MOTO MORINI

Fabbrica Italiana Motocicli S.p.A.

500

Notes:

I have included the wiring diagram, even though the quality is pretty poor. A color version is available at Peter Booth's technical reference web site (http://www.tresette.com).

Also included is the are both the apparently-factory-done modifications to the running in and maintenance instructions (page 18), which were stapled over the original (page 19).

N O T I C E

1 km = 0.6214 mi.
1 mi. = 1.6093 km.

1) *Free service is offered by the distributor who sold the motorcycle.*

2) *For normal maintenance of the motorcycle follow the instruction handbook.*

FREE SERVICE

a 500 Km. 310 mi

- — Oil change (payment is required for quantity of oil)
- — Cleaning of filters
- — Cleaning of carburettor
- — Adjustment of tappets
- — Tightening of headed nuts and bolts of frame
- — Adjustment of clutch
- — Adjustment of brakes

GUARANTEE CERTIFICATE

Issued to Mr/Ms. .....

.....

.....

Buyer of motorvehicle « MOTO MORINI »

Model .....

Frame N. .....

Dated .....

Distributor

.....

GUARANTEE

The guarantee for MOTO MORINI motorcycles is for a period of 6 months from delivery and covers defects of assembly and material.
Parts which are considered defecting by the factory will be replaced free of charge.

Expenses for labour are at the charge of the buyer.

The following are not under guarantee: tyres, chains, bearings, carburettors, ignition and lighting system and, in general ,all parts not manufactured by « Moto Morini ».

Any guarantee ceases for those motorcycles that are not used according to instructions, rented out, used for racing, or that have been repaired outside the « Moto Morini ».

Neither the distributor, or the manufacturer are responsible for damages that may occur to people or property, by the use of « Moto Moirni » motorcycles, even if the damages are due to defects in construction.

The guarantee is no longer valid if during the period of 6 months the instructions regarding use of recommended lubricants and fuel have not been followed.

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TECHNICAL DATA

ENGINE

2 cylinder 4 stroke.
72° V longitudinal with 50 mm staggered cylinders face gear.
Bore and stroke 69 x 64 x 2 mm.
Compression ration 11,2 : 1
Single cylinder capacity 239,3 cc.
Total cylinder capacity 478,6 cc.
HP DIN 43 - Kw 31,6; HP SAE 46 - Kw 33,8 at 7500 r.p.m.
Speed limit of wobble max. 8200 r.p.m.
Specific power HP/L 90 DIN; HP/L 96 SAE
Max. torque 4,43 Kgm DIN 43,46 N.m.; Kgm 4,6 SAE 45,12 N.m.
Max torque speed 5100 r.p.m.
Flywheel magneto current generator 140 W 12 V alternator with electronic adjuster totally rechargeable.
Ignition advance from 10° after TDC to 30° before TDC with electronic adjustment.
Two PHBH 26 BS Dellorto carburetors with common air filter.
Mesh oil filter in crankcase sump.
Capacity of crankcase sump 3 litres.
Recommended oil: Castrol 20-50 XL every 4000 Km or Castrol RS every 8000 Km. For winter use Castrol GTZ/2
Helical gear primary drive, ratio 1 : 2,03
Secondary drive by 5/8 x 3/8 chain, pinion Z = 14.
Crown Z = 44 with rubber flexible coupling on hub.
Heat rating spark plug = 225 BOSCH scale.
For sport use or long motorway runs a spark plug with a heat rating of 240 BOSCH scale is recommended.

spark plug gap = 0.7 ~ 0.8 mm.
0.023 ~ 0.031 in.

GEAR BOX

5 speed block type with quick coupling.
Gear ratios:
1st gear: 1 : 2,23 - 2nd gear: 1 : 1,47 - 3rd gear:1 : 1,10
4th gear: 1 : 0,91 5th gear: 1 : 0,79

WHEELS

Light alloy monolithic wheels.
Front with WM 2/1,85 run with 100/80 x 18" tyre
Rear with WM 3/2,15 run with 3,50 x 18" tyre.
Inflation pressure:
front 1,9 atm. with driver and 2,1 atm. with passenger. ~ 28 lbs.
Rear 2,2 atm. with driver and 2,4 atm. with passenger. ~ 32 lbs.

BRAKES

Front double disc type Ø 260 mm with hydraulic control.
Rear disc type Ø 260 mm with hydraulic control and removable pivot for quick removal of wheel.

ELECTRICAL SYSTEM

With 12 Volt and 20 A/h battery.
3 beam headlamp with 170 mm diameter.

FRAME

Tubular duplex continous cradle type.
Wheel base 1443 ma. length 2135 mm.
Dry weight 167 Kg - Fuel tank capacity 14 litres.
Reserve 2,5 litres.

368 lbs.

TUNE-UP DATA

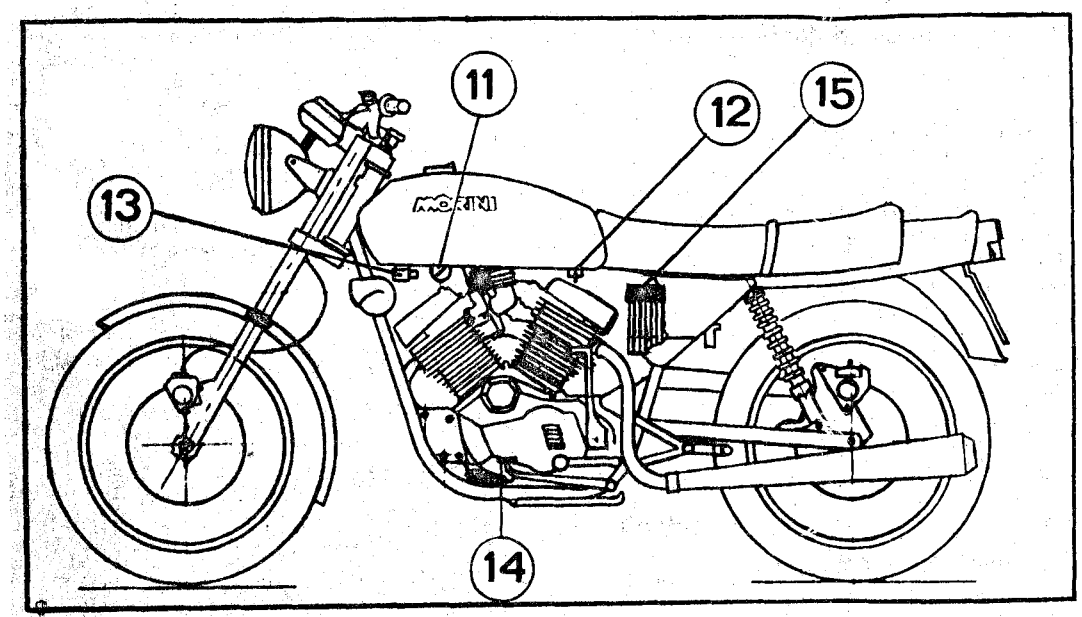
With valve gap adjusted to 1 mm. (cold engine) front and rear cylinder:

inlet opens	23° before TDC
inlet closes	51° after BDC
exhaust opens	51° before BDC
exhaust closes	22° after TDC

PERFORMANCE

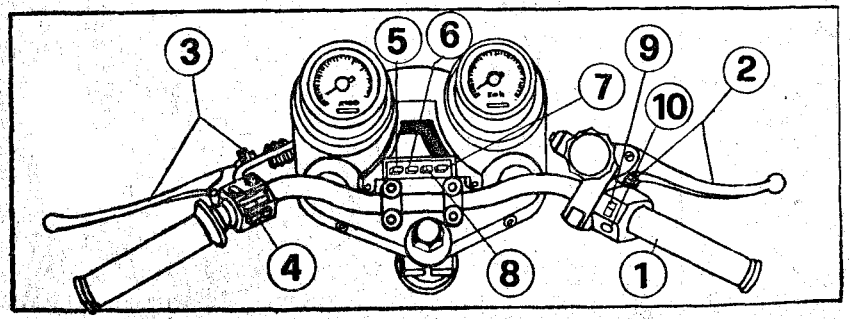
109 mph

Max. speed 177 Km/h - Consumption 4,7 litres x 100 Km. (C.U.N.A. Directions).

