SACHS
Recommends

SACHS
verwendet
und empfiehlt

Sachs Fahrzeug- und Motorentechnik GmbH · Ernst-Sachs-Straße 6
D-90441 Nürnberg · Tel +49 (0)911 42 31 0 · Fax +49 (0) 911 42 31 405

Printed in Germany 2005 04 003

TECHNICAL DATA

Engine type	FY139FMB
Construction	One cylinder 4-stroke petrol engine
Valve steering	1 overhead cam with rocker arms
Valve	2 valve
Valve clearance, cold	intake + exhaust 0.05 mm - 0.08 mm
Pistion displacement	49,5 cm^3
Bore	ø 39 mm
Stroke	41,4 mm
Compression ratio	10:1
Lubrication system	forced oil lubrication
Cooling	air cooled
Maximum net power output	2,0 kW at 7.000 rpm
Maximum net torque	3,2 Nm at 4.300 rpm
Air-filter	paper air-filter
Typ of starter	electric starter / kick starter
Ignition system	transistorized ignition system with electronic ignition control (CDI)
Ignition timing	15 ° before TDC at 2.000 rpm / 30 ° before TDC at 3.500 rpm
Pickup coil resistance	110-130 Ohm (bl/w-ground)
Ignition coils resistance	Primary 550-570 Ohm
Spark plug	NGK CR7 HSA electrode gap 0,6- 0,8 mm
Carburetor	Mikuni type VM 12 101 6
Main jet #	47,5
Idle jet	15
Jet needle setting groove	4 th from top
Mixture regulation screw	Initial opening 2,5 turns out
Idle speed	1.800 +/- 200 rpm
Float level	13 mm - 1 mm
Throttle cable free play	1,0 - 2,0 mm
Power transmission	
Clutch	Wet multi-plate type
Gear box	4-seed constant mesh, foot operated
Gear ratios	1. gear = 36/11 (3,273)
	2. gear = 31/16 (1,938)
	3. gear = 27/20 (1,350)
	4. gear = 24/23 (1,044)
Primary transmission ratio	4,059
Chain pinion	11 teeth
Sprocket	53 teeth
Drive chain	420, 116 links

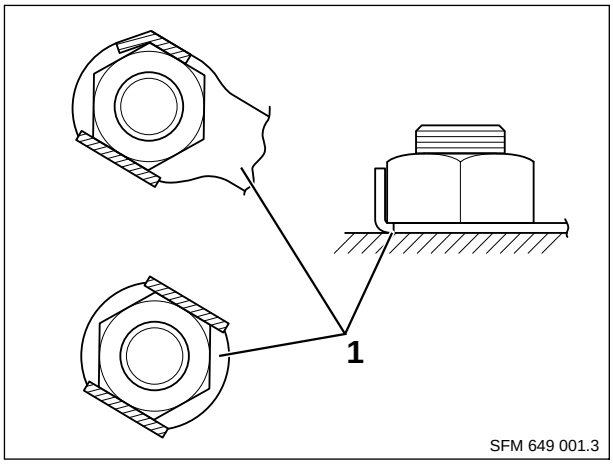
GENERAL NOTES

Gaskets, seal rings and O-rings

- Gaskets, seal rings and O-rings must generally be replaced when overhauling the engine. The sealing faces must be thoroughly cleaned.

Lock washers and split pins

- After removal replace all lock washers (1) and split pins. After tightening the nut, lock washer (1) must be bent up against the side of the nut.



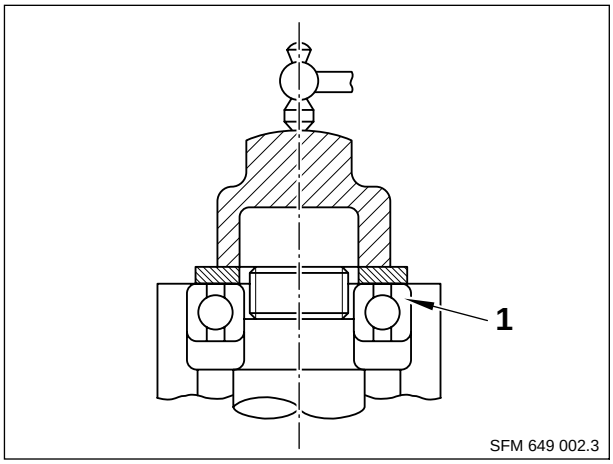
SFM 649 001.3

Bearings and radial seals

- When assembling bearings (1) make sure that manufacturer name or number point to the outside. Lubricate the bearings with oil.

ATTENTION
Do not use compressed air to dry the bearings since this could damage the surface of the bearings.

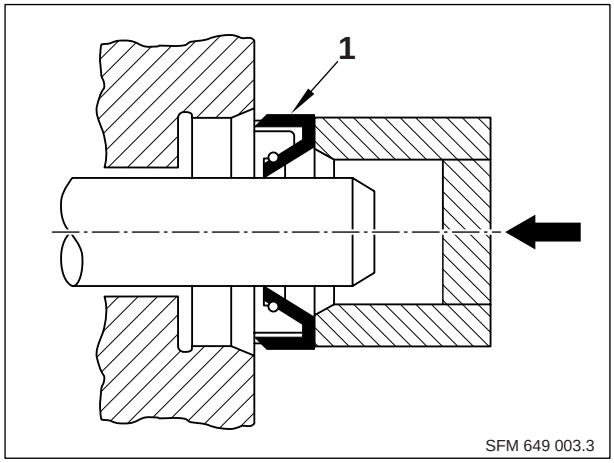
- When assembling radial seals (1) make sure that manufacturer name or number point to the outside. Apply a thin coat of lightly viscous engine oil to the seal lips.



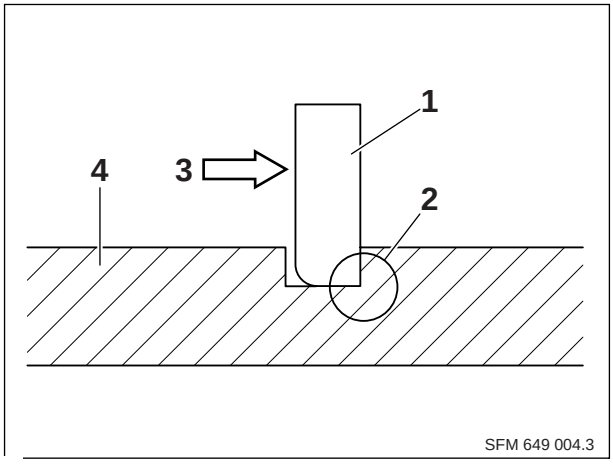
SFM 649 002.3

Circlips

- Circlips must be thoroughly inspected before installation.
- Piston pin circlips must not be assembled again.
- Warped circlips must be renewed.
- When assembling a circlip (1) make sure that the sharp edged side (2) is positioned opposite the side subjected to the force (3) applied to the circlip. See cross-sectional drawing (4 = shaft).



SFM 649 003.3



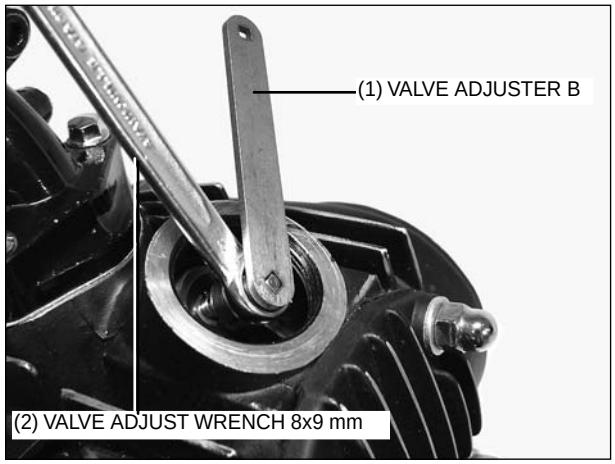
SFM 649 004.3

MAINTENANCE

Adjust by loosening the lock nut and turning the adjusting screw until there is slight drag on the feeler gauge. Hold the adjusting screw and tighten the lock nut. Recheck the valve clearances.

TOOLS:
Valve adjust wrench, 9 mm
Valve adjuster B **P00 927 941 92 12 000**

Install the valve adjuster covers and the inspection plugs.



CARBURETOR IDLE SPEED

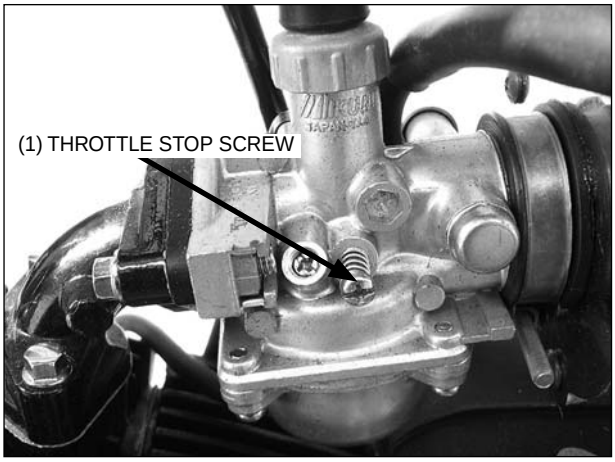
NOTE
Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
The engine must be warm for accurate idle speed inspection and adjustment.

