



Kohler
Service, Part, &
Operator's Manual
K90, K90R,
K90P & K90T
Engines

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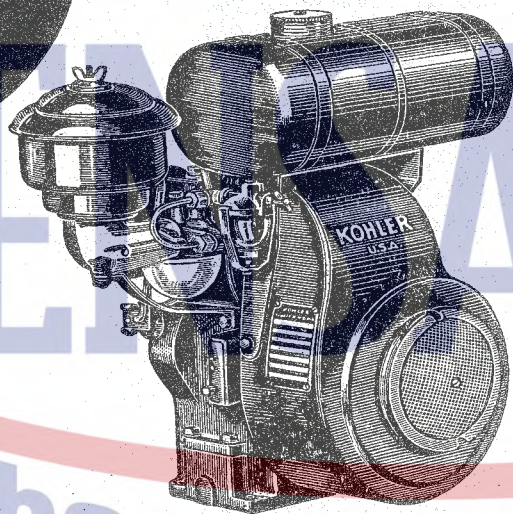
KO-SOP-K90+

Service, Part, & Operator's Manual

KOHLER ENGINES

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K90



**OPERATION
MAINTENANCE
AND PARTS**

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DETAILED INSTRUCTIONS FOR REPAIR AND MAINTENANCE OF K-90 ENGINE

IGNITION SYSTEM

Description

The ignition system consists of magneto, spark plug, spark plug cable and breaker assembly.

In case of misfiring, the spark plug should be inspected first. Then the breaker points should be checked.

Magneto

The Bendix - Scintilla K1 series magnetos are high tension crankshaft magnetos designed for use on small one cylinder engines. They combine dependability with light weight and simplicity.

The rotating magnet turns in close relation to a pair of laminated iron pole shoes, the outer ends of which carry the coil assembly. The pole shoes as well as the condenser are secured to a mounting flange which is a sturdy aluminum casting. The breaker is operated by a cam on the engine camshaft.

Beginning with engine serial number 286901, a Phelon magneto has replaced the Bendix Scintilla. The specification letter was changed to "c". The Phelon magneto gives the additional voltage required for easy starting. The two magnetos are not completely interchangeable in all cases. Write the factory giving serial number of engine for listing of parts required.

Maintenance

Ordinarily these magnetos will operate over extremely long periods of time without the need for adjustment or repair. However, if engine operating difficulties are experienced which appear to be caused by the ignition system, the magneto output should be checked to determine if this unit is functioning properly.

This check is accomplished by disengaging the high tension cable from the spark plug and holding it by its insulation in such a position that the metal terminal is about $\frac{3}{16}$ inch from grounded part of the engine. While holding the wire in this position, spin the engine over at normal cranking speed. If the magneto sparks this gap, the trouble is not in the magneto.

Should a magneto fail to spark, inspect the breaker points.

If the contact points are dirty, they may be cleaned with a little clean gasoline. Make sure no particles of lint are left between the point surfaces if a brush or cloth is used. If severely burned, the points should be replaced.

The contacts must be properly adjusted. When fully open, there should be about twenty thousandths (.020") of an inch between the point surfaces. Check with a feeler gauge. If the contacts do not open the proper distance, loosen the screws which hold the contact breaker and shift the assembly slightly to obtain the correct clearance of about .020" between the point surfaces.

The coil and condenser are removable for testing or replacement purposes. To remove the coil, pry off the coil clamps and lift off the coil.

We recommend that the coil be tested with the Weidenhoff Model D-358 Winding Tester in accordance with the instructions furnished with the instrument. When making the Spark Discharge Test, a primary indexer reading of less than 12 is desirable and a reading of 12 is permissible. Coils testing over 12 should be discarded. Set the primary indexer pointer at 30 while testing for marginal insulation leaks. Any coil that leaks at this value should be replaced.

Remove the condenser by taking out its securing screw and test with the Bendix-Scintilla 11-1767 Primary Condenser Tester or equivalent. The condenser capacity should be at least .15 mfd.

Before installing the coil on magnetos that incorporate a high tension connection insulator, fill the cavity of the insulator about two-thirds full of Bendix-Scintilla No. 47 compound. When reinstalling the coil clamps, push them into place by applying pressure on the curved portion. *Do not hammer into position.*

Ignition Timing — Position of Piston Below T.D.C.
Per Degree of Crankshaft

Flywheel Position		Piston Below T.D.C.®
In.	Deg.	
0	0	0
$\frac{1}{2}$	8.8	.010
1	17.6	.050
$1\frac{1}{2}$	26.4	.125
2	35.2	.220
$2\frac{1}{2}$	44.0	.340
3	52.8	.480

20 deg. on flywheel = .063" = $\frac{1}{16}$ " piston down from T.D.C.