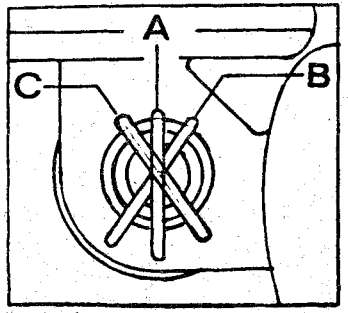


Picture 1

1 THROTTLE CONTROL
2 DOUBLE DISC FRONT BRAKE CONTROL AND ADJUSTMENT
3 CONTROL AND ADJUSMENT OF CLUTCH
4 LIGHTS DIVERTER AND HORN
5 **BLUE LIGHT HI BEAM**
6 **GREEN LIGHT NEUTRAL**
7 **RED LIGHT LIGHTS**
8 **YELLOW LIGHT OIL PRESSURE**
9 ENGINE SWITCH OFF
10 ENGINE START
11 KEY COMMUTATOR
12 FUEL RESERVE TAP * OFF FOR NORMAL RUNNING
13 ELECTROMAGNETIC FUEL TAP
14 REAR BRAKE PEDAL
15 12 V - 20 A/h BATTERY



Picture 2



Paricular 11

A - OFF

B - PARKING LIGHT

C - IGNITION ON

Picture 3

RUN- IN INSTRUCTIONS

The first period of running is a determining factor for the future performance and life of the engine and therefore it is strongly recommended to comply with the following instructions:

STARTING

1 - Insert key in the ignition switch and turn till first click (picture 3).
2 - Check that the engine on off switch is on position « RUN ».
3 - With cold engine turn the starter lever, press starter button.
4 - After the engine has started, leave it to idle a little, so that the oil may go into circulation.
5 - Immediately after starting remember to lower the starter lever.
6 - During the first 1500 Km do not exceed 4500 r.p.m. rating.

From 1500 Km. to 3000 Km do not exceed 6000 r.p.m. Over 3000 Km increase now and then progressively.
(Instructions for maintenance during the run-in period are given at page 13).

PROCEDURE FOR ROUTINE MAINTENANCE

CHANGING OIL

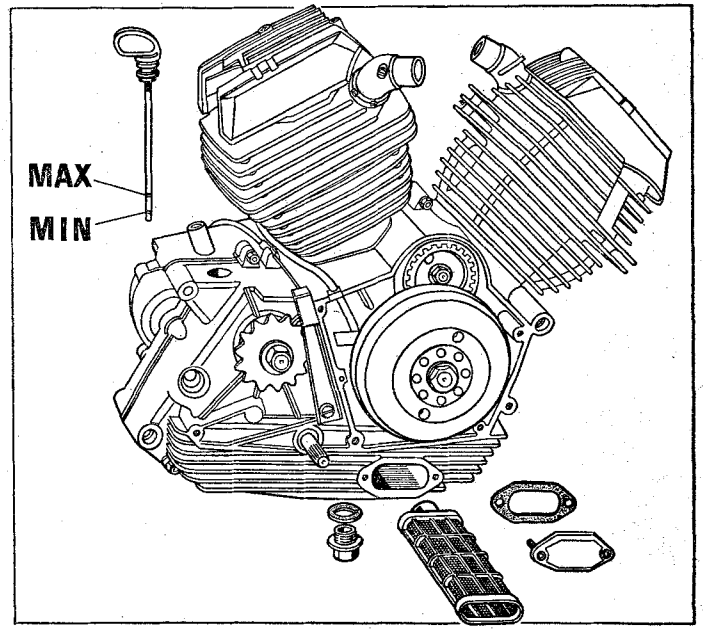
This operation must always be made with **WARM** engine.

1 - Remove tap located under the engine (picture 4) and take care that the most quantity of oil is drained.
2 - Carefully close the tap, remove dip-stick (picture 4) and pour in 3 litres of Castrol 20-50 XL or Castrol RS oil (see page 1).
It is good practice to check the oil level every 1000 Km and ensure that the level never goes below the « MIN » level.

Dipstick must be pushed all the way in.

CLEANING OIL FILTER

1 - Remove side cover (picture 4).
2 - Take off filter and clean it carefully using compressed air.
3 - **It is good practice to clean filter every time oil is changed.**



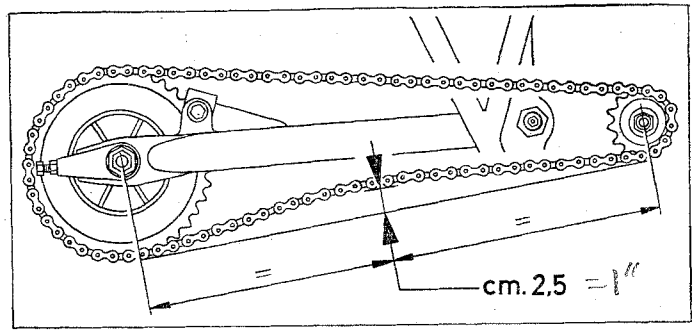
Picture 4

CHAIN ADJUSTMENT AND MAINTENANCE

1 - Loosen locking nuts of rear wheel.

2 - Act on chain tighteners uniformly.

3 - With motorcycle on its stand check the chain tension, placing a rod under the chain (picture 5).
After this check, verify the wheel alignment.



Pictufre 5

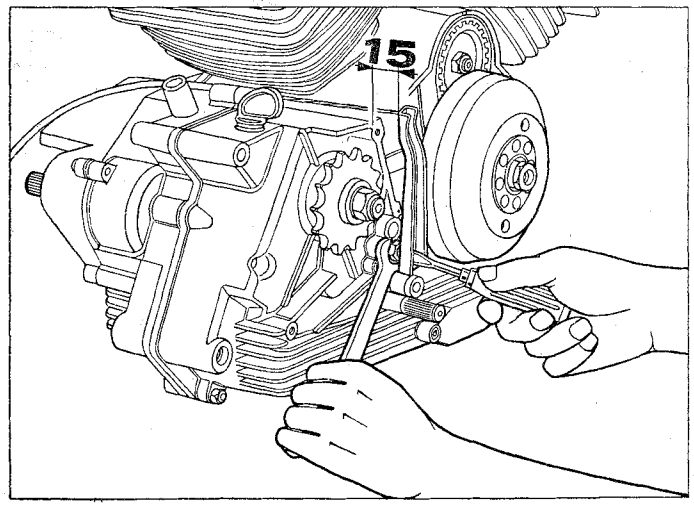
CHAIN LUBRICATION

1 - Immerse the chain in a tin contaning trichloroethylene and wash it thoroughly.

2 - Lubricate the chain by immersing it in a tray containing Molykote Oil (Type MKL 32) and heat it so that it may penetrate the chain mesh or wash the chain with petrol and then spray Castrol Chain Lube.

