

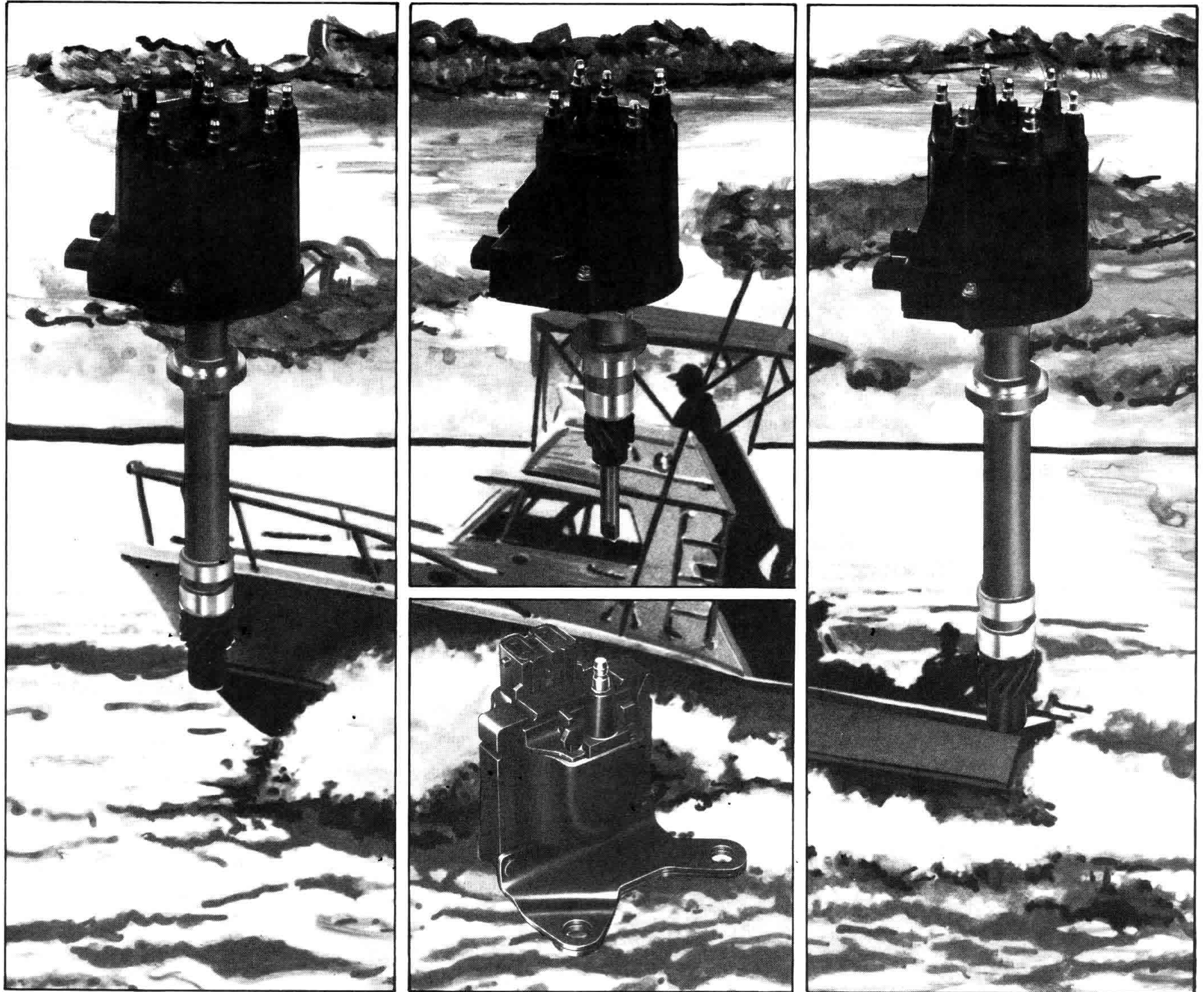
Delco Voyager[®]

MARINE DISTRIBUTOR IGNITION SYSTEM

DR-6685

1D-184
1/15/92

For General Motors L4, V6 or V8 Marine Engines



RETROFIT INSTALLATION MANUAL

VOYAGER® MARINE DISTRIBUTOR IGNITION SYSTEM

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 (or stronger) 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 fasteners that require it. If the above conditions are not followed, part or system damage could result.

Important

The illustrations in these instructions show a 4-cylinder installation. The procedures, except for the number of spark plug secondary leads, are the same for 6-cylinder and 8-cylinder installations. The illustrations also show an installation with shift interrupt. Specific instructions for installations without shift interrupt are provided in the text. Read and become familiar with all instructions before beginning to install this kit.

APPLICATIONS

Kit no. 10457090

for GM 2.5 litre and 3.0 litre 4-cylinder marine engines. Typical applications:

- MerCruiser 2.5L and 3.0L, 120 thru 140 HP
- OMC 3 Litre/130

Kit no. 10457092

for GM 5.0 litre and 5.7 litre V8 marine engines.

Typical applications:

- MerCruiser 5.0L and 5.0LX, 200 and 230 HP
5.7L, 260 and 270 HP
350 Magnum, 270 HP
(includes Bluewater Series)
- OMC 5 Litre/200, 5 Litre/230, 5.7 Litre/260,
350 C.I./270
- Volvo Penta AQ211, AQ231, AQ271
- Crusader C305, CP305, CS305, C350, CP350,
CS350, CS350 HO

Kit no. 10457091

for GM 4.3 litre V6 marine engines.

