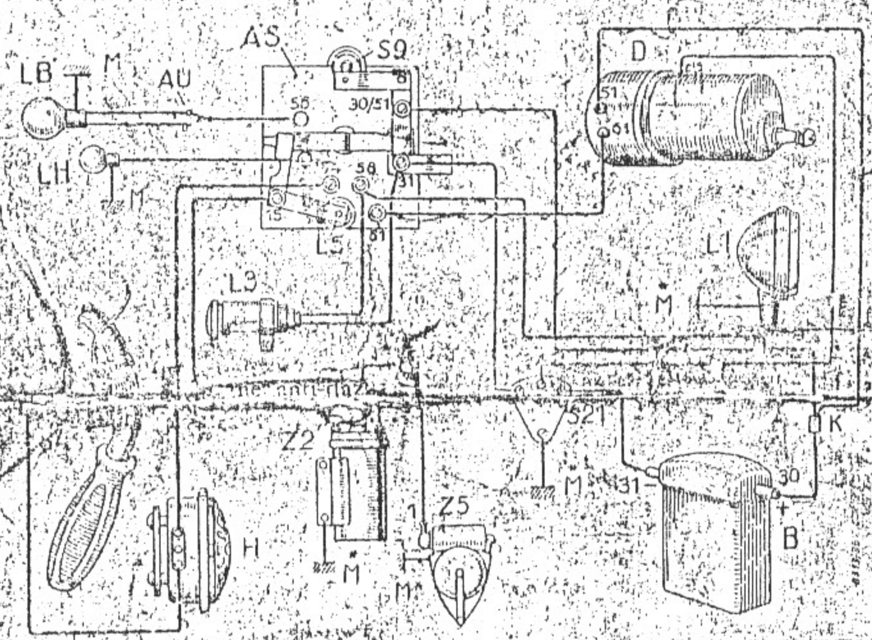
...bles may have become detached from their terminals on the dynamo, in the headlamp or the battery, and must therefore be fastened. Burnt-out bulbs must be replaced. If the cables, cable connections and bulbs are in good condition, the dynamo is tested by disconnecting the battery (loosen cable connection between dynamo and battery), switching on a current detail and starting the engine. If the dynamo still supplies no current, the dynamo must be forwarded to a Bosch repair shop.

In the event of troubles occuring when switching over from distance to anti-dazzle and vice versa, inspect the anti-dazzle switch (page 15, "Adjusting the Bowden wire").

Wiring diagram for single cylinder engines



AS	Connection plate } in headlamp	LB	Bilux bulb
AU	Anti-dazzle switch } in headlamp	LH	Auxiliary bulb
B	Battery	M	Earth
D	Dynamo	S3	Anti-dazzle switch with press button for the horn
H	Horn	S9	Fuse holder
K	Cable connector	S21	Frame terminal plate
L1	Side lamp	[illegible]	Sparking plug cable
L3	Number plate lamp	Z2	Ignition coil
L5	Charging indicator lamp	Z5	Contact breaker

Battery troubles

Battery troubles need hardly be expected if the instructions are carefully followed. Trouble may arise owing to the fact that tools are placed on the open battery when the cover is off, thus shorting one or more cells. This

The dynamo

is a two pole shunt wound 6 volt machine having a rated output of 30 watts.[1] As long as the engine is running, a constant flow of current is supplied by it to the headlamp, the number or tail lamp, also to the side lamp, the horn and ignition coil. Besides this it charges the battery, which, when the engine is not running supplies the current consumers.

Voltage regulator

The voltage of the dynamo is kept practically constant by the voltage regulator irrespective of the speed of the dynamo and the number of current consuming details in circuit. The lamps always burn with uniform brightness and give long service. The battery is charged quite automatically.

Automatic switch

In order to prevent the battery discharging through the dynamo when the engine is running at low speed and when the voltage of the dynamo is lower than that of the battery, an automatic switch is fitted. It only connects the dynamo in parallel to the battery, when the dynamo attains sufficient speed so that the battery and dynamo voltage are the same.

Construction

The dynamo armature is eccentrically carried in the pole housing; the end of ... the driving side is conical ... the case of cog wheel drive, eccentric bearing enables the wheel ... (no play) to ... simple manner, and in the case of cog-chain drive the tightening ... by turning the dynamo in its support. The commutator and the brushes of the dynamo are accessible for overhauling after removal of protecting cover 217 (fig. 19).

Working of the dynamo without battery

(For dynamo with "bridge connector" refer to Appendix)

The voltage regulation offers the following important advantages:

The dynamo can be worked even though the battery is switched off (but not when it is short-circuited) as long as the speed of the dynamo is so high that the automatic switch remains closed. It is impossible for the dynamo or for the consumers it feeds to be damaged on account of too high a voltage.

In case of battery trouble, the driver can start the engine without the help of the battery. All he has to do is to increase the speed of the dynamo to such an extent that the voltage it produces suffices to close the automatic switch. If he unable to attain that speed with the aid of the kickstarter, the motor cycle must be pushed a distance with the engine switched on.

1) Dynamo RD 45 watts and REA 50 watts see page 24

The cables

cable ends stripped of their insulation to about 10 mm are inserted as far as possible into the rubber sockets of protecting cap 217 (Fig. 19) and fixed into the terminal by means of the terminal screws. The protecting cap need not be removed. A special cable is to be fixed to the earth screw underneath the housing, and the other end must be connected to the frame terminal plate S 21 (see wiring diagram page 22).

The contact breaker

is situated in a housing into which cam 133 a which is driven by the engine projects through a bore. The insulating block 107 d of the contact breaker lever trails on the cam. The insulated contact breaker lever is connected to the primary terminal which is covered by rubber protecting cap 140 a. As soon as the insulating block runs on to the elevation of the cam, contacts 107 a and 107 b are separated and the primary current is interrupted.

