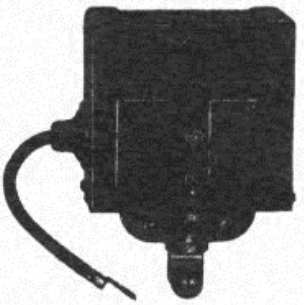
# SERVICE INSTRUCTIONS FOR MODEL EK WICO MAGNETO

## INDEX





MODEL EK
WICO MAGNETO

# INSTALLATION OF MAGNETO ON ENGINE

## TYPE #1, ECCENTRIC AND STRAP DRIVE

The Type 1 or Eccentric and Strap Drive, as the name implies, operates the magneto through the use of an eccentric and strap, from either the crank shaft or the cam shaft of the engine. The following is a brief outline of the steps involved in the operation of this type drive:

Except for the period during which the magneto is firing, the armature is held against the cores by the return spring and the magnetic attraction of the cores. The spark is produced by pulling the armature away from the cores. This "tripping of the armature", as it is called, is done by the drive spring which bears against the end of the rocker arm. The drive spring is compressed as the eccentric turns until finally the trip shoulder on the shaft inside the spring strikes against the end of the rocker arm and snaps the armature away from the cores. The compressed drive spring helps to make a quick break between the armature and the core. As the eccentric continues to revolve the pressure of the drive spring is relieved and the return spring throws the armature back to the cores again where it remains until the cycle is again repeated.

### TIMING CONTROL

The time at which the spark occurs is controlled by the advance lever (See Figure 1) which moves the rocker arm back and forth in relation to the trip shoulder (See F,

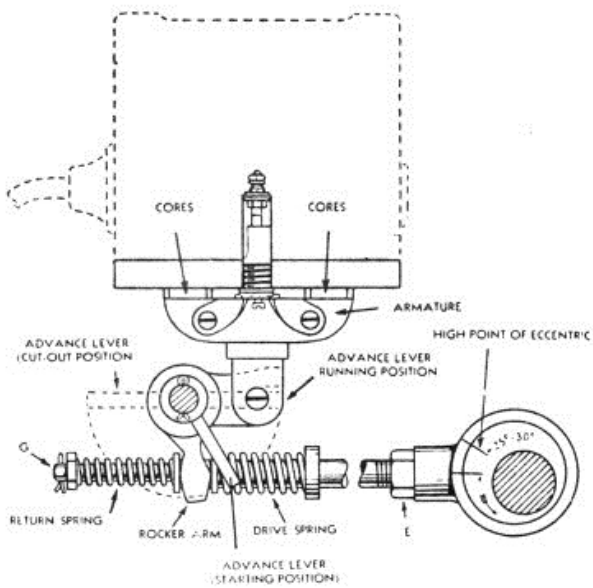



**Fig. 1**

Armature Ready to Trip, Advance Lever Retarded

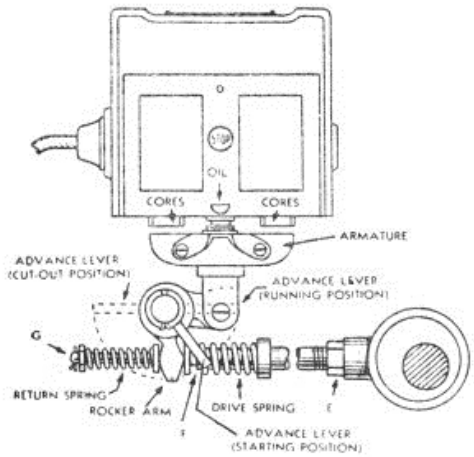



**Fig. 2**

Armature Just Tripped, Advance Lever Retarded

Figure 2). The advance lever can always be set in either the retard or advance position and on some engines it can also be set in a third position which will prevent the armature from tripping and thus render the engine inoperative. The advance lever should be in the retarded position for starting and in the advance position when the engine is running.

### ARMATURE OPENING

When the magneto is installed on an engine the eccentric should be properly located on its shaft, so that proper spark control may be secured with the least opening of the armature when the engine is at full speed. Large armature openings are undesirable because they put unnecessary strains on the wearing parts. The maximum armature opening should not exceed $\frac{1}{4}$".

