Ch tof Paar
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Workshop-manual

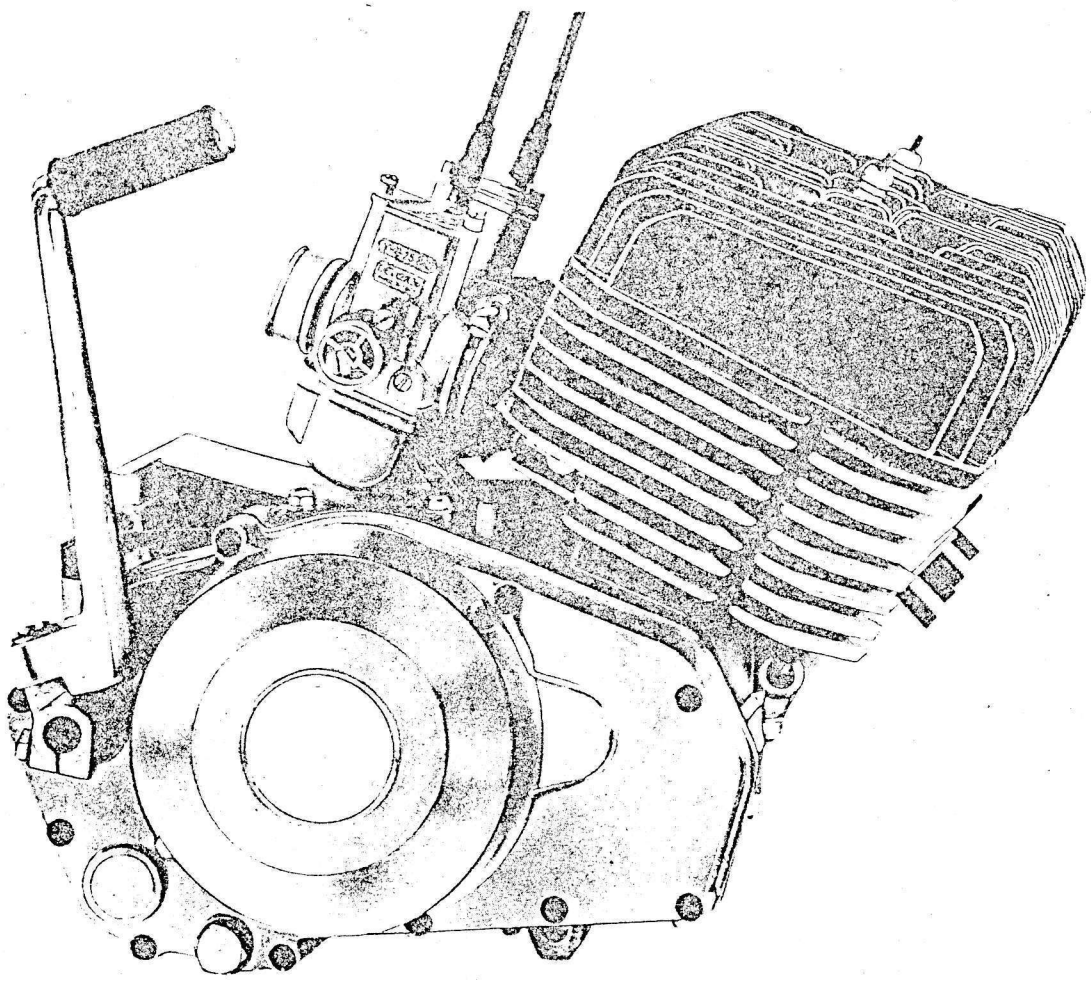
for:

Moto Guzzi

250 TS

INHALTSVERZEICHNIS

125



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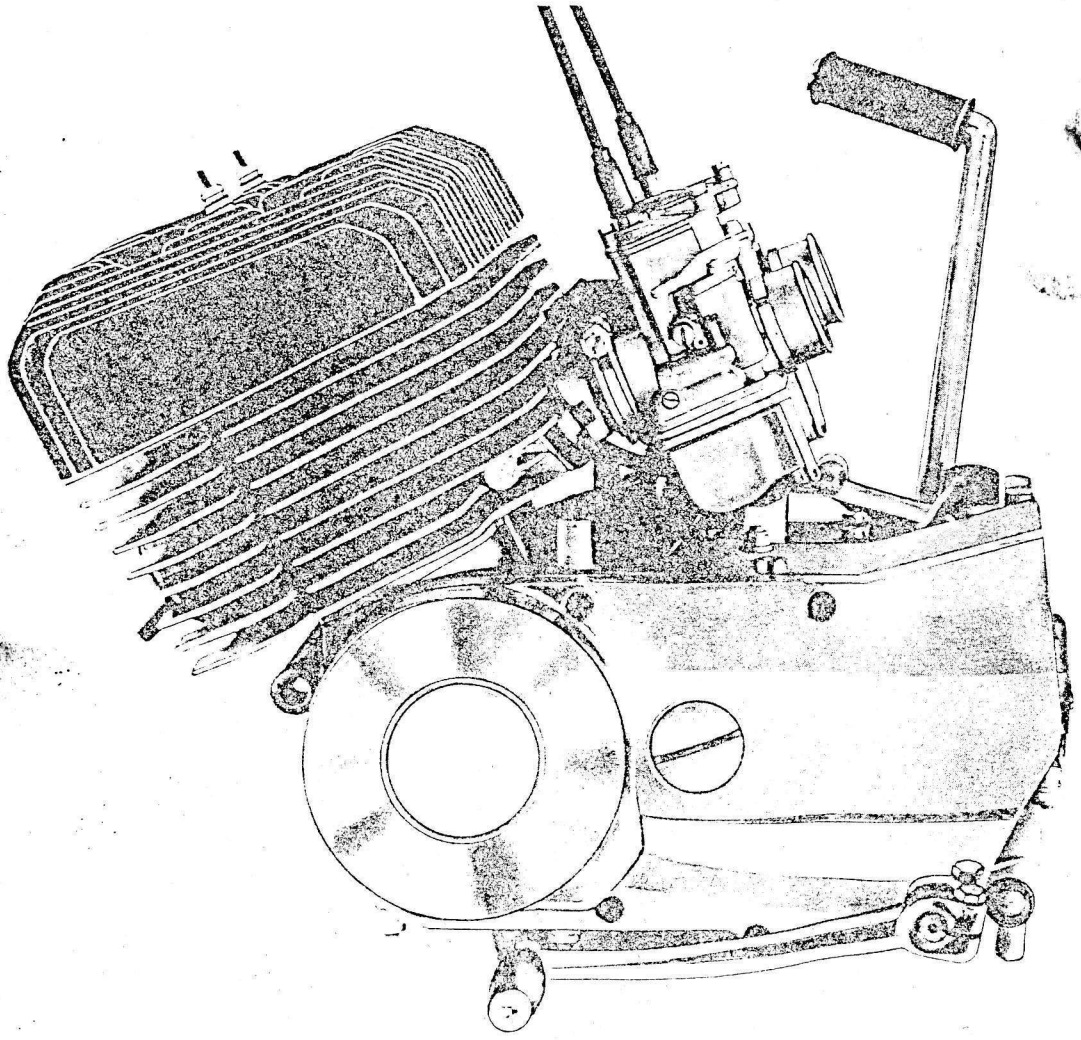

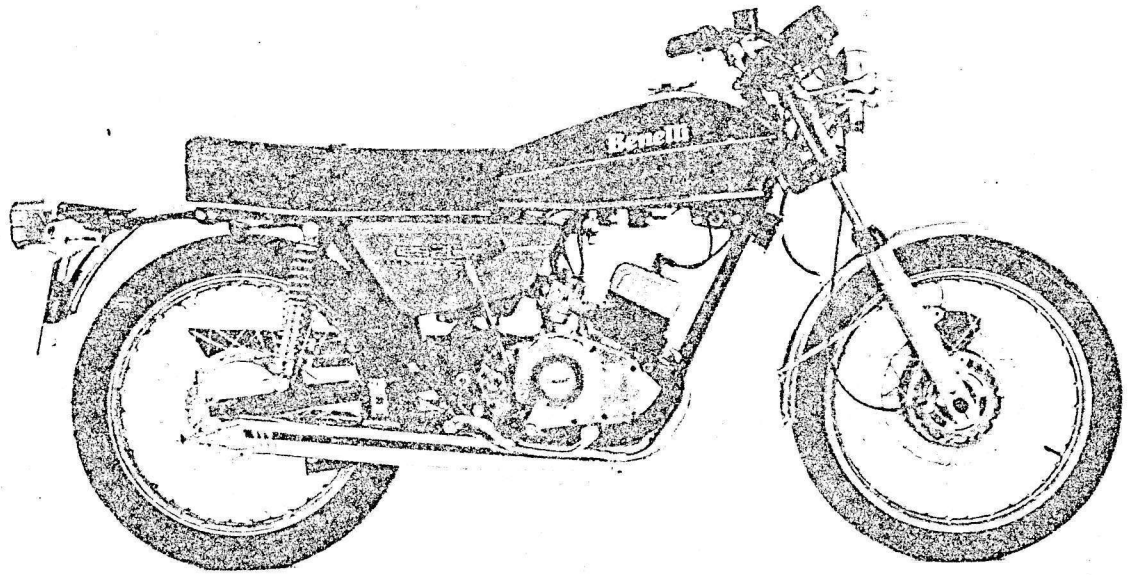
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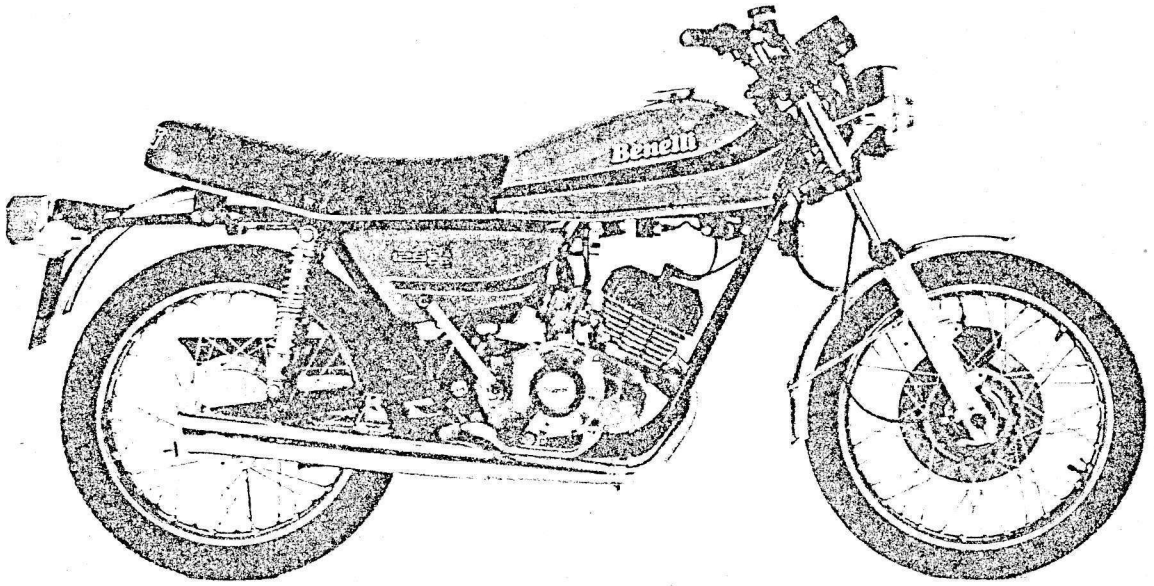
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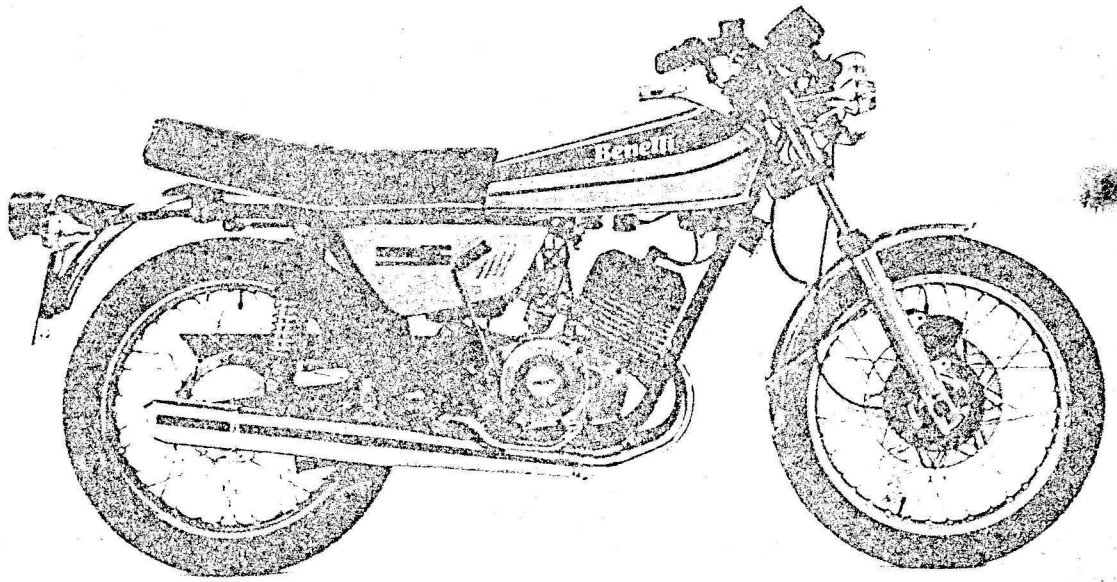
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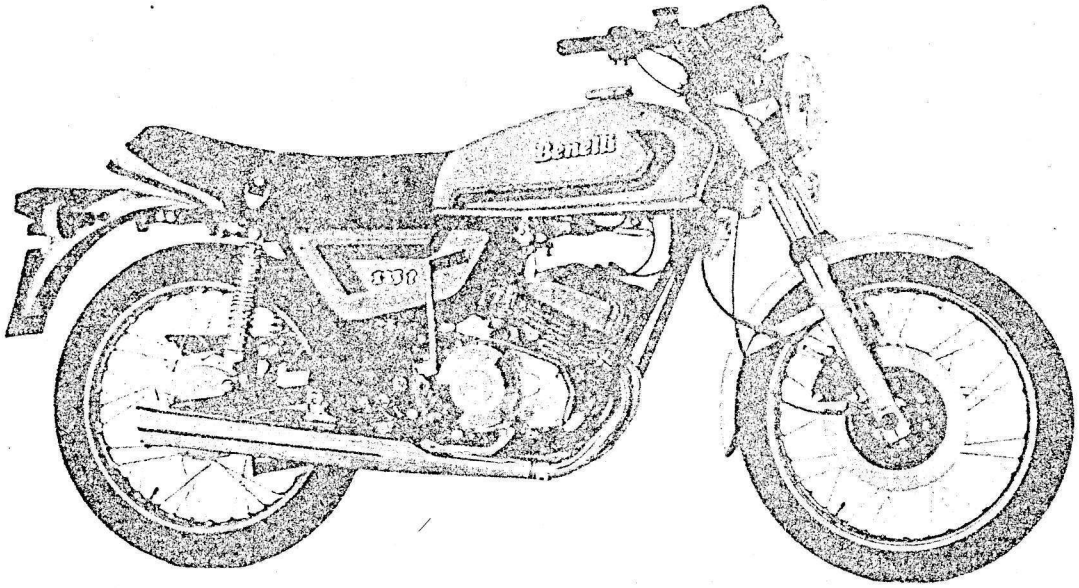
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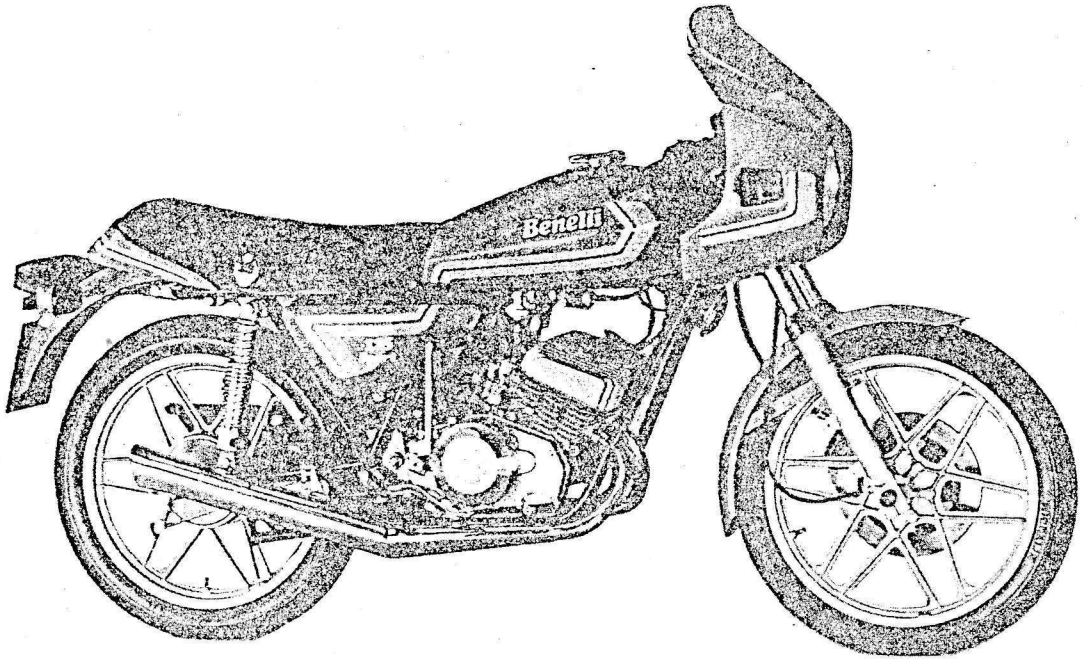
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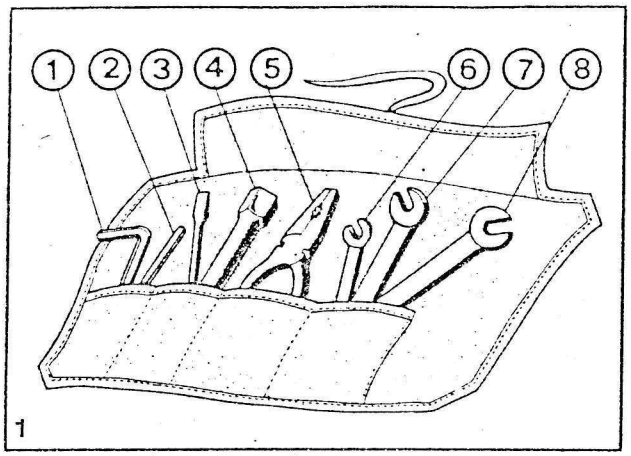
1 MAIN FEATURES

	Model 125	Model 250
Motor ENGINE	2 stroke	2 stroke
— number of cylinders	2	2
— bore per stroke	42.5 x 44 mm	56 x 47 mm
— displacement	124.7 cc	231.4 cc
— compression ratio	10.3	10.3
— max. output	15.4 HP at 7000 rpm - 125-2C 17 HP at 8100 rpm - 125-2C-SE	32 HP at 7000 rpm
Zündung IGNITION	electronic	electronic
— ignition advance	21° corresponding to 20 mm as measured on the outer rotor starting from the arrow on the rotor itself	18° corresponding to 17 mm as measured on the outer rotor starting from the arrow on the rotor itself
— spark plugs	Champion N4-AC 43 XL Bosch W 225 T2 — 125-2C Champion N3-AC 42 XL Bosch W 240 T2 — 125-2C-SE	Champion N4-AC 43 XL ? Bosch W 225 T2 ? Vorsicht! besser W 260 T2!
Vergaser CARBURATION		
— carburettors	n. 2 Dell'Orto SHB 19 B	n. 2 Dell'Orto VHB 25 BD (right); VHB 25 BS (left)
Kraftübertragung TRANSMISSIONS		
— primary	by gears Ratio (Z = 18/53) = 1 to 2.944	by gears Ratio (Z = 18/53) = 1 to 2.944
— secondary	by chain Ratio (Z = 14/42) = 1 to 3.000	by chain Ratio (Z = 17/41) = 1 to 2.411
— clutch	multiplate in oil bath Lever controlled from the L/H side of the handlebar	multiplate in oil bath Lever controlled from the L/H side of the handlebar
— gearbox	5 speed, constant mesh gears Pedal controlled from the L/H of the vehicle Gear ratios: Low gear (Z = 12/34) = 1 to 2.833 2nd gear (Z = 14/26) = 1 to 1.857 3rd gear (Z = 20/26) = 1 to 1.300 4th gear (Z = 22/23) = 1 to 1.045 High gear (Z = 24/21) = 1 to 0.875	5 speed, constant mesh gears Pedal controlled from the L/H of the vehicle Gear ratios: Low gear (Z = 12/34) = 1 to 2.833 2nd gear (Z = 14/26) = 1 to 1.857 3rd gear (Z = 20/26) = 1 to 1.300 4th gear (Z = 22/23) = 1 to 1.045 High gear (Z = 24/21) = 1 to 0.875
— overall gear ratios	Low gear 25.02 2nd gear 16.40 3rd gear 11.48 4th gear 9.22 High gear 7.72	Low gear 20.10 2nd gear 13.18 3rd gear 9.22 4th gear 7.41 High gear 6.21

	Model 125	Model 250
STARTING	by pedal on the R/H side of the vehicle	by pedal on the R/H side of the vehicle
FRAME	tubular structure, duplex cradle	tubular structure, duplex cradle
SUSPENSIONS		
— front	telescopic fork with sealed hydraulic dampers	telescopic fork with sealed hydraulic dampers
— rear	rear swing arm with externally adjustable springs concentric to hydraulic dampers	rear swing arm with externally adjustable springs concentric to hydraulic dampers
WHEELS		
— front	spoked rim, WM 2/1.85 x 18"	spoked rim, WM 2/1.85 x 18"
— rear	spoked rim, WM 2/1.85 x 18"	spoked rim, WM 3/2.15 x 18"
TYRES		
— front	2.75 - 18" ribbed	3.00 - 18" ribbed
— rear	3.00 - 18" studded	3.25 - 18" studded
— front tyre pressure	1.8 kg/sqcm	1.8 kg/sqcm
— rear tyre pressure	2 kg/sqcm (1 person) 2.2 kg/sqcm (2 persons)	2 kg/sqcm (1 person) 2.2 kg/sqcm (2 persons)
BRAKES		
— front	**1st series** mechanical expanding type (dia. 176 mm). Lever controlled from the R/H side of the handlebar **2nd series** disc brake, fixed caliper with double braking cylinder. Lever controlled from the master cylinder on the R/H side of the handlebar. Hydraulic transmission disc dia. 260 mm, braking cylinder dia. 32 mm, master cylinder dia. 12.7 mm	**1st series** mechanical expanding type (dia. 180 mm, width 25 mm). Lever controlled from the R/H side of the handlebar **2nd series** disc brake, fixed caliper with double braking cylinder. Lever controlled from the master cylinder on the R/H side of the handlebar. Hydraulic transmission disc dia. 260 mm, braking cylinder dia. 32 mm, master cylinder dia. 12.7 mm
— rear	mechanical expanding type (dia. 158 mm, width 30 mm)	mechanical expanding type (dia. 158 mm, width 30 mm)

	Model 125	Model 250
OVERALL DIMENSIONS AND WEIGHT		
— wheelbase (fully loaded)	1.310 m	1.310 m
— max length	1.950 m	1.950 m
— max height	1.050 m	1.050 m
— max width	0.780 m	0.780 m
— weight in running order, without rider	127 kg - 113 kg (for mod. 125-2C-SE)	132 kg
PERFORMANCES		
— max speed, (solo)	120 km/h about 130 km/h about (mod. 125-2C-SE)	150 km/h about
— consumption	4.44 l/100 km (CUNA) 5.00 l/100 km (CUNA) (mod. 125-2C-SE)	7.21 l/100 km (CUNA)
FUEL AND OIL CAPACITIES		
— fuel tank	12.5 l including reserve, 5% petrol/oil mixture «Agip F.1 - 2T» 3% (model 125-2C-SE) (for the running in period 5%)	12.5 l including reserve, 3% petrol/oil mixture «Agip F.1 - 2T» (for the running in period 5%)
— gearbox	0.800 l oil «Agip F.1 Rotra SAE 80»	0.800 l oil «Agip F.1 Rotra SAE 80»
— front fork (each leg)		
1st series	0.200 l	0.200 l
2nd series	0.070 l oil «Agip F.1 ATF Dexron»	0.070 l oil «Agip F.1 ATF Dexron»
— front braking circuit (2nd series)	«Agip F.1 Brake Fluid SAE J 1703 C»	«Agip F.1 Brake Fluid SAE J 1703 C»
ELECTRICAL EQUIPMENT		
BATTERY	6 V - 9 Ah	6 V - 9 Ah
BULBS		
— headlight (high/low beam)	6 V - 40/45 W	6 V - 40/45 W
— headlight (town driving light)	6 V - 3 W	6 V - 3 W
— tail light (parking and stop light)	6 V - 5/21 W	6 V - 5/21 W
— turning indicator lights	6 V - 21 W	6 V - 21 W
— speedometer and rev. counter	6 V - 3 W	6 V - 3 W
— panel lights	12 V - 1.2 W	12 V - 1.2 W
FUSE	15 A	15 A
HORN	6 V	6 V
FLASHER	6 V - 40 W	6 V - 40 W



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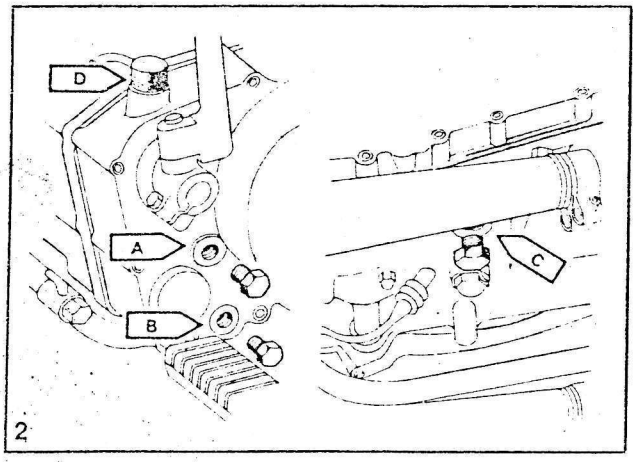
2 OVERHAULING JOBS

The life and efficiency of all the engine and machine components depend on regular and accurate maintenance.
The month and mileage intervals shown in the following pages are intended for a normal use of the vehicle, but if it sustains severe or high speed operation under adverse conditions it may necessitate more frequent servicing.
If the motorcycle has been turned over or involved in a collision have it inspected by your dealer. Every motorcycle is equipped with a tool kit for any emergency operation.

1 Key for screws T.C.E.I. dia. 8.
2 Pin for tubular spanner.
3 Screw driver with tubular spanner 10 mm.
4 Spark plug wrench.
5 Pliers.
6 8-10 mm spanner.
7 12-13 mm spanner.
8 17-22 mm spanner.

2.1 ENGINE LUBRICATION

The lubrication of the engine is automatic because of the presence of oil in the fuel:
— during the running in use 5% mixture (1000 km about);
— after the running in use 5% mixture for the model 125-2C, and 3% mixture for the models 125-2C-SE and 250-2C.
Recommended mixture «Agip F.1 2T».



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2.2 GEARBOX LUBRICATION

a Checking the oil level

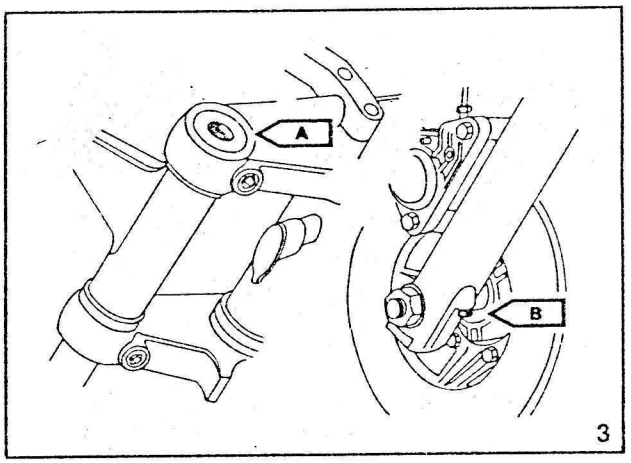
Every 500 km check the oil level in the gearbox housing. The oil has to nearly reach the lower side of the inspection rim «A»; should it be under this level, add oil of the recommended type. It is advisable not to overfill the gearbox in order to avoid the clutch becoming too hard and the oil to leak through the breather tube on the cap «D» because of too much pressure.

b Changing the oil

After the first 1000 to 1500 km and at 6000 km intervals or so, change the oil in the gearbox housing. This change will be carried out with a warm engine proceeding as follows:
1 Place a container under the crankcase to catch the oil, loosen the caps «A-B-C» which are located on the R/H side of the engine and under the engine itself. It is advisable to remove the filler cap «D» too.
2 Refit the caps «B» and «C» then fill the oil tank through the hole «D» until the oil leaks out of the hole «A».
Oil quantity: 0.800 l about «Agip F.1 Rotra MP SAE 80».

2.3 CHANGING THE OIL IN THE FRONT FORK

Every 10,000 km about, or whenever necessary change the oil in the front fork proceeding as follows:
— undo the filler caps «A» and the drain plugs «B»;
— let the oil fully drain, then refit the drain plugs «B»;
— introduce 0.200 l of oil «Agip F.1 ATF Dexron» into each leg, for the 1st series (drum brake);
— introduce 0.070 l of oil «Agip F.1 ATF Dexron» into each leg then refit the filler caps «A», for the 2nd series (disc brake).