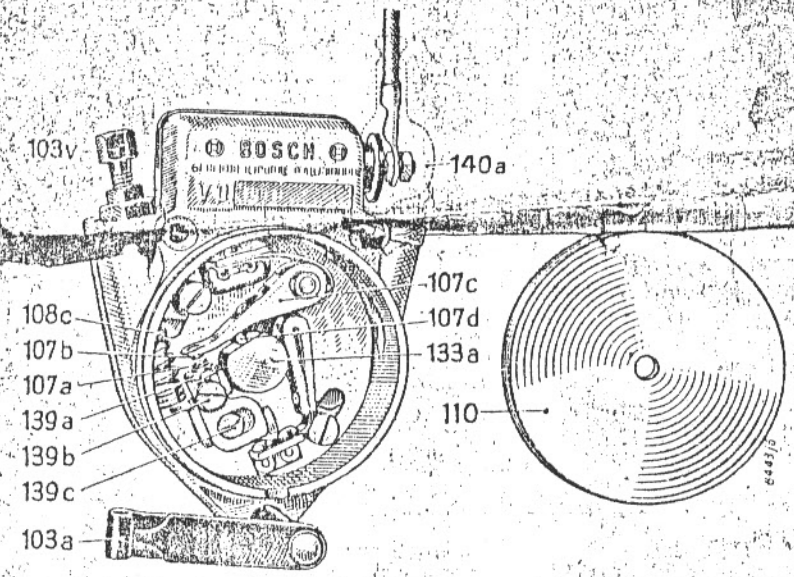


Fig. 1. Contact breaker VU 1 C (for single cylinder engines), end cap removed

103a = Spring clip	107c = Contact breaker lever	139a = Contact plate
103v = Bowden wire holder	107d = Sliding piece	139b = Screw for fixing 139a
107a = Adjustable contact	108c = Pull-off spring	139c = Adjusting screw
107b = Contact of contact breaker lever	110 = End cap	140a = Rubber protecting cap
	133a = Cam	

On the one-cylinder type (VU 1, Fig. 1), the cam has one lobe only and there is therefore one interruption with every complete turn of the cam.

On the two-cylinder type (VU 2 D, Fig. 2), the distributor disc 113 replaces the contact breaker cover 110. Cam 133 a has two lobes and interrupts the primary current twice with every complete turn. Distributor rotating piece 112 rotates with the cam. The high tension cable leading from the ignition coil is connected to center cable outlet of the distributor disc marked 4. The ignition then reaches the center carbon brush 113 e which slides on metal segment 112 a of distributor rotating piece 112. The segment of the distributor rotating piece distributes the ignition alternately to the two lateral brushes 113 a which are connected to the two sparking plugs of the engine (see wiring diagram on page 22).

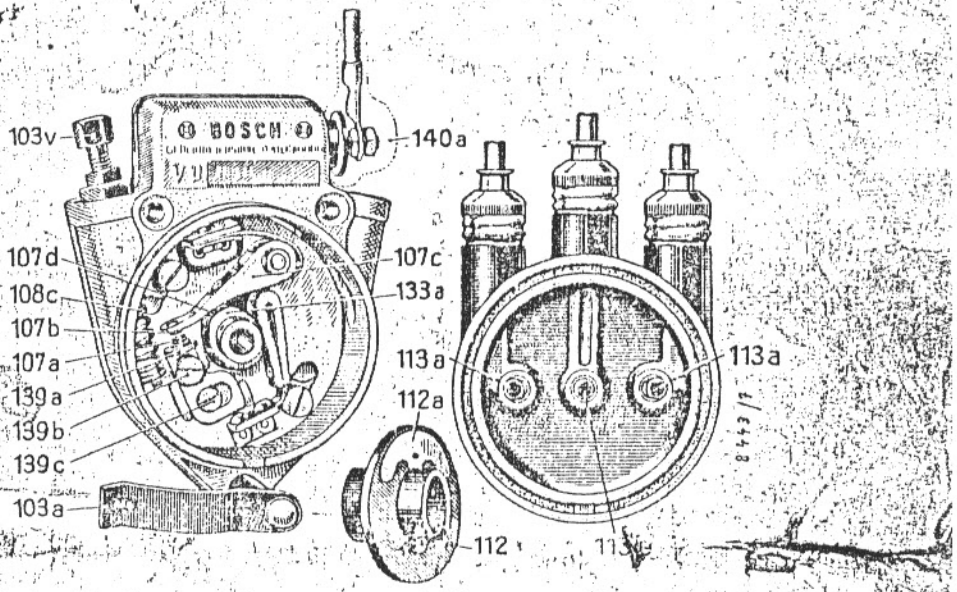


Fig. 2. Contact breaker VU 2 D (for twin cylinder engines) distributor disc and rotor removed)

103a = Spring clip	107d = Sliding piece	113e = Center carbon brush
103v = Bowden wire holder	108c = Pull-off spring	133a = Cam
107a = Adjustable contact	112 = Distributor rotor	139a = Contact plate
107b = Contact of contact breaker lever	112a = Electrode	139b = Screw for fixing 139a
107c = Contact breaker lever	113 = Distributor disc	139c = Adjusting screw
	113a = Lateral carbon brushes	140a = Rubber protecting cap

Timing of sparking moment

For timing the sparking moment, the contact breaker may be turned in relation to the cam 133 a to the extent of 20° with the aid of a Bowden wire.

Fixing the ignition cable to the contact breaker terminal

The low tension cable is fixed to the terminal by the cable shoe supplied with it. The cable end, first stripped of its insulation for about 5 mm, is inserted from above through the smaller opening of the rubber protecting cap, then pushed into the cable shoe, fastened and soldered (Fig. 3). After the cable

Fig. 3. Cable shoe for the low tension cable

shoe has been fastened by screw and spring washer to the terminal (Figs. 1 and 2), the rubber protecting cap 140 a is again drawn over the insulating disc of the terminal, as indicated in Figs. 1 and 2 by the dotted lines.

The other end of the cable is connected with the terminal 1 of the ignition coil (see wiring diagram page 22).