Figure 9
Bendix Scintilla Magneto

- | | |
|-----------------|-------------------|
| A Stop button | D Pole shoes |
| B Bearing plate | E Rotating magnet |
| C Magneto coil | F Condenser |



Figure 12

Installation of Governor Shaft and Bushing

The cylinder block is placed on its side and governor shaft installed with the regulator disc, speed control bracket, and bushing. See Figure 12. Place the snap ring on the shaft to prevent it from falling into the cylinder.

Slide the governor spring and arm assembly on the shaft and tighten nut.

Installation of Camshaft Assembly

The cylinder block should be turned upside down and valve tappets placed in the tappet guides.

Figure 13 illustrates the installation of the camshaft assembly and camshaft pin.

Hold the camshaft assembly in position shown, and slide the camshaft pin through from the bearing plate side and press into the power take-off side of the block.

Camshaft end clearance should be .005 to .020".

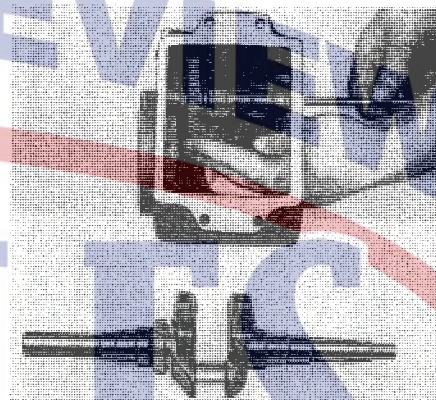


Figure 13

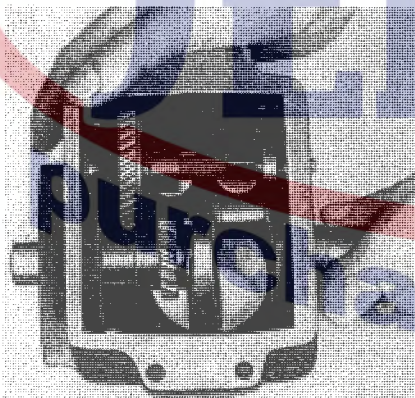


Figure 14

Installation of Crankshaft in Cylinder Block

The installation of the crankshaft in the cylinder block is illustrated in Figure 14.

Timing marks are provided on crankshaft and camshaft gears to correctly time the engine. The mark on a tooth of the camshaft must line up with mark on the shoulder of the crankshaft after the crankshaft is in place. Chalk may be used to show up timing marks more clearly.

Installation of Bearing Plate

Press the front main ball bearing into the plate with the same tool used to press the rear ball bearing into the cylinder block. See Figure 15.

Assemble the bearing plate to the cylinder block as illustrated in Figure 16.

Press the bearing plate, gasket, and ball bearing on the crankshaft and into the block carefully to prevent bending the crankshaft.

Even pressure around the entire plate prevents distortion.



Figure 15

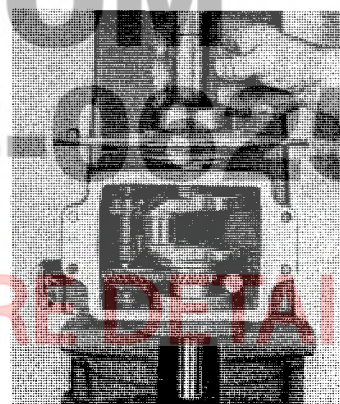


Figure 16

Installation of Phelon Magneto

The Phelon magneto is screwed to the bearing plate. It differs from the Bendix Scintilla in that the magnets are in the flywheel and the magneto assembly is not pressed on the crankshaft. The coil and condenser very seldom need replacement.

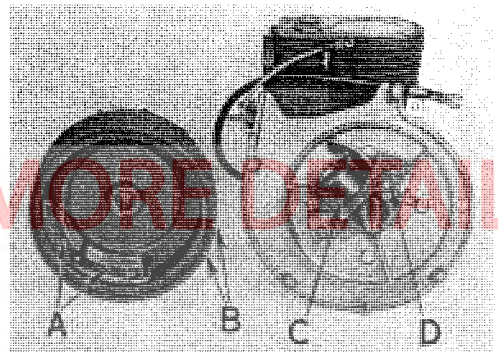


Figure 26a
Phelon Magneto

A Magnets
B Timing marks
C Coil
D Condenser



Figure 26

Installation of Bendix Scintilla Magneto

Woodruff key must be installed in key slot in crankshaft. Now the engine is ready for the installation of the magneto and rotating magnet. Figure 26 shows the magneto being put into place on bearing plate. Notice that the breaker lead and high tension spark plug cable have been pulled through the opening in the bearing plate. After the magneto assembly has been bolted to the bearing plate, the rotating magnet must be pressed onto the crankshaft.