CLUTCH ADJUSTMENT

1 - Use adjuster sited on control lever on handlebar; should it not be sufficient, use pin of crankcase lever.
This ad ustment is carried out using the special adpuster (picture 6). It is recommended that you maintain the distance between the lever and the crankcase which should be 15 mm.



Picture 6

BRAKE ADJUSTMENT

Brake adjustment is necessary when the free travel of the brake control levers becomes excessive.
Checking wear of pads: to check if the pads are efficient, it is necessary to see that on the disks there is a circular mark, when the mark disappears, replace the pads.
Check the oil level in the trays and if necessary add Castrol Disc Brake Fluid.

CHANGING FORK OIL

1 - Unscrew plugs (upper and lower).

2 - Press down a few times so as to fully empty legs.

3 - Close the lower plug and fill each leg with 180 gr. oil Castrol TQF.

ADJUSTMENT OF TAPPETS (to be made with cold engine)

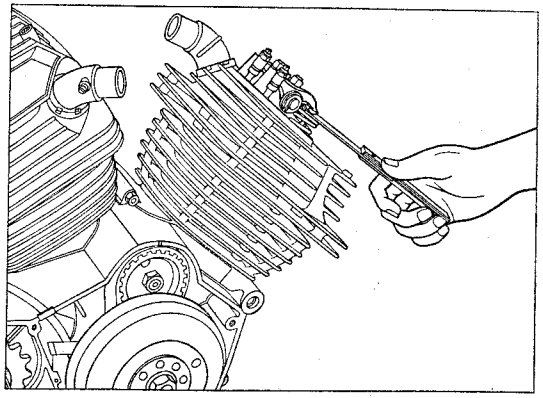
Functioning inlet and exhaust gap 0,10 mm.
1 - Remove the protection cover of flywheel magneto.

Adjustment of front cylinder (n. 1) (picture 7).
1 - Zero arrow on flywheel marked TDC 1 with the centre of the timing sprocket (picture 8).
2 - Proceed to adjust tappets of the front cylinder (n. 1).

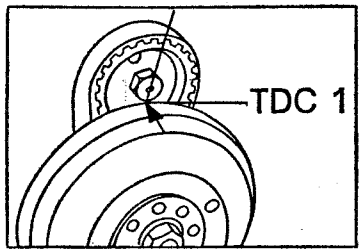
Ad ustment of rear cylinder (n. 2 (picture 9).
1 - Zero arrow marked TDC 2 with the centre of the timing sprocket by turning the flywheel (fig. 10).
2 - Proceed to adjust the tappets of the rear cylinder (n. 2).

N.B.: In case of disassembling the tappet rods, take note of their length, as the front rods are about 2 mm. shorter than the rear ones.

FRONT CYLINDER N. 1

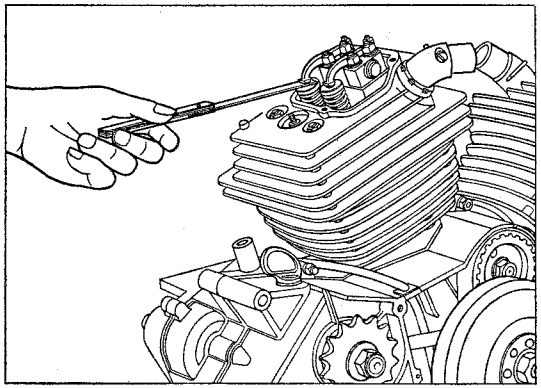


Picture 7

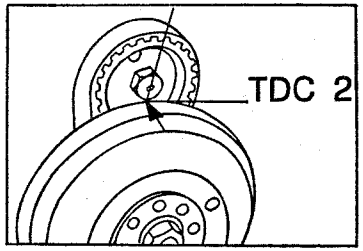


Picture 8

REAR CYLINDER (N. 2)



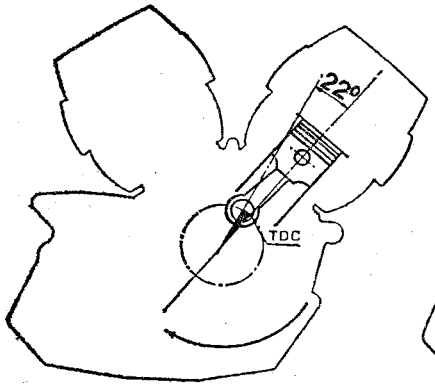
Picture 10



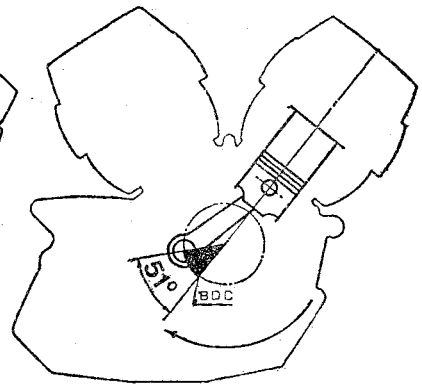
Picture 9

TUNE UP DATA WITH VALVES GAP ADJUSTED AT 1 mm. (COLD ENGINE)

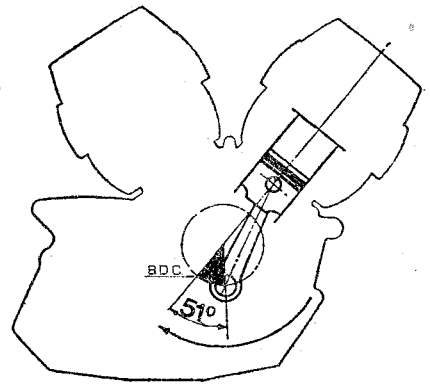
FRONT CYLINDER (N. 1)



