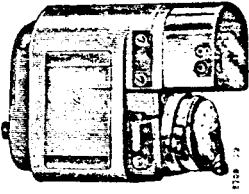


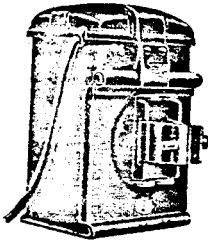
BOSCH-Lighting Set for Motor Cycles

Component parts:



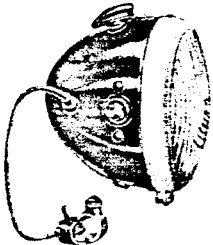
The Dynamo-Magneto Unit

Two separate and distinct units combined in one common housing; hardly takes up any more room than the magneto hitherto used on such motor cycles; common drive for both dynamo and magneto.



The Battery

has moderate dimensions and may easily be fixed to the motor cycle by its carrier. It is in every way adapted to meet the exacting requirements of motor cycles, because of its strong construction.



The Headlamp

provides a distance light of great range, and an excellent anti-dazzle light that satisfies all demands required by law.

The alternate switching on of the distance light or the anti-dazzle light is done by means of a Bowden wire without letting go of the handle bar, an advantage that every motor cyclist will appreciate.



The Number Plate Lamp

illuminates the number plate and may also be used as a hand lamp for carrying out repairs on the road by night.



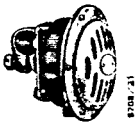
The Side Lamp

completes the set, if a sidecar is attached to the motor cycle.



The spot light

can easily be fitted on the handle bar and serves as an excellent auxiliary instrument for lighting up signposts and house-numbers.



The Horn

prevents accidents, gives warning signals without startling, and generally increases driving safety.

The Dynamo-Magneto Unit

Before putting in use the gearing of the dynamo-magneto unit must be lubricated (see page 16).

Construction

The Bosch Dynamo-Magneto Unit consists of the magneto and the dynamo with its specially constructed constant voltage regulator also the automatic switch. Both machines are in one common housing and have a common drive. They work absolutely independently of each other; lighting current and ignition current being generated by separate armatures. It will, therefore, be noted that the failure of the dynamo does not in any way affect the functioning of the magneto.

The magneto is designed on well-known principles, but the usual horseshoe magnet is replaced by two bar magnets, the magnetic circuit being completed by dynamo yoke and laminated pole shoes. In this magnetic field the double T-armature with primary and secondary winding revolves in the usual way. On one side is a taper driving spindle which projects outward through the housing, and on the other side the contact breaker and slip ring.

The dynamo is situated above the magneto: its armature is driven by a gear-wheel fitted to the ignition armature through a small intermediate wheel (see fig. 16).

The dynamo is a two pole shunt wound 6 volt dynamo having a rated output of 30 watt. 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 and the horn. 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, and quickly, because high initial charging current is admissible.

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.

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.

Timing the dynamo-magneto to the engine

The dynamo-magneto is already correctly timed by the engine manufacturer. The following instructions apply if the dynamo-magneto has been taken off for any reason. In re-installing same, observe the following:

At first the piston of the cylinder must be timed in accordance with the directions laid down in the handbook supplied with the motor cycle. In two-cylinder engines with V-set cylinders, the cylinder inclined towards the rear wheel must be used for timing, when the crank-shaft rotates in the same direction as the rear wheel, otherwise the cylinder inclined towards the front wheel must be used.