Shift the transmission into neutral and place the motorcycle on its center stand on level ground.
Warm up the engine for about ten minutes and connect a tachometer.

WARNING
If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause lass of consciousness and lead to death.

Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 1.800 +/- 200 rpm



MAINTENANCE

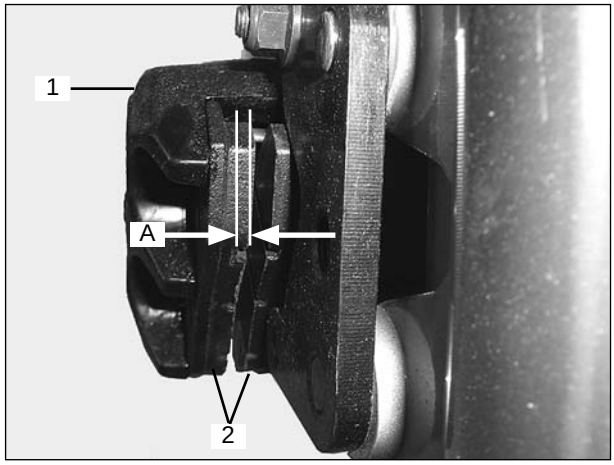
Checking/replacing the lining of the front brakeshoes

Checking the lining thickness

CAUTION
Make sure the minimum lining thickness is observed.
- Visually inspect the calliper (1).
- Check the minimum lining thickness.

  Minimum lining thickness (A): 2.5 mm

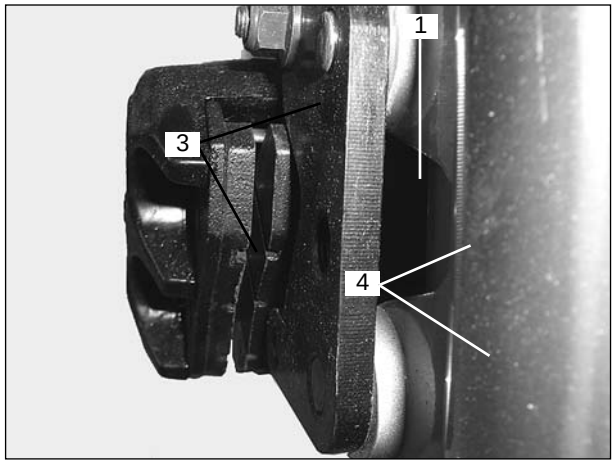
If the thickness is less than the minimum:
replace the brake lining (2).
- Check the brake disk for wear and wobble.



Replacing the brake linings:

NOTE
Brake linings may only be replaced in pairs.

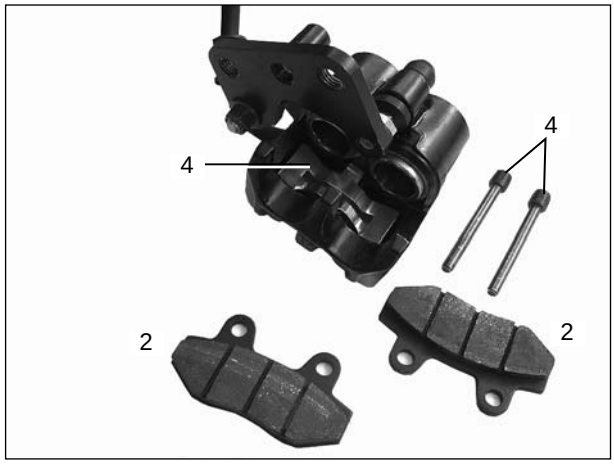
- Remove the screws (3) from the calliper (2).
- Remove the calliper.
- Remove the holder bolts (4) from the calliper (1).
- Remove the brake linings (2).
- Check the lock plate (5) for damage.
- Insert the new brake linings and fasten them with the holder bolts.
- Reassemble in reverse order.



Tightening torques
calliper screws (3): 35-38 Nm
Holder bolts (4): 25-28 Nm

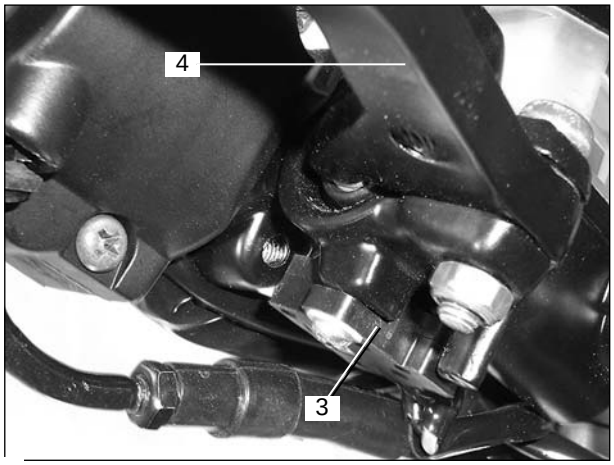
WARNING - RISK OF ON-ROAD ACCIDENT
Operate the brakes several times, until the brake linings make contact.

- Check the brake - fluid level and the handbrake play.
- Check the operation.



Brake light switch

NOTE
The brake light switch (3) is placed in the hand brake lever.
By operating the front brake lever (4) the brake light must flash up immediately.
An adjustment is not required.



MAINTENANCE

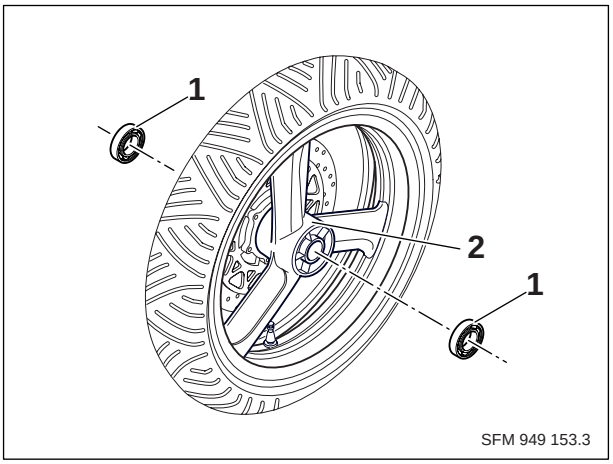
FRONTWHEEL / REARWHEEL BEARINGS

Removing/installing the front-wheel bearing

NOTE
Heat the bearing seat to approx. 100 °C in order to facilitate removal/installation.

Removing the wheel bearing:
- Remove the front wheel.
- Use an internal extractor to pull the wheel bearing (1) out of the bearing seat of the wheel hub (2).

Installing the wheel bearing:
- Press the wheel bearing (1) into the bearing seat of the wheel hub (2).
- Install the front wheel.



SFM 949 153.3

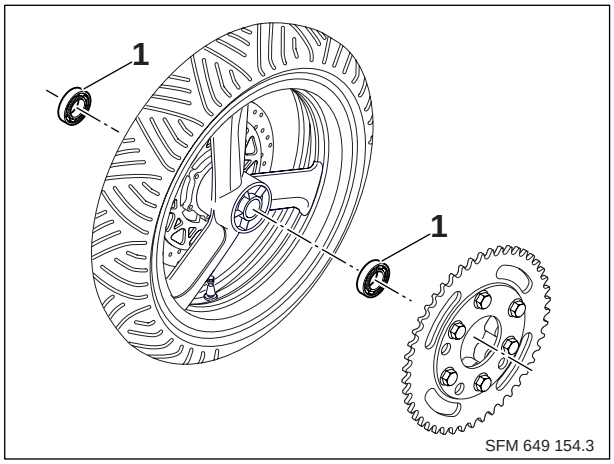
Removing/installing the rear-wheel bearing

NOTE

Heat the bearing seat to approx. 100 °C in order to facilitate its removal and installation.

Removing the wheel bearing:
- Remove the rear wheel.
- Remove the brake shoe support.
- Use an internal extractor to pull the wheel bearing (1) out of the bearing seat of the wheel hub (2).

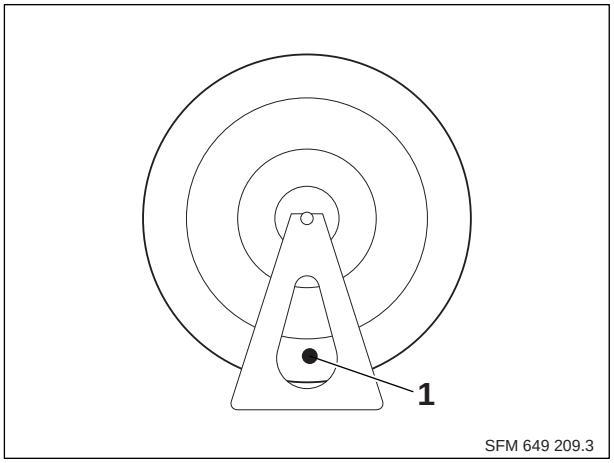
Installing the wheel bearing:
- Press the wheel bearing (1) into the bearing seat of the wheel hub (2).
- Install the front wheel.



