

*The Original*  
**BOSCH**

Instruction Book  
DVAR

MAGNETO - GENERATOR

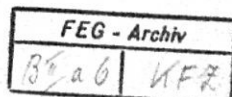
*For Motorcycles*

ROBERT BOSCH MAGNETO CO., Inc.  
Long Island City - New York

TRADE MARK OF



ROBERT BOSCH A.G.



## IMPORTANT

1. The magneto-generator DVAR must be used with a small 6 volt battery as is commonly used for motorcycles.
2. The *negative* pole of the battery *must* be grounded.
3. The unit must be wired as shown in diagram on page 9.
4. The continuous lamp load to be carried by the generator must not exceed 30 watts. (Figure on 15 watts for each 21 c.p. bulb and 1 watt for each c.p. of smaller bulbs). The full output of 30 watts is reached at 550 RPM.
5. *Do not tamper with regulator.* If regulator needs adjustment, this can be made satisfactorily only by a Robert Bosch Authorized Service Station.
6. The magneto-generator must be driven in a clockwise direction, seen from drive end.
7. The interrupter should be inspected every 4 to 6 weeks as directed on page 5.
8. Gearing above drive end of magneto-generator must be lubricated every 1000 to 1500 miles as described on page 6. Other parts need lubrication only when engine is given a general overhauling.
9. Do not leave off dust cover of regulator.
10. Do not leave off interrupter end cap.

## INSTRUCTIONS

### for the OPERATION and MAINTENANCE of

### Magneto-Generator Type DVAR

The Robert Bosch Magneto-Generator, type DVAR, consists of a magneto and a generator which are combined in one single unit, but work quite independently from each other—lighting and ignition current being generated by two entirely separate armatures.

The magneto is a high tension magneto, designed on well-known principles. It has a double T armature with primary and secondary windings. When the armature is rotated in the magnetic field, a current is produced in the primary winding which, at the moment of its maximum value, is interrupted by a mechanically acting interrupter, rotating together with the armature. This action produces in the secondary winding a high tension current which is conducted through the collector ring, the collector brushes and the high tension cables to the spark plugs, where the spark jumps across the electrodes and ignites the mixture in the cylinders.

The generator, which is a two-pole shunt-wound 6 volt machine with a rated output of 30 watts, is built into the upper part of the unit. (See Fig. 1). Its outstanding feature is a voltage regulator and cutout relay which holds the voltage within defined limits regardless of the speed of the engine. The use of this voltage regulator enables the generator to supply a high charging current, when the battery is empty. A discharged battery is thus brought up to par in a short time. On the other hand, when the battery is fully charged, a low current is furnished by the generator which prevents overcharging and means particularly long life of the battery. Since with this generator the voltage cannot exceed a certain amount, the lamps always burn with a uniform brightness, which insures long life of the filaments. Even if the battery terminals become corroded or the battery disconnected, the electrical system can still operate without burning out the lamps.

The voltage regulator is mounted dust and water-proof under a metal cap M (Fig. 1) on the commutator end of the generator.

### STARTING

The ignition should be **retarded at starting**. However, to give the highest efficiency, when the engine is running, the spark should be advanced as much as the engine will stand without knocking.

### IGNITION SWITCH

In order to stop the engine, the ignition may be cut off by means of a short circuiting switch or push button, which is connected be-

tween the terminal 2 of the interrupter end cap E (Fig. 1) and the engine frame. When the switch is closed, ignition cannot occur.

### CARE and INSPECTION

Once installed, the magneto-generator requires very little attention. In order to keep the whole electrical system in proper working condition, it is suggested, however, that the following inspections be made regularly:

#### 1. Every 4 to 6 Weeks

**Interrupter.** Remove the interrupter end cap E (Fig. 1) and inspect the condition and adjustment of the contacts C (Fig. 2). The gap

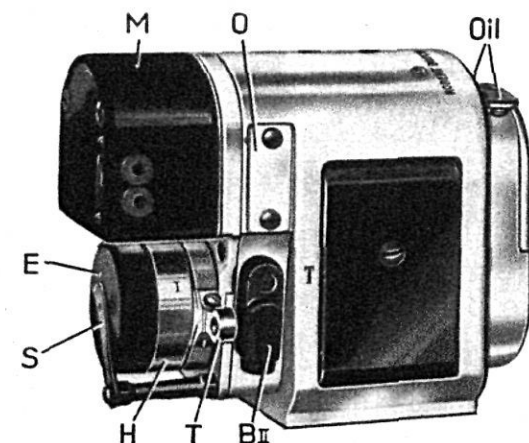


Fig. 1. Magneto-Generator DVAR viewed from interrupter end.

(1/3 actual size)

- BII = Collector brush holder of cylinder No. II
- E = Interrupter end cap.
- H = Interrupter housing.
- M = Dust cover.
- O = Cover plate.
- S = Interrupter end cap holding spring.
- T = Timing control arm.

between the contacts when open should be between .013" and .015" (.35 and .4 mm). Check this by means of the gauge on Bosch wrench ZASI/1 and adjust the contact screw, if necessary.

If the contacts are dirty, they must be cleaned with a soft brush dipped in gasoline. Uneven or pitted contacts must be flattened with a small file, but emery paper must not be used for this purpose. The contacts are made accessible by removing the interrupter housing H and can be opened by depressing the interrupter lever L (Fig. 2).

