YAMAHA

TDM850

Service Manual



LIT-11616-

YAMAHA

TDM850D
TDM850DC

SERVICE MANUAL

LIT-11616-08-29

TDM850D/TDM850DC
SERVICE MANUAL
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unauthorized use without the written
permission of Yamaha Motor Co., Ltd.
is expressly prohibited.

NOTICE

This manual was written by 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 motorcycles should have a basic understanding of the mechanical concepts and procedures inherent in motorcycle repair technology. Without such knowledge, attempted repairs or service to the motorcycle may render it unfit to use and/or unsafe.

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools in necessary to ensure that the motorcycle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his motorcycle and to conform with federal environmental quality objectives. 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.

NOTE:

FOR USA:

This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.

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 motorcycle operator, a bystander, or a person inspecting or repairing the motorcycle.

CAUTION: — A CAUTION indicates special precautions that must be taken to avoid damage to the motorcycle.

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")

1 st 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

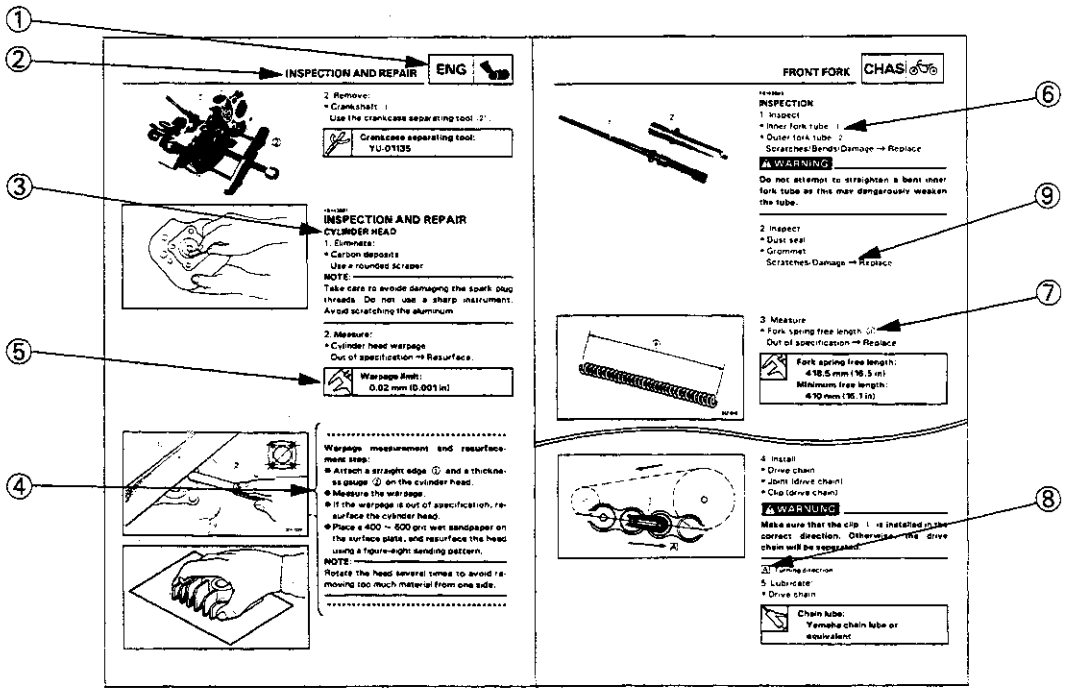
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections. A set of particularly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

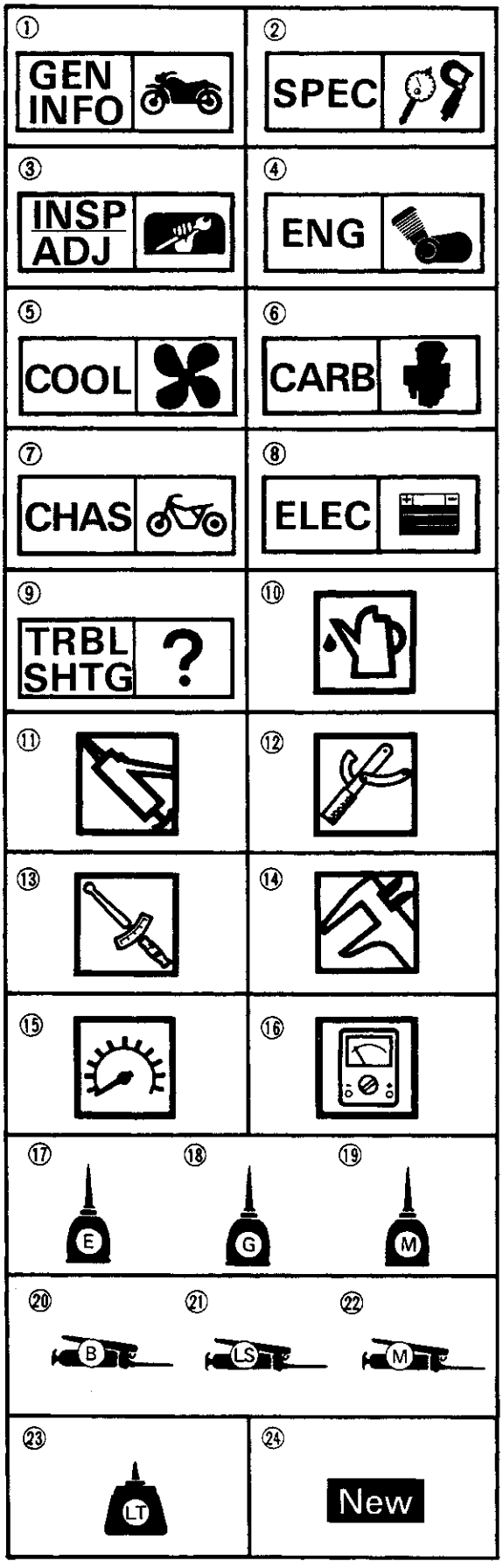
IMPORTANT FEATURES

- 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.





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 Cooling system
⑥ Carburetion
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 disufide 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

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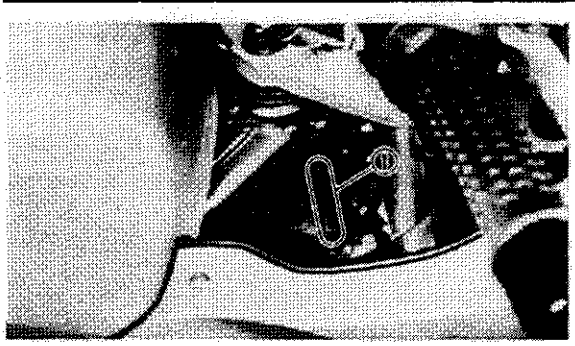
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GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

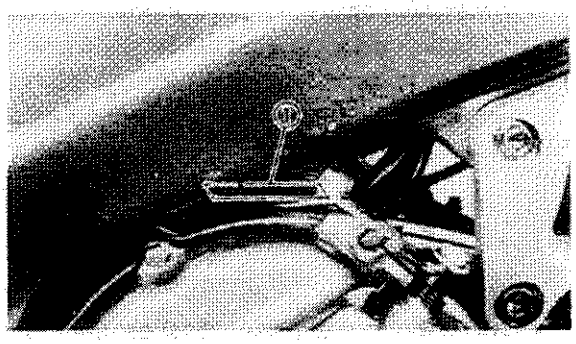
VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the right side of steering head.

Starting serial number:
JYA4DTE0 * NA000101
(USA–Except for California)
JYA4DTC0 * NA004101
(USA–For California)
JYA4DTN0 * NA005101
(CDN)

NOTE:

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



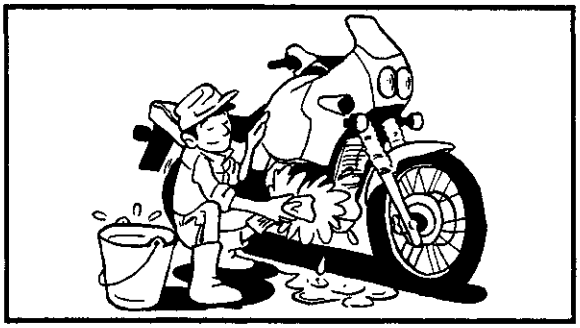
ENGINE SERIAL NUMBER

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

Starting serial number:
TDM850D 4DT-000101
(USA–Except for California)
TDM850DC ..4DT-004101
(USA–For California)
TDM850D 4DT-005101
(CDN)

NOTE:

- The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.
- Designs and specifications are subject to change without notice.



IMPORTANT INFORMATION

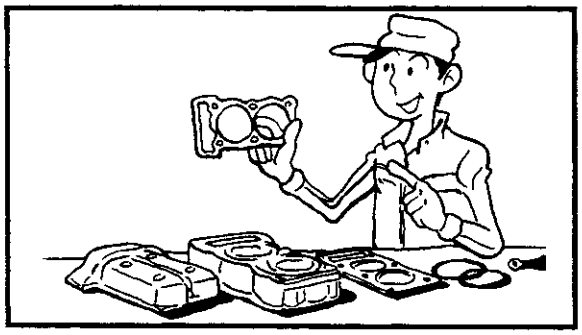
PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Remove all dirt, mud dust, and foreign masterial before removing and disassembling.

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

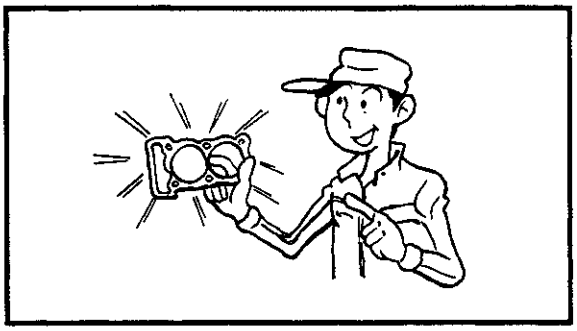


3. When disassembling the motorcycle keep mated parts together. This includes gears, cylinders, pistons, and other mated parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.



4. During the motorcycle 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.



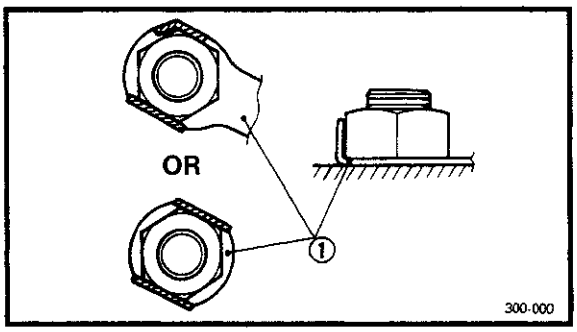
ALL REPLACEMENT PARTS

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

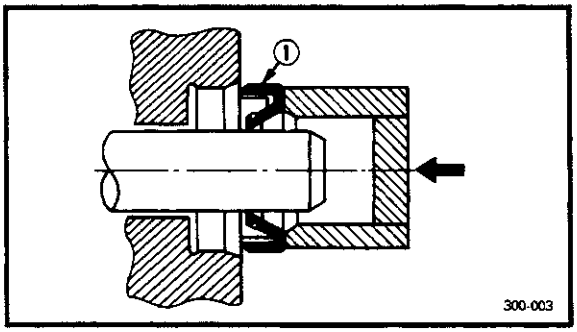
1. All gaskets, seals and O-rings should be replaced when an engine is overhauled. All gaskets surfaces, oil seal lips and O-rings must be cleaned.

2. Properly oil all mating parts and bearing during reassembly. Apply grease to the oil seal lips.



LOCK WASHERS/PLATES AND COTTER PINS

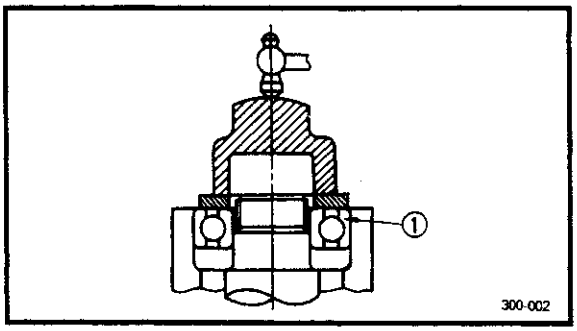
1. All lock washers/plates ① and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.



BEARINGS AND OIL SEALS

1. Install the bearing(s) and oil seal(s) 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.

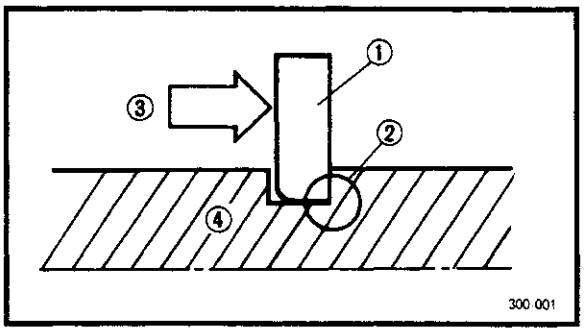
① Oil seal



CAUTION:

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

① Bearing



CIRCLIPS

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

④ Shaft

SPECIAL TOOLS

The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvi-sed techniques.
The shape and part number used for the special tool differ by country, so two types are provided.

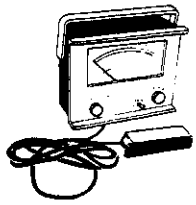
Refer to the list provided to avoid errors when placing an order.

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

P/N.90890-□□□□□ } Except for USA, CDN

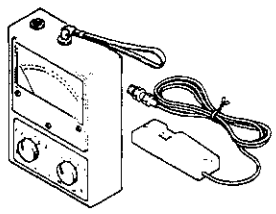
FOR TUNE UP

1-A
Inductive tachometer
P/N. YU-08036-A



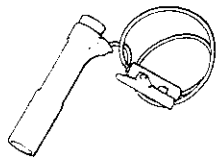
This tool is needed for detecting engine rpm.

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



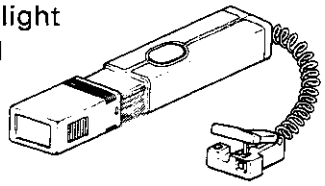
This tool is needed for detecting engine rpm.

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



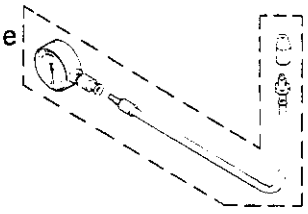
This tool is necessary for checking ignition timing.

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



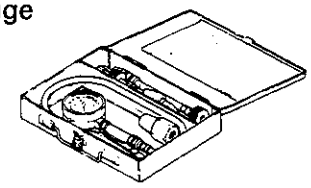
This tool is necessary for checking ignition timing.

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



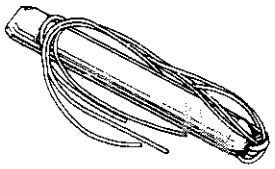
This gauge is used to measure the engine compression.

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



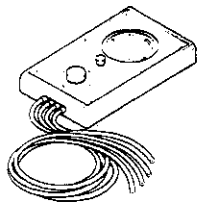
This gauge is used to measure the fuel level in the float chamber.

5-A
Vacuum gauge
P/N. YU-08030



This gauge is needed for carburetor synchronization.

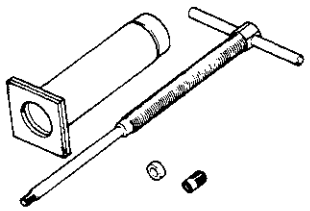
5-B
Vacuum gauge
P/N. 90890-03094



This gauge is needed for carburetor synchronization.

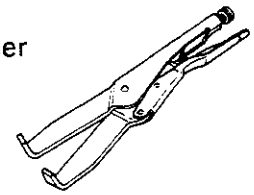
FOR ENGINE SERVICE

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



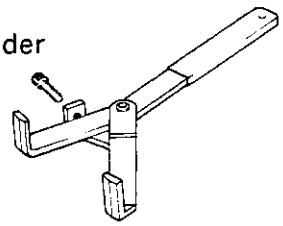
This tool is used to remove the piston pin.

2-A
Universal clutch holder
P/N. YM-91042



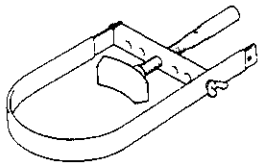
This tool is used to hold the clutch when removing or installing the clutch boss locknut.

2-B
Universal clutch holder
P/N. 90890-04086



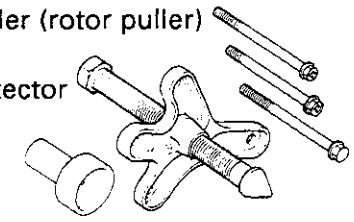
This tool is used to loosen and tighten the clutch boss locknut.

3
Sheave holder
P/N. YS-01880
P/N. 90890-01701



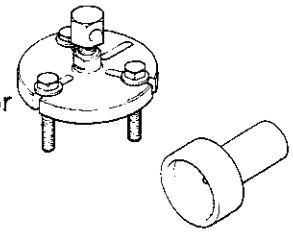
This tool is used to loosen and tighten the A.C. magneto.

4-A
Heavy duty puller (rotor puller)
P/N. YU-33270
Crankshaft protector
P/N. YM-1382



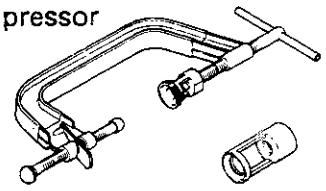
These tools are used to remove the rotor.

4-B
Rotor puller
P/N. 90890-01362
Crankshaft protector
P/N. 90890-01382



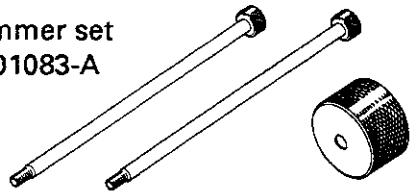
These tools are used to remove the rotor.

5
Valve spring compressor
P/N. YM-04019
P/N. 90890-04019
Attachment
P/N. YM-4114
P/N. 90890-04114



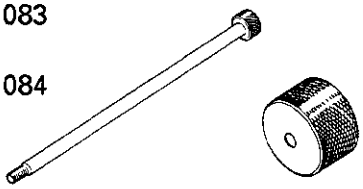
This tool is needed to remove and install the valve assemblies.

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

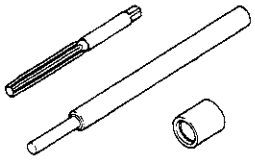


These tools are used when removing the rocker arm shaft.

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

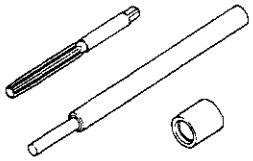


7-A
Valve guide remover and installer (5,5 mm)
Valve guide remover
P/N. YM-01122
Valve guide installer
P/N. YM-4015
Valve guide reamer
P/N. YM-01196



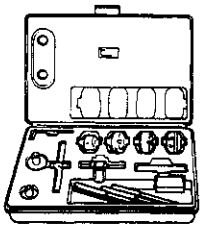
These tools are used to remove, install and rebore the valve guide.

7-B
Valve guide remover and installer set
(5.5 mm)
P/N. 90890-04016



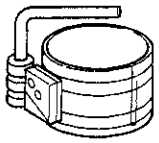
These tools are used to remove, install and rebore the valve guide.

8
Valve seat cutter
P/N. YM-91043-C



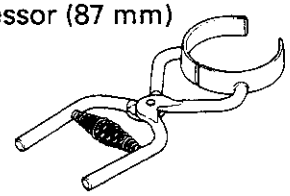
This tool is used to adjust the valve clearance.

9-A
Piston ring compressor (87 mm)
P/N. YU-33294
(35 mm ~ 88 mm)



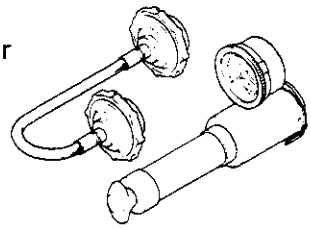
This tool is used to compress piston rings when installing the cylinder.

9-B
Piston ring compressor (87 mm)
P/N. 90890-04121



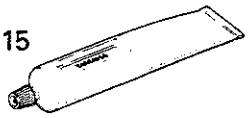
This tool is used to compress piston rings when installing the cylinder.

10
Radiator cap tester
P/N. YU-24460-01
P/N. 90890-01325
Adapter
P/N. YU-33984
P/N. 90890-01352



This tester is used for checking the cooling system.

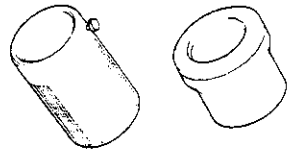
11
Sealant (Quick gasket)
P/N. ACC-11001-15-01
YAMAHA bond No. 1215
P/N. 90890-85505



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

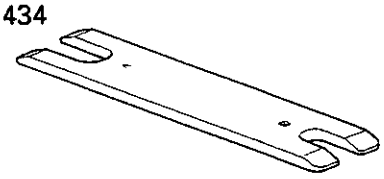
FOR CHASSIS SERVICE

1
Front fork seal driver (weight)
P/N. YM-33963
P/N. 90890-01367
Adapter (41 mm)
P/N. YM-33968
P/N. 90890-01381



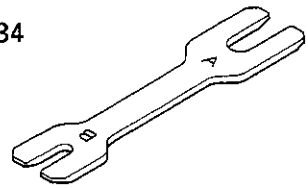
These tools are used when installing the fork oil seal.

2-A
Rod holder
P/N. YM-01434



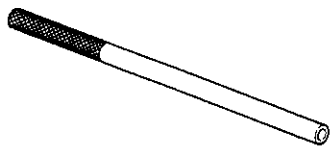
This tool is used to hold the fork spring.

2-B
Rod holder
P/N. 90890-01434



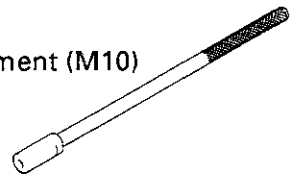
This tool is used to hold the fork spring.

3-A
Rod puller
P/N. YM-01437



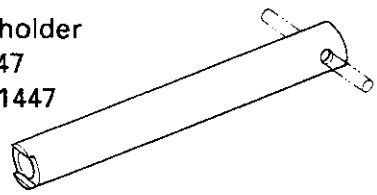
This tool is used to pull up the fork damper rod.

3-B
Rod puller
P/N. 90890-01437
Rod puller attachment (M10)
P/N. 90890-01436



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

4
Damper rod holder
P/N. YM-01447
P/N. 90890-01447



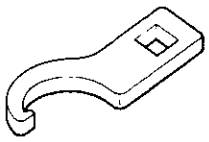
This tool is used to loosen and tighten the damper rod holding bolt.

5-A
Ring nut wrench
P/N. YU-33975



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

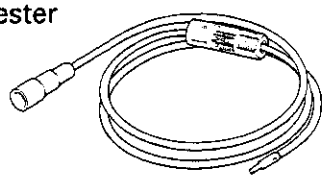
5-B
Ring nut wrench
P/N. 90890-01403



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

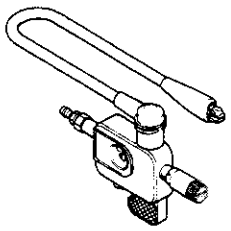
FOR ELECTRICAL COMPONENTS

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



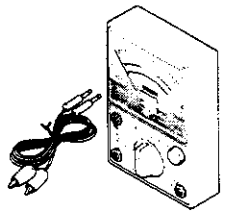
This instrument is necessary for checking the ignition system components.

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



This instrument is necessary for checking the ignition system components.

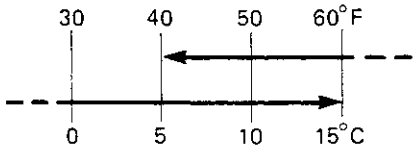
2
Pocket tester
P/N. YU-03112
P/N. 90890-03112



This instrument is invaluable for checking the electrical system.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	TDM850D/DC
Model code number:	4DT1 (USA–Except for California) 4DT2 (USA–For California) 4DT3 (CDN)
Vehicle identification number:	JYA4DTEO * NA000101 (USA–Except for California) JYA4DTCO * NA004101 (USA–For California) JYA4DTNO * NA005101 (CDN)
Engine starting number:	4DT-000101 (USA–Except for California) 4DT-004101 (USA–For California) 4DT-005101 (CDN)
Dimensions: Overall length Overall width Overall height Seat height Wheelbase Minimum ground clearance	 2,175 mm (85.6 in) 780 mm (30.7 in) 1,260 mm (49.6 in) 795 mm (31.3 in) 1,475 mm (58.1 in) 160 mm (6.3 in)
Basic weight: With oil and full fuel tank	 230 kg (507 lb)
Minimum turning radius:	2,900 mm (114.2 in)
Engine: Engine type Cylinder arrangement Displacement Bore × stroke Compression ratio Compression pressure Starting system	 Liquid cooled 4-stroke, DOHC Forward inclined parallel 2-cylinder 849 cm^3 89.5 × 67.5 mm (3.52 × 2.66 in) 9.5 : 1 (USA) 9.2 : 1 (CDN) 1,050 kPa (10.5 kg/cm^2, 149 psi) Electric starter
Lubrication system:	Dry sump
Engine oil type or grade: Yamalube 4 (10W 30)or SAE 10W 30 type SE motor oil  Yamalube 4 (20W 40) or SAE 20W 40 type SE motor oil	

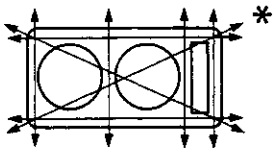
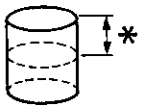
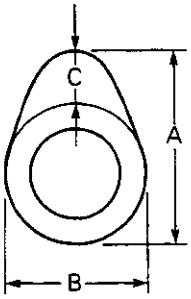
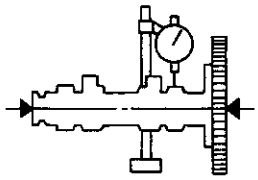
Model	TDM850D/DC	
Engine oil capacity:		
Periodic oil change	3.8 L (3.3 Imp qt, 4.0 US qt)	
With oil filter replacement	3.9 L (3.4 Imp qt, 4.1 US qt)	
Total amount	4.2 L (3.7 Imp qt, 4.4 US qt)	
Coolant total amount: (Including all routes)	1.7 L (1.5 Imp qt, 1.8 US qt)	
Air filter:	Dry type element	
Fuel:		
Type	Unleaded fuel ..... (USA) Regular unleaded gasoline ..... (CDN)	
Tank capacity	18 L (4.0 Imp gal, 4.8 US gal)	
Reserve amount	3.5 L (0.8 Imp gal, 0.9 US gal)	
Carburetor:		
Type × quantity	BDST 38 × 2	
Manufacturer	MIKUNI	
Spark plug:		
Type/Manufacture	DPR 9EA-9 (NGK) or X27EPR-U9 (NIPPONDENSO)	
Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in)	
Clutch type:	Wet, multiple-disc	
Transmission:		
Primary reduction system	Spur gear	
Primary reduction ratio	67/39 (1.717) ..... (USA) 67/39 (1.718) ..... (CDN)	
Secondary reduction system	Chain drive	
Secondary reduction ratio	44/16 (2.750)	
Transmission type	Constant mesh 5-speed	
Operation	Left foot operation	
Gear ratio 1st	37/13 (2.846)	
2nd	37/20 (1.850)	
3rd	29/22 (1.318)	
4th	29/27 (1.074)	
5th	27/30 (0.900)	
Chassis:		
Frame type	Backbone	
Caster angle	25°	
Trail	105 mm (4.13 in)	
Tire:	Front	Rear
Type	Tubeless	Tubeless
Size	110/80-18 58H	150/70-17 69H
Manufacturer/(Type)	BRIDGESTONE (G547) DUNLOP (K505F)	BRIDGESTONE (G548G) DUNLOP (K505)
<Wear limit>	<0.8 mm (0.03 in)>	<0.8 mm (0.03 in)>

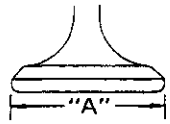
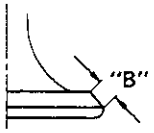
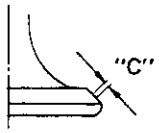
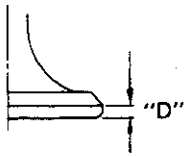
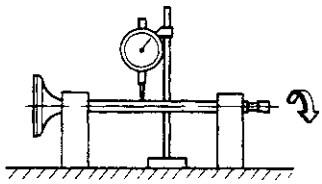
Model	TDM850D/DC	
Tire pressure (Cold tire): Maximum load *	USA: 171 kg (377 lb) CDN: 205 kg (452 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load *	200 kPa (2.00 kg/cm², 28 psi)	225 kPa (2.25 kg/cm², 33 psi)
90 kg (198 lb) ~ Maximum load *	200 kPa (2.00 kg/cm², 28 psi)	250 kPa (2.5 kg/cm², 36 psi)
High speed riding	200 kPa (2.00 kg/cm², 28 psi)	250 kPa (2.5 kg/cm², 36 psi)
*Load is total weight of cargo, rider, passenger, and accessories.		
Brake: Front brake type Operation Rear brake type Operation	 Dual disc brake Right hand operation Single disc brake Right foot operation	
Suspension: Front suspension Rear suspension	 Telescopic fork Swingarm (Monocross)	
Shock absorber: Front shock absorber Rear shock absorber	 Coil-spring/ Oil damper Coil-spring/Gas-Oil damper	
Wheel travel: Front wheel travel Rear wheel travel	 160 mm (6.30 in) 140 mm (5.51 in)	
Electrical: Ignition system Generator system Battery type or model Battery capacity	 T.C.I. (Digital) A.C. magneto generator YTX12-BS or GTX12-BS 12V, 10AH	
Headlight type:	Quartz bulb (Halogen)	
Bulb wattage × Quantity: Headlight Parking/Running light Tail/brake light Flasher light	 12V 35/35W × 2 12V 8W × 2 12V 8W/27W × 2 12V 27W × 4	

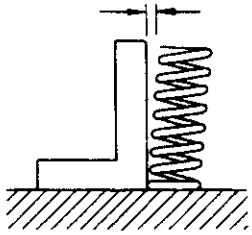
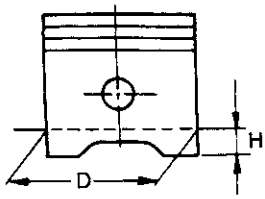
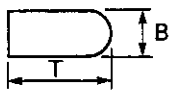
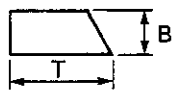
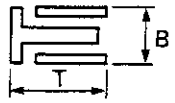
Model		TDM850D/DC
Indicator light:		
Wattage × quantity	Meter light	12V 3.4W × 4
	"NEUTRAL"	12V 3.4W × 1
	"HIGH BEAM"	12V 3.4W × 1
	"TURN"	12V 3.4W × 1

MAINTENANCE SPECIFICATIONS

ENGINE

Model	TDM850D/DC
Cylinder head: <Warp limit>* 	<0.03 mm (0.0012 in)> * Lines indicate straightedge measurement.
Cylinder: Bore size/Measuring point*  <Wear limit>	89.500 ~ 89.505 mm (3.5236 ~ 3.5238 in)/ 40 mm (1.6 in) <89.6 mm (3.528 in)>
Camshaft: Drive method Camshaft outside diameter Shaft-to-cap clearance Cam dimensions: Intake "A" <Limit> "B" <Limit> "C" Exhaust "A" <Limit> "B" <Limit> "C"  <Camshaft runout limit> 	Chain drive (Right) 24.967 ~ 24.980 mm (0.9830 ~ 0.9835 in) 0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in) 35.7 ~ 35.8 mm (1.4055 ~ 1.4094 in) <35.6 mm (1.4 in)> 27.95 ~ 28.05 mm (1.1004 ~ 1.1043 in) <27.85 mm (1.1 in)> 7.65 ~ 7.85 mm (0.3012 ~ 0.3091 in) 35.95 ~ 36.05 mm (1.4154 ~ 1.4193 in) <35.85 mm (1.41 in)> 27.95 ~ 28.05 mm (1.1004 ~ 1.1043 in) <27.85 mm (1.1 in)> 7.9 ~ 8.1 mm (0.3110 ~ 0.3189 in) <0.03 mm (0.0012 in)>
Timing chain: Chain type/No. of links Chain adjustment method	82 RH 2015/138 Links Automatic

Model		TDM850D/DC
Valve, valve seat, valve guide:		
Valve clearance (Cold):	IN.	0.15 ~ 0.20 mm (0.006 ~ 0.008 in)
	EX.	0.25 ~ 0.30 mm (0.010 ~ 0.012 in)
Valve dimensions:		
 Head Dia.	 Face Width	 Seat Width  Margin Thickness
"A" Head diameter	IN.	25.9 ~ 26.1 mm (1.020 ~ 1.028 in)
	EX.	27.9 ~ 28.1 mm (1.098 ~ 1.106 in)
"B" Face width	IN.	2.06 ~ 2.46 mm (0.081 ~ 0.097 in)
	EX.	2.06 ~ 2.46 mm (0.081 ~ 0.097 in)
"C" Seat width	IN.	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
	EX.	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
"D" Margin thickness	IN.	0.8 ~ 1.2 mm (0.032 ~ 0.047 in)
	EX.	0.8 ~ 1.2 mm (0.032 ~ 0.047 in)
Stem outside diameter	IN.	5.475 ~ 5.490 mm (0.2156 ~ 0.2161 in)
	EX.	5.460 ~ 5.475 mm (0.2150 ~ 0.2156 in)
<Limit>	IN.	<5.45 mm (0.214 in)>
	EX.	<5.43 mm (0.214 in)>
Guide inside diameter	IN.	5.50 ~ 5.51 mm (0.216 ~ 0.217 in)
	EX.	5.50 ~ 5.51 mm (0.216 ~ 0.217 in)
<Limit>	IN.	<5.55 mm (0.219 in)>
	EX.	<5.55 mm (0.219 in)>
Stem-to-guide clearance	IN.	0.01 ~ 0.04 mm (0.0004 ~ 0.0015 in)
	EX.	0.03 ~ 0.05 mm (0.001 ~ 0.002 in)
<Limit>	IN.	<0.08 mm (0.003 in)>
	EX.	<0.1 mm (0.004 in)>
<Stem runout limit>		<0.01 mm (0.0004 in)>
		
Valve seat width	IN.	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
	EX.	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)

Model		TDM850D/DC
Valve spring:		
Free length	IN.	37.29 mm (1.47 in)
	EX.	37.29 mm (1.47 in)
Set length (Valve closed)	IN.	30.39 mm (1.2 in)
	EX.	30.39 mm (1.2 in)
Compressed pressure	IN.	10.00 ~ 11.60 kg (22.05 ~ 22.57 lb) at 30.39 mm
(Installed)	EX.	10.00 ~ 11.60 kg (20.05 ~ 22.57 lb) at 30.39 mm
<Tilt limit>	IN.	<2.5°/1.7 mm (2.5°/0.067 in)>
	EX.	<2.5°/1.7 mm (2.5°/0.067 in)>
		
Direction of winding (Top view)	IN.	Clockwise
	EX.	Clockwise
Piston:		
Piston size "D"		89.420 ~ 89.435 mm (3.520 ~ 3.521 in)
Measuring point "H"		4.5 mm (0.177 in)
		
Piston off-set		1 mm (0.04 in)
Piston off-set direction		INSIDE
Piston-to-cylinder clearance		0.065 ~ 0.085 mm (0.0026 ~ 0.0033 in)
<Limit>		<0.15 mm (0.0059 in)>
Piston ring:		
Top ring:		
Type		Barrel
Dimensions (B × T)		1.0 × 3.5 mm (0.039 × 0.137 in)
End gap (Installed)		0.3 ~ 0.45 mm (0.012 ~ 0.018 in)
		
Side clearance (Installed)		0.035 ~ 0.07 mm (0.0014 ~ 0.0028 in)
2nd ring:		
Type		Taper
Dimensions (B × T)		1.0 × 3.5 mm (0.039 × 0.138 in)
End gap (Installed)		0.3 ~ 0.45 mm (0.012 ~ 0.018 in)
		
Side clearance		0.02 ~ 0.055 mm (0.0008 ~ 0.0022 in)
Oil ring:		
Dimensions (B × T)		2.0 × 2.85 mm (0.079 × 0.112 in)
End gap (Installed)		0.2 ~ 0.7 mm (0.008 ~ 0.028 in)
		

Model	TDM850D/DC
Connecting rod:	
Oil clearance	0.026 ~ 0.050 mm (0.001 ~ 0.002 in)
Bearing color code	1. Blue 2. Black 3. Brown 4. Green
Crankshaft:	
Crank width "A"	64.75 ~ 65.25 mm (2.549 ~ 2.569 in)
Crank width "B"	153.6 ~ 154.4 mm (6.047 ~ 6.079 in)
<Runout limit "C">	<0.02 mm (0.0008 in)>
Big end side Clearance "D"	0.16 ~ 0.272 mm (0.006 ~ 0.011 in)
Small end free play "F"	0.8 ~ 1.0 mm (0.0315 ~ 0.0394 in)
Jounal oil clearance	0.020 ~ 0.038 mm (0.0007 ~ 0.0015 in)
Bearing color code	1. Blue 2. Black 3. Brown 4. Green 5. Yellow
Balancer:	
Drive method	Gear
Clutch:	
Friction plate:	
Thickness	2.9 ~ 3.1 mm (0.114 ~ 0.122 in)
Quantity	8 pcs.
<Wear limit>	<2.8 mm (0.11 in)>
Clutch plate:	
Thickness	2.2 ~ 2.4 mm (0.087 ~ 0.094 in)
Quantity	1 pc.
<Warp limit>	<0.1 mm (0.004 in)>
Clutch plate:	
Thickness	1.9 ~ 2.1 mm (0.075 ~ 0.083 in)
Quantity	7 pcs.
<Warp limit>	<0.1 mm (0.004 in)>
Clutch spring:	
Free length	55.0 mm (2.17 in)
Quantity	6 pcs.
Minimum free length	53 mm (2.09 in)
Clutch release method	Outer pull, rack & Pinion pull
Transmission:	
<Main axle runout limit>	<0.08 mm (0.003 in)>
<Drive axle runout limit>	<0.08 mm (0.003 in)>
Shifter:	
Type	Guide bar

Model			TDM850D/DC		
Carburetor:			4DT1	4DT2	4DT3
I.D. mark			4DT 00	4DT 10	3VD 00
Main jet		(M.J.)	#140	←	←
Main air jet		(M.A.J.)	#50	←	←
Jet needle		(J.N.)	5EL79	←	5G52-3
Needle jet		(N.J.)	Y-4	←	←
Throttle valve size		(Th. V.)	#130	←	←
Pilot jet		(P.J.)	#37.5	←	←
Pilot air jet		(P.A.J.1)	#75	←	#70
		(P.A.J.2)	1.4	←	←
Bypass	1	(B.P.1)	ø0.8	←	←
	2	(B.P.2)	ø0.9	←	←
	3	(B.P.3)	ø0.8	←	←
Pilot screw		(P.S.)	Preset	←	3 turns out
Valve seat		(V.S.)	ø1.7	←	←
Starter jet	1	(G.S.1)	#72.5	←	#75
	2	(G.S.2)	ø0.8	←	←
Pilot outlet		(P.O.)	ø0.9	←	←
Fuel level			7.4 ~ 8.4 mm (0.29 ~ 0.33 in)	←	←
			Above from the float chamber line	←	←
Engine idling speed			1,000 ~ 1,200 r/min	←	←
Vacuum pressure at idling speed			32.59 ~ 35.25 kPa (245 ~ 265 mmHg, 9.65 ~ 10.63 in Hg)	←	33.25 ~ 35.91 kPa (250 ~ 270 mm Hg, 9.84 ~ 10.64 in Hg)
Fuel pump:					
Type			Vacuum type		
Model/Manufacturer			3LD/TAIYOGIKEN		
Lubrication system:					
Oil filter type			Paper type		
Oil pump type			Trochoid type		
Tip clearance			0 ~ 0.12 mm (0 ~ 0.005 in)		
Side clearance			0.03 ~ 0.08 mm (0.001 ~ 0.003 in)		
Bypass valve setting pressure			40 ~ 80 kPa (0.4 ~ 0.8 kg/cm², 5.69 ~ 11.38 psi)		
Relief valve operating pressure			350 ~ 450 kPa (3.5 ~ 4.5 kg/cm², 49.77 ~ 63.99 psi)		
Cooling system:					
Radiator core size		Width	300 mm (11.8 in)		
		Height	185 mm (7.28 in)		
		Thickness	32 mm (1.26 in)		
Radiator cap opening pressure			75 ~ 105 kPa (0.75 ~ 1.05 kg/cm², 10.67 ~ 14.93 psi)		
Reservoir tank capacity			0.3 L (0.26 Imp qt, 0.32 US qt)		
<From low to full level>			<0.2 L (0.18 Im qt, 0.21 US qt)>		
Water pump					
Type			Single-suction centrifugal pump		
Reduction ratio			44/44 × 38/27 (1.407)		
Thermostat					
Opening temperature			80 ~ 84°C (176 ~ 183°F)		

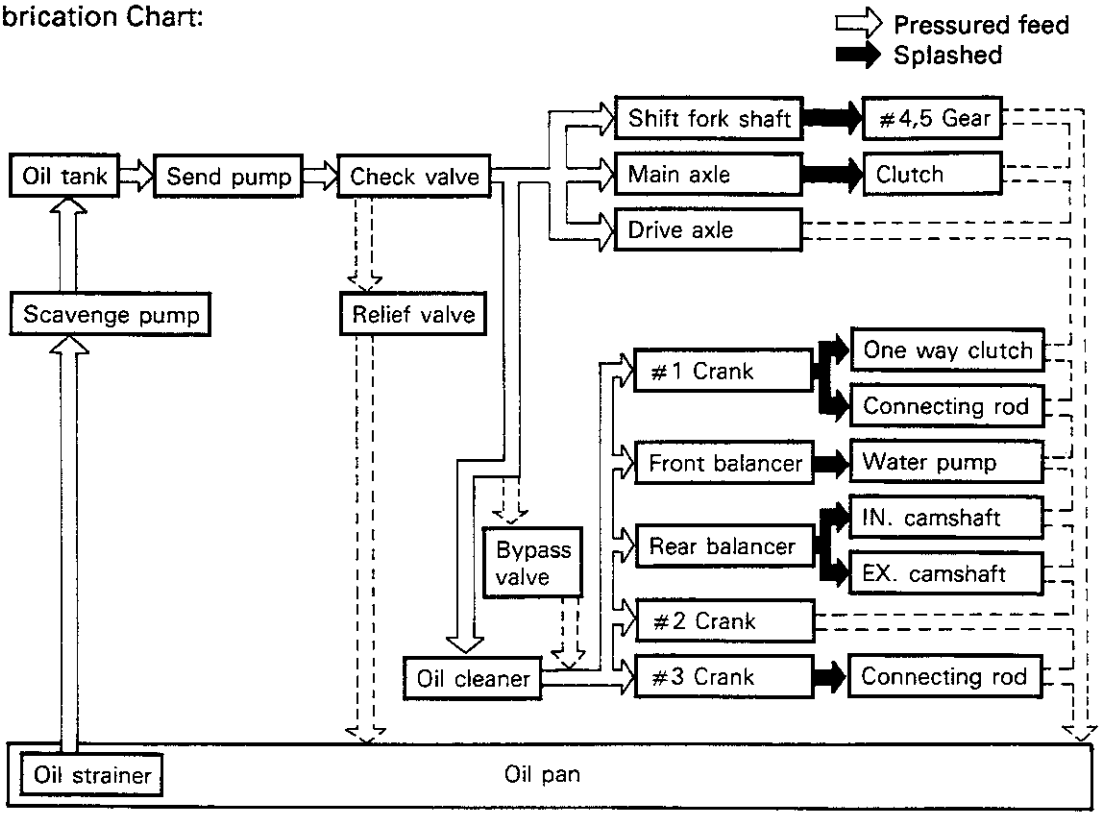
TIGHTENING TORQUE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque Nm	m·kg	ft·lb	Remarks
Cylinder head (exhaust pipe)	Stud bolt	M 8	4	15	1.5	11	E
Cylinder head (camshaft cap)	Flange bolt	M 6	16	10	1.0	7.2	
Cylinder head	Nut	M 10	6	40	4.0	29	E
Cylinder head cover	Bolt	M 6	4	10	1.0	7.2	
Cylinder body drain bolt	Flange bolt	M 6	1	10	1.0	7.2	
Spark plug	—	M 12	2	17.5	1.75	12.5	
Connecting rod	Nut	M 9	4	48	4.8	35	
Flywheel magneto	Flange bolt	M 12	1	130	13	94	
Timing chain sprocket	Flange bolt	M 7	4	24	2.4	17	
Chain guide (timing chain)	Bolt	M 6	1	10	1.0	7.2	
Thermostat cover	Flange bolt	M 6	1	10	1.0	7.2	
Hose clamp (oil hose 2)	—	M 5	7	2	0.2	1.4	
Radiator protector	Panhead screw	M 5	2	5	0.5	3.6	
Radiator	Flange bolt	M 6	3	7	0.7	5.1	
Delivery pipe (crankcase-cylinder head)	Union bolt	M 10	2	21	2.1	15	
Oil pipe 1	Bolt	M 6	2	10	1.0	7.2	
Oil pump assembly 1	Panhead	M 6	3	6	0.6	4.3	
Oil pump assembly 2	screw	M 6	3	6	0.6	4.3	
Oil buffle plate	Flange bolt	M 6	2	10	1.0	7.2	
Drain plug (oil pan)	—	M 14	1	35	3.5	25	
Oil strainer	Panhead screw	M 6	4	7	0.7	5	LT
Stay 1 (relief valve)	Flange bolt	M 6	1	10	1.0	7.2	LT
Strainer cover	Flange bolt	M 10	1	30	3.0	22	
	Flange bolt	M 6	1	10	1.0	7.2	
Hose clamp	Flange bolt	M 6	1	10	1.0	7.2	
Drain bolt (oil strainer case)	Flange bolt	M 10	1	30	3.0	22	
Carburetor joint	Bolt	M 6	4	10	1.0	7.2	
Air filter	Flange bolt	M 6	1	7	0.7	5.1	
Exhaust pipe (CO test)	Bolt	M 6	2	10	1.0	7.2	
Exhaust pipe and cylinder head	Nut	M 8	4	20	2.0	14	
Exhaust pipe and muffler	Screw	M 6	3	4	0.4	2.9	
Muffler	Bolt	M 8	1	20	2.0	14	
	Bolt	M 8	1	24	2.4	17	
	Bolt	M 10	2	30	3.0	22	
Crankcase 1	Stud bolt	M 10	6	8	0.8	5.8	Height 149.7 mm (5.89 in)
Crankcase 1 and crankcase 2	Bolt	M 10	6	40	4.0	29	M
Crankcase 1 and crankcase 2	Flange bolt	M 6	10	12	1.2	8.7	E
Crankcase 1 and crankcase 2	Flange bolt	M 8	11	24	2.4	17	E
Balancer shaft	Screw	M 6	2	12	1.2	8.7	
Holder (crankcase)	Flange bolt	M 6	2	10	1.0	7.2	
Holder (crankcase)	Flange bolt	M 6	2	10	1.0	7.2	
Chain cover	Flange bolt	M 6	2	5	0.5	3.6	
Crankcase cover 2 (left-rear)	Flange bolt	M 6	5	5	0.5	3.6	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque Nm	m·kg	ft·lb	Remarks
Crankcase cover 1 (left-front)	Panhead screw	M 6	9	5	0.5	3.6	
Bracket	Flange bolt	M 8	2	24	2.4	17	
Starter clutch	Bolt	M 6	3	10	1.0	7.2	LT
Clutch spring	Screw	M 6	6	8	0.8	5.8	
Clutch boss	Nut	M 20	1	70	7.0	50	Use lock washer
Main axle bearing stopper	Screw	M 6	3	12	1.2	8.7	
Drive sprocket	Nut	M 18	1	70	7.0	51	Use lock washer
Drive axle cover plate	Bolt	M 6	5	10	1.0	7.2	
Shift cam	Screw	M 5	1	4	0.4	2.9	
Shift cam stopper lever	Bolt	M 6	1	12	1.2	8.7	
Shift fork guide	Flange bolt	M 6	2	12	1.2	8.7	
Shift arm	Flange bolt	M 6	1	12	1.2	8.7	
Shift rod	Nut	M 6	2	8	0.8	5.8	
Stopper screw (shift rod)	Bolt	M 8	1	22	2.2	16	
Stopper screw (shift lever)	Screw	M 6	1	12	1.2	8.7	LT
Stator	Screw	M 6	3	7	0.7	5.1	LT
Pick-up coil (stator assembly)	Screw	M 5	2	4	0.4	2.9	LT
Ignition coil	Screw	M 6	2	10	1.0	7.2	
Neutral switch	Screw	M 6	2	4	0.4	2.9	
Starter motor	Flange bolt	M 6	2	10	1.0	7.2	
Thermo switch	—	M 6	1	28	2.8	20	
Thermo unit housing	—	PT 1/8	1	15	1.5	11	

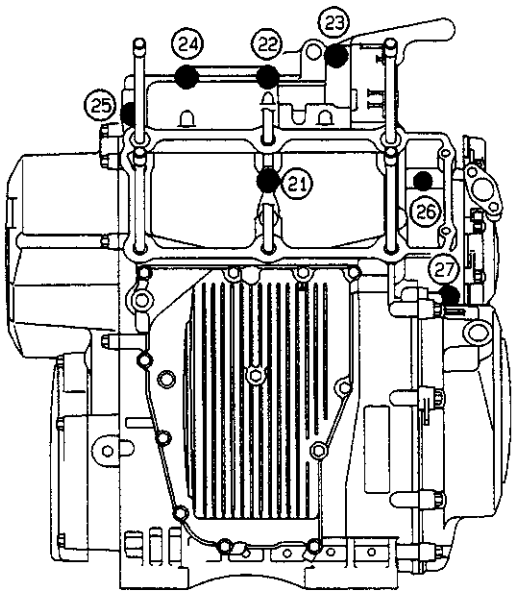
Model	TDM850D/DC

Lubrication Chart:

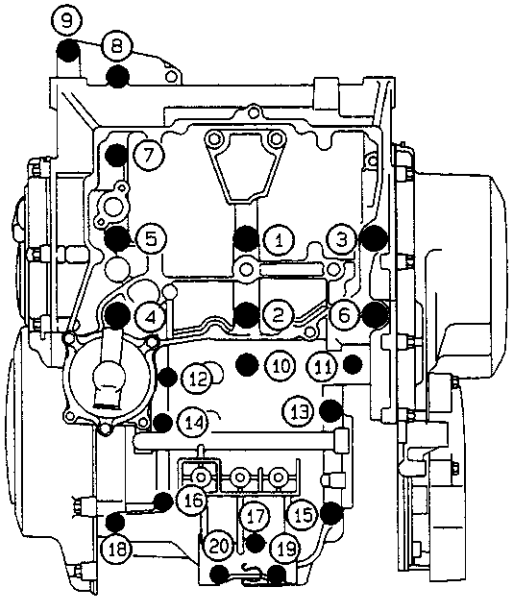


Crankcase Tightening Sequence:

Crankcase (Upper)

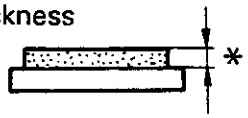
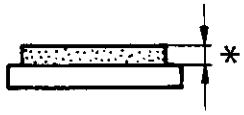


Crankcase (Lower)



CHASSIS

Model			TDM850D/DC
Steering system:			
Steering bearing type			Taper roller bearing
Front suspension:			
Front fork travel			160 mm (6.30 in)
Front fork spring free length			427 mm (16.8 in)
<Limit>			<406 mm (16.0 in)>
Spring rate		K1	7 N/mm (0.7 kg/mm, 39.2 lb/in)
Stroke		K1	0 ~ 160 mm (0 ~ 6.30 in)
Optional spring			No
Oil capacity			395 cm³ (13.9 Imp oz, 13.4 US oz)
Oil level			165 mm (6.50 in) From top of inner tube fully compressed without spring
Oil grade			Suspension oil 01or equivalent
Rear Suspension:			
Shock absorber travel			46.6 mm (1.83 in)
Spring free length	(Main)		146 mm (5.75 in)
	(Sub)		69 mm (2.72 in)
Fitting length			206 mm (8.1 in)
Spring rate	(Main + Sub)	K1	170 N/mm (17.0 kg/mm, 952 lb/in)
	(Main)	K1	235 N/mm (23.5 kg/mm, 1,316 lb/in)
Stroke		K1	0 ~ 46.6 mm (0 ~ 1.8 in)
Optional spring			No
Enclosed gas pressure:			
Standard			1,200 kPa (12 kg/cm², 171 psi)
Swingarm:			
<Free play limit-End>			<1.0 mm (0.039 in)> at swingarm end Move swingarm end side to side
<Free play limit-Side>			<0.3 mm (0.012 in)> at swingarm pivot
Front wheel:			
Type			Cast wheel
Rim size			18 × MT3.00
Rim material			Aluminum
Rim runout limit	Radial		2.0 mm (0.08 in)
	Lateral		2.0 mm (0.08 in)
Rear wheel:			
Type			Cast wheel
Rim size			17 × MT4.00
Rim material			Aluminum
Rim runout limit	Radial		2.0 mm (0.08 in)
	Lateral		2.0 mm (0.08 in)
Drive chain:			
Type/Manufacturer			525HV/DAIDO
No. of links			114
Chain free play			40 ~ 50 mm (1.6 ~ 2.0 in)

Model	TDM850D/DC
Front disc brake:	
Type	Dual
Disc outside diameter × thickness	298 × 4 mm (11.7 × 0.16 in)
Pad thinkness Inner	5.5 mm (0.22 in)
<Limit>*	<0.5 mm (0.02 in)>
Pad thickness Outer	5.5 mm (0.22 in)
 <Limit>*	<0.5 mm (0.02 in)>
Master cylinder inside diameter	15.8 mm (0.62 in)
Caliper cylinder inside diameter	45.4 mm (1.79 in)
Brake fluid type	DOT #4 If DOT #4 is not available, DOT #3 can be used
Rear disc brake:	
Type	Single
Disc outside diameter × Thickness	245 × 5 mm (9.65 × 0.20 in)
Pad thickness Inner	5,5 mm (0.22 in)
<Limit>*	<0.5 mm (0.02 in)>
Pad thickness Outer	5.5 mm (0.22 in)
<Limit>* 	<0.5 mm (0.02 in)>
Master cylinder inside diameter	14 mm (0.55 in)
Caliper cylinder inside diameter	42.8 mm (1.69 in)
Brake fluid type	If DOT #4 is not available, DOT #3 can be used
Brake lever and brake pedal:	
Brake pedal position	17 ~ 41 mm (0.7 ~ 1.6 in) Below top of footrest.
Clutch lever and throttle grip:	
Clutch lever free play	10 ~ 15 mm (0.4 ~ 0.6 in) at clutch lever end
Throttle cable free play	3 ~ 5 mm (0.12 ~ 0.20 in) at grip flange.

TIGHTENING TORQUE

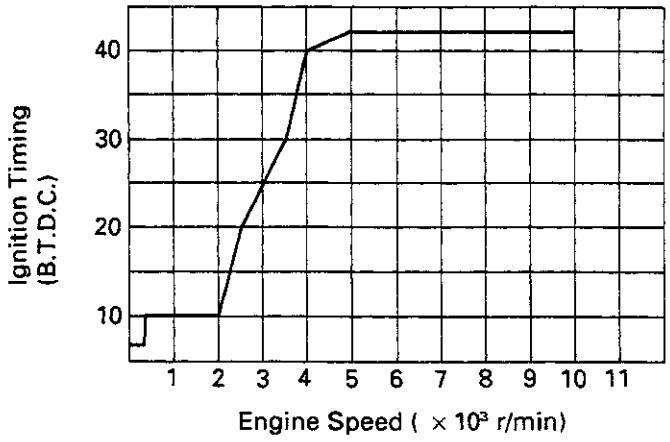
Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Handle crown and inner tube	M 8	23	2.3	17	
Handle crown and steering shaft	M 14	110	11.0	80	
Inner tube and under bracket	M 8	23	2.3	17	
Steering shaft and ring nut	M 25	3	0.3	2.2	See Note.
Joint (brake hose) and under bracket	M 6	10	1.0	7.2	
Brake hose (union bolt)	M 10	26	2.6	19	
Cowling stay and frame	M 8	16	1.6	11	
Cowling stay and cowling (upper)	M 5	4	0.4	2.9	
Cowling (upper) and panel 1, 2	M 5	4	0.4	2.9	
Cowling (upper) and screen	M 5	0.4	0.04	0.3	
Panel and frame	M 5	4	0.4	2.9	
Meter and cowling stay	M 8	16	1.6	11	
Cover and stay 1	M 6	4	0.4	2.9	
Handlebar and grip end	M 16	26	2.6	19	
Front master cylinder	M 6	9	0.9	5.8	
Front master cylinder and master cylinder cap	M 4	1.5	0.15	1	
Handlebar holder (under) and nut	M 10	30	3.0	22	
Handlebar holder (under) and handlebar (upper)	M 8	23	2.3	17	
Main switch and Handle crown	M 6	7	0.7	5.1	
Engine mounting (rear-lower)	M 10	64	6.4	46	
Engine mounting (rear-upper)	M 10	64	6.4	46	
Engine bracket and engine (upper)	M 10	60	6.0	43	
Engine bracket and engine (rear-lower)	M 8	30	3.0	22	
Engine bracket and frame	M 8	30	3.0	22	
Pivot shaft and nut	M 14	90	9.0	65	
Rear shock absorber and frame	M 12	64	6.4	46	
Rear shock absorber and swing arm	M 10	64	6.4	46	
Seal guard	M 6	7	0.7	5.1	
Chain case and swingarm	M 6	7	0.7	5.1	
Brake hose holder and swingarm	M 6	7	0.7	5.1	
Rear fender cover and swingarm	M 6	7	0.7	5.1	
Fuel tank bracket and fuel tank	M 6	7	0.7	5.1	
Fuel tank bracket and frame	M 8	16	1.6	11	
Fuel tank (rear) and frame	M 8	16	1.6	11	
Fuel cock and fuel tank	M 6	7	0.7	5.1	
Ignition coil and frame	M 6	7	0.7	5.1	
Battery box and battery stay	M 6	7	0.7	5.1	
Reservoir tank and frame	M 6	7	0.7	5.1	
Rear fender and frame	M 6	7	0.7	5.1	
Taillight	M 6	7	0.7	5.1	
Rear fender cover and taillight bracket	M 5	1.3	0.13	0.9	
Rear fender stay and taillight bracket	M 8	16	1.6	11	
Rectifier/Regulator and frame	M 6	7	0.7	5.1	
Frame and stay battery	M 6	7	0.7	5.1	
Oil tank and frame	M 6	7	0.7	5.1	
Oil tank and oil hose	M 20	40	4.0	29	

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Front wheel axle	M 16	58	5.8	42	
Front wheel axle pinch bolt	M 8	19	1.9	13	
Rear wheel axle and nut	M 16	105	10.5	75	
Brake caliper (front) and front fork	M 10	35	3.5	25	
Brake caliper (rear) and caliper bracket	M 10	35	3.5	25	
Caliper bracket and swingarm	M 10	35	3.5	25	
Brake disc and wheel hub (front and rear)	M 8	20	2.0	14	LT
Rear wheel sprocket and clutch hub	M 10	60	6.0	43	
Caliper bleed screw	M 8	6	0.6	4.3	
Brake hose (union bolt)	M 10	26	2.6	19	
Brake hose (rear) and joint	M 10	14	1.4	10	
Rear caliper and joint	M 10	26	2.6	19	
Brake hose holder and front fork	M 6	7	0.7	5.1	
Front fender and front fork	M 6	9	0.9	6.5	
Chain puller and locknut	M 8	16	1.6	11	
Sidestand bolt	M 10	46	4.6	33	
Sidestand locknut	M 10	39	3.9	28	
Footrest bracket and frame	M 8	30	3.0	22	
Footrest (for passenger) and frame	M 8	30	3.0	22	
Footrest bracket and footrest	M 10	64	6.4	46	
Footrest and bank angle sensor	M 8	16	1.6	11	
Master cylinder (rear brake) and frame	M 8	23	2.3	17	
Reservoir tank (rear brake) and holder	M 6	4	0.4	2.9	
Reservoir tank holder and frame	M 6	4	0.4	2.9	
Brake pedal and brake shaft	M 6	8	0.8	5.8	

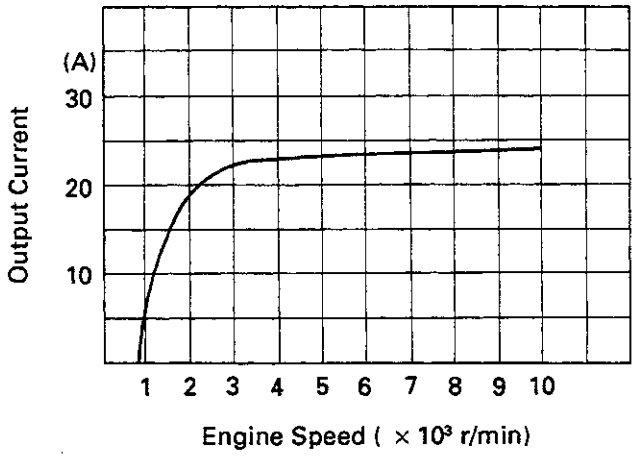
NOTE:

1. First, tighten the ring nut (lower) approximately 52 Nm (5.2 m • kg, 37 ft • lb) by using the torque wrench, then loosen the ring nut one turn.
2. Retighten the ring nut (lower) to specification.

ELECTRICAL

Model	TDM850D/DC
Voltage:	12V
Ignition system:	
Ignition timing (B.T.D.C.)	10° at 1,100 r/min
Advanced timing (B.T.D.C.)	42° at 5,000 r/min
Advancer type	Electrical type
	
T.C.I.:	
Pickup coil resistance	184 ~ 276Ω at 20°C (68°F)
(Color)	(White/Red–White/Green)
T.C.I. Unit/Manufacturer	TNDF14/NIPPONDENSO
Ignition coil:	
Model/Manufacturer	JO282/NIPPONDENSO
Minimum spark gap	6 mm (0.24 in)
Primary winding resistance	2.38 ~ 3.22Ω at 20°C (68°F)
Secondary winding resistance	12 ~ 18 kΩ at 20°C (68°F)
Spark plug cap:	
Type	Resin type
Resistance	10 kΩ at 20°C (68°F)
Charging system:	
Type	A.C. magneto generator

Model	TDM850D/DC
A.C. Generator	
Model/Manufacturer	LNZ39/NIPPONDENSO
Standard output	14V 25A at 5,000 r/min

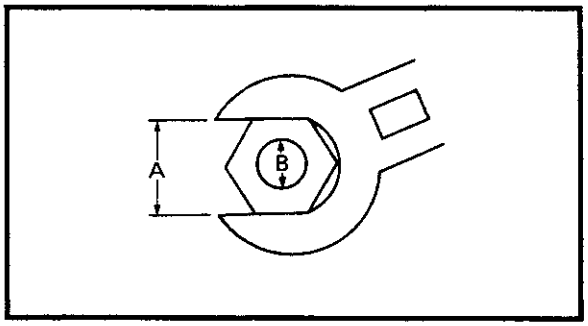


Stator coil resistance	0.20 ~ 0.30Ω at 20°C (68°F) (White–White)
Rectifier/Regulator:	
Model/Manufacturer	SH629/SINDENGEN
Type	Semi conductor–Short circuit type
Voltage regulator	
No load regulated voltage	14.3 ~ 15.3V
Rectifier	
Capacity	25A
Withstand voltage	200V
Battery:	
Specific gravity	1.32
Electrical starter system:	
Type	Constant mesh type
Starter motor:	
Model/Manufacturer	SM-13/MITSUBA
Output	0.8 kW
Brush–Overall length	12.5 mm (0.49 in)
<Limit>	<5 mm (0.20 in)>
Commutator diameter	28.0 mm (1.10 in)
<Wear limit>	<27.0 mm (1.06 in)>
Mica undercut (depth)	0.7 mm (0.028 in)
Starter relay:	
Model/Manufacturer	A104-128/HITACHI
Amperage rating	100A
Horn:	
Type/Quantity	Plane type/1 pc.
Model/Manufacturer	YF-12/NIKKO
Maximum amperage	2.5A

Model	TDM850D/DC
Flasher relay:	
Type	Semi transistor type
Model/Manufacturer	G8A-101-03/OMRON
Self cancelling device	No
Flasher frequency	75 ~ 95 cyl/min
Wattage	21W × 2 + 3.4W
Starting circuit cut-off relay:	
Model/Manufacturer	G8R-30Y-A/OMRON
Coil winding resistance	180 ~ 270Ω
Diode	Yes
Electric fan:	
Model/Manufacturer	NAAF20/NIPPONDENSO
Thermostat switch:	
Model/Manufacturer	2EL/N. THERMOSTAT
Function temperature	102 ~ 108°C (215.6 ~ 226.4°F): ON 98°C (208.4°F): OFF
Thermo unit:	
Model/Manufacturer	11H/NIPPON SEIKI
Coil winding resistance	153.9Ω at 50°C (122°F) 47.5 ~ 52.8Ω at 80°C (176°F) 26.2 ~ 29.3Ω at 100°C (212°F) 16.1Ω at 120°C (248°F)
Circuit breaker:	
Type	Fuse
Amperage for individual circuit × quantity:	
MAIN	30A × 1
HEAD	20A × 1
SIGNAL	10A × 1
IGNITION	10A × 1
FAN	10A × 1
RESERVE	30A × 1 20A × 1 10A × 1

GENERAL TORQUE SPECIFICATIONS

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



A: Distance across flats
B: Outside thread diameter

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

LUBRICATION POINT AND GRADE OF LUBRICANT

ENGINE

Lubrication Point	Lubricant Type
Oil seal lips (all)	LS
O-ring (all)	LS
Bearing (all)	E
Crankshaft (big end)	E
Piston surface	E
Piston pin	E
Connecting rod bolt	M
Crankshaft journal	E
Balancer (Bearing/shaft)	E
Camshaft cam lobe/journal	M
Valve stem (IN. EX.)	M
Valve stem end	E
Water pump impeller shaft	E
Oil pump rotor (Inner/outer) shaft	E
Oil strainer assembly	E
Crankcase cover (Push rod)	M
Idle gear surface	E
Starter clutch	E
Primary driver gear	E
Transmission (free movement gear)	M
Transmission (sliding gear)	M
Shift cam	E
Shift fork/guide bar	E
Shift shaft assembly	E
Shift boss (Inner)	LS
Matching surface (Cylinder head and cylinder head cover)	Sealant (Quick gasket)® or Yamaha Bond No.1215
Crankcase matching surface	Sealant (Quick gasket)® or Yamaha Bond No.1215

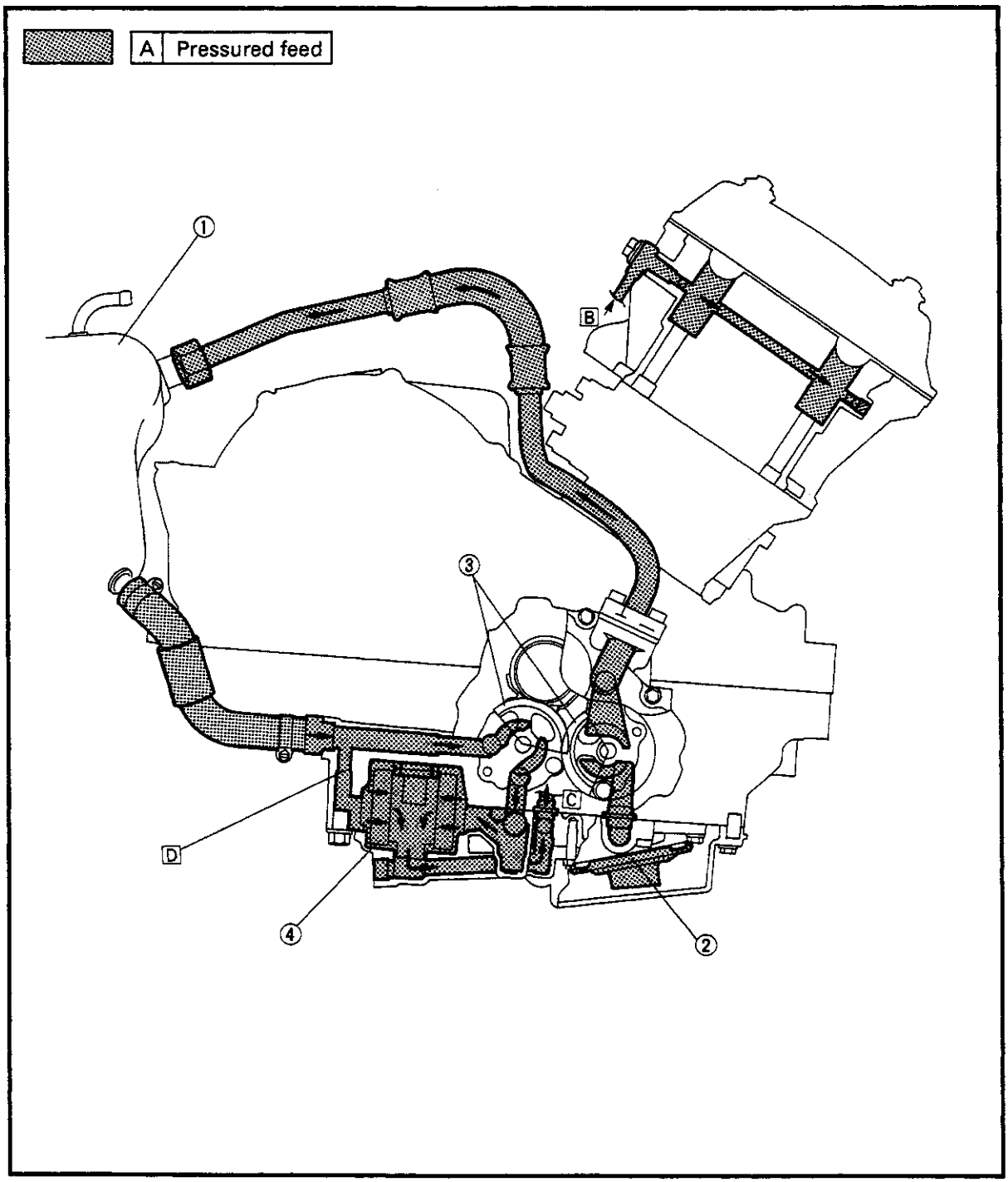
CHASSIS

Lubrication Point	Lubricant Type
Gear unit (Speedometer)	LS
Bearing (Steering head)	B
Steering head ball race lip	LS
Front wheel oil seal lips	LS
Rear wheel oil seal lips	LS
Clutch hub oil seal lip	LS
Clutch hub and rear wheel	LS
Rear brake pedal shaft	LS
Side stand bolt, sliding surface	LS
Tube guide (Throttle grip) inner surface	LS
Brake lever, sliding surface	LS
Clutch lever, sliding surface	LS
Clutch cable end	LS
Rear shock absorber (lower bolt)	M
Rear shock absorber (lower oil seal inner surface)	M
Pivot shaft (Swingarm)	M
Bearing (Swingarm pivot)	M
Swingarm (Thrust cover-inside)	M

LUBRICATION DIAGRAM

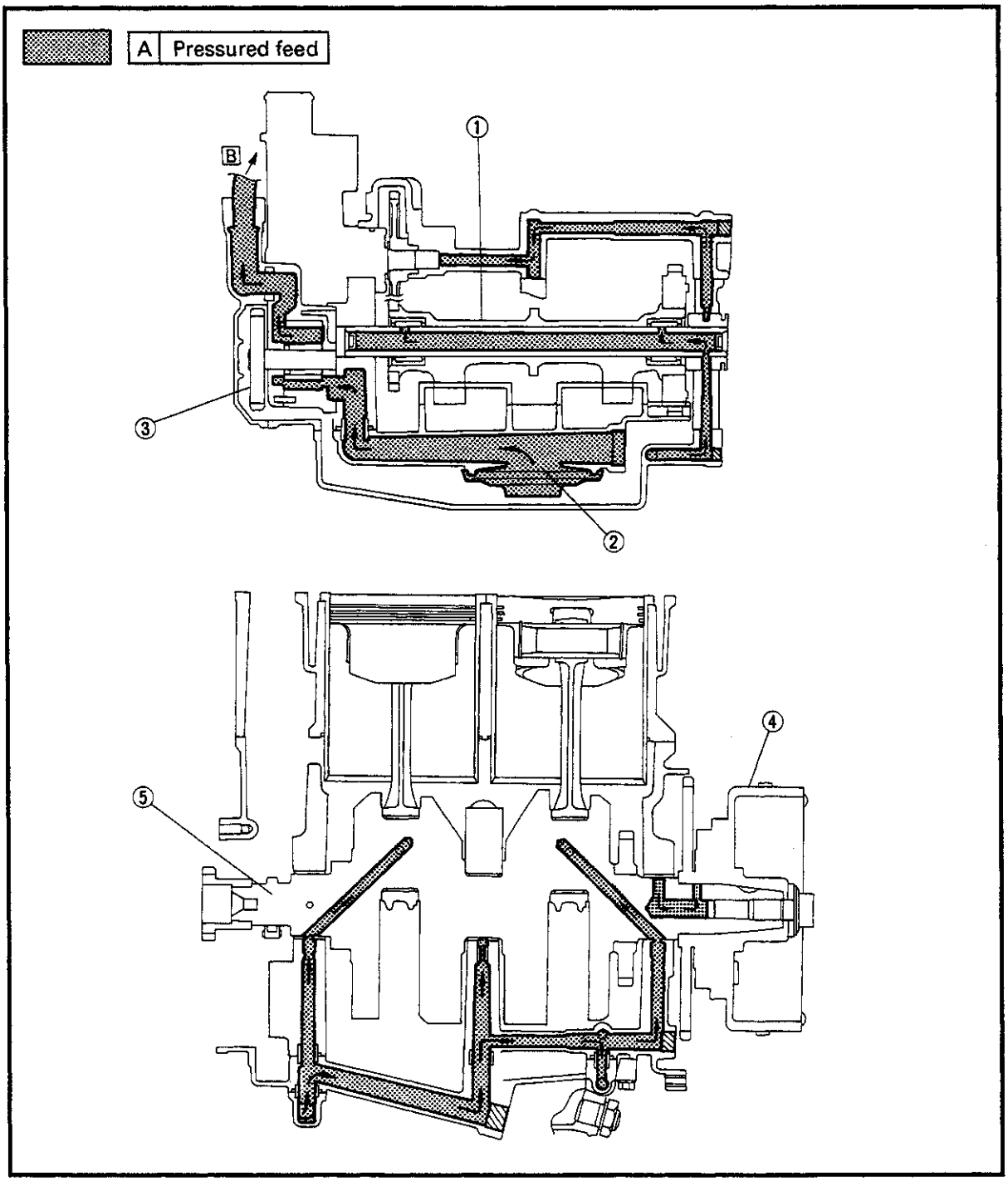
① Oil tank
② Oil strainger
③ Oil pump
④ Oil cleaner

B From crankcase
C To crankshaft
D To transmission



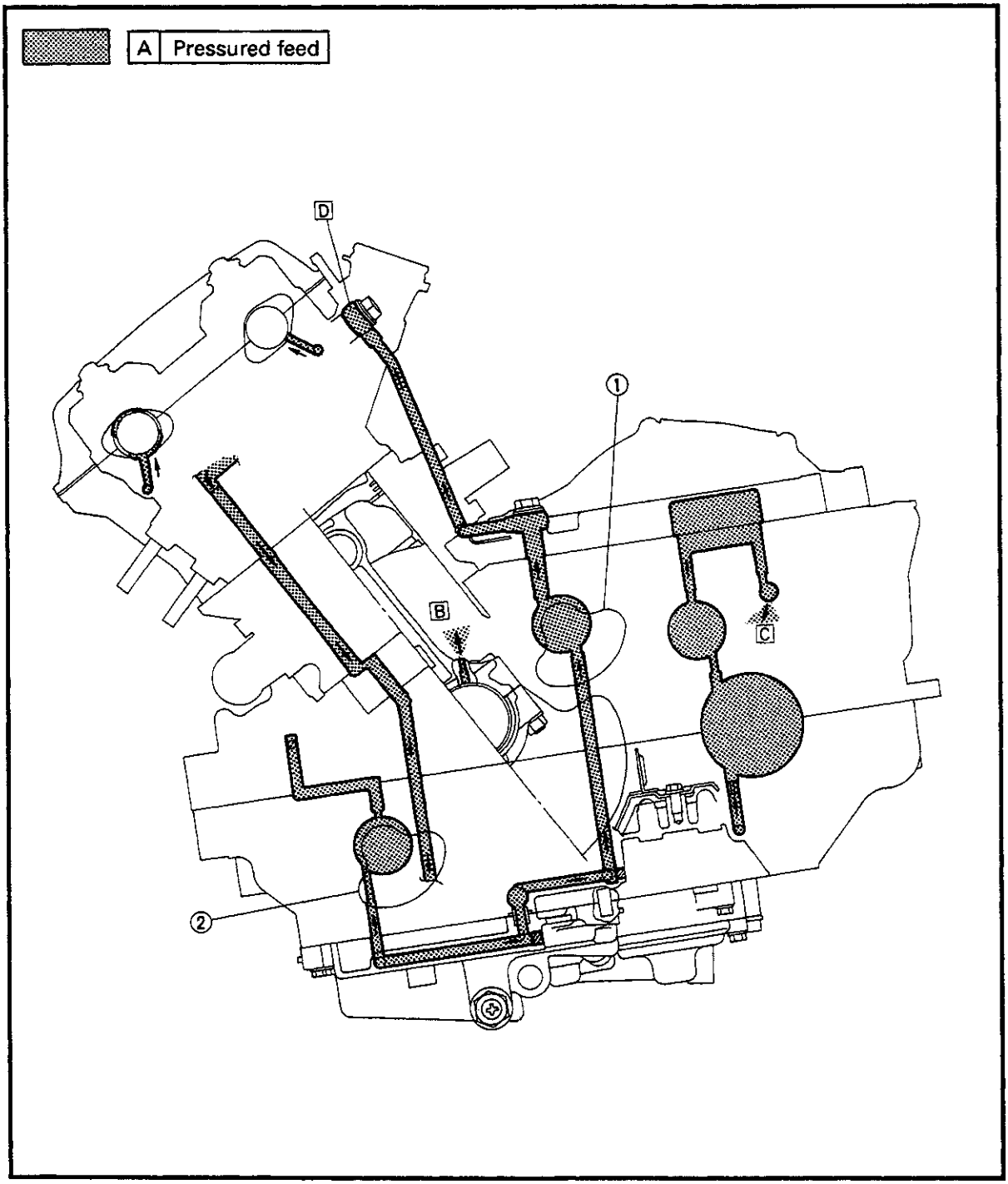
① Balancer
② Oil strainer
③ Oil pump
④ Rotor
⑤ Crankshaft

Ⓑ To oil tank



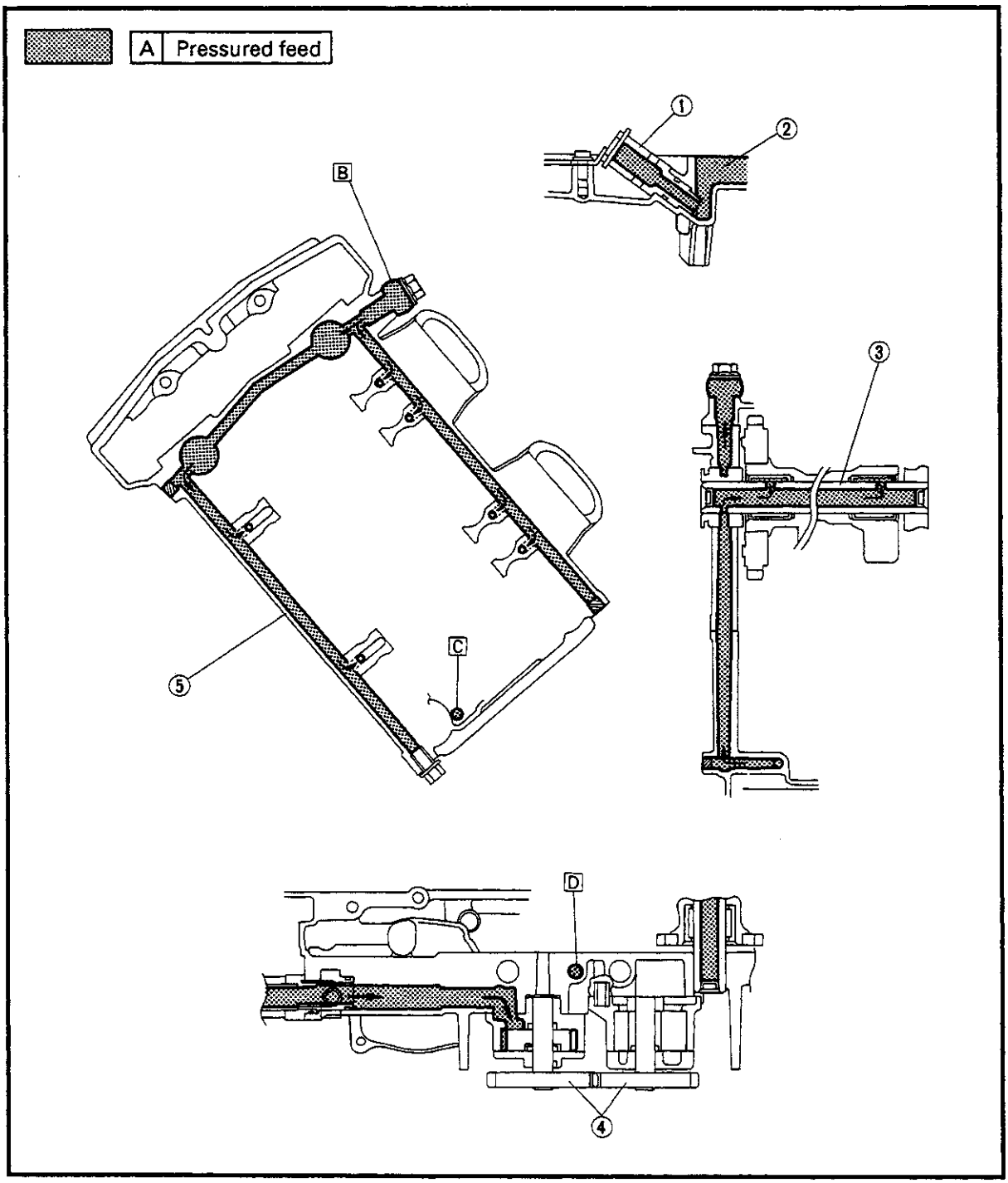
① Rear balancer
② Front balancer

B To piston
C To shift fork shaft
D To cylinder head



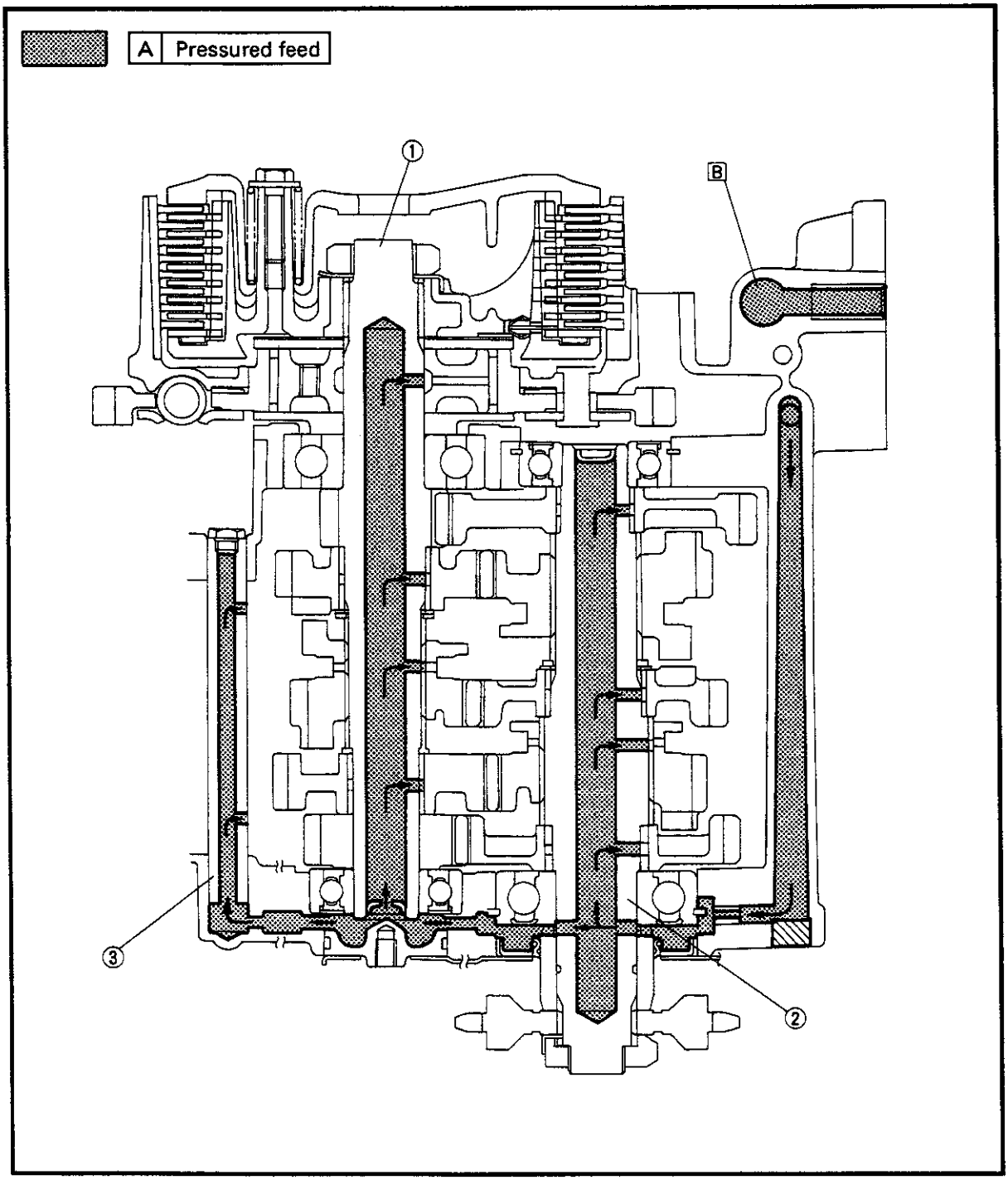
① Relief valve
② Oil pan
③ Balancer shaft
④ Oil pump
⑤ Cylinder head

B From crankcase
C To crankcase
D To crankshaft



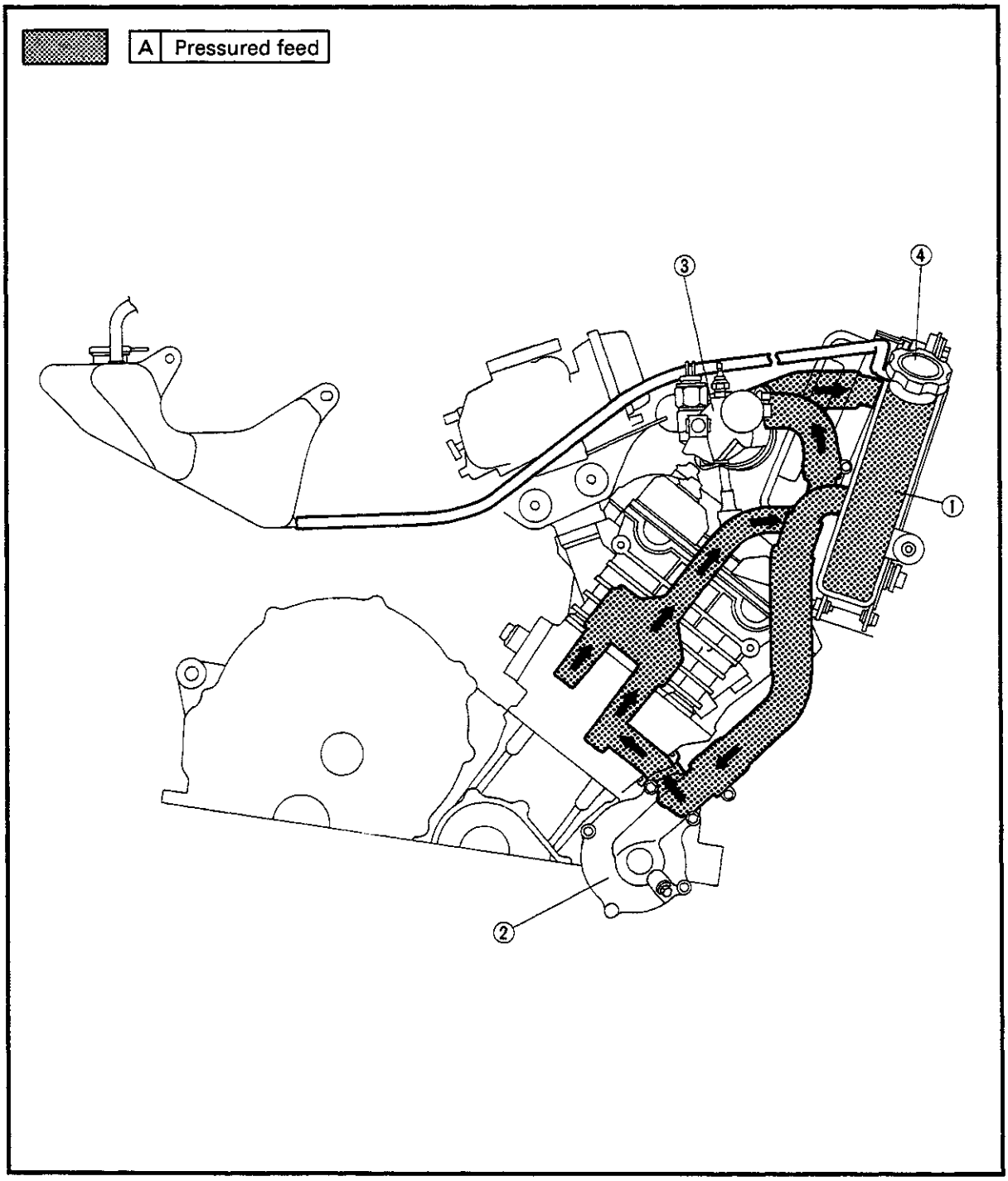
① Main axle
② Drive axle
③ Shift fork shaft

B From drain bolt



COOLANT DIAGRAM

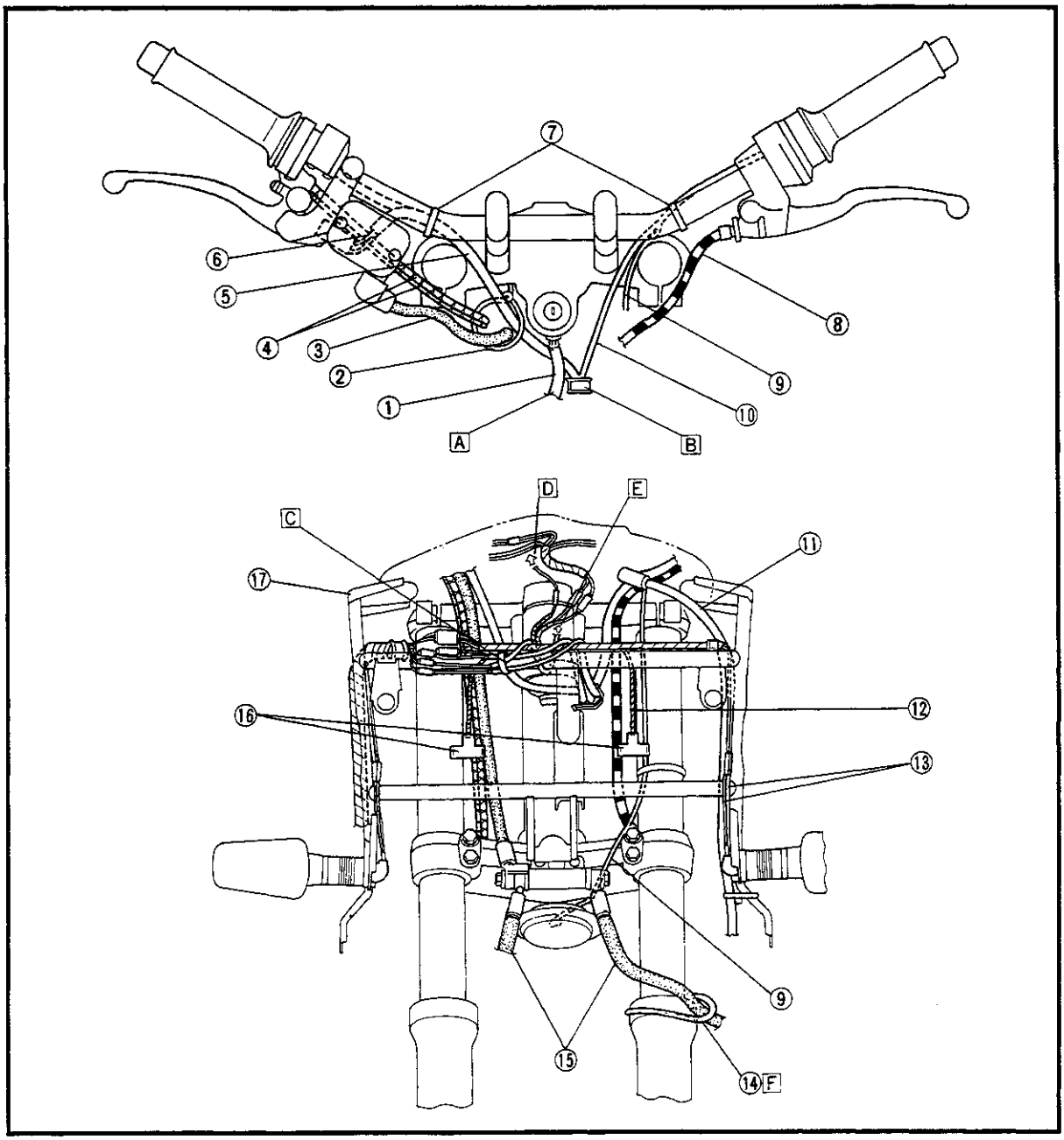
① Radiator
② Water pump
③ Thermostat housing
④ Radiator cap



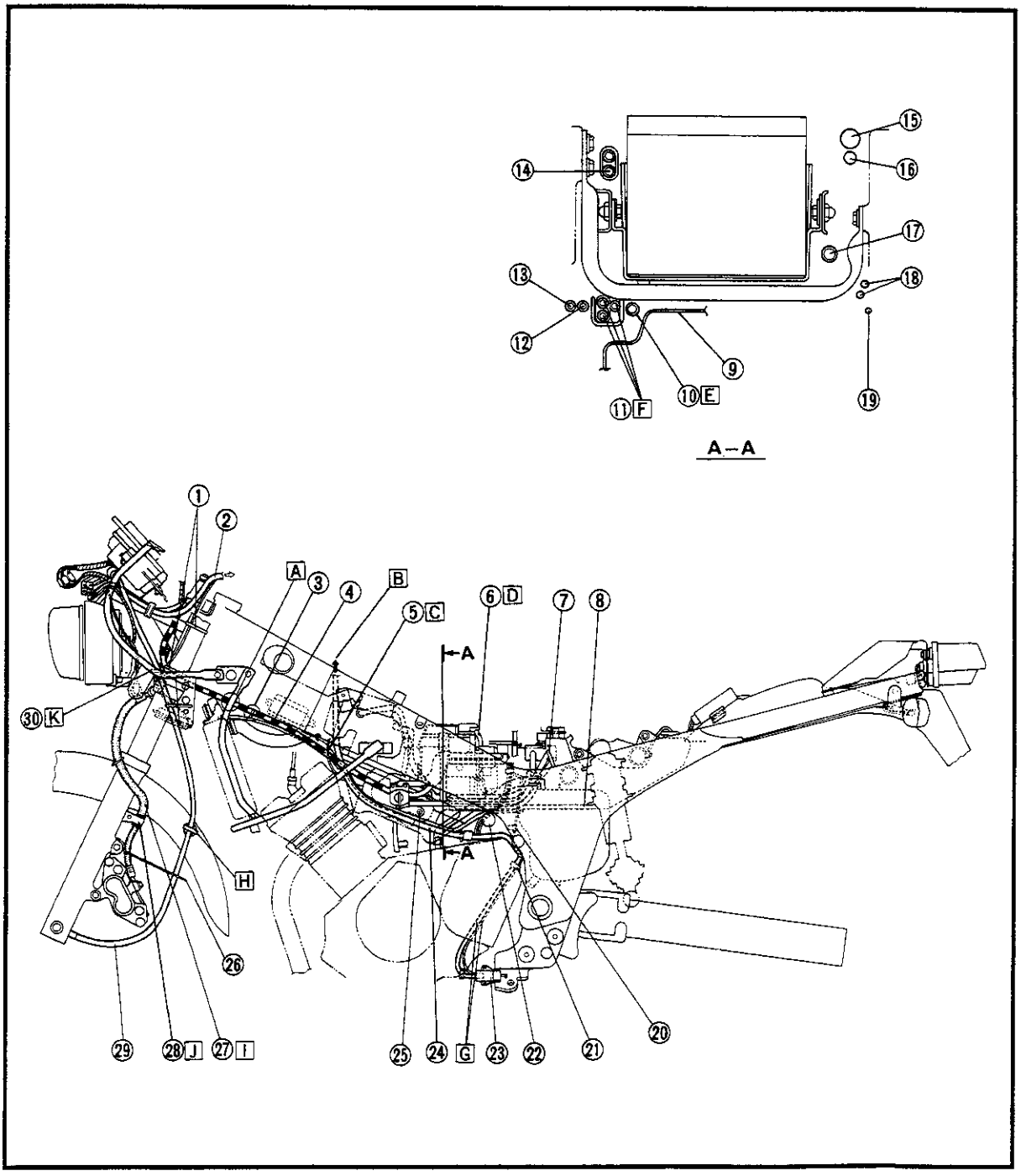
CABLE ROUTING

① Main switch lead
② Cable guide
③ Brake hose
④ Throttle cable
⑤ Handlebar switch lead (right)
⑥ Front brake switch lead
⑦ Band
⑧ Clutch cable
⑨ Horn lead
⑩ Handlebar switch lead (left)
⑪ Speedometer cable
⑫ Headlight lead
⑬ Front flasher light lead (left)
⑭ Cable guide
⑮ Brake hose
⑯ Headlight coupler
⑰ Cowling stay

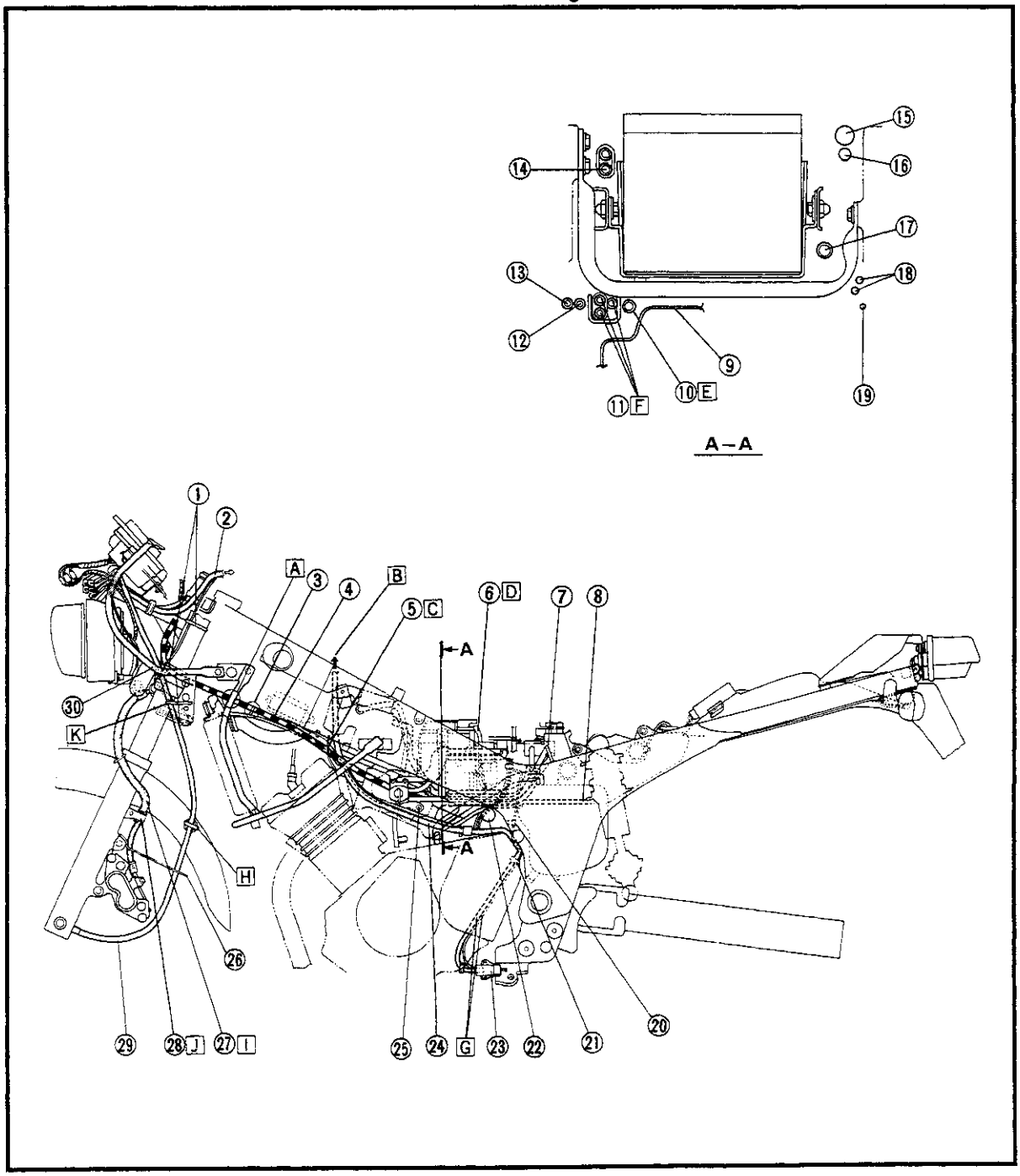
[A] Pass the main switch lead through the right side of the steering head pipe. Do not clamp the main switch lead.
[B] Clamp the left and right handlebar switch leads at the points marked with white tape.
[C] Do not clamp the cowling stay and headlight lead.
[D] To the indicator light
[E] To the main switch
[F] Pass the brake hose through the cable guide.



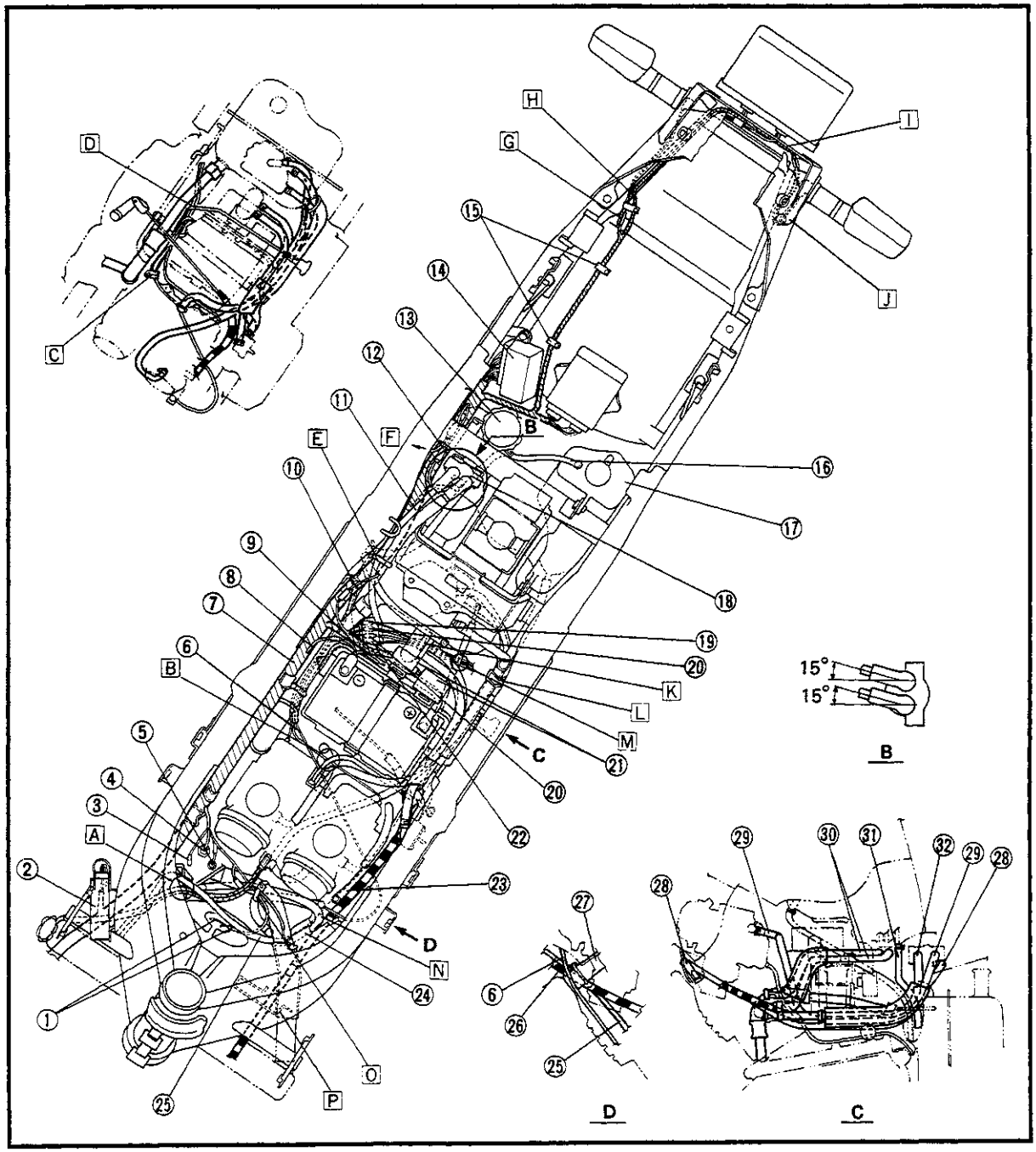
① Clamp
② Handlebar switch lead (left)
③ Cable guide
④ Clutch cable
⑤ Starter cable
⑥ Battery positive lead
⑦ Lace
⑧ Reservoir tank hose
⑨ Cover 2
⑩ Oil tank overflow pipe
⑪ Hose (from fuel pump)
⑫ Reservoir tank hose
⑬ Air filter drain hose
⑭ Hose (from fuel cock)
⑮ Wireharness
⑯ Carburetor vacuum hose
⑰ Oil pipe
⑱ Carburetor overflow pipe
⑲ Starter cable
⑳ Clamp (frame)
㉑ Clamp (engine)
㉒ Starter lever
㉓ Sidestand switch
㉔ Air cleaner breather hose
㉕ Throttle stop screw
㉖ Cable holder
㉗ Brake hose
㉘ Brake hose holder
㉙ Speedometer cable
㉚ Cowling stay guide



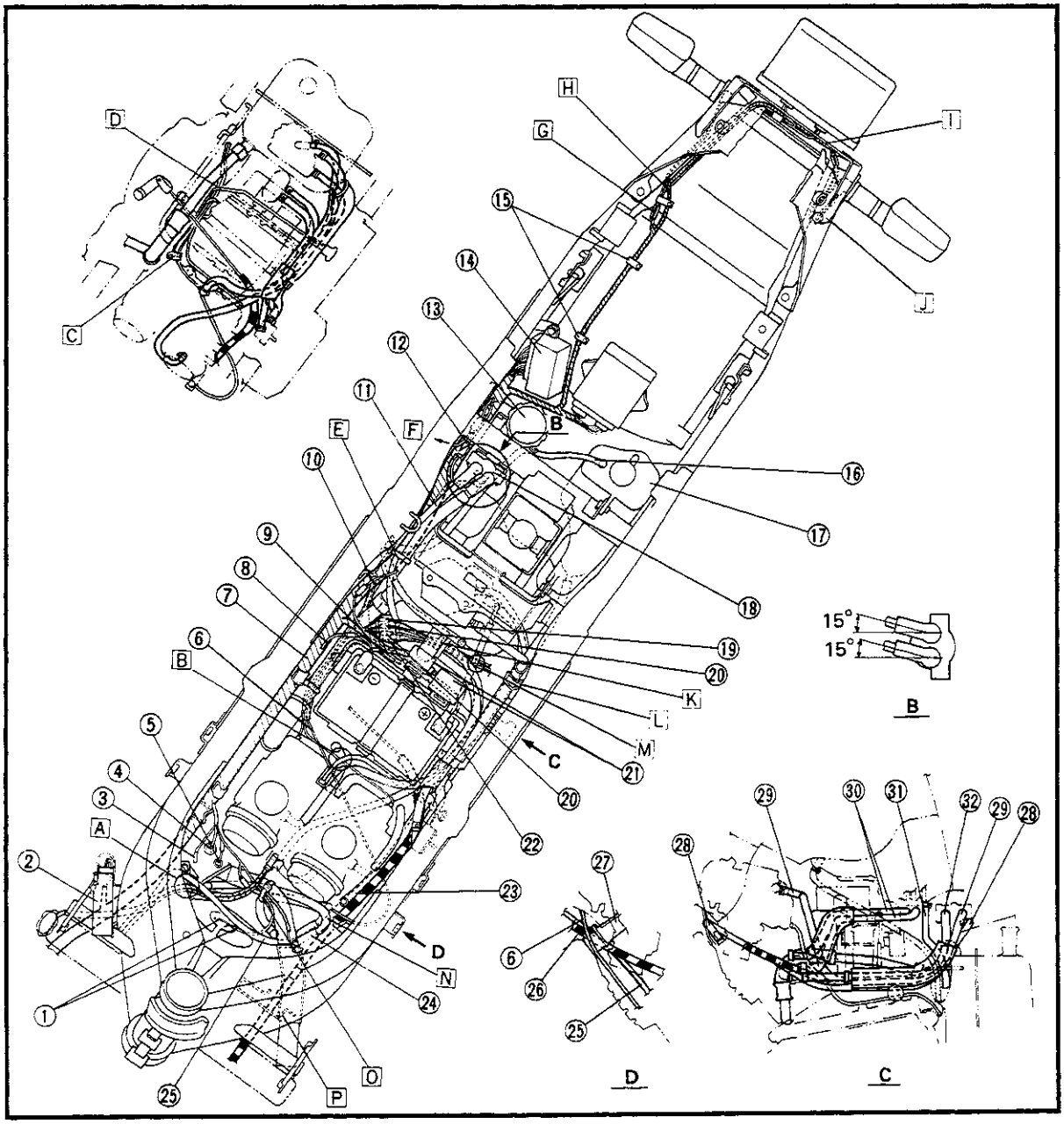
[A] Pass the clutch cable over the cowl stay cross pipe.
[B] To air filter case
[C] Pass the starter cable in front of the engine bracket and under all hoses.
[D] Pass the battery positive lead under the relay assemblies to the main wireharness.
[E] Pass the oil tank overflow pipe between the stay battery guide and the cover 2.
[F] Pass the vacuum hose through the inside of the fuel hose.
[G] Pass the sidestand lead and air filter case drain hose through the inside of the engine cover.
[H] Pass the speedometer cable through the guide.
[I] Pass the brake hose to the outside of the front fork.
[J] Pass the brake hose through the brake hose holder.
[K] Pass the speedometer cable through the guide.



