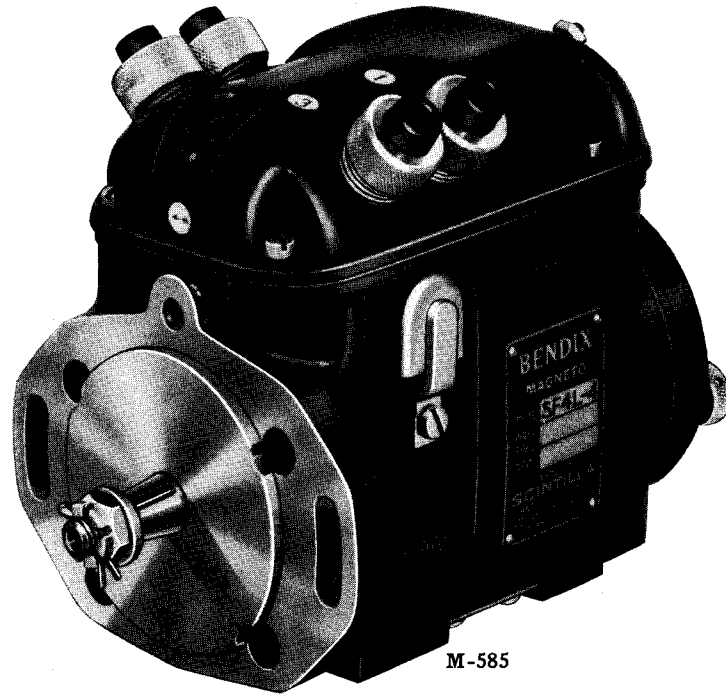


BENDIX - SCINTILLA

AIRCRAFT MAGNETOS

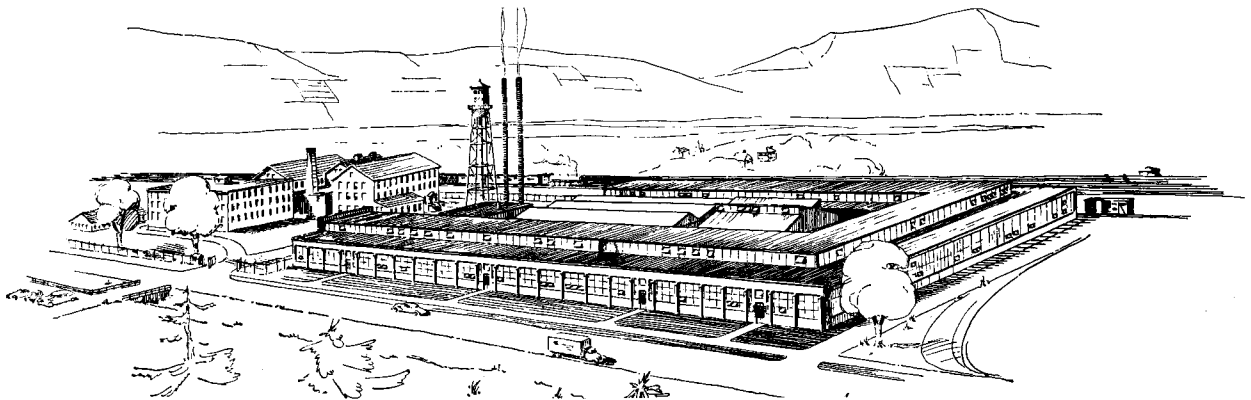
Types SF4R and SF4L Series

User Operating Instructions



M-585

Magneto Type SF4L-4



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SCINTILLA MAGNETO DIVISION

BENDIX AVIATION CORPORATION

SIDNEY, NEW YORK, U.S.A.

USER OPERATING INSTRUCTIONS

These new magnetos are characteristic of all Scintilla magnetos in principle and construction. The outstanding features incorporated are the new and powerful rotating magnet and the rubber encased coil which increase their efficiency and ability to give dependable service for longer periods of time. Their general appearance is somewhat changed which is due mostly to the new feature incorporated for the distribution of the spark. In place of distributor blocks, separate terminals, which protrude from the main cover, are provided for the installation of the spark plug cables.

These magnetos are radio shielded and provision is made for attaching radio shielded cables. A screened ventilator on each side of the housing and one in the base insure adequate ventilation for the magneto.

Installing and Timing to the Engine

Before installing the magneto, insure that it has been correctly timed and checked in accordance with the section entitled "Adjustment of the Breaker Contact Points." It is installed to the engine in the following manner:

1. Set the piston of cylinder No. 1 at its firing position.
2. Place the breaker in its full advance position (variable spark magnetos). Rotate the magneto drive shaft until the timing mark A on the chamfered tooth of gear, Fig. 1, and timing pointer B are opposite each other as seen through the timing window in the magneto cover. At this position the breaker contacts should begin to open.
3. All adjustments for exact timing to the engine are made at the drive end and not by altering the position of the contact points. Insure that the mounting faces are

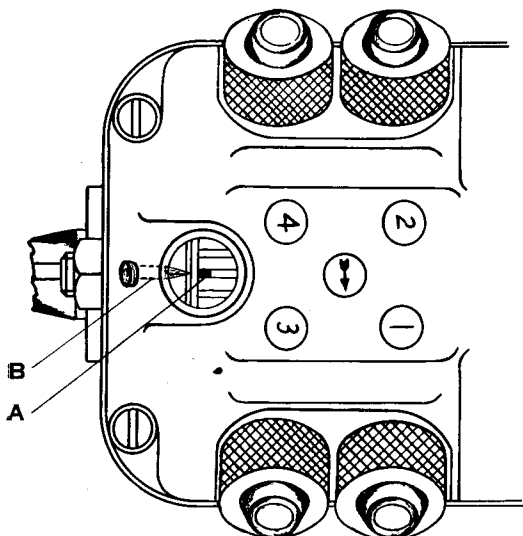


Fig. 1. Showing Timing Markers.

clean and smooth. With the timing marks A and B (Fig. 1) opposite each other, install the magneto on the engine and secure with its mounting bolts. Exact timing is obtained by turning the magneto through the range provided in the slots of the mounting flange. A convenient

way of checking this adjustment is to place a piece of thin cellophane between the contact points and pull on it slightly. When the cellophane slips, the contact points are just opening. Insure that particles of the cellophane are not left between the contact points after adjustment has been made.