Typical applications:

- MerCruiser 4.3L and 4.3LX, 175 and 205 HP
- OMC 4.3 Litre/175 and 4.3 Litre/205
- Volvo Penta AQAD41, AQ205
- Crusader C262

Kit no. 10457093

for GM 7.4 litre and 8.2 litre V8 marine engines.

Typical applications:

- MerCruiser 7.4L, 330 HP
7.4L, 340 HP (Bluewater Series)
454 Magnum, 365 HP
- Volvo Penta AQ311, 740DP
- Crusader C454, CM454, CM454 HO, C502,
CM502

Typical applications are shown. There are other applications of these GM engines produced by various marine upfitters. To determine if a particular boat contains one of these GM engines, contact your marine dealer.

RETROFIT INSTALLATION INSTRUCTIONS

VOYAGER[®] MARINE DISTRIBUTOR IGNITION SYSTEM

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GENERAL INFORMATION

These instructions cover the installation of the Voyager Marine Distributor Ignition System with Electronic Spark Timing (EST), to replace original equipment breaker point ignition systems on most GM marine engines. These engines are used by marine inboard and inboard-outboard stern drive unit manufacturers such as Mercury Marine, OMC, Crusader Marine, Volvo Penta, and others. This ignition system may be installed on 1980 and later model years of these engines.

The retrofit kit includes the following items (see figure 1):

- Voyager Marine Ignition Distributor with EST
- High Energy Ignition Coil
- Coil and Spark Plug Secondary Leads
- Distributor to Coil Wiring Harness
- Distributor to Shift Interrupt Lead
- Coil to Ignition Switch/Tach Splice Lead
- Coil Mounting Screws and Washers
- Distributor/Engine Gasket Kit
- Butt Splice Connectors (extras included)
- Base Timing Label for Engine
- Initial Timing Connector
- Label for Initial Timing Connector
- Extra Length of 18 AWG Wire (Purple)

These instructions are intended for use by professional marine-certified technicians only, not a "do-it-yourselfer." Properly trained technicians have the equipment, tools, safety instructions, and know-how to do the job properly and safely. See your marine service dealer for information on whether your boat may benefit from installation of this retrofit package.

CAUTION: Failure to follow these guidelines can result in personal injury or death due to fire or explosion. It is important that U.S. Coast Guard guidelines be observed when installing this kit, to help prevent electrical sparks from igniting fuel vapors in the bilge during engine operation.

The equipment in this kit and the installation instructions comply with U.S. Coast Guard regulations in effect at the time the kit was packaged. For any updates that may have occurred in those regulations or for system modifications other than those described in these instructions, refer to U.S. Coast Guard electrical compliance guidelines available from the National Technical Information Service, Springfield, VA 22161.

For best performance of the Voyager Marine Distributor Ignition System, replace worn or dirty spark plugs with new plugs of the type and gap specified for use by the marine engine manufacturer.

