YAMAHA 2006

XT125R(V)
XT125X(V)

SERVICE MANUAL

3D6-F8197-E0

XT125R(V)/XT125X(V) 2006
SERVICE MANUAL

First edition, 2006

WARNING

This manual was written by Yamaha Motor Europe N.V. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to provide a mechanic with all necessary information with only one manual. For this reason, persons using this book to perform maintenance and repairs on Yamaha motorcycles should have a basic understanding of the mechanical concepts and procedures concerning motorcycle repair technology. Without such knowledge, attempted repairs or service to the motorcycle may render it unfit to use and/or unsafe.

Yamaha Motor Europe N.V. is continuously 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, where applicable, they will appear in future editions of this manual.

NOTE:
Designs and specifications are subject to change without notice.

PARTICULARLY IMPORTANT INFORMATION ABOUT THE MANUAL

Particularly important information is shown with the following symbols.

⚠	This symbol shows a danger and means CAUTION! DANGER! YOUR SAFETY IS INVOLVED!
⚠ WARNING	Failure to follow WARNING instructions could result in severe injury or death for the motorcycle operator, a bystander, or a person inspecting or repairing the motorcycle.
CAUTION:	The CAUTION symbol 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

STRUCTURE OF THE MANUAL

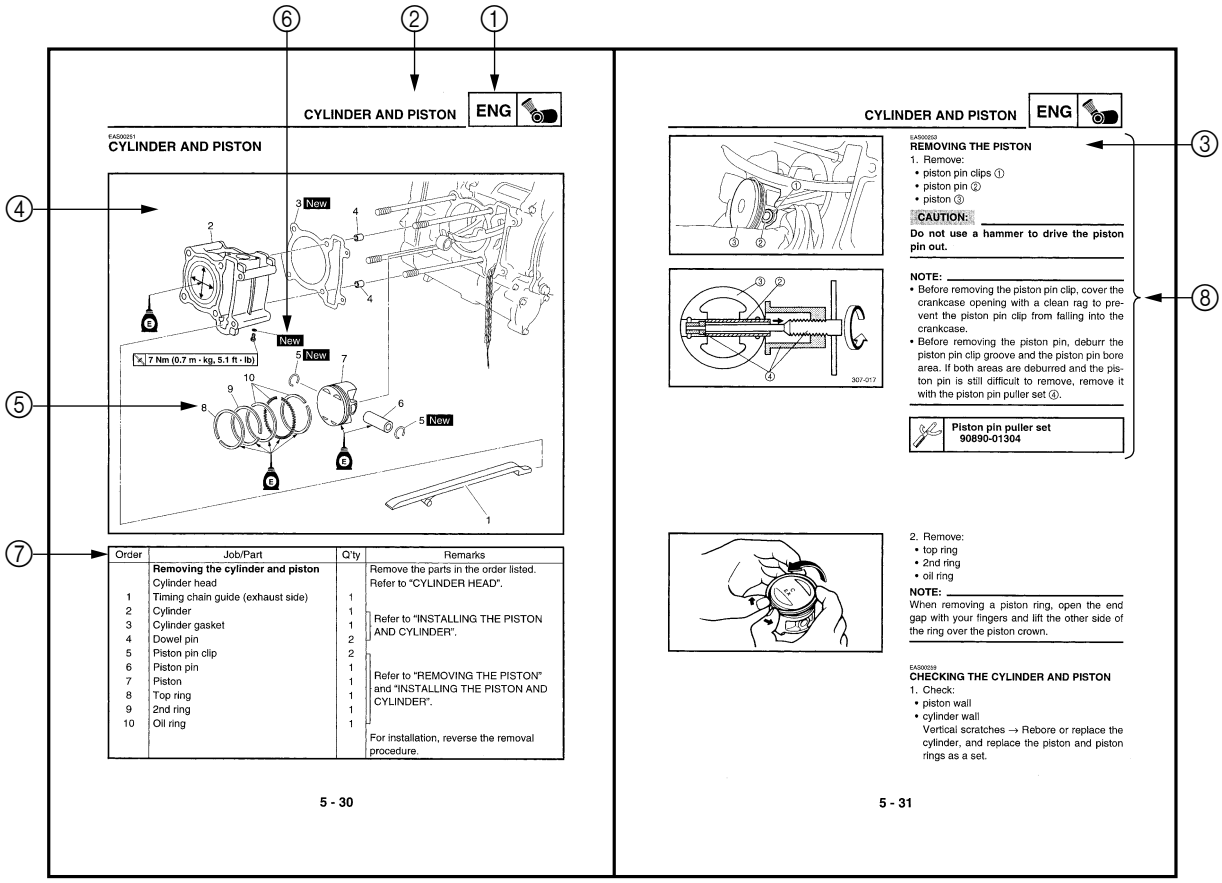
This manual is divided into chapters according to the main subject categories.
See “EXPLANATORY SYMBOLS”

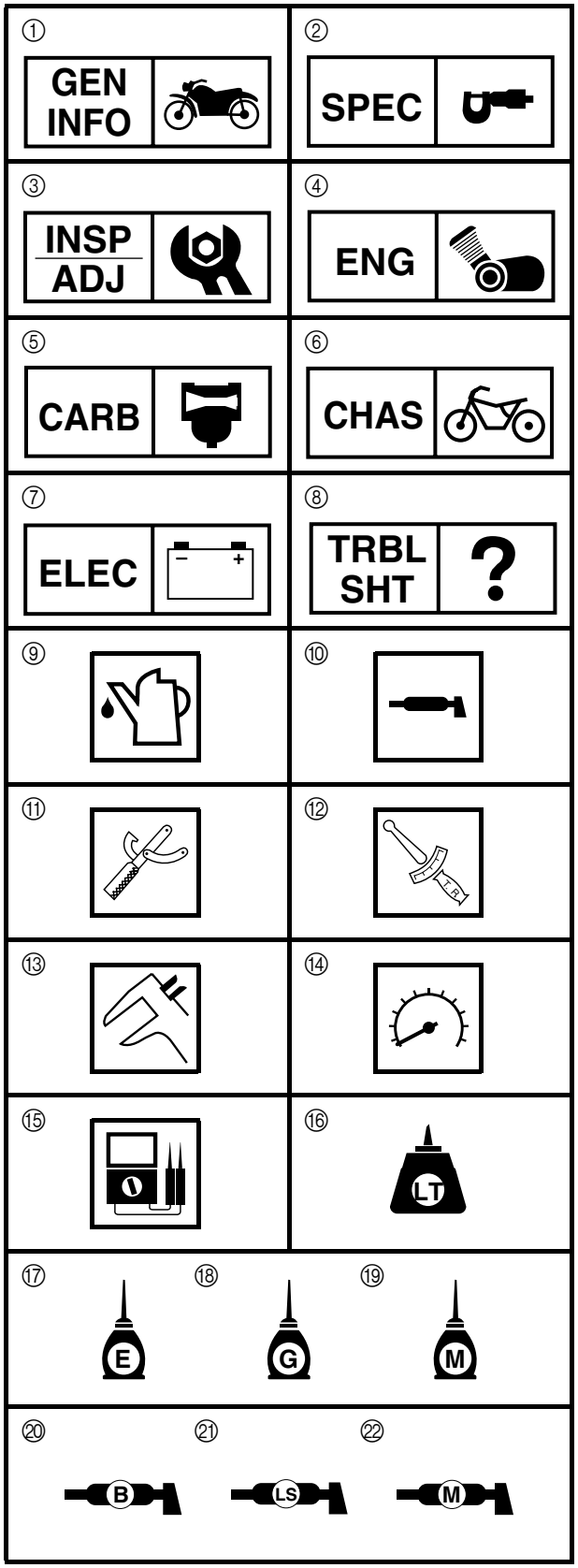
1st title 1: This is the title of the chapter with its symbol on the upper right corner of each page.
2nd title 2: This title indicates the section of each chapter and it is located in the upper left corner of the first page of each section.
3rd title 3: This title indicates a sub-section that is followed by step-by-step procedures accompanied by illustrations.

EXPLODED DIAGRAMS

To help identify parts and clarify procedure steps, there are exploded diagrams at the beginning of each removal and disassembly section.

1. Each section is characterised by an exploded drawing (4) that can be easily understood and that facilitates assembly and disassembly operations.
2. The numeric references (5) in the exploded drawings show the order of the operations to be carried out. A number inside a circle shows a disassembly phase.
3. The symbols (6) supply precise information easy to be understood about the operations to be carried out with the relevant notes.
4. The exploded drawing is provided with an instruction box (7) that contains the description of the sequence of operations to be carried out, the name of the components, the notes, etc.
5. For operations that require further information, a supplement (8) with the description of step-by-step operations is supplied with the exploded drawings and the instruction box.





EXPLANATORY SYMBOLS

The explanatory symbols from (1) to (8), shown in the side figure show the numbers and the content of the different chapters.

(1) General information
(2) Specifications
(3) Periodic inspections and adjustments
(4) Engine
(5) Carburetor
(6) Chassis
(7) Electrical
(8) Troubleshooting

The explanatory symbols from (9) to (15) show some specifications that can be found in the text

(9) Fill up
(10) Lubricant
(11) Special tool
(12) Tighten with torque wrench
(13) Wear limit, clearance
(14) Engine speed
(15) Multimeter Ω, V, A

The explanatory symbols from (16) to (22), inserted in the exploded drawings show the type of sealant and/or lubricant and the application points

(16) Apply sealant LOCTITE
(17) Apply engine oil
(18) Apply gear oil
(19) Apply molybdenum disulfide oil
(20) Apply bearing grease
(21) Apply lithium-soap base grease
(22) Apply molybdenum disulfide grease

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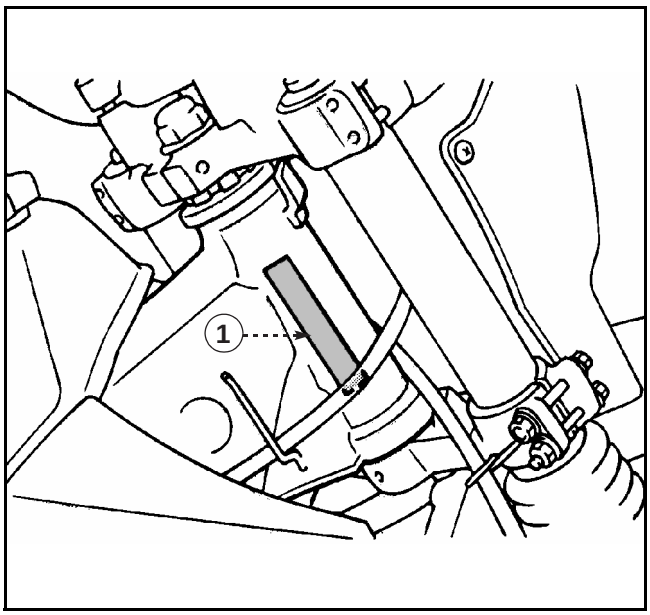
CHAPTER 1
GENERAL INFORMATION

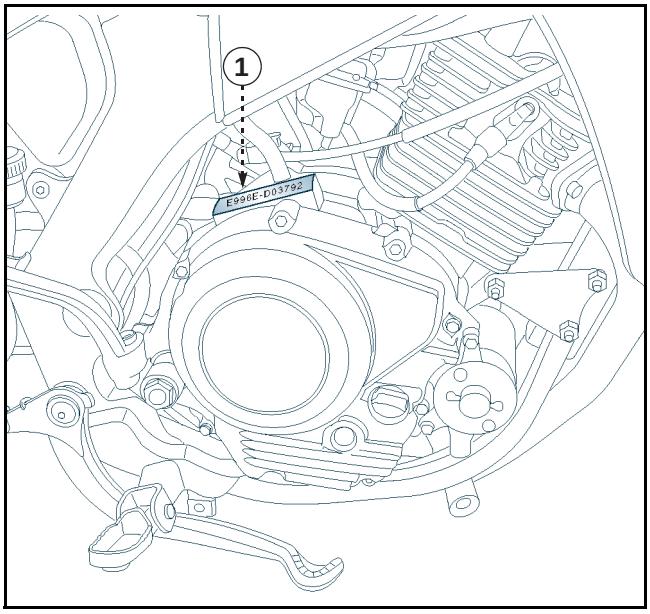


GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

VEHICLE SERIAL NUMBER

The vehicle serial number (1) is stamped on the right side of the steering sleeve tube.



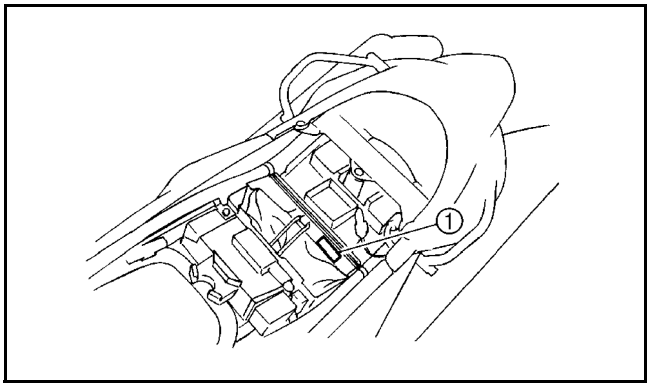
The engine serial number (1) is stamped on the left side of the crankcase.

NOTE:

The first five figures of the number identify the engine Code; the other figures show the number of production of the unit.

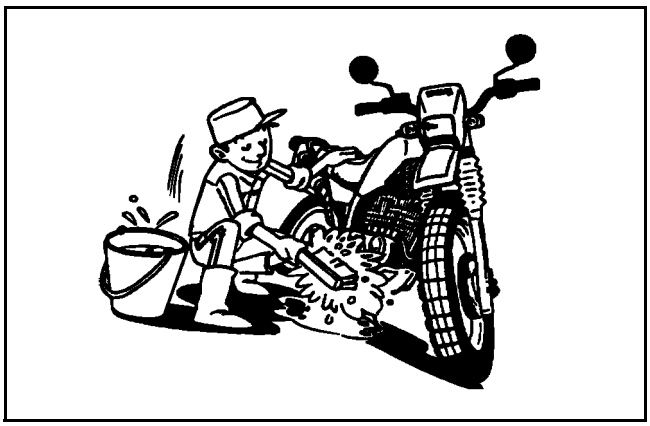
NOTE:

Designs and specifications are subject to change without notice.



MODEL LABEL

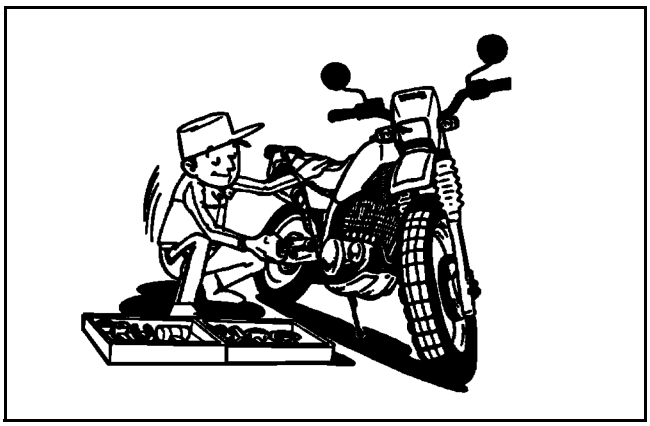
The model label (1) is applied to the rear mudguard. This information is necessary for ordering the spare parts.



IMPORTANT INFORMATION

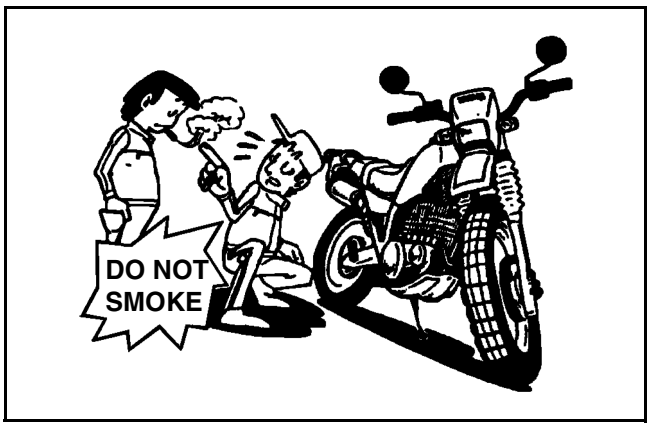
PREPARATION FOR REMOVAL AND DISASSEMBLY

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

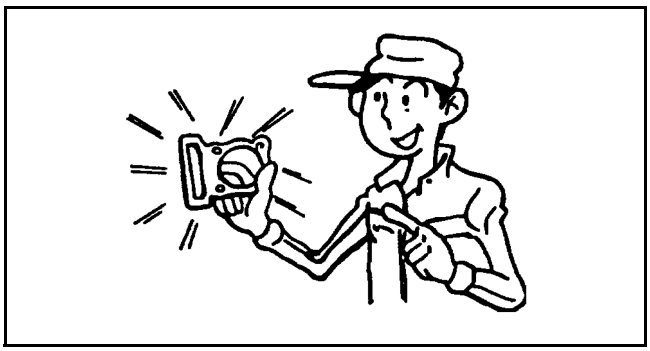


2. Use proper tools and cleaning equipment. See “SPECIAL TOOLS”.

3. When disassembling the motorcycle, keep mated parts together. This includes gears, cylinders, pistons and other mated parts that wear out with each other. Mated parts must be reused as an assembly or replaced.
4. During motorcycle disassembly, clean all parts and place them in trays the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled.



5. Keep all components away from fire.

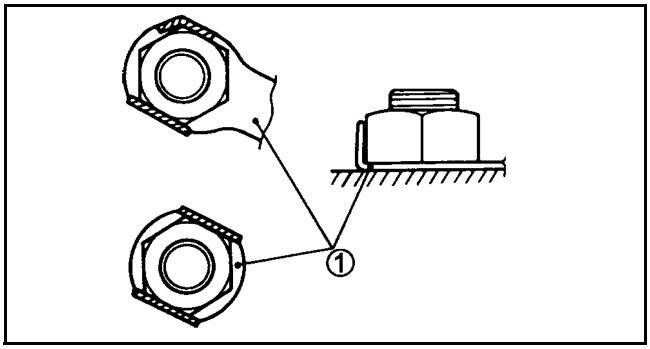


SPARE PARTS

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

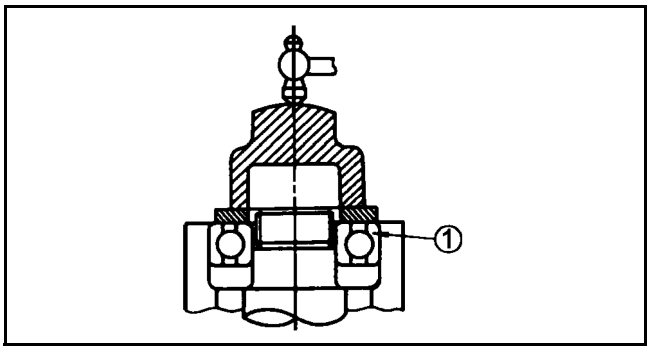
GASKETS, SEALS AND O-RINGS

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



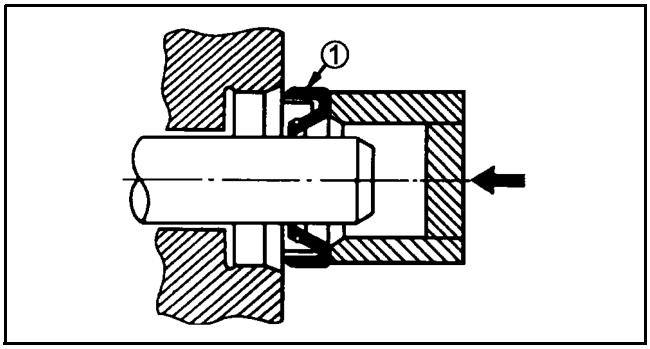
LOCK WASHERS, PLATES AND COTTER PINS

1. All lock washers, plates (1) and cotter pins must be replaced when they are removed. After proper tightening, lock tabs should be bent along the bolt or nut.



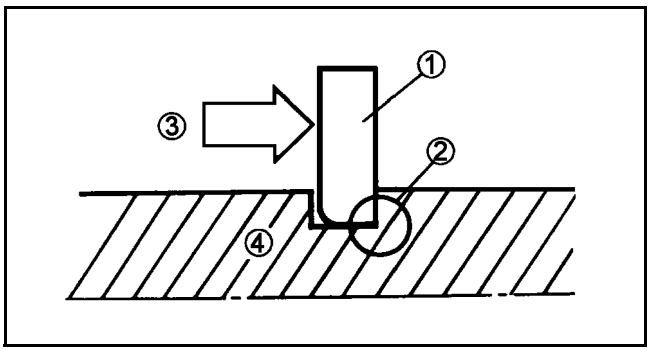
BEARINGS AND OIL SEALS

1. Install the bearings and oil seals with their manufacturer's marks or numbers facing outward. When installing oil seals, lubricate a light coating of lithium base grease to the seal lips. If necessary, lubricate the bearings.



CAUTION:

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

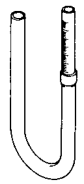
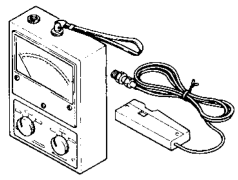
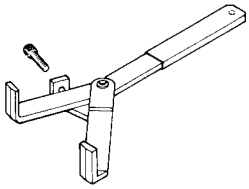
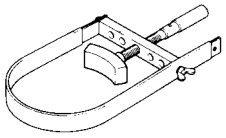
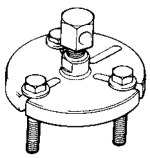
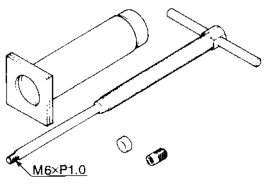
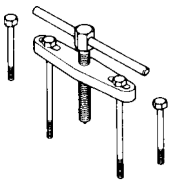


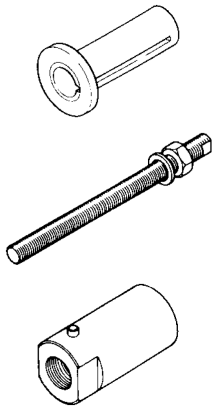
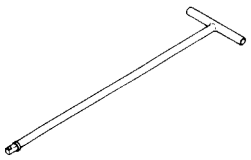
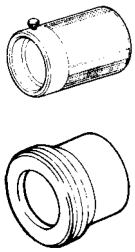
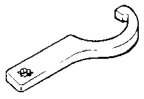
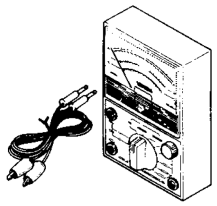
CIRCLIPS

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

SPECIAL TOOLS

The following special tools are necessary for complete and careful setting and assembly.
Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.
Refer to the following list to avoid errors when placing an order.

Tool no.	Tool/function name	Figure
90890-01312	Fuel level gauge This gauge is used to measure the fuel level in the float chamber.	
90890-03113	Engine speed counter This tool is used to measure the engine speed.	
90890-04086	Universal clutch holder This tool is used to hold the clutch when removing or installing the clutch boss locknut.	
90890-01701	Pulley holder This tool is used to hold the secondary pulley.	
90890-01362	Flywheel puller To remove the flywheel.	
90890-01304	Piston pin puller This tool is used to remove the piston pins.	
90890-01135	Crankcase separating tool This tool is necessary to remove the engine shaft or to separate the crankcase.	

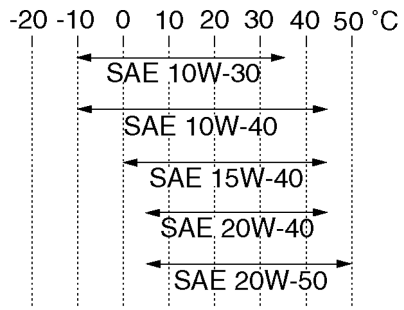
Tool no.	Tool/function name	Figure
90890-01274 (1) 90890-01275 (2) 90890-01278 (3)	Engine shaft adapter guide Adapter bolt Adapter (M12)	
90890-01326	"T" handle This tool is used to lock the fork holder during removal or installation.	
90890-01367 90890-01370	Counter-weight to install the fork gasket Coupling to install the fork gasket This tool is used when installing the fork gasket.	
90890-01403	Ring nut wrench This tool is used to loosen and to tighten the steering ring nut.	
90890-03112	Pocket tester This instrument is available for checking the electrical system.	

CHAPTER 2
SPECIFICATIONS

SPECIFICATIONS

MAIN SPECIFICATIONS

Element	Standard	Limit
Model code	3D61 (XT125R) 3D62 (XT125X)	---- ----
Dimensions		
Overall length	2110 mm (XT125R) 2040 mm (XT125X)	---- ----
Overall width	860 mm	----
Overall height	1130 mm (XT125R) 1090 mm (XT125X)	---- ----
Seat height	860 mm (XT125R) 830 mm (XT125X)	---- ----
Wheelbase	1340 mm	----
Minimum ground clearance	300 mm (XT125R) 271 mm (XT125X)	---- ----
Minimum turning radius	2100 mm (XT125R) 2016 mm (XT125X)	---- ----
Vehicle weight		
With oil and full fuel tank	120 kg	----
Engine		
Engine type	4-stroke, air-cooled engine SOHC	----
CCs	123.7 cm^3	----
Cylinder arrangement	Forward-inclined single cylinder	----
Bore and stroke	54 $\times$ 54 mm	----
Compression ratio	10 : 1	----
Engine idling speed	1650 ~ 1850 rpm	----
Standard compression pressure	1200 kPa (12 kg/cm^2, 171 psi)	----
Maximum power	7.3 kW / 8500 rpm	----
Maximum torque	9.5 N·m / 5500 rpm	----
Fuel		
Recommended fuel	Regular unleaded fuel	----
Fuel tank capacity	10.0 L	----
Fuel reserve amount	2.0 L	----

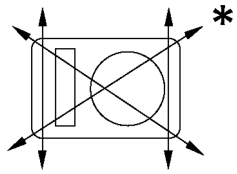
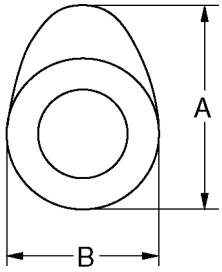
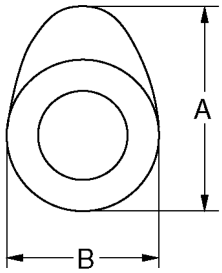
Element	Standard	Limit
Engine oil		
Lubrication system	Wet-type crankcase	----
Recommended oil	Oil SAE 10W30/ SH or equivalent	----
		
Quantity		
Total amount	1.20 L	----
Periodic oil replacement	1.00 L	----
Starting system type	Electric and kick starting	----
Carburetor		
Type	VM2059	----
Manufacturer	MIKUNI	----
Spark plug		
Type	CR7HSA	----
Manufacturer	NGK	----
Electrode distance	0.7 mm	----
Clutch type	Wet-type, multiple-disc	----
Transmission		
Transmission type	Constant mesh, with 5 gears	----
Primary reduction system	Helical gear	----
Primary reduction ratio	68/20 (3.400)	----
Secondary reduction system	Chain drive	----
Secondary reduction ratio	50/14(3.5715) XT125R	----
	48/14(3.4286) XT125X	----
Gearbox control	Left foot operation	----
Transmission ratios		
1st gear	37/14 (2.642)	----
2nd gear	32/18 (1.777)	----
3rd gear	25/19 (1.315)	----
4th gear	23/22 (1.045)	----
5th gear	21/24 (0.875)	----
Frame		
Chassis type	Double half-cradle	----
Caster angle	28° (XT125R)	----
	26.7° (XT125X)	----
Trail	114.4 mm (XT125R)	----
	78.33 mm (XT125X)	----

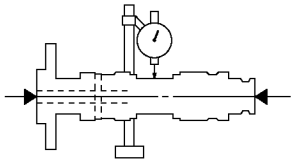
Element	Standard	Limit
Tire		
Type	With inner tube	----
Dimensions		
Front	90/90 - 21 54S (XT125R)	----
	100/80 - 17 52S (XT125X)	----
Rear	120/80 - 18 62S (XT125R)	----
	130/70 - 17 62S (XT125X)	----
Minimum tire tread depth	0.8 mm	----
Pressione pneumatico (a freddo)		
0 ~ 90 kg		
Front	180 kPa (1.8 kgf/cm^2, 26.1 psi)	----
Rear	190 kPa (1.9 kgf/cm^2, 27.6 psi)	----
90 ~ Loading condition		
Front	200 kPa (2.0 kgf/cm^2, 29.0 psi)	----
Rear	210 kPa (2.1 kgf/cm^2, 30.5 psi)	----

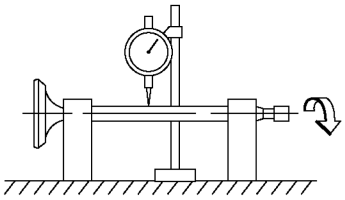
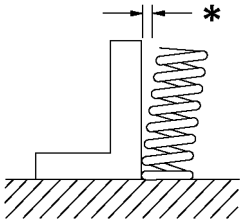
* Load is total weight of cargo, rider, passenger and accessories.

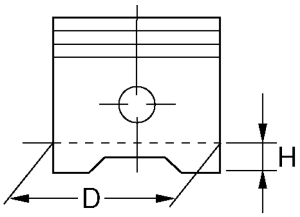
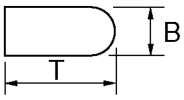
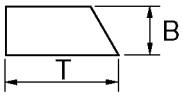
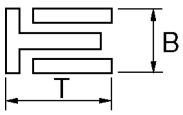
MAINTENANCE INFORMATION

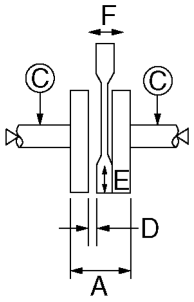
ENGINE SPECIFICATIONS

Element	Standard	Limit
Head		
Volume	54.10 ~ 54.020 cm^3	----
Warp limit *	----	0.03 mm
		
Camshaft		
Transmission system	Chain drive (left side)	----
Dimensions of the intake camshaft lobes		
		
Measurement (A)	25.881 ~ 25.981 mm	25.851 mm
Measurement (B)	21.195 ~ 21.295 mm	21.165 mm
Dimensions of the exhaust camshaft lobes		
		
Measurement (A)	25.841 ~ 25.941 mm	25.811 mm
Measurement (B)	21.05 ~ 21.15 mm	21.02 mm
Valve phasing reference		
Intake - opened (BTDC)	29°	----
Intake - closed (ABDC)	59°	----
Exhaust - opened (BBDC)	61°	----
Exhaust - opened (ATDC)	29°	----
Overlap angle “A”	58°	----

Element	Standard	Limit
Maximum camshaft run out 	----	0.03 mm
Timing chain		
Mesh model/number	Bush chain/P 88x	----
Tension system	Automatic system	----
Rocker arm/rocker arm shaft		
Rocker arm inside diameter	10.000 ~ 10.015 mm	10.03 mm
Shaft outside diameter	9.981 ~ 9.991 mm	9.95 mm
Valves, valve seats, valve guides		
Valve clearance (cold)		
Intake	0.08 ~ 0.12 mm	----
Exhaust	0.10 ~ 0.14 mm	----
Valve dimensions  Valve head diameter; Face width; Seat width; Margin thickness		
Valve head diameter (A)		
Intake	25.9 ~ 26.1 mm	----
Exhaust	21.9 ~ 22.1 mm	----
Valve face width (B)		
Intake	1.1 ~ 3.0 mm	----
Exhaust	1.7 ~ 2.8 mm	----
Valve seat width (C)		
Intake	0.9 ~ 1.1 mm	1.6 mm
Exhaust	0.9 ~ 1.1 mm	1.6 mm
Valve margin thickness		
Intake	0.4 ~ 0.8 mm	----
Exhaust	0.8 ~ 1.2 mm	----
Valve stem diameter		
Intake	4.975 ~ 4.990 mm	4.950 mm
Exhaust	4.960 ~ 4.975 mm	4.935 mm
Valve guide inside diameter		
Intake	5.000 ~ 5.012 mm	5.042 mm
Exhaust	5.000 ~ 5.012 mm	5.042 mm

Element	Standard	Limit
Valve stem – valve guide clearance		
Intake	0.010 ~ 0.037 mm	0.08 mm
Exhaust	0.025 ~ 0.052 mm	0.10 mm
Valve stem run out	----	0.010 mm
		
Valve seat width		
Intake	0.9 ~ 1.1 mm	1.6 mm
Exhaust	0.9 ~ 1.1 mm	1.6 mm
Valve springs		
Free length		
Intake	38.78 mm	37 mm
Exhaust	38.78 mm	37 mm
Set length (valve closed)		
Intake	25.6 mm	----
Exhaust	25.6 mm	----
Compression spring strength (installed)		
Intake	132 ~ 155 N	----
Exhaust	132 ~ 155 N	----
Spring inclination ∗		
		
Intake	----	2.5°/1.7 mm
Exhaust	----	2.5°/1.7 mm
Winding direction (top view)		
Intake	Clockwise direction	----
Exhaust	Clockwise direction	----
Cylinder		
Cylinder arrangement	Forward-inclined single cylinder	----
Bore and stroke	54.000 × 54.018 mm	----
Compression ratio	10 : 1	----

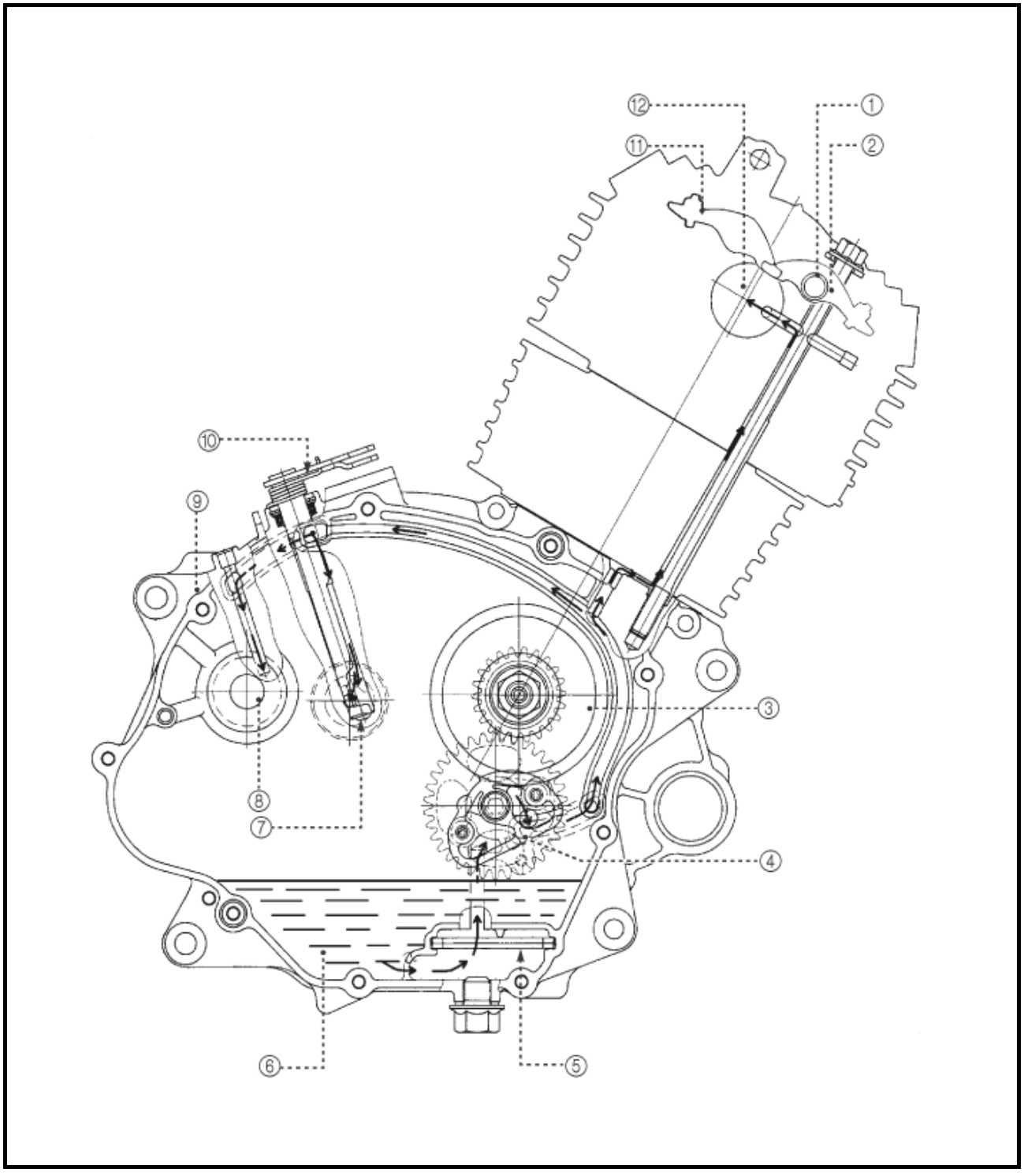
Element	Standard	Limit
Piston		
Piston-cylinder clearance	0.020 ~ 0.028 mm	0.15 mm
Diameter (D)	53.977 ~ 53.996 mm	----
		
Height (H)	4.5 mm	----
Piston pin bore (in the piston)		
Diameter	15.002 ~ 15.013 mm	----
Piston pin		
Outside diameter	14.991 ~ 15.000 mm	
Piston rings		
Upper ring		
		
Ring type	Barrel	----
Dimensions B × T	1.0 × 2.1 mm	----
End gap (installed ring)	0.15 ~ 0.30 mm	0.4 mm
Ring side clearance	0.03 ~ 0.07 mm	0.12 mm
Second ring		
		
Ring type	Taper	----
Dimensions B × T	1.0 × 2.1 mm	----
End gap (installed ring)	0.15 ~ 0.30 mm	0.4 mm
Ring side clearance	0.02 ~ 0.06 mm	0.12 mm
Scraper ring		
		
Dimensions B × T	2.0 × 2.2 mm	----
End gap (installed ring)	0.20 ~ 0.70 mm	----

Element	Standard	Limit
Crankshaft		
		
Width (A)	46.95 ~ 47.00 mm	----
Maximum run out (C)	----	0.03 mm
Side clearance (D) of the big end	0.15 ~ 0.45 mm	0.8 mm
Balancer		
Balancer drive method	Sprocket	----
Clutch		
Clutch type	Wet-type, multiple-disc	----
Clutch release method	Inner push, cam push	----
Push rod bending limit		0.5 mm
Control	Left hand operation	----
Clutch cable clearance (at the end of the clutch lever)	10.0 ~ 15.0 mm	----
Driving discs		
Thickness	2.92 ~ 3.08 mm	2.80 mm
Disc number	5	----
Clutch discs		
Thickness	1.05 ~ 1.35 mm	1.00 mm
Disc number	4	----
Clutch spring		
Free length	31 mm	29 mm
Spring number		----
Shifting mechanism		
Shifting mechanism type	Gearbox drum and guide bar	----
Air filter type	Wet element	----

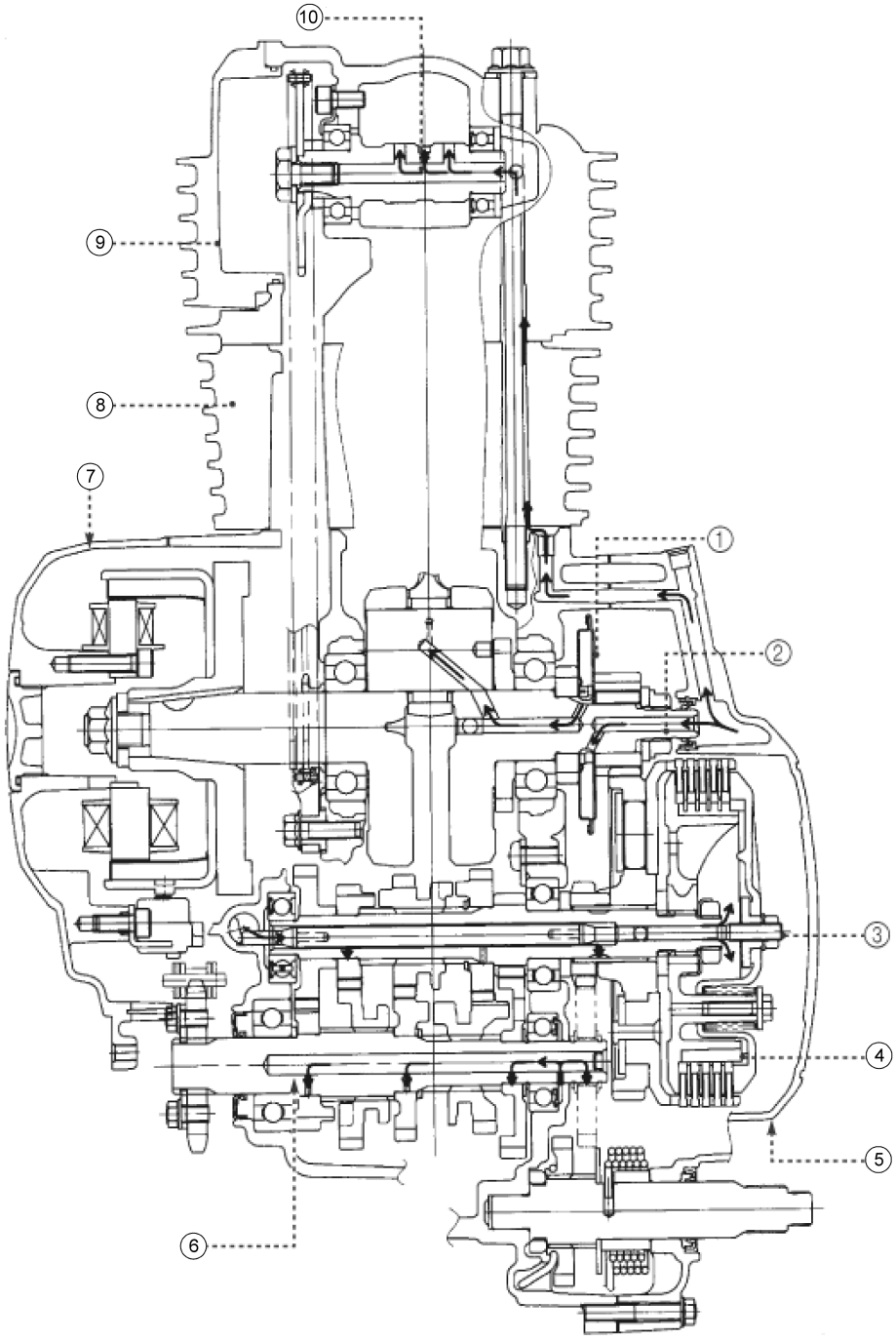
Element	Standard	Limit
Carburetor		
Mark I.D.	3D6	----
Main jet M.J.	#105	----
Main air jet M.A.J.	1.2	----
Jet needle J.N.	5EJ9-2	----
Needle jet N.J.	N-7M (913)	----
Pilot outlet P.O.	ø1.05	----
Pilot jet P.J.	#12.5	----
Pilot air screw P.S.	1	----
Bypass	1.6	----
Valve seat size V.S.	1.8	----
Starter jet G.S.	22.5	----
Fuel level (with special tool) F.L.	7.5 mm	----
Power jet	#60	----
Float height	18.9 mm	----
Engine idling speed	1650 ~ 1850 rpm	----
Lubrication system		
Oil pump type	Trochoid type	----
End gap “A”	0.15 mm	0.2 mm
Side clearance	0.06 mm ~ 0.10 mm	0.15 mm
Housing and rotor clearance	0.06 mm ~ 0.10 mm	0.15 mm

LUBRICATION DIAGRAMS

(1) Rocker arm shaft
(2) Rocker arm (exhaust)
(3) Centrifugal filter
(4) Oil pump
(5) Oil filter
(6) Engine oil
(7) Main axle
(8) Drive axle
(9) Crankcase (RH)
(10) Clutch operating lever
(11) Rocker arm (intake)
(12) Camshaft



(1) Centrifugal filter
(2) Crankshaft
(3) Main axle
(4) Clutch
(5) Cover (RH)
(6) Drive axle
(7) Cover (LH)
(8) Cylinder
(9) Head
(10) Camshaft



SPECIFICATIONS OF CYCLING COMPONENTS

Element	Standard	Limit
Frame		
Chassis type	Double half-cradle	----
Caster angle	28° (XT125R)	----
	26.7° (XT125X)	----
Trail	114.4 mm (XT125R)	----
	78.33 mm (XT125X)	----
Front wheel		
Wheel type	Spoke wheel	----
Rim		
Dimensions	21 × 1.85 (XT125R)	----
	17 × 2.50 (XT125X)	----
Material	Aluminium	----
Wheel travel	170 mm	----
Rim runout limit		
Maximum rim radial runout limit	----	1.0 mm
Maximum rim side runout limit	----	0.5 mm
Rear wheel		
Wheel type	Spoke wheel	----
Rim		
Dimensions	18 × 2.50 (XT125R)	----
	17 × 3.00 (XT125X)	----
Material	Aluminium	----
Wheel travel	170 mm	----
Rim runout limit		
Maximum rim radial runout limit	----	1.0 mm
Maximum rim side runout limit	----	0.5 mm
Front tire		
Tire type	With inner tube	----
Dimensions	90/90-21 54S (XT125R)	----
	100/80-17 52S (XT125X)	----
Tire pressure		
0 ~ 90 kg	180 kPa (1.8 kgf/cm^2; 26.1 psi)	----
90 ~ 178 kg	200 kPa (2.0 kgf/cm^2; 29.0 psi)	----

Element	Standard	Limit
Rear tire		
Tire type	With inner tube	----
Dimensions	120/80-18 62S (XT125R)	----
	130/70-17 62S (XT125X)	----
Tire pressure		----
0 ~ 90 kg	190 kPa (1.9 kgf/cm^2; 27.6 psi)	----
90 ~ 178 kg	210 kPa (2.1 kgf/cm^2; 30.5 psi)	
Front brakes		
Brake type	Single disc brake	----
Control	Right hand operation	----
Recommended liquid	DOT 4	----
Brake discs		
Diameter × thickness	245 × 3.5 mm (XT125R)	----
	260 × 3.5 mm (XT125X)	----
Pad inside thickness	3.0 mm	0.8 mm
Pad outside thickness	3.0 mm	0.8 mm
Pump inside diameter	11.0 mm	----
Caliper cylinder inside diameter	32.0 mm (XT125R)	----
	25.0 mm (XT125X)	----
Lever free play	2 ~ 5 mm	----
Rear brakes		
Brake type	Single disc brake	----
Control	Right foot operation	----
Recommended liquid	DOT 4	----
Brake discs		
Diameter × thickness	218 × 3.5 mm	----
Brake pad lining thickness (inside)	4.0 mm	1.0 mm
Brake pad lining thickness (outside)	4.0 mm	1.0 mm
Pump inside diameter	12.7 mm	----
Caliper cylinder inside diameter	32.0 mm	----
Lever free play	15 mm	----
Steering		
Steering bearing type	Taper roller	----
Lock-to-lock angle (LH)	45.0°	----
Lock-to-lock angle (RH)	45.0°	----

Element	Standard	Limit
Front suspension		
Suspension type	Telescopic fork	----
Front fork type	Coil spring/oil damper	----
Front fork travel	250.0 mm	----
Spring		
Free length	575 mm	----
Spring rate (K1)	4.8 N/mm	----
Fork oil		
Recommended oil	10 W fork oil or equivalent	----
Amount (on each fork)	285 cc	----
Level (from the inner tube top, with completely compressed tube and without fork spring)	180 mm	----
Inner tube outside diameter	ø36	----
Rear suspension		
Suspension type	Swingarm (monocross)	----
Rear sock absorber unit travel	45.0 mm	----
Spring		
Free length	163.0 mm	----
Installed length	158.0 mm	----
Spring rate (K1)	177 N/mm (17.7 kg/mm; 1010.67 lb/in)	----
Spring travel	55.0 mm	----
Available optional spring	No	----
Transmission chain		
Type/manufacturer	428H G&G/DID	----
Number of links	128 (XT125R) 126 (XT125X)	----
Drive chain slack	25.0 ~ 40.0 mm	----

ELECTRICAL SYSTEM SPECIFICATIONS

Element	Standard	Limit
Electrical system voltage	12 V	----
Ignition system		
System type	CDI	----
Ignition timing	0.0° BTDC at 1400 rpm	----
Advancer type	Electrical	----
Pickup coil resistance	240±20% at 20°C (68°F)	----
Cable colour	(Blue/yellow–green)	
Model of ignition system with transistor coil/manufacturer	3D6-MORIYAMA	----
Ignition coil		
Model/manufacturer	5HH	----
Spark minimum length	7.0 mm	----
Primary coil resistance	0.27 ~ 0.33 Ω at 20°C (68°F)	----
Secondary coil resistance	2.84 ~ 3.48 kΩ at 20°C (68°F)	----
Spark plug cap		
Material	Rubber	----
Resistor	4.0 ~ 6.0 kΩ at 20°C (68°F)	----
Charging system		
System type	Magneto AC	----
Model/manufacturer	3D6 MORIYAMA	----
Rated power	14.0 V/20.8 A at 5000 rpm	----
Stator coil resistance	0.51 ~ 0.77 Ω at 20°C (68°F)	----
Rectifier/ regulator		
Regulator type	Semi conductor - short circuit type	----
No load regulated voltage	13.0 ~ 14.0 V	----
Rectifier capacity	8.0 A	----
Withstand voltage	400.0 V	----
Battery		
Battery type/manufacturer	GT6B-3/GS	----
Battery voltage/capacity	12 V/6.5 AH	----
Headlight type	Halogen bulb	----
Light (voltage/wattage × quantity)		
Neutral indicator light	LED × 1	----
High beam indicator light	LED × 1	----
Fuel level indicator light	LED × 1	----
Flasher light	LED × 1	----
Parking lights	LED × 1	----

Element	Standard	Limit
Bulbs (voltage/wattage × quantity)		
Headlight	12 V 35/35 W × 1	----
Service light	12 V 5 W × 1	----
Rear position/stop light	12 V 5/21 W × 1	----
Front flasher light	12 V 10 W × 2	----
Rear flasher light	12 V 10 W × 2	----
Meter lighting	LED	----
Electric ignition system		
Starter		
Model/manufacturer	3MB/Moric	----
Delivered power	0.2 kW	----
Induced winding resistance	0.0315 ~ 0.0385 Ω at 20°C (68°F)	----
Brushes		
Overall length	12.5 mm	3.5 mm
Spring force	3.92 ~ 5.88 N	----
Commutator diameter	17.6 mm	16.6 mm
Mica undercut	1.35 mm	----
Starter relay		
Model/manufacturer	NAIS	----
Amperage	70 A	----
Coil resistance	90 ~ 100 Ω	----
Horn		
Warning horn type	Plate	----
Model/manufacturer × amount	K70H/LEB × 1	----
Maximum amperage	3.0 A	----
Performance	105 ~ 118 db (A)	----
Turn signal/emergency flasher relay		
Relay type	Full transistor type	----
Model/manufacturer	Cablologica/CBL	----
Integrated automatic stopping device	No	----
Flashing frequency	80 ~ 160 cycles/minute	----
Output	10 W × 2 +2.0 W	----
Fuses (amperage × amount)		
Main fuse	10 A × 1	----

CONVERSION TABLE

All specifications in this Manual keep to the International System (IS) and to the METRIC SYSTEM UNITS.
Use the following table to convert values expressed in the METRIC SYSTEM UNITS into values expressed in IMPERIAL UNITS.

Example

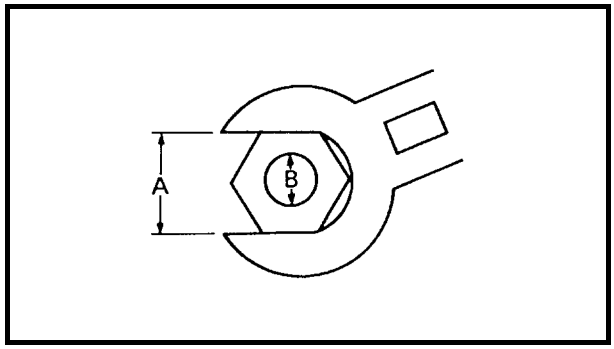
METRIC SYSTEM		OVERDRIVE		IMPERIAL
** mm	×	0.03937	=	** in
2 mm	×	0.03937	=	0.08 in

CONVERSION TABLE

FROM METRIC SYSTEM TO IMPERIAL SYSTEM			
	Metric system units	Overdrive	Imperial unit
Tightening torque	m · kg m · kg cm · kg cm · kg	7.233 86.794 0.0723 0.8679	ft · lb in · lb ft · lb in · lb
Counter-weight	kg g	2.205 0.03527	lb oz
Speed	km/h	0.6214	mph
Distance	km m m cm mm	0.6214 3.281 1.094 0.3937 0.03937	mi ft yd in in
Volume/ Capacity	cc (cm^3) cc (cm^3) l (litres) l (litres)	0.03527 0.06102 0.8799 0.2199	oz (IMP liq.) cu · in qt (IMP liq.) gal (IMP liq.)
Other	kg/mm kg/cm^2 Celsius degrees (°C)	55.997 14.2234 9/5+32	lb/in psi (lb/in^2) Fahrenheit degrees (°F)

MAIN SPECIFICATIONS OF THE TIGHTENING TORQUES

The table shows the tightening torques of standard nuts and bolts with standard ISO thread pitch. The tightening torques of components and special units are to be found in the special chapters of this Manual. In order to avoid deformation, tighten the nut or bolt units in gradual or crisscross way, until you reach the specified tightening torque. If not otherwise specified, the recommended tightening torques are for clean and dry threads. The components must be at ambient temperature.



A: Wrench opening
B: Thread outside diameter

A (nut)	B (bolt)	General tightening torques		
		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

TIGHTENING TORQUES

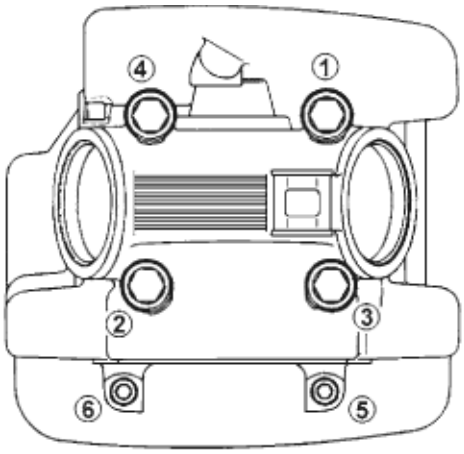
ENGINE TIGHTENING TORQUES

Element to be tightened	Name	Thread	Quantity	Tightening torque		Remarks
				m · kg	Nm	
Head	Bolt	M8	4	2.2	22	Oil inspection
	Bolt	M6	2	1.0	10	
Spark plug	—	M10	1	1.25	12.5	
Head side cover	Bolt	M6	2	1.0	10	
Valve cover	—	M45	2	1.75	17.5	
CDI magneto	Bolt	M12	1	7.0	70	
Stopper guide (timing chain)	Bolt	M6	1	1.0	10	
Adjusting screw	Nut	M5	2	0.75	7.5	
Sprocket (cam chain)	Bolt	M8	1	2.0	20	
Plate	Bolt	M6	1	1.0	10	
Cap	Spark plug	M8	1	0.75	7.5	
Drive chain tightener	Bolt	M6	2	1.0	10	
Oil pump unit	Bolt	M6	2	0.7	7	
Exhaust cap	Bolt	M12	1	2.0	20	
Intake manifold	Bolt	M6	2	1.0	10	
Carburetor joint (manifold side)	Bolt	M4	1	0.2	2	
Carburetor joint (air filter side)	Bolt	M4	1	0.2	2	
Air filter box	Bolt	M6	3	0.7	7	
Exhaust pipe (head)	Bolt	M6	2	0.8	8	
Exhaust pipe (frame)	Bolt	M6	2	0.8	8	
Box 1-2	Bolt	M6	2	1.0	10	
	Bolt	M6	6	1.0	10	
	Bolt	M6	2	1.0	10	
Crankcase cover 1	Bolt	M6	5	1.0	10	
	Bolt	M6	2	1.0	10	
	Bolt	M6	6	0.7	7	
Crankcase cover 2	Bolt	M6	7	1.0	10	
	Bolt	M6	2	1.0	10	
Clutch plate, wire fixing	Bolt	M6	1	0.7	7	
Timing check plug	Bolt	M14	1	0.7	7	
Plug access	Bolt	M32	1	0.7	7	
Kick starting unit	Nut	M12	1	5.0	50	
Primary transmission driving gear	Nut	M12	1	7.0	70	
Disc pushing plate	Bolt	M8	4	0.6	6	
Clutch hub	Nut	M12	1	6.0	60	
Control rod	Nut	M6	1	0.8	8	Use a locking washer
Plate	Bolt	M6	2	1.0	10	
Drive sprocket	Bolt	M8	2	1.0	10	
Shift pedal	Bolt	M6	1	1.0	10	

Element to be tightened	Name	Thread	Quantity	Tightening torque		Remarks
				m · kg	Nm	
Cam	Bolt	M6	1	1.2	12	
Stopping lever	Bolt	M6	1	1.0	10	
Coil (Pick-up)	Bolt	M6	2	1.0	10	
Neutral position switch	—	M10	1	0.13	1.3	
Stator	Bolt	M6	3	1.0	10	

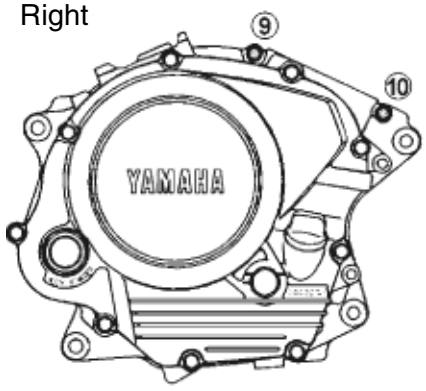
Tightening sequence

Head

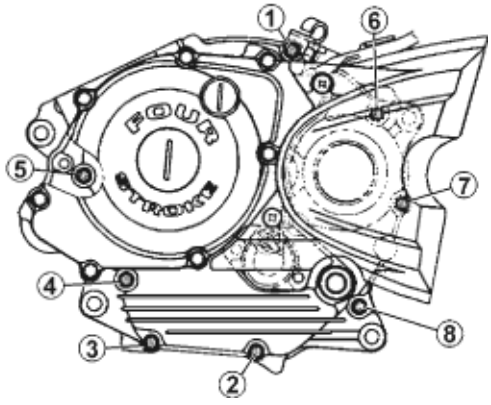


Crankcase

Right



Left



TIGHTENING TORQUES OF CYCLING COMPONENTS

Element to be tightened	Thread	Tightening torque		Remarks
		m · kg	Nm	
Front wheel axle	M14	4.5	45	
Front wheel axle tightening bolt	M8	2.0	20	
Front brake caliper	M8	3.0	30	
(Front) Engine mount	M8	2.3	23	
(Rear) Engine and frame mount	M8	2.3	23	
Swingarm pivot nut	M14	6.0	60	
(Front brake) master cylinder clamp	M6	0.6	6	
Rear wheel axle nut	M14	8.5	85	
Throttle twist grip	M6	0.3	3	
Rear Shock Absorber	M10	4.5	45	
Upper bracket	M8	2.0	20	
Handle bar clamps	M8	2.15	21.5	
Steering nut	M25	3.0	30	
Rear frame	M8	2.0	20	

LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE

Lubrication points	Symbol
Oil seal lips	LS
O-rings	LS
Bearings	E
Head tightening bolts	E
Cylinder tightening bolts	E
Crank pin	E
Internal surface of the twist grip	M
Big end thrust surface	E
Piston pin	E
Piston ring and groove	E
Balancer counter-weight tightening nut	E
Internal surface of magneto rotor tightening nut AC	E
Valve stem/Valve guide (intake and exhaust)	M
Valve stem ends (intake and exhaust)	M
Rocker arm shaft	E
Cam shaft lobes	M
(Outside and inside) Oil pump rotors	E
Oil pump shaft	E
Kick starter axle surface	E
Drive gear surface	E
Kick starter axle gear	E
Kick starter idle gear	E
Tightening nut of the primary transmission driving gear	M
Primary transmission driven gear	E
Clutch hub tightening nut	E
Control rod	M
Drive gear (wheel/front sprocket)	M
Main and driving axle	M
Gearbox forks	E
Gearbox boss	E
Gearbox shaft	E
Gearbox shaft spacer	E

Lubrication points	Symbol
Crankcase mating surface	Yamaha glue no. 1215
Flywheel cover AC	Yamaha glue no. 1215
Oil retainer support tightening bolt	Yamaha glue no. 1215

CYCLING COMPONENTS

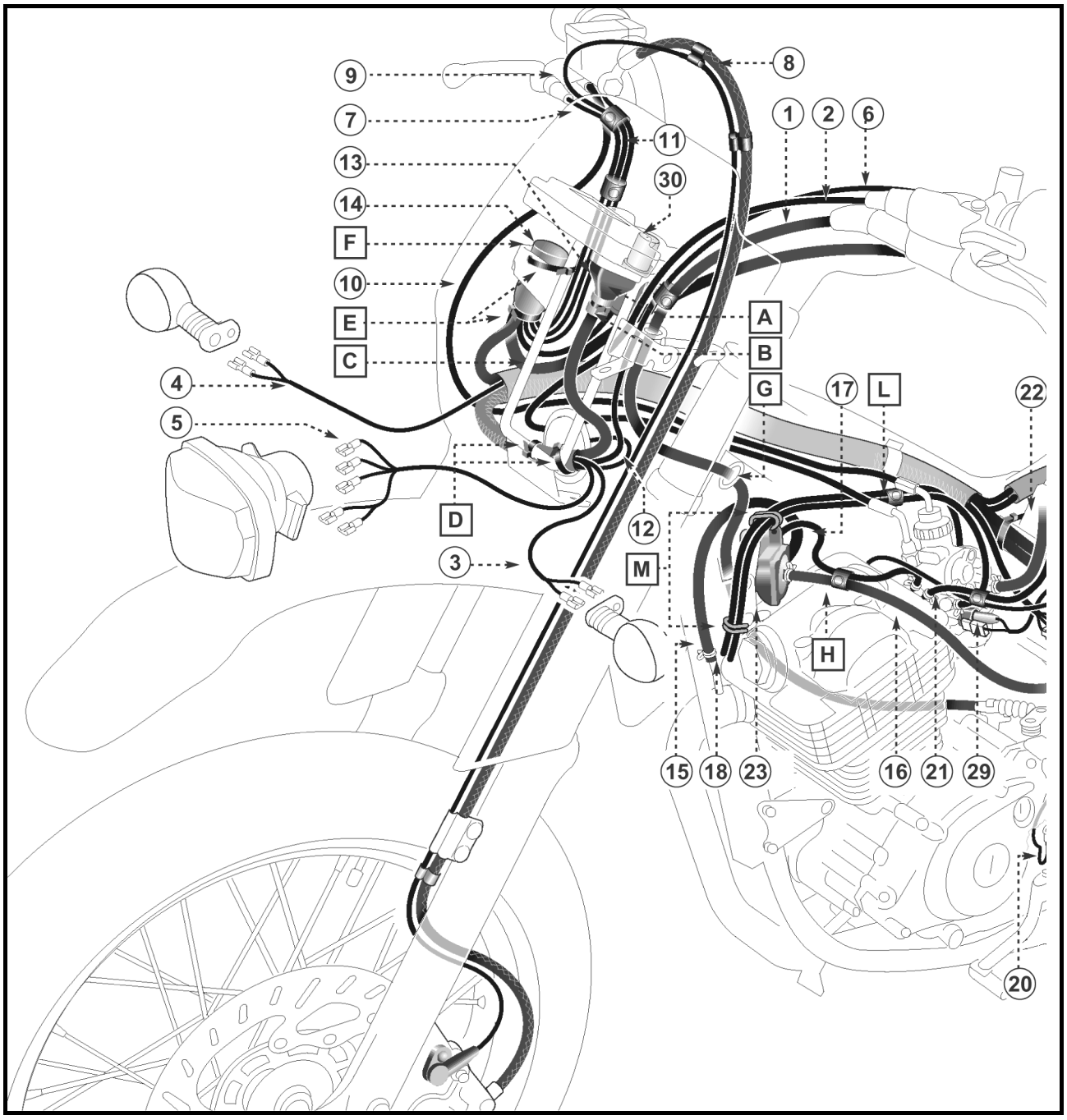
Lubrication points	Symbol
Rear wheel hub	LS
Swingarm pivot and seals	LS
Surface of dust seal cover thrust bearing	LS
Pivot of brake pedal	LS
(Upper and lower) Steering sleeve tube bearings	LS
Tracks of (upper and lower) steering sleeve tube bearings	LS
Inside surface of tube guide (twist grip)	LS
Clutch lever pivot bolt	LS
Side stand pivot	LS
Footrest pivot point	LS
Footrest spring end	LS
Outside surface of rear axle shaft	LS
Pivot point of passenger's footrest	LS
Fuel cock connector (1)	B
C/km sensor transmission connector (1)	B
Dashboard connector (2)	B
Connector CDI magneto (2)	B

(1) *Up to the frame number 74007950 included (blue enduro)*
Up to the frame number 74009373 included (blue motard)
Up to the frame number 74007950 included (black enduro)
Up to the frame number 74009706 included (red motard)
Up to the frame number 74010046 included (English version)

(2) *From the frame number following 74007950 (blue enduro)*
From the frame number following 74009373 (blue motard)
From the frame number following 74007950 (black enduro)
From the frame number following 74009706 (red motard)
From the frame number following 74010046 (English version)

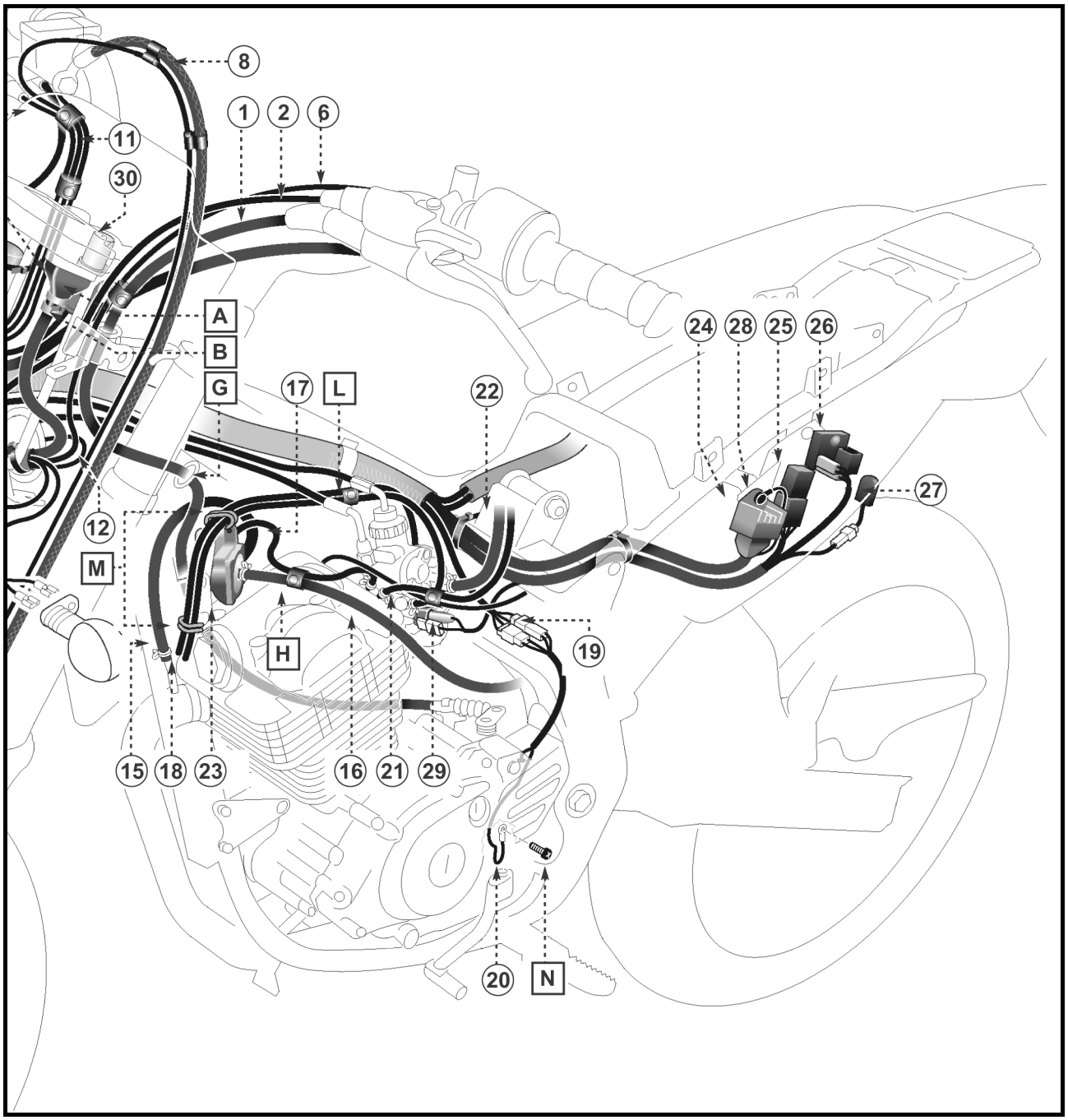
CABLE ROUTING

(1) Clutch cable
(2) Starter cable
(3) (Left) Front flasher lead
(4) (Right) Front flasher lead
(5) Front headlight lead
(6) Starting enabling cable
(7) Front brake light switch lead
(8) Front brake hose
(9) Front brake
(10) Throttle cable
(11) Starter relay lead
(12) Horn lead
(13) Main switch connector
(14) Starting switch terminal board connector
(15) Breather hose valve of air induction system
(16) Valve intake hose of air induction system
(17) Vacuum hose of air induction system
(18) Air breather hose
(19) Flywheel connector
(20) Neutral switch lead
(21) Fuel cock vacuum hose
(22) Fuel hose
(23) Air induction system valve
(24) Regulator
(25) Starter relay

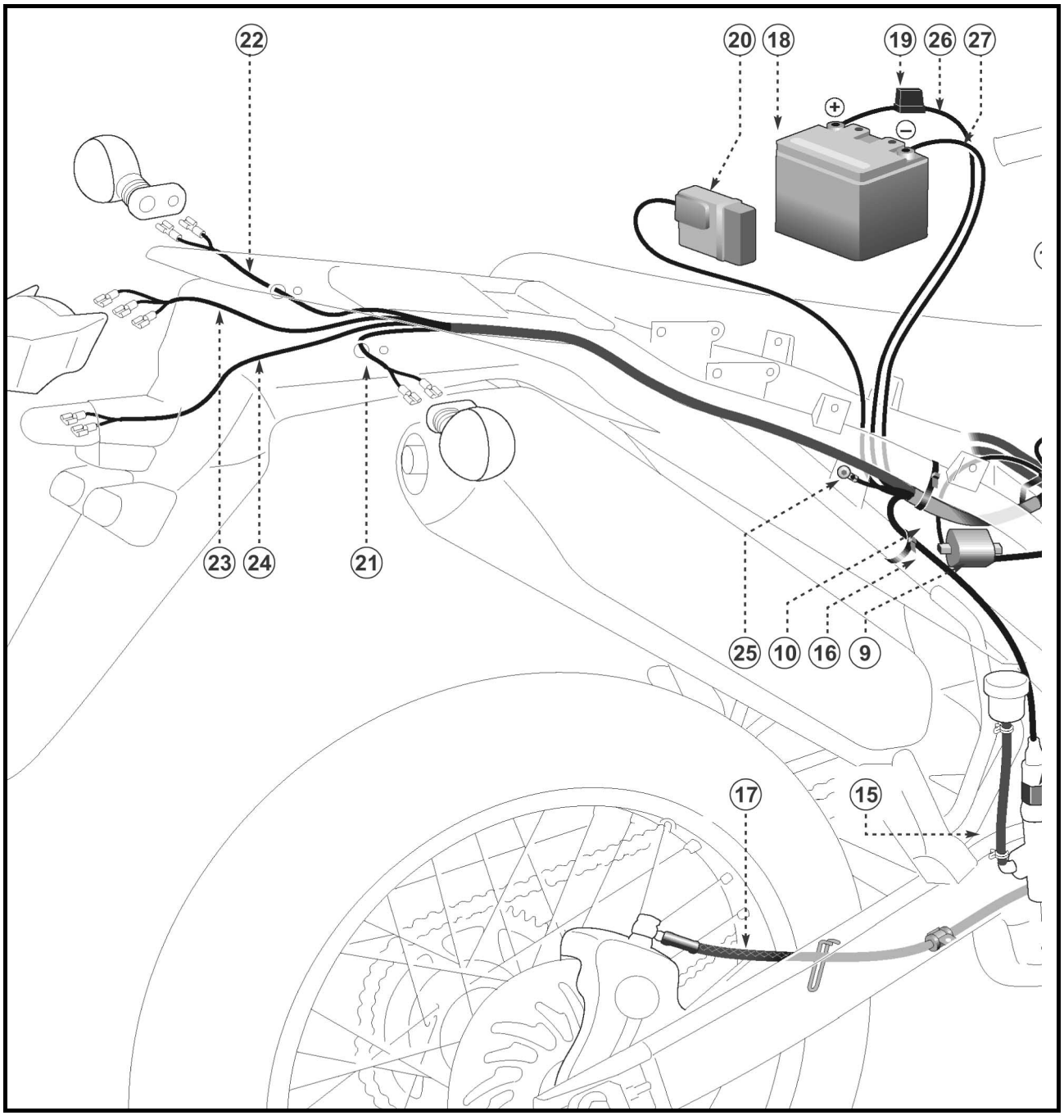


(26) Flasher relay
(27) Thermal sensor
(28) Regulator ground cable
(29) Carburetor heater
(30) Main switch

1. Insert device (A) after connecting connector (13) and close rubber clamp (B).
2. Pass the cables through frame (C) and lock it with clamps (D).
3. To remove connector (14), cut clamps (E) and remove rubber cover (F).
4. Insert clutch cable (1) into cable guide (G).
5. Insert cable (20) into the housing on the engine crankcase; lock the cable on neutral position switch with screw (N).
6. Connect hose (16) to hose (17) with clamp (H).
7. Tighten breather hose (18) with clamp (L) and cable guides (M).

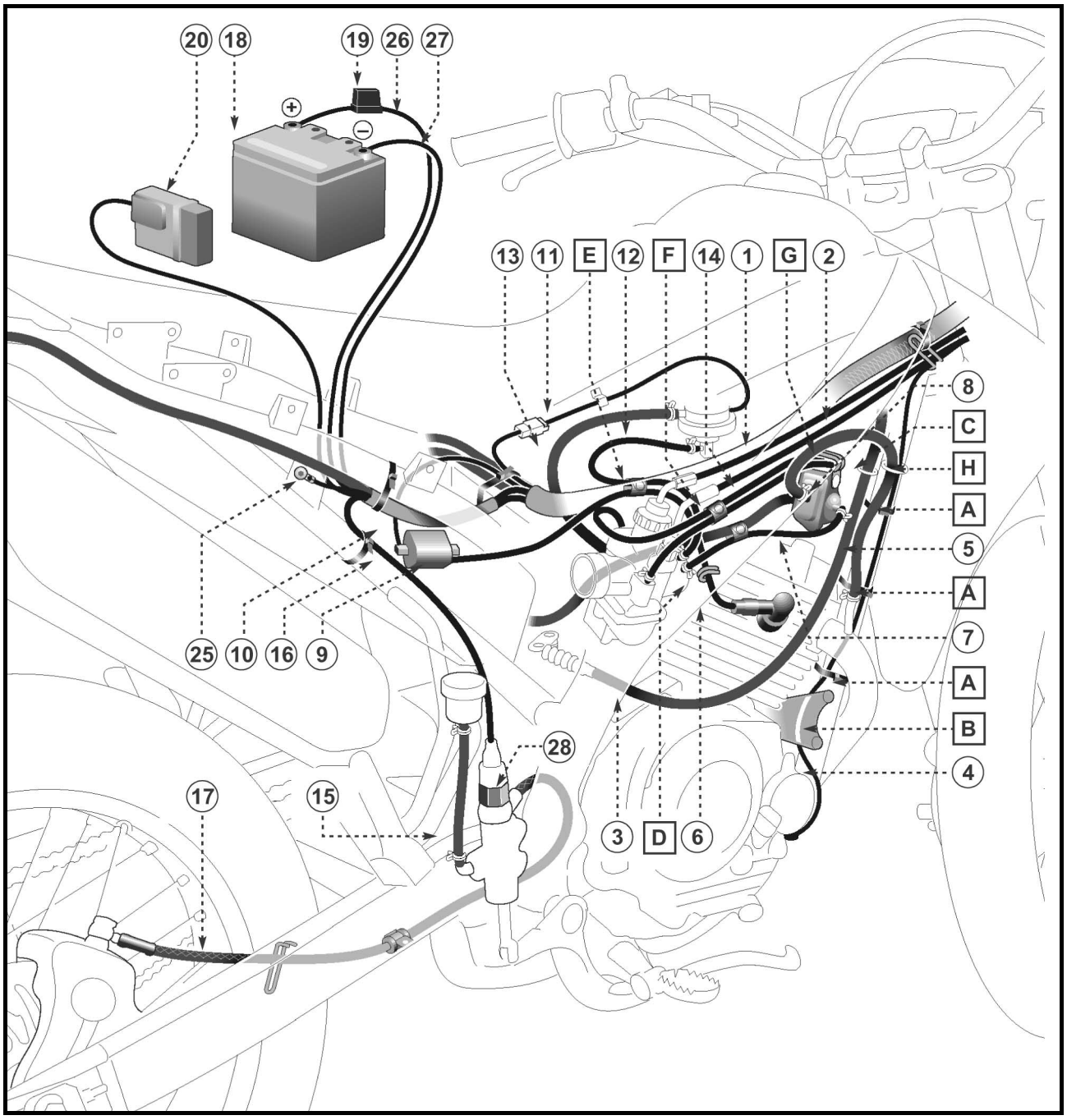


(1) Throttle cable
(2) Starter cable
(3) Clutch cable
(4) Lead (+) of the starter
(5) Breather hose valve of air induction system
(6) Spark plug lead
(7) Vacuum hose of air induction system
(8) Air induction system valve
(9) Ignition coil
(10) Coil lead
(11) Fuel level lead
(12) Fuel cock vacuum hose
(13) Fuel hose
(14) Air breather hose
(15) Rear brake reservoir
(16) Rear brake light switch lead
(17) Rear brake hose
(18) Battery
(19) Main fuse 10A
(20) CDI unit
(21) (Right) Rear flasher lead
(22) (Left) Rear flasher lead
(23) Rear position/stop light
(24) Plate light lead
(25) Ground cable
(26) Cable battery (+)
(27) Cable battery (-)
(28) Rear brake light switch



1. Tighten cable (4) to the motorcycle frame with three clamps (A); pass it through plate (B) and cable guide (H).
2. Insert clutch cable (3) into cable guide (C).
3. Fasten spark plug lead (6) to cable guide (D) and connect to lead (12) with clamp (E).
4. Fasten breather lead (14) with clamp (F) and cable guide (G).

Insert hose (5) into cable guide (H).



CHAPTER 3
PERIODIC INSPECTIONS AND ADJUSTMENTS

PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

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

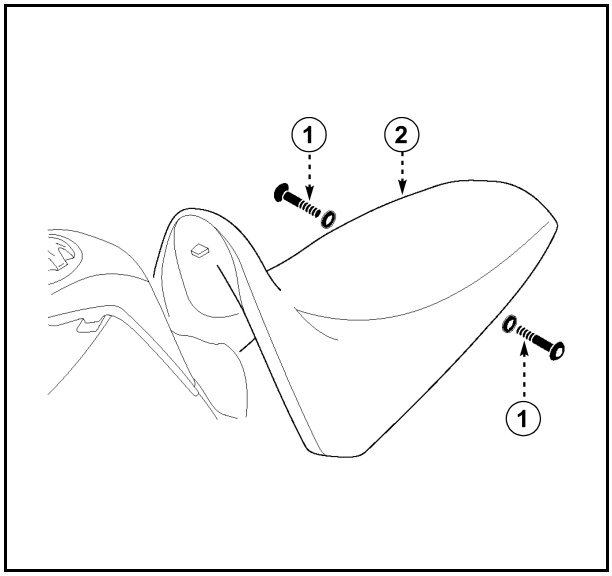
MAINTENANCE INTERVAL TABLE

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

Components	Check	1000 km	6000 km	Every 6000 km or every 12 months
Valves*	Check noise/Adjust if necessary	X	X	X
Spark plug	Check condition and clean, if required. If required, replace spark plug every 12000 km	X	X	X
Air filter element	Clean or replace, if required	X	X	X
Carburetor*	Adjust.	X	X	X
Battery	Check electrolyte level and ventilation hose path	X	X	X
Engine oil	Replace.	X	X	X
muffler	Check to see any damage. Tighten.		X	X
Brakes*	Check operation, adjust lever stroke. Check pad thickness	X	X	X
Rear Arm Pin*	Check arm tightening. Do not exaggerate greasing		X	X
Wheels and tyres	Check tyre pressure, spoke wear and tightening	X	X	X
Wheel Bearings*	Check tightening; check to see whether there is any damage		X	X
Steering System Bearings*	Check tightening. Grease every 12000 km or every 12 months**	X	X	X
Front Forks*	Check the operation. Oil leakage.	X	X	X
Rear Shock Absorber*	Check the operation. Oil leakage.	X	X	X
Transmission chain	Check tightening. Grease and adjust, if required.	Every 500 km		
Fastening/locking Parts	Check tightening.	X	X	X
Side Stand	Check serviceability and tightening	X	X	X
Control Cables: Gas Feeding/Clutch/ Front Brake	Adjust. Check the operation. Grease every 12000 km.	X	X	X
Lights and Indicators	Check the operation.	X	X	X
Bolts and Nuts	Check tightening.	X	X	X
Motorcycle Appearance	Check.	X	X	X

* Address to a Yamaha Dealer.
** Molybdenum disulphate grease
*** lithium soap grease

SEAT, TANK PANEL AND FUEL TANK



SEAT REMOVAL

⚠ WARNING

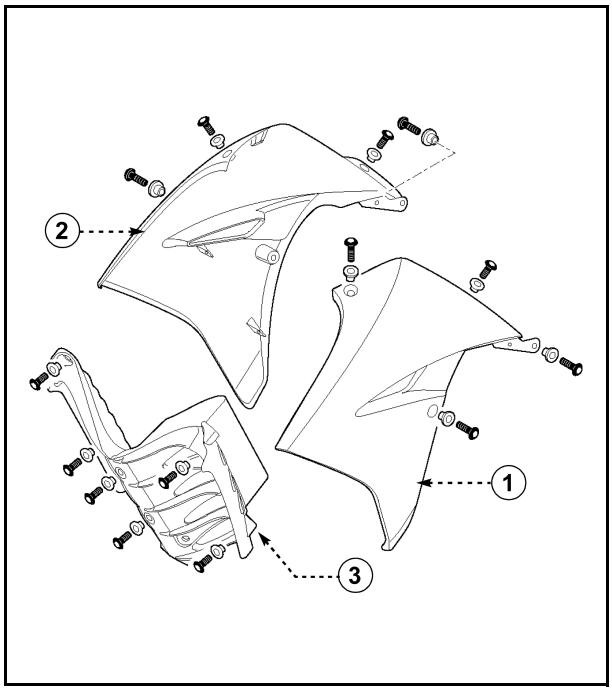
Securely support the motorcycle so there is no danger of it falling over.

1. Stand the motorcycle on a level surface.
2. Remove
   - Bolt (1)
   - Seat (2)

SEAT INSTALLATION

1. Install
   - Seat (2)
   - Bolt (1)

	Bolt (1) : **0.7 Kgf·m (7 N·m)**



TANK PANEL REMOVAL

⚠ WARNING

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

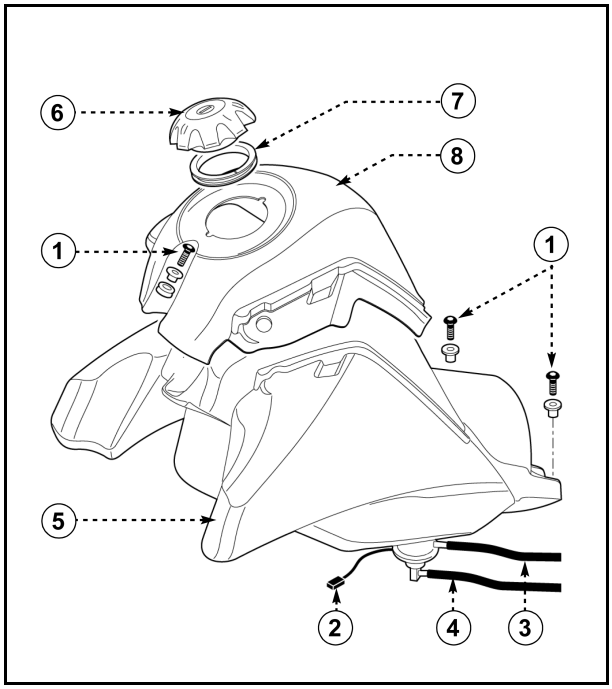
1. Stand the motorcycle on a level surface.
2. Remove
   - Seat
     See “SEAT REMOVAL” page 3-2
   - Left cover (1)
   - Right cover (2)
   - Radiator grid (3)

TANK PANEL INSTALLATION

1. Install
   - Radiator grid (3)
   - Left cover (1)
   - Right cover (2)

	Cover bolts: **0.25 Kgf·m (2.5 N·m) ± 25%**

   - Seat
     See “SEAT INSTALLATION” page 3-2



FUEL TANK REMOVAL

⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Remove
   - Seat
     See "SEAT REMOVAL" page 3-2
   - Side covers
     See "TANK PANEL REMOVAL" page 3-2
3. Unscrew
   - Tank bolts (1)
   - Fuel tank cap (6)
4. Disconnect
   - Fuel tap connector (2)
   - Fuel supply hose (3)
   - Fuel tap vacuum hose (4)

⚠ WARNING

The fuel is highly flammable. Avoid fuel discharge on the hot motor.

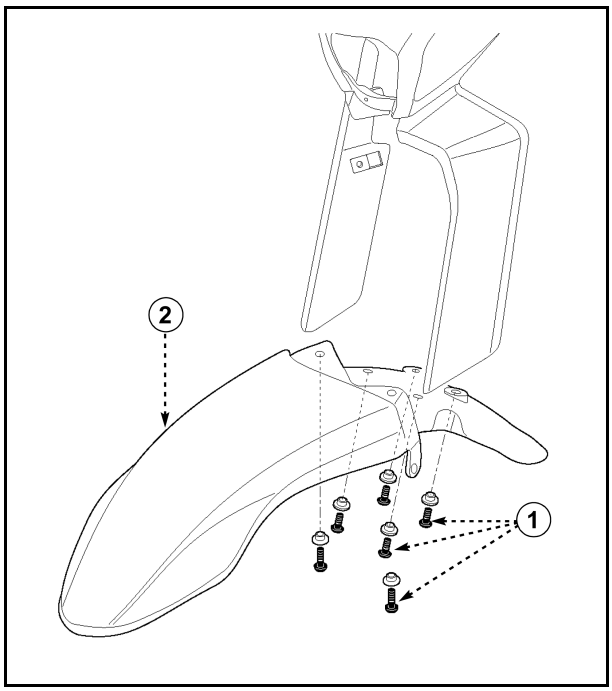
5. Remove
   - Gasket (7)
   - Tank cover (8)
   - Fuel tank (5)

FUEL TANK INSTALLATION

1. Install
   - Fuel tank (5)
   - Tank cover (8)
   - Gasket (7)
2. Connect
   - Fuel tap connector (2)
   - Fuel supply hose (3)
   - Fuel tap vacuum hose (4)
3. Screw
   - Tank bolts (1)

	**Tank bolts:** **0.7 Kgf·m (7 N·m)**

   - Fuel tank cap (6)
4. Install
   - Tank panel
     See "TANK PANEL INSTALLATION" page 3-2
   - Seat
     See "SEAT INSTALLATION" page 3-2



FRONT MUDGUARD AND HEADLIGHT HOLDER

FRONT MUDGUARD REMOVAL

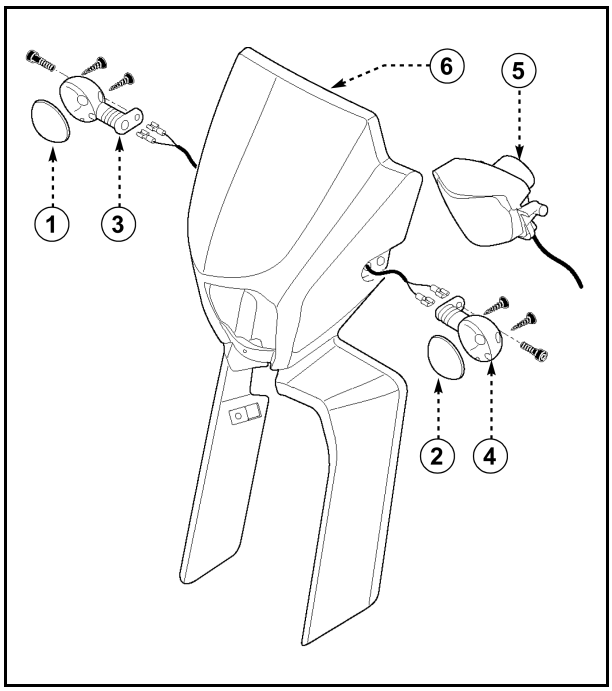
⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Remove
   - Bolts (1)
   - Front mudguard (2)

FRONT MUDGUARD INSTALLATION

1. Install
   - Front mudguard (2)
   - Bolts (1)



HEADLIGHT HOLDER REMOVAL

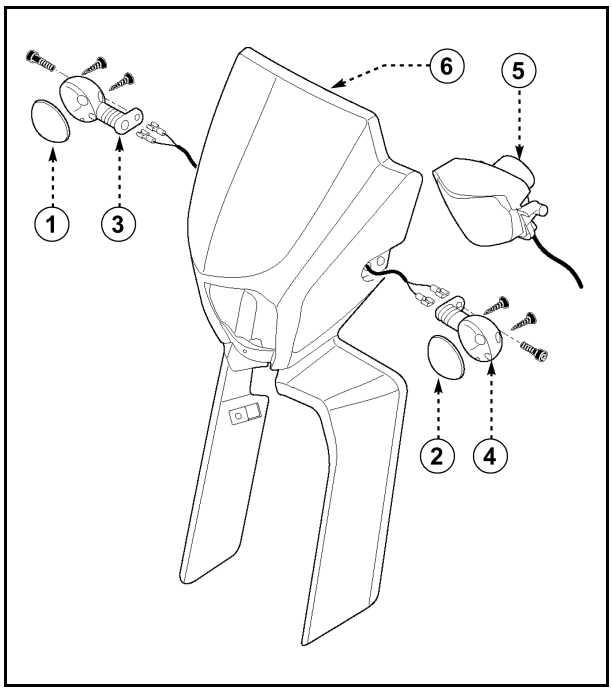
⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Remove
   - Front mudguard
     See “FRONT MUDGUARD REMOVAL” page 3-4
3. Disassemble
   - Right turn signal lens (1)
   - Left turn signal lens (2)
4. Disconnect
   - Right turn signal wires
   - Left turn signal wires

NOTE:

Extract the wires in order to remove the headlight holder



5. Remove
   - Right turn signal (3)
   - Left turn signal (4)
   - Head lamp (5)

NOTE:
Remove the head lamp from the seating position

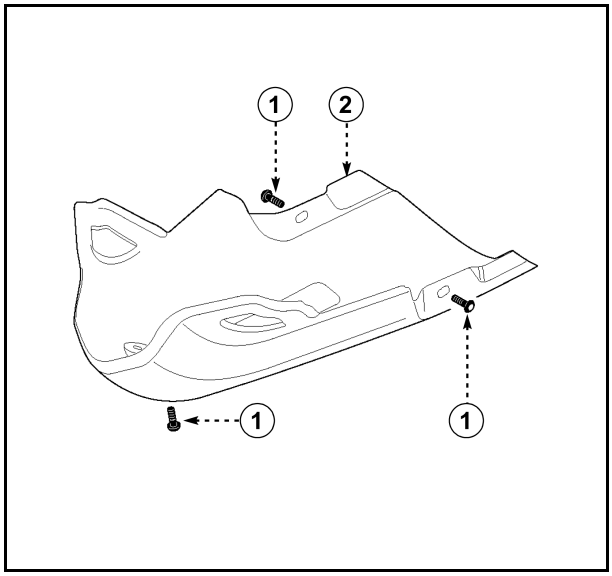
- Headlight holder (6)

HEADLIGHT HOLDER INSTALLATION

1. Install
   - Headlight holder (6)
   - Front lamp (5)
2. Connect
   - Right turn signal wires
   - Left turn signal wires
3. Assemble
   - Right turn signal lens (1)
   - Left turn signal lens (2)
   - Right turn signal (3)
   - Left turn signal (4)
   - Front mudguard
     See “FRONT MUDGUARD INSTALLATION” page 3-4

SUMP COVER, SIDE PANELS, TAIL COWLING AND REAR MUDGUARD

ENGINE SUMP COVER REMOVAL



⚠ WARNING

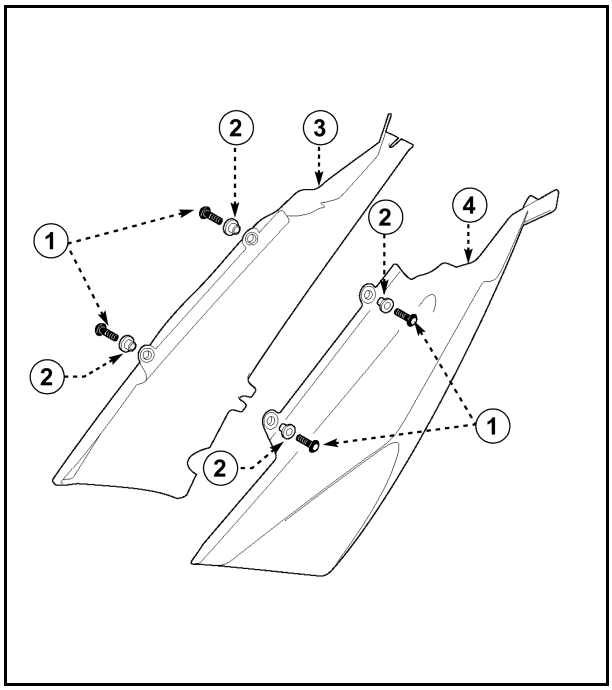
Securely support the motorcycle so there is no danger of it falling over.