SFM 649 154.3

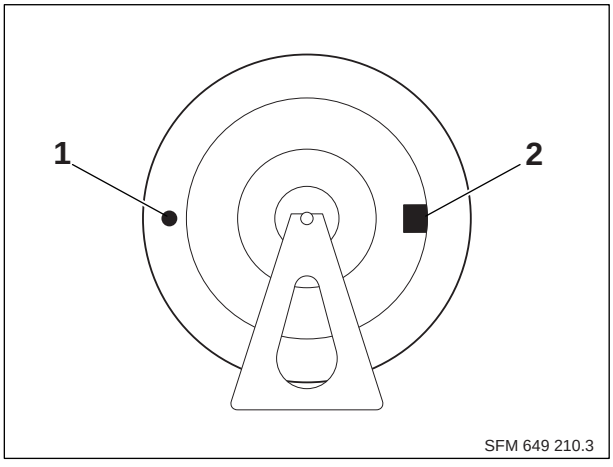
Statically aligning the wheels
- Clamp the relevant wheel in the aligning device.
- Rotate the wheel gently and wait until it comes to a standstill. Make a mark (1) at the low point of the tyre.

NOTE
Always start with the smallest alignment weight.



SFM 649 209.3

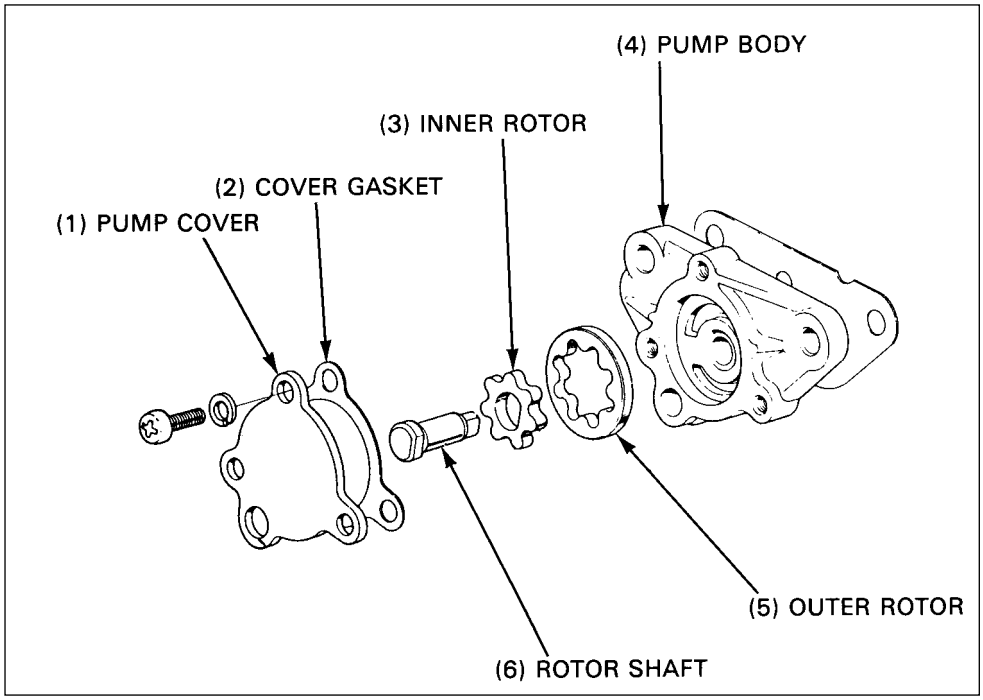
- Turn the wheel through 90°, stop it and let it find its own position. If the mark (1) again stops at the low point of the tyre, this is the heavy point and an alignment weight (2) must be installed opposite it.
- Each time turn the wheel through 90° and stop it; the wheel must remain in position, otherwise repeat the alignment procedure.



SFM 649 210.3

LUBRICATION SYSTEM

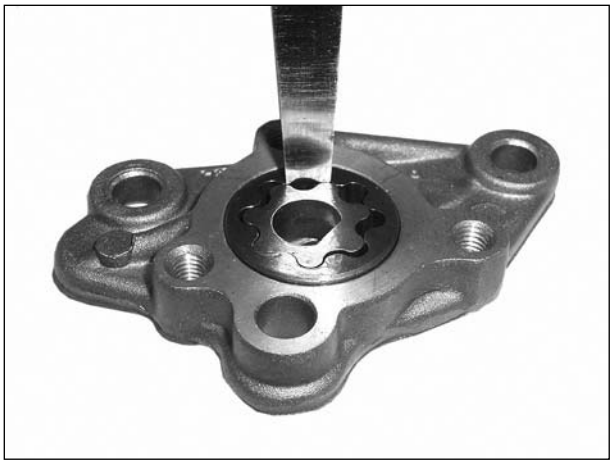
Clean all disassembled parts in solvent and check for damage or abnormal wear.



INSPECTION
Install the rotor shaft and inner and outer rotors into the pump body.

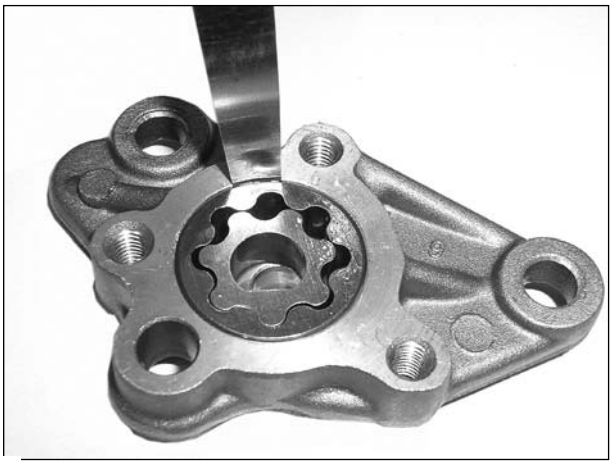
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



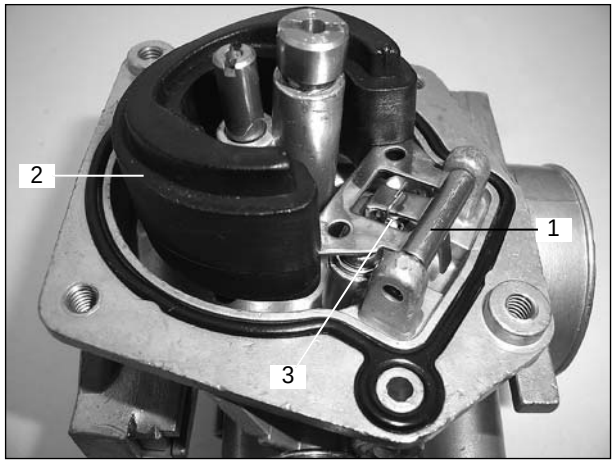
Measure the pump body clearance.

SERVICE LIMIT: 0.12 mm (0.005 in)



FUEL SYSTEM

Pull out the float arm pin (1) and remove the float (2) and float valve (3).

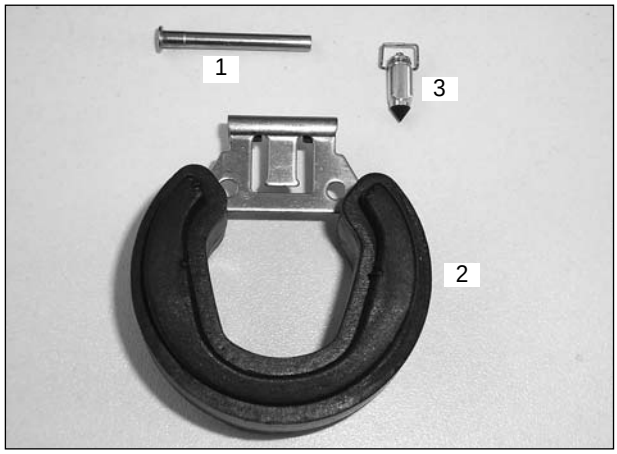


FLOAT VALVE/FLOAT INSPECTION
Inspection seating surface of the float valve (3) for wear or damage.

Inspect the float valve for grooves and nicks, and replace if necessary.

Check the Operation of the float valve.