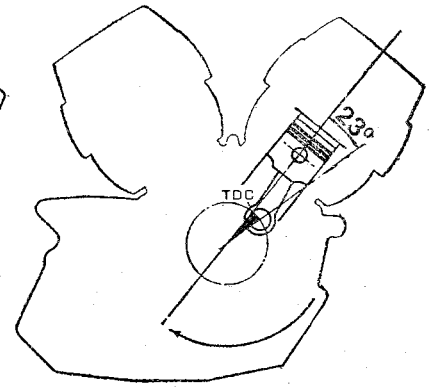
Inlet opens



Inlet closes

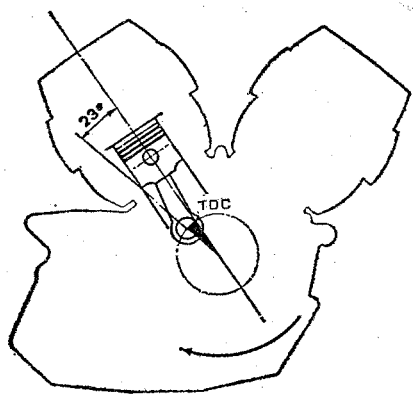


Exhaust opens

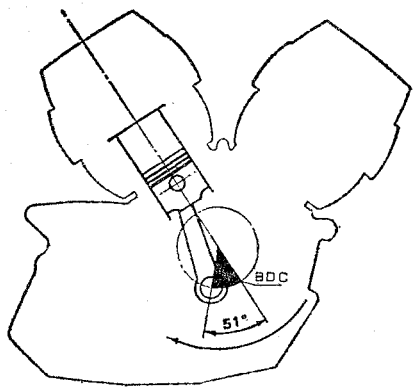


Exhaust closes

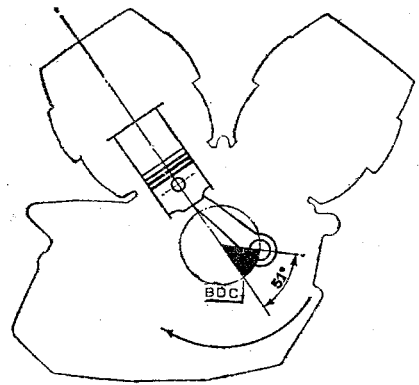
REAR CYLINDER N. 2



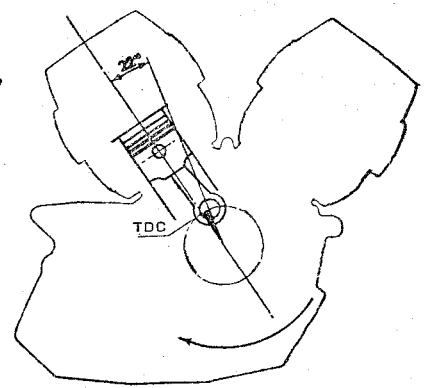
Inlet opens



Inlet closes



Exhaust opens



Exhaust closes

CHECKING ENGINE TIMING

The check of timing is made only when the following parts are being replaced:

Driving shaft, timing sprocket, camshaft. Check is made with a tappet gap of 1 mm.

1 - Adjust the valves proceeding as indicated on page 5.

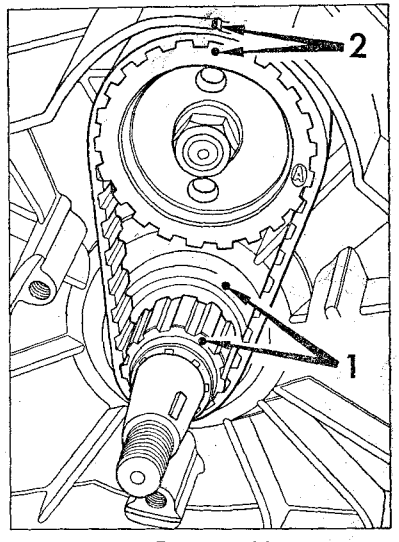
2 - Place cylinder n. 1 (front) in position of valve crossing (TDC 1).

3 - Mount and zero a protractor (at TDC 1).

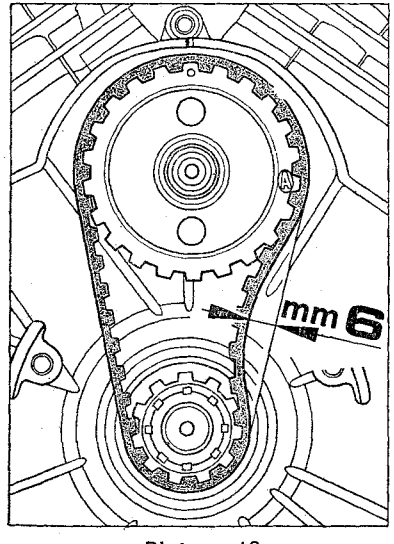
4 - Rotate clockwise to reach beginning of inlet opening.

5 - Make sure that angle on the protractor is ± 3° from the established one (page 6).

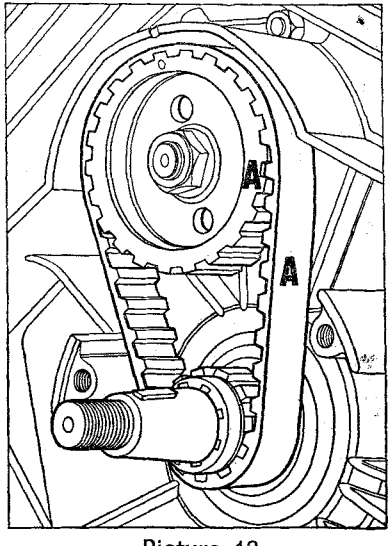
6 - Should this angle be out of tolerance, rotate small timing control sprocket, so as to find a timed mark, allowing introduction of sprocket, and mark the new references as shown in picture 11.



Picture 11



Picture 12



Picture 13

CHECKING TOOTHED BELT

TIMING BELT

It is good practice to inspect the tension of the belt every 8000 Km, and to replace it after 20000 Km.

Checking toothed belt tension (picture 12):

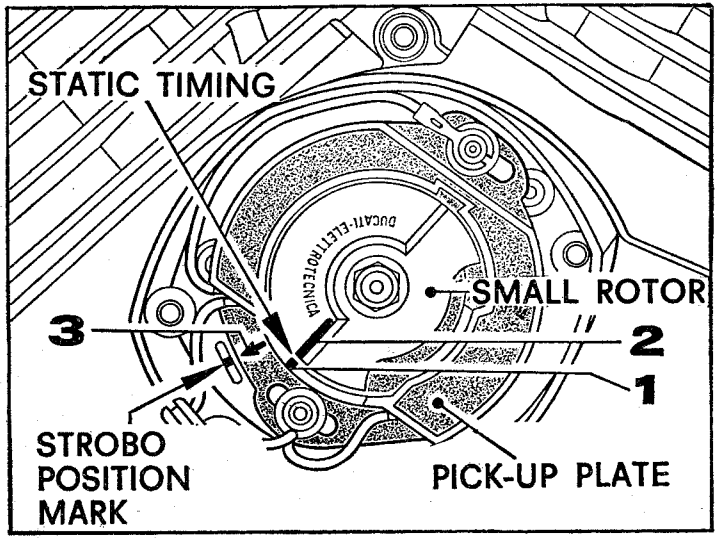
1 - Dismount flywheel magneto unit.

2 - Place a rule on the two pulleys and check with a feeler gauge the tangent gap; should this be higher than 6 mm, replace belt.

REPLACING TIMING TOOTHED BELT

1 - Set the two marks on sprocket as shown in picture 11. Slide off sprockets making use of a seeger ring as a hook. Replace belt taking care that the capital letter marked on the big sprocket corresponds to that market on the belt (see picture 13). Introduce now belt and sprockets together, taking care that mark of small sprocket is timed with key (picture 11).

2 - **After assembling check timing marks** (1 and 2 - picture 11).



Picture 14

DYNAMIC CHECKING OF ELECTRONIC IGNITION ADVANCE

1 - Connect impulse tap of stroboscopic pistol to cable of spark plug of front cylinder (n. 1).

2 - Start engine and let it reach a rating of 7000 r.p.m.

3 - Check with light of stroboscopic pistol the timing of reference marks on flywheel (fig. 15). In arrow on flywheel does not correspond to notch on case, adjust pick-up plate by means of slight desplacements (pictu-re 14).

4 - When point zero is obtained, mark the new reference on the cover notch in direction of arrow (3) placed on pick-up plate (picture 14).

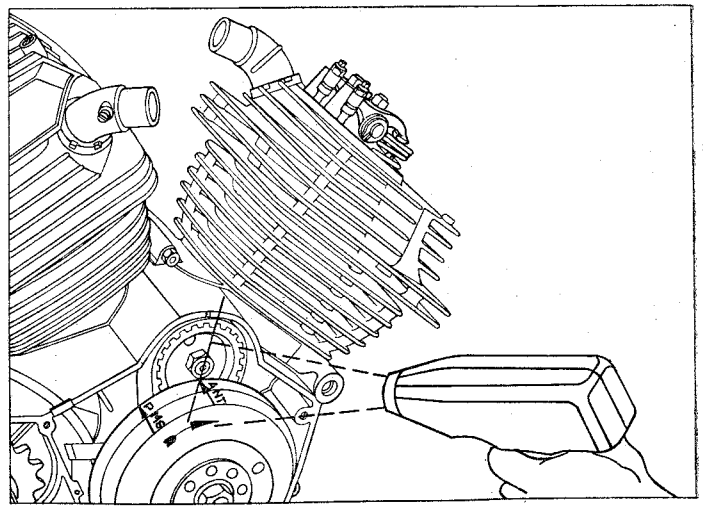
STATIC CHECKING OF ELECTRONIC IGNITION ADVANCE

This checking is made during total or partial assembling of engine.