**Do not permit oil to get on the interrupter contacts, because this will cause improper contact, faulty operation and rapid contact wear.**

The interrupter can be removed from the magneto armature for replacement of parts by unscrewing the interrupter fastening screw F located in the center. When replacing, care must be taken to put back the interrupter into its proper position as indicated by key and keyway. When replacing the interrupter housing H, be sure to engage the interrupter housing stop pin P in the groove G which is marked by an arrow showing the direction of the interrupter rotation. This groove G is on the upper right when facing the unit from the interrupter side. (See Fig. 2).

**Battery.** The battery must always be kept clean and dry. The metal parts should be slightly greased. It is particularly important to see that the level of the electrolyte is always well above the top of the plates as specified by the battery manufacturer. If it is lower, it is in most cases sufficient to add distilled water until the required level is reached. From time to time, however, the battery should be inspected more closely as directed by the instructions furnished by the battery manufacturer.

## 2. Every 1000 to 1500 Miles

**Gearing.** The gearing of the magneto-generator must be lubricated with heavy motor oil every 1000 to 1500 miles. Two oil cups are provided for this purpose on top of the gear housing on the drive end of the magneto-generator. See the arrow in Fig. 1. In order to make the oil flow more easily it is advisable to heat it a little. Sufficient oil must be applied to saturate the felt wick, and the gear housing, which, of course, takes some time. For very cold weather conditions, Robert Bosch Magneto Oil US506 should be used.

Particular care must be taken that no oil can reach the interrupter, because this would cause missing and rapid wear of the contacts.

**Cables.** If the insulation is worn through or damaged, the cables must be replaced.

To replace the high tension cables, it is necessary to remove the black collector brush holders B1 and BII. After taking out the carbon brush A, the cable fastening screw D is accessible. (See Fig. 3). When this screw is unscrewed, the old cable can be pulled out. The new cable must be cut even and after slipping the small rubber cap R over it, it is inserted in the collector brush holder until it strikes bottom. When the cable fastening screw D is replaced and tightened well, the small rubber cap R can be pushed over the brush holder. Then the carbon brush A must be re-inserted so that the spring K bears against the cable fastening screw D. The brush must move freely all the way down in the collector brush holder.

When the short circuiting and the lighting cables have to be replaced, the corresponding fastening screws must be loosened (but not entirely unscrewed). After removing the old cables, strip the

new ones for about 5/16" and insert them in the corresponding openings as far as they go. When the cable fastening screws are re-tightened, a gentle pull on the cables will show whether they are firmly attached.

## 3. Every 2500 to 3000 Miles

**Carbon brushes of generator.** The collector brushes of the generator must be inspected every 2500 to 3000 miles of operation. They are made accessible by removing the two small cover plates O on both

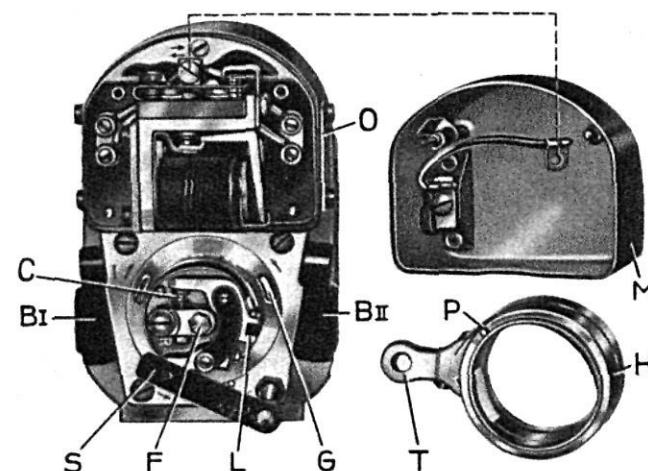


Fig. 2. Magneto-Generator DVAR (Interrupter end view) with dust cover and interrupter housing removed.

- B1 = Collector brush holder of cylinder No. I.
- BII = Collector brush holder of cylinder No. II.
- C = Interrupter contacts.
- F = Interrupter fastening screw.
- G = Groove.
- H = Interrupter housing.
- L = Interrupter lever.
- M = Dust cover.
- O = Cover plate.
- P = Interrupter housing stop pin.
- S = Interrupter end cap holding spring.
- T = Timing control arm.

sides above the collector brush holders of the magneto. If the carbon brushes are worn so much that the depressing springs bear against the end of the corresponding recess in the brush holder, the brushes must be replaced, preferably by an Authorized Robert Bosch Service Station.

**Interrupter.** The interrupter should also be inspected after every 2500 to 3000 miles of service as directed on page 5.



#### 4. When Motorcycle is being Overhauled

When the motorcycle is given a general overhauling, the magneto-generator should also receive a general inspection. It is suggested that the latter be given preferably by an Authorized Robert Bosch Service Station.

When removing the magneto-generator from the engine, the battery should first be disconnected, in order to avoid possible short circuits.

**Armatures.** The ball bearings of the armatures are packed with a special high-temperature lubricant, **Robert Bosch Magneto Grease US505**, which need not be replaced for 30,000 to 40,000 miles (1500

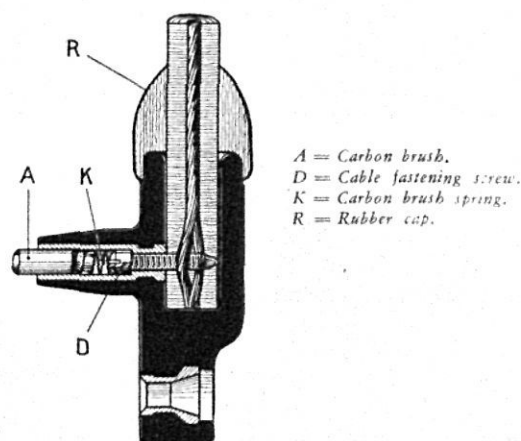


Fig. 3. Collector Brush Holder.

to 2000 hours) of service. The felt packing in the interrupter housing H is saturated with oil which will also last for a very long time. It is sufficient to renew these lubricants when the engine is given a general overhauling.