Fixing the cables to the distributor disc

(in case of twin cylinder models only)

The cables are fixed to the distributor disc in the same way as to the ignition coil (cf. Figs. 5 and 6).

The ignition coil

serves as a transformer for the low tension dynamo or battery current into high tension ignition current. It has a primary winding, consisting of a few turns of thick wire, through which the low tension current is flowing, and a secondary winding consisting of a large number of turns of thin wire, which is connected with the sparking plug, and through which the high tension current is flowing.

In the primary circuit the contact breaker interrupts the current in the moment of ignition, with the result that in the secondary winding a high tension is induced, giving rise to a spark at the plug.

The beginning of the primary winding (terminal 15) is connected across the ignition switch of the headlamp with the terminal 51 of the dynamo, and thus at the same time with the + terminal 30 of the battery as shown in wiring diagram, page 22. A cable runs from the end of the winding (terminal 1) to the terminal of the contact breaker. The secondary winding forms the continuation of the primary one; the end of the primary winding and the commencement of the secondary winding are joined together. The end of the secondary winding (terminal 4) is connected to the sparking plug by a high

tension cable, and on the two-cylinder type, it is connected to terminal 4 of the distributor disc.

When fitting the ignition coil, care must be taken that its housing has metallic connection with the frame of the motor cycle.

Fixing the cables to the ignition coil

The low tension cables are fixed on the terminals 1 and 15 of the ignition coil by means of cable shoes. The connection is done in the same way as described on page 6 under the heading "Fixing the ignition cable to the contact breaker terminal" (Fig. 3).

It will be found advantage to cover the cable shoe with a piece of rubber tubing, as shown in figure 4.

Fig. 4.

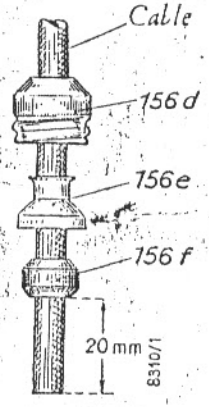


Fig. 5.

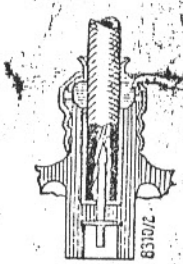


Fig. 6.

The high tension cable leading to the sparking plug, leaves the ignition coil through the high tension outlet (terminal 4). The connecting up of this cable is done as follows:

1. Pull cap nut 156 d, bushing 156 e and rubber packing 156 f over the cable end (cable end must project at least 20 mm) (Fig. 5).
2. Insert cable end firmly into the high tension outlet of the ignition coil, until it strikes against the bottom of the hole.
3. Push the rubber packing and the bushing down until they are firmly seated and tighten them with the cap nut (Fig. 6).
4. Examine by a gentle pull whether the cable is well fixed.

The battery

has a nominal potential of 6 volts. Its capacity is 7 ampere hours with a discharge-current of 0.7 amperes; the battery when fully charged is able to supply a current of 0.7 amperes without interruption for 10 hours.

On the lid of the battery box, brief instructions for treatment are given. Detailed instructions see next page.

Fixing the cables

1) Battery BGD 312 (Fig. 7)

The battery has no special terminals; the rubber insulated battery cables are directly soldered to the pole heads and pass out of the lid of the box, through side slots. The earth cable running from the negative pole (31) of the battery must be connected up to the frame terminal plate S 21 (see wiring diagram, page 22).

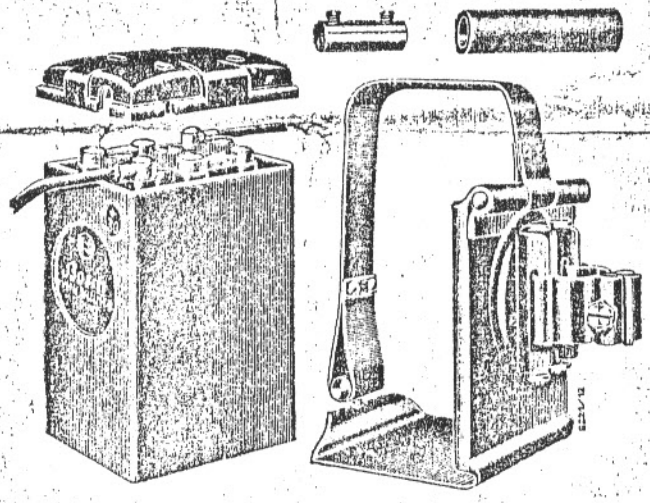


Fig. 7. Battery BGD 312 with battery carrier and cable connector

The positive cable (30) is connected by a socket (Fig. 7) with the cable running from terminal 51 on the dynamo. This socket is protected against earthing by a rubber sleeve.

When drawing over the rubber sleeve, care must be taken that the socket is completely covered by it.

2) Battery BGD 312 A (Fig. 8)

In the case of this battery the lacquered cables are fixed by clamping screws to the laterally projecting bars of lead. The cable connector mentioned under 1) is not required.

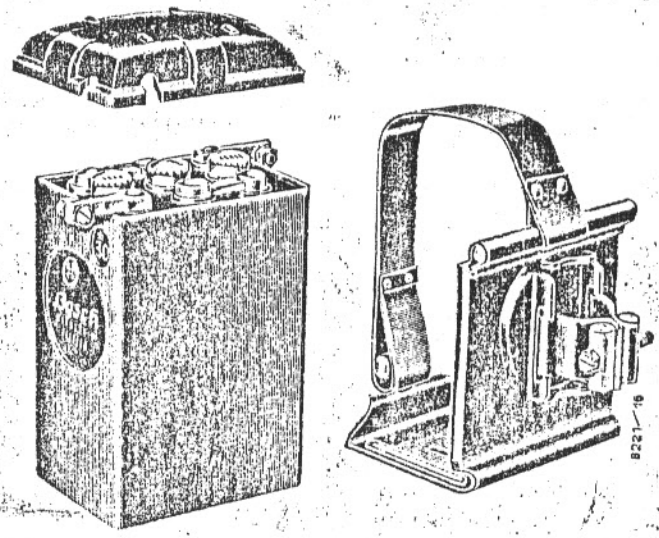


Fig. 8. Battery BGD 312 A with battery carrier

The cable running from the negative pole (31) of the battery must be connected up to the frame terminal plate S 21 (see wiring diagram page 22). The positive terminal (30) is connected with terminal 51 on the dynamo and terminal 30/51 on the headlamp.