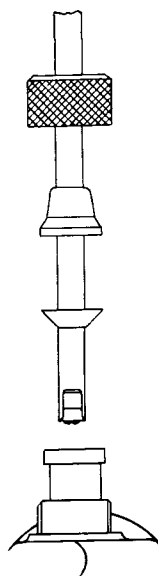


Fig. 2.

When the exact timing to the engine has been made, tighten and lock the mounting bolts and recheck the adjustment.

Installation of the Cables

The new type of individual high tension terminals for each cylinder used in these series magnetos eliminates the use of cable piercing screws. It permits the use of a snap terminal clip on the cable end which can be quickly attached to or disconnected from the distributor terminals which protrude from the main cover. The cable outlets are water-tight and are separated sufficiently to prevent flashing between the cables.

High tension terminals for vertical and angular outlet covers are not interchangeable.

The number discs adjacent to the high tension terminal bushings on the main cover indicate the serial firing order of the magneto and are not engine cylinder numbers.

Attach the high tension cables to the magneto as follows: (See Fig. 2).

1. Slip the knurled nut, rubber collar, and the rubber gland over the cable in the order named.
2. Strip the insulation from the cable end for about $\frac{1}{4}$ " and attach the terminal clip which is provided with the magneto. Insert the bare cable strands through the hole of the terminal clip and secure with a drop of solder.
3. Push the cable end into the terminal until the clip engages the groove provided and tighten the knurled head nut.

Care in Operation

The ball bearings of the magneto are packed in grease and require no lubrication except when the magneto is disassembled for overhaul. At such times the grease should be washed out and replaced with Keystone No. 44 grease or its equivalent.

At routine inspection intervals, take off the breaker cover by loosening the two knurled head securing screws and remove any excess oil. Thoroughly clean and dry the breaker mechanism to insure that oil will never touch the breaker contacts.

Adjustment of the Breaker Contact Points

The contact points are adjusted in the following manner:

1. Place the breaker in its full advance position (variable spark magnetos).
2. Turn the drive shaft until the mark \bar{A} (Fig. 1) on the chamfered tooth of the large distributor gear is opposite the timing pointer B inside the magneto cover as seen through the timing window. When these two marks are opposite each other, the breaker contacts should be just opening. A convenient way of checking this adjustment is to place a piece of thin cellophane between the contacts and pull against it slightly. When the cellophane slips, the contacts are separating. Insure that particles of the cellophane are not left on the contact points after the adjustment has been made.
3. If the contacts do not open at the proper time, loosen the two screws, A and B (Fig. 3), which hold the adjustable contact assembly in place and move it to right or left until the two contacts separate when the timing marks are opposite each other. It should be noted that the contact points are not adjusted for any fixed clearance between them.
4. If the contacts do not line up properly, the location of the contact and cam follower assembly can be adjusted by loosening the two screws, C and D (Fig. 3), which secure it to the housing. The screw holes are slightly elongated to permit this adjustment. After retighten-

ing the screws, recheck this adjustment to insure that it is correct.

5. Insure that the lubricating felt attached to the cam follower is soft and moist with oil. This felt supplies a very minute quantity of lubricant to the breaker cam.

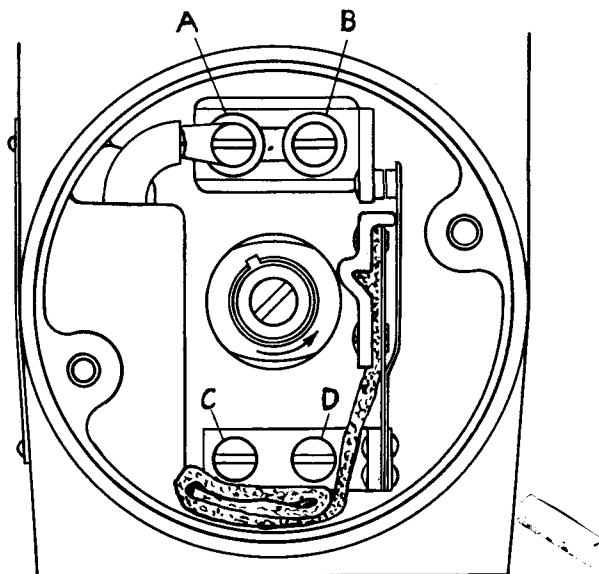


Fig. 3. Showing Breaker Mechanism.

If oil appears on the surface when the felt is squeezed between the fingers, do not add any more oil. If the felt is dry, however, moisten with a few drops of medium bodied mineral lubricating oil, preferably SAE 30. Do NOT give it all it will hold.

Before replacing the breaker, wipe out any dirt or excess oil which may have entered into the breaker compartment during adjustment.

WARRANTY AIRCRAFT UNITS

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 free replacement at our factory of any part of said unit which shall, within six (6) months after delivery to the original purchaser, or two hundred and fifty (250) operating hours, whichever event shall first occur, be returned to us with transportation charges prepaid and which examination shall disclose to our satisfaction to have been defective.

