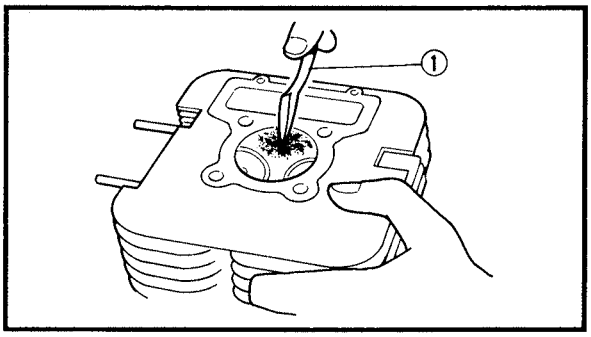




NOTE:

Compress the valve spring to remove the valve cotters by the valve spring compressor ⑧.

Valve spring compressor:
P/N. YM-04019, 90890-04019



INSPECTION AND REPAIR

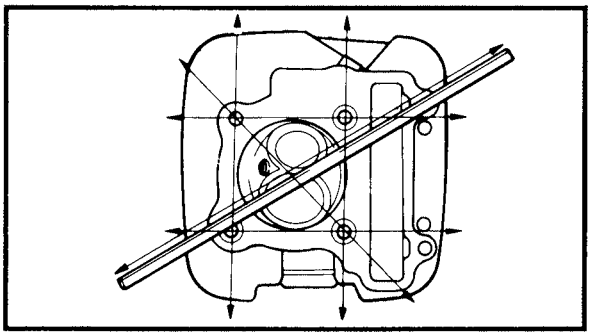
CYLINDER HEAD

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

NOTE:

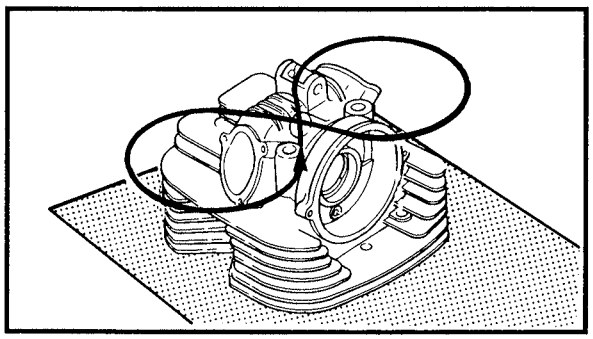
Do not use a sharp instrument and avoid damaging or scratching:
- Spark plug threads
- Valve seat

2. Inspect:
- Cylinder head
  Scratches/Damage → Replace.



3. Measure:
- Warpage
  Out of specification → Resurface.

Cylinder head warpage:
Less than 0.03 mm (0.0012 in)



4. Resurface:
- Cylinder head

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Resurfacement steps:

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

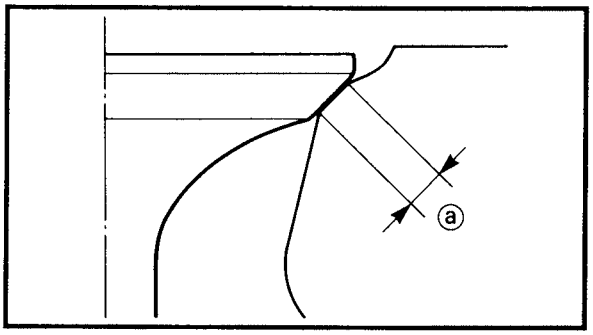
NOTE:

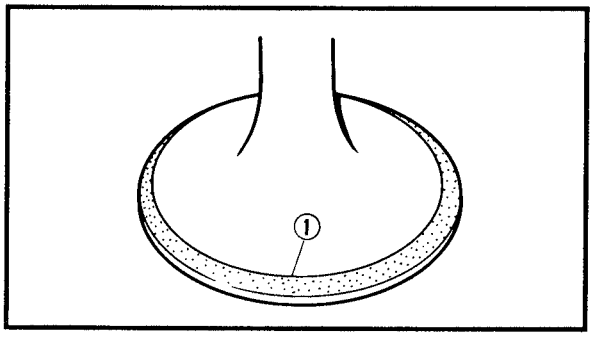
Rotate the head several times to avoid removing too much material from one side.

****

VALVE SEAT

1. Eliminate:
- Carbon deposit
  (from valve face and valve seat)
2. Inspect:
- Valve seat
  Pitting/Wear → Reface the valve seat.





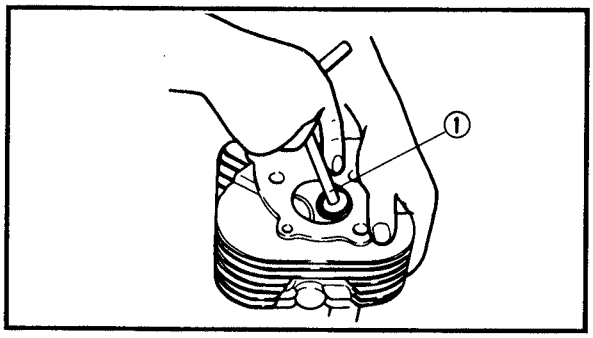
3. Measure:
- Valve seat width ⓐ
  Out of specification → Reface valve seat.

	Valve seat width:	Limit:
Intake	1.2 ~ 1.4 mm (0.048 ~ 0.055 in)	1.6 mm (0.06 in)
Exhaust	1.2 ~ 1.4 mm (0.048 ~ 0.055 in)	1.6 mm (0.06 in)

****

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

****

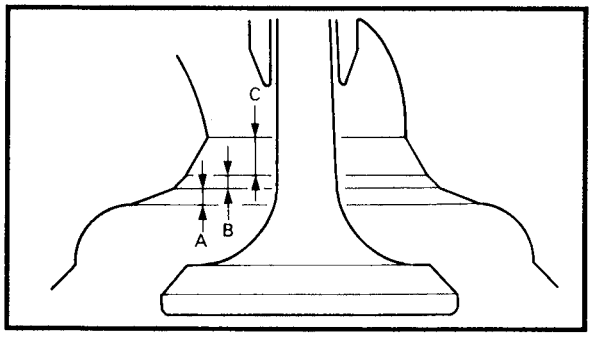


4. Reface:
- Valve seat
  Use a 20°, 45° and 60° valve seat cutter ①.

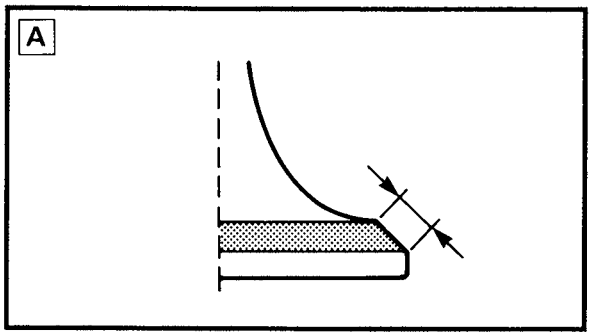
	Valve seat cutter: P/N. YM-91043

CAUTION:

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



Cut sections as follows	
Section	Cutter
A	20°
B	45°
C	60°



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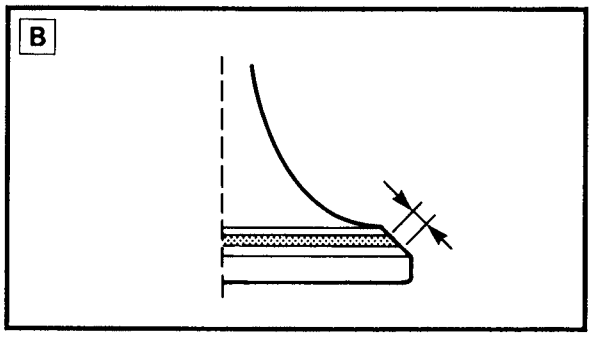
Valve seat refacing steps:

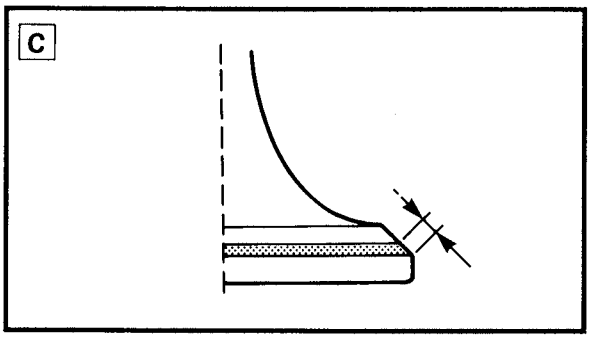
[A] Valve face indicates that valve seat is centered on valve face but is too wide.

Valve seat cutter set		Desired result
Use lightly	20° cutter	To reduce valve seat width to 1.3 mm (0.051 in).
	60° cutter	



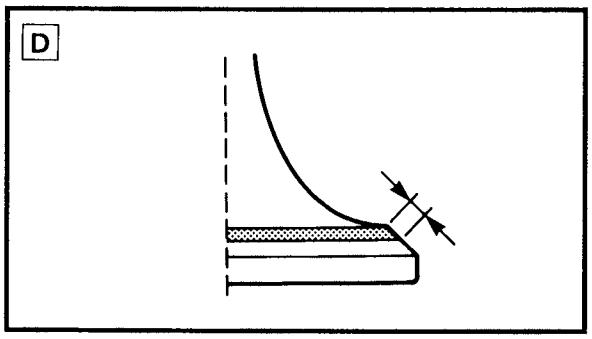
[B] Valve seat is in the middle of the valve face but too narrow.

Valve seat cutter set		Desired result
Use	45° cutter	To achieve a uniform valve seat width of 1.3 mm (0.051 in).



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

Valve seat cutter set		Desired result
Use	20° cutter, first	To center the seat and to achieve its width of 1.3 mm (0.051 in).
	45° cutter	



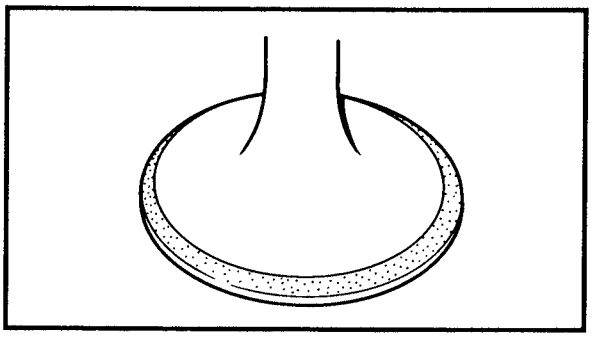
[D] Valve seat is too narrow and is located down near the bottom edge of the valve face.

Valve seat cutter set		Desired result
Use	60° cutter, first	To center the seat and increase its width.
	45° cutter	

****

5. Lap:
- Valve face
- Valve seat

NOTE:
When refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.



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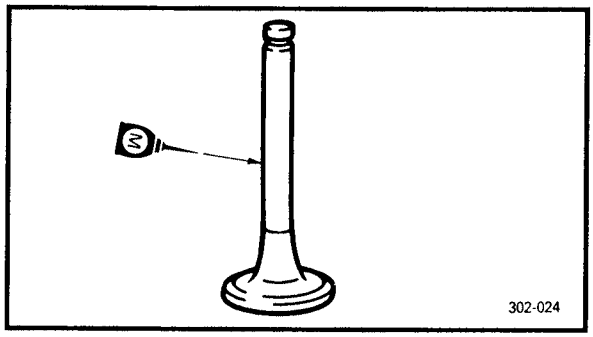
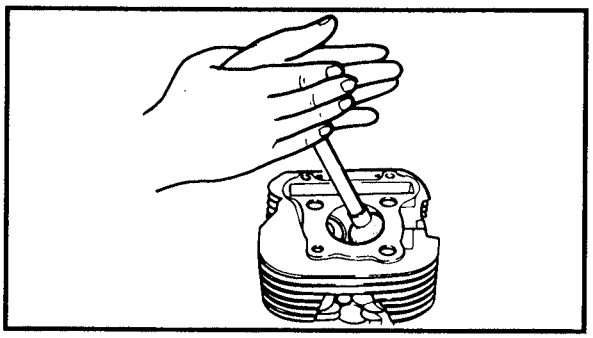
Lapping steps:
- Apply a coarse lapping compound to the valve face.

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



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

NOTE:
To obtain the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

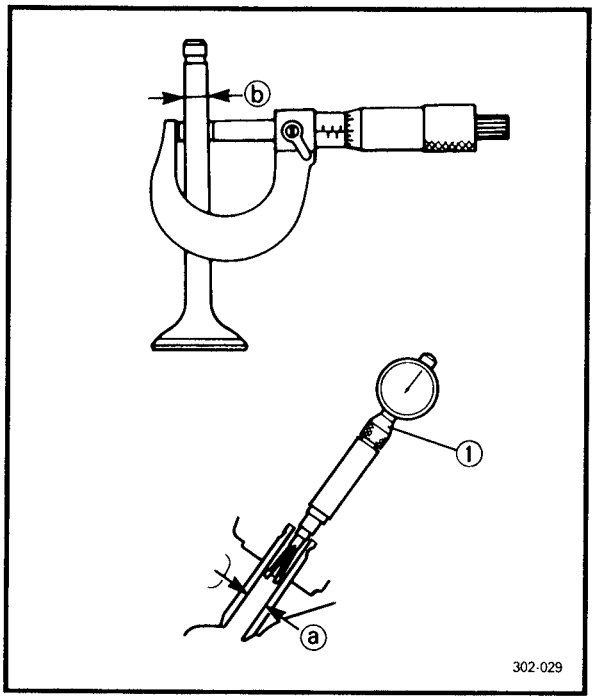


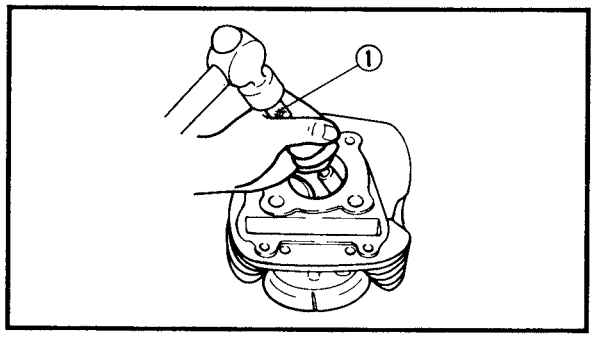
- Apply a fine lapping compound to the valve face and repeat the above steps.

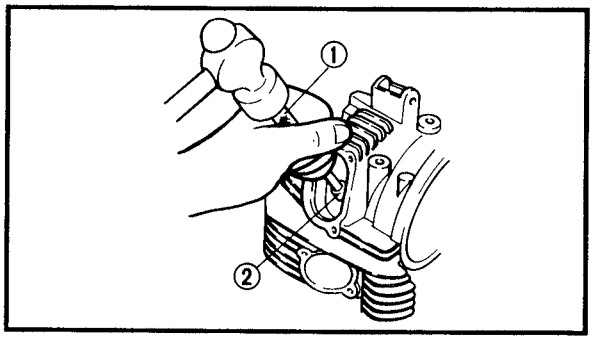
NOTE:
Be sure to clean off all compound from the valve face and valve seat after every lapping operation.

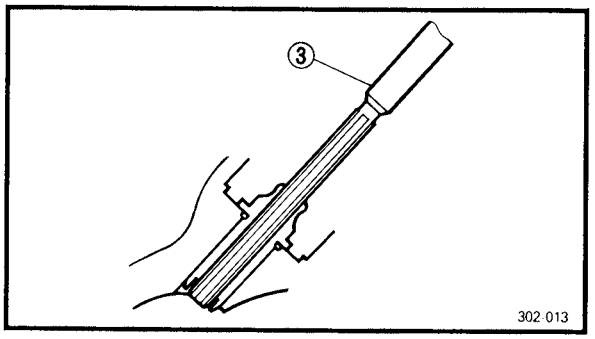
- Apply the mechanic's bluing dye (dykem) to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width again. If the valve seat width is out of specification, reface and lap the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

****









VALVE AND VALVE GUIDE

1. Measure:
- Stem-to-guide clearance

Stem-to-guide clearance=
Valve guide inside diameter ⓐ — Valve stem diameter ⓑ

Out of specification → Replace valve guide.

	Stem-to-guide clearance:	Limit:
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)
Exhaust	0.030 ~ 0.057 mm (0.0012 ~ 0.0022 in)	0.10 mm (0.0039 in)

① Bore gauge

****

Replacement steps:

NOTE:

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

- Remove the valve guide using the valve guide remover ①.
- Install the valve guide (new) using the valve guide installer ② and valve guide remover ①.
- After installing the valve guide, bore the valve guide using the valve guide reamer ③ to obtain proper stem-to-guide clearance.

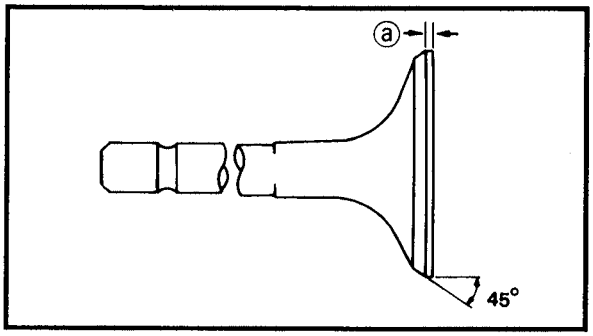
Valve guide remover
7 mm (0.28 in):
P/N. YM-01225-A, 90890-01225
Valve guide installer:
P/N. YM-04017, 90890-04017
Valve guide reamer 7 mm (0.28 in):
P/N. YM-01227, 90890-01227

NOTE:

Reface the valve seat after replacing the valve guide.

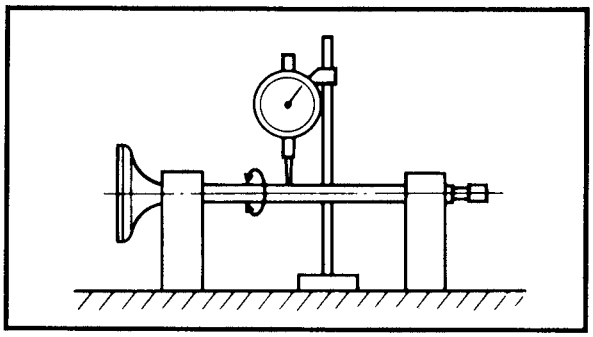
2. Eliminate:
- Carbon deposit (from valve face)

3. Inspect:
- Valve stem
  Damage/Broken → Replace
- Valve face
  Pitting/Wear → Grind the face.
- Valve stem end
  Mushroom shape or diameter larger than rest of stem → Replace.



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

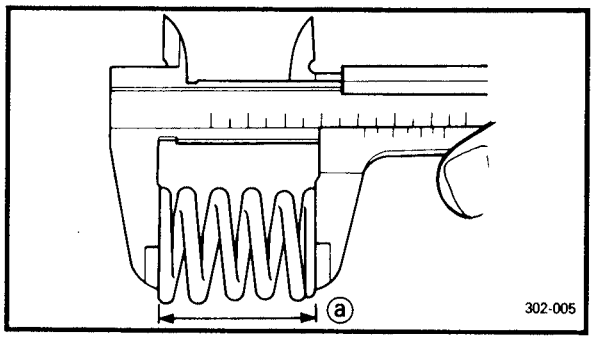
Margin thickness:
Intake
1.0 ~ 1.4 mm (0.039 ~ 0.055 in)
Exhaust
0.8 ~ 1.2 mm (0.031 ~ 0.047 in)



5. Measure:
- Runout (valve stem)
  Out of specification → Replace.

Stem runout limit:
0.02 mm (0.0008 in)

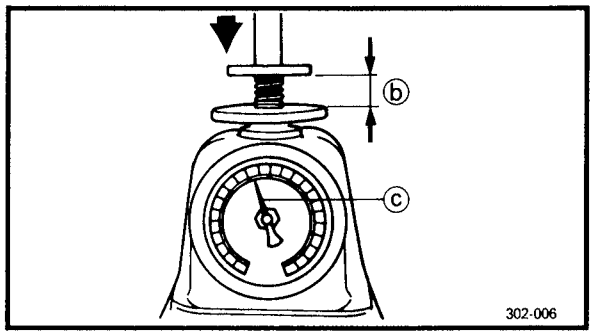
NOTE:
- Always replace the guide if the valve is replaced.
- Always replace the oil seal if the valve is removed.

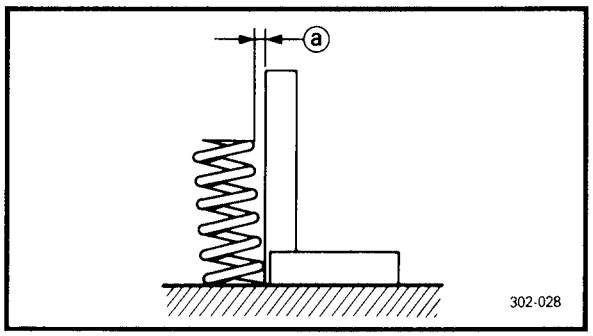


VALVE SPRING

1. Measure:
- Valve spring free length ⓐ
  Out of specification → Replace.

Valve spring free length:		Limit:
Inner spring	39.9 mm (1.57 in)	37.9 mm (1.49 in)
Outer spring	43.27 mm (1.70 in)	41.27 mm (1.62 in)





2. Measure:
- Valve spring installed force ⓒ
  Out of specification → Replace.

ⓑ Installed length

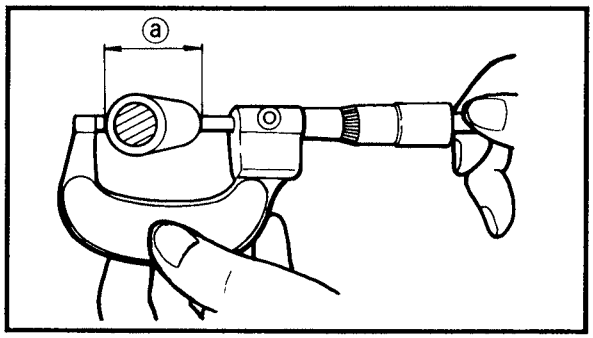
Valve spring installed force:			
Inner spring		Outer spring	
ⓑ	ⓒ	ⓑ	ⓒ
33.6 mm (1.32 in)	10.7 ~ 12.3 kg (23.6 ~ 27.1 lb)	36.6 mm (1.44 in)	24.0 ~ 25.6 kg (52.9 ~ 56.4 lb)

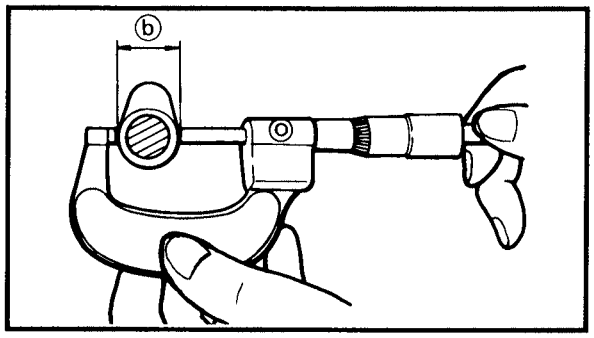
3. Measure:
- Spring Tilt ⓐ
  Out of specification → Replace.

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

CAMSHAFT

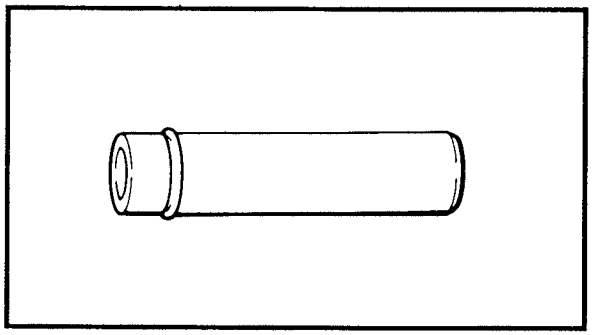
1. Inspect:
- Camshaft bushing
  Wear/Damage → Replace
- Camshaft needle bearing (in head)
  Wear/Damage → Replace
- Cam lobes
  Pitting/Scratches/Blue discoloration → Replace.





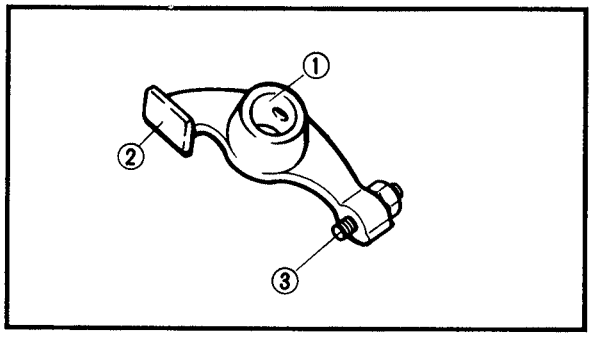
2. Measure:
- Cam lobes length ⓐ and ⓑ.
  Out of specification → Replace.

	Cam lobe limit "A"	Cam lobe limit "B"
Intake	40.26 mm (1.585 in)	32.11 mm (1.264 in)
Exhaust	40.25 mm (1.585 in)	32.11 mm (1.264 in)

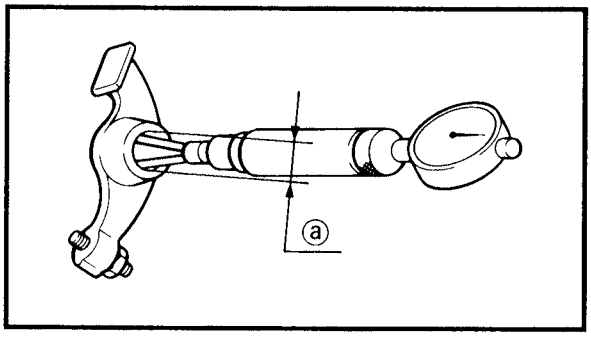


ROCKER ARM AND ROCKER ARM SHAFT

1. Inspect:
- Rocker arm shaft
  Blue discoloration/Grooves → Replace, then inspect lubrication system.



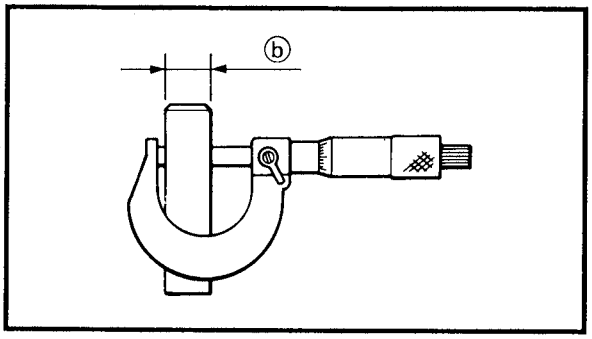
2. Inspect:
- Bore ① (rocker arm shaft)
- Cam lobe contact surface ②
- Adjuster surface ③
  Wear/Pitting/Scratches/Blue discoloration → Replace, then inspect lubrication system.

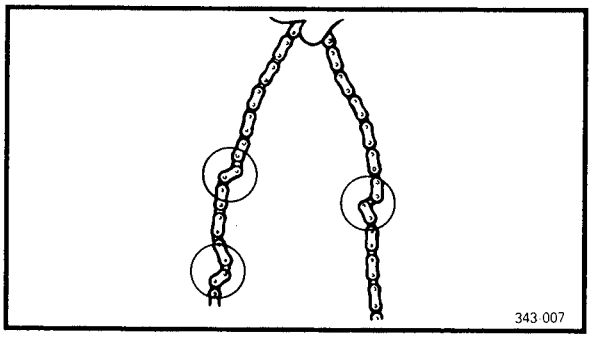


3. Measure:
- Arm-to-shaft clearance
  Out of specification → Replace as a set.

Arm-to-shaft clearance =
Bore size (rocker arm shaft) ⓐ —
Outside diameter (rocker arm shaft) ⓑ

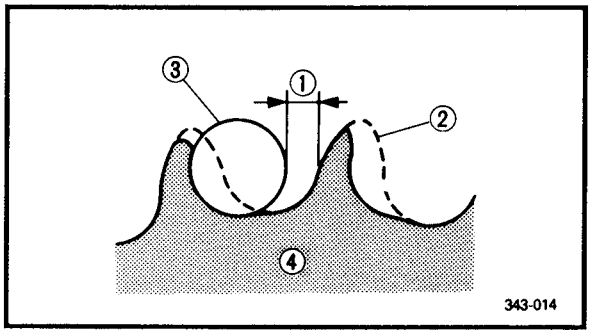
Arm-to-shaft clearance:
0.009 ~ 0.037 mm
(0.0003 ~ 0.0015 in)
<Limit: 0.08 mm (0.0031 in)>





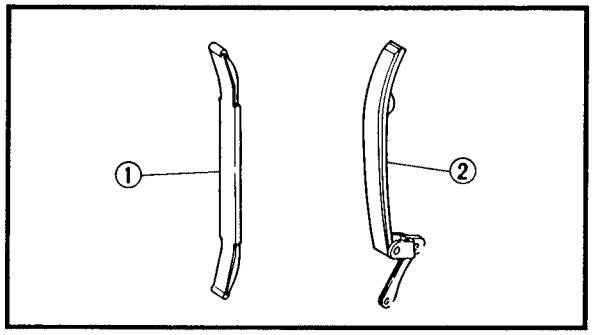
CAM CHAIN TENSIONER

1. Inspect:
- Cam chain
  Stiff/Cracks → Replace cam chain and cam sprocket as a set.

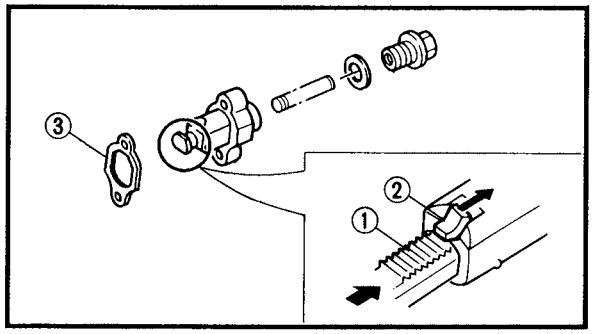


2. Inspect:
- Cam sprocket
  Wear/Damage → Replace cam sprocket and cam chain as a set.

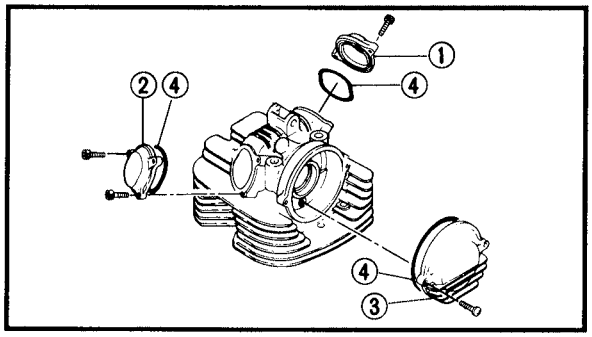
① 1/4 tooth
② Correct
③ Roller
④ Sprocket



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



4. Inspect:
- Tensioner rod ①
- One-way cam ②
- Gasket ③
  Damage → Replace.

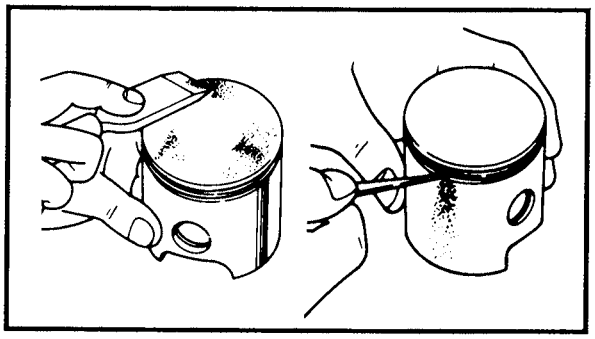


TAPPET COVER AND SIDE COVER

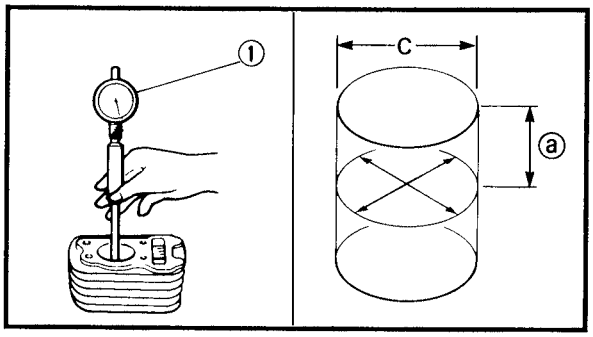
1. Inspect:
- Tappet cover ① (intake)
- Tappet cover ② (exhaust)
- Side cover ③
- O-ring ④
  Cracks/Damage → Replace.

CYLINDER AND PISTON

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



2. Eliminate:
- Carbon deposits
  (from the piston crown and ring grooves)



3. Measure:
- Piston-to-cylinder clearance

****

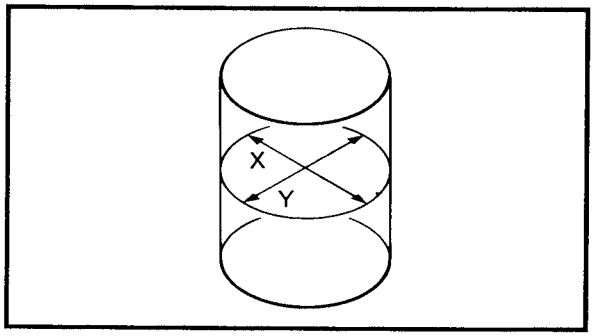
Measurement steps:

First steps

- Measure the cylinder bore "C" with a cylinder bore gauge ①.
  ⓐ 40 mm (1.57 in) from the cylinder top

NOTE:

Measure the cylinder bore "C" in parallel to and at right angles to the cylinder matching surface.
Then, find the average of the measurements.

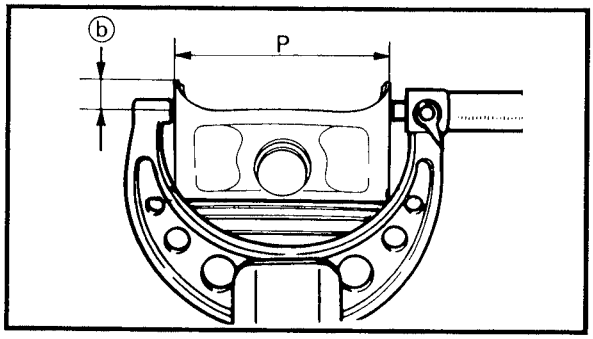


	Standard	Wear limit
Cylinder bore "C"	82.97 ~ 83.02 mm (3.267 ~ 3.269 in)	83.15 mm (3.27 in)
$C = \frac{X+Y}{2}$		

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

2nd steps

- Measure the piston skirt diameter "P" with a micrometer.
  ⓑ 5.5 mm (0.22 in) from the piston bottom edge



Piston skirt diameter "P"	
Standard	82.92 ~ 92.97 mm (3.265 ~ 3.267 in)

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

3rd steps

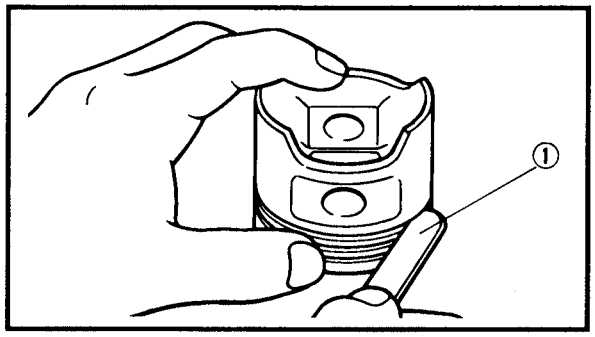
- Find the piston-to-cylinder clearance with following formula.

Piston-to-cylinder clearance=
Cylinder bore "C" — Piston skirt diameter "P"

Piston-to-cylinder clearance:
0.04 ~ 0.06 mm
(0.0016 ~ 0.0024 in)
Limit:
0.1 mm (0.004 in)

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

****

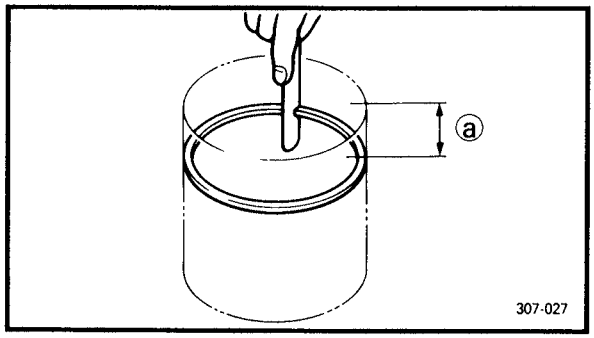


PISTON RING

1. Measure:
- Ring side clearance
  Use a feeler gauge ①.
  Out of specification → Replace piston, and rings as a set.

NOTE:
Clean carbon from piston ring grooves and rings before measuring side clearance.

	Side clearance	
	Standard	**Limit**
Top ring	**0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)**	**0.12 mm (0.0047 in)**
2nd ring	**0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)**	**0.12 mm (0.0047 in)**



2. Position:
- Piston ring
  (in cylinder)

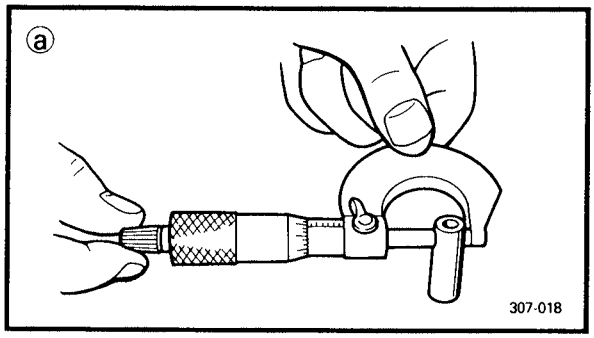
NOTE:
Insert a ring into cylinder, and push it approximately 20 mm (0.8 in) into the cylinder. Push ring with piston crown so that ring will be at right angle to cylinder bore.

ⓐ 20 mm (0.8 in)

3. Measure:
- Ring end gap
  Out of specification → Replace.

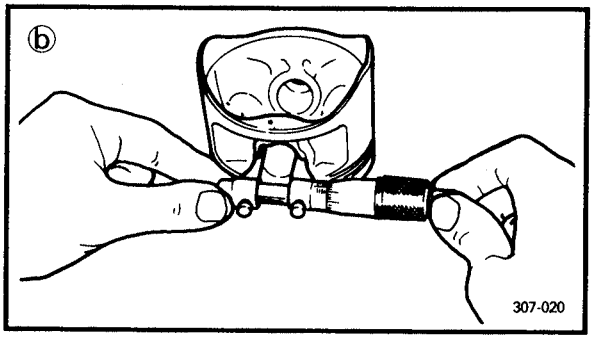
NOTE:
You cannot measure end gap on expander spacer of oil control ring. If oil control ring rails show excessive gap, replace all there rings.

	End gap	
	Standard	Limit
Top ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	0.5 mm (0.020 in)
2nd ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	0.5 mm (0.020 in)
Oil ring	0.3 ~ 0.9 mm (0.012 ~ 0.036 in)	—



PISTON PIN
1. Inspect:
- Piston pin
  Blue discoloration/Grooves → Replace then inspect lubrication system.
2. Measure:
- Outside diameter ⓐ (piston pin)
  Out of specification → Replace.

Outside diameter (piston pin):
18.990 ~ 18.995 mm
(0.7476 ~ 0.7478 in)



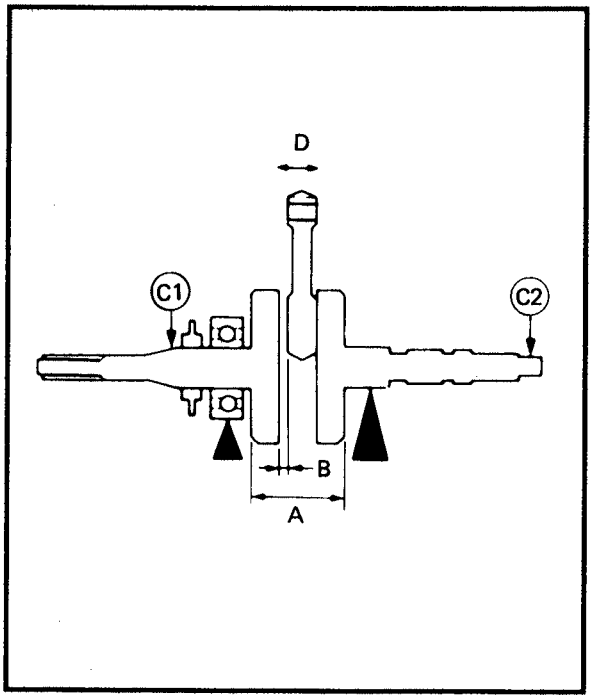
3. Measure:
- Piston pin bore inside diameter ⓑ (piston)
  Out of specification → Replace.

Piston pin bore inside diameter (piston):
19.004 ~ 19.015 mm
(0.7482 ~ 0.7486 in)

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

Piston pin-to-piston clearance =
Bore size (piston) ⓑ —
Outside diameter (piston pin) ⓐ

Piston pin-to-piston clearance:
0.009 ~ 0.025 mm
(0.0004 ~ 0.0010 in)
Limit: 0.07 mm (0.003 in)



CRANKSHAFT

1. Measure:
- Crank width Ⓐ
  Out of specification → Replace crankshaft.

Crank width:
58.95 ~ 59.00 mm
(2.321 ~ 2.323 in)

- Side clearance Ⓑ
  Out of specification → Replace big end bearing, connecting rod, crank pin and/or side washer as a set.

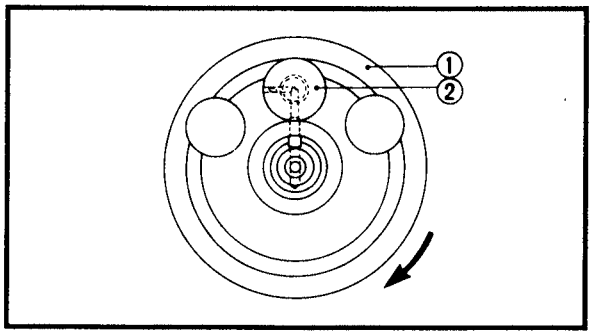
Big end side clearance:
0.35 ~ 0.85 mm (0.014 ~ 0.033 in)

- Runout Ⓒ
  Out of specification → Replace crankshaft.

Runout limit:
C1: 0.02 mm (0.0008 in)
C2: 0.06 mm (0.0024 in)

- Small end free play Ⓓ
  Out of specification → Replace big end bearing, crank pin, connecting rod and/or side washer as a set.

Small end free play:
Standard: 0.8 ~ 1.0 mm (0.03 ~ 0.04 in)
Limit: 2.0 mm (0.08 in)



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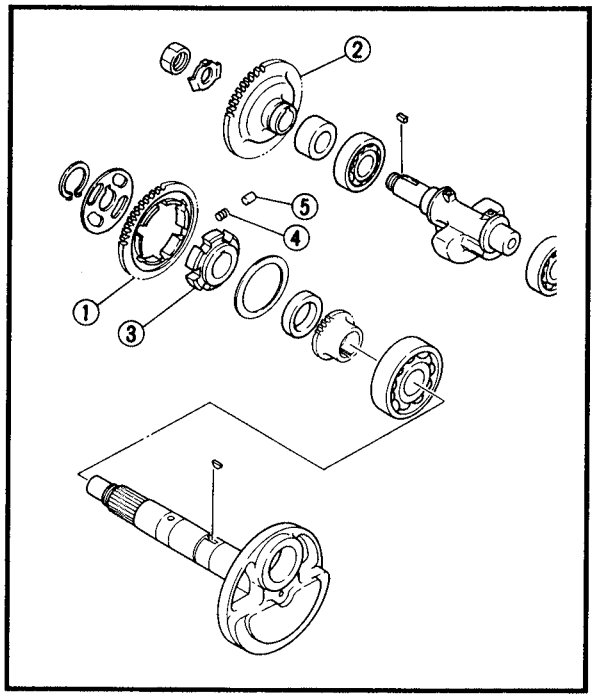
Crankshaft reassembling point:
The crankshaft ① and the crank pin ② oil passages must be properly interconnected with a tolerance of less than 1 mm (0.04 in).

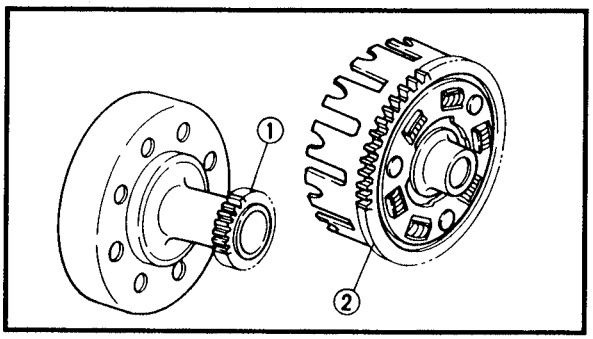
****

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



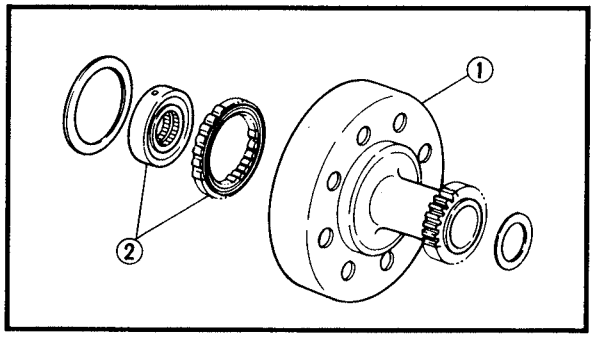
BALANCER DRIVE GEAR AND DRIVEN GEAR

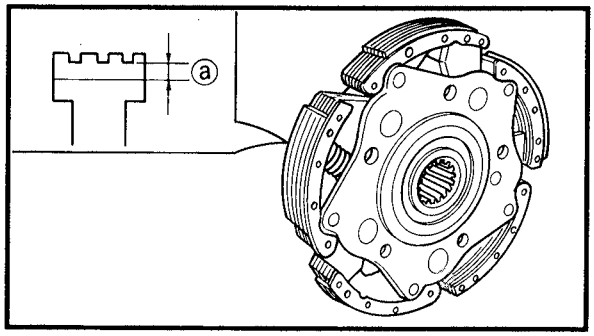
1. Inspect:
- Balancer drive gear teeth ①
- Balancer driven gear teeth ②
- Buffer boss ③
- Springs ④
- Dowel pins ⑤
  Wear/Damage/Fatique → Replace.



PRIMARY GEARS

1. Inspect:
- Primary drive gear teeth ①
- Primary driven gear teeth ②
  Wear/Damage → Replace both gears.
  Excessive noises during operation → Replace both gears.





PRIMARY CLUTCH

Clutch housing

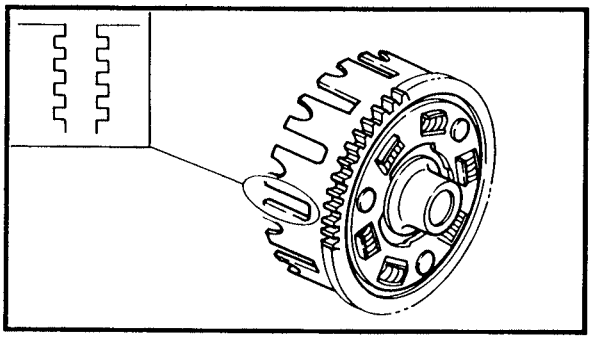
1. Inspect:
- Clutch housing ①
  Heat damage/Wear/Damage → Replace.
- One way clutch assembly ②
  Chafing/Wear/Damage → Replace.

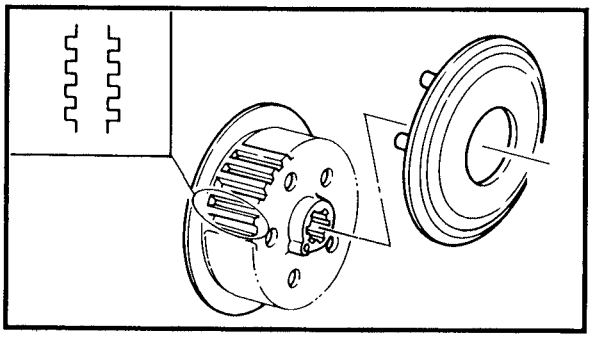
NOTE:
- Replace the one way clutch assembly and clutch housing as a set.
- One way bearing must be installed with flag side facing inward.

Clutch carrier

1. Inspect:
- Clutch shoe
  Heat damage → Replace.
2. Measure:
- Clutch shoe thickness
  Out of specification → Replace.

Clutch shoe thickness:
2.0 mm (0.08 in)
Clutch shoe wear limit ⓐ:
1.5 mm (0.06 in)





SECONDARY CLUTCH

Clutch housing

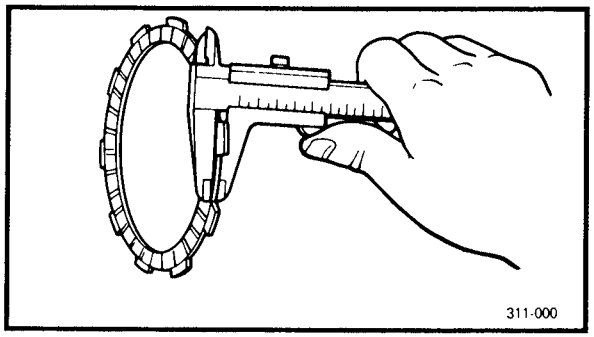
1. Inspect:
- Clutch housing dogs
  Cracks/Pitting (edges):
  Moderate → Deburr.
  Severe → Replace clutch housing.

NOTE:
Pitting on friction plate dogs of clutch housing will cause erratic operation.

Clutch boss and pressure plate

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

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

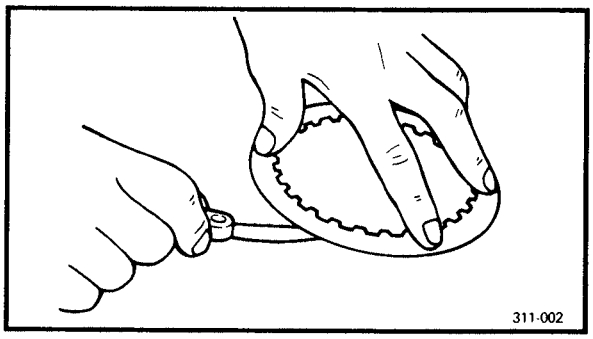


Friction plates

1. Inspect:
- Friction plate
  Damage/Wear → Replace friction plates as a set.

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

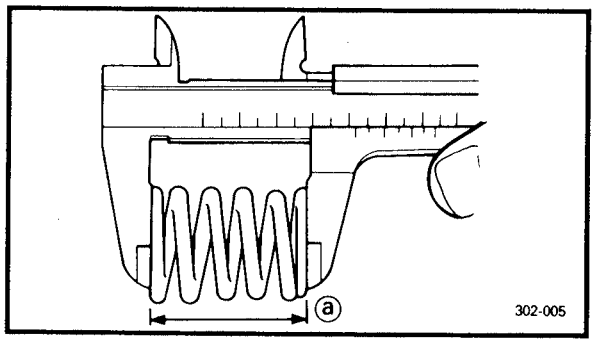
	Thickness	Wear limit
Type "A" Cut (1 pcs.)	2.94 ~ 3.06 mm (0.1157 ~ 0.1205 in)	2.8 mm (0.11 in)
Type "B" (6 pcs.)		



Clutch plates

1. Measure:
- Clutch plate warpage
  Use surface plate and feeler gauge.
  Out of specification → Replace.

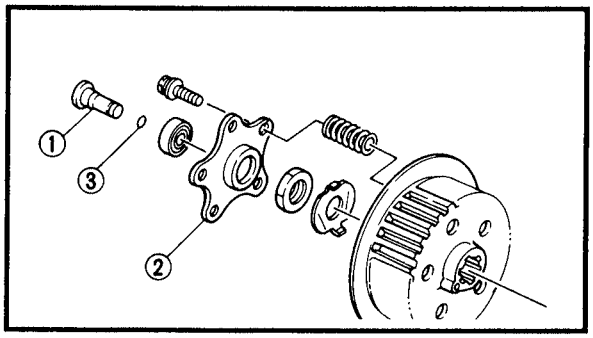
	Thickness	Warp limit
Type "A" (4 pcs.)	1.5 ~ 1.7 mm (0.059 ~ 0.067 in)	0.2 mm (0.008 in)
Type "B" (2 pcs.)	1.9 ~ 2.1 mm (0.075 ~ 0.083 in)	0.2 mm (0.008 in)



Clutch spring

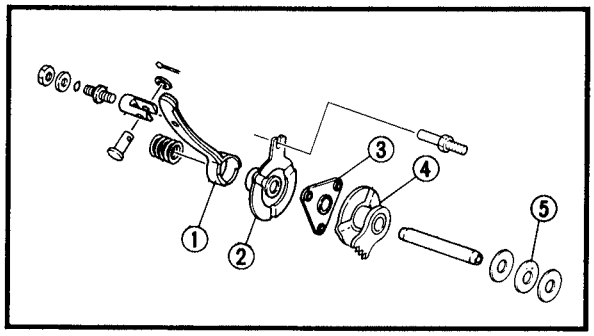
1. Measure:
- Clutch spring free length ⓐ
  Out of specification → Replace spring as a set.

Free length ⓐ:
47.8 mm (1.882 in)
Minimum length:
46.5 mm (1.831 in)



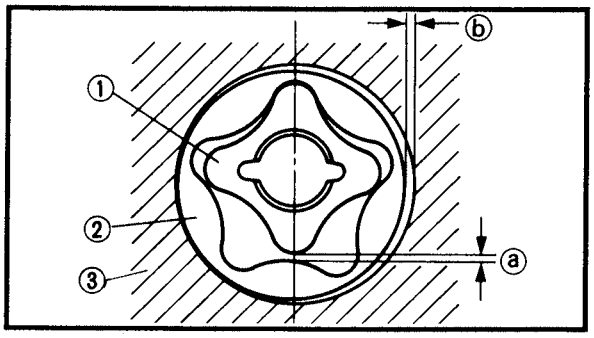
Push rod

1. Inspect:
- Push rod ①
- Clutch spring plate ②
  Bends/Crack/Damage → Replace.
- Push rod O-ring ③
  Damage → Replace



Shift arm and shift guide

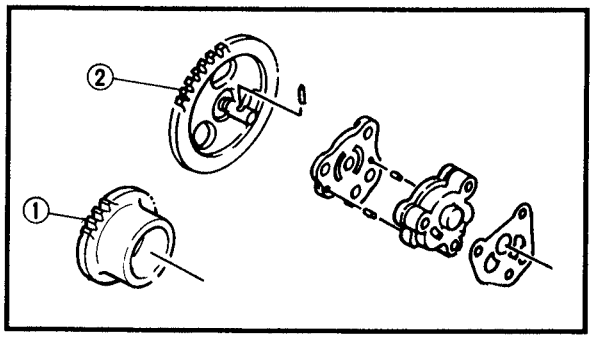
1. Inspect:
- Release lever ①
- Shift guide #2 ②
- Pawl holder ③
- Shift guide #1 ④
- Bearing ⑤
  Bends/Crack/Damage → Replace.



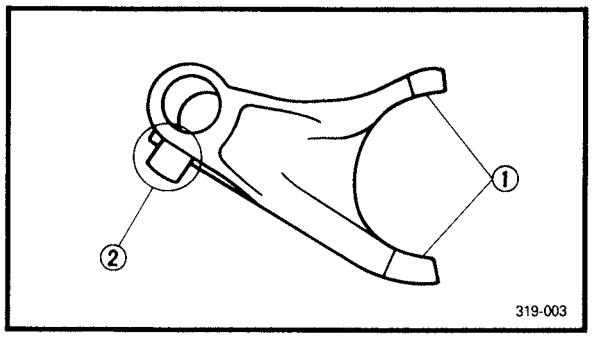
OIL PUMP

1. Measure:
- Tip clearance ⓐ
  (between inner rotor ① and outer rotor ②)
- Side clearance ⓑ
  (between outer rotor ② and pump housing ③)
  Out of specifications → Replace oil pump.

Oil pump clearance:	
Tip clearance	0.15 mm (0.006 in)
Side clearance	0.04 ~ 0.09 mm (0.0016 ~ 0.0035 in)



2. Inspect:
- Oil pump drive gear ①
- Oil pump driven gear ②
  Wear/Cracks/Damage → Replace.

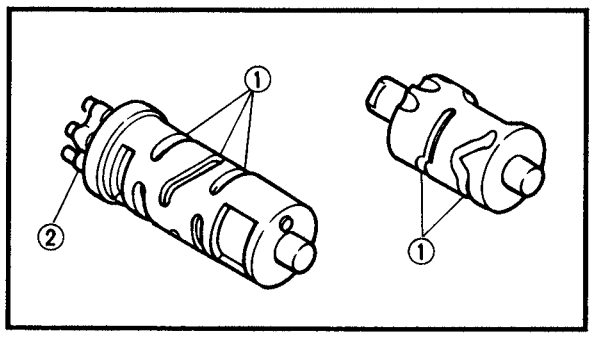


SHIFTER AND TRANSMISSION

Shifter

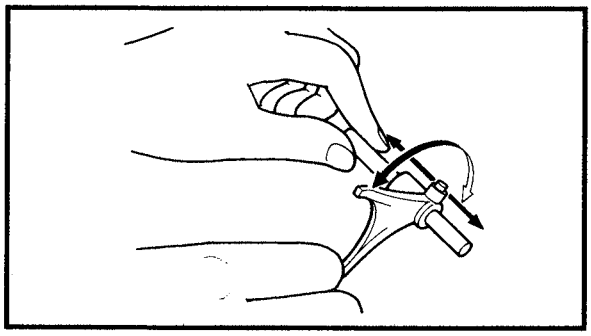
1. Inspect:
- Shift fork cam follower ①
- Shift fork pawl ②

Scoring/Bends/Wear → Replace.



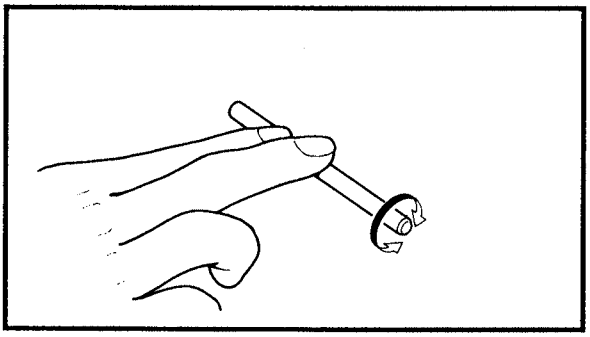
2. Inspect:
- Shift cam groove ①
- Shift cam segment ②

Wear/Damage → Replace.



3. Check:
- Shift fork movement

Unsmooth operation → Replace shift fork and/or guide bar.

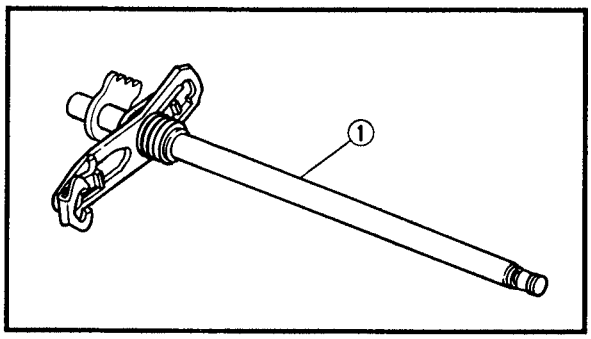


4. Inspect:
- Guide bar

Roll the guide bar on a flat surface.
Bends → Replace.

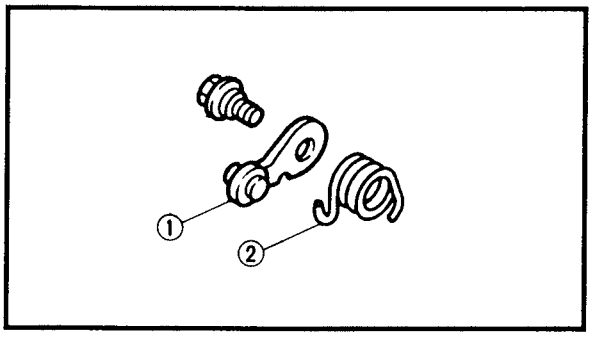
⚠ WARNING

Do not attempt to straighten a bent guide bar.



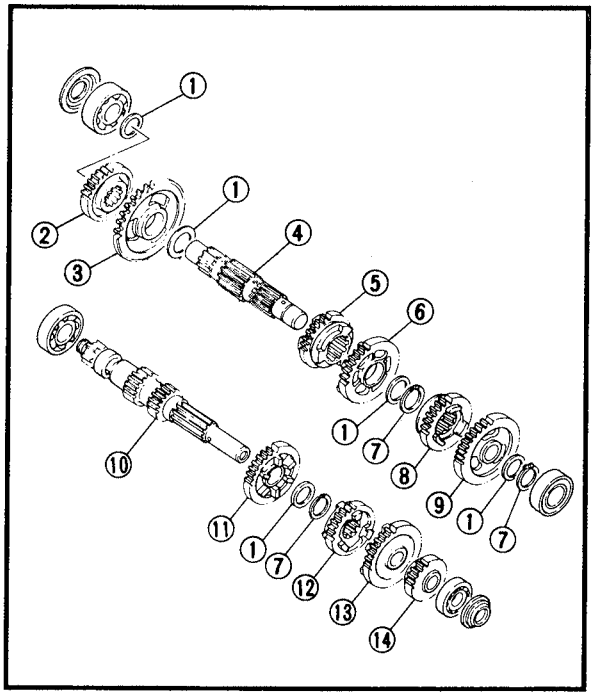
5. Inspect:
- Shift shaft ①

Bends/Wear/Damage → Replace.



6. Inspect:
- Stopper lever ①
  Roller turns roughly → Replace.
  Bends/Damage → Replace.

7. Inspect:
- Return spring ②
  Damage/Cracks → Replace.



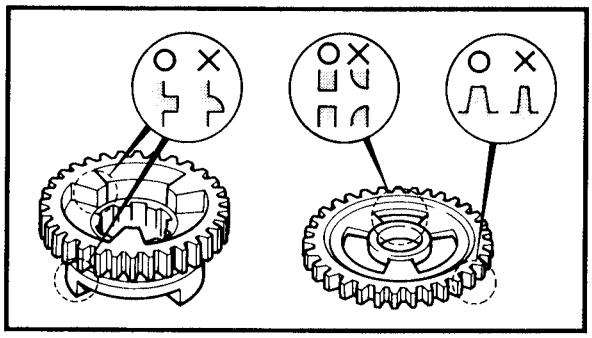
Transmission

1. Inspect:
- Plain washer ①
- High pinion gear ②
- 1st wheel gear ③
- Drive axle ④
- 5th wheel gear ⑤
- 3rd wheel gear ⑥
- Circlip ⑦
- 4th wheel gear ⑧
- 2nd wheel gear ⑨
- Main axle ⑩
- 5th pinion gear ⑪
- 3rd pinion gear ⑫
- 4th pinion gear ⑬
- 2nd pinion gear ⑭

  Damage/Cracks → Replace.

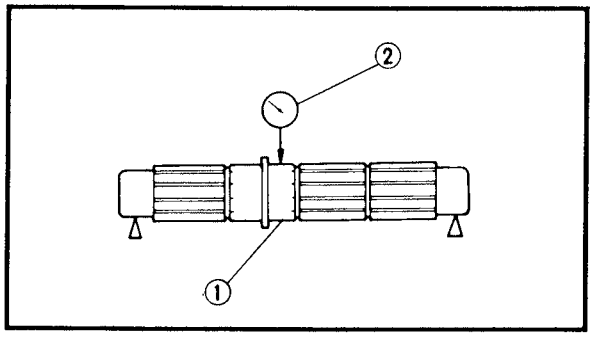
⚠ WARNING

Always use a new circlip.



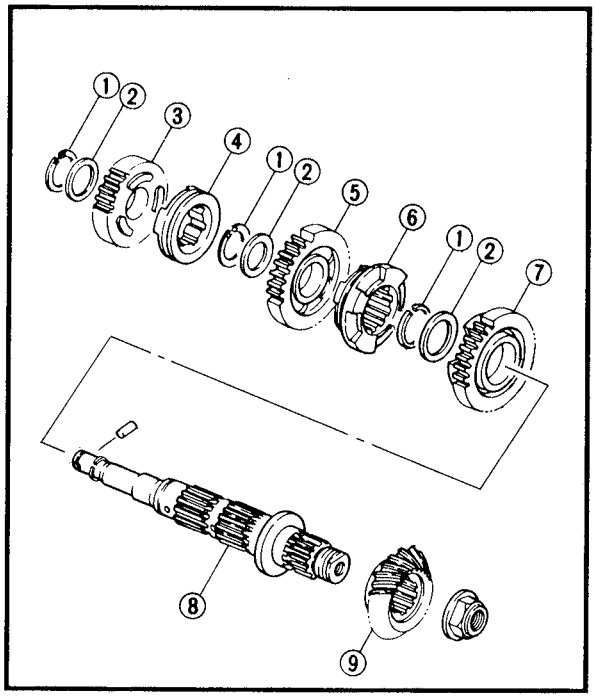
2. Inspect:
- Gear teeth
  Blue discoloration/Pitting/Wear → Replace.
- Mated dogs
  Rounded edges/Cracks/Missing portions → Replace.

3. Check:
- Gear movement
  Unsmooth operation → Replace.



4. Measure:
- Axle ① runout
  Use centering device and dial gauge ②
  Out of specification → Replace.

Runout limit:
Less than 0.08 mm (0.0031 in)



MIDDLE GEAR

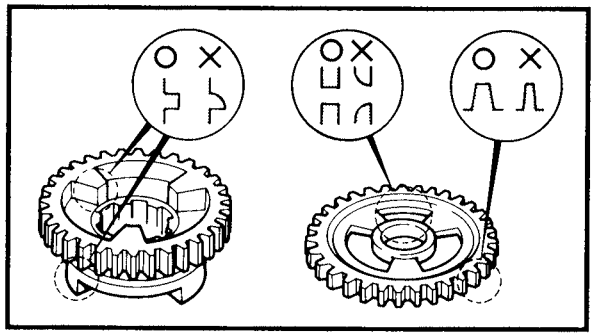
1. Inspect:
- Circlip ①
- Plain washer ②
- Middle driven gear ③
- Holder ④ (middle driven gear)
- Middle drive gear ⑤
- Dog clutch ⑥
- Reverse wheel gear #2 ⑦
- Middle drive axle ⑧
- Middle drive pinion gear ⑨
  Damage/Cracks → Replace.

NOTE:

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

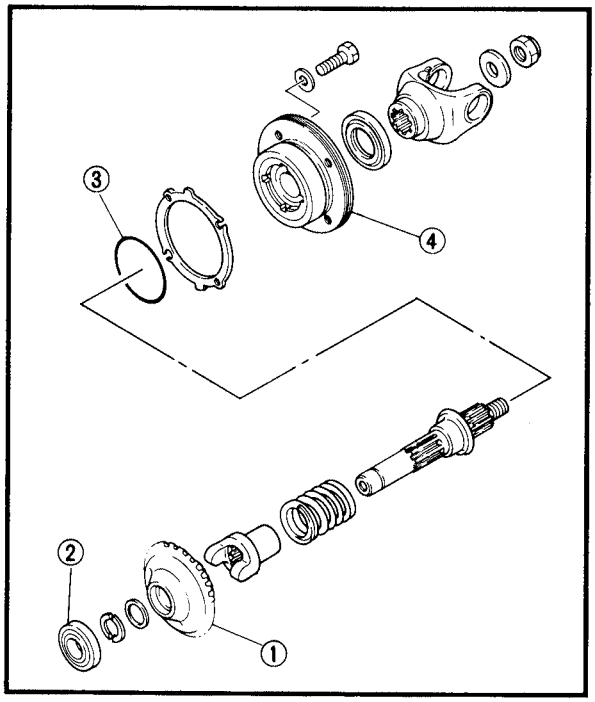
⚠ WARNING

Always use a new circlip.



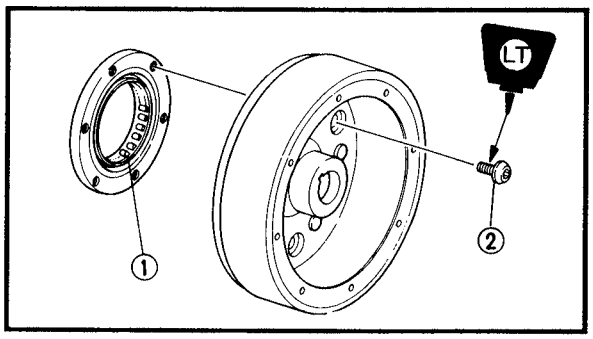
2. Inspect:
- Gear teeth
  Blue discoloration/Pitting/Wear → Replace.
- Mated dogs
  Rounded edges/Cracks/Missing portions → Replace.

3. Check:
- Gear movement
  Unsmooth operation → Replace.



4. Inspect:
- Middle driven pinion gear ①
- Bearing ②
- O-ring ③
- Bearing housing ④
  Damage/Wear → Replace.

5. Check:
- Bearing movement
  Turns roughly → Replace.



STARTER

1. Inspect:
- Starter one-way ①
  Cracks/Damage → Replace.
- Bolts ② (starter clutch)
  Loose → Replace with a new one, and clinch the end of the bolt.

NOTE:
The arrow mark on the starter clutch must face inward, away from the CDI rotor.

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

****

Starter clutch operation
- Install the starter wheel gear to the starter clutch, and hold the starter clutch.
- When turning the starter wheel gear counter clockwise [A], the starter clutch and the wheel gear should be engaged.
  If not, the starter clutch is faulty. Replace it.
- When turning the starter wheel gear clockwise [B], the starter wheel gear should turn freely.
  If not, the starter clutch is faulty. Replace it.

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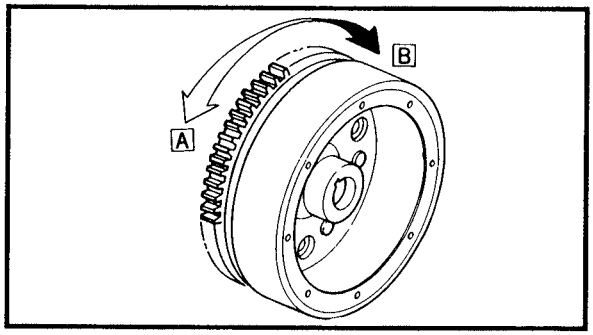
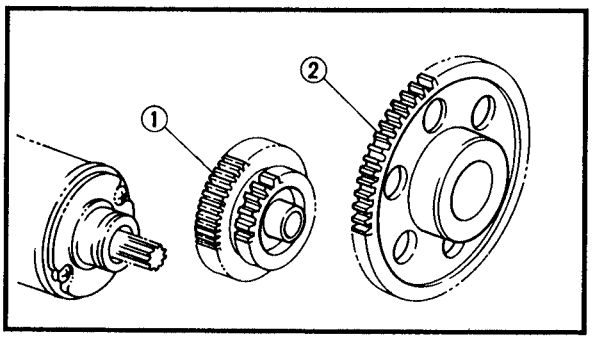
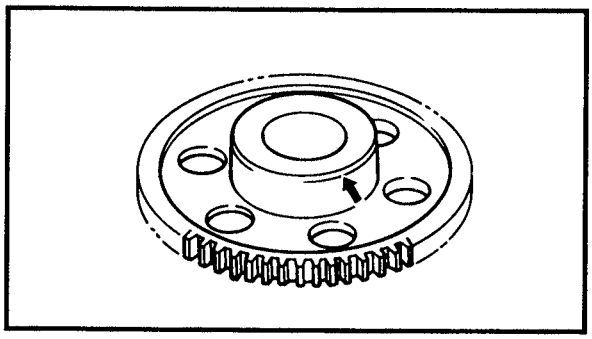
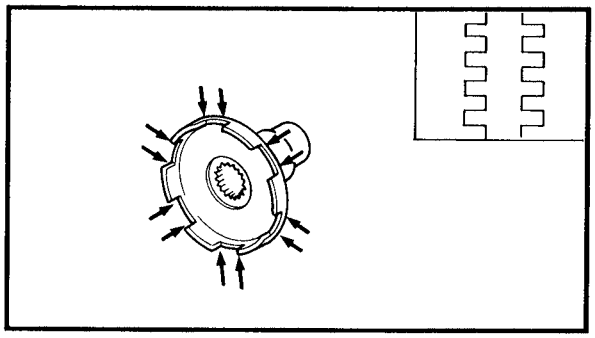




2. Inspect:
- Starter idle gear teeth ①
- Starter wheel gear teeth ②
  Burrs/Clips/Roughness/Wear → Replace.

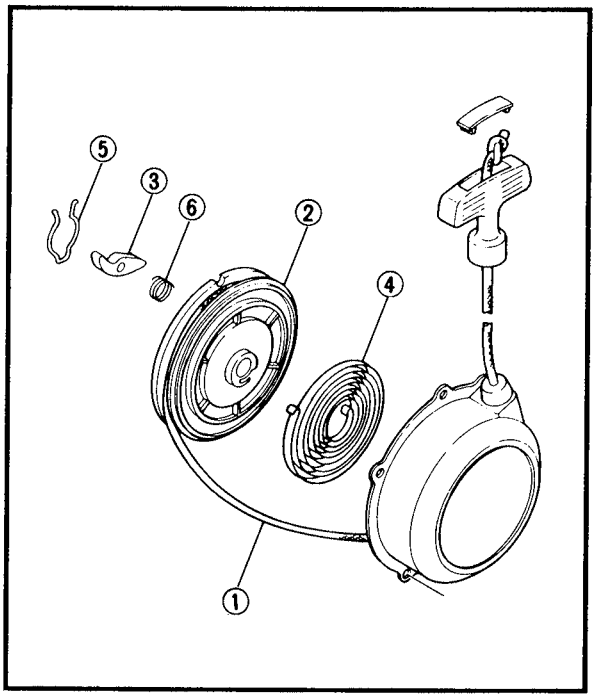


3. Inspect:
- Starter wheel gear
  (contacting surface)
  Pitting/Wear/Damage → Replace.

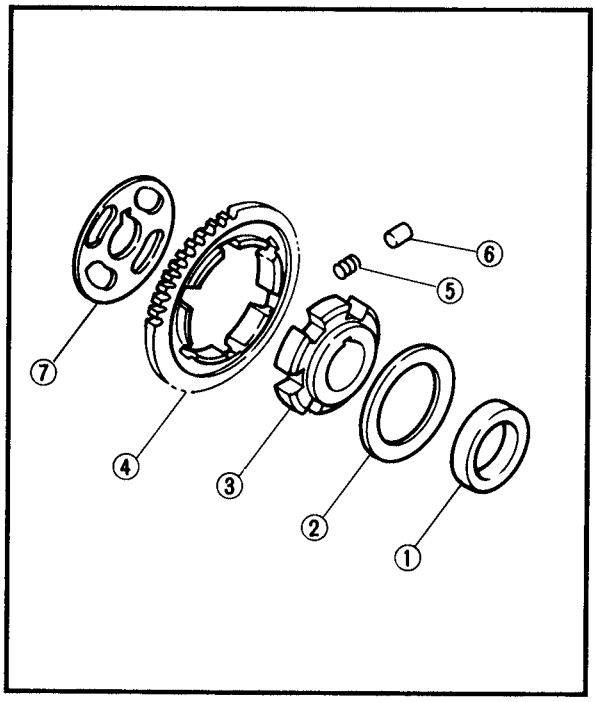


STARTER PULLEY AND RECOIL STARTER

1. Inspect:
- Starter pulley
  Cracks/Pitting → Deburr or replace.

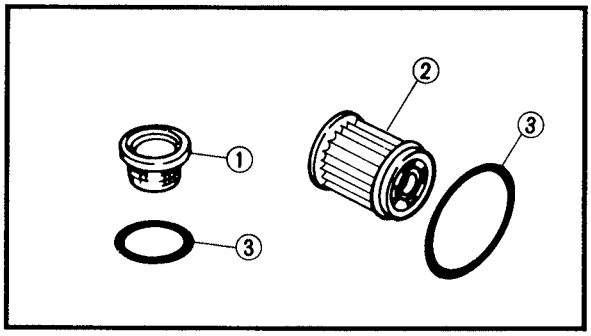


2. Inspect:
- Rope ①
- Sheave drum ②
- Drive pawl ③
  Wear/Damage → Replace.
- Coil spring ④
- Pawl spring ⑤
- Spring ⑥
  Fatigue → Replace.



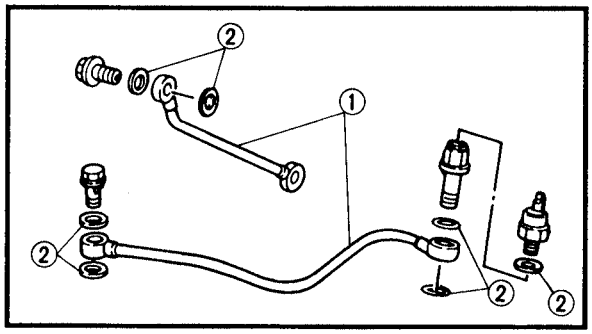
BALANCER DRIVE GEAR

1. Inspect:
- Collar ①
- Plain washer ②
- Buffer boss ③
- Drive gear ④
- Springs ⑤
- Dowel pins ⑥
- Holding plate ⑦
  Damage/Wear/Fatigue → Replace.

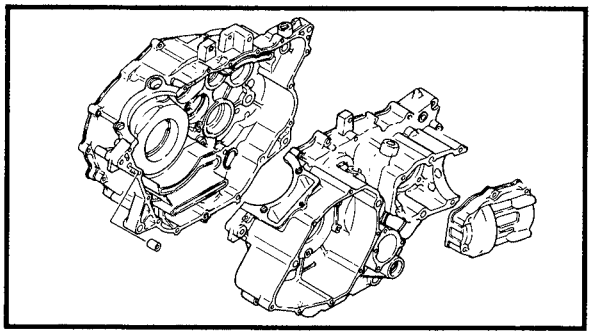


OIL STRAINER, OIL FILTER AND OIL PIPES

1. Inspect:
- Oil strainer ①
- Oil filter ②
- O-rings ③
  Damage → Replace.

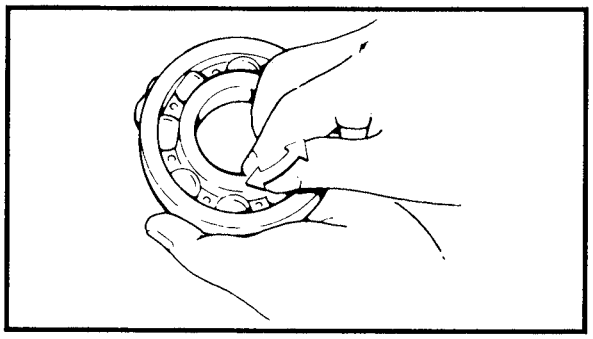


2. Inspect:
- Oil delivery pipes ①
  Cracks/Damage → Replace.
  Clog → Blow out with compressed air.
- Copper washers ②
  Damage → Replace.



CRANKCASE

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



BEARINGS AND OIL SEALS

1. Inspect:
- Bearing
  Clean and lubricate, then rotate inner race with finger.
  Roughness → Replace.
2. Inspect:
- Oil seals
  Damage/Wear → Replace.

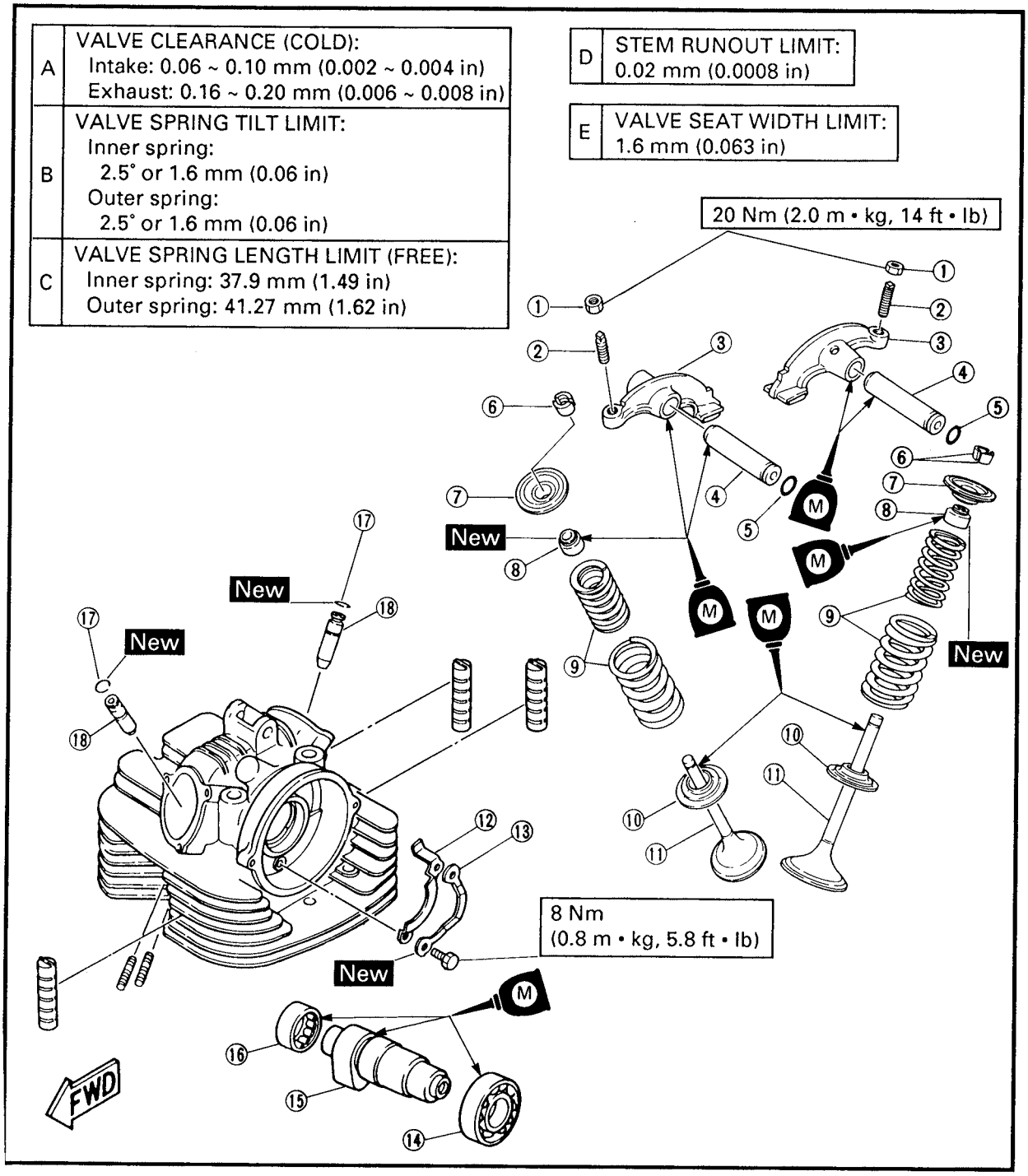
CIRCLIPS AND WASHERS

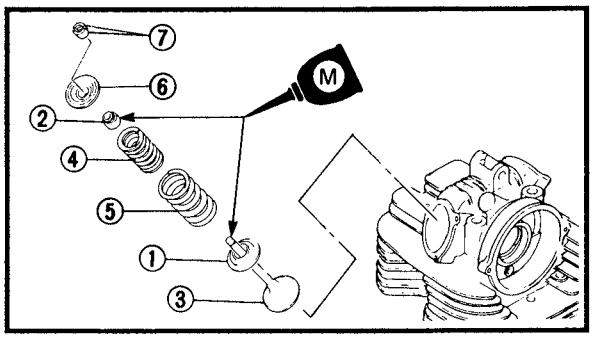
1. Inspect:
- Circlips
- Washers
  Damage/Looseness/Bends → Replace.

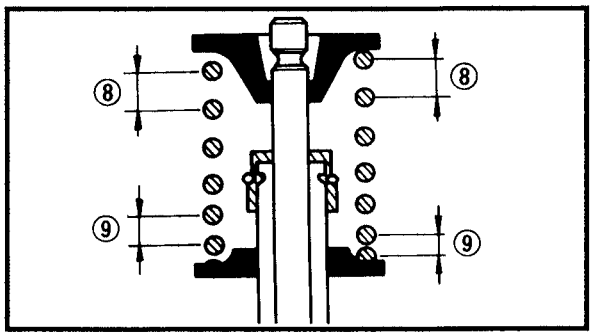
ENGINE ASSEMBLY AND ADJUSTMENT

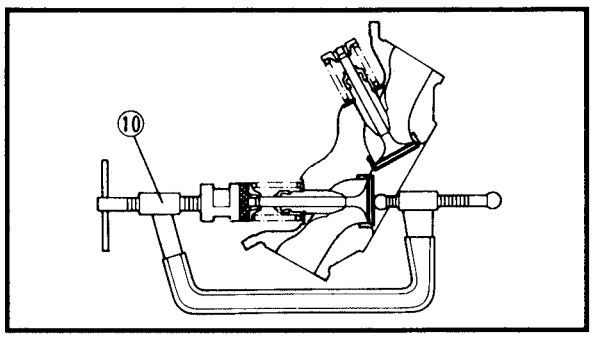
VALVE, CAM SHAFT AND ROCKER ARM

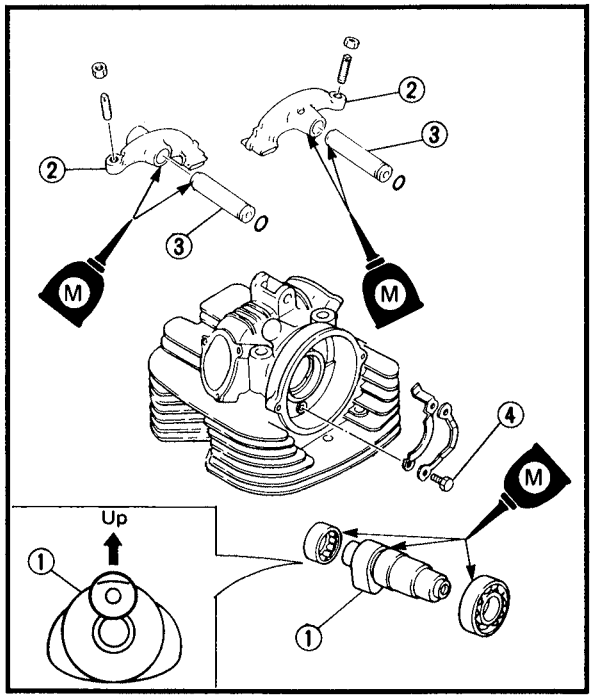
① Locknuts (valve adjusting)
② Adjuster (valve adjusting)
③ Rocker arm
④ Rocker arm shaft
⑤ O-ring
⑥ Valve cotter
⑦ Valve spring retainer
⑧ Oil seal
⑨ Valve springs
⑩ Valve spring seat
⑪ Valve
⑫ Bearing retainer
⑬ Lock washer
⑭ Bearing
⑮ Camshaft
⑯ Bearing
⑰ Circlip
⑱ Valve guide











VALVE, CAM SHAFT AND ROCKER ARM

1. Apply:
- High-quality molybdenum disulfide motor oil
  (to the valve stem and oil seal)

2. Install:
- Valve spring seat ①
- Oil seal ②
- Valve ③
- Valve spring ④ (inner)
- Valve spring ⑤ (outer)
- Spring retainer ⑥
- Valve cotters ⑦

NOTE:
Install the valve spring with the wider gapped coils facing upwards as shown.

⑧ Lager pitch
⑨ Smaller pitch

NOTE:
Compress the valve spring with the valve, spring compressor ⑩ and then, install the valve cotters.

Valve spring compressor:
P/N. YM-04019, 90890-04019

3. Apply:
- Engine oil
  (to the bearing of the camshaft)
- High-quality molybdenum disulfide motor oil
  (to the rocker arm and shaft)

4. Install:
- Camshaft ① (compression stroke as shown)
- Rocker arm ②
- Rocker arm shaft ③

Bolt ④ (cam shaft bearing retainer):
8 Nm (0.8 m • kg, 5.8 ft • lb)

NOTE:
Bend the lock washer tab along the nut flats.

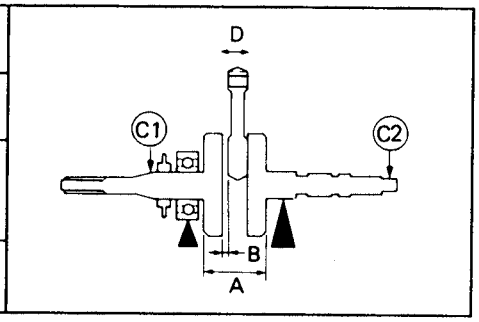
⚠ WARNING
Always use a new lock washer.