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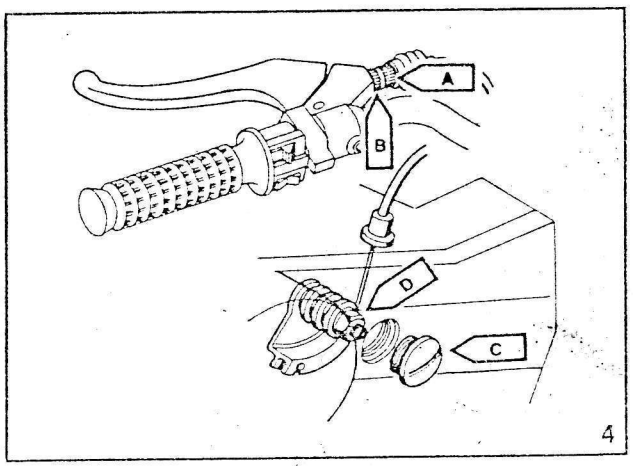
Beim Ölwechsel je Holm beide Inbusschrauben (große kleine) lösen, und im Komplett ausgefederten Zustand Öl einfüllen.

2.4 DRIVE CHAIN LUBRICATION

Normally it is not necessary to remove the drive chain to lubricate it; should it be very dirty, it will be necessary to wash it in a petrol bath, to carefull dry it and to smear it with «Agip F.1 Grease 30» or «Agip Rocol Chain & Drive Spray».

2.5 ADJUSTING THE CLUTCH CONTROL

If the free play at the handlebar is more or less than 3-4 mm (1/8-5/32") slacken the ring «B» and screw in or out the adjuster «A» to obtain the correct measure.
If this adjustment is not sufficient, loosen the cap «C» on the engine and screw in or out the proper adjuster.



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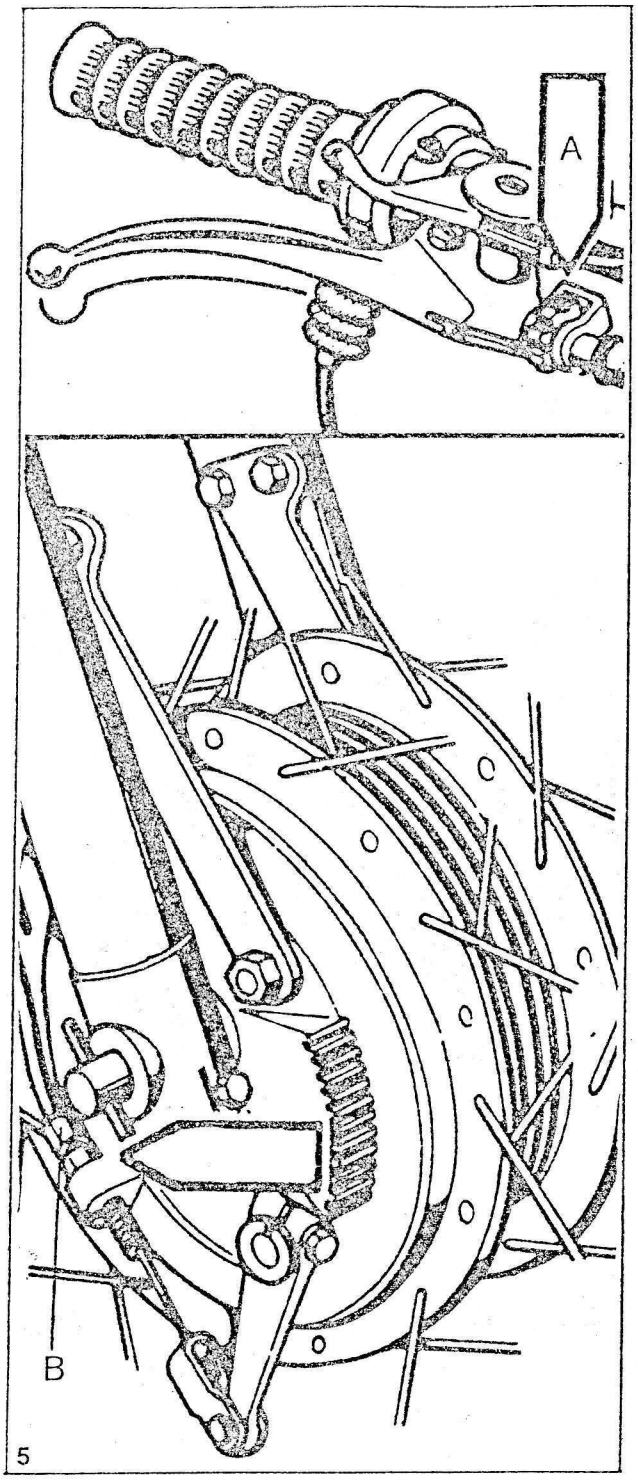

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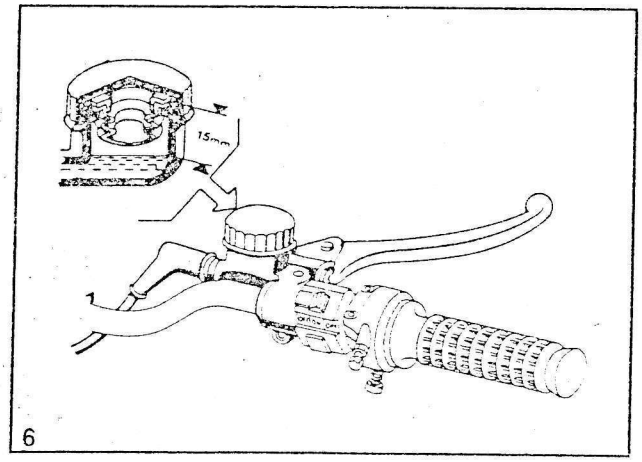
2.6 ADJUSTING THE DRUM BRAKE CONTROL LEVER ON THE FRONT WHEEL (1st series)

Periodically check that the play at the handlebar is not over 20 to 25 mm (see «A») otherwise turn the proper adjuster ring.
It is also possible to operate the cable adjuster screwed on the shoe holder, after loosening the counternut (see «B»).



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2.7 ADJUSTING AND SERVICING THE DISC FRONT BRAKE (2nd series)

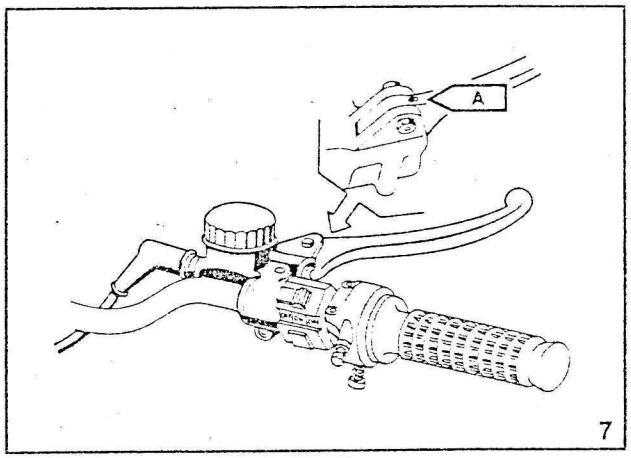
For a good efficiency of the front brake strictly follow these directions:
— periodicaly check the fluid level in the master cylinder; it must never fall under the point shown in the figure;
— periodically (every 5000 km or so) top up the fluid in the master cylinder, use only «Agip F.1 Brake Fluid SAE J 1703 C» taking it from an original container to be opened only when used;
— completely renew the brake fluid every 20,000 km or at least every two years;
— check the play between the floater in master cylinder and the end of the control lever, if it is

not 0.05 to 0.15 mm act on the screw «A» to adjust correctly to this measurement.
The fluid pipes have to be always full and without air, a long and elastic movement of the control lever means that there is air inside the braking circuit.
In case of washing use only fresh fluid. Use no alcohol for washing and no compressed air for drying, for metal parts use trychlorethylene.
Every 5000 km check the wear condition of the brake pads:
— new pad thickness: 7 mm;
— wear limit: 3.5 mm.
If the thickness of the pads is below 3.5 mm, replace the pads.
After pad replacement it is not necessary to bleed the air from the braking circuit, but operate the control lever only to bring the pistons back to their normal position.

NB - *It is however, advisable to remove a little fluid off the master cylinder during the pad replacement, as the return of pistons into their seats could let the fluid leak out.*

Important - During the first 100 km riding after pad replacement do not brake strongly and long, in order to allow the friction material to be properly run in.

Carefully check the hydraulic pipe condition. In case of any damage, replace immediately.
Flexible ducts or rigid pipes damaged or bruised have to be replaced immediately.
In addition, check the various connections to make sure there is no fluid leaking, if this is the case tighten the leaking connection, and if necessary replace the pipe or the copper gasket.
The brake disc must not show any trace of oil, grease or other dirt and any deep scoring.



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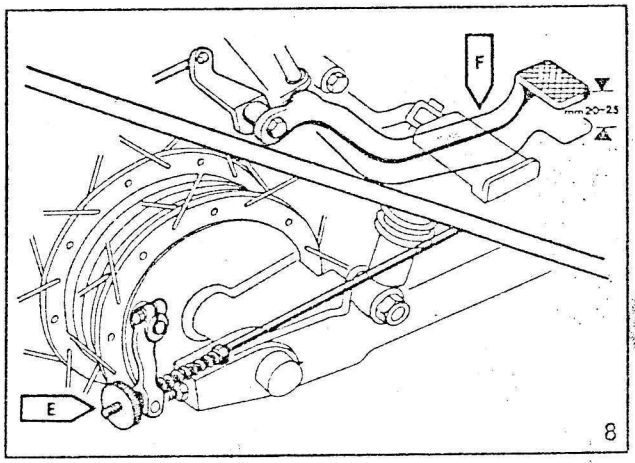
2.8 ADJUSTING THE REAR BRAKE CONTROL

If the control lever has too much travel before the shoe linings come in touch with the brake drum, screw the knob «E» of the control link, paying attention to leave a free play of 20 to 25 mm measured at the end of the control lever «F», before the linings touch the drum.



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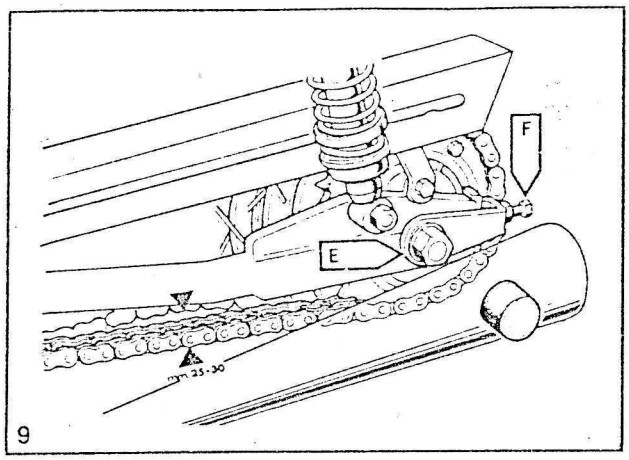

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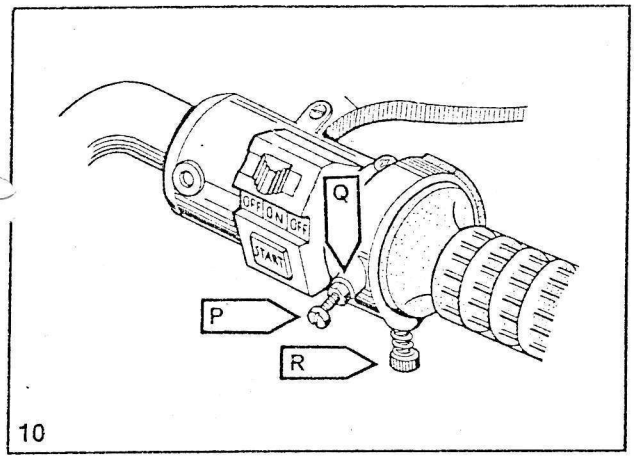
2.9 ADJUSTING THE FINAL DRIVE CHAIN

With the motorcycle off the stand, the chain must have a free play of 25-30 mm, in order to avoid excessive tightening during the rear fork swinging.
To adjust proceed as follows:
— slacken the nuts «E» (wheel spindle) and turn the chain adjuster bolts «F» in order to centralize the wheel in the rear fork.
After this adjustment, remember to adjust the free play of the rear brake control lever (see proper chapter).



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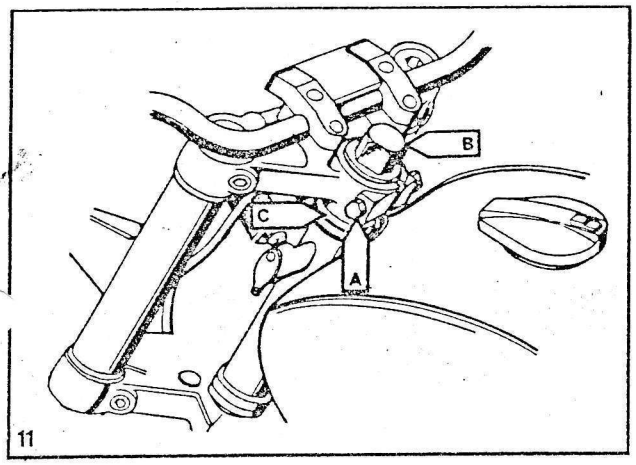
2.10 ADJUSTING THE THROTTLE CONTROL TWIST GRIP

To adjust the travel of the throttle control twist grip, adjust screw «P» after loosening the counternut «Q».
To harden the twist grip travel act on the screw «R».



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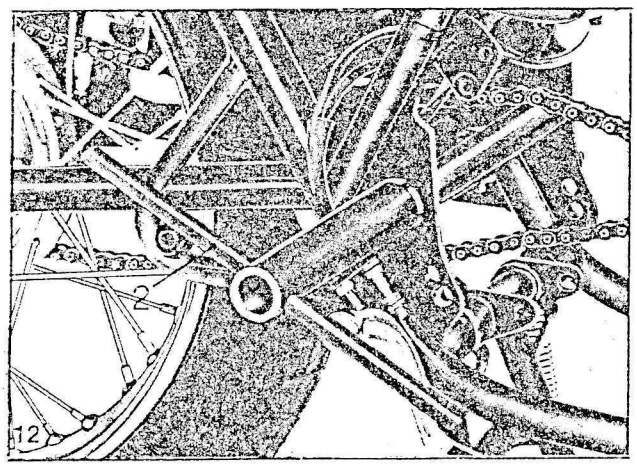
2.11 ADJUSTING THE STEERING

For a safe riding, the steering has to be so adjusted to allow free movement of the handlebar but without excessive play.
Operations are as follows:
— slacken the steering head fixing screw «A», loosen the nut «B» and screw in or out the adjusting ring «C» until regular play is reached;
— after the adjustment lock the nut «B» and the screw «A».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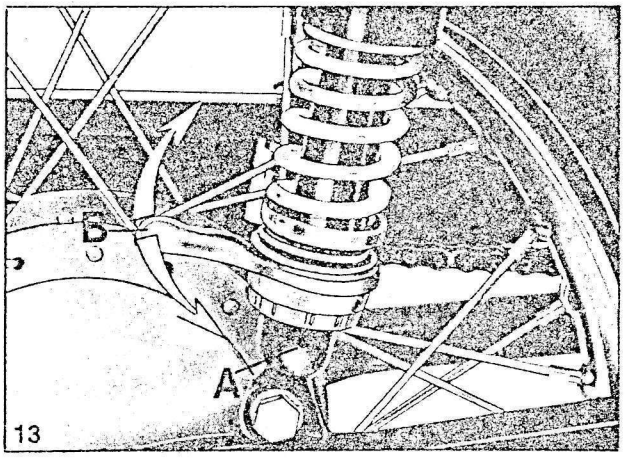
2.12 ADJUSTING THE REAR SWINGING FORK

Periodically check the side play of the swinging arm. If needed, adjust it as follows: using the proper tool (2), slacken the ring on the R/H side of the motorcycle and screw in the pin to allow the arm to move freely but without side play.
Lock the ring and check the play again.

2.13 ADJUSTING THE REAR SUSPENSION

The springs of rear suspensions units can be adjusted to five positions, turning the lever «B» to the right or to the left.
Starting from position «I» in correspondence with the red mark «A» on the suspension body, turn the lever «B» (see the arrows) into the positions «II», «III», «IV», «V» paying attention that these positions must always be in correspondence with the mark «A», (for mod. 125-2C, the positions are three).
If the damper action is not correct, replace them or have them checked by the manufacturer.

For good stability of the motorcycle, the springs of the two suspensions have to be adjusted to the same position.



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2.14 TYRES

Tyres are included in the components which must be very carefully checked as vehicle stability, riding comfort, and even rider safety are dependant on their conditions. It is not legal to use tyres having less than 1.5 front and 2 mm rear tread thickness. An incorrect tyre pressure may affect the vehicle stability and cause the tyre to quickly wear out.

Recommended pressures are:
— front wheel, one or two persons:
1.8 kg/cm² (25.5 lbs);
— rear wheel, one person:
2.0 kg/cm² (28.5 lbs);
— rear wheel, two persons:
2.2 kg/cm² (31.5 lbs).

If using the motorcycle at a constant high speed increase the tyre pressure by 0.15 kg/cm² (2.2 lbs).

2.15 LUBRICATION AND MAINTENANCE CHART

Before starting

1 Check braking efficiency.
2 Check tyre pressure.
3 Check battery electrolyte level.
4 Check clutch efficiency.
5 Check drive chain tightening.
6 Check electrical equipment efficiency.
7 Check suspension efficiency.

Every 500 km

8 Check the oil level in the gearbox.

After the first 500 km

9 Check the spoke tension and the wheel truing.

After the first 1500 km

10 Check brake efficiency.
11 Check and inspect the carburation.
12 Lubricate the throttle control cable.
13 Check locking of fixing screws for heads and intake tubes.
14 Clean the spark plug electrodes and adjust their gap.
15 Adjust and lubricate the drive chain.
16 Check the fluid level in the master cylinder.
17 Check spoke tensioning and wheel truing.
18 Check ignition adjustment.

Every 3000 km

19 Check the oil level in the engine crankcase.
20 Clean the fuel circuit.
21 Clean and adjust the spark plug electrodes.
22 Clean the air filter, using low pressure air.
23 Check the fluid level in the master cylinder and the pad thickness of the front brake.

After the first 4000 km

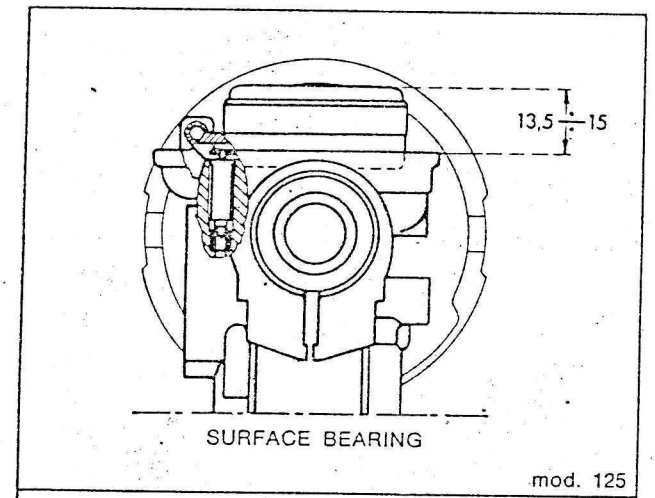
24 Check brake efficiency.
25 Check and eventually adjust the carburation.
26 Check and eventually adjust the throttle control cable.
27 Check and tighten all nuts and bolts.
28 Check and eventually adjust the spark plug electrodes.
29 Adjust and lubricate the drive chain.
30 Check the fluid level in the master cylinder.
31 Check spoke tightening and wheel truing.

Every 6000 km

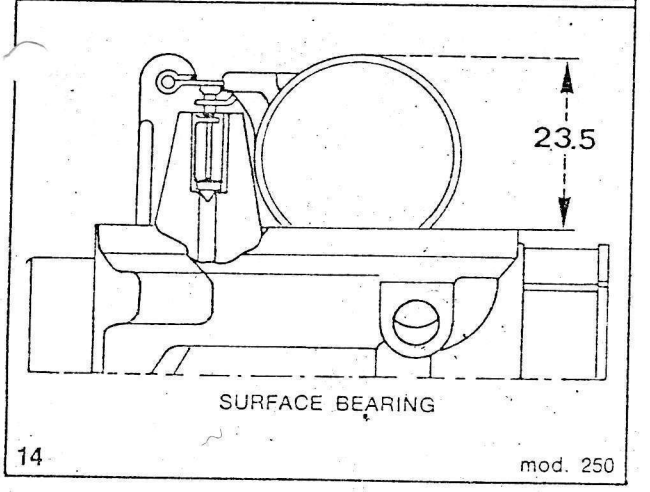
32 Check the fluid level in the master cylinder.
33 Change the gearbox oil.
34 Replace the spark plugs.
35 Replace the air filter.
36 Adjust the rear brake control lever.
37 Adjust the clutch control lever.
38 Check and eventually adjust the carburation.
39 Lubricate the throttle control cable.
40 Check and tighten all nuts and bolts.

Every 10,000 km

41 Check and tighten all nuts and bolts.
42 Check the ignition adjustment.
43 Replace the oil in the fork legs.
44 Lubricate the bearings of the rear wheel.
45 Check the condition of caps and balls of the steering and replace the grease «Agip F.1 Grease 30».



mod. 125



mod. 250

2.16 CARBURATION

1 Carburettors

Standard carburettor setting

Carburettor for **mod. 125**	Carburettor for **mod. 250**
Dell'Orto	Dell'Orto
type SHB 19-19 B	type VHB 25 BD/BS
Throttle 7938.03	Throttle 50
Main jet 105	Needle E30 (2nd notch)
Idling jet 42	Atomizer 260 S
Starter jet 55	Main jet 98
Floater 3.5 gr	Idling jet 45
Idling screw opening	Starter jet 70
1 turn and a half	Floater 10 gr
	Idling screw opening
	1 turn and a half

2 Float level

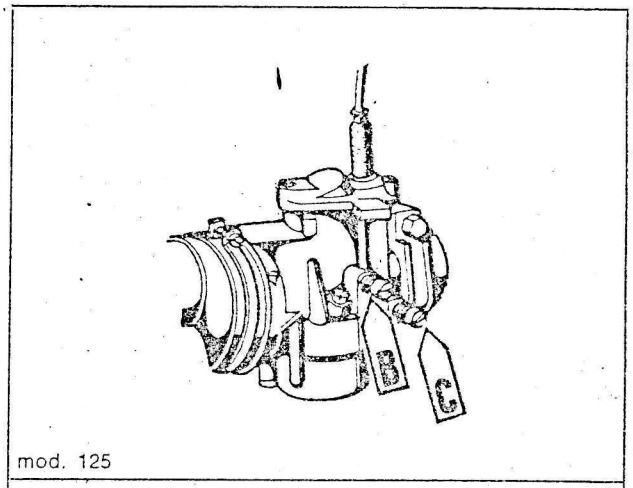
Ensure that the float weight is as recommended and indicated on the float itself and the float rotates freely on its pin.
Keep the carburettor body as indicated so that the float balance slightly touches the needle and the needle slightly touches the seat.
Under this condition check if the two float halves are of the fixed measure in respect of the body plane.

3 Adjusting the idling speed

Proceed as follows:
— ensure that the throttle control cables have a free play of about 2 mm; twist grip fully closed;
— fully screw in the idling adjuster screws «C», then screw them out from 1 turn to 1 turn and a half (see fig. 15).

4 Adjusting the carburetion

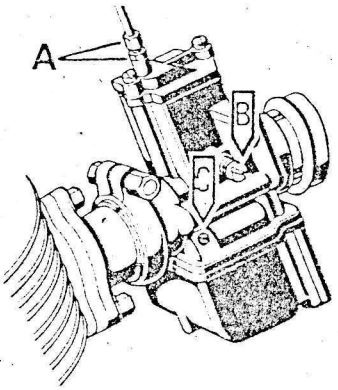
This adjustment has to be done when **engine is warm** by proceeding as follows:
— start the engine, act on reserve «B» until the engine reaches 1500 to 1700 rpm.
During this adjustment check if the exhaust pipe pressures are equal for both cylinders, in order to ensure that both cylinders are duly synchronized.
Then adjust the screws «C» and «B» to obtain the desired carburation adjustment.



mod. 125

5 Adjusting the carburettor controls on the handlebar

This vehicle fits n. 2 carburettors with the following controls:
— a twist grip controlling the throttle;
— two levers controlling the starters on carburettors;
— a twin control for the cables going to carburettors.

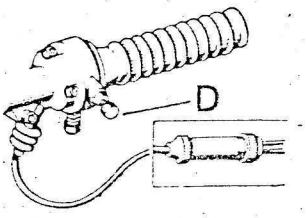


mod. 250

15

6 Synchronizing the carburettors

Proceed as follows:
— undo the stop screws «D» on the throttle control twist grip, and fully turn the grip towards the rider;
— ensure that the throttle control cables on the carburettors have no play, otherwise adjust the screws «A» with counternuts on carburettors;
— screw in the stop screw «D» on the handlebar until it touches the twist grip body, then lock the counternut;
— ensure that the control cables on the handlebar have 2 to 3 mm play.



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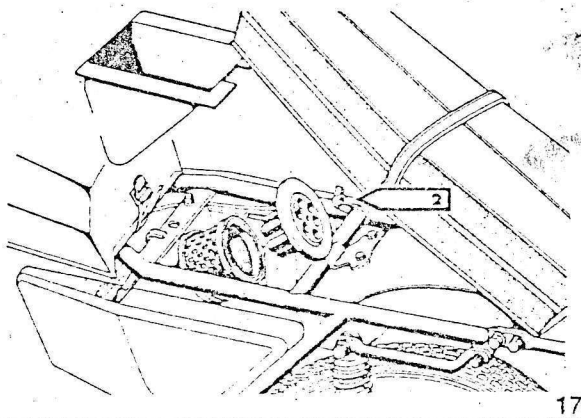
Caution - Sometimes a faulty carburetion may be due to:
— very dirty air filter;
— carbon deposits in the exhaust ducts, on cylinder heads or piston tops.
It is therefore advisable to check the above before any adjustment of the carburation.

NB - *It is recommended not to modify the previously mentioned standard carburettor setting, unless required by particular temperature or height (over sea level) conditions.*

7 Cleaning and replacing the air filter

Lift the saddle and remove the tool box, undo the nut «2», take off the cover and slide out the air filter.
If it is still in good conditions, blow it with low pressure air jet, otherwise replace it.
Every 6000 km the air filter has to be replaced.



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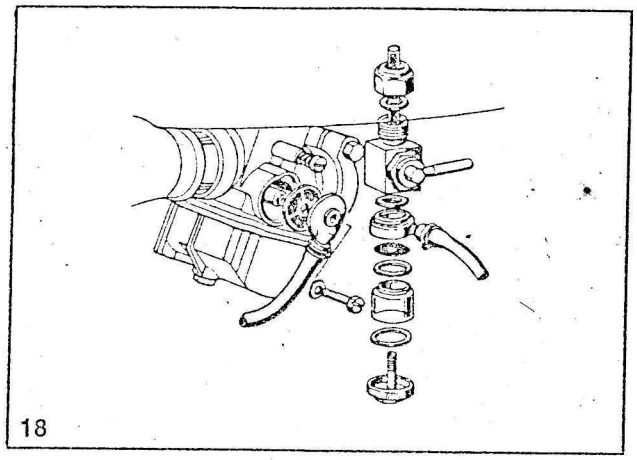

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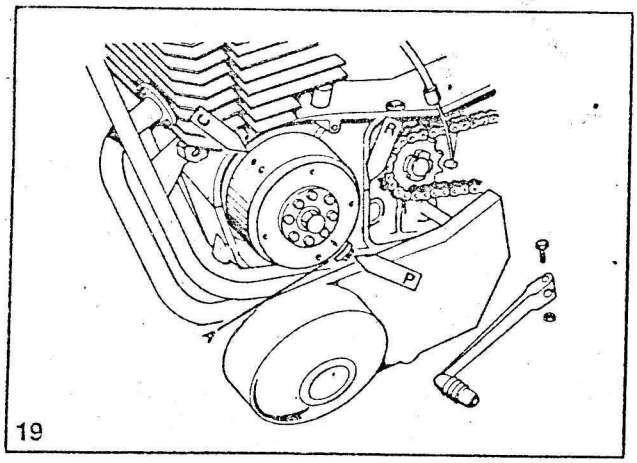

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8 Cleaning the fuel system

Every 10,000 km or whenever necessary, clean the fuel tank, the fuel filters in taps and carburettors and the pipes carrying the fuel to the carburettors using petrol and compressed air jets.

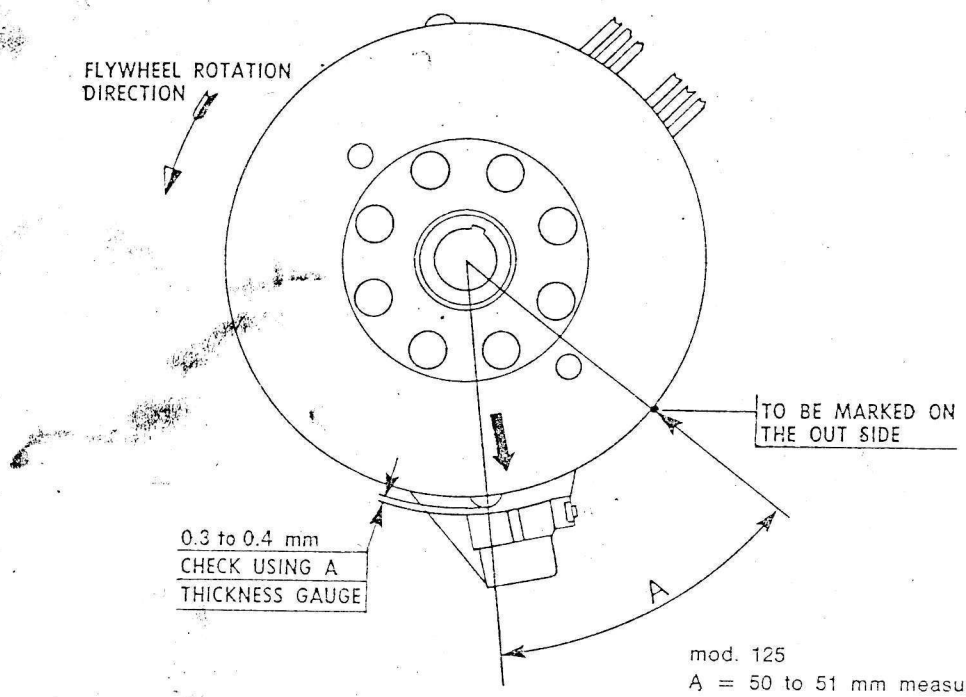
2.17 IGNITION

1 Spark plugs

Ensure that the electrodes gap is 0.5 mm (0.20″); the spark plugs are best cleaned with petrol and a wire brush using a needle for the inner part. In re-fitting the spark plugs ensure they are properly started by hand for a few turns completing the operation by means of a proper plug spanner. For all events the plugs have to be replaced every 6000 km, even if they appear to be still in good condition.

