Wisconsin

Service Manual

VH4

Service® Manual

BOOK OF INSTRUCTIONS

WISCONSIN *Air-Cooled*

FOUR CYLINDER ENGINE

Model VH4

3¼" Bore
3¼" Stroke
107.7 cu. in. Disp.

NOTE: Engine having Stellite Exhaust Valves and Valve Seat Inserts is designated as Model VH4D.

INDEX

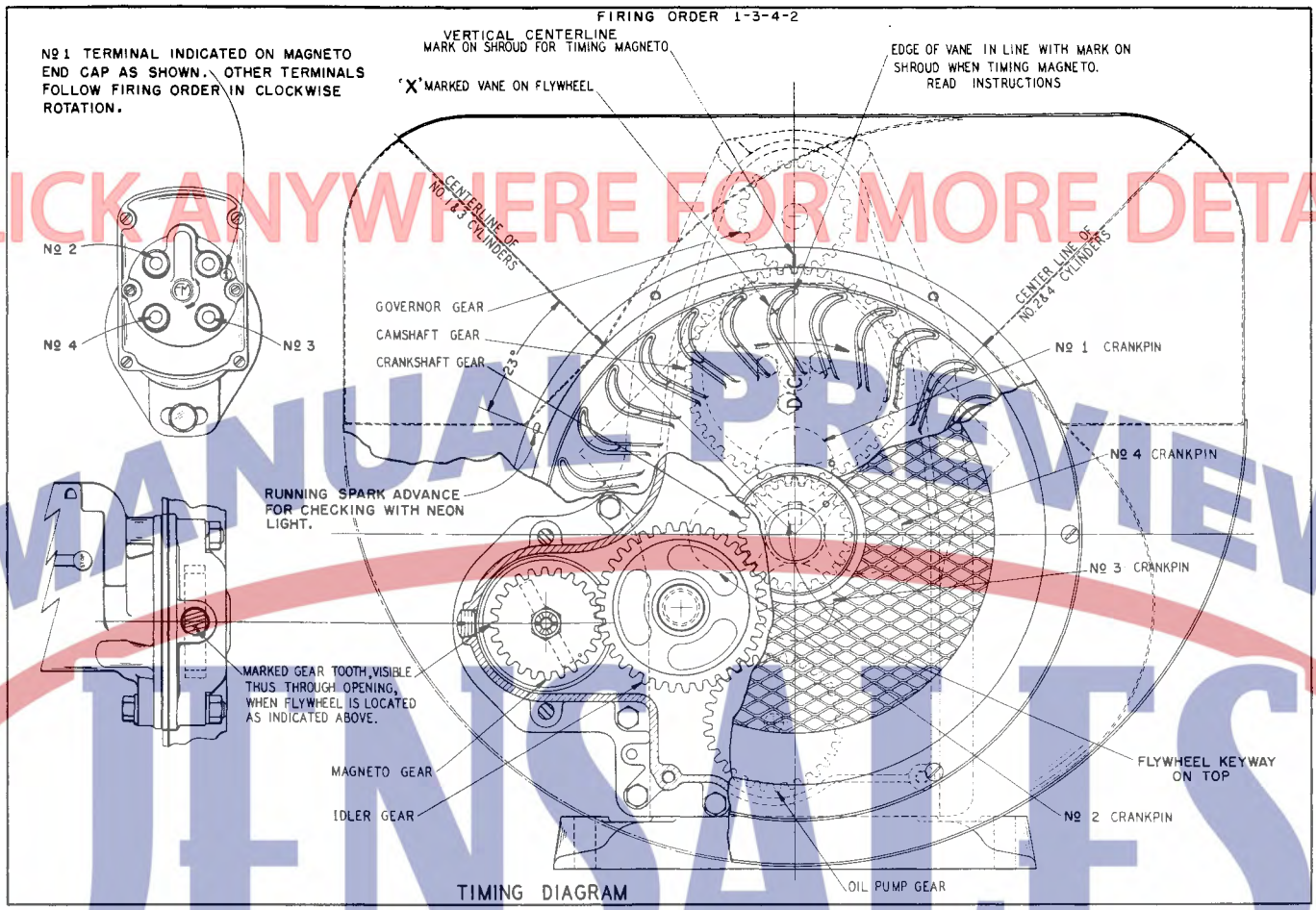

Fig. 11, MAGNETO TIMING DIAGRAM

in preceding paragraph under 'Magneto Breaker Point Adjustment'. If this does not remedy the trouble, it may be necessary to install a new condenser. See Magneto Manufacturer's Maintenance Instructions in back of this book.