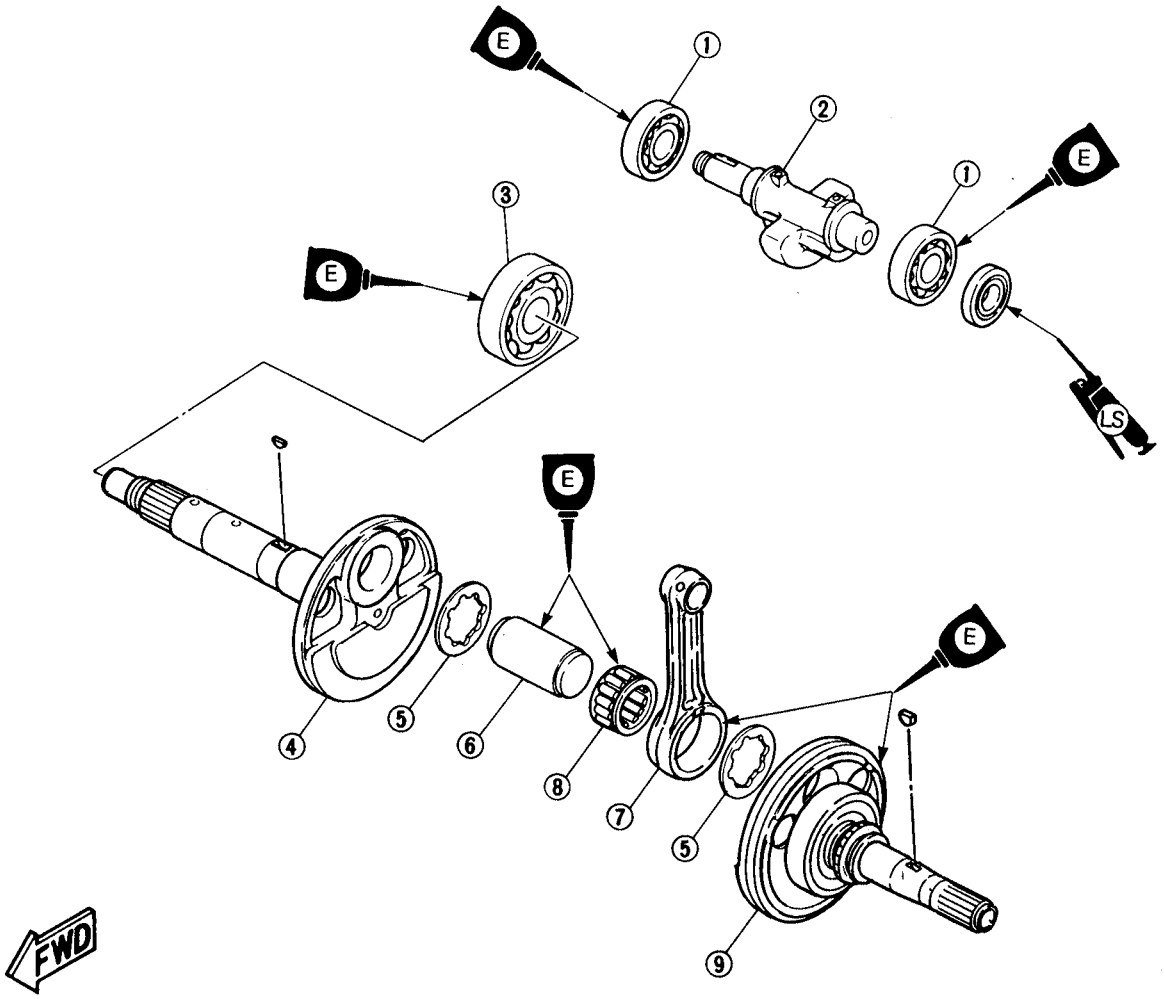
CRANKSHAFT, MIDDLE DRIVE AXLE TRANSMISSION AND CRANK CASE

Crankshaft

① Bearing
② Balancer shaft
③ Bearing
④ Crank (right)
⑤ Washer
⑥ Crank pin
⑦ Connecting rod
⑧ Big end bearing
⑨ Crank (left)

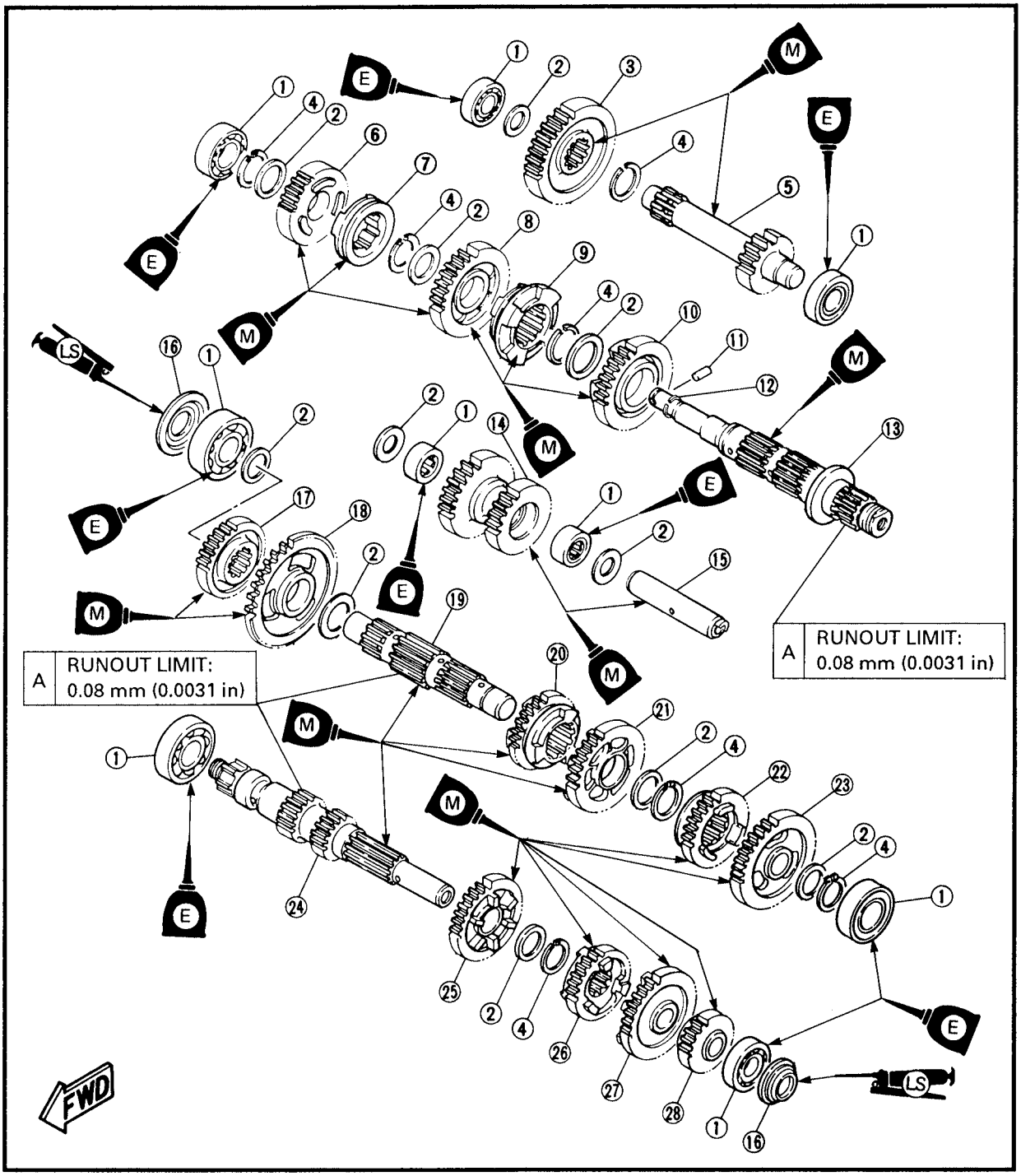
A	CRANK WIDTH: 58.95 ~ 59.00 mm (2.321 ~ 2.323 in)
B	BIG END SIDE CLEARANCE: 0.35 ~ 0.85 mm (0.013 ~ 0.033 in)
C	RUNOUT LIMIT: C_1: 0.02 mm (0.0008 in) C_2: 0.06 mm (0.0024 in)
D	SMALL END FREE PLAY LIMIT: 2.0 mm (0.08 in)





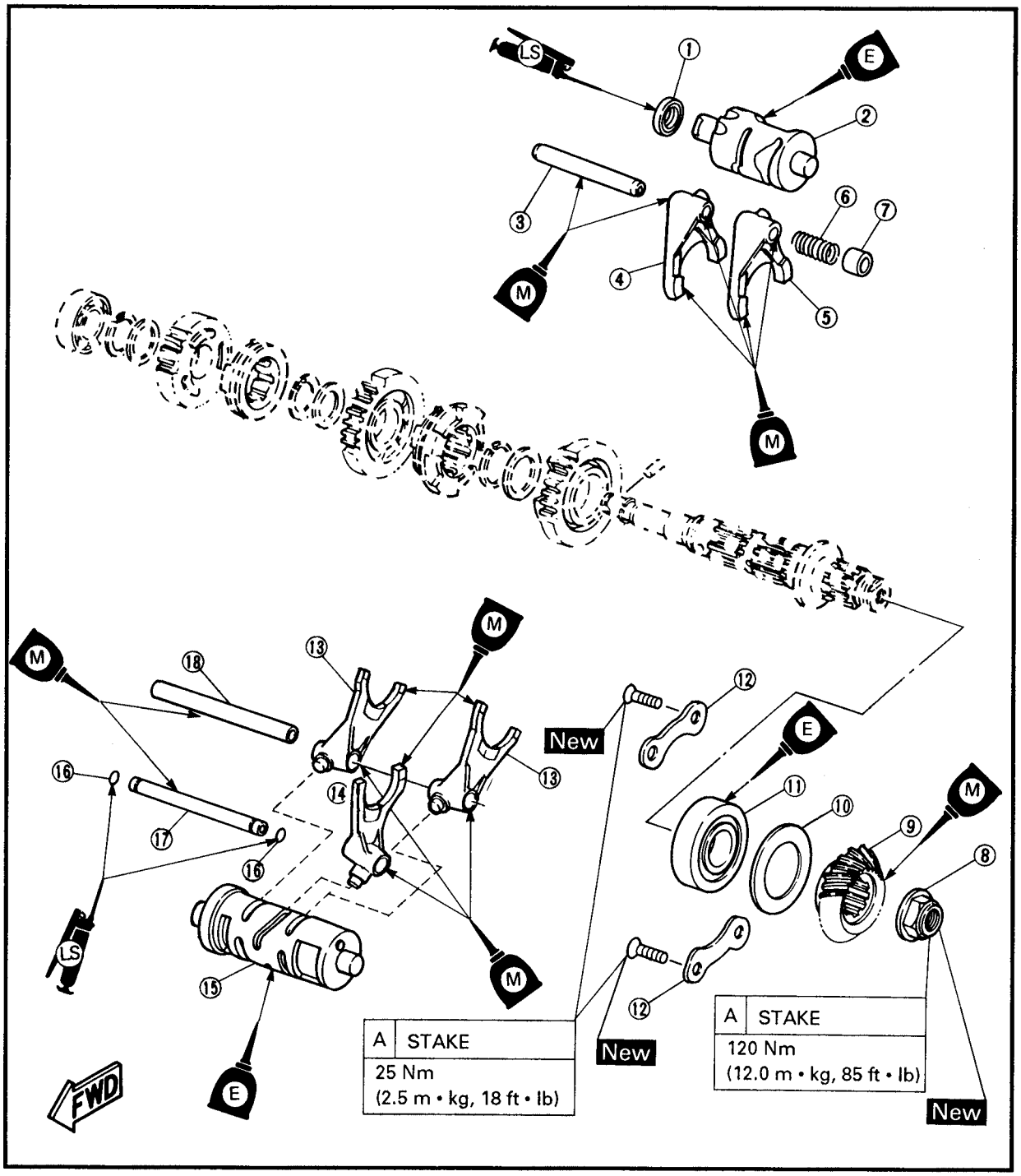
Transmission 1

① Bearing
② Plain washer
③ Reverse wheel gear #1
④ Circlip
⑤ Reverse axle
⑥ Middle driven gear
⑦ Holder (middle driven gear)
⑧ Middle drive gear
⑨ Dog clutch
⑩ Reverse wheel gear # 2
⑪ Dowel pin
⑫ Snap ring
⑬ Middle drive axle
⑭ High wheel gear
⑮ Idle axle
⑯ Oil seal
⑰ High pinion gear
⑱ 1st wheel gear
⑲ Drive axle
⑳ 5th wheel gear
㉑ 3rd wheel gear
㉒ 4th wheel gear
㉓ 2nd wheel gear
㉔ Main axle
㉕ 5th pinion gear
㉖ 3rd pinion gear
㉗ 4th pinion gear
㉘ 2nd pinion gear



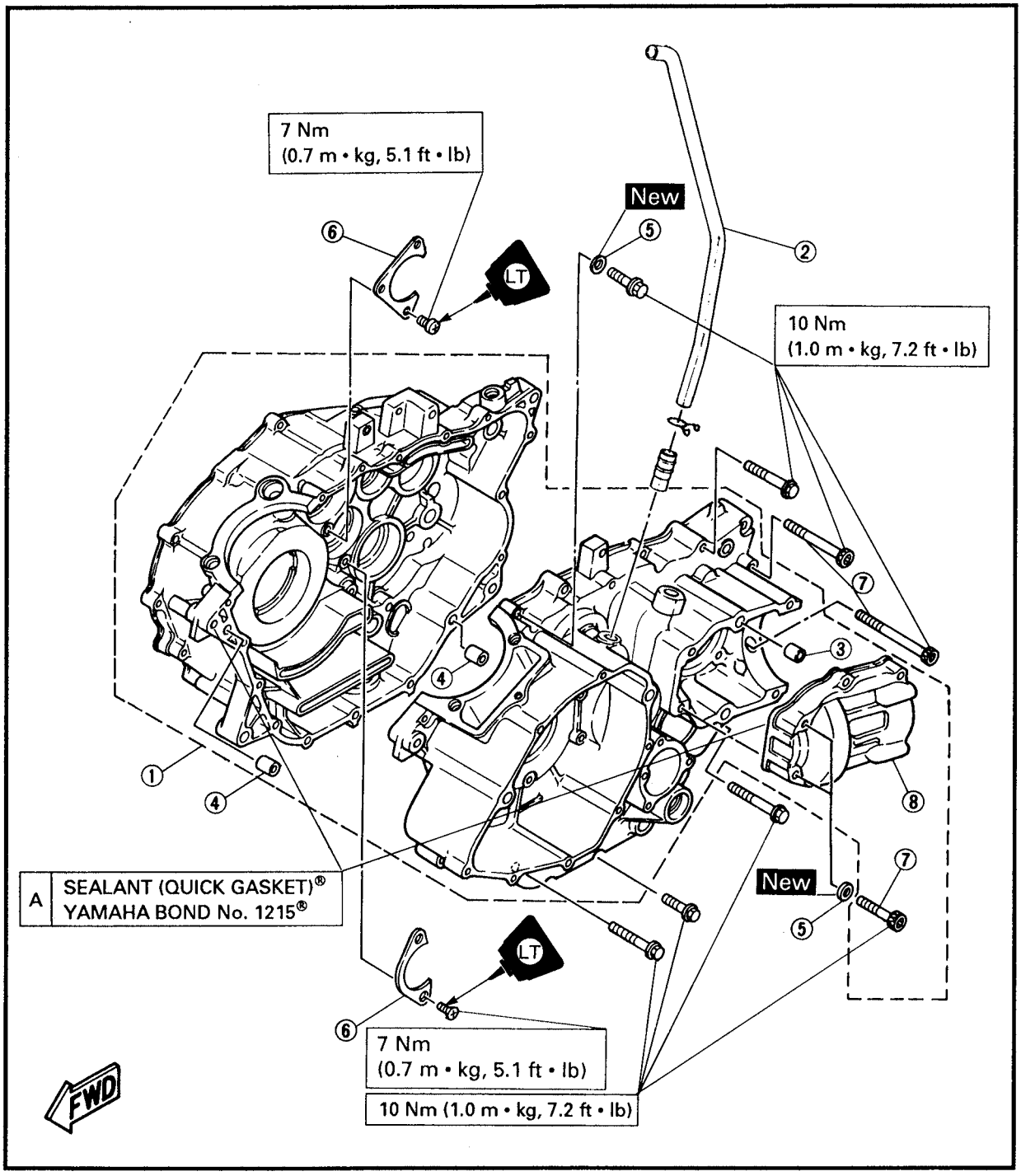
Transmission 2 and middle drive axle

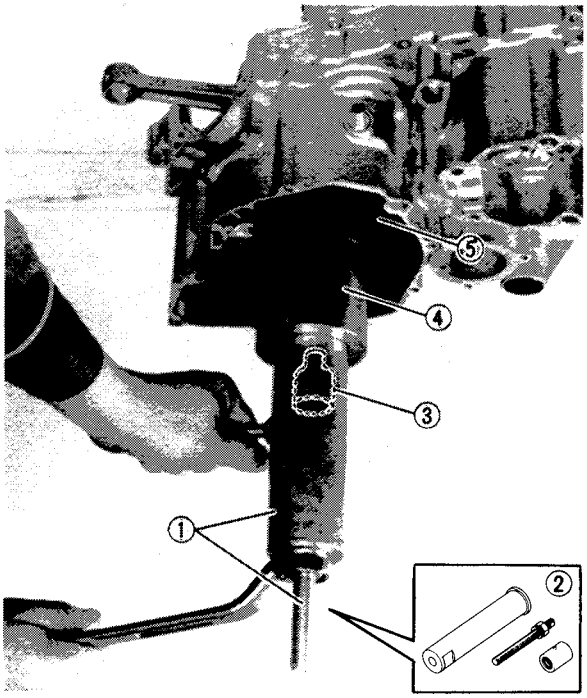
① Oil seal
② Shift cam #2
③ Guide bar #2
④ Shift fork #2
⑤ Shift fork #1
⑥ Spring
⑦ Spring cap
⑧ Nut
⑨ Middle drive pinion gear
⑩ Shim
⑪ Bearing
⑫ Bearing retainer
⑬ Shift fork #1
⑭ Shift fork #2
⑮ Shift cam #1
⑯ O-ring
⑰ Guide bar #1 (shorter)
⑱ Guide bar #2 (longer)



Crankcase

① Crankcase assembly
② Crankcase ventilation hose
③ Dowel pin
④ Dowel pin
⑤ Copper washer
⑥ Stopper plate
⑦ Hexagon socket head screw
⑧ Middle gear case





CRANKSHAFT, MIDDLE DRIVE AXLE TRANSMISSION AND CRANKCASE

1. Install:
- Crankshaft

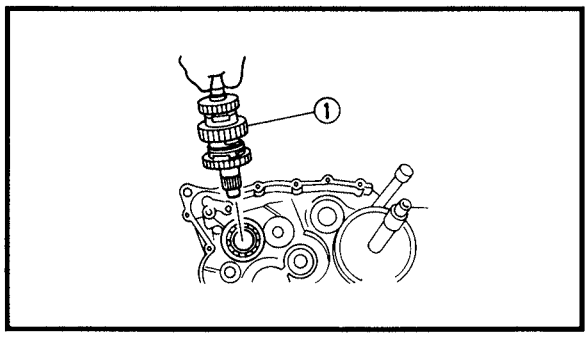
Crankshaft installer set ①:
P/N. YU-90050
Buffer boss installer set ②:
P/N. 90890-04088
Adapter #12 ③:
P/N. YM-01383, 90890-01383
Pot extension ④:
P/N. YM-33280
Crank pot spacer ⑤:
P/N. YM-91044, 90890-04081

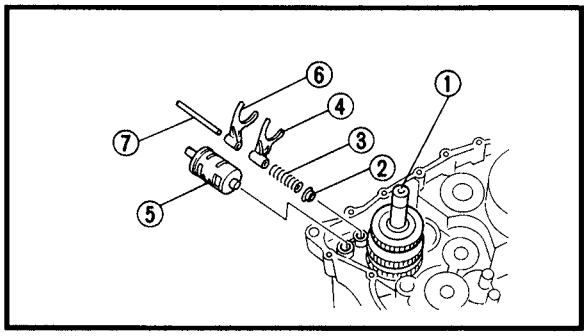
NOTE:

Hold the connecting rod at top dead center while turning the nut of the installing tool with the other. Operate the installing tool until the crankshaft bottoms against the bearing.

CAUTION:

To protect the crankshaft against scratches or to facilitate the operation of the installation. Apply the engine oil to each bearing.



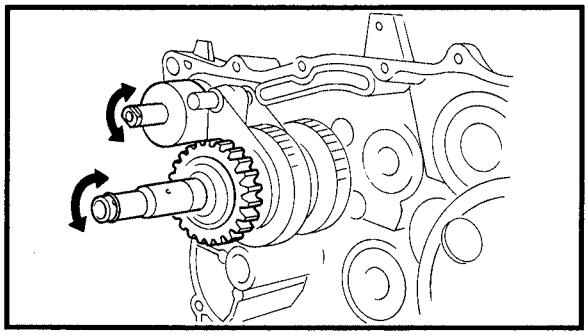


Middle drive axle

1. Install:
- Middle drive axle assembly ①
- Spring cap ②
- Spring ③
- Shift fork #1 ④
- Shift cam #2 ⑤
- Shift fork #2 ⑥
- Guide bar #2 ⑦

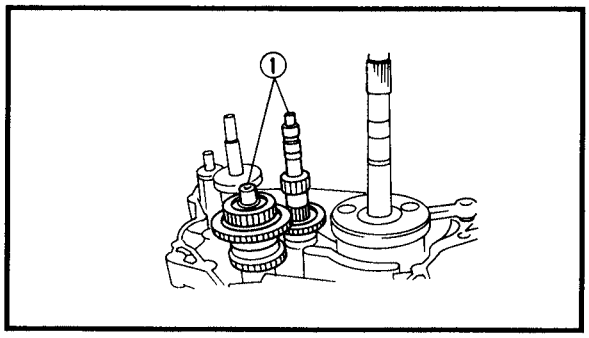
NOTE:

When assembling the shift fork #1 ④, raising the middle drive axle assembly ① slightly will make assembly easier.

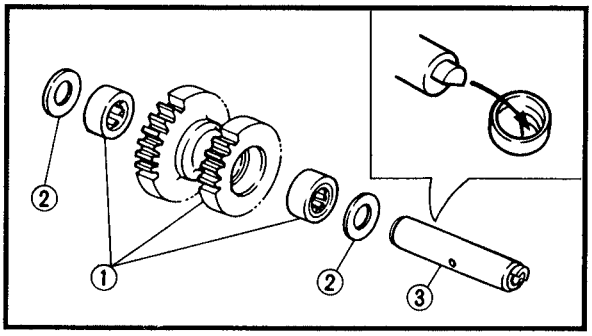


2. Check:
- Shifter operation
  Unsmooth operation → Repair.

NOTE:
Oil each gear and bearing thoroughly.

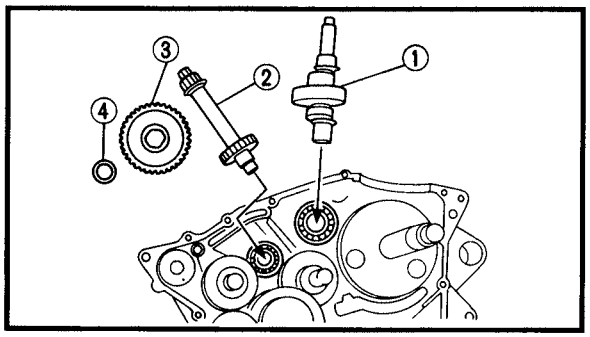


Transmission
1. Install:
- Transmission assembly ①

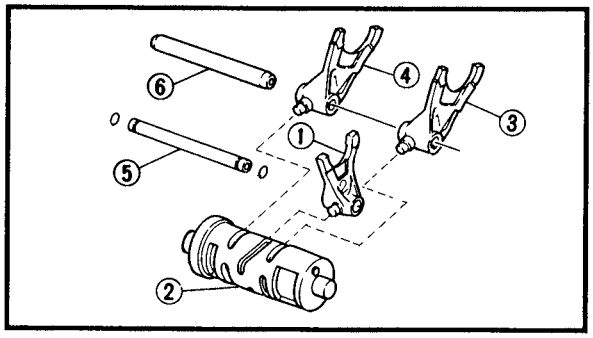


2. Install:
- High wheel gear ① (with plain washer ②)
- High wheel gear shaft ③

NOTE:
Align the projected portion of the high wheel gear shaft end with the groove in the hole of the crankcase, as shown.

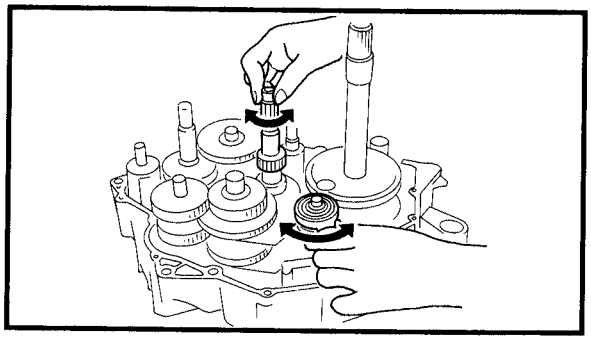


3. Install:
- Balancer weight ①
- Reverse axle ② (with circlip)
- Reverse wheel gear ③ (36T)
- Plain washer ④ (reverse axle)



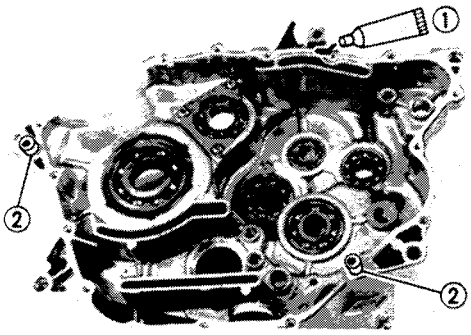
4. Install:
- Shift fork #2 ①
- Shift cam #1 ②
- Shift fork #1 ③ (inside)
- Shift fork #1 ④ (outside)
- Guide bar #1 ⑤ (shorter)
- Guide bar #2 ⑥ (longer)

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



5. Check:
- Transmission and shifter operation
  Unsmooth operation → Repair.

NOTE:
- Oil each gear bearing thoroughly.
- Shift main transmission into neutral and High-Low-Reverce to Low before assembly.



Crankcase

1. Apply
- Sealant ① (Quick Gasket®)
  (to the mating surfaces of both case halves)

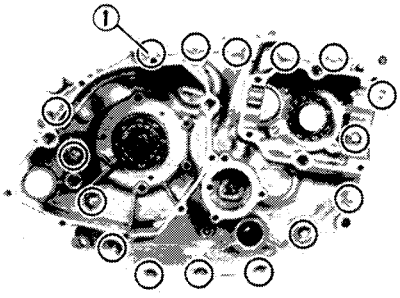
Sealant (Quick Gasket®):
P/N. ACC-11001-01
Yamaha bond No. 1215:
P/N. 90890-85505

2. Install:
- Dowel pin ②

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

CAUTION:

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



4. Tighten:
- Bolts (crankcase)

NOTE:
- Tighten the bolts in stages, using a criss-cross pattern.
- Install the copper washer on the bolt ①.

Bolts (crankcase):
10 Nm (1.0 m • kg, 7.2 ft • lb)

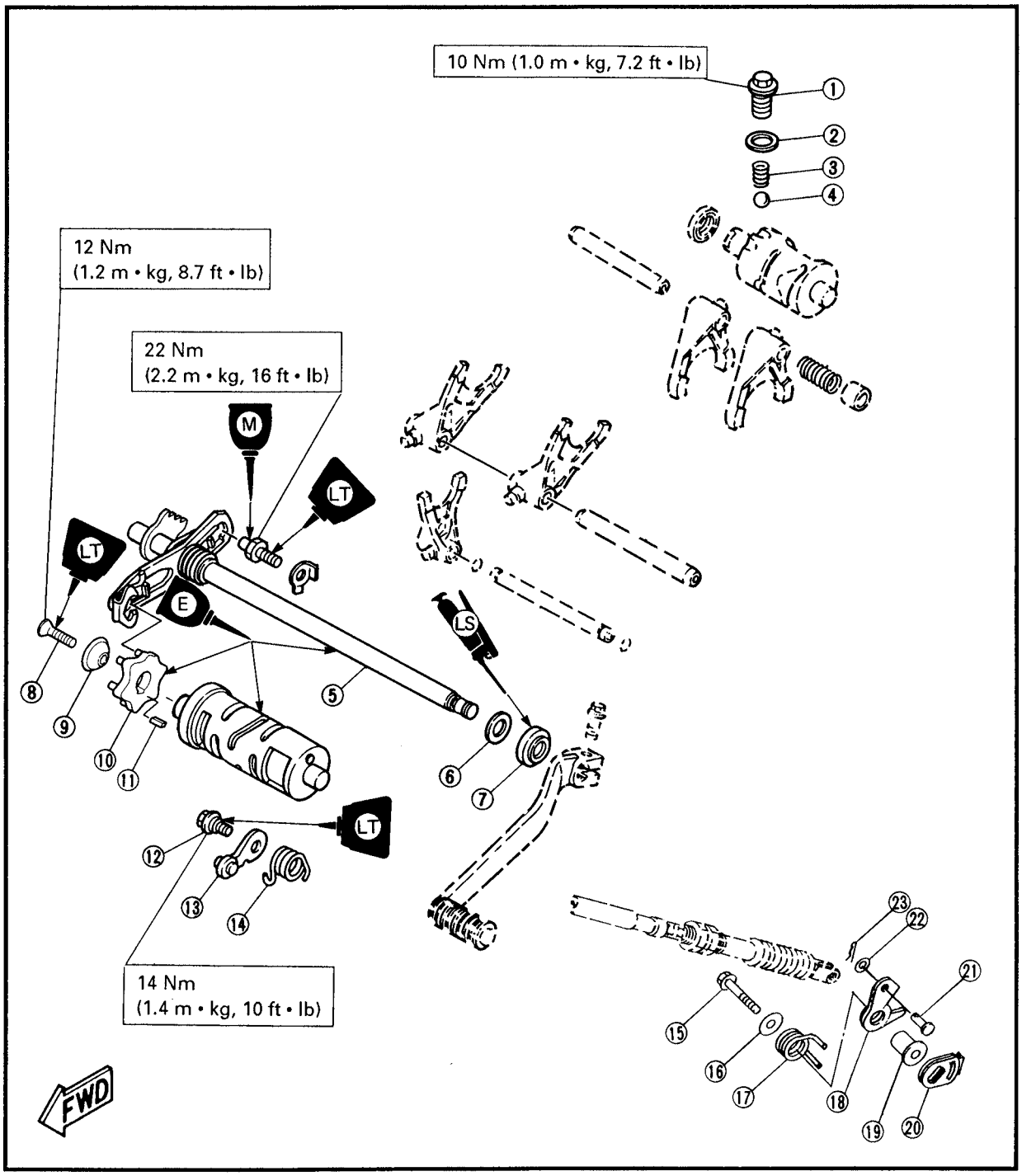
5. Apply:
- 4-stroke engine oil
  (to the crank pin, bearing and oil delivery hole)

6. Check:
- Crankshaft and transmission operation
  Unsmooth operation → Repair.

SHIFTER AND OIL PUMP

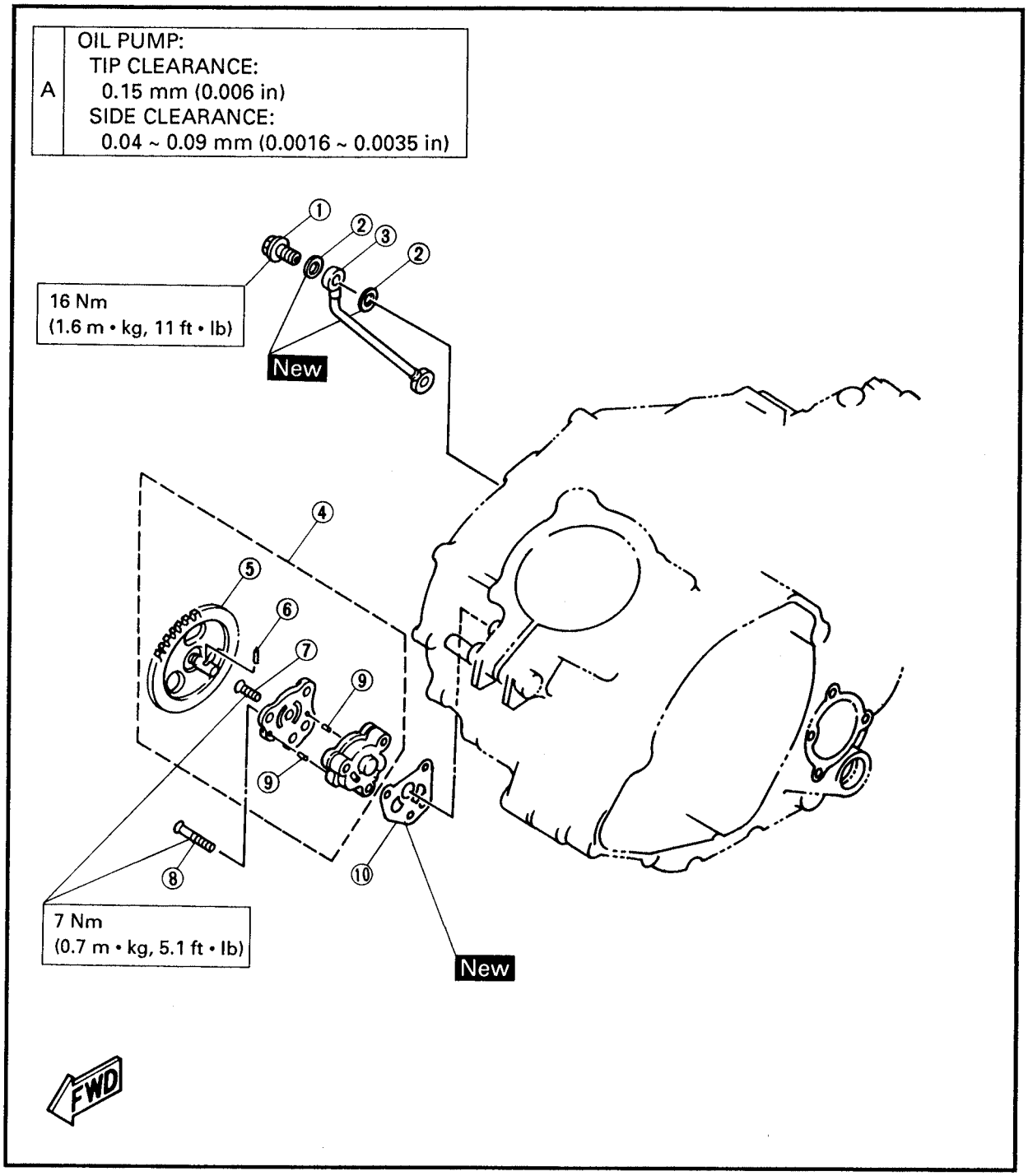
Shifter

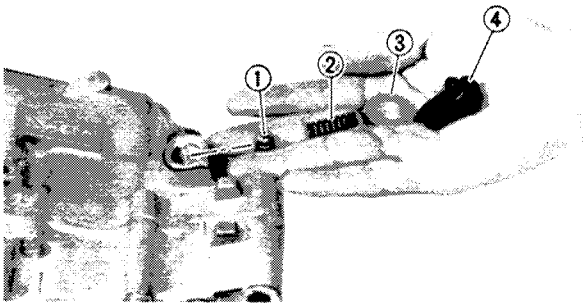
① Bolt (shift cam #2)
② Plain washer
③ Spring
④ Ball
⑤ Shift shaft
⑥ Plain washer
⑦ Oil seal
⑧ Pan head screw
⑨ Washer
⑩ Segment
⑪ Straight key
⑫ Bolt (stopper lever)
⑬ Stopper lever
⑭ Spring
⑮ Bolt
⑯ Plain washer
⑰ Return spring
⑱ Lever (outside)
⑲ Collar
⑳ Lever (inside)
㉑ Clevis pin
㉒ Plain washer
㉓ Pin



Oil Pump

① Union bolt
② Copper washer
③ Oil pipe
④ Oil pump assembly
⑤ Oil pump driven gear
⑥ Pin
⑦ Pan head screw
⑧ Pan head screw
⑨ Pin
⑩ Gasket



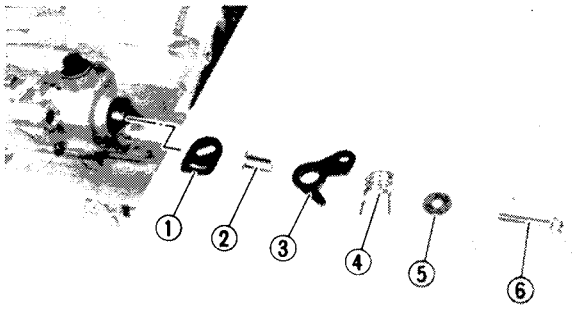


SHIFTER AND OIL PUMP

1. Install:
- Ball ①
- Spring ②
- Plain washer ③
- Bolt ④ (shift cam # 2)

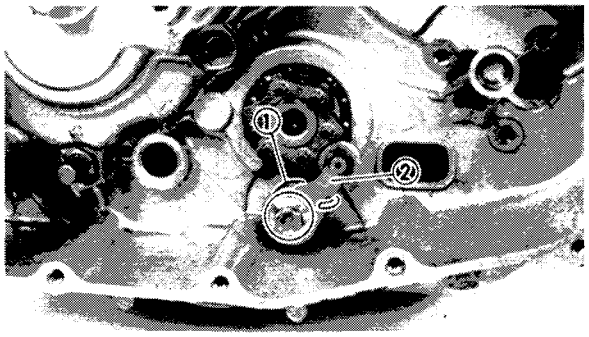
NOTE:
- Apply grease to the ball and spring throughly.
- Shift the shift cam in "LOW" position.

	Bolt (shift cam 2): **10 Nm (1.0 m • kg, 7.2 ft • lb)**



2. Install:
- Lever ① (inside)
- Collar ②
- Lever ③ (outside)
- Return spring ④
- Plain washer ⑤
- Bolt ⑥

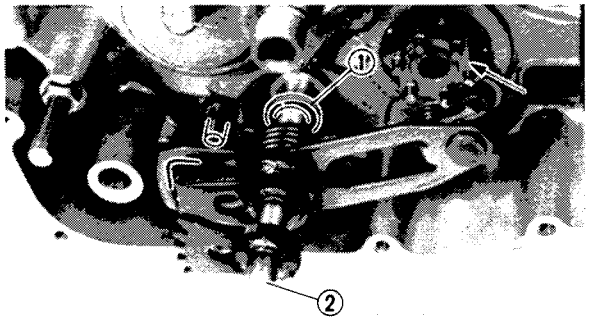
	Bolt (select lever cam): **14 Nm (1.4 m • kg, 10 ft • lb)**



3. Install:
- Spring ①
- Stopper lever ②

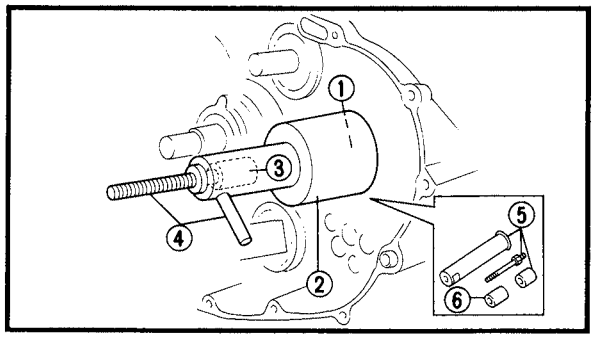
4. Hook the spring to its original position.
5. Tighten:
- Bolt (stopper lever)

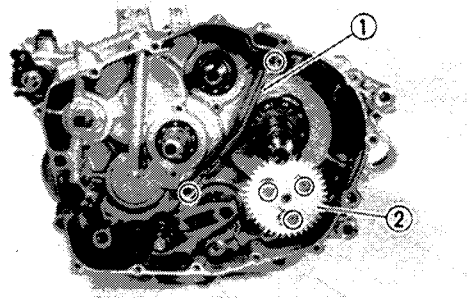
	Bolt (stopper lever): **14 Nm (1.4 m • kg, 10 ft • lb)** **LOCTITE®**



6. Install:
- Plain washer ①
- Shift shaft ②

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





7. Secure:
- Oil pump drive gear ①

Pot extension ②:
P/N. YM-90070-A
Adapter #11 ③:
P/N. YM-33279
Crankshaft installer set ④:
P/N. YM-90050
Buffer boss installer set ⑤:
P/N. 90890-04088
Pot extension ⑥:
P/N. 90890-04060

8. Install:
- Oil pipe ① (with copper washers)
- Gasket (oil pump)
- Oil Pump assembly ②

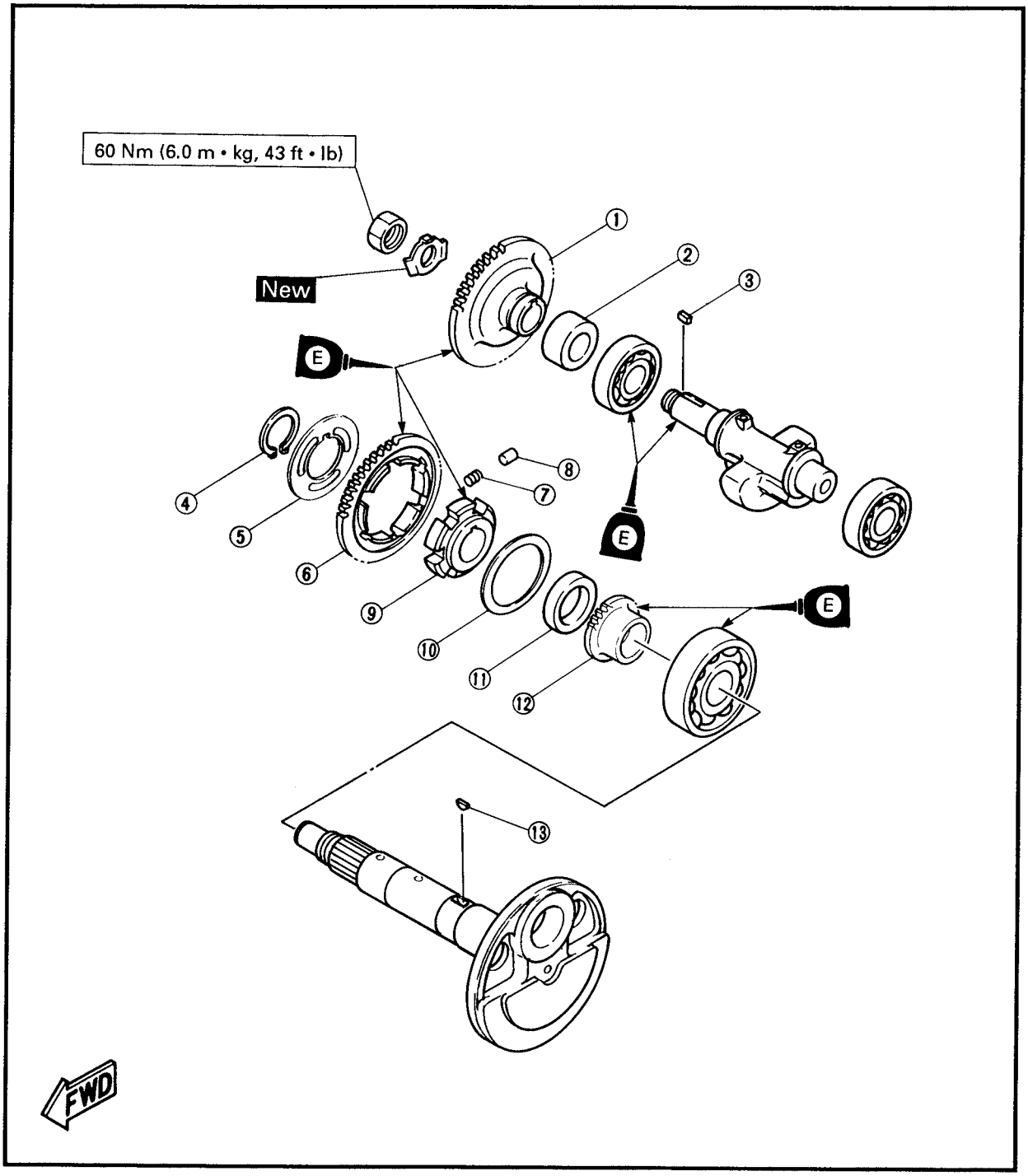
Oil pipe:
16 Nm (1.6 m • kg, 11 ft • lb)
Oil pump:
7 Nm (0.7 m • kg, 5.1 ft • lb)

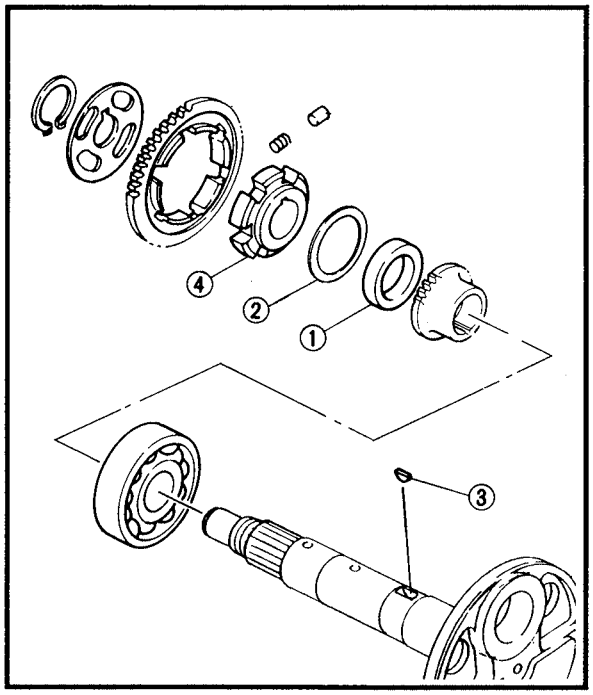
⚠ WARNING

Always use a new gasket and new copper washers.

BALANCER DRIVE AND DRIVEN GEARS

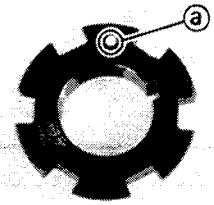
① Balancer driven gear
② Collar
③ Key (straight)
④ Circlip
⑤ Holding plate
⑥ Balancer drive gear
⑦ Springs
⑧ Pins
⑨ Buffer boss
⑩ Plain washer
⑪ Collar
⑫ Oil pump drive gear
⑬ Key (woodruff)



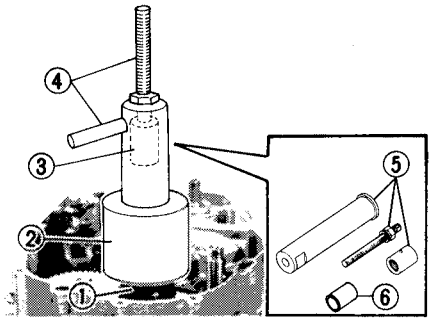


BALANCER DRIVE AND DRIVEN GEARS

1. Install:
- Collar ①
- Plain washer ②
- Key ③ (woodruff)
- Buffer boss ④ (new)

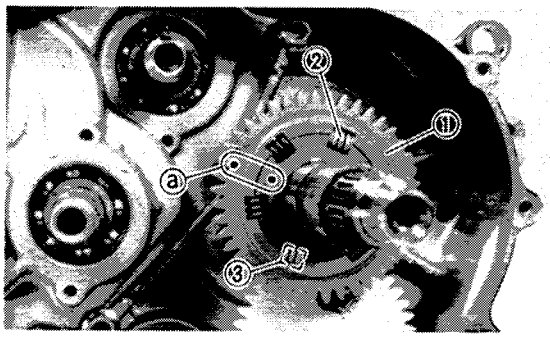


NOTE:
- The punch mark ⓐ on the boss must face outward, away from the main bearing.
- Be sure the woodruff key in the crankshaft should engage the keyway in the buffer boss.



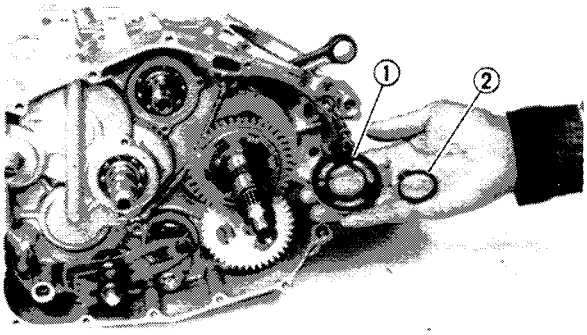
2. Secure:
- Buffer boss ①

Pot extension ②:
P/N. YM-90070-A
Adapter #11 ③:
P/N. YM-33279
Crankshaft installer set ④:
P/N. YM-90050
Buffer boss installer set ⑤:
P/N. 90890-04088
Pot extension ⑥:
P/N. 90890-04060

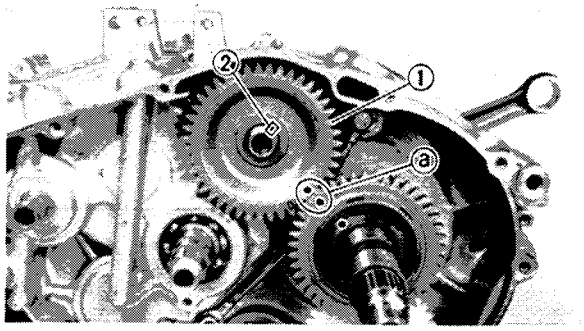


3. Install:
- Balancer drive gear ①

NOTE:
- The balancer drive gear damper assembly is composed of six springs ② and three pins ③. Insert a spring into the buffer boss, then insert a spring with a pin in it.
- Align the punch marks ⓐ on the buffer boss and drive gear.



4. Install:
- Holding plate ①
- Circlip ②

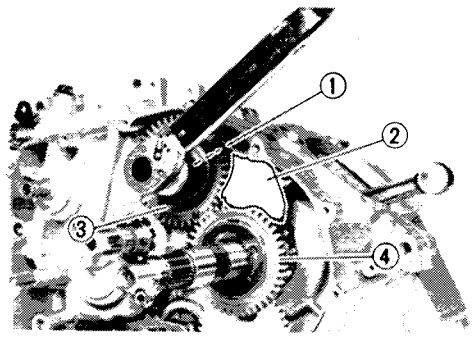


5. Install:
- Collar
- Balancer driven gear ①
- Key ② (straight)
- Lock washer

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

⚠ WARNING

Always use a new lock washer.



6. Tighten:
- Nut ① (driven gear)

NOTE:

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

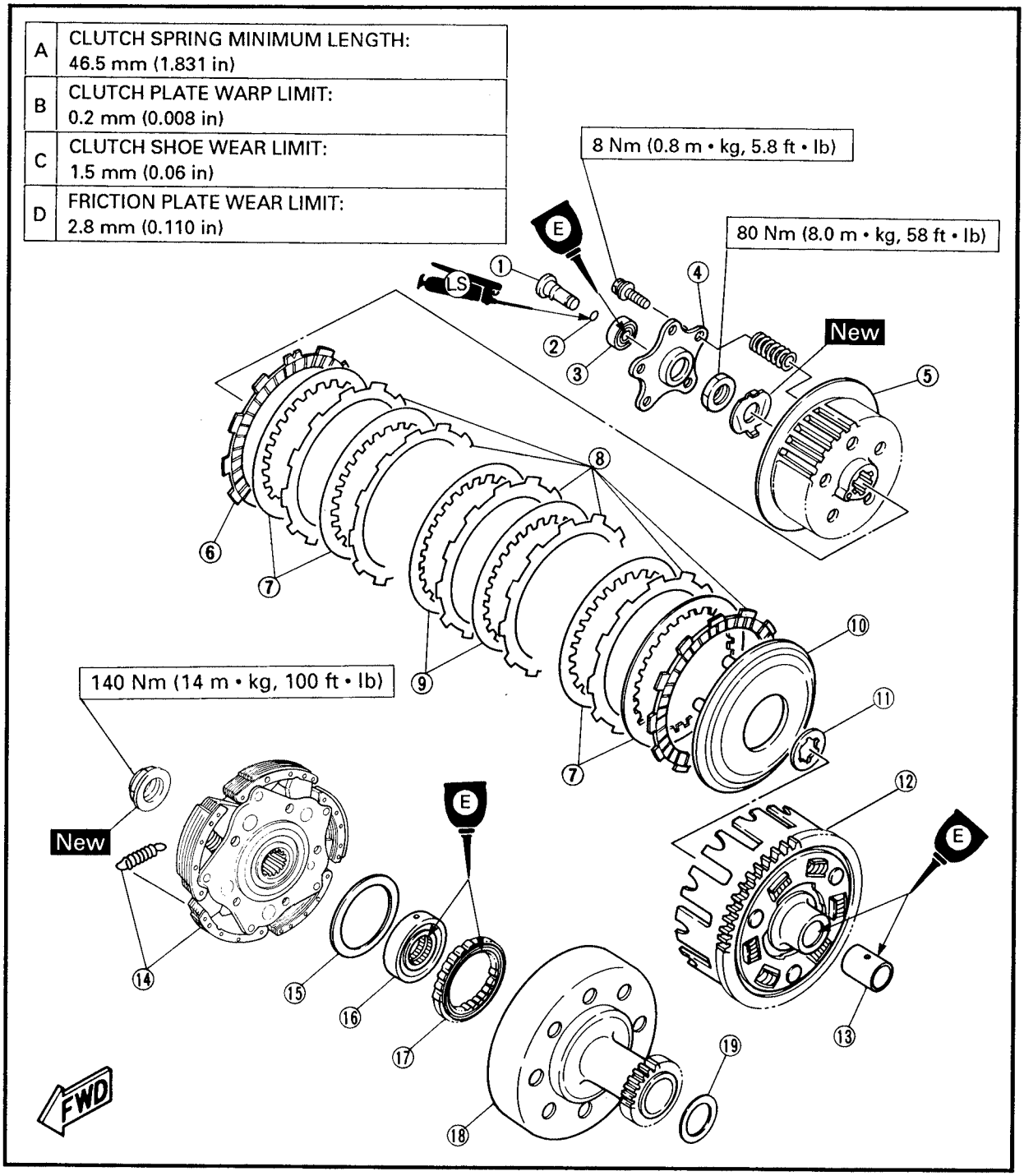
	Nut (balancer driven gear): 60 Nm (6.0 m • kg, 43 ft • lb)

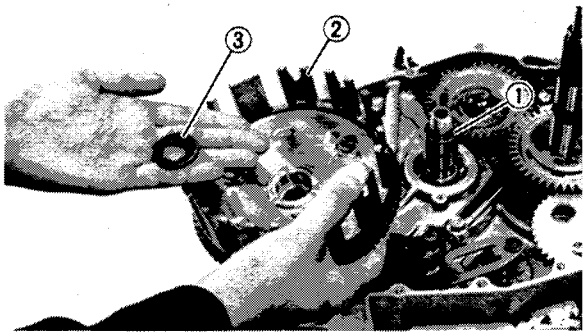
7. Bend the lock washer tabs.

CLUTCH

Secondary clutch and primary clutch

① Push rod
② O-ring
③ Bearing
④ Clutch spring plate
⑤ Clutch boss
⑥ Friction plate (cut – 1 pc)
⑦ Clutch plates (thickness: 1.6 mm – 4 pcs.)
⑧ Friction plates (red – 6 pcs.)
⑨ Clutch plate (thickness: 2.0 mm – 2 pcs.)
⑩ Pressure plate
⑪ Thrust washer
⑫ Clutch housing (secondary)
⑬ Collar
⑭ Clutch carrier assembly
⑮ Plain washer
⑯ Bearing retainer
⑰ One way bearing
⑱ Clutch housing (primary)
⑲ Plain washer

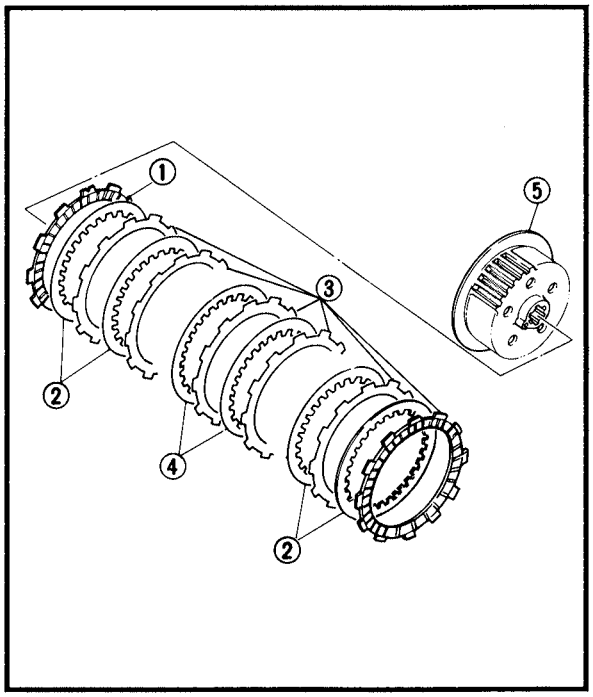




CLUTCH

Secondary clutch and primary clutch

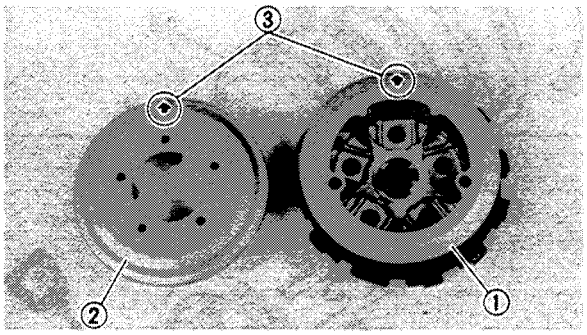
1. Install:
- Collar ①
- Clutch housing ②
- Thrust washer ③



2. Install:
- Friction plate ① (cut – 1 pc.)
- Clutch plates ② (thickness: 1.6 mm – 4 pcs)
- Friction plates ③ (red-6 pcs)
- Clutch plates ④ (thickness: 2.0 mm - pcs) (to clutch boss ⑤)

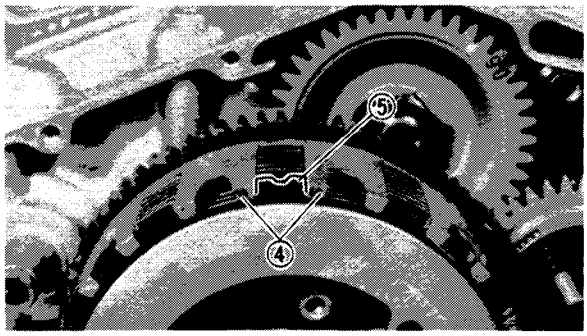
NOTE:

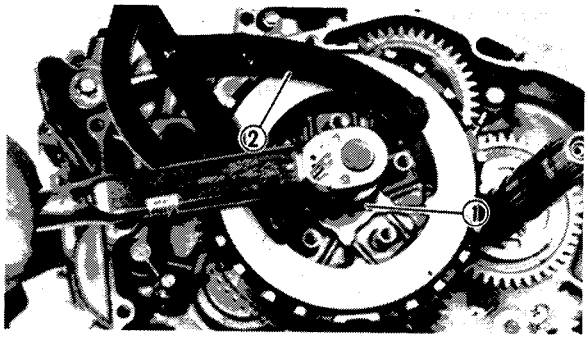
Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.



3. Install:
- Clutch boss ① (to the pressure plate assembly ②)

NOTE:
- Align the arrow marks ③ on the clutch boss with the pressure plate assembly.
- Align the match mark ④ on the clutch housing with the semi-circular slot ⑤ on the friction plate.
- When installing the clutch boss in the clutch housing, temporarily attaching the bolt and spring (used to tighten down the clutch spring plate) to the pressure plate at one place will make assembly easier.





4. Install:
- Lock washer (new)
- Nut ① (clutch boss)

	Nut (clutch boss): 80 Nm (8.0 m • kg, 58 ft • lb)

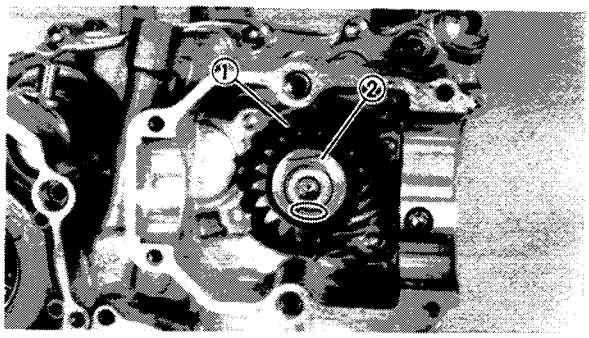
⚠ WARNING

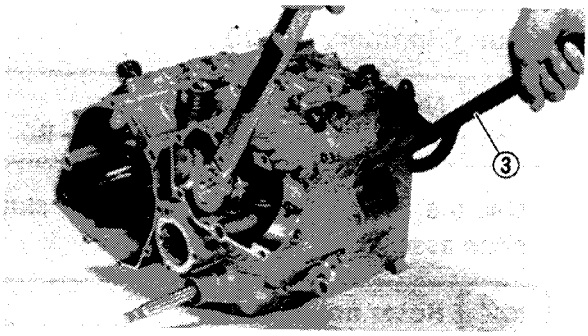
Always use a new lock washer.

Use the rotor holder ② to hold the clutch boss.

	Rotor holder: P/N. YU-01235, 90890-01235

5. Bend the lock washer tabs.





6. Install:
- Middle drive pinion gear ①
- Nut ②

	Nut (middle drive pinion gear): 120 Nm (12.0 m • kg, 85 ft • lb)

Use the rotor holder ③ to hold the clutch boss.

	Rotor holder: P/N. YU-01235, 90890-01235

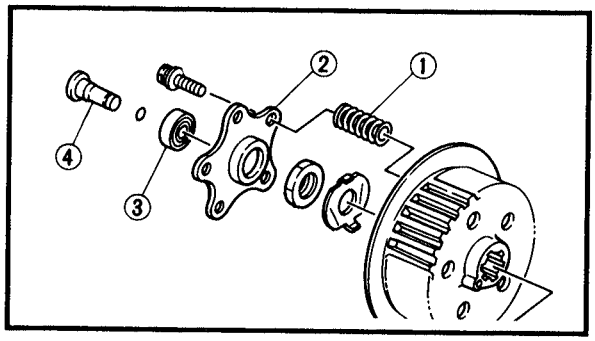
NOTE:

Put the engine in 1st and carry out the operation.

7. Lock the threads with drift punch.

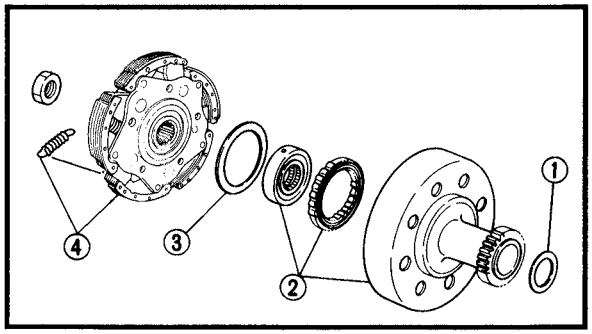
⚠ WARNING

Always use a new nut.



8. Install:
- Clutch springs ①
- Clutch spring plate ②
- Bearing ③
- Push rod ④

	Bolts (clutch spring): 8 Nm (0.8 m • kg, 5.8 ft • lb)

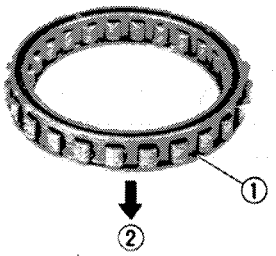


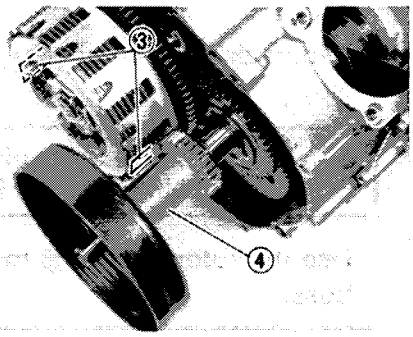
9. Install:
- Plain washer ①
- Clutch housing comp ②
- Plain washer ③
- Clutch carrier assembly ④
- Nut ⑤ (primary clutch) (new)

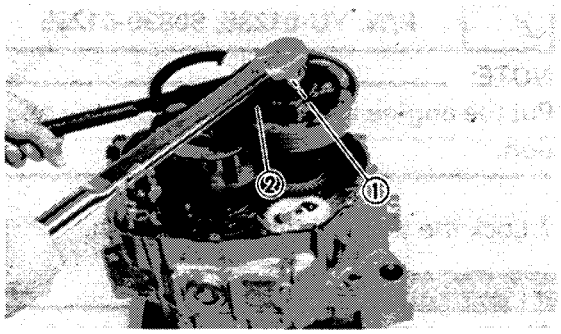
⚠ WARNING

Always use a new nut (primary clutch).

NOTE:
- The flange side ① of the one-way bearing must face inward ②, away from the clutch shoe.
- The secondary clutch housing has two notches ③ machined into it to permit the primary drive gear behind the primary clutch to clear the secondary clutch.
  Align one of these notches with the primary gear ④ before installing the primary clutch assembly.







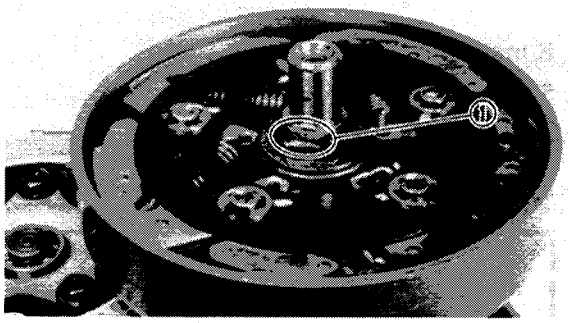
10. Tighten:
- Nut ① (primary clutch)

	Nut (primary clutch): **140 Nm (14 m • kg, 100 ft • lb)**

Use the rotor holder ② to hold the clutch shoe assembly.

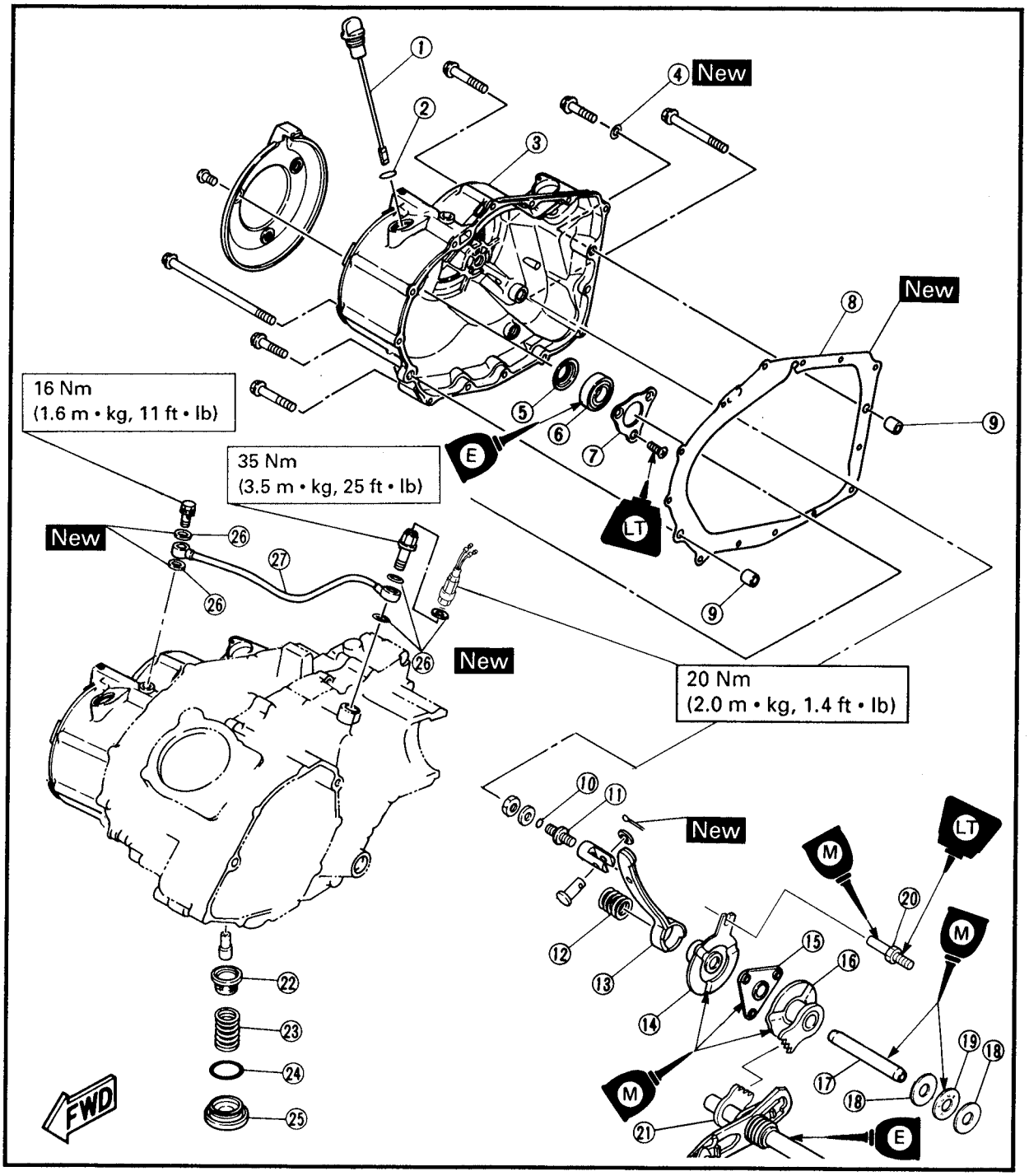
	Rotor holder: **P/N. YU-01235, 90890-01235**

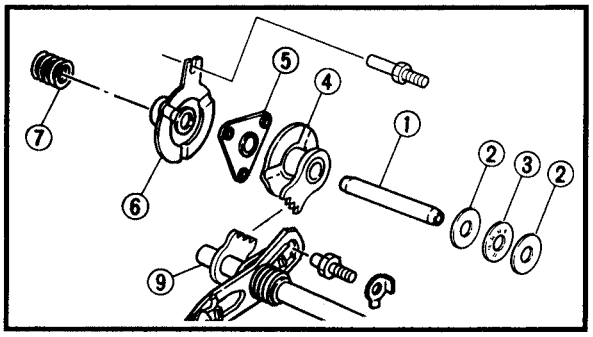
11. Lock the therads ① with drift punch.



CRANKCASE COVER (RIGHT), SHIFT GUIDE AND OIL PIPE

① Dip stick
② O-ring
③ Crankcase cover (right)
④ Copper washer
⑤ Oil seal
⑥ Bearing
⑦ Stopper plate
⑧ Crankcase cover gasket
⑨ Dowel pin
⑩ O-ring
⑪ Adjust bolt
⑫ Spring
⑬ Release lever (clutch)
⑭ Shift guide #2
⑮ Pawl holder
⑯ Shift guide #1
⑰ Shaft
⑱ Plain washer
⑲ Bearing
⑳ Stopper bolt
㉑ Shift shaft
㉒ Oil strainer
㉓ Spring
㉔ O-ring
㉕ Drain bolt
㉖ Copper washer
㉗ Oil pipe



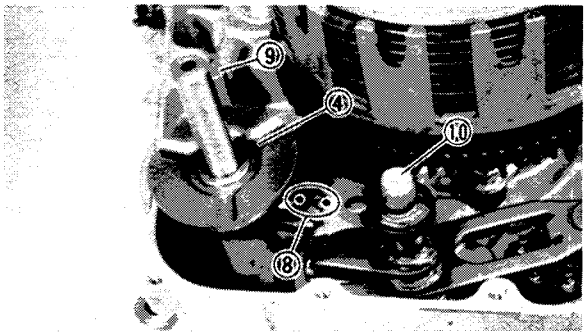


CRANKCASE COVER (RIGHT), SHIFT GUIDE AND OIL PIPE

Shift guide

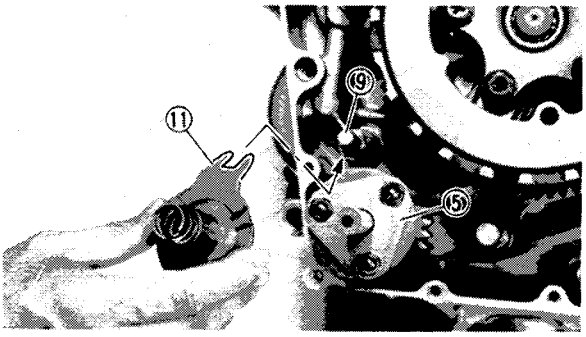
1. Install:
- Shaft ①
- Plain washers ②
- Bearing ③
- Shift guide #1 ④
- Pawl holder ⑤
- Shift guide #2 ⑥
- Spring ⑦

NOTE:
Align the punch marks ⑧ on the shift guides.



⑨ Stopper bolt
⑩ Shift shaft

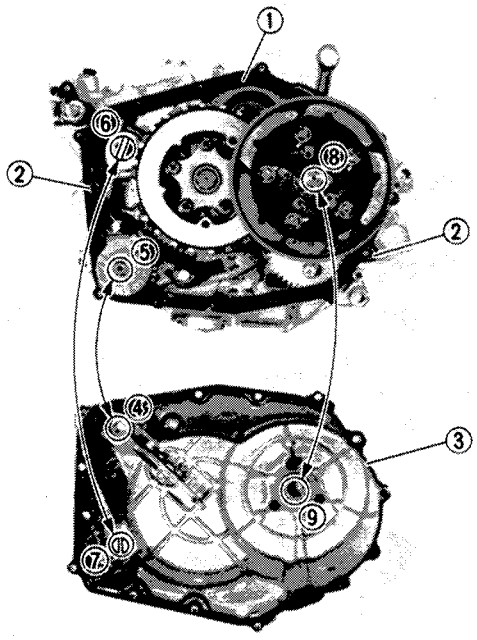
NOTE:
The slot ⑪ in the shift guide #1 must engage the stopper bolt ⑨.

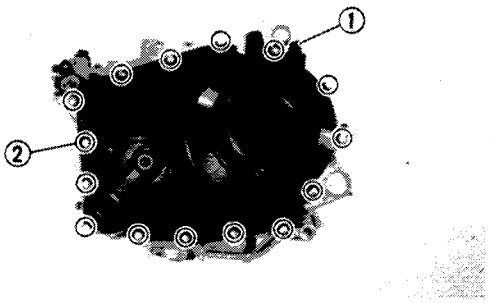


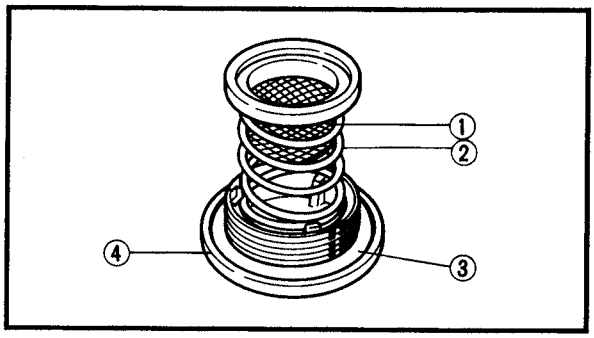
CRANKCASE COVER (RIGHT)

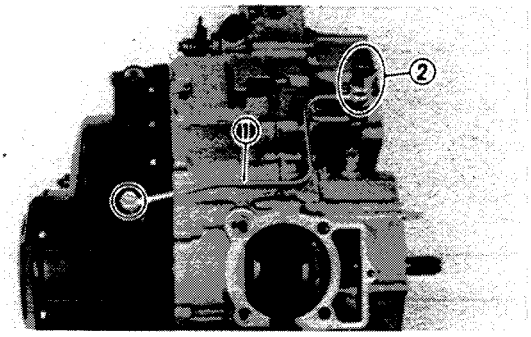
1. Install:
- Gasket ① (new)
- Dowel pins ②
- Crankcase cover ③ (right)

NOTE:
- The release lever ④ engages the shift guide #1 ⑤.
- The pin of middle drive axle ⑥ engages the groove of speedometer drive gear ⑦.
- The crankshaft end ⑧ engages the bearing of crankcase ⑨.









2. Tighten:
- Bolts (crankcase cover)
- Dip stick ①

NOTE:
- Tighten the bolts in stage, using a criss-cross pattern.
- Install the copper washers on the bolt ②.

	Screws (crankcase cover): **10 Nm (1.0 m • kg, 7.2 ft • lb)**

3. Install:
- Oil strainer ①
- Spring ②
- O-ring ③
- Drain plug ④

	Drain plug: **32 Nm (3.2 m • kg, 23 ft • lb)**

OIL PIPE

1. Install:
- Oil pipe ①
- Thermo unit ②

⚠ WARNING

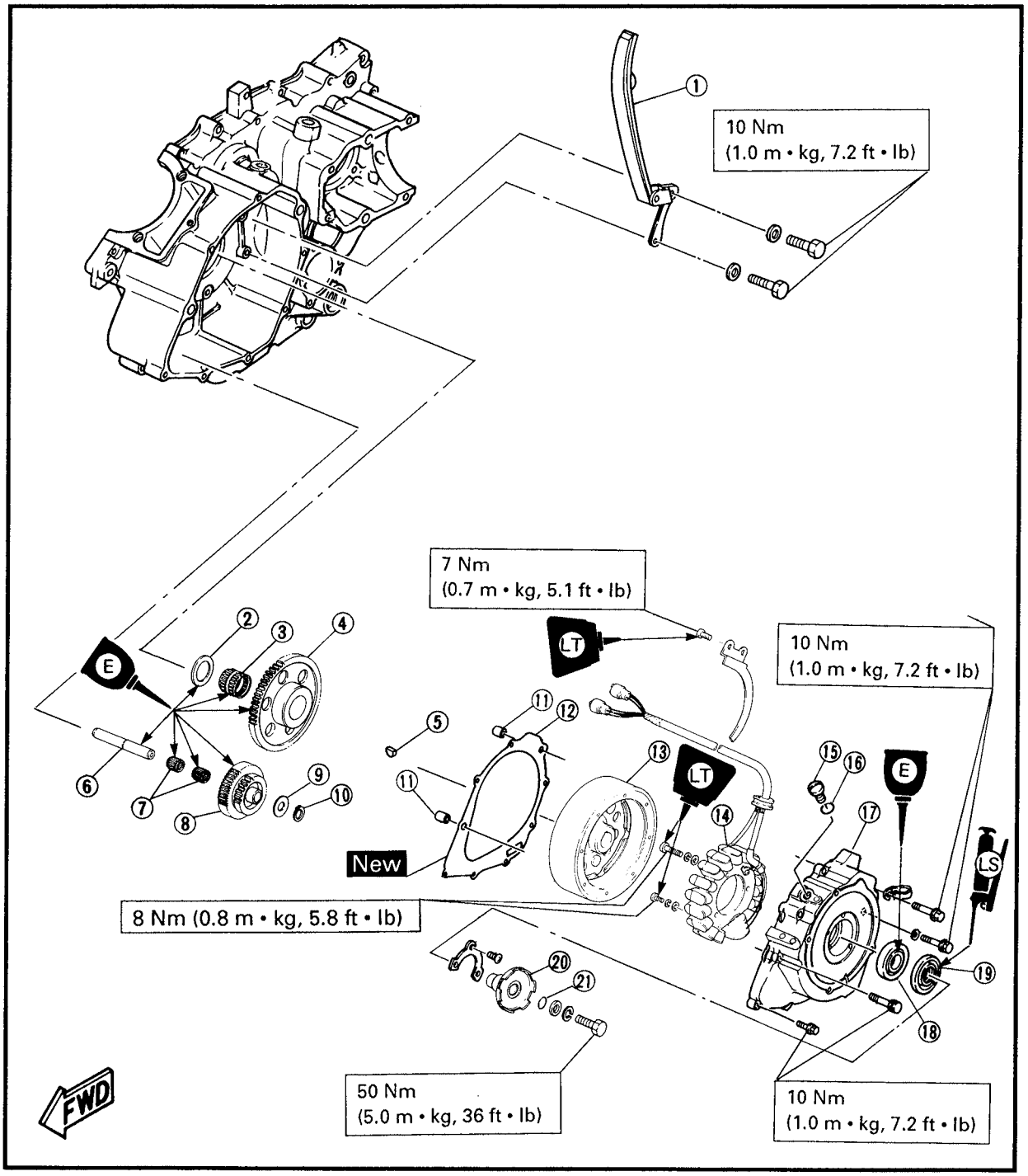
Always use new copper washers.

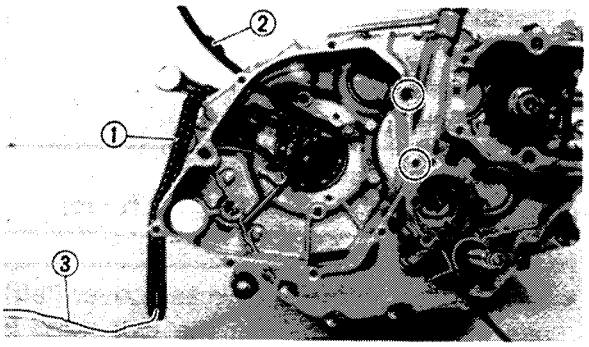
	Union bolt (8 mm): **16 Nm (1.6 m • kg, 11 ft • lb)** **Union bolt (14 mm):** **35 Nm (3.5 m • kg, 25 ft • lb)** **Thermo unit:** **20 Nm (2.0 m • kg, 14 ft • lb)**

2. Install:
- "NEUTRAL" switch lead

CDI ROTOR AND CRANKCASE COVER (LEFT)

① Cam chain guide (intake)
② Plain washer
③ Bearing
④ Starter wheel gear
⑤ Key (woodruff)
⑥ Shaft
⑦ Bearing
⑧ Starter idle gear
⑨ Plain washer
⑩ Circlip
⑪ Dowel pin
⑫ Crank case cover gasket (left)
⑬ CDI rotor
⑭ Stator coil assembly
⑮ Timing plug
⑯ O-ring
⑰ Crankcase cover (left)
⑱ Bearing
⑲ Oil seal
⑳ Rotor
㉑ O-ring





CDI ROTOR AND CRANKCASE COVER (LEFT)

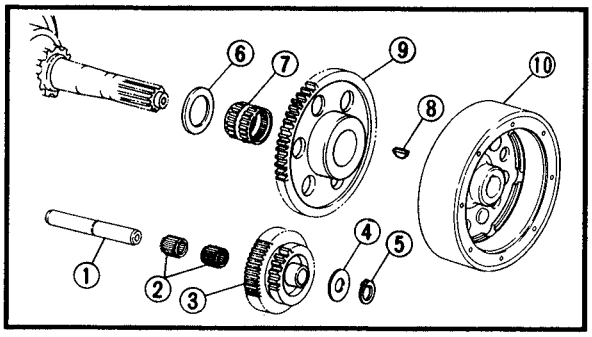
CDI rotor

1. Install:
- Cam chain ①
- Cam chain guide ② (intake)

	Cam chain guide (intake): 10 Nm (1.0 m • kg, 7.2 ft • lb)

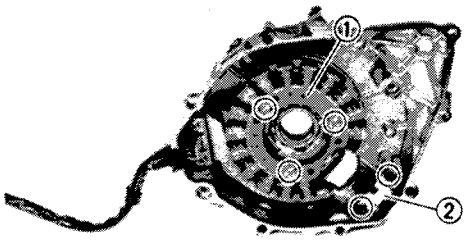
NOTE:

Fasten safety wire ③ to the cam chain to prevent it from falling into the crankcase.



2. Install:
- Shaft ①
- Bearings ②
- Starter idle gear ③
- Plain washers ④
- Circlip ⑤
- Plain washers ⑥
- Bearing ⑦
- Woodruff key ⑧
- Starter wheel gear ⑨ (with CDI Rotor ⑩)

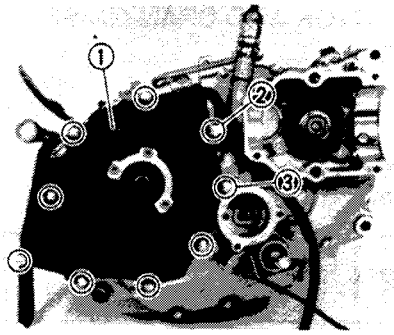
NOTE:
- Before installing the rotor, clean the outside of the crankshaft and inside of the rotor.
- After installing the rotor, check the rotor rotation smoothly. If not, reinstall the key and rotor.



Crankcase cover (left)

1. Install:
- Stator assembly ①
- Pickup coil assembly ②

	Stator assembly: 8 Nm (0.8 m • kg, 5.8 ft • lb) LOCTITE® **Pickup coil assembly: 5 Nm (0.5 m • kg, 3.6 ft • lb)**



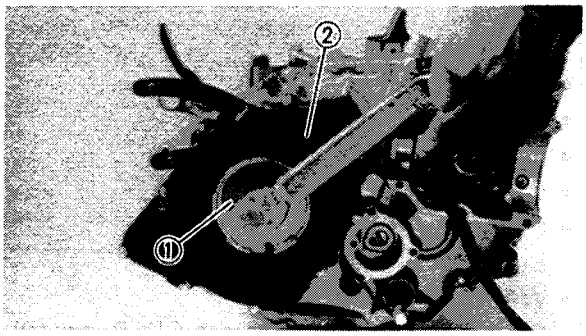
2. Install:
- Dowel pins
- Gasket (new)
- Crankcase cover ① (left)

	Crankcase cover (left): **10 Nm (1.0 m • kg, 7.2 ft • lb)**

NOTE:
- When installing the crankcase cover (left), use a long rod to hold the CDI rotor in position from the outside. This will make assembly easier. Be careful not to damage the oil seal.
- Install the clamp on the bolt ②, and the copper washer on the bolt ③.

⚠ WARNING

Always use a new gasket and a new copper washer.



3. Install:
- Starter pulley ①

	Starter pulley: **50 Nm (5.0 m • kg, 36 ft • lb)**

Use the rotor holder ② to hold the starter pulley.

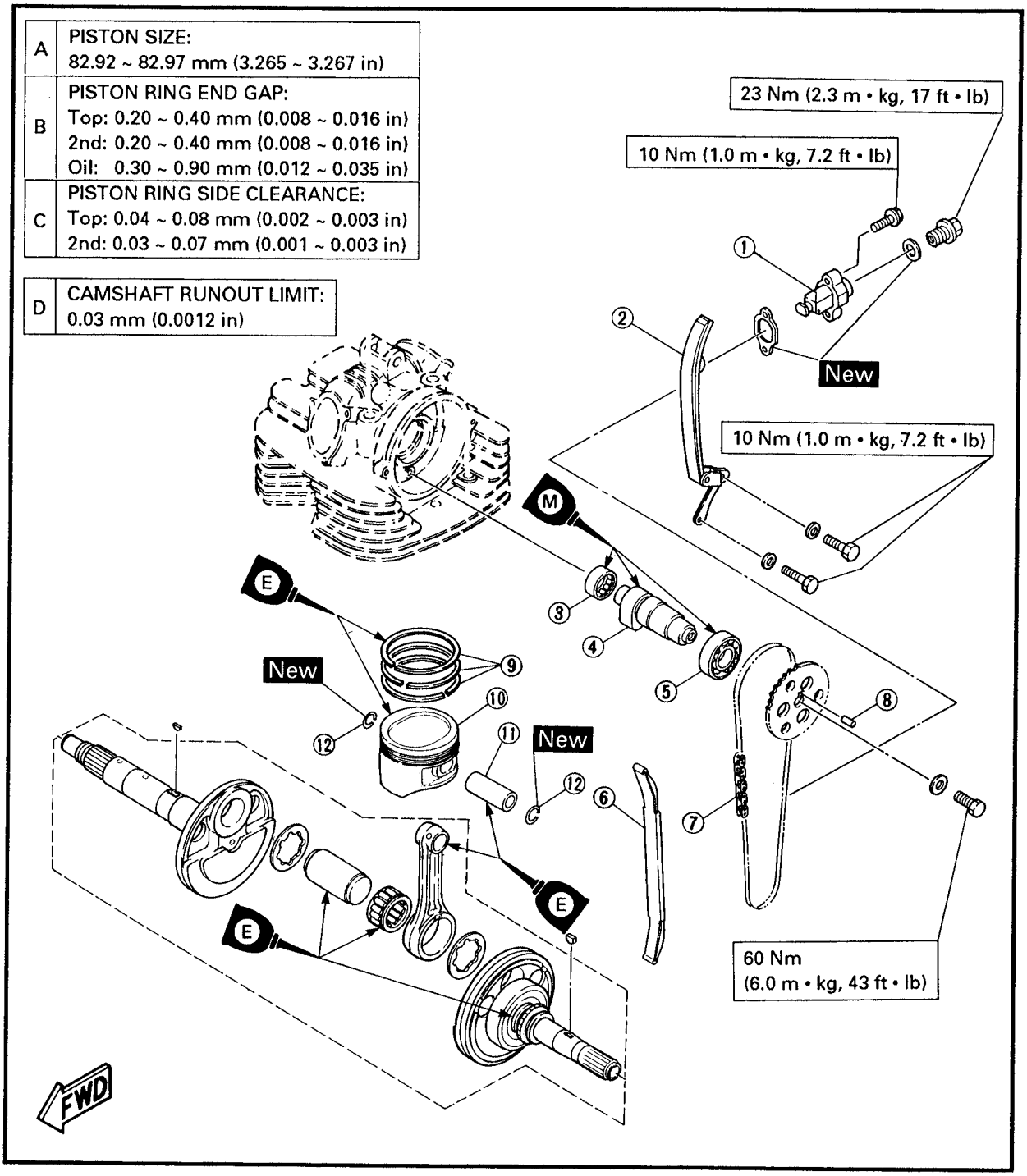
	Rotor holder: **P/N. YM-01235, 90890-01235**

NOTE:
Before installing the starter pulley, do not forget to fit the O-ring.

PISTON, CYLINDER AND CYLINDER HEAD

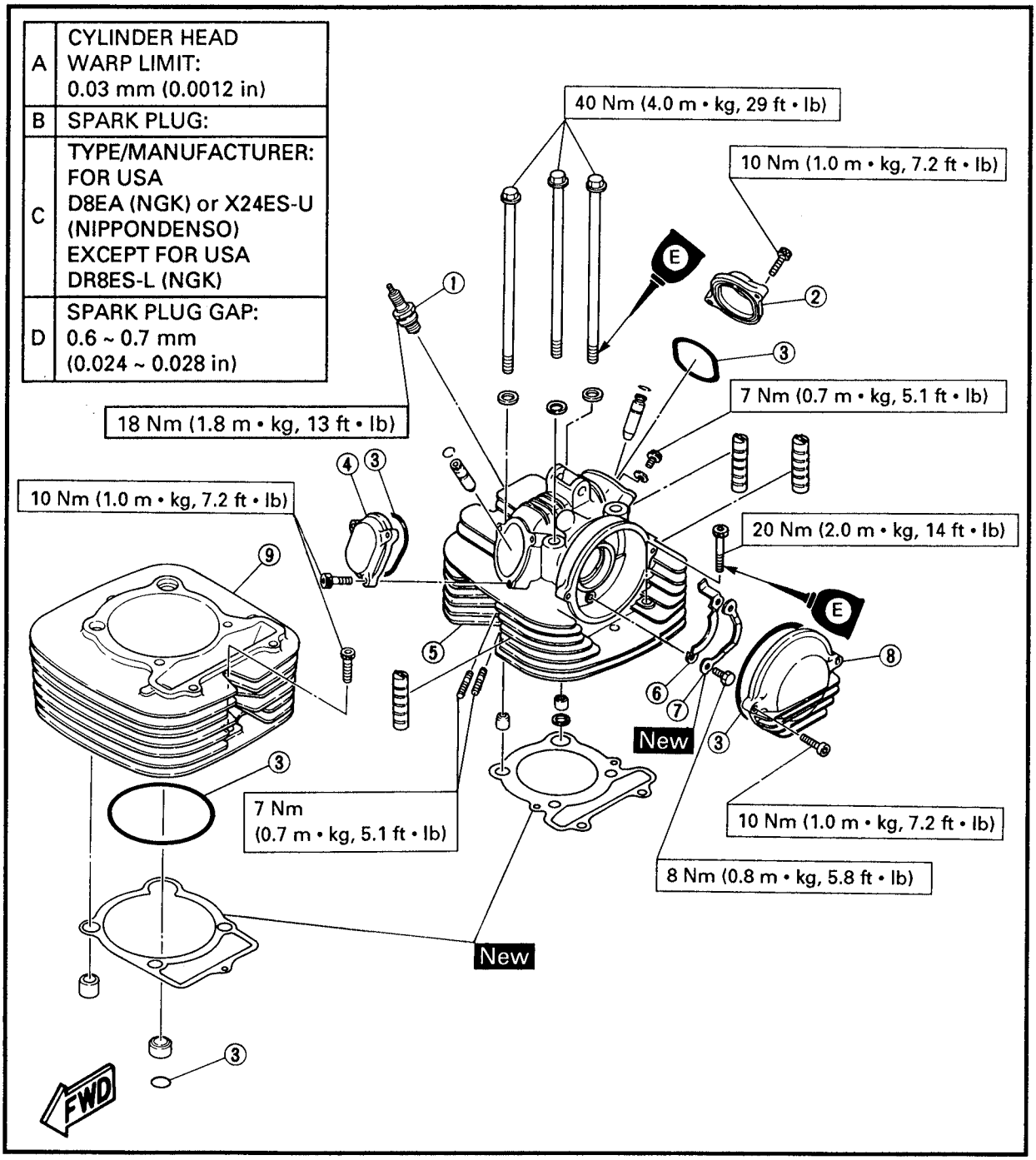
Piston

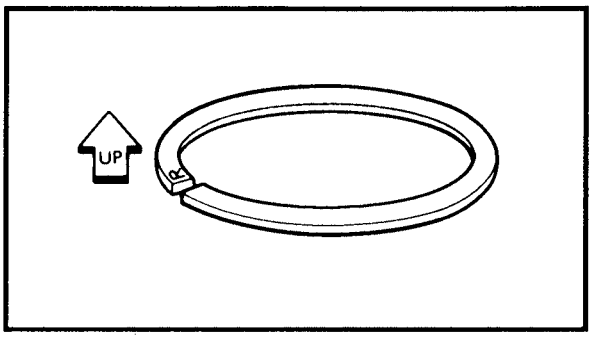
① Cam chain tensioner
② Cam chain guide (intake)
③ Bearing
④ Cam shaft
⑤ Bearing
⑥ Cam chain guide (exhaust)
⑦ Cam chain
⑧ Pin
⑨ Piston ring
⑩ Piston
⑪ Piston pin
⑫ Piston pin clip



Cylinder and cylinder head

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





PISTON, CYLINDER AND CYLINDER HEAD

Piston

1. Install:
   - Piston rings
     (onto the piston)

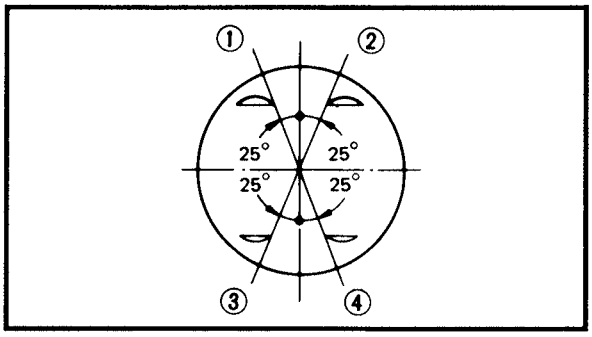
NOTE:

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

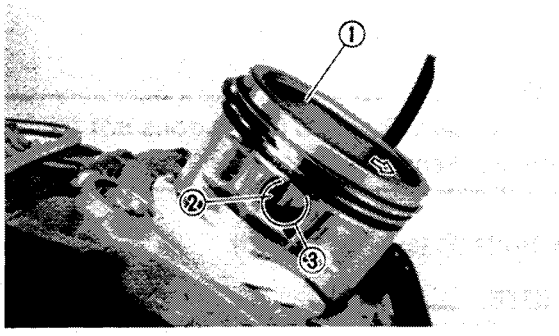
2. Apply:
   - 4-stroke engine oil
     (to the piston, piston rings and cylinder)
3. Set:
   - Piston ring ends

CAUTION:

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



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



4. Install:
   - Piston ①
   - Piston pin ②
   - Piston pin clip ③

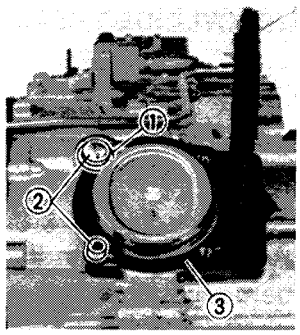
NOTE:

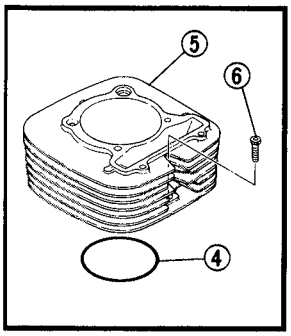
- The arrow on the piston must point to the front of the engine.
- Before installing the piston pin clip, cover the crankcase with a clean towel or rag so you will not accidentally drop the pin clip and material into the crankcase.