2 Electronic ignition

To ascertain the proper working of the electronic ignition, proceed as follows:
— take off the gear change pedal and remove the L/H side engine cover;
— using a feeler gauge ensure that the clearance «A» between the «pick-up» inner part and the rotor «C» outer prominence is 0.3 to 0.4 mm. This clearance is fixed in the factory, therefore no other adjustment is foreseen. If necessary, it is however possible to recover 0.1 to 0.2 mm. For this operation remove the rotor, undo the screws «E» (see fig. 21) securing the stator plate «F» to the crankcase and eventually adjust the clearance between the screws «E» and the hollows of the stator plate «F».



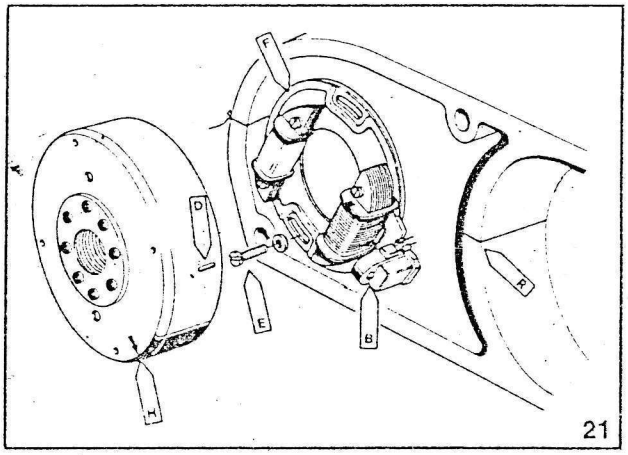
mod. 125
A = 50 to 51 mm measured on the circumference

mod. 250
A = 46 to 47 mm measured on the circumference

20

3 Adjusting the ignition timing

First of all (after ensuring that the rotor does not show any mark other than the arrow «H») it is necessary to trace a mark «D» (in counter-clockwise rotation) at about 50 to 51 mm (for the mod. 125-2C) and 46 to 47 mm (for the mod. 250-2C) starting from the centre of prominences on the rotor near the arrow «H».
Rotate the flywheel as to align the rotor arrow with the notch «B» located on the «pick-up» on the stator plate. If everything is normal, the traced mark «D» must be aligned with the two crankcase halves connection «R».
Eventual adjustments are made as follows:
— using a 17 mm wrench and proper tool take off the rotor;
— undo the screws «E» securing the stator plate «F» to the engine crankcases;
— rotate the stator plate «F» as to get the proper timing, then fix it to the crankcase without locking the screw «E»;
— re-fit the flywheel rotor and check the alignment of the rotor arrow «H» with the «pick-up» notch «B».
Ensure that everything is normal, take off the rotor and lock the screws «E» paying attention not to modify the position of the plate.
Re-fit the rotor, locking its securing nut to the crankshaft.



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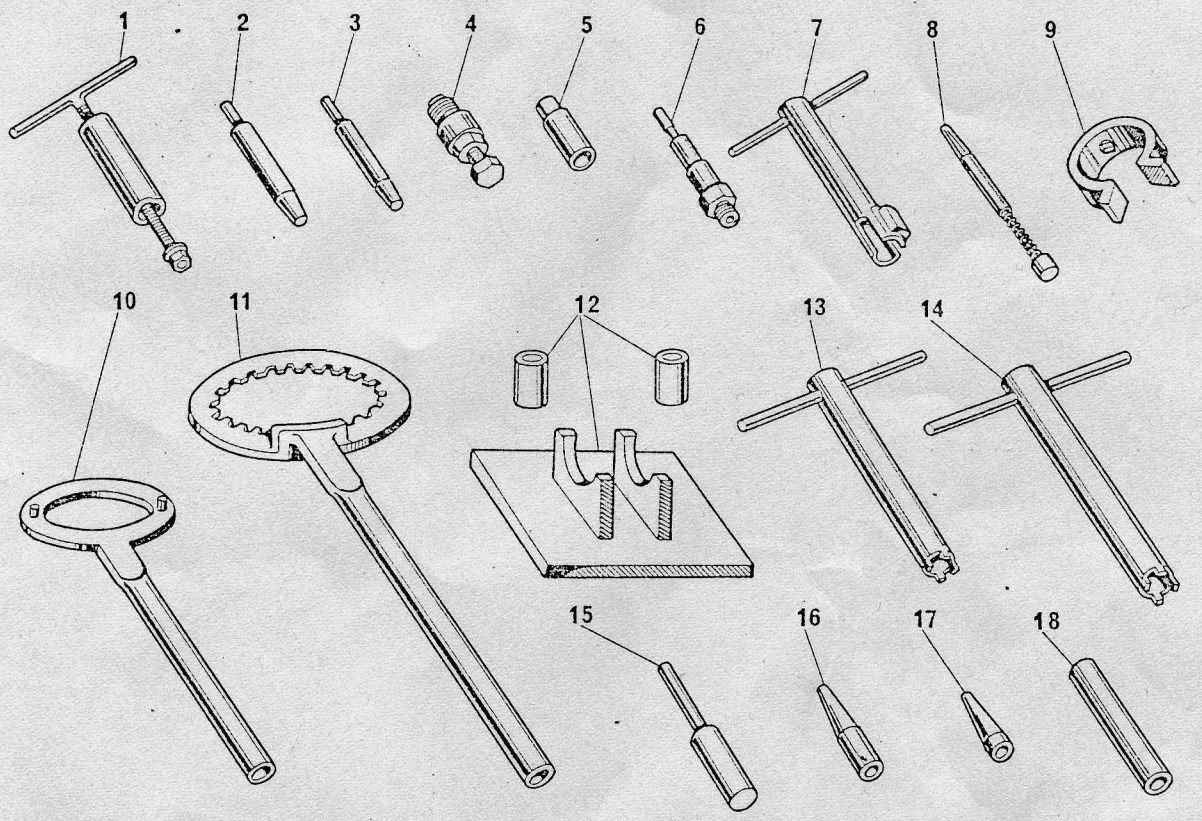
Flywheel = Polrad

3 TORQUE LOADING

	kgm
Cylinder head securing nut	2.5
Spark plug	1.2 to 1.6
Nut for stud bolt, crankcase securing	2
Right cover securing screws	1
Nut securing exhaust pipe to cylinder head	2
Intake tube securing screws	2.5
Engine pinion securing nut	9
Flywheel securing nut	3 to 3.5
Standard rates	
Screws dia. 6 mm	0.8 to 1.2
Screws dia. 8 mm	2 to 2.4



22

POS. N.	PART N.	DESCRIPTION
1	39 90 78 50	Puller piston pin
2	39 90 78 51	Tool for pressing in piston pin 250
3	39 90 78 52	Tool for pressing in piston pin 125
4	39 90 66 50	Puller flywheel
5	39 91 07 50	Bush, removal of gear selector
6	39 91 07 51	Support, dial gauge
7	39 90 27 50	Tool, starting spring charging
8	62 90 93 00	Puller
9	39 90 28 50	Tool, engine pinion holdfast
10	39 91 18 50	Tool, flywheel holdfast
11	39 90 65 50	Tool, removal of clutch body
12	39 90 65 51	Support for con-rod checkings
13	39 91 26 00	Wrench, clutch ring and engine pinion
14	39 90 30 00	Wrench, rear fork ring
15	14 92 64 00	Puller, master cylinder float
16	18 92 65 00	Tool, fitting of master cylinder gasket
17	18 92 66 00	Tool, fitting of master cylinder gasket
18	18 92 67 00	Tool, fitting of master cylinder float lock ring

5 ENGINE REMOVAL AND REFITTING

5.1 REMOVING THE ENGINE FROM THE FRAME

a Proceed as follows:

1 lift the saddle;

2 unhook the clamp securing the fuel tank rear side;

3 close the fuel taps, slide out the fuel pipes from the taps and take the fuel tank off the rubber bushings on the frame;

4 undo the screws and remove the side covers;

5 unhook the securing clamp and remove the battery cover, then slacken the nuts and detach the cables (positive and negative);

6 detach the electric wiring from «pick-up» impedance, spark plugs and so on;

7 undo the nuts securing the exhaust pipe flanges on cylinders and the screws securing silencer and foot rest to the frame, then remove the exhaust pipe ass.y;

8 undo the screw and slide out the gear control lever from the selector on the L/H side of the vehicle;

9 undo the screws and slide out the pedal of the starting shaft on the R/H side of the vehicle;

10 undo the securing screws and take off the front chain cover;

11 using the proper wrench, undo the 5 screws and remove the left cover from the engine crankcase, then detach the clutch control cable;

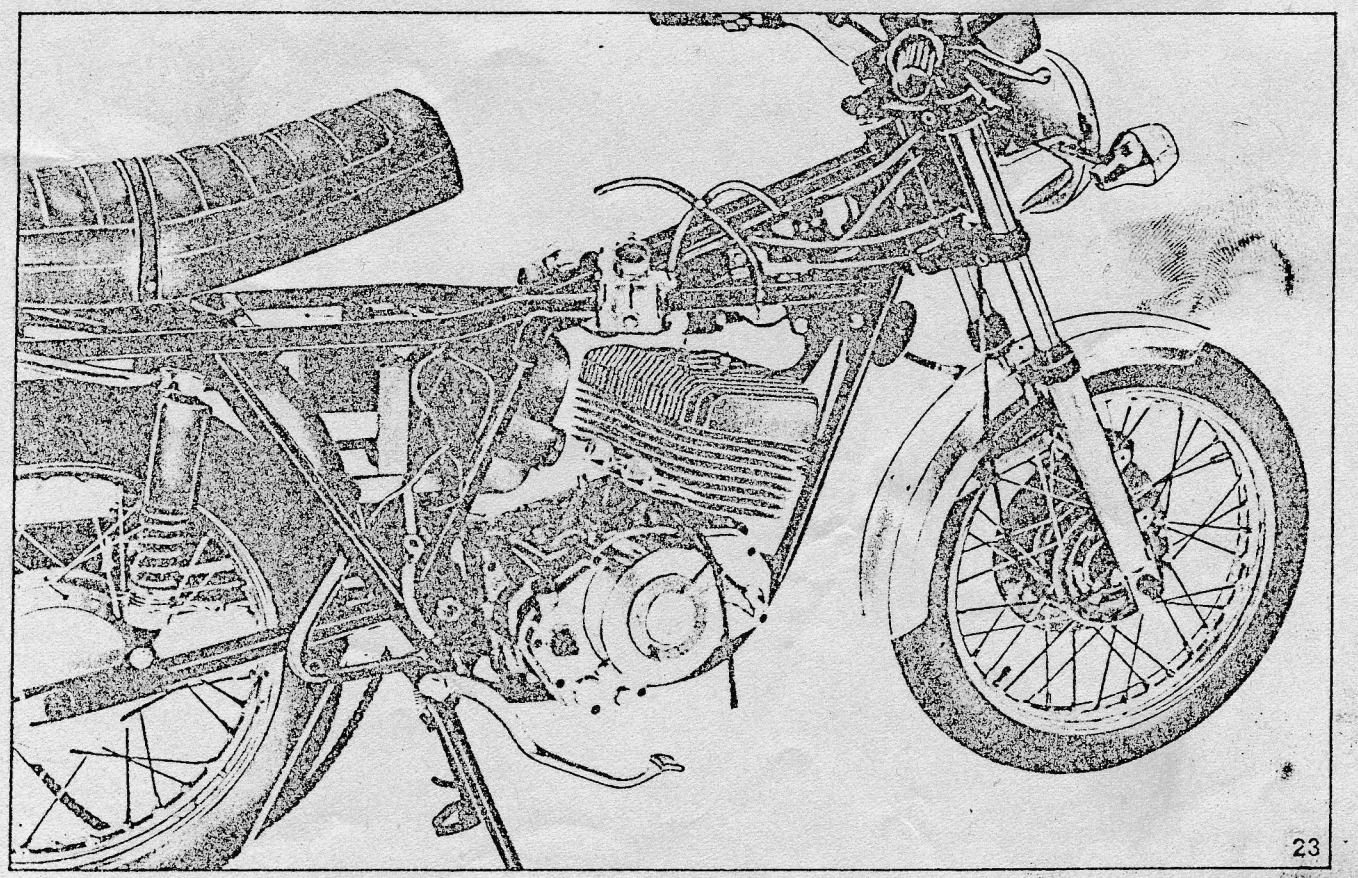
12 take out the chain link and slide the chain off the sprocket;

13 slacken the screws of straps securing the rubber manifolds on carburettors;

14 take the rubber manifolds off carburettors and cartridge air filter box;

15 undo the screws and take the carburettors off intake tubes on cylinders;

16 undo nuts and screws and slide out the pins securing engine to frame, be certain to remove the engine stop plate on the side where the engine is slid out.



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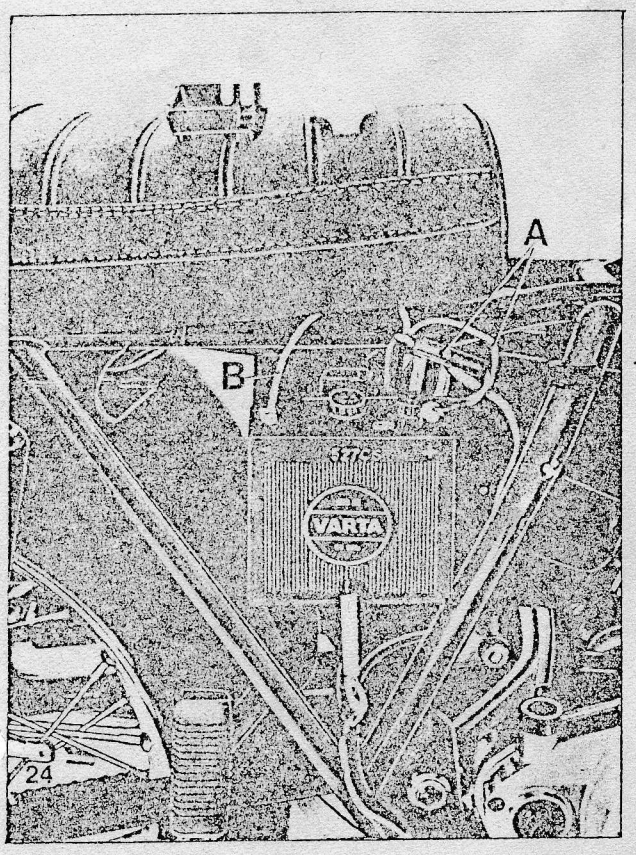

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5.2 RE-FITTING THE ENGINE INTO THE FRAME

b In re-fitting the engine into the frame reverse the removal sequence paying attention to the following:

1 before re-fitting the left cover onto the engine crankcase, connect the clutch control cable to the clutch lever;

2 adjust the clutch (see chapter «Clutch adjustment»);

3 connect the battery cables to their clamps: the two red cables «A» (the one with fuse into proper fuse holder) to the clamp marked (+); the white cable «B» to the clamp marked (—), see the figure;

4 adjust the rear brake control lever (see proper chapter and figure), after adjusting the chain tension (see chapter «Adjusting the final drive chain»);

5 check and eventually adjust the carburation (see chapter «Carburation and settings»).

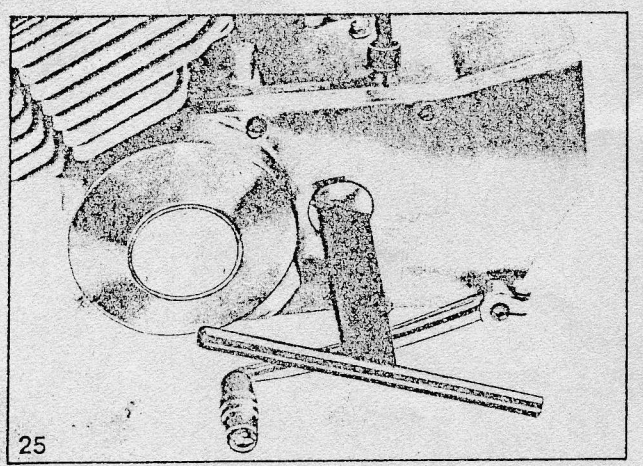
6 ENGINE STRIPPING AND ASSEMBLING

6.1 STRIPPING THE ENGINE

a Proceed as follows:

1 remove the caps «A» and «B» (see fig. 2) and drain the oil from the engine crankcase;

2 slacken the screws and take the gear control from the selector shaft;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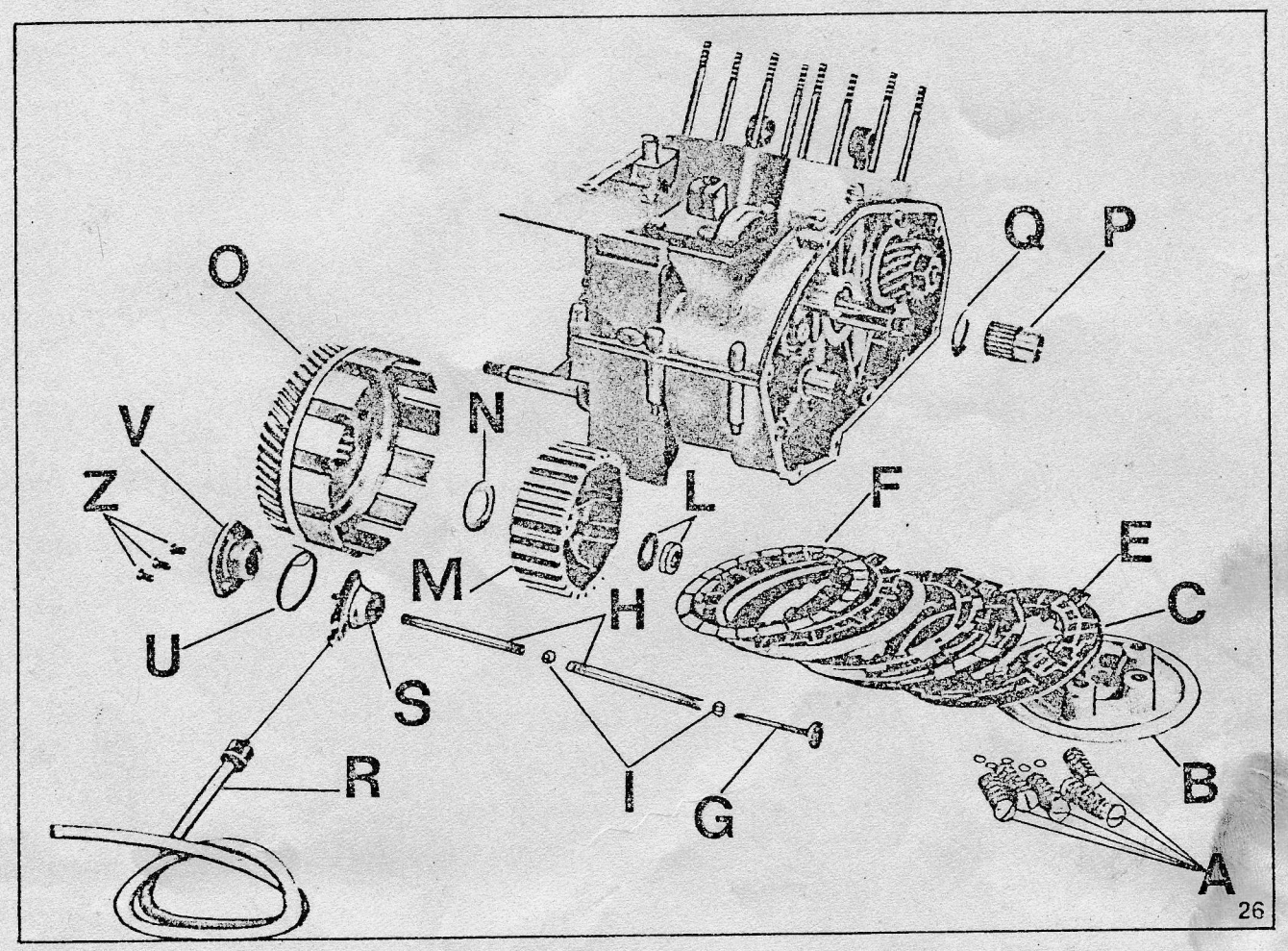
3 using the special tool remove the plug from the left crankcase cover;



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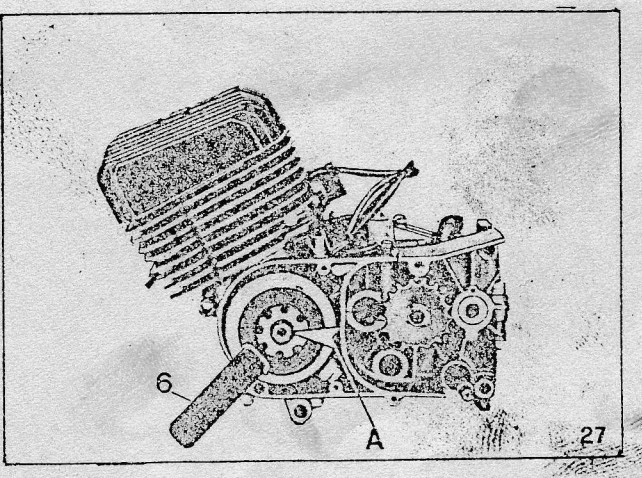
4 undo the screws and take off the crankcase left cover; from this cover remove the following (see fig. 26):
— the cable of the clutch lever «R»;
— the clutch control lever «S»;
— the spring «U»;
— undo three screws «Z» securing the bushing «V» to the crankcase and remove the bushing itself;

5 using a proper wrench and special holdfast tool (6 in the figure) undo the nut «A» securing the rotor flywheel to the crankshaft;

6 using proper wrench and puller (5 in figure) remove the rotor flywheel from the crankshaft;



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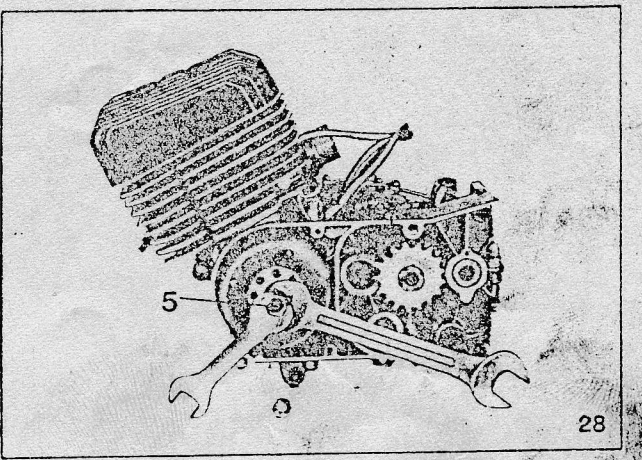

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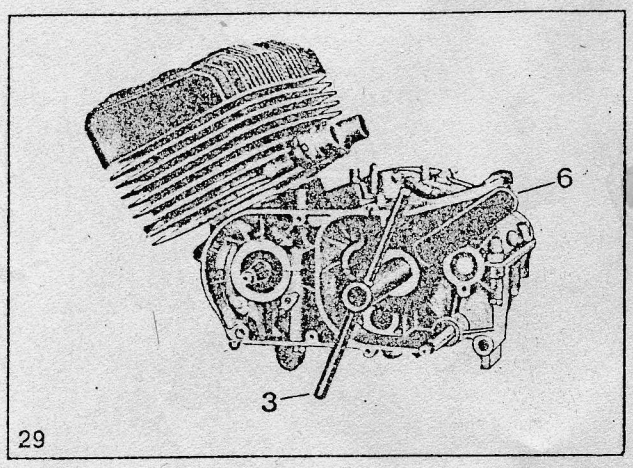


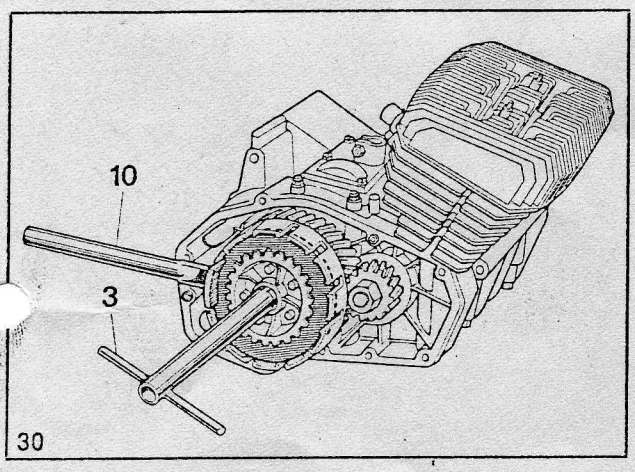
29

7 using the holdfast tool (6 in figure) and special wrench (3 in figure) undo the ring securing the chain pinion to the layshaft in the gearbox then take the pinion off the layshaft;

8 slacken the securing screw and remove the pedal kick starter;

9 slacken the screws and remove the R/H cover from the crankcase;

10 slacken the five screws «A» with springs and springs washers (see fig. 26) then take off the following:
— the clutch outer plate «B»;
— the internally toothed driven plate «C»;
— the rubber gasket;
— the externally toothed driving plate «E»;
— the other five driven plates, the five gaskets and the four driving plates;
— the plate «F»;
— from the shaft remove the pusher «G» then using a rod slide out the rods «H» and the balls «I» (act on left side);



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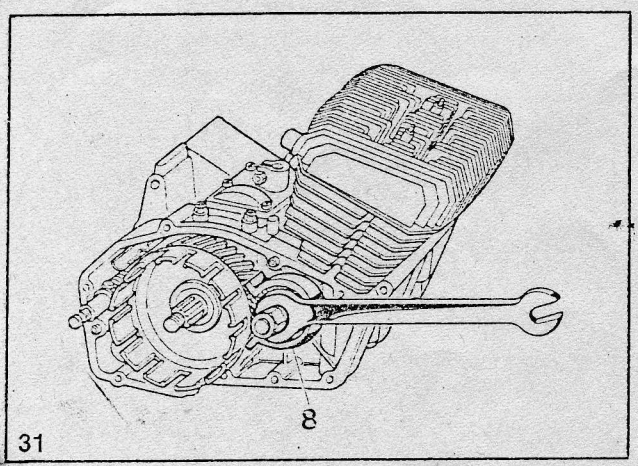
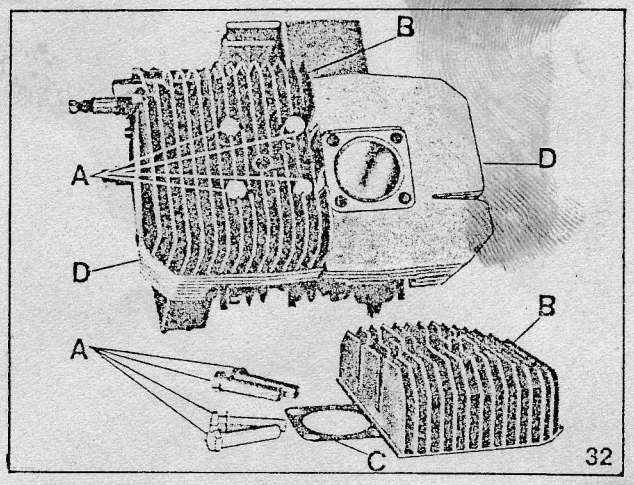
11 using the proper holdfast tool (10 in figure) and wrench (3 in figure) undo the nut with washer «L» and take off (see fig. 26) the clutch plates holder «M» and the shim «N».



31

12 using the proper wrench and holdfast tool (8 in the figure) undo the engine pinion securing nut, take off the clutch housing «O», the cage and rollers complete with bush «P» and inner shim «Q»;

13 slacken and remove the eight screws «A», paying attention to do it in crossed sequence, then take off the cylinder heads «B» with their gaskets «C» and afterwards take off the cylinders «D» with their gaskets;



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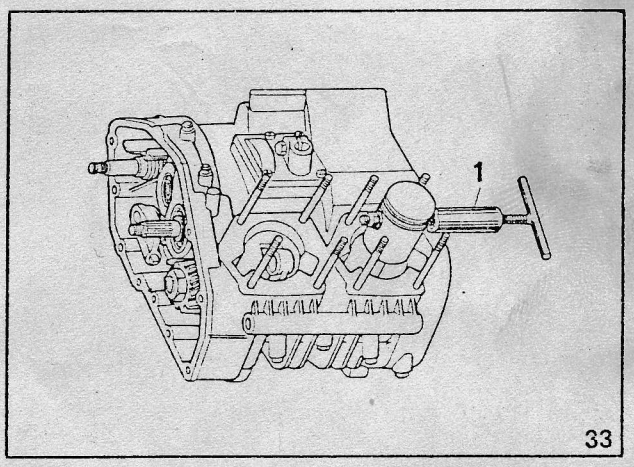
14 using special pliers or a point take out the piston pin circlips, then using the proper puller (1) take out the piston pin;



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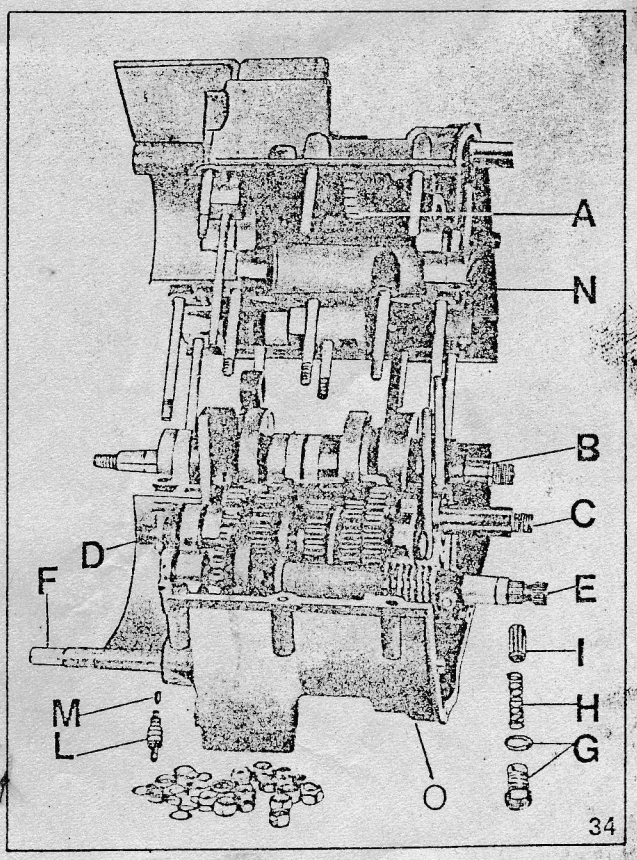
15 undo the nuts on the stud bolts (upper side) then turn the crankcase ass.y, undo the others nuts and slide out the stud bolts;

16 undo the plug with gasket «G», take off the spring «H» and if possible the stop pin «I», the neutral position cutout «L» with the pin «M» (see fig. 34);

17 using a leather hammer tap on the stud bolts in order to separate the two crankcase halves «N» and «O» and lift the upper half «N»; from the crankcase upper half take off the rev. counter gear «A»;
from the lower crankcase half take off the following:
— the crankshaft «B» complete with con-rods, bearings, spacer, rings and keys;
— the layshaft «C» complete with bearings and gears;
— the main shaft «D» complete with ring, bearings, and gears;
— the starting shaft «E» complete with bushing, ring, seeger rings, starting gear, manifold, spacers, spring, bottom, bolt, spring and nut;
— the gear control selector shaft «F», remove first the seeger ring and the shim (see par. 22).



