

Delco Voyager EST Ignition Kit Installation Instructions

For General Motors L4, V6, V8 Marine Engines



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NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing the fasteners that require it. If the above conditions are not allowed, part or damage could result.

IMPORTANT: The illustrations in these instructions show a 4-cylinder installation. The procedures, except for the number of spark plug leads, are the same for 6-cylinder and 8-cylinder installations. Read and become familiar with all instructions before installing this kit.

What's included in this kit?

1 – Distributor

2 – High Performance Ignition Coil

3 – Distributor Gasket

4 – Distributor to Coil Harness

5 – Coil to Ignition Switch/Tachometer Splice Lead

6 – Initial Timing Connector

7 – Spark Plug Leads

The following instructions are summarized from a variety of sources including the AC Delco installation guide, Mercruiser ignition instructions and other sources. For AC Delco instructions, please visit: http://www.marineengines4less.com/Delco_Voyager_Installation_Guide.pdf

Removing Your Old Ignition System

1. If you are careful and do not rotate the engine after beginning this procedure, it is not necessary to rotate the number one cylinder to Top Dead Center (TDC). Instead using a permanent marker, trace all of the plug wires and mark their cylinder numbers on the old distributor cap. Compare the firing sequence with the order of the numbers that you have written on the cap, they should match (if you have twin engines, one engine will likely have a different firing sequence). Also mark cylinder 1's location on the engine block near the distributor hole.
2. Remove the plug and coil wire(s) from the distributor cap.
3. Now remove the distributor cap from the distributor and using a permanent marker, mark the position of the rotor's alignment relative to the engine (direction the rotor is pointing) on the engine housing. When installing the new distributor, the rotor must be aligned to the same location.
4. Remove the clamp bolt and distributor hold down clamp.
5. Disconnect the leads from the negative (-) terminal of the ignition coil. These will include the distributor primary wire (normally black running from negative terminal of coil to distributor base terminal) possibly a shift-interrupt lead (black or brown) and tachometer lead (brown or gray). Always consult the wiring diagram applicable to your specific engine for the correct color codes. In the image below some of the wires fell prey to paint and the colors are hidden, but the labels show the correct color.
6. Lift the old distributor from the engine slowly, as you lift you will notice the rotor turn slightly. Note the amount that it turns and its position relative to its original position (your mark). When you install the new distributor you will position the rotor at this new relative position then slide it down into the housing. As you slide the new distributor into the housing, the rotor will turn the opposite direction and same amount and should line up with your mark (the rotor turns because of the spiral alignment of the gears at the bottom of the distributor and the cam gear within the engine).
7. Check the distributor gear for damage or unusual wear, if either is noted, the cam gear within the engine may need replacement. Until installation of the new distributor do not allow any debris to fall into the distributor hole.
8. Now remove the leads from the positive side of the distributor: purple to resistor and purple to starter. One of these leads is the feed from the starter motor "R" terminal that bypasses the resistor during starting to deliver a full 12 volts to the coil. The other lead is from the resistor that is the stepped down voltage delivered to the coil while the engine is running. These leads will not be used with the new ignition system and should be taped off and secured.
9. Remove the coil and resistor, these will not be used with the new ignition system.

Distributor Installation

Engine Not Disturbed

1. Install new gasket on distributor housing.
2. Turn rotor approximately 1/8 turn in a counter clockwise direction past mark previously scratched on distributor housing.
3. Work distributor down into position in engine block with distributor positioned as noted during removal.

IMPORTANT: It may be necessary to move rotor slightly to start gear into mesh camshaft gear, but rotor should line up with mark when distributor is down in place. Distributor shaft must enter oil pump shaft for complete installation.

4. Put into place and tighten distributor hold-down bolt and clamp. Connect primary lead to coil. Also install spark plug and coil secondary wires.
5. Place distributor cap in position and check that rotor lines up with terminal for No. 1 spark plug. Install cap.
6. Proceed to page 4 of this instruction manual.