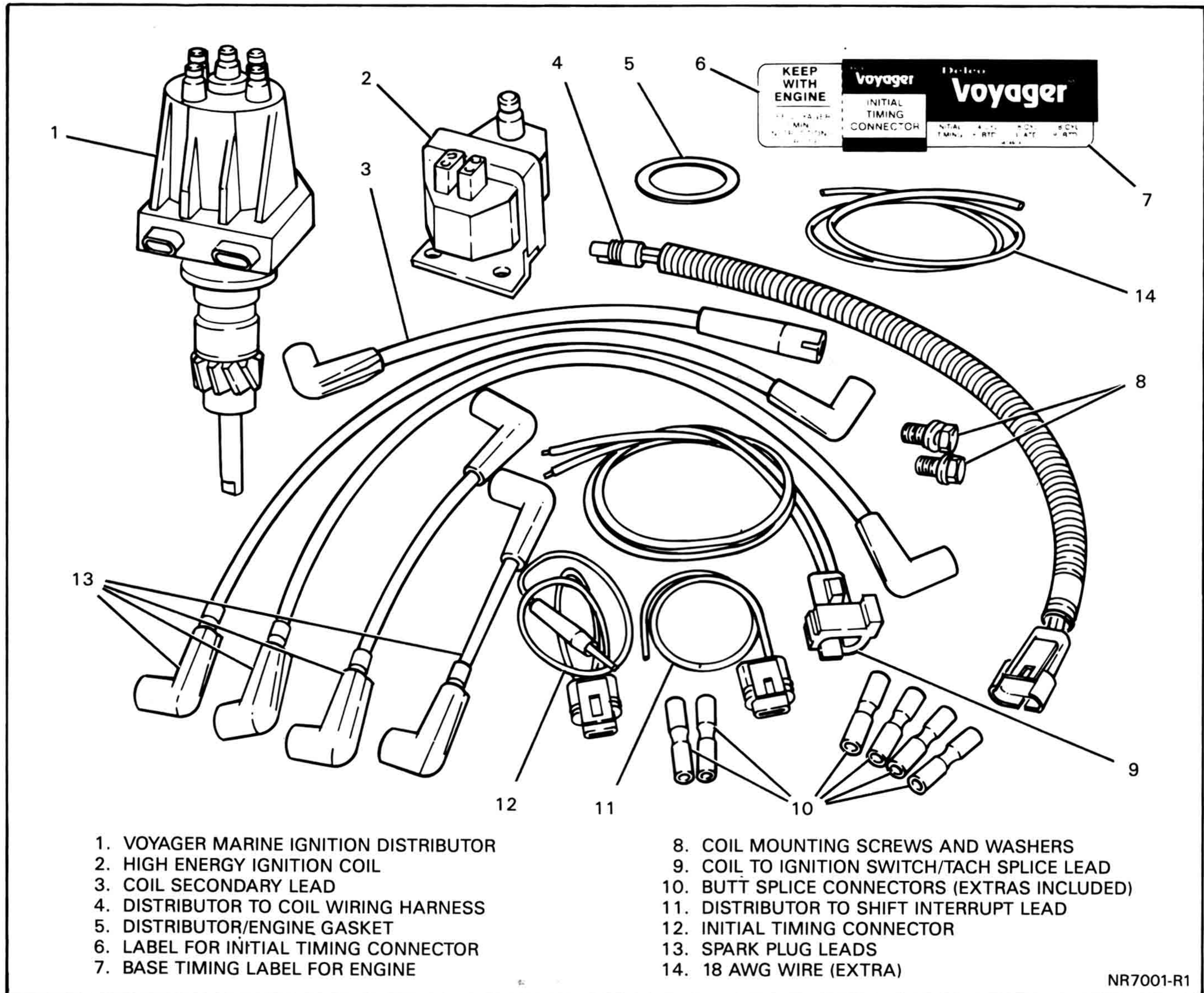


Figure 1 — Delco Voyager Marine Distributor Ignition System

REMOVAL OF OLD IGNITION SYSTEM

Figures 2 and 3

! Important

For easiest replacement, the engine crankshaft must not be rotated between the time the old distributor is removed and the time the new distributor is installed. If the crankshaft has been rotated, rotate the crankshaft until the number 1 cylinder is positioned at top dead center (TDC), or "0" on the timing tab, before installing the new distributor.

1. Disconnect negative battery cable at battery.
2. Determine which tower of the distributor cap is connected to the #1 cylinder spark plug. Mark the position relative to the engine. (The #1 spark plug is the one closest to the front of the engine.)

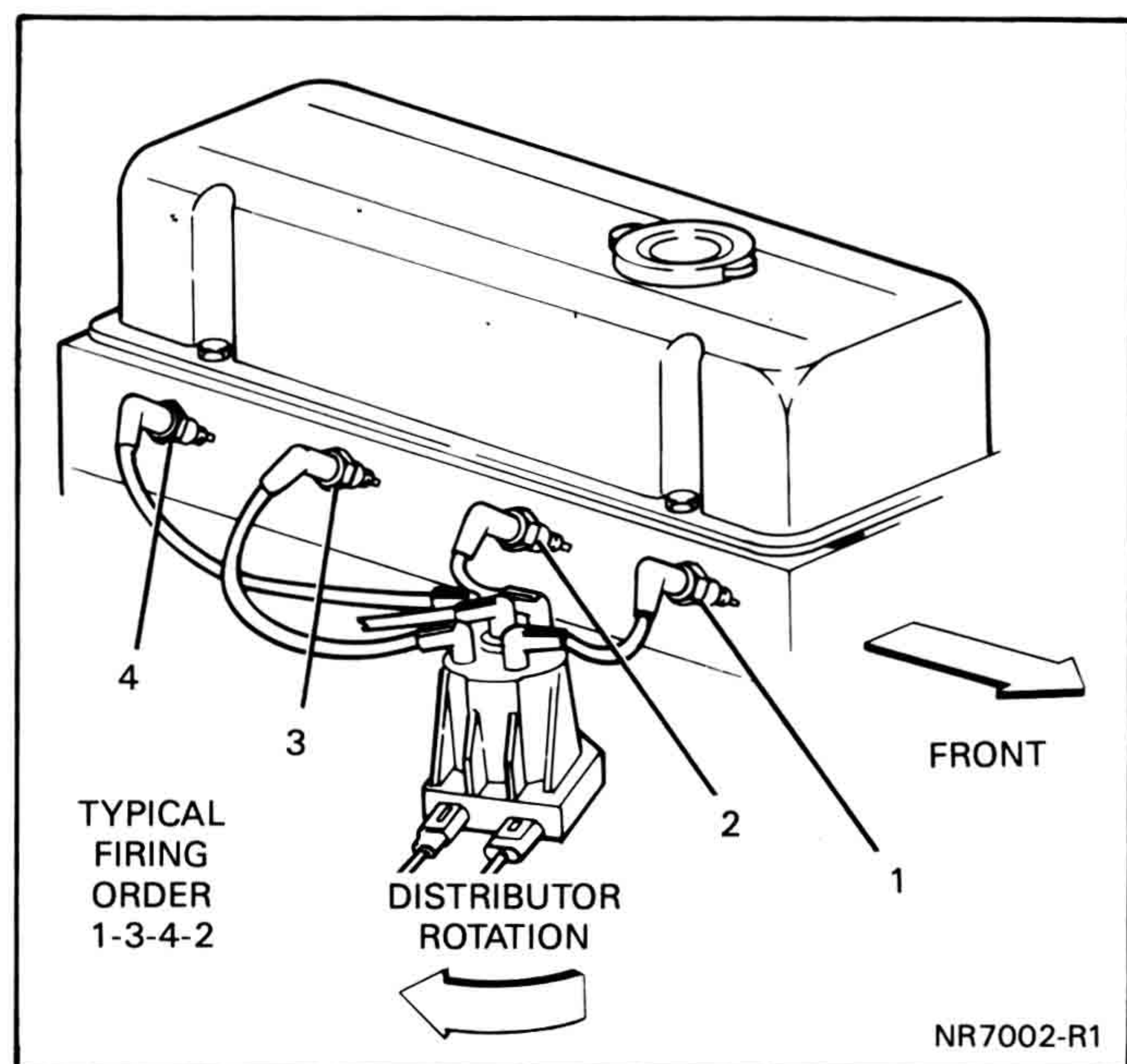


Figure 2 — Typical 4-Cylinder Firing Order (Single Engine)

! Important

On dual engine installations, one engine will likely have a firing order opposite to the other. Treat each engine individually and do not assume that they are identical.