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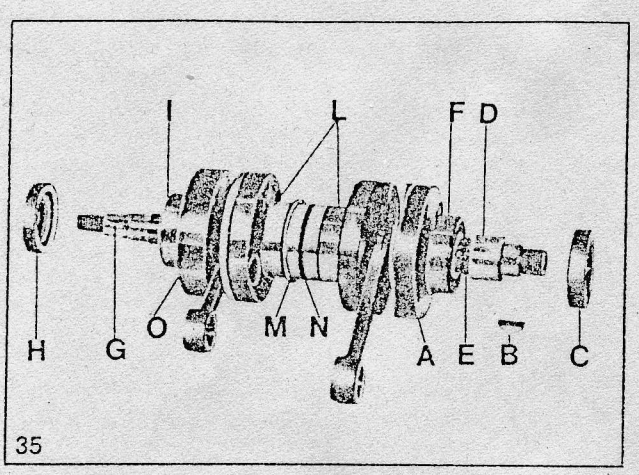

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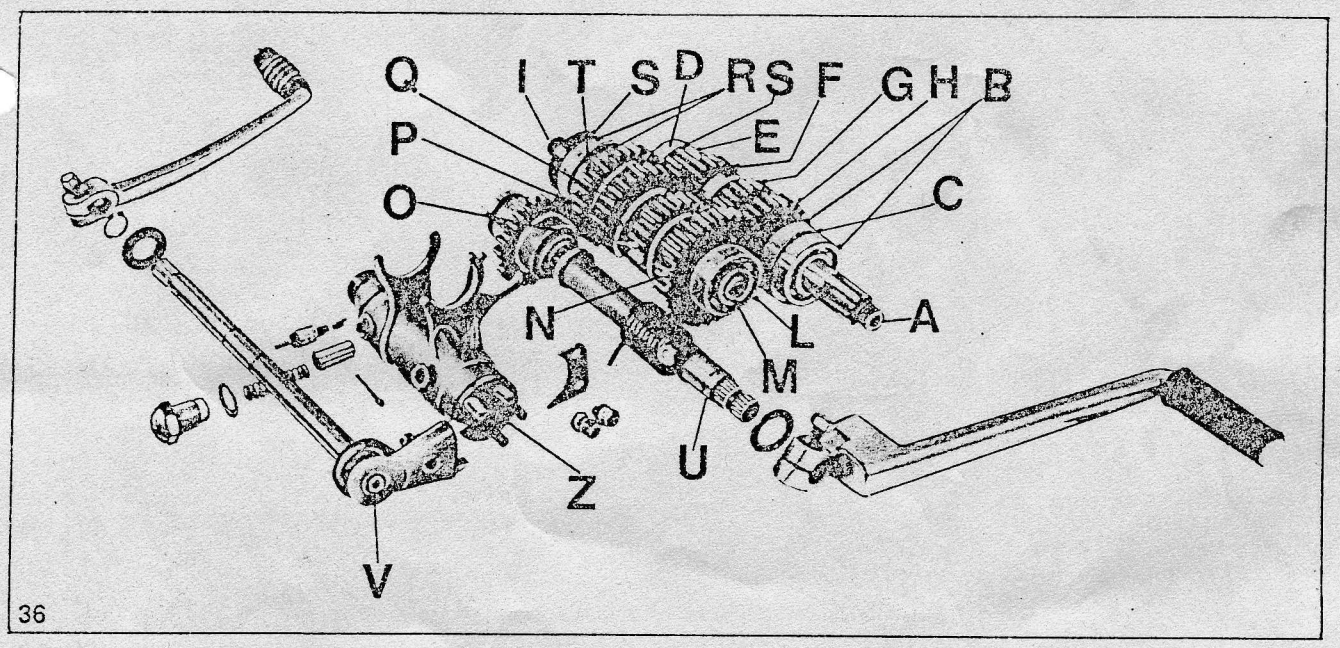
STRIPPING THE SHAFTS

18 Crankshaft

To strip the two crankshaft halves «A» and «O» proceed as follows:
right side
— take off the key «B»;
— using a universal puller take off: the ring «C», the spacer «D», the ring «E» (OR type) the bearing «F»;
left side
— take off the key «G»;
— using a universal puller take off: the ring «H» and the bearing «I»;
in the middle
— slide out the crankshaft halves joining pin, then take off the two bearings «L», the bushing «M» and the ring «N» (OR type) from the bushing itself.



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19 Layshaft (gearbox)

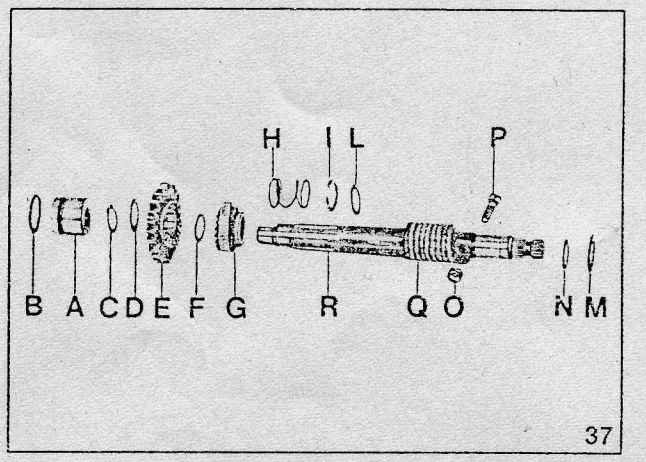
To strip the layshaft «A» proceed as follows:
— using a universal puller slide out the two bearings «B», see the outer spacer «C» between the bearings;
— take off the securing ring, then using a universal puller slide out the bearing «D», afterwards slide out the gears «E-F-G-H» with their rings and spacers.

20 Main shaft (gearbox)

To strip the main shaft «I» proceed as follows:
— take off the securing ring «M», then using a universal puller slide out the bearing «L», the gears «N-O-P-Q», the rings and the shims;
— slide out the securing ring «S», the two bearings «R» and the spacer «T» between the two bearings.

21 Starting shaft

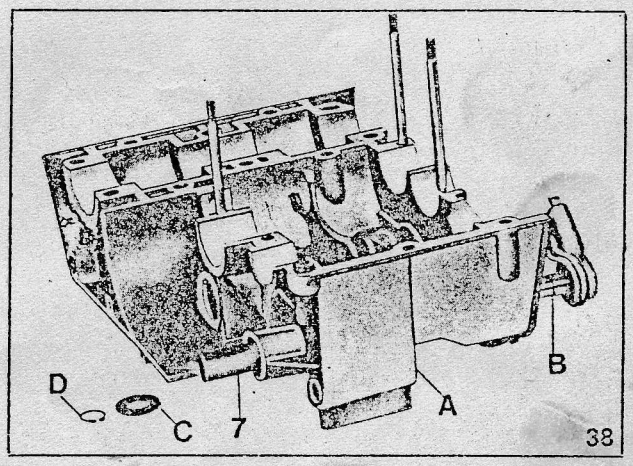
To strip the engine starting shaft proceed as follows:
— slide out the bushing «A» and take the ring «B» off the bushing itself;
— using proper pliers remove the seeger ring «C» and the washer «D»;
— slide out the starting gear «E», the washer «F» the bushings «G», the spring «H» the bottom «I» and the seeger ring «L»;
— slide out the washer «M» and the seeger ring «N»;
— undo the nut «O» then slide out screw «P» and the spring «Q».



37

22 Gear control selector shaft

To remove the shaft «B» from the crankcase «A», proceed as follows:
— using correct pliers remove the seeger ring «D» and then the washer «C» (not to damage the ring on the crankcase, it is advisable first to fit the bushing (7) onto the shaft).



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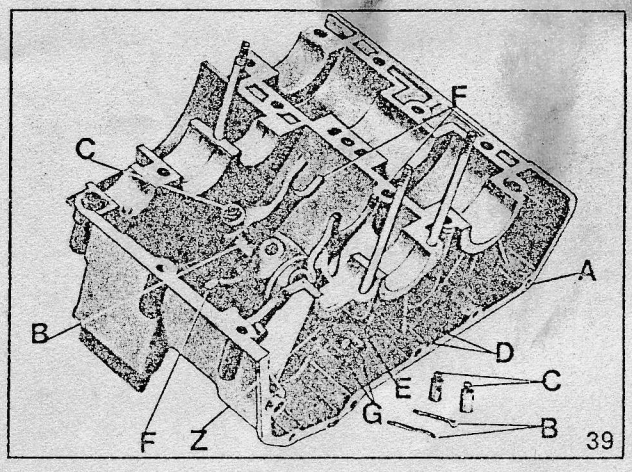
23 Splined shaft (desmodromic ass.y)

To remove the splined shaft «Z» from the crankcase «A», proceed as follows:
— take off the circlips «B» and the pins «C»;
— slacken the screws «D» and remove the securing plate «E»;
— then slide out the shaft «Z» from the crankcase.



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6.2 ASSEMBLING THE ENGINE

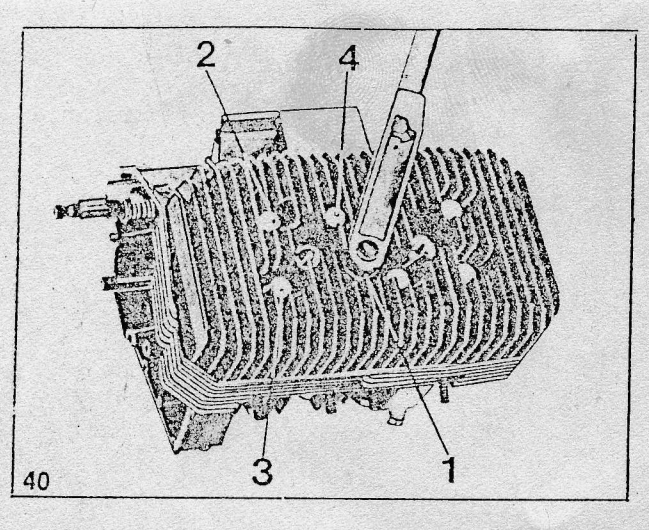
b In re-assembling the engine reverse the stripping sequence, paying attention to the following (see a of chapter 6.1 «Stripping the engine»).

Point 10

The packed side of the clutch plate «F» must face the clutch housing (see fig. 26).

Point 11

The ribbed side of the shim «N» must face the cage. The lowered side of the shim «Q» must face the crankcase (see fig. 26).



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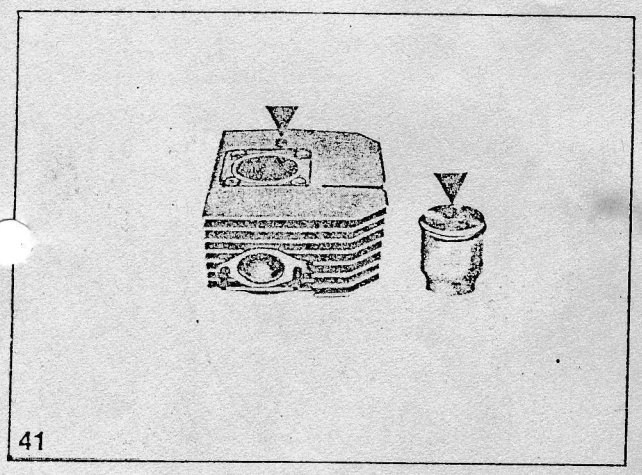
Point 13

a To lock the screws securing cylinders and cylinder heads to the crankcase use a 2,5 kgm loading torque wrench, following a crossed sequence (1-2-3-4, see the figure);

b in fitting the pistons on con-rods pay attention that the piston ring stop pegs face the exhaust parts;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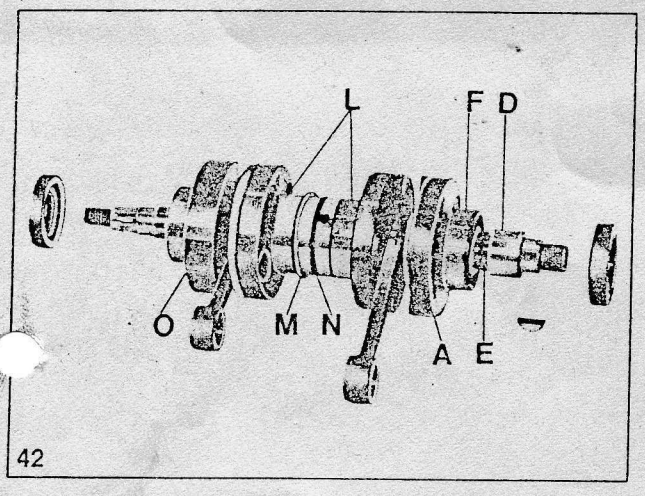
c before fitting the pistons into cylinders watch the matching of same: pistons must be matched with cylinders according to tables in page 29.



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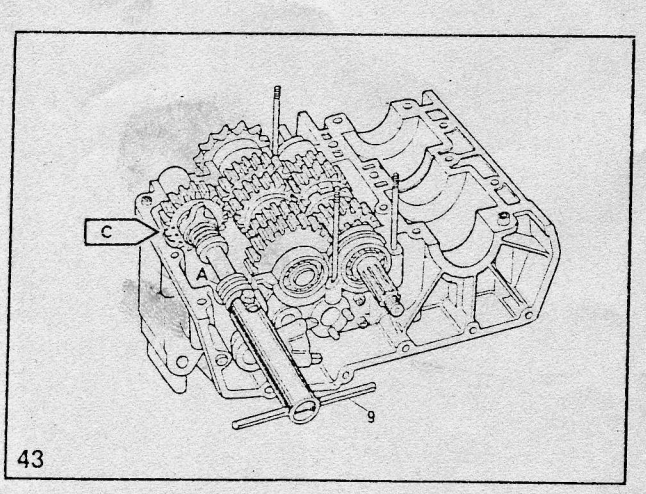
Point 18

In fitting the crankshaft spacer «D» pay attention that the hollow side, where the ring «E» (OR type) has to be fitted, must face the bearing «F». In case of replacement of: main bearings «L», ring «N», bush «M» or the central pin, it is advisable to apply to a specialized workshop due to the difficulty of centralizing and of coupling the two crankshaft halves «A» and «O».



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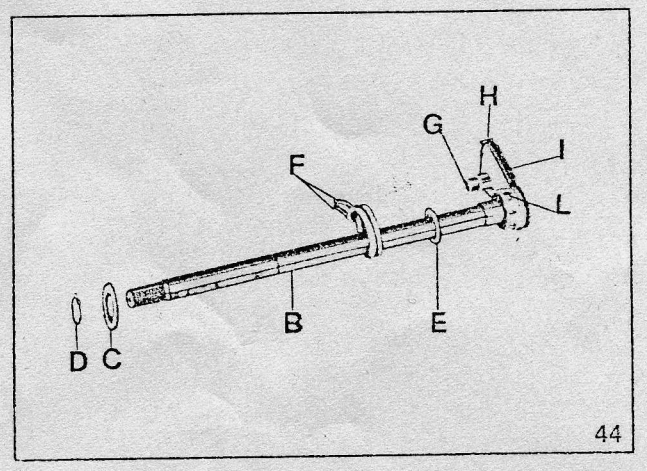
Point 21

To give load to the return spring of the kick starter pedal «A», use the special tool (9 in figure), the load given, pay attention that the position of the bushing clip is as indicated by the arrow «C».

Point 22

After fitting the shim «E» onto the shaft «B», fit the spring ends «F» onto the pin of selector «G»; then fit the bushing (7 in figure 38) on the L/H side of crankcase, before fitting the selector shaft «B» in order not to damage the securing ring which has been already fitted onto the crankcase.
The shaft fitted, remove the bushing (7) and fit first the washer «C», then, using the correct pliers, the seeger ring «D» onto the shaft itself.



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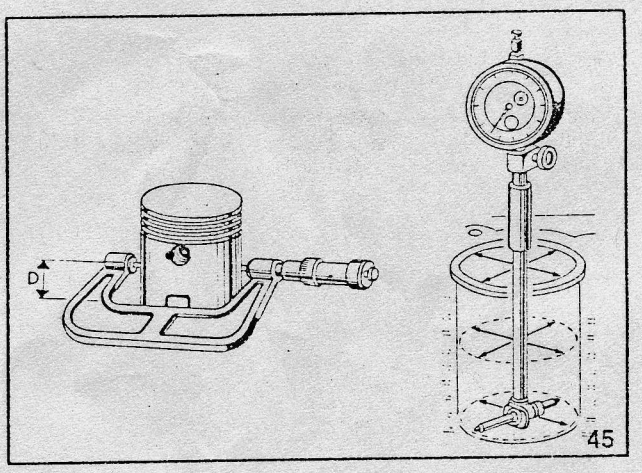
7 INSPECTION AND CHECKING

7.1 CYLINDER

Measure the cylinder diameter at the top, at the middle and at the bottom in both directions (longitudinal and cross sections).
In case the measurement values result in off limits, replace the cylinders.

7.2 PISTON

Check the piston diameter using a micro-gauge (see the drawing); in case of: off limits values, damages or scoring, replace the piston.
The matching measurement «Piston/cylinder» has to be taken at distance «D» from the piston bottom (see figs. 45 and 46):
— for mod. 125: «D» = 37 mm;
— for mod. 250: «D» = 50 mm.



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Cylinder piston matching table

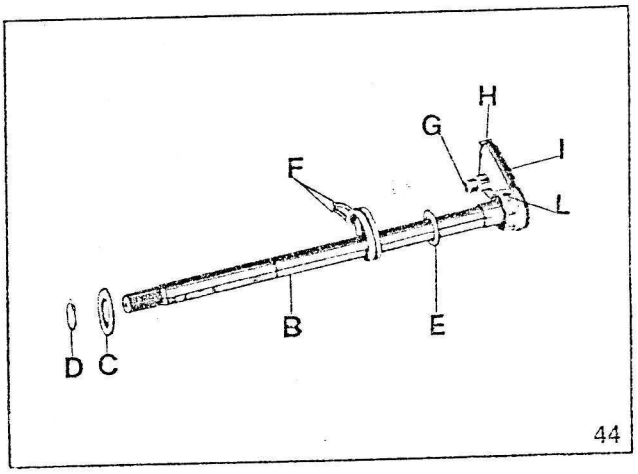
Model 125-2C	CYLINDER DIA. mm	CLASS «A»		CLASS «B»
		42.530 to 42.540		42.520 to 42.530
	PISTON DIA. mm	RED POINT	NO POINT	GREEN POINT
		42.415 to 42.419	42.406 to 42.414	42.401 to 42.405

Model 125-2C-SE	CYLINDER DIA. mm	MARK «A-A» OR 2 RED POINTS	MARK «A» OR 1 RED POINT	MARK «B» OR NO POINT	MARK «B-B» OR 1 GREEN POINT
		42.530 to 42.520	42.520 to 42.510	42.510 to 42.500	42.500 to 42.490
	PISTON DIA. mm	2 RED POINTS	1 RED POINT	NO POINT	1 GREEN POINT
		42.478 to 42.468	42.468 to 42.458	42.458 to 42.448	42.448 to 42.438

Model 250-2C	CYLINDER DIA. mm	MARK «A-A» OR 2 RED POINTS	MARK «A» OR 1 RED POINT	MARK «B» OR NO POINT	MARK «B-B» OR 1 GREEN POINT
		56.030 to 56.020	56.020 to 56.010	56.010 to 56.000	56.000 to 55.990
	PISTON DIA. mm	2 RED POINTS	1 RED POINT	NO POINT	1 GREEN POINT
		55.940 to 55.931	55.930 to 55.921	55.920 to 55.911	55.910 to 55.901

Point 22

After fitting the shim «E» onto the shaft «B», fit the spring ends «F» onto the pin of selector «G»; then fit the bushing (7 in figure 38) on the L/H side of crankcase, before fitting the selector shaft «B» in order not to damage the securing ring which has been already fitted onto the crankcase.
The shaft fitted, remove the bushing (7) and fit first the washer «C», then, using the correct pliers, the seeger ring «D» onto the shaft itself.



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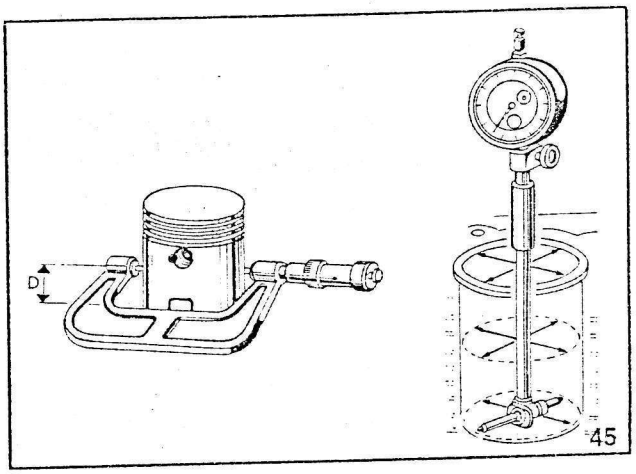
7 INSPECTION AND CHECKING

7.1 CYLINDER

Measure the cylinder diameter at the top, at the middle and at the bottom in both directions (longitudinal and cross sections).
In case the measurement values result in off limits, replace the cylinders.

7.2 PISTON

Check the piston diameter using a micro-gauge (see the drawing); in case of: off limits values, damages or scoring, replace the piston.
The matching measurement «Piston/cylinder» has to be taken at distance «D» from the piston bottom (see figs. 45 and 46):
— for mod. 125: «D» = 37 mm;
— for mod. 250: «D» = 50 mm.



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Cylinder piston matching table

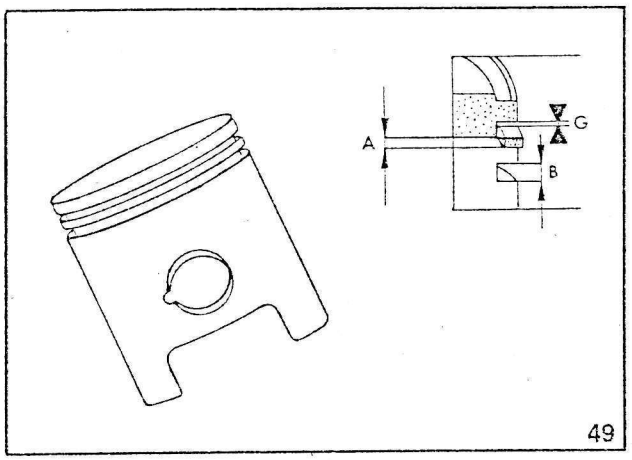
Model 125-2C	CYLINDER DIA. mm	CLASS «A»		CLASS «B»
		42.530 to 42.540		42.520 to 42.530
	PISTON DIA. mm	RED POINT	NO POINT	GREEN POINT
		42.415 to 42.419	42.406 to 42.414	42.401 to 42.405

Model 125-2C-SE	CYLINDER DIA. mm	MARK «A-A» OR 2 RED POINTS	MARK «A» OR 1 RED POINT	MARK «B» OR NO POINT	MARK «B-B» OR 1 GREEN POINT
		42.530 to 42.520	42.520 to 42.510	42.510 to 42.500	42.500 to 42.490
	PISTON DIA. mm	2 RED POINTS	1 RED POINT	NO POINT	1 GREEN POINT
		42.478 to 42.468	42.468 to 42.458	42.458 to 42.448	42.448 to 42.438

Model 250-2C	CYLINDER DIA. mm	MARK «A-A» OR 2 RED POINTS	MARK «A» OR 1 RED POINT	MARK «B» OR NO POINT	MARK «B-B» OR 1 GREEN POINT
		56.030 to 56.020	56.020 to 56.010	56.010 to 56.000	56.000 to 55.990
	PISTON DIA. mm	2 RED POINTS	1 RED POINT	NO POINT	1 GREEN POINT
		55.940 to 55.931	55.930 to 55.921	55.920 to 55.911	55.910 to 55.901

b Fit the piston ring into its seat on the piston then using a proper feeler gauge measure the clearance between ring and seat:

	Mod. 125	Mod. 250
«A»	1.238 to 1.225	1.490 to 1.478
«B»	Top ring 1.320 to 1.290	1.550 to 1.530
	Bottom ring 1.310 to 1.280	
«G» Wear limit	0.11	0.11



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7.5 CON-ROD

a Check the integrity of the rollers in the cage on the con-rod small end, should they be damaged replace the cage.

b Check the clearance between con-rods and crankshaft shoulders:
— it must be within 0.11 to 0.15 mm.

7.6 CRANKSHAFT

a Check the excentricity of the crankshaft by proceeding as follows:
— lay the crankshaft ends on two «V» blocks, then turning the shaft itself inspect its excentricity by means of a dial gauge. Should the excentricity on the axis «H-H» in the figure be over 0.020 mm it will be necessary to straighten the shaft. In this case it is advisable to apply to specialized workshops.

b Ensure that the key seats allow a good housing of the keys.

c Ensure that the bearing seats allow a good housing of the bearings.

d In case of fitting of the central holder, check that the ring «N» (OR type) on the bushing «M» (see fig. 35) is not damaged, otherwise replace it.

e Ensure that the central bush «M» does not show any deep scoring or ovalization.

f Ensure that the crankshaft halves joining pin is in good condition as to allow a good coupling with bearings, bushing and crankshaft halves, otherwise replace it.

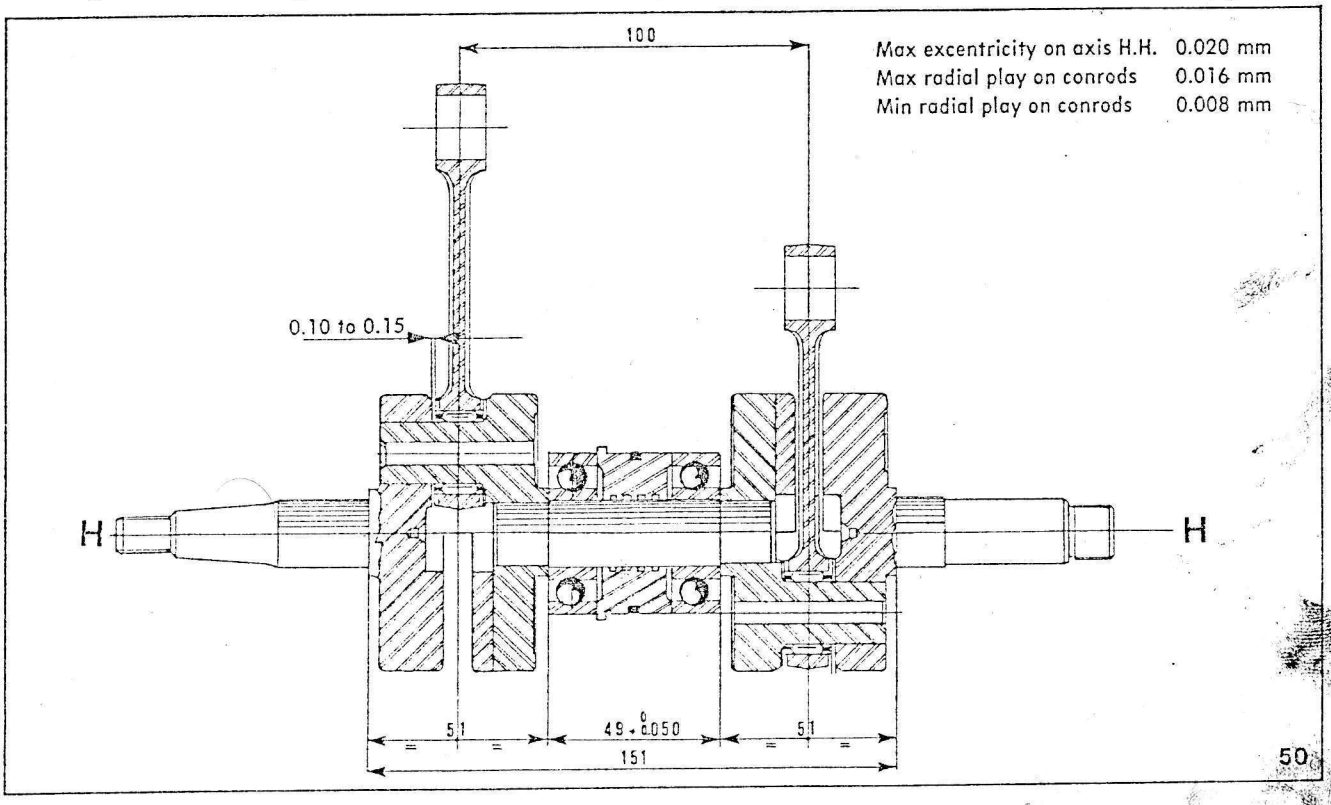
g Ensure that the two bearing rings are in good condition and do not show any profile deformation (inner and outer) or damage, otherwise replace them.

h Ensure that the spacer fitting the securing ring, right side, does not show any deep scoring or damages, otherwise replace it.

i Ensure that the securing ring (OR type) right side is not damaged, otherwise replace it.

l Ensure that the keys are in good condition, otherwise replace them.