Engine Disturbed

1. Locate No. 1 piston in firing order position by either of two methods described below.
 - a. Remove No. 1 spark plug wire and, with finger on plug hole, crank engine until compression is felt in No. 1 cylinder. Continue cranking until pointer lines up with timing mark on crankshaft pulley, or
 - b. Remove rocker cover and crank engine until No. 1 intake valve closes, continuing to crank slowly until pointer lines up with the timing mark on the crankshaft pulley.
2. Position distributor to opening in block in normal installed attitude.
3. Position rotor to point toward front of engine (with distributor housing held in installed attitude), then turn rotor counterclockwise approximately 1/8-turn more to the left and push distributor down to engage camshaft. It may be necessary to rotate rotor slightly until camshaft engagement is felt.
4. While pressing down firmly on distributor housing, engage starter a few times to make sure oil pump shaft is engaged. Install hold-down clamp and bolt and snug up bolt.
5. Turn distributor slightly until points just open and tighten distributor clamp bolt.
6. Place distributor cap in position and check that rotor lines up with terminal for No. 1 spark plug. Install cap.
7. Proceed to page 4 of this instructions manual.

IMPORTANT: Wires must be installed in their proper locations in supports to prevent cross-firing. Follow proper firing order on intake manifold.

Installing the Coil & Distributor Wiring

1. Determine the mounting location for the new ignition coil. Bracket provided on the new coil fits pre-drilled mounting holes on the engine or cylinder head. In some applications, it may not be possible to mount the coil to these standard holes due to other equipment. If this is the case, mount the coil to marine upfitter's location of oil coil or another convenient location by altering the bracket to fit.
2. Install the new ignition coil to the engine block, or cylinder head by using two screws and lockwashers used on your previous ignition coil.
3. Begin installing the plug wires in the sequence you noted earlier in step 1 of "Removing Your Old Ignition System". Make sure the wires are fully seated, the short boots connect to the distributor cap while the long boots connect to the spark plugs.
4. Install distributor to coil wiring harness (wire harness in black casing). Connect harness to 2-terminal connector on distributor and to mating connector on ignition coil. Be sure that both ends of the harness are properly latched.
5. Install connector with ignition switch and tachometer splice leads into ignition coil terminal. Be sure that the connector is properly latched. Route the grey and purple wire as follows:
 - a. The grey connector lead is the tachometer lead and is to be spliced to the old tach lead that has already been detached. Determine suitable routing and length for leads. Use suitable butt splice connector to splice wires together. Strip end of each wire to be joined $\frac{1}{4}$ " from the end. Insert stripped end of one wire into connector, then crimp to secure.
 - b. The purple connector lead is to be connected to a B+ source that is switched by the ignition switch.

Setting the Ignition Timing

The initial timing connector is used in setting the initial engine timing on Delco EST ignition equipped engines. This connector by-passes the electronic spark timing of the engine and allows the initial timing to be adjusted by rotating the distributor. Use the following procedure (become familiar with entire procedure before beginning):

The ignition timing marks are located on the engine's front cover or on the balancer. A saw slot on the balancer indicates engine at (TDC) Top Dead Center. Adjust ignition timing as follows:

1. Connect a timing light to the No. 1 spark plug wire. Connect the timing light power lead to a 12 volt power source. (Do NOT CONNECT TO 12 VOLTS ON ALTERNATOR.)
2. Start engine and allow to it warm to operating temperature. Bring engine to idle (650-800 Rpm).
3. WHILE ENGINE IS RUNNING, install the initial timing connector supplied with your engine into the (4) terminal connector on distributor.
4. Loosen distributor clamp just enough to rotate distributor in place.
5. Secure the bare wire (black wire) of the initial timing connector to battery positive "+" voltage. (The most convenient location of this voltage is on the cranking motor solenoid.) If desired, a suitable clip, such as an alligator clip may be permanently attached to the bare wire end of the initial timing connector to hold it in place. While the lead is touching the voltage source, the frozen electronic timing is "Frozen".
6. Attach timing light according to the manufacturers' instructions.
7. Rotate distributor to set mechanical timing. (timing chart located below)
8. Tighten distributor clamp to hold in position when initial timing is obtained.
9. Recheck timing.
10. Detach initial timing connector from distributor.
11. Check total timing. This must not exceed 24 degrees at 4000 RPM for 181/262 CID engines, 26 degrees for 305/350 CID engines and 30 degrees for 454/502 CID engines. (see chart located below)
12. Disconnect and remove timing light.