⚠ WARNING

Always use a new piston pin clip.

5. Apply:
   - 4-stroke engine oil
     (to the piston pin, piston ring grooves and piston skirt areas)



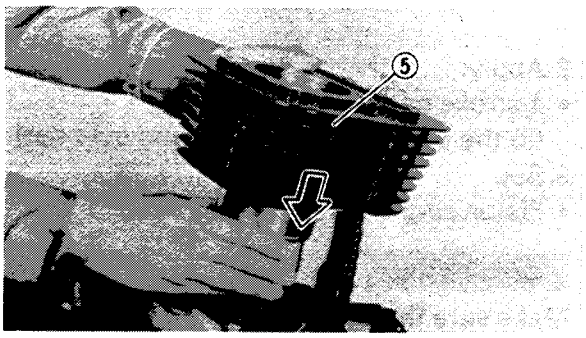


Cylinder and cylinder head

1. Install:
- O-ring ①
- Dowel pins ②
- Gasket (new) ③ (to crankcase)
- O-ring ④
- Cylinder ⑤
- Bolt ⑥ (cylinder)

NOTE:

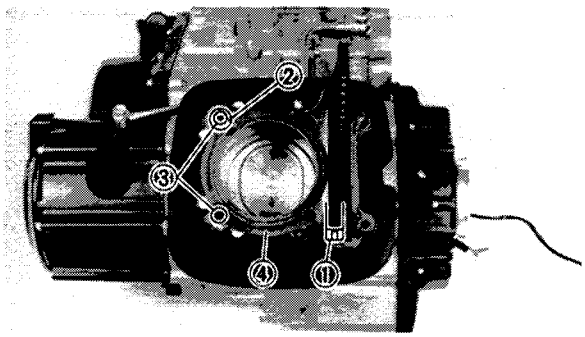
Install the cylinder with one hand while compressing the piston rings with the other hand.



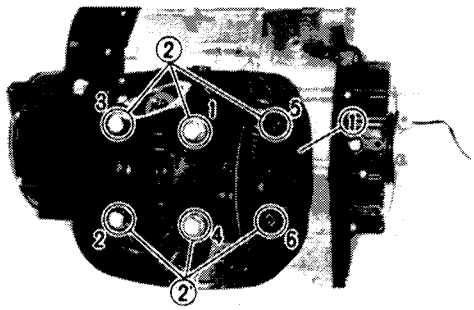
CAUTION:

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

	Bolts (cylinder): **10 Nm (1.0 m • kg, 7.2 ft • lb)**



2. Install:
- Cam chain guide ① (exhaust)
- O-ring ②
- Dowel pins ③
- Gasket ④ (new)



3. Install:
- Cylinder head ①

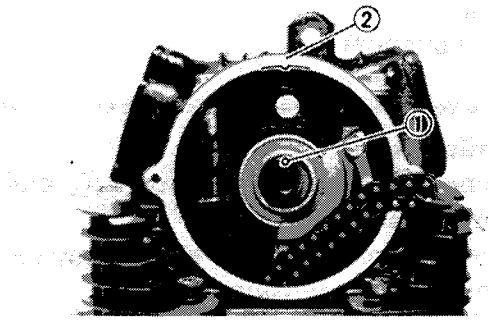
NOTE:

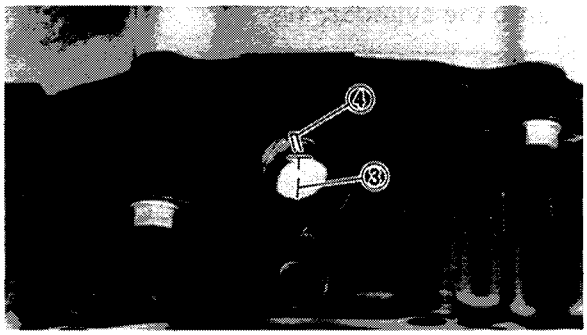
Tie the cam chain so that it does not fall into the crankcase.

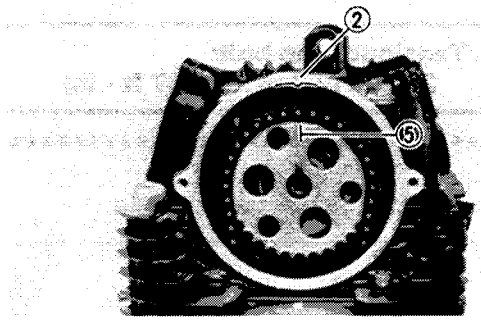
- Bolts ② (cylinder head)

NOTE:
- Apply the 4-stroke engine oil onto the washers.
- Tighten the bolts starting with the lowest numbered one.

	Bolts (cylinder head) – 10 mm: **40 Nm (4.0 m • kg, 29 ft • lb)** **Bolts (cylinder head) – 8 mm:** **20 Nm (2.0 m • kg, 14 ft • lb)**







4. Install:
• Cam sprocket

****

Cam sprocket installing steps:

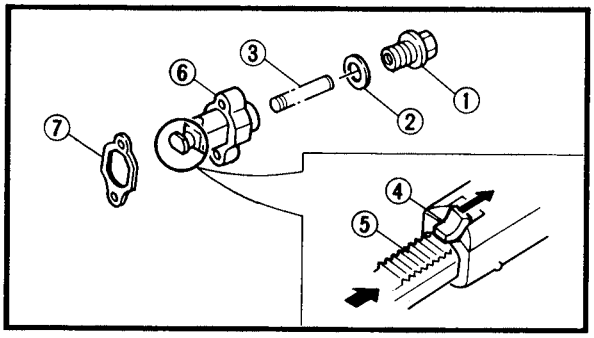
- Rotate the camshaft to align the camshaft pin ① with the cylinder head match mark ②.
- Turn the starter pulley until the "T" mark ③ is aligned with the stationary pointer ④ on the crankcase.
- Place the cam chain onto the cam chain sprocket.
- Install the cam chain sprocket onto the camshaft, and finger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

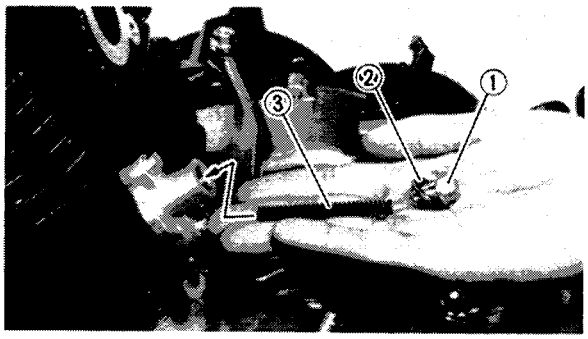
NOTE:

Be sure the match mark ⑤ on the cam chain sprocket is aligned with the match mark ② on the cylinder head.

- Force the camshaft clockwise and counter-clockwise to remove the cam chain slack.
- Insert the screwdriver into the cam chain tensioner hole, and push the cam chain damper inward.
- While pushing the cam chain damper, be sure cam sprocket match mark ⑤ align the cylinder head match mark ②.
- If marks is aligned, tighten the cam sprocket bolt. If marks do not align, change the meshing position of sprocket and cam chain.

****





5. Install:
- Chain tensioner

****

Installation steps:
- Remove the tensioner cap bolt ①, plain washer ② and spring ③.
- Release the chain tensioner one-way cam ④ and push the tension rod ⑤.
- Install the tensioner ⑥ with a new gasket ⑦ into the cylinder.

	Bolts (tensioner body): **10 Nm (1.0 m • kg, 7,2 ft • lb)**

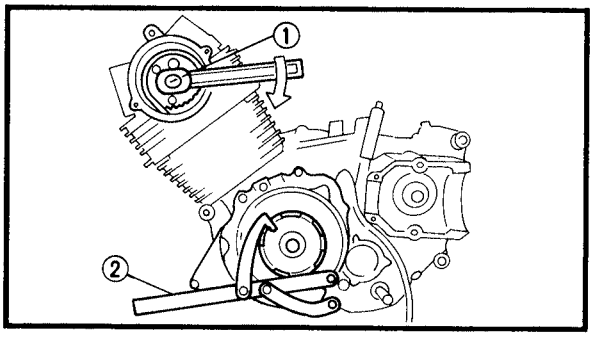
⚠ WARNING

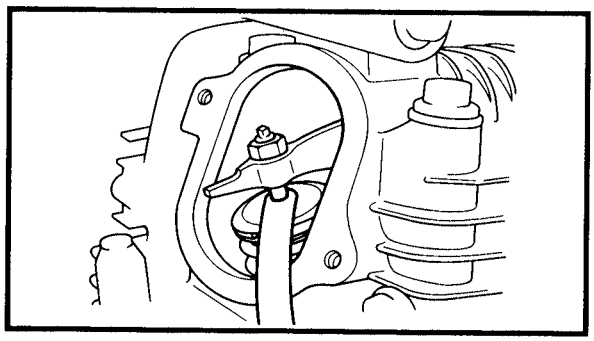
Always use a new gasket.

- Install the spring ③, plain washer ② and tensioner cap bolt ①.

	Tensioner cap bolt: **23 Nm (2.3 m • kg, 17 ft • lb)**

****





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

	Bolt (cam chain sprocket): **60 Nm (6.0 m • kg, 43 ft • lb)**

Use the rotor holder ② to hold the rotor.

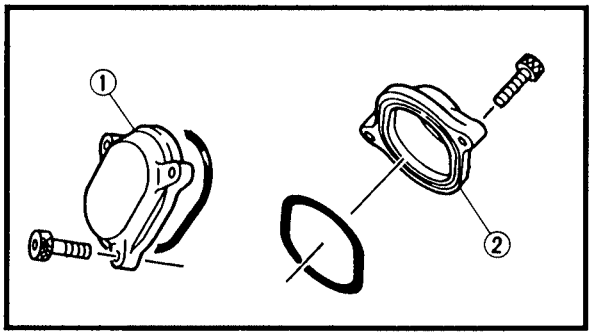
	Rotor holder: **P/N. YU-1235, 90890-01235**

7. Adjust:
- Valve clearance

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

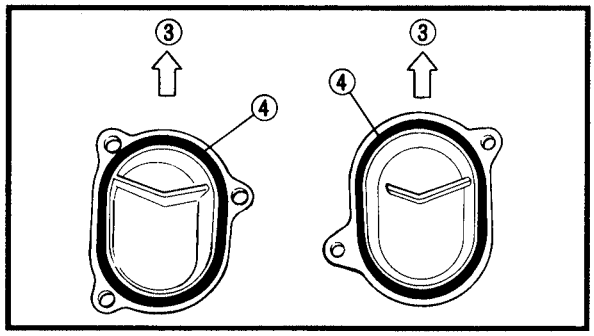
	Intake valve (cold): **0.06 ~ 0.10 mm (0.002 ~ 0.004 in)** **Exhaust valve (cold):** **0.16 ~ 0.20 mm (0.006 ~ 0.008 in)**

NOTE:
After adjusting the valve clearance, apply 4-stroke engine oil to the following parts.
- Camshaft
- Rocker arm shafts
- Rocker arms
- Valve assemblies

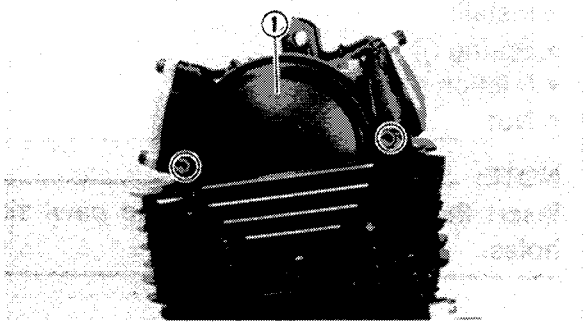


8. Install:
- O-ring (exhaust cover)
- Tappet cover ① (exhaust)
- O-ring (intake cover)
- Tappet cover ② (intake)

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

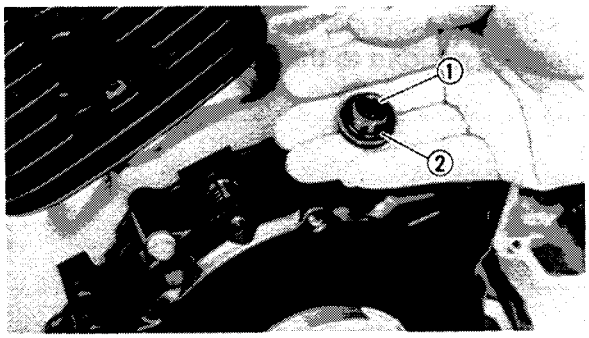


	Tappet cover: **10 Nm (1.0 m • kg, 7.2 ft • lb)**



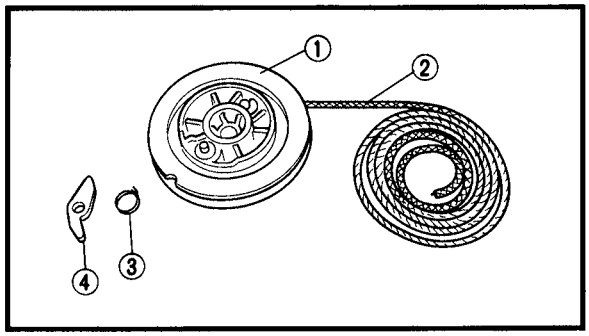
9. Install:
- O-ring (side cover)
- Side cover ① (cylinder head)

	Side cover (cylinder head): **10 Nm (1.0 m • kg, 7.2 ft • lb)**



10. Install:
- Timing plug ①
- O-ring ②
- Spark plug

	Spark plug: **18 Nm (1.8 m • kg, 13 ft • lb)**

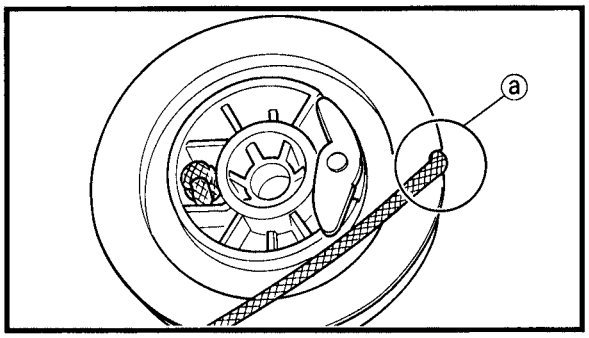


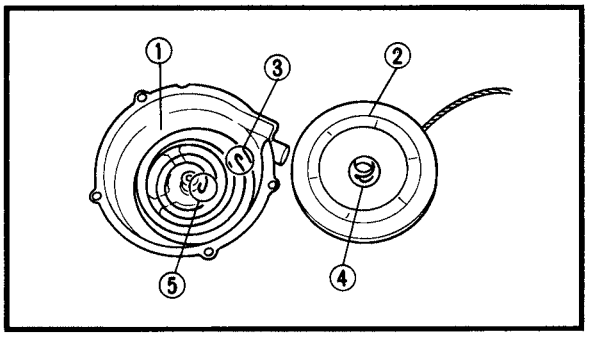
RECOIL STARTER

1. Install:
- Sheave drum ①
- Rope ②
- Pawl spring ③
- Drive pawl ④

NOTE:

Wind the rope 4-1/2 turns clockwise around the sheave drum. Then insert the rope into the drum slit ⓐ.

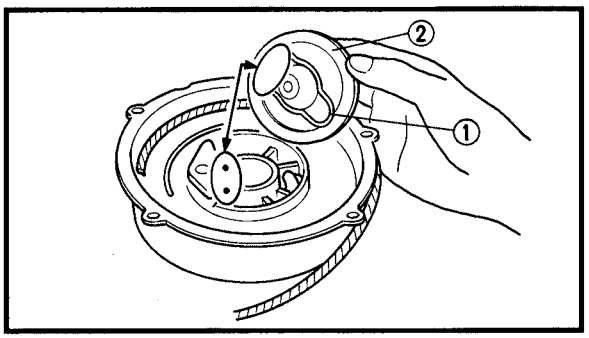




2. Install:
- Starter spring ①
- Sheave drum assembly ②

NOTE:

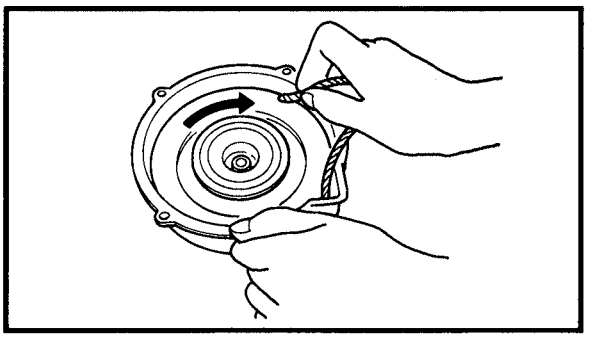
- Mesh the spring hook ③ with the case slit, then wind the spring clockwise into the case from larger to smaller diameter.
- Mesh the sheave drum hook ④ with the spring hook ⑤.



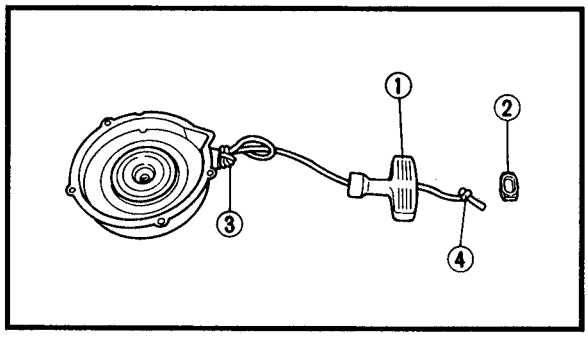
3. Install:
- Spring ①
- Friction plate ②
- Nut

NOTE:

Insert the spring hooks into the pawl side holes.

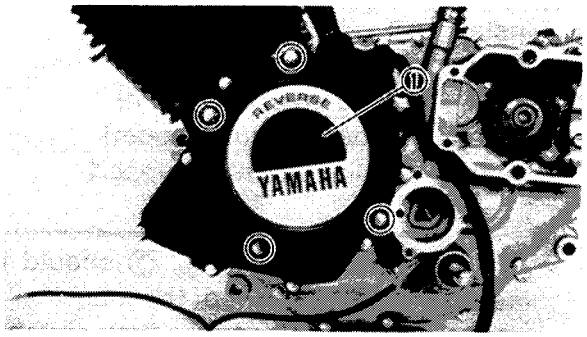


4. Turn the sheave drum 3-turns clockwise to give preload to the spring.



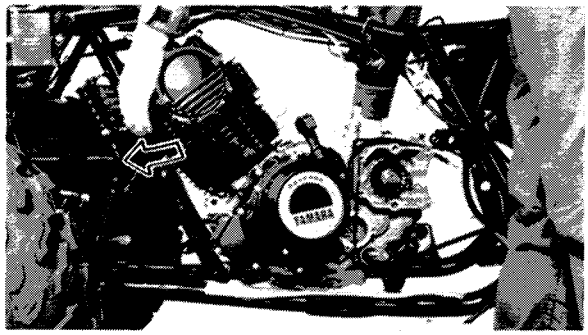
5. Install:
- Starter handle ①
- Cap ②

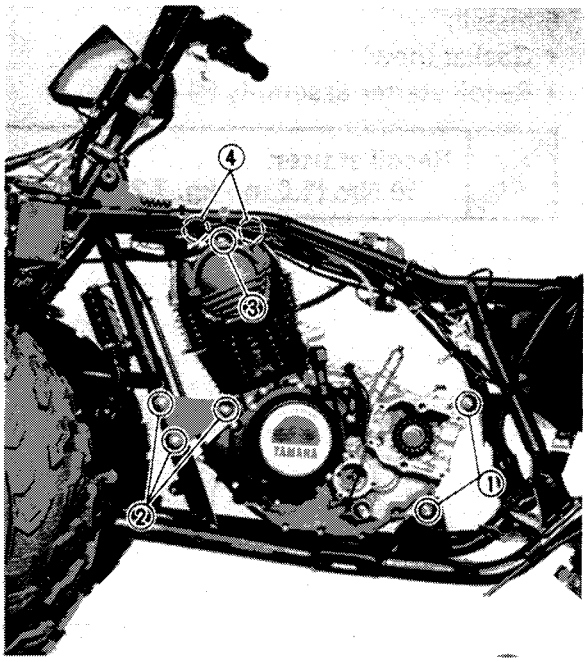
NOTE:
- Pass the rope through the case hole and make knot ③ on the rope so that the rope is not pulled into the case.
- Untying knot ③ after making knot ④.



6. Install:
- Gasket (new)
- Recoil starter assembly ①

	Recoil starter: **10 Nm (1.0 m • kg, 7.2 ft • lb)**





REMOUNTING ENGINE

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

⚠ WARNING

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

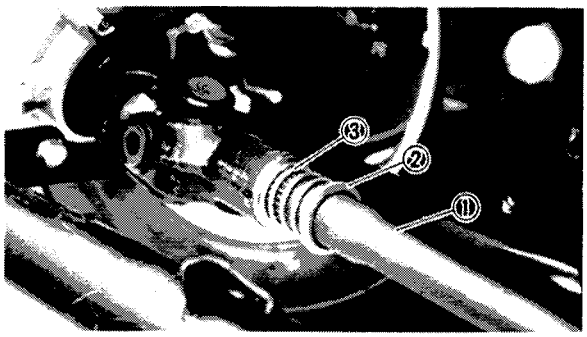
1. Install:
- Engine
  (from the left side)
2. Install:
- Bolts ① (engine mounting-rear)
- Bolt ② (engine mounting-front)
- Bolt ③ (engine mounting-upper)
- Bolts ④ (engine mounting-upper)

NOTE:
- All mounting bolts ①, ②, ③ should be installed from the right of the machine.
- Install the all bolts and nuts first, and then tighten the bolts and nuts to specifications.

Nuts (engine stay front-frame):
33 Nm (3.3 m • kg, 24 ft • lb)
Bolts (engine stay upper-frame):
33 Nm (3.3 m • kg, 24 ft • lb)
Nuts (mounting bolt):
Upper
33 Nm (3.3 m • kg, 24 ft • lb)
Front, rear
42 Nm (4.2 m • kg, 30 ft • lb)

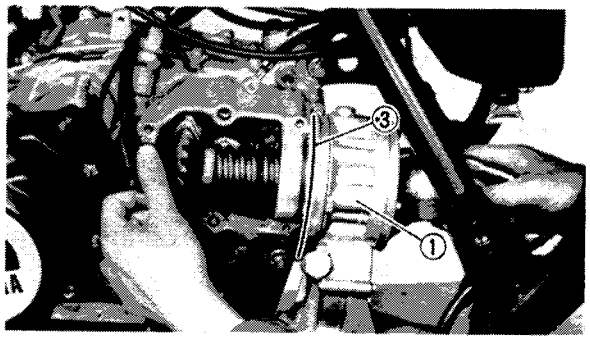
3. Apply:
- Drive shaft splines

Molybdenum disulfide grease



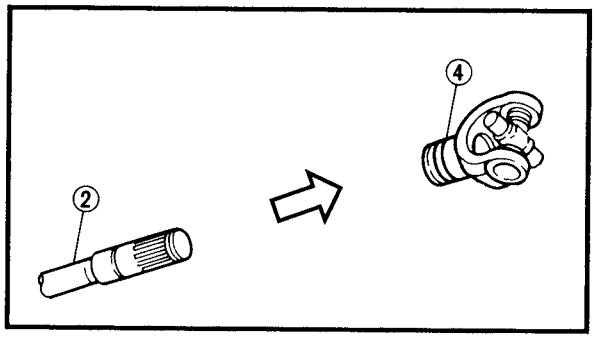
4. Install:
- Front drive shaft ①

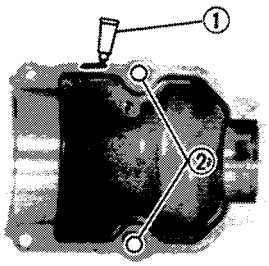
NOTE:
- Before connecting the drive shaft, do not forget to fit the spring seat ② and spring ③.
- Insert the front drive shaft into the universal joint (front differential gear side) properly.



5. Install:
- Transfer gear assembly ①

NOTE:
- Before installing the transfer gear assembly;
  1) Insert the front drive shaft ② into the universal joint ④ (transfer gear side) properly.
  2) Do not forget to fit the shims ③.
- Finger tighten the mounting bolts (crankcase side) of the transfer gear assembly, do not torque them at this point.



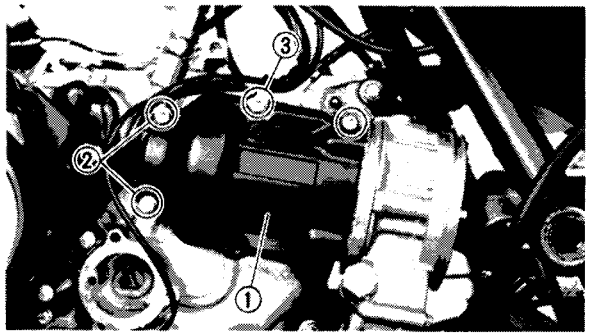


6. Apply:
- Sealant ①
  (onto the mating surface of both case halves.)

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

NOTE:
Before installing the middle gear case, do not forget to fit the dowel pins ②.

7. Install:
- Middle gear case ①



NOTE:
- Finger tighten the mounting bolts (middle gear case side) of the transfer gear assembly, do not torque them at this point.
- Install the copper washer on the bolt ②, and the clamp on the bolt ③.

Bolts (middle gear case):
10 Nm (1.0 m • kg, 7.2 ft • lb)

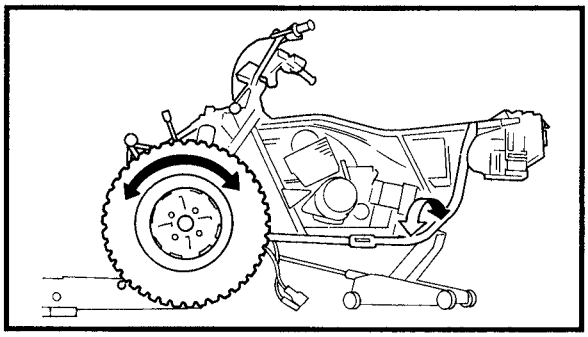
8. Check:
- Front drive shaft operation

****

Front drive shaft operation checking steps:
- Make sure that the machine is off the ground at the rear.
- Lift the front of the machine off the ground, too.

⚠ WARNING

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



- Turn the front wheels back and forth.
- Check the front drive shaft operation. If the operation is unsmooth, reinstall the front drive shaft properly.

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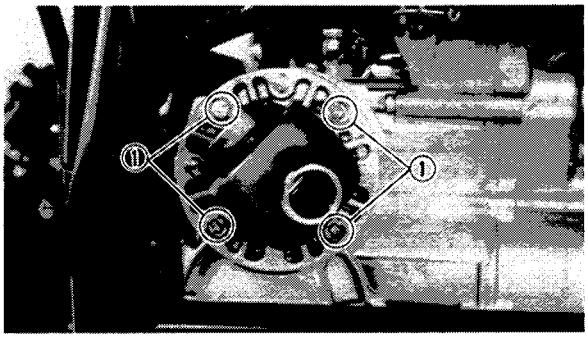
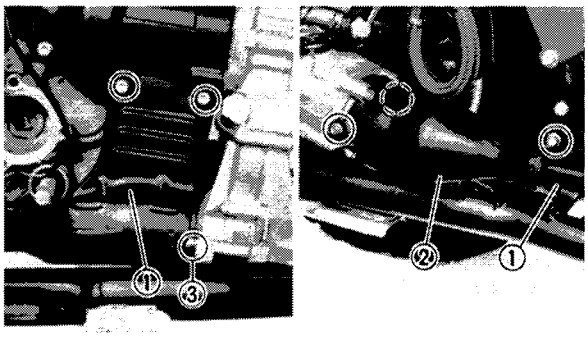


9. Tighten:
- Bolts ① (transfer gear assembly)

	Bolts (transfer gear assembly): 25 Nm (2.5 m • kg, 18 ft • lb)

NOTE:

Before tightening the bolts, adjust the gear lash of the middle gear. Refer to the "TRANSFER GEAR" section in the CHAPTER 6.



10. Install:
- Front drive shaft protector ① (rear half)
- Front drive shaft protector ② (front half)

NOTE:

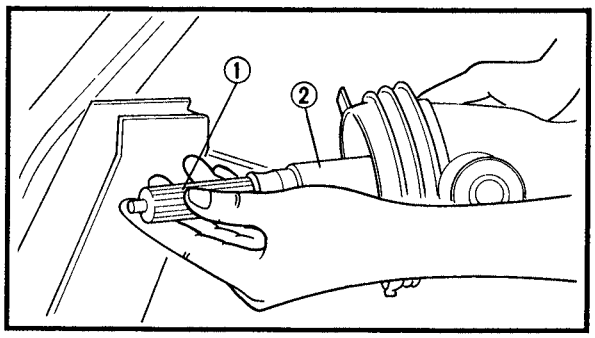
Install the clamp on the bolt ③.

	Bolts (front drive shaft protector): 10 Nm (1.0 m • kg, 7.2 ft • lb)

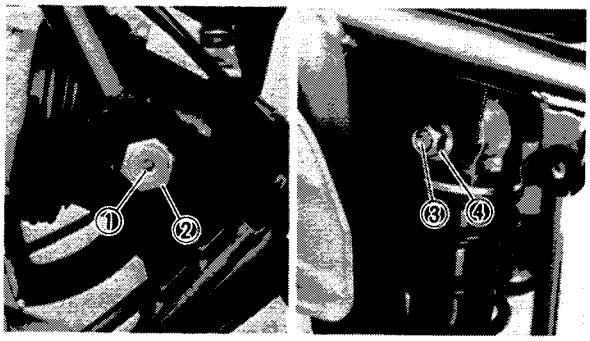
11. Lubricate:
- Bearings (swingarm)
- Oil seals (swingarm)
- Collars (swingarm)
- Pivot shaft
- Bolt (rear shock absorber)

	Lithium base waterproof wheel Bearing Grease

12. Install:
- Rear drive assembly and swingarm

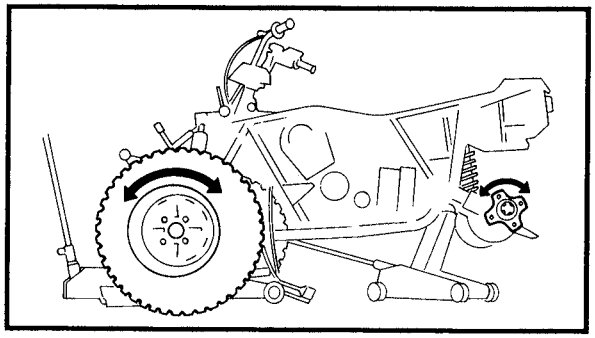


NOTE:
- Before installing the swingarm, do not forget to fit the rear drive shaft ① and coupling gear ②.
- Insert the rear drive shaft into the universal joint properly.
- When installing the swingarm, tilt it to the left side.



13. Install:
- Pivot shafts ①
- Locknuts ② (swingarm)
- Bolt ③ (rear shock absorber)
- Nut ④ (rear shock absorber)

NOTE:
Finger tighten the pivot shafts, locknuts and bolt (shock absorber) do not torque them at this point.



14. Check:
- Rear drive shaft operation

****

Rear drive shaft operation checking steps:
- Make sure that the machine is off the ground at the rear.
- Place the suitable block under the swingarm.
- Lift the front of the machine off the ground, too.

⚠ WARNING

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

- Turn the front wheel back and forth.
- Check the rear axle operation. If the operation is unsmooth, reinstall the swingarm properly.

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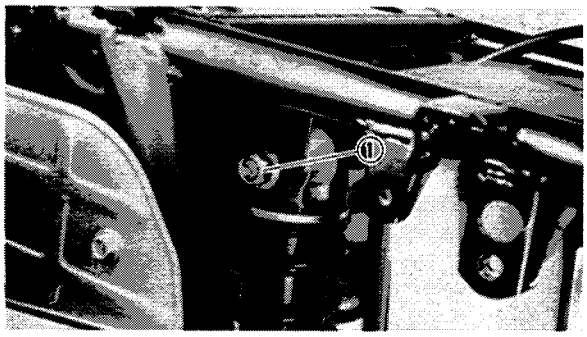
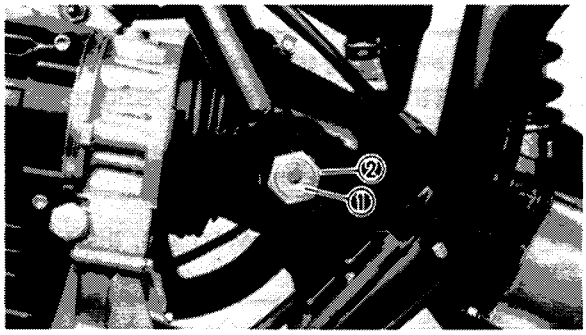


15. Tighten:
- Nut ① (rear shock absorber-upper)

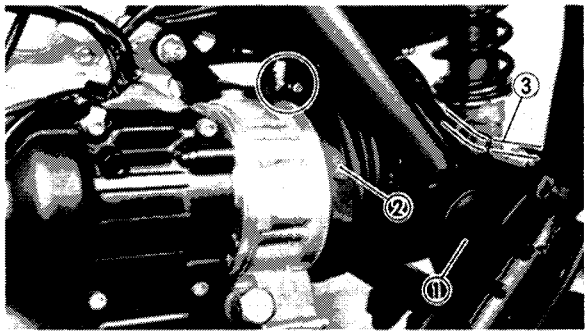
	Nut (rear shock absorber-upper): 50 Nm (5.0 m • kg, 36 ft • lb)



16. Tighten:
- Pivot shafts ① (swingarm)
- Locknuts ② (swingarm)

  Refer to the "REAR SHOCK ABSORBER AND SWINGARM - INSTALLATION" section in the CHAPTER 7.

	Pivot shaft (right): 6 Nm (0.6 m • kg, 4.3 ft • lb) **Locknut (right): 130 Nm (13.0 m • kg, 94 ft • lb)**



17. Install:
- Pivot shaft caps ①
- Rubber boot ②

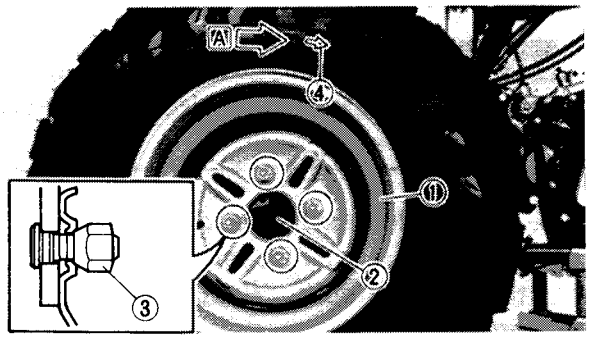
18. Connect:
- Breather hose ③ (final gear housing)

⚠ WARNING

Proper pipe routing is essential to insure safe machine operation. Refer to the "CABLE ROUTING" section in the CHAPTER 2.

NOTE:

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



19. Install:
- Rear wheels ①
- Caps ②

NOTE:

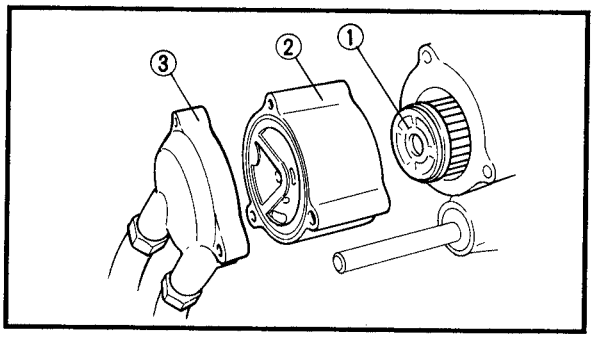
The arrow mark ④ on the tire must point toward the direction of rotation [A] of the wheel.

20. Tighten:
- Nuts ③ (rear wheel)

⚠ WARNING

Tapered wheel nuts ③ are used for both front and rear wheels. Install the nut with its tapered side towards the wheel.

	Nut (rear wheel): **55 Nm (5.5 m • kg, 40 ft • lb)**



21. Install:
- Oil filter element ①
- Oil filter cover ② (inside)
- Oil filter cover ③

NOTE:

Check the O-rings for damage if damaged, replace.

Refer to the "ENGINE OIL/TRANSFER GEAR OIL REPLACEMENT (WITH OIL FILTER)" section in the CHAPTER 3.

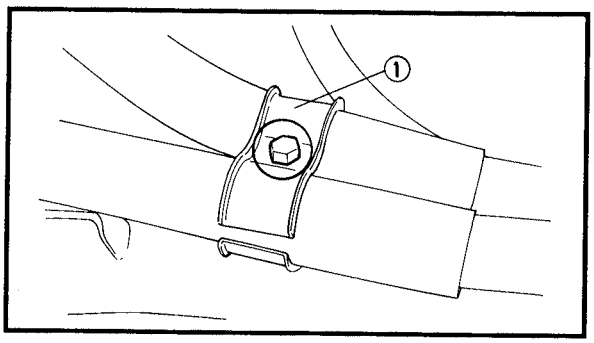
22. Apply:
- Sealant (Quick Gasket®)

To the thread portion of the filter cover bolts.

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

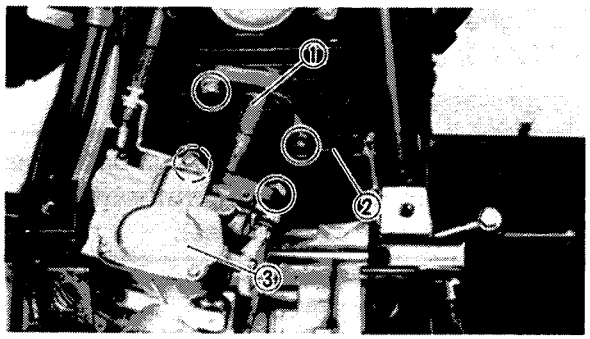
23. Tighten:
- Bolts (filter cover)

	Bolts (filter cover): **10 Nm (1.0 m • kg, 7.2 ft • lb)**



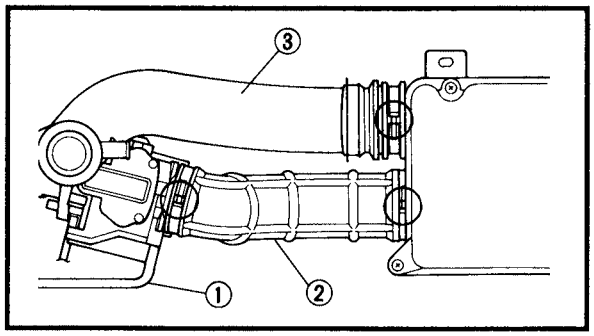
24. Install:
- Clamp ① (oil hose)

	Bolt (oil hose clamp): **7 Nm (0.7 m • kg, 5.1 ft • lb)**

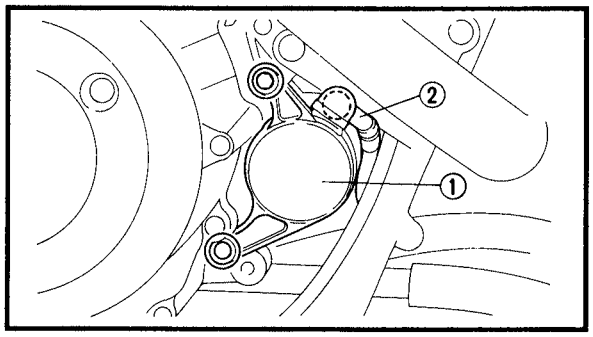


25. Install:
- Intake manifold ①
- Cable holder ②
- Carburetor ③

Bolts (intake manifold):
20 Nm (2.0 m • kg, 14 ft • lb)
Nuts (carburetor):
16 Nm (1.6 m • kg, 11 ft • lb)



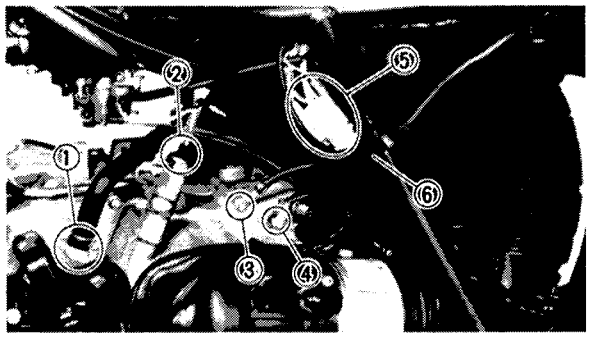
26. Install:
- Air vent hose ①
- Carburetor joint ②
- Air cleaner manifold ③



27. Install:
- Starter motor ①
- Starter motor lead ②

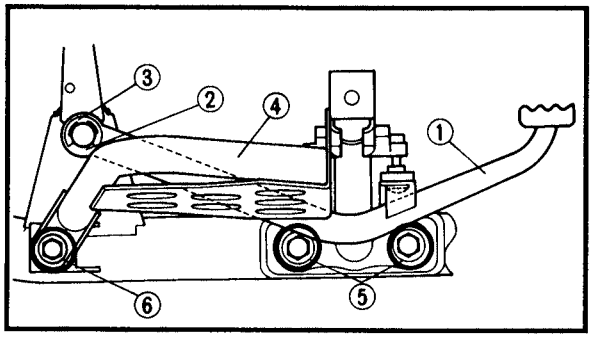
NOTE:
Be careful not to damage the O-ring during installation.

Starter motor:
10 Nm (1.0 m • kg, 7.2 ft • lb)



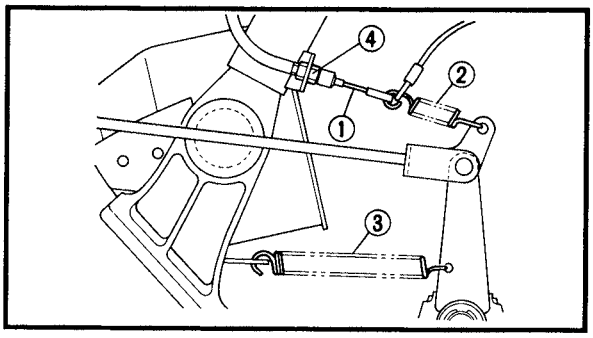
28. Connect:
- Ventilation hose ①
- Thermo unit lead ②
- Ground lead ③
- "REVERSE" switch lead ④
- CDI magneto leads ⑤
- "NEUTRAL" switch lead ⑤
- Band ⑥
- Spark plug lead

29. Install:
- Brake pedal assembly ①
- Plain washer ②
- Circlip ③
- Footrest ④ (right)



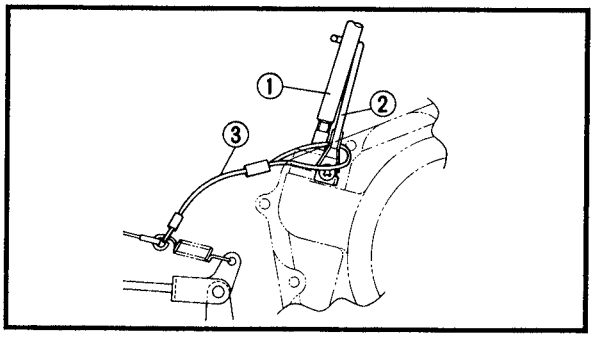
Bolt ⑤ (footrest):
55 Nm (5.5 m • kg, 40 ft • lb)
Bolt ⑥ (footrest):
23 Nm (2.3 m • kg, 17 ft • lb)

NOTE:
- Before installing the brake pedal, apply the 4-cycle oil to the pivot on the frame.
- When installing the brake pedal, do not forget to fit the circlip.



30. Install:
- Select lever control cable 2 ①
- Spring (upper) ②
- Spring (lower) ③
- Locknut ④

NOTE:
After connecting the cable 2, adjust the control cable. Refer to the "SELECT LEVER CONTROL CABLE ADJUSTMENT" section in the CHAPTER 3.



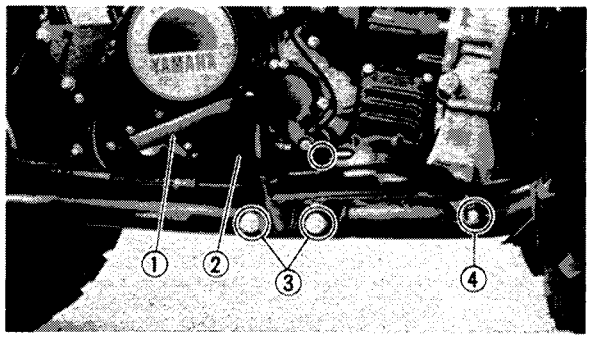
31. Install:
- Speedometer cable ①
- Wire guide ②
- Reverse lock release wire ③

NOTE:
- Before installing the wire guide, pass the wire guide into the release wire.
- After connecting the cable, check the cable operation. If there is unsmooth operation, repair.

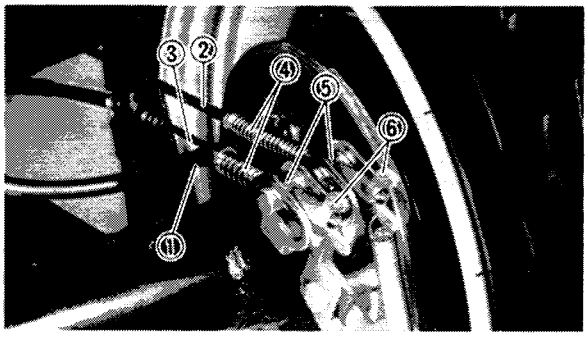
	Screw (speedometer gear housing): **7 Nm (0.7 m • kg, 5.1 ft • lb)**

32. Install:
- Shift pedal ①
- Footrest (left) ②

NOTE:
After installing the shift pedal, check the shifting operation. If there is unsmooth operation, repair.



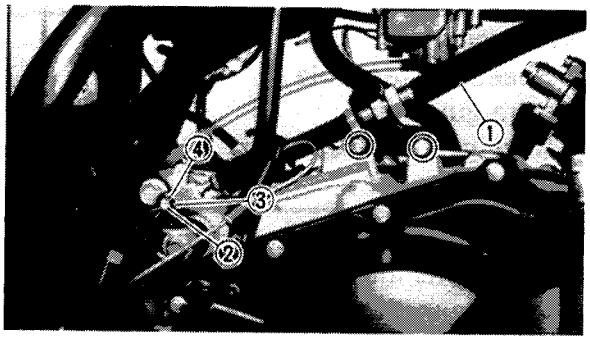
	Bolt (shift pedal): **10 Nm (1.0 m • kg, 7.2 ft • lb)** **Bolts ③ (footrest):** **55 Nm (5.5 m • kg, 40 ft • lb)** **Bolt ④ (footrest):** **23 Nm (2.3 m • kg, 17 ft • lb)**

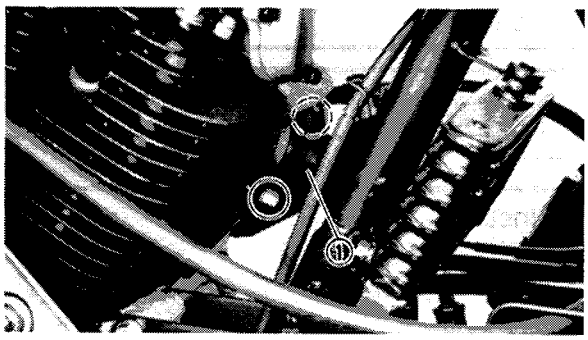


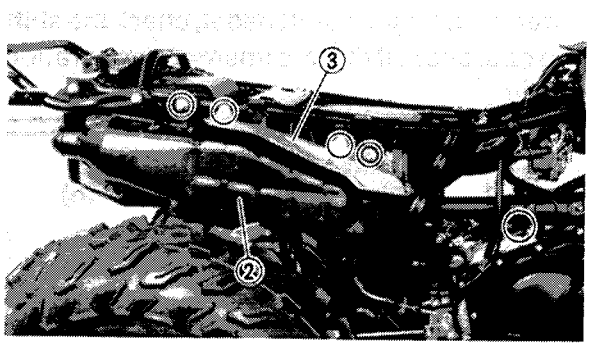
33. Connect:
- Breather hose ①
- Brake rod ② (brake pedal)
- Brake cable ③ (brake lever)

34. Install:
- Compression springs ④
- Pins ⑤
- Adjusters ⑥ (brake lever and brake pedal)

35. Adjust:
- Adjusters ⑥ (brake lever and brake pedal)
  Refer to the "REAR BRAKE LEVER AND PEDAL ADJUSTMENT" section in the CHAPTER 3.







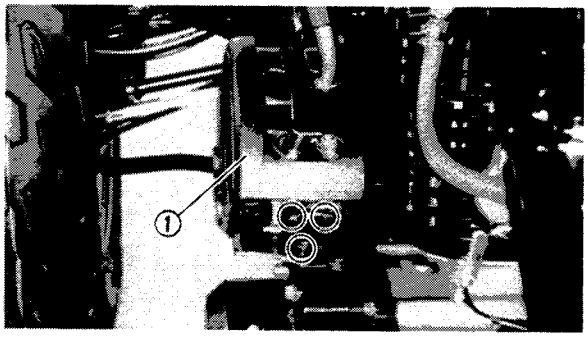
36. Install:
- Select lever control cable 1 ①
- Pin ②
- Plain washer ③
- Cotter pin ④

NOTE:
After installing the control cable 1, adjust the control cable. Refer to the "SELECT LEVER CONTROL CABLE ADJUSTMENT" section in the CHAPTER 3.

	Bolts (select lever cable holder): 10 Nm (1.0 m • kg, 7.2 ft • lb)

37. Install:
- Exhaust pipe ①
- Muffler ②
- Muffler protector ③

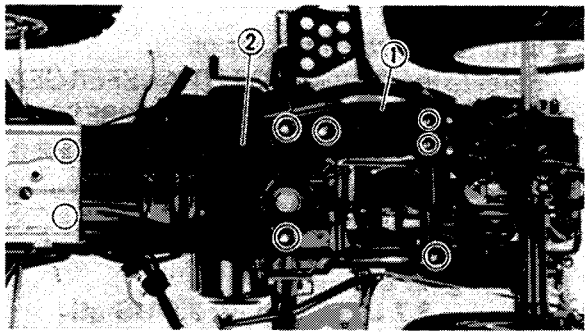
	Bolts (muffler and frame): 27 Nm (2.7 m • kg, 19 ft • lb) **Bolt (muffler and exhaust pipe): 20 Nm (2.0 m • kg, 14 ft • lb)** **Nuts (exhaust pipe): 12 Nm (1.2 m • kg, 8.7 ft • lb)**



38. Install:
- Select lever assembly ①

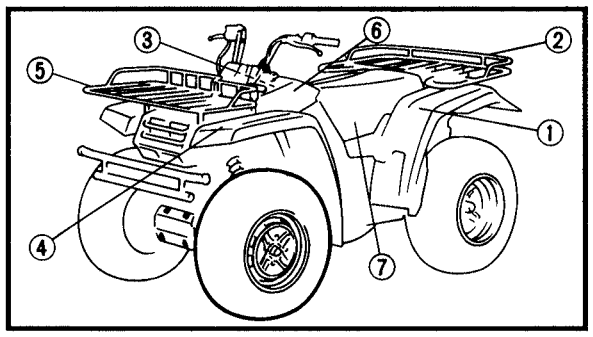
39. Adjust:
- Select lever control cable 1
- Select lever control cable 2

Refer to the "SELECT LEVER CONTROL CABLE ADJUSTMENT" section in the CHAPTER 3.



40. Install:
- Engine guard ① (rear)
- Engine guard ② (center)

	Bolts (engine guard): **15 Nm (1.5 m • kg, 11 ft • lb)**



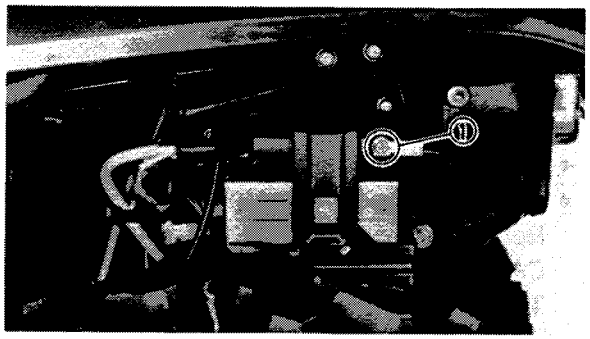
41. Install:
- Rear fender stay
- Rear fender ①
- Rear carrier ②
- Fuel tank ③
- Front fender ④
- Front carrier ⑤
- Fuel tank cover ⑥
- Seat ⑦

Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

	Bolts (rear carrier - frame): **33 Nm (3.3 m • kg, 24 ft • lb)** **Bolts (rear carrier - rear bumper):** **9 Nm (0.9 m • kg, 6.5 ft • lb)** **Bolts (front carrier - frame):** **20 Nm (2.0 m • kg, 14 ft • lb)** **Bolts (front carrier - front bumper):** **10 Nm (1.0 m • kg, 7.2 ft • lb)**

CAUTION:

Never start the engine when the oil is drained.



42. Connect:
- Battery negative lead ①

43. Fill:
- Engine oil/Transfer gear oil
  Refer to the "ENGINE OIL/TRANSFER GEAR OIL REPLACEMENT AND OIL PRESSURE INSPECTION" section in the CHAPTER 3.

	Oil quantity: **Total amount (engine oil/transfer gear oil)** **3.7 L (3.3 Imp qt; 3.9 US qt)**
	Oil check bolt: **7 Nm (0.7 m • kg, 5.1 ft • lb)**

NOTE:
The engine and transfer gear share the some oil supply.

44. Inspect:
- Oil leakage

45. Check:
- "NEUTRAL" indicator light operation
- "REVERSE" indicator light operation
- "OIL TEMP" indicator light operation
- Head light operation
  Poor operation → Repair.

46. Check:
- Engine idle speed
  Refer to the "IDLE SPEED ADJUSTMENT" section in the CHAPTER 3.

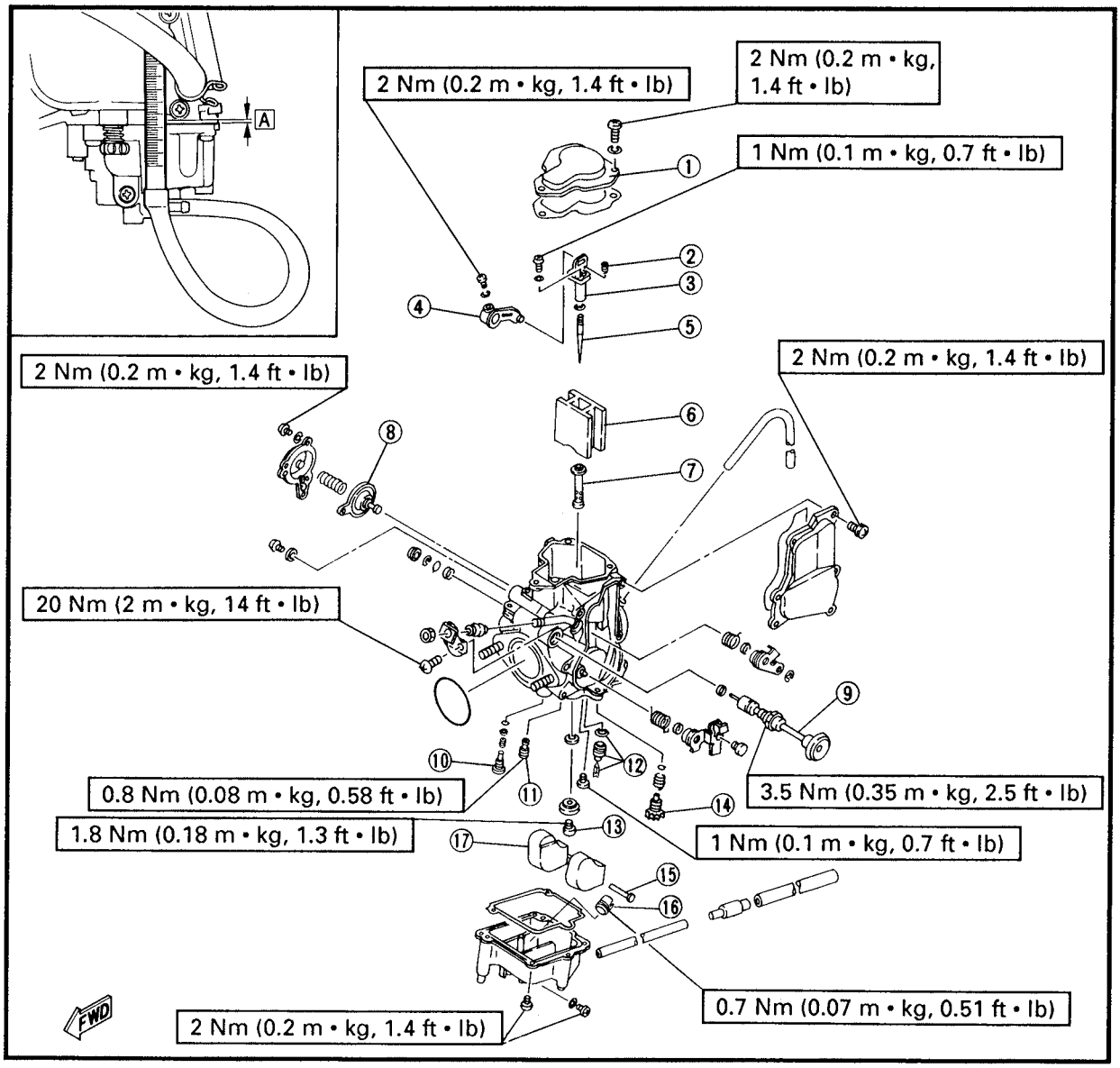
	Engine idle speed: **1,350 ~ 1,450 r/min**

CARBURETION

CARBURETOR

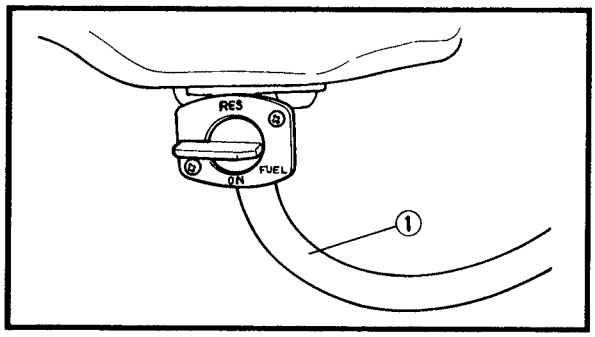
① Carburetor top cap
② Spring
③ Needle holder
④ Connecting arm
⑤ Jet needle
⑥ Piston valve
⑦ Main nozzle
⑧ Coasting enricher diaphragm
⑨ Starter plunger assembly
⑩ Pilot screw
⑪ Pilot jet
⑫ Needle valve set
⑬ Main jet
⑭ Throttle stop screw
⑮ Float pin
⑯ Starter jet
⑰ Float

SPECIFICATIONS	
ID MARK	3RW00
MAIN JET (M.J.)	#122.5
PILOT JET (P.J.)	#45
JET NEEDLE (J.N.)	5H26-3
NEEDLE JET (N.J.)	N-8
PILOT SCREW (P.S.)	2 turns out
FLOAT HEIGHT (F.H.)	11.4 ~ 13.4 mm (0.45 ~ 0.53 in)
FUEL LEVEL [A] (F.L.)	1.0 ~ 2.0 mm (0.04 ~ 0.08 in) Above the carburetor body edge
ENGINE IDLING SPEED	1,350 ~ 1,450 r/min



REMOVAL

NOTE:
The following parts can be cleaned and inspected without disassembly.
- Throttle stop screw
- Pilot screw

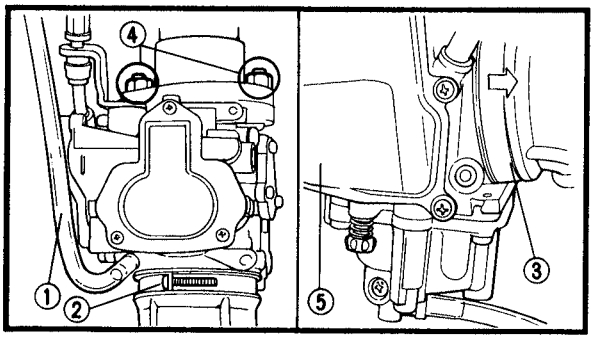


1. Turn the fuel cock lever to "OFF"
2. Disconnect:
Fuel hose ①
3. Drain:
- Fuel (float chamber)

NOTE:
Place a rag under the over flow hose to absorb a spilt fuel.

⚠ WARNING
Gasoline is highly flammable. Avoid spilling fuel on the hot engine.

4. Remove:
- Seat
- Fuel tank cover
- Fuel tank
  Refer to the "SEAT CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

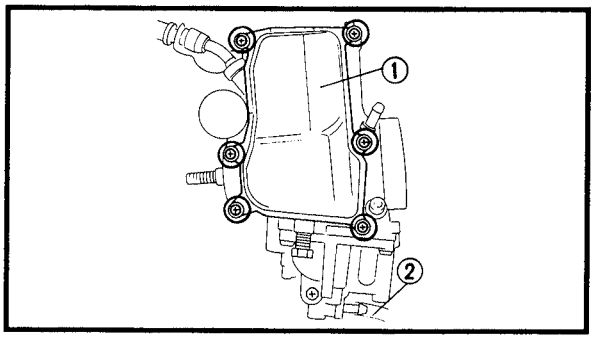


5. Disconnect:
- Air vent hose ①

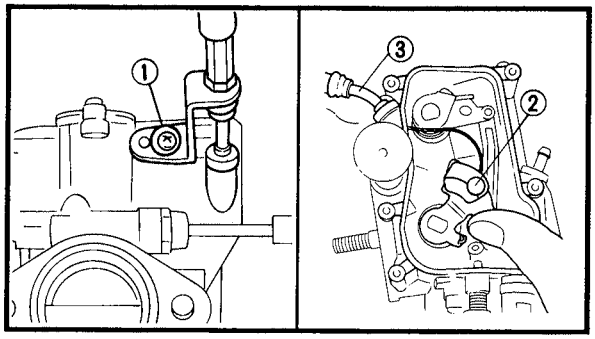
6. Loosen:
- Screw ② (carburetor joint clamp)

NOTE:
Move carburetor joint clamp ③ to the rear.

7. Remove:
- Nuts ④ (carburetor)
- Carburetor ⑤

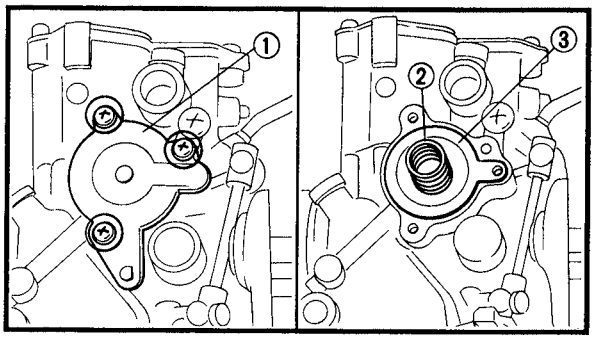


8. Remove:
- Throttle valve cover ①
- Overflow hose ②



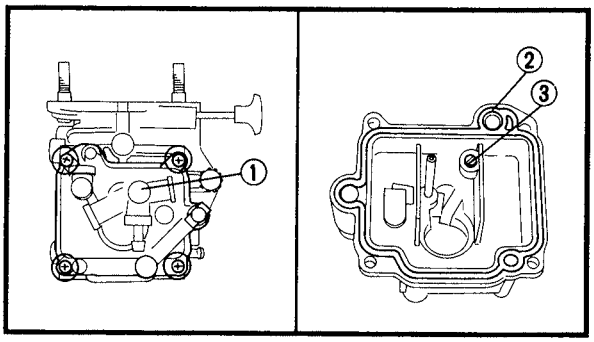
9. Remove:
- Bolt ① (throttle cable holder)
- Holder guide ②

10. Disconnect:
- Throttle cable ③

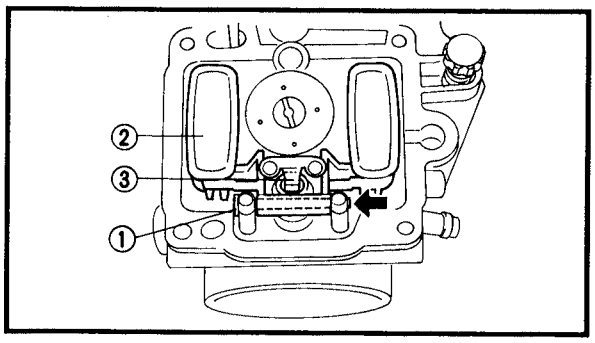


DISASSEMBLY

1. Remove:
- Cover ① (coasting enricher)
- Spring ②
- Diaphragm ③



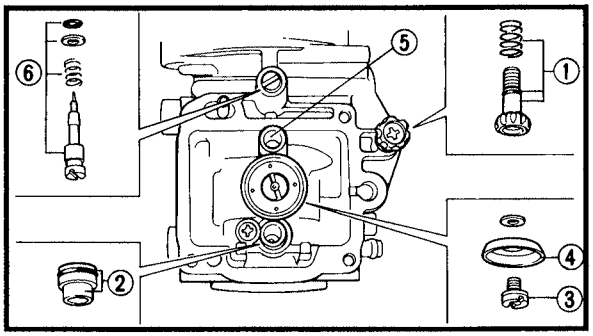
2. Remove:
- Float chamber ①
- O-ring ②
- Starter jet ③



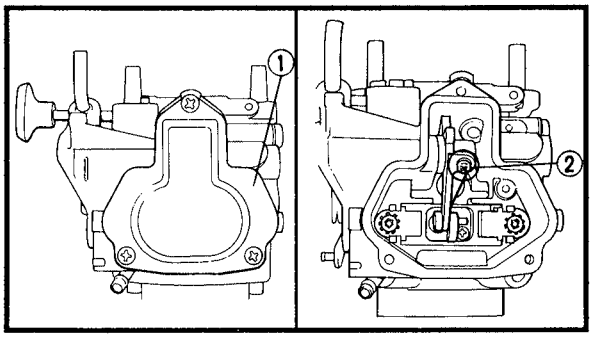
3. Remove:
- Float pin ①
- Float ②
- Needle valve ③

NOTE:

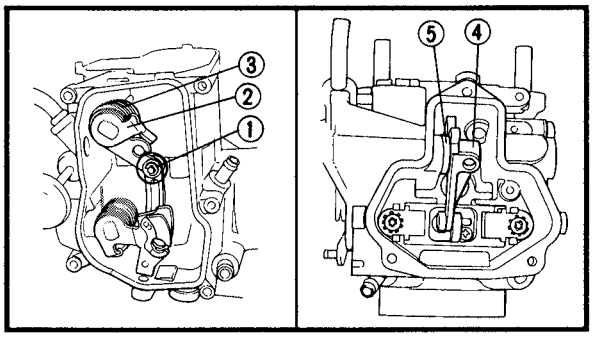
Remove the float pin in the arrow direction.



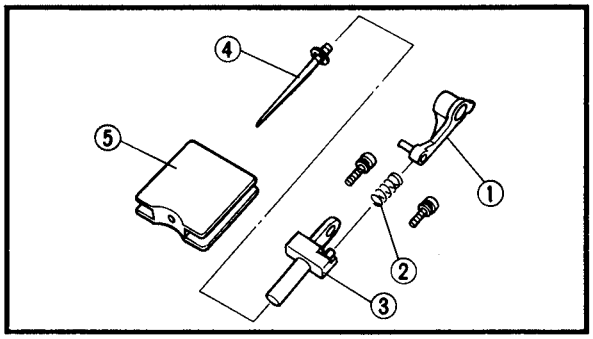
4. Remove:
- Throttle stop screw ①
- Valve seat ②
- Main jet ③
- Main jet cover ④
- Pilot jet ⑤
- Pilot screw ⑥



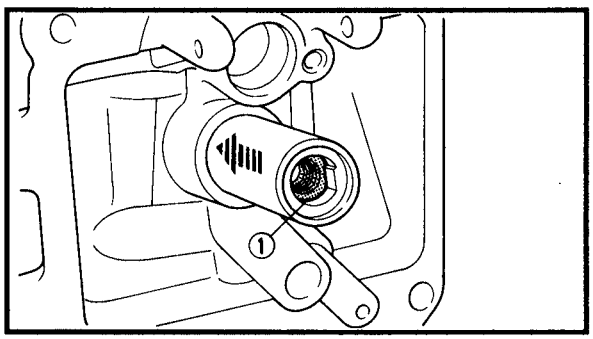
5. Remove:
- Carburetor top cap ①
- Gasket
- Screw ② (connecting arm)



6. Remove:
- Circlips ①
- Piston valve shaft ②
- Spring ③
- Connecting arm ④ (with piston valve)
- Collar ⑤

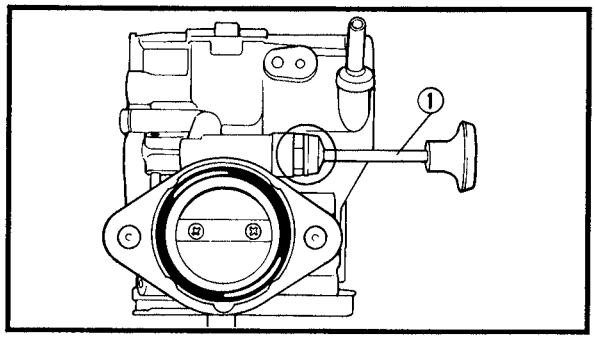


7. Remove:
- Connecting arm ①
- Spring ②
- Needle holder ③
- Jet needle ④
- Piston valve ⑤

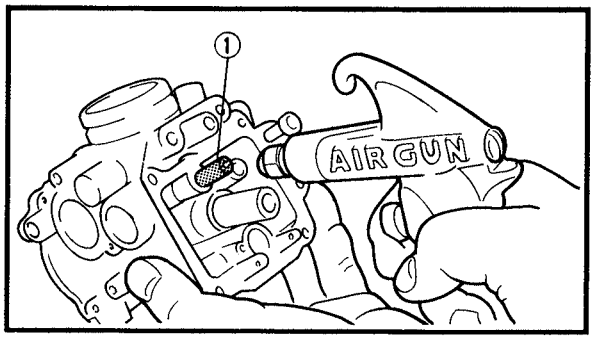


8. Remove:
- Needle jet ①

NOTE:
Remove the needle jet towards the piston valve side.



9. Remove:
   Starter plunger ①



INSPECTION

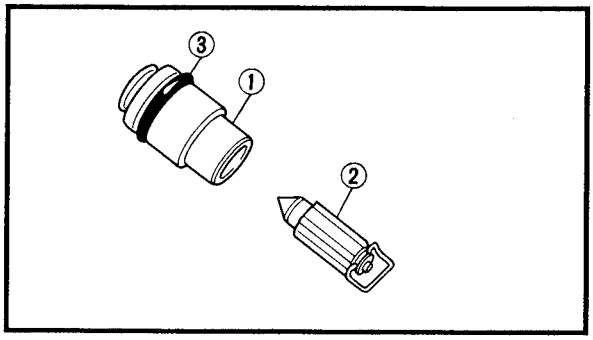
1. Inspect:
- Carburetor body
- Starter jet ①
- Float chamber
  Cracks/Damage → Replace.
- Fuel passage
  Contamination → Clean.

NOTE:

Use a petroleum based solvent for cleaning. (do not use any caustic carburetor cleaning solution.) Blow out all passages and jets with compressed air.

CAUTION:

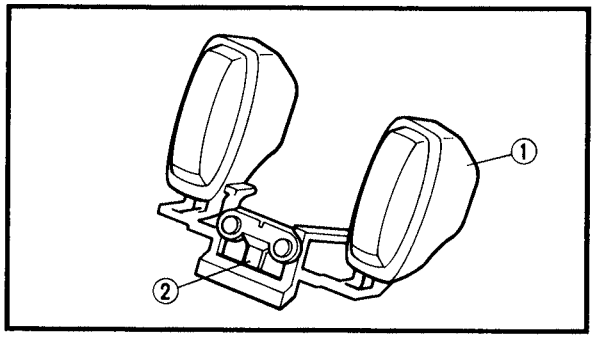
- **The starter jet is press-fit so it is unremovable.**
- **Do not use a wire for cleaning.**



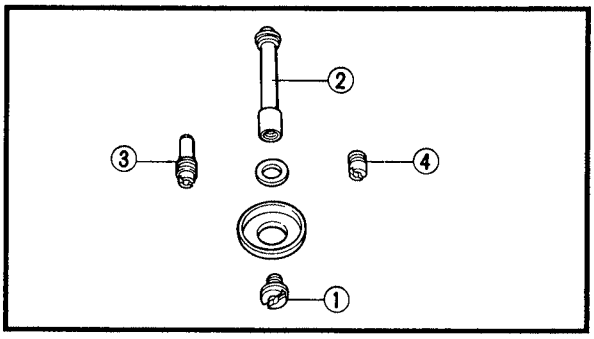
2. Inspect:
- Valve seat ①
- Needle valve ②
- O-ring ③
  Damage/Wear/Contamination → Replace as a set.

NOTE:

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

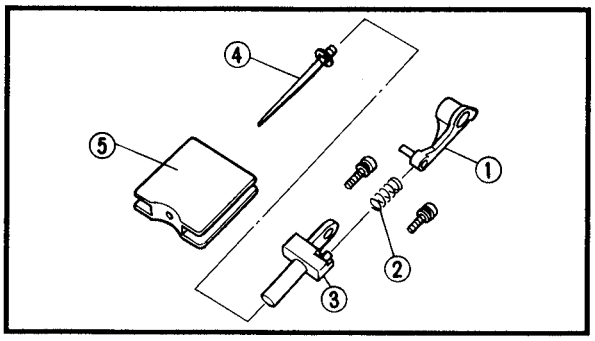


3. Inspect:
- Float ①
- Float arm ②
  Damage → Replace.



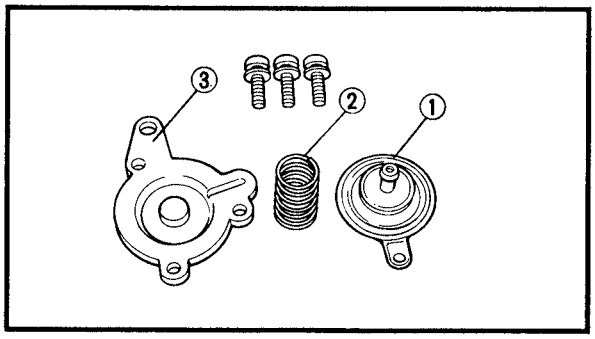
4. Inspect:
- Main jet ①
- Main nozzle ②
- Pilot jet ③
- Starter jet ④

Wear/Damage → Replace.
Contamination → Blow out jets with compressed air.



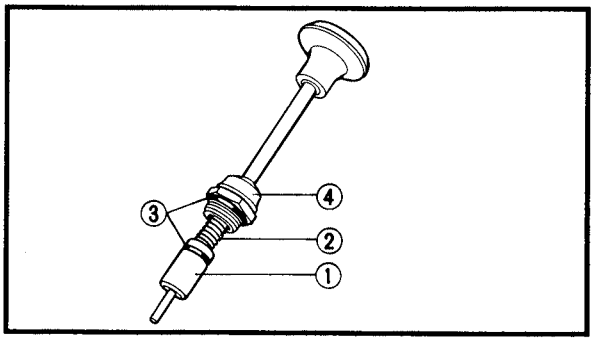
5. Inspect:
- Connecting arm ①
- Spring ②
- Needle holder ③
- Jet needle ④
- Piston valve ⑤

Damage/Bends/Wear → Replace.

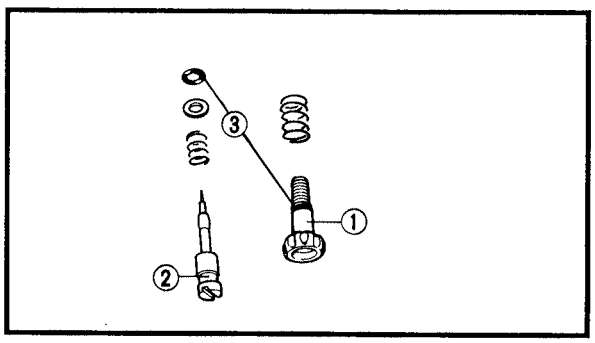


6. Inspect:
- Diaphragm ① (coasting enricher)
- Spring ②
- Cover ③

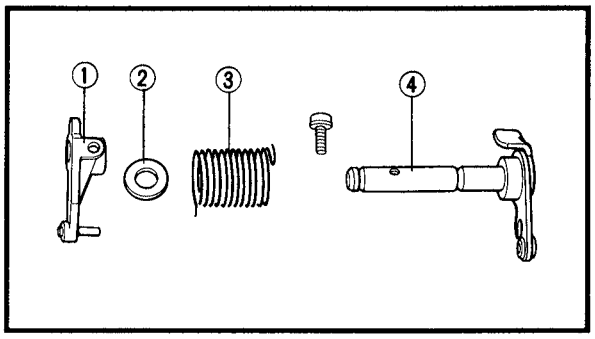
Damage/Tears (diaphragm) → Replace.



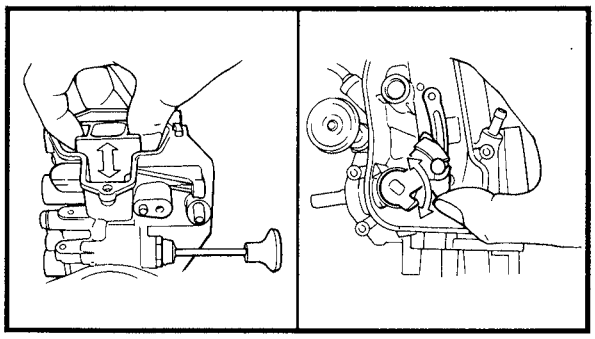
7. Inspect:
- Starter plunger ①
  Bends/Wear/Damage → Replace.
- Spring ②
  Damage → Replace.
- O-ring ③
  Damage → Replace.
- Plunger cap cover ④
  Damage → Replace.



8. Inspect:
- Throttle stop screw ①
  Pilot screw ②
  Wear/Contamination → Replace.
- O-ring ③
  Damage → Replace.



9. Inspect:
- Connecting arm ①
- Collar ②
- Spring ③
- Piston valve shaft ④
  Damage/Bends/Wear → Replace.



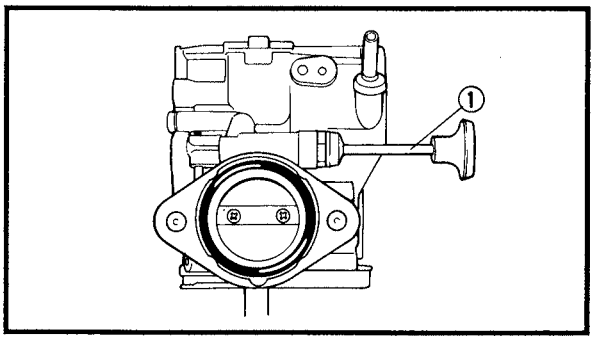
10. Check:
- Free movement (piston valve)
  Stick → Replace.
  Insert the piston valve into the carburetor body, and check for free movement.

11. Check:
- Free movement (throttle valve)
  Damage → Replace.

ASSEMBLY

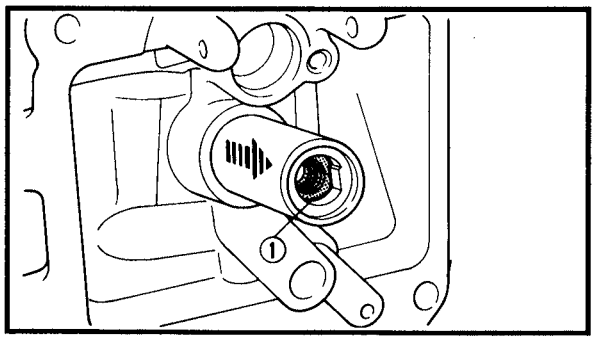
Reverse the "DISASSEMBLY" procedures. Note the following points.

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



1. Install:
- Starter plunger set

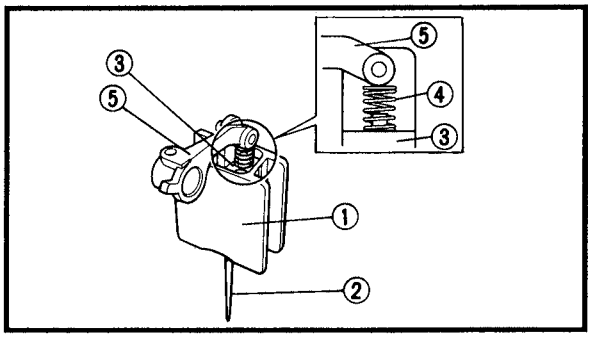
	Starter plunger set: **3.5 Nm (0.35 m • kg, 2.5 ft • lb)**



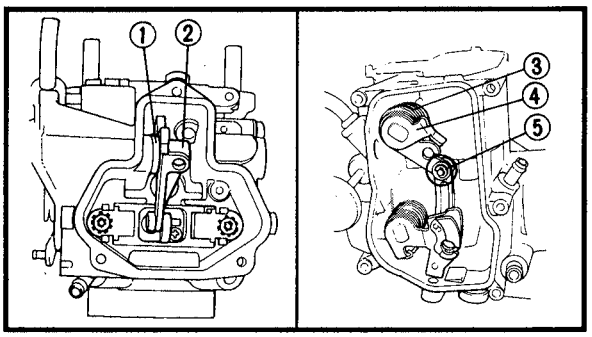
2. Install:
- Needle jet ①

NOTE:

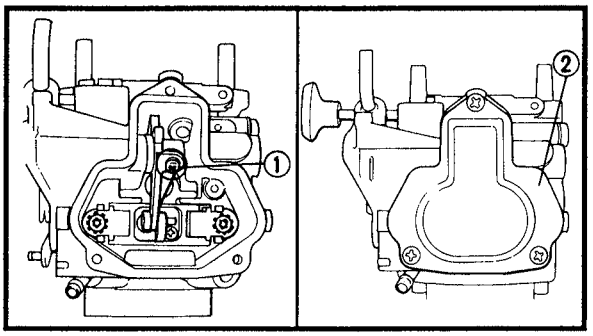
Align the cut end of the needle jet with the slot on the body.



3. Install:
- Piston valve ①
- Jet needle ②
- Needle holder ③
- Spring ④
- Connecting arm ⑤

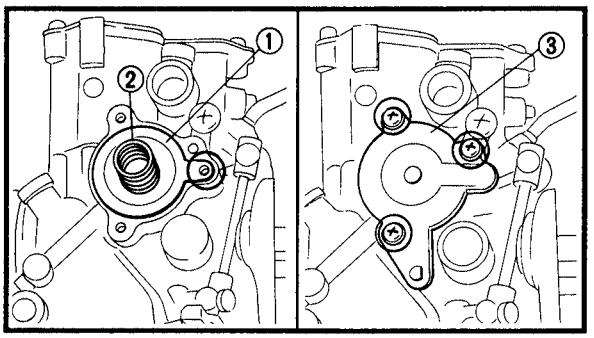


4. Install:
- Collar ①
- Connecting arm ② (with piston valve)
- Spring ③
- Piston valve shaft ④
- Circlips ⑤



5. Install:
- Screw ① (connecting arm)
- Gasket
- Carburetor top cap ②

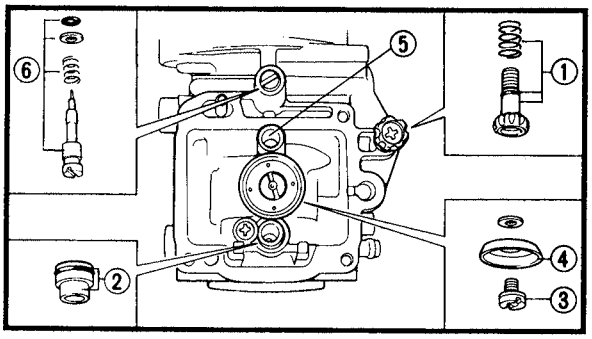
Screw (connecting arm):
2 Nm (0.2 m • kg, 1.4 ft • lb)
Screws (carburetor top cap):
2 Nm (0.2 m • kg, 1.4 ft • lb)



6. Install:
- Diaphragm ① (coasting enricher)
- Spring ②
- Cover ③

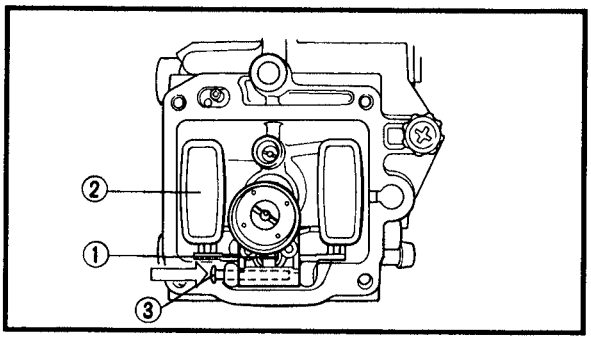
NOTE:
Match the tab on the rubber diaphragm to the matching recess in the carburetor body.

Screws (cover):
2 Nm (0.2 m • kg, 1.4 ft • lb)



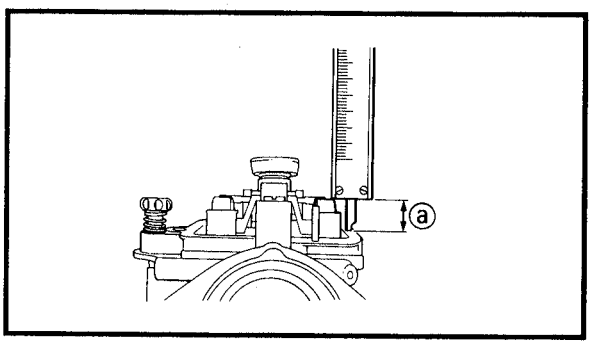
7. Install:
- Throttle stop screw ①
- Valve seat ②
- Main jet ③
- Main jet cover ④
- Pilot jet ⑤
- Pilot screw ⑥

Pilot jet:
1 Nm (0.1 m • kg, 0.7 ft • lb)
Main jet:
1.8 Nm (0.18 m • kg, 1.3 ft • lb)
Screw (valve seat):
1 Nm (0.1 m • kg, 0.7 ft • lb)



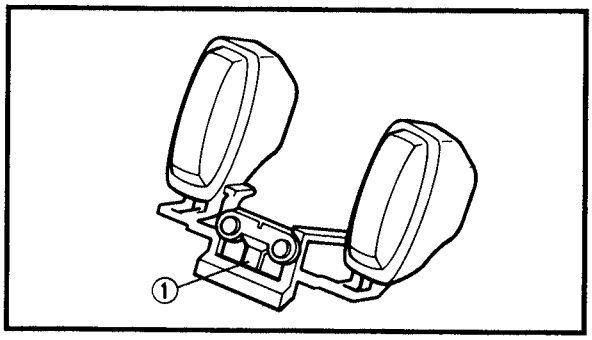
8. Install:
- Needle valve ①
- Float ②
- Float pin ③

NOTE:
Install the float pin reverse to the arrow.



9. Measure:
- Float height ⓐ
  Out of specification → Adjust.

Float height (F.H.):
11.4 ~ 13.4 mm (0.45 ~ 0.53 in)



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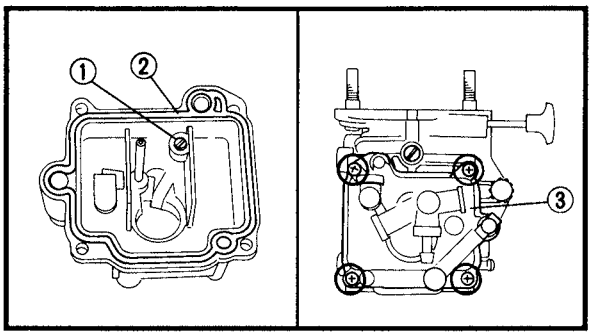
Measurement and adjustment steps:
- Hold the carburetor in an upside down position.
- Measure the distance from the front mating surface of the float chamber (gasket removed) to the top of the float.

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

- If the float height is not within specification, inspect the valve seat and needle valve.

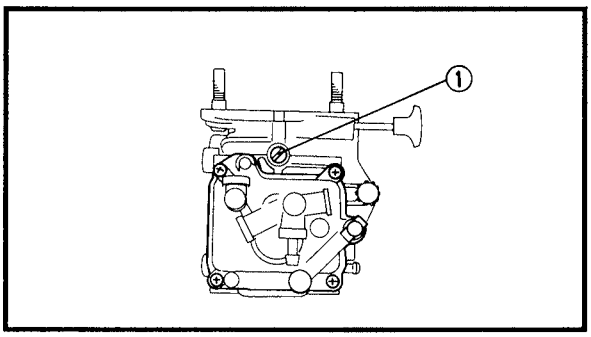
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tang ① on the float.
- Recheck the float height.

****



10. Install:
- Starter jet ①
- O-ring ②
- Float chamber ③

	Screws (float chamber): 2 Nm (0.2 m • kg, 1.4 ft • lb)



11. Adjust:
- Pilot screw ①

****

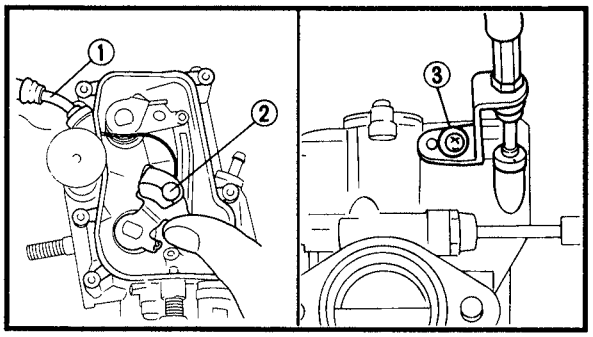
Adjustment steps:
- Turn in the pilot screw until it is lightly seated.
- Back out by the specified number of turns.

	Pilot screw (turn out): 2 turns out

****

INSTALLATION

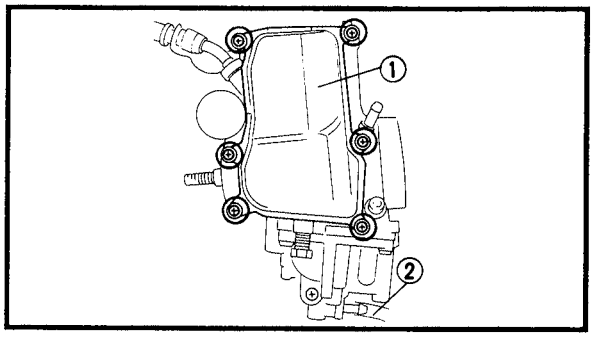
Reverse the "REMOVAL" procedures. Note the following points.



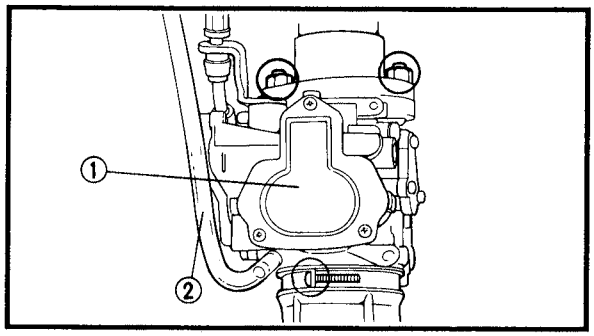
1. Connect:
- Throttle cable ①

2. Install:
- Holder guide ②
- Bolt ③ (throttle cable holder)

	Bolt (throttle cable holder): 2 Nm (0.2 m • kg, 1.4 ft • lb)



3. Install:
- Throttle valve cover ①
- Over flow hose ②



4. Install:
- Carburetor ①

Bolts (carburetor):
16 Nm (1.6 m • kg, 11 ft • lb)
Screw (joint clamp):
2 Nm (0.2 m • kg, 1.4 ft • lb)

5. Connect:
- Air vent hose ②

6. Connect:
- Fuel hose

7. Install:
- Fuel tank
- Fuel tank cover
- Seat

Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

8. Adjust:
- Throttle lever free play

Refer to the "THROTTLE CABLE FREE PLAY ADJUSTMENT" section in the CHAPTER 3.

Throttle lever free play:
3 ~ 5 mm (0.12 ~ 0.20 in)

9. Adjust:
- Idle speed

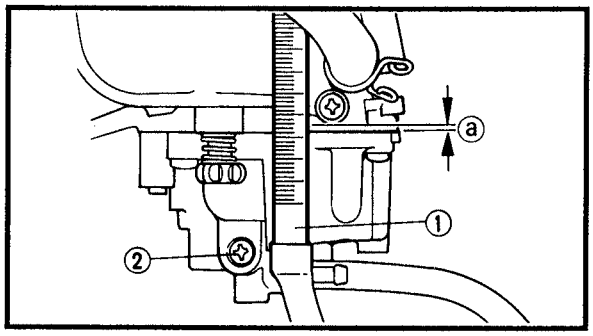
Refer to the "IDLE SPEED ADJUSTMENT" section in the CHAPTER 3.