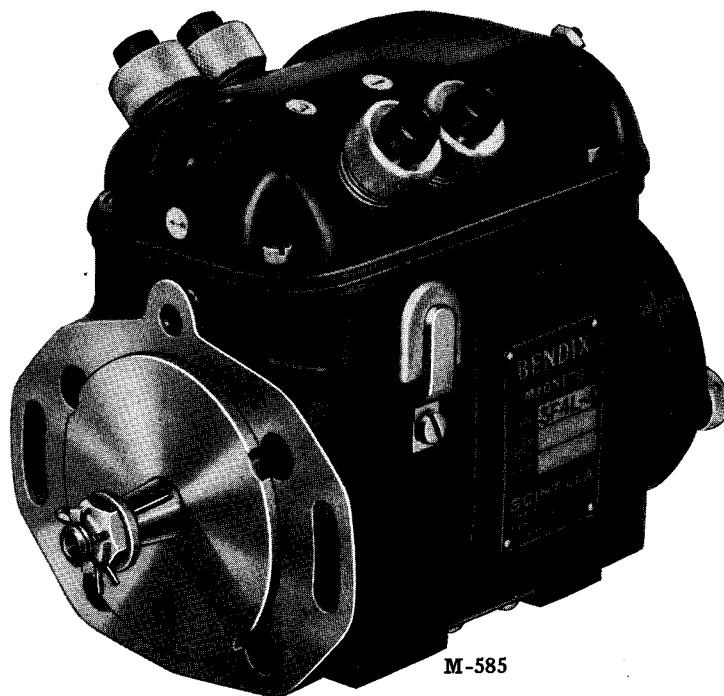
This warranty shall not apply to any unit which has been subjected to misuse, neglect, or accident, or which has been repaired or altered outside of our factory so as to, in our judgment, affect its performance or reliability. We are not responsible for failure of any unit because of improper installation or defective wiring, nor liable for damages or personal injury resulting directly or indirectly from the design, material, workmanship or installation of any of our products.

SCINTILLA MAGNETO DIVISION
BENDIX AVIATION CORPORATION
SIDNEY, NEW YORK, U.S.A.