1. Stand the motorcycle on a level surface.
2. Remove
   - Bolts (1)
   - Sump guard (2)

ENGINE SUMP GUARD INSTALLATION

1. Install
   - Sump guard (2)
   - Bolts (1)

SIDE COVER REMOVAL



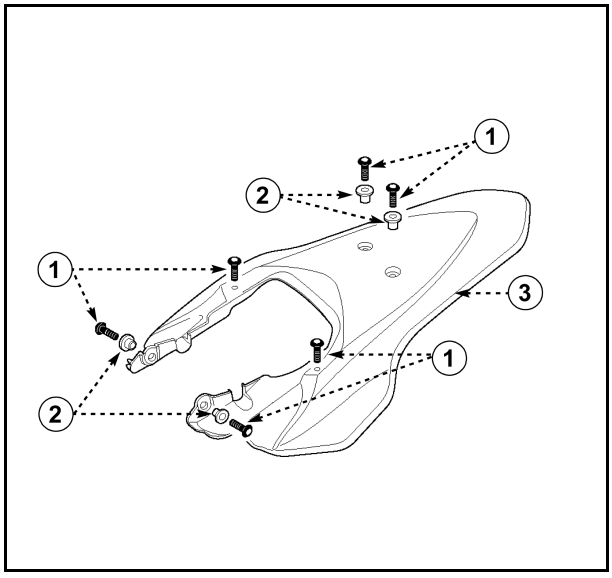
⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Remove
   - Bolts (1)
   - Bushings (2)
   - Right side cover (3)
   - Left side cover (4)

SIDE COVER INSTALLATION

1. Install
   - Right side cover (3)
   - Left side cover (4)
   - Bushings (2)
   - Bolts (1)



TAIL COWLING REMOVAL

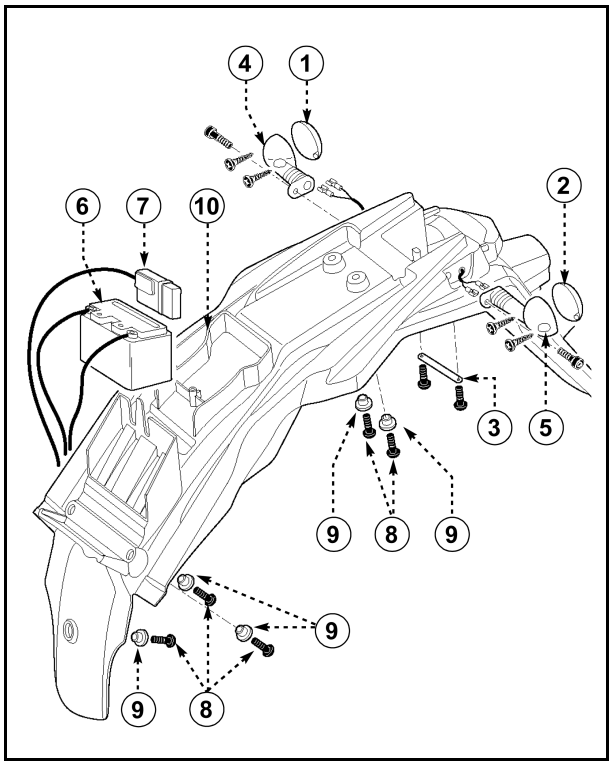
⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Remove
   - Bolts (1)
   - Bushings (2)
   - Tail cowling (3)

TAIL COWLING INSTALLATION

1. Install
   - Tail cowling (3)
   - Bushings (2)
   - Bolts (1)

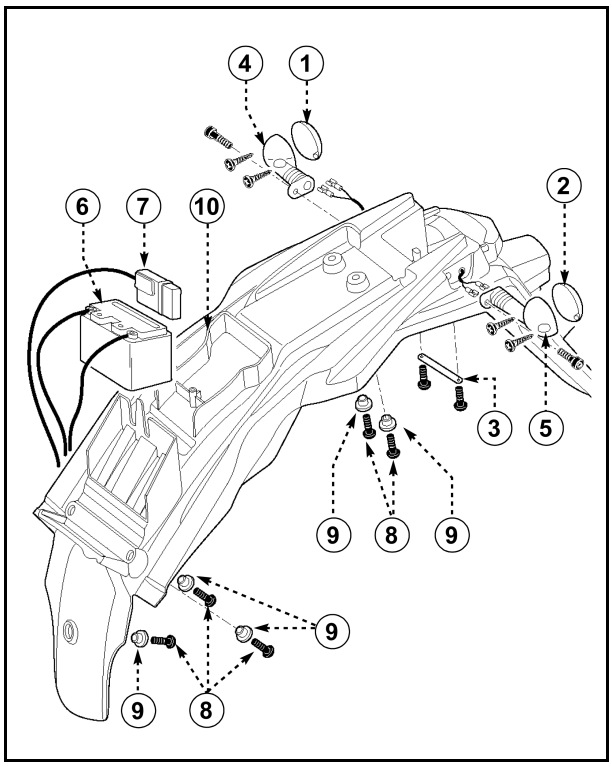


REAR MUDGUARD REMOVAL

⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Remove
   - Seat
     See “SEAT REMOVAL” page 3-2
   - Tail cowling
     See “TAIL COWLING REMOVAL” page 3-7
3. Disassemble
   - Right turn signal lens (1)
   - Left turn signal lens (2)
   - Wire retaining plate (3)
4. Disconnect
   - Right turn signal wires
   - Left turn signal wires
   - Rear light wires
   - Plate light wires
   - Battery leads
   - “CDI” control unit wires



NOTE:

Extract the wires in order to remove the rear mudguard

5. Remove
   - Right turn signal (4)
   - Left turn signal (5)
   - Battery (6)
   - "CDI" control unit (7)
   - Bolts (8)
   - Bushings (9)
   - Rear mudguard (10)

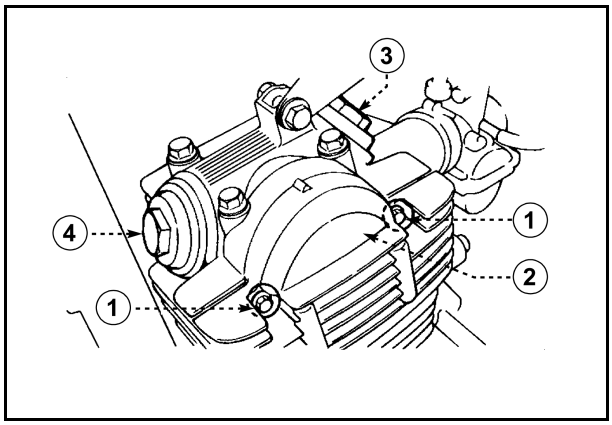
REAR MUDGUARD INSTALLATION

1. Install
   - Rear mudguard (10)
   - Bushings (9)
   - Bolts (8)
   - Battery (6)
   - "CDI" control unit (7)
2. Connect
   - Right turn signal wires
   - Left turn signal wires
   - Rear light wires
   - Plate light wires
   - Battery leads
   - "CDI" control unit wires
3. Assemble
   - Wire retaining plate (3)
   - Right turn signal (4)
   - Left turn signal (5)
   - Right turn signal lens (1)
   - Left turn signal lens (2)
   - Tail cowling
     See "TAIL COWLING INSTALLATION" page 3-7
   - Seat
     See "SEAT INSTALLATION" page 3-2

ENGINE

VALVE CLEARANCE ADJUSTMENT

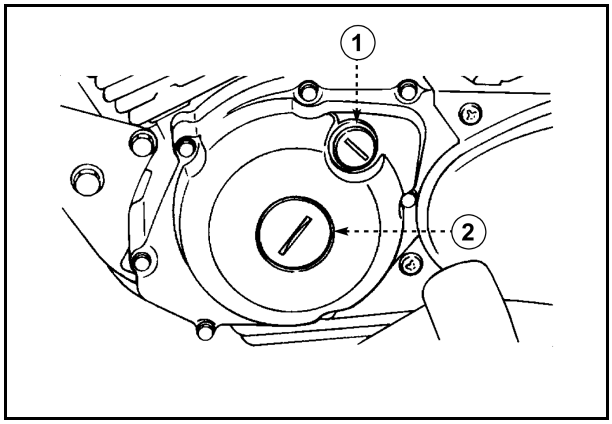
NOTE:
Valve clearance adjustment must be made when the engine is cool, at room temperature. When the valve clearance is to be measured or adjusted, the piston must be at Top Dead Center (T.D.C.) on the compression stroke.



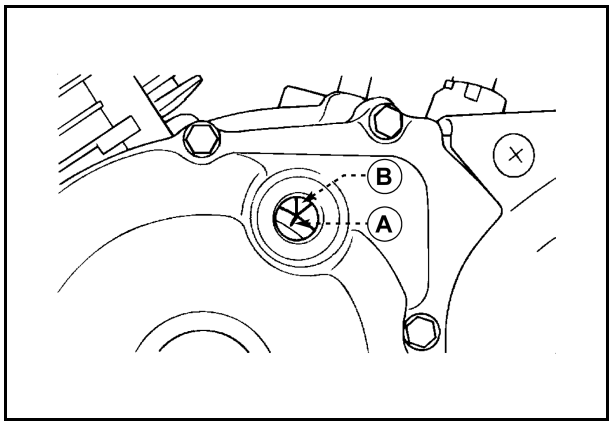
⚠ WARNING

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

1. Remove
   - Spark plug
   - Bolts (1)
   - Cylinder head side cover (2)
   - Valve cover (intake side) (3)
   - Valve cover (exhaust side) (4)



2. Remove
   - Timing check plug with O-Ring (1)
   - Center plug with O-Ring (2)



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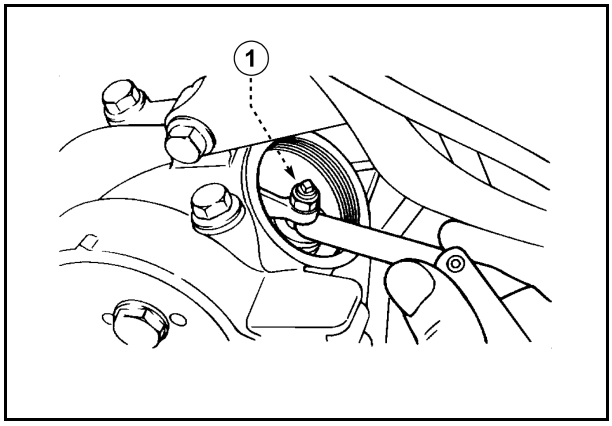
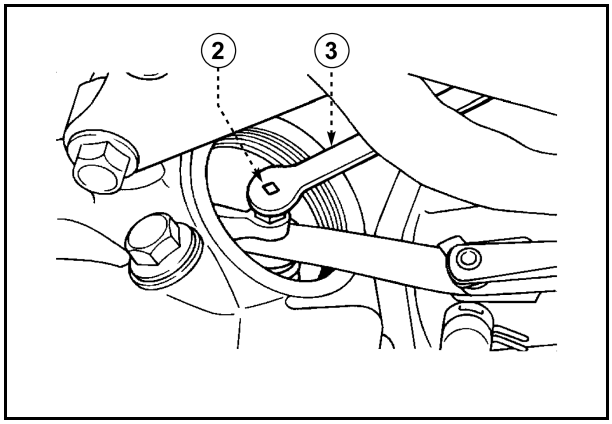
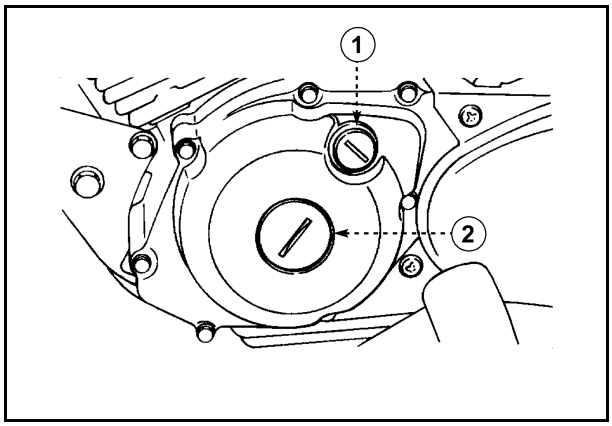
Measurement steps

- Rotate the crankshaft counterclockwise to align the mark (A) on the rotor with the stationary pointer (B) on the crankcase cover. The piston must be at Top Dead Center (TDC) and the marking on the cam sprocket must be aligned with the cylinder head marking.

****







3. Measure
   - Valve clearance
     Measure the valve clearance by using a feeler gauge
     Out of specification → Adjust

	Valve clearance (cold): **Intake valve: 0.08 ~ 0.12 mm** **Exhaust valve: 0.10 ~ 0.14 mm**

4. Adjust
   - Valve clearance

****

Adjustment steps

- Loosen the locknut (1)
- Turn the adjuster (2) clockwise or counterclockwise with the valve adjusting tool (3) until specified clearance is obtained.

Turning clockwise → Clearance is decreased
Turning counterclockwise → Clearance is increased

	Valve adjusting tool: **90890-01311-09**

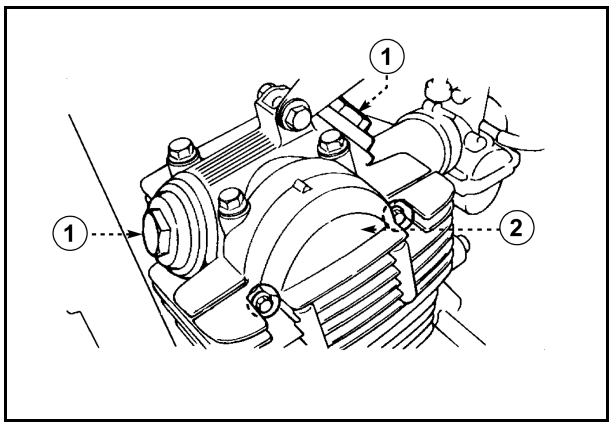
- Hold the adjuster to prevent it from moving and tighten the locknut.

	Locknut: **0.8 Kgf·m (8 N·m)**

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

****

5. Install
   - Timing check plug with O-Ring (1)
   - Center plug with O-Ring (2)

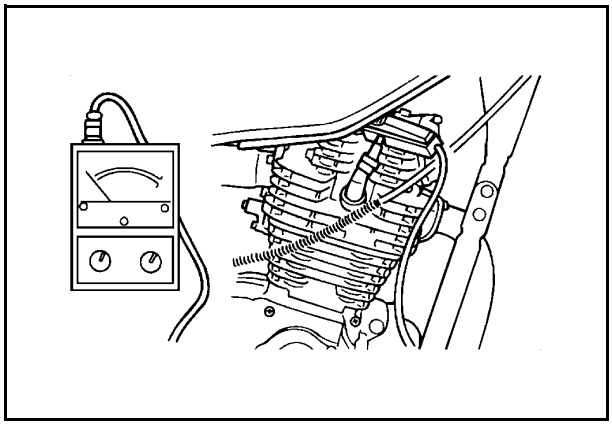


6. Install
   - Valve cover with O-Ring (1)
   - Spark plug
   - Cylinder head side cover (2)

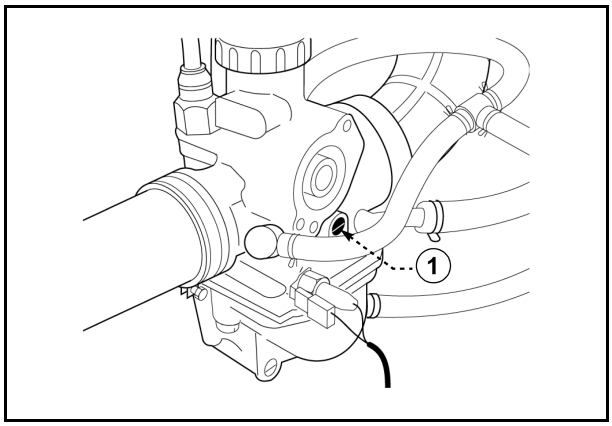
Valve cover (intake and exhaust):
1.75 Kgf·m (17.5 N·m)
Bolts cylinder head side cover:
1.0 Kgf·m (10 N·m)
Spark plug:
1.25 Kgf·m (12.5 N·m)

CO MEASUREMENT AND IDLING SPEED ADJUSTMENT

1. Start the engine and let it warm up for several minutes
2. Connect
   - Inductive tachometer to the spark plug lead

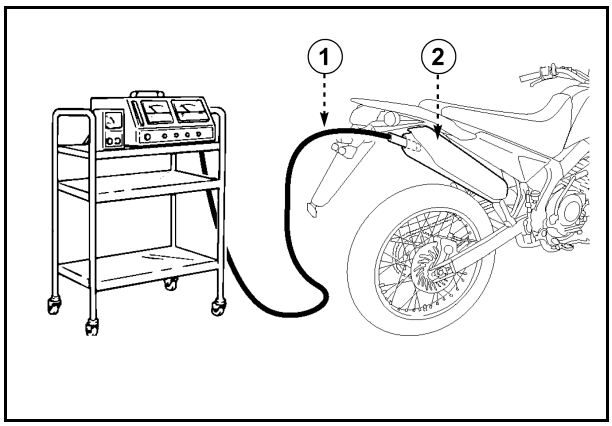


Engine tachometer:
90890-06760



3. Check
   - Engine idling speed
     Out of specification → Adjust
     Turn the throttle stop screw (1) clockwise or counterclockwise until specified idling speed is obtained.

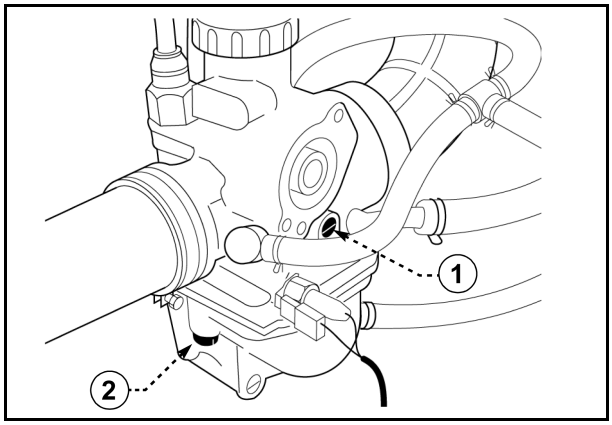
Engine idling speed:
1300 ~ 1500 rpm



4. Install
   - Sampling probe CO tester (1) to the exhaust pipe (2)

CO concentration:
Maximum value 4.5%

Out of specification → Adjust



5. Adjust
   - CO concentration

****

Adjustment steps

- Turn the pilot screw (2) in or out to achieve correct CO specification

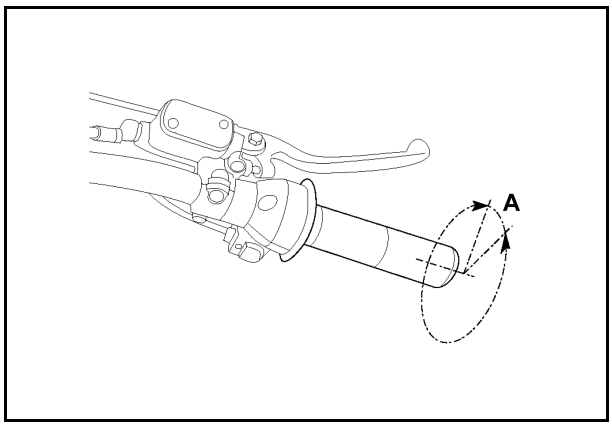
Pilot screw:
Standard setting 1 1/4 turns out

NOTE:

The adjustment of the CO concentration may influence the idling speed, it is therefore recommended to adjust screw (1) to regulate the engine idling speed.

- After adjusting, check the CO concentration specification and remove the CO tester, make sure that the engine idling speed does not change.

****



THROTTLE CABLE ADJUSTMENT

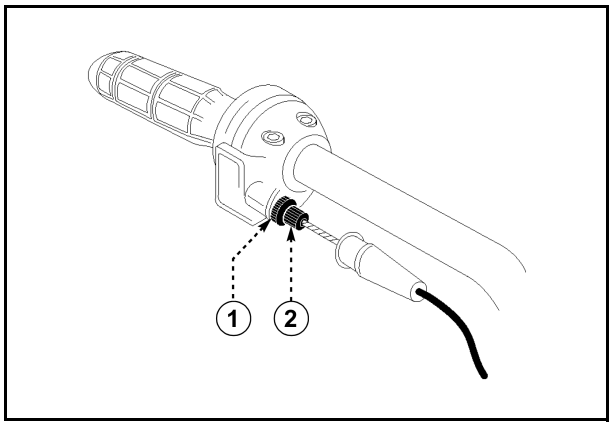
NOTE:

Prior to adjusting the throttle cable, the engine idling speed should be adjusted. See "CO MEASUREMENT AND IDLING SPEED ADJUSTMENT" page 3-11

1. Check
   - Throttle (A) cable free play
     Out of specification → Adjust

Free play at throttle grip flange:
3 ~ 5 mm

2. Adjust
   - Throttle cable free play



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Adjustment steps

- Loosen lock nut (1).
- Rotate adjusting nut (2) clockwise and counterclockwise to adjust the free play.

Turning clockwise → Free play is increased
Turning counterclockwise → Free play is decreased

- Tighten lock nut (1).

****

SPARK PLUG INSPECTION

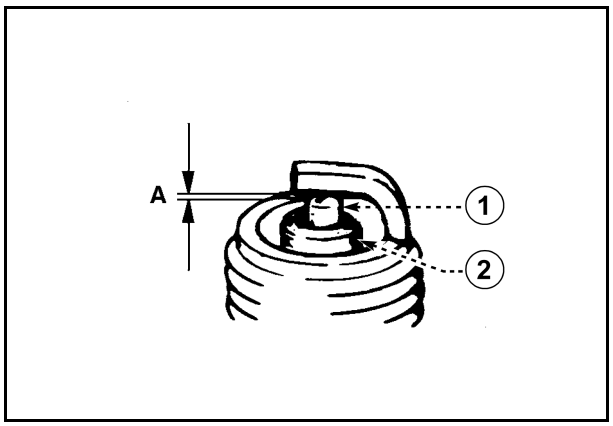
1. Remove
   - Spark plug cap
   - Spark plug

CAUTION:

Before removing the spark plug, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinder

2. Check
   - Spark plug type
     Incorrect type → Replace

Spark plug type:
NGK CR7HSA or DENSO U22 FSR-U

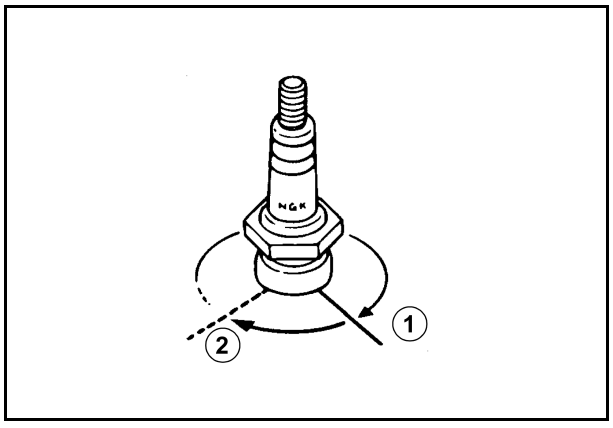


3. Inspect
   - Electrode (1)
     Wear and damage → Replace
   - Insulator (2)
     Abnormal colour → Replace
     The standard colour is brown
4. Clean
   - Spark plug
     Clean the spark plug with a special contact cleaner or with a wire brush
5. Measure
   - Spark plug gap (A) with a wire gauge
     Out of specification → Adjust gap

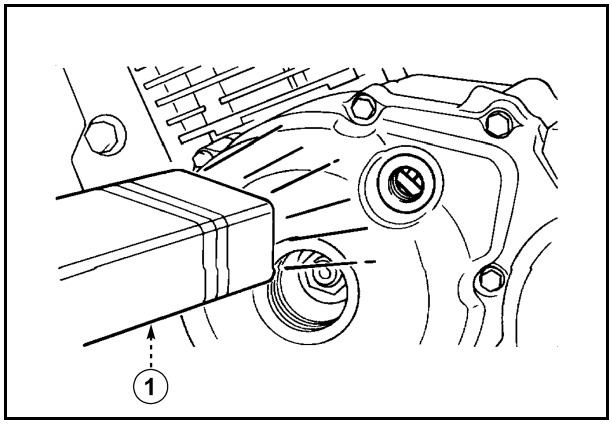
	Electrode gap: **0.6 mm**

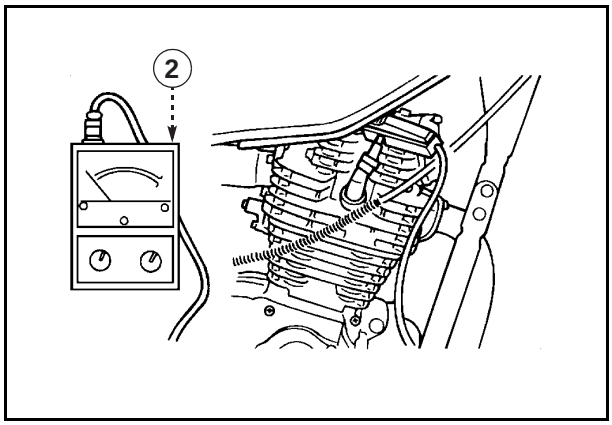
6. Install
   - Spark plug

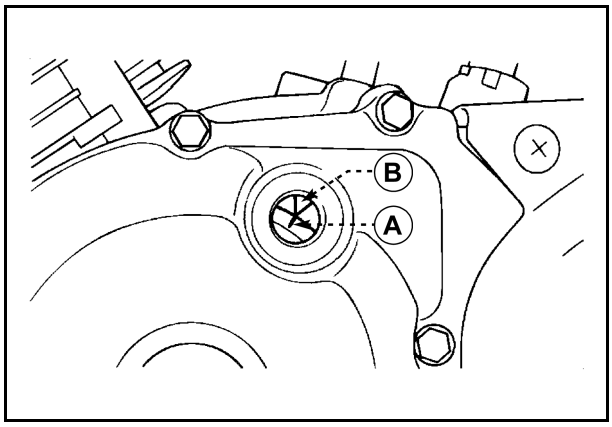
	Spark plug: **1.25 Kgf·m (12.5 N·m)**



NOTE:
- Before spark plug installation, clean the gasket surface and plug surface
- If a torque wrench is unavailable tighten the spark plug by hand (1), then using a spark plug wrench tighten a further 1/4 ~ 1/2 turn (2).







IGNITION TIMING CHECK

NOTE:

Prior to checking the ignition timing, check all electrical connections related to the ignition system. Make sure all connections are tight and free of corrosion and that all ground connections are tight.

1. Remove
   - Check plug
2. Install
   - Timing light (1)
   - Engine tachometer (2) to the spark plug lead

Timing light:
90890-03141
Engine tachometer:
90890-06760

3. Check
   - Ignition timing

****

Checking steps

- Start the engine and let it warm up for several minutes. Let the engine run at the specified speed

Engine idling speed:
1300 ~ 1500 rpm

- Visually check the stationary pointer (A) to verify it is within the correct range (B) indicated on the flywheel.
  Incorrect range → Check the ignition system

****

NOTE:

Ignition timing is not adjustable

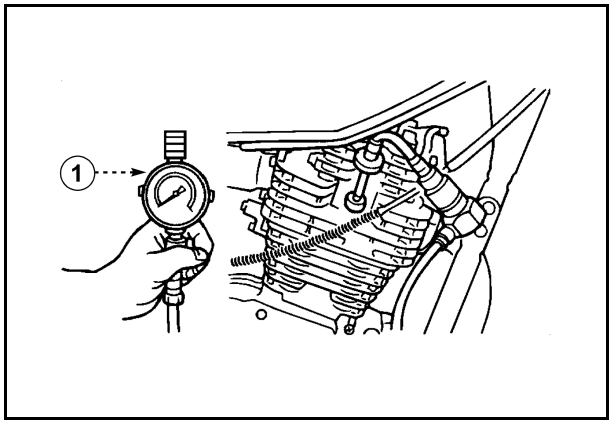
4. Install
   - Timing check plug with O-Ring

COMPRESSION PRESSURE MEASUREMENT

NOTE:
Insufficient compression pressure will result in performance loss

1. Check
   - Valve clearance
     Out of specification → Adjust
     See "VALVE CLEARANCE ADJUSTMENT" page 3-9
2. Start the engine and let it warm up for several minutes
3. Turn off the engine.
4. Remove the spark plug

CAUTION:
Before removing the spark plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder



5. Install
   - Compression gauge (1)

Compression gauge:
90890-03081

6. Check
   - Compression pressure

****
Measurement steps
- Crank the engine with the throttle wide open until the reading on the compression gauge stabilizes

⚠ WARNING
Before cranking the engine, ground all spark plug leads to prevent sparking.

Compression pressure at sea level:
Standard:
1200 KPa (12 Kg/cm^2)
Minimum value:
1040 KPa (10.4 Kg/cm^2)

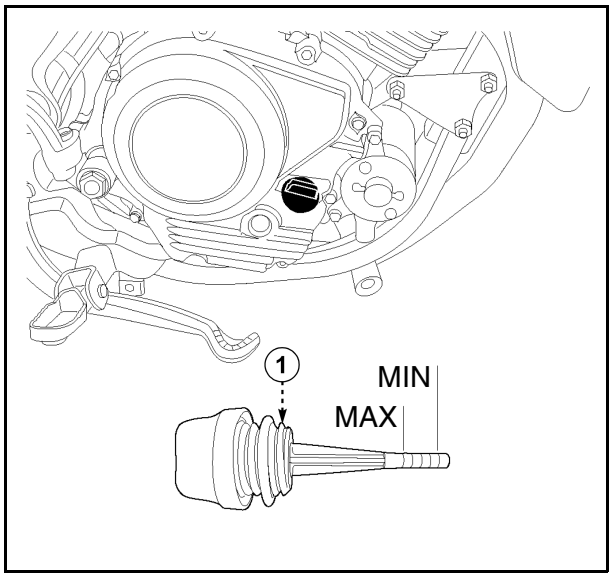
****

7. Measure
   • Compression pressure
   If it exceeds the maximum pressure allowed → Inspect the cylinder head, valve surfaces and piston crown for carbon deposits
   If it is below the minimum pressure → Squirt a few drops of oil into the affected cylinder and measure again

Follow the table below

Compression pressure (with oil applied into cylinder)	
Measured value	Diagnosis
Value increased after oil added	Worn or damaged pistons
Value did not increase	Possible defective ring, valves, cylinder head gasket or piston → Repair

8. Install
   • Spark plug



ENGINE OIL LEVEL INSPECTION

1. Stand the motorcycle on a level surface.

NOTE:
Make sure the motorcycle is upright when inspecting the oil level

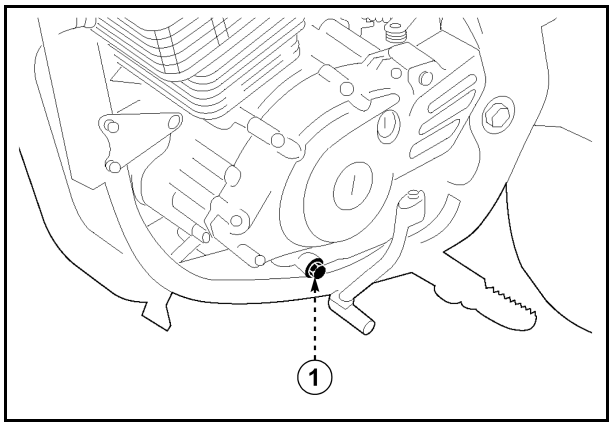
- Start the engine and let it warm up for several minutes
- Turn off the engine.

2. Remove the dip stick (1)
   Wipe off the dip stick with clean cloth and reset on the threads of oil filler hole
   Then remove the dip stick (oil level gauge)
3. Check
   • Engine oil level
   Oil level should be between MIN and MAX marks
   Oil level is below the MIN mark → Add oil to the MAX mark

	Recommended engine oil: YAMALUBE 4 or SAE 10W30-SH

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

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



ENGINE OIL CHANGE

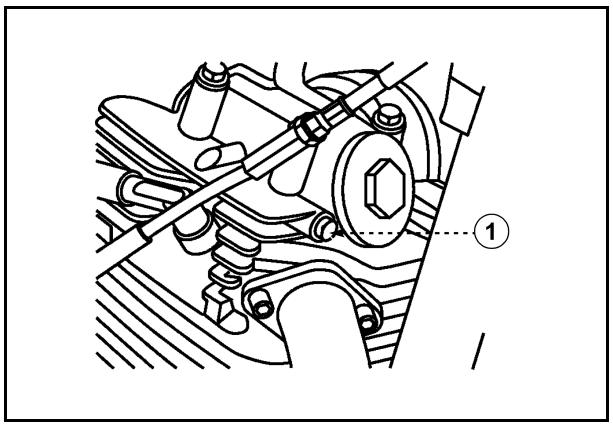
1. Stand the motorcycle on a level surface.
2. Start the engine and let it warm up for several minutes
3. Turn off the engine and place an oil pan under the engine
4. Remove
   - Dip stick (oil level gauge)
   - Drain plug (1)
   - Gasket
5. Drain the crankcase oil
6. Install
   - Drain plug (1)
   - Dip stick (oil level gauge)

	Drain plug: **2.0 Kgf·m (20 N·m)**

7. Fill
   - Oil in the cover

	Oil quantity: **1.0 L**

8. Check
   - Engine oil level
     See “ENGINE OIL LEVEL INSPECTION” page 3-17



OIL PRESSURE INSPECTION

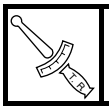
1. Remove
   - Oil check bolt (1)
2. Start the engine and keep it idling for several minutes.

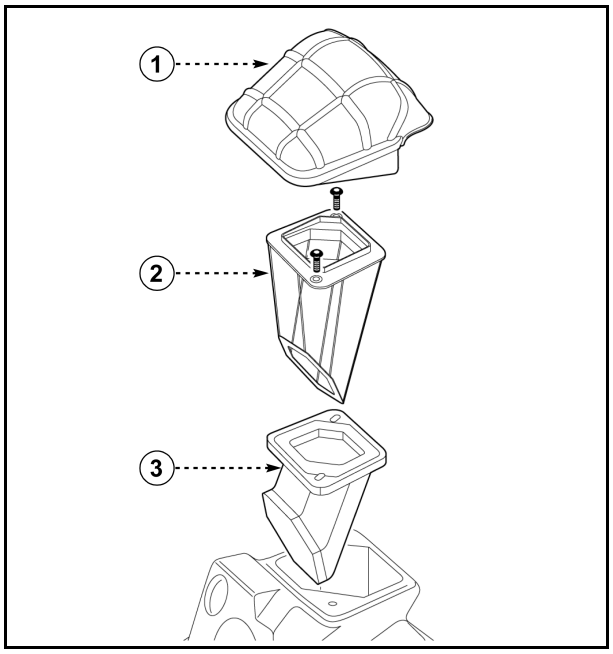
Oil flows out → Oil pressure is good
No oil comes out → Oil pressure is bad

CAUTION:

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

Tighten
- Oil check bolt (1)

	**Oil check bolt:** **0.7 Kgf·m (7 N·m)**



CLEANING THE AIR FILTER

1. Stand the motorcycle on a level surface.
2. Remove
   - Seat
     See "SEAT REMOVAL" page 3-2
   - Boot (1)
   - Air filter case (2)
   - Air filter (3)

CAUTION:

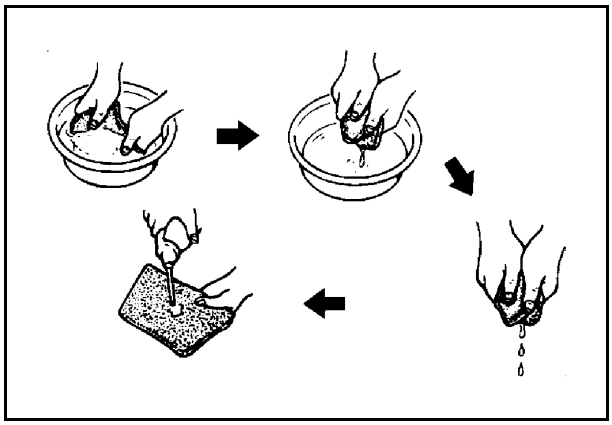
Never operate the engine when the air filter element is not installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the filter element will also affect the carburetor tuning, leading to poor engine performance and possible overheating.

3. Inspect
   - Air filter element
     Wear and damage → Replace

4. Clean
   • Air filter element
     Use kerosene to clean the element

NOTE:
After cleaning, remove the remaining kerosene by squeezing the element

CAUTION:
Do not twist the filter element when squeezing it

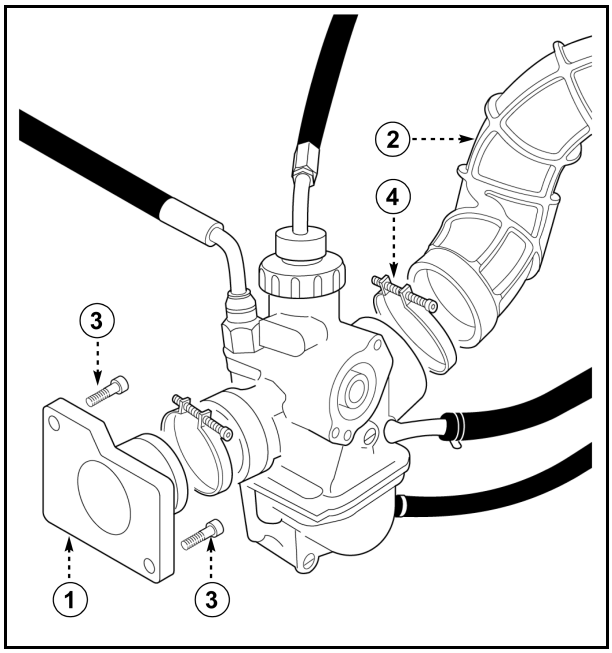


5. Apply the recommended oil to the entire surface of the filter and squeeze out excess oil. The element should be wet not dripping

Recommended oil:
YAMALUBE 4 or SAE 10W30-SH

CAUTION:
Never use gasoline to clean the air filter element. Such solvent may cause a fire or an explosion.

6. Install
   • Air filter (3)
   • Air filter case (2)
   • Boot (1)
   • Seat
     See “SEAT INSTALLATION” page 3-2



MANIFOLD AND INLET SLEEVE INSPECTION

1. Stand the motorcycle on a level surface.
2. Remove
   • Seat
     See “SEAT REMOVAL” page 3-2
3. Check
   • Manifold (1)
   • Inlet sleeve (2)
     Wear and damage → Replace

Bolt (3):
1.0 Kgf·m (10 N·m)
Clamp (4):
0.2 Kgf·m (2 N·m)

4. Install
   • Seat
     See “SEAT INSTALLATION” page 3-2

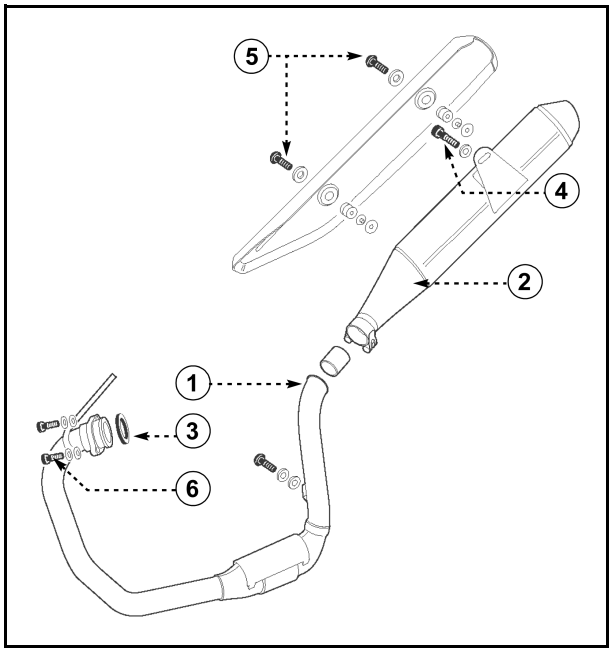
FUEL LINE INSPECTION

1. Remove
   - Side covers
     See “TANK PANEL REMOVAL” page 3-2
   - Fuel tank
     See “FUEL TANK REMOVAL” page 3-3
2. Check
   - Fuel hose
   - Wear and damage → Replace
3. Install
   - Fuel tank
     See “FUEL TANK INSTALLATION” page 3-3
   - Side covers
     See “TANK PANEL INSTALLATION” page 3-2

CRANKCASE VENTILATION HOSE INSPECTION

1. Check
   - Crankcase ventilation hose
     Wear and damage → Replace

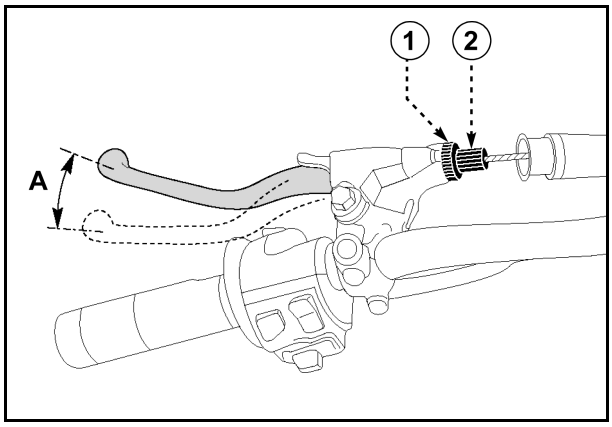
EXHAUST SYSTEM INSPECTION



1. Remove
   - Exhaust pipe (1)
   - Muffler (2)
   - Gasket (3)
2. Inspect
   - Exhaust pipe (1)
   - Muffler (2)
     Damage and bends → Replace
   - Gasket (3)
     Exhaust gas leak → Replace

Muffler bolt (4):
4.0 Kgf·m (40 N·m)
Protection bolt (5):
0.8 Kgf·m (8 N·m)
Exhaust pipe screw (6):
1.0 Kgf·m (10 N·m)

3. Install
   - Gasket (3)
   - Exhaust pipe (1)
   - Muffler (2)



FRAME

CLUTCH ADJUSTMENT

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

Free play at the end of the clutch lever:
10 ~ 15 mm

2. Adjust
   - Clutch lever free play (A)

****

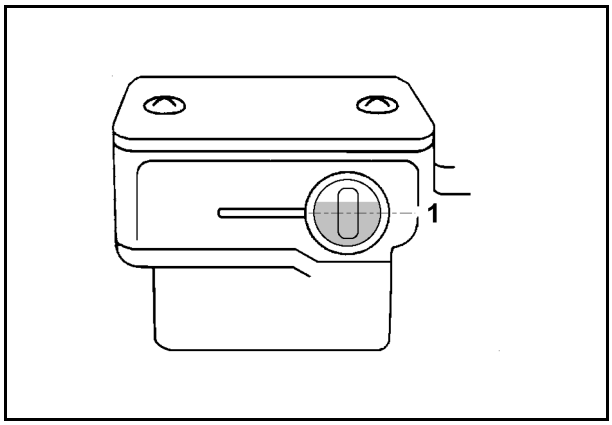
Adjustment steps

- Loosen lock nut (1).
- Turn the adjuster (2) clockwise or counterclockwise until the specified free play is obtained.

Turning clockwise → Clearance is increased
Turning counterclockwise → Clearance is decreased

- Tighten lock nut (1).

****



FRONT BRAKE FLUID LEVEL INSPECTION

1. Stand the motorcycle on a level surface.

NOTE:

- Position the motorcycle on a suitable stand.
- During check, make sure that the upper part of the brake pump is in horizontal position

1. Check
   - Brake fluid level
     Fluid level is under "LOWER" level line (1) → Add the recommended brake fluid to the proper level

Recommended brake fluid:
DOT N°4

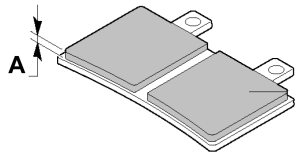
CAUTION:

Brake fluid may damage painted surfaces and plastic parts. Always clean up split fluid immediately.

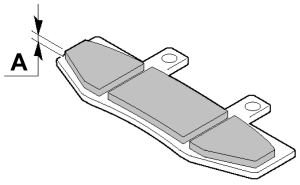
⚠ WARNING

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

XT 125 R



XT 125 X



FRONT BRAKE PAD INSPECTION

1. Activate the brake lever
2. Check
   - Brake pad
     Pad thickness (A) lower than the minimum value → Replace

Minimum pad thickness:
2 mm

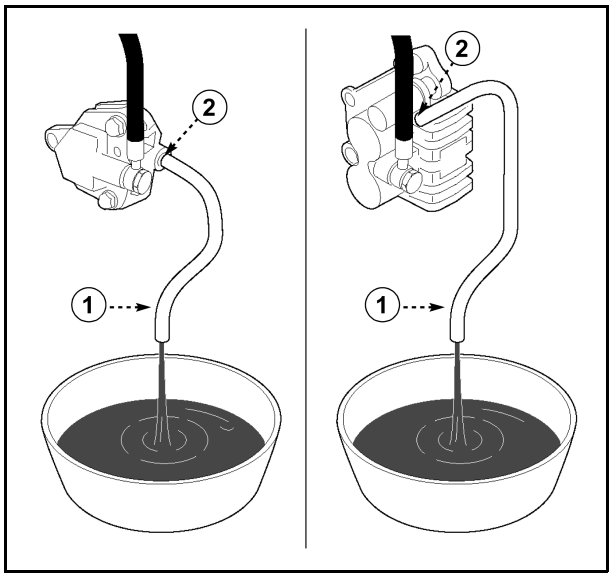
See “BRAKE PAD REPLACEMENT” page 6-7

AIR BLEEDING (FRONT 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
   - Braking system

****

Air bleeding steeps

(a) Fill up the brake master cylinder reservoir until you reach the maximum level
(b) Install the diaphragm, check that no liquid flows out and that the master cylinder reservoir is not filled too much.
(c) Connect the clear plastic tube (1) tightly to the caliper bleed screw (2)
(d) Place the other end of the tube into a container.
(e) Slowly apply the brake lever or pedal several times
(f) Pull the lever in or push down on the pedal. Hold the lever or pedal in position
(g) Loosen the bleed screw and allow the lever or pedal to travel towards its limit
(h) Tighten the bleed screw when the lever or pedal limit has been reached; then release the lever or pedal

	Bleed screw: **0.6 Kgf·m (6 N·m)**

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

NOTE:

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

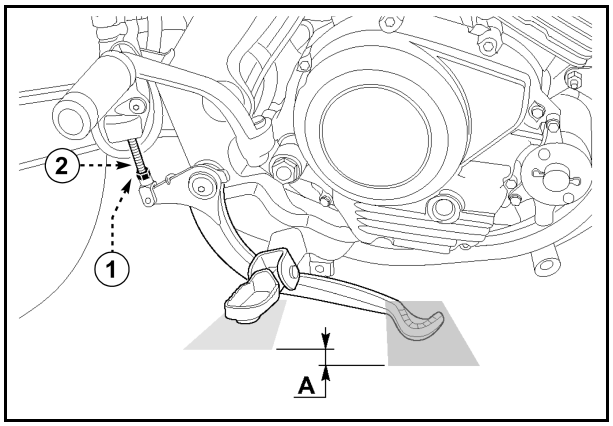
(m)Add brake fluid to proper level.

	Recommended brake fluid: DOT N°4

⚠ WARNING

After bleeding, check the correct operation of the braking system.

****



REAR BRAKE PEDAL ADJUSTMENT

1. Stand the motorcycle on a level surface.
2. Check
   - Brake pedal free play (A)
     Out of specification → Adjust

	Brake pedal free play: 12 ~ 15 mm

3. Adjust
   - Brake pedal free play (A)

****

Adjustment steps

- Loosen lock nut (1).
- Turn adjusting screw (2) clockwise and counerclockwise until you reach the recommended play

Turning clockwise → The pedal free play is increased
Turning counterclockwise → The pedal free play is decreased

- Tighten lock nut (1).

****

DRIVE CHAIN SLACK ADJUSTMENT

NOTE:

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

CAUTION:

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

⚠ WARNING

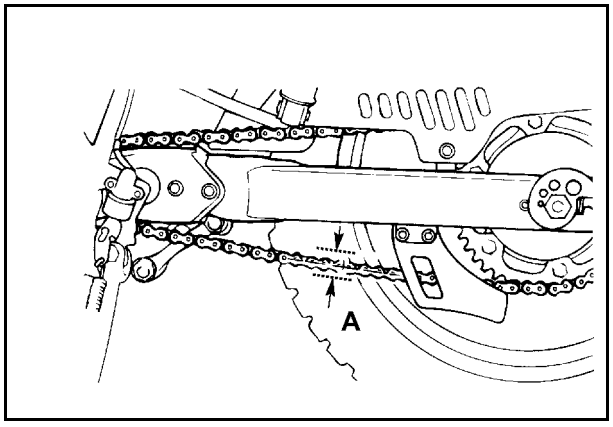
Securely support the motorcycle so there is no danger of it falling over.

1. Stand the motorcycle on suitable stand.

NOTE:

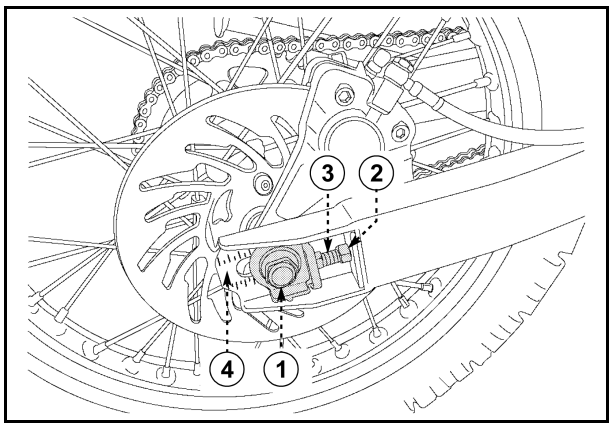
When checking chain slack both wheels should be on the ground without the rider on it.

2. Check
   - Drive chain slack (A)
     Out of specification → Adjust



Drive chain slack without rider and with the wheels on the ground:
25 ~ 40 mm

3. Adjust
   - Drive chain slack (A)



****

Adjustment steps

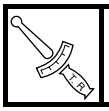
- Loosen nut (1).
- Loosen lock nut (2).
- Turn adjusting screw (3) clockwise and counerclockwise to adjust the chain play.

Turning clockwise → The chain slack is increased
Turning counterclockwise → The chain slack is decreased

NOTE:

Carry out the operation in the same way on both sides to keep the pin aligned. Use graduated scale (4) to check alignment.

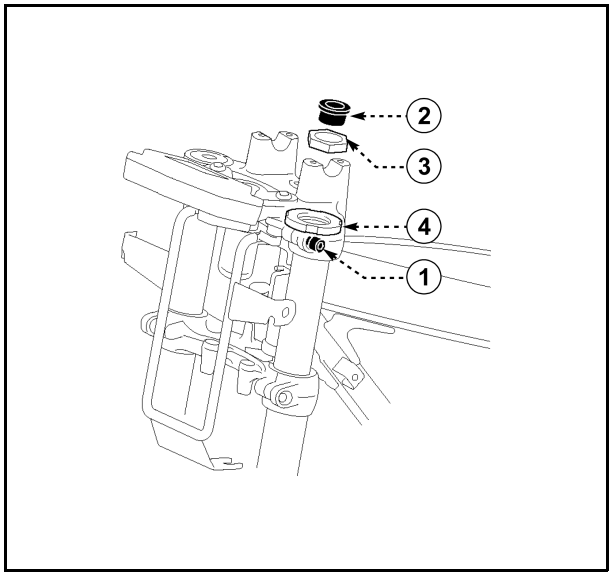
- Tighten lock nut (2).
- Tighten nut (1).

	**Axle nut:** **8.5 Kgf·m (85 N·m)**

DRIVE CHAIN LUBRICATION

The chain consists of many parts that work against each other. If the chain is not maintained properly, it will wear out rapidly, therefore, it is recommended to periodically service the chain. This service is specially necessary when riding in dusty conditions.

	**Recommended lubricant SAE 20W50 or chain lubricants suitable for "O-Ring" chains.**



STEERING HEAD INSPECTION

⚠ WARNING

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

1. Position a support under the engine and lift the front wheel.
2. Unscrew
   - Bolts (1) (upper support)
3. Remove
   - Protection cap (2)
   - Nut (3)
4. Adjust
   - Steering head

****

Adjustment steps

- Turn ring nut (4) clockwise to eliminate the free play from the steering
- Turn the handlebar in both directions to check the correct movement of the steering head

	**Ring nut wrench:** **90890-01268**

****

5. Assemble
   - Nut (3)

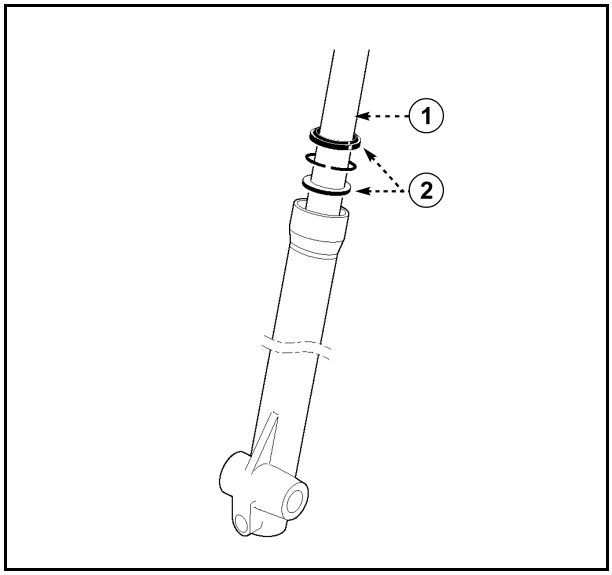
	**Nut:** **3.0 Kgf·m (30 N·m)**

   - Protection cap (2)
6. Tighten
   - Bolts (1) (upper support)

	**Bolts (upper support):** **2.0 Kgf·m (20 N·m)**

⚠ WARNING

Avoid over tightning

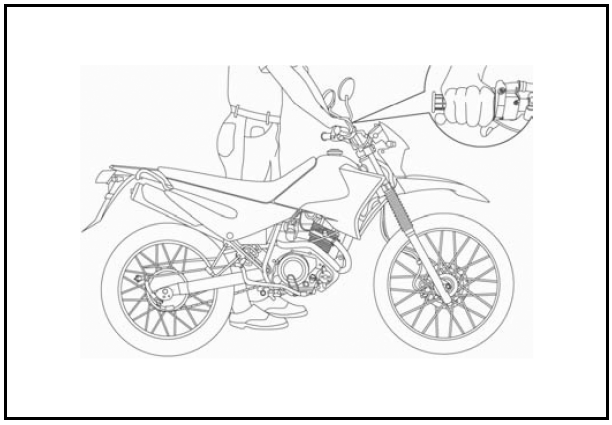


FRONT SUSPENSION INSPECTION

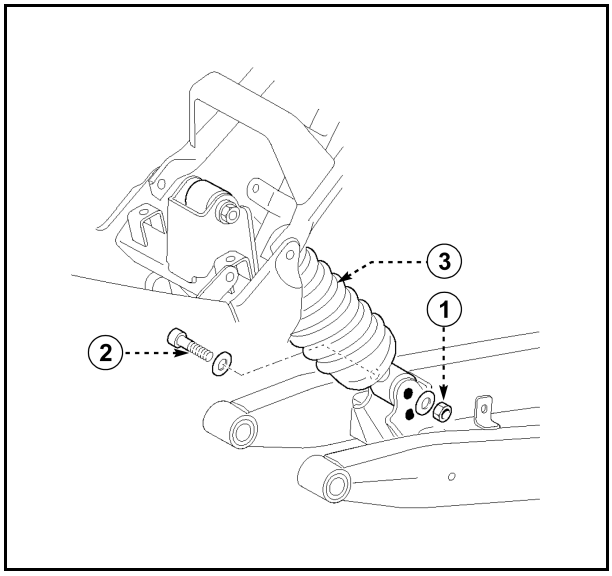
⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Check
   - Inner tube (1)
     Damage or bent → Replace
   - Oil and dust seal (2)
     Leak or damage → Replace
3. Hold the motorcycle upright and apply the front brake.



4. Check operation
   - Push down hard on the handlebars several times.
     Unsmooth operation → repair See “FRONT SUSPENSION” page 3-36



REAR SHOCK-ABSORBER POSITION ADJUSTMENT

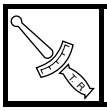
⚠ WARNING

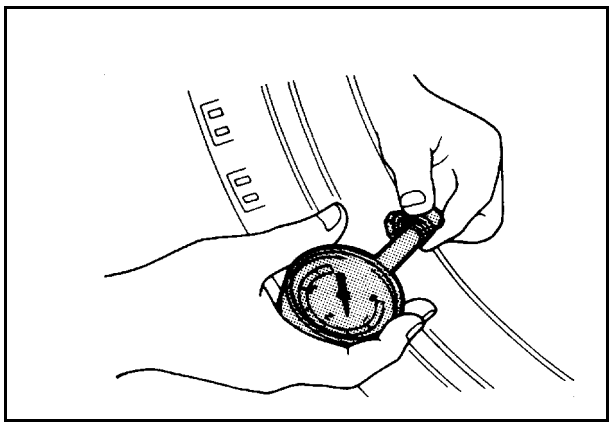
Securely support the motorcycle so there is no danger of it falling over.

1. Stand the motorcycle on a level surface.
2. Remove
   - Nut (1)
   - Bolt (2)
   - Shock-absorber (3) (Lower part)
3. Assemble
   - Shock-absorber (3) (Lower part)

NOTE:
Use the holes present on the frame to adjust the shock-absorber position

- Bolt (2)
- Nut (1)

	**Nut (1):** **4.5 Kgf·m (45 N·m)**



TYRE INSPECTION

1. Measure
   - Tyre inflation pressure
     Out of specification → Adjust

⚠ WARNING

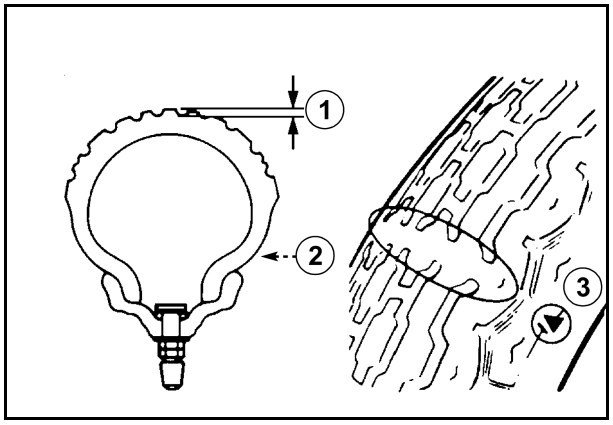
- **Tyre inflation pressure should only be checked and adjusted when the tyre temperature equals the ambient air temperature. Tyre inflation pressure and suspension must be adjusted according to the total weight of the cargo, rider, passenger and accessories (fairing, saddlebags, etc. if approved for this model).**

NEVER OVERLOAD THE MOTORCYCLE

- **Operation of an overloaded motorcycle could cause tyre damage, accident or injury.**

Tyre inflation pressure	Front	Rear
Up to 90 kg load	1.8 bar (26.1 psi)	1.9 bar (27.6 psi)
With maximum load 178 kg	2.0 bar (29.0 psi)	2.1 bar (30.5 psi)

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



2. Inspect
   - Tyre surfaces
     Wear and damage → Replace

Minimum tyre tread depth: 1 mm

(1) Tread depth
(2) Side wall
(3) Wear indicator

⚠ WARNING

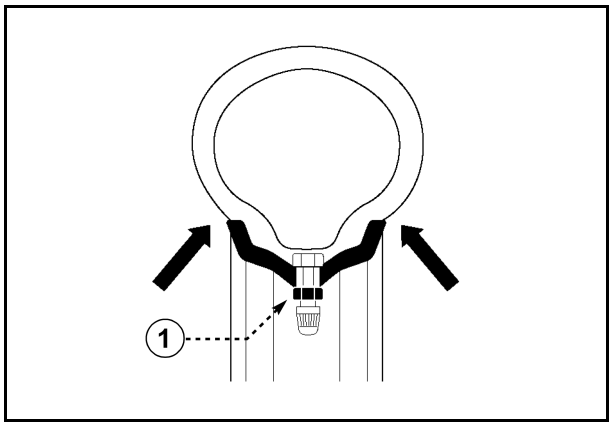
- **It is dangerous to ride with a worn-out tyre. When the tyre tread begins to show signs of wear, replace the tyre immediately.**
- **Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement tube.**
- **Do not use Tubeless tyres on a wheel designed for Tube Type tires only. Tyre failure and personal injury may result from sudden deflation.**

Tube Type wheel → Tube Type tyre only
Tubeless type wheel → Tube type or tubeless tyre.

- Be sure to install the correct tube when using Tube Type tyres.

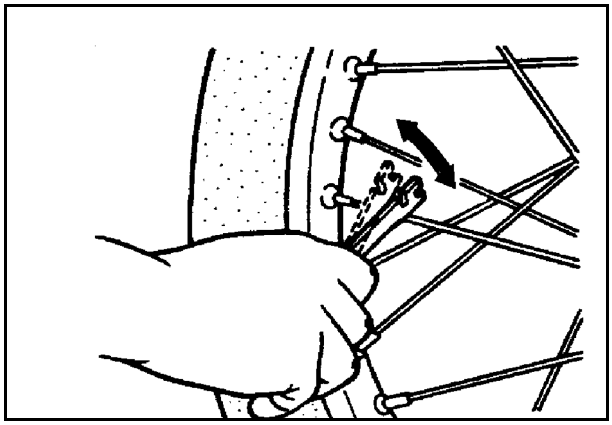
⚠ WARNING

After mounting a tyre, ride conservatively for a while to give the tire time to seat itself properly in the rim. Failure to do so could lead to an accident with possible injury to the rider or damage to the motorcycle.



3. After a tyre repair or replacement, be sure to tighten the valve stem locknut (1) according to the correct tightening torque.

	Valve locknut (1): 0.3 Kgf·m (3 N·m)



SPOKE INSPECTION AND TIGHTENING

1. Inspect
   - Wheel spokes
     Damage and bends → Replace
     Loose spoke → Retighten
2. Tighten
   - Loose spoke

NOTE:

Be sure to tighten the spokes before and after break-in.

	Wheel spokes: **0.3 Kgf·m (3 N·m)**

WHEEL INSPECTION

1. Inspect
   - Wheels
     Damage or bent → Replace

NOTE:

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

⚠ WARNING

Never attempt to make any repairs to the wheel.

CABLE INSPECTION AND LUBRICATION

⚠ WARNING

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

1. Check
   - Cable auta sheaths
     Bends and wear → Replace
2. Check
   Cable operation → Unsmooth operation

Lubricate with engine oil or a suitable cable lubricant

NOTE:

Hold the cable end upright and pour a few drops of lubricant into cable sheaths or use a suitable lubing device.

LEVER AND PEDAL LUBRICATION

Lubricate the joints with grease

ELECTRIC SYSTEM

BATTERY INSPECTION

1. Remove
   - Seat
     See “SEAT REMOVAL” page 3-2
2. Inspect
   - Battery terminals
     Dirt → Clean with a wire brush
     Poor connection → connect properly

NOTE:

After cleaning the terminals, apply a light coat of grease to the terminals.

****

Replace the battery if:

Battery voltage will not rise to a specific value

****

CAUTION:

Always charge a new battery before using it to ensure maximum performance.

⚠ WARNING

- **Battery electrolyte is dangerous. It contains sulphuric acid which 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.**

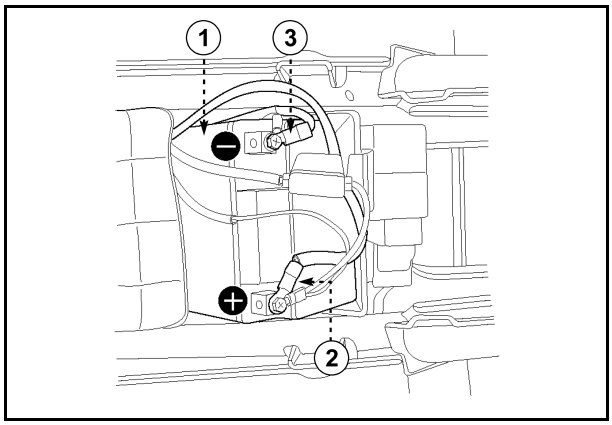
Antidote (EXTERNAL)

- **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 followed 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.**

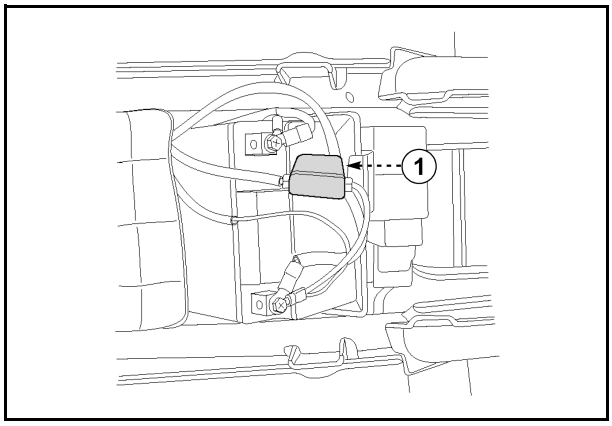


3. Install
   - Battery (1)
4. Connect
   - Battery leads (2-3)

CAUTION:

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

- Seat
  See "SEAT INSTALLATION" page 3-2



FUSE INSPECTION 10A

CAUTION:

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

1. Remove
   - Seat
     See "SEAT REMOVAL" page 3-2
2. Inspect
   - Fuse (1)

****

Inspection steps

- Connect the Multimeter to the fuse and check it for continuity

NOTE:

Set the Multimeter selector to $\Omega \times 1$ position

Multimeter:
90890-01312

- If the Multimeter is indicated at "∞", replace the fuse

****

3. Replace
   - Blown fuse

****

Replacement steps

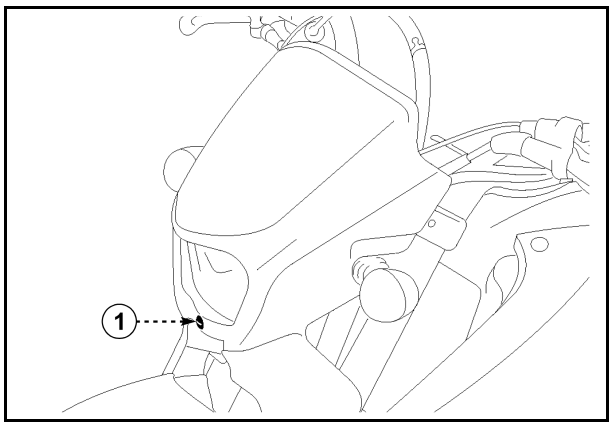
- Install a new fuse with the proper current rating.
- Turn on switches to verify operation of related electrical devices.
- If the fuse blows again immediately, check the electrical circuit.

⚠ WARNING

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

****

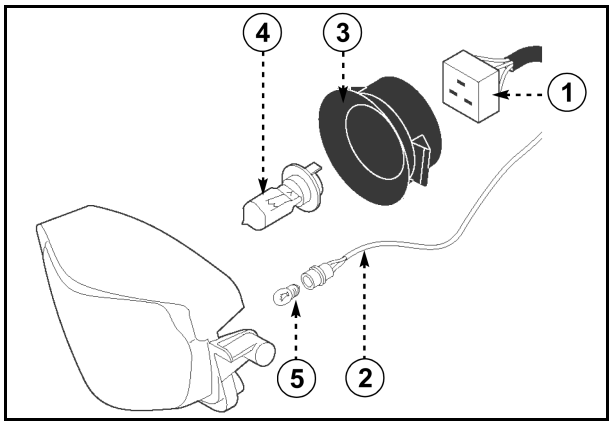
4. Install
   - Seat
     See "SEAT INSTALLATION" page 3-2



HEADLIGHT BEAM ADJUSTMENT

1. Adjust
   - Headlight beam (vertical)

To raise the beam	**Turn adjuster (1) clockwise**
To lower the beam	**Turn adjuster (1) counterclockwise**



CHANGING FRONT HEADLIGHT BULBS

1. Remove
   - Headlight holder
     See "HEADLIGHT HOLDER REMOVAL" page 3-4
2. Disconnect
   - Connectors (1-2)
3. Remove
   - Boot (3)
4. Replace
   - Damaged bulbs (4-5)

⚠ WARNING

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

5. Install
   - Bulbs (new)

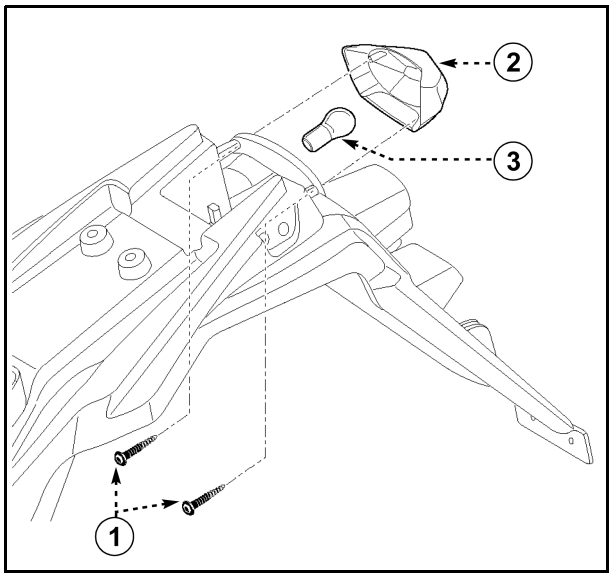
CAUTION:

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

   - Boot (3)

6. Connect
   • Connectors (1-2)
7. Install
   • Headlight holder
   See "HEADLIGHT HOLDER INSTALLATION" page 3-5

REAR TAIL /BRAKE LIGHT BULB REPLACEMENT



1. Remove
   • Rear cover
   See "TAIL COWLING REMOVAL" page 3-7
2. Unscrew
   • Bolts (1)
3. Remove
   • Rear glass (2)
4. Replace
   • Damaged bulb (3)

⚠ WARNING

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

5. Install
   • Bulb (new)

CAUTION:

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

   • Rear glass (2)
6. Screw
   • Bolts (1)
7. Install
   • Rear cover
   See "TAIL COWLING INSTALLATION" page 3-7

****

CHAPTER 4
ENGINE

ENGINE

ENGINE REMOVAL

NOTE:

It is not necessary to remove the engine to remove the following parts

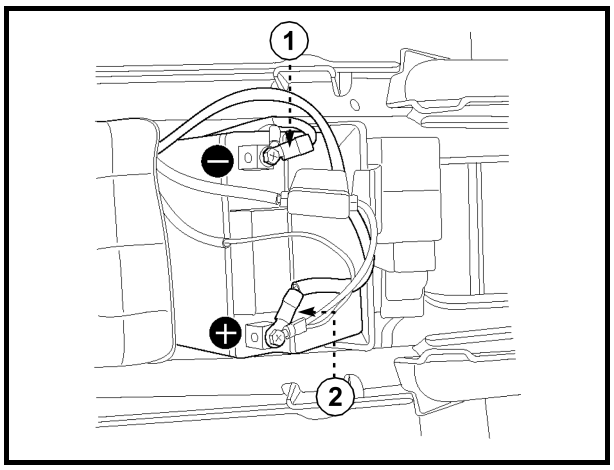
- Cylinder head
- Cylinder
- Piston
- Clutch
- CDI magneto

FUEL TANK

1. Remove
   - Seat
     See "SEAT REMOVAL" page 3-2
   - Fuel tank
     See "FUEL TANK REMOVAL" page 3-3

ENGINE OIL

1. Drain
   - Engine oil
     See "ENGINE OIL CHANGE" page 3-18



BATTERY

1. Remove
   - Battery

CAUTION:

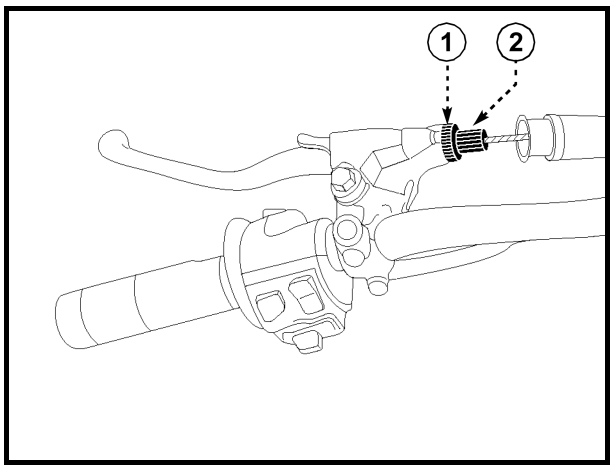
Disconnect the negative lead (1) first and then disconnect the positive lead (2) from the battery.

CARBURETOR

1. Remove
   - Carburetor
     See "REMOVAL" page 5-2

NOTE:

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



CLUTCH CABLE

1. Remove
   - Clutch cable

****

Removal steps

- Loosen the locknut (1) of the lever side
- Turn the adjuster (2) enough to free the clutch cable
- Unhook the cable end of the engine side

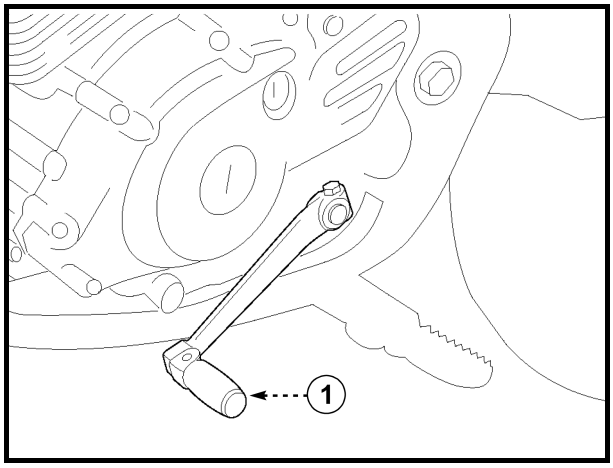
****

TRANSMISSION CHAIN

1. Remove
   - Transmission chain
     See "CHAIN REMOVAL" page 6-32

MUFFLER

1. Remove
   - Muffler
     See "EXHAUST SYSTEM INSPECTION" page 3-21

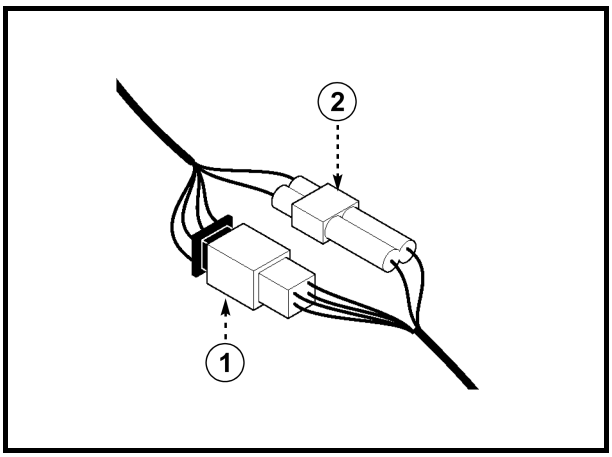


SHIFT PEDAL

1. Remove
   - Shift pedal (1)

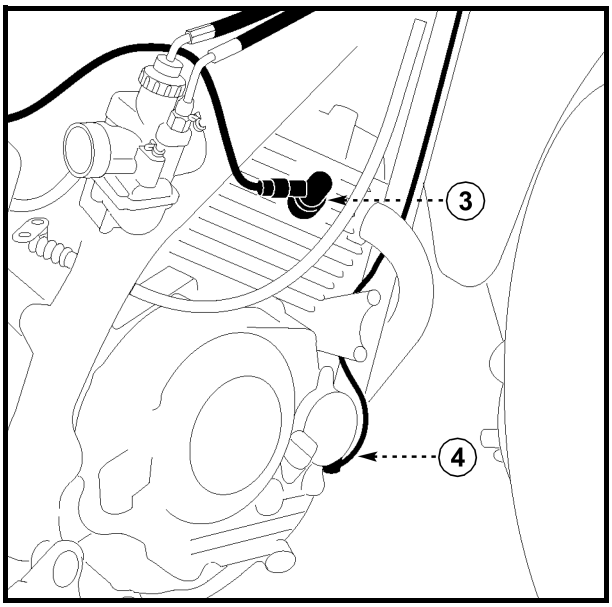
SUMP COVER

1. Remove
   - Sump cover
     See "ENGINE SUMP COVER REMOVAL" page 3-6



CDI MAGNETO CONNECTORS

1. Disconnect
   - 4-pin connector (1)
   - 2-pin connector (2)



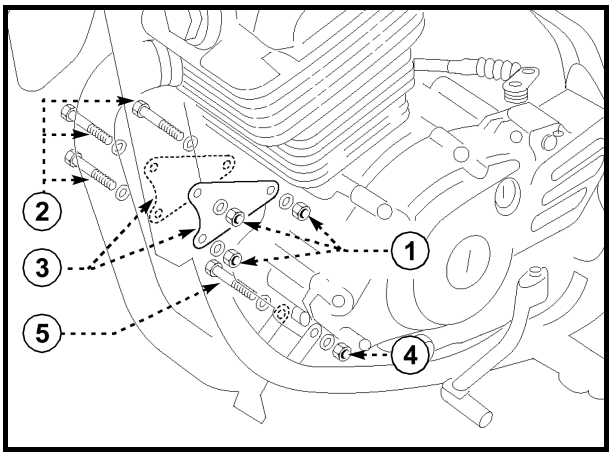
- Spark plug cap (3)
- Starter motor cable (4)

ENGINE REMOVAL

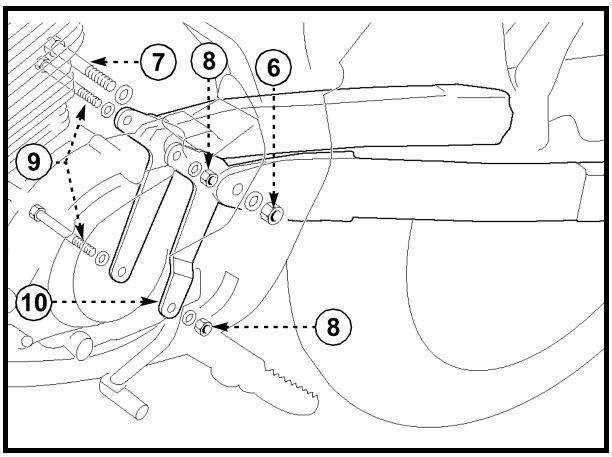
Place a suitable stand beneath the frame and engine.

⚠ WARNING

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



1. Remove
   - Nuts (1)
   - Bolts (2)
   - Brackets (3)
2. Remove
   - Nut (4)
   - Bolt (5)



3. Remove
   - Nut (6)
   - Bolt (7)
4. Remove
   - Engine

NOTE:
Remove the engine from the right side of the motorcycle

5. Remove
   - Nuts (8)
   - Bolts (9)
   - Rear stand (10)

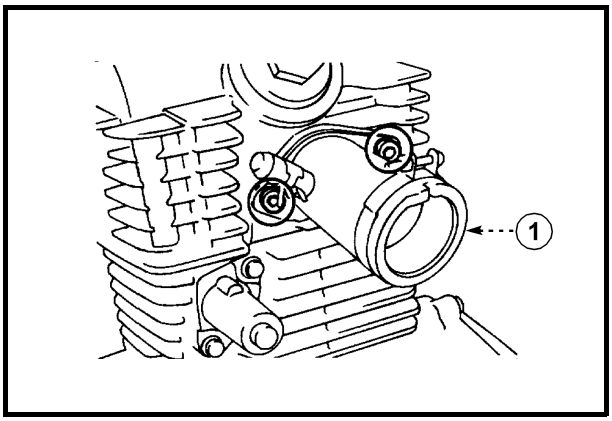
ENGINE DISASSEMBLY

CYLINDER HEAD, CYLINDER AND PISTON

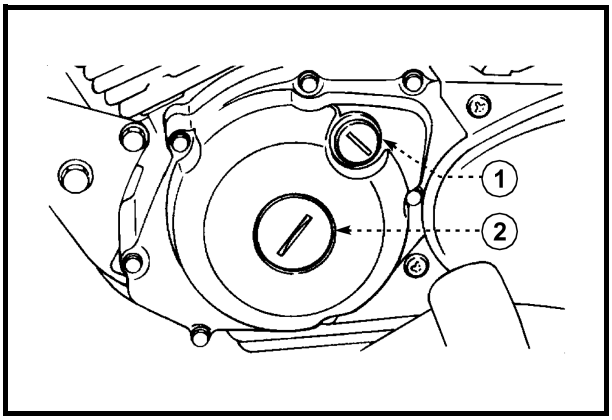
NOTE:

With engine mounted, the cylinder head, camshaft and cylinder can be checked by removing the following parts:

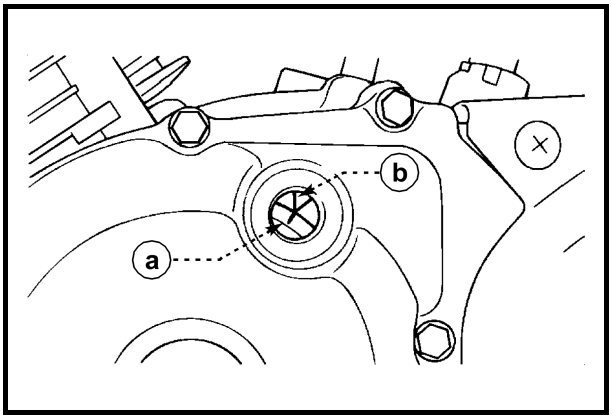
- Seat
- Side covers
- Fuel tank
- Exhaust pipe
- Carburetor
- Clutch cable
- Spark plug lead
- Upper engine stand



1. Remove
   - Spark plug
   - Intake manifold (1)



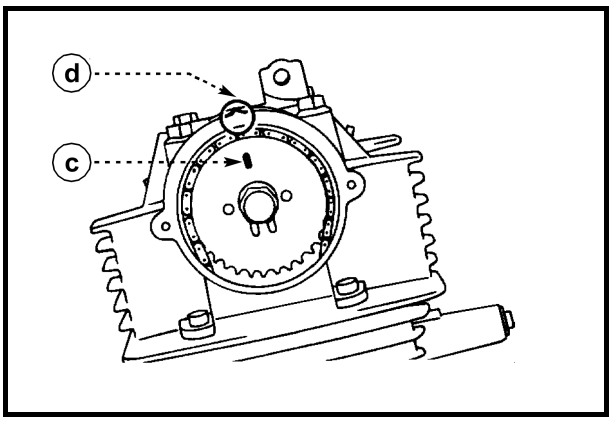
2. Remove
   - Timing check plug (with O-Ring) (1)
   - Center plug (with O-Ring) (2)
3. Remove
   - Valve cover (with O-Ring)
   - Cylinder head side cover (with O-Ring)



4. Align
   - Slit (a) on the magneto with stationary pointer (b) on the cover

NOTE:

Turn the crankshaft counter-clockwise with a wrench.



****

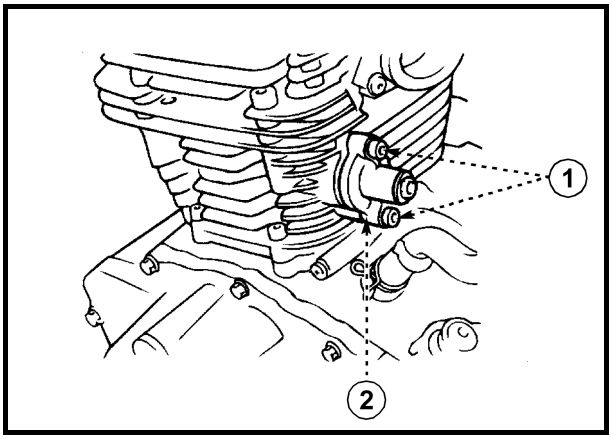
TDC alignment step

- Turn the crankshaft counter-clockwise until the slit (a) matches the stationary pointer (b).
- Align the slit (c) of the drive gear with the stationary pointer (d) of the cylinder head. In this way the piston will be at the top dead centre (TDC).

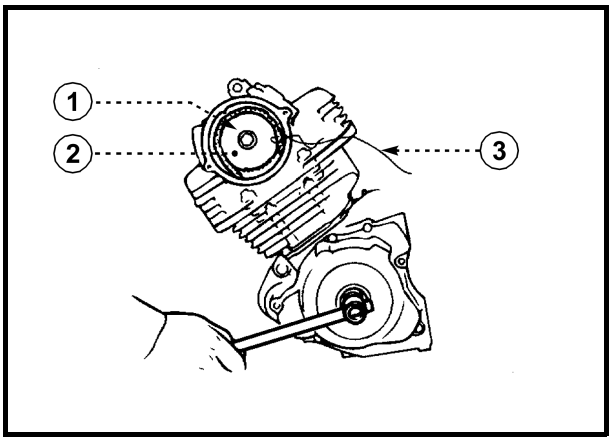
NOTE:

- Check that the piston is at TDC on the compression stroke.
- If not, give the crankshaft one counterclockwise turn.

****



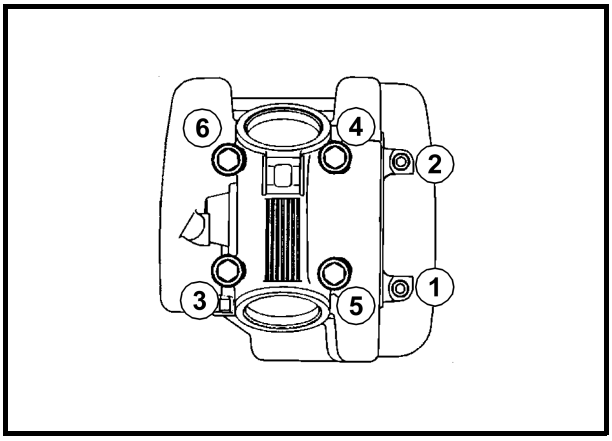
5. Remove
   - Bolt (timing chain tensioner) (1)
   - Timing chain tensioner assembly (2)



6. Remove
   - Bolt (drive gear) (1)
   - Special washer (drive gear) (2)

NOTE:

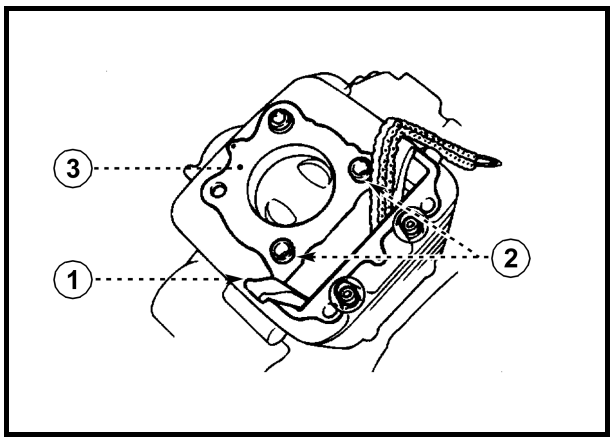
Fasten a safety wire (3) to the timing chain to prevent it from falling into the crankcase cavity.



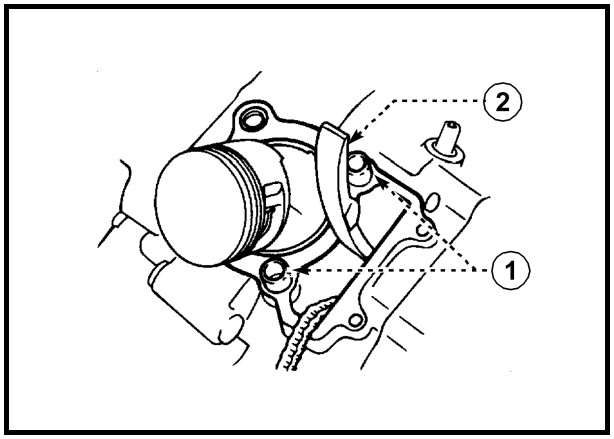
7. Remove
   - Bolts (cylinder head)
   - Cylinder head

NOTE:

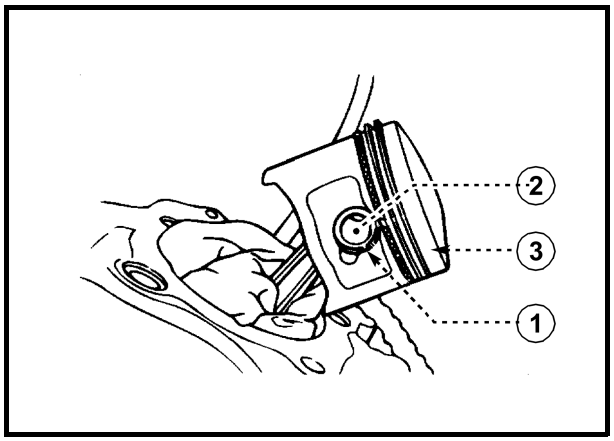
- Loosen the bolts by 1/4 turns each and remove them after all are loosened.
- Loosen the bolts starting with the lowest number one.
- The embossed numbers in the cylinder head designate the tightening sequence.



8. Remove
   - Timing chain guide (exhaust side) (1)
   - Dowel pins (2)
   - Gasket (cylinder head) (3)
   - Bolts (cylinder head)
   - Clutch cable holder
   - Cylinder



9. Remove
   - Dowel pins (1)
   - Gasket (cylinder) (2)



10. Remove
    - Piston pin circlip (1)
    - Piston pin (2)
    - Piston (3)

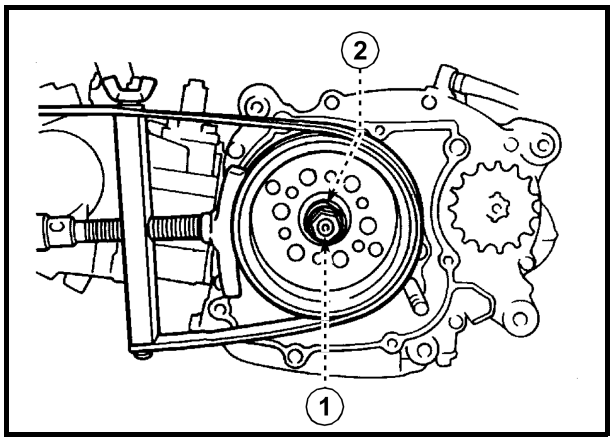
NOTE:

- Before removing the piston pin circlip, cover the crankcase with a clean rag to prevent any object from falling into the crankcase cavity.
- Before removing the piston pin, deburr the circlip grooves and pin hole area. If the piston pin is still difficult to remove, use the piston pin puller.

	Piston pin puller: **90890-01304**

CDI MAGNETO

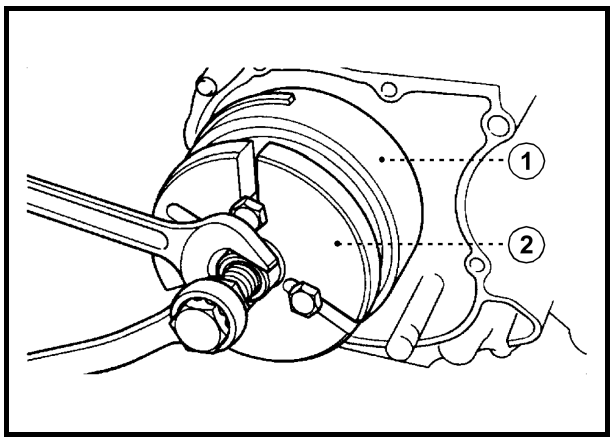
NOTE:
The CDI magneto can be removed while the engine is mounted by removing the shift pedal.



1. Remove
   - Crankcase cover (left)
   - Neutral switch lead
   - Nut (magneto) (1)
   - Washer (2)

NOTE:
Hold the magneto with a rotor holder while loosening the magneto nut.

	Rotor holder: 90890-01701

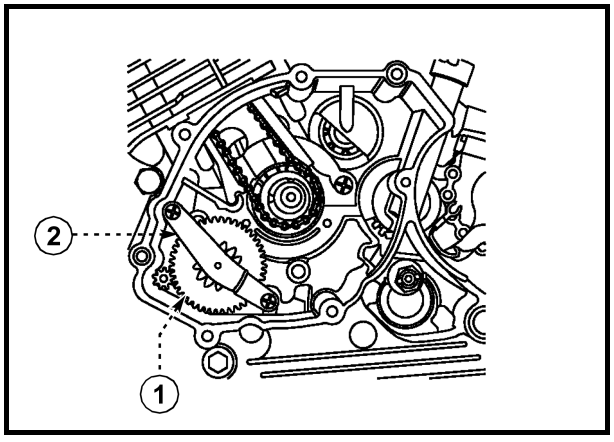


2. Remove
   - CDI magneto (1)
   - Key

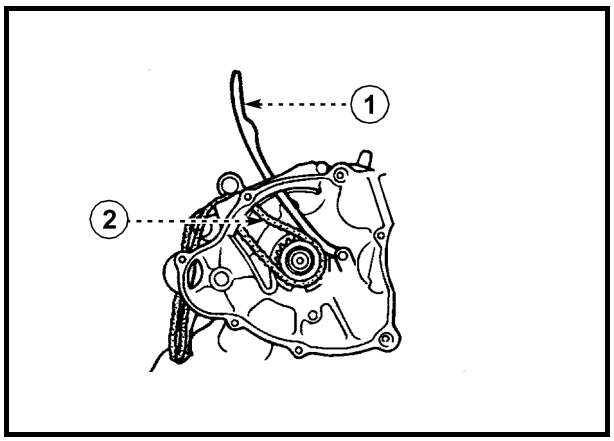
NOTE:
- Remove the CDI magneto with the rotor puller (2).
- Center the rotor puller over the CDI magneto. Make sure after installing the holding bolts that the clearance between the puller and the flywheel is the same everywhere. If necessary, one holding bolt may be turned out slightly to adjust the puller's position.