**Timing.** Since the magneto-generator has been timed correctly by the engine manufacturer, the following instructions apply only if the unit has been dismantled from the engine.

The timing of the magneto-generator to the engine consists of bringing the magneto armature into proper relation to the engine pistons and connecting it to the engine in this relation.

Turn the engine crankshaft until the piston of cylinder No. I is on top dead center of its compression stroke. With engines where the crankshaft rotates in the same direction as the wheels of the motorcycle, cylinder No. I is the one inclined towards the rear. If

the crankshaft rotates in the opposite direction, which is very seldom, the front cylinder is No. 1. If the top dead center position of cylinder No. I is not marked on the flywheel, it can easily be ascertained by means of a feeler rod.

Remove the interrupter end cap E by turning aside the interrupter end cap holding spring S. Put the timing control arm T in full retard position by turning it as far as it goes in the direction of rotation of the drive shaft. Then rotate the drive shaft until the fibre block of the interrupter lever L strikes the cam No. I and the interrupter contacts C just begin to separate. When facing the interrupter end of the unit this cam No. I is on the upper right as indicated by the figure I engraved on the circumference of the interrupter housing H. With this position of the magneto armature the unit must be coupled to the engine.

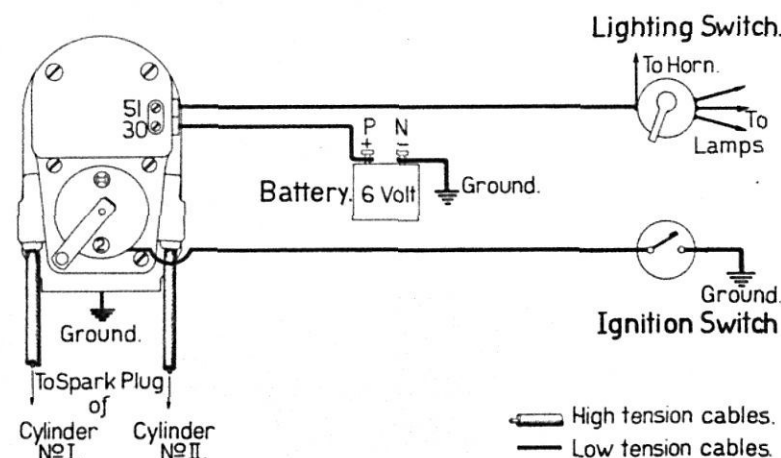


Fig. 4. Wiring Diagram

When attaching the high tension cables, the spark plug of cylinder No. I must be connected to the collector brush holder B1 and the cable leading to the spark plug of cylinder No. II must be attached to collector brush holder B11 as shown in Fig. 2.

With the setting described, i.e., with the retarded spark at top dead center, the fully advanced spark will occur 40° before the piston has reached top dead center.

If, with this timing, an ignition knock occurs in full advance position of the timing lever, this indicates that the spark is set too early. In this case, the unit must be retimed to the engine, but with the piston of cylinder No. I set slightly later in its compression stroke. This must be repeated until the engine runs under full load without knocking when the spark is fully advanced. To operate at maximum

efficiency, the engine should be given as much ignition advance as it will stand without knocking.

**Cable Connections.** After the magneto-generator is remounted on the engine, be sure to make all the cable connections as they were before. In order to avoid possible short circuits, the battery must be connected last. It is very important that the negative (—) pole of the battery be grounded, otherwise the generator will not function properly.

### SUGGESTIONS

If the engine misses explosions, inspect the ignition wiring for possible short circuits. Be sure that the terminals are clean and tight and that the insulation is in perfect condition.

**Spark plug.** With properly chosen Robert Bosch plugs, spark plug trouble should not occur. If a spark plug is suspected of giving trouble, remove it for examination. If the insulator is badly sooted, this may short circuit the electrodes and prevent the spark from jumping. Sooting may be caused by too rich a mixture, by too much lubricating oil in the cylinders, or by too small a gap between the electrodes. Wash off the carbon with gasoline and consult the engine manufacturer's service station, if the trouble cannot be readily located. If the gap between electrodes has become too large, adjust this by bending in the outer electrodes. The gap should be .019" to .023" (.5 to .6 mm).

If the engine fails to start, it is advisable to check the ignition system. Disconnect the cable which leads from the magneto to the ignition switch by removing the interrupter end cap E (Fig. 1). If this remedies the trouble, the switch cable is grounded, either by damaged insulation or by one of its terminals touching a grounded part of the engine.

**Magneto.** If the wiring and spark plugs are in good condition, but the magneto still fails to operate when the switch cable is disconnected, next inspect the interrupter as directed in the foregoing. If this is in proper condition, examine the collector brush holders B1 and B11 and check the timing of the magneto to the engine.

If, after observing the foregoing instructions, the trouble cannot be located, it is advisable to send the unit for inspection and repair to an Authorized Robert Bosch Service Station, or to the Robert Bosch Magneto Company, Inc., 3601 Queens Boulevard, Long Island City, New York.

**Generator.** If the generator fails to furnish voltage enough to make the lights burn brightly or to keep the battery properly charged, inspect the cables and the commutator brushes as directed on page 7. If these are in order, the magneto-generator should be turned over for inspection and repair to an Authorized Robert Bosch Service Station or the Robert Bosch Magneto Company, Inc. Under no condition should the user try to change anything in the adjustment of the voltage regulator. This is very important.