### ECCENTRIC SETTING

For reversible engines, when the piston is at the end of its compression stroke, the eccentric should be at its point of maximum throw towards the end of the rocker arm.

For non-reversible engines (both 2-cycle and 4-cycle), when the piston is at the end of its compression stroke, the eccentric should be 25° to 30° before its greatest throw towards the rocker arm (See Figure II). In other words, when the eccentric is properly set on 2-cycle non-reversible engines, the flywheel will have to be rotated 25° to 30° beyond compression center before the eccentric reaches its greatest throw towards the rocker arm, and in 4-cycle engines the flywheel will have to be rotated 50° to 60° beyond compression center before the eccentric reaches its greatest throw towards the rocker arm, because in 4-cycle engines the flywheel rotates 2 degrees to the eccentric's 1 degree; while in

2-cycle engines the flywheel rotates 1 degree for every degree that the eccentric rotates. If this setting of the eccentric is used, the necessary movement of the advance lever to provide the proper advance can be accomplished without giving the armature so great a throw that it will leave the poles more than 1/4".

**TIMING ADJUSTMENT**

The lock nut E marks the position of the trip rod which has been properly set at the time the engine left the manufacturers plant. In the event that it becomes necessary to adjust the time at which the spark occurs this nut may be loosened and the rod rotated only enough to make certain that the magneto trips when the piston is at the end of the compression stroke with the magneto advance lever in the starting position. After this adjustment has been made tighten the lock nut securely.

**RETURN SPRING ADJUSTMENT**

The nut G which controls the adjustment of the return spring has also been properly set at the time the engine left the manufacturers plant and the position of this nut should not be changed. In the event that it is necessary to remove this nut for any reason the following procedure should be followed for its adjustment: Set the advance lever in the cut-out position (See Figure 2), or in the retarded position, if the engine has no cut-out position, turn the flywheel until the driving eccentric is at its point of greatest backward throw from the rocker arm. Then tighten the adjusting nut until the return spring is completely closed, then unscrew the nut one turn and lock in position.