CAUTION:
Cover the crankshaft tip with the wrench for protection.

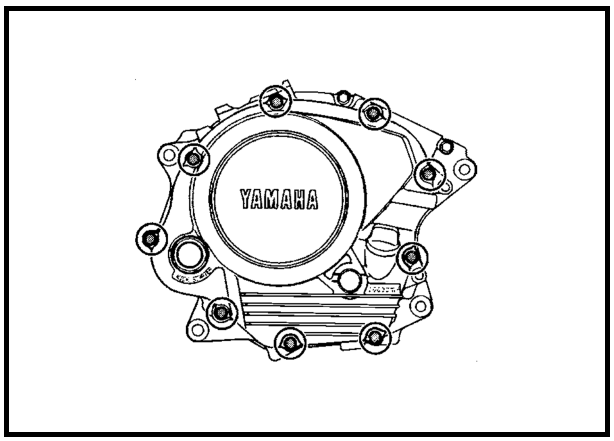
	Rotor puller: 90890-01362



3. Remove
   - Starter gear
   - Washer
4. Remove
   - Plate (2)
   - Starter gear (1)



5. Remove
   - Timing chain guide (1)
   - Timing chain (2)

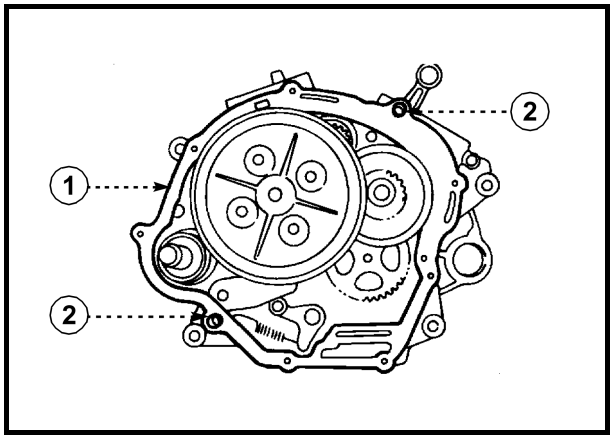


CLUTCH

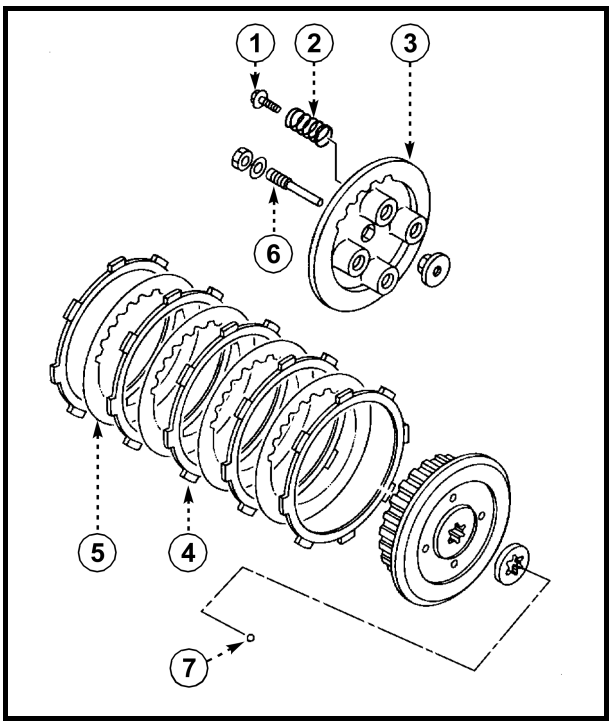
NOTE:
The clutch assembly can be removed while the engine is mounted.
Remove the following parts to carry out this operation
- Footrest
- Shift lever
- Kick starter

1. Remove
   - Crankcase cover (right)

NOTE:
Loosen the bolts in a crisscross pattern.



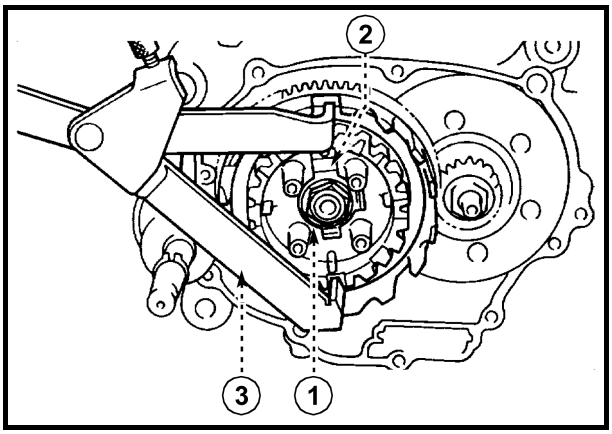
2. Remove
   - Gasket (1)
   - Dowel pins (2)



3. Remove
   - Pressure plate bolts (1)
   - Clutch springs (2)
   - Pressure plates (3)
   - Friction plates (4)
   - Clutch plate (5)

NOTE:
Loosen the pressure plate bolts in a crisscross pattern

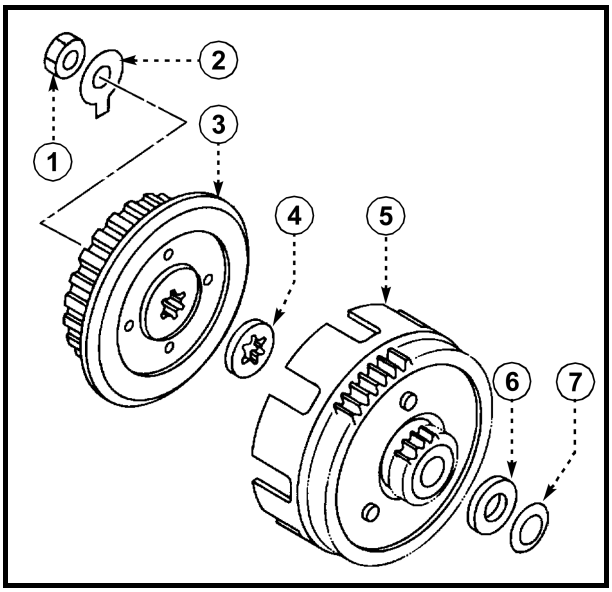
4. Remove
   - Push rod (6)
   - Ball (7)



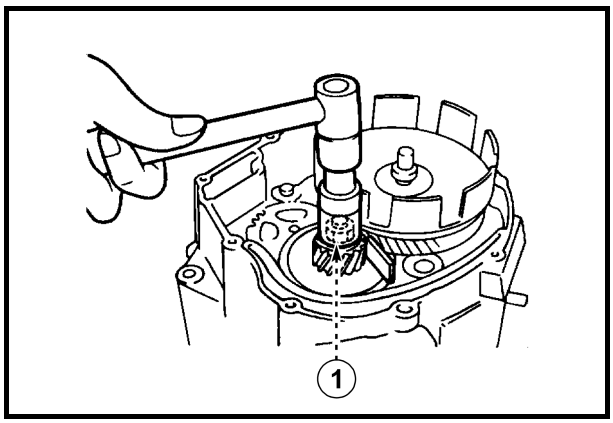
5. Unscrew
   - Nut (clutch boss) (1)

NOTE:
- Straighten the lock washer tab (2).
- Loosen the hub nut (1) while holding the clutch hub with a universal clutch holder (3).

	Universal clutch holder: 90890-04086

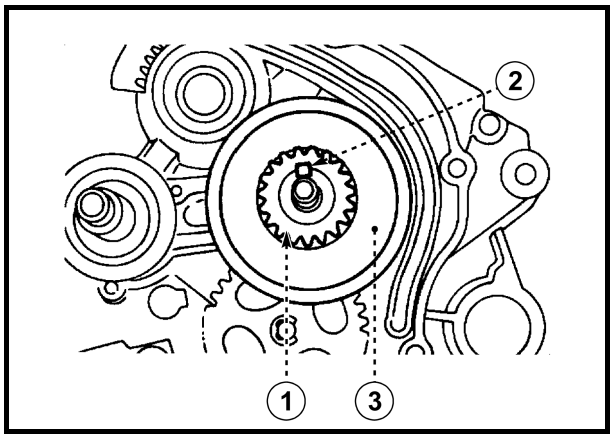


6. Remove
   - Clutch boss nut (1)
   - Lock washer (2)
   - Clutch boss (3)
   - Spacer (4)
   - Clutch housing (5)
   - Spacer (6)
   - Washer (7)

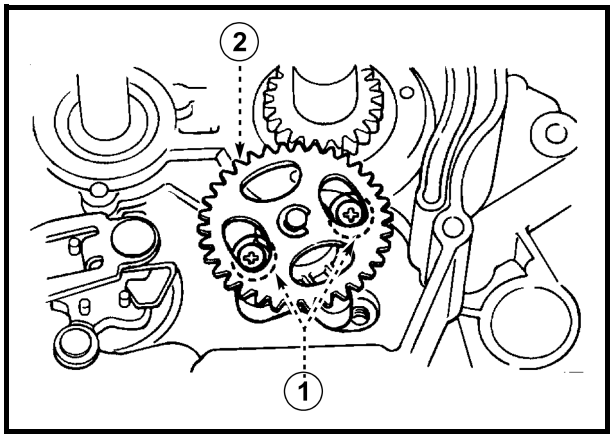


7. Unscrew
   - Nut (1)

NOTE:
- Place a folded aluminium plate between the teeth of the primary drive gear and the teeth of the clutch housing.
- Take care not to damage the gear teeth.



8. Remove
   - Nut
   - Special washer
   - Primary drive gear (1)
   - Key (2)
   - Rotary filter (3)



OIL PUMP

NOTE:
The oil pump can be removed while the engine is mounted.
Remove the following parts to carry out this operation
- Clutch
- Rotary filter

1. Remove
   - Bolt with washer (oil pump) (1)
   - Oil pump assembly (2)
   - Oil suction screen

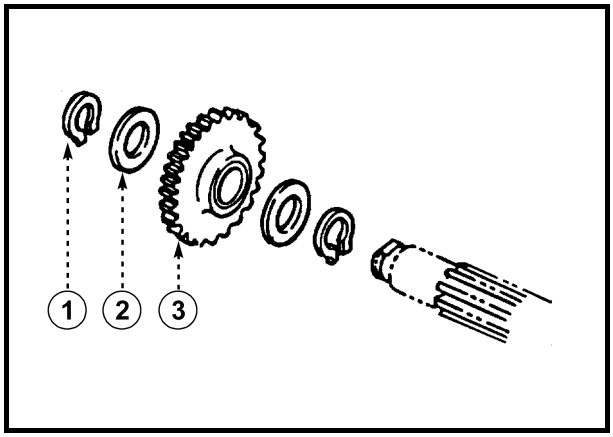
KICK STARTER

NOTE:

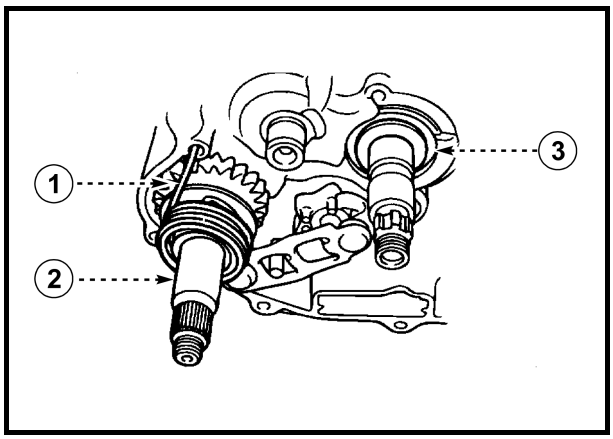
The kick starter can be removed while the engine is mounted.

Remove the following parts to carry out this operation

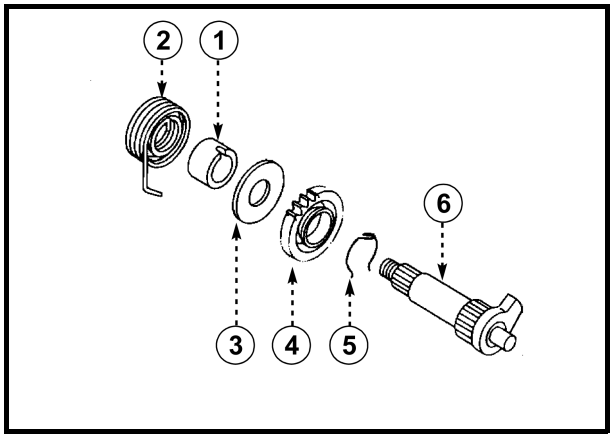
- Exhaust pipe
- Bracket
- Brake pedal
- Shift pedal
- Clutch



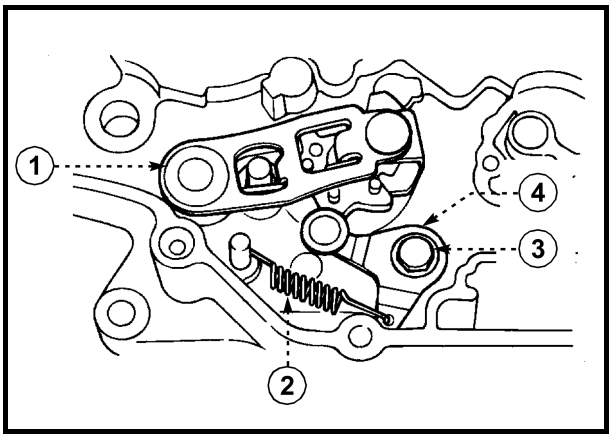
1. Remove
   - Circlip (1)
   - Flat washer (2)
   - Starter gear (3)
   - Special washer
   - Seeger ring



2. Remove
   - Return spring (1)
   - Kick starter assembly (2)
   - Flat washer (3)
   - Seeger ring
   - Kick starter disassembly



3. Remove
   - Spacer (1)
   - Return spring (2)
   - Washer (3)
   - Starter gear (4)
   - Circlip (5)
   - Kick axle (6)



SHIFT SHAFT

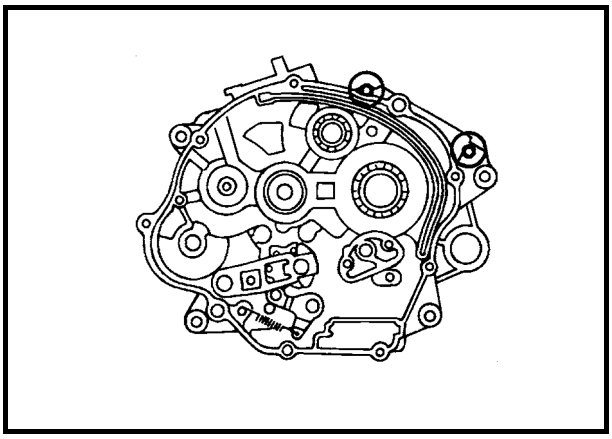
NOTE:

The shift shaft can be removed while the engine is mounted

Remove the following parts to carry out this operation

- Shift pedal
- Clutch
- Kick starter assembly

1. Remove
   - Shift shaft (1)
   - Return spring (2)
   - Bolt (stopper lever) (3)
   - Stopper lever (4)

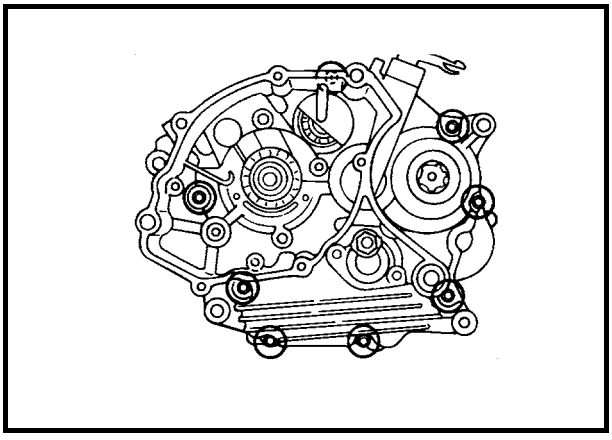


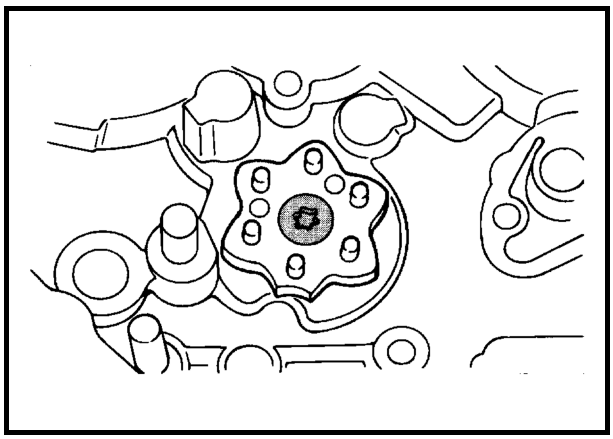
ENGINE COVER

1. Remove
   - Bolts (crankcase)
   - Battery cable stand

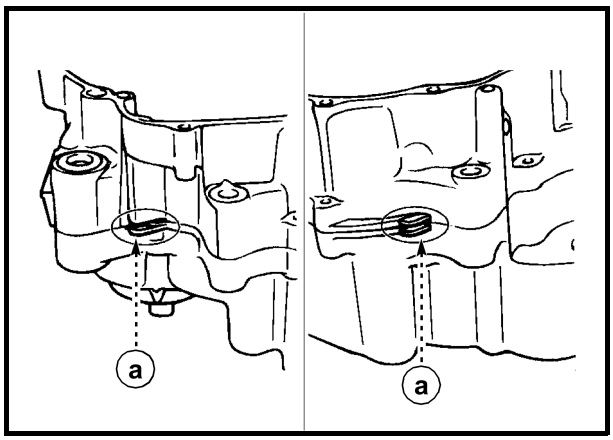
NOTE:

- Loosen the bolts in a crisscross pattern.
- Loosen the bolts by 1/4 turns each and remove them after all are loosened.





2. Remove
   - Segment bolts
   - Use a wrench Torx T-30



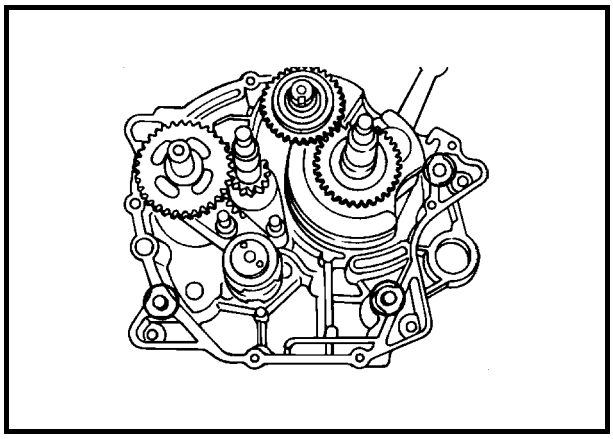
3. Remove
   - Crankcase half (right)

NOTE:

Place the engine with the left crankcase half turned downwards and put in a screwdriver in the crankcase separating grooves (a).

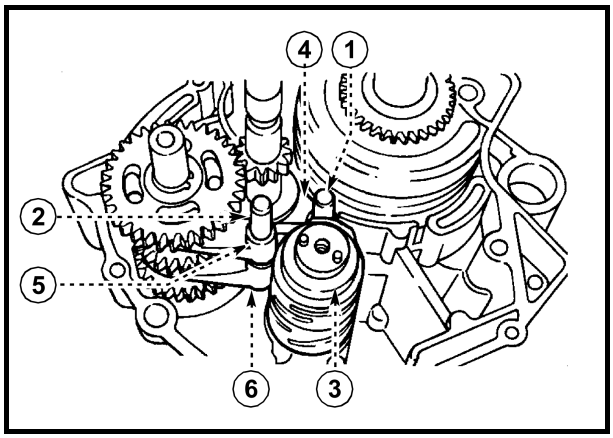
CAUTION:

- **Do not use the screwdriver except in the places shown.**
- **The left crankcase half should be under.**
- **Separate the crankcase halves after removing the segment and the axle circlip.**
- **Do not damage the mating surfaces of the crankcase halves.**

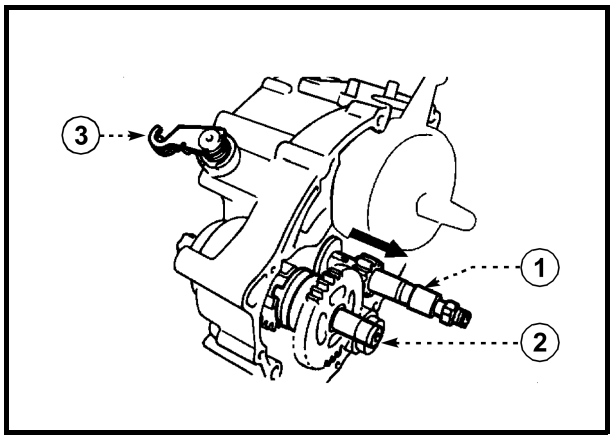


4. Remove
   - Dowel pins

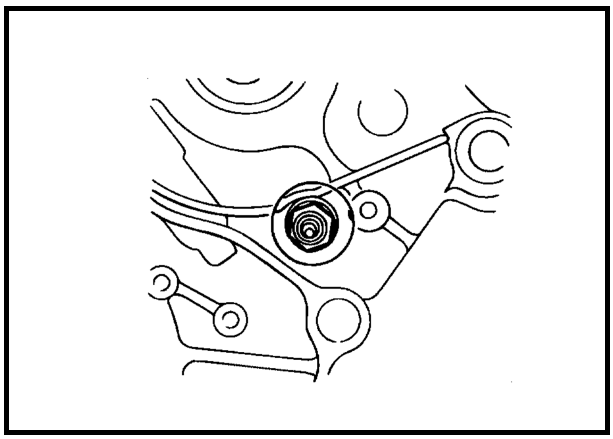
BALANCER, TRANSMISSION AND SHIFTER



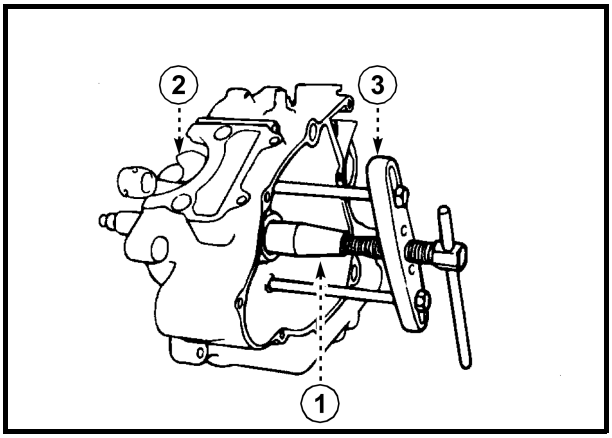
1. Remove
   - Shift fork guide bar (1) (short)
   - Shift fork guide bar (2) (long)
   - Shifter (3)
   - Shift fork (4)
   - Shift fork (5)
   - Shift fork (6)



2. Remove
   - Main axle assembly (1)
   - Push rod n. 2
   - Drive axle assembly (2)
   - Washer
   - Push lever assembly (3)



3. Remove
   - Neutral switch



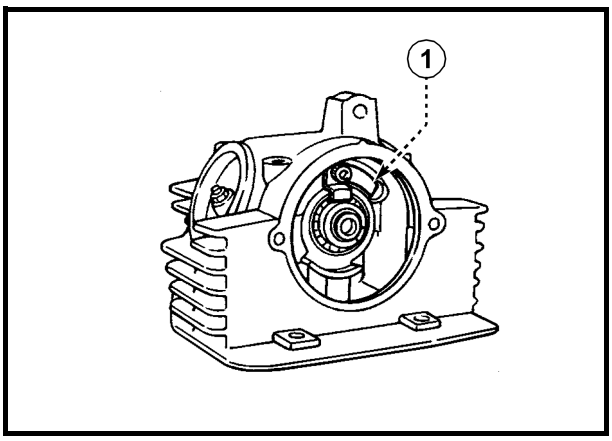
CRANKSHAFT

1. Remove
   - Crankshaft (1) and balancer (2)

NOTE:

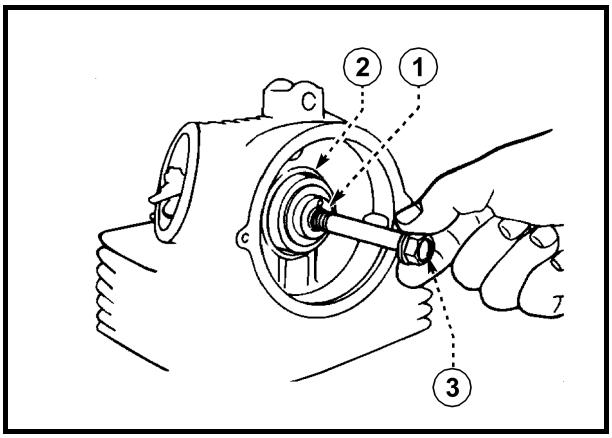
- Remove the crankshaft with a suitable separating tool (3).
- Fully tighten the crankshaft separating tool holding bolts, but make sure that the tool body is parallel with the crankcase cover. If necessary, one holding bolt may be turned out slightly to adjust the separating tool's position.

	Crankshaft separating tool: 90890-01135



ROCKER ARMS, CAMSHAFT AND VALVES

1. Unscrew
   - Valve adjuster locknuts
   - Valve adjusters
2. Remove
   - Stopper plate (1)

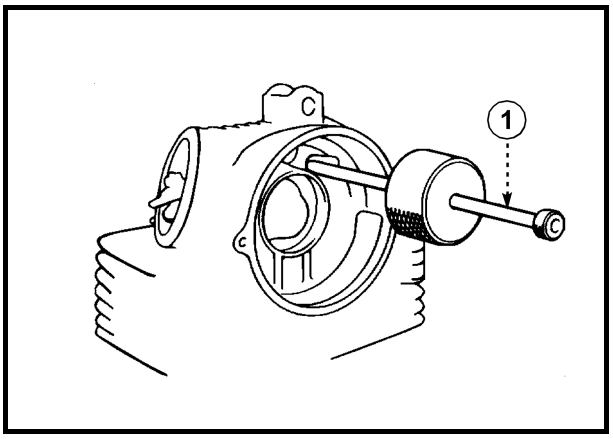


3. Remove
   - Camshaft (1)
   - Spacer (2)

NOTE:

Screw a M8 bolt (3) into the threaded end of the camshaft and pull out the camshaft.

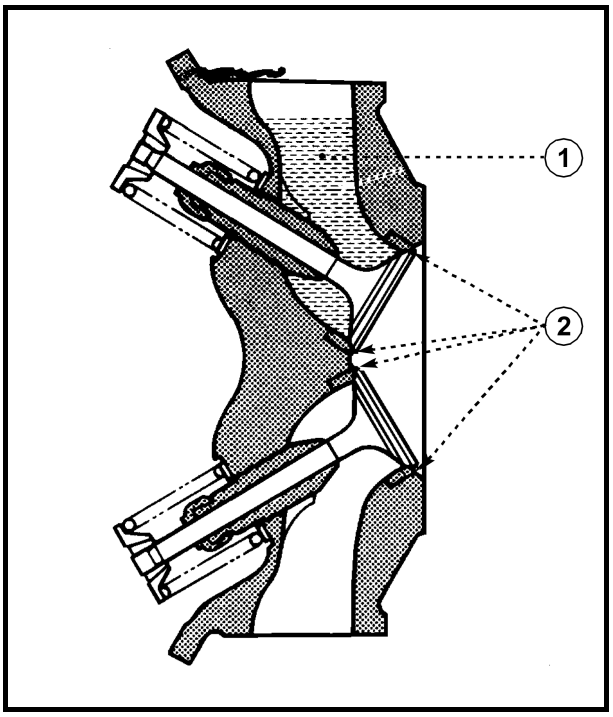
4. Remove
   - Rocker arm shafts
   - Rocker arms (intake and exhaust)



NOTE:
Use a slide hammer (1) to remove the rocker arm shafts.

Slide hammer:
(Bolt)
90890-01085
(Weight)
90890-01084

NOTE:
Before the valves, valve springs, valve seats, etc. are removed from the cylinder head, the valve sealing should be checked.



5. Check
   - Valve sealing
     Leakage from the valve seats → Inspect the valve face, valve seat and seat width. See "VALVE SPRINGS AND VALVES" page 4-22

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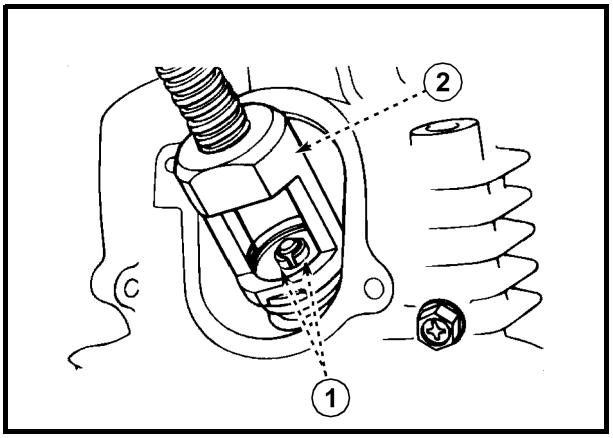
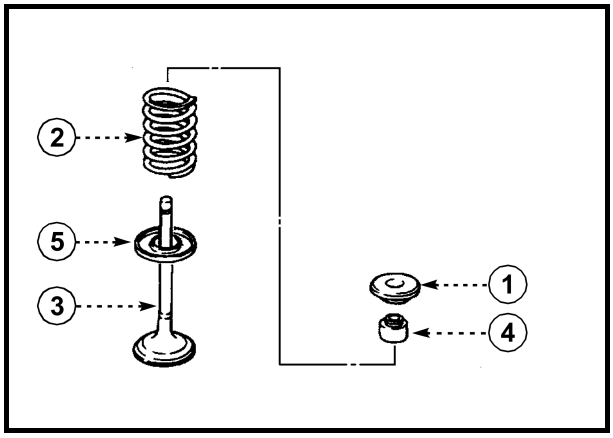
Checking steps
- Pour fuel (1) into the intake chamber and then into the exhaust chamber.
- Check the sealing of both valves.
- Make sure there is no leakage from the valve seats (2).



6. Remove
   - Valve cotters (1)

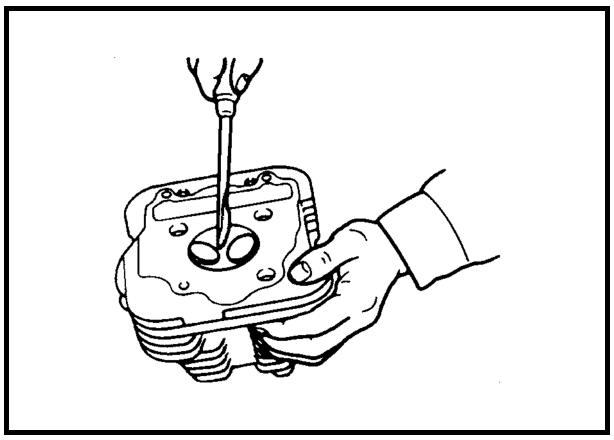
NOTE:
Attach a compressor to compress the valve spring with an adapter (2) between the top retainer and the cylinder head to remove the valve cotters.

Valve spring compressor:
90890-04019



7. Remove
   - Valve retainer (1)
   - Spring (2)
   - Valve (3)
   - Valve stem seal (4)
   - Valve spring seat (5)

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



INSPECTION AND REPAIR

CYLINDER HEAD

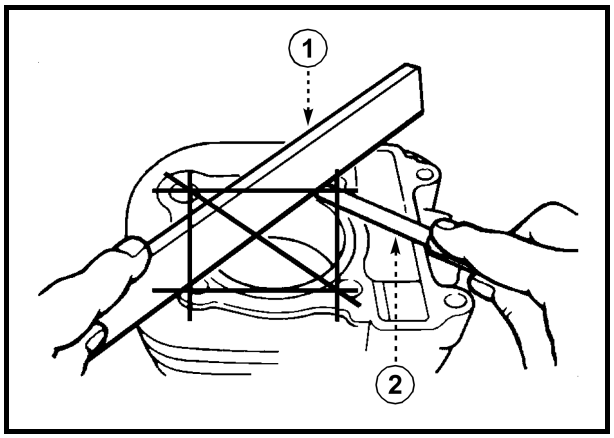
1. Eliminate
   - Carbon deposits (from the combustion chamber)
     Use a rounded scraper.

NOTE:
Do not use a sharp instrument to avoid damaging or scratching
- Spark plug threads
- Valve seats

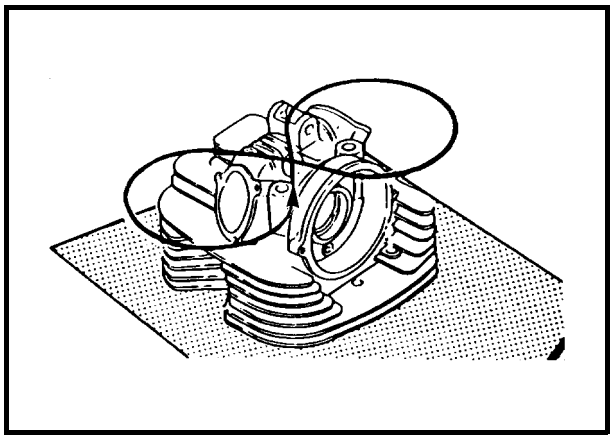
2. Inspect
   - Cylinder head
   - Scratches and damage → Replace
3. Measure
   - Warpage
     Out of specification → Resurface

Cylinder head warpage:
less than 0.03 mm

****



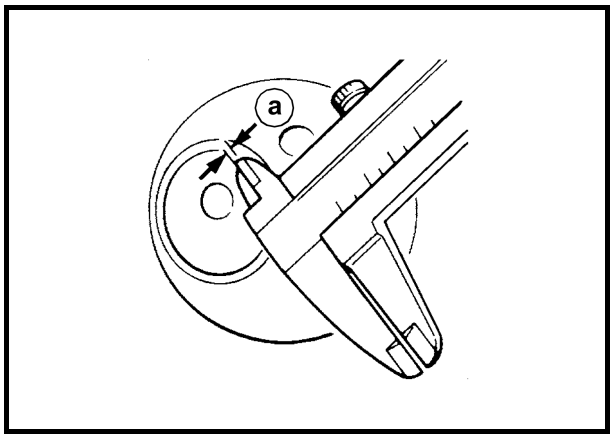
Warpage measurement and resurfacing steps
- Place a straightedge (1) and a feeler gauge (2) across the cylinder head, as shown in the figure.
- Measure the warpage
- If the warpage is out of specification, resurface the cylinder head.

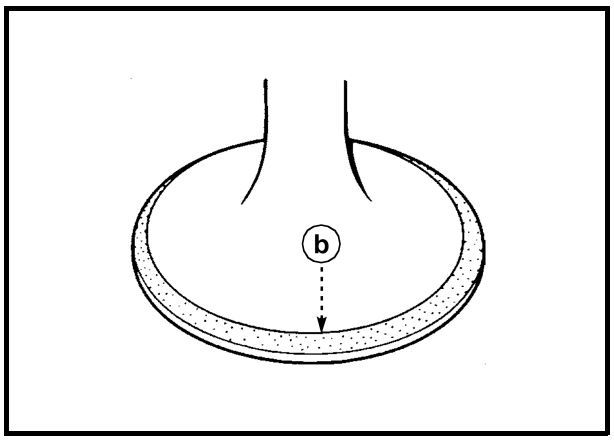


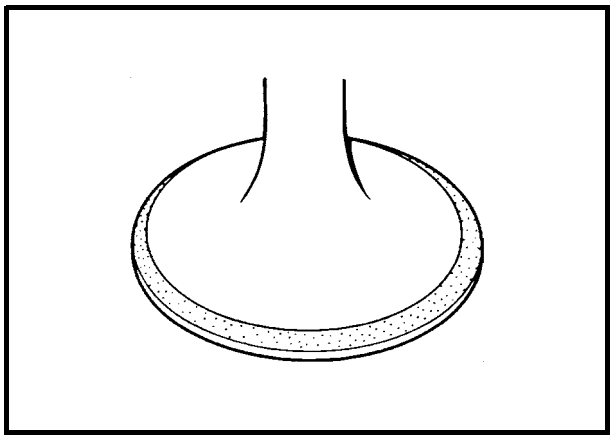
- Place an abrasive paper (400 ~ 600) on a flat surface, and resurface the cylinder head using a figure-eight sanding pattern.

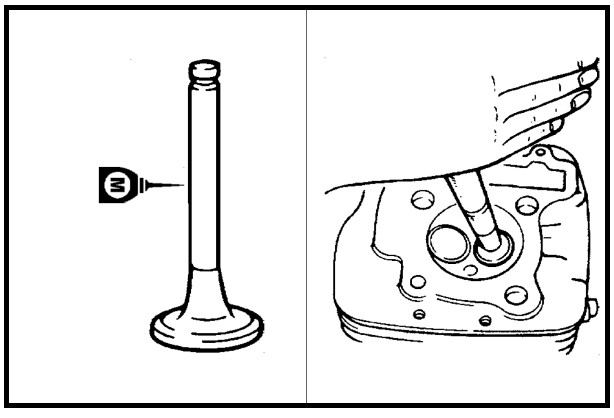
NOTE:
Rotate the cylinder head several times for an even resurfacement.

****









VALVE SEATS

1. Eliminate
   - Carbon deposits (from the valve face and seat)
2. Inspect
   - Valve seats
     Wear and damage → Valve seat grinding
3. Measure
   - Valve seat width (a)
     Out of specification → Valve seat grinding

Valve seat width
Intake: 0.9 ~ 1.1 mm
<Limit: 1.6 mm>
Exhaust: 0.9 ~ 1.1 mm
<Limit: 1.6 mm>

****

Measurement steps

- Apply Mechanic's blueing dye (Dykem) (b) to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto its seat to make a clear pattern.
- Measure the valve seat width.
- Where the valve seat and valve face made contact, blueing will be removed
- If the valve seat is too wide, too narrow, or the seat is not centered, the valve seat must be resurfaced.

****

4. Grinding
   - 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.

****

Valve lapping steps

- Apply a coarse lapping compound onto the valve sealing surface.

CAUTION:

Do not let compound enter the gap between the valve stem and the guide.

- Apply 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.

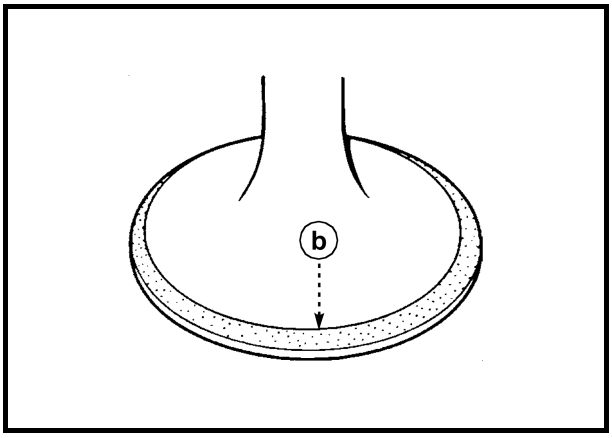
NOTE:

For best valve lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.

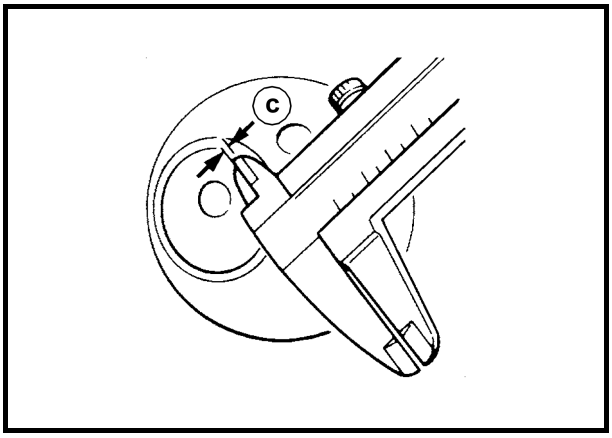
- Apply a fine lapping compound to the valve face and repeat the above steps.

NOTE:

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



- Apply Mechanic's blueing dye (Dykem) (b) to the valve face.
- Install the valve into the cylinder head.
- Press the valve onto the seat until it fits perfectly.
- Measure the valve seat width (c) again. If the valve seat width is out of specification, reface and lap the valve seat.



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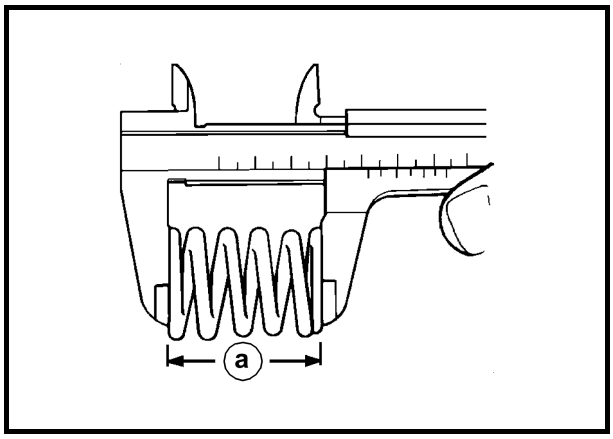
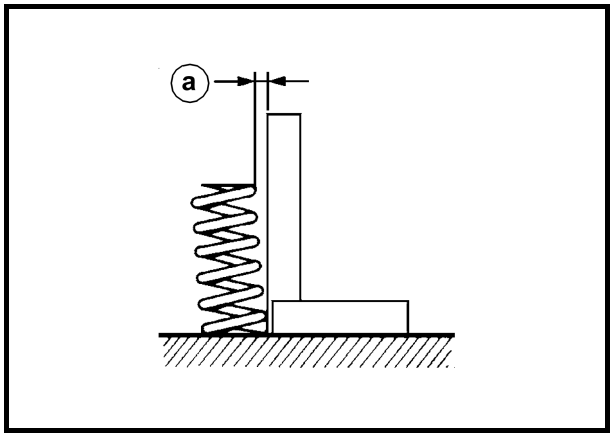


VALVE SPRINGS AND VALVES

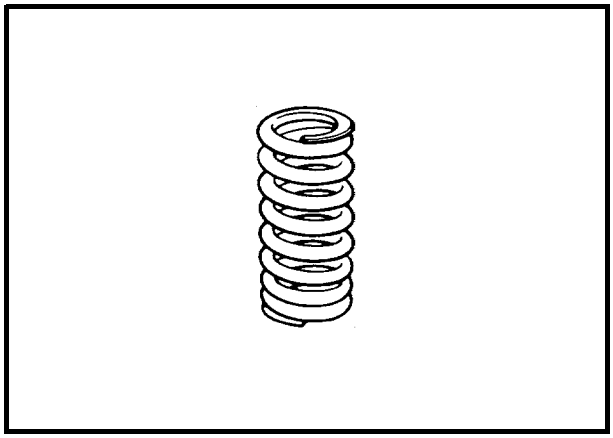
1. Measure
   - Valve spring free length (a).
     Out of specification → Replace

Valve spring free length:
38.78 mm
<Minimum value: 37.0 mm>

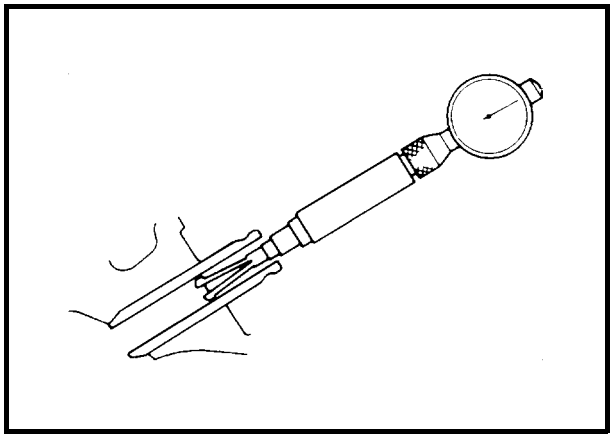


2. Measure
   - Spring tilt (a)
     Out of specification → Replace

Maximum spring tilt:
1.7 mm

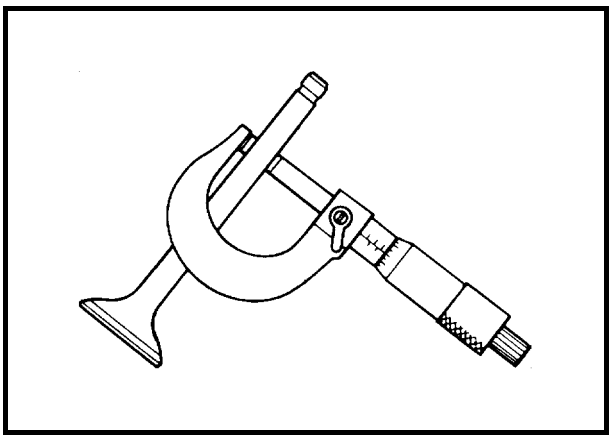


3. Measure
   - Spring contact area
     Wear and damage → Replace



4. Measure
   - Valve guide inside diameter
     Out of specification → Replace

Valve guide inside diameter
Intake: 5.000 ~ 5.012 mm
<Maximum value: 5.042 mm>
Exhaust: 5.000 ~ 5.012 mm
<Maximum value: 5.042 mm>

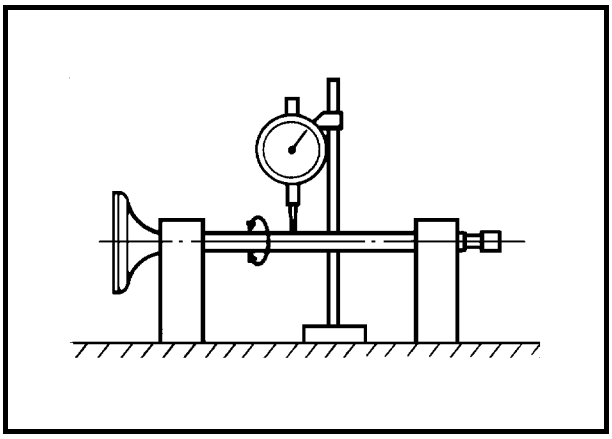


5. Measure

Stem-to-guide clearance = guide inside diameter – Valve stem diameter

Maximum stem-to-guide clearance Intake:
0.010 ~ 0.037 mm
<Maximum value: 0.08 mm>
Exhaust: 0.025 ~ 0.052 mm
<Maximum value: 0.10 mm>

Out of specification → Replace the valve guide



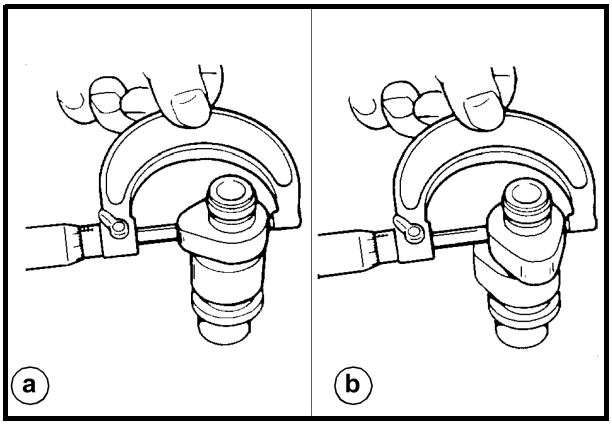
6. Measure
- Runout (valve stem)
  Out of specification → Replace

Maximum runout:
0.01 mm

CAMSHAFT INSPECTION

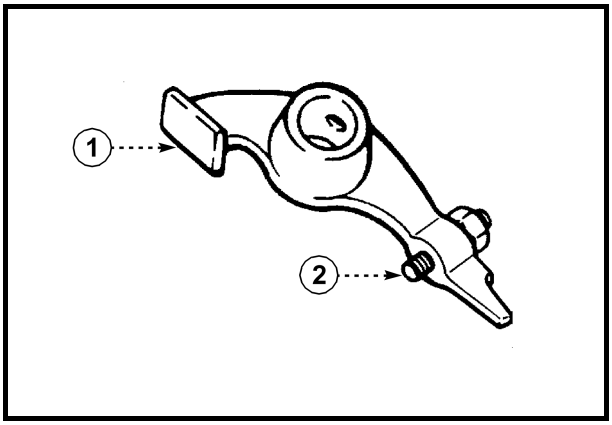
1. Check
- Cam lobes
  Pitting, scratches and blue discoloration → Replace

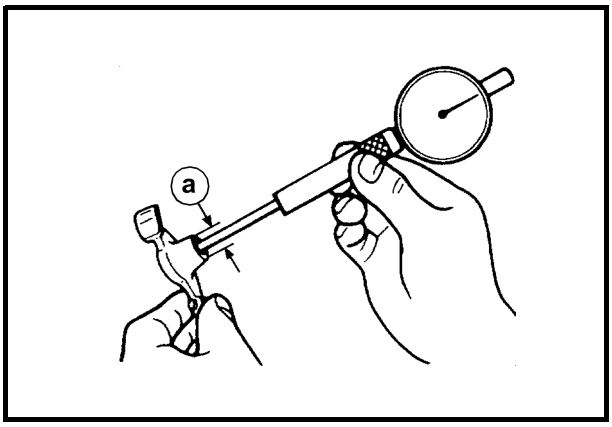
2. Measure
- Cam length (a-b)
  Out of specification → Replace

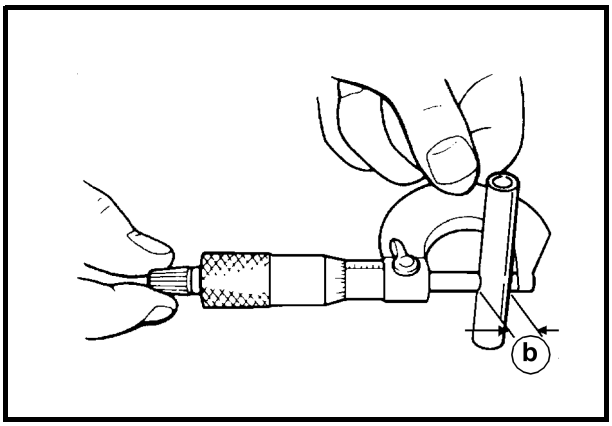


Cam length:
Intake: (a) 25.881 ~ 25.981 mm
<Minimum value: 25.851 mm>
Intake: (b) 21.195 ~ 21.295 mm
<Minimum value: 21.165 mm>
Exhaust: (a) 25.841 ~ 25.941 mm
<Minimum value: 25.811 mm>
Exhaust: (b) 21.05 ~ 21.15 mm
<Minimum value: 21.02 mm>

3. Inspect
- Oil passage in the camshaft
  Stuffed → Blow out oil passage with compressed air







ROCKER ARMS AND ROCKER ARM SHAFTS INSPECTION

1. Inspect
   - Cam contact surface (1)
   - Adjuster surface (2)

   Wear, grooves, scratches and blue discoloration → Replace

****

Inspection steps

- Inspect the two contact areas on the rocker arms for signs of unusual wear.
- Rocker arm shaft hole.
- Cam contact surface.
- Excessive wear → Replace
- Inspect the surface condition of the rocker arm shafts.
- Grooves and scratches → Replace or check the lubrication system.
- Measure the inside diameter (a) of the rocker arm holes.
- Out of specification → Replace

Inside diameter 10.000 ~ 10.015 mm of the rocker arm hole <Maximum value: 10.03 mm>

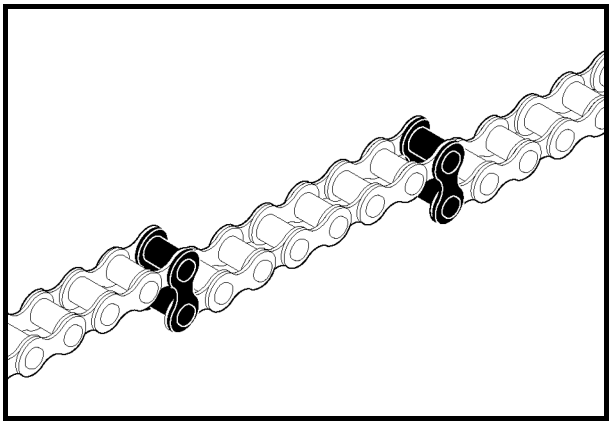
- Measure the outside diameter (b) of the rocker arm holes.

  Out of specification → Replace

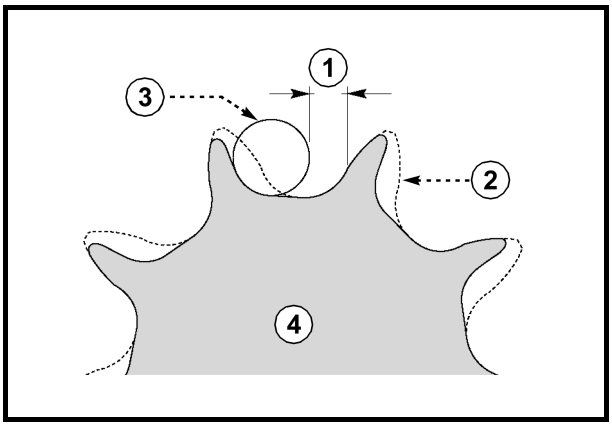
Outside diameter 9.981 ~ 9.991 mm of the rocker arm shaft <Minimum value: 9.95 mm>

****

TIMING CHAIN, SPROCKETS AND CHAIN GUIDES

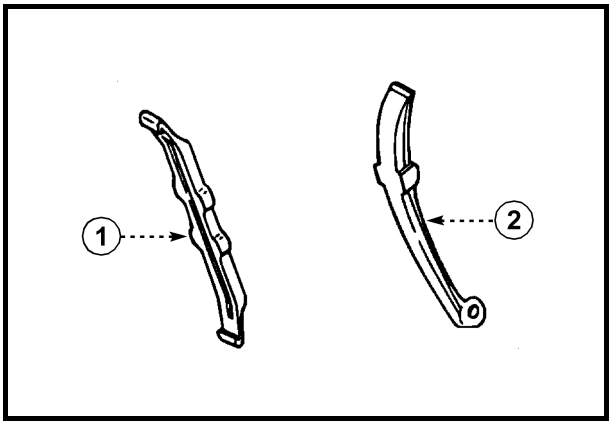


1. Inspect
   - Timing chain
     Stiffness and damage → Replace chain and sprockets

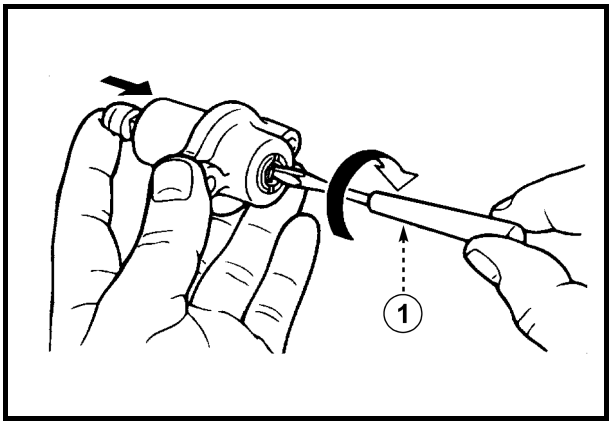


2. Inspect
   - Sprocket
     Wear and damage → Replace sprockets and timing chain

(1) Distance equal to 1/4 tooth
(2) Correct shape of the tooth
(3) Pin
(4) Sprocket



3. Inspect
   - Timing chain guide (exhaust side) (1)
   - Timing chain guide (intake side) (2)
     Wear and damage → Replace



TIMING CHAIN TENSIONER

1. Check
   - One-way cam operation
     Unsmooth operation → Replace

****

Checking steps

- While pressing the tensioner rod lightly with fingers, use a screwdriver 1 and wind the tensioner rod up fully clockwise.
- When releasing the screwdriver, make sure that the tensioner rod will come out smoothly.
- If not, replace the chain tensioner assembly.

****

CYLINDER AND PISTON

1. Inspect
   - Cylinder and piston walls
     Vertical scratches → Rebore or replace cylinder and piston
2. Measure
   - Cylinder-to-piston clearance

****

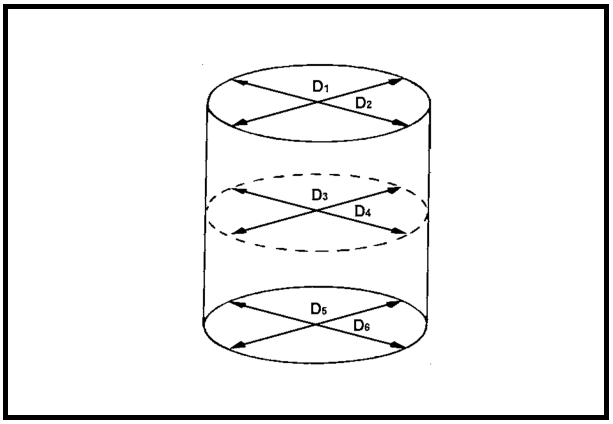
Measurement steps

1st step

- Measure the cylinder bore "C".

NOTE:

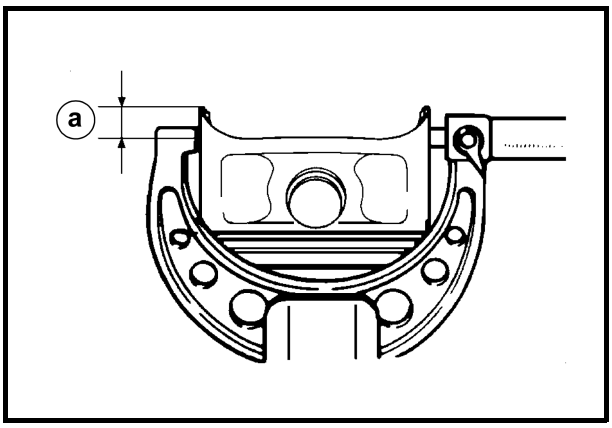
Measure the cylinder bore "C" in a crisscross pattern and at right angles to the crankshaft. Then, find the average of the measurements.



Cylinder bore "C"	54.000 ~ 54.018 mm
Taper limit "T"	0.05 mm
Maximum out of round "R"	0.01 mm

"C" = D maximum
"T" = (D_1 - D_2 maximum) - (D_5 - D_6 maximum)
"R" = (D_1, D_3, D_5 maximum) - (D_2, D_4, D_6 minimum)

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



2nd step

• Measure the piston skirt "P" with a micrometer.
(a) 4.5 mm from the piston bottom edge.

	Piston diameter (P)
Standard	53.977 ~ 53.996 mm

Oversize	I°
	II°

• If the value is out of specification, replace the piston and piston rings as a set.

3rd step

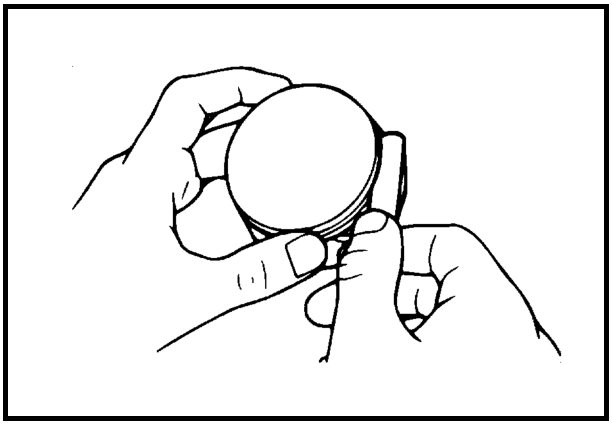
• Calculate the piston-to-cylinder clearance using the following formula

Cylinder-to-piston clearance = Cylinder bore "C" – Piston "skirt" diameter "P"

Cylinder-to-piston clearance:
0.020 ~ 0.028 mm
<Maximum value: 0.15 mm>

• If the value is out of specification, rebore the cylinder and replace the piston and piston rings as a set.

****

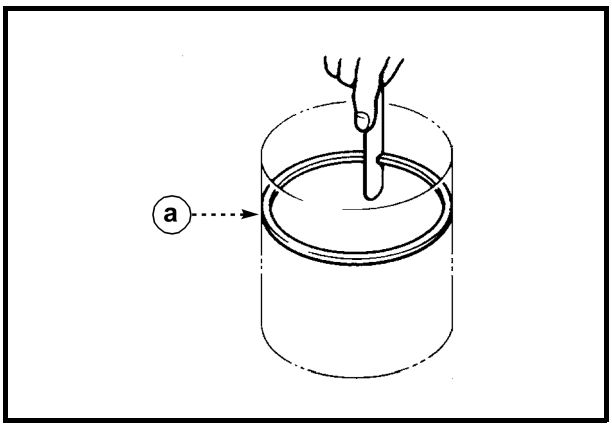


PISTON RING INSPECTION

1. Measure
 • Side clearance
 Out of specification → Replace the piston and piston rings as a set.

NOTE:
Eliminate the carbon deposits from the piston ring grooves before measuring the side clearance.

Side clearance (piston rings)
Top piston ring:
0.03 ~ 0.07 mm
<Maximum value: 0.12 mm>
Second piston ring:
0.02 ~ 0.06 mm
<Maximum value: 0.12 mm>



2. Position
   • Piston rings into the cylinder

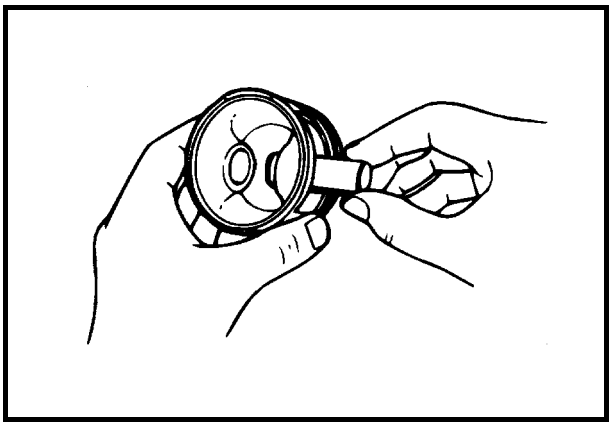
NOTE:
Push the ring with the piston crown so that the ring will be parallel to the cylinder edge.

(a) 5 mm

3. Measure
   • End gap
     Out of specification → Replace

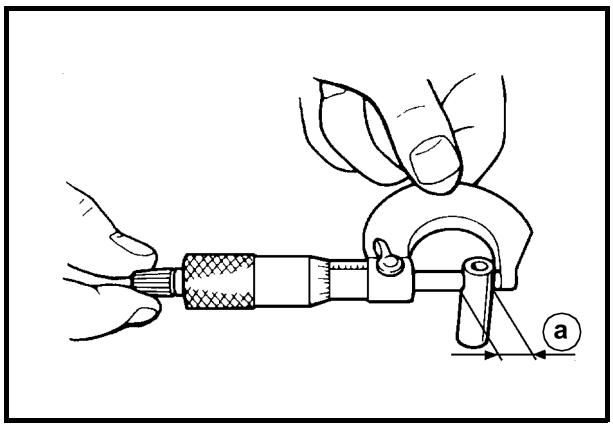
NOTE:
You cannot measure the end gap on the expander spacer of the oil ring.
If the oil ring shows excessive gap, replace all three rings.

End gap top piston ring:
0.15 ~ 0.30 mm
<Maximum value: 0.40 mm>
Second piston ring:
0.15 ~ 0.30 mm
<Maximum value: 0.40 mm>
Oil ring: 0.2 ~ 0.7 mm



PISTON PIN INSPECTION

1. Inspect
   • Piston pin
     Blue discoloration and grooves → Replace and then check the lubrication system
2. Measure
   • piston-to-piston pin clearance



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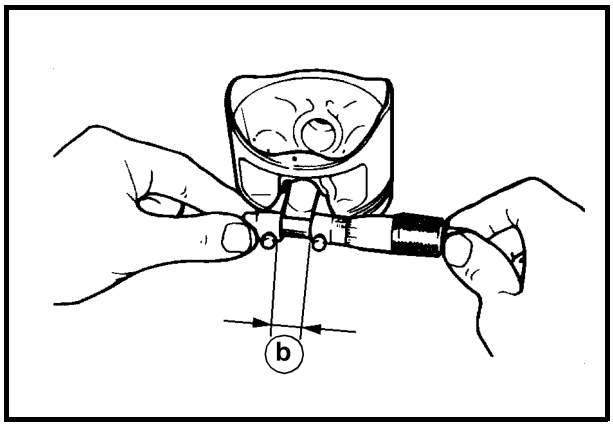
Measurement steps

- Measure the piston pin outside diameter (a)
  Out of specification → Replace the piston pin

Piston pin outside diameter:
14.991 ~ 15.000 mm
<Minimum value: 14.975 mm>

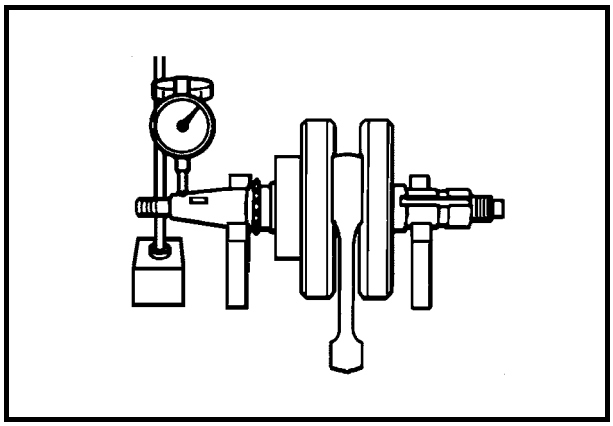


- Measure the piston pin diameter (b) inside the piston.
- Calculate the piston-to-piston pin clearance applying the following formula

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

- If the value is out of specification, replace the piston.

Piston-to-piston pin clearance:
0.009 ~ 0.013 mm

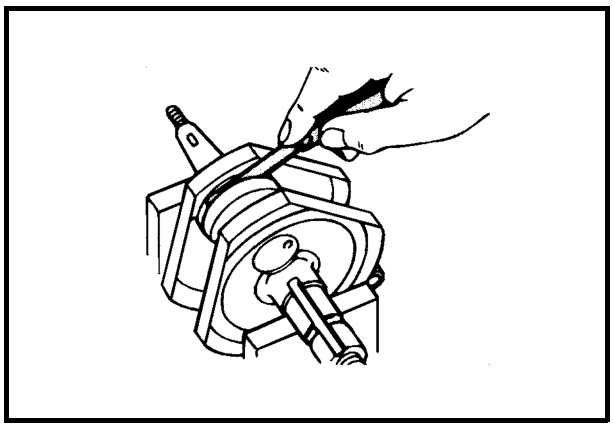


CRANKSHAFT

1. Measure
   - Crankshaft runout
     Out of specification → Replace the crankshaft and/or bearings.

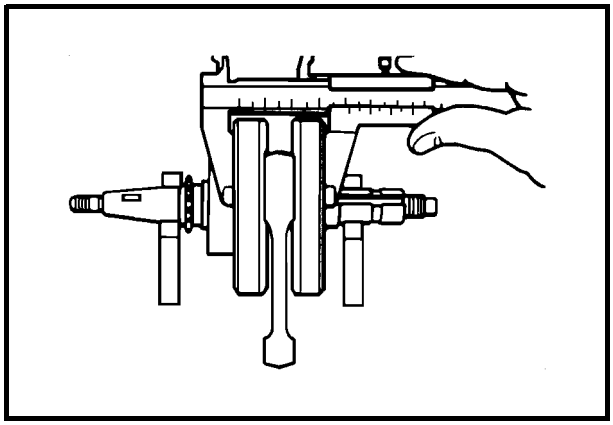
NOTE:
Measure the crankshaft runout turning the whole assembly.

Maximum runout: 0.03 mm



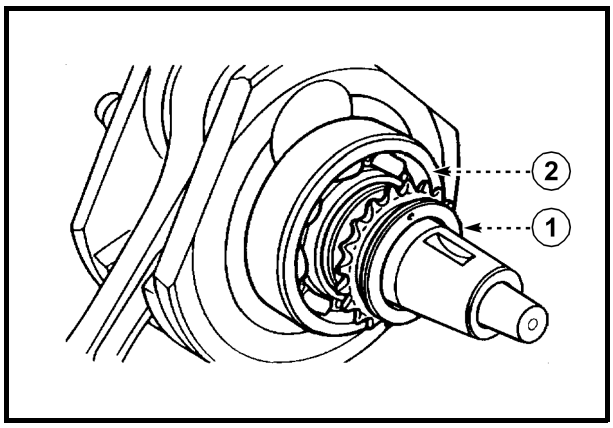
2. Measure
   - Connecting rod side clearance
     Out of specification → Replace big end bearing, crank pin and/or connecting rod.

Connecting rod side clearance:
0.15 ~ 0.45 mm
<Maximum value: 0.8 mm>

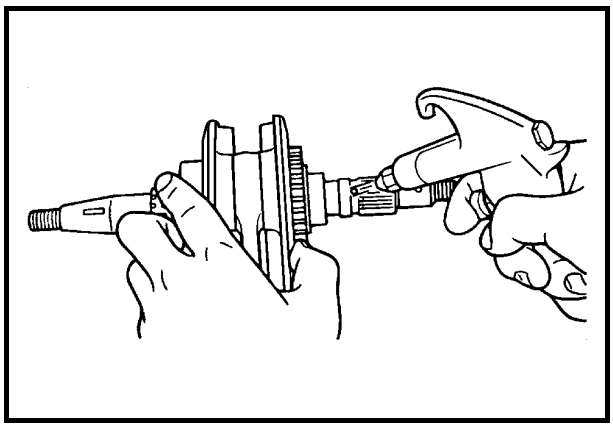


3. Measure
   - Crankshaft width
     Out of specification → Replace crankshaft

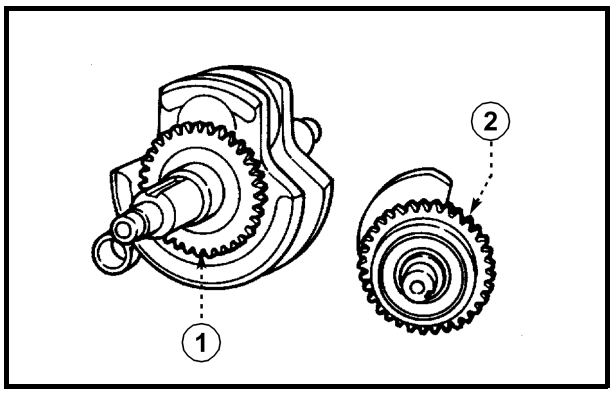
Crankshaft width:
46.95 ~ 47.00 mm



4. Inspect
   - Crankshaft sprocket (1)
     Wear and damage → Replace crankshaft
   - Bearing (2)
     Wear and damage → Replace bearing

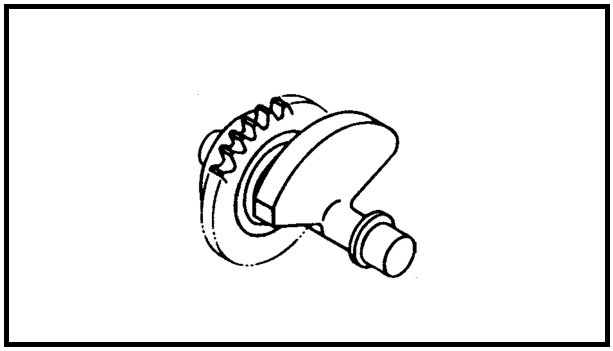


5. Inspect
   - Oil passage in crankshaft
     Stuffed → Blow out oil passage with compressed air

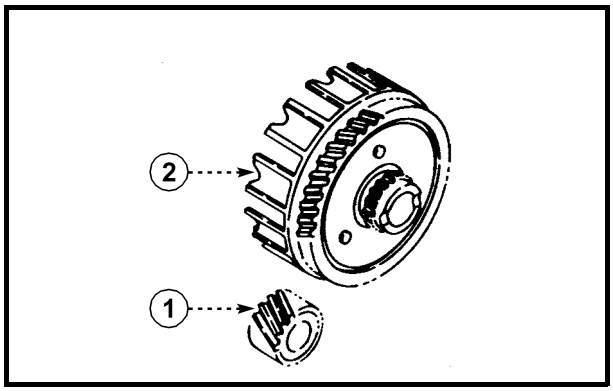


BALANCER INSPECTION

1. Inspect
   - Balancer drive gear teeth (1)
   - Balancer driven gear teeth (2)
     Wear and damage → Replace the assembly



2. Inspect
   - Balancer
     Wear, warpage and damage → Replace

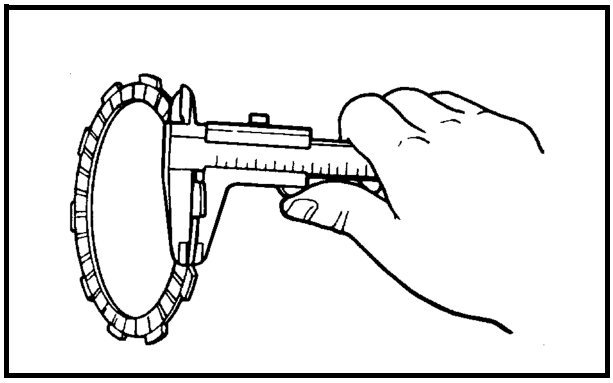


CLUTCH HOUSING INSPECTION

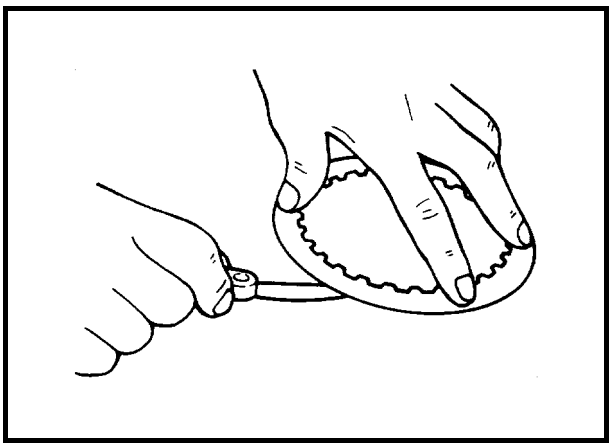
1. Inspect
   - Drive gear teeth (1)
   - Clutch housing drive gear (2)
     Wear and damage → Replace both gears
     Excessive noise during operation → Replace both gears

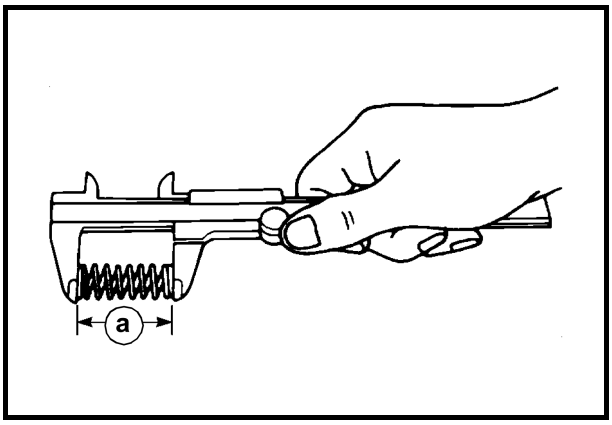
CLUTCH INSPECTION

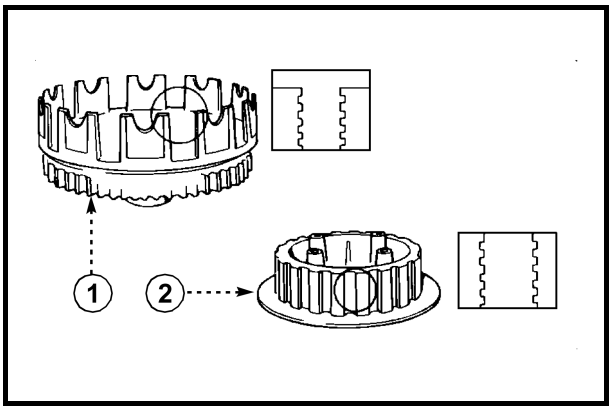
1. Inspect
   - Friction plates
     Wear and damage → Replace the friction plate assembly
2. Measure
   - Friction plate thickness
     Out of specification → Replace the friction plate assembly
     Measure at four places.

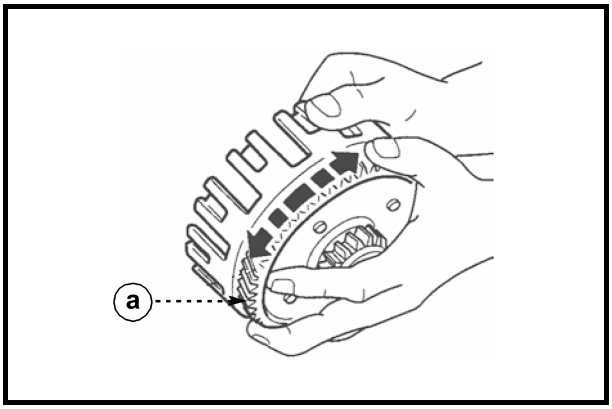


Friction plate thickness:
3.0 mm
<Minimum value: 2.80 mm>









3. Inspect
   - Clutch plates
     Damage → Replace the friction plate assembly
4. Measure
   - Clutch plate warpage
     Out of specification → Replace the plate assembly
     Use a flat surface and a feeler gauge for the measurement

Clutch plate maximum warpage: less than 0.05 mm

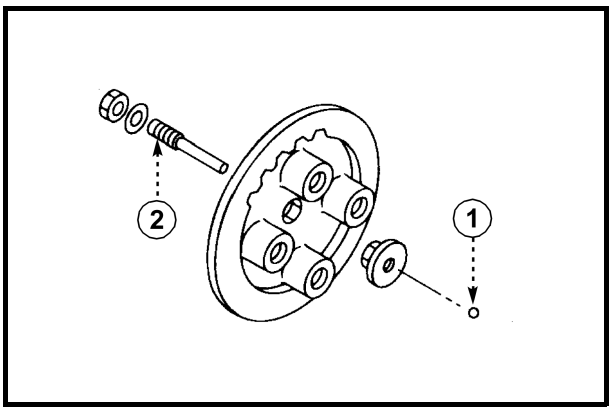
5. Inspect
   - Clutch springs
     Damage → Replace the spring assembly
6. Measure
   - Spring free length (a)
     Out of specification → Replace the spring assembly

Spring free length: 31.0 mm <Minimum value: 29.0 mm>

7. Inspect
   - Clutch housing teeth (1)
     Burrs, wear and damage → Eliminate the projections or replace the clutch housing
   - Clutch hub grooves (2)
     Projections, wear and damage → Replace the clutch hub

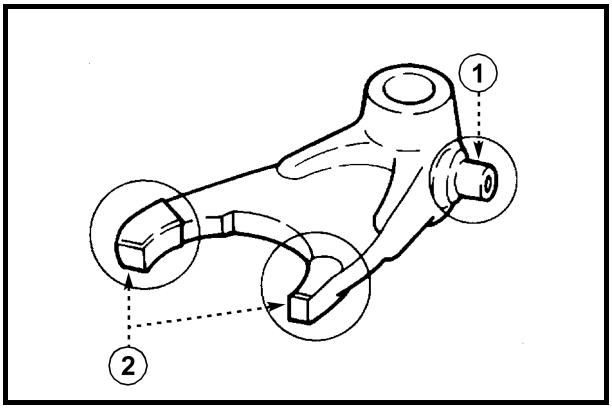
NOTE:
Projections on the clutch housing teeth and clutch hub grooves will cause erratic operation.

8. Inspect
   - Primary drive gear (a)
     Excessive clearance, projections, wear and damage → Replace the clutch housing Circumferential play (if present) → Replace the clutch housing



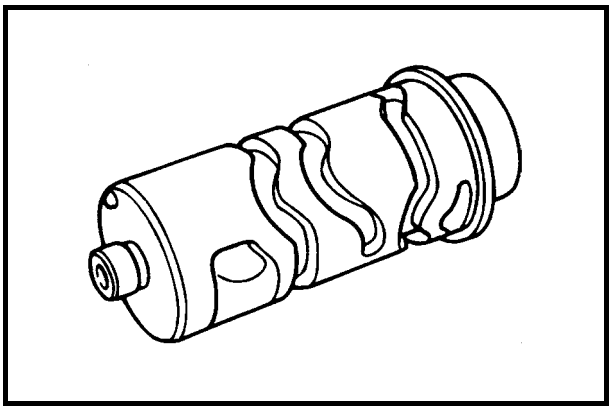
PUSH ROD INSPECTION

1. Inspect
   - Ball (1)
   - Push rod (2)
     Wear and damage → Replace

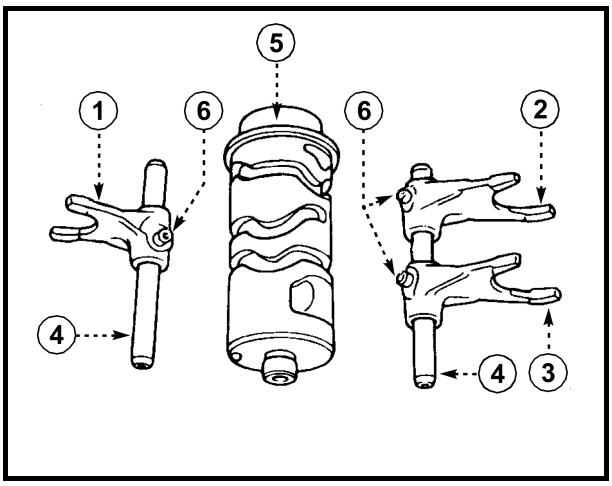


FORK AND SHIFTER INSPECTION

1. Inspect
   - Fork guide bar (1)
   - Shift end (2)
     Scratches, warpage, wear and damage → Replace



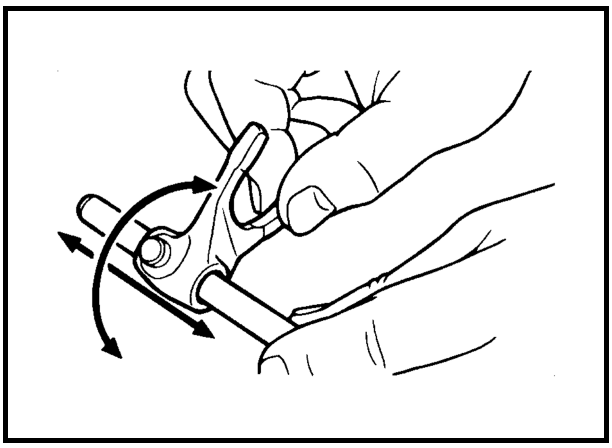
2. Inspect
   - Shifter grooves
     Wear, damage and scratches → Replace
   - Shifter pin
     Wear and damage → Replace



3. Inspect
   - Right center shift fork (1)
   - Left upper shift fork (2)
   - Left lower shift fork (3)
   - Fork guide bar (4)
   - Shifter (5)
   - Guide bars (6)
     Roll the fork guide bar on a flat surface.
     Bends → Replace

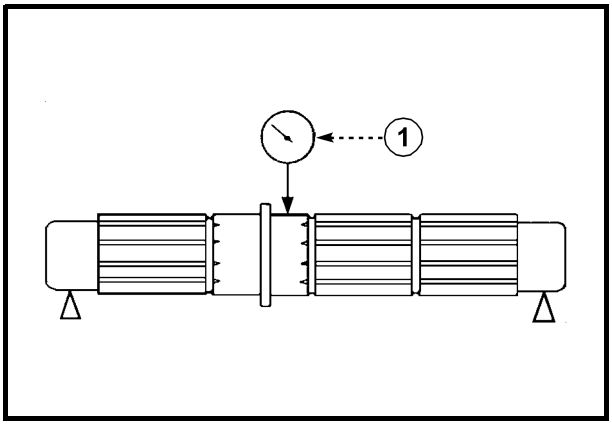
⚠ WARNING

Do not attempt to straighten a bent fork guide bar.

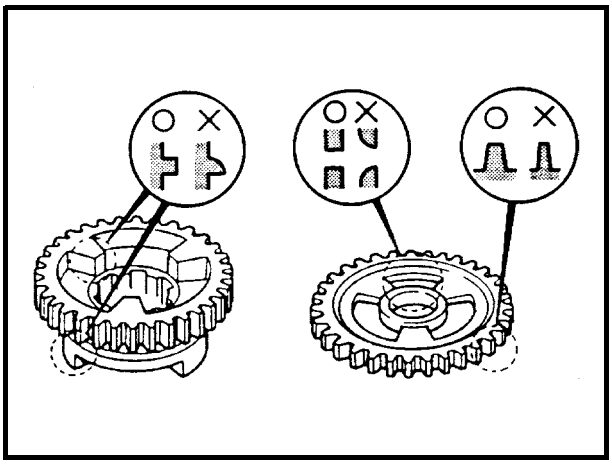


4. Check
   - Shift fork movement (on the fork guide bar)
     Unsmooth operation → Replace the shift fork and the guide bar.

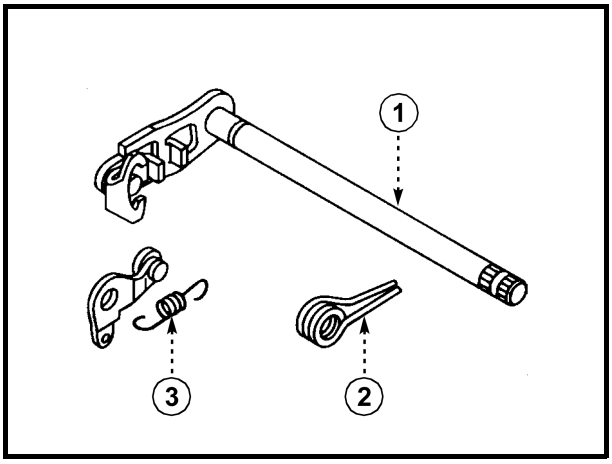
NOTE:
When the shift fork and transmission gear are damaged, replace all the facing gears.