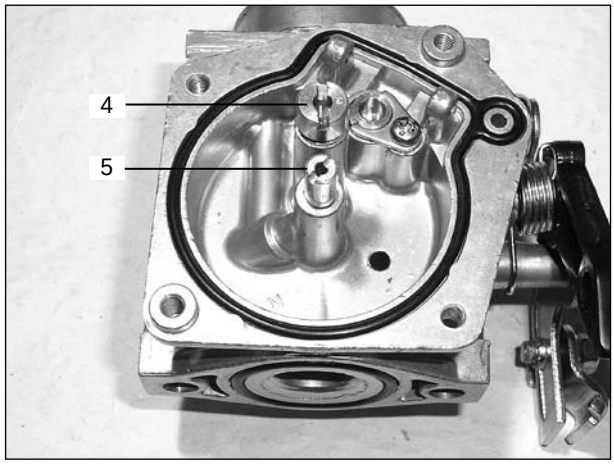
Check the float for damage and fuel in float.



Remove the main jet (4).

Remove the pilot jet (5).

Turn the air screw (6) in and record the number of turns before it seats lightly.

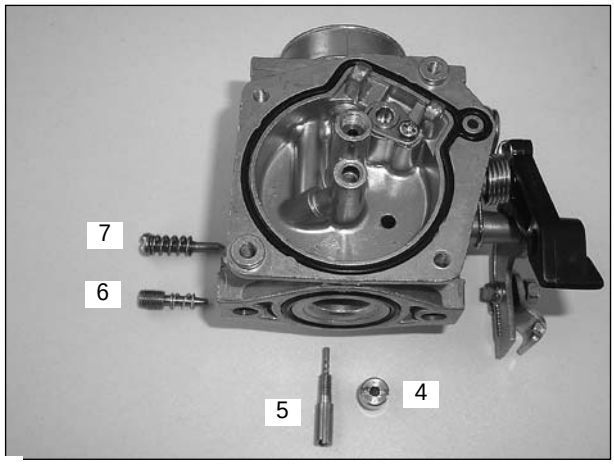


CAUTION
Damage to the air screw seat will occur if the screw is tightened against the seat.

Remove the air screw, and the throttle stop screw (7).

Clean all disassembled parts with solvent and dry them.

Inspect the air screw and each jet and replace them if they are worn or damaged.



ENGINE DISASSEMBLY/ASSEMBLY

SERVICE INFORMATION

GENERAL

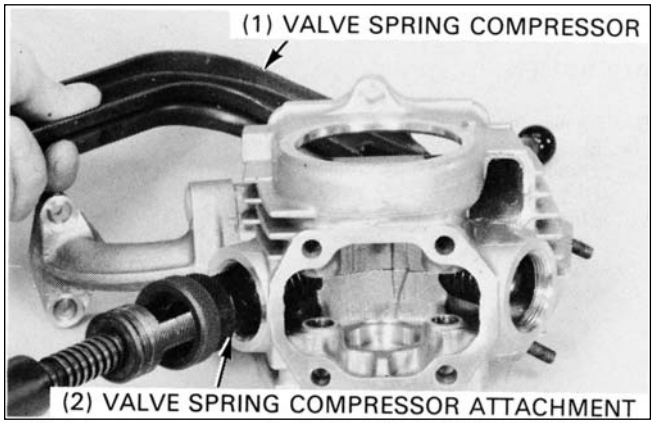
When removing the engine, support the motorcycle using safety stands.

Parts requiring engine removal for servicing:
Crankcase
Transmission
Shift drum and forks
Crankshaft
Kick starter spindle

SPECIFICATION	
Engine oil capacity	0.8 lit after draining
	1.0 lit after disassembly
Engine dry weight	22 kg
TORQUE VALUES	
Engine upper mounting bolt	33-35 Nm
Engine lower mounting bolt	33-35 Nm
Exhaust pipe joint nut	10-12 Nm
Intake manifold mounting bolt	10-12 Nm
Rear axle nut	50-60 Nm
Drive sprocket bolt	12-15 Nm

CYLINDER HEAD / VALVES

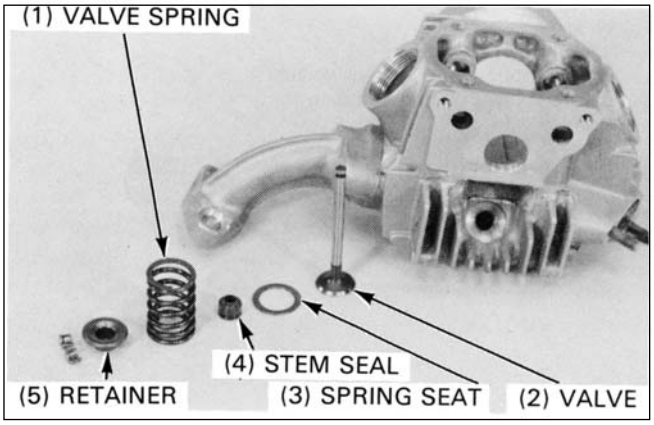
While compressing the valve spring with a valve spring compressor, remove the valve cotters.



CAUTION
To prevent lass of tension, do not compress the valve springs more than necessary to remove the cotters.

TOOLS:
Commercially available tools.

Loosen the valve spring compressor and remove the valve retainer, valve spring, spring seat and valve.

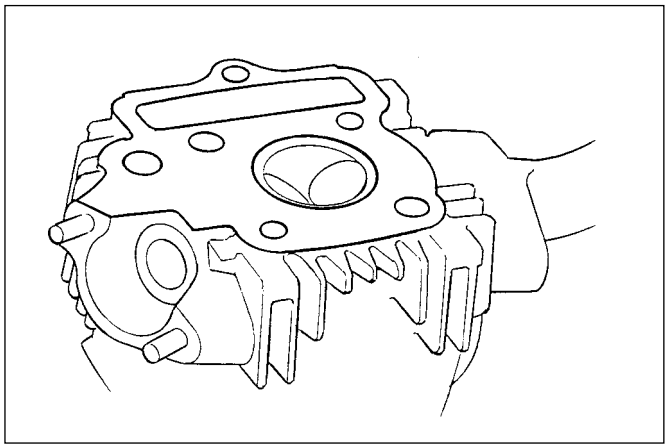


NOTE
Mark all disassembled parts to ensure correct reassembly.

Remove the stem seals, if necessary.

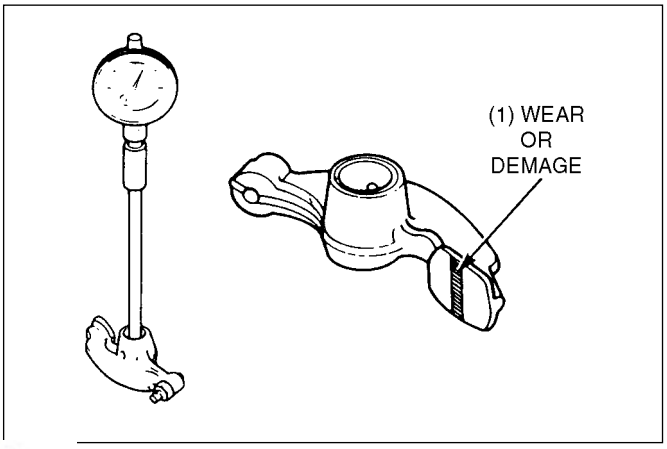
NOTE
Remove the stem seals with new ones whenever they are removed.

Remove the carbon deposits from the combustion chamber.
Clean off any gasket material from the cylinder head surface.



INSPECTION

Rocker arm
Inspect the rocker arm for wear, damage or clogged oil holes.



NOTE
If any rocker arm require servicing or replacement, inspect the cam lobes for scoring, chipping or excessive wear.

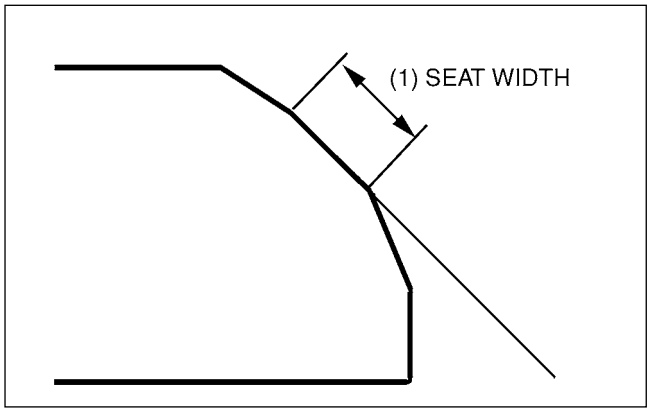
Measure the rocker arm I.D.

SERVICE LIMIT: 10.10 mm

CYLINDER HEAD / VALVES

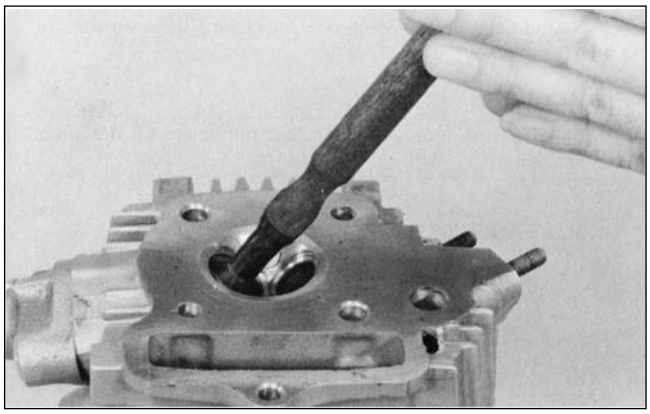
Install a 45 degree finish cutter and cut the seat to proper width. Make sure that all pitting and irregularities are removed.
Refinish if necessary.

