DUCATI MECCANICA S. p. A. - 40100 BOLOGNA
(BORGO PANIGALE) CASELLA POSTALE 313
TELEFONO N. 400250 (quattro linee) - TELEGRAMMI "DUCATIMEC" - BOLOGNA

fra nr. 354099
mtnr. 14454
VR 90-51

DUCATI

250 - 350 cc. over head cam - shaft

MOTORCYCLES 197

Instructions for use and maintenance

PRINTED IN ITALY

Over head cam-shaft

DUCATI MOTORCYCLES 197

250 - 350 MARK 3

250 - 350 MARK 3 DESMO

250 - 350 SCRAMBLER

DISTINCTIVE FEATURES - USE - MAINTENANCE

DUCATI MECCANICA BOLOGNA

1st. ISSUE - PRINTED DM - Mod. 771/E - June 1970 - 10.000
Every Motorcycle receives one copy of the present booklet.

GUARANTEE CARD

Every DUCATI MOTORCYCLE is supplied with a « Guarantee Card » which will be found in the sealed tool box.
The seal may be broken only by the purchaser.

The contents of this booklet are not binding and though the main specifications of the motorcycle described and illustrated in this booklet remain unchanged, the DUCATI MECCANICA S.p.A. will be free to introduce modifications of some details, or of some accessories, if these modifications will be judged necessary, or if they can improve the motorcycle, or finally for some technical-economical exigencies, but without being obliged to bring this booklet up-to-date.

Dear Sir,

We are very glad to welcome you among our Customers, and feel sure that you will not fail to appreciate the excellent performances of the DUCATI motorcycles.

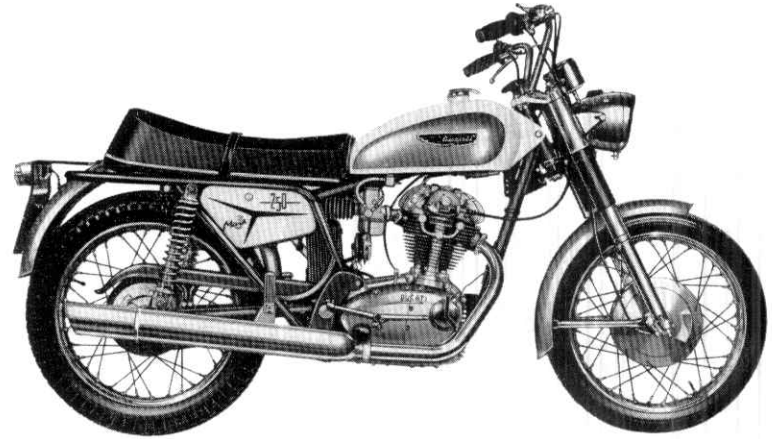
The excellent performances and reliability of our machines reflect the experience gained throughout many years of long distance racing contests which were always won, even sensationally, by DUCATI MECCANICA.

However, we have to advise you that, in order to obtain the fine service that the Ducati Single Shaft Motorcycle is capable of giving, it is essential that you strictly follow the instructions contained in this book as regards the features, running and maintenance of your motorcycle.

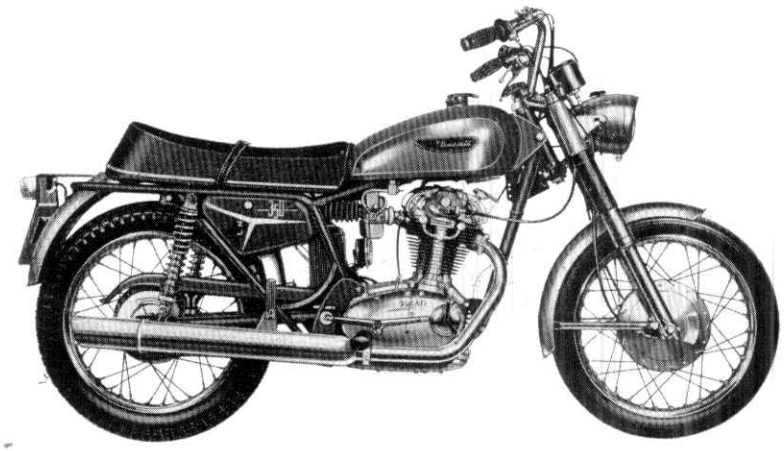
If you strictly follow these instructions, particularly during the running — in period of the machine, then you will be assured of many years trouble-free enjoyable riding with extraordinary performances.

While thanking you and congratulating you on your wise choice of such a fine machine, we hope that you will be proud for many years of possessing a SINGLE SHAFT MOTORCYCLE DUCATI.

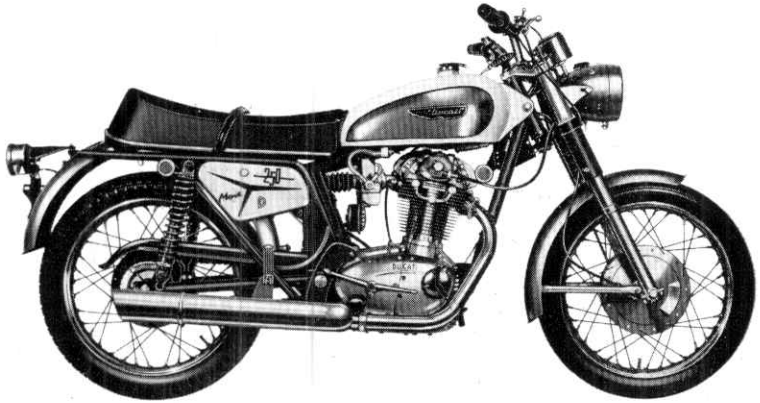
DUCATI MECCANICA S.p.A.



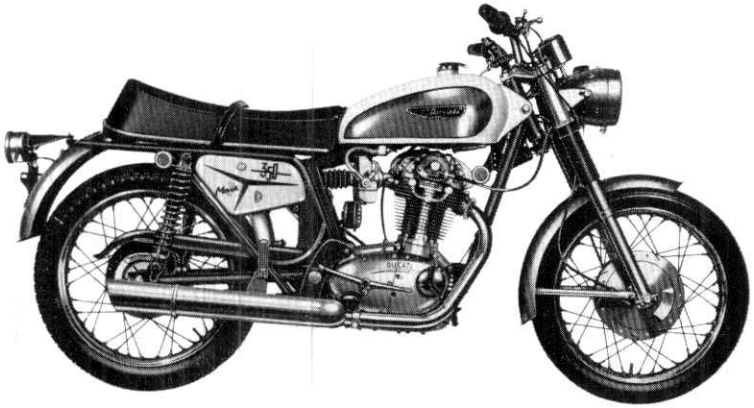
MOTORCYCLE DUCATI 250 MARK 3



MOTORCYCLE DUCATI 350 MARK 3



MOTORCYCLE DUCATI 250 MARK 3 DESMO (U.S.A.)



MOTORCYCLE DUCATI 350 MARK 3 DESMO (U.S.A.)

MOTORCYCLE DUCATI 250 SCRAMBLER

MOTORCYCLE DUCATI 350 SCRAMBLER

A FOREWORD

The main goal of the present instruction booklet is to enable the owner of a SINGLE SHAFT Motorcycle to use his vehicle in the best possible way.

The following notices are therefore only simple recommendations, suggestions, advices, and terms of reference, sufficient to enable anyone, having no experience or ignoring any special technical knowledge, to use his vehicle and to maintain it for a long time in perfect working condition.

In the field of single shaft Motorcycle, DUCATI produces now six new models whose features are reported in this booklet.

DUCATI SERVICING STATIONS

In case the machine needs repairs requiring a special technical competence, it is advisable to apply to « Ducati Servicing Stations » which are equipped with specially trained staff and with the necessary tools to perfectly carry out any repair required. (See the pictures at the page 53 and following).
Therefore you will be sure that genuine DUCATI spares will eventually replace defective groups or parts, so that any possible trouble will be avoided, whereas interchangeability, good working and long life will be assured.

SPARE PARTS

It is absolutely necessary that each order for spare parts clearly states the following data:

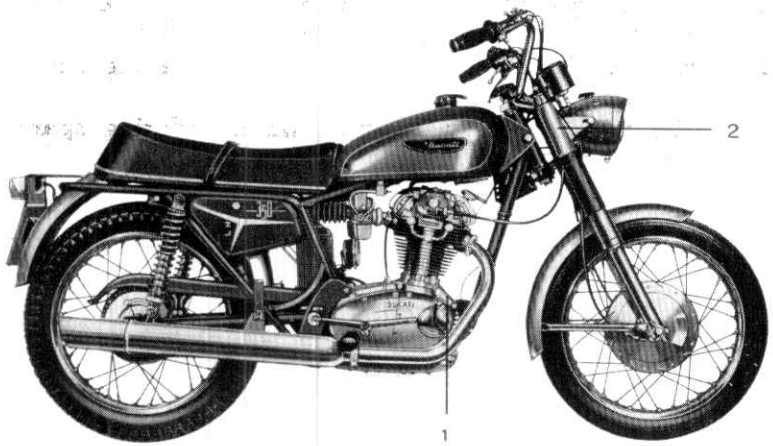
1) The catalogue code of the spare part obtained from the Spare Parts Catalogue of the model chosen.
2) Serial number of the engine (when ordering spare parts of the engine).
3) Serial number of the frame (when ordering spare parts of the frame).

IDENTIFICATION NUMBERS

Every DUCATI over head cam-shaft motorcycle can be identified by its frame and engine serial number.

For the frame, the number is printed in the steering tube.

The engine serial number is stamped on the crankcase near the front connection between the engine and the frame.



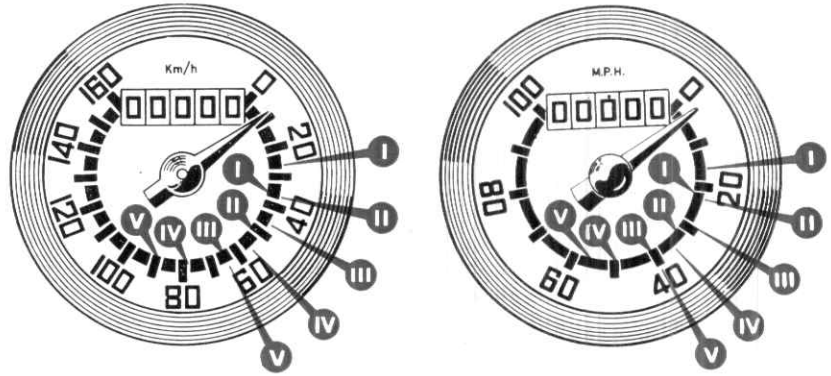
1 - Engine serial number

2 - Frame serial numbe.

PRECAUTIONS

to be followed during the initial running-in period

The modern engine construction calls for very close tolerances between moving parts. Therefore it is essential that the Customer completes the running-in period, already started by the Factory, which has made the engine run first when it was cold and then hot. To obtain a proper running-in, maximum speeds in gears as shown in the below diagram and table should be strictly observed.



DISTANCE TRAVELLED	MAXIMUM SPEEDS IN MILES AND KMS. PER HOUR				
	in bottom speed	in 2nd speed	In 3rd speed	in 4th speed	in top speed
Up to 300 miles	16	22	29	36	40
Up to 500 Km.	25	36	46	56	64
From 300 to 600 miles	21	31	40	49	56
From 500 to 1000 Km.	34	50	64	79	90

Moreover, it is advisable to follow the instructions mentioned below:

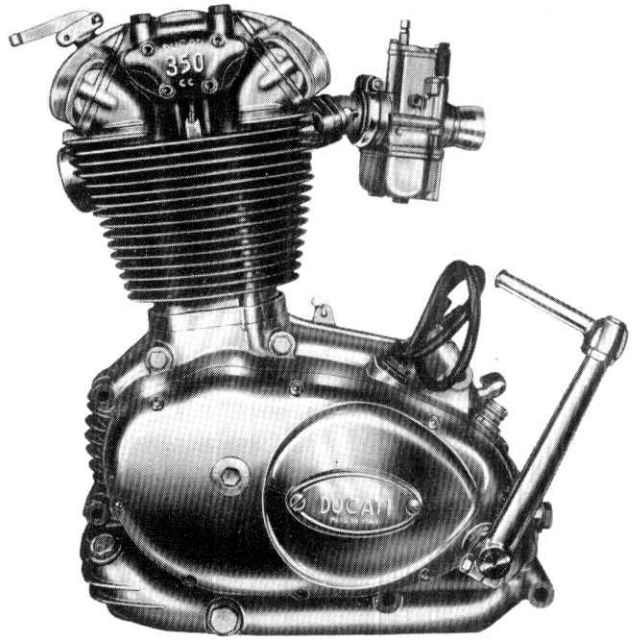
— do not keep the maximum speeds allowed for long periods of time;
— do not force the engine by keeping it for a long period at high r.p.m., especially when going uphill;
— first after 500 kms. (300 miles) and then after 1000 kms. (600 miles), completely change the oil in the oil sump with the engine warm; readjust the tappets, fitting the rocker appropriate shim; tighten cylinder head and holding nuts, crankcase nuts and screws; readjust contact breaker platinum points.

The more strictly and carefully the above mentioned recommendations will be followed, the longer will be the engine life and the rarer the need of overhauling and tuning.

In order to ensure careful running-in, the carburetor has been fitted with a distance piece which restricts the stroke of the throttle valve. After 1000 kms. (600 miles) approximately, this should be removed by your Ducati dealer.

Failure to comply with the above recommendations absolves the manufacturer from all liability of guarantee and damage that may result.

MAIN SPECIFICATIONS



Note: The figure represents the engine of the 350 MARK 3

ENGINE

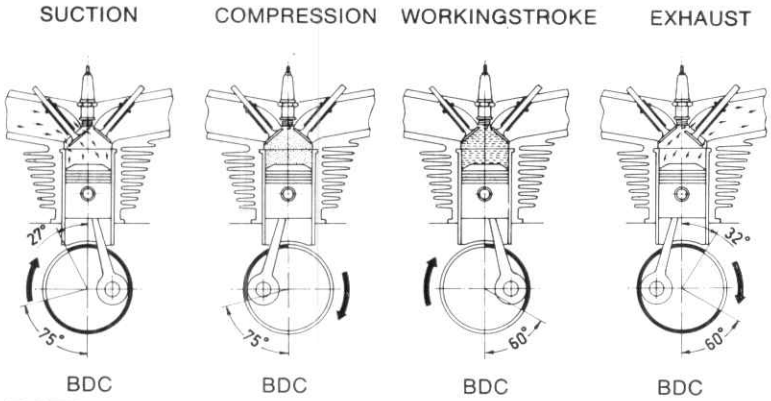
— Single cylinder, four strokes, with cylinder inclined forward 10° from the vertical. The engine is supported by a cradle formed frame.
— bore: 74 mm. (2.9134") for the 250 cc. and 76 mm. (2.9921") for the 350 cc.;
— stroke: 57.8 mm. (2,2756") for the 250 cc. and 75 mm. (2.9527") for the 350 cc.;
— cylinder capacity: 248.6 cc. (15.1698 cu. in) for the 250 cc. and 340.2 (20.7544 cu. in) for the 350 cc.;
— compression ratio: 9:1 for the 250 SCR, 9.7:1 for the 250 MARK 3 and DESMO and 9.5:1 for the 350 cc.

— combustion chamber with hemispherical ceiling;
— cylinder barrel in light alloy, deeply finned and with inserted special cast-iron liner;
— connecting rod in special steel with big-end assembled on a cage roller bearing (crank pin) and little-end bushed to take the gudgeon pin;
— piston in light alloy, conical truncated, press-forged with skirt in one piece, with 3 piston rings, 1 of which is slotted oil scraper;
— cylinder head cast in light alloy and closely finned with inserted valve seats.

TIMING

The timing system is provided with overhead valves, inclined at 80° timed by an overhead camshaft. The valves are made in special steel.

250 SCR



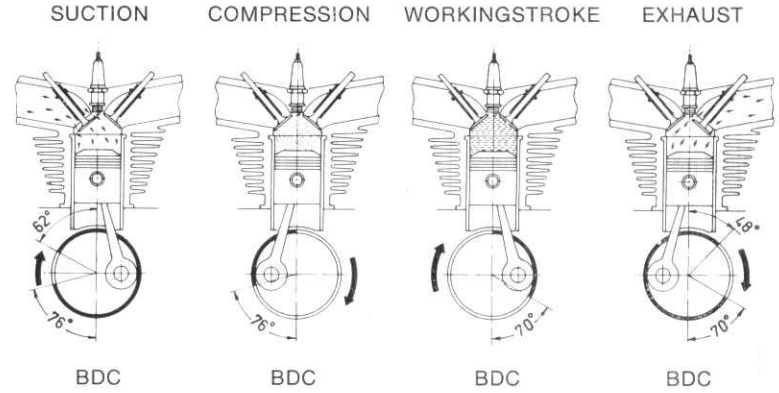
DATA

The timing data, with a clearance of 0.05÷0.10 mm. (0.0020"÷0.0039") between the valves and the rockers are as follows:

Valve	Opening ± 5°	Closing ± 5°
Suction	27° before TDC	75° after BDC*
Exhaust	60° before BDC	32° after TDC**

* BDC - Bottom dead center.
** TDC - Top dead center.