### PARTS LIST for DVAR and DVAL Magneto-Generators

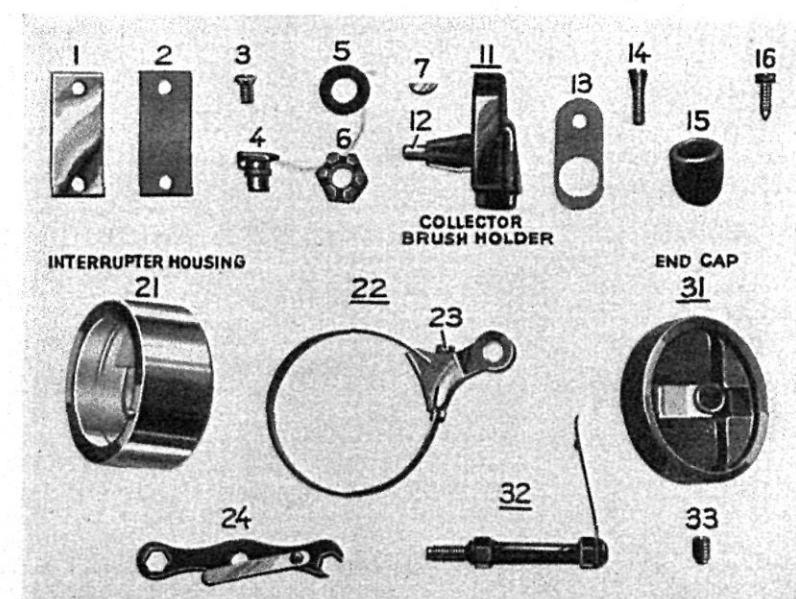
Illustration Number	Description of Parts	Part Number
1	Inspection hole cover .....	ZPT 126/1
2	Inspection hole cover packing strip .....	ZPT 65/1
3	Inspection hole cover fastening screw .....	NSR 730/8
4	Oil cup .....	WAM 1/1
5	Magneto armature shaft washer .....	NMS 16/1
6	Magneto armature shaft slotted nut .....	WMU 38/1
7	Magneto armature shaft Woodruff key .....	WKE 3/1

#### Collector Brush Holder

11	Collector brush holder complete .....	ZSA 10/13
12	Collector brush and spring .....	WSK 1/5
13	Collector brush holder gasket .....	ZPT 62/1
14	Collector brush holder fastening screw .....	WSR 508/1
15	Collector brush holder protecting cap .....	WNK 2/1
16	Collector brush holder cable fastening screw .....	WSR 82/1

#### Interrupter Housing

21a	Interrupter housing, clockwise, for DVAR .....	ZNC 11/14
21b	Interrupter housing, anti-clockwise, for DVAL .....	ZNC 11/4
22	Control arm and band .....	ZHE 1/5
23	Control arm fastening screw .....	WSR 6/1
24	Magneto wrench .....	ZAS 1/1
31	End cap with short circuiting terminal .....	ZDE 17/1
32	End cap holding post and spring .....	ZFT 4/6
33	End cap cable fastening screw .....	WSR 501/1



Note: When ordering parts specify description, part number and type of magneto-generator.

# PARTS LIST for DVAR and DVAL Magneto-Generators (Continued)

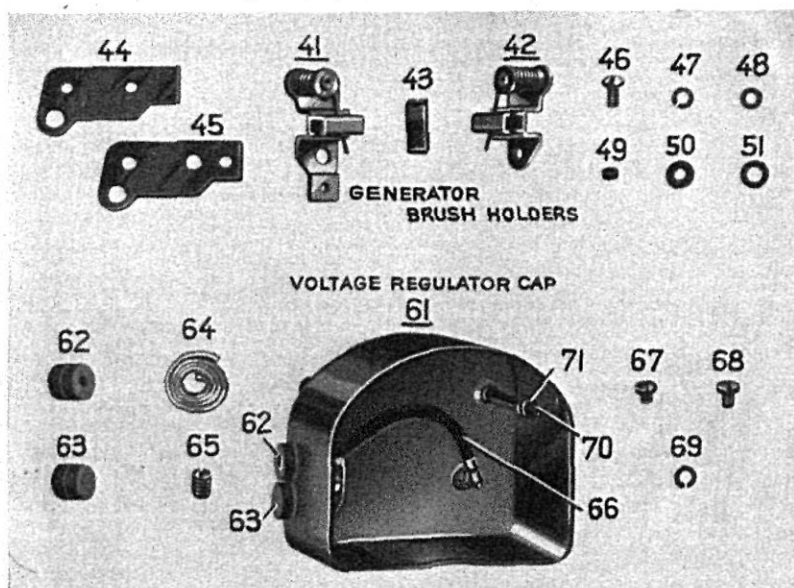
Illustration Number	Description of Parts	Part Number
<b>Generator Brush Holders</b>		
41	Generator brush holder (+) insulated with spring	DSA 504/11
42	Generator brush holder (—) not insulated with spring	DSA 503/11
43	Brush	WSK 500/1
44	Brush holder insulating plate—small hole	DPT 518/2
45	Brush holder insulating plate—large hole	DPT 518/1
46	Brush holder fastening screw	NSR 249/13
47	Brush holder fastening screw spring washer	NMS 407/1
48	Brush holder fastening screw washer	NMS 7/1
49	Brush holder fastening screw insulating bushing	WNB 23/1
50	Brush holder screw insulating washer—small hole	WNS 115/4
51	Brush holder screw insulating washer—large hole	NNS 74/1