STANDARD SEAT WIDTH: 1.0 mm



Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

NOTE
The location of the valve seat in relation to the valve face is very important for good sealing.



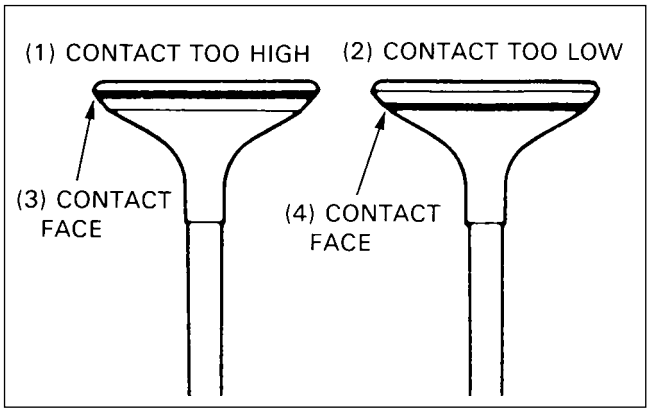
If the contact area is too high on the valve, the seat must be lowered using a 32 degree flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.

Refinish the seat to specifications, using a 45 degree finish cutter.

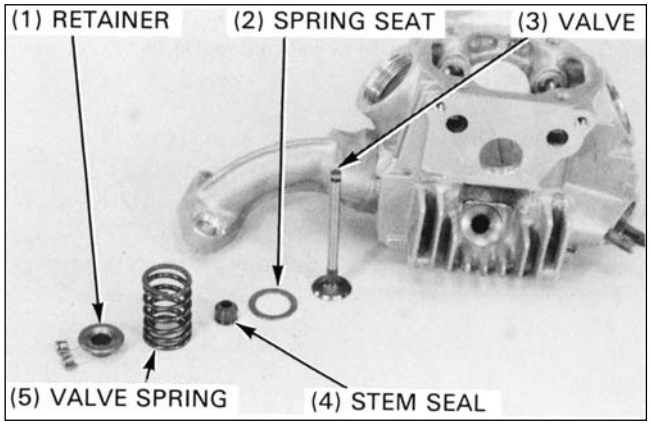
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

After lapping, wash all residual compound off the cylinder head and valves.

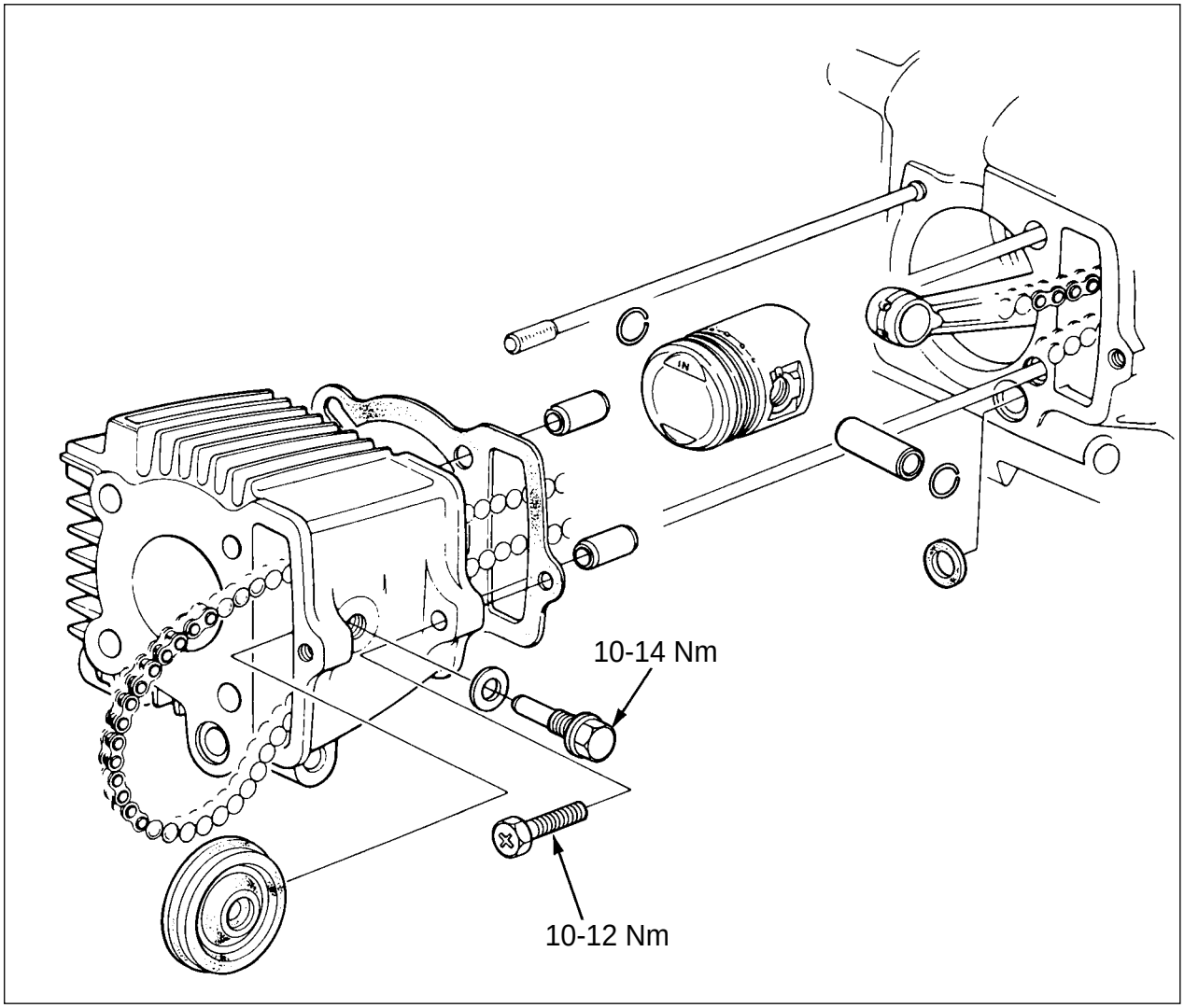


CYLINDER HEAD ASSEMBLY

Install new valve stem seals.
Lubricate each valve stem with the engine oil.
Insert the intake and exhaust valve into the valve guides.



CYLINDER / PISTON



CYLINDER / PISTON

PISTON RING INSTALLATION

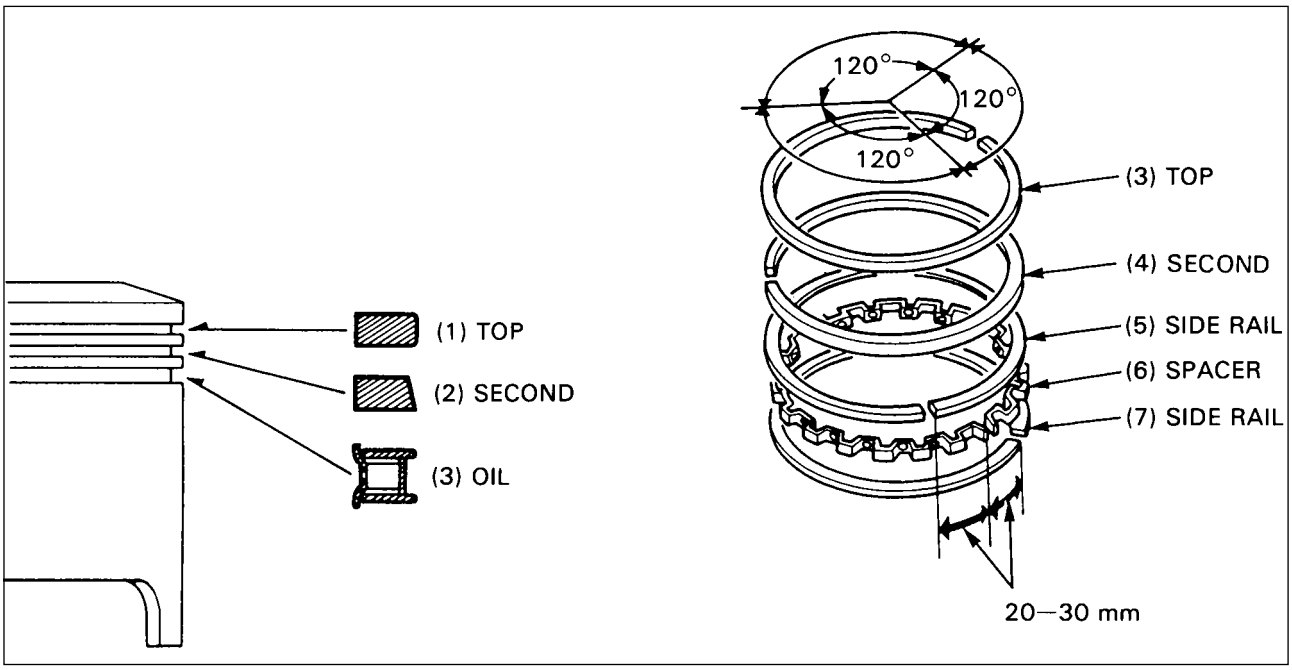
Clean the piston ring grooves thoroughly and install the piston rings with the markings facing up.