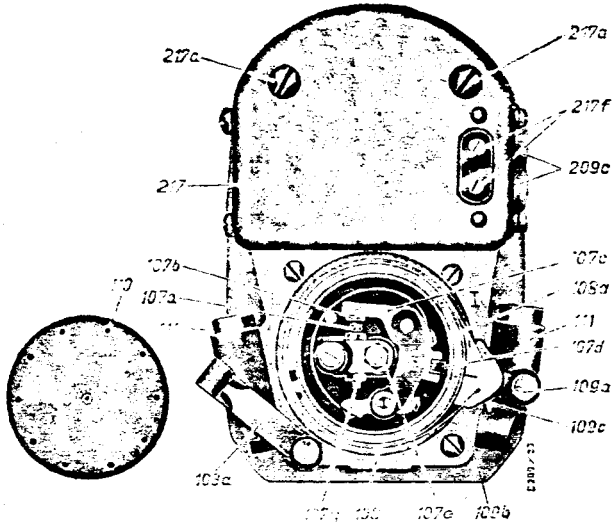


Fig. 1. Dynamo-Magneto D 2 B, with contact breaker cover removed

- | | | | |
|-------|--|-------|--------------------------------------|
| 103 a | = Spring for holding contact breaker cover | 109 a | Timing arm |
| 107 a | = Adjustable contact | 109 b | Strap |
| 107 b | = Contact on contact breaker arm | 109 c | Tension screw for strap |
| 107 c | = Contact breaker arm | 110 | Contact breaker cover |
| 107 d | = Fibre piece on contact breaker arm | 111 | Ignition current collector |
| 107 e | = Screw for fixing contact breaker | 209 c | Socket for insertion of cable |
| 107 g | = Lock nut | 217 | Commutator cover |
| 108 | = Cam ring | 217 a | = Screws for fixing commutator cover |
| 106 a | = Cam | 217 f | = Cable connecting screws |

To adjust the dynamo-magneto, the hand timing lever on the motor cycle must first be put over to "advanced ignition" (neutral position of the timing lever arm 109 a, in which the pull-off spring is released):

After turning the spring 103 a the cover 110 of the contact breaker is taken off. The armature is turned in the direction of rotation (see arrow on gear cover) until the fibre piece 107 d on the contact breaker arm 107 c runs on to the cam 108 a—or, in the case of two-cylinder engines, on to the contact cam marked on the cam ring as I—and the contact breaker point 107 b just comes away from the contact point 107 a. Then move the dynamo-magneto until its driving component meshes with that of the already timed engine and fix the dynamo-magneto on its seating.

During timing, great care must always be taken to see that the spindle of the dynamo-magneto and the engine shaft, by which it is driven, are not displaced relatively to each other, that is to say, that their previously adjusted position relatively to one another is not altered, as otherwise the mixture of air and fuel would not ignite at the right moment.

Note. For timing, a steel about 0.03 mm in thickness, which can be inserted between the contacts, should be used. The moment the steel strip can be easily withdrawn, indicates the commencement of the opening of the contacts. It is not advisable to use paper strips for this purpose as particles of paper may adhere to the contacts and cause ignition failure, if the contacts are not carefully cleaned.

The dynamo-magneto is fixed on its base by screws or by dowel pins and strap. When fixing by a strap the fixing screw on the strap and also its lock nut must be tightened up well to prevent the strap working loose. Any differences in height which may occur between the engine base and driving spindle may be made up by packing strips of a suitable non-magnetic metal (brass, aluminium, etc.). Strips of paper or pasteboard must not be used, because the magneto would then have no connection with the frame of the engine.

If the dynamo-magneto is gear-driven there is no need for re-setting the dynamo-magneto. All that is needed is to re-assemble the gears according to the markings.

Fixing the lighting cables to the dynamo-magneto

The cables running from the dynamo-magneto to the terminals 30 51 of the headlamp and to the $-$ terminal 30 of the battery are stripped of their insulation for about 8 mm., and the terminal screws 217 f (Fig. 1) are loosened

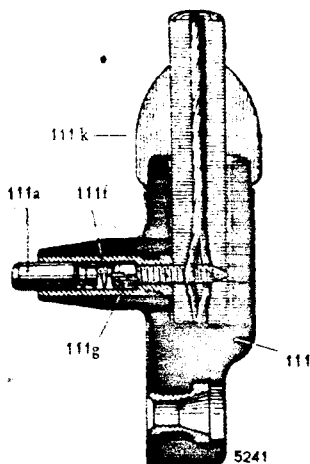


Fig. 2. Section of carbon holder

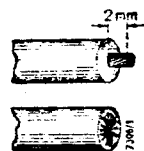


Fig. 3.

