

- A. Thunderbolt IV (HEI) Ignition System Operation -  
MCM 898R/228R/260R/330 and MIE 230/260/340 Models
- B. Troubleshooting Thunderbolt IV (HEI) Ignition System
- C. Thunderbolt IV Distributor Repair
- D. Quicksilver Insulating Compound Used In Distributor Cap Spark Plug Wire  
Boots - All Engines Equipped with Thunderbolt IV (HEI) Ignition System

**NUMBER: 83-24**

CIRCULATE TO:  
SERVICE MANAGER   
PARTS MANAGER   
MECHANICS   
"Place in a Service  
Bulletin Binder"

## **A. THUNDERBOLT IV (HEI) IGNITION SYSTEM OPERATION - MCM 898R/228R/260R/330 and MIE 230/260/340 MODELS**

Thunderbolt IV is a battery powered High Energy Ignition system, not a CD system. The system requires no breaker points or mechanical advance mechanism. It is designed to be maintenance free without need for periodic adjustment.

### **Distributor**

The Sensor (a device that acts like a switch when subjected to a magnetic field) is used to trigger the ignition. Triggering is not speed sensitive and will trigger at virtually zero RPM. The Sensor is positioned in the distributor housing and senses the toothed sensor wheel mounted on the distributor shaft. Triggering accuracy is not affected by trigger air gap or distributor shaft end play. The distributor rotor and cap distribute the spark to the proper cylinder and in no way determines engine timing advance. Initial ignition timing can be adjusted by rotating the distributor housing just like conventional systems. Idle timing must be set below speeds of 900 RPM.

### **Ignition Amplifier**

Ignition advance is provided by the Ignition Amplifier. The advance starts at 1000 RPM and provides 24 degrees advance (in addition to initial timing). Advance progresses on a non-linear curve and reaches maximum advance between 3600 and 3800 RPM. The Ignition Amplifier controls ignition coil primary current without the need of a resistor wire. With engine at rest and key on, coil primary current automatically turns off after a short period of time (to protect ignition coil). The Ignition Amplifier will withstand reverse battery connection for one minute.

### **Ignition Coil**

The ignition coil is of standard size and shape, but utilizes a special winding and core for this ignition. The use of a standard ignition coil will not damage the Ignition Amplifier, however, DO NOT use a standard coil because it will provide low output and overheat.

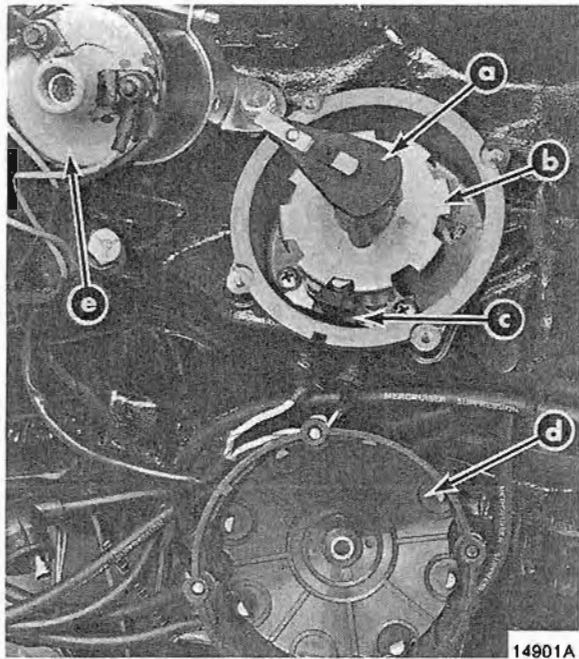
### **Tachometer and Synchronizer**

Tachometers or most synchronizers that monitor the ignition impulses at the negative (-) terminal of the ignition coil will operate properly on the Thunderbolt IV ignition system.

## B. TROUBLESHOOTING THUNDERBOLT IV (HEI) IGNITION SYSTEM

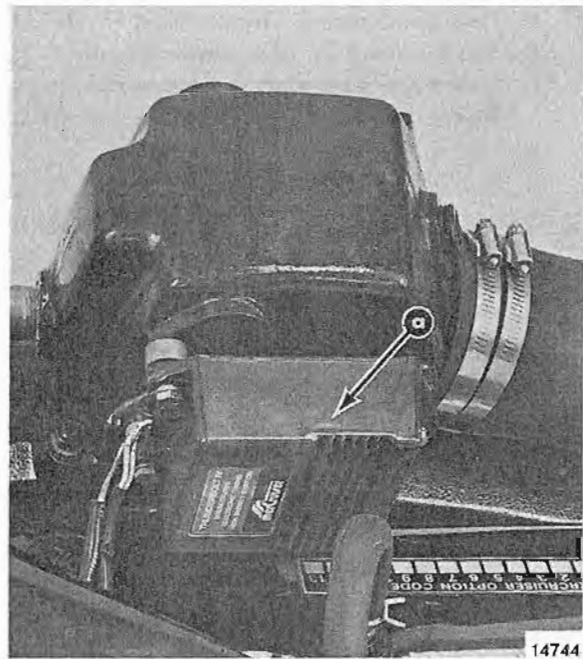
The Thunderbolt IV ignition system is a relatively simple system. It consists of four components and a 12-volt source to operate it. The four components are: ignition coil, ignition amplifier, ignition sensor and sensor wheel (Figures 1 and 2).