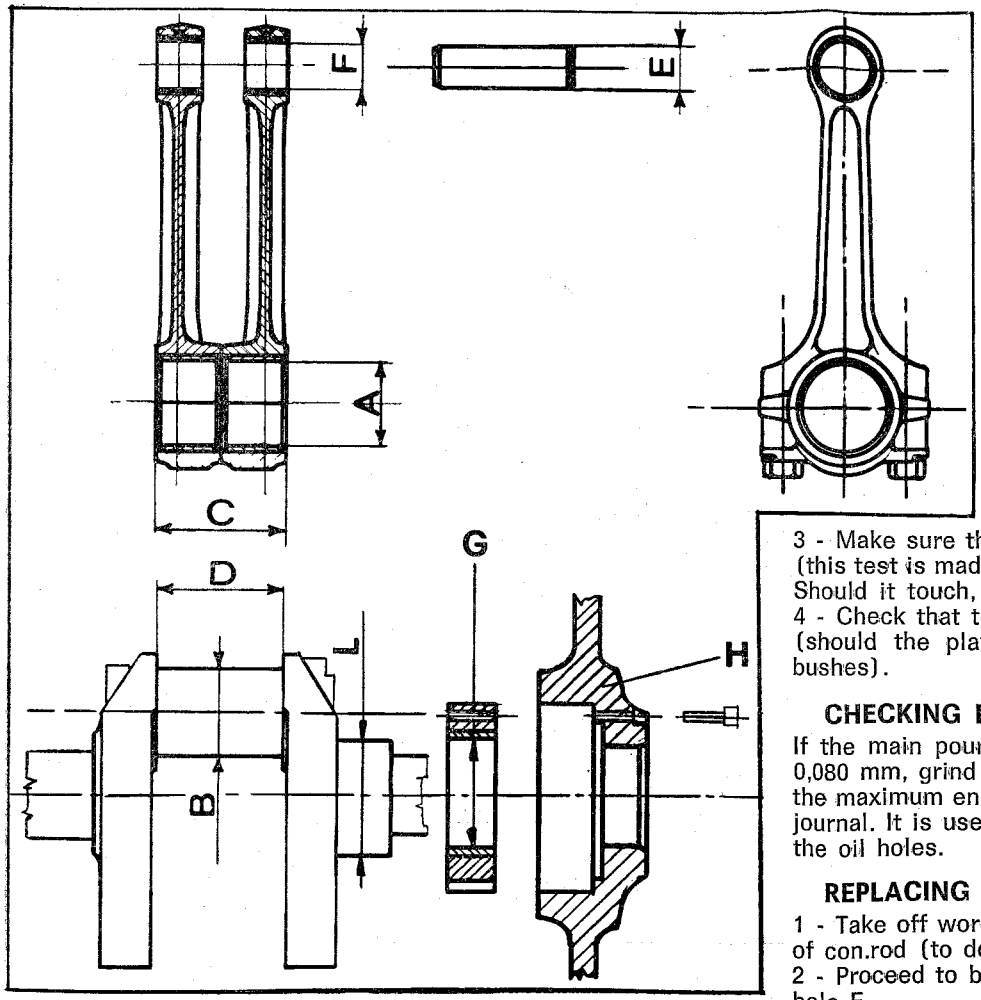
1 - Rotate driving shaft untill notch on flywheel magneto marked with ANT. 1 corresponds to the centre of timing sprocket (Picture 8).

2 - Rotate pick-up plate until notch on plate (1) corresponds to mark on small rotor (2) (Picture 14); then fix plate.

After the static check a careful checking is suggested using a stroboscopic pistol.



Picture 15



Picture 16

ENGINE OVERHAULING

CRANK SHAFT

CHECKING PLAY OF CRANK PIN

Shoul crank pin be worn, or the play between A and B (picture 16) exceed 0,080 mm proceed to grinding pin.
Admissible undersize: 0,2 and 0,4 mm.
After grinding, remove seams and edges on oil holes.

ASSEMBLING CONNECTING ROD

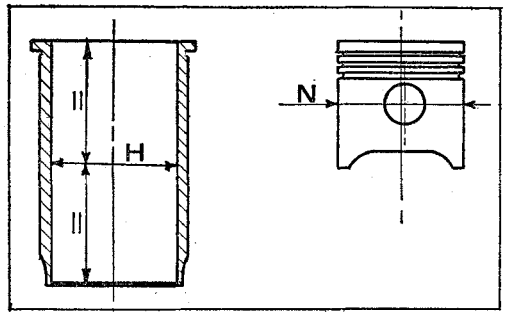
1 - Make sure that oversize marked on the back of bronze bush corresponds to undersize performed on crank shaft. Play between A and B must be between 0,025 and 0,056 mm.
To perform this checking it is necessary to lock con.rod and cap with dynamometric key calibrated at 3,5 kgm ÷ 3,7 kgm, and check that the difference between A and B is within the tolerance admitted.
2 - Fit con.rods on crakshaft maintaining position shown in picture 16.
3 - Make sure that radius on crank pin clearance does not touch bush edge (this test is made by locking con.rod and gently pushing it against shoulder). Should it touch, file bush edge.
4 - Check that total side play between C and D is between 0,3 and 0,4 mm (should the play be smaller, smooth with a surface-grinder surfaces of bushes).

CHECKING PLAY OF MAIN BUSHING

If the main pournal is worn or the play between G and L is greater than 0,080 mm, grind the pournal. Minimum allowed 0,2 and 0,4 mm. Check that the maximum engraved on the ring corresponds to the minimum on the main journal. It is useful after grinding to remove the burrs, and sharp edges on the oil holes.

REPLACING BUSH OF GUDGEON PIN

1 - Take off worn bush and introduce the new one perpendicular to the plan of con.rod (to do that a small press would be required).
2 - Proceed to boring, taking great care of perpendicularity and squaring of hole F.
3 - Play between hole F and gudgeon pin E 0,02 - 0,035 mm (picture 16) (lubricated gudgeon pin must fall slowly).



Picture 17

BARRELS AND PISTONS

To check play between barrels and pistons it is necessary to obtain a micrometer and a comparator and then proceeed as follows:

1 - Measure diameter N of the piston on gudgeon axis (picture 17). Adjust to zero comparator at the measure read. Introduce comparator into barrel in the position H and find out the play.
Max. admissible play is 0,10 - 0,12 mm.

2 - Max. admissible oversize: 0,2 - 0,4 - 0,6 mm.
Running play — after new assembling — 0,050 mm.
After assembling ring - make sure that gap of split is 0,15 ÷ 0,25. mm.

COMMON DIRECTIONS FOR A CORRECT ASSEMBLING OF BARRELS, PISTONS, RINGS

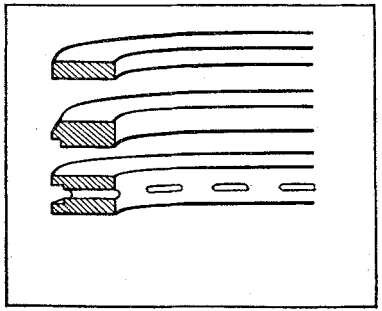
During assembly, avoid inverting original position and setting of pistons. Assembling is carried out as shown in picture 19.