Instructions for treatment of battery

A. Treatment of fully charged battery

1. Keep battery clean and dry.
2. Do not put any objects on the open battery (risk of short-circuit).
3. Inspect as often as possible (at least every 4 weeks) to see whether the electrolyte is 8 mm above the top of plates.
   If this is not the case, add distilled water.
4. Replace electrolyte lost by spilling and leakage, with solution of chemically pure accumulator acid and distilled water only. The density of the refilling electrolyte must be approximately the same as that of the electrolyte in the cell to be refilled. Measure density of electrolyte beforehand.
5. Replace evaporated electrolyte with distilled water only.

6. The battery is fully charged when all cells gas freely and steadily (the battery boils), the terminal voltage of each cell has risen to 2.6—2.7 volts, and the specific gravity of the acid is 1.285 = 32 ° Bé (in tropical climate 1.230 = 27 ° Bé).

Note: Measure the cell voltage during charging.
Measure electrolyte density not before the required level of 8 mm is reached.

The state of charge of the battery can be ascertained by the density of electrolyte provided that the battery has always been properly treated. The relationship between density of electrolyte and state of charge is as follows:

1.285 spec. grav. (32 ° Bé): battery fully charged	in tropical climate:	1.230 (27 ° Bé)
1.250 spec. grav. (29 ° Bé): battery half charged		1.210 (25 ° Bé)
1.21-1.23 spec. grav. (25 °-27 ° Bé): battery discharged		1.70 (21 ° Bé)

7. After adding water or acid, the density must only be measured after the liquid has been thoroughly mixed in the cells; this is best done by re-charging (½ hour).

B. Treatment of the insufficiently charged and discharged battery

1. Charge the battery on the motor cycle, or by a separate source of current until it "boils" for half an hour and the voltage of each cell is 2.6—2.7 volts.
2. Switch off the charging current.
3. Let battery stand for half an hour.
4. Measure density of acid. The spec. grav. must be 1.285 = 32 ° Bé (in tropical climate 1.230 = 27 ° Bé). If density of acid is too high: dilute liquid in the cells with distilled water. If density of acid is too low: add acid of higher density. In both cases take care that the liquid is not too high above the plates (see A 3).

C. Treatment of defective battery

1. Charge sulphated battery for 40 hours with charging rate of 0—25 amperes. Afterwards complete charge with charging rate of 1 ampere.
2. Other defects, such as short-circuiting of a cell, loose pole head connections or cracked ebonite boxes, must only be repaired in a special workshop.

D. Treatment when not in use

Treat battery as stated under A; charge at least every 14 weeks at 1 ampere, if necessary from a separate source of constant current. It is advisable to discharge the battery beforehand, 1 ampere discharge rate until the voltage drops to 1.8 volts per cell.

The headlamp.

The headlamp is so constructed that dust and water cannot reach the reflector. Therefore, the cleaning of the reflector is quite unnecessary, and must on no account be attempted, because all contact with the surface of the reflector decreases its reflecting power.

The headlamp is provided with two bulbs, a Bilux bulb for full and anti-dazzle light and an auxiliary bulb for stationary illumination. The auxiliary bulb is placed beneath the Bilux bulb.

When inserting the Bilux bulb into the headlamp, the distance light filament comes exactly in the focus of the reflector.

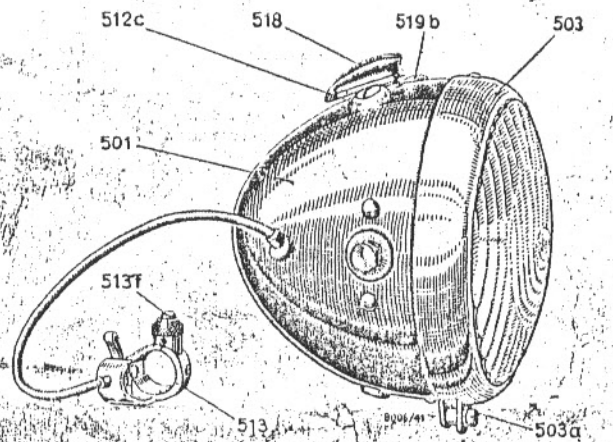


Fig. 9. Headlamp S 150×2

501	= Casing	513 f	= Press button for the horn
503	= Glass frame	518	= Switch lever
503a	= Fixing screw	519 b	= Inspection window of charging indicator lamp
512c	= Fuse holder		
513	= Bowden wire switch		

For the alternate switching on of the distance light or the antidazzle light, an anti-dazzle switch is fitted inside the headlamp, which is operated by a Bowden wire from the handle bar.

On the casing of the headlamp, a switch lever 518 is attached. It is provided with three positions for switching the various lamps (such as headlamp, number plate and side lamps) on and off. The ignition is switched off by either pushing the switch lever upwards or withdrawing it completely. The switch lever can be withdrawn in any of the three positions, thus preventing its being tampered with by unauthorised persons.

In order to have a substitute handy in the event of the switch lever (an insulating material) getting lost, it is advisable to carry an emergency key on your key-ring (supplied to special order).

For the supervision of the charging of the battery, a charging indicator lamp is placed by the side of the switch. As soon as the battery is switched

in parallel with the dynamo by the automatic switch, the lamp goes out, thus indicating the commencement of the charging. The lighting up of the lamp after stopping, reminds the driver to switch off the ignition by partly or entirely withdrawing the switch lever. The lamp goes out, when the ignition is switched off.

The battery ignition should be switched off immediately the engine stops running. If the crankshaft of the engine, when stationary, is in such a position that the contact breaker contacts are touching one another, than the battery will discharge itself over the ignition coil, if the battery ignition has not been switched off.