To troubleshoot the ignition system all that is needed is a voltmeter and spark gap tester.



a - Rotor  
b - Sensor Wheel  
c - Ignition Sensor  
d - Distributor Cap  
e - Ignition Coil

**Figure 1. Distributor Components and Ignition Coil**

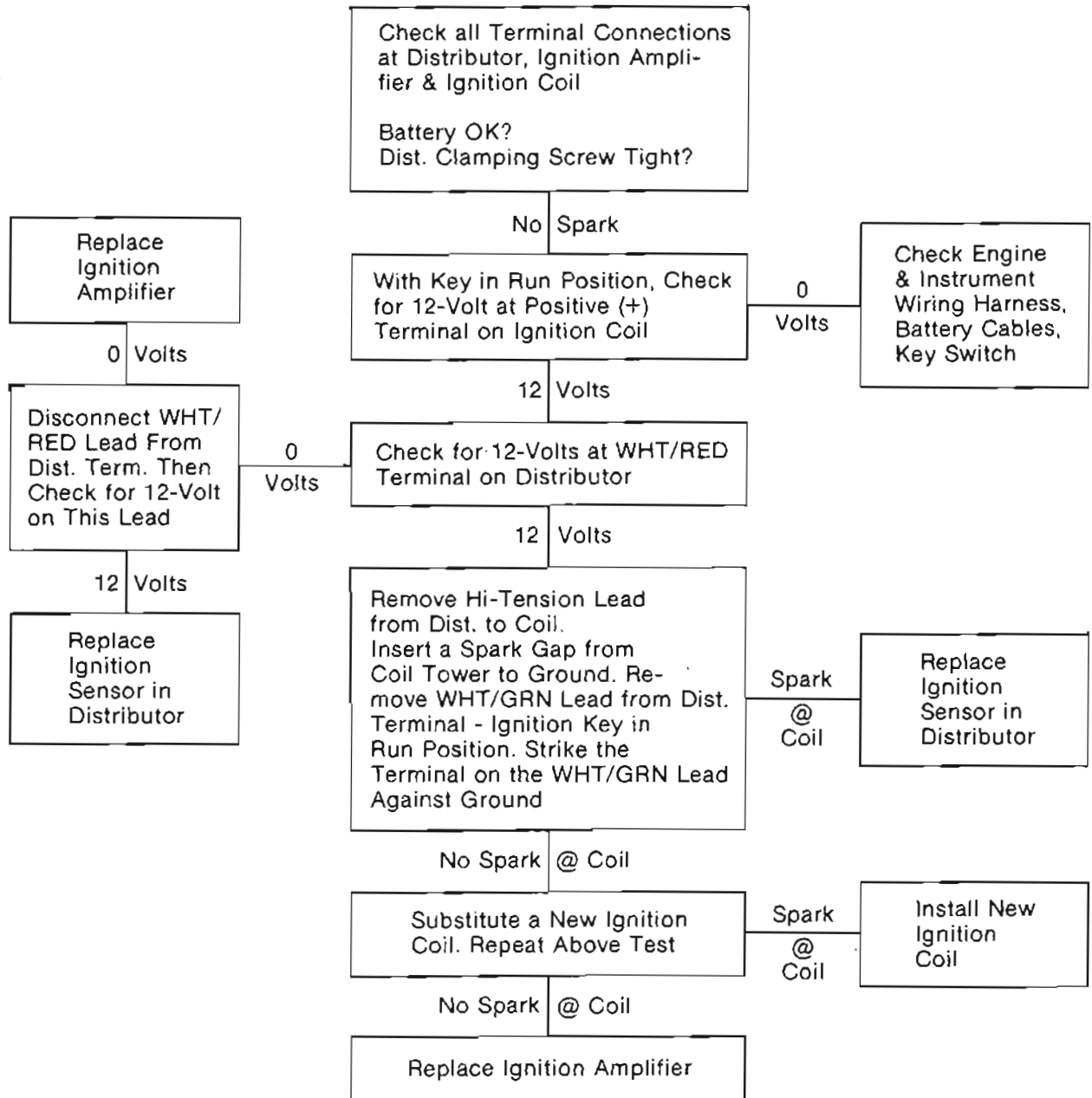


a - Ignition Amplifier

**Figure 2. Ignition Amplifier**

## ⚠ WARNING

**Be sure that engine compartment is well ventilated and that there are no gasoline vapors present during the following test - to prevent a potential fire hazard.**