## Voltage Regulator Cap

61a	Voltage regulator cap, cable terminals left	DMK 502/1
61b	Voltage regulator cap, cable terminals right	DMK 502/2
62	Cable insulating bushing	WNB 19/2
63	Rubber plug to close cable outlet	WNB 19/3
64	Regulator cap packing strip	WSC 501/8
65	Terminal block cable fastening screw	WSR 541/1
66	Cable with terminals from terminal block to regular unit	WEA 4/1
67	Cable terminal fastening screw—on regulator unit	NSR 249/5
68	Cable terminal fastening screw—on terminal block	NSR 249/9
69	Cable terminal fastening screw spring washer	NMS 407/1
70	Regulator cap fastening screw	WSR 81/1
71	Fastening screw holding ring	WMR 37/1

## Robert Bosch Lubricants

..	Robert Bosch magneto grease, ½ lb. tube	US 505
..	Robert Bosch magneto oil, 4 fl. ozs. can	US 506



Note: Do not order parts by illustration number, as they do not identify parts sufficiently.

# INTERRUPTER ZUB 9/2, ZUB 10/2

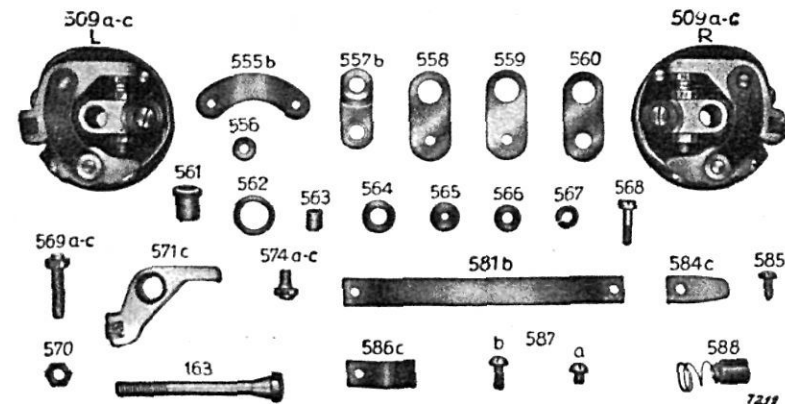


Illustration Number	Description of Parts	Part Number
509L	Interrupter complete, anti-clockwise, for DVAL	ZUB 9/2
509R	Interrupter complete, clockwise, for DVAR	ZUB 10/2
555b	Interrupter lever holding spring	ZBF 7/1
556	Interrupter lever holding spring washer	NMS 66/1
557b	Contact block	ZKT 1/1
558	Contact block insulating plate—thin	ZPT 13/2
559	Contact block insulating (spacing) plate—thin	ZPT 13/3
560	Contact block insulating plate—thick	ZPT 13/1
561	Interrupter center insulating bushing	WNB 3/1
562	Contact block brass ring	WMS 8/1
563	Contact block insulating bushing	NNB 5/7
564	Contact block insulating washer—thick	WNS 5/1
565	Contact block insulating washer—thin	NNS 65/1
566	Contact block washer under spring washer	WMS 9/1
567	Contact block spring washer	NMS 405/1
568	Contact block fastening screw	WSR 4/1
569	Platinum screw—long	ZKV 3/3
570	Platinum screw lock nut	WMU 2/1
571c	Interrupter lever with bearing bushing	ZUH 6/1
574	Platinum screw—short	ZKV 9/3
581b	Interrupter lever operating spring	ZBF 9/1
584c	Interrupter lever stop spring	ZBF 6/1
585	Interrupter lever stop spring fastening screw	NSR 277/8
586c	Reinforcing spring	ZBF 8/1
587a	Operating spring fastening screw—on disc	NSR 277/5
587b	Operating spring fastening screw—on lever	NSR 277/11
588	Interrupter grounding brush and spring	WSK 9/1
163	Interrupter fastening screw	ZSR 1/1

Note: When ordering parts specify description, part number and type of magneto-generator.



*The Original*  
**Bosch**  
ROBERT BOSCH PRODUCTS

### MASTER HORN

This is the original high frequency vibrator horn, which stands without rival in spite of many imitations. It is built to the well known high standards of Robert Bosch master workmanship and permanent dependability, and retains its clear, compelling tone without need of lubrication or adjustment. This horn is constructed to withstand exposure to the dust and dirt, snow and rain to which outside mounted horns are subjected, while its elegant appearance and graceful design make it an ornament to any vehicle.



Furnished in three sizes, for 6 and 12 Volts. Also for industrial use for 110 Volts D. C.

*Ask for booklet.*

### FD HORN

This type of horn is of very compact and of rugged construction. The volume of sound obtained from this instrument is surprising. Its pleasing, penetrating, snappy and attention-getting pitch and the far-reaching tone make it suitable for all cars and commercial vehicles, large or small.

The Short Horn can be supplied either with bracket for cylinder head mounting, or with special bracket for Ford Model A or with round mounting bracket for handlebar or motorcycle.



Furnished for 6 volts.