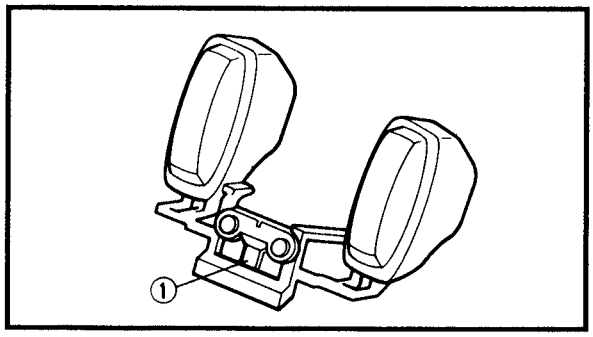
Engine idle speed:
1,350 ~ 1,450 r/min

FUEL LEVEL ADJUSTMENT

1. Place the machine on a level place.
2. Attach the Fuel level gauge ① to the float chamber drain pipe.

	Fuel level gauge: **P/N. YM-01312, 90890-01312**





3. Loosen the drain screw ②, and warm up the engine for several minutes.

4. Hold the gauge vertically next to the carburetor body edge.

5. Measure:
- Fuel level ⓐ
  Out of specification → Adjust.

	Fuel level: **1.0 ~ 2.0 mm (0.04 ~ 0.08 in)** **Above the carburetor body edge.**

6. Adjust:
- Fuel level

****

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

****

DRIVE TRAIN

TROUBLESHOOTING

The following conditions may indicate damage shaft drive components:

Symptoms	Possible causes
1. A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (this must not be confused with engine surging or transmission characteristics.) 2. A "rolling rumble" noticeable at low speed; a high-piched whine; a "clunk" from a shaft drive component or area. 3. A locked-up condition of the shaft drive train mechanism, no power transmitted from engine to front and/or rear wheel.	A. Bearing damage. B. Improper gear lash. C. Gear tooth damage. D. Broken drive shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G. Small foreign object lodged between moving parts.

NOTE:

Areas A,B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components for specific inspection.

6

Inspection notes

1. Investigate any unusual noises

****

The following "noises" may indicate a mechanical defect:

- A "rolling rumble" noise during coasting, acceleration, or deceleration. The noise increases with front and/or rear wheel speed, but it does not increase with higher engine or transmission speeds.
  Diagnosis: Possible wheel bearing damage.
- A "whining" noise that varies with acceleration and deceleration.
  Diagnosis: Possible incorrect reassembly, too-little gear lash.

CAUTION:

Too-little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.

- A slight "thunk" evident at low speed operation. This noise must be distinguished from normal machine operation.
  Diagnosis: Possible broken gear teeth.

⚠ WARNING

Stop riding immediately if broken gear teeth are suspected. This condition could result in a locking-up of the shaft drive assembly, causing loss of control of the machine and possible injury to the rider.

****

2. Inspect:
- Drained oil
  Drain plug shows large amount of metal.
  Particles → Check bearing fur seizure.

NOTE:

A small amount of metal particles in the oil is normal.

3. Inspect:
- Oil leakage

****

Oil leakage inspection steps:
- Clean the entire machine thoroughly, then dry it.
- Apply a leak-localizing compound or dry powder spray to the shaft drive.
- Road test the machine for the distance necessary to locate the leak.

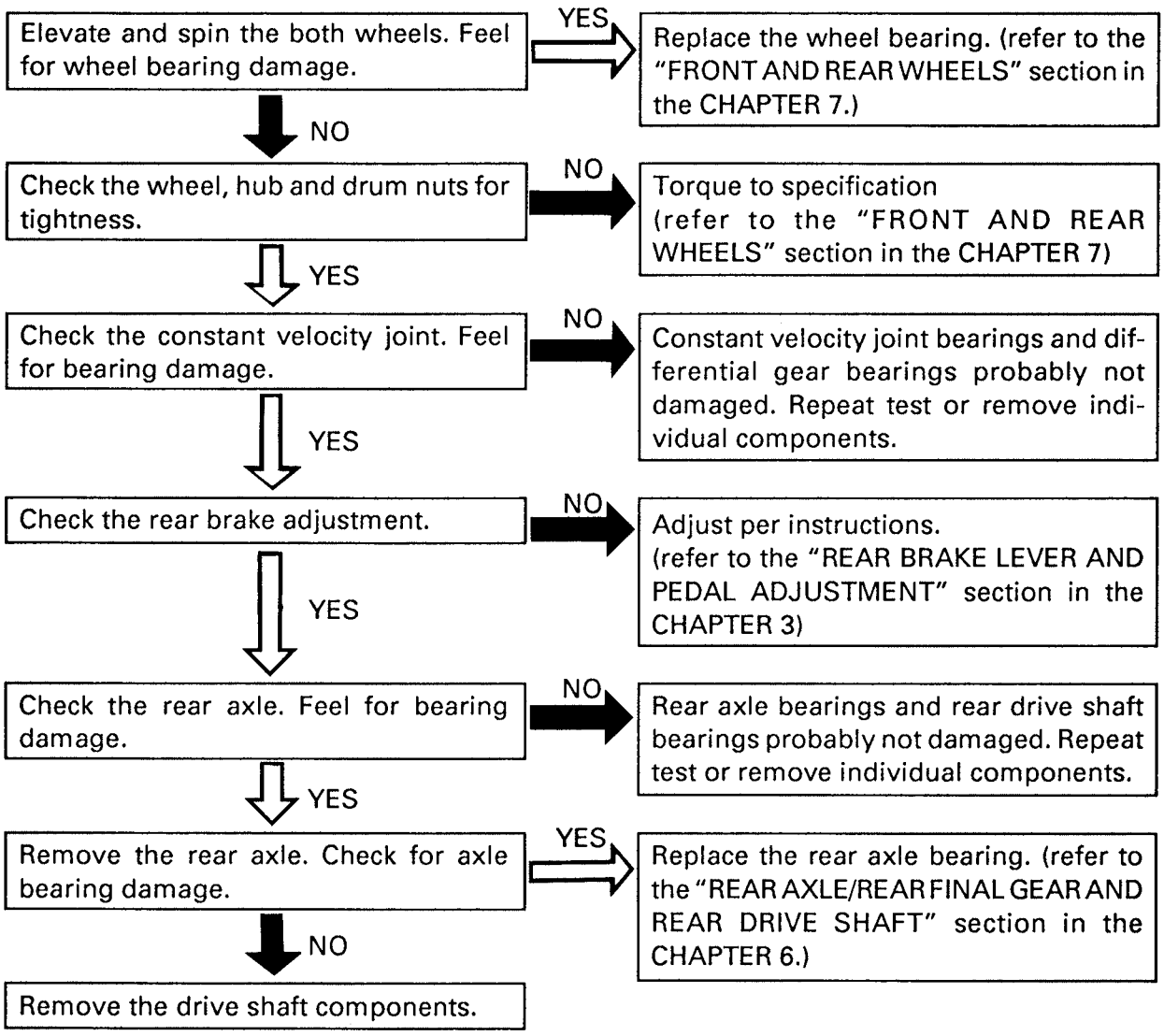
  Leakage → Inspect component housing, gasket, and/or seal for damage.
  Damage → Replace component.

NOTE:
- An apparent oil leak on a new or nearly new machine may be the result of a rust-preventative coating or excessive seal lubrication.
- Always clean the machine and recheck the suspected location of an apparent leakage.

****

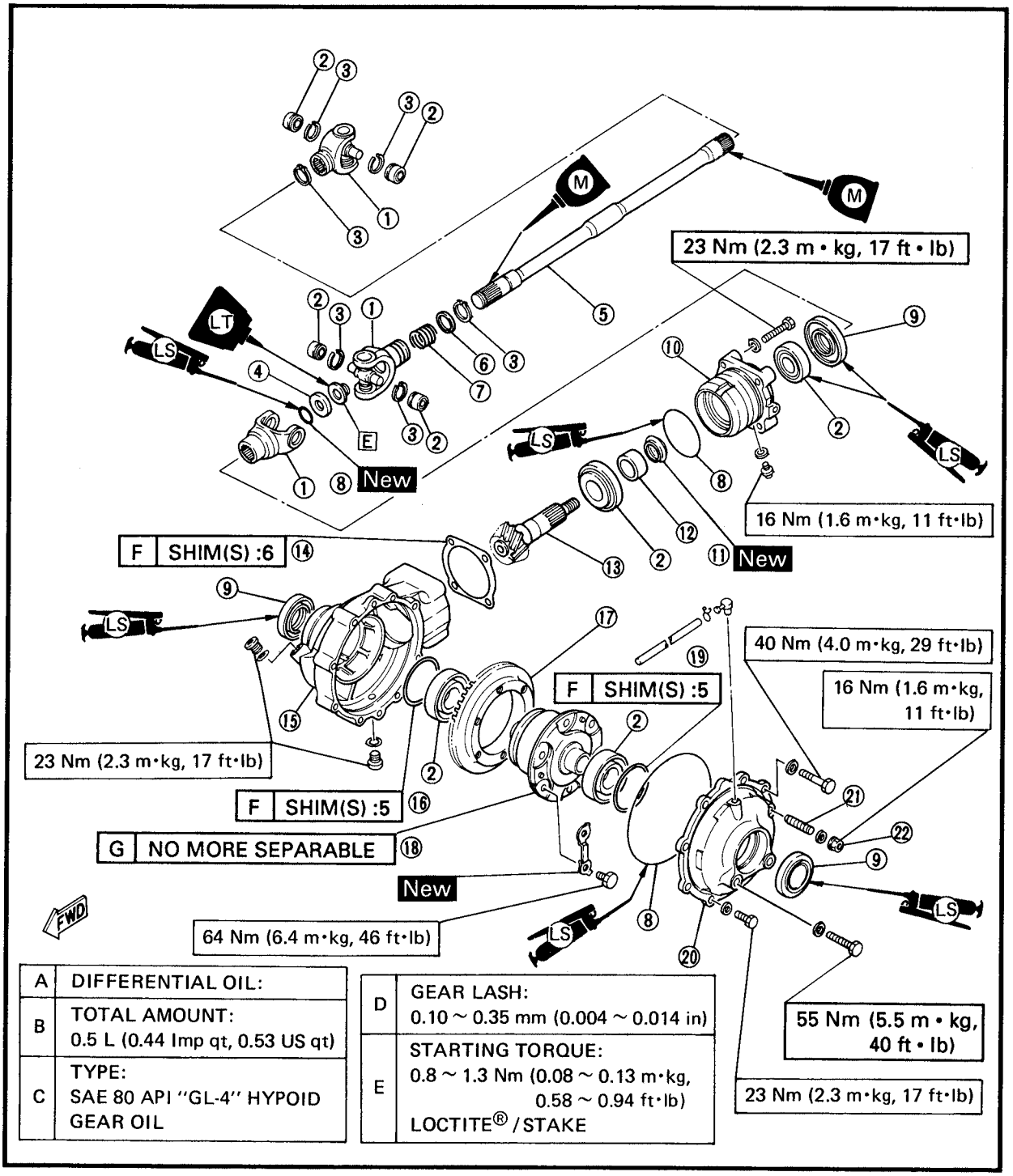
Troubleshooting Chart

When basic condition "a" and "b" above exist, check the following points:



DIFFERENTIAL GEAR AND CONSTANT VELOCITY JOINTS

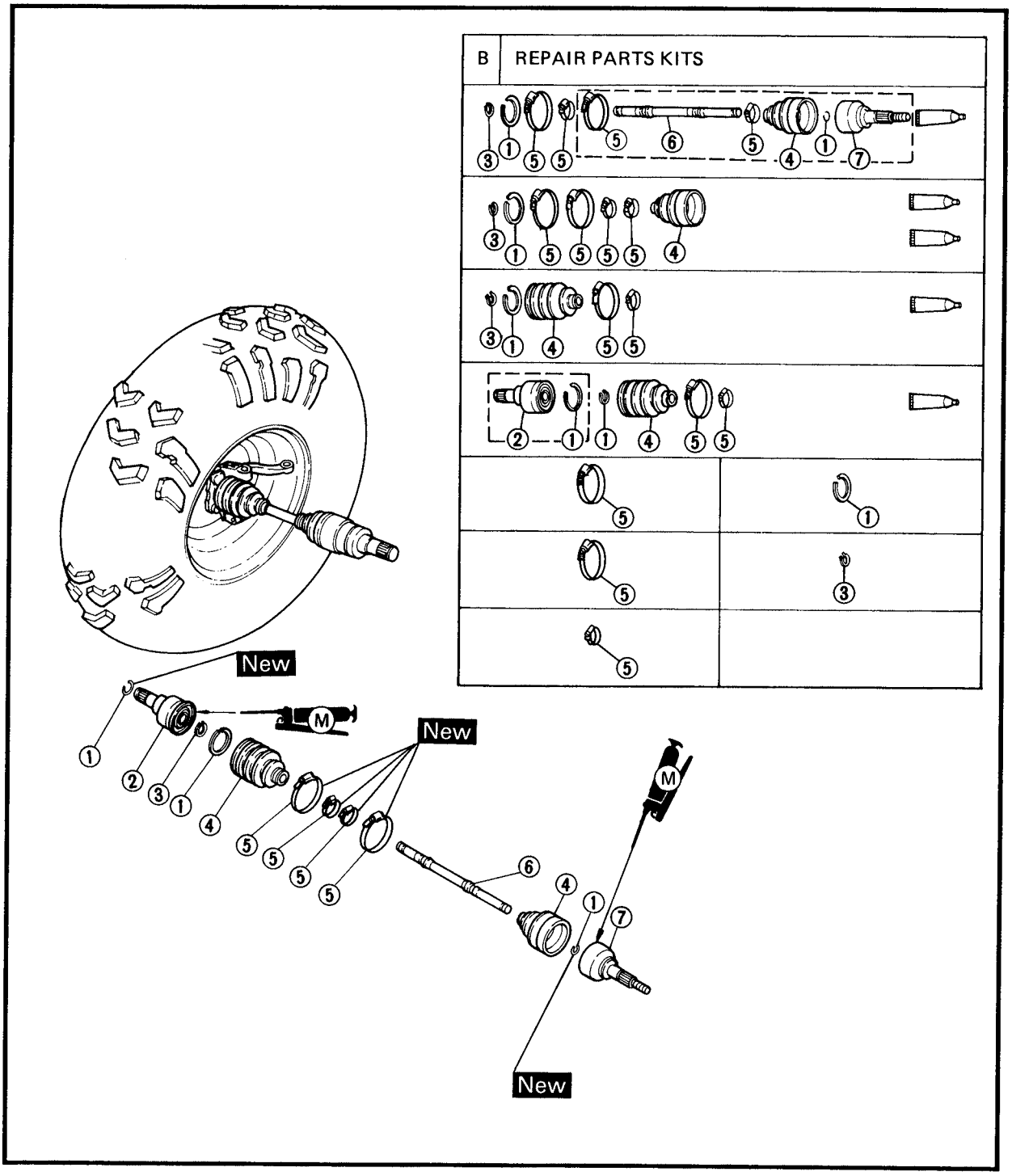
① Universal joint
② Bearing
③ Circlip
④ Plane washer
⑤ Front drive shaft
⑥ Spring seat
⑦ Spring
⑧ O-ring
⑨ Oil seal
⑩ Bearing housing (front drive gear)
⑪ Collapsible collar
⑫ Spacer
⑬ Front drive gear
⑭ Front drive gear shim
⑮ Differential gear case
⑯ Thrust washer
⑰ Ring gear
⑱ Differential gear assembly
⑲ Ring gear shim
⑳ Bearing housing (ring gear)
㉑ Ring gear stopper
㉒ Locknut



A	DIFFERENTIAL OIL:
B	TOTAL AMOUNT: 0.5 L (0.44 Imp qt, 0.53 US qt)
C	TYPE: SAE 80 API "GL-4" HYPOID GEAR OIL

D	GEAR LASH: 0.10 ~ 0.35 mm (0.004 ~ 0.014 in)
E	STARTING TORQUE: 0.8 ~ 1.3 Nm (0.08 ~ 0.13 m•kg, 0.58 ~ 0.94 ft•lb) LOCTITE® / STAKE

① Circlip
② Double off-set joint
③ Snap ring
④ Dust boot
⑤ Boot band
⑥ Joint shaft
⑦ Ball joint



REMOVAL

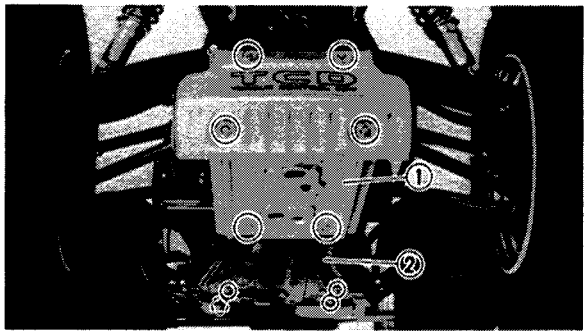
1. Place the machine on a level place.
2. Apply the parking brake.

3. Remove:
- Seat
- Fuel tank cover
- Front carrier
- Front fender

Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

4. Drain:
- Differential gear oil

Refer to the "DIFFERENTIAL GEAR OIL REPLACEMENT" section in the CHAPTER 3.

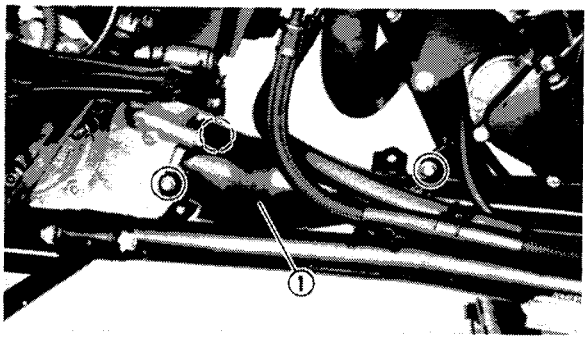


5. Remove:
- Engine guard ① (front)
- Engine guard ② (center)

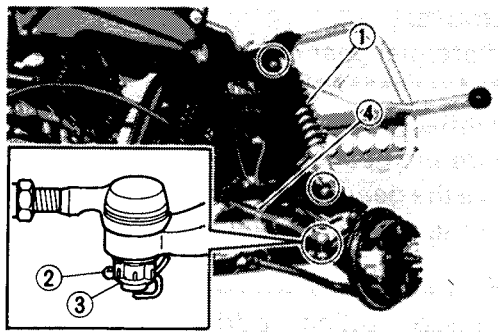
6. Block the rear wheels, and elevate the front wheels by placing the suitable stand under the frame.

7. Remove:
- Front wheels
- Front brake drums

Refer to the "FRONT AND REAR WHEELS" section in the CHAPTER 7.

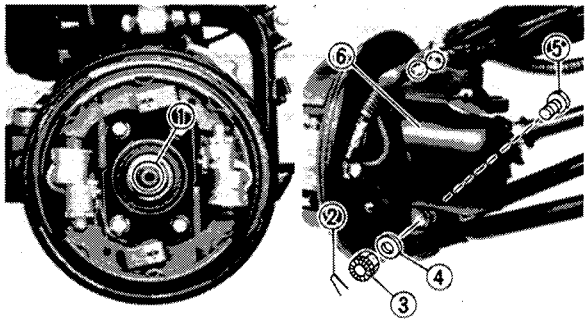


8. Remove:
- Front drive shaft protector ① (front half)

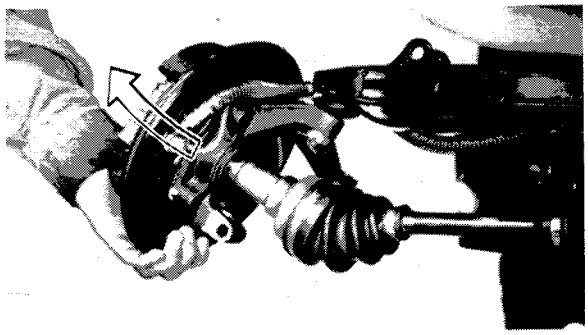


9. Remove:
- Front shock absorbers ① (right and left)
- Cotter pins ②
- Nuts ③ (tie-rod end)

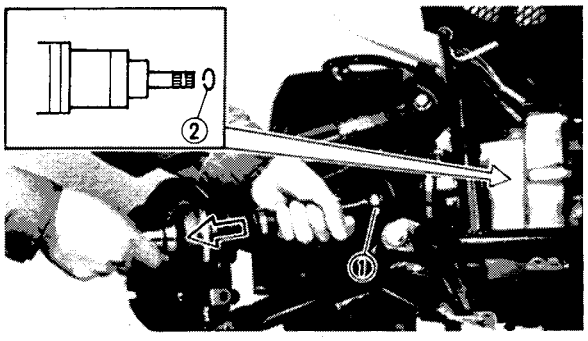
10. Disconnect:
- Tie-rods ④ (right and left)



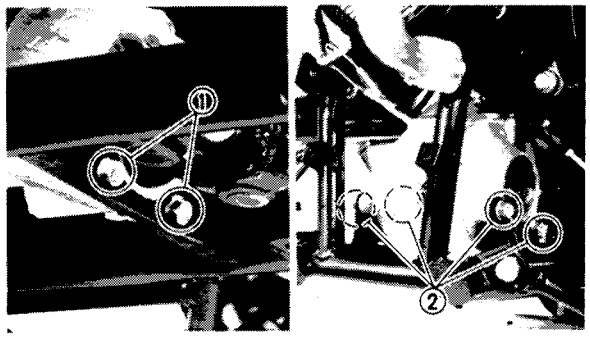
11. Remove:
- O-ring ①
- Cotter pin ②
- Nut ③
- Plain washer ④
- Bolt ⑤
- Constant velocity joint protector ⑥



12. Disconnect:
- Ball joint ends
  Push down the lower arm and pull up the steering knuckle.

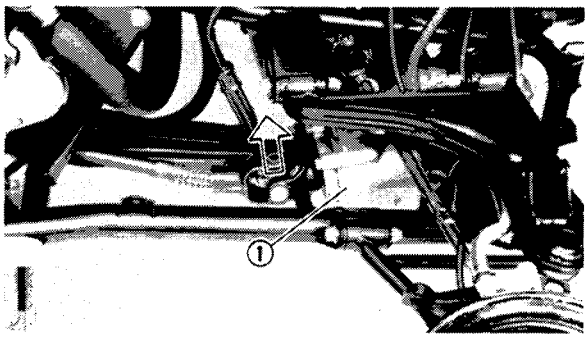


13. Remove:
- Constant velocity joints ①
- Circlips ② (double off-set joint)



14. Remove:
- Bolts ① (differential gear case – side)
- Bolts ② (differential gear case – rear)

15. Disconnect
- Breather hose



16. Remove:
- Differential gear case ①

****

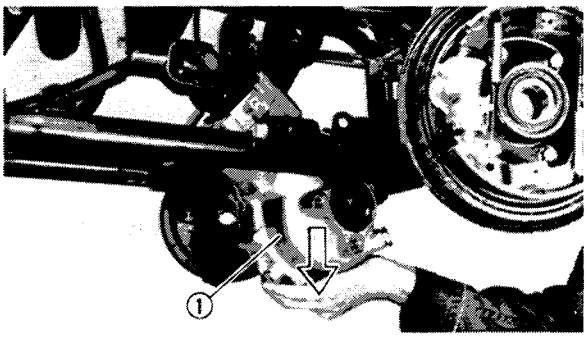
Differential gear case removing steps:
- Lift up the gear case.
- Move the gear case to forward and disconnect the drive shaft universal joint.

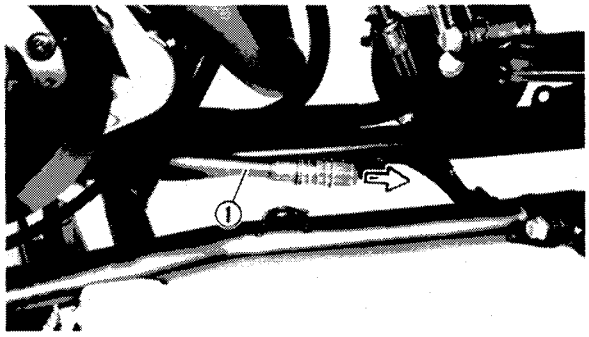
NOTE:

When disconnecting the drive shaft, the spring seat and spring will fall off. Take care not to lose these parts.

- Lift down the gear case.

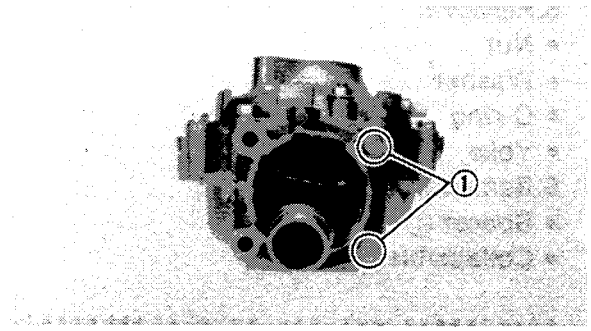
****





17. Remove:
- Front drive shaft ①

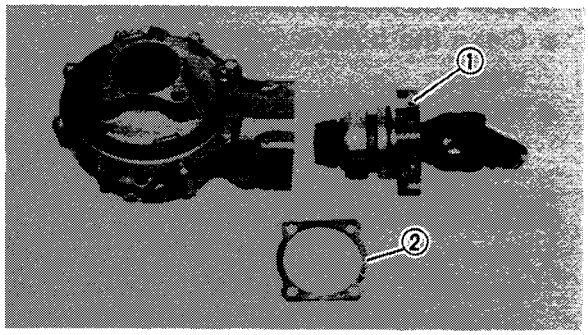
  Pull out the drive shaft to forward.



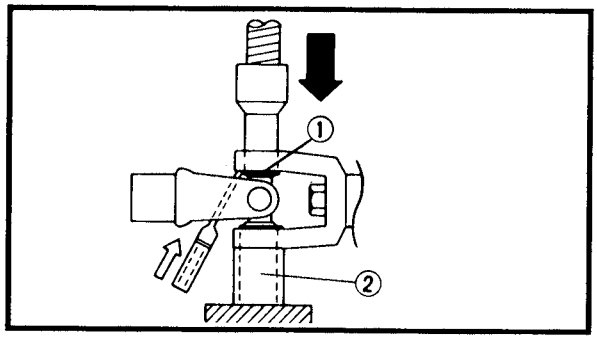
DISASSEMBLY

Differential Gear

1. Remove:
- Bolts (bearing housing - front drive gear) ①



2. Remove:
- Front drive gear assembly with bearing housing ①
- Shim(s) ②

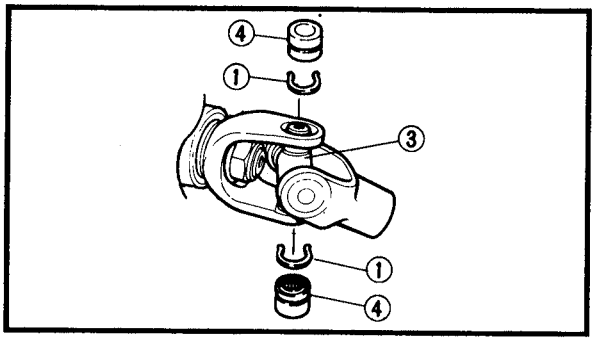


3. Remove:
- Universal joint

****

Universal joint removal steps:
- Remove the circlips ①.
- Place the U-joint in a press.
- With a suitable diameter pipe ② beneath the yoke ③, press the bearing ④ into the pipe as shown.

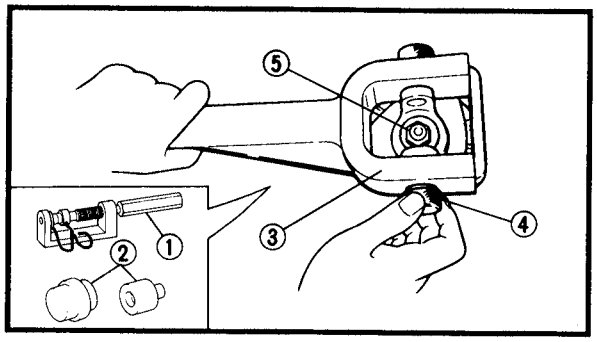
NOTE:
It may be necessary to lightly tap the yoke with a punch.



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

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

****

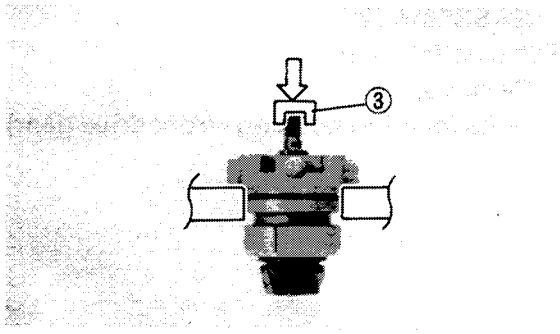


4. Attach:
- Universal joint holder
- Attachment

Onto the universal joint yoke.

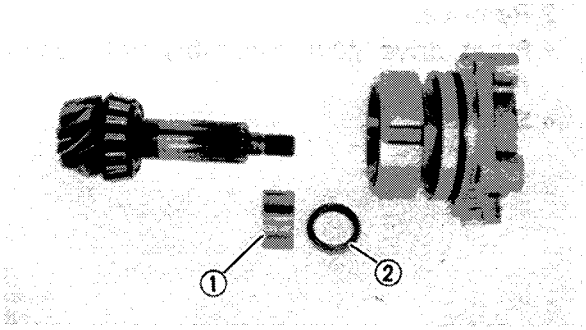
Universal joint holder:
P/N. YM-04062-①, 90890-04062
③

Attachment:
P/N. YM-33291-②, 90890-04096
④



5. Remove:
- Nut
- Washer
- O-ring
- Yoke

6. Remove:
- Spacer ①
- Collapsible collar ②



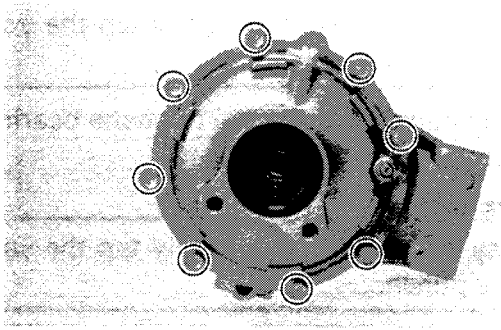
****

Spacer and collapsible collar removal steps:
- Clean the outside of the front drive gear shaft.
- Place the front drive gear assembly with bearing housing onto a hydraulic press.

CAUTION:
- **Never directly press the shaft end with a hydraulic press, this will result in damage to the shaft thread.**
- **Install the suitable socket ③ on the shaft end to protect the thread from damage.**

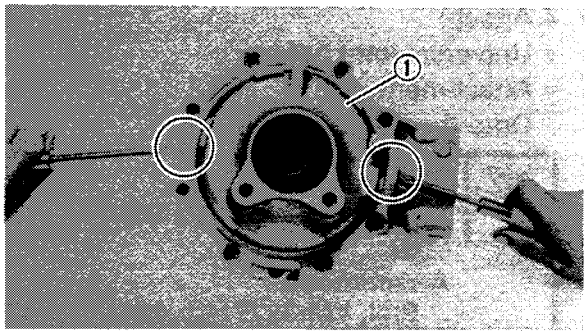
- Press the shaft end, and remove the spacer and collapsible collar.

****

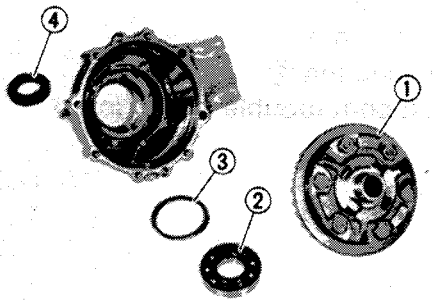


7. Remove:
- 8 mm bolts (bearing housing – ring gear)
- 10 mm bolts (bearing housing – ring gear)

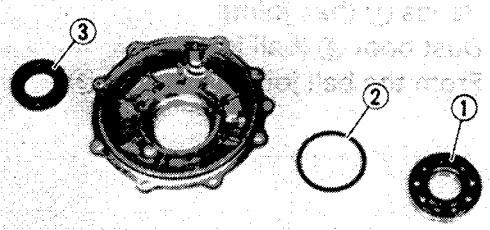
NOTE:
Working in a crisscross pattern, loosen the bolt 1/4 turn each. Remove then after all loosened.



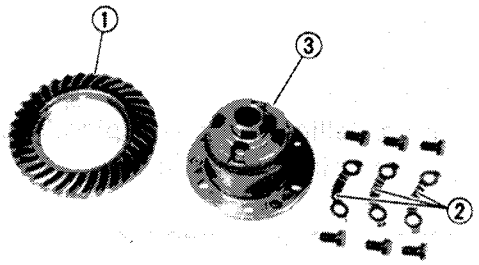
8. Remove:
- Bearing housing ① (ring gear)



9. Remove:
- Differential gear assembly with ring gear ①
- Bearing ②
- Thrust washer(s) ③
- Oil seal ④



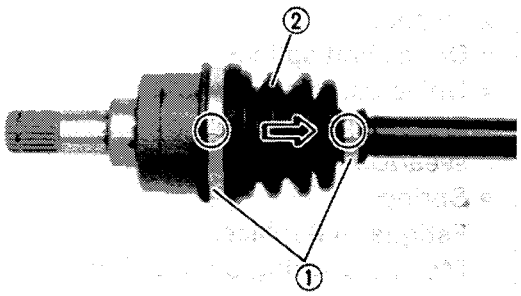
10. Remove:
- Bearing ①
- Ring gear shim(s) ②
- Oil seal ③



11. Remove:
- Ring gear ①
- Lock washers ②
  From the differential gear assembly ③.

CAUTION:

The differential gears are assembled into a proper unit at the factory by means of specialized equipment. Do not attempt to disassemble this unit. Disassembly will result in the malfunction of the unit.

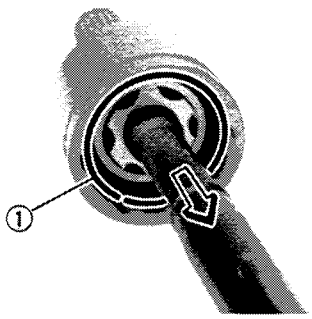


Constant velocity joint

1. Remove:
- Bands (double off-set joint) ①

NOTE:

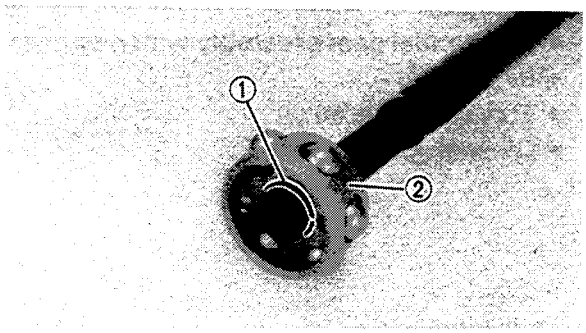
After removing the bands, slide the dust boot ② (double off-set joint) to the ball joint side.



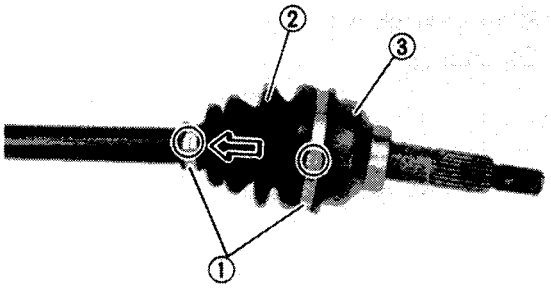
2. Remove:
- Circlip ①

NOTE:

After removing the circlip, pull out the shaft with bearing.



3. Remove:
- Snap ring ①
- Ball bearing ②
- Dust boot (double off-set joint)



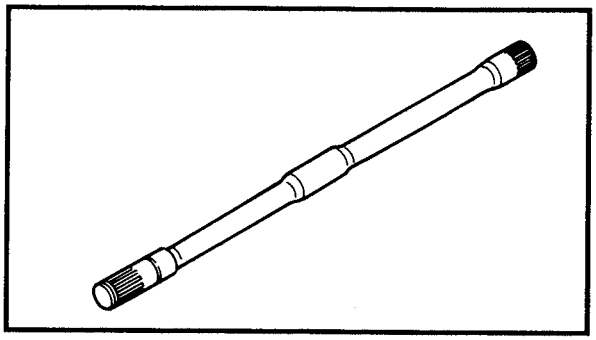
4. Remove:
- Bands ① (ball joint)
- Dust boot ② (ball joint)
  From the ball joint assembly ③.

INSPECTION

Differential gear

1. Inspect:
- Gear teeth
  Pitting/Galling/Wear → Replace front drive gear and ring gear as a set.
- Bearing
  Pitting/Damage → Replace.
- Oil seal
- O-ring
  Damage → Replace.

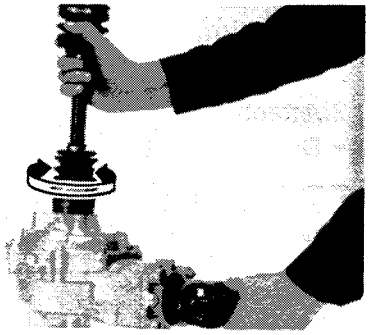
2. Inspect:
- Drive shaft splines
- Universal joints
- Front drive gear splines
  Wear/Damage → Replace.
- Spring
  Fatigue → Replace.
  Move the spring up and down.



3. Inspect:
- Front drive shaft
  Bends → Replace.

⚠ WARNING

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



4. Check:
- Differential gear operation
  Unsmooth operation → Replace differential gear assembly.
  Insert the double off-set joint into the differential gear, and turn the gear back and forth.

Constant velocity joint

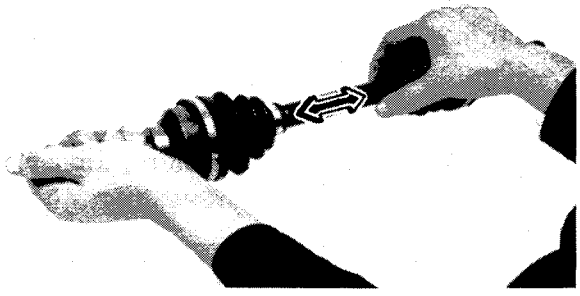
1. Inspect:
- Double off-set joint spline
- Ball joint spline
- Shaft spline
  Wear/Damage → Replace.

2. Inspect:
- Dust boots
  Cracks/Damage → Replace.

CAUTION:

Always use new boot band.

3. Inspect:
- Balls and ball races
- Inner surface of double off-set joint
  Pitting/Damage/Wear → Replace.



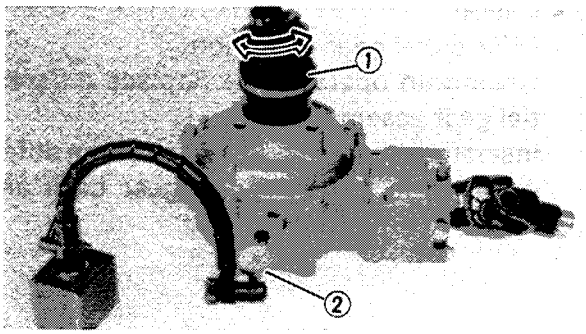
4. Check:
- Free play (thrust movement)
  Excessive play → Replace joint assembly.
  Move the shaft back and forth.

MEASUREMENT AND ADJUSTMENT

Differential gear gear lash measurement

1. Remove:
- Drain plug (14 mm)
  Drain the oil.
2. Install:
- Constant velocity joint ①
  Into the joint hole.

NOTE:
When installing the joint, do not fit the circlip to the joint.



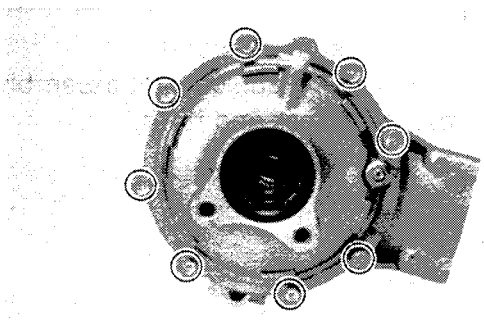
3. Attach:
- Dial gauge ② (for lever type)

	Dial gauge (for lever type): **P/N. YM-03110**

4. Measure:
- Gear lash
  Gently rotate the constant velocity joint from engagement to engagement.
  Over specified limit → Adjust.

NOTE:
- When rotating the joint, do not turn the U-joint.
- Measure the gear lash at 4 positions. Rotate the ring gear 90° each time.

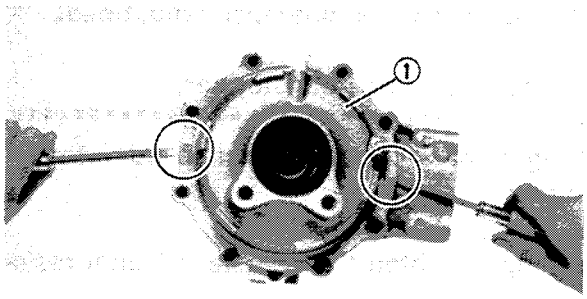
	Differential gear gear lash: **0.10 ~ 0.35 mm (0.004 ~ 0.14 in)**



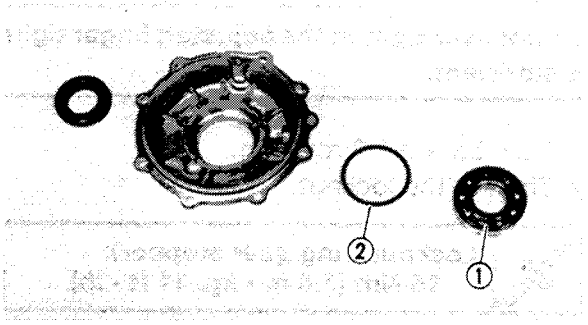
Differential Gear Gear Lash Adjustment

1. Remove:
- 8 mm bolts (bearing housing – ring ger)
- 10 mm bolts (bearing housing – ring ger)

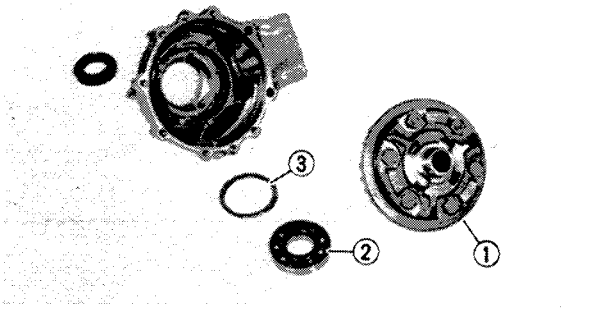
NOTE:
Working in a crisscross pattern, loosen the bolt 1/4 turn each. Remove then after all loosened.



2. Remove:
- Bearing housing ① (ring gear)



3. Remove:
- Bearing ①
- Ring gear shim(s) ②



4. Remove:
- Differential gear assembly with ring gear ①
- Bearing ②
- Thrust washer(s) ③

5. Adjust:
- Gear lash

****

Gear lash adjustment steps:

- Select the suitable shims(s) and thrust washer(s) by the following chart.

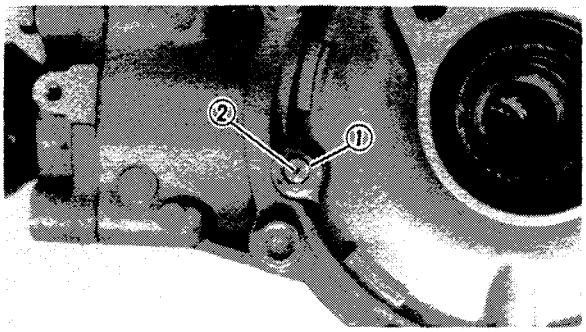
Too-little gear lash → Reduce shim thickness.
Too-large gear lash → Increase shim thickness.

To add or reduce ring gear shim thickness	
Increase by more than 0.1 mm (0.004 in)	Reduce by more than 0.1 mm (0.004 in)

Reduce thrust washer thickness by 0.1 mm (0.004 in) for every 0.1 mm of ring gear shim increase. → **Reverse procedure**

Ring gear shim/thrust washer	
Thickness (mm)	0.15 0.20 0.30 0.40 0.50

****



Ring gear stopper clearance adjustment

1. Adjust:
   - Clearance (ring gear stopper)

****

Ring gear stopper clearance adjustment steps:

- Loosen the locknut ①.
- Finger tighten the adjuster ② until resistance is felt.

CAUTION:

Do not over tighten the adjuster; finger tight is sufficient.

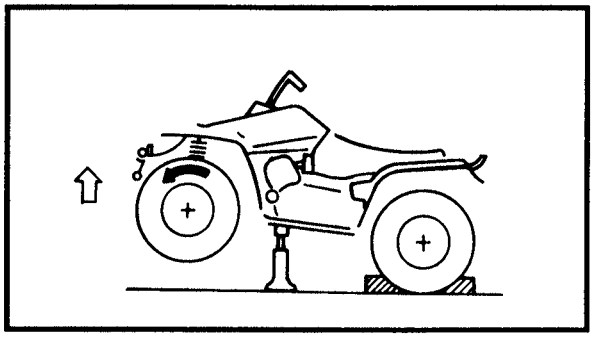
- Turn back it 1/2 rotation.
- Tighten the locknut.

	Locknut (ring gear stopper): 16 Nm (1.6 m • kg, 11 ft • lb)

****

DIFFERENTIAL GEAR OPERATION CHECK

1. Block the rear wheels, and elevate the front wheels by placing a suitable stand under the frame.
2. Remove the wheel cap and cotter pin from the axle nut (right or left).
3. Measure the starting torque of the front wheel (i.e., differential gear preload) with the torque wrench.



NOTE:

- Repeat this step several times to obtain an average figure.
- During this test, the other front wheel will turn in the opposite direction.

Front wheel starting torque:
(differential gear preload):
New unit:
40 ~ 80 Nm (4.0 ~ 8.0 m • kg,
29 ~ 58 ft • lb)
Minimum:
10 Nm (1.0 m • kg, 7.2 ft • lb)

4. Out of the above specification, replace the differential gear assembly.
5. Within the above specification, install the cotter pin and wheel cap.

⚠ WARNING

Always use a new cotter pin.

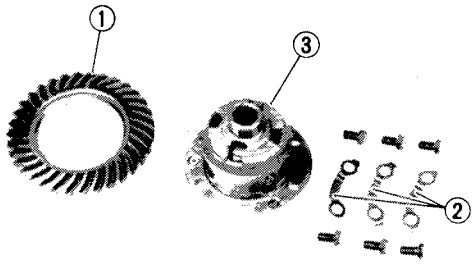
ASSEMBLY

Differential gear

When reassembling the differential gear, reverse the "DISASSEMBLY" procedures. Note the following points.

1. Lubricate:
- Oil seals
- O-rings

	Lithium soap base grease



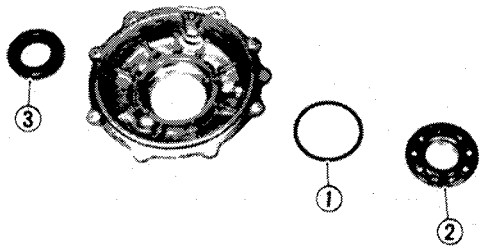
2. Install:
- Ring gear ①
- Lock washers ② (new)

  To the differential gear assembly ③.

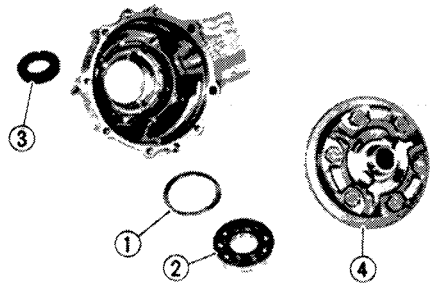
	Ring gear: **64 Nm (6.4 m • kg, 46 ft • lb)**

3. Bend
- Lock washer tab

  (along the bolt flats)



4. Install:
- Ring gear shim(s) ①
- Bearing ②
- Oil seal ③

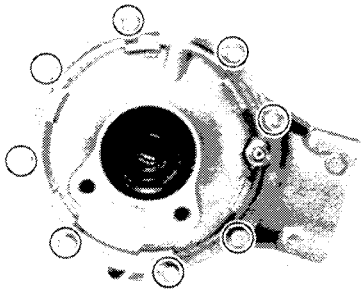


5. Install:
- Thrust washer(s) ①
- Bearing ②
- Oil seal ③
- Differential gear assembly with ring gear ④

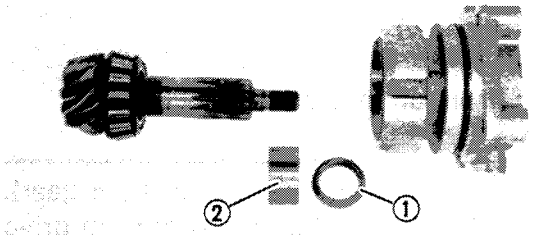
6. Tighten:
- 10 mm bolts (bearing housing - ring gear)
- 8 mm bolts (bearing housing - ring gear)

NOTE:

Tighten the bolts in stage, using a crisscross pattern.



	10 mm Bolts (bearing housing - ring gear): **40 Nm (4.0 m • kg, 29 ft • lb)** **8 mm Bolts (bearing housing - ring gear):** **23 Nm (2.3 m • kg, 17 ft • lb)**



7. Install:
- Collapsible collar ① (new)
- Spacer ②

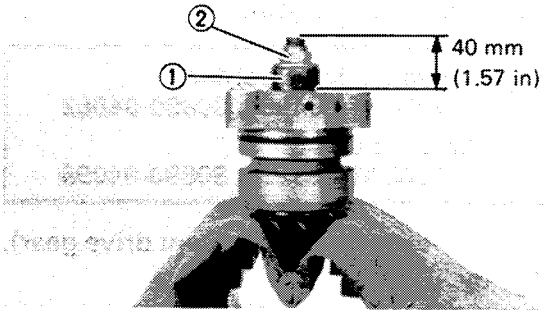
****

Collapsible collar and spacer installation steps:
- Clean the outside of the front drive gear shaft and inside of the collapsible collar and spacer.
- Inspect the spacer for damage. If damaged, replace it.

⚠ WARNING

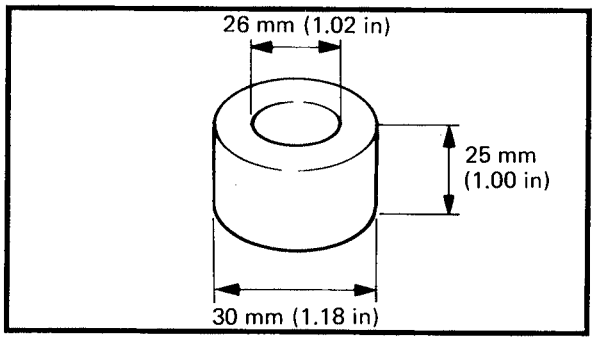
Always use a new collapsible collar.

- Fit the spacer and collapsible collar onto the front drive gear shaft.
- Insert the front drive gear assembly into the bearing housing.
- Clamp the front drive gear in a vise with soft jaws.



CAUTION:

Do not clamp the bearing inner race. Clamp the front drive gear with case at this point.



- Install the hand-made tool ① and nut (front drive gear) ②.
- Tighten the nut until the front drive gear shaft end and bearing housing end are 40 mm (1.57 in) apart.
- Remove the nut (front drive gear) and tool from the front drive gear assembly.

****

8. Lubricate
- O-ring (to the O-ring of the yoke)

	Lithium soap base grease

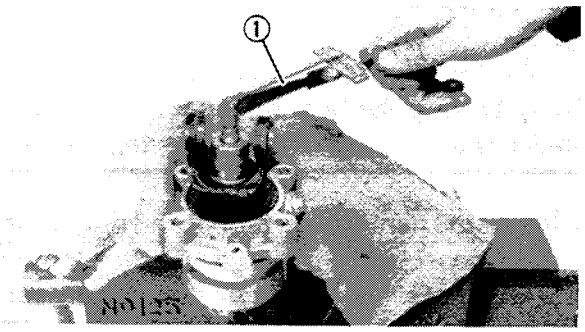
9. Install:
- Yoke
- O-ring (new)
- Washer
- Nut (front drive gear)

NOTE:
Before installing the nut (front drive gear), apply LOCTITE® to the thread of front drive gear shaft.

****

Nut (front drive gear) tightening steps:
- Clean the outside of the bearing housing.
- Clamp the bearing housing in a vise with soft jaws.

CAUTION:
Do not clamp the bearing inner race. Clamp the bearing housing with care at this point.



- Attach the universal joint holder and attachment on the U-joint.

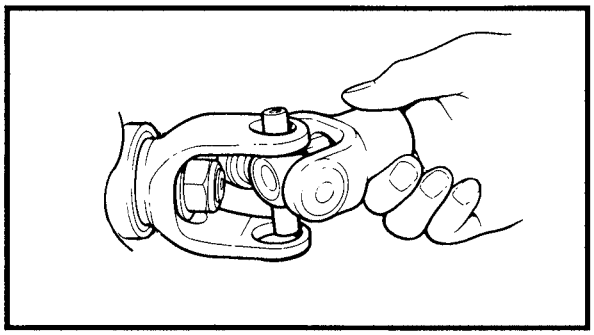
Universal joint holder
P/N. YM-04062, 90890-04062
Attachment
P/N. YM-33291, 90890-04096

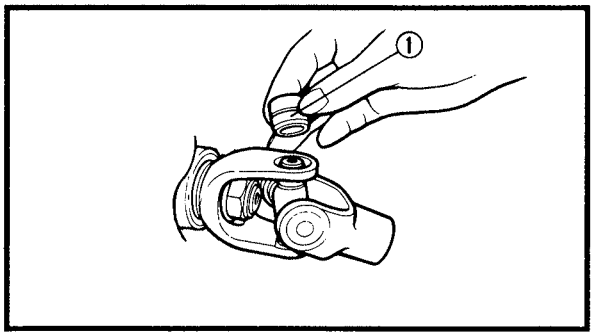
- Carefully tighten the nut (front drive gear), little by little.
- Remove the aforementioned special tools.
- Measure the starting torque of the front drive gear with the small size torque wrench ①.

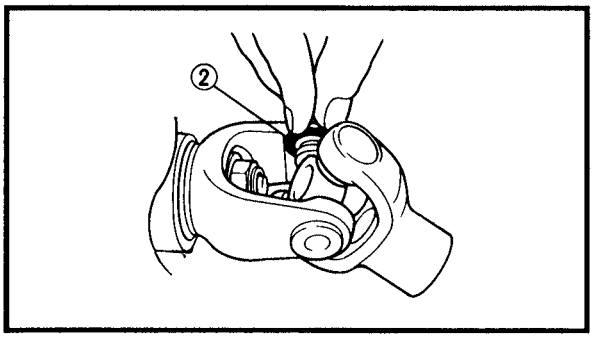
Front drive gear starting torque:
0.8 ~ 1.3 Nm (0.08 ~ 0.13 m • kg, 0.60 ~ 0.94 ft • lb)

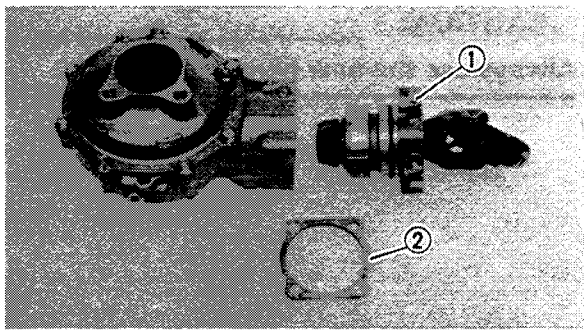
- Repeat tightening steps to establish the standard starting torque for the front drive gear.

NOTE:
Starting torque is the amount of force required to make the shaft begin to turn against the drag of the bearing and oil seal.









CAUTION:

Never exceed the standard starting torque. Be sure to tighten the nut (front drive gear) slowly, carefully checking and measurements each time. Exceeding the standard starting torque may depress the collapsible collar, requiring reassembly. Then you must replace the collapsible collar and repeat the tightening steps to obtain the standard starting torque.

- Stake the nut head with a center punch to lock.

****

10. Install:
- Universal joint

****

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

CAUTION:

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

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

NOTE:

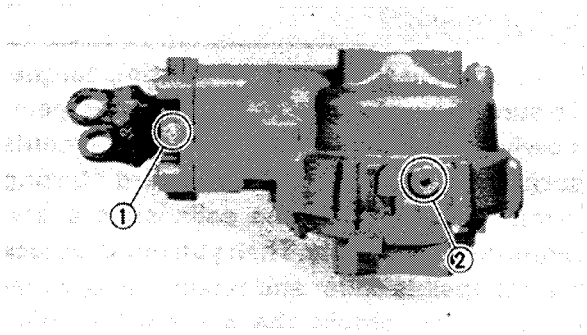
Bearing must be inserted far enough into U-joint so that circlip can be installed.

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

****

11. Install:
- Shim(s) ①
- Front drive gear assembly with bearing housing ②

  Lightly tap the end of the bearing housing with soft hammer.



NOTE:
Be sure to position the bearing housing so that the drain plug face downward.

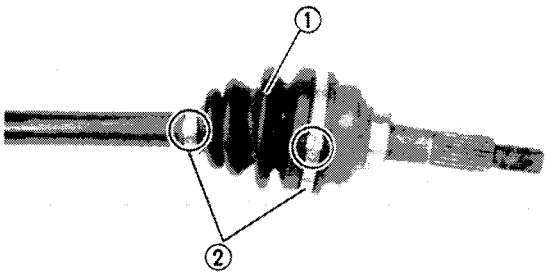
Drain plug ① (rear):
16 Nm (1.6 m • kg, 11 ft • lb)
Drain plug ② (front):
23 Nm (2.3 m • kg, 17 ft • lb)

12. Check:
- Gear lash
  Out of specification → Adjust.
  Refer to the "MEASUREMENT AND ADJUSTMENT" section.

Constant velocity joint
When reassembling the constant velocity joint. Reverse the "DISASSEMBLY" procedures. Note the following points.

1. Apply:
- Molybdenum disulfide grease
  Into the ball joint assembly.

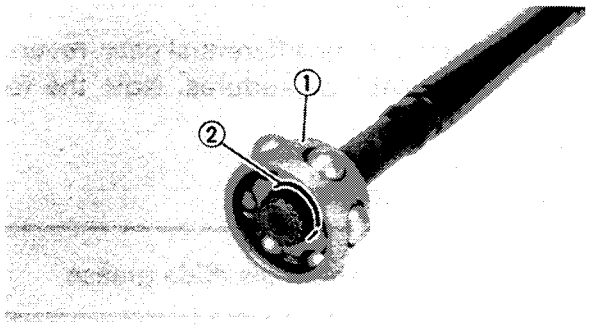
NOTE:
Molybdenum disulfide grease is included in the repair kit.



2. Install:
- Dust boot ① (ball joint)
- Bands ② (ball joint – new)

NOTE:
After installing the bands, bend the band ends securely.

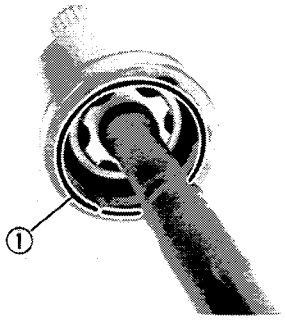
CAUTION:
Always use the new bands.



3. Install:
- Dust boot (double off-set joint)
  Insert the shaft into the boot.
- Ball bearing ①
- Snap ring ②

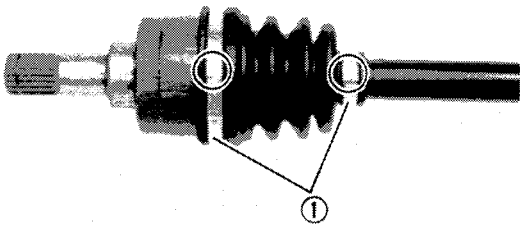
4. Lubricate:
- Ball bearing

Molybdenum disulfide grease



5. Install:
- Ball bearing with shaft
- Circlip ①
  To the double off-set joint.

NOTE:
- Before installing the ball bearing, apply the molbdenum disulfide grease into the double off-set joint.
- Cover the double off-set joint with the dust boot.



6. Install:
- Bands ① (double off-set joint)

NOTE:
After installing the bands, bend the band ends securely.

CAUTION:
Always use the new bands.

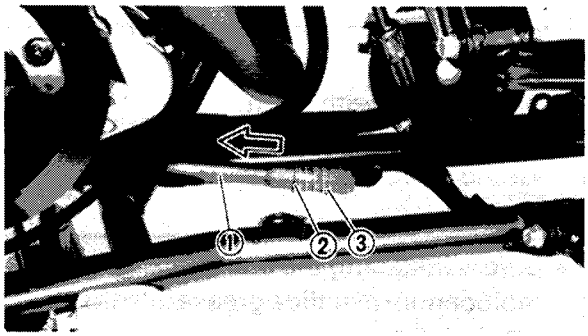
7. Check:
- Free play (thrust movement)
  Refer to the "INSPECTION" section.

INSTALLATION

When installing the differential gear, reverse the "REMOVAL" procedures. Note the following points.

1. Lubricate:
   - Drive shaft splines

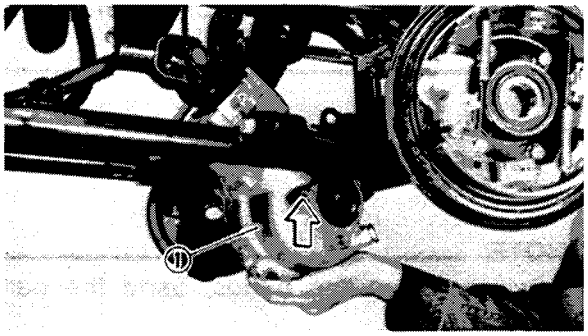
	Molybdenum disulfide grease



2. Install:
   - Front drive shaft ①
   - Spring seat ②
   - Spring ③

NOTE:

Insert the drive shaft into the universal joint properly.



3. Install:
   - Differential gear case ①

****

Differential gear case installation steps:

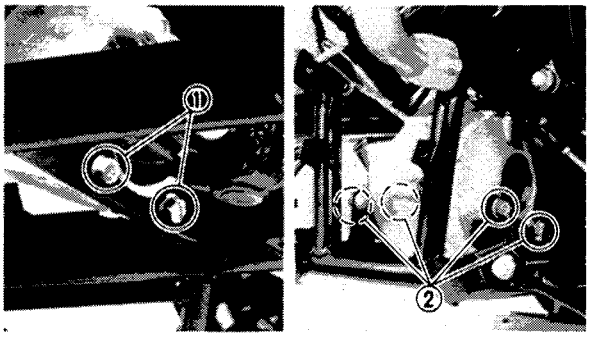
- Connect the drive shaft universal joint.

NOTE:

Before connecting the drive shaft, do not forget to fit the spring seat and spring.

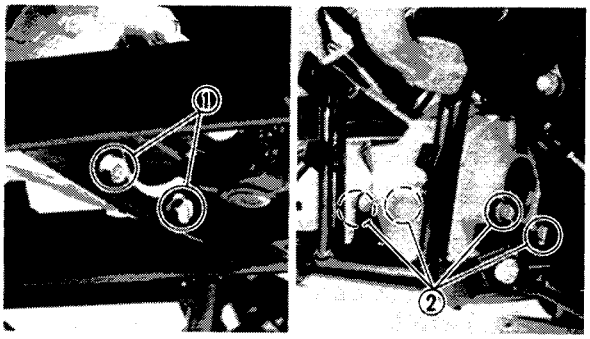
- Check the differential gear operation. If not, reinstall the drive shaft.

****



4. Install:
   - Bolts ① (differential gear case – rear)
   - Bolts ② (differential gear case – side)

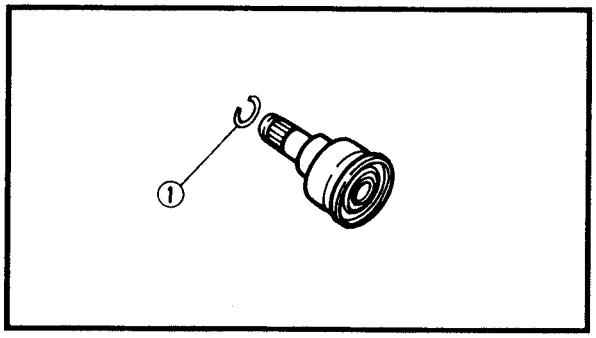
5. Connect:
   - Breather hose



6. Tighten:
- Bolts ① (differential gear case – rear)
- Bolts ② (differential gear case – side)

NOTE:
First tighten the bolts ① (differential gear case - rear) and then tighten the bolts ② (differential gear case - side).

Bolts (differential gear case - rear): 23 Nm (2.3 m • kg, 17 ft • lb)
Bolts (differential gear case - side): 55 Nm (5.5 m • kg, 40 ft • lb)

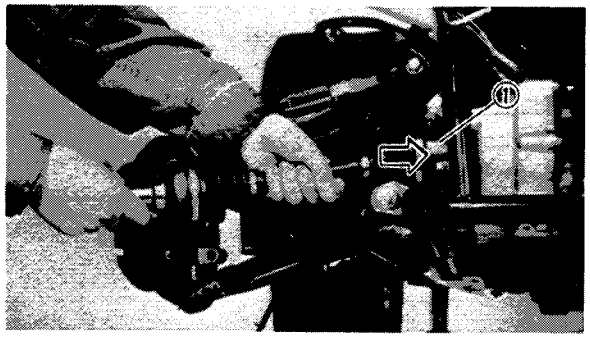


7. Install:
- Circlip ① (double off-set joint)

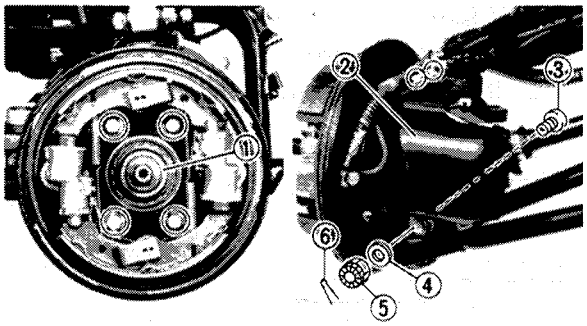
⚠ WARNING
Always use a new circlip.

8. Lubricate:
- Constant velocity joints
- Oil seals

Lithium soap base grease



9. Install:
- Constant velocity joints ①

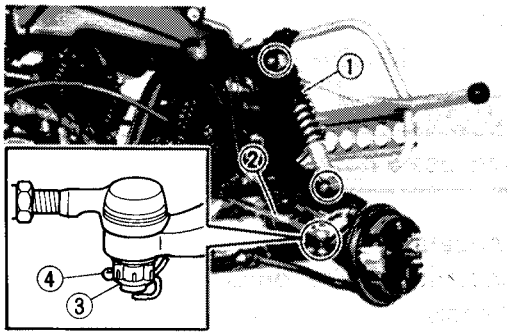


10. Install:
- O-ring ①
- Constant velocity joint protector ②
- Bolt ③ (knuckle arm)
- Plain washer ④
- Nut ⑤
- Cotter pin ⑥ (new)

Nut (steering knuckle and lower arm):
48 Nm (4.8 m • kg, 35 ft • lb)

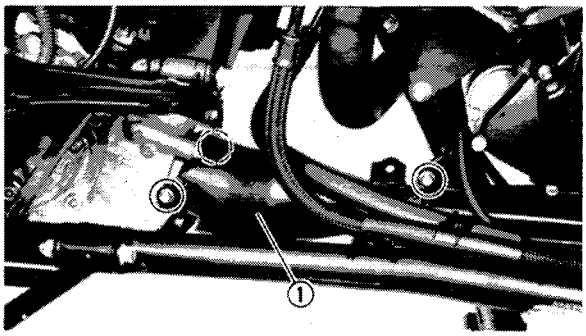
⚠ WARNING

Always use a new cotter pin.



11. Install:
- Front shock absorbers ① (right and left)
- Tie-rods ② (right and left)
- Nuts ③
- Cotter pins ④

Nuts (front shock absorber):
45 Nm (4.5 m • kg, 32 ft • lb)
Nuts (tie-rod end):
25 Nm (2.5 m • kg, 18 ft • lb)

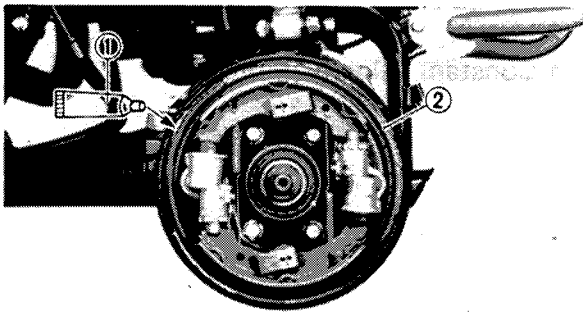


⚠ WARNING

Always use a new cotter pin.

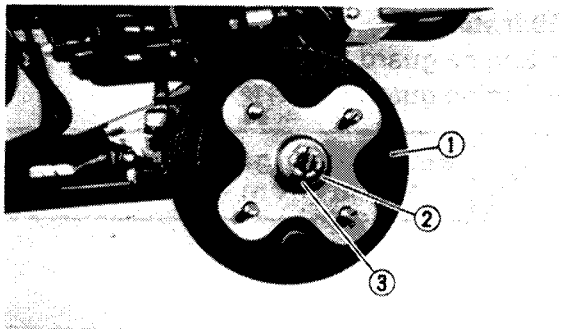
12. Install:
- Front drive shaft protector ① (front half)

Bolts (front drive shaft protector-front half):
10 Nm (1.0 m • kg, 7.2 ft • lb)



13. Apply:
- Yamaha brake grease
  (to the dust seal ②)

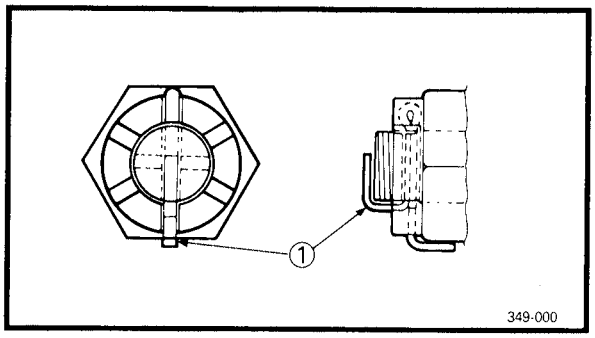
Yamaha brake grease ①:
P/N. 90793-40003



14. Install:
- Front brake drum ①
- Plain washer ②
- Axle nut ③

15. Tighten:
- Axle nut (front wheel)

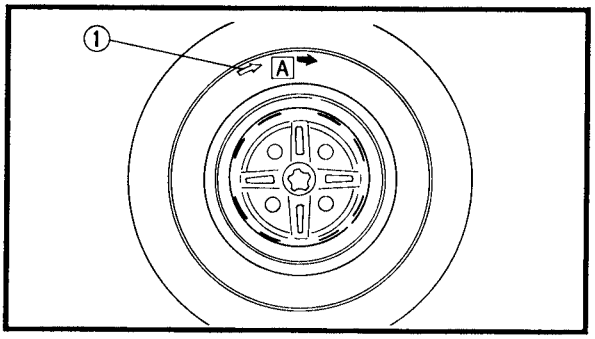
	Axle nut (front wheel): 130 Nm (13 m • kg, 94 ft • lb)



16. Install:
- Cotter pin ① (new)

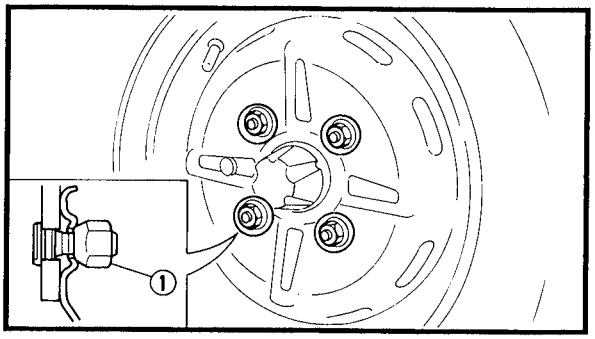
NOTE:
Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

⚠ WARNING
Always use a new cotter pin.



17. Install:
- Front wheel

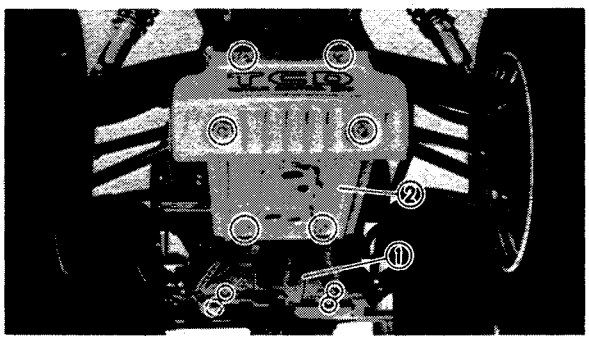
NOTE:
The arrow mark ① on the tire must point toward the rotating direction [A] of the wheel.



18. Tighten:
- Nuts ① (front wheel)

⚠ WARNING
Tapered wheel nuts ① are used for both front and rear wheels. Install the nut with its tapered side towards the wheel.

	Nuts (front wheel): 55 Nm (5.5 m • kg, 40 ft • lb)



19. Install:
- Engine guard (center) ①
- Engine guard (front) ②

	Bolts (engine guard): **15 Nm (1.5 m • kg, 11 ft • lb)**

20. Fill:
- Differential gear case

	Total amount: **0.5 L (944 Imp qt, 0.53 US qt)** **Recommended oil:** **SAE 80 API "GL-4" Hypoid gear oil**

Refer to the "DIFFERENTIAL GEAR OIL REPLACEMENT" section in the CHAPTER 3.

21. Install:
- Rear fender
- Rear carrier
- Seat

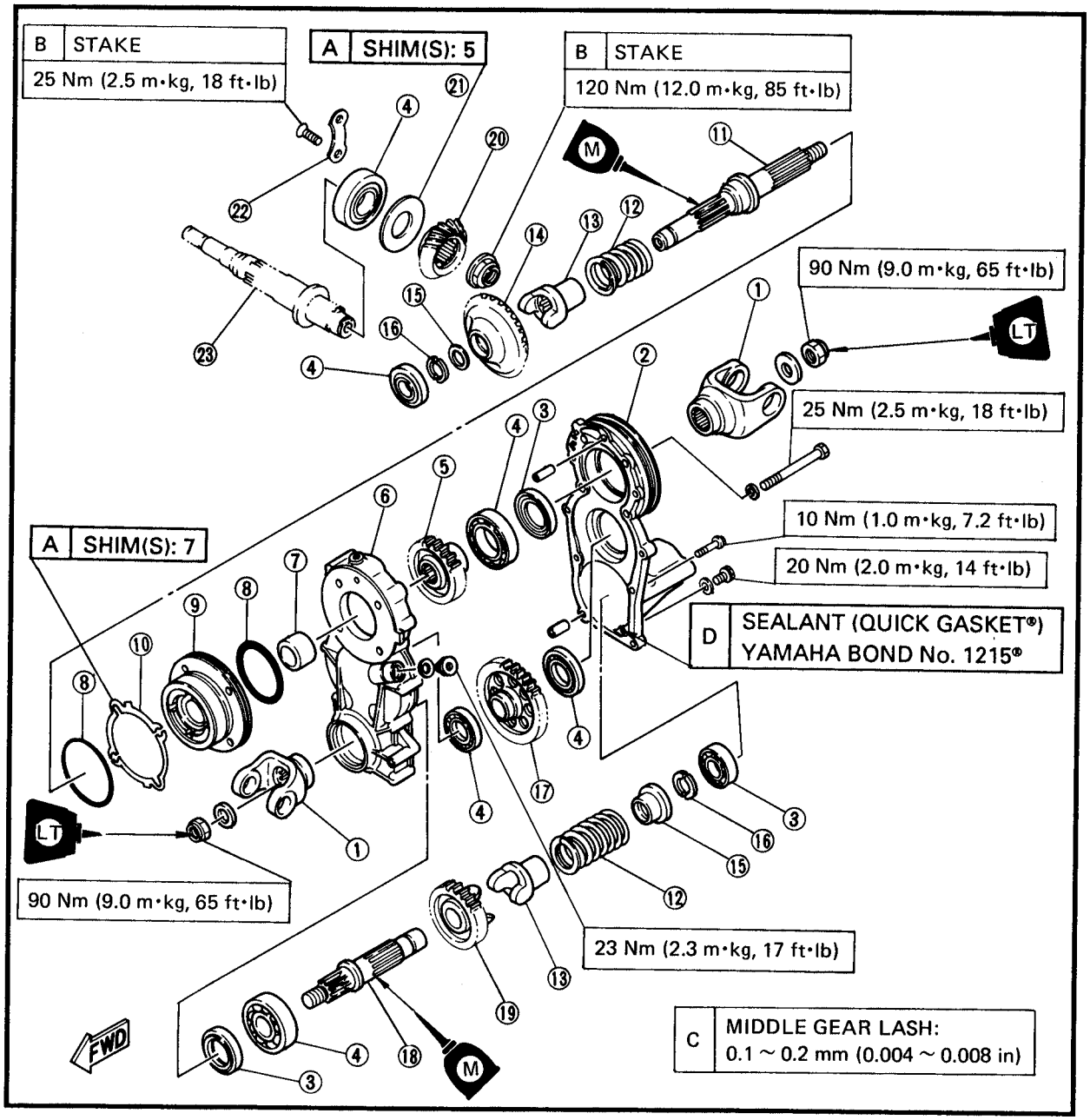
Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

22. Check:
- Differential gear operation.

Refer to the "DIFFERENTIAL GEAR OPERATION CHECK" section.

TRANSFER GEAR

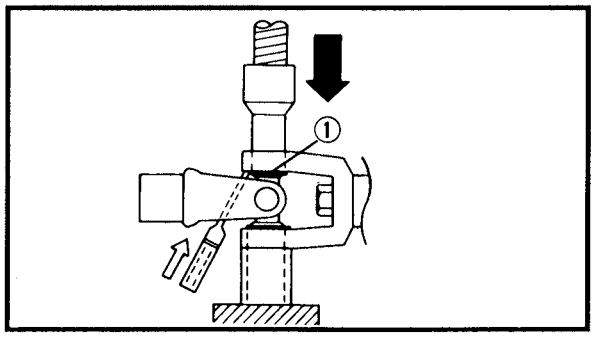
① Universal joint
② Transfer gear case (rear)
③ Oil seal
④ Bearing
⑤ Transfer drive gear (26T)
⑥ Transfer gear case (front)
⑦ Collar
⑧ O-ring
⑨ Bearing housing assembly
⑩ Shims
⑪ Middle driven shaft (for rear final gar)
⑫ Damper spring
⑬ Damper cam
⑭ Middle driven gear
⑮ Holder
⑯ Retainers
⑰ Idler gear (34T)
⑱ Middle driven shaft (for differential gear)
⑲ Transfer driven gear (26T)
⑳ Middle drive gear
㉑ Thrust shims
㉒ Bearing retainers
㉓ Middle drive shaft



REMOVAL

1. Drain:
- Transfer gear oil
  Refer to the "ENGINE OIL/TRANSFER GEAR OIL REPLACEMENT" section in the CHAPTER 3.

2. Remove:
- Rear carrier
- Rear fender
- Muffler
- Exhaust pipe
- Rear shock absorber
- Rear drive assembly with swingarm
- Engine guard (rear)
- Middle gear case
- Transfer gear assembly
  Refer to the "ENGINE OVERHAUL - ENGINE REMOVAL" section in the CHAPTER 4.



DISASSEMBLY

Middle drive shaft (for rear final gear)

1. Remove:
- Universal joint (for rear final gear)

****

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

NOTE:

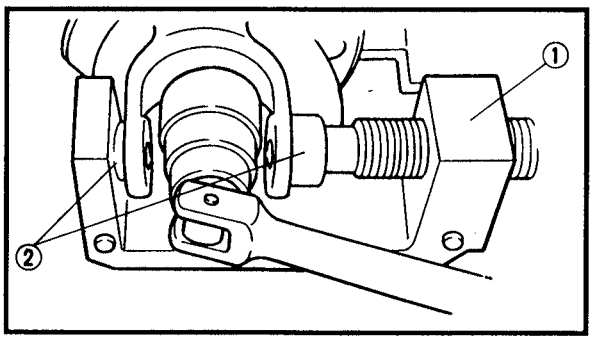
It may be necessary to lightly tap the yoke with a punch.

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

NOTE:

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

****



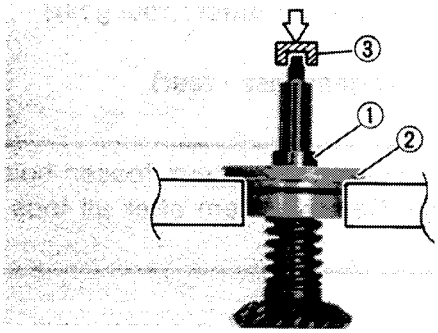
2. Attach:
- Universal Joint Holder ①
- Attachment ②

Onto the universal joint yoke.

Universal joint holder:
P/N. YM-04062 ①
Attachment:
P/N. YM-33291 ②

3. Remove:
- Nut (middle driven shaft - for rear final gear)
- Washer
- O-ring
- Yoke
- Middle driven shaft assembly with bearing housing (for rear final gear)
  Lightly tap the end of the axle with soft hammer.

4. Remove:
- Collar ①
- Bearing housing assembly ②



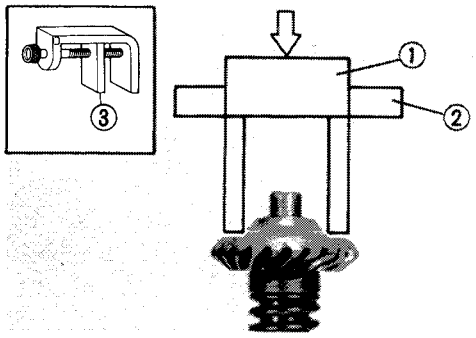
****

Collar and bearing housing removal steps:
- Clean the outside of the middle driven shaft.
- Place the middle driven shaft assembly onto a hydraulic press.

CAUTION:
- **Never directly press the shaft end with a Hydraulic Press, this will result in damage to the shaft thread.**
- **Install the suitable socket ③ on the shaft end to protect the thread from damage.**

- Press the shaft end, and remove the collar and bearing housing.

****



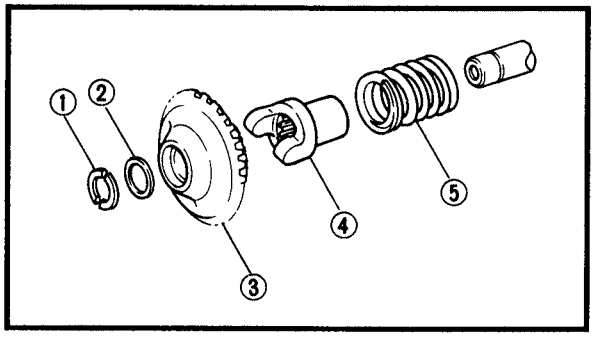
5. Attach:
- Damper spring compressor ①
- Middle drive gear holder ②
  Onto the middle driven gear.

Damper spring compressor:
P/N. YM-33286 ①, 90890-04090 ③

Middle drive gear holder:
P/N. YM-33222 ②

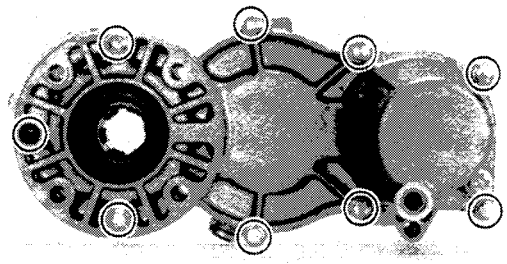
6. Position:
- Middle driven shaft assembly onto a hydraulic press.

7. Compress the damper spring on the middle driven gear assembly.



8. Remove:
- Retainers ①
- Holder ②
- Middle driven gear ③
- Damper cam ④
- Damper spring ⑤

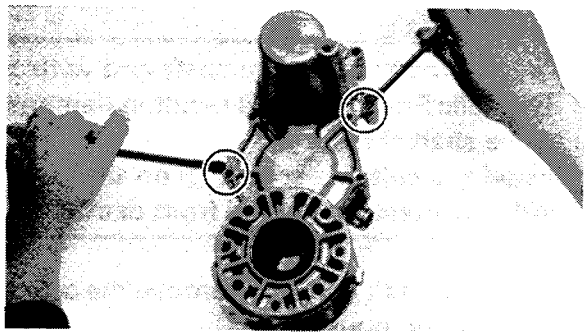
Middle driven shaft (for differential gear)



1. Remove:
- Bolts (transfer gear case - rear)

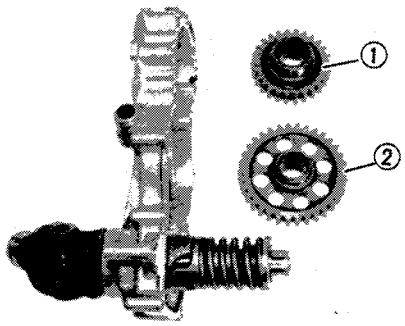
NOTE:

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

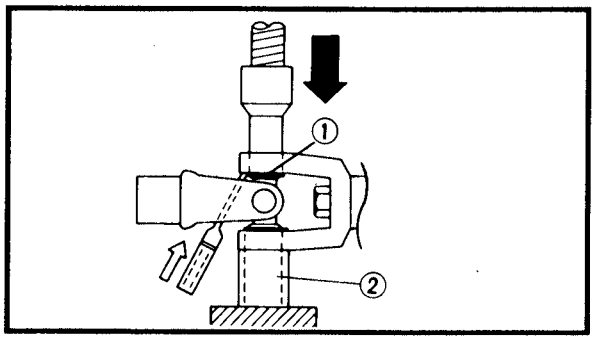


2. Remove:
- Transfer gear case (rear)

NOTE:
- For this removal, slits in the transfer gear case can be use as shown.
- When removing the transfer gear case, the dowel pins will fall off. Take care not to lose these parts.



3. Remove:
- Transfer drive gear ①
- Idle gear ②



4. Remove:
- Universal joint (for differential gear)

****

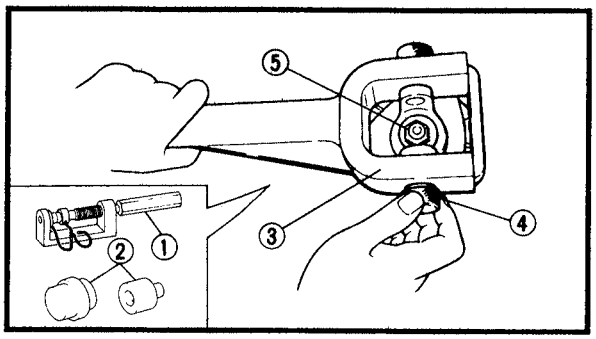
Universal joint removal steps:
- Remove the circlips ①.
- Place the U-joint in a press.
- With a suitable diameter pipe ② beneath the yoke, press the bearing into the pipe as shown.

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

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

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

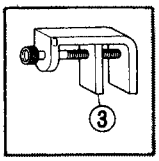
****

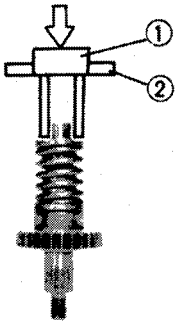


5. Attach:
- Universal joint holder
- Attachment
  Onto the universal joint yoke.

Universal joint holder:
P/N. YM-04062 ①, 90890-046062 ③
Attachment:
P/N. YM-33291 ②, 90890-04096 ④

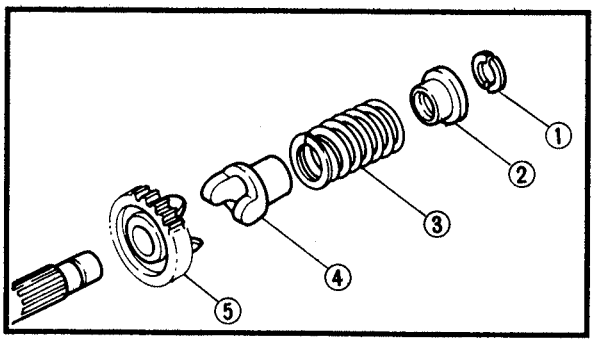
6. Remove:
- Nut ⑤ (middle driven shaft - front differential gear)
- Washer
- Yoke
- Middle driven shaft assembly (for differential gear)
  Lightly tap the end of the shaft with soft hammer.





7. Attach:
- Damper spring compressor
- Middle drive gear holder
  Onto the holder of transfer driven gear.

Damper spring compressor:
P/N. YM-33286 ①, 90890-04090 ③
Middle drive gear holder:
P/N. YM-33222 ②

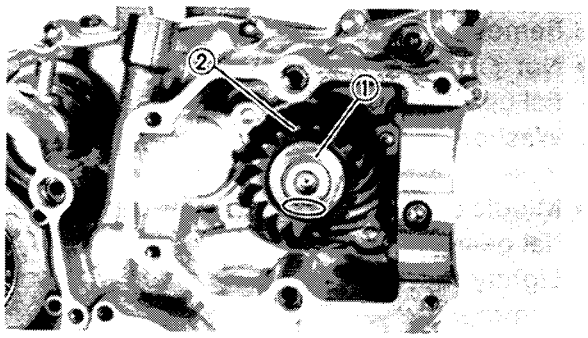


8. Position:
- Middle driven shaft assembly
  onto a hydraulic press.
9. Compress the damper spring on the holder.
10. Remove:
- Retainers ①
- Holder ②
- Damper spring ③
- Damper cam ④
- Transfer driven gear ⑤

Middle drive shaft

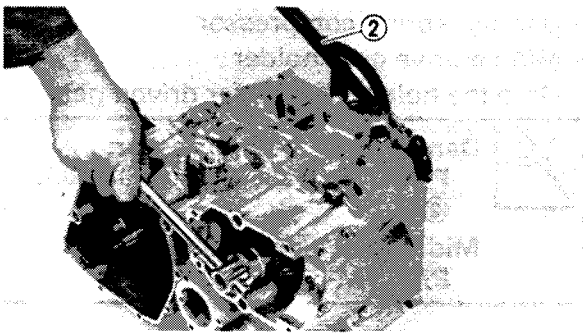
NOTE:
It is necessary to separate the crankcase in order to service the middle drive shaft, refer to the "ENGINE OVERHAUL" section in the CHAPTER 4.

1. Remove:
- Engine
  Refer to the "ENGINE REMOVAL" section in the CHAPTER 4.



2. Remove:
- Nut ① (middle drive pinion gear)
- Middle drive pinion gear ②

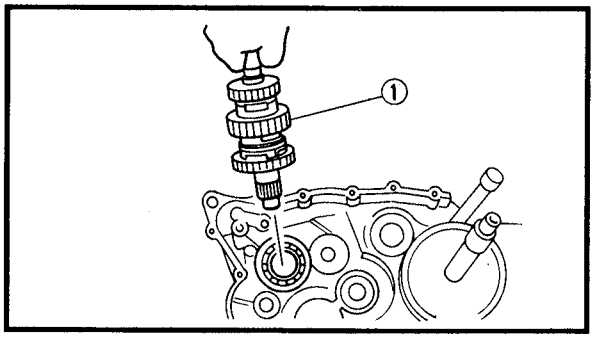
NOTE:
- Flatten the punched position of the middle drive gear nut using the drift punch.
- Put the engine in 1st, and carry out the operation.



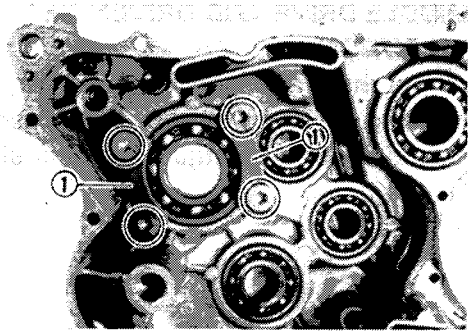
Use the Rotor holder ② hold the clutch boss.

	Rotor holder: **P/N. YU-01235, 90890-01235**

Refer to the "ENGINE DISASSEMBLY CLUTCH" section in the CHAPTER 4.

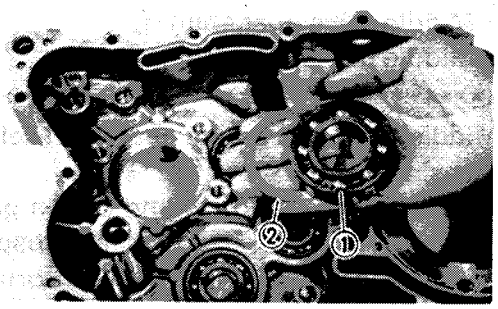


3. Remove:
- Middle drive axle assembly ①.
  Refer to the "ENGINE DISASSEMBLY - TRANSMISSION, MIDDLE DRIVE AXLE AND CRANKSHAFT" section in the CHAPTER 4.