The headlamps can also be supplied with a built-in speedometer.

Switching Combinations

Left	Centre	Right
Town Driving at Night Auxiliary lamp, number plate lamp and side lamp as well as ignition are switched on Switch lever pushed upwards or withdrawn	**Day Driving** Ignition switched on, all other consumers (except horn) switched off. Switch lever pushed upwards or withdrawn	**Night Driving** Ignition, Bilux lamp*), number plate lamp and side lamp switched on.
Light for Stationary Use Auxiliary lamp, number plate lamp and side lamp switched on, ignition switched off.	**Zero Position** Ignition and all other consumers (except horn) switched off.	

*) Positions of the lever are understood as viewed in the direction of driving.
*) Driving light, i. e., distance and anti-dazzle light, in accordance with the position of the Bowden wire switch.
The horn is always switched on irrespective of the position of the switch lever (also when switch lever is pushed upwards or withdrawn).

Fixing the cables

When connecting the cables the wiring diagram (see page 22) should be used. To enable the cables being connected to the terminals, the headlamp must first be opened. This is done by loosening the fixing screw 503 a (Fig. 9); then the glass frame 503 is swung upwards and the guide clip 503 c (Fig. 10) lifted out of the slit in the holding lobe 501 b. The cable ends are stripped for a length of about 7 mm of their insulation and passed through the cable insert sockets 501 a.

The openings in the cable rubber sockets are sealed by means of thin coverings. Before inserting the cable, the covering is pierced with a pointed object. The various cables are then connected to the corresponding terminals, as shown in the wiring diagram.

Note: Do not pierce the coverings of cable insert sockets that are not yet in use, as otherwise dust and water get into the headlamp.

The cables inside the headlamp are guided through cable thimbles 509 c.

A two-core cable is used for number plate lamp JN 5 if it is used as a hand lamp; the black cable is connected to terminal 58, the white cable (earth) to terminal 31.

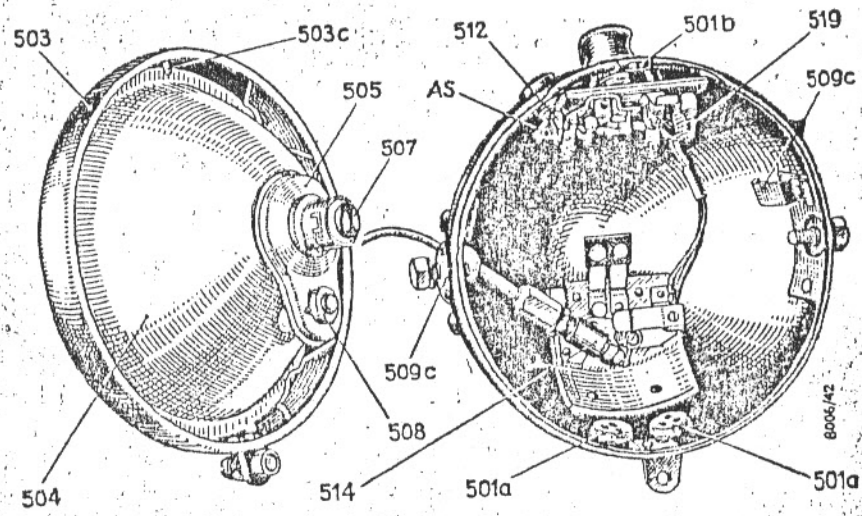


Fig. 10. Headlamp EAS 150×2, opened

501 a = Cable insert sockets
501 b = Holding lobe
503 = Glass frame
503 c = Guide clip
504 = Reflector
505 = Bulb holder
507 = Bilux bulb
508 = Auxiliary bulb
509c = Cable thimble
512 = Fuse
514 = Anti-dazzle switch
519 = Charging control lamp
AS = Connecting plate

Adjustment of the headlamp

When the motor cycle is loaded, the axis of the "full light" beam should be 2 cm (3/4") lower than the centre of the headlamp at 5 metres (16 ft) distance. (Machine should not be placed on its stand). The sharp limit between the lower (bright) zone and the upper (dim) zone of the anti-dazzle beam should lie at least 5 centimetres (2") lower than the centre of the lamp at 16 ft. distance; otherwise the adjustment must be altered in order to preclude dazzling under all circumstances.

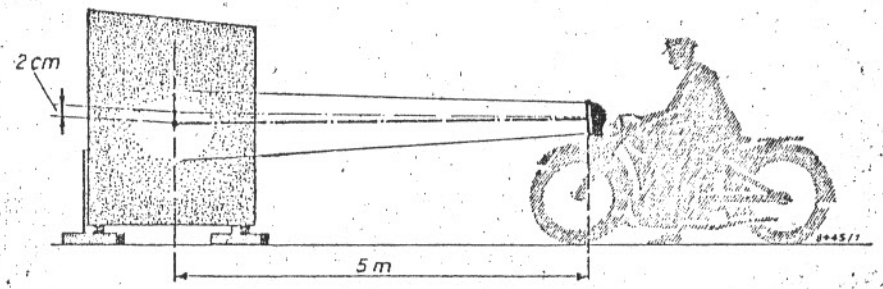


Fig. 11. Adjustment of the headlamp

Replacing the bulbs

For the purpose of replacing a burnt out bulb, the headlamp must be opened as described in paragraph "fixing the cables".

Detach the bulb holder 505 (Fig. 10) from the reflector. To remove the damaged bulb, press it back and turn it to the left until it can be pulled out. Insert the new Bilux bulb, making sure that the words "oben-top" stamped on the base point upwards and that the two flaps on the base may slide in the corresponding slots of the holder. Then turn the bulb to the right as far it will go and pull it forward. Insert the new auxiliary bulb so that the two pins on the base may slide in the corresponding slots of the holder, turn it to the right, then pull it forward until the pins rest in the two notches.