*Ask for booklet.*

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ROBERT BOSCH PRODUCTS

### PYRO-ACTION SPARK PLUGS

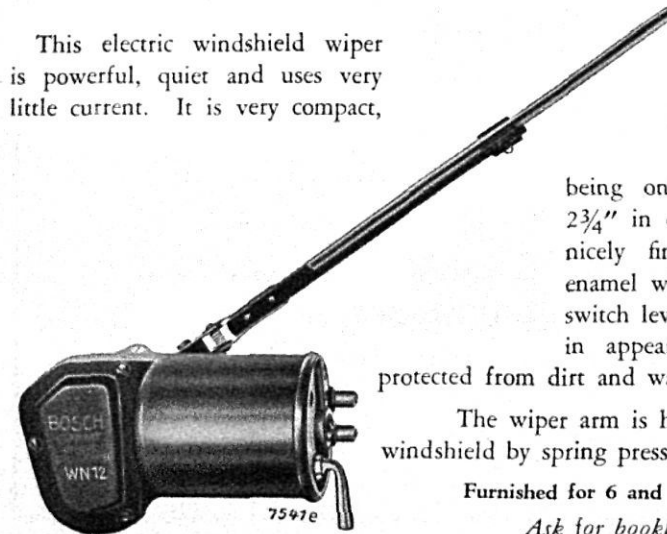
These give lasting service of a high standard, usually expected only when plugs are new. Their exclusive "Steatite" insulator does not become permeated by carbon, which is a common spark plug defect. Any oil or liquid fuel which collects on the insulator is immediately burned away. These features mean immunity from fouling. The famous Robert Bosch "crescent gap" gives a broad, ribbon-like spark which insures energetic ignition and reduces electrode wear. On account of this feature and the special alloy electrodes used, Robert Bosch spark plugs rarely need adjustment and have a life many times that of cheaper plugs.



*Ask for folder.*

### WINDSHIELD WIPER

This electric windshield wiper is powerful, quiet and uses very little current. It is very compact,



being only 5" long by 2 3/4" in diameter. Being nicely finished in black enamel with nickel plated switch lever, it is pleasing in appearance and fully

protected from dirt and water.

The wiper arm is held against the windshield by spring pressure.

Furnished for 6 and 12 volts.

*Ask for booklet.*



## WARRANTY

*We warrant each new unit sold by us to be free from defects in material and workmanship under normal use and service. Our obligation under this warranty is limited to the furnishing at our factory of any part of said equipment which shall, within one (1) year or—if used on taxicabs or motorbuses within ninety (90) days—after delivery to the original purchaser, be returned to us with transportation charges prepaid and which our examination shall disclose to our satisfaction to have been defective.*

*This warranty shall not apply to any unit which has been subjected to misuse, neglect, accident, or which has been repaired or altered outside of our factory so as, in our judgment, to affect its stability or reliability. We are not responsible for failure of any unit due to defective wiring or improper installation.*

*We do not authorize any person to assume for us any other liability in connection with the sale of our products.*

**ROBERT BOSCH MAGNETO COMPANY, INC.**

**3601 Queens Boulevard**

**Long Island City—New York**



## Authorized Service Stations in U. S. A. and Canada

To assure to its users the best possible satisfaction from Robert Bosch products, the Robert Bosch Magneto Company, Inc., has built up an extensive service organization.

The above sign in red and blue colors is displayed by Authorized Service Stations of the Robert Bosch Magneto Company, Inc., in the United States and Canada. They are the only representatives in these countries who are authorized to give service in accordance with the Robert Bosch guarantee. Look for this sign to be sure you deal with official service stations. A directory of Authorized Service Stations will gladly be sent you on request.



All Robert Bosch products are identified by the trade mark shown above. It is your guarantee of Original-Bosch quality as known the world over since 1887.

*Always specify "Robert Bosch" to obtain the Original.*

## DISTRIBUTOR ORGANIZATION

### United States and Canada

A nation-wide organization is maintained for the sales and servicing of Robert Bosch products throughout the United States and Canada. This organization includes over a thousand distributors, service stations and dealers. These cannot be given here in full due to space limitations. The following list of distributors includes the Robert Bosch representatives in the principal cities. For the name of the Robert Bosch service station or dealer in your vicinity, write to the nearest distributor listed below.