250 MARK 3



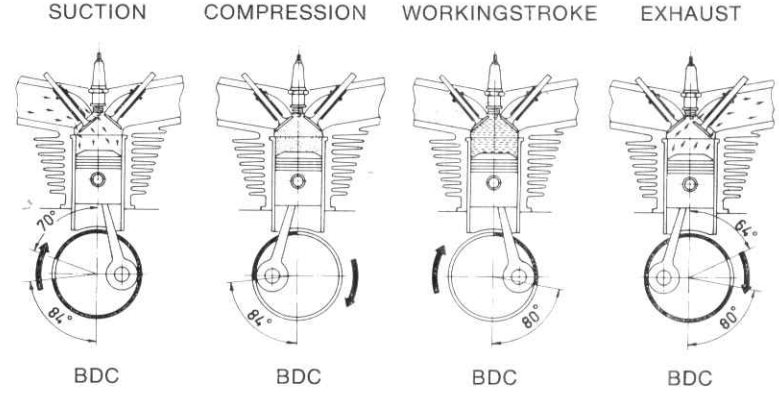
DATA

The timing data, with a clearance of 0.05÷0.10 mm. (0.0020"÷0.0039") between the valves and the rockers are as follows:

Valve	Opening ± 5°	Closing ± 5°
Suction	62° before TDC	76° after BDC*
Exhaust	70° before BDC	48° after TDC**

* BDC - Bottom dead center.
** TDC - Top dead center.

350 SCR - 350 MARK 3



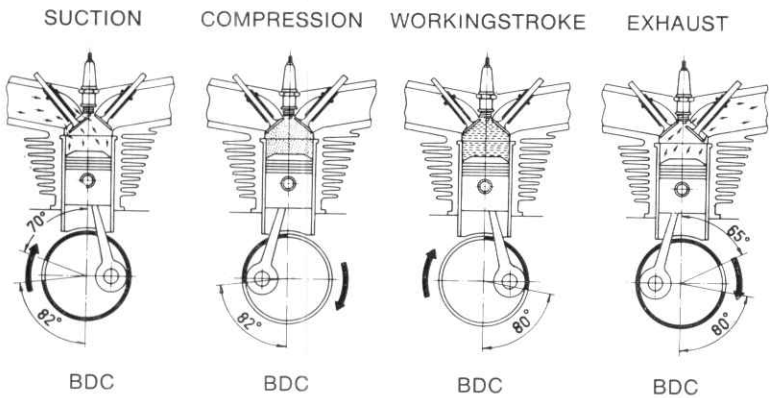
DATA

The timing data, with a clearance of 0.05÷0.10 mm. (0.0020"÷0.0039") between suction and exhaust valves are as follows:

Valve	Opening ± 5°	Closing ± 5°
Suction	70° before TDC	84° after BDC*
Exhaust	80° before BDC	64° after TDC**

* BDC - Bottom dead center.
** TDC - Top dead center.

250 and 350 MARK 3 DESMO



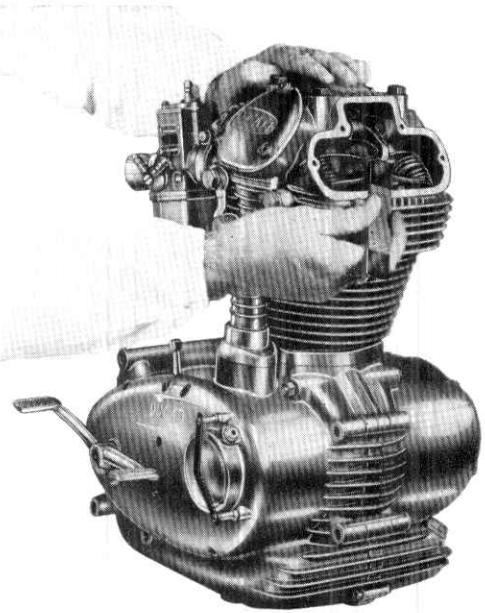
DATA

The timing data, with a clearance of 0.10÷0.15 mm. (0.0039"÷0,0059") between the suction and exhaust valves are as follows:

Valve	Opening ± 5°	Closing ± 5°
Suction	70° before TDC	82° after BDC*
Exhaust	80° before BDC	65° after TDC**

* BDC - Bottom dead center.
** TDC - Top dead center.

Adjustment

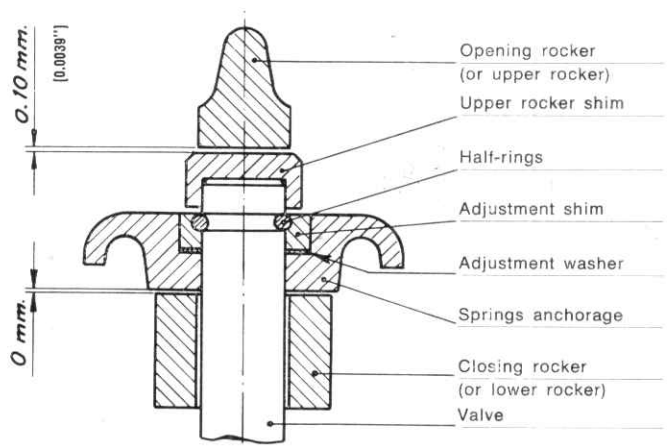


The tappets are adjusted by means of the appropriate rocker shim on the end of the valve stem.

Clearance

The working clearance between valves and rockers, when the engine is cold, is of 0.05÷0.10 mm. (0.0020"÷0.0039") for Mark 3 and Scr.; for Mark 3 Desmo clearance is of 0.10÷0.15 mm. (0.0039"÷0.0059") (upper rockers), and of 0 mm. (lower rockers).

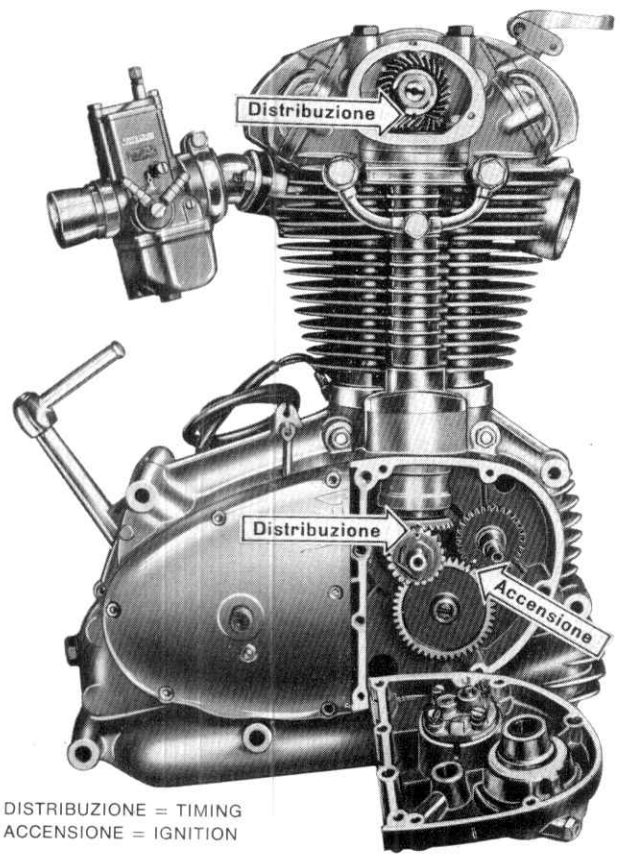
The clearance has to be adjusted and checked with a feeler gauge, after the said timing data have been controlled.



Engine timing

The timing gears in the crankshaft and on the camshaft, are provided with reference marks engraved on the toothed periphery. A point (.) for all the gears except that of the ignition coil which bears a line (|) and a point (.).

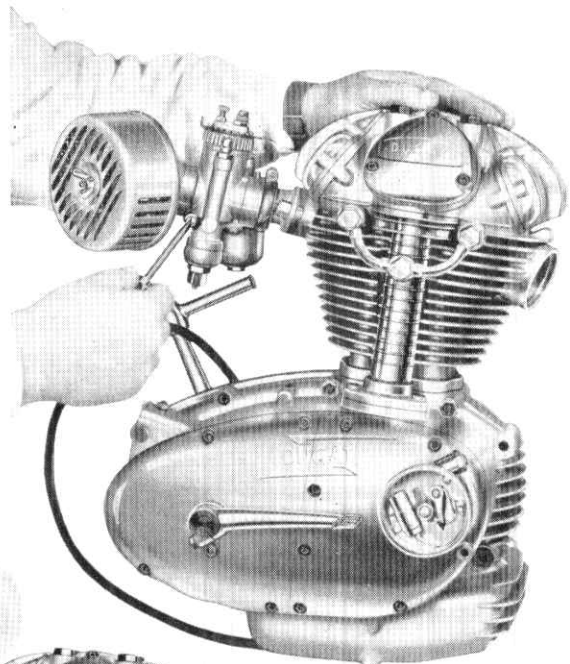
The engine is timed when the above mentioned marks are disposed as indicated by the arrows in the following illustration.

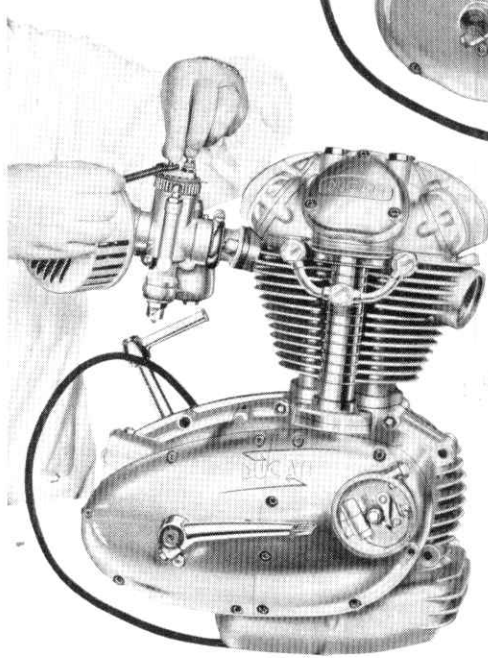


DISTRIBUZIONE = TIMING
ACCENSIONE = IGNITION

CARBURETOR SSI (up to m.)

Adjustment of minimum air intake

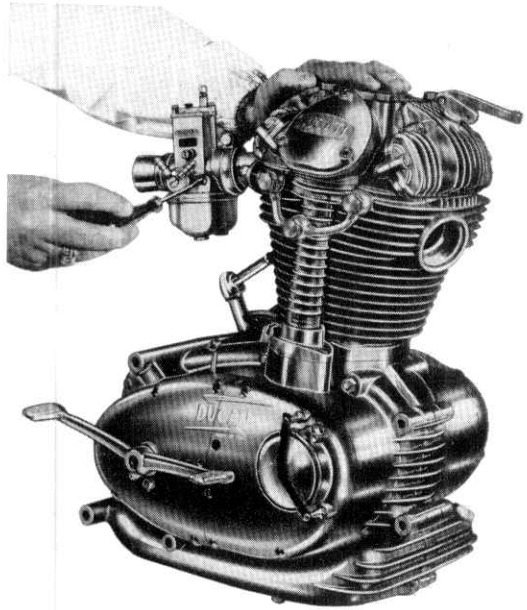


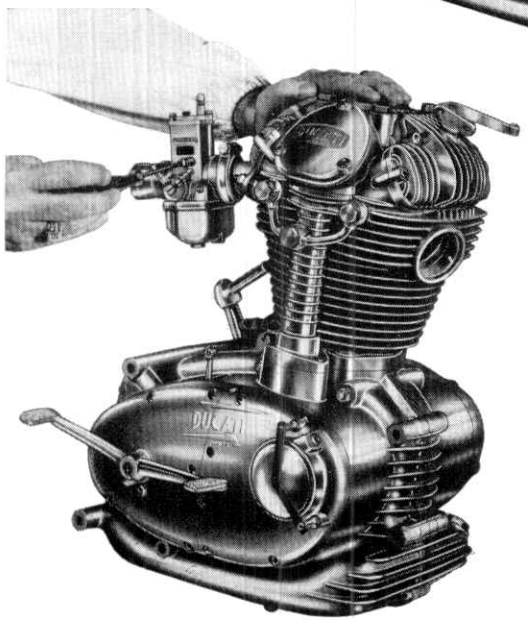


Adjustment of the throttle

CARBURETOR VHB (from m.)

Adjustment of minimum air intake





Adjustment of the throttle

PETROL FEED

The petrol is fed to the carburetor by gravity.
The carburetor is Dell'Orto with filter and cloth filter for SCR, with horn for MARK 3 and DESMO.

Model	Carburetor	Atomizer	Diffuser	Main jet	Idling jet	Validity
250 SCR	SSI 27 D	265	27	112	50	up to m.
250 SCR	VHB 26 BD	260 R	26	95	45	from m.
250 MARK 3	SSI 29 D	260	29	112	45	—
250 MARK 3 D	SSI 29 D	260	29	115	45	—
350 SCR	SSI 29 D	265	29	112	50	up to m.
350 SCR	VHB 29 AD	265 M	29	110	45	from m.
350 MARK 3	SSI 29 D	260	29	112	45	—
350 MARK 3 D	SSI 29 D	260	29	115	45	—

The petrol tank having the capacity and number of taps mentioned below is provided with a three positions tap: closed - open - reserve.

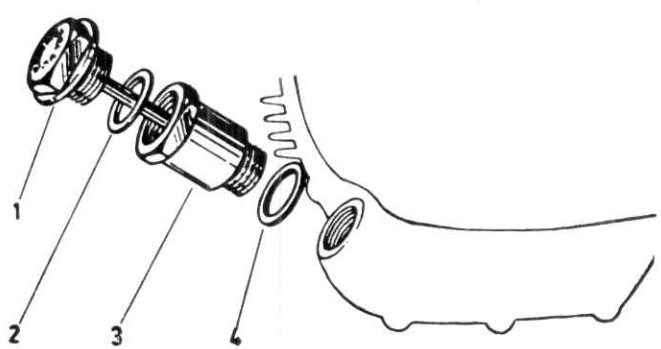
Model	Tank capacity lt.	Tap number	Reserve lt.
SCR and MARK 3 MARK 3 D	11 **(imp. gal. 2.4197 = U.S. gal. 2.9059)**	2	1.6 **imp. gal. 0.3520 = U.S. gal. 0.4227)**

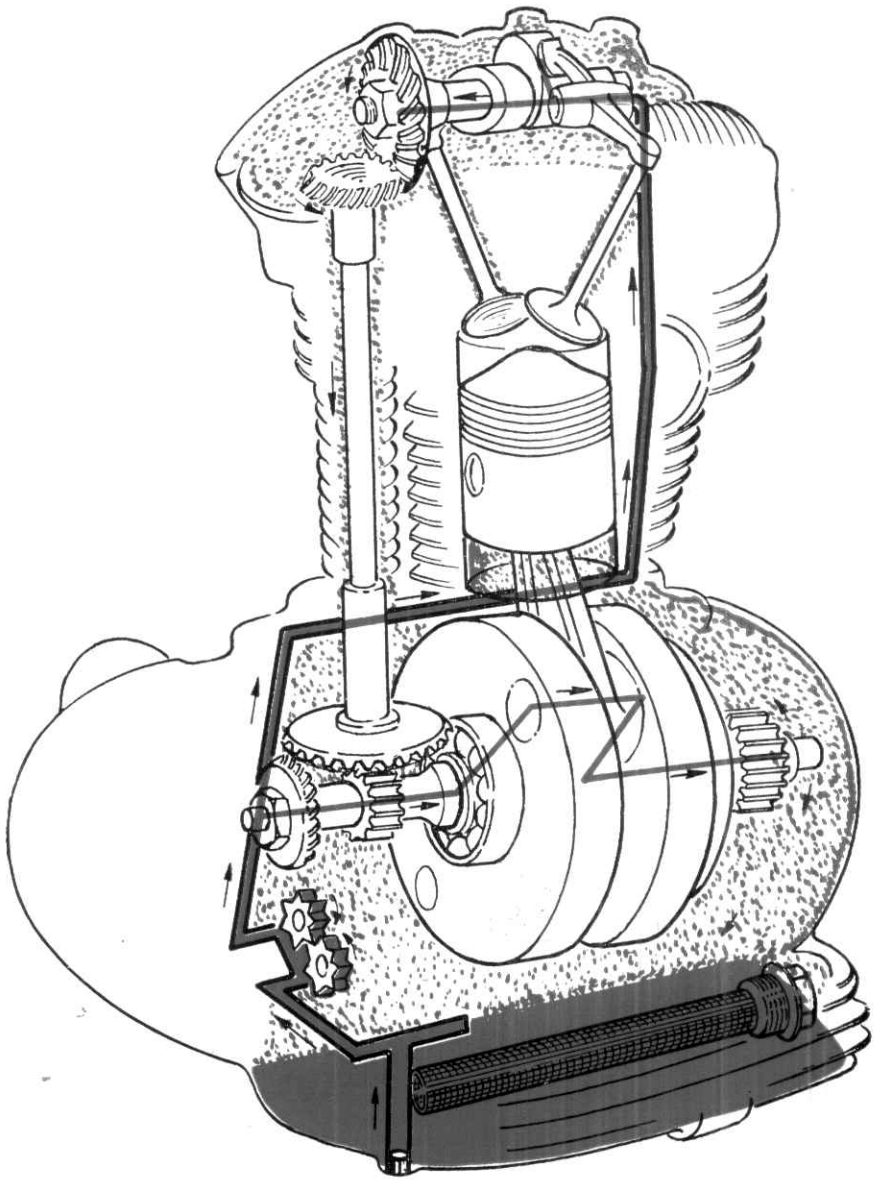
LUBRICATION

The engine is pressure lubricated, by means of a gear pump driven by the main shaft; this pump takes the oil through a filter, from the lowest point of the crank-case which acts as an oil sump, and forces it through proper oil-ways, to all parts of the engine which have to be lubricated. The oil returns by gravity.
The sump capacity is of about 2.2 Kg. (4.850 lb) = lt. 2.5 (0.5499 imp. gal. = 0.6604 US. gal.).
An Oil-filler with stick consisting of:

1) Stick-provided filler plug;
2) Sealing gasket;
3) Filler;
4) Sealing gasket;

allows the oil level measurement.