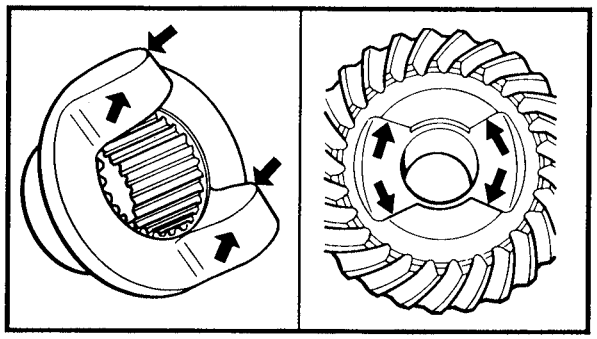


4. Remove:
- Bearing retainers ①
  use #40 torx driver.

	Torx driver #40: **P/N. YM-04049, 90890-04049**



5. Remove:
- Bearing ①
- Shim(s) ②



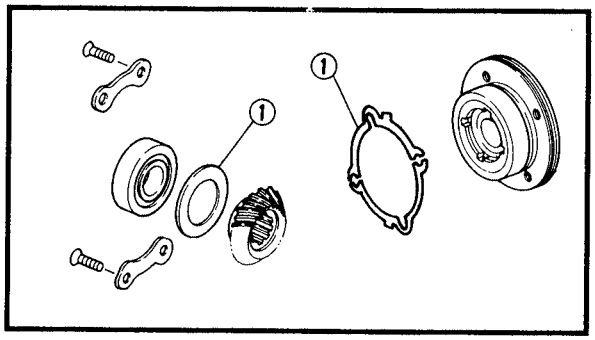
INSPECTION

Middle driven shafts

1. Inspect:
- Damper cam surfaces
  Wear/Scratches → Replace damper and middle driven gear as a set.
2. Inspect:
- Damper spring
  Damage/Cracks → Replace.
3. Inspect:
- Gear teeth (middle gear)
  Pitting/Galling/Wear → Replace middle gear as a set.
- Gear teeth (transfer gear)
  Pitting/Galling/Wear → Replace transfer gear as a set.
4. Inspect:
- O-ring
- Oil seal
  Damage → Replace.
- Bearings
  Pitting/Damage → Replace.
5. Check:
- U-joint movement
  Roughness → Replace U-joint.

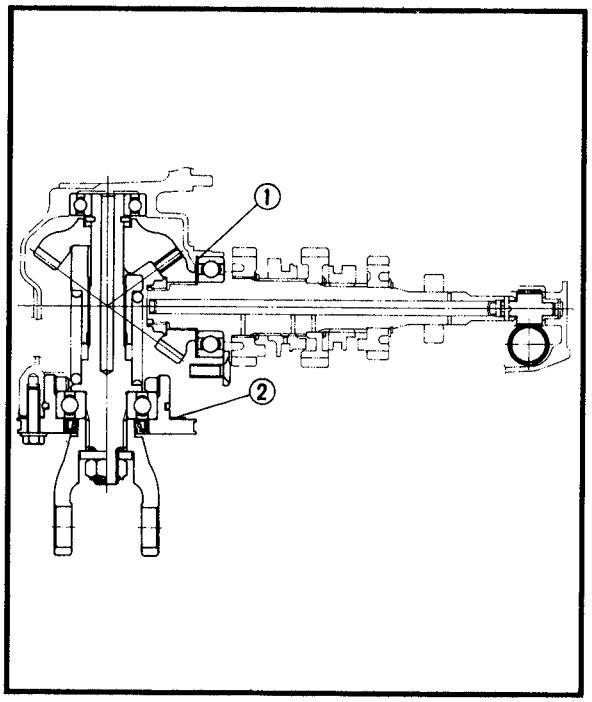
Middle drive shaft

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



MIDDLE DRIVE AND DRIVEN GEAR SHIM SELECTION

When the drive and driven gear, bearing housing assembly and/or crankcase and replaced, be sure to adjust the gear shim ①.



1. Select:
- Middle drive gear shim ①
- Middle driven gear shim ②

****

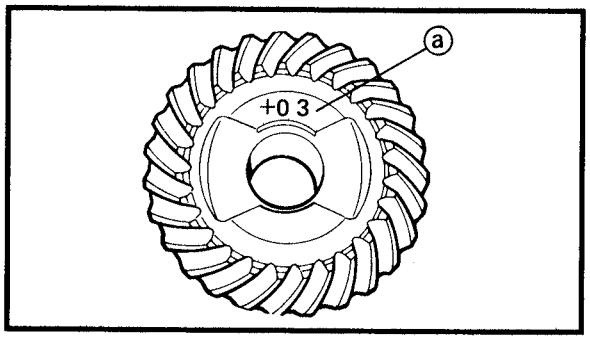
Middle drive and driven gear shim selection steps:

- Position middle drive and driven gear by using shims ① and ② with their respective thickness calculated from information marked on crankcase, bearing housing and drive gear end.

① Shim thickness "A"
② Shim thickness "B"

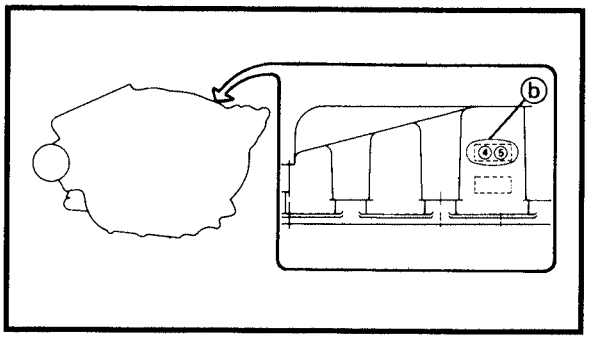
- To find shim thickness "A" use following formula:

Middle drive pinion gear shim thickness:
"A" = ⓐ − ⓑ



Where:
- ⓐ = a numeral (usually a decimal number) on the drive pinion gear is either added to or substracted from "55".
- ⓑ = a numeral (usually a decimal number) on the crankcase is either added to or substracted from "54".

Example:
1) If the drive pinion gear is marked "+03" .....ⓐ is 55.03
2) If the crankcase is marked "45" .....ⓑ is 54.45
   A = 55.03 − 54.45
   = 0.58
3) Therefore, shim thickness is 0.58 mm. Shim sizes are supplied in following thickness:



Middle drive pinion gear shim		
Thickness (mm)	0.10 0.15 0.20 0.30	0.40 0.50 1.00

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

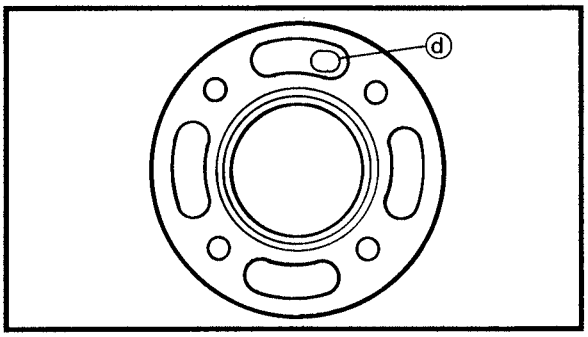
Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

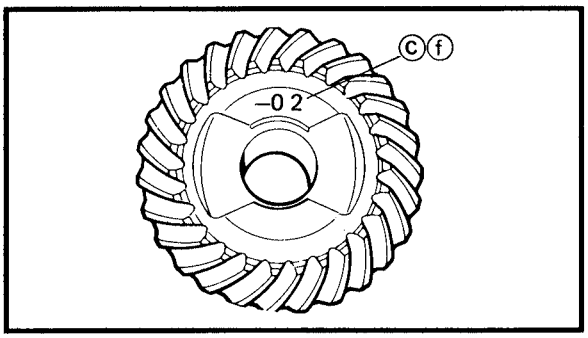
In the example above, the calculated shim thickness is 0.58 mm. The chart instructs you, however, to round off the 8 to 10.
Thus you may choose either 2 pcs. –0.30 mm shims, or 1 pc. –0.30 mm and 2 pcs. –0.15 mm shims.

- To find shim thickness "B" use following formula:

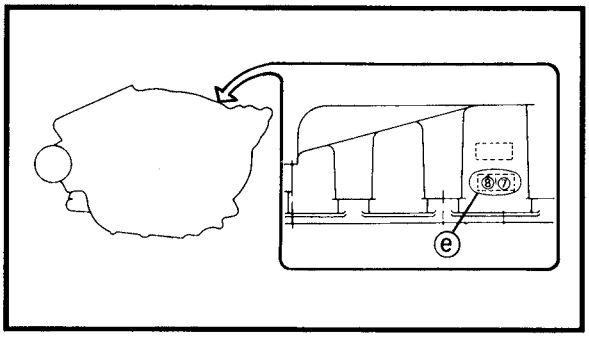
Middle driven pinion gear shim thickness:
"B" = ⓓ - ⓕ - ⓒ - ⓔ

Where:
ⓓ = a numeral (usually a decimal number) on the bearing housing is either added to or substracted from "124".
ⓕ = a numeral (usually a decimal number) on the driven pinion gear is either added to or substracted from "5".
ⓒ = a numeral (usually a decimal number) on the driven pinion gear is either added to or substracted from "49.5".
ⓔ = a numeral (usually a decimal number) on the crankcase is either added to or substracted from "68".





Example:
1) If the bearing housing is marked "20" .....ⓓ is 124.20
2) If the driven pinion gear is marked " –02"ⓕ is 4.98
ⓒ is 49.48



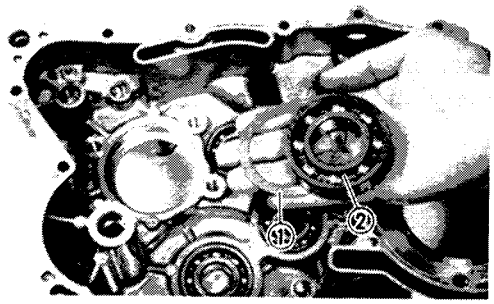
3) If the crankcase is marked "87" .....ⓔ is 68.87
B = 124.20 – 4.98 – 49.48 -68.87
= 0.87
4) Therefore, shim thickness is 0.87 mm. Shim sizes are supplied in following thickness:

Middle driven pinion gear shim	
Thickness (mm)	0.15 0.50 0.30 0.60 0.40

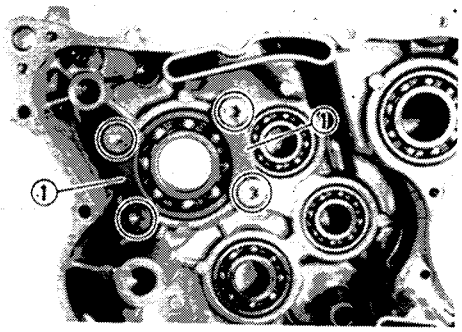
Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

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

In the example above, the calculated shim thickness is 0.87 mm. The chart instructs you, however, to round off the 7 to 5.
Thus you may choose either 1 pc. –0.40 mm shim and 3 pcs. –0.15 mm shims or 1pc. –0.40 mm shim, 1pc. –0.30 mm shim and 1 pc. –0.15 mm shim.
****

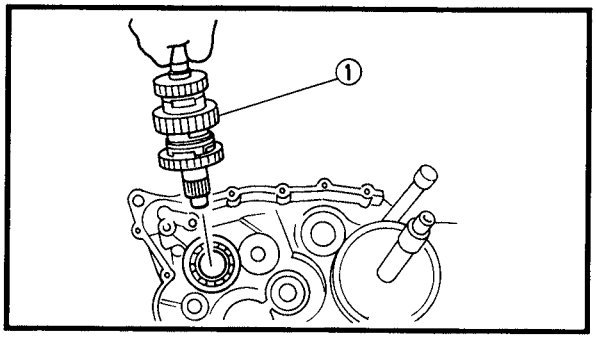


ASSEMBLY
Reverse the "DISASSEMBLY" procedures.
Note the following points.
Middle drive shaft
1. Install:
- Shim(s) ①
- Bearing ②



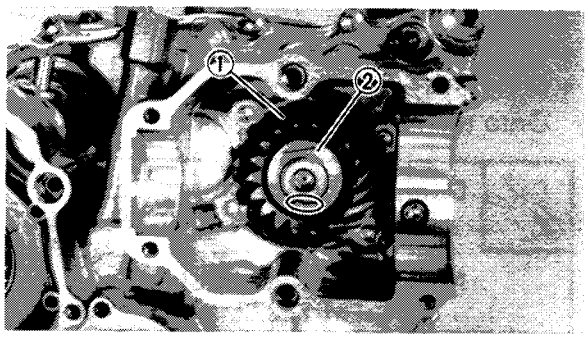
2. Install:
- Bearing retainers ①
  Use #40 torx driver.

	Torx driver #40: P/N. YM-04049, 90890-04049
	Bearing retainer: 25 Nm (2.5 m • kg, 18 ft • lb)



3. Lock the screw head with drift punch.

4. Install:
- Middle drive axle assembly ①
  Refer to the "ENGINE ASSEMBLY AND ADJUSTMENT-CRANK SHAFT, MIDDLE DRIVE AXLE, TRANSMISSION AND CRANKCASE" section in the CHAPTER 4.

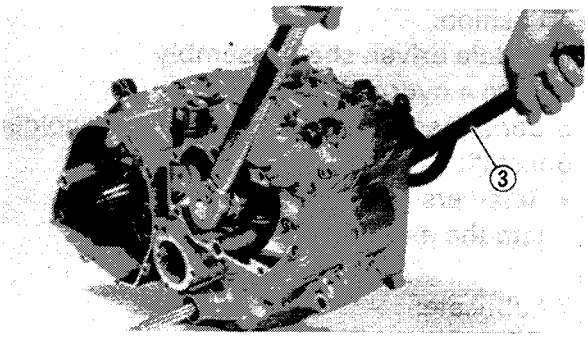


5. Install:
- Middle drive pinion gear ①
- Nut ②

	Nut (middle drive pinion gear): 120 Nm (12.0 m • kg, 85 ft • lb)

Use the rotor holder ③ to hold the clutch boss.

	Rotor holder: P/N. YU-01235, 90890-01235

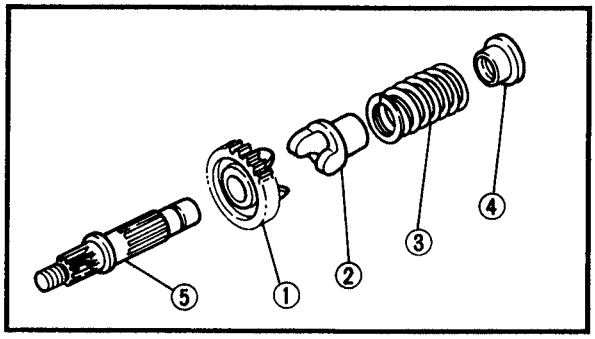


NOTE:
Put the engine in 1st, and carry out the operation.

5. Lock the thread with drift punch.

⚠ WARNING
Always use a new nut.

Refer to the "ENGINE ASSEMBLY AND ADJUSTMENT - CLUTCH" section in the CHAPTER 4.



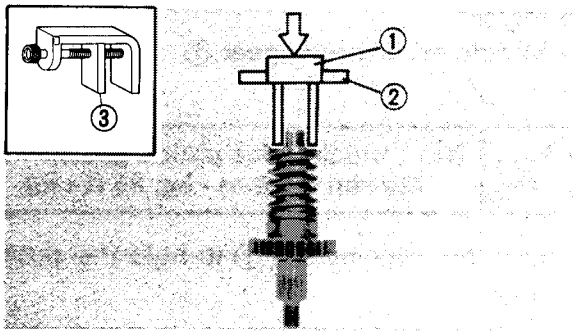
Middle driven shaft (for differential gear)

1. Lubricate:
   - Middle driven shaft

	Molybdenum disulfide grease

2. Install:
   - Transfer driven gear ①
   - Damper cam ②
   - Damper spring ③
   - Holder ④

   To the middle driven shaft ⑤



3. Attach:
   - Damper spring compressor
   - Middle drive gear holder

   Onto the holder of transfer driven gear.

	Damper spring compressor: P/N. YM-33286 ① 90890-04090 ③ **Middle drive gear holder: P/N. YM-33222 ②**

4. Position:
   - Middle driven shaft assembly

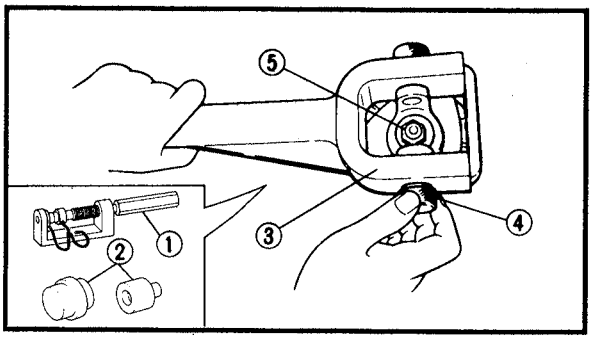
   Onto a hydraulic press.
5. Compress the damper spring on the holder.
6. Install:
   - Retainers

   Into the middle driven shaft groove.

7. Lubricate:
   - Oil seal (middle driven shaft)

	Lithium soap base grease

8. Install:
- Middle driven shaft assembly
  To the transfer gear case.
- Yoke
- Washer
- Nut (middle driven shaft - for differential gear)
  To the middle driven shaft.

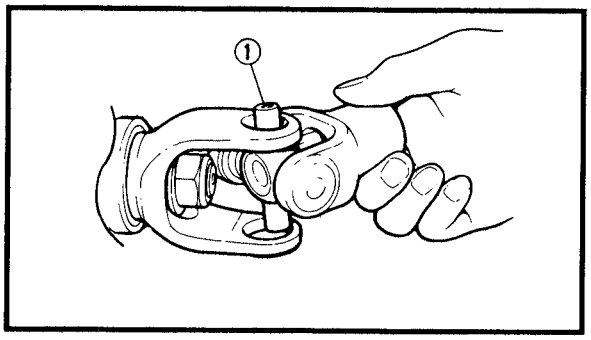


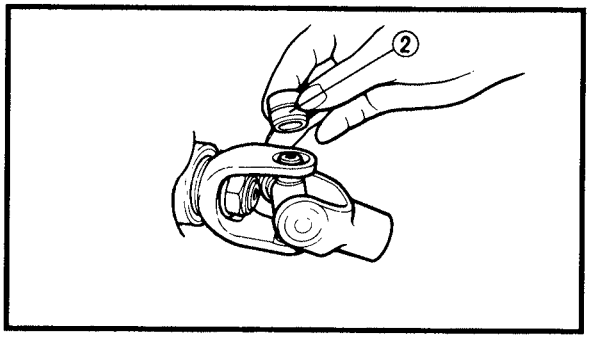
9. Attach:
- Universal joint holder
- Attachment
  Onto the universal joint yoke.

Universal joint holder:
P/N. YM-04062 ①, 90890-04062 ③
Attachment:
P/N. YM-33291 ②, 90890-04096 ④

10. Tighten:
- Nut (middle driven shaft - for differential gear)
  Torque the nut carefully, little by little.

Nut (middle driven shaft - for differential gear):
90 Nm (9.0 m • kg, 65 ft • lb)
LOCTITE®





11. Install:
- Universal joint (for differential gear)

****

Installation steps:
- Install the opposite yoke ① into the U-joint.
- Apply the "wheel bearing grease" to the bearings ②.
- Install the bearing onto the yoke.

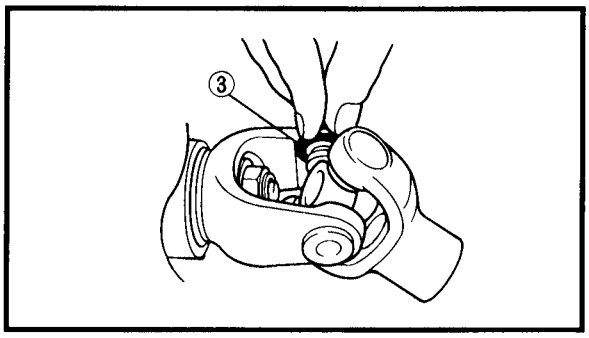
CAUTION:

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

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

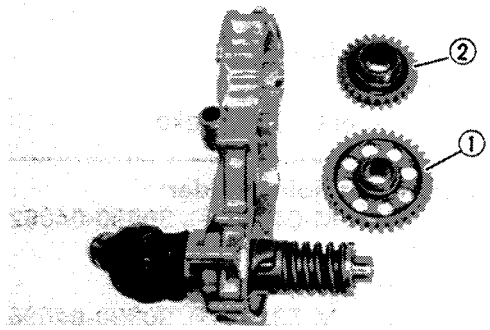
NOTE:

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

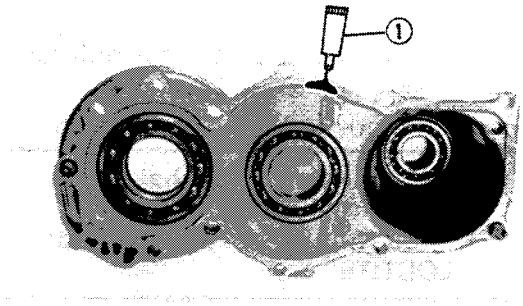


- Install the circlips ③ into the groove of each bearing.

****



12. Install:
- Idle gear ①
- Transfer drive gear ②



13. Apply:
- Sealant ①
  (onto mating surfaces of both case halves)

	Sealant (Quick Gasket®): **P/N. ACC-11001-01** **Yamaha bond No. 1215:** **P/N. 90890-85505**

14. Install:
- Dowel pins
- Transfer gear case (rear)

15. Tighten:
- Bolts (transfer gear case)

	6 mm Bolts (transfer gear case): **10 Nm (1.0 m • kg, 7.2 ft • lb)**

NOTE:

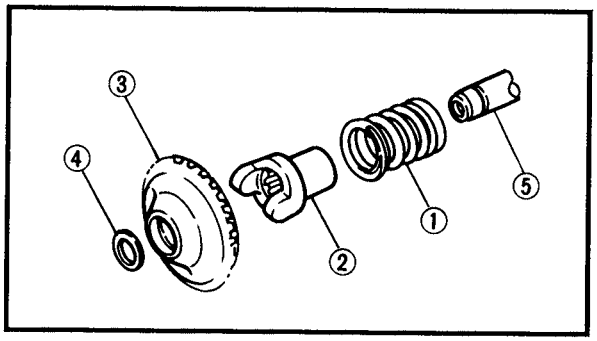
Tighten the bolts in this point, using a criss-cross pattern.

Middle driven shaft (for rear final gear)

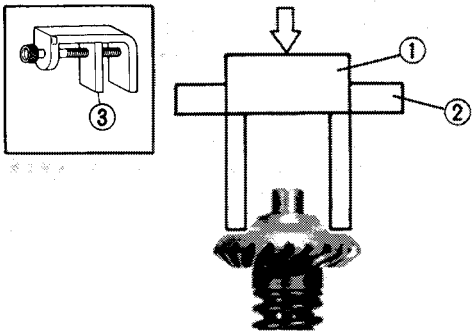
1. Lubricate:
- Oil seal
- O-ring

	Lithium soap base grease

2. Apply:
- 4-stroke engine oil
  (to the middle driven shaft)



3. Install:
- Damper spring ①
- Damper cam ②
- Middle driven gear ③
- Holder ④
  To the middle driven shaft ⑤.



4. Attach:
- Damper spring compressor
- Middle drive gear holder
  Onto the midddle driven gear.

	Damper spring compressor: P/N. YM-33286 ①, 90890-04090 ③ **Middle drive gear holder: P/N. YM-33222 ②**

5. Position:
- Middle driven gear assembly
  Onto a hydraulic press

6. Compress the damper spring on the middle driven gear assembly.

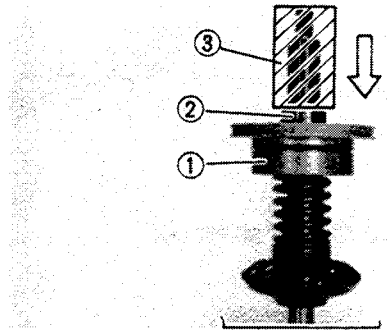
7. Install:
- Retainers
  Into the middle driven shaft groove.

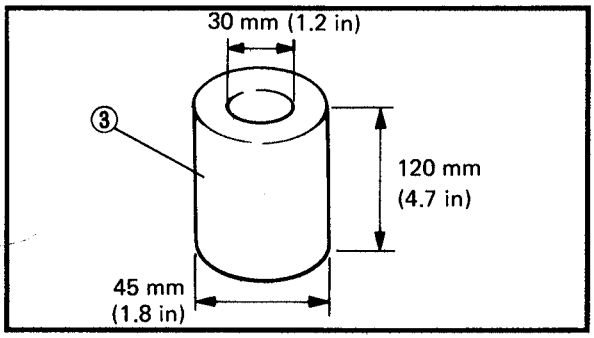
8. Install:
- Bearing housing assembly ①
- Collar ②

****

Bearing housing and collar installation steps:
- Clean the outside of the middle driven shaft and inside of the bearing housing and collar.
- Inspect the collar for damage. If damaged, replace it.
- Fir the bearing housing and collar onto the middle driven shaft.
- Place the middle driven shaft assembly onto a hydraulic press.

CAUTION:
- **Never directly press the collar or bearing housing with a Hydraulic Press, this will result in damage to them.**
- **Install the hand-made tool ③ to protect the collar and bearing housing from damage.**



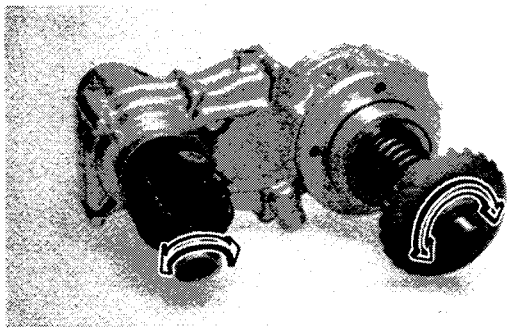


- Press the hand-made tool, and secure the collar and bearing housing.

****

9. Install:
- Middle driven shaft assembly

NOTE:
- Before installing the middle driven shaft, apply the lithium base grease to the oil seals and O-rings.
- Insert the middle driven shaft assembly into the transfer gear case.



10. Check:
- Transfer gear operation
  Unsmooth operation → Repair.

11. Install:
- Yoke
- Washer
- Nut (middle driven shaft - for rear final gear)

  To the middle driven shaft.

12. Attach:
- Universal joint holder
- Attachment

  Onto the universal joint yoke.

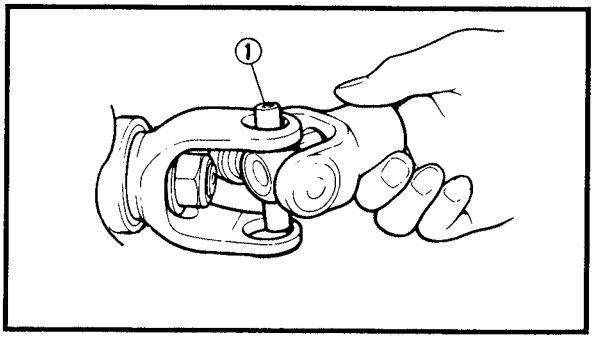
Universal joint holder:
P/N. YM-04062
Attachment:
P/N. YM-332291

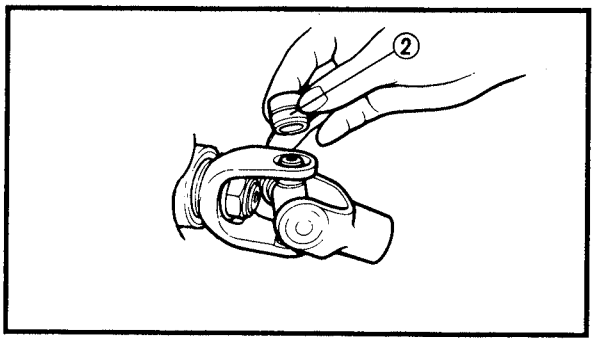
13. Tighten:
- Nut (middle driven shaft - for rear final gear)

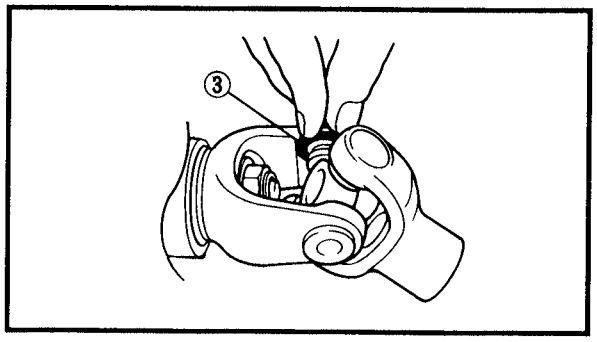
  Torque nut carefully, little by little.

Nut (middle drive shaft - for rear final gear):
90 Nm (9.0 m • kg, 65 ft • lb)
LOCTITE®

14. Install:
- Universal joint







****

Installation steps:
- Install the opposite yoke ① into the U-joint.
- Apply the "wheel bearing grease" to the bearings ②.
- Install the bearing onto the yoke.

CAUTION:

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

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

NOTE:

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

- Install the circlips ③ into the groove of each bearing.

****

15. Install:
- Engine
- Transfer gear assembly
- Middle gear case

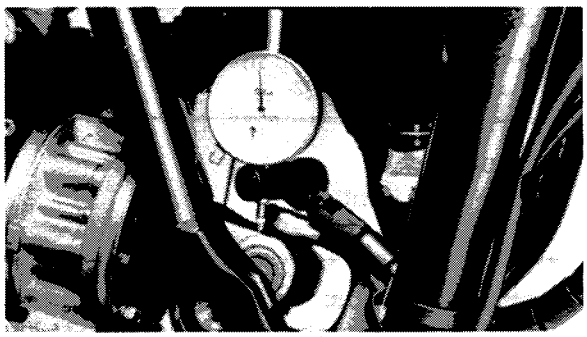
Refer to the "ENGINE ASSEMBLY AND ADJUSTMENT - REMOUNTING ENGINE" section in the CHAPTER 4.

ADJUSTMENT

Middle gear gear lash adjustment

1. Measure:
- Gear lash

	Middle gear lash: **0.1 ~ 0.2 mm (0.004 ~ 0.008 in)**



2. Position:
- Dial gauge

On the outside edge of U-joint.

	Dial gauge: **P/N. YM-03097, 90890-03097**

NOTE:

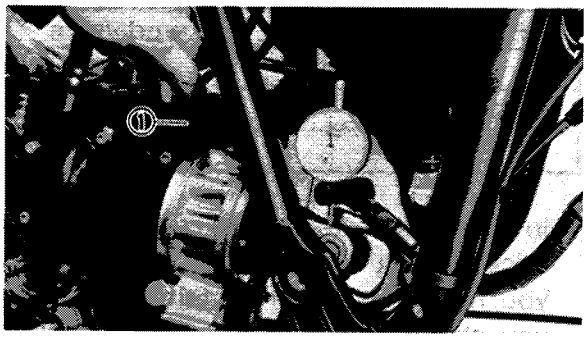
Be sure the gauge is positioned over the centerline of the yoke bearing hole.

3. Rotate:
- U-joint

Rotate it back and forth carefully.

	Middle gear lash: **0.1 ~ 0.2 mm (0.004 ~ 0.008 in)**

If the measured value in step 3 is different than that of the calculated value for shim size on page 6-38, loosen the bearing housing bolts and remove the shim(s) then complete steps 4 ~ 9.



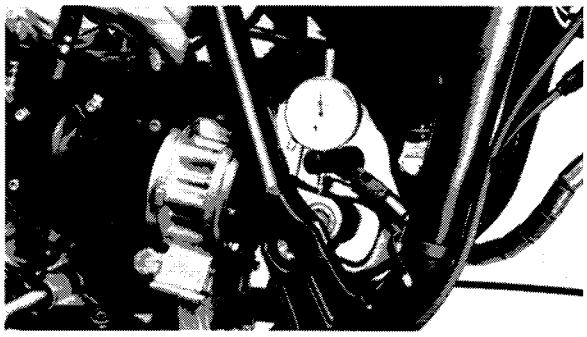
4. Install:
- Bolts (four)
  On driven bearing housing.
  Finger-tighten the bolts.

NOTE:
Clearance between the crankcase and driven bearing housing should be about 2 mm. Measure gap with feeler gauge ①.

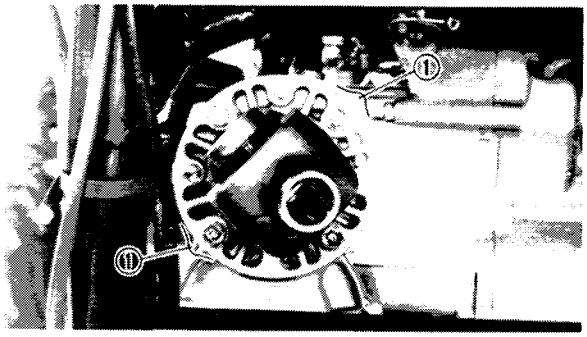
CAUTION:
Do not overtighten bearing housing bolts or you may obtain too little gear lash and cause damage to gears. If over tightened, loosen the 4 bolts so that crankcase/bearing housing clearance is about 2 mm (0.08 in) and repeat all previous steps.

5. Rotate:
- U-joint
  Rotate it back and forth, while carefully tightening the bolts in a crisscross pattern until the dial gauge reads 0.1 ~ 0.2 mm (0.004 ~ 0.008 in).

Middle gear lash:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in).



6. Measure:
- Crankcase/bearing housing clearance
  Use a feeler gauge.



7. Select:
- Shim(s) ①

****

Example: selection of the driven pinion gear shim;
- If the clearance is 0.46 mm.
- The shim can only be selected in 0.05 m increments, round off hundredths digit and select appropriate shim(s).

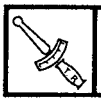
Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6,	5
7, 8, 9	10

- In the example above, the calculated shim thickness is 0.46 mm. The chart instructs you, however, to round off the 6 to 5. Thus you should use 0.15 mm and 0.30 mm shims.
- Shim sizes are supplied in the following thickness.

 Driven pinion gear shim	
Thickness (mm)	0.10 0.15 0.20 0.30 0.40

****

8. Tighten:
- Bolts (bearing housing)

	**Bolts (bearing housing): 25 Nm (2.5 m • kg, 18 ft • lb)**

9. Measure:
- Gear lash

	**Middle gear lash: 0.1 ~ 0.2 mm (0.004 ~ 0.008 in)**

If the gear lash is incorrect → Repeat.

INSTALLATION

Reverse the "REMOVAL" procedure. Note the following points.

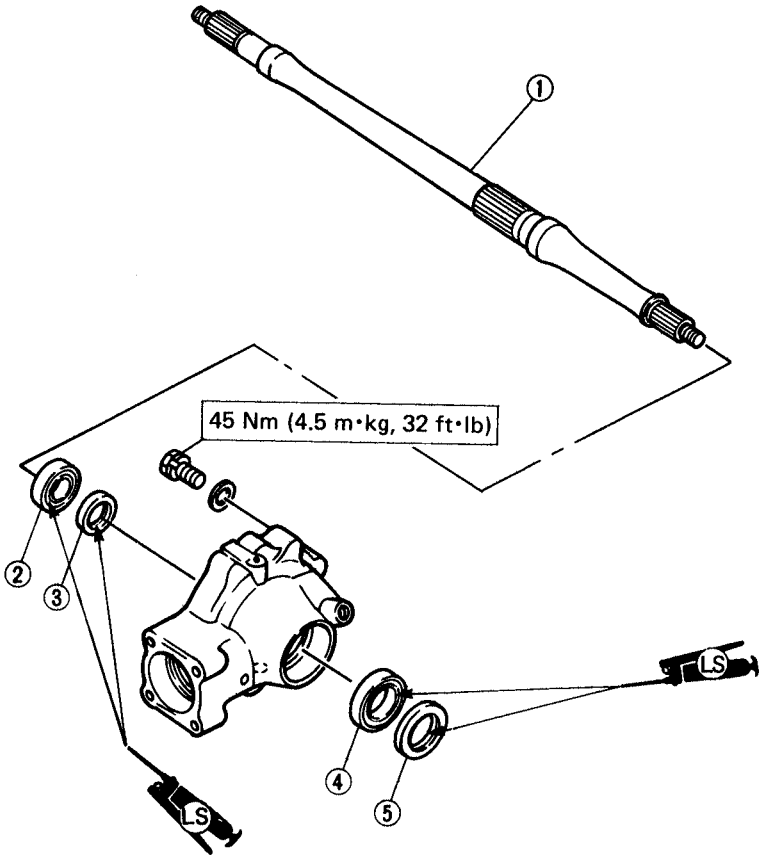
1. Install:
- Rear drive assembly with swingarm
- Rear shock absorber
- Exhaust pipe
- Muffler
- Rear fender
- Rear carrier

Refer to the "ENGINE OVERHAUL - REMOUNTING ENGINE" section in the CHAPTER 4.

REAR AXLE/REAR FINAL GEAR AND REAR DRIVE SHAFT

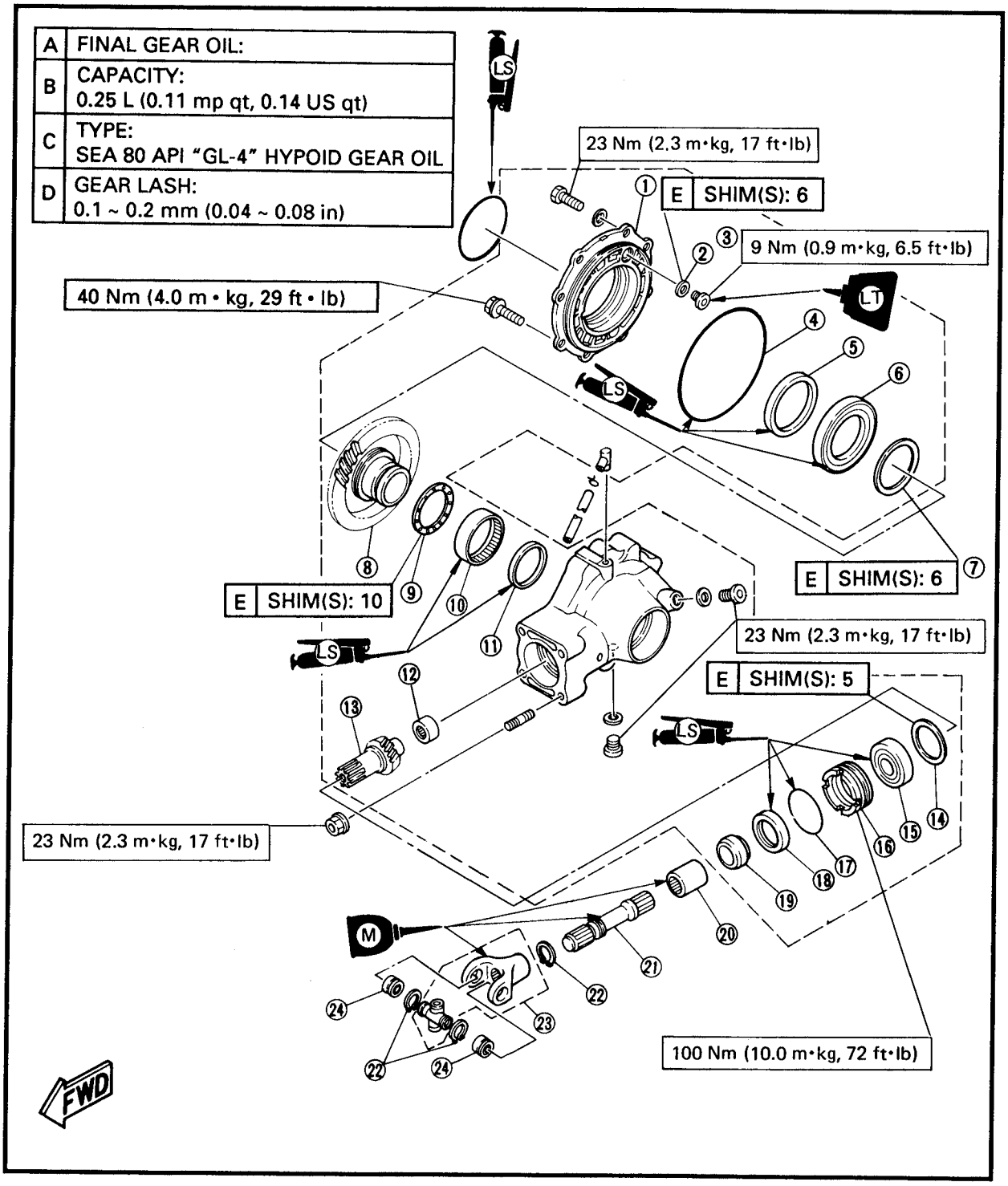
① Rear axle
② Bearing
③ Oil seal
④ Bearing
⑤ Oil seal

A	REAR AXLE RUNOUT LIMIT: 1.5 mm (0.06 in)



FINAL DRIVE GEAR AND DRIVE SHAFT

① Bearing housing
② Ring gear stopper shim
③ Ring gear stopper
④ O-ring
⑤ Oil seal
⑥ Bearing
⑦ Ring gear shim
⑧ Ring gear
⑨ Thrust washer
⑩ Bearing
⑪ Oil seal
⑫ Bearing
⑬ Drive pinion gear
⑭ Final drive gear shim
⑮ Bearing
⑯ Bearing retainer
⑰ O-ring
⑱ Oil seal
⑲ Coller
⑳ Coupling gear
㉑ Drive shaft
㉒ Circlip
㉓ Universal joint
㉔ Bearing

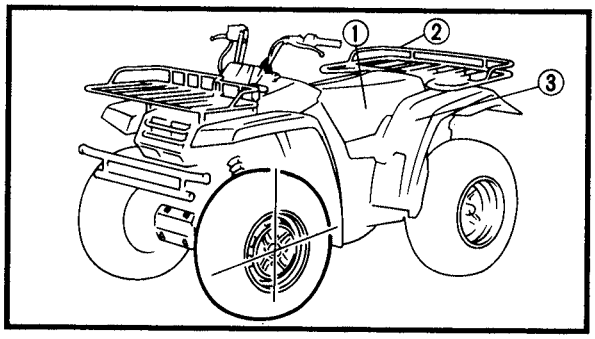


REMOVAL

⚠ WARNING

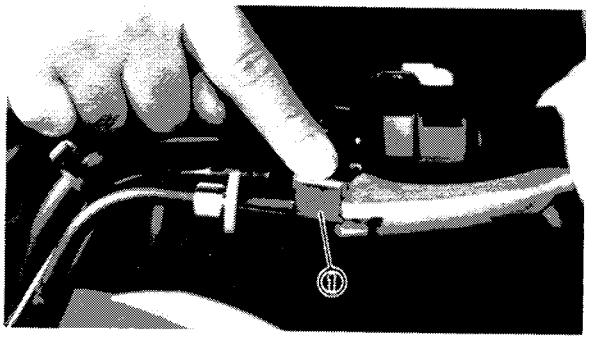
Securely support the machine so there is no danger of it falling over.

1. Place the machine on a level place.



2. Remove:
- Seat ①
- Rear carrier ②
- Rear fender ③

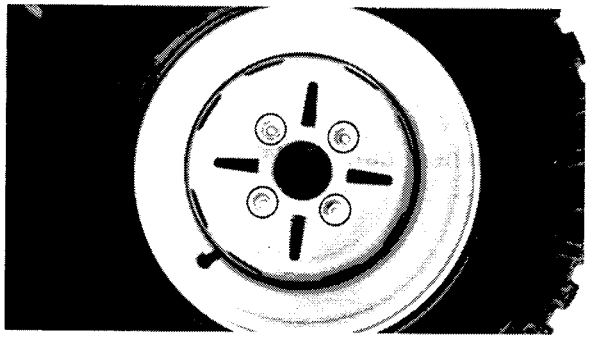
Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.



3. Loosen:
- Nuts (rear wheel)

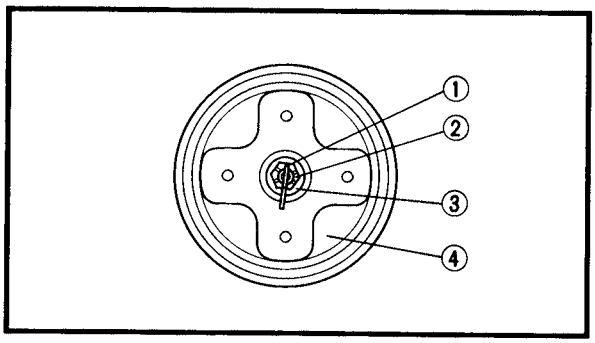
Apply the parking brake ①.

4. Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.

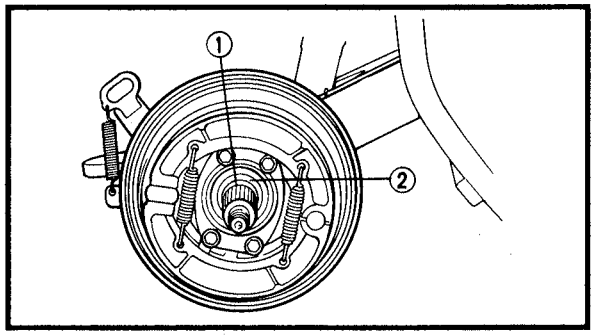


5. Remove:
- Nuts (rear wheel)
- Rear wheel
- Wheel cap

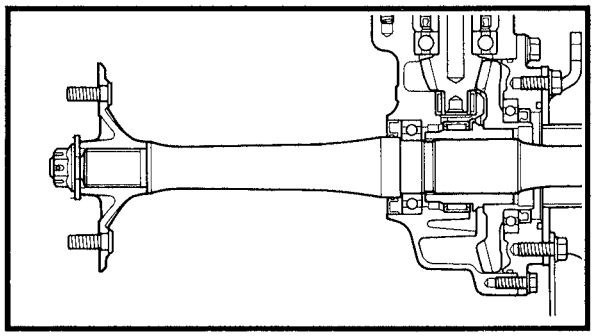
Refer to the "FRONT AND REAR WHEELS - REMOVAL" section in the CHAPTER 7.



6. Remove:
- Cotter pin ①
- Axle nut ②
- Plain washer ③
- Brake drum ④



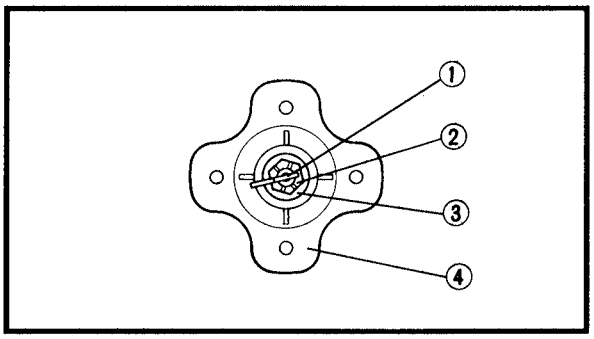
7. Remove:
- O-ring ①
- Plain washer ②



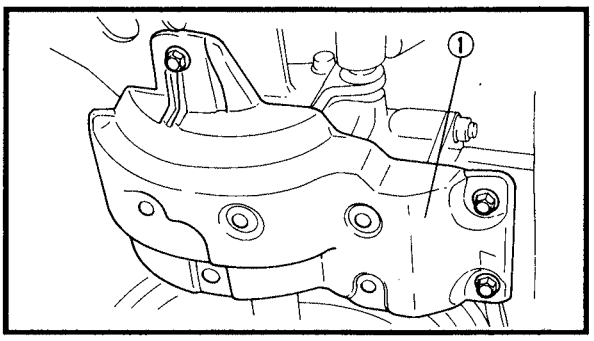
8. Remove:
- Rear axle ① (with rear wheel hub)

CAUTION:

- **Never directly tap the axle end with a hammer, this will result in damage to the axle thread and spline.**
- **Tap the rear wheel hud with a soft hammer. Pull out the rear axle to the left.**

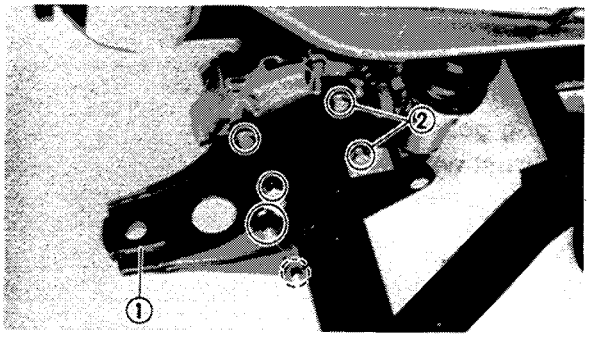


9. Remove:
- Cotter pin ①
- Axle nut ②
- Plane washer ③
- Rear wheel hub ④

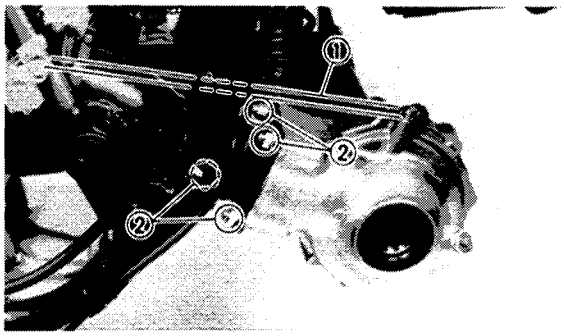


10. Remove:
- Final gear case protector ①

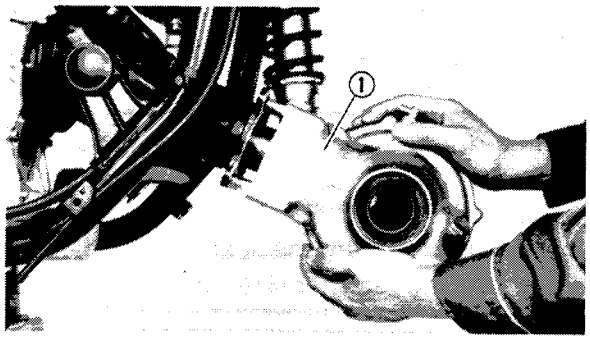
11. Drain:
- Final gear oil
  Refer to the "FINAL GEAR OIL REPLACEMENT" section in the CHAPTER 3.



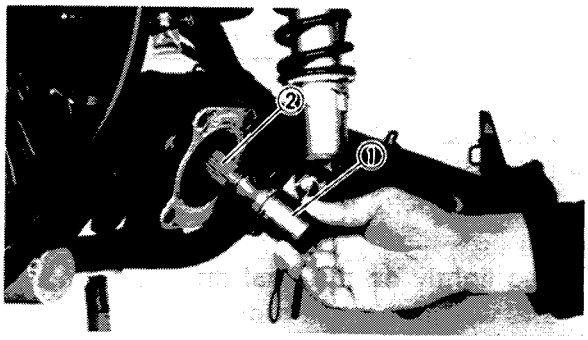
12. Remove:
- Trailer hitch bracket ①
- Bolts ② (rear final gear housing)



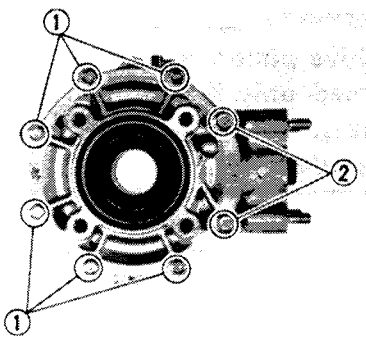
13. Remove:
- Breather hose ① (rear final gear housing)
- Nuts ② (rear final gear housing)



14. Remove:
- Rear final gear assembly ①



15. Remove:
- Coupling gear ①
- Rear drive shaft ②

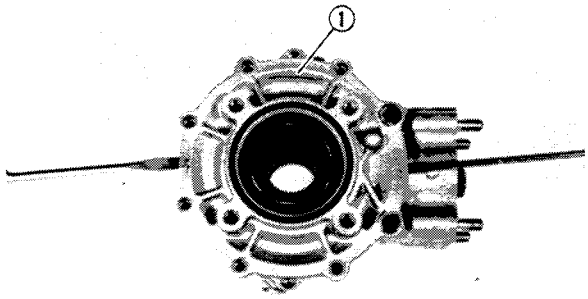


DISASSEMBLY

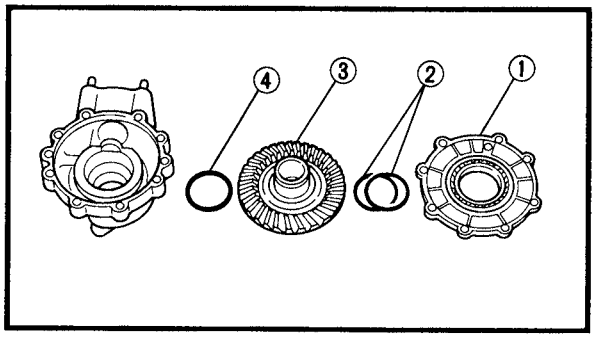
1. Remove:
- Bolts ① (8 mm)
- Bolts ② (10 mm)

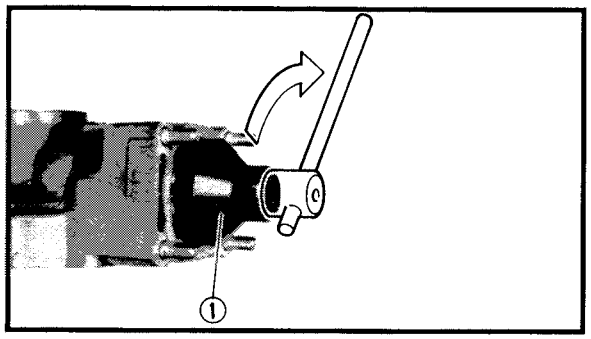
NOTE:

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



2. Remove:
- Bearing housing ①
- Shim(s) ②
- Ring gear ③
- Thrust washer(s) ④

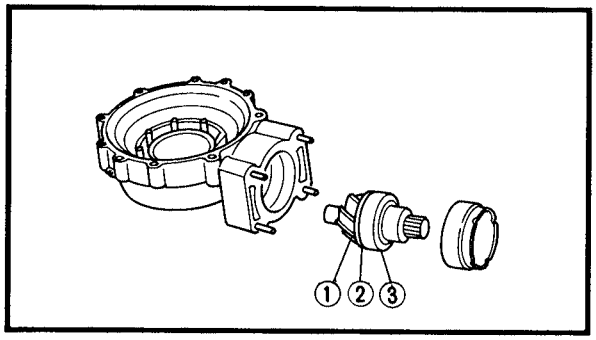




3. Remove:
- Bearing retainer (drive shaft - final)

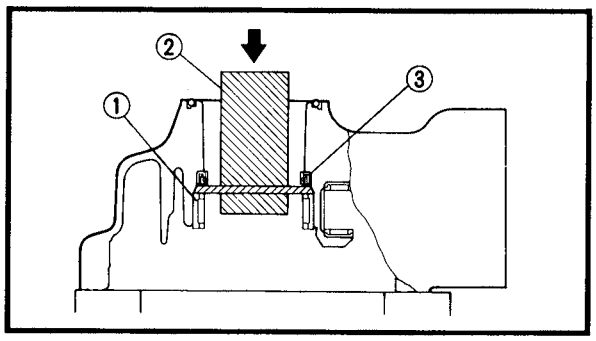
NOTE:
- Final-drive-shaft-bearing-retainer has left-hand threads. Turn retainer clockwise to loosen it.
- When remounting the bearing retainer, use the bearing retainer wrench ①.

	**Bearing retainer wrench; P/N. YM-04050, 90890-04050**

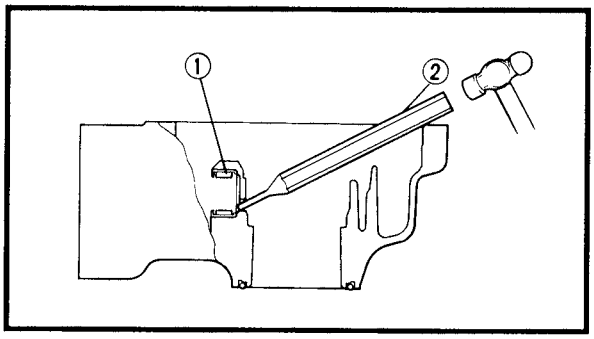


4. Remove:
- Drive pinion gear ①
  (together with the shim(s) ② and bearing ③)
  Tap lightly on the final drive pinion gear end with a soft hammer.

CAUTION:
Final drive pinion gear removal should be performed only if gearing replacement is necessary. Do not reuse bearings or races after removal.



5. Remove:
- Roller bearing ① (ring gear)
  Use a suitable press tool ② and an appropriate support for the main housing.
- Oil seal ③



6. Remove:
- Roller bearing ① (drive pinion gear)

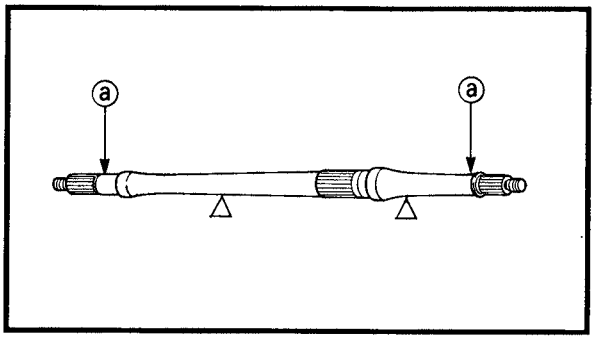
****

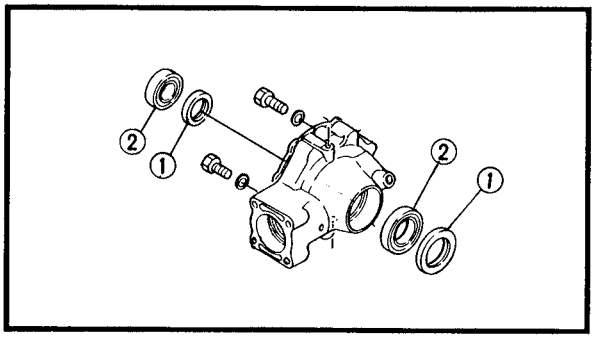
Removal steps:
- Heat the main housing only to 150°C (302°F).
- Remove the roller bearing outer race with an appropriately shaped punch ②.
- Remove the inner race from the final drive shaft.

NOTE:

The removal of the final drive shaft roller bearing is difficult seldom necessary.

****





INSPECTION

1. Inspect:
- Rear axle runout ⓐ
  Out of specification → Replace.

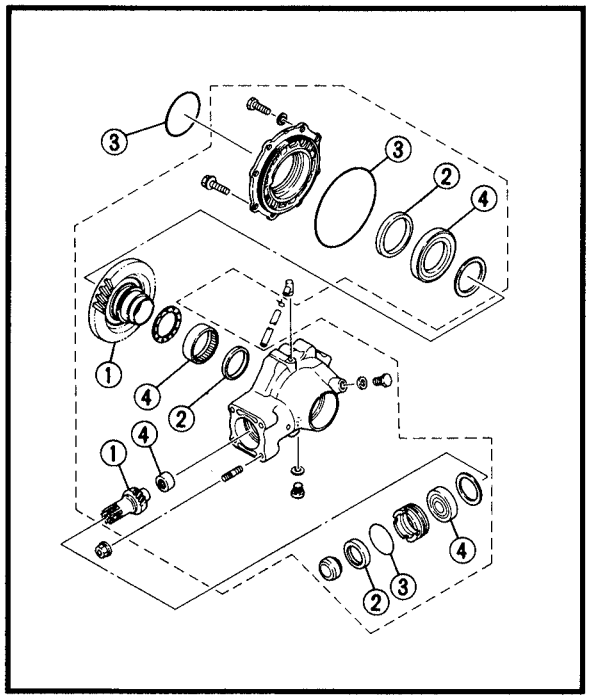
⚠ WARNING

Do not attempt to straighten a bent axle.

Rear axle runout limit:
1.5 mm (0.06 in)

2. Inspect:
- Oil seals ①
  Damage → Replace.

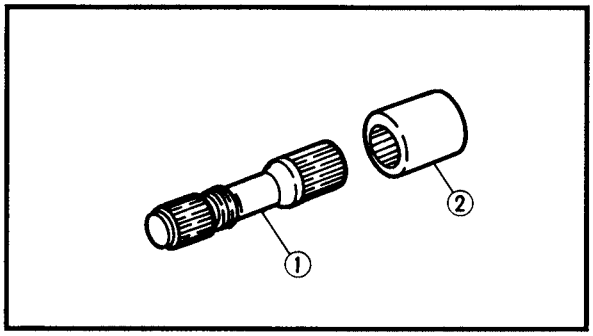
3. Check:
- Bearings ②
  Bearings allow play in the final gear housing and rear hub or rear axle turns roughly → Replace.



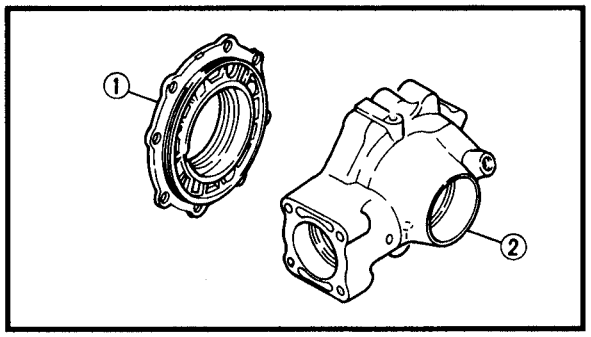
4. Inspect:
- Gear teeth ①
  Pitting/Galling/Wear → Replaced drive pinion gear and ring gear as a set.
- Oil seal ②
- O-ring ③
  Damage → Replace.

5. Inspect:
- Bearings ④
  Damage → Replace.

NOTE:
- Reuse of roller bearing OK, but Yamaha recommends installation of new bearing. Do not reuse the oil seal.
- When the final drive pinion gear and/or ring gear are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear, refer to the "FINAL DRIVE PINION GEAR AND RING GEAR SHIM SELECTION" section.

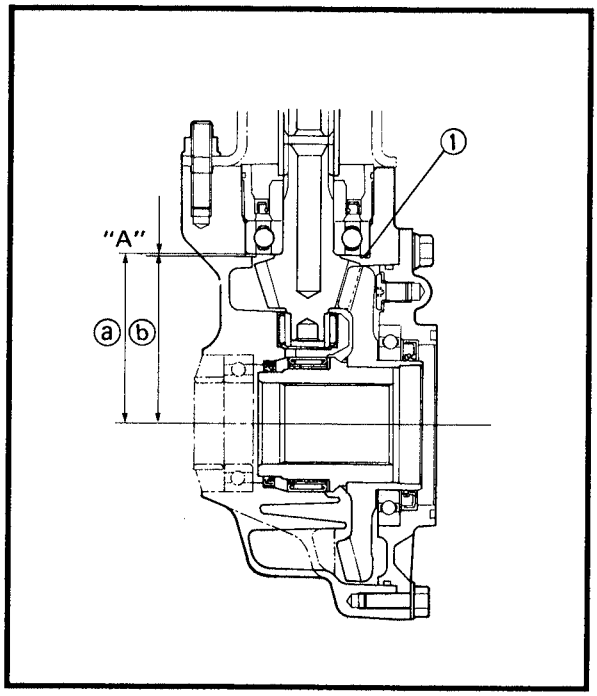


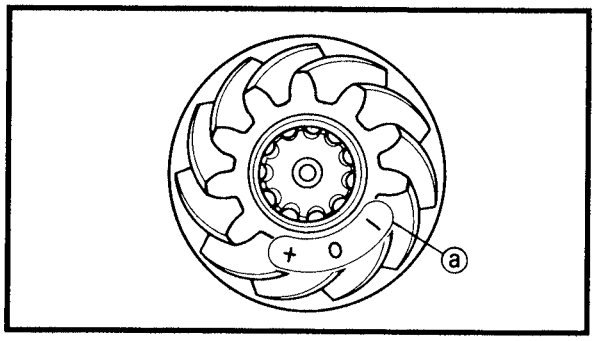
6. Inspect:
- Drive shaft ① (splines)
- Coupling gear ② (spline)
  Wear/Damage → Replace.

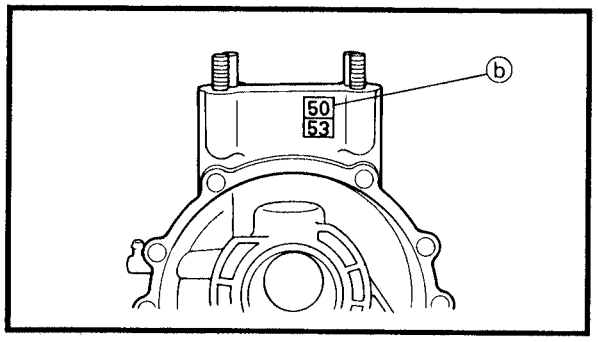


7. Inspect:
- Final gear case ①
- Bearing housing ② (ring gear)
  Cracks/Damage → Replace.

NOTE:
When the final gear case and/or ring gear bearing housing are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear, refer to "FINAL DRIVE PINION GEAR AND RING GEAR SHIM SELECTION" section.







FINAL DRIVE PINION GEAR AND RING GEAR SHIM SELECTION

When the final drive pinion gear, ring gear, final gear case and/or ring gear bearing housing are replaced, be sure to adjust the positions for the final drive pinion gear and ring gear by the shim(s).

Final drive pinion gear shim(s) selection

1. Select:
   - Final drive pinion gear shim(s) ①

****

Shim selection steps:

- To find final drive pinion gear shim thickness "A", use the following formula.

Final drive pinion gear shim thickness:
"A" = ⓐ - ⓑ

ⓐ = a numeral (usually a decimal number) on the final drive pinion gear is either added to or subtracted from "84".

ⓑ = a numeral (usually a decimal number) on the final gear case is either added to or subtracted from "83".

Example:

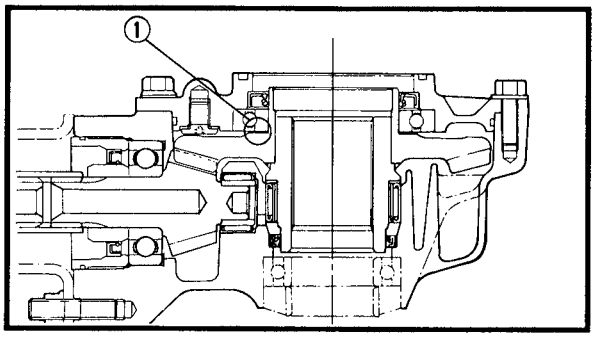
1) If the "+01" is stamped on the final drive pinion gear,
   ⓐ = 84 + 0.01 = 84.01
2) If the "50" is stamped on the final gear case,
   ⓑ = 83 + 0.50 = 83.50
3) Therefore, "A" is 0.51.
   "A" = 84.01 – 83.50
   = 0.51
4) Round off hundredths digit and select appropriate shim(s).
   In the example above, the calculated number is 0.51. The chart instructs you to round off 1 to 0 at the hundredth place. Thus, the shim thickness is 0.50 mm.

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

Shim sizes are supplied in the following thickness.

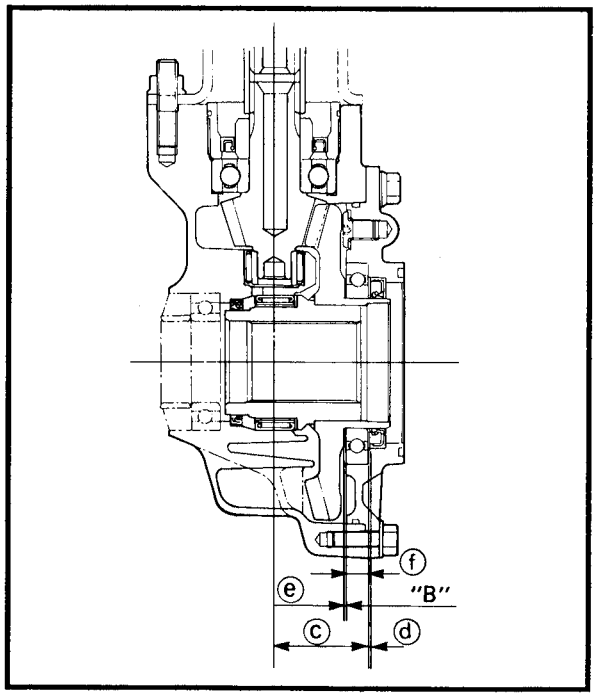
Final drive pinion gear shim		
Thickness (mm)	0.15 0.40 0.50	0.30 0.45 0.60

****



Ring gear shim(s) selection

1. Select:
- Ring gear shim(s) ①



****

Shim selection steps:

- To find ring gear shim thickness "B", use the following formula.

Ring gear shim thickness:
"B" = ⓒ + ⓓ − (ⓔ + ⓕ)

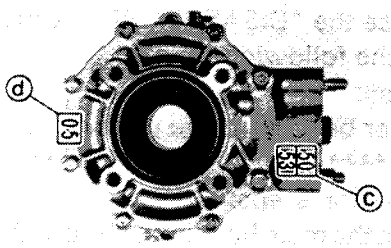
ⓒ = a numeral (usually a decimal number) on the final gear case is either added to or subtracted from 45.

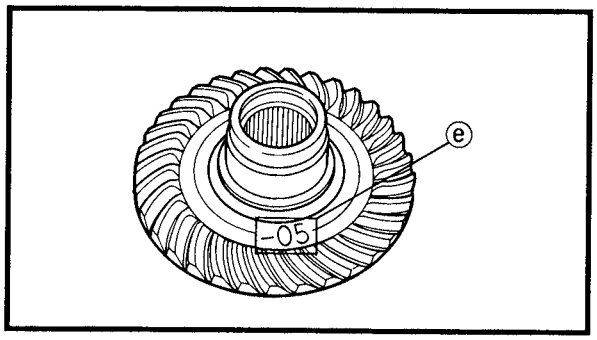
ⓓ = a numeral (usually a decimal number) on outside of ring gear bearing housing and added to 1.

ⓔ = a numeral (usually a decimal number) on inside of ring gear either added to or subtracted from 35.00.

ⓕ = bearing thickness (considered constant).

Bearing thickness ⓕ :
11.00 mm





Example:

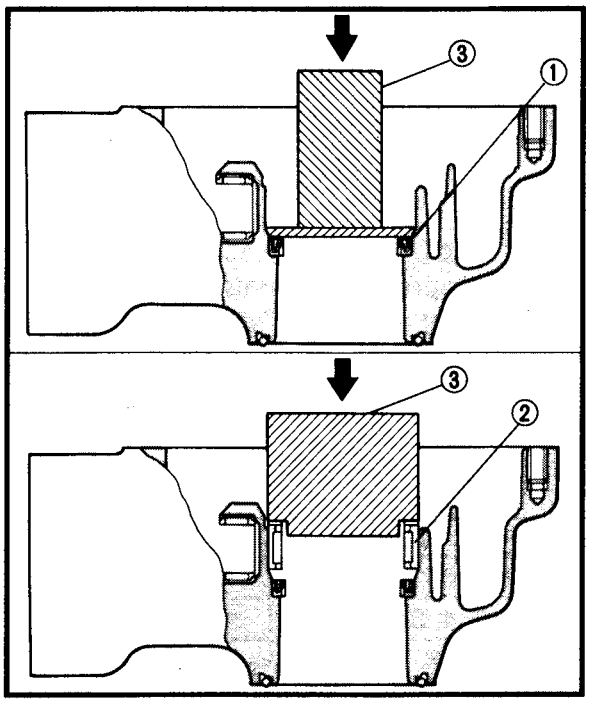
1) If the "53" is stamped on the final gear case,
   ⓒ = 45 + 0.53 = 45.53
2) If the "05" is stamped on the ring gear bearing housing,
   ⓓ = 1 + 0.05
   = 1.05
3) If the "–05" is stamped on the ring gear,
   ⓔ = 35 – 0.05
   = 34.95
4) ⓕ = is 11.00.
5) Therefore, shim thickness "B" is,
   "B" = 45.53 + 1.05 – (34.95 + 11.00)
   = 46.58 – 45.95
   = 0.63
6) Round off hundredths digit and select appropriate shim(s).
   In the example above, the calculated number is 0.63. The chart instructs you to round off the 3 to 5 at the hundredth place.
   Thus, the shim thickness is 0.65 mm.

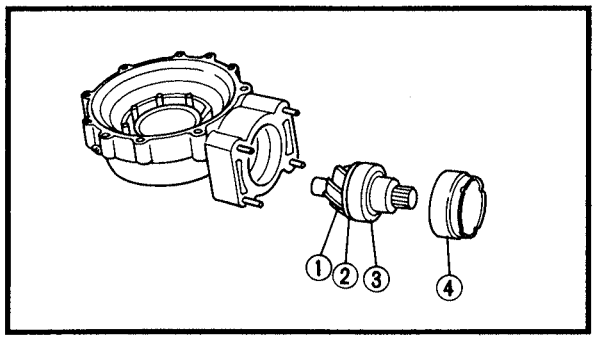
Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

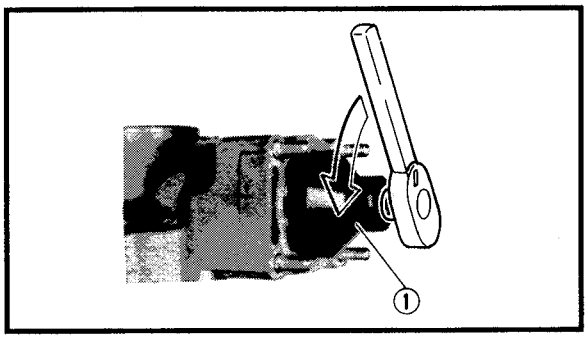
Shim sizes are supplied in the following thickness.

Ring gear shim			
Thickness (mm)	0.25 0.40	0.30 0.45	0.35 0.50

****







ASSEMBLY

Reverse the "DISASSEMBLY" procedures.
Note the following points.

1. Install:
- Roller bearing (drive pinion gear)

****

Installation steps:
- Heat the main housing only to 150°C (302°F).
- Install the roller bearing outer race using the proper adapted.
- Install the inner race onto the drive shaft.

****

2. Install:
- Oil seal ①
- Roller bearing ② (outer race)
  Use a suitable press tool ③ and a press to install the above components into the main housing.

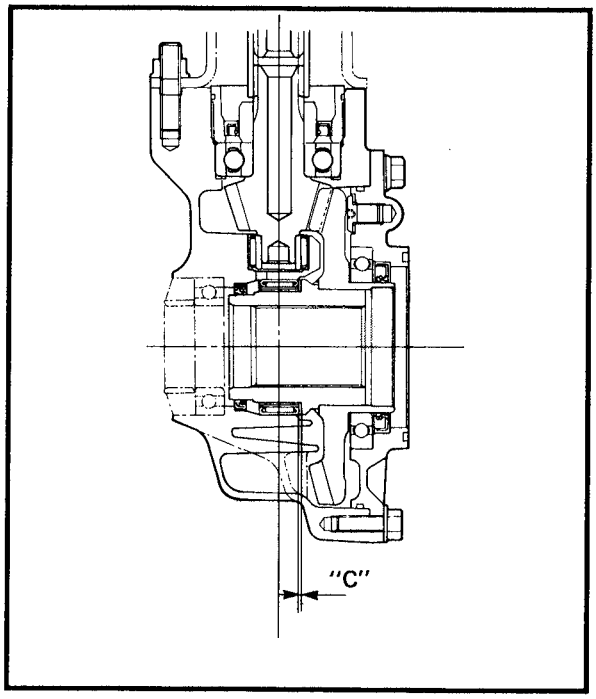
⚠ WARNING

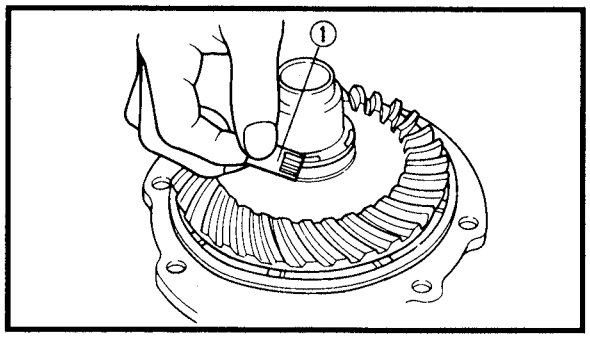
Always use a new oil seal.

3. Install:
- Drive pinion gear ① (with shim(s) ② and bearing ③)
  Shim(s) → (proper size as calculated)
- Bearing retainer ④ (drive pinion gear)

NOTE:
- The bearing retainer has left-hand threads; turn retainer counterclockwise to tighten it.
- Before installing the bearing retainer, apply the grease to the O-ring.
- When installing the bearing retainer, use the Bearing Retainer Wrench①.

	Bearing retainer wrench: P/N. YM-04050, 90890-04050
	Bearing retainer: 100 Nm (10.0 m • kg, 72 ft • lb)





Thrust washer selection

1. Measure/select:
- Ring gear thrust clearance "C"

****

Thrust clearance measurement steps:

- Place four pieces of Plastigauge® between originally fitted thrust washer and ring gear.
- Install the ring gear assembly and tighten the bolts to specification.

8 mm Bolts (bearing housing):
23 Nm (2.3 m • kg, 17 ft • lb)
10 mm Bolts (bearing housing):
40 Nm (4.0 m • kg, 29 ft • lb)

NOTE:

Do not turn the shaft drive and ring gear when measuring clearance with Plastigauge®.

- Remove the ring gear assembly.
- Measure the thrust clearance. Calculate width of flattened Plastigauge® ①.

Ring gear thrust clearance:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

- If the out of specification, select the correct washer.

Thrust washer selection steps:

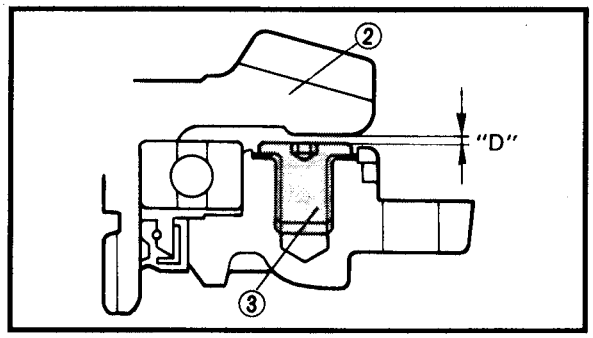
- Select the suitable thrust washer by the following chart.

Thrust washer	
Thickness (mm)	**1.0 1.1 1.2** **1.3 1.4 1.5** **1.6 1.7 1.8** **1.9 2.0 2.1**

- Repeat measurement steps until the ring gear thrust clearance is within the specified limits.

Ring gear thrust clearance:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

****

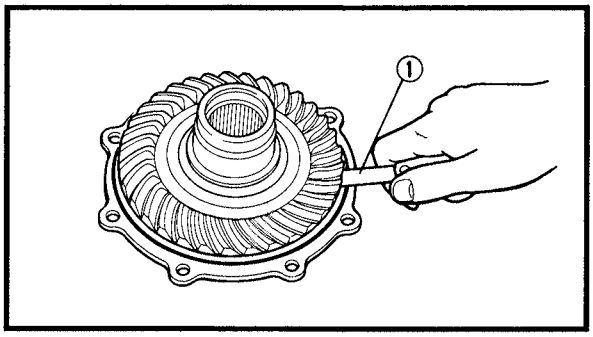


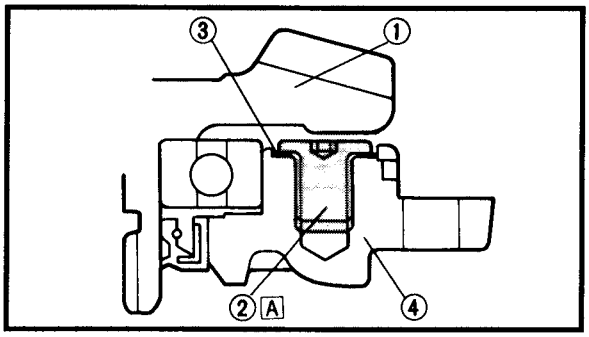
Ring Gear Stopper Shim Selection

1. Measure:
- Ring gear stopper clearance "D"
  Use the Feeler Gauge ①.
  Out of specification → Adjust.

	Ring gear stopper clearance "D": **0.30 ~ 0.60 mm (0.012 ~ 0.024 in)**

② Ring gear stopper
③ Ring gear





Ring gear stopper clearance adjustment

1. Remove:
- Ring gear ①
- Ring gear stopper ②
- Shim(s) ③

④ Bearing housing
A Left-hand-threads

2. Select:
- Suitable shim(s)

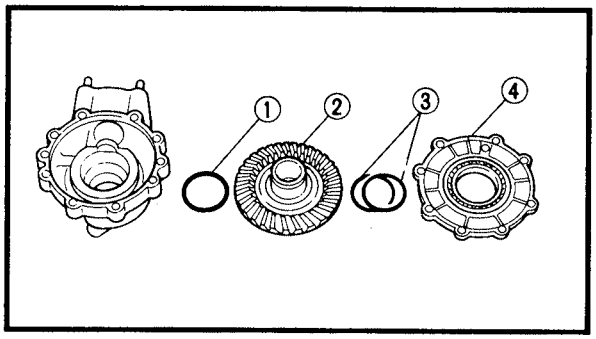
	Shim	
Thickness (mm)	**0.10** **0.20** **0.40**	**0.15** **0.30** **0.50**

3. Install:
- Shim(s)
- Ring gear stopper (left-hand-threads)
- Ring gear

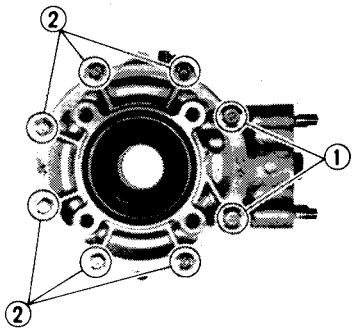
	Ring gear stopper: **9 Nm (0.9 m • kg, 6.5 ft • lb)**

4. Measure:
- Ring gear stopper clearance.
  Out of specification → Repeat.

	Ring gear stopper clearance: **0.30 ~ 0.60 mm (0.012 ~ 0.024 in)**



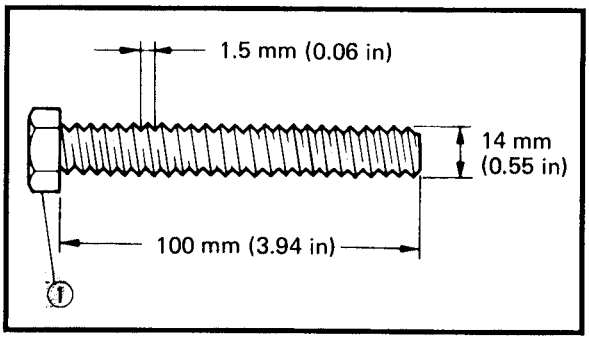
5. Install:
- Thrust washer(s) ①
- Ring gear ②
- Shim(s) ③ (proper size as calculated)
- Bearing housing ④

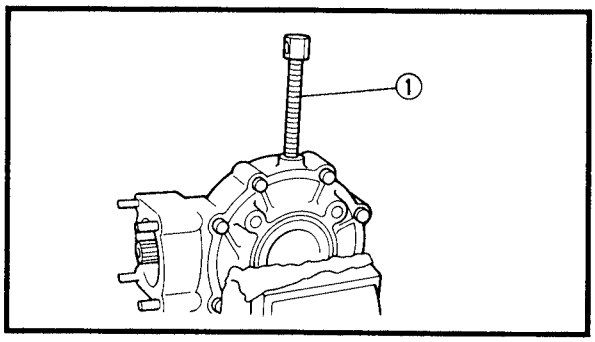


6. Install:
- 10 mm Bolts ① (bearing housing)
- 8 mm Bolts ② (bearing housing)

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

10 mm Bolts (bearing housing):
40 Nm (4.0 m • kg, 29 ft • lb)
8 mm Bolts (bearing housing):
23 Nm (2.3 m • kg, 17 ft • lb)



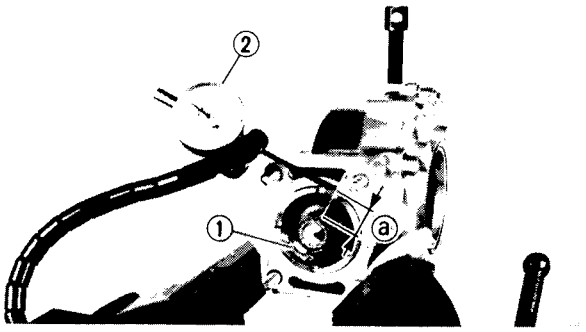


FINAL GEAR GEAR LASH MEASUREMENT AND ADJUSTMENT

Final gear gear lash measurement

1. Secure the gear case in a vise or other support.
2. Remove:
- Drain plug
- Gasket
3. Install:
- A bolt of the specified size ①
  Into the drain plug hole.

CAUTION:
Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damage.



4. Attach:
- Gear lash measurement tool ①
- Dial gauge ②

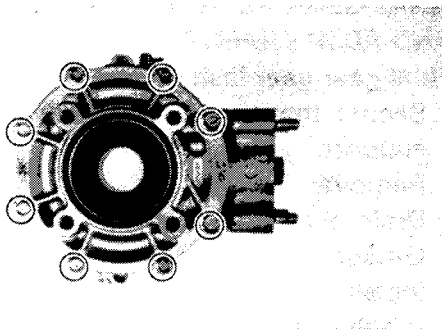
Gear lash measurement tool:
P/N. YM-01231, 90890-01231
Dial gauge:
P/N. YU-03097, 90890-03097

ⓐ Measuring point

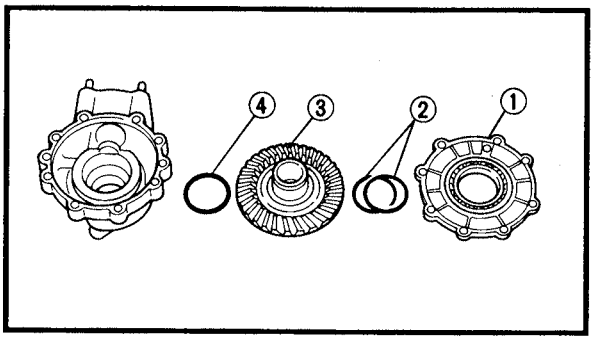
5. Measure:
- Gear lash
  Gently rotate the gear coupling from engagement to engagement.
  If the measured value in step 5 is different than that of the calculated value for shim size on page 6-59, repeat the following steps using the measured value in step 5.

Final gear gear lash:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

NOTE:
Measure the gear lash at 4 positions Rotate the shaft 90° each time.



Final gear gear lash adjustment
1. Remove:
- 8 mm Bolts (bearing housing):
- 10 mm Bolts (bearing housing):
  Refer to the "REAR AXLE/REAR FINAL GEAR AND REAR SHAFT DRIVE - DISASSEMBLY" section.



2. Remove:
- Bearing housing ①
- Shim(s) ②
- Ring gear ③
- Thrust washer ④
  Refer to the "REAR AXLE/REAR FINAL GEAR AND REAR SHAFT DRIVE - DISASSEMBLY" section.

3. Adjust:
- Gear lash

****

Gear lash adjustment steps:
- Select the suitable shim(s) and thrust washer(s) by the following chart.

Too-little gear lash →
Reduce shim thickness.
Too-large gear lash →
Increase shim thickness.

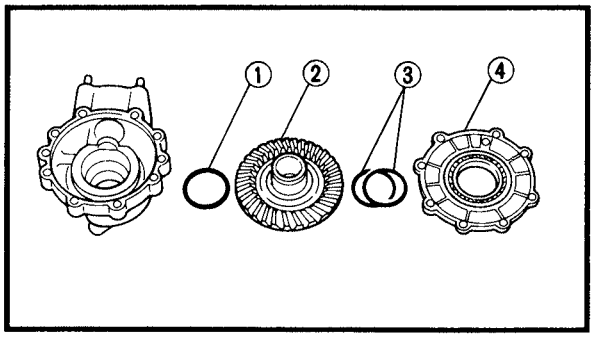
To add or reduce ring gear shim thickness	
Increase by more than 0.1 mm (0.004 in)	Reduce by more than 0.1 mm (0.004 in)

Reduce thrust washer thickness by 0.1 mm (0.004 in) for every 0.1 mm of ring gear shim increase. → **Reverse procedure**

Ring gear shim	
Thickness (mm)	0.25 0.30 0.35 0.40 0.45 0.50

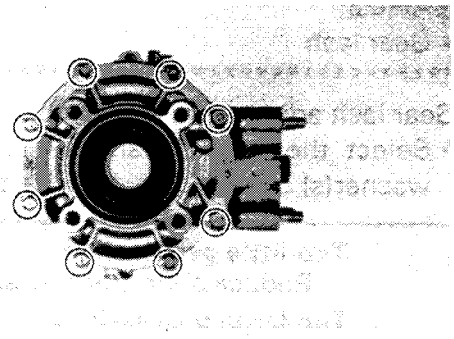
Thrust Washer	
Thickness (mm)	1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1

****



4. Install:
- Thrust washer(s) ①
- Ring gear ②
- Shim(s) ③
- Bearing housing ④

Refer to the "REAR AXLE/REAR FINAL GEAR AND REAR SHAFT DRIVE - ASSEMBLY" section..



5. Install:
- 10 mm Bolts (bearing housing)
- 8 mm Bolts (bearing housing)

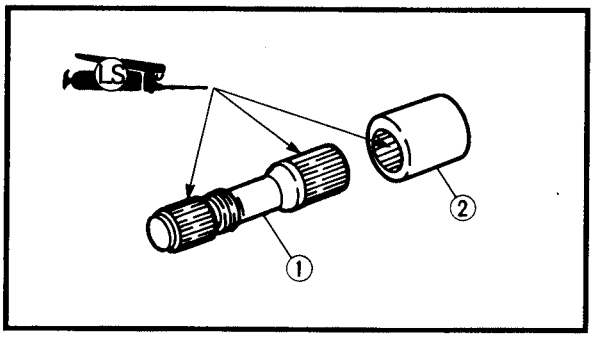
10 mm Bolts (bearing housing):
40 Nm (4.0 m • kg, 29 ft • lb)
8 mm Bolts (bearing housing):
23 Nm (2.3 m • kg, 17 ft • lb)

Refer to the "REAR AXLE/REAR FINAL GEAR AND REAR SHAFT DRIVE - ASSEMBLY" section.

6. Measure:
- Gear lash

If the gear lash is incorrect → Repeat.

Final gear lash:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

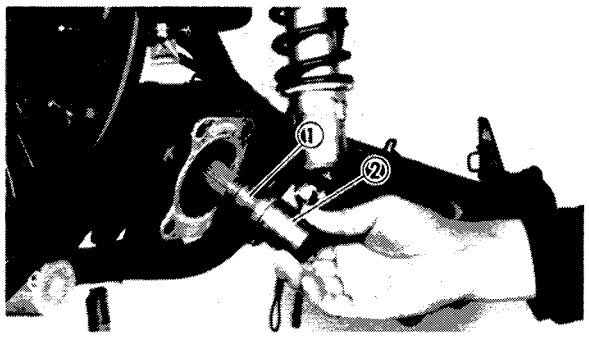


INSTALLATION

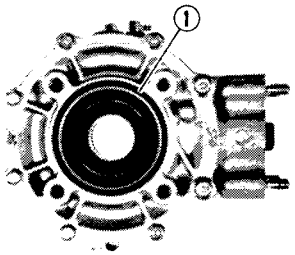
Reverse the "REMOVAL" procedures. Note the following points.