NOTE
When installing the oil ring, install the spacer first and then the side rails.

Be careful not to damage the piston or rings during installation.

After Installation, the piston rings should be free to rotate in the grooves.
Do not interchange the top ring with the second ring.

Space the piston ring end gaps 120 ^{0} apart.
Do not align the gaps of the oil ring side rails.

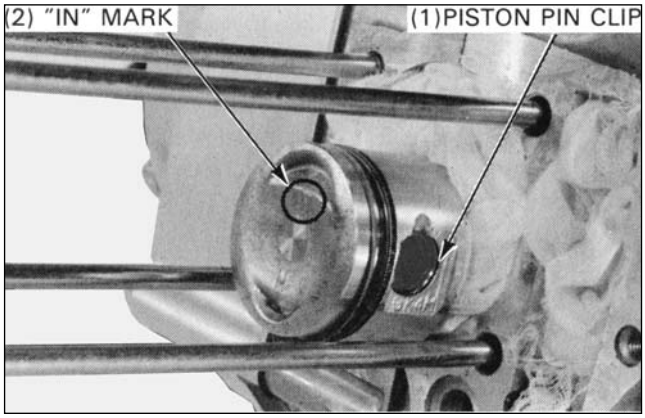


PISTON INSTALLATION

Install the piston with the "IN" mark facing the intake valve. Install the piston pin and new piston pin clips.

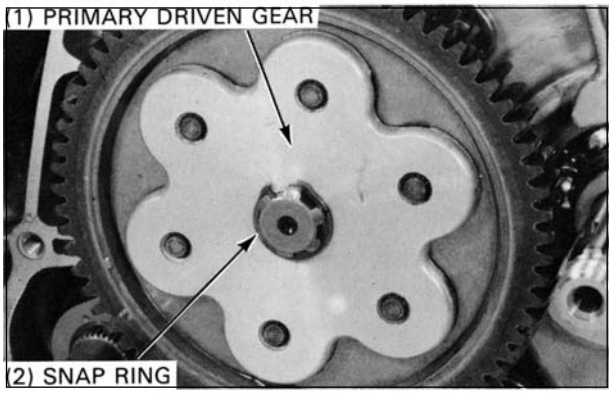
NOTE
Replace piston pin clips whenever they were removed.

Do not align the piston pin clip end gap with the piston cutout.

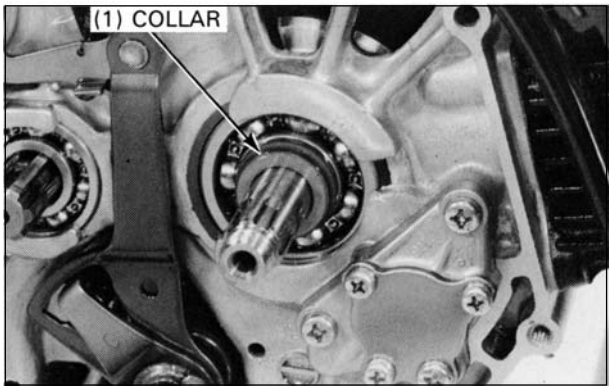


CLUTCH/GEARSHIFT LINKAGE

Remove the snap ring (2) and the primary driven gear (1).



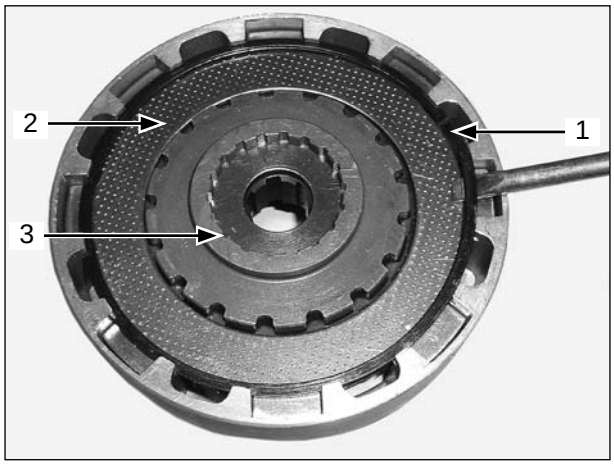
Remove the collar (3) from the crankshaft.



CLUTCH DISASSEMBLY

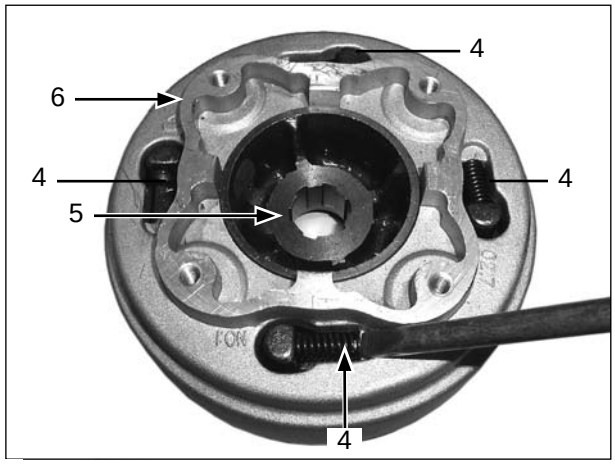
Remove the set ring (1).

Remove the clutch plates (2), friction discs and clutch center (3).



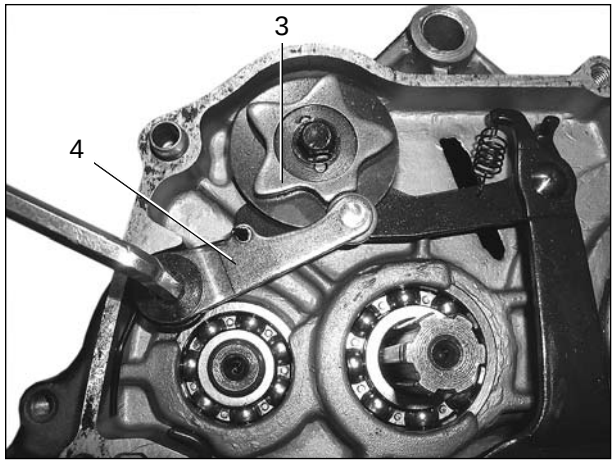
Remove the damper springs (4).

Separate the drive plate (5) and clutch springs from the clutch outer (6).



CLUTCH/GEARSHIFT LINKAGE

Install the gearshift spindle (3) and stopper arm (4).

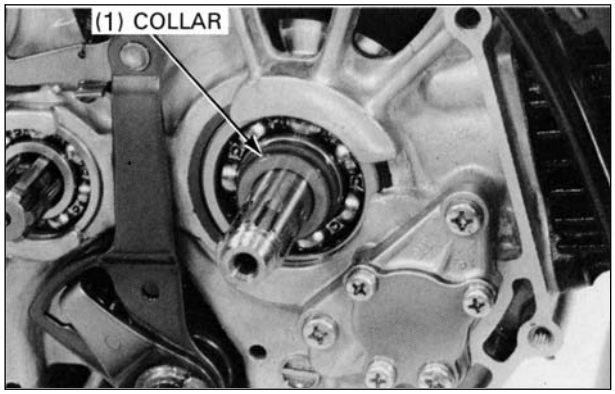


TORQUE:

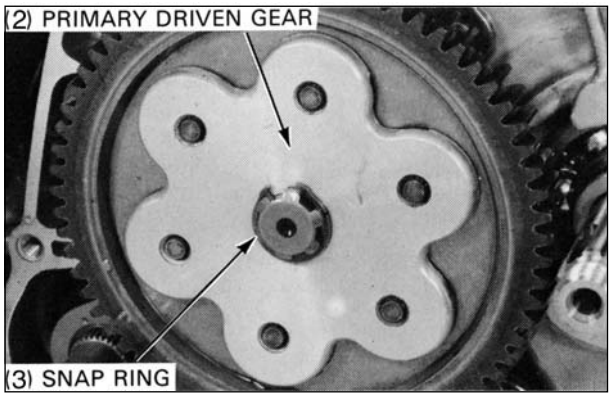
Stopper arm bolt	**10 Nm**
Stopper plate bolt	**17 Nm**

CLUTCH INSTALLATION

Install the collar (1) onto the crankshaft.



Install the primary driven gear (2) and secure it with the snap ring (3).