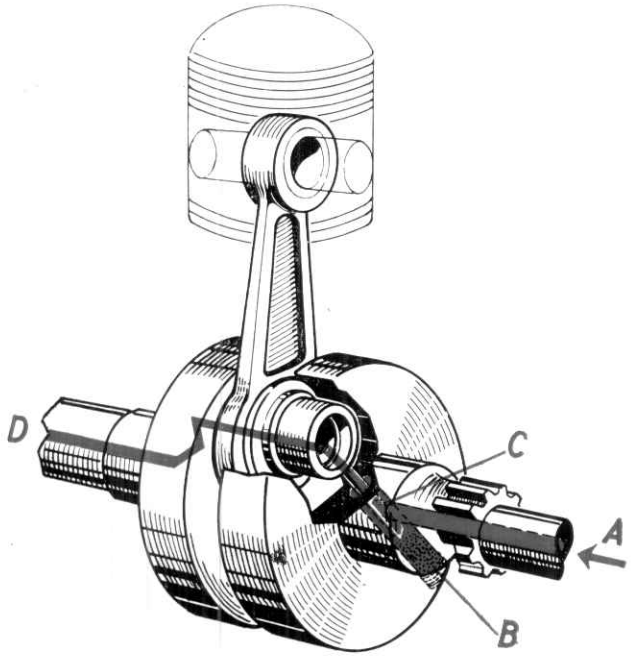


The filler plug stick is marked by two notches in the spots where the oil level is respectively at its lowest and at its highest point.

The oil level is measured by just resting the plug on the filler.

— The lubricating system of the DUCATI over head camshaft motorcycles is very simple and requires no special maintenance except the renewal of the oil level (AGIP F.1 SUPERMOTOROIL 20W/40 or AGIP F.1 RACING SAE 40) each 500 Km. (310 miles) and the total change of the oil, including the cleaning of the filter every 2000 Km. (1240 miles) approx.

CENTRIFUGAL OIL FILTER INSERTED IN THE MAIN SHAFT



How it works

The oil which is to be filtered, is brought to the filter through the pipe A; from here, the centrifugal force eliminates all the impurities (which are heavier than the oil), which accumulate all around the threaded plug B of the main shaft.

The filtered oil goes through the tube C to lubricate the big end, and through the duct D to lubricate the engine clutch housing gear.

COOLING

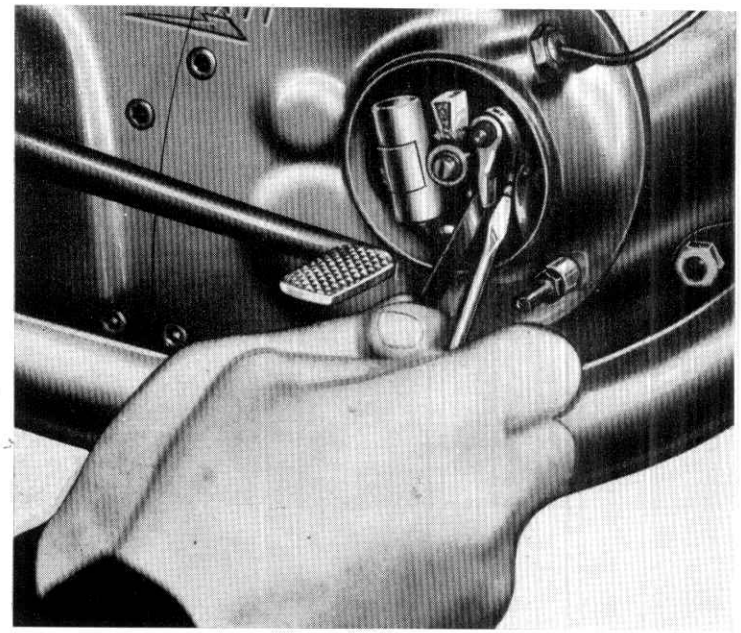
Cooling of the engine is achieved by close finning of both the cylinder and cylinder head.

IGNITION

The ignition is battery-coil.

The partial automatic advance ignition is:

Advance with stopped engine	5°÷8°
Amplitude of automatic advance	28°
Total advance with engine running at 3.000 r.p.m.	33°÷36°

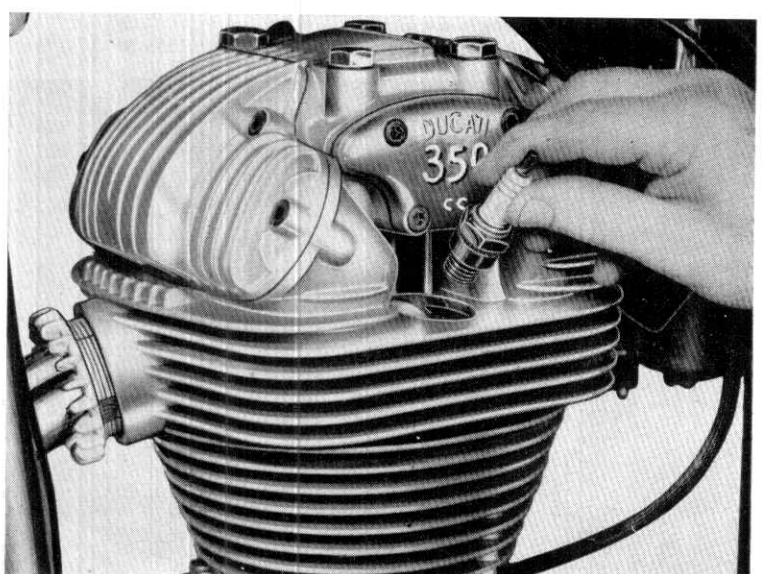


For setting up the ignition, see figure on page 18.

The clearance between the platinum plated contacts is of 0.3 to 0.4 mm. (0.0118"÷0.0157") and has to be checked by means of the feeler gauge (see figure on previous page).

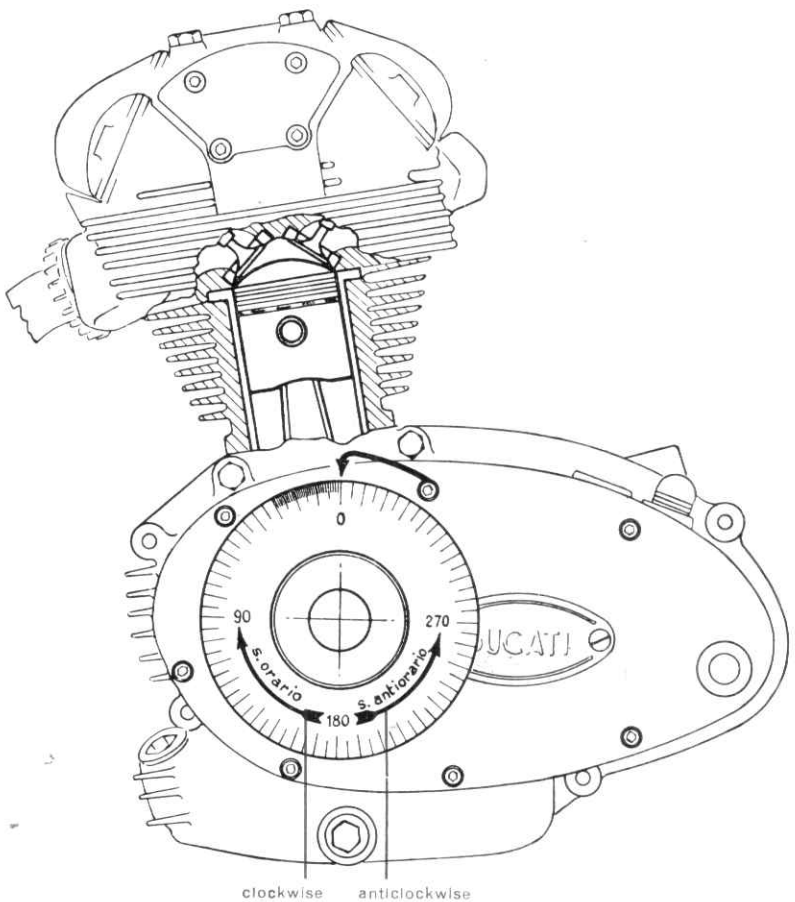
The ignition plug is a Marelli CW 260 N, or a similar model and is located on the left side of the top of the cylinder head.

When replacing the sparking plug make sure that the angle of the plug, relating to the plughole, is correct, otherwise there is a risk of stripping the thread in the cylinder head. Screw the plug lightly at first, then tighten it.



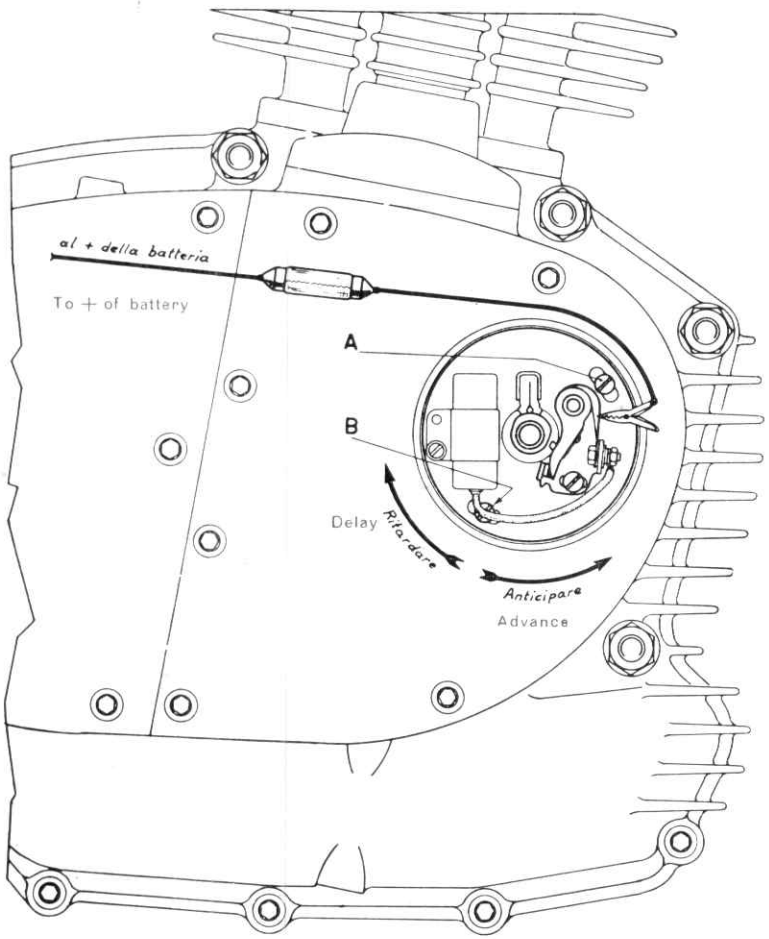
HOW TO CHECK IGNITION SPARK ADVANCE

Check periodically the ignition spark advance (after the first 1000 kms. (600 miles) and, later, every 2000 kms. (1200 miles); be sure that the automatic device works properly, that it is well lubricated and that the springs are neither *out of shape* nor *out of place.*



(Fig. 1)

The rotary amplitude of the automatic advance must be 14° equal to 28° on the driving shaft. If you have any doubt, get it checked by a specialized workshop. To check the spark advance, proceed as follows:



(Fig. 2)

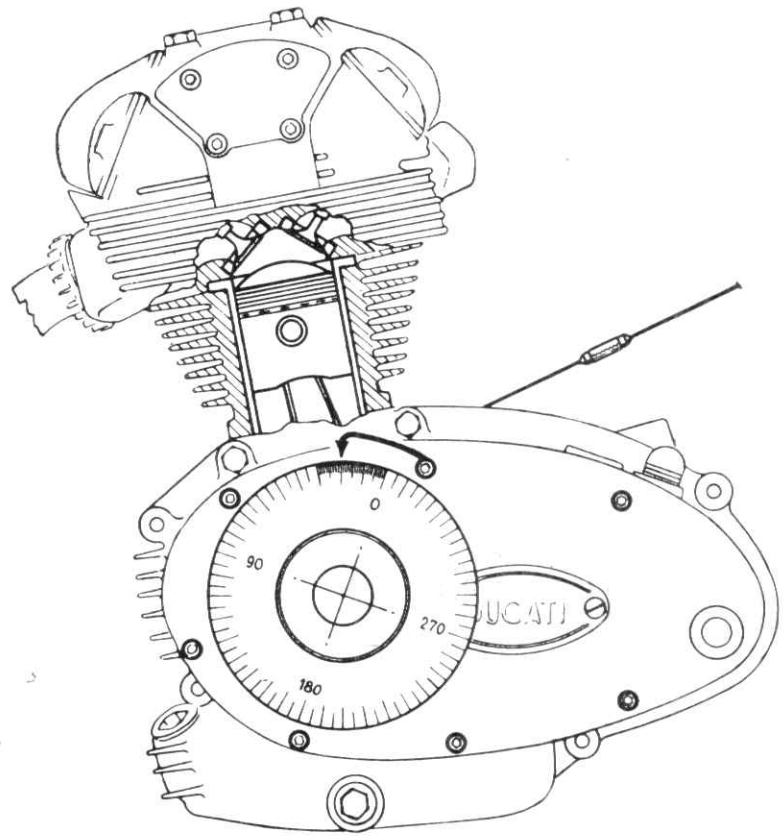
1st. - Remove the threaded plug which is at the driving shaft level, and fit a suitable timing chart (Fig. 1).

2nd. - Fit an indicator on one of the screws that secure the cover (Fig. 1).

3rd. - Bring engine to TDC of compression stage and set the indicator at « O » of the timing chart (Fig. 1).

4th. - Rotate the driving shaft clockwise for about a quarter of a turn.

5th. - To the spring of the mobile part of the contact breaker connect a 6V. - 3W. lamp in series with the + of the battery (Fig. 2). The lamp should light up.



(Fig. 3)

6th. - Rotate the driving shaft slowly, anticlockwise, till the light goes out or its intensity is lowered.
At that very moment, the indicator should give on the goniometer the advance indicated at page 25.

7th. - To be sure, it is advisable to repeat the test.

8th. - If the reading should not tally with the requested numbers, then loosen the two screws (A and B) which secure the plate, and rotate it, advancing or delaying ignition until the requested values are obtained.

9th. - Bear in mind that if you let go dry the felt which lubricates the cam, the fibrous slipping block (that operates the opening of the moving part of the contact breaker arm), will tend to wear out, thus lowering the value of the gap.

IGNITION ADVANCE CONTROLLED BY STROBO LIGHT

1 - Let mount the advance control indicator 88713.0441 on the driving shaft flywheel side, after the plug 0400.49.090 has been removed.

2 - Insert the strobo light cable in the sparking plug.