### C. THUNDERBOLT IV DISTRIBUTOR REPAIR

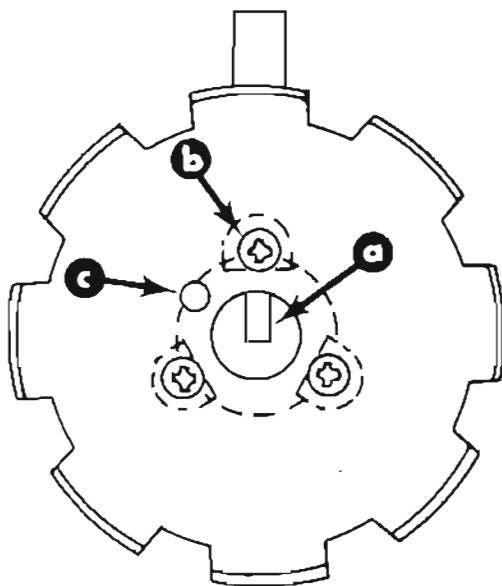
#### ⚠ CAUTION

**DO NOT USE any type of silicone sealer on the inside of the distributor. Most silicone sealers give off an acidic vapor during the curing stage of the sealer. This acidic acid can cause corrosion on the ignition components.**

1. Remove 4 distributor cap attaching screws and remove cap.
2. Remove distributor rotor/sensor wheel assembly from distributor shaft.

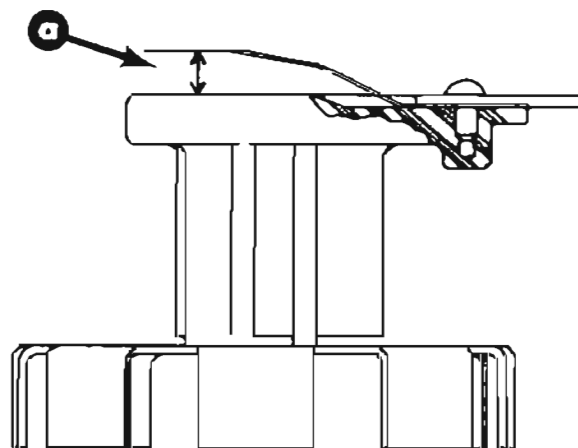
*NOTE: If rotor and sensor wheel assembly cannot be removed by hand, remove as follows: Use two 3/8" (9.5mm) wide flat blade screwdrivers approximately 8" (20.3cm) to 10" (25.4cm) long. The screwdrivers are positioned opposite each other with the blade tips on the underside of the rotor and sensor wheel assembly. Make sure blade tips are toward distributor shaft until they come in contact with shaft. A downward push on both screwdriver handles at the same time will pry rotor and sensor wheel assembly off. The use of Torch Lamp (91-63209) will also aid in the removal of the rotor/sensor wheel assembly.*

3. With the rotor and sensor wheel assembly removed, inspect the locating key inside the rotor. (Use a penlight or suitable light to inspect.) (Figure 3)
4. The locating key will appear as a clean edged, 1/8" (3.2mm) wide, sloped ramp at the bottom of the splined hole.
5. If there are pieces of material shaved off of key or if it appears to have been damaged by being forced down while misaligned with slot in distributor shaft, the rotor must be replaced.
6. If rotor key is damaged, replace rotor by removing 3 phillips screws and separating sensor wheel from rotor. Reinstall sensor wheel to new rotor making sure locating pin on rotor is installed in locating hole in sensor wheel. Tighten 3 phillips screws securely. (Figure 3)
7. Bend carbon brush tang upward slightly until a distance of 1/4" (6.4mm) is obtained between rotor and tang. (Figure 4)