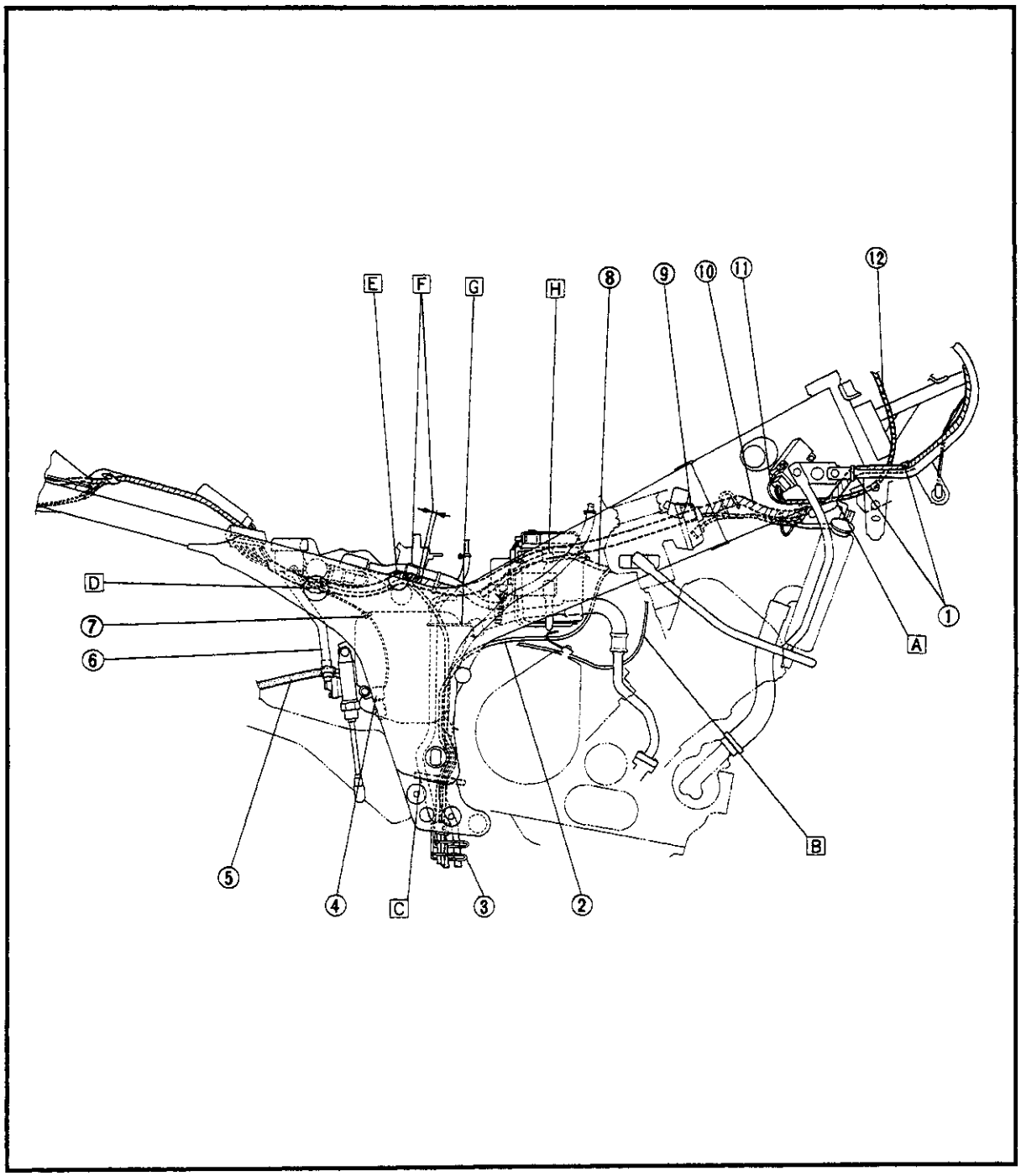
① Fan motor lead
② Rectifier/Regulator
③ Ground lead
④ Thermo switch
⑤ Thermo unit
⑥ Starter cable
⑦ Wireharness
⑧ Ground lead
⑨ Battery negative lead
⑩ Fuel tank breather hose
⑪ Starter relay lead
⑫ Rear brake switch lead
⑬ Rear brake reservoir tank
⑭ Fuse assembly
⑮ Clamp
⑯ Reservoir tank overflow hose
⑰ Reservoir tank
⑱ Starter relay
⑲ Sidestand switch connector
⑳ Pick-up lead connector
㉑ Relay assembly
㉒ Neutral switch lead connector
㉓ Air filter case breather hose
㉔ Ignition coil
㉕ Reservoir tank hose
㉖ Clutch cable
㉗ Breather hose
㉘ Vacuum hose (carburetor joint-fuel pump)
㉙ Fuel hose (carburetor-fuel pump)
㉚ Fuel hose (to fuel cock)
㉛ Fuel tank breather hose
㉜ Fuel hose (from fuel cock)



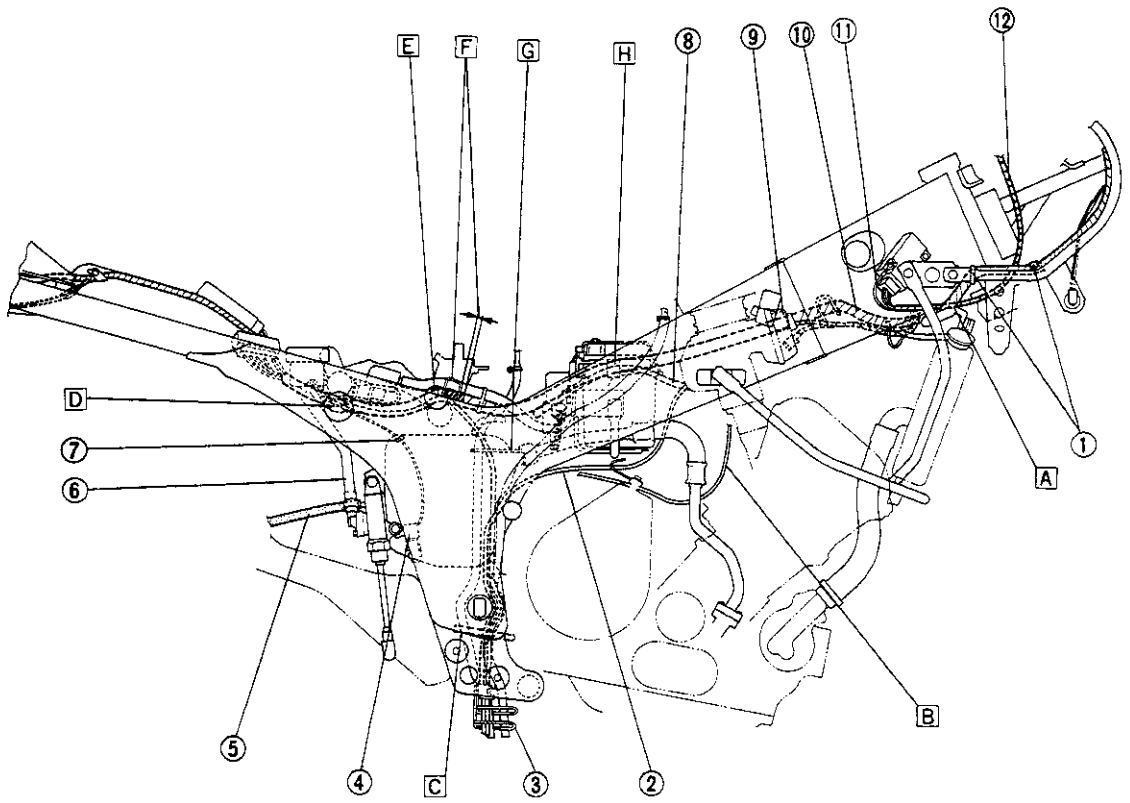
[A] Pass the reservoir tank hose and throttle cable through the frame guide.
[B] Pass the carburetor overflow hose under the throttle stop cable.
[C] Clamp the starter cable.
[D] Pass the starter cable outside the carburetor overflow hose clamp.
[E] Clamp the wireharness and starter relay leads.
[F] To rear brake switch
[G] To rear flasher light
[H] To taillight
[I] For rear flasher light (left)
[J] Pass the rear flasher light lead under the seat rail and through to the rear fender hole.
[K] Clamp the neutral switch lead, AC magneto lead, pick-up lead and sidestand switch lead.
[L] Clamp the fuel hose and reservoir tank hose.
[M] Pass the oil tank overflow pipe over the A.C. generator lead. Do not pinch the oil tank overflow pipe.
[N] Pass the high tension cord to the rear of the radiator hose.
[O] Clamp the radiator hose, high tension cord (left and right), ignition coil lead and fan motor lead.
[P] Pass the clutch cable through the frame clamp.



① Clamp
② Carburetor overflow hose
③ Cable holder
④ Rear brake switch
⑤ Brake hose
⑥ Reservoir hose
⑦ Clamp
⑧ Carburetor vacuum hose
⑨ Clamp
⑩ Wireharness
⑪ Ground lead (Rectifier/Regulator)
⑫ Throttle cable

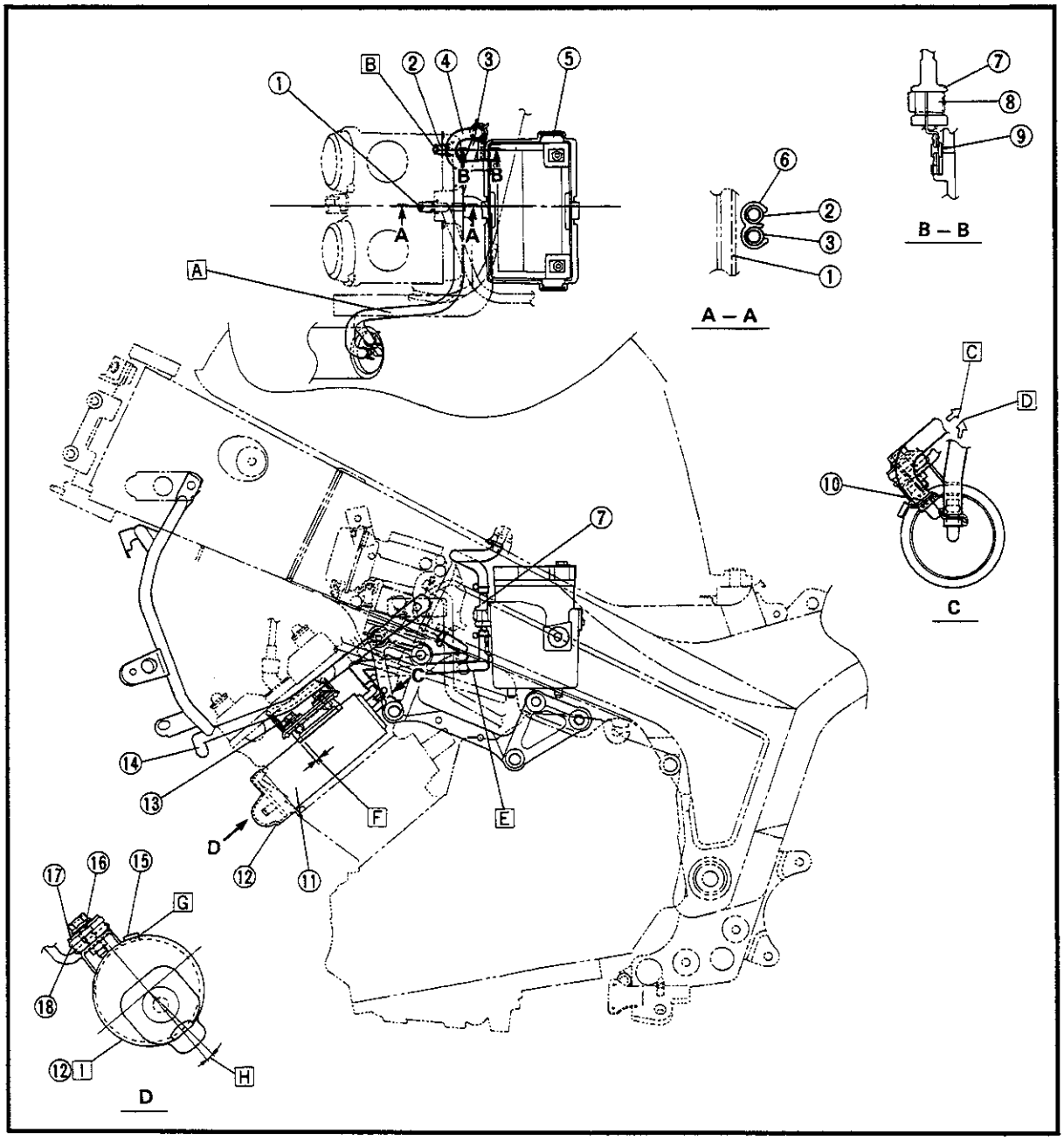


[A] Pass the throttle cable over the stay.
[B] Pass the starter cable under the clutch cable.
[C] Pass the reservoir tank overflow hose, fuel tank breather hose and carburetor overflow hose through the guide, then pass the fuel tank breather hose to the rear.
[D] Pass the reservoir tank overflow hose, rear brake switch lead and starter relay lead under the frame cross pipe.
[E] Pass the reservoir tank overflow hose over the frame cross pipe.
[F] Secure the wireharness and starter switch leads with the guide.
Align the wireharness white tape with the guide. (0 mm (0 in))
[G] Pass the reservoir tank overflow hose and fuel tank breather hose through the guide.
[H] Clamp the wireharness and carburetor vacuum hose.



EMISSION HOSE ROUTING (TDM850DC CALIFORNIA ONLY)

① Fuel hose (carburetor–fuel pump)
② Canister hose 3 (canister–carburetor)
③ Canister hose (canister–roll over valve)
④ Overflow hose (rollover valve–fuel tank)
⑤ Battery box
⑥ Clamp
⑦ Rollover valve
⑧ Valve holder
⑨ Blind rivet
⑩ Clip
⑪ Canister assembly
⑫ Canister cover
⑬ Flange bolt
⑭ Cowling stay 2
⑮ Damper
⑯ Collar
⑰ Washer
⑱ Grommet
[A] Pass the canister hose over the clutch cable.
[B] Connect the canister hose 3 to the carburetor (right).
[C] To carburetor (right).
[D] To rollover valve.
[E] Pass the canister hose to the rear of the fuel hose.
[F] 0 ~ 5 mm (0 ~ 0.20 in)
[G] Align the damper on the canister cover with the bracket edge.
[H] Less than 15 mm (0.59 in)
[I] Apply the adhesive to 4 points of the canister cover.



PERIODIC INSPECTION AND ADJUSTMENT

INTRODUCTION

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

MAINTENANCE INTERVALS CHARTS (for USA, California)

Proper periodic maintenance is important. Especially important are the maintenance services related to emissions control. These controls not only function to ensure cleaner air but are also vital to proper engine operation and maximum performance. In the following maintenance tables, the services related to emissions control are grouped separately.

PERIODIC MAINTENANCE/EMISSION CONTROL SYSTEM

NO.	Item	Remarks	Initial	Odometer readings				
			1,000 km or 1 month (600 mi)	**1 7,000 km or 7 months (4,400 mi)	**2 13,000 km or 13 months (8,200 mi)	19,000 km or 19 months (12,000 mi)	**3 25,000 km or 25 months (15,800 mi)	31,000 km or 31 months (19,600 mi)
1*	Valve clearance	Check and adjust valve clearance when engine is cold.					○	
2	Spark plugs	Check condition. Adjust gap and clean. Replace at 13,000 km (or 13 months) and thereafter every 12,000 km (or 12 months).		○	Replace	○	Replace	○
3*	Crankcase breather system	Check breather hose for cracks or damage. Replace if necessary.		○	○	○	○	○
4*	Fuel line	Check fuel hose and vacuum pipe for cracks or damage. Replace if necessary.		○	○	○	○	○
5*	Exhaust system	Check for leakage. Retighten if necessary. Replace gasket(s) if necessary.		○	○	○	○	○
6*	Carburetor synchronization	Adjust synchronizaion of carburetors.	○	○	○	○	○	○
7*	Idle speed	Check and adjust engine idle speed. Adjust cable free play.		○	○	○	○	○
8*	Evaporative emission control system**	Check control system for damage. Replace if necessary.				○		○

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

NOTE:

For farther odometer reading, repeat the above maintenance at the period established; **1: Every 6,000 km (3,800 mi), **2: Every 12,000 km (7,600 mi), **3: Every 24,000 km (15,200 mi) intervals.

GENERAL MAINTENANCE/LUBRICATION

NO.	Item	Remarks	Type	Initial	Odometer readings				
				1,000 km or 1 month (600 mi)	**1 7,000 km or 7 months (4,400 mi)	**2 13,000 km or 13 months (8,200 mi)	19,000 km or 19 months (12,000 mi)	**3 25,000 km or 25 months (15,800 mi)	31,000 km or 31 months (19,600 mi)
1	Engine oil	Warm-up engine before draining.	*1) Yamalube 4 (20W40) or SAE 20W40 type "SE" motor oil *2) Yamalube 4 (10W30) or SAE 10W30 type "SE" motor oil	○	○	○	○	○	○
2	Oil filter	Replace.	—	○		○		○	
3	Air filter	Clean with compressed air. Replace if necessary.	—		○	○	○	○	○
4	Cooling system	Check hose for cracks or damage. Replace if necessary.			○	○	○	○	○
		Replace coolant every 24 months.	Ethylene glycol antifreeze coolant					Replace	
5	Brake system	Check brake system. Replace pads if necessary.	—	○	○	○	○	○	○
6	Clutch	Adjust free play.	—	○	○	○	○	○	○
7	Drive chain	Check chain condition. Adjust and lubricate chain thoroughly.	SAE 30W-50W motor oil	Every 500 km (300 mi)					
8	Control and meter cable	Apply chain lube thoroughly.	Yamaha chain and cable lube or SAE 10W30 motor oil	○	○	○	○	○	○
9	Rear arm pivot shaft	Apply grease lightly.	Molybdenum disulfide grease					○	
10	Brake/Clutch lever pivot shaft	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil		○	○	○	○	○
11	Brake pedal and shift pedal shaft	Lubricate. Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil		○	○	○	○	○
12	Sidestand pivot	Check operation and lubricate. Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil		○	○	○	○	○
13	Front fork	Check operation and leakage.	—		○	○	○	○	○
14	Steering bearings	Check bearings assembly for looseness. Moderately repack every 24,000 km (15,200 mi).	Medium weight wheel bearing grease		○	○	○	Repack	○
15	Wheel bearings	Check bearings for smooth rotation.	—		○	○	○	○	○
16	Sidestand switch	Check and clean or replace if necessary.	—	○	○	○	○	○	○

*1) If ambient temperature does not go below 5°C.
*2) If ambient temperature does not go below 15°C.

NOTE:

For farther odometer reading, repeat the above maintenance at the period established; **1: Every 6,000 km (3,800 mi), **2: Every 12,000 km (7,600 mi) and **3: Every 24,000 km (15,200 mi) intervals.

INTRODUCTION

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

PERIODIC MAINTENANCE/LUBRICATION (for CDN)

Unit: km (miles)

Item	Remarks	Break-in 1,000 (600)	EVERY 6,000 (4,000) or 6 months	EVERY 12,000 (8,000) or 12 months
Valve(s)*	Check valve clearance. Adjust if necessary.	EVERY 42,000 (26,000) or 42 months		
Spark plug(s)	Check condition. Clean or replace if necessary.	○	○	○
Air filter	Clean. Replace if necessary.		○	○
Carburetor*	Check idle speed/synchronization/starter operation. Adjust if necessary.	○	○	○
Fuel line*	Check fuel hose and vacuum pipe for cracks or damage. Replace if necessary.		○	○
Engine oil	Replace (Warm engine before draining).	○	○	○
Engine oil filter*	Replace.	○		○
Brake*	Check operation/fluid leakage/See NOTE. Correct if necessary.		○	○
Clutch	Check operation. Adjust if necessary.		○	○
Rear arm pivot*	Check rear arm assembly for looseness. Correct if necessary. Moderately repack every 24,000 (16,000) or 24 months.***			○
Wheels*	Check balance/damage/runout. Repair if necessary.		○	○
Wheel bearings*	Check bearings assembly for looseness/damage. Replace if damaged.		○	○
Steering bearings*	Check bearings assembly for looseness. Correct if necessary. Moderately repack every 24,000 (16,000) or 24 months.**	○		○
Front forks*	Check operation/oil leakage. Repair if necessary.		○	○
Rear shock absorber*	Check operation/oil leakage. Repair if necessary.		○	○
Cooling system	Check coolant leakage. Repair if necessary. Replace coolant every 24,000 (16,000) or 24 months.		○	○
Drive chain	Check chain slack/alignment. Adjust if necessary. Clean and lube.	EVERY 500 (300)		
Fittings/Fasteners*	Check all chassis fittings and fasterners. Correct if necessary.	○	○	○
Sidestand*	Check operation. Repair if necessary.	○	○	○
Sidestand switch*	Check operation. Clean or replace if necessary.	○	○	○

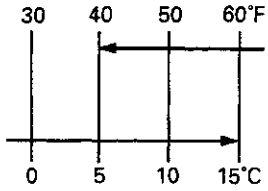
* : It is recommended that these items be serviced by a Yamaha dealer.
** : Medium weight wheel bearing grease.
*** : Molybdenum disulfide grease.

NOTE:

Brake fluid replacement:

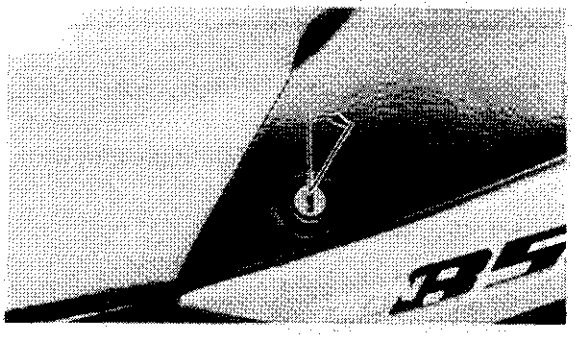
1. When disassembling the master cylinder or caliper cylinder, replace the brake fluid. Normally check the brake fluid level and add the fluid as rquired.
2. On the inner parts of the master cylinder and caliper cylinder, replace the oil seals every two years.
3. Replace the brake hoses every four years, or if cracked or damaged.

Engine oil:



Yamalube 4 (20W 40) or
SAE 20W 40 type SE motor oil

Yamalube 4 (10W 30) or
SAE 10W 30 type SE motor oil



KB231001

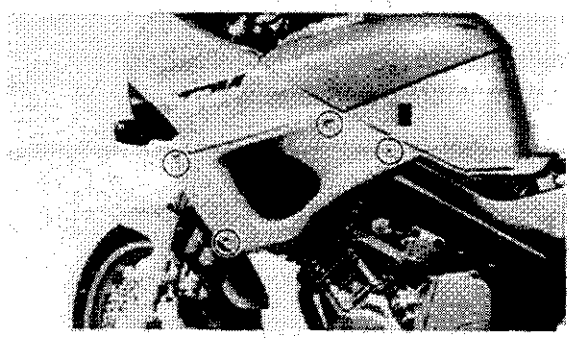
SEAT, COWLING AND FUEL TANK

REMOVAL

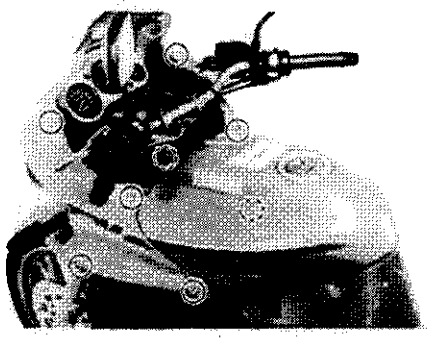
⚠ WARNING

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

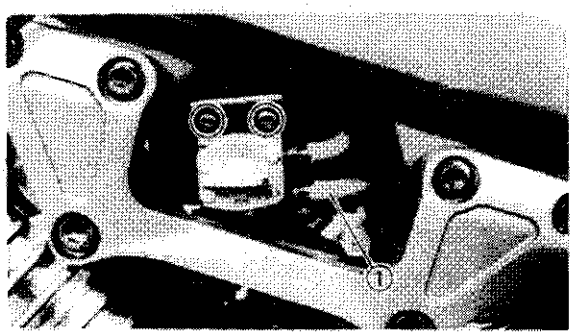
1. Remove:
• Seat



2. Remove:
• Side cowlings (left and right)



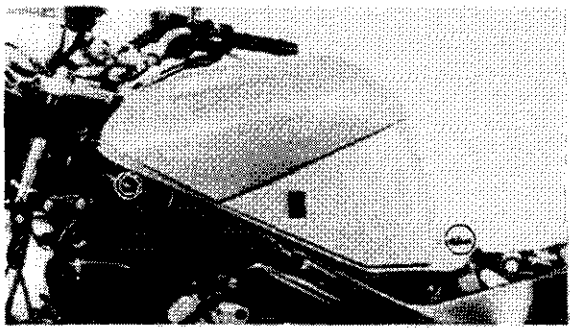
3. Remove:
• Upper cowling



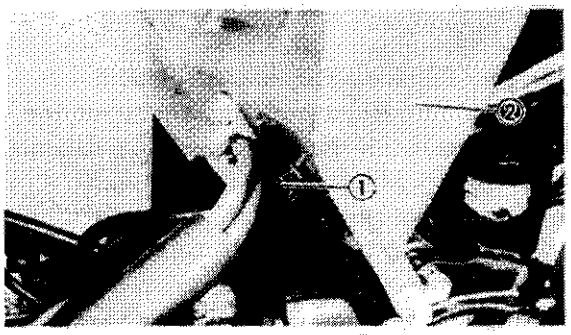
4. Turn fuel cock lever to "OFF".

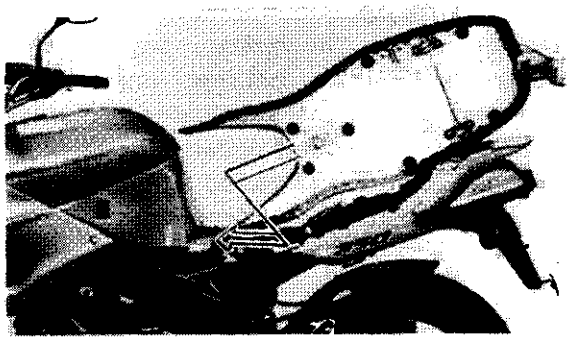
5. Disconnect:
• Fuel hose ① (fuel cock—fuel pump)

6. Remove:
• Fuel cock



7. Remove:
• Bolts (fuel tank)





8. Disconnect:
- Breather hose ① (fuel tank)
- Breather hose
  (from roll over valve-for california only)

9. Remove:
- Fuel tank ②

KB231002

INSTALLATION

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

1. Install:
- Fuel tank
- Upper cowl
- Side cowlings (left and right)
- Seat

NOTE:

When installing the seat, insert the lobe on the seat front into the receptacle on the frame, then push down the seat.

	Bolt (fuel tank—rear): **16 Nm (1.6 m · kg, 11 ft · lb)** **Bolt (fuel tank—front):** **7 Nm (0.7 m · kg, 5.1 ft · lb)** **Bolt (cowling):** **4 Nm (0.4 m · kg, 2.9 ft · lb)**

KB232001

ENGINE

VALVE CLEARANCE ADJUSTMENT

NOTE:

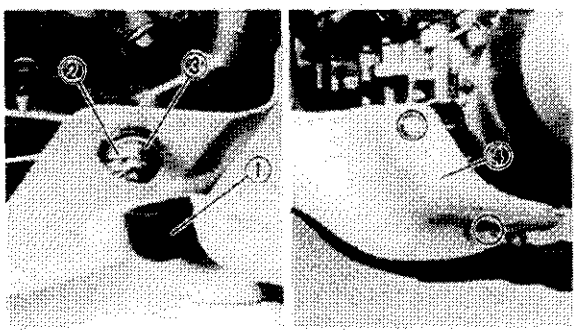
- The valve clearance should be adjusted when the engine is cool to the touch.
- The piston must be at Top Dead Center (TDC) on compression stroke to check or adjust the valve clearance.

⚠ WARNING

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by the following procedure:
Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detente. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.

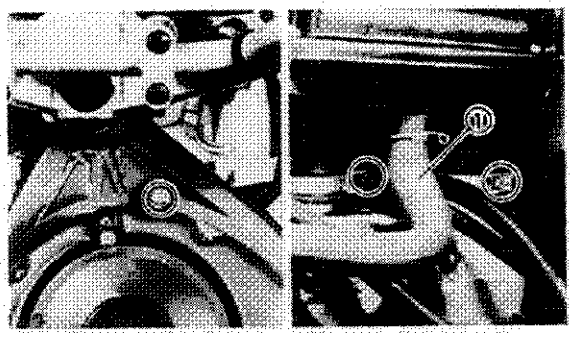
1. Remove:
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

Refer to the "SEAT, COWLING AND FUEL TANK" section.



2. Remove:
- Cover ①
- Cotter pin ②
- Washer ③
- Rubber washer
- Engine guard ④

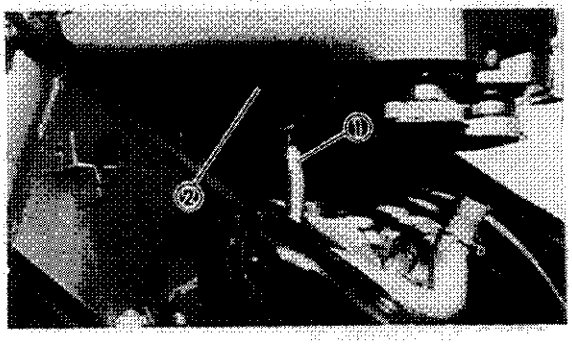
3. Drain:
• Coolant
Refer to the "COOLANT REPLACEMENT" section.



4. Remove:
• Bolt (air filter case)

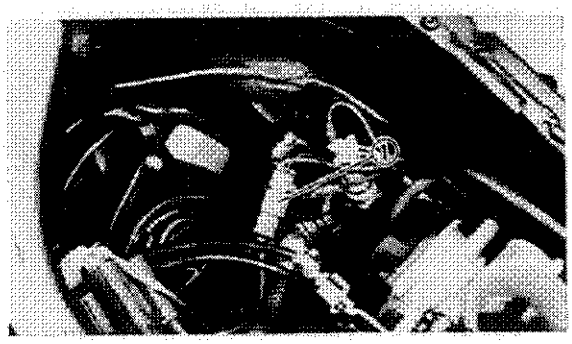
5. Disconnect:
• Breather hose ① (air filter hose)

6. Loosen:
• Screws (carburetor joints)

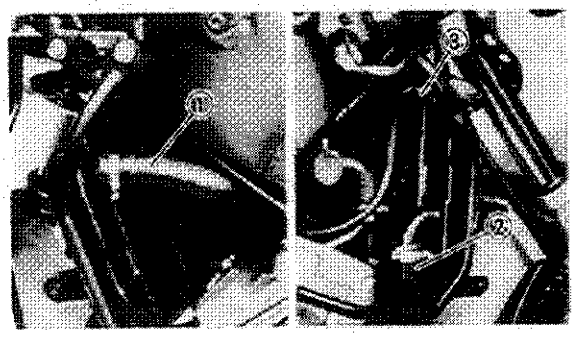


7. Disconnect:
• Drain hose ①

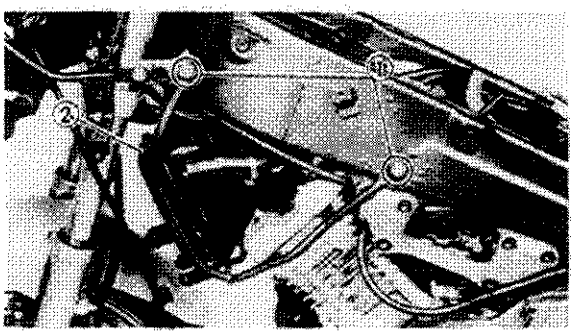
8. Remove:
• Air filter case ②



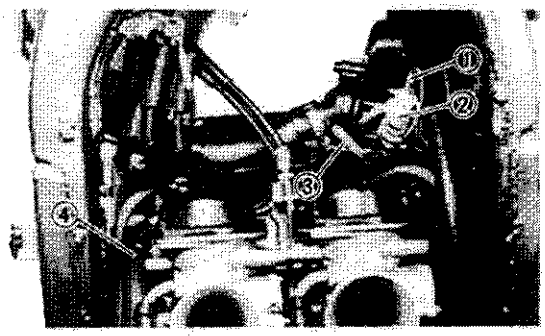
9. Disconnect:
• Fan motor coupler ①



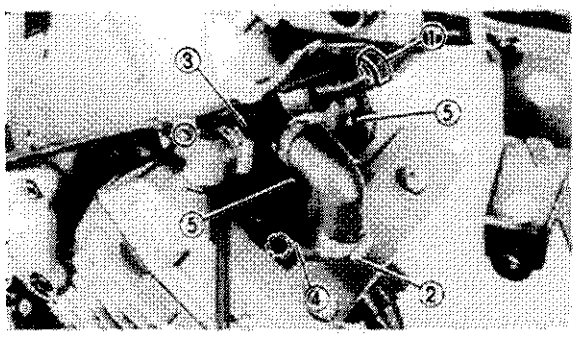
10. Disconnect:
• Radiator hose (radiator—thermostat) ①
• Radiator hose (radiator—water pump housing) ②
• Reservoir tank hose ③



11. Remove:
- Bolts ① (radiator stay)
- Radiator assembly ② (with stay)



12. Disconnect:
- Thermo unit lead ①
- Thermo switch lead ②
- Ground lead ③
- Breather hose ④ (cylinder head cover)

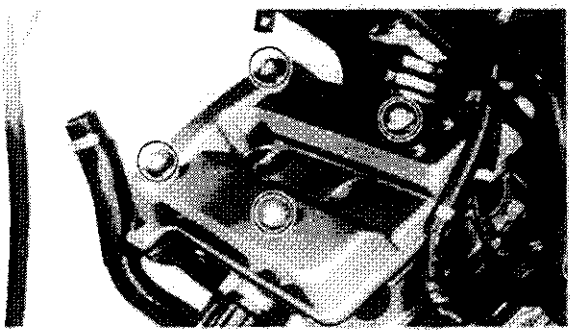


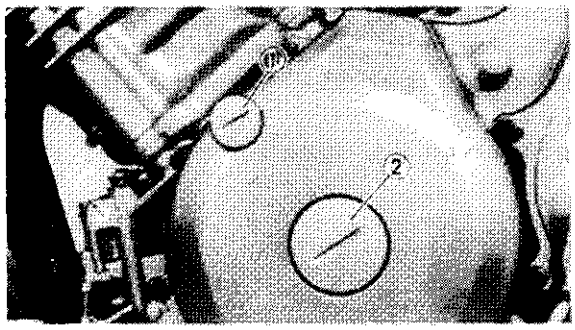
13. Disconnect:
- Band ①

14. Loosen:
- Hose clamp ②

15. Remove:
- Thermostat ③
- Pipe ④ (with O-ring)
- Spark plug leads ⑤

16. Remove:
- Cylinder head cover

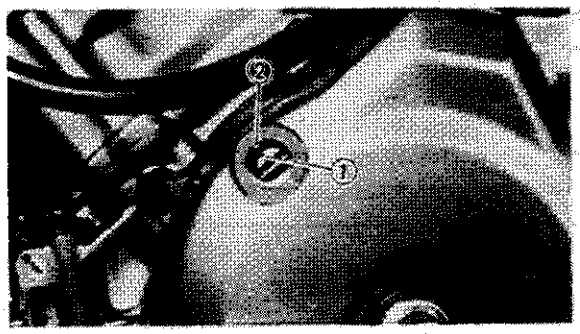




17. Remove:
- Timing plug ① (magneto cover)
- Plug ② (magneto cover)

18. Check:
- Valve clearance
  Out of Specification → Adjust

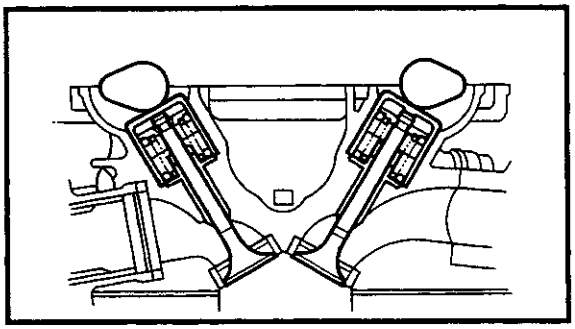
Valve clearance (cold):
Intake valve
0.15 ~ 0.20 mm
(0.006 ~ 0.008 in)
Exhaust valve
0.25 ~ 0.30 mm
(0.010 ~ 0.012 in)



****

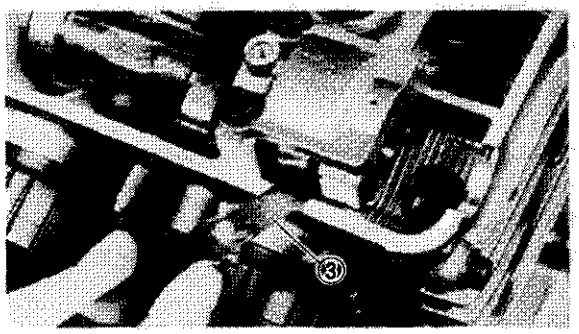
Checking steps:

- Turn the crankshaft counterclockwise with a wrench.
- Align the mark ① on the crankshaft web with the stationary pointer ② when #1 piston is at TDC on compression stroke.



NOTE:

When measuring the valve clearance at the #2 cylinder, turn the crankshaft 360 degrees counterclockwise from the #1 cylinder TDC on compression stroke. TDC on compression stroke can be found when the cam lobes are apart from each other, as shown.



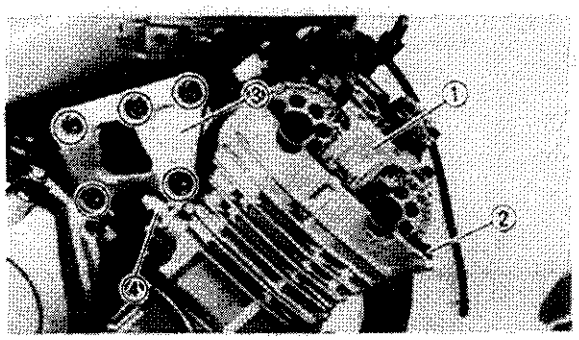
- Measure the valve clearance by using a feeler gauge ③ .

NOTE:

- Record the measured amount if the clearance is incorrect.
- Measure valve clearance in sequence.

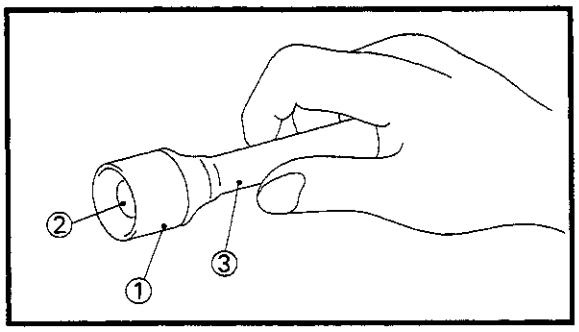
Measuring sequence:
#1 → #2

****



19. Remove:
- Chain guide (upper) ①
- Chain guide (exhaust side) ②
- Engine bracket ③ (right)
- Timing chain tensioner ④
- Camshaft caps
- Camshafts

NOTE:
- Refer to "ENGINE DISASSEMBLY—CYLINDER HEAD, CYLINDER AND PISTON " section in the CHAPTER 4.
- Fasten the wire to the cam chain to prevent it from falling into the crankcase.



20. Adjust:
- Valve clearance

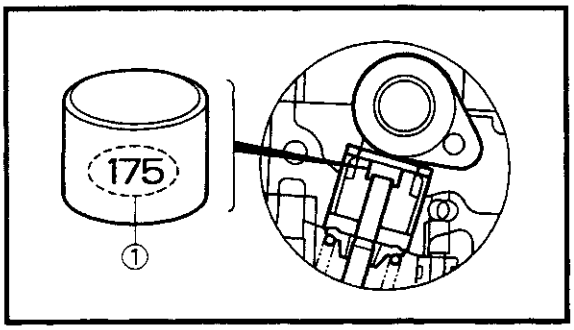
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Adjustment steps:
- Remove the valve lifter ① and pad ② by using the valve lapper ③.

NOTE:
- Place a piece of rag in the cam chain room to prevent the pad from falling into the crankcase.
- Remove the rag after adjustment.

- Record the installed pad number.
- Select the proper pad from the table:

Pad range		Pad availability: 25 increments
No. 120 ~ No. 240	1.20 mm (0.047 in) 2.40 mm (0.094 in)	Pads stepped in 0.05 mm (0.002 in) increments



NOTE:
Thickness ① of each pad is marked on the pad side wall.

- Round off the hundredths digit of the original pad number to the nearest 0.05 mm (0.002 in) increment.

Hundredths digit	Rounded valve
0 or 2	0
5	(NOT ROUNDED OFF)
8	10

EXAMPLE:
Original pad number = 173 (1.73 mm)
Rounded off digit = 175

NOTE:
Pads can only be selected in 0.05 mm (0.002 in) increments.

- Locate the "Rounded off pad number" on the chart, and then find the measured valve clearance. The point where these coordinates intersect is the new pad number.

NOTE:
Use the new pad number as a guide only if the number must be verified.

****

INTAKE

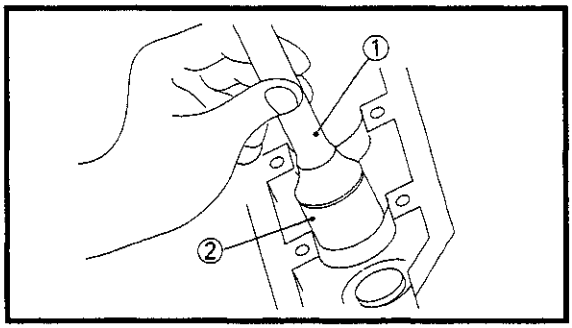
B MEASURED CLEARANCE	A INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.04				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.05 ~ 0.09			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.10 ~ 0.14		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.15 ~ 0.20	RECOMMENDED CLEARANCE																								
0.21 ~ 0.25	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.26 ~ 0.30	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.31 ~ 0.35	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.36 ~ 0.40	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.41 ~ 0.45	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.46 ~ 0.50	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.51 ~ 0.55	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.56 ~ 0.60	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.61 ~ 0.65	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.66 ~ 0.70	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.71 ~ 0.75	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.76 ~ 0.80	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.81 ~ 0.85	185	190	195	200	205	210	215	220	225	230	235	240													
0.86 ~ 0.90	190	195	200	205	210	215	220	225	230	235	240														
0.91 ~ 0.95	195	200	205	210	215	220	225	230	235	240															
0.96 ~ 1.00	200	205	210	215	220	225	230	235	240																
1.01 ~ 1.05	205	210	215	220	225	230	235	240																	
1.06 ~ 1.10	210	215	220	225	230	235	240																		
1.11 ~ 1.15	215	220	225	230	235	240																			
1.16 ~ 1.20	220	225	230	235	240																				
1.21 ~ 1.25	225	230	235	240																					
1.26 ~ 1.30	230	235	240																						
1.31 ~ 1.35	235	240																							
1.36 ~ 1.40	240																								

VALVE CLEARANCE (cold):
0.15 ~ 0.20 mm (0.006 ~ 0.008 in)
Example: Installed is: 170
Measured clearance is: 0.27 mm (0.011 in)
Replace 170 pad with 180 pad

EXHAUST

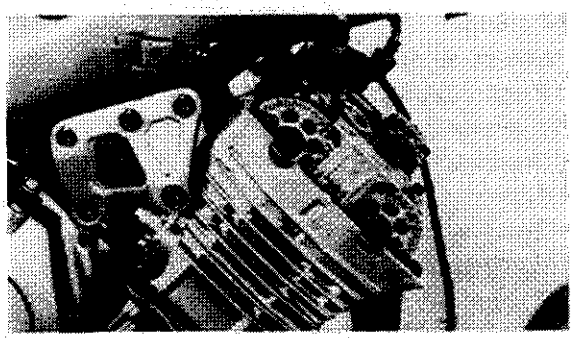
B MEASURED CLEARANCE	A INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.04						120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
0.05 ~ 0.09					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.10 ~ 0.14				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.15 ~ 0.19			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.20 ~ 0.24		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.25 ~ 0.30	RECOMMENDED CLEARANCE																								
0.31 ~ 0.35	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.36 ~ 0.40	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.41 ~ 0.45	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.46 ~ 0.50	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.51 ~ 0.55	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.56 ~ 0.60	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.61 ~ 0.65	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.66 ~ 0.70	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.71 ~ 0.75	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.76 ~ 0.80	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.81 ~ 0.85	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.86 ~ 0.90	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.91 ~ 0.95	185	190	195	200	205	210	215	220	225	230	235	240													
0.96 ~ 1.00	190	195	200	205	210	215	220	225	230	235	240														
1.01 ~ 1.05	195	200	205	210	215	220	225	230	235	240															
1.06 ~ 1.10	200	205	210	215	220	225	230	235	240																
1.11 ~ 1.15	205	210	215	220	225	230	235	240																	
1.16 ~ 1.20	210	215	220	225	230	235	240																		
1.21 ~ 1.25	215	220	225	230	235	240																			
1.26 ~ 1.30	220	225	230	235	240																				
1.31 ~ 1.35	225	230	235	240																					
1.36 ~ 1.40	230	235	240																						
1.41 ~ 1.45	235	240																							
1.46 ~ 1.50	240																								

VALVE CLEARANCE (cold):
0.25 ~ 0.30 mm (0.010 ~ 0.012 in)
Example: Installed is: 175
Measured clearance is: 0.37 mm (0.015 in)
Replace 175 pad with 185 pad



21. Install:
- Valve lifter ①
- Pads ② (new)

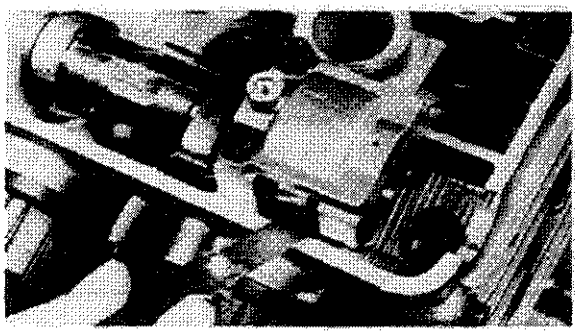
NOTE:
- Apply molybdenum disulfide grease to the pad.
- Valve lifter must be rotated smoothly by a finger.



22. Install:
- Camshafts
- Timing chain
- Camshaft caps
- Chain guide (exhaust side)
- Timing chain tensioner
- Engine bracket (right)
- Chain guide (upper)

	Bolt (camshaft cap, timing chain tensioner, chain guide): **10 Nm (1.0 m · kg, 7.2 ft · lb)** **Cap bolt (timing chain tensioner):** **20 Nm (2.0 m · kg, 14 ft · lb)** **Bolt (engine bracket—frame):** **30 Nm (3.0 m · kg, 22 ft · lb)** **Bolt (engine bracket—engine):** **60 Nm (6.0 m · kg, 43 ft · lb)**

NOTE:
- Install the exhaust camshaft first.
- Align the matching marks.
- Refer to "CHAPTER 4. ENGINE ASSEMBLY AND ADJUSTMENT—CYLINDER HEAD, CYLINDER AND PISTONS" section.
- Apply molybdenum disulfide grease to the cam caps.
- Turn the crankshaft counterclockwise several turns for the installed parts to settle into the correct position.

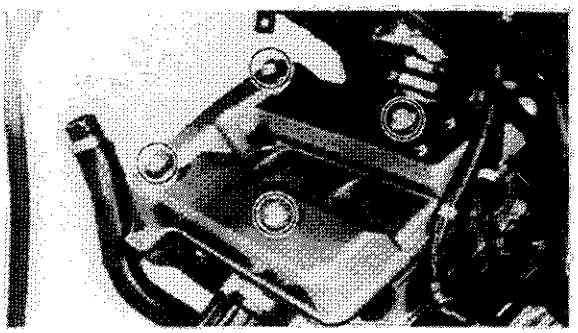


23. Measure:
• Valve clearance

****

Verification steps:
- Follow the valve clearance measurement steps.
- If the clearance is incorrect, repeat all adjustment steps until the proper clearance is obtained.

****



24. Install:
Reverse removal steps.
• Plugs (magneto cover)
• Cylinder head cover
• Breather hose
• Thermostat
• Spark plug leads
• Radiator assembly

	Bolt (cylinder head cover): **10 Nm (1.0 m · kg, 7.2 ft · lb)** **Bolt (radiator stay):** **16 Nm (1.6 m · kg, 11 ft · lb)**

25. Install:
• Gasket (drain bolt)
• Drain bolt (cylinder)
• Drain bolt (water pump)

	Drain bolt (cylinder, water pump): **10 Nm (1.0 m · kg, 7.2 ft · lb)**

26. Fill:
• Coolant system
Refer to "COOLANT REPLACEMENT" section.

	Coolant amount: **1.7 L (1.5 Imp qt, 1.8 US qt)**

27. Install:
- Air filter case
- Fuel tank
- Upper cowling
- Side cowlings (left and right)
- Seat

Refer to the "SEAT, COWLING AND FUEL TANK" section.

KB232002

CARBURETOR SYNCHRONIZATION

NOTE:

Valve clearance should be adjusted properly before synchronizing the carburetors.

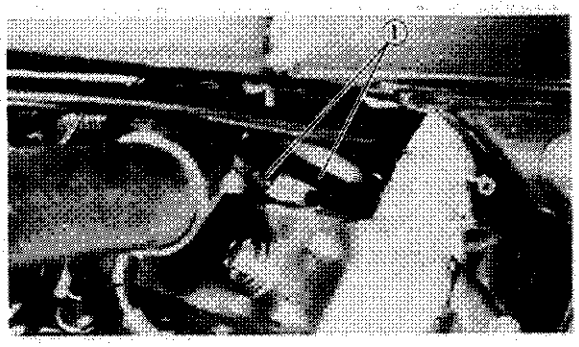
1. Place the motorcycle on a level surface.

NOTE:

Place a suitable stand under the motorcycle.

2. Remove:
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

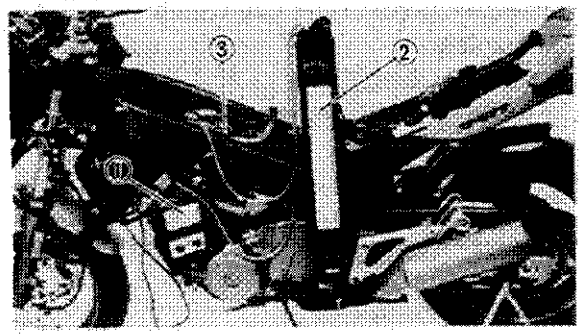
Refer to "SEAT, COWLING AND FUEL TANK" section.



3. Remove:
- Air filter case

Refer to "VALVE CLEARANCE ADJUSTMENT" section.

4. Disconnect:
- Vacuum hoses ①



5. Attach:
- Inductive tachometer ①
  (to #1 spark plug lead)
- Vacuum gauge ②
- Sub fuel tank
  (to carburetor connecting pipe ③)

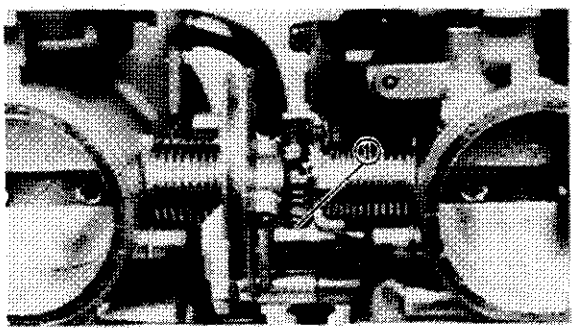
	Inductive tachometer: **P/N YU-08036-A/90890-03113** **Vacuum gauge:** **P/N YU-08030/90890-03094**

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

7. Check:
- Engine idling speed
  Out of specification → Adjust.
  Refer to "ENGINE IDLING SPEED ADJUSTMENT" section.

	Engine idling speed: **1,000 ~ 1,200 r/min**

8. Adjust:
- Carburetor synchronization



****

Adjustment steps:
- Synchronize carburetor No.1 to carburetor No.2 by turning synchronizing screw ① until both gauges read the same.
- Race the engine for less than a second, two or three times and check the synchronization again.

Vacuum pressure at idle speed:
for USA
32.59~35.25 kPa
(245~265 mm Hg, 9.65~10.63 in Hg)
except for USA
33.25 ~ 35.91 kPa
(250 ~ 270 mm Hg, 9.84 ~ 10.64 in Hg)

NOTE:
The difference between both carburetors should be 1.33 kPa (10 mm Hg, 0.4 in Hg) or less.

****

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

10. Stop the engine and detach the measuring equipment and sub fuel tank.

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



Free play:
3 ~ 5 mm (0.12 ~ 0.20 in)
at grip flange

12. Install:
- Air filter case
- Fuel tank
- Upper cowling
- Side cowlings (left and right)
- Seat
  Refer to the "SEAT, COWLING AND FUEL TANK" section.

KB232003
TIMING CHAIN ADJUSTMENT
Adjustment free.

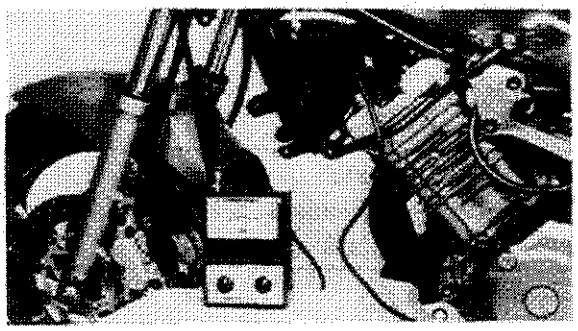
KB232004

IDLING SPEED ADJUSTMENT

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

2. Remove: (except for USA)
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank
  Refer to "SEAT, COWLING AND FUEL TANK" section.
- Battery
- Battery box

3. Attach: (except for USA)
- Sub fuel tank
  Refer to "CARBURETOR SYNCHRONIZATION" section.

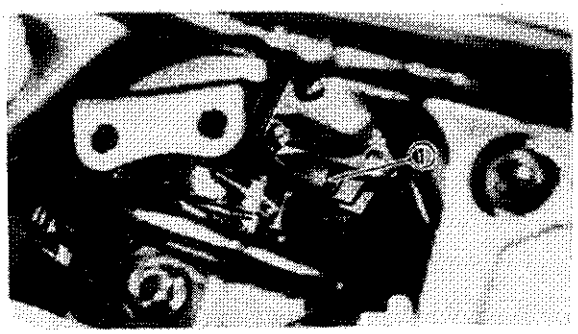


4. Attach:
- Inductive tachometer (to the spark plug lead).

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

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

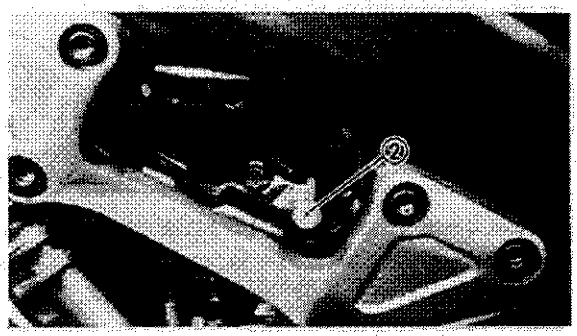
	Engine idling speed: **1,000 ~ 1,200 r/min**



6. Adjust:
- Engine idling speed

****

Adjustment steps:
- Turn in the pilot screw ① until it is lightly seated.(except for USA)
- Turn out the pilot screw for the specified number of turns.(except for USA)



Pilot screw: 3 turns out

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

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

****

7. Install: (except for USA)
- Battery box
- Battery
- Fuel tank
- Upper cowling
- Side cowlings (left and right)
- Seat

Refer to the "SEAT, COWLING AND FUEL TANK" section.

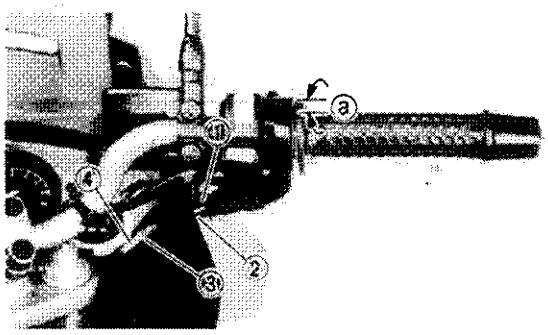
8. Adjust:
- Throttle cable free play

Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.

Free play:
3 ~ 5 mm (0.12 ~ 0.20 in)
at grip flange

KB232005
THROTTLE CABLE ADJUSTMENT

NOTE:
Engine idling speed and carburetor synchronization should be adjusted properly before adjusting the throttle cable free play.



1. Check:
- Throttle cable free play ⓐ

Out of specification → Adjust.

Free play:
3 ~ 5 mm (0.12 ~ 0.20 in)
at throttle grip flange

2. Adjust:
• Throttle cable free play

****

Adjustment steps:

NOTE:

When accelerating, the throttle cable #1 ① is pulled and the throttle cable #2 ② is pushed.

Throttle grip side:

- Loosen the locknut ③ on the throttle cable #1.
- Turn the adjuster ④ in or out until the specified free play is obtained.

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

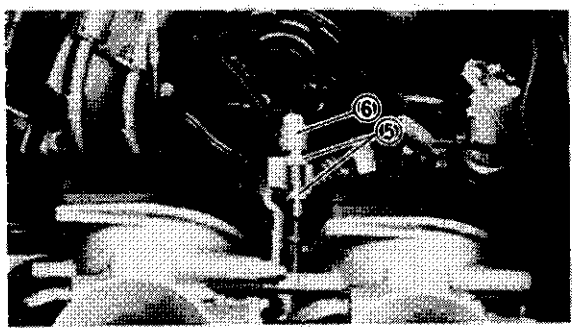
- Tighten the locknut.

NOTE:

If the free play cannot be adjusted here, adjust it at the carburetor side of the cable.

⚠ WARNING

After adjusting, turn the handlebar to the right and left, making sure that the engine idling speed does not change.



Carburetor side:

- Remove the seat, side cowlings, upper cowling and fuel tank. Refer to the "SEAT, COWLING AND FUEL TANK" section.
- Remove the air filter case. Refer to the " ENGINE REMOVAL" section in the CHAPTER 4.
- Loosen the locknut ⑤.
- Turn the adjuster ⑥ in or out until the specified free play is obtained.

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

- Tighten the locknut.
- Install the air filter case, fuel tank, upper cowling, side cowlings and seat.

⚠ WARNING

After adjusting, turn the handlebar to the right and left, making sure that the engine idling speed does not change.

****

KB232006

SPARK PLUG INSPECTION

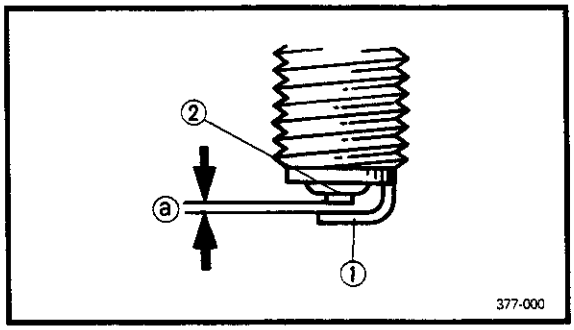
1. Remove:
- Spark plug

Use the spark plug wrench in the owner's tool kit.

2. Inspect:
- Spark plug type

Incorrect→Replace.

Standard spark plug:
DPR9EA-9 (N.G.K.)
X27EPR-U9 (N.D.)



3. Inspect:
- Electrode ①

Wear/Damage→Replace.
- Insulator ②

Abnormal color→Replace
Normal color is a medium-to-light tan color.

4. Clean the spark plug with a spark plug cleaner or wire brush.

5. Measure:
- Plug gap ⓐ

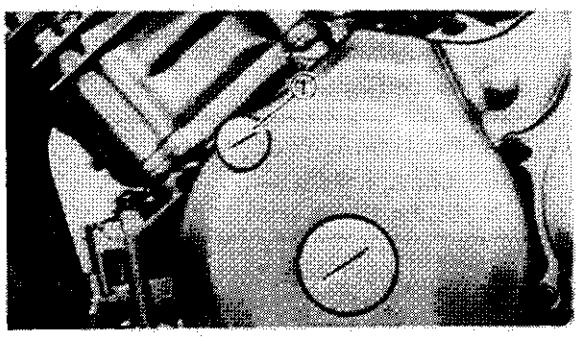
Use a Wire Gauge or Feeler Gauge.
Out of specification→Re-gap.

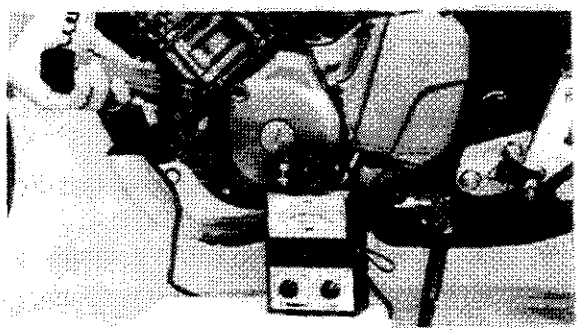
Spark plug gap:
0.8 ~ 0.9 mm (0.031 ~ 0.035 in)

6. Tighten:
• Spark plug(s)

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





KB232007
IGNITION TIMING CHECK

NOTE:
Carburetor synchronization, engine idling speed and throttle cable free play should be adjusted properly before checking the ignition timing.

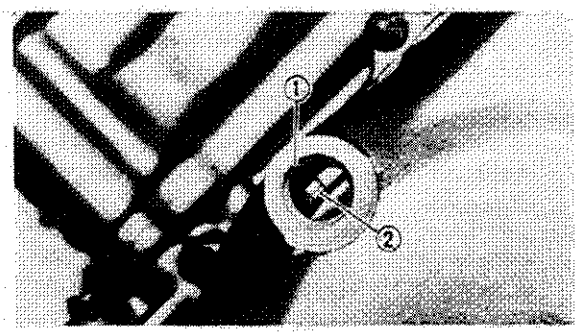
1. Remove:
• Timing plug ① (magneto cover)
2. Attach:
• Timing light and inductive tachometer
(To the spark plug lead for the #1 cylinder)

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

3. Check:
• Ignition timing
****

Checking steps:
● Warm up the engine and keep it at the specified speed.

	Engine speed: **1,000~1,200 r/min**



- Visually check the stationary pointer ① to verify it is within the required firing range ② indicated on the flywheel.
  Incorrect firing range→Check timing plate and/or pickup assembly(tightness damage).

****

4. Install:
- Timing plug (magneto cover)

KB232008

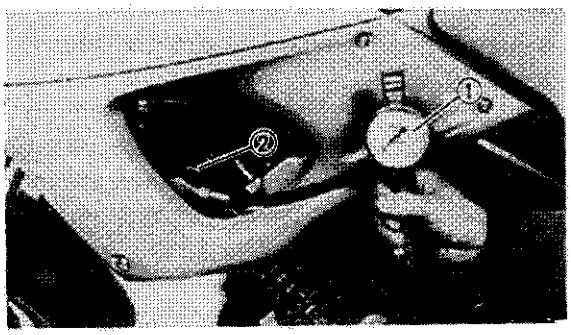
COMPRESSION PRESSURE MEASUREMENT

NOTE:
- Insufficient compression pressure will result in performance loss.
- Valve clearance should be adjusted properly before compression pressure measurement.

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

2. Stop the engine.

3. Remove:
- Spark plug(s)



4. Attach:
- Compression gauge ①
- Adapter ②

	Compression gauge: **P/N YU-33223/90890-03081** **Adapter (M12):** **P/N YU-33223-3/90890-04082**

5. Measure
- Compression pressure
  Above the maximum pressure →
  Inspect cylinder head, valve surfaces, and piston crown for carbon deposits.
  Below the minimum pressure →
  Squirt a few drops of oil into affected cylinder and measure again.
- Follow the table below.

Compression pressure (With oil applied 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.

Compression pressure (at sea level):
Standard:
1,050 kPa (10.5 kg/cm², 149 psi)
Minimum:
1,010 kPa (10.1 kg/cm², 144 psi)
Maximum:
1,090 kPa (10.9 kg/cm², 155 psi)

****

Measurement steps:

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

⚠ WARNING

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

- Repeat the previous steps for the other cylinders.

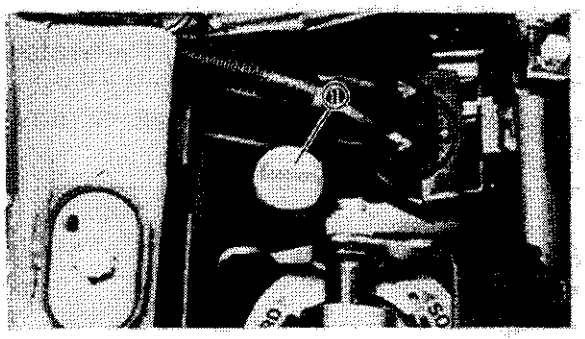
NOTE:

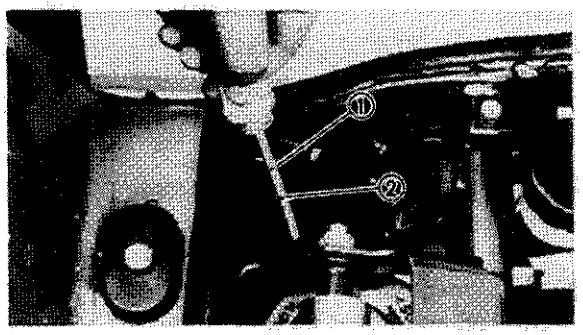
The difference of compression pressure between the highest and lowest cylinder compression readings should be 100 kpa (1 kg/cm², 14 psi) or less.

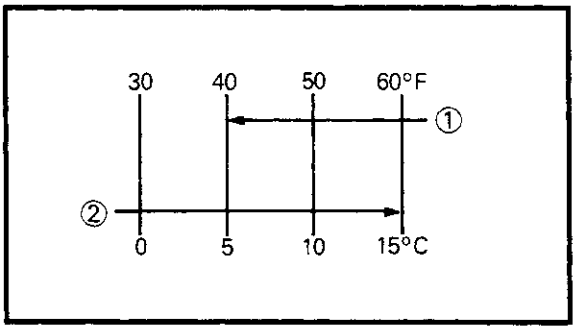
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6. Install:
• Spark plug(s)

Spark plug:
17.5 Nm (1.75 m · kg, 12.5 ft · lb)







KB232009

ENGINE OIL LEVEL INSPECTION

NOTE:

Position the motorcycle straight up when inspecting the oil level.

1. Place the motorcycle on a level surface.

NOTE:

Place a suitable stand under the motorcycle.

2. Remove:
- Seat
- Oil tank cap ①

3. Inspect
- Oil level

  Oil level should be between maximum ① and minimum ② marks.

  Oil level low → Add oil to proper level.

NOTE:

Do not screw the dipstick. Insert the dipstick lightly when inspecting the oil level.

Recommended oil:

At 5°C (40°F) or higher ① :
YAMALUBE-4 (20W40) or
SAE 20W40 type SE motor oil

At 15°C (60°F) or lower ② :
YAMALUBE-4 (10W30) or
SAE 10W30 type SE motor oil

CAUTION:

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

4. Start the engine and let it warm up until the oil temperature rises to approximately 60°C (140°F).

5. Idle the engine more than 10 second while keeping the motorcycle upright. Then stop the engine and inspect the oil level once again.

⚠ WARNING

Never attempt to remove the oil tank cap just after high speed operation. The heated oil spout out, causing danger. Wait until the oil cools down to approximately 60°C (140° F).

6. Install:
- Oil tank cap
- Seat

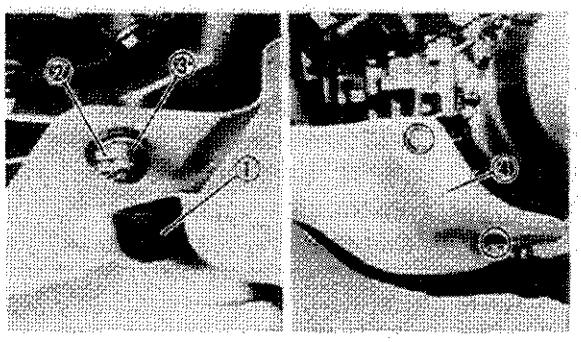
KB232010

ENGINE OIL REPLACEMENT

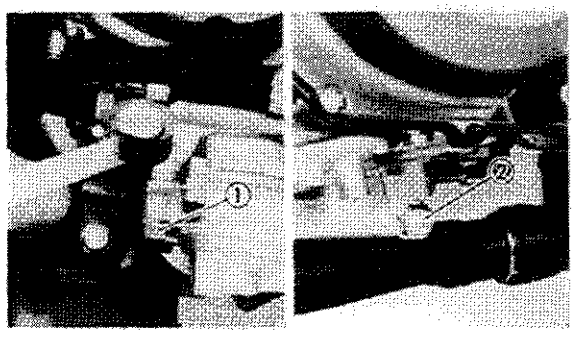
1. Place the motorcycle on a level place.

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

3. Stop the engine and place oil pans under the engine and oil tank.



4. Remove:
- Cover ①
- Cotter pin ②
- Washer ③
- Rubber washer
- Engine guard ④

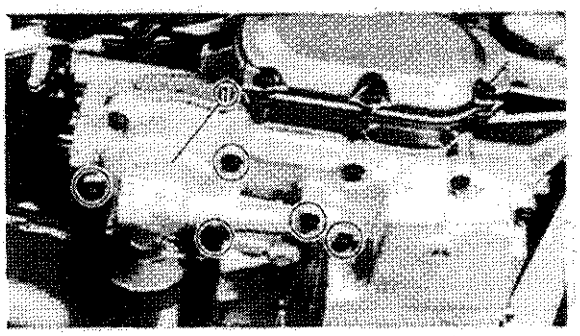


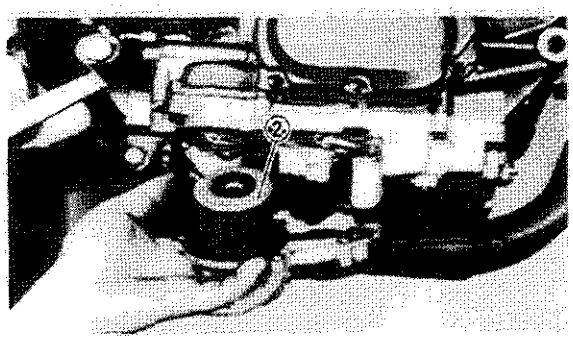
5. Remove:
- Oil tank cap
- Drain bolt ① (for oil tank)
- Drain bolt ② (for engine)

Drain the crankcase and oil tank of their oil.

6. Position the motorcycle straight up.

7. Drain:
- Engine oil (from oil tank)





8. Replace:
• Oil filter

****

Replacement steps:
- Remove the oil filter cover ① and oil filter element ②.
- Check the O-ring, if cracked or damaged, replace them with a new one.
- Install the oil filter element and oil filter cover.

	Bolt (oil filter case): **10.Nm (1.0 m · kg, 7.2 ft · lb)**

****

9. Install:
• Drain bolt (for oil tank)
• Drain bolt (for engine)

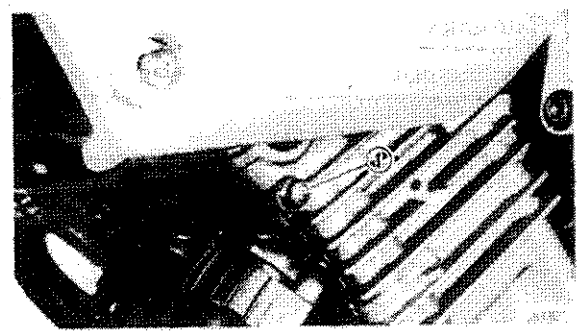
	Drain bolt (for oil tank): **30 Nm (3.0 m · kg, 22 ft · lb)** **Drain bolt (for engine):** **35 Nm (3.5 m · kg, 25 ft · lb)**

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

10. Fill:
• Oil tank

	Oil quantity: **Without oil filter change** **3.8 L (3.3 Imp qt, 4.0 US qt)** **With oil filter change** **3.9 L (3.4 Imp qt, 4.1 US qt)**

Refer to the "ENGINE OIL LEVEL INSPECTION" section.



11.Check:
• Oil pressure

****

Checking steps:
- Slightly loosen the oil gallery bolt ①.
- Start the engine and keep it idling until oil begins to seep from the oil gallery bolt.

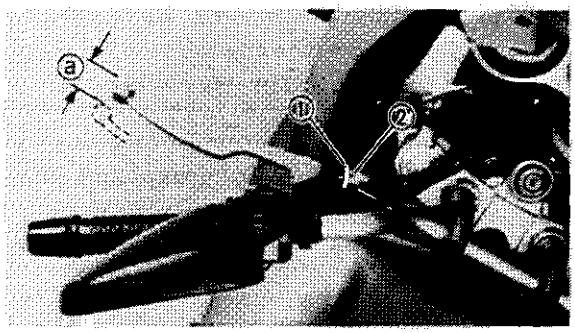
If no oil comes out after one minute, turn the engine off so it will not seize.

- Restart the engine after solving the problem(s), and recheck the oil pressure.
- After checking, tighten the oil gallery bolt to specification.

	Oil gallery bolt: **10 Nm (1.0 m · kg, 7.2 ft · lb)**

****

12. Install:
- Oil tank cap
- Engine guard



KB232011

CLUTCH ADJUSTMENT

1. Check:
- Clutch cable free play ⓐ
  Out of specification → Adjust.

	Free play: **10 ~ 15 mm (0.4 ~ 0.6 in)** **at clutch lever end**

2. Adjust:
- Clutch cable free play

****

Adjustment steps:
- Loosen the locknut(s) ① .
- Turn the adjuster(s) ② in or out until the specified free play is obtained.

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

- Tighten the locknut(s).

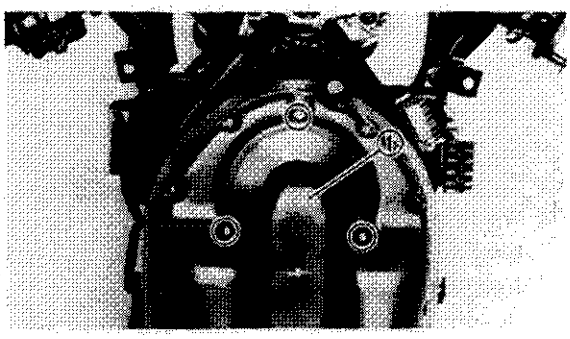
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KB232012

AIR FILTER CLEANING

1. Remove:
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

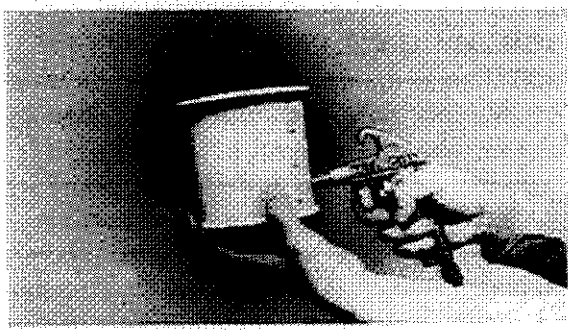
Refer to "SEAT, COWLING AND FUEL TANK" section.



2. Remove:
- Air filter case cover ①

CAUTION:

Never operate the engine with the air filter element removed. Unfiltered air will cause rapid wear of engine parts and possible engine damage. Additionally, operation without the filter element will affect carburetor tuning with subsequent poor performance and possible engine overheating.



3. Inspect:
- Air filter element

Damaged → Replace.

4. Clean:
- Air filter element

Blow out the dust in the element from the outer surface using compressed air.

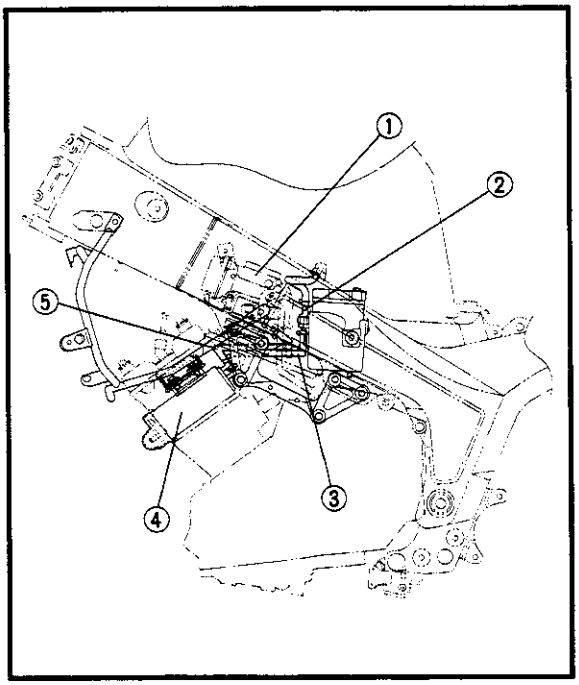
5. Install:
- Air filter element

NOTE:

When installing the element in its case, be sure its sealing surface matches the sealing surface of the case so there is no air leak.

6. Install:
- Air filter case cover
- Fuel tank
- Upper cowling
- Side cowlings (left and right)
- Seat

Refer to the "SEAT, COWLING AND FUEL TANK" section.



① Carburetor
② Roll over valve
③ Hose (to roll over valve)
④ Canister
⑤ Hose (to carburetor)

KB232015

EMISSION HOSE AND CANISTER INSPECTION (for California only)

1. Inspect:
- Hose connection
  Poor condition→Correct.
- Hoses
- Canister
  Cracks/Damage→Replace.
  Clogs→Clean.

KB232016

COOLANT LEVEL INSPECTION

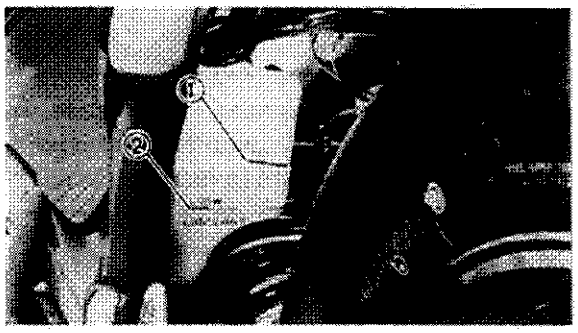
NOTE:

Position the motorcycle straight up when inspecting the coolant level.

1. Place the motorcycle on a level surface.

NOTE:

Place a suitable stand under the motorcycle.



2. Remove:
- Seat

3. Inspect:
- Coolant level
  Coolant level should be between maximum ① and minimum ② marks.
  Coolant level low→Add soft water (tap water) to proper level.

CAUTION:

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

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

5. Stop the engine and inspect the coolant level once again.

NOTE:
Wait a few minutes until level settles before inspecting the coolant level.

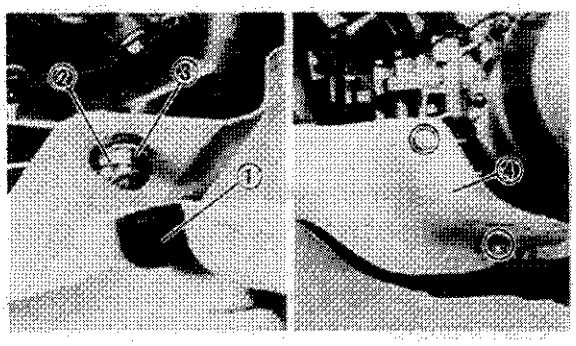
6. Install:
• Seat

KB232017

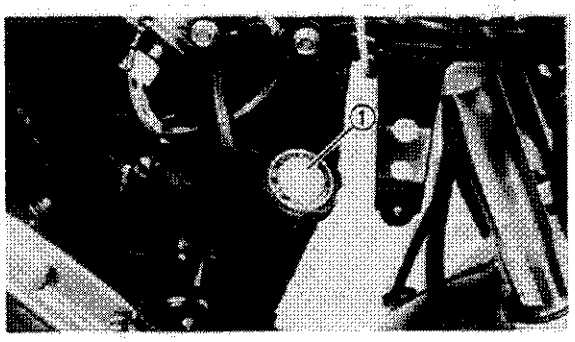
COOLANT REPLACEMENT

1. Place a drain pan under the drain bolts.

2. Remove:
• Seat
• Side cowlings (left and right)
• Upper cowling
Refer to "SEAT, COWLING AND FUEL TANK" section.



3. Remove:
• Cover ①
• Cotter pin ②
• Washer ③
• Rubber washer
• Engine guard ④

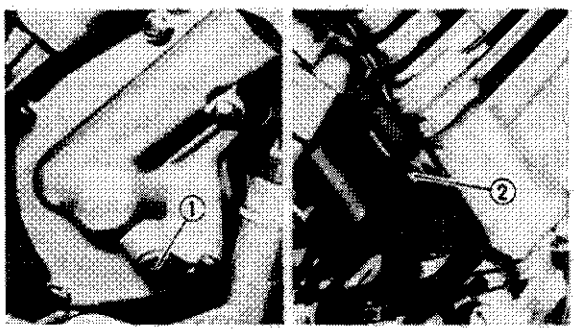


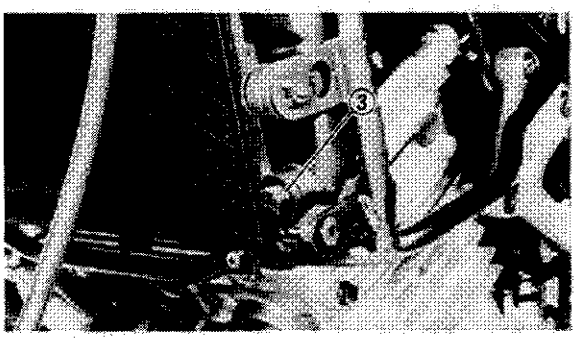
4. Remove:
• Radiator cap ①

⚠ WARNING

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by the following procedure:

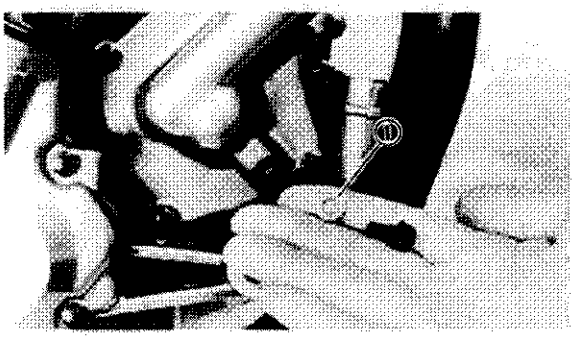
Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detente. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.





5. Remove:
- Drain bolt ① (water pump)
- Drain bolt ② (cylinder)
- Drain bolt ③ (radiator)
- Gasket (drain bolt)

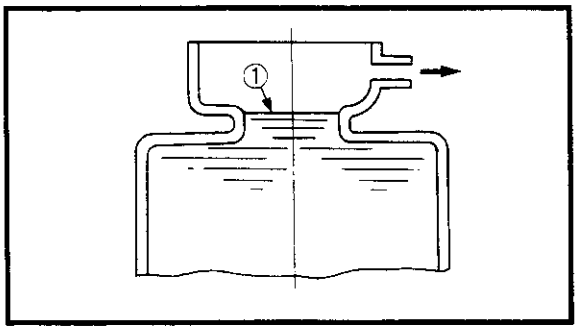
Drain the radiator and engine of its coolant.



6. Inspect:
- Gasket (drain bolt)

Damage→Replace.

7. Install:
- Gasket ① (drain bolt)
- Drain bolt (radiator)
- Drain bolt (cylinder)
- Drain bolt (water pump)
- Engine guard



	Drain bolt (cylinder, water pump): **10 Nm (1.0 m · kg, 7.2 ft · lb)**

8. Fill:
- Radiator
- Engine

(to specified level ①)

	Recommended coolant: **High quality ethylene glycol anti-freeze containing anti-corrosion for aluminum engine inhibitors**

Coolant and water (soft water)
Mixed ratio: 50%/50%
Total amount:
1.7 L (1.5 Imp qt, 1.8 US qt)
Reservoir tank capacity:
0.3 L (0.26 Imp qt, 0.32 US qt)

****

Handling notes of coolant:

- The coolant is harmful so it should be handled with special care.

⚠ WARNING

- **When coolant splashes in your eye. Thoroughly wash your eye with water and see your doctor.**
- **When coolant splashes on your clothes. Quickly wash it away with water and then with soap.**
- **When coolant is swallowed. Quickly make him vomit and take him to a doctor.**

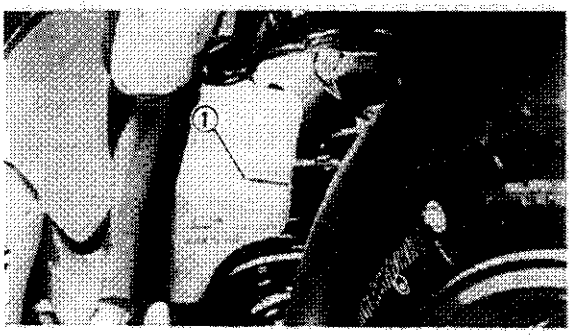
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CAUTION:

- **Hard water or salt water is harmful to the engine parts; use boiled or distilled water if you can't get soft water.**
- **Do not use water containing impurities or oil.**
- **Take care so that coolant does not splash on painted surfaces. If it splashes, wash it away with water.**
- **Do not mix more than one type of ethylene glycol anti-freeze containing corrosion inhibitors for aluminum engines.**

9. Install:
- Radiator cap

10. Connect:
- Hose (resirvoir tank)



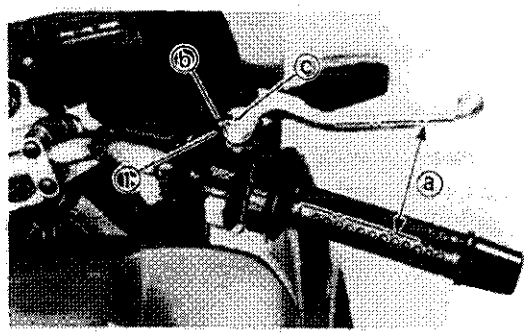
11. Fill:
- Reservoir tank
  (to maximum level ①)

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

13. Stop the engine and inspect the level. Refer to the "COOLANT LEVEL INSPECTION" section.

NOTE:
Wait a few minutes until level settles before inspecting the coolant level.

14. Install:
- Upper cowling
- Side cowlings (left and right)
- Seat
  Refer to "SEAT, COWLING AND FUEL TANK" section.



KB233001

CHASSIS

FRONT BRAKE ADJUSTMENT

1. Adjust:
- Brake lever position
  (distance ⓐ from handlebar grip to front brake lever)

****

Adjustment steps:
- Push the brake lever forward.
- Turn the adjuster ① in or out.

Turning in→Distance is decreased.
Turning out→Distance is increased.

- Align the mark ⓑ on the adjuster with the mark ⓒ on the lever.

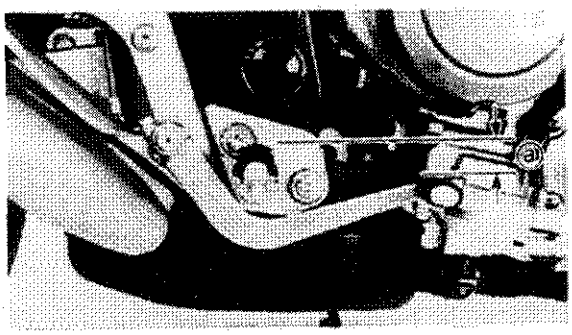
****

CAUTION:

Make sure that the brake does not drag after adjusting it.

⚠ 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 motorcycle 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.

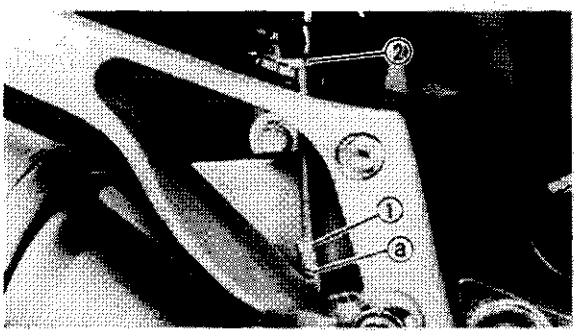


KB233002

REAR BRAKE ADJUSTMENT

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

Brake pedal height:
17~41 mm (0.7~1.6 in)
below top of 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 is down.
Turning out→Pedal is up.

⚠WARNING

After adjusting the brake pedal height, visually check the adjuster end through the hole ⓐ of the joint holder. The adjuster end must appear within this hole.

● Tighten the locknut.

****

CAUTION:

Make sure that the brake does not drag after adjusting it.

⚠WARNING

A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. This air must be removed by bleeding the brake system before the motorcycle 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.

3. Adjust:
• Brake light switch
Refer to the "BRAKE LIGHT SWITCH ADJUSTMENT" section.

KB233003

BRAKE FLUID LEVEL INSPECTION

NOTE:

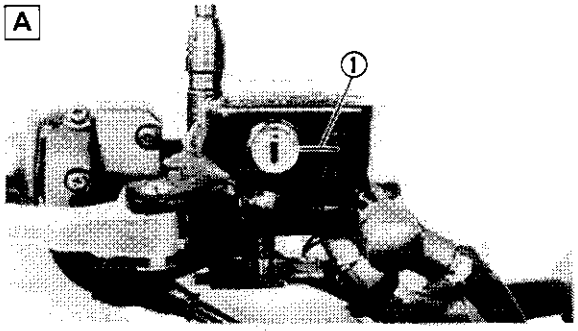
Position the motorcycle straight up when inspecting the fluid level.

1. Place the motorcycle on a level surface.

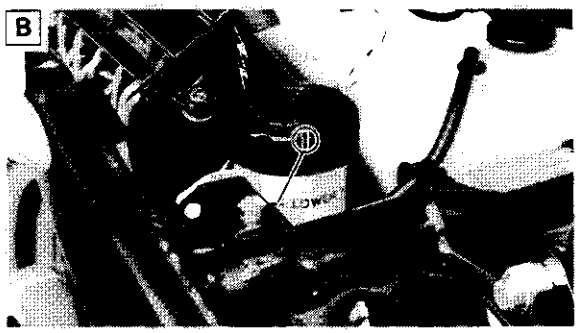
NOTE:

Place a suitable stand under the motorcycle.

A



B



2. Inspect:
- Fluid level
  Fluid level is under "LOWER" level line ①
  →Replenish.

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

A FRONT
B REAR

NOTE:

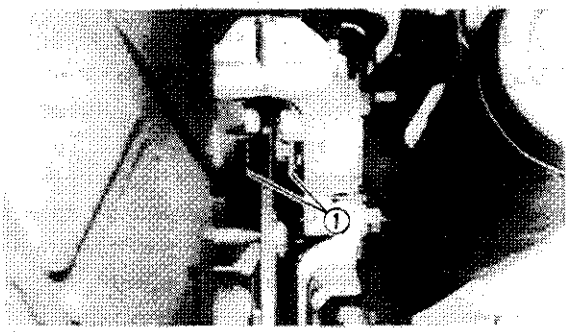
- If DOT No.4 is not available, DOT No.3 can be used.
- When inspecting the fluid level of the reservoir at the handlebars, make sure the master cylinder top is horizontally level.

CAUTION:

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

⚠ WARNING

- **Use only the designated quality fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of 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.**



KB233004

BRAKE PAD INSPECTION

1. Activate the brake lever or brake pedal.

2. Inspect:
- Brake pad
  Wear indicator ① almost contacts brake disc→Replace brake pad as a set.

Refer to the "BRAKE PAD REPLACEMENT" section in the CHAPTER 7.

KB233005

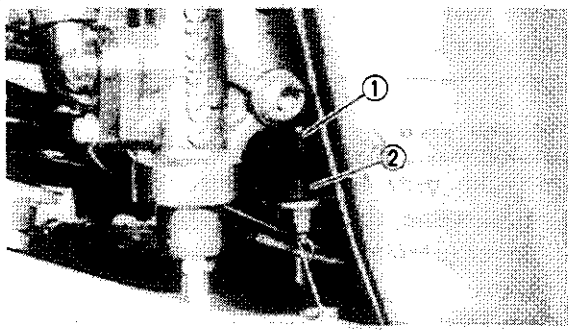
BRAKE LIGHT SWITCH ADJUSTMENT

NOTE:

The brake light switch is operated by movement of the brake pedal.
Proper adjustment is achieved when the brake light comes on just before the brake begins to take effect.

1. Check:
- Brake light operating timing
  Incorrect→Adjust.

2. Adjust:
- Brake light operating timing



****

Adjustment steps:

- Hold the main body ① of the switch with your hand so that it does not rotate, and turn the adjuster in or out ② until the operating timing is correct.

****

KB233006

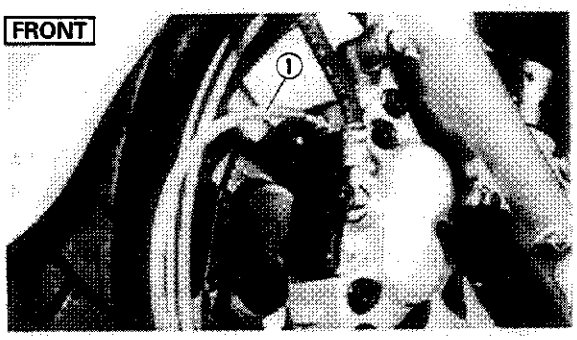
AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)

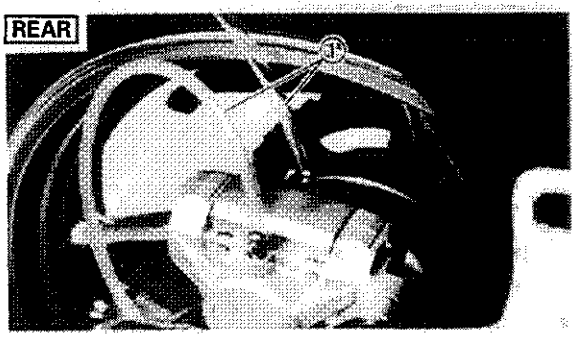
⚠ WARNING

Bleed the brake system if:

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

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





1. Bleed:
- Brake fluid

****

Air bleeding steps:

- Add proper brake fluid to the reservoir.
- Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.

- Connect the clear plastic tube ① tightly to the caliper bleed screw.
- Place the other end of the tube into a container.
- Slowly apply the brake lever or pedal several times.
- Pull the lever in or push down on the pedal. Hold the lever or pedal in position.

- Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
- Tighten the bleed screw when the lever or pedal limit has been reached; then release the lever or pedal.

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

● Repeat above steps until the air bubbles have been removed from the system.

NOTE:

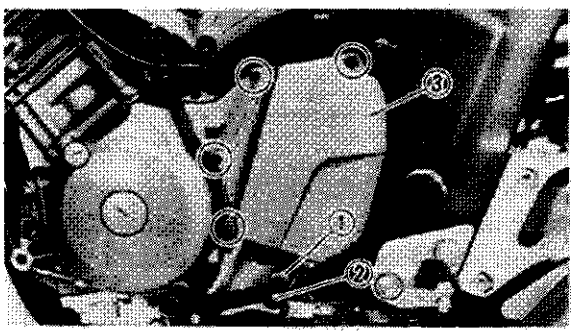
If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

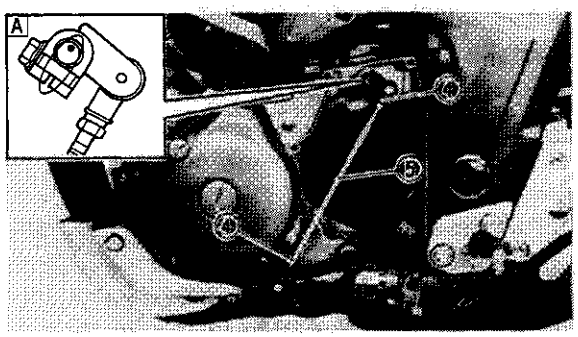
● Add brake fluid to proper level.

⚠ WARNING

Check the operation of the brake after bleeding the brake system.

****





KB233007

SHIFT PEDAL ADJUSTMENT

1. Check:
• Shift pedal position
When looking at the side view the top of the crankcase boss ① should be even with the top of the Shift pedal ② .
(Also align slot [A] of shift lever with opposite side of punch mark on the shaft.)

Not even → Adjust.

2. Adjust:
• Shift pedal position

****

Adjustment steps:

● Remove the cover ③ .
● Loosen the locknuts ④ .
● Turn the adjuster rod ⑤ in or out until adjustment is suitable.
● Tighten the both locknuts.
● Install the cover.

****

KB233008

DRIVE CHAIN SLACK ADJUSTMENT

NOTE:

Before checking and/or adjusting, rotate the rear wheel several revolutions and check slack at several points to find the tightest point. Check and/or adjust the chain slack with the rear wheel in this "tightest" position.

CAUTION:

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

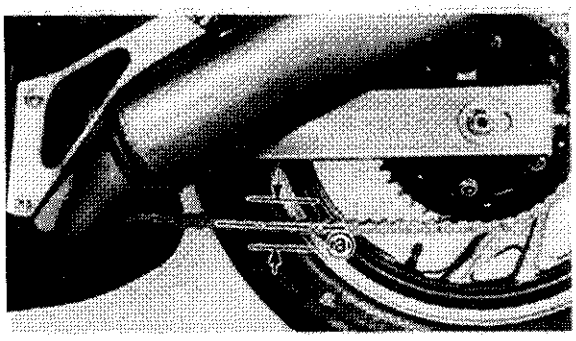
⚠ WARNING

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

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

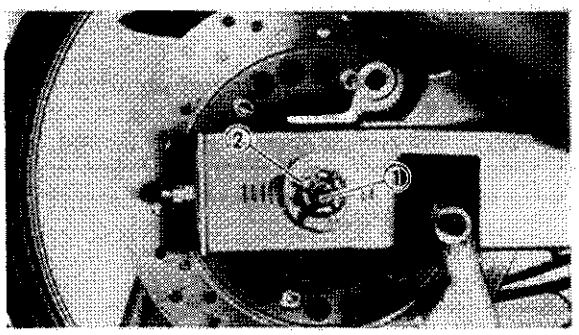
NOTE:

Both wheels should be on the ground without the rider on it.



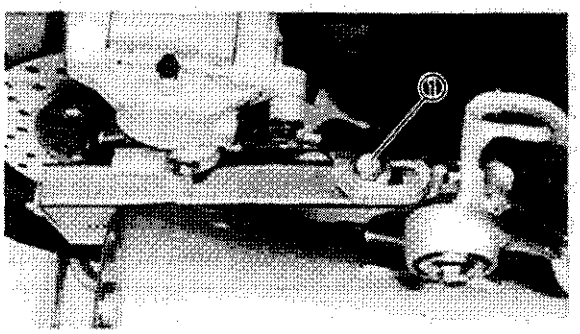
2. Check:
- Drive chain slack ⓐ
  Out of specification→Adjust.

Drive chain slack:
40 ~ 50 mm (1.6 ~ 2.0 in)
at both wheels on ground
without rider

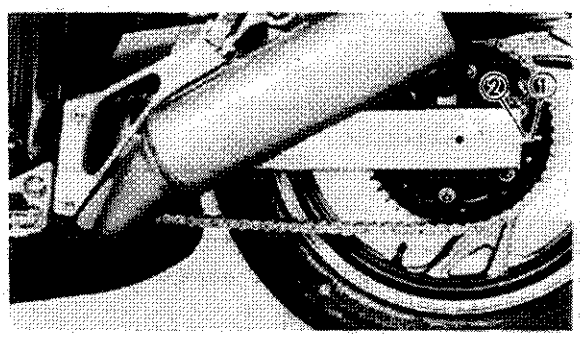


3. Remove:
- Cotter pin ①

4. Loosen:
- Axle nut ②



5. Loosen:
• Caliper bracket bolt ①



6. Adjust:
• Drive chain slack

****

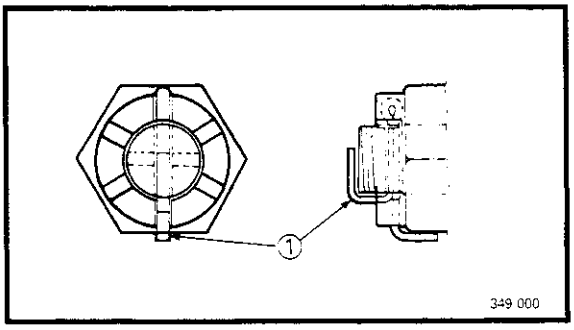
Adjustment steps:
- Loosen the locknut ① .
- Turn the adjuster ② in or out until the specified slack is obtained.

Turning in → Slack is decreased.
Turning out → Slack is increased.

NOTE:
Turn each adjuster exactly the same amount to maintain correct axle alignment. (There are marks on each side of swingarm and on each chain puller; use them to check for proper alignment.)

- Tighten the axle nut to specification, while pushing up or down on the chain to zero slack.

	Axle nut: **105 Nm (10.5 m · kg, 75 ft · lb)**



- Tighten the locknut and caliper bracket bolt.

	Bolt (caliper bracket): **35 Nm (3.5 m · kg, 25 ft · lb)**

****

7. Install:
• Cotter pin ①

CAUTION:

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.

KB233009

DRIVE CHAIN LUBRICATION

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

This motorcycle has a drive chain with small rubber O-rings between the chain plates. Steam cleaning, high-pressure washes, and certain solvents can damage these O-rings. Use only kerosene to clean the drive chain. Wipe it dry, and thoroughly lubricate it with SAE 30 ~ 50W motor oil. Do not use any other lubricants on the drive chain. They may contain solvents that could damage the O-rings.

Recommended lubricant:
SAE 30 ~ 50 W Motor Oil or chain lubricants suitable for "O-ring" chains.

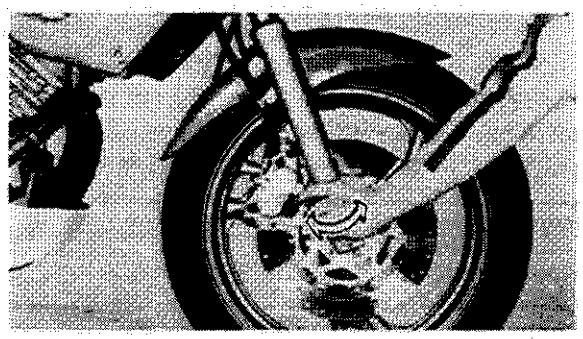
KB233010

STEERING HEAD ADJUSTMENT

⚠ WARNING

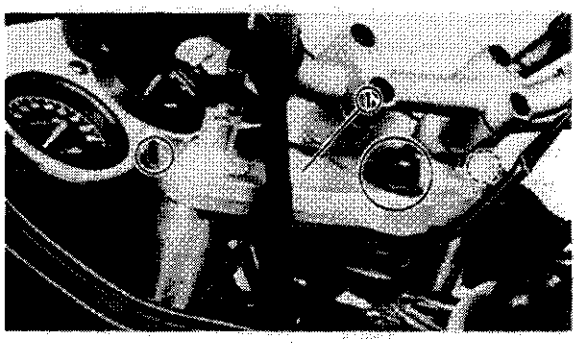
Securely support the motorcycle so there is no danger of it falling over.

1. Elevate the front wheel by placing a suitable stand under the engine.



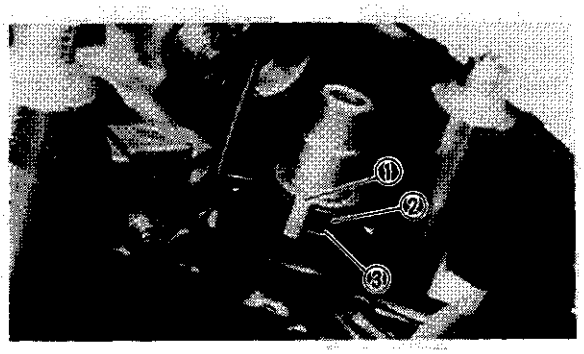
2. Check:
• Steering assembly bearings
Grasp the bottom of the forks and gently rock the fork assembly back and forth.
Looseness→Adjust steering head.

3. Remove:
• Seat
• Side cowlings (left and right)
• Upper cowling
• Fuel tank
Refer to the "SEAT, COWLING AND FUEL TANK" section.



4. Remove:
• Front wheel
Refer to the "FRONT WHEEL" section in the CHAPTER 7.

5. Remove:
• Handle crown ①

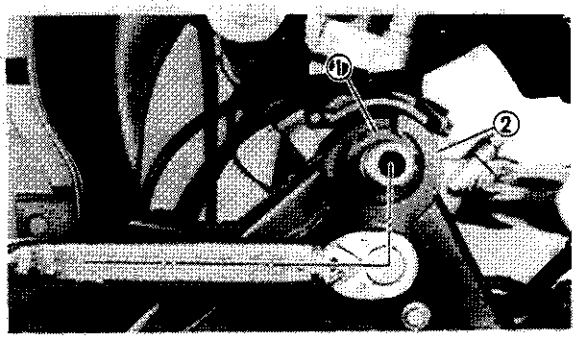


6. Adjust:
• Steering head

****

Adjustment steps:

● Remove the special washer ① , ring nut ② (upper) and rubber washer ③ .



● Tighten the ring nut ① (lower) using the ring nut wrench ② .

NOTE:

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

	Ring nut wrench: **P/N YU-33975/90890-01403**

	Ring nut (initial tightening): **52 Nm (5.2 m · kg, 37 ft · lb)**

● Loosen the ring nut (lower) one turn.
● Retighten the ring nut (lower) using the ring nut wrench.