Delco EST Ignition Timing Chart

Engine CID	Initial Timing @ 500 RPM	Total Timing @ 4000 RPM
181	0°	24°
250	10°	32°
262	8°	26°
305	8°	24°
350	8°	25°
454	10°	30°
502	10°	30°

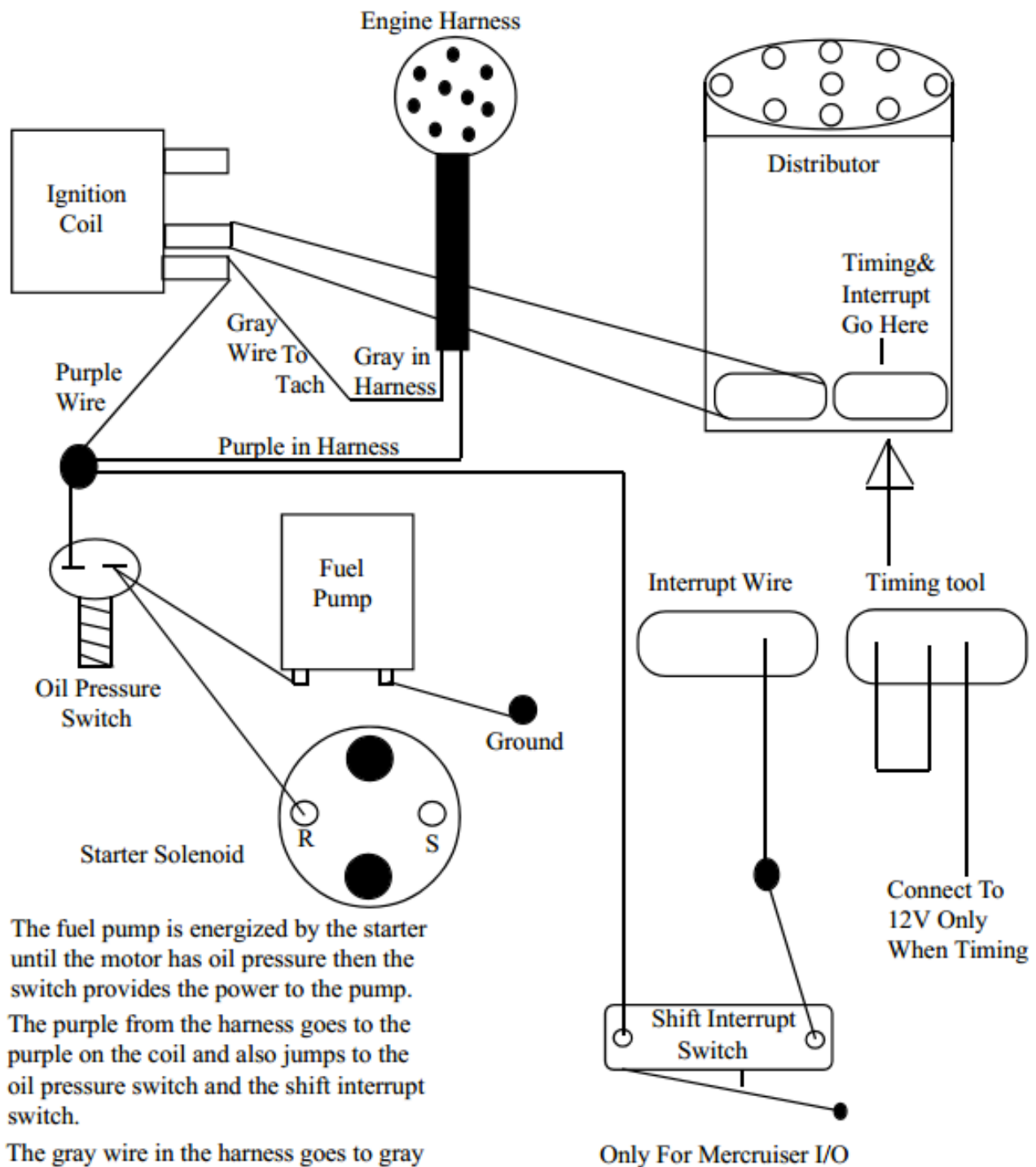
WARNING: These timing numbers should be verified with your owners manual. These numbers are not necessarily true for every engine setup and application as variances occur. Use this chart for reference only.