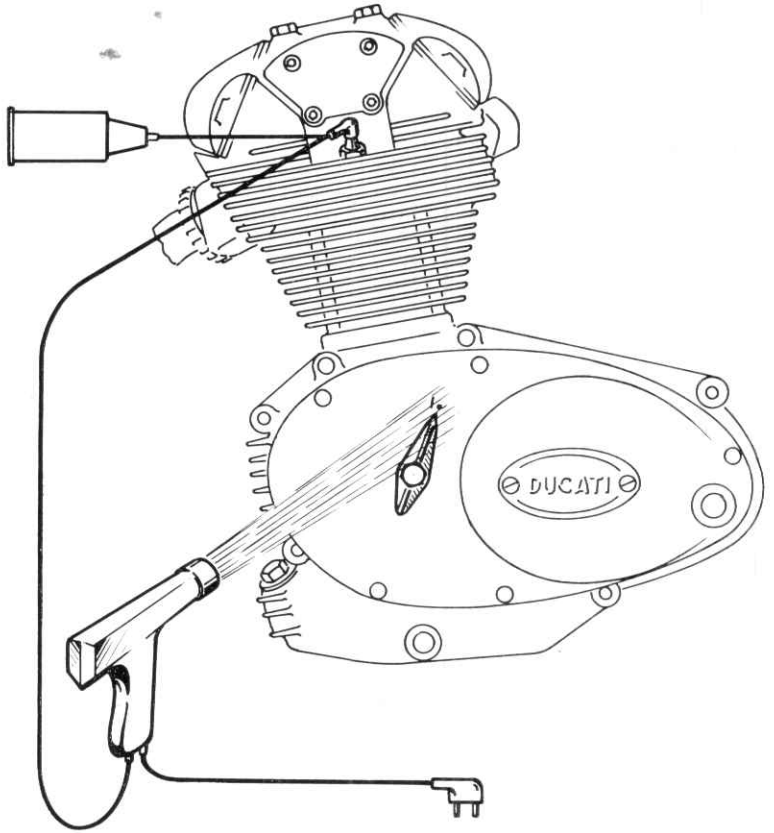
3 - Let the engine run till 2,500 to 3,000 r.p.m. and send the strobo light on the reference (.) marked on the cover, clutch side.

4 - **Check with the strobo light**

The timing indicator must be lined up with the reference (.) (full advance); if it is not lined up, adjust the distributor, rotating anti-clockwise for the retarded timing, rotating clockwise for the advanced timing.

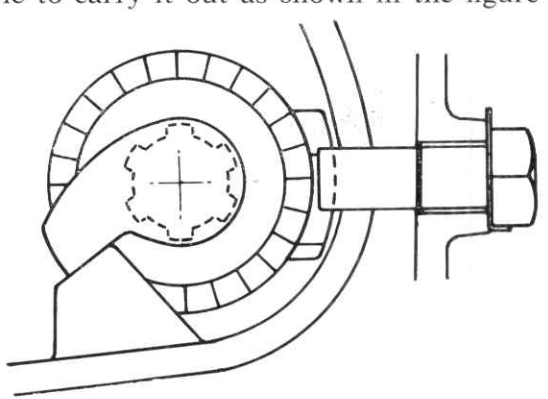
Parts needed for the check

— 1 advance control indicator 88713.0441 complete with screw and oil protection.
— The strobo bulb is not supplied.



STARTING

The kick-starter is located on the left hand side of the engine. In the case the starter unit is refitted, it is indispensable to carry it out as shown in the figure aside.



TRANSMISSION

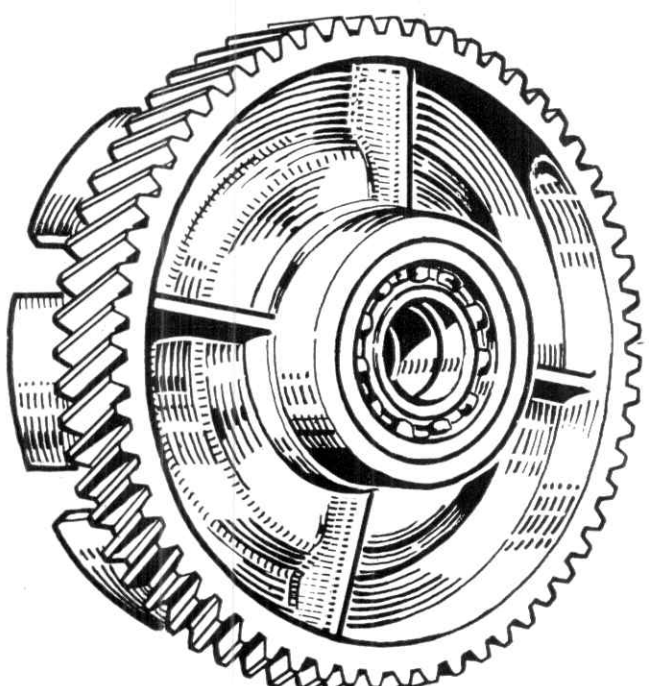
The transmission components comprise a clutch and a gear box. The clutch is of the multiple plate type with steel and phenol resin disks. It turns in an oil bath and is mounted on the primary shaft on the gear box.

The clutch housing, made of special wear resisting steel iron, turns on two inner bearings which are set at an adequate distance. It is lubricated together with the engine sprocket as already explained in the paragraph of the centrifugal filter.

This system ensures smooth movement, solidity and long wearing; it has been fitted and tested.

The clutch is operated by a handlever placed on the left hand side of the handlebar.

The transmission between the engine and the primary



shaft of the gearbox is obtained by means of gears and the reduction ratio is:
2.111 to 1.

The gearbox is mounted in the crankcase; the gears for the 5 speed gearbox are constantly meshed and are operated by a foot pedal.

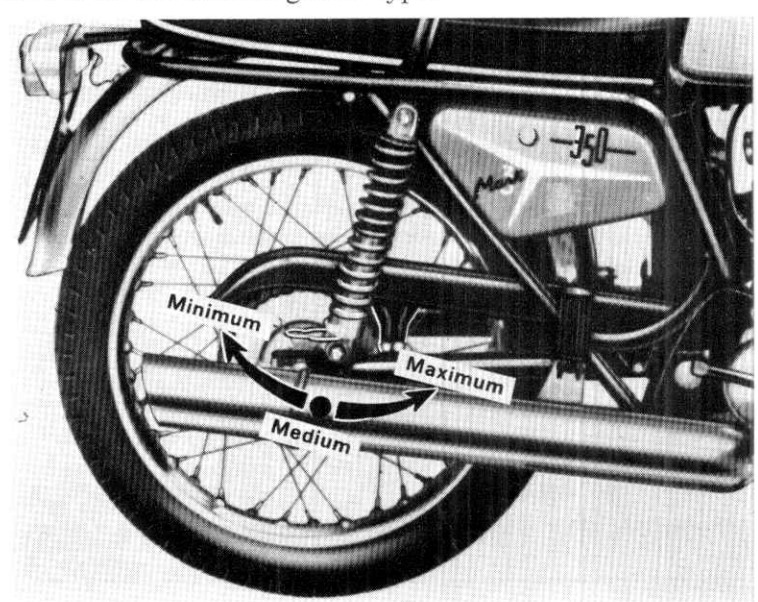
The transmission ratios of the gears are the following:

— in bottom gear	1 to 2.46
— in second gear	1 to 1.73
— in third gear	1 to 1.35
— in fourth gear	1 to 1.10
— in top gear	1 to 0.97

The transmission between the gearbox and the rear wheel is made by means of a chain and the speed ratio is:
3.214:1 for 250 and 350 SCR, 2.647:1 for 250 MARK 3 and DESMO, 2.812:1 for 350 MARK 3, 2.625:1 for 350 DESMO.

FRAME

The frame of the DUCATI 250 - 350 is of a very smart and modern design, is manufactured with high tensile steel and is of the central girder type.



SUSPENSION

The front suspension is composed by the telescopic - hydraulic long-stroke fork, with steering stop.

DUCATI model for MARK 3 and DESMO: each fork leg contains 100÷110 cu. cm. (cu. inch. 6.1025 to 6.7127) of AGIP F.1 oil SHOCK ABSORBER.

MARZOCCHI model for SCR:
each fork leg contains 180÷185 cu. cm. (cu. inch. 10.98÷11.29) AGIP F.1 ROTRA ATF oil., for hydraulic controls viscosity 3-4 Engler at 50° C.

The rear suspension consists of a robust hinged fork with double action hydraulic differentiated load dampers (shock-absorbers), which can be adjusted for three different loads: Minimum - Medium - Maximum.

In these machines the fork fulcrum-spindle is fixed to the frame while the fork with bronze bush rotates on it. This gives the machine greater solidity and stability.

WHEELS

The wheels are of the spoke type with rims as follows:

Model	Material	Profile	Wheel rim size	
			Front	Rear
MARK 3	Steel	Normal	18 x 2 1/2	18 x 2 1/2
MARK 3 D	Steel	Normal	18 x 2 1/2	18 x 2 1/2
SCRAMBLER	Steel	Normal	19 x 2 1/2	18 x 3

The front wheel has a detachable spindle.
The rear wheel has a special cushion drive.
Tyres and pressures are as follows:

MODEL	Front wheel		Rear wheel	
	Tyre	Pressure	Tyre	Pressure
MARK 3 and DESMO	2.75-18 ribbed supersport	2.25 Kg/cm² (32.01 lb/sq. inc.)	3.00-18 grooved supersport	2.25 Kg/cm² (32.01 lb/sq. inc.)
SCRAMBLER	3.50-19 grooved	1.75 Kg/cm² (24.89 lb/sq. inc.)	4.00-18 grooved	1.75 Kg/cm² (24.89 lb/sq. inc.)

BRAKES

The brakes are of the expanding type with two brake-shoes, — hand operated the front and pedal operated the rear — with finned brake drums of large diameter width, and with wear resisting brake linings.
The diameter of the front brake drum is 180 mm (7.0866"), the diameter of the rear drum is 160 mm (6.2992").

ELECTRICAL SYSTEM

The lighting is provided by a storage battery which is recharged by the DUCATI flywheel alternator and electronic current regulator.
The head-lamp APRILIA of large diameter carries 3 lights. A Km-speedometer CEV with dial of 180 for MARK 3 and DESMO, 160 for SCR or a milespeedometer with dial 150 for MARK 3 and DESMO, 120 for SCR, all with luminous dials, are incorporated in a case fixed to front fork. Another case contains the revolution indicator for MARK 3 and DESMO and on request for SCR.
The 3-way switch for the light control is situated on the head lamp. A removable key placed on the headlamp provides the contact for the ignition. By removing the key the engine is stopped.
Alongside the lefthand grip of the handlebar is the switch for the diplight, the antidazzle light, and the button for the horn.
In the normal position on the rear mudguard are placed the number-plate carrier, the rear light, the reflector, the numberplate lighting the stop-light and side lights (these on request).
When the engine is stopped, the electrical current for the position lights (town light and tail light) is provided by a free acid cell storage battery SAFA, mod. 3L3, of 6V-13.5 Ah; the charge is maintained by means of the flywheel alternator and electronic regulator.

IMPORTANT

To avoid ruining the efficiency of the rectifier, never run the engine without battery.

In fact the engine can be started only if the battery tension exceeds 4 volts; if such a tension is below this value (battery fully down) the engine does not start.

The battery wires must absolutely not be detached when the engine is in motion, because the electronic regulator would be inevitably damaged.

ADVANTAGES OF THE ELECTRICAL SYSTEM

The electrical system with electronic regulator of current offers real advantages in comparison with the system employed till now.

The advantages can be summarised as follows:

1) Regulation of the automatic charge.
2) There are no electrical contacts with the regulator and therefore there is a greater surety in the working.
3) Simplified commutator system which is limited to the sole lights section.
4) Protection of the electrical system on 3 fuses and therefore possibility to rapidly locate the eventual breakdown and to allow the remaining part of the equipment to be operating: the fuse (17) protects the equipment of the front and rear parking lights; the fuse (19) protects the equipment of the head light (dazzling and antidazzling); the fuse (18), protects the horn and the stop indicator (see the electrical scheme).
5) Greater simplicity of operation and wiring.

WIRING SYSTEM OPERATION

1) **Key inserted:**

   the machine can be run.

   The white warning light lights up till the engine stops.

   The battery is conveniently recharged.

commutator:

position 0 - lights switched out	**the battery charge is well-balanced in all conditions.**
position 1 - switched on the rear and front parking lights as well as the green warning light.	
position 2 - projector light is lit and commutable in dazzling and anti-dazzling lights.	

(in the high beam, the red warning light lights)

the horn is operating

the stop indicator is operating

2) **Key not-inserted:**

   the machine cannot be run

   the white warning light does not light

commutator:

position 0 - lights switched out	**the battery cannot be charged.**
position 1 - switched on the rear and front parking lights as well as the green warning light.	
position 2 - switched on projector light	

The connection between the electronic regulator of current and battery is cut-out.

The horn does not operate.

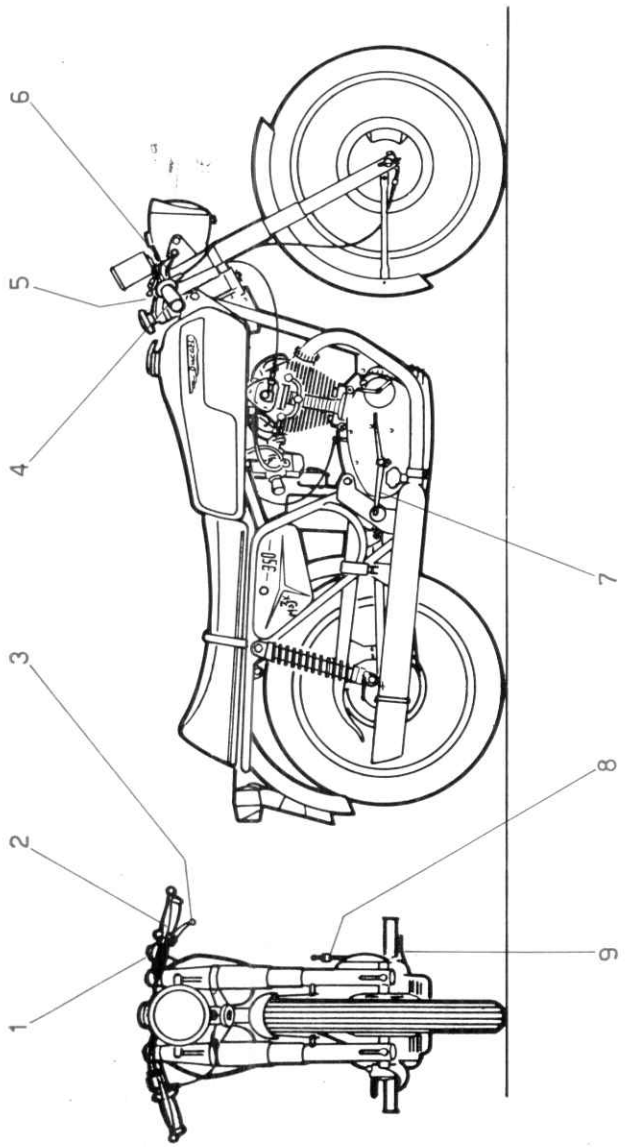
The stop light indicator does not operate.

CONTROLS

As mentioned in the foregoing paragraph, alongside the left hand fixed handlebar grip will be found the two switches for the dip light and the antidazzle light, the button for the horn, the hand operated clutch lever, the valve-lift lever. (The latter only in the models 350 MARK 3 and SCR).

The righthand handlebar grip rotates for accelerating and decelerating the engine. In front of the grip is placed the operating lever for the front brake which operates the front stoplight and above grip is located the little air-regulating control lever.

Near the left hand footrest is placed the rear wheel brake lever which also operates the back stoplight and the kick-start. Alongside the right hand footrest is the double lever for the gear change.