⚠WARNING

Avoid over-tightening.

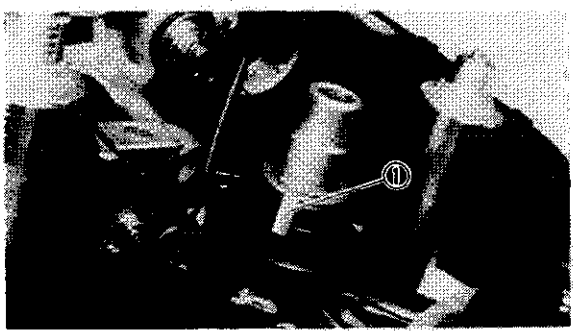
	Ring nut (final tightening): **3 Nm (0.3 m · kg, 2.2 ft · lb)**

NOTE:
Recheck the steering head by turning the steering from lock to lock, after adjusting steering head.
If steering is binded, loosen the ring nut but not to the extent of free play in bearing.

If steering is loosened, repeat the adjustment steps.

- Install the rubber washer and ring nut (upper).

NOTE:
The tapered side of ring nut must be faced downward.



- Finger tighten the ring nut (upper), then align the slots of both ring nuts. If not aligned, hold the ring nut (lower) and tighten the other until they are aligned.
- Install the special washer ①.

NOTE:
Make sure the special washer tab is placed in the slots.

****

7. Install:
- Handle crown

	Bolt (steering shaft): **110 Nm (11.0 m · kg, 80 ft · lb)** **Pinch bolt (handle crown):** **23 Nm (2.3 m · kg, 17 ft · lb)**

8. Install:
- Front wheel

Refer to the "FRONT WHEEL" section in the CHAPTER 7.

9. Install:
- Fuel tank
- Upper cowling
- Side cowlings
- Seat

Refer to the "SEAT, COWLING AND FUEL TANK" section.

KB233011

FRONT FORK INSPECTION

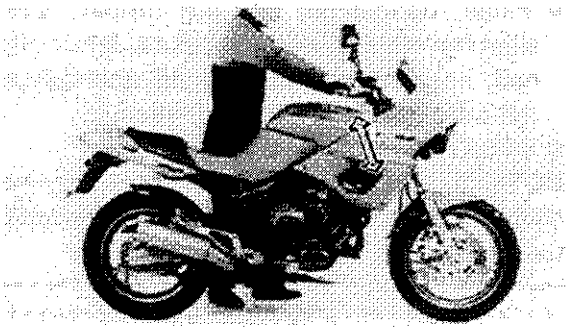
⚠ WARNING

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

1. Place the motorcycle on a level place.

2. Check:
- Inner tube
  Scratch/Damage→Replace.
- Oil seal
  Excessive oil leakage→Replace.

3. Hold the motorcycle on upright position and apply the front brake.



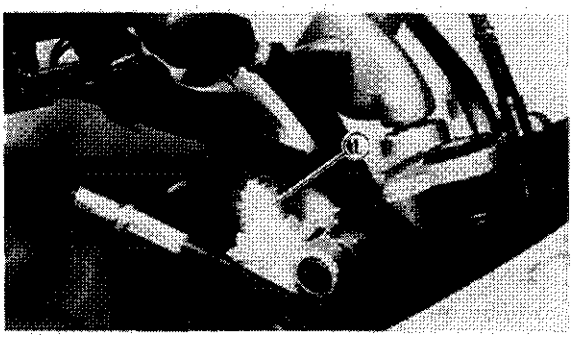
4. Check:
- Operation
  Pump the front fork up and down for several times.
  Unsmooth operation→Repair.
  Refer to the "FRONT FORK" section in the CHAPTER 7.

KB233012

FRONT FORK ADJUSTMENT

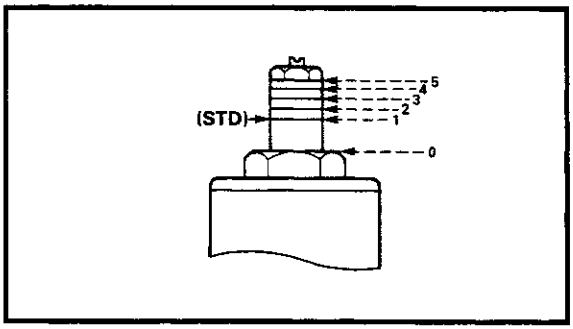
⚠ WARNING

- **Always adjust each fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.**
- **Securely support the motorcycle so there is no danger of it falling over.**



1. Adjust:
- Spring preload
  Turn the adjuster ① in or out.

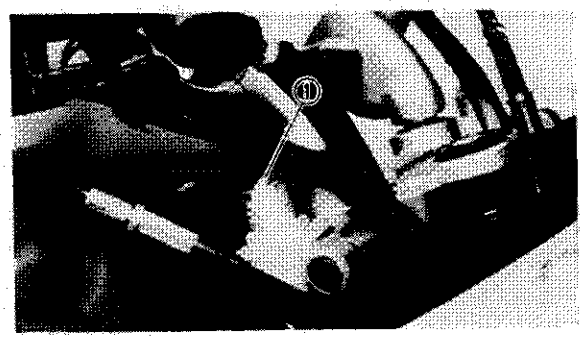
Turning in→Spring preload is harder.
Turning out→Spring preload is softer.



Adjuster position:
Standard: 1
Minimum: 0
Maximum: 5

NOTE:
The adjuster is at the "0" position when it is fully turned out.

CAUTION:
- **Grooves are provided to show the adjusting level.**
- **Never turn the adjuster beyond the maximum or minimum setting.**



2. Adjust:
- Damping force
  Click the adjuster ① in or out.

Click in→Damping force is increased.
Click out→Damping force is decreased.

Adjuster position:
Standard: 4 clicks out*
Minimum: 6 clicks out*
Maximum: 2 clicks out*

*:From the fully turn in position

CAUTION:
Never turn the adjuster beyond the maximum or minimum setting.

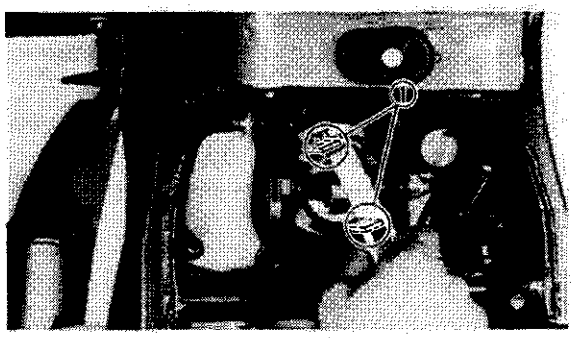
KB233013

REAR SHOCK ABSORBER ADJUSTMENT

1. Place the motorcycle on a level place.

⚠ WARNING

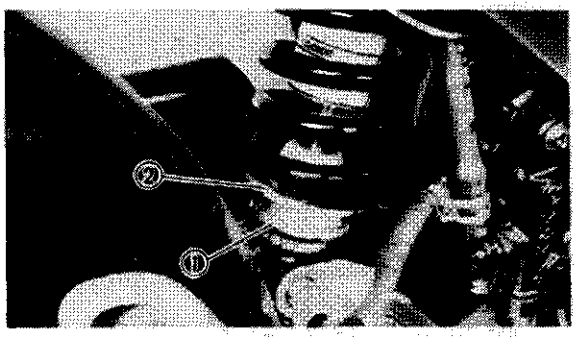
Securely support the motorcycle so there is no danger of it falling over.



2. Adjust:
• HARD/SOFT selector ①

HARD → Spring is harder
SOFT → Spring is softer

NOTE:
When turning the selector, use the select lever which is attached to the owner's tool kit.



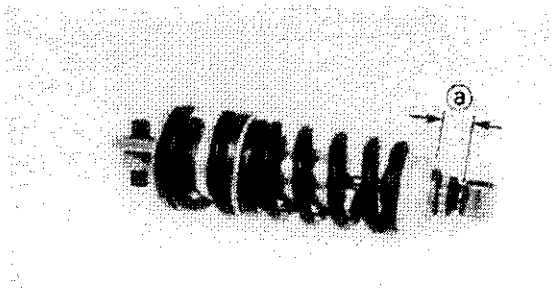
3. Adjust:
• Spring preload

****

Adjustment steps:
● Loosen the locknut ① .
● Turn the adjuster ② in or out.

Turning in→Spring preload is increased.
Turning out→Spring preload is decreased.

NOTE:
The length of the spring (installed) changes 1.0 mm (0.04 in) per turn of the adjuster.



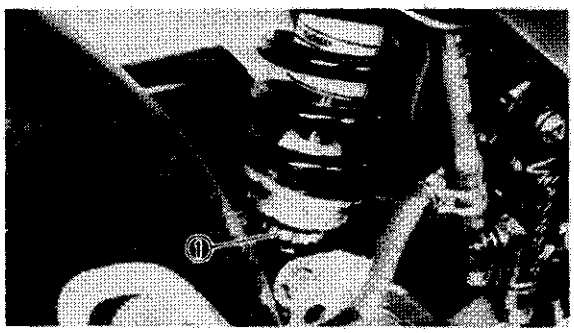
	Measurement length ⓐ : **Standard (minimum):** **24 mm (0.94 in)** **Minimum:** **22 mm (0.87 in)** **Maximum:** **29 mm (1.14 in)**

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

● Tighten the locknut.

	Locknut: **70 Nm (7.0 m · kg, 50 ft · lb)**

****



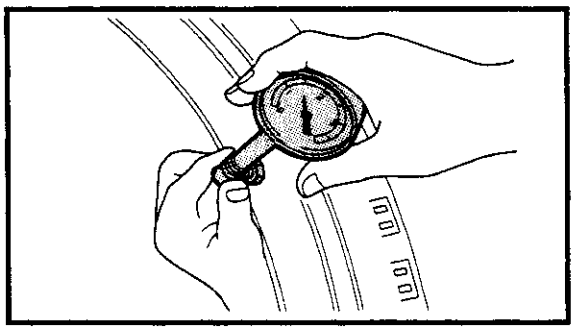
4. Adjust:
• Damping force
Click the adjuster ① in or out.

Click in→Damping force is increased.
Click out→Damping force is decreased.

Adjuster position: **Standard: 10 clicks out*** **Minimum: 15 clicks out*** **Maximum: 5 clicks out***

*:From the fully turn in position

CAUTION:
Never turn the adjuster beyond the maximum or minimum setting.



KB233014
TIRE INSPECTION
1. Measure:
• Tire pressure
Out of specification→Adjust.

⚠ WARNING
- **Tire inflation pressure should be checked and adjusted when the temperature of the tire equals the ambient air temperature. Tire inflation pressure must be adjusted according to total weight of cargo, rider, passenger, and accessories (fairing, saddlebags, etc. if approved for this model), and vehicle speed.**
- **Proper loading of your motorcycle is im-**

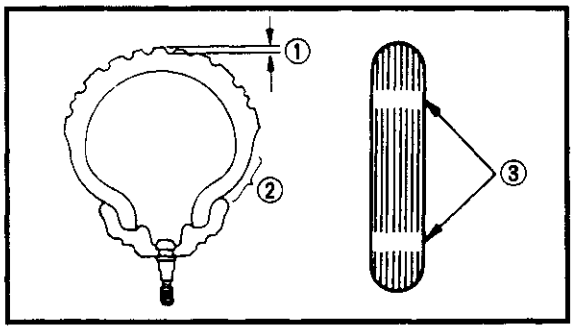
portant for the handling, braking, and other performance and safety characteristics of your motorcycle. Do not carry loosely packed items that can shift. Securely pack your heaviest items close to the center of the motorcycle, and distribute the weight evenly from side to side. Properly adjust the suspension for your load, and check the condition and pressure of your tires. NEVER OVERLOAD YOUR MOTORCYCLE. Make sure the total weight of the cargo, rider, passenger, and accessories (fairing, saddlebags, etc. if approved for this model) does not exceed the maximum load of the motorcycle. Operation of an overloaded motorcycle could cause tire damage, an accident, or even injury.

Basic weight: With oil and full fuel tank	230 kg (507 lb)
Maximum load*	USA: 171 kg (377 lb) CDN: 205 kg (452 lb)

Cold tire pressure	Front	Rear
Up to 90kg (198lb) load*	200 kPa (2.00kg/cm^2, 28 psi)	225 kPa (2.25kg/cm^2, 33 psi)
90kg(198lb) ~Maximum load*	200 kPa (2.00kg/cm^2, 28 psi)	250 kPa (2.50kg/cm^2, 36 psi)

Cold tire pressure	Front	Rear
High speed riding	200 kPa (2.00kg/cm^2, 28 psi)	250 kPa (2.50kg/cm^2, 36 psi)

*Load is the total weight of cargo, rider, passenger, and accessories.



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

Minimum tire tread depth:
(front and rear):
0.8 mm (0.03 in)

① Tread depth
② Side wall
③ Wear indicator

⚠ WARNING

- **It is dangerous to ride with a worn—out tire. When a tire tread begins to show lines, replace the tire immediately.**
- **Do not use tubeless tires on a wheel designed for tube type tires only. Tire failure and personal injury may result from sudden deflation.**

Tube type wheel → Tube type tire only
Tubeless type wheel → Tube type or tubeless tire

- **Be sure to install the correct tube when using tube type tires.**

⚠ WARNING

After extensive tests, the tires mentioned below have been approved by Yamaha motor Co., Ltd. for this model. No guarantee for handling characteristics can be given if tire combinations other than what is approved are used on this motorcycle. The front and rear tires should be of the same manufacture and design.

FRONT:

Manufacture	Size	Type
BRIDGES-TONE	110/80-18 58H	G547
DUNLOP	110/80-18 58H	K505F

REAR:

Manufacture	Size	Type
BRIDGES-TONE	150/70-17 69H	G548G
DUNLOP	150/70-17 69H	K505

⚠ WARNING

After mounting a tire, ride conservatively to allow proper tire to rim seating. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury.

KB233015

WHEEL INSPECTION

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

NOTE:

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

⚠ WARNING

Never attempt even small repairs to the wheel.



KB234001

ELECTRICAL

BATTERY INSPECTION

NOTE:

Since the MF battery is of a sealed-type construction, it is impossible to measure the specific gravity of the electrolyte in order to check the state of charge in the battery. Therefore, to check the state of charge in the battery, voltage must be measured at the battery terminals.

CAUTION:

CHARGING METHOD

- **This battery is sealed type. Never remove sealing caps even when charging. With the sealing cap removed, this balancing will not be maintained, and battery performance will lower gradually.**
- **Never add water. If distilled water is added, chemical reaction in the battery will not proceed in the normal way, thus making it impossible for the battery to operate regularly.**
- **The charging time, charging current and charging voltage for the MF battery is different than general type batteries.**
  The MF battery should be charged as instructed in the "Charging method". Should the battery be overcharged, the electrolyte level will over extremely. Therefore, use special care when charging the battery.
- **Avoid using any electrolyte other than specified. The specific gravity of the MF battery electrolyte is 1.32 at 20 C (68 F). (The specific gravity of the general type battery electrolyte is 1.28.) If the electrolyte whose specific gravity is less than 1.32, the sulfuric acid will decrease and thus low battery performance will result. Should any electrolyte, whose specific gravity is 1.32 or more, be used, the battery plates will corrode and battery life will shorten.**

⚠ 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 and 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.

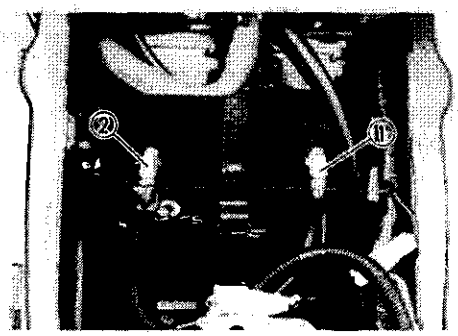
Always follow these preventive measures:

- **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
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

Refer to the "SEAT, COWLING AND FUEL TANK" section.

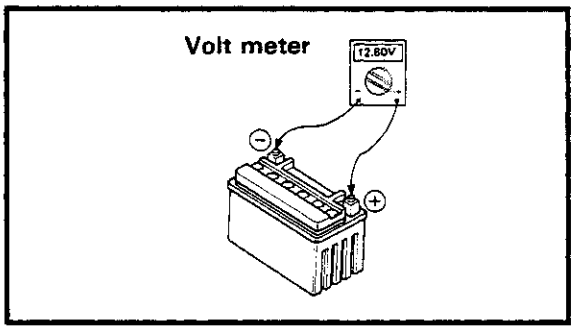


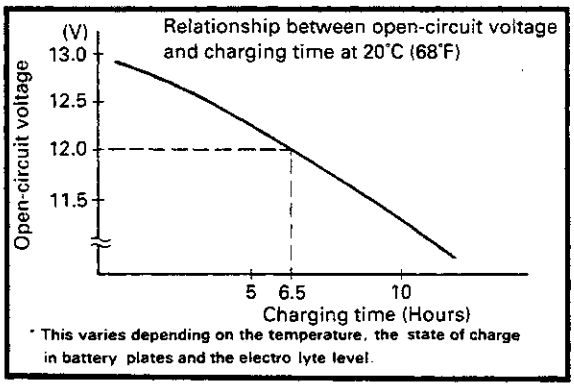
2. Disconnect:
- Battery leads

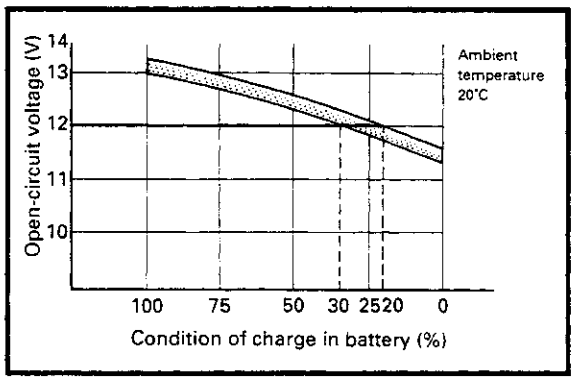
CAUTION:

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

3. Remove:
- Battery







4. Check:
• Battery condition

****

Battery condition checking steps:
● Connect a digital volt meter to the battery terminals.

Tester (+) lead → Battery (+) terminal.
Tester (−) lead → Battery (−) terminal.

NOTE:
The state of a discharged MF battery can be checked by measuring open circuit voltage (the voltage measured with the positive terminals being disconnected).

Open circuit voltage	Charging time
12.8 v or more	No charging is necessary.

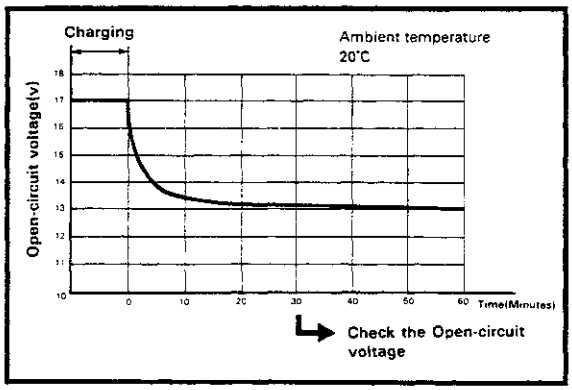
● Check the battery condition using figures.

EXAMPLE:
Open circuit voltage = 12.0 v
Charging time = 6.5 hours
Condition of charge in battery = 20~30 %

****

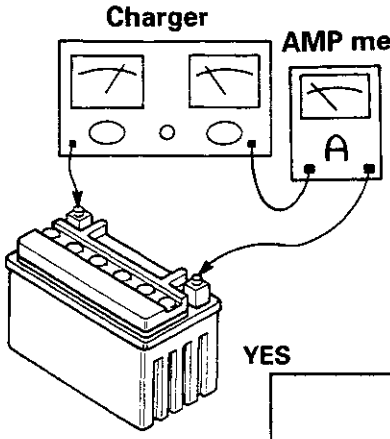
5. Charging method of MF battery

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 plug from the MF battery.
- Use special care so that 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.
- Change in the open-circuit voltage of the MF battery after being charged is shown below. As shown in the figure, the open-circuit voltage is stabilized 30 minutes after charging has been completed.
  Therefore, to check the condition of the battery, measure the open-circuit voltage 30 minutes after has been completed.

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

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

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

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

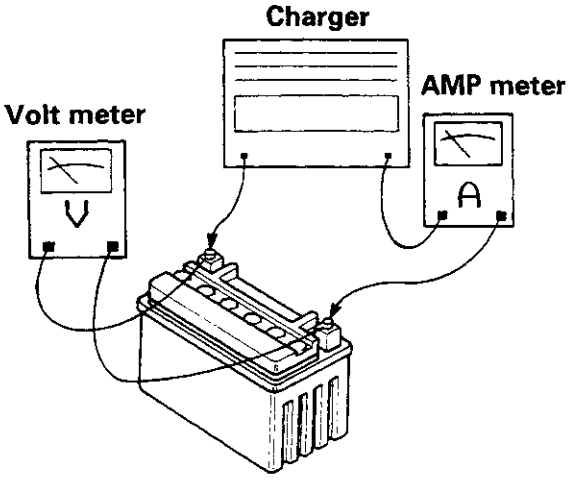
Charge the battery until the battery's charging voltage is 15 volts.

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

Check the open-circuit voltave 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 if battery charger cannot charge the MF battery.

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

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

7. Install
• Battery

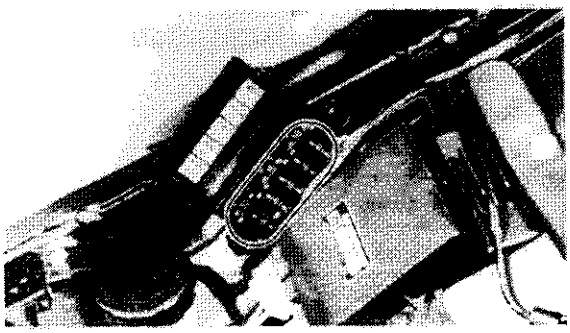
8. Connect:
• Battery leads

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

9. Install:
• Fuel tank
• Upper cowling
• Side cowlings (left and right)
• Seat
Refer to the "SEAT, COWLING AND FUEL TANK" section.

KB234002
FUSE INSPECTION

CAUTION:
Don't forget to turn off the main switch when checking or replacing the fuse. Otherwise, it may cause accidental short-circuiting.



1. Remove:
• Seat

2. Inspect:
• Fuse

****

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 indicates infinity, replace the fuse.

****

3. Replace:
- Blown fuse

****

Replacement steps:

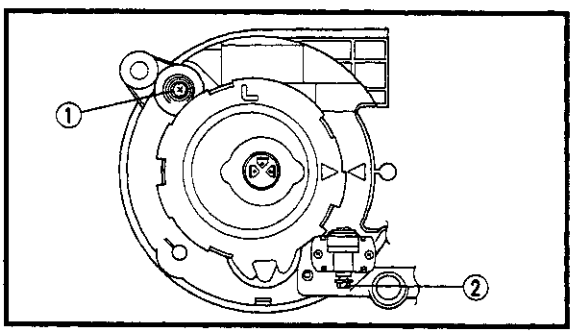
- Turn off the main switch.
- Install a new fuse of proper amperage.
- Turn on the switches to verify operation of electrical device.
- If the fuse blows immediately again, check electrical circuit.

****

⚠ 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.

4. Install:
- Seat



KB234003

HEADLIGHT BEAM ADJUSTMENT

1. Adjust:
- Headlight beam (vertical)

  Turn the adjuster ① in or out.

Turn in→Headlight beam moves to raise
Turn out→Headlight beam moves to lower

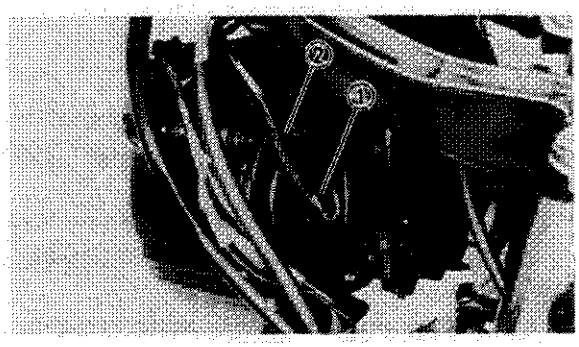
2. Adjust:
• Headlight beam (holizontal)
Turn the adjuster ② in or out.

Turn in→Headlight beam moves to left
Turn out→Headlight beam moves to right

KB234004

HEADLIGHT BULB REPLACEMENT

1. Remove:
• Side cowlings (left and right)
• Upper cowling
Refer to "SEAT, COWLING AND FUEL TANK" section.

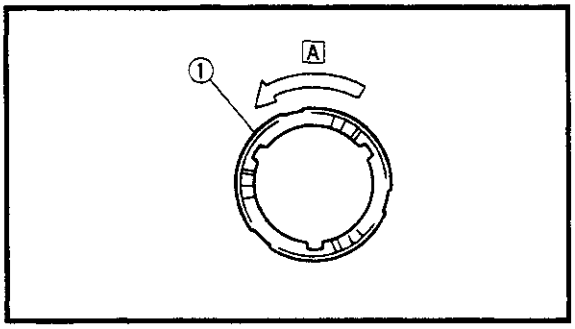


2. Disconnect:
• Headlight lead ①

3. Remove:
• Cover ②



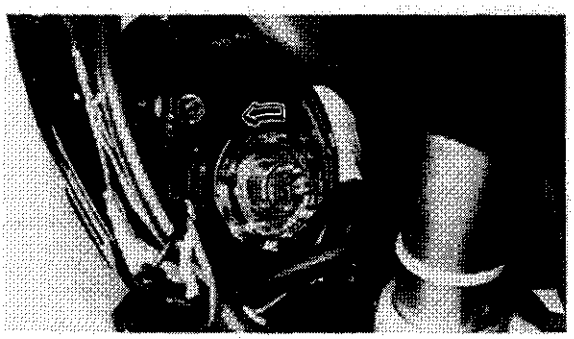
4. Remove:
• Bulb cover ①



5. Remove:
• Bulb holder ①
• Bulb
A Turn

⚠ 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.



6. Install:
- Bulb (new)

  Secure the new bulb with the bulb holder.

CAUTION:

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

NOTE:

Align the projection on the bulb holder with the slot on the headlight body.

7. Install:
- Bulb holder

8. Install:
- Bulb cover
- Cover

NOTE:
- Install the bulb cover so that the "TOP" mark faces upward.
- Make sure that the projection on the bulb cover is meshed with slot on the headlight body.

9. Connect:
- Headlight leads

10. Install:
- Upper cowling
- Side cowlings (left and right)

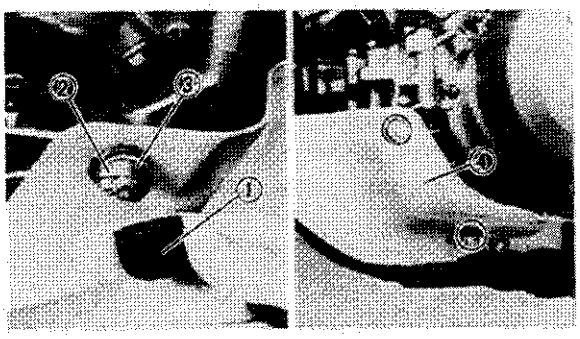
  Refer to "SEAT, COWLING AND FUEL TANK" section.

KB241000
ENGINE OVERHAUL
ENGINE REMOVAL

NOTE:
It is not necessary to remove the engine in order to remove the following components:
- Cylinder head
- Cylinder
- Piston
- Clutch
- Water pump
- AC magneto

KB241001
SEAT, COWLING AND FUEL TANK
1 Remove:
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

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



KB241002
ENGINE OIL AND COOLANT
1. Remove:
- Cover ①
- Cotter pin ②
- Washer ③
- Rubber washer
- Engine guard ④

2. Drain:
- Engine oil
- Coolant

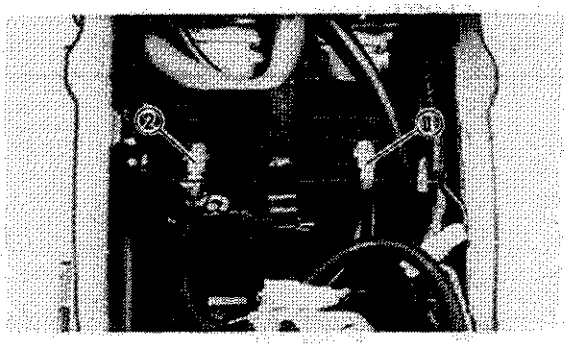
Refer to the "ENGINE OIL REPLACEMENT/ COOLANT REPLACEMENT" section in the CHAPTER 3.

KB241012

CANISTER (for California only)

1. Disconnect:
• Canister hoses

2. Remove:
• Canister



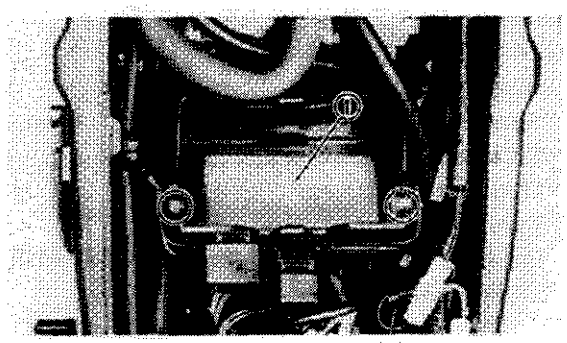
KB241003

BATTERY

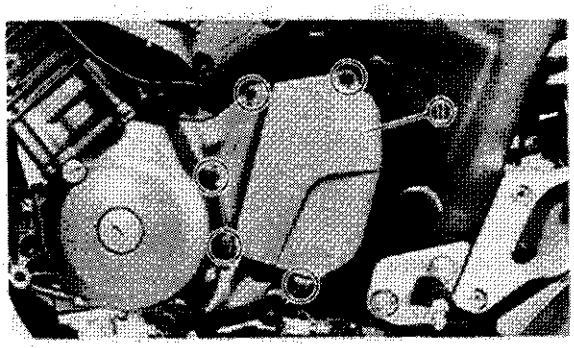
1. Disconnect:
• Battery leads

CAUTION:

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



2. Remove:
• Battery
• Battery box ①

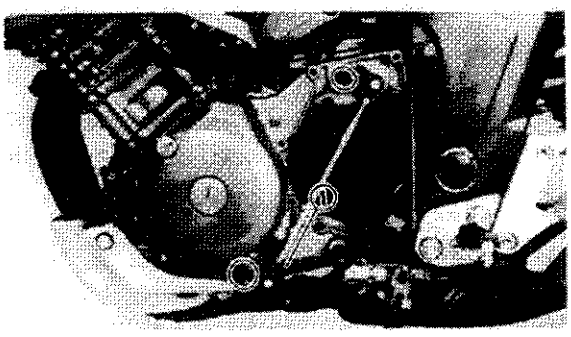


KB241010

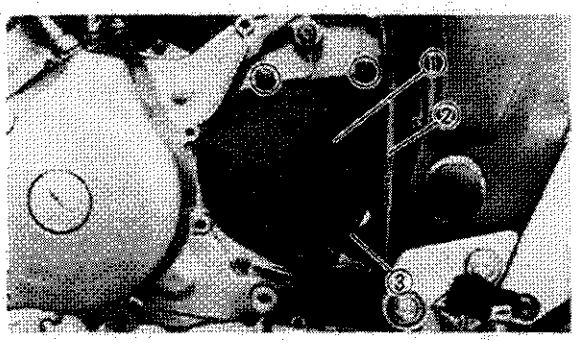
DRIVE CHAIN

1. Loosen:
• Drive chain slack
Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.

2. Remove:
• Cover ①

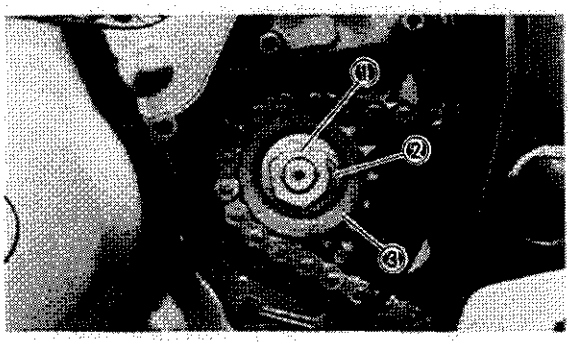


3. Remove:
• Shift pedal assembly ①



4. Remove:
• Sprocket cover ①

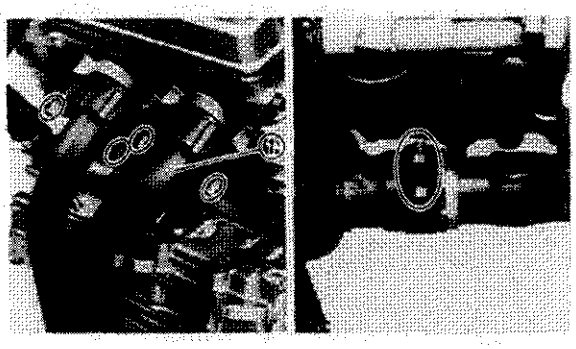
5. Unhook:
• Air filter drain hose ②
• Sidestand switch lead ③



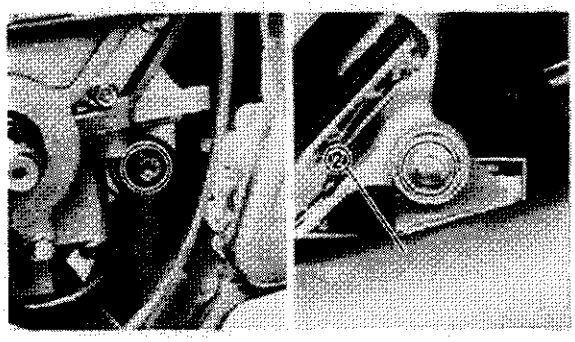
6. Straighten:
• Lock washer tab

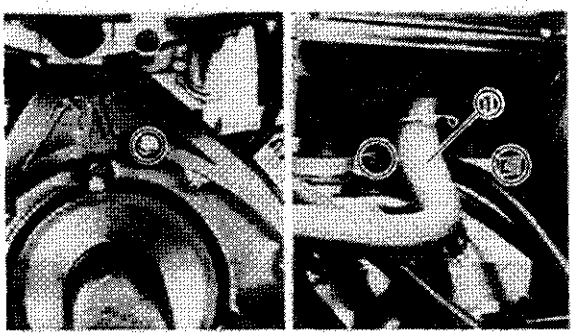
7. Remove:
• Nut ①
• Lock washer ②
• Drive sprocket ③

NOTE:
Loosen the nut while applying the rear brake.



KB241005
EXHAUST PIPE AND MUFFLER
1. Remove:
• Exhaust pipe ①
• Muffler ②

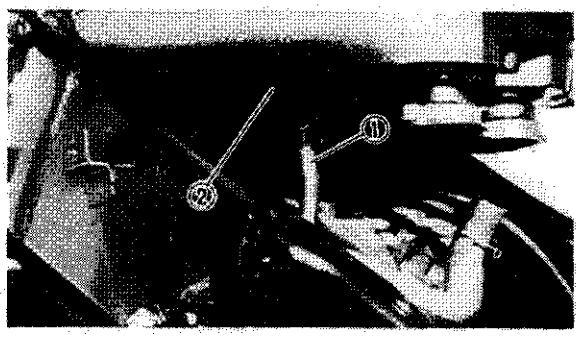




KB241007
AIR FILTER CASE AND CARBURETOR
1. Remove:
• Bolt (air filter case)

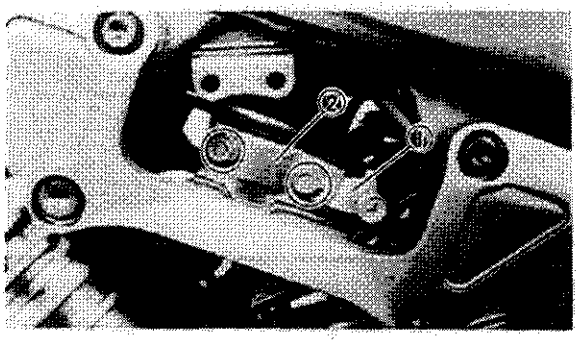
2. Disconnect:
• Breather hose ① (air filter case)

3. Loosen:
• Screws (carburetor joints)

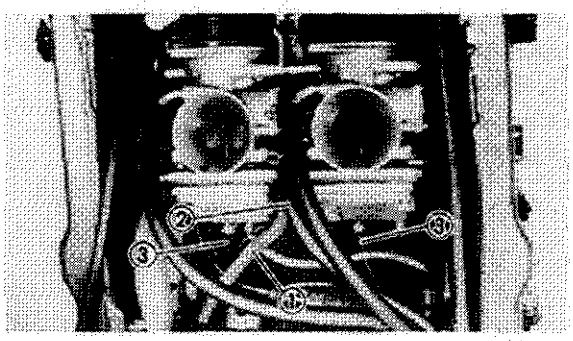


4. Disconnect:
• Drain hose ①

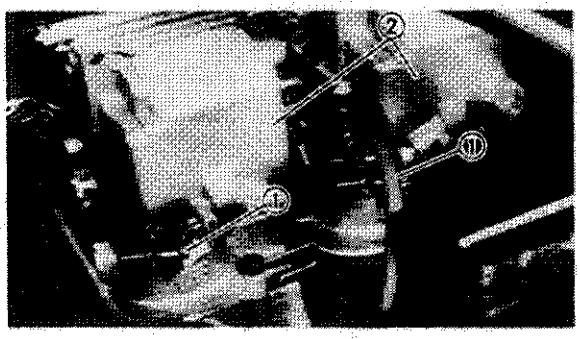
5. Remove:
• Air filter case ②



6. Remove:
• Throttle stop screw stay ①
• Clutch cable stay ②

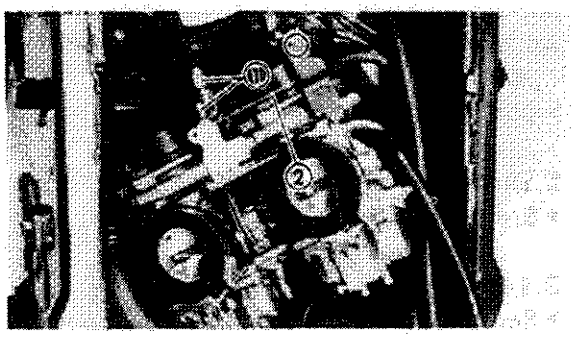


7. Disconnect:
• Fuel hose ①
• Breather hose ②
• Drain hoses ③



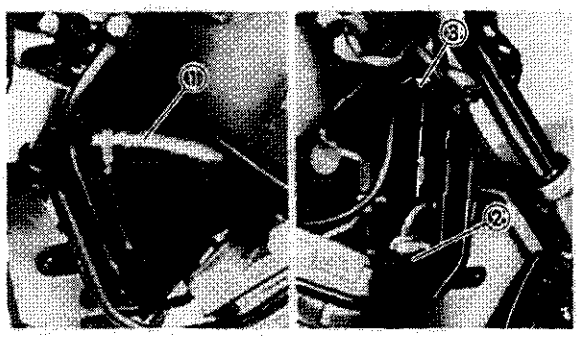
8. Loosen:
• Screws ① (intake manifold)

9. Disconnect:
• Carburetors ②
(from intake manifold)



10. Disconnect:
• Throttle cables ①
• Starter cable ②

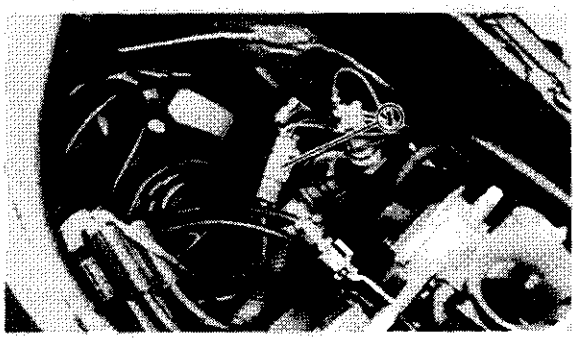
NOTE:
Cover the carburetor with a clean rag to prevent dirt or foreign material from entering the carburetor.



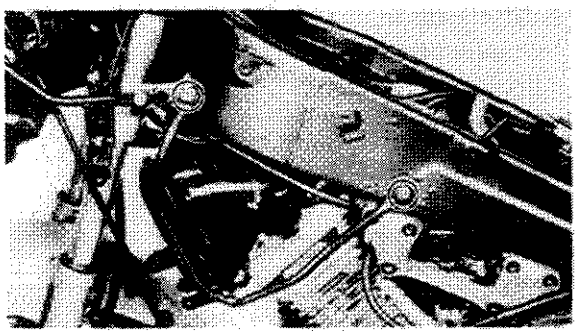
KB241008

RADIATOR

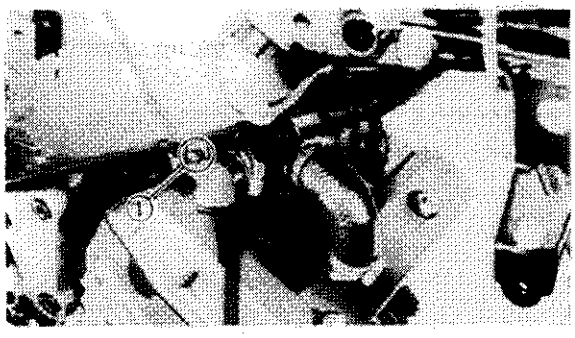
1. Disconnect:
- Radiator hose ① (radiator—thermostat)
- Radiator hose ② (radiator—water pump housing)
- Reservoir tank hose ③



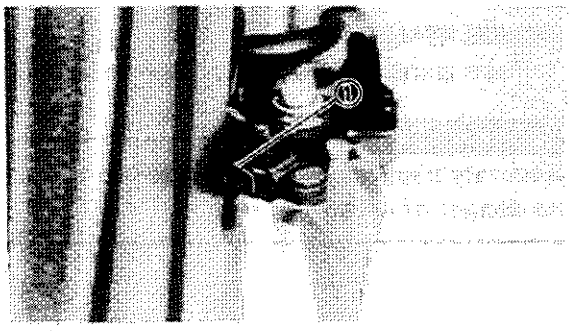
2. Disconnect:
- Fan motor coupler ①



3. Remove:
- Radiator assembly (with stay)



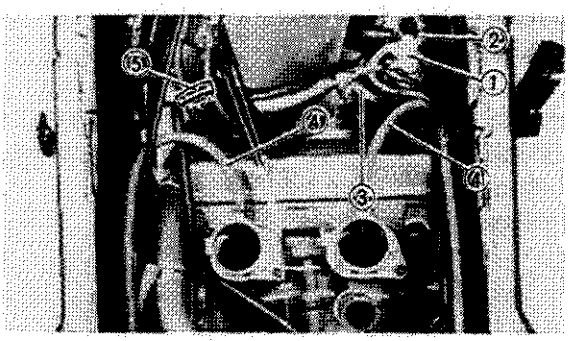
4. Remove:
- Bolt ① (thermostat)



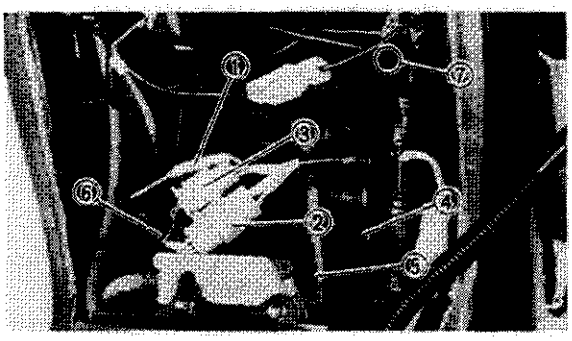
KB241009

CABLES AND LEADS

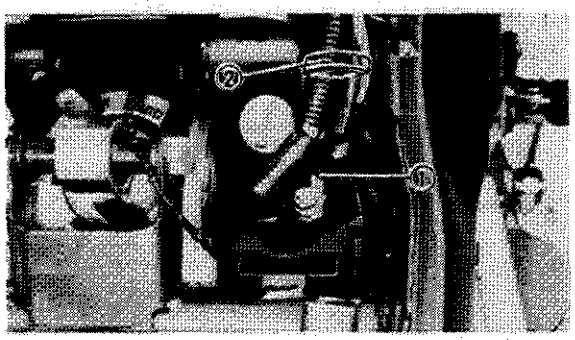
1. Disconnect:
- Clutch cable ① (from pull lever)



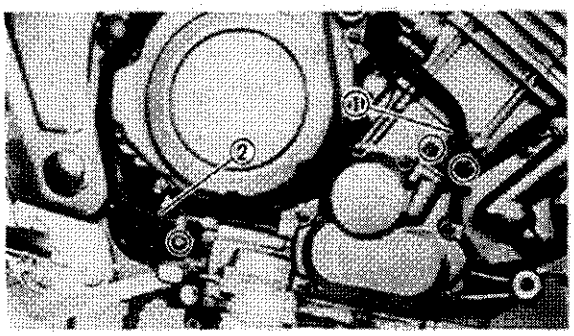
2. Disconnect:
- Spark plug leads (from spark plugs)
- Thermo switch lead ①
- Thermo unit lead ②
- Ground lead ③
- Vacuum hoses ④
- Band ⑤ (from radiator hose)



3. Disconnect:
- Neutral switch lead ①
- AC magneto leads ②
- Pickup coil leads ③
- Ground lead ④ (from crankcase cover)
- Breather hose ⑤ (oil tank)
- Band ⑥
- Starter cable ⑦ (from crankcase clamp)



4. Disconnect:
- Starter motor lead ① (from starter relay)
- Band ②



5. Disconnect:
- Oil pipe ① (oil tank—oil pump cover) (from oil pump cover)
- Oil pipe ② (oil tank—oil filter cover) (from oil filter cover)

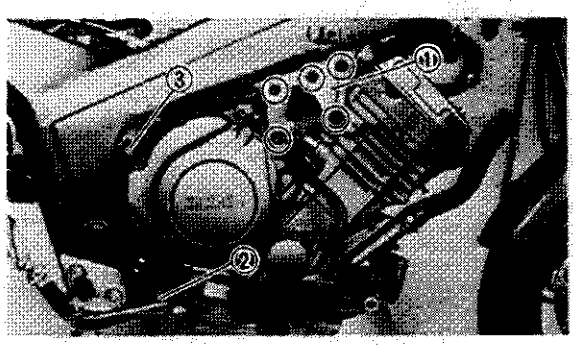
KB241011

ENGINE REMOVAL

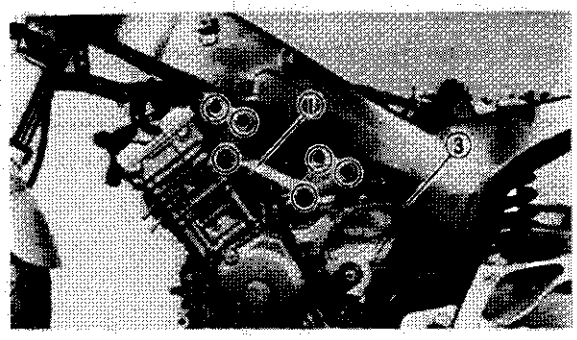
1. Place suitable stand under the motorcycle.

⚠ WARNING

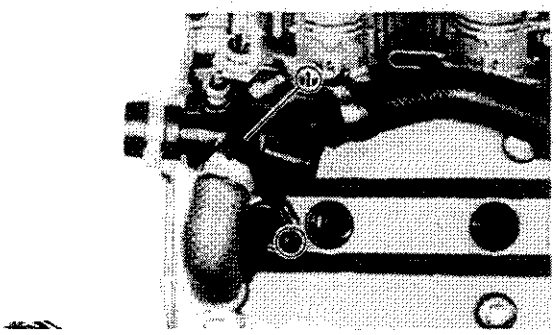
Securely support the motorcycle so there is no danger of it falling over.



2. Remove:
- Engine brackets ① (left and right)
- Mounting bolt ② (lower)
- Mounting bolt ③ (upper)



3. Remove:
- Engine assembly
  (from right side of motorcycle)

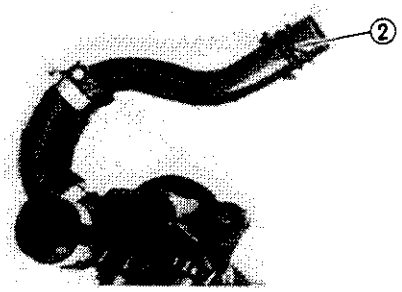


KB242001

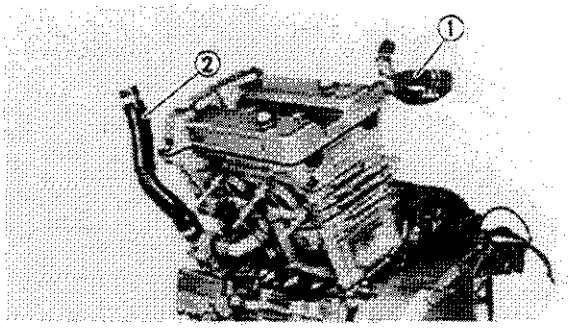
ENGINE DISASSEMBLY

PIPE AND HOSES

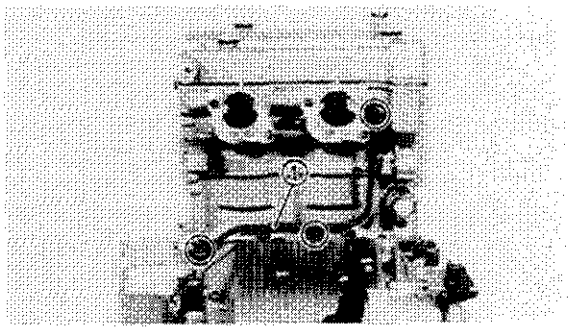
1. Remove:
- Thermostat assembly ① (with radiator hose etc.)



NOTE:
Do not fall the O-ring ② into the cylinder head when removing the coolant hose.



2. Remove:
- Breather hose ①
- Radiator hose ②



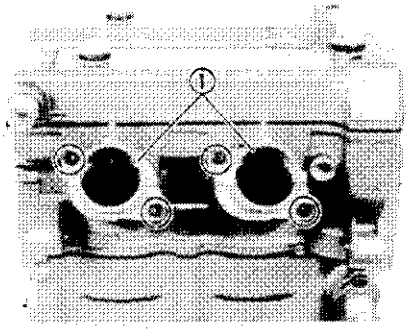
3. Remove:
- Oil delivery hose ①

KB242002

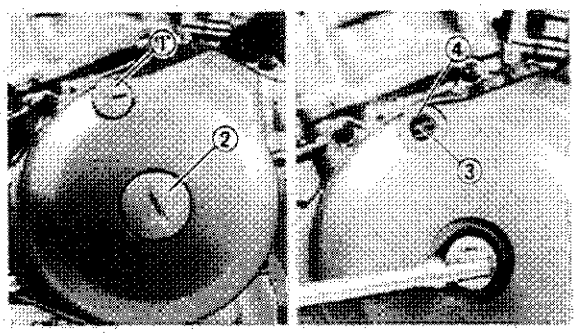
CYLINDER HEAD, CYLINDER AND PISTONS

NOTE:
With the engine mounted, the cylinder head cover, camshaft and cylinder head can be maintained by removing the following parts.
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

- Air filter case
- Carburetor
- Engine guard
- Exhaust pipe
- Radiator

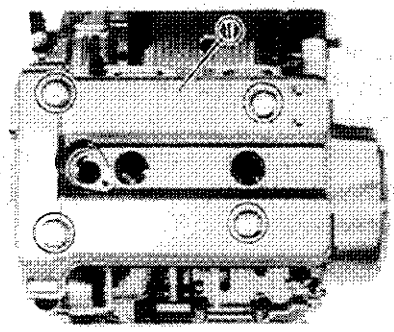


1. Remove:
- Intake manifolds ①



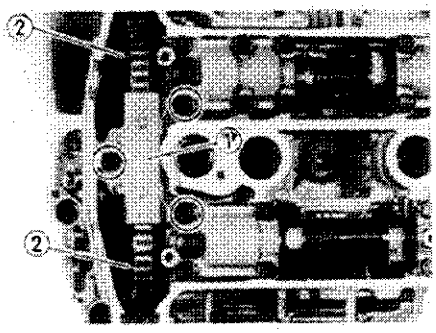
2. Remove:
- Spark plugs
- Timing plug ①
- Plug (center) ②

3. Turn:
- Crankshaft
  (until TDC mark ③ is aligned with stationary pointer ④)



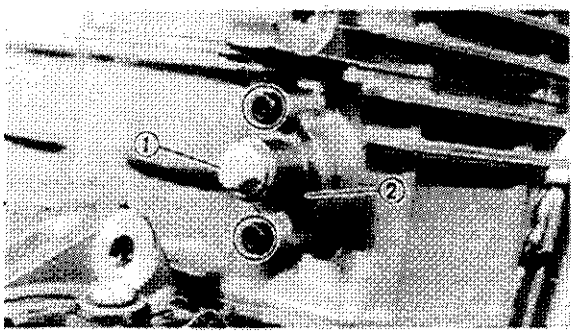
4. Remove:
- Cylinder head cover ①

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



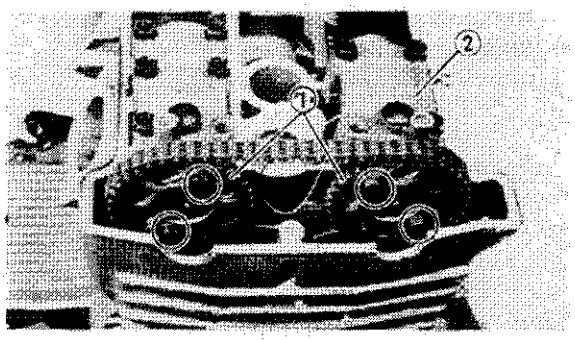
5. Remove:
- Chain guide ① (upper)

6. Loosen:
- Bolts ② (cam sprocket)



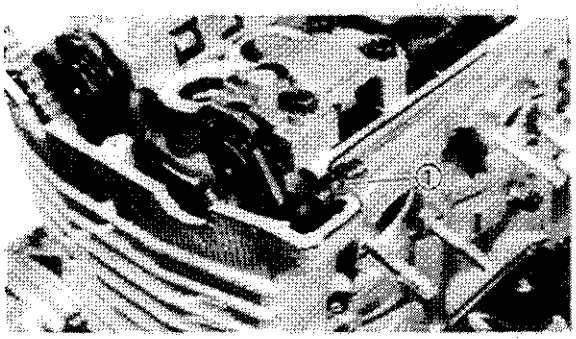
7. Loosen:
• Cap bolt ① (chain tensioner)

8. Remove:
• Chain tensioner ②

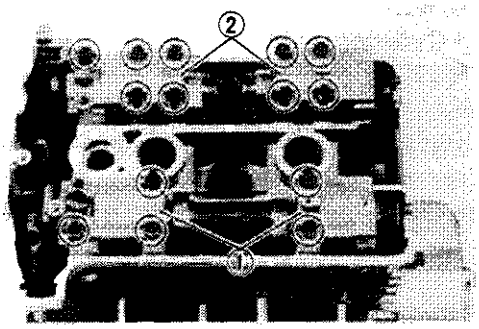


9. Remove:
• Cam sprockets ①

NOTE:
Fasten a safety wire ② to the timing chain to prevent it from falling into the crankcase.

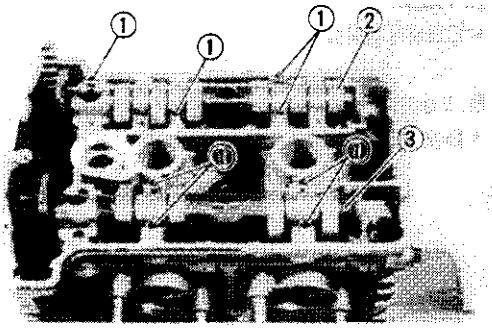


10. Remove:
• Chain guide ① (exhaust)

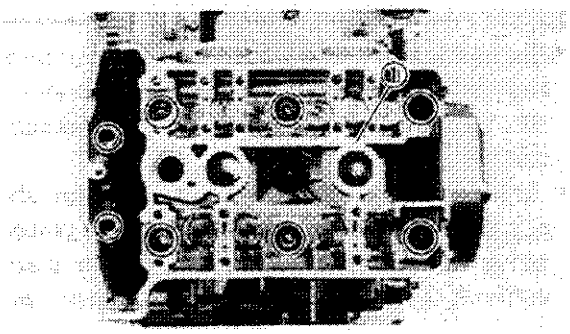


11. Remove:
• Camshaft caps (exhaust) ①
• Camshaft caps (intake) ②

NOTE:
The piston, cylinder head, cylinder etc. can be serviced without removing the camshaft caps and camshafts.

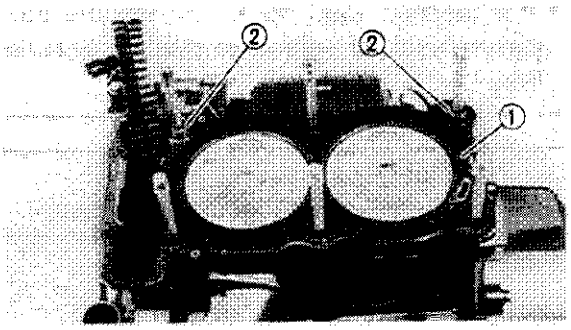


12. Remove:
• Dowel pins ①
• Intake camshaft ②
• Exhaust camshaft ③

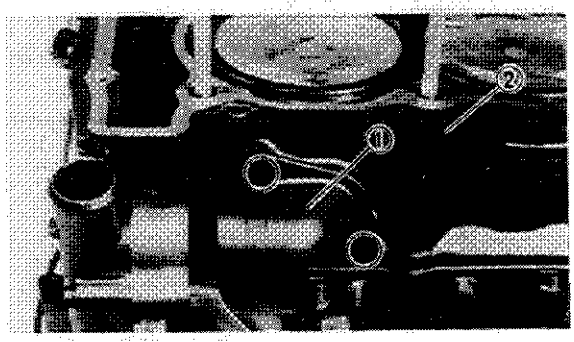


13. Remove:
• Cylinder head ①

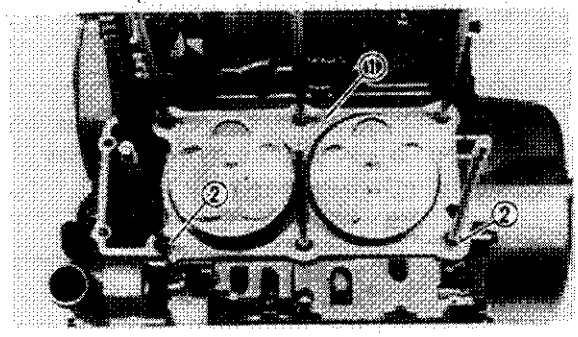
NOTE:
Working in a crisscross pattern, loosen the nuts 1/4 turn each. Remove them after all are loosened.



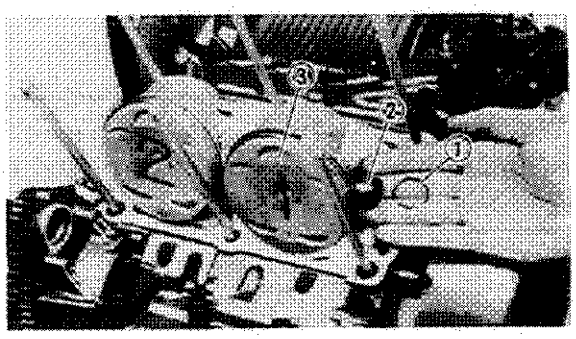
14. Remove:
• Gasket ① (cylinder head)
• Dowel pins ②



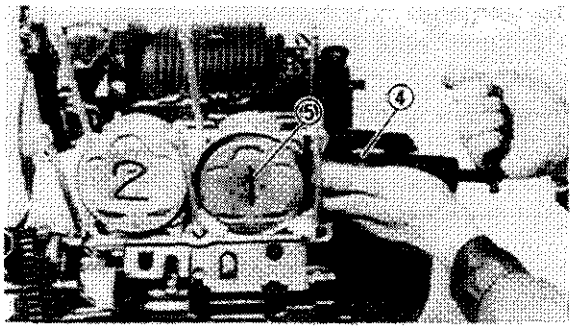
15. Remove:
• Pipe ①
• Cylinder ②



16. Remove:
• Gasket ① (cylinder)
• Dowel pins ②



17. Remove:
• Piston pin circlips ①
• Piston pins ②
• Pistons ③



NOTE:

- Before remove the piston pin circlip, cover the crankcase with a clean rag to prevent the circlip from falling into the crankcase cavity.
- Before remove the piston pin, deburr the clip grooved and pin hole area. If the piston pin groove is deburred and piston pin is still difficult to remove, use the piston pin puller ④.
- Put identification mark ⑤ on the each piston head for reference during reinstallation.

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

CAUTION:

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

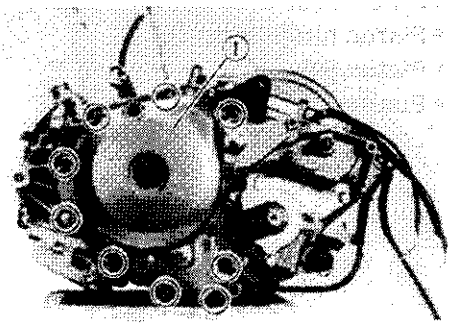
KB242003

ROTOR AND STARTER DRIVES

NOTE:

With the engine mounted, the AC magneto and starter drives can be maintained by removing the following part.

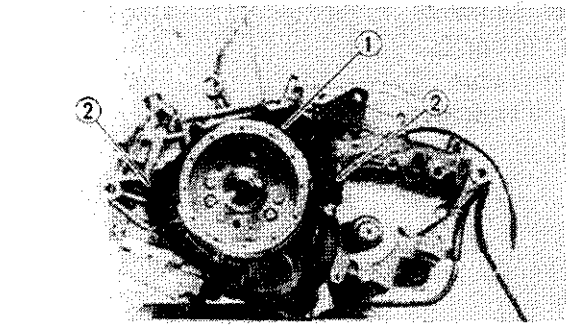
- Engine guard



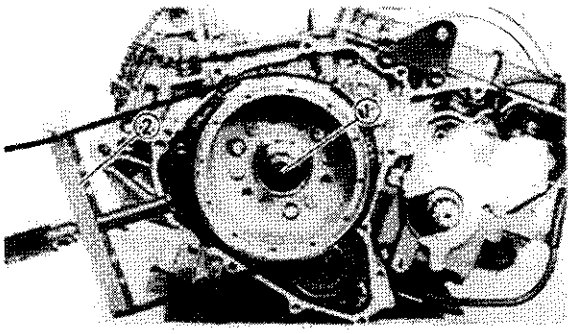
1. Remove:
- Crankcase cover ① (left)

NOTE:

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



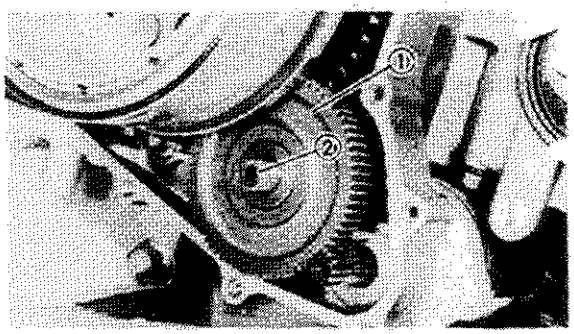
2. Remove:
- Gasket ① (crankcase cover)
- Dowel pins ②



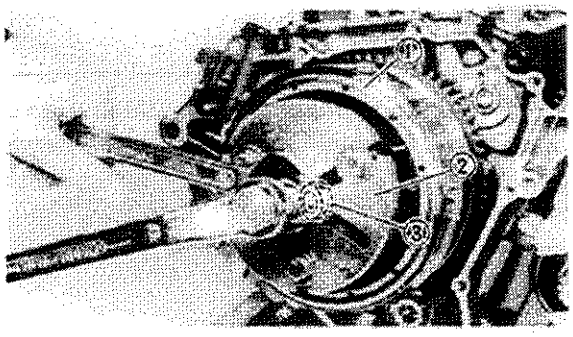
3. Remove:
- Bolt ① (rotor)

NOTE:
Loosen the bolt (rotor) while holding the rotor with the rotor holder ② .

	Rotor holder: **P/N YS-01880/90890-01701**



4. Remove:
- Starter idle gear ①
- Shaft (starter idle gear) ②

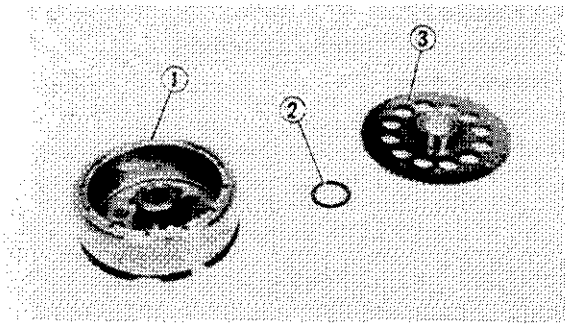


5. Remove:
- Rotor ①

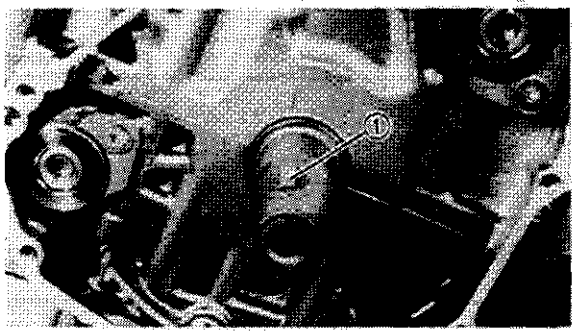
Use the rotor puller ② adapter ③ .

	Rotor puller: **P/N YU-33270/90890-01362** **Adapter:** **P/N YM-1382/90890-01382**

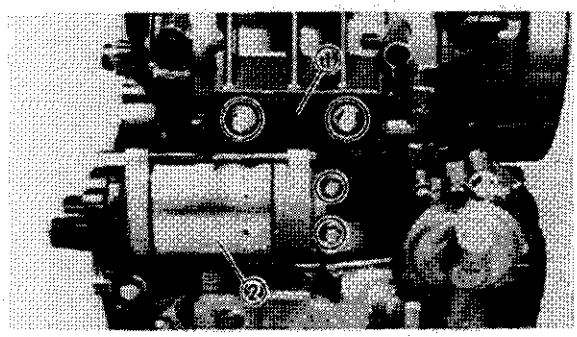
NOTE:
Tighten the tool holding bolts, but make sure that the tool body is parallel with the rotor. If necessary, one screw may be backed out slightly to level tool body.



6. Remove:
- Rotor ①
- Washer ②
- Wheel gear ③



7. Remove:
- Woodruff key ①



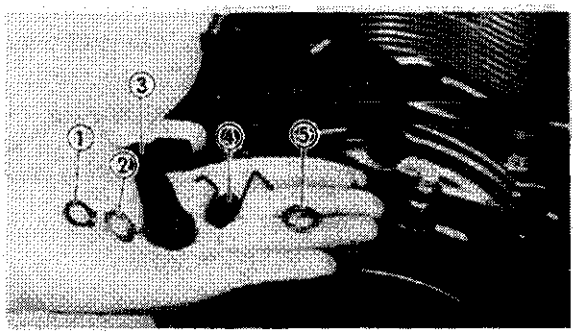
8. Remove:
- Engine stay ①
- Starter motor ②

KB242004

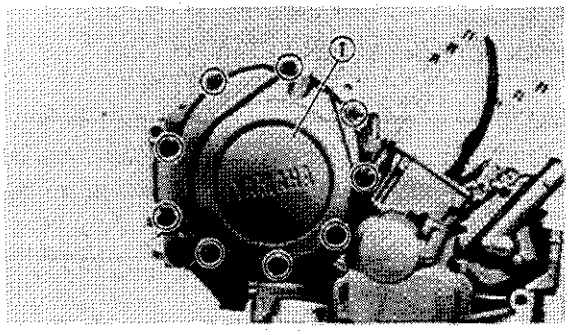
CLUTCH

NOTE:

With the engine mounted, the clutch can be maintained by removing the following parts.
- Clutch cable
- Engine guard

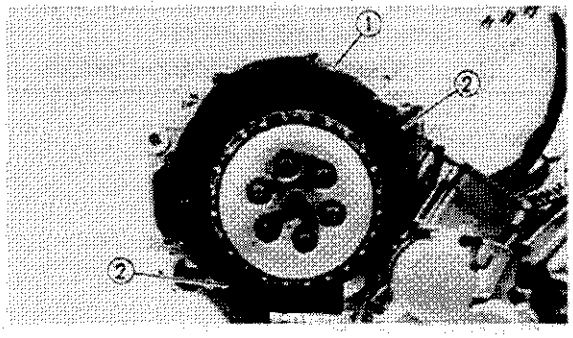


1. Remove:
- Circlip ①
- Washer ②
- Pull lever ③
- Return spring ④
- Washer ⑤

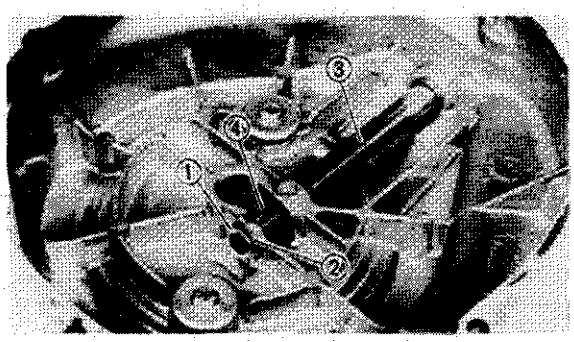


2. Remove:
• Crankcase cover ① (right)

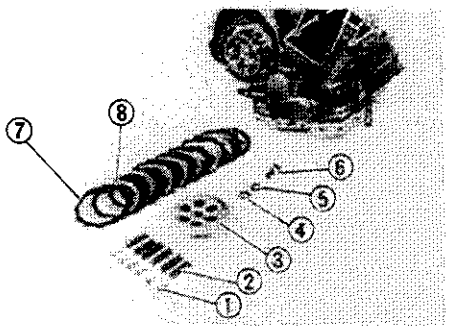
NOTE:
Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.



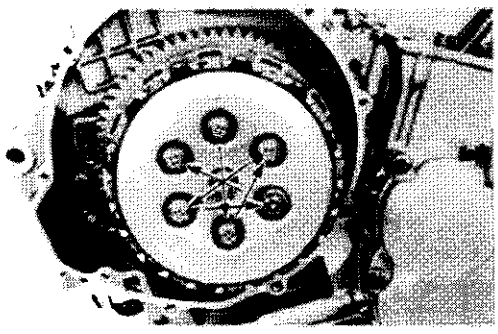
3. Remove:
• Gasket ① (crankcase cover)
• Dowel pins ②



4. Remove:
• Circlip ①
• Washer ②
• Pull lever axle ③
• Release pinion gear ④
(from crankcase cover)

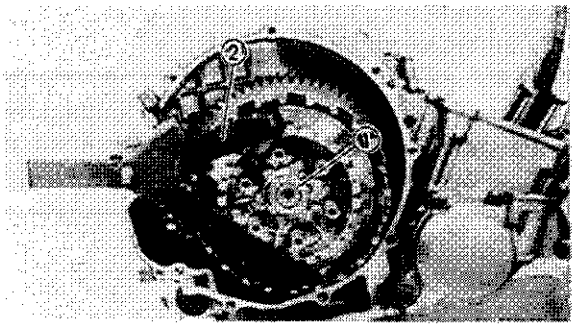


5. Remove:
• Bolts ①
• Clutch springs ②
• Pressure plate ③
• Washer ④
• Bearing ⑤
• Pull rod ⑥
• Friction plate ⑦
• Clutch plate ⑧



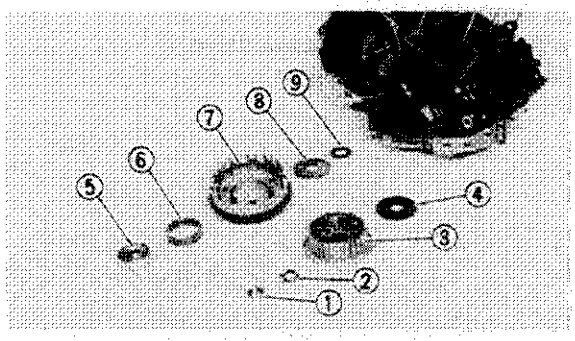
NOTE:
Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.

6. Straighten:
• Lock washer tab



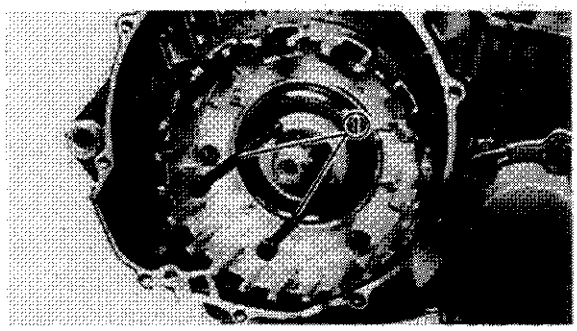
7. Loosen:
• Nut ① (clutch boss)

NOTE:
Loosen the nut (clutch boss) while holding the clutch boss with universal clutch holder ② .

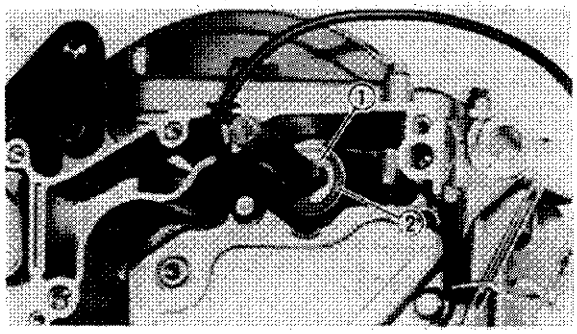


Universal clutch holder:
P/N YM-91042/90890-04086

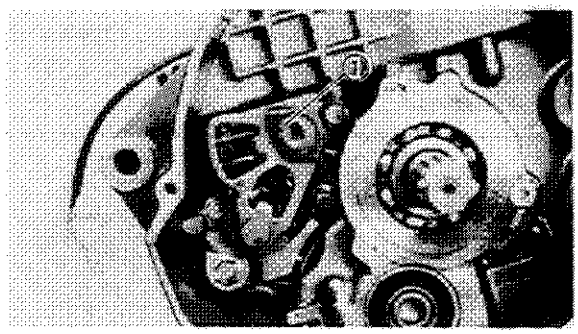
8. Remove:
• Nut ① (clutch boss)
• Lock washer ②
• Clutch boss assembly ③
• Thrust plate ④
• Spacer ⑤
• Bearing ⑥
• Clutch housing ⑦
• Thrust plate ⑧
• Collar ⑨



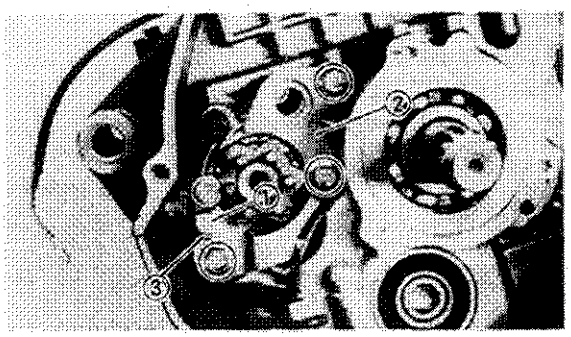
NOTE:
Install suitable screws ① [thread diameter is 6 mm] into the spacer, then remove the spacer by pulling on the screws.



9. Remove:
• Circlip ①
• Washer ②



10. Remove:
• Shift shaft ①



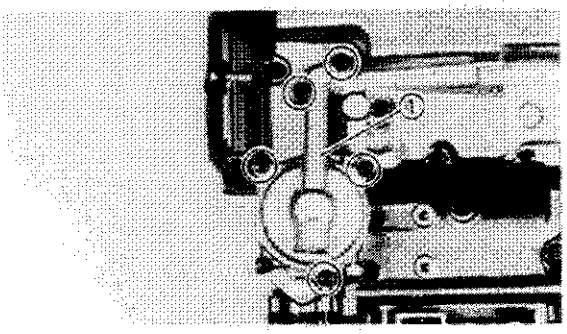
11. Remove:
- Stopper lever ①
- Bearing retainer ②
- Return spring ③

KB242005

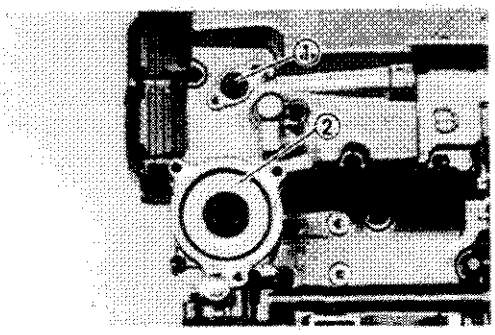
OIL PAN, OIL FILTER AND OIL STRAINER

NOTE:

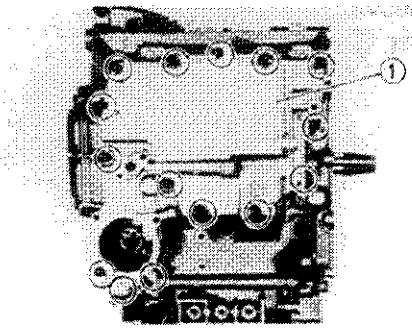
With the engine mounted, the oil pan and oil strainer can be maintained by removing the following part.
- Engine guard
- Exhaust pipe



1. Remove:
- Oil filter cover ①



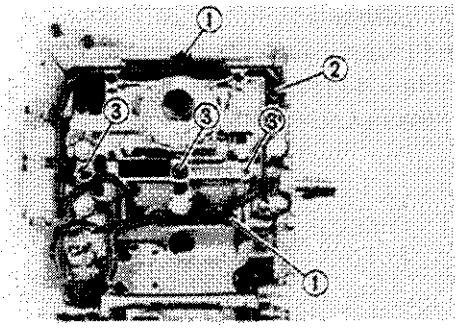
2. Remove:
- Collar ① (with O-ring)
- Oil filter ②



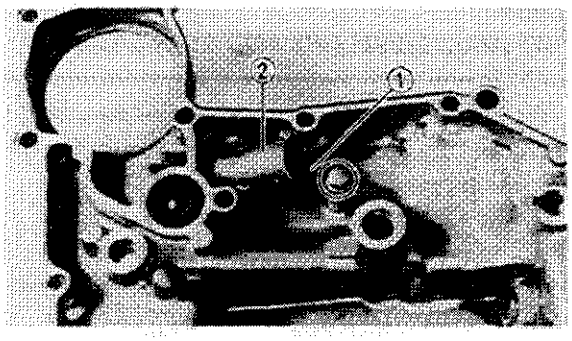
3. Remove:
- Oil pan ①

NOTE:

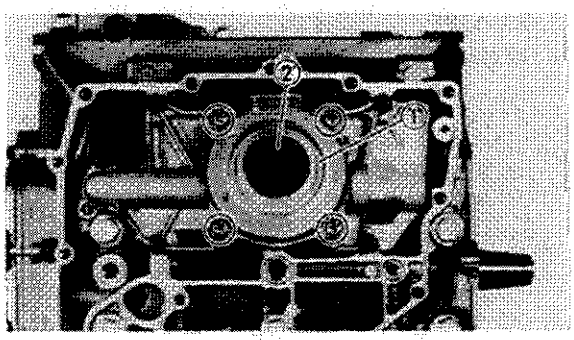
Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.



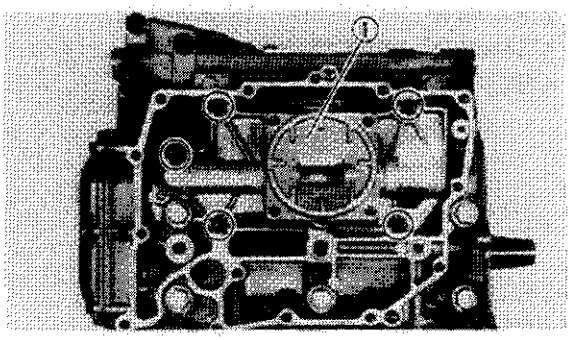
4. Remove:
- Dowel pins ①
- Gasket ② (oil pan)
- Collars ③ (with O-ring)



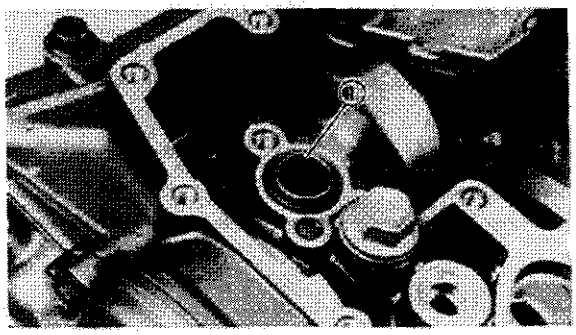
5. Remove:
- Holder ① (relief valve)
- Relief valve ②
  (from oil pan)



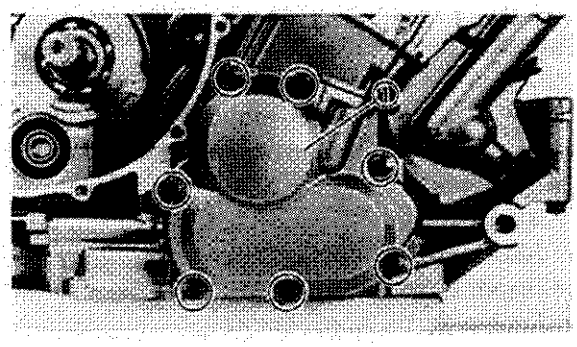
6. Remove:
- Cover (oil strainer) ①
- Oil strainer ②



7. Remove:
- Oil strainer housing ①



8. Remove:
- Collar ① (with O-ring)



KB242006

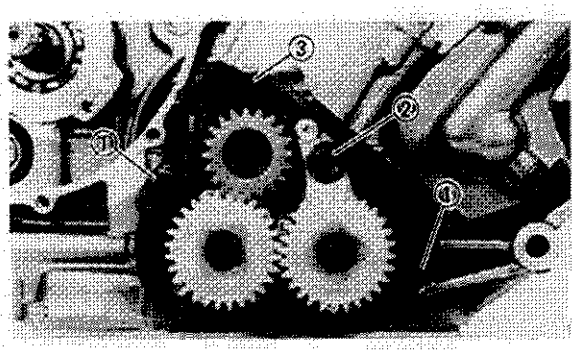
OIL PUMPS AND TIMING CHAIN

NOTE:

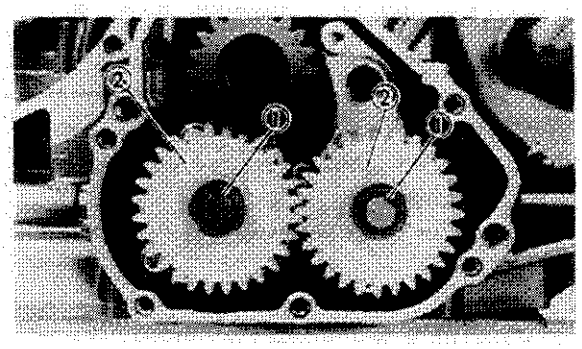
With the engine mounted, the oil pump can be maintained by removing the following parts.

- Engine guard

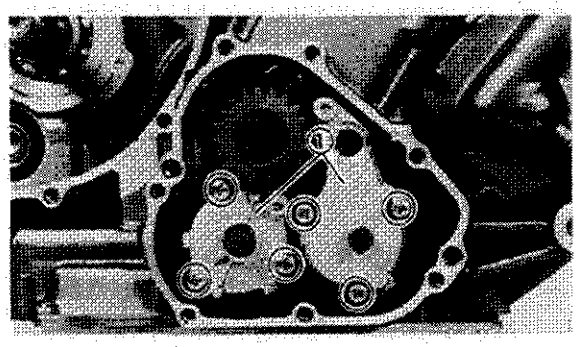
1. Remove:
   - Oil pump cover ①



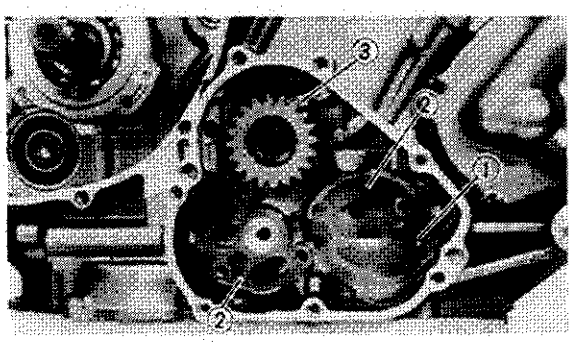
2. Remove:
   - Dowel pins ①
   - Collar ② (with O-ring)
   - Gasket ③ (oil pump cover)



3. Remove:
   - Circlips ①
   - Oil pump gears ②



4. Remove:
   - Oil pumps ①



5. Remove:
   - Dowel pin ①
   - Gaskets ② (oil pumps)
   - Timing chain ③

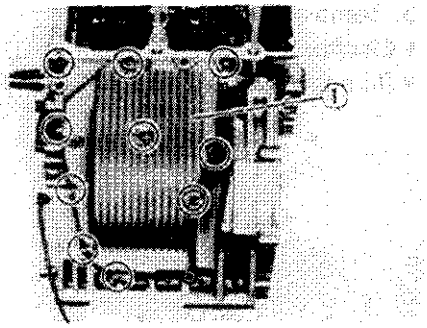
KB242007

BALANCER WEIGHTS

NOTE:

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

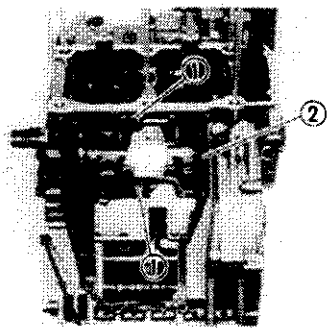
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank
- Engine guard
- Exhaust pipes
- Crankcase cover (left)
- AC magneto rotor
- Starter drives
- Oil filter
- Oil pan
- Oil strainer housing



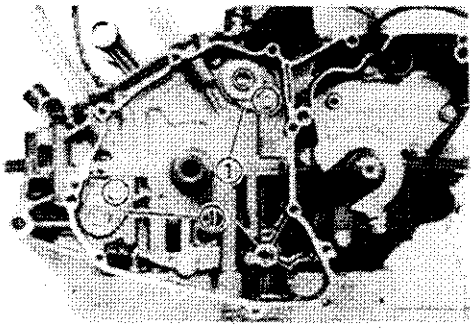
1. Remove:
- Crankcase cover ① (upper)

NOTE:

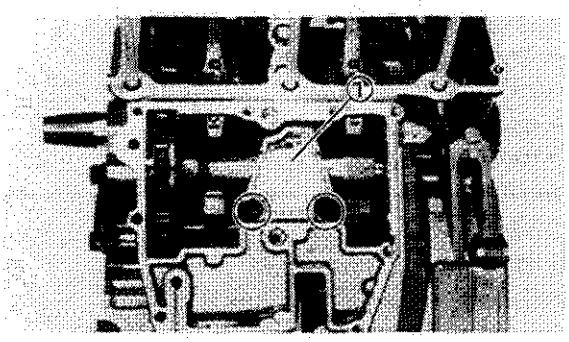
Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.



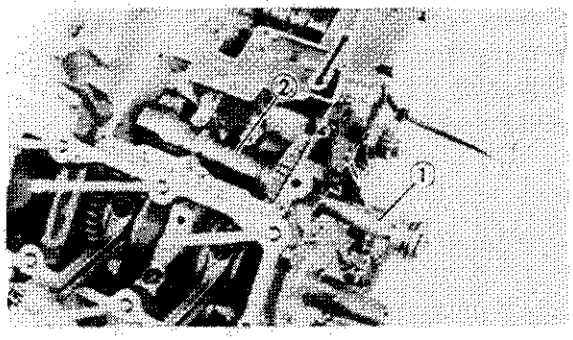
2. Remove:
- Dowel pins ①
- Gasket ② (crankcase cover)



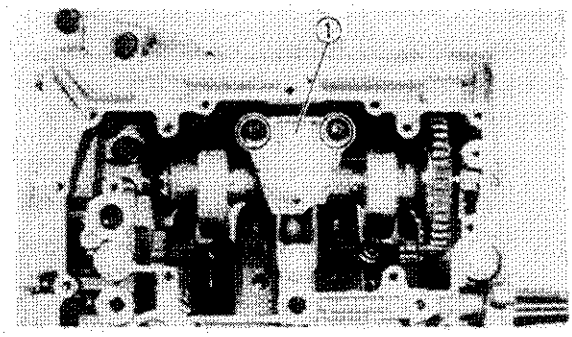
3. Remove:
- Balancer shaft holders ①
  Use the torx wrench (T30).



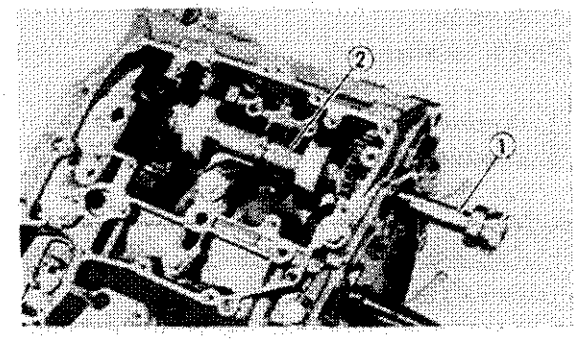
4. Remove:
- Balancer holder ① (rear)
- Dowel pins



5. Remove:
- Balancer shaft ① (rear)
- Balancer weight ② (rear)



6. Remove:
- Balancer holder ① (front)
- Dowel pins



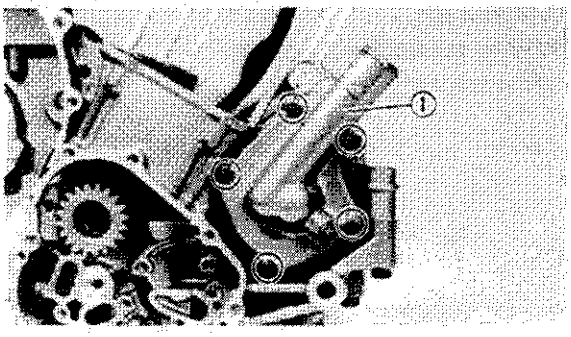
7. Remove:
- Balancer shaft ① (front)
- Balancer weight ② (front)

KB242008

WATER PUMP

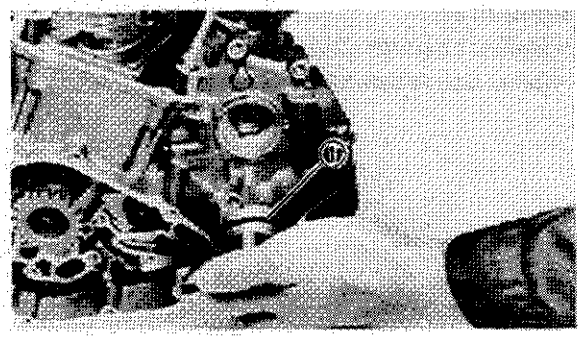
NOTE:

With the engine mounted, the water pump can be maintained by removing the following parts.
- Engine guard
- Exhaust pipe
- Oil filter cover
- Oil pan

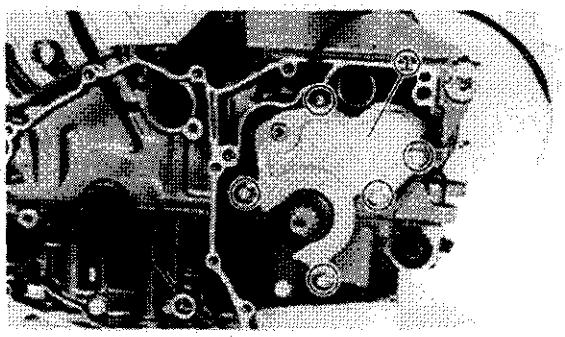


- Oil strainer housing
- Crankcase cover (left)
- AC magneto rotor
- Balancer shaft (front)
- Balancer weight (front)

1. Remove:
- Water pump cover ①
- O-ring (water pump cover)



2. Remove:
- Water pump assembly ①
- Washer
- Water pump gear

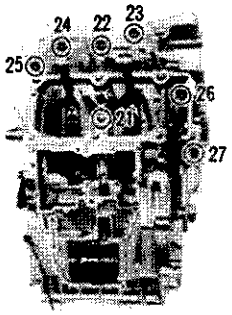


KB242009

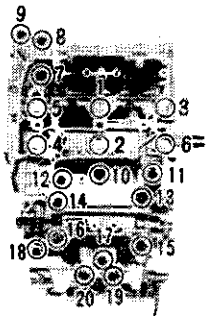
CRANKCASE (LOWER)

1. Remove:
- Plate ① (oil seal holder)

A



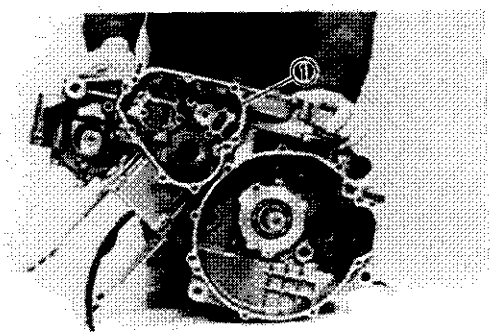
B



2. Remove:
- Bolts (crankcase)

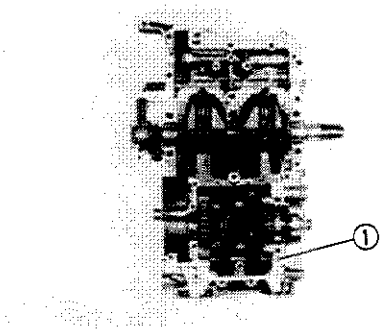
A Crankcase (upper)
B Crankcase (lower)

NOTE:
- Loosen the bolts 1/4 turn each and remove them after all are loosened.
- Loosen the bolts starting with the highest numbered one.
- The embossed numbers in the crankcase (lower) designate the tightening sequence.

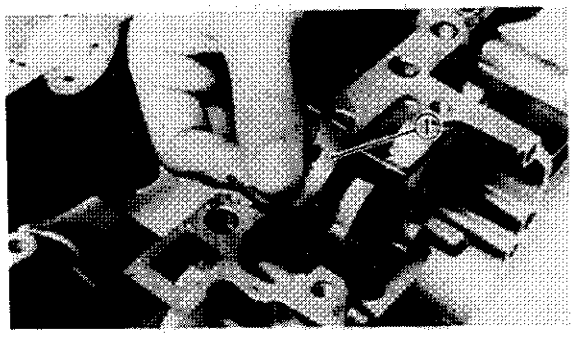


3. Remove:
• Lower crankcase ①

CAUTION:
Use a soft hammer to tap on the case half. Tap only on reinforced portions of the case. Do not tap on the gasket mating surface. Work slowly and carefully. Make sure that the case halves separate evenly.



4. Remove:
• Dowel pin ①

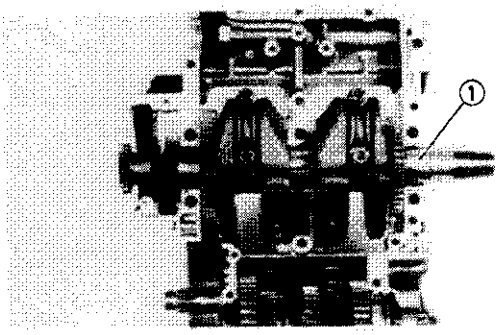


5. Remove:
• Main journal bearing ①
(from lower crankcase)

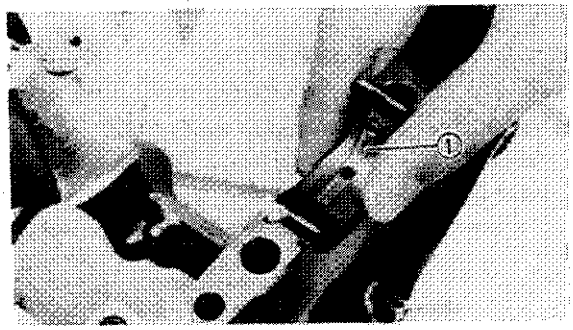
NOTE:
Identify each plane bearing position very carefully so that it can be reinstalled in its original place.

KB242010

CRANKSHAFT

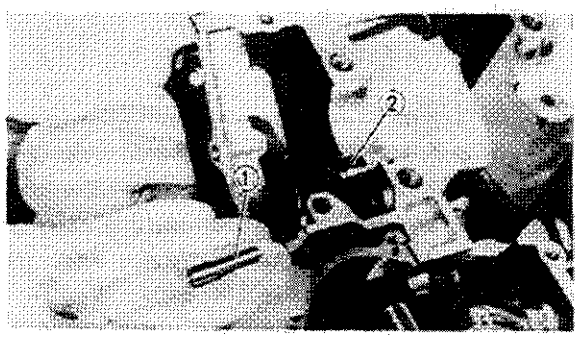


1. Remove:
• Crankshaft assembly ①

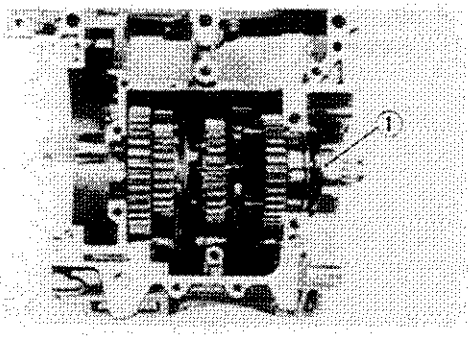


2. Remove:
• Main journal bearing ①
(from upper crankcase)

NOTE:
Identify each plane bearing position very carefully so that it can be reinstalled in its original place.



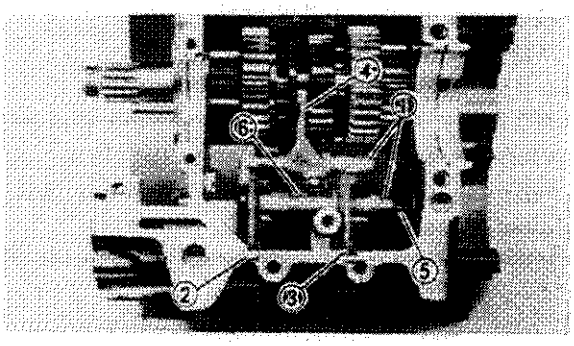
3. Remove:
- Pin ①
- Chain guide ② (intake)



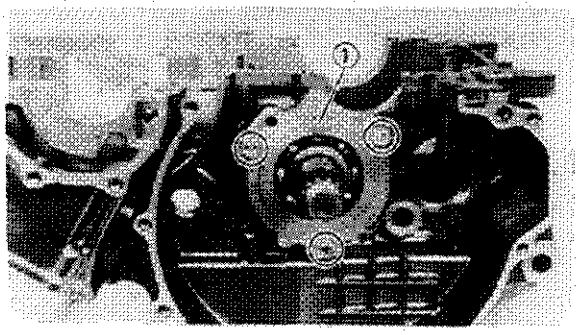
KB242013

TRANSMISSION, SHIFT CAM AND SHIFT FORK

1. Remove:
- Drive axle assembly ①

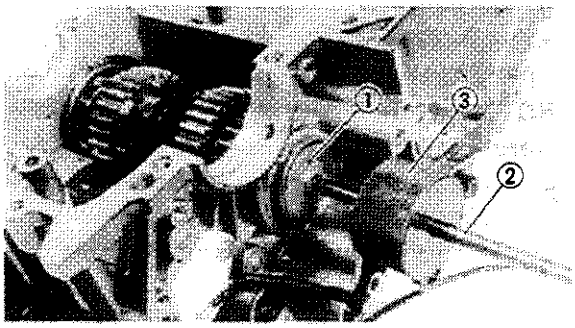


2. Remove:
- Guide bars ①
- Shift fork "R" ②
- Shift fork "L" ③
- Shift fork "C" ④
- Spring ⑤
- Shift cam ⑥



3. Remove:
- Bearing retainer ①

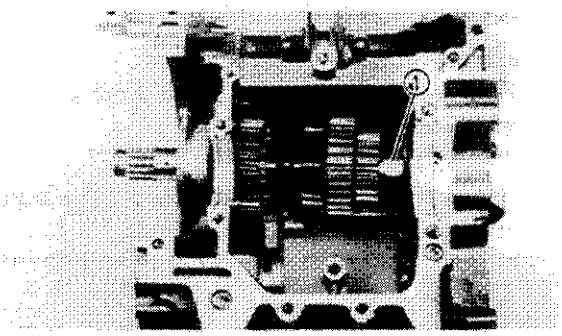
  Use the torx wrench (T30)



4. Remove:
- Plug ① (main axle)

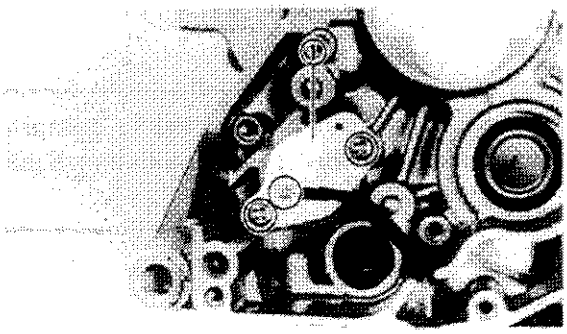
NOTE:

Install the slide hammer bolt (M6) ② and weight ③ into the plug, then remove the plug by pulling.



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

5. Remove:
• Main axle assembly ①

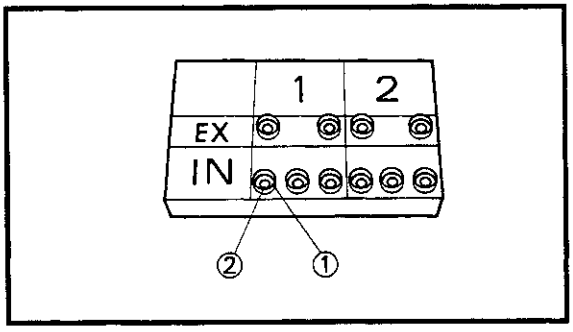


6. Remove:
• Neutral switch ①

KB242011

VALVE

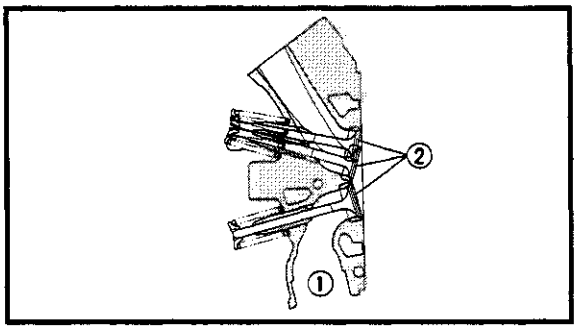
NOTE:
Before removing the internal parts (valve, valve spring, valve seat etc.) of the cylinder head.
The valve sealing should be checked.



1. Remove:
• Lifters ①
• Pads ②

NOTE:
Identify each lifter and pad position very carefully so that it can be reinstalled in its original place.

2. 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".

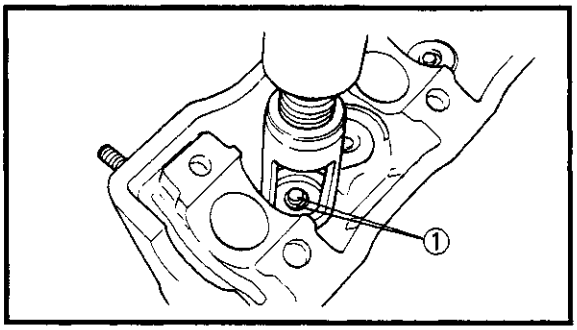


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Checking steps:

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

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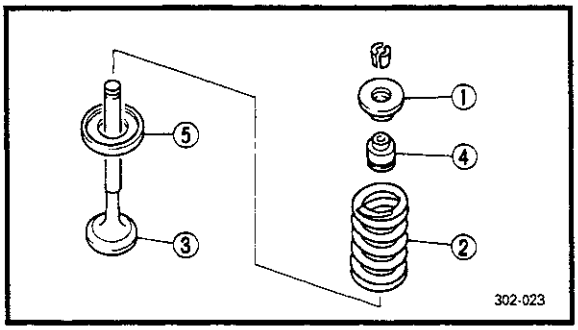


3. Remove:
- Valve cotters ①

NOTE:

Remove the valve cotters while compressing the valve spring with the valve spring compressor.

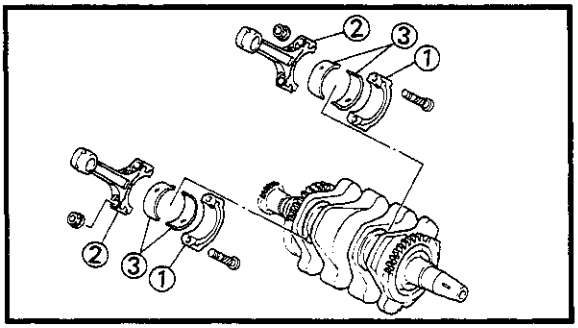
	Valve spring compressor: **P/N YM-04019/90890-04019** **Attachment:** **P/N YM-4114/90890-04114**



4. Remove:
- Valve retainers ①
- Valve spring ②
- Valve ③
- Oil seal ④
- Spring seat ⑤

NOTE:

Identify each part position very carefully so that it can be reinstalled in its original place.



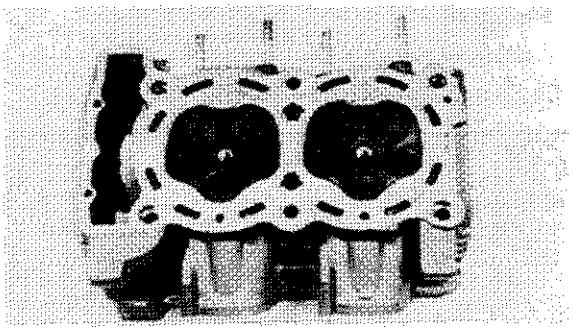
KB242012

CONNECTING RODS

1. Remove:
- Connecting rod caps ①
- Connecting rod ②
- Crank pin bearing ③

NOTE:

Identify each part position very carefully so that it can be reinstalled in its original place.