The bulbs to be inserted must be entirely free from oil and grease, otherwise the reflector will be tarnished by their fumes in the course of time. New bulbs are best handled and inserted with aid of tissue paper. Dirty bulbs should be wiped with a cloth and some alcohol — not with petrol.

Changing charging indicator lamp

For the purpose of changing a burnt out charging indicator lamp, the headlamp must be opened. Charging indicator lamp 519 (Fig. 2) is held in position by a spring clip. After pressing back this clip, the charging indicator lamp can be taken out and replaced by a new one (Order number: BOSCH NGL 692/1 Z = Osram 3765).

Changing fuse

In order to change fuse, only fuse holder 512 c (Fig. 9) need be screwed out of the headlamp housing. When a new fuse (Order number WSG 501/1 Z)

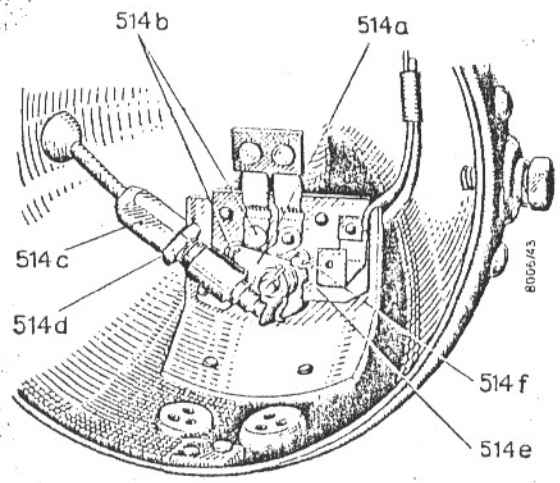


Fig. 12. Anti-dazzle switch

514 a = Contact lever
514 b = Contact buttons
514 c = Adjusting nut
514 d = Fuse nut
514 e = Base flap
514 f = Base pin

has been inserted, the fuse holder is screwed in again. If a screwdriver does not happen to be at hand, the fuse holder may be screwed out and in with the aid of a coin.

Adjusting the Bowden wire

The Bowden wire should be adjusted in such a manner that there is a gap of about 0.5 mm between base flap 514 e of the contact lever and base pin 514 f (Fig. 12). If this is not the case, adjusting nut 514 c, after loosening fuse nut 514 d must be turned until the contact lever is in its correct position.

Attendance

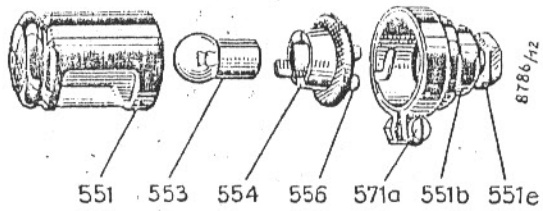
Chromium-plated parts should be given a filmy greasing from time to time with vaseline or sewing machine oil; if wet, first rub dry with a clean cloth. If very dirty, rinse with water. Do not use polish.

The number plate and tail lamp

serves to illuminate the rear distinction mark and at the same time as a tail lamp. The housing is therefore provided with two light apertures, one with a clear glass for illuminating the distinction mark and one with a red glass for a tail lamp.

a) Number plate lamp JN 5 (Fig. 13).

This lamp is of cylindrical shape. After loosening fastening nut 551 e and removing the lamp from the slot of the carrier, it can also be used as a hand lamp. In that case, a two-core cable (order No. NKA 30/0,75) is used which, running from the headlamp to the number plate lamp, is held by cable clips, and where easy removal is required by spring clips.



551 = Housing
551b = Sleeve
551 e = Fastening nut
553 = Bulb
554 = Bulb holder
556 = Terminal
571a = Clamping screw

Fig. 13. Number-plate lampe JN 5, dismounted

If a longer cable is used to allow a greater freedom of movement, the extra length of cable can be carried in a holder on the motor cycle.

Fixing the cable

1. Loosen clamping screw 571 a.
2. Pull housing 551 out of sleeve 551 b by turning on the left.
3. Insert cable end through fastening nut 551 e and sleeve 551 b.
4. When using the number plate lamp as a hand lamp (see above), connect black cable to + terminal, white cable to the other terminal 556 of bulb holder 554. The other ends of the cable are conducted to the headlamp; the black cable is connected to terminal 58, the white cable (earth connection) to terminal 31 of the headlamp.

If the number plate lamp is not intended for use as a hand lamp, + terminal 556 of the number plate lamp is connected to terminal 58 of the headlamp. From the other terminal 556 of the number plate lamp a cable leads to the frame terminal plate S 21, or to the earth connection of the motor cycle.

5. Withdraw cable until lamp holder 554 seats firmly in the sleeve 551 b.
6. Push housing 551 into sleeve 551 b by turning to the right and tighten it by means of tension screw 571 a. The other ends of cables are conducted to the headlamp; the black cable is connected to terminal 58, the white cable (earth connection) to terminal 31 of the headlamp.

Replacing the bulb

1. Loosen tension screw (Fig. 13).
2. Pull out housing 551 out of sleeve 551 b by turning on the left.
3. To remove the damaged bulb, press it back and turn it to the left until it can be pulled out.
4. Insert the new bulb so that the two pins on the base may slide in the corresponding slots of the holder. Turn the bulb to the right, then pull it forward until the pins rest in the two notches.
5. Push housing 551 onto sleeve 551 b by turning to the right and tighten it by means of tension screw 571 a.

b) Number plate lamp JN 7 K 1 (Fig. 14).

This lamp has a shell-shaped housing. It is firmly fixed to the number plate and can therefore not be used as a hand lamp.

