mercruiser
STERN DRIVES & INBOARDS

service bulletin

TO: SERVICE MANAGER ☐ TECHNICIANS ☐
PARTS MANAGER ☐

No. 89-9

Digital Distributorless Ignition System (DDIS) - MCM 3.0L

Digital Distributorless Ignition System (DDIS) will be used on MCM 3.0L engines starting with serial number 0C337888. DDIS controls ignition timing and coil output timing (dwell) more accurate than other ignitions by monitoring engine speed and engine power supply voltage. DDIS also provides an overspeed control and minimizes the number of mechanical parts.

Motion Sensor

The motion sensor replaces the distributor and determines crankshaft position.

Ignition Amplifier

Ignition advance is provided by the ignition amplifier. The advance starts at 1000 RPM and provides 26° spark advance above 2600 RPM. Add 8° BTDC initial timing for the full 34° above 2600 RPM. The amplifier also has an overspeed control at approximately 5000 RPM.

Coil

The ignition coil is actually two coils in one with four high voltage towers. DDIS fires each cylinder on every revolution of the engine (compression and exhaust stroke). DDIS provides a tachometer signal in the harness so that tachometers and most synchronizers that monitor the ignition impulses at the negative (-) terminal of conventional ignition coil will operate.

DDIS Specifications - MCM 3.0L

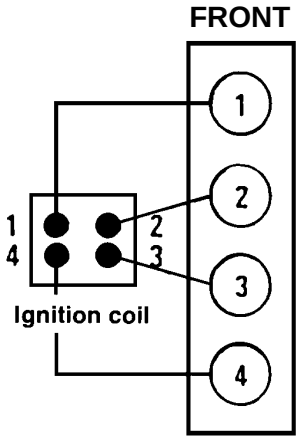
UNIT OF MEASUREMENTS in. (mm)

COIL	
Primary Resistance	1.9 – 2.5 Ohms
Secondary Resistance	11300 – 15500 Ohms

TIMING	
TIMING	8° BTDC

SPARK PLUG	
Spark Plug Gap	.035 (.9)
Spark Plug Type	AC-MR 43T NGK BR 6FS Champion RV8C