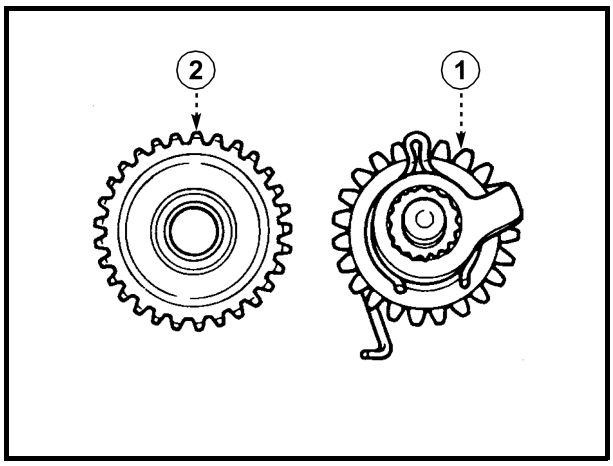
5. Measure
   - Axle runout (main and drive)
     Use a centering device and a dial gauge (1)
     Out of specification → Replace the bent axle



6. Inspect
   - Gear teeth
     Blue discoloration, grooves and wear → Replace
   - Dogs
     Rounded edges, cracks and missing portions → Replace

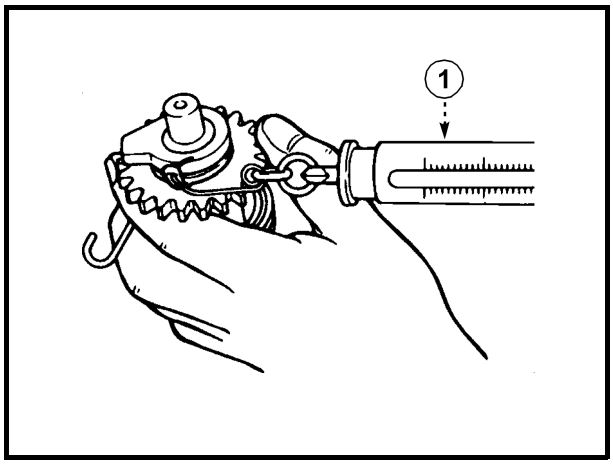


7. Inspect
   - Shift shaft (1)
     Damage, bends and wear → Replace
   - Return spring (shift shaft) (2)
   - Return spring (stopper lever) (3)
     Wear and damage → Replace



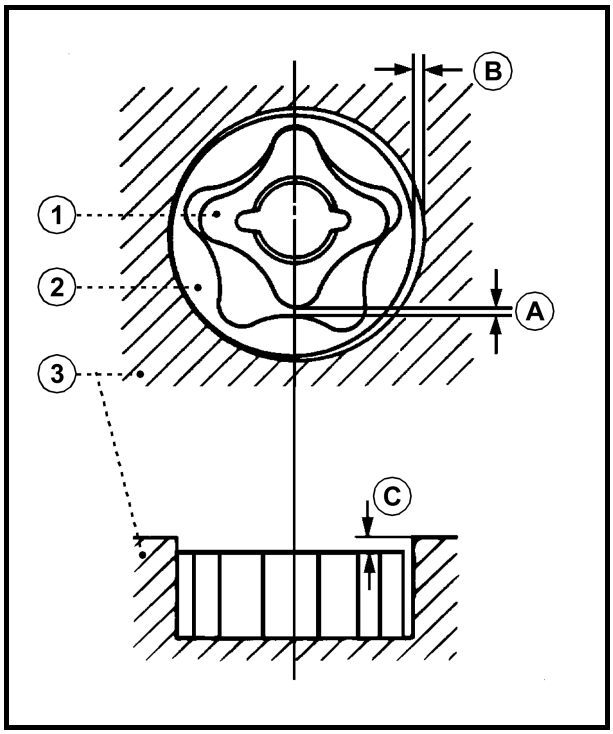
KICK STARTER INSPECTION

1. Inspect
   - Gear teeth (starter gear) (1)
   - Gear teeth (sliding gear) (2)
     Wear and damage → Replace



2. Measure
   - Kick clip friction force (return spring)
     Out of specification → Replace
     Use a spring gauge (1)

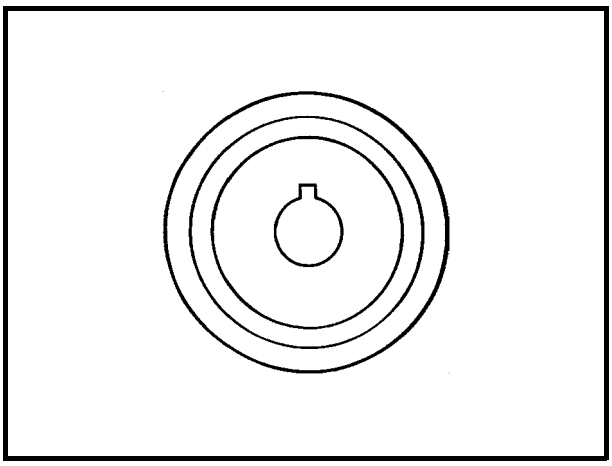
Kick clip friction force:
0.8 ~ 1.2 Kgf



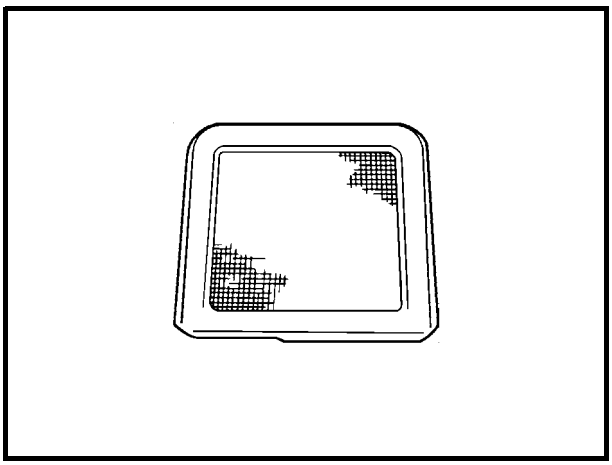
OIL PUMP INSPECTION

1. Measure
   - Tip clearance (A) between inner rotor (1) and outer rotor (2)
   - Side clearance (B) between outer rotor and pump housing (3)
     Out of specification → Replace the oil pump assembly
   - Clearance between housing and rotor (C) between pump housing (3) and rotors (1-2) Out of specification → Replace the oil pump assembly

Tip clearance:
(A) 0.15 mm
<Maximum value: 0.20 mm>
Side clearance:
(B) 0.06 ~ 0.10 mm
<Maximum value: 0.15 mm>
Clearance between housing and rotor:
(C) 0.06 ~ 0.10 mm
<Maximum value: 0.15 mm>



2. Inspect
   - Rotary filter
     Cracks and damage → Replace
     Dirt → Clean



3. Inspect
   - Oil suction screen
     Cracks and damage → Replace
     Dirt → Clean

OIL PASSAGE INSPECTION (RIGHT CRANKCASE HALF COVER)

1. Inspect
   - Oil passage
     Blockage → Blow out oil passage with compressed air

ENGINE COVER

1. Thoroughly wash the crankcase halves with kerosene.
2. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
3. Inspect
   - Crankcase halves
     Cracks and damage → Replace
   - Oil passage
     Blockage → Blow out oil passage with compressed air

BEARINGS AND OIL SEALS

1. Inspect
   - Bearings
     Clean and lubricate, then turn the inner seal using a finger.
     Roughness → Replace
2. Inspect
   - Oil seals
     Wear and damage → Replace

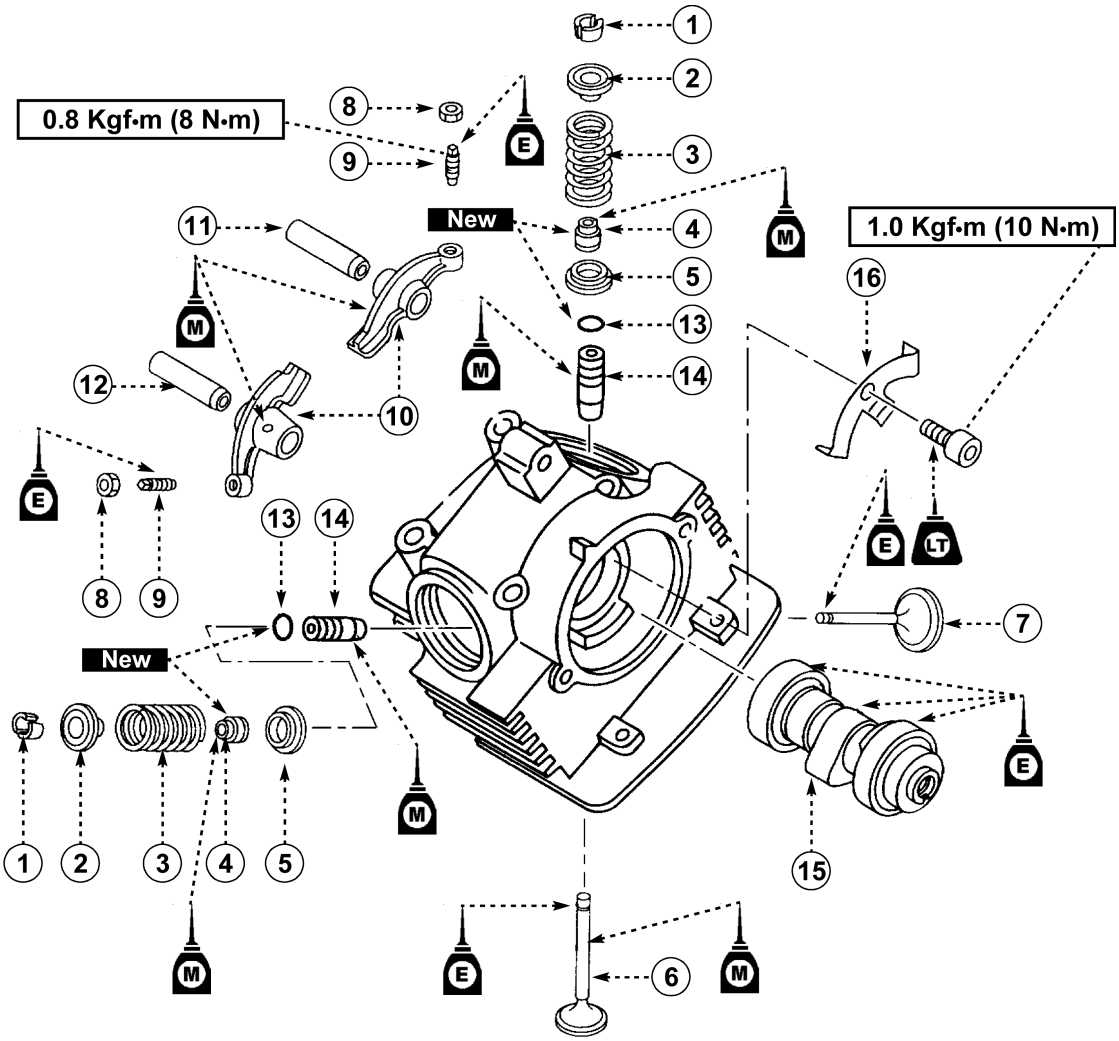
CIRCLIPS AND WASHERS

1. Inspect
   - Circlips
   - Washers
     Damage, loosening and bends → Replace

ENGINE ASSEMBLY AND ADJUSTMENTS

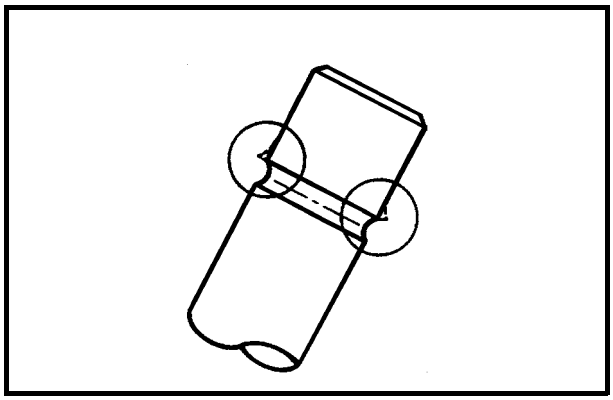
VALVES, ROCKER ARMS AND CAMSHAFT

(1) Valve cotter
(2) Valve retainer
(3) Spring
(4) Valve stem seal
(5) Valve spring seat
(6) Valve (intake)
(7) Valve (exhaust)
(8) Locknut
(9) Adjuster
(10) Rocker arm
(11) Rocker arm shaft (intake)
(12) Rocker arm shaft (exhaust)
(13) Circlip
(14) Valve guide
(15) Camshaft
(16) Plate



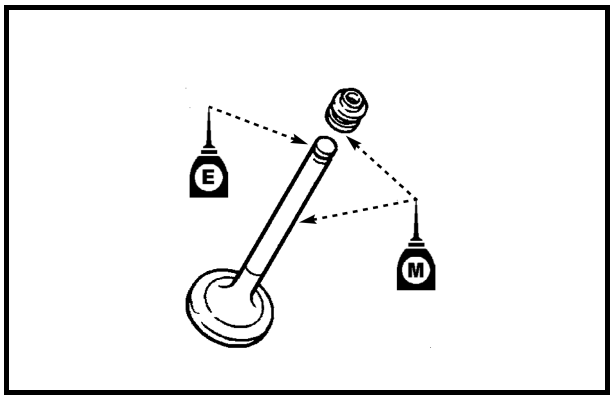
⚠ WARNING

For engine assembly, replace the following parts with new ones
- **O-Rings**
- **Gaskets**
- **Oil seals**
- **Copper washers**
- **Lock washers**
- **Circlips**



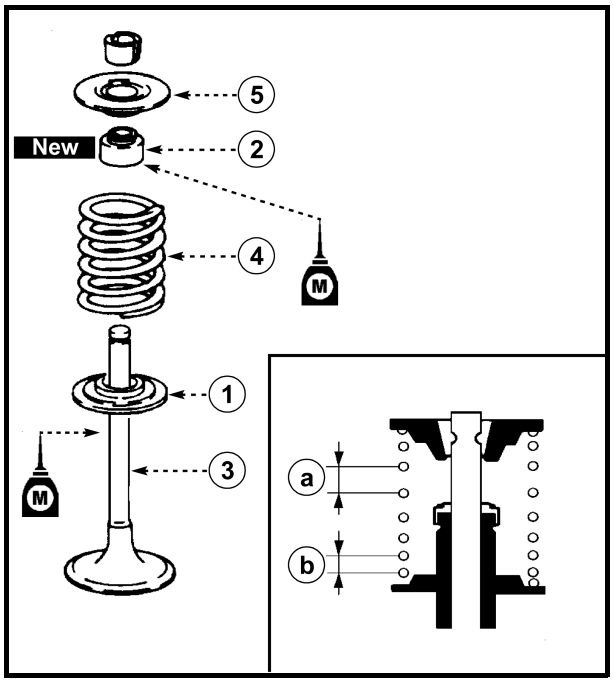
VALVES AND VALVE SPRINGS INSTALLATION

1. Deburr
   - From the valve stem end.
     Use an abrasive stone to deburr.



2. Apply
   - Molybdenum disulfide oil (onto the valve stem and oil seal)

M	**Molybdenum disulfide oil**

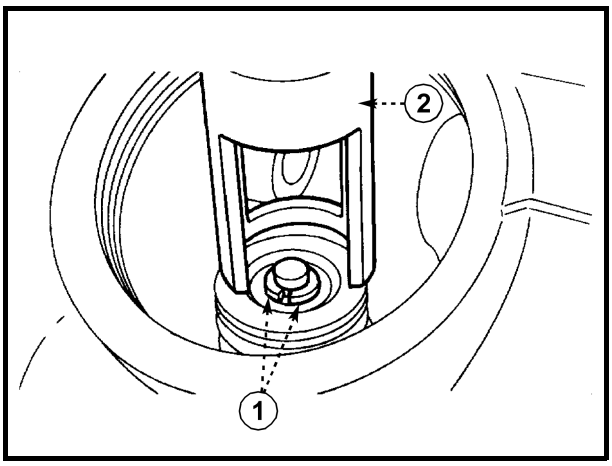


3. Install
   - Valve spring seat (1)
   - Valve stem seal (2) New
   - Valve (3) (into the cylinder head)
   - Valve spring (4)
   - Valve retainer (5)

NOTE:
Install the valve springs with the larger pitch (a) facing upwards.

(b) Smaller pitch

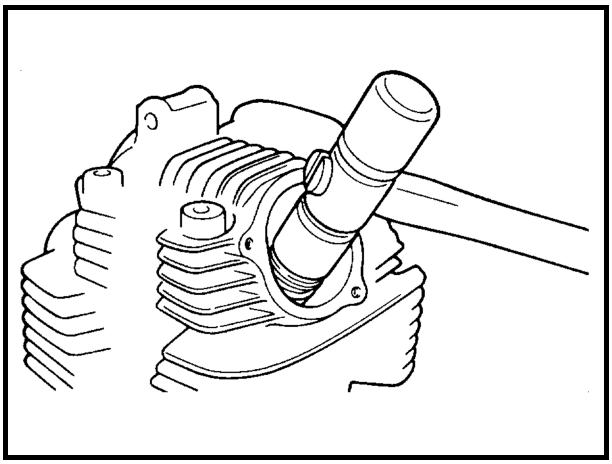
Intake **Mark "IN"** **Exhaust** **Mark "EX"**



4. install
   • Valve cotters (1)

NOTE:
Install the valve cotters while compressing the spring with a valve spring compressor (2).

	Valve spring compressor: 90890-04019

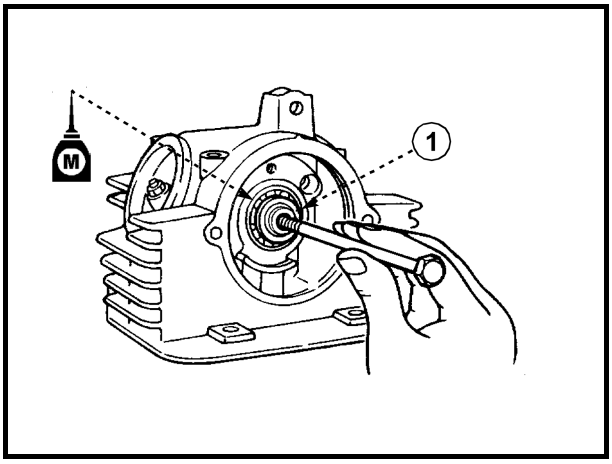


5. Secure the valve cotters onto the valve stem by tapping lightly with a soft hammer.

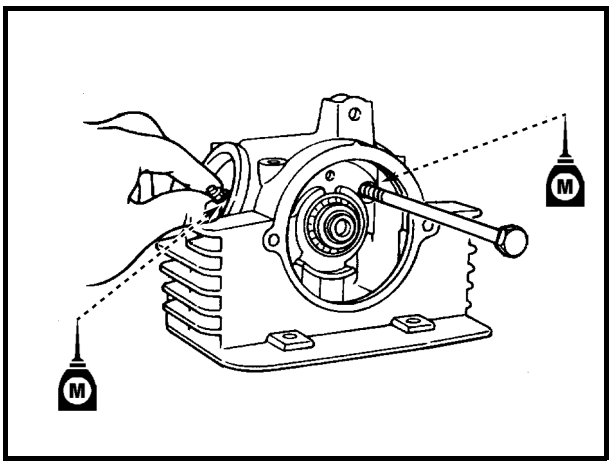
CAUTION:
Do not hit so much the cotters as to damage the valve.

ROCKER ARM AND CAMSHAFT INSTALLATION

1. Lubricate
   • Camshaft (1)

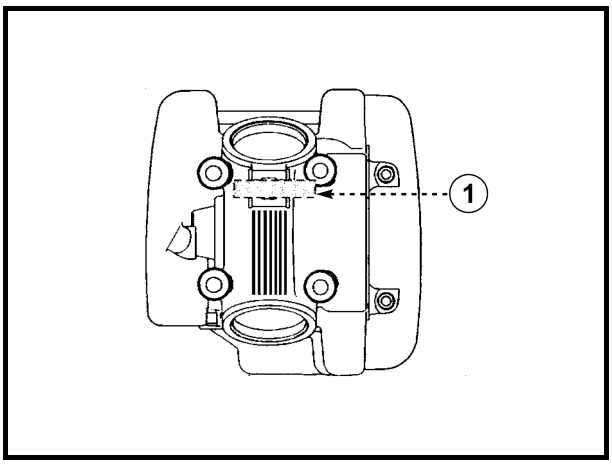


M	**Camshaft: Molybdenum disulfide oil** **Camshaft bearing: Engine oil**



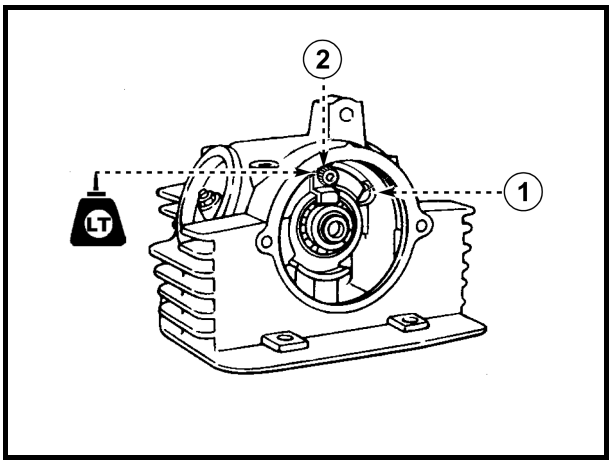
2. Apply
   • Molybdenum disulfide oil (onto the rocker arm and rocker arm shaft)

	Molybdenum disulfide oil



3. Install
   • Rocker arm
   • Rocker arm shaft (1)

NOTE:
Install the rocker arm shaft (exhaust) completely pushed in.

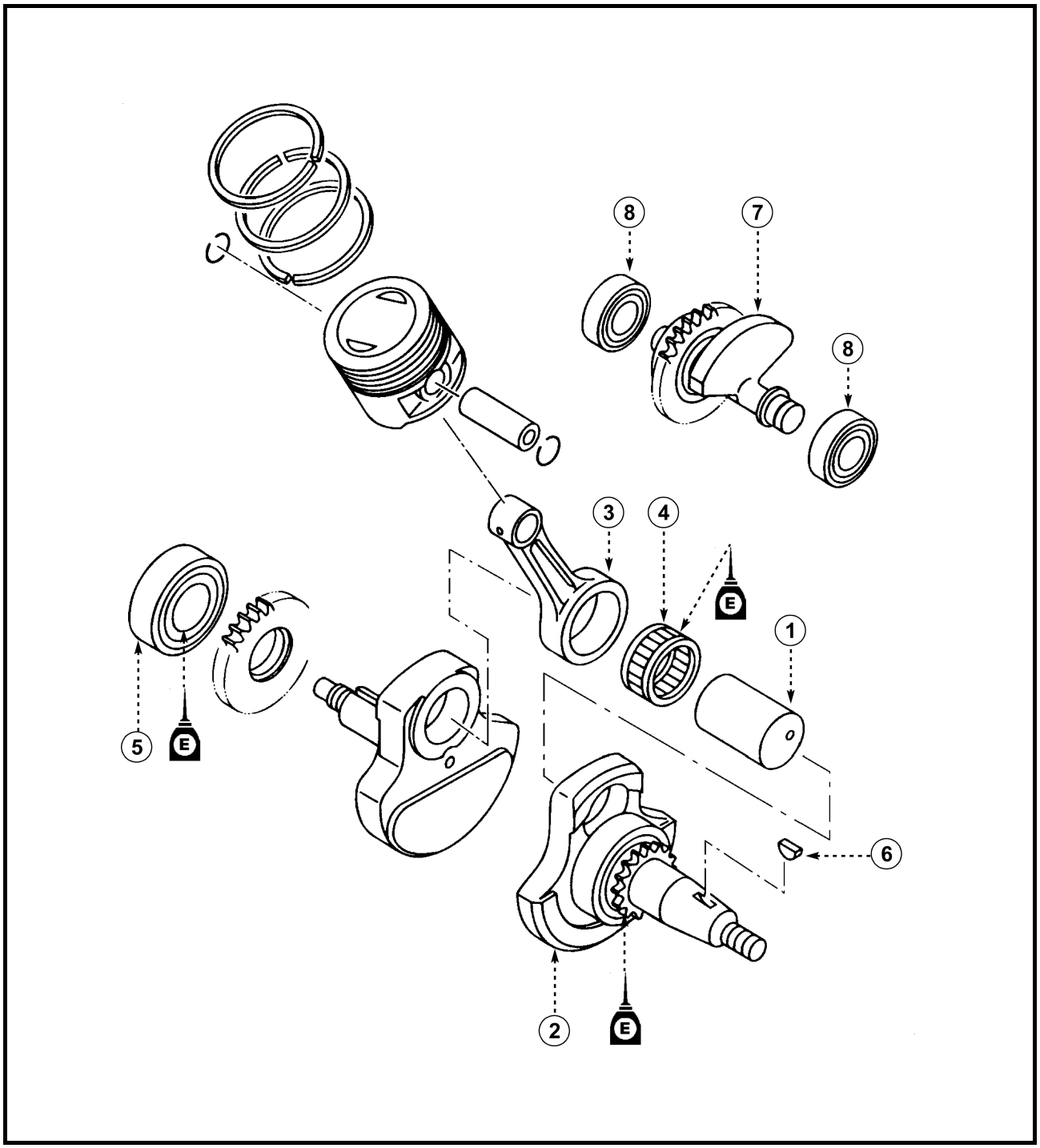


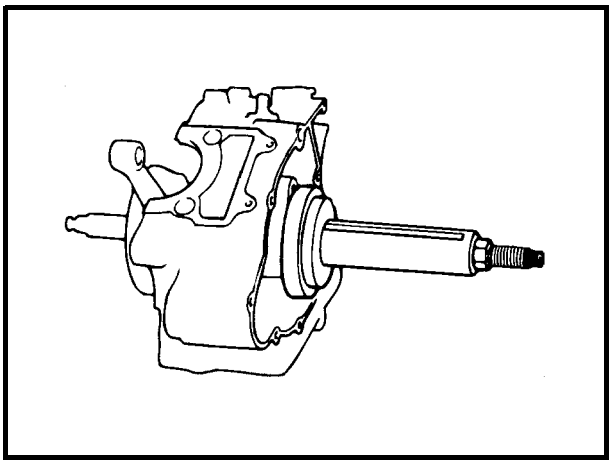
4. Install
   • Stopper plate (1)
   • Bolt (2)

	Bolt (plate): **1.0 Kgf·m (10 N·m)**

CRANKSHAFT AND BALANCER SHAFT

(1) Crank pin
(2) Axle shaft (flywheel side)
(3) Connecting rod
(4) Big end bearing
(5) Crankshaft bearing
(6) Key
(7) Balancer shaft
(8) Bearing





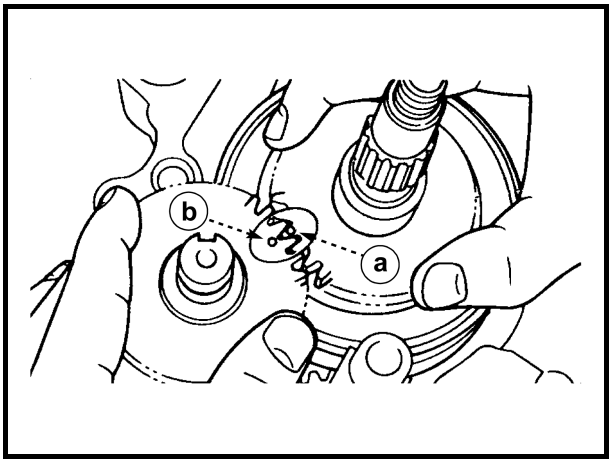
1. Install
   • Crankshaft separating tool

Crankshaft separating tool:
Rod: 90890-01274
Bolt: 90890-01275
Adapter: 90890-01278
Spacer: 90890-04881

2. Install
   • Crankshaft

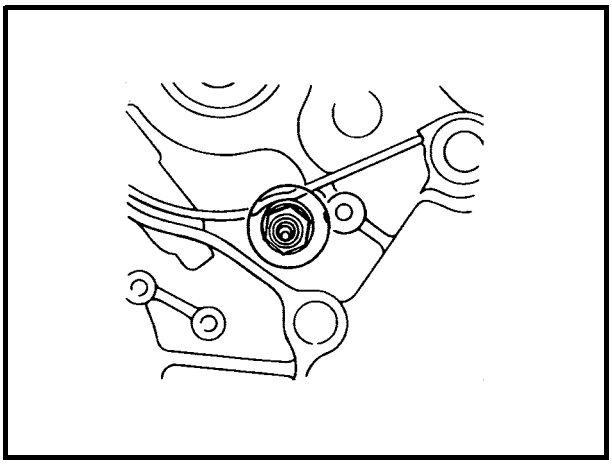
NOTE:
Hold the connecting rod at Top Dead Center with one hand while turning the nut of the installing tool with the other. Operate the installing tool until the crankshaft bottoms against the bearing.

CAUTION:
To avoid scratching the crankshaft and to ease the installation procedure, apply grease onto the oil seal lips and apply engine oil onto each bearing.



3. Install
   • Balancer shaft
     Always use a new O-Ring.

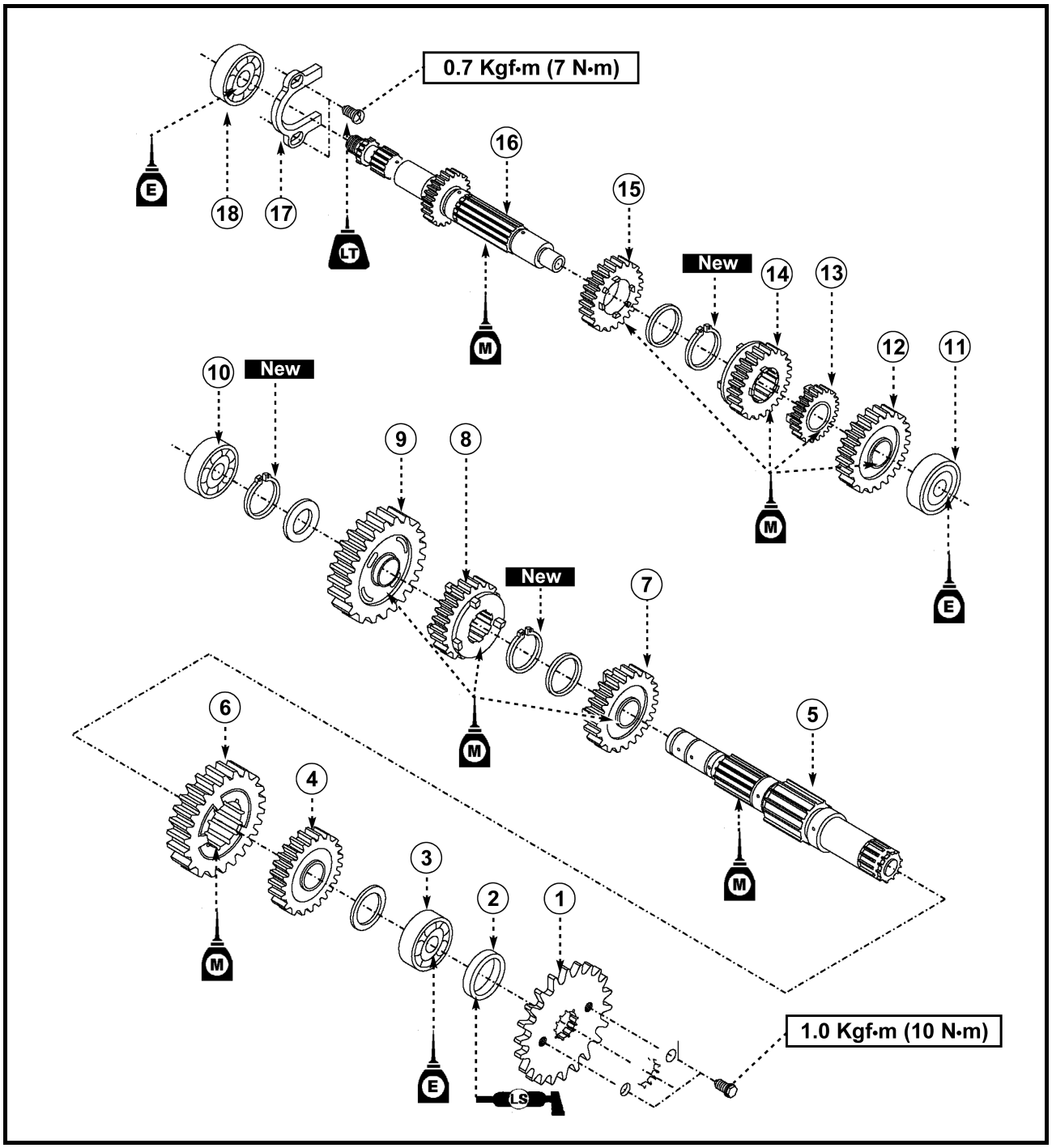
NOTE:
When installing the balancer shaft, align the mark (a) on the crankshaft drive gear with the mark (b) on the balancer gear.



4. Install
   • Neutral switch

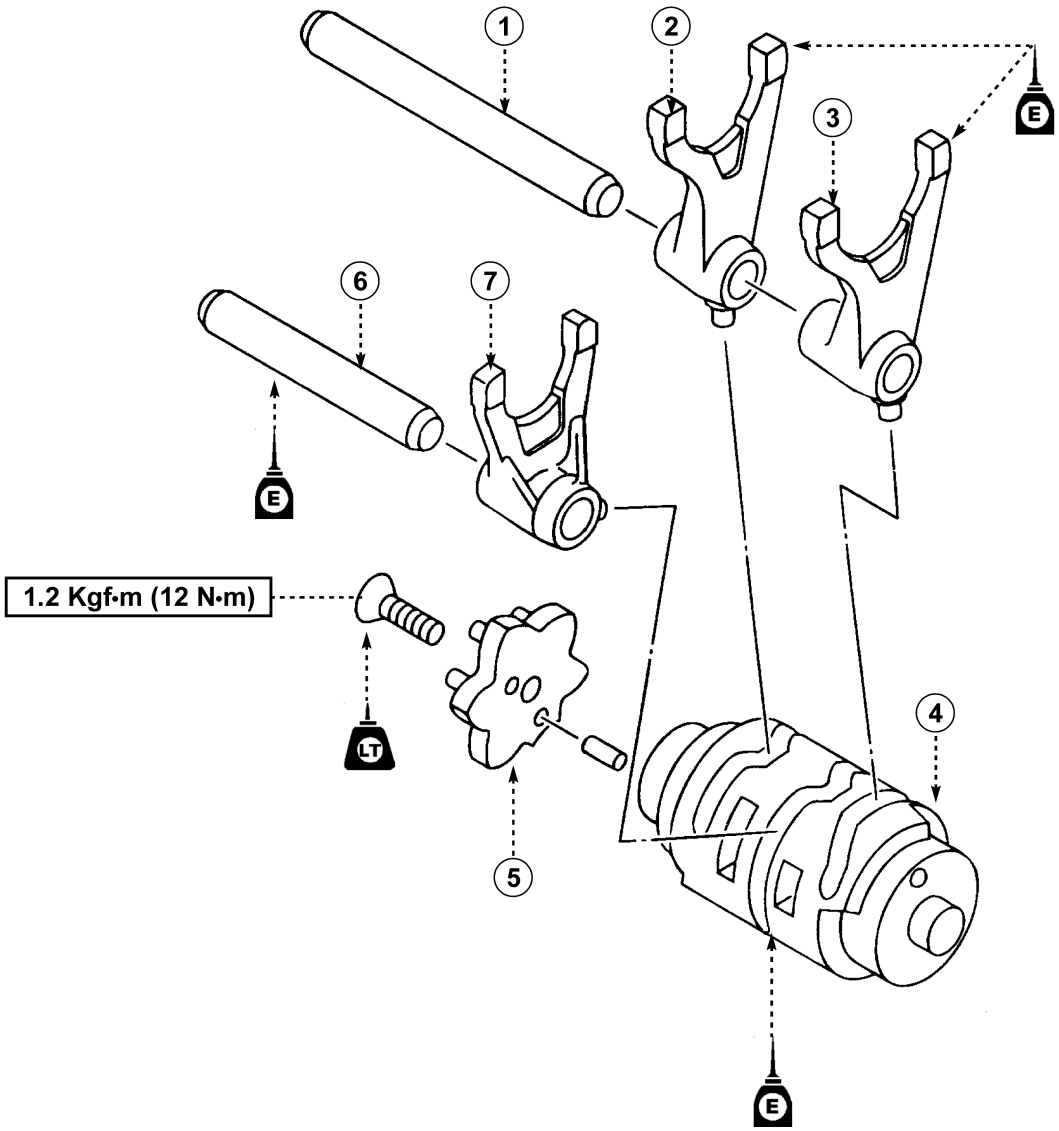
TRANSMISSION

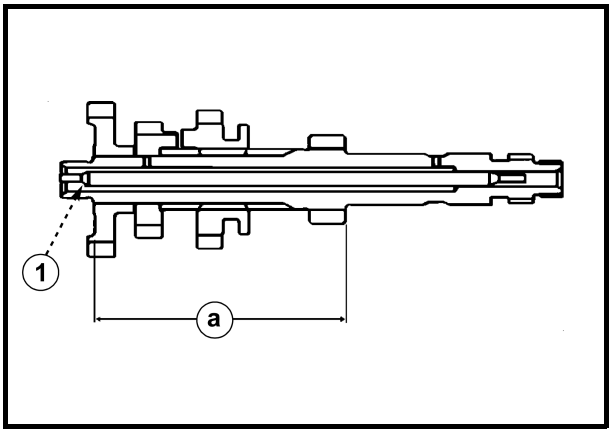
(1) Pinion
(2) Valve stem seal
(3) Bearing
(4) 5th wheel gear
(5) Drive axle
(6) 2nd wheel gear
(7) 3rd wheel gear
(8) 4th wheel gear
(9) 1st wheel gear
(10) Bearing
(11) Bearing
(12) 5th pinion gear
(13) 2nd pinion gear
(14) 3rd pinion gear
(15) 4th pinion gear
(16) Main axle
(17) Plate
(18) Bearing



SHIFTER

(1) Shift fork guide bar (long)
(2) Shift fork 3
(3) Shift fork 1
(4) Shifter
(5) Segment
(6) Shift fork guide bar (short)
(7) Shift fork 2



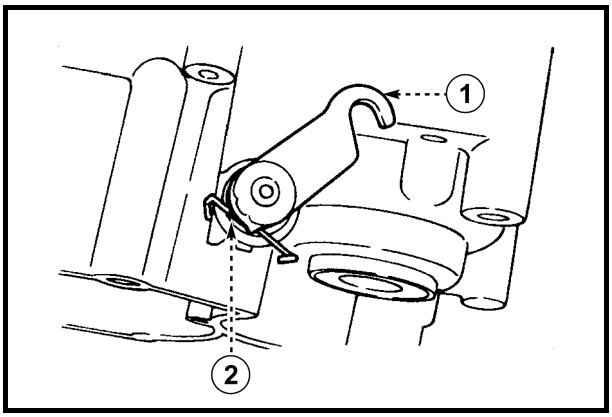


TRANSMISSION, SHIFT FORK AND SHIFTER INSTALLATION

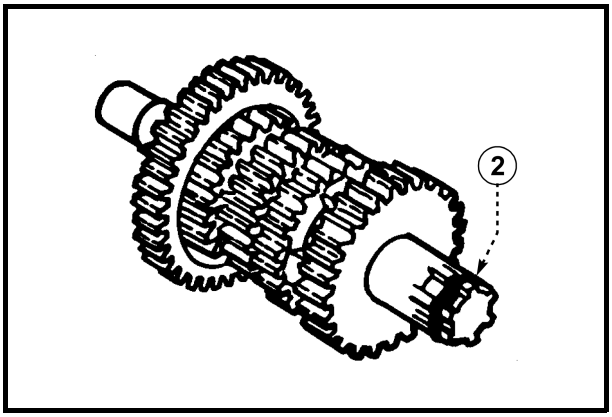
1. Measure
   - Main axle length (a).

	Length (main axle): 82.25 ~ 83.45 mm

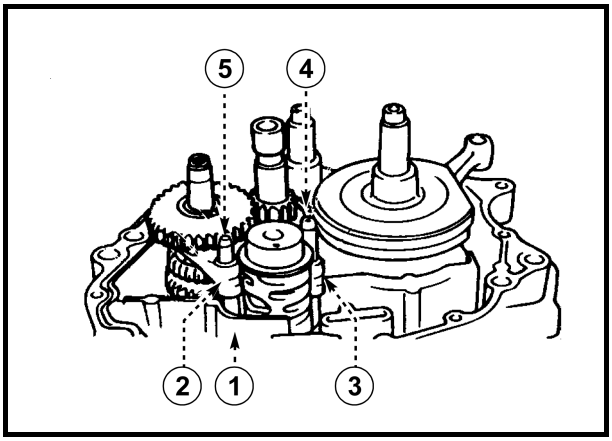
2. Install
   - Push rod n. 2 (1) to main axle hole.



3. Install
   - Push lever (1)
   - Spring, circlip, oil seal (2)

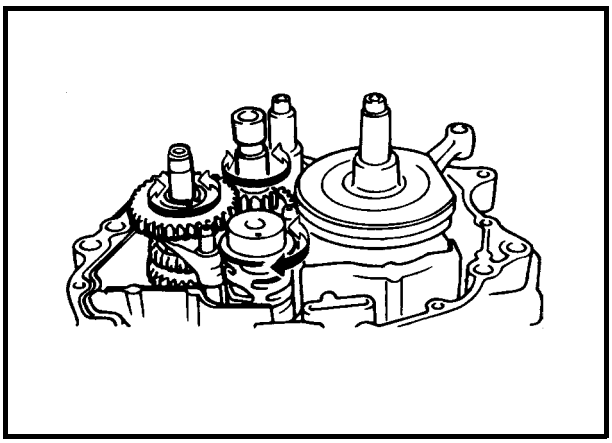


4. Install
   - O-Ring (2) to the groove of the drive axle pinion holding plate.



5. Install
   - Left lower shift fork (1)
   - Left upper shift fork (2)
   - Right center shift fork (3)
   - Shift fork guide bar (short) (4)
   - Shift fork guide bar (long) (5)

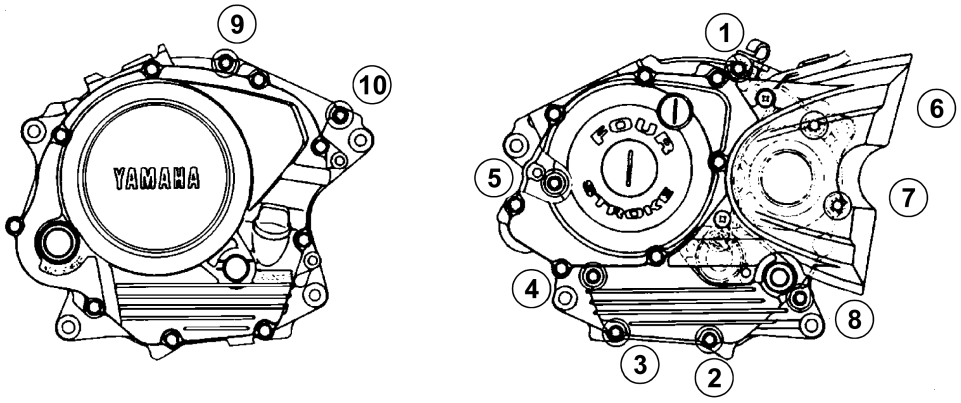
NOTE:
Install the shift forks with the embossed mark in sequence L, R, C beginning from the right.



6. Check
   - Shifter operation
     Unsmooth operation → Adjust

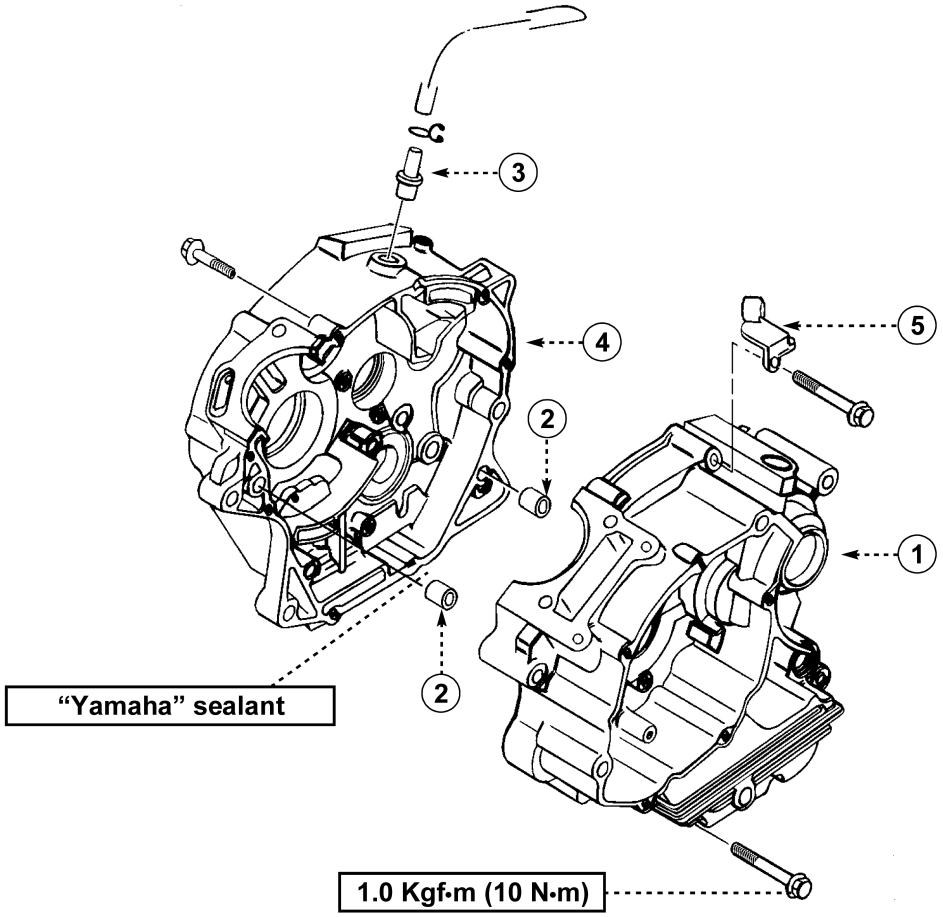
NOTE:
Check the transmission and shift forks for smooth operation by turning the shifter with your hand.

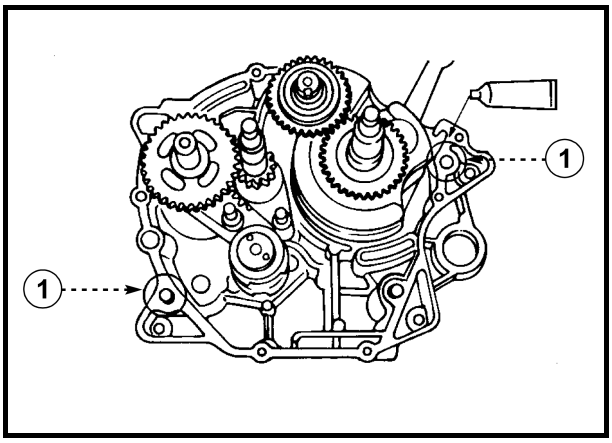
Tightening sequence

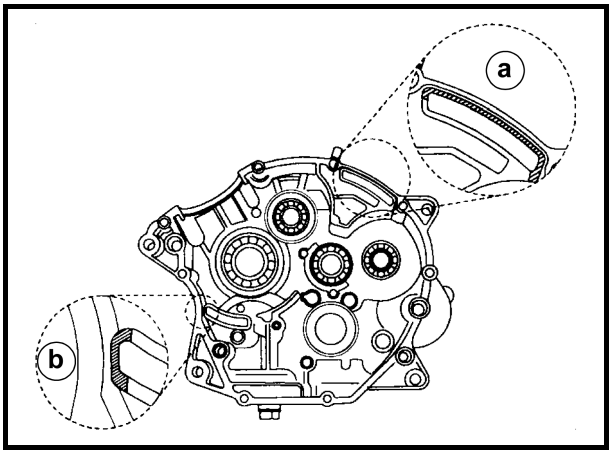


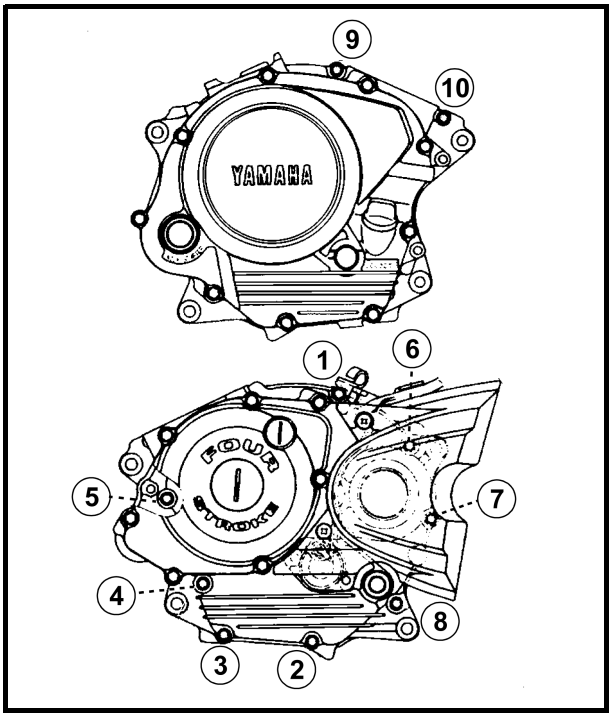
CRANKCASE

(1) Crankcase half (right)
(2) Dowel pins
(3) Crankcase breather hose
(4) Crankcase half (left)
(5) Clutch holder









CRANKCASE (LEFT)

1. Apply
   - Sealant (onto the crankcase mating surfaces)

	"Yamaha" sealant: 90890-01215

NOTE:
Do not allow any sealant to come in contact with the oil galleries (a-b) as shown in the figure.

2. Install
   - Dowel pins (1)
3. Install
   - Crankcase half (left) (onto the right crankcase)

NOTE:
Tap lightly on the crankcase with a soft hammer.

4. Tighten
   - Crankcase bolts

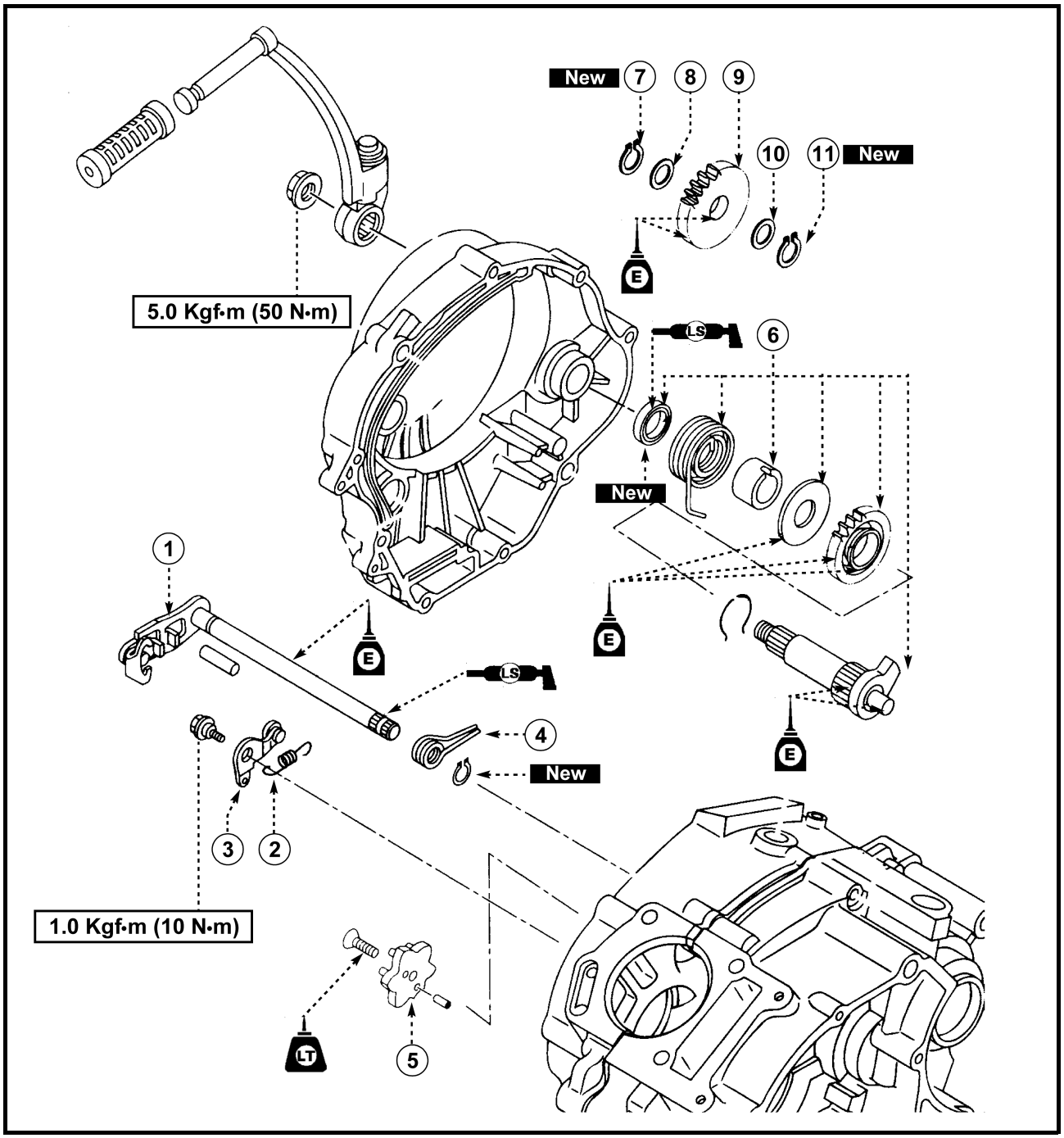
	Crankcase bolts: 1.0 Kgf·m (10 N·m)

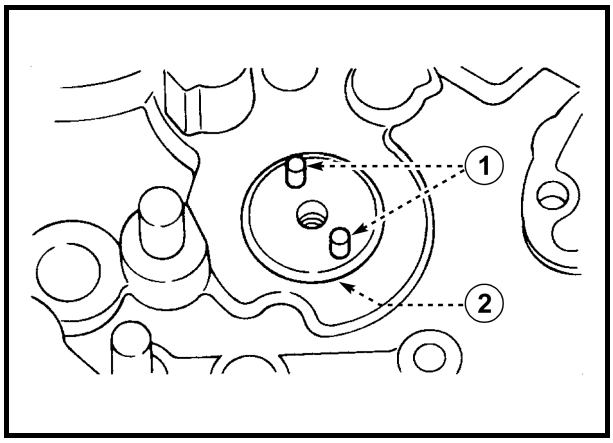
NOTE:
Tighten the bolts in a decreasing order (see the numbers in the figure).

5. Apply
   - Engine oil 4T in the crank pin, bearings and oil delivery holes
6. Check
   - Crankshaft and transmission operation
     Unsmooth operation → repair

SHIFT SHAFT AND KICK STARTER

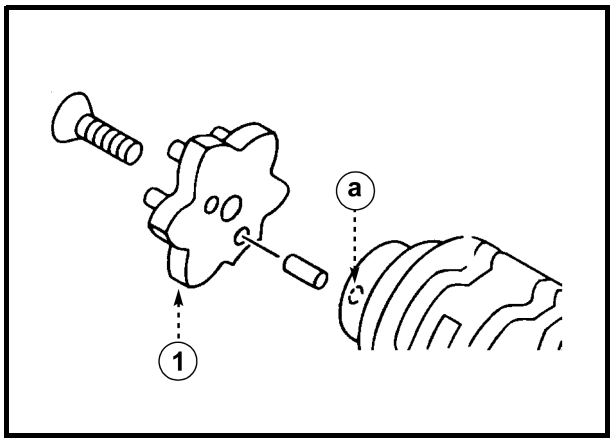
(1) Shift shaft
(2) Return spring
(3) Stopper lever
(4) Return spring
(5) Segment
(6) Kick starter assembly
(7) Seeger ring
(8) Washer
(9) Starter gear
(10) Washer
(11) Seeger ring





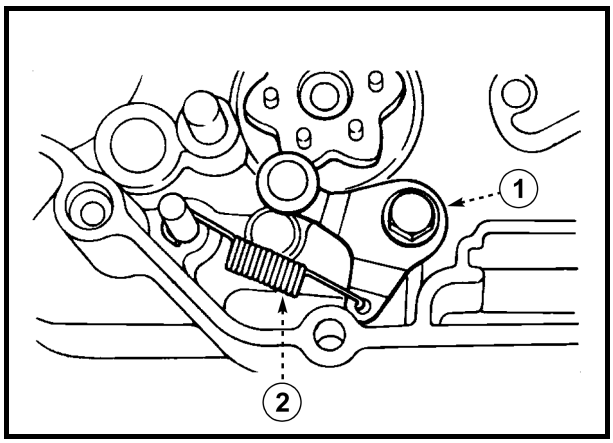
SEGMENT AND SHIFT SHAFT

1. Install
   • Dowel pins (1) into the shifter (2)



2. Install
   • Segment (1)
     Use a wrench Torx-T30

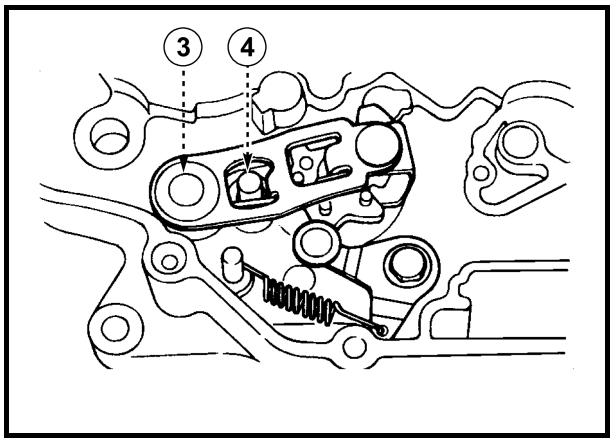
NOTE:
Fit the segment guide bars into the locating hole (a) of the shifter and install the segment.



3. Install
   • Stopper lever (1)
   • Spring (2)

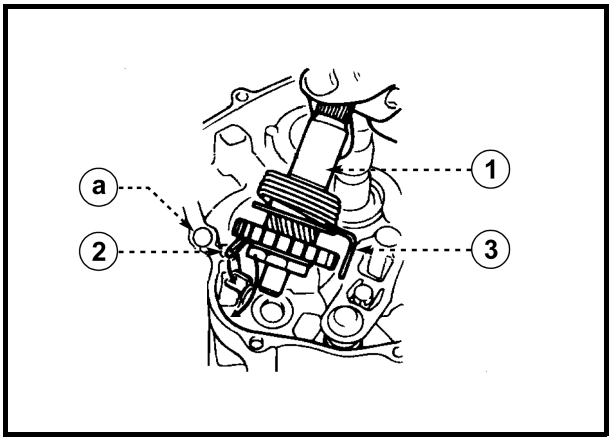
NOTE:
Hook the spring (2) on the stopper lever (1) and on the crankcase hub. Mesh the stopper lever (1) with the segment.

	Bolt (stopper lever): 1.0 Kgf·m (10 N·m)



4. Install
   • Shift shaft assembly (3)

NOTE:
Apply grease to the oil seals.
Hook the spring ends onto the stopper (4).

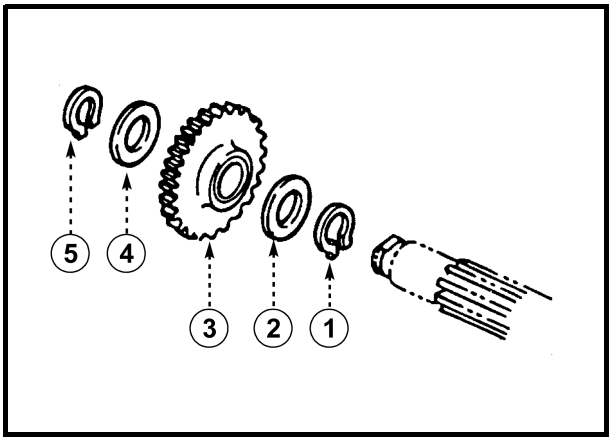


KICK STARTER INSTALLATION

1. Install
   - Kick starter assembly (1)
   - Kick gear circlip (2)
   - Return spring (3)

NOTE:

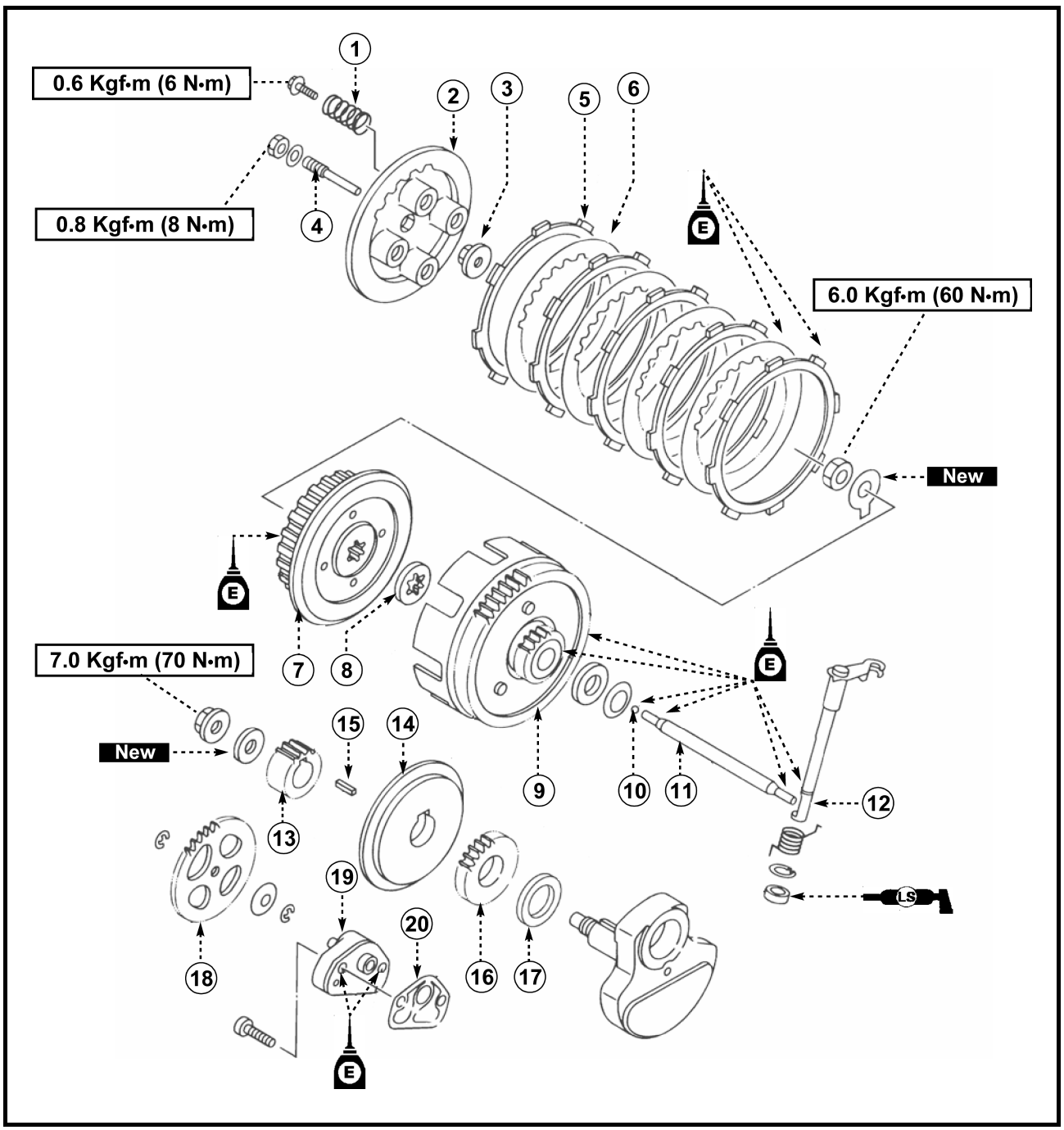
Turn the return spring clockwise and hook it into the proper hole (a) in the crankcase.

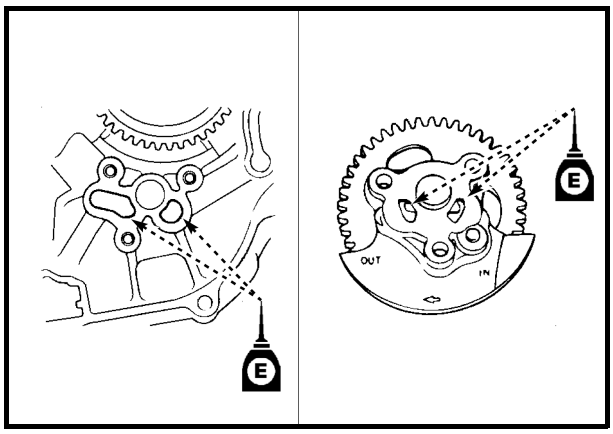


2. Install
   - Seeger ring (1)
   - Washer (2)
   - Starter gear (3)
   - Washer (4)
   - Seeger ring (5)

CLUTCH, CLUTCH HOUSING AND OIL PUMP

(1) Clutch spring
(2) Clutch pressure plate
(3) Push plate
(4) Push rod (1)
(5) Friction plate
(6) Clutch plate
(7) Clutch boss
(8) Spacer
(9) Clutch housing
(10) Ball
(11) Push rod (2)
(12) Push lever
(13) Primary drive gear
(14) Rotary filter
(15) Key
(16) Oil pump drive gear
(17) Washer
(18) Oil pump driven gear
(19) Oil pump
(20) Gasket

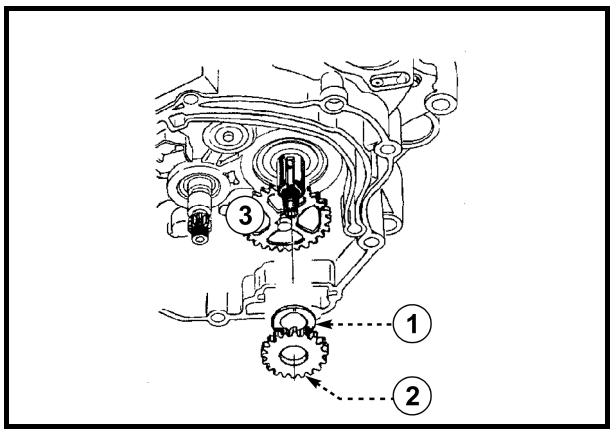




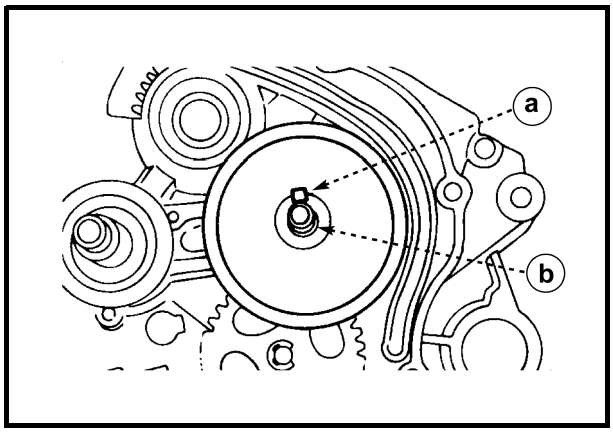
OIL PUMP INSTALLATION

1. Lubricate
   - Oil delivery passage (right crankcase)
   - Oil pump assembly

E	**Recommended lubricant: Engine oil**



2. Install
   - Washer (1)
   - Oil pump drive gear (2)
   - Key
   - Rotary filter

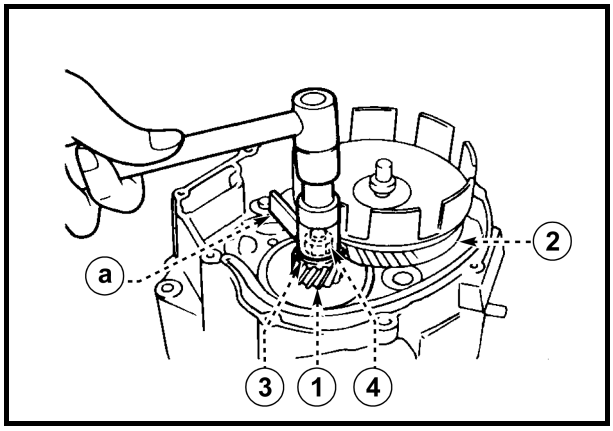


NOTE:

- Install the washer (1) with mark "H" facing out.
- Install the oil pump drive gear with its groove facing in.
- Install the rotary filter with its more projecting side facing in and place the key into the groove of the crankshaft.

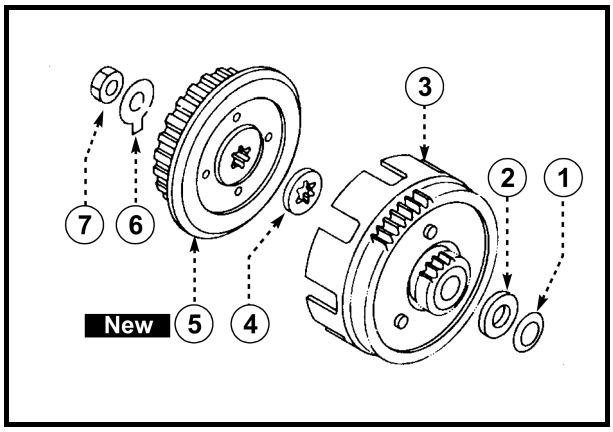
CLUTCH GEAR INSTALLATION

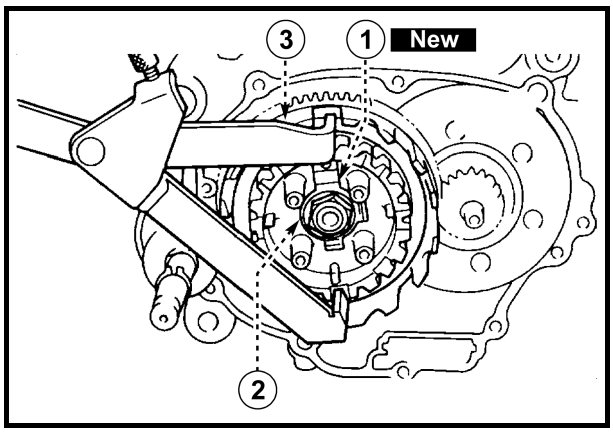
1. Install
   - Primary drive gear (1)
   - Clutch housing (2)
   - Washer (3)
   - Primary gear nut (4)

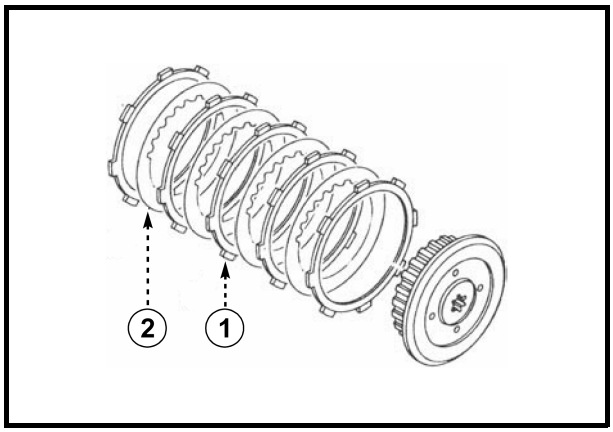


NOTE:

Install the primary drive gear with the stamp facing out. Place a folded aluminium or copper plate (a) between the teeth of the primary drive gear (1) and the teeth of the clutch housing gear (2).







CLUTCH INSTALLATION

1. Install
   - Washer (1)
   - Spacer (2)
   - Clutch housing (3)
   - Spacer (4)
   - Clutch boss (5)
   - Lock washer (6)
   - Clutch boss nut (7)

2. Tighten
   - Clutch boss nut (2)

NOTE:

Tighten the clutch boss nut (2) while holding the clutch boss with a universal clutch holder (3)

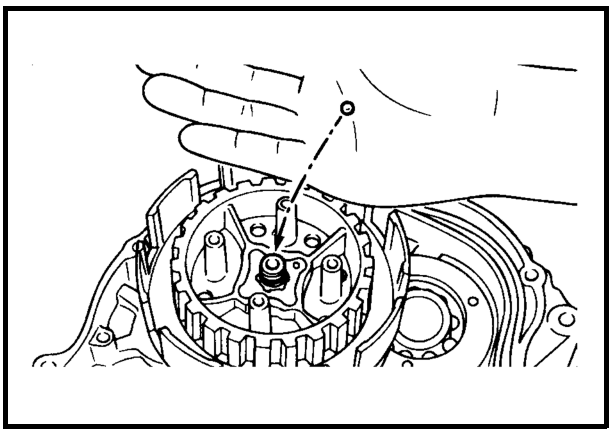
	**Universal clutch holder: 90890-04086**

	**Clutch boss nut: 6.0 Kgf·m (60 N·m)**

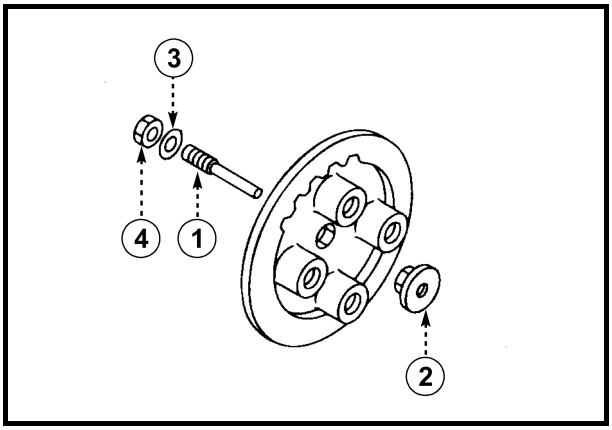
3. Bend
   - Lock washer edge (1) (along a flat side of the nut)
4. Install
   - Friction plate (1)
   - Clutch plate (2)

NOTE:

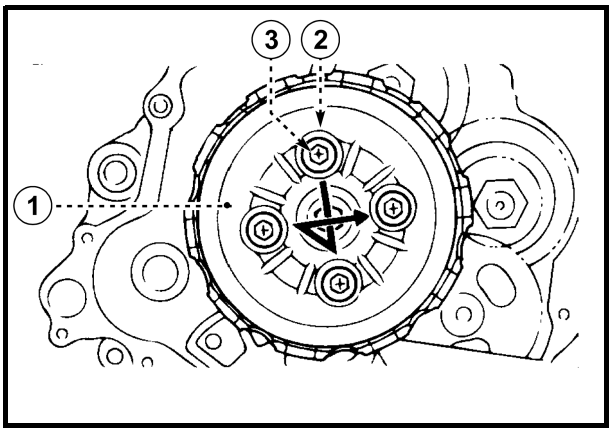
- Install the clutch plates and friction plates alternately on the clutch boss, starting with a clutch plate and ending with a clutch plate.
- Coat all clutch and friction plates with engine oil before installation.
- Be sure to install a clutch plate with projection offset approximately 90° from previous plates projection. Continue this procedure in a clockwise direction until all clutch plates are installed.



5. Install
   • Ball



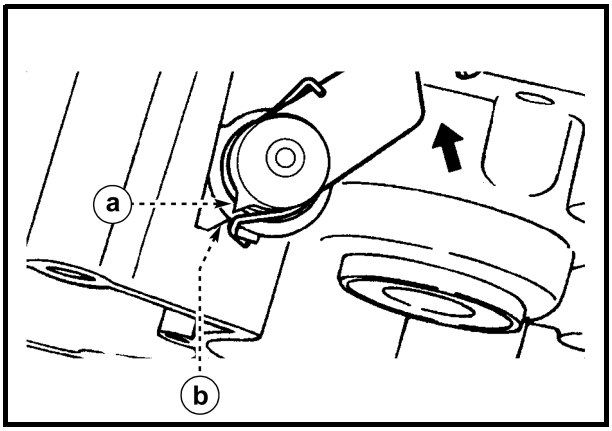
6. Install
   • Push rod n.1 (1)
   • Push plate (2)
   • Washer (3)
   • Push rod nut n.1 (4)



7. Install
   • Pressure plate (1)
   • Clutch springs (2)
   • Bolts (3)

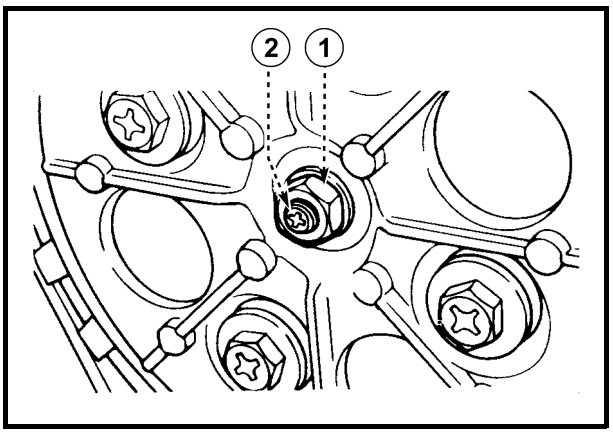
	**Bolts (clutch springs): 0.6 Kgf·m (6 N·m)**

NOTE:
Tighten the clutch spring bolts gradually, using a crisscross pattern.



8. Check
   • Push lever position
     Push the push lever assembly in the arrow direction and make sure that the marks are aligned.

(a) Mark on the push lever assembly
(b) Mark on the crankcase



9. Adjust
   • Push lever position

****

Adjustment steps
- Loosen the locknut (1)
- Turn the adjuster (2) clockwise or counter-clockwise to align marks.
- Hold the adjuster to prevent it from moving and tighten the locknut to specification.

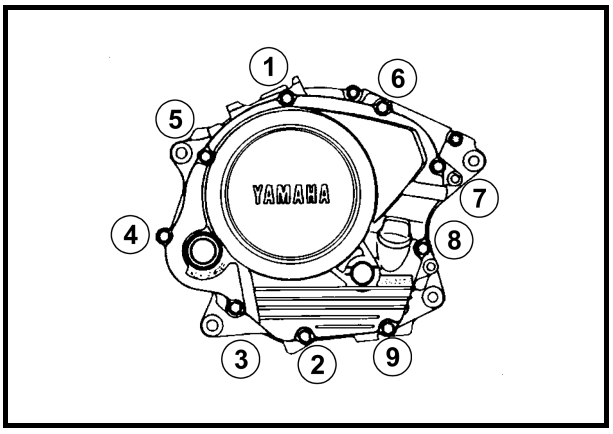
CAUTION:

Take care not to overtighten the adjuster 2 and remove the freeplay between both push rods.

- Tighten lock nut (1).

	Lock nut: **0.8 Kgf·m (8 N·m)**

****

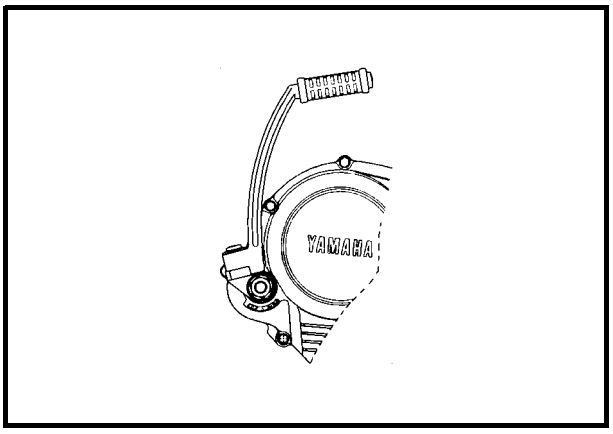


10. Install
   • Dowel pins
   • Crankcase gasket
   • Crankcase cover (right)

	Crankcase cover bolts: **1.0 Kgf·m (10 N·m)**

NOTE:

Tighten the bolts in a decreasing order (see the numbers in the figure).

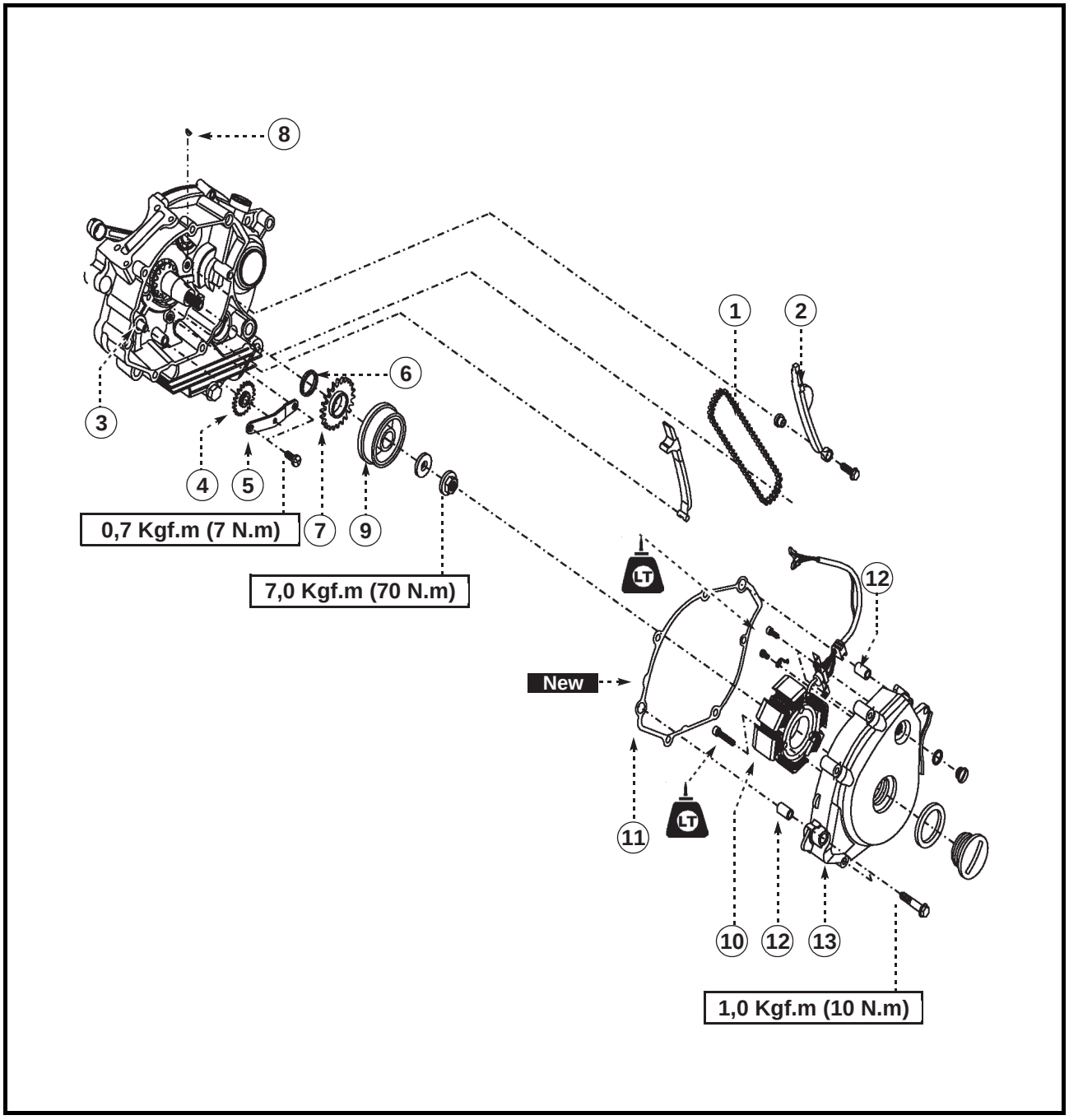


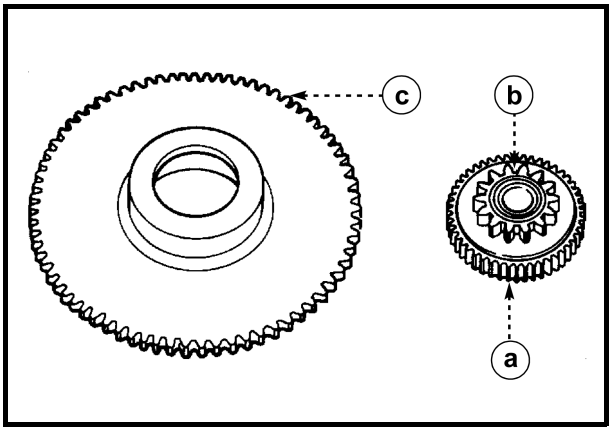
11. Install
   • Kick starter

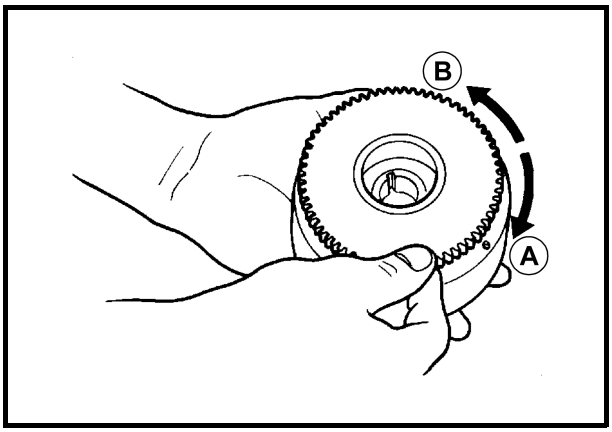
	Kick starter nut: **5.0 Kgf·m (50 N·m)**

CDI MAGNETO

(1) Timing chain
(2) Timing chain guide (intake side)
(3) Dowel pins
(4) Starter gear (1)
(5) Plate
(6) Washer
(7) Starter gear (2)
(8) Key
(9) CDI magneto
(10) Stator
(11) Gasket
(12) Dowel pins
(13) Crankcase cover







STARTER GEAR INSPECTION

1. Inspect
   - Starter gear teeth (a-b-c)
     Burrs, chips, roughness and wear → Replace
2. Check
   - Free-wheel gear operation.
     Push the guide bars in the arrow direction.
     Unsmooth operation → Replace

****

Checking steps

- Hold the free-wheel gear.
- When turning the (big) starter gear clockwise (A), the free-wheel gear and the starter gear should be engaged.
- If not, the free-wheel gear is faulty.
- Replace
- When turning the starter gear counterclockwise (B), it should turn freely.
- If not, the free-wheel gear is faulty.
- Replace

****

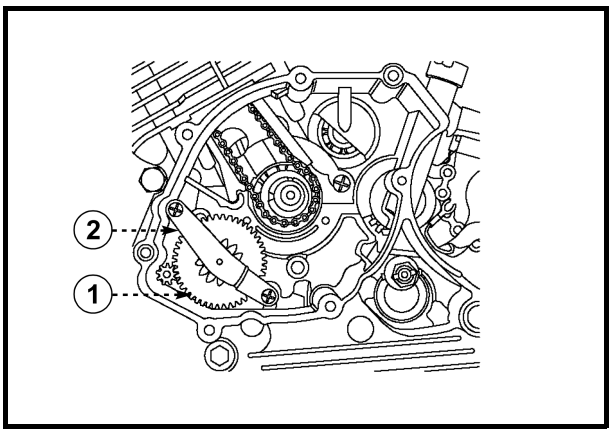
CDI MAGNETO AND STARTER GEAR

1. Install
   - Timing chain
   - Chain guide

	Bolt (chain guide): 1.0 Kgf·m (10 N·m)

NOTE:

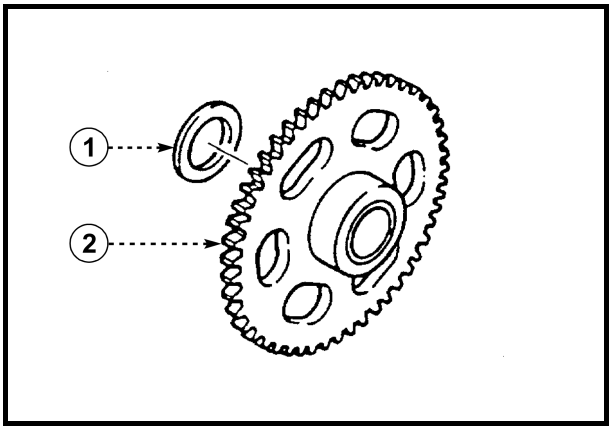
Fasten a safety wire to the timing chain to prevent it from falling into the crankcase.



2. Install
   - Starter gear (1)
   - Plate (2)

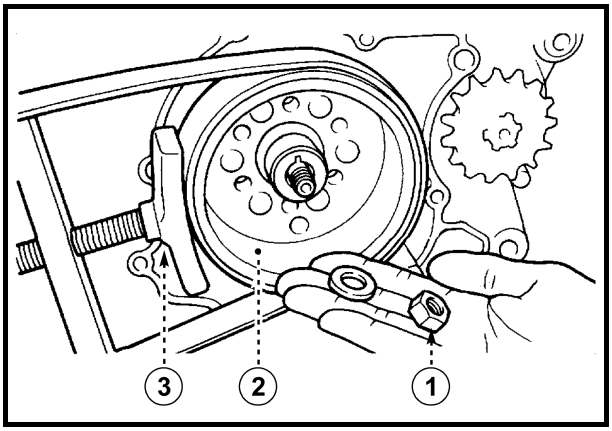
	Plate bolt: **0.7 Kgf·m (7 N·m)**

3. Apply
   - Engine oil 4T (in the starter gears)



4. Install
   - Washer (1)
   - Starter gear (2)
5. Install
   - Key
   - CDI magneto

NOTE:
Temporarily install the flywheel aligning the groove with the key. Turn the starter gear clockwise and install the flywheel into the starter gear.



6. Tighten
   - Nut (CDI magneto)

	CDI magneto nut: **7.0 Kgf·m (70 N·m)**

NOTE:
Tighten the flywheel (2) with the rotor holder (3) while tightening the nut (1). Do not allow the rotor holder to touch the projections on the rotor.

	Rotor holder: **90890-01701**

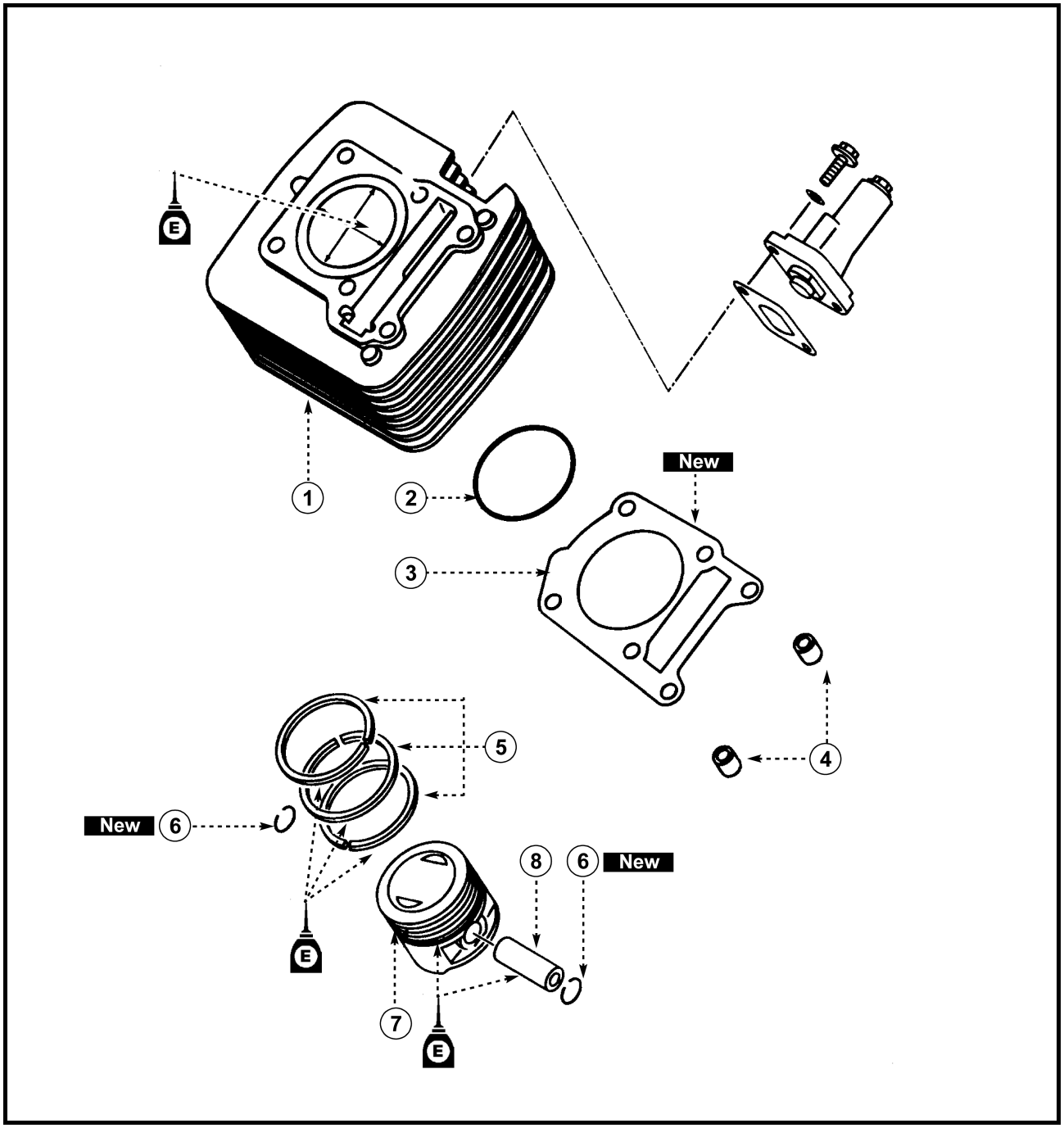
7. Install
   - Guide bars
   - Crankcase cover gasket New
   - Crankcase cover (left)

	Crankcase cover bolts: **1.0 Kgf·m (10 N·m)**

8. Connect
   - Neutral switch lead.

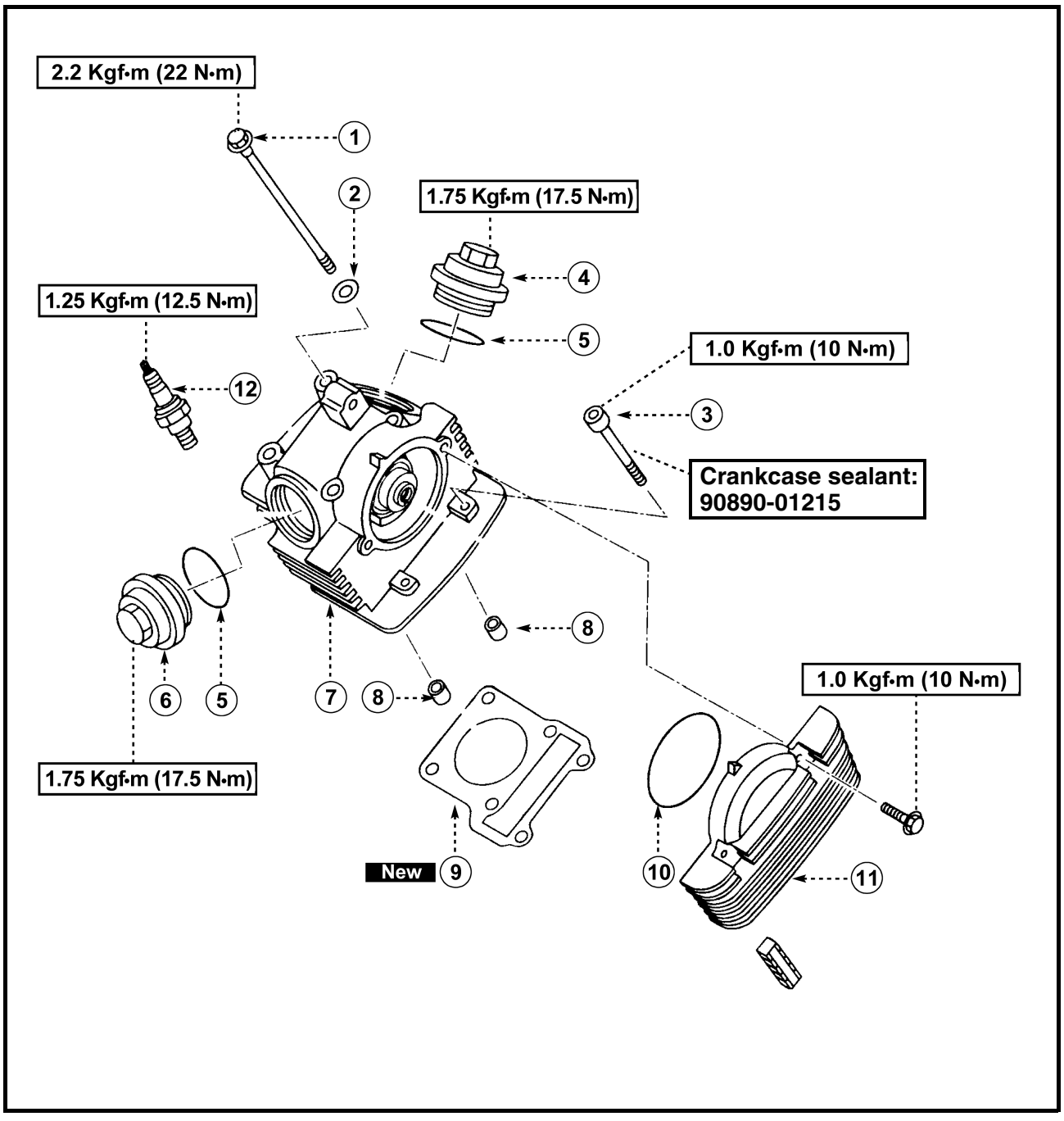
CYLINDER AND PISTON

(1) Cylinder
(2) O-Ring
(3) Cylinder gasket
(4) Dowel pins
(5) Piston rings
(6) Piston pin circlip
(7) Piston
(8) Piston pin



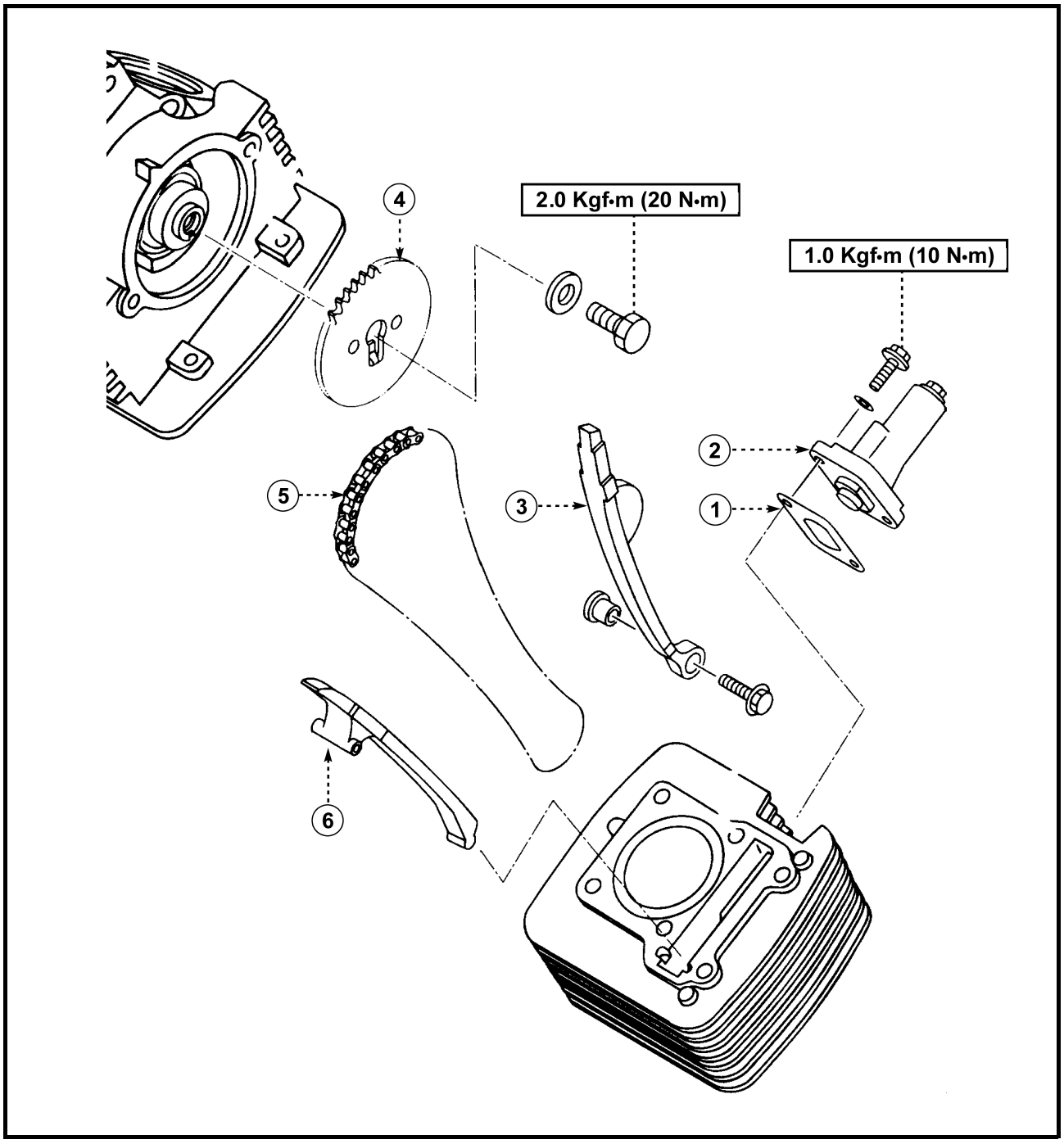
CYLINDER HEAD

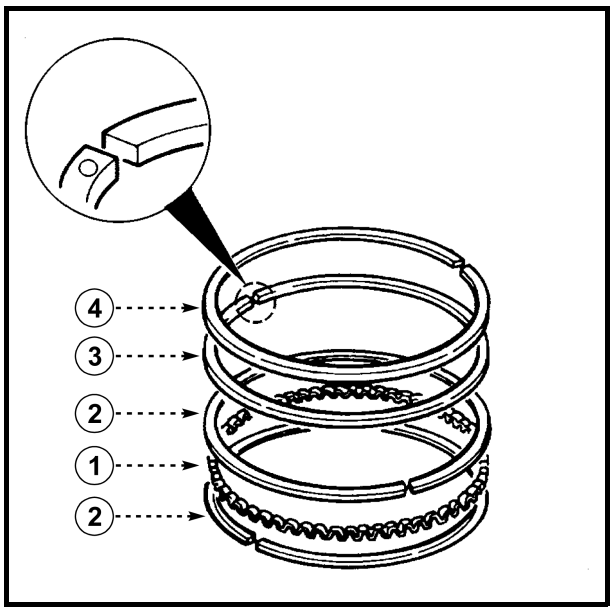
(1) Bolt
(2) Washer
(3) Bolt
(4) Valve cover (intake)
(5) O-Ring
(6) Valve cover (exhaust)
(7) Cylinder head
(8) Dowel pins
(9) Cylinder head gasket
(10) O-Ring
(11) Cylinder head side cover
(12) Spark plug



DRIVE GEAR AND TIMING CHAIN

(1) Gasket
(2) Timing chain tensioner assembly
(3) Timing chian guide (intake side)
(4) Drive gear
(5) Timing chain
(6) Timing chain guide (exhaust side)



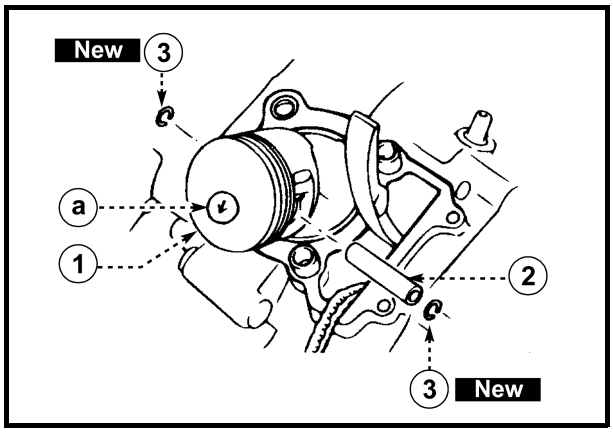


PISTON RINGS, PISTON AND CYLINDER INSTALLATION

1. Install in the following order
   - Expander spacer (oil ring) (1)
   - Side rails (oil ring) (2)
   - Second ring (3)
   - Top ring (4)

NOTE:

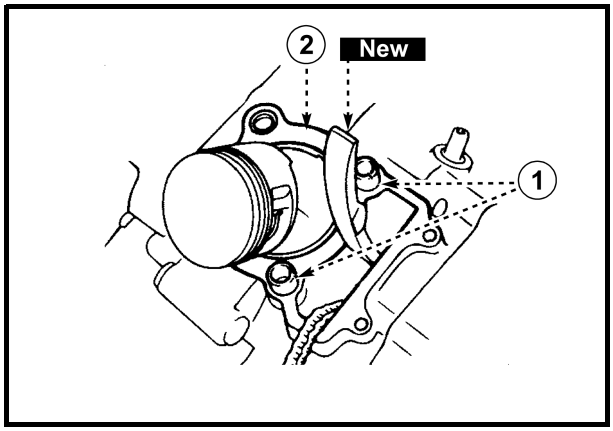
- Make sure to install the piston rings so that the manufacturer's mark or number is facing up.
- Lubricate the piston and piston rings properly with engine oil.