3. Note location and firing order of old spark plug leads relative to #1 spark plug tower on distributor cap (see figure 2). Using a twist-and-lift motion to unseat the connectors, remove the old spark plug and coil secondary leads from the engine (see figure 3). Retain any wire looms for later routing of new leads.
4. Remove the old distributor cap from the distributor. Mark the location of the rotor segment relative to the engine. When the new distributor is installed, the rotor segment must be positioned to the same location. (If the engine crankshaft is rotated while the distributor is out of the engine, the segment will be positioned to the #1 distributor tower position marked in step 3, after the #1 cylinder is positioned at TDC.)
5. Remove clamp bolt and distributor hold-down clamp.
6. Disconnect leads from (-) terminal of ignition coil. This will include the distributor primary, along with tachometer and shift interrupt leads as applicable. Note location of tach lead for later installation of new ignition coil.
7. Lift old distributor from engine. Note that distributor rotor rotates slightly as distributor is removed. Note position of rotor segment relative to earlier position. Rotor of new distributor will rotate a similar amount in opposite direction as distributor is installed.

Take steps to prevent material from falling into distributor hole in engine, then clean away any pieces of old distributor gasket that may have stuck to the mounting surface in the engine.

! Important

Check gear of old distributor for excessive wear. If worn, cam gear in engine may also be excessively worn (inspect by using light to see gear through distributor mounting hole in engine). For best performance of Delco Voyager Marine Distribution Ignition System, correct cam gear for any excessive wear before ignition system installation.

9. **NOTICE:** The B+ lead to the new ignition coil must not be stepped down through a resistor as it was with the old contact point system. The new coil lead will be connected to a B+ source from the ignition switch that is known to be free of the old resistor or resistance wire, as described later in this procedure. The new ignition system will not operate properly if there is a resistance in the distributor B+ lead.

Disconnect leads from (+) terminal of old ignition coil. One of these leads will be a B+ lead from the ignition switch stepped down through a resistor or resistance wire. A second lead will be from the starting motor solenoid "R" terminal (to bypass the resistance during engine cranking). These leads are not used for the new ignition system. Tape back the connectors on these two leads to insulate them from accidental contact and to secure them to the wiring harness. ("R" terminal lead may be removed completely by disconnecting at starter solenoid. Be sure to retighten inside nut on solenoid terminal to 2.5 N·m (22 lb.in.) to secure terminal in cap after lead removal.)

