

# ***SETTING UP A MAGNETO FOR A GRAVELY L-SERIES TRACTOR***

## ***PROPERLY SETTING UP A MAGNETO AND A GRAVELY L-SERIES TRACTOR***

1. First, you must be certain that your magneto has been properly repaired. All magneto's wear so as to fire later and later, over time. Therefore, it is ***essential*** that the wear be compensated for internally, so that the engine fires at the correct time when running. If it is a WICO magneto, this wear can be adjusted for, as described in other documents. If it is a Fairbanks-Morse magneto, it cannot be adjusted internally for wear, and the worn parts must be replaced. Do not proceed to Step 2 until you are certain that your magneto has been properly adjusted to compensate for internal wear.
2. First check that the Camshaft Extension is tight on the camshaft! You cannot time the engine if it is loose.
3. Clean the bottom of the magneto with a wirewheel to bare metal, then wipe it down with a clean rag sprayed with brake cleaner.
4. Make sure the metal Magneto Coupling Nut is on the Camshaft Extension and the plate where the magneto will be mounted has been thoroughly wirewheeled to bare metal, cleaned with brake cleaner, and wiped down with a clean rag. *Do not leave off Steps 3 and 4, or your magneto will eventually lose contact with the tractor and your spark plug will no longer receive spark.* The application of dielectric grease on this surface is also recommended.
5. Check that the vent holes are open. In a WICO magneto, they are in the bottom of the unit. On a Fairbanks-Morse (F-M) unit, they are on the side and are covered with a small cap. This cap ***must*** be open at the bottom and should be holding a small screen in place over the hole. If your F-M magneto is missing this cap, you must get a replacement. If there are no holes present, they must be drilled, the hole for the screw drilled and tapped, and the cap and screen installed. Be careful not to get metal shavings inside the magneto when you do so.
6. The air intake area on the WICO magneto must be protected from infestation by insects while still allowing air to get inside the magneto.

### ***There are two methods of accomplishing this:***

***Method 1*** = Invert the magneto and ***loosely*** place pieces of copper "steel" wool (such as made by ChoreBoy) into the galleries through which the vents draw air. This is the preferred method, and is very easy to do right, and very hard to do wrong, as long as you don't jam pack the space full and, thus, block the passage of air into the inside of the magneto.

***Method 2*** = Invert the magneto and place strips of 3M (NOT THE SOAP KIND) ***course*** green scrubbing pad edge-wise into the galleries through which the vents draw air.

7. Place the fibre block between the magneto and the magneto Camshaft Extension, and slide the metal magneto Coupling Nut up against the fibre block.
8. Bolt the magneto onto the tractor. When you bolt it on, make ***sure*** it is parallel to the camshaft before tightening. It is recommended that you use an offset machinist square, leaving .040" between the face of the magneto and the fibre block. Leave the magneto-coupling nut loose on the camshaft.
9. Now - you must determine top dead center (TDC) of the engine's piston.

***NOTE:*** This determination must be made without having the magneto's impulse operating. Loosen the slip dog that is mounted on the Magneto Cam Shaft Extension using a 1/2" drive 6 point 1/2" socket so that it does not rotate the magneto when you are turning the crankcase. Use a long handled wrench to roll the crankshaft over while applying about 20 pounds of pressure to the top of the piston with your other hand. This takes slack out of the timing gears.

Keeping in mind that Top Dead Center is always a “dead spot” where there is still crank movement without piston travel, proceed as follows:

- A. Disconnect the wire from the spark plug and remove the spark plug.
- B. Remove the head. This is the **ONLY** way to make **SURE** you are at TDC and on the compression stroke (*Note: This may also be accomplished without removing the head, but it takes a few more attempts to get it exactly right. Don't remove the head if it's not already off.*)
- C. Using a **LONG** handled wrench or breakover, turn the nut on the back side of the crankshaft (nearest the operator) **SLOWLY** until you reach TDC.

**To find TDC, you must:**

1. Place a long-handled screwdriver or piece of metal rod on top of the piston.
  2. Lay a flat piece of metal left-to-right across the engine block and slide it up even with the metal rod.
  3. Using the breakover (or wrench), rotate the engine **SLOWLY** until you reach TDC - the point where the piston is stationary at the top of the engine, both valves are closed (this is the compression stroke), but the crankshaft is continuing to move. This is a little tricky to locate, so you'll probably miss it the first few tries.
  4. Once you have determined the exact spot of TDC, make a mark with a pencil on the vertical rod against the metal bar for reference.
- D. Ground the magneto to itself by placing a screwdriver between the case and the stop button mounted to the side of the magneto. This is important, as firing into open air isn't good for the magneto.
  - E. **SLOWLY** roll the magneto over using slip joint pliers until the magneto “clicks”, making note where it does so in relation to the magneto cover.
  - F. Tighten the slip dog with a 1/2" drive 6 point 1/2" socket on the magneto Coupling Nut while holding the crank shaft rigid with the long handled wrench used to bring the crank to this position.
  - G. Slowly roll the engine over 360-degrees (and ever so slowly at the end), and, with pressure against the piston you will feel the exact time the impulse occurs, which should be just as the piston reaches TDC, but the crankshaft is still turning. **YOU WANT THE MAGNETO TO “CLICK” JUST AS THE CRANKSHAFT BEGINS ITS DOWNWARD TRAVEL - NOT BEFORE OR LATER!**
10. Once you have set, checked, and rechecked your setting, you are now ready to try to start the engine. Be sure to remove the screwdriver that is shorting the magneto case to the side-mounted stop button and reattach the kill-switch wire, if you have one, at this time.
  11. Reinstall the head, head gasket, and torque the headbolts to specifications (18 ft-pounds) in the correct sequence.
  12. Check the gap on spark plug (clean it, if necessary, also), reinstall, and reattach the spark plug wire (you really should replace it with a new one while you're at it) to the plug and the magneto.
  13. Start the tractor and run it for at least 20 minutes, then turn it off, let it cool, then check the timing again, this time leaving the head on: just remove the spark plug and repeat step #9 Once you are certain it is right, tighten it down securely.

***NOTE:*** *If the tractor will not start, it could be that the kill-switch in the end of the handlebar has shorted out - disconnect the wire from the magneto and see if it will run without the wire connected. If so, the switch has failed and must be replaced.*

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