TRANSMISSION / CRANKSHAF T/ KICK STARTER

SERVICE INFORMATION

GENERAL
The crankcase must be separated to Service the components covered in the section.
The following parts/systems must be removed before the crankcase can be separated:

- Engine removal
- Cylinder head
- Cylinder/piston
- Clutch/gearshift linkage
- Alternator/cam chain tensioner
- Oil pump

SERVICE DATA Unit: mm

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod small end I.D.		13.016-13.043	13.06
	Connecting rod big end clearance	Axial	0.100-0.350	0.60
		Radial	0-0.012	0.05
	Runout		—	0.10
Transmission	Mainshaft O.D.	M2	16.983-16.994	16.94
	Countershaft O.D.	C1	19.959-19.980	19.94
	Gearshift fork	I.D.	34.000 34.025	34.14
		Claw thickness	4.86-4.94	4.60
	Gearshift drum O.D.		33.950-33.975	33.93

TORQUE VALUE
Shift drum bolt 12 Nm

TOOLS
Special
Universal bearing puller

Common
Inner driver
Attachment, 20 mm
Driver
Attachment, 37 x 40 mm
Pilot, 17 mm

TROUBLESHOOTING

Hard to shift
- Incorrect clutch adjustment
- Bent gearshift fork
- Worn gear dogs
- Damaged gearshift drum groove
- Damaged guide pin

Transmission Jumps out of gear
- Worn gear dogs
- Bent gearshift fork
- Damaged gearshift drum stopper

Engine noise
- Worn main Journal bearing
- Worn crankpin bearing
- Worn piston pin
- Worn piston pin bore

Transmission noise
- Worn gears
- Damaged or worn mainshaft and/or countershaft

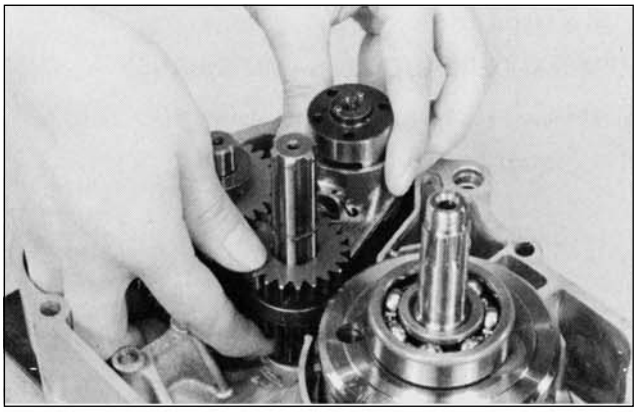
TRANSMISSION / CRANKSHAF T/ KICK STARTER

TRANSMISSION DISASSEMBLY

Separate crankcase.

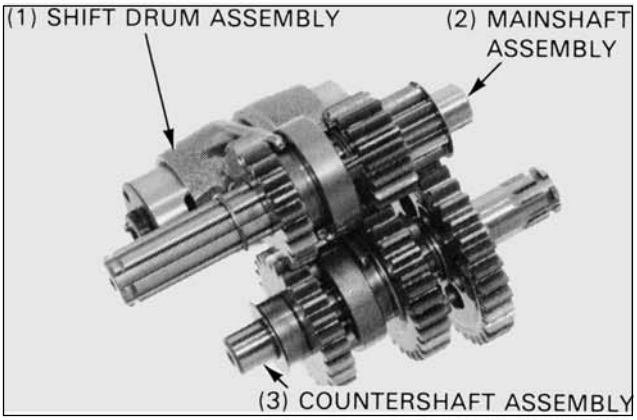
Remove the kick starter.

Remove the transmission and shift drum as an assembly.



Separate the shift drum assembly from the transmission gears.

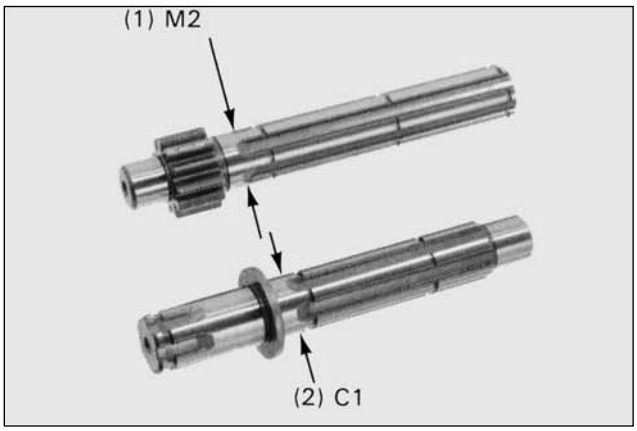
Remove the gears from the mainshaft and countershaft.



INSPECTION

Measure the mainshaft and countershaft O.D.

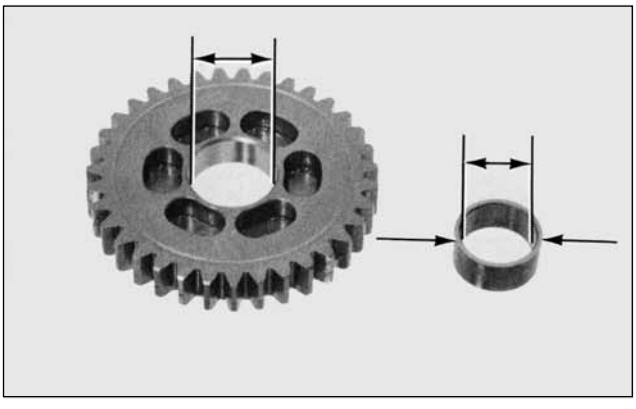
SERVICE LIMITS:
M2: 16.95 mm (0.667 in)
C1: 16.94 mm (0.667 in)



Check each gear for wear or damage.

Measure the gear I.D.

SERVICE LIMITS:
M2: 17.10 mm (0.673 in)
C1: 20.10 mm (0.791 in)
C3: 17.10 mm (0.673 in)



Measure the I.D. and O.D. of the C1 gear bushing.

SERVICE LIMITS:
I.D.: 17.08 mm (0.672 in)
O.D.: 19.93 mm (0.785 in)

ELECTRICAL SYSTEM

FUSE

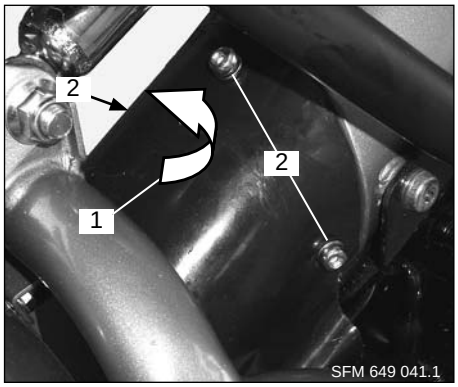
CAUTION
Never install a fuse with a larger rating, since this could destroy the entire electrical system.

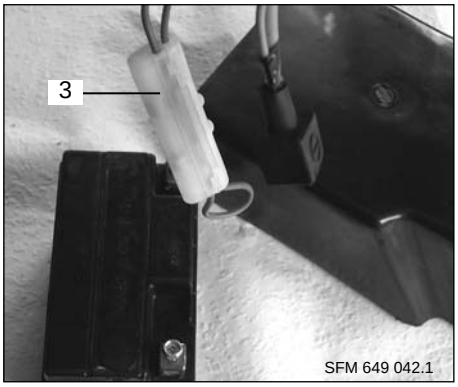
The fuse is located behind the battery cover (1).

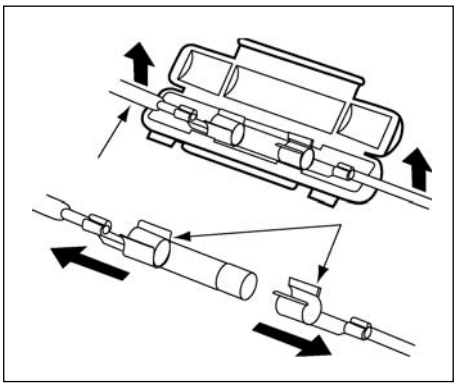
Replace fuse

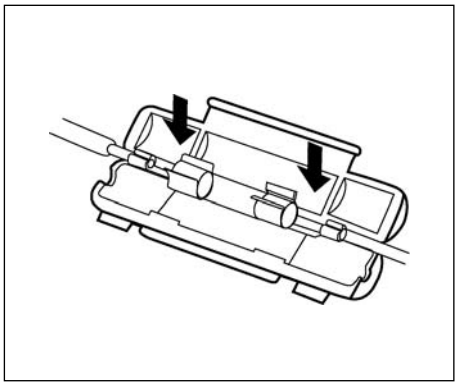
- Remove three screws (2) and lift off cover (1) to the left side.
- Open the fuse case (3).
- A faulty or blown fuse must be replaced by a new one with 15 A.

NOTE
The spare fuse is placed in the fuse case.