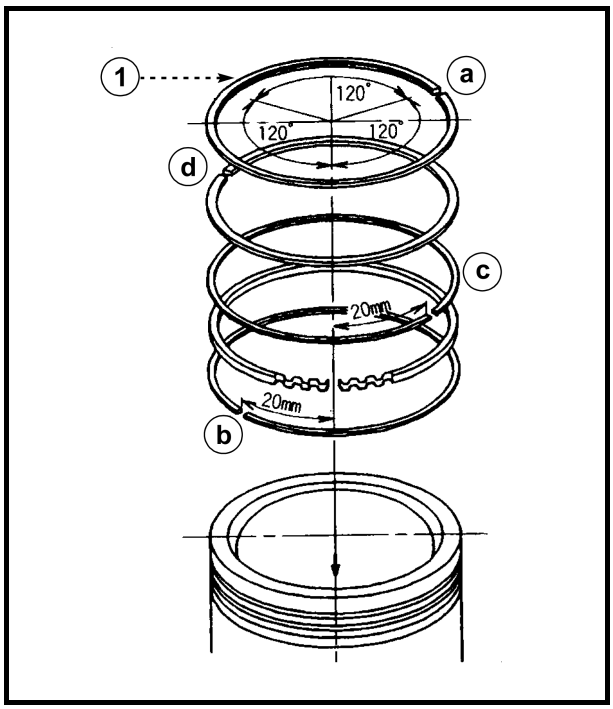
2. Install
   - Piston (1)
   - Piston pin (2)
   - Pin circlip (3) New

NOTE:

- Apply engine oil onto the piston pins.
- The mark (a) on the piston must face the exhaust side of the cylinder.
- Before installing the piston pin circlip, cover the crankcase opening with a clean rag.



3. Install
   - Dowel pins (1)
   - Cylinder gasket (2) New

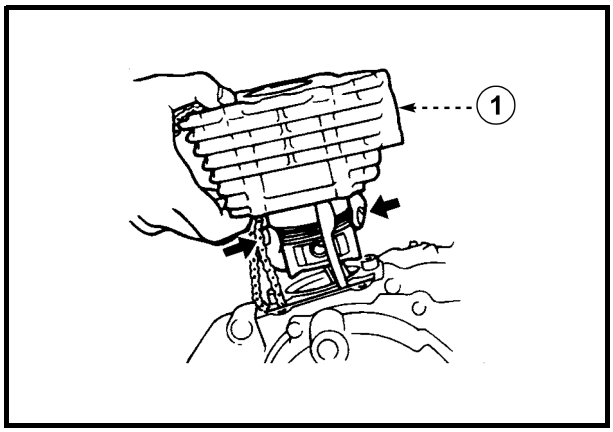


4. Install
   • Piston rings (1)

NOTE:
Place the piston ring ends as shown in the figure.

(a) Top ring end
(b) Oil ring end (lower)
(c) Oil ring end (upper)
(d) 2nd ring end

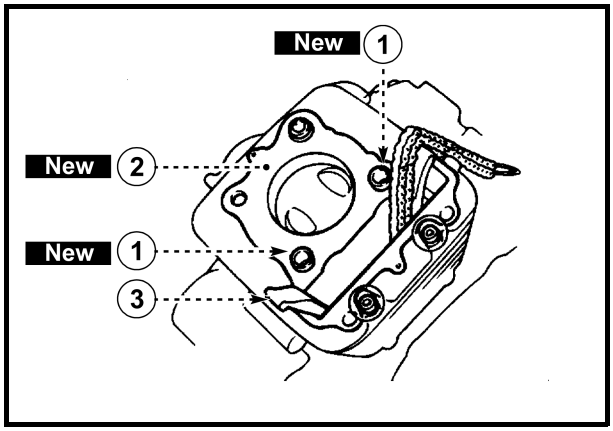
5. Lubricate
   • Piston outer surface
   • Piston rings
   • Cylinder inner surface



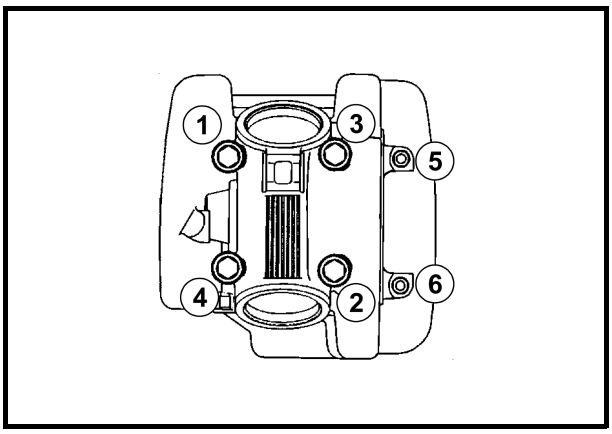
6. Install
   • O-Ring New
   • Cylinder (1)

NOTE:
- Install the cylinder with one hand while compressing the piston rings with the other hand.
- Pass the timing chain guide (exhaust side) through the timing chain cavity.

CYLINDER HEAD INSTALLATION



1. Install
   • Dowel pins (1) New
   • Cylinder head gasket (2) New
   • Timing chain guide (exhaust side) (3)

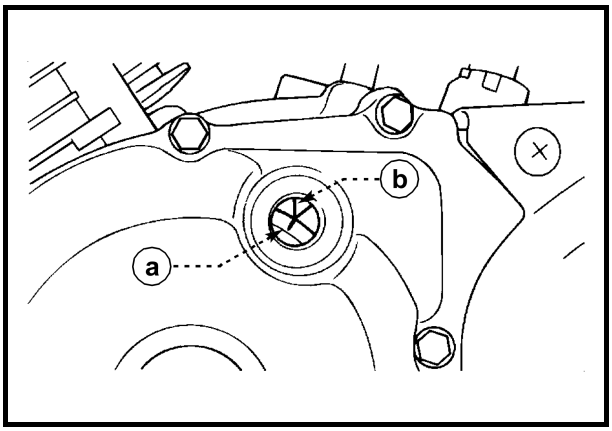


2. Install
   - Cylinder head
   - Bolt with washer (cylinder head)

Bolts (cylinder head):
M8 (1-4):
2.2 Kgf·m (22 N·m)
M6 (5-6):
1.0 Kgf·m (10 N·m)

NOTE:
- Apply engine oil onto the bolt thread.
- Tighten the bolts starting with the lower numbered one.

3. Install
   - Drive gear
   - Timing chain



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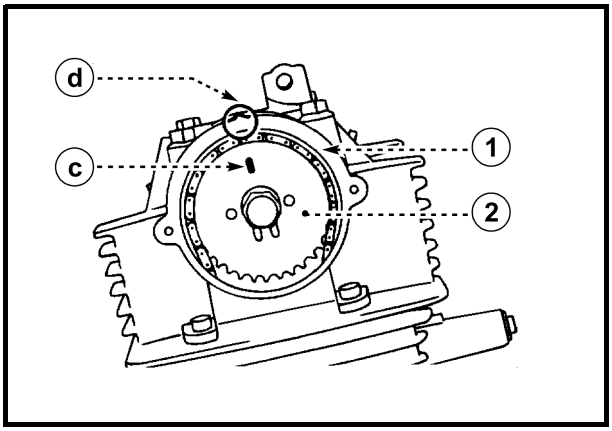
Installation steps
- Turn the crankshaft counter-clockwise until the mark (a) matches the stationary pointer (b).
- Align the mark (c) on the drive gear with the stationary pointer (d) on the cylinder head.
- Fit the timing chain (1) onto drive gear (2) and then install the drive gear on the camshaft.

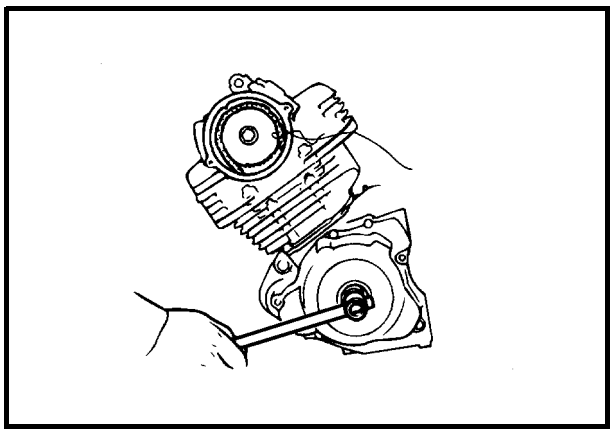
NOTE:
When installing the drive gear, keep the timing chain as tense as possible on the exhaust side.



CAUTION:
Do not turn the crankshaft during installation of the camshaft. Damage or improper valve timing will result.

- Remove the safety wire from the timing chain.

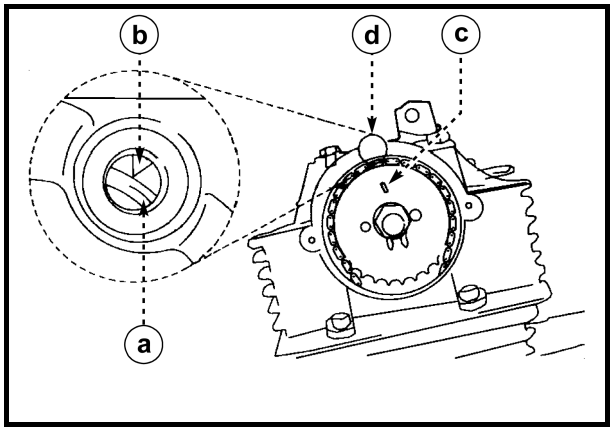
****



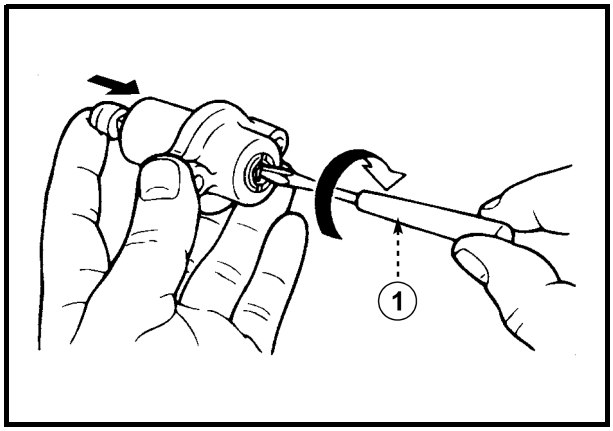
4. Install
   • Plate
5. Install
   • Bolt (sprocket)

	Bolt (timing chain sprocket): 2.0 Kgf·m (20 N·m)

NOTE:
Hold the CDI magneto nut with a wrench and mount the bolt.



6. Check
   • CDI magneto mark (a)
     Align the stationary pointer (b) with the crankcase cover (left).
   • drive gear mark (d)
     Align the stationary pointer (c) with the cylinder head.
     Out of alignment → Align
7. Install
   • Timing chain tensioner



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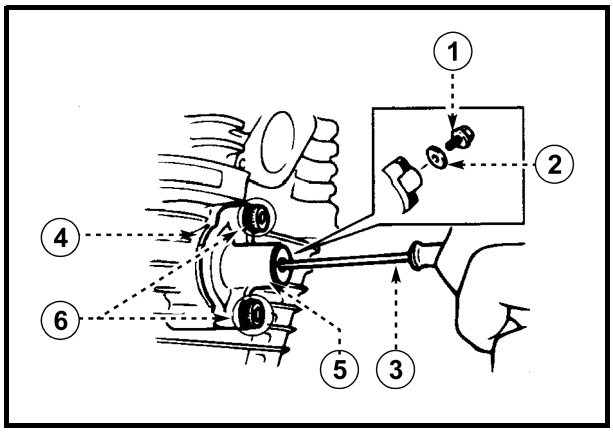
Installation steps

• Remove the tensioner cover bolt.
• While pressing the tensioner rod lightly with fingers, use a screwdriver (1) and wind the tensioner rod up fully clockwise.

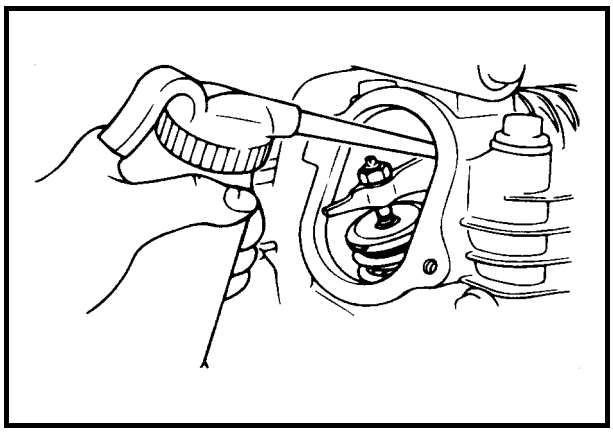


• While pressing the tensioner rod lightly, install the gasket (4), the chain tensioner (5), and tighten the bolts (6) to the specified torque.
• Release the screwdriver.
• Install the gasket (2) and tighten the cover bolt
  (1) to the specified torque.

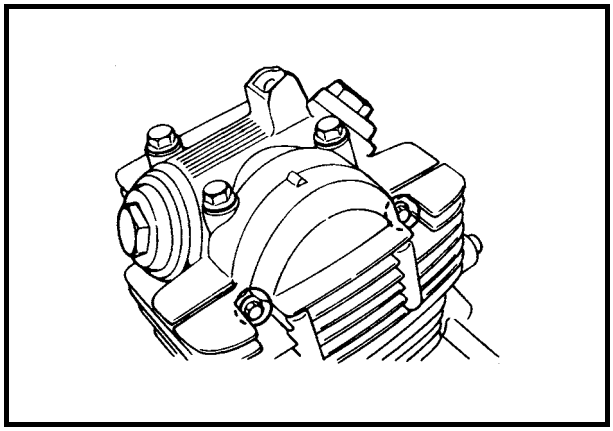
	Bolts (timing chain tensioner): 1.0 Kgf·m (10 N·m) **Cover bolt (timing chain tensioner): 0.75 Kgf·m (7.5 N·m)**

****

8. Check
   - Valve clearance
     Out of specification → Adjust
     See “VALVE CLEARANCE ADJUSTMENT” page 3-9

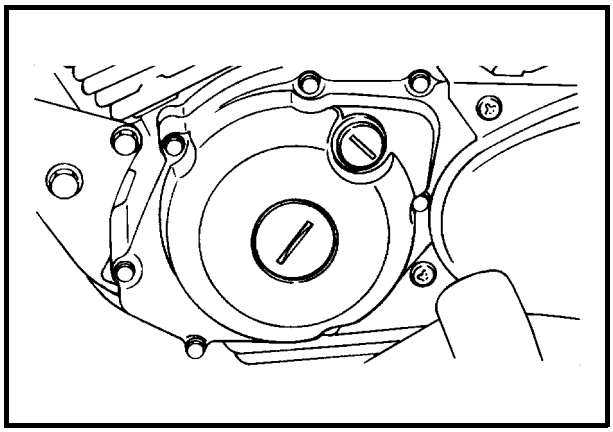


9. Lubricate
   - With engine oil

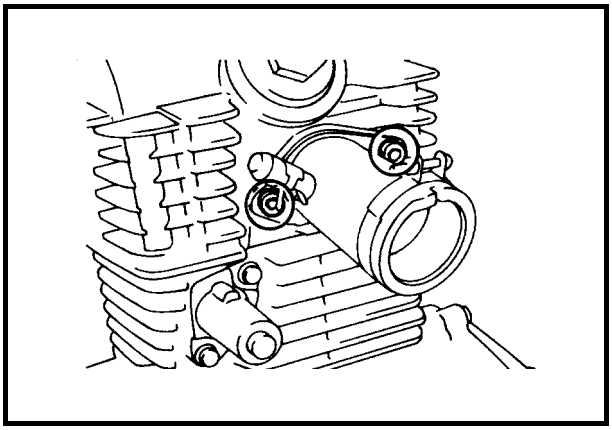


10. Install
    - Valve covers (with O-Rings)
    - Cylinder head side cover (with O-Rings)
    - Bolts (with washers)

Valve cover:
1.75 Kgf·m (17.5 N·m)
Bolts (cylinder head side cover):
1.0 Kgf·m (10 N·m)



11. Install
    - Timing check plug (with O-Ring)
    - Center plug (with O-Ring)



12. Install
- Gasket (intake manifold)
- Intake manifold

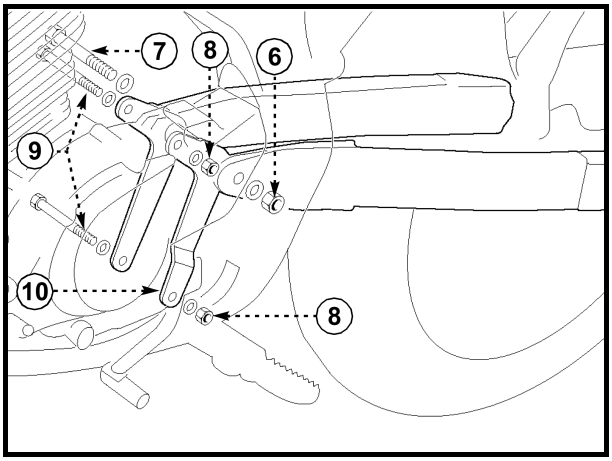
	Bolts (intake manifold): 1.0 Kgf·m (10 N·m)

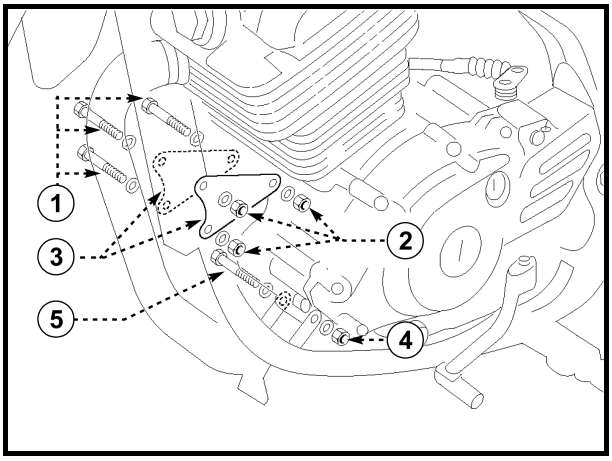
13. Install
- Spark plug

	Spark plug: 1.25 Kgf·m (12.5 N·m)

14. Install
- Oil drain plug

	Oil drain plug: 2.0 Kgf·m (20 N·m)





ENGINE MOUNTING

When remounting the engine, reverse the removal procedure.

Note the following points

1. Install
- Rear stand (10)
- Bolts (9)
- Nuts (8)
- Engine

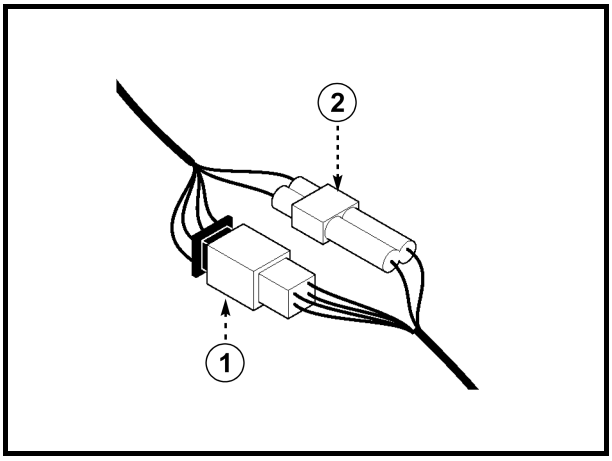
NOTE:

Assemble the engine from the right side of the motorcycle

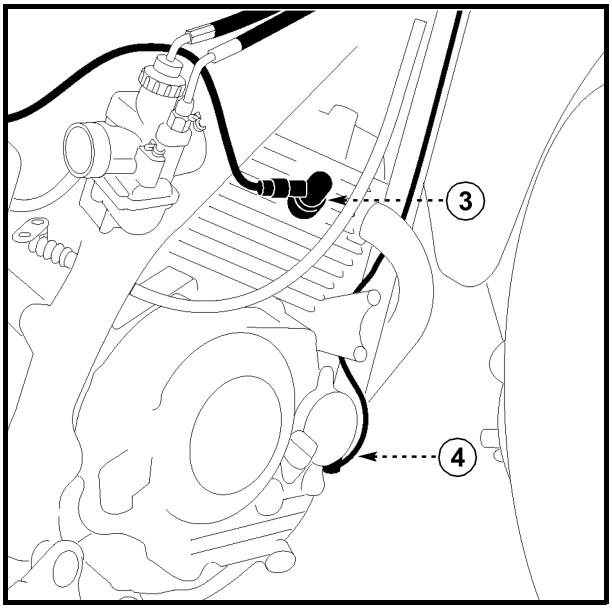
2. Install
- Bolt (7)
- Nut (6)
- Bolt (5)
- Nut (4)

3. Install
- Brackets (3)
- Bolts (1)
- Nuts (2)

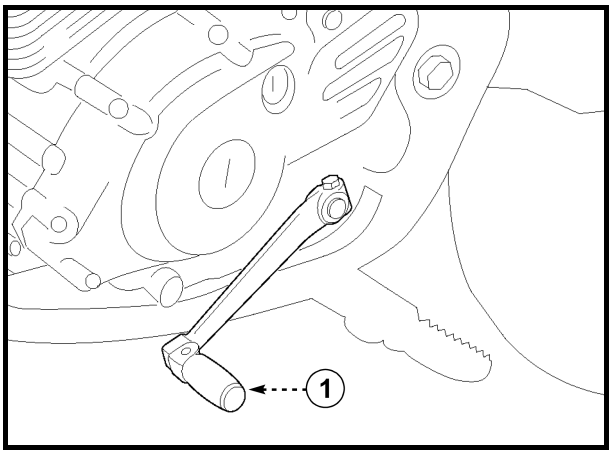
	Engine mounting bolts: 2.3 Kgf·m (23 N·m)



4. Connect
   - 4-pin connector (1)
   - 2-pin connector (2)



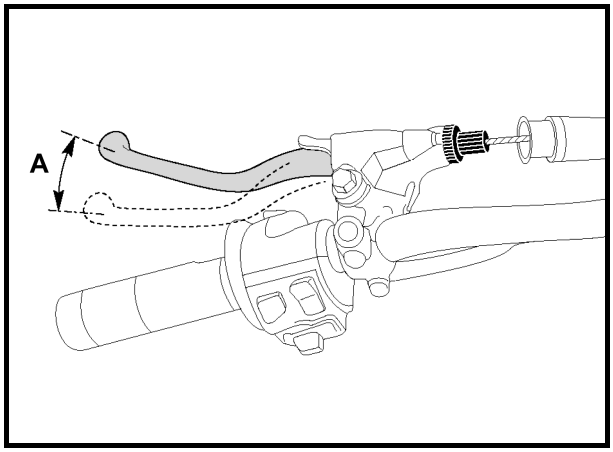
   - Spark plug pipette (3)
   - Starter motor connector (4)
5. Install
   - Sump cover
     See “ENGINE SUMP GUARD INSTALLATION” page 3-6



6. Install
   - Shift pedal (1)

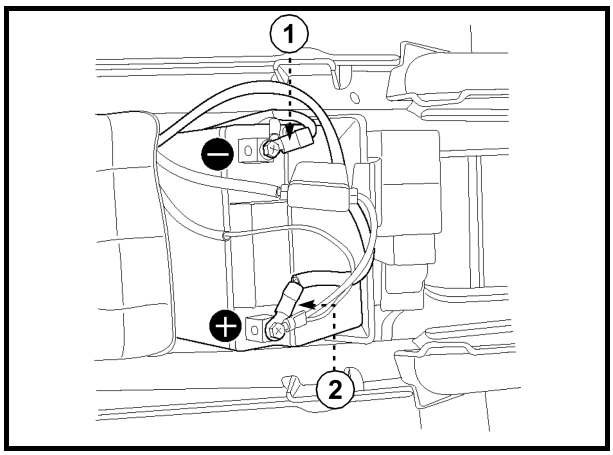
	Shift pedal bolt: **0.3 Kgf·m (3 N·m)**

7. Install
   - Muffler
     See “EXHAUST SYSTEM INSPECTION” page 3-21
8. Install
   - Transmission chain
     See “CHAIN INSTALLATION” page 6-34
9. Install
   - Clutch cable



10. Adjust
- Clutch cable clearance (A)
  See “CLUTCH ADJUSTMENT” page 3-22

11. Install
- Carburetor
  See “INSTALLATION” page 5-8



12. Install
- Battery

CAUTION:

Connect the positive lead (2) first and then connect the negative lead (1).

13. Fill
- Engine oil
  See “ENGINE OIL CHANGE” page 3-18

14. Install
- Fuel tank
  See “FUEL TANK INSTALLATION” page 3-3
- Seat
  See “SIDE COVER INSTALLATION” page 3-6

15. Adjust
- Engine idling speed
  See “CO MEASUREMENT AND IDLING SPEED ADJUSTMENT” page 3-11
- Accelerator cable clearance
  See “THROTTLE CABLE ADJUSTMENT” page 3-13

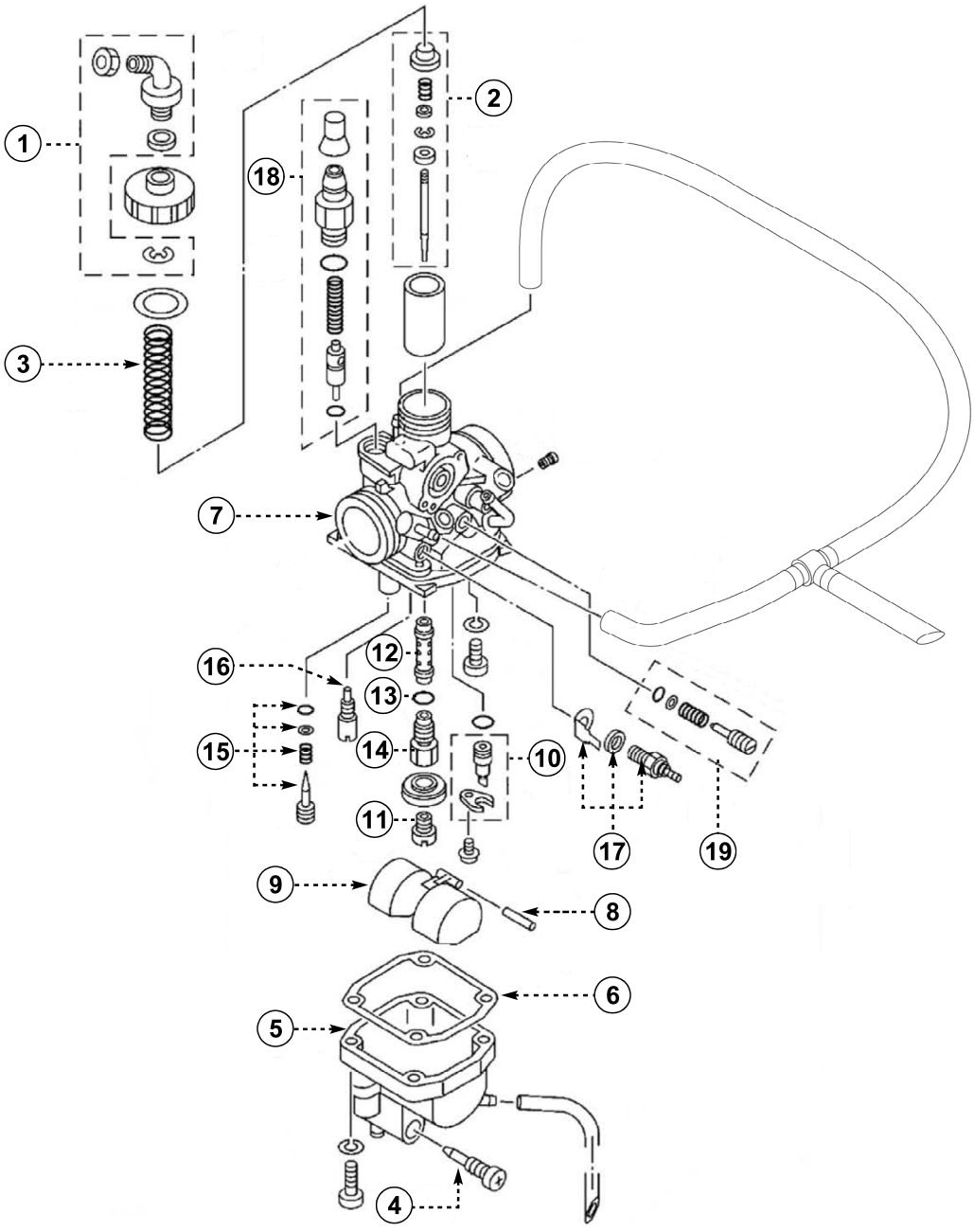
CHAPTER 5
CARBURETOR

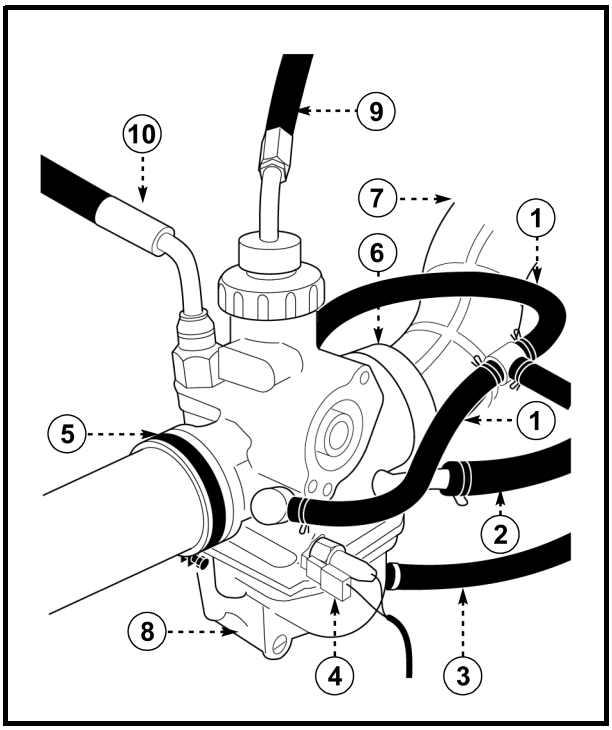
CARBURETOR

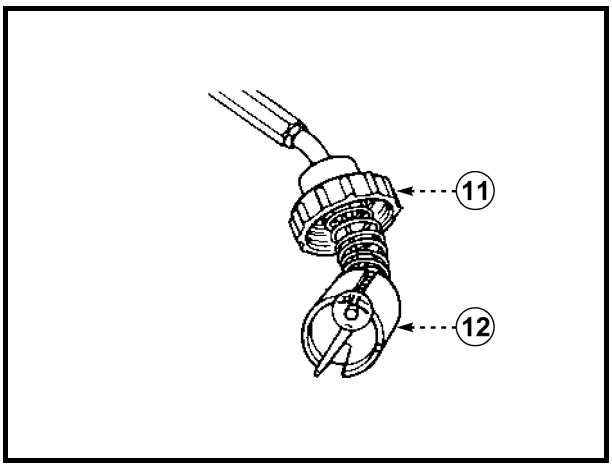
CARBURETOR

COMPONENT DESCRIPTION

(1) Throttle cable unit
(2) Throttle valve unit
(3) Throttle valve spring
(4) Float chamber drain screw
(5) Carburetor float chamber
(6) Float chamber gasket
(7) Carburetor body
(8) Float pin
(9) Float
(10) Float needle valve assembly
(11) Main jet
(12) Main nozzle
(13) O-ring
(14) Setter needle jet
(15) Pilot screw
(16) Pilot jet
(17) Heater
(18) Starter unit
(19) Throttle stop screw







REMOVAL

⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Remove
   - Seat
     See "SEAT REMOVAL" page 3-2
   - Fuel tank
     See "FUEL TANK REMOVAL" page 3-3
3. Remove
   - Fuel (carburetor float chamber)

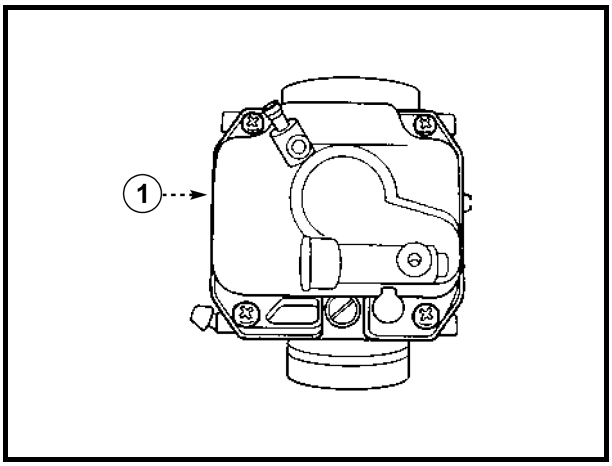
NOTE:

Position a cloth under the drain pipe for the absorption of the fuel poured out.

⚠ WARNING

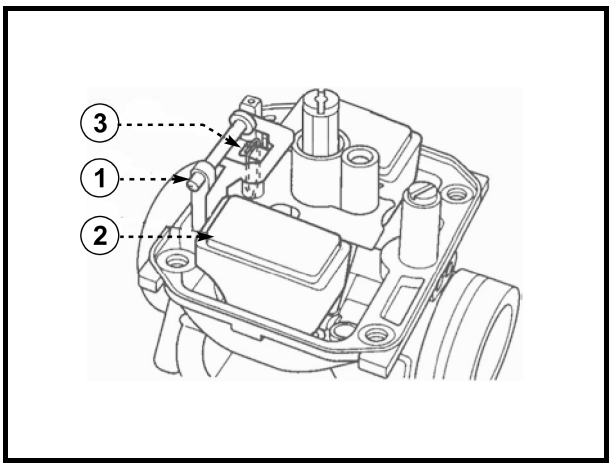
Gasoline is highly flammable; avoid fuel leakages on the warm engine.

4. Disconnect
   - Breather hose (1)
   - Fuel hose (2)
   - Fuel hose (3)
   - Carburetor heater leads (4)
5. Unscrew
   - Intake manifold clamp screw (5)
   - Filter case sleeve clamp screw (6)
6. Remove
   - Filter case sleeve (7)
   - Carburetor (8)
   - Throttle cable (9)
   - Starter cable (10)
   - Cover (11)
   - Throttle valve (12)

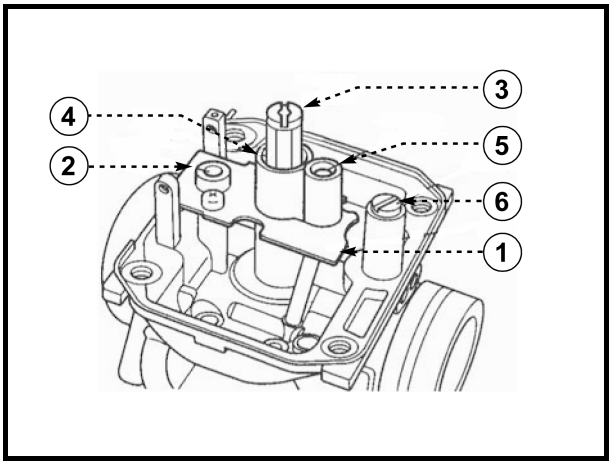


DISASSEMBLY

1. Remove
   - Carburetor float chamber (1)
   - Float chamber gasket



2. Remove
   - Float pin (1)
   - Float (2)
   - Needle valve (3)



3. Remove
   - Plate (1)
   - Needle valve holder (2)
   - Main jet (3)
   - Spray nozzle (4)
   - Pilot jet (5)
   - Pilot adjust screw (6)

CHECKS AND CONTROLS

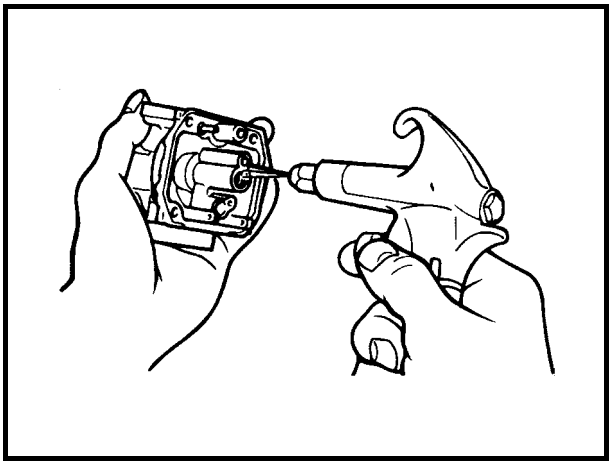
1. Inspect
   - Carburetor body
   - Carburetor float chamber
   - Nozzle housing
     Cracks and damage → Replace
   - Carburetor float chamber body
     Dirt → Clean
   - Fuel circuit
     Dirt → Clean as indicated below

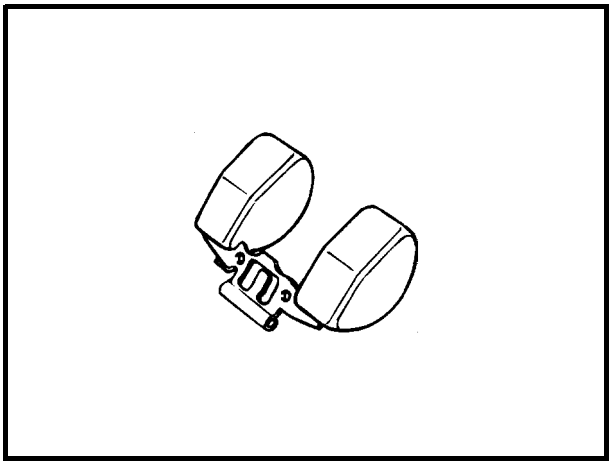
****

Cleaning phases

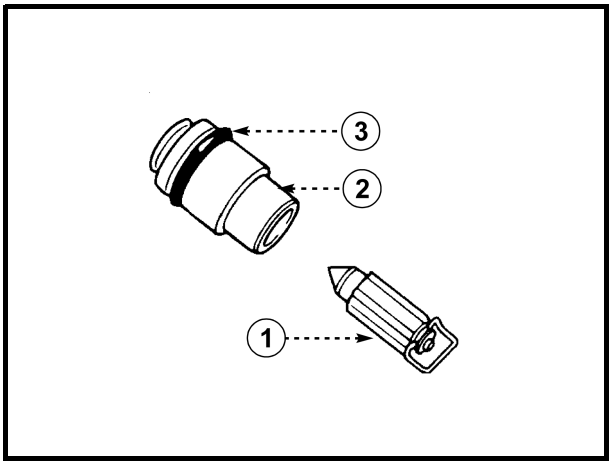
- Wash the carburetor with kerosene or petrol. Do not clean the carburetor with caustic solutions.
- Blow compressed air into passages and nozzles

****

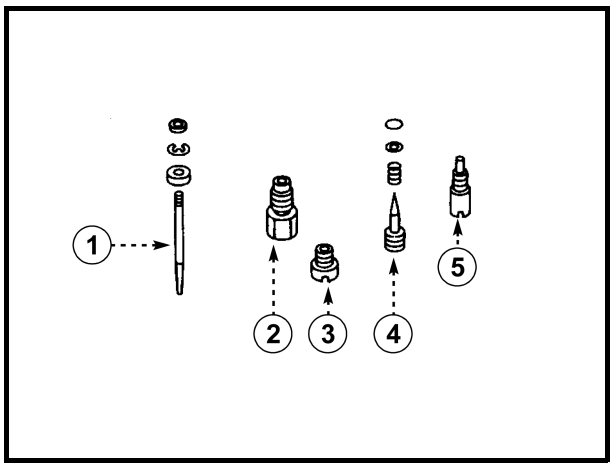




2. Inspect
   - Float
     Damage → Replace

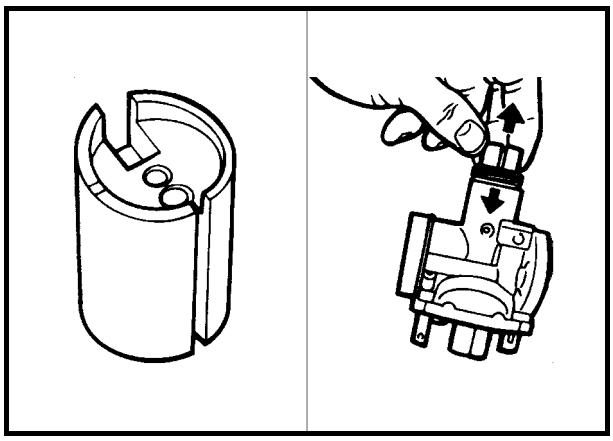


3. Inspect
   - Needle valve (1)
   - Needle valve holder (2)
   - O-Ring (3)
     Dirt → Clean
     Wear and damage → Replace



4. Inspect
   - Jet needle (1)
   - Spray nozzle (2)
   - Main jet (3)
   - Pilot screw (4)
   - Pilot jet (5)

   Wear and damage → Replace
   Dirt → Blow compressed air into the nozzles



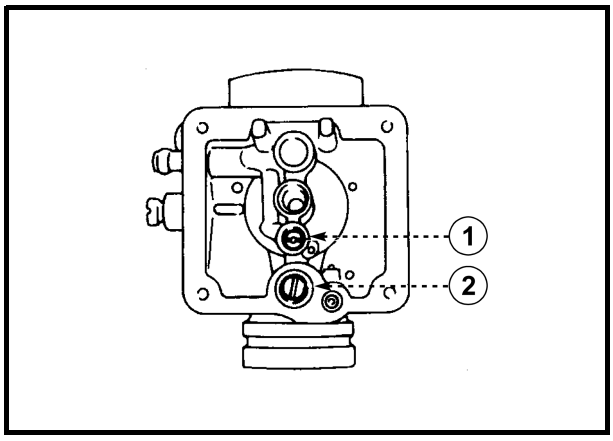
5. Check
   - Correct sliding

   Put the throttle valve into the carburetor body and make sure that it slides freely
   Dirt → Replace

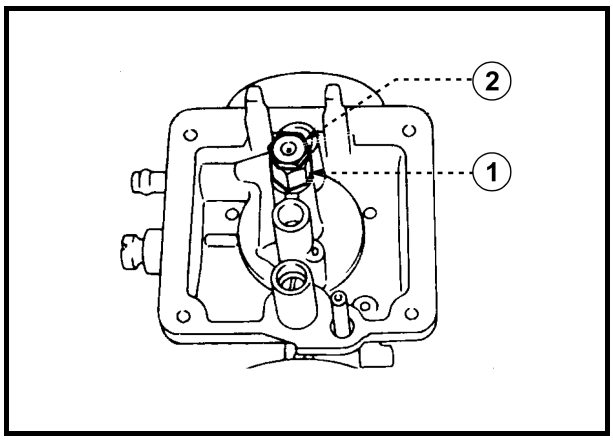
ASSEMBLY

CAUTION:

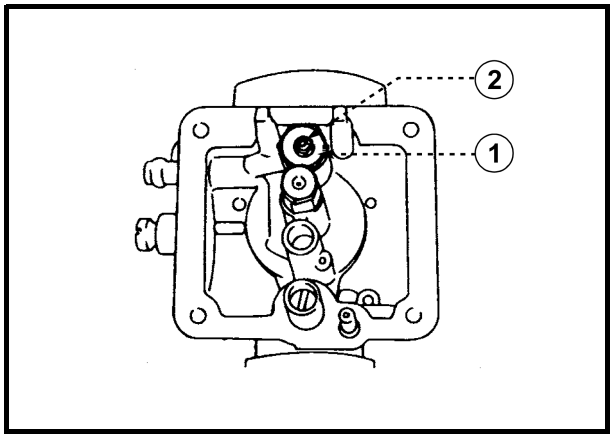
Before assembly wash all components with kerosene



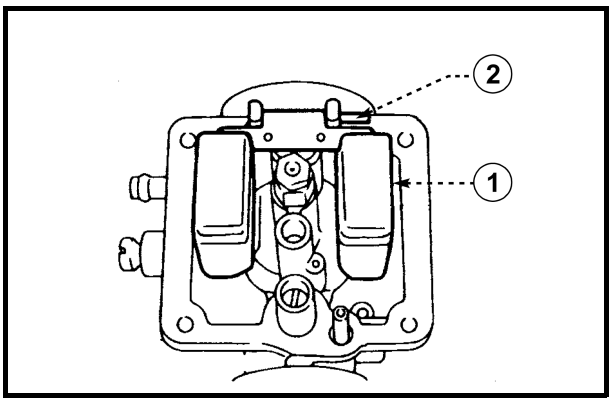
1. Install
   - Pilot jet (1)
   - Pilot screw (2)



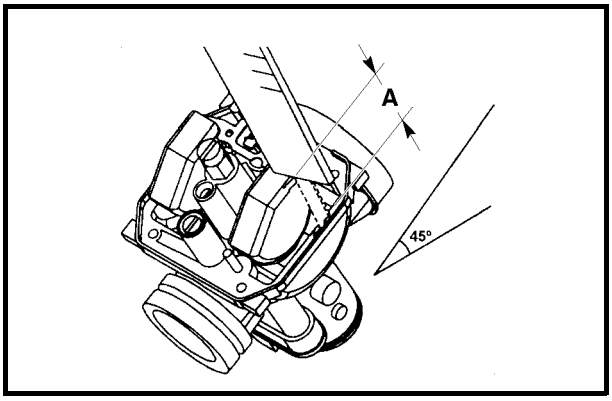
2. Install
   - O-Ring gasket (new)
   - Spray (1)
   - Main jet (2)



3. Install
   - Needle valve holder (1)
   - Plate
   - Needle valve (2)

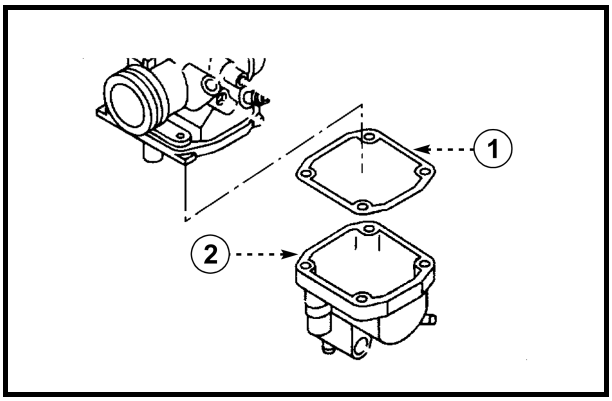


4. Install
   - Float (1)
   - Float pin (2)

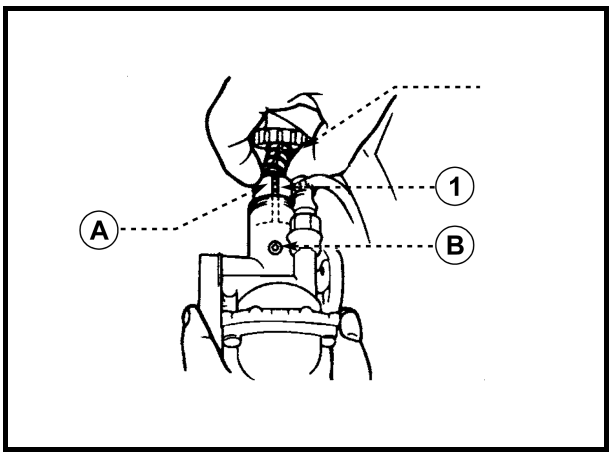


5. Measure
   - Float height (A) without gasket
     If the float height is incorrect → Adjust

	Float height: **18.9 mm**



6. Install
   - Carburetor float chamber gasket (1) (new)
   - Carburetor float chamber (2)

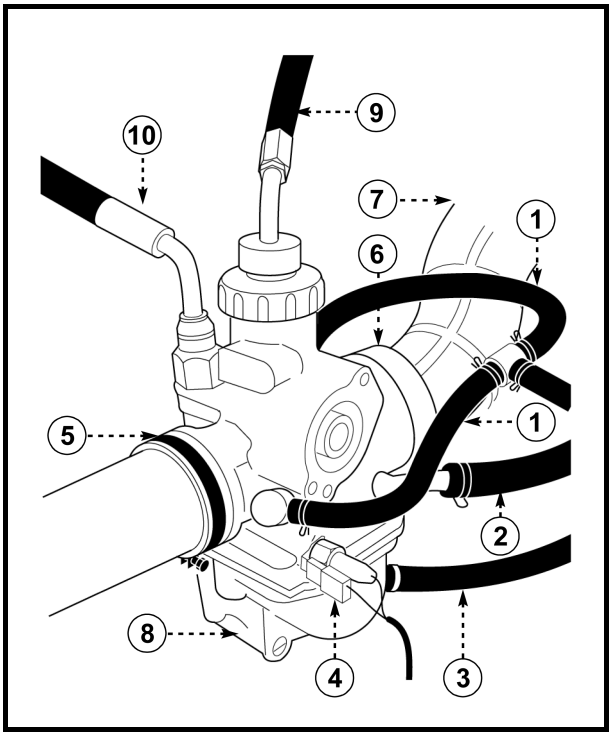


INSTALLATION

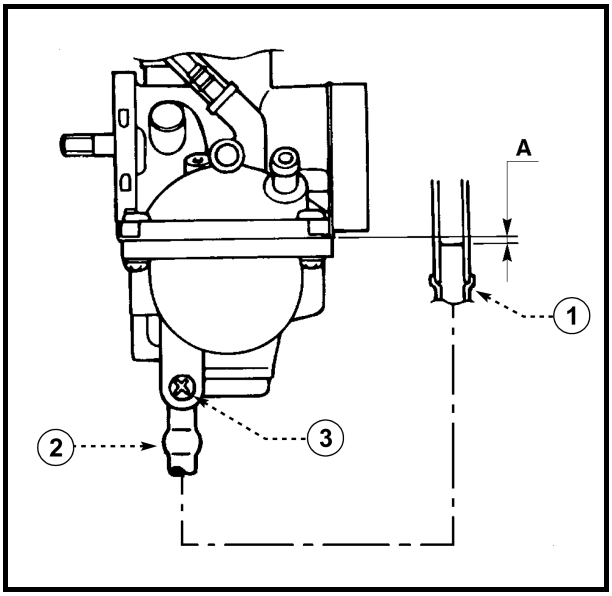
1. Install
   - Throttle valve
   - Cover

NOTE:

Align slot (A) of throttle valve (1) with match mark (B) of the carburetor body



2. Install
   - Carburetor (8)
   - Starter cable (10)
   - Throttle cable (9)
   - Filter case sleeve (7)
   - Breather hose (1)
   - Fuel hose (2)
   - Fuel hose (3)
   - Carburetor heater leads (4)
3. Tighten
   - Intake manifold clamp screw (5)
   - Filter case sleeve clamp screw (6)
4. Install
   - Seat
     See “SEAT INSTALLATION” page 3-2
   - Fuel tank
     See “FUEL TANK INSTALLATION” page 3-3



FUEL LEVEL ADJUSTMENT

1. Measure
   - Fuel level (A)
     Out of specification → Adjust

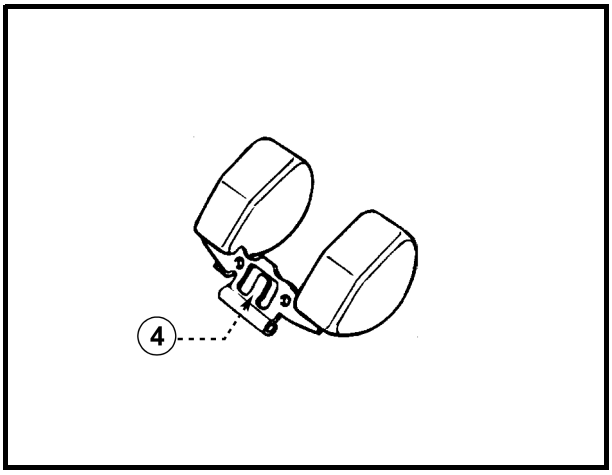
Fuel level below the float chamber line: 7.5 mm

****

Adjustment steps

- Place the motorcycle on a level surface
- Place a lifting device or support under the engine so that the carburetor is in a vertical position
- Connect fuel level gauge (1) to drain pipe (2)

Fuel level gauge: 90890-01312



- Unscrew drain screw (3)
- Keep the gauge in a vertical position next to the carburetor float chamber line
- Measure fuel level (A) by means of the gauge
- Incorrect fuel level → Adjust
- Remove the carburetor
- Check the needle valve and its housing
- Replace them if they are worn out
- Otherwise adjust the level by slightly bending the float tab (4) slightly
- Install the carburetor
- Check again the fuel level

****

CHAPTER 6
CHASSIS

CHASSIS

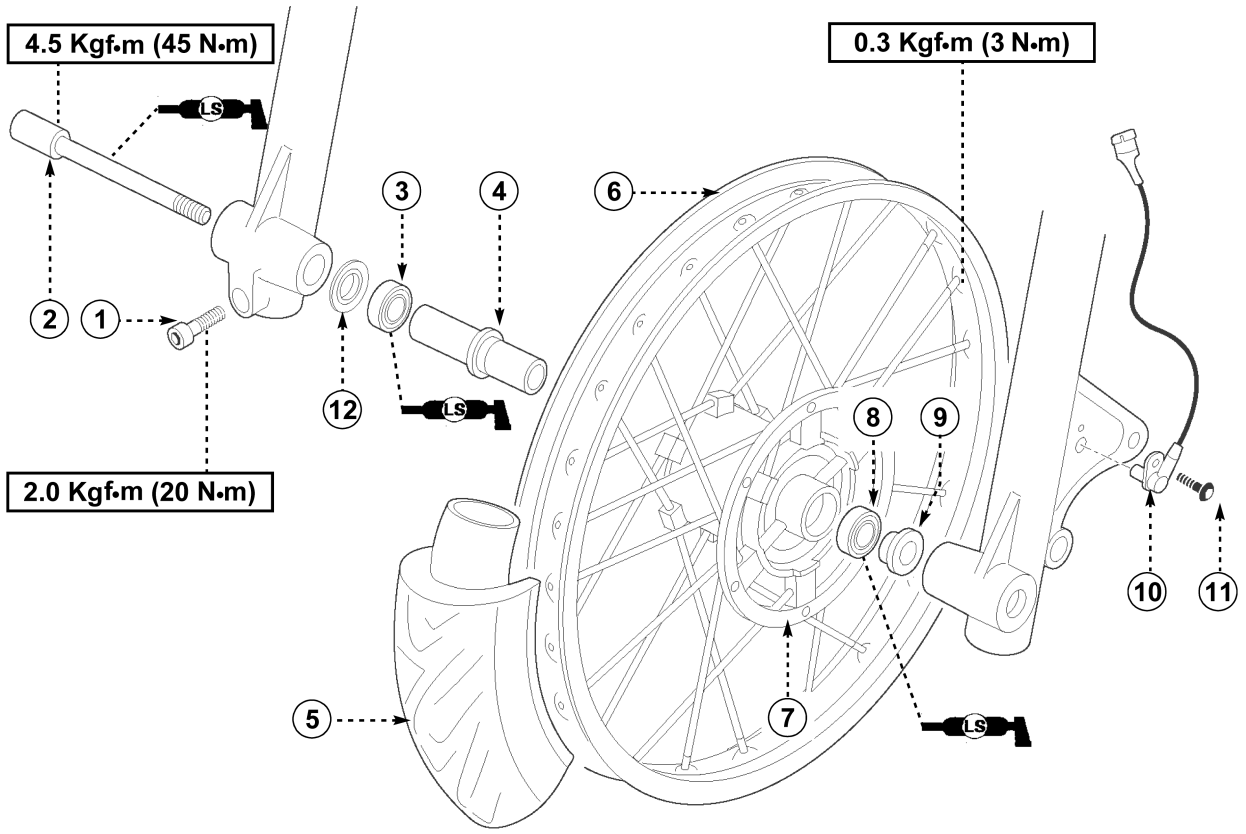
FRONT WHEEL

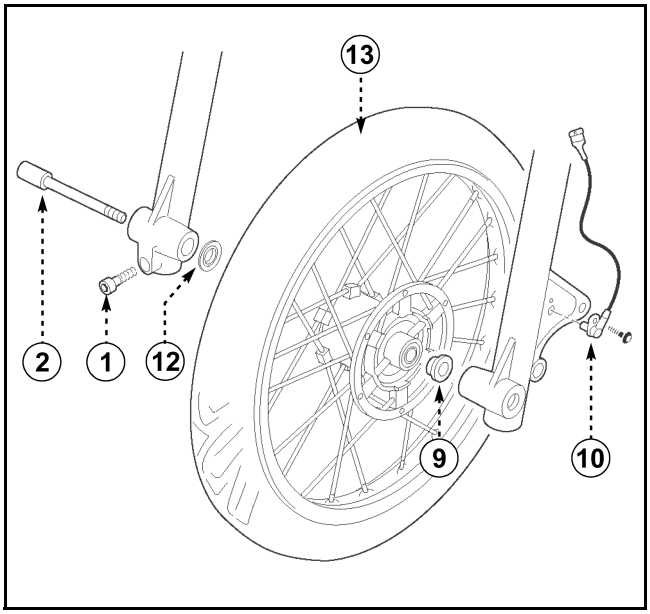
COMPONENT DESCRIPTION

(1) Bolt
(2) Wheel axle
(3) Bearing
(4) Spacer
(5) Tire
(6) Rim
(7) Hub
(8) Bearing
(9) Spacer
(10) Speedometer sensor
(11) Bolt
(12) Dust seal

Tyre inflation pressure	Front	Rear
Up to 90 kg load	1.8 bar (26.1 psi)	1.9 bar (27.6 psi)
With maximum load 178 kg	2.0 bar (29.0 psi)	2.1 bar (30.5 psi)

A	Tire size XT 125 R: 90/90-21 54S XT 125 X: 100/80-17 52S	C	Rim runout limits Vertical: 1.0 mm Lateral: 0.5 mm
B	Rim size XT 125 R: 1.85x21 XT 125 X: 2.5x17	D	Tire wear limit 1 mm





REMOVAL

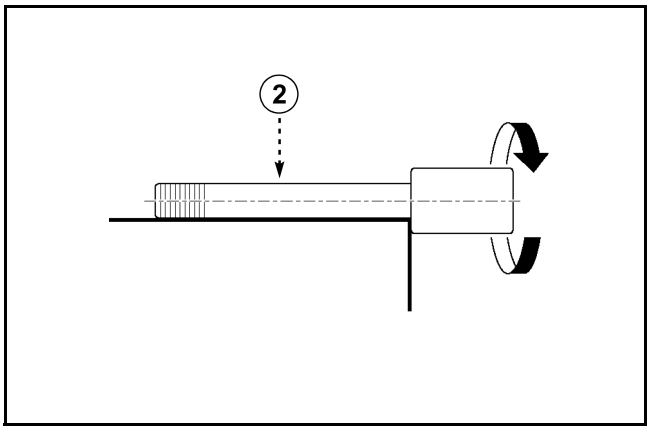
⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Elevate the rear wheel by placing a suitable stand under the engine.
3. Remove
   - Speedometer sensor (10)
   - Bolt (1)
   - Wheel axle (2)
   - Dust seal (12)
   - Spacer (9)
   - Front wheel (13)

NOTE:

Do not depress the brake lever when the wheel is off the motorcycle, otherwise the brake pads will be forced shut.



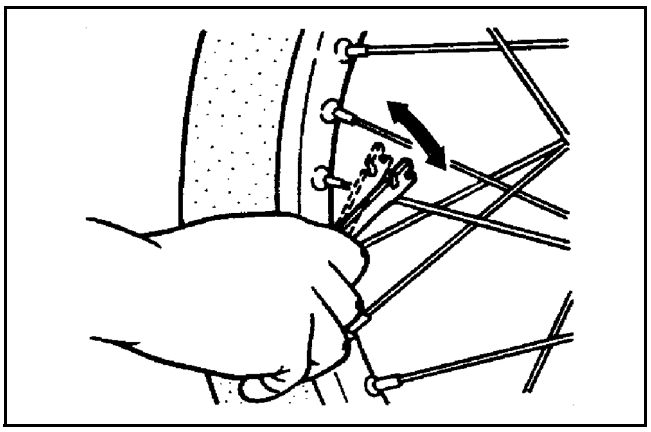
CHECKS AND CONTROLS

1. Eliminate any corrosion from the parts.
2. Check
   - Wheel axle (2)
     Roll the axle on a flat surface.
   - Warpage → Replace

⚠ WARNING

Do not attempt to straighten the axle.

3. Check
   - Tire
     Wear and damage → Replace
     See "TYRE INSPECTION" page 3-31
   - Front wheel
     Damage and bends → Replace
     See "WHEEL INSPECTION" page 3-33.

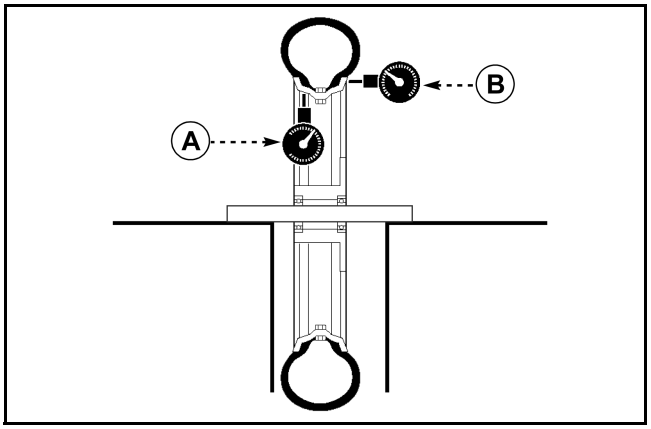


4. Check
   - Wheel spokes
     Damage and bends → Replace
     Loose spoke → Retighten
     Turn the wheel and tap the spokes with a screw driver.

NOTE:
A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

5. Tighten
   - Loose spoke

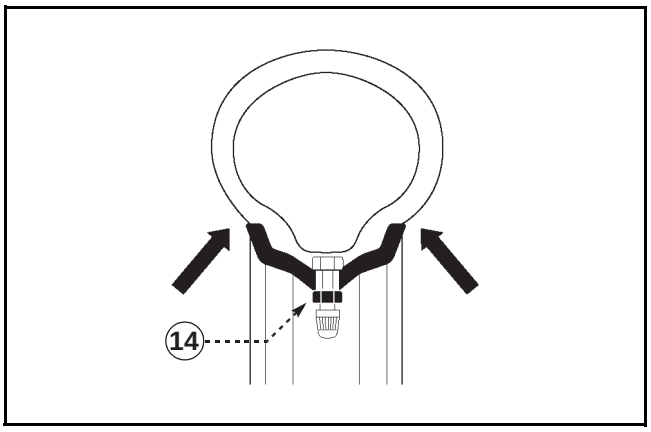
Wheel spokes:
0.3 Kgf•m (3 N•m)



NOTE:
Check the wheel runout after tightening the spokes.

6. Measure
   - Rim runout
     Out of specification → Check the rim and the bearing play.

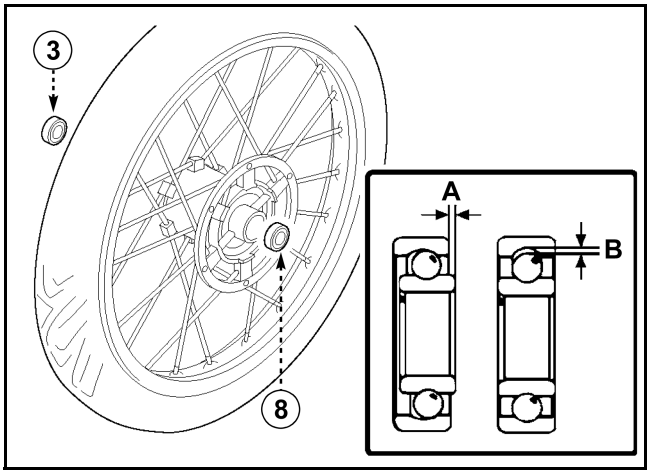
Rim runout limits:
Vertical (A): 1.0 mm
Lateral (B): 0.5 mm



⚠ WARNING

After mounting a tire, ride conservatively to allow the tire do be adapted to the rim. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury. After a tire repair or replacement, be sure to torque tighten the valve stem locknut (14) to specification.

Valve locknut (14):
0.3 Kgf·m (3 N·m)



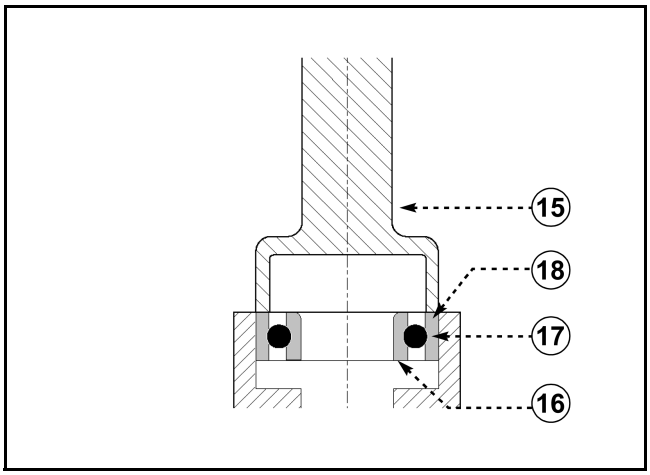
7. Check
   - Bearing (3-8)
     Abnormal noise, irregular free play and rotation → Replace

(A) side free play
(B) axial free play

****

Bearing replacement steps:

- Remove bearings (3-8) using a bearing puller.
- Install the new bearings.



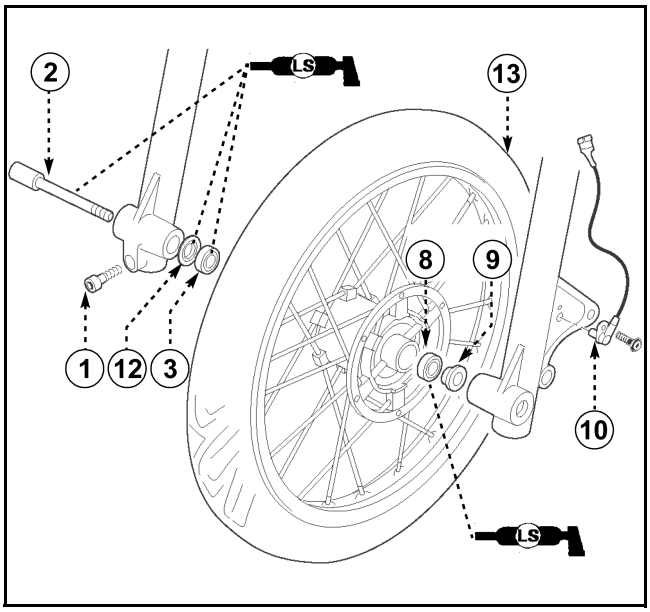
NOTE:

Use a socket wrench (15) that matches the outside diameter of the bearing.

CAUTION:

Do not strike the centre race (16) or balls (17) of the bearing. Contact should be made only with the outer race (18).

****



INSTALLATION

1. Lubricate
   - Wheel axle (2)
   - Dust seal (12)
   - Bearing (3-8)

	Use lithium soap base grease

2. Assemble
   - Dust seal (12)
   - Wheel axle (13)
   - Spacer (9)
   - Bolt (1)
3. Tighten
   - Wheel axle (2)
   - Bolt (1)

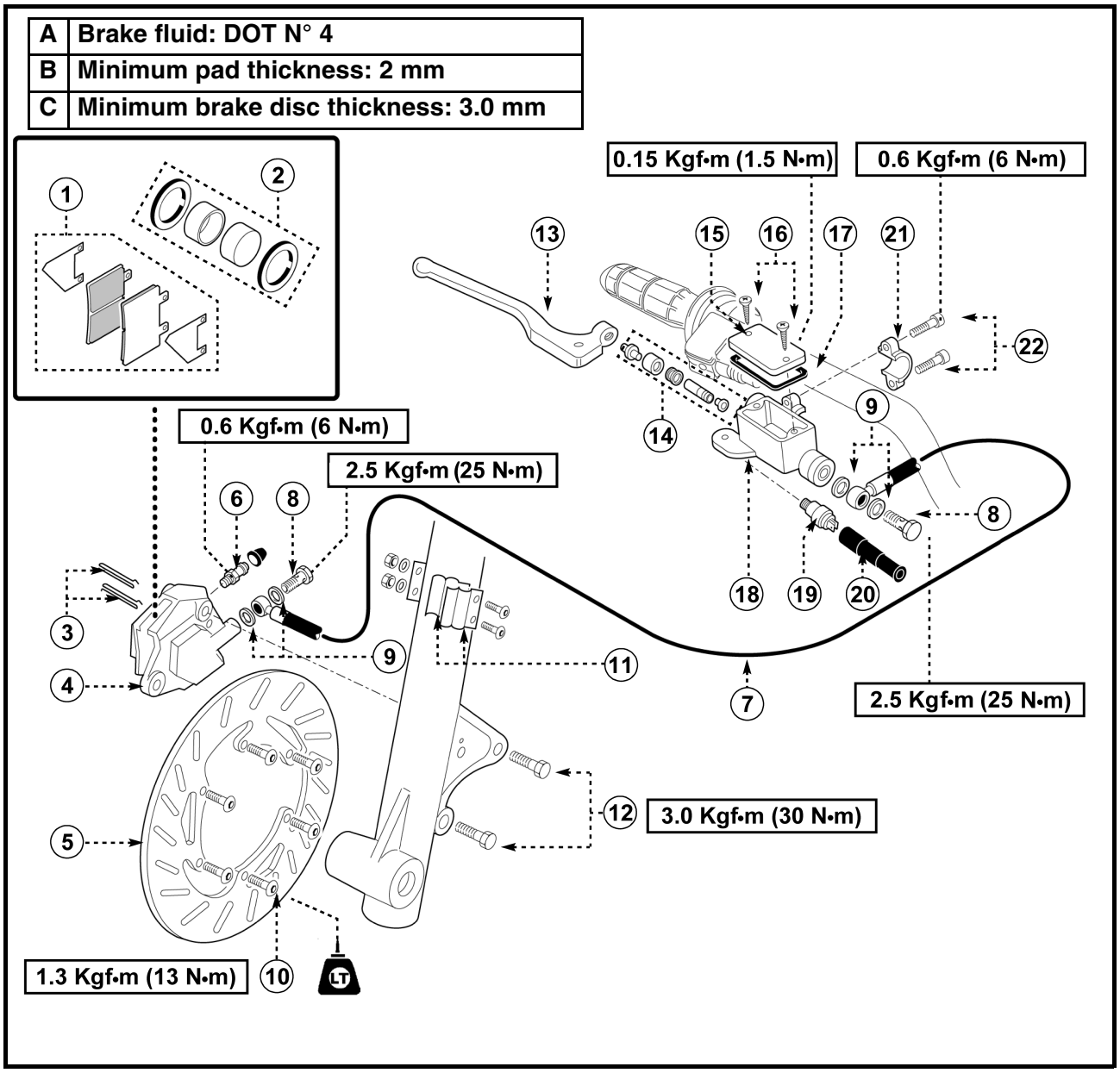
	Wheel axle (2): **4.5 Kgf·m (45 N·m)** **Bolt (1):** **2.0 Kgf·m (20 N·m)**

4. Install
   - Speedometer sensor (10)

FRONT BRAKE

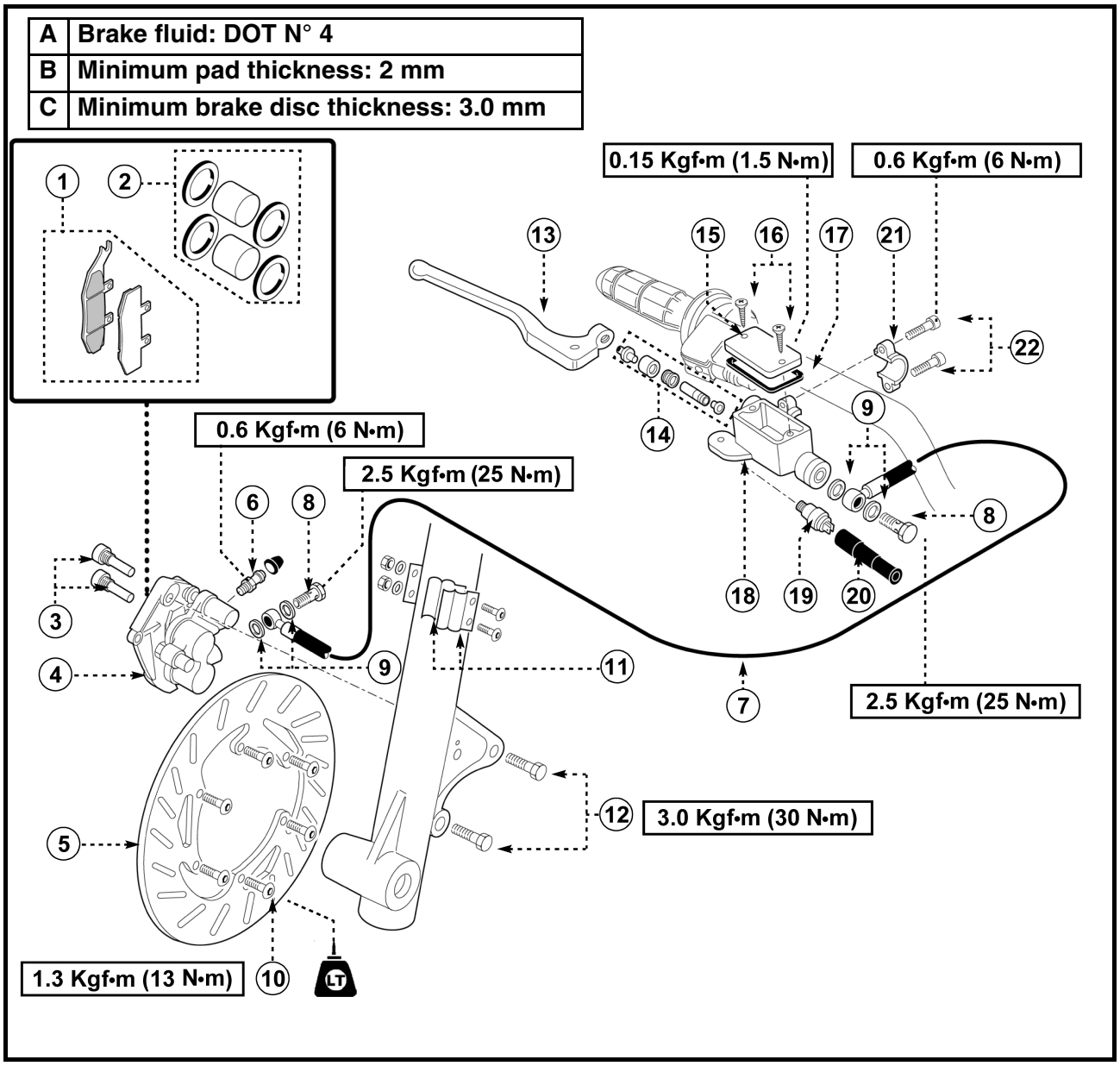
COMPONENT DESCRIPTION (XT 125 R)

(1) Brake pads
(2) Pistons and piston seals
(3) Cotter pin
(4) Brake caliper
(5) Brake disc
(6) Bleed screw
(7) Hydraulic hose
(8) Union bolt
(9) Washer
(10) Bolt
(11) Cable holder
(12) Bolt
(13) Brake lever
(14) Brake piston
(15) Cover
(16) Bolt
(17) Cover gasket
(18) Master cylinder
(19) Stop switch
(20) Switch protection
(21) Clamp
(22) Bolt



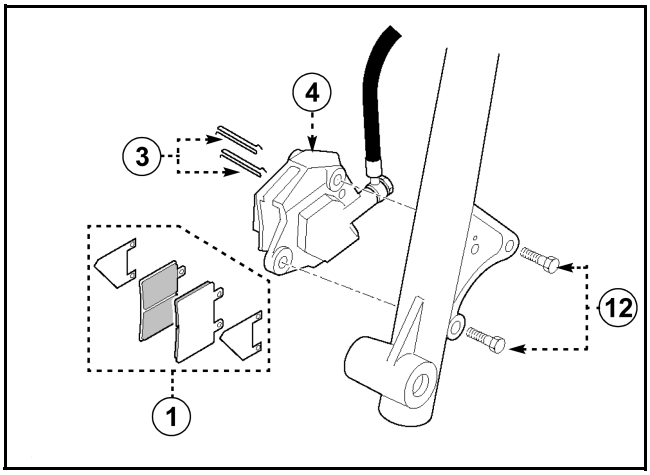
COMPONENT DESCRIPTION (XT 125 X)

(1) Brake pads
(2) Pistons and piston seals
(3) Bolt
(4) Brake caliper
(5) Brake disc
(6) Bleed screw
(7) Hydraulic hose
(8) Union bolt
(9) Washer
(10) Bolt
(11) Cable holder
(12) Bolt
(13) Brake lever
(14) Brake piston
(15) Cover
(16) Bolt
(17) Gasket
(18) Master cylinder
(19) Stop switch
(20) Switch protection
(21) Clamp
(22) Bolt



CAUTION:

Brake disc components rarely require disassembly.
- **Disassemble the components only if absolutely necessary.**
- **Do not use solvents on internal brake components.**
- **Do not use contaminated brake fluid for cleaning.**
- **Avoid contact with the eyes.**
- **Avoid contact with painted surfaces or plastic parts.**



BRAKE PAD REPLACEMENT (XT 125 R)

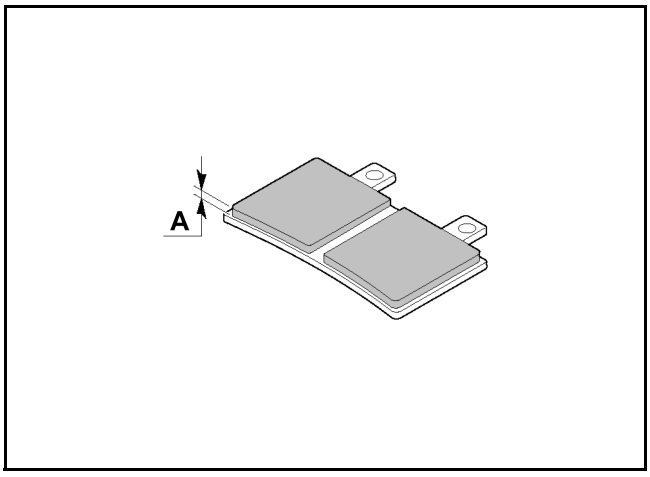
NOTE:

It is not necessary to disassemble the brake caliper and the hydraulic transmission to replace the brake pads.

⚠ WARNING

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

1. Remove
   - Bolt (12)
   - Brake caliper (4)
   - Cotter pin (3)
   - Brake pads (1)



Minimum pad thickness (A):
2 mm

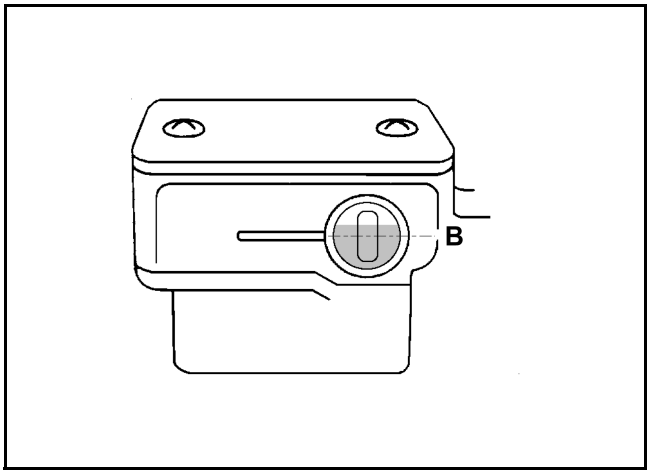
NOTE:

When replacing the pads, replace also spring retaining clips (3), if necessary.

2. Install
   - Brake pads (1)

NOTE:

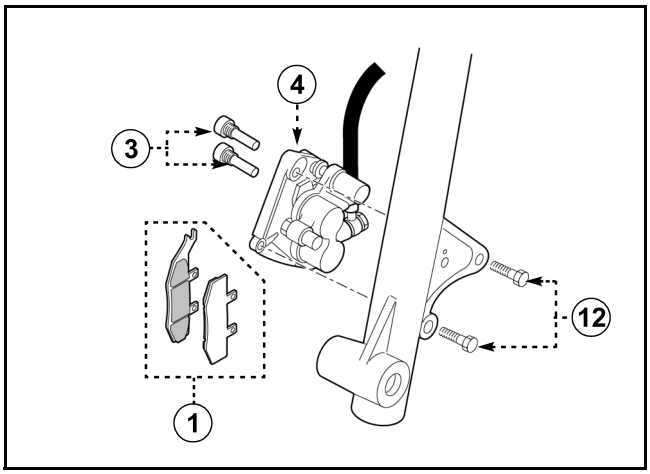
Be careful when mounting the vibration-proof plates; the arrow must show the running direction.



3. Install
   - Cotter pin (3)
   - Brake caliper (4)
   - Bolt (12)

	Bolt (12): **3.0 Kgf·m (30 N·m)**

4. Check
   - Brake fluid level
     See "FRONT BRAKE FLUID LEVEL INSPECTION" page 3-22.
     Lower level line (B)
5. Check
   - Brake lever operation
     Softy and spongy lever stroke → Bleed the brake system.
     See "AIR BLEEDING (FRONT BRAKE SYSTEM)" page 3-24



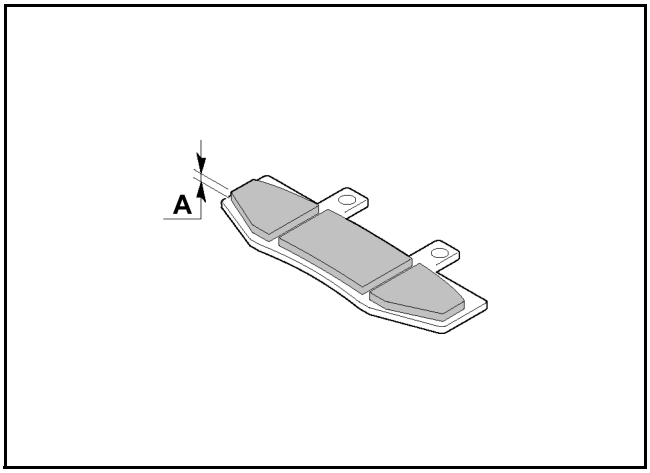
BRAKE PAD REPLACEMENT (XT 125 X)

NOTE:
It is not necessary to disassemble the brake caliper and the hydraulic transmission to replace the brake pads.

⚠ WARNING

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

1. Remove
   - Bolt (12)
   - Brake caliper (4)
   - Bolt (3)
   - Brake pads (1)

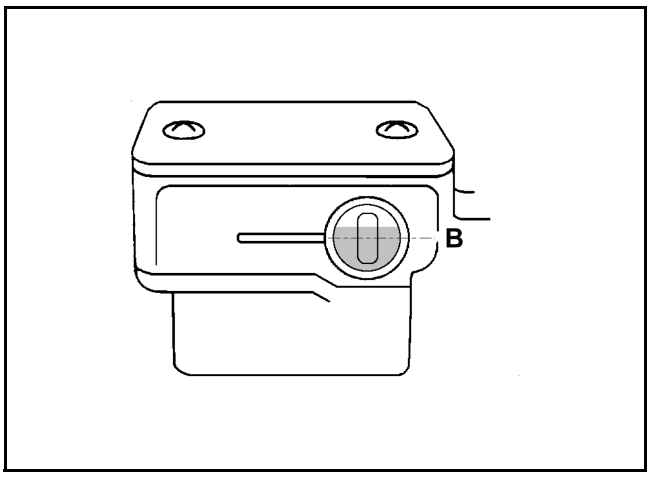


	Minimum pad thickness (A): **2 mm**

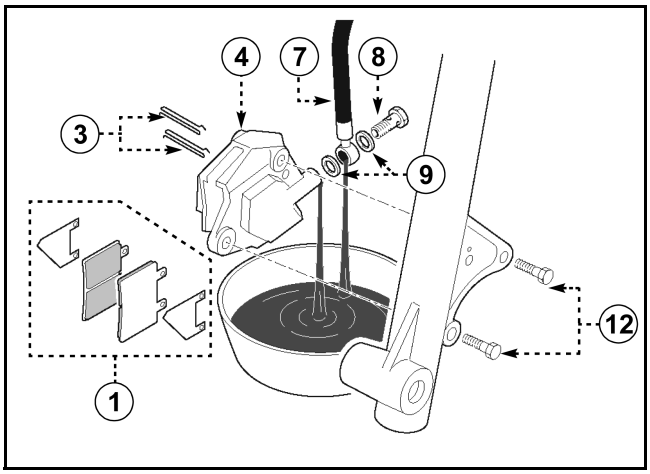
NOTE:
When changing the brake pad linings, replace also screws (3), if necessary.

2. Install
   - Brake pads (1)
   - Bolt (3)
   - Brake caliper (4)
   - Bolt (12)

	Bolt (12): **3.0 Kgf·m (30 N·m)**



3. Check
   - Brake fluid level
     See "FRONT BRAKE FLUID LEVEL INSPECTION" page 3-22
     Lower level line (B)
4. Check
   - Brake lever operation
     Softy and spongy lever stroke → Bleed the brake system.
     See "AIR BLEEDING (FRONT BRAKE SYSTEM)" page 3-24



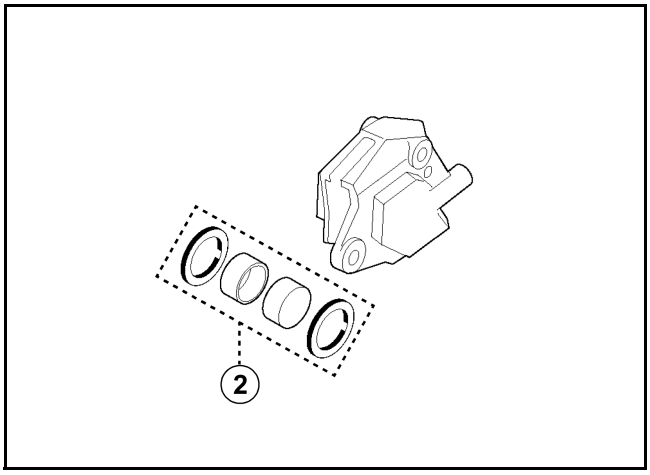
BRAKE CALIPER DISASSEMBLY (XT 125 R)

NOTE:
Before disassembling the caliper, drain the brake system of its brake fluid.

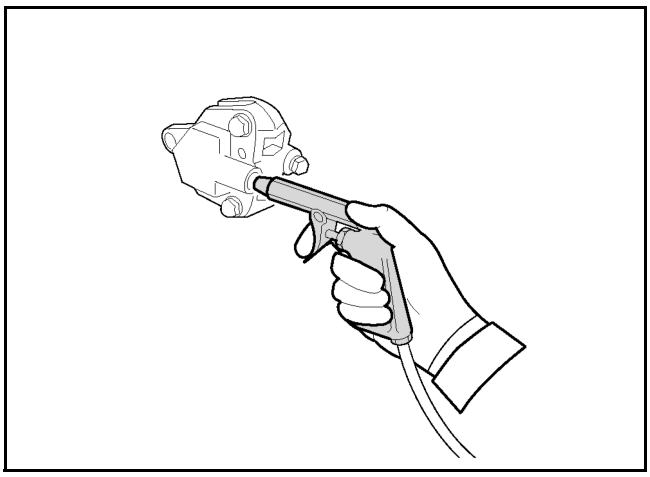
⚠ WARNING
Securely support the motorcycle so there is no danger of it falling over.

1. Remove
   - Union bolt (8)
   - Washer (9)
2. Disconnect
   - Hydraulic hose (7)

NOTE:
Position the end of hose (7) in a container and operate the master cylinder to bleed all fluid.



3. Remove
   - Bolt (12)
   - Brake caliper (4)
   - Cotter pin (3)
   - Brake pads (1)
4. Remove
   - Pistons and piston seals (2)



****

Piston and piston seal removal steps:

- Blow compressed air into the hole to push out the pistons from the caliper.

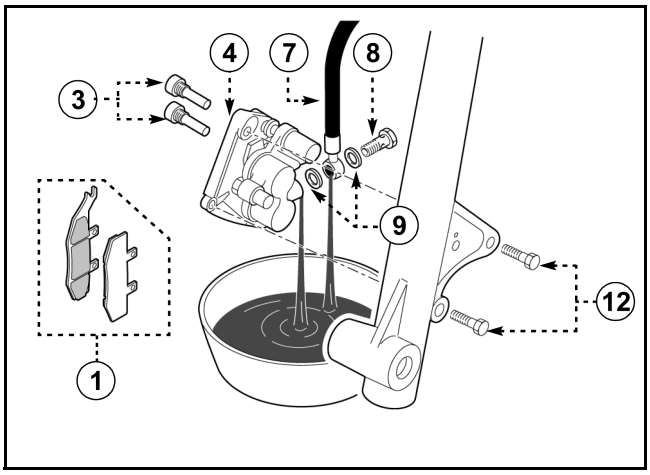
⚠ WARNING

- **Do not force out the piston from the caliper body.**
- **Cover the pistons with a rag and use care so that pistons do not cause injury as they are expelled from the caliper.**

CAUTION:

To remove the piston seals, extract them with your hands and do not use tools.

****



BRAKE CALIPER DISASSEMBLY (XT 125 X)

NOTE:

Before disassembling the caliper, drain the brake system of its brake fluid.

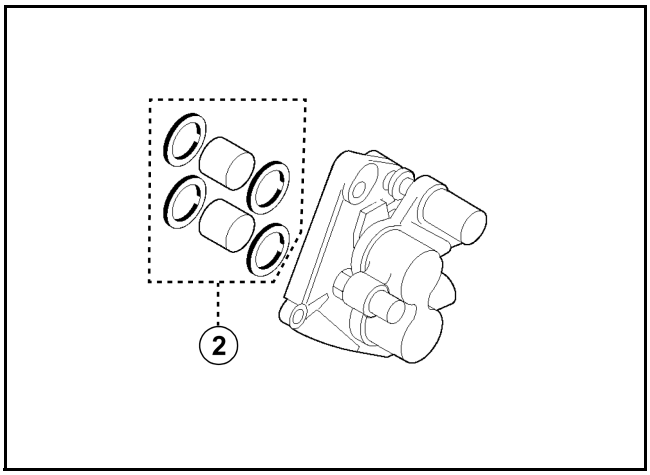
⚠ WARNING

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

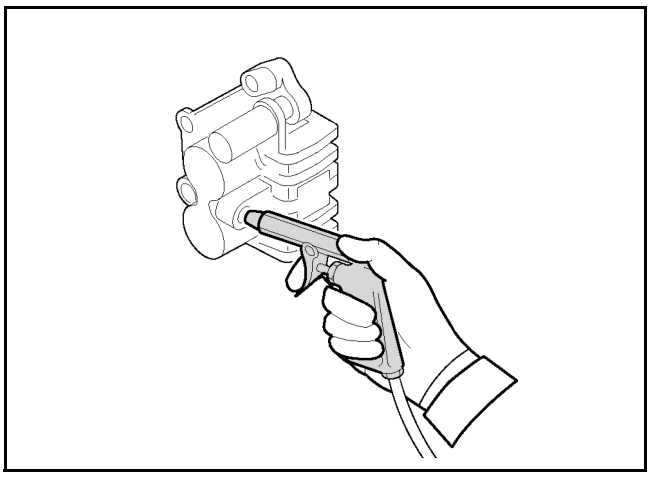
1. Remove
   - Union bolt (8)
   - Washer (9)
2. Disconnect
   - Hydraulic hose (7)

NOTE:

Position the end of hose (7) in a container and operate the master cylinder to bleed all fluid.