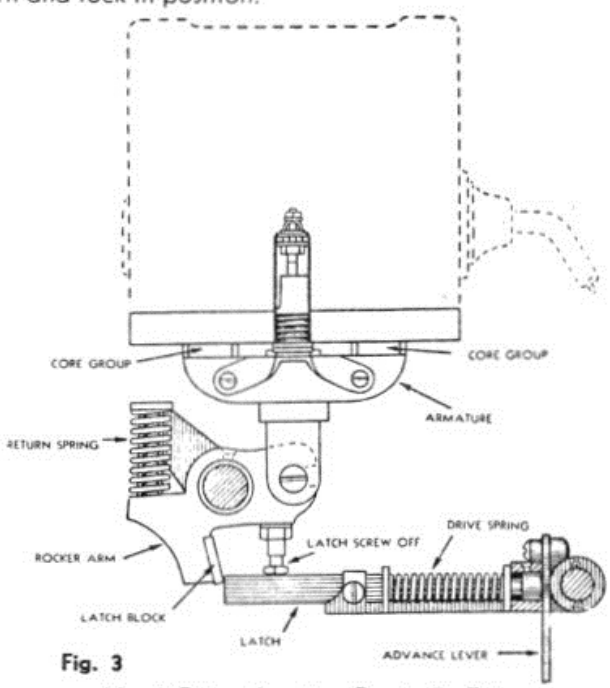



**Fig. 3**

**No. 2 Drive, Armature Ready To Trip**

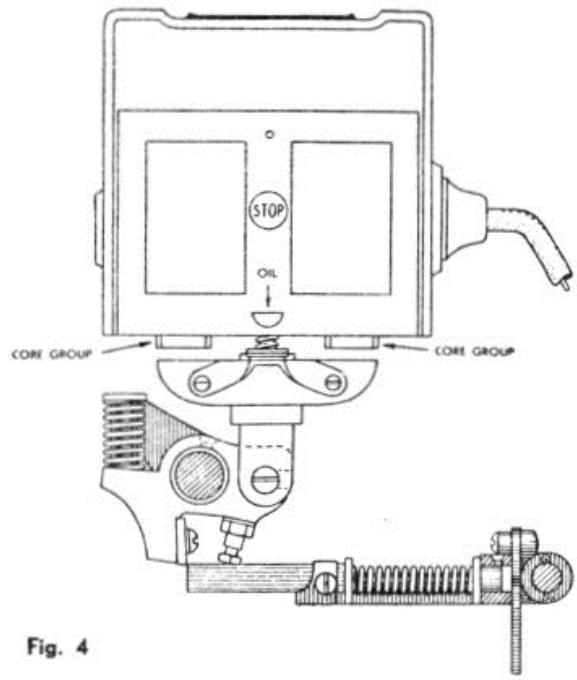



**Fig. 4**

**No. 2 Drive, Rocker Arm Ready To Latch Off**

**TYPE #2 PUSH ROD DRIVE**

The Push Rod Drive or Type No. 2 EK Wico Magneto Drive is used when the magneto is operated from the valve push rod of the engine. The tripping of the magneto is accomplished in essentially the same manner as in the No. 1 Drive, however the drive and return spring are in different positions and a different type drive yoke is used. Figures 3 & 4 clearly show the manner in which this type of drive operates. In Figure 3 the armature is shown in contact with the cores ready to trip, and the drive spring compressed. Figure 4 shows the armature away from the cores and the trip finger about to "latch-off" and return the armature to the cores. In this type drive the armature is tripped by the rocker arm when it is engaged by the trip finger on the push rod.

The trip finger latch bears against a spring and when the latch engages the rocker arm the spring is compressed until the end of the latch-rod strikes the advance lever and trips the armature. The compressed spring then drives the latch forward giving the rapid motion of the armature necessary for the operation of the magneto. After the armature has been snapped away from the cores the "latch-off" screw disengages the rocker arm from the trip finger latch and the return spring snaps the armature back into position on the cores.

### TIMING CONTROL

The timing of the spark is controlled by the advance lever which can be set in either the retarded position for starting or the advance spark position for running. When the advance lever points straight out from the engine (See Figure 5) the spark is retarded for starting. When the handle points downward (See Figures 5 and 3) the spark is advanced for running.

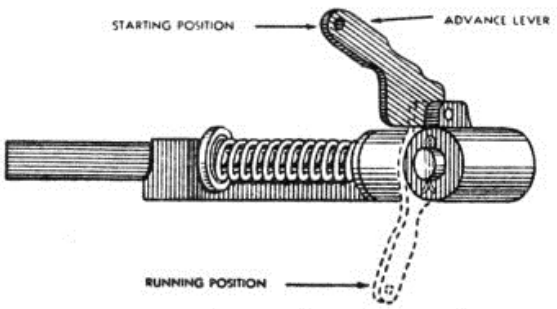



**Fig. 5 Trip Finger For #2 Drive Showing Positions Of Advance Line**

### TIMING ADJUSTMENT

When the magneto is installed on the engine, the proper timing is secured by locating the bracket which supports the trip finger, shown in Figure 5, at such a position on the push rod that the magneto trips at the end of the compression stroke when the advance lever is in the starting position.

This adjustment should not be altered unless it is found that something has occurred to make the magneto trip in a position other than that given above.

### LATCH OFF OF TRIP FINGER ADJUSTMENT

(See Figures 3 and 4)

The rocker arm of the Type No. 2 Drive is provided with a screw and lock nut for adjusting the "latch-off" of the trip finger. This screw must be set so that the latch will slip off the lip of the rocker arm just after the breaker points have been opened by the downward movement of the armature. If the screw is OUT too far the breaker points will not open and the magneto will not fire.

If the screw is IN too far the trip finger will drive the armature down too far and possibly break the return spring or the parts that hold it.

To adjust the latch-off trip the armature from its contact with the cores and insert strips of metal 3/32" thick between the armature and the face of the cores. Move the push rod slowly until the latch of the trip finger reaches the rocker arm. The edge of the latch should then just engage the edge of the latch block on the rocker arm, and the adjusting screw should be bearing on the top side of the latch (See Figure 4), so that the slightest further movement of the push rod will cause the latch to slip off the latch block.

If the latch does not engage the latch block when the armature is set as above, the adjusting screw should be screwed in until the latch just engages. If the latch engages the latch block too much (more than 1/32"), unscrew the adjusting screw to give the proper engagement. Loosen the lock nut on the adjusting screw (419) before attempting to change adjustment and be sure to set it up tight after the adjustment has been made. Before attempting to start the engine, remove the metal strips which were placed between the armature and the cores.