ELECTRICAL SYSTEM

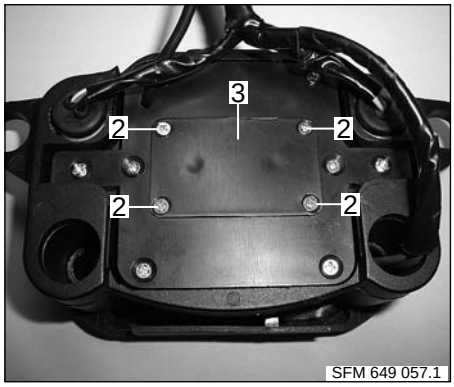
Speedometer battery change

NOTE
If there is no reading on the display or very poor change the batteries. Always replace both batteries.

Remove the speedometer for battery change.

- Remove the screws (1) and take off the speedometer.

- Remove the screws (2) and take off the cover (3).



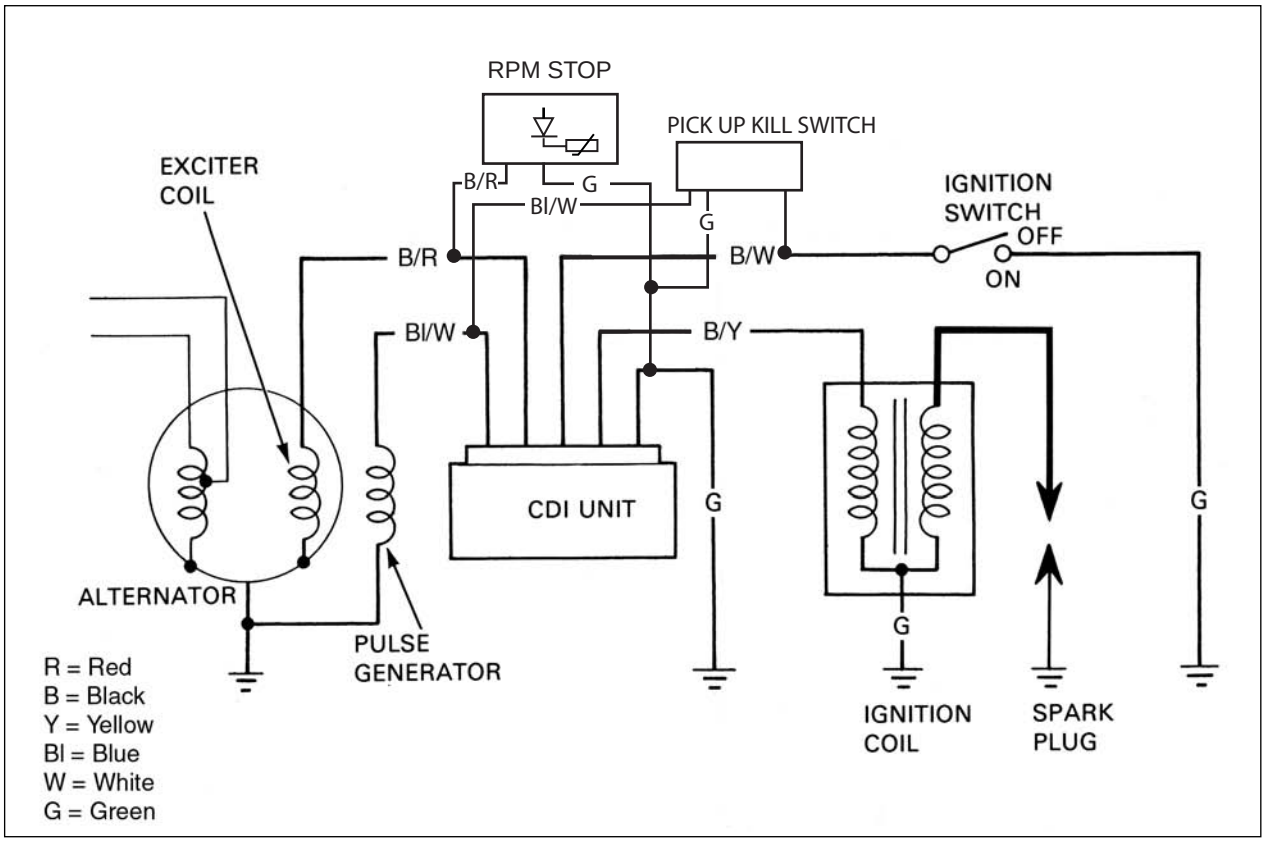
- Remove the batteries (4) and replace against new once, type AG 13.
- Set-in the batteries with the plus terminal showing upwards.
- Close the cover (3) properly.

NOTE
After battery change set-up the time again. The total distance is set on zero.

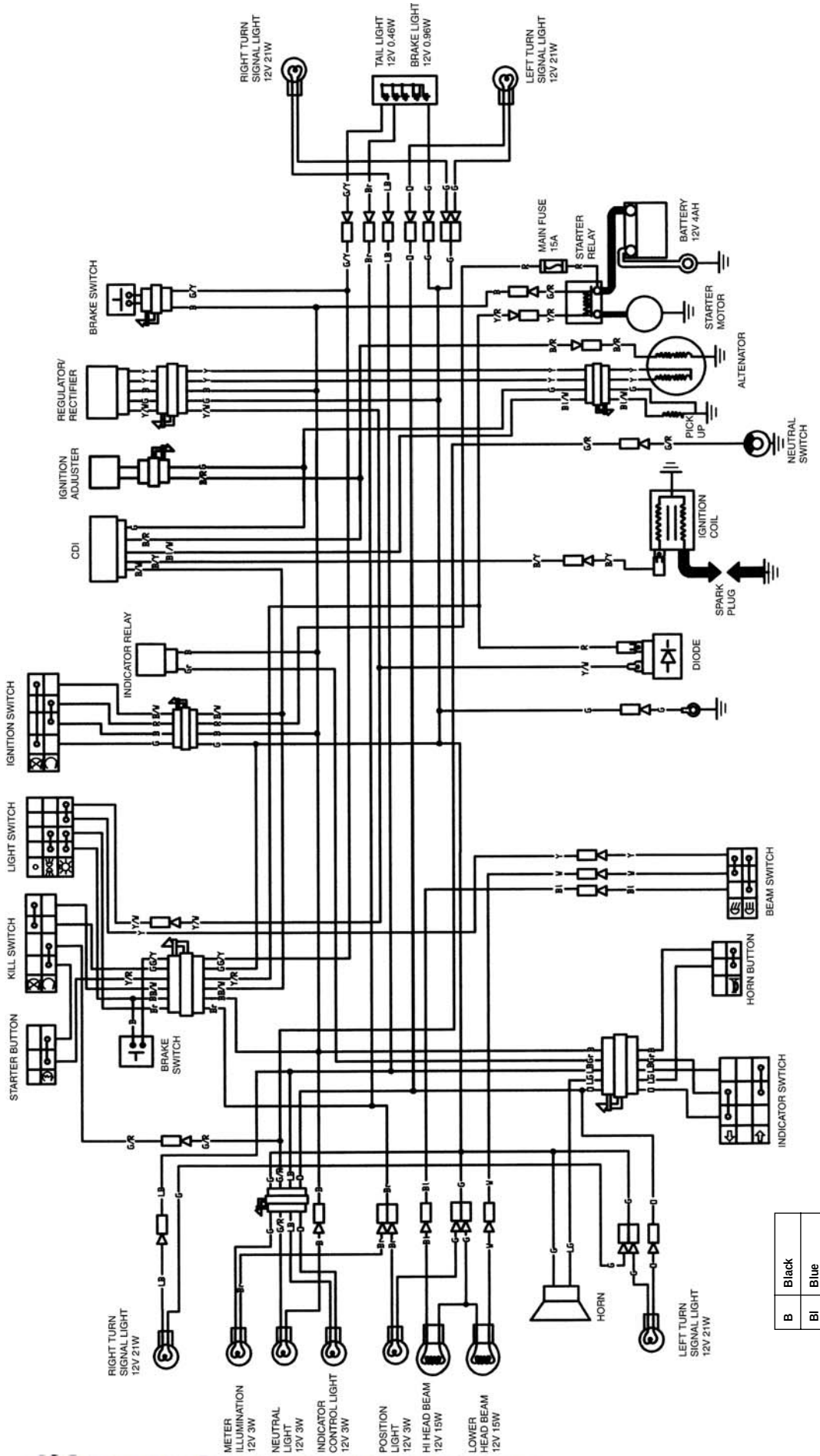
DISPOSAL
Take a dead battery to a collection point. Never dispose of one with household refuse.

IGNITION SYSTEM

SCHEMA



WIRING DIAGRAM WITHOUT CLUTCH SWITCH



B	Black
Bl	Blue
Br	Brown
G	Green
Gr	Grey
LB	Light Blue
LG	Light Green
O	Orange
R	Red
Y	Yellow

B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Bl/W	Blue/White
G/R	Green/Red
G/Y	Green/Yellow
Y/W	Yellow/White