3. Remove
   - Bolt (12)
   - Brake caliper (4)
   - Bolt (3)
   - Brake pads (1)
4. Remove
   - Pistons and piston seals (2)



****

Piston and piston seal removal steps:

- Blow compressed air into the hole to push out the pistons from the caliper.

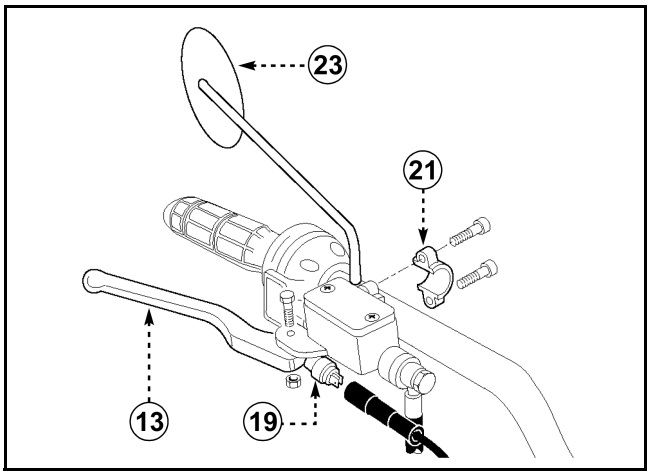
⚠ WARNING

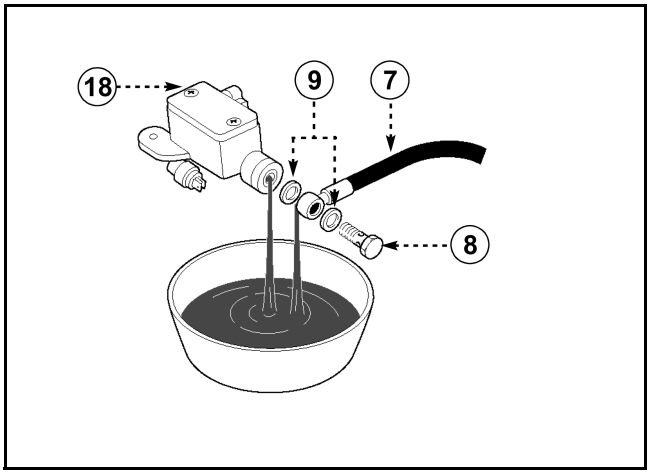
- **Do not force out the piston from the caliper body.**
- **Cover the pistons with a rag and use care so that pistons do not cause injury as they are expelled from the caliper.**

CAUTION:

To remove the piston seals, extract them with your hands and do not use tools.

****





MASTER CYLINDER DISASSEMBLY

NOTE:

Before disassembling the caliper, drain the brake system of its brake fluid.

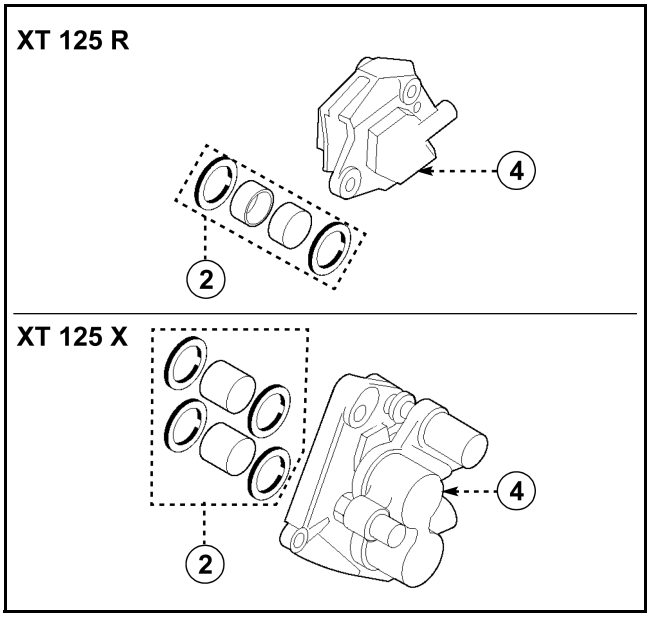
⚠ WARNING

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

1. Remove
   - Rear-view mirror (23)
   - Brake lever (13)
   - Clamp (21)
2. Disconnect
   - Stop switch (19)
3. Remove
   - Union bolt (8)
   - Washer (9)
   - Hydraulic hose (7)

NOTE:

Place a container under pump (18) to collect the brake fluid.

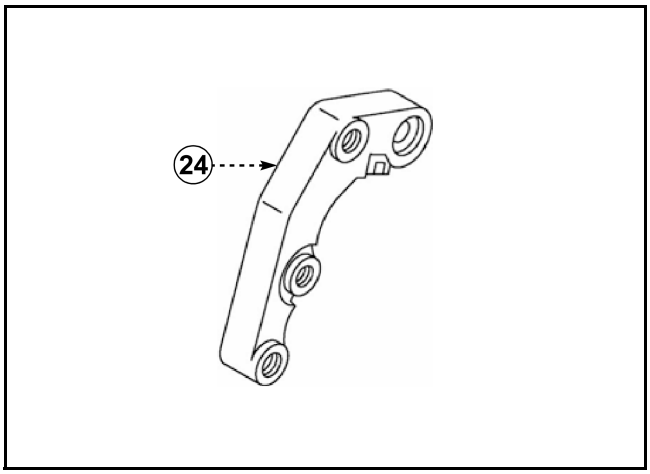


INSPECTION AND REPAIR

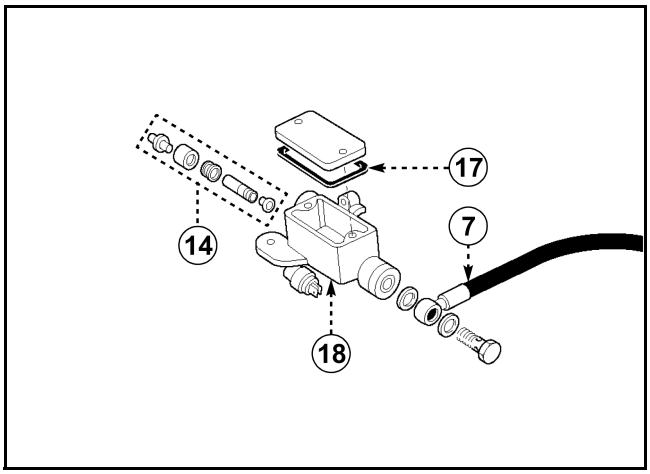
⚠ WARNING

All internal parts should be cleaned in new brake fluid only. Do not use solvents; they may cause deformation.

1. Check
   - Pistons and piston seals (2)
     Bends and wear → Replace
   - Brake caliper (4)
     Damage → Replace
   - Oil delivery passages
     Blow out with compressed air

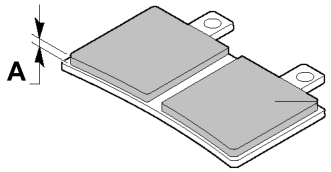


2. Check
   - Caliper bracket (24)
     Only for model XT 125 X
     Damage → Replace

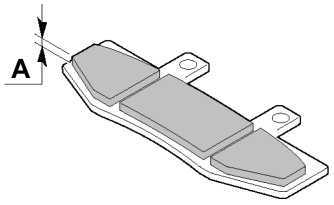


3. Check
   - Master cylinder (18)
     Wear and damage → Replace
   - Oil delivery passages
     Blow out with compressed air
4. Check
   - Brake piston (14) and seals
     Wear and damage → Replace
   - Cover gasket (17)
     Wear and damage → Replace
   - Hydraulic hose (7)
     Wear and damage → Replace

XT 125 R

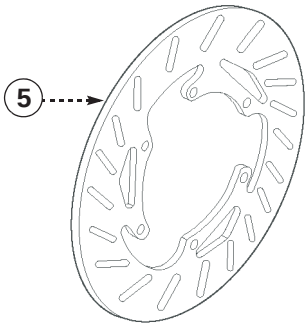


XT 125 X

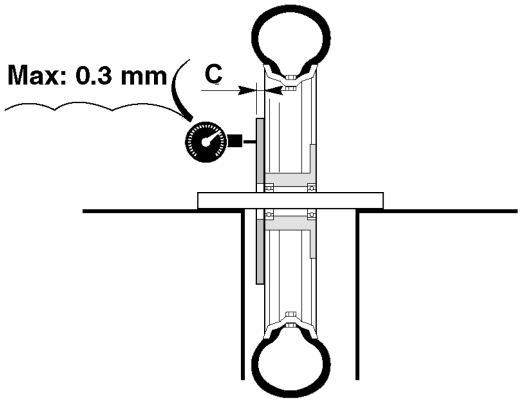


5. Measure
   - Brake pad thickness
     Out of specification → Replace pads

	Minimum pad thickness (A): **2 mm**



6. Check
   - Brake disc (5)
     Wear and damage → Replace



7. Measure
   - Brake disc run out
     Out of specification → Replace brake disc

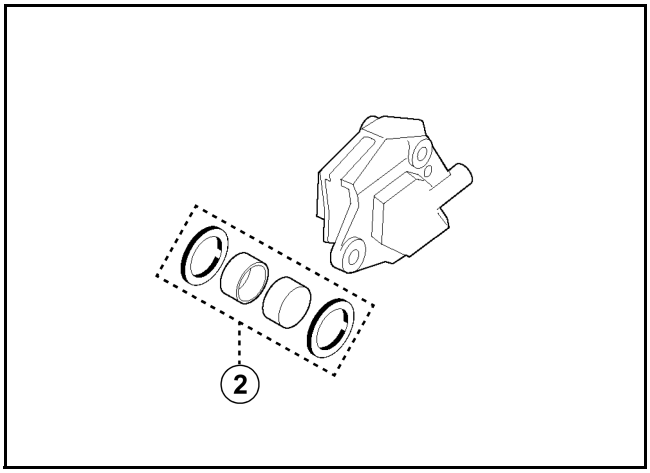
	Maximum brake disc run out: **0.3 mm**

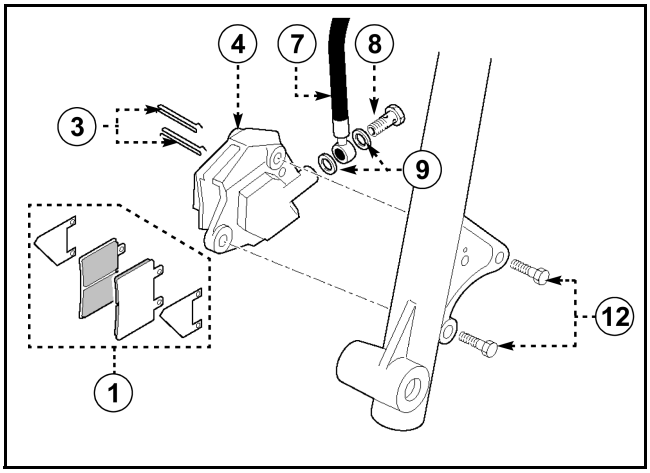
   - Brake disc thickness
     Out of specification → Replace brake disc

	Minimum brake disc thickness (C): **0.3 mm**

NOTE:
Tighten the brake disc bolts in symmetric way.

	Brake disc bolts: **1.3 Kgf·m (13 N·m)** **Apply sealant "Loctite" on the bolts**





ASSEMBLY OF BRAKE CALIPER (XT 125 R)

⚠ WARNING

All internal parts should be cleaned in new brake fluid only.

Recommended brake liquid:
DOT N° 4

1. Install
   • Pistons and piston seals (2)

NOTE:
Always use new seals for the caliper pistons.

2. Install
   • Brake pads (1)

NOTE:
Be careful when mounting the vibration-proof plates; the arrow must show the running direction.

- Cotter pin (3)
- Brake caliper (4)
- Washer (9)
- Hydraulic hose (7)
- Union bolt (8)

Bolt (12):
3.0 Kgf·m (30 N·m)
Bolt (8):
2.5 Kgf·m (25 N·m)

⚠ WARNING

- **Proper brake hose routing is essential to guarantee safe motorcycle operation.**
- **Always use new copper washers.**

3. Fill
   • Brake fluid

Recommended brake liquid:
DOT N° 4

CAUTION:

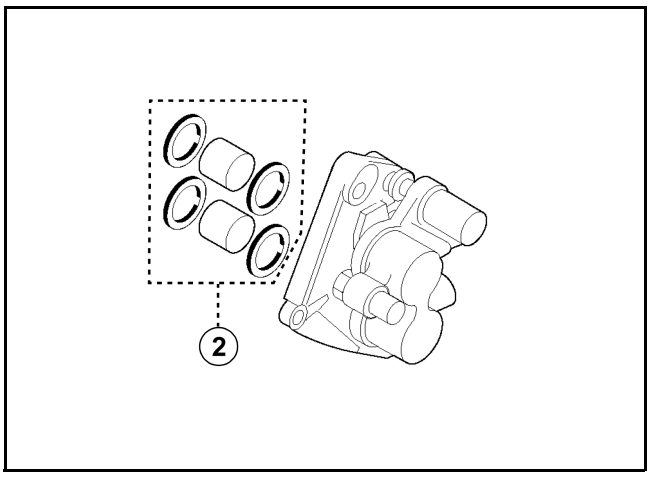
Brake fluid may erode painted surfaces or plastic parts.

⚠ WARNING

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

4. Check
   - Brake system operation
     See "AIR BLEEDING (FRONT BRAKE SYSTEM)" page 3-24
   - Brake fluid level
     See "FRONT BRAKE FLUID LEVEL INSPECTION" page 3-22

ASSEMBLY OF BRAKE CALIPER (XT 125 X)



⚠ WARNING

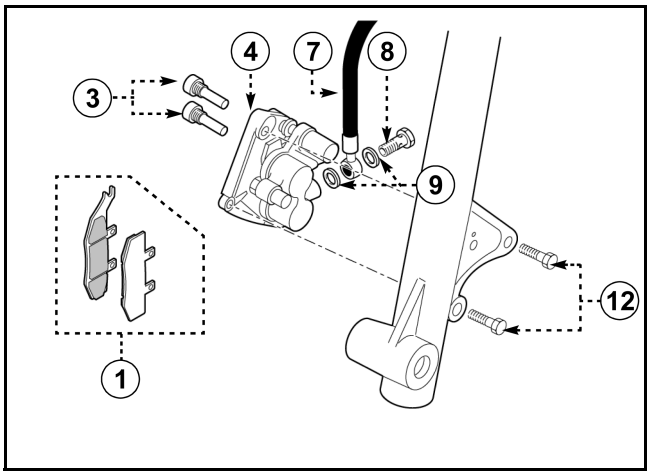
All internal parts should be cleaned in new brake fluid only.

Recommended brake liquid:
DOT N° 4

1. Install
   - Pistons and piston seals (2)

NOTE:

Always use new seals for the caliper pistons.



2. Install
   - Brake pads (1)
   - Bolt (3)
   - Brake caliper (4)
   - Washer (9)
   - Hydraulic hose (7)
   - Union bolt (8)

Bolt (12):
3.0 Kgf·m (30 N·m)
Bolt (8):
2.5 Kgf·m (25 N·m)

⚠ WARNING

- **Proper brake hose routing is essential to guarantee safe motorcycle operation.**
- **Always use new copper washers.**

3. Fill
   - Brake fluid

Recommended brake liquid:
DOT N° 4

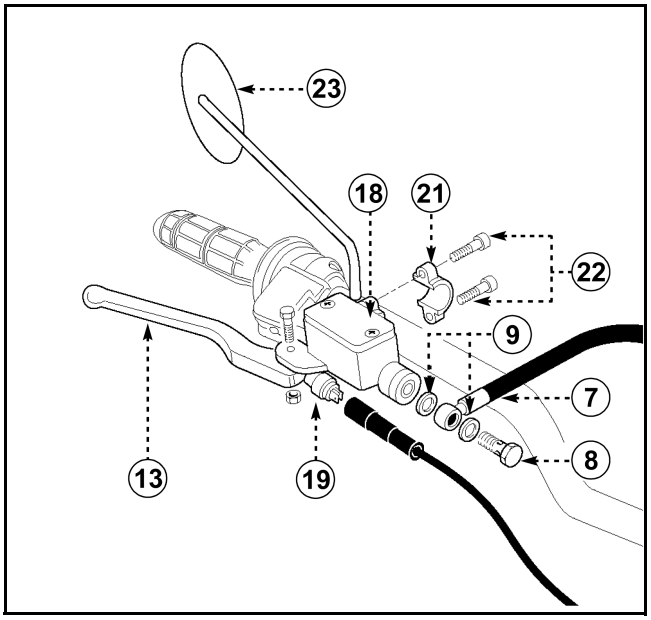
CAUTION:

Brake fluid may erode painted surfaces or plastic parts.

⚠ WARNING

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

4. Check
   - Brake system operation
     See "AIR BLEEDING (FRONT BRAKE SYSTEM)" page 3-24
   - Brake fluid level
     See "FRONT BRAKE FLUID LEVEL INSPECTION" page 3-22



MASTER CYLINDER ASSEMBLY

⚠ WARNING

All internal parts should be cleaned in new brake fluid only.

Recommended brake liquid:
DOT N° 4

1. Install
   - Master cylinder (18)
   - Clamp (21)

Bolt (22):
0.6 Kgf·m (6 N·m)

2. Install
   - Washer (9)
   - Hydraulic hose (7)
   - Union bolt (8)

Bolt (8):
2.5 Kgf·m (25 N·m)

⚠ WARNING

- **Proper brake hose routing is essential to guarantee safe motorcycle operation.**
- **Always use new copper washers.**

3. Connect
   - Stop switch (19)
4. Install
   - Rear-view mirror (23)
   - Brake lever (13)
5. Fill
   - Brake fluid

Recommended brake liquid:
DOT N° 4

6. Check
   - Brake system operation
     See “AIR BLEEDING (FRONT BRAKE SYSTEM)” page 3-24
   - Brake fluid level
     See “FRONT BRAKE FLUID LEVEL INSPECTION” page 3-22

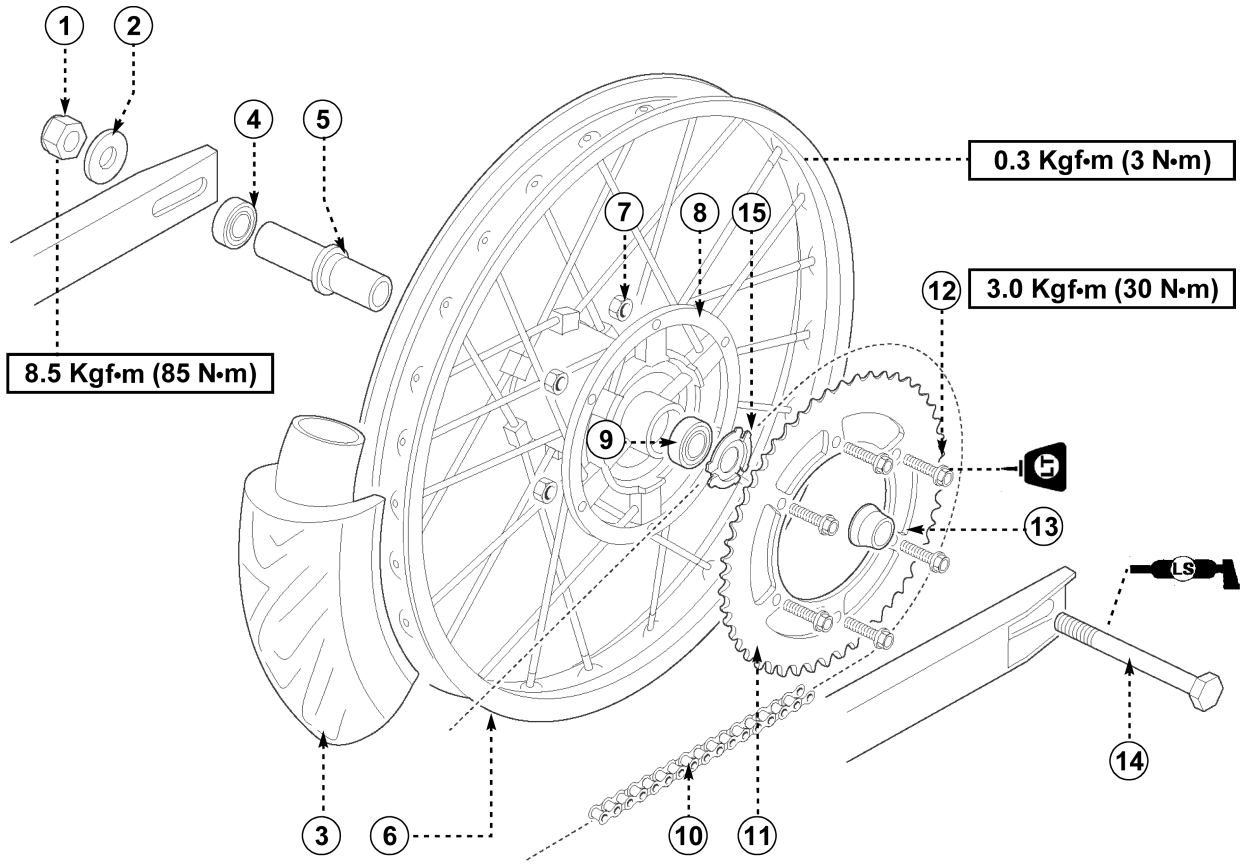
REAR WHEEL

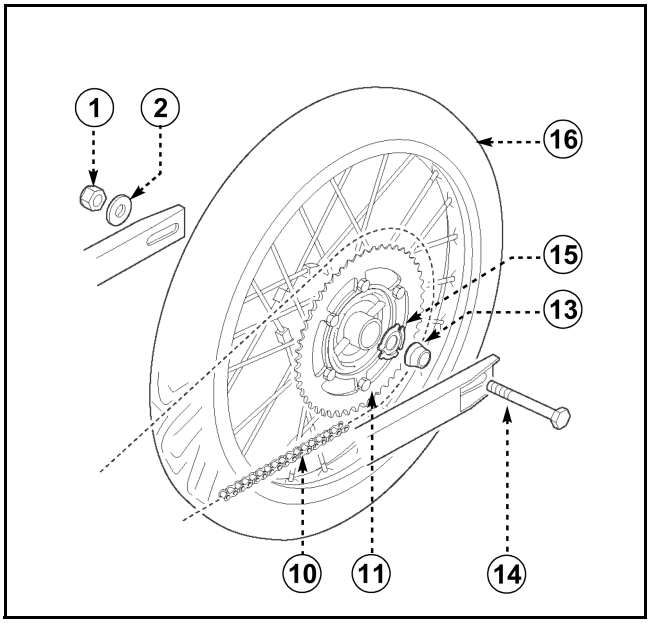
COMPONENT DESCRIPTION

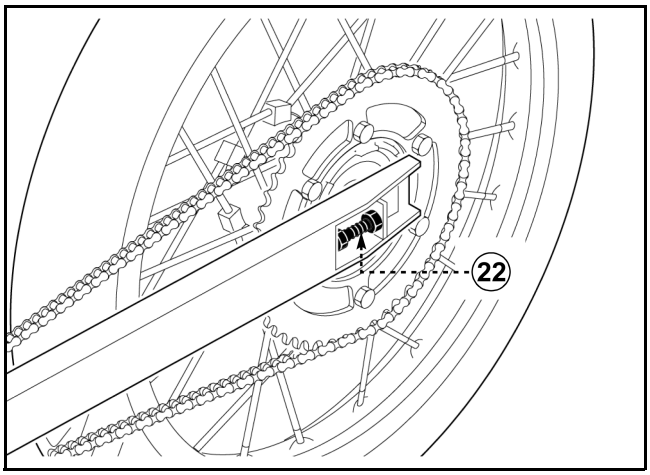
(1) Nut
(2) Washer
(3) Tire
(4) Bearing
(5) Spacer
(6) Rim
(7) Nut
(8) Hub
(9) Bearing
(10) Drive chain
(11) Sprocket
(12) Bolt
(13) Spacer
(14) Wheel axle
(15) Dust seal

Tyre inflation pressure	Front	Rear
Up to 90 kg load	1.8 bar (26.1 psi)	1.9 bar (27.6 psi)
With maximum load 178 kg	2.0 bar (29.0 psi)	2.1 bar (30.5 psi)

A	Tire size XT 125 R: 120/80-18 62S XT 125 X: 130/70-17 62S	C	Rim runout limits Vertical: 1.0 mm Lateral: 0.5 mm
B	Rim size XT 125 R: 2.50x18 XT 125 X: 3.00x17	D	Tire wear limit: 1 mm
		E	Drive chain slack







REMOVAL

⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Position a support under the engine and lift the rear wheel.
3. Loosen
   - Nut (1)
   - Chain puller bolts (22)
4. Remove
   - Nut (1)
   - Washer (2)
   - Wheel axle (14)
   - Spacer (13)
   - Dust seal (15)

NOTE:

After removing wheel axle (14), take case not to lose collar (13).

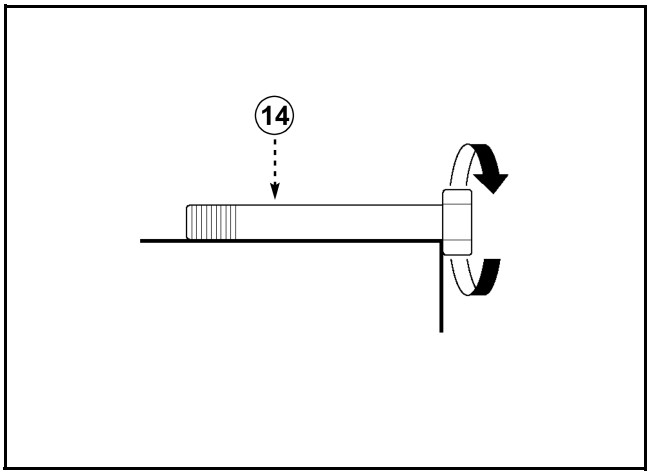
5. Remove
   - Rear wheel (16)

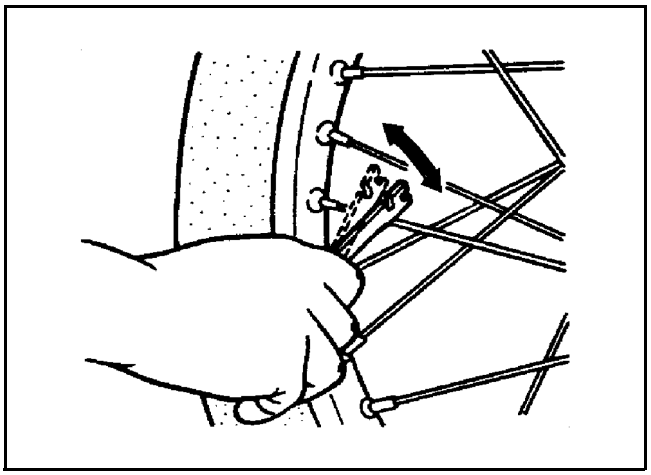
NOTE:

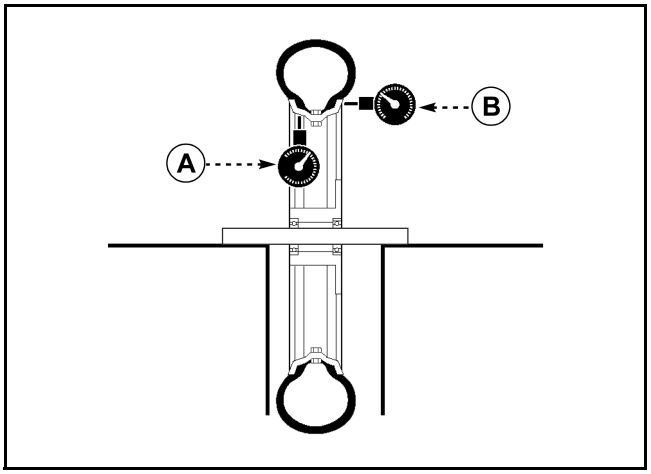
Before removing the wheel, push it forward, to remove the drive chain (10) from driven sprocket (11).

⚠ WARNING

Do not depress the brake lever when the wheel is off the motorcycle, otherwise the brake pads will be forced shut.







CHECKS AND CONTROLS

1. Eliminate any corrosion from the parts.
2. Check
   - Wheel axle (14)
     Roll the axle on a flat surface.
     Warpage → Replace

⚠ WARNING

Do not attempt to straighten the axle.

3. Check
   - Tire
     Wear and damage → Replace
     See "TYRE INSPECTION" page 3-31
     Damage and bends → Replace
     See "WHEEL INSPECTION" page 3-33
4. Check
   - Wheel spokes
     Damage and bends → Replace
     Loose spoke → Retighten
     Turn the wheel and tap the spokes with a screw driver.

NOTE:

A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

5. Tighten
   - Loose spoke

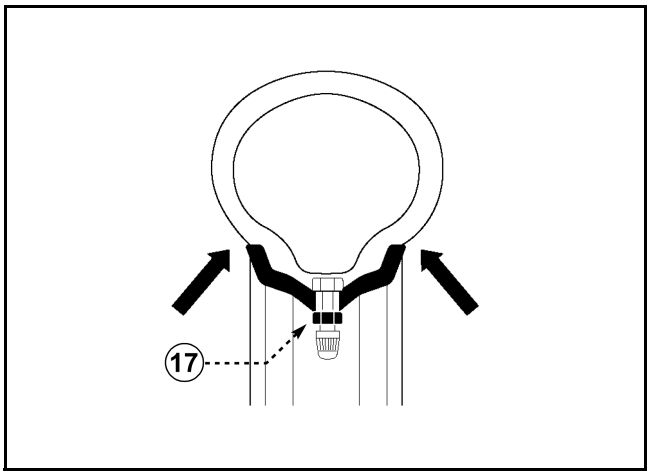
Wheel spokes:
0.3 Kgf·m (3 N·m)

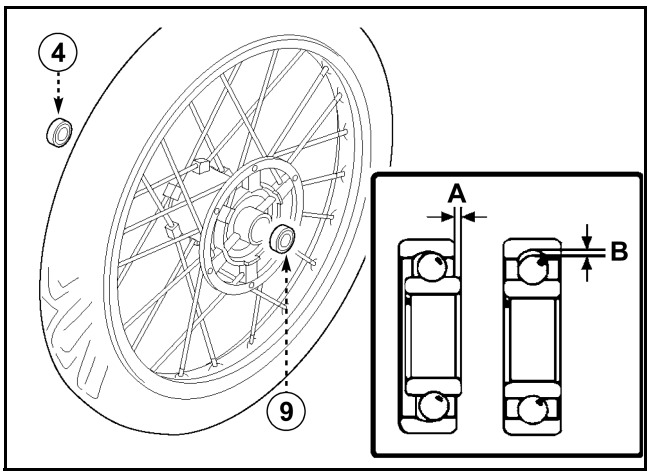
NOTE:

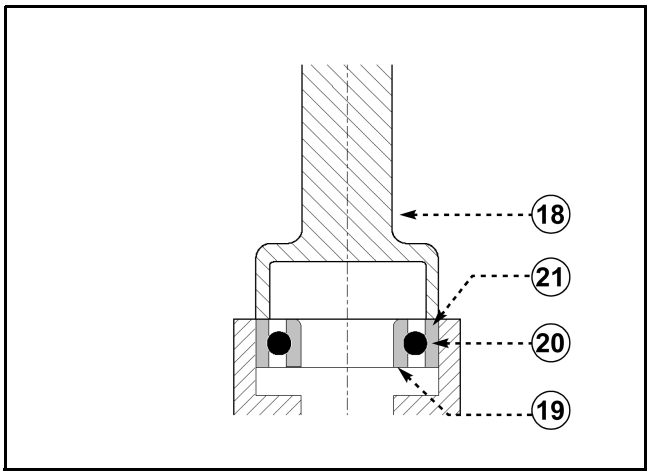
Check the wheel runout after tightening the spokes.

6. Measure
   - Rim runout
     Out of specification → Check the rim and the bearing play.

Rim runout limits:
Vertical (A):
1.0 mm
Lateral (B):
0.5 mm







⚠ WARNING

After mounting a tire, ride conservatively to allow the tire to be adapted to the rim. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury. After a tire repair or replacement, be sure to torque tighten the valve stem locknut (17) to specification.

Valve locknut (17):
0.3 Kgf·m (3 N·m)

7. Check
   - Bearing (4-9)
     Abnormal noise, irregular free play and rotation → Replace

(A) side free play
(B) axial free play

****

Bearing replacement steps:

- Remove bearings (4-9) using a bearing puller.
- Install the new bearings

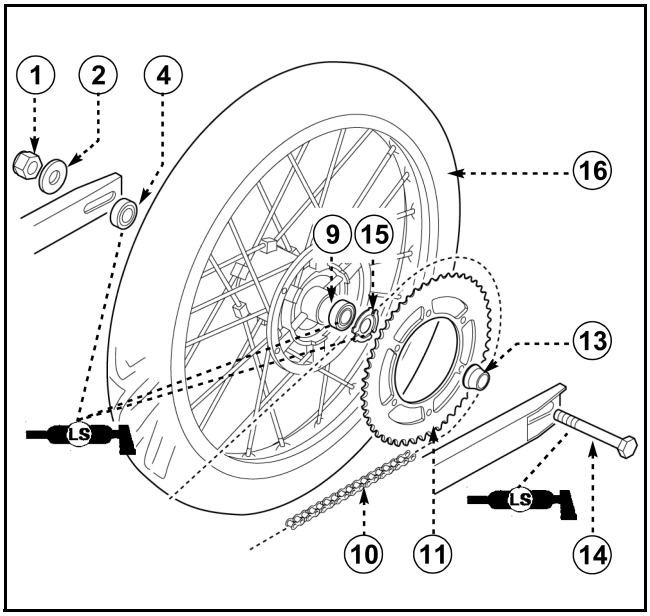
NOTE:

Use a socket wrench (18) that matches the outside diameter of the bearing.

CAUTION:

Do not strike the centre race (19) or balls (20) of the bearing. Contact should be made only with the outer race (21).

****



INSTALLATION

1. Lubricate
   - Wheel axle (14)
   - Dust seal (15)
   - Bearing (4-9)

	Use lithium soap base grease

2. Assemble
   - Dust seal (15)
   - Rear wheel (16)
   - Spacer (13)
   - Wheel axle (14)
   - Washer (2)
   - Nut (1)

NOTE:
Connect drive chain (10) to driven sprocket (11).

3. Adjust
   - Drive chain slack
     See "DRIVE CHAIN SLACK ADJUSTMENT" page 3-26

	Drive chain slack: **25 ~ 40 mm**

4. Tighten
   - Nut (1)

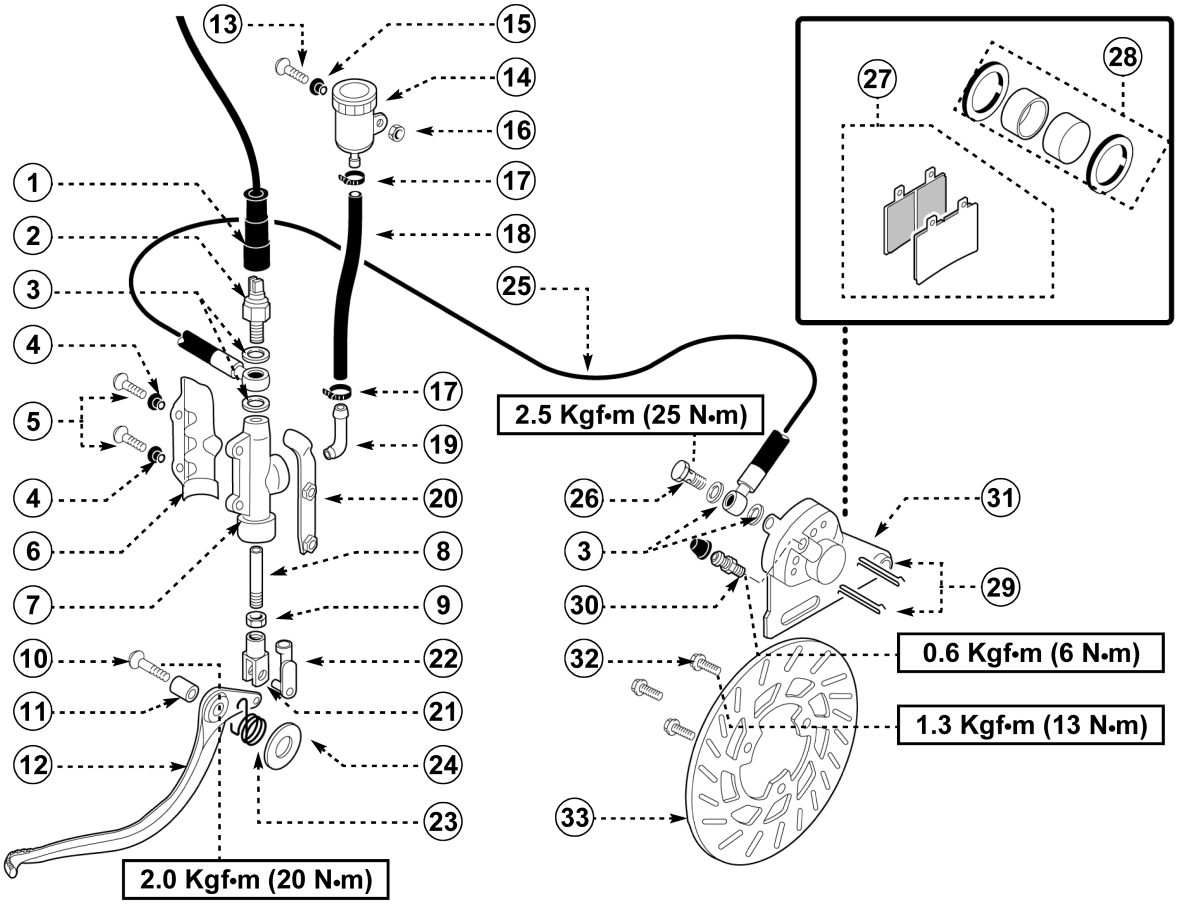
	Nut (1): **8.5 Kgf·m (85 N·m)**

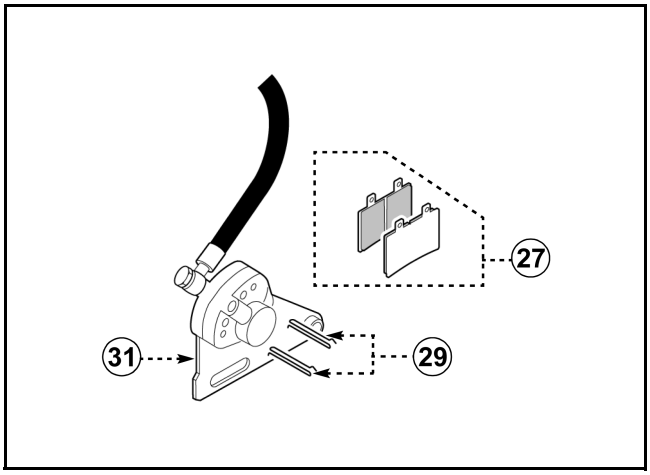
REAR BRAKE

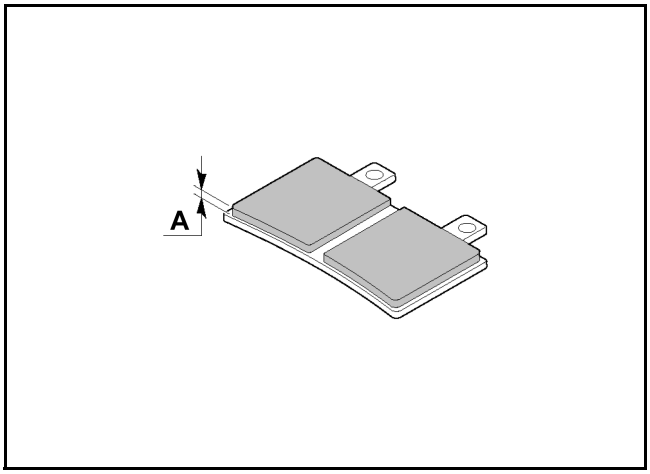
COMPONENT DESCRIPTION

(1) Switch protection
(2) Hydraulic stop switch
(3) Washer
(4) Bush
(5) Bolt
(6) Cover (Master cylinder)
(7) Master cylinder
(8) Push rod
(9) Nut
(10) Bolt
(11) Bush
(12) Brake pedal
(13) Bolt
(14) Reservoir
(15) Washer
(16) Nut
(17) Clamp
(18) Reservoir-pump hose
(19) Master cylinder coupling
(20) Master cylinder fastening bracket
(21) Fork
(22) Fork pin
(23) Spring
(24) Washer
(25) Hydraulic hose
(26) Union bolt
(27) Brake pads
(28) Pistons and piston seals
(29) Cotter pin
(30) Bleed screw
(31) Brake caliper
(32) Bolt
(33) Brake disc

A	Brake fluid: DOT N° 4
B	Minimum pad thickness: 2 mm
C	Minimum brake disc thickness: 3.0 mm







BRAKE PAD REPLACEMENT

⚠ WARNING

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

1. Remove
   - Rear wheel
     See "REMOVAL" page 6-19
   - Brake caliper (31)
   - Cotter pin (29)
   - Brake pads (27)

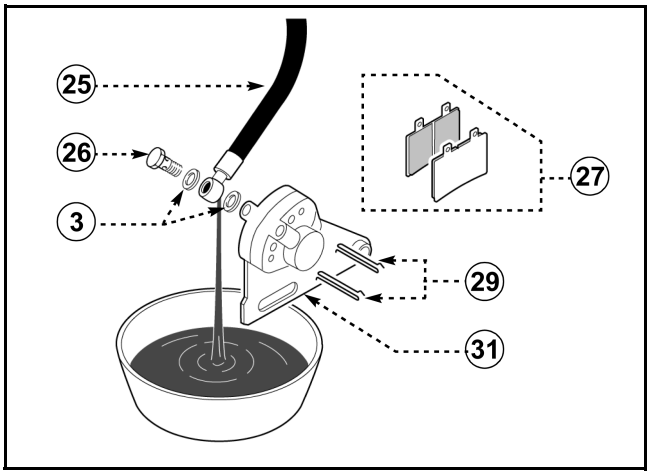
Minimum pad thickness (A):
2 mm

NOTE:
When replacing the pads, replace also spring retaining clips (27), if necessary.

2. Install
   - Brake pads (27)

NOTE:
Be careful when mounting the vibration-proof plates; the arrow must show the running direction.

3. Install
   - Spring retaining clip (29)
   - Brake caliper (31)
   - Rear wheel
     See "INSTALLATION" page 6-22
4. Check
   - Rear brake fluid level
5. Check
   - Brake pedal operation
     Softy and spongy pedal stroke → Bleed the brake system.



BRAKE CALIPER DISASSEMBLY

NOTE:

Before disassembling the caliper, drain the brake system of its brake fluid.

⚠ WARNING

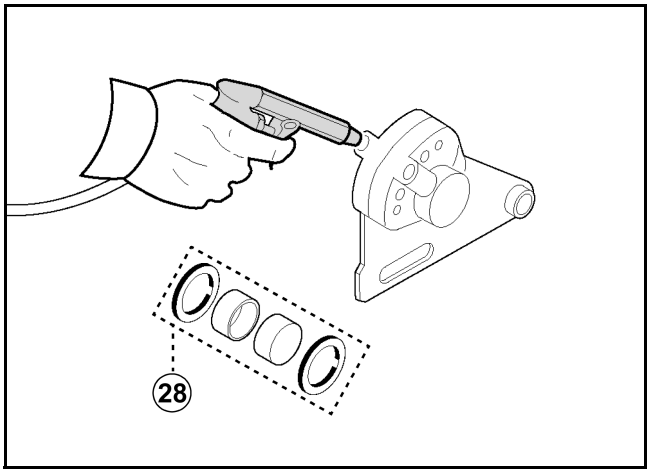
Securely support the motorcycle so there is no danger of it falling over.

1. Remove
   - Rear wheel
     See "REMOVAL" page 6-19
   - Union bolt (26)
   - Washer (3)
2. Disconnect
   - Hydraulic hose (25)

NOTE:

Position the end of hose (25) in a container and operate the master cylinder to bleed all fluid.

3. Remove
   - Brake caliper (31)
   - Cotter pin (29)
   - Brake pads (27)
4. Remove
   - Pistons and piston seals (28)



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Piston and piston seal removal steps:

- Blow compressed air into the hole to push out the pistons from the caliper.

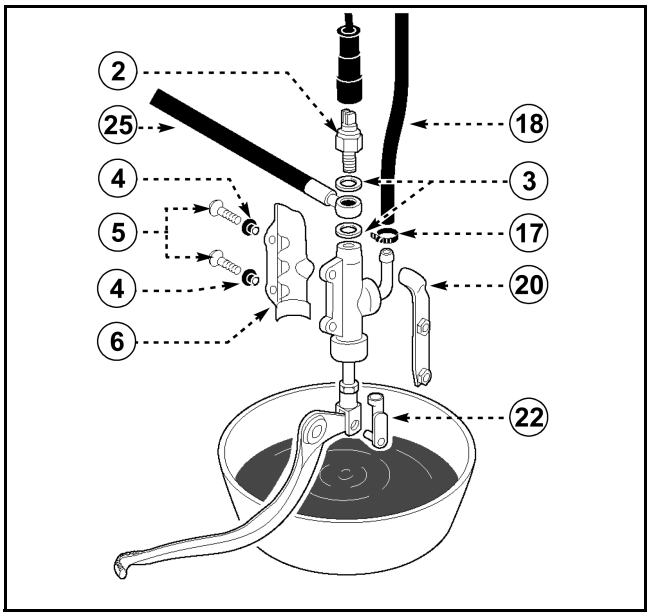
⚠ WARNING

- **Do not force out the piston from the caliper body.**
- **Cover the pistons with a rag and use care so that pistons do not cause injury as they are expelled from the caliper.**

CAUTION:

To remove the piston seals, extract them with your hands and do not use tools.

****



MASTER CYLINDER DISASSEMBLY

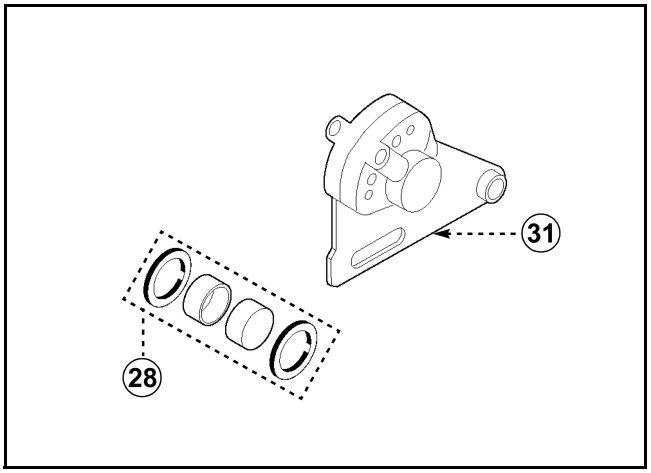
NOTE:
Before disassembling the caliper, drain the brake system of its brake fluid.

⚠ WARNING

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

1. Disconnect
   - Hydraulic stop switch (2)
2. Remove
   - Hydraulic stop switch (2)
   - Washer (3)
   - Hydraulic hose (25)
   - Fork pin (22)
   - Clamp (17)
   - Oil tank-pump hose (18)
   - Bolt (5)
   - Bush (4)
   - Cover (Master cylinder) (6)
   - Master cylinder fastening bracket (20)

NOTE:
Place a container to collect the brake fluid.

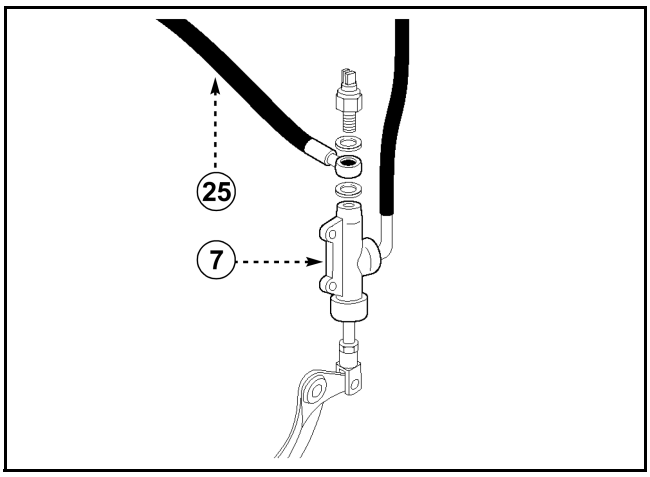


INSPECTION AND REPAIR

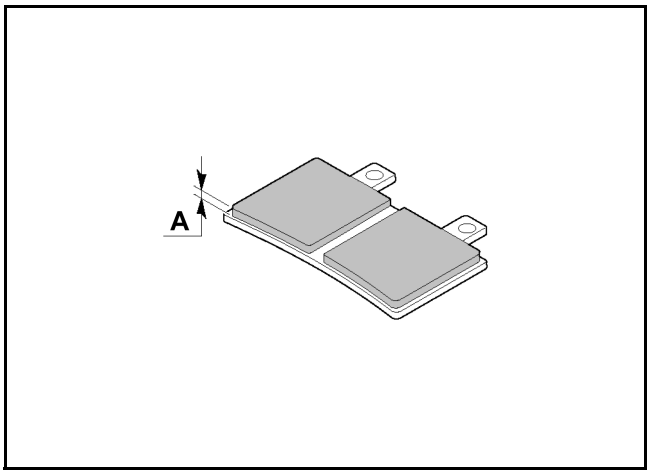
⚠ WARNING

All internal parts should be cleaned in new brake fluid only. Do not use solvents; they may cause deformation.

1. Check
   - Pistons and piston seals (28)
     Bends and wear → Replace
   - Brake caliper (31)
     Damage → Replace
   - Oil delivery passages
     Blow out with compressed air

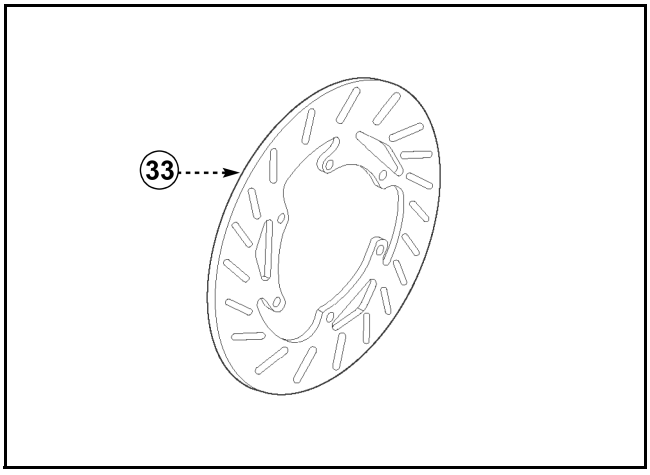


2. Check
   - Master cylinder (7)
     Wear and damage → Replace
   - Hydraulic hose (25)
     Wear and damage → Replace

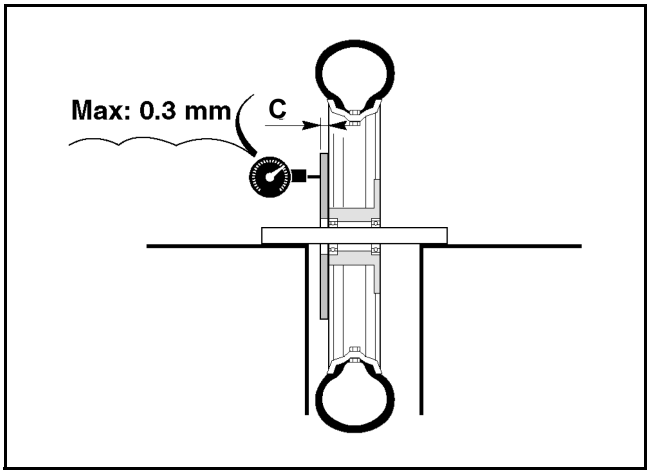


3. Measure
   - Brake pad thickness
     Out of specification → Replace pads

Minimum pad thickness (A):
2 mm



4. Check
   - Brake disc (33)
     Wear and damage → Replace



5. Measure
   - Brake disc deflection
     Out of specification → Replace brake disc

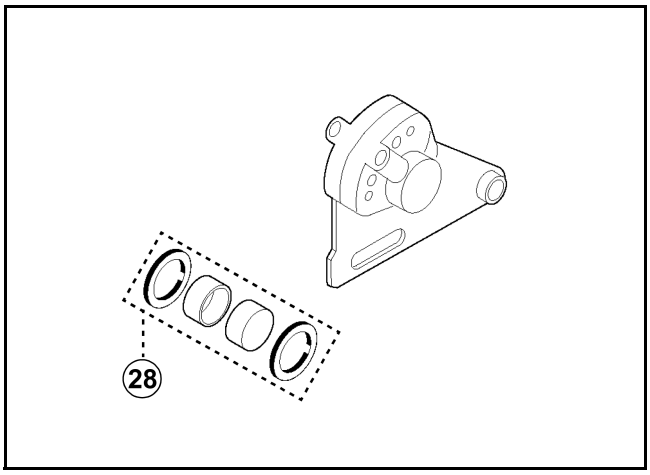
Maximum brake disc deflection:
0.3 mm

   - Brake disc thickness
     Out of specification → Replace brake disc

Minimum brake disc thickness (C):
0.3 mm

NOTE:
Tighten the brake disc bolts in symmetric way.

Brake disc bolts:
1.3 Kgf·m (13 N·m)
Apply sealant "Loctite" on the bolts



ASSEMBLY OF BRAKE CALIPER

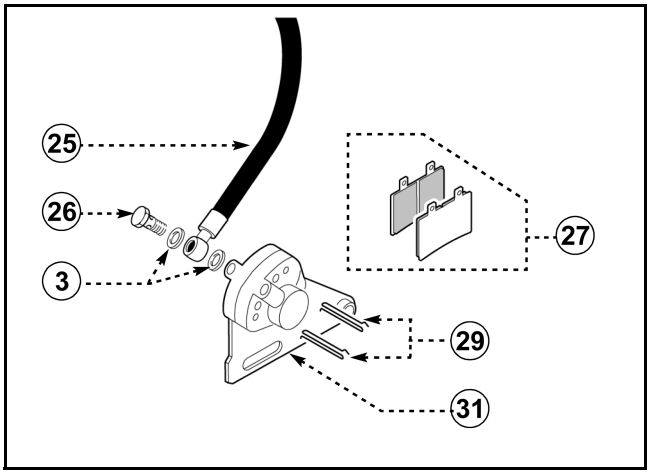
⚠ WARNING

All internal parts should be cleaned in new brake fluid only.

Recommended brake liquid:
DOT N° 4

1. Install
   - Pistons and piston seals (28)

NOTE:
Always use new seals for the caliper pistons.



2. Install
   • Brake pads (27)

NOTE:
Be careful when mounting the vibration-proof plates; the arrow must show the running direction.

   • Cotter pin (29)
   • Brake caliper (31)
   • Washer (3)
   • Hydraulic hose (25)
   • Union bolt (26)

Bolt (26):
2.5 Kgf·m (25 N·m)

⚠ WARNING
- **Proper brake hose routing is essential to guarantee safe motorcycle operation.**
- **Always use new copper washers.**

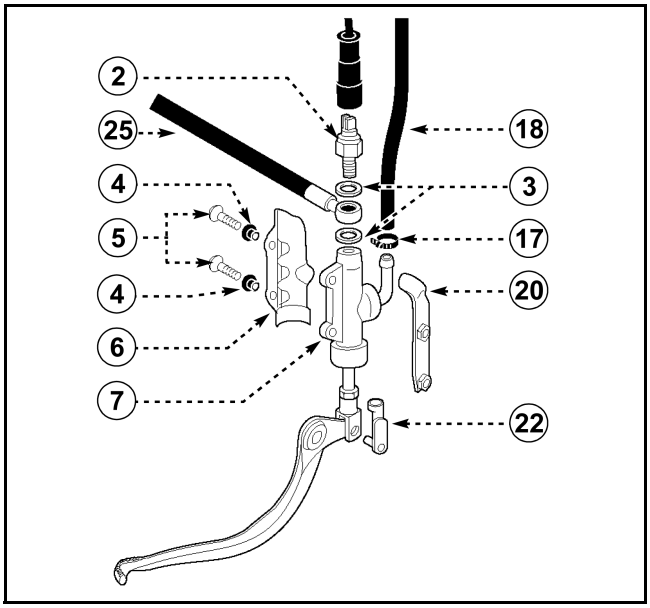
3. Install
   • Rear wheel
   See “INSTALLATION” page 6-22
4. Fill
   • Brake fluid

Recommended brake liquid:
DOT N° 4

CAUTION:
Brake fluid may erode painted surfaces or plastic parts.

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

5. Check
   - Rear brake system operation
   - Rear brake fluid level



MASTER CYLINDER ASSEMBLY

⚠ WARNING

All internal parts should be cleaned in new brake fluid only.

Recommended brake liquid:
DOT N° 4

1. Install
   - Master cylinder fastening bracket (20)
   - Master cylinder (7)
   - Cover (Master cylinder) (6)
   - Bush (4)
   - Bolt (5)
   - Washer (3)
   - Hydraulic hose (25)
   - Hydraulic stop switch (2)

⚠ WARNING

- **Proper brake hose routing is essential to guarantee safe motorcycle operation.**
- **Always use new copper washers.**

2. Connect
   - Hydraulic stop switch (2)
3. Install
   - Fork pin (22)
   - Oil tank-pump hose (18)
   - Clamp (17)
4. Fill
   - Brake fluid

Recommended brake liquid:
DOT N° 4

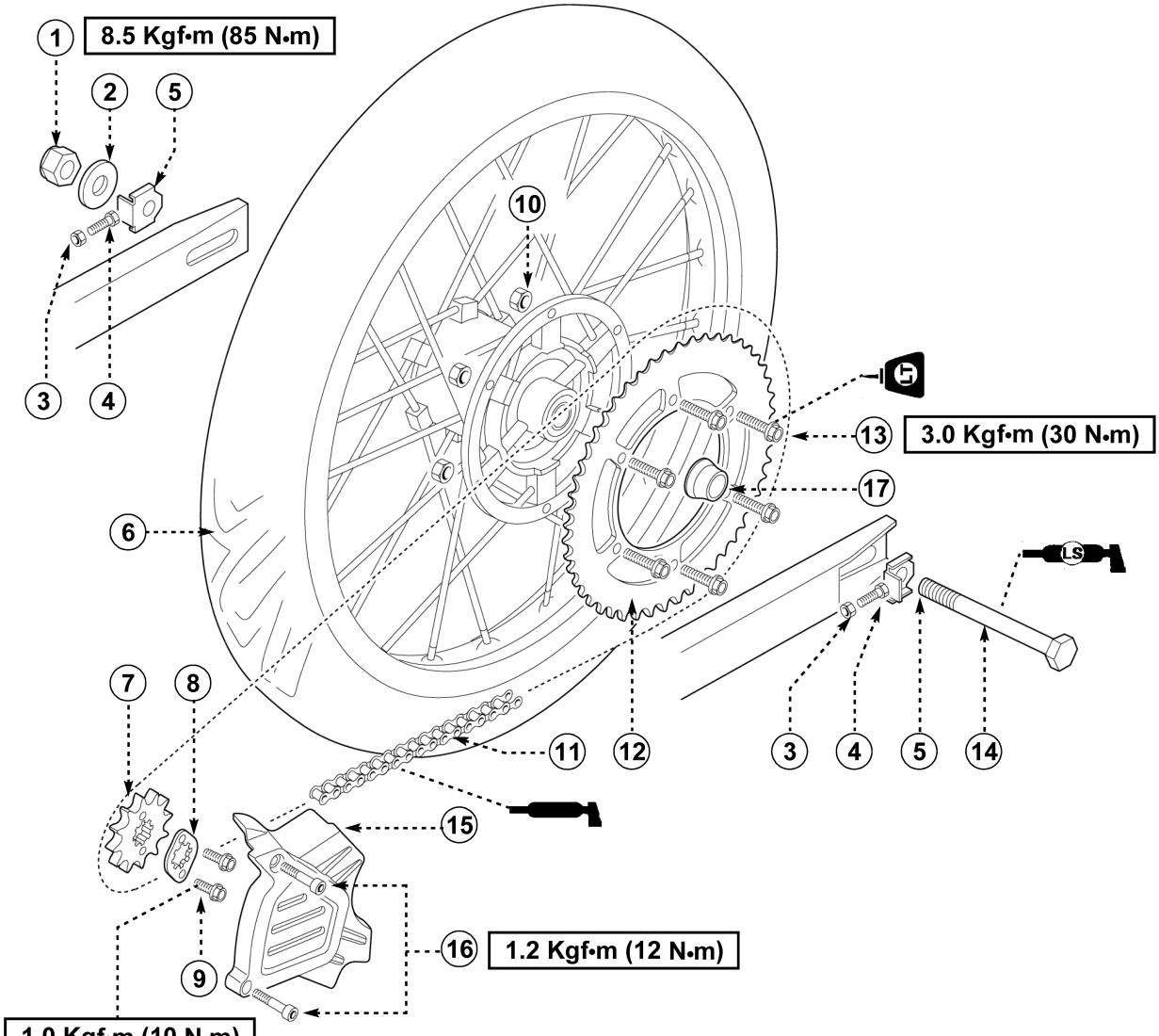
5. Check
   - Rear brake system operation
   - Rear brake fluid level

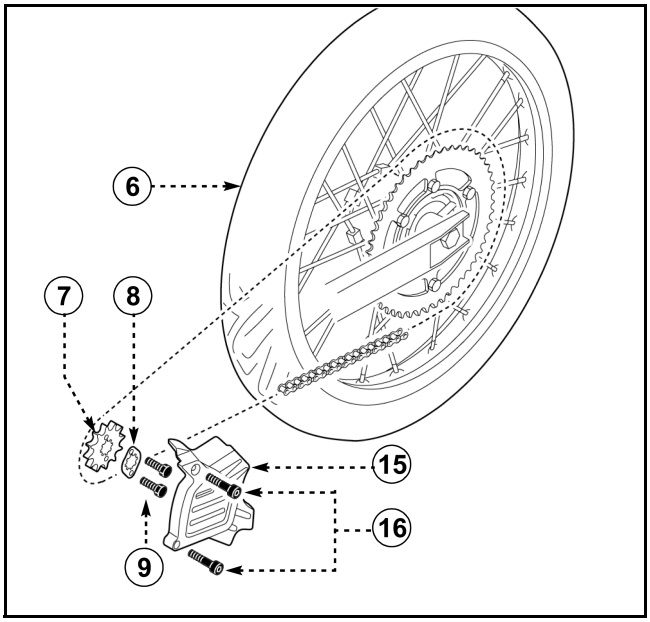
DRIVE CHAIN AND SPROCKETS

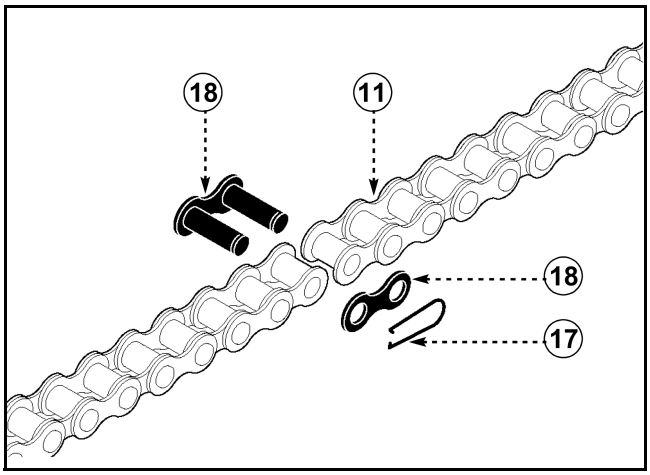
COMPONENT DESCRIPTION

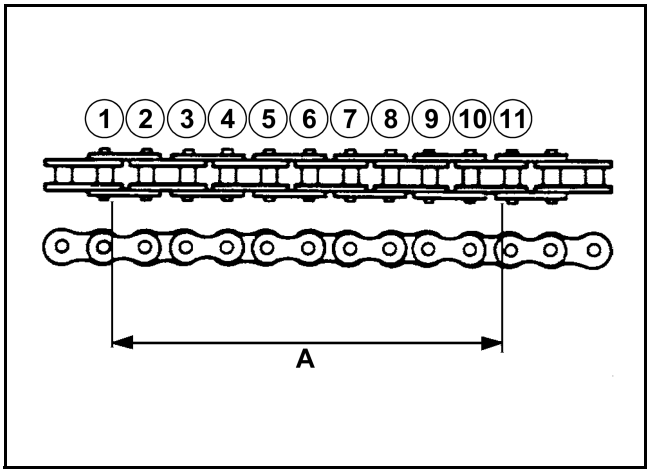
(1) Nut
(2) Washer
(3) Nut
(4) Chain puller adjusting screw
(5) Chain puller
(6) Rear wheel
(7) Drive sprocket
(8) Drive sprocket plate
(9) Bolt
(10) Nut
(11) Drive chain
(12) Driven sprocket
(13) Bolt
(14) Wheel axle
(15) Drive sprocket cover
(16) Bolt
(17) Spacer

A	Drive chain type: 428H G&G DID
B	Number of drive chain links: XT 125 R: 128 XT 125 X: 126
C	Drive chain slack: 25 ~ 40 mm









CHAIN REMOVAL

NOTE:
Before removing the drive chain and sprockets, measure the drive chain slack.

1. Stand the motorcycle on a level surface.
2. Position a support under the engine and lift the rear wheel.
3. Remove
   - Bolt (16)
   - Drive sprocket cover (15)
   - Bolt (9)
   - Drive sprocket plate (8)
   - Drive sprocket (7)
   - Rear wheel (6)
     See “REMOVAL” page 6-19
4. Remove
   - Chain joint pin (17)
   - Chain joint (18)
   - Drive chain (11)

NOTE:
In case of chain without chain joint, use the special puller.

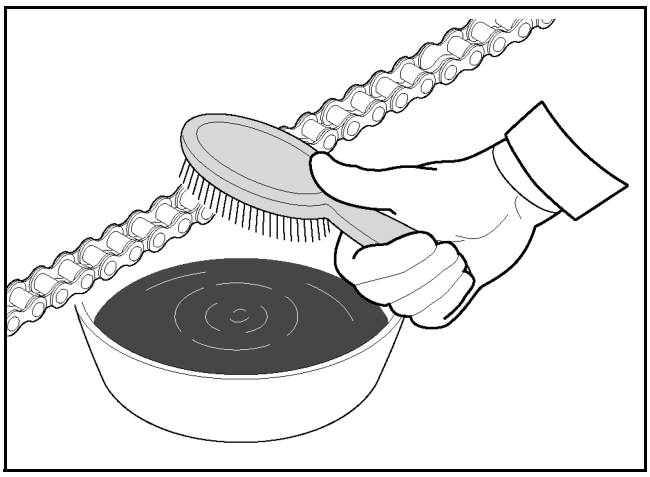
Chain pin puller:
90890-01286

CHECKS AND CONTROLS

1. Measure
   - Length 10 of links (A)
     Out of specification → Replace the chain

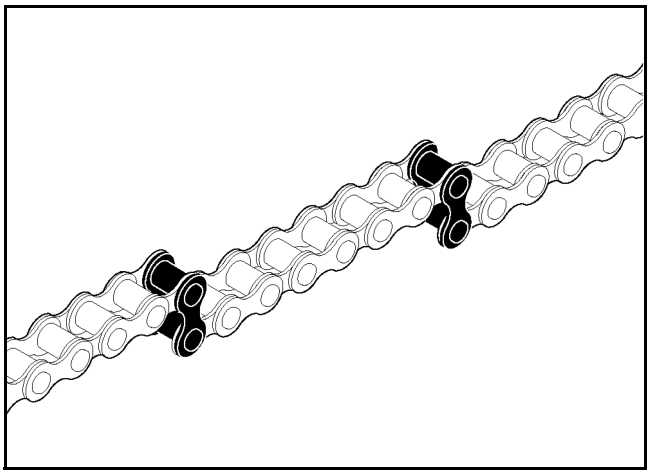
Maximum length of 10 links:
119.7 mm

NOTE:
- The measurement (A) of the 10 links is to be carried out on the inside edge of roller from(1) to (11).
- Measure the 10 links in different positions of the chain.

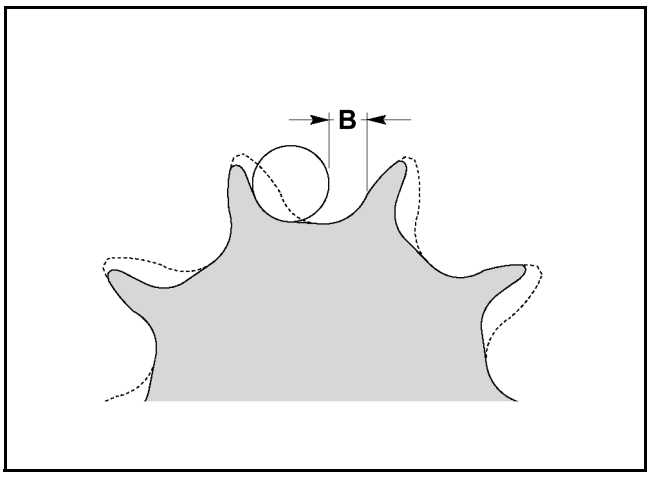


2. Clean
   • Drive chain

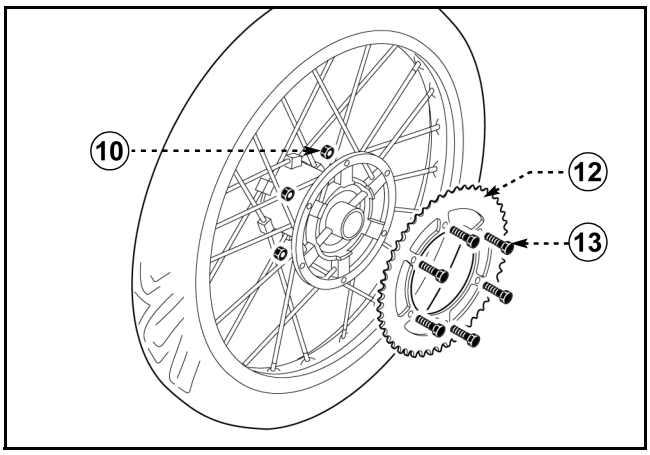
NOTE:
Place the chain in kerosene, and brush off as much dirt as possible, and then dry it.



3. Check
   • Seized chain links
   Clean, lubricate or, if necessary, replace the complete chain.



4. Check
   • Drive sprocket
   • Driven sprocket
   Distance (B) higher than 1/4 of the tooth thickness → Replace
   Damaged teeth → Replace



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Sprocket replacement steps

5. Remove
   - Rear wheel
     See "REMOVAL" page 6-19
   - Bolts (13)
   - Nuts (10)
   - Driven sprocket (12)

NOTE:

Replace the sprocket and, when re-assembling it, tighten bolts (13) in symmetric way.

	Bolt (13): **3.0 Kgf·m (30 N·m)**

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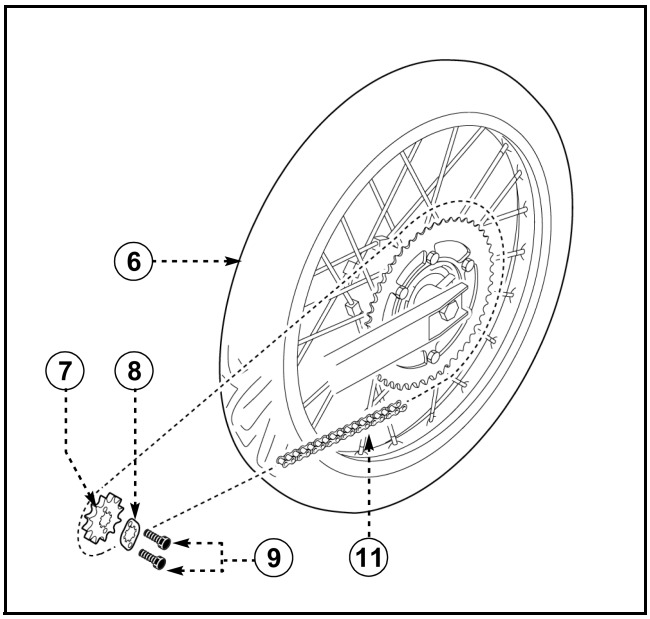


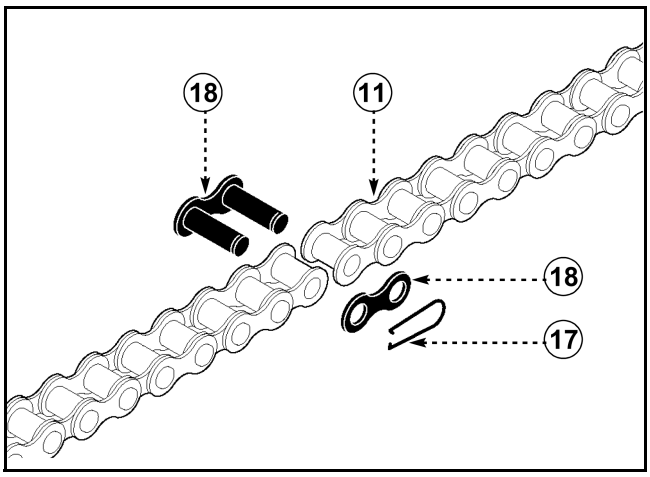
CHAIN INSTALLATION

1. Lubricate
   - Drive chain
   - Chain joint

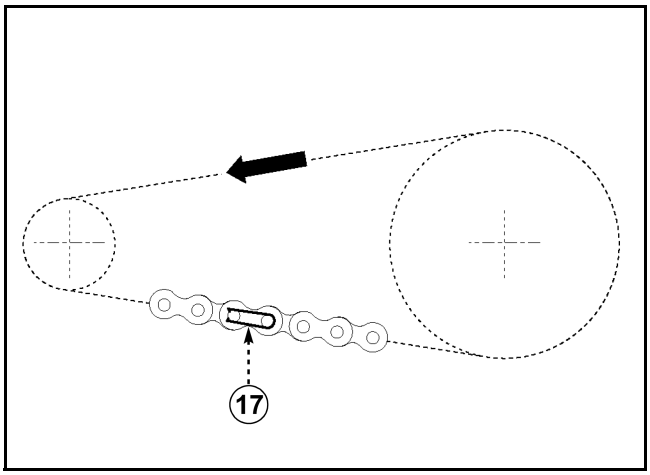
	Drive chain lubricant: **YAMALUBE 4-SAE 10W30/SH** **(Engine oil)**

2. Install
   - Rear wheel (6)
     See "INSTALLATION" page 6-22
   - Drive chain (11)
   - Drive sprocket (7)
   - Drive sprocket plate (8)
   - Bolt (9)

	Bolt (9): **1.0 Kgf·m (10 N·m)**



3. Install
   - Chain joint (18)
   - Chain joint pin (17)



CAUTION:

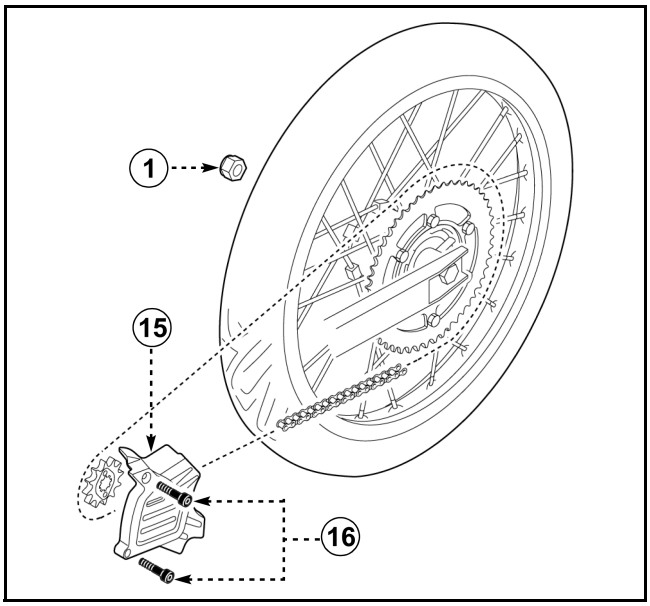
Install chain joint pin 17 in the direction shown in the figure.

4. Adjust
   - Drive chain slack
     See "DRIVE CHAIN SLACK ADJUSTMENT" page 3-26

	Drive chain slack: **25 ~ 40 mm**

CAUTION:

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



5. Tighten
   - Nut (1)

	Nut (1): **8.5 Kgf·m (85 N·m)**

6. Install
   - Drive sprocket cover (15)
   - Bolt (16)

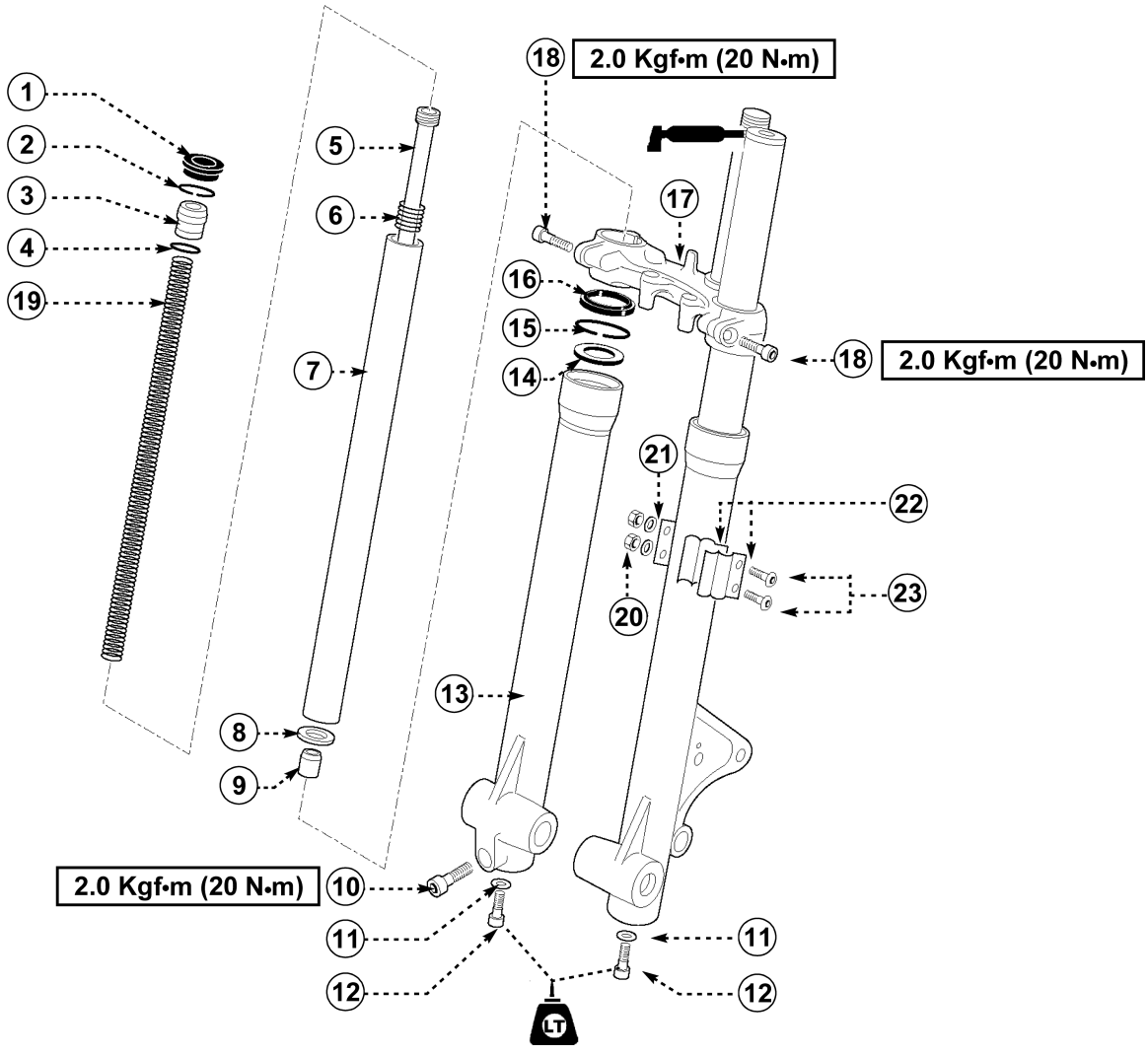
	Bolt (16): **1.2 Kgf·m (12 N·m)**

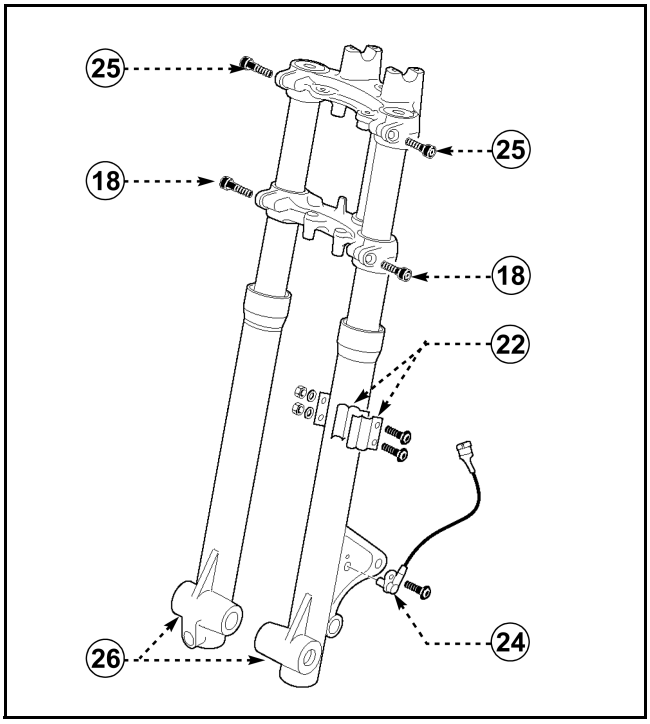
FRONT SUSPENSION

COMPONENT DESCRIPTION

(1) Protection cap
(2) C - clip
(3) Spacer
(4) O-Ring
(5) Damper rod
(6) Spring
(7) Fork tube
(8) Washer
(9) Bush taper
(10) Bolt
(11) Washer
(12) Bolt
(13) Tube outer
(14) Oil seal
(15) C - clip
(16) Dust seal
(17) Steering bottom yoke
(18) Bolt
(19) Spring
(20) Nut
(21) Washer
(22) Cable holder
(23) Bolt

A	**Oil amount in each fork leg: 285 cc**
B	**Free spring length (19): 495 mm ± 3 mm**
C	**Oil level on each fork: 180 mm** The oil level is measured from the top of tube (7) completely inserted into tube holder (13), without spring (19).





REMOVAL OF RH/LH FORK LEG

⚠ WARNING

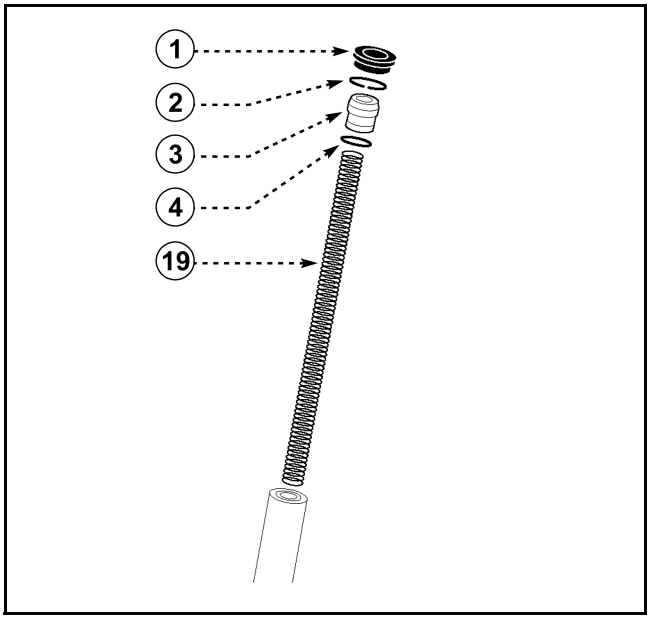
Securely support the motorcycle so there is no danger of it falling over.

1. Stand the motorcycle on a level surface.
2. Position a support under the engine and lift the front wheel.
3. Remove
   - Front wheel
     See "REMOVAL" page 6-2
   - Cable holder (22)
   - Speedometer sensor (24)
   - Brake caliper
     See "BRAKE CALIPER DISASSEMBLY" page 6-9
   - Headlight holder
     See "HEADLIGHT HOLDER REMOVAL" page 3-4
4. Loosen
   - Bolt (18)
   - Bolt (25)

⚠ WARNING

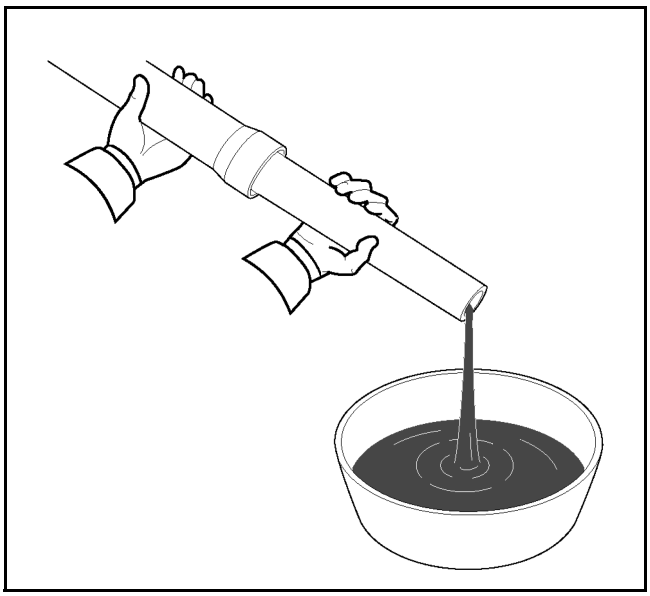
Position the forks on ground before loosening bolts (18-25).

5. Remove
   - RH/LH fork leg (26)

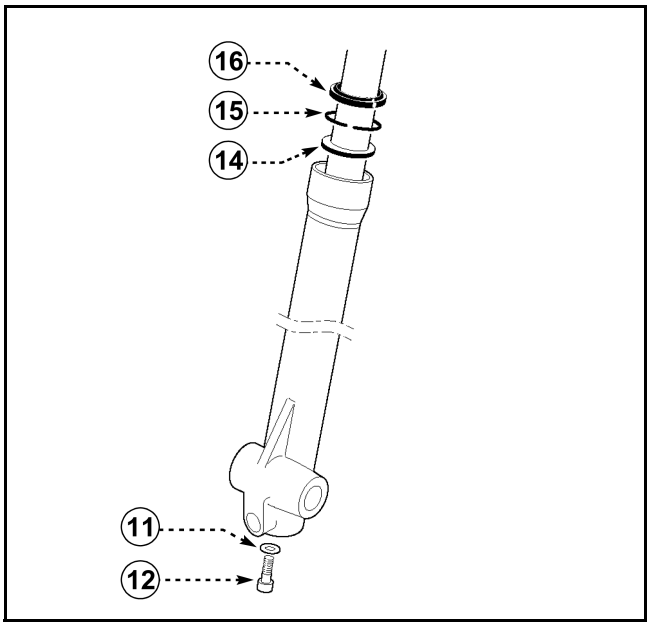


FORK LEG DISASSEMBLY

1. Remove
   - Protection cap (1)
   - C - clip (2)
   - Spacer (3)
   - O-Ring gasket (4)
   - Spring (19)



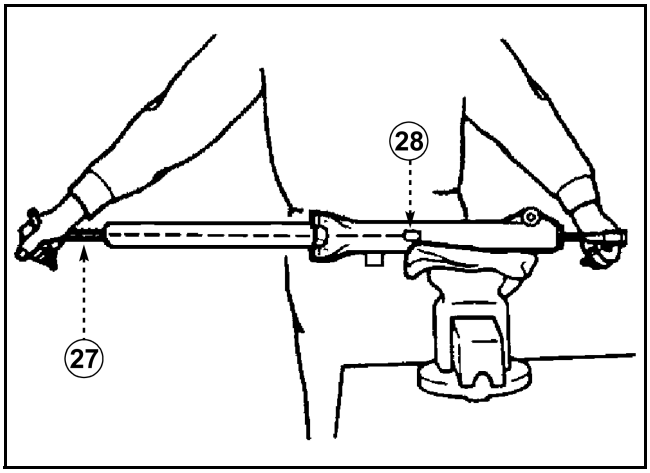
2. Drain
   - Fork oil



3. Remove
   - Dust seal (16)
   - C - clip (15)
   - Oil seal (14)

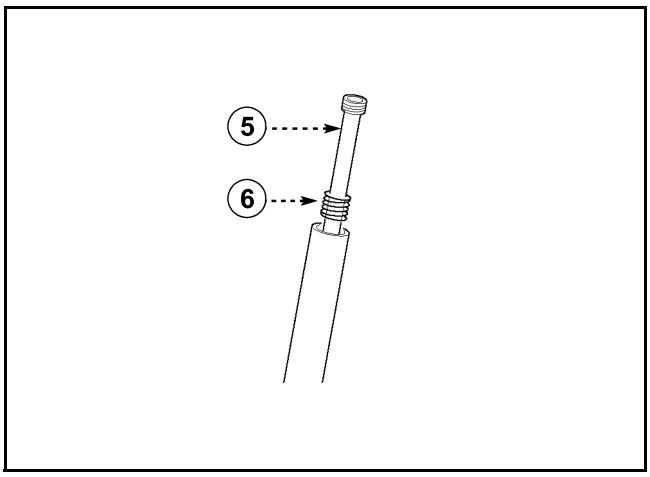
NOTE:
Use a screwdriver, and be careful not to scratch fork tube.

4. Remove
   - Bolt (12)
   - Washer (11)

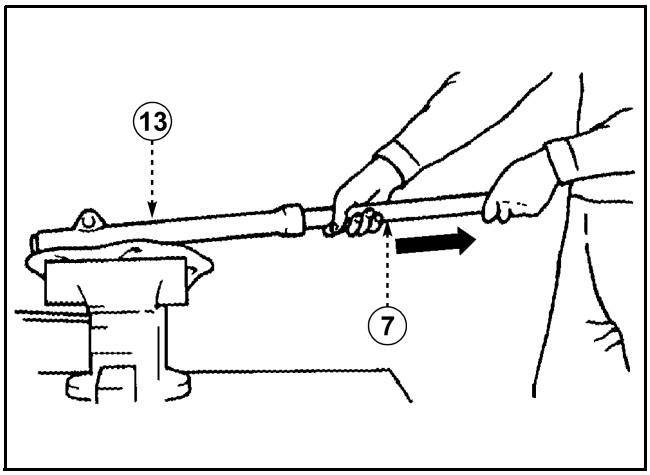


NOTE:
To remove bolt (12), lock the tube holder in a vice and loosen the bolt by means of adapter (28) and of special "T" wrench (27).

"T" wrench:
90890-01326
Adapter:
90890-01294



5. Remove
   - Damper rod (5)
   - Spring (6)



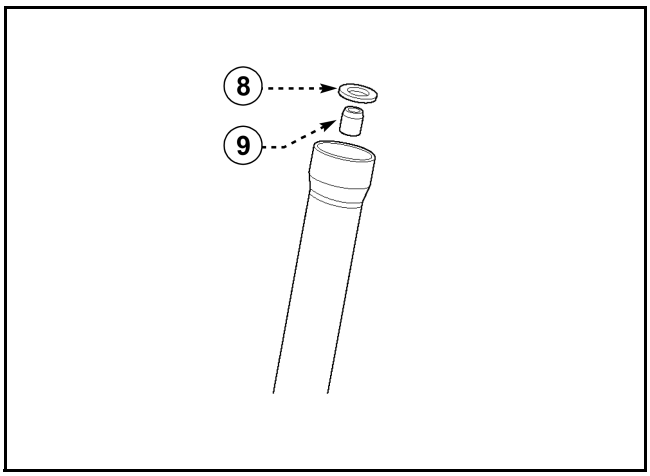
6. Remove
   - Fork tube (7)

****

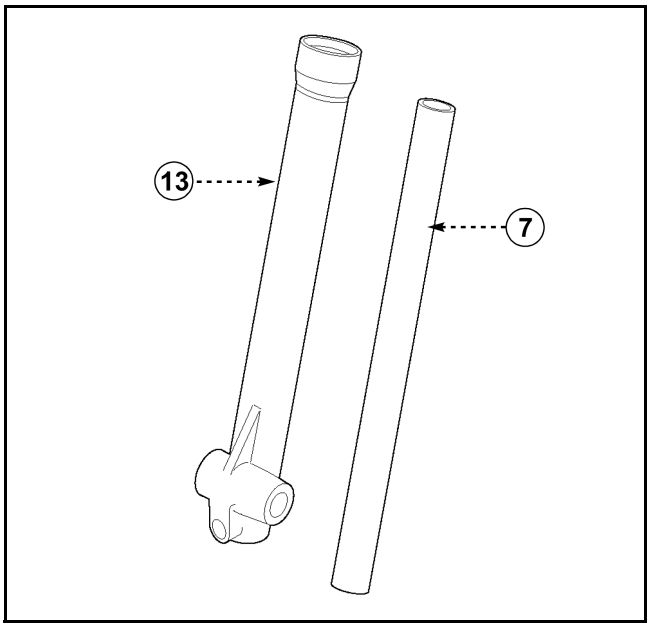
Removal steps

- Position the fork in horizontal position.
- Lock tube outer (13) in a vice, by means of aluminium inserts, in order not to damage the tube holder surface.
- Extract fork tube (7) strongly and with great care.