MAGNETO TIMING

The magneto is properly timed at the factory, but if for any reason it is necessary to retime the magneto, the following instructions will be helpful.

First remove the screen over the flywheel air intake opening by taking out the screws holding the screen in place. This will expose the ***timing marks*** on flywheel and shroud for timing magneto. *See Fig. 11.*

Next, remove the spark plug from No. 1 cylinder and turn the engine over slowly by the starting crank, at the same time holding a finger over the spark plug hole, so that the compression stroke can be determined by the air blowing out of the hole.

The flywheel is marked with the letters ***'DC'*** near one of the air circulating vanes. This vane is further identified by an ***'X'*** mark cast on the end. *See Fig. 11.* When the air blows out of the No. 1 spark plug hole, continue turning the starting crank until the edge of the ***marked vane*** on flywheel is on line with the ***mark*** on the ***vertical centerline*** of the ***shroud*** as shown on *Fig. 11.* Leave flywheel in this position. At this point the ***keyway*** for mounting the flywheel is also on top.

Next, remove the inspection hole plug from the magneto timing opening, located in the gear cover as shown in *Fig. 10.*

Assuming that the magneto has been removed from the engine, the following procedure should be followed before replacing magneto.

The Number 1 cylinder firing position of the magneto must be determined. Insert the ignition cable into the No. 1 tower terminal of the magneto end cap and hold the spark plug terminal at the other end, about 1/8" away from the magneto body. Turn the magneto gear in a clockwise rotation, tripping the impulse coupling, until the No. 1 terminal sparks, then hold the gear in this position. Mount the magneto to the engine, meshing the gears so that when the magneto is in place, the gear tooth marked with an **'X'** will be visible through the lower half of the inspection hole in the gear cover. *See Timing Diagram, Fig. 11.* Tighten the nut and capscrew for mounting the magneto to the gear cover, making sure the magneto flange gasket is in place.

The No. 1 terminal is identified on the magneto cap. The terminals follow the proper firing order of 1-3-4-2 in a clockwise direction viewing the cap end. The leads from the magneto should be connected to spark plugs of corresponding numbers.

No. 1 cylinder is the cylinder nearest the fan-flywheel of the engine in the left bank and No. 3 cylinder is the other cylinder in that bank. No. 2 cylinder

what if desired, as will be self-evident to the mechanic. Reassembly of the engine should be made in the reverse order.

ACCESSORIES

The air cleaner, magneto, and if an electric starter and generator are used, these should be removed first.

SHEET METAL HOUSE

With engines enclosed in a sheet metal house, the top cover or canopy of the house should be removed by taking out the screws holding it to the end panels. For removing end panels, see following paragraphs.

FLYWHEEL

After the flywheel screen has been removed, drive out the starting crank pin in the crankshaft and remove the flywheel nut and washer.

Fig. 18 76696C

The flywheel is mounted to a taper on the crankshaft. Take a firm hold on the flywheel fins, pull outward and at the same time strike the end of the crankshaft with a babbitt hammer, *see Fig. 18*. The flywheel will slide off the taper of the crankshaft. Do not use a hard hammer as it may ruin the crankshaft and bearings. When reassembling the flywheel, be sure the Woodruff key is in position on the shaft and that the keyway in the flywheel is lined up accurately with the key.

AIR SHROUDING

To disassemble air shrouding, refer to *Fig. 19*. First remove cylinder head covers and the screws mounting the flywheel shroud to the lower cylinder shrouds and cylinder heat deflectors, then remove the screws holding the flywheel shroud to gear cover.

On power units, remove the front end panel as shown in *Fig. 20* together with flywheel shroud, and the rear end panel, *see Fig. 21*, complete with fuel tank.

Balance of shrouding can now be readily removed.