### REPLACEMENT OF LATCH AND LATCH BLOCK EDGES

(See Figures 3 and 4)

If the edge of the latch of Type No. 2 Drive becomes worn where it engages latch block, a fresh edge can be obtained by clamping the latch in a vise and pulling it out of the trip finger and giving it a quarter turn before replacing it. A fresh edge on the latch block may be obtained by loosening the latch block screw and giving the latch block a quarter turn before replacing it. The screw is headed over at its outer end and the heading should be filed off before attempting to loosen the screw. Be sure to replace the lock washer and set screw up tight. The latch-off screw should be removed to get at the latch block screw. After the latch block is replaced, the latch-off adjustment should be made as described above.

### TYPE #3 DRIVE

The Type No. 3 Drive is a combination of the features in the No. 1 and 2 Drive. In this case the magneto is operated from the valve push rod as in the Type No. 2 Drive, except that there is no "latch-off". The drive spring, return spring, rocker arm and trip shoulder operate in exactly the same manner as in the Type No. 1 Drive. The lock nut E (Figure 6) is provided for the locking of the trip rod in position with timing the magneto as explained under the Type No. 1 Drive.

The spark advance for this combination drive is obtained by means of an advance lever attached to the rocker arm. To advance the spark the lever is pushed down into position between the rocker arm and the trip washer, the trip shoulder strikes against the rocker arm sooner than it would if the advance lever were in a raised position.

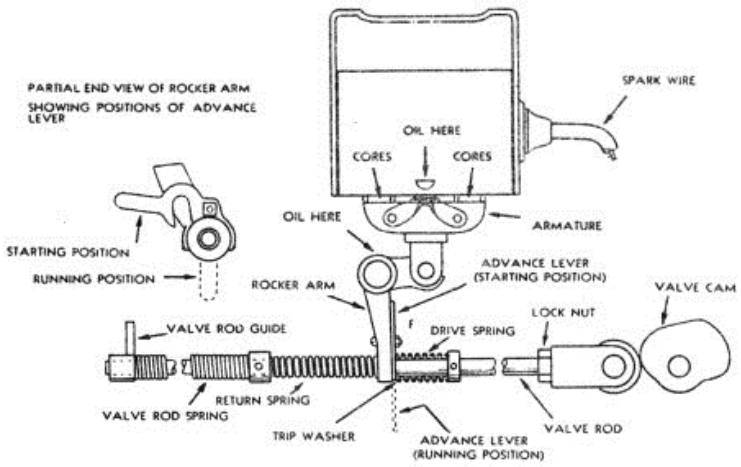



**Fig. 6 Type #3 Drive**

### TYPE 1A DRIVE

This drive operates in the same manner as the #1 drive with the exception that a different type trip finger is used.

The proper assembly of this trip finger is shown in figure 7. This assembly should be adjusted so that when the drive spring is fully compressed as shown, i.e., with the large washer in contact with the tube, screw down the trip finger nut until the spring is neither loose nor compressed. Then lock with the second nut, or if there is only one nut, rivet end of rod to prevent loosening of the nut.

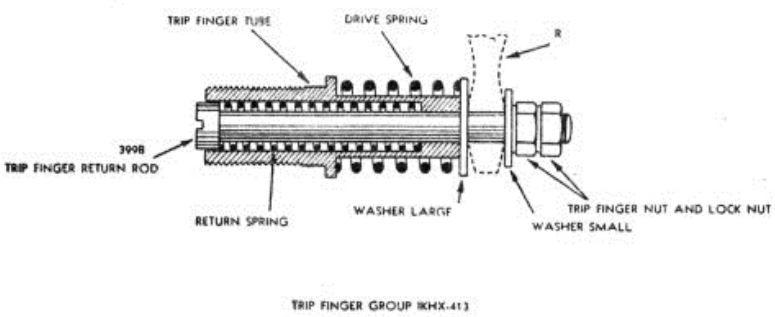



**Fig. 7 Trip Finger Used On 1A Drive**

## REPAIR OF MAGNETO

### MOVING PARTS

All moving parts can be withdrawn from the magneto by lifting the armature from its magnetic contact with the cores. When replacing the armature make sure that the oil pad slips over the guide rod.