10. Remove ignition coil mounting bolt(s) and old ignition coil from engine.

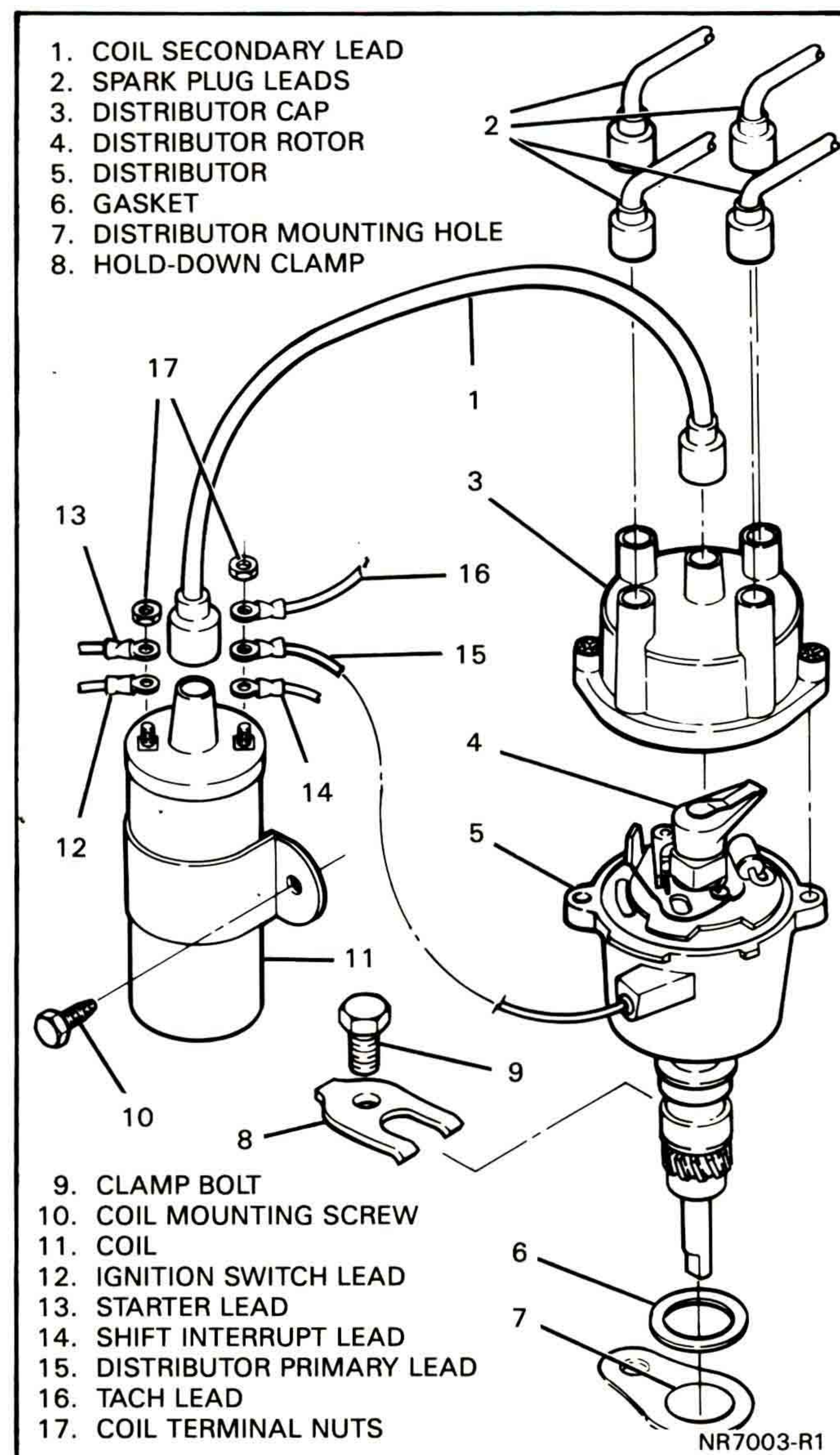
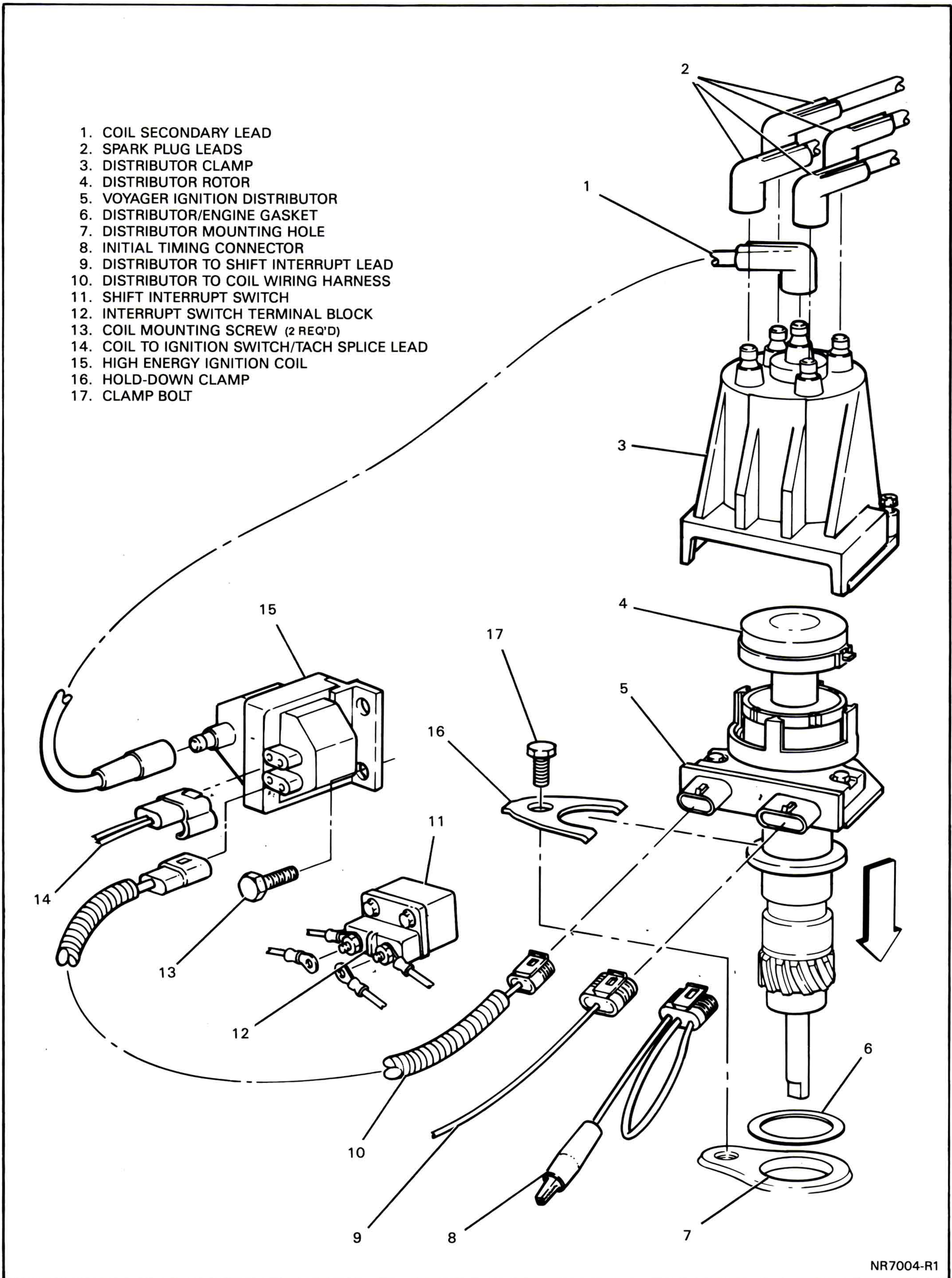