KB243001

INSPECTION AND REPAIR

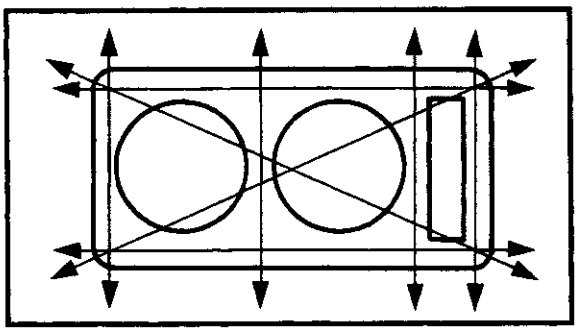
CYLINDER HEAD

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

NOTE:

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

2. Inspect:
- Cylinder head
  Scratches/Damage → Replace.
- Water jacket
  Crust of minerals/Rust → Eliminate.



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

	Cylinder head warpage: **〈Limit: 0.03 mm (0.0012 in)〉**

4. Resurface:
- Cylinder head

****

Resurfacement steps:

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

NOTE:

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

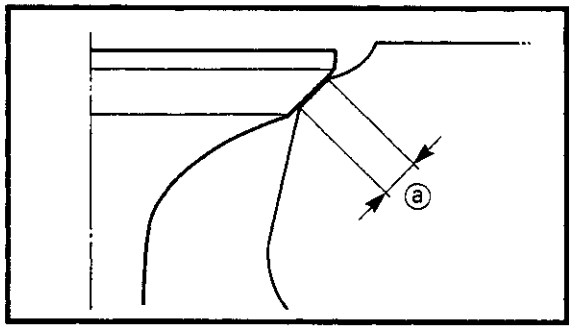
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KB243002

VALVE SEAT

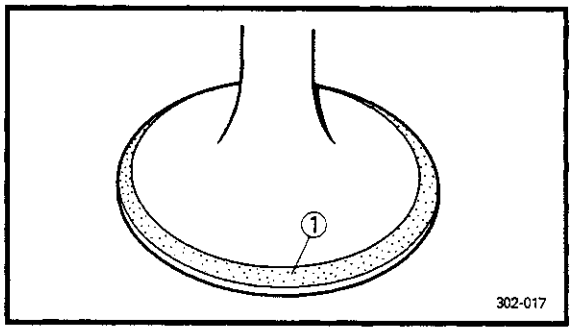
1. Eliminate:
- Carbon deposit
  (from valve face and valve seat)

2. Inspect:
- Valve seat
  Pitting/Wear → Refuse the valve seat.



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

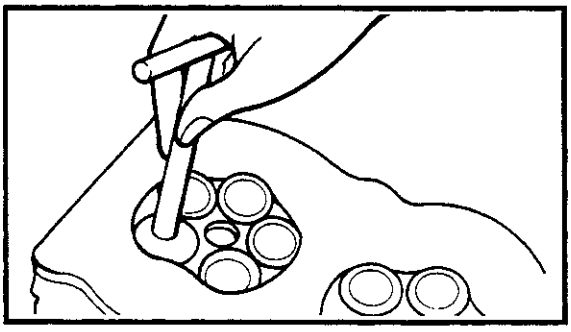
	Valve seat width: **Intake** **0.9~1.1 mm (0.035~0.043 in)** **Exhaust** **0.9~1.1 mm (0.035~0.043 in)**



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

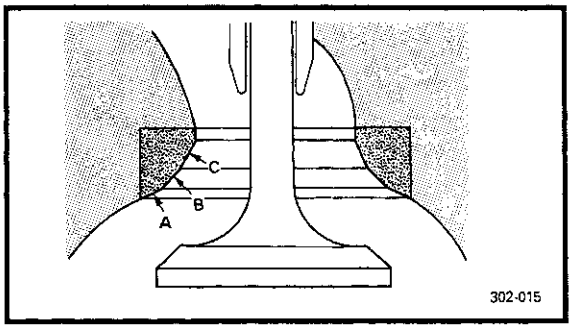
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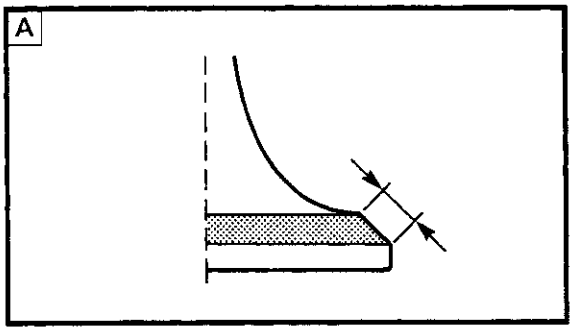
4. Reface:
• Valve seat
Use a 30°,45° and 60° valve seat cutter.

	Valve seat cutter set: **P/N YM-91043-C**

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



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

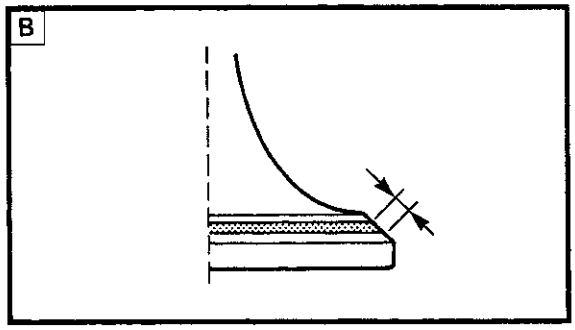


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Refacing steps:

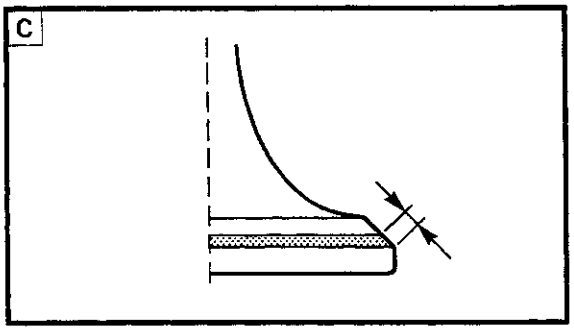
A Valve seat is centered on valve face but it is too wide.

Valve seat cutter set		Desire result
Use lightly	30° cutter 60° cutter	To reduce valve seat width to 1.0 mm (0.039 in).



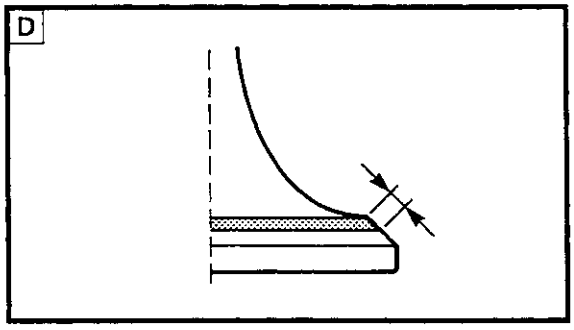
B Valve seat is in the middle of the face but it is too narrow.

Valve seat cutter set		Desired result
Use	45° cutter	To achieve a uniform valve seat width of 1.0 mm (0.039 in).



C Valve seat is too narrow and it is near valve margin.

Valve seat cutter set		Desired result
Use	First: 30° cutter Second: 45° cutter	To center the seat and to achieve its width of 1.0 mm (0.039 in).



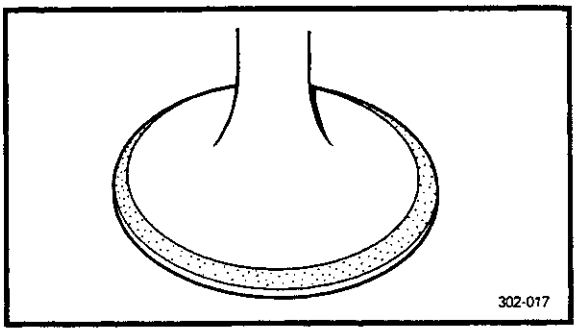
D Valve seat is too narrow and it is located near the bottom edge of the valve face.

Valve seat cutter set		Desired result
Use	First: 60° cutter Second: 45° cutter	To center the seat and increase its width.

****

5. Lap:
- Valve face
- Valve seat

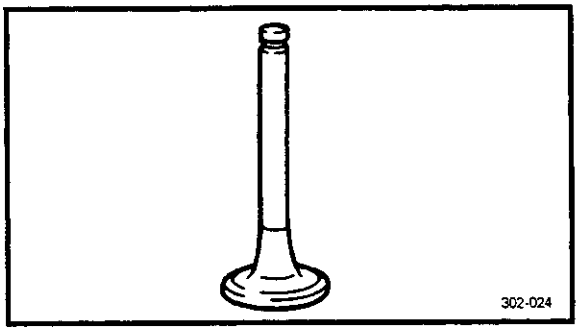
NOTE:
After refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.



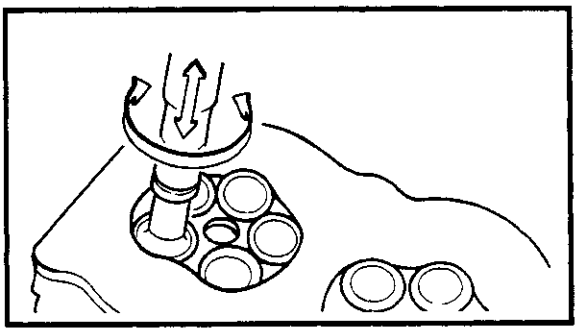
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Lapping steps:
- Apply a coarse lapping compound to the valve face.

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.

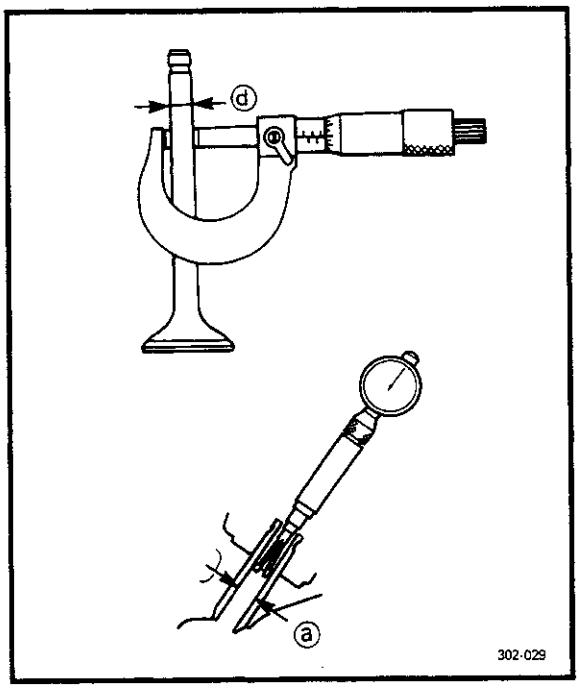
- Apply fine lapping compound to the valve face and repeat the above steps.

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

- Apply a 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.

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KB243003

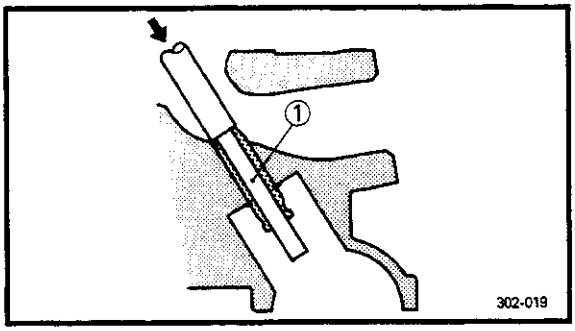
VALVE AND VALVE GUIDE

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:
Intake:
0.01~0.04 mm
(0.0004~0.0015 in)
〈Limit: 0.08 mm (0.0031 in)〉
Exhaust:
0.03~0.05 mm
(0.001~0.002 in)
〈Limit: 0.10 mm (0.0039 in)〉



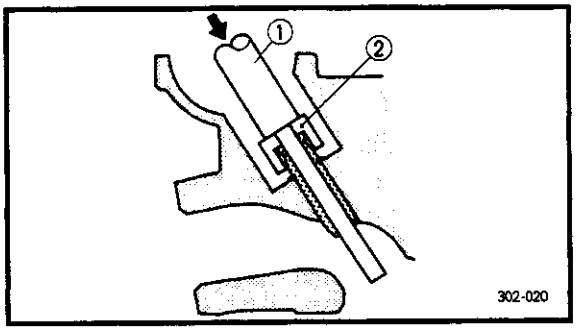
2. Replace:
- Valve guide

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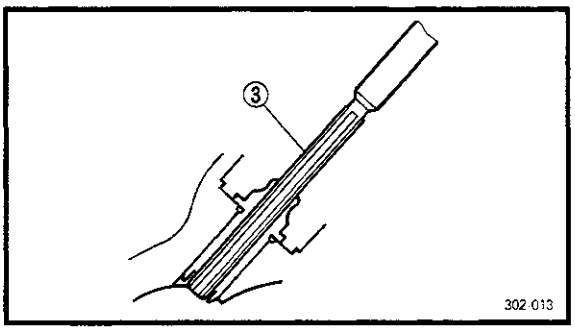
Replacement steps:

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.



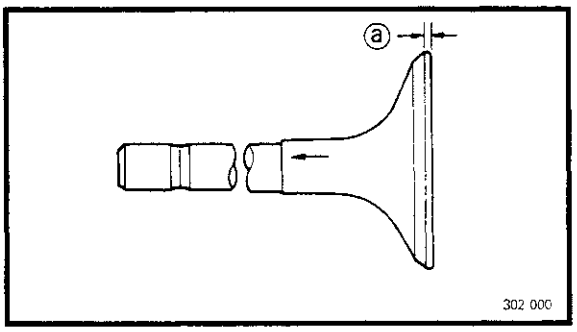
Valve guide remover (5.5 mm):
P/N YM-01122
Valve guide installer (5.5 mm):
P/N YM-4015
Valve guide reamer (5.5 mm):
P/N YM-01196
Valve guide remover and installer set (5.5 mm):
P/N 90890-04016

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NOTE:
Reface the valve seat after replacing the valve guide.

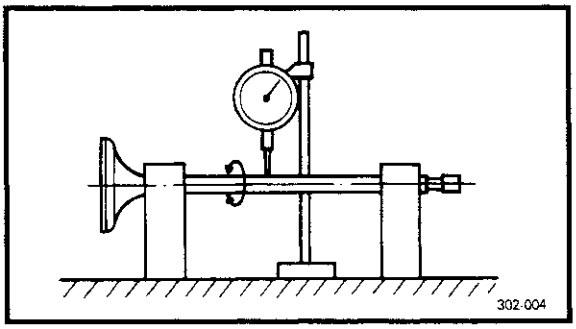
3. Eliminate:
- Carbon deposit
  (from valve face)

4. Inspect:
- Valve face
  Pitting/Wear → Grind the face.
- Valve stem end
  Mushroom sharp or diameter larger than rest of stem → Replace.



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

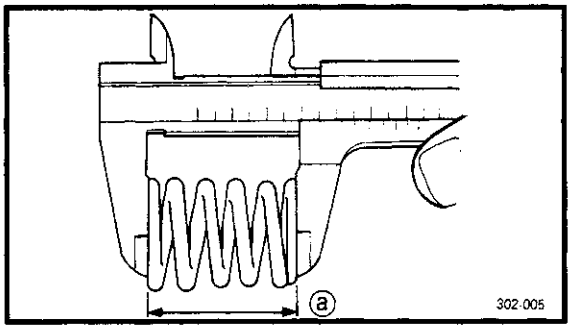
Margin thickness:
〈Limit: 0.8 mm (0.032 in)〉



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

Runout:
〈Limit: 0.01 mm (0.0004 in)〉

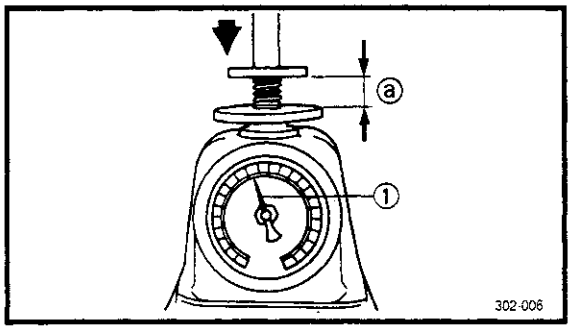
NOTE:
- Always replace the guide if the valve is replaced.
- Always replace the oil seal if the valve is removed.



KB243004

VALVE SPRING

1. Measure:
- Free length ⓐ (valve spring)
  Out of specification → Replace.

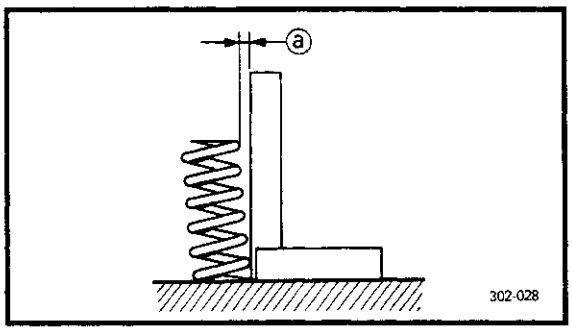


Free length (valve spring):
Intake: 37.29 mm (1.47 in)
Exhaust: 37.29 mm (1.47 in)

2. Measure:
- Compressed force (valve spring) ①
  Out of specification → Replace.

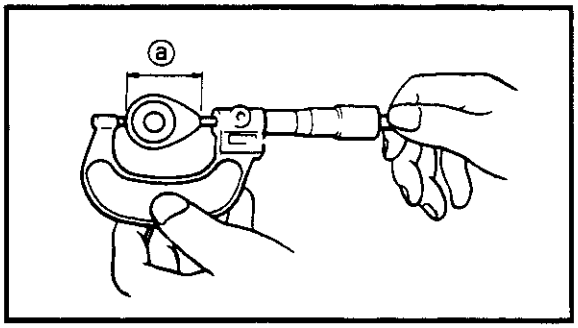
ⓐ Installed length

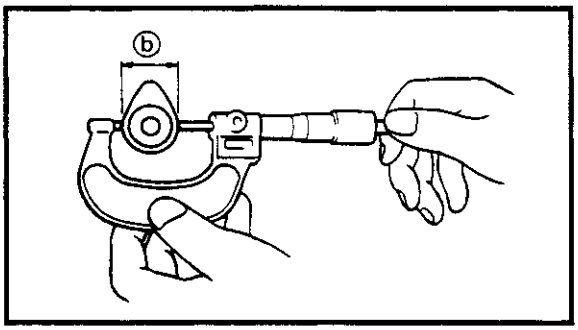
Compressed force:
Intake
10.0~11.6 kg (22.05~22.57 lb)
at 30.39 mm (1.2 in)
Exhaust
10.0~11.6 kg (22.05~22.57 lb)
at 30.39 mm (1.2in)



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

Spring tilt:
〈Limit: 1.7 mm (0.067 in)〉





KB243005

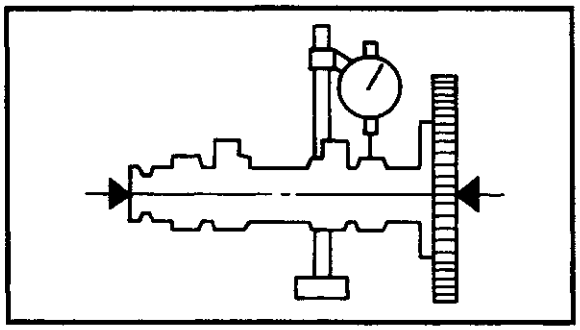
CAMSHAFT

1. Inspect:
- Cam lobs
  Pitting/Scratches/Blue discoloration → Replace.

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

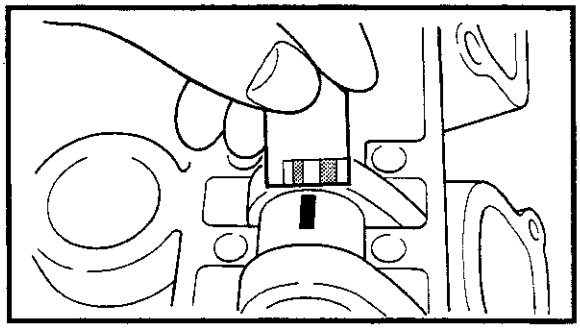
Cam lobes length:
Intake
〈Limit: ⓐ 35.6 mm (1.4 in)〉
〈Limit: ⓑ 27.85 mm (1.1 in)〉

Cam lobes length:
Exhaust
〈Limit: ⓐ 35.85 mm (1.41 in)〉
〈Limit: ⓑ 27.85 mm (1.1 in)〉



3. Measure:
- Runout (camshaft)
  Out of specification → Replace.

Runout (camshaft):
〈Limit: 0.03 mm (0.0012 in)〉



4. Measure:
- Camshaft-to-cap clearance
  Out of specification → Measure bearing diameter (camshaft).

Camshaft-to-cap clearance:
0.020~0.054 mm
(0.0008~0.0021 in)

****

Measurement steps:

- Install the camshaft onto the cylinder head.
- Position a strip of Plastigauge® onto the camshaft.
- Install the dowel pins and camshaft caps.

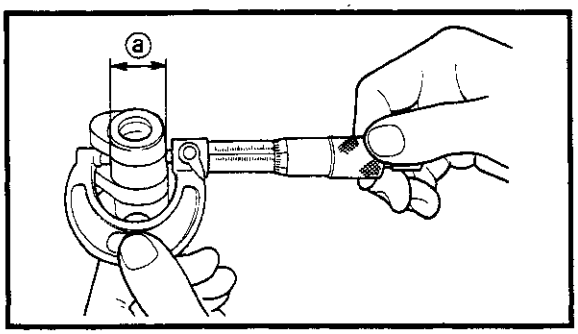
	Bolt (camshaft cap): **10 Nm (1.0 m · kg, 7.2 ft · lb)**

NOTE:

- Tighten the camshaft caps in a crisscross pattern from innermost to outer.
- Do not turn the camshaft when measuring clearance with the Plastigauge®.

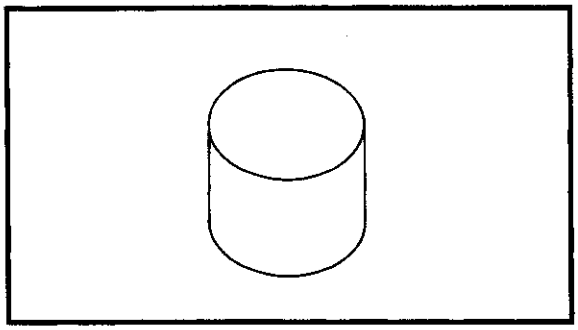
- Remove the camshaft caps and measure width of the Plastigauge®.

****



5. Measure:
- Bearing diameter ⓐ (camshaft)
  Out of specification → Replace camshaft.
  Within specification → Replace cylinder head.

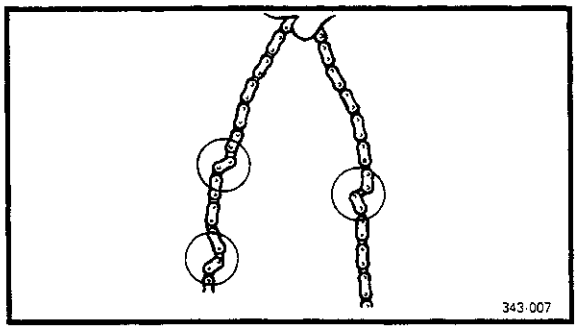
	Bearing diameter (camshaft): **24.967~24.980 mm** **(0.9830~0.9835 in)**



KB243006

VALVE LIFTER

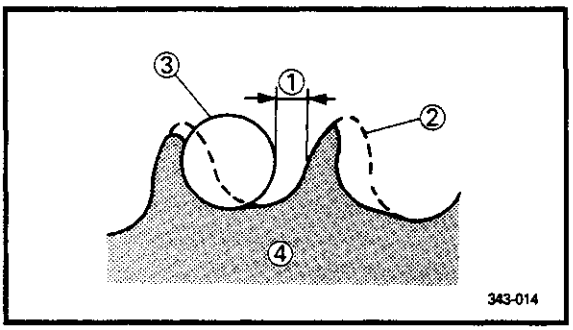
1. Inspect:
- Valve lifters
  Scratches/Damage → Replace both lifters and camshaft case.



KB243007

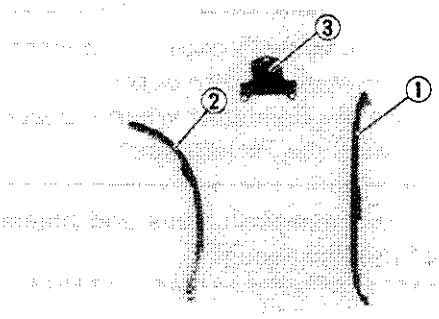
TIMING CHAIN, SPROCKET AND CHAIN GUIDE

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

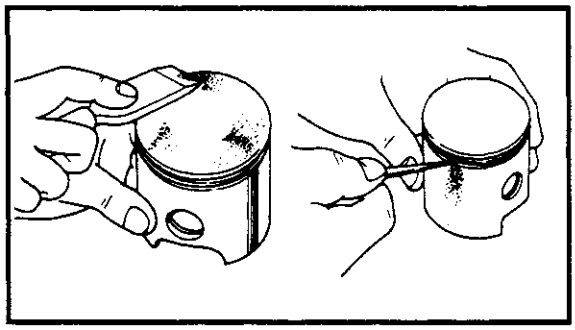


2. Inspect:
• Cam sprocket
Wear/Damage → Replace cam sprocket and timing chain as a set.

① 1/4 tooth
② Correct
③ Roller
④ Sprocket

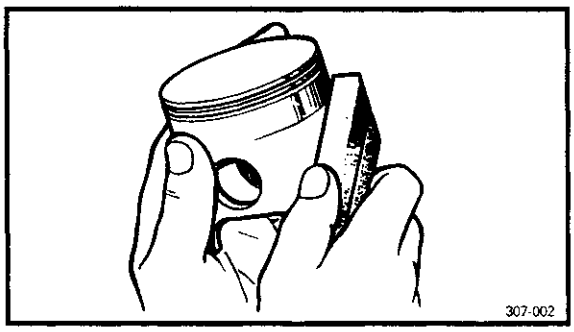


3. Inspect:
• Chain guide ① (exhaust side)
• Chain guide ② (intake side)
• Chain guide ③ (upper)



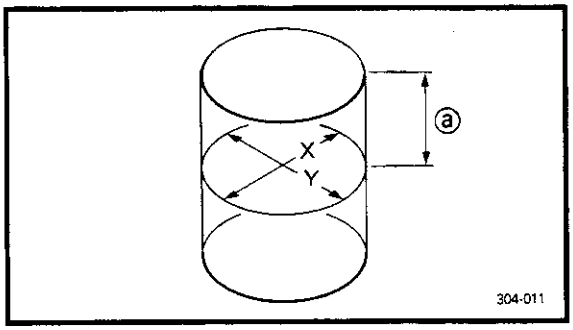
KB243008
CYLINDER AND PISTON
1. Eliminate:
• Carbon deposits
(from the piston crown and ring grooves.)

2. Inspect:
• Piston wall
Wear/Scratches/Damage → Replace.



3. Eliminate:
• Score marks and lacquer deposits
(from the side of the piston.)
Use a 600~800 grit wet sandpaper.
NOTE:
Sand in a crisscross pattern. Do not sand excessively.

4. Inspect:
• Cylinder water jacket
Crust of minerals/Rust → Remove.
• Cylinder wall
Wear/Scratches → Rebore or replace.



5. Measure:
• Piston-to-cylinder clearance

****

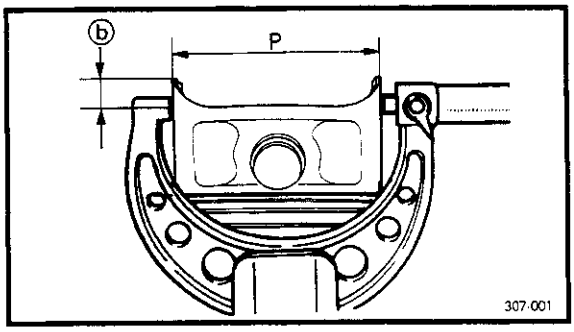
Measurement steps:
First steps
● Measure the cylinder bore "C" with a cylinder bore gauge.
ⓐ 40 mm (1.6 in) from the cylinder top

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

Cylinder bore "C":
89.500~89.505 mm
(3.5236~3.5238 in)
〈Limit: 89.6 mm (3.528 in)〉

C=(X+Y)/2

● If out of the 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.
ⓑ 4.5 mm (0.177 in) from the piston bottom edge

Piston skirt diameter "P":
89.420~89.435 mm
(3.520~3.521 in)

● If out of the specification, replace the piston and piston ring 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:
0.065~0.085 mm
(0.0026~0.0033 in)
〈Limit: 0.15 mm (0.006 in)〉

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

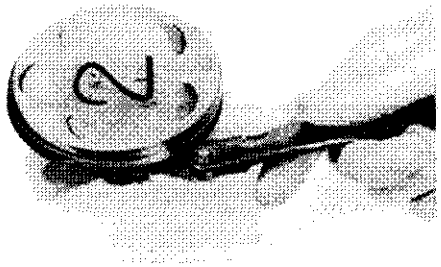
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KB243009

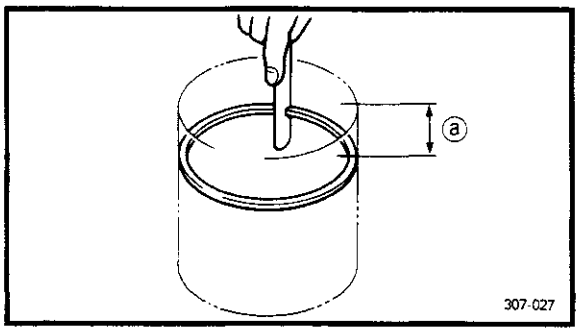
PISTON RING

1. Measure:
- Side clearance
  Out of specification → Replace piston and piston ring as a set.

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



Side clearance:
Top ring
0.035~0.07 mm
(0.0014~0.0028 in)
2nd ring
0.02~0.055 mm
(0.0008~0.0022 in)



2. Position:
- Piston ring
  (into the cylinder)

NOTE:
Push the ring with the piston crown so that the ring will be at a right angle to cylinder bore.

ⓐ 20 mm (0.8 in)

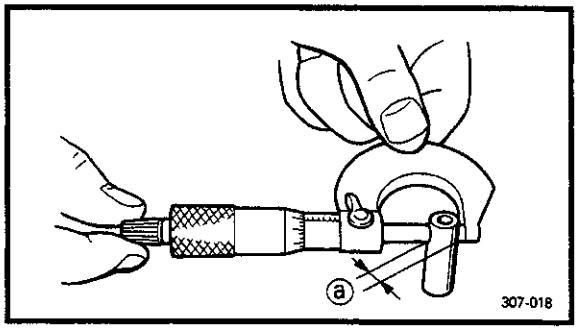
3. Measure:
- End gap
  Out of specification → Replace.

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

End gap:
Top ring
0.3~0.45 mm(0.012~0.018 in)
2nd ring
0.3~0.45 mm(0.012~0.018 in)
Oil ring
0.2~0.7 mm(0.008~0.028 in)

KB243010
PISTON PIN

1. Inspect:
• Piston pin
Blue discoloration/groove → Replace, then inspect lubrication system.

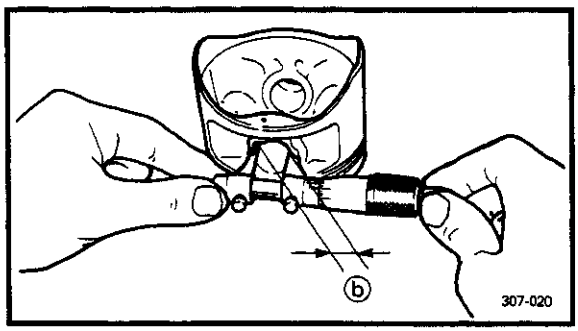


2. Measure:
• piston pin-to-piston clearance

****

Measurement steps:
● Measure the piston pin outside diameter ⓐ.
If out of specification, replace the piston pin.

Outside diameter (piston pin):
19.991~20.000 mm
(0.7870~0.7874 in)



● Measure the piston inside diameter ⓑ.
● Calculate the piston pin-to-piston clearance with following formula:

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

● If out of specification, replace the piston.

Piston pin-to-piston clearance:
0.002~0.022 mm
(0.0001~0.0008 in)
〈Limit:0.07 mm (0.003 in)〉

****

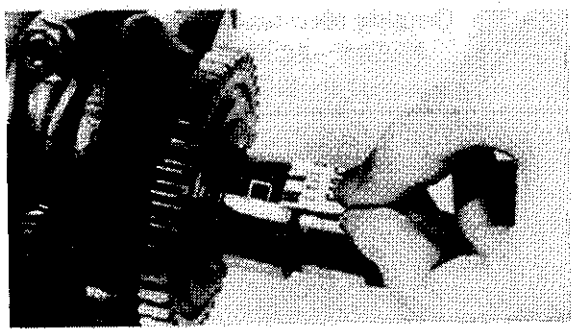
KB243011

CRANKSHAFT AND CONNECTING ROD

1. Measure:
• Runout (crankshaft)
Out of specification → Replace.

Runout:
〈Limit: 0.02 mm (0.0008 in)〉

2. Inspect:
• Main journal surfaces
• Crank pin surfaces
• Bearing surfaces
Wear/Scratches → Replace.



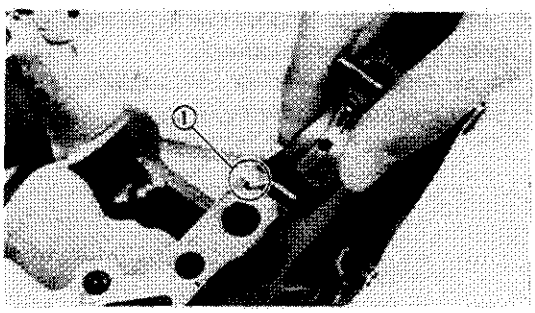
3. Measure:
• Oil clearance (main journal)
Out of specification → Replace bearing.

Oil clearance:
0.020~0.038 mm
(0.0007~0.0015 in)

****

Measurement steps:

CAUTION:
Do not interchange the bearings. They must be installed in their original positions, or the correct oil clearance may not be obtained causing engine damage.



- Clean the bearings, main journals and bearing portions of the crankcase.
- Place the crankcase (upper) on a bench in an upside down position.
- Install the upper half of the bearings and crankshaft into the crankcase(upper).

NOTE:
Align the projection ① of the bearing with the notch in the crankcase.

- Put a piece of Plastigauge® on the each main journal.

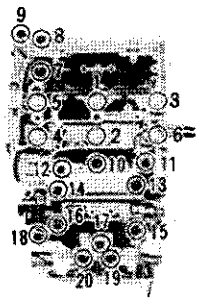
NOTE:
Do not put the Plastigauge® over the oil hole in the main journal of the crankshaft.

- Install lower half of the bearings into the crankcase (lower) and assembly the crankcase halves.

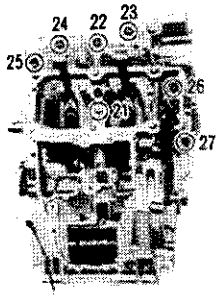
NOTE:
- Align the projection of the bearing with the notch in the crankcase.
- Do not move the crankshaft until the oil clearance measurement has been completed.

- Tighten the bolt to specification in tightening sequence cast on the crankcase.

A



B



	Bolt (crankcase): **M10 (① ~ ⑥):** **40 Nm (4.0 m · kg, 29 ft · lb)** **M8 (⑦ ~ ⑩ , ⑬ , ⑮ and ㉑ ~ ㉕):** **24 Nm (2.4 m · kg, 17 ft · lb)** **M6 (⑪ , ⑫ , ⑭ , ⑯ ~ ⑳ , ㉖ and ㉗):** **12 Nm (1.2 m · kg, 8.7 ft · lb)**

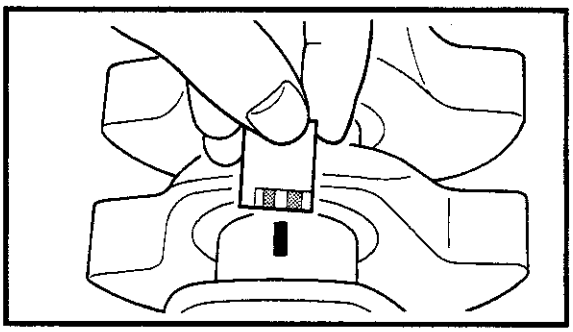
A Lower crankcase
B Upper crankcase

NOTE:
- Lubricate the threads of bolts (M10) with molybdenum disulfide motor oil.
- Lubricate the threads of bolts (M8 and M6) with engine oil.

- Remove the crankcase (lower) and lower half of the bearings.

● Measure the compressed Plastigauge® width on each main journal.
If oil clearance is out of specification, select a replacement bearing.

****



4. Measure:
• Oil clearance (crank pin)
Out of specification → Replace bearing.

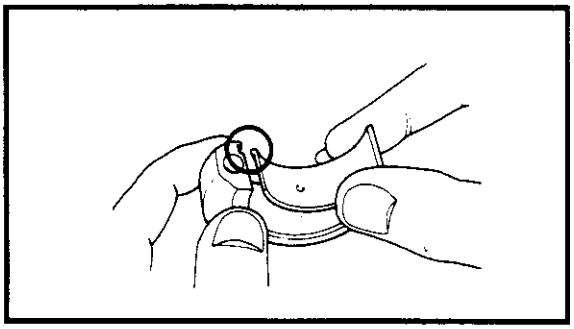
	Oil clearance: **0.026~0.050 mm** **(0.001~0.002 in)**

****

Measurement steps:

CAUTION:

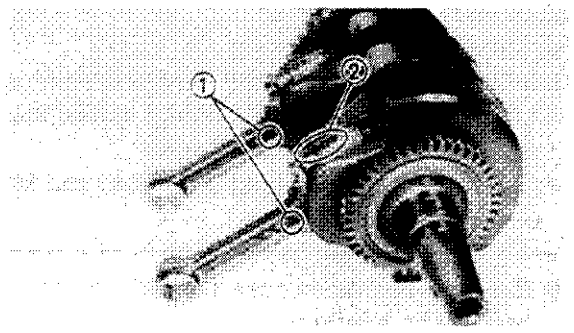
Do not interchange the bearings and connecting rod. They must be installed in their original positions, or the correct oil clearance may not be obtained causing engine damage.



● Clean the bearings, crank pins and bearing portions of the connecting rods.
● Install the upper half of the bearing into the connecting rod and lower half of the bearing into the connecting rod cap.

NOTE:

Align the projection of the bearing with the groove of the cap and connecting rod.



● Put a piece of Plastigauge® on the crank pin.
● Assemble the connecting rod halves.

NOTE:

• Do not move the connecting rod or crankshaft until the oil clearance measurement has been completed.
• Lubricate molybdenum disulfide grease to the bolt, threads and nut seats.
• Make sure the "Y" marks ① on the connecting rods face toward left side crankshaft.

• Make sure that the letters ② on both components align to from a perfect character.

● Tighten the nuts in 2~3 steps.

	Nut: **48 Nm (4.8 m · kg, 35 ft · lb)**

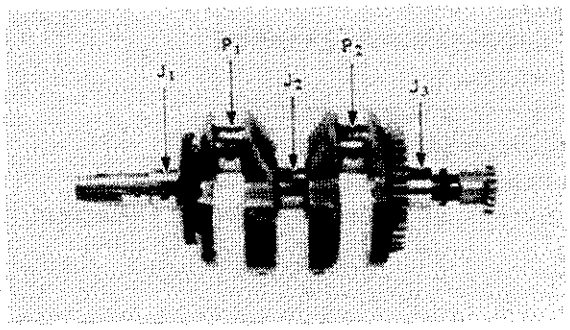
CAUTION:

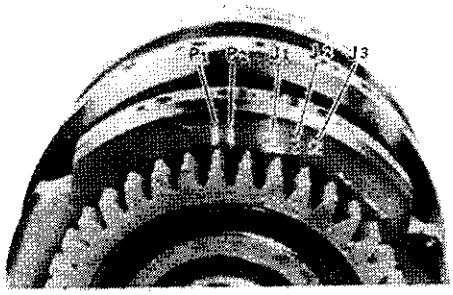
Tighten to full torque specification without pausing. Apply continuous torque between 4.6 and 4.8 m · kg. Once you reach 4.6 m · kg DO NOT STOP TIGHTENING until final torque is reached. If the tightening is interrupted between 4.6 and 4.8 m · kg, loosen the nut to less than 4.6 m · kg and start again.

● Remove the connecting rods and bearings.

● Measure the compressed Plastigauge® width on each crank pin.
If oil clearance is out of specification, select a replacement bearing.

****





5. Select:
• Main journal bearing (J_1~J_3)
• Crank pin bearing (P_1 and P_2)

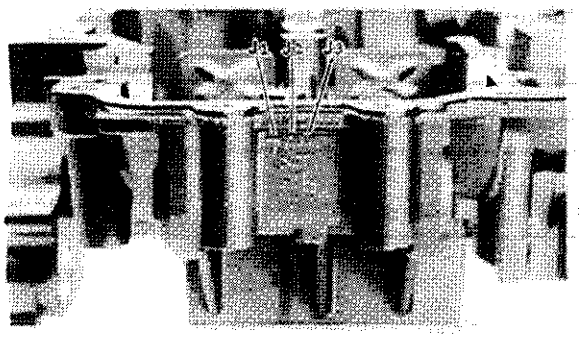
****

Selection of bearings:

Example 1: Main journal bearing

● If the numerals "4" and "1" are respectively shown on the crankcase J_1 and crankweb J_1, the bearing size of J_1 is:

Bearing size of J_1: **Crankcase J_1–CrankwebJ_1=** **4–1=3 (Brown)**



BEARING COLOR CODE	
1	Blue
2	Black
3	Brown
4	Green
5	Yellow

Example 2: Crank pin bearing

- If the numerals "5" and "1" are respectively shown on the connecting rod P_1 and crankweb P_1, the bearing size of P_1 is:

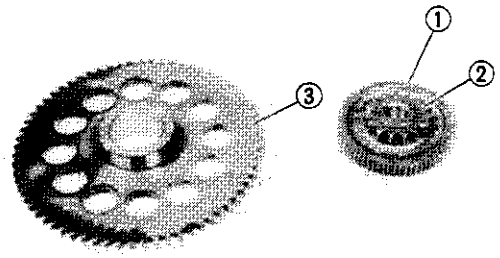
Bearing size of P_1:
Connecting rod P_1–Crankweb P_1=
5–1=4 (Green)

BEARING COLOR CODE	
1	Blue
2	Black
3	Brown
4	Green

****

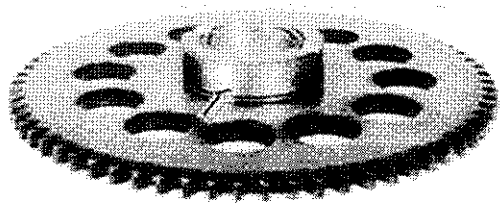
KB243012

ELECTRIC STARTER DRIVE



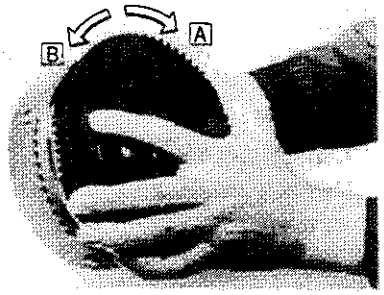
1. Inspect:
- Starter idle gear teeth ①
- Starter drive gear teeth ②
- Starter wheel gear teeth ③

Burrs/Chips/Roughness/Wear → Replace.



2. Inspect:
- Starter wheel gear (contacting surfaces)

Pitting/Wear/Damage → Replace.



3. Check:
• Starter clutch operation

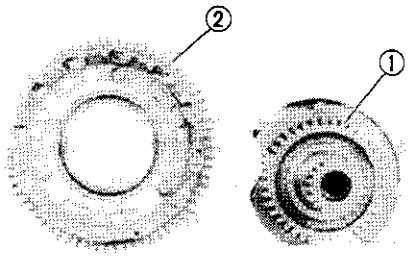
****

Checking steps:
- Install the starter clutch gear to the starter clutch, and hold the starter clutch.
- When turning the starter clutch gear 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 clutch gear counterclockwise [B], the starter clutch gear should turn freely.
  If not, the starter clutch is faulty. Replace it.

****

KB243013

PRIMARY DRIVE

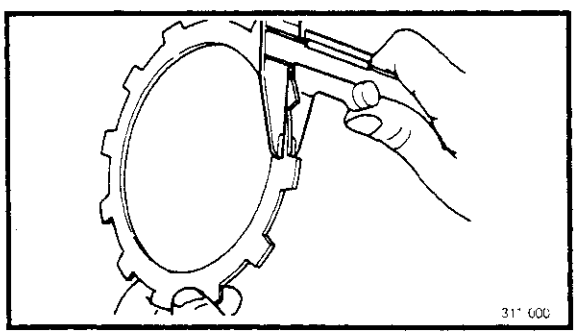


1. Inspect:
• Primary drive gear teeth ①
• Primary driven gear teeth ②
  Wear/Damage → Replace both gears.
  Excessive noises during operation → Replace both gears.

KB243014

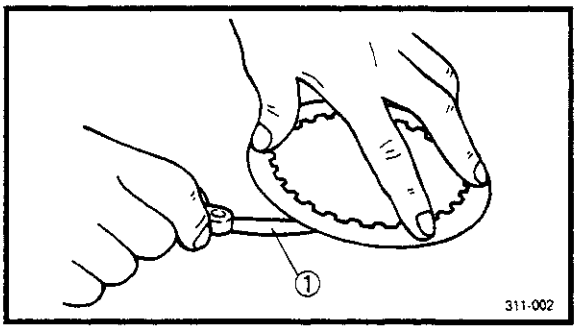
CLUTCH

1. Inspect:
• Friction plate
  Damage/Wear → Replace friction plate as a set.



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

Thickness:
2.9~3.1 mm (0.114~0.122 in)
〈Limit: 2.8 mm (0.11 in)〉

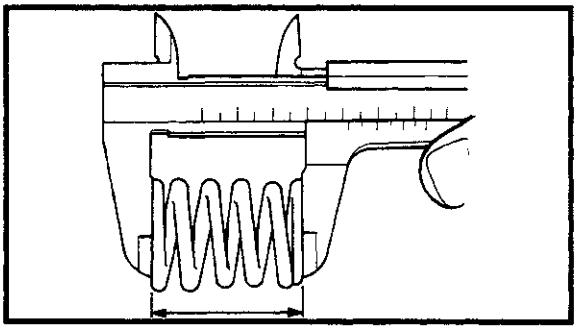


3. Inspect:
• Clutch plate
Damage → Replace clutch plate as a set.

4. Measure:
• Clutch plate warpage
Out of specification → Replace clutch plate as a set.
Use a surface plate and feeler gauge ①.

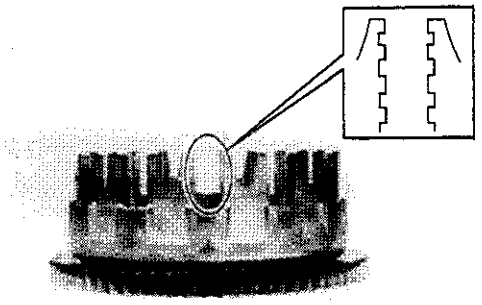
Warp limit:
〈0.1 mm (0.004 in)〉

5. Inspect:
• Clutch spring
Damage → Replace as a set.



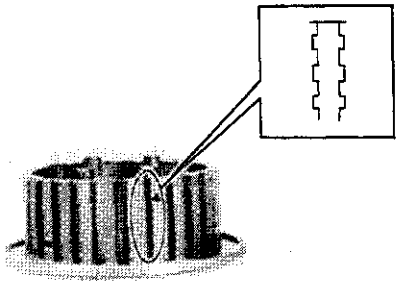
6. Measure:
• Clutch spring free length
Out of specification → Replace spring as a set.

Free length(clutch spring):
55.0 mm (2.17 in)
〈Limit: 53 mm (2.09 in)〉



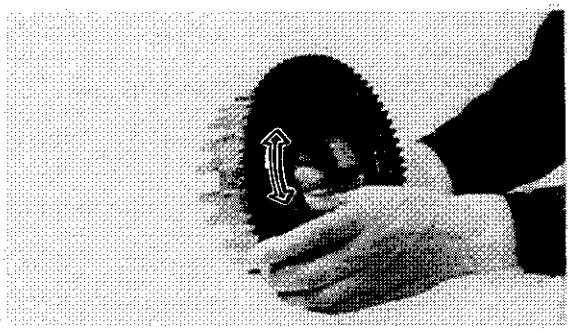
7. Inspect:
• Dogs on the clutch housing
Scoring/Wear/Damage → Deburr or replace.
• Clutch housing bearing
Wear/Damage → Replace clutch housing.

NOTE:
Scoring on the clutch housing dogs will cause erratic operation.

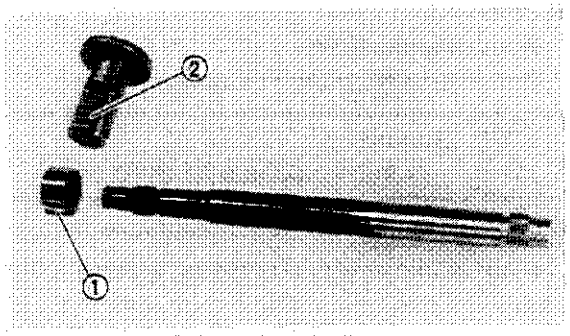


8. Inspect:
• Clutch boss splines
Scoring/Wear/Damage → Replace clutch boss.

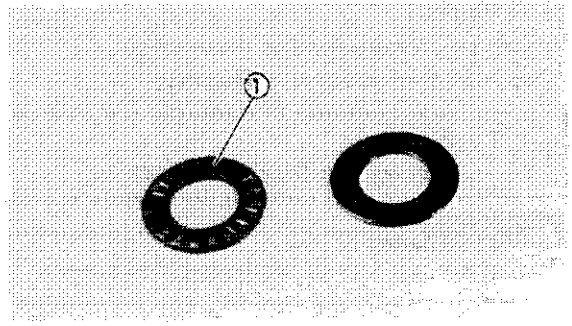
NOTE:
Scoring on the clutch boss splines will cause erratic operation.



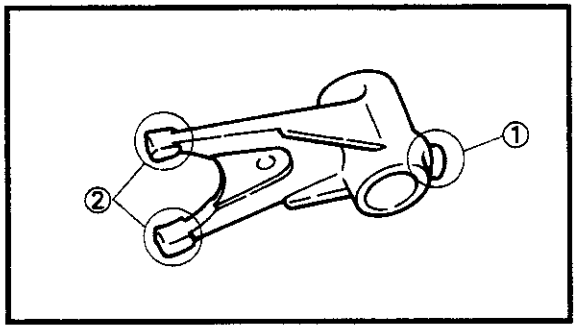
9. Check:
- Circumferential play
  Free play exists → Replace.



10. Inspect:
- Gear teeth (release pinion gear) ①
- Gear teeth (pull rod) ②
  Wear/Damage → Replace as a set.



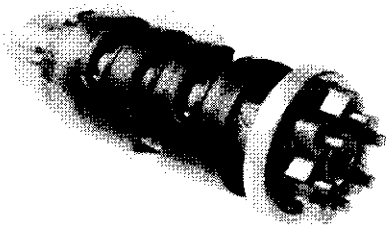
11. Inspect:
- Bearing ① (pull rod)
  Wear/Damage → Replace.



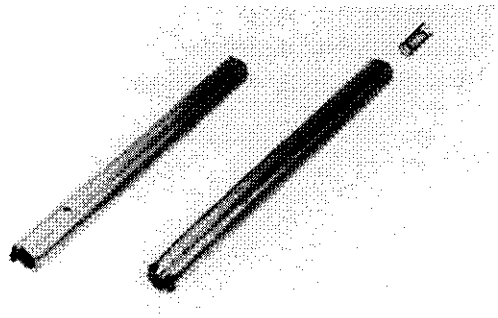
KB243015

TRANSMISSION AND SHIFTER

1. Inspect:
- Shift fork cam follower ①
- Shift fork pawl ②
  Scoring/Bends/Wear → Replace.



2. Inspect:
- Shift cam groove
- Shift cam segment
  Wear/Damage → Replace.



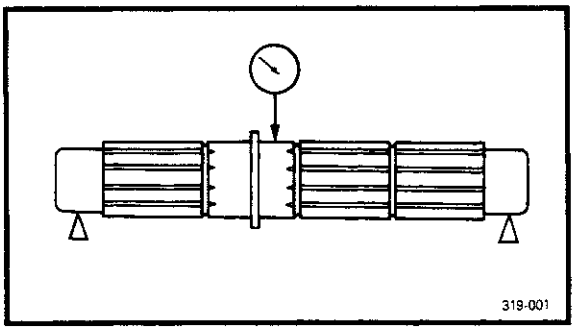
3. Inspect:
- Guide bar
  Clog → Blow out with compressed air.
- Guide bar spring
  Damage → Replace.

4. Measure:
- Runout (guide bar)
  Out of specification → Replace.

Runout:
〈Limit: 0.03 mm (0.0012 in)〉

⚠ WARNING

Do not attempt to straighten a bent guide bar.

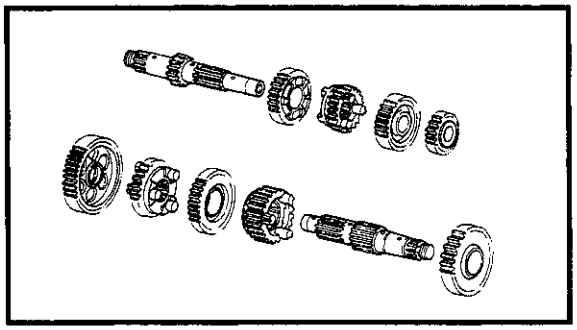


5. Measure:
- Runout (drive axle and main axle)
  Out of specification → Replace.

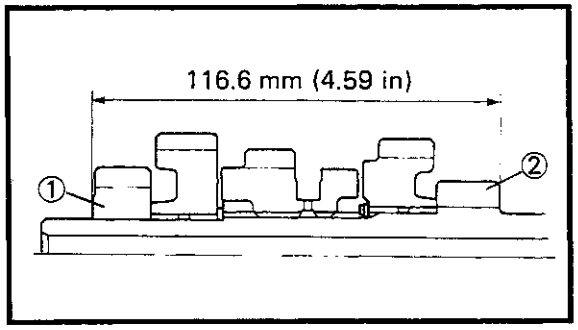
Runout:
〈Limit: 0.08 mm (0.003 in)〉

⚠ WARNING

Do not attempt to straighten a bent axle.



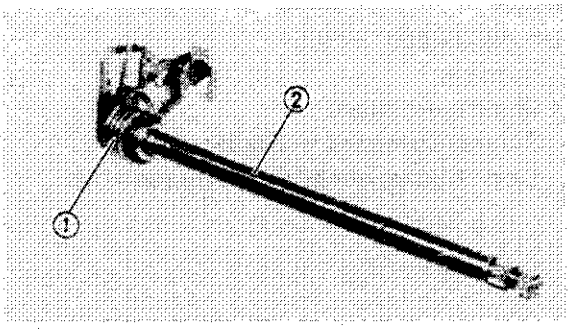
6. Inspect:
- Gear teeth
  Blue discoloration/Pitting/Wear → Replace.
- Mated dogs
  Rounded edges/Cracks/Missing portions → Replace.



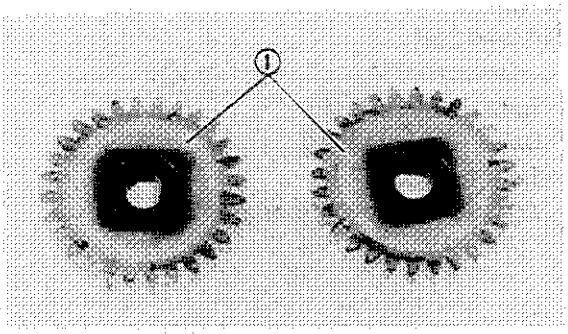
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Reassembling point:
- Press the 2nd pinion gear ① in the main axle ② as shown.

****



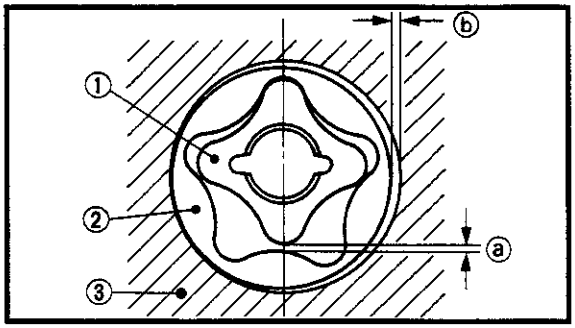
7. Inspect:
- Spring ① (shift shaft)
  Damage → Replace.
- Shift shaft ②
  Damage/Bends/Wear → Replace.



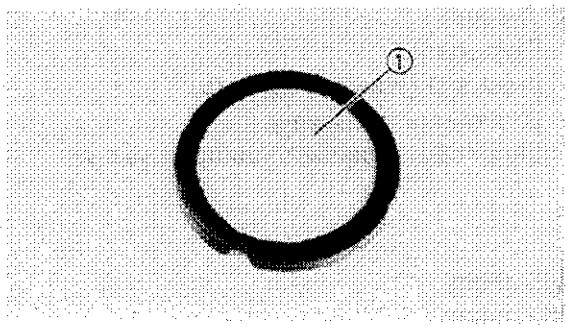
KB243016

OIL PUMP AND STRAINER

1. Inspect:
- Oil pump gear ①
  Damage/Wear → Replace.



2. 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.



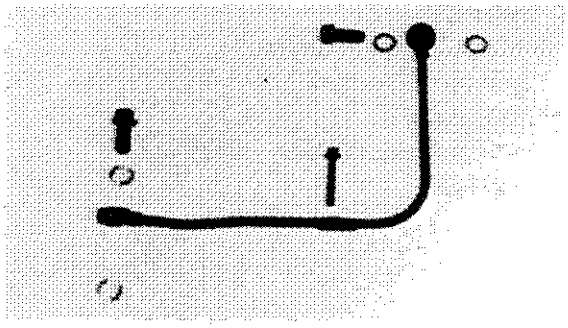
Tip clearance:
0~0.12 mm (0~0.005 in)
Side clearance:
0.03~0.08 mm (0.001~0.003 in)

3. Inspect:
- Oil strainer ①
  Damage → Replace.

KB243021

RELIEF VALVE

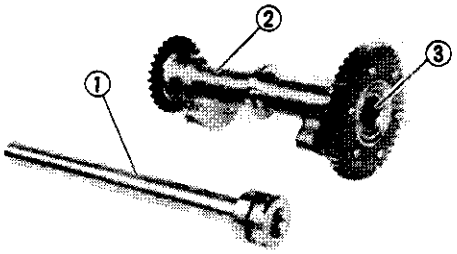
- Relief valve
- Check valve
  Damage/Wear → Replace.



KB243017

OIL DELIVERY PIPES

1. Inspect:
- Oil delivery pipes
  Cracks/Damages → Replace.
  Clog → Blow out with compressed air.

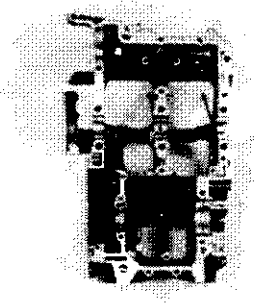


KB243022

BALANCER

1. Inspect:
- Balancer shaft ①
- Balancer weight ②
- Bearing ③
  Wear/Damage → Replace.

A



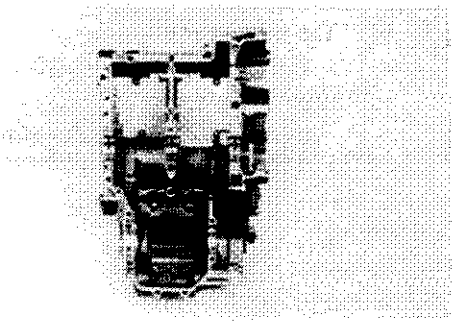
KB243018

CRANKCASE

1. Thoroughly wash the case halves in mild solvent.

2. Clean all the gasket mating surface and crankcase mating surface thoroughly.

B



3. Inspect:
- Crankcase
  Cracks/Damage → Replace.
- Oil delivery passages
  Clog → Blow out with compressed air.

A UPPER
B LOWER

KB243019

BEARING AND OIL SEAL

1. Inspect:
- Bearings
  Clean and lubricate, then rotate inner race with finger.
  Roughness → Replace (see removal).

2. Inspect:
• Oil seals
Damage/Wear → Replace (see removal).

KB243020

CIRCLIP AND WASHER

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

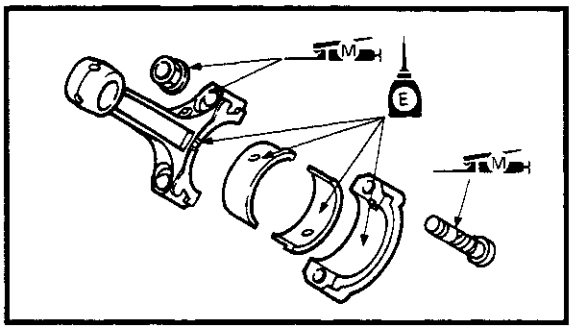
KB244000

ENGINE ASSEMBLY AND ADJUSTMENT

⚠ WARNING

For engine reassembly, replace the following parts with new ones.

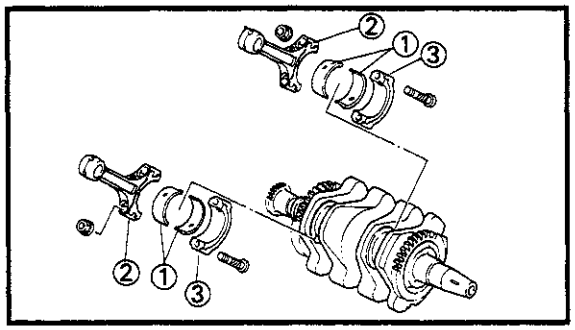
- **O-ring**
- **Gasket**
- **Oil seal**
- **Copper washer**
- **Lock washer**
- **Circlip**



KB244001

CONNECTING ROD

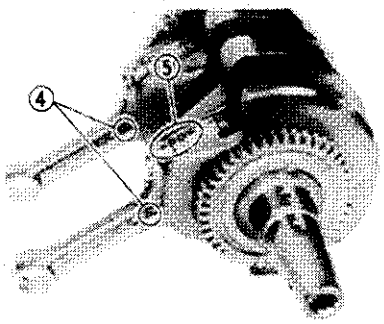
1. Apply:
- Molybdenum disulfide grease
  (onto threads of bolts and bottom surfaces of nuts)
- Engine oil
  (onto crank pins, crank pin bearings and inner surfaces of connecting rods)



2. Install:
- Crank pin bearings ①
- Connecting rods ②
- Connecting rod caps ③
  (onto crank pins)

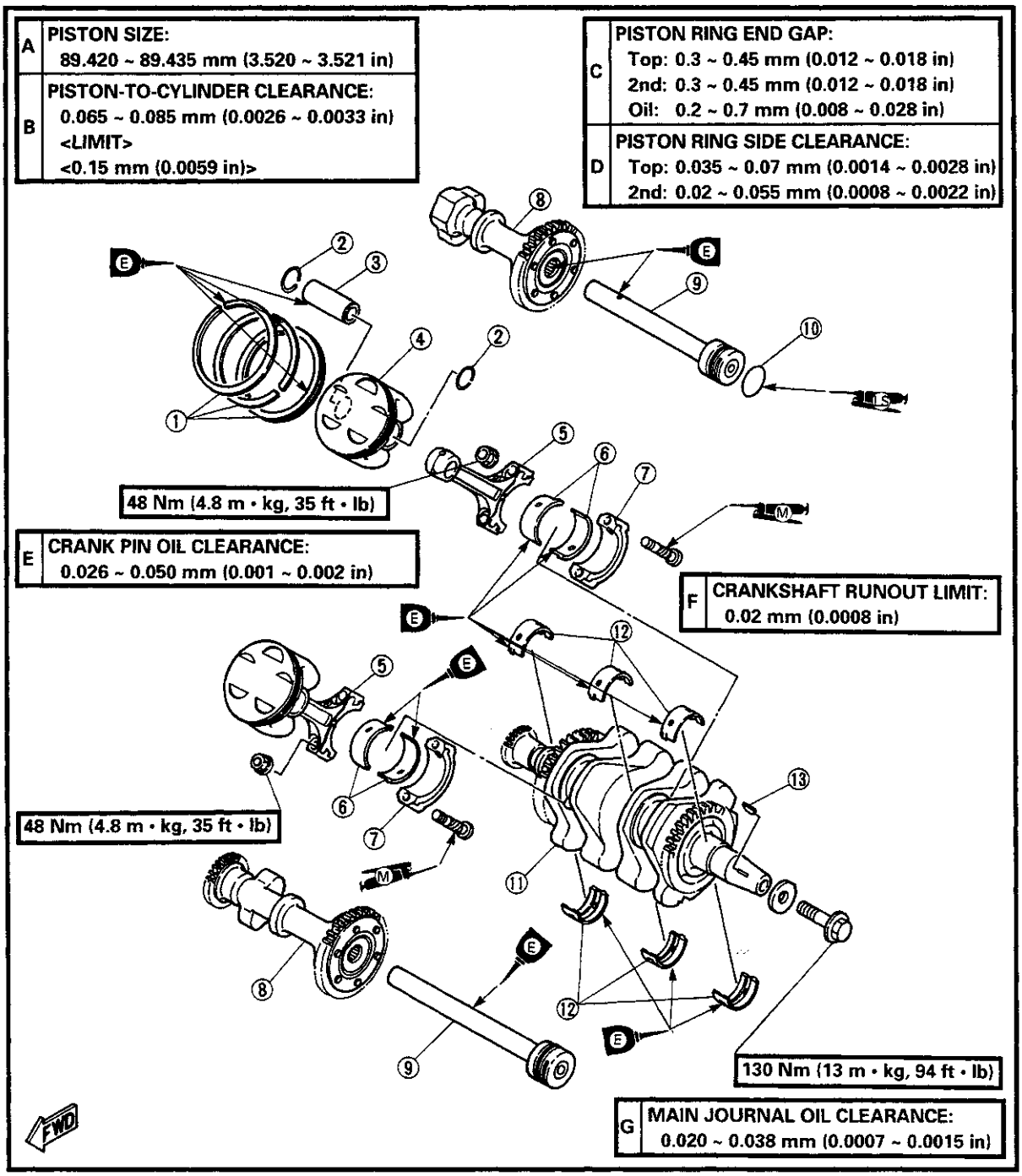
NOTE:

- Align the projection of bearing with the groove of the caps and connecting rod.
- Identify each bearing position very carefully so that it can be reinstalled in its original place.
- The stamped "Y" mark on the connecting rods ④ should face towards the left side of the crankcase.
- Be sure that the letter ⑤ on both components align to from a perfect character.



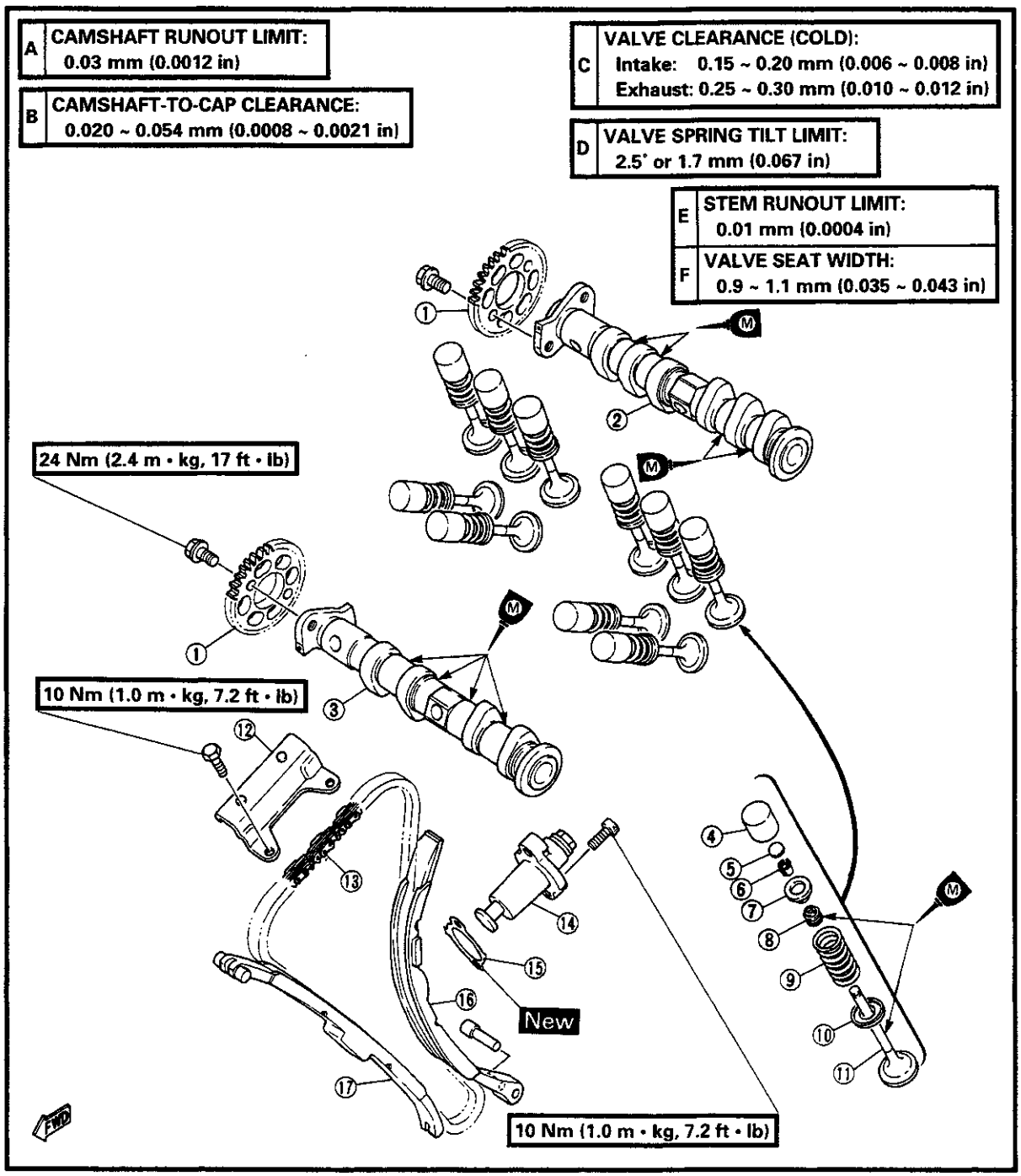
CRANKSHAFT, PISTON AND BALANCER

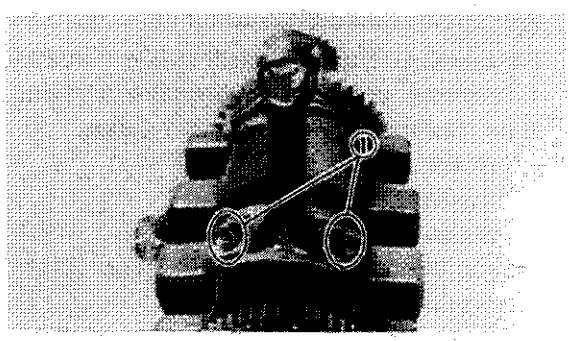
① Piston ring
② Piston pin clip
③ Piston pin
④ Piston
⑤ Connecting rod
⑥ Crank pin bearing
⑦ Connecting rod cap
⑧ Balancer weight
⑨ Balancer shaft
⑩ O-ring
⑪ Crankshaft
⑫ Main journal bearing
⑬ Woodruff key



CAMSHAFT, VALVE AND TIMING CHAIN

① Cam sprocket
② Camshaft (intake)
③ Camshaft (exhaust)
④ Valve lifter
⑤ Valve pad
⑥ Valve cotter
⑦ Valve spring retainer
⑧ Oil seal
⑨ Valve spring
⑩ Spring seat
⑪ Valve
⑫ Chain guide
⑬ Timing chain
⑭ Chain tensioner
⑮ Gasket
⑯ Chain guide (intake)
⑰ Chain guide (exhaust)





3. Align:
• Bolt head ①
(with connecting rod cap)

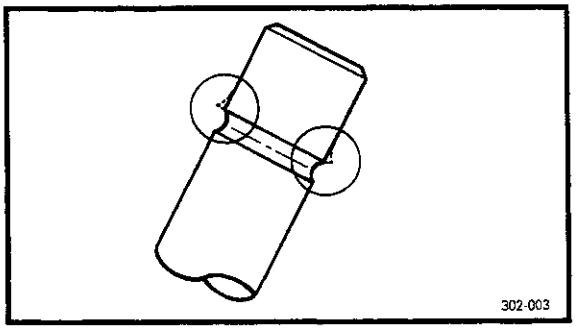
4. Tighten:
• Nuts (connecting rods)

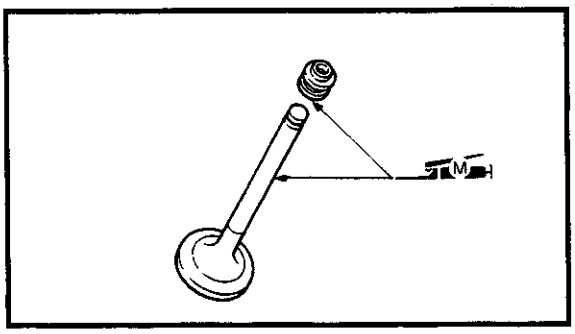
CAUTION:
Tighten to full torque specification without pausing. Apply continuous torque between 4.6 and 4.8 m · kg. Once you reach 4.6 m · kg DO NOT STOP TIGHTENING until final torque is reached. If the tightening is interrupted between 4.6 and 4.8 m · kg, loosen the nut to less than 4.6 m · kg and start again.

	Nut (connecting rod): **48 Nm (4.8 m · kg, 35 ft · lb)**

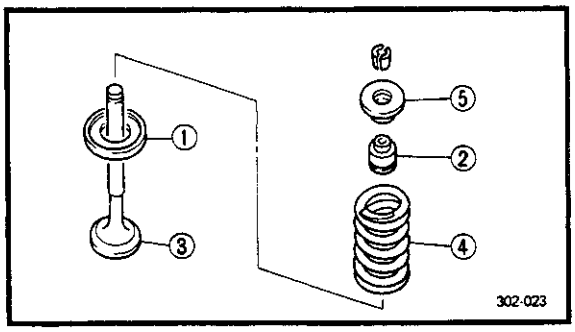
KB244002
VALVE

1. Deburr:
• Valve stem end
Use an oil stone to smooth the stem end.

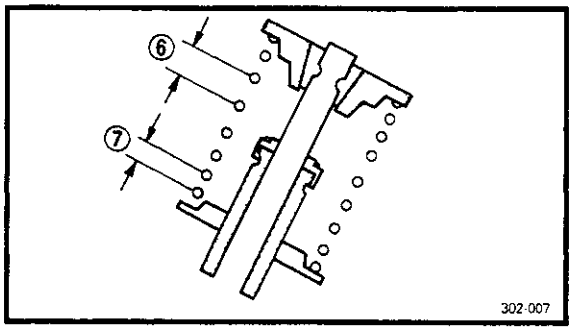




2. Apply:
• Molybdenum disulfide oil
(onto valve stem and oil seal)

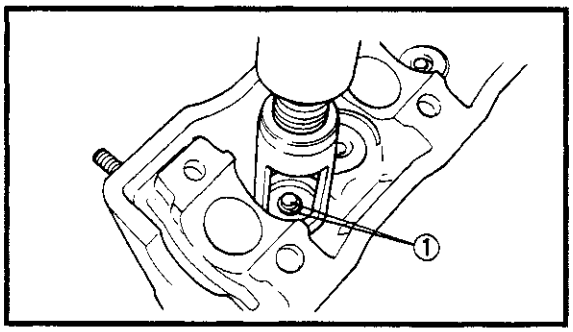


3. Install:
• Spring seat ①
• Oil seal ②
• Valve ③
• Valve spring ④
• Valve retainer ⑤
(into cylinder head)



NOTE:
- Make sure that the each valve is installed in its original place by reference to it embossed identification mark, as follows:
  Intake (both sides) : 3LD:
  Intake (middle) : 3LD •
  Exhaust : 3LD
- Install the valve spring with larger pitch ⑥ facing upward.

⑦ Smaller pitch



4. Install:
- Valve cotters ①

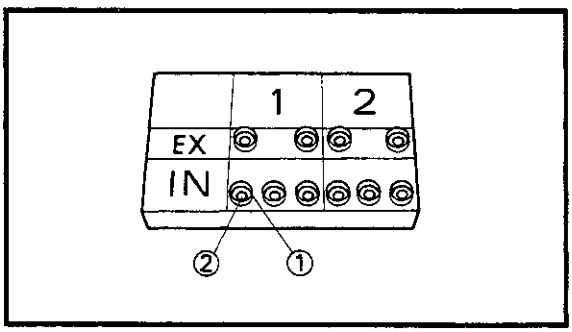
NOTE:
Install the valve cotters while compressing the valve spring with the valve spring compressor.

	Valve spring compressor: **P/N YM-04019/90890-04019** **Attachment:** **P/N YM-4114/90890-04114**

5. Secure the valve cotter on to the valve stem by tapping it lightly with a piece of wood.

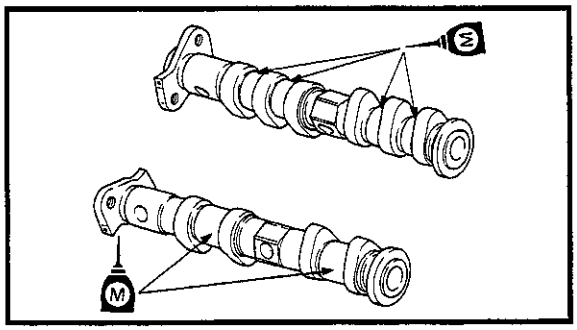
NOTE:
Do not hit so much as to damage the valve.

6. Apply:
- Molybdenum disulfide oil
  (onto outer surface of valve lifters and pads.)

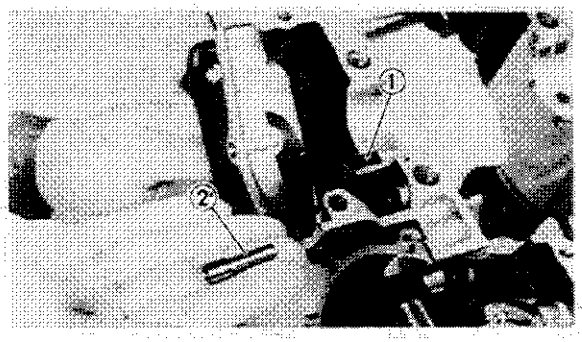


7. Install:
- Valve lifters ①
- Pads ②

NOTE:
- Valve lifter must be rotated smoothly by a finger.
- Each valve lifter and pad position very carefully so that its original place.



8. Apply:
- Molybdenum disulfide oil (onto journal of camshaft)

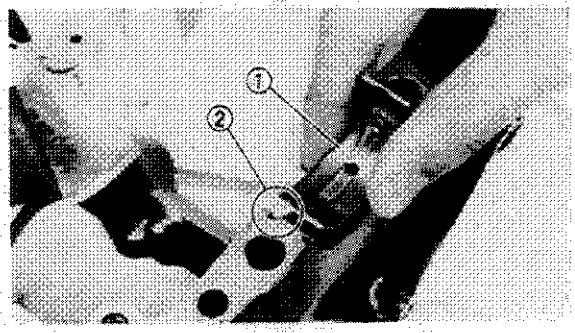


KB244003

CRANKSHAFT

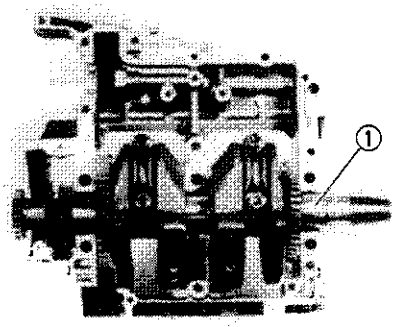
1. Install:
- Chain guide ① (intake)
- Pin ②

2. Apply:
- Engine oil (onto main journal bearings)



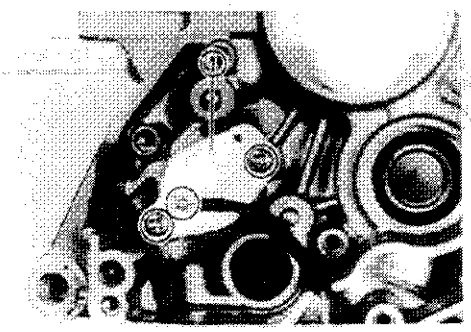
3. Install:
- Main journal bearings ① (onto upper crankcase)

NOTE:
- Align the projection ② of the bearing with the notch in the case.
- Identify each bearing position so that the bearing should be installed in position.



4. Apply:
- Engine oil (onto main journal of crankcase)

5. Install:
- Crankshaft assembly ① (to the upper crankcase)



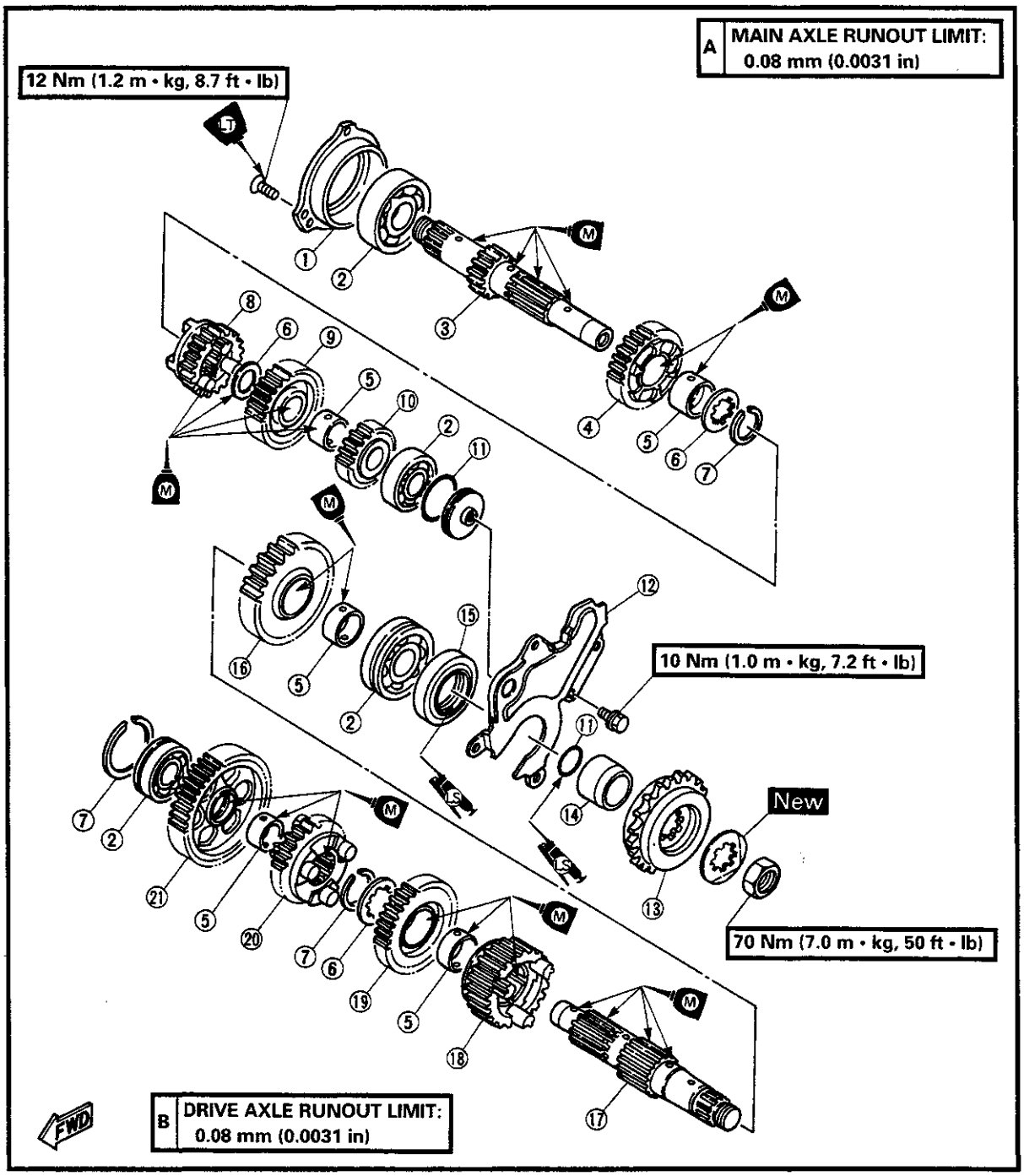
KB244004

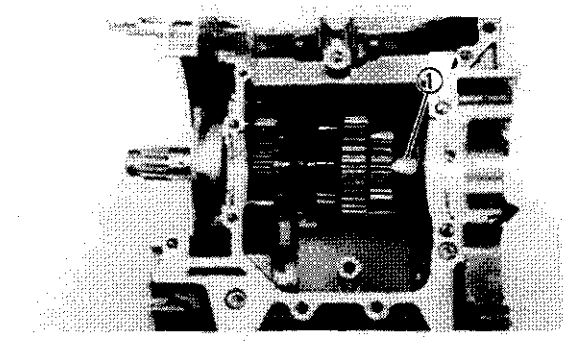
TRANSMISSION AND SHIFTER

1. Install:
- Neutral switch ①

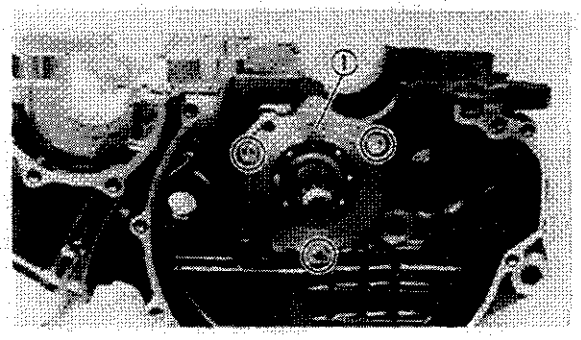
TRANSMISSION

① Bearing retainer
② Bearing
③ Main axle
④ 4th pinion gear
⑤ Collar
⑥ Washer
⑦ Circlip
⑧ 3rd pinion gear
⑨ 5th pinion gear
⑩ 2nd pinion gear
⑪ O-ring
⑫ Oil seal holder
⑬ Drive sprocket
⑭ Collar
⑮ Oil seal
⑯ 2nd wheel gear
⑰ Drive axle
⑱ 5th wheel gear
⑲ 3rd wheel gear
⑳ 4th wheel gear
㉑ 1st wheel gear





2. Install:
• Main axle assembly ①

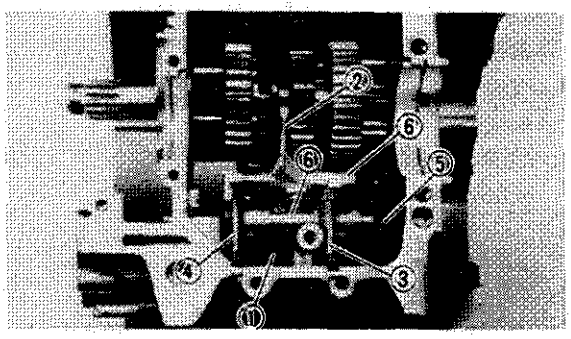


3. Install:
• Plug (main axle)

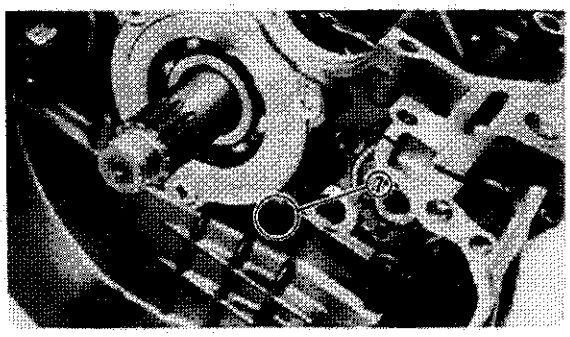
4. Install:
• Screws ① (bearing retainer)

	Screw (bearing retainer): **12 Nm (1.2 m · kg, 8.7 ft · lb)** **Apply Loctite®**

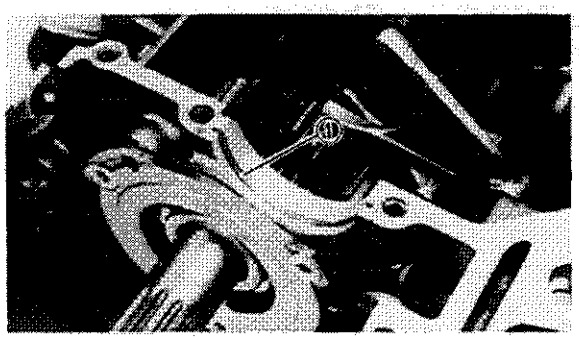
5. Apply:
• Engine oil
(onto guide bars)



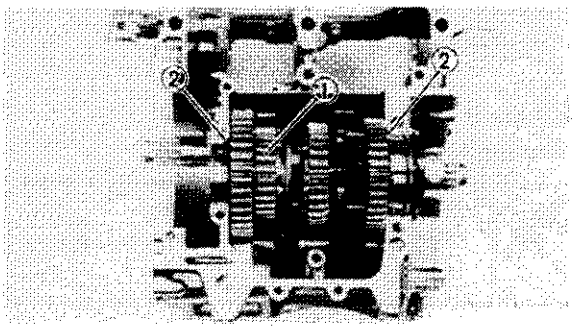
6. Install:
• Shift cam ①
• Shift fork "C" ②
• Shift fork "L" ③
• Shift fork "R" ④
• Spring ⑤
• Guide bars ⑥



NOTE:
• Install the shift forks with the embossed mark on each shift fork facing right side of the engine.
• Install the guide bar with the cut-out end ⑦ facing the right side of the engine.

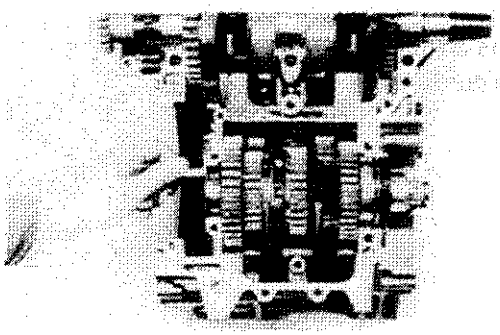


7. Install:
• Stopper ring ① (bearing)
(onto clutch side)



8. Install:
• Drive axle assembly ①

NOTE:
• Align the bearing knock pin ② with the pin slot in the crankcase.
• Be sure the stopper ring is fitted to the bearing and the stopper ring have been positioned in the ring groove.

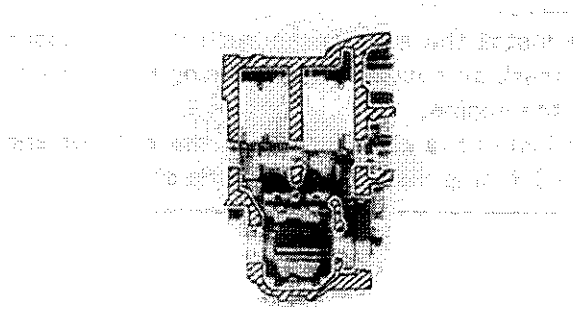


9. Check:
• Transmission operation unsmooth operation → Repair.

KB244005

CRANKCASE (LOWER)

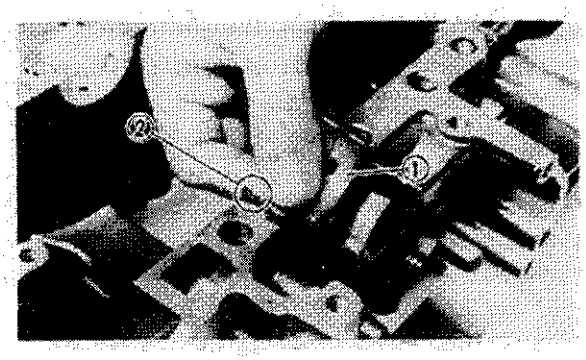
1. Apply:
• Engine oil
(onto main journal bearings)



2. Apply:
• Sealant
(onto crankcase matching surfaces)

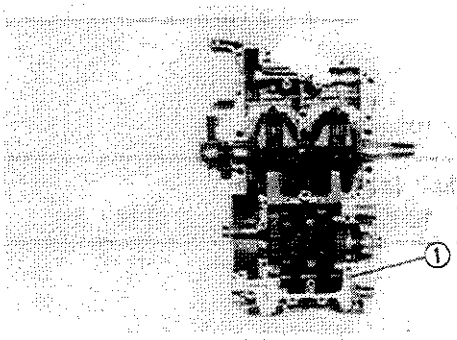
	Sealant (Quick gasket): **P/N ACC-11001-15-01** **Yamaha bond No. 1215:** **P/N 90890-85505**

NOTE:
DO NOT ALLOW any sealant to came in contact with the oil gallery or crankshaft bearing. Do not apply sealant to within 2~3 mm (0.08~0.12 in) of the bearings.



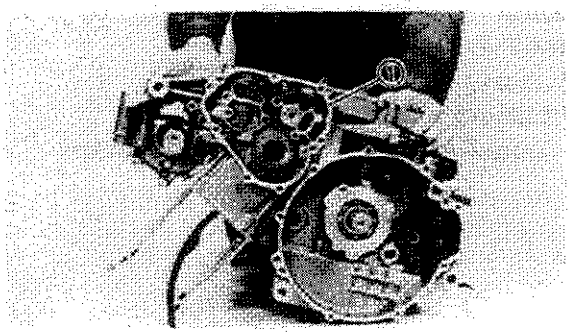
3. Install:
- Main journal bearings ①
  (onto lower crankcase)

NOTE:
- Align the projection ② of the bearing with the notch in the case.
- Identify each bearing position so that the bearing should be installed in position.



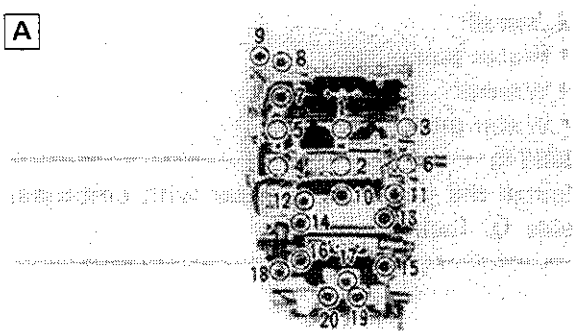
4. Install:
- Dowel pin ①

5. Set shift cam and transmission gears in NEUTRAL position.



6. Install:
- Lower crankcase ①

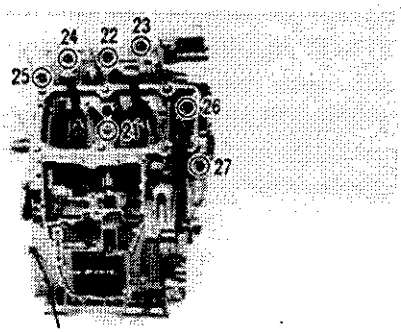
A



7. Install:
- Bolts (crankcase)

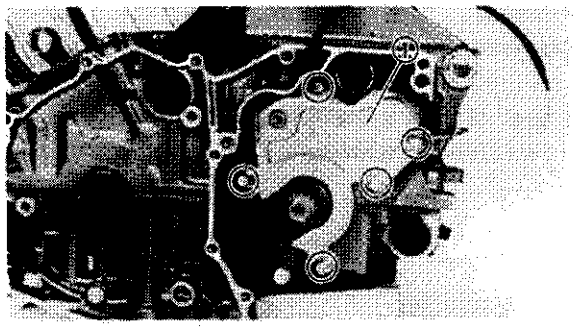
A Lower crankcase
B Upper crankcase

B



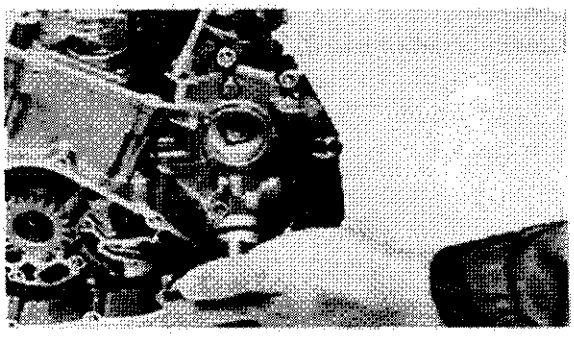
	Bolt (crankcase): **M10 (① ~ ⑥):** **40 Nm (4.0 m · kg, 29 ft · lb)** **M8 (⑦ ~ ⑩ , ⑬ , ⑮ and ㉑ ~ ㉕):** **24 Nm (2.4 m · kg, 17 ft · lb)** **M6 (⑪ , ⑫ , ⑭ , ⑯ ~ ⑳ , ㉖ and ㉗):** **12 Nm (1.2 m · kg, 8.7 ft · lb)**

NOTE:
- Lubricate the threads of bolts (M10) with molybdenum disulfide oil.
- Lubricate the threads of bolts (M8 and M6) with engine oil.
- Tighten the bolts starting with the lowest numbered one.
- Install the copper washer on the bolts No. 18, No.22, No.23, No.25 and No.27.
- Install the cable holder on the bolt No.20.



8. Install:
- Plate ① (oil seal holder)

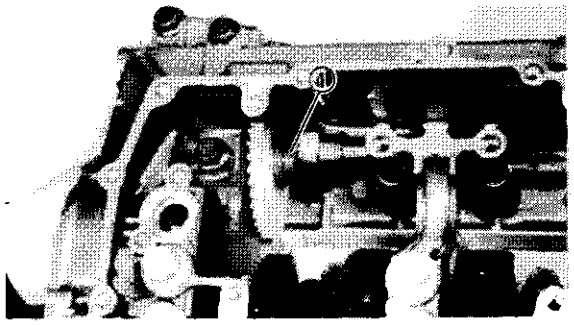
	Bolt (plate): **10 Nm (1.0 m · kg, 7.2 ft · lb)**



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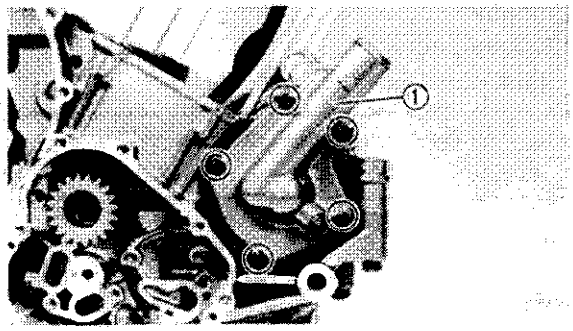
WATER PUMP

1. Apply:
- Lithium soap base grease (onto O-ring on water pump assembly).



2. Install:
- Water pump gear
- Washer
- Water pump assembly

NOTE:
Install the water pump gear with embossed side ① facing to inside.



3. Apply:
- Lithium soap base grease (onto O-ring)

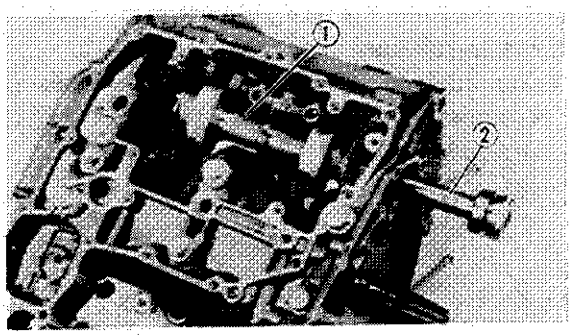
4. Install:
- O-ring
- Water pump cover ①

	Bolt (water pump): 10 Nm (1.0 m · kg, 7.2 ft · lb)

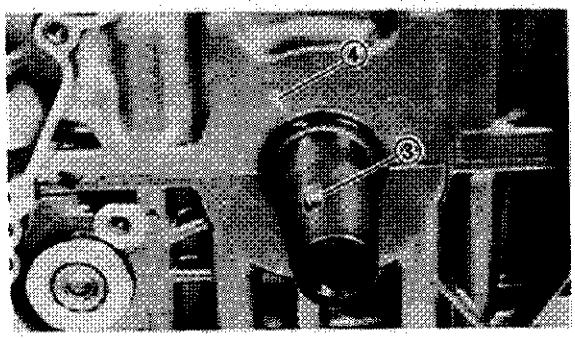
KB244007

BALANCER WEIGHTS

1. Apply:
- Engine oil (onto balancer shaft)
- Lithium soap base grease (onto O-ring on balancer shaft)



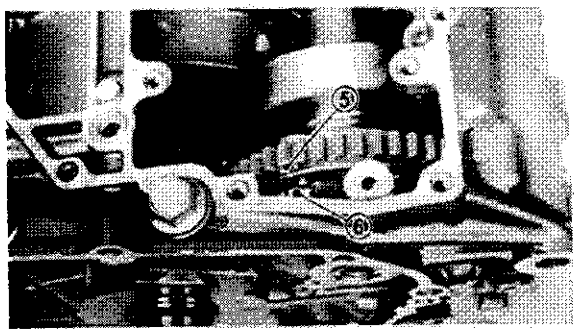
2. Install:
- Balancer weight ① (front)
- Balancer shaft ② (front)



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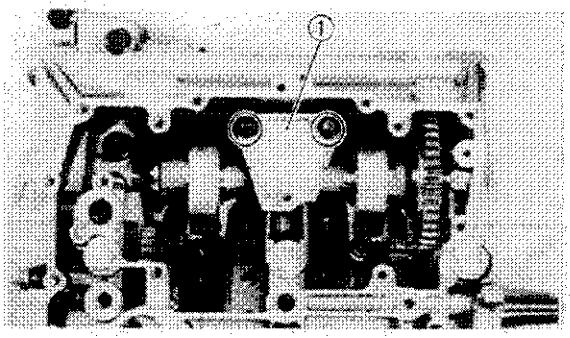
Installing steps:

- Turn the crankshaft until the keyway ③ is aligned with the embossed mark ④ on the crankcase.



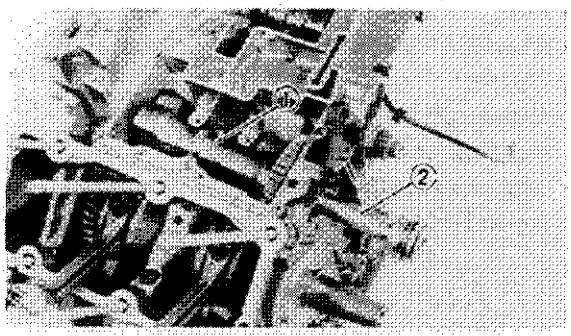
- While holding the crankshaft, install the balancer weight and align the mark ⑤ on the balancer gear with the embossed mark ⑥ on the crankcase.
- Install the balancer shaft.

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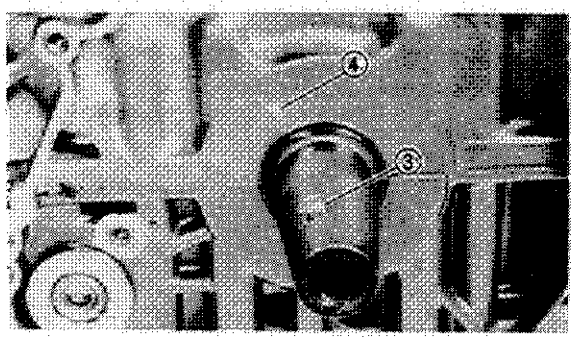


3. Install:
- Dowel pins
- Balancer holder ① (front)

	Bolt (balancer holder): **10 Nm (1.0 m · kg, 7.2 ft · lb)**



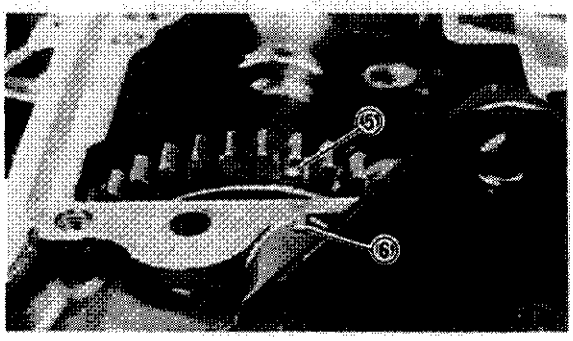
4. Install:
- Balancer weight ① (rear)
- Balancer shaft ② (rear)



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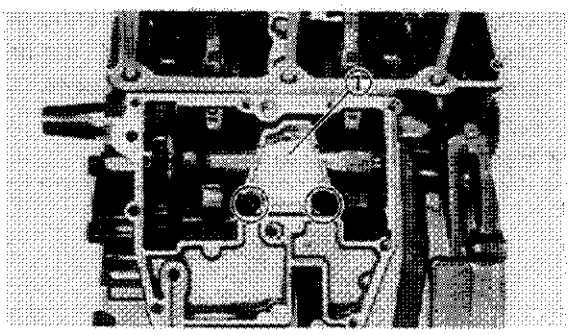
Installing steps:

- Turn the crankshaft until the keyway ③ is aligned with the embossed mark ④ on the crankcase.



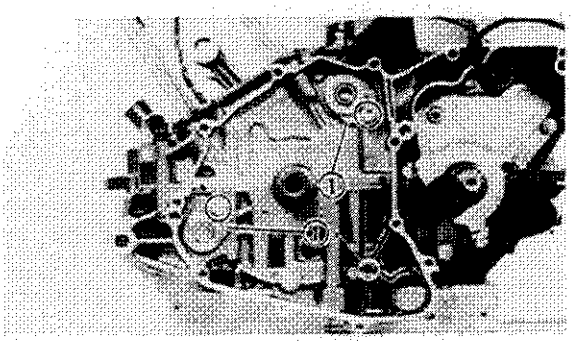
- While holding the crankshaft, install the balancer weight and align the mark ⑤ on the balancer gear with the embossed mark ⑥ on the crankcase.
- Install the balancer shaft.

****



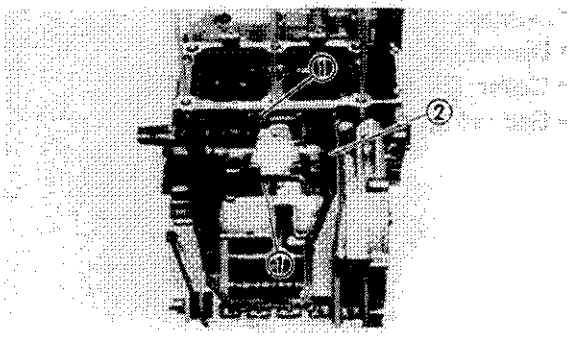
5. Install:
- Dowel pins
- Balancer holder ① (rear)

	Bolt (balancer holder): **10 Nm (1.0 m · kg, 7.2 ft · lb)**



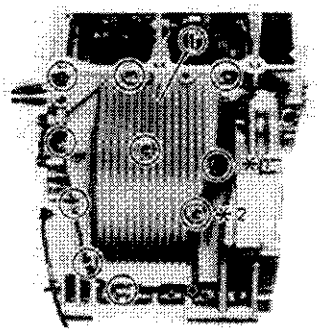
6. Install:
• Balancer shaft holders ①

	Screw (balancer shaft holder): 12 Nm (1.2 m • kg, 8.7 ft • lb) apply Loctite®



NOTE:
Install the balancer shaft holder with chamfered side facing outside.

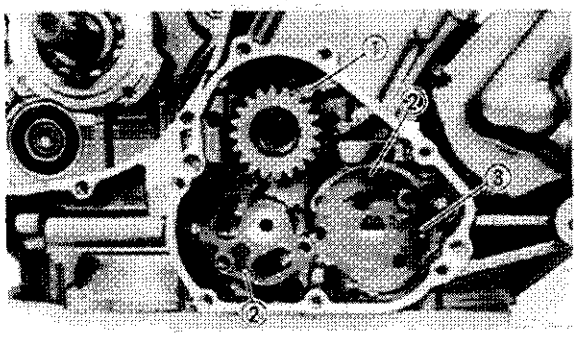
7. Install:
• Dowel pins ①
• Gasket ② (crankcase cover)



8. Install:
• Crankcase cover ① (upper)

NOTE:
• Install the cable holder on the indicated bolt "*1".
• Install the copper washer on the indicated bolt "*2".
• Tighten the bolts in a crisscross pattern.