1. Lubricate:
- Drive shaft ① (splines)
- Coupling gear ② (spline)

Lithium soap base grease

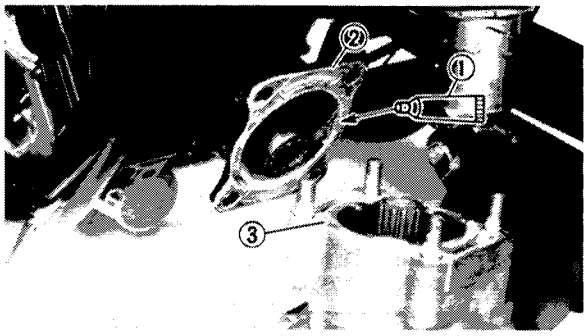


2. Install:
- Drive shaft ①
- Coupling gear ②
  (to universal joint)



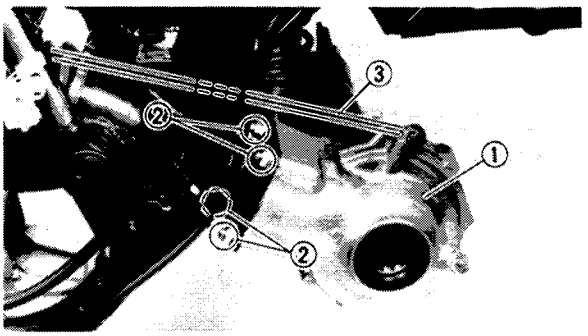
3. Lubricate:
- O-ring ①
- Oil seal
- Bearing

Lithium soap base grease

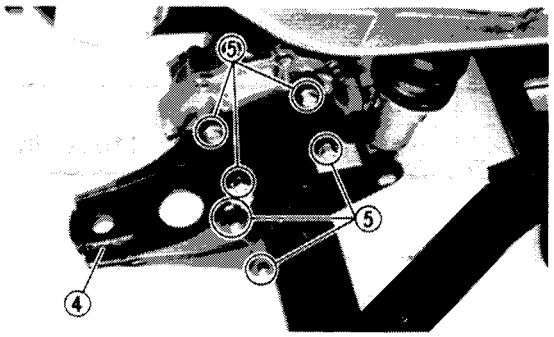


4. Apply:
- Sealant ①
  (to matching surfaces of swingarm ② and final gear case ③)

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

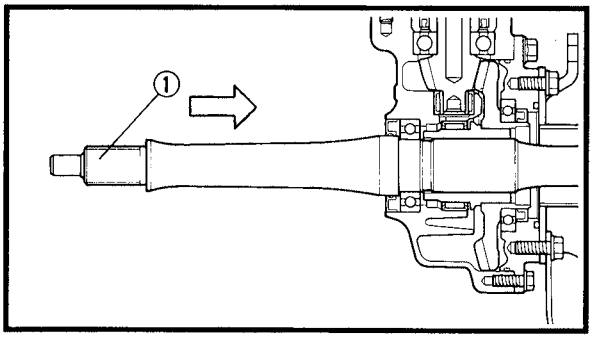


5. Install:
- Rear final gear assembly ①
- Nuts ②
- Breather hose ③
- Trailer hitch bracket ④
- Bolts ⑤



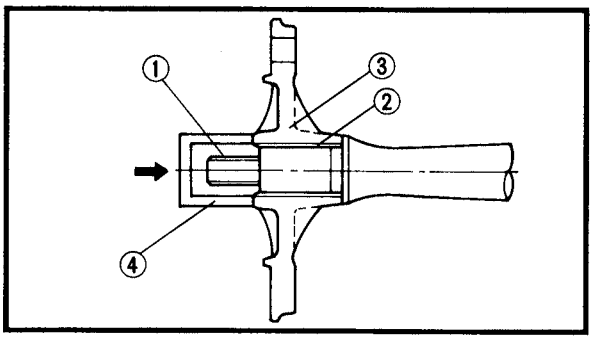
6. Tighten:
- Nuts ②
- Bolts ⑤

Nuts ② (bearing housing - swingarm):
45 Nm (4.5 m • kg, 32 ft • lb)
Bolts ⑤ (gear housing - swingarm):
23 Nm (2.3 m • kg, 17 ft • lb)



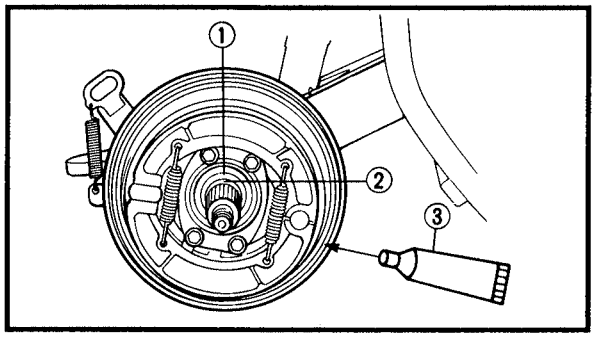
7. Install:
- Final gear case protector

8. Install:
- Rear axle ①
  Tap the LEFT END axle while checking the ring gear engagement.



CAUTION:

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



9. Install:
- Plain washer ①
- O-ring ②

10. Apply:
- Yamaha brake grease (to the dust seal)

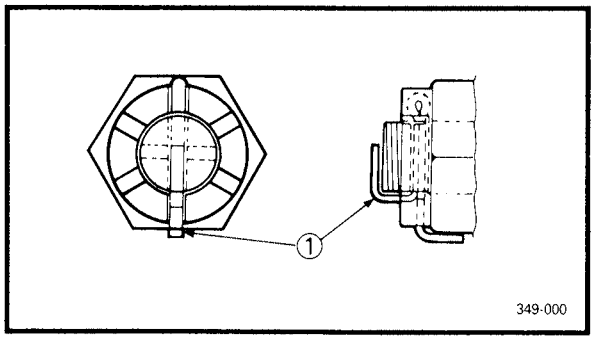
Yamaha brake grease ③:
P/N. 90793-40003

11. Install:
- Rear brake drum
- Rear wheel hub

Refer to the "FRONT AND REAR WHEELS" section in the CHAPTER 7.

12. Tighten:
- Axle nut (rear wheel)

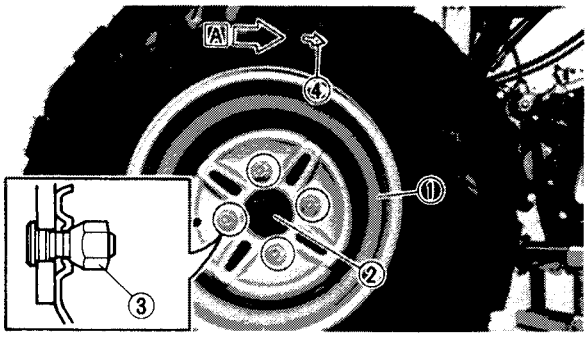
Axle Nut (rear wheel):
150 Nm (15 m • kg, 110 ft • lb)



13. Install:
- Cotter pin ① (new)

NOTE:
Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

⚠ WARNING
Always use a new cotter pin.



14. Install:
- Rear wheels ①
- Caps ②

NOTE:
The arrow mark ④ on the tire must point toward the direction of rotation [A] of the wheel.

15. Tighten:
- Nuts ③ (rear wheel)

⚠ WARNING

Tapered wheel nuts ③ are used for both front and rear wheels. Install the nut with its tapered side towards the wheel.

	Nuts (rear wheel): **55 Nm (5.5 m • kg, 40 ft • lb)**

16. Fill:
- Final gear case
  Refer to the "FINAL GEAR OIL REPLACEMENT" section in the CHAPTER 3.

	Total amount: **0.25 L (0.22 Imp qt, 0.26 US qt)** **Recommended oil:** **SAE 80 API "GL-4" Hypoid gear oil**

17. Install:
- Rear fender
- Rear carrier
- Seat
  Refer to the "SEAT, CHARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

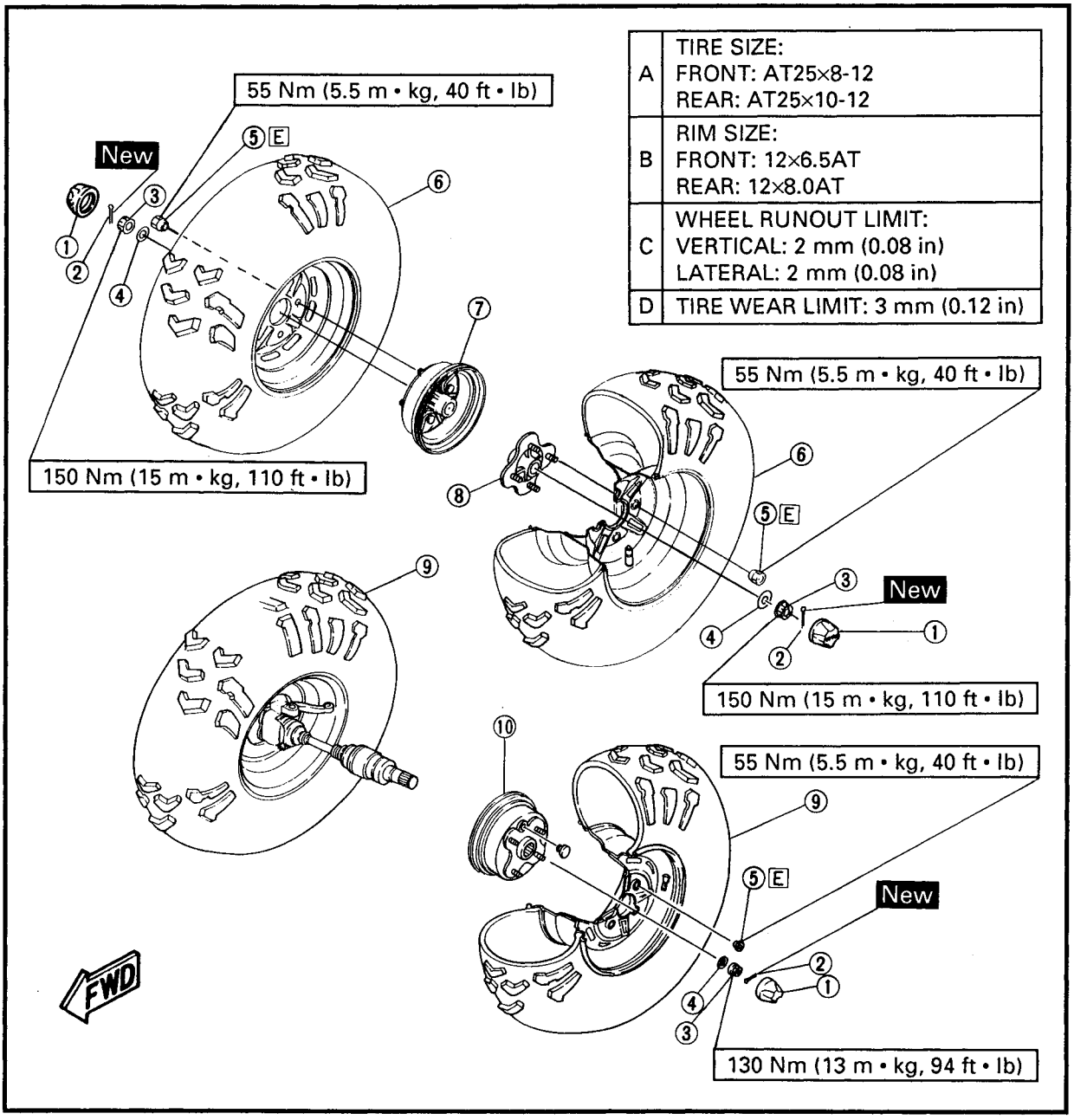
CHASSIS

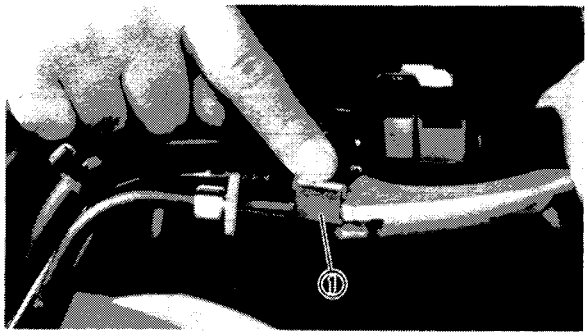
FRONT AND REAR WHEELS

① Wheel cap
② Cotter pin
③ Axle nut
④ Plain washer
⑤ Wheel nut
⑥ Rear wheel
⑦ Rear brake drum
⑧ Rear wheel hub
⑨ Front wheel
⑩ Front brake drum

E Tapered wheel nuts are used for both front and rear wheels. Install the nut with its tapered side towards the wheel.

TIRE AIR PRESSURE		
Cold Tire Pressure	Front	Rear
Standard	20 kPa (0.20 kg/cm², 2.8 psi)	25 kPa (0.25 kg/cm², 3.6 psi)
Minimum	17 kPa (0.17 kg/cm², 2.4 psi)	22 kPa (0.22 kg/cm², 3.2 psi)
Maximum	23 kPa (0.23 kg/cm², 3.2 psi)	28 kPa (0.28 kg/cm², 3.9 psi)



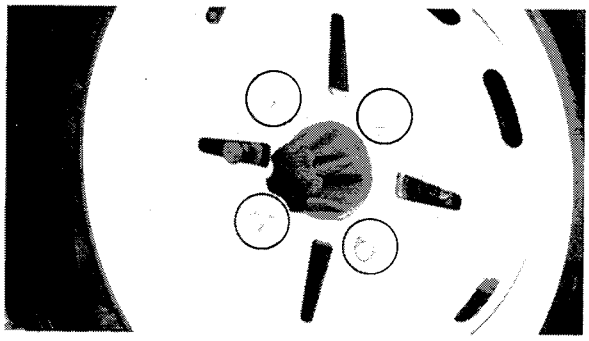


REMOVAL

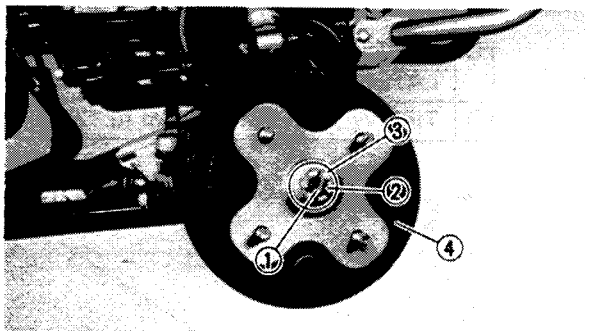
Front wheel removal

1. Place the machine on a level place.
2. Loosen:
   - Nuts (front wheel)

   Apply the parking brake ①.
3. Block the rear wheels, and elevate the front wheels by placing the suitable stand under the frame.



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

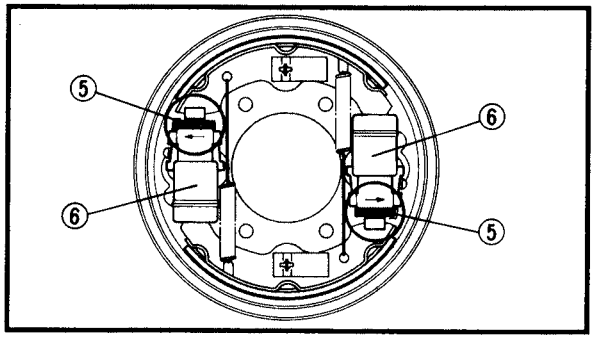


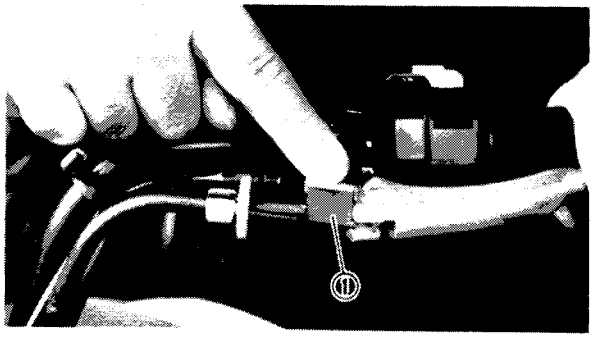
Front brake drum removal

1. Remove:
   - Cotter pin ①
   - Axle nut ②
   - Plain washer ③
   - Brake drum ④

NOTE:

If the brake drum is difficult to removal, turn the adjusters ⑤ on both wheel cylinders ⑥ in the direction opposite to the arrow.

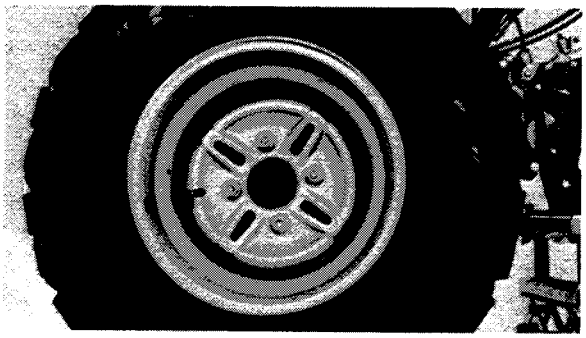




Rear wheel removal

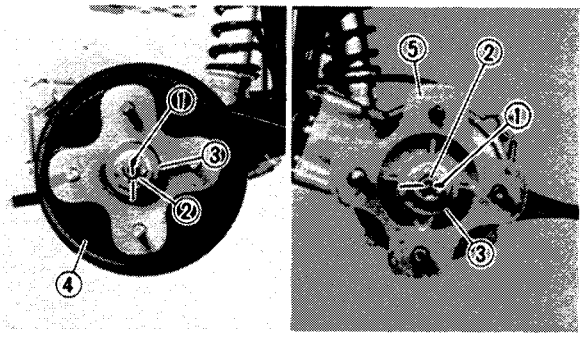
1. Place the machine on a level place.
2. Loosen:
   - Nuts (rear wheel)

   Apply the parking brake ①.
3. Block the front wheels, and elevate the rear wheels by placing the suitable stand under frame.



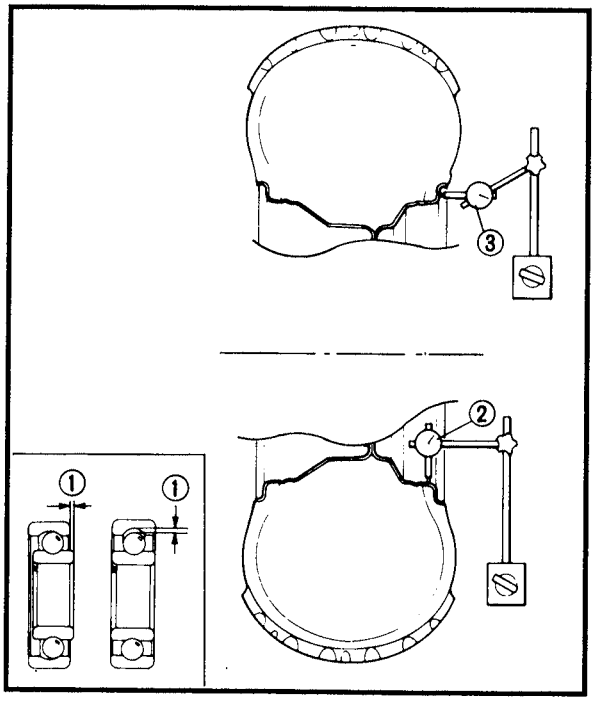
4. Remove:
- Nuts (rear wheel)
- Rear wheel
- Wheel cap

Refer to the "FRONT WHEEL REMOVAL" section.



Rear wheel hub and brake drum

1. Remove:
- Cotter pin ①
- Axle nut ②
- Plain washer ③
- Brake drum ④
- Wheel hub ⑤



INSPECTION

1. Inspect:
- Wheel

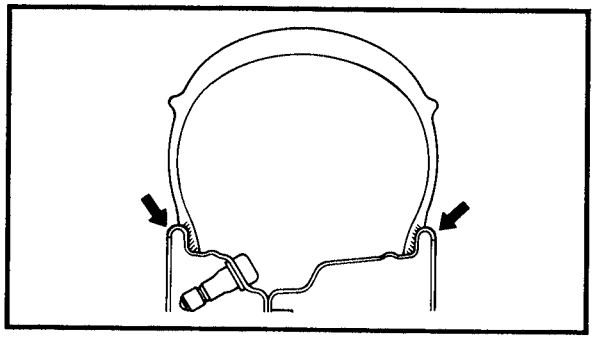
2. Measure:
- Wheel runout

Over specified limit → Replace wheel or check bearing play ①.

Rim runout limits:
Vertical ②: 2.0 mm (0.08 in)
Lateral ③: 2.0 mm (0.08 in)

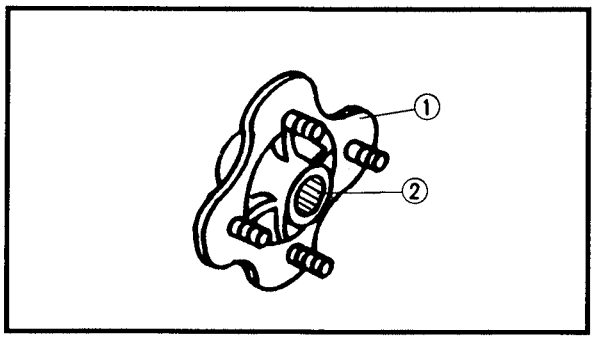
3. Check:
- Wheel balance

Out of balance → Adjust.

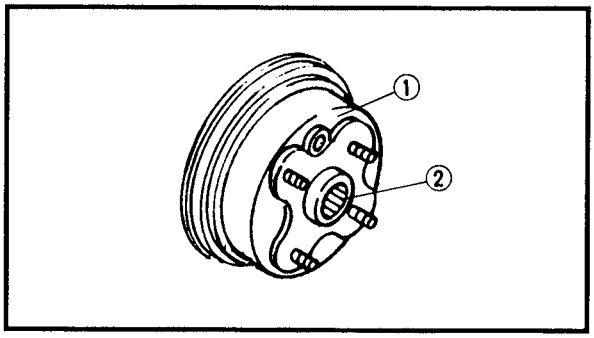


⚠ WARNING

After replacing the tire, ride conservatively to allow the tire to be properly seated in the rim. Failure to do so may cause an accident resulting in machine damage and possible operator injury.



4. Inspect:
- Wheel hub ①
  Cracks/Damage → Replace.
- Splines ② (wheel hub)
  Wear/Damage → Replace.



5. Inspect:
- Brake drum ①
  Cracks/Damage → Replace.
- Splines ② (wheel drum)
  Wear/Damage → Replace.

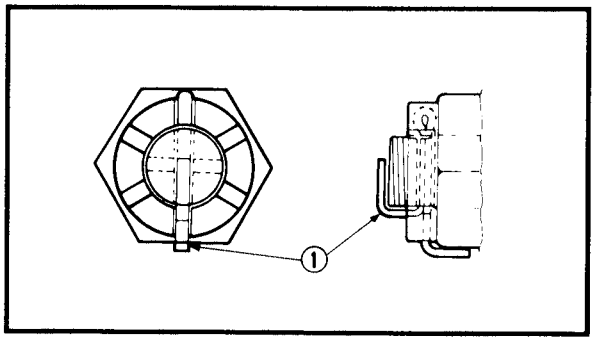
INSTALLATION

When installing the front and rear wheels, reserve the removal procedure. Note the following points.

Front brake drum installation

1. Tighten:
- Axle nut (front wheel)

	Axle nut (front wheel): 130 Nm (13 m • kg, 94 ft • lb)



2. Install:
- Cotter pin ① (new)

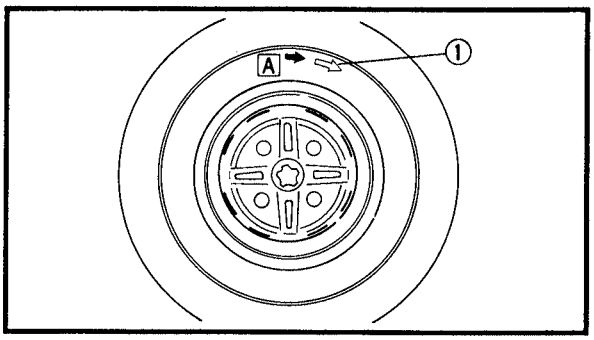
NOTE:

Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

⚠ WARNING

Always use a new cotter pin.

3. Adjust:
- Front brake free play
  Refer to the "FRONT BRAKE ADJUSTMENT" section in the CHAPTER 3.

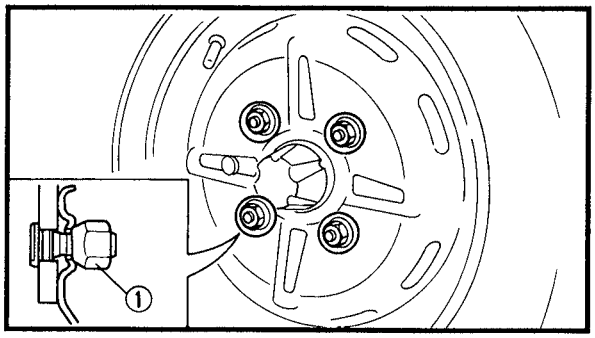


Front wheel installation

1. Install:
   - Front wheel

NOTE:

The arrow mark ① on the tire must point toward the rotating direction [A] of the wheel.



2. Tighten:
   - Nuts ① (front wheel)

⚠ WARNING

Tapered wheel nuts ① are used for both front and rear wheels. Install the nut with its tapered side towards the wheel.

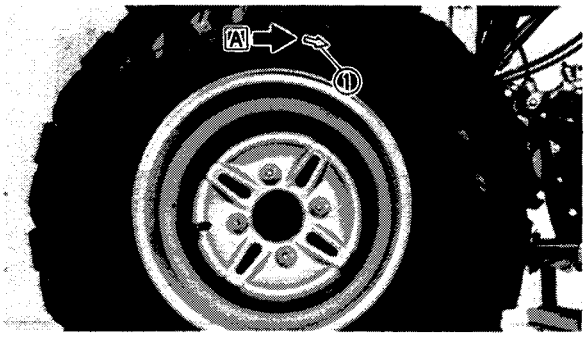
	Nuts (front wheel): 55 Nm (5.5 m • kg, 40 ft • lb)

Rear wheel hub and brake drum installation

Refer to the "FRONT BRAKE DRUM INSTALLATION" section.

1. Tighten:
   - Axle nut (rear wheel)

	Axle nut (rear wheel): 150 Nm (15 m • kg, 110 ft • lb)



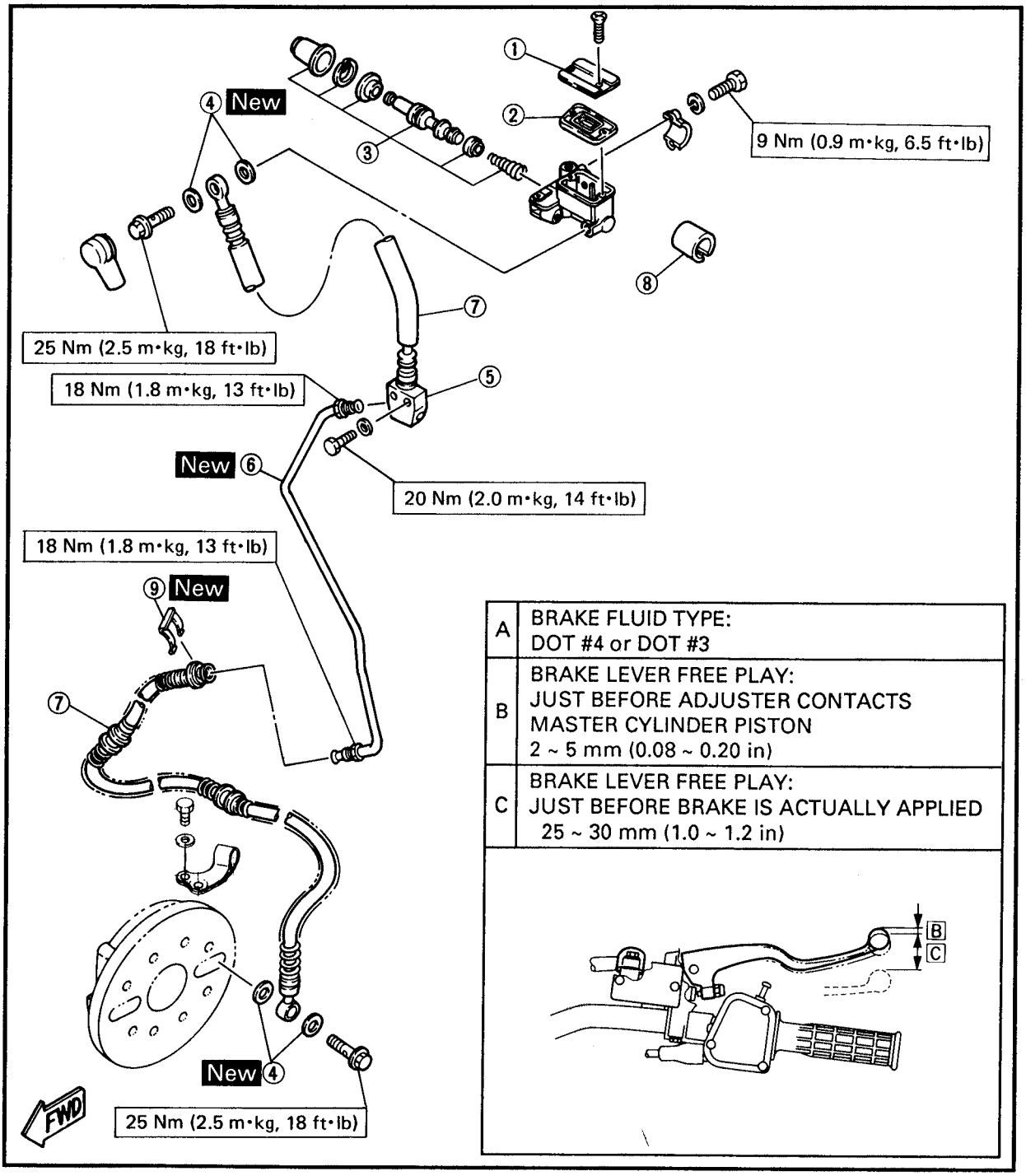
Rear wheel installation

Refer to the "FRONT WHEEL - INSTALLATION" section.

① Arrow mark
[A] Rotating direction of wheel

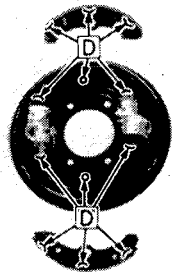
FRONT BRAKE

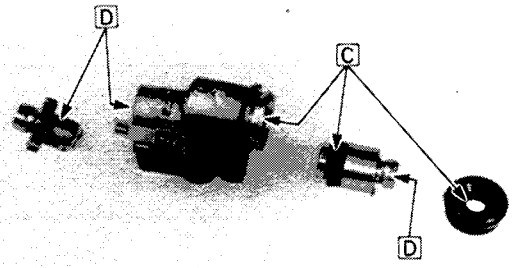
① Master cylinder cap
② Rubber seal
③ Master cylinder kit
④ Copper washer
⑤ Brake joint
⑥ Brake pipe
⑦ Brake hose
⑧ Collar
⑨ Clip

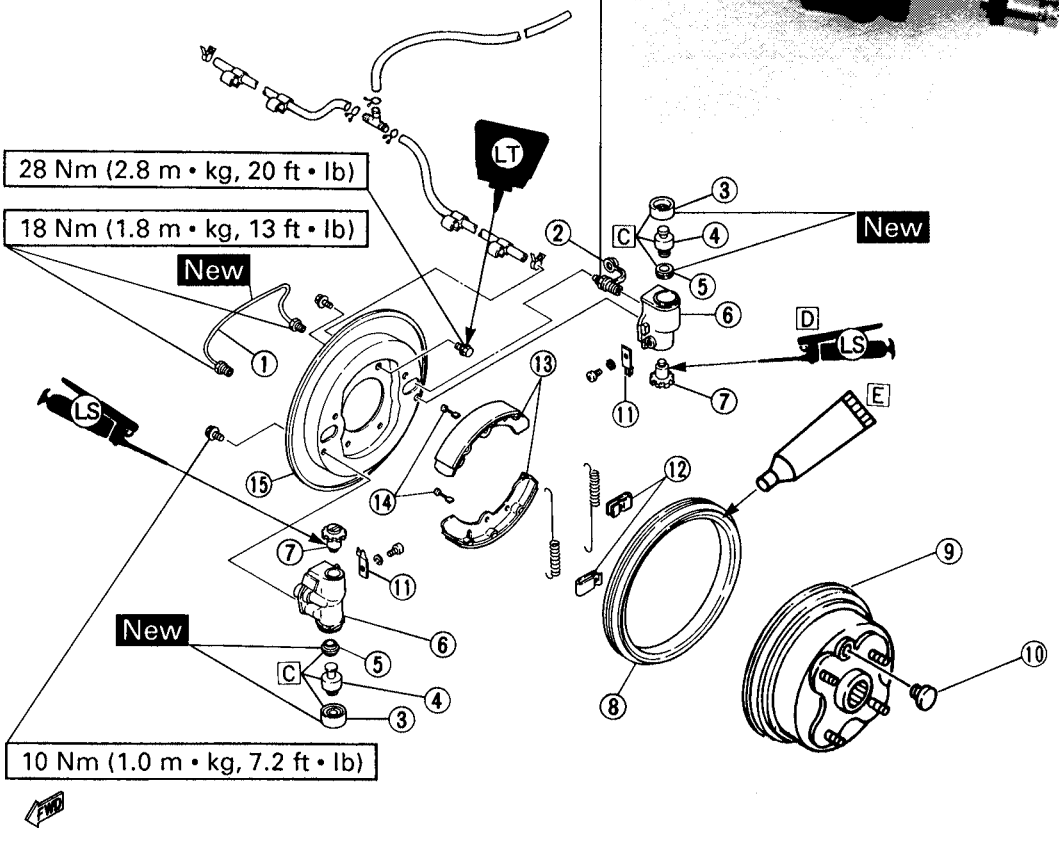


① Brake pipe
② Bleed screw set
③ Dust seal (wheel cylinder)
④ Piston
⑤ Piston seal
⑥ Wheel cylinder
⑦ Adjuster (wheel cylinder)
⑧ Dust seal (brake drum)
⑨ Brake drum
⑩ Blind plug
⑪ Lock spring
⑫ Holder (brake shoe)
⑬ Brake shoe set
⑭ Pin (brake shoe)
⑮ Backing plate

A	BRAKE LINING WEAR LIMIT: 1 mm (0.04 in)
B	BRAKE DRUM WEAR LIMIT: 161 mm (6.34 in)
C	APPLY RUBBER GREASE
D	APPLY LITHIUM BASE GREASE
E	APPLY YAMAHA BRAKE GREASE (P/N. 90793-40003)







REMOVAL AND DISASSEMBLY

⚠ WARNING

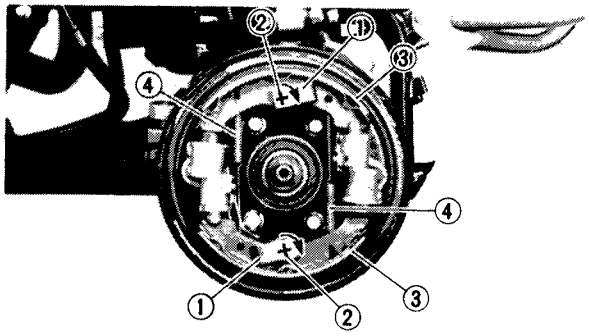
Hydraulic brake components rarely require disassembly. DO NOT:

- **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 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.**

Wheel cylinder disassembly

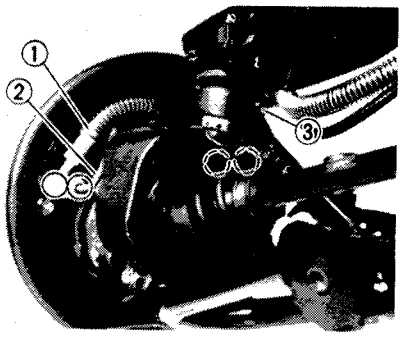
1. Remove:
- Front wheel
- Front brake drum

Refer to the "FRONT AND REAR WHEELS" section.



2. Remove:
- Holders ① (brake shoe)
- Pins ② (brake shoe)
- Brake shoes ③
- Springs ④

Turn the pins 90° and remove the brake shoes.

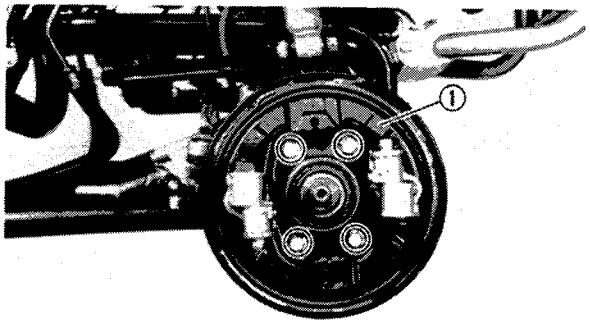


3. Disconnect:
- Brake hose ①
- Bleed screw
- Brake pipe ②
- Breather hose ③

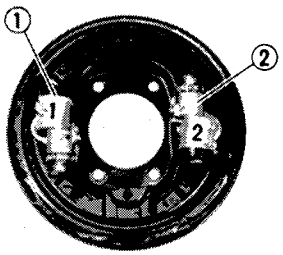
Use the brake pipe wrench.

NOTE:

Drain the brake fluid before disconnecting the brake hose and pipe.

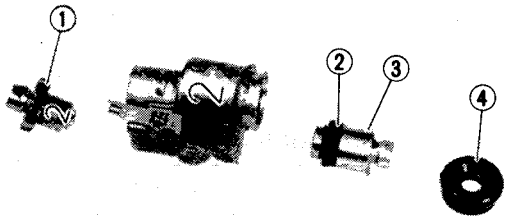


4. Remove:
- Backing plate ①



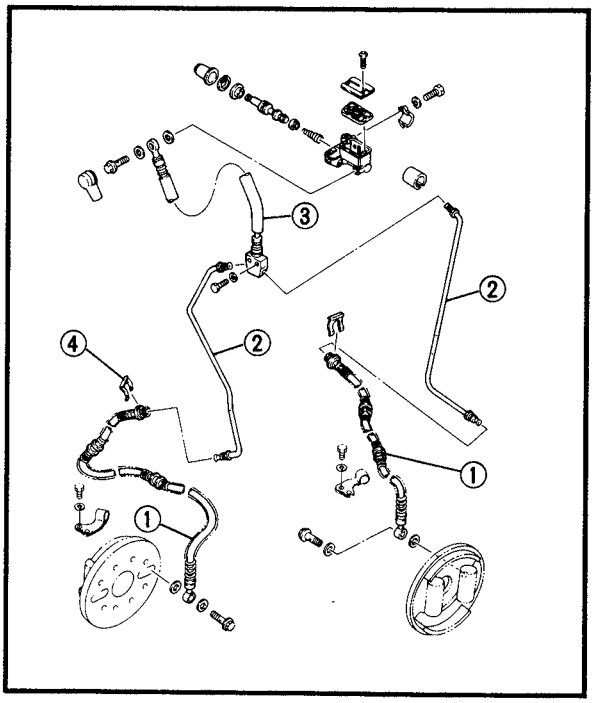
5. Remove:
- Wheel cylinder ①, ②

NOTE:
Identify each wheel cylinder position very carefully so that it can be reinstalled in its original place.



6. Remove:
- Adjuster ① (wheel cylinder)
- Piston seal ②
- Piston ③
- Dust seal ④

NOTE:
Identify each adjuster position very carefully so that it can be reinstalled in its original place.

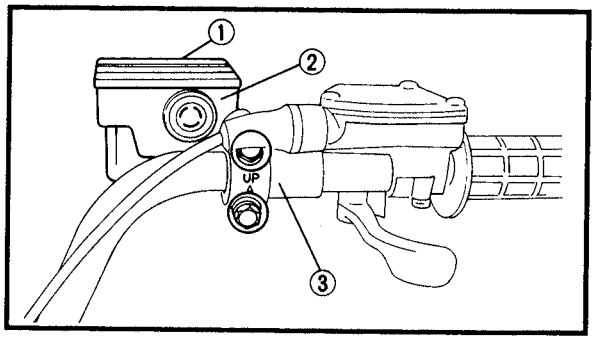


Master cylinder and brake hose disassembly

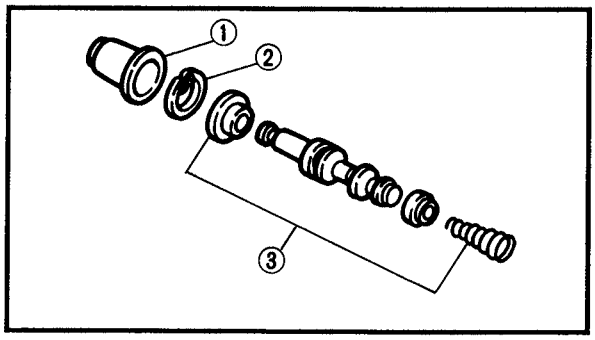
1. Remove:
- Front carrier (if so equipped)
- Front fender
  Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

2. Disconnect:
- Brake hoses ① (upper) with brake joint
- Brake pipes ② (upper)
- Brake hose ③ (lower)

NOTE:
Drain the brake fluid before disconnecting the brake hoses and pipes.



3. Remove:
- Master cylinder cap ①
- Diaphragm
- Master cylinder ②
- Collar ③



4. Remove:
- Dust boot ①
- Circlip ②
- Master cylinder kit ③

  Drain the excess fluid.

INSPECTION AND REPAIR

⚠ WARNING

All internal parts should be cleaned in new brake fluid only. Do not use solvents will cause seals to swell and distort.

Recommended Brake Component Replacement Schedule:	
Brake shoes	As required
Piston seal, dust seal	Every two years
Brake hoses	Every four years
Brake fluid	Replace only when brakes are disassembled
Brake pipes	Replace whenever brake pipes are disconnecting.

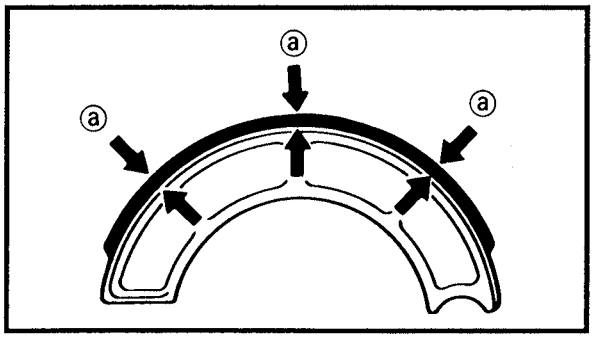
1. Inspect:
- Brake lining surface

  Glazed areas → Remove.

  Use a coarse sand paper.

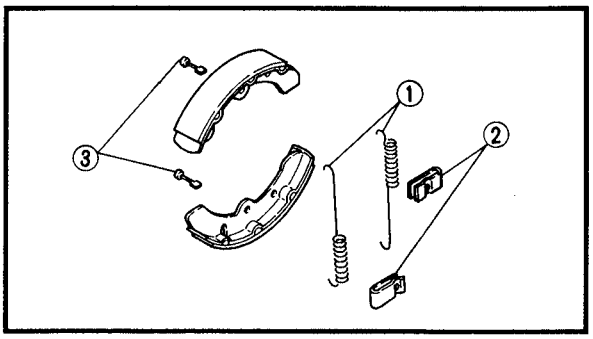
NOTE:

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

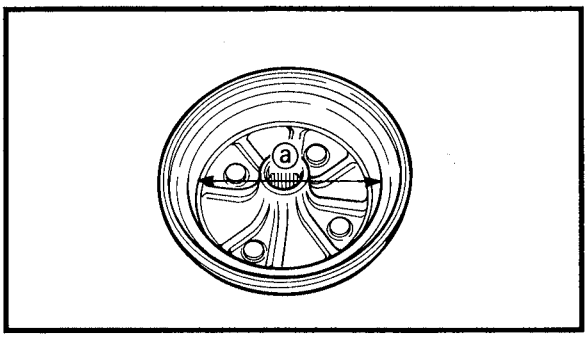


2. Measure:
- Brake lining thickness ⓐ
  Out of specification → Replace.

Brake lining thickness:
4.0 mm (0.16 in)
<Wear limit>:
1.0 mm (0.04 in)

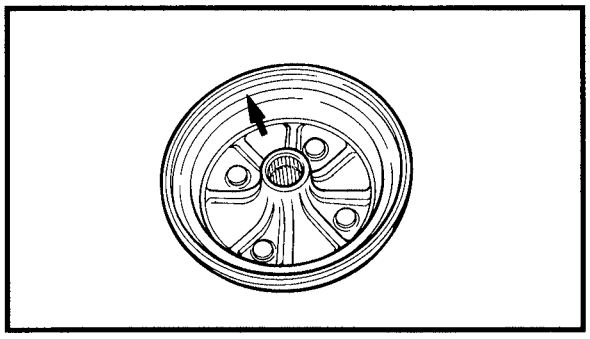


3. Inspect:
- Shoe springs ①
- Holders ②
- Pins ③
  Wear/Damage → Replace.



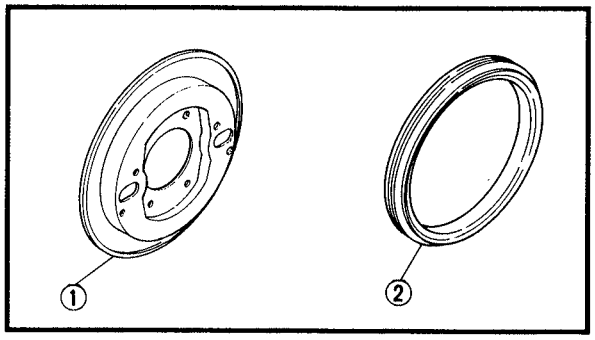
4. Measure:
- Brake drum inside diameter ⓐ
  Out of specification → Replace.

Front brake drum inside diameter:
160 mm (6.30 in)
<Wear limit>:
161 mm (6.34 in)

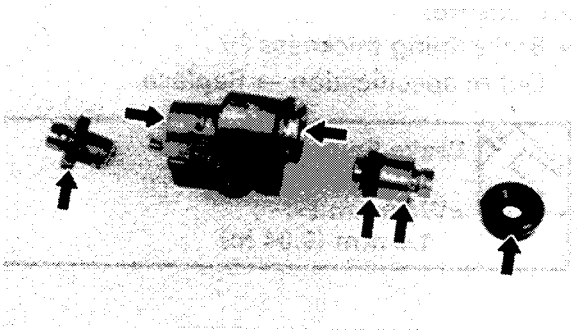


5. Inspect:
- Brake drum inner surface
  Oil/Scratches → Remove.

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



6. Inspect:
- Backing plate ①
  Cranks/Bends/Damage → Replace.
- Dust seal ②
  Wear/Damage → Replace.



7. Inspect:
- Cylinder bore (wheel cylinder)
- Piston surfaces (wheel cylinder)
- Adjuster (wheel cylinder)
  Rust/Scratches/Damage → Repair or replace.
- Dust seal
- Piston seal
  Scratches/Damage → Replace.

⚠ WARNING

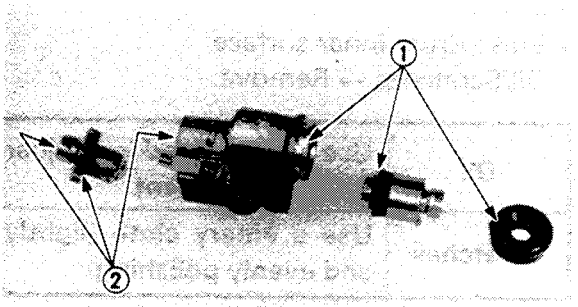
Replace the piston and dust seals whenever the wheel cylinder is disassembled.

ASSEMBLY

⚠ WARNING

- **All internal parts should be cleaned in new brake fluid only.**
- **Internal parts should be lubricated with brake fluid when installed.**

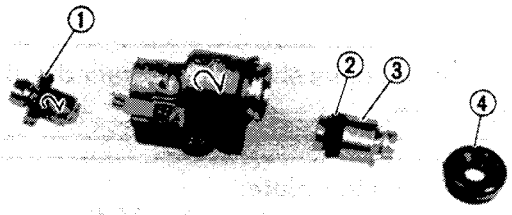
Brake fluid
DOT #4 or DOT #3



Wheel cylinder assembly
When assembling the wheel cylinder, reverse the disassembly, procedure. Note the following points.
1. Apply:
- Rubber grease
  To the part ①.
- Lithium base grease
  To the part ②.

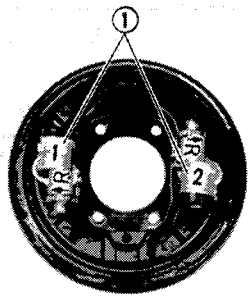
CAUTION:

Be careful not to apply too much grease to the part ① and ②. If grease gets on the brake lining, the brake slippage will result.



2. Install:
- Adjuster ① (wheel cylinder)
- Piston seal ② (new)
- Piston ③
- Dust seal ④ (new)

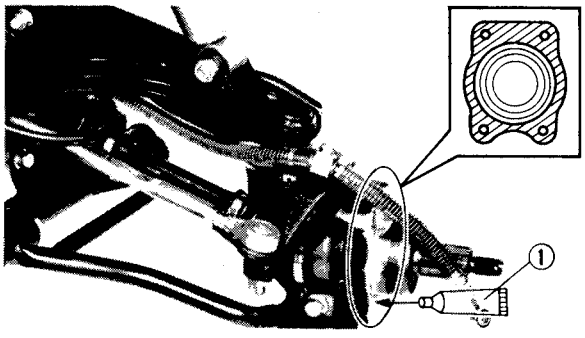
NOTE:
- Identify each adjuster position very carefully so that it can be reinstalled in its original place.
- The adjuster is right-hand threaded on the right of the cut in the backing plate and left-hand threaded on the left.



3. Install:
- Wheel cylinder ①

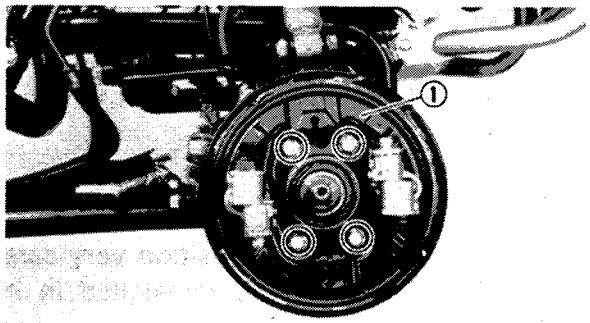
NOTE:
- Identify each wheel cylinder position very carefully so that it can be reinstalled in its original place.
- To prevent confusion, there is on "L" embossed on each of the left-hand wheel cylinders and an "R" embossed on each of the right-hand wheel cylinders.
- Install the wheel cylinders with the arrow facing outward.

Wheel cylinder:
10 Nm (1.0 m • kg, 7.2 ft • lb)
LOCTITE® (HEAT RESISTANT)



4. Apply:
- Sealant ①
(onto mating surfaces knuckle arm)

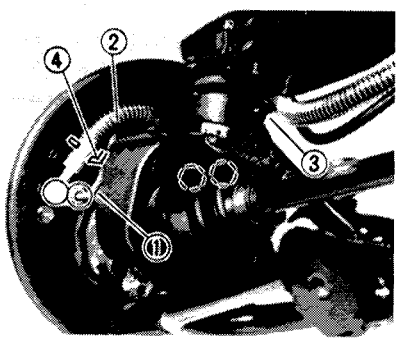
Sealant (quick gasket)®:
P/N. ACC-11001-01
Yamaha bond No.1215®:
P/N. 90890-85505



5. Install:
- Backing plate ①

NOTE:
The backing plate should be installed with cut downward.

	Backing plate: **28 Nm (2.8 m • kg, 20 ft • lb)** **LOCTITE® (HEAT RESISTANT)**

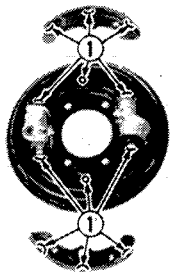


6. Connect:
- Brake pipe ① (new)
- Bleed screw
- Brake hose ②
- Breather hose ③

CAUTION:
Insert the brake hose end into the hose holder ④ on the backing plate.

⚠ WARNING
- **Replace the brake pipe whenever brake pipe is disconnecting.**
- **Always use the new copper washers.**

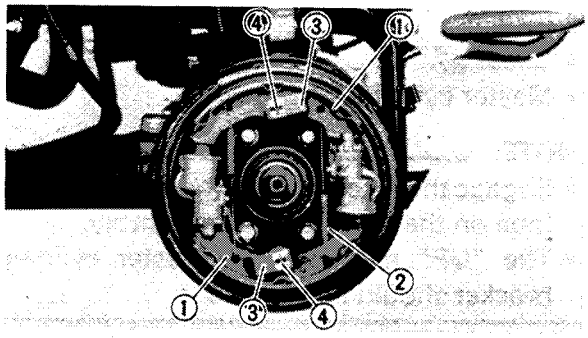
	Brake pipe: **18 Nm (1.8 m • kg, 13 ft • lb)** **Bleed screw:** **6 Nm (0.6 m • kg, 4.3 ft • lb)** **Union bolt (brake hose):** **25 Nm (2.5 m • kg, 18 ft • lb)**



7. Apply:
- To the part ①.

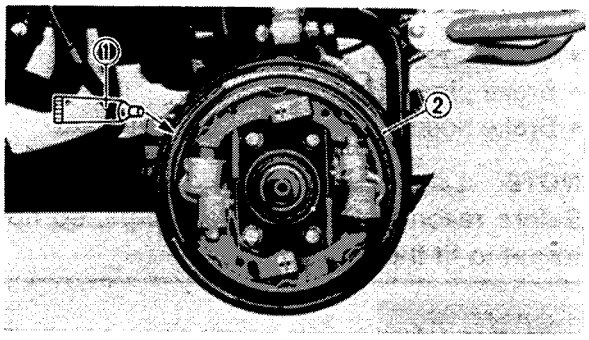
CAUTION:
Be careful not to apply too much grease to the part ①. If grease gets on the brake lining, the brake slippage will result.

	Lithium soap base grease.



8. Install:
- Brake shoes ①
- Springs ②
- Pins ③ (brake shoe)
- Holders ④ (brake shoe)

NOTE:
- Make sure that the above components are proper positioned as shown.
- Make sure that the pin is hitched on the holder.
- Before installing the brake drum, turn the adjuster on both wheel cylinders in the direction opposite to the arrow.



9. Apply:
- Yamaha brake grease ①
  (to the dust seal ②)

Yamaha brake grease:
P/N. 90793-40003

10. Install:
- Front wheel drum
  Refer to the "FRONT AND REAR WHEELS" section.

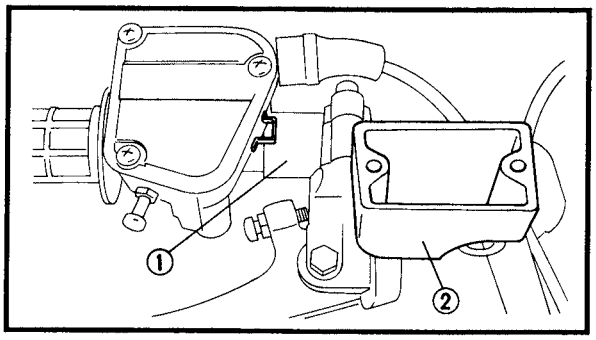
Axle nuts (front):
130 Nm (13 m • kg, 94 ft • lb)

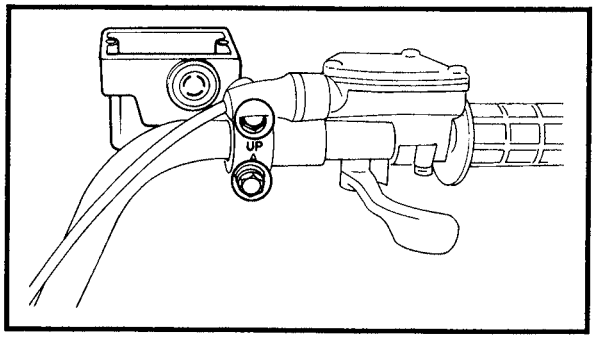
Master cylinder and brake hose assembly
When assembling the master cylinder, reverse the "DISASSEMBLY" procedure. Note the following points.

⚠ WARNING
- **All internal parts should be cleaned in new brake fluid only.**
- **Internal parts should be lubricated with brake fluid when installed.**

Brake fluid:
DOT #4 or DOT #3

1. Install:
- Master cylinder kit

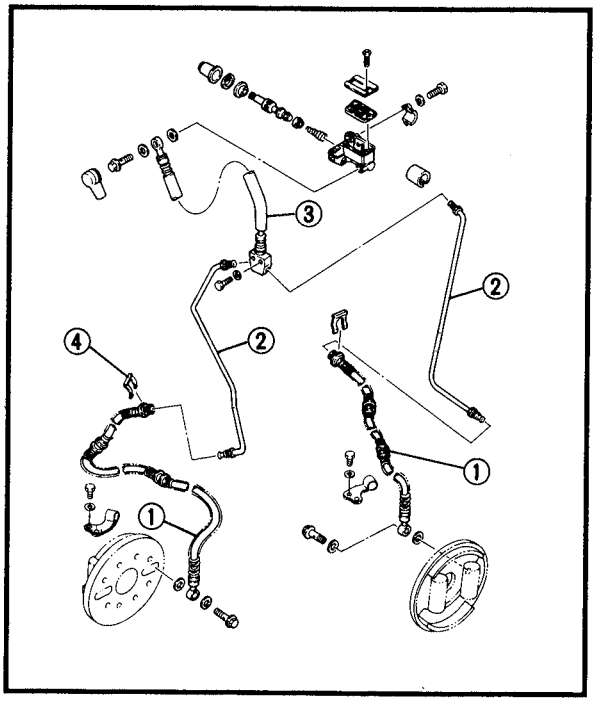




2. Install:
- Collar ①
- Master cylinder ②

NOTE:
- Engage the receptacle on the collar with the lobe on the throttle lever assembly.
- The "UP" mark on the master cylinder bracket should be upward.

	Master cylinder assembly: 9 Nm (0.9 m • kg, 6.5 ft • lb)



3. Connect:
- Brake hoses ① (lower)
- Brake pipes ② (upper) (new)
- Brake hose ③ (upper) with brake joint

NOTE:
Before reconnecting the brake pipe, do not forget to fit the clip ④.

CAUTION:
Insert the brake hose (lower) end into the hose holder on the backing plate.

⚠ WARNING
- **Replace the brake pipe whenever brake pipe is disconnecting.**
- **Always use the new copper washer.**

	Brake pipe: 18 Nm (1.8 m • kg, 13 ft • lb) **Union bolts (brake hose): 25 Nm (2.5 m • kg, 18 ft • lb)**

4. Fill:
- Brake fluid

Recommended brake fluid:
DOT #4 or DOT #3

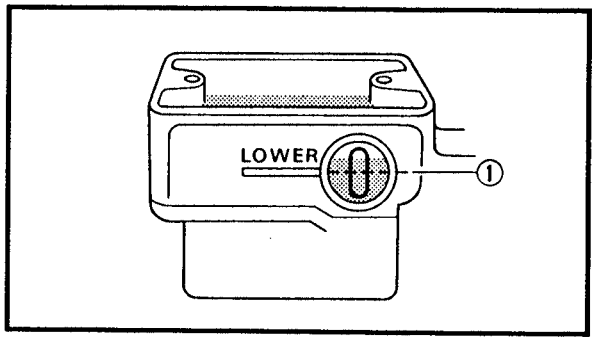
CAUTION:

Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

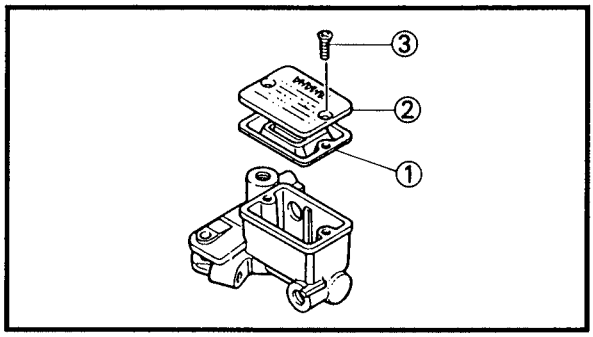
⚠ WARNING

- **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.**

5. Air bleed:
- Brake system
  Refer to the "AIR BLEEDING" section in the CHAPTER 3.



6. Inspect;
- Brake fluid level
  Fluid level is under "LOWER" level line ①
  → Fill up.
  Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.



7. Install:
- Diaphragm ①
- Master cylinder cap ②
- Screws ③

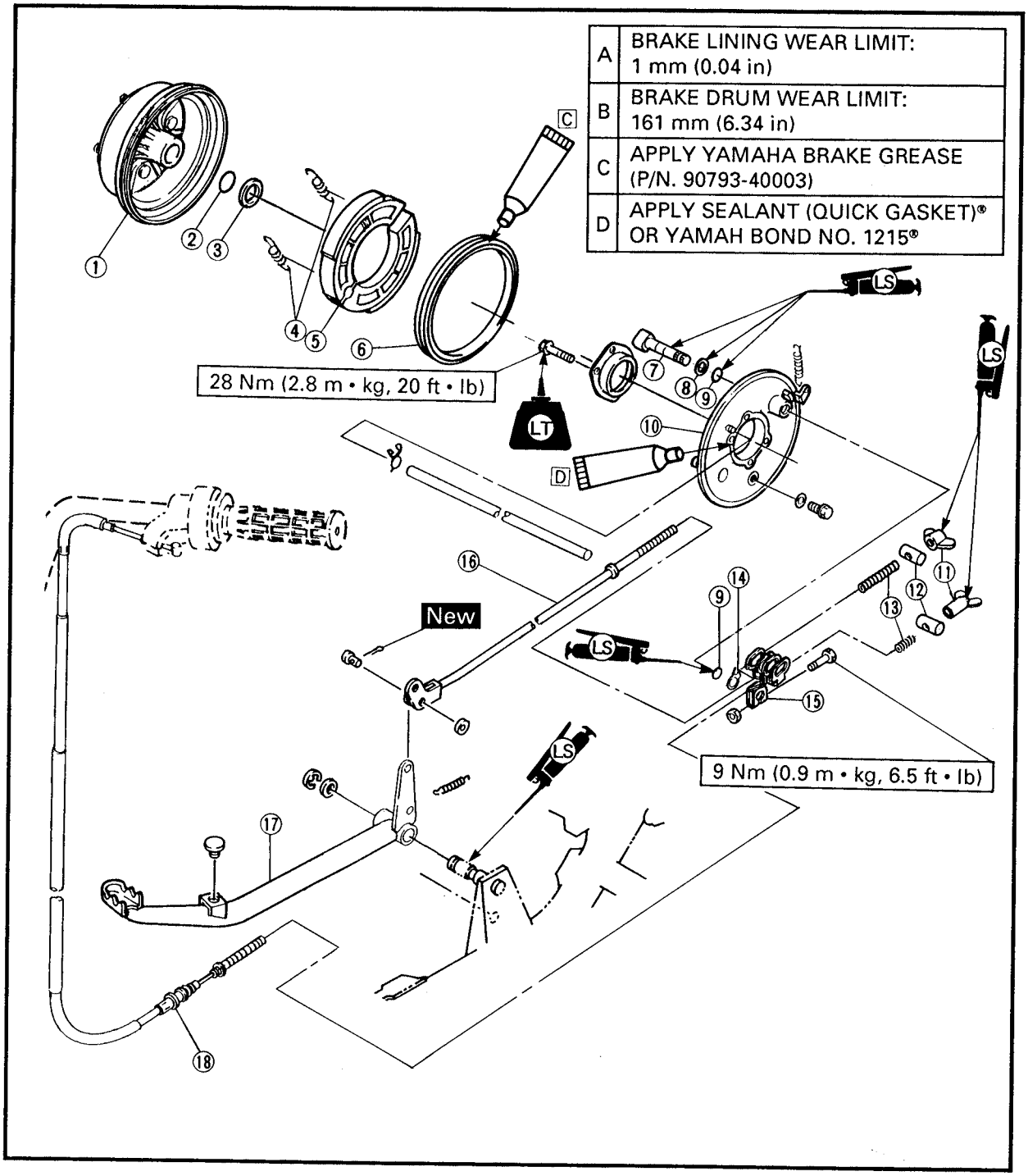
	Screw (master cylinder cap): 1.5 Nm (0.15 m • kg, 1.1 ft • lb)

8. Install:
- Front wheels
  Refer to the "FRONT AND REAR WHEELS" section.

9. Adjust:
- Front brake lever free play
  Refer to the "FRONT BRAKE ADJUSTMENT" section in the CHAPTER 3.

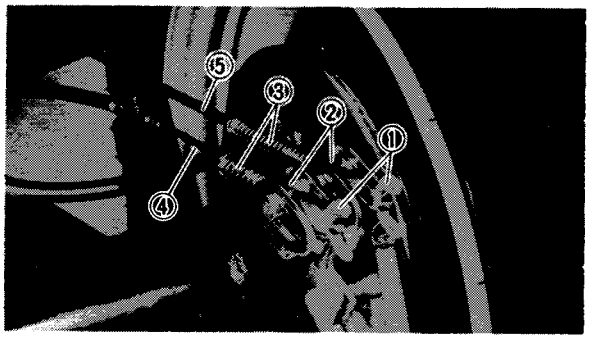
REAR BRAKE

① Rear brake drum
② O-ring
③ Plain washer
④ Brake shoe spring
⑤ Brake shoe
⑥ Dust seal
⑦ Camshaft
⑧ Plain washer
⑨ O-ring
⑩ Brake shoe plate
⑪ Adjuster
⑫ Pin
⑬ Compression spring
⑭ Wear indicator plate
⑮ Camshaft lever
⑯ Brake rod
⑰ Brake pedal
⑱ Brake cable



REMOVAL

1. Place the machine on a level place.
2. Apply the parking brake. Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.

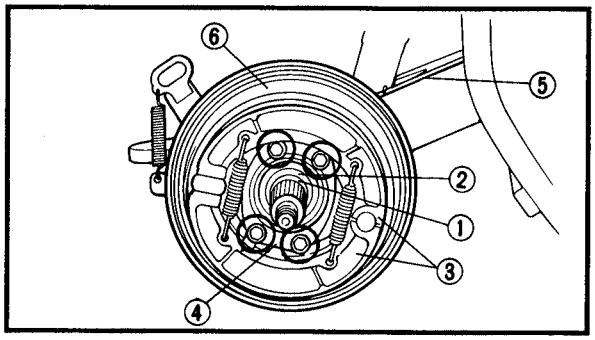


3. Remove:
- Adjuster ① (brake lever and pedal)
- Pins ②
- Compression springs ③

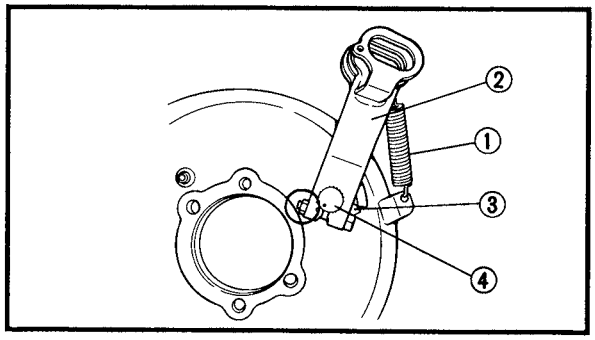
4. Disconnect:
- Brake cable ④ (brake lever)
- Brake rod ⑤ (brake pedal)

5. Remove:
- Rear wheel (left)
- Rear brake drum (left)

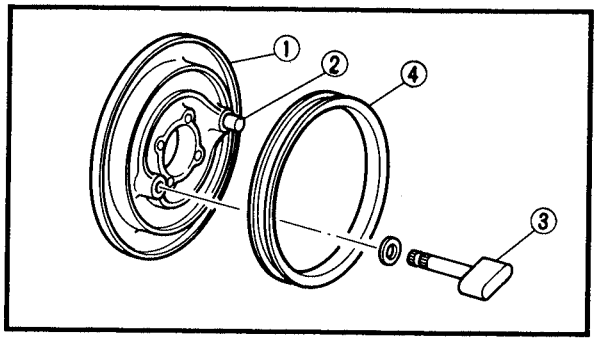
Refer to the "FRONT AND REAR WHEELS" section.



6. Remove:
- O-ring ①
- Plain washer ②
- Brake shoe ③
- Bearing retainer ④
- Breather hose ⑤
- Brake shoe plate ⑥

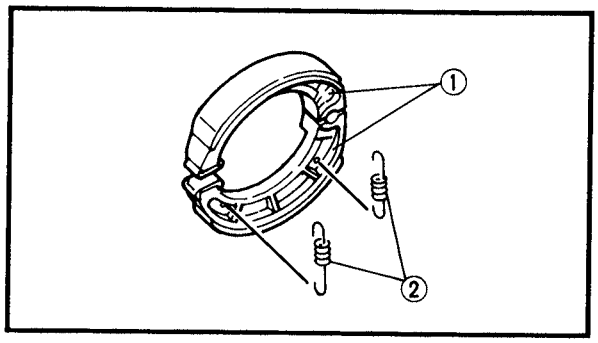


7. Remove:
- Spring ①
- Camshaft lever ②
- Wear indicator plate ③
- Camshaft ④
- Plain washer



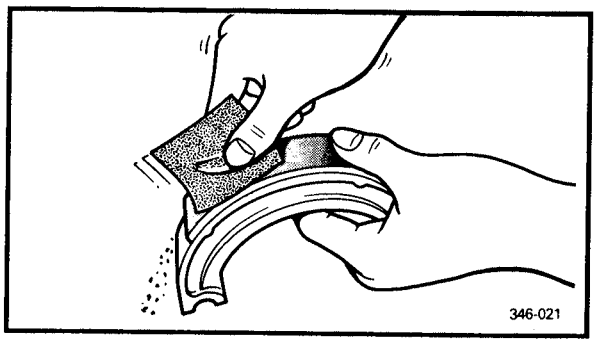
INSPECTION

1. Inspect:
- Brake shoe plate ①
- Pivot pin ②
- Camshaft ③
  Cracks/Bends/Damage → Replace.
- Dust seal ④
  Wear/Damage → Replace.



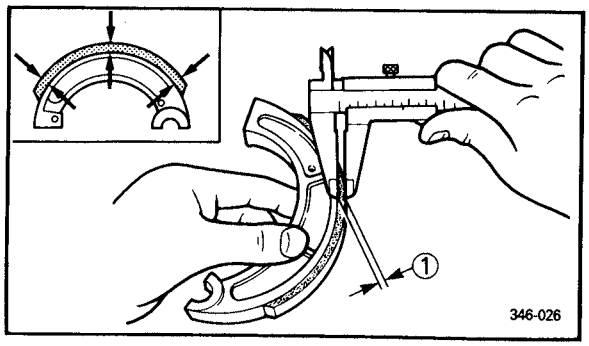
2. Inspect:
- Brake shoe ①
- Brake shoe spring ②
  Cracks/Damage → Replace as a set.

NOTE:
When replacing the brake shoes, replace the brake shoe springs at the same time.



3. Inspect:
- Brake shoe lining surface
  Glazed areas → Remove.
  Use a coarse sand paper.

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

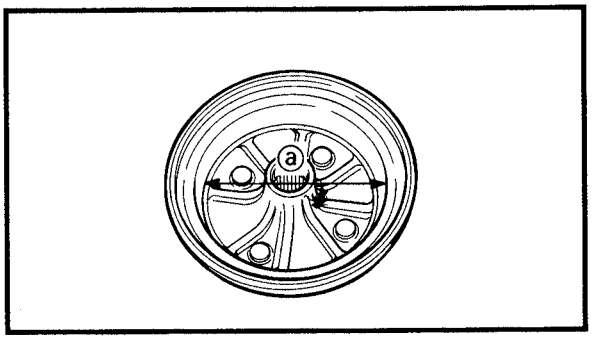


4. Measure:
- Brake shoe lining thickness
  Out of specification → Replace.

① Measuring points

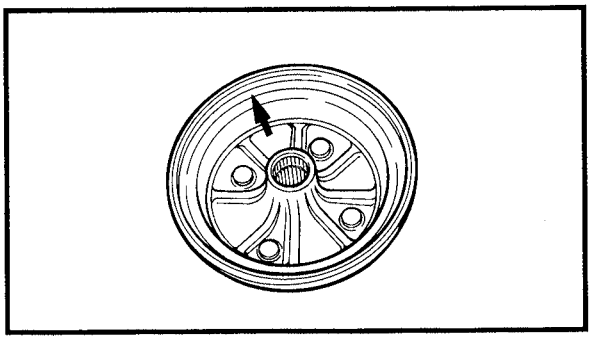
NOTE:
Replace the brake shoes as a set if either is found to be worn to the wear limit.

Brake lining thickness:
4.0 mm (0.16 in)
<Wear limit>:
1.0 mm (0.04 in)



5. Measure:
- Brake drum inside diameter ⓐ
  Out of specification → Replace.

Front brake drum inside diameter:
160 mm (6.30 in)
<Wear limit>:
161 mm (6.34 in)

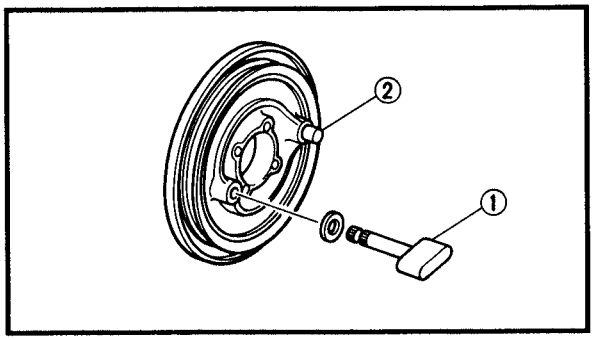


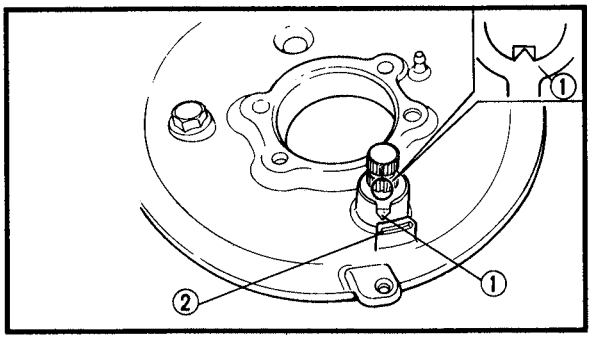
6. Inspect:
- Brake drum inner surface
  Oil/Scratches → Remove.

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

INSTALLATION

Reverse the "REMOVAL" procedure.
Note the following points.





1. Lubricate:
- Camshaft ①
- Pivot pin ②

Lithium soap base grease

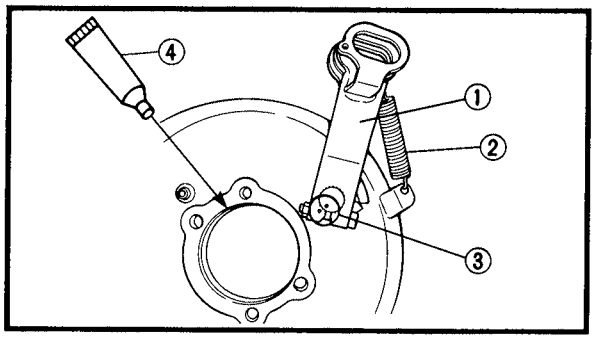
CAUTION:

Install the camshaft and the pivot pin with lightly greased. Wipe off the excess grease.

2. Install:
- Wear indicator plate ①

NOTE:

When installing the wear indicator plate, fit the projection to the camshaft groove and align the pointer to the wear indicator ②.



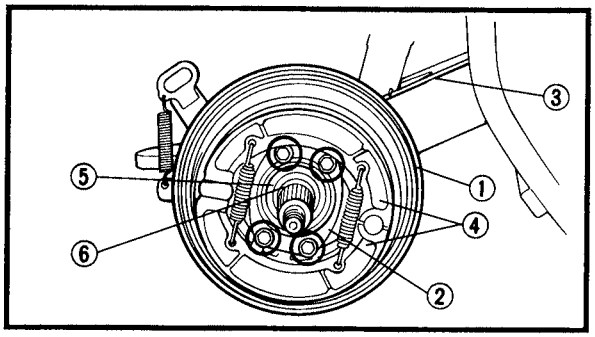
3. Install:
- Camshaft lever ①
- Spring ②

Bolt (camshaft lever):
10 Nm (1.0 m • kg, 7.2 ft • lb)

NOTE:
When installing the camshaft lever, align the punch mark ③ on the camshaft lever and camshaft.

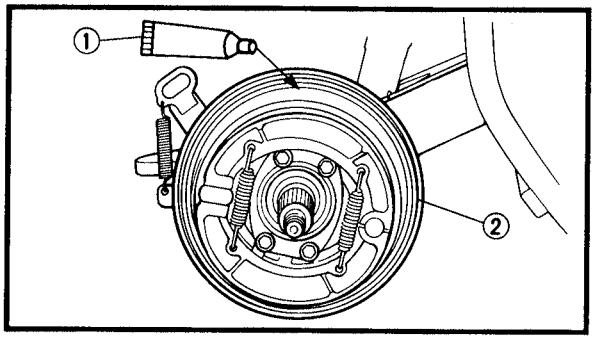
4. Apply:
- Sealant ④
  (onto mating surfaces of swingarm)

Sealant (quick gasket)®:
P/N. ACC-11001-01
Yamaha bond No 1215:
P/N. 90890-85505



5. Install:
- Brake shoe plate ①
- Bearing retainer ②
- Breather hose ③
- Brake shoe ④
- Plain washer ⑤
- O-ring ⑥

Bolts (brake shoe plate):
30 Nm (3.0 m • kg, 22 ft • lb)



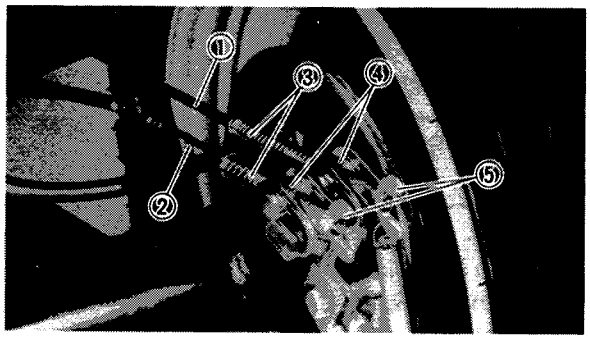
6. Check:
- Camshaft operation
  Unsmooth operation → Repair.

7. Apply:
- Yamaha brake grease ①
  (to the dust seal ②)

Yamaha brake grease:
P/N. 90793-40003

8. Install:
- Rear brake drum
- Rear wheel
  Refer to the "FRONT AND REAR WHEELS" section.

Axle nut (rear drum):
150 Nm (15 m • kg, 110 ft • lb)
Nuts (rear wheel):
55 Nm (5.5 m • kg, 40 ft • lb)



9. Connect:
- Brake rod ① (brake lever)
- Brake cable ② (brake pedal)

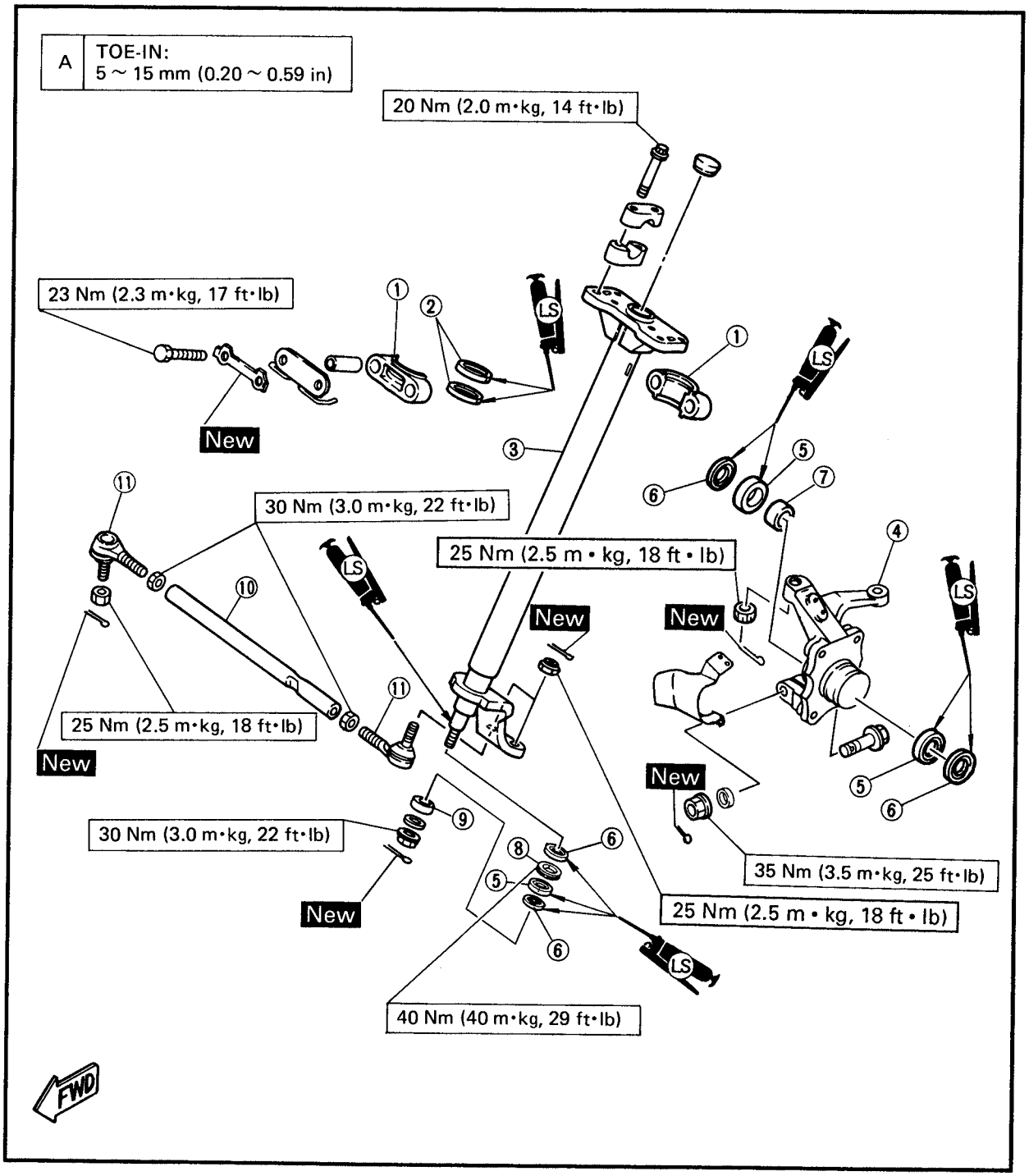
10. Install:
- Compression springs ③
- Pins ④
- Adjusters ⑤ (brake lever and pedal)

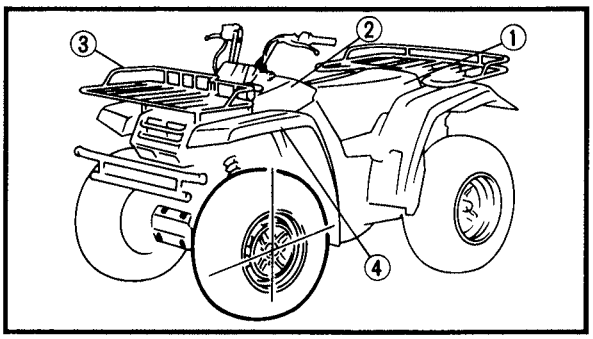
11. Adjust:
- Rear brake pedal free play
- Rear brake lever free play

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

STEERING SYSTEM

① Steering shaft bushing
② Oil seal
③ Steering shaft
④ Steering knuckle
⑤ Bearing
⑥ Oil seal
⑦ Spacer
⑧ Bearing retainer
⑨ Collar
⑩ Tie-rod
⑪ Tie-rod end

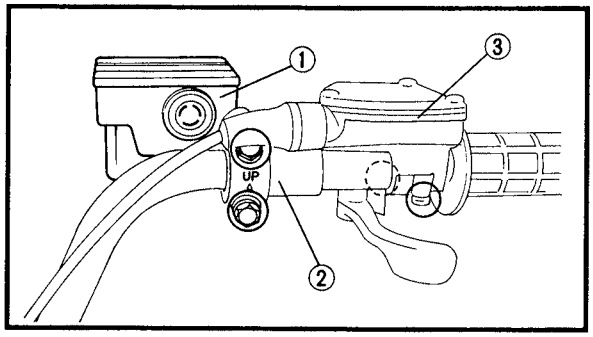




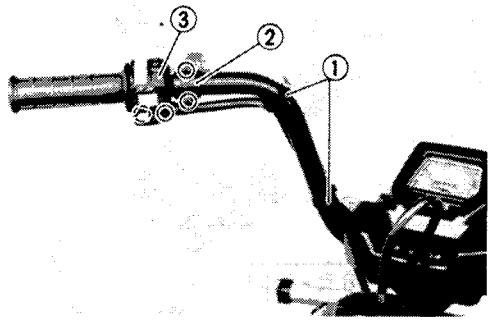
REMOVAL

1. Remove:
- Seat ①
- Fuel tank cover ②
- Front carrier ③
- Front fender ④

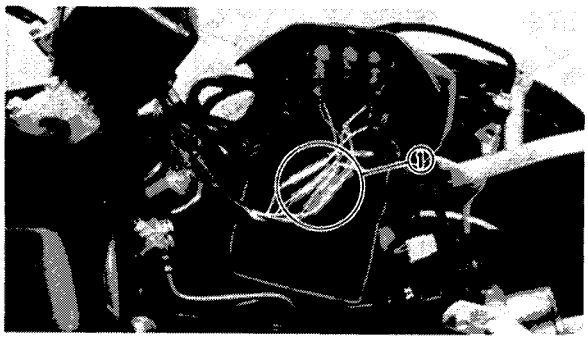
Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.



2. Remove:
- Master cylinder assembly ①
- Collar ②
- Throttle lever assembly ③

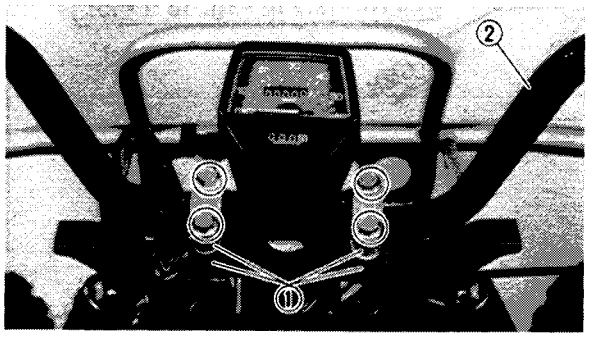


3. Remove:
- Bands ①
- Lever holder ②
- Handlebar switch ③

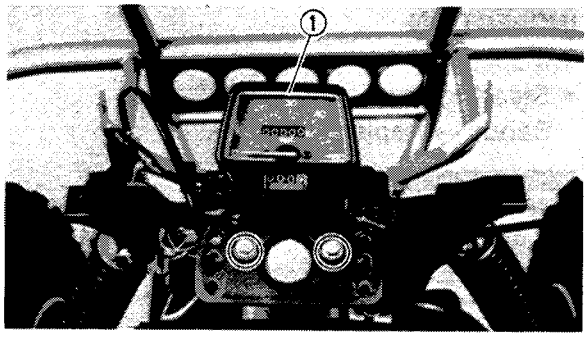


4. Disconnect:
- Indicator leads ①

Pull up the handlebar cover, and disconnect the leads.

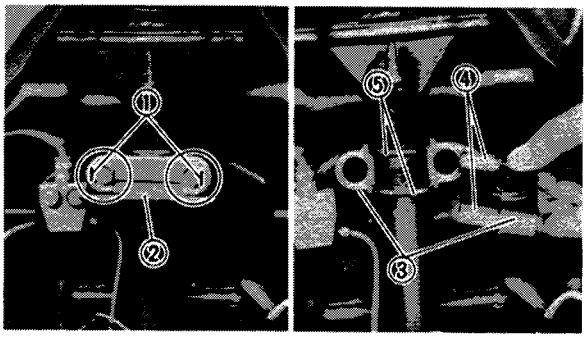


5. Remove:
- Handlebar holders ① (upper and lower)
- Handlebar ②



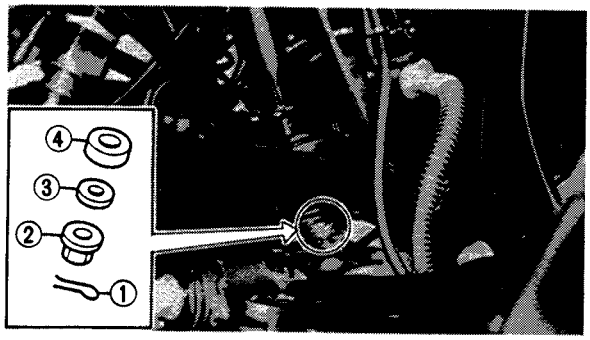
6. Disconnect:
- Speedometer cable
- Speedometer lead

7. Remove:
- Speedometer assembly ①

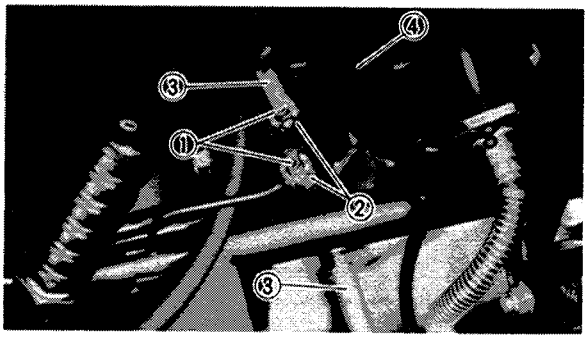


8. Straighten:
- Lock washer tabs ①

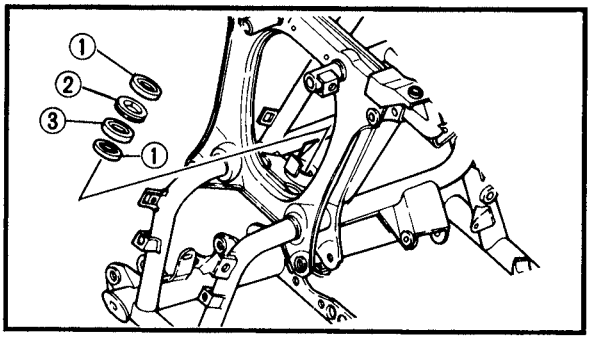
9. Remove:
- Steering shaft bracket ②
- Steering shaft bushings ③
- Collars ④
- Oil seals ⑤



10. Remove:
- Cotter pin ①
- Nut ② (steering shaft)
- Plain washer ③
- Collar ④

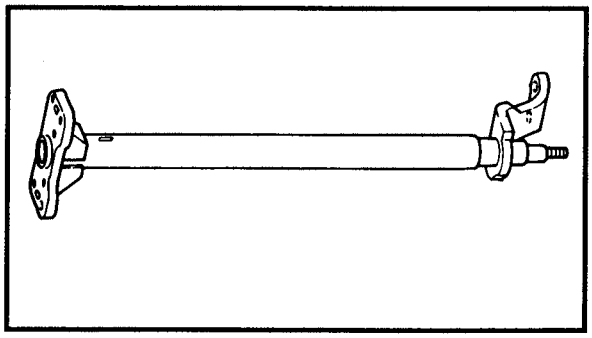


11. Remove:
- Cotter pin ①
- Nuts ② (tie-rod end)
- Tie-rod ends ③
- Steering shaft ④



12. Remove:
- Oil seals ①
- Bearing retainer ②
  Use the damper rod holder
- Bearing ③

	Damper rod holder: **P/N YM-01327, 90890-01327**

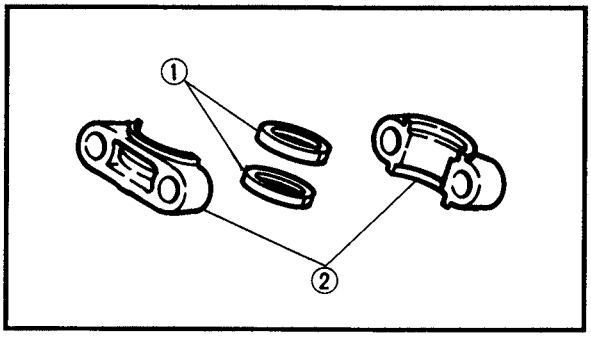


INSPECTION

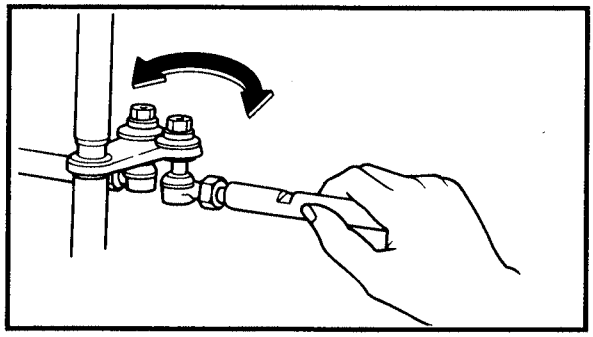
1. Inspect:
- Steering shaft
  Bends → Replace.

⚠ WARNING

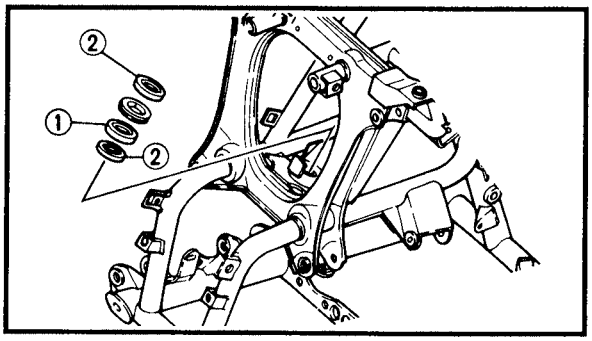
Do not attempt to straighten a bent shaft; this may dangerously weaken the shaft.