ASSEMBLING FRONT AND REAR PISTON RINGS

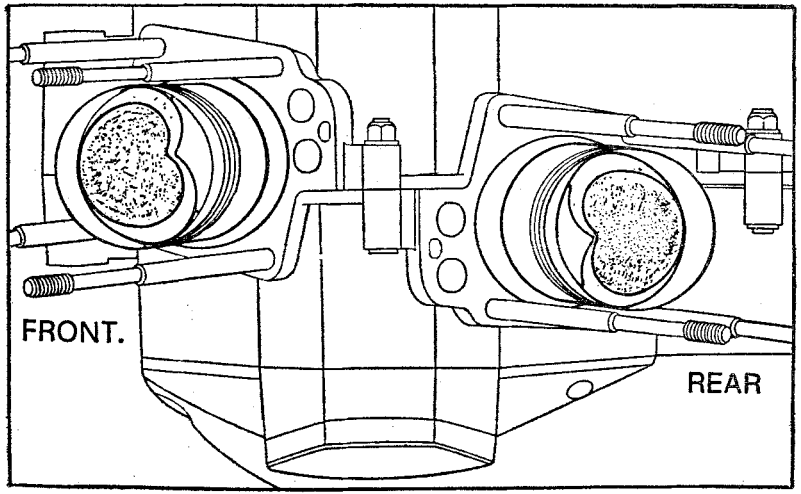
1 - Upper ring ACK ∅ x 1,5 x 2,5.

2 - Middle ring ROS chamfered ∅ 69 x 2 x 2,6.

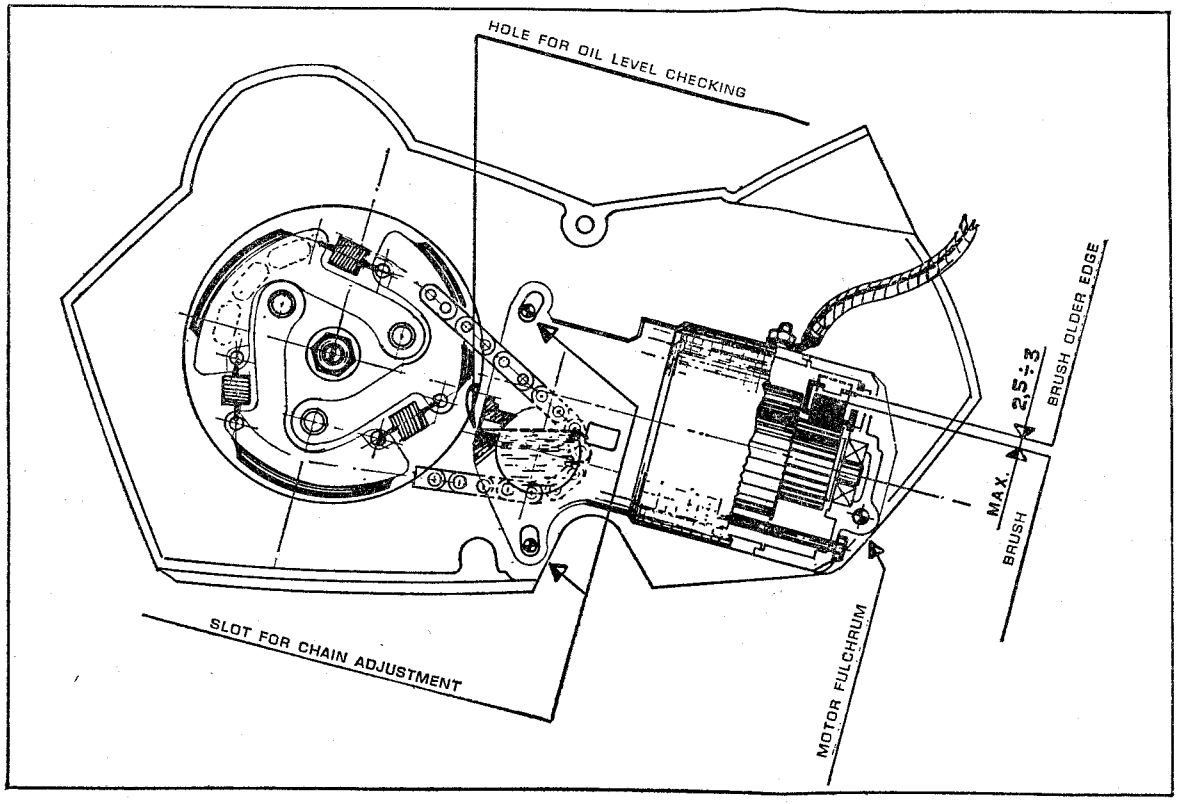
3 - Lubricating ring ROF ∅ 69 x 3 x 2,6.



Picture 18



Picture 19



Picture 20

NOTICES AND MAINTENANCE

1) **Checking oil level** (every 8000 km).
In order to check the oil level it is necessary to dismount the electric motor, place it on a flat surface, unscrew the closing screws of the hole and ensure that the lubricant is level with the surface of the hole; if not, top up until the oil overflows.
N.B.: Use oil with a viscosity of S.A.E. 90 (see picture 20).

2) **Checking brushes for wear.**
Check that the distance between brushes and the upper edge of the brush holder is not greater than that which is indicated in picture 20 is 2,5 - 3 mm. Should this not be the case replace the brushes.

3) **Checking the plates.**
If it is noticed that the starter motor is idling it is necessary to check that the surface of the plates is not soiled with oil; if so, clean the traction surfaces of the plates with trichloroethylene and if this proves insufficient, restore the surface with a thin layer of emery cloth.

4) **Adjustment of tension of chain**

Insert the motor fulchrum screw, loosen the adjustment slot screws (see picture 20) and adjust until an adequate tension is established.

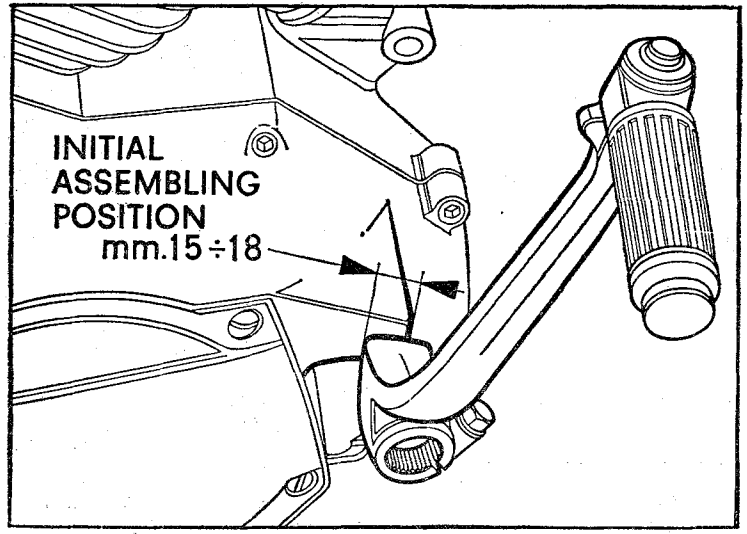
ASSEMBLING PEDAL STARTER

1 - Place gear control against cup and rotate anti-clockwise until the sprocket stops with the cam lock against the cup.

2 - Connect spring to cup pi nand rotate spring anti-clockwise.