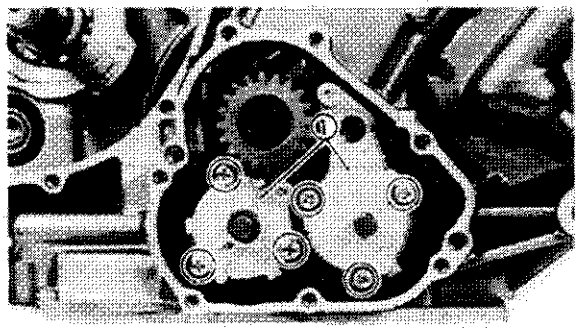
	Bolt (crankcase cover): 10 Nm (1.0 m • kg, 7.2 ft • lb)



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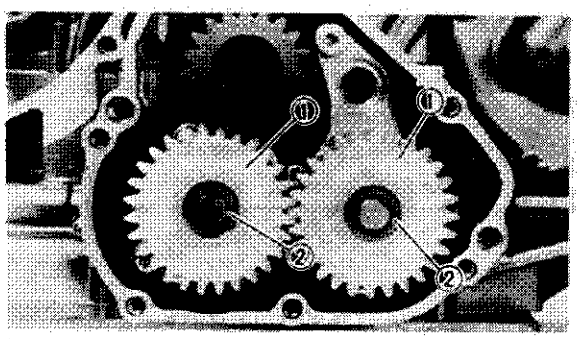
OIL PUMPS AND TIMING CHAIN

1. Install:
• Timing chain ①
• Gaskets ② (oil pumps)
• Dowel pin ③

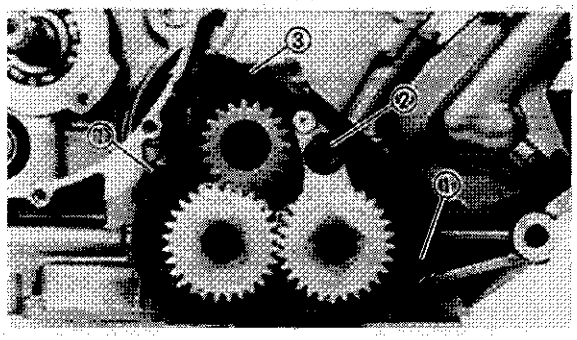


2. Install:
• Oil pumps ①

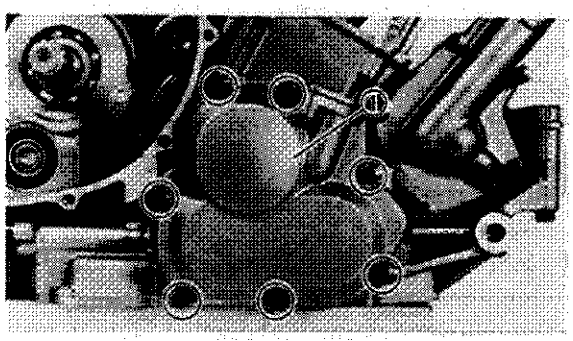
	Screw (oil pump): 6 Nm (0.6 m • kg, 4.3 ft • lb)



3. Install:
- Oil pump gears ①
- Circlips ②

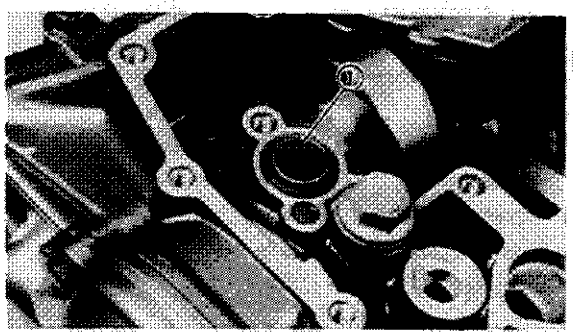


4. Install:
- Dowel pins ①
- Collar ② (with O-ring)
- Gasket ③ (oil pump cover)



5. Install:
- Oil pump cover ①

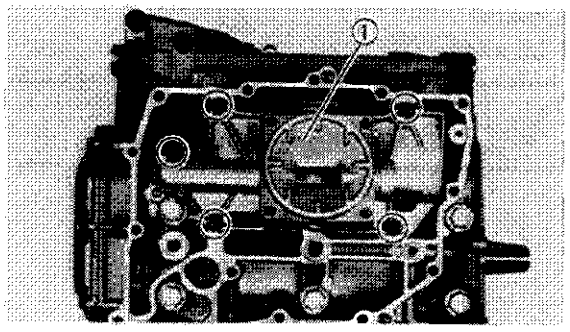
	Bolt (oil pump cover): 10 Nm (1.0 m · kg, 7.2 ft · lb)



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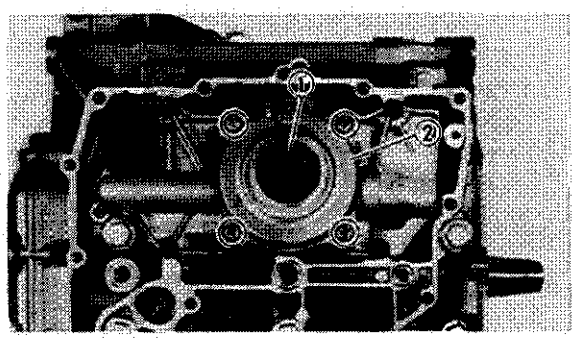
OIL PAN, OIL FILTER AND OIL STRAINER

1. Install:
- Collar ① (with O-ring)



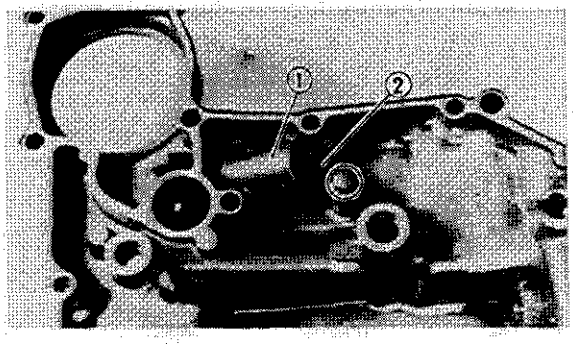
2. Install:
- Oil strainer housing ①

	Bolt (oil strainer housing): 10 Nm (1.0 m · kg, 7.2 ft · lb)



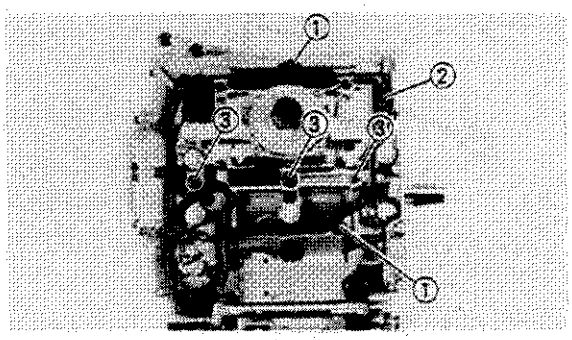
3. Install:
- Oil strainer ①
- Oil strainer cover ②

	Screw (oil strainer cover): **7 Nm (0.7 m · kg, 5.1 ft · lb)** **apply Loctite®**

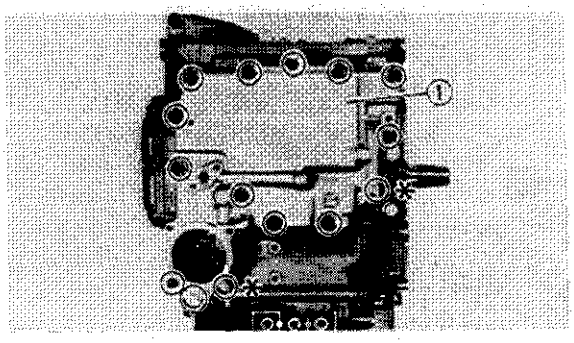


4. Install:
- Relief valve ①
- Holder ② (relief valve) (into oil pan)

	Bolt (holder): **10 Nm (1.0 m · kg, 7.2 ft · lb)** **apply Loctite®**

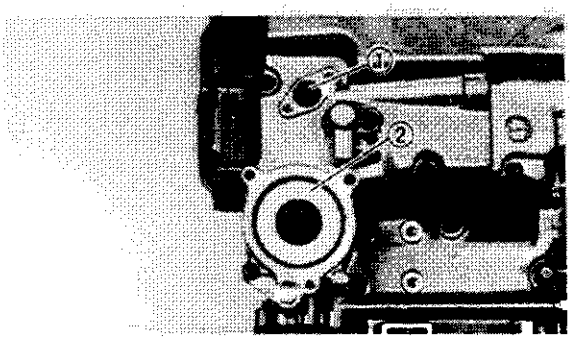


5. Install:
- Dowel pins ①
- Gasket ② (oil pan)
- Collars ③ (with O-ring)



6. Install:
- Oil pan ①

	Drain bolt: **30 Nm(3.0 m · kg, 22 ft · lb)** **Bolt (oil pan):** **10 Nm (1.0 m · kg, 7.2 ft · lb)**

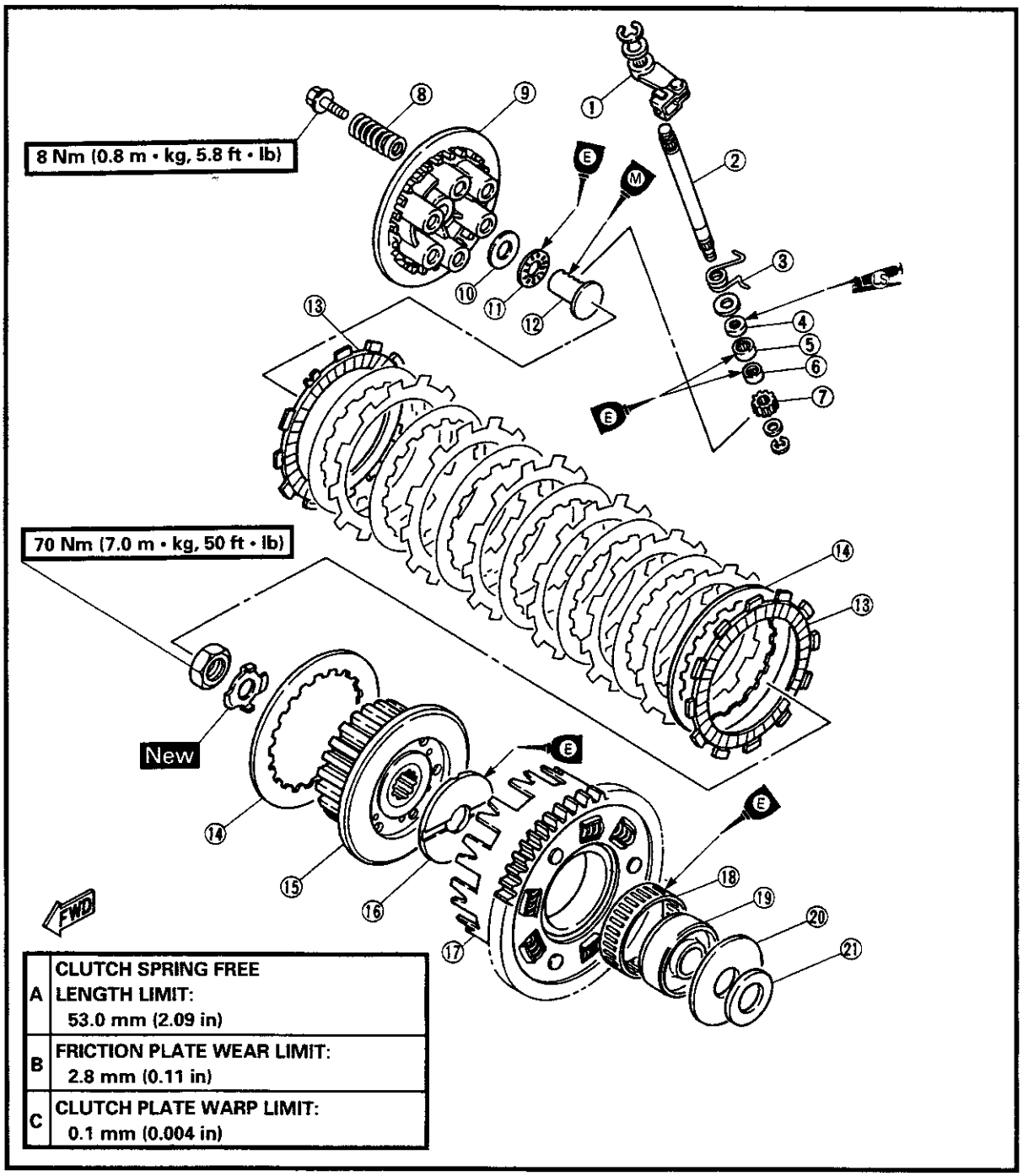


NOTE:
- For indicated bolt *, apply Loctite® onto the threads of bolt.
- Tighten the bolts (oil pan) in a crisscross pattern.

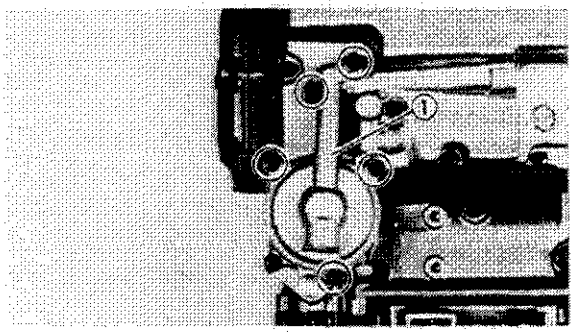
7. Install:
- Collar ① (with O-ring)
- Oil filter ②

CLUTCH

① Pull lever
② Pull rod
③ Return spring
④ Oil seal
⑤ Bearing
⑥ Bearing
⑦ Pinion gear
⑧ Clutch spring
⑨ Pressure plate
⑩ Washer
⑪ Bearing
⑫ Pull rod
⑬ Friction plate
⑭ Clutch plate
⑮ Clutch boss
⑯ Thrust washer
⑰ Clutch housing
⑱ Bearing
⑲ Spacer
⑳ Thrust plate 2
㉑ Thrust plate 1

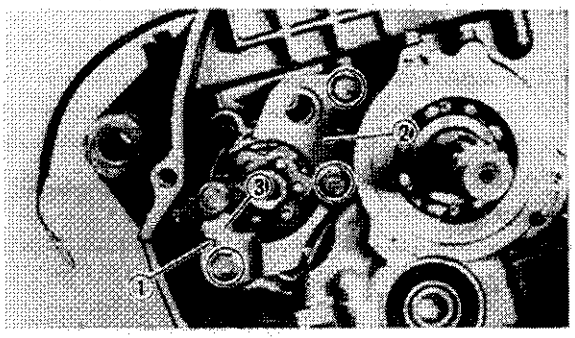


A	CLUTCH SPRING FREE LENGTH LIMIT: 53.0 mm (2.09 in)
B	FRICTION PLATE WEAR LIMIT: 2.8 mm (0.11 in)
C	CLUTCH PLATE WARP LIMIT: 0.1 mm (0.004 in)



8. Install:
- O-ring
- Oil filter cover ①

	Bolt (oil filter cover): 10 Nm (1.0 m · kg, 7.2 ft · lb)



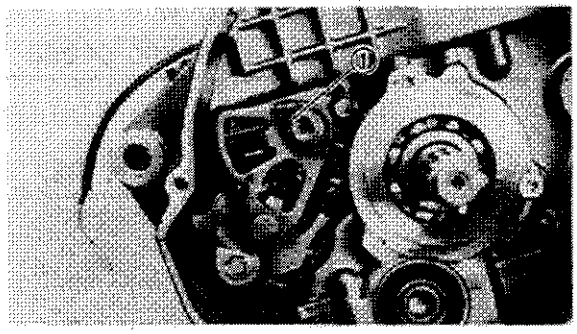
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CLUTCH

1. Install:
- Return spring ①
- Bearing retainer ②
- Stopper lever ③

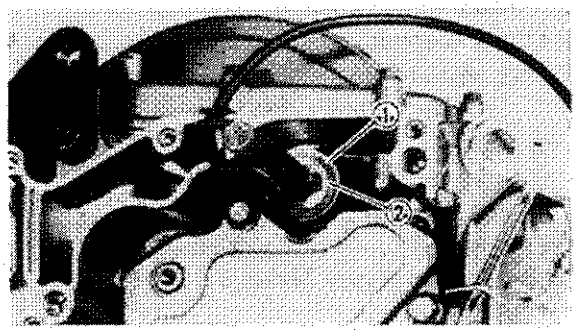
NOTE:
- Hook the spring ends on the stopper lever and crankcase boss.
- Fit the bearing retainer onto the cut surface of guide bar.

	Bolt (stopper lever/bearing retainer): 12 Nm (1.2 m · kg, 8.7 ft · lb) apply Loctite®



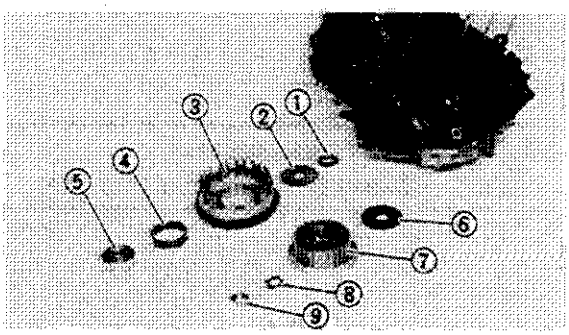
2. Apply:
- Lithium soap base grease (onto oil seal lips)
- Engine oil (onto shift shaft)

3. Install:
- Shift shaft ①

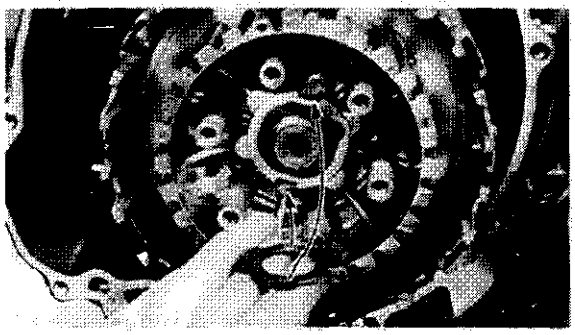


4. Install:
- Washer ①
- Circlip ②

5. Apply:
- Engine oil (onto bearing and gear teeth)

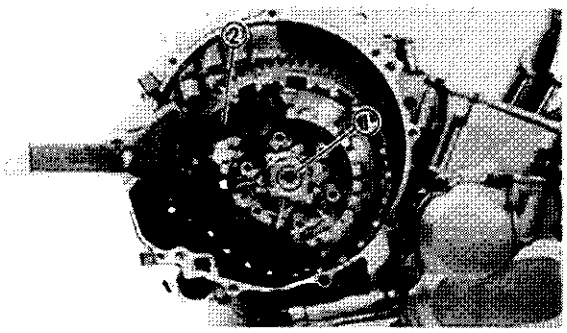


6. Install:
- Collar ①
- Thrust plate ② (inner)
- Clutch housing ③
- Bearing ④
- Spacer ⑤
- Thrust plate ⑥
- Clutch boss assembly ⑦
- Lock washer ⑧
- Nut ⑨ (clutch boss)



CAUTION:
Use a new lock washer.

NOTE:
Fit the tabs of the lock washer to the groove of the clutch boss.



7. Tighten:
- Nut ① (clutch boss)

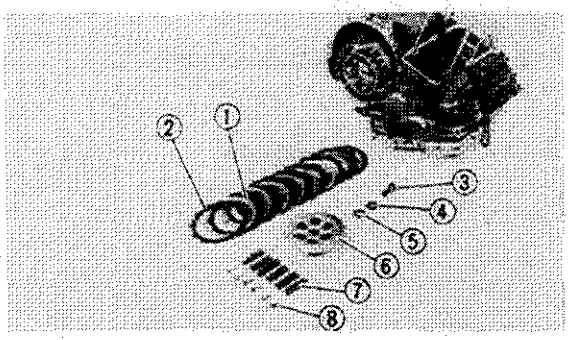
NOTE:
Tighten the nut (clutch boss) while holding the clutch boss with the universal clutch holder ② .

	Universal clutch holder: P/N YM-91042/90890-04086

	Nut (clutch boss): 70 Nm (7.0 m · kg, 51 ft · lb)

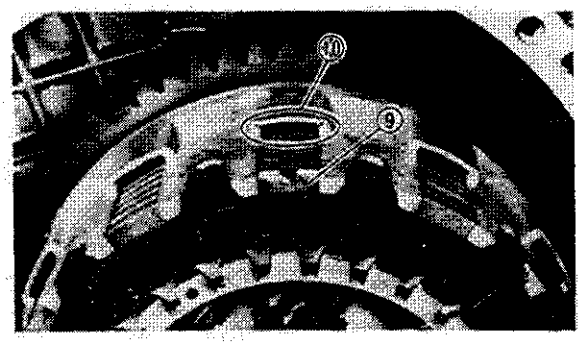
8. Bend:
- Lock washer tab (along nut flat)

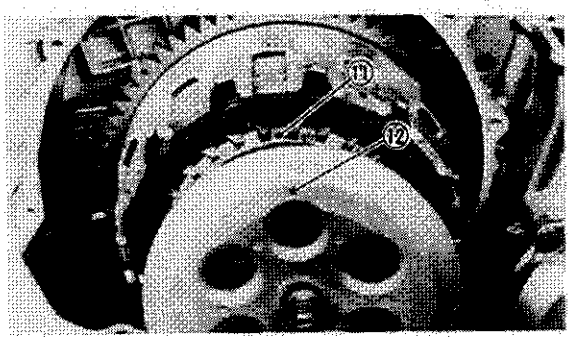
9. Apply:
- Molybdenum disulfide grease (onto gear teeth of pull rod)
- Engine oil (onto bearing (pull rod))



10. Install:
- Clutch plates ①
- Friction plate ②
- Pull rod ③
- Bearing ④ (pull rod)
- Washer ⑤
- Pressure plate ⑥
- Clutch spring ⑦
- Bolts ⑧

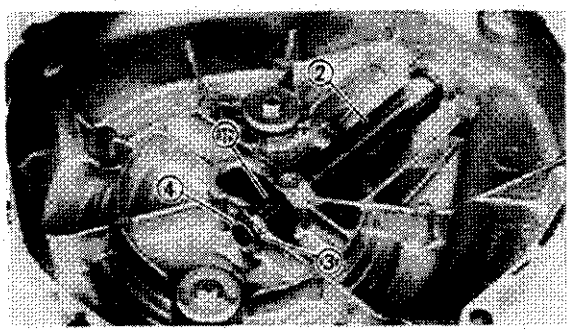
NOTE:
- Install the clutch plate with slick surface first.
- Install the friction plate with semi-circular slot ⑨ closest to pressure plate and align the semi-circular slot with the embossed marks ⑩ on the clutch housing.
- Make sure that the match mark ⑪ on the clutch boss is aligned with the match mark ⑫ on the pressure plate.
- Tighten the bolts (pressure plate) in a criss-cross pattern.



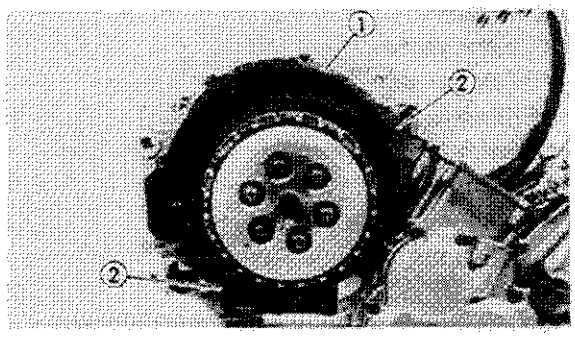


	Bolt (pressure plate): **8 Nm (0.8 m · kg, 5.8 ft · lb)**

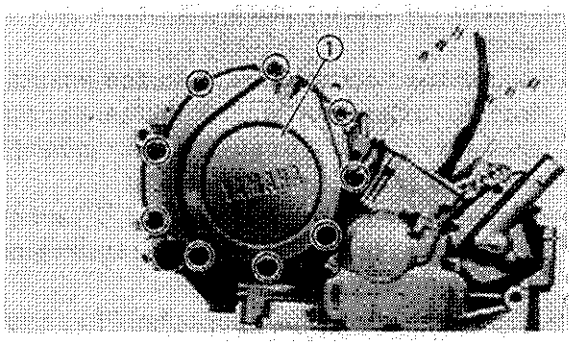
11. Apply:
- Lithium soap base grease
  (onto oil seal lips in crankcase cover)
- Engine oil
  (onto bearings in crankcase cover)



12. Install:
- Release pinion gear ①
- Pull lever axle ②
- Washer ③
- Circlip ④
  (into crankcase cover)



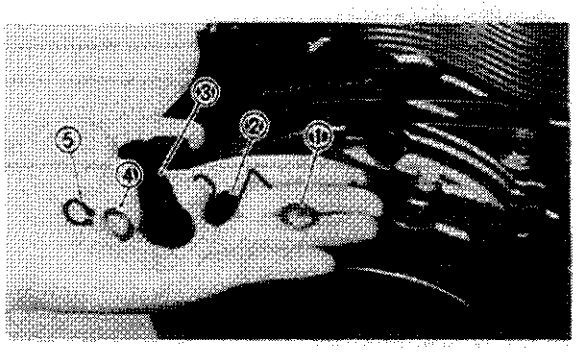
13. Install:
- Gasket ① (crankcase cover)
- Dowel pins ②



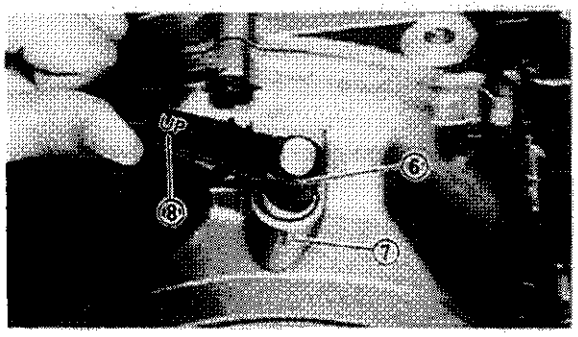
14. Install:
- Crankcase cover ① (right)

	Bolt (crankcase cover): 10 Nm (1.0 m · kg, 7.2 ft · lb)

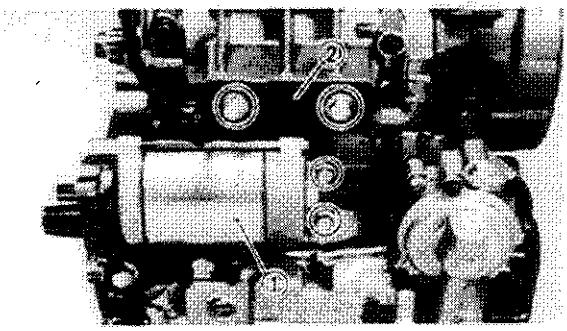
NOTE:
Tighten the bolts (crankcase cover) in a criss-cross pattern.



15. Install:
- Washer ①
- Return spring ②
- Pull lever ③
- Washer ④
- Circlip ⑤



NOTE:
- Make sure that the mark ⑥ on the pull lever is aligned with the embossed mark ⑦ on the crankcase while pushing the pull lever. If not, change the pull lever position.
- Install the pull lever with the "UP" mark ⑧ facing upward.

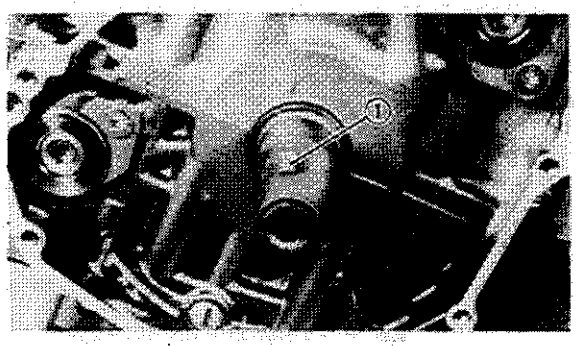


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ROTOR AND STARTER DRIVES

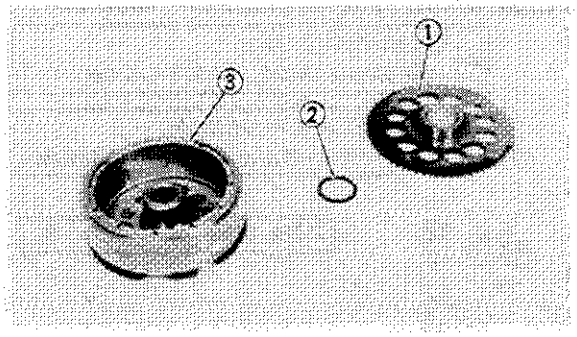
1. Apply:
- Lithium soap base grease (onto O-ring on starter motor)

2. Install:
- Starter motor ①
- Engine stay ②



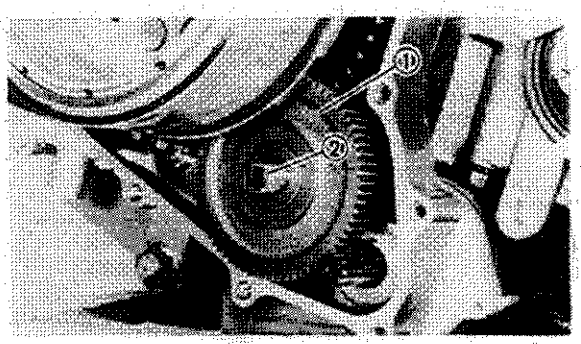
	Bolt (starter motor): **10 Nm (1.0 m · kg, 7.2 ft · lb)** **Bolt (engine stay):** **30 Nm (3.0 m · kg, 22 ft · lb)**

3. Install:
- Woodruff key ①

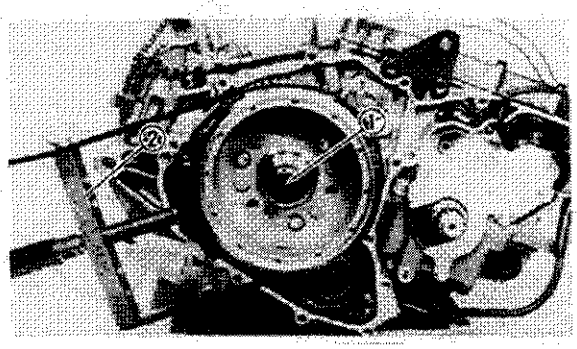


4. Install:
- Wheel gear ①
- Washer ②
- Rotor ③

NOTE:
When installing the magneto rotor, make sure that the woodruff key is properly seated in the keyway of the crankshaft.



5. Install:
- Starter idle gear ①
- Shaft ② (starter idle gear)

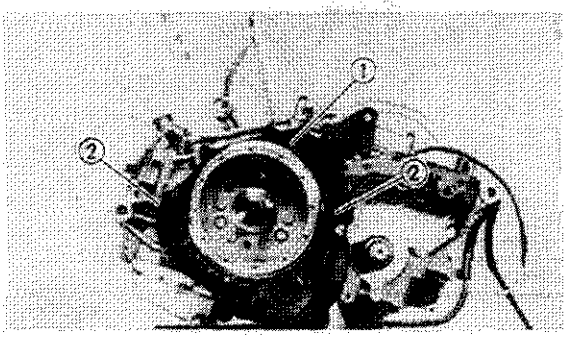


6. Install:
- Bolt ① (rotor)

	Bolt (rotor): **130 Nm (13 m · kg, 94 ft · lb)**

NOTE:
Tighten the bolt (rotor) while holding the rotor with the rotor holder ② .

	Rotor holder: **P/N YS-01880/90890-01701**

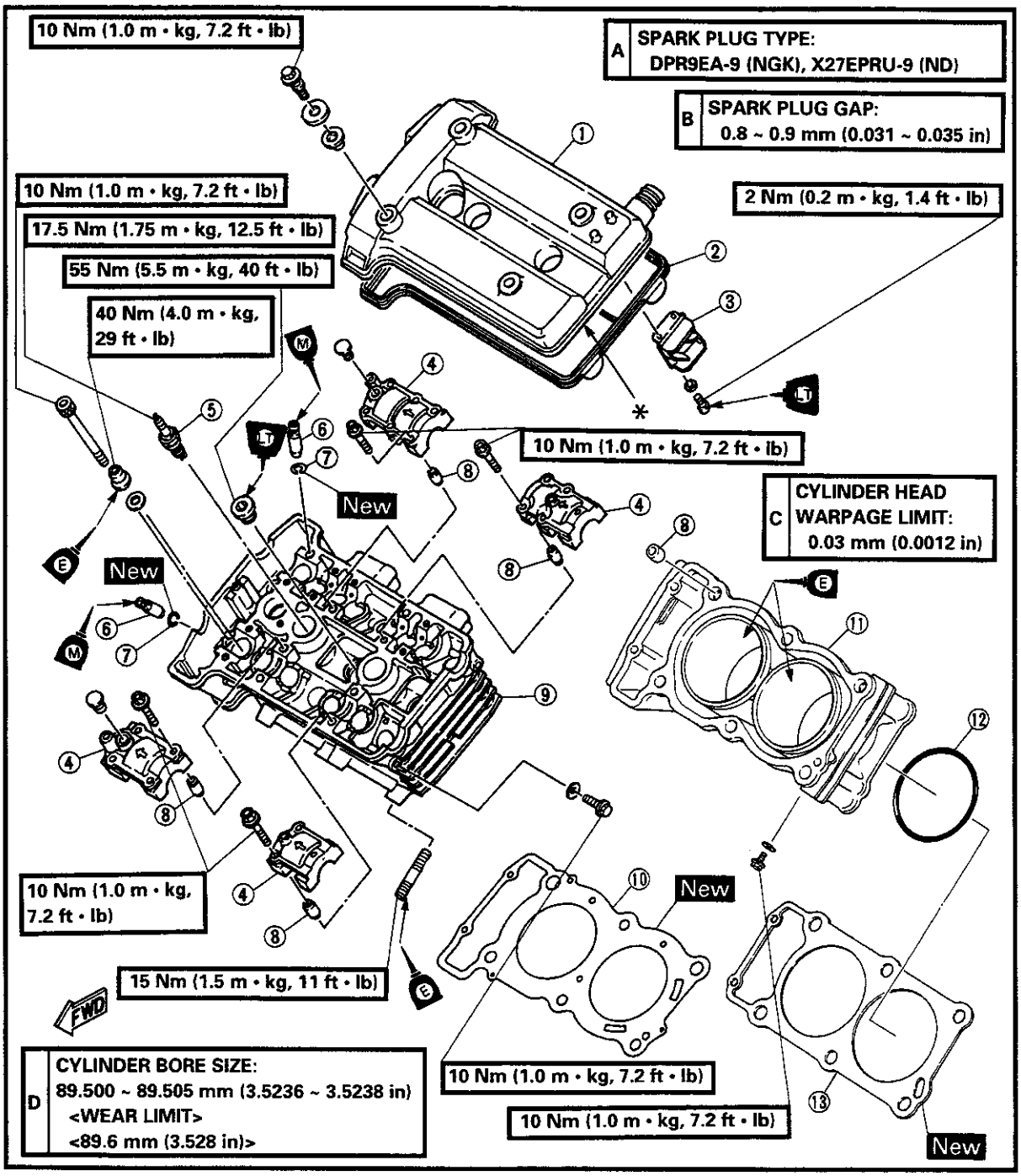


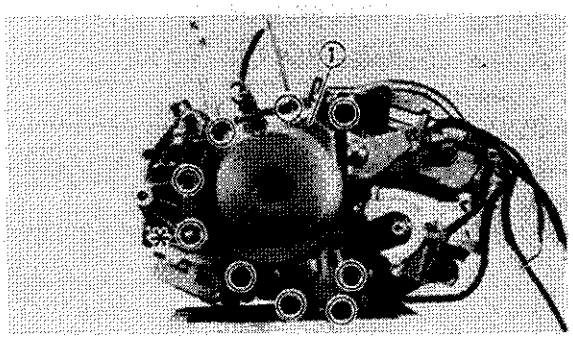
7. Install:
- Gasket ① (crankcase cover)
- Dowel pins ②

CYLINDER HEAD AND CYLINDER

① Cylinder head cover
② Gasket
③ Breather
④ Camshaft cap
⑤ Spark plug
⑥ Valve guide
⑦ Circlip
⑧ Dowel pin
⑨ Cylinder head
⑩ Gasket
⑪ Cylinder
⑫ O-ring
⑬ Gasket

*Apply Yamaha bond No.1215





8. Install:
• Crankcase cover ① (left)

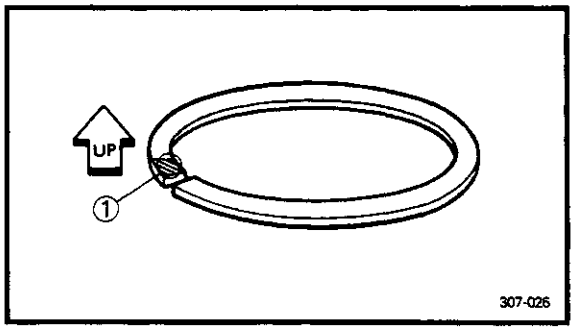
	Bolt (crankcase cover): 10 Nm (1.0 m • kg, 7.2 ft • lb)

NOTE:
• For indicated bolt ✻, apply Loctite® onto the threads of bolt.
• Tighten the bolts (crankcase cover) in a crisscross pattern.

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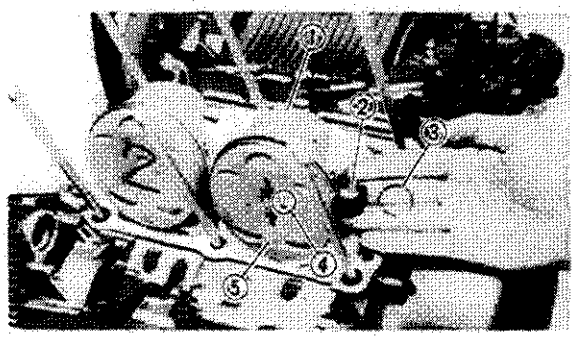
CYLINDER HEAD, CYLINDER AND PISTONS

1. Apply:
• Engine oil
(onto piston ring and piston pins)



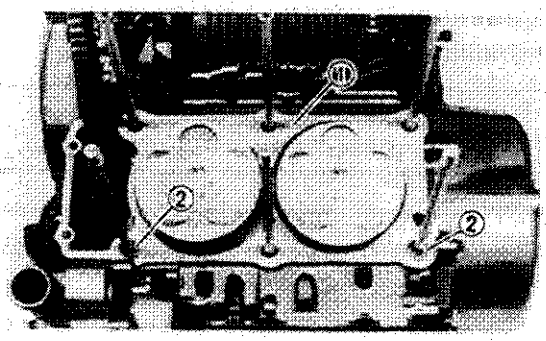
2. Install:
• Piston rings

NOTE:
Be sure to install ring so that manufactures marks or numbers ① are located on the top side of the rings.



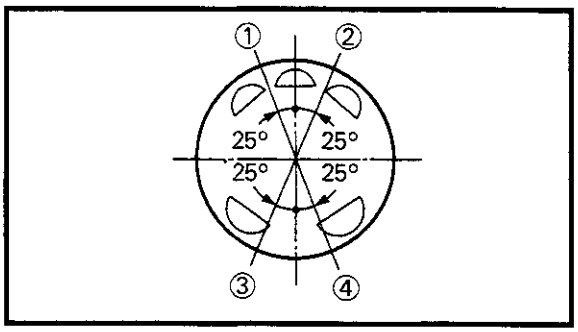
3. Install:
• Pistons ①
• Piston pins ②
• Circlips ③

NOTE:
• The allow ④ on the piston must point to the front of the engine.
• Make sure that the marked numbers ⑤ on the piston should be in sequence beginning from the left.
• Before installing the circlip, cover the crankcase with a clean towel or rag so you will not accidentally drop the pin clip and material into the crankcase.



4. Install:
- Gasket ① (cylinder)
- Dowel pins ②

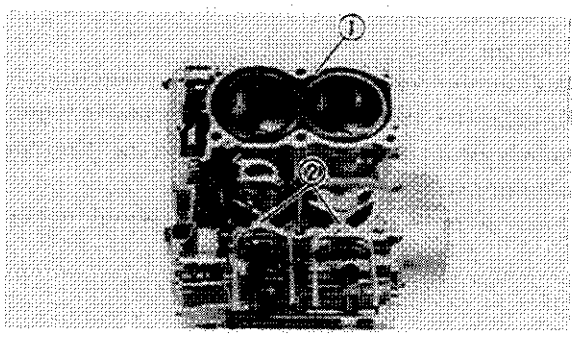
NOTE:
Install the gasket with the "UP" mark facing upward.



5. Position:
- Top ring
- 2nd ring

Offset the piston ring end gaps as shown.

① Top ring end
② Oil ring end (lower)
③ Oil ring end (upper)
④ 2nd ring end

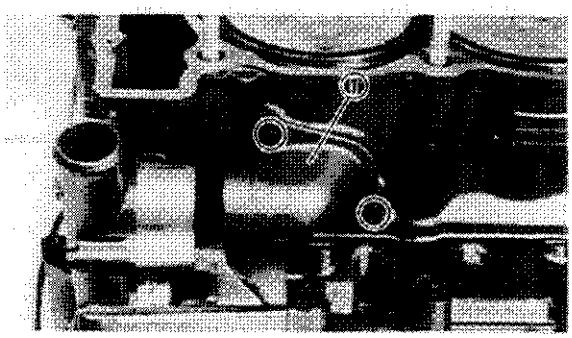


6. Install:
- Cylinder ①

NOTE:
Install the cylinder while compressing the piston ring with the piston ring compressor ② .

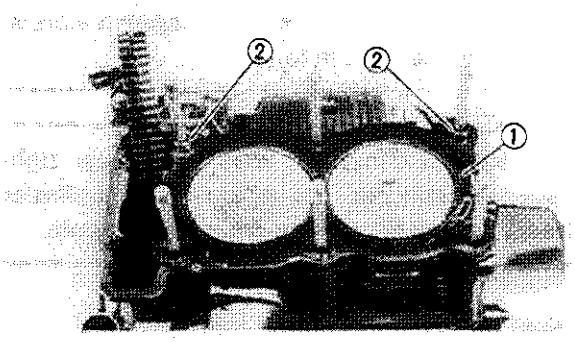
Piston ring compressor:
P/N YU-33294/90890-04121

7. Apply:
- Lithium soap base grease (onto O-ring in pipe)

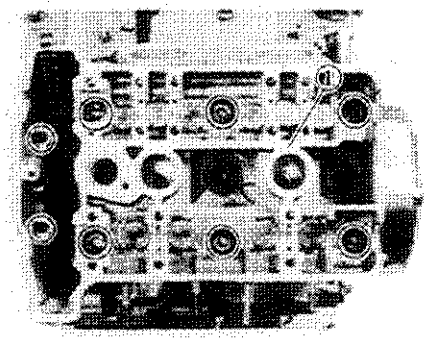


8. Install:
- Pipe ① (with O-rings)

Bolt (pipe):
10 Nm (1.0 m · kg, 7.2 ft · lb)



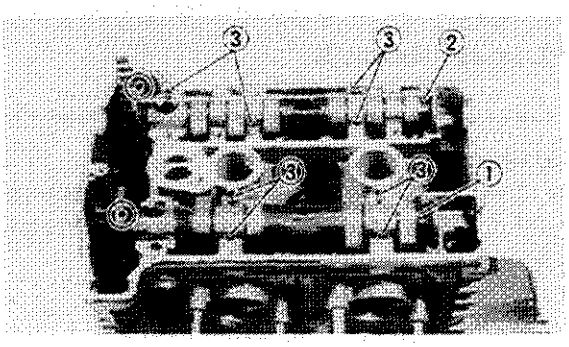
9. Install:
- Gasket ① (cylinder head)
- Dowel pins ②



10. Install:
- Cylinder head ①

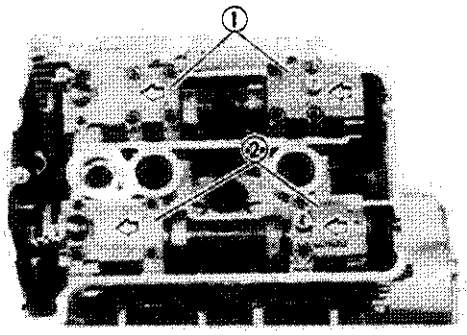
	Nut (cylinder head): **40 Nm (4.0 m · kg, 29 ft · lb)** **Bolt (cylinder head):** **10 Nm (1.0 m · kg, 7.2 ft · lb)**

NOTE:
- Apply the engine oil onto the nut threads.
- Tighten the nuts in a crisscross pattern.



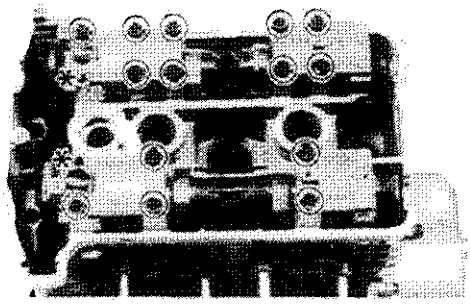
11. Install:
- Exhaust camshaft ①
- Intake camshaft ②
- Dowel pins ③

NOTE:
Install the camshaft with the punch mark facing upward.



12. Install:
- Camshaft caps ① (intake camshaft)
- Camshaft caps ② (exhaust camshaft)

NOTE:
Install the camshaft cap with the arrow mark embossed facing right side of the engine.



13. Tighten:
- Bolts (camshaft caps)

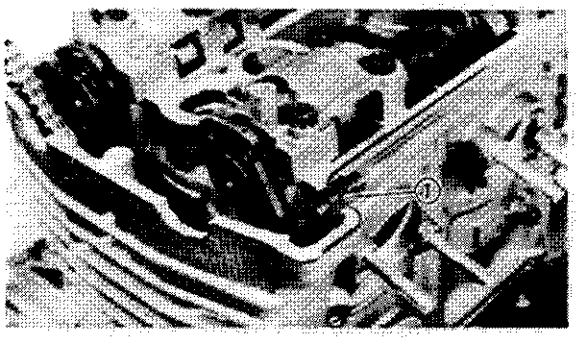
	Bolt (camshaft caps): **10 Nm (1.0 m · kg, 7.2 ft · lb)**

NOTE:
- Do not install the bolts at * marked place in this stage.

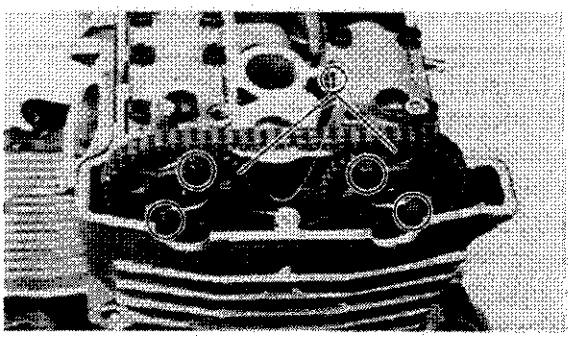
• Tighten the bolts (camshaft caps) in a criss-cross pattern from inner.

CAUTION:

The bolts (camshaft caps) must be tightened evenly or damage to the cylinder head, camshaft caps and cam will result.



14. Install:
• Chain guide ① (exhaust)

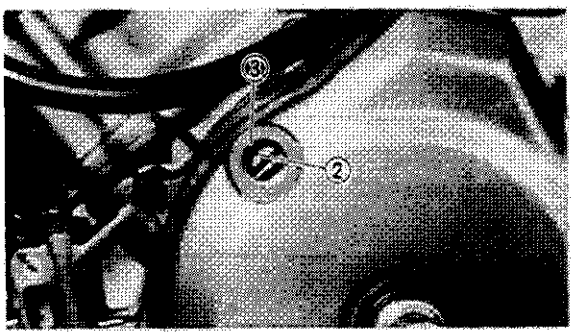


15. Install:
• Cam sprockets ①

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Installing steps:

● Turn the crankshaft counterclockwise until the TDC mark ② is aligned with the stationary pointer ③.

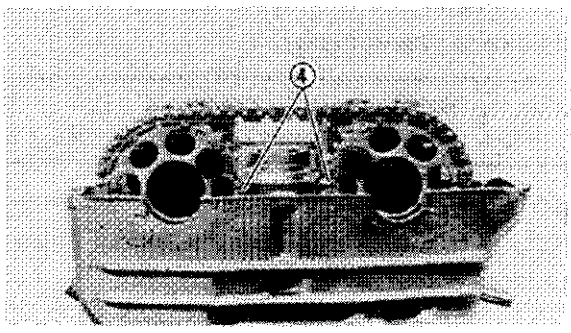


● Fit the timing chain onto both cam sprockets and install the cam sprockets on the camshafts.

NOTE:

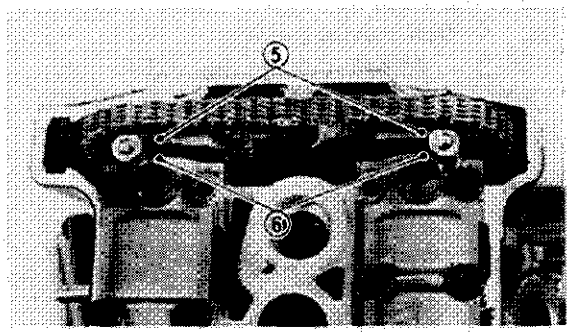
When installing the cam sprockets, start with the exhaust camshaft to keep the timing chain as tense as possible on the exhaust side, and set the respective match marks ④ to be parallel with the case surface on the corresponding sides.

"I":Intake side
"E":Exhaust side



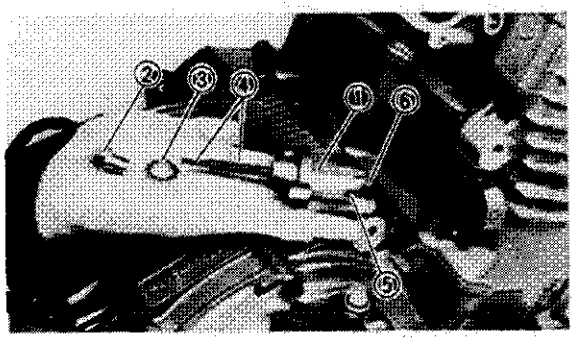
CAUTION:

Do not turn the crankshaft during the camshafts installation. Damage or improper valve timing will result.



- Turn both camshafts opposite to each other unit the punch mark ⑤ on the camshaft is aligned with the embossed mark ⑥ on the camshaft cap.
- While holding the camshafts, temporary tighten the bolts.

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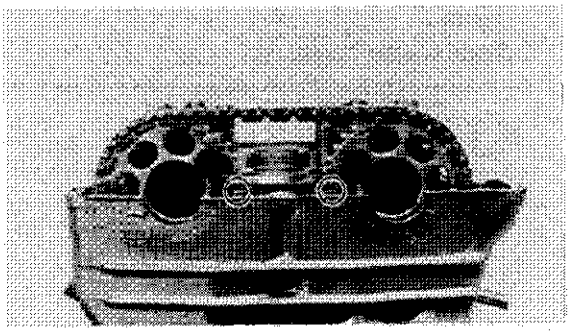
16. Install:
- Chain tensioner ①

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Installing steps:
- Remove the cap bolt ② , washer ③ and springs ④ .
- Release the ratchet ⑤ and push the tension rod ⑥ .

- Install the chain tensioner with the ratchet end facing downward.
- Tighten the bolts.

	Bolt (chain tensioner): 10 Nm (1.0 m · kg, 7.2 ft · lb)

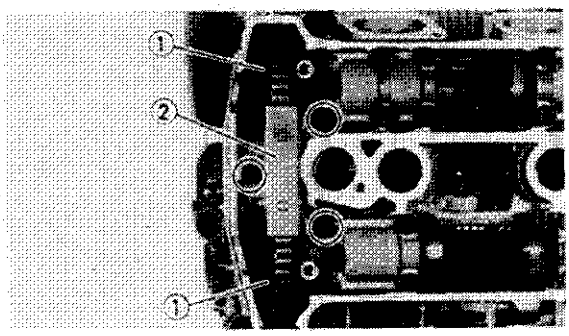


- Install the springs ④ , washer ③ and cap bolt ② .

	Cap bolt (timing chain tensioner): 20 Nm (2.0 m · kg, 14 ft · lb)

- Check the cam sprockets position. If not align, repeat No.15 to No.16 steps.

****



17. Tighten:
- Bolts ① (cam sprockets)

	Bolt (cam sprocket): 24 Nm (2.4 m · kg, 17 ft · lb)

18. Install:
- Chain guide ② (upper)

	Bolt (chain guide): **10 Nm (1.0 m · kg, 7.2 ft · lb)**

19. Check:
- Valve timing

  Out of alignment → Adjust.

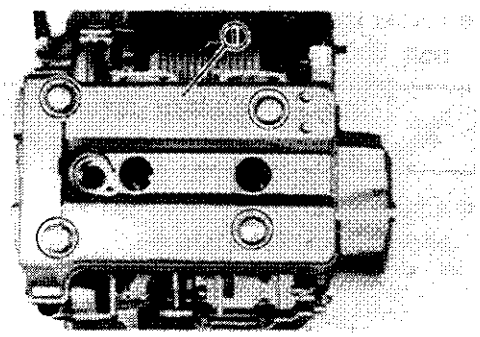
  Refer to above steps 13~16.

20. Check:
- Valve clearance

Out of specification → Adjust.

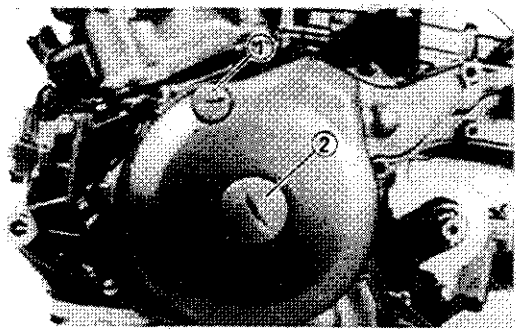
Refer to "VALVE CLEARANCE ADJUSTMENT" section in the CHAPTER 3.

	Install valve (cold): **0.15~0.20 mm** **(0.006~0.008 in)** **Exhaust valve (cold):** **0.25~0.30 mm** **(0.010~0.012 in)**

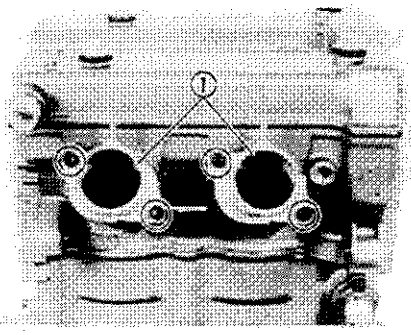


21. Install:
- Cylinder head cover ①

	Bolt (cylinder head): **10 Nm (1.0 m · kg, 7.2 ft · lb)**



22. Install:
- Timing plug ①
- Plug ②

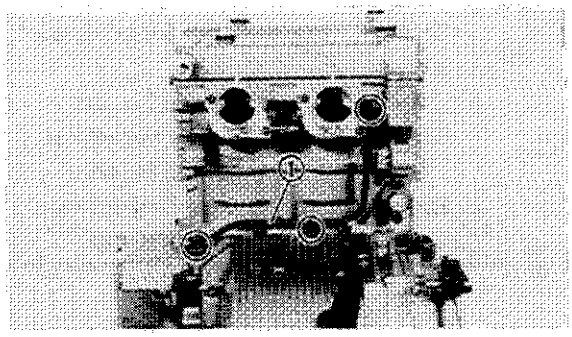


23. Install:
• Intake manifolds ① (with O-ring)

	Bolt (intake manifold): **10 Nm (1.0 m · kg, 7.2 ft · lb)**

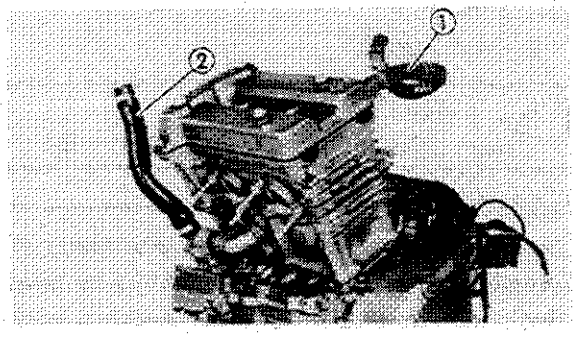
24. Install:
• Spark plug

	Spark plug: **17.5 Nm (1.75 m · kg, 12.5 ft · lb)**



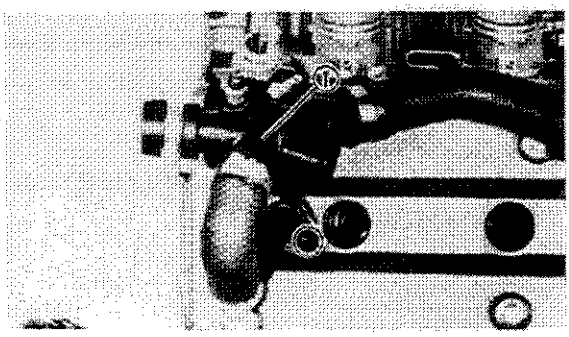
KB244013
PIPES AND HOSES
1. Install:
• Oil delivery pipe ①

	Union bolt: **21 Nm (2.1 m · kg, 15 ft · lb)** **Bolt:** **10 Nm (1.0 m · kg, 7.2 ft · lb)**



2. Install:
• Breather hose ①
• Radiator hose ②

3. Apply:
• Lithium soap base grease
(onto O-ring on oil seal pipes)



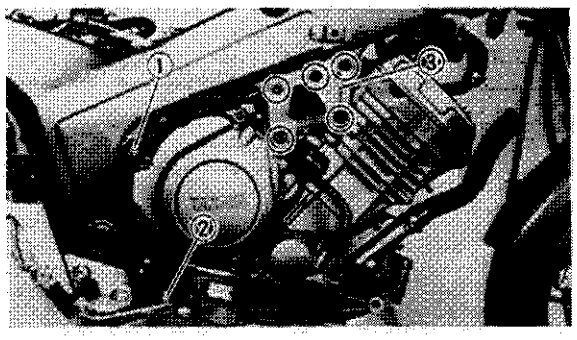
4. Install:
• Thermostat assembly ①

	Bolt (oil hose): **10 Nm (1.0 m · kg, 7.2 ft · lb)**

KB244014

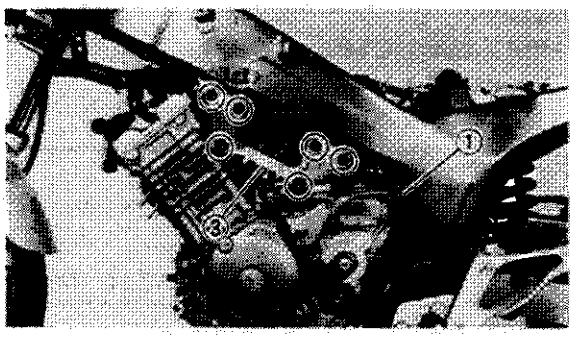
REMOUNTING ENGINE

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

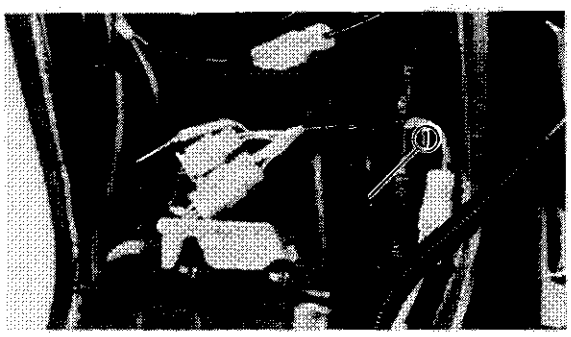


1. Install:
- Mounting bolt ① (rear—upper)
- Mounting bolt ② (rear—lower)
- Engine brackets ③ (left and right)

NOTE:
Install the all bolts and nuts first, and then tighten the bolts and nuts to specifications.



	Engine mounting (rear—upper/lower): **64 Nm (6.4 m · kg, 46 ft · lb)** **Engine mounting (frame—bracket):** **30 Nm (3.0 m · kg, 22 ft · lb)** **Engine mounting (engine—bracket):** **60 Nm (6.0 m · kg, 43 ft · lb)**

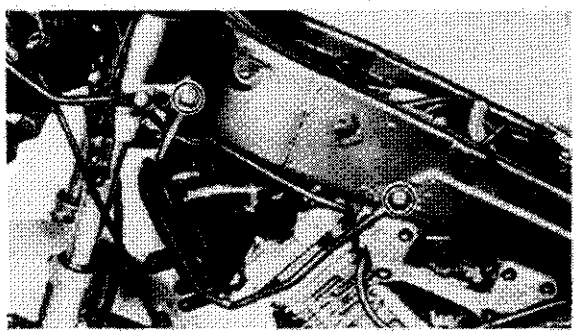


2. Connect:
- Ground lead ①

	Bolt: **10 Nm (1.0 m · kg, 7.2 ft · lb)**

CAUTION:
Make sure the hoses, cables and leads are properly routed, and damaged or twisted. Refer to "CABLE ROUTING" section in the CHAPTER 2.

3. Adjust:
- Clutch cable free play
  Refer to the "CLUTCH ADJUSTMENT" section in the CHAPTER 3.



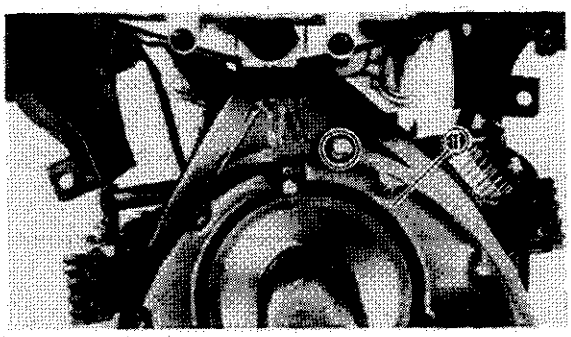
Free play:
10~15 mm (0.4~0.6 in)
at clutch lever end

4. Install:
• Radiator (with stay)

Bolt (radiator stay):
16 Nm (1.6 m · kg, 11 ft · lb)

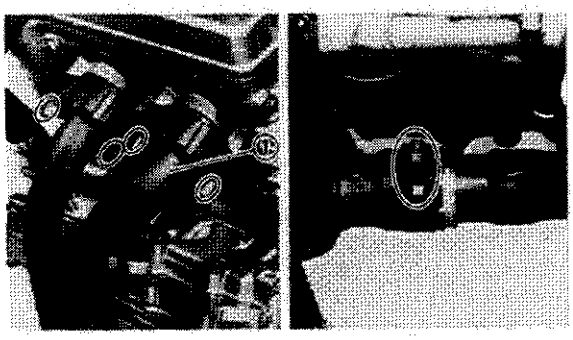
5. Tighten:
• Screws (hose clamps)

Screw (hose clamp):
2 Nm (0.2 m · kg, 1.4 ft · lb)



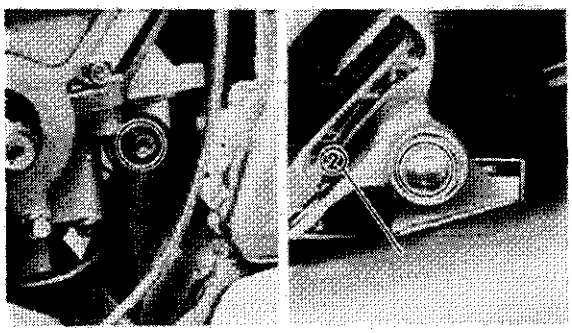
6. Install:
• Air filter case ①

Bolt (air filter case):
7 Nm (0.7 m · kg, 5.1 ft · lb)

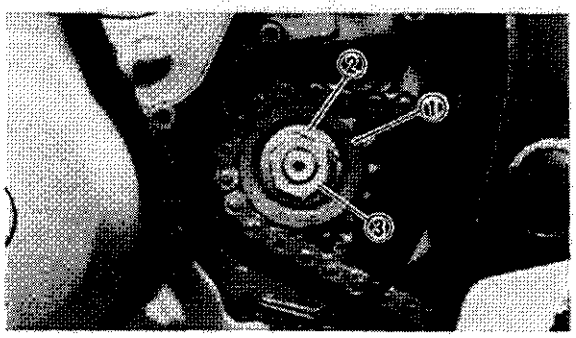


7. Install:
• Exhaust pipes ①
• Muffler ②

Nut (exhaust pipe):
20 Nm (2.0 m · kg, 14 ft · lb)
Bolt (exhaust pipe and muffler):
20 Nm (2.0 m · kg, 14 ft · lb)



Bolt (chamber):
24 Nm (2.4 m · kg, 17 ft · lb)
Bolt (muffler):
30 Nm (3.0 m · kg, 22 ft · lb)



8. Install:
- Drive sprocket ①
- Lock washer ②
- Nut ③

⚠ WARNING

Use a new lock washer.

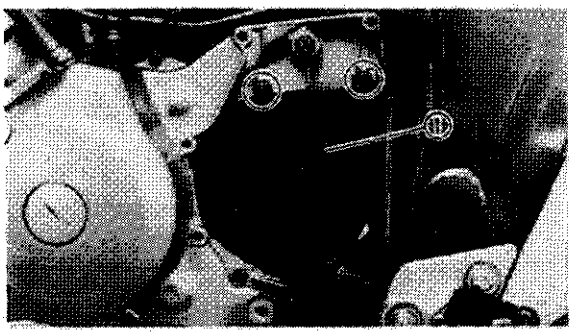
	Nut (drive sprocket): **70 Nm (7.0 m · kg, 50 ft · lb)**

9. Bend:
- Lock washer tab (along nut flat)

10. Adjust:
- Drive chain slack

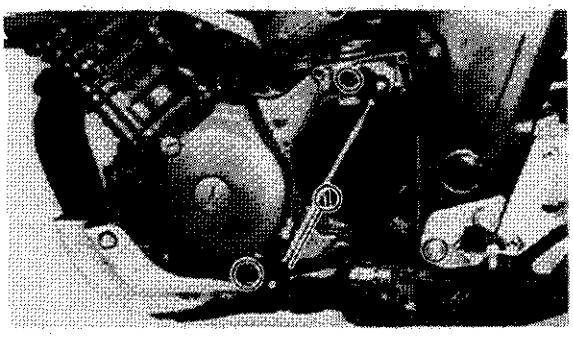
Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.

	Drive chain slack: **40~50 mm (1.6~2.0 in)**



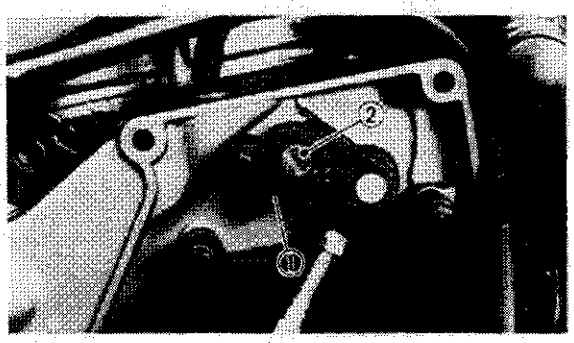
11. Install:
- Sprocket cover ①

	Bolt (sprocket cover): **5 Nm (0.5 m · kg, 3.6 ft · lb)**

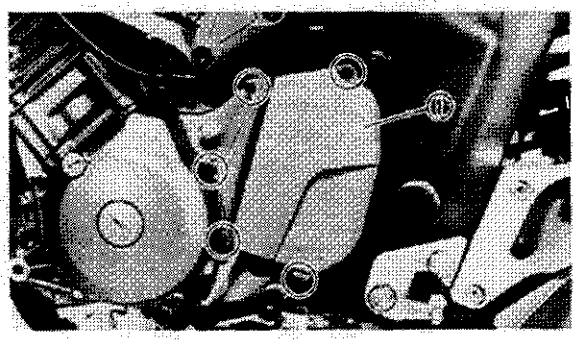


12. Install:
- Shift rod assembly ①

	Bolt (shift pedal): **12 Nm (1.2 m · kg, 8.7 ft · lb)** **Bolt (shift rod):** **22 Nm (2.2 m · kg, 16 ft · lb)**

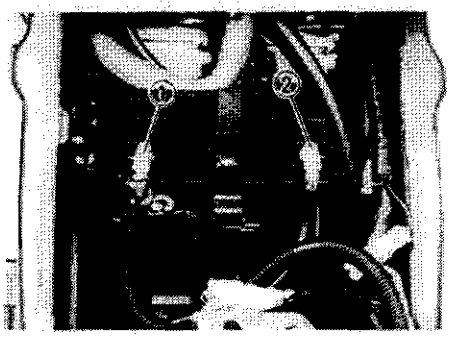


NOTE:
Align the opening ① of the shift arm with the opposite side of punch mark ② on the shift shaft.



13. Install:
• Cover ①

	Bolt (cover): **5 Nm (0.5 m · kg, 3.6 ft · lb)**



14. Connect:
• Battery leads

CAUTION:
Connect the positive lead ① first and then connect the negative lead ② .

15. Fill:
• Coolant
Refer to the "COOLANT REPLACEMENT" section in the CHAPTER 3.
• Engine oil
Refer to the "ENGINE OIL REPLACEMENT" section in the CHAPTER 3.

16. Install:
• Fuel tank
• Upper cowling
• Side cowlings
• Seat
Refer to the "SEAT, COWLING AND FUEL TANK" section in the CHAPTER 3.

KB251000

COOLING SYSTEM

RADIATOR

⚠ WARNING

Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by the following procedure:
Place a thick rag, like a towel, over the radiator cap, slowly rotated the cap counterclockwise to the detent. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.

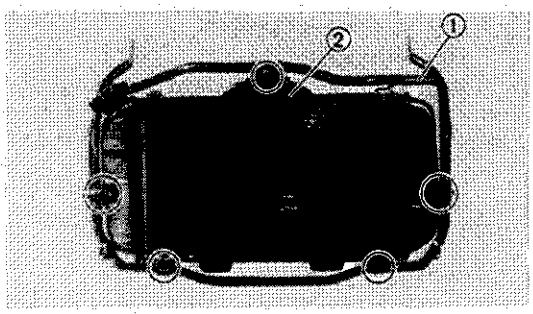
KB251001

REMOVAL

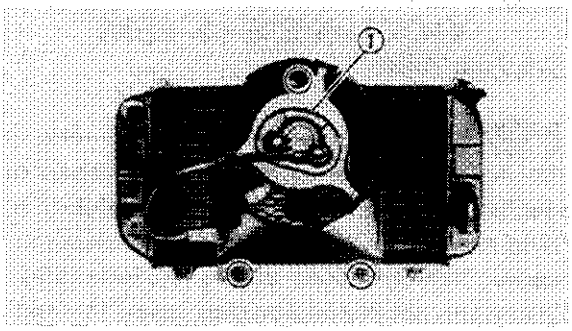
1. Remove:
- Side cowlings (left and right)
- Upper cowling
  Refer to "SEAT, COWLING AND FUEL TANK" section in the CHAPTER 3.

2. Drain:
- Coolant
  Refer to "COOLANT REPLACEMENT" in the CHAPTER 3.

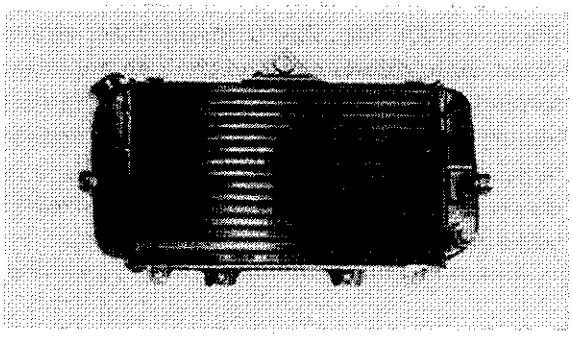
3. Remove:
- Radiator assembly
  Refer to "VALVE CLEARANCE ADJUSTMENT" in the CHAPTER 3.



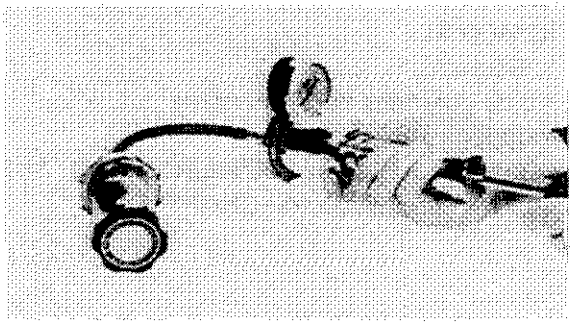
4. Remove:
- Radiator stay ①
- Radiator protector ②



5. Remove:
• Fan motor assembly ①



KB251002
INSPECTION
1. Inspect:
• Radiator
Obstruction → Blow out with compressed air through rear of radiator.
Flattened fins → Repair.
• Coolant hoses
Cracks/Damage → Replace.



2. Install:
• Radiator cap tester
• Adapter

****

Inspection steps:
● Measure radiator cap pressure using the radiator cap tester.
● Check vacuum valve for spring tension and seating condition.

	Radiator cap tester: **P/N YU-24460-01/90890-01325** **Adapter:** **P/N YU-33984/90890-01352**

● Valve opens at pressure below specified value or defective → Replace.

Valve opening pressure:
75~105 kPa
(0.75~1.05 kg/cm², 10.7~14.9 psi)

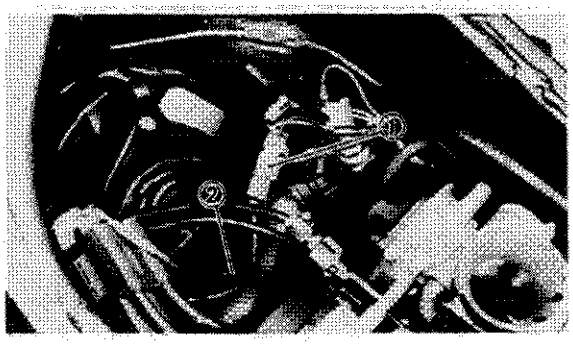
****

KB251003

ASSEMBLY

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

1. Install:
• Radiator assembly



	Bolt (radiator): **7 Nm (0.7 m · kg, 5.1 ft · lb)** **Bolt (radiator stay):** **16 Nm (1.6 m · kg, 11 ft · lb)**

2. Connect:
• Fan motor coupler ①
• Hose (radiator—inlet)
• Hose (radiator—outlet)
• Band ②
3. Tighten:
• Drain bolts

	Drain bolt: **10 Nm (1.0 m · kg, 7.2 ft · lb)**

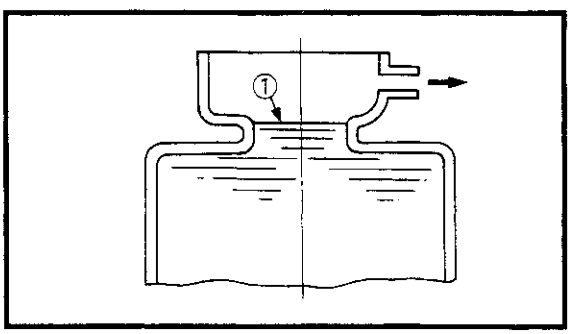
NOTE:
Replace with new copper gaskets.

4. Fill:
• Cooling system

****

Coolant filling steps:

- Fill the coolant into the radiator until the radiator is full.
- Start the engine (coolant level decreases.)



CAUTION:

Always check coolant level, and check for coolant leakage before starting engine.

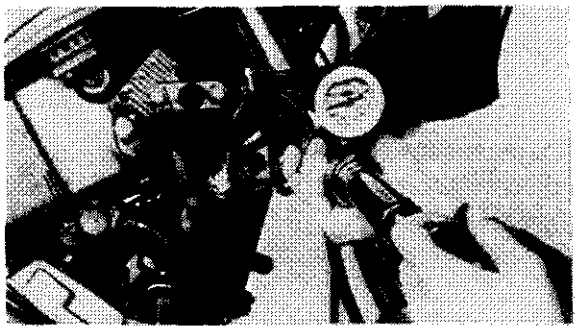
- Add the coolant while engine is running.
- Stop the engine when coolant level stabilizes.
- Add the coolant again to specified level ① .
- Install the radiator cap.

****

Recommended coolant:
High quality ethylene glycol anti-freeze containing anti-corrosion for aluminum engine inhibitors

Coolant and water mixed ratio:
50%:50%
Total amount:
1.7 L (1.5 Imp qt, 1.8 US qt)
Reservoir tank capacity:
0.3 L (0.26 Imp qt, 0.32 US qt)
From "LOW" to "FULL" level:
0.2 L (0.18 Imp qt, 0.21 US qt)

CAUTION:
- **Hard water or salt water is harmful to the engine. You may use distilled water if you can not get soft water.**
- **Do not mix more than one type of ethylene glycol anti-freeze containing corrosion for aluminum engine inhibitors.**



5. Inspect:
- Cooling system

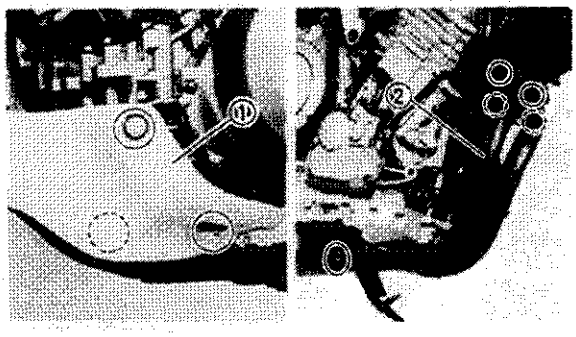
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Inspection steps:
- Connect radiator cap tester and adapter.
- Apply 1.0 kg/cm² (14 lb/in²) pressure.
- Measure pressure with gauge.
  Decrease of pressure (leaks) → Repair as required.

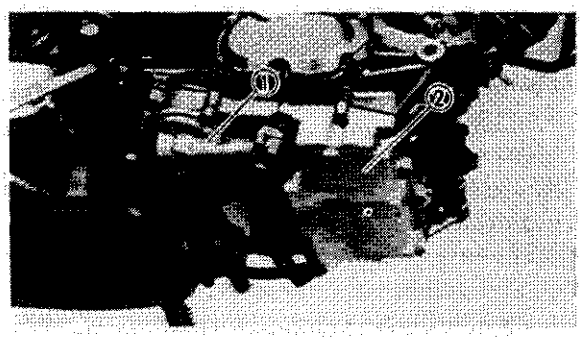
Radiator cap tester:
P/N YU-24460-01/90890-01325
Adapter:
P/N YU-33984/90890-01352

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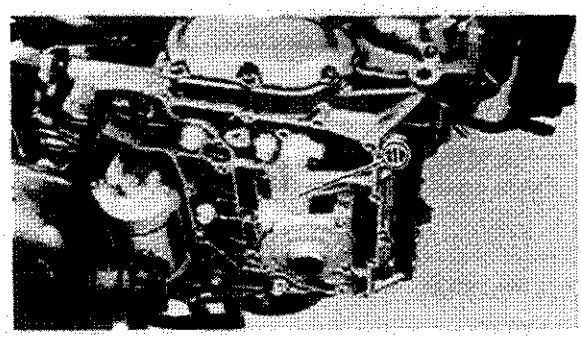
KB252001
WATER PUMP
DISASSEMBLY
NOTE:
Be sure to drain the engine oil and coolant before disassembly of the cooling system components. Refer to "ENGINE OIL REPLACEMENT" and "COOLANT REPLACEMENT" section in the CHAPTER 3.



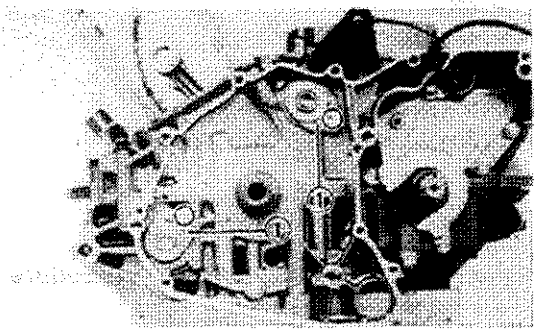
1. Remove:
- Engine guard ①
- Exhaust pipe ②



2. Remove:
- Oil filter cover ①
- Oil pan ②

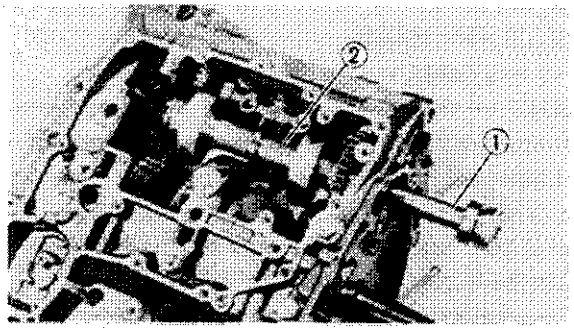


3. Remove:
- Oil strainer housing ①



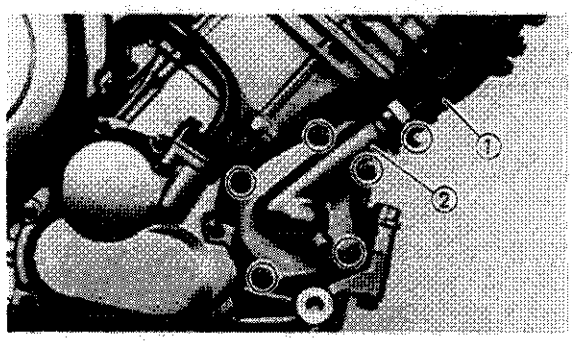
4. Remove:
- Crankcase cover (left)
- AC magneto
- Balancer shaft holder ①

Refer to the "ENGINE DISASSEMBLY" section in the CHAPTER 4.



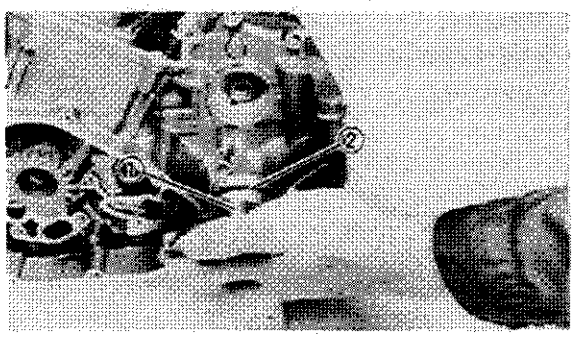
5. Remove:
- Balancer shaft (front) ①
- Balancer weight (front) ②

Refer to the "ENGINE DISASSEMBLY" section in the CHAPTER 4.



6. Disconnect:
- Radiator hose ① (radiator—water pump)

7. Remove:
- Cover (water pump) ②



8. Remove:
- Water pump housing ①
- O-ring ②
- Plain washer
- Water pump drive gear

Refer to "ENGINE DISASSEMBLY" section in the CHAPTER 4.

NOTE:

Put the washer on the shaft so that it may not drop into the crankcase, while removing the water pump housing.

9. Eliminate:
- Deposits

From the impeller and water pump housing.

KB252002

INSPECTION

1. Inspect:
- O-ring
- Water pump housing
- Plain washer
- Joint pipe

Cracks/Wear/Damage → Replace.

KB252003

ASSEMBLY

Reverse the "DISASSEMBLY" procedure.

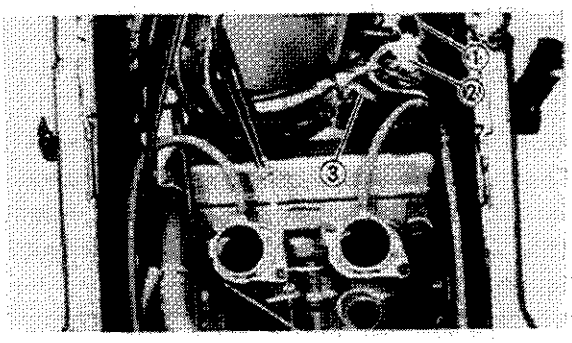
KB253001
THERMOSTAT
REMOVAL

1. Remove:
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

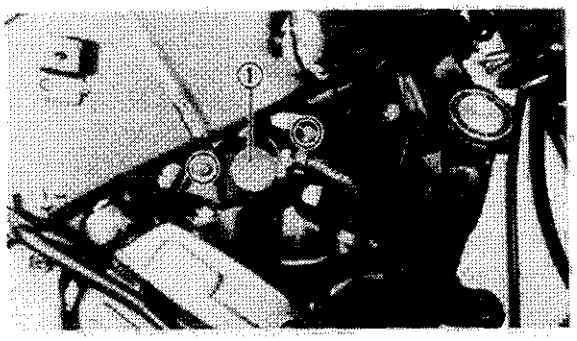
  Refer to "SEAT, COWLING AND FUEL TANK" section in the CHAPTER 3.
- Air filter case

2. Drain:
- Coolant

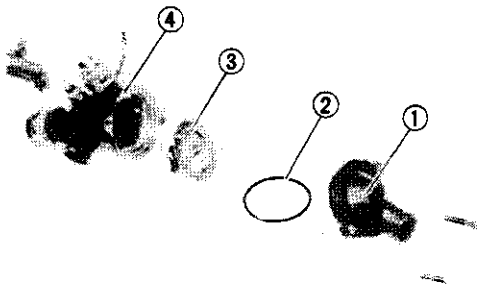
  Refer to "COOLANT REPLACEMENT" in the CHAPTER 3.



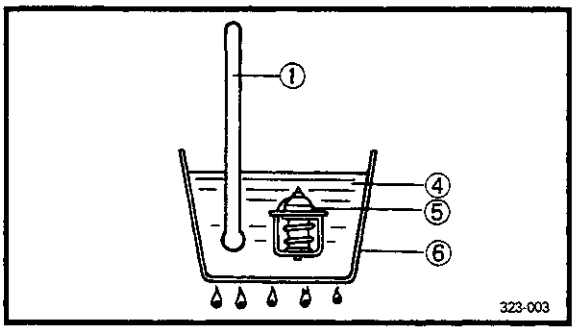
3. Disconnect:
- Thermo unit lead ①
- Thermo switch lead ②
- Ground lead ③

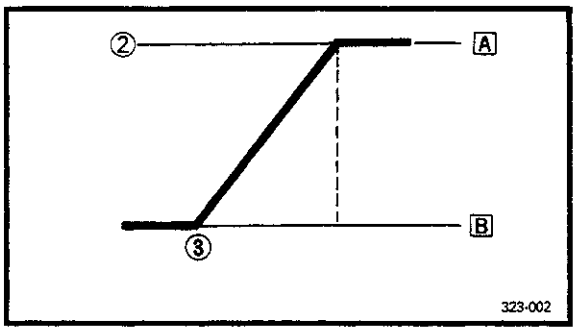


4. Remove:
- Thermostat assembly ①



5. Remove:
- Thermostat cover ①
- O-ring ②
- Thermostat ③
- Thermostat housing ④





KB253002

INSPECTION

1. Inspect:
• Thermostat ⑤
Valve dose not open at 80~84°C (176~183°F) → Replace.

****

Inspection steps:

- Suspend thermostat in a vessel.
- Place reliable thermometer in a water.
- Heat water slowly.
- Observe thermometer, while stirring water continually.

****

① Thermometer
② Full open
③ Opening sequence begins
④ Water
⑤ Thermostat
⑥ Vessel
A OPEN
B CLOSE

NOTE:

Thermostat is sealed and its setting is specialized work. If its accuracy is in doubt, replace it. A faulty unit could cause serious overheating or overcooling.

2. Inspect:
• O-ring
Wear/Damage → Replace.

KB253003

ASSEMBLY

1. Install:
• Thermostat
• Thermostat cover

	Bolt (thermostat cover): 10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

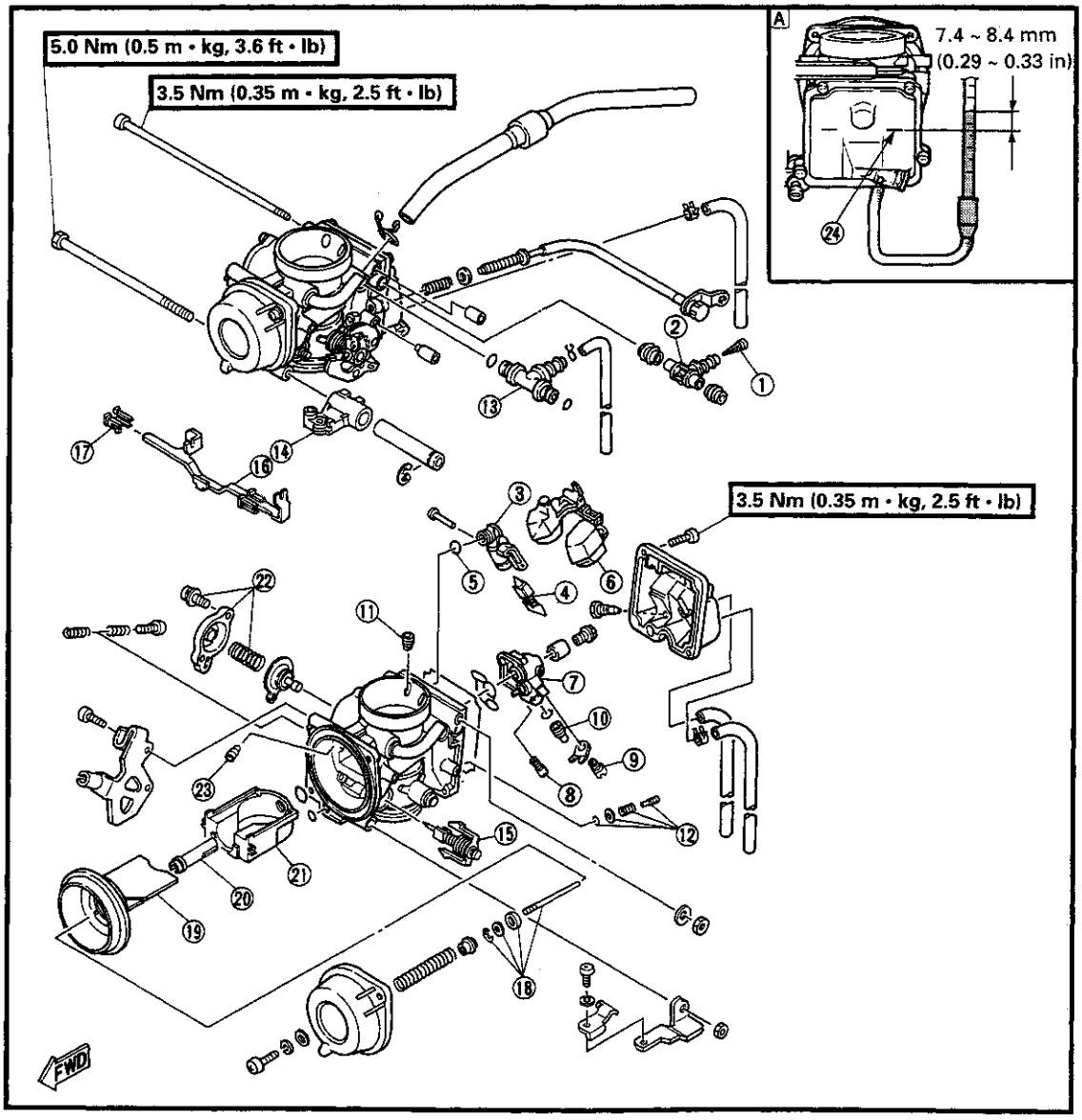
The thermostatic valve must be installed with the breather hole facing to the upward.

CARBURETION

CARBURETOR

① Fuel strainer
② Joint (delivery hose)
③ Valve seat
④ Needle valve
⑤ O-ring
⑥ Floats
⑦ Jet housing
⑧ Pilot jet
⑨ Starter jet
⑩ Main jet
⑪ Pilot air jet
⑫ Pilot air screw
⑬ Joint (ventilation hose)
⑭ Joint (starter lever)
⑮ Starter plunger
⑯ Starter joint
⑰ Stopper
⑱ Jet needle set
⑲ Piston valve
⑳ Needle jet
㉑ Piston valve support
㉒ Coasting enricher
㉓ Pilot air jet 2
㉔ Float chamber line

SPECIFICATIONS		
ID MARK	4DT00/4DT10	3VD00
MAIN JET	# 140	←
MAIN AIR JET	# 50	←
PILOT JET	# 37.5	←
PILOT AIR JET 1	# 75	#70
PILOT AIR JET 2	ø1.4	←
JET NEEDLE	5EL79	5G52-3
PILOT SCREW	Preset	3 Turns out
THROTTLE VALVE	# 130	←
ENGINE IDLE SPEED	1,000 ~ 1,200 r/min	←
FUEL LEVEL A	7.4 ~ 8.4 mm (0.29 ~ 0.33 in)	←



6

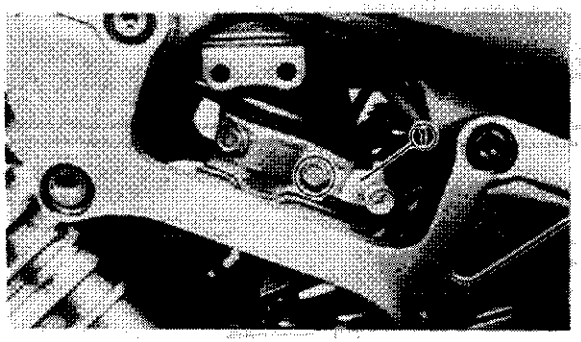
KB261001

REMOVAL

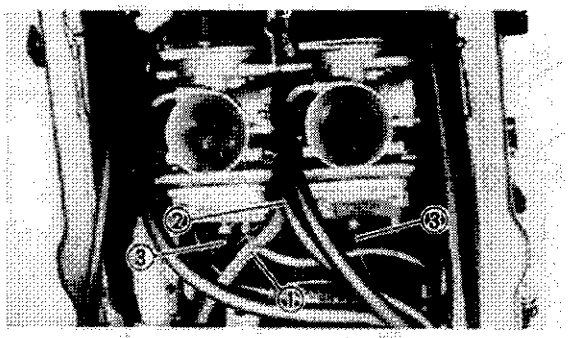
1. Remove:
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

  Refer to "SEAT, COWLING AND FUEL TANK" section.
- Air filter case

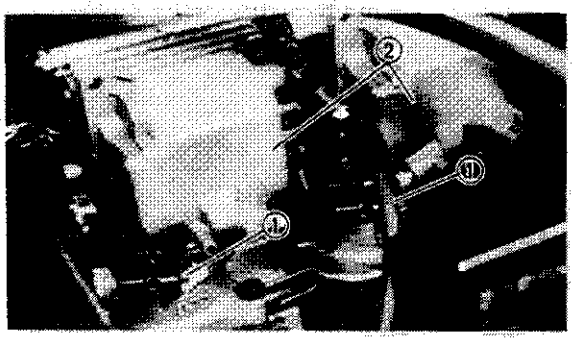
  Refer to "VALVE CLEARANCE ADJUSTMENT" section in the CHAPTER 3.



2. Remove:
- Throttle stop screw stay ①

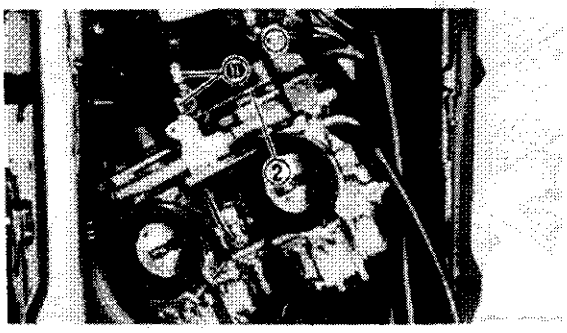


3. Disconnect:
- Fuel hose ①
- Breather hose ②
- Drain hoses ③



4. Loosen:
- Screws ①

5. Remove:
- Carburetors ②



6. Disconnect:
- Throttle cables ①
- Starter cable ②

NOTE:

Cover the intake manihold with a clean rag to prevent dirt or foreign material from entering the cylinder head.

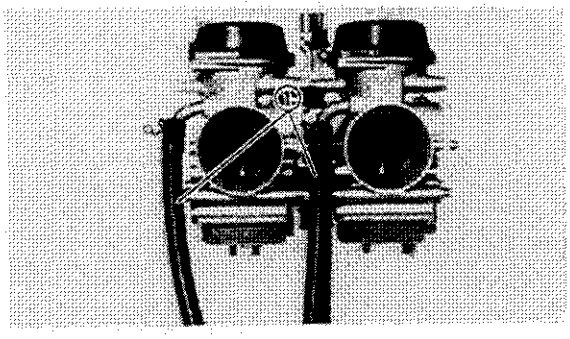
KB261002

DISASSEMBLY

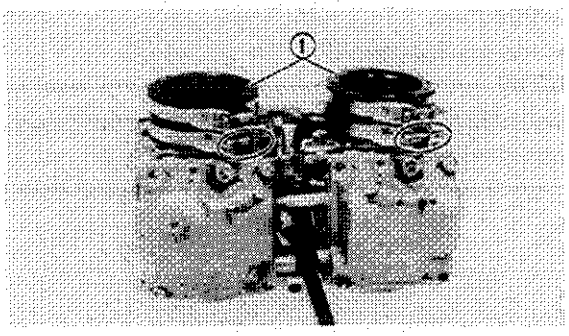
NOTE:

The following parts can be cleaned and inspected without carburetor separation.

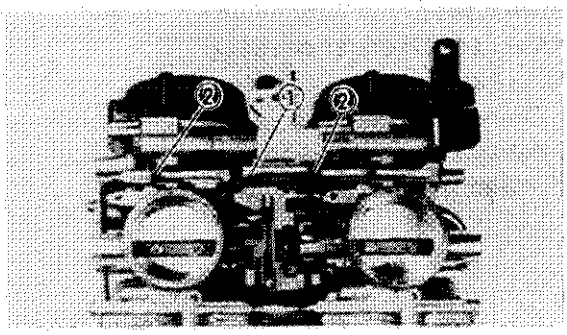
- Piston valve
- Starter plunger
- Float chamber components



1. Disconnect:
- Ventilation hoses (carburetor) ①

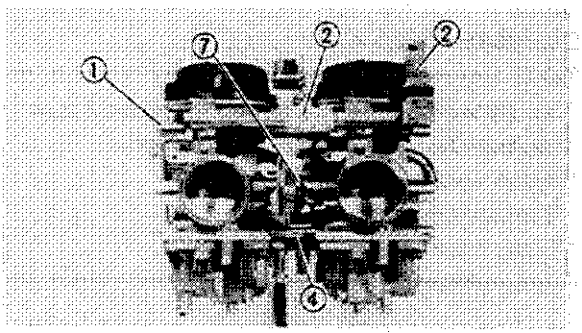


2. Remove:
- Carburetor joints ①

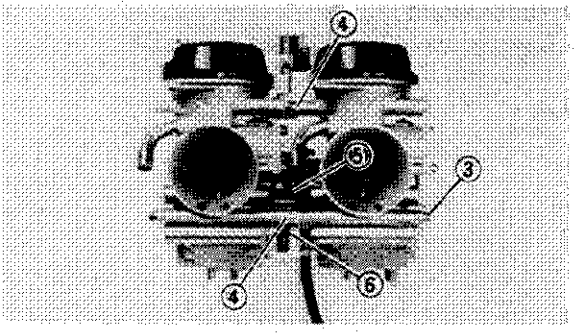


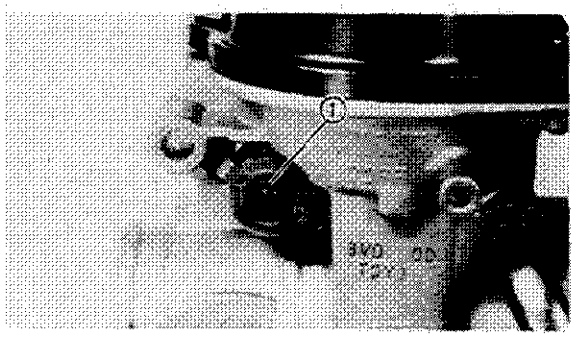
3. Remove:
- Starter joint ①

Slide out the stoppers ② to remove the starter joint ①.



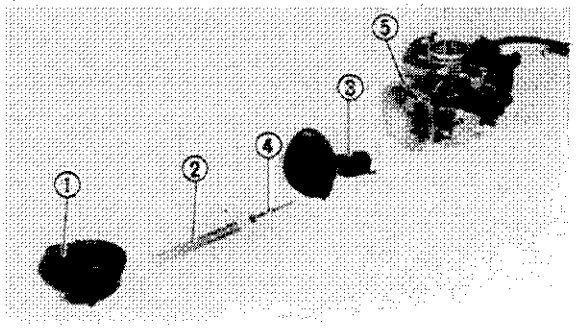
4. Remove:
- Connecting bolt ① (upper)
- Joints ② (starter lever)
- Connecting bolt ③ (lower)
- Spacer collars ④
- Joint ⑤ (ventilation hose)
- Joint ⑥ (delivery hose) (with gaskets/O-rings)
- Spring ⑦



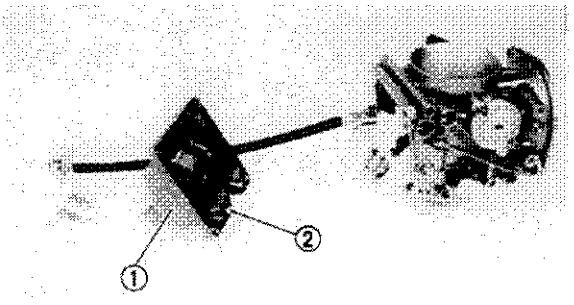


5. Remove:
- Starter plunger ①

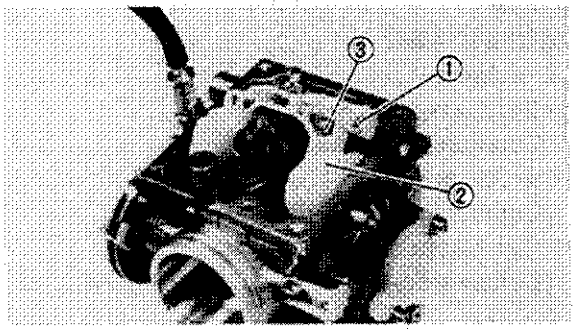
NOTE:
Unhook the hooks from the carburetor body and then pull out the starter plunger.



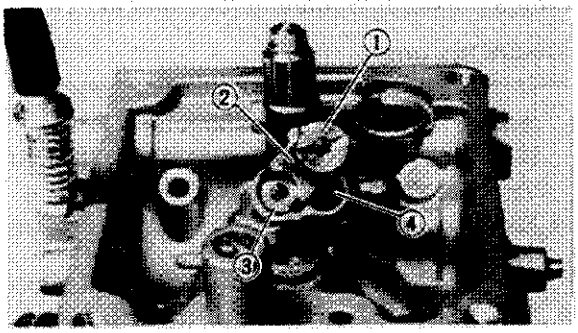
6. Remove:
- Vacuum chamber cover ①
- Spring ②
- Piston valve ③
- Jet needle ④
- O-ring ⑤



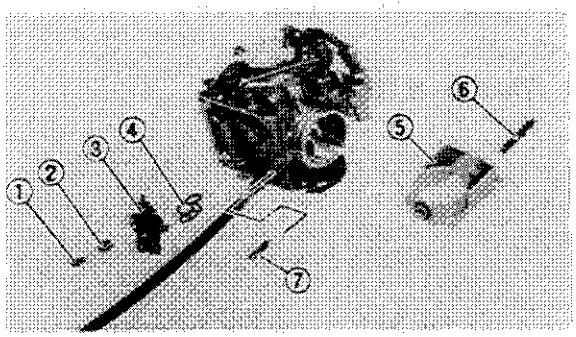
7. Remove:
- Float chamber cover ①
- Gasket ②



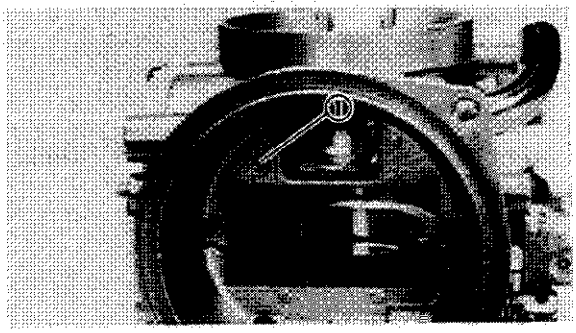
8. Remove:
- Float pin ①
- Float ②
- Needle valve ③
- Valve seat
- O-ring



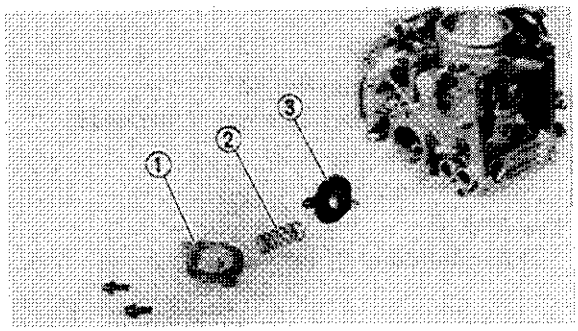
9. Remove:
- Starter jet ①
- Holder (main jet) ②
- Main jet ③
- Pilot jet ④



10. Remove:
- Bolt ① (needle jet)
- Collar ②
- Jet housing ③
- Gasket ④
- Piston valve support ⑤
- Needle jet ⑥
- Pilot screw ⑦ (except for USA)



11. Remove:
- Pilot air jet ①

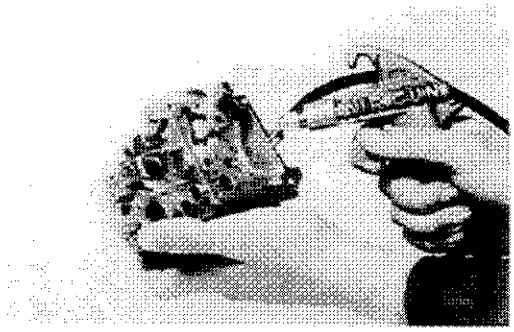


12. Remove:
- Diaphragm cover ①
- Spring ②
- Diaphragm ③

KB261003

INSPECTION

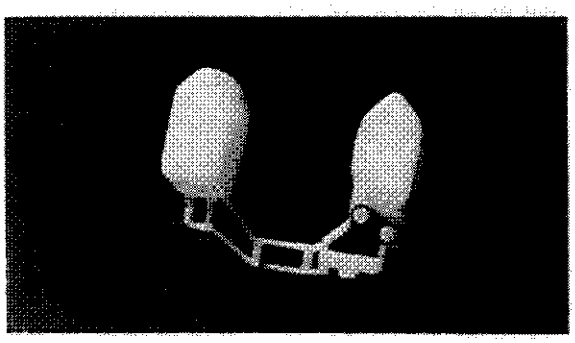
1. Inspect:
- Carburetor body
- Float chamber
- Jet housing
  Cracks/Damage → Replace.
- Fuel passage
  Contamination → Clean as indicated.



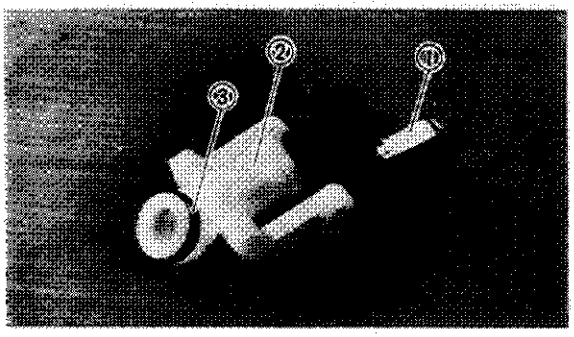
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Cleaning steps:
- Wash carburetor in petroleum based solvent.
  (Do not use any caustic carburetor cleaning solution.)
- Blow out all passage and jets with compressed air.

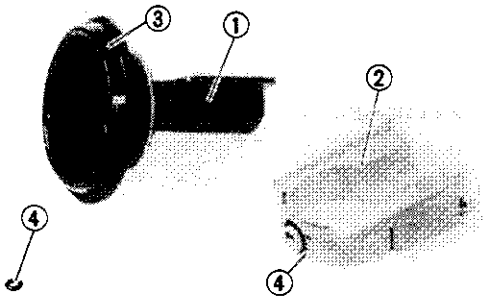
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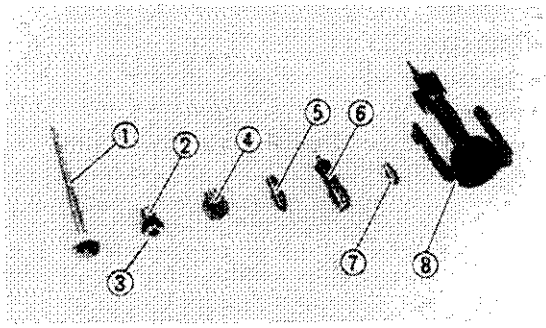
2. Inspect:
- Floats
  Damage → Replace.



3. Inspect:
- Needle valve ①
- Valve seat ②
- O-ring ③
  Damage/Wear/Contamination → Replace as a set.

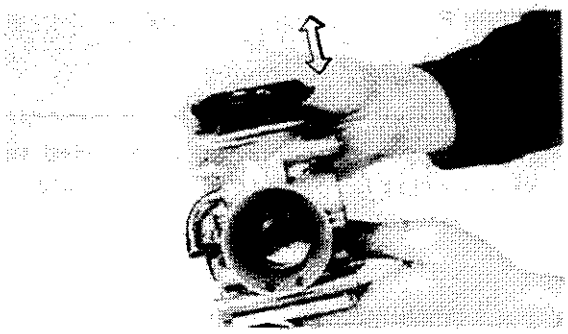


4. Inspect:
- Piston valve ①
- Piston valve support ②
  Scratches/Wear/Damage → Replace.
- Rubber diaphragm ③
  Tears → Replace.
- O-ring ④
  Wear/Damage → Replace.



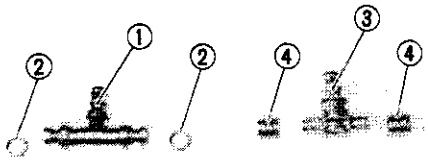
5. Inspect:
- Jet needle ①
- Main jet ②
- O-ring ③
- Starter jet ④
- Pilot jet ⑤
- Pilot screw set ⑥
- Pilot air jet ⑦
- Starter plunger ⑧

Bends/Wear/Damage - Replace.
Contamination → Blow out jets with compressed air.



6. Check:
- Free movement

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



7. Inspect:
- Joint (ventilation hose) ①
- O-rings ②
- Joint (delivery hose) ③
- Gasket rings ④

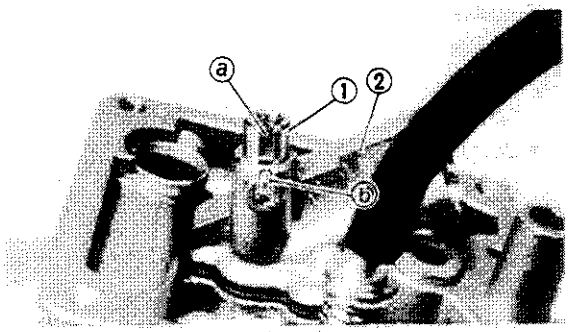
Damage/Wear/Contamination → Replace.