LEGEND

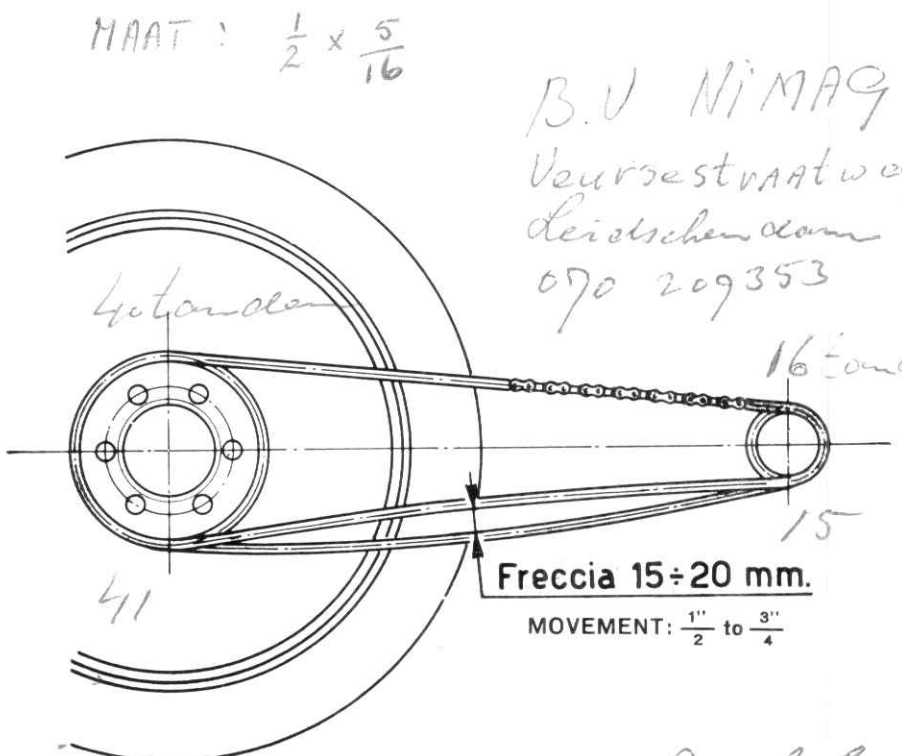
1 - 2 way switches for dip light and antidazzle light, and button for horn
2 - Clutch control lever
3 - Valve lift control lever
4 - Rotating throttle control grip
5 - Air regulating control lever
6 - Front brake control lever
7 - Change double lever
8 - Kickstarter
9 - Rear brake control lever

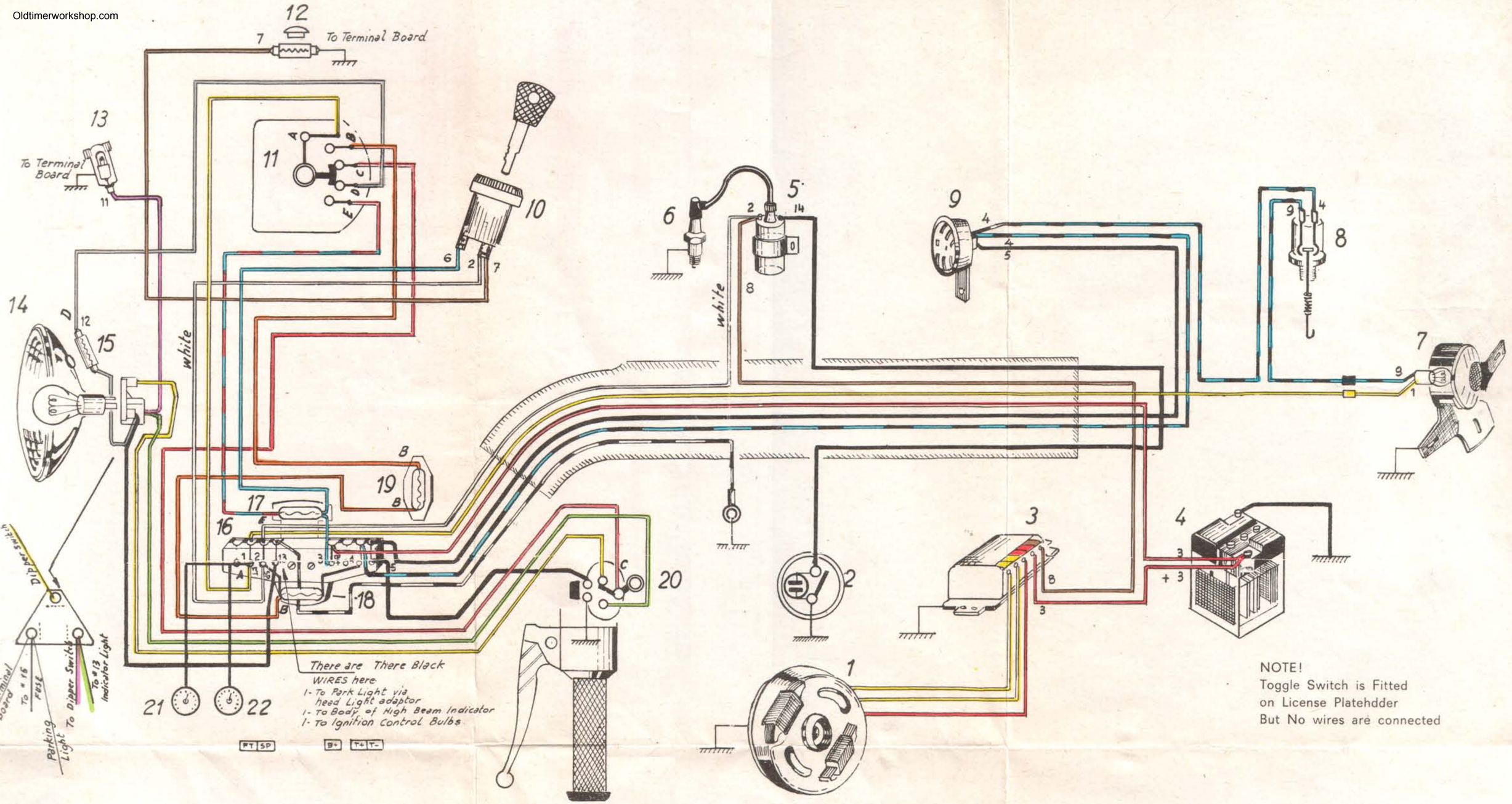
SADDLE

The motorcycle is provided with a wide and comfortable saddle.

ADJUSTING OF THE CHAIN TENSION

For the correct chain adjustment up and down movement should be of 15÷20 mm. (1/2"÷3/4") with earthed machine and with one person sitting on the rear part of the saddle, or with the rear suspensions at half stroke.



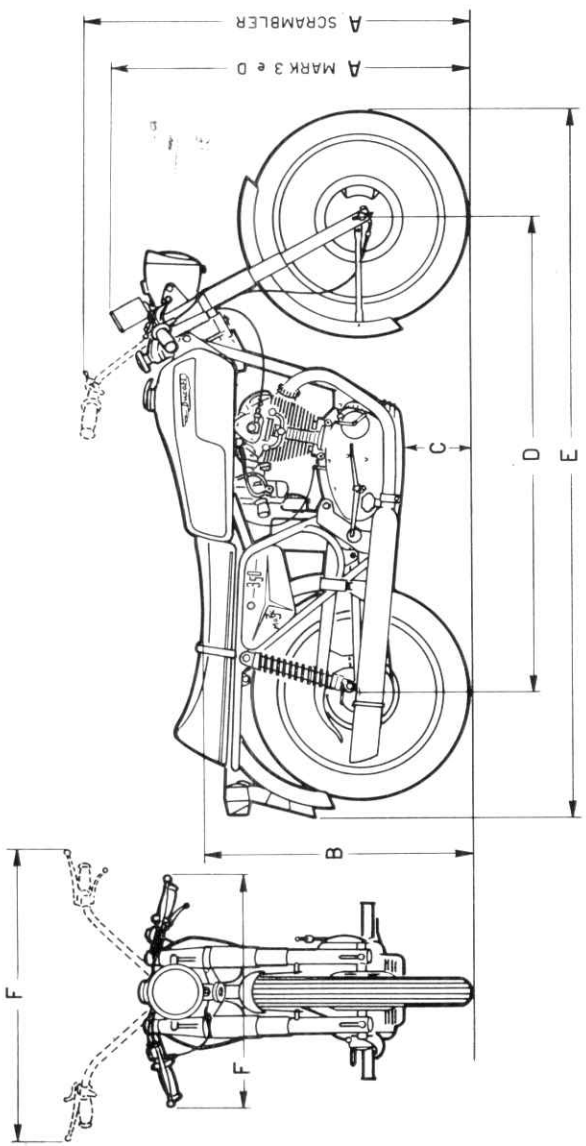


NOTE!
Toggle Switch is Fitted
on License Platehdder
But No wires are connected

1 Generator
2 Contact breaker - Condenser
3 Electronic regulator
4 Battery
5 Ignition coil
6 Ignition spark plug
7 Number plate and stop light 6V – 3 15W
8 Stop light switch
9 Horn
10 Ignition switch
11 Light switch
12 Inserted key white control bulb 6V - 1,5W
13 High beam red indicator lamp 6V - 0,6W
14 Bulb 6V 25 25W headlight unit
15 Bulb for parking light 6V - 3W control green warning light
16 Headlight terminal board
17 Parking light fuse - 25 Amp.
18 Horn - stop fuse - 25 Amp.
19 High beam and lower beam fuse - 25 Amp.
20 Dimmer switch and horn switch
21 Mile speedometer control bulb 12V - 3W
22 Revs counter control bulb 12V – 3W

DUCATI 250 - 350 ed. 1970
DUCATI 450 Mark 3
DUCATI 450 Mark 3 DESMO
DUCATI 450 SCR

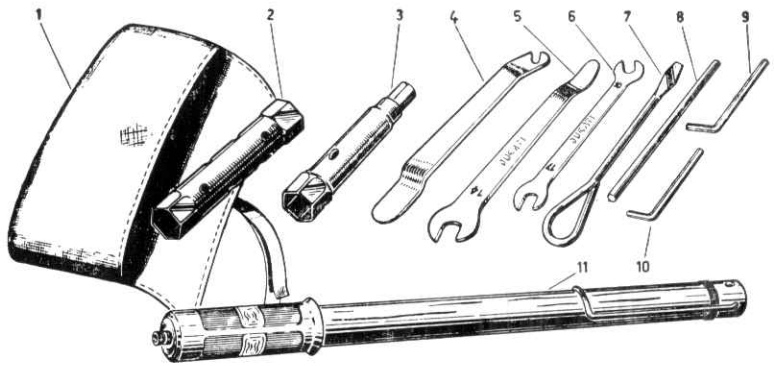
ELECTRICAL DIAGRAM WITH **ELECTRONIC**
REGULATOR (OVERHEAD CAMSHAFT MACHINES) DUCATI



Model	A	B	C	D	E	F	Weight
250 MARK 3	mm. 940-37.0078''	mm. 735-28.9369''	mm. 130-5.1181''	mm. 1360-53.5432''	mm. 2000-78.740''	mm. 600-23.6220''	kg. 127 - lb 280
350 MARK 3	mm. 940-37.0078''	mm. 735-28.9369''	mm. 130-5.1181''	mm. 1360-53.5432''	mm. 2000-78.740''	mm. 600-23.6220''	kg. 128 - lb 282
250 MARK 3 D	mm. 940-37.0078''	mm. 735-28.9369''	mm. 130-5.1181''	mm. 1360-53.5432''	mm. 2000-78.740''	mm. 600-23.6220''	kg. 127 - lb 280
350 MARK 3 D	mm. 940-37.0078''	mm. 735-28.9369''	mm. 130-5.1181''	mm. 1360-53.5432''	mm. 2000-78.740''	mm. 600-23.6220''	kg. 128 - lb 282
250 SCRAMBLER	mm. 1150-45.2755''	mm. 770-30.3149''	mm. 130-5.1181''	mm. 1380-54.3306''	mm. 2120-83.464''	mm. 940-37.0078''	kg. 132 - lb 291
350 SCRAMBLER	mm. 1150-45.2755''	mm. 770-30.3149''	mm. 130-5.1181''	mm. 1380-54.3306''	mm. 2120-83.464''	mm. 940-37.0078''	kg. 133 - lb 293

TOOL BOX

A large tool box of ample capacity is placed under the saddle at the left side of the rider and contains the spanners and the tools supplied with the motorcycle for the normal inspections of the engine, which can be executed by the rider himself, only for the MARK 3 and DESMO models.
For the Scrambler model the cloth toolbag is supplied separately.



1 - Tool bag
2 - Double box spanner 19-22 (0.7480"—0.8661")
3 - Double box spanner 21 for hexagon 14 (0.8268" — 0.5512")
4 - Tyre lever
5 - Hexagon spanner 14 with tyre puller (0.5512")
6 - Double hexagon spanner 10-11 (0.3937"—0.4331")
7 - Screw driver
8 - Tommy-bar for box spanner 21-22 (0.8268"—0.8661")
9 - Spanner for hollow hexagon 6 (0.2362")
10 - Spanner for hollow hexagon 5 (0.1968")
11 - Tyre inflator

On the right side of the MARK 3, on the contrary, a similar tool box (only in the model MARK 3 on request) contains the air cleaner for the carburetor for the quiet air inlet.
In the inlet duct of the carburetor there is the engine

breather which sends oil vapours to the valves for their lubrication.
The battery is located between the two boxes in the models MARK 3 and DESMO.

PERFORMANCES

Fuel: petrol AGIP SUPERCORTEMAGGIORE

Model	Consumption					Fuel distance	
	At the saving speed		Litres for 100 Km.	M/imp. gal.	M/U.S. gal.		
	Km/h	Miles				Km.	Miles
250 MARK 3	85 ÷ 90	53 ÷ 56	4.2	67	56	262	163
250 MARK 3 D	85 ÷ 90	53 ÷ 56	4.4	64	53	250	155
250 SCR	65 ÷ 70	40 ÷ 44	3.8	74	62	290	180
350 MARK 3	85 ÷ 90	53 ÷ 56	5.0	56	47	220	137
350 MARK 3 D	85 ÷ 90	53 ÷ 56	5.5	51	43	200	124
350 SCR	65 ÷ 70	40 ÷ 44	4.4	64	53	250	155

IMPORTANT

In every speed follow the maximum r.p.m. of the engine indicated below for each model.
Failure to comply with the above recommendations absolves the DUCATI MECCANICA from all liability of guarantee and any damage that may result in the engine.

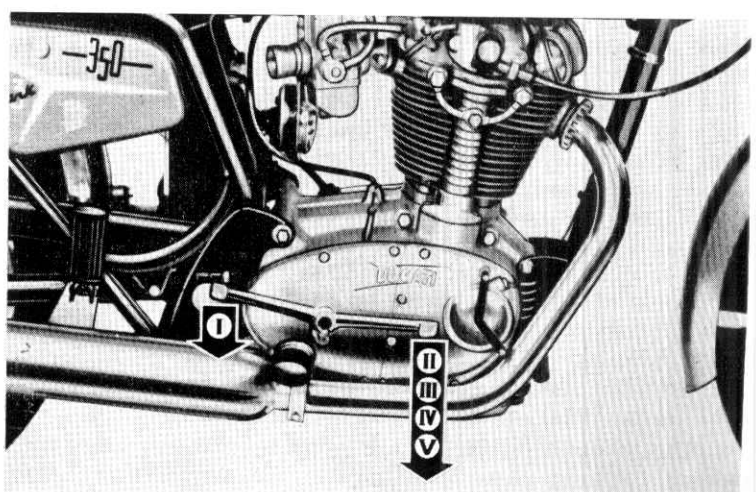
Model	Max r.p.m.	Model	Max r.p.m.
250 MARK 3	8,000	350 MARK 3	7,500
250 MARK 3 D	8,500	350 MARK 3 D	8,000
250 SCR	7,000	350 SCR	7,500

FILLING UP AND STARTING THE ENGINE

Before starting the engine make sure that there is sufficient petrol in the tank, for the distance you wish to travel. See that the petrol tap is on and that the engine lubricating oil is at the right level.

For the lubrication it is advisable to use AGIP F.1 SUPER-MOTOROIL 20 W/40 or AGIP F.1 RACING SAE 40.

Having refuelled and checked the oil, see that gear lever is in neutral position and press down the carburetor tickler to ensure the correct level of petrol in the float chamber. Pull forward (clockwise rotation for the machines with carburetor VHB and anticlockwise rotation for the machines with carburetor SSI) air control lever. Now, after having inserted the contact-key into its place



on the headlamp and turned it clockwise, turn the right-hand handlebar grip (accelerator) for about one-eighth of its travel, pull the valve-lift lever in models 350 MARK 3 and SCR and thrust the kickstarter energically downward leaving the valve-lift lever before completing the travel in models 350 MARK 3 and SCR after inserting wrench into the commutator placed on head lamp and rotating it clockwise.

If the engine does not start repeat this operation, varying at the same time more or less the opening of the throttle by means of the handlebar grip. **Once the engine is started, bring air control lever to its former position (anticlockwise or clockwise rotation), do not race it immediately, especially when the engine is cold, but before accelerating the engine let the lubrication oil warm up to facilitate its circulation throughout the engine, so as to reach all moving parts.**

RIDING AWAY AND RUNNING OF THE MOTORCYCLE

With the engine running, disengage the clutch and, using your heel, push down the rear arm of the gearchange level. When this lever is left to itself it returns to its original position. With this move the bottom gear is now engaged. Now turn the righthand grip little by little and release gradually your hold on the clutch lever; the motorcycle begins slowly to go under way. With the clutch lever completely released let the motorcycle increase its speed until about 15/20 Km/h. (9÷12 m.p.h.). To pass now from bottom gear into second gear, turn back righthand grip fully and quickly; and after having disengaged the clutch follow up at once by pressing down the front arm of the gearchange lever. Now turn forward the righthand grip again, releasing at the same time the clutch lever. Similar operations are carried out in order to change from second gear into third gear, from third gear into fourth gear and from the fourth to the top gear.

To change down from a high gear to a lower one, operate as follows: close the throttle, disengage the clutch, accelerate the engine momentarily, thus synchronizing

the gear about to be engaged, engage the lower gear and then let the clutch control go off.

A good motorcyclist will make use of the controls intelligently and at the right time. When riding uphill and the engine tends to slow down, change to a lower gear at once; do not " hang on " to a higher gear when the effort required from the engine advises to use a lower gear.

When the engine turns at a low number of revolutions, do not accelerate its turning at once: thus you avoid any oversupply of fuel and too harsh drive to the transmission.

The clutch should not be held long disengaged with a gear engaged, because the clutch plates will become overheated, causing rapid wear by friction.

Except in case of emergency, never use the brakes brutally when you are already near behind the obstacle, but throttle down the engine at the right time and then make use of the brakes.

Bear in mind that insufficiently inflated tyres are detrimental to the roadholding qualities of the motorcycle, cause a greater tyre wear and lower efficiency.

STOPPING THE MOTORCYCLE

To stop the engine, close the throttle completely (the engine will then act as a gentle brake) disengage the clutch and put the gear pedal in neutral. A slight use of the brakes will then stop the motorcycle.