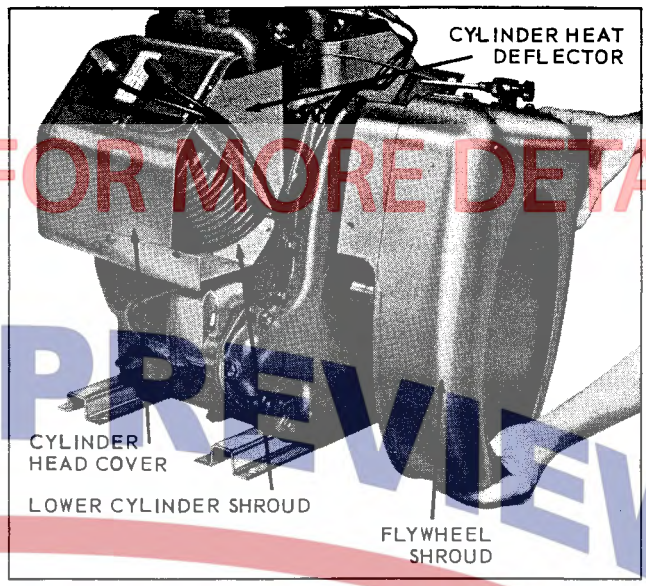

Fig. 19 104811C

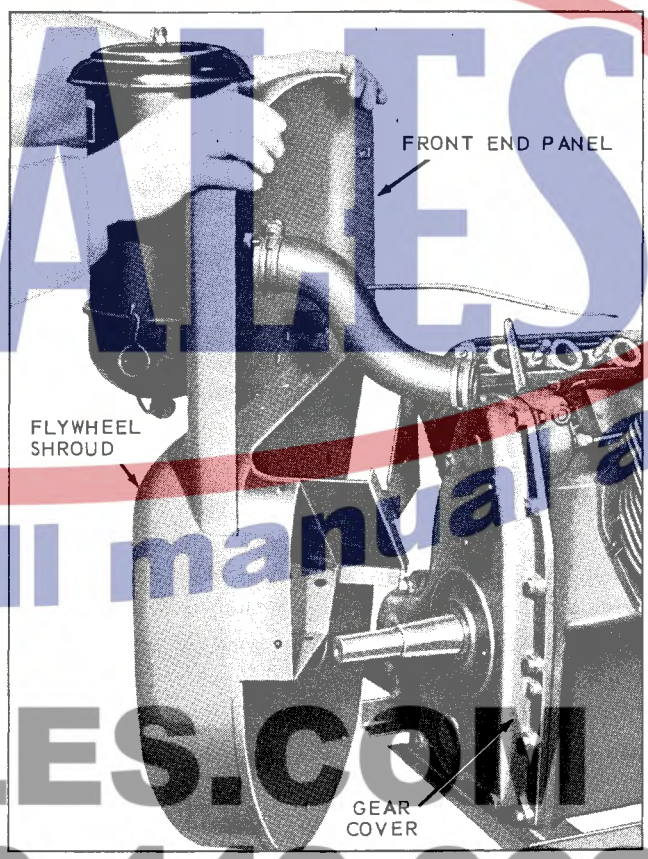

Fig. 20 104719C

FUEL TANK

If a side mount gasoline tank is used, this should be removed next as shown in *Fig. 22*.

CARBURETOR AND MANIFOLD

The carburetor and manifold can be removed as a complete unit.

In reassembly tighten the nuts for mounting the manifold, 18 to 23 foot pounds torque. Tightening beyond specification may cause the flanges to break.

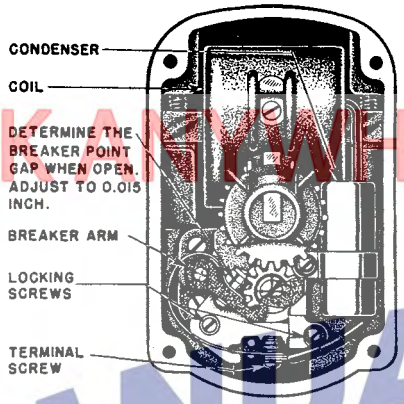

Fig. 1. End View of Type FM-X4B7A Magneto

Fig. 1. Then move the contact support until the proper breaker point clearance is obtained. This is accomplished by means of a screwdriver inserted in the horizontal slot at the bottom of the contact support and pivoted between the two small bosses on the bearing support. Lock the assembly in place by tightening the locking screws, and take a final measurement of the breaker point gap after the locking screws are tightened.