BENDIX AIRCRAFT MAGNETOS

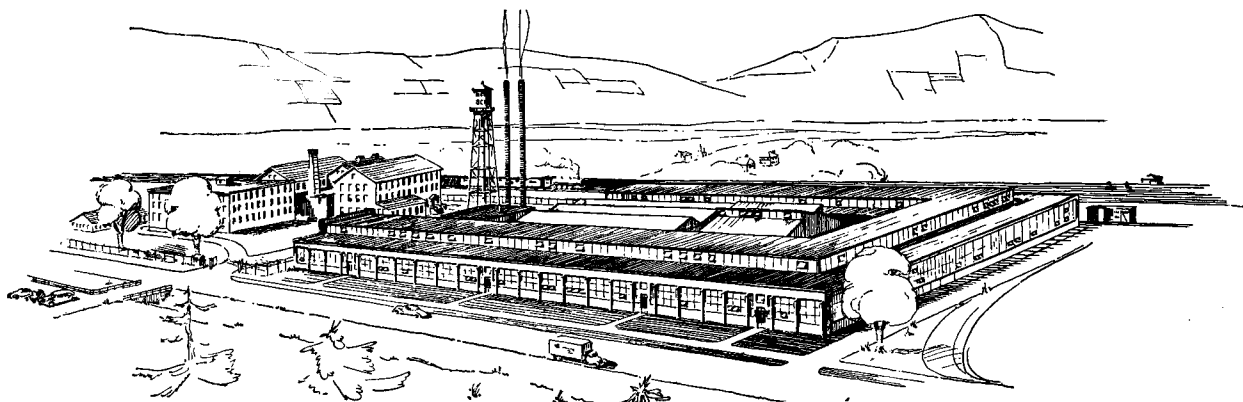
Types SF4R and SF4L Series

Service Parts List



M-585

Magneto Type SF4L-4

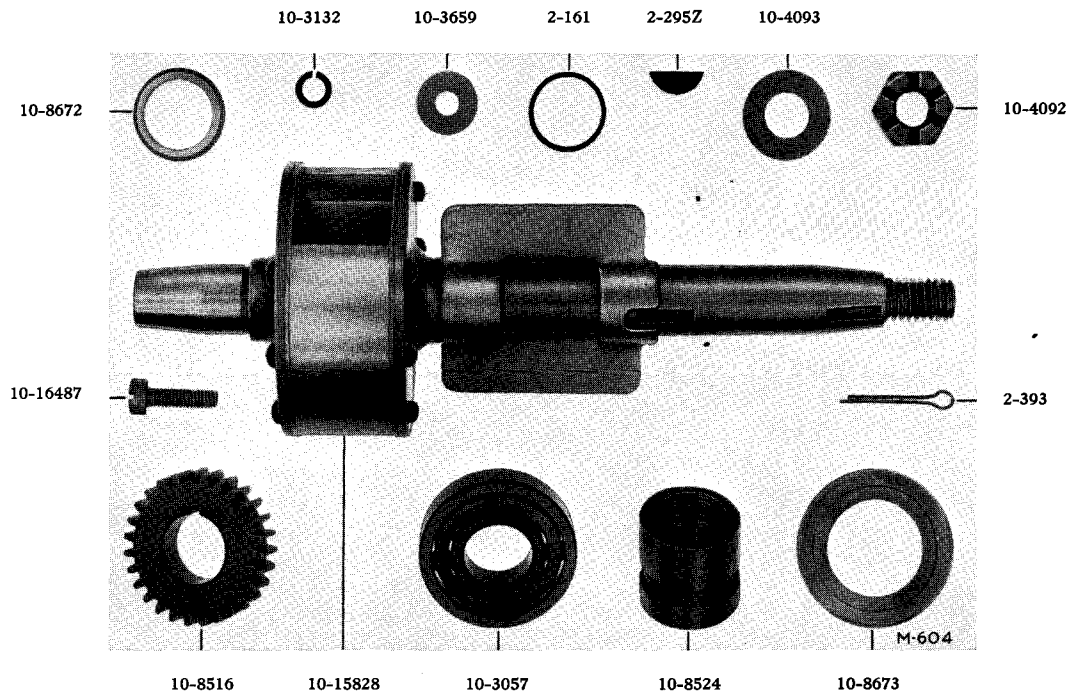


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BENDIX AVIATION CORPORATION

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BENDIX MAGNETOS

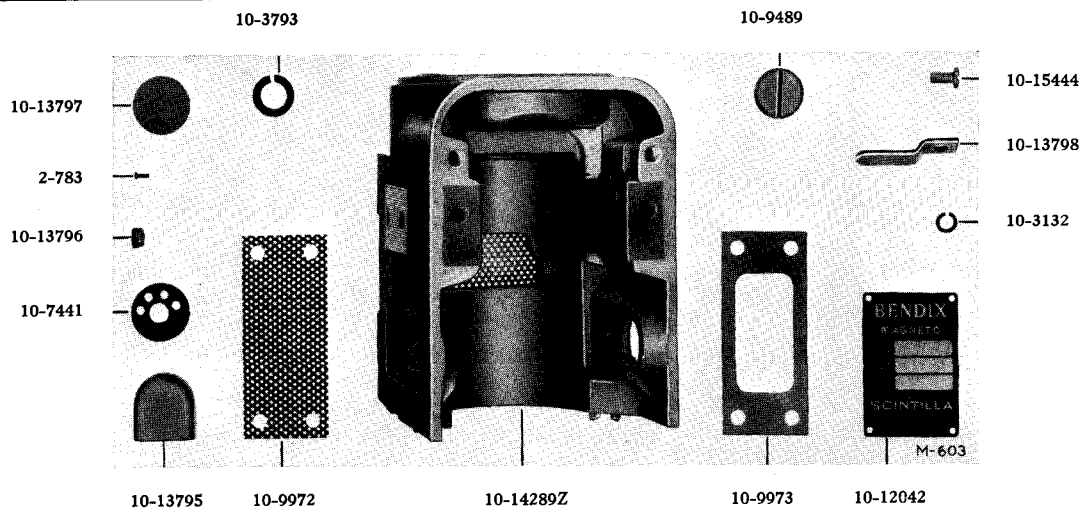


ROTATING MAGNET

Part No.	No. Req.	Description	Part No.	No. Req.	Description
2-161-1		WASHER—Shim—.0025" thick	10-4092	1	NUT—Drive Shaft
2-161-2		WASHER—Shim—.004" thick	10-4093	1	WASHER—Plain (Drive Shaft Nut)
2-161-3		WASHER—Shim—.005" thick	10-8516	1	GEAR—Distributor—Small—Clw.
2-161-4		WASHER—Shim—.008" thick	*10-12120	1	GEAR—Distributor—Small—Anti-clw.
2-161-5		WASHER—Shim—.010" thick	10-8524	1	CAM—Breaker—Fixed Spark
2-161-6		WASHER—Shim—.012" thick (Magnet End Play Adjusting)	*10-13053	1	CAM—Breaker—Variable Spark
2-295Z	2	KEY—Woodruff (1, Small Gear) (1, Drive Shaft)	10-8672	1	SPACER—Plain (Between Small Gear and Bearing)
2-393	1	PIN—Cotter (Drive Shaft Nut)	10-8673	2	OIL SEAL—Bearing (Magnet, Drive and Breaker Ends)
10-3057	2	BEARING—Ball (Magnet, Drive and Breaker Ends)	*10-9657	1	SPACER—Plain (Between Bearing and Front End Plate Oil Seal)
10-3132	1	WASHER—Lock (Cam Screw)	10-15828	1	MAGNET—Rotating
10-3659	1	WASHER—Plain (Cam Screw)	10-16487	1	SCREW—Cam Fastening

*Not illustrated.