KB261004

ASSEMBLY

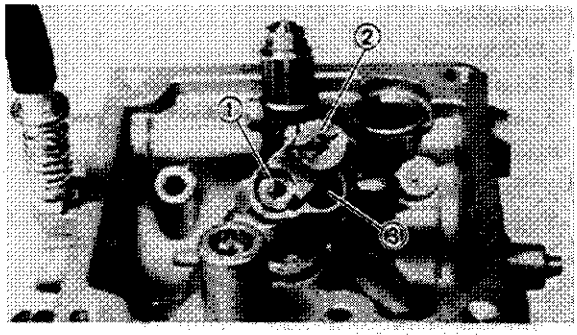
Reverse the "DISASSEMBLY" procedures.
Note the following points.

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

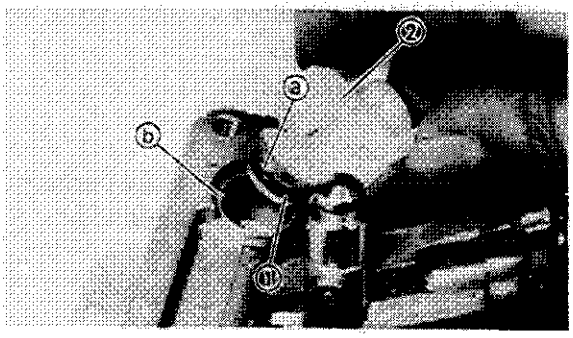


1. Install:
- Needle jet ①
- Jet housing ②

NOTE:
Align the groove ⓐ on the needle jet with the projection ⓑ on the jet housing.

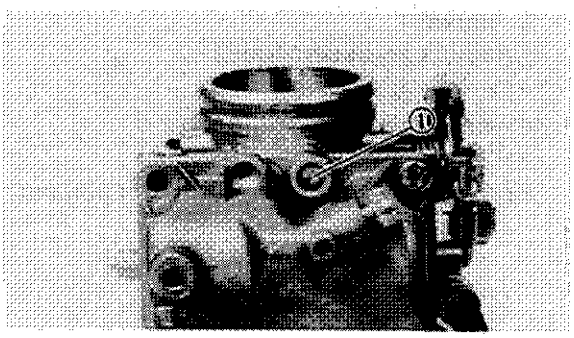


2. Install:
- Main jet ①
- Starter jet ②
- Pilot jet ③



3. Install:
- O-ring ①
- Valve seat ②

NOTE:
Align the projection ⓐ on the valve seat with the slot ⓑ on the carburetor body.



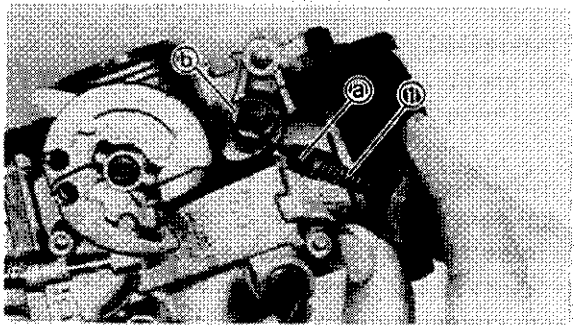
4. Install: (except for USA)
- Pilot screw ①

****

Installation points:
- Screw in the pilot screw ① until it is lightly seated.
- Back out by the specified number of turns.

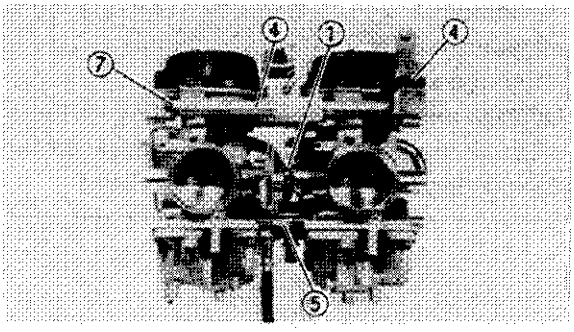
Pilot screw (turn out): 3

****

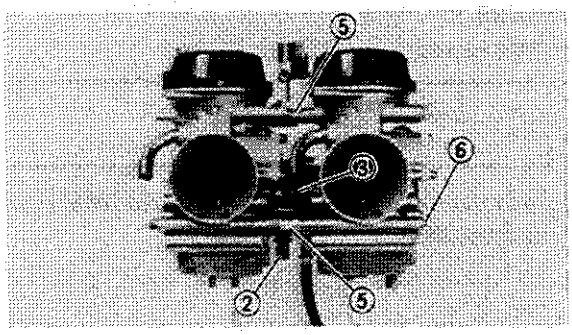


5. Install:
- Starter plunger ①

NOTE:
Install with the flat surface ⓐ of the starter plunger on that of the carburetor body ⓑ.



6. Install:
- Spring ①
- Joint (delivery hose) ② (with gasket rings)
- Joint (ventilation hose) ③ (with O-rings)
- Joints (starter lever) ④
- Spacer collars ⑤
- Connecting bolt (lower) ⑥
- Connecting bolt (upper) ⑦

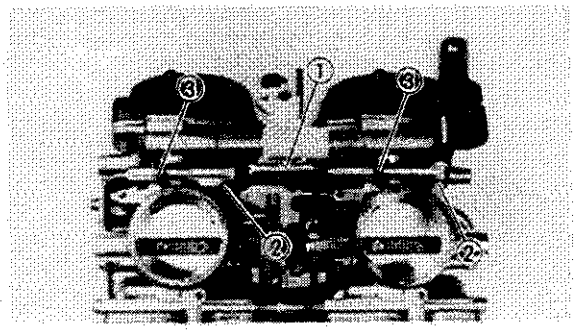


NOTE:
- Do not tighten the connecting bolts yet.
- Insert the throttle arm (on the #1, #2 carburetors) between the spring and synchronizing screw.

7. Tighten:
- Connecting bolts

	Connecting bolt (upper): **3.5 Nm (0.35 m · kg, 2.2 ft · lb)** **Connecting bolt (lower):** **5 Nm (0.5 m · kg, 3.6 ft · lb)**

NOTE:
- Place the carburetor assembly on a surface plate with the intake manifold side down and then tighten the connecting bolts while pushing down the respective carburetors with an even force.
- After tightening, check the throttle lever and starter joint for smooth action.



8. Install:
- Starter joint ①

NOTE:
- Hook the starter joint arm ② onto each starter plunger.
- Insert the stoppers ③ into the slots on the carburetor body.

KB261005

INSTALLATION

Reverse the "REMOVAL" procedure.
Note the following points.
1. Adjust:
- Carburetor synchronization
  Refer to the "CARBURETOR SYNCHRONIZATION" section in the CHAPTER 3.

2. Adjust:
• Idle speed

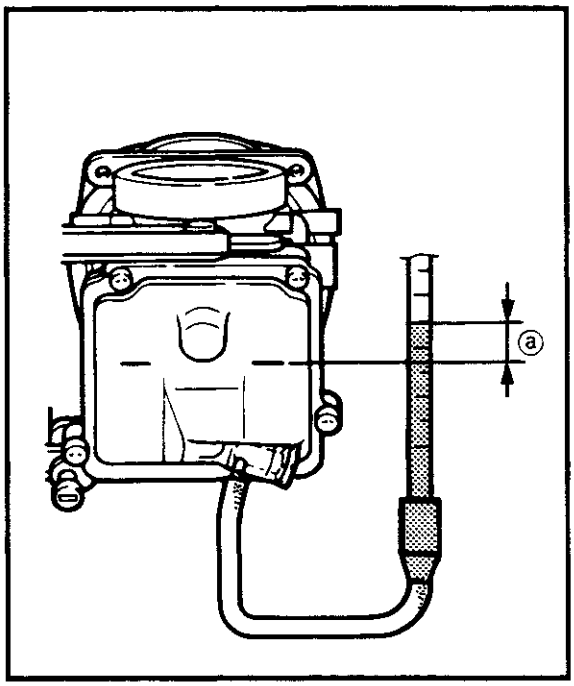
	Engine idle speed: **1,000~1,200 r/min**

Refer to the "IDLE SPEED ADJUSTMENT" section in the CHAPTER 3.

3. Adjust:
• Throttle cable free play

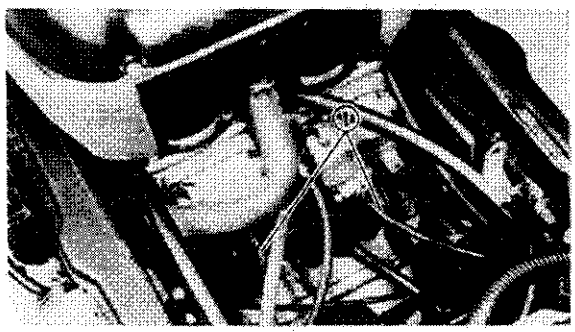
	Throttle cable free play: **3~5 mm (0.12~0.20 in)**

Refer to the "THROTTLE CABLE FREE PLAY ADJUSTMENT" section in the CHAPTER 3.



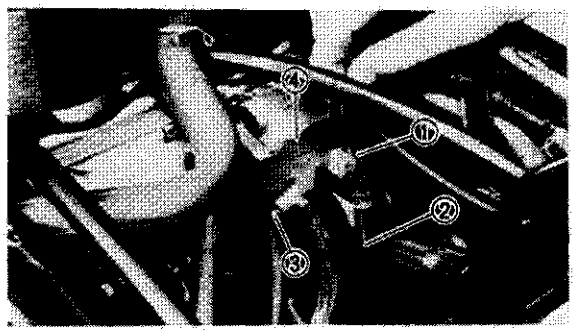
KB261006
FUEL LEVEL ADJUSTMENT
1. Measure:
• Fuel level ⓐ
Out of specification → Adjust.

	Fuel level ⓐ : **7.4~8.4 mm (0.29~0.33 in)** **above the float chamber line**



****

Measurement and adjustment steps:
- Place the motorcycle on a level surface.
- Use a garage jack under the engine to ensure that the carburetor is positioned vertically.
- Disconnect the drain hoses ①.



● Connect the fuel level gauge ① to the drain pipe ②.

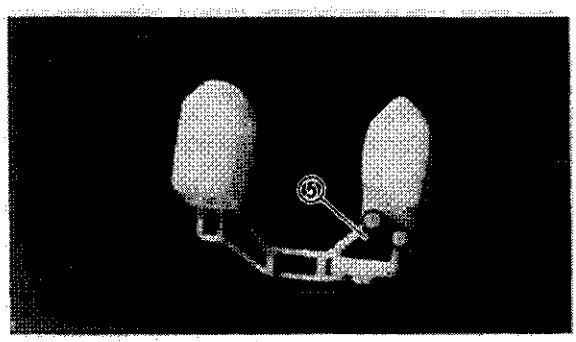
	Fuel level gauge: **P/N YM-01312-A/90890-01312**

● Loosen the drain screw ③ and warm up the engine for several minutes.

● Hold the gauge vertically next to the float chamber line ④.
● Measure the fuel level ⓐ with the gauge.

NOTE:
Fuel level readings of both side of carburetor line should be equal.

● If the fuel level is incorrect, adjust the fuel level.



● Remove the carburetor.
● Inspect the valve seat and needle valve.
● If either is worn, replace them both.
● If both are fine, adjust float level by bending the float tang ⑤ slightly.
● Install the carburetor.
● Recheck the fuel level.
● Connect the drain hoses.

****

KB262001

FUEL PUMP

PUMP OPERATION INSPECTION

1. Remove:
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

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

2. Inspect:
- Fuel pump operation

****

Operation inspection steps:
- Connect the fuel hose (fuel cock—fuel pump)
- Turn the fuel cock to "ON".
- Disconnect the fuel hose from the carburetor. (fuel pump—carburetor)
- Place the receptacle under the fuel hose end.
- Turn the main switch to "ON".
- Push the starter switch.
- Check the fuel flow out from the fuel hose end.

If fuel does not flow out, replace the fuel pump assembly or refer to "FUEL PUMP INSPECTION" section.

****

3. Install:
- Fuel tank
- Upper cowling
- Side cowlings (left and right)
- Seat

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

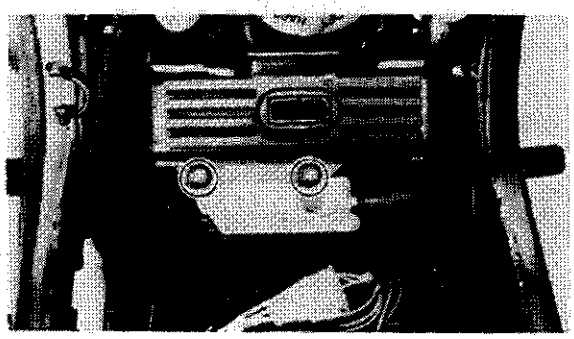
KB262002

FUEL PUMP INSPECTION

Removal

1. Remove:
- Seat
- Side cowlings (left and right)
- Upper cowling
- Fuel tank

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



2. Remove:
- Fuel pump assembly

Inspection

1. Inspect:
- Fuel hose
- Vacuum hose
- Delivery hose

Crack/Wear/Damage → Replace.

KB262003

ASSEMBLY

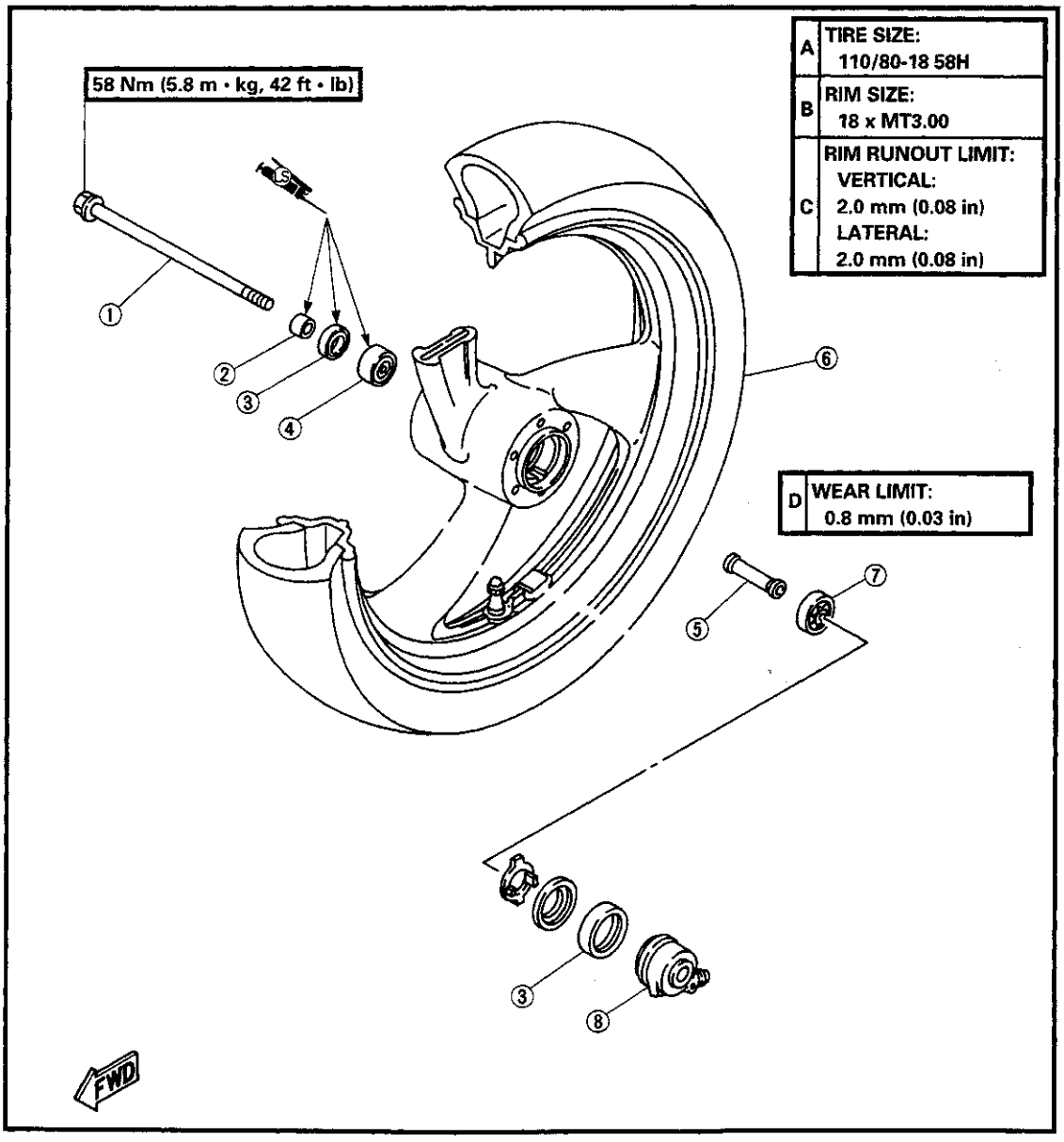
Reverse the "REMOVAL" procedure.

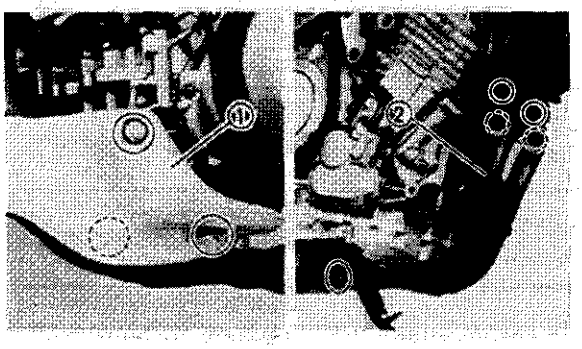
FRONT WHEEL

① Wheel axle
② Collar
③ Oil seal
④ Bearing
⑤ Collar
⑥ Front wheel
⑦ Bearing
⑧ Gear unit
(speedometer)

TIRE AIR PRESSURE (COLD):		
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	200 kPa (2.00 kg/cm², 28 psi)	225 kPa (2.25 kg/cm², 33 psi)
90 kg (198 lb) ~ Maximum load*	200 kPa (2.00 kg/cm², 28 psi)	250 kPa (2.50 kg/cm², 36 psi)
High speed riding	200 kPa (2.00 kg/cm², 28 psi)	250 kPa (2.50 kg/cm², 36 psi

*Load is the total weight of cargo, rider, passenger, and accessories.





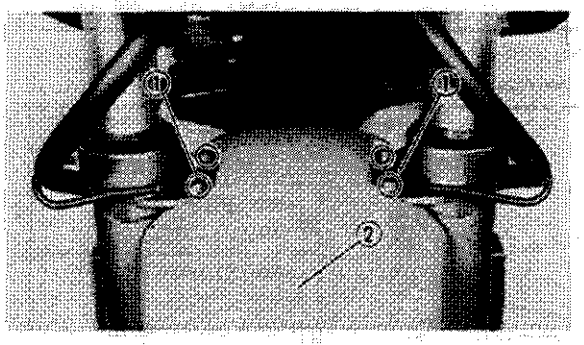
KB271001

REMOVAL

⚠ WARNING

Support the motorcycle securely so there is no danger of it falling over.

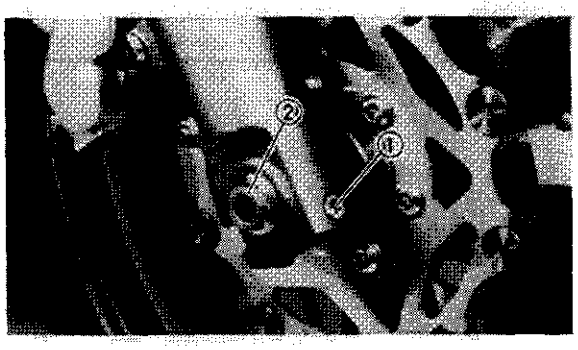
1. Remove:
- Engine guard ①
- Exhaust pipe ②



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

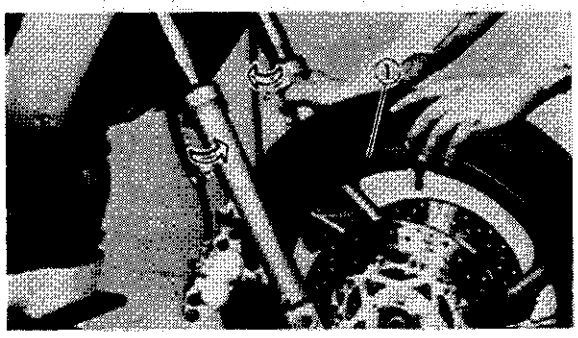
3. Disconnect:
- Speedometer cable

4. Remove:
- Brake hose holders ①
- Front fender ②



5. Loosen:
- Pinch bolt ①

6. Remove:
- Wheel axle ②



7. Remove:
- Front wheel ①
- Gear unit (speedometer)
- Collar

NOTE:

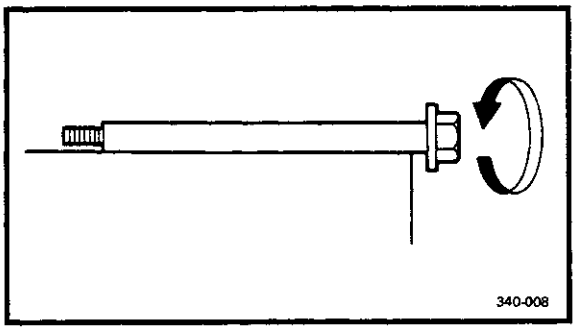
Do not depress the brake lever when the wheel is off the motorcycle otherwise the brake pads will be forced shut.

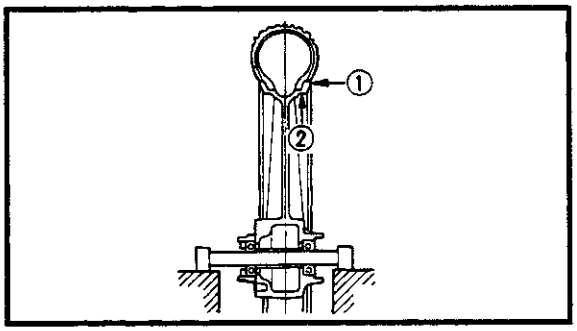
KB271002

INSPECTION

1. Inspect:
- Tire
  Wear/Damage → Replace.
  Refer to the "TIRE INSPECTION" section in the CHAPTER 3.

2. Eliminate any corrosion from parts.





3. Inspect:
• Wheel axle
Roll the axle on a flat surface.
Bends → Replace.

⚠WARNING

Do not attempt to straighten a bent axle.

4. Inspect:
• Wheel
Cracks/Bends/Warpage → Replace.

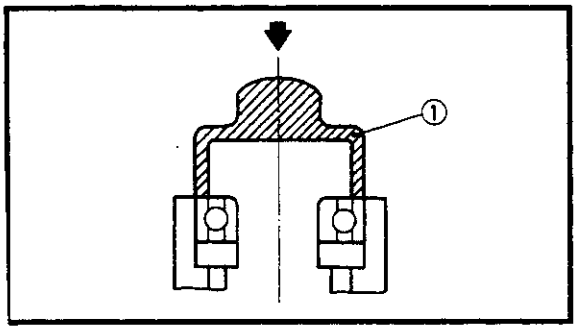
5. Measure:
• Wheel runout
Out of specification → Check the wheel and bearing play.

Rim runout limits:
Vertical ① : 2.0 mm (0.08 in)
Lateral ② : 2.0 mm (0.08 in)

6. Check:
• Wheel bearings
Bearings allow play in the wheel hub or wheel turns roughly → Replace.

****

Replacement steps:
- Clean the outside of the wheel hub.
- Remove the bearing a using a general bearing puller.
- Install the new bearing.



NOTE:

Use a socket ① that matches the outside diameter of the race of the bearing.

CAUTION:

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

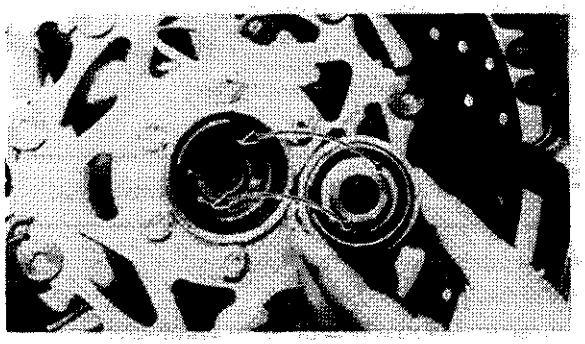
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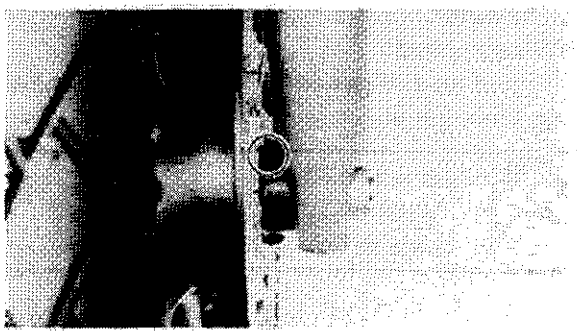
KB271003

INSTALLATION

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

1. Lubricate:
• Oil seal
• Gear unit





Recommended lubricant:
Lithium soap base grease

2. Install:
• Gear unit assembly

NOTE:
Make sure the projection inside the gear unit are meshed with the flats in the wheel hub.

3. Install:
• Front wheel assembly

NOTE:
Be sure the boss on the outer fork tube correctly engages with the locating slot on the gear unit assembly.

4. Tighten:
• Wheel axle
• Pinch bolt (wheel axle)

Wheel axle:
58 Nm (5.8 m · kg, 42 ft · lb)
Pinch bolt (wheel axle):
19 Nm (1.9 m · kg, 13 ft · lb)

5. Install:
• Front fender
• Brake hose holders

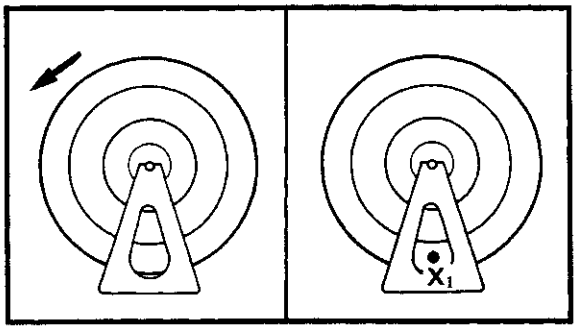
Bolt (front fender):
9 Nm (0.9 m · kg, 6.5 ft · lb)

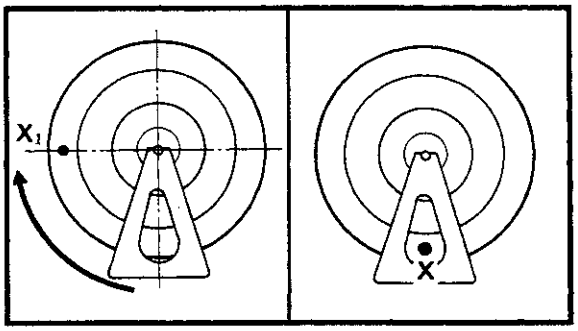
KB271004

STATIC WHEEL BALANCER ADJUSTMENT

NOTE:
• After replacing the tire and/or rim, wheel balance should be adjusted.
• Adjust the wheel balance with brake disc installed.

1. Remove:
• Balancing weight
2. Set the wheel on a suitable stand.



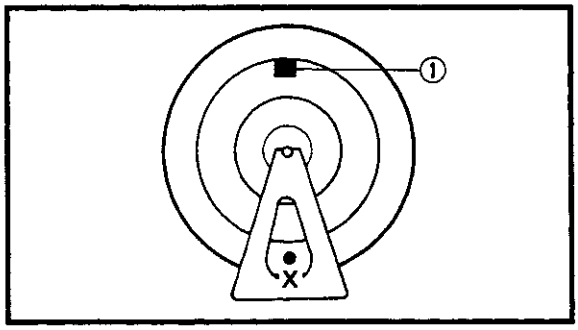


3. Find:
• Heavy spot

****

Procedure:
- Spin the wheel and wait for it to rest.
- Put an "X_1" mark on the wheel bottom spot.
- Turn the wheel so that the "X_1" mark is 90° up.
- Let the wheel fall and wait for it to rest. Put an "X_2 mark on the wheel bottom spot.
- Repeat the above steps several times until these marks come to the same spot.
- This spot is the heavy spot "X".

****

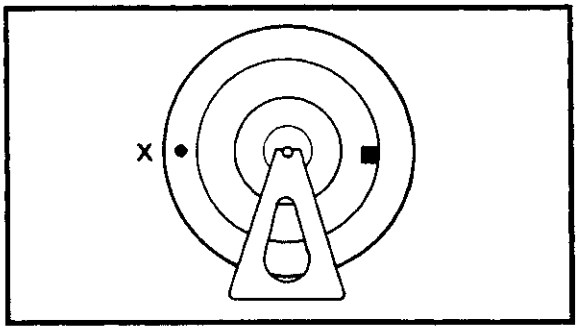


4. Adjust:
• Wheel balance

****

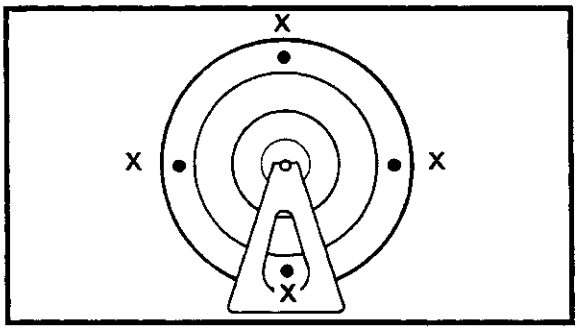
Adjustment steps:
- Install a balance weight ① on the rim exactly opposite to the heavy spot "X".

NOTE:
Start with the smallest weight.



- Turn the wheel so that the heavy spot is 90° up.
- Check that the heavy spot is at rest there. If not try another weight until the wheel is balanced.

****



5. Check:
• Wheel balance

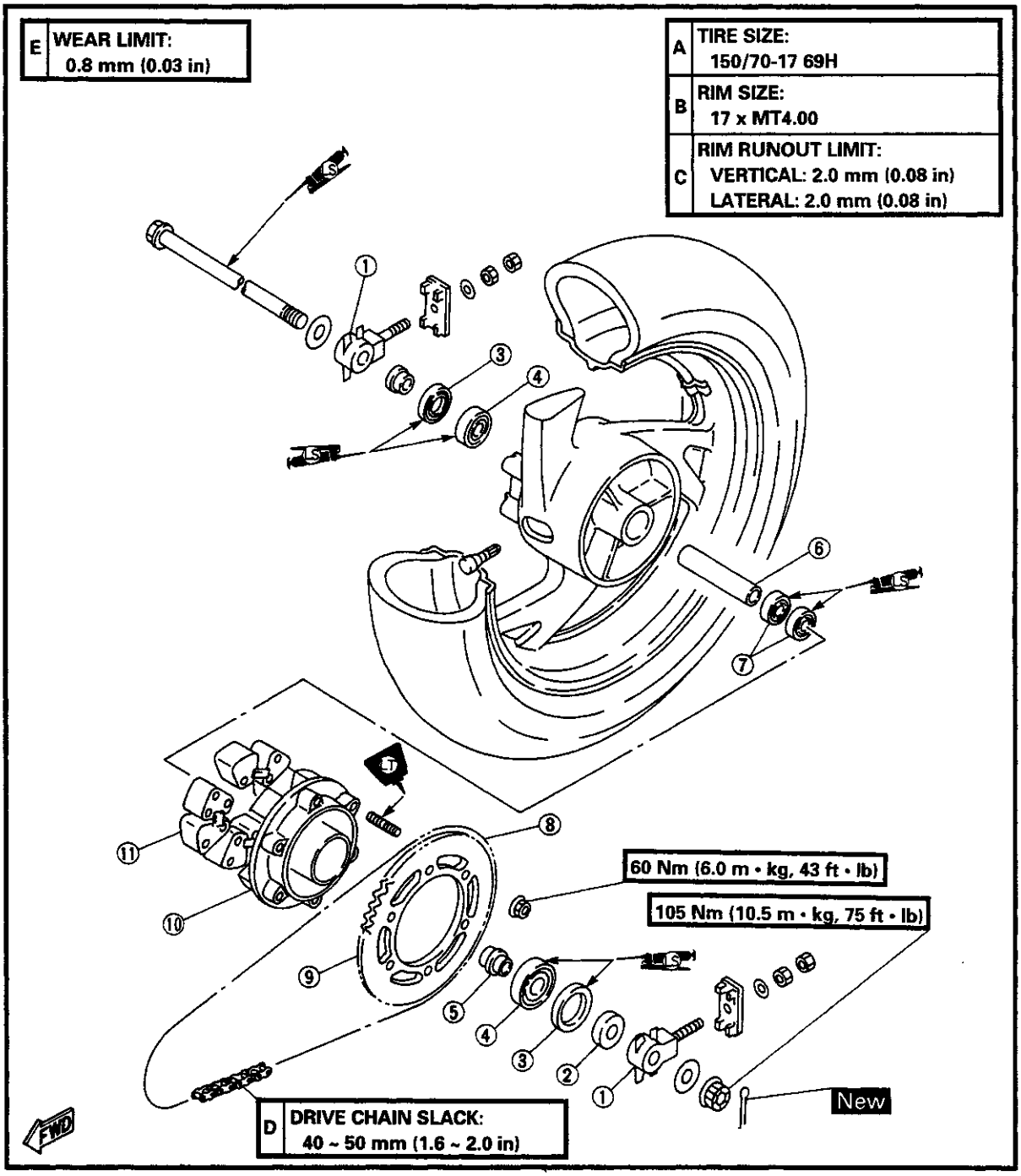
****

Checking steps:
- Turn the wheel so that it comes to each point as shown.
- Check that the wheel is at rest at each point. If not readjust the wheel balance.

****

REAR WHEEL

① Adjuster collar
② Collar
③ Oil seal
④ Bearing
⑤ Collar
⑥ Spacer
⑦ Bearing
⑧ Drive chain
⑨ Driven sprocket
⑩ Clutch hub
⑪ Damper



KB272001

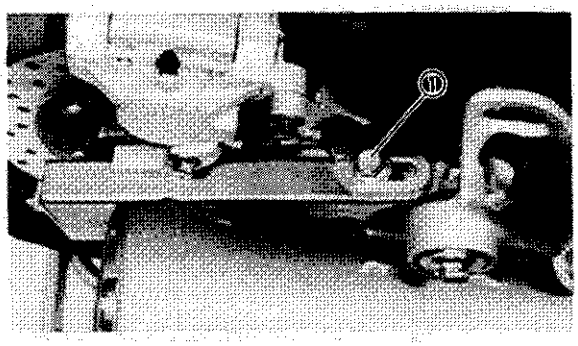
REMOVAL

1. Place the motorcycle on a level place.

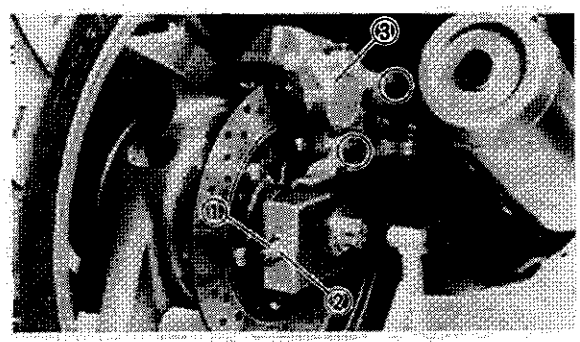
⚠ WARNING

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

2. Elevate the rear wheel by placing a suitable stand under the swingarm.
3. Loosen:
   - Bolt ① (brake caliper bracket)



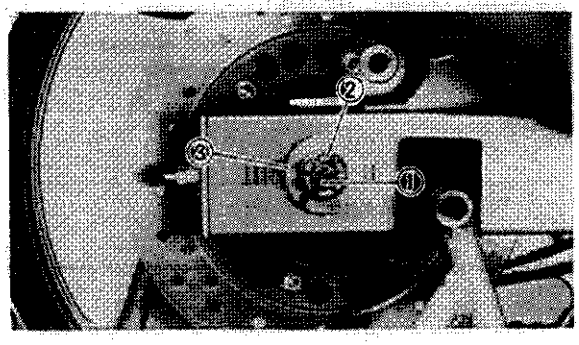
4. Loosen:
   - Locknut ①
   - Adjuster ②
5. Remove:
   - Brake caliper ③



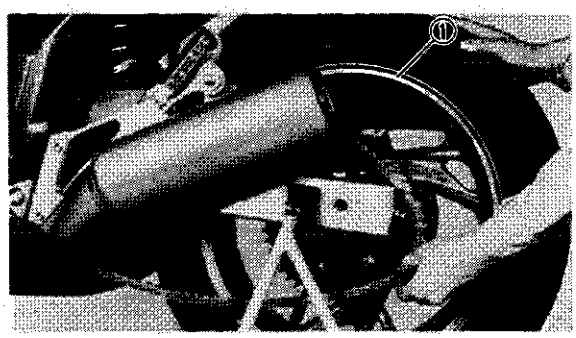
NOTE:

Do not depress the brake pedal when the wheel is off the motorcycle as the brake pads will be forced shut.

6. Remove:
   - Cotter pin ①
   - Axle nut ②
   - Washer ③



7. Remove:
   - Wheel axle
   - Washer
   - Rear wheel ①



NOTE:

Before removing the rear wheel, push the wheel forward and remove the drive chain.

KB272002

INSPECTION

1. Inspect:
- Tire
- Rear wheel axle
- Wheel
- Wheel bearings
- Oil seals

Refer to the "FRONT WHEEL—INSPECTION".

2. Measure:
- Wheel runout

Refer to the "FRONT WHEEL—INSPECTION".

3. Check:
- Wheel balance

Refer to the "FRONT WHEEL—INSPECTION".

KB272003

INSTALLATION

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

1. Lubricate:
- Rear wheel axle
- Bearings
- Oil seals



Recommended lubricant:
Lithium soap base grease

2. Adjust:
- Drive chain slack

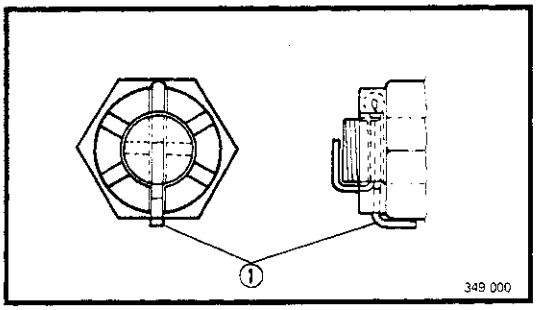


Drive chain slack:
40~50 mm (1.6~2.0 in)

Refer to the "CHAPTER 3—DRIVE CHAIN ADJUSTMENT".

3. Tighten:
- Nut (rear wheel axle)
- Bolts (brake caliper)
- Bolt (brake caliper bracket)

	Nut (rear wheel axle): **105 Nm (10.5 m · kg, 75 ft · lb)** **Bolt (brake caliper):** **35 Nm (3.5 m · kg, 25 ft · lb)** **Bolt (brake caliper bracket):** **35 Nm (3.5 m · kg, 25 ft · lb)**



4. Install:
• Cotter pin ①

NOTE:
Bend the ends of the cotter pin.

⚠ WARNING
Always use a new cotter pin.

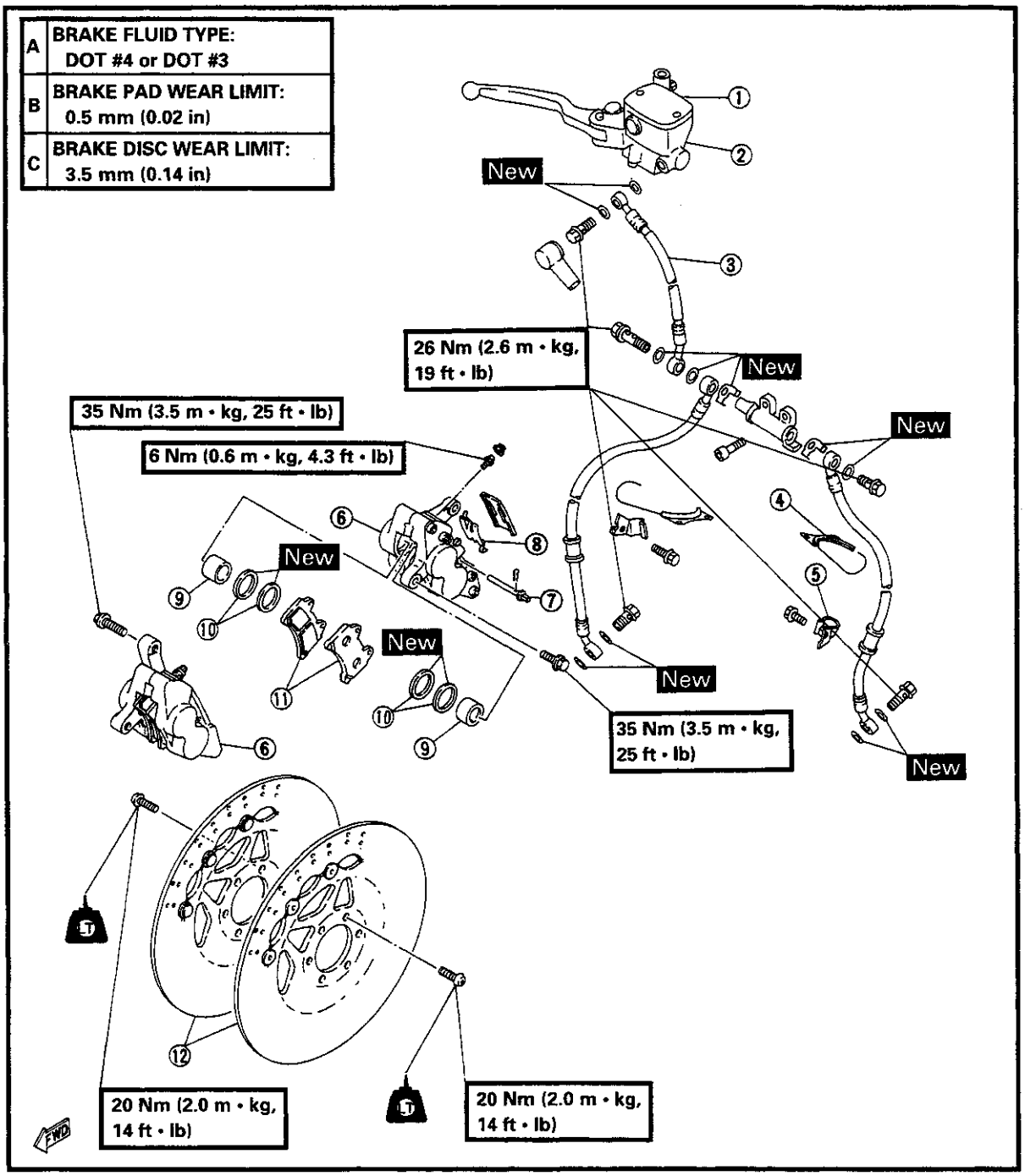
KB272004
STATIC WHEEL BALANCE ADJUSTMENT

NOTE:
- After replacing the tire and/or rim, wheel balance should be adjusted.
- Adjust the wheel balance with brake disc and wheel hub installed.

1. Adjust:
• Wheel balance
Refer to the "FRONT WHEEL—STATIC WHEEL BALANCE ADJUSTMENT" section.

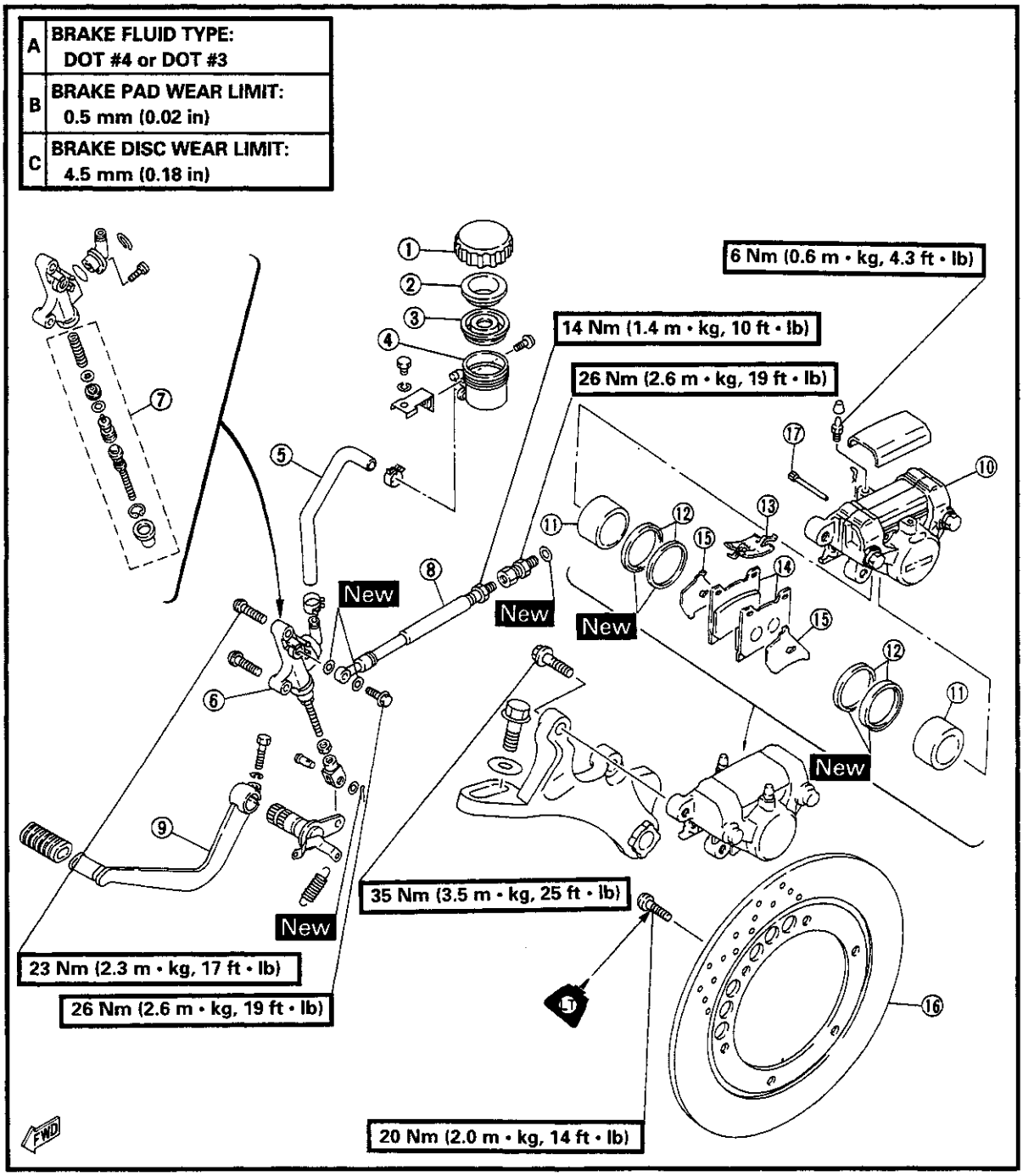
FRONT AND REAR BRAKE

① Master cylinder cap
② Master cylinder
③ Brake hose
④ Brake hose guide
⑤ Brake hose holder
⑥ Brake caliper
⑦ Retaining pin
⑧ Pad spring
⑨ Piston
⑩ Piston seal
⑪ Brake pad
⑫ Brake disc



① Reservoir tank cap
② Bush
③ Diaphragm
④ Reservoir tank
⑤ Reservoir hose
⑥ Master cylinder
⑦ Master cylinder kit
⑧ Brake hose
⑨ Brake pedal
⑩ Brake caliper
⑪ Piston
⑫ Piston seal
⑬ Pad spring
⑭ Brake pad
⑮ Shim
⑯ Brake disc
⑰ Retaining pin

A	**BRAKE FLUID TYPE:** DOT #4 or DOT #3
B	**BRAKE PAD WEAR LIMIT:** 0.5 mm (0.02 in)
C	**BRAKE DISC WEAR LIMIT:** 4.5 mm (0.18 in)



KB273000

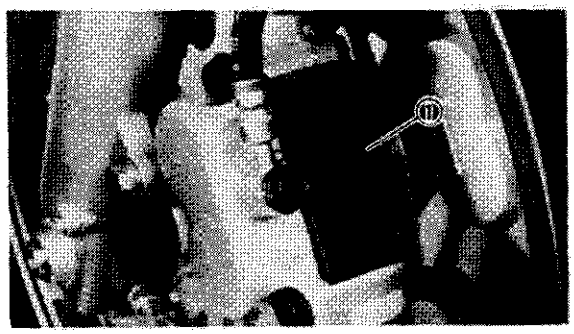
CAUTION:

Disc brake components rarely require disassembly. DO NOT:

- **Disassembly components unless absolutely necessary.**
- **Use solvents on internal brake component.**
- **Use contaminated brake fluid for cleaning.**
- **Allow brake fluid to came in contact with the eyes otherwise eye injury may occur.**
- **Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.**
- **Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.**

⚠ WARNING

- **Use only 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 may result in vapor lock.**



KB273001

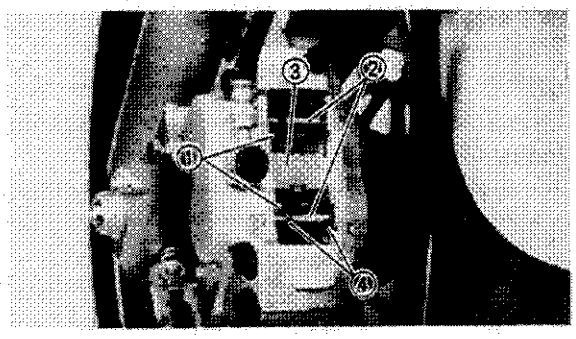
BRAKE PAD REPLACEMENT

NOTE:

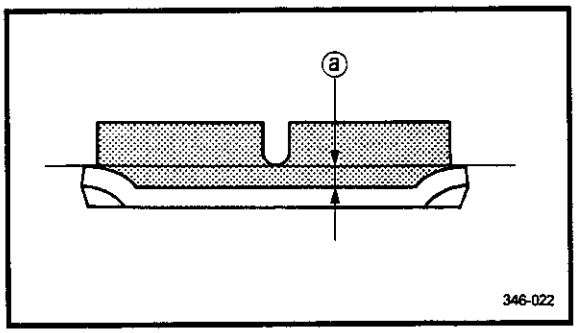
It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.

Front brake

1. Remove:
   - Caliper cover ①

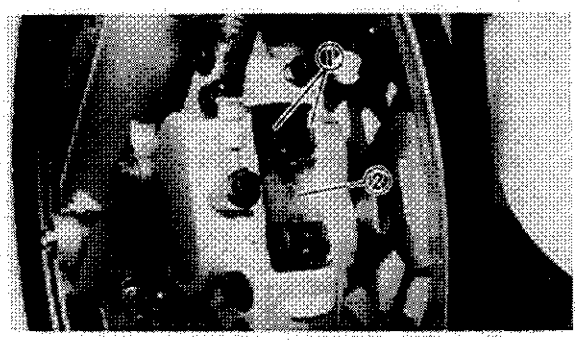


2. Remove:
- Clips ①
- Retaining pins ②
- Pad spring ③
- Brake pads ④

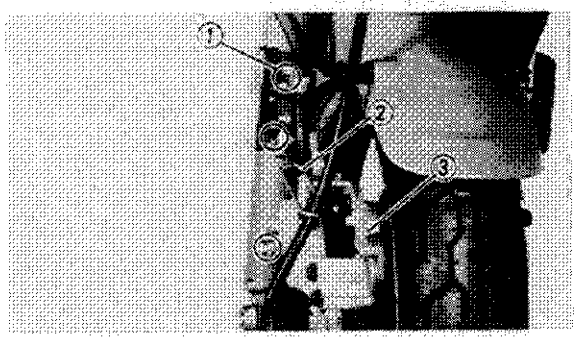


NOTE:
- Replace the pad spring if the pad replacement is required.
- Replace the pads as a set if either is found to be worn to the wear limit.

	Wear limit ⓐ : **〈0.5 mm (0.02 in)〉**



3. Install:
- Brake pads ① (new)
- Pad spring ② (new)



****

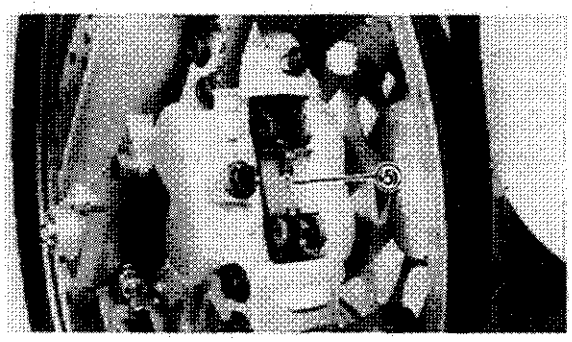
Installation steps:
- Remove the brake hose holder ① , speedometer cable holder ② and caliper body ③ .
- Connect a suitable hose ④ tightly to the caliper bleed screw. then, place the other end of this hose into an open container.
- Loosen the caliper bleed screw and push the piston into the caliper by your finger.
- Tighten the caliper bleed screw.

	Caliper bleed screw: **6 Nm (0.6 m · kg, 4.3 ft · lb)**



- Install the caliper body, speedometer cable holder and brake hose holder.

	Bolt (brake caliper): **35 Nm (3.5 m · kg, 25 ft · lb)**

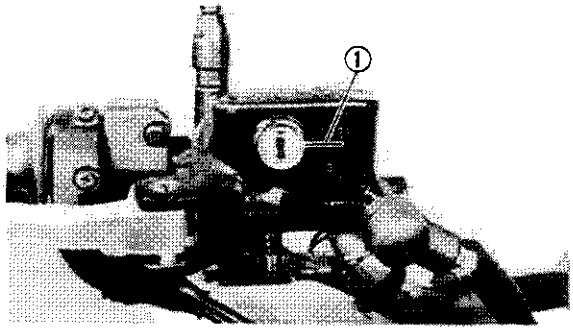


● Install the brake pad (new) of the pad spring (new).

NOTE:

The arrow mark ⑤ of the pad spring must point in the disc rotation direction.

****



4. Inspect:
- Brake fluid level

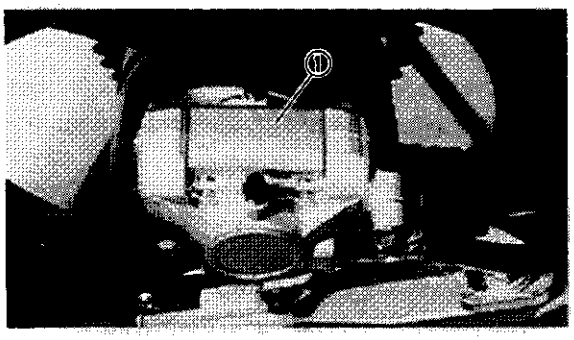
  Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

① "LOWER" level line

5. Check:
- Brake lever operation

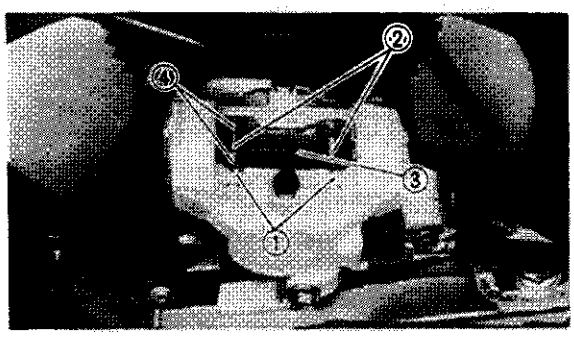
  A softly or spongy filling → Bleed brake system.

  Refer to the "AIR BLEEDING" section in the CHAPTER 3.

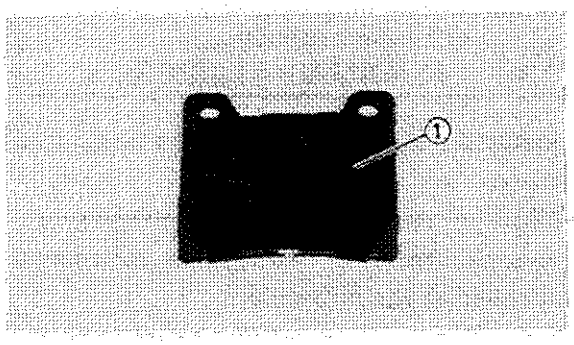


Rear brake

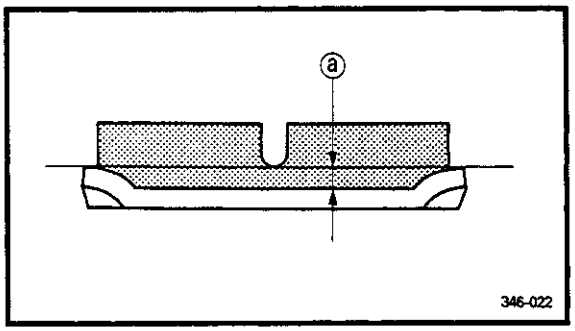
1. Remove:
- Caliper cover ①



2. Remove:
- Clips ①
- Retaining pins ②
- Pad spring ③
- Brake pads ④



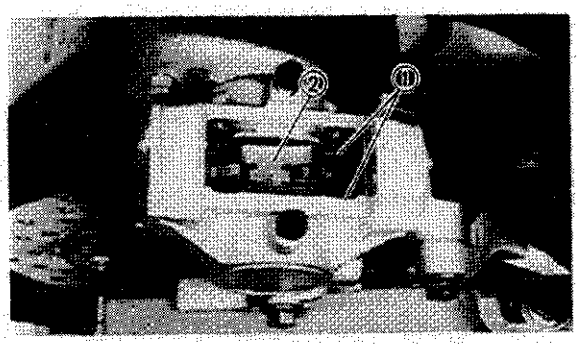
3. Remove:
• Shim ①



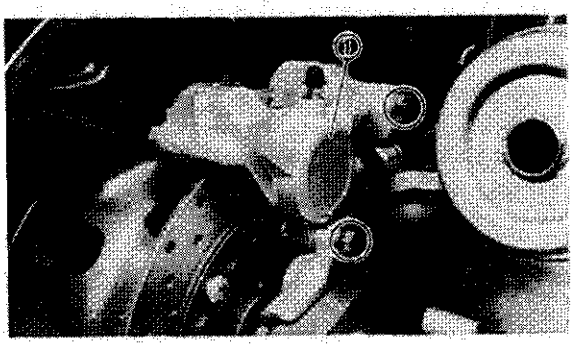
NOTE:
• Replace the spring if the pad replacement is required.
• Replace the pads as a set if either is found to be worn to the wear limit.

Wear limit ⓐ :
〈0.5 mm (0.02 in)〉

• Replace the pad shim if the pad replacement is required.

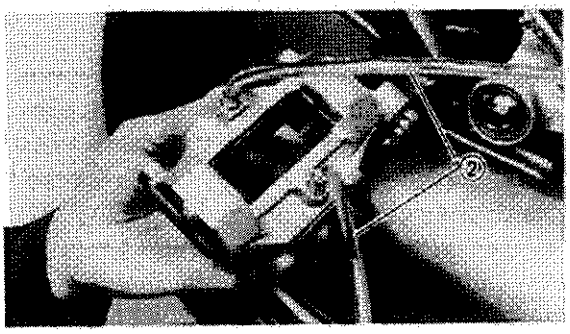


4. Install:
• Brake pads ① (new)
• Shim (new)
• Pad spring ② (new)



****

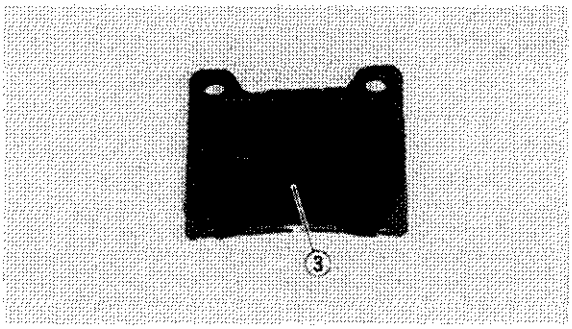
Installation steps:
● Remove the caliper body ① .
● Connect a suitable hoses ② tightly to the caliper bleed screw. Then, place the other end of this hose into an open container.



● Loosen the caliper bleed screw and push the piston into the caliper by your finger.
● Tighten the caliper bleed screw.

Caliper bleed screw:
6 Nm (0.6 m · kg, 4.3 ft · lb)

● Install the caliper body.



	Bolt (brake caliper): **35 Nm (3.5 m · kg, 25 ft · lb)**

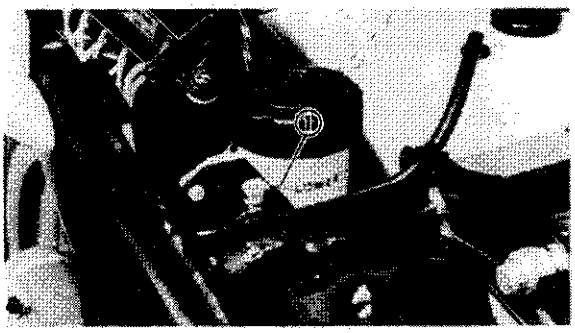
- Install the pad shim (new) to the brake pad (new).

NOTE:

The arrow mark ③ of the shim must point in the disc rotation direction.

- Install the brake pad (new) and pad spring (new).

****



5. Inspect:
- Brake fluid level

  Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

① "LOWER" level line.

6. Check:
- Brake pedal operation

  A soft or spongy filling → Bleed brake system.

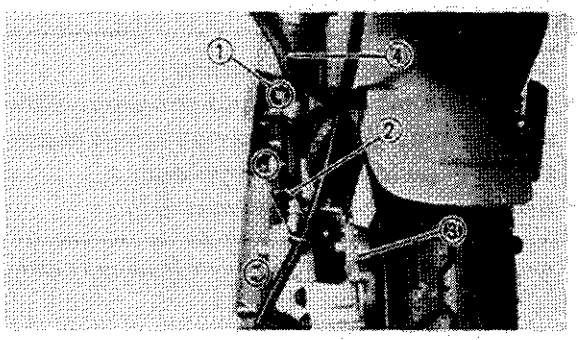
  Refer to "AIR BLEEDING" section in CHAPTER 3.

KB273002

CALIPER DISASSEMBLY

NOTE:

Before disassembling the front brake caliper or rear brake caliper, drain the brake hose, master cylinder, brake caliper and reservoir tank of their brake fluid.

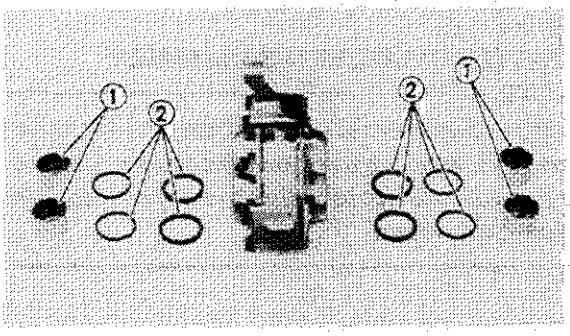


Front brake

1. Remove:
- Brake pads
- Pad spring

Refer to the "BRAKE PAD REPLACEMENT" section.
- Brake hose holder ①
- Speedometer cable holder ②
- Caliper body ③
- Brake hose ④

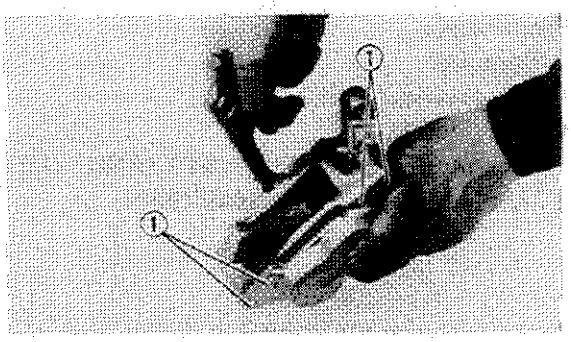
2. Remove:
- Pistons ①
- Piston seals ②



****

Removal steps:

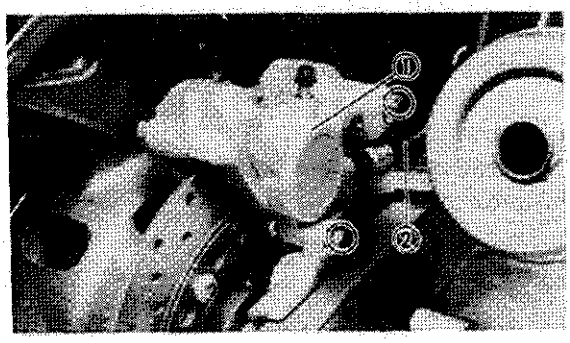
- Blow compressed air into the tube joint opening to force out the piston from the caliper body.



⚠ WARNING

- **Never try to pry out the piston.**
- **Cover the piston with a wood piece. Use care so that piston dose not cause injury as it is expelled from the cylinder.**
- **Do not loose the bridge bolts ① .**

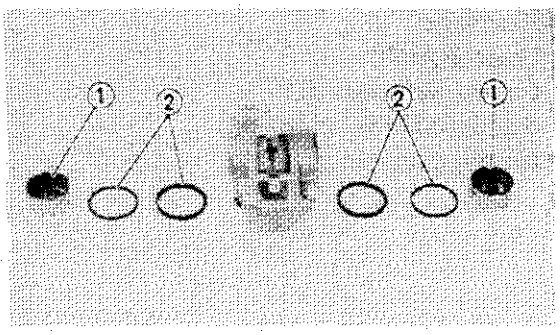
****



Rear brake

1. Remove:
- Brake pads
- Pad spring

Refer to the "BRAKE PAD REPLACEMENT" section.
- Caliper body ①
- Brake hose ②

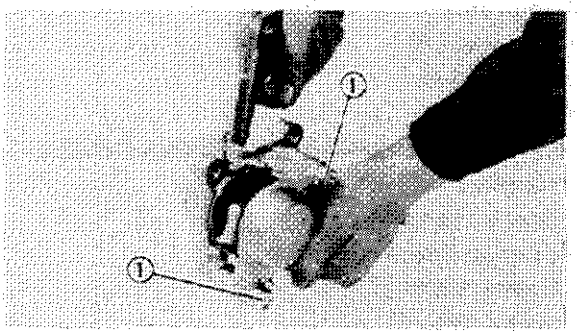


2. Remove:
- Pistons ①
- Piston seals ②

****

Removal steps:

- Blow compressed air into the tube joint opening to force out the piston from the caliper body.



⚠ WARNING

- **Never try to pry out the piston.**
- **Cover the piston with a wood piece. Use care so that piston does not cause injury as it is expelled from the cylinder.**
- **Do not loose the bridge bolts ① .**

****

KB273003

MASTER CYLINDER DISASSEMBLY

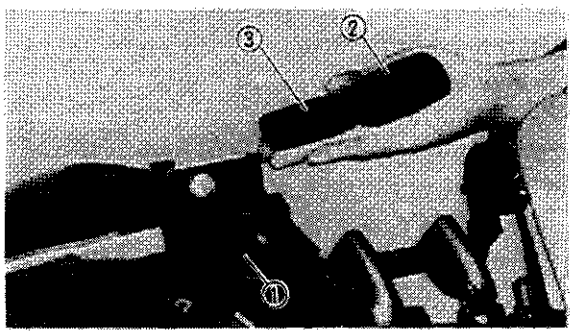
NOTE:

Before disassembling the front or rear brake master cylinders, drain the hose, master cylinder, brake caliper and reservoir tank of their brake fluid.

Front brake

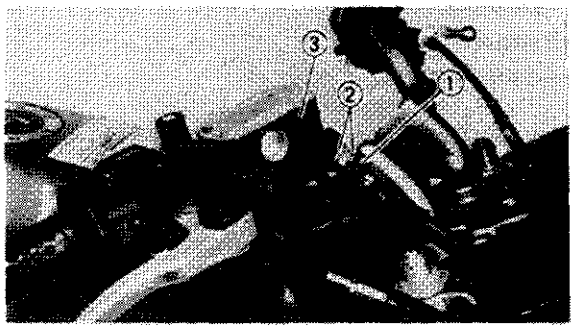
1. Remove:
- Side cowlings (left and right)
- Upper cowling

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

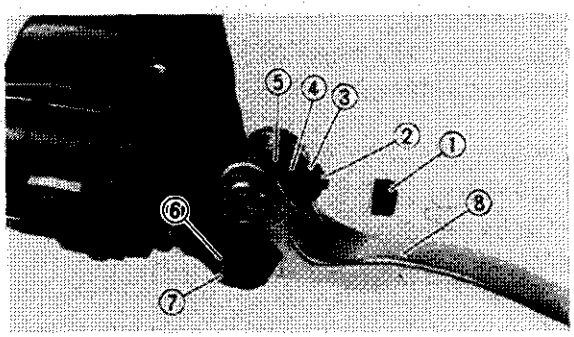


2. Disconnect:
- Brake switch coupler ①

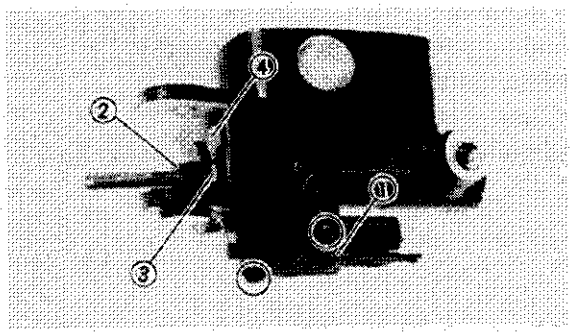
3. Remove:
- Master cylinder cap ②
- Rubber seal ③
- Plate



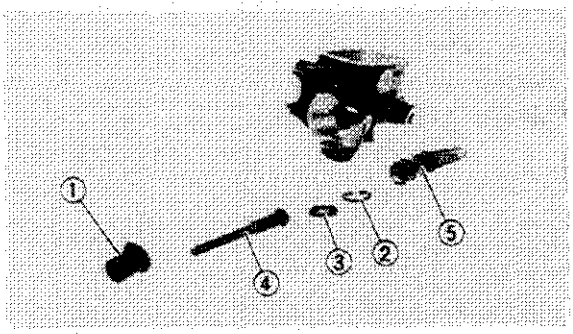
4. Remove:
- Union bolt ①
- Copper washers ②
- Master cylinder bracket
- Master cylinder ③



5. Remove:
- Cap ①
- Circlip ②
- Nut ③
- Spring ④
- Plate ⑤
- Nut ⑥ (brake lever pivot)
- Bolt ⑦ (brake lever pivot)
- Brake lever ⑧ (with pin)
- Collar (brake lever pivot)

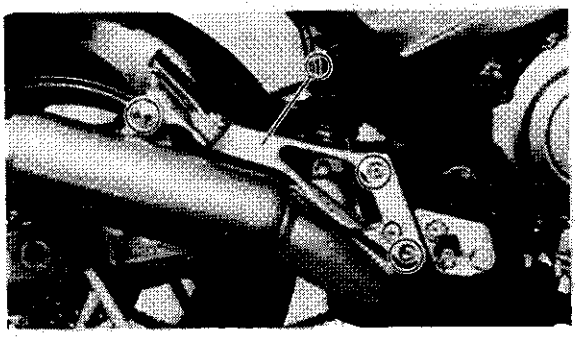


6. Remove:
- Brake switch ①
- Adjuster ②
- Nut ③
- Plate ④

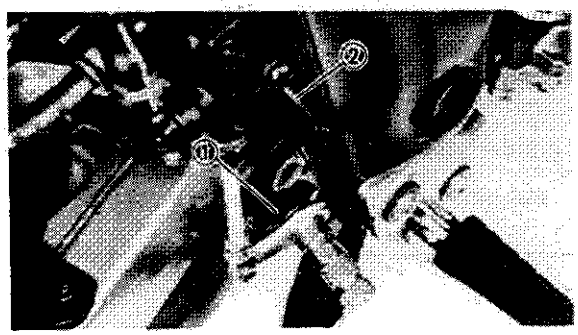


7. Remove:
- Dust cover ①
- Circlip ②
- Washer ③
- Rod ④
- Master cylinder kit ⑤

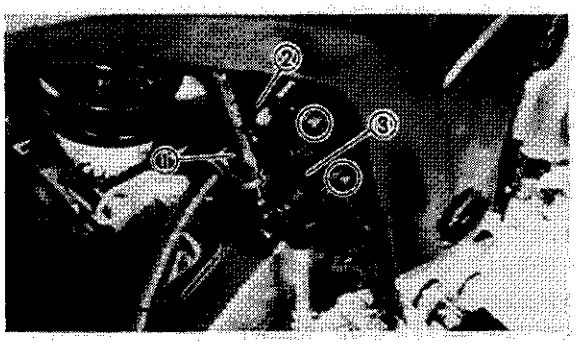
Rear brake



1. Remove:
- Brake pedal
- Footrest bracket ①

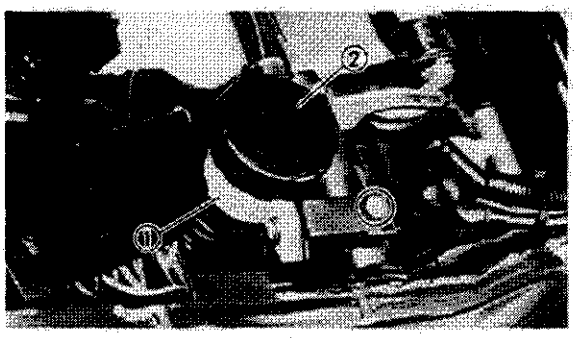


2. Disconnect:
- Return spring ① (from brake pedal shaft)
- Rear brake switch ② (from brake pedal shaft)

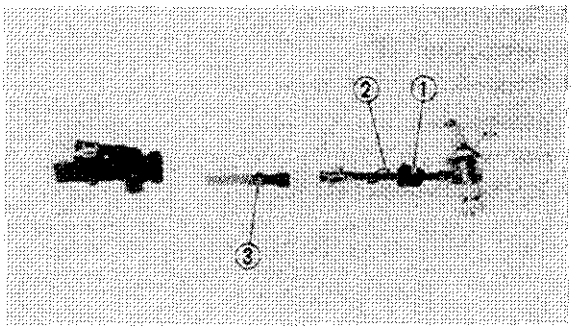


3. Disconnect:
- Reservoir tank hose ①
  (from master cylinder)

4. Remove:
- Union bolt ②
- Copper washers
- Master cylinder ③



5. Remove:
- Reservoir tank ① (with bracket)
- Reservoir tank cap ②
- Bush
- Diaphragm



6. Remove:
- Dust cover ①
- Circlip ②
- Master cylinder kit ③

KB273004

INSPECTION AND REPAIR

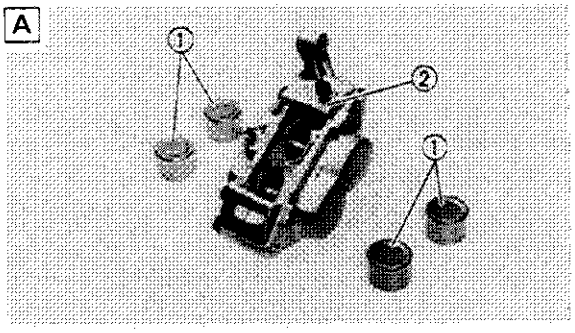
Recommended brake component replacement schedule:

⚠WARNING

All internal parts should be cleaned in new brake fluid only. Do not use solvents will cause seals to swell and distort.

Brake pads	As required
Piston seal, dust seal	Every two years
Brake hoses	Every fore years
Brake fluid	Replace only when brakes are disassembled

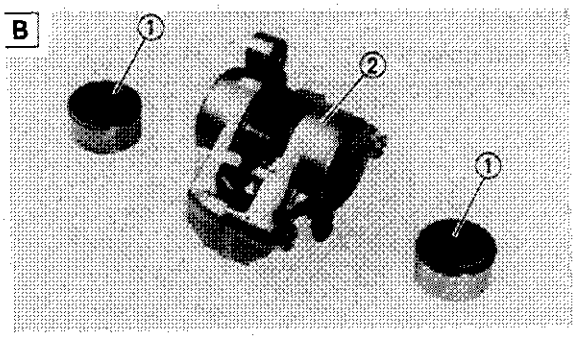
A



1. Inspect:
- Caliper pistons ①
  Scratches/Rust/Wear → Replace caliper assembly.
- Caliper cylinder ②
  Wear/Scratches → Replace caliper assembly.

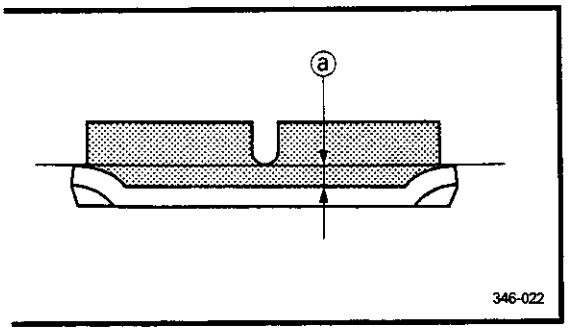
A Front
B Rear

B



⚠ WARNING

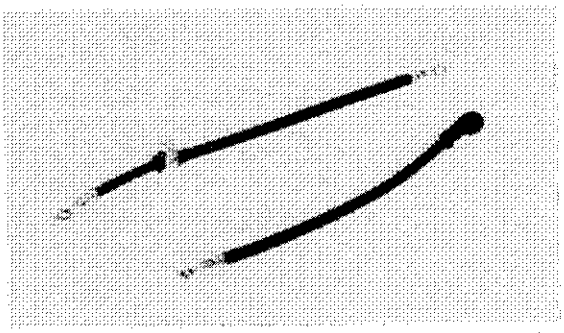
Replace the piston seal and dust seal whenever a caliper is disassembled.



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

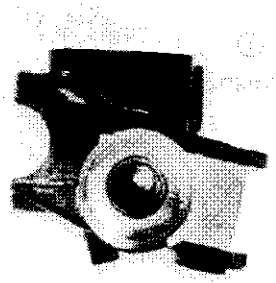
Pad wear limit:
〈0.5 mm (0.02 in)〉

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



3. Inspect:
- Brake hose
  Cracks/Damage → Replace.

A

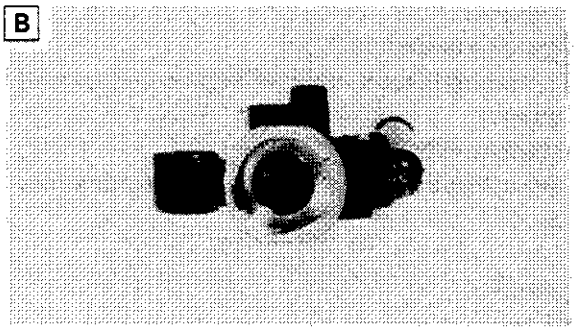


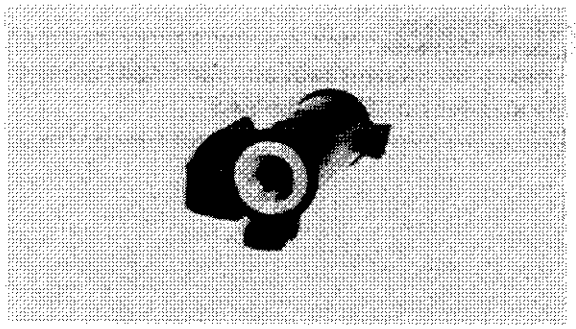
4. Inspect:
- Master cylinder body
  Scratches/Wear → Replace.

NOTE:
Clean all passage with new brake fluid.

A Front brake
B Rear brake

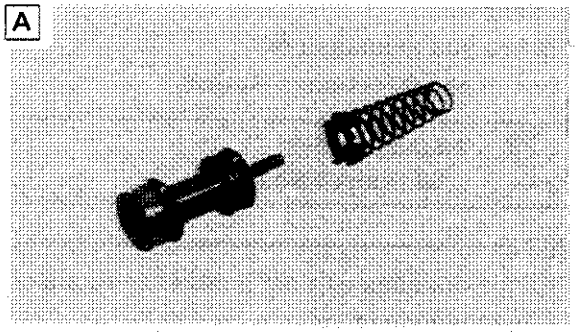
B





5. Inspect:
- Brake hose joint
  Cracks/Damage → Replace.

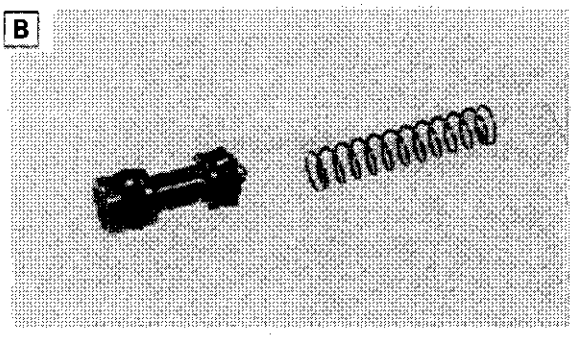
A

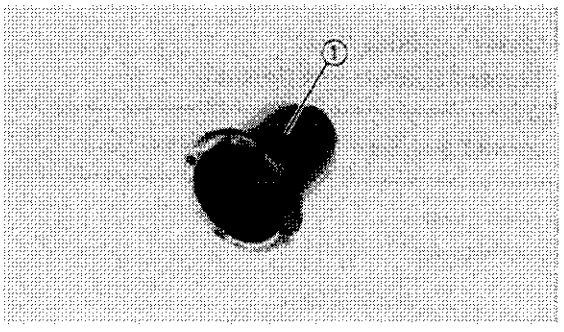


6. Inspect:
- Master cylinder kit
  Scratches/Wear → Replace.

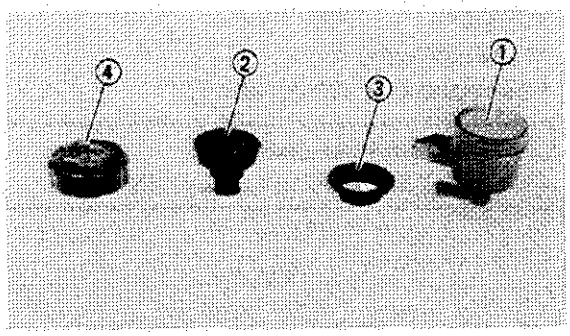
A Front brake
B Rear brake

B





7. Inspect:
- Dust cover ①
  Cracks/Damage → Replace.



8. Inspect:
- Reservoir tank ①
- Diaphragm ②
- Bush ③
- Reservoir tank cap ④

  Cracks/Damage → Replace.

KB273005

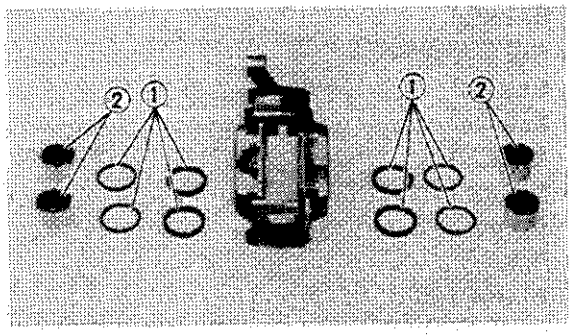
ASSEMBLY

⚠ 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** **If DOT #4 is not available, DOT #3 can be used.**

- **Replace the piston seals whenever a caliper is disassembled.**

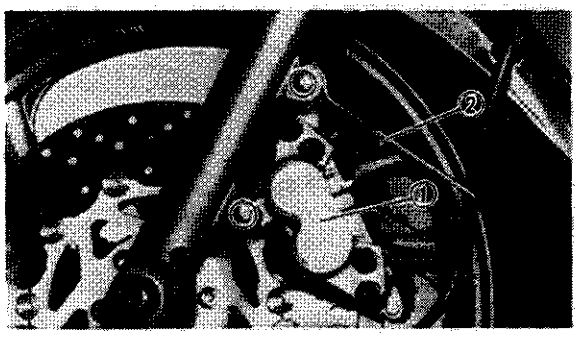


Front brake

1. Install:
- Piston seals ① (new)
- Pistons ②

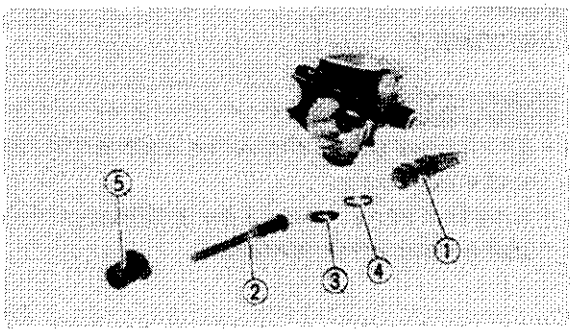
2. Install:
- Pad spring
- Brake pads
- Retaining pin

  Refer to the "BRAKE PAD REPLACEMENT" section.

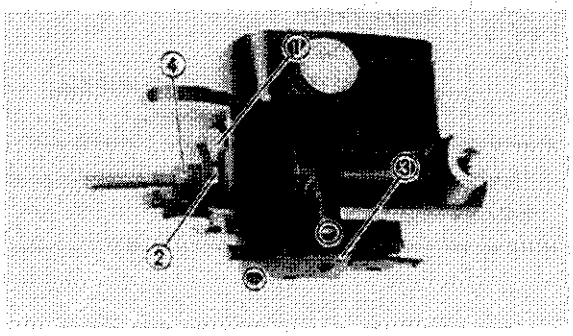


3. Install:
- Brake caliper ①
- Speedometer cable holder ②

	Bolt (brake caliper): 35 Nm (3.5 m · kg, 25 ft · lb)

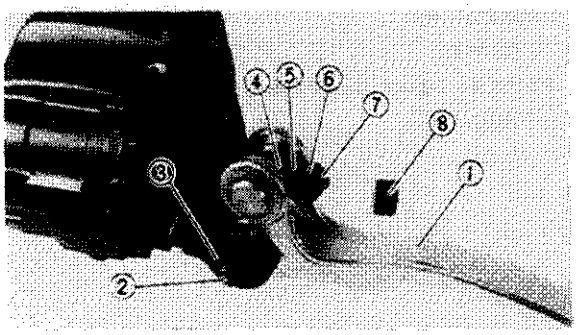


4. Install:
- Master cylinder kit ①
- Rod ②
- Plate washer ③
- Circlip ④
- Dust cover ⑤



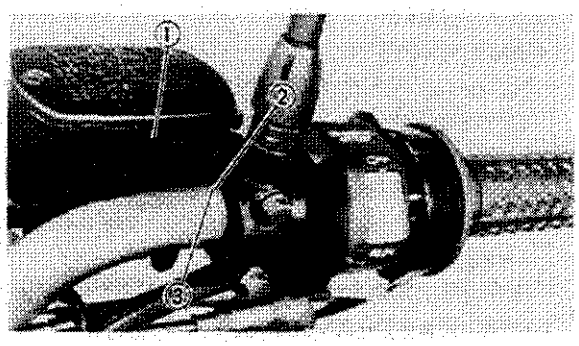
5. Install:
- Plate ①
- Nut ②
- Brake switch ③
- Adjusater ④

NOTE:
Fit the brake switch arm with the plate ① .



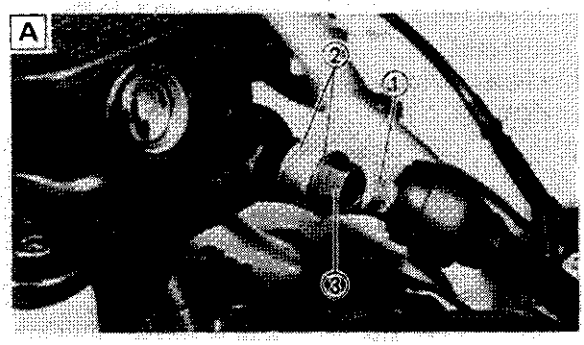
6. Install:
- Brake lever ①
- Collar
- Bolt ②
- Nut ③
- Washer ④
- Spring ⑤
- Nut ⑥
- Circlip ⑦
- Cap (rubber) ⑧

NOTE:
- Apply lithium soap base grease to pivot shaft of the brake lever.
- After install the circlip ⑦ , turn back the nut ⑥ until touch the circlip ⑦ .



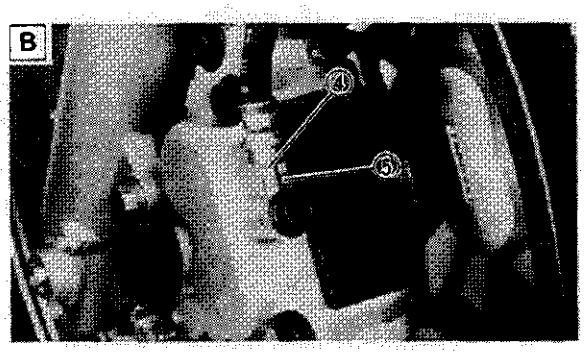
7. Install:
• Master cylinder ①

NOTE:
• Align the end of the holder ② with the punch mark ③ on the handlebar.
• Tighten first the upper bolt, then the lower bolt.



	Bolt (master cylinder bracket): 9 Nm (0.9 m · kg, 6.8 ft · lb)

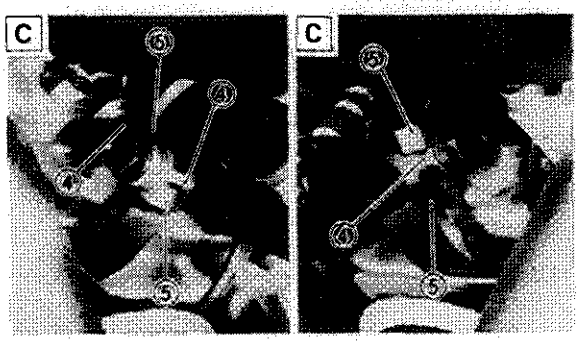
8. Install:
• Brake hoses ①
• Copper washers ②
• Union bolts ③



	Union bolt: 26 Nm (2.6 m · kg, 19 ft · lb)

Ⓐ Master cylinder
Ⓑ Brake caliper
Ⓒ Brake joint

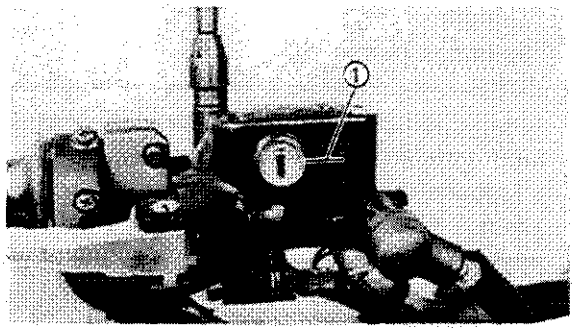
CAUTION:
When installing the brake hose to the caliper and brake joint, lightly touch the pipe ④ with the projection ⑤ on the caliper and brake joint (copper washer).



⚠ WARNING
Always use new copper washers.

9. Fill:
• Brake fluid

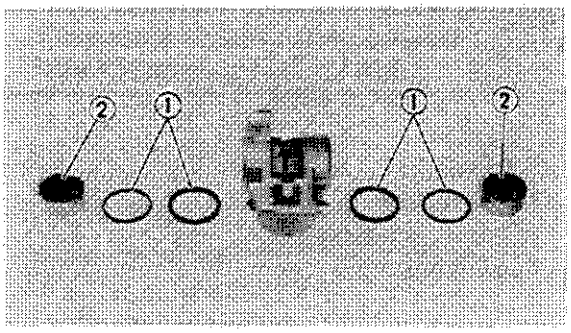
	Recommended brake fluid: DOT #4 If Dot #4 is not available, Dot #3 can be used.



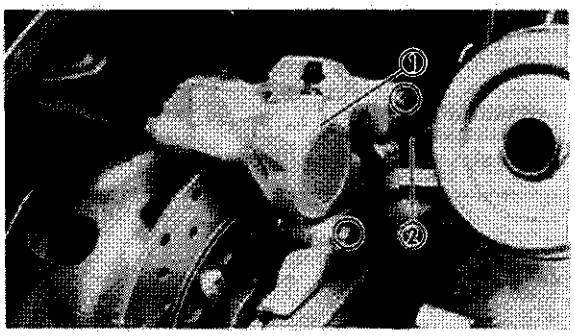
10. Air bleed:
• Brake system
Refer to "AIR BLEEDING" section in the CHAPTER 3.
11. Inspect:
• Brake fluid level
Fluid level is under "LOWER" level line ①
→ Replenish.
Refer to "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

Rear brake

1. Install:
• Piston seals ① (new)
• Pistons ②

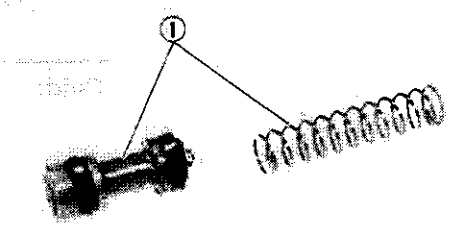


2. Install:
• Pad spring
• Brake pads
• Shims
Refer to the "BRAKE PAD REPLACEMENT" section.



3. Install:
• Brake caliper ①
• Brake hose ②

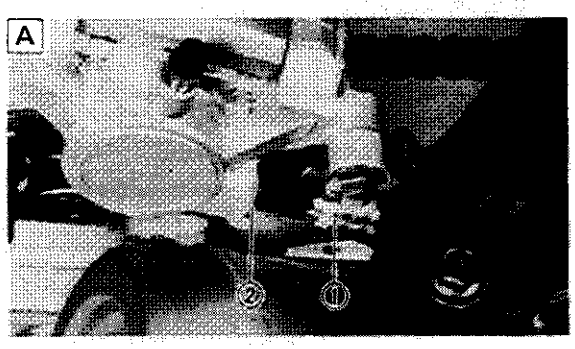
	Bolts (brake caliper): **35 Nm (3.5 m · kg, 25 ft · lb)** **Nut (brake hose joint):** **14 Nm (1.4 m · kg, 10 ft · lb)**

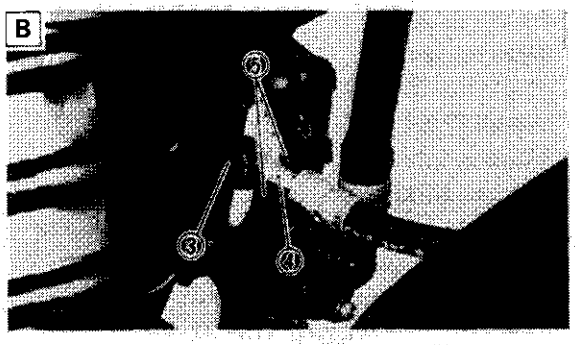


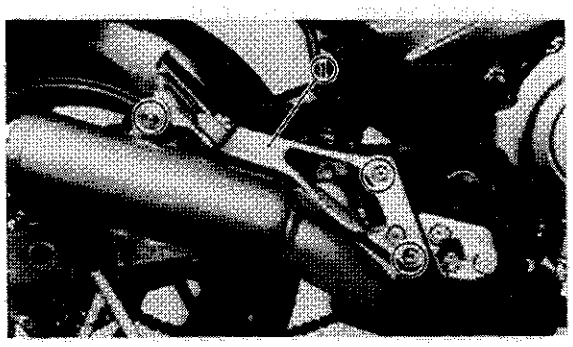
4. Install:
• Master cylinder kit ①

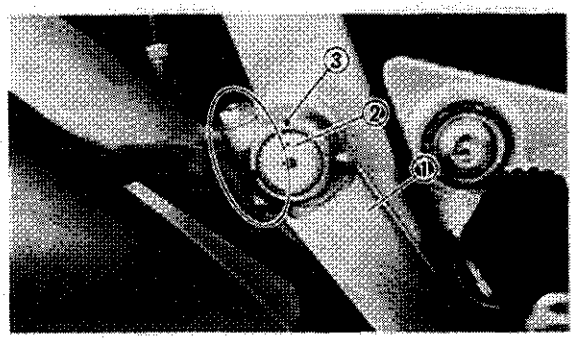
5. Install:
• Master cylinder

	Bolt (master cylinder): **23 Nm (2.3 m · kg, 17 ft · lb)**









6. Install:
- Brake hose ①
- Copper washers ②
- Union bolts ③

	Union bolt: **26 Nm (2.6 m • kg, 19 ft • lb)**
	Nut (brake hose joint): **14 Nm (1.4 m • kg, 10 ft • lb)**

A Brake caliper
B Master cylinder

CAUTION:
When installing the brake hose, lightly touch the brake pipe ④ with the projections ⑤ on the master cylinder.

⚠ WARNING
Always use new copper washers.

7. Install:
- Footrest bracket ①

	Bolt (footrest bracket): **30 Nm (3.0 m • kg, 22 ft • lb)**

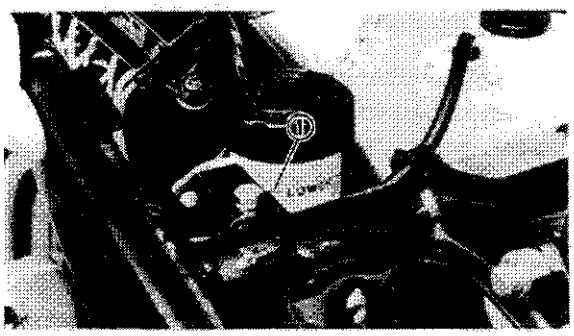
8. Install:
- Brake pedal ①

NOTE:
Align the punch mark ② on the brake pedal boss with the punch mark ③ on the brake pedal.

	Bolt (brake pedal): **8 Nm (0.8 m • kg, 5.8 ft • lb)**

9. Fill:
• Brake fluid

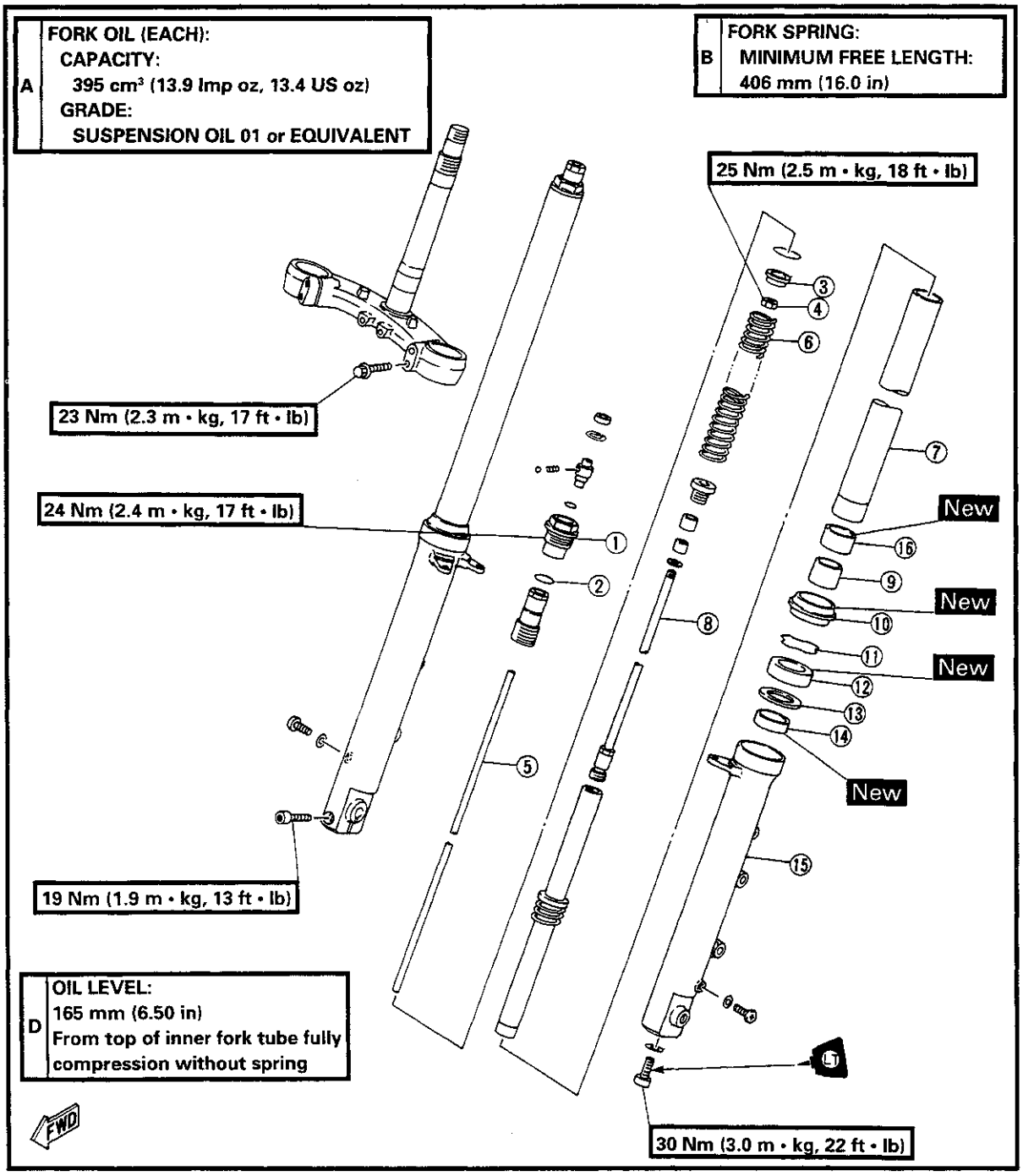
	Recommended brake fluid: **DOT #4** **If DOT #4 is not available,** **DOT #3 can be used.**

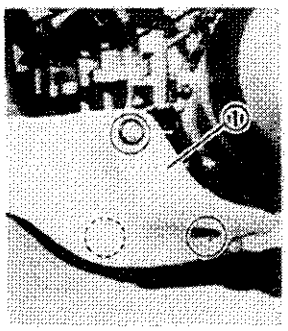
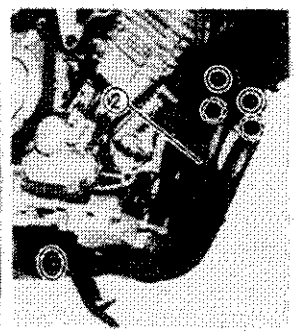


10. Air bleed:
• Brake system
Refer to the "AIR BLEEDING" section in the CHAPTER 3.
11. Inspect:
• Brake fluid level
Fluid level is under "LOWER" level line ①
→ Replenish.
Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

FRONT FORK

① Cap bolt
② O-ring
③ Spring seat
④ Lock nut
⑤ Damping adjuster rod
⑥ Fork spring
⑦ Inner fork tube
⑧ Damper rod
⑨ Oil lock pieces
⑩ Dust seal
⑪ Retaining clip
⑫ Oil seal
⑬ Plain washer
⑭ Slide metal
⑮ Outer fork tube
⑯ Piston metal



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REMOVAL

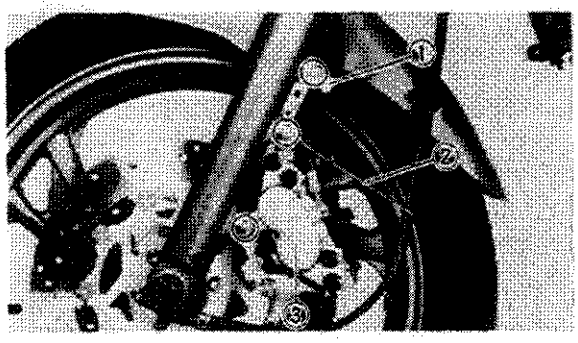
⚠ WARNING
Support the motorcycle securely so there is no danger of it falling over.

1. Remove:
- Engine guard ①
- Exhaust pipe ②

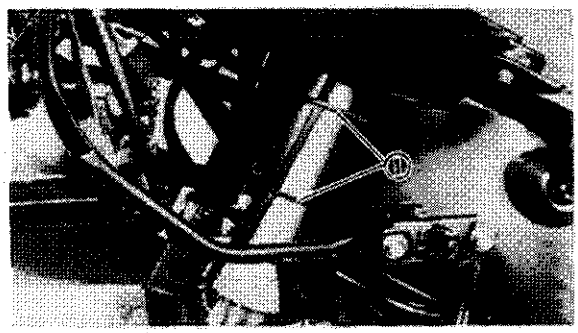
2. Elevate the front wheel by placing a suitable stand under the engine.

3. Remove:
- Front wheel
  Refer to the "FRONT WHEEL—REMOVAL" section.

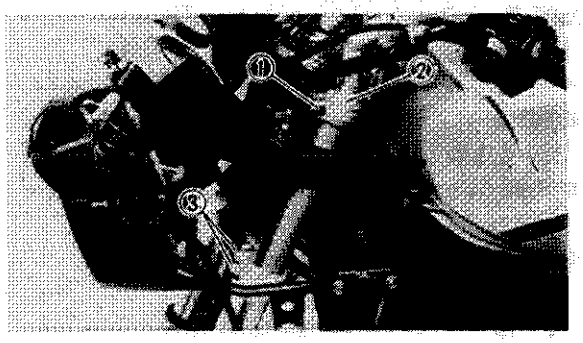
4. Remove:
- Side cowlings (left and right)
- Upper cowling
  Refer to "SEAT, COWLING AND FUEL TANK" section in the CHAPTER 3.



5. Remove:
- Brake hose holder ①
- Speedometer cable holder ②
- Brake caliper ③



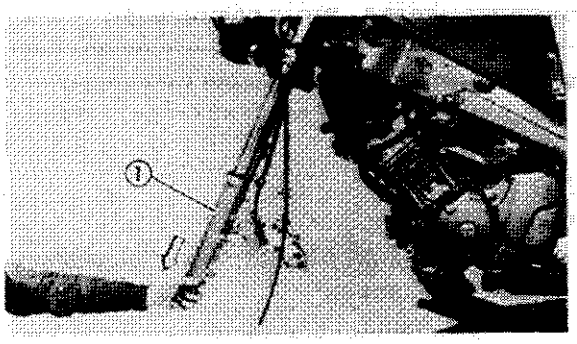
6. Remove:
- Horn lead clamps ①



7. Loosen:
- Pinch bolts ① (handlebar crown)
- Cap bolts ②
- Pinch bolts ③ (lower bracket)

⚠ WARNING

Support the fork before loosening the pinch bolt.

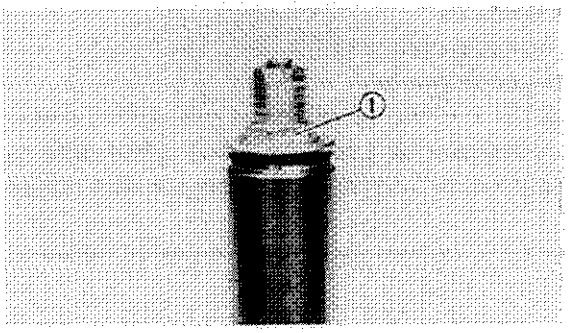


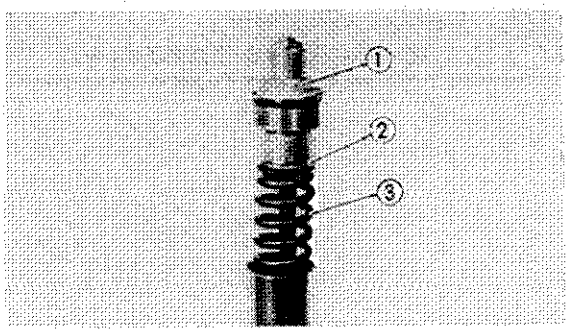
8. Remove:
- Front fork ①

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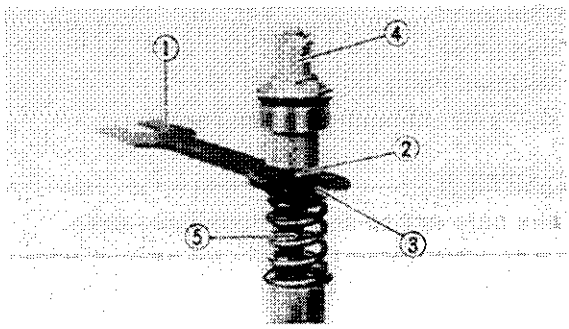
DISASSEMBLY

1. Remove:
- Cap bolt ①
  (from inner tube)





2. Remove:
- Cap bolt ①
- Spring seat ②
- Fork spring ③
- Damping adjuster rod



****

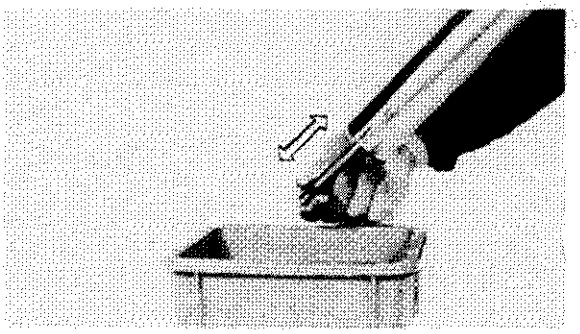
Removing steps:
- Press down the spring seat.
- Set the rod holder ① between the lock-nut ② and spring seat ③.