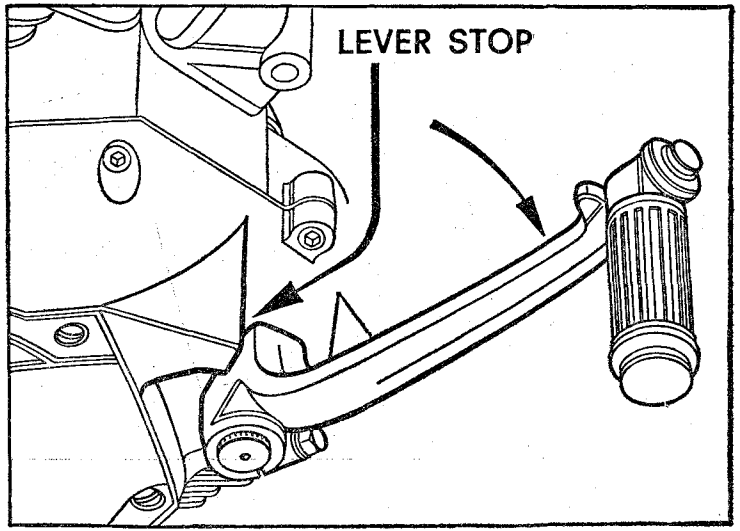
3 - After closing cap, fit starter lever so that end of return travel is determined by the lever stopping against the case cover and not against the tooth on the cam of the sprocket.

Picture 21



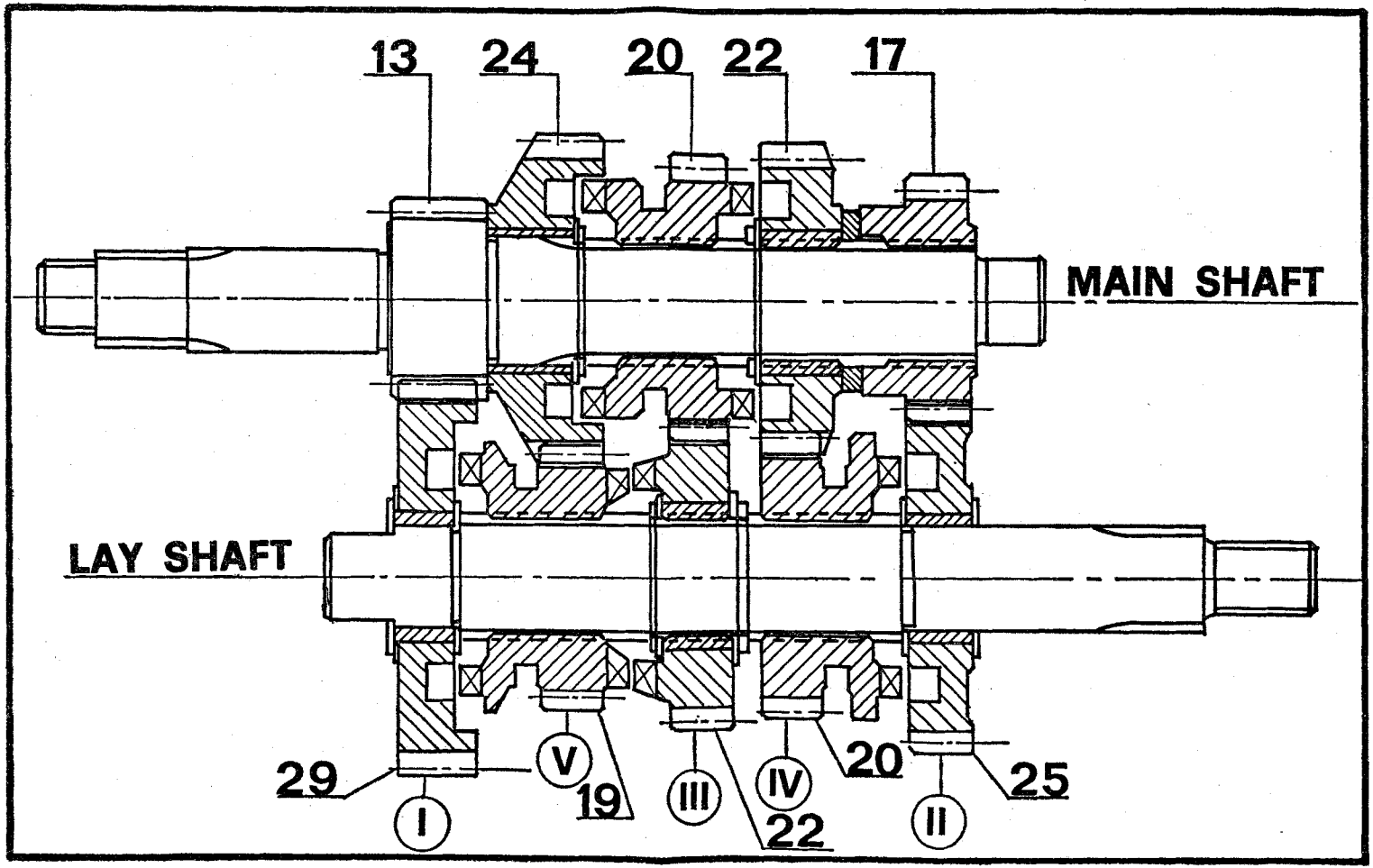
1 - Fit lever respecting values 15 ÷ 18 as shown.

Picture 22



2 - Rotate lever and then introduce it fully.

DIAGRAM OF GEAR BOX ASSEMBLING



Km → Mi = 0.621 Mi → Km = 1.609

INSTRUCTION FOR RUN-IN PERIOD		
RENEW OIL AND CLEAN FILTER	500 Km. 310 mi	Pag. 1
CHECK HEAD LOCKING NUTS (key calibration 2 Kgm)		Pag. 3
ADJUST TAPPET VALVES (inlet and exhaust play 0,1 mm)		Pag. 5
CHECK MOTOR SCREWS AND EXHAUST PIPE RING LOCKING		
CHANGE OIL AND CLEAN FILTER	2000 Km. 1242 mi	Pag. 5
CHECK AND ADJUST VALVE TAPPETS		Pag. 7
CHECK ADVANCE IGNITION WITH STROBOSCOPIC PISTOL		Pag. 11
CHECK MOTOR SCREWS LOCKING AND EXHAUST PIPE RING LOCKING		