### BREAKER POINTS ADJUSTMENT

On engines using the type No. 1 Eccentric and Strap Drive, the breaker point contact should just open when the armature is about 1/16" away from the cores. On engines using the type No. 2 Push Rod Drive or the type No. 3 Combination Drive the breaker point contacts should just open when the armature is 3/32" away from the cores.

To adjust contacts, withdraw the moving parts and loosen the lock nut on the stem of the breaker point. Replace the moving parts and insert metal strips either 1/16"or 3/32" thick (See above) between the armature and the face of the cores. Hold the contact from turning by inserting a key in the slot B in its side. Turn the screw until the moving contact just fails to touch the fixed contact. Then remove the armature from the magneto and set up the nut tight against the lock washer and contact, taking care that the screw does not turn in the contact while doing this. Replace armature and check this adjustment.

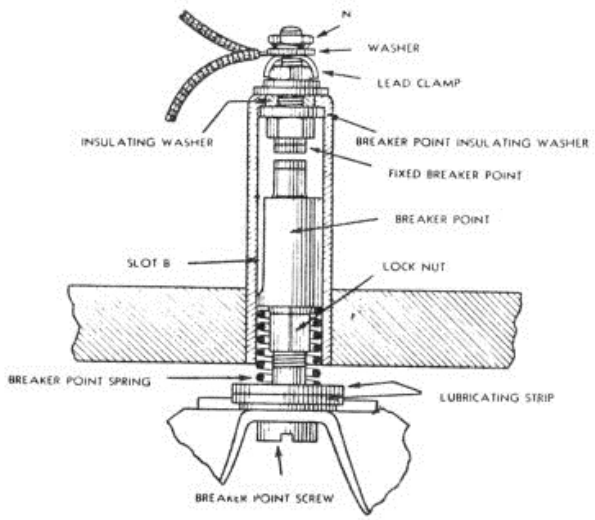



**Fig. 8 Assembly of Broken Parts**

As soon as adjustment has been made, be sure to remove the temporary strips placed between armature and cores.

### REPLACEMENT

To replace the moving contact: Withdraw the armature group, loosen the breaker point nut and unscrew the contact from the breaker point screw. Screw on the new contact being careful to replace the lock washer between the contact and the nut.

To replace the fixed contact: Remove the front cover and withdraw the armature. Disconnect the two leads from the breaker point tube. Remove all nuts and washers from shank of tube and push the contact out of the tube. The breaker point insulating washer and the breaker point tube insulating washer should also be removed from inside this tube. New insulating washers and nuts are supplied with each new fixed contact and these should be used.

New points should be set as outlined under adjustment.

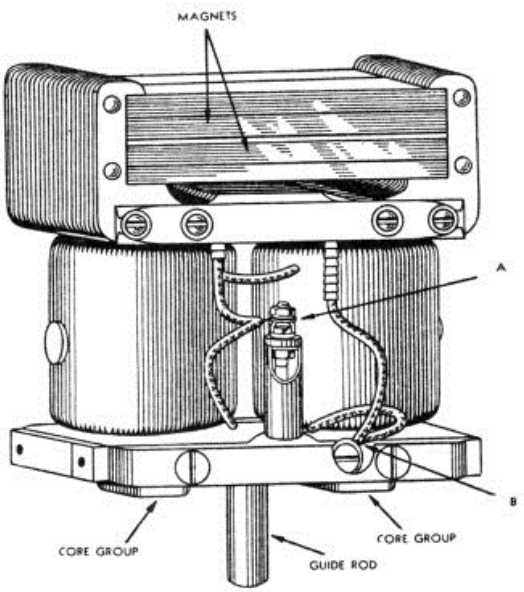



**Fig. 9 Magneto with Covers and Moving Parts Removed**

## CONDENSER

The condenser, 12-X235, should have a capacity of 10-.12 microfarads. If, when tested, it shows to be below capacity, the condenser should be replaced.

To remove the condenser it is necessary to remove the covers, disconnect the condenser leads and remove the cross arm IKA-146. The condenser may then be removed from its position beneath the magnets.