Figure 3 — Old Distributor System



NR7004-R1

Figure 4 — Delco Voyager Marine Distributor Ignition System Installation

INSTALLING NEW IGNITION SYSTEM

Figures 4 through 10

11. Remove cap from new distributor (see figure 4). Determine location to which rotor segment must be positioned during installation.
 - If engine crankshaft has not moved, this will be the same as the position of the old distributor rotor segment as marked in step 3. Select proper gasket from set provided in kit and place onto distributor housing. Allowing for rotation of rotor segment as distributor is inserted, install distributor to engine so that segment is in same position as old rotor segment. Be sure distributor is fully seated; bottom of shaft must engage with oil pump drive slot in engine.
 - If crankshaft has been moved, rotate crankshaft until #1 cylinder is at top dead center (TDC), or "0" on timing tab. Use screwdriver to reposition oil pump drive slot in engine so that tang on bottom of distributor shaft will engage as distributor is inserted. Select proper gasket from kit and place on distributor housing. Allowing for rotation of rotor segment as distributor is inserted, install distributor to engine so that segment is positioned at location of cap tower for #1 cylinder as marked in step 3. Be sure distributor is fully seated in engine.
12. Install distributor hold-down clamp and bolt, leaving just loose enough to rotate distributor housing in engine. Install distributor cap.

Tighten

- Distributor cap screws to 1.6 N·m (14 lb.in.).
13. Rotate distributor to a convenient position for electrical connectors and wire routing while leaving clearance around cap for timing adjustment. Align one distributor cap tower with the location of the old cap tower for the #1 cylinder marked in step 3. Temporarily tighten clamp bolt.
 14. Determine mounting location for new ignition coil. Bracket provided on new coil fits pre-drilled mounting holes on engine. In some applications, it may not be possible to mount the coil to these standard holes due to other equipment. If not, mount coil to marine upfitter's location of old coil or to another convenient location by altering bracket to fit. Bracket should allow for mounting coil with two mounting screws.

Install new ignition coil to engine block, using two new screws and lockwashers (the old coil mounting screw may be too long). Two thread sizes are supplied; select the ones that fit the standard tapped holes in the engine block. Use two screws for coil installation even if old coil used only one. If the screws bottom out before the coil bracket feels secure to the engine, remove each screw and add a flat washer next to the coil bracket, then reinstall the screw and lockwasher.

Table 1. Torques

DISTRIBUTOR HOLD-DOWN CLAMP	
ENGINE	TORQUE
2.5L	17 N·m (13 lb.ft.)
3.0L	17 N·m (13 lb.ft.)
4.3L	27 N·m (20 lb.ft.)
5.0L	40 N·m (30 lb.ft.)
5.7L	40 N·m (30 lb.ft.)
7.4L	40 N·m (30 lb.ft.)
8.2L	40 N·m (30 lb.ft.)
IGNITION COIL MOUNTING BOLTS	
TO BLOCK	TO BRACKET
22 N·m (17 lb.ft.)	SEE MARINE ENGINE MANUFACTURER SPECIFICATIONS

Tighten

- Mounting screws to torque specified in Table 1.
15. Install spark plug and ignition coil secondary leads (see figure 5 and refer to notes made during step 3). Be sure leads are fully seated on spark plugs, distributor cap, and ignition coil.
 16. Install distributor-to-coil wiring harness supplied in kit (see figure 6). Connect harness to 2-terminal connector on distributor and to mating connector on ignition coil. Be sure harness connectors are fully seated and latched.