Using the Shift Interrupt Switch

Some older applications use a shift interrupt switch. While this kit does not come with the shift interrupt wire, there is an easy way around this. This process is described below and can be done only after the initial timing has been set (page 5 of this installation guide).

1. Get the initial timing connector. Make sure that it is not plugged into the distributor.
2. Cut the white looped wire so each side is not touching. Wire plugs can be installed but it is not required.
3. Plug the initial timing connector back into the distributor (this has now become your shift interrupt wire). The single black wire will be used in step 6.
4. Locate the shift interrupt switch on top of the engine.
5. Cut the light-blue wire on both sides of the switch.
6. Connect one side of the light-blue wire to any keyed 12 volt source. Connect the other side of the light-blue wire to the single black wire that is described in step 3.
7. The shift interrupt hookup is now complete.

Delco EST Ignition Wiring Diagram



The fuel pump is energized by the starter until the motor has oil pressure then the switch provides the power to the pump.
 The purple from the harness goes to the purple on the coil and also jumps to the oil pressure switch and the shift interrupt switch.
 The gray wire in the harness goes to gray coming off of the coil.

This is only a guide, you as the installer are responsible for ascertaining the proper hookup for your application. This will give you the theory of operation, and is to be used only as a guide.

Delco EST Ignition

Description

EST or Electronic Spark Timing is a High Energy Ignition System (HEI). The distributor itself has no centrifugal advance mechanism or devices.

The spark plug wires are a carbon-impregnated cord conductor with a silicon rubber jacket. It is important they be handled with care, and routed so as not to cross each other, or to be in contact with other parts of the engine to prevent rubbing.

The EST System uses a square coil with epoxy covered windings to protect against moisture and arcover.

Torque Specifications

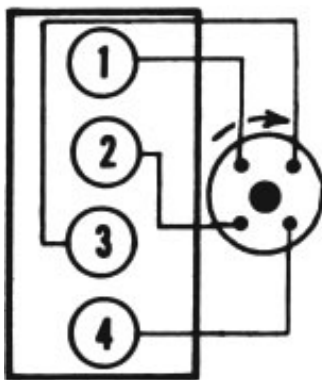
Fastener Location	Lb. Ft.	N.m
Distributor Clamp	20	27
Spark Plugs 12mm	15	20

Tools/Lubricants/Sealants

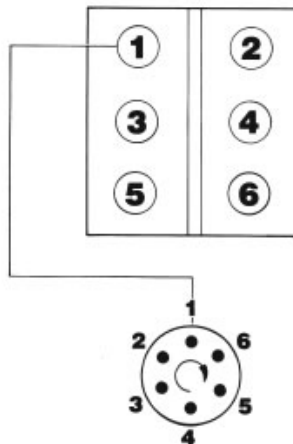
Mercury Marine Special Tools	
Description	Part #
Dwell Meter	91-59339
Magneto Analyzer	91-76032
Remote Starter Switch	91-52024A1
Timing Light	91-99379
Volt/Ohm Meter	91-99750
Timing Jumper	91-818812A1
Liquid Neoprene	92-25711-1

Firing Order

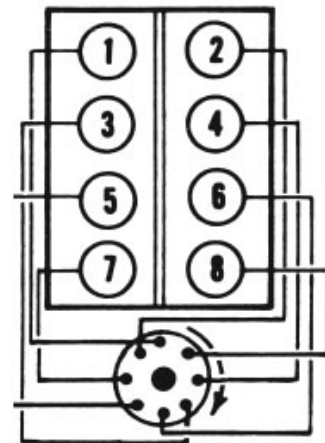
The following firing orders are to be used for reference only. Please verify with your owners manual before installing spark plug wires.



4-cyl



6-cyl



8-cyl (standard rotation)