NB - *Clearance, excentricity and other data are shown in the drawing.*



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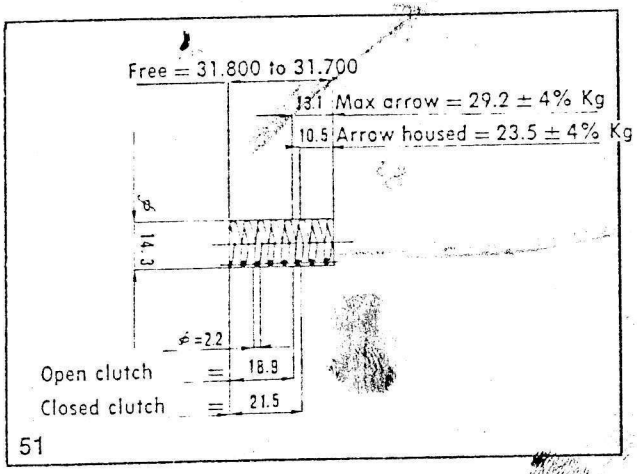

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7.7 CLUTCH AND CONTROL

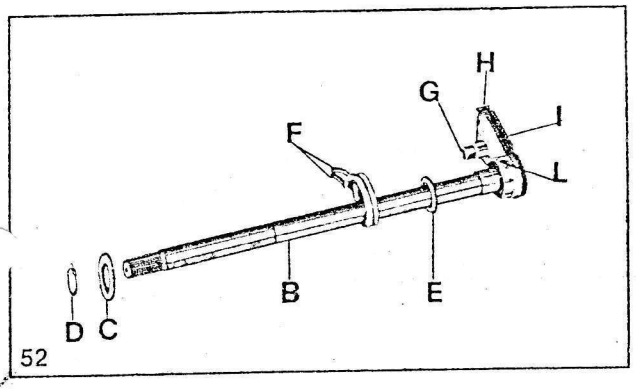
a Using a proper gauge measure the thickness of externally toothed driving plates and of the single packed plate.
If measurements result off limits, replace them:
— double packed plate: new mm 3, wear limit mm 2.8;
— single packed plate: new mm 2.25, wear limit mm 2.

b Using a dial gauge measure the internally toothed plates to assure there is no deformation, putting them onto a plane surface, should this measurement result over mm 0.1 replace the plates.

c Ensure that the clutch springs are not off limits:
— spring dia. mm 14.3, turn dia. mm 2.2;
— free length mm 31.800 to 31.700;
— length under load of kg 23.5 (closed clutch): mm 21.5;
— length under load of kg 29,5 (open clutch): mm 18.9.

d Check the teeth condition of the gear on the clutch housing and ensure that the gear itself does not have much play; in this case detach the housing from the gear and replace the cush drive rubbers.
Check the condition of the rubber ring between gear and housing, if it is damaged replace it.

e Check that the main rod and the straight rods are not bent otherwise replace them, if the balls are flat replace them too.



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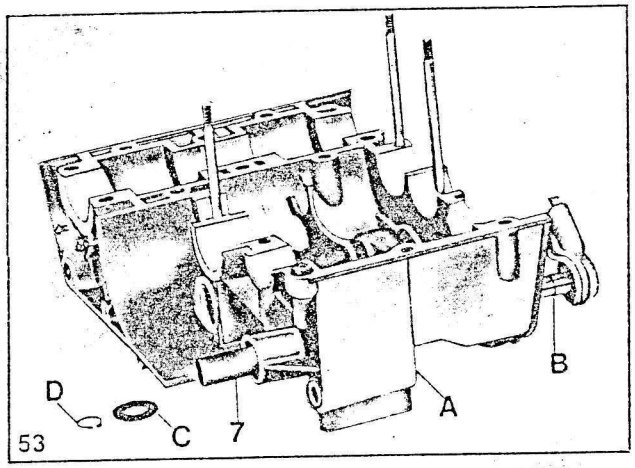
7.8 GEARBOX SELECTOR ASS.Y

a Ensure that the seeger ring «D» securing shaft to the crankcase left side has not been damaged during the shaft removing, if so replace it.

b Ensure that the spring on the selector «F» is in good condition, otherwise replace it.

c Ensure that the nibs «H» on selector «B», which control the splined shaft «F» are not worn or damaged, otherwise replace the selector «I», removing first the spring pin «L».



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7.9 SPLINED SHAFT AND GEAR CONTROL FORKS (see fig. 39)

a In re-fitting replace the clips «B» securing the control pins «C».

b Ensure that the pins «C» are in good conditions, especially the side acting into the shaft splines «Z».

c Ensure that the fork flanks «F» acting into the gears with sleeves are not worn or damaged otherwise replace the forks.

d Ensure that the pins on the splined shaft «G» where the nibs «H» operate, are not worn or damaged, otherwise replace them.

e Ensure that the shaft splines «Z» where the pins «C» operate, are not worn or damaged and check also the condition of the gear stop hollows, if these too are damaged or worn replace the shaft.

7.10 GEARBOX

a Main shaft

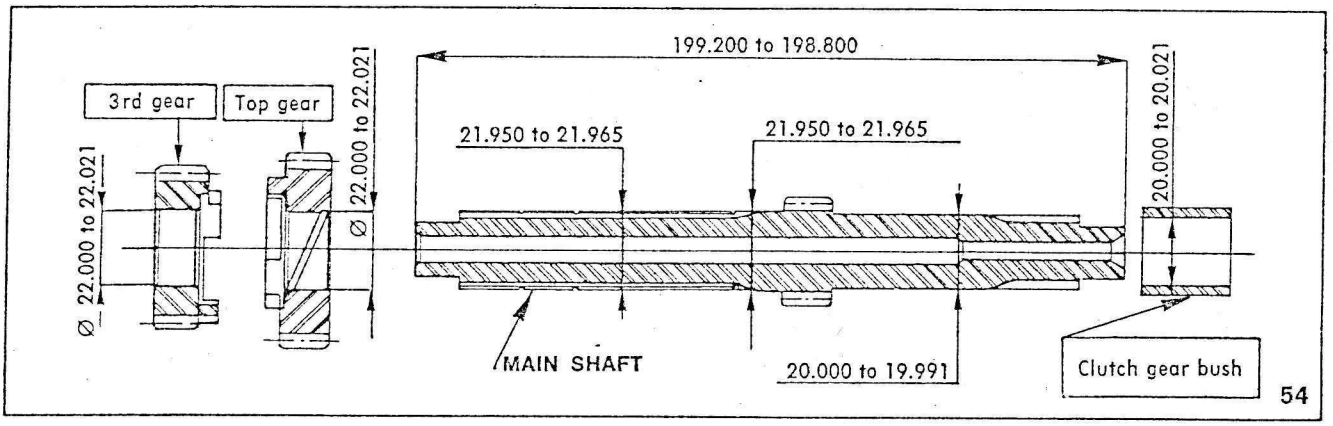
Ensure that the following parts are in good conditions, otherwise replace the shaft itself: the teeth of the 1st. speed gear on the shaft, the threading where the clutch housing is fixed, the shaft splines, the seeger rings seats.

b 2nd - 3rd - 4th - 5th speed gears on the main shaft

Ensure that the following is in good condition, otherwise replace the gears: outer teeth and inner splines, frontal engagements, 1st. speed gear hollow where the control fork operates.

c Assembling clearance

— between 5th. speed gear and main shaft: 0.035 to 0.071 mm;
— between 3rd. speed gear and main shaft: 0.035 to 0.071 mm;
— between main shaft and clutch gear bush: 0 to 0.030 mm.



d Layshaft

If the following is not in good condition, replace the shaft. Outer spline where the gears slide, threading for chain pinion ring, seeger rings seats, shaft straightness.

e 1st - 2nd - 3rd - 4th - 5th speed gears on the layshaft

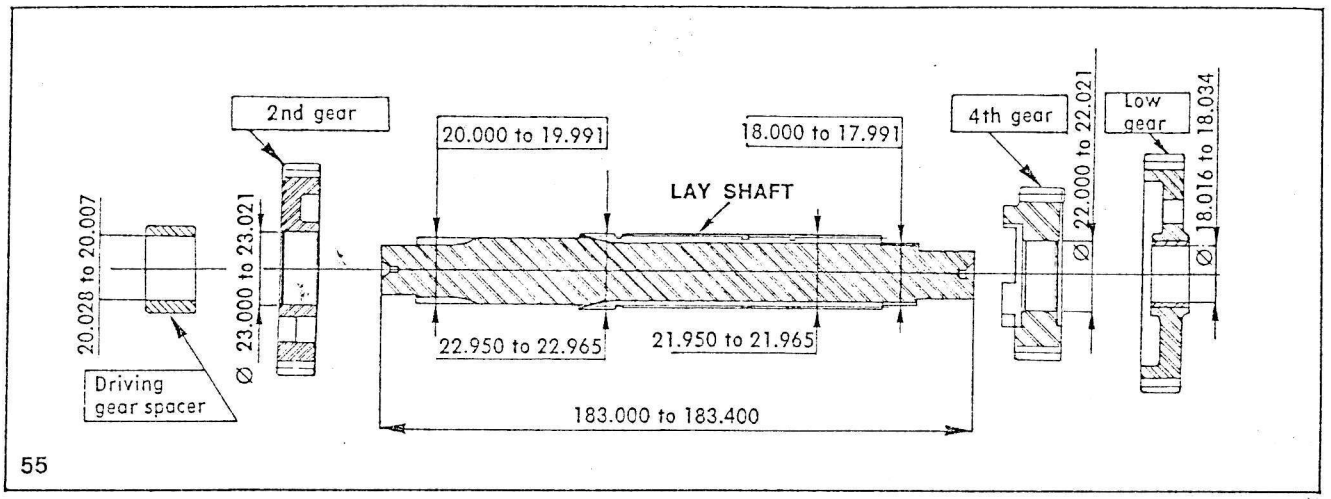
Ensure that the following is in good condition, otherwise replace the gears: outer teeth and inner splines, frontal engagements, 3rd. and 4th. speed gears hollows where the control forks operate.

f Assembling clearance

— between 1st. speed gear and layshaft: 0.016 to 0.043 mm;
— between 2nd. speed gear and layshaft: 0.035 to 0.071 mm;
— between 4th. speed gear and layshaft: 0.035 to 0.071 mm;
— between transmission and gear spacer and layshaft: 0.007 to 0.037 mm.

g Seeger rings

Ensure they are still in good conditions, it is advisable to replace them before re-assembling the gearbox.



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h Transmission gears

Ensure that the gear teeth where the drive chain rollers operate are in good condition, otherwise replace the gear.
In case of replacement for: transmission gear, transmission crown, drive chain, it is advisable to replace the whole ass.y to ensure proper working.

i Transmission gear securing ring

Check the integrity of the threading and the condition of the nylon ring, in case of damage replace the securing ring.

7.11 ENGINE STARTING ASS.Y

a Ensure that the inner side of the bushing «A», where the starting shaft operates, is not damaged or scored.

b Check if the securing ring «B» on the bushing «A» is in good condition, otherwise remove the bushing and replace the ring.

c Ensure that the seeger rings «C-L-N» are still in good conditions, anyway it is advisable to replace them before re-assembling.

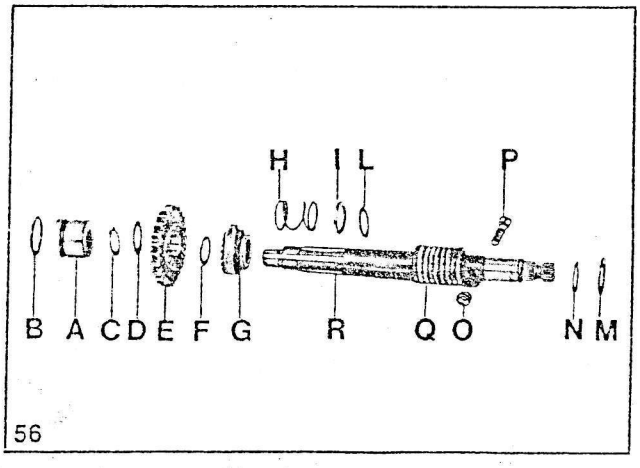
d Ensure that the outer teeth and the frontal engagements of the gear «E» are in good conditions, otherwise replace the gear.

e Ensure that the inner splines and notches of the bushing «G» are in good conditions, otherwise replace the bushing.

f Ensure that the spring «H» does not show any load lacking or any deformation, otherwise replace it.

g Ensure that the starting pedal return spring «Q» does not show any load lacking, otherwise replace it.

h Ensure that the splines of the starting shaft «R» are in good conditions, otherwise replace the shaft.



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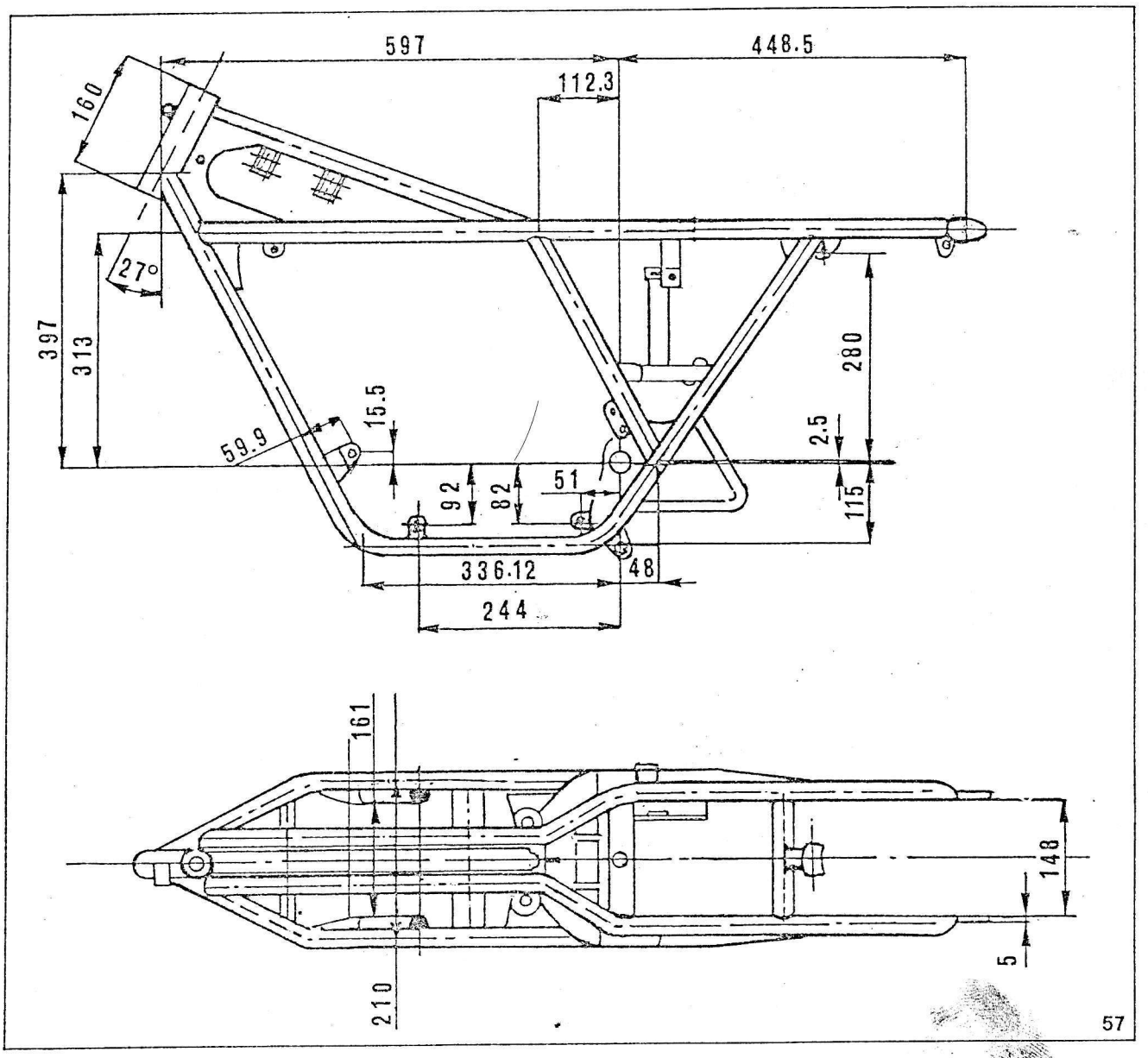
8 FRAME AND CYCLE PARTS

Ensure that the frame is true and does not show any abnormal bending, otherwise adjust it following the drawing measurements.



8.1 FRONT WHEEL WITH DRUM BRAKE: MECHANICAL CONTROL

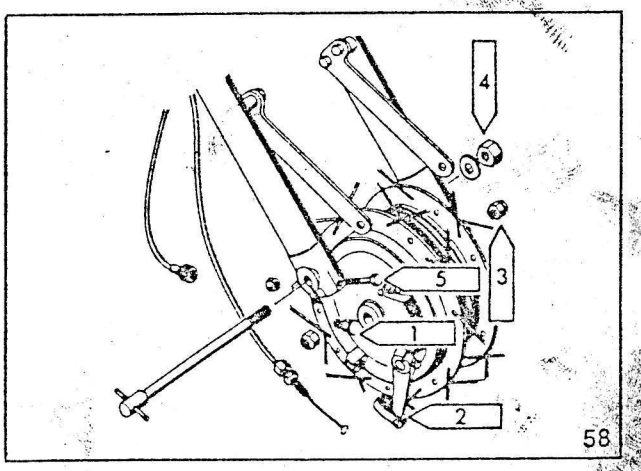
a Removal

1 Set a block under the engine to lift the front wheel from the ground.

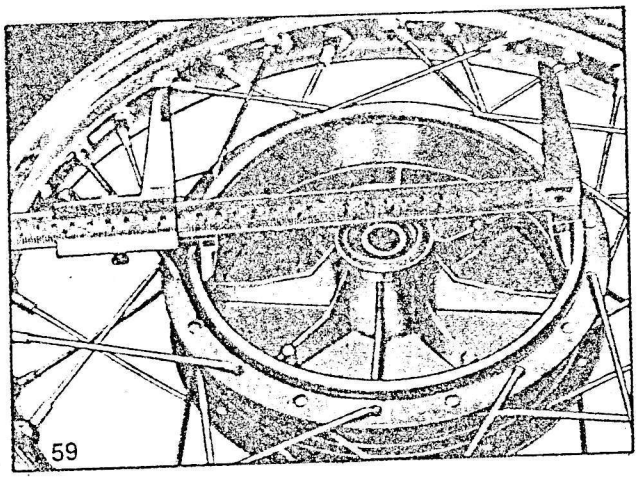
2 Detach the speedometer cable «1» from the right shoe holder then detach the two control cables «2» loosing the screws securing them to the shoe holders.

3 Undo the nuts «3» securing the attachments to the shoe holders.

4 Undo the nut «4» securing the wheel spindle, then loosen the screws «5» securing fork



covers and wheel hub. Pay attention to the position of the speedometer transmission.
To re-fit reverse the removal sequence, paying attention to fix the attachments to the wheel hub by means of nuts and washers.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b Inspection

1 Check the wheel spoke tension.

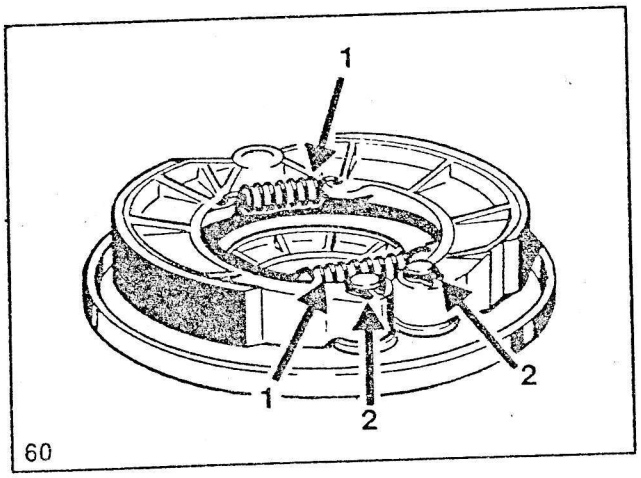
2 Check the excentricity of the rim, max. limit 0.8 to 1 mm.

3 Check the bearing condition.

4 Check the condition and wear of the brake shoe linings; should the thickness be under 2 mm, replace the shoes.

5 Check the braking diameter:

	dia. normal	max. limit
Mod. 125	176 mm	177 to 177.2 mm
Mod. 250	180 mm	181 to 181.2 mm



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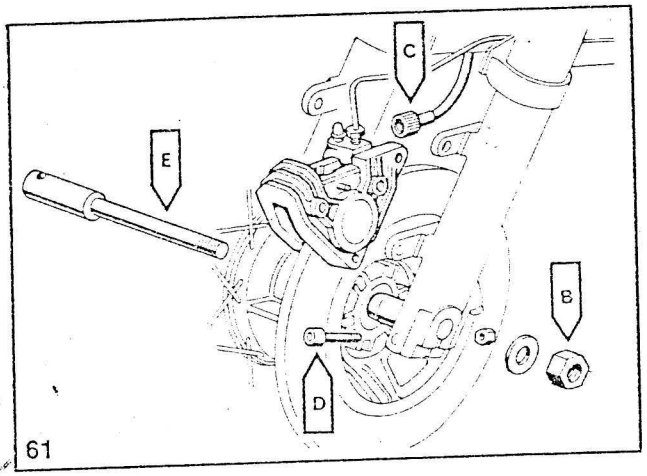
6 Check the integrity of springs «1» and securing rings «2».



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8.2 FRONT WHEEL WITH DISC BRAKE: HYDRAULIC CONTROL

a Removal

1 Set a block under the engine to lift the front wheel from the ground.

2 Detach the speedometer cable, loosing the ring securing it to the wheel hub.

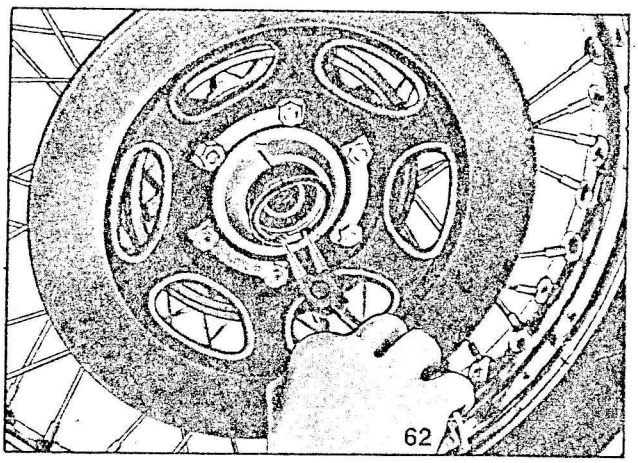
3 Loosen the screws «D» at the bottom of fork covers, securing the front wheel hub spindle «E».

4 Undo the nut securing the wheel spindle «B» and take off the spindle to free the wheel.

5 Remove first the securing ring for the bearing «A», and then the two side bearings and the central spacer.

6 To remove the braking disc, simply slacken the screws securing it to the wheel hub, after flattening the tab washer.

Important - Do not operate the front brake control lever when the wheel is removed, this might cause the pistons to go out of cylinder housings and consequently brake fluid leaking. Should this occur, re-fit the pistons into the cylinder housings and top up the fluid reservoir, then bleed the air from the braking circuit.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b Inspection

1 Check the wheel spokes tension and condition.
2 Check the rim trueness:
— max excentricity limit: 0.9 to 1 mm.
3 Check the condition of bearings.

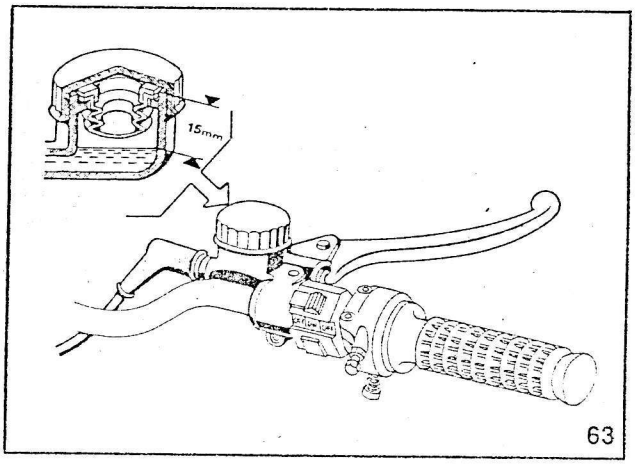
c Re-fitting

1 Re-fit the various components reversing the removal sequence.

8.3 DIRECTIONS FOR INSPECTING AND OVERHAULING THE HYDRAULIC BRAKING CIRCUIT

1 General Maintenance

For proper operation of brakes these directions are to be followed:
— periodically check the fluid level in the master cylinder (fluid reservoir), it must never be lower than 8 mm under max level;
— periodically or every 5000 km top up the fluid reservoir; take the fluid from original containers which must only be opened when using the fluid itself;
— every 20,000 km or max every two years completely renew the brake fluid.
The fluid ducts must always be full and without air, a long and elastic movement of the control lever means air is present inside the ducts.
In case of washing use only fresh fluid, no alcohol is to be used for washing and no compressed air for drying. Recommended fluid type: «Agip F.1 Brake Fluid SAE J 1703 C».



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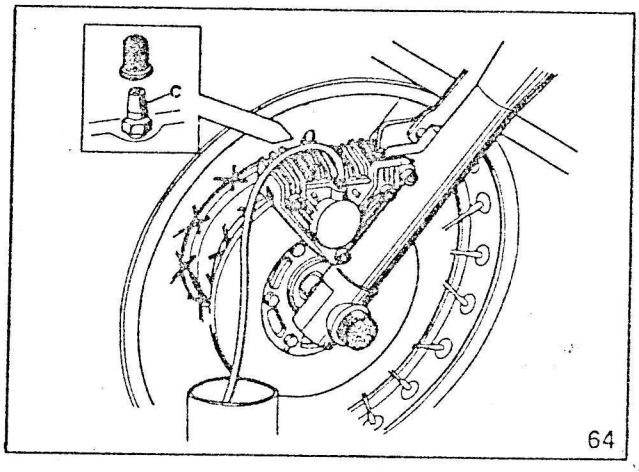
2 Air bleeding from the braking circuit

This operation is required when the movement of the control lever on the handlebar is long and elastic because of the presence of air inside the braking circuit.
Operations are as follows:
— turn the handlebar until the master cylinder (fluid reservoir) reaches the horizontal position;
— if necessary fill up the fluid reservoir (take care that during the air bleeding the fluid does not fall 8 mm lower than the max level);
— act on a caliper half at a time;



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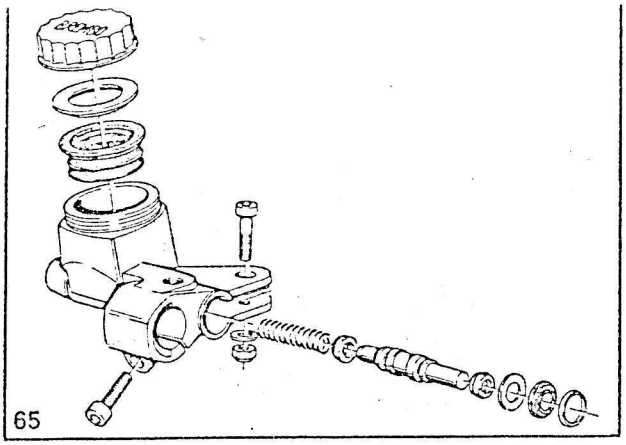
a take off the rubber cover, then fit a transparent flexible pipe onto the drain plug «C». The other end of this duct will be plunged into a transparent container partially filled up with fluid of the same type;



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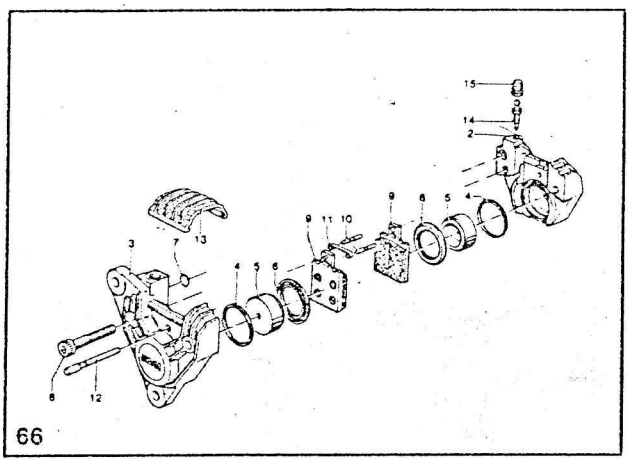

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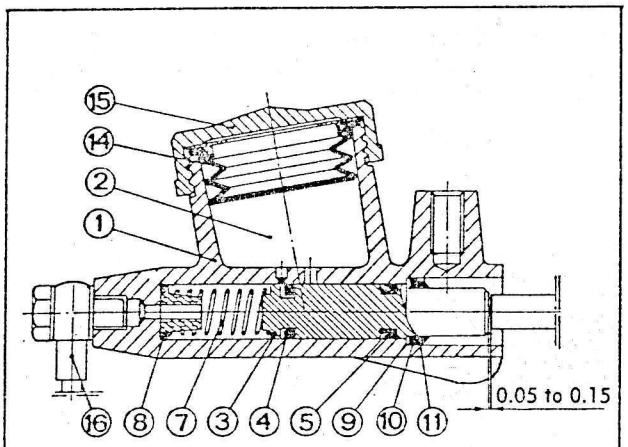

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1	Master Cylinder	9	Washer
2	Fluid reservoir	10	Scraper ring
3	Float	11	Stop ring
4	Gasket	14	Gaiter
5	Lip gasket	15	Cap
7	Return spring	16	Connection
8	Bushing		

c completely operate the brake control lever on the handlebar, release it and wait a few seconds before operating it again.
Repeat this operation until the pipe plunged into the transparent container emits airless fluid;

d keep the control lever fully in and lock the drain plug «C» then take off the pipe and re-fit the rubber cover on the drain plug.
If this air bleeding has been correctly carried out a direct and efficient working of the fluid will be realized immediately after the initial idle movement of the control lever; otherwise repeat the air bleeding.