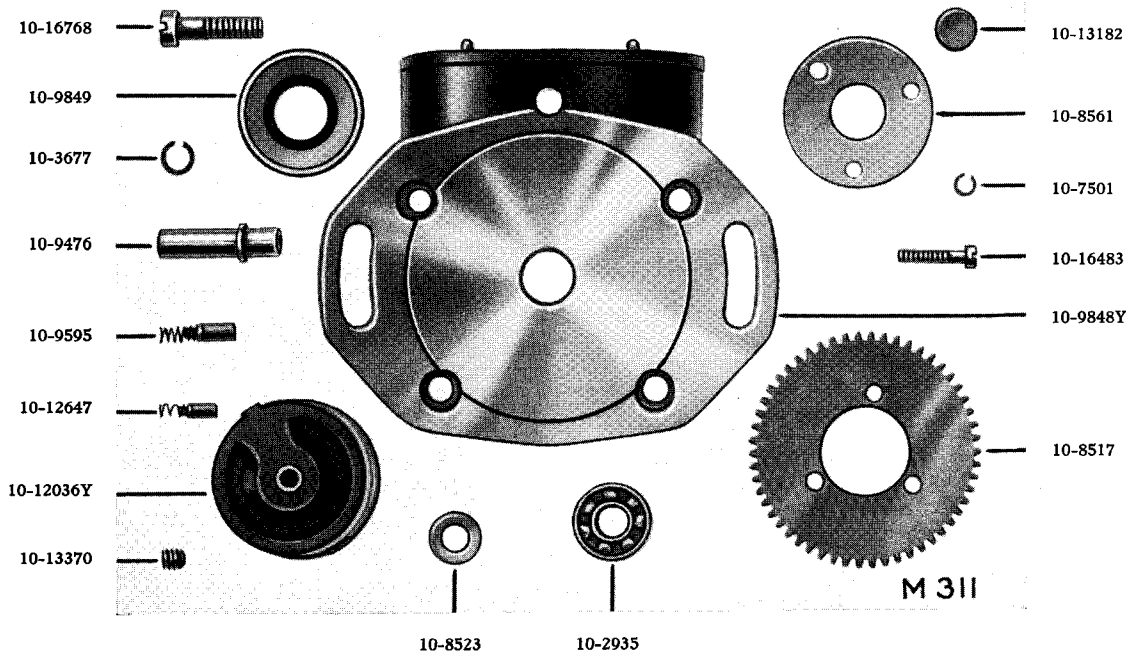
BENDIX MAGNETOS



MAGNETO HOUSING

Part No.	No. Req.	Description	Part No.	No. Req.	Description
2-783	4	DRIVE SCREW—Identification Plate Fastening	10-13797	2	SCREEN—Side Ventilator
10-3132	6	WASHER—Lock (2, Side Ventilator Clamp Screw) (4, Base Ventilator Plug Screw)	10-13798	2	CLAMP—Side Ventilator
10-3793	1	WASHER—Lock (Condenser Plug)	10-14289Z	1	HOUSING—Magneto—Fixed Spark (Except SF4R-8, SF4L-8)
10-7441	2	RETAINER—Side Ventilator Screen	*10-19805	1	HOUSING—Magneto—Fixed Spark (SF4R-8, SF4L-8)
10-9489	1	PLUG—Condenser Retaining	*10-14351	1	HOUSING—Magneto—Variable Spark
10-9972	1	SCREEN—Base Ventilator	*10-14673	2	VENTILATOR ASSEMBLY—Side—Complete (Includes 10-3132, 10-7441, 10-13795, 10-13796, 10-13797, 10-13798, 10-15444)
10-9973	1	PLATE—Base Ventilator Screen	10-15444	6	SCREW—Fastening (2, Side Ventilator Clamp) (4, Base Ventilator Plate)
10-12042	1	PLATE—Magneto Identification			
10-13795	2	SHIELD—Side Ventilator			
10-13796	2	SPACER—Side Ventilator Shield			

*Not illustrated.



FRONT END PLATE

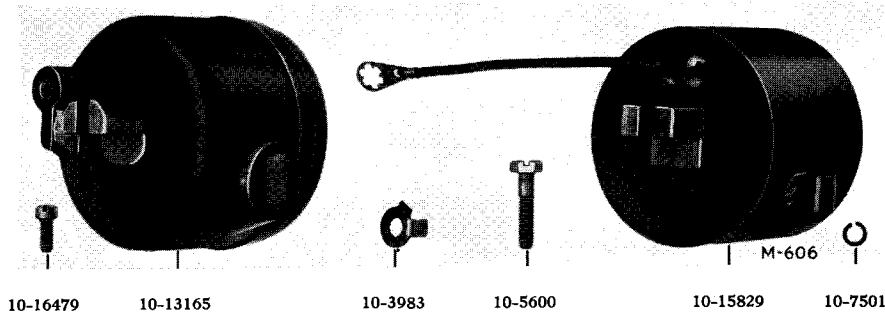
Part No.	No. Req.	Description	Part No.	No. Req.	Description
*10-1800	4	SCREW (For Plugging Impulse Coupling Fastening Screw Hole, Front End Plate 10-15648)	10-2935	1	BEARING—Ball (Distributor)
			10-3677	4	WASHER—Lock (End Plate Screw)
			10-7501	3	WASHER—Lock (Bearing Retainer Screw)

*Not illustrated.

FRONT END PLATE (Cont'd)

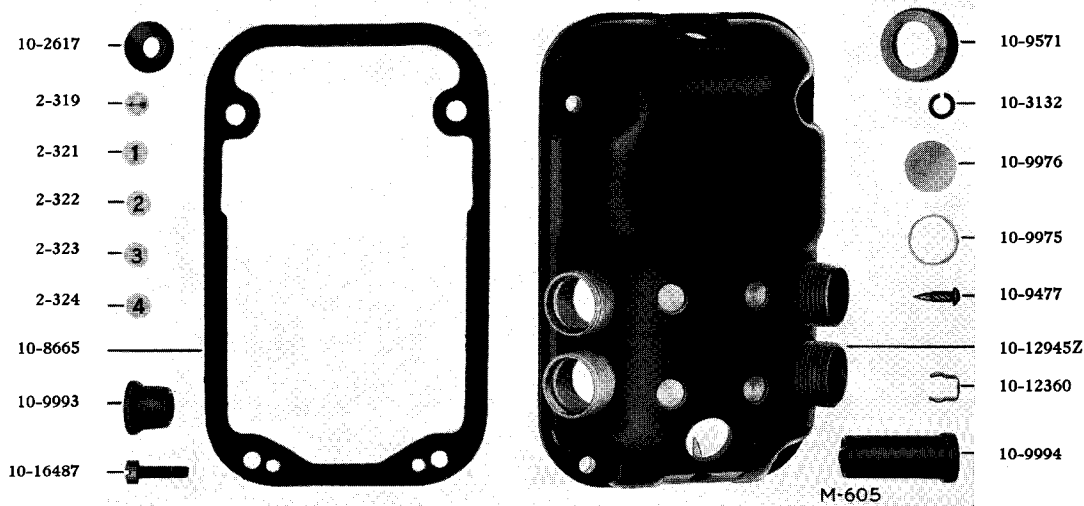
Part No.	No. Req.	Description	Part No.	No. Req.	Description
10-8517	1	GEAR—Distributor—Large	*10-12643	1	DISC—Distributor Axle Carbon Brush (Cylinder)
10-8523	1	WASHER—Plain (Axle)	10-12647	1	CARBON BRUSH (Axle)
10-8561	1	RETAINER—Bearing	*10-12651Y	1	CYLINDER AND GEAR ASSEMBLY—Distributor (Includes 10-2935, 10-7501, 10-8517, 10-8523, 10-8561, 10-9476, 10-12036Y, 10-12647, 10-16483)
10-9476	1	AXLE—Distributor	10-13182	4	PLUG—Leather (End Plate Screw Hole)
10-9595	1	CARBON BRUSH (Cylinder)	10-13370	1	SCREW—Axle Fastening
10-9848Y	1	PLATE—Front End	10-16483	3	SCREW—Bearing Retainer Fastening
*10-15648	1	PLATE—Front End (Drilled for Impulse Coupling Installation)	10-16768	4	SCREW—End Plate Fastening
10-9849	1	OIL SEAL—Drive Shaft			
10-12036Y	1	CYLINDER—Distributor			
*10-8560	1	BUSHING—Distributor Axle (Cylinder)			

*Not illustrated.