(but not entirely unscrewed). The cables are inserted into the openings of the rubber sockets 209 c and pushed well home; they are then fastened tightly by the screws 217 f. (Test by a gentle pull whether the cables are firmly held.)

The cable issuing from the terminal 30 of the battery must be connected last of all.

Fixing the ignition cable to the carbon holder

In the first place the carbon holder 111 (fig. 2) is taken off (loosen fixing screw). The carbon brush 111 a with the spring 111 f is then taken out and the pointed screw 111 g, now visible in the opening, which receives the carbon, is loosened. The HT cable (7 mm diameter) is cut square, and after pushing the rubber sleeve 111 k over it, the various strands of the cable are bent back radially on the face of the cable, as shown in Figure 3.

Push the cable thus prepared into the opening of the carbon holder as far as it will go. Screw the pointed screw 111 g in again until its head is firmly seated. The carbon 111 a with the spring 111 f are then again inserted until the spring 111 f bears on the head of the screw 111 g. Check—see whether the carbon 111 a can be pressed into its opening until its free end is flush with the edge of the opening. The rubber sleeve on the cable is then pushed downwards until it bears on the carbon holder so that no water can penetrate the latter. The carbon holder with cable is then screwed up again to the housing of the dynamo-magneto (do not forget the paper packing).

In dynamo-magnetos for two-cylinder engines the cable leading to the sparking plugs of No. 1 cylinder used for the timing should be connected up to cable holder I.

Changing the carbon in carbon holder

For the purpose of changing the carbon in the carbon holder of the magneto, the collector 111 (fig. 2) must be taken off by loosening the screw which fixes it to the casing. The carbon 111 a and also spiral spring 111 f (fig. 2) can then easily be taken out of the carbon holder.

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 page 8.

Fixing the cables

1) Battery BGD 312 (Fig. 4)

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).

The positive cable (30) is connected by a socket (Fig. 4) with the cable running from terminal 30 on the dynamo-magneto. 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.

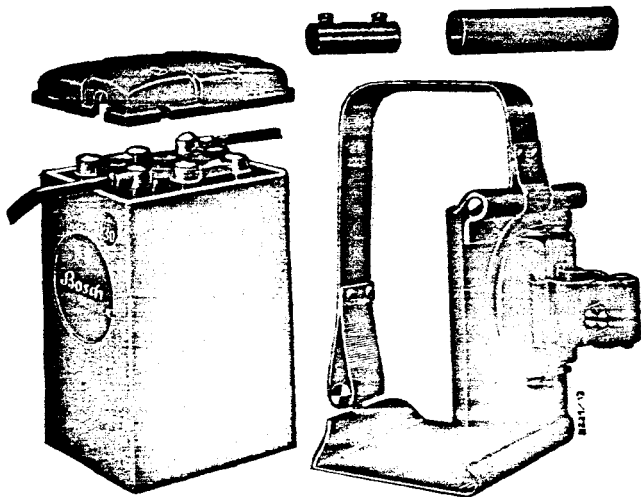


Fig. 4. Batterie BGD 312 with battery carrier and cable connector

2) Battery BGD 312 A (Fig. 5)

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.

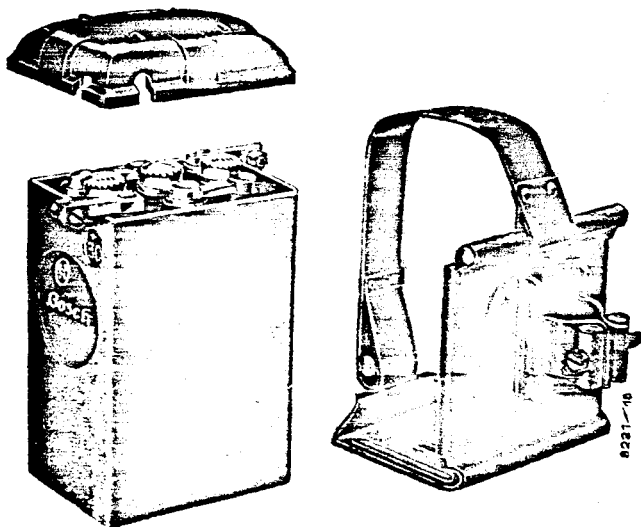


Fig. 5. Batterie BGD 312 A with battery carrier

is not required. The cable running from the negative pole (31) of the battery must be connected up to the frame terminal plate S21 (see wiring diagram page 20). The positive terminal (30) is connected with terminal 30 on the dynamo-magneto.