FURTHER FIELD SERVICE NOT RECOMMENDED

The cam felt wick, if dry or hard, should be replaced by a new factory-impregnated wick. This is done by substituting a new cam wick and holder assembly for the old assembly. Other than this, Types FM-X4B7A and FM-XZE4B7 magnetos do not require field lubrication and any attempt to oil or grease the bearings is inadvisable. The lubricants should be renewed only during a complete overhaul of the magneto by a Factory-Authorized Magneto Service Station. Coil and condenser replacements, while simple, are not recommended unless test equipment is available. No attempt should be made to remove the magneto rotor from the frame. It is locked in a special drive end thrust bearing and specific instructions must be carefully followed in releasing the shaft.

INTERNAL TIMING

If, for any reason, the magneto has been dismantled to the extent that the distributor gear has been removed the teeth must be properly meshed with those of the magnetic rotor gear upon reassembly. The gear teeth are marked to facilitate the internal timing of the magneto. Since Types FM-X4B7A and FM-XZE4B7 magnetos are both clockwise in rotation, the single marked tooth of the rotor gear must mesh between the two teeth of the distributor gear designated by the letter C.

SEALING TYPE FM-X4B7A MAGNETO

Before replacing the end cap on the magneto frame, clean the contact surfaces between the end cap and the frame. Then coat both contact surfaces completely with Fairbanks-Morse FMCO2 Gasket Varnish, place a new gasket in the joint, and mount the end cap on the frame, tightening the four screws securely.

TIMING MAGNETO TO ENGINE

The importance of correctly timing the magneto to the engine cannot be overemphasized. Two methods are given: (1), the advance spark position method and (2), the impulse coupling trip method. Whichever method is used, the breaker points must first be accurately adjusted to secure proper timing of the ignition spark.

(1) Advance Spark Position Method

A. Magneto

Set the magneto for advance spark position in the No. 1 cylinder. This is done by first mounting the distributor rotor on the distributor shaft and then turning the magnetic rotor until the distributor contact points diagonally upward to the right, 45° above the horizontal, as illustrated in Fig. 2. This applies to both the standard Type FM-X4B7A magneto and the radio-shielded FM-XZE4B7. The magneto is now timed for advance spark position in the No. 1 cylinder and should be held exactly in this position until it is coupled to the engine.

B. Special Drive Gear Types FM-X4B7A and FM-XZE4B7 magnetos are both equipped with a special drive gear mounted on the rotor shaft and locked to the impulse coupling by means of the drive lugs. The gear is a slip fit on the coupling bushing, since movement of the gear with respect to the coupling bushing and rotor shaft occurs during the impulse period. If the gear has been removed, it is necessary to exercise care in reassembly, since both coupling and gear are symmetrical.

With the distributor rotor in the position described in Paragraph A above, mount the drive gear on the magnetic rotor shaft so that the marked tooth is aligned with the impulse coupling pawl stop pin. See Fig. 3.

Fig. 2. Timing Diagram

C. Engine

Engine builders usually indicate by marks on the flywheel and flywheel housing the position of the engine for advance timing. Refer to the engine instructions for details concerning the timing marks on your particular engine. Then rotate the crankshaft until the timing marks coincide, indicating that the No. 1 cylinder is in advance spark firing position. Be sure that the piston is on its compression stroke.

(2) Impulse Coupling Trip Method

This method is convenient to use when the drive gear has not been removed from the magneto.

A. Magneto

If the magneto is the standard non-radio shielded unit, remount the end cap cover on the end cap, following the same procedure used in sealing the joint between the end cap and the magneto frame. If the magneto is the radio-shielded FM-XZE4B7, replace the end cap on the frame, preferably using a new lead gasket between the

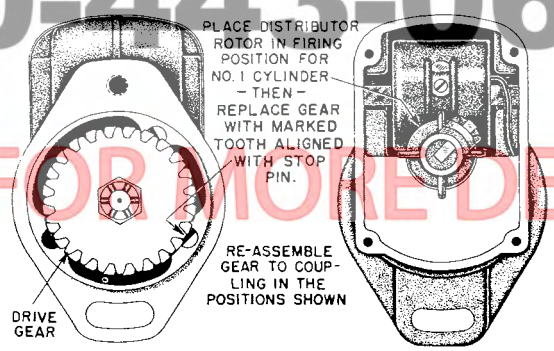

Fig. 3. Drive Gear Marking and Assembly