MAGNETO COIL

Part No.	No. Req.	Description	Part No.	No. Req.	Description
10-3983	2	WASHER—2 Ear Lock (Coil Core Screw)	10-13165	1	COIL (Molded Type)
10-5600	2	SCREW—Coil Core Fastening	10-15829	1	COIL (Built Up Type)
10-7501	1	WASHER—Lock (Connector to Coil Screw) Coil 10-13165 only	10-16479	1	SCREW—Connector to Coil Fastening Coil 10-13165 only



MAGNETO COVER

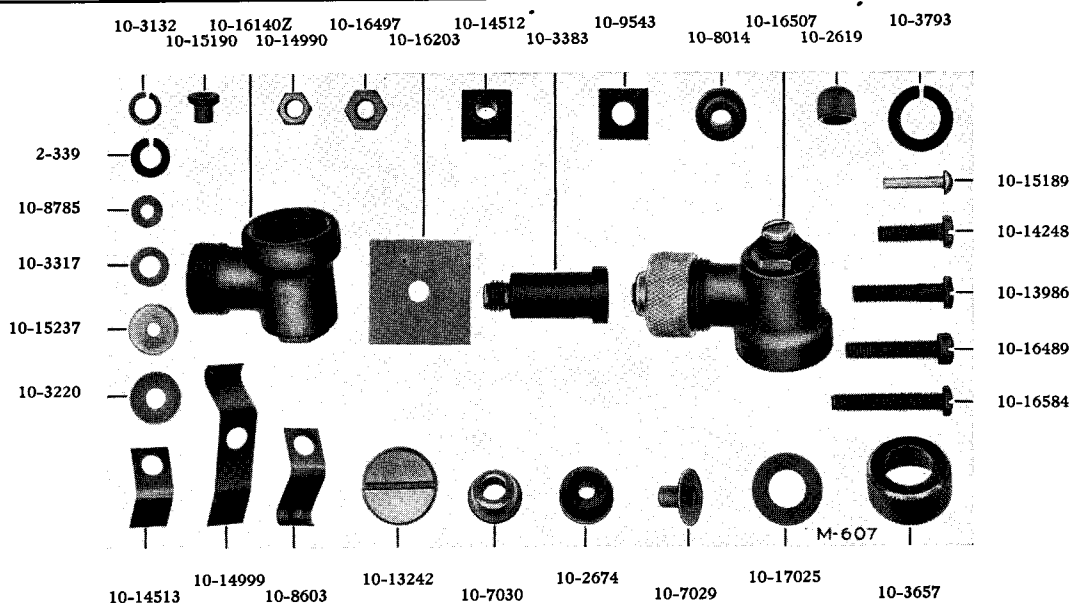
Part No.	No. Req.	Description	Part No.	No. Req.	Description
2-319	1	DISC—Rotation Direction	10-2617	4	GROMMET—Rubber (High Tension Terminal)
2-321	1	DISC—No. 1	10-3132	4	WASHER—Lock (Cover Screw)
2-322	1	DISC—No. 2	10-8665	1	GASKET—Cover
2-323	1	DISC—No. 3	10-9477	1	POINTER—Timing
2-324	1	DISC—No. 4	10-9571	4	NUT—High Tension Terminal Non-Shielded Installations

BENDIX MAGNETOS

MAGNETO COVER (Cont'd)

Part No.	No. Req.	Description	Part No.	No. Req.	Description
*10-14855	4	NUT—High Tension Terminal Shielded Installations	10-9994	4	TERMINAL—High Tension (Angle Outlet Cover)
10-9975	1	WASHER—Plain (Timing Window Retaining)	*10-13458	4	TERMINAL—High Tension (Vertical Outlet Cover)
10-9976	1	WINDOW—Timing	10-12360	4	CLIP—High Tension Cable
10-9993	4	COLLAR—High Tension Cable Non-Shielded Installations	10-12945Z	1	COVER—Magneto (Angle Outlet)
			*10-13457Z	1	COVER—Magneto (Vertical Outlet)
			10-16487	4	SCREW—Cover Fastening

*Not illustrated.



GROUND TERMINAL

Part No.	No. Req.	Description	Part No.	No. Req.	Description
NON-SHIELDED GROUND TERMINAL					
2-339	2	WASHER—Lock (Ground Contact Screw Nut)	10-8603	1	SPRING—Ground Contact Coil 10-13165 only
10-3220		WASHER—Plain (1, Primary Connector Insulator) Coil 10-15829 only (1, Ground Contact Spring) Bushing 10-8014 only	10-9543	1	PLATE—Insulating (Ground Contact Screw Nut)
10-3317	1	WASHER—Plain (Ground Contact Screw Nut)	10-13986	1	SCREW—Ground Contact Coil 10-13165 only
10-8014		BUSHING—Insulating, Round (1, Ground Contact Screw) Coil 10-15829 only (1, Ground Contact Spring) Coil 10-13165 only with covers having counterbore inside	10-16489	1	SCREW—Ground Contact Coil 10-15829 only
10-14512	1	BUSHING—Insulating, Square (Ground Contact Spring) Coil 10-13165 only with covers having recess inside	10-14513	1	SPRING—Reinforcing (Ground Contact Spring) Bushing 10-14512 only
			10-16203	1	INSULATOR—Primary Connector Coil 10-15829 only
			10-16497	2	NUT (Ground Contact Screw)
SHIELDED GROUND TERMINAL—INTEGRAL TYPE					
† 2-339	1	WASHER—Lock (Ground Contact Spring Screw Nut)	10-14512	1	BUSHING—Insulating, Square (Ground Contact Spring Screw) Covers having recess inside
10-2619	1	CONTACT BUTTON (Ground Terminal Screw)	†10-8785	1	WASHER—Plain, Inside (Ground Contact Spring Rivet)
10-2674	1	GROMMET—Rubber (Ground Terminal Screw)	†10-15237	1	WASHER—Plain, Outside (Ground Contact Spring Rivet)
10-3220	1	WASHER—Plain (Ground Contact Spring) Bushing 10-8014 only	†10-9543	1	PLATE—Insulating (Ground Contact Spring Screw Nut)
†10-3317	1	WASHER—Plain (Ground Contact Spring Screw Nut)	†10-14248	1	SCREW—Ground Contact Spring Fastening
10-3383	1	TERMINAL SCREW—Ground	10-14513	1	SPRING—Reinforcing (Ground Contact Spring) Bushing 10-14512 only
10-3657	1	NUT (Ground Terminal Screw)	10-14999	1	SPRING—Ground Contact
10-7029	1	FERRULE—Inner (Ground Terminal Cable)	†10-15189	1	RIVET—Ground Contact Spring Fastening
10-7030	1	FERRULE—Outer (Ground Terminal Cable)	†10-15190	1	BUSHING—Insulating (Ground Contact Spring Rivet)
10-8014	1	BUSHING—Insulating, Round (Ground Contact Spring Screw) Covers having counterbore inside	†10-16497	1	NUT (Ground Contact Spring Screw)