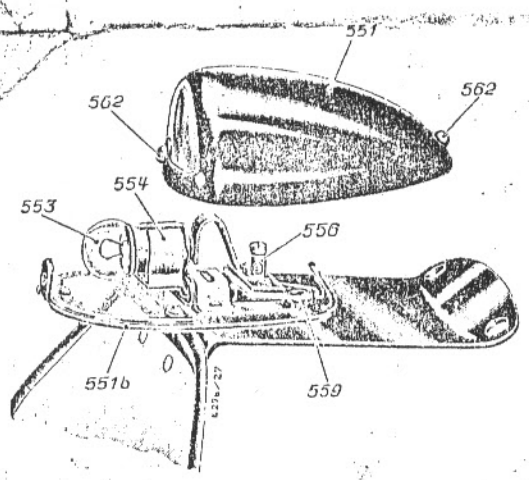


Fig. 14. Number-plate lamp JN 7 K 1, opened

551 = Lamp housing
551 b = Base plate
553 = Bulb
554 = Bulb holder
556 = Terminal
559 = Rubber socket
562 = Fixing screws

Fixing the cable

1. Remove the two screws 562 and lift lamp housing 551 off base plate 551 b.
2. Insert cable end through rubber socket 559 and clamp underneath screw 556. The other end of the cable is fixed to terminal 58 of the headlamp.
3. Lamp housing 551 is then put on base plate 551 b again and fastened by means of the two screws 562.

Replacing the bulb

1. Remove the two screws 562 and lift lamp housing 551 off base plate 551 b.
2. Remove worn bulb (to begin with, press bulb back in holder 554, then turn bulb by 90° and pull out). Insert new bulb in such a manner that one of the two pins in the base of the bulb points upwards. Insert bulb in holder 554 and then turn by 90° until the hollows provided for that purpose.
3. Lamp housing 551 is then put on base plate 551 b again and fastened by means of the two screws 562.

The side lamp

is intended for motor cycles with side-cars; it must be fiexd to the off-side of the side-car.

a) Side lamp L 75 (Fig. 15)

Fixing the cable

1. After the loosening of the screw 572 a the glass rim 572 is removed from the housing of the side lamp.

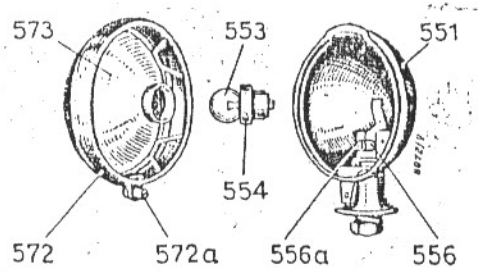


Fig. 15. Side lamp L 75, dismounted

551 = Housing
553 = Bulb
554 = Bulb holder
556 = Cable terminal
556a = Terminal screw
572 = Glass rim
572a = Fixing screw
573 = Reflector

2. The cable from the terminal 58 of the headlamp (ordering number NKA 14/1.5) must be pushed through the post of the housing and tightened by the terminal screw 556.
3. The rim 572 is then put on again and fastened by means of the fixing screw 572 a.

b) Side lamp JK 50 (Fig. 16)

Fixing the cable and replacing the bulb is done in the same manner as on number plate lamp JN 7 K 1 (Fig. 14).

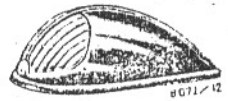


Fig. 16. Side lamp JK 50

The horn

The sound of the Bosch horn is produced by the vibrations of a diaphragm caused by means of an electromagnet and a contact breaker.

The horn requires no special attention. If the tone loses its purity the horn should be examined at a Bosch Service Station.

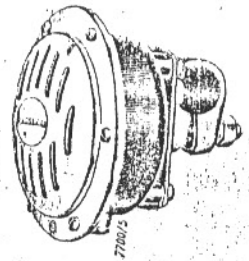


Fig. 17. Horn

Wiring

To avoid short-circuits and breakdowns, great care must be taken when laying and connecting the cables. For this purpose lacquer cables having a strand section of 1.5 sq mm are used; these are impervious to water, petrol or oil. For the purpose of fixing the cables to the frame of the motor cycle cable clips are used (Fig. 18). The metal parts of the cycle frame or the

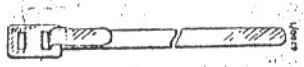


Fig. 18. Cable clip

engine (earth) are used for the return of the current. When mounting parts marked + in the wiring diagram, care should be taken that there is a good metallic connection to the frame or the engine.

The terminals 31 of the battery and the headlamp as well as the earthing screw of the dynamo are connected to the frame terminal plate by special cables (see wiring diagram page 22).

When connecting the cables the wiring diagram should be used. On principle, terminals, bearing the same number should always be connected with each other, for instance terminal 61 of the dynamo with terminal 61 of the head lamp, terminal 15 of the ignition coil with terminal 15 of the headlamp etc. The cables must first be connected to the dynamo, then to the headlamp and the other current consumers, and last of all to battery, as otherwise there is the risk of a short circuit.

Instructions for use

Note: The regulator is accurately adjusted at the factory and, under no circumstances may this adjustment be tampered with. Do not touch any high-tension carrying metal part of the ignition circuit (sparking plug terminal nut, for instance) whilst the engine is running, for dangerous electric shoks might result under certain circumstances.

1. After running-in period of engine

(see data in motor cycle instruction book):

Check up contact breaker gap

For this purpose the end cap 110 (in case of contact breaker VU 1, Fig. 1) or the distributor disc 113 (in case of contact breaker VU 2, Fig. 2) must be removed.

During the break, i. e. when the sliding block 107 d (Figs. 1 and 2) of the contact breaker lever 107 c runs on to the steel cam 133 a, the contacts 107 a and 107 b of the contact breaker must be from 0.4 to 0.5 mm (.016—.020 inch) distant from each other. This gap may be regulated by adjusting the contact plate 139 a. For this purpose loosen the fixing screw 139 b which fixes the contact plate, and after the gap has been correctly adjusted by moving the eccentric screw 139 c, the fixing screw 139 b is tightened.

2. Regularly, about every 4—6 weeks:

Examine the battery
(see page 9)

3. Regularly after about 3000 miles:

Examine cables

Examine cables to see whether worn through at any point (particularly the cables on the handle bar and battery cables). Replace damaged cables.