NB - *This bleeding does not eliminate the air completely, the little remaining quantities are automatically bled in a short time during the riding, thus involving a less spongy lever movement.*

3 General directions to follow in removing the braking circuit components

Before removing the braking ass.y, carefully clean the outer components, block the pipe ends to avoid entering of foreign material.
After the removal, clean the metal parts with trychloroethylene and the rubber parts with the recommended brake fluid; by no way the trychloroethylene must get in touch with rubber gaskets.
The high precision components have to be handled with care to avoid any damage.
After cleaning, dry the components using unfrayed rags and moisten pistons and cylinder housing walls to avoid corrosion.

4 Master cylinder (Fluid Reservoir)

The fluid reservoir is provided with a gaiter preventing the fluid from leaking out in case the motorcycle falls over; such gaiter is firmly housed by the cap.

a Inspection

Often check the fluid level in the reservoir, it must never fall more than 8 mm under the max level. Periodically, every 5000 km, top up the fluid reservoir, use the recommended fluid only, taking it from new containers to be opened only when using the fluid.
Ensure that the play between the float and the lever end amounts to 0.05 to 0.15 mm.
Periodically lubricate the scraper ring «10» moistening the float stem «3»; do not use mineral oil or grease.

b Overhauling and replacing the braking circuit components, tools to be used

If the master cylinder does not work properly (fluid leaking where the control lever operates, less braking efficiency) it is necessary to replace the gaskets «4».

Proceed as follows:

— remove the fluid from the fluid reservoir «2»;

— detach and block the end of the delivery pipe «16»;

— remove the lever;

— fit the tool (12) into the fluid hole and using a hammer push the floater «3» outwards (see fig. 67), pay attention not do damage the hole walls and the outer surface of the floater «3»;

— remove the floater «3», the lock ring «11», the scraper ring «10» and the stop washer «9»;

— remove the spring «7» and the bushing «8» from the master cylinder «1»;

— carefully clean the floater «3» and the cylinder «1» and check them against damages. It is also advisable to inspect the wearing of master cylinder inner dia. and floater outer dia.:

- max hole dia. limit: mm 12.843;
- min floater dia. limit: mm 12.657;

— check the condition of gaskets «4» and «5»; if they still appear in good conditions do not remove them from their seats, if replacement is necessary, remove them using a proper tool;

— fit the new gaskets «4» and «5» onto the floater «3», using the tool (13) for the lip gasket and the tool (15) for the other gasket. (Pay attention to the right positioning of the lip gasket);

— onto the floater «3» fit then the washer «9», the scraper ring «10» (ensuring it is still in good conditions) and the lock ring «11»;

— fit the return spring «7» onto floater «3» and bushing «8»;

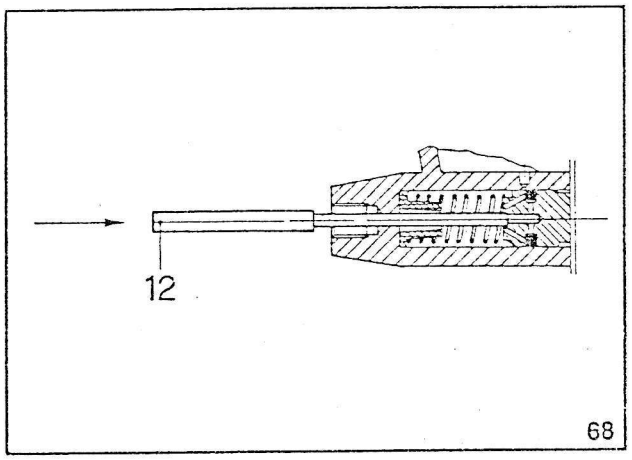
— fit the group into the master cylinder hole; re-fit the lock ring «11» using a leather hammer on the tool (14) until it is felt that the washer «9» reaches its travel end;

— connect the delivery pipe to the master cylinder «1»;

— re-fit the lever, checking the play between the lever end and the floater «3»;

— fill up the reservoir «2» with fluid and bleed the air from the braking circuit.

NB - *Before re-fitting, moisten the rubber and metal parts using brake fluid.* **Do not use any mineral oil or grease.**



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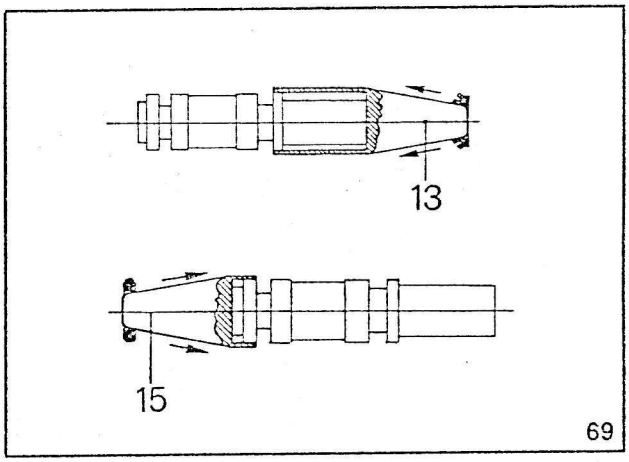

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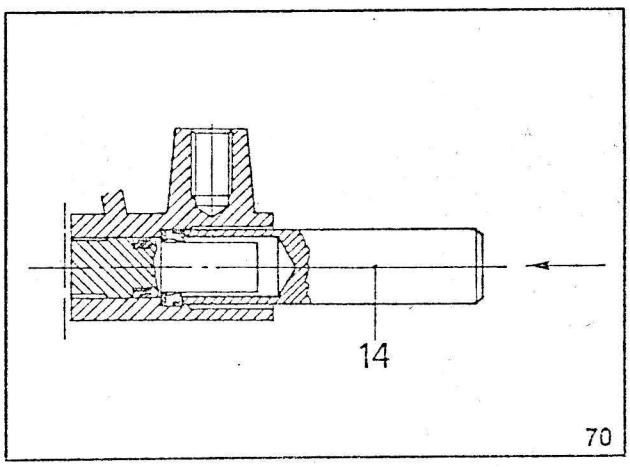

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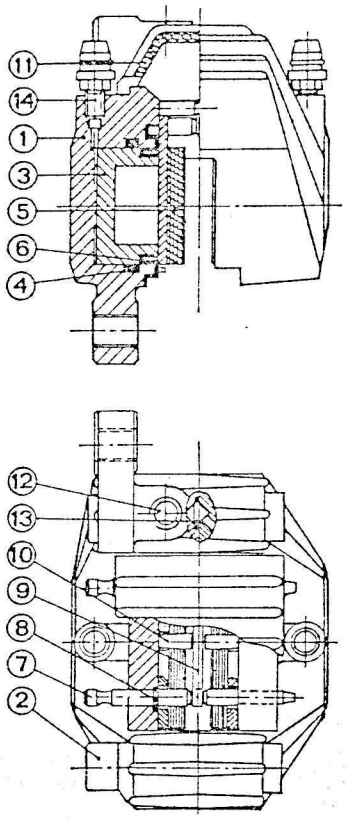
5 Caliper

The brake caliper consists of two caliper halves «1» in light alloy, joined by two screws «2» (see fig. 71).
In each caliper half there is a cylinder housing which guides the piston «3».
The sealing between piston and cylinder housing is ensured by a gasket «4» housed in a spline inside the cylinder.
The clearance is automatically adjusted because the pistons come out of cylinder housings according to the wearing of the pads «5».
A protection «6» which is fixed inside the piston and outside the cylinder prevents moisture or foreign material from entering.



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1	Caliper half
2	Joining screws
3	Piston
4	Gasket
5	Pad
6	Protection
7	Pad retaining pin
8	Spring ring
9	Pad positioning spring
10	Pad positioning peg
11	Cover
12	Fluid hole
13	Joining gasket
14	Drain plug

The two pistons act directly on the two pads, between which the braking disc rotates.
The pads are secured by two pins «7» each of one fits a spring ring «8» preventing them from coming out of seat. A taper pin «10» which is pressed on the spring «9» act on the upper side of pads preventing them from fluttering and facilitate the return of the pads themselves after braking. The cover «11» fitted on the upper side of the pads prevents entering of mud and water.
The caliper is fluid fed through the hole «12» which is located in the lugged caliper half; the hydraulic connection between the two caliper halves is obtained by means of two inner holes while the sealing is secured by the gasket «13».
Each caliper half is provided with a drain plug «14» for a full air bleeding.

a Inspection and checking

Every 5000 km check the wearing of pads, proceeding as follows:

— remove the cover «11»;

— remove the pin «10» and the spring «9»;

— take off the pins «7»;

— take off the pads «5», their thickness must be:

- new pad 7 mm;
- wear limit 3.5 mm.

If thickness is under the wear limit, replace the pads. The friction material has not to be used until the metal plate appears as this would damage the disc and inhibit the necessary thermal insulation between pad and brake fluid.
To replace the pads proceed as follows:

— push the pistons «3» inside the caliper halves «1» paying attention not do damage the protections «6»;

— fit the new pads «5» into the caliper halves;

— re-fit the pins «7», the pin «10» and the spring «9».

After the pad replacement, if made as above mentioned, it is not necessary to bleed the air from the braking circuit, but simply operate the control lever until the pistons come back to their normal position (pad/disc clearance 0.2 mm).

NB - *Before replacing the pads, it is advisable to take a little fluid off the reservoir as the return of pistons into the cylinder housings could cause the fluid to leak out.*

Important - To allow the friction material of new pads to be properly run in, it is advisable to carefully operate the brake for about 100 km riding after pad replacement.

b Overhauling and replacing the components

Should fluid leakage through the cylinder housings occur, it is necessary to replace the sealing gaskets. Fluid traces will be found on discs and pads while the fluid level in the reservoir will become lower and lower.
A fluid leakage involves a lower braking efficiency and an elastic lever movement.
To replace the gaskets proceed as follows:
— detach and stop the fluid pipe;
— remove the caliper from the fork cover;
— take off the pad pin and the pad spring, the pad retaining pins and the pads;
— separate the caliper into two halves;
— take off the protection from the leaking caliper half;
— take the piston off the caliper half, using a compressed air jet, paying attention not to damage or score the piston surface;
— remove the defective gasket, using a needle and paying attention not to score the cylinder housing walls;
— carefully clean piston and cylinder housing and ensure they are not damaged.
It is also advisable to check the inner dia. of the cylinder housing and the outer dia. of the piston against excessive wear:
- max allowed cylinder dia.: 32.071 mm;
- min allowed piston dia.: 31.930 mm.

— fit the new gasket into the cylinder spline;
— fit the piston into the cylinder housing (use finger pressure only);
— re-fit the protection, after inspecting it (pay attention to fix the protection very well to its seats on both the piston and the caliper half);
— join the two caliper halves, paying attention that the joining gasket is well housed in its seat; lock the screw using a 2.5 to 2.9 kgm loading torque wrench;
— re-fit the caliper onto the fork cover, lock the screws using a 2.2 to 2.4 kgm loading torque wrench;
— fit the pads, the pad retaining pins, the spring and the other pin;
— connect the pipe to the caliper;
— bleed the air from the braking circuit.

NB - *Before re-fitting, moisten the rubber and metal parts using brake fluid.* **Do not use any mineral oil or grease.**

6 Pipes

Inspection and checking

The condition of the flexible pipes must be carefully inspected; in case of any damage, they must be immediately replaced.

7 Braking disc

The braking disc is the rotating component on which the caliper pads act during braking; its features can therefore remarkably affect the braking efficiency.
For use on motorcycles the disc undergoes a surface treatment preventing it from oxidation;

this treatment is brought on the braking parts too. After some use the protection on the braking parts is automatically taken away, thus involving the ideal coupling condition between pad and disc.

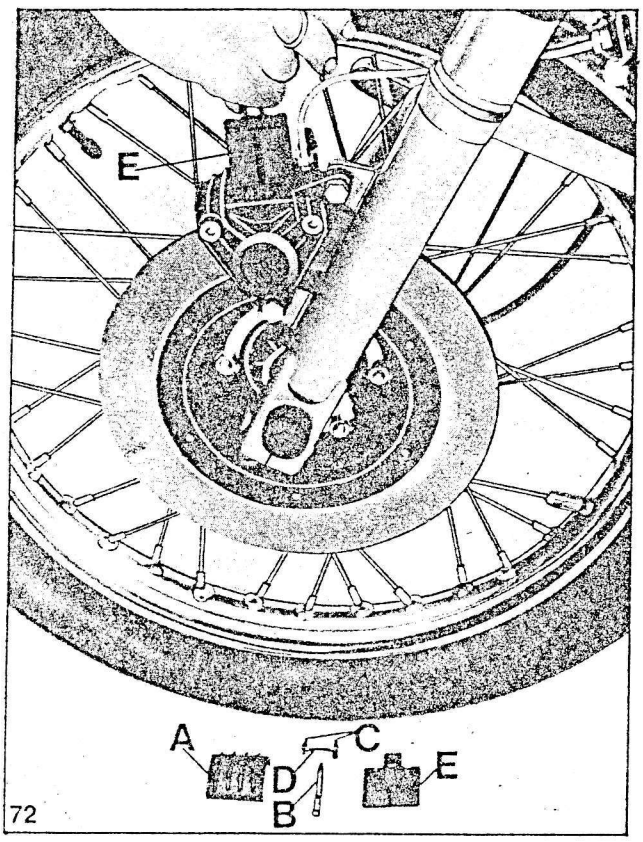
Inspection and checking

The inspection of the braking disc is very important, it must be very clean that's without rust, oil, grease or other dirt and must not show any deep scoring. The damaged discs must be taken off and reground on a special machine.
Allowed shape tolerances are as follows:
— parall. of plane and braking parts 0.050 mm;
— planarity of braking parts 0.050 mm;
— parall. of braking parts (circular) 0.015 mm;
— parall. of braking parts (radial) 0.060 mm.
Thickness:
— normal: 6.150 to 6.550 mm;
— minimum 5.800 mm.
In case of replacement or overhauling of the braking disc, it is necessary to check the fluttering of the same; this checking is made using a dial gauge that must never read over 0.2 mm. Should the fluttering be higher, carefully check the mounting of the disc on the wheel hub and the play of the wheel bearings.
The loading torque for the screws securing the disc to the wheel hub is 2.2 to 2.4 kgm.

8 Remove of braking pads from the caliper on the fork cover

a Removal

— remove the cover «A»;
— slide out the pin «B»;
— take off the pins «C» and the spring «D»;
— take off the two pads «E».
Replace the pads and re-fit the ass.y reversing the removal sequence. It is not necessary to bleed the air from the braking circuit, simply operate some times the brake to properly couple pad and disc.



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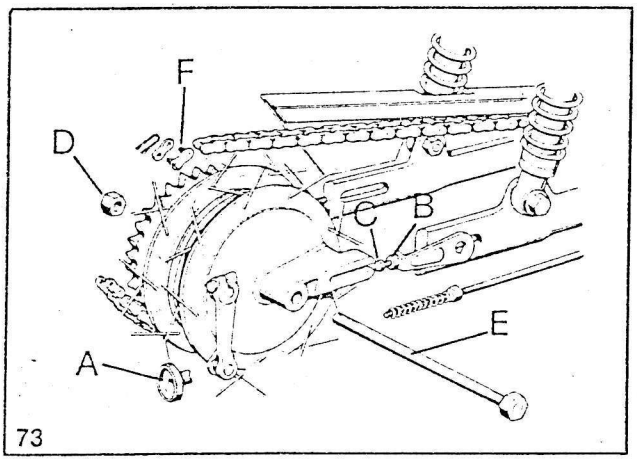
Braking circuit faults

CAUSE	REMEDY
The brake schreeches	
Brake pad unproperly locked	Lock the fixing screw
Defective or missing springs	Fit new springs
Pad wearing off limit	Check disc conditions and fit new pads
Dirty pads from oil or grease	Replace the pads
Fitting of wrong type pads	Replace the pads
The disc heats excessively during the normal riding	
Piston locked, pad stuck to disc	Inspect the pistons, clean the pad housings in the caliper
Brake lever without play	Adjust the lever play according the proper directions
Insufficient braking	
Dirty disc from oil or other dirt	Clean the disc
Too worn pads	Replace the pads, inspect the disc
Dirty pads from oil or grease	Replace the pads
Locked pistons	Free the pistons
The brake blocks	
Pad with too high friction	Fit proper pads
Oxidized disc	Reground the disc
Too worn pads	
Pads stuck in housings and to the disc	Clean the pad housings, check the pad/guide coupling
Locked pistons	Free the pistons
Deep scored disc	Reground or replace the disc
Abnormal wearing of pads	
Dirty pad housings	Clean the housings
Poor piston sliding	Adjust piston sliding
Defective pad springs	Replace the springs
Slantways pad mounting	Check and mount properly
Too long brake lever travel	
Disc fluttering over 0.2 mm	Inspect mounting conditions, reground or replace the disc
Air inside the braking system	Bleed the air
Deep scored disc	Reground or replace the disc

The float in master cylinder does not return	
Clamp fixing screws too much locked	Partially slacken the screws
Pin screw for lever too much locked (non-original screw)	Partially slacken the screw
Lever with oversized thickness in respect of master cylinder	Replace the lever
Scraper ring damaged from liquids	Replace the ring
Dirty brake fluid	Strip the master cylinder, clean and inspect its components (no scoring allowed) and replace the braking fluid
Damaged floater return spring	Replace the spring
Fluid leaking from the reservoir	
Gaiter unproperly fitted	Fit the gaiter properly and close cap smoothly
Damaged gaiter	Replace the gaiter
Damaged reservoir rim	Repair or replace the master cylinder

Recommendations

The rubber components (for master cylinder: gaskets, scraper ring, gaiter; for caliper: gasket, joining gasket, dust protection) are made of a mixture, brake fluid resistant.
On the other hand this mixture does not resist to the action of mineral oils or other products which sometimes are used to wash the motorcycle. Therefore any contact of such products with these parts has to be absolutely avoided.
For example it may occur that the scraper ring melts and sticks to the float affecting the float sliding.



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8.4 REAR WHEEL AND BRAKE

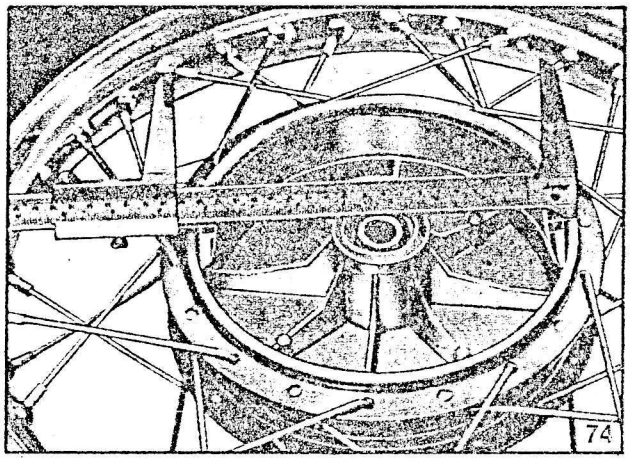
a Removal

— Loosen the knob «A» on the rear brake control rod;
— undo the nuts «B» and remove the bolts «C»;
— undo the nut «D» and slide out the spindle «E» complete with nut;
— shift the wheel onwards and remove the chain from the crown on the rear wheel (to do this, it is not necessary to remove the chain link «F»);

— slide out the control rod from the brake lever on the shoe holder;
— lean the motorcycle to one side or lift the rear side to free the wheel from the rear fork arms.
Set the motorcycle on the central stand, to do this removal.

b Inspection

— Check the tightening condition of all wheel spokes;
— check the rim excentricity, max limit 0.8 to 1 mm;
— check the bearing condition;
— check the condition and the wearing of the brake shoes; should the thickness of linings be under 2 mm replace the brake shoes;
— inspect the braking dia.:
- normal: 158 mm;
- max limit: 159 to 159.2 mm;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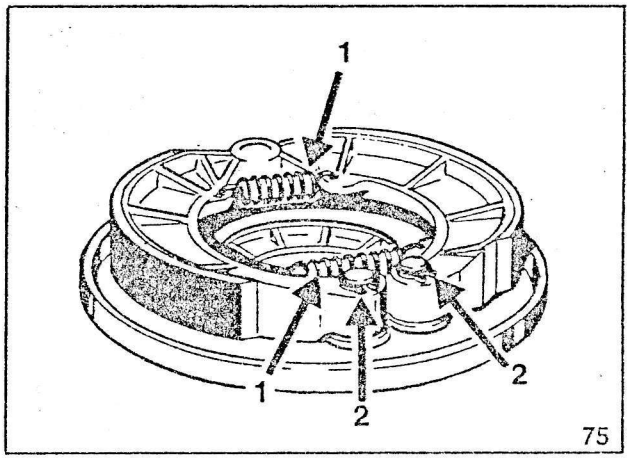
— check the integrity of springs «1» and rings «2»;



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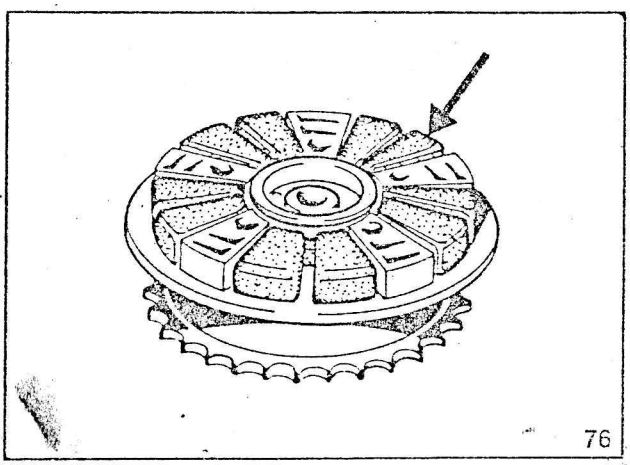
— check the integrity of cush drive parts.

c Re-fitting

— In re-fitting reverse the removal sequence;
— adjust the chain according to chapter 2.9;
— adjust the brake control pedal according to chapter 2.8.

NB - *Fit the stop spring of the chain link (in case it has been removed) as indicated in fig. 73. Ensure the proper locking of the attachment rod on shoe holder and rear swing fork.*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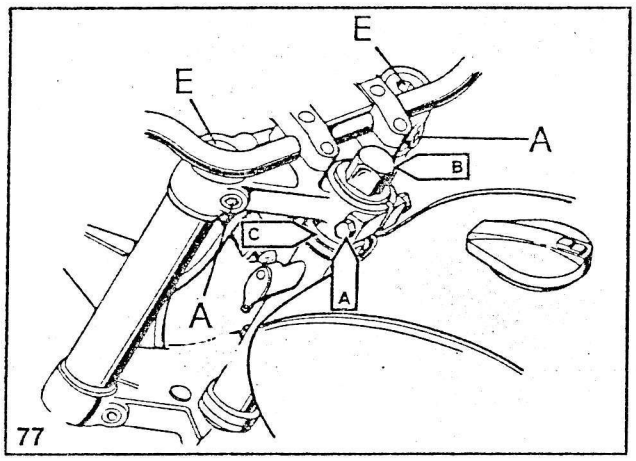
8.5 ADJUSTING THE SPOKES

Check that all spokes are tightened and the wheel is well trued by proceeding as follows:
— turn the wheel and check its truing. If necessary adjust the left or right spokes until it turns properly. This checking has to be done after the first 500 km and later on every 1500 km.

8.6 BALANCING THE WHEELS

To improve stability and decrease vibrations at high speeds, the wheels have to be kept balanced. Proceed as follows:
— remove the wheel, then after checking spoke tightening and wheel truing suspend it on a fork;
— lightly spin the wheel several times and see if it always stops in various positions, thus indicating a correct balancing;
— if one point of the wheel always stops at the bottom, put a balance weight on the spoke opposite this point;
— repeat this operation until the wheel balancing is proper, then fix balance weights using pliers.



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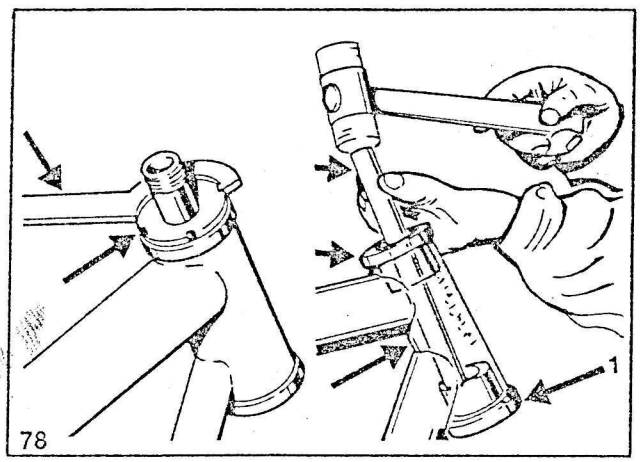

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8.7 STEERING

a Removal

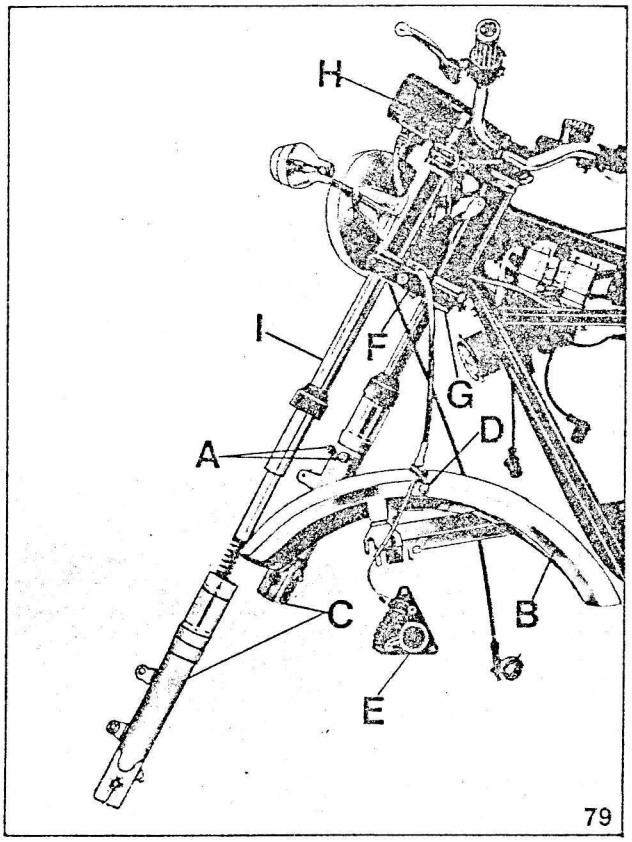
— Set a block under the engine crankcase;
— remove the front wheel from the fork covers (see point 8.2);
— undo the screw securing the handlebar clamps with instrument box and handlebar plate;
— tilt the handlebar complete with control cables and master cylinder for front brake without detaching the pipe;
— slacken first the screws securing the caliper to the left fork cover, then the U-bolt securing the pipe on the front mudguard and the screw securing the pipes twin control at the fork bottom, detach now the electric wiring from the front stop light cutout;
— undo the screws «A» securing the steering head to fork covers and steering tube;
— undo the nut «B» securing steering tube to steering head, then slide out the steering head using a hammer;
— detach the electric wiring from the headlight, then remove the fork stay tubes complete with headlight and turning indicator lights from the fork arms;
— undo the ring «C» securing the steering tube and take the complete fork off frame;
— collect the steering balls (44) then using a proper punch take the two steering caps off frame.

b Inspection

— Check the ball race on the steering caps and the cap condition as well. Should the caps be damaged or very worn replace them;
— ensure the balls are not flat, otherwise replace them.

c Re-fitting

— Re-fit the steering ass.y, the front fork, the handlebar and the front wheel, reversing the removal sequence. Before re-fitting balls and caps wash and dry them, fill the caps with grease «Agip F.1 Grease 30» then fit the balls into;
— adjust the steering according to chapter 2.11.