FIRING ORDER 1-3-4-2 **FRONT**



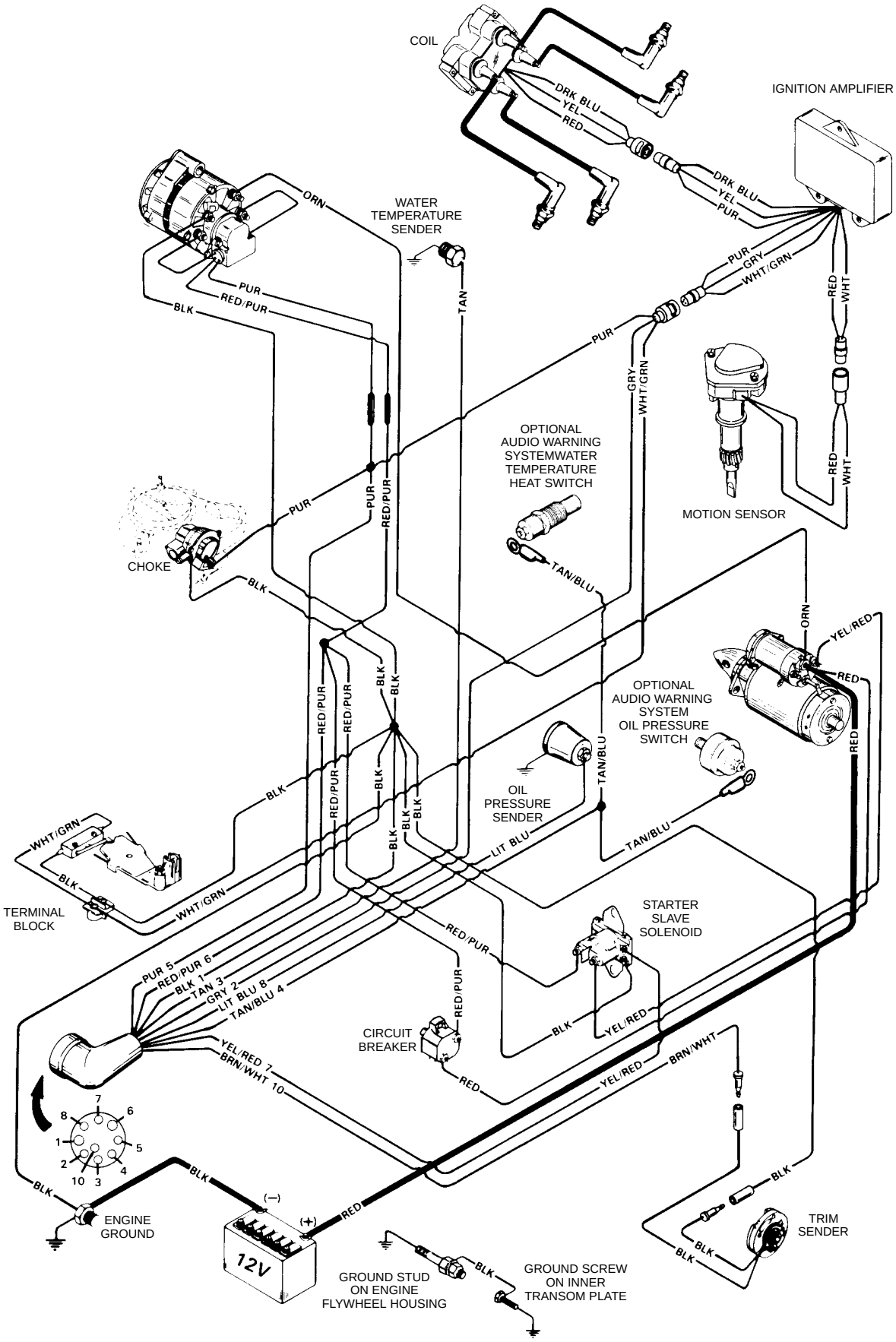
Tools/Lubricants/Sealants

TOOLS	
91-52024A1	Remote Starter Switch
91-63998	Spark Gap Tester
91-99379	Timing Light
91-99750	Volt/Ohmmeter

LUBRICANTS/SEALANTS	
92-90018	2-4-C Marine Lubricant
92-41669	Insulating Compound
92-25711	Liquid Neoprene
92-32609	Quicksilver Loctite “A”

Torque Specifications

Fastener Location	lb. ft. (N.m)
Motion Sensor Clamp 3/8 - 16	20 (27)
Spark Plugs (14mm)	15 (20)



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MCM 3.0L DDIS Wiring Diagram

Troubleshooting DDIS

To troubleshoot DDIS all that is needed is a multimeter and spark gap tester. Check for spark, high tension leads and spark plugs before DDIS components.

1. Ignition Amplifier to Coil Power Supply

NOTE: *Ignition switch must be in ON or RUN position to test the amplifier. Disconnect amplifier from the ignition coil and measure voltage between amplifier connector terminal #1 (Figure 1) and amplifier mounting bolt. Approximately 12 volts.*

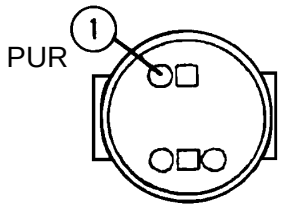

Figure 1.

2. Engine Harness to Amplifier Power Supply
   Disconnect engine harness from amplifier and measure voltage between harness connector terminal #2 (Figure 2) and amplifier mounting bolt. Approximately 12 volts.

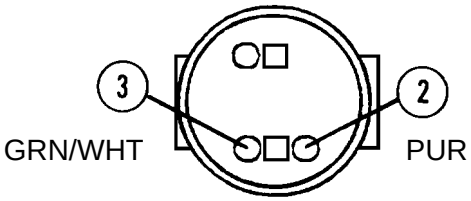

Figure 2.

3. Amplifier Ground Test
   If the voltage found in step 1 is low, and the voltage in step 2 is approximately 12 volts, the amplifier may be defective.

4. Ignition Coil Test

NOTE: *Ignition switch must be in OFF position for ignition coil test.*

a. Primary Coil Resistance
   Disconnect the coil from amplifier and measure resistance between coil connector terminals (Figure 3).