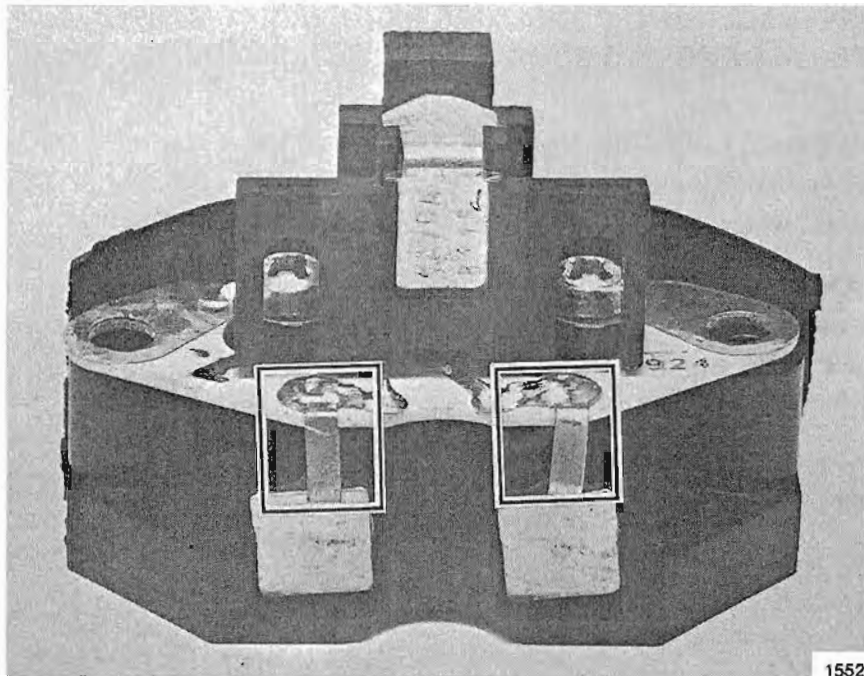
a - Locating Key  
b - Phillips Screws  
c - Sensor Wheel  
Locating Pin

**Figure 3. Locating Key Location**



a - 1/4" (6.4mm)

**Figure 4. Rotor Assembly**



**Figure 5. Location of Cracks in Metal Jumper Leads on Ignition Sensor**

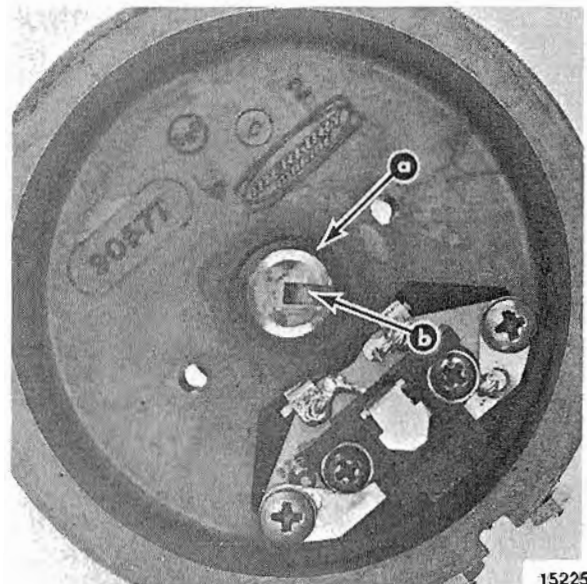
8. Use a good magnifying glass and light to inspect the two metal "jumper leads" for cracks (Figure 5). If a crack is found in either metal "jumper lead", install a new sensor.
9. Place a small amount of Quicksilver 2-4-C Lubricant (92-86154A1) around distributor shaft where it enters the bronze bushing (Figure 6).

*NOTE: This will prevent any of the Loctite used in the next step from getting into bronze bearing.*

10. Put 2 drops of Loctite 271 or Loctite Type 'A' into the rotor so it lands on the locating key. (Figure 3)
11. Put 2 drops of Loctite in keyway on upper portion of distributor shaft. (Figure 6)
12. Immediately install rotor assembly onto distributor shaft. **MAKE SURE** rotor locating key is aligned with keyway in distributor shaft **BEFORE** pressing rotor all the way down on shaft until it stops with the palm of your hand.

*NOTE: The rotor should fit very tight. It may be necessary to heat rotor with Torch Lamp (91-63209) to properly install.*

13. Reinstall distributor cap on distributor. Reinstall spark plug wires to cap using Insulating Compound, as explained in 'D' following.
14. Check engine timing.



a - Bronze Bushing                      b - Keyway

**Figure 6. Distributor Housing**

**D. QUICKSILVER INSULATING COMPOUND USED IN DISTRIBUTOR CAP SPARK PLUG WIRE BOOTS - ALL ENGINES EQUIPPED WITH THUNDERBOLT IV (HEI) IGNITION SYSTEM**

Apply a small quantity of Insulating Compound (92-41669-1) to the inside of each spark plug wire boot before installing the boot on distributor cap. Wipe off excess. This Insulating Compound will help "waterproof" this area of the ignition system.

**IMPORTANT: Make sure boot DOES NOT "hydraulic" back off of distributor cap terminal. If it does, use needle nose pliers and bend metal spark plug wire terminal (inside of boot) slightly so it grips the distributor cap terminal tighter.**