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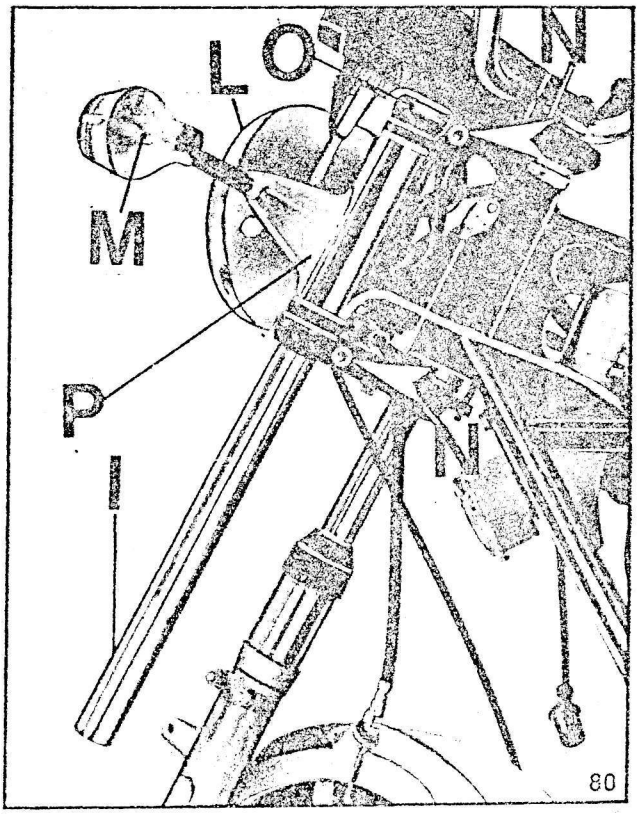
8.8 FRONT FORK

a Removal

— Remove the front wheel according to chapter 8.2;
— undo the nuts «A» (see fig. 79) securing the mudguard «B» to the fork covers «C»;
— undo the screw securing the U-bolt «D» to the mudguard;
— undo the screws and take off caliper «E» from the left cover «C»;
— undo the securing screw and take off the twin control «F» from the fork bottom «G»;
— remove the steering ass.y according to chapter 8.7.
NB - *In case of removal of the cover ass.y «C» only, complete with spring and damper, without removing the steering ass.y, proceed as follows:*
— undo the screw «H» securing the cover to the fork arm;
— slide out the cover ass.y, spring and damper from the fork arm;
— detach the electric wiring from the headlight «L» (see fig. 80) and remove the turn light indicators «M»;
— undo screws «N» securing the fork arms «I» to steering head «O» and steering bottom «G» (see fig. 79) than slide out the arms «I» and the stay tube «P»;



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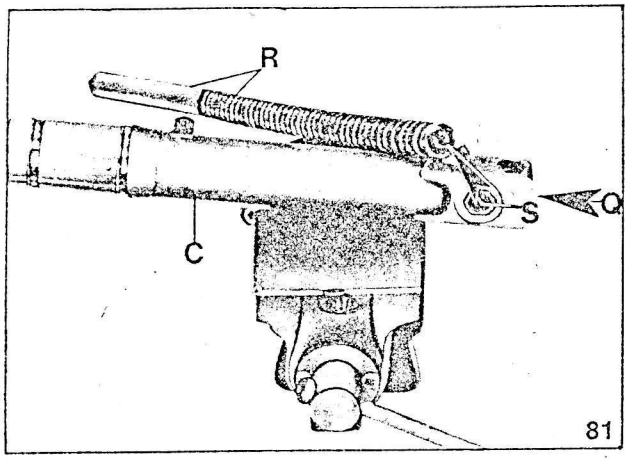

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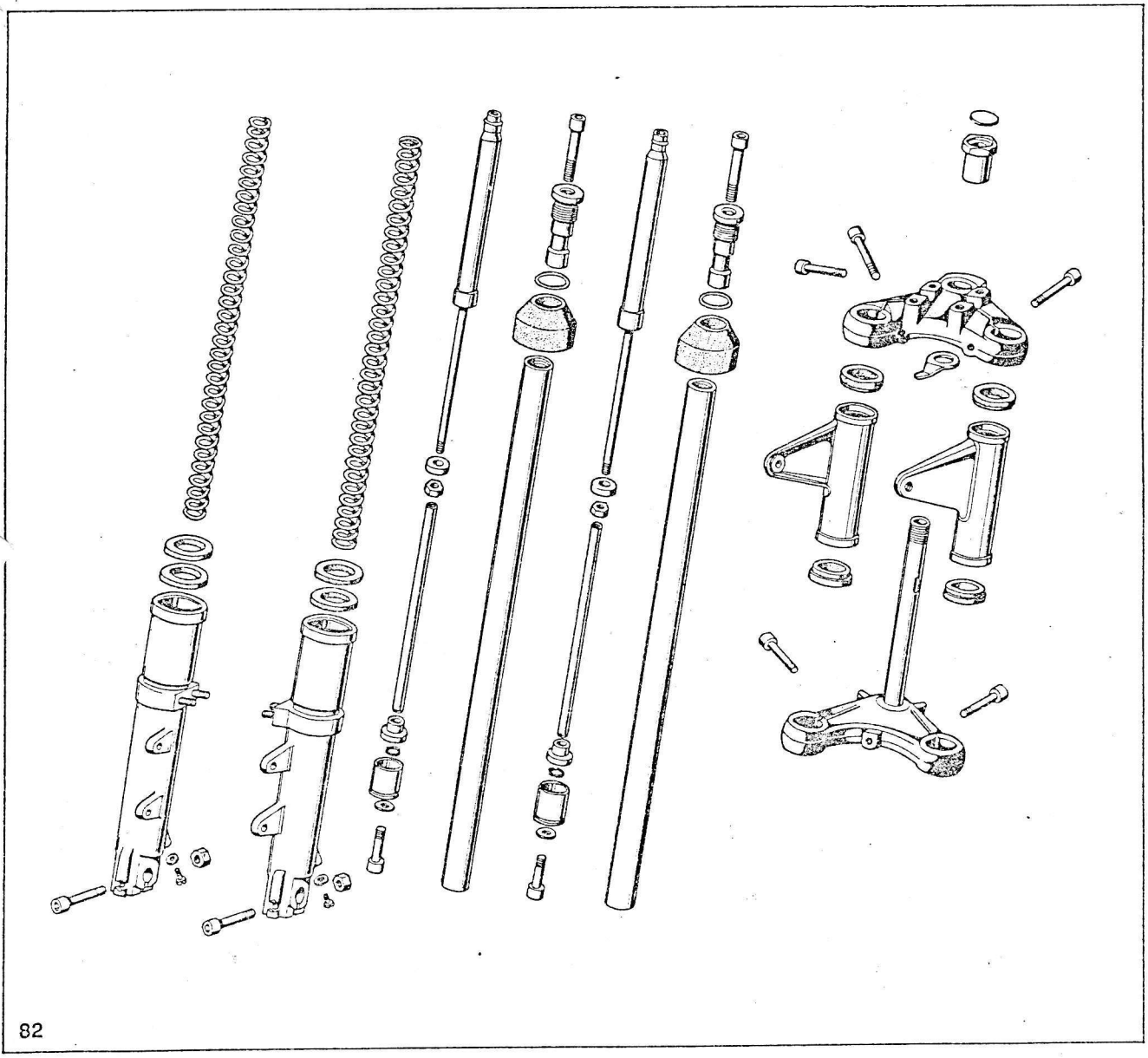
— undo the screw «Q» then remove damper and spring «R» from the cover «C» after taking the oil off the cover itself.
In re-fitting the ass.y «R» onto the fork cover, pay attention that the hollows «S» fit into the special notch on the cover bottom, before fixing the screw «Q».

b Inspection

— Fork arm:
Ensure that the chrome plated part is quite straight, without scoring and the threading is in good conditions.
— Inspecting the arm dia.:
The measurement must result as follows: 31.690 to 31.715 mm.
— Fork cover:
The cover is made of light alloy; ensure that the inner side is quite smooth and without scoring or notching.
— Inspecting the inner dia.:
The measurement must result as follows: 31.750 to 31.790 mm.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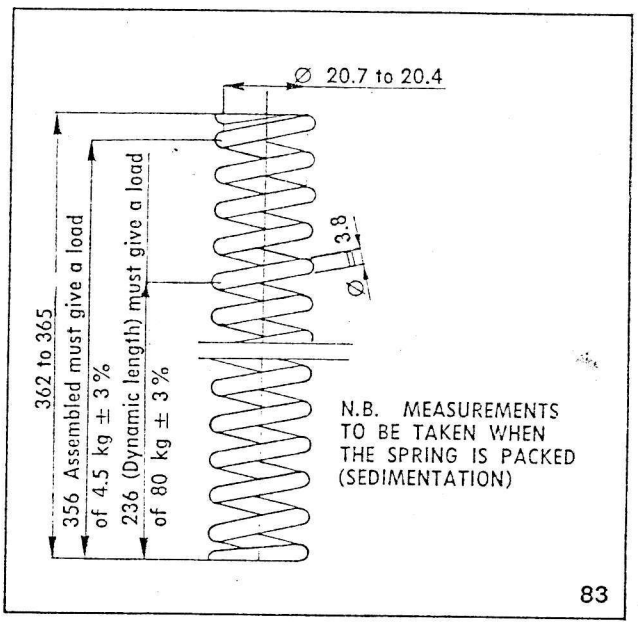
— Fork spring:
Ensure that the spring has not lost its features:
- free length: 362 to 365 mm;
- load with compressed spring to 356 mm (on assembly): 4.5 kg ± 3%;
- load with compressed spring to 236 mm (dynamic lenght): 80 kg.

— Sealing rings on fork covers:
Check the sealing condition, if damaged replace them.
— Rubber ring, damper return stop:
Ensure it is in good condition.
— Fork damper:
Such dampers must be by no way modified and both must be checked at the same time to ensure they have the same load for avoiding unbalance on the two fork arms; in case of faulty damper action, replace them.
— Steering bottom:
Ensure that the steering tube is quite straight and its threaded part is not damaged. Check also the condition of the steering bottom threading for the fork arms screws. In case of damaged threadings replace the bottom.
— Steering head:
Check the condition of the threading for the fork arms screws and stearing tube is in good conditions, otherwise replace the head.



c Re-fitting

Reverse the removal sequence. Remember to introduce 70 cc of oil «Agip F.1 ATF Dexron» before fitting the damper ass.y and springs.

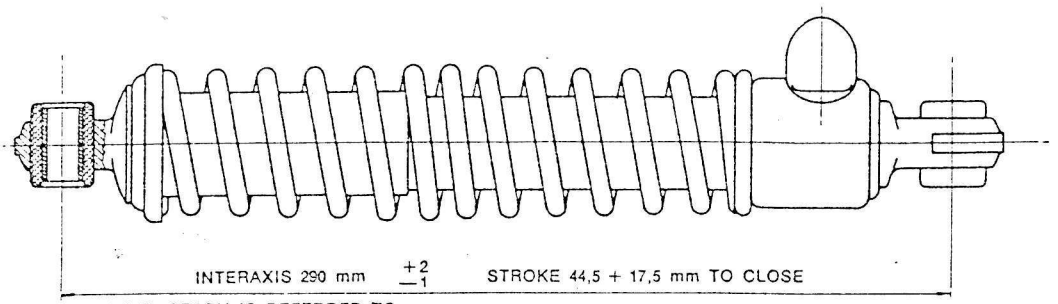
8.9 REAR SUSPENSIONS

a Removal

— Undo the securing screws to frame and rear swing fork then remove the suspensions;
— undo the screws and remove the exhaust silencers;
— remove the rear wheel according to chapter 8.4;
— undo the self locking ring on the R/H side of the motorcycle;
— slide out the spindle and take off the rear swing fork.

b Inspection

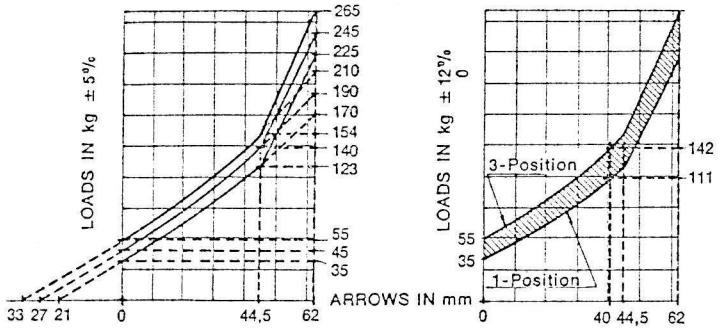
— check the condition of dampers (both must be checked at the same time, to ensure they have the same load to avoid unbalance on the rear fork). With removed spring, the measurements have to result as indicated in the figure;
— ensure there is no excessive clearance between spindle and bushings of the rear fork.
Max allowed clearance: 0.30 to 0.35 mm.



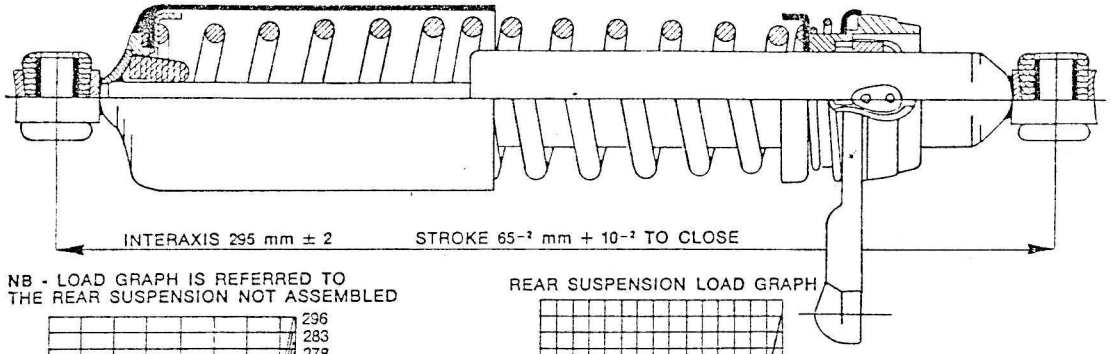
mod. 125

NB - LOAD GRAPH IS REFERRED TO THE REAR SUSPENSION NOT ASSEMBLED

REAR SUSPENSION LOAD GRAPH

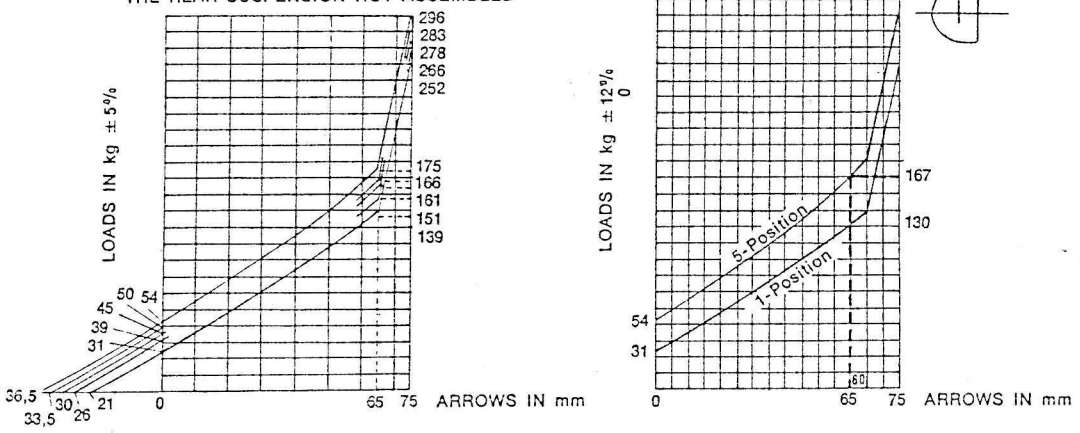


HYDRAULIC BRAKE		
EXTENSION	20,00 kg $^{+4.00}_{-5.60}$	6,00 kg ± 4,40
COMPRESSION	6,00 kg ± 4,40	4,00 kg ± 4,00
ARM	300 mm	300 mm
STROKE	50 mm	50 mm
CYCLES	60 per min	20 per min



NB - LOAD GRAPH IS REFERRED TO THE REAR SUSPENSION NOT ASSEMBLED

REAR SUSPENSION LOAD GRAPH



mod. 250

HYDRAULIC BRAKE		
EXTENSION	24,00 kg ± 5,40	6,00 kg ± 4,40
COMPRESSION	6,00 kg ± 4,40	4,00 kg ± 4,00
ARM	300 mm	300 mm
STROKE	50 mm	50 mm
CYCLES	50 per min	20 per min

c Re-fitting

— Put some grease «Agip F.1 Grease 30» on the rear fork spindle then fit the spindle onto frame and rear swing fork;
— lock the ring on the R/H side of the motorcycle;
— to adjust the rear swing fork play, act on the ring, locking but not excessively, with proper tool (2 in the fig. 12) until the fork swings freely without any play;
— fit the rear wheel as indicated in chapter 8.4;
— re-fit the rear suspensions onto frame and rear swing fork using the proper screws and washers.

9 ELECTRICAL EQUIPMENT

The electrical equipment consists of:

— a magneto-flywheel for the electronic ignition and battery charge;

— a 6 V - 9 Ah battery;

— two spark plugs;

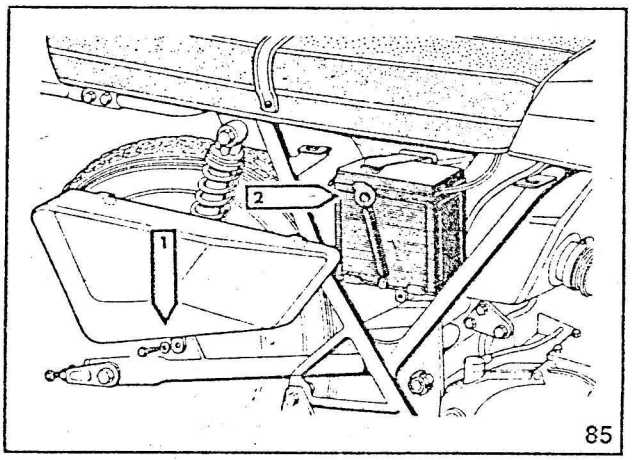
— warning lights on the instrument panel;

— lighting system;

— acoustic system.

9.1 BATTERY

The battery is located under the right side bag. To remove the battery take off the bag, loosening the screw 1, unhook the strap «2» and detach the electric wiring.
It is necessary to periodically ensure that the electrolyte level is mm 6 under the separators; otherwise top up adding **distilled water.** If the battery is wet, dry it and smear the clamps with neuter vaseline.



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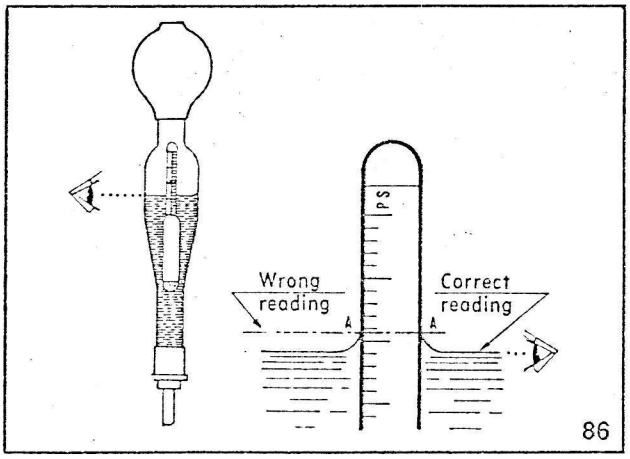
Putting a battery into service

1 Loosen the caps and introduce in each cell pure sulphuric acid for batteries with a specific gravity 1.28 kg/l (1.23 in tropical climates) with temperature + 20 °C until to cover the min. level mark on the battery itself. At introduction acid temperature must not be under + 10 °C. Do not use metal funnels.

2 Let the battery at rest for about one hour, then top up to recommended level, adding sulphuric acid; charge now the battery. The charging current rate in A, is computed in 1/10 of the capacity rate labelled on the battery itself (i.e. a 9 Ah battery requires a charging rate of 0.9 A).

NB - Start charging when temperature is under + 40 °C (+ 50 °C in tropical climates).

To charge the battery connect the battery positive pole (+) to the supplier positive pole (+), same connection for negative poles (—).
During charging, the acid temperature must not be over + 45 °C (+ 55 °C in tropical climates); otherwise stop charging or reduce the current rate.
The initial charge will be accomplished when acid gravity and current intensity rates will remain the same for at least two consecutive charging hours. At this point the acide specific gravity will have to be 1.28 ± 0.01 (1.23 ± 0.01 in tropical climates) at + 20 °C.
It is to be considered that the acid specific gravity varies by 0.01 for each 14 °C temperature



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change. This means that the specific gravity at + 34°C must be increased of 0.01 to obtain the specific gravity at + 20 °C.
Two hours after the charge end check the acid level and if necessary top up by adding distilled water and screw in the filling caps.
The battery is now ready to be in service.
Periodically check the electrolyte level, add only distilled water whenever necessary. Check that all battery connections are well locked and clean, smear them with neuter vaseline.

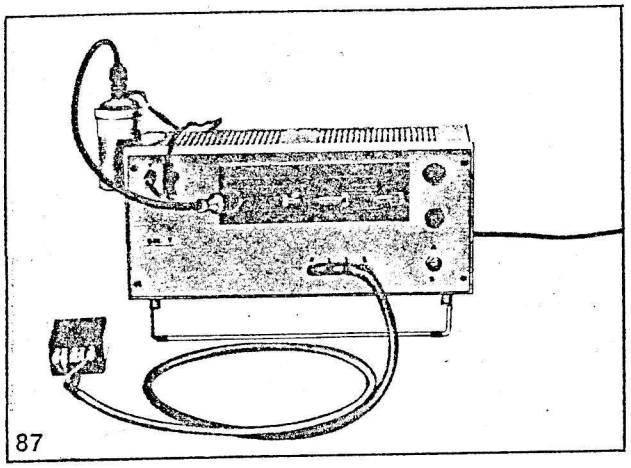
9.2 CHECKING THE IGNITION SYSTEM

The electronic ignition system consists of following parts:
— electronic unit;
— H.V. coil;
— pick-up on the stator plate;
— charging rotor for ignition condenser (located on the stator plate);
— rotor-flywheel;
— impedance.
The electronic unit contains the control circuit and the charging circuit for the condenser (which is incorporated in the electronic unit too). It has three inputs and two outputs.

Inputs

1 for connecting the red cable from the charging rotor for ignition condenser;

2 for connecting the green cable from the pick-up;



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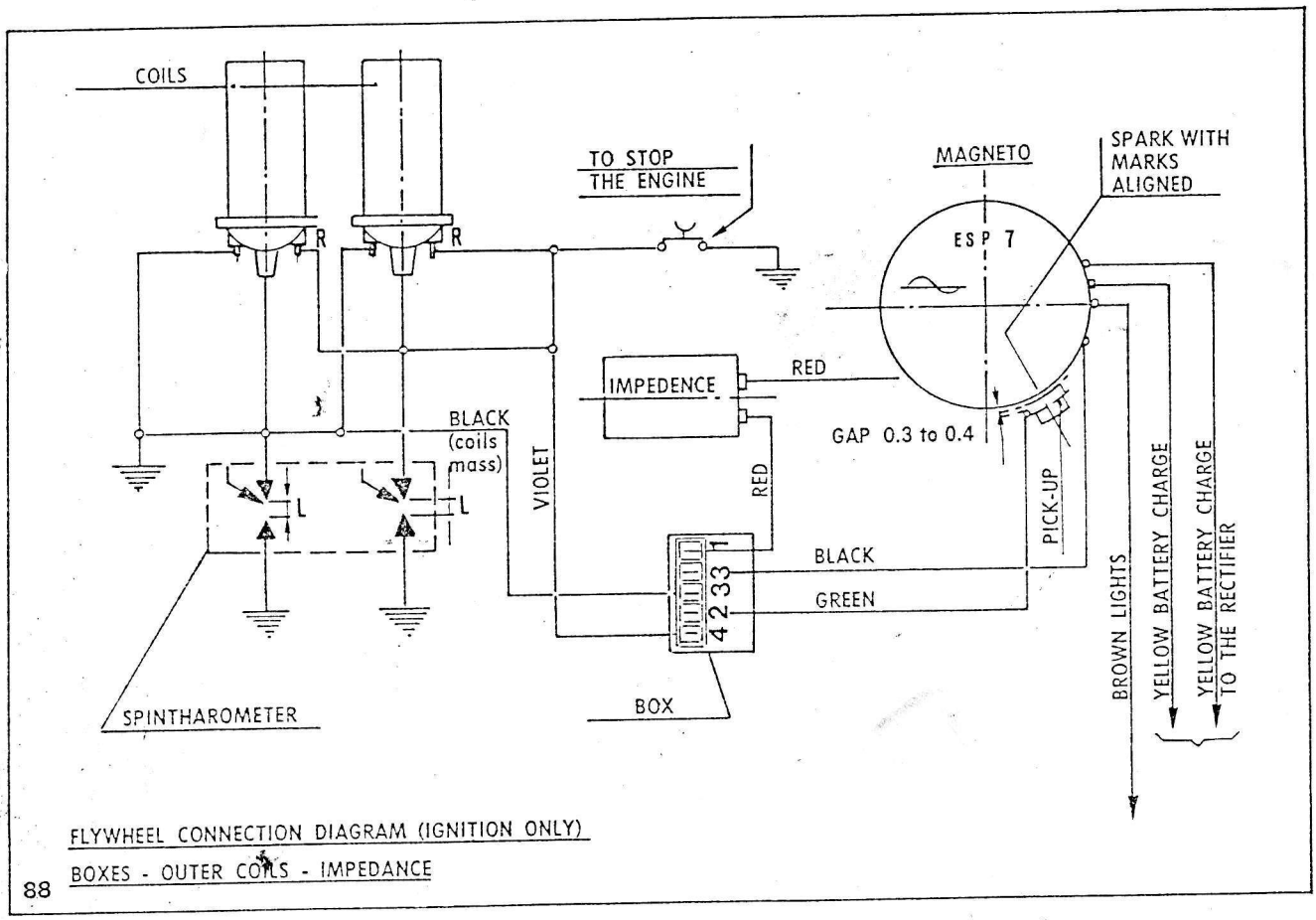


FLYWHEEL CONNECTION DIAGRAM (IGNITION ONLY)
BOXES - OUTER COILS - IMPEDANCE

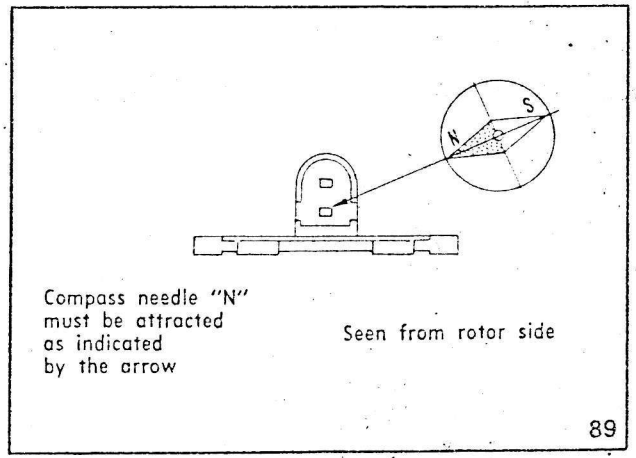
88

3 for connecting the black cable from the stator plate which also grounds charging rotor and pick-up.

Outputs

4 for connecting the clamp «R» of the H.V. coil;

5 for connecting the remaining clamp of the H.V. coil, thus closing the ground circuit.
The electronic unit can be inspected using the proper test (see fig. 87) detecting every damage or defect of the electronic components (checking the sparking on a three point spark gap adjusted at the distance according to instructions). It is not advisable to check only (as many riders do) if there is sparking on a removed spark plug from cylinder after operating on the kick starter; as a matter of fact the electronic unit might show some defect at higher rpm rates.
A better inspection can be carried out using the set on a test bench according to the diagram in fig. 88.
When the set turns at 600 rpm rate, there must be a regular sparking on the three point spark gap adjusted to a length (L) equal to 5 mm.
Increasing the rpm rate to 8000 rpm, there must be a regular sparking adjusted to a length (L) equal to 8 to 9 mm.
An approximative inspection can be carried out using a standard 20,000 ohm/volt tester adjusting it at ohm x 100 and checking the following:
— tester positive terminal connected to clamp 1 - tester negative terminal connected to clamp 3: no conduction;
— tester negative terminal connected to clamp 1 - tester positive terminal connected to clamp 3: no conduction;
— tester positive terminal connected to clamp 3 - tester negative terminal connected to clamp 4: no conduction;
— tester positive terminal connected to clamp 4 - tester negative terminal connected to clamp 3: no conduction;
— tester positive terminal connected to clamp 3 - tester negative terminal connected to clamp 2: about 1000 ohm;
— tester negative terminal connected to clamp 3 - tester positive terminal connected to clamp 2: from 1000 ohm to 1600 ohm.
Should one of the above conditions not occur, the electronic unit would be no doubt defective; but it could not be efficient even if all conditions have occurred, for example due to a damaged but not fully short circuited condenser, or other causes.
The H.V. coil can be inspected using a standard tester, checking the following values:
— secondary winding resistance = 2800 ohm ± 10%;
— primary winding resistance = 0.5 ohm ± 10%.
To measure the secondary winding resistance connect the tester terminals to one of the two transducer clamps; to measure the primary winding resistance connect the tester terminals to the two threaded clamps of the transducer cover.
Ensure that the transformer is detached from the electronic unit when carrying out these measu-



Compass needle "N" must be attracted as indicated by the arrow

Seen from rotor side

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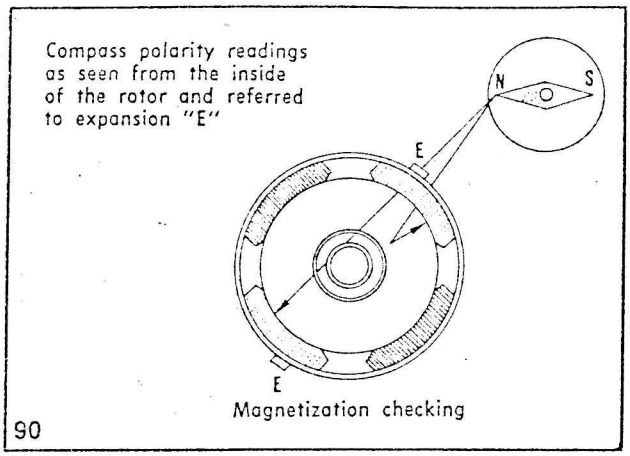
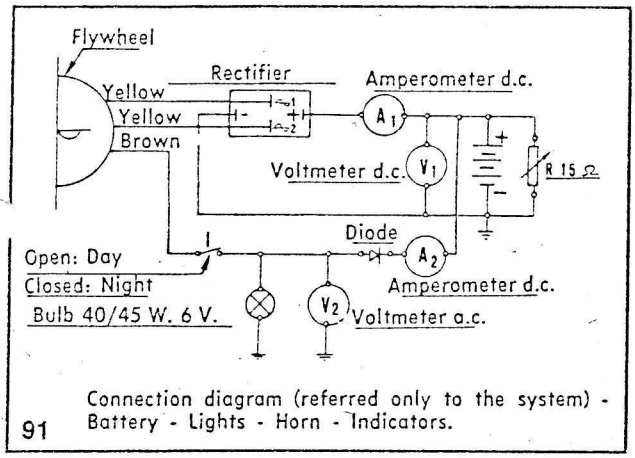


90 Magnetization checking



91 Connection diagram (referred only to the system) - Battery - Lights - Horn - Indicators.

res. The pick-up has to be inspected both electrically and magnetically.
For electric inspection, simply check that its winding resistance is: 90 to 140 ± 20 ohm.
To do this, connect the tester terminals between the pick-up output blade and the metal housing. **The pick-up must not be connected to the circuit.**
To check the pick-up magnetization, inspect the polarity according to the drawing, using a compass or a sample magnet.
The charging rotor for the ignition condenser must show the following electrical resistance: 250 ohm ± 40.
For this measure connect the tester terminals to the red and black cables of the stator plate, paying attention that **such cables are detached from the electronic unit.**
The magnetization of the rotor-flywheel will be inspected by introducing a metal piece inside (i.e. a screw driver) and check that it is strongly attracted by each one of the four magnets.
Using a compass check the magnet polarities which must result alternating (see the figure).
The impedance must show a resistance of 110 ohm ± 15 at the ends of the output clamps **(not connected to the circuit).**

9.3 CHECKING THE BATTERY RE-CHARGING AND 6 V - 40/45 W HEADLIGHT SUPPLYING ASS.Y

To inspect the proper working of the circuit for charging the battery and supplying the 40/45 W headlight, insert in the pictured diagram of figure 91 the indicated instruments. (The diagram represents the motorcycle electrical equipment with the exception of the rectifying ass.y which replaces the regulator).
Check the values indicated in the table (commutator «I» in position «CHIUSO»), paying attention that no load have to be brought to the battery other than the rheostat (15 ohm - 4 A) indicated in the figure which keeps a constant battery voltage of 6 V (can be seen on the voltmeter V 1) during the whole test.

rpm	A 1	A 2	V 2
4000	3.8 to 4.5 A	0.5 to 0.8 A	5.7 to 6.3 V

Lightly higher values too can be accepted.
Should the values result remarkably lower or should no current passage be detected by one or both instruments, inspect first the rectifying

ass.y (according to directions hereunder), then check the integrity of all connections and the proper rotor magnetization (see fig. 90).
If all the above results to be in good conditions, an eventual defect will be due to the stator windings receiving the wires yellow-yellow (for A 1 readings) and the brown cable (for V 2 and A 2 readings).