To stop the engine pull out the contact key of the switch placed on the headlamp.

MAINTENANCE

On good maintenance depends the good condition of the motorcycle.

By following these fundamental rules you can avoid serious trouble and obtain an excellent performance from your motorcycle.

The operations to be carried out are subdivided in accordance with the order on which depend the kilometers run by the motorcycle. The recommendations which follow are, of course, merely indicative, because lubricating, checking and adjustments depend also on the nature of the road, the seasonal temperature, the length of the intervening period.

EVERY 500 Km (about 310 miles)

— Restore the oil-level in the crankcase;
— Check the tyre pressure with a pressure-gauge;
— Tighten the cylinder head holding down bolts;
— Readjust the brakes;
— Check the clearance between valves and rockers placing the appropriate rocker shim on the valve stem end, letting the clearance be as mentioned at page 17.

EVERY 1000 Km (about 620 miles)

— Check and adjust the distance between the sparking plug electrodes to about 0.5 mm. (0.0197") and clean them with a small wire brush and some petrol;
— Clean the contact breaker platinum plates with a rag damped in petrol and check the distance between the platinum plates, whose opening should be 0.3 to 0.4 mm. (0.0118"÷0.0157");
— Check the clearance between valves and rockers as mentioned in the above paragraph.

EVERY 1500 Km (about 930 miles)

— Lubricate the speedometer drive with AGIP F. 1 GREASE 30.

EVERY 2000 Km (about 1240 miles)

— Change the oil in the crankcase draining it while the engine is hot, make sure that the oil drains off completely.
— Remove the carburetor oil filter and wash it by blast of compressed air, in order to remove all impurities from the cloth.
— Clean out the carburetor float chamber, the main jet and the idle jet.
— Readjust the clutch because the wear on its linings might otherwise cause slip.
— Lubricate the hinge of the rear fork.
— Dampen with 2 drops (not more) of thin mineral oil the lubricating wick of the contact breaker cam.
— Uniformly tighten the nipples of the spokes and check whether the screws and the nuts of the wheels have been firmly tightened.

EVERY 10000 Km (about 6200 miles)

— Unscrew plug B of the crankshaft (see pages 24-25) and clean the hollow part.
— Tighten again the plug in its seat, smearing some paint to avoid the plug be unscrewed during operation. To clean, it is sufficient to remove the engine cylinder.

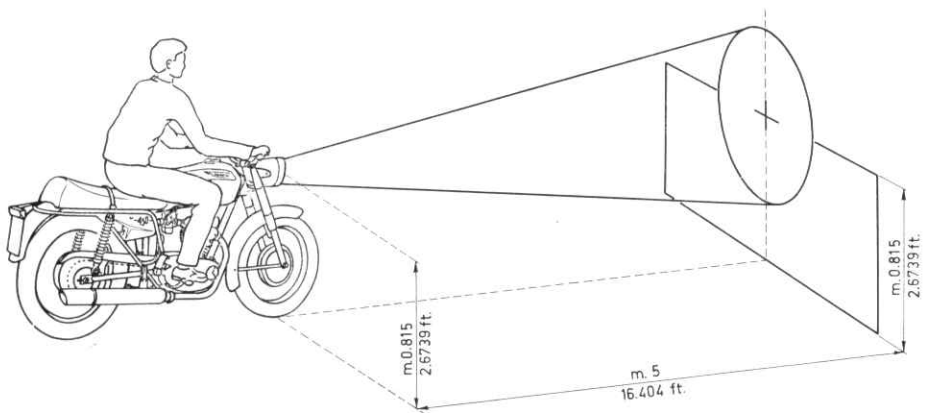
EVERY 20000 Km (about 12400 miles)

— Dismantle the exhaust pipe and the cylinder, in order to remove the carbon deposits on the cylinder head and on the piston (this should be done by a Ducati Servicing Garage).

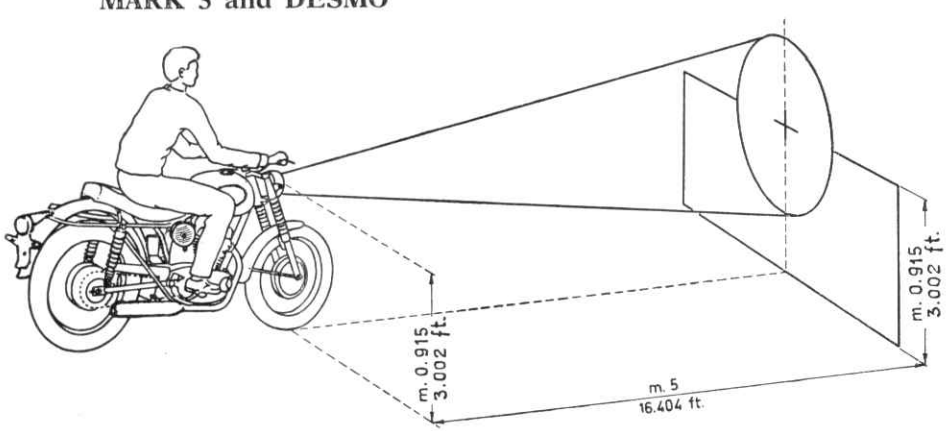
HEADLAMP ALIGNMENT

It is advisable to check periodically the alignment of the headlight as follows:

— place the motorcycle at a distance of 5 meters (ft. 16.404) from a bright wall;
— make sure that the ground be even and that the optic axis of the headlamp be perpendicular to the wall;
— the motorcycle with its rider must rest on the wheels, not on the central stand;



MARK 3 and DESMO



SCRAMBLER

— trace a cross in the intersections between the optic axis and the wall, that it is at a height of 0.915 meters (ft. 3.002) from the ground, for SCRAMBLER and 0.815 meters (ft. 2.6739) for MARK 3 and DESMO.
— when the depthlight is lit up, the cross must be in the center of the circular light-beam hitting the wall;
— to rectify the alignment of the headlamp, operate by means of the two fixing screws of the headlamp on the front fork.

OVERALL CLEANING

The motorcycle should be washed and cleaned periodically, according to the length of time it has been used and the state of the road.

— Clean the engine with parafin and wipe it dry with a clean rag;
— wash down the painted parts of the frame with water, using a sponge for washing and a shammy leather for drying;
— never use solvents, petrol, spirit or parafin, otherwise the paint will look flat;
— grease the chromium plated parts with vaseline and polish with shammy leather.

PROLONGED REST OF THE MOTORCYCLE

If the motorcycle has to be put at rest for several months, it is advisable to proceed as follows:

— clean the motorcycle thoroughly;
— empty the petrol tank;
— take out the battery and keep it efficient, as per instructions at page 50;
— squirt through the hole of the sparking plug several drops of oil into the cylinder and turn the engine by hand for several revolutions, distributing a thin oil film on the walls;
— put the motor upon a piece of wood, lifting the machine from the ground and empty the air out of the inner tubes;
— cover the machine with a canvas, or water-proof cover.

INSTRUCTIONS FOR THE FIRST CHARGE AND FOR THE MAINTENANCE OF THE BATTERY

Battery SAFA 3L3, with free acid, dry charge.

Type

— tension . . . . . 6 V
— Capacity at 20 hours . . . . 13.5 Ah
— Capacity at 10 hours . . . . 12 Ah
— Normal charging current . . 1.2 Amp.
— Max. recharging current . . 2 Amp.
— External dimensions . . . . 120 x 90 x 165 mm. = 4.7244"x3.5433"x6.3960"

Warning

The battery must always be preserved in a fresh but dry place. It is important to frequently check the level and the density of the electrolyte.
Never let the accumulators completely without charge.
Keep always the plugs well closed and screwed down.
Clean always well the oxyde from the terminals and connections, and protect them with a thin layer of pure vaseline. Never use grease. The battery must always be preserved well cleaned and dry, especially the top part.

Electrolyte

The electrolyte consists of sulphuric acid of regular purity, diluted with distilled water, so that the density, referred to a temperature of 15° C (59° F.), corresponds to the following values:

PLACE CONDITIONS	DENSITY OF THE ELECTROLYTE		Max. temperat. of the electrolyte during charge
	dry battery	charged battery	
Temperate climate	1.28÷1.29	1.27÷1.28	50°C (122°F)
Tropical climate	1.21÷1.22	1.20÷1.21	60°C (140°F)

The level of the electrolyte within the element must be the same as the antisplash gauze.
When all elements have been filled with the electrolyte, let the battery at rest for about 2 hours to allow the cooling of the plates.

A certain part of the electrolyte will be absorbed by the separators and by the plates, so that it will be necessary to add more sulphuric acid to establish the right level. To check the electrolyte level use only glass sticks or ebonite.

First charge

Take down the breathers and connect the battery with a source of direct current, having an intensity equal to 1/10 of the normal 10 hours capacity, for a maximum period of at least 10 consecutive hours.
Take care that during the charge the temperature of the electrolyte does not overpass 50° C (122° F).
The charge has to be interrupted:

a) when the above mentioned effective number of hours has elapsed, reckoning of course also the eventual interruptions;
b) in case of an intense ebullition in all the elements;
c) in case for at least 3 consecutive readings at intervals of one hour each, the density of the electrolyte and the voltage of each element remain the same.

At the end of the charge, the electrolyte should have recovered the initial density, and the voltage of each element should arrive at a minimum of 2.7 Volts under charge, that is 8.1 Volts for a battery of 3 elements and of 16.2 Volts for a battery of 6 elements.
At this point the battery is ready to be put in service.

SUCCESSIVE CHARGES

The successive charges have to be made preferably with a current having an intensity in Amp. equal but not greater than 1/10 of the normal 10 hours capacity.
If during the charge the temperature, checked with a suitable thermometer immerged into the electrolyte would reach 50° C, (122° F), it will be necessary to reduce or to interrupt the charge until the temperature falls at least below 40° C (104° F).
The charge must continue until the density of the electrolyte results to be constant during 3 consecutive readings made at intervals of one hour each, and until the voltage reaches the value of 2.7 Volts for each element.

Never and for no reason refill the battery with sulphuric acid of whatever density. The refilling has to be made only with distilled water, chemically pure, taking care that the vessel used is absolutely clean, to avoid the spoiling of the electrolyte by noxious substances and so compromise the efficiency of the battery.

In case the accumulators remain temporarily inactive, it is necessary to recharge the battery at least once each month, and each time the battery will be put in service.

INSTRUCTIONS FOR THE MAINTENANCE OF THE ELECTRICAL SYSTEM

In case of inspections or repairs, it is extremely important to know the working of the electrical system and to follow with care the scheme on page 36/1.

To avoid demagnetizing the regulator, be careful never to send electrical current (direct or alternate current) in the opposite direction.

Every inspection should be made with convenient Ohmmeters and Voltmeters.

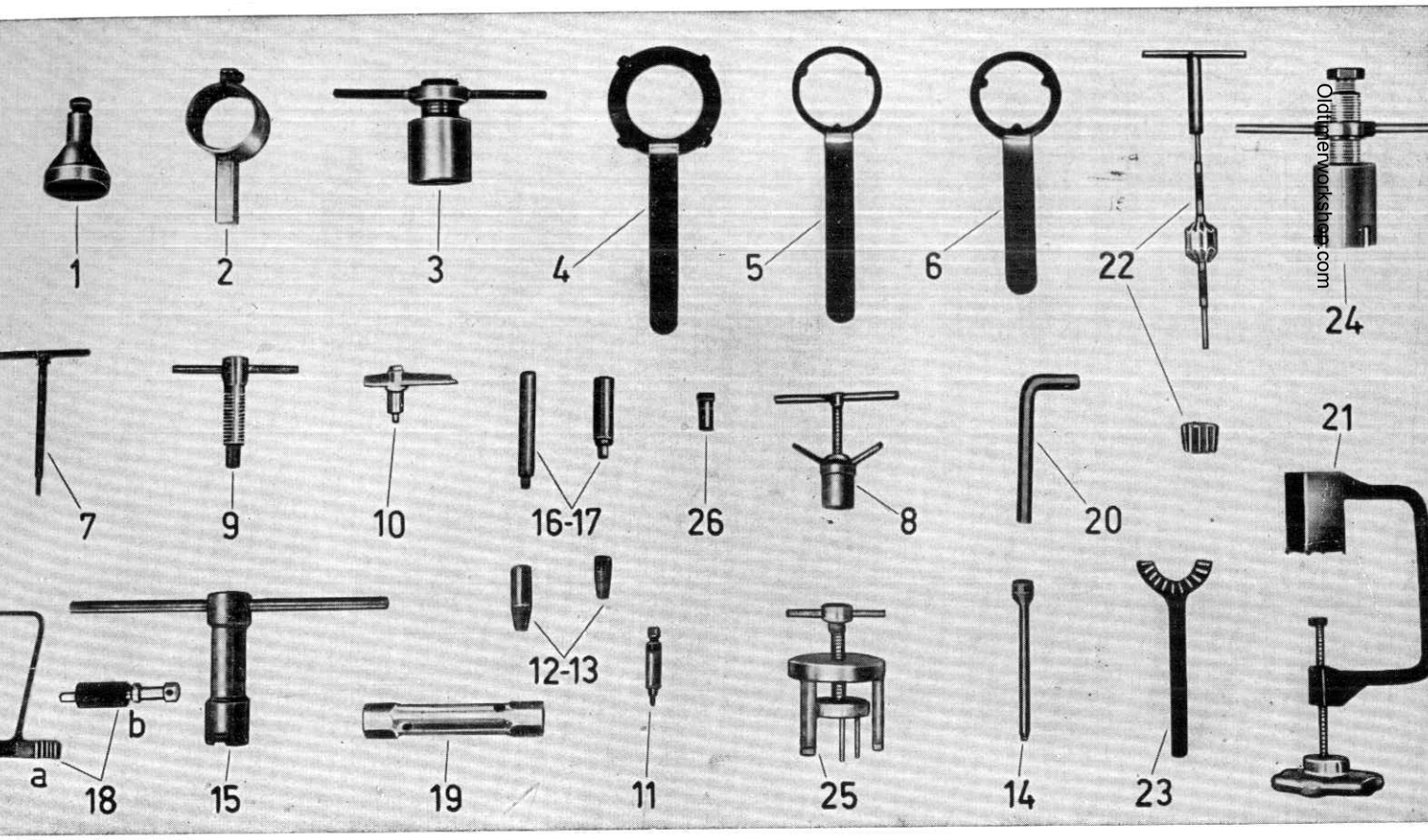
To avoid ruining the efficiency of the electronic regulator, never run the engine without battery. (See also at page 33).

For no reason, the electronic regulator of current should be opened: if it does not work, send it to the CONCESSIONAIRES of DUCATI MECCANICA for replacement.

NOTICE! Battery shall be always mounted with the positive pole (+), red cable clamp, at the driver's right-hand side, and with the negative pole (—), blue cable clamp, at the driver's left-hand side.