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		1.23 (27° Bé)	
1.250 spec. grav. (29° Bé): battery half charged			tropical	1.21 (25° Bé)
1.21-1.23 spec. grav. (25°-27° Bé): battery discharged			climate	1.17 (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 recharging (1/2 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 A3).

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

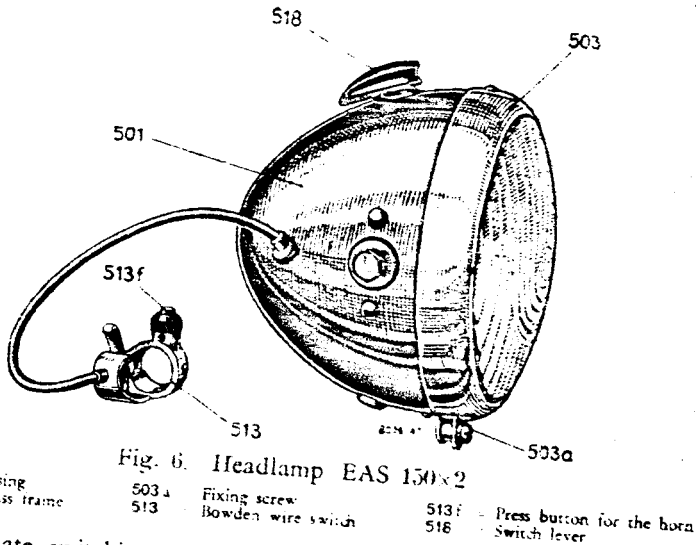
Treat battery as stated under A; charge at least every 4 weeks at 1 ampere, if necessary from a separate source of constant current. It is advisable to discharge the battery beforehand, 1 ampere discharge rate until the voltage drops to 1.8 volts per cell.

The headlamp

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.



For the alternate switching on of the distance light or the anti-dazzle 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 (of insulating material) getting lost, it is advisable to carry an emergency key on your key-ring (supplied to special order).

The headlamp can also be delivered with an opening to fit a 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	Day driving Ignition switched on, all other consumers (except horn) switched off	Night driving Ignition, Bllux lamp*), number plate lamp and side lamp switched on
Switch lever pushed upwards or withdrawn	Switch lever pushed upwards or withdrawn	
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	

The 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 20) 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. 6); then the glass frame 503 is swung upwards and the guide clip 503 c (Fig. 7) lifted out of the slit in the holding lobe 501 b. The cable ends are stripped for a