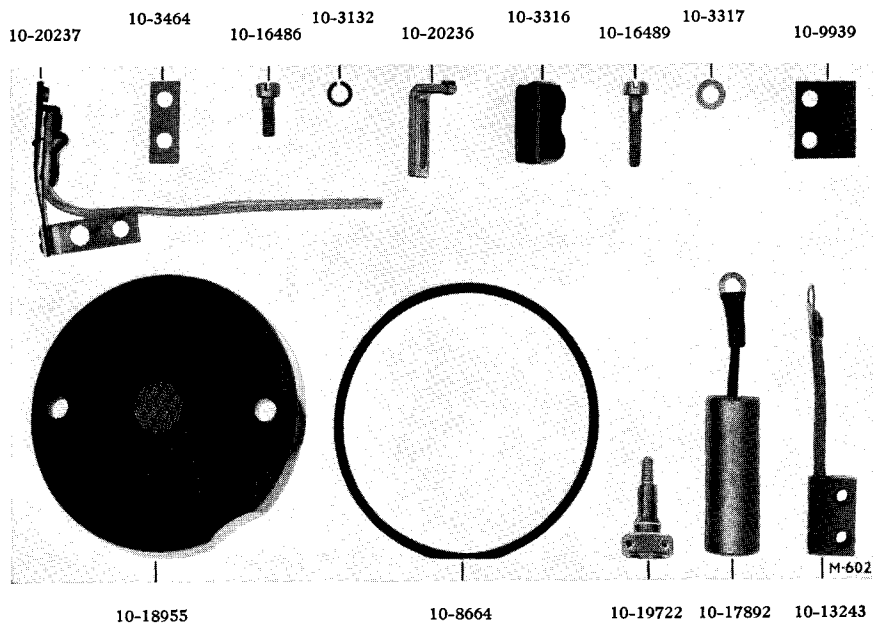
†Covers having Ground Contact Spring fastened by Screw and Nut.

‡Covers having Ground Contact Spring fastened by Rivet.

GROUND TERMINAL (Cont'd)

Part No.	No. Req.	Description	Part No.	No. Req.	Description
SHIELDED GROUND TERMINAL—REMOVABLE TYPE					
10-3220		WASHER—Plain (1, Primary Connector Insulator) Coil 10-15829 only (1, Ground Contact Spring) Bushing 10-8014 only	Detail Parts of Shield Assembly No. 10-16507		
10-8014		BUSHING—Insulating, Round (1, Ground Contact Screw) Coil 10-15829 only (1, Ground Contact Spring) Coil 10-13165 only with covers having counterbore inside	10-3132	2	WASHER—Lock (Ground Terminal Shield Screw Nut)
10-8603	1	SPRING—Ground Contact Coil 10-13165 only	10-2674	1	GROMMET—Rubber (Ground Terminal Cable)
10-14512	1	BUSHING—Insulating, Square (Ground Contact Spring) Coil 10-13165 only with covers having recess inside	10-3657	1	NUT (Ground Terminal Shield)
10-14513	1	SPRING—Reinforcing (Ground Contact Spring) Bushing 10-14512 only	10-3793	1	WASHER—Lock (Ground Terminal Shield Plug)
10-16203	1	INSULATOR—Primary Connector Coil 10-15829 only	*10-5534	1	WASHER—Plain (Ground Terminal Shield Screw Bushing)
10-16507	1	SHIELD ASSEMBLY—Ground Terminal—Complete	10-7029	1	FERRULE—Inner (Ground Terminal Cable)
			10-7030	1	FERRULE—Outer (Ground Terminal Cable)
			10-8014	1	BUSHING—Insulating (Ground Terminal Shield Screw)
			10-13242	1	PLUG—Ground Terminal Shield
			10-14990	2	NUT (Ground Terminal Shield Screw)
			10-16140Z	1	SHIELD—Ground Terminal
			10-16584	1	SCREW—Ground Terminal Shield Fastening
			10-17025	1	WASHER—Plain (Ground Terminal Shield Plug)

*Not illustrated.