****



7. Remove
   - Washer (8)
   - Bush (9)

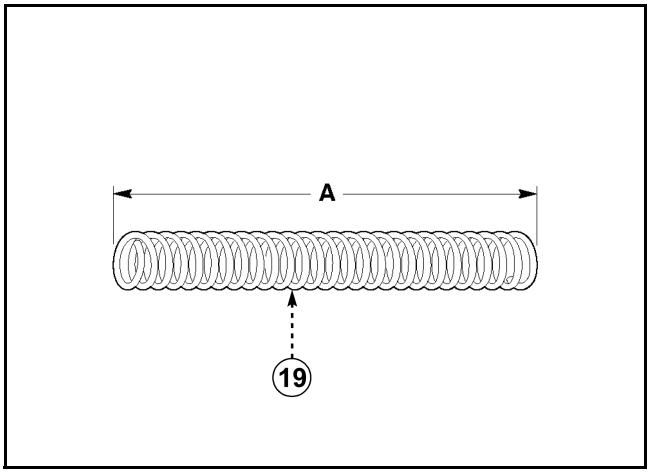


CHECKS AND CONTROLS

1. Check
   - Fork tube (7)
   - Tube outer (13)
     Damage and bends → Replace

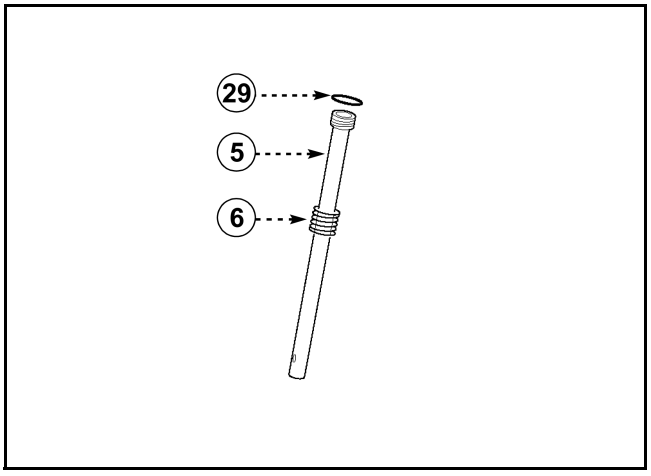
⚠ WARNING

Do not attempt to straighten fork tube 7 in order not to weaken it.



2. Measure
   - Free length of spring (19)
     Out of specification → Replace

Free length (A) of spring:
495 mm ± 3 mm

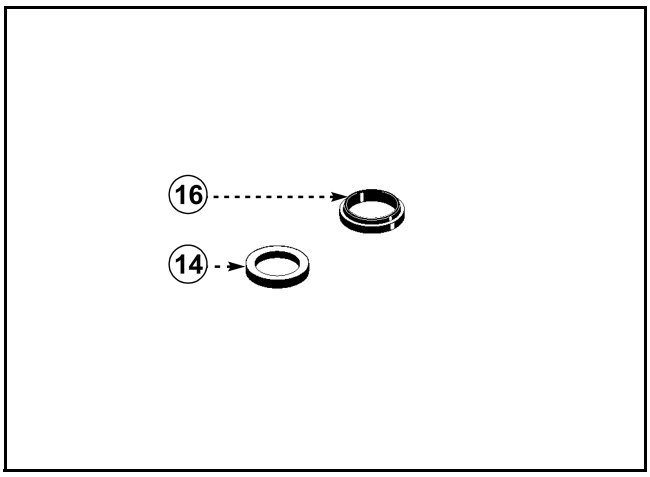


3. Check
   - Damper rod (5)
     Damage and bends → Replace
     Dirt → Blow out with compressed air
   - O-Ring gasket (29)
     Wear and damage → Replace

⚠ WARNING

Do not try to straighten damper rod (5) in order not to weaken it.

4. Check
   - Spring (6)
     Damage → Replace

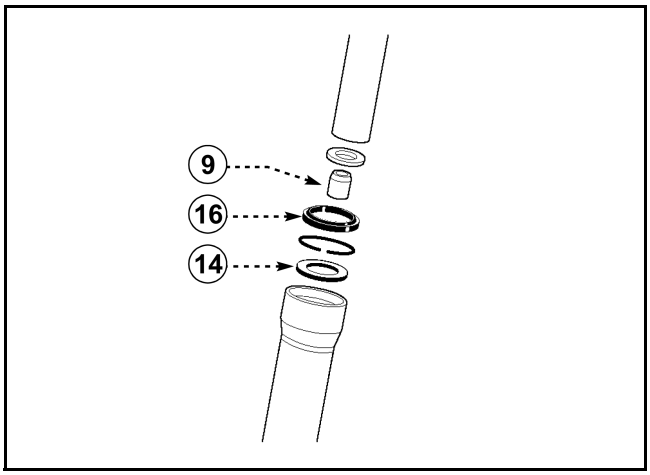


5. Replace
   - Oil seal (14)
   - Dust seal (16)

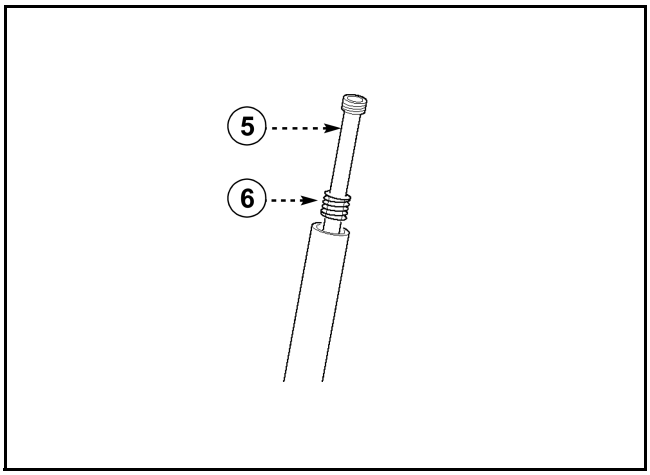
FORK LEG ASSEMBLY

NOTE:

When mounting the fork leg, make sure that the following components are always replaced.
- Bush (9)
- Oil seal (14)
- Dust seal (16)



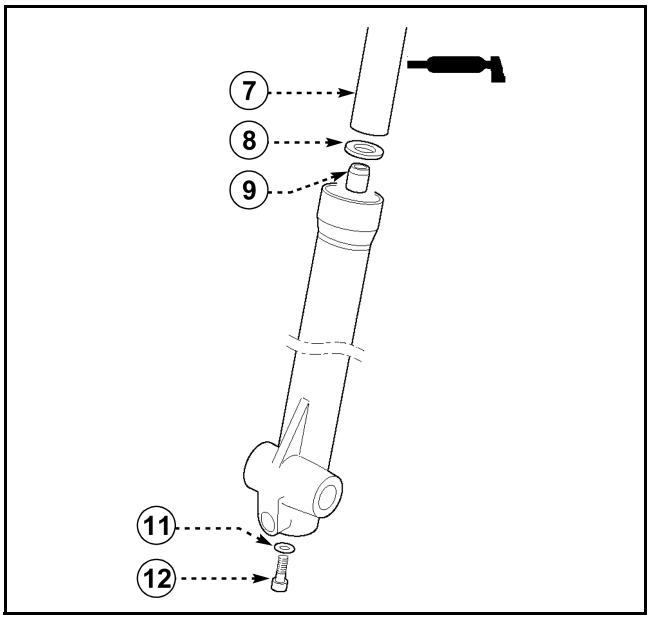
1. Clean
   - Fork components



2. Install
   - Spring (6)
   - Damper rod (5)

CAUTION:

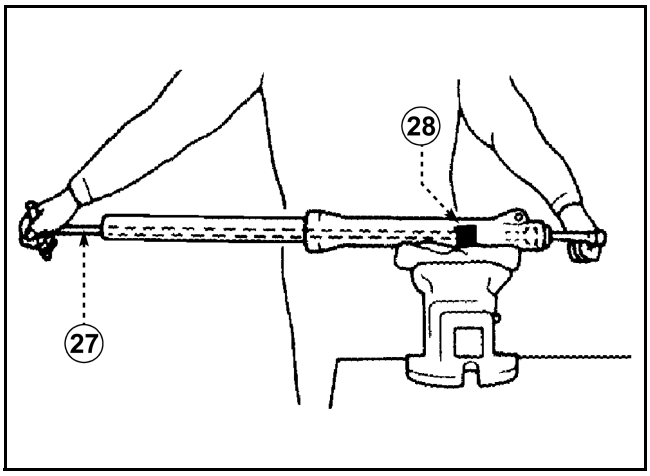
Let damper rod (5) slide up to the fork tube end.



3. Lubricate
   • Fork tube (7)

Fork oil or equivalent:
SAE 10

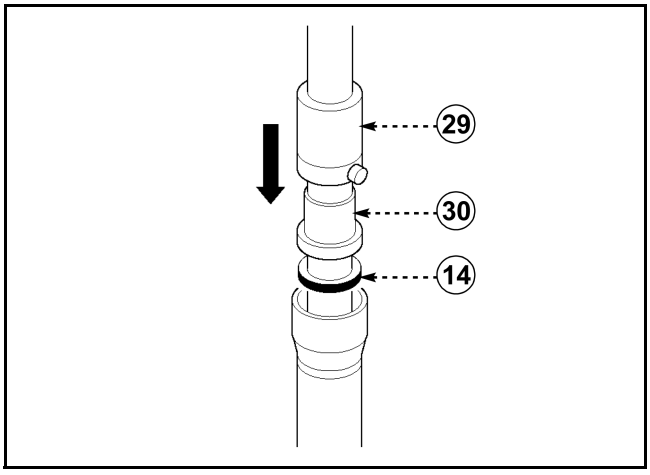
4. Install
   • Bush (9)
   • Washer (8)
   • Fork tube (7)
   • Washer (11)
   • Bolt (12)
5. Tighten
   • Bolt (12)



NOTE:
To tighten bolt (12), lock the outer tube in a vice and tighten the bolt by means of adapter (28) and of special "T" wrench (27).

"T" wrench:
90890-01326
Adapter:
90890-01294

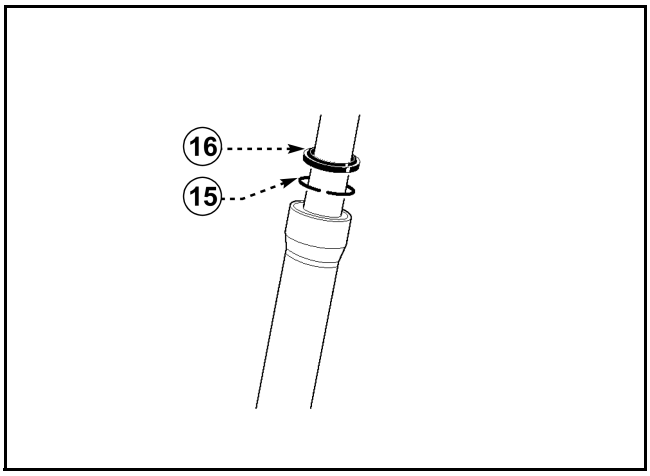
Bolt (12):
2.0 Kgf·m (20 N·m)
Apply sealant "Loctite" on the bolts



6. Install
   • Oil seal (14)
   Use puller (29) and adapter (30)

Puller:
90890-01367
Adapter:
90890-01370

NOTE:
Before installing the oil seal, lubricate the edges with lithium soap base grease.

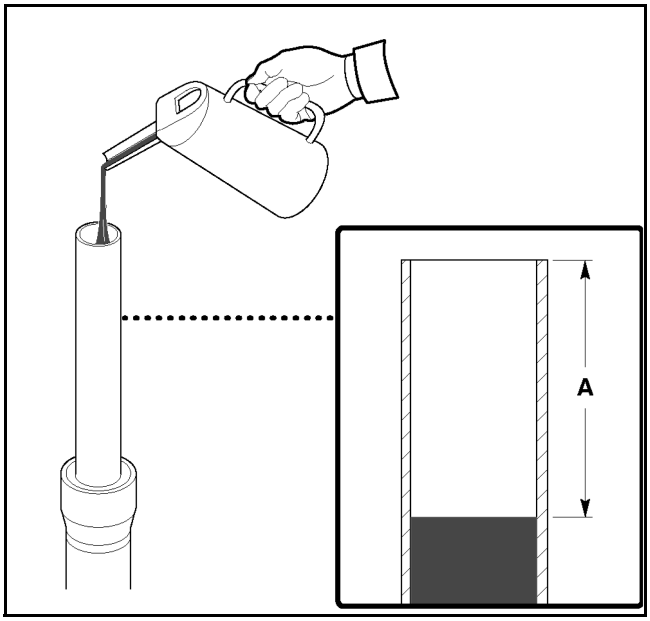


7. Install
   • C - clip (15)

NOTE:
Install lock ring (15) in the slot of the tube holder.

8. Install
   • Dust seal (16)
   Use puller (29) and adapter (30)

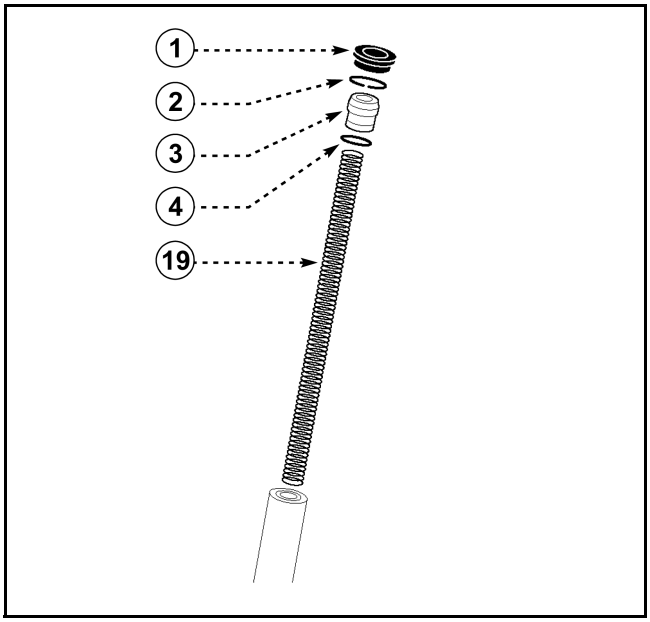
Puller:
90890-01367
Adapter:
90890-01370



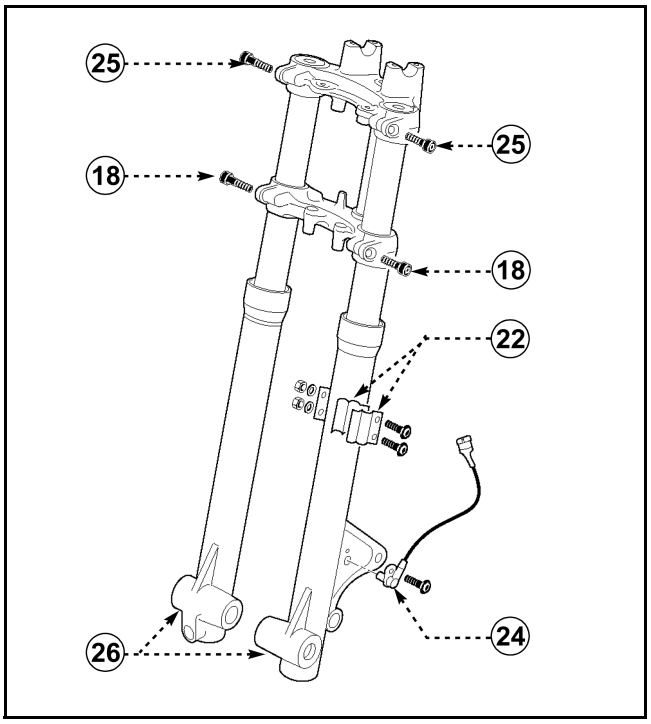
9. Fill
   • Fork leg

Oil amount in each fork leg:
285 cc
After filling the fork leg with oil, operate it slowly to spread the oil evenly.

Oil level (A) in each fork leg:
180 mm
The oil level is measured from the top of the inner tube, with the inner tube fully compressed and without the fork spring.



10. Install
   • Spring (19)
   • O-Ring (4)
   • Spacer (3)
   • C - clip (2)
   • Protection cap (1)



RH/LH FORK LEG INSTALLATION

1. Install
   - RH/LH fork leg (26)

NOTE:

Make sure that the inner fork tube is flush with the top of top yoke.

2. Tighten
   - Bolt (18)
   - Bolt (25)

	Bolt (18): **2.0 Kgf·m (20 N·m)** **Bolt (25):** **2.0 Kgf·m (20 N·m)**

3. Install
   - Brake caliper
     See "ASSEMBLY OF BRAKE CALIPER" page 6-14

	Brake caliper bolt: **3.0 Kgf·m (30 N·m)**

   - Speedometer sensor (24)
   - Cable holder (22)
   - Front wheel
     See "INSTALLATION" page 6-4

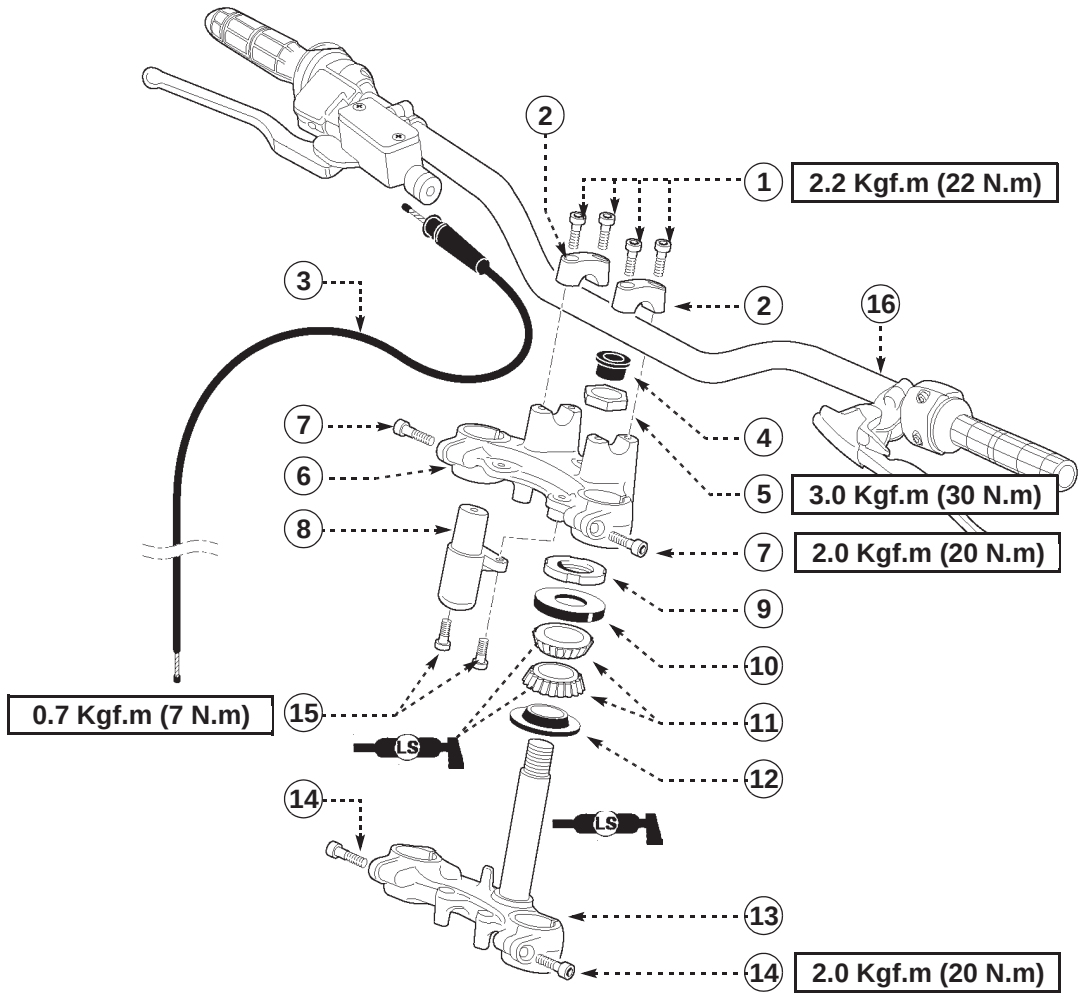
	Wheel axle pin: **4.5 Kgf·m (45 N·m)**

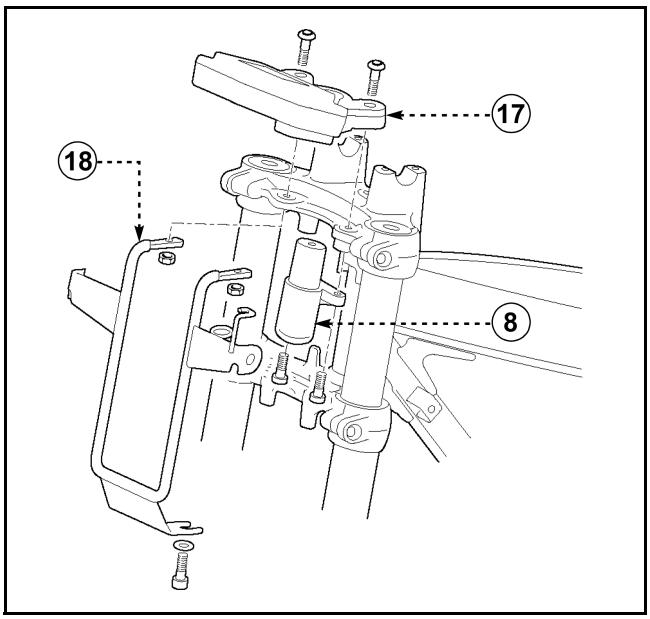
   - Headlight holder
     See "HEADLIGHT HOLDER INSTALLATION" page 3-5

STEERING HEAD AND HANDLEBAR

COMPONENT DESCRIPTION

(1) Bolt
(2) Handlebar holder
(3) Throttle cable
(4) Protection cap
(5) Nut
(6) Steering top yoke
(7) Bolt
(8) Main switch
(9) Lock nut
(10) Upper dust seal
(11) Bearings
(12) Lower dust seal
(13) Steering bottom yoke
(14) Bolt
(15) Bolt
(16) Handlebar



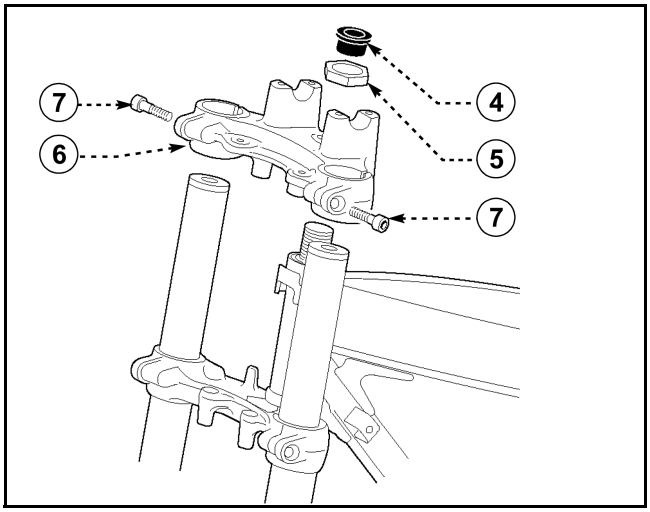


STEERING HEAR REMOVAL

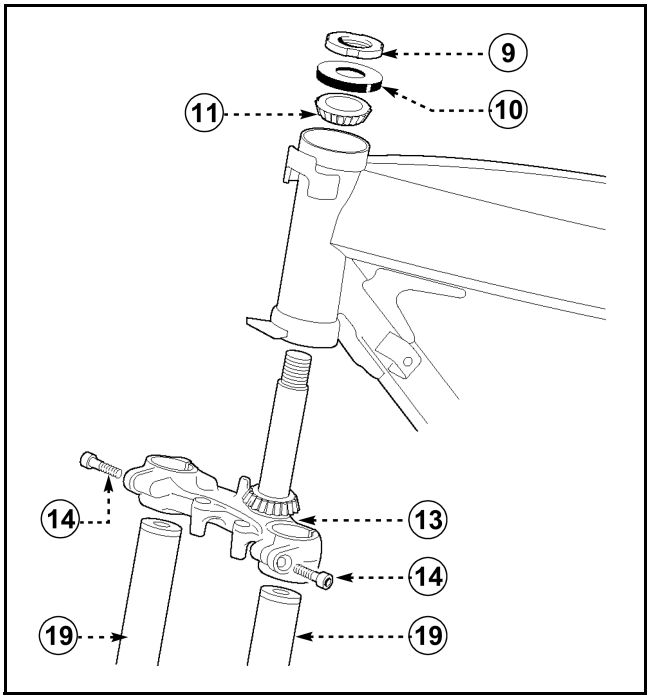
⚠ WARNING

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

1. Remove
   - Headlight holder
     See "HEADLIGHT HOLDER REMOVAL" page 3-4
   - Front mudguard
     See "FRONT MUDGUARD REMOVAL" page 3-4
2. Remove
   - Meter Assembly (17)
   - Stay (18)
   - Main switch (8)



3. Loosen
   - Bolt (7)
4. Remove
   - Protection cap (4)
   - Nut (5)
   - Steering top yoke (6)

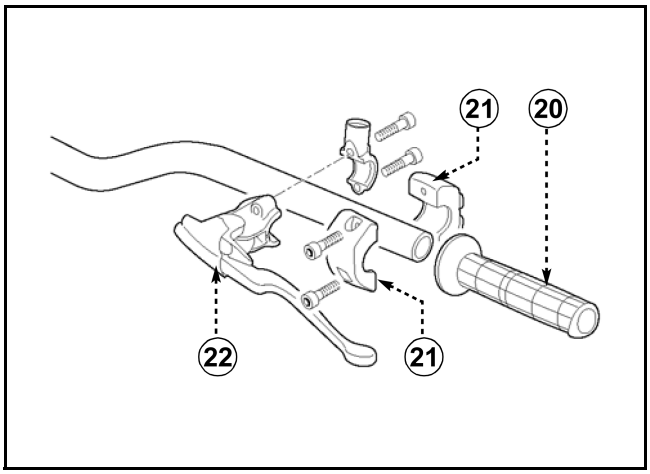


5. Loosen
   - Bolt (14)
6. Remove
   - RH/LH fork leg (19)
   - Lock nut (9)
   - Dust seal (10)
   - Steering bottom yoke (13)

NOTE:

Use a rubber hammer to remove steering bottom yoke.

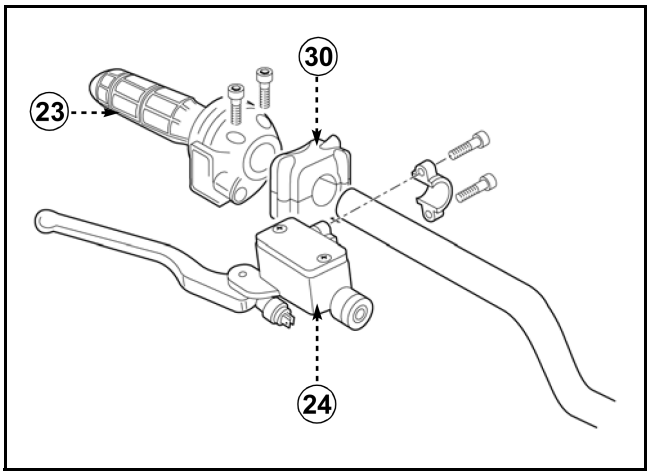
   - Bearing (11)



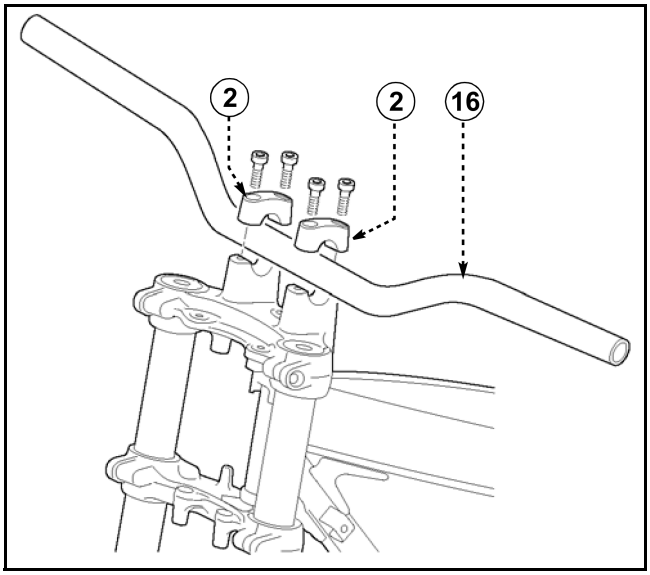
HANDLEBAR REMOVAL

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

1. Remove
   - Grip (20)
   - Light swich (21)
   - Clutch lever (22)



2. Remove
   - Throttle twist grip (23)
   - Engine stop (30)
   - Master cylinder (24)



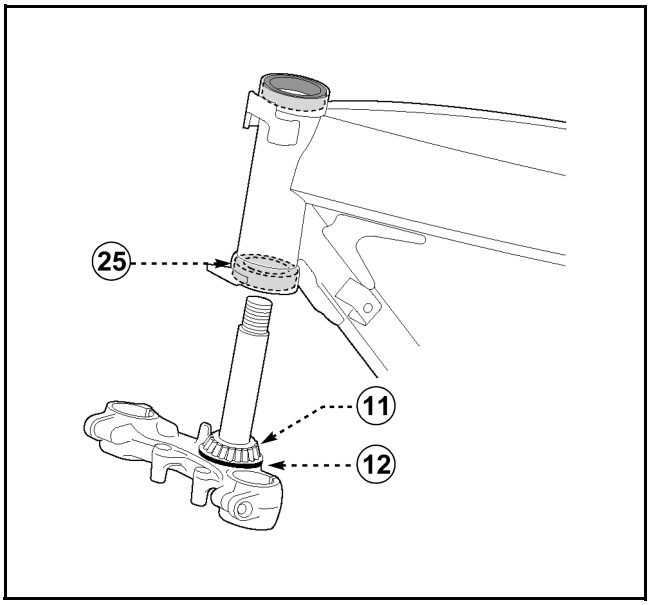
3. Remove
   - Handlebar holder (2)
   - Handlebar (16)

HANDLEBAR INSPECTION

1. Inspect
   - Handlebar
     Damage and bends → Replace

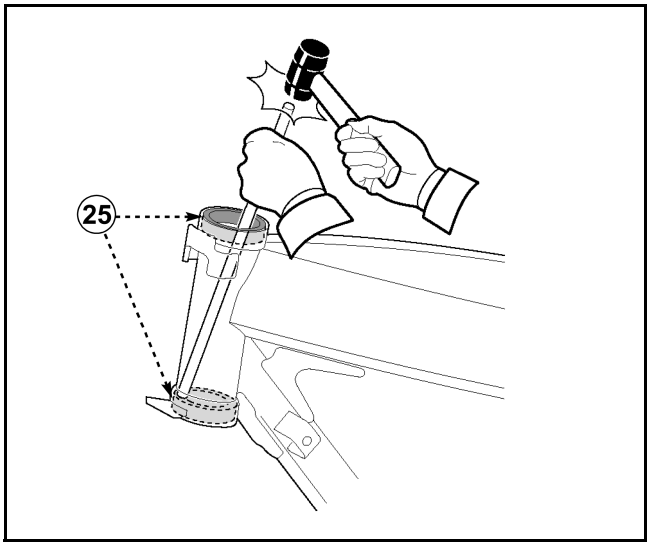
⚠ WARNING

Do not attempt to straighten a bent handlebar, in order not to weaken it



INSPECTION OF STEERING HEAD

1. Wash bearings with kerosene
2. Inspect
   - Bearing ring (25)
     Damage and bends → Replace
   - Bearing (11)
     Wear and damage → Replace

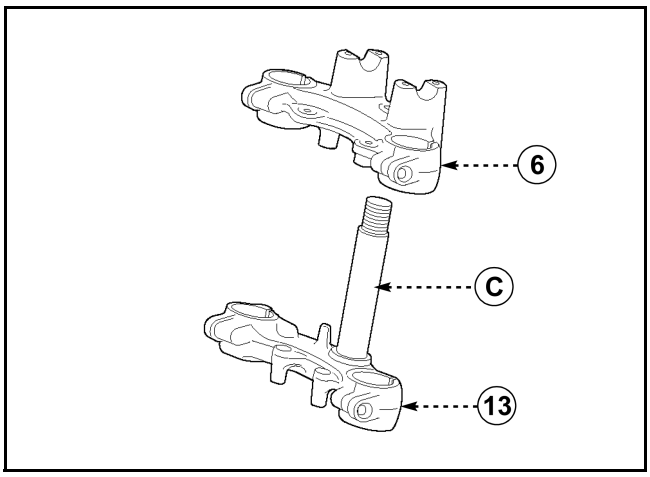


****

Race and bearing replacement steps

- Remove races (25) using a long rod and a hammer.
- Remove bearing (11) from the steering bottom yoke with a bearing puller (code 90890-02828)
- Replace dust seal (12), if necessary
- Install the new bearing with a taper bearing installing tool (code 90890-02829)

****



CAUTION:

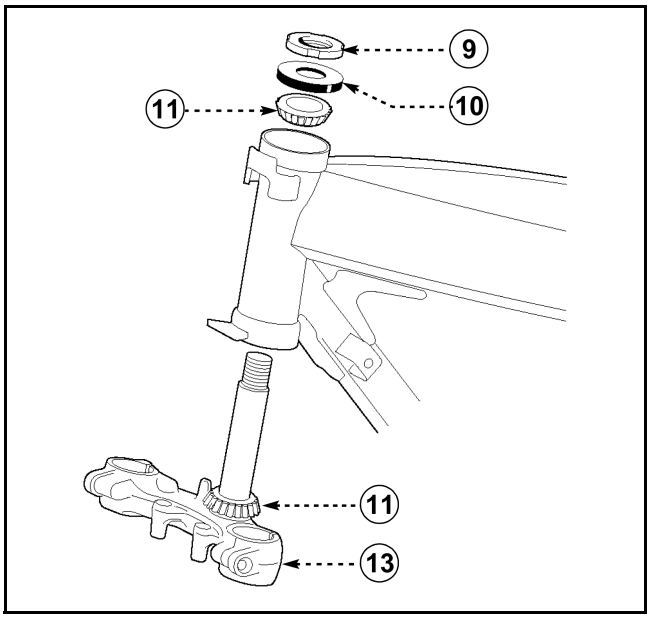
A slant installation of the bearing races will damage the frame, so take care to install them in horizontal position.

3. Check
   - Steering top yoke (6)
   - Steering bottom yoke (13)

   Damage and bends → Replace

⚠ WARNING

Do not try to straighten sleeve (C) of the steering yoke, if it is deformed, in order not to weaken it.



STEERING HEAD INSTALLATION

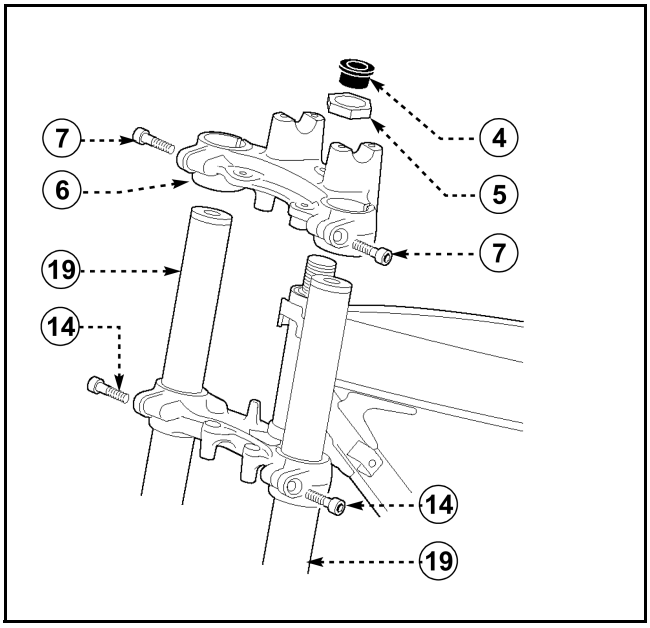
1. Lubricate
   - Bearing (11)

	Use lithium soap base grease

2. Install
   - Upper bearing (11)
   - Steering bottom yoke (13)
   - Dust seal (10)
   - Lock nut (9)

NOTE:

Rotate steering bottom yoke (13) to the right and to the left and check that the motion is correct. If necessary, loosen or tighten lock nut (9).



3. Install
   - Steering top yoke (6)
   - Nut (5)

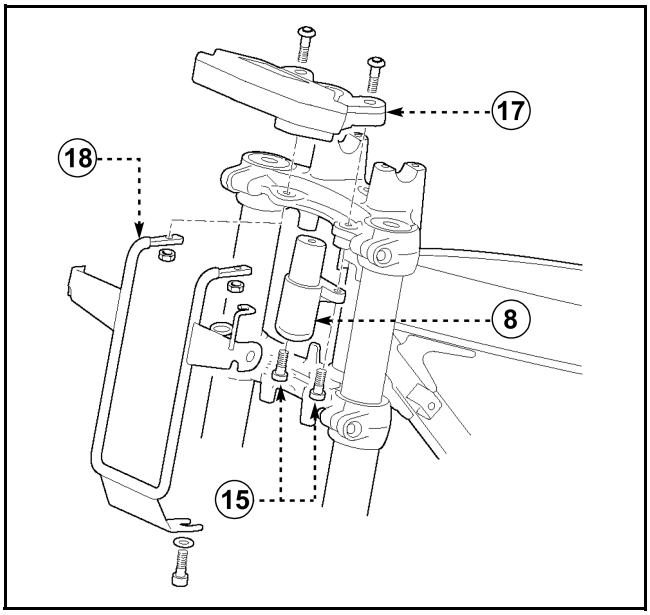
	Nut (5): **3.0 Kgf·m (30 N·m)**

   - Protection cap (4)
4. Install
   - RH/LH fork leg (19)
5. Tighten
   - Bolt (7)
   - Bolt (14)

	Bolt (7): **2.0 Kgf·m (20 N·m)** **Bolt (14):** **2.0 Kgf·m (20 N·m)**

6. Install
   - Headlight holder
     See "HEADLIGHT HOLDER INSTALLATION" page 3-5
   - Front mudguard
     See "FRONT MUDGUARD INSTALLATION" page 3-4

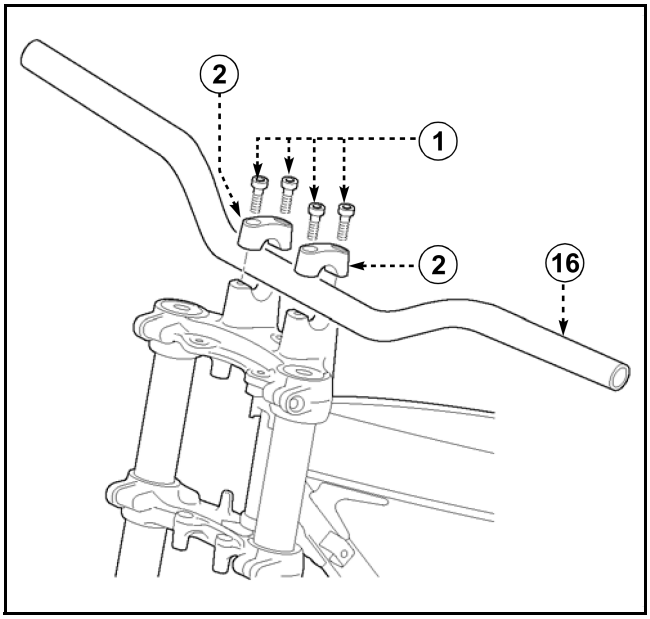
HANDLEBAR INSTALLATION



1. Install
   - Main switch (8)

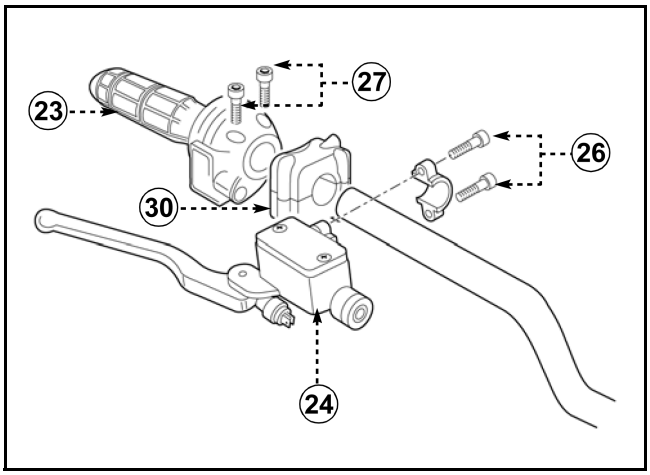
	Bolt (15): **0.7 Kgf·m (7 N·m)**

   - Meter assembly (17)
   - Stay (18)



2. Install
   - Handlebar (16)
   - Handlebar holder (2)

	Bolt (1): **2.2 Kgf·m (22 N·m)**

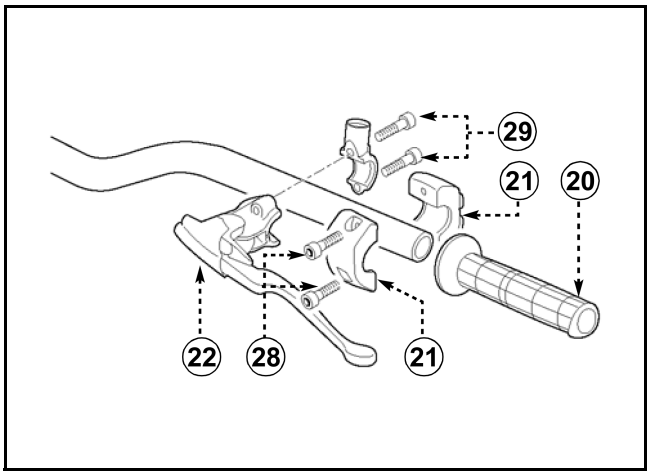


3. Install
   - Master cylinder (24)

	Bolt (26): **0.6 Kgf·m (6 N·m)**

   - Engine stop (30)
   - Throttle twist grip (23)

	Bolt (27): **0.3 Kgf·m (3 N·m)**



4. Install
   - Grip (20)
   - Light switch (21)

	Bolt (28): **0.5 Kgf·m (5 N·m)**

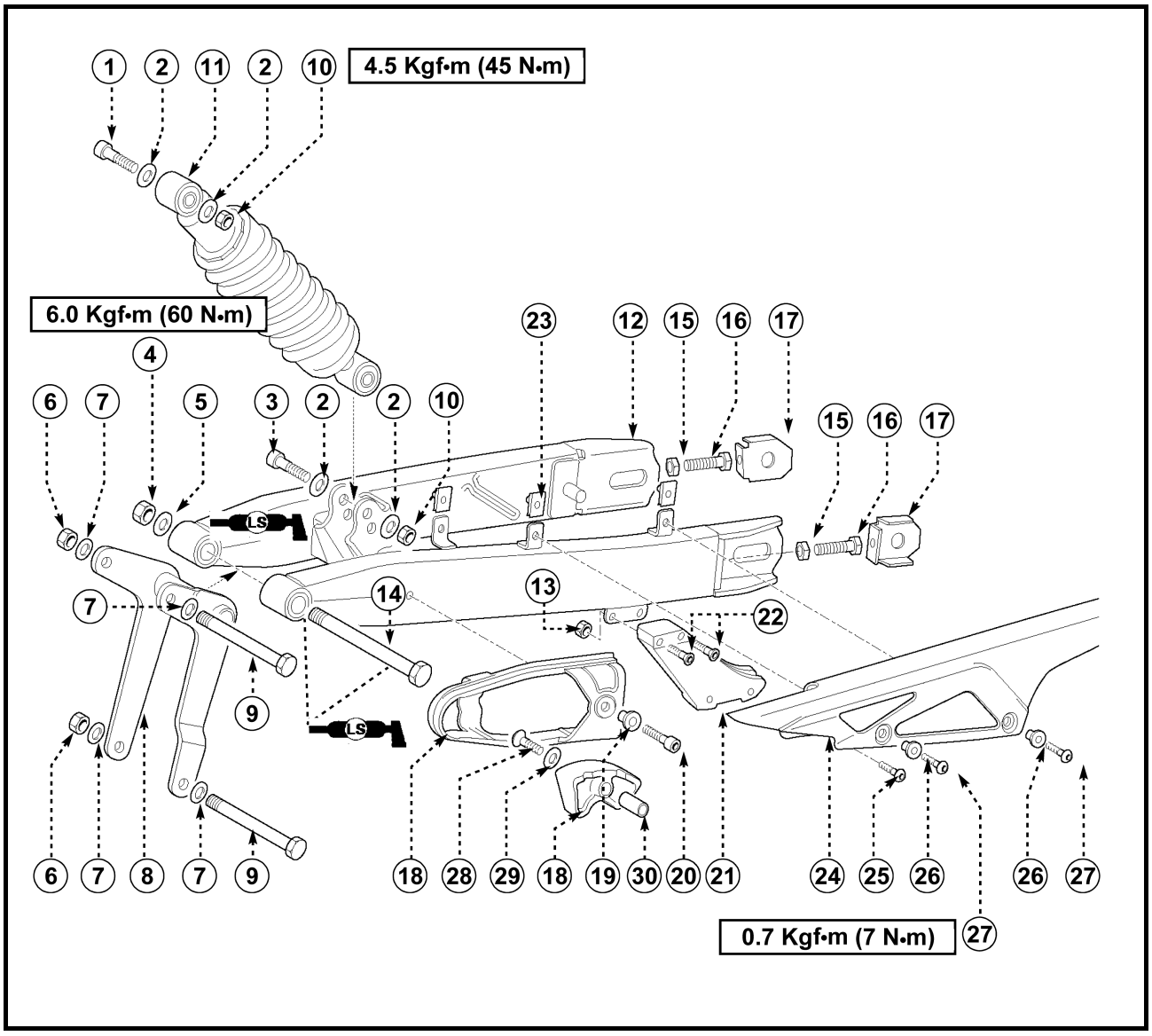
   - Clutch lever (22)

	Bolt (29): **0.6 Kgf·m (6 N·m)**

REAR SUSPENSION

COMPONENT DESCRIPTION

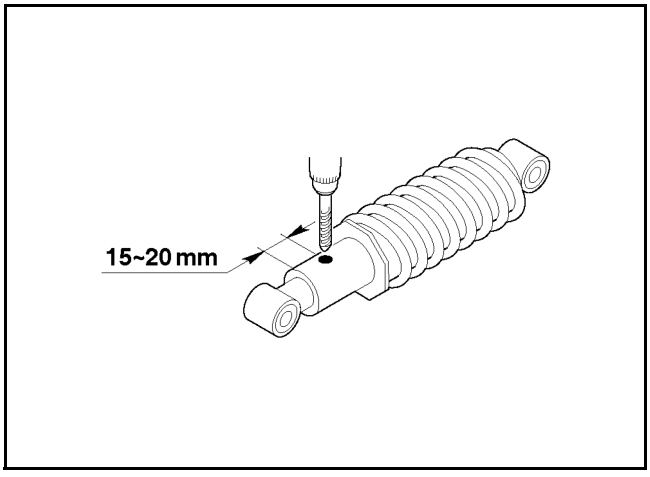
(1) Bolt
(2) Washer
(3) Bolt
(4) Nut
(5) Washer
(6) Nut
(7) Washer
(8) Engine mount
(9) Bolt
(10) Nut
(11) Shock-absorber
(12) Swingarm
(13) Nut
(14) Bolt
(15) Nut
(16) Bolt
(17) Chain puller
(18) Chain sliding guide
(19) Bush
(20) Bolt
(21) Chain guide
(22) Bolt
(23) Threaded insert
(24) Chain case
(25) Bolt
(26) Bush
(27) Bolt
(28) Bolt
(29) Washer
(30) Spacer



RECOMMENDATIONS FOR USE

⚠ WARNING

- **This shock absorber contains highly pressurized nitrogen gas. Read and understand the following information before handling the shock absorber. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.**
- **Do not tamper with or attempt to open the shock absorber 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 damping performance.**
- **In case of disposal, see the instructions in section "Disposal instructions".**



DISPOSAL INSTRUCTIONS

****

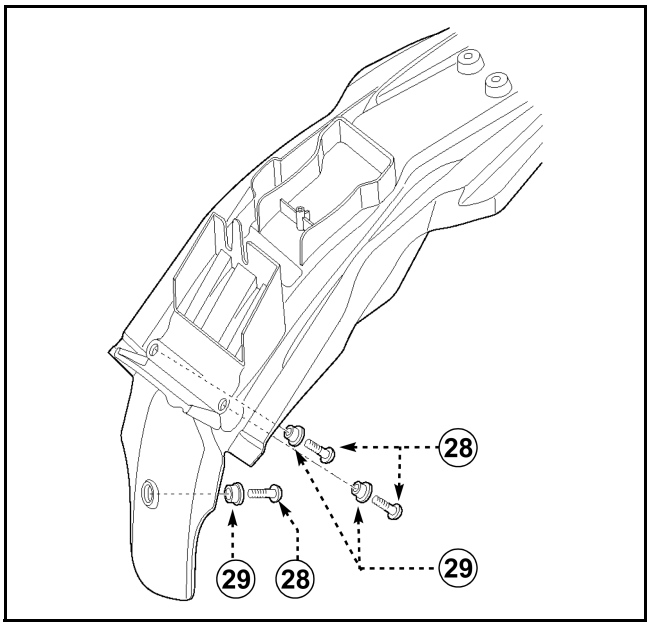
Shock absorber disposal steps:

- The shock absorber nitrogen gas must be released before disposing. To do so, drill a 2-3 mm hole through the chamber case at a 15-20 mm distance from the end of the chamber case.

⚠ WARNING

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

****

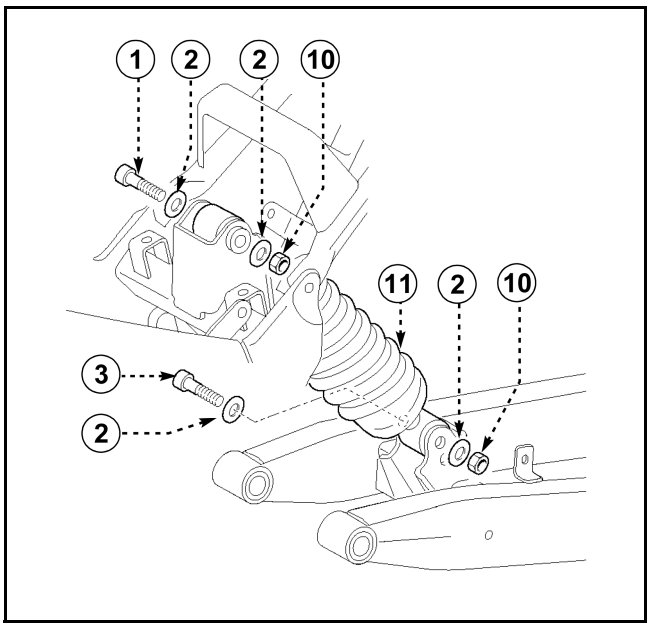


SHOCK ABSORBER REMOVAL

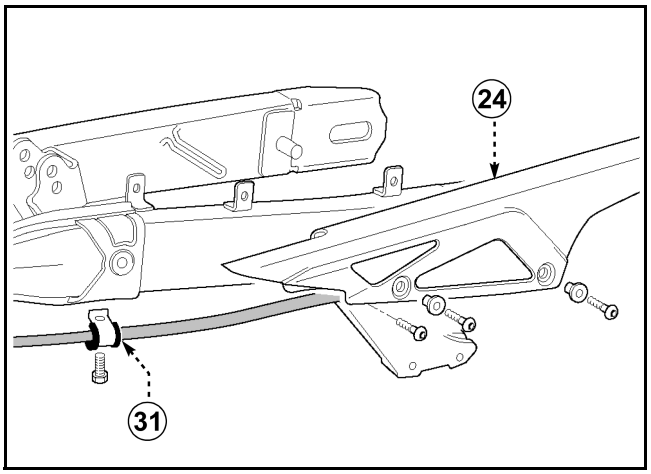
⚠ WARNING

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

1. Stand the motorcycle on a level surface.
2. Remove
   - Seat
     See “SEAT REMOVAL” page 3-2
3. Remove
   - Bolt (28)
   - Bush (29)



4. Remove
   - Nut (10)
   - Washer (2)
   - Bolt (1-3)
   - Shock-absorber (11)

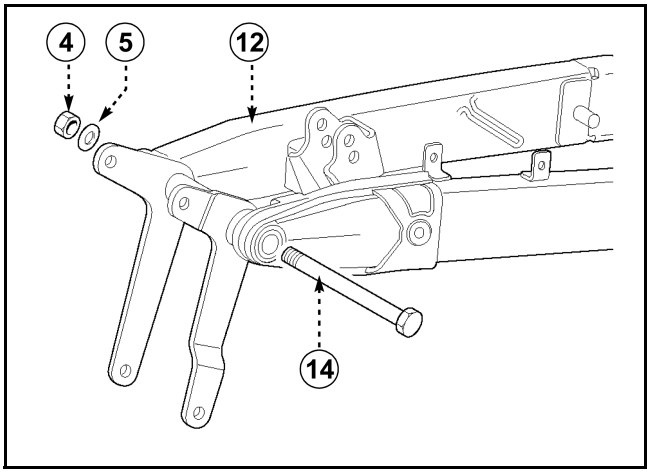


SWINGARM REMOVAL

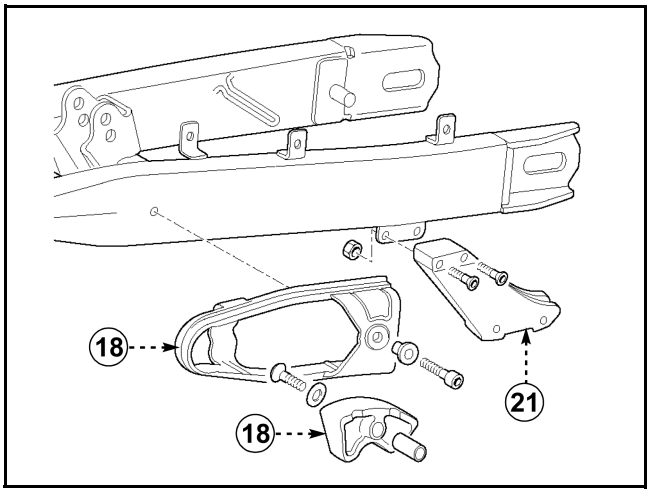
⚠ WARNING

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

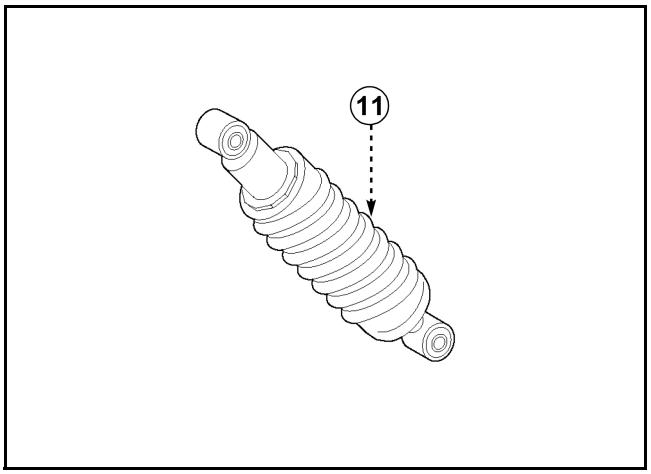
1. Stand the motorcycle on a level surface.
2. Disassemble
   - Shock absorber lower part
     See "SHOCK ABSORBER REMOVAL" page 6-54
3. Remove
   - Chain case (24)
   - Chain
     See "CHAIN REMOVAL" page 3-32
   - Rear wheel
     See "REMOVAL" page 6-19
   - Cable holder (31)
   - Brake caliper



4. Remove
   - Nut (4)
   - Washer (5)
   - Bolt (14)
   - Swingarm (12)

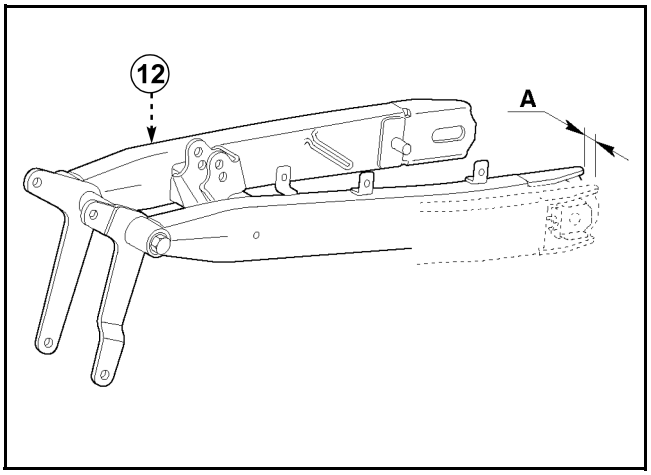


5. Remove
   - Chain sliding guide (18)
   - Chain guide (21)



CHECKS AND CONTROLS

1. Check
   - Shock-absorber (11)
     Leak and damage → Replace

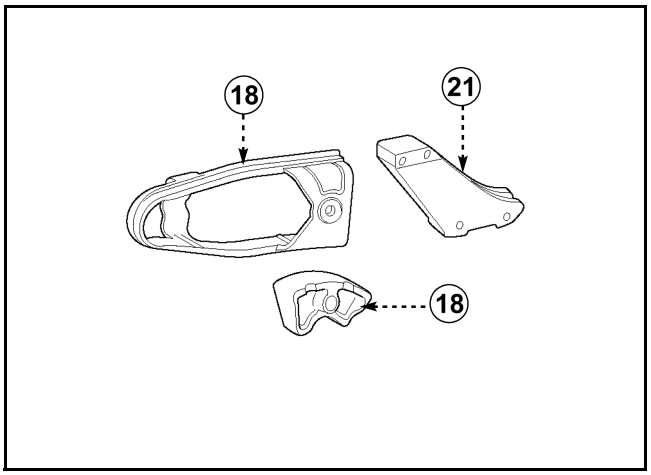


2. Check
   - Swingarm (12)
     Damage and bends → Replace
   - Frame side free play

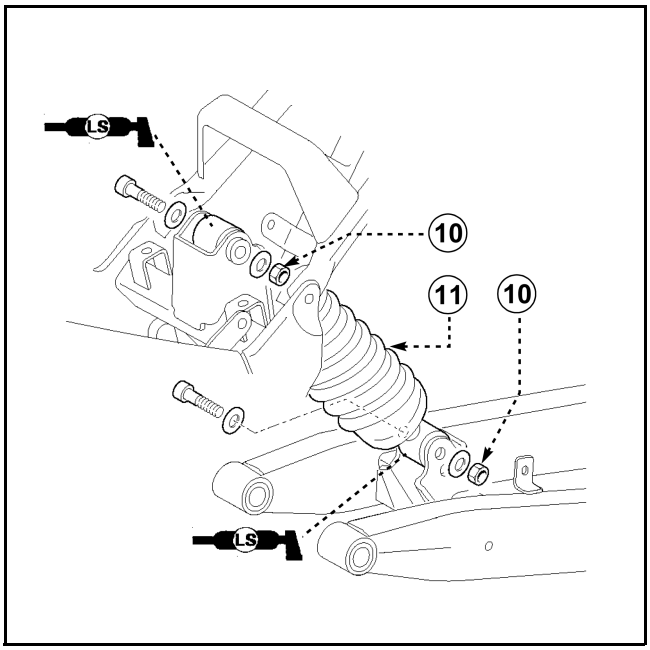
NOTE:
Carry out this operation without disassembling the suspension frame.

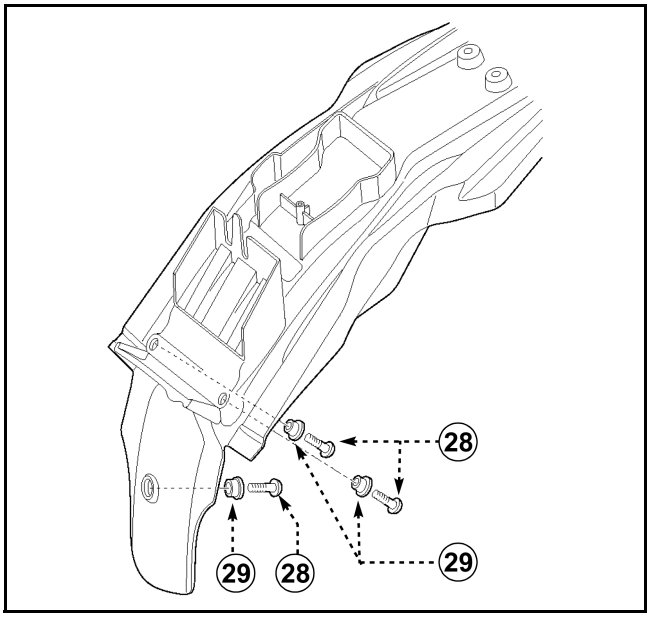
Out of specification → Replace frame

	Side free play (A): **max 1.0 mm**



3. Check
   - Chain sliding guide (18)
   - Chain guide (21)
     Damage and bends → Replace





SHOCK ABSORBER INSTALLATION

1. Lubricate
   - Bush internal surface

	Use lithium soap base grease

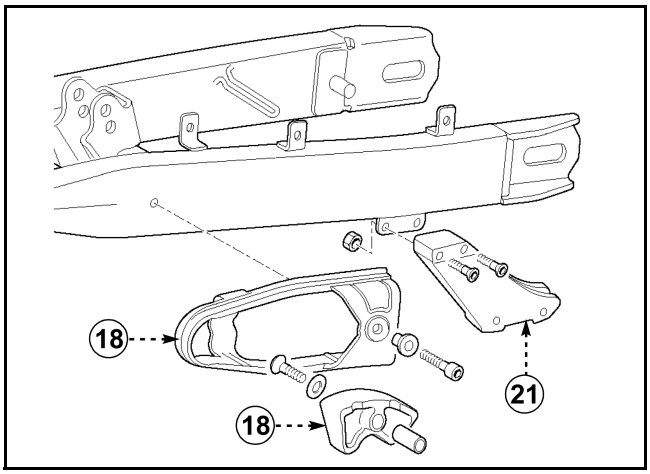
2. Install
   - Shock-absorber (11) (upper part)
3. Tighten
   - Nut (10)

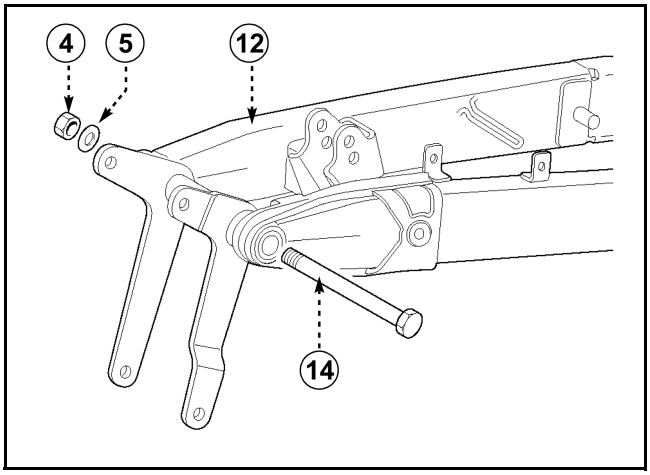
	Nut (10) (upper part): 4.5 Kgf·m (45 N·m)

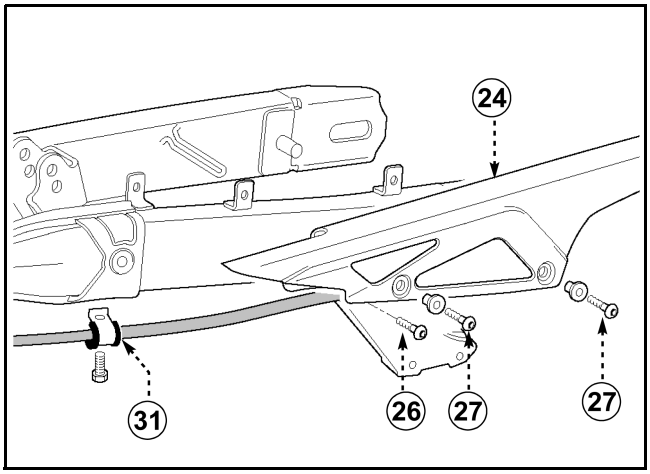
4. Install
   - Shock-absorber (11) (lower part)
5. Tighten
   - Nut (10)

	Nut (10) (lower part): 4.5 Kgf·m (45 N·m)

6. Assemble
   - Bush (29)
   - Bolt (28)







SWINGARM INSTALLATION

1. Lubricate
   - Bush internal surface

	Use lithium soap base grease

2. Assemble
   - Chain sliding guide (18)
   - Chain guide (21)

3. Lubricate
   - Bolt (14)

	Use lithium soap base grease

4. Assemble
   - Swingarm (12)
   - Bolt (14)
   - Washer (5)
   - Nut (4)
5. Tighten
   - Nut (4)

	Nut (4): **6.0 Kgf·m (60 N·m)**

6. Assemble
   - Brake caliper
   - Cable holder (31)
   - Rear wheel
     See “INSTALLATION” page 6-22
   - Chain
     See “CHAIN INSTALLATION” page 6-34
   - Chain case (24)

	Bolt (26-27): **0.7 Kgf·m (7 N·m)**

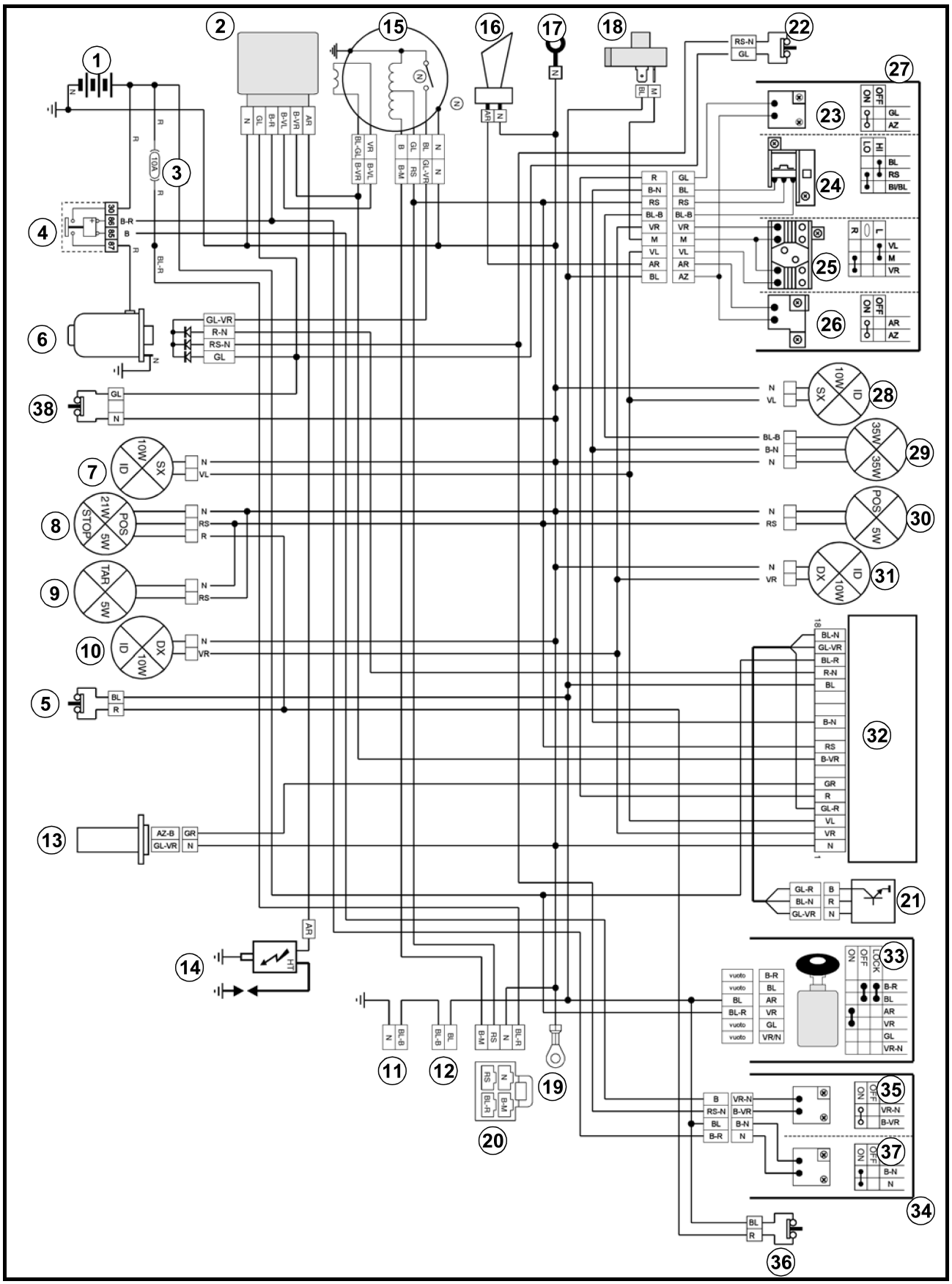
7. Connect
   - Shock absorber lower part
     See “SHOCK ABSORBER INSTALLATION” page 6-57

CHAPTER 7
ELECTRICAL SYSTEM

ELECTRICAL SYSTEM

ELECTRICAL SYSTEM

CIRCUIT DIAGRAM



(1) Battery
(2) “CDI” control unit
(3) Fuse 10A
(4) Starting relay
(5) Rear stop switch
(6) Starter
(7) Left rear flasher light
(8) Tail brake and stop light
(9) Licence light
(10) Right rear flasher light
(11) Carburetor heater
(12) Thermal sensor
(13) Fuel reserve sensor
(14) Coil
(15) CDI magneto
(16) Horn
(17) Chassis ground
(18) Turn light relay
(19) Regulator ground
(20) Regulator
(21) Tachometer counter
(22) Clutch switch
(23) “MODE” button
(24) Light switch
(25) Turn signal switch
(26) Horn switch
(27) Left hand switch
(28) Left front flasher light
(29) Low and high beam indicator light
(30) Side light
(31) Right front flasher light
(32) Meter assembly
(33) Main switch
(34) Right hand switch
(35) Starting button
(36) Front stop switch
(37) “Engine stop” button
(38) Side stand switch

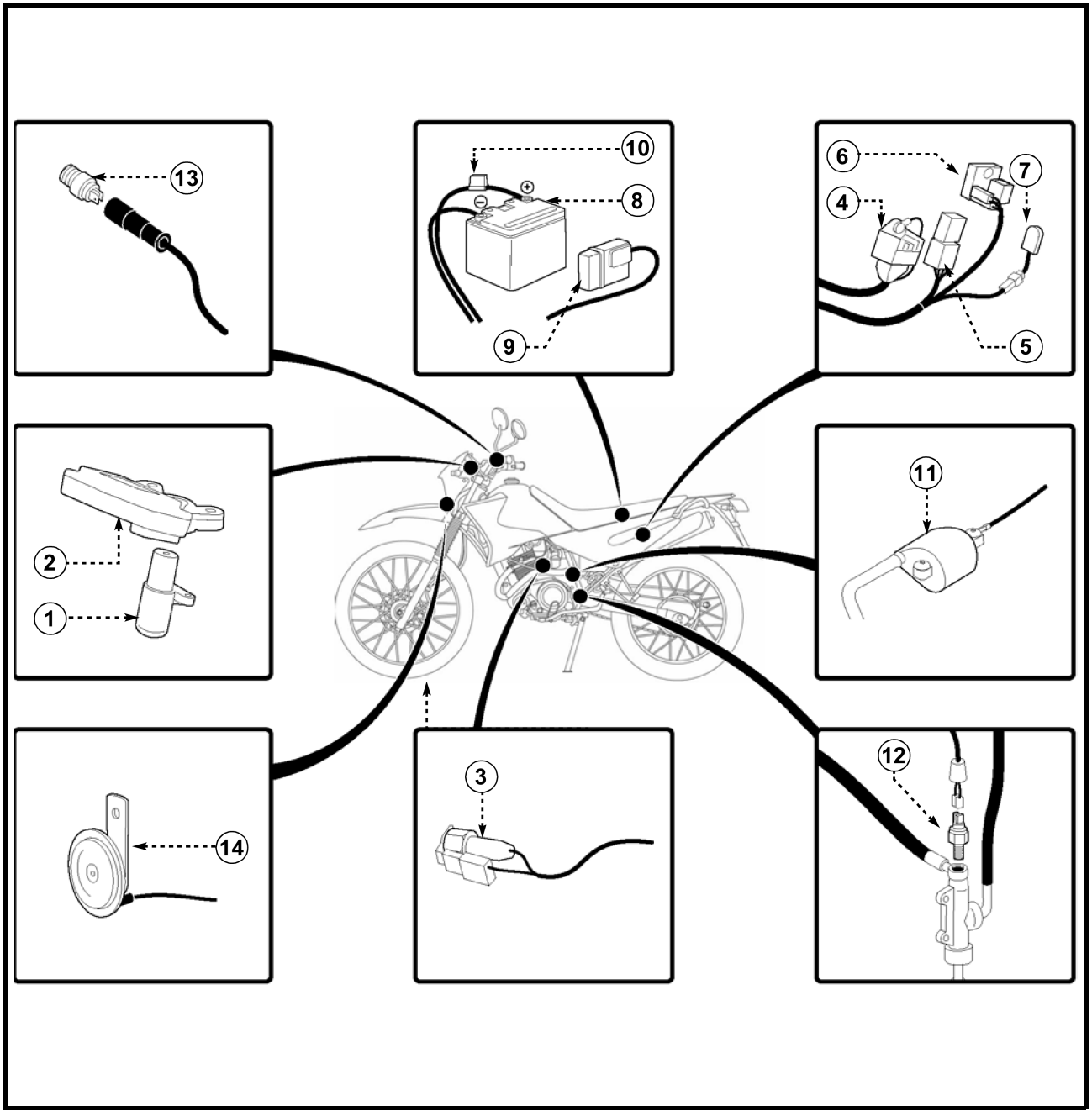
NOTE:
The rear brake switch is closed while the brake pedal is activated.

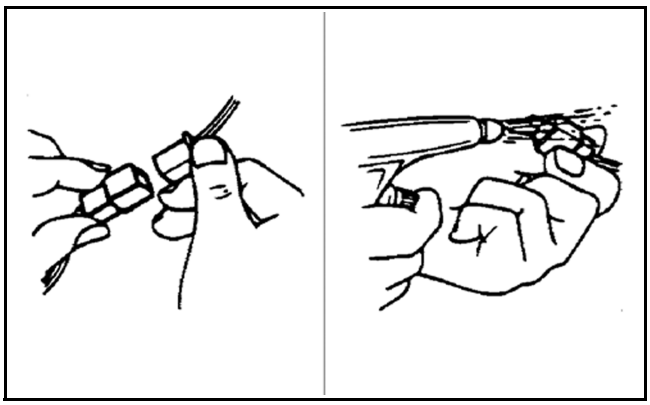
COLOUR CODE
The letters listed in the following table represent identification tags of electrical wires. The letters can be read close to each part in the wiring plan.

AR	Orange	**GL-N**	Yellow-Black
AZ	Light blue	**GL-R**	Yellow-Red
AZ-B	Light blue-White	**GL-VR**	Yellow-Green
B	White	**GR**	Grey
B-N	White-Black	**GR-R**	Grey-Red
B-M	White-Brown	**M**	Brown
B-R	White-Red	**M-N**	Brown-Black
B-VL	White-Purple	**N**	Black
B-VR	White-Green	**R**	Red
BL	Blue	**RS**	Pink
BL-B	Blue-White	**VL**	Purple
BL-GL	Blue-Yellow	**VR**	Green
BL-N	Blue-Black	**VL-GL**	Purple-Yellow
BL-R	Blue-Red	**VR-N**	Green-Black
GL	Yellow	**R-N**	Red-Black
GL-B	Yellow-White	**RS-N**	Pink-Black

ELECTRICAL COMPONENTS

(1) Main switch
(2) Digital meter assembly
(3) Carburetor heater
(4) Regulator
(5) Starting relay
(6) Turn signal relay
(7) Thermal sensor
(8) Battery
(9) "CDI" control unit
(10) Fuse 10A
(11) Coil
(12) Rear stop switch
(13) Front stop switch
(14) Horn

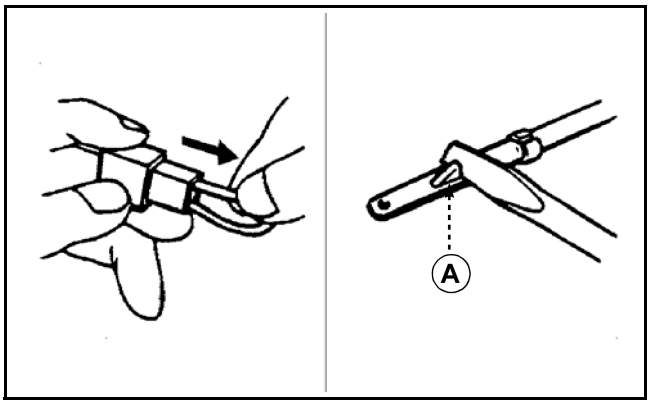




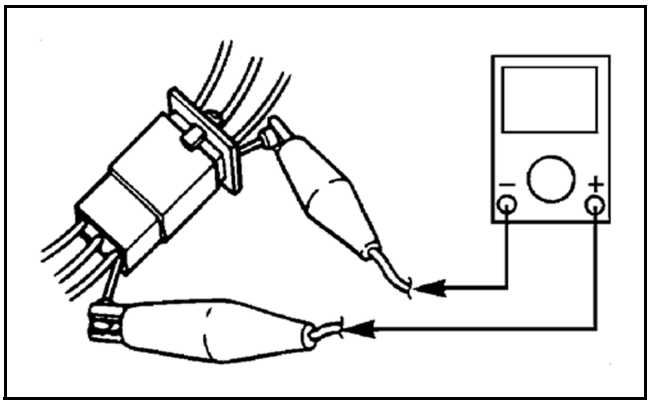
CHECKING THE CONNECTIONS

Check for rust and moisture in connectors

1. Disconnect
   - Connectors
2. Dry each terminal with an air blower.



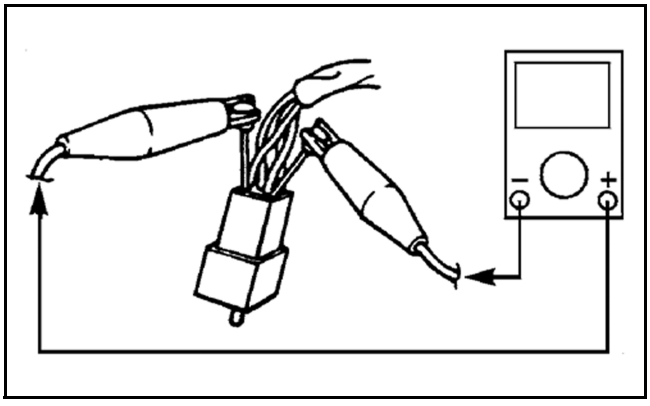
3. Connect and disconnect the connector two or three times.
4. Pull the connector to check that it will not come off.
5. If the terminal comes off, bend up pin (A) and reinsert the terminal into the connector.



6. Connect
   - Connectors

NOTE:

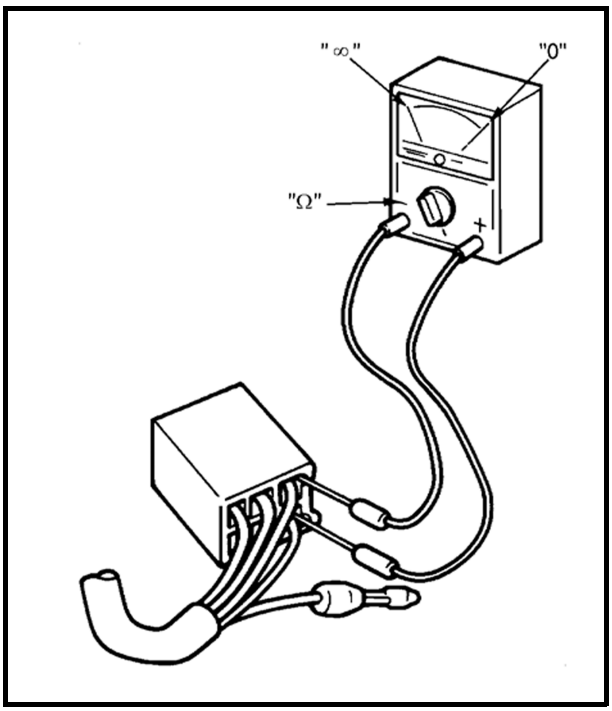
The connector parts are assembled properly when they “click” together.



7. Check for continuity with a Tester.

NOTE:

- If there is no continuity, clean the terminals.
- Be sure to perform the steps 1 to 7 when checking the electrical system.
- For a field remedy, use a contact cleaner.
- Use the Tester as shown in figure.



CHECKING THE SWITCHES

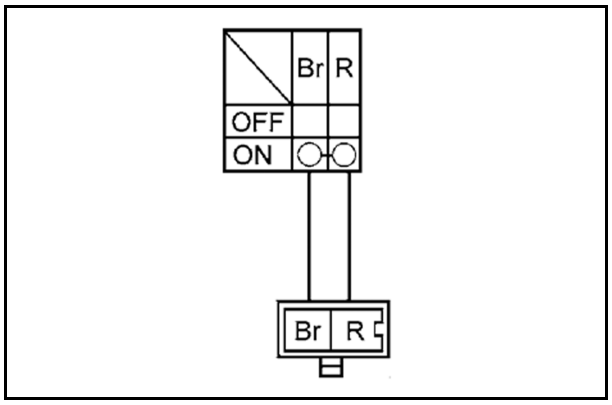
CHECKING STEPS

Use a Tester to check the terminals for continuity and for proper connection. If the continuity is faulty at any point, replace the component.

	Tester: **90890-01312**

NOTE:

- Turn switch “ON-OFF” to “ON” and “OFF” several times
- Set the Tester selector to “Ω”.
- Set the indicator to “0”.



SWITCH CONNECTIONS AS SHOWN IN THIS MANUAL

This manual contains the connection charts (as shown left) showing the switch terminals (e.g., main switch, brake switch, lighting switch, etc.)

The left column indicates the different switch positions; the top line indicates the colours of the conductors connected to the switch terminals.

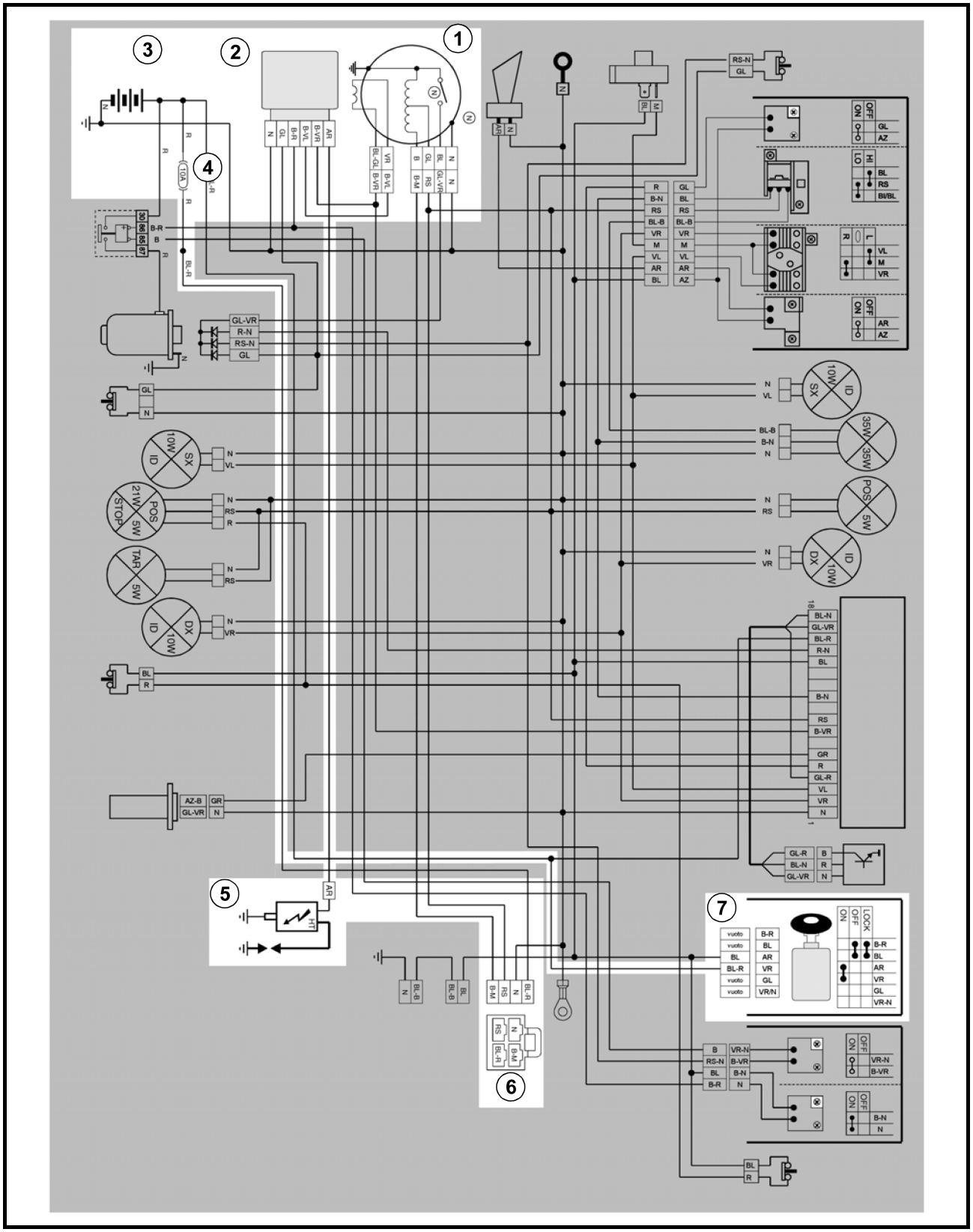
“∞” indicates the continuity between terminals; i.e., a closed circuit at the special switch positions.

In this chart, “Br” and “R” are continuous when the switch is set to “ON”.

IGNITION SYSTEM

CIRCUIT DIAGRAM

(1) CDI magneto
(2) "CDI" control unit
(3) Battery
(4) Fuse 10A
(5) Coil
(6) Regulator
(7) Main switch

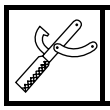


TROUBLESHOOTING

THE IGNITION SYSTEM FAILS TO OPERATE (NO SPARK OR INTERMITTENT SPARK)

Check
1. Fuse 10A
2. Battery
3. Spark plug
4. Spark
5. Spark plug cap resistance
6. H.T. coil resistance
7. Main switch
8. Charge coil resistance
9. Pick-up resistance
10. Ignition system connections

NOTE:
- For these operations use the following tools:



Dynamic spark tester: 90890-06754

Tester: 90890-03112

1. Fuse 10A
- Remove the fuse
- Connect Tester "Ω" to the fuse
- Check the fuse for continuity

See "FUSE INSPECTION 10A" page 3-36

NO CONTINUITY → Faulty fuse → Replace

CONTINUITY

2. Battery
- Check the battery conditions:
  Minimum voltage: 12.5 V
  Specific gravity: 1280 g/dm^3
  Electrolyte level

INCORRECT
- Clean the terminals
- Recharge or replace battery
- Refill with distilled water

CORRECT

3. Spark plug

- Check the spark plug conditions
- Check the spark plug type
- Check the electrolyte gap

See "SPARK PLUG INSPECTION" page 3-13

Electrode gap: 0.7 mm

Standard spark plug: NGK CR7HSA or DENSO U22 FSR-U

INCORRECT

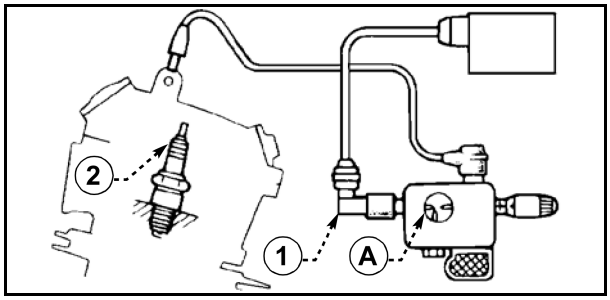
Faulty spark plug → Replace or adjust the electrolyte gap

CORRECT

4. Spark

- Disconnect the spark plug connector
- Connect spark dynamic tester (1)
- Spark plug (2)
- Turn the main switch to "ON"
- Check the electrolyte gap (A)
- Start the engine and increase the spark gap until the spark is eliminated.

Minimum gap: 6.0 mm



CORRECT

Operating ignition system

INCORRECT

5. Spark plug cap resistance

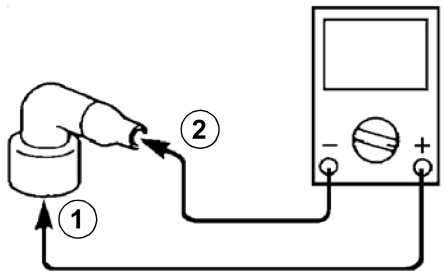
- Remove the spark plug cap

NOTE:
When removing cap "KΩ" do not pull the spark plug lead

- Connect Tester as shown in figure
  Removal → Turn counterclockwise
  Installation → Turn clockwise
- During connection, check the spark plug lead and, if necessary, replace it with a new one.