## COILS

Testing

It is not necessary to remove the coils from the magneto when testing them. To test the right hand coil, IKBX-103, when using an Eiseman Coil Tester, remove the secondary interlead between the two coils and then disconnect the primary ground lead at B, Fig. 9 and connect it to the ground lead from the tester. Connect the breaker lead from the tester to the primary interlead of the coil. Connect the secondary interlead to the ground lead from the tester and then connect the spark lead from the tester to secondary terminal on the coil.

When testing the left hand coils, IKBX-104, the above procedure is followed with the exception that the primary lead of the left hand coil is removed from A, Fig. 9 and connected to the ground lead from the tester.

## MAGNETS

Do not remove the magnets from the magnet and core group. Their magnetism will instantly be destroyed and nothing gained as every part of the magneto that may conceivably require renewal can be replaced without removing the magnets from the core group.

After any repairs or adjustments have been made to the magneto which have necessitated the removal of the armature, the magnets should be recharged. When recharging the magnets the magneto should be completely reassembled with the exception of the side bands and covers. The charging blocks must be placed in contact with the ends of the magnet and core group, i.e., the two surfaces of the magnet and core group which run parallel to the side band, when the side band is in position, and which are immediately above the high tension terminals on the coils.

**EXPLODED VIEW OF MODEL EK PARTS SHOWN ON PAGE EK 3 OF SERVICE PARTS SECTION**

# SERVICE PARTS LIST FOR MODEL EK WICO MAGNETOS

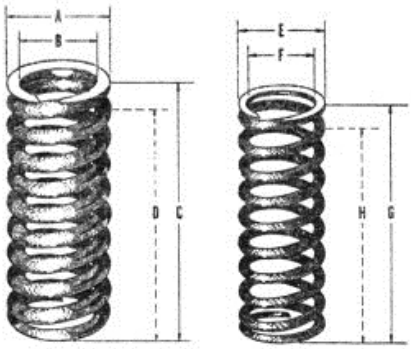
| Part No. | Part Name |
|---|---|
| IKA-5 | Latch Block |
| IKA-6 | Latch Block Screw |
| IKA-22 | Side Band Screw |
| M-32XA | Breaker Point Tube Insulating Washer |
| IKA-33 | Secondary Interlead |
| IKC-38 | Terminal Contact Spring (3/4" long) |
| IKD-38 | Terminal Contact Spring (3/16" long) |
| M-53X | Breaker Point L. W. |
| IKD-74 | Name Plate |
| IKB-94 | Ground Contact |
| IKB-94 | Ground Connection |
| IKA-97 thru IKO-97 | Return springs See table for dimensions |
| IKBX-103 | Coil Group (right hand) |
| IKBX-104 | Goil Group (left hand) |
| IKBX-107 | Core Group |
| IKBX-120 | Terminal Block Group (Screw Type) |
| IKCX-120 | Terminal Block Group (Push Type) |
| IKDX-121 | Lead Wire Group (Screw Type) (6") |
| IKFX-121 | Lead Wire Group (Push Type) (6") |
| IKA-122 | Cable End (Screw Type) |
| 12-122 | Cable End (Push Type) |
| IKA-124 | Secondary Interlead Tube |
| IKAX-132 | Side Band Group |
| IKFX-136 | Terminal Group (IKDX-121 and IKBX-120) 6" |
| IKHX-136 | Terminal Group (IKFX-121 and IKCX-120) 6" |
| 12-X140C | Fixed Contact Group |
| IKCX-140 | Fixed Contact Group (Use 12-X140C) |
| IKAX-141 | Magnet and Core Group |
| IKAX-145 | Deck only (no fixed contact) |
| IKA-146 | Cross Arm |
| IKA-151 | Deck Screw |
| IKA-152 | Front Cover (Plain) |
| IKC-152 | Front Cover (No Oil Hole) |
| IKA-153 | Back Cover |
| IKB-168 | Breaker Point Insulating Washer (Inside) |
| IKA-172 | Pole Yoke Screw |
| IKC-173 | Breaker Point Rod |
| IKAX-176 | Breaker Point Spring |
| IKB-177 | Breaker Point Insulating Washer (Outside) |
| 12-182 | Name Plate Rivet |
| IKB-184 | Breaker Point Tube Insulating Washer |