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



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

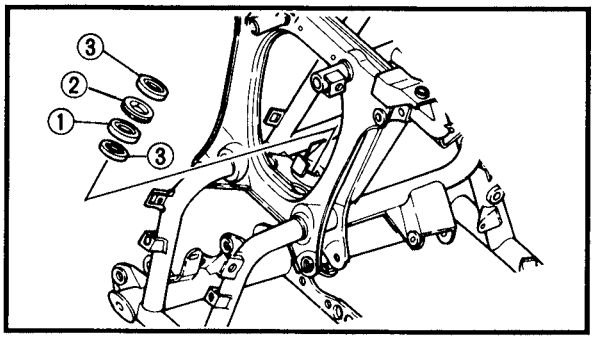


INSTALLATION

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

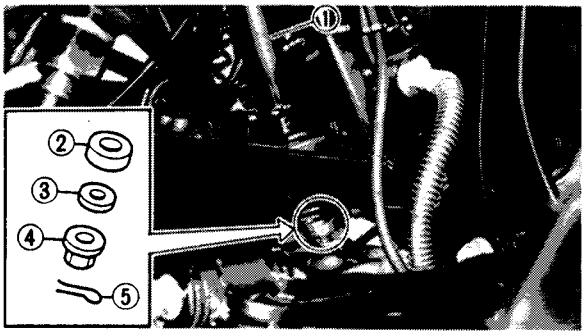
1. Lubricate:
- Bearing ①
- Oil seal ②

Lithium soap base grease



2. Install:
- Bearing ①
- Bearing retainer ②
  Use the damper rod holder.
- Oil seals ③

	Damper rod holder: **P/N. YM-01327, 90890-01327**
	Bearing retainer: **40 Nm (4.0 m • kg, 29 ft • lb)**

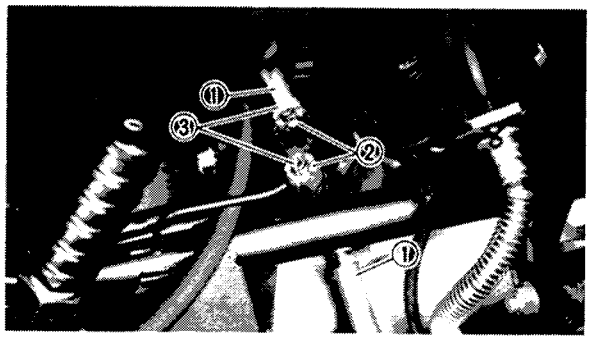


3. Install:
- Steering shaft ①
- Collar ②
- Plain washer ③
- Nut (steering washer ④)
- Cotter pin ⑤ (new)

	Nut (steering shaft): **30 Nm (3.0 m • kg, 22 ft • lb)**

⚠ WARNING

Always use a new cotter pin.

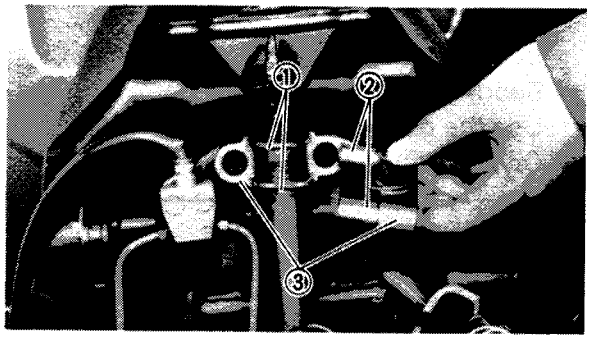


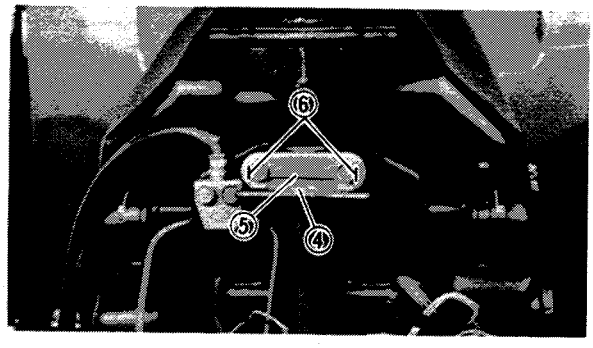
4. Install:
- Tie-rod ends ①
- Nuts ② (tie rod end)
- Cotter pins ③ (new)

	Nuts (tie-rod end) **25 Nm (2.5 m • kg, 18 ft • lb)**

⚠ WARNING

- **Make sure the brake hoses and pipes are properly routed, and are not damaged or twisted.**
- **Always use a new cotter pin.**





5. Lubricate:
- Oil seals

	Lithium soap base grease

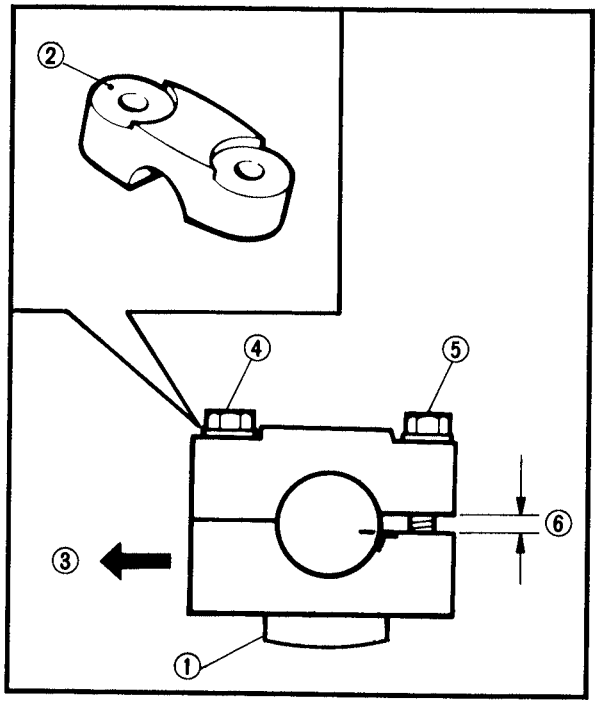
6. Install:
- Oil seals ①
- Collars ②
- Steering shaft bushings ③

NOTE:
Be careful not to damage the oil seals during installation.

7. Install:
- Steering shaft bracket ④
- Lock washer ⑤ (new)
- Bolts (steering shaft bracket)

	Bolts (steering shaft bracket) **23 Nm (2.3 m • kg, 17 ft • lb)**

8. Bend:
- Lock washer tabs ⑥ (along the bolt flats)



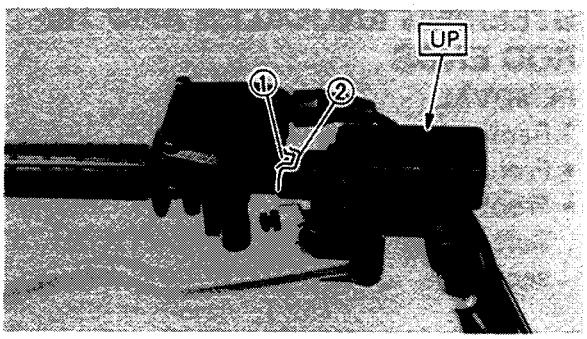
9. Install:
- Handlebar
- Handlebar holders (upper and lower)

NOTE:
- Insert the projection ① of handlebar holder (lower) into the steering shaft hole.
- The upper handlebar holder should be installed with the punched mark ② forward ③.

CAUTION:
First tighten the bolts on the front side on the handlebar holder, and then tighten the bolts on the rear side.

④ 1st
⑤ 2nd
⑥ Gap

	Bolts (handlebar holder-upper) **20 Nm (2.0 m • kg, 14 ft • lb)**



10. Install:
- Throttle lever assembly
- Collar
- Master cylinder assembly

NOTE:
- Insert the lobe ① on the throttle lever assembly into the receptacle ② on the collar.
- The "UP" mark on the master cylinder bracket should be upward.

11. Install:
- Front fender
- Front carrier
- Fuel tank cover
- Seat

  Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

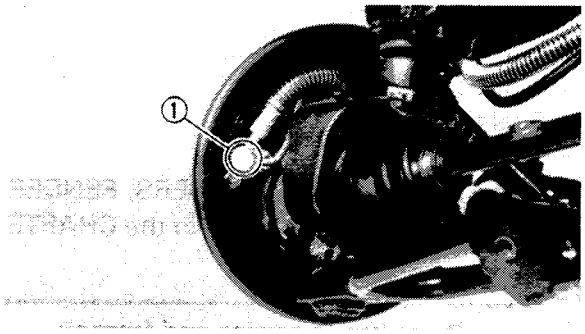
Bolts (front carrier and frame):
20 Nm (2.0 m • kg, 14 ft • lb)
Bolts (front carrier and front bumper):
10 Nm (1.0 m • kg, 7.2 ft • lb)

STEERING KNUCKLES AND TIE-ROD ENDS

REMOVAL

1. Remove:
- Front wheels
- Front brake drums

Refer to the "FRONT AND REAR WHEELS" section.

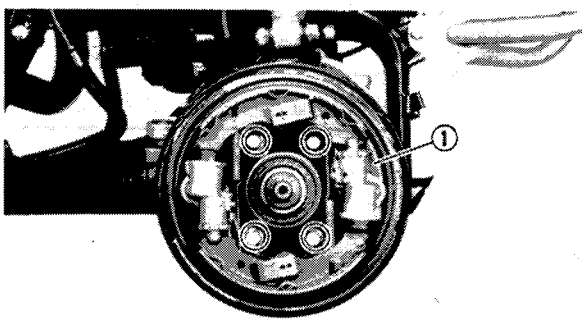


2. Disconnect:
- Brake hose ①

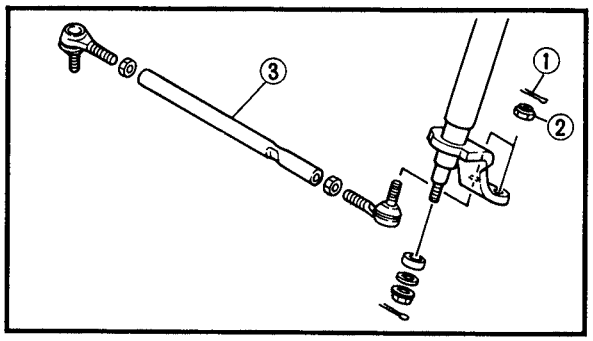
Place the open hose end into a container, and drain the brake fluid.

CAUTION:

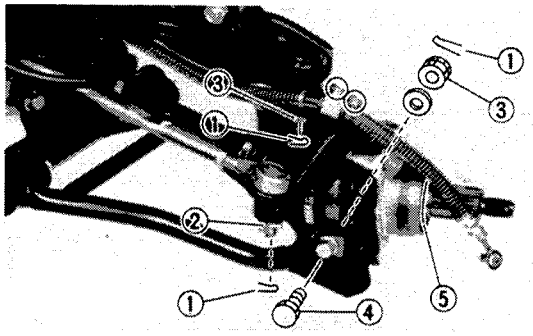
Completely wipe off any brake fluid adhering to any part of machine. The brake fluid reacts chemically with paint, plastics, rubber materials, etc.



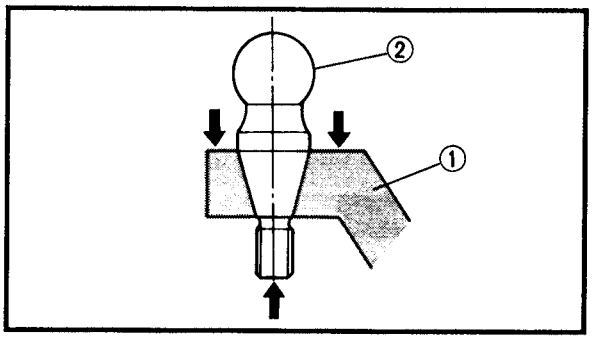
3. Remove:
- Backing plate assembly ①



4. Remove:
- Cotter pins ①
- Nuts ② (tie-rod end)
- Tie-rod ③

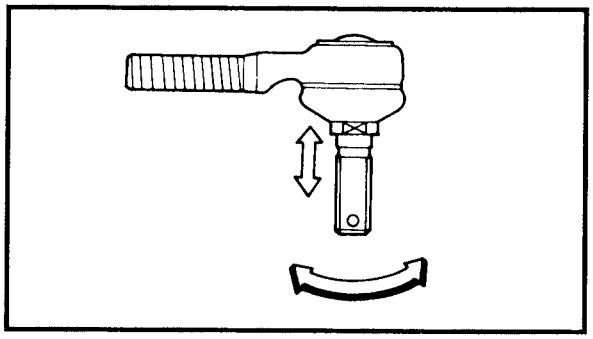


5. Remove:
- Cotter pins ①
- Nut ② (tie-rod end)
- Nuts ③ (steering knuckle)
- Bolt ④ (knuckle arm)
- Constant velocity joint protector
- O-ring ⑤



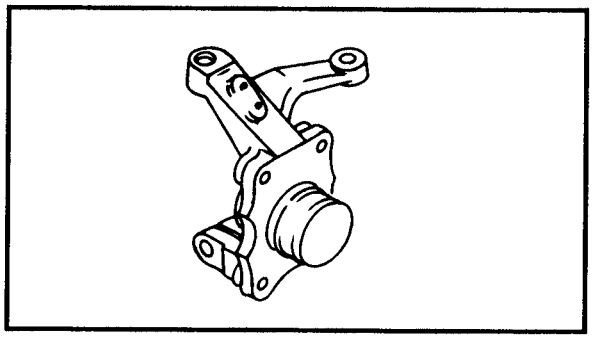
6. Remove:
- Steering knuckle ①

NOTE:
Use the General Puller to separate the ball joint ② and steering knuckle.

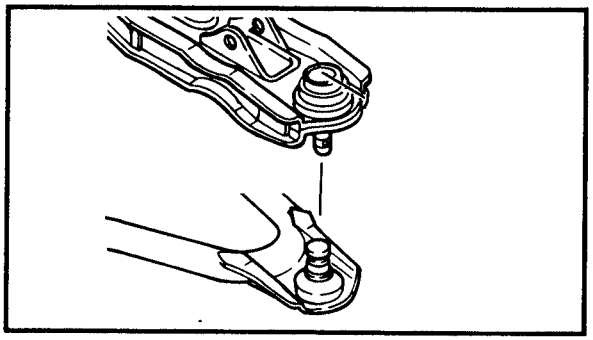


INSPECTION

1. Check:
- Tie-rod free play and movement
  Tie-rod is exists free play → Replace tie-rod end.
  Tie-rod is turns roughly → Replace tie-rod end.

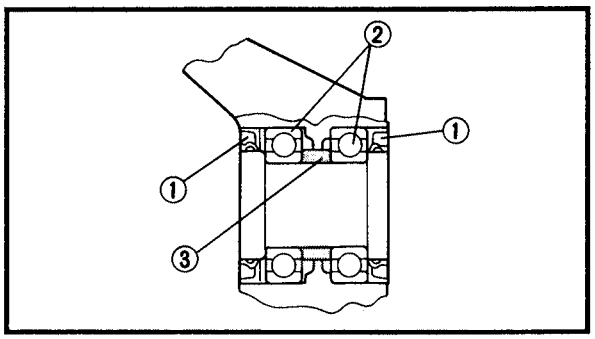


2. Inspect:
- Steering knuckle
  Damage/Pitting → Replace.



3. Inspect:
- Ball joints
  Damage/Pitting → Replace front arms.
  Ball joint is exists free play → Replace front arms.
  Ball joint turns roughly → Replace front arms.

4. Inspect:
- Wheel bearings
  Bearings allow play in the wheel hubs or wheel turns roughly → Replace.
- Oil seals
  Damage → Replace.



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Wheel bearing replacement steps:

- Clean the outside of the steering knuckle.
- Remove the oil seals ①.
- Drive out the bearings ②.

⚠ WARNING

Eye protection is recommended when using striking tools.

- Remove the spacer ③.
- Apply the lithium base grease to the bearings and oil seals.
- Install the spacer to the steering knuckle.
- Install the new bearings.

NOTE:

Install the outside bearing first.

CAUTION:

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

- Install the new oil seal.

NOTE:

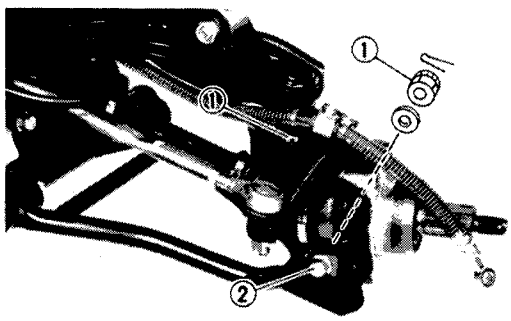
When installing the oil seals, sealed side of oil seal comes outside.

****

INSTALLATION

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

1. Apply:
   - Lithium base grease
     Lightly grease to the constant velocity joint and oil seals.
2. Tighten:
   - Nuts ① (steering knuckle)
   - Bolt ② (knuckle arm)



CAUTION:

Avoid over-tightening.

	Nut (steering knuckle and upper arm): 25 Nm (2.5 m • kg, 18 ft • lb)
	Nut (steering knuckle and lower arm): 48 Nm (4.8 m • kg, 35 ft • lb)

3. Install:
• Cotter pins

⚠ WARNING

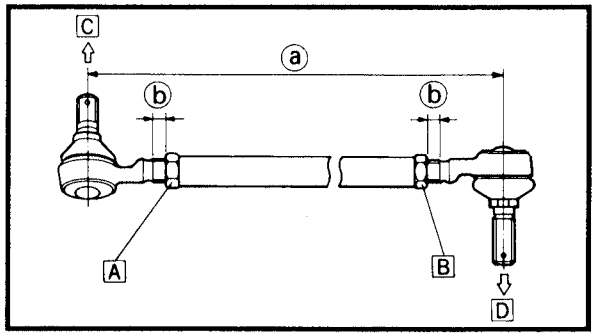
Always use a new cotter pin.

4. Adjust:
• Tie-rod assembly length

****

Tie-rod assembly length adjustment steps:

- Loosen the lock nuts.
- Adjust tie-rod assembly length ⓐ by turning both tie-rod ends.



	Tie-rod assembly length ⓐ: 344.5 mm (13.6 in)

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

NOTE:

The threads ⓑ on both tie-rod ends must be of the same length.

- Tighten the locknuts.

	Locknut (tie-rod): 30 Nm (3.0 m • kg, 22 ft • lb)

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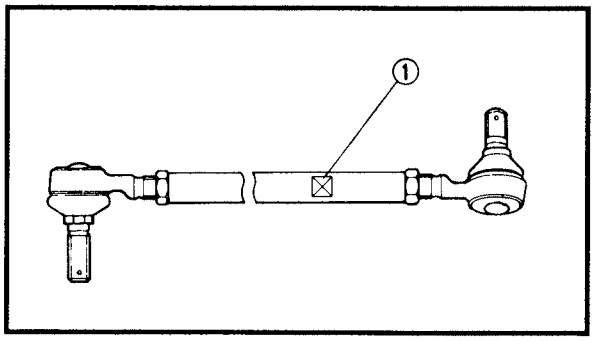


5. Install:
• Tie-rods (left and right)

NOTE:

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

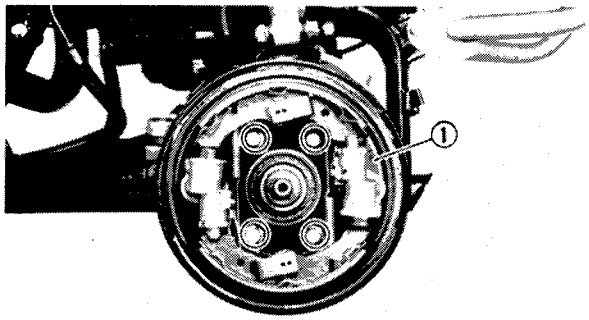
6. Tighten:
• Nuts (tie-rod end)

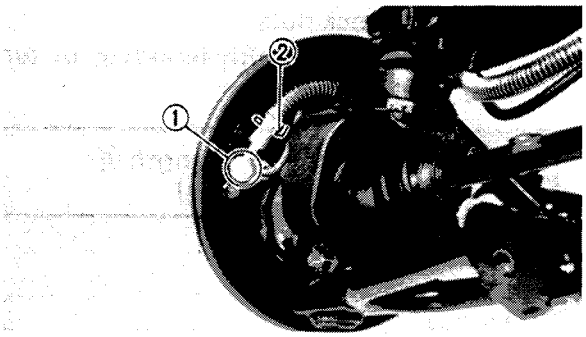
	Nuts (tie-rod end): 25 Nm (2.5 m • kg, 18 ft • lb)

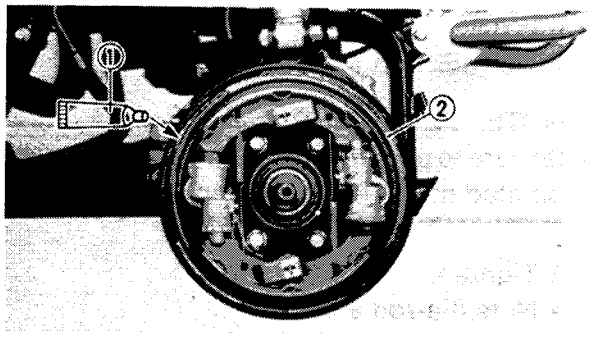
7. Install:
• Cotter pins

⚠ WARNING

Always use a new cotter pin.







8. Install:
- Backing plate assembly ①
  Refer to the "FRONT BRAKE" section.

	Bolts (backing plate): **28 Nm (2.8 m • kg, 20 ft • lb)** **LOCTITE® (HEAT RESISTANT)**

NOTE:
The backing plate should be installed with cut downward.

9. Connect:
- Brake hose ①
  Refer to the "FRONT BRAKE" section.

CAUTION:
- **Completely wipe off any brake fluid adhering to any part of machine. The brake fluid reacts chemically with paint, plastics, rubber materials, etc.**
- **Insert the brake hose end into the hose holder ② on the backing plate.**

⚠ WARNING

Always use the new copper washer.

	Union bolt (brake hose): **25 Nm (2.5 m • kg, 18 ft • lb)**

10. Apply:
- Yamaha brake grease ①
  (to the dust seal ②)

	Yamaha brake grease: **P/N. 90793-40003**

11. Install:
- Brake drum
- Front wheel
  Refer to the "FRONT AND REAR WHEELS" section.

	Axle nut (front wheel): **130 Nm (13 m • kg, 94 ft • lb)** **Nuts (front wheel):** **55 Nm (5.5 m • kg, 40 ft • lb)**

12. Fill:
- Master cylinder
  Refer to the "FRONT BRAKE" section.

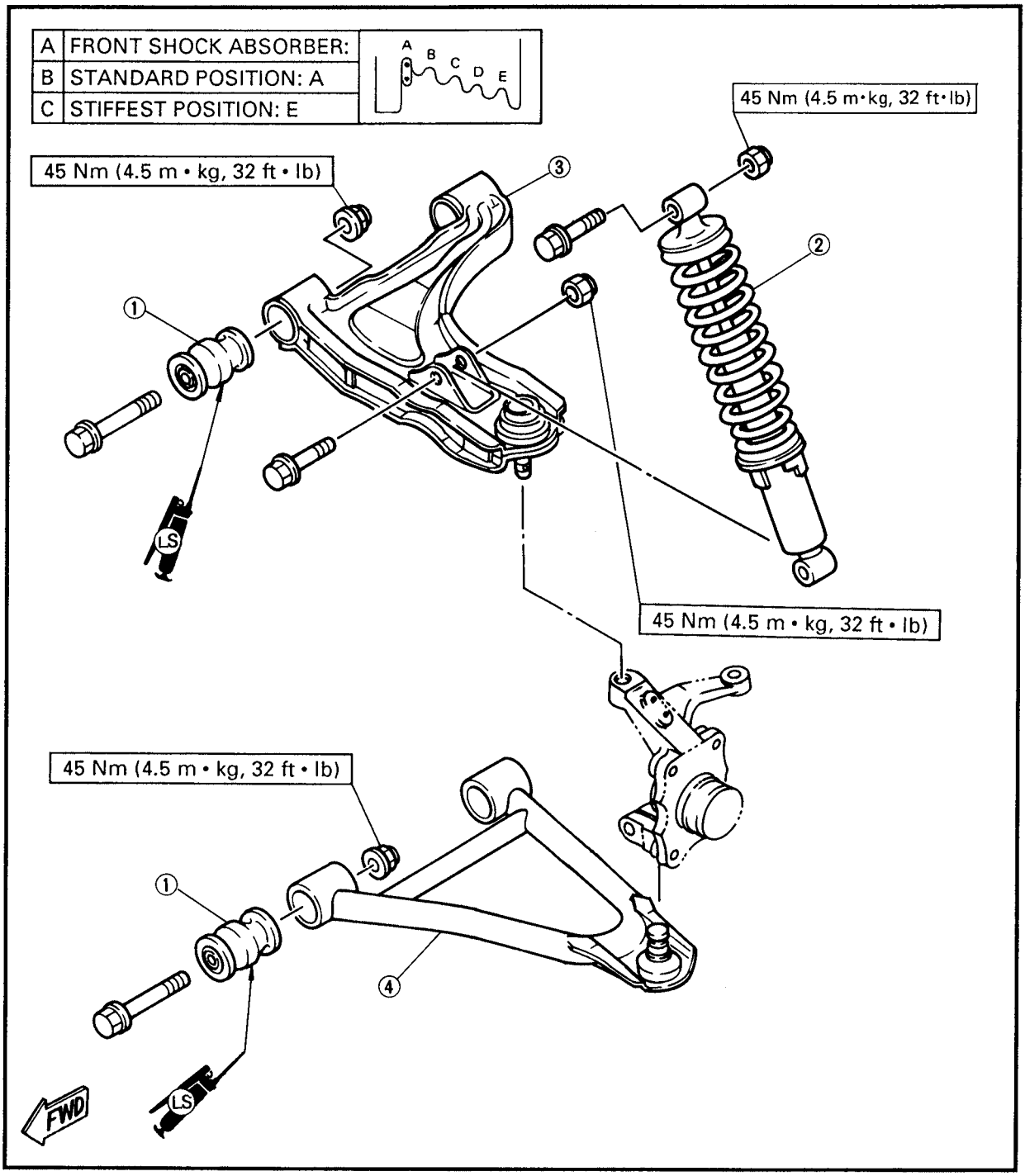
	Brake fluid: **DOT #4 or DOT #3**

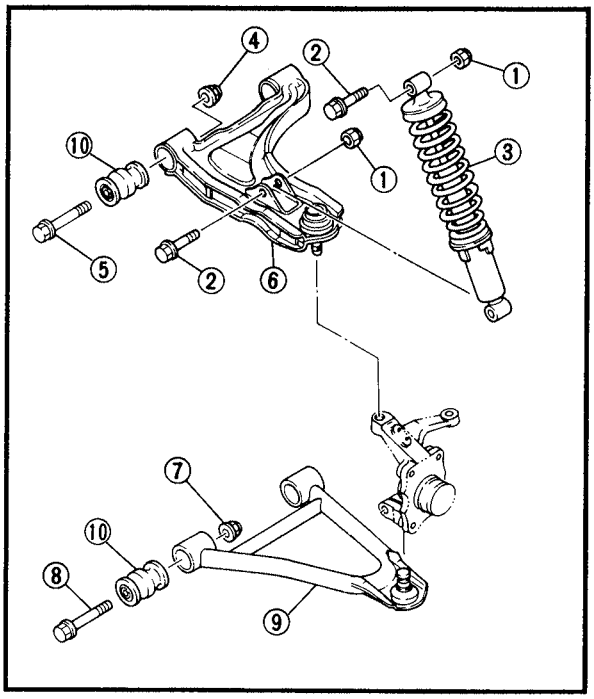
13. Air bleed:
- Brake system
  Refer to the "AIR BLEEDING" section in the CHAPTER 3.

14. Adjust:
- Toe-in
  Refer to the "TOE-IN ADJUSTMENT" section in the CHAPTER 3.

FRONT SHOCK ABSORBER AND FRONT ARMS

① Bushing
② Front shock absorber
③ Upper arm
④ Lower arm





REMOVAL

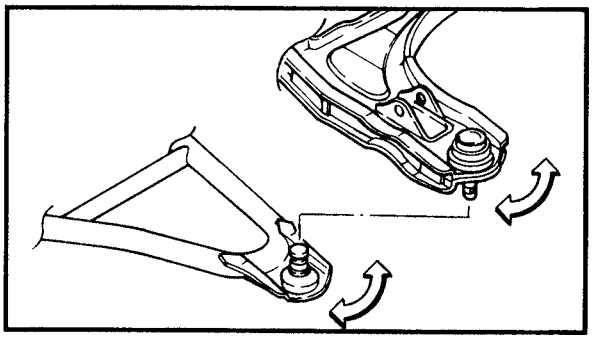
1. Remove:
- Front wheels
- Front brake drums

Refer to the "FRONT WHEEL-REMOVAL" section.

2. Remove:
- Backing plate assemblies
- Tie-rods
- Steering knuckles

Refer to the "STEERING KNUCLES AND TIE-ROD ENDS - REMOVAL" section.

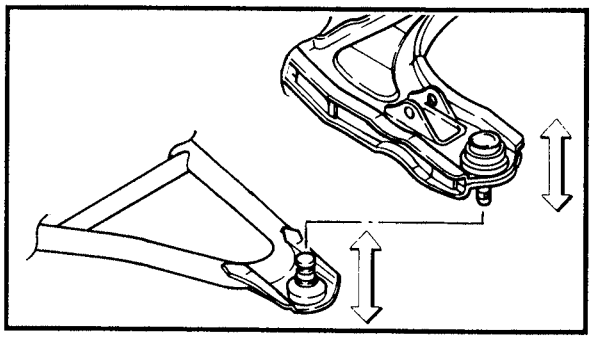
3. Remove:
- Nuts ① (front shock absorber)
- Bolts ② (front shock absorber)
- Front shock absorber ③
- Nuts ④ (upper arm)
- Bolts ⑤ (upper arm)
- Upper arm ⑥
- Nuts ⑦ (lower arm)
- Bolts ⑧ (lower arm)
- Lower arm ⑨
- Bushings ⑩



INSPECTION

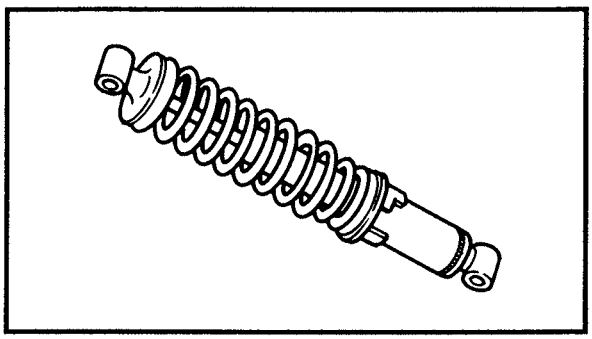
1. Inspect:
- Front arms (side play)

Side play → Replace bushings.
Move the front arms from side to side.
There should be no noticeable side play.

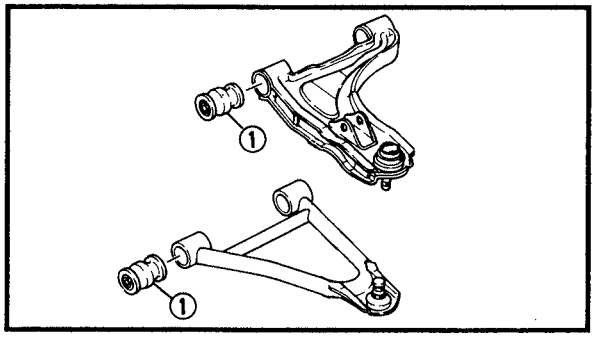


2. Inspect:
- Front arms (vertical movement)

Tightness/Binding/Rouge spots → Replace bushings.
Move the front arms up and down.



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



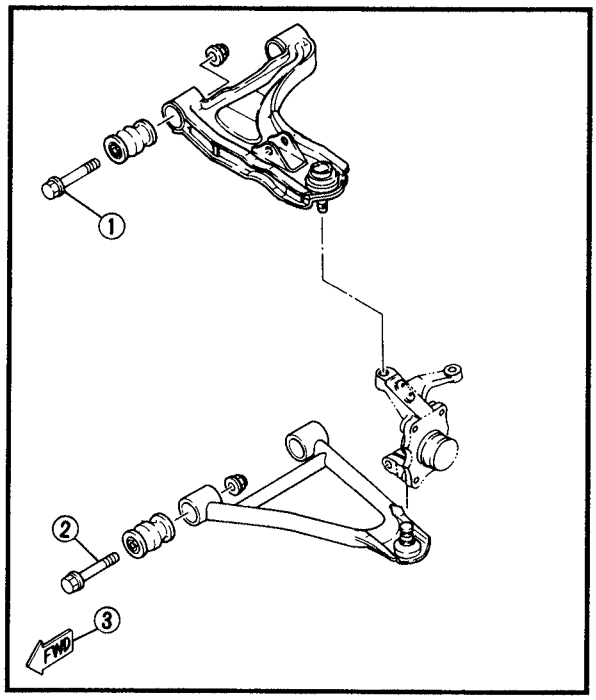
4. Inspect:
- Bushings ①
  Wear/Damage → Replace.

INSTALLATION

When installing the front arms and shock absorber, reverse the "REMOVAL" procedure. Note the following points.

1. Lubricate:
- Front arms
- Bushings

	Lithium - soap base grease



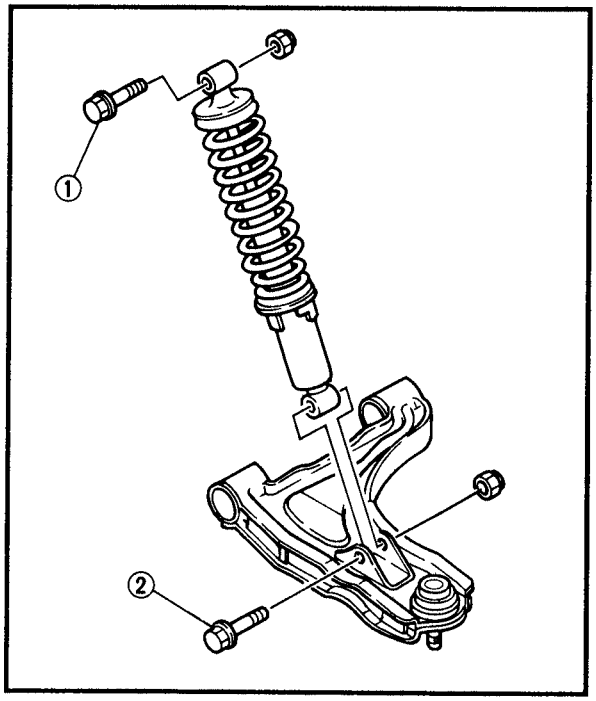
2. Install:
- Upper arm
- Lower arm

NOTE:
- Be sure to position the bolts (upper and lower) ①, ② so that the bolt head face outward.
- When tightening the nuts, move up the front arms.

③ Forward

3. Tighten:
- Nuts (front arm)

	Nuts (front arms): 45 Nm (4.5 m • kg, 32 ft • lb)



4. Install:
- Front shock absorber

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

5. Tighten:
- Nuts (front shock absorber)

	Nuts (front shock absorber): 45 Nm (4.5 m • kg, 32 ft • lb)

6. Install:
- Steering knuckles
- Tie-rods
- Backing plate assemblies

Refer to the "STEERING KNUCKLES AND TIE-ROD ENDS-INSTALLATION" section.

7. Install:
- Front brake drums
- Front wheels

Refer to the "FRONT AND REAR WHEELS" section.

8. Air bleed:
- Brake system

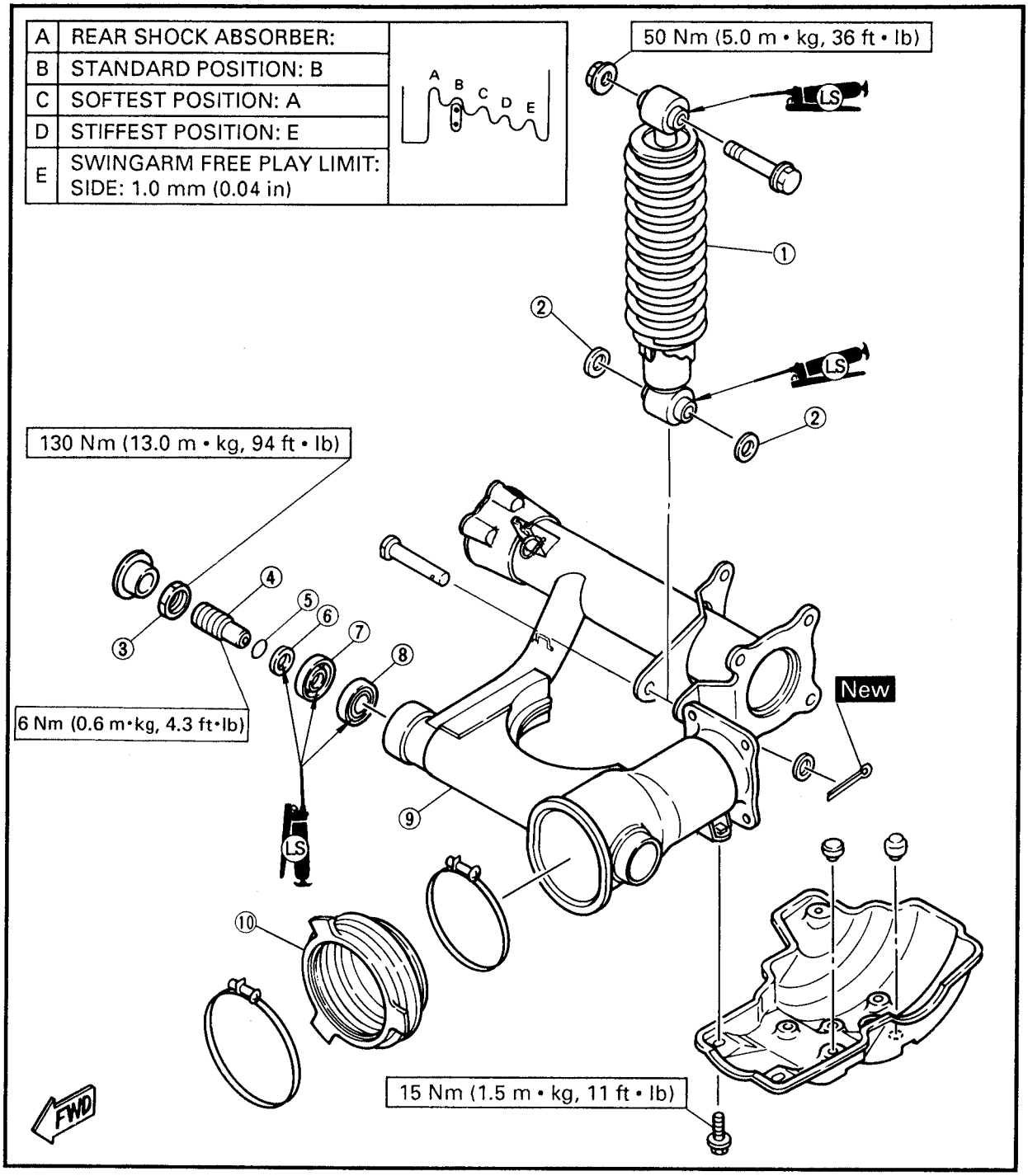
Refer to the "AIR BLEEDING" section in the CHAPTER 3.

9. Adjust:
- Toe-in

Refer to the "TOE-IN ADJUSTMENT" section in the CHAPTER 3.

REAR SHOCK ABSORBER AND SWINGARM

① Rear shock absorber
② Thrust washer
③ Locknut
④ Pivot shaft
⑤ O-ring
⑥ Collar
⑦ Oil seal
⑧ Taper roller bearing
⑨ Swingarm
⑩ Rubber boot



REMOVAL

1. Remove:
- Seat
- Rear carrier
- Rear fender

Refer to the "SEAT, CARRIERS, FENDERS AND FUEL TANK" section in the CHAPTER 3.

2. Remove:
- Rear wheels
- Rear brake drum
- Rear wheel hub
- Rear axle

Refer to the "REAR AXLE/REAR FINAL GEAR AND REAR DRIVE SHAFT - REMOVAL" section in the CHAPTER 6.

3. Remove:
- Brake shoe plate

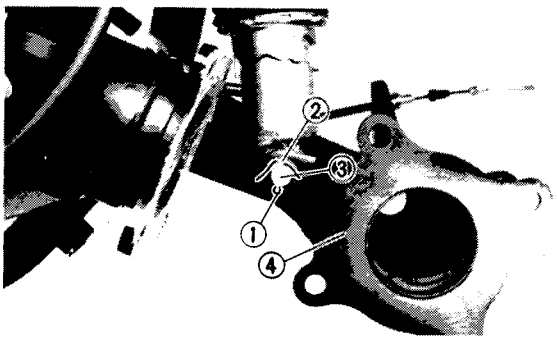
Refer to the "REAR BRAKE" section.

4. Remove:
- Trailer hitch bracket
- Rear final gear assembly

Refer to the "REAR AXLE/REAR FINAL GEAR AND REAR DRIVE SHAFT - REMOVAL" section in the CHAPTER 6.

5. Remove:
- Muffler

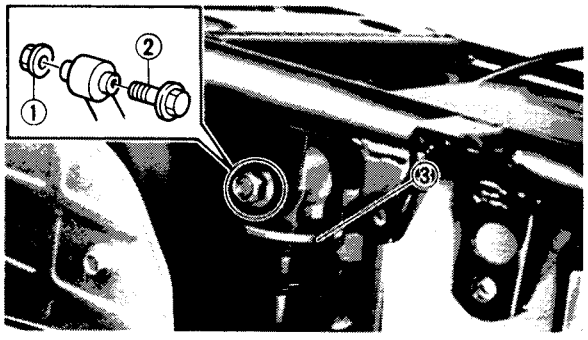
Refer to the "ENGINE REMOVAL" section in the CHAPTER 4.



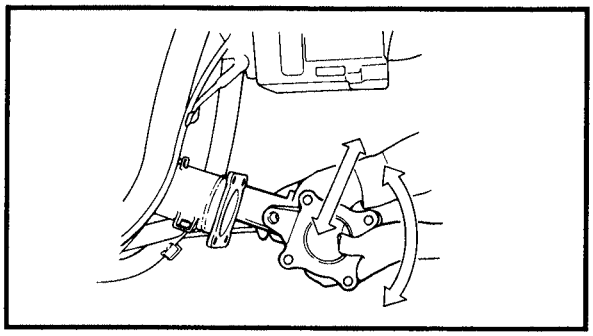
6. Remove:
- Cotter pin ①
- Washer ②
- Shaft ③ (shock absorber - lower)
- Spacer collars

NOTE:

When removing the lower shaft ③, hold the swingarm ④ so that it does not drop downwards when the shaft is removed.



7. Remove:
- Nut ①
- Bolt ② (shock absorber - upper)
- Shock absorber ③



8. Remove:
- Caps (pivot shaft)

9. Inspect:
- Swingarm free play

****

Inspection steps:

- **Check the tightening torque of the pivot shafts (swingarm) and locknuts (pivot shaft).**

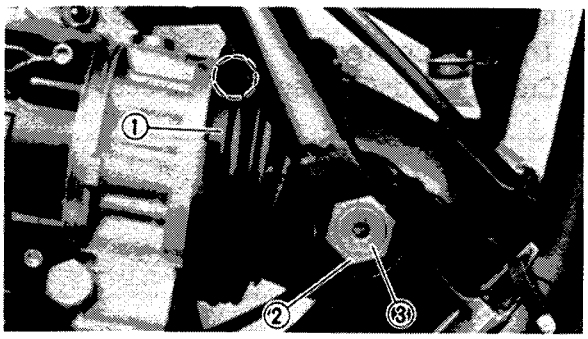
Pivot shaft (swingarm):
6 Nm (0.6 m • kg, 4.3 ft • lb)
Locknut (pivot shaft):
130 Nm (13 m • kg, 94 ft • lb)

- Check the swingarm side play by moving it from side to side.
  If side play noticeable, check the spacer collar, bearing and frame pivot.

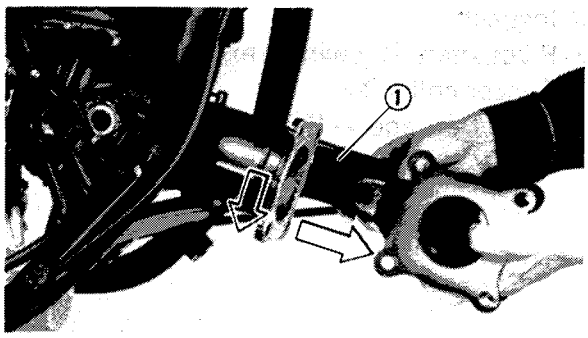
Free play limit:
1.0 mm (0.04 in)

- Check the swingarm vertical movement by moving it up and down.
  If vertical movement is tight, binding or rough, check the spacer collar, bearing and frame pivot.

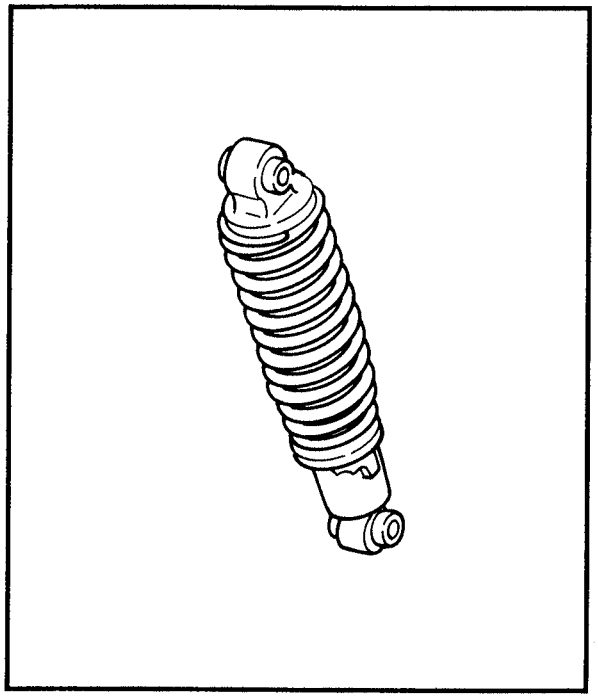
****



10. Remove:
- Clamp ① (rubber boot)
- Locknuts ② (pivot shaft)
- Pivot shafts ③ (swingarm)

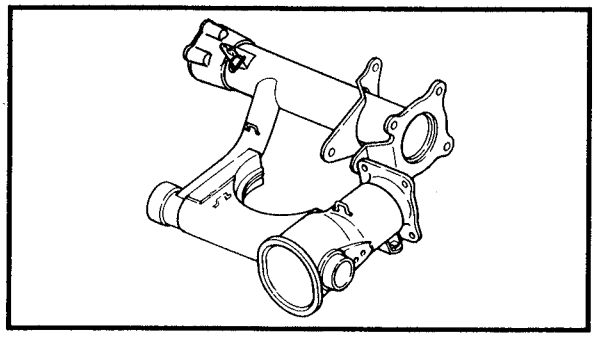


11. Remove:
- Swingarm ①

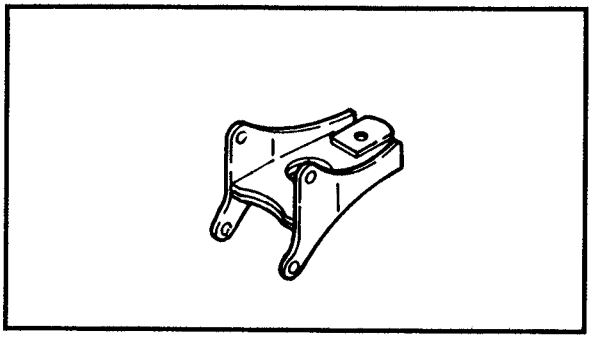


INSPECTION

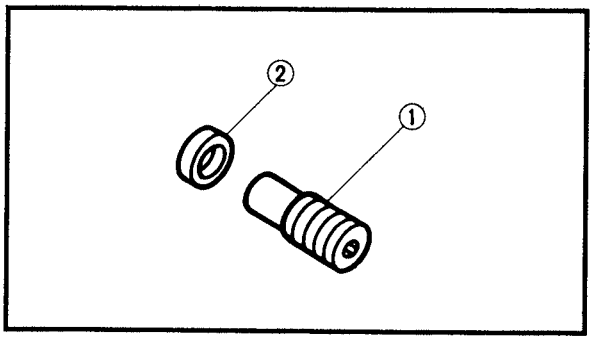
1. Inspect:
- Shock absorber
  Oil leakes → Replace the shock absorber assembly.
- Shock absorber rod
  Bends/Damage → Replace the shock absorber assembly.
- Spring
  Fatigue → Replace the shock absorber assembly.
  Move the spring up and down.



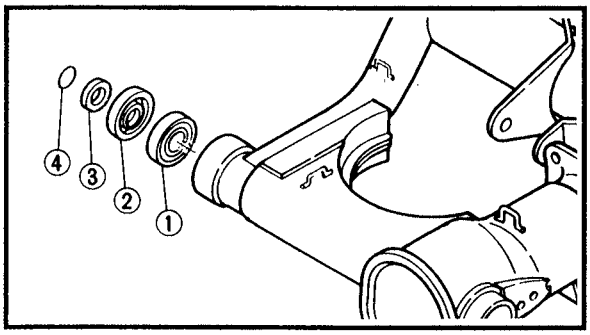
2. Inspect:
- Swingarm
  Cracks/Bends/Damage → Replace.



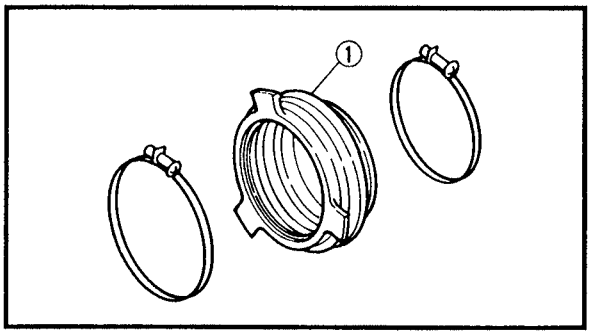
3. Inspect:
- Trailer hitch bracket
  Cracks/Bends/Damage → Replace.



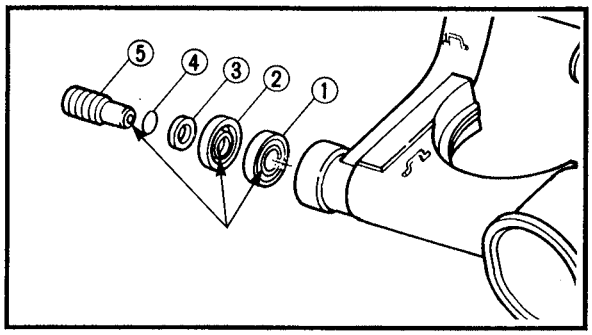
4. Inspect:
- Pivot shaft ① (swingarm)
- Spacer collar ②
  Wear/Damage → Replace.



5. Inspect:
- Bearings ① (swingarm)
  Bearings allow play in the swingarm or to the bearing turns roughly → Replace.
- Oil seals ②
- Collars ③
- O-ring ④
  Wear/Damage → Replace.



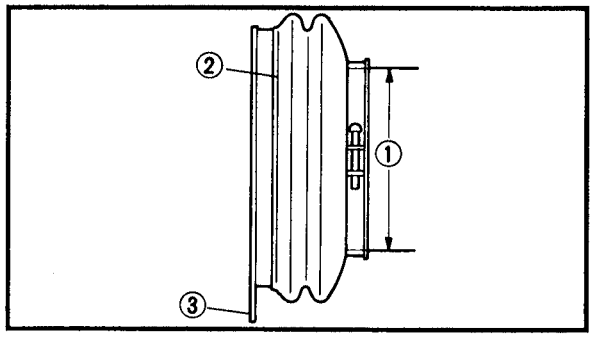
6. Inspect:
- Rubber boot ①
  Damage → Replace.



INSTALLATION

Reverse the "REMOVAL" procedures.
Note the following points.

1. Lubricate:
- Bearings ①
- Oil seals ②
- Collars ③
- O-ring ④
- Pivot shafts ⑤



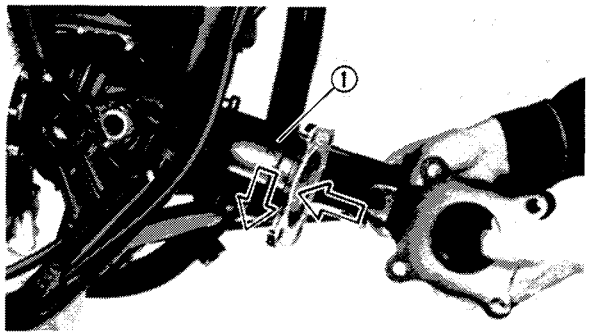
Lithium-soap base grease

2. Apply:
- Adhesive (for rubber)
  To the swingarm end ①.

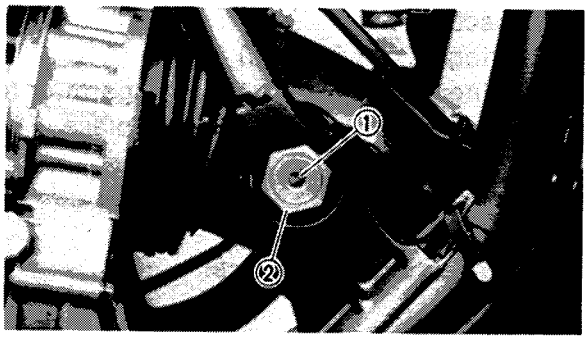
3. Install:
- Rubber boot ②

NOTE:

Be sure to position the rubber boot so that the tang ③ face downward.

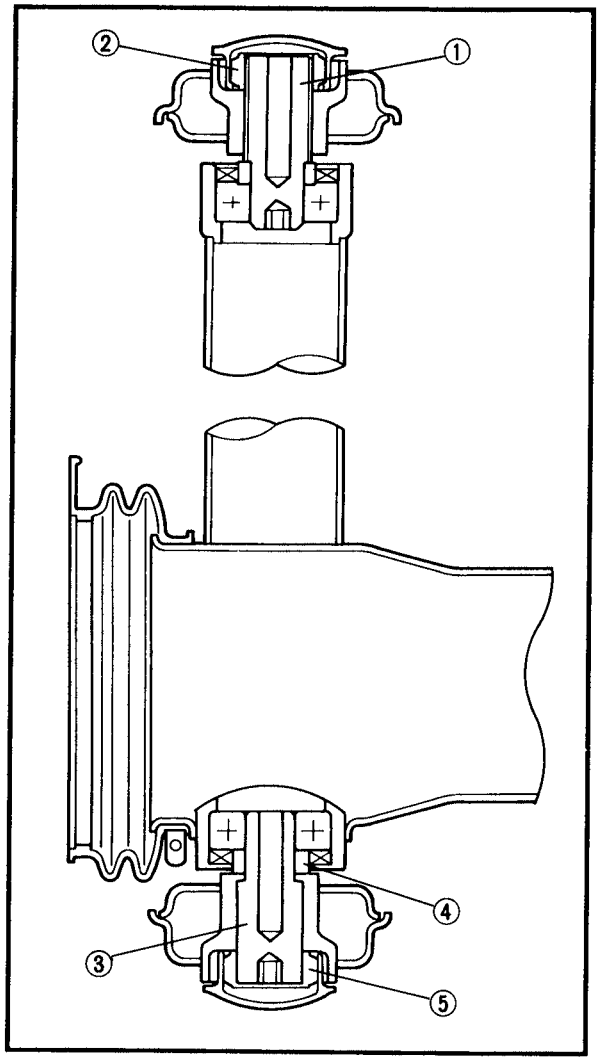


4. Install:
- Swingarm ①



5. Install:
- Pivot shafts ①
- Locknuts ② (swingarm)

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



6. Tighten:
- Pivot shafts

****

Pivot shaft tightening steps:
- Tighten the pivot shaft ① (right) to specification.

	Pivot shaft (right): 6 Nm (0.6 m • kg, 4.3 ft • lb)

- Tighten the locknut ② (right) to specification.

	Locknut (right): 130 Nm (13 m • kg, 94 ft • lb)

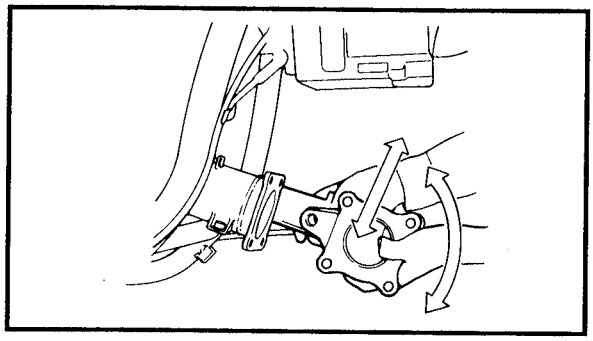
- Tighten the pivot shaft ③ (left) unit it contacts the collar ④.

	Pivot shaft (left): 6 Nm (0.6 m • kg, 4.3 ft • lb)

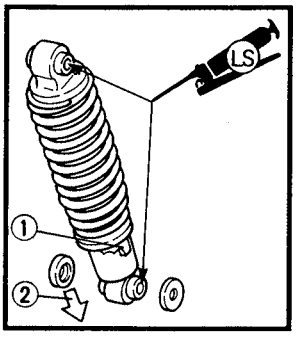
- Tighten the locknut ⑤ (left) to specification.

	Locknut (left): 130 Nm (13 m • kg, 94 ft • lb)

****



7. Inspect:
- Swingarm free play
  Refer to the step 9 in the "REMOVAL" section.



8. Lubricate:
- Bushings (shock absorber - upper and lower)

	Lithium-soap base grease

9. Install:
- Shock absorber

NOTE:
The rear shock absorber should be installed so that the spring seat ① on the shock absorber face downward ②.

⚠ WARNING

Always use a new cotter pin.

	Nut (shock absorber - upper): 50 Nm (5.0 m • kg, 36 ft • lb)

10. Install:
- Final gear assembly
  Refer to the "REAR AXLE/REAR FINAL GEAR AND REAR SHAFT DRIVE - INSTALLATION" section in the CHAPTER 6.

	Nuts (rear final gear housing): 23 Nm (2.3 m • kg, 17 ft • lb) **Bolts (rear final gear housing): 45 Nm (4.5 m • kg, 32 ft • lb)**

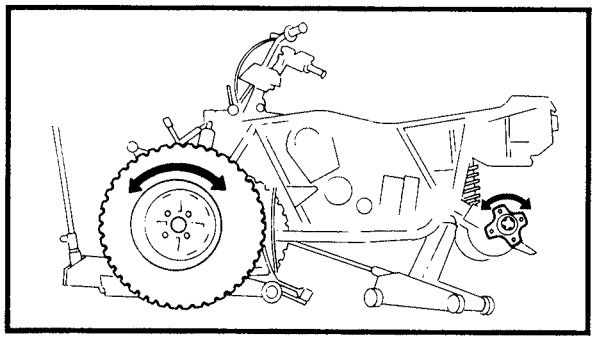
11. Check:
- Rear drive shaft operation

****

Rear drive shaft operation checking steps:
- Make sure that the machine is off the ground at the rear.
- Lift the front of the machine off the ground, too.

⚠ WARNING

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



- Turn the front wheels back and forth.
- Check the rear drive shaft operation.
  If the operation is unsmooth, reinstall the rear drive shaft properly.

****

12. Install:
- Muffler

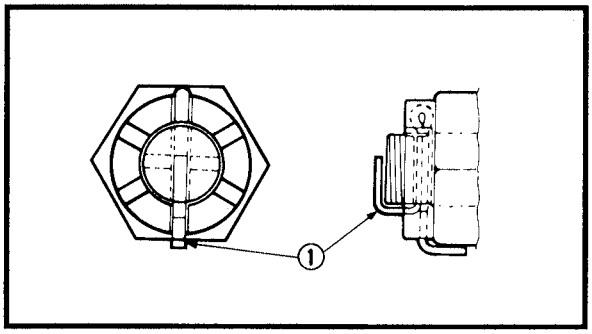
Refer to the "ENGINE ASSEMBLY AND ADJUSTMENT" section in the CHAPTER 4.

Bolts (muffler and frame):
27 Nm (2.7 m • kg, 19 ft • lb)
Bolt (muffler and exhaust pipe):
20 Nm (2.0 m • kg, 14 ft • lb)

13. Install:
- Brake shoe plate

Refer to the "REAR BRAKE" section.

Bolts (brake shoe plate):
30 Nm (3.0 m • kg, 22 ft • lb)



14. Install:
- Cotter pin ①

NOTE:
Do not loosen the wheel hub and brake drum nut after torque tightening. If the wheel hub nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the wheel hub nut.

⚠ WARNING
Always use a new cotter pin.

15. Install:
- Rear axle
- Rear wheel hub
- Rear brake drum
- Rear wheels

Refer to the "REAR AXLE/REAR FINAL GEAR AND REAR DRIVE SHAFT-INSTALLATION" section in the CHAPTER 6.

Axle nut (rear wheel):
150 Nm (15 m • kg, 110 ft • lb)
Nuts (rear wheel):
55 Nm (5.5 m • kg, 40 ft • lb)

16. Install:
- Rear fender
- Rear carrier
- Seat

Refer to the "SEAT, CARRIERS FENDERS AND FUEL TANK" section in the CHAPTER 3.

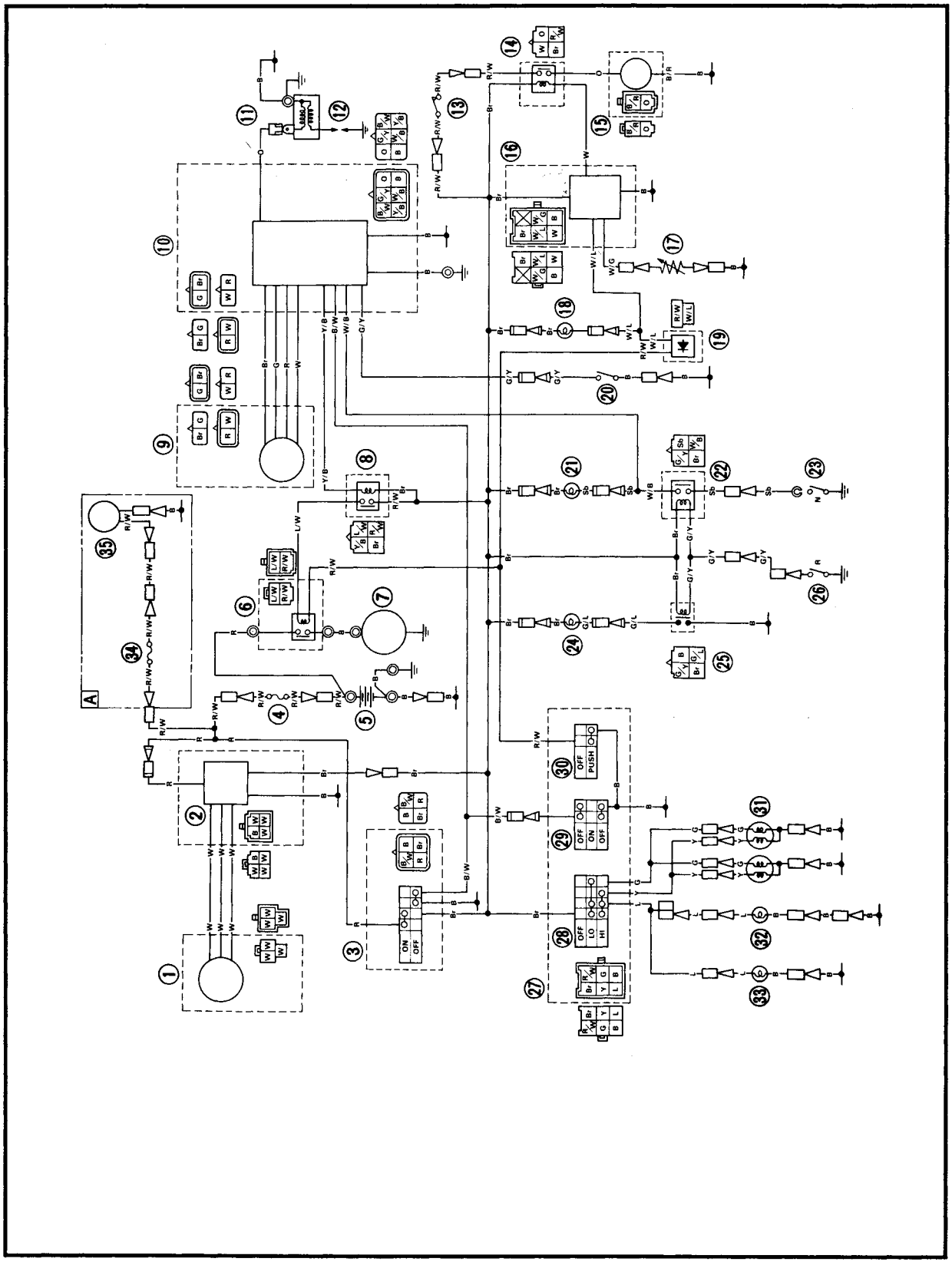
Bolts (rear carrier and frame):
33 Nm (3.3 m • kg, 24 ft • lb)
Bolts (rear carrier and bumper):
9 Nm (0.9 m • kg, 6.5 ft • lb)

17. Adjust:
- Rear brake pedal free play
- Rear brake lever free play

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

ELECTRICAL

YFM400FW CIRCUIT DIAGRAM



① CDI magneto (stator coil)
② Rectifier/Regulator
③ Main switch
④ Fuse (main)
⑤ Battery
⑥ Starter relay
⑦ Starter motor
⑧ Starting circuit cut off relay
⑨ CDI magneto (source coil and pickup coil)
⑩ CDI unit
⑪ Ignition coil
⑫ Spark plug
⑬ Circuit breaker (fan motor)
⑭ Fan motor relay
⑮ Fan motor
⑯ Fan motor control unit
⑰ Thermo unit
⑱ "OIL TEMP" indicator light
⑲ Diode
⑳ Front brake switch
㉑ "NEUTRAL" indicator light
㉒ Neutral relay
㉓ Neutral switch
㉔ "REVERSE" indicator light
㉕ Reverse relay
㉖ Reverse switch
㉗ Handlebar switch (left)
㉘ "LIGHTS" (dimmer) switch
㉙ "ENGINE STOP" switch
㉚ "START" switch
㉛ Head lights
㉜ Taillight
㉝ Speedometer light
㉞ Fuse
㉟ Terminal
[A] Option

NOTE:

- Brake switch is closed while the brake is applied.
- Neutral switch is closed while the transmission in neutral.
- Reverse switch is closed while the drive select lever position in LOW or HIGHT.
- "START" switch is closed while the button (switch) is pushed.

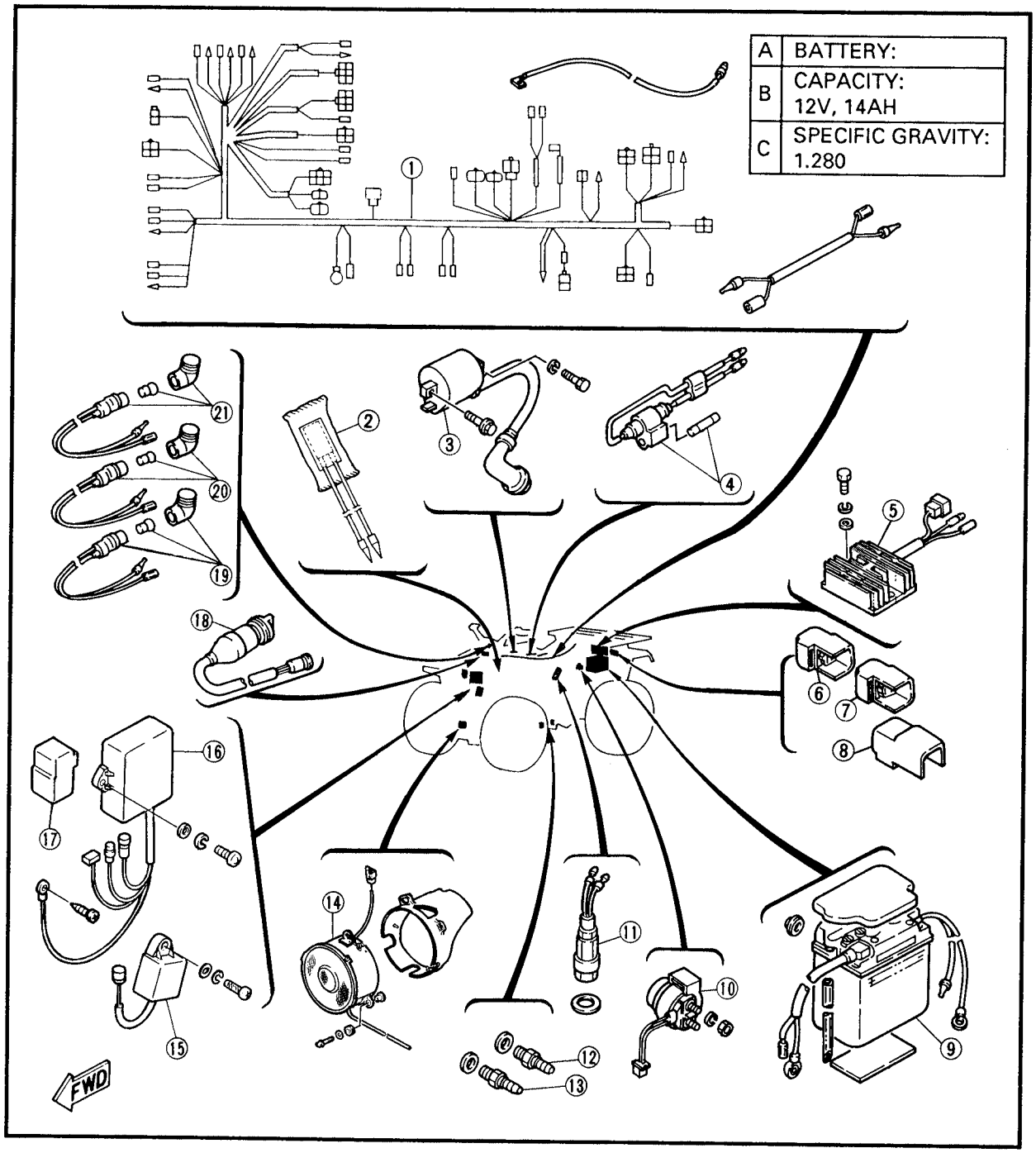
COLOR CODE

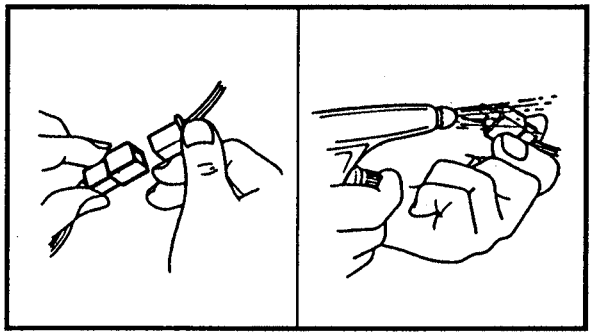
B	Black	B/W	Black/White
Br	Brown	G/L	Green/Blue
G	Green	G/Y	Green/Yellow
L	Blue	L/W	Blue/White
O	Orange	R/W	Red/White
R	Red	W/B	White/Black
Sb	Sky blue	W/G	White/Green
W	White	W/L	White/Blue
Y	Yellow	Y/B	Yellow/Black
B/R	Black/Red		

ELECTRICAL COMPONENTS

① Wire harness
② Circuit breaker
③ Ignition coil
④ Fuse
⑤ Rectifier/regulator
⑥ Neutral relay
⑦ Starting circuit cut-off relay
⑧ Reverse relay
⑨ Battery
⑩ Starter relay
⑪ Thermo unit
⑫ Reverse switch
⑬ Neutral switch
⑭ Fan motor
⑮ Fan motor control unit
⑯ CDI unit
⑰ Fan motor relay
⑱ Main switch
⑲ "OIL TEMP" indicator light
⑳ "NEUTRAL" indicator light
㉑ "REVERSE" indicator light

SPECIFICATIONS	RESISTANCE
IGNITION COIL:	
PRIMARY	0.36 ~ 0.48 Ω
SECONDARY	5.44 ~ 7.36 kΩ
PICK-UP COIL	171 ~ 209 Ω
SOURCE COIL	270 ~ 330 Ω
CHARGING COIL	0.70 ~ 0.86 Ω

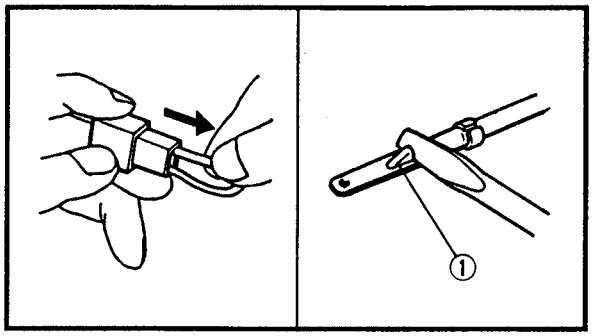




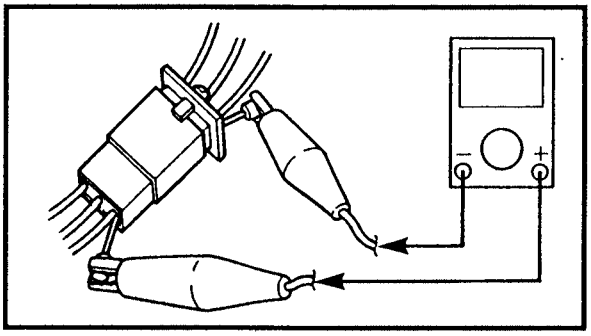
CHECKING OF CONNECTIONS

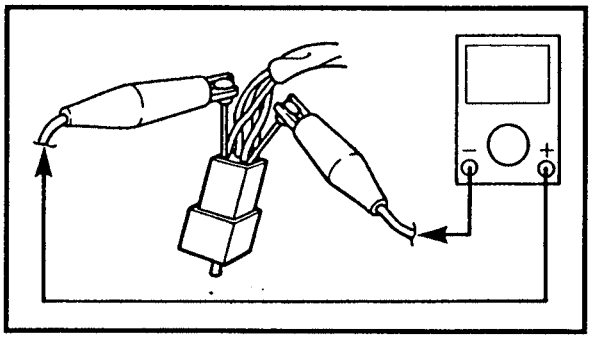
Dealing with stains, rust, moisture, etc. on the connector.

1. Disconnect:
   - Connector
2. Dry each terminal by an air blower.



3. Connect and disconnect the connector two or three times.
4. Pull the lead to check that it will not come off.
5. If the terminal comes off, bend up the pin ① and reinsert the terminal into connector.





6. Connect:
   - Connector
7. Check for continuity by a tester.

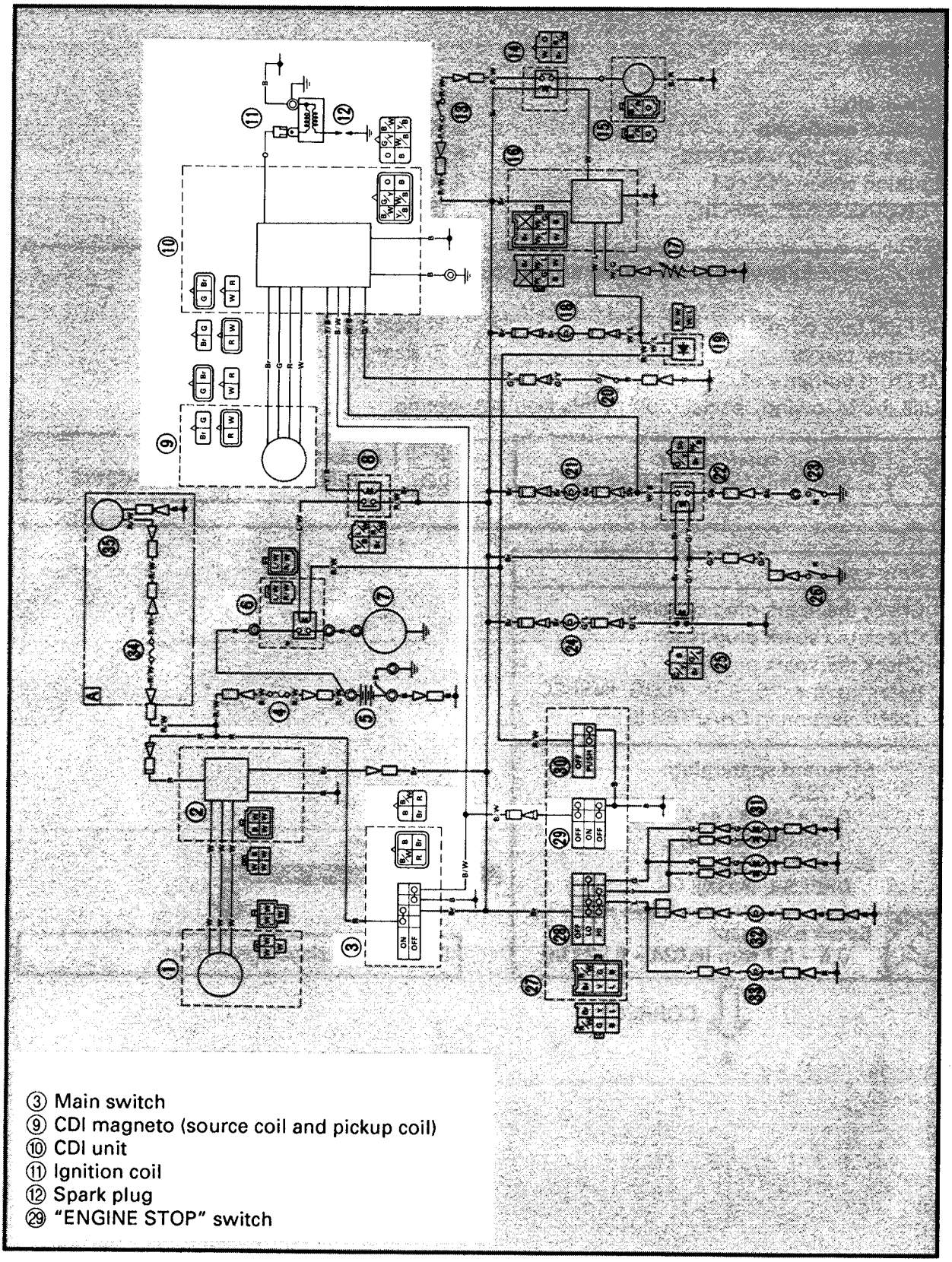
NOTE:

- If there is no continuity, clean the terminals.
- Be sure to perform the above steps 1 to 7 when checking the wireharness.
- When replacing the CDI unit, be sure to check its connector.
- For a field remedy, use a contact revitalizer available on the market.
- Us the tester on the connector as shown.

IGNITION SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows ignition system.



③ Main switch
⑨ CDI magneto (source coil and pickup coil)
⑩ CDI unit
⑪ Ignition coil
⑫ Spark plug
㉙ "ENGINE STOP" switch

TROUBLESHOOTING

IF THE IGNITION SYSTEM SHOULD BECOME INOPERATIVE (NO SPARK OR INTERMITTENT SPARK).

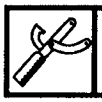
Procedure

Check:

1. Spark plug
2. Ignition spark gap
3. Spark plug cap resistance
4. Ignition coil resistance
5. "ENGINE STOP" switch
6. Main switch
7. Pickup coil resistance
8. Source coil resistance
9. Wiring connection. (Entire ignition system)

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat
  2) Fuel tank cover
  3) Front carrier
  4) Front fender
  5) Fuel tank
  6) Rear carrier
  7) Rear fender
- Use the following special tools in this troubleshooting.



Dynamic spark tester:
P/N. YM34487, 90890-06754

Pocket tester:
P/N. YU-03112, 90890-03112

1. Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.
  Refer to the "SPARK PLUG INSPECTION" section in CHAPTER 3.

Standard spark plug:
For USA
D8EA (NGK) or X24ES-U (NIPPONDENSO)
Except for USA
DR8ES-L (NGK)

Spark plug gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

INCORRECT → Repair or replace spark plug.

CORRECT ↓

*

*

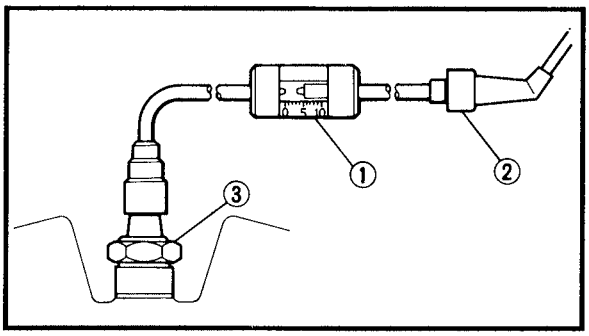
2. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the dynamic spark tester ① as shown.

② Spark plug cap
③ Spark plug

- Turn the main switch to "ON".
- Check the ignition spark gap.
- Start the engine and increase the spark gap until misfiring occurs.

Minimum spark gap:
6.0 mm (0.24 in)



MEETS SPECIFICATION

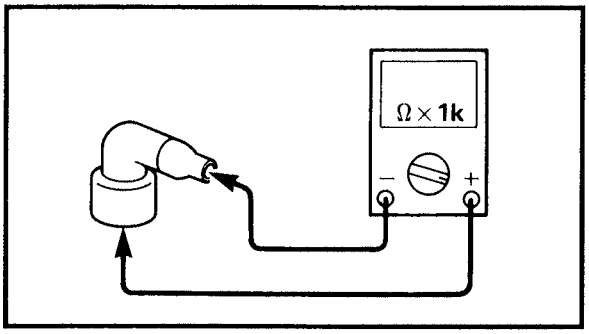
Ignition system is good.

OUT OF SPECIFICATION OR NO SPARK

3. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester (Ω × 1k) to the spark plug cap.
- Check the spark plug cap for specified resistance.

Spark plug cap resistance:
8 ~ 12kΩ at 20°C (68°F)



OUT OF SPECIFICATION

Spark plug cap is faulty, replace it.

MEETS SPECIFICATION

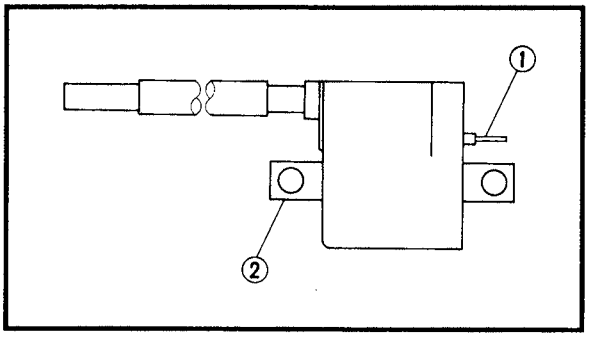
4. Ignition coil resistance

- Disconnect the ignition coil lead (Orange) from the ignition coil.
- Connect the pocket tester (Ω × 1) to the ignition coil.

Tester (+) lead → Lead terminal ①
Tester (–) lead → Ignition coil base ②

- Check the primary coil for specified resistance.

Primary coil resistance:
0.36 ~ 0.48Ω at 20°C (68°F)
(Lead terminal – ignition coil base)

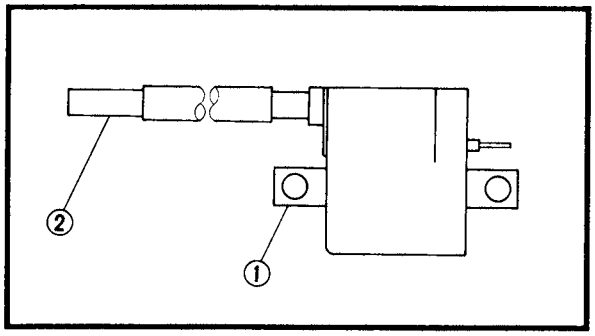


- Connect the Pocket tester (Ω × 1k) to the ignition coil.

Tester (+) lead → Ignition coil base ①
Tester (–) lead → Spark plug lead ②

- Check the secondary coil for specificated resistance.

Secondary coil resistance:
5.44 ~ 7.36kΩ at 20°C (68°F)
(Ignition coil base - spark plug lead)



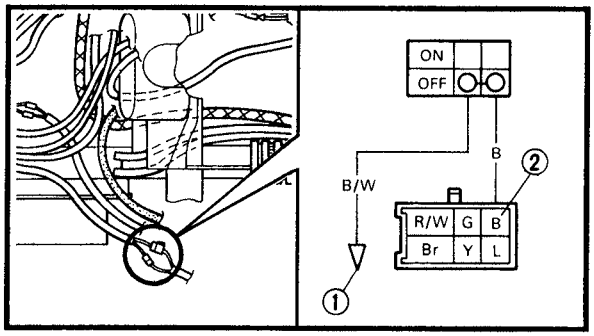
OUT OF SPECIFICATION

Ignition coil is faulty, replace it.

BOTH MEET SPECIFICATIONS

5. "ENGINE STOP" switch

- Disconnect the "ENGINE STOP" switch leads from the wireharness.



INCORRECT

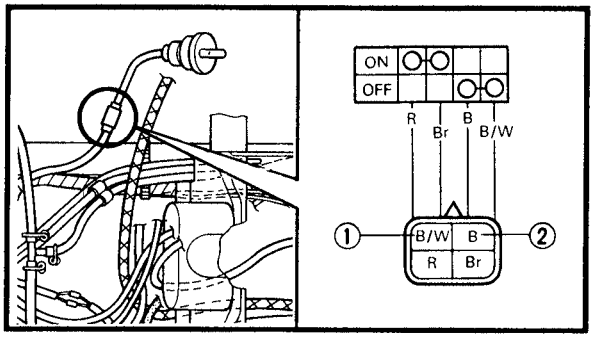
- Check the switch component for the continuity between "Black/White ① and Black ②".

"ENGINE STOP" switch is faulty, replace handlebar switch (left).

CORRECT

6. Main switch

- Disconnect the main switch coupler from the wireharness.



INCORRECT

- Check the switch component for the continuity between "Black/White ① and Black ②".

Main switch is faulty, replace it.

CORRECT

*

*

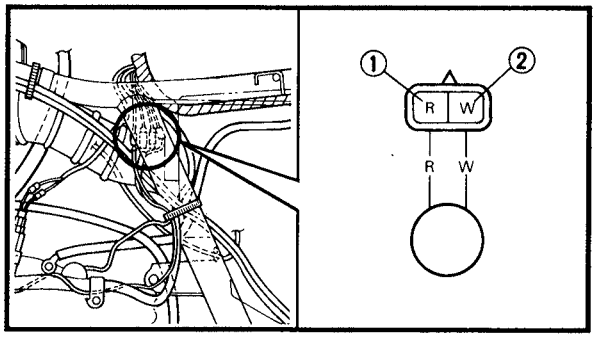
7. Pickup coil resistance

- Disconnect the CDI magneto coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the pickup coil leads.

Tester (+) lead → Red ① lead
Tester (–) lead → White ② lead

- Check the pickup coil for specified resistance.

Pickup coil resistance:
171 ~ 209Ω at 20°C (68°F)
(Red – White)



OUT OF SPECIFICATION

Pickup coil is faulty, replace it.

MEETS SPECIFICATION

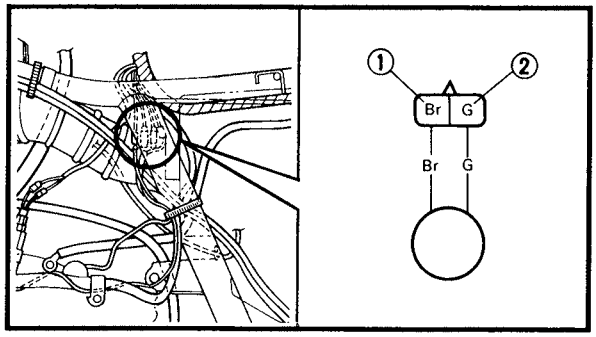
8. Source coil resistance

- Disconnect the CDI magneto coupler from the wireharness.
- Connect the pocket tester (Ω × 100) to the source coil leads.

Tester (+) lead → Brown ① lead
Tester (–) lead → Green ② lead

- Check the source coil for specified resistance.

Source coil resistance:
270 ~ 330Ω at 20°C (68°F)
(Brown – Green)



OUT OF SPECIFICATION

Source coil is faulty, replace it.

MEETS SPECIFICATION

9. Wiring connection

Check the entire ignition system for connections. Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION

Correct.

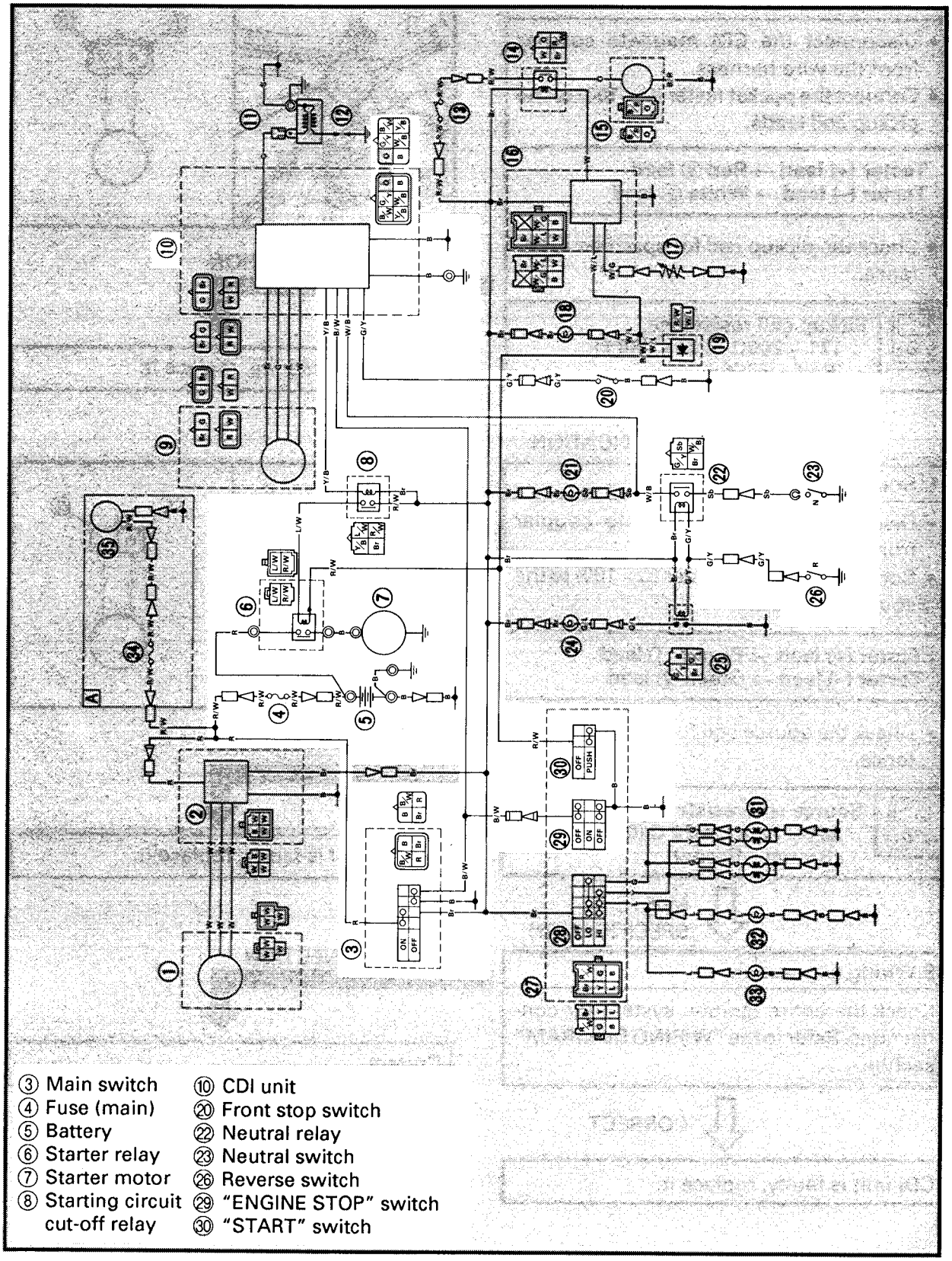
CORRECT

CDI unit is faulty, replace it.

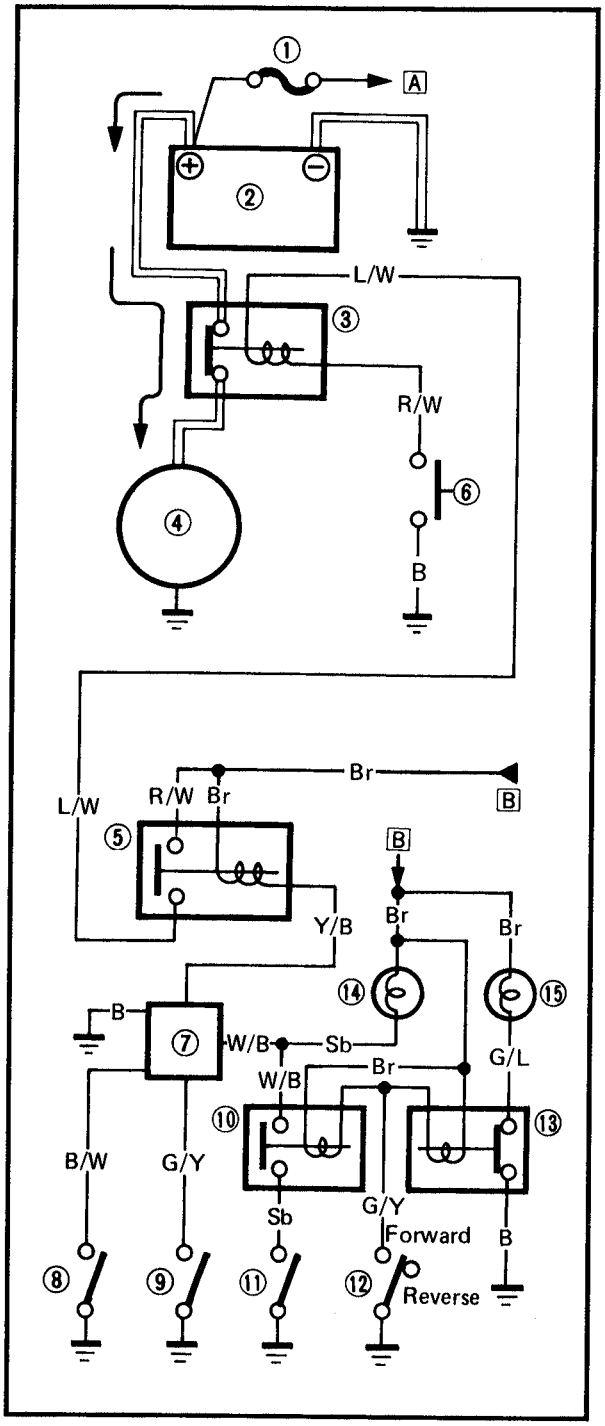
ELECTRICAL STARTING SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows electric starting system.