	Rod holder: **P/N YM-01434/90890-01434**

NOTE:
Use "B" side of rod holder.

- Hold the spring preload adjuster ④ and loosen the locknut ② (clockwise).
- Remove the spring preload adjuster (with cap bolt) ④.
- Remove the damping adjuster rod ⑤.
- Remove the rod holder.

NOTE:
Be careful, fork spring is compressed.

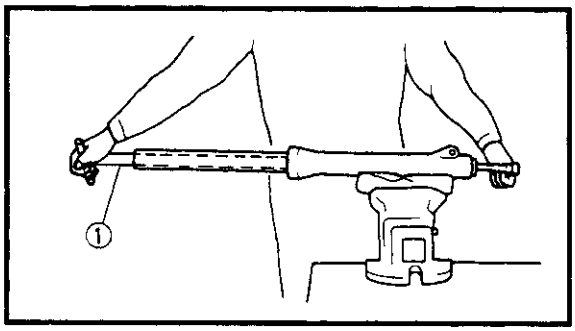


- Remove the spring seat and fork spring.

****

3. Drain:
- Fork oil

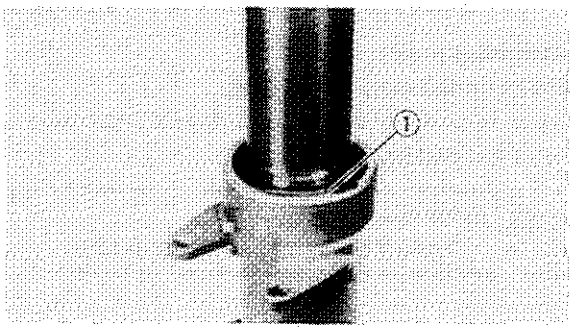
Drain the fork oil while stroking the damper rod several times.



4. Remove:
- Bolt (damper rod)
- Copper washer

NOTE:
Loosen the bolt (damper rod) while holding the damper rod with the damper rod holder ①.

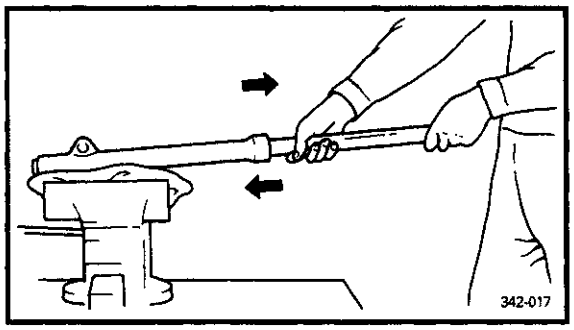
	Damper rod holder: **P/N YM-01447/90890-01447**



5. Remove:
- Dust seal
- Stopper ring ①

Using slotted head screwdriver.

CAUTION:
Take care not to scratch the inner tube.

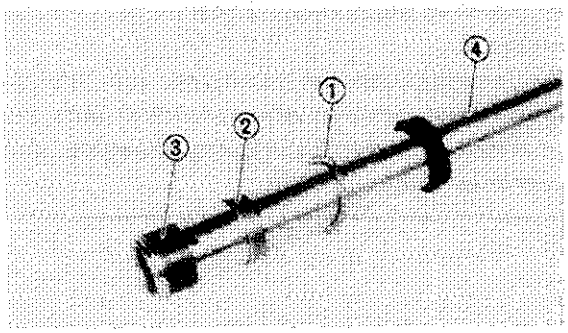


6. Remove:
• Oil seal

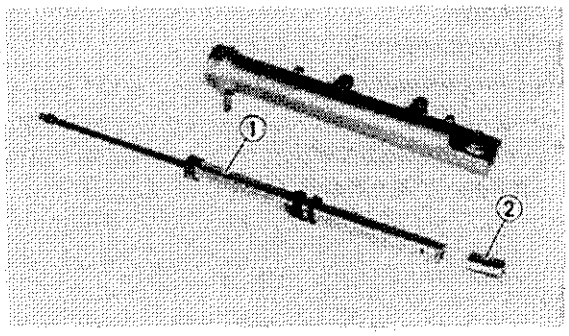
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Removing steps:
- Hold the fork leg horizontally.
- Clamp the caliper mounting boss of the outer tube securely in a vise with soft jaws.
- Pull out the inner fork tube from the outer tube by forcefully, but carefully, with drawing the inner tube.
- Repeat this step until the inner tube can be pulled out from the outer tube.

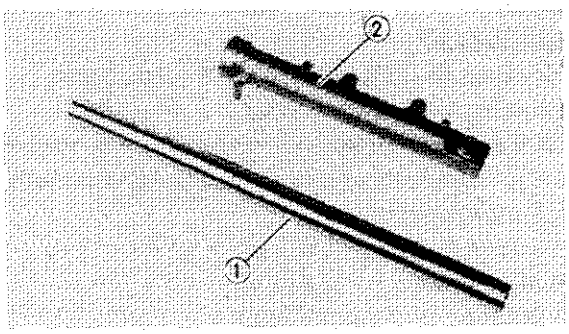
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7. Remove:
• Plain washer ①
• Slide metal ②
• Piston metal ③
• Inner tube ④



8. Remove:
• Damper rod ①
• Oil lock piece ②



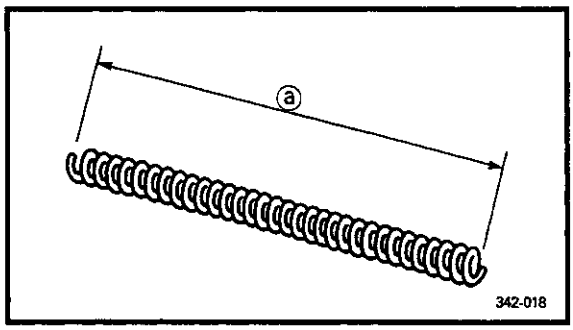
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INSPECTION

1. Inspect:
• Inner fork tube ①
• Outer fork tube ②
Scratches/Bends/Damages → Replace.

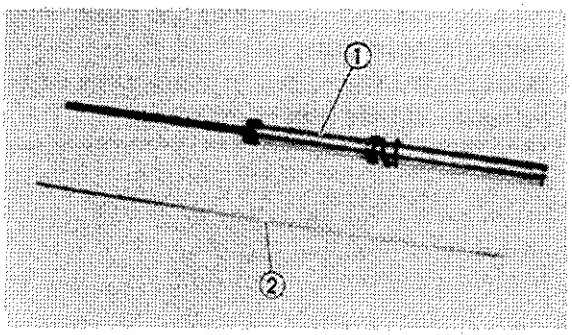
⚠ WARNING

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



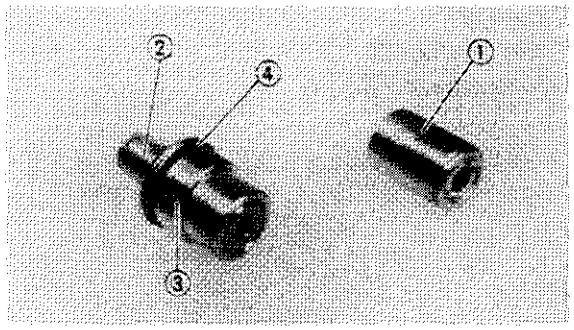
2. Measure:
• Fork spring free length ⓐ
Out of specification → Replace.

Fork spring free length:
427 mm (16.8 in)
Minimum free length:
406 mm (16.0 in)



3. Inspect:
• Damper rod ①
• Damping adjuster rod ②
Bend/Damage → Replace.
Contamination → Blow out oil passages with compressed air.

CAUTION:
The front fork with a built-in damper rod has a very sophisticated internal construction and is particularly sensitive to foreign material.
Use enough care not to arrow any foreign material to come in when the oil is replaced or when the front fork is disassembled and reassembled.



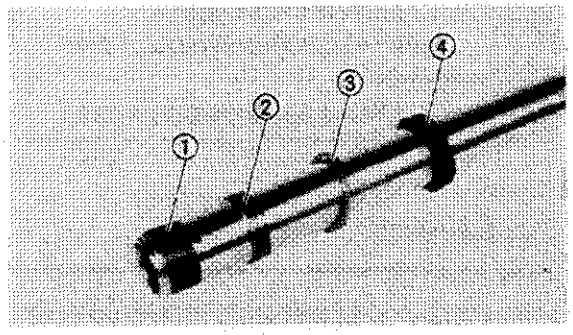
4. Inspect:
• Oil lock piece ①
• Spring preload adjuster ②
• Cap bolt ③
• O-ring ④ (cap bolt)
Damage → Replace.

KB274004
ASSEMBLY
Reverse the "DISASSEMBLY" procedure.
Note the following points.

NOTE:
In front fork reassembly, be sure to use following new parts:
• Piston metal
• Slide metal
• Oil seal

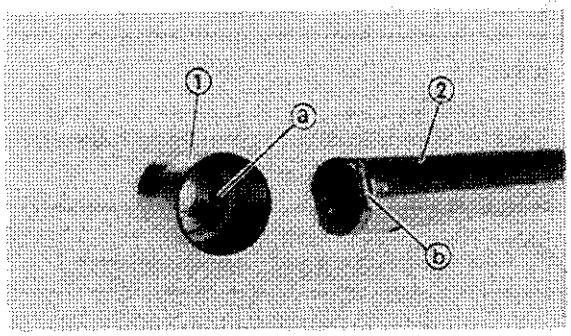
• Dust seal

Make sure all components are clean before reassembly.



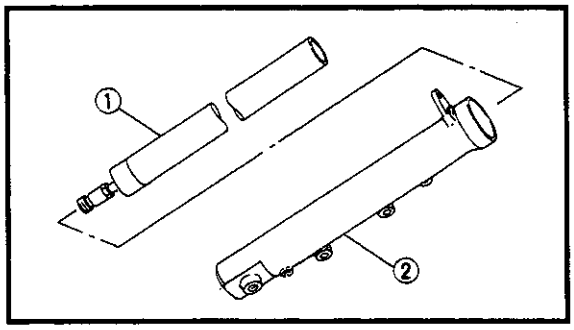
1. Install:
• Piston metal ①
• Slide metal ②
• Plain washer ③
• Oil seal ④

NOTE:
• Apply the forn oil on the inner tube.
• Be sure that the oil seal numbered side face upward.



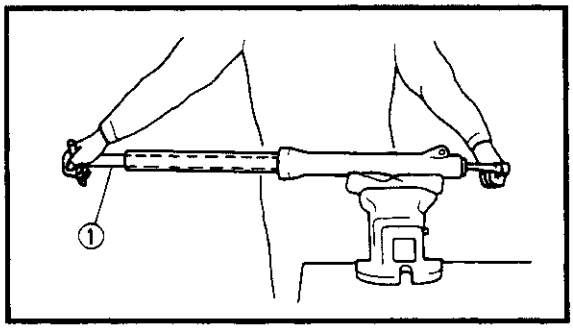
2. Install:
• Oil lock piece ①
• Damper rod ② (into the inner tube)

CAUTION:
Align the projection ⓐ in the oil lock piece with the slot ⓑ on the damper rod.



3. Install:
• Inner tube ① (with damper rod) into the outer tube ②

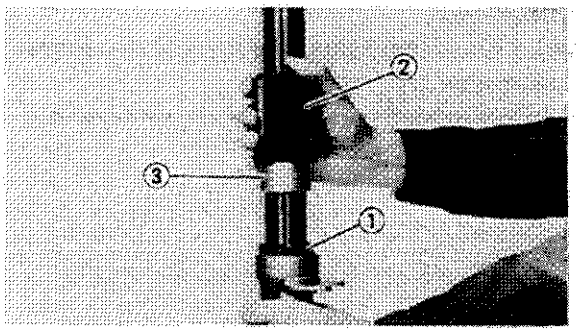
CAUTION:
Make sure that the projections on the oil lock piece is aligned with the slots in the outer tube.

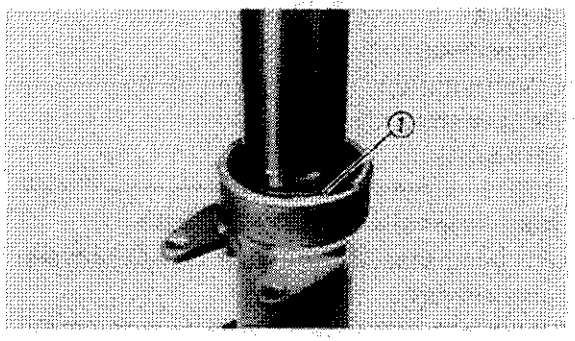


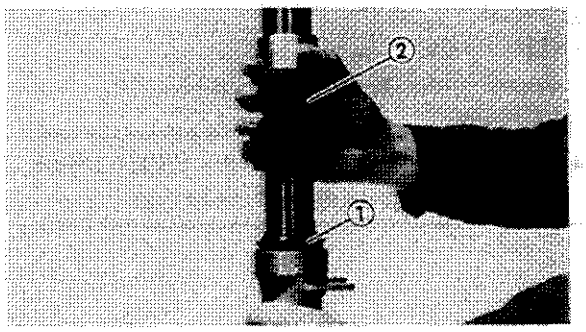
4. Tighten:
• Bolt (damper rod)

	Bolt (damper rod): **30 Nm (3.0 m · kg, 22 ft · lb)** **apply Loctite®**

NOTE:
Tighten the bolt (damper rod) while the damper rod with the damper rod holder ① .







	Damper rod holder: **P/N YM-01447/90890-01447**

5. Install:
- Oil seal ①

Press the oil seal into the outer tube with fork seal driver weight ② and adapter ③.

	Fork seal driver weight: **P/N YM-33963/90890-01367** **Adapter:** **P/N YM-33968/90890-01381**

6. Install:
- Stopper ring ①

NOTE:

Fit the stopper ring correctly in the groove in the outer tube.

7. Install:
- Dust seal ①

Press the dust seal into the outer tube with fork seal driver weight ②.

	Fork seal driver weight: **P/N YM-33963/90890-01367**

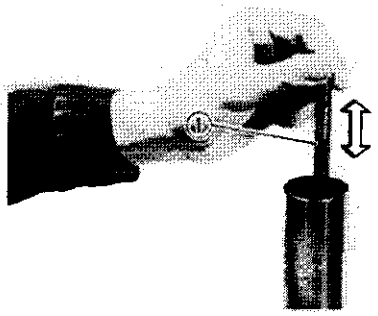
8. Compress the front fork fully.

9. Fill:
- Fork oil

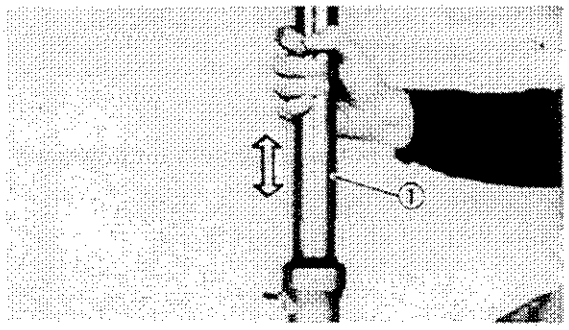
	Fork oil capacity: **395 cm³ (13.9 Imp oz, 13.4 US oz)** **Recommended fork oil:** **Suspension oil 01 or equivalent**

CAUTION:

- **Be sure to use recommended fork oil. If other oils are used, they may have an excessively adverse effect on the front fork performance.**
- **Never allow foreign materials to enter the front fork.**

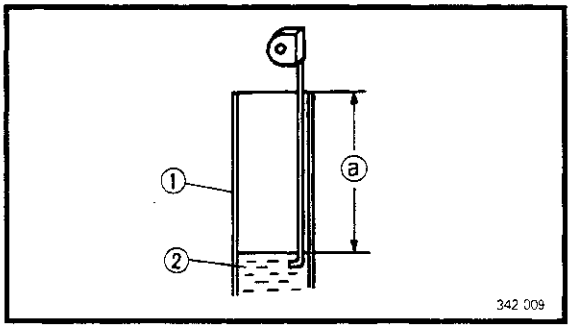


10. After filling, pump the damper rod ① slowly up and down more than 10 times to distribute the fork oil.



11. After filling, pump the inner tube ① slowly up and down to distribute the fork oil once more.

12. Wait ten minutes until the air bubbles have been removed from the front fork.



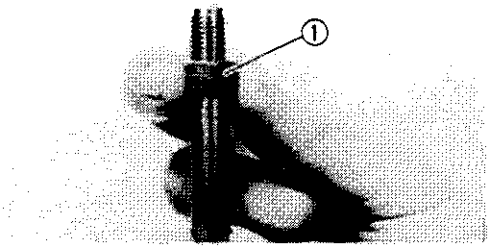
13. Measure:
• Oil level ⓐ
Out of specification → Adjust.

① Inner tube
② Fork oil

Fork oil level:
165 mm (6.50 in)
From top of inner tube with inner tube and damper rod fully compressed without spring

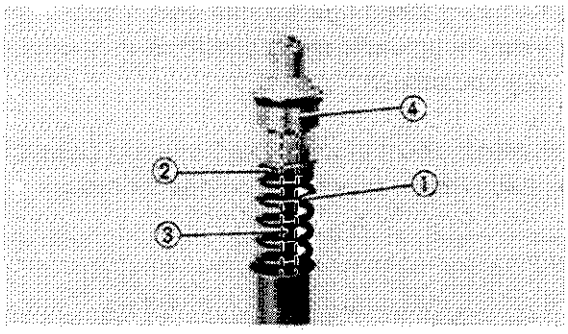
⚠ WARNING

Never fail to mark the oil level adjustment specification level and always adjust each front fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.

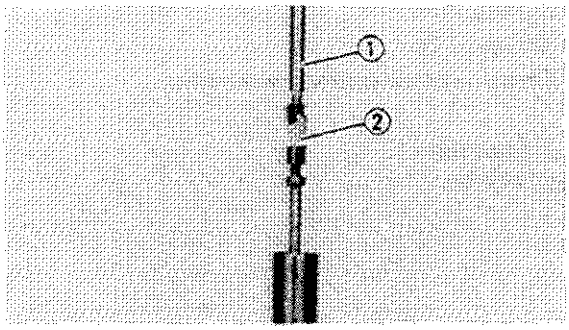


14. Install:
- Locknut ①
  Full tighten with your finger.

15. Adjust:
- Cap bolt
  Turn the damping adjuster minimum position (counter clockwise).



16. Install:
- Fork spring ①
- Spring seat ②
- Damping adjuster rod ③
- Cap bolt ④ (with spring preload adjuster)

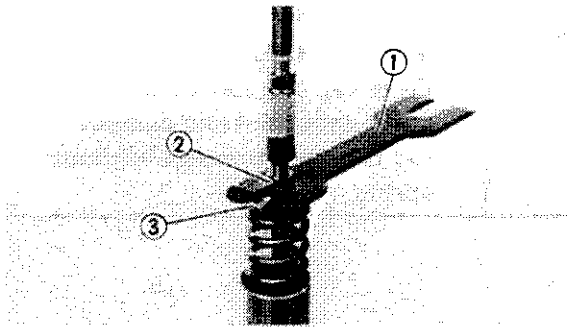


****

Installing steps:

- Install the rod puller ① and attachment ② to damper rod.

	Rod puller: **P/N YM-01437/90890-01437** **Rod puller attachment:** **P/N 90890-01436**

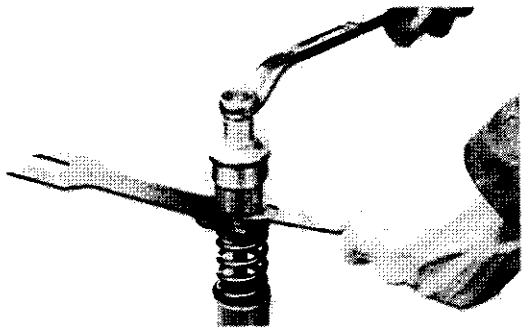


- Install the fork spring and spring seat.
- Pull up the rod puller and set the rod holder ① between the locknut ② and spring seat ③.

NOTE:
Use "B" side of rod holder.

	Rod holder: **P/N YM-01434/90890-01434**

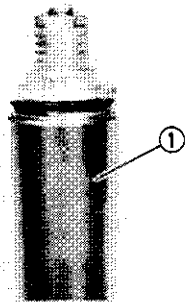
- Remove the rod puller and attachment.
- Install the damping adjuster rod.
- Install the cap bolt (with spring preload adjuster) and tighten with your finger slightly tight.
- Tighten the locknut.



NOTE:
Hold the spring preload adjuster and tighten the locknut with specified torque.

	Locknut: **25 Nm (2.5 m · kg, 18 ft · lb)**

● Remove the rod holder.

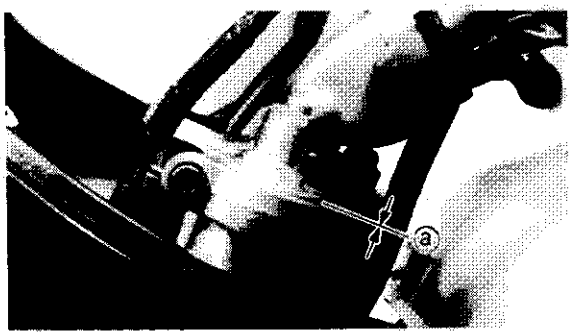


NOTE:
Be carefully, this fork spring is compressed.

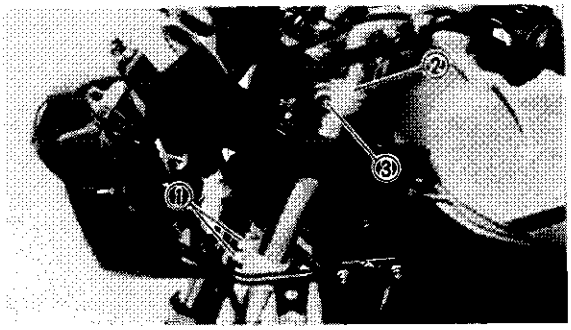
****

17. Install:
• Inner tube ①
(to cap bolt)
Temporarily tighten the cap bolt.

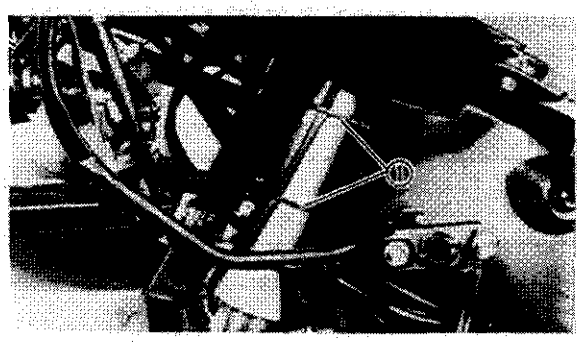
KB274005
INSTALLATION
Reverse the "REMOVAL" procedure.
Note the following points.
1. Install:
• Front fork
Temporary tighten the pinch bolts.

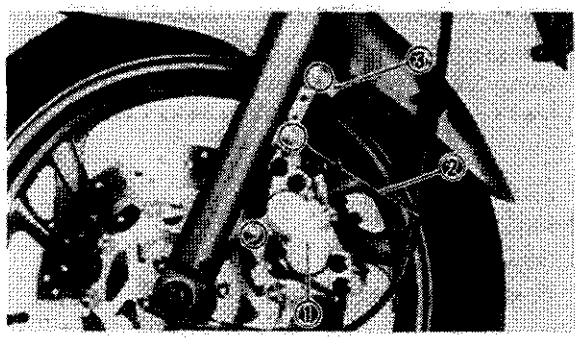


NOTE:
Position the inner fork tube end in such a way that it is flush ⓐ with the top of the handle crown.



2. Tighten:
• Pinch bolts ① (under bracket)
• Cap bolt ②
• Pinch bolts ③ (handle crown)





	Pinch bolt (under bracket): **23 Nm (2.3 m · kg, 17 ft · lb)** **Cap bolt:** **24 Nm (2.4 m · kg, 17 ft · lb)** **Pinch bolt (handle crown):** **23 Nm (2.3 m · kg, 17 ft · lb)**

3. Install:
- Horn lead clamps ①

4. Install:
- Brake caliper ①
- Speedometer cable holder ②
- Brake hose holder ③

	Bolt (brake hose holder): **7 Nm (0.7 m · kg, 5 ft · lb)** **Bolt (brake caliper):** **35 Nm (3.5 m · kg, 25 ft · lb)**

5. Install:
- Front wheel

	Wheel axle: **58 Nm (5.8 m · kg, 42 ft · lb)** **Pinch bolt (wheel axle):** **19 Nm (1.9 m · kg, 13 ft · lb)**

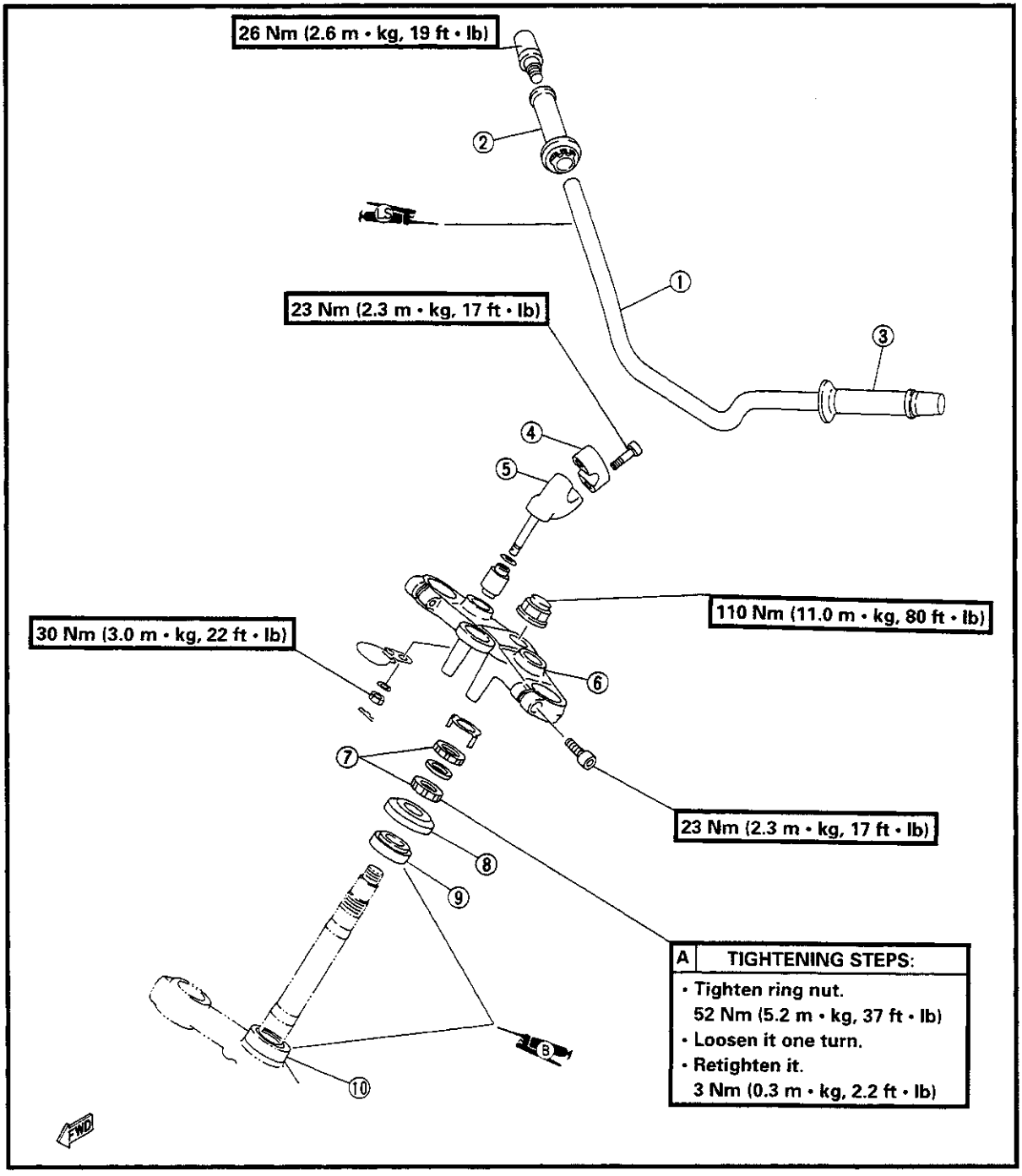
Refer to the "FRONT WHEEL—INSTALLATION" section.

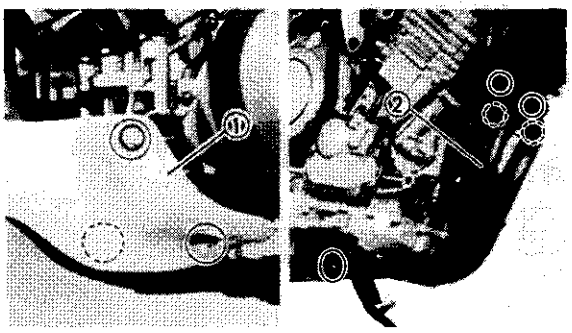
6. Install:
- Front fender
- Brake hose holders

	Bolt (front fender): **9 Nm (0.9 m · kg, 6.5 ft · lb)**

STEERING HEAD AND HANDLEBAR

① Handlebar
② Handlebar grip (right)
③ Handlebar grip (left)
④ Handlebar holder (upper)
⑤ Handlebar holder (lower)
⑥ Handle crown
⑦ Ring nut
⑧ Cover
⑨ Bearing (upper)
⑩ Bearing (lower)





KB275001
REMOVAL

⚠ WARNING
Securely support the motorcycle so there is no danger of it falling over.

1. Remove:
- Engine guard ①
- Exhaust pipe ②

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

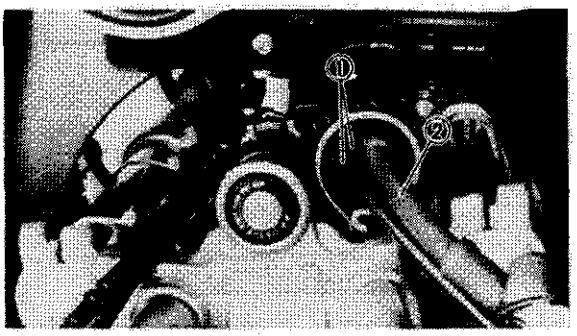
3. Remove:
- Seat
- Side covers (left and right)
- Upper cowling
- Fuel tank

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

4. Remove:
- Front wheel

Refer to the "FRONT WHEEL—REMOVAL" section.
- Front fork

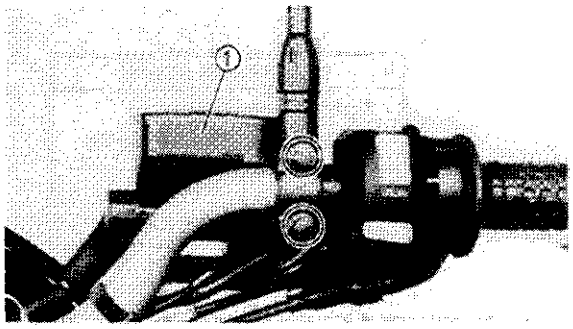
Refer to the "FRONT FORK—REMOVAL" section.



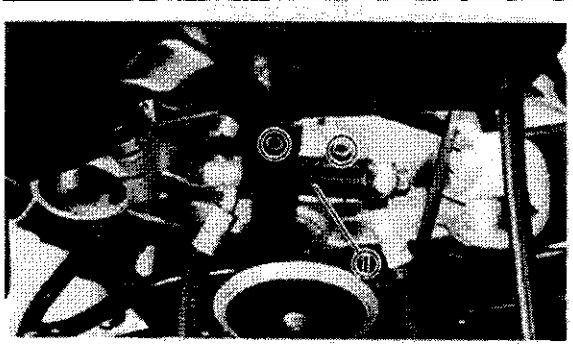
5. Unhook:
- Throttle cables ①
- Brake hose ②

form cable guide

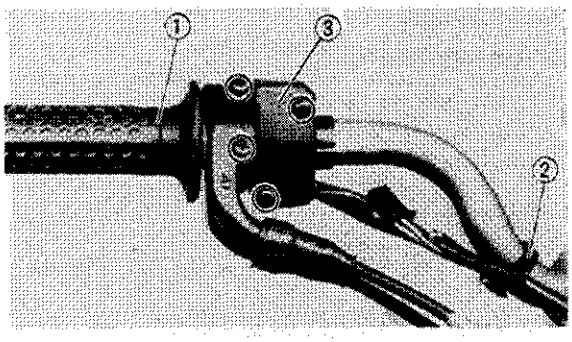
6. Disconnect:
- Brake switch lead



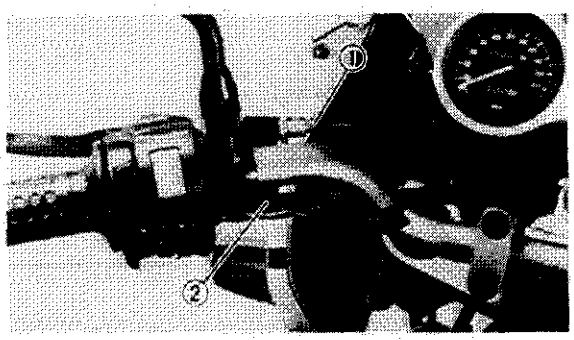
7. Remove:
- Master cylinder ①



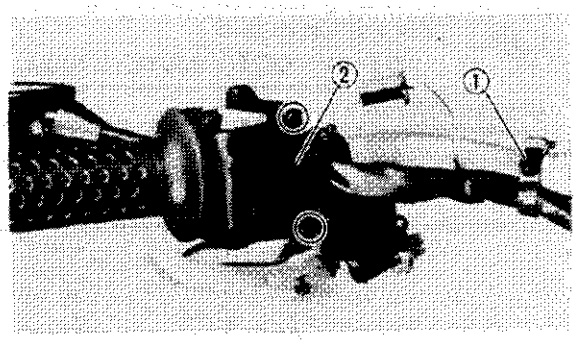
8. Remove:
- Brake hose joint ①



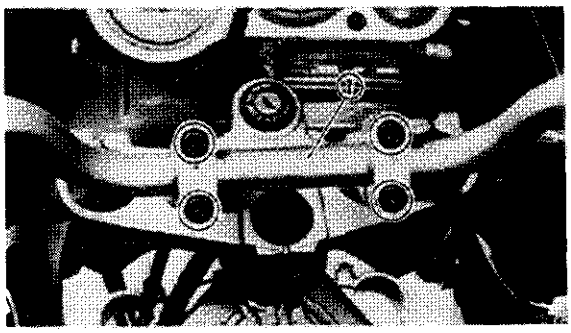
9. Remove:
- Grip end (right)
- Throttle grip ①
- Clamp ② (handlebar switch)
- Handlebar switch ③ (right)



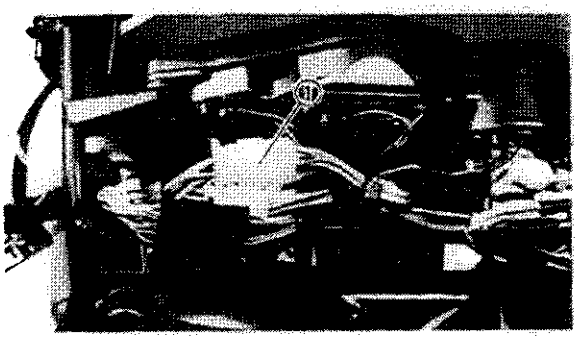
10. Disconnect:
- Clutch cable ①
- Clutch switch lead ②



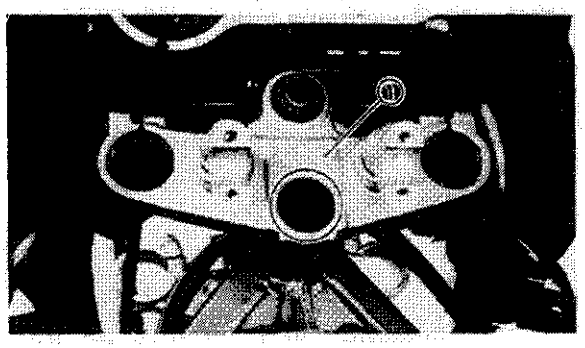
11. Remove:
- Clamp ① (handlebar switch)
- Handlebar switch ② (left)



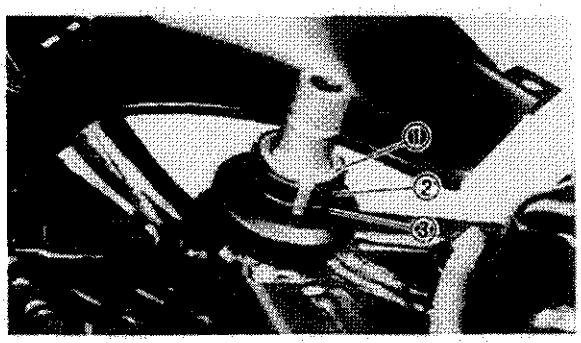
12. Remove:
- Handlebar ①



13. Disconnect:
- Main switch coupler ①



14. Remove:
- Handle crown ①

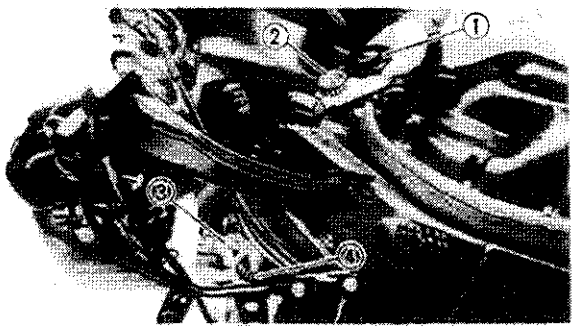


15. Remove:
- Special washer ①
- Ring nut ② (upper)
- Rubber washer
- Ring nut (lower) ③

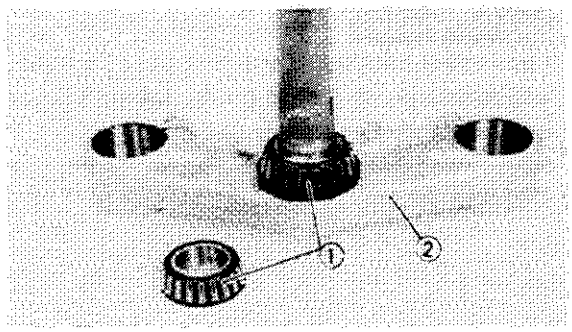
NOTE:
Remove the ring nut by the ring nut wrench.

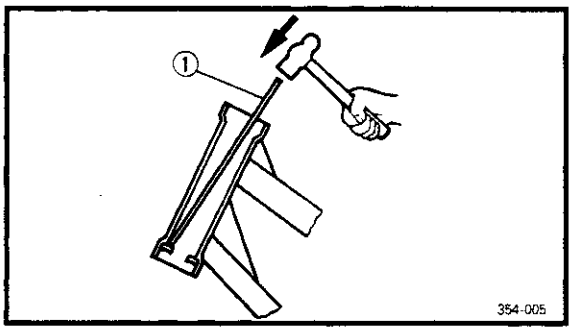
Ring nut wrench:
P/N YU-33975/90890-01403

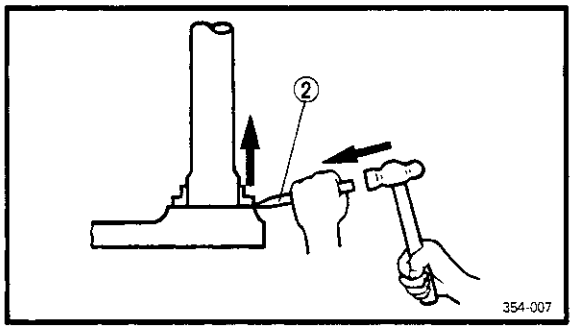
⚠ WARNING
Support the lower bracket so that it may not fall down.

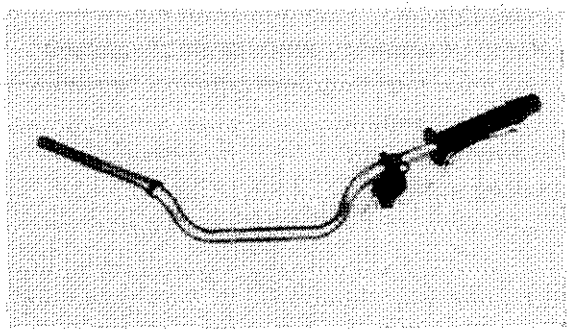


16. Remove:
- Bearing cover ①
- Bearing ② (upper)
- Lower bracket ③
- Bearing ④ (lower)









KB275002

INSPECTION

1. Wash the bearings with a solvent.

2. Inspect:
- Bearing ①
  Pitting/Damage → Replace.
- Lower bracket ②
- Handle crown
  Bends/Cracks/Damage → Replace.

****

Replacement steps:
- Remove the bearing races using a long rod ① and hammer as shown.
- Remove the bearing race on the steering stem using the floor chisel ② and the hammer as shown.
- Install the new dust seal and races.

****

NOTE:
Always replace bearings, races and dust seal as a set.

3. Inspect:
- Handlebars
  Bends/Cracks/Damage → Replace.

⚠ WARNING
Do not attempt to straighten a bent handlebar as this may dangerously weaken the handlebar.

****

Replacement steps:
- Remove the grip end, handlebar grip and lever holder (left).
- Install the lever holder to a new handlebar.
- Apply a light coat of an adhesive for rubber on the left handlebar grip.
- Install the handlebar grip and grip end.

NOTE:
Wipe off excess adhesive with a clean rag.

⚠ WARNING

Leave the handlebar intact until the adhesive becomes dry enough to make the grip and handlebar stuck securely.

****

KB275003

INSTALLATION

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

1. Lubricate:
- Bearing (upper and lower)
- bearing races

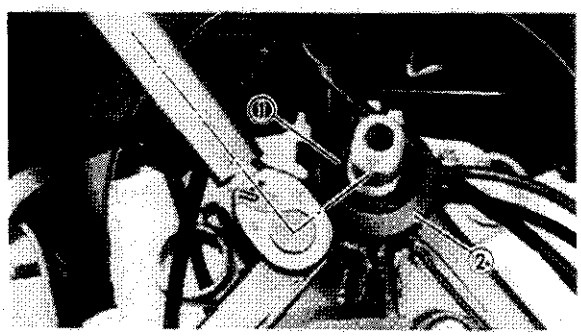
Recommended lubricant:
Wheel bearing grease

2. Install:
- Bearing (lower)
  (onto steering stem)
- Lower bracket

CAUTION:

Hold the steering stem until it is secured.

- Bearing (upper)
- Bearing cover
- Ring nut



3. Tighten:
- Ring nut ①

****

Tightening steps:
- Tighten the ring nut using the ring nut wrench ②.

	Ring nut wrench: **P/N YU-33975/90890-01403**

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

	Ring nut wrench (initial tightening): **52 Nm (5.2 m · kg, 37 ft · lb)**

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

⚠ WARNING
Avoid over-tightening.

	Ring nut (final tightening): **3 Nm (0.3 m · kg, 2.2 ft · lb)**

- Check the steering stem by turning lock to lock. If there is any binding, remove the steering stem assembly and inspect the steering bearings.
- Install the rubber washer.
- Install the ring nut (upper).

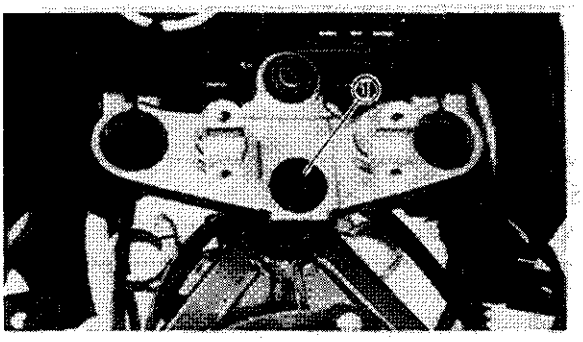
NOTE:
The tapered side of ring nut must face downward.



- Finger tighten the ring nut, then align the slot of both ring nuts. If not aligned, hold the lower ring nut (lower) and tighten the other until they are aligned.
- Install the special washer.

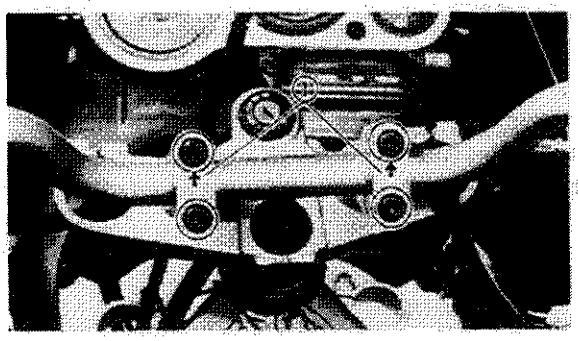
NOTE:
Make sure that the special washer tab is placed in the slots.

****



4. Install:
• Handle crown

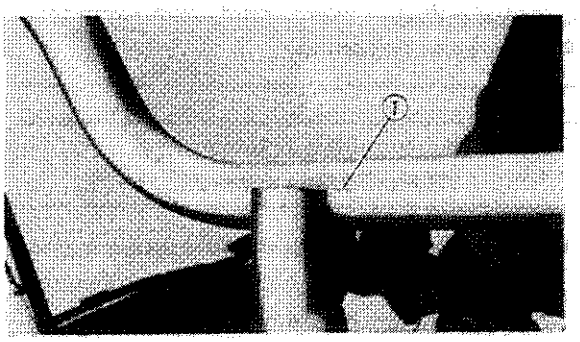
NOTE:
Temporary tighten the steering fitting bolt ① .



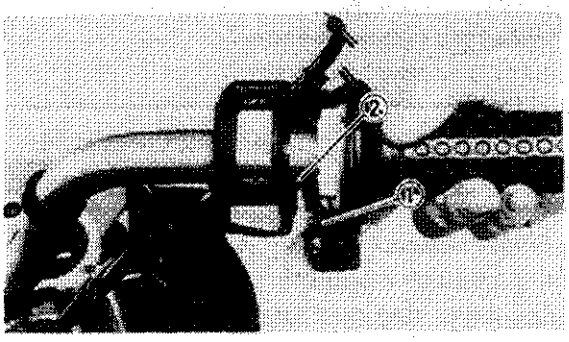
5. Install:
• Handlebar

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

NOTE:
- The upper handlebar holder should be installed with the arrow mark ① forward.
- Before installing the handlebar onto the handlebar crown, apply a light coat of lithium soap base grease onto the handlebar end and install the throttle grip to the handlebar.

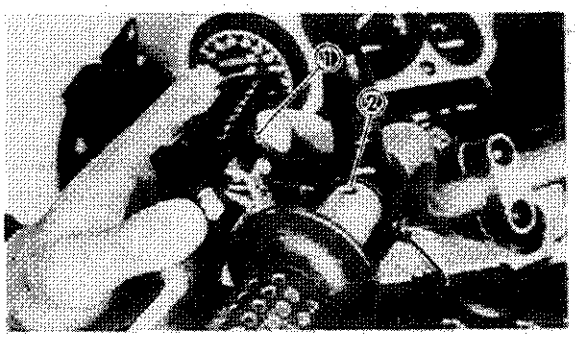


CAUTION:
- **Align the match mark ① on the handlebar with the top of handlebar holder (lower).**
- **First tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.**



6. Tighten:
• Throttle grip

⚠ WARNING
Make sure that the projection ① on the throttle grip housing is aligned with the hole ② on the handlebar.

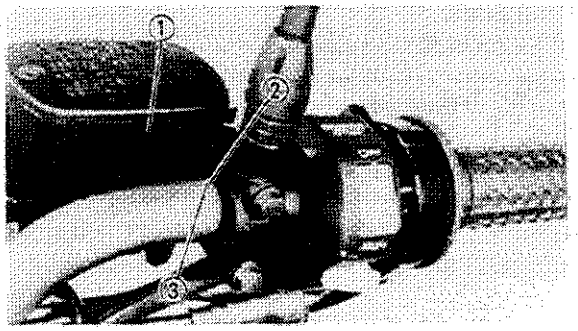


7. Install:
• Handlebar switches (left and right)

NOTE:
Align the projection ① on the handlebar switch with the hole ② on the handlebar.

8. Install:
• Clutch cable

NOTE:
Apply a light coat of lithium soap base



grease onto the clutch cable end.

9. Install:
- Master cylinder ①

NOTE:
- Align the end of the holder ② with the punch mark ③ on the handlebar.
- Tighten first the upper bolt, then the lower bolt.

	Bolt (master cylinder bracket): **9 Nm (0.9 m · kg, 6.5 ft · lb)**

10. Install:
- Front fork

Refer to the "FRONT FORK—INSTALLATION" section.

	Pinch bolt (lower bracket): **23 Nm (2.3 m · kg, 17 ft · lb)** **Pinch bolt (handlebar crown):** **23 Nm (2.3 m · kg, 17 ft · lb)**

11. Tighten:
- Steering fitting bolt
- Grip ends (left and right)

	Steering fitting bolt: **110 Nm (11.0 m · kg, 80 ft · lb)** **Grip end:** **26 Nm (2.6 m · kg, 19 ft · lb)**

12. Install:
- Front wheel

Refer to the "FRONT WHEEL—INSTALLATION" section.

	Wheel axle: **58 Nm (5.8 m · kg, 42 ft · lb)** **Pinch bolt (wheel axle):** **19 Nm (1.9 M · kg, 13 ft · lb)**

13. Adjust:
• Clutch cable free play

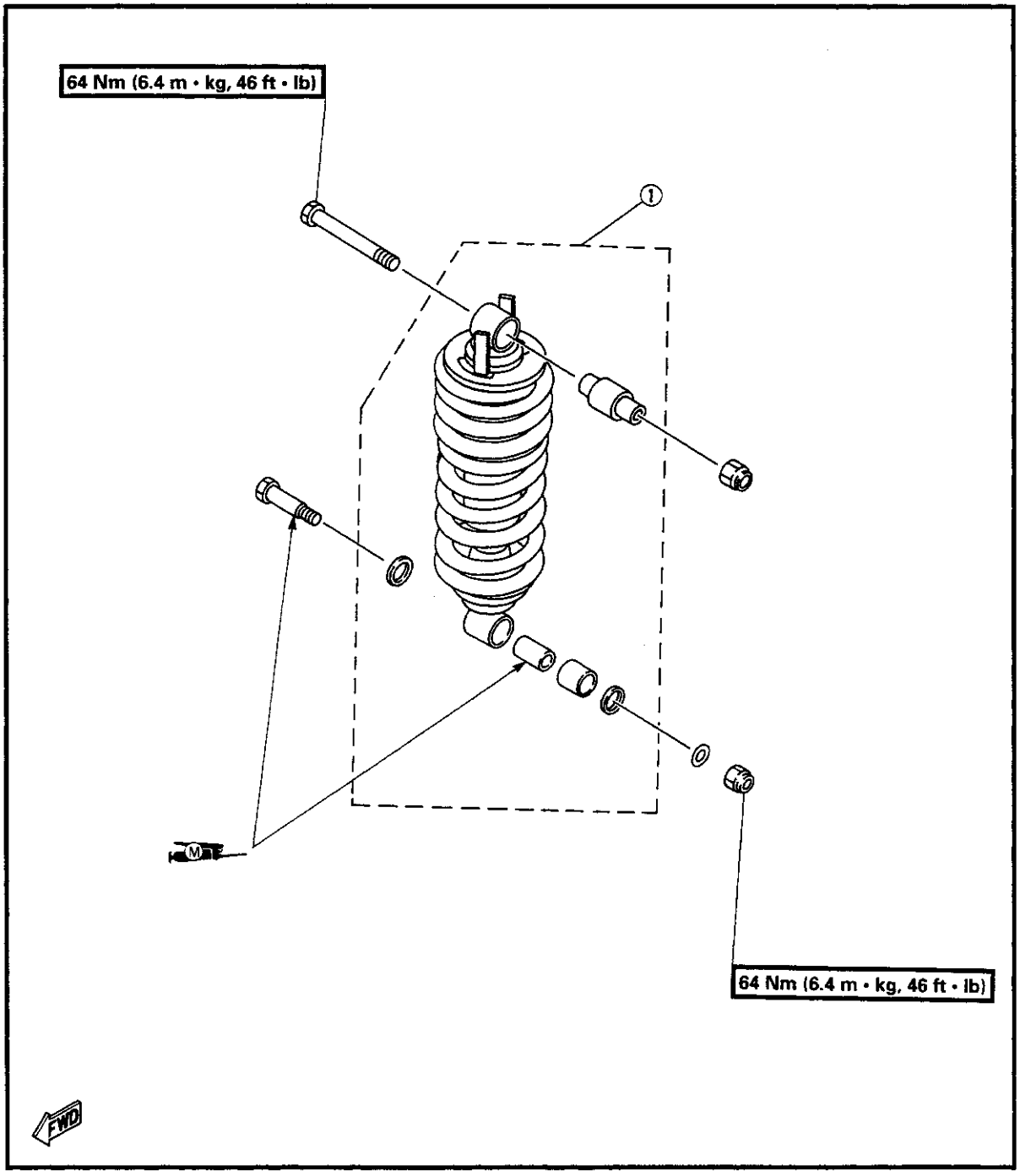


Free play:
10~15 mm (0.4~0.6 in)
at lever end

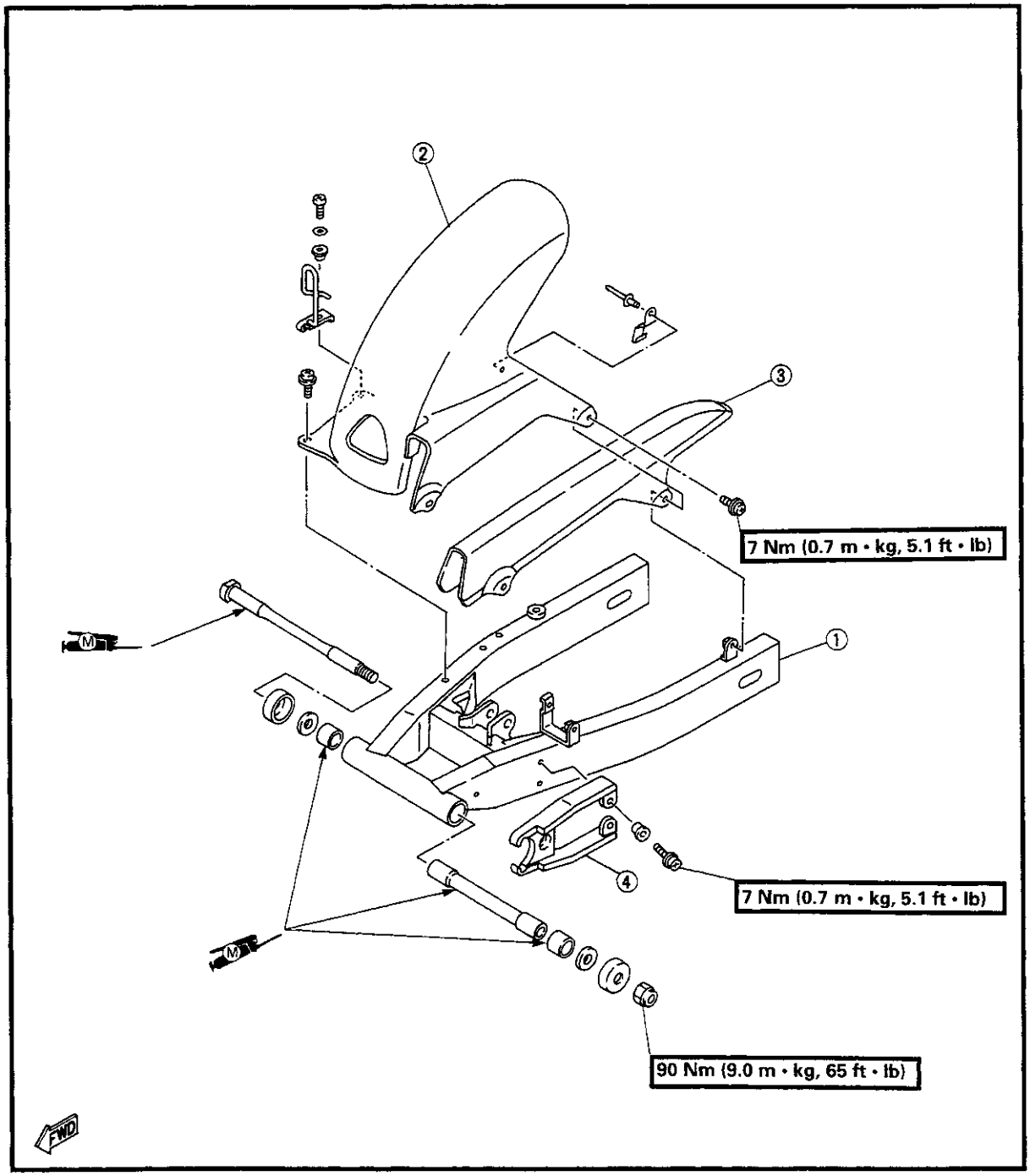
Refer to "CLUTCH ADJUSTMENT" section in CHAPTER 3.

REAR SHOCK ABSORBER AND SWINGARM

① Rear shock absorber assembly



① Swingarm
② Rear fender
③ Chain case
④ Chain protector



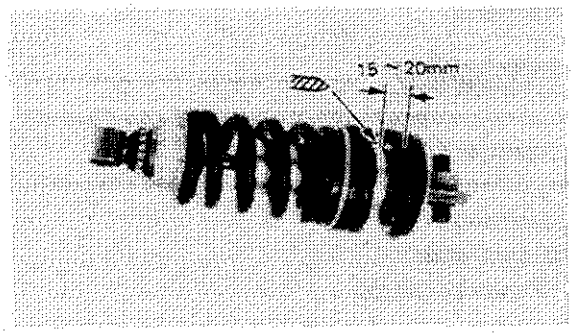
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HANDLING NOTES

⚠ WARNING

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

- **Do not tamper with or attempt to open the cylinder assembly.**
- **Do not subject shock absorber to an open flame or other high heat source. this may cause the unit to explode due to excessive gas pressure.**
- **Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damaging performance.**
- **Take care not to scratch the contact surface of the piston rod with the cylinder; or oil could leak out.**
- **When scrapping the shock absorber, refer to the "NOTES ON DISPOSAL" section.**



KB276002

NOTES ON DISPOSAL

****

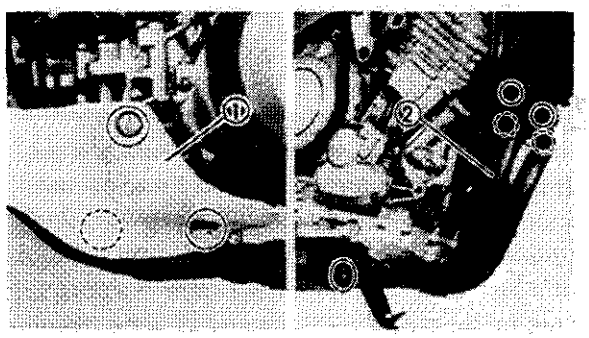
Disposal steps:

- Gas pressure must be released before disposing of shock absorber. To do so, drill a 2~3 mm (0.08~0.12 in) hole through the cylinder wall at a point 15~20 mm (0.6~0.8 in) from the end of the gas chamber.

⚠ WARNING

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

****



KB276003

REMOVAL

Rear shock absorber

⚠ WARNING

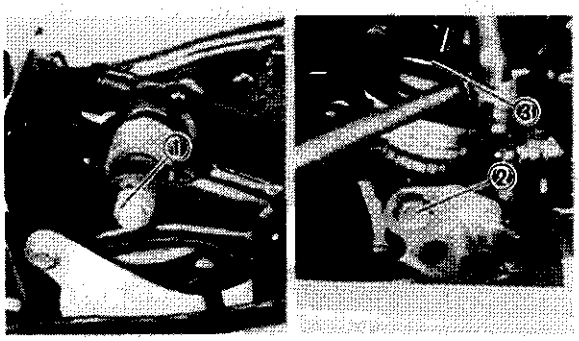
Securely support the motorcycle so there is no danger of it falling over.

1. Remove:
- Engine guard ①
- Exhaust pipe ②

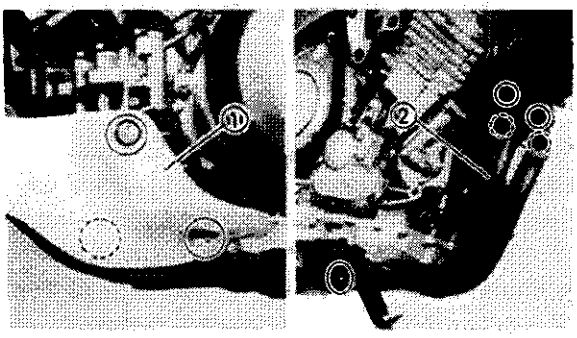
2. Elevate the rear wheel by placing a suitable stand under the engine.

3. Remove:
- Rear wheel

Refer to the "REAR WHEEL" section.



4. Remove:
- Bolt ① (shock absorber—top)
- Bolt ② (shock absorber—lower)
- Rear shock absorber ③



Swingarm

⚠ WARNING

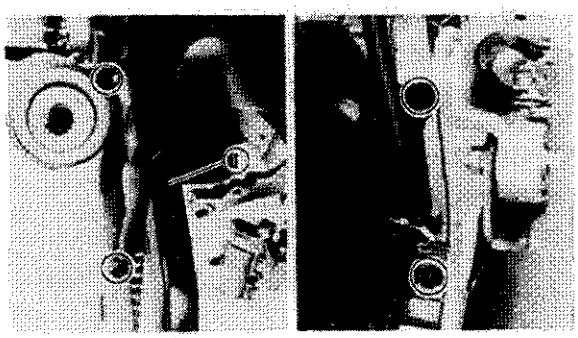
Securely support the motorcycle so there is no danger of it falling over.

1. Remove:
- Engine guard ①
- Exhaust pipe ②

2. Elevate the rear wheel by placing a suitable stand under the engine.

3. Remove:
- Rear shock absorber

Refer to the "REAR SHOCK ABSORBER" section.



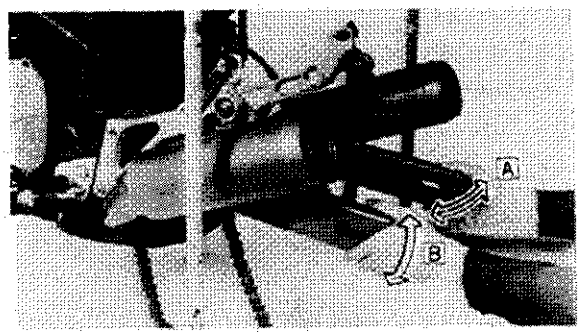
4. Remove:
• Chain case/Rear fender ①

5. Check:
• Swingarm free play

****

Inspection steps:

● Check the tightening torque of the pivot shaft (swingarm) securing nut.



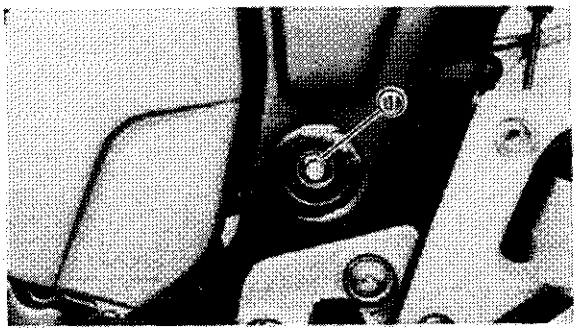
	Nut (swingarm—pivot shaft): 90 Nm (9.0 m · kg, 65 ft · lb)

● Check the swingarm side play [A] by moving it from side to side.
If side play is noticeable, check the inner collar, bearing, washer and thrust cover.

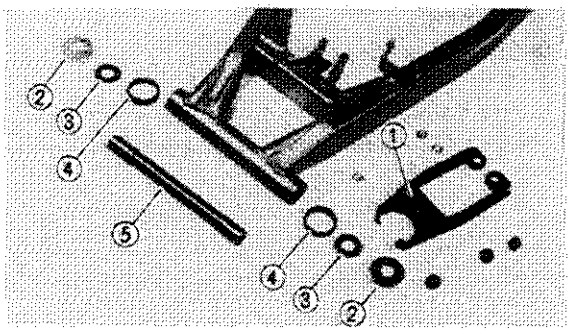
	Side play (at end of swingarm): 1.0 mm (0.04 in)

● Check the swingarm vertical movement [B] by moving it up and down.
If vertical movement is tight, binding or rough, check the inner collar, bearing, washer and thrust cover.

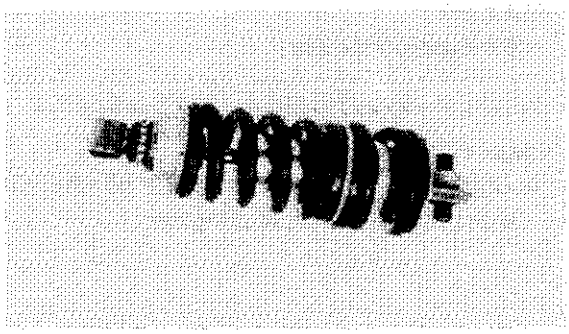
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5. Remove:
• Nut (pivot shaft) ①
• Pivot shaft
• Swingarm



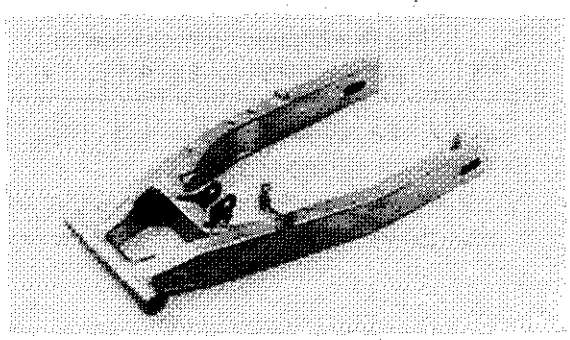
6. Remove:
- Chain protector ①
- Thrust covers ② (swingarm)
- Washers ③ (swingarm)
- Oil seals ④ (swingarm)
- Solid bush ⑤ (swingarm)



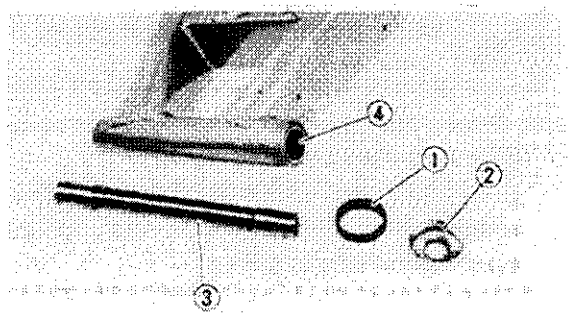
KB276004

INSPECTION

1. Inspect:
- Shock absorber
  Oil leaks/Damage → Replace.



2. Inspect:
- Swingarm
  Bends/Cracks/Damage → Replace.



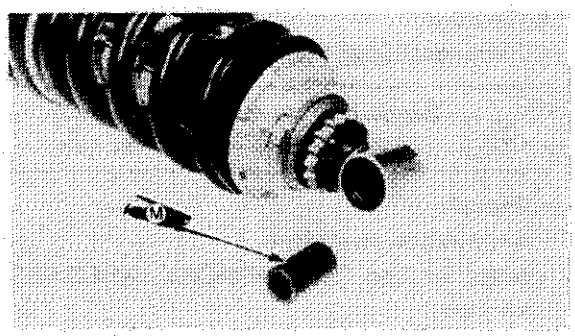
3. Inspect:
- Oil seal ①
  Damage → Replace.
- Thrust cover ②
  Damage → Replace.
- Bush ③
  Scratches/Damage → Replace.
- Bearing ④
  Pitting/Damage → Replace.

KB276006

INSTALLATION

Rear shock absorber

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



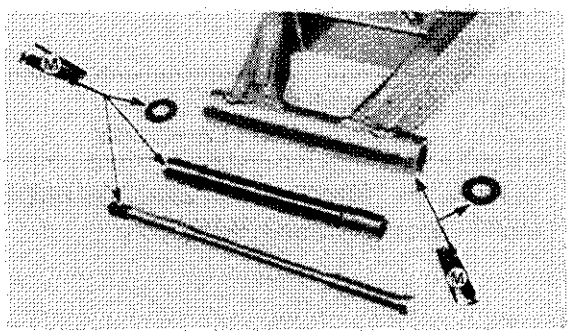
1. Lubricate:
• Bush

Recommended lubricant:
Molybdenum disulfide grease

2. Install:
• Rear shock absorber

Nut (shock absorber—top/lower):
64 Nm (6.4 m · kg, 46 ft · lb)

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

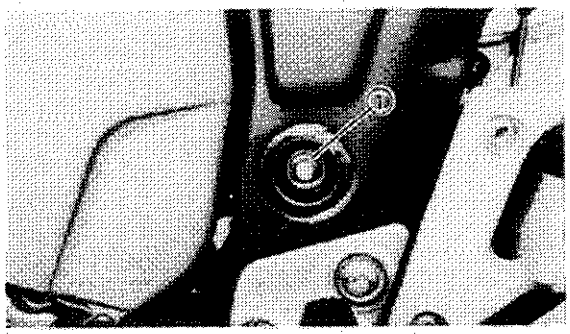


1. Lubricate:
• Bearings
• Solid bush
• Thrust washers
• Pivot shaft

Recommended lubricant:
Molybdenum disulfide grease

2. Tighten:
• Bolt (chain protector)

Bolt (chain protector):
7 Nm (0.7 m · kg, 5.1 ft · lb)



3. Tighten:
• Nut ① (pivot shaft)

Nut ① (pivot shaft):
90 Nm (9.0 m · kg, 65 ft · lb)

4. Tighten:
• Chain case/Rear fender

	**Screw (chain case/rear fender): 7 Nm (0.7 m • kg, 5.1 ft • lb)**

5. Install:
• Rear shock absorber
Refer to the "REAR SHOCK ABSORBER" section.

6. Install:
• Rear wheel

	**Nut (rear wheel axle): 105 Nm (10.5 m • kg, 75 ft • lb)**

Refer to "REAR WHEEL—INSTALLATION" section.

7. Adjust:
• Drive chain slack

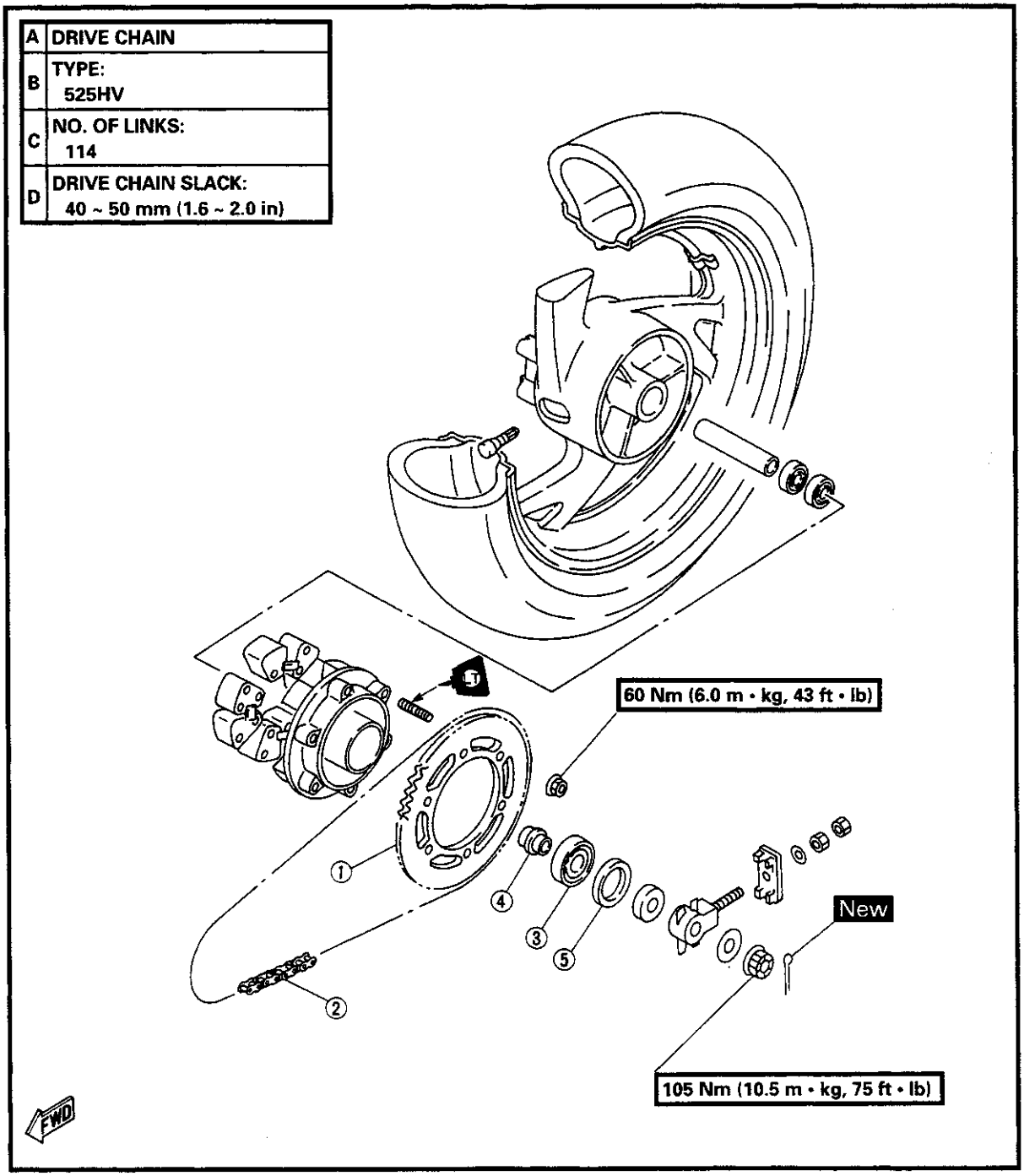
	**Drive chain slack: 40~50 mm (1.6~2.0 in)**

Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.

DRIVE CHAIN AND SPROCKETS

① Driven sprocket
② Drive chain
③ Bearing
④ Collar
⑤ Oil seal

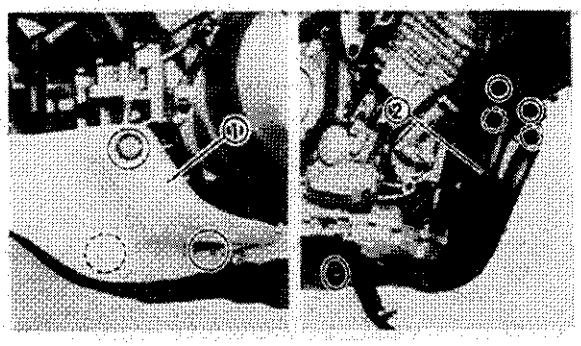
A	DRIVE CHAIN
B	TYPE: 525HV
C	NO. OF LINKS: 114
D	DRIVE CHAIN SLACK: 40 ~ 50 mm (1.6 ~ 2.0 in)

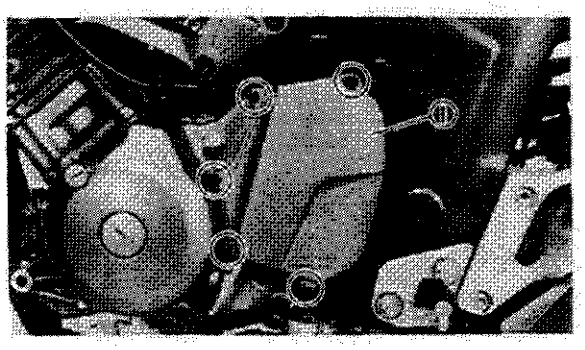


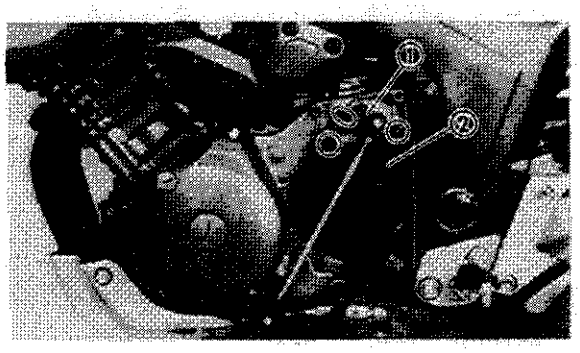
KB277000

NOTE:

Before removing the drive chain and sprockets, drive chain slack and 10-link length of drive chain should be measured.







KB277001

REMOVAL

⚠ WARNING

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

1. Remove:
   - Engine guard ①
   - Exhaust pipe ②

2. Elevate the rear wheel by placing a suitable stand under the engine.

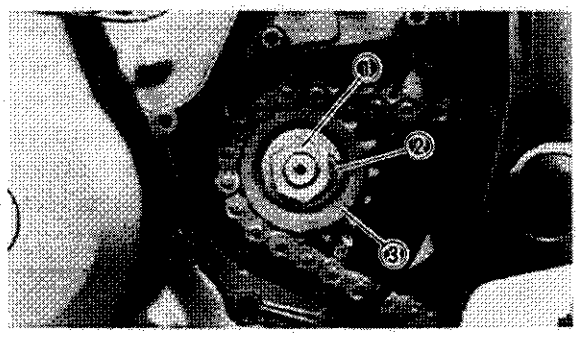
3. Remove:
   - Cover ① (drive sprocket)

4. Remove:
   - Shift arm ① (shift pedal)
   - Cover ② (drive sprocket)

5. Loosen:
   - Drive chain

   Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.

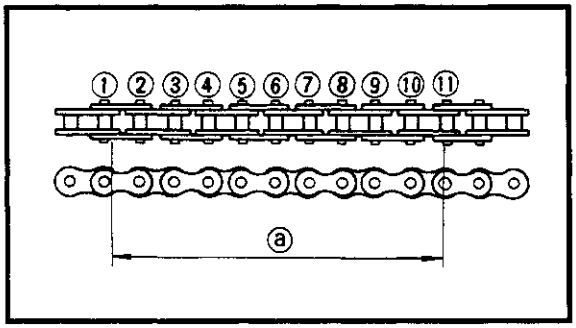
6. Straighten:
   - Lock washer tab



7. Remove:
- Nut (drive sprocket) ①
- Lock washer ②
- Drive sprocket ③

NOTE:
Loosen the nut (drive sprocket) while applying the rear brake.

8. Remove:
- Rear wheel
  Refer to the "REAR WHEEL" section.
- Swingarm
- Drive chain
  Refer to the "REAR SHOCK ABSORBER AND SWINGARM" section.



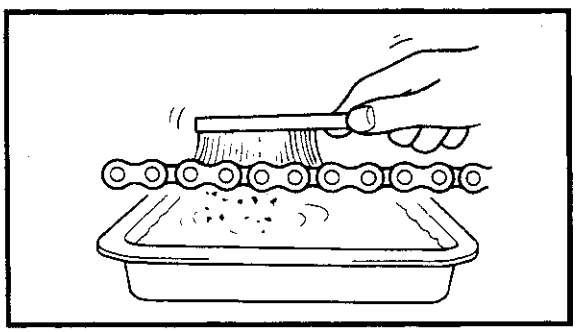
KB277002

INSPECTION

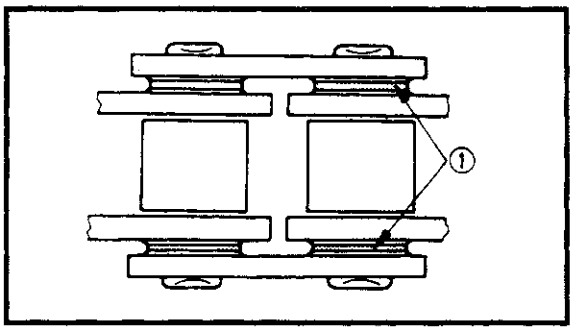
1. Measure:
- 10-link length ⓐ (drive chain)
  Out of specification → Replace drive chain.

	10-link length limit: 150.0 mm (5.91 in)

NOTE:
- For measurement make the chain tense by finger.
- 10-link length is a measurement between the insides of the ① and ⑪ rollers as shown.
- Two or three different 10-link length should be measured.

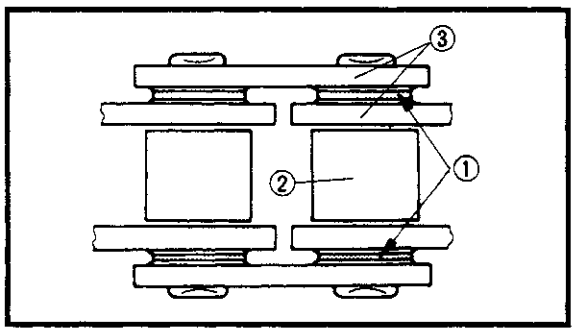


2. Clean:
- Drive chain
  Place it in kerosene, and brush off as much dirt as possible. Then remove the chain from the kerosene and dry the chain.



CAUTION:

This motorcycle has a drive chain with small rubber O-rings ① between the chain plates. Steam cleaning, high-pressure washers, and certain solvent can damage these O-rings. Use only kerosene to clean the drive chain.

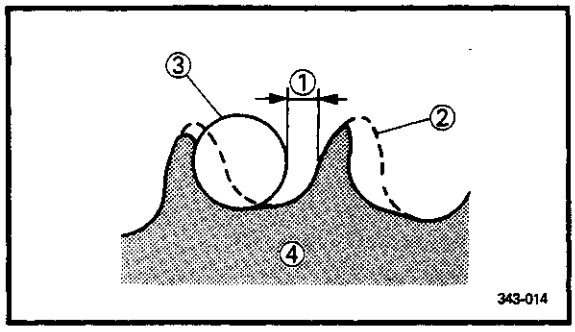


3. Inspect:
- O-ring ① (drive chain)
  Damage → Replace drive chain.
- Rollers ②
- Side plates ③
  Damage/Wear → Replace drive chain.

4. Lubricate:
- Drive chain

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

5. Inspect:
- Drive sprocket
- Driven sprocket
  More than 1/4 teeth ① wear → Replace sprocket.
  Bent teeth → Replace sprocket.



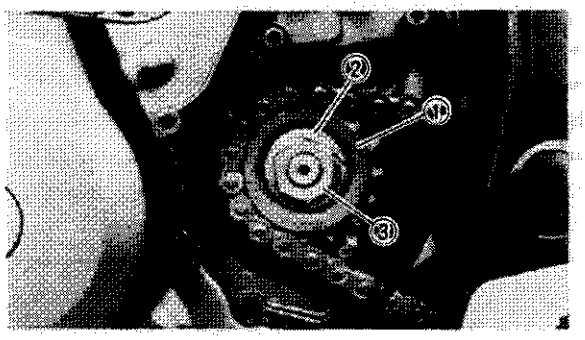
② Correct
③ Roller
④ Sprocket

KB27003

INSTALLATION

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

1. Install:
- Drive chain
- Swingarm
  Refer to the "REAR SHOCK ABSORBER AND SWINGARM" section.
- Rear wheel
  Refer to the "REAR WHEEL" section.



2. Install:
- Drive sprocket ①
- Lock washer ②
- Nut (drive sprocket) ③

	Nut (drive sprocket): **70 Nm (7.0 m · kg, 51 ft · lb)**

NOTE:
Tighten the nut (drive sprocket) while applying the rear brake.

⚠ WARNING
Always use a new lock washer.

3. Install:
- Rear wheel
  Refer to the "REAR WHEEL—INSTALLATION" section in the CHAPTER 6.

	Axle nut: **105 Nm (10.5 m · kg, 75 ft · lb)**

4. Adjust:
- Drive chain slack
  Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.

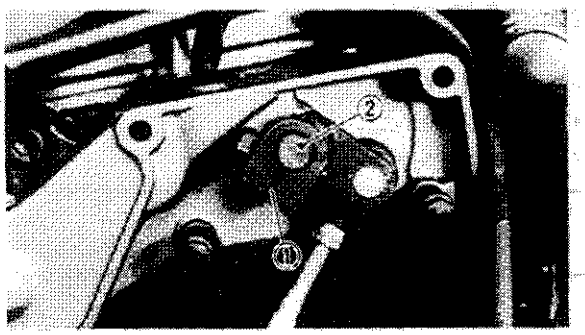
	Drive chain slack: **40~50 mm (1.6~2.0 in)**

CAUTION:

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

⚠ WARNING

Always use a new cotter pin on the axle nut.



5. Install:
- Covers (drive sprocket)
- Shift arm

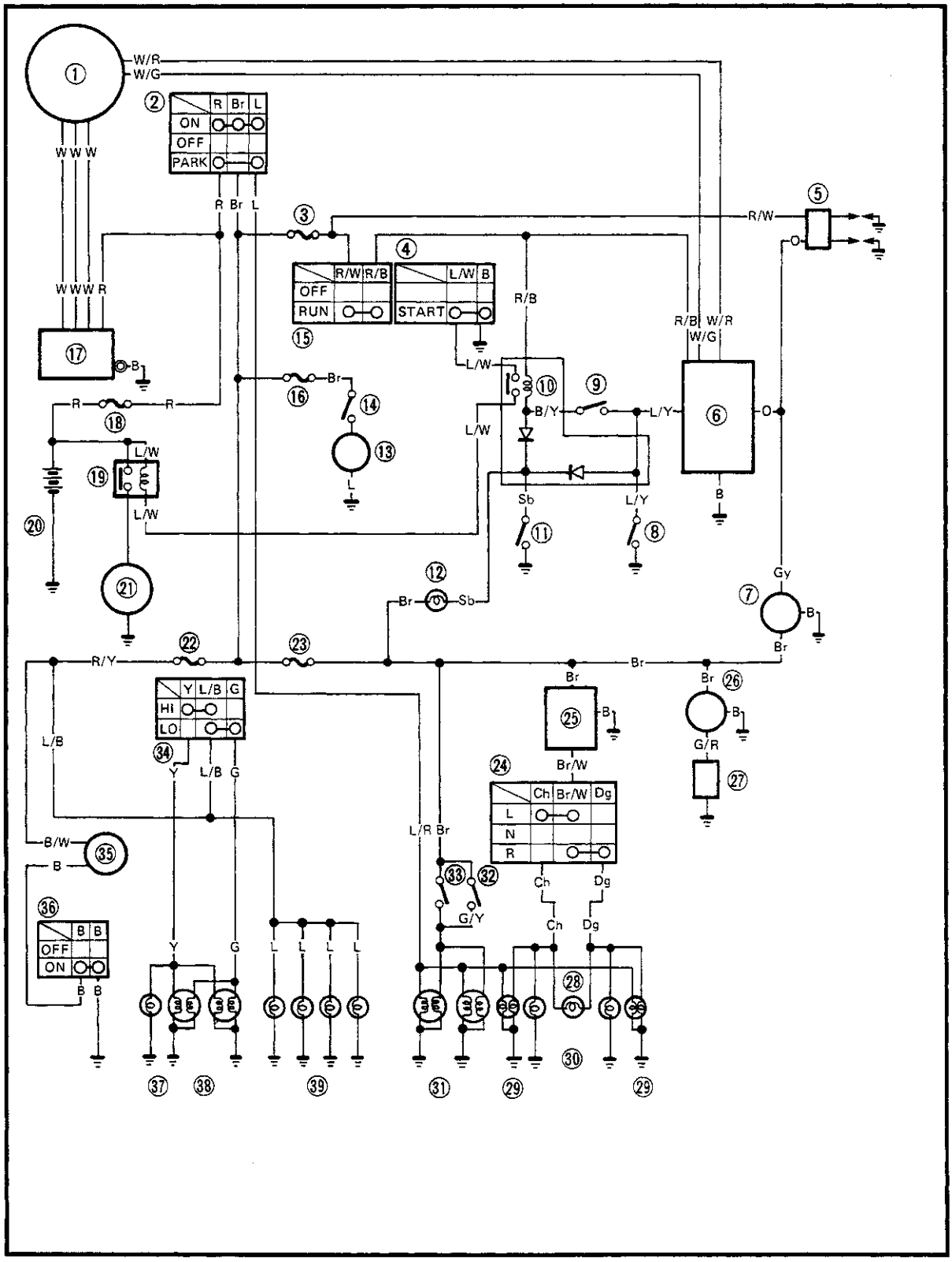
NOTE:

Align the opening ① of the shift arm with the opposite side of punch mark ② on the shift shaft.

	Bolt (cover): **5 Nm (0.5 m · kg, 3.6 ft · lb)** **Bolt (shift arm):** **12 Nm (1.2 m · kg, 8.7 ft · lb)**

ELECTRICAL

TDM850D/DC CIRCUIT DIAGRAM



① A.C. magneto
② Main switch
③ Fuse (ignition)
④ "START" switch
⑤ Ignition coil
⑥ Ignitor unit
⑦ Tachometer
⑧ Sidestand switch
⑨ Clutch switch
⑩ Starting circuit cut-off relay
⑪ Neutral switch
⑫ "NEUTRAL" indicator light
⑬ Fan motor
⑭ Thermo switch
⑮ "ENGINE STOP" switch
⑯ Fuse (fan motor)
⑰ Rectifier/ Regulator
⑱ Fuse (main)
⑲ Starter relay
⑳ Battery
㉑ Starter motor
㉒ Fuse (head)
㉓ Fuse (signal)
㉔ "TURN" switch
㉕ Flasher relay
㉖ Temperature gauge
㉗ Thermo unit
㉘ "TURN" indicator light
㉙ Parking/Running light/Front flasher light
㉚ Rear flasher light
㉛ Tail/brake light
㉜ Rear brake switch
㉝ Front brake switch
㉞ "LIGHTS" (dimmer) switch
㉟ Horn
㊱ "HORN" switch
㊲ "HIGH BEAM" indicator light
㊳ Headlight
㊴ Meter light

NOTE:
- "START" switch is closed while the button (switch) is pushed.
- "HORN" switch is closed while the button (switch) is pushed.
- Clutch switch is closed while the clutch lever is pulled.
- Sidestand switch is closed while the sidestand is upped.
- Neutral switch is closed while the transmission is in neutral.
- Brake switch is closed while the brake is applied.

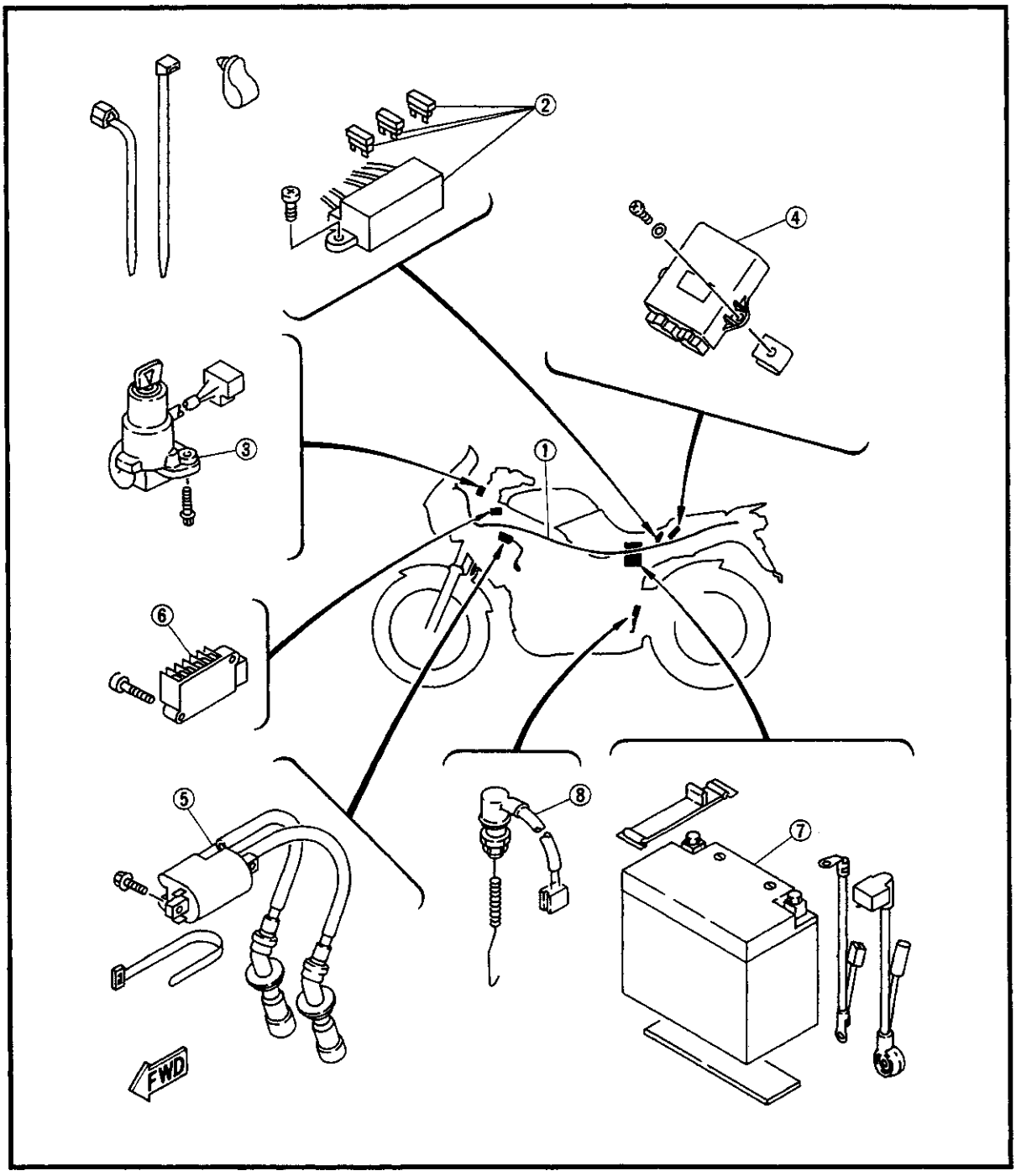
COLOR CODE

B	Black	Sb	Sky blue	L/R	Blue/Red
Br	Brown	W	White	L/W	Blue/White
Ch	Chocolate	Y	Yellow	L/Y	Blue/Yellow
Dg	Dark green	B/W	Black/White	R/B	Red/Black
G	Green	B/Y	Black/Yellow	R/W	Red/White
Gy	Gray	Br/W	Brown/White	R/Y	Red/Yellow
L	Blue	G/R	Green/Red	W/G	White/Green
O	Orange	G/Y	Green/Yellow	W/R	White/Red
R	Red	L/B	Blue/Black		

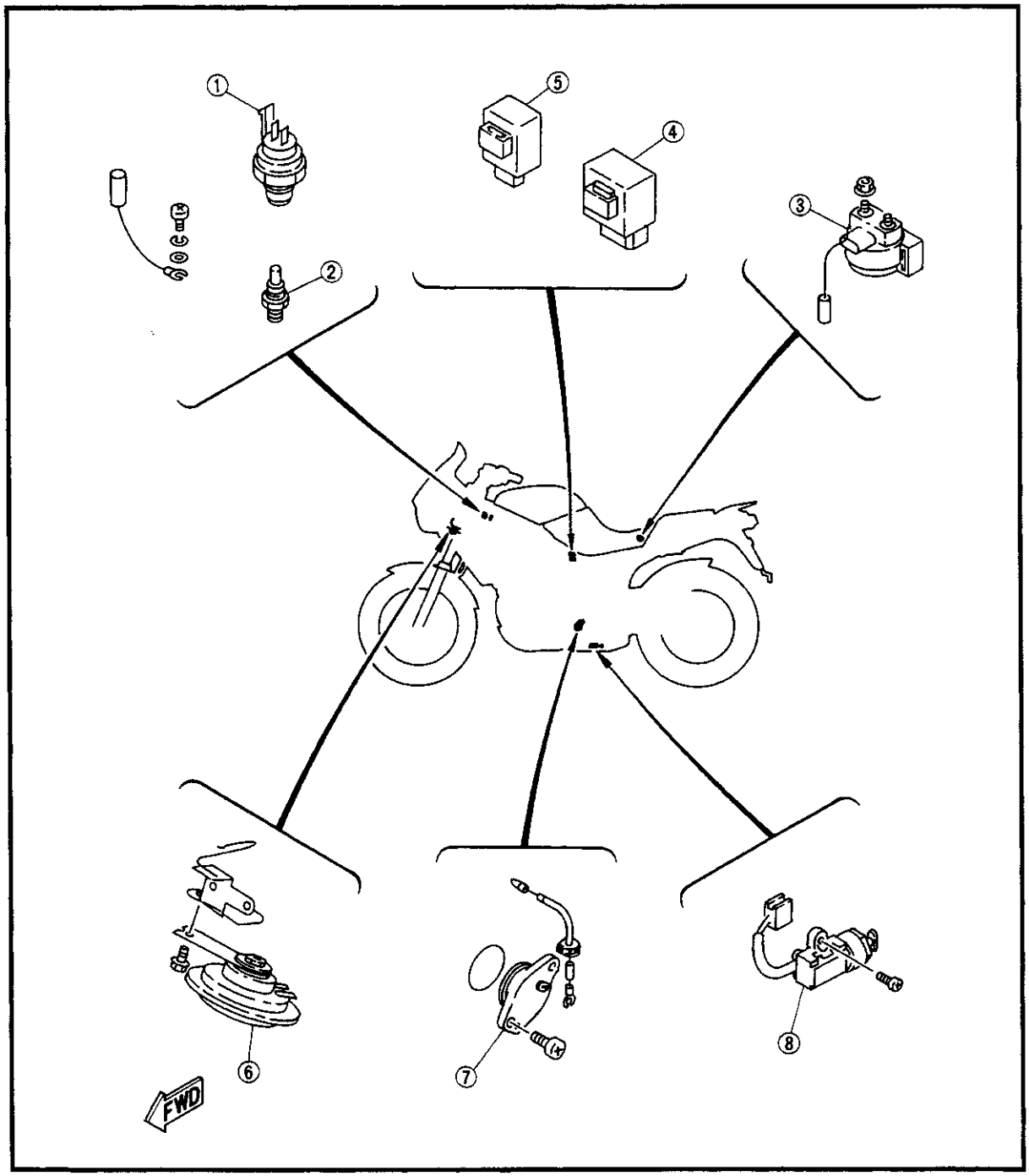
ELECTRICAL COMPONENTS

① Wireharness
② Fuse
③ Main switch
④ Ignitor unit
⑤ Ignition coil
⑥ Rectifier/regulator
⑦ Battery
⑧ Brake switch

BATTERY: **SPECIFIC GRAVITY: 1.32**
IGNITION COIL: **PRIMARY COIL RESISTANCE:** **2.38 ~ 3.22Ω at 20°C (68°F)** **SECONDARY COIL RESISTANCE:** **12 ~ 18kΩ at 20°C (68°F)**



① Thermo switch
② Thermo unit
③ Starter relay
④ Starting circuit cut-off relay
⑤ Flasher relay
⑥ Horn
⑦ Neutral switch
⑧ Sidestand switch



KB281000

CHECKING OF SWITCHES

Check the switches for the continuity between the terminal to determine correct connection.

Read the following for switch inspection.

KB281100

SWITCH CONNECTION AS SHOWN IN MANUAL

The manual contains a connection chart as shown left showing the terminal connections of the switches (e.g., main switch, handlebar switch, bracket switch, lighting switch etc.)

The extreme left column indicates the switch positions and the top line indicates the colors of leads connected with the terminals in the switch component.

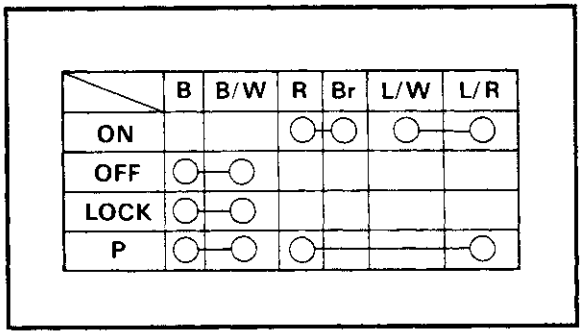
"○—○" indicates the terminals between which there is a continuity of electricity; i.e., a closed circuit at the respective switch positions.

In this chart:
"R and Br" and "L/W and L/R" are continuous with the "ON" switch position.

"B and B/W" is continuous with the "OFF" switch position.

"B and B/W" is continuous with the "LOCK" switch position.

"B and B/W" and "R and L/R" are continuous with the "P" switch position.

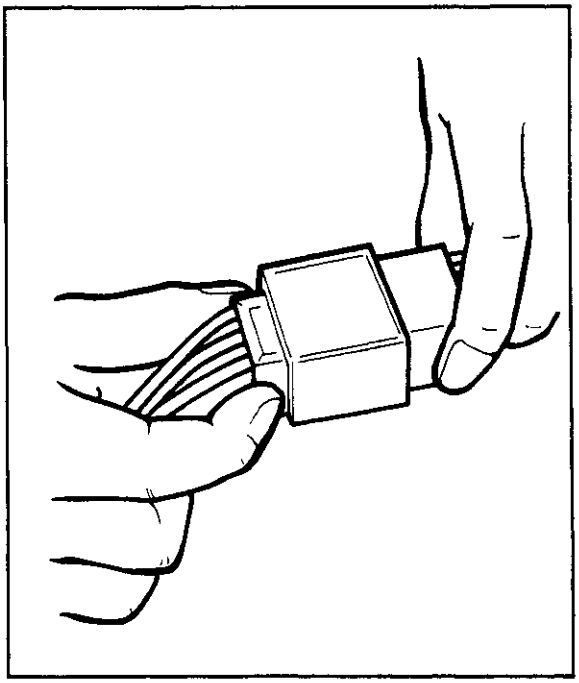


KB281120

CHECKING SWITCH FOR TERMINAL CONNECTION

Before checking the switch, refer to the connection chart as shown above and check for the correct terminal connection (closed circuit) by the color combination.

To explain how to check the switch, the main switch taken for example in the following.



1. Disconnect the main switch coupler from the wireharness.

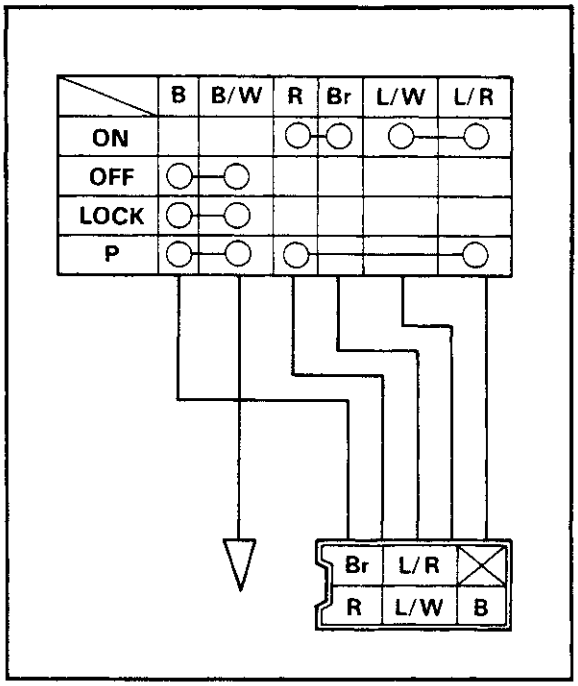
CAUTION:

Never disconnect the main switch coupler by pulling the leads. Otherwise, leads may be pulled off the terminals inside the coupler.

2. Inspect whether any lead is off the terminal inside the coupler. If it is, repair it.

NOTE:

If the coupler is clogged with mud or dust, blow it off by compressed air.



3. Use the connection chart to check the color combination for continuity (a closed circuit). In this example, the continuity is as follows.

   "R and Br" and "L/W and L/R" are continuous with the "ON" switch position.

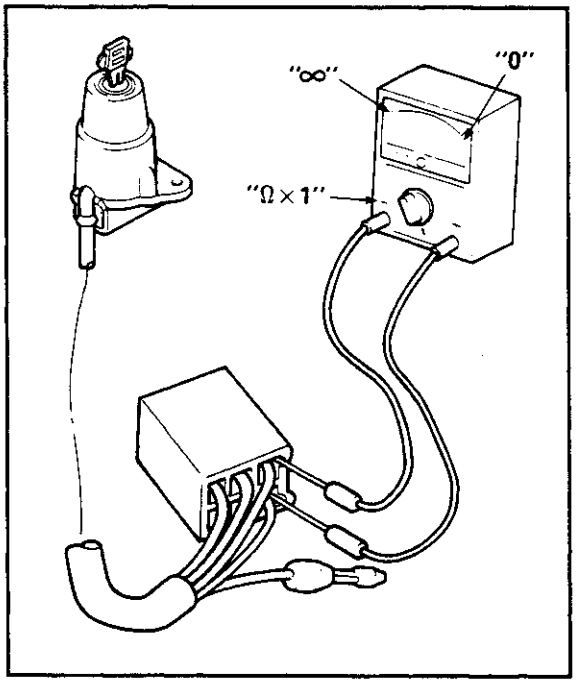
   "B and B/W" is continuous with the "OFF" switch position.

   "B and B/W" is continuous with the " LOCK" switch position.

   "B and B/W" and "R and L/R" are continuous with the "P" switch position.

   Please note that these is no continuity (an open circuit) at all for the color combinations other than the above.

4. Check the switch component for the continuity between "R and Br".



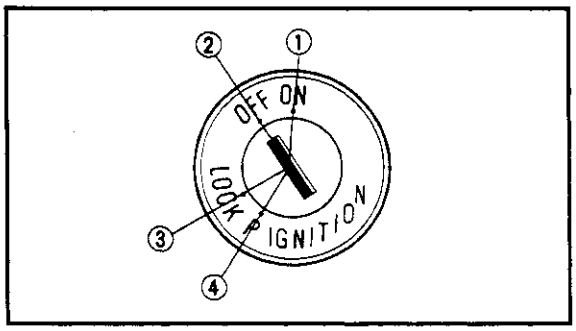
****

Checking steps:

- Turn the switch key to the "ON", "OFF", " LOCK" and "P" several times.
- Set the pocket tester selector to the "Ωx1".
- Connect the tester (+) lead to the "R" lead terminal in the coupler and the (−) lead to the "Br" lead terminal.

NOTE:

Use thin probes for checking the continuity. Otherwise, the probes may contact other terminals inside the coupler.



- Check the continuity between "R" and "Br " at the respective switch position of "ON" ① , "OFF" ② , "LOCK" ③ , and "P" ④ . There must be continuity (the tester indicating "0") at the "ON" switch position, and there must be no continuity (the tester indicating "∞") at "OFF", "LOCK", or "P". There is something wrong between "R" and "Br" if there is no continuity at the "ON " position or if there is some continuity

either at the "OFF" or "LOCK" or "P".

NOTE:

Check the switch for continuity several times.

****

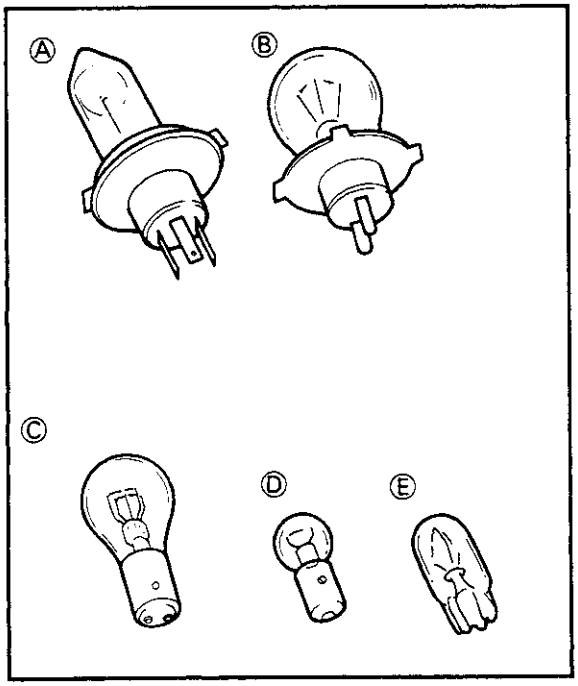
5. Next go on to checking of the continuity between "B" and "B/W", "L/W and L/R", and "R and L/R" at the respective switch positions, as in the same manner mentioned above.

6. If there is something wrong with any one of the combinations, replace the switch component.

KB282000

CHECKING OF BULBS (FOR HEADLIGHT, TAIL/BRAKE LIGHT, FLASHER LIGHT, METER LIGHT, ETC.)

Check the bulb terminal continuity for the condition of the bulb.



KB282100

KINDS OF BULBS

The bulbs used in the motorcycle are classified as shown left by the shape of the bulb socket.

Ⓐ and Ⓑ are many used for the headlight.

Ⓒ is mainly used for the flasher light and tail /brake light.

Ⓓ and Ⓔ are mainly used for the meter light and other indicator lights.