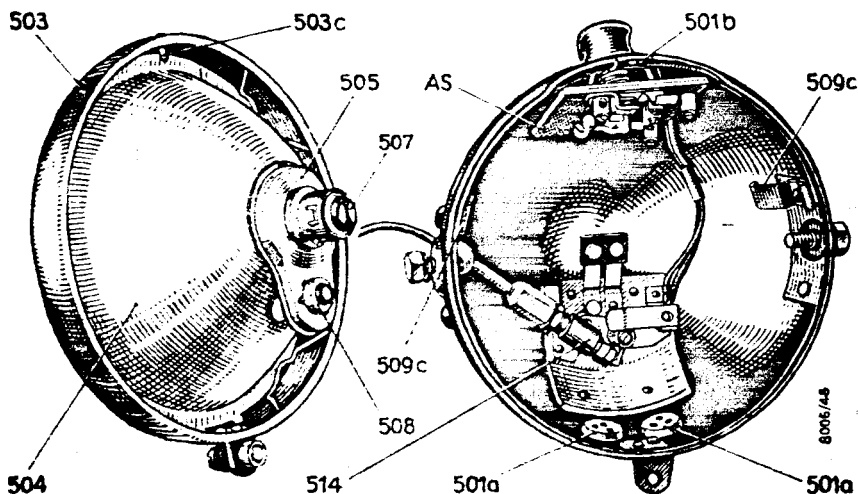


Fig. 7. Headlamp, opened

- | | | |
|------------------------------|----------------------|--------------------------|
| 501 a = Cable insert sockets | 504 = Reflector | 509 c = Cable thimble |
| 501 b = Holding lobe | 505 = Bulb holder | 514 = Anti-dazzle switch |
| 503 = Glass frame | 507 = Bitux bulb | AS = Connection plate |
| 503 c = Guide clip | 508 = Auxiliary bulb | |

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.

Adjustment of the headlamp

When the motor cycle is loaded, the axis of the "full light" beam should be 2 cm ($\frac{3}{4}$ ") 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

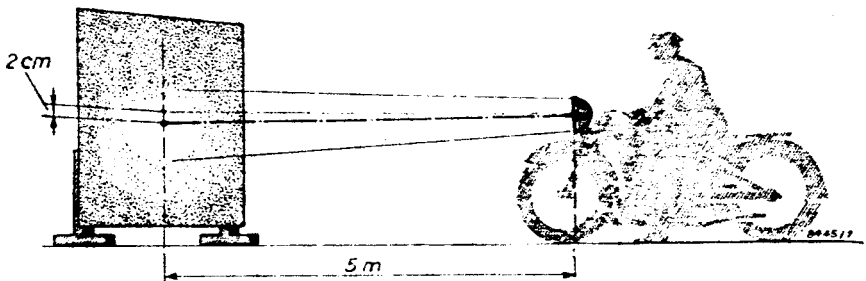


Fig. 8. Adjustment of the headlamp

(bright) zone and the upper (dim) zone of the anti-dazzle beam should lie at least 5 cm (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.

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. 7) 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 as 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.

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.

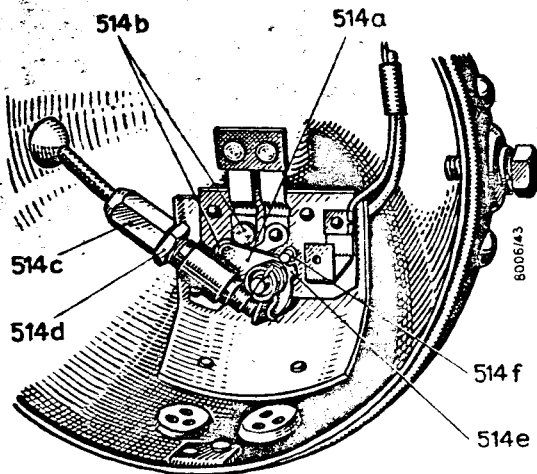


Fig. 9. Anti-dazzle switch

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

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. 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. 10)

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. WKA 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.

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.

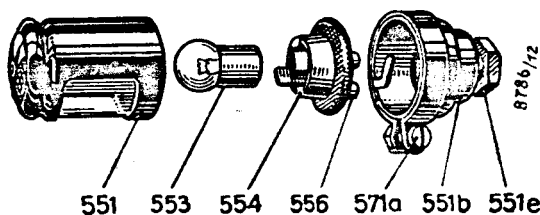


Fig. 10. Number-plate lamp JN 5, dismantled

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

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 S21, 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. 10).
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. 11)

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.

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.