SERVICE STATION

TOOLS FOR SERVICE STATION



Note: The tools nos. 12-13, and 25 are deleted

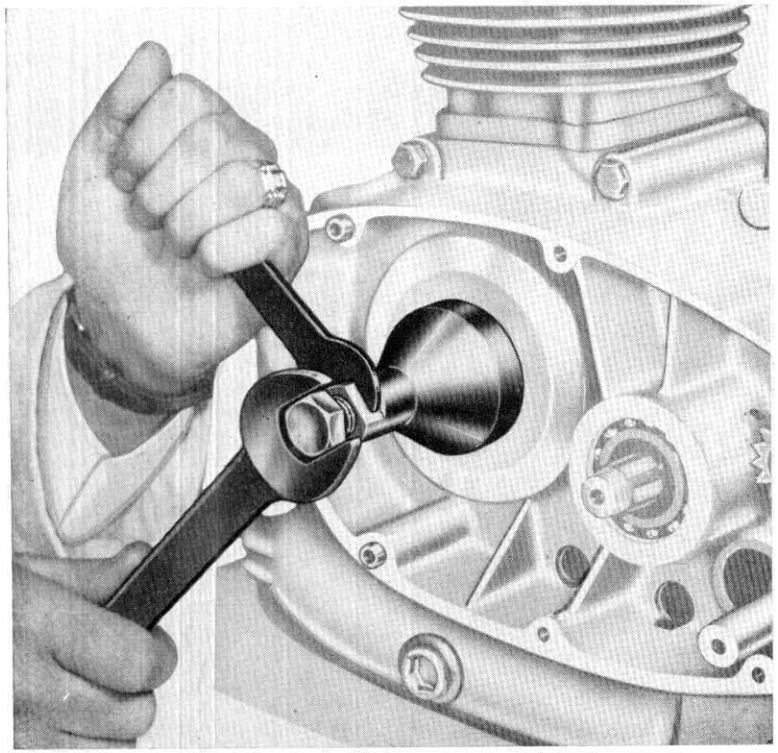
TOOL EQUIPMENT
LEGEND

1) Flywheel magneto extractor
2) Tool to grasp piston
3) Extractor for timing bearing holder bush
4) Spanner to secure fhe clutch housing and to lock the main shaft gear
5) Spanner to secure the clutch drum and to lock the drum nut
6) Wrench to hold the counter - shaft sprockets and to lock the nut
7) Spanner for nuts with hollow hexagon ch. 5 (0.1968'') or ch. 6 (0.2362'')
8) Clamp for lapping the valve seats
9) Cover extractor on clutch side
10) Piston position indicator
11) Extractor for rocker pin
14) Pin for orienting washers and bushes when fitting rocker pins
15) Spanner to hold timing shaft and to lock bevel gear Z = 28
16-17) Pins to fit and re-fit gudgeon pin
18) Tools to lock the main shaft tapered Z = 21 gear
a) with assembled cylinder head b) dismantled cylinder head
19) Spanner for bevel gear Z = 28 (see 15)
20) Plug assembly spanner for plugs with hollow hexagon ch. 12 (0.4724'') or ch. 14 (0.5512'')
21) Device for assembling and dismantling valves
22) Grinder for valve seats (one for inlet and one for exhaust)
23) Key for threaded ring of exhaust pipe
24) Ball bearing puller (No 3 types)
26) Bush for fitting advance cover

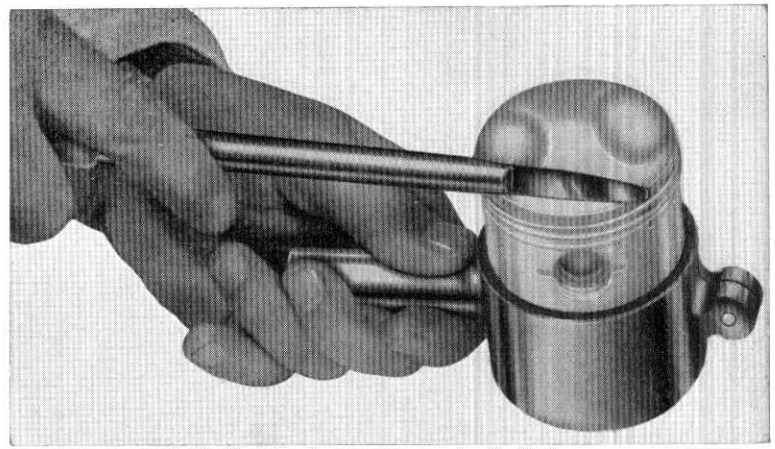
SERVICE STATION

TOOL EQUIPMENT

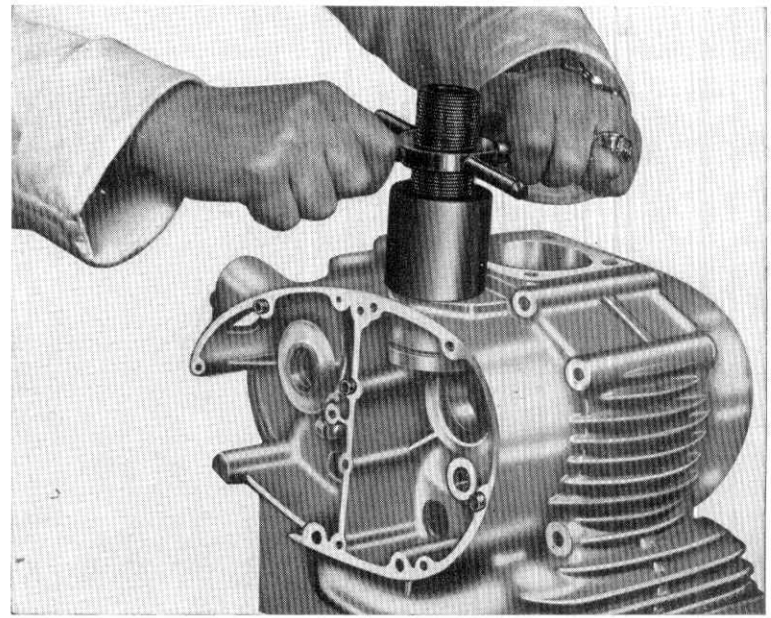
DIRECTIONS FOR USE



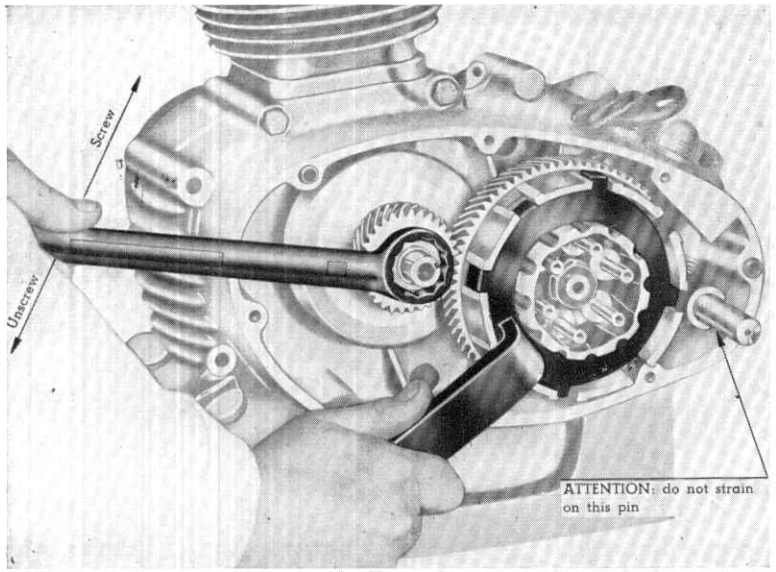
1 - Flywheel magneto extractor



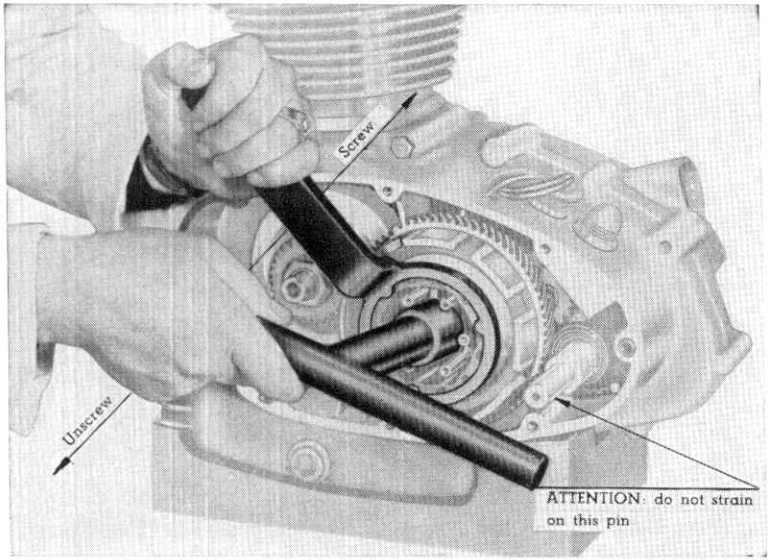
2 - Tool to grasp piston



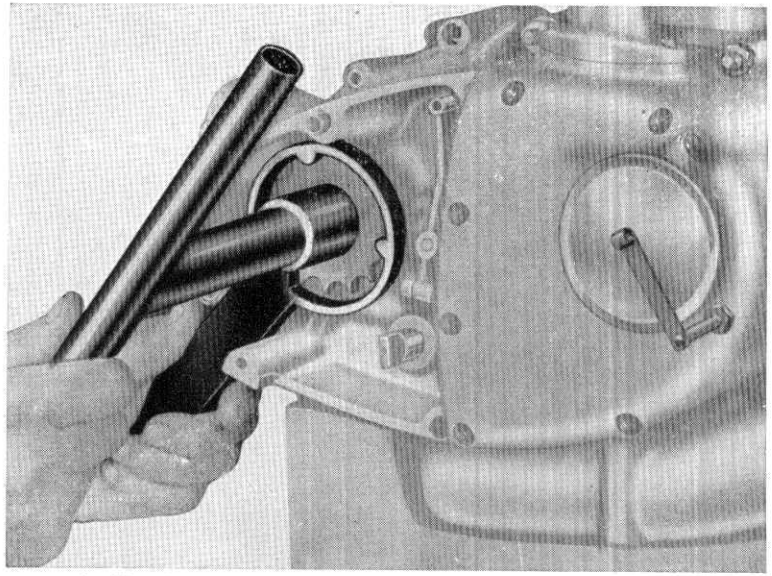
3 - Extractor for ti ming bearing holder bush



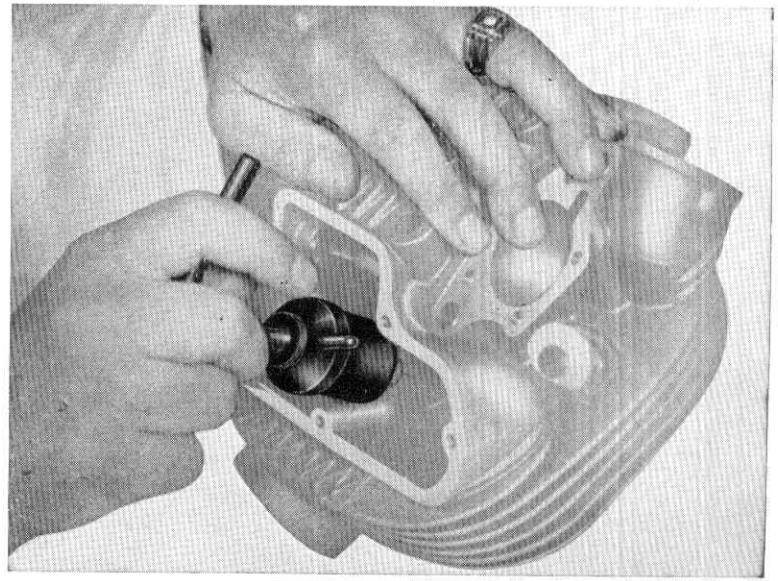
4 - Spanner to secure the clutch housing and to lock the main shaft gear



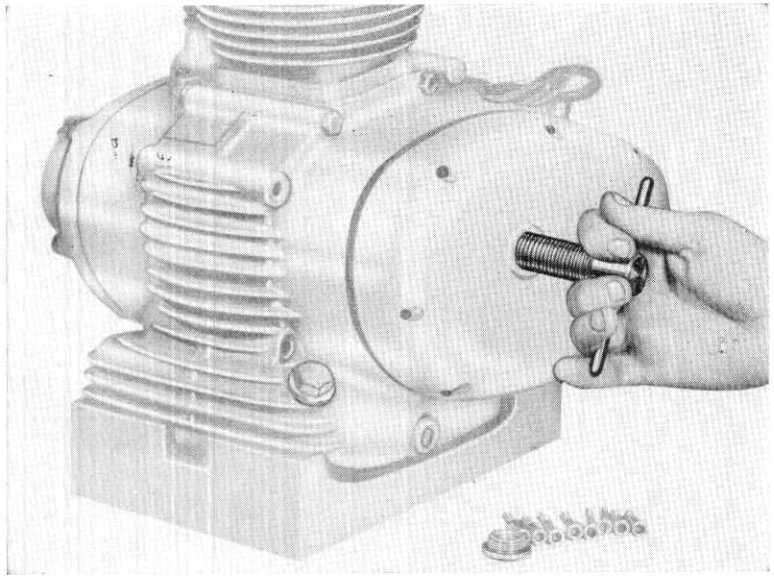
5 - Spanner to secure the clutch drum and to lock the drum nut



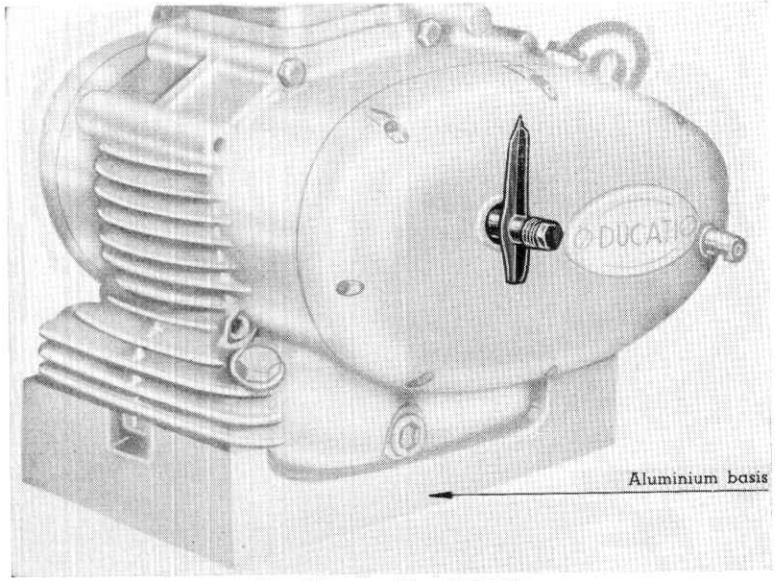
6 - Wrench to hold the counter shaft sprockets and to lock the nut