③ Main switch
④ Fuse (main)
⑤ Battery
⑥ Starter relay
⑦ Starter motor
⑧ Starting circuit cut-off relay
⑩ CDI unit
⑳ Front stop switch
㉒ Neutral relay
㉓ Neutral switch
㉖ Reverse switch
㉙ "ENGINE STOP" switch
㉚ "START" switch



STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor, starter relay, neutral switch, starting circuit cut-off relay, front stop switch, neutral relay, CDI unit and reverse switch. If the main switch is on and the "ENGINE STOP" switch is RUN, the starter motor can be operated only if:

- The transmission is in neutral (the neutral switch is on) and the select lever is in forward (the reverse switch is on).

  or

- Pull in the front brake lever (the front stop switch is ON).

NOTE:

The starter motor can be operated irrespective of the engine stop switch ("OFF" or "RUN"). However, the engine can be started if the engine stop switch at "RUN".

The starting circuit cut-off relay prevents the starter from operating when the transmission is in gear or the select lever is in reverse, and the front brake lever is free. In this instance, the starting circuit cut-off relay is off so that current cannot reach the starter motor.

① Fuse
② Battery
③ Starter relay
④ Starter motor
⑤ Starting circuit cut-off relay
⑥ "START" switch
⑦ CDI unit
⑧ "ENGINE STOP" switch
⑨ Front stop switch
⑩ Neutral relay
⑪ Neutral switch
⑫ Reverse switch
⑬ Reverse relay
⑭ "NEUTRAL" indicator light
⑮ "REVERSE" indicator light
Ⓐ TO MAIN SWITCH
Ⓑ FROM MAIN SWITCH

TROUBLESHOOTING

STARTER MOTOR DOES NOT OPERATE.

Procedure

Check:

1. Fuse
2. Battery
3. Starter motor
4. Starter relay
5. Main switch
6. "START" switch
7. Starting circuit cut-off relay
8. "ENGINE STOP" switch
9. Neutral switch
10. Neutral relay
11. Reverse switch
12. Front stop switch
13. Wiring connection (entire electric starting system)

NOTE:

- Remove the following before troubleshooting.
  1. Seat
  2. Front carrier
  3. Fuel tank cover
  4. Front fender
  5. Rear carrier
  6. Rear fender
- Use the following special tool in this troubleshooting.

Pocket tester:
P/N. YU-03112, 90890-03112

1. Fuse (main)
   - Check the fuse condition. Refer to the "FUSE INSPECTION" section in the CHAPTER 3.

INCORRECT → Fuse is faulty, replace it.

CORRECT ↓

2. Battery
   - Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Specific gravity:
1.280 at 20°C (68°F)

INCORRECT →
- Refill the battery fluid
- Clean the battery terminals.
- Recharge or replace the battery

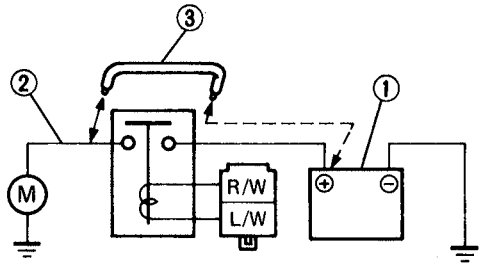
CORRECT ↓

*

*

3. Starter motor

- Connect the battery positive terminal ① and starter motor cable ② using a jumper lead ③ * as shown.



- Check the starter motor for operation.

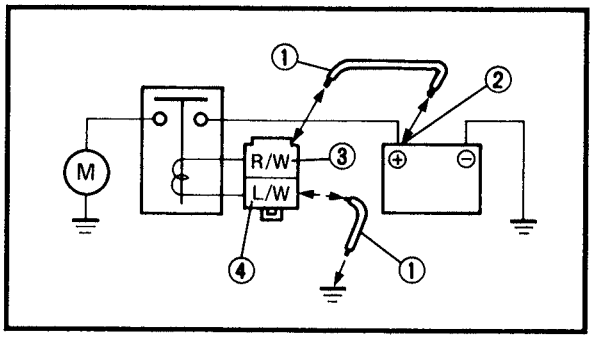
DOES NOT MOVE → Starter motor is faulty, repair or replace it.

MOVES ↓

4. Starter relay

- Disconnect the starter relay coupler.
- Connect the battery and frame to the starter relay coupler, using the jumper lead ① as shown.

Battery (+) terminal ② → Red/White terminal ③
Frame → Blue/White terminal ④



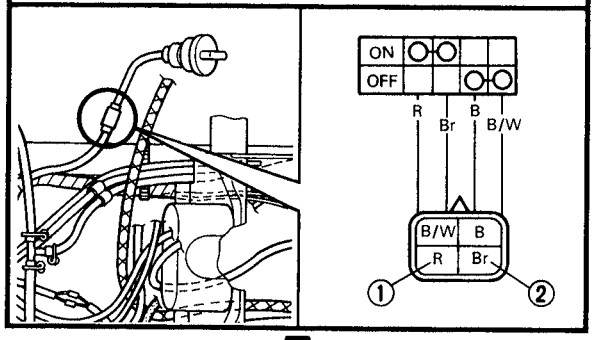
- Check the starter motor for operation.

DOES NOT MOVE → Starter relay is faulty, replace it.

MOVES ↓

5. Main switch

- **Disconnect the main switch coupler from the wireharness.**
- **Check the switch component for the continuity between "Red ① and Brown ②". Refer to the "CHECKING OF SWITCHES" section.**



INCORRECT → Main switch is faulty, replace it.

CORRECT ↓

*

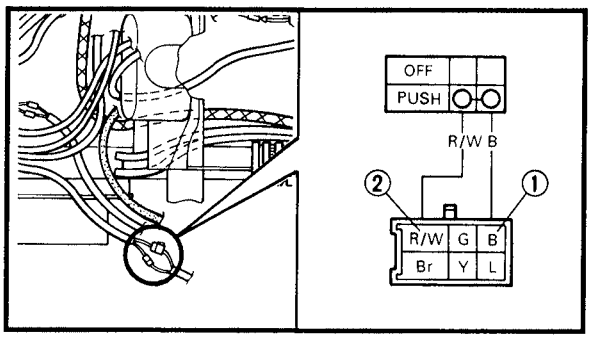
* **WARNING**

A wire for the jumper lead must have a capacity equivalent to or greater than that of the battery lead. Otherwise it may cause the jumper lead to be burned. This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

*

6. "START" switch

- Disconnect the handlebar switch coupler from the wire harness.
- Check the switch component for the continuity between "Black ① and Red/White ②".



INCORRECT

"START" switch is faulty, replace handlebar switch (left).

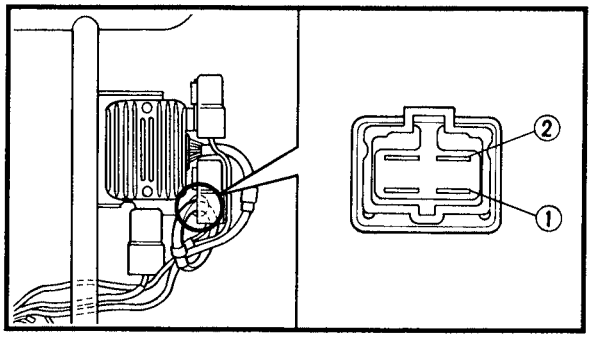
7. Starting circuit cut-off relay

- Disconnect the starting circuit cut-off relay from the wire harness.
- Connect the pocket tester (Ω × 10) to the relay terminal.

Tester (+) lead → Terminal ①.
Tester (–) lead → Terminal ②.

- Check the starting circuit cut-off relay for specified resistance.

Starting circuit cut-off relay resistance:
72 ~ 88Ω at 20°C (68°F)

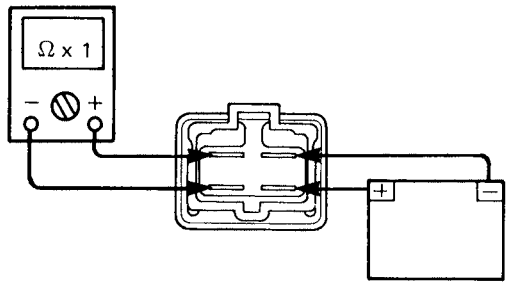


*

- If the resistance is within specification, go to the next steps. If not, replace the relay.
- Connect the battery (12V) and pocket tester (Ω × 1) as shown.*

⚠ WARNING

This check is likely to produce sparks, so be sure to connect battery leads securely to terminal. Also be sure that no flammable gas or fluid is in the vicinity.



- Check the starting circuit cut-off relay for continuity.

Battery connected: ZeroΩ
Battery disconnected: ∞

OUT OF SPECIFICATION

Starting circuit out-off relay is faulty, replace it.

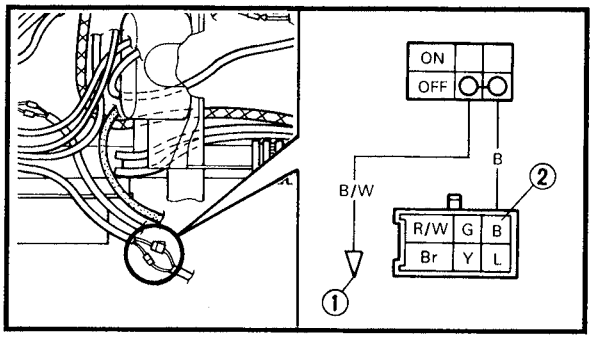
BOTH MEET SPECIFICATIONS

*

*

8. "ENGINE STOP" switch

- Disconnect the "ENGINE STOP" switch leads from the wireharness.



- Check the switch component for the continuity between "Black/White ① and Black ②".

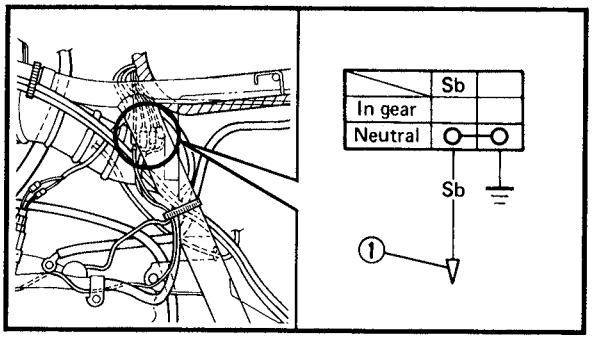
INCORRECT

"ENGINE STOP" switch is faulty, replace handlebar switch (left).

CORRECT

9. Neutral switch

- Disconnect the neutral switch lead from the wireharness.



- Check the switch component for continuity between "Sky blue ① and ground".

INCORRECT

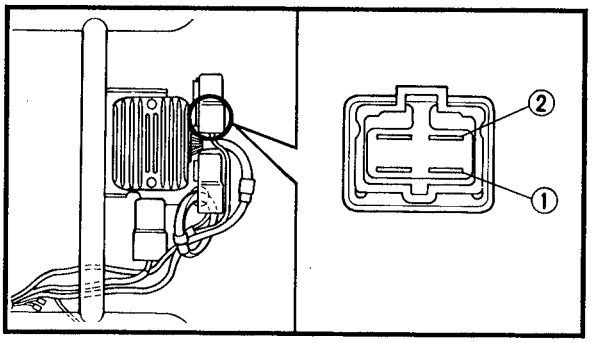
Neutral switch is faulty, replace it.

CORRECT

10. Neutral relay

- Disconnect the neutral relay from the wireharness.
- Connect the Pocket tester (Ω × 10) to the relay terminal.

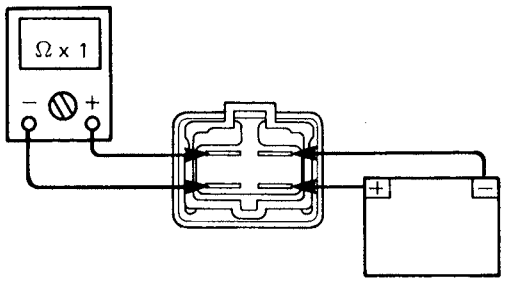
Tester (+) lead → Terminal ①.
Tester (–) lead → Terminal ②.



- Check the neutral relay for specified resistance.

Neutral relay resistance:
72 ~ 88Ω at 20°C (68°F)

- If the resistance is within specification, go to the next steps. If not, replace the relay.
- Connect the battery and pocket tester as shown.*



- Check the neutral relay for continuity.

Battery connected: ZeroΩ
Battery disconnected: ∞

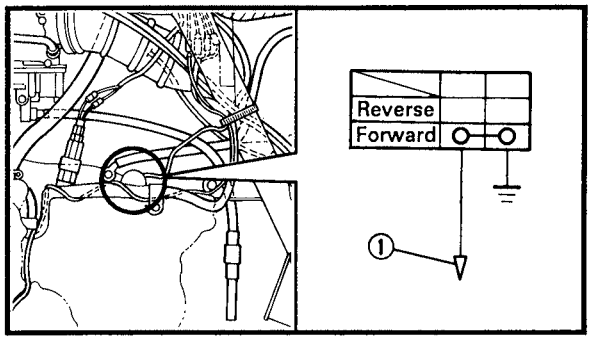
OUT OF SPECIFICATION

Neutral relay is faulty, replace it.

BOTH MEET SPECIFICATIONS

11. Reverse switch

- Disconnect the reverse switch lead from the Reverse switch terminal.



- Check the switch component for continuity between the "Reverse switch terminal ① and ground".

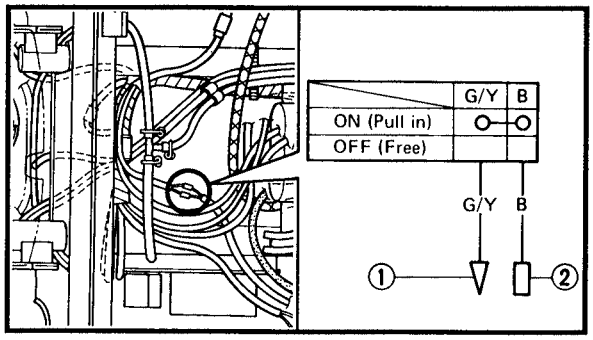
INCORRECT

Reverse switch is faulty, replace it.

CORRECT

12 . Front stop switch

- Disconnect the front stop switch leads from the wire harness.



- Check the switch component for the continuity between "Green/Yellow ① and Black ②.

INCORRECT

Brake switch is faulty, replace it.

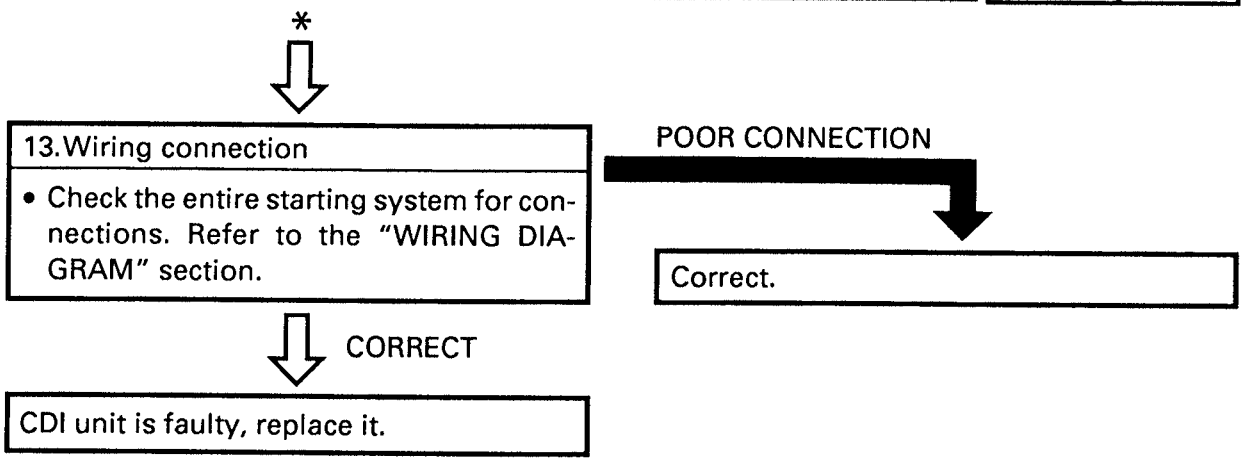
CORRECT

*

*

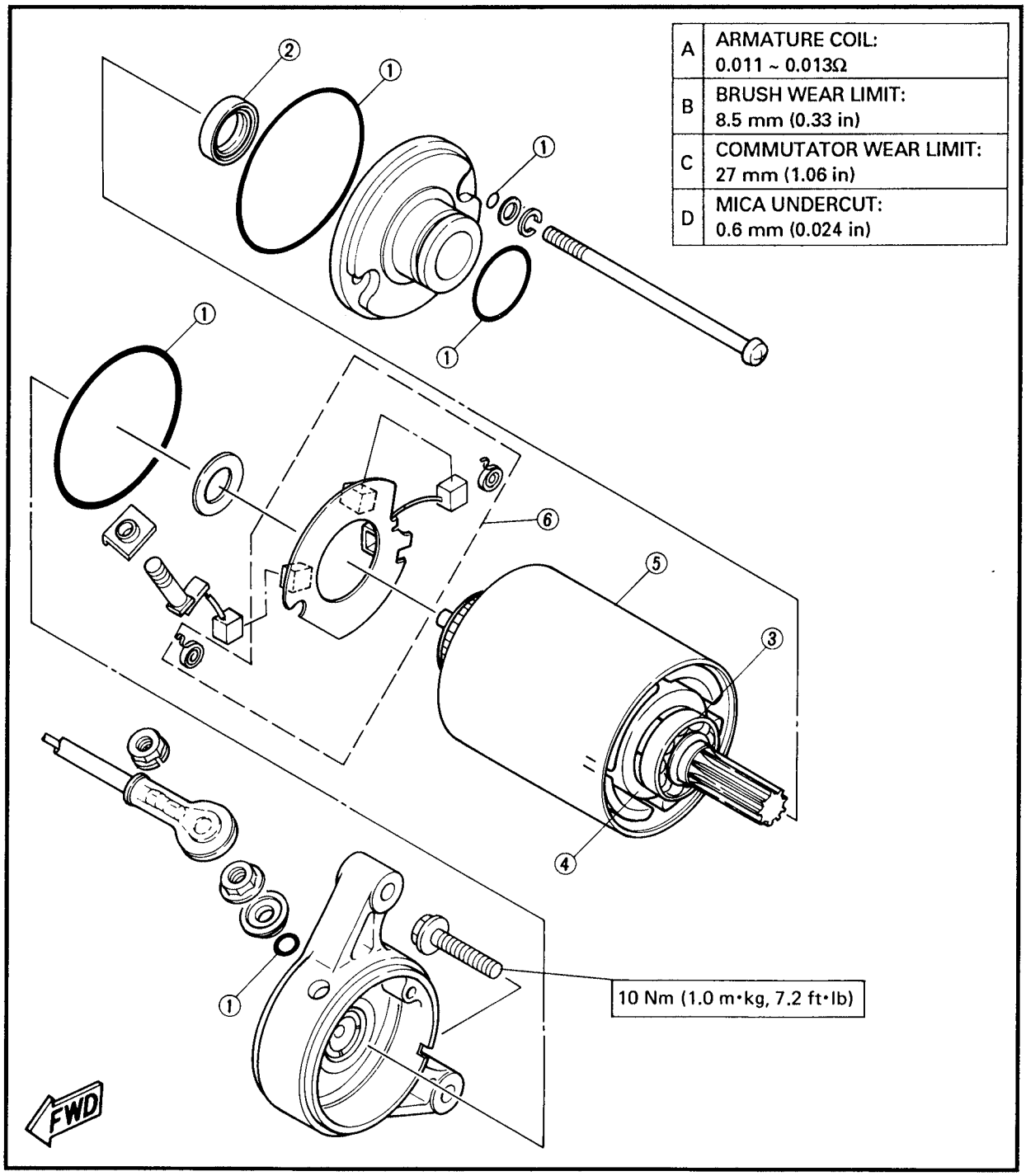
⚠ WARNING

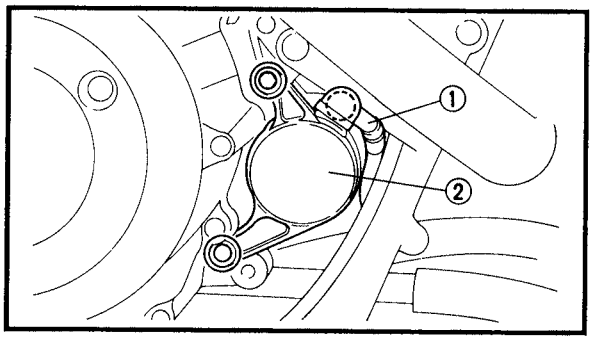
This check is likely to produce sparks, so be sure to connect the battery leads securely to the terminal. Also be sure that no flammable gas or fluid is in the vicinity.


*
13.Wiring connection
• Check the entire starting system for connections. Refer to the "WIRING DIAGRAM" section.
POOR CONNECTION
Correct.
CORRECT
CDI unit is faulty, replace it.

STARTER MOTOR

① O-ring
② Oil seal
③ Bearing
④ Armature coil assembly
⑤ Yoke assembly
⑥ Brush set



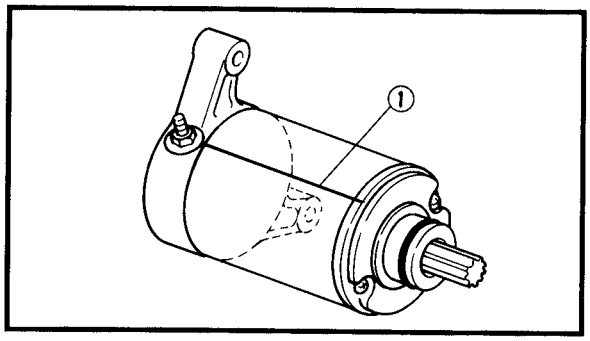


Removal

1. Disconnect:
- Battery negative lead
- Starter motor lead ①

CAUTION:

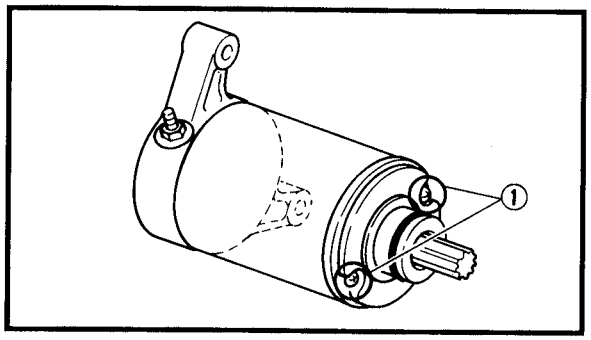
Disconnect the battery negative lead first and then disconnect the starter motor lead ①.



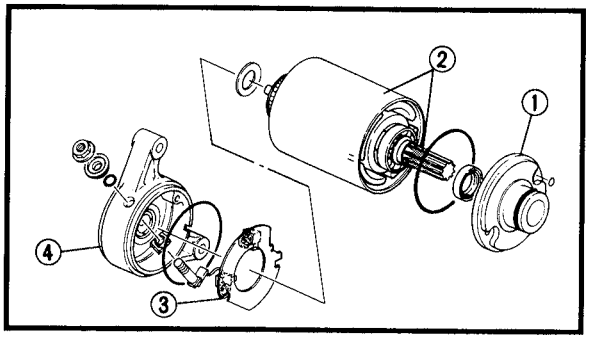
2. Remove
- Starter motor ②

Disassembly

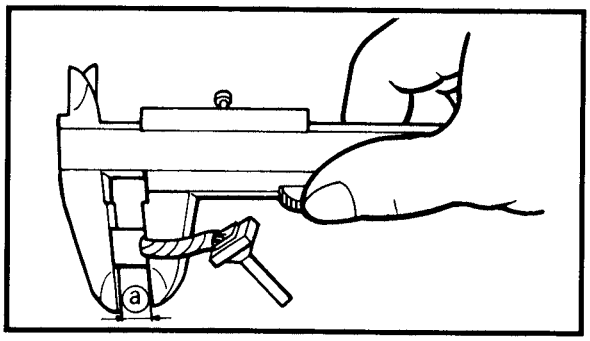
1. Put identifying marks ① on the brackets for reassembly as shown.



2. Remove:
- Screws ①



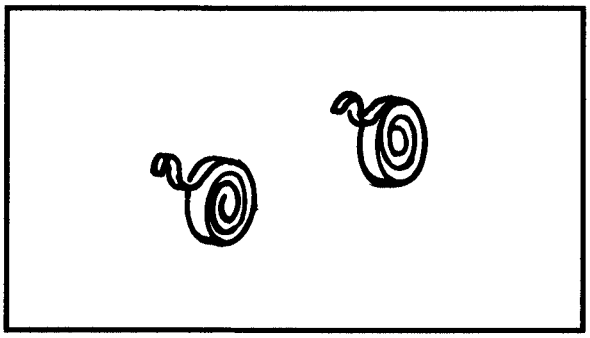
3. Remove:
- Bracket ① (rear)
- Yoke assembly ② (with armature coil assembly)
- Brush assembly ③
- Bracket ④ (front)



Inspection

1. Measure:
- Brush length ⓐ (each)
  Out of specification → Replace brush.

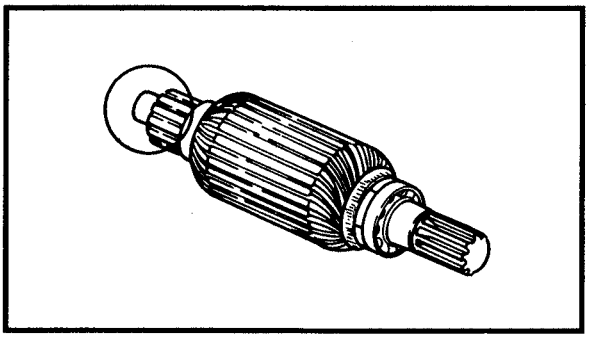
Brush length:
12.0 mm (0.47 in)
<Wear limit:>
<8.5 mm (0.33 in)>



2. Inspect:
- Brush spring
  Damage → Replace.

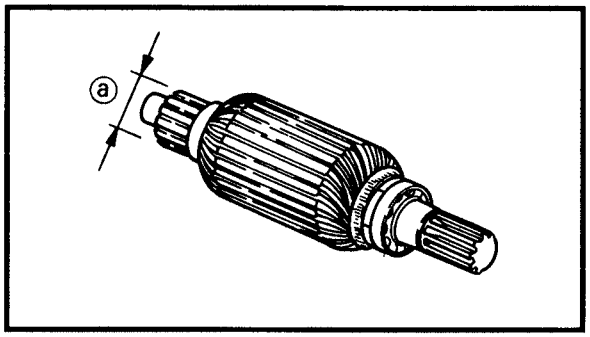
3. Measure:
- Brush spring pressure
  Fatigue/Out of specification → Replace as a set.

Brush spring pressure:
650 ~ 950 g (22.9 ~ 33.4 oz)



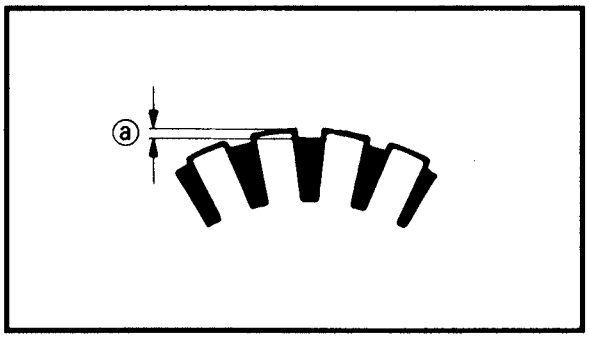
4. Inspect:
- Commutator (outer surface)
  Grooved wear/Burning/Scratches → Smooth using sandpaper (# 600).

NOTE:
Sand the commutator outer surface lightly and evenly.



5. Measure:
- Commutator diameter ⓐ
  Out of specification → Replace.

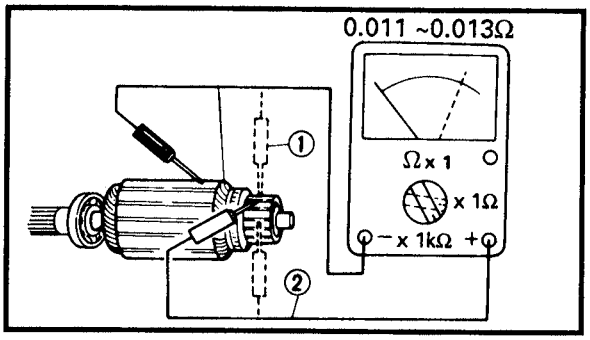
Outside diameter:
28 mm (1.10 in)
<Wear limit:>
<27 mm (1.06 in)>



6. Measure:
- Mica undercut ⓐ
  Out of specification → Scrape mica using a hacksaw blade.

Mica undercut:
0.6 mm (0.024 in)

NOTE:
The mica insulation of the commutator must be undercut to ensure proper operation of the commutator.



7. Inspect:
- Armature coil (insulation/continuity)
  Defects(s) → Replace starter motor.

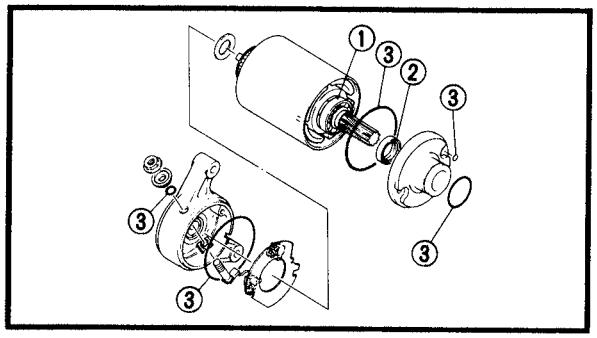
****

Armature coil inspecting steps:
- Connect the pocket tester for continuity check ① and insulation check ②.
- Measure the armature resistances.

Armature coil resistance:
Continuity check ①:
0.011 ~ 0.013Ω at 20°C (68°F)
Insulation check ②:
More than 1MΩ at 20°C (68°F)

- If the resistance is incorrect, replace the starter motor.

****

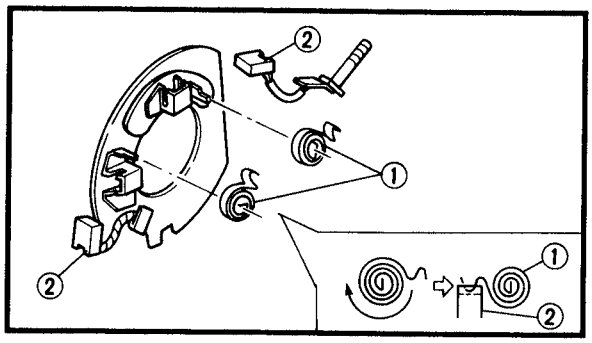


8. Inspect:
- Bearing ①
- Oil seal ②
- O-rings ③
  Wear/Damage → Replace.

Assembly and Installation

Reverse the "Removal" and "Disassembly" procedures. Note the following points.

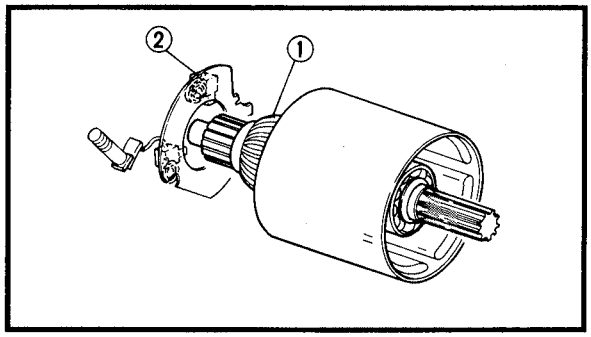
1. Apply:
- Lithium soap base grease
  (onto oil seal lips and o-rings)



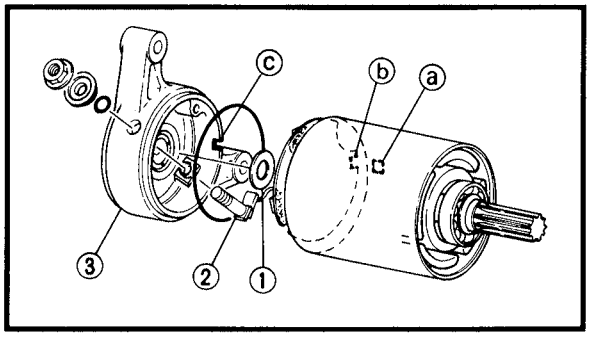
2. Install:
- Brush springs ①
- Brushes ②

NOTE:

Rotate the brush springs 1/2 turn as shown in the diagram, and attach securely in the grooves of the brush.

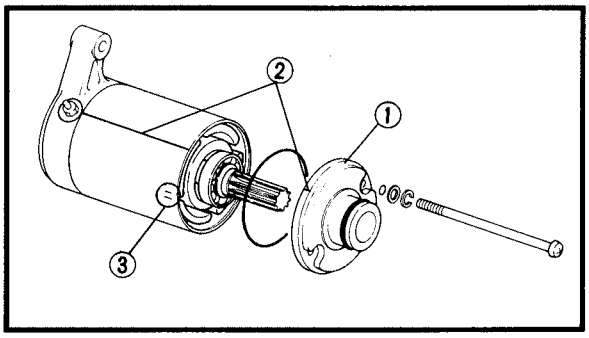


3. Install:
- Armature coil assembly ① (to stator)
- Brush set ② (to commutator)



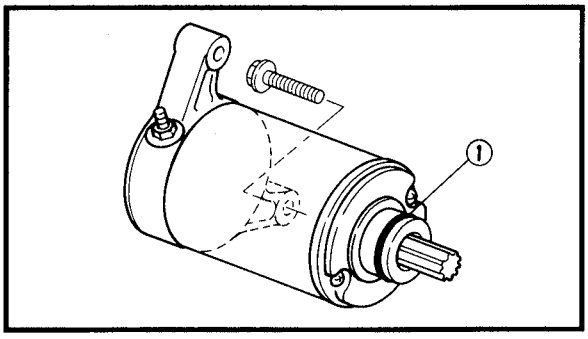
4. Install:
- Shim ① (to armature shaft)
- Bolt ② (brush)
- Bracket (front) ③ (to yoke assembly)

NOTE:
When assembling the bracket and yoke, securely match projection ⓐ at the end of the yoke with the notches provided on the brush set ⓑ and bracket ⓒ. Do not let this connection move out of position.



5. Install:
- Bracket ① (rear)

NOTE:
Align the identifying marks ② on the brackets as shown. Also align the mark ③ with the bolt hole in the bracket ①.



Installation

1. Install:
- Starter motor

NOTE:
Apply grease lightly to the O-ring ①.

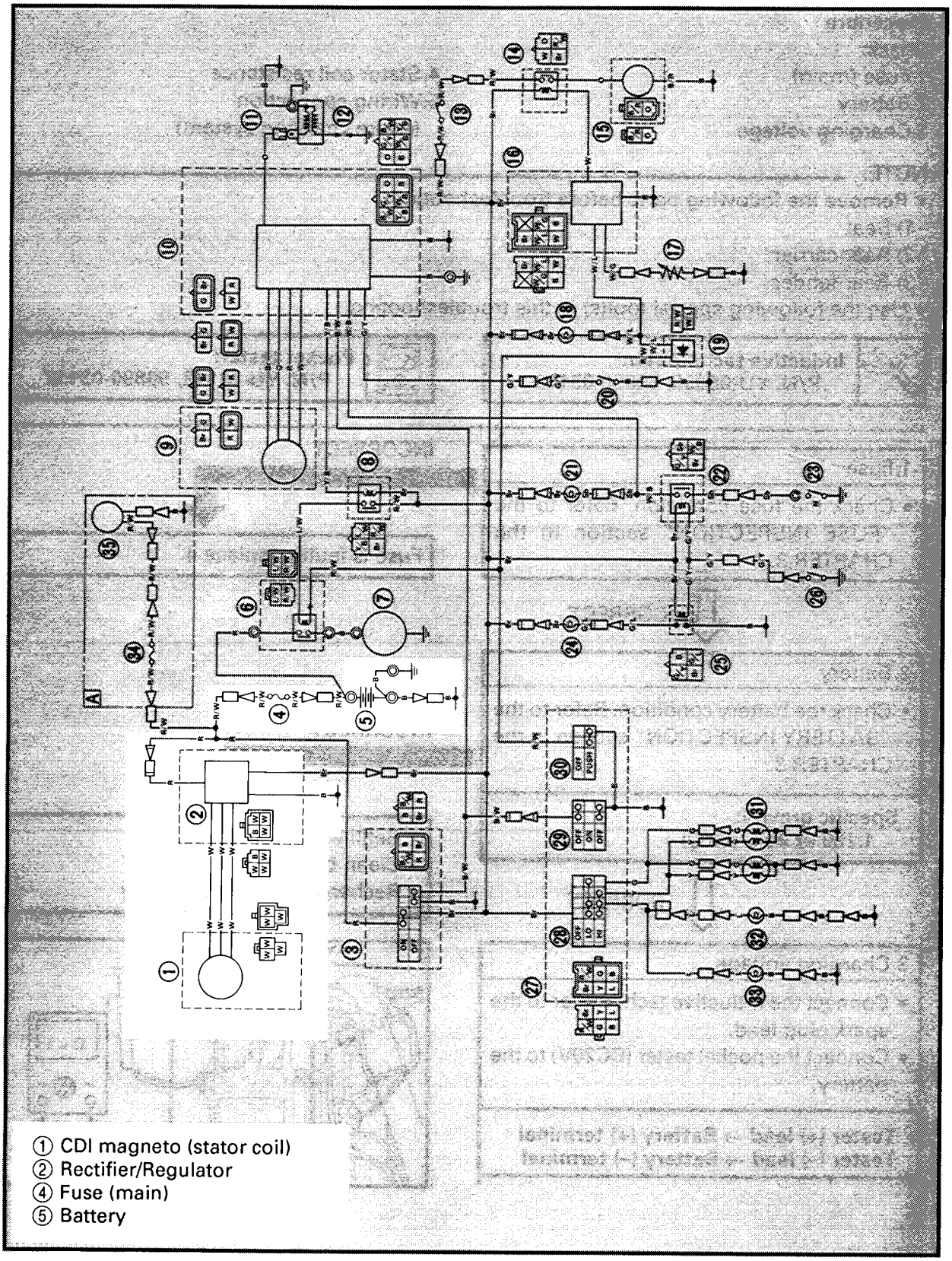
	Bolts (starting motor): 10 Nm (1.0 m • kg, 7,2 ft • lb)

2. Connect:
- Battery negative lead
  Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

CHARGING SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows charging system.



① CDI magneto (stator coil)
② Rectifier/Regulator
④ Fuse (main)
⑤ Battery

TROUBLESHOOTING

THE BATTERY IS NOT CHARGED.

Procedure

Check:

1. Fuse (main)
2. Battery
3. Charging voltage
4. Stator coil resistance
5. Wiring connection (entire charging system)

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat
  2) Rear carrier
  3) Rear fender
- Use the following special tool(s) in this troubleshooting.

Inductive tachometer: **P/N. YU-08036, 90890-03113**	**Pocket tester:** **P/N. YU-03112, 90890-03112**

1. Fuse

- Check the fuse condition. Refer to the "FUSE INSPECTION" section in the CHAPTER 3.

INCORRECT → Fuse is faulty, replace it.

CORRECT ↓

2. Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Specific gravity:
1.280 at 20°C (68°C)

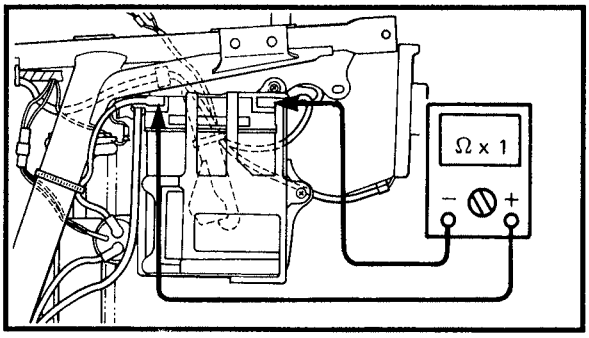
INCORRECT →
- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery

CORRECT ↓

3. Charging voltage

- Connect the inductive tachometer to the spark plug lead.
- Connect the pocket tester (DC20V) to the battery.

Tester (+) lead → Battery (+) terminal
Tester (–) lead → Battery (–) terminal



- Start the engine and accelerate to about, 5,000 r/min.
- Check charging voltage.

Charging voltage:
14.0V at 5,000 r/min

NOTE:
Use a full charged battery.

MEETS SPECIFICATION → Charging circuit is good.

OUT OF SPECIFICATION ↓

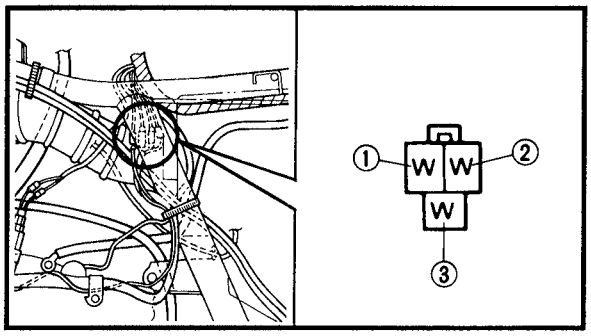
4. Stator coil resistance

- Disconnect the stator coil coupler from the wireharness.
- Connect the pocket tester (Ω × 1) to the stator coils.
- Measure the stator coil resistances.

Tester (+) lead → White lead ①
Tester (–) lead → White lead ②

Tester (+) lead → White lead ①
Tester (–) lead → White lead ③

Stator coil resistance:
0.70 ~ 0.86 at 20°C (68°F)



OUT OF SPECIFICATION → Stator coil is faulty, replace it.

BOTH MEET SPECIFICATION ↓

5. Wiring connection

Check the entire ignition system for connections.
Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

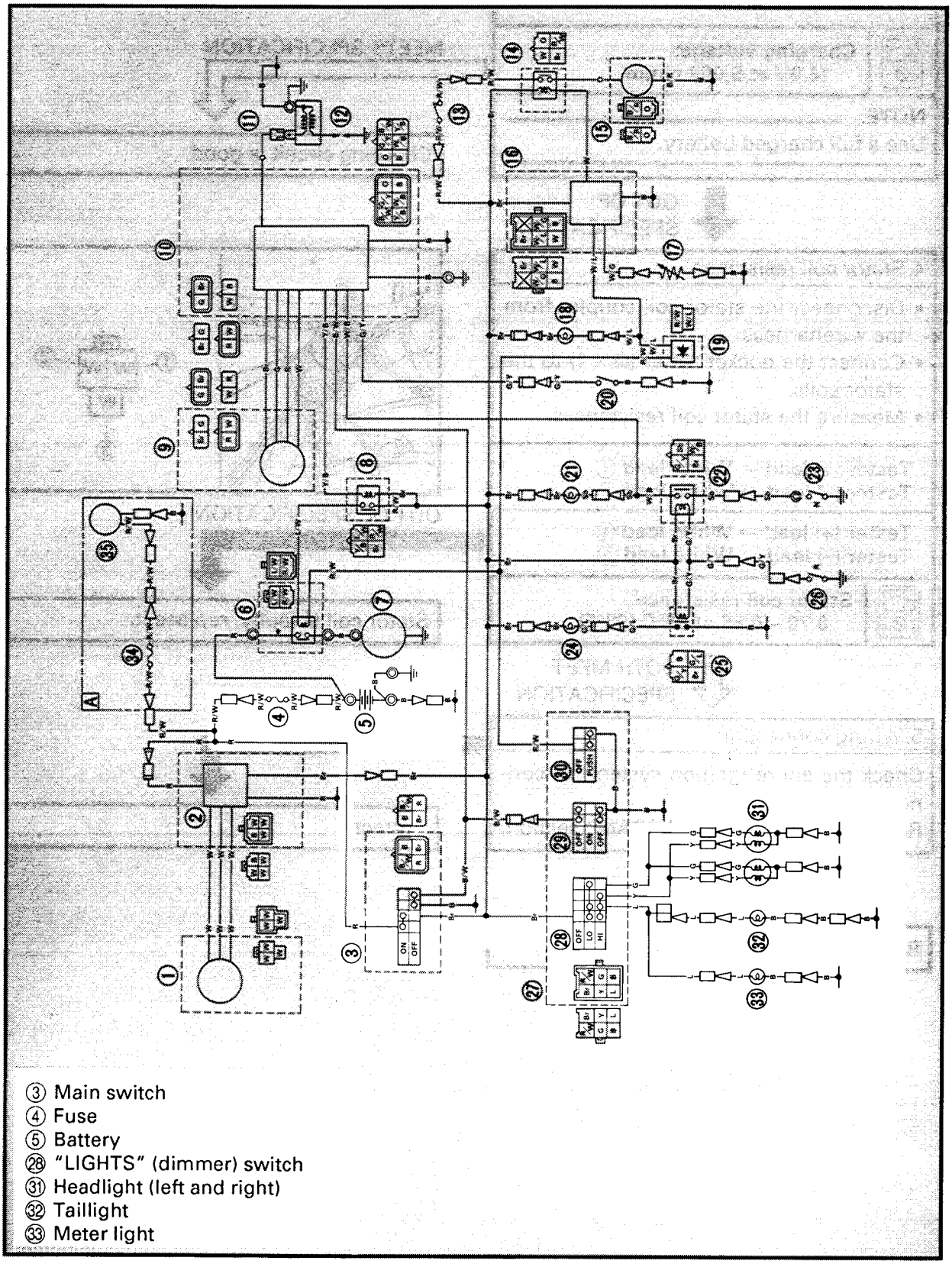
OK ↓

Replace rectifier/regulator.

LIGHTING SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows lighting system.



③ Main switch
④ Fuse
⑤ Battery
㉘ "LIGHTS" (dimmer) switch
㉛ Headlight (left and right)
㉜ Taillight
㉝ Meter light

TROUBLESHOOTING

HEADLIGHT AND/OR TAILLIGHT DO NOT COME ON.

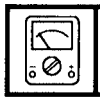
Procedure

Check:

1. Fuse
2. Battery
3. Main switch
4. "LIGHTS" (dimmer) switch
5. Wiring connection (entire lighting system)

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat
  2) Front carrier
  3) Front fender
  4) Fuel tank cover
  5) Rear carrier
  6) Rear fender
- Use the following special tool in this troubleshooting.



Pocket tester:
P/N. YU-03112, 90890-03112

1. Fuse (main)
   - Check the fuse condition. Refer to the "FUSE INSPECTION" section in the CHAPTER 3.

INCORRECT → Fuse is faulty, replace it.

CORRECT ↓

2. Battery
   - Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Specific gravity:
1.280 at 20°C (68°F)

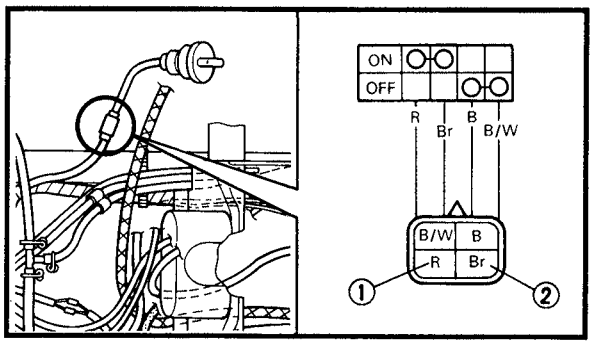
INCORRECT →
- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

CORRECT ↓

*

*

3. Main switch
- Disconnect the main switch coupler from the wireharness.



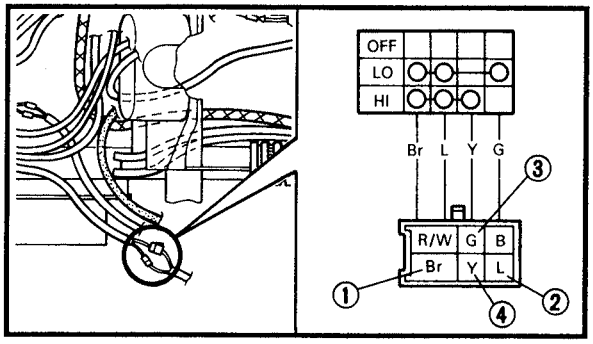
- Check the switch component for the continuity between Red ① and Brown ②.

INCORRECT

Main switch is faulty, replace it.

CORRECT

4. "LIGHTS" (dimmer) switch
- Disconnect the handlebar switch coupler from the wireharness.



- Check the switch component for the continuity between Brown ① and Blue ②, "Brown ① and Green ③" and "Brown ① and Yellow ④"

INCORRECT

"LIGHTS" (dimmer) switch is faulty, replace handlebar switch (left).

CORRECT

5. Wiring connection
- Check the entire lighting system for connections.
  Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION

Correct.

CORRECT

Check condition of each circuit for lighting system.
Refer to the "LIGHTING SYSTEM CHECK" section.

LIGHTING SYSTEM CHECK

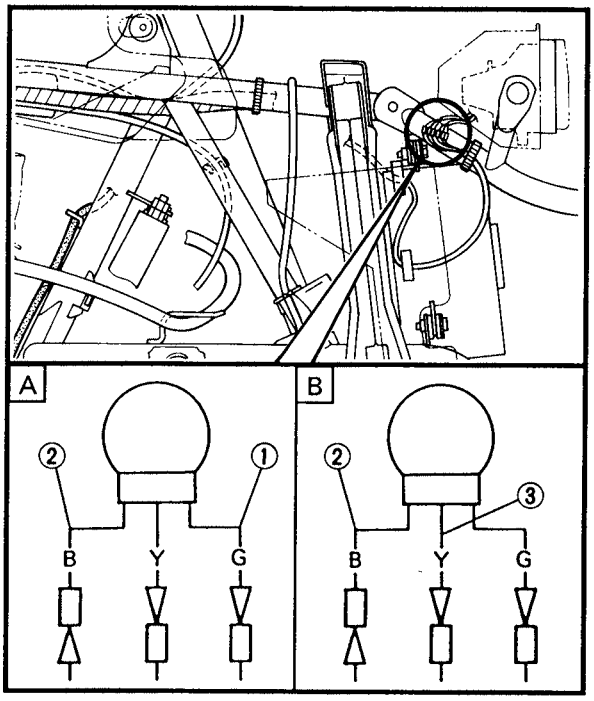
1. Headlights do not come on.

1. Bulb and bulb socket
• Check the bulb and bulb socket for continuity.

NO CONTINUITY → Bulb and/or bulb socket are faulty, replace.

CONTINUITY ⇩

2. Lighting voltage
• Connect the pocket tester (DC20V) to the headlight leads.
Head light (1): **Tester (+) lead → Green lead ①** **Tester (–) lead → Black lead ②** **Head light (2):** **Tester (+) lead → Yellow lead ③** **Tester (–) lead → Black lead ②**
Ⓐ When "LIGHT" (dimmer) switch is "LO" position. Ⓑ When "LIGHT" (dimmer) switch is "HI" position.
• Turn the main switch to "ON". • Turn the "LIGHTS" (dimmer) switch to "LO" or "HI" position. • Check for voltage (12V) on the "Green" and "Yellow" lead at bulb socket connectors.



OUT OF SPECIFICATION → Wiring circuit from main switch to bulb socket connector is faulty, repair.

BOTH MEET SPECIFICATION (12V) ⇩

This circuit is good.

2.Taillight does not come on.

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

NO CONTINUITY → Replace bulb and/or bulb socket.

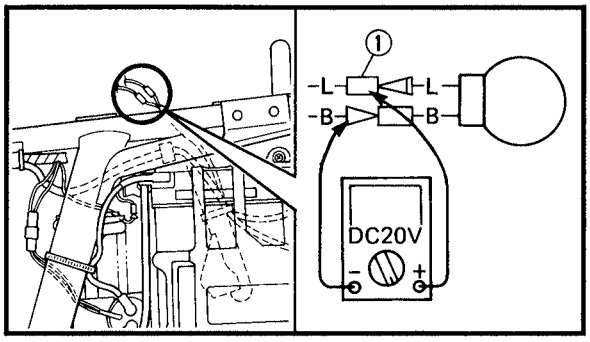
CONTINUITY ↓

2.Lighting voltage

- Connect the pocket tester (DC20V) to the bulb socket connector.

Tester (+) lead → Blue ① terminal
Tester (–) lead → Black ② terminal

- Turn the main switch to "ON".
- Turn the "LIGHTS" (dimmer) switch to "LO" or "HI" position.
- Check for voltage (12V) on the "Blue" lead at the bulb socket connector.



OUT OF SPECIFICATION → Wiring circuit from main switch to bulb socket connector is faulty, repair.

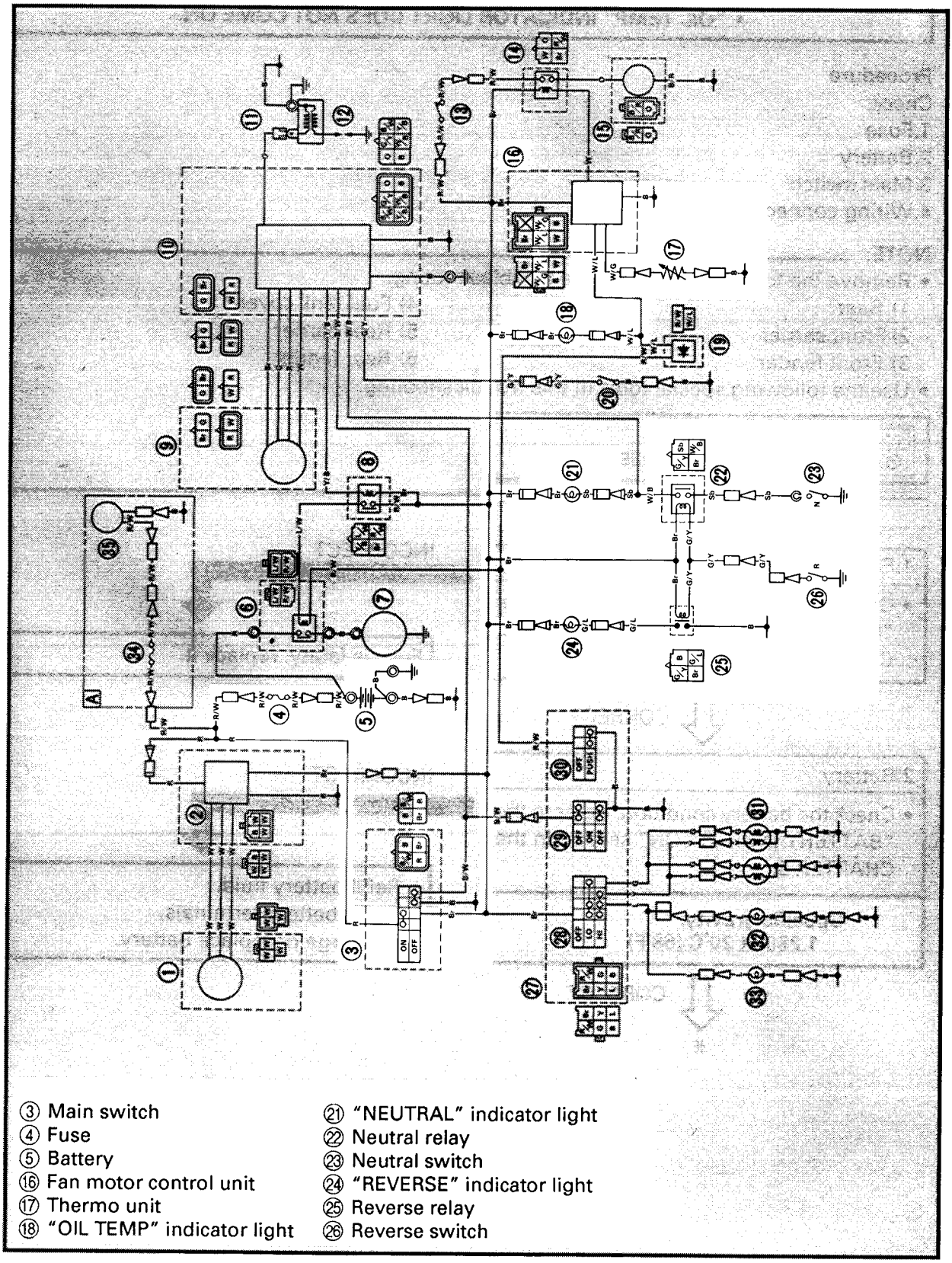
MEETS SPECIFICATION (12V) ↓

This circuit is good.

SIGNAL SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows signal circuit.



③ Main switch
④ Fuse
⑤ Battery
⑯ Fan motor control unit
⑰ Thermo unit
⑱ "OIL TEMP" indicator light
㉑ "NEUTRAL" indicator light
㉒ Neutral relay
㉓ Neutral switch
㉔ "REVERSE" indicator light
㉕ Reverse relay
㉖ Reverse switch

TROUBLESHOOTING

- **"NEUTRAL" INDICATOR LIGHT DOES NOT COME ON.**
- **"REVERSE" INDICATOR LIGHT DOES NOT COME ON.**
- **"OIL TEMP" INDICATOR LIGHT DOES NOT COME ON.**

Procedure

Check:

1. Fuse
2. Battery
3. Main switch
4. Wiring connection

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat
  2) Front carrier
  3) Front fender
  4) Fuel tank cover
  5) Rear carrier
  6) Rear fender
- Use the following special tools in this troubleshooting.

Pocket tester:
P/N. YU-03112, 90890-03112

1. Fuse (main)
   - Check the fuse condition. Refer to the "FUSE INSPECTION" section in the CHAPTER 3.

INCORRECT → Fuse is faulty, replace it.

CORRECT ↓

2. Battery
   - Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

   Specific gravity:
   1.280 at 20°C (68°F)

INCORRECT →
- Refill battery fluid.
- Clean battery terminals.
- Recharge or replace battery.

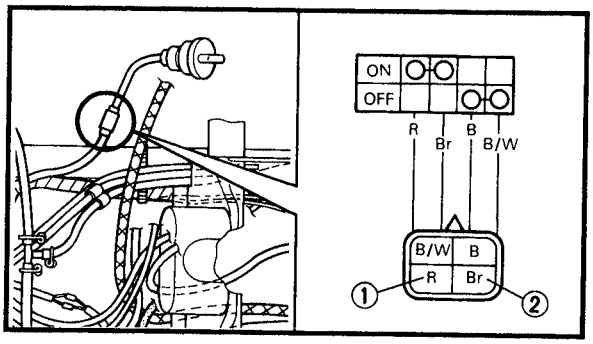
CORRECT ↓

*

*

3. Main switch

- Disconnect the main switch coupler from the wireharness.



- Check the switch component for the continuity between "Red ① and Brown ②".

INCORREC T

Main switch is faulty, replace it.

CORRECT

4. Wiring connection

- Check the entire signal system for connections. Refer to the "WIRING DIAGRAM" section.

CORRECT

Check condition of each circuit for signal system. Refer to "SIGNAL SYSTEM CHECK" section.

POOR CONNECTION

Correct.

SIGNAL SYSTEM CHECK

1. "NEUTRAL" indicator light does not come on.

1. Bulb and bulb socket

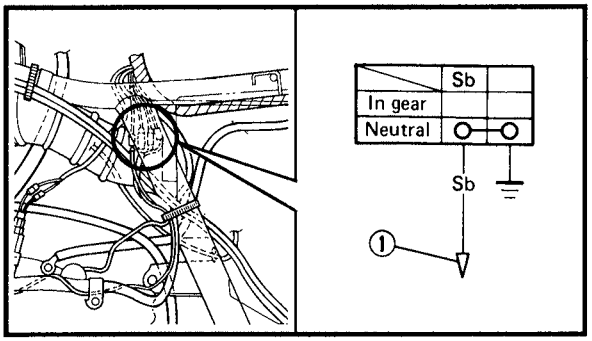
- Check the bulb and bulb socket for continuity.

NO CONTINUITY → Bulb and/or bulb socket are faulty, replace.

CONTINUITY ↓

2. Neutral switch

- Disconnect the neutral switch lead from the wireharness.



- Check the switch component for continuity between the "Sky Blue ① and ground".

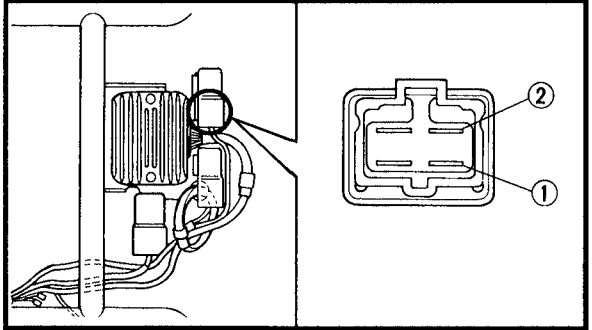
INCORRECT → Neutral switch is faulty, replace it.

CORRECT ↓

3. Neutral relay

- Disconnect the neutral relay from the wireharness.
- Connect the pocket tester (Ω × 10) to the relay terminal.

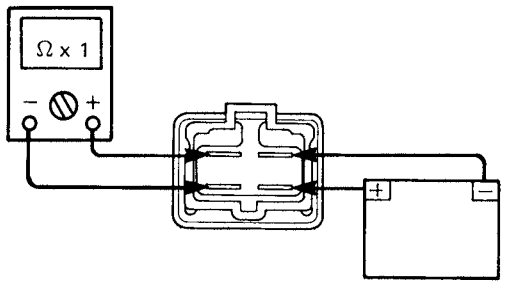
Tester (+) lead → Terminal ①
Tester (–) lead → Terminal ②



- Check the neutral relay for specified resistance.

Neutral relay resistance:
72 ~ 88Ω at 20°C (68°F)

- If the resistance is within specification, go to the next steps. If not, replace the relay.
- Connect the battery and pocket tester as shown. *



- Check the neutral relay for continuity.

Battery connected: Zero Ω
Battery disconnected: ∞

OUT OF SPECIFICATION

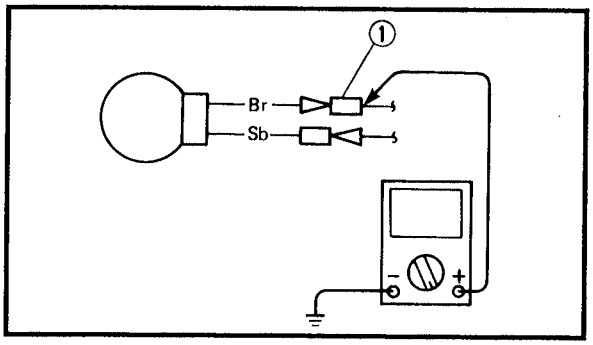
Neutral relay is faulty, replace it.

BOTH MEET SPECIFICATION

4. VOLTAGE

- Connect the pocket tester (DC20V) to the bulb socket connector.

Tester (+) lead → Brown ① lead
Tester (–) lead → Frame ground



- Turn the main switch to "ON".
- Check for voltage (12V) on the "Brown" lead at bulb socket connector.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

MEETS SPECIFICATION (12V)

This circuit is good.

*

⚠ WARNING

This check is likely to produce sparks, so be sure to connect battery leads securely to terminal. Also be sure that no flammable gas or fluid is in the vicinity.

2. "REVERSE" indicator light does not come on.

1. Bulb and bulb socket

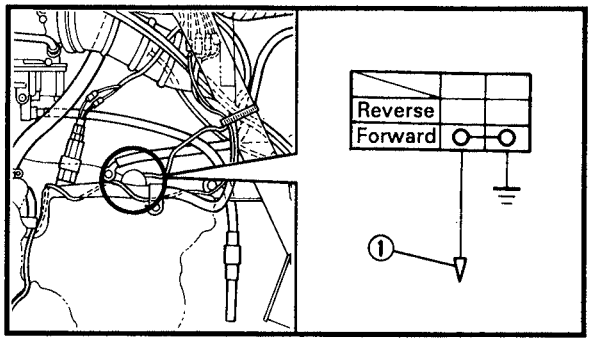
- Check the bulb and bulb socket for continuity.

NO CONTINUITY → Bulb and/or bulb socket are faulty, replace.

CONTINUITY ↓

2. Reverse switch

- Disconnect the reverse switch lead from the reverse switch terminal.



- Check the switch component for continuity between the "Reverse switch terminal ① and ground".

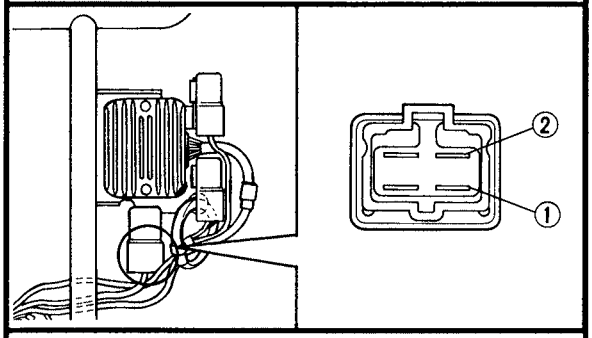
INCORRECT → Reverse switch is faulty, replace it.

CORRECT ↓

3. Reverse relay

- Disconnect the reverse relay from the wireharness.
- Connect the pocket tester (Ω × 10) to the relay terminal.

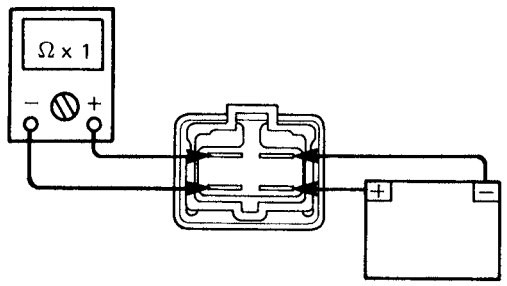
Tester (+) lead → Terminal ①
Tester (–) lead → Terminal ②



- Check the reverse relay for specified resistance.

Reverse relay resistance:
72 ~ 88Ω at 20°C (68°F)

- If the resistance is within specification, go to the next steps. If not, replace the relay.
- Connect the battery and pocket tester as shown.*



- Check the reverse relay for continuity.

Battery connected: ∞
Battery disconnected: Zero Ω

OUT OF SPECIFICATION

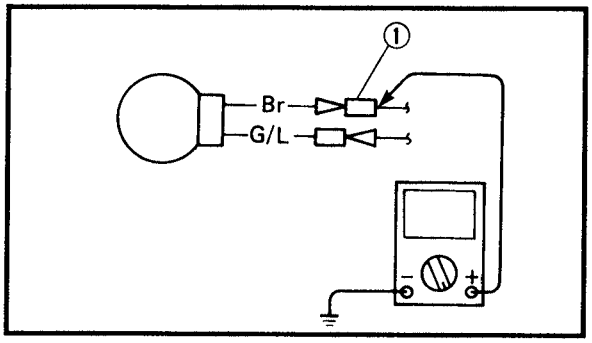
Reverse relay is faulty, replace it.

BOTH MEET SPECIFICATION

4. Voltage

- Connect the pocket tester (DC20V) to the bulb socket connector.

Tester (+) lead → Brown ① lead
Tester (–) lead → Frame ground



- Turn the main switch to "ON".
- Check for voltage (12V) on the "Brown" lead at bulb socket connector.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

MEETS SPECIFICATION (12V)

This circuit is good.

*

⚠ WARNING

This check is likely to produce sparks, so be sure to connect battery leads securely to terminal. Also be sure that no flammable gas or fluid is in the vicinity.

3. "OIL TEMP" indicator light does not come on, or "OIL TEMP" indicator light does not go off, or "OIL TEMP" indicator light does not come on at temperature is high (more than 147°C (297°F) ~ 163°C (325°F)).

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

NO CONTINUITY → Bulb and/or bulb socket are faulty, replace.

CONTINUITY ↓

2. Wiring connection (entire signal system)

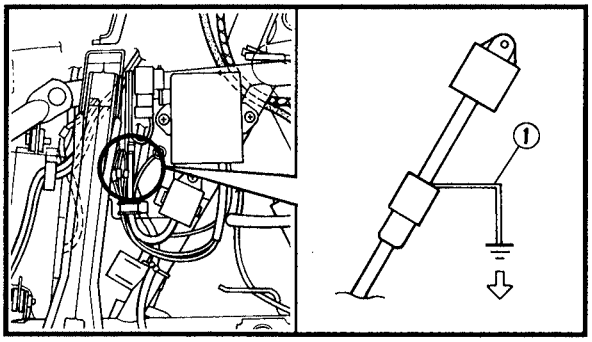
- Check the entire signal system for connections. Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

CORRECT ↓

3. Fan motor control unit

- Connect the fan motor control unit "White/Green lead and from using the jumper lead ① as shown.



- Turn the main switch to "ON".
- Check the "OIL TEMP" indicator light come on.

DOES NOT COME ON → Fan motor control unit is faulty, replace it.

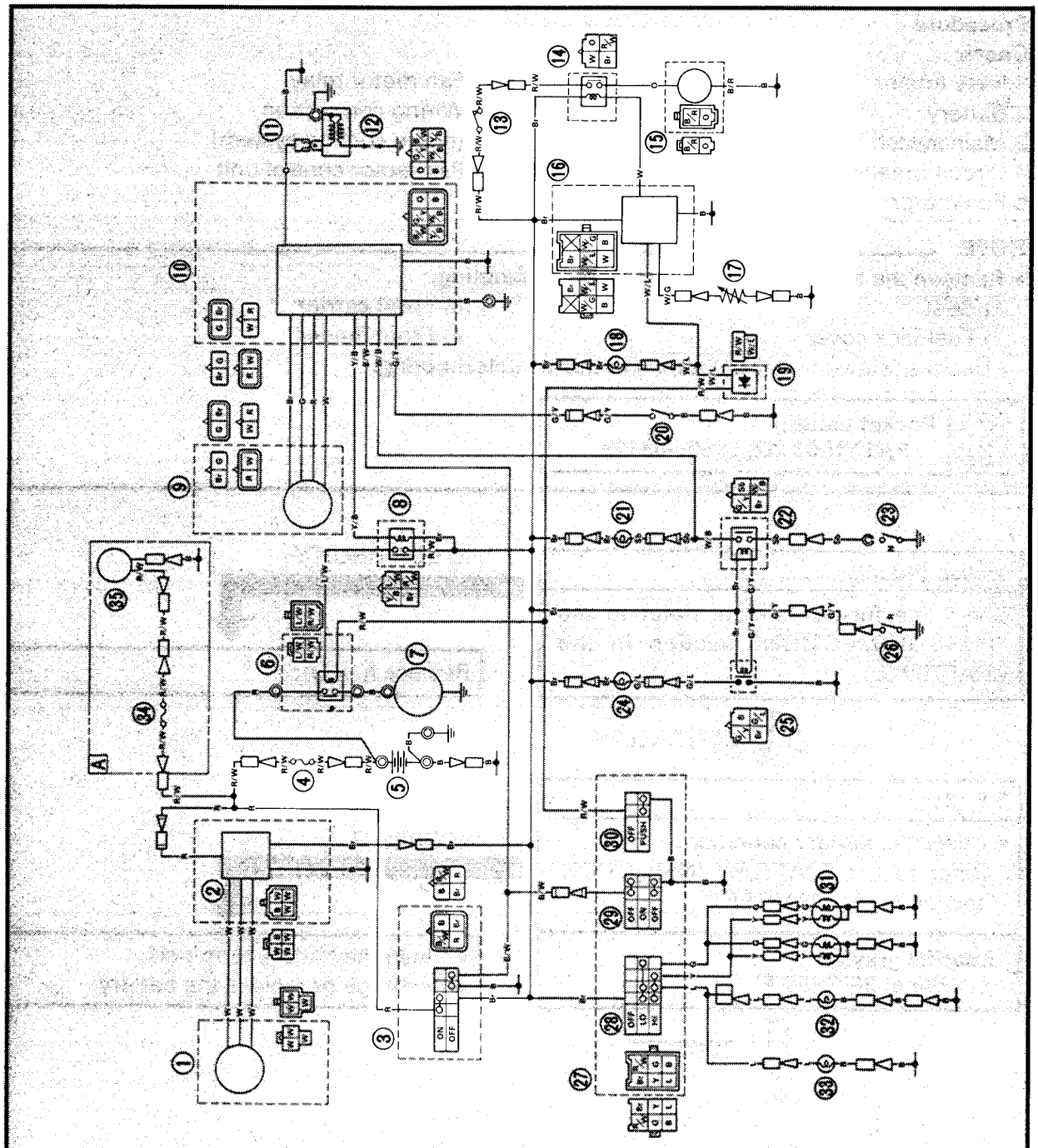
COME ON ↓

Thermo unit is faulty, replace it.

COOLING SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows cooling system.



③ Main switch
④ Fuse (main)
⑤ Battery
⑬ Circuit breaker (fan motor)
⑭ Fan motor relay
⑮ Fan motor
⑯ Fan motor control unit
⑰ Thermo unit

TROUBLESHOOTING

FAN MOTOR DOES NOT TURN.

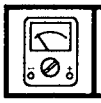
Procedure

Check;

1. Fuse (main)
2. Battery
3. Main switch
4. Circuit breaker (fan motor)
5. Fan motor
6. Fan motor relay
7. Wiring connection (entire cooling system)
8. Fan motor control unit

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat
  2) Fuel tank cover
  3) Front carrier
  4) Front fender
- Use the following special tool(s) in this troubleshooting.



Pocket tester:
P/N YU-03112, 90890-03112

1. Fuse (main)

Check the fuse condition. Refer to the "FUSE INSPECTION" section in the CHAPTER 3.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

2. Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Specific gravity:
1,280 at 20°C (68°F)

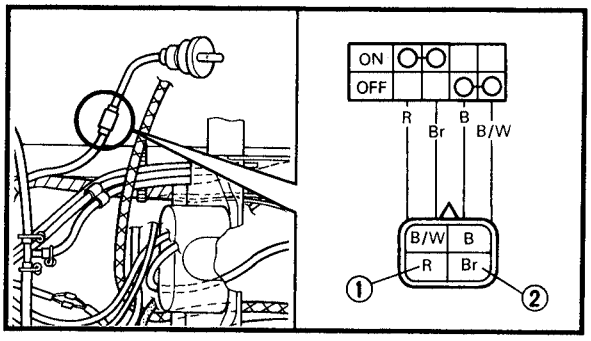
INCORRECT →
- Clean the battery terminals.
- Recharge or replace the battery.

CORRECT ↓

*

*

3. Main switch
- Disconnect the main switch coupler from the wireharness.



- Check the switch component for the continuity between Red ① and Brown ②.

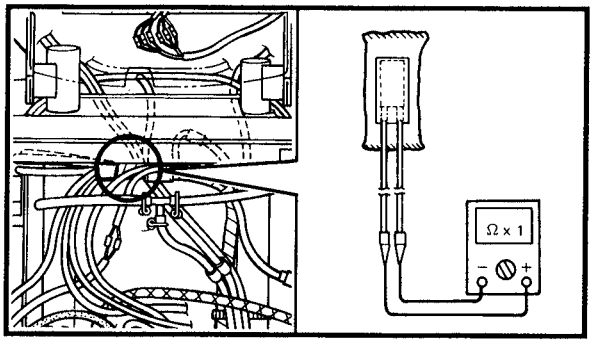
INCORRECT

Main switch is faulty, replace it.

CORRECT

4. Circuit breaker (fan motor)
- Disconnect the circuit breaker.
- Connect the pocket tester (Ω × 1) to the circuit breaker.

Circuit breaker resistance:
Zero Ω at 20°C (68°F)



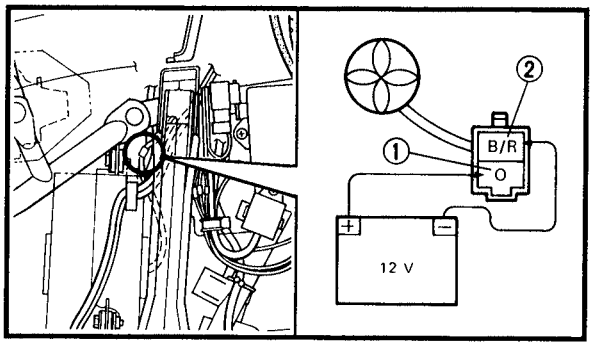
OUT OF SPECIFICATION

Circuit breaker is faulty, replace it.

SPECIFICATION

5. Fan motor
- Disconnect the fan motor coupler.
- Connect the battery (12V) as shown. *

Battery (+) lead → Orange ① lead
Battery (−) lead → Black/Red ② lead



*

⚠ WARNING

This check is likely to produce sparks, so be sure to connect battery leads securely to terminal. Also be sure that no flammable gas or fluid is in the vicinity.

- Check the motor for operation.

DOES NOT MOVE

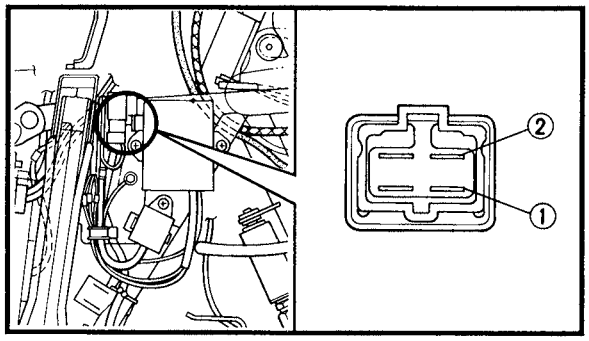
Replace fan motor.

MOVES

6.Fan motor relay

- Disconnect the fan motor relay from the wireharness.
- Connect the pocket tester (Ω x 10) to the relay terminal.

Tester (+) lead → Terminal ①
Tester (–) lead → Terminal ②



- Check the fan motor relay for specified resistance.

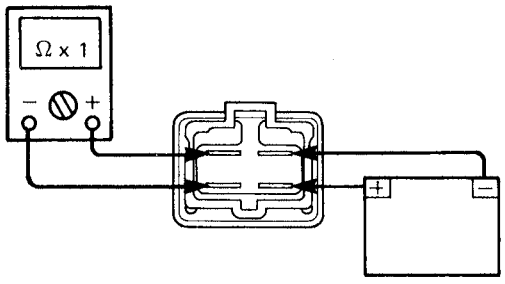
Fan motor relay resistance:
72 ~ 88Ω at 20°C (68°F)

- If the resistance is within specification, go to the next steps. If not, replace the relay.
- Connect the battery and pocket tester as shown. *

*

⚠ WARNING

This check is likely to produce sparks, so be sure to connect battery leads securely to terminal. Also be sure that no flammable gas or fluid is in the vicinity.



- Check the fan motor relay for continuity.

OUT OF SPECIFICATION

Battery connected: Zero Ω
Battery disconnected: ∞

Fan motor relay is faulty, replace it.

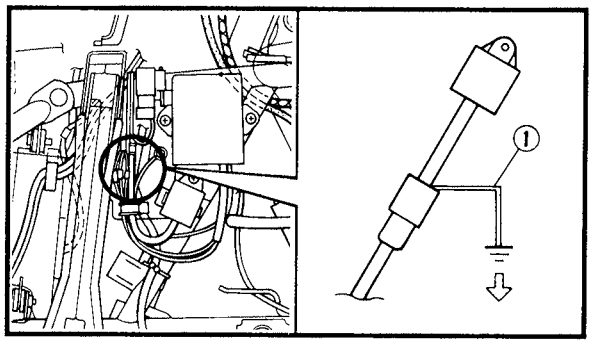
BOTH MEET SPECIFICATION

7. Wiring connection
- Check the entire cooling system for connections.
  Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

CORRECT ⇩

8. Fan motor control unit
- Connect the fan motor control unit White/Green lead and from using the jumper lead ① as shown.



- Turn the main switch to "ON".
- Check the fan motor for operation.

DOES NOT MOVE → Fan motor control unit is faulty, replace it.

MOVES ⇩

Thermo unit is faulty, replace it.

TROUBLESHOOTING

NOTE:
The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for inspection, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM

Fuel tank
- Empty
- Clogged fuel filter
- Clogged fuel strainer
- Clogged fuel breather hose
- Deteriorated fuel or fuel containing water or foreign material

Fuel cock
- Clogged fuel hose

Carburetor
- Deteriorated fuel, fuel containing water or foreign material
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Deformed float
- Groove-worn needle valve
- Improperly sealed valve seat
- Improperly adjusted fuel level
- Improperly set pilot jet
- Clogged starter jet
- Starter plunger malfunction

Air filter element
- Clogged

ELECTRICAL SYSTEM

Spark plug
- Improper plug gap
- Worn electrodes
- Wire between terminals broken
- Improper heat range
- Faulty spark plug cap

Ignition coil
- Broken or shorted primary/secondary
- Faulty spark plug lead
- Broken body

CDI system
- Faulty CDI unit
- Faulty pickup coil
- Faulty source coil
- Broken woodruff key

Switches and wiring
- Faulty main switch
- Faulty "ENGINE STOP" switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty neutral relay
- Faulty reverse switch
- Faulty reverse relay
- Faulty "START" switch
- Faulty rear brake lever switch

Starter motor
- Faulty starter motor
- Faulty starter relay
- Faulty circuit cut-off relay
- Faulty starter clutch

COMPRESSION SYSTEM

Cylinder and cylinder head
- Loose spark plug
- Loose cylinder head or cylinder
- Broken cylinder head gasket
- Worn, damaged or seized cylinder

Piston and piston ring
- Improperly installed piston ring
- Worn, fatigued or broken piston ring
- Seized piston ring
- Seized or damaged piston

Valve, camshaft and crankshaft
- Improperly sealed valve
- Improperly contacted valve and valve seat
- Improper valve timing
- Broken valve spring
- Seized camshaft
- Seized crankshaft

POOR IDLE SPEED PERFORMANCE

POOR IDLE SPEED PERFORMANCE

Carburetor
- Improperly returned starter plunger
- Loose pilot jet
- Clogged pilot jet
- Clogged pilot air jet
- Improperly adjusted idle speed (Throttle stop screw)
- Improper throttle cable play
- Flooded carburetor

Electrical system
- Faulty spark plug
- Faulty CDI unit
- Faulty pickup coil
- Faulty souse coil
- Faulty ignition coil

Valve train
- Improperly adjusted valve clearance

Air cleaner
- Clogged air filter element

POOR MEDIUM AND HIGH SPEED PERFORMANCE

POOR MEDIUM AND HIGH SPEED PERFORMANCE

Refer to the "STARTING FAILURE/HARD STARTING" and "POOR IDLE SPEED PERFORMANCE-valve train" section.

Carburetor
- Improper jet needle clip position
- Improperly adjusted fuel level
- Clogged or loose main jet
- Deteriorated fuel containing water or foreign material

Air cleaner
- Clogged air filter element

FAULTY DRIVE TRAIN

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Causes
1. A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (this must not be confused with engine surging or transmission characteristics.) 2. A "rolling rumble" noticeable at low speed; a high-pitched whine; a "clunk" from a shaft drive component or area. 3. A locked-up condition of the shaft drive mechanism, no power transmitted from engine to front and/or rear wheel.	A. Bearing damage. B. Improper gear lash. C. Gear tooth damage. D. Broken drive shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G. Small foreign object lodged between moving parts.

NOTE:

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components for specific inspection.

FAULTY GEAR SHIFTING

HARD SHIFTING

Refer to the "CLUTCH SLIPPING/DRAGGING-CLUTCH DRAGGING" section.

SHIFT PEDAL DOES NOT MOVE

Shift shaft
- Bent shift shaft

Shift cam, shift fork
- Groove jammed with impurities
- Seized shift fork
- Bent shift fork guide bar

Transmission
- Seized transmission gear
- Jammed impurities
- Incorrectly assembled transmission

Shift guide
- Broken shift guide

JUMP-OUT GEAR

Shift shaft
- Improperly adjusted shift lever position
- Worn shift shaft lever
- Improperly returned stopper level

Shift fork
- Worn shift fork

Shift cam
- Improper thrust play
- Worn shift cam groove

Transmission
- Worn gear dog

CLUTCH SLIPPING/DRAGGING

CLUTCH SLIPPING

Clutch
- Improperly adjusted clutch lever free
- Loose clutch spring (primary and/or secondary) play
- Fatigued clutch spring (primary and/or secondary)
- Worn friction plate
- Worn clutch plate
- Worn clutch shoe (primary)

Engine oil
- Low oil level
- Improper quality (low viscosity)
- Deterioration

CLUTCH DRAGGING

Clutch
- Improperly adjusted clutch release lever free play
- Improper engagement of release lever and push rod
- Warped clutch plate
- Swollen friction plate
- Broken clutch boss

Engine oil
- High oil level
- Improper quality (high viscosity)
- Deterioration

OVERHEATING

OVERHEATING

Ignition system
- Improper spark plug gap
- Improper spark plug heat range
- Faulty CDI unit

Fuel system
- Improper carburetor main jet (improper setting)
- Improperly adjusted fuel level
- Clogged air filter element

Compression system
- Heavy carbon build-up

Engine oil
- Incorrect oil level
- Improper oil viscosity
- Inferior oil quality

Brake
- Dragging brake

Oil cooling system
- Faulty thermo unit
- Faulty fan motor control unit
- Faulty fan motor relay
- Faulty fan motor circuit breaker
- Clogged or damaged oil coolar
- Inoperative fan motor

FAULTY BRAKE

POOR BRAKING EFFECT

Front drum brake
- Worm brake shoe lining
- Worm brake drum
- Air in brake fluid
- Leaking brake fluid
- Faulty master cylinder kit cup
- Faulty wheel cylinder seal
- Loose union bolt
- Broken brake hose and pipe
- Oily or brake shoe lining
- Oily or brake drum
- Improper brake fluid level
- Fatigue/Damaged return spring

Rear drum brake
- Worn brake shoe lining
- Worn brake drum
- Oily or greasy brake shoe lining
- Oily or greasy brake drum
- Improperly adjusted brake free play
- Improper brake cam lever position
- Fatigue/Damaged return spring

SHOCK ABSORBER MALFUNCTION

MALFUNCTION

- Bent or damaged damper rod
- Damaged oil seal lip
- Fatigued shock absorber spring

INSTABLE HANDLING

INSTABLE HANDLING

Handlebars
- Improperly installed or bent

Steering
- Incorrect toe-in
- Bent steering shaft
- Improperly installed steering shaft
- Damaged bearing or bearing race
- Bent tie-rods.
- Deformed steering knuckles

Tires
- Uneven tire pressures on both sides
- Incorrect tire pressure
- Unevenly worn tires

Wheels
- Deformed wheel
- Loose bearing
- Bent or loose wheel axle
- Excessive wheel run-out

Frame
- Twisted
- Damaged frame
- Improperly installed bearing race

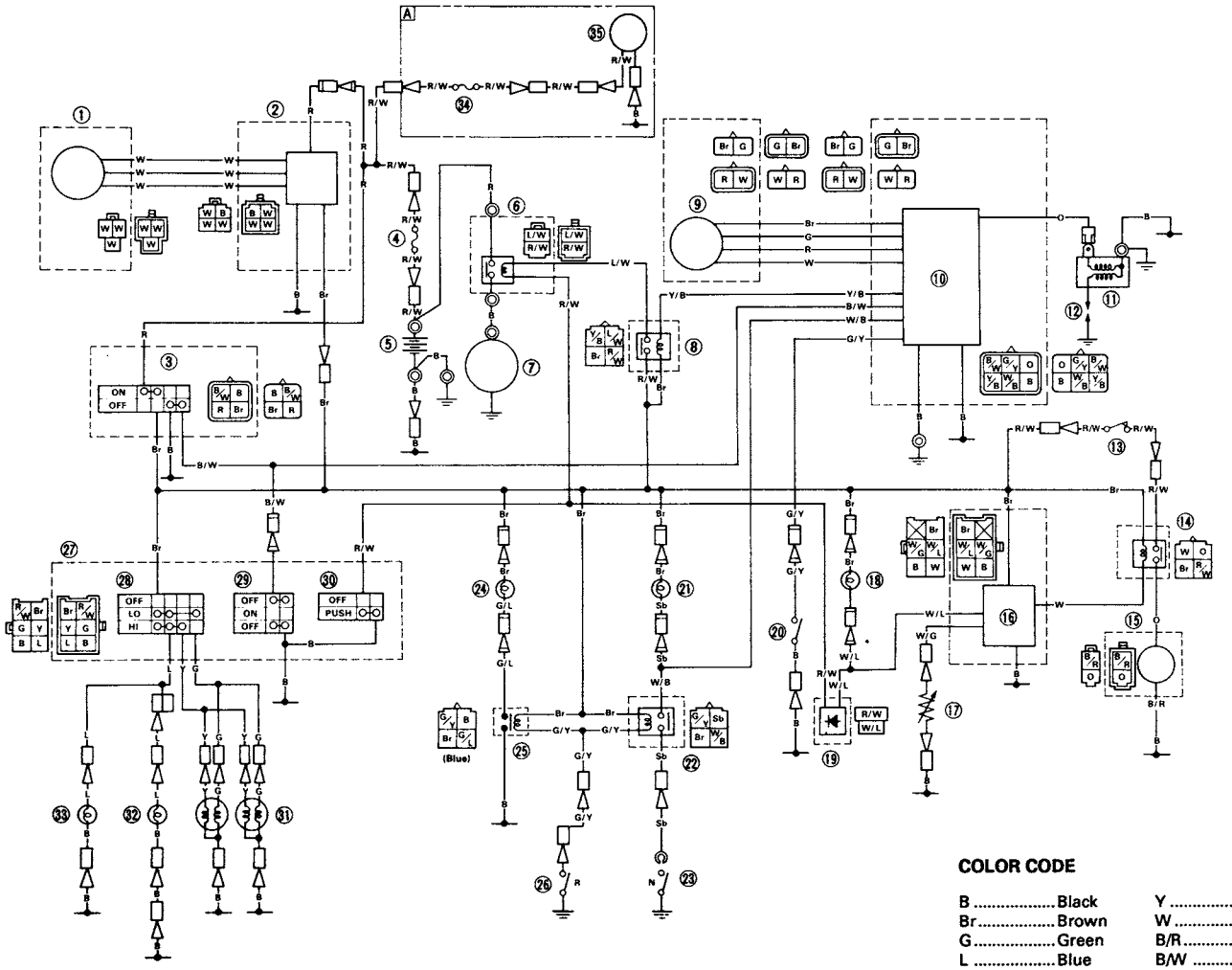
Swingarm
- Worn bearing or bush
- Bent or damaged

LIGHTING SYSTEM

HEADLIGHT DARK
- Improper bulb
- Too many electric accessories
- Hard charging (broken stator coil and/or faulty rectifier/regulator)
- Incorrect connection
- Improperly grounded
- Poor contacts main or "LIGHTS" (dimmer) switch
- Bulb life expired

BULB BURNT OUT
- Improper bulb.
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded
- Faulty main and/or "LIGHTS" (dimmer) switch
- Bulb life expired

YFM400FW WIRING DIAGRAM



① CDI magneto (stator coil)
② Rectifier/Regulator
③ Main switch
④ Fuse (main)
⑤ Battery
⑥ Starter relay
⑦ Starter motor
⑧ **Starting circuit cut-off relay**
⑨ CDI magneto (source coil and pickup coil)
⑩ CDI unit
⑪ Ignition coil
⑫ Spark plug
⑬ Circuit breaker (fan motor)
⑭ Fan motor relay
⑮ Fan motor
⑯ Fan motor control unit
⑰ Thermo unit
⑱ "OIL TEMP" indicator light
⑲ Diode
⑳ Front brake switch
㉑ "NEUTRAL" indicator light
㉒ Neutral relay
㉓ Neutral switch
㉔ "REVERSE" indicator light
㉕ Reverse relay
㉖ Reverse switch
㉗ Handlebar switch (left)
㉘ "LIGHTS" (dimmer) switch
㉙ "ENGINE STOP" switch
㉚ "START" switch
㉛ Head lights
㉜ Taillight
㉝ Speedometer light
㉞ Fuse
㉟ Terminal
Ⓐ Option

COLOR CODE

B	Black	Y	Yellow	L/W	Blue/White
Br	Brown	W	White	R/W	Red/White
G	Green	B/R	Black/Red	W/B	White/Black
L	Blue	B/W	Black/White	W/G	White/Green
O	Orange	G/L	Green/Blue	W/L	White/Blue
R	Red	G/Y	Green/Yellow	Y/B	Yellow/Black
Sb	Sky blue				

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