Allentown, Pa. ....	Electrical Devices Co.	New Orleans, La. ....	Suhren, Inc.
Amarillo, Tex. ....	Whitlock Co.	New York, N. Y. ....	Empire State Ignition
Asheville, N. C. ....	Auto Electric Service	New York, N. Y. ....	Manhattan Ign. Corp.
Atlanta, Ga. ....	Auto Elec. & Mag. Co.	Norfolk, Va. ....	Tidewater Elec. Corp.
Atlantic City, N. J. ....	Automotive El. Serv.	Oklahoma City, Okla. ....	American Elec. Ignition Co.
Baltimore, Md. ....	Parks & Hull, Inc.	Omaha, Nebr. ....	Carl Anderson, Inc.
Binghamton, N. Y. ....	Archer Bat. & Elec. Serv.	Philadelphia, Pa. ....	Havas & Shields Co.
Birmingham, Ala. ....	Auto El. & Carb. Co.	Phoenix, Ariz. ....	Spaulding Auto Elec. Co.
Boston, Mass. ....	E. B. Atmus Co., Inc.	Pittsburgh, Pa. ....	Keelan-Lyons Co.
Bridgeport, Conn. ....	Reuter Auto Elec. Co., Inc.	Plattsburgh, N. Y. ....	H. E. Atwater Bat. & Elec. Serv.
Brooklyn, N. Y. ....	Magneto Repair Co.	Portland, Me. ....	L. W. Cleveland Co.
Buffalo, N. Y. ....	Hettrich Elec. Serv.	Portland, Ore. ....	Sunset Electric Co.
Calgary, Alberta, Can. ....	Delta Elec. Ltd.	Port Richmond, S. I. ....	Arc-Man Elec. Serv., Inc.
Camden, N. J. ....	Camden Storage Bat. Co.	Providence, R. I. ....	E. B. Atmus Co., Inc.
Chattanooga, Tenn. ....	Lancaster Bros.	Raleigh, N. C. ....	A. M. Tyner Co.
Chicago, Ill. ....	Illinois Auto Elec. Co.	Reading, Pa. ....	Beiks Auto Ignition Co.
Chicago, Ill. ....	Motor Car Serv. Co.	Regina, Sask., Can. ....	Magneto Serv. Station, Ltd.
Chicago, Ill. ....	West Side Ignition Service	Richmond, Va. ....	Havens & Martin
Cincinnati, Ohio. ....	Tri-State Ign. Corp.	Rochester, N. Y. ....	Starter & Ign. Serv. Co.
Cleveland, Ohio. ....	Cleveland Ignition Co.	Rockford, Ill. ....	Eric J. Gustafson
Columbus, Ohio. ....	Columbus Ignition Co.	So. Jacksonville, Fla. ....	Autom. Elec. Serv. Sta.
Dallas, Texas. ....	J. J. Gibson Co.	Salina, Kans. ....	Motor Service Co.
Davenport, Iowa. ....	Motor Rim & Wheel Corp.	San Antonio, Texas. ....	Allen Auto Elec. Serv.
Denver, Colo. ....	H. R. Brown Bat. & Elec'l Co.	Salt Lake City, Utah. ....	Motor Equip. Co.
Detroit, Mich. ....	Motor Car Service Co.	San Francisco, Cal. ....	Furrer & Uster, Inc.
Duluth, Minn. ....	United Elec. Serv. Co.	Saskatoon, Sask., Can. ....	Lemery-Denison Elec. Ltd.
Elmira, N. Y. ....	United Elec. & Speedometer Co.	Scranton, Pa. ....	J. B. Umberger Ign. Serv.
El Paso, Texas. ....	Randel Bat. & Elec. Co.	Seattle, Wash. ....	Sunset Electric Co.
Erie, Pa. ....	Briggs-Hagenlocher, Inc.	Shreveport, La. ....	Chain Bat. & Auto Sup., Inc.
Goldsboro, N. C. ....	Standard Autom. Parts Co.	Sioux City, Iowa. ....	Western Bat. & Elec. Co.
Harrisburg, Pa. ....	Atlas Elec. Serv. Co.	Springfield, Mass. ....	E. B. Atmus Co., Inc.
Hartford, Conn. ....	E. B. Atmus Co., Inc.	St. Louis, Mo. ....	Motor Elec. Serv. Co.
Honolulu, T. H. ....	Schuman Carriage Co., Ltd.	Syracuse, N. Y. ....	Al Bergdorf Auto Elec. Serv.
Houston, Texas. ....	Chain Battery System, Inc.	Tampa, Fla. ....	Electric Service Co.
Indianapolis, Ind. ....	Equipment Service	Toledo, Ohio. ....	Fort Meigs Elec. Co.
Kansas City, Mo. ....	Elec. & Mag. Serv. Co.	Toronto, Ont., Can. ....	Auto Starter Co., Ltd.
Knoxville, Tenn. ....	McNutt & Burks, Inc.	Trenton, N. J. ....	Holmes, Inc.
Lancaster, Pa. ....	Ignition Eng. Serv.	Troy, N. Y. ....	Ehrlich Electric Service
Lincoln, Nebr. ....	Parkhurst Auto Elec. Co.	Tulsa, Okla. ....	Electrical & Magneto Co.
Los Angeles, Cal. ....	Magneto Sales & Serv. Co.	Vancouver, B. C., Can. ....	Bat. House, Ltd.
Louisville, Ky. ....	Koch Auto Elec. Co.	Washington, D. C. ....	Miller Dudley Co.
Memphis, Tenn. ....	Motor Bat. Co., Inc.	Waterbury, Conn. ....	A. & P. Battery & Elec. Co.
Miami, Fla. ....	Clayton Bat. & Eng. Co.	Watertown, N. Y. ....	Watertown Bat. & Elec. Co.
Milwaukee, Wisc. ....	Lemke Elec. Co.	West Palm Beach, Fla. ....	Sutcliffe's Auto. Elec. Serv. Co.
Minneapolis, Minn. ....	Fowler Elec. Co.	White Plains, N. Y. ....	White Plains Bat. & Ign. Co., Inc.
Minneapolis, Minn. ....	Reinhard Brothers	Wichita, Kans. ....	Whitlock Co.
Montgomery, Ala. ....	Auto Elec. Serv. Co.	Williamsport, Pa. ....	Harer Auto Elec. Co.
Montreal, Quebec, Can. ....	International Elec. Co.	Worcester, Mass. ....	Damon Bat. & Elec. Co.
Mount Vernon, N. Y. ....	Ray Elec. Serv.	Yonkers, N. Y. ....	Auto. Ign. Serv. Co.
Nashville, Tenn. ....	Ewing Thomas Autoelectric Co.		
Newark, N. J. ....	Tire Trading Co.		
Newburgh, N. Y. ....	J. G. Mezger, Inc.		
New Haven, Conn. ....	Auto Elec. Sales & Serv. Co.		

## AUTHORIZED SERVICE REPRESENTATIVES

### Outside of the U. S. A. and Canada

The following list contains the principal houses rendering services on Robert Bosch products. In addition, many other service stations, too numerous to mention, have been appointed in most of the countries listed. Users of Robert Bosch products located in these countries are requested to communicate with the nearest representative listed for the address of the service station most convenient to them.