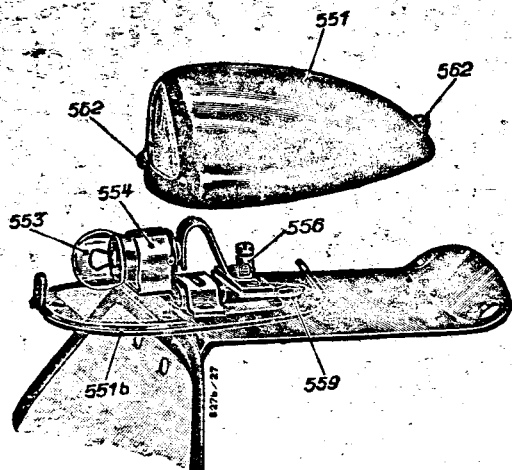


Fig. 11. Number-plate lamp JN 7 K 1, opened

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

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 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 fixed to the off-side of the side-car.

a) Side lamp L 75 (Fig. 12)

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.

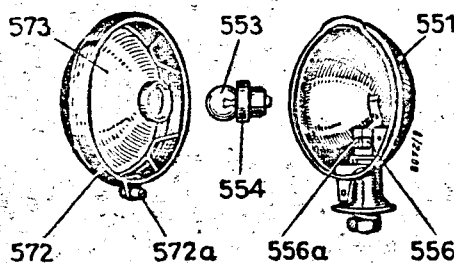


Fig. 12. Side lamp, L 75, dismantled

- 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. 13)

Fixing the cable and replacing the bulb is done in the same manner as on number plate lamp JN 7 K 1 (Fig. 11).



Fig. 13. 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 electro-magnet 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.

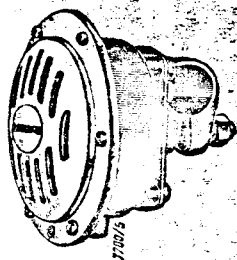


Fig. 14. Horn

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. 15).

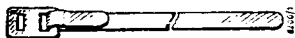


Fig. 15. Cable clip

The metal parts of the cycle frame or the 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 are connected to the frame terminal plate by special cables (see wiring diagram page 20).

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 30 of the dynamo-magneto with terminal 30 of the battery, terminal 51 of the dynamo-magneto with terminal 30,51 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 shocks might result under certain circumstances.

1. After running-in period of engine

(see data in motor cycle instruction book):

Check up contact breaker gap

During the break, i. e., when the fibre piece 107 d (fig. 1) of the contact breaker arm 107 c runs on to the steel cam 108 a of the cam ring 108 the contacts 107 a and 107 b of the contact breaker must be from 0.3 to 0.4 mm from each other. This gap may be regulated by adjusting the contact screw 107 a. (For this purpose loosen the lock nut 107 g, adjust the gap with the gauge on the contact breaker spanner and re-tighten the lock nut.)

2. Regularly, about every 4—6 weeks:

Examine the battery
(see page 8)

3. Regularly after about every 1000—1500 miles or after an interruption of several months:

Oil the gearing

The gearing must be lubricated at least once about every 1000—1500 miles. The two oil covers 103 d (fig. 16), marked by red letters: "Motor oil every 1500 miles" are lifted and in one of them motor oil*) is filled until the oil container is full i. e. until oil overflows on the other side.

The oil space will hold about 7 ccm of oil. The thick cylinder oil flows in slowly; therefore it takes some time before the lubricating wick is saturated. It is preferable to warm the oil beforehand.

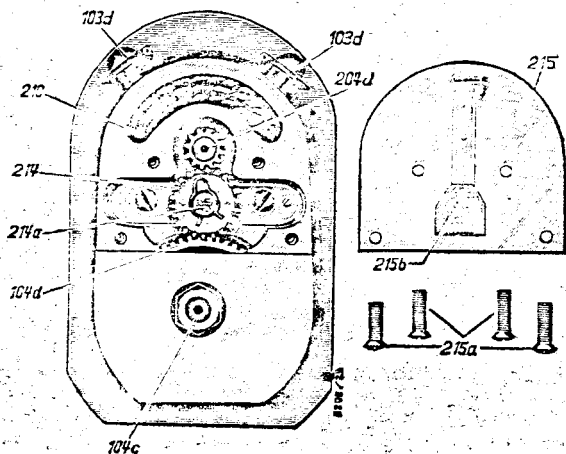


Fig. 16.