Checking the rectifying ass.y
(Use a tester 20,000 ohm/V adjusted ohm x 100)

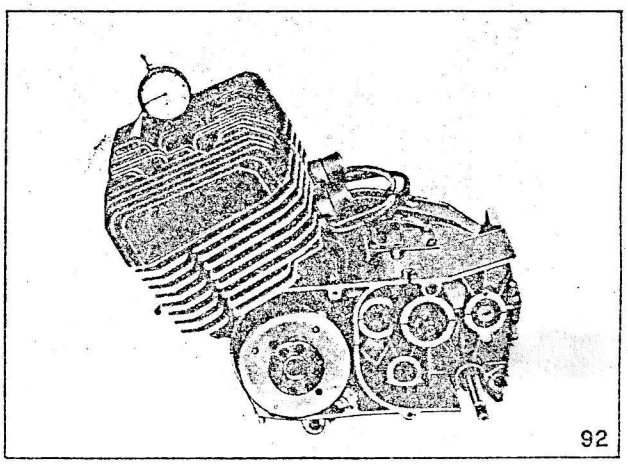
Tester positive terminal to clamp	Tester negative terminal to clamp	Results
+	⏦ 1	No conduction
+	⏦ 2	No conduction
⏦ 1	—	No conduction
⏦ 2	—	No conduction

Repeating the same measures with inverted terminals a conduction of about 1000 ohm must be read.

9.4 IGNITION TIMING FIXED ADVANCE

a By means of a dial gauge

Proceed as follows:
— remove the spark plug from the right cylinder and fit the gauge onto the spark plug hole;
— rotate the crankshaft to bring the right piston at its T.D.C. (ensure that the T.D.C. is properly reached by slightly moving the crankshaft back and forward) and set the gauge to zero (see the figure);
— fit the stator plate onto the crankcase centralizing the plate slots in the screws holes then lock the screws just to harden the plate rotating;
— fit the rotor-flywheel onto the crankshaft ensuring that the hollow fits onto the key which was previously mounted on the shaft itself;
— rotate the crankshaft clockwise until the dial gauge arrow starting from zero («0») makes a rotation equal to 1.6 mm for mod. 125 and 1.35 mm for mod. 250; at this stage the arrow which is stamped on the rotor must be between the two marks on the pick-up (see arrow «A» in the figure).
Should this condition not occur it is necessary to remove the rotor from the crankshaft and to rotate the stator plate to the left or to the right until the arrow position is as above mentioned. Take off the rotor again and lock the screws securing the stator plate to the crankcase; refit the rotor onto the crankshaft and lock the nut «A» using the proper wrench and the holdfast tool (6 in fig. 27).
For eventual subsequent checking it will be advisable to trace a mark «B» on the flywheel rotating part towards the crankcase halves joining mark «C» (see page 19 «Adjusting the ignition timing»).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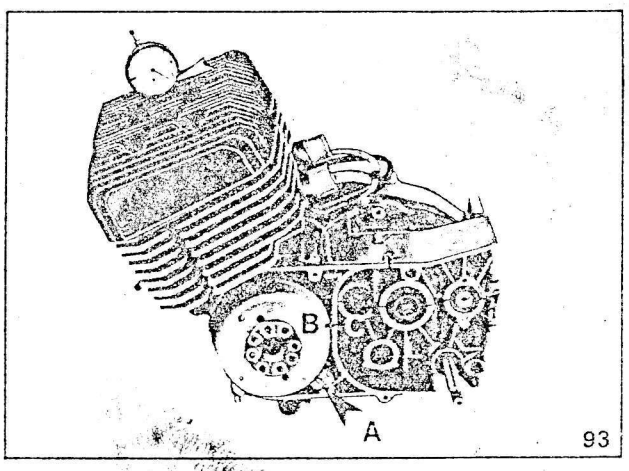

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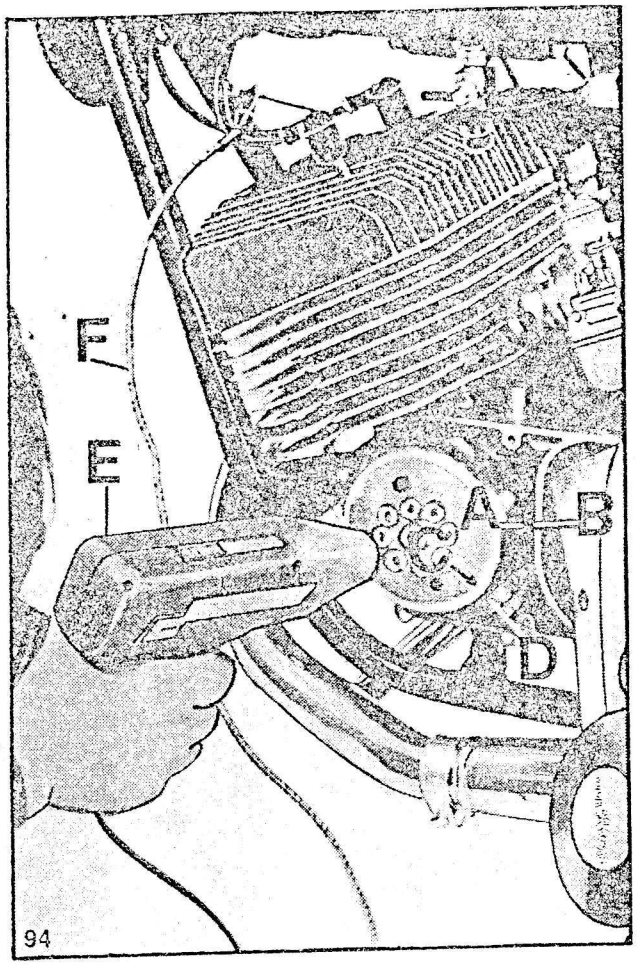

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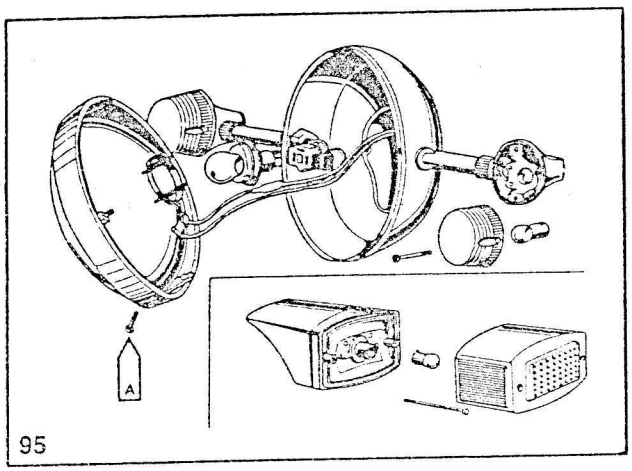
9.5 CHECKING THE IGNITION BY MEANS OF A STROBOSCOPIC LIGHT

To check the stroboscopic ignition point proceed as follows:
— connect the stroboscopic light wires «E» to the battery clamps (either the motorcycle battery or another one) paying attention that the (+) wire has to be connected to the (+) battery clamp and the (—) wire has to be connected to the (—) battery clamp. The wire «F» will be connected to the right cylinder spark plug;
— start the engine and direct the stroboscopic light beam to the crankcase halves joining mark «B». The timing is correct when mark «A» on the rotating part of the rotor «C» is in line with mark «B».
To obtain the correct timing rotate plate «D» (see page 19).



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9.6 BULBS REPLACEMENT PROCEDURE

1 Headlight

a Remove the screw «A» loacted in the lower part of the headlight rim.
b Remove the two bulb holders.
c Take off and replace the bulbs.

2 Tail light

a Remove the two screws fixing the reflector.
b Press the bulb inwards and twist it to the left at the same time thus allowing its removal.

3 Turn indicator lights

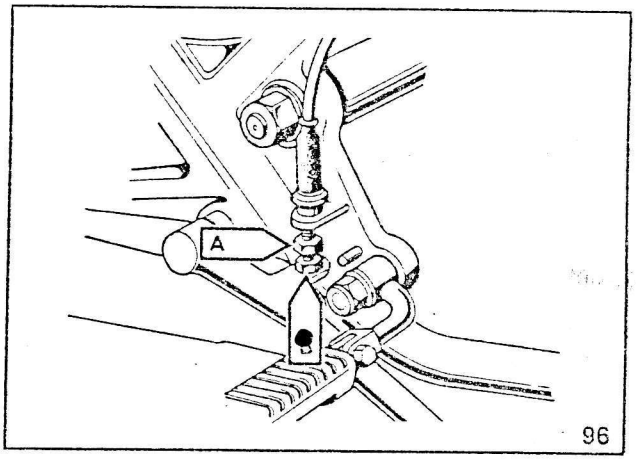
Proceed as indicated at point 2.
NB - When re-fitting the reflectors do not overtighten the securing screws and lock them uniformly not do damage the reflector itself.

4 Instrument panel

The instrument lights are pressed in; take them out from the underside. The warning light bulbs are housed in the panel cover, access to them is made possible by slackening the transparent lenses of the warning lights same.

9.7 ADJUSTING THE STOP LIGHT CUTOUT

This motorcycle fits two stop light cutouts; a hydraulic one for the front brake, which needs no adjustment, and a mechanical one for the rear brake. The latter is located in correspondence of the rear brake control pedal and can be adjusted by simply acting on the screw «A» after loosening the counter nut «B» by means of a 10 mm wrench. It is advisable to keep the button always lubricated.



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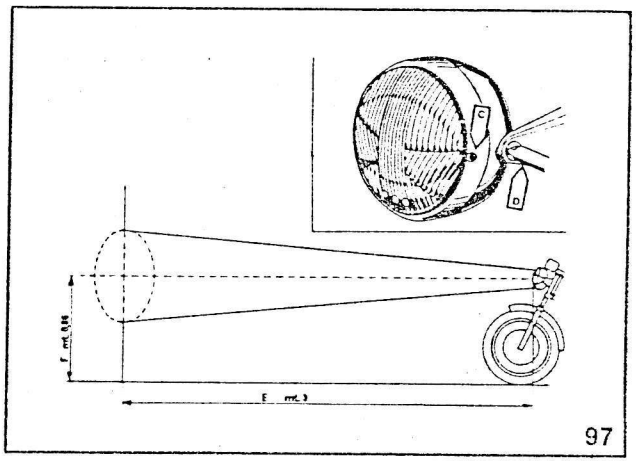
9.8 ADJUSTING THE HEADLIGHT BEAM

The headlight must be properly adjusted for a safe night riding and in order to avoid creating problems for crossing vehicles.
The horizontal adjustment of the headlight beam is made through the screw «C» while the vertical adjustment is made by loosening the bolts «D» and shifting the headlight by hand.
The center of the high beam must not be over the height «F» of 0.86 m measured at a 3 m distance «E» with motorcycle not on stand and rider on saddle.



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10 CLEANING AND STORAGE

10.1 CLEANING

1 Preparation for washing
Before washing the motorcycle cover the following parts using some nylon: exhaust silencer ends, throttle, clutch and brake controls, ignition block, air filter holes.

2 During the washing
Avoid spraying water with great force on: km counter, rev counter, rear wheel hub (should some water enter the hub, it will not work unless again well dry) as well as under saddle and fuel tank where all electric components are located.

3 After washing
Remove all nylon covers.
Lubricate the chain immediately to avoid any rust. Dry the whole motorcycle very carefully.
Test the brakes before riding.
Caution - If using petrol or solvents on washing purpose and mineral oils or greases on lubricating pay attention that such products do not come in touch with the rubber components of the hydraulic braking system in order to avoid any irremediable damage.

10.2 STORAGE

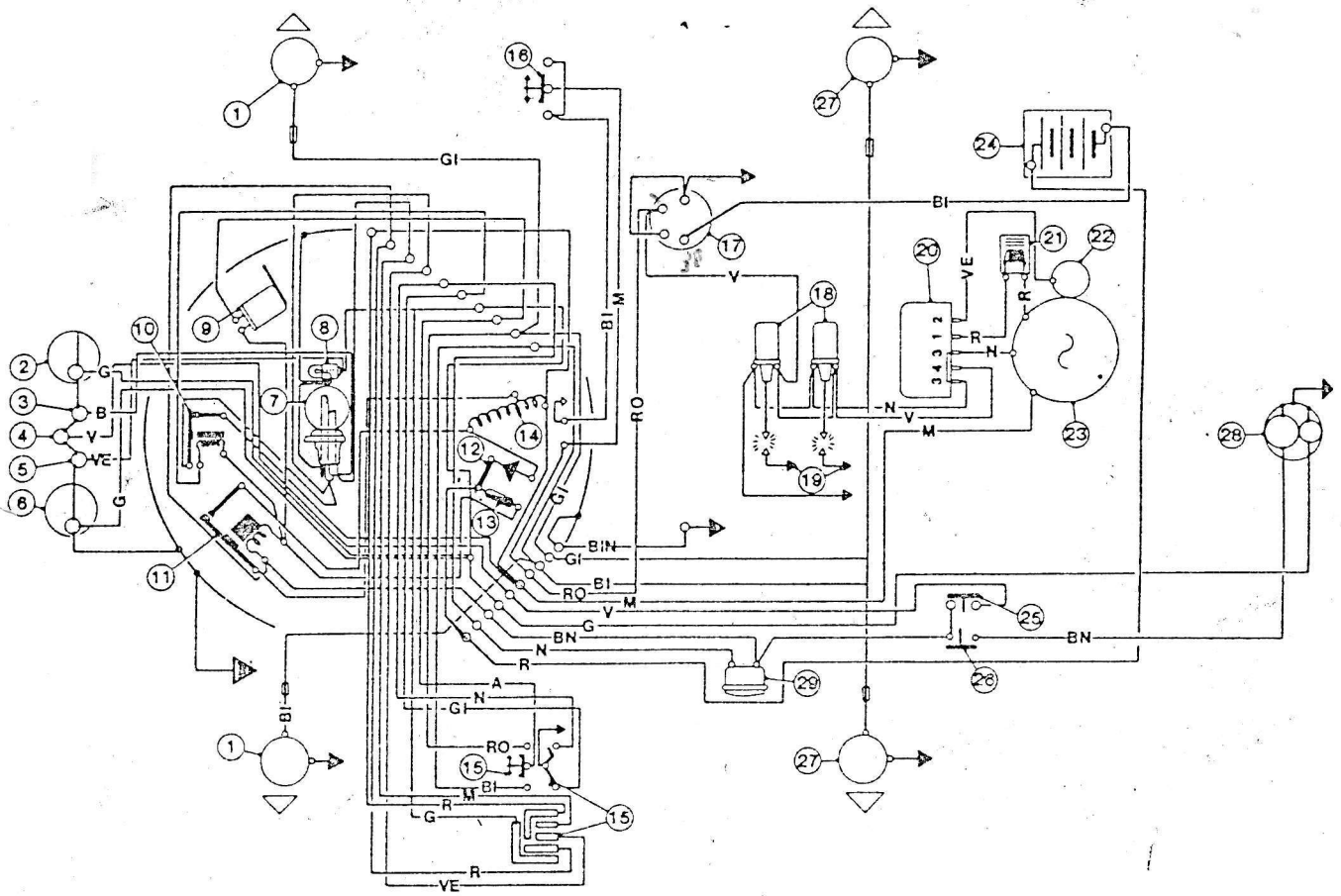
When the motorcycle has to be stored for any length of time such as during the cold season it should be prepared for storage as follows:
— clean the entire vehicle thoroughly;
— empty the petrol from the fuel tank and from carburettors. If left in for a long time petrol would go sour;
— remove the spark plugs and put several drops of SAE 30 oil into each cylinder.
Kick the engine over slowly a few times to coat the cylinder walls with oil then re-fit the plugs;
— reduce tyre pressure by about 20%;
— set the motorcycle in such a way that both wheels are raised off the ground;
— oil all unpainted surfaces to prevent rusting;
— avoid oiling rubber parts and brakes;
— remove the battery and store it where it will not be exposed to direct sunlight or to moisture or freezing. During storage it should be given a low charge (one Ampere or less) about once a month;
— put a cover onto the motorcycle to protect it from dust but let the air circulation free.

11 WIRING DIAGRAM

250 TS Trommelbrem

11.1 1st SERIES (drum brake)

1 Bulb 6 V - 21 W
2 Bulb 6 V - 3 W
3 Bulb 12 V - 1.2 W
4 Bulb 12 V - 1.2 W
5 Bulb 12 V - 1.2 W
6 Bulb 6 V - 3 W
7 Bulb 6 V - 40/45 W
8 Bulb 6 V - 3 W
9 Flasher 6 V - 40 W
10 Flashing relay MTP/1A 50
11 Recharge relay MLP/1C/10
12 Diode 1R 21 PT 20
13 Fuse 15 Ah
14 Twin impedance
15 Control block: lights, horn, turn signals, flashing light
16 Engine stop switch
17 Ignition block (3 positions)
18 H.T. coils
19 Spark plugs
20 Electronic unit
21 Impedance
22 Pick-up
23 Magnet
24 Battery 6 V - 9 Ah
25 Neutral position cutout
26 Stop light cutout
27 Bulb 6 V - 21 W
28 Bulb 6 V - 5/21 W
29 Horn



KEY TO COLORS

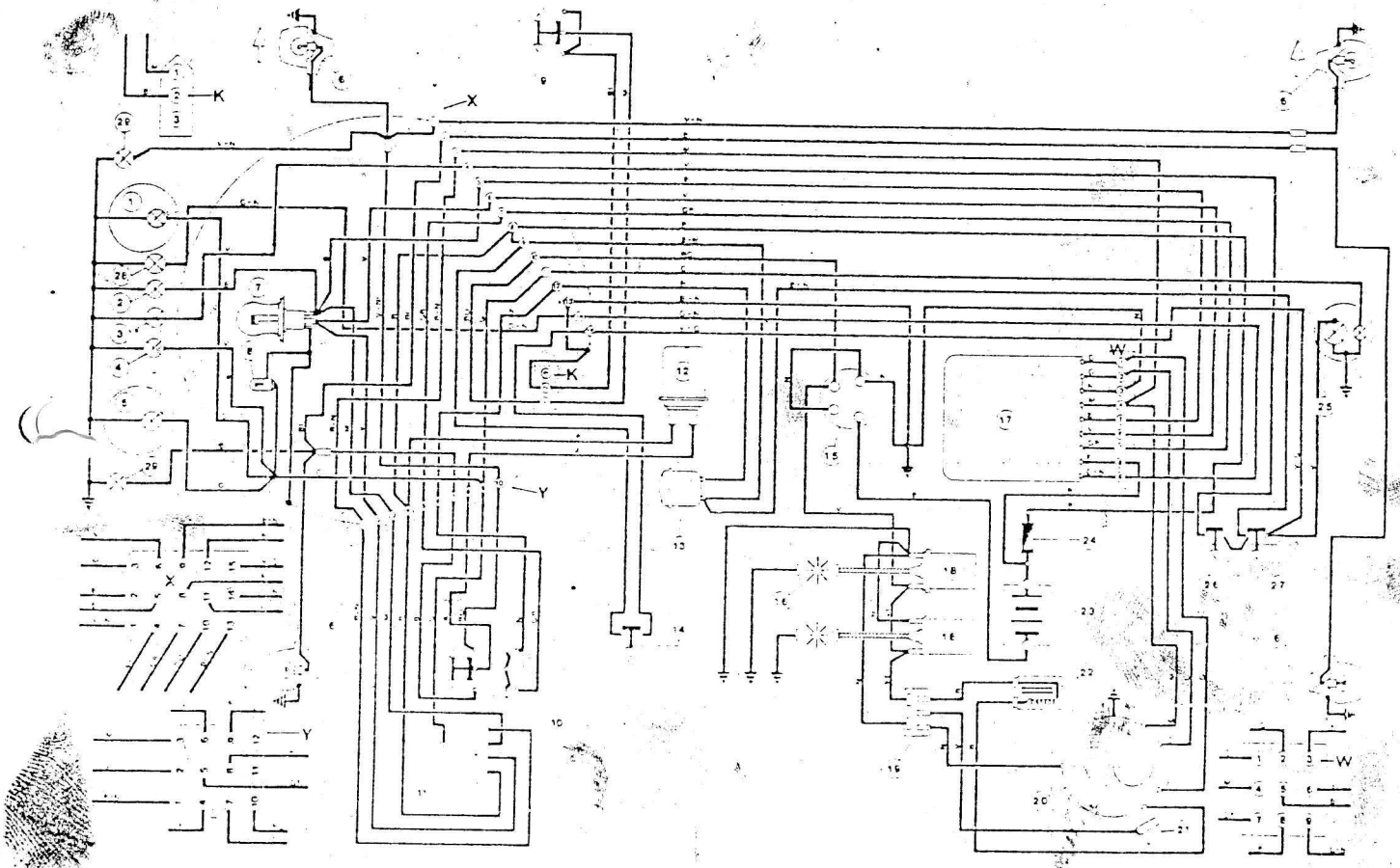
VE	=	green	RO	=	pink
R	=	red	GI	=	gray
G	=	yellow	A	=	orange
N	=	black	V	=	violet
M	=	brown	B	=	blue
RN	=	red-black	BN	=	blue-black
BI	=	white	BIN	=	white-black

250 TS Scheibenbremse

11.2 2nd SERIES (disc brake)

Innenschaltung Lichtmaschiene(20) und Elektronikeinheit(17) s. nächste Seite(125T)

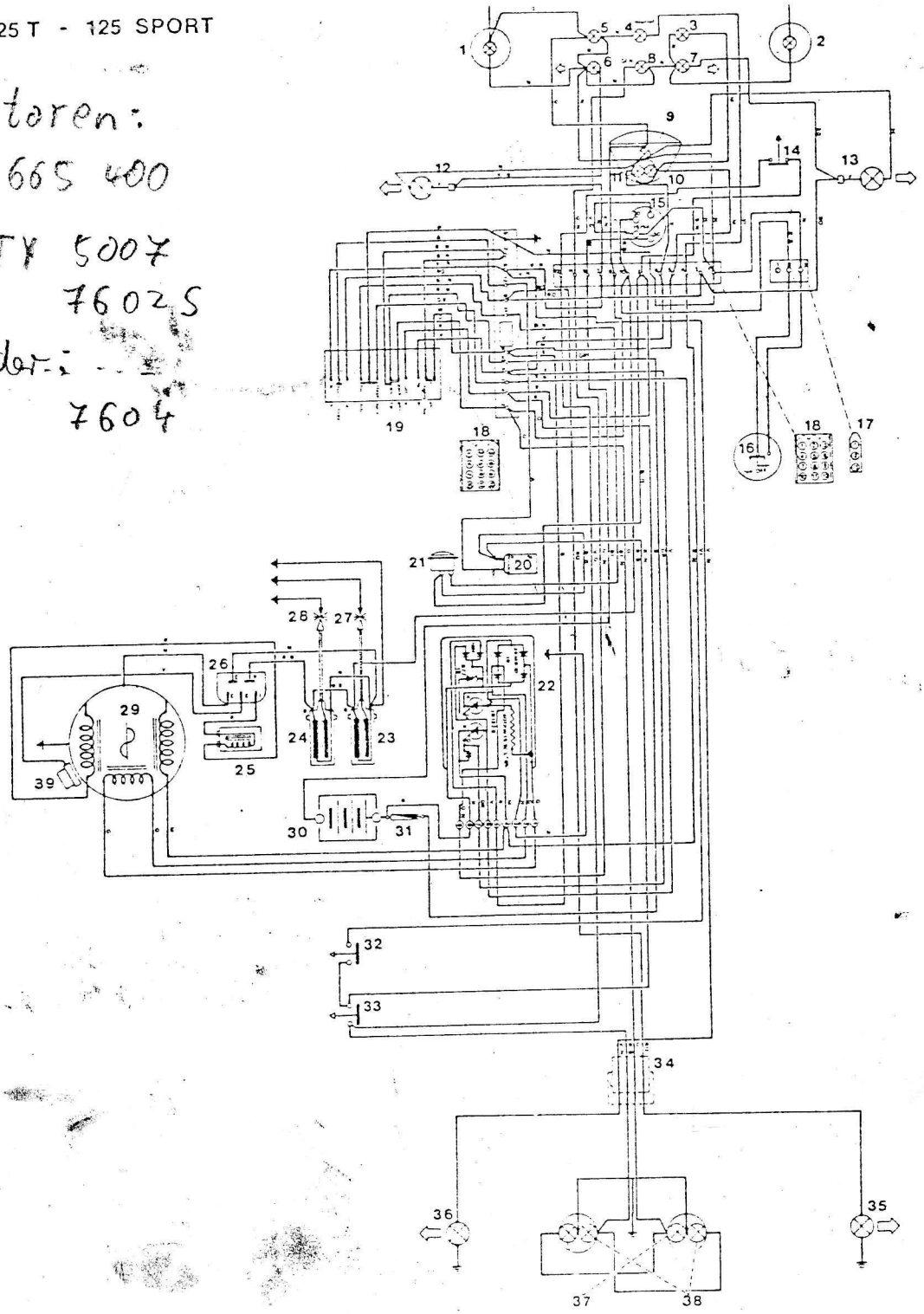
1 Km counter, bulb 6 V - 3 W
2 High beam warning light 12 V - 1.2 W
3 Neutral position warning light 12 V - 1.2 W
4 Lighting warning light bulb 12 V - 1.2 W
5 Rev counter 6 V - 3 W
6 Turn signal bulb 6 V - 21 W
7 Bulb 6 V - 40/45 W
8 Bulb 6 V - 3 W
9 Engine stop switch
10 Control block: horn, flashing light, turn signal
11 Light switch
12 Flasher 6 V - 40 W
13 Horn
14 Front stop light cutout
15 Ignition block
16 Spark p ugs
17 Regulator - electronic rectifier
18 H.T. coil
19 Electronic unit
20 Magneto-flywheel
21 Pick-up
22 Impedance
23 Battery
24 Fuse - 15 A
25 Tail light - Bulb 6 V - 5/21 W
26 Neutral position cutout
27 Rear stop light cutout



KEY TO COLORS

N	= black	BI	= white
G	= yellow	GR	= gray
V	= green	B-N	= blue-black
R	= red	V-N	= green-black
B	= blue	R-N	= red-black
VI	= violet	BI-N	= white-black
RO	= pink	G-N	= yellow-black
A	= orange	V-G	= green-yellow
M	= brown		

Thyristoren:
1) TAG 665 400
2) SSC TY 5007
7602 S
oder:
7604



KEY TO COLORS

V	=	green
N	=	black
G	=	yellow
M	=	brown
R	=	red
BI	=	white
VI	=	violet
RO	=	pink
B	=	blue
A	=	orange
GR	=	grey
BI-N	=	white-black
R-N	=	red-black
V-G	=	green-yellow
B-N	=	blue-black
V-N	=	green-black
R-B	=	red-blue
G-N	=	yellow-black

1 Rev counter lamp 3 W
2 Speedometer lamp 3 W
3 High beam warning light - blue 1.2 W
4 Neutral warning light - orange 1.2 W
5 Parking light, warning light - green 1.2 W
6 Turn indicator left, warning light - green 1.2 W
7 Turn indicator right, warning light - green 1.2 W
8 Generator charge warning light - red 1.2 W
9 Parking lights, front 4 W
10 Low beam 45 W
11 Low beam 40 W
12 Front turn indicator, left 21 W
13 Front turn indicator, right 21 W
14 Front STOP swjtch
15 Light switch and ignition switch
16 Engine stop button
17 3-way connector
18 12-way connector
19 Flashing light, turn indicator, and horns switch
20 Starter unit, intermittence 40 W
21 Horn
22 Current regulator and rectifier
23 Coil, cilinder 1
24 Coil, cilinder 2
25 Impedance
26 Electronic gearbox
27 Spark plug, cilinder 1
28 Spark plug, cilinder 2
29 Alternator
30 Battery
31 Fuse 15 A
32 Neutral switch
33 Rear STOP switch
34 4-way AMP Male-female connector
35 Turn indicator, right rear 21 W
36 Turn indicator, left rear 21 W
37 STOP light 21 W
38 Number plate and parking light 5 W
39 Pick-ups