### SOUTH AMERICA

Barranquilla (Columbia), A. Held, Correo Apartado 127	Mexico, D. F., Sommer, Herrmann & Cia., Sucrs., Departamento Maquinaria, Apto 299
Buenos Aires, Robert Bosch S.A., Calle Rivadavia 1857-61	Rio de Janeiro, Steinberg & Cia., Rua do Passeio, 62
Havana (Cuba), Albert Eppinger, Ave. Belgica, 10	Santiago (Chile), Saavedra, Bénard y Cia., Lda. São Paulo, Steinberg & Cia., Rua Barão de Itapetininga 16
Montevideo (Uruguay), Eugenio Barth y Cia., Uruguay, 757	Valparaíso, Saavedra, Bénard & Cia., Lda., Sociedad Comercial, Avenida Brasil, 929

### EUROPE

Amsterdam, Willem van Rijn, Keizersgracht 171	Leipzig, Eiseemann-Werke A.-G., Zweigstelle Leipzig, Gottschedstrasse 18
Athens, G. Paleologue & Co., 20, Rue Santarosa	London, W. J. A. Stevens Ltd., 21/22 Upper Rathbone Place
Barcelona, Equipo Bosch S.A., Calle Mallorca, 281	Luxemburg, Romain Lecorsais, Ing., Grand rue 51
Berlin, Robert Bosch A.-G., Verkaufsbüro Berlin, Charlottenburg 4, Bismarckstrasse 71	Madrid, Equipo Bosch S. A., Calle Viriato, 18
Berlin SW 48, Eiseemann Werke A.-G., Zweigstelle Berlin, Friedrichstrasse 225	Milan (126), S. A. per il Commercio dei Materiali Bosch Via Londonio, 2
Breslau II, Eiseemann-Werke A.-G., Zweigstelle Breslau, Taubentzenstrasse 35	Munich, Eiseemann-Werke, A.-G., Zweigstelle München, Karlstrasse 42
Brussels-Midi, Allumage-Lumière S.A., 23/25, Rue Lambert Crickx	Oporto, Roberto Cudell, Rua Passos Manuel 41-1
Bucharest, Leonida & Cie, S.A., Calea Victoriei 53	Oslo, A./S. Automagnet, Kongensgate 16
Budapest, V. Robert Bosch Ges. m.b.H., Vaci-ut 22-24	Paris (16 éme), Ateliers de Construction Lavallette S. A., 97, Boulevard Exelmans
Cologne, Eiseemann-Werke A.-G., Zweigstelle Köln, Mästrichterstrasse 13	Prague XII, Robert Bosch, Mars. Foch 8
Constantinople, Constantin Dassira & Georges Dassira, Galata, Rue des Banques 66. 68. 70	Rome (27), S. A. per il Commercio dei Materiali Bosch, Via Novara, 8-14
Copenhagen, A./S. Magneto, Gammel Mont 12	Seville, Equipo Bosch S. A., Paseo de Colon 4 dupl
Danzig, Alfred Bauch, Langer Markt 32	Sofia, Léon Arié, Uliza Targovska 15
Frankfurt a.M. West, Robert Bosch A.-G., Verkaufsbüro Frankfurt a.M., Moltke-Allee 47-53	Stockholm, 7 Aktiebolaget Robo, Birgerjargatan 25
Geneva, Robert Bosch S. A., 78, Rue de Lausanne	Stuttgart-Berg, Robert Bosch A.-G., Verkaufsbüro Stuttgart, Stuttgarterstrasse 17
Glasgow, C. J. A. Stevens Ltd., 218/222 Bothwell Street	Turin (10), S. A. per il Commercio dei Materiali Bosch, Via A. Vespucci, 52-54
Hannover, Eiseemann-Werke A.-G., Zweigstelle Hannover, Marienstrasse 49	Vienna, IX, Robert Bosch G. m. b. H., Spittelauerlande 5, bei der Friedensbrücke
Helsingfors, A. B. Walfrid Alftan O. Y.	Warsaw, I. Kestenbaum, Ul. Wilcza 29

### ASIA

Bangkok, Windsor & Co.	Kobe, C. Illies & Co., 84 b, Yedomachi
Beyrouth, Eastern Engineering Co., B. P. No. 257	Penang, N. V. Straits Java Trading Co., Weld Quay
Calcutta, Martin & Co., Department Bosch Service, 58, Free School Street	Shanghai, Jebesen & Co., 7, Hankow Road
Canton (China), Jebesen & Co., 10, Western Bund	Singapore, N. V. Straits Java Trading Co., 114, Cecil Street
Colombo (Ceylon), Freudenberg & Co. De Mel Building	Soerabaya, N. V. Willem van Rijn's Technisch Bureau, Kaliasin 15
Hongkong, Jebesen & Co., 12, Pedder Street	Tokio, C. Illies & Co., 1 Yurakuchō Ichome Kojimachi-ku
Jaffa, Gebr. Wagner, P. O. B. 249	Tsingtau, Henzler & Co., P. O. Box 230

### AFRICA

Alexandria and Cairo, Equipements Electriques d'automobiles,	Johannesburg, F. Hoppert, 86, Marshall Street
Alexandria, 42 Rue Fouad I er	
Cairo, 11 Rue Gameh Charkass	

### AUSTRALIA and NEW ZEALAND

Melbourne and Sydney, Robert Bosch Supply & Service Co., Pty. Ltd.	Sydney, 249, Elizabeth Street
Melbourne, 256/258, Latrobe Street	Wellington, Jas. J. Niven & Co., Ltd., 152-72 Wakefield Street