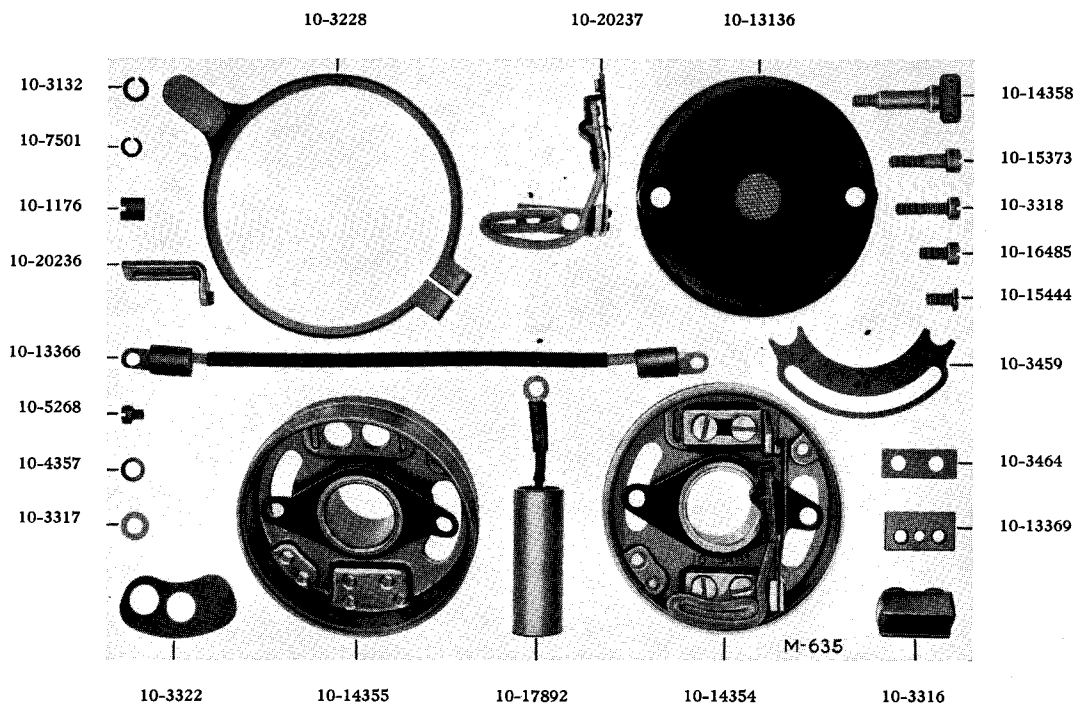


BREAKER ASSEMBLY—FIXED SPARK

Part No.	No. Req.	Description	Part No.	No. Req.	Description
10-3132	4	WASHER—Lock (2, Adjustable Contact Assembly Screw) (2, Contact and Cam Follower Assembly Screw)	10-9939	1	INSULATOR—Connector
10-3316	1	INSULATOR—Adjustable Contact Assembly	10-13243	1	CONNECTOR—Primary (Breaker to Coil) (Coil 10-13165 only)
10-3317	2	WASHER—Plain (Adjustable Contact Assembly Screw)	*10-15832	1	CONNECTOR—Primary (Breaker to Ground Terminal) (Coil 10-15829 only)
10-3464-1		SPACER—Shim—.025" thick	10-16486	2	SCREW—Contact and Cam Follower Assembly Fastening
10-3464-2		SPACER—Shim—.028" thick	10-16489	2	SCREW—Adjustable Contact Assembly Fastening
10-3464-3		SPACER—Shim—.032" thick	10-17892	1	CONDENSER
10-3464-4		SPACER—Shim—.035" thick	10-18955	1	COVER—Breaker
10-3464-5		SPACER—Shim—.020" thick (Contact and Cam Follower Assembly)	10-19722	2	SCREW—Breaker Cover Fastening
10-8664	1	GASKET—Breaker Cover	10-20236	1	ADJUSTABLE CONTACT ASSEMBLY
			10-20237	1	CONTACT AND CAM FOLLOWER ASSEMBLY

*Not illustrated.

BENDIX MAGNETOS



BREAKER ASSEMBLY—VARIABLE SPARK

Part No.	No. Req.	Description	Part No.	No. Req.	Description
10-1176	2	NUT—Breaker Housing Fastening	10-4357	2	WASHER—Plain (<i>Adjustable Contact Assembly Screw</i>)
10-3132	9	WASHER—Lock (1, <i>Advance Lever Screw</i>) (2, <i>Breaker Housing Nut</i>) (2, <i>Timing Range Plate Screw</i>) (2, <i>Adjustable Contact Assembly Screw</i>) (2, <i>Contact and Cam Follower Assembly Screw</i>)	10-5268	1	SCREW—Connector to Breaker Fastening
10-3228	1	LEVER—Breaker Advance and Retard	10-7501	1	WASHER—Lock (<i>Connector to Breaker Screw</i>)
10-3316	1	INSULATOR—Adjustable Contact Assembly	10-13136	1	COVER—Breaker
10-3317	2	WASHER—Plain (<i>Timing Range Plate Screw</i>)	10-13366	1	CONNECTOR—Primary (<i>Breaker to Coil</i>) (<i>Coil 10-13165 only</i>)
10-3322	1	INSULATOR—Connector Support	*10-16988	1	CONNECTOR—Primary (<i>Breaker to Ground Terminal</i>) (<i>Coil 10-15829 only</i>)
10-3459	1	PLATE—Breaker Timing Range	10-13369	1	SUPPORT—Connector
10-3464-1		SPACER—Shim—.025" thick	10-14354	1	BREAKER ASSEMBLY—Complete
10-3464-2		SPACER—Shim—.028" thick	10-14355	1	HOUSING—Breaker
10-3464-3		SPACER—Shim—.032" thick	10-14358	2	SCREW—Breaker Cover Fastening
10-3464-4		SPACER—Shim—.035" thick	10-15373	1	SCREW—Advance Lever Clamping
10-3464-5		SPACER—Shim—.020" thick (<i>Contact and Cam Follower Assembly</i>)	10-15444	2	SCREW—Timing Range Plate Fastening
			10-16485	2	SCREW—Contact and Cam Follower Assembly Fastening
			*10-17889	1	CONDENSER (<i>Coil 10-15829 only</i>)
			10-17892	1	CONDENSER (<i>Coil 10-13165 only</i>)
			10-20236	1	ADJUSTABLE CONTACT ASSEMBLY
			10-20237	1	CONTACT AND CAM FOLLOWER ASSEMBLY

*Not illustrated.