| Part No. | Part Name |
|---|---|
| IKA-186 thru IKM-186 | Drive Springs See table for dimensions |
| A-199X | Magneto Buffer Spring (Witte 2, 3, 4, 6 and 8 H. P. |
| A-199XA | Magneto Buffer Spring (Witte 15, 20 and 30 H. P. |
| A-199XB | Magneto Buffer Spring (Witte 10 H. P.) |
| IKA-200 | Assembly Plate |
| IKD-206 | Coil Gasket |
| 12-X207 | Deck Half Group (includes fixed breaker point) |
| IKB-208 | Breaker Point Contact Washer |
| IKHX-214 | Front Cover Group (push button switch) |
| IKGX-214 | Front Cover Group (push button switch, no oil hole) |
| IKD-223 | Breaker Point Movable Contact (Use 12-223D) |
| 12-223D | Breaker Point Movable Contact |
| 12-X235 | Condenser Group |
| IKA-236 | Deck Gasket |
| IKB-238 | Breaker Point Lead Clamping Washer (Use 2965) |
| IKA-239 | Coil Wedge |
| IKA-240 | Breaker Point Lead Clamp |
| IKBX-241 | Coil Group IKBX-103 and IKBX-104 with Connection Wires |
| IKA-242 | Drive Spring Adjusting Washer (1/64" thick) |
| IKB-242 | Drive Spring Adjusting Washer (1/32" thick) |
| IKB-245 | Ground Lead Clamp Washer |
| IKB-253 | Return Spring Support |
| IKC-253 | Return Spring Support (for armature yoke) (fork special) |
| IKC-257 | Breaker Point Spring Washer |
| 12-258B | Armature Fork Bolt (Standard) |
| 12-258C | Armature Fork Bolt (long head) |
| 12-258E | Armature Fork Bolt (1 1/8" long) |
| IKB-266 | Breaker Point Lubricating Strip |
| 12-284C | Armature Fork Bolt Nut Standard |
| IKA-285 | Armature Fork Bolt Bushing Standard |
| IKB-286 | Latch Block Screw Lock Washer |
| 12-X296D | Breaker Point Moving Group |
| 12-302 | Breaker Point Nut (3/32" thick) |

SERVICE PARTS LIST CONTINUED ON NEXT PAGE

| Part No. | Part Name |
|---|---|
| 12-302C | Breaker Point Nut (1/4" thick) |
| IKA-362 | Armature Fork Bolt Lock Washer |
| IKA-363 | Armature Fork Bearing Block |
| IKB-363 | Armature Fork Roller |
| IKA-374 | Trip Finger Clip |
| IKA-376 | Trip Finger Clip Screw |
| IKA-387 | Ground Connection screw L. W. |
| IKA-400 | Armature Cover |
| IKA-402 | Latch Rod |
| IKC-403 | Advance Lever |
| IKA-406 | Rocker Arm |
| IKAX-407 | Latch Group |
| IKA-410 | Buffer Spring (Novo) |
| IKAX-412 | Rocker Arm Group (Uses IKA-419) |
| IKBX-412 | Rocker Arm Group (Uses IKB-419) |
| IKCX-413 | Trip Finger Group |
| IKGX-413 | Trip Finger Group (Barrel Type) |
| IKA-415 | Drive Spring Washer |
| IKA-419 | Latch-off Screw |
| IKB-419 | Latch-off Screw (Large Head) |
| IKA-420 | Latch-off Screw Nut |
| IKA-422 | Trip Finger Support Spring |
| IKA-423 | Latch-off Screw Lock Washer |
| IKC-429 | Trip Finger Frame Group |
| IKA-430 | Ground Spring Washer |
| 12-X502D | Breaker Point Set (replacement) |
| IKBX-505 | Breaker Point Lubricating Felts |
| IKAX-511 | Set of Coil Connecting Wires |
| IKCX-513 | Armature Group |
| IKDX-513 | Armature Group |
| IKEX-513 | Armature Group |
| IKGX-513 | Armature Group |
| IKAX-515 | Armature Fork Bolt Group |
| IKBX-515 | Armature Fork Bolt Group |
| IKCX-515 | Armature Fork Bolt Group |
| IKB-518 | Breaker Point Ground Button |
| IKA-519 | Breaker Point Ground Spring |
| IKA-520 | Breaker Point Ground Spring Rivet |
| IKB-520 | Breaker Point Ground Spring Rivet |
| IKA-709 | Condenser Cover |
| 2965 | Breaker Point Lead Clamp Washer |