Cap resistance: 5 KΩ ± 20% at 20°C

Terminal (+) → Spark plug side (1)
Terminal (-) → Spark plug lead side (2)



INCORRECT

Faulty spark plug cap → Replace

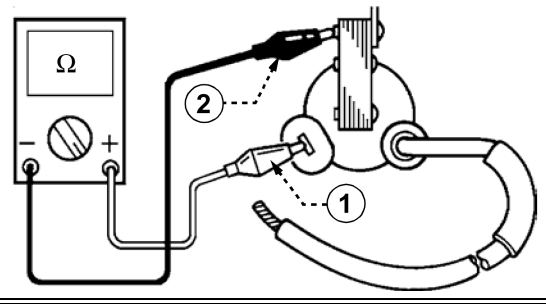
CORRECT

6. H.T. coil resistance

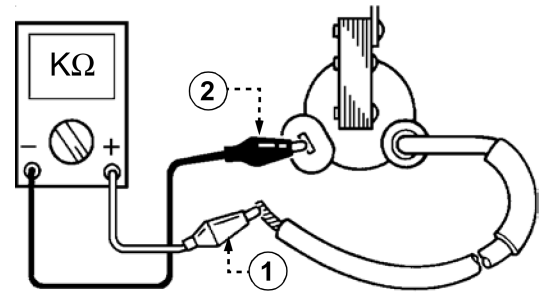
- Disconnect orange lead
- Connect Tester "Ω" to H.T. coil
- Check the primary coil resistance

Primary coil resistance:
0.3 Ω ± 10% at 20°C

Terminal (+) → Terminal (1)
Terminal (-) → Earthed (2)



Terminal (+) → Spark plug lead (1)
Terminal (-) → Terminal (2)



- Connect Tester "KΩ" to H.T. coil
- Check the secondary coil resistance

Secondary coil resistance:
3.16 KΩ ± 10% at 20°C

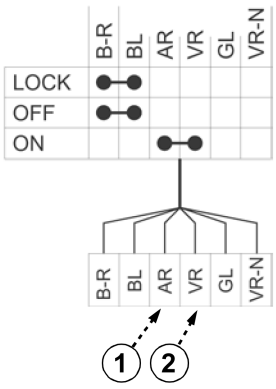
INCORRECT

Faulty ignition coil → Replace

CORRECT

7. Main switch

- Disconnect the main switch from the system
- Turn the main switch to "ON"
- Connect Tester "Ω" and check leads for continuity
  Orange (1) → Green (2)
  See "CHECKING THE SWITCHES" page 7-5



INCORRECT

Faulty main switch → Replace

CORRECT

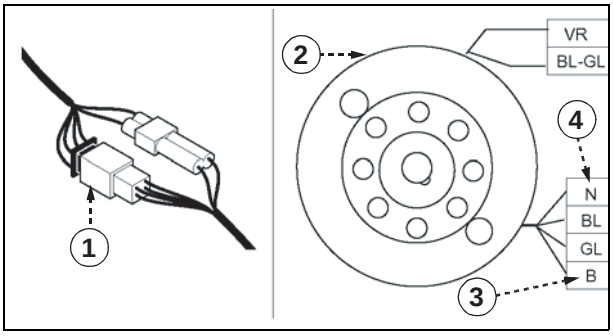
8. Charge coil resistance

- Disconnect four-way connector (1) of magneto flywheel (2)
- Connect Tester "Ω" to the connector as follows

Terminal (+) → White terminal (3)
Terminal (-) → Black terminal (4)

- Check the charge coil resistance

Charge coil resistance:
0.80 Ω ± 20% at 20°C



INCORRECT

Replace the stator assembly

CORRECT

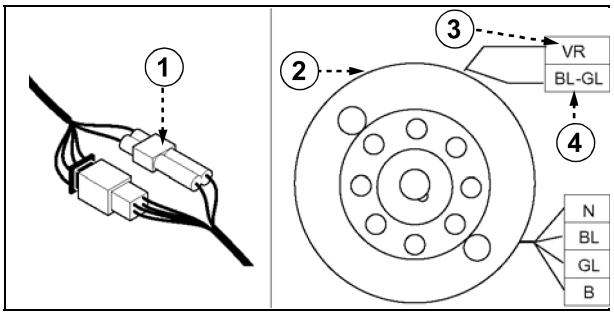
9. Pick-up resistance

- Disconnect two-way connector (1) of magneto flywheel (2)
- Connect Tester "Ω" to the connector as follows

Terminal (+) → Green terminal (3)
Terminal (-) → Blue-yellow terminal (4)

- Check the pick-up resistance

Pick-up resistance:
240 Ω ± 20% at 20°C



INCORRECT

Replace the stator assembly

CORRECT

10. Wiring connections

- Check the ignition system for connections See "CIRCUIT DIAGRAM" page 7-1

INCORRECT

Repair the system wiring

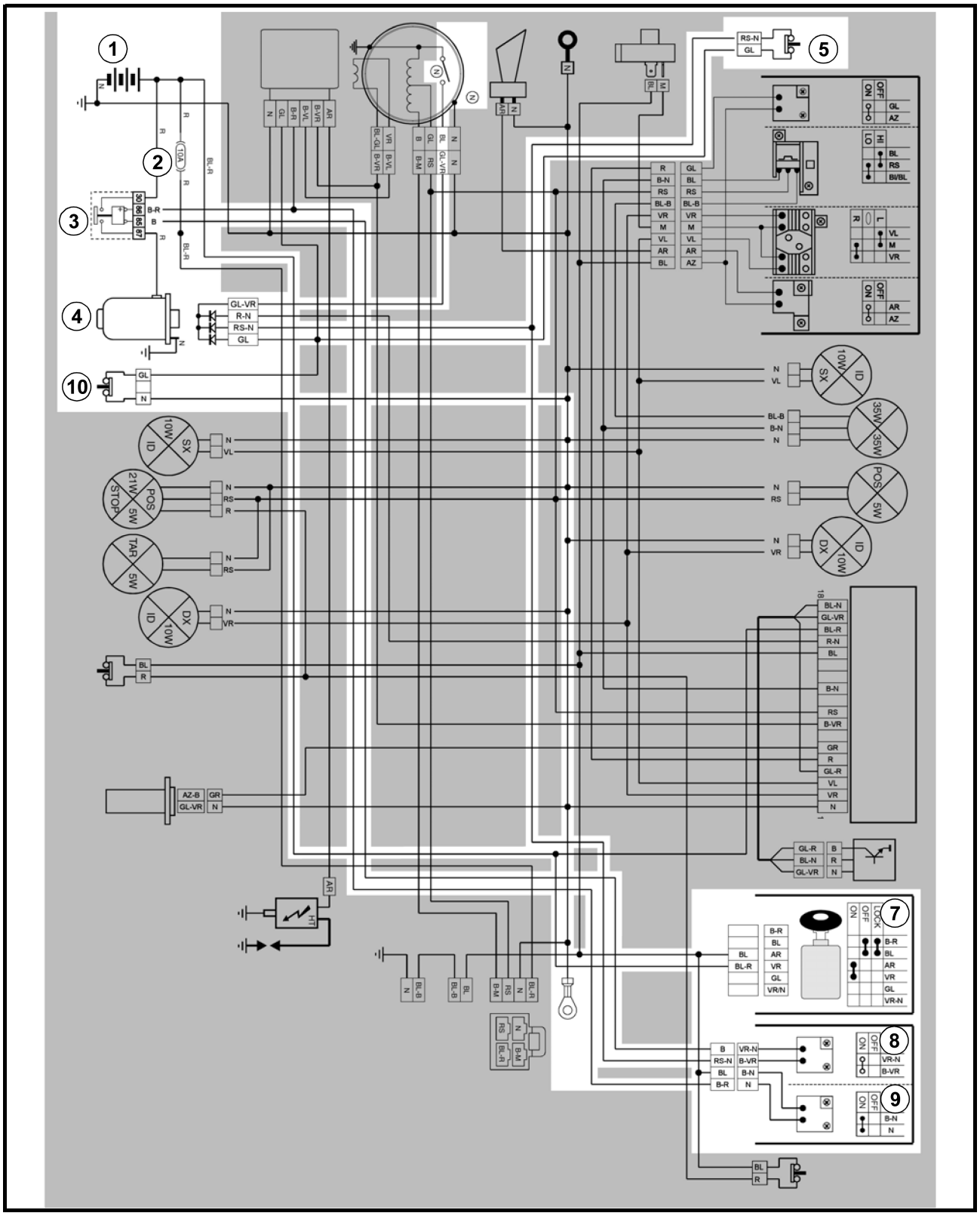
CORRECT

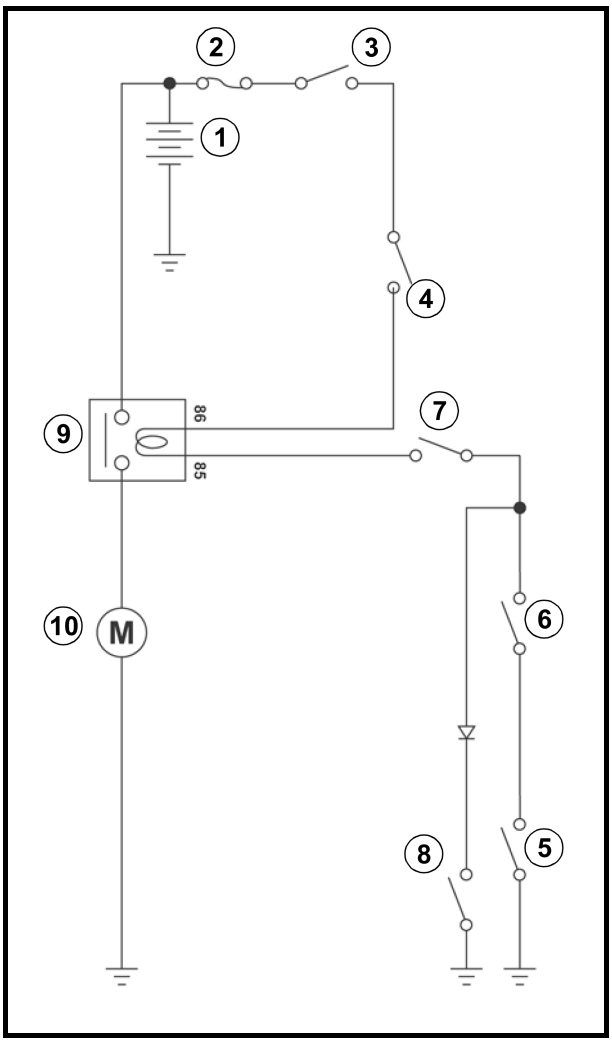
Replace the "CDI" control unit

ELECTRICAL STARTING SYSTEM

CIRCUIT DIAGRAM

(1) Battery
(2) Fuse 10A
(3) Starting relay
(4) Starter
(5) Clutch switch
(6) Neutral position switch
(7) Main switch
(8) Starting button
(9) “Engine stop” button
(10) Side stand switch





STARTING CIRCUIT OPERATION

When key commutator is in position “ON”, the “engine stop” button is in position “ON” and the starting button is pressed, the starter functions only if:

The shifting mechanism is idle, or the clutch lever is pulled and the side stand is lifted.

If the above mentioned conditions are not met, the starting relay cannot be energized.

(1) Battery
(2) Fuse 10A
(3) Main switch
(4) “Engine stop” button
(5) Side stand switch
(6) Clutch switch
(7) Starting button
(8) Neutral position switch
(9) Starting relay
(10) Starter

TROUBLESHOOTING

THE STARTER MOTOR FAILS TO OPERATE

Check
(1) Fuse 10A
(2) Battery
(3) Starter
(4) Starting relay
(5) Main switch
(6) Neutral position switch
(7) Clutch switch
(8) Starting button
(9) "Engine stop" button
(10) Side stand switch
(11) Wiring connections

NOTE:
• For these operations use the following tools:

Tester:
90890-03112

1. Fuse 10A
• Remove the fuse
• Connect Tester "Ω" to the fuse
• Check the fuse for continuity

NO CONTINUITY → Faulty fuse → Replace

CONTINUITY

2. Battery
• Check the battery conditions
See "BATTERY INSPECTION" page 3-35

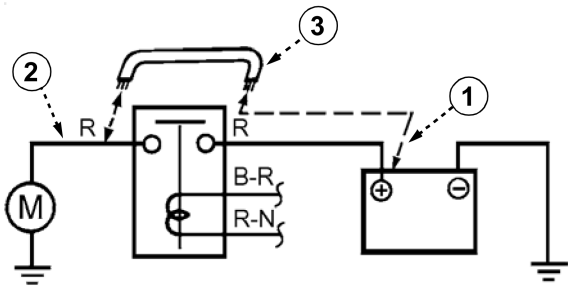
Minimum voltage: 12.5 V
Specific gravity: 1280 g/dm^3
Electrolyte level

INCORRECT →
• Clean the terminals
• Recharge or replace battery
• Refill with distilled water

CORRECT

3. Starter

- Connect battery positive terminal (1) and starter motor cable (2) using a jumper lead (3) as shown in figure.



- Check the starter motor for operation.

THE STARTER FAILS TO TURN →

Faulty starter motor → Repair or replace

THE STARTER TURNS ↓

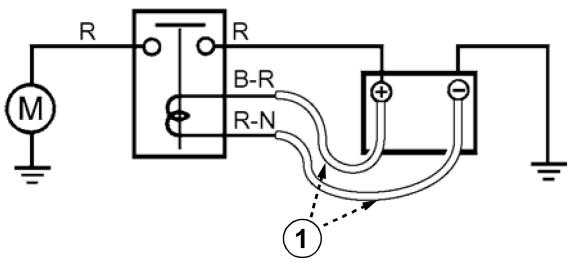
⚠ WARNING

A wire for the jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.

4. Starting relay

- Disconnect the starter relay
- Connect the battery to the starting relay with jumper leads (1)

Battery lead (+) → White-red lead
Battery lead (-) → Red-black lead



- Check the starter motor for operation.

THE STARTER FAILS TO TURN →

Faulty starter relay → Replace

THE STARTER TURNS ↓

CAUTION:

- **Take care not to reverse the battery connections because the diode will be damaged.**
- **Take care to avoid shorting the positive and negative terminals when connecting the battery to the relay.**

5. Main switch

- Disconnect the main switch
- Turn the main switch to "ON"
- Connect Tester "Ω" and check leads for continuity

Orange lead → Green lead
See "CHECKING THE SWITCHES" page 7-5

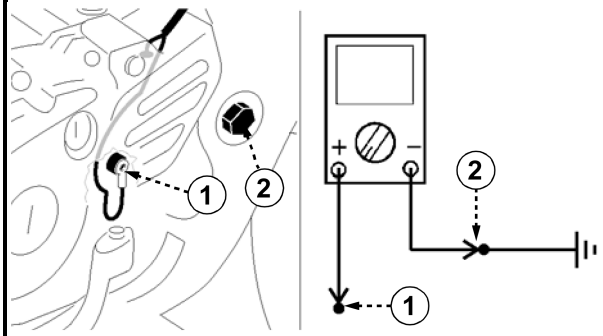
INCORRECT

Faulty main switch → Replace

CORRECT

6. Neutral position switch

- Connect Tester "Ω" and check the continuity between neutral switch (1) and chassis ground (2).
  Idle run → Continuity
  Engaged gear → No continuity



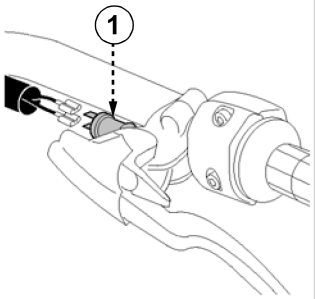
INCORRECT

Faulty neutral switch → Replace

CORRECT

7. Clutch switch

- Disconnect clutch switch (1)
- Connect Tester "Ω" and check the terminals for continuity.
  Terminal (T1) → Terminal (T2)
  See "CHECKING THE SWITCHES" page 7-5



	T.1	T.2
1		
2	O—O	

1 Clutch lever not pulled
2 Clutch lever pulled

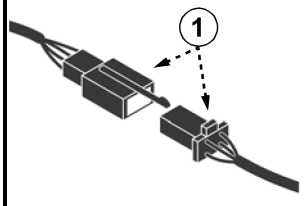
INCORRECT

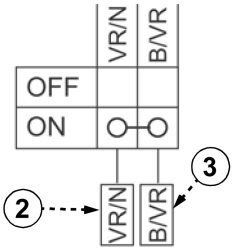
Faulty clutch switch → Replace

CORRECT

8. Starting button (start)

- Disconnect four-pin connector (1)
- Connect Tester "Ω" and check leads for continuity
  Green-black lead (2) → White-green lead (3)
  See "CHECKING THE CONNECTIONS" page 7-4





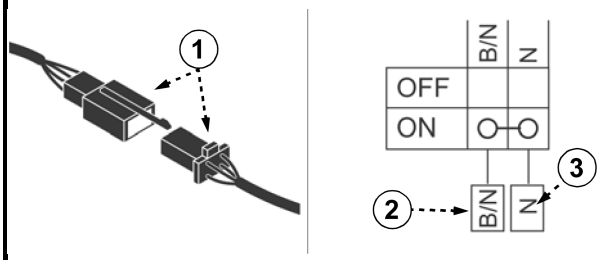
INCORRECT

Faulty starting switch → Replace

CORRECT

9. "Engine stop" button

- Disconnect four-pin connector (1)
- Connect Tester "Ω" and check leads for continuity
  White-black lead (2) → Black lead (3)
  See "CHECKING THE CONNECTIONS" page 7-4



INCORRECT

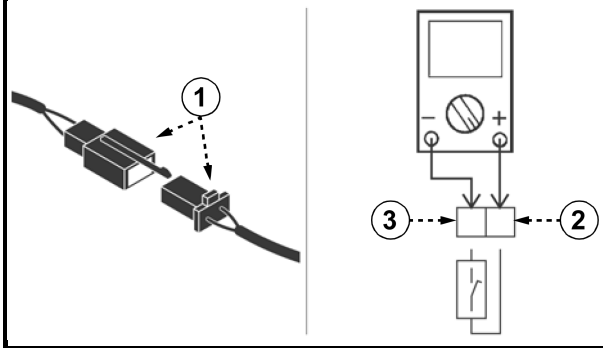
Faulty "engine stop" button → Replace

CORRECT

10. Side stand switch

- Disconnect two-pin connector (1) of the side stand
- Connect Tester "Ω" to the connector as follows

Terminal (+) → Terminal (2)
Terminal (-) → Terminal (3)



INCORRECT

Faulty side stand switch → Replace

CORRECT

11. Wiring connections

- Check the ignition system for connections
  See "CIRCUIT DIAGRAM" page 7-11

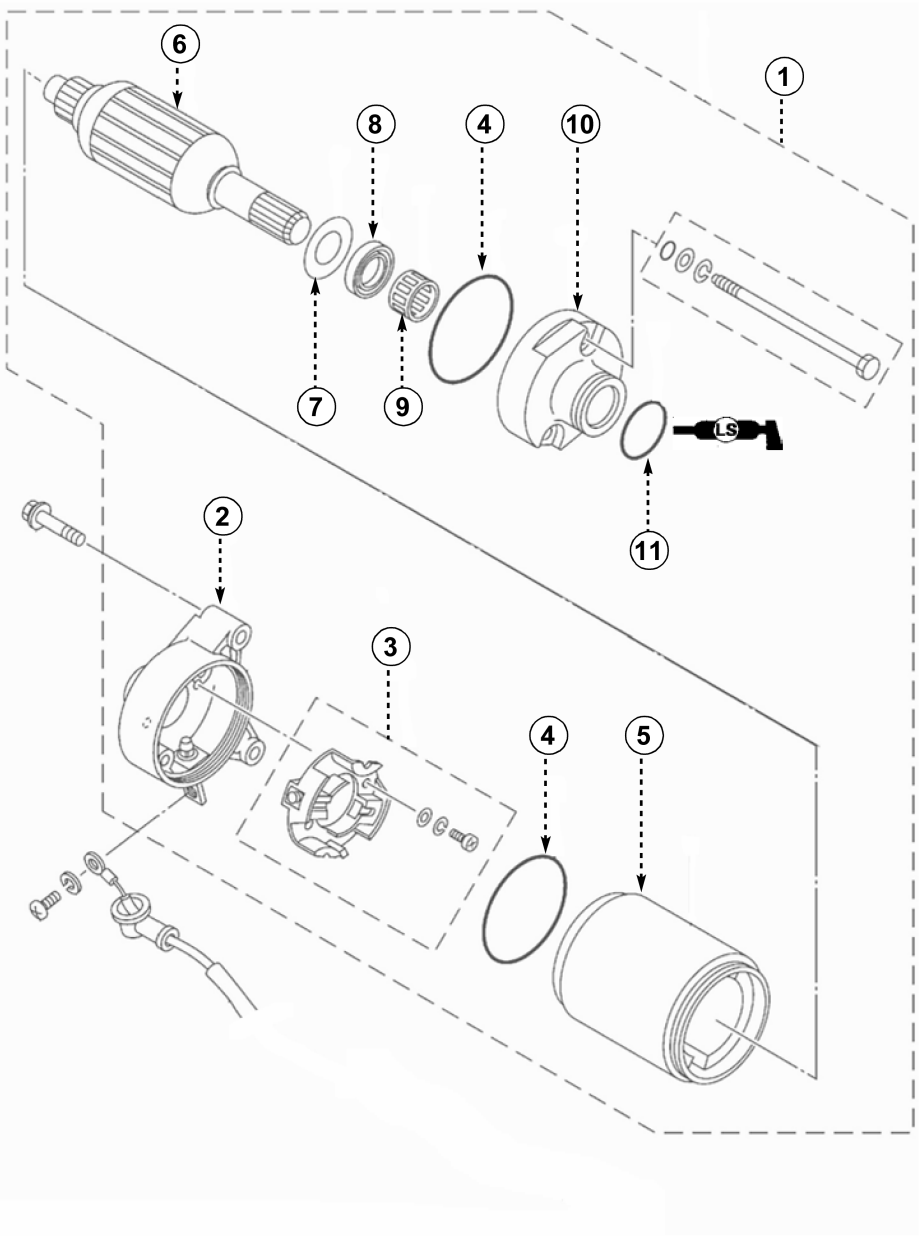
INCORRECT

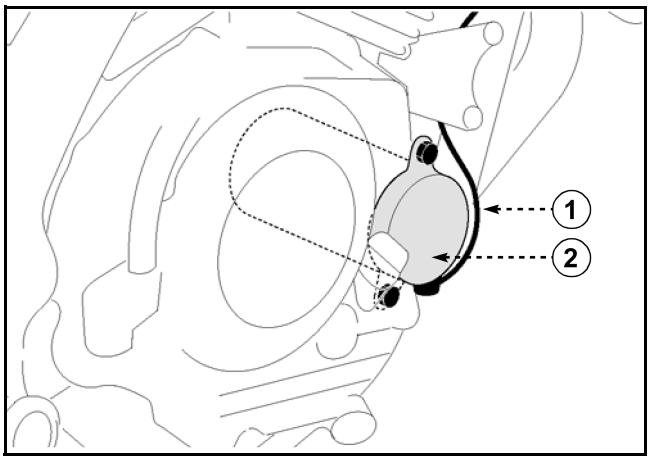
Restore or correct

LIST OF COMPONENTS

(1) Starter motor
(2) Rear stand
(3) Brush set
(4) O-Ring gasket
(5) Yoke
(6) Armature
(7) Shim
(8) Circlip
(9) Bearing
(10) Front bracket
(11) O-Ring gasket

A	**Brush length limit: 3.5 mm**
B	**Commutator wear limit: 21.0 mm**
C	**Mica undercut: 1.5 mm**
D	**Armature coil resistance: 0.017 ~ 0.021 Ω at 20°C**



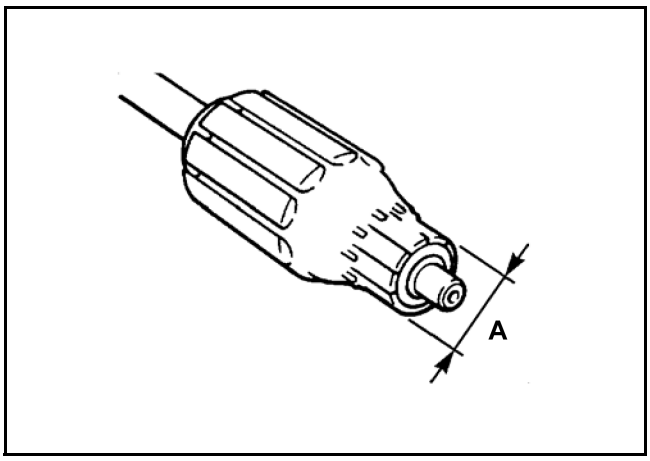


STARTER MOTOR REMOVAL

1. Remove
   - Starter motor lead (1)
   - Starter motor (2)

STARTER MOTOR DISASSEMBLY

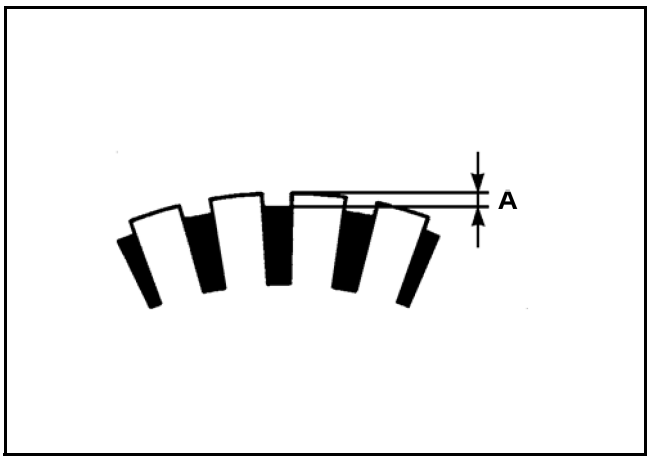
1. Put identifying marks on the brackets for reassembly as shown.
2. Remove
   - Front bracket
   - Lock washer
   - Rear stand
3. Remove
   - Yoke
   - Armature
4. Remove
   - Springs



INSPECTION AND REPAIR

1. Check
   - Commutator
     Dirt → Clean it with grit sandpaper N. 600
2. Measure
   - Commutator diameter (A)
     Out of specification → Replace starter motor

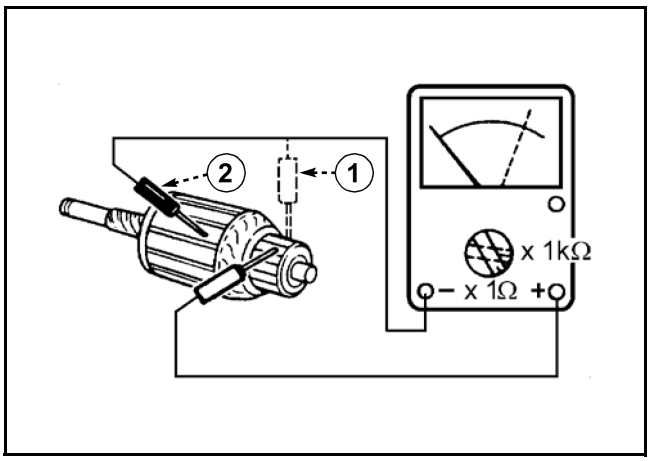
Commutator wear limit:
21 mm



3. Measure
   - Mica undercut (a)
     Out of specification → Scrape the mica to proper value by using a hacksaw blade

	Mica undercut: **1.5 mm**

NOTE:
The mica insulation of the commutator must be undercut to ensure the proper operation of the commutator.



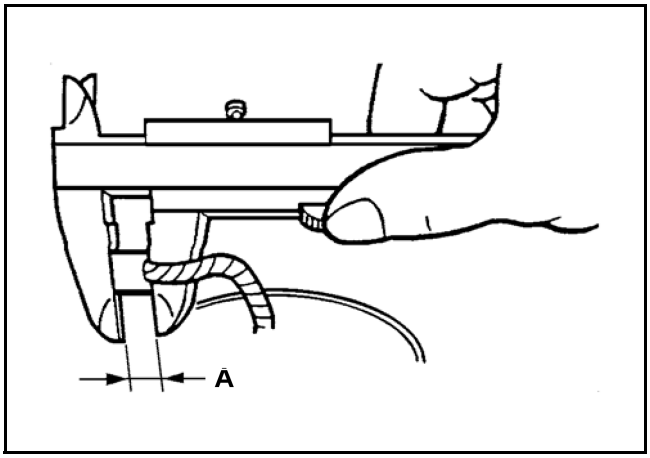
4. Check
   - Armature coil (insulation/continuity)
     Defects → Replace starter motor

****

Checking steps
- Connect the Tester, as shown in the figure, for continuity check (1) and insulation check (2).
- Measure the armature resistance
- If the resistance is not correct, replace the starter motor.

	Measure the armature coil: **Continuity check (1)** **0.017 ~ 0.021 W at 20°C** **Insulation check (2)** **More than 1 M W at 20°C**

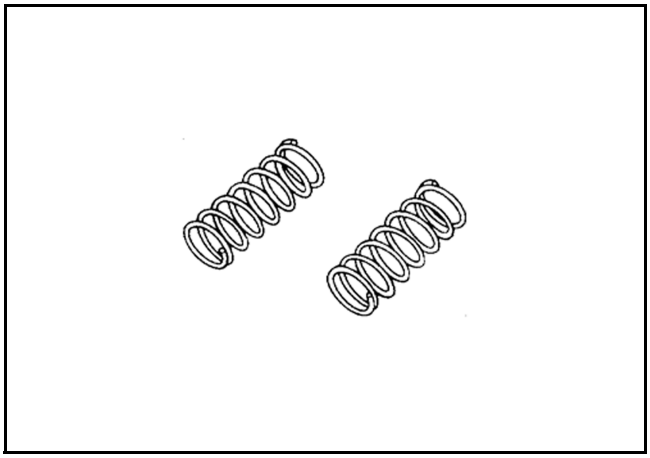
****



5. Measure
   - Brush length (A)
     Out of specification → Replace the assembly

	Brush length limit: **3.5 mm**

NOTE:
When replacing the brushes make sure that the brush side is correct.



6. Measure
   - Brush spring force
     Out of specification → Replace the assembly

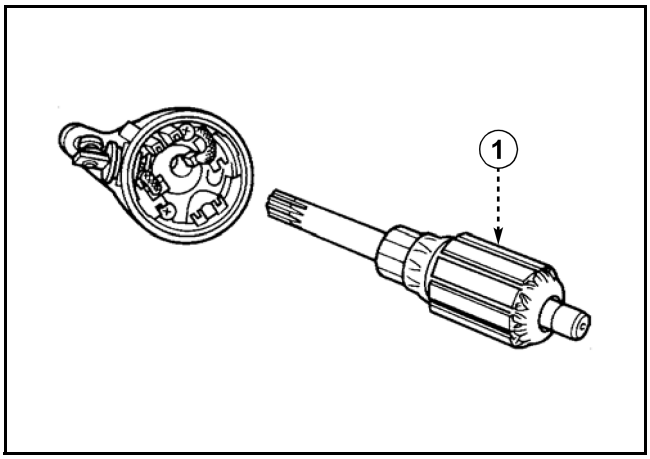
Spring force:
560 ~ 840 g

7. Check
   - Circlip
   - Bearing
   - Bush
     Defects → Replace the bracket
   - O-Ring gasket
     Wear and damage → Replace

STARTER MOTOR ASSEMBLY

1. Install
   - Spring
   - Brushes

NOTE:
When installing the brush, pass the brush lead outside the projection on the brush spring holder.
Install the brush lead terminal to touch lightly the projection on the side of brush spring holder.



2. Install
   - Armature (1)

NOTE:
When installing the armature, press the brushes with a thin screwdriver to avoid damage.

3. Install
   - O-Ring gasket

⚠ WARNING
Always use new O-Rings.

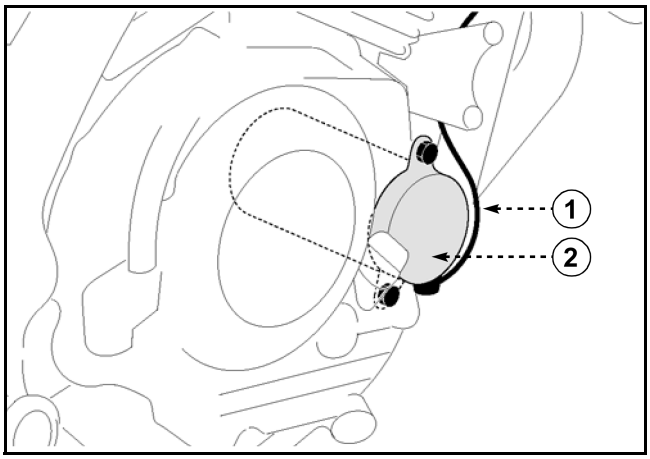
4. Install
   - Yoke

NOTE:
Align the match mark on the yoke with the match mark on the rear bracket.

5. Install
   - Lock washer
   - Shim
   - Front bracket

NOTE:
- Align the projection of the washer with the slot of the front bracket and install it.
- Align the match marks on the yoke with the match marks on the brackets.

	Bolt: **0.5 Kgf·m (5 N·m)**



STARTER MOTOR ASSEMBLY

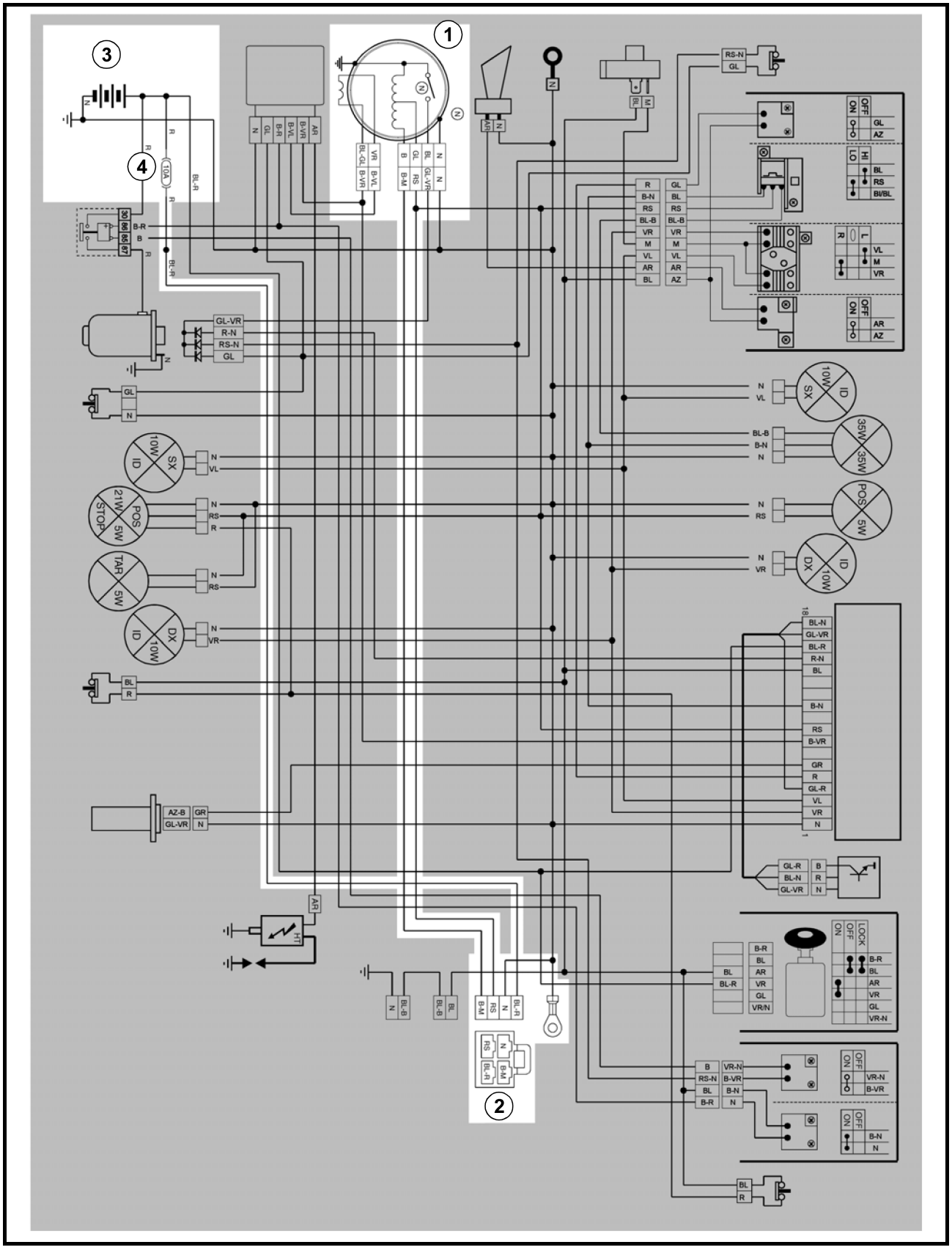
1. Install
   - Starter motor (2)
   - Starter motor lead (1)

	Starter motor bolt: **0.7 Kgf·m (7 N·m)**

CHARGING SYSTEM

CIRCUIT DIAGRAM

(1) CDI magneto
(2) Regulator
(3) Battery
(4) Fuse 10A

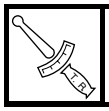


TROUBLESHOOTING

IF THE BATTERY IS NOT CHARGED

Check
(1) Fuse 10A
(2) Battery
(3) Charging voltage
(4) Charge coil resistance
(5) Charging system wiring

NOTE:
• For these operations use the following tools:



Engine tachometer
90890-03113

Tester:
90890-03112

1. Fuse 10A
• Remove the fuse
• Connect Tester "Ω" to the fuse
• Check the fuse for continuity
See "FUSE INSPECTION 10A" page 3-36

NO CONTINUITY → Faulty fuse → Replace

CONTINUITY

2. Battery
• Check the battery conditions
See "BATTERY INSPECTION" page 3-35

Minimum voltage: 12.5 V
Specific gravity: 1280 g/dm^3
Electrolyte level

INCORRECT

• Clean the terminals
• Recharge or replace battery
• Refill with distilled water

CORRECT

3. Charging voltage

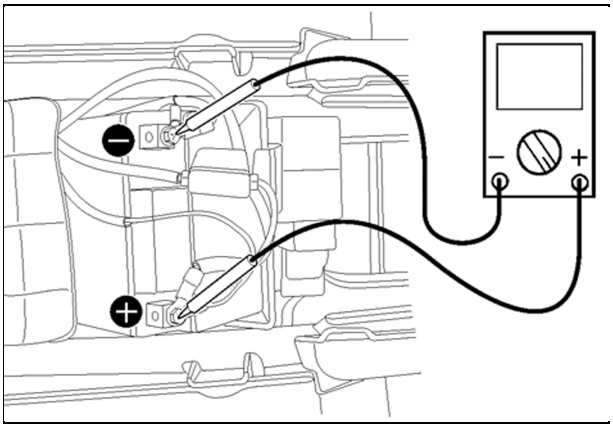
- Connect the engine tachometer to the spark plug lead.
- Connect Tester DC 20V to the battery.

Terminal (+) → Battery terminal (+)
Terminal (-) → Battery terminal (+)

- Measure the battery voltage
- Start the engine and accelerate to 5000 rpm.
- Check the battery voltage.

Charging voltage:
12.5 ~ 14.5 V

NOTE:
Use a fully charged battery.



CORRECT

The charging circuit operates properly

INCORRECT

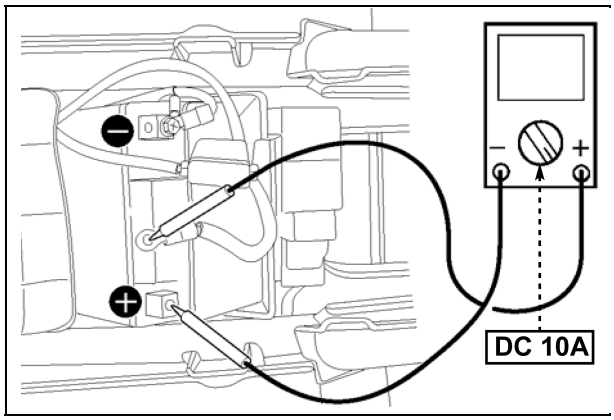
3.1. Current consumption check

- Disconnect red lead from pole + of the battery
- Do not disconnect the black lead from pole - of the battery
- Connect Tester DC 10A to pole + of the battery and to red lead

Terminal (+) → Battery red lead
Terminal (-) → Battery terminal (+)

- When the main switch is in position “OFF” the measured value must correspond to “0”
- If current consumption is detected, it will be necessary to find the cause and to repair wiring.

- Start the engine and accelerate to 3500 rpm. If the charging current is above zero “0”, the charging system is normal.



⚠ WARNING

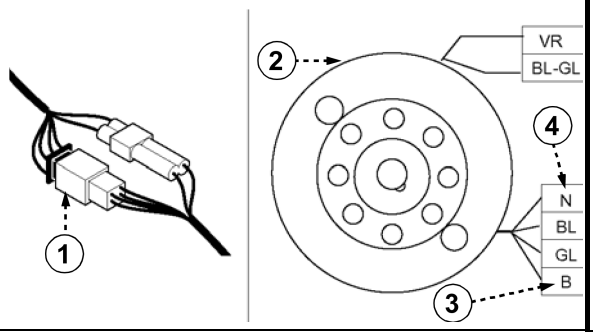
Make sure that the (+) lead is in contact with the (+) terminal of the battery during start up of machine or demage to the tester will occur.

INCORRECT

4. Charge coil resistance

- Disconnect four-way connector (1) of magneto flywheel (2)
- Connect Tester "Ω" to the connector as follows

Terminal (+) → White lead terminal (3)
Terminal (-) → Black lead terminal (4)



- Measure the charge coil resistance

Charge coil resistance:
0.80 Ω ± 20% at 20°C

INCORRECT

Replace the yoke

CORRECT

5. Charging system wiring

- Check the charging system wiring

See "CIRCUIT DIAGRAM" page 7-23

INCORRECT

Repair the system wiring

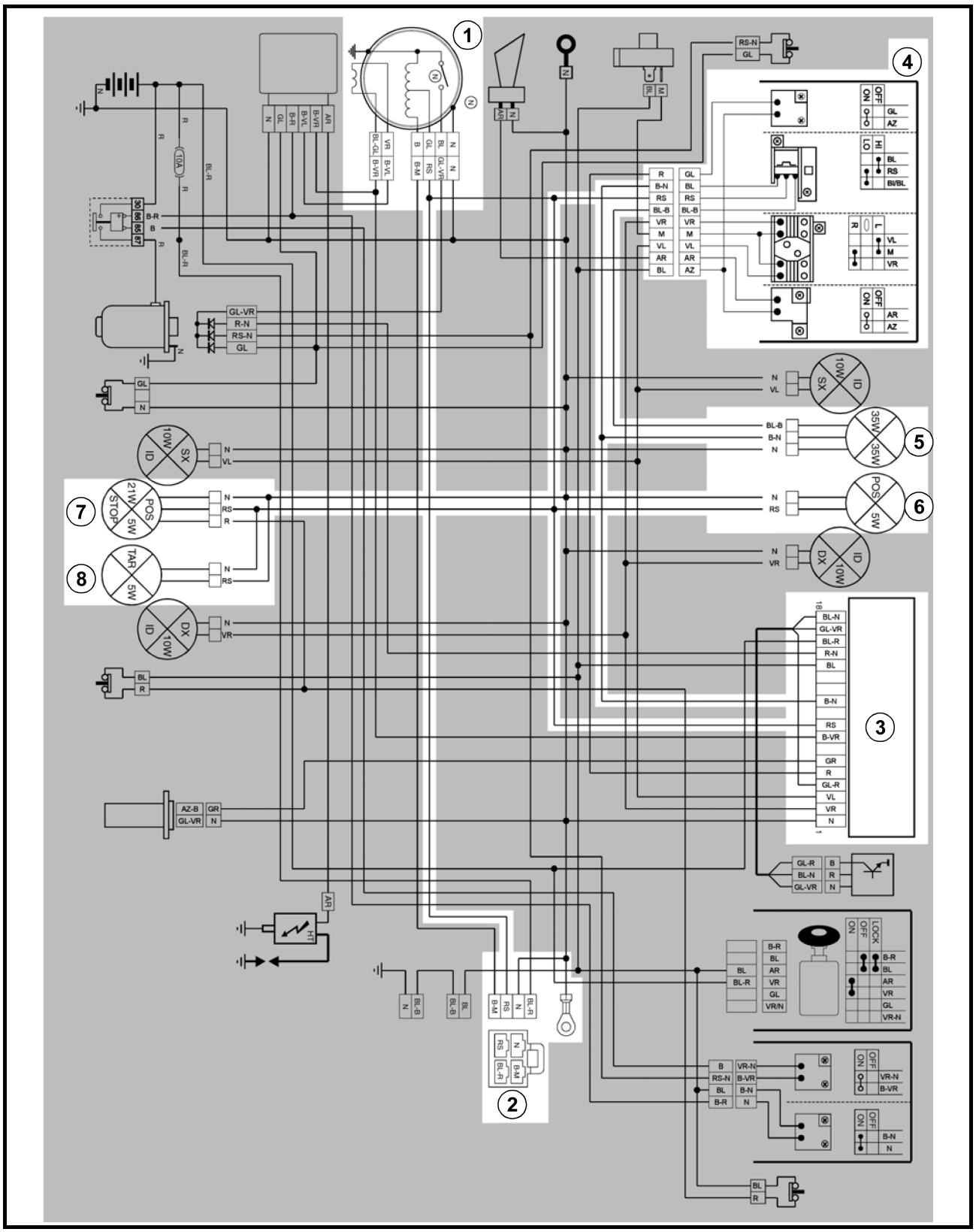
CORRECT

Replace the voltage regulator

LIGHTING SYSTEM

CIRCUIT DIAGRAM

(1) CDI magneto
(2) Regulator
(3) Meter assembly
(4) Left control unit
(5) High and low beam indicator light
(6) Side light
(7) Tail brake and stop light
(8) Licence light



TROUBLESHOOTING

THE HEADLIGHT, THE HIGH BEAM INDICATOR LIGHT, THE TAILLIGHT AND/OR THE METER ASSEMBLY LIGHTS FAIL TO COME ON

Check
(1) Lighting coil resistance
(2) Pink lead continuity
(3) Light switch (left control)
(4) Lighting system wiring

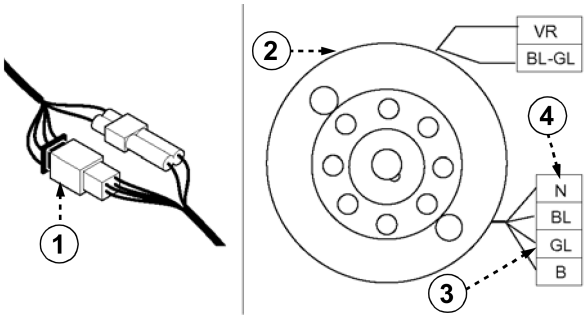
NOTE:
• For these operations use the following tools:

	Tester: **90890-03112**

1. Lighting coil resistance

• Disconnect four-way connector (1) of magneto flywheel (2)
• Connect Tester "Ω" to the connector as follows

Terminal (+) → Yellow lead terminal (3)
Terminal (-) → Black lead terminal (4)

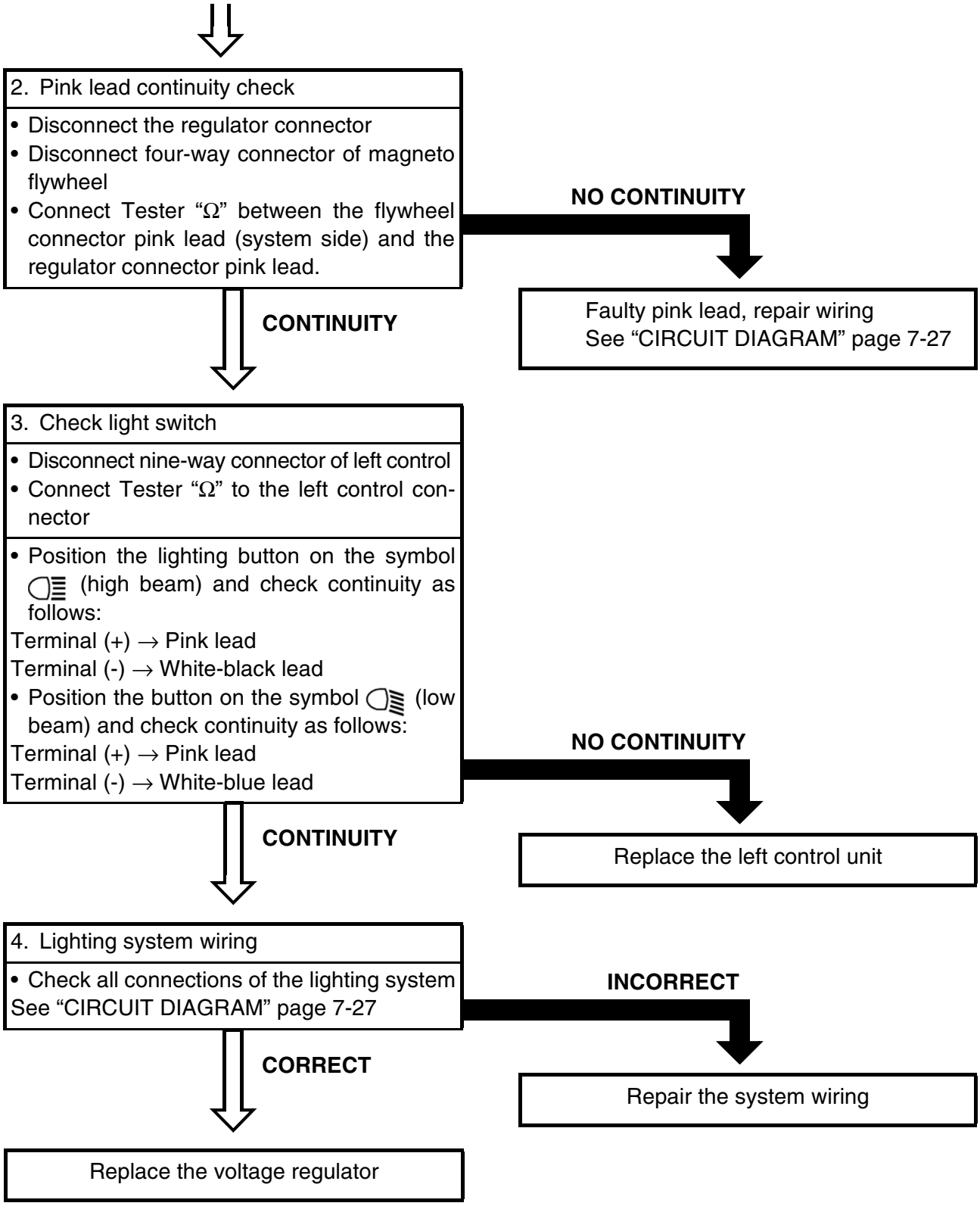


• Measure the lighting coil resistance

Lighting coil resistance:
0.6 Ω ± 20% at 20°C

INCORRECT → Replace the yoke

CORRECT


2. Pink lead continuity check
• Disconnect the regulator connector
• Disconnect four-way connector of magneto flywheel
• Connect Tester "Ω" between the flywheel connector pink lead (system side) and the regulator connector pink lead.
NO CONTINUITY
Faulty pink lead, repair wiring
See "CIRCUIT DIAGRAM" page 7-27
CONTINUITY
3. Check light switch
• Disconnect nine-way connector of left control
• Connect Tester "Ω" to the left control connector
• Position the lighting button on the symbol (high beam) and check continuity as follows:
Terminal (+) → Pink lead
Terminal (-) → White-black lead
• Position the button on the symbol (low beam) and check continuity as follows:
Terminal (+) → Pink lead
Terminal (-) → White-blue lead
NO CONTINUITY
Replace the left control unit
CONTINUITY
4. Lighting system wiring
• Check all connections of the lighting system
See "CIRCUIT DIAGRAM" page 7-27
INCORRECT
Repair the system wiring
CORRECT
Replace the voltage regulator

LIGHTING SYSTEM

LIGHTING SYSTEM CHECK

THE LOW/HIGH BEAM INDICATOR LIGHT AND THEIR PILOT LIGHTS FAIL TO COME ON

1. Bulb and bulb socket
- Check the bulb and bulb socket for continuity

NO CONTINUITY

Replace bulb or bulb socket

CONTINUITY

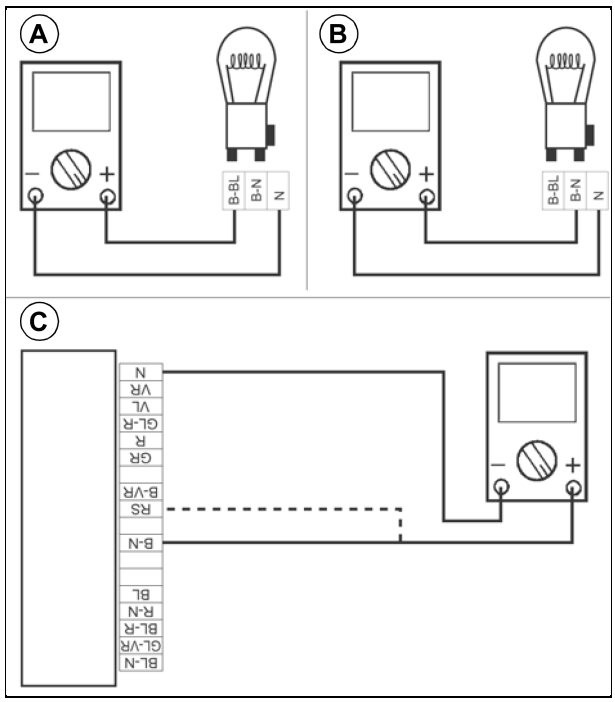
2. Checking the light holder and meter assembly voltage
- Connect Tester AC 20V to the headlight and meter assembly connector

(A) Checking the low beam indicator light
Terminal (+) → Blue-white lead
Terminal (-) → Black lead

(B) Checking the high beam indicator light
Terminal (+) → White-black lead
Terminal (-) → Black lead

(C) Checking the high beam indicator light and pilot light
Terminal (+) → White-black lead (pin 11)
Terminal (+) → Pink lead (pin 9)
Terminal (-) → Black lead (pin 1)

- Start the engine and press the button to activate the high and low beam indicator lights.
- The voltage measured during checks A-B-C must correspond to 12.5V



INCORRECT

Repair the connections of the front headlight and the meter assembly light
See “CIRCUIT DIAGRAM” page 7-27

CORRECT

The circuit is not faulty

THE TAILLIGHT FAILS TO COME ON

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity

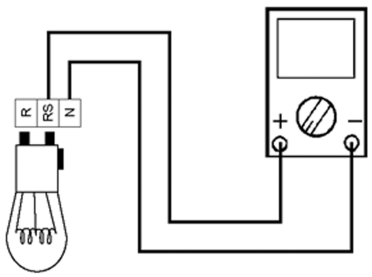
NO CONTINUITY → Replace bulb or bulb socket

CONTINUITY ↓

2. Checking the light holder voltage

- Connect Tester AC 20V to the bulb socket terminals

Terminal (+) → Pink lead terminal
Terminal (-) → Black lead terminal



INCORRECT → Repair connections between regulator, left control and taillight connector
See “CIRCUIT DIAGRAM” page 7-27

- Start the engine.
- The measured voltage must be 12.5V

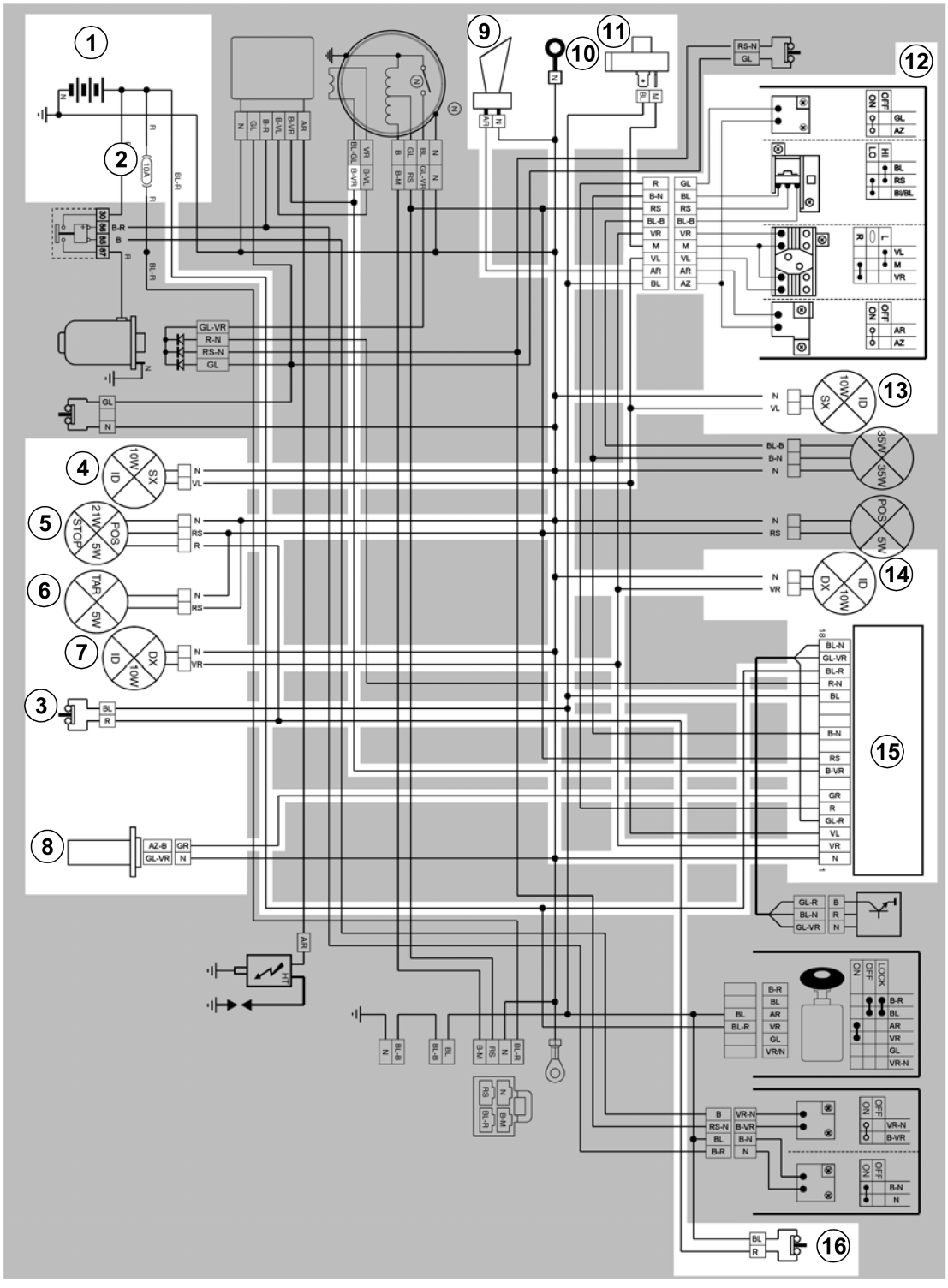
CORRECT ↓

The circuit is not faulty

SIGNAL SYSTEM

CIRCUIT DIAGRAM

(1) Battery
(2) Fuse 10A
(3) Rear stop switch
(4) Left front flasher light
(5) Tail brake and stop light
(6) Licence light
(7) Right front flasher light
(8) Fuel reserve sensor
(9) Horn
(10) Chassis ground
(11) Turn signal relay
(12) Left hand switch
(13) Left rear flasher light
(14) Right rear flasher light
(15) Meter assembly
(16) Front stop switch



TROUBLESHOOTING

THE FLASHER LIGHTS, THE STOP LIGHT, THE IDLING AND FUEL LIGHT FAIL TO COME ON, THE TACHOMETER AND THE HORN ARE FAULTY

Check
(1) Fuse 10A
(2) Battery
(3) Main switch
(4) Signal system wiring

NOTE:
• For these operations use the following tools:

Tester:
90890-03112

1. Fuse 10A

• Remove the fuse
• Connect Tester "Ω" to the fuse
• Check the fuse for continuity
See "FUSE INSPECTION 10A" page 3-36

NO CONTINUITY → Faulty fuse → Replace

CONTINUITY

2. Battery

Check the battery conditions
See "BATTERY INSPECTION" page 3-35

Minimum voltage: 12.5 V
Specific gravity: 1280 g/dm^3
Electrolyte level

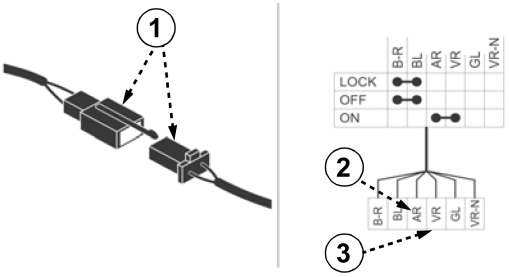
INCORRECT →
• Clean the terminals
• Recharge or replace battery
• Refill with distilled water

CORRECT

3. Main switch

- Disconnect connector (1) of the main switch
- Turn the main switch to “ON”
- Connect Tester “Ω” and check the continuity as follows:

Terminal (+) → Orange lead (2)
Terminal (-) → Green lead (3)
See “CHECKING THE CONNECTIONS” page 7-4



INCORRECT

Faulty main switch → Replace

CORRECT

4. Check wiring

- Check the signal system wiring

See “CIRCUIT DIAGRAM” page 7-32

INCORRECT

Repair the system wiring

CORRECT

- Check the conditions of all signal system circuits

See “CHECKING THE SIGNAL SYSTEM” page 7-35

CHECKING THE SIGNAL SYSTEM

THE HORN DOES NOT SOUND

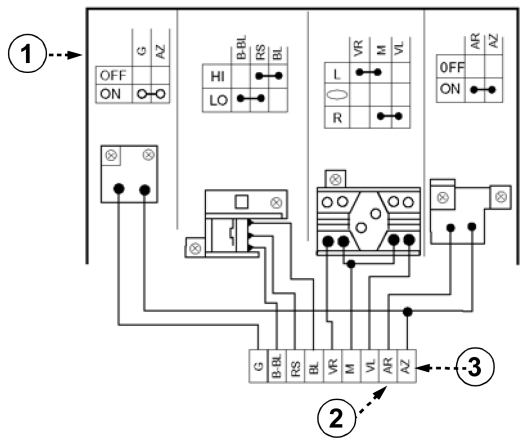
1. Horn switch

- Disconnect nine-way connector of left hand switch assembly (1)
- Connect Tester "Ω" to the connector
- Press the button (Horn) to activate the horn
- Check the continuity between the leads

Terminal (+) → Orange lead (2)
Terminal (-) → Light blue lead (3)

Button pressed → Continuity
Button not pressed → No continuity

See "CHECKING THE CONNECTIONS" page 7-4



INCORRECT

Horn switch faulty → Replace the left control unit

CORRECT

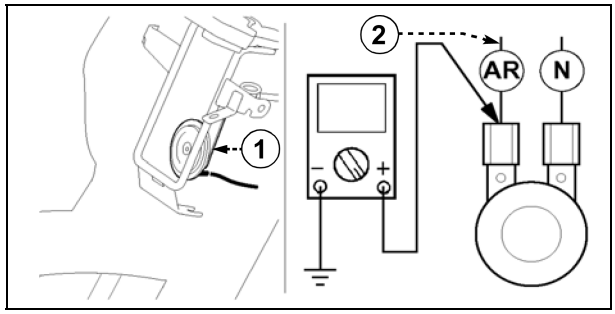
2. Voltage check

- Connect Tester DC 20V to horn lead (1)

Terminal (+) → Orange lead (2)
Terminal (-) → Chassis ground

- Turn the main switch to "ON"
- Press the button (Horn) to activate the horn

- The measured voltage must be 12.5V



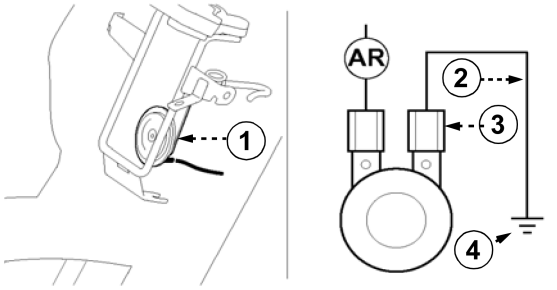
INCORRECT

Repair the connection of the horn power supply circuit.
See "CIRCUIT DIAGRAM" page 7-32

CORRECT

3. Ground check

- Disconnect the black lead from the terminal of horn (1)
- Connect jumper lead (2) between terminal (3) and chassis ground (4)
- Turn the main switch to “ON”
- Press the button (Horn) to activate the horn



THE HORN SOUNDS

Repair the connection between the black lead and the chassis ground
See “CIRCUIT DIAGRAM” page 7-32

THE HORN DOES NOT SOUND

Faulty horn → Replace

THE STOP LIGHT FAILS TO COME ON

1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity

NO CONTINUITY

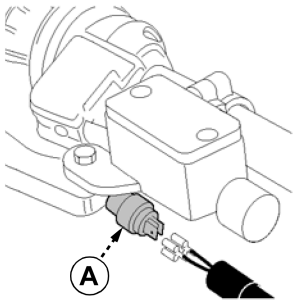
Replace bulb or bulb socket

CONTINUITY

2. Front and rear brake switch

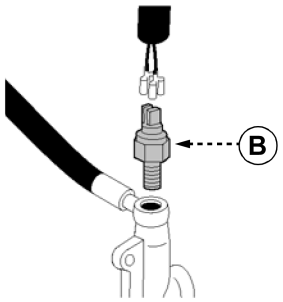
- Disconnect the switch leads
- Connect Tester "Ω" to terminals (T1-T2)
- Check the terminals for continuity

See "CHECKING THE SWITCHES" page 7-5



	T.1	T.2
1	○—○	
2		

1- Front brake lever pulled
2- Front brake lever not pulled



	T.1	T.2
1	○—○	
2		

1- Rear brake pedal pressed
2- Rear brake pedal not pressed

(A) Front brake switch
(B) Rear brake switch

INCORRECT

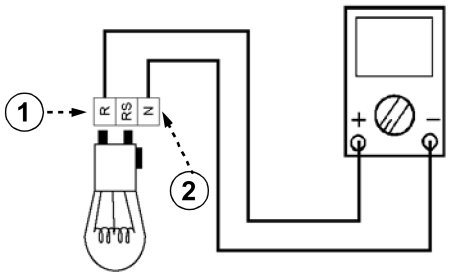
Faulty brake switch → Replace

CORRECT

3. Voltage check

- Connect Tester DC 20V to the bulb socket connector

Terminal (+) → Red lead (1)
Terminal (-) → Black lead (2)



- Turn the main switch to “ON”
- Pull the brake lever or depress the brake pedal
- The measured voltage in both cases must be 12.5V

INCORRECT

Faulty read lead, repair wiring
See “CIRCUIT DIAGRAM” page 7-32

CORRECT

The circuit is not faulty

THE FLASHER LIGHTS AND/OR THE FLASHER LIGHT PILOT LIGHTS FAIL TO COME ON

1. Bulb and bulb socket
- Check the bulb and bulb socket for continuity

NO CONTINUITY

Replace bulb or bulb socket

CONTINUITY

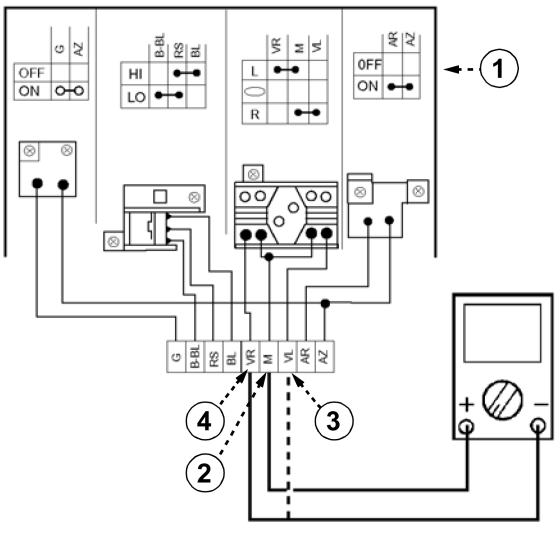
2. Turn signal switch
- Disconnect nine-way connector of left hand switch assembly (1)
- Connect Tester "Ω" to the leads
- Press the switch to activate the right turn signal lights

Terminal (+) → Brown lead (2)
Terminal (-) → Green lead (4)

- Press the switch to activate the left turn signal lights

Terminal (+) → Brown lead (2)
Terminal (-) → Purple lead (3)

- There must be continuity in both cases



INCORRECT

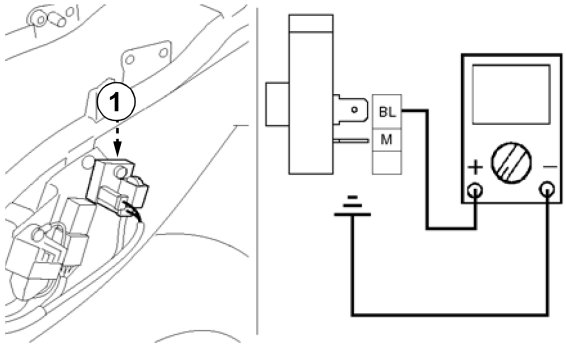
Faulty flasher light switch → Replace the left control unit

CORRECT

3. Turn signal relay voltage check

- Disconnect connector of turn signal relay (1)
- Connect Tester DC 20V to the leads

Terminal (+) → Blue lead
Terminal (-) → Chassis ground lead



- Turn the main switch to “ON”
- The measured voltage must be 12V

INCORRECT

Faulty blue lead between main switch and turn signal relay. Repair wiring
See “CIRCUIT DIAGRAM” page 7-32

CORRECT

4. Check the brown lead for continuity

- Disconnect connector of turn signal relay
- Disconnect connector of the left hand switch
- Connect Tester “Ω” to the terminals
- Check the brown lead for continuity

NO CONTINUITY

Faulty brown lead between turn signal relay and left hand switch. Repair wiring.
See “CIRCUIT DIAGRAM” page 7-32

CONTINUITY

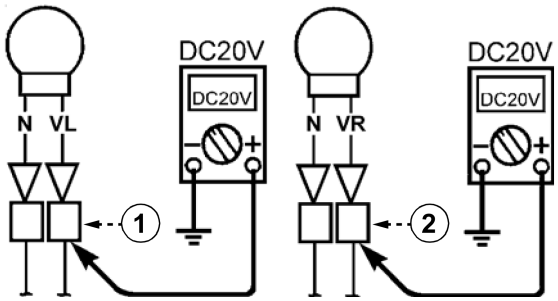
Faulty turn signal relay → Replace

5. Check voltage of right and left light holder

- Connect Tester DC 20V to the bulb socket connector

(A) Left flasher light
Terminal (+) → Purple lead (1)
Terminal (-) → Chassis ground lead

(B) Right flasher light
Terminal (+) → Green lead (2)
Terminal (-) → Chassis ground lead



- Turn the main switch to "ON"
- (A) Use the switch to activate the left flasher lights
- (B) Use the switch to activate the right flasher lights
- The measured voltage in both cases must be 12.5V

INCORRECT

Faulty lead between the flasher light switch and the bulb socket connector. Repair wiring
See "CIRCUIT DIAGRAM" page 7-32

CORRECT

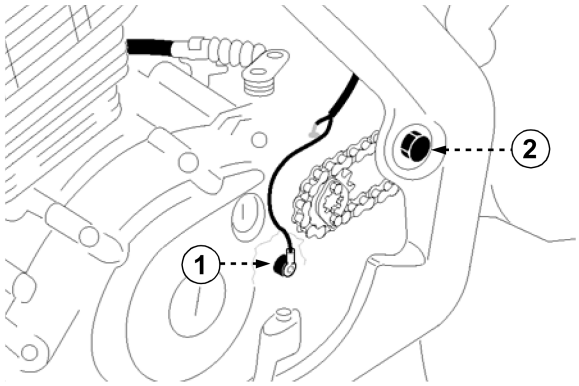
The circuit is not faulty

THE NEUTRAL SWITCH FAILS TO COME ON

1. Neutral switch check

- Connect Tester "Ω" and check the continuity between the neutral switch and the ground

Neutral switch (1) → Chassis ground (2)
Idle run → Continuity
Engaged gear → No continuity



INCORRECT

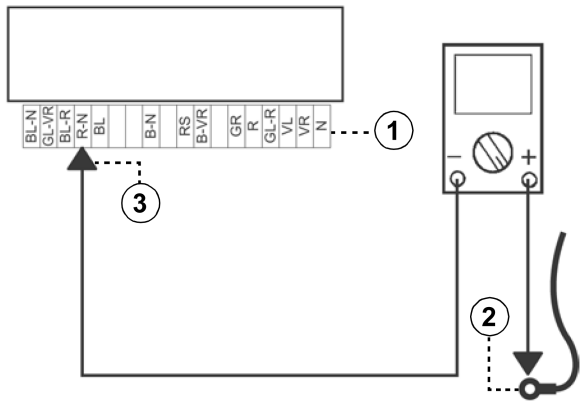
Faulty neutral switch → Replace

CORRECT

2. Meter assembly check

- Disconnect connector of meter assembly (1)
- Disconnect cable terminal (2) of neutral switch
- Connect Tester "Ω" as follows:

Terminal (+) → Blue lead cable terminal (2)
Terminal (-) → Red-black lead (3)



NO CONTINUITY

Faulty lead between neutral switch and meter assembly connector. Repair wiring
See "CIRCUIT DIAGRAM" page 7-32

CONTINUITY

Replace the meter assembly

⚠ WARNING

After disassembling the cable terminal, check that the neutral switch is tightened properly.

WHEN THE "MODE" BUTTON IS PRESSED, THE DISPLAY DOES NOT CHANGE FUNCTION

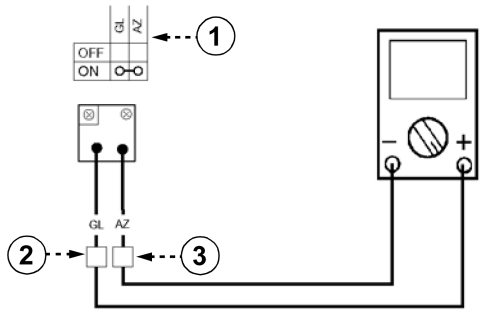
1. "Mode" button check

- Disconnect nine-way connector of left hand switch (1)
- Connect Tester "Ω" as follows

Terminal (+) → Yellow lead (2)
Terminal (-) → Light blue lead (3)

- Press the "Mode" button
- Check continuity

See "CHECKING THE CONNECTIONS" page 7-4



NO CONTINUITY

Faulty "Mode" button → Replace the left control unit

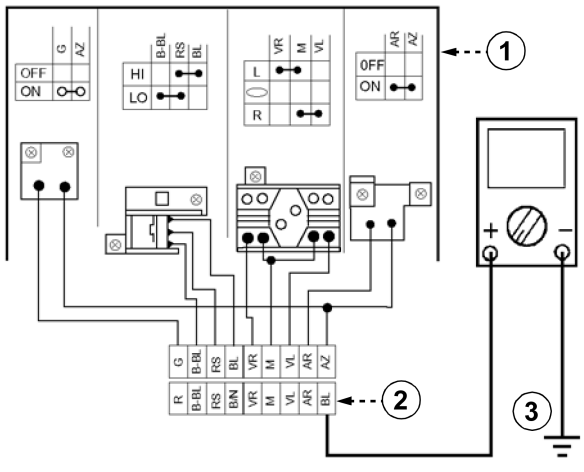
CONTINUITY

2. Power supply check

- Disconnect nine-way connector of left hand switch (1)
- Connect Tester DC 20V to the connector (system side) as follows

Terminal (+) → Blue lead (2)
Terminal (-) → Chassis ground (3)

- Turn the main switch to "ON"
- The measured voltage must be 12.5V



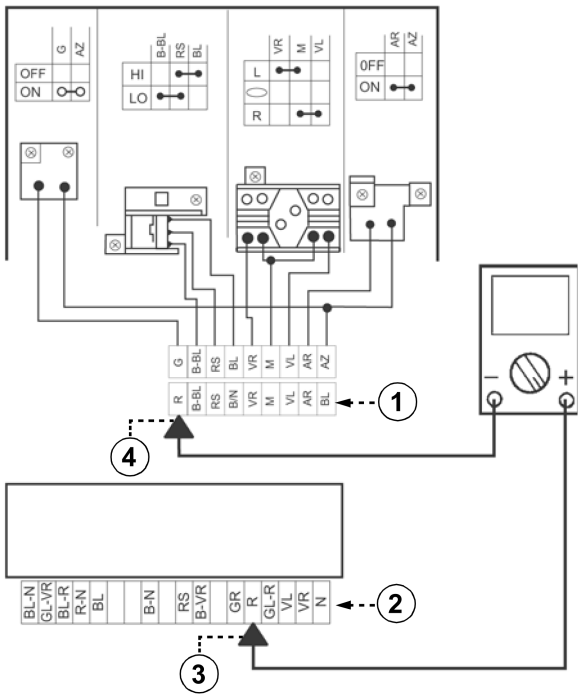
INCORRECT

"Mode" button not powered; the blue lead is faulty. Repair wiring
See "CIRCUIT DIAGRAM" page 7-32

CORRECT

3. Check the red lead for continuity

• Connect Tester "Ω" as follows
Terminal (+) → Red lead (3)
Terminal (-) → Red lead (4)
• Check the red lead for continuity between left control unit connector (1) and meter assembly connector (2)



NO CONTINUITY

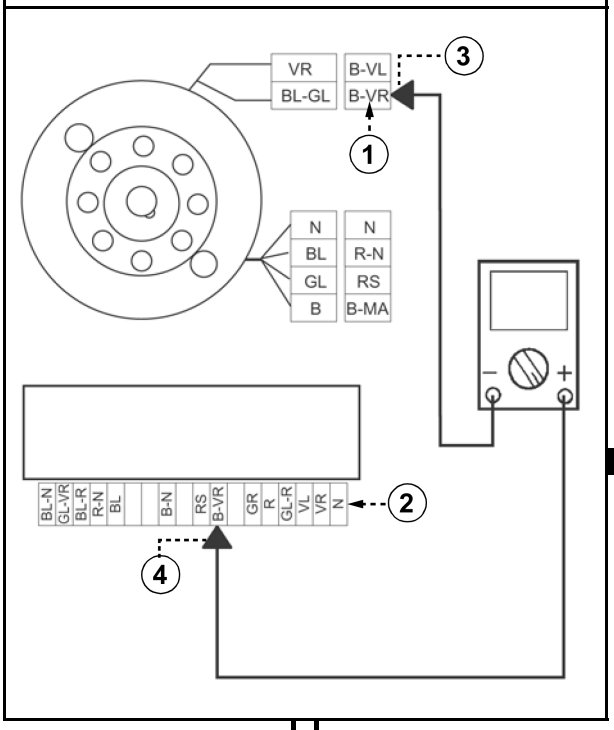
Faulty red lead. Repair wiring
See "CIRCUIT DIAGRAM" page 7-32

CONTINUITY

Replace the meter assembly

THE TACHOMETER IS FAULTY

• Connect Tester Ωx1 as follows
Terminal (+) → White-green lead (3)
Terminal (-) → White-green lead (4)
• Check the white-green lead for continuity between magneto flywheel connector (1) and meter assembly connector (2)



NO CONTINUITY

Faulty white-green lead. Repair wiring
See “CIRCUIT DIAGRAM” page 7-32

CONTINUITY

Replace the meter assembly

THE FUEL LIGHT FAILS TO COME ON

1. Fuel probe check

• Disconnect the connector of the fuel cock
• Create a jumper between the grey lead and the black lead of the system side connector
• Turn the main switch to position “ON” and wait for some seconds

PILOT LIGHT ON

Replace the fuel cock

PILOT LIGHT OFF

2. Checking grey lead continuity

- Connect Tester "Ω" to the leads and check the grey lead for continuity between fuel cock connector and meter assembly connector (PIN 9)

NO CONTINUITY → Faulty black lead. Repair wiring
See "CIRCUIT DIAGRAM" page 7-32

CONTINUITY ↓

3. Ground check (black lead)

- Connect Tester "Ω" as follows
Terminal (+) → Black lead
Terminal (-) → Chassis ground
- Check the ground continuity to the fuel cock connector (system side black lead)

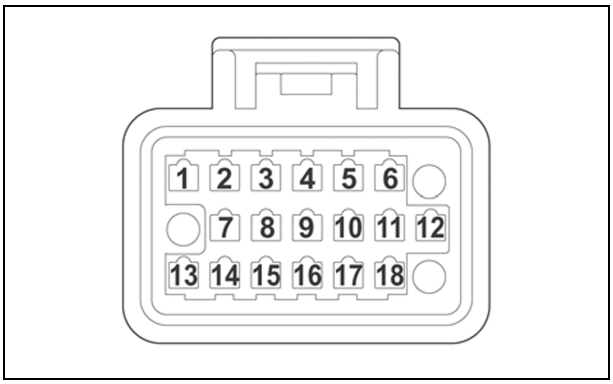
NO CONTINUITY → Faulty black lead. Repair wiring
See "CIRCUIT DIAGRAM" page 7-32

CONTINUITY ↓

Replace the meter assembly

METER ASSEMBLY CONNECTOR CONFIGURATION

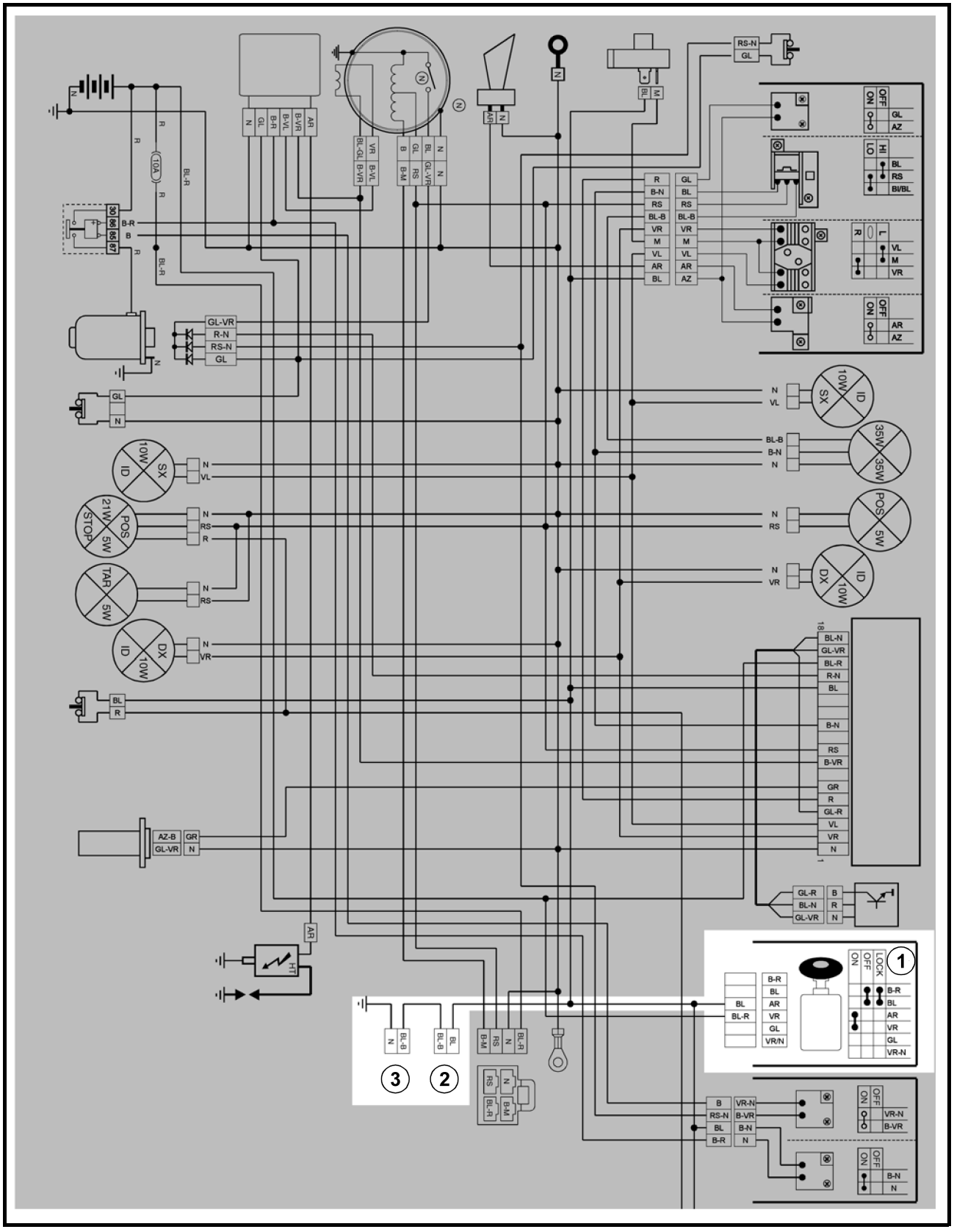
PIN	Description
1	Neutral
2	Right flasher light
3	Left flasher light
4	Sensor input
5	"Mode" button signal
6	Fuel warning light
7	NC
8	RPM
9	Side lights
10	NC
11	High beam light
12	NC
13	NC
14	Ignition live
15	Neutral indicator light
16	Battery positive lead
17	Sensor GND
18	Sensor VCC



CARBURETOR HEATER SYSTEM

CIRCUIT DIAGRAM

(1) Main switch
(2) Thermal sensor
(3) Carburetor heater



CARBURETOR HEATER CIRCUIT

The carburetor is equipped with a heater. It is powered when the "thermal sensor" located under the left number holder panel detects an outside temperature ≤ 3°C.

The heater keeps the temperature of the carbuteror body constant, thus facilitating the throttle valve sliding.

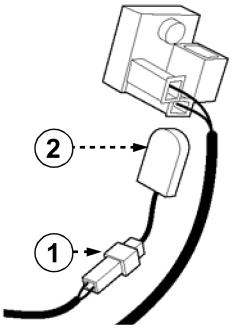
CHECKING THE CARBURETOR HEATER CIRCUIT AND THERMAL SENSOR

1. Checking the "thermal sensor" voltage

- Disconnect two-way connector (1) of "thermal sensor" (2)
- Connect Tester DC 20V as follows:

Terminal (+) → Blue lead
Terminal (-) → Chassis ground

- Turn the main switch to "ON"
- The measured voltage must be 12V



INCORRECT

Faulty blue lead between main switch and "thermal sensor" connector. Repair wiring
See "CIRCUIT DIAGRAM" page 7-47

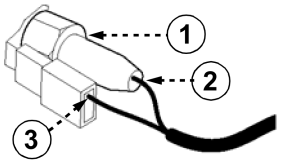
CORRECT

2. Checking the carburetor heater voltage

- Create a jumper between the blue lead and the blue white lead of the "Thermal sensor" connector
- Connect Tester DC 20V to the leads of carburetor heater (1) as follows:

Terminal (+) → Blue white lead (2)
Terminal (-) → Black lead (3)

- Turn the main switch to "ON"
- The measured voltage must be 12V



INCORRECT

Inspect
(A) White-light blue lead between "Thermal sensor" and heater. If faulty, repair wiring.
(B) Black lead (ground). If faulty, repair wiring.
See "CIRCUIT DIAGRAM" page 7-47

CORRECT

The circuit operates properly

CHAPTER 8
TROUBLESHOOTING

TROUBLESHOOTING

TROUBLESHOOTING

ELECTRIC SYSTEM

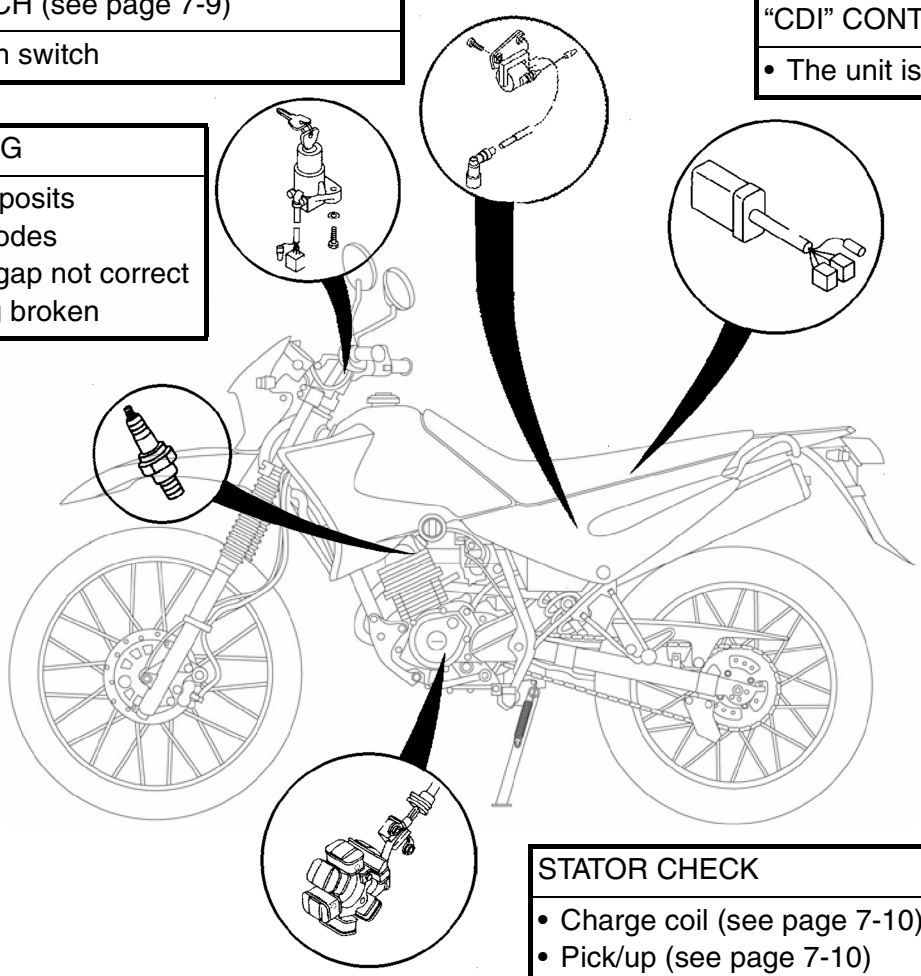
* CHECK ALL CONNECTIONS

IGNITION COIL (see page 7-9)
- One of the windings (primary or secondary) is broken or damaged.
- The spark plug lead is damaged
- Spark plug cap damaged

MAIN SWITCH (see page 7-9)
- Faulty main switch

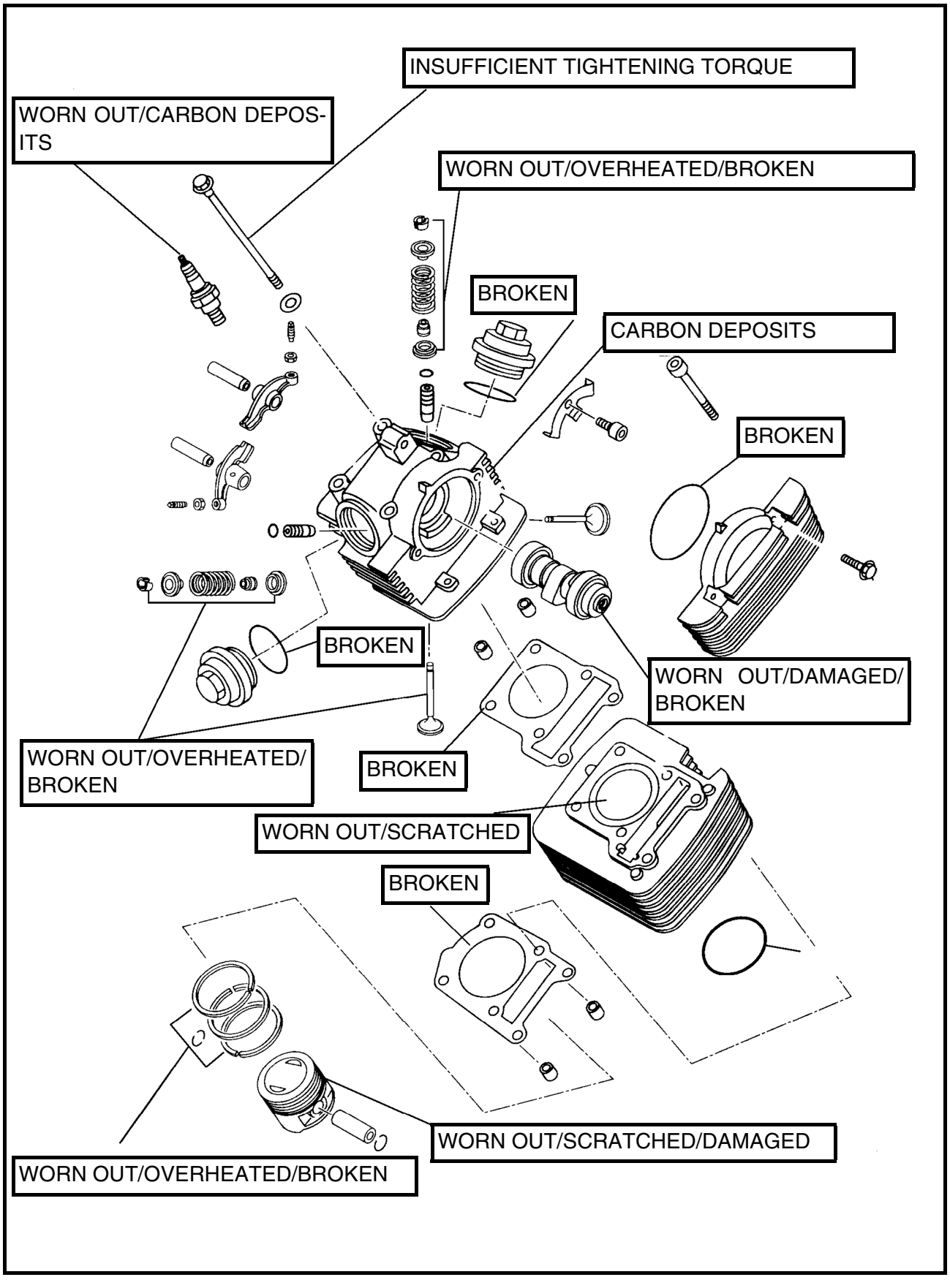
"CDI" CONTROL UNIT
- The unit is damaged

SPARK PLUG
- Carbon deposits
- Wet electrodes
- Electrode gap not correct
- Spark plug broken



STATOR CHECK
- Charge coil (see page 7-10)
- Pick/up (see page 7-10)
- Windings broken

COMPRESSION SYSTEM



INTAKE AND EXHAUST SYSTEM

VACUUM HOSE
FUEL HOSE
- Clogged, bent or kinked

FUEL TANK CAP
- Clogged ventilation hole

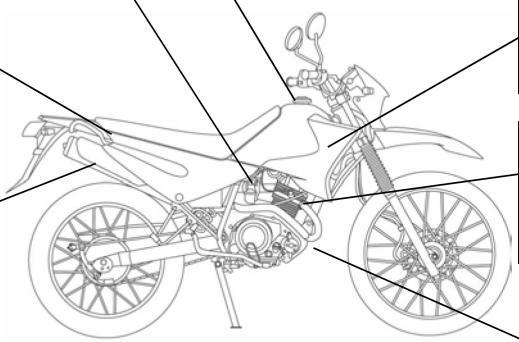
AIR FILTER
- Air intake

"AIS" VALVE
- Faulty

SILENCER
- Blocked
- Broken

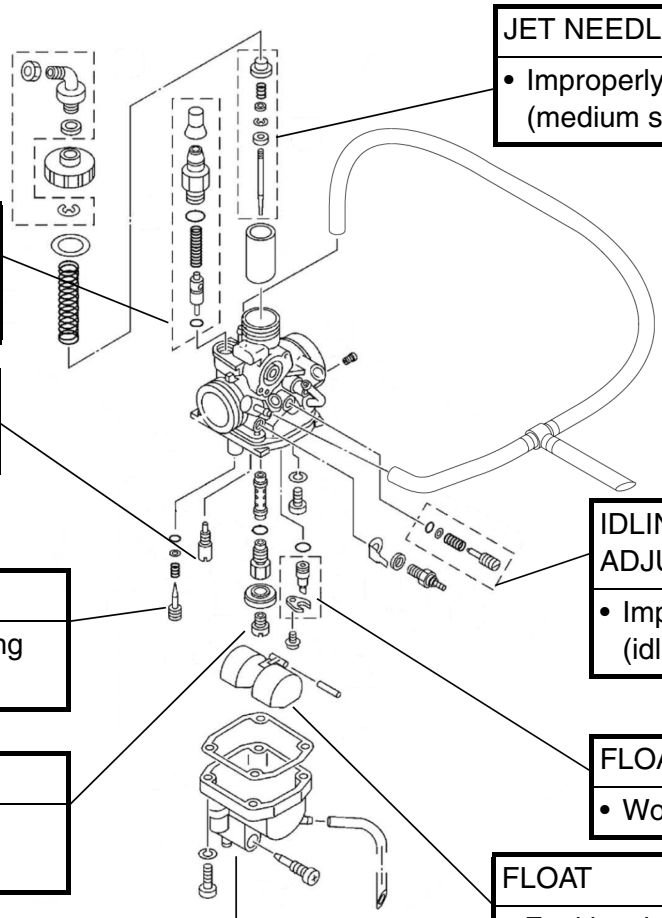
VALVE TRAIN COMPONENTS
- Improper adjustment
- Improper timing

EXHAUST PIPE
- Holed or broken
- Carbon deposits



(CARBURETOR)

JET NEEDLE
- Improperly adjusted (medium speed)



STARTER
- Improperly adjusted (starting)

PILOT JET
- Clogged (low speed)

IDLING SPEED ADJUST SCREW
- Improperly adjusted (idling and starting)

PILOT SCREW
- Improperly adjusted (idling and starting)

FLOAT VALVE
- Worn out

MAIN JET
- Incorrect size
- Clogged (high speed)

FLOAT
- Fuel level not correct
- Holed

FLOAT CHAMBER
- Accumulated dust and/or water

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