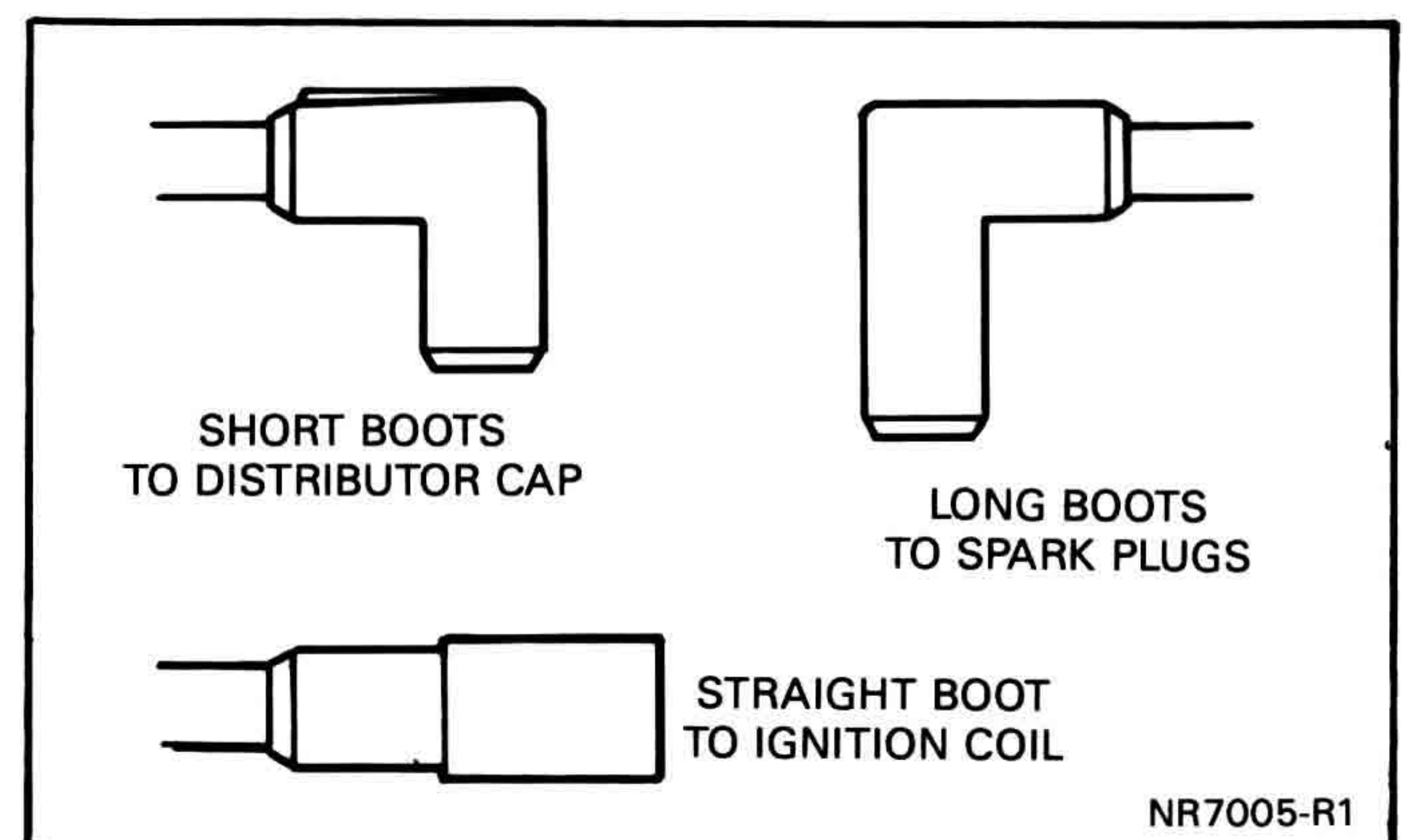


Figure 5 — Spark Plug Lead Connector Identification

17. Install connector with ignition switch and tachometer splice leads into ignition coil terminal (see figure 6). Be sure connector is fully seated and latched. Route gray and purple connector leads as follows:
 - The gray connector lead is the tachometer lead and is to be spliced to the old tach lead detached during step 6. Determine suitable routing and length for the leads. Use suitable butt splice connector provided in kit to splice wires together (see figure 7). Strip end of each wire to be joined 1/4" from end. Insert stripped end of one wire into connec-

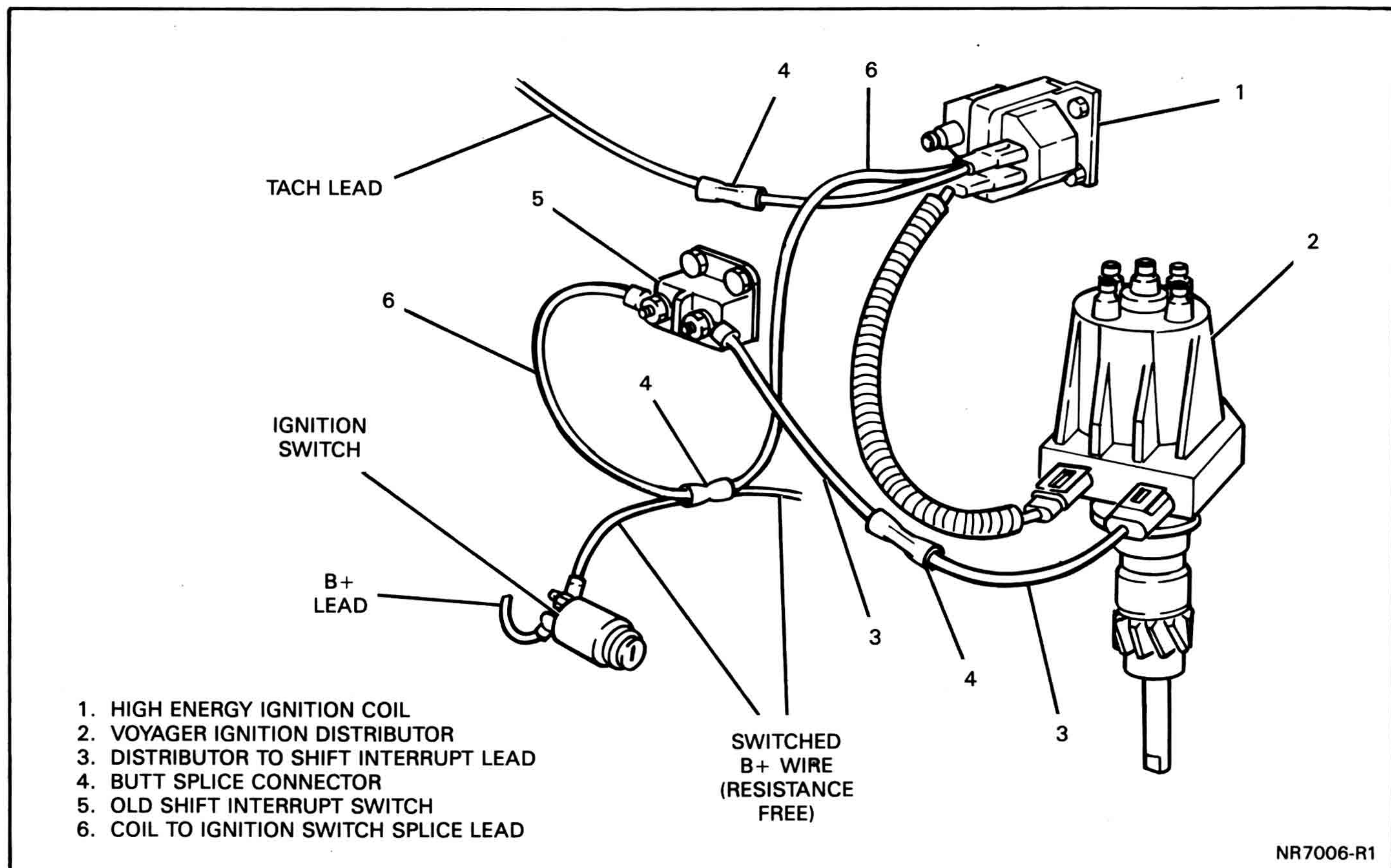


Figure 6 — Delco Voyager Distributor Ignition System Primary Circuit

tor, then crimp to secure. Insert stripped end of other wire into other end of connector, then crimp to secure. Use heat gun to shrink plastic coating on connector and seal the connection.