Terminals	Prescribed Range
① – ②	1.9-2.5 Ω (Listed in the specificat ions)
① – ③	

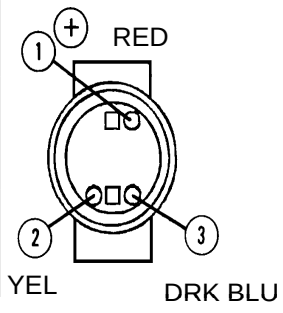

Figure 3.

b. Secondary Coil Resistance
   Disconnect high tension leads from coil towers and measure resistance between coil towers (Figure 4).

High-voltage towers to be measured	Prescribed Range
① – ④	11.3-15.5 kΩ (Listed in the specificat ions)
② – ③	

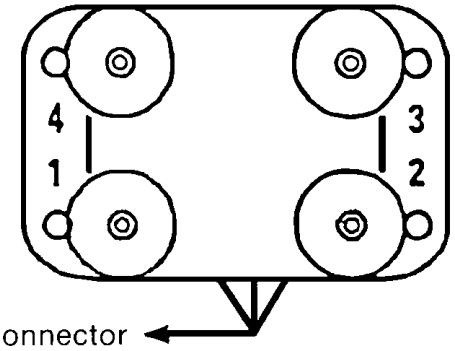

Figure 4.

c. Coil Insulation Resistance

1. Measure resistance between coil connector terminal #1 (Figure 3) and engine ground. Minimum resistance of 10 megohms.
2. Measure resistance between each coil tower and engine ground. Minimum resistance of 10 megohms.

5. Motion Sensor Test

NOTE: *Motion sensors air gap is factory set and is not adjustable. If resistance is not within specifications, replace motion sensor.*

a. With ignition switch in OFF position disconnect sensor from amplifier and measure the resistance between the sensors connector terminals (Figure 5). Resistance range 140 to 180 ohms.

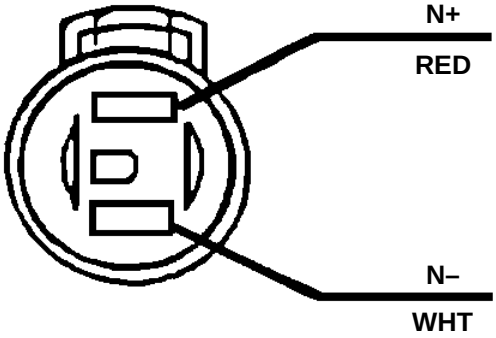

Figure 5.

b. To remove and install the motion sensor, use the same procedure described in Service Manuals for distributors with the exception of aligning the sensor drive gear hole (not roll pin hole) with the notch in housing (Figure 6) when installing sensor with engine disturbed.

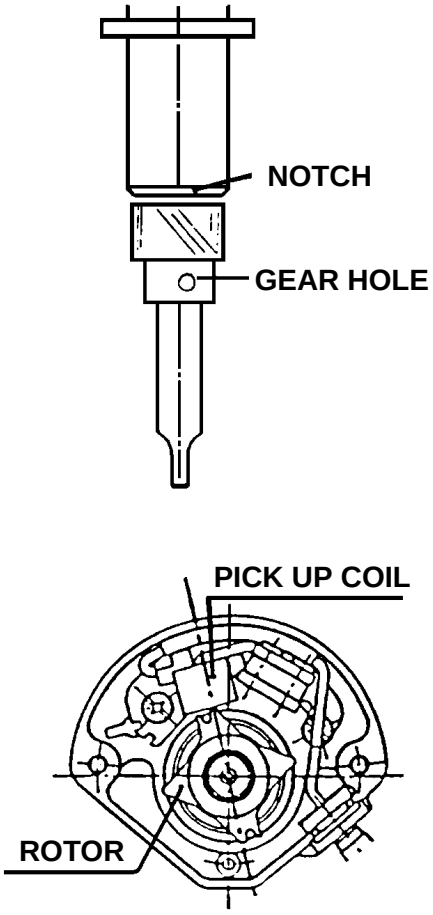

Figure 6.

6. Shift Cutout Switch
Disconnect amplifier from engine harness and measure resistance between connector #3 (Figure 1) and amplifier bolt. During normal operation switch (normally open) has no meter movement. During shifting switch (normally closed) has meter movement.