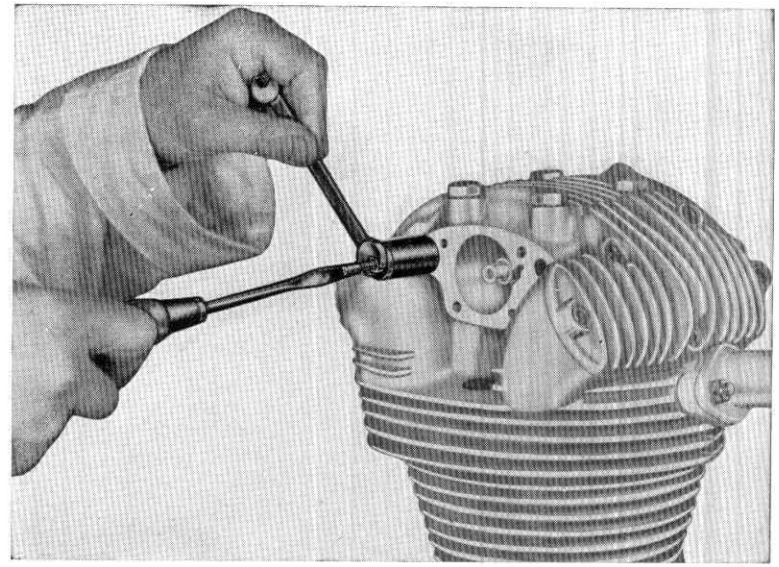
8 - Clamp for lapping the valve seats



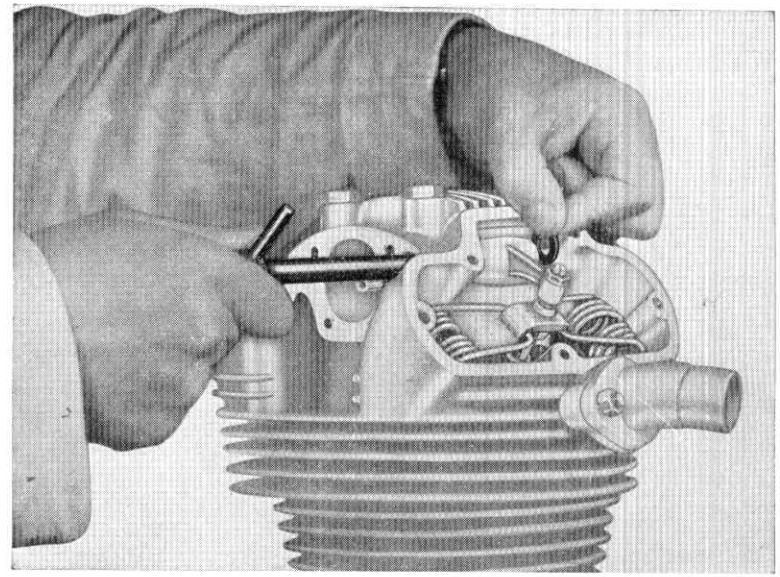
9 - Cover extractor on clutch side



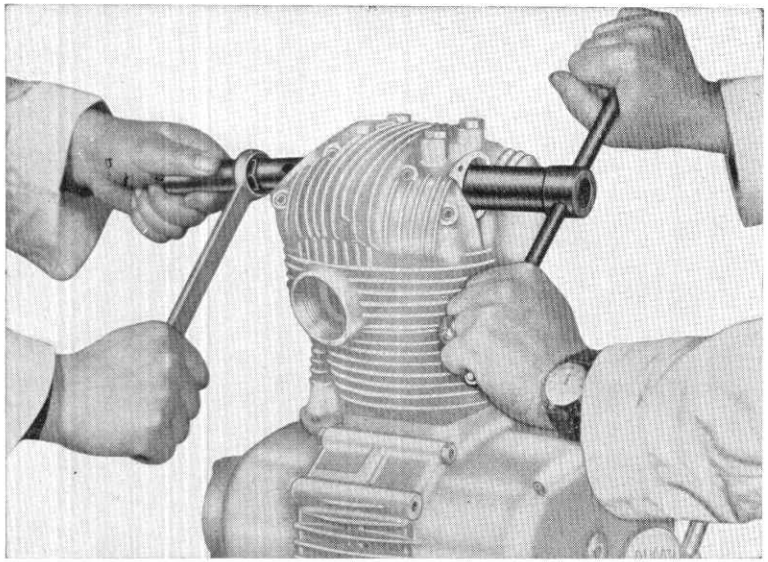
10 - Piston position indicator



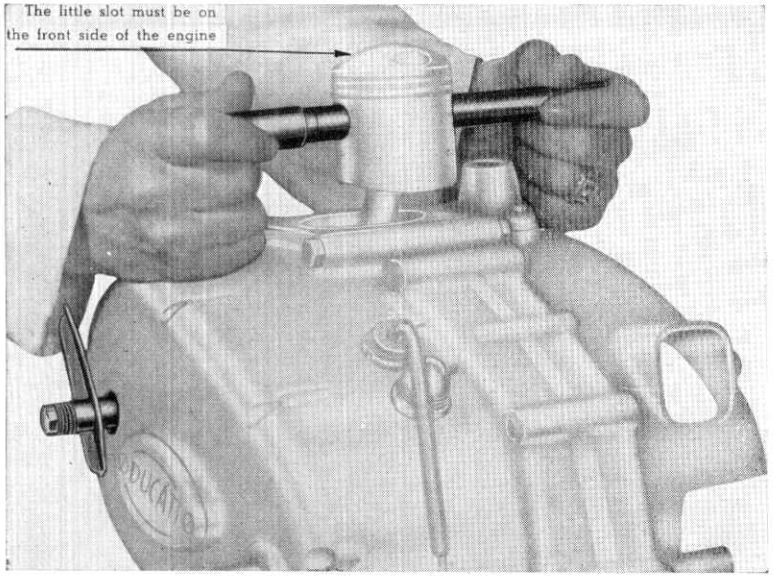
11 - Extractor for rocker pin



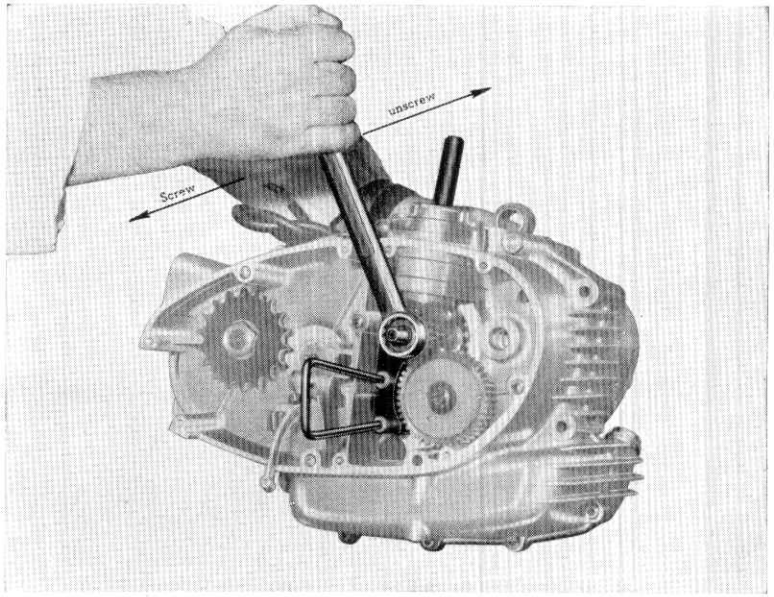
14 - Pin for orienting washers and bushes when fitting rocker pins



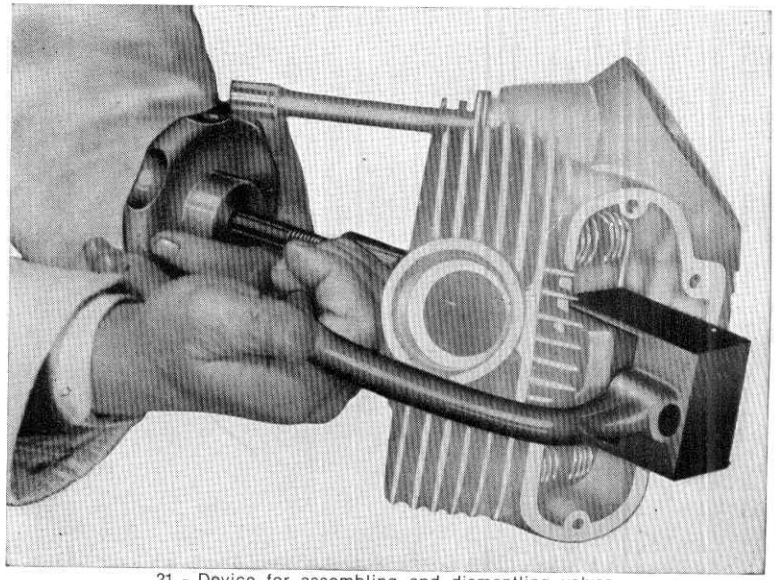
15 - Spanner to hold timing shaft and to lock bevel gear Z = 28



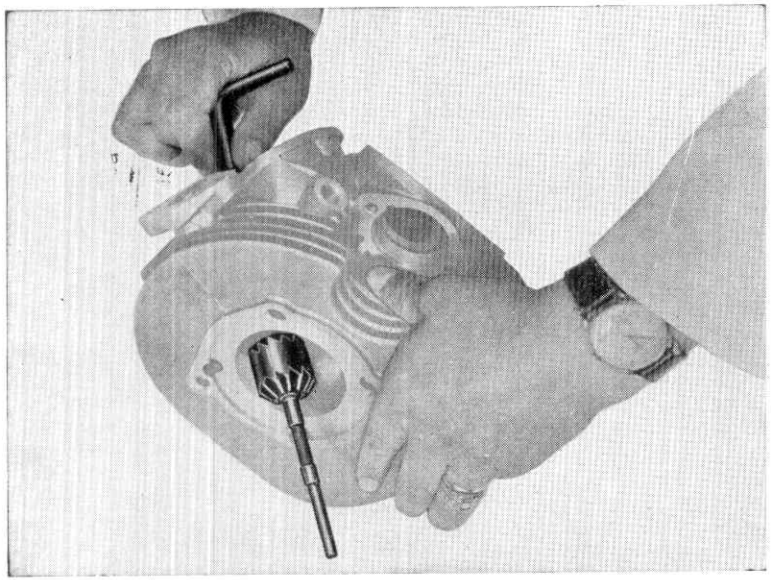
16-17 - Pins to fit and re-fit gudgeon pin



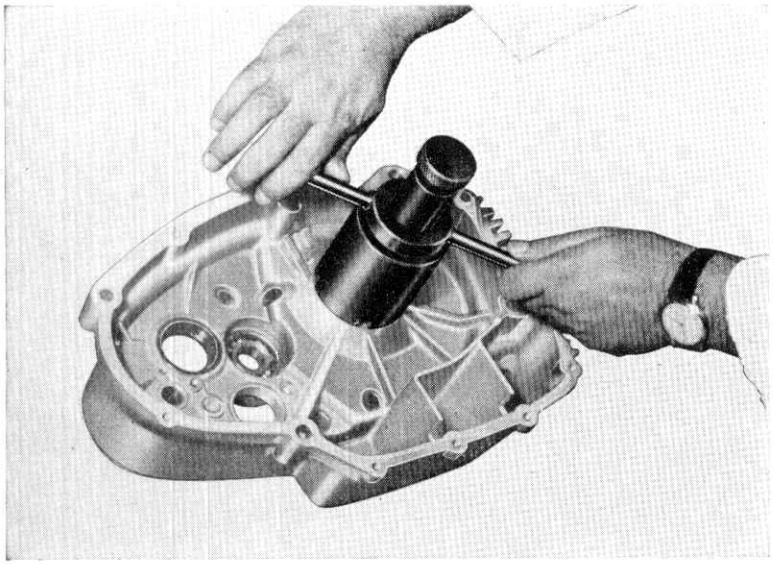
18 - Tools to lock the main shaft tapered Z = 21 gear



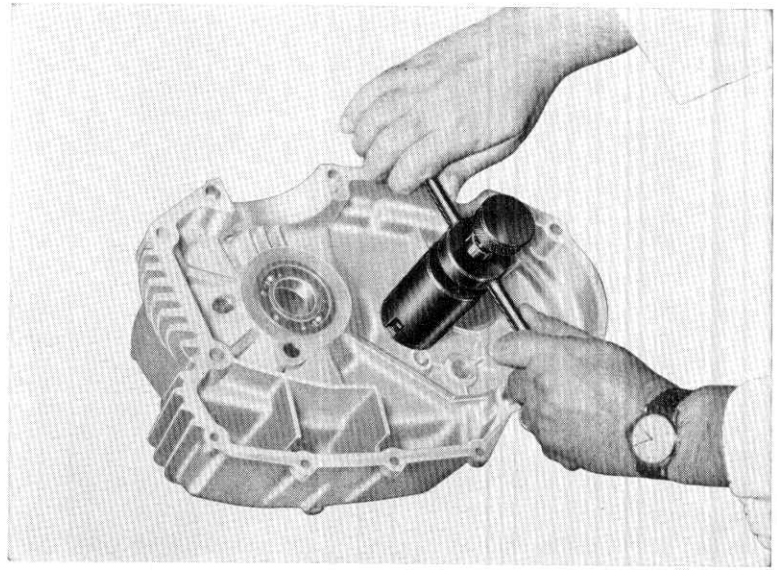
21 - Device for assembling and dismantling valves



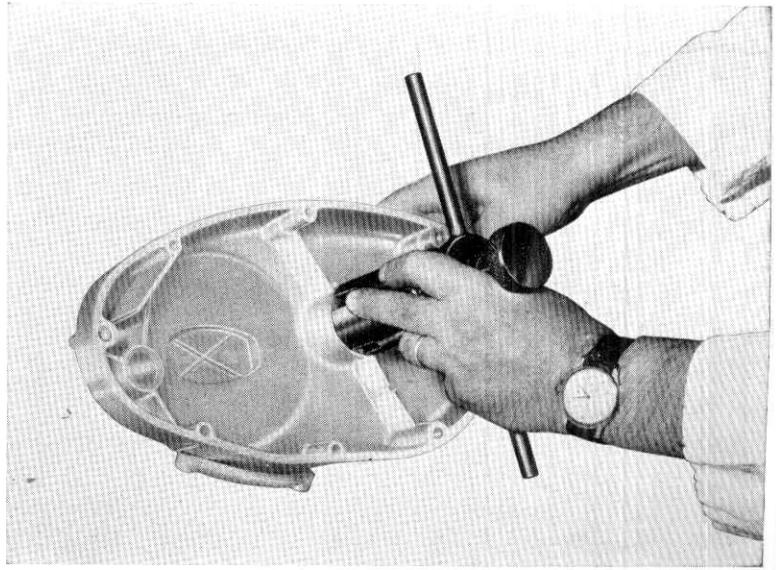
22 - Grinder for valve seats (one for inlet and one for exnaust)



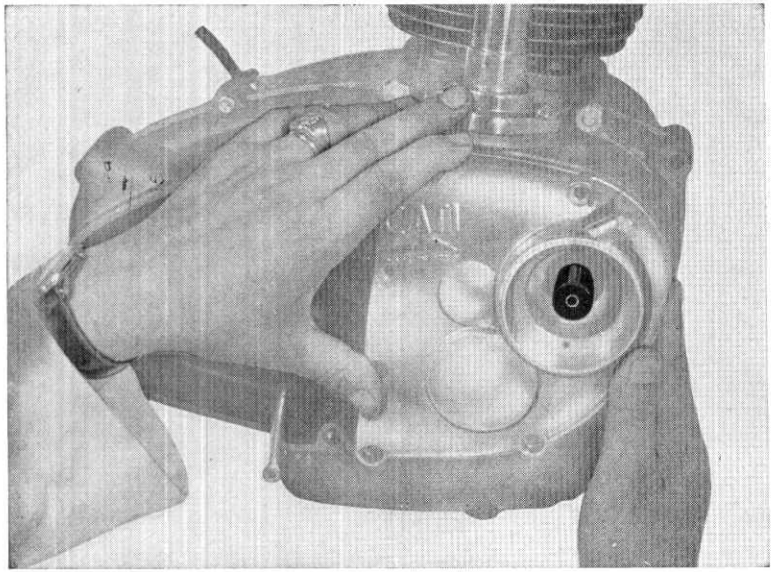
24 - Ball bearing puller



24 - Ball bearing puller



24 - Ball bearing puller



26 - Bush for fitting advance cover

LOCATING AND REMEDYING FAULTS

The following list contains several of the most frequent faults which may arise and advice on remedying them.

ENGINE DOES NOT START EASILY

First of all, ascertain that there is enough petrol and that the cock is turned on. (A = open; R = reserve). If these are in order, the fault may be one or more of the following:

CAUSE	REMEDY
Petrol pipe is clogged.	Blow through it until the obstacle is removed.
Petrol filter dirty.	Dismantle the filter and clean the gauze by air blast.
Petrol cock filter is dirty.	Dismantle the filter and clean it by a blast of air through the gauze.
Carburetor float stuck.	Remove the float and clean out the float chamber (this should be done by a DUCATI Servicing Garage).
Carburetor float leaking.	Change the float (at a DUCATI Servicing Garage).
Jet is clogged.	Remove the obstacle by a strong blast of air.
The cable of the ignition coil is broken or sparking externally.	Inspect the cable insulation for faults and if necessary change the cable at a DUCATI Servicing Garage.
Defective sparking plug.	Change or clean the plug, making sure that the insulating core is not damaged, that there are no carbon deposits on the electrodes and that the spark gap does not exceed 0.5 mm. (0.0197").

CAUSE	REMEDY
The contact breaker points do not open.	Check the position of the fixed contact point.
The contact breaker arm is seized on its pivot.	Check movement between rocker arm and pivot and if necessary lubricate the pivot.
The contact breaker points are dirty.	Clean the contact breaker points with a rag damped in petrol.
The capacitor has broken down or is short circuited.	Change the capacitor (at a Ducati Servicing Garage).
Compression lacking.	Check if the sparking plug has been tightly screwed in, check the valves for gastightness and the tightness of the piston rings (at a Ducati Servicing Garage).
A valve spring is broken.	Change the broken spring (at a Ducati Servicing Garage).
Valve sticking.	Dismantle the valve, clean the valve stem and the bore of the valve guide, and make sure that the clearance between stem and bore does not exceed 0.08 mm. = 0.0032" (at a Ducati Servicing Garage).
The rocker adjuster is worn out.	Check again the clearance by fitting the adequate rocker shim on the valve stem end.
The battery is discharged.	Recharge the battery according to the instructions of page 50 (at a Ducati Servicing Station).

CAUSE	REMEDY
The battery quickly discharges for a fault or an interruption in the recharging circuit.	Disjoin the wire from the + terminal block of the battery. — Insert an amperemeter in continuous current between the terminal clamp and the wire (possibly with central « 0 »). — Insert the ignition key and let the engine turn, till attaining 6000 r.p.m. The amperemeter should show: a) maximum current about 10 A, with completely dis charged battery. b) minimum current about 1 A, with completely charged battery. According to the battery load condition, you will obtain intermediate figures. These tests must be carried out with switched out headlight. **Checking the Electrical System.** Make sure that all the bulbs are efficient. 1) With the lights switched out (during the day), the amperemeter should read 0 at 1100 r.p.m. approx. 2) With town lights switched on (during the night) the amperemeter should read 0 at 1400 r.p.m. approx. 3) With the antidazzle lights switched on (during the night) the amperemeter should read 0 at 2,300 r.p.m. approx.

INEFFICIENT ENGINE

CAUSE	REMEDY
Irregular feed of petrol to the carburetor.	Clean the carburetor filter, the petrol cock filter and the petrol pipe.
Main jet partly clogged.	Clean the main jet by means of an air blast.
Carburetor butterfly valve does not open completely.	Readjust the valve travel by means of the adjustment screw of the carburetor Bowden cable (at a Ducati Service Garage).
The float needle does not close properly.	Clean out the carburetor and especially the needle seat (at a Ducati Servicing Garage).
Petrol of bad quality.	Empty the petrol tank and refill at a reliable garage.
The spark plug is not of the right type.	If the sparking plug overheats, you will have preignition, knocking, and misses, especially at high revs. If the sparking plug remains too cold, you will have no ignition, because the electrodes will short-circuit. Use the right type of sparking plug; we advise the use of a plug having a thermal figure of 260 of the Bosch international scale.
The plug is loose in its adaptor.	Tighten the plug down well. A washer should always be placed between the sparking plug and its seating in the cylinder head.
The sparking plug cable sparks externally.	Change the cable or repair the insulation (at a Ducati Servicing Garage).

CAUSE	REMEDY
The spark gap between the electrodes of the sparking plug is too wide.	Adjust the gap to the proper width of about 0.5 mm. (0.0197")
The sparking plug electrodes are dirty.	Clean the electrodes with a wire brush.
The contact breaker opening is excessive.	Readjust the exact opening of the contact which is 0.3÷0.4 mm. (0.0118"÷0.0157")
The secondary winding of the coil is short-circuited or broken.	Change the coil (at a Ducati Servicing Garage).
The silencer is almost completely clogged-up.	Clean the silencer, to ensure the free discharge of the spent gases.

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