Installing Breaker Points and Checking Breaker Point Gap

Install breaker push rod before bolting the breaker point assembly to the cylinder block.

Check breaker point gap with a feeler gauge. See Figure 27. Breaker points should be adjusted to a gap of about .020".

Attach breaker point lead to the breaker points. Bolt breaker point cover to cylinder block, making sure that the rubber grommet is inserted in the side opening of the cover. On later engines, a timing hole, "C", Fig. 1, has been added to allow more accurate timing.

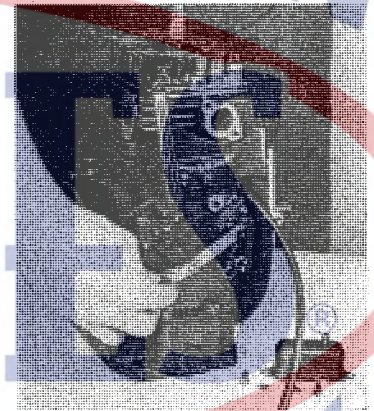


Figure 27



Figure 28

Installing Flywheel

Place the wave washers and flywheel key on crankshaft and press the flywheel into position on the crankshaft taper as shown in Figure 28. Install the starter pulley and lockwasher and tighten the nut holding this assembly.

The rotating screen is fastened to the starter pulley with screw and spacer.



Figure 29

Installing Blower Housing and Tank Brackets

The engine is now ready for the blower housing, cylinder baffle, head baffle, and tank brackets. Figure 29 shows how these parts are held in place by two cap screws on each side of the engine.



Figure 30

Installation of Carburetor

The carburetor adapter plate and gasket are fastened to the cylinder block by two Phillips screws.

The carburetor linkage must be placed in the governor arm and carburetor throttle arm before the carburetor gasket and carburetor are bolted to the adapter plate by two cap screws as shown in Figure 30.

Adjusting Governor

Loosen nut which holds the governor arm (1) to the shaft (H). Turn the shaft counter-clockwise as far as possible with a pair of pliers. Pull the arm (1) all the way to the left (away from the carburetor). Tighten nut. Check for freedom of motion.

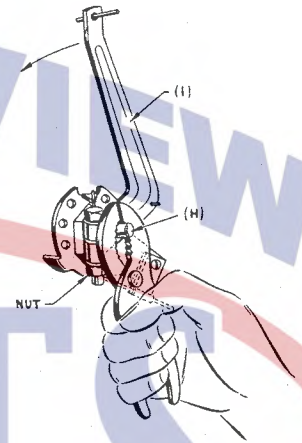


Figure 31

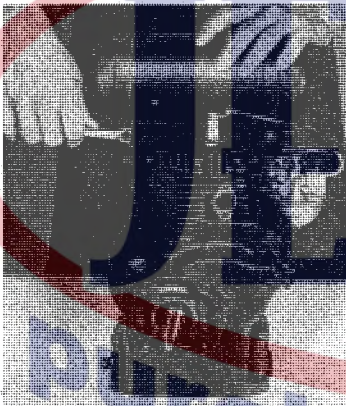


Figure 32

Installing Fuel Tank

After the carburetor has been bolted in place, the fuel tank assembly with sediment bowl and connecting tubing should be installed on the tank brackets. Figure 32 illustrates tightening the fuel tank straps around the tank. Connect and tighten tubing.

Bolting Air Cleaner to Carburetor Intake

Figure 33 shows the method of bolting the air cleaner elbow to the carburetor intake. Bottom of the air cleaner elbow is supported by a bracket attached to the cylinder block.



Figure 33

Connecting Muffler to Plant

The muffler is installed as shown in Figure 34 and held in position by two studs and two brass hex nuts.

The muffler may be installed in position shown or rotated 180°.

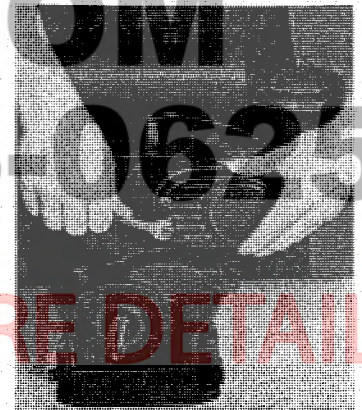


Figure 34