Dynamo-Magneto
Unit D 2 B,
gear cover removed

- 103 d = Oil-cover
- 104 c = Driving spindle
- 104 d = Gear-wheel of ignition armature
- 204 d = Gear-wheel of lighting armature
- 210 = Lubricating wick
- 214 = Intermediate wheel (with play)
- 214 a = Lubricating wick
- 215 = Gear cover
- 215 a = Screws for fixing gear cover
- 215 b = Lubricating wick

*) Especially suitable for this purpose we recommend our special oil OI 1 v 13 which is delivered in little tins of 100 ccm contents.

or undertake other changes and alterations 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 oxide 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 use to re-adjust the gap as indicated under 1.

Removing the cam ring. The cam ring 108 (fig. 1) can simply be drawn off in the direction of the shaft when the spring 103 a has been moved aside and the cover 110 removed. When re-fitting the cam ring the following should be observed. Place the cam ring 108 (fig. 17) on its seating so that the projecting end 108 d of the pull-off spring engages recess 103 i. Then turn cam ring 108 in the direction of rotation of the armature by means of the timing lever arm 109 a, until the stop pin 108 b is in front of recess 103 h. The cam ring 108 is now completely pressed on its seating so that stop pin 108 b engages recess 103 h.

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 of the movable parts of the Bowden wire switch and also to the anti-dazzle switch 514 (Fig. 9).

Troubles, their Cause and Remedy

Ignition Troubles

I. The engine stops suddenly or does not start.

In the case of dynamo-magnetos with short circuiting terminal remove at first the short circuiting cable from the end cap (terminal 2) and try to start the engine. If the engine then starts, the trouble is caused by an earth connection of the damaged short circuiting cable. Remedy: cable is to be repaired or changed. If the engine still fails to start remove sparking plugs, place them on the engine body and observe whether sparking occurs when the engine is turned over by means of the Kickstarter.

a) Sparks jump between the electrodes. Either the plug cables are damaged (earth connection) or interchanged (in the case of dynamo-magnetos for twin cylinder engines) or the dynamo-magneto is incorrectly timed, or the gap between the electrodes is too great, or the sparking plugs are sooted up or there is some defect in the engine. Remedy: Replace damaged cables, connect plug cables properly, retime dynamo-magneto (see page 4), correct gap between plug electrodes by bending the side electrodes, clean or change plug.

The gap between the electrodes should be $.028''$ (.7 mm). In case of difficult starting it may prove advisable to reduce the spark gap to about $.016''$ to $.020''$ (.4 to .5 mm).

- b). No sparks jump between the electrodes: Then detach the cable from the sparking plug; hold the cable end at a distance of .08" to .12" (2 to 3 mm) from the frame and test to see whether the sparks jump across from cable end to the frame of the engine:
1. If the spark does jump across from cable to frame, the insulator base or electrodes carbonised. Remedy: Change plug or remove carbon deposit. If necessary use plugs with lower heat resistance value.
 2. If no spark jumps across from cable to frame, the contact breaker contacts must be examined to see whether they are oxydized, or the sparking plug cables damaged or loose. Remedy: Clean the contacts, if necessary adjust or replace them, change or refix plug cable.

II. Irregular running of engine

- a) Engine gets hot and does not accelerate. Causes: Ignition too far retarded or dynamo-magneto incorrectly timed or driving member lose. Remedy: Adjust ignition to take place earlier, retime dynamo-magneto.
- b) Engine knocking. Causes: Ignition too far advanced or dynamo-magneto incorrectly timed or driving member loose. Remedy: Adjust ignition to take place later, retime dynamo-magneto.
- c) Misfiring. Causes: Short circuit cable earthed (remedy: Repair or replace cable), sparking plug oiled or sooted up, electrodes too far apart or in contact (remedy: clean plugs, correct the gaps between electrodes). Contact breaker contacts oxydized up or worn. (Remedy: Clean or adjust contacts, if necessary replace them). The plug cables may have become loose or damaged (refix or renew cables); petrol or oil vapours have formed in contact breaker housing (remedy: clean latter).
- d) Backfiring. Causes: Pre-ignition due to overheated plugs (detectable by pale white colour of insulator). Remedy: Use plugs with higher resistance to heat; whilst the plug may be the right one for the engine it may nevertheless get too hot if not properly screwed home, or if the packing washer has been omitted. Pre-ignition may also be occasioned by carbonised oil on the plug or in the cylinder. Remedy: Clean plug, prevent oiling up.
Backfiring may also be due to the fact that the spark occurs in the wrong cylinder. Cause: dynamo-magneto incorrectly timed. Cables connected to plugs interchanged.