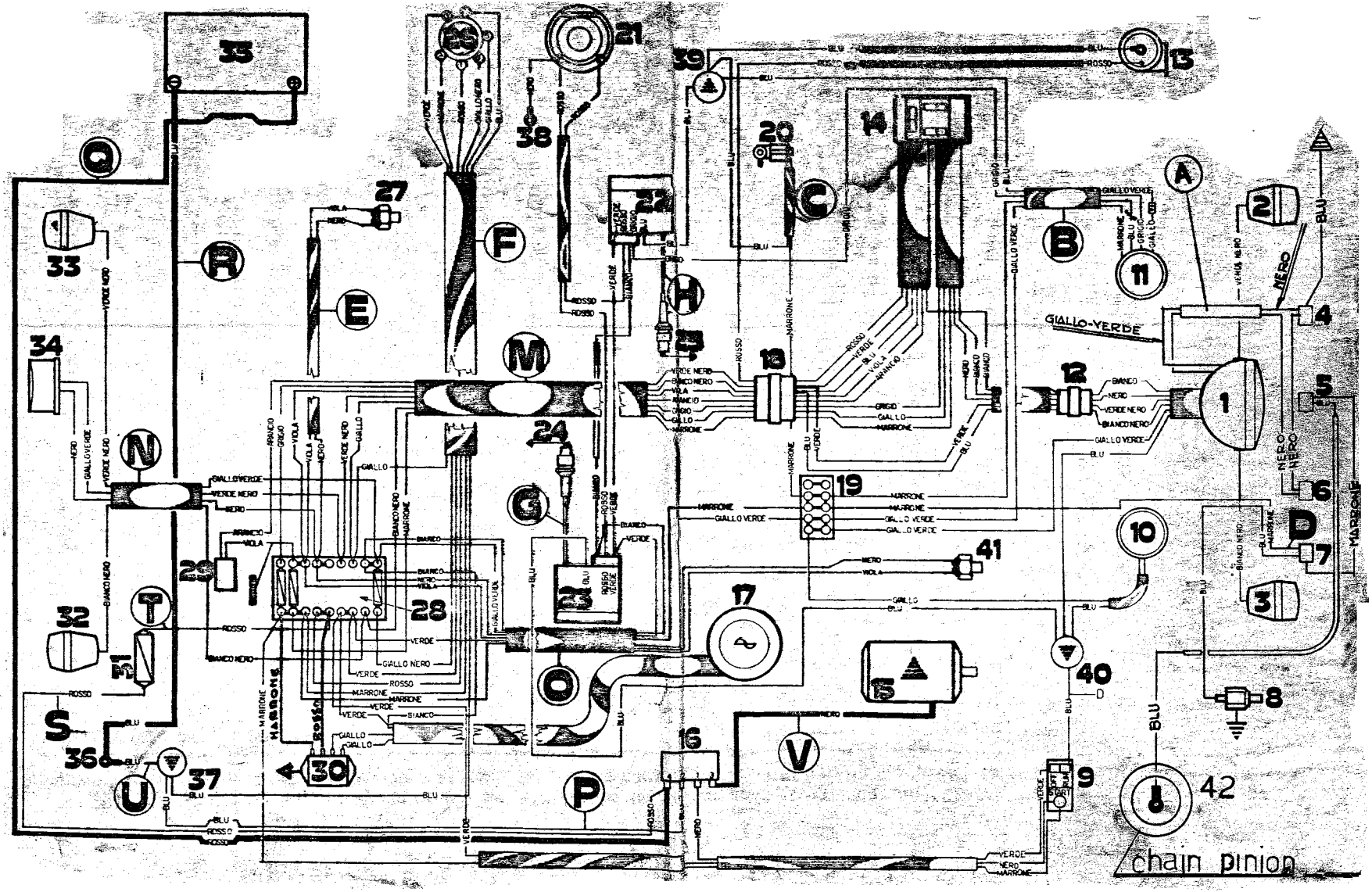
PERIODICAL OPERATIONS FOR ROUTINE MAINTENANCE		
CHECK OIL LEVEL	1000 Km. 621 mi	Pag 5-6
CHECK AND LUBRICATE CHAIN		Pag. 1-3
CHECK TYRE PRESSURE		
CHANGE OIL (with Castrol oil GTX/2 see page 1)	4000 Km. 2484 mi	Pag. 5
CHECK TAPPET GAP every 3000 Km		Pag. 7
CLEAN OIL FILTER		Pag. 5
CHECK AND LUBRICATE CLUTCH AND TACHOMETER CABLES		
REPLACE AIR FILTER (every 6000 Km on no duster ways)		
CLEAN THE CARBURETTORS ATOMISERS (every 2000 Km in warm season		
CHECK PLAY OF TOOTHED TIMING BELT	8000 Km. 4968 mi	Pag. 10
CHECK PLATES AND ELECTRIC START		Pag. 14
CHECK BRUSHES OF ELECTRIC MOTOR		
CHECK OIL LEVEL OF ELETRIC START		
CHECK TENSION OF CHAIN OF ELECTRIC START		
REPLACE SPARK PLUGS every 5000 Km		
CHECK BRAKE PADS		
REPLACE TOOTHED BELT (every 20.000 Km or after 3 years) ~12,500 mi.	20000 Km. 12420 mi	Pag. 10
CHECK AND GREASE WHEEL HUB BEARINGS		

REFUELING 14 litres 98-100 N.O. petrol; 2,5 litres Castrol oil GTX/2 (see page 1). It is not recommended to go downhill with the engine off and in neutral gear, because the transmission parts ~~should~~ will not be lubricated since the oil pump would not be working.

INSTRUCTION FOR RUN-IN PERIOD		
RENEW OIL AND CLEAN FILTER CHECK HEAD LOCKING NUTS (key calibration 2 Kgm) ADJUST TAPPET VALVES (inlet and exhaust play 0,1 mm) CHECK MOTOR SCREWS AND EXHAUST PIPE RING LOCKING	500 Km.	Pag. 1 Pag. 3
CHANGE OIL AND CLEAN FILTER CHECK AND ADJUST VALVE TAPPETS CHECK ADVANCE IGNITION WITH STROBOSCOPIC PISTOL CHECK MOTOR SCREWS LOCKING AND EXHAUST PIPE RING LOCKING	2000 Km.	Pag. 1 Pag. 3 Pag. 6

PERIODICAL OPERATIONS FOR ROUTINE MAINTENANCE		
CHECK OIL LEVEL CHECK AND LUBRICATE CHAIN CHECK TYRE PRESSURE	1000 Km.	Pag. 1 Pag. 2
CHANGE OIL (with Castrol oil 20-50 XL see page 1) CHECK TAPPET GAP CLEAN OIL FILTER CHECK AND LUBRICATE CLUTCH AND TACHOMETER CABLES	4000 Km.	Pag. 1 Pag. 3
CHANGE CASTROL OIL RS (see page 1) CHECK PLAY OF TOOTHED TIMING BELT REPLACE AIR FILTERS WASH AND ADJUST CARBURETTORS CHECK PLATES AND ELECTRIC START CHECK BRUSHES OF ELECTRIC MOTOR CHECK OIL LEVEL OF ELECTRIC START CHECK TENSION OF CHAIN OF ELECTRIC START. REPLACE SPARK PLUGS CHECK BRAKE PADS	8000 Km.	Pag. 5 Pag. 11
REPLACE TOOTHED BELT (every 20.000 Km or after 3 years) CHECK AND GREASE WHEEL HUB BEARINGS	20000 Km.	Pag. 7

REFUELING 14 litres 98-100 N.O. petrol; 3 litres Castrol oil 20-50 XL or RS (see page 1). It is not recommended to go downhill with the engine off and in neutral gear, because the transmission parts should not be lubricated since the oil pump would not be working.


chain pinion

CAPTION

1) Front headlight
2) Front left arrow
3) Front right arrow
4) Blue light HI Beam
5) Green light neutral
6) Red light Lights
7) Yellow light Oil pressure
8) Oil pressure valve
9) Control for start and stopping engine
10) Miles counter
11) Tachometer
12) Small connector
13) Hooter
14) Handlebar controls
15) Electric starter motor
16) Starter relay
17) Flywheel magneto
18) Large connector
19) Terminal panel
20) Electromagnetic fuel tap
21) Pick up
22) Transducer cilender N. 1
23) " " " 2
24) Spark plug cilinder N. 2
25) " " " " 1
26) Key commutator
27) Stop switch
28) Fuse box
29) Intermittence
30) Adjuster
31) General fuse
32) Rear right arrow
33) " left "
34) Rear light
35) Battery
36) Engine earth
37) Earth
38) Pick up earth
39) Earth
40) "
41) Front stop switch
42) Neutral warning control