KB282120

CHECKING BULB CONDITION

1. Remove the bulb

NOTE:

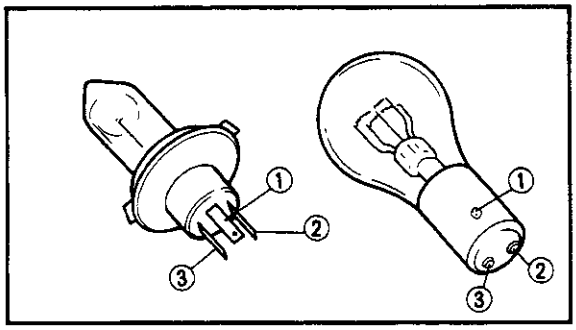
- Bulbs of the Ⓐ and Ⓑ type uses a bulb holder. Remove the bulb holder before removing the bulb itself. Most of the bulb holder for this type can be removed by turning them counterclockwise.
- Most of the bulbs of Ⓒ and Ⓓ type can be removed from the bulb sockets by pushing and turning them counterclockwise.
- Bulbs of the Ⓔ type can be removed from the bulb sockets by simply pulling them out.

CAUTION:

Be sure to hold the socket firmly when removing the bulb. Never pull the lead. Otherwise, the lead may be pulled off the terminal in the coupler.

⚠ WARNING

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



2. Check the bulb terminals for continuity.

****

Checking steps:

- Set the pocket tester selector to the "Ω×1".
- Connect the tester lead to the respective bulb terminals. Take for example a 3-terminal bulb as shown left. First check the continuity between the ① and ② terminal by connecting the tester (+) lead to the ① terminal and the tester (−) lead to the ② terminal. Then check the continuity between the ① and ③ terminals by connecting the tester (+) lead still to the ① terminal and the tester (−) lead to the ③ terminal. If the tester shown "∞" in either case, replace the bulb.

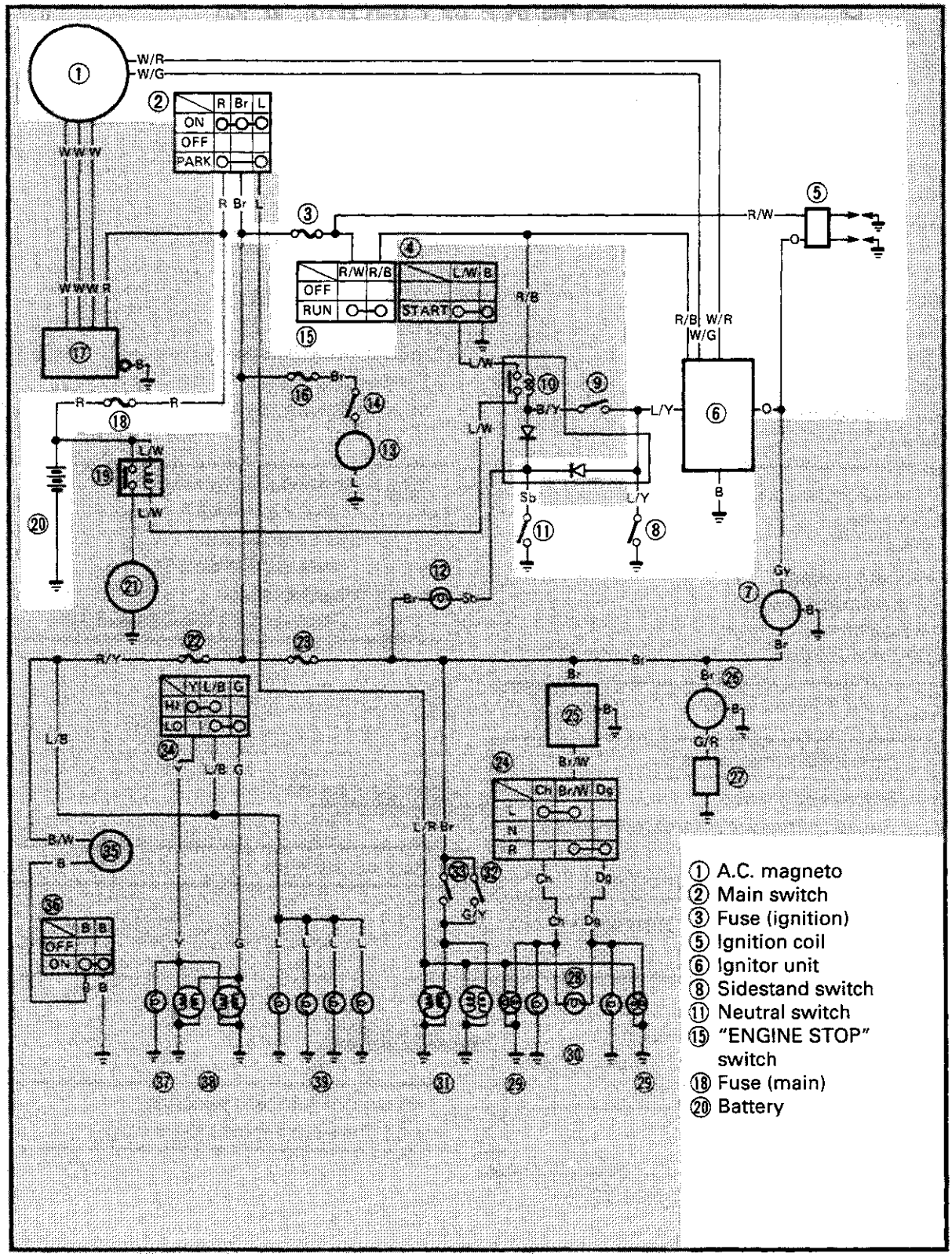
****

3. Check the bulb socket by installing a proven bulb to it. As in the checking of bulbs, connect the pocket tester leads to the respective leads of the socket and check for continuity in the same manner as mentioned above.

IGNITION SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows ignition system.



KB283000

TROUBLESHOOTING

IF IGNITION SYSTEM SHOULD BECOME INOPERATIVE (NO SPARK OR INTERMITTENT SPARK)

KB283100

Procedure

Check;

1. Fuse (main and ignition)
2. Battery
3. Spark plug
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Main switch
8. "ENGINE STOP" switch
9. Neutral switch
10. Sidestand switch
11. Diode (relay unit)
12. Pickup coil resistance
13. Wiring connection (Entire ignition system)

KB283110

NOTE:

- Remove the following parts before troubleshooting.

1) Seat
2) Side cowlings
3) Upper cowling
4) Fuel tank
5) Air filter case

Dynamic spark tester:
P/N YM-34487
Ignition checker:
P/N 90890-06754
Pocket tester:
P/N YU-03112/90890-03112

KB283120

1. Fuse (main and ignition)

- Remove the fuses.
- Connect the pocket tester (Ω x 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

KB283130

2. Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Open circuit voltage:
12.8 V or more

INCORRECT →

- Clean the battery terminals.
- Recharge or replace the battery.

CORRECT ↓

*

*

KB283140

3. Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.

Replace to the "SPARK PLUG INSPECTION" section in the CHAPTER 3.

Standard spark plug:
DPR9EA-9 (NGK), X27EPR-U9 (N.D.)

Spark plug gap:
0.8~0.9 mm (0.031~0.035 in)

INCORRECT → Repair or replace spark plug.

CORRECT

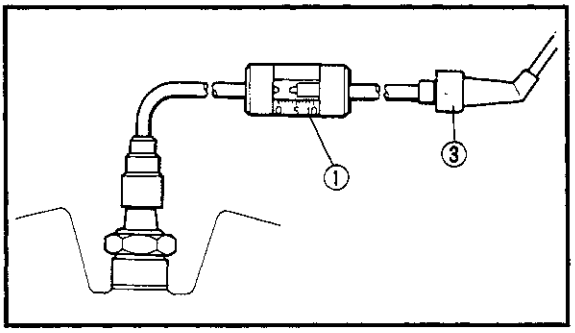
KB283150

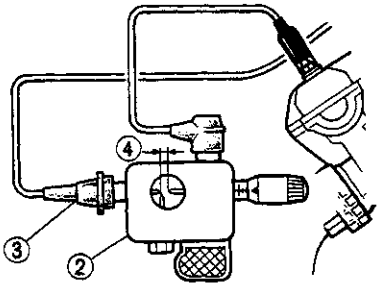
4. Ignition spark gap

- Disconnect the spark plug gap from spark plug.
- Connect the dynamic spark tester ① / ignition checker ② as shown.

③ Spark plug cap ④ Spark gap

- Turn the main switch to "ON".





- Check the ignition spark gap.
- Start engine, and increase spark gap until misfire occurs.

Minimum spark gap:
6.0 mm (0.24 in)

MEETS SPECIFICATION → Ignition system is good.

OUT OF SPECIFICATION OR NO SPARK

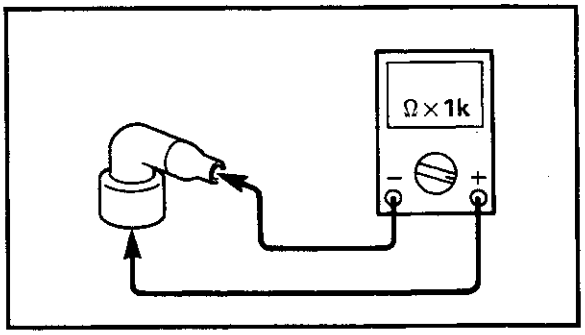
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KB283160

5. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester (Ω x 1k) to the spark plug cap.



- Check the spark plug cap for specificated resistance.

Spark plug cap resistance:
9~11kΩ at 20°C (68°F)

OUT OF SPECIFICATION

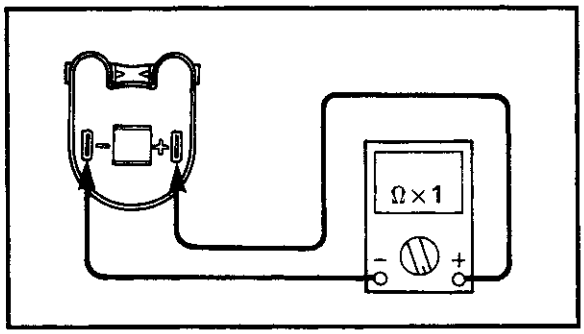
Replace spark plug cap.

MEETS SPECIFICATION

KB283170

6. Ignition coil resistance

- Disconnect the ignition coil leads from the ignition coil.
- Connect the pocket tester (Ω x 1) to the ignition coil.



Ignition coil ②:
Tester (+) lead → (+) terminal
Tester (–) lead → (–) terminal

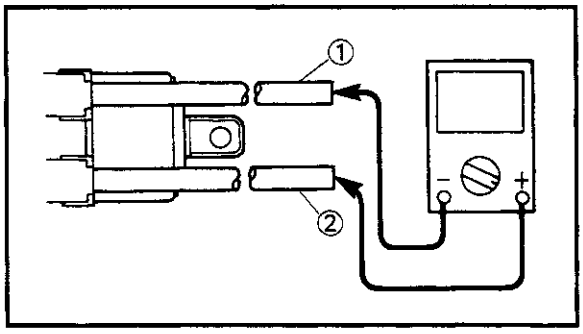
- Check the primary coil for specificated resistance.

Primary coil resistance:
2.38~3.22 Ω at 20°C (68°F)

- Connect the pocket tester (Ω x 1k) to the ignition coil.

Tester (+) lead → Spark plug lead ①
Tester (–) lead → Spark plug lead ②

- Check the secondary coil for specificated resistance.



Secondary coil resistance:
12~18 kΩ at 20°C (68°F)
(Spark plug lead-Spark plug lead)

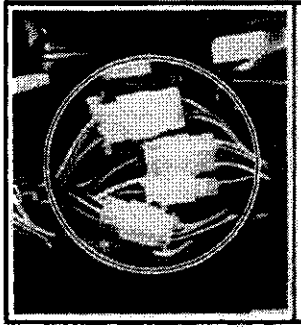
OUT OF SPECIFICATION → Replace ignition coil.

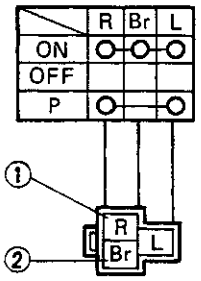
BOTH MEET SPECIFICATIONS

KB283180

7. 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.





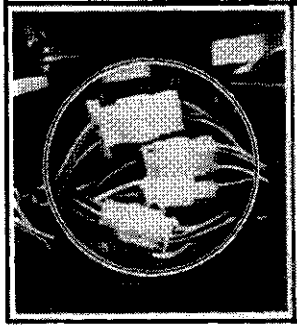
INCORRECT → Replace main switch.

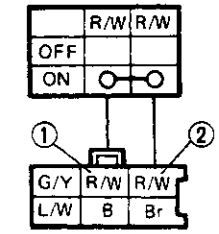
CORRECT

KB283190

8. "ENGINE STOP" switch

- Disconnect the handlebar switch (right) coupler from the wireharness.
- Check the switch component for the continuity between "Red/White ① and Red/White ② ". Refer to the "CHECKING OF SWITCHES" section.





INCORRECT → Replace handlebar switch (right).

CORRECT

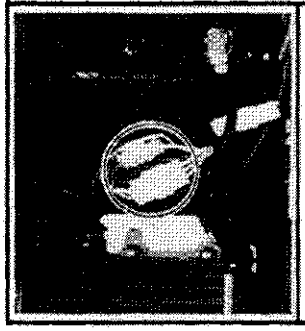
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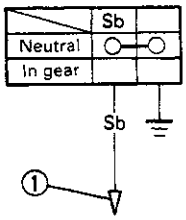
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KB283200

9. Neutral switch

- Disconnect the neutral switch coupler from the wireharness.
- Check the switch component for the continuity between "Sky blue ① and Ground". Refer to the "CHECKING OF SWITCHES" section.





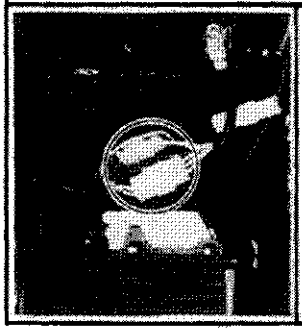
INCORRECT → Replace neutral switch.

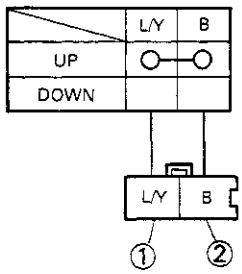
CORRECT

KB283210

10. Sidestand switch

- Disconnect the sidestand switch coupler from the wireharness.
- Check the switch component for the continuity between "Blue/Yellow ① and Black ② ". Refer to the "CHECKING OF SWITCHES" section.





INCORRECT → Replace sidestand switch.

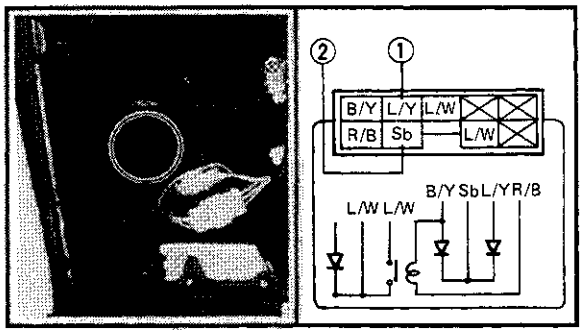
CORRECT

KB283220

11. Diode (relay unit)

- Disconnect the relay unit from the wireharness.
- Connect the pocket tester (Ω x 1) to the relay unit terminal.
- Check the relay unit for continuity.

Pocket tester connecting point		
(+) lead	Blue/Yellow ①	Sky blue ②
(−) lead	Sky blue ②	Blue/Yellow ①
Condition	O	X
O: Continuity X: No continuity		



INCORRECT

Replace relay unit.

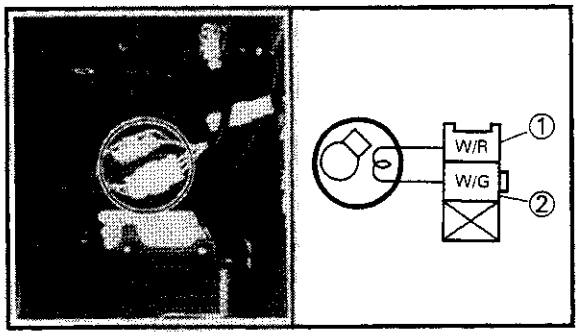
CORRECT

KB283230

12. Pickup coil resistance

- Disconnect the pickup coil coupler from the wireharness.
- Connect the pocket tester (Ω x 100) to the pickup coil terminal.

Tester (+) lead → White/Red ①
Tester (−) lead → White/Green ②



- Check the pickup coil for specificated resistance.

Pickup coil resistance:
184~276 Ω at 20°C (68°F)
(White/Red-White/Green)

OUT OF SPECIFICATION

Replace pickup coil.

MEET SPECIFICATION

KB283240

13. Wiring connection

- Check the entire ignition system for connections.
  Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION

Correct.

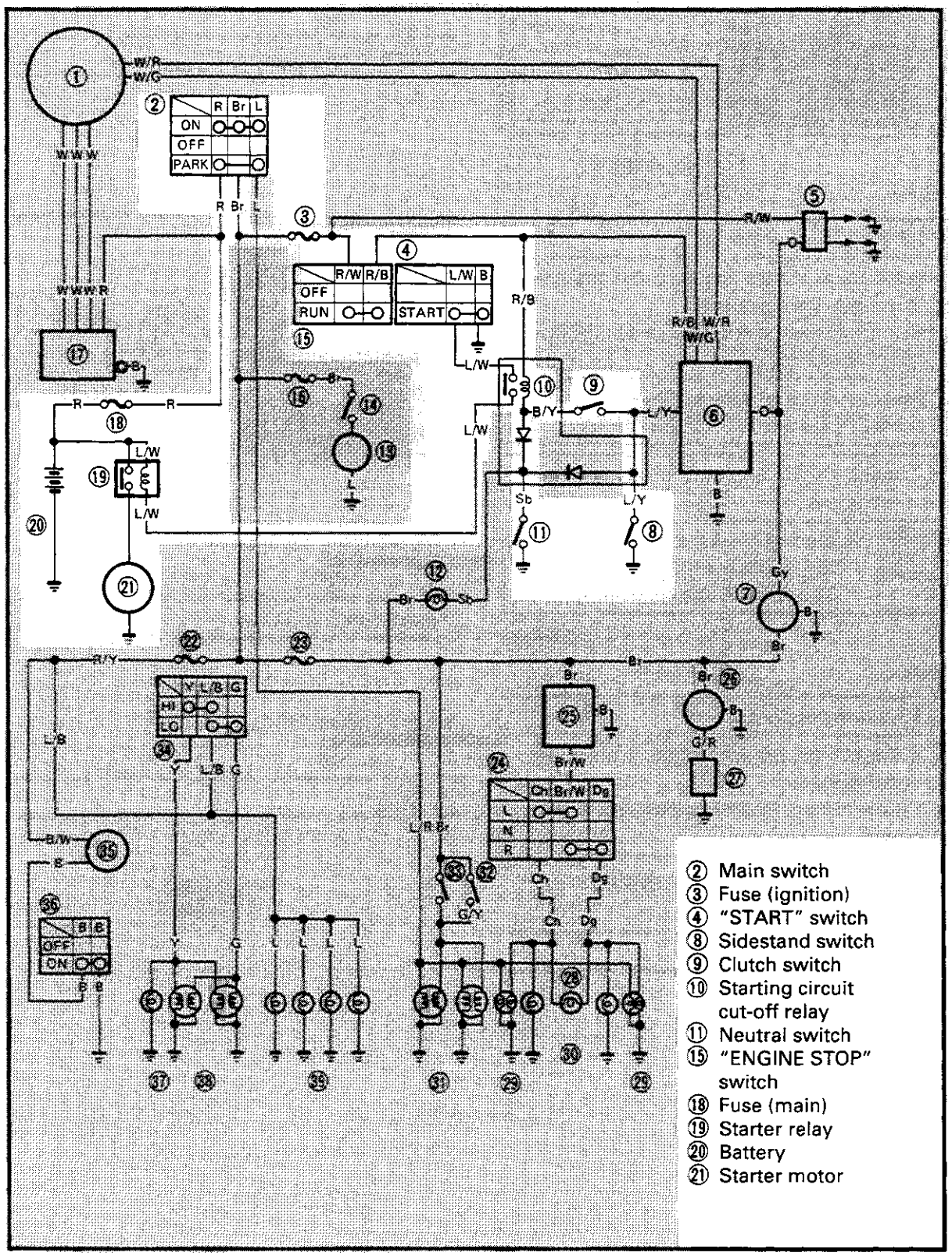
CORRECT

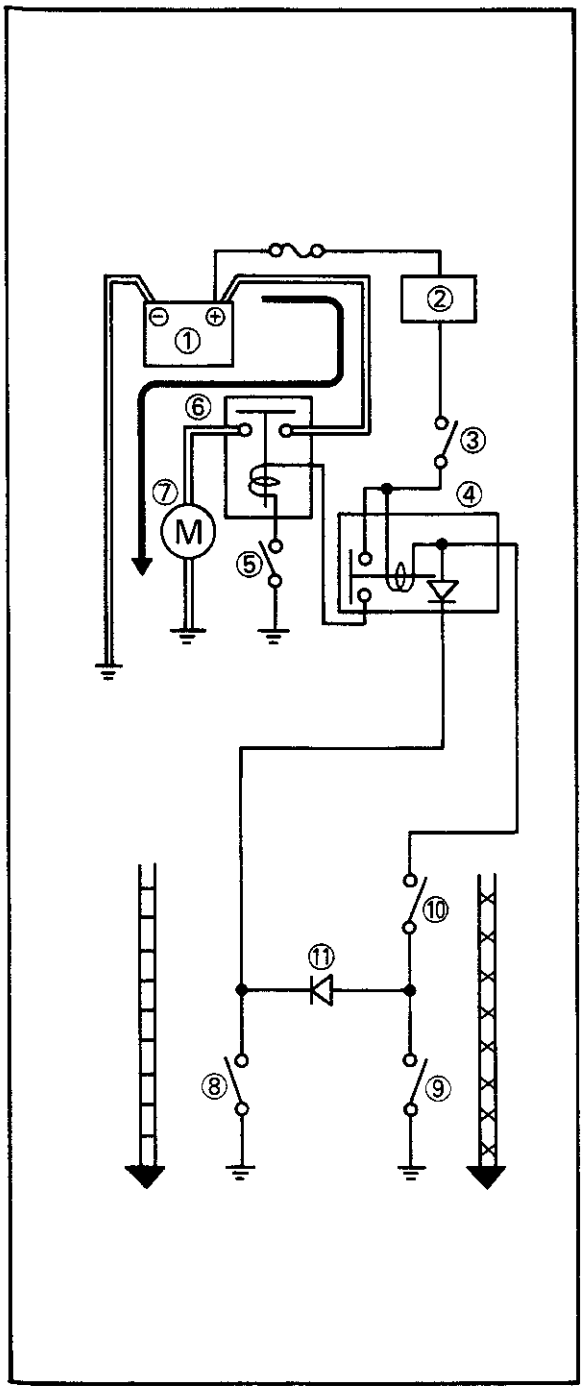
Replace digital ignitor unit.

ELECTRICAL STARTING SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows electrical starting system.





KB284001

STARTING CIRCUIT OPERATION

The starting circuit on this model consist of the starter motor, starter relay, and the relay unit (starting circuit cut-off relay). If the "ENGINE STOP" switch and the main switch are both closed, the starter motor can operate only if:

The transmission is in neutral (the neutral switch is closed).

or if

The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor.

When one of both of the above conditions have been met, however, the starting circuit cut-off relay is closed, and the engine can be started by pressing the starter switch.

WHEN THE TRANSMISSION IS IN NEUTRAL

WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED IN

① Battery
② Main switch
③ "ENGINE STOP" switch
④ Starting circuit cut-off relay
⑤ "START" switch
⑥ Starter relay
⑦ Starter motor
⑧ Neutral switch
⑨ Sidestand switch
⑩ Clutch switch
⑪ Diode

KB284100

TROUBLESHOOTING

STARTER MOTOR DOES NOT OPERATE.

KB284110

Procedure

Check;

1. Fuse (main and ignition)
2. Battery
3. Starter motor
4. Starter relay
5. Starting circuit cut off relay
6. Main switch
7. "ENGINE STOP" switch
8. Neutral switch
9. Sidestand switch
10. Clutch switch
11. "START" switch
12. Wiring connection (entire electric starting system)

KB284120

NOTE:

Remove the following parts before troubleshooting.

1) Seat
2) Side cowlings
3) Upper ciwling
4) Fuel tank
5) Engine guard
6) Exhaust pipe
7) Muffler

Pocket tester:
P/N YU-03112/90890-03112

KB284130

1. Fuse (main and ignition)
   - Remove the fuses.
   - Connect the pocket tester (Ω x 1) to the fuses.
   - Check the fuses for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

KB284140

2. Battery
   - Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Open circuit voltage:
12.8 V or more at 20°C (68°F)

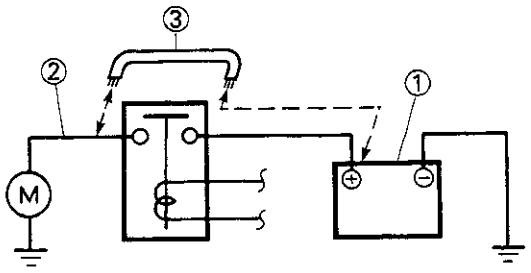
INCORRECT →
- Clean the battery terminals.
- Recharge or replace the battery.

CORRECT ↓

*

*

KB284150

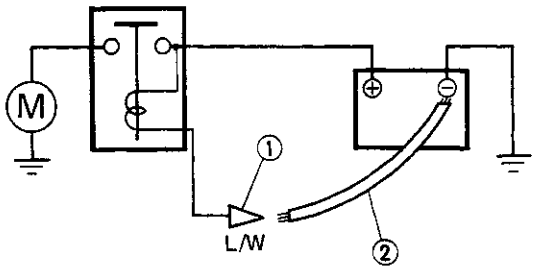
3. Starter motor
• Connect the battery positive terminal ① and starter motor cable ② using a jumper lead ③ *. • Check the starter motor for operation.


DOES NOT MOVE

Repair or replace starter motor.

MOVES

KB284160

4. Starter relay
• Disconnect the starter relay lead from the wireharness. • Ground the starter relay lead "Blue/White" ① to the frame using the jumper lead ② . • Check the starter motor for operation.


DOES NOT MOVE

Replace starter relay.

MOVES

KB284170

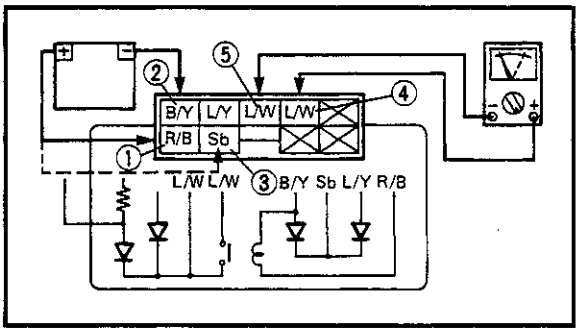
5. Starting circuit cut-off relay (relay unit)
• Disconnect the relay unit coupler from the wireharness. • Connect the pocket tester (Ω x 1) and battery (12 V) to the relay unit coupler terminals.

*

⚠ WARNING

- **A wire for jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.**
- **This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.**

Step 1.
Battery (+) terminal → Red/Black ① terminal.
Battery (—) terminal → Black/Yellow ② terminal.
Step 2.
Battery (+) terminal → Red/Black ① terminal.
Battery (—) terminal → Sky blue ③ terminal.



Tester (+) lead → Blue/White ④ terminal
Tester (—) lead → Blue/White ⑤ terminal

- Check the starting circuit cut-off relay for continuity.

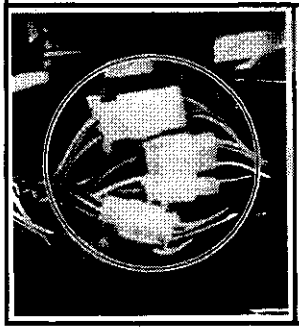
NO CONTINUITY → Replace relay assembly.

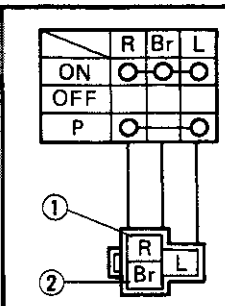
CONTINUITY

KB284180

6. 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.





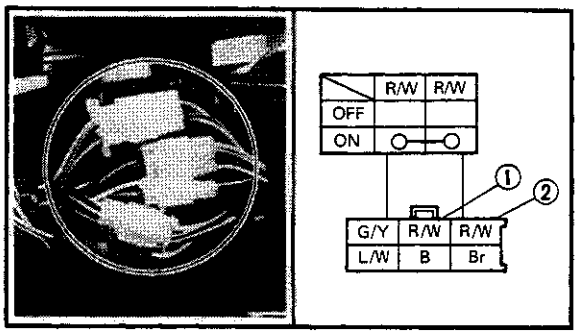
INCORRECT → Replace main switch.

CORRECT

KB284190

7. "ENGINE STOP" switch

- Disconnect the handlebar switch (right) coupler from the wireharness.
- Check the switch component for the continuity between "Red/White ① and Red/White ② ". Refer to the "CHECKING OF SWITCHES" section.



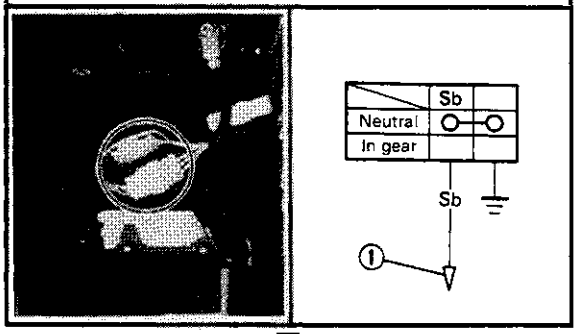
KB284200

INCORRECT → Replace handlebar switch (right).

CORRECT ↓

8. Neutral switch

- Disconnect the neutral switch lead from the wireharness.
- Check the switch component for the continuity between "Sky blue ① and Ground". Refer to the "CHECKING OF SWITCHES" section.



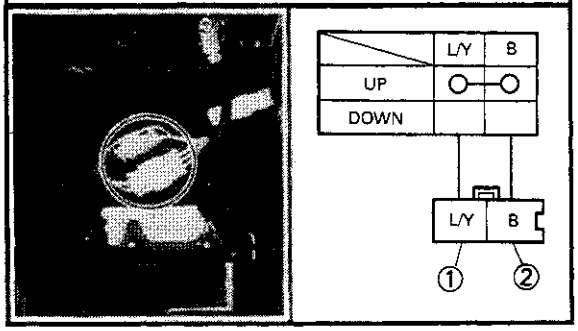
KB284210

INCORRECT → Replace neutral switch.

CORRECT ↓

9. Sidestand switch

- Disconnect the sidestand switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Blue/Yellow ② and Black ③ ". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT → Replace sidestand switch.

CORRECT ↓

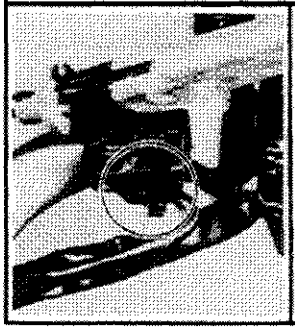
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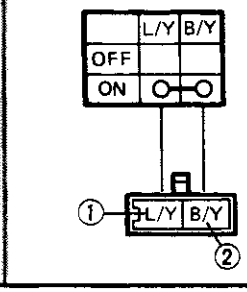
*

KB284220

10. Clutch switch

- Disconnect the clutch switch coupler from wireharness.
- Check the clutch switch component for the continuity between "Blue/Yellow ① and Black/Yellow ② ". Refer to the "CHECKING OF SWITCHES" section.





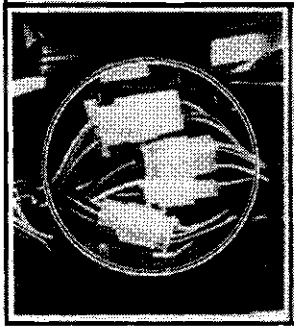
INCORRECT → Replace the clutch switch.

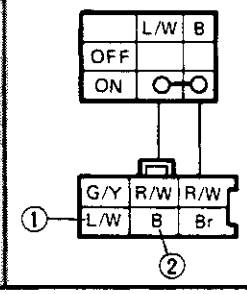
CORRECT

KB284230

11. "START" switch

- Disconnect handlebar switch (right) coupler from wireharness.
- Check the "START" switch component for the continuity between "Blue/White ① and Black ② ". Refer to the "CHECKING OF SWITCHES" section.





INCORRECT → Replace handlebar switch (right).

CORRECT

KB284240

12. Wiring connection

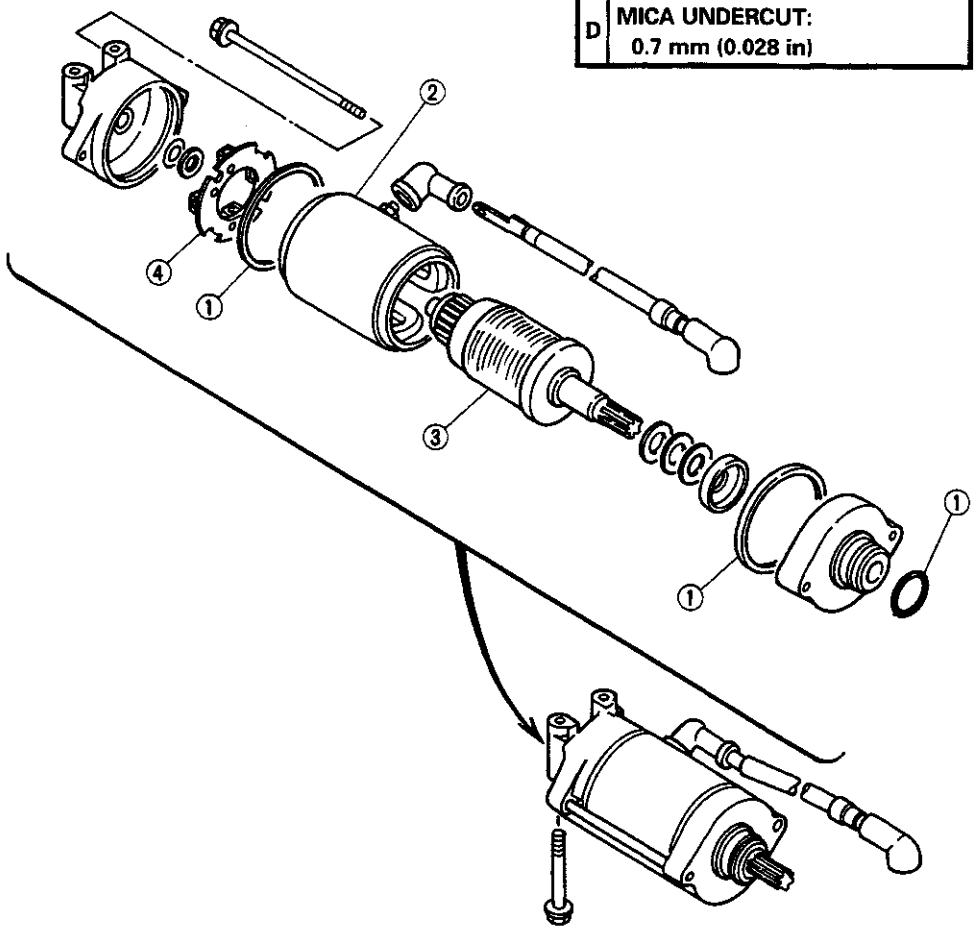
- Check the entire starting system for connections.
  Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

STARTER MOTOR

① O-ring
② Yoke
③ Armature
④ Brush

A	ARMATURE COIL RESISTANCE: 0.01Ω at 20°C (68°F)
B	BRUSH WEAR LIMIT: 5.0 mm (0.20 in)
C	COMMUTATOR WEAR LIMIT: 27 mm (1.06 in)
D	MICA UNDERCUT: 0.7 mm (0.028 in)

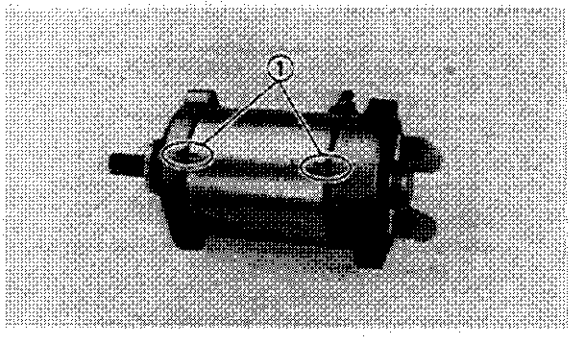


KB284250

Removal

1. Remove:
- Starter motor

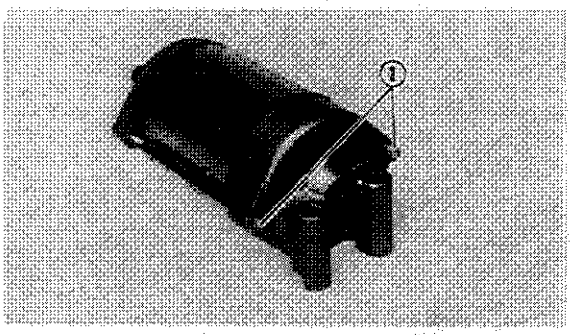
Refer to the "ENGINE OVERHAUL—ENGINE DISASSEMBLY" section in the CHAPTER 4.



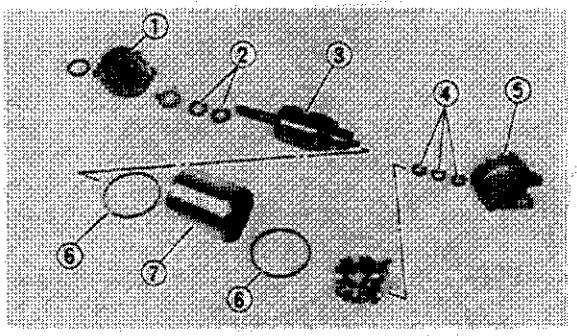
KB284251

Disassembly

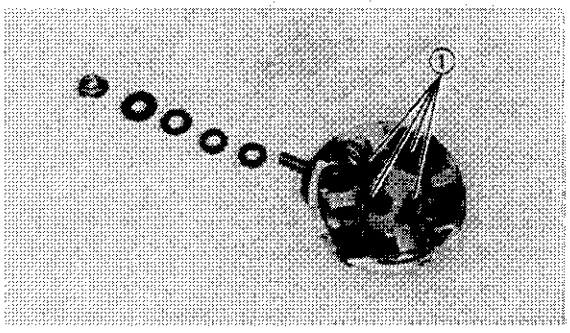
1.Put identifying marks ① on the brackets for reassembly as shown.



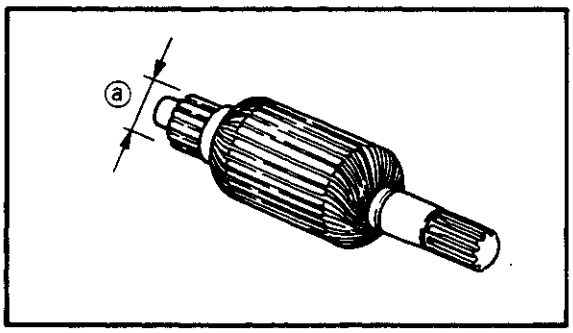
2. Remove:
- Bolts ①

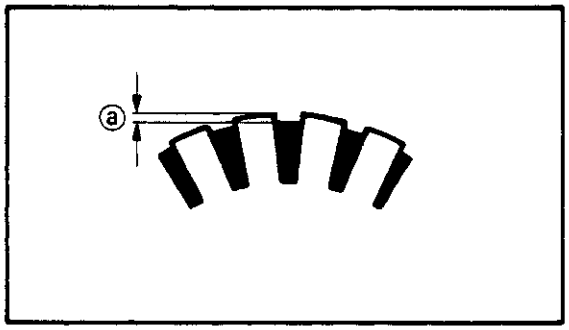


3. Remove:
- Bracket ①
- Washers ②
- Armature ③
- Shims ④
- Bracket ⑤
- O-rings ⑥
- Yoke ⑦



4. Remove:
- Brush ①





KB284252

Inspection and repair

1. Inspect:
- Commutator
  Dirty → Clean it with #600 grit sandpaper.

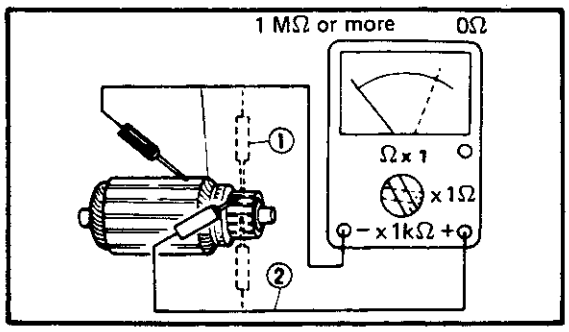
2. Measure:
- Commutator diameter ⓐ
  Out of specification → Replace starter motor.

	Commutator wear limit: **27 mm (1.06 in)**

3. Measure:
- Mica undercut ⓐ
  Out of specification → Scrape the mica to proper value use a hacksaw blade can be ground to fit.

	Mica undercut: **0.7 mm (0.028 in)**

NOTE:
The mica insulation of the commutator must be undercut to ensure proper operation of commutator.



4. Inspect:
- Armature coil (insulation/continuity)
  Defects → Replace starter motor.

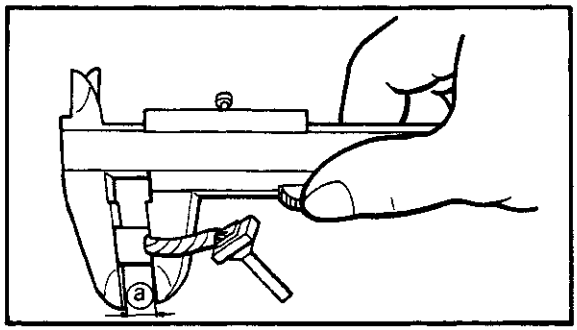
****

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 Ω 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.

****



5. Measure:
• Brush length ⓐ
Out of specification → Replace.

Brush length limit:
5.0 mm (0.2 in)

6. Measure:
• Brush spring force
Fatigue/Out of specification → Replace as a set.

Brush spring force:
570~920 g (20.1~32.4 oz)

7. Inspect:
• Bearing
• Oil seal
• O-rings
• Bush
Damage → Replace.

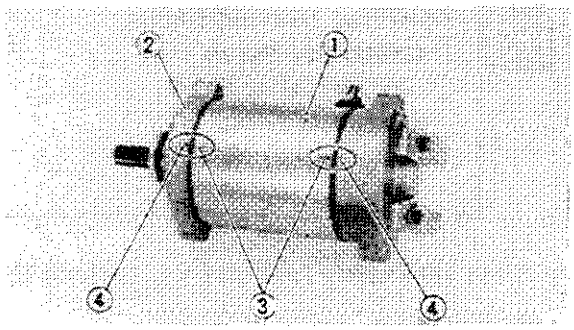
KB284253

Assembly

Reserve the "Removal" procedure.
Note the following points.

1. Install:
• Brush set

NOTE:
Align the projection on the brush seat with the slot on the housing.



2. Install:
• Yoke ①
• Brackets ②

NOTE:
Align the match marks ③ on the yoke with the match marks on the brackets ④.

KB284254

Installation

1. Install:
   • Starter motor

NOTE:

Apply a lightly grease to the O-ring.

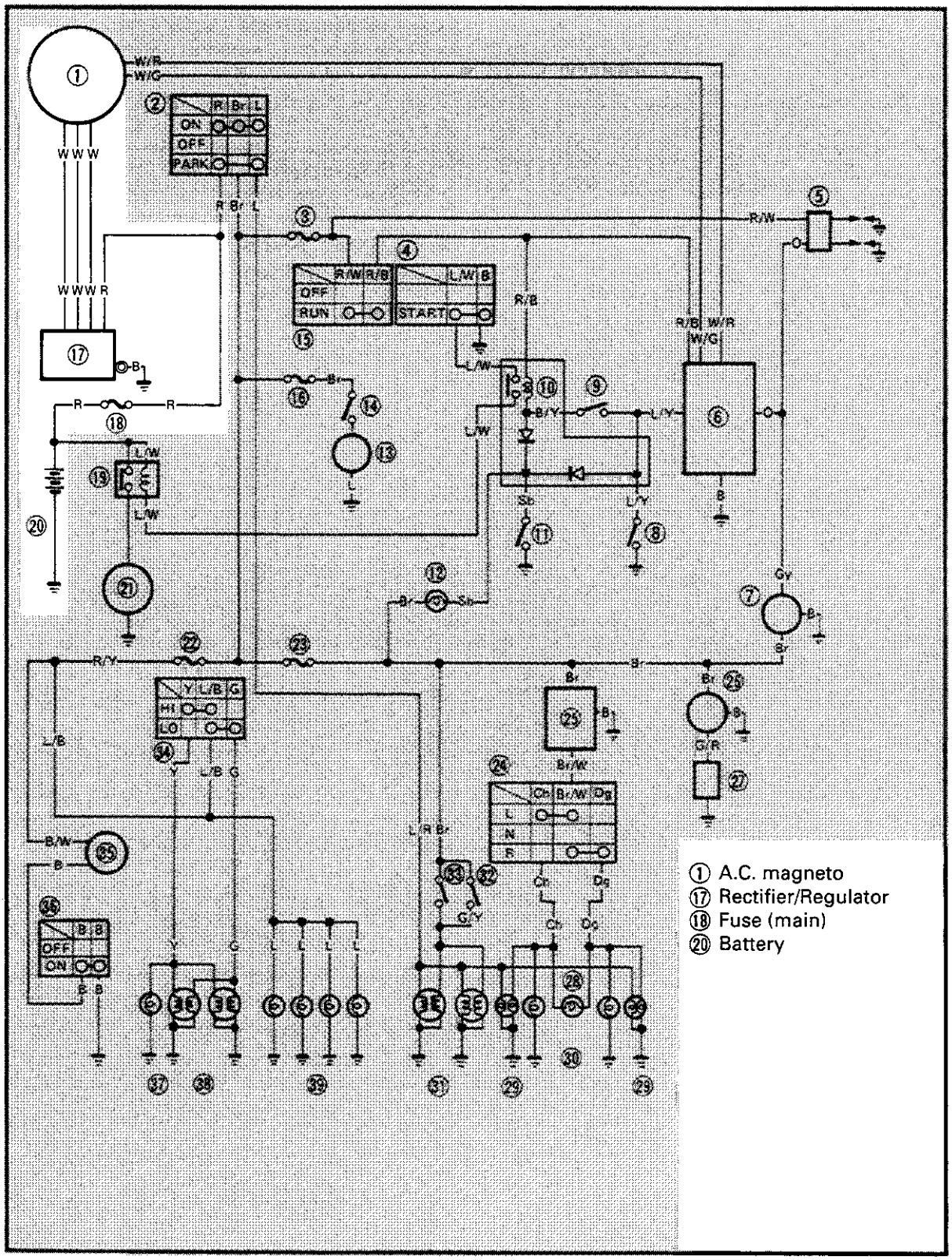
	Bolt (starter motor): **10 Nm (1.0 m · kg, 7.2 ft · lb)**

Refer to the "ENGINE OVERHAUL—ENGINE ASSEMBLY" section in the CHAPTER 4.

CHARGING SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows charging system.



KB285000
TROUBLESHOOTING

THE BATTERY IS NOT CHARGED.

KB285100
Procedure
Check;
1. Fuse (main)
2. Battery
3. Charging voltage
4. Stator coil resistance
5. Wiring connection
   (entire charging system)

KB285110
NOTE:
- Remove the following parts before troubleshooting.

1) Seat
2) Side cowlings
3) Upper cowling
4) Fuel tank

- Use the following special tool(s) in this troubleshooting.

Inductive tachometer:
P/N YU-08036-A/90890-03113
Pocket tester:
P/N YU-03112/90890-03112

KB285120

1. Fuse (main)
- Remove the fuse.
- Connect the pocket tester (Ω x 1) to the fuse.
- Check the fuse for continuity.

NO CONTINUITY → Replace fuse.

CONTINUITY ↓

KB285130

2. Battery
- Check the battery condition.
  Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Open circuit voltage:
12.8 V or more at 20°C (68°F)

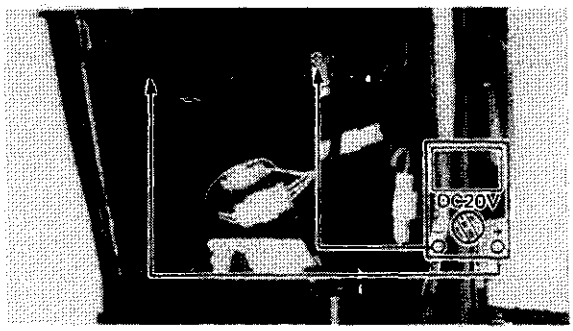
INCORRECT →
- Clean the battery terminals.
- Recharge or replace the battery.

CORRECT ↓

KB285140

3. Charging voltage
- Connect the inductive tachometer to the #1 spark plug lead.
- Connect the pocket tester (DC 20 V) 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:
14.3~15.3 V at 5,000 r/min

NOTE:
Use a full charged battery.

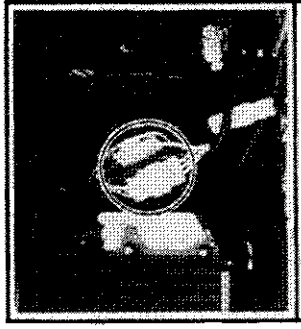
MEETS SPECIFICATION → Charging circuit is good.

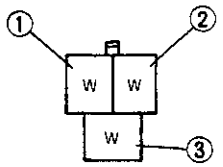
OUT OF SPECIFICATION

KB285150

4. Stator coil resistance

- Disconnect the stator coil coupler from the wireharness.
- Connect the pocket tester (Ω x 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:
0.2~0.3 Ω at 20°C (68°F)

OUT OF SPECIFICATION → Replace stator assembly.

BOTH MEET SPECIFICATIONS

KB285160

5. Wiring connection

- Check the entire ignition system for connections.
  Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

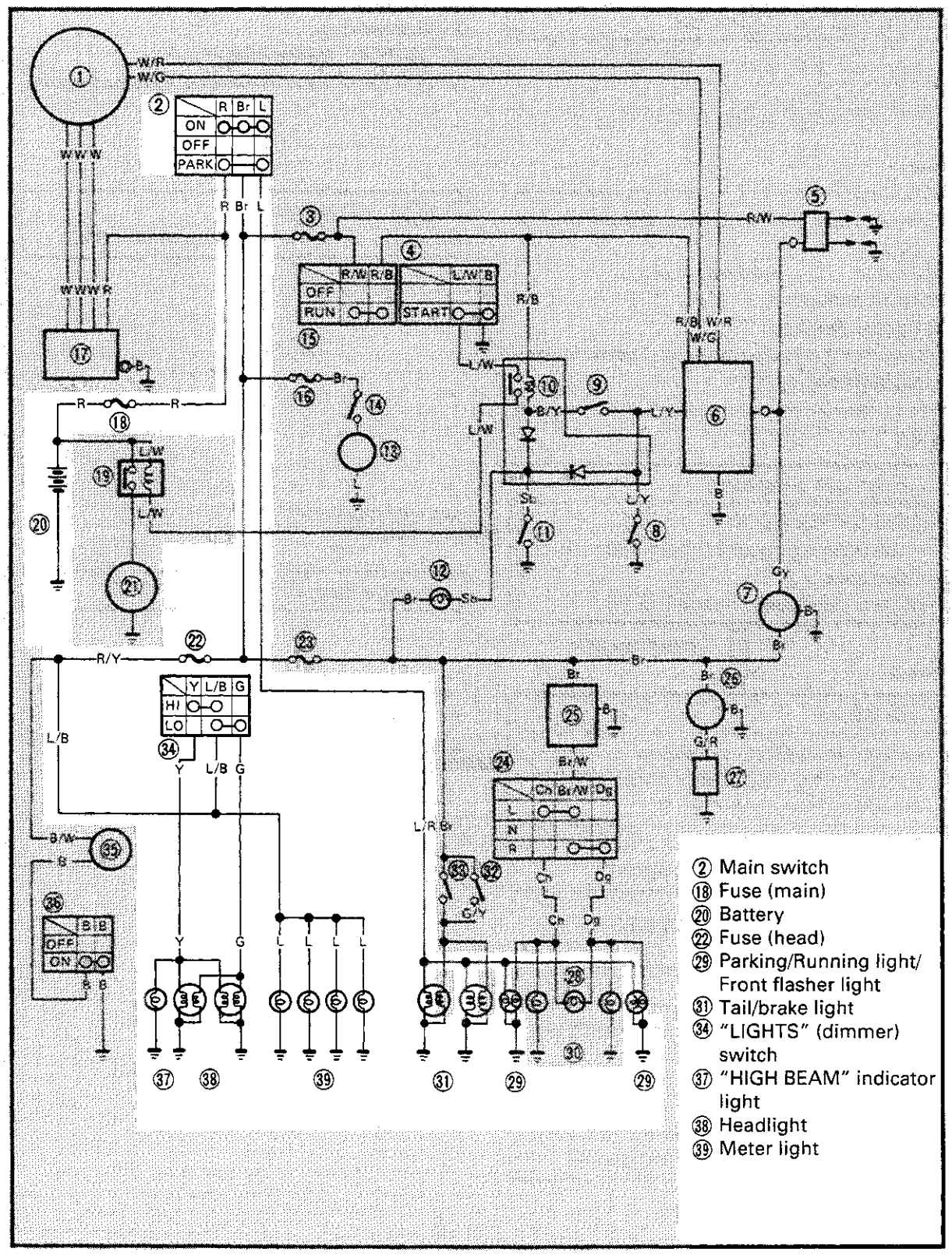
CORRECT

Replace rectifier/regulator.

LIGHTING SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows lighting system.



KB286000

TROUBLESHOOTING

HEADLIGHT "HIGH BEAM" INDICATOR LIGHT, TAILLIGHT, AND/OR METER LIGHT DO NOT COME ON.

KB286100

Procedure

Check;
1. Fuse (main and head)
2. Battery
3. Main switch
4. "LIGHTS" (Dimmer) switch
5. Wiring connection (entire lighting system)

KB286110

NOTE:

- Remove the following parts before troubleshooting.

1) Seat
2) Side cowlings
3) Upper cowling
4) Fuel tank

- Use the following special tool(s) in this troubleshooting.

Pocket tester:
P/N YU-03112/90890-03112

KB286120

1. Fuse (main and head)

- Remove the fuses.
- Connect the pocket tester (Ω x 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

KB286130

2. Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Open circuit voltage:
12.8 V or more at 20°C (68°F)

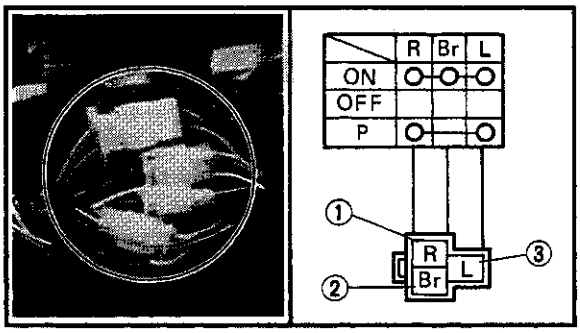
INCORRECT → • Clean the battery terminals. • Recharge or replace the battery.

CORRECT ↓

KB286140

3. Main switch

- Disconnect the main switch coupler from the wireharness.
- Check the switch component for the continuity between "Red ① and Brown ②", "Brown ② and Blue ③" and "Red ① and Blue ③". Refer to the "CHECKING OF SWITCHES" section.



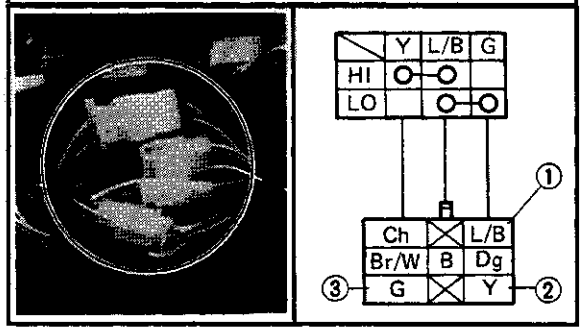
KB286150

INCORRECT → Replace main switch.

CORRECT

4. "LIGHTS" (Dimmer) switch

- Disconnect the handlebar switch (left) coupler from the wireharness.
- Check the switch component for the continuity between "Blue/Black ① and Yellow ②" and "Blue/Black ① and Green ③". Refer to the "CHECKING OF SWITCHES" section.



KB286160

INCORRECT → 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 "LIGHTING SYSTEM CHECK" section.

KB286170

LIGHTING SYSTEM CHECK

1. Headlight and "HIGH BEAM" indicator light does not come on.

1. Bulb and bulb socket
• Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

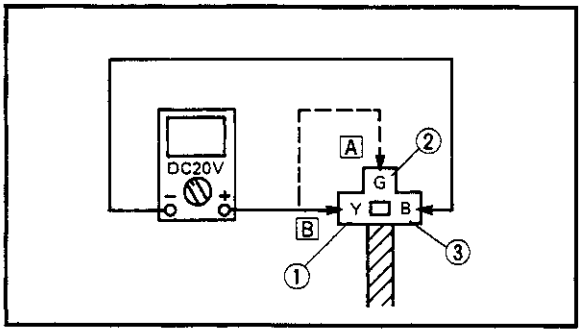
NO CONTINUITY → Replace bulb and/or bulb socket.

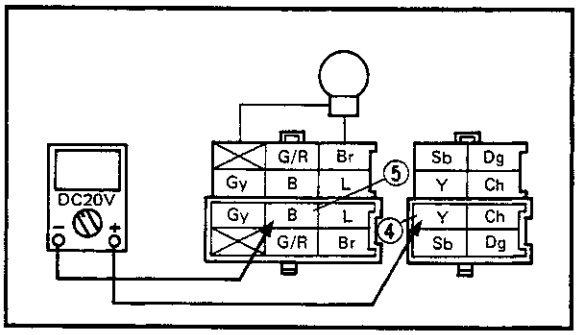
CONTINUITY

KB286180

2. Voltage
• Connect the pocket tester (DC 20 V) to the headlight and "HIGH BEAM" indicator light couplers.
A When "LIGHTS" (dimmer) switch is "LO" position.
B When "LIGHTS" (dimmer) switch is "HI" position.

Head light:
Tester (+) lead → Yellow ① or Green ② lead.
Tester (−) lead → Black ③ lead.
"HIGH BEAM" indicator light:
Tester (+) lead → Yellow ④ lead
Tester (−) lead → Black ⑤ lead





- Turn the main switch to "ON".
- Turn the "LIGHTS" (dimmer) switch to "LO" or "HI" position.
- Check for voltage (12 V) 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.

MEETS SPECIFICATION

This circuit is good.

KB286190

2. Meter light does not come on.

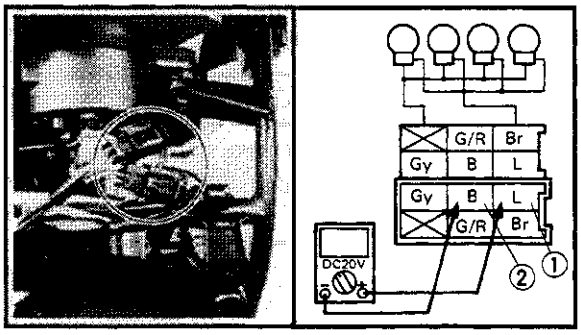
1. Bulb and bulb socket
• Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY → Replace bulb and/or bulb socket.

CONTINUITY

KB286200

2. Voltage
• Connect the pocket tester (DC 20 V) to the bulb socket coupler.
Tester (+) lead → Blue ① terminal **Tester (−) lead → Black ② terminal**



- Turn the main switch to "ON".
- Check for voltage (12 V) 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

This circuit is good.

KB286210

3. Taillight does not come on.

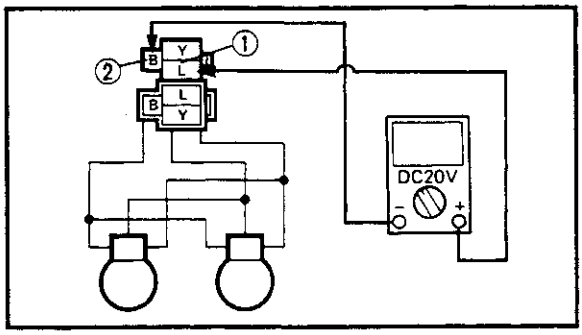
1. Bulb and bulb socket
• Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY → Replace bulb and/or bulb socket.

CONTINUITY

KB286220

2. Voltage
• Connect the pocket tester (DC 20 V) to the bulb socket connector.
Tester (+) lead → Blue ① terminal **Tester (−) lead → Black ② terminal**



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Blue" lead at the bulb socket connector.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connection is faulty, repair.

MEETS SPECIFICATION

This circuit is good.

KB286230

4. Parking/Running light does not come on.

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY

Bulb and/or bulb socket are faulty, replace.

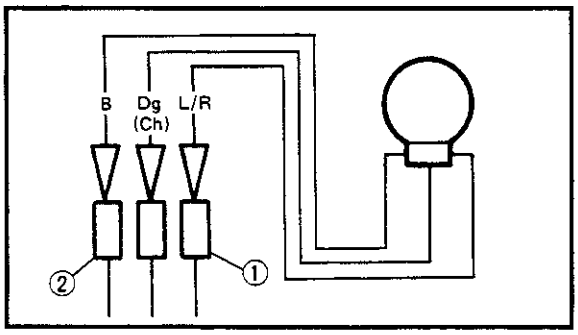
CONTINUITY

KB286240

2 Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Blue/Red ① lead
Tester (−) lead → Black ② lead



- Turn the main switch to "P" or "ON".
- Check for voltage (12 V) on the "Blue/Red" lead at the bulb socket connector.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

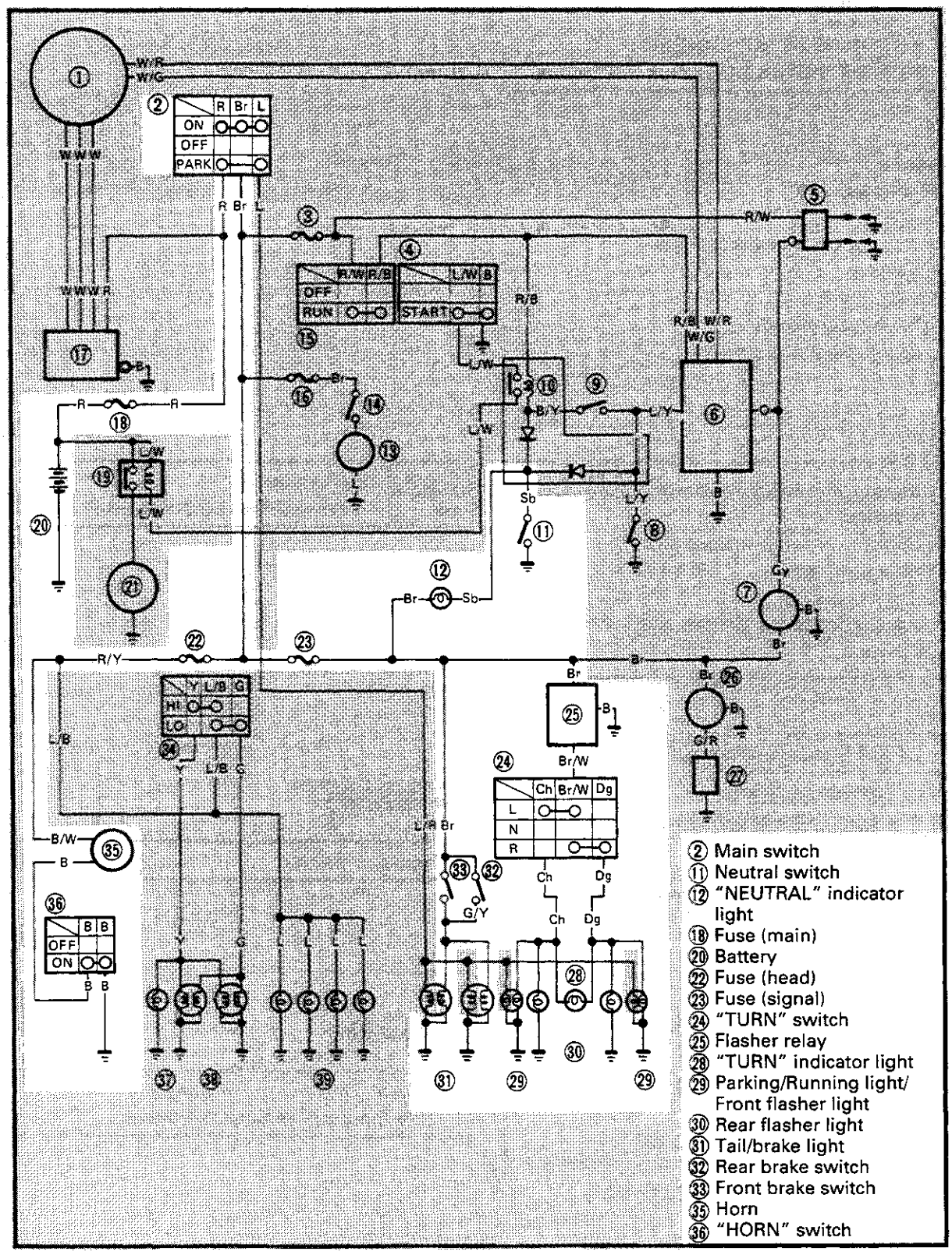
MEETS SPECIFICATION

This circuit is good.

SIGNAL SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows signal system.



② Main switch
⑪ Neutral switch
⑫ "NEUTRAL" indicator light
⑱ Fuse (main)
⑳ Battery
㉒ Fuse (head)
㉓ Fuse (signal)
㉔ "TURN" switch
㉕ Flasher relay
㉘ "TURN" indicator light
㉙ Parking/Running light/ Front flasher light
㉚ Rear flasher light
㉛ Tail/brake light
㉜ Rear brake switch
㉝ Front brake switch
㉟ Horn
㊱ "HORN" switch

KB287000

TROUBLESHOOTING

- **FLASHIER LIGHT, BRAKE LIGHT AND /OR INDICATOR LIGHT DO NOT COME ON.**
- **HORN DOES NOT SOUND.**
- **TACHOMETER DOES NOT OPERATE.**

KB287100

Procedure

Check;

1. Fuse (main, head and signal)
2. Battery
3. Main switch
4. Wiring connection
   (entire signal system)

KB287110

NOTE:

- Remove the following parts before troubleshooting.

1) Seat
2) Side cowlings
3) Upper cowling
4) Fuel tank
5) Air filter case

- Use the following special tool in this troubleshooting.

Pocket tester:
P/N YU-03112/90890-03112

KB287120

1. Fuse (main, head and signal)

- Remove the fuses.
- Connect the pocket tester (Ω x 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

KB287220

2. Battery

- Check the battery condition.
  Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Open circuit voltage:
12.8 V or more at 20°C (68°F)

INCORRECT →
- Clean the battery terminals.
- Recharge or replace the battery.

CORRECT ↓

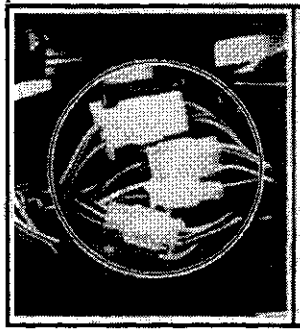
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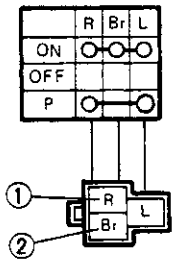
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KB287230

3. 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 → Replace main switch.

CORRECT

KB287240

4. Wiring connection

- Check the entire signal system for connections.
  Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

CORRECT

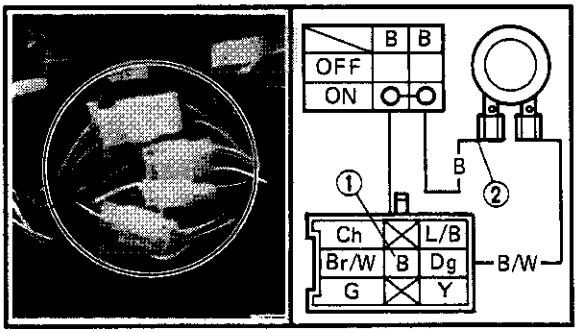
Check condition of each circuit for signal system. Refer to "SIGNAL SYSTEM CHECK" section.

KB287250

SIGNAL SYSTEM CHECK

1. Horn does not sound.

1. "HORN" switch.
• Disconnect the handlebar switch (left) coupler from wireharness and horn lead.



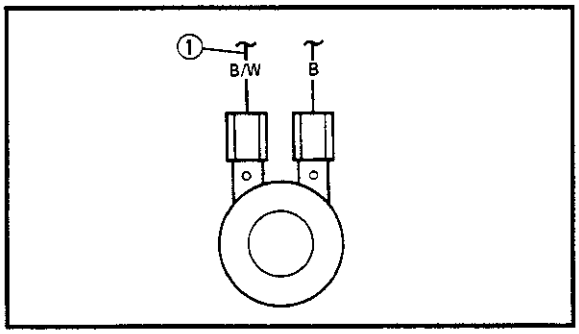
• Check the switch component for the continuity between "Black ① and Black ②". Refer to the "CHECKING OF SWITCHES" section.

INCORRECT → Replace handlebar switch (left).

CORRECT

KB287260

2. Voltage
• Connect the pocket tester (DC 20 V) to the horn lead.
Tester (+) lead → Black/White ① lead **Tester (−) lead → Frame ground**



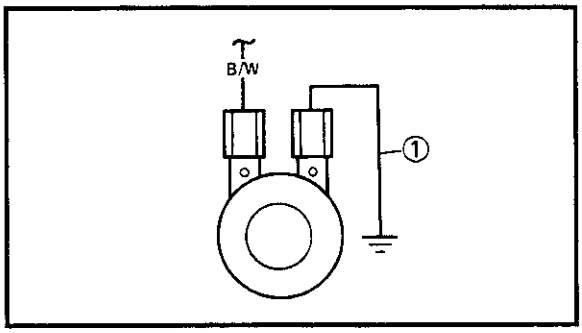
• Turn the main switch to "ON". • Check for voltage (12 V) on the "Brown" lead at the horn terminal.

OUT OF SPECIFICATION → Wiring circuit from main switch to horn terminal is faulty, repair.

MEETS SPECIFICATION

KB287270

3. Horn
• Disconnect the "Black" lead at the horn terminal. • Connect a jumper lead ① to the horn terminal and ground the jumper lead. • Turn the main switch to "ON".



KB287280

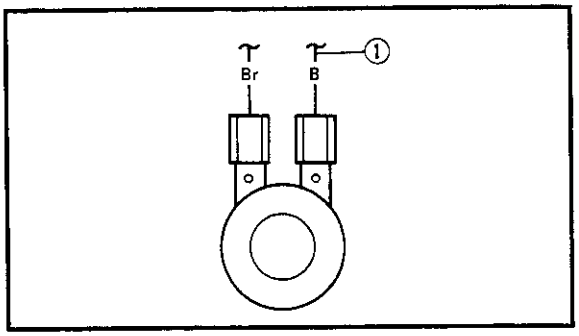
HORN IS SOUNDED → Horn is good.

HORN IS NOT SOUNDED ↓

4. Voltage

- Connect the pocket tester (DC 20 V) to the horn at the "Black" terminal.

Tester (+) lead → Black ① lead
Tester (−) lead → Frame ground



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Black" lead at the horn terminal.

OUT OF SPECIFICATION → Replace horn.

MEETS SPECIFICATION ↓

Adjust or replace horn.

KB287290

2. Brake light does not come on.

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY → Replace bulb and/or bulb socket.

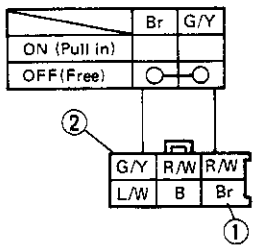
CONTINUITY ↓

KB287300

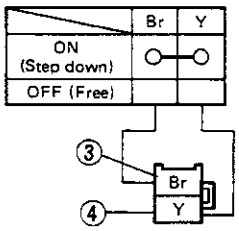
2. Brake switch

- Disconnect the brake switch coupler from the wireharness.
- Check the switch component for the continuity between "Brown ① and Green/Yellow ②", or "Brown ③ and Yellow ④". Refer to the "CHECKING OF SWITCHES" section.

A



B



A Front brake switch
B Rear brake switch

NO CONTINUITY

Replace brake switch.

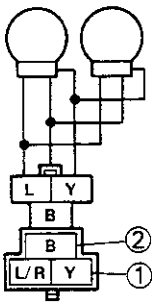
CONTINUITY

KB287310

3. Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Yellow ① lead
Tester (−) lead → Black ② lead



- Turn the main switch to "ON".
- The brake lever is pulled in or brake pedal is stepped down.
- Check for voltage (12 V) on the "Yellow" lead at the bulb socket connector.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

MEETS SPECIFICATION

This circuit is good.

KB287320

3. Flashier light and/or "TURN" indicator light does not blink.

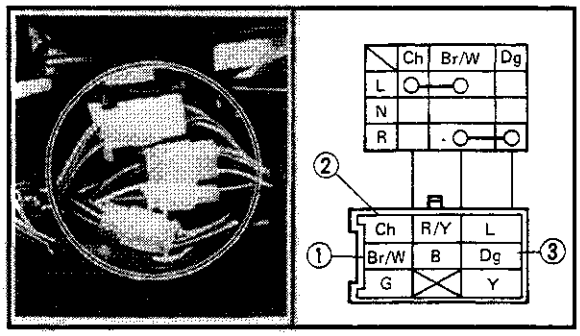
1. Bulb and bulb socket
- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY → Replace bulb and/or bulb socket.

CONTINUITY

KB287330

2. "TURN" switch
- Disconnect the handlebar switch (left) coupler from the wireharness.



- Check the switch component for the continuity between "Brown/White ① and Chocolate ② " and "Brown/White ① and Dark green ③ ". Refer to the " CHECKING OF SWITCHES" section.

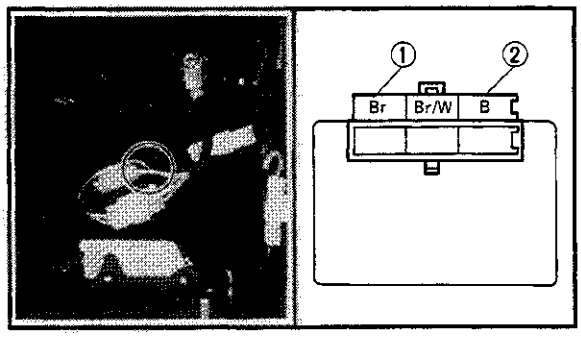
IN CORRECT → Replace handlebar switch (left).

CORRECT

KB287340

3. Voltage
- Connect the pocket tester (DC 20 V) to the flashier relay.

Tester (+) lead → Brown ① terminal
Tester (−) lead → Black ② terminal



- Turn the main switch to "ON".
- Check for voltage (12 V) on the " Brown" lead at the flashier relay terminal.

OUT OF SPECIFICATION → Wiring circuit from main switch to flashier relay connector is faulty, repair.

MEETS SPECIFICATION

*

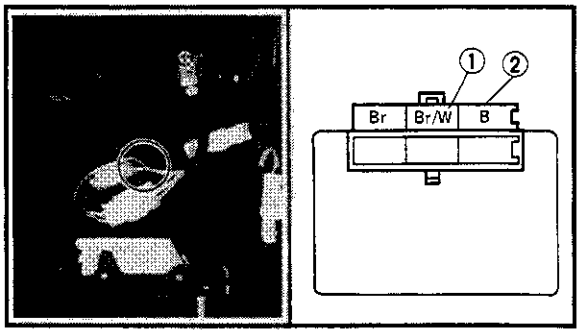
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KB287350

4. Voltage

- Connect the pocket tester (DC 20 V) to the flashier relay.

Tester (+) lead → Brown/White ① terminal
Tester (−) lead → Black ② terminal



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Brown/White" lead at the flashier relay terminal.

OUT OF SPECIFICATION → Replace flashier relay.

MEETS SPECIFICATION

KB287360

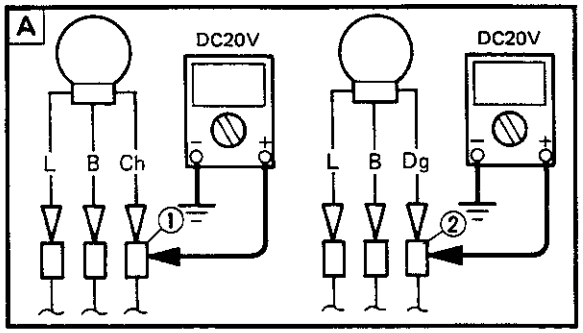
5. Voltage

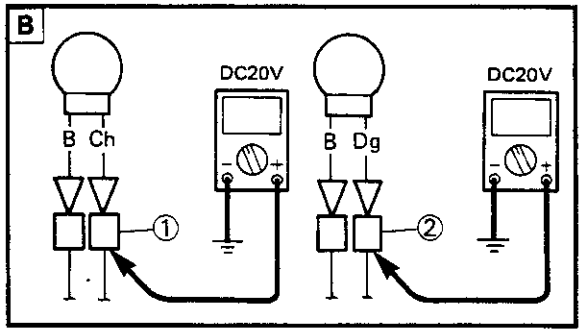
- Connect the pocket tester (DC 20 V) to the bulb socket connector.

A Front side
B Rear side

At flashier light (left):
Tester (+) lead → Chocolate ① lead
Tester (−) lead → Frame ground

At flashier light (right):
Tester (+) lead → Dark green ② lead
Tester (−) lead → Frame ground





- Turn the main switch to "ON".
- Turn the "TURN" switch to "L" or "R".
- Check for voltage (12 V) on the "Chocolate" lead or "Dark green" lead at the bulb socket connector.

OUT OF SPECIFICATION → Wiring circuit from "TURN" switch to bulb socket connector is faulty, repair.

MEETS SPECIFICATION

This circuit is good.

KB287370

4. "NEUTRAL" indicator light does not come on.

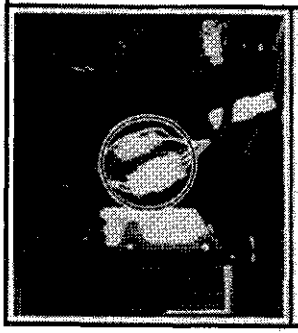
1. Bulb and bulb socket
- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

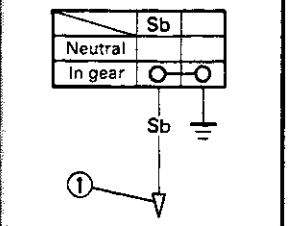
NO CONTINUITY → Replace bulb and/or bulb socket.

CONTINUITY

KB287380

2. Neutral switch
- Disconnect the neutral switch lead from the wireharness.
- Check the switch component for the continuity between "Sky blue ① and Ground". Refer to the "CHECKING OF SWITCHES" section.





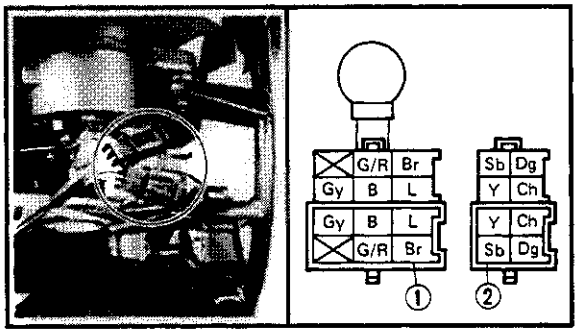
IN CORRECT → Replace neutral switch.

CORRECT

KB287390

3. Voltage
- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Brown ① terminal
Tester (−) lead → Sky blue ②



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Brown" lead at bulb socket connector.

OUT OF SPECIFICATION → Wiring circuit from main switch to bulb socket connector is faulty, repair.

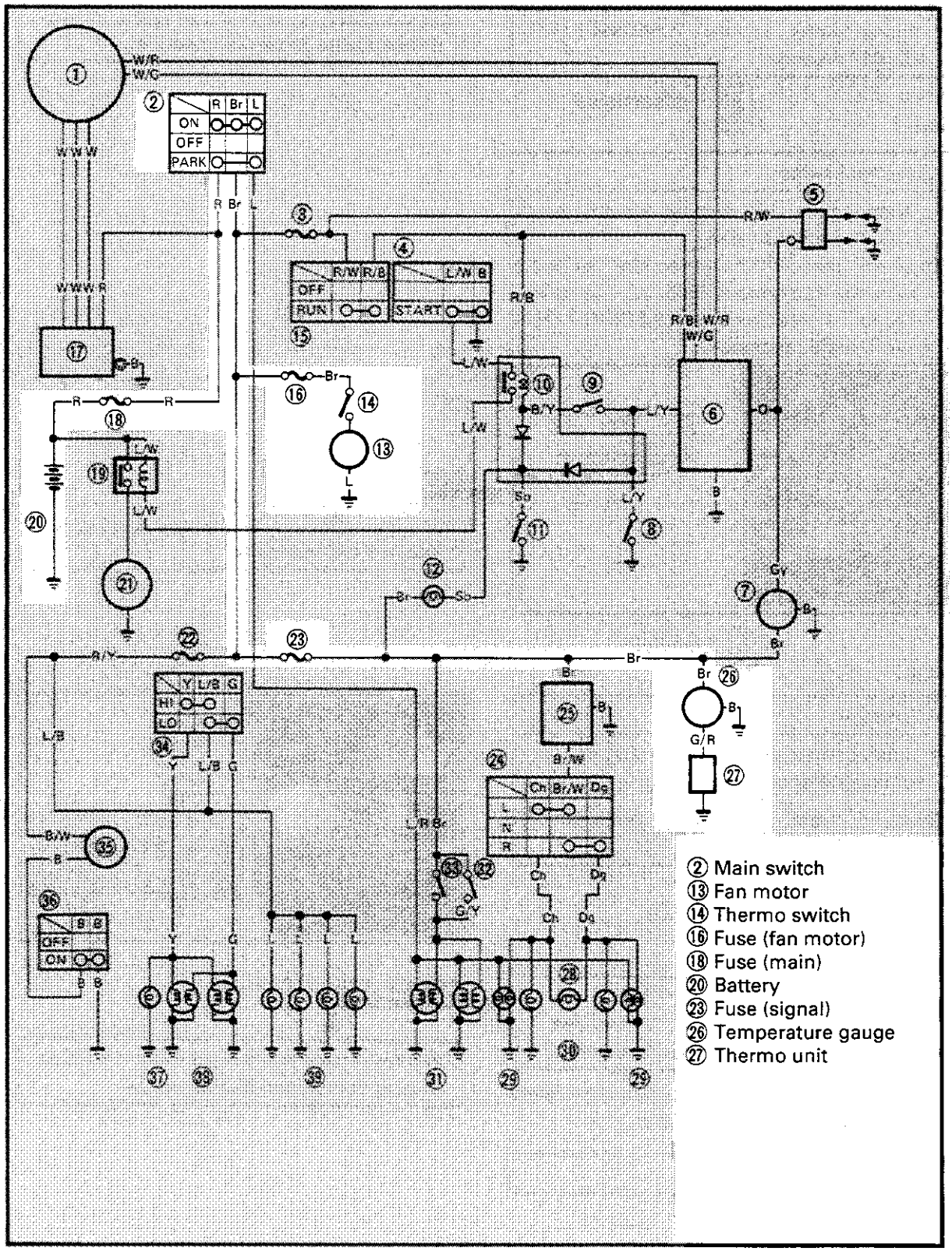
MEETS SPECIFICATION

This circuit is good.

COOLING SYSTEM

CIRCUIT DIAGRAM

Below circuit diagram shows cooling system.



KB288000
TROUBLESHOOTING

FAN MOTOR DOES NOT TURN.

KB288100
Procedure
Check;
1. Fuse (main and fan)
2. Battery
3. Main switch
4. Fan motor (test 1)
5. Fan motor (test 2)
6. Thermo switch
7. Wiring connection (entire cooling system)

KB288110
NOTE:
- Remove the following parts before troubleshooting.
  1) Seat
  2) Side cowlings
  3) Upper cowling
  4) Fuel tank
  5) Air filter case
- Use the following special tool(s) in this troubleshooting.

Pocket tester:
P/N YU-03112/90890-03112

KB288120

1. Fuse (main and fan)
- Remove the fuses.
- Connect the pocket tester (Ω x 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

KB288130

2. Battery
- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Open circuit voltage:
12.8 V or more at 20°C (68°F)

INCORRECT → • Clean the battery terminals. • Recharge or replace the battery.

CORRECT ↓

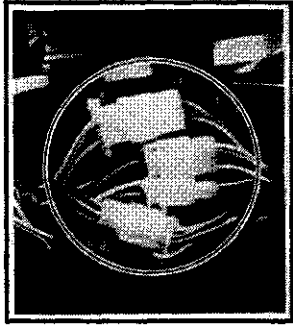
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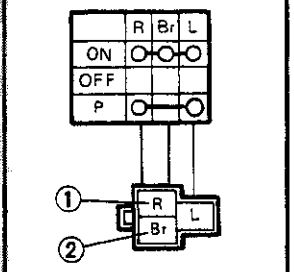
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KB288140

3. 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

Replace main switch.

CORRECT

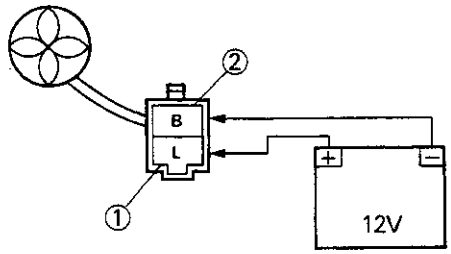
KB288150

4. Fan motor (test 1)

- Disconnect the fan motor coupler.
- Connect the battery (12 V) as shown.

Battery (+) lead → Blue ① terminal
Battery (−) lead → Black ② terminal

- Check the motor for operation.



DOES NOT MOVES

Replace fan motor.

MOVES

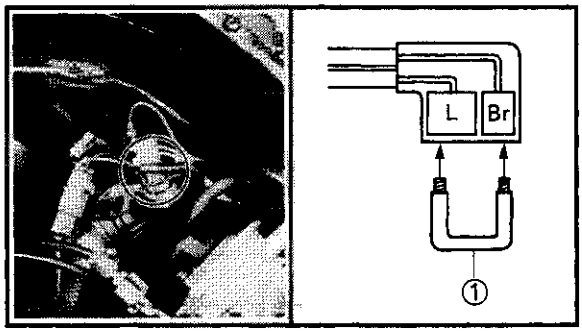
KB288160

5. Fan motor (test 2)

- Disconnect the thermo switch leads ("Blue" and "Brown").
- Turn the main switch to "ON".
- Connect the leads with the jumper lead ① as shown.

⚠ WARNING

This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.



DOES NOT MOVE

Wiring circuit from main switch to fan motor leads is faulty, repair.

MOVES

KB288170

6. Thermo switch

- Remove the thermo switch from the thermostat housing.
- Connect the pocket tester (Ω x 1) to the thermo switch ①.
- Immerse the thermo switch in the water ②.

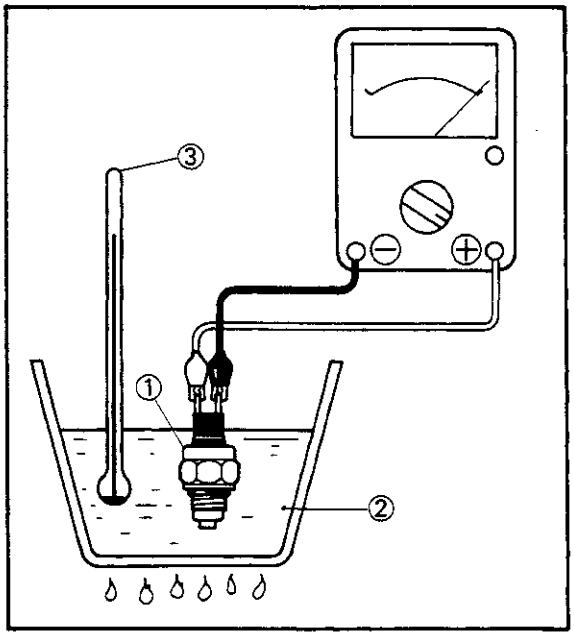
⚠ WARNING

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

- Check the thermo switch for continuity. Note temperatures while heating the water with the temperature gauge ③.

Test step	Water temperature	Good condition
1	0~98°C (32~208.4°F)	X
2	More than 105±3°C (221.0±5.4°F)	O
3*	105 to 98°C (221.0 to 208.4°F)	O
4*	Less than 98°C (208.4°F)	X

Thermo switch:
28 Nm (2.8 m · kg, 20 ft · lb)
Water resistant sealant



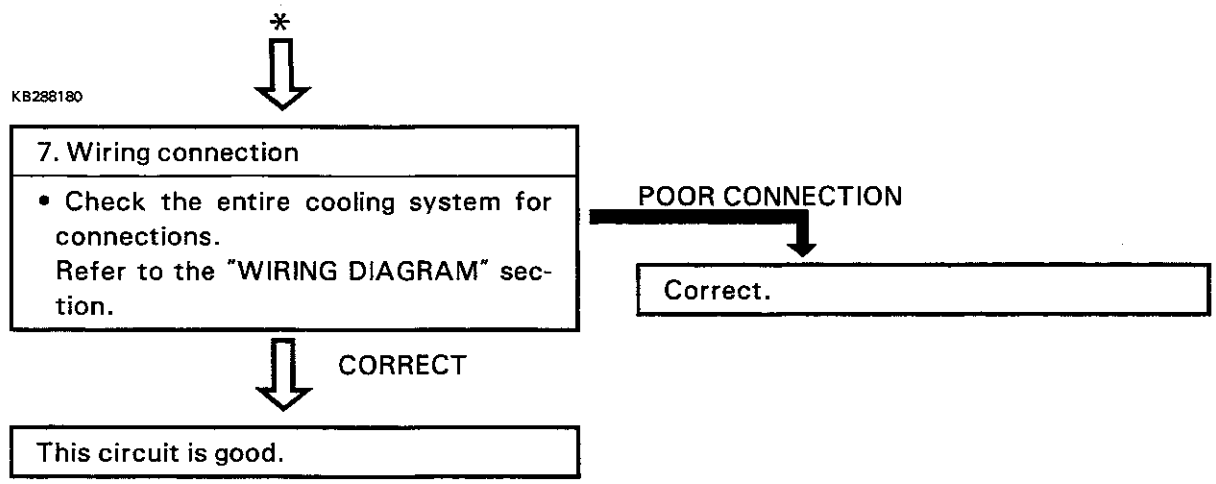
Test 1 & 2; Heat-up tests
Test 3* & 4*; Cool-down tests
O: Continuity X: No continuity

BAD CONDITION

Replace thermo switch.

GOOD CONDITION

*


*
KB288180
7. Wiring connection
• Check the entire cooling system for connections.
Refer to the "WIRING DIAGRAM" section.
POOR CONNECTION
Correct.
CORRECT
This circuit is good.

KB288190

WHEN ENGINE IS HOT, TEMPERATURE GAUGE DOES NOT MOVE.

KB288200

Procedure

Check;

1. Fuse (main and signal)
2. Battery
3. Main switch
4. Thermo unit
5. Wiring connection (entire cooling system)

KB288210

NOTE:

- Remove the following parts before troubleshooting.

1) Seat
2) Side cowlings
3) Fuel tank
4) Air filter case

- Use the following special tool(s) in this troubleshooting.

Pocket tester:
P/N YU-03112/90890-03112

KB288220

1. Fuse (main and signal)

- Remove the fuses.
- Connect the pocket tester (Ω x 1) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY → Replace fuse(s).

CONTINUITY ↓

KB288230

2. Battery

- Check the battery condition. Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

Open circuit voltage:
12.8 V or more at 20°C (68°F)

INCORRECT →

- Clean the battery terminals.
- Recharge or replace the battery.

↓

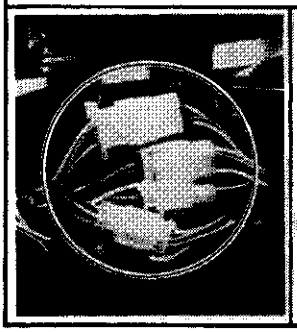
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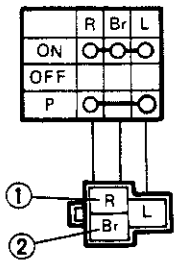
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KB288240

3. 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

Replace main switch.

CORRECT

KB288250

4. Thermo unit

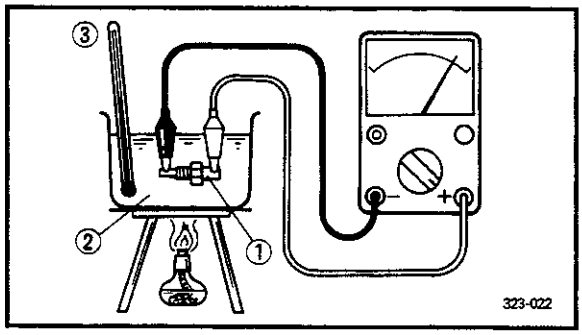
- Remove the thermo unit.
- Immerse the thermo unit ① in coolant ② .
- Measure the resistance at each temperature as tabulated.

⚠ WARNING

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

③ Thermo meter

Coolant temperature	Resistance
50°C (122°F)	154 Ω
80°C (176°F)	47~57 Ω
100°C (212°F)	26~29 Ω
120°C (248°F)	16 Ω



- After measuring the thermo unit, install the unit.

Thermo unit:
15 Nm (1.5 m · kg, 11 ft · lb)
Use water resistance sealant.

CAUTION:

Avoid over tightening.

OUT OF SPECIFICATION

Replace thermo unit.

MEETS SPECIFICATION

*

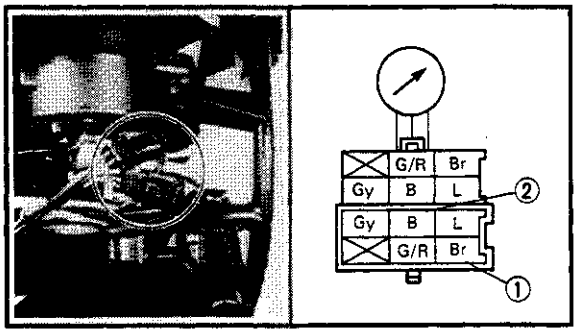
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KB288260

5. Voltage

- Connect the pocket tester (DC 20 V) to the temperature gauge leads.

Tester (+) lead → Brown ① terminal
Tester (—) lead → Black ② terminal



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Brown" lead at the temperature gauge connector.

OUT OF SPECIFICATION → Wiring circuit from main switch to temperature gauge connector, repair.

MEETS SPECIFICATION

KB288270

6. Wiring connection

- Check the entire cooling system for connections.
  Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION → Correct.

CORRECT

Replace temperature gauge.

KB291000
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.

KB291100
STARTING FAILURE/HARD STARTING

FUEL SYSTEM

Fuel tank
- Empty
- Clogged fuel filter
- Clogged fuel strainer
- Deteriorated fuel, fuel containing water or foreign material
- Clogged fuel breather hose

Fuel cock
- Clogged fuel hose
- Clogged vacuum hose
- Faulty diaphragm

Air filter element
- Clogged

Fuel pump
- Faulty fuel pump
- Clogged vacuum 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
- Improperly adjusted pilot screw
- Improperly adjusted starter cable

KB291120

ELECTRICAL SYSTEM

Spark plug
- Improper plug gap
- Worn electrodes
- Wire between terminal broken
- Improper heat range
- Faulty spark plug cap

Ignition coil
- Broken or shorted primary/secondary
- Faulty spark plug lead
- Broken body

Full-transistor system
- Faulty ignitor unit
- Faulty pick-up coil

Starter motor
- Faulty starter motor
- Faulty starter relay
- Faulty circuit cut-off relay
- Faulty starter clutch

Switches and wiring
- Faulty main switch
- Faulty "ENGINE STOP" switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty "START" switch
- Faulty sidestand switch
- Faulty clutch switch

KB291140

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

Crankcase and crankshaft
- Improperly sealed crankcase
- Damaged crankshaft oil seal lip
- Seized crankshaft

Valve and camshaft
- Improperly sealed valve
- Improperly contacted valve and valve seat
- Improperly valve timing
- Broken valve spring
- Seized camshaft

KB292100

POOR IDLE PERFORMANCE

POOR IDLE PERFORMANCE

Carburetor

- Improperly returned starter plunger
- Loose pilot jet
- Clogged pilot air jet
- Improperly synchronized carburetors
- Improperly adjusted idle speed (throttle stop screw/air screw)
- Improper throttle cable free play
- Flooded carburetor

Electrical system

- Faulty battery
- Faulty spark plug
- Faulty ignitor unit
- Faulty pickup coil
- Faulty ignition coil

Valve train

- Improperly adjusted valve clearance

KB292120

POOR MEDIUM AND HIGH SPEED PERFORMANCE

POOR MEDIUM AND HIGH SPEED PERFORMANCE

Refer to "Starting failure/Hard starting". (FUEL SYSTEM, ELECTRICAL SYSTEM, COMPRESSION SYSTEM and valve train)

Carburetor

- Improper jet needle clip position
- Diaphragm malfunction
- Improperly adjusted fuel level
- Clogged or loose main jet

Air filter

- Clogged air filter element

Fuel pump

- Faulty fuel pump

KB293100

FAULTY GEAR SHIFTING

HARD SHIFTING

Refer to "CLUTCH DRAGGING".

KB293120

SHIFT PEDAL DOES NOT MOVE

Shiftshaft
- Improperly adjusted shift rod
- 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

KB293140

JUMP-OUT GEAR

Shiftshaft
- Improperly adjusted shift lever position
- Improperly returned stopper lever

Shift fork
- Worn shift fork

Shift cam
- Improperly thrust play
- Worn shift cam groove

Transmission
- Worn gear dog

KB294100

CLUTCH SLIPPING/DRAGGING

CLUTCH SLIPPING

Clutch
- Improperly adjusted clutch cable
- Loose clutch spring
- Fatigued clutch spring
- Worn friction plate
- Worn clutch plate
- Incorrectly assembled clutch

Engine oil
- Low oil level
- Improper quality (low viscosity)
- Deterioration

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CLUTCH DRAGGING

Engine oil
- High oil level
- Improper quality (high viscosity)
- Deterioration

Clutch
- Warped clutch plate
- Unevenly tensioned clutch spring
- Match mark not aligned
- Loose clutch boss nut
- Burnt primary driven gear bushing
- Bent clutch plate
- Swollen friction plate
- Broken clutch boss

KB295100

OVERHEATING OR OVER-COOLING

OVERHEATING

Ignition system
- Improper spark plug gap
- Improper spark plug heat range
- Faulty ignitor unit

Compression system
- Heavy carbon built-up

Engine oil
- Incorrect oil level
- Improper oil viscosity
- Inferior oil quality

Brake
- Dragging brake

Fuel system
- Improper carburetor main jet (improper setting)
- Improperly adjusted fuel level
- Clogged air filter element

Cooling system
- Faulty water temperature gauge
- Faulty thermo unit
- Incorrect coolant level
- Faulty thermostat
- Faulty thermo switch
- Clogged or damaged radiator
- Faulty radiator cap
- Seized impeller shaft
- Inoperative fan motor

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OVER-COOLING

Cooling system
- Faulty water temperature gauge
- Faulty thermo unit
- Faulty thermostat
- Faulty thermo switch
- Inoperative fan motor

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FAULTY BRAKE

POOR BRAKING EFFECT

Disc brake
- Worn brake pad
- Worn brake disc
- Air in brake fluid
- Leakage brake fluid
- Faulty cylinder kit cup
- Faulty caliper kit seal
- Loose union bolt
- Broken brake hose
- Oily or greasy brake disc
- Oily or greasy brake pad
- Improper brake fluid level

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FRONT FORK OIL LEAKAGE AND FRONT FORK MALFUNCTION

OIL LEAKAGE

- Bent, damaged or rusty inner tube
- Damaged or cracked outer tube
- Damaged oil seal lip
- Improperly installed oil seal
- Improper oil level (too much)
- Loose damper rod holding bolt
- Broken cap bolt O-ring
- Loose drain bolt
- Damaged drain bolt gasket

MALFUNCTION

- Bent, deformed or damaged inner tube
- Bent or deformed outer tube
- Damaged fork spring
- Worn or damaged slide metal
- Bent or damaged damper rod
- Improper oil viscosity
- Improper oil level

KB298100

INSTABLE HANDLING

INSTABLE HANDLING

Handlebars
- Improperly installed or bent

Tires
- Uneven tire pressures on both sides
- Incorrect tire pressure
- Unevenly worn tires

Front forks
- Uneven oil level on both side
- Uneven spring tension (uneven damping adjuster position)
- Broken spring
- Twisted front fork

Drive chain
- Improperly adjusted chain slack

Swingarm
- Worn bearing or brush
- Bent or damaged

Cowling
- Damaged or broken
- Incorrectly installed

Steering
- Improperly installed upper bracket
- Bent steering stem
- Improperly installed steering stem (improperly tightened ring nut)
- Damaged bearing or bearing race

Wheels
- Incorrect wheel balance
- Deformed cast wheel
- Loose bearing
- Bent or loose wheel axle
- Excessive wheel run-out

Frame
- Twisted
- Damaged head pipe
- Improperly installed bearing race

Rear shock absorber
- Fatigued spring
- Improperly adjusted spring preload
- Oil and gas leakage

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FAULTY SIGNAL AND LIGHTING SYSTEM

HEAD LIGHT 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" switch)
- Bulb life expired

FLASHER KEEPS ON
- Faulty flasher relay
- Insufficient battery capacity (nearly discharged)
- Bulb burnt out

FLASHER WINKS SLOWER
- Faulty flasher relay
- Insufficient battery capacity (nearly discharged)
- Improper bulb
- Faulty main and/or "TURN" switch

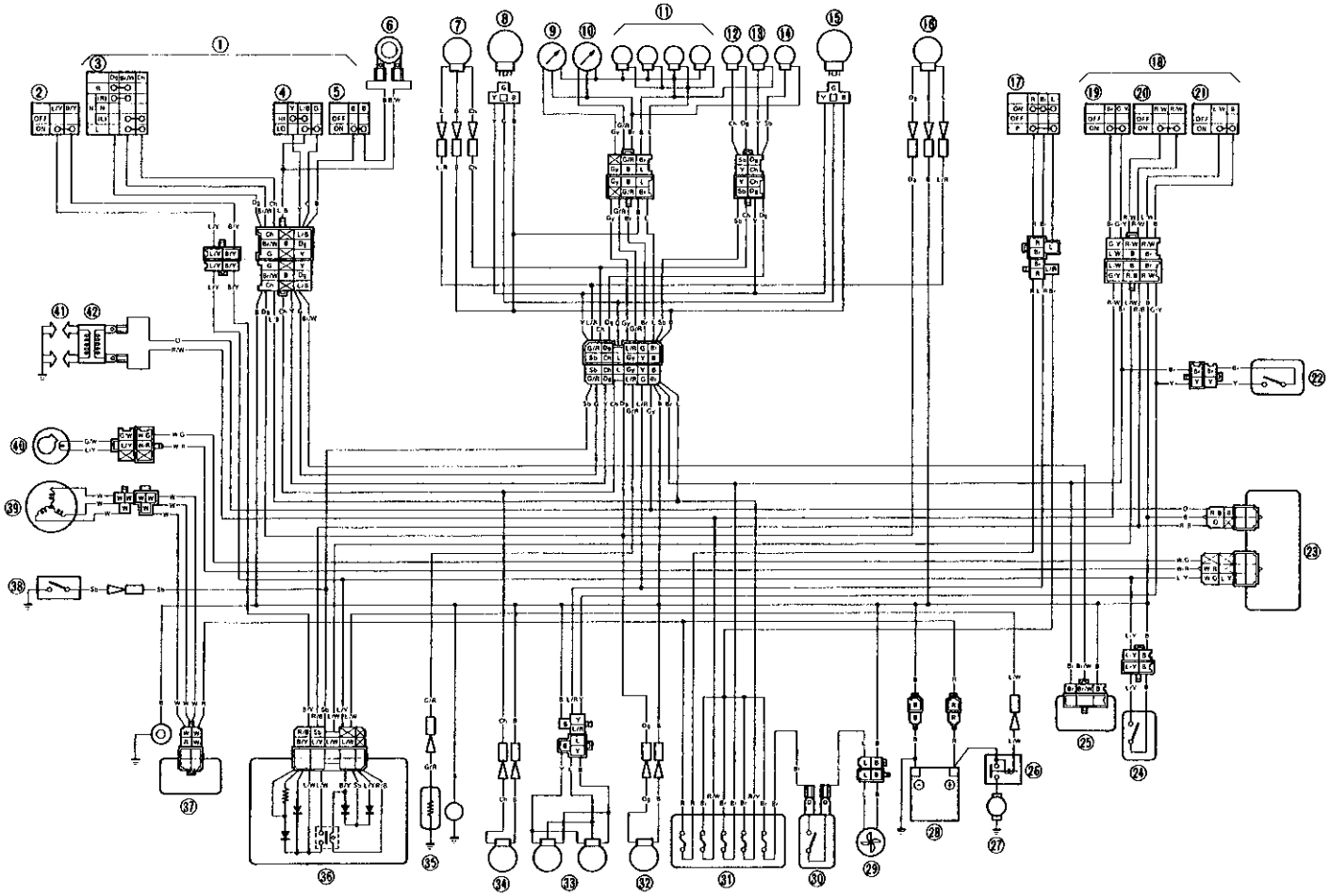
FLASHER WINKS QUICKER
- Improper bulb
- Faulty flasher relay

BULB BURNT OUT
- Improper bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded
- Faulty main and/or "LIGHTS" switch
- Bulb life expired

FLASHER DOES NOT LIGHT
- Improperly grounded
- Discharged battery
- Faulty "TURN" switch
- Faulty flasher relay
- Broken wireharness
- Loosely connected coupler
- Bulb burnt out
- Faulty fuse

HORN IS INOPERATIVE
- Faulty battery
- Faulty main and/or horn switch
- Improperly adjusted horn
- Faulty horn
- Broken wireharness

TDM850D/DC WIRING DIAGRAM



① Handlebar switch (Left)
② Clutch switch
③ "TURN" switch
④ "LIGHTS" (Dimmer) switch
⑤ "HORN" switch
⑥ Horn
⑦ Parking/Running light/ Front flasher light (Left)
⑧ Headlight (Left)
⑨ Tachometer
⑩ Engine temperature gauge
⑪ Meter light
⑫ "TURN" indicator light
⑬ "HIGH BEAM" indicator light
⑭ "NEUTRAL" indicator light
⑮ Headlight (Right)
⑯ Parking/Running light/ Front flasher light (Right)
⑰ Main switch
⑱ Handlebar switch (Right)
⑲ Front brake switch
⑳ "ENGINE STOP" switch
㉑ "START" switch
㉒ Rear brake switch
㉓ Ignitor unit
㉔ Sidestand switch
㉕ Flasher relay
㉖ Starter relay
㉗ Starter motor
㉘ Battery
㉙ Fan motor
㉚ Thermo switch
㉛ Fuse box
㉜ Rear flasher light (Right)
㉝ Tail/brake light
㉞ Rear flasher light (Left)
㉟ Thermo unit
㊱ Relay
㊲ Rectifier/regulator
㊳ Neutral switch
㊴ A.C. magneto
㊵ Pick up coil
㊶ Spark plug
㊷ Ignition coil

COLOR CODE

B ..... Black	L ..... Blue	B/W ..... Black/White	L/R ..... Blue/Red	W/G ..... White/Green
Br ..... Brown	O ..... Orange	B/Y ..... Black/Yellow	L/W ..... Blue/White	W/R ..... White/Red
Ch ..... Chocolate	R ..... Red	Br/W ..... Brown/White	L/Y ..... Blue/Yellow	
Dg ..... Dark green	Sb ..... Sky blue	G/R ..... Green/Red	R/B ..... Red/Black	
G ..... Green	W ..... White	G/Y ..... Green/Yellow	R/W ..... Red/White	
Gy ..... Gray	Y ..... Yellow	L/B ..... Blue/Black	R/Y ..... Red/Yellow	