## DRIVE AND RETURN SPRING DIMENSIONS




| Drive Springs | | | | |
|---|---|---|---|---|
| PART NO. | A | B | C | D |
| IKA-186 | .485 | .285 | 1 21/32 | 1 7/16 |
| IKB-186 | .751 | .475 | 1 3/4 | 1 5/8 |
| IKC-186 | .701 | .477 | 1 | 7/8 |
| IKD-186 | .824 | .600 | 1 1/2 | 1 9/32 |
| IKE-186 | .995 | .655 | 1 5/32 | 1 15/64 |
| IKF-186 | .685 | .515 | 1 7/8 | 1 1/4 |
| IKH-186 | .701 | .477 | .633<br>.638 | 9/16 |
| IKM-186 | .716 | .500 | 13/16 | 10/16 |

| Return Springs | | | | |
|---|---|---|---|---|
| PART NO. | E | F | G | H |
| IKA-97 | .615 | .481 | 1 13/32 | 1 11/64 |
| IKC-97 | .443 | .325 | 1 11/16 | 1 17/32 |
| IKD-97 | .459 | .325 | 2 29/32 | 2 3/4 |
| IKE-97 | .634 | .500 | 1 21/32 | 1 1/2 |
| IKF-97 | .649 | .515 | 1 3/8 | 21/32 |
| IKG-97 | .549 | .415 | 2 15/32 | 2 17/32 |
| IKJ-97 | .443 | .325 | 1 53/64 | 1 43/64 |
| IKK-97 | .585 | .405 | 1 27/32 | 1 3/16 |
| IKL-97 | .632 | .420 | 2 5/32 | 2 |
| IKM-97 | .490 | .335 | 2 | 1 27/32 |
| IKO-97 | .590 | .410 | 1 1/4 | 1 3/32 |

Decimal Dimensions ± .015" Fractional Dimensions ± 1/32"

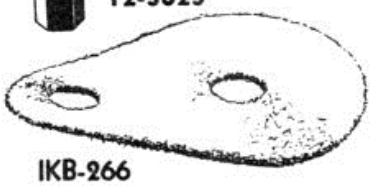
# SERVICE PARTS ILLUSTRATIONS MODEL EK MAGNETO

12-223D

IKA-176

M-54X

12-3023



IKB-266

IKB-266

IKC-256

12-173

12-X296D
Moving Contact
Replacement Group

12-302

M-52X

2965

IKA-240

12-302

M-52X

IKB-208

IKB-177

M-32XB

IKB-168

11-301

12-X140C
Fixed Contact
Replacement
Group

Enlarged view of fixed and moving contact parts. All of the above parts are included in kit #12-X502D.

IKBX-120
Screw Type
Terminal

IKCX-120
Push Type
Terminal

IKA-153

IKAX-132

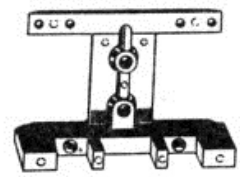




IKC-38

IKA-22


Front
Cover



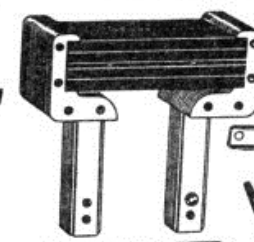
IKA-200

IKA-236

12-X235

12-X207
Includes
Fixed Contact

IKAX-145
Does not
Include
Fixed Contact

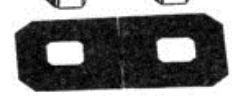


IKAX-141

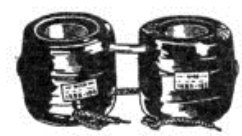
IKA-146



IKA-172



IKD-206

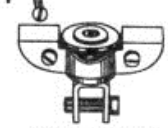


IKBX-241

IKD-206

IKA-151

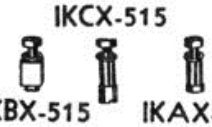
IKEX-513



IKDX-513

IKCX-513

IKCX-515



IKBX-515

IKAX-515

IKA-400