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. The cables may 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 using detail and starting the engine. If the dynamo still supplies no current, the dynamo-magneto be forwarded to a Bosch repair shop.

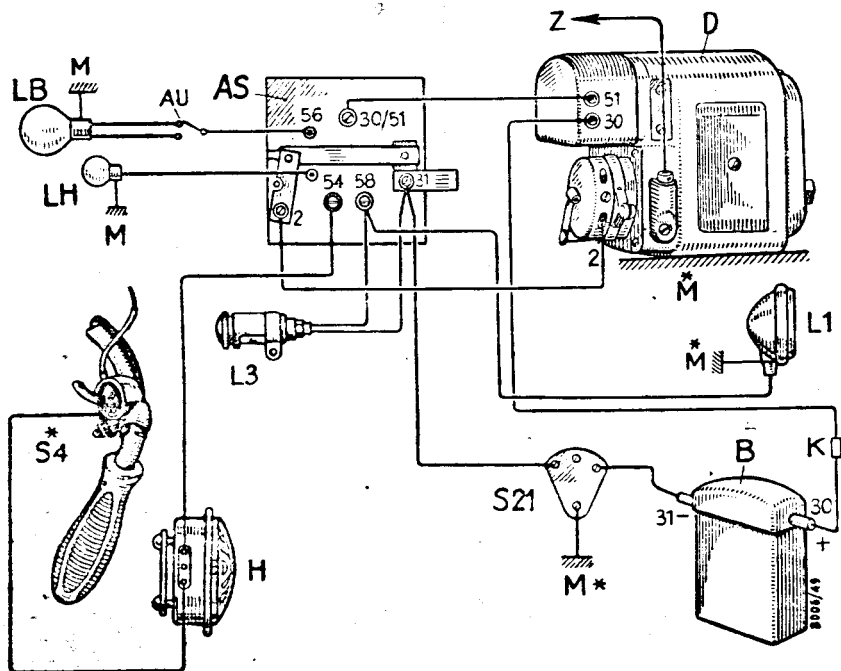
In the event of troubles occurring when switching over from distance to anti-dazzle and vice versa, inspect the anti-dazzle switch (page 11, "Readjusting the Bowden wire").

Battery troubles

Battery troubles need hardly be expected if the instructions are carefully followed. Trouble may arise owing to the fact that tools or other metal objects are placed on the open battery when cover is off, thus shorting one or more cells. This not only causes an involuntary discharge, but is injurious to the cells themselves, as the plates suffer. Spilled acid must at once be carefully removed. If other troubles occur, such as for instance, shorting inside a cell, detached pole head connection, loosening of plates, cracking of the lead paste, cracking of the ebonite box, etc., then the battery must be forwarded to a Bosch Repair Workshop.

Wiring diagram

Current is returned through the frame. The parts marked * must therefore make good metallic connection with the frame or the engine.



AS = Connection plate } in head
 AU = Anti-dazzle switch } lamp
 B = Battery
 D = Dynamo-magneto
 H = Horn

K = Cable connector
 L1 = Side lamp
 L3 = Number plate lamp
 LB = Bilux bulb
 LH = Auxiliary bulb

M = Earth
 S4 = Anti-dazzle switch with
 press button for the horn
 S21 = Frame terminal plate
 Z = Sparking plug cable

For all wiring purposes with the exception of plug cable, lacquer cable of 1.5 sq. mm are used (order number NKA 14/1.5). If the number plate lamp shall be used as a tail lamp, a two core cable (order number NKA 30/0.75) may be used.

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