Examine brushes and commutator of the dynamo

For this purpose, remove protecting cap 217 (CARE! Do not tear the connecting cable inside the protecting cap!) Lift the springs pressing the brushes against the commutator and try to move the brushes up and down in their guides. If one brush is sooted up and jams, it must be taken out and cleaned with a clean cloth and petrol. The brush holder must be blow out at the same time.

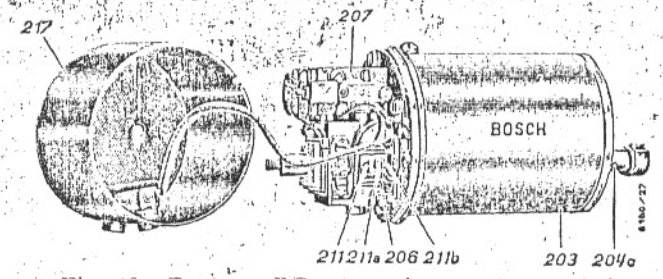


Fig. 19. Dynamo RD, protecting cover removed

203	= Pole housing	211	= Brush holder
206	= Commutator	211a	= Brush
207	= Regulator and automatic switch	211b	= Brush spring
		217	= Protecting cap

Never, under any circumstances, may emery-paper or a file be used on the polished bearing surface of the brush. When a brush is worn to the extent that the copper flex threatens to bear against the end of the brush holder, it must be replaced. A slightly dirty commutator should be wiped with a clean cloth. If the commutator has become rough and uneven, it must be reground. This is most advantageously done at a BOSCH Agency or a BOSCH Service Station.

4. After 10000 miles or when motor cycle is being overhauled

Inspect breaker contacts

In the course of time the contact faces are liable to burn away and get pitted. Generally speaking these phenomena do not affect engine operation. We would therefore advise to refrain from unnecessary filing and dressing of the points or undertake other changes and alternations in the setting. When an engine overhaul is due, the breaker points should be seen to by an approved Bosch Service Station, who will dress the points on an oil stone or replace them in the event that they should be completely worn.

In the event of ignition failure in service, due to corrosion of the breaker faces, these superficial layers of oxyde should be removed with a perfectly clean, hard instrument, such as the Bosch contact file (supplied on request). On no account use emery paper or emery cloth, as this ravels. Ordinary commercial files or files that have been previously in use for other metals should also be avoided, as they are liable to damage the contact faces beyond repair.

After cleaning the contacts be sure to re-adjust the gap as indicated under 1.

Replenish the grease in the ball bearing

Renewing the hot bearing grease (fuse point 170° C) in the ball bearings and the grease in the pad for cam lubrication is most advantageously done at a BOSCH Agency or a Bosch Service Station.

Lubricate Bowden wire on headlamp

A few drops of oil should be given to the movable parts of the Bowden wire [illegible] the anti-dazzle switch (Fig. 10).

Troubles, their Cause and Remedy

Ignition Troubles

I. The engine stops suddenly or does not start

Remove from the sparking plug (on the two-cylinder type from the distributor disc) the high tension cable (terminal 4) leading from the ignition coil and hold cable end about 2 to 3 mm away from earth, at the same time giving the engine a turn by means of the kickstarter.

Sparks jump from the cable to earth

1. High tension cable damaged (earthed) or broken or interchanged (in case of twin cylinder model).
   Remedy: Repair or replace cable, connect cables correctly.
2. Sparking plug sooted up or oily. *Remedy:* Clean plug or replace it.

No sparks jump from cable to earth

1. When opening, no spark is to be seen between the contacts of the contact breaker: primary cable broken, damaged (earthed) or loosened from the terminals, battery discharged. *Remedy:* Replace, repair or fasten cable, charge battery.

Battery almost discharged or quite empty. *Remedy:* Switch off, without delay all current consuming details, and after a longer interval start engine. Inspect battery, and charge it as soon as possible during a longer day run, or by a separate source of current. (See also under "Battery Troubles"). The fault may also be caused by the dynamo, or a cable has become loosened between the dynamo and the battery, or a cable is damaged (earthed).

2. When opening, distinct sparks are seen between the contacts. Coil damaged. *Remedy:* Have it examined at a Bosch repair shop.

II. The engine stops at high speed

1. Examine gap after contact breaker lever has been completely diverted; the contacts of the contact breaker must be from 0.4—0.5 mm (.016—.020 inch), from each other (Adjustment see page 19).
2. Gap between the electrodes of the sparking plug is too great; it should be 0.7 mm (.028 inch). *Remedy:* Right gap may be obtained by bending the side electrodes.

III. The engine runs intermittingly, or efficiency is impaired

1. Sparking plug sooted up, oily or leaky. *Remedy:* Clean plug or replace it, if necessary use plug with lower heat resistance.
2. Gap between the electrodes of the plug is too great. *Remedy:* Adjust gap by bending the side electrodes.
3. Sparking plug cable loosened or damaged (earthed). *Remedy:* Fix cable, repair or replace it.
4. Contact breaker contacts fouled or oxidised. *Remedy:* Contacts must be cleaned by means of a fine flat file (see page 20).
5. Gap of contact breaker is too great or too small. *Remedy:* Regulate contact gap (see page 19).
6. Oil or petrol vapours in the contact breaker housing. *Remedy:* Clean contact breaker housing with a piece of cloth and then blow through.
7. Ignition coil damaged. *Remedy:* Have it examined at a Bosch repair shop.

IV. Explosions in the carburettor

Causes: Incandescent ignition by plug becoming incandescent, recognizable by the pale white colour of the insulator. *Remedy:* Select plug of higher heat resistance. Though the plug may be the right one for the engine, it gets too hot, because it is not screwed tight or the packing washer has been forgotten. Incandescent ignition may also be caused by a deposit of oily soot in the plug or cylinder. *Remedy:* Clean plug, prevent it becoming oily.

Breakdowns in the lighting set

Given proper attention breakdowns in the lighting set hardly ever occur. If troubles nevertheless occur in the lighting set, the cables should first be examined. The cables with defective insulation must be repaired or replaced.