- The purple connector lead is to be connected to a B+ source that is switched by the ignition switch. To be sure of avoiding resistance wires that may have been used in the original ignition system, use the manufacturer's wiring diagram to locate a switched B+ wire that is both convenient and known to be free of an in-line resistor or resistance wire. A location near the bulkhead connector may be best.

Determine the proper routing and length of the new purple lead to reach the selected splice point. Secure lead to existing wiring harness with continuous tape wrap so that free length of wire does not exceed 30 inches. DO NOT make the splice in the wires until after the next step, but do cut the wires at the proper location. Keep the removed length of purple wire for use if needed later in this procedure.

18. On installations using a shift interrupt (or "shift assist") circuit to momentarily interrupt engine power during shifting of the drive mechanism, temporarily install the connector with the shift interrupt lead (black) to the 4-terminal connector on the distributor. If application does not use shift interrupt, refer to step 30.

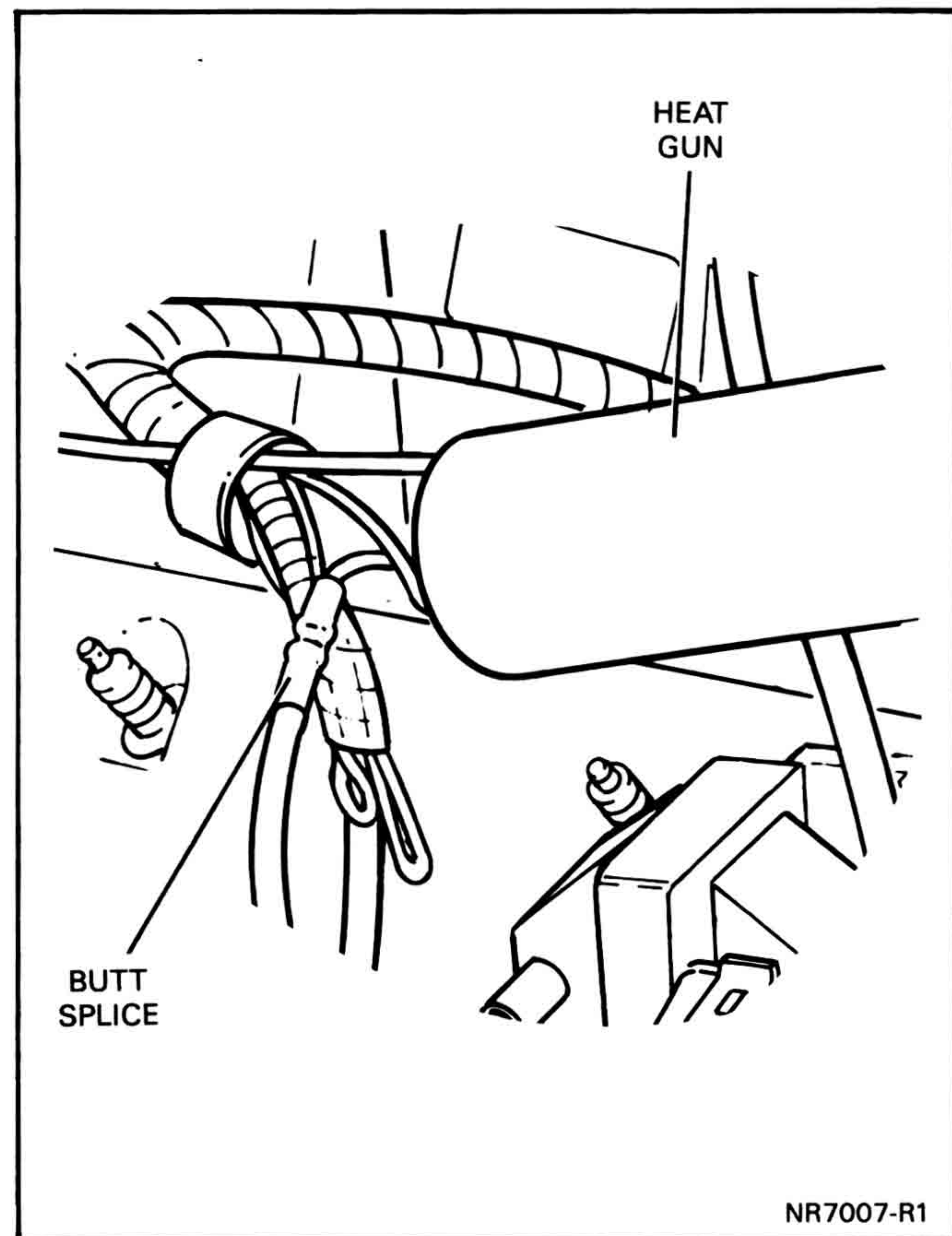


Figure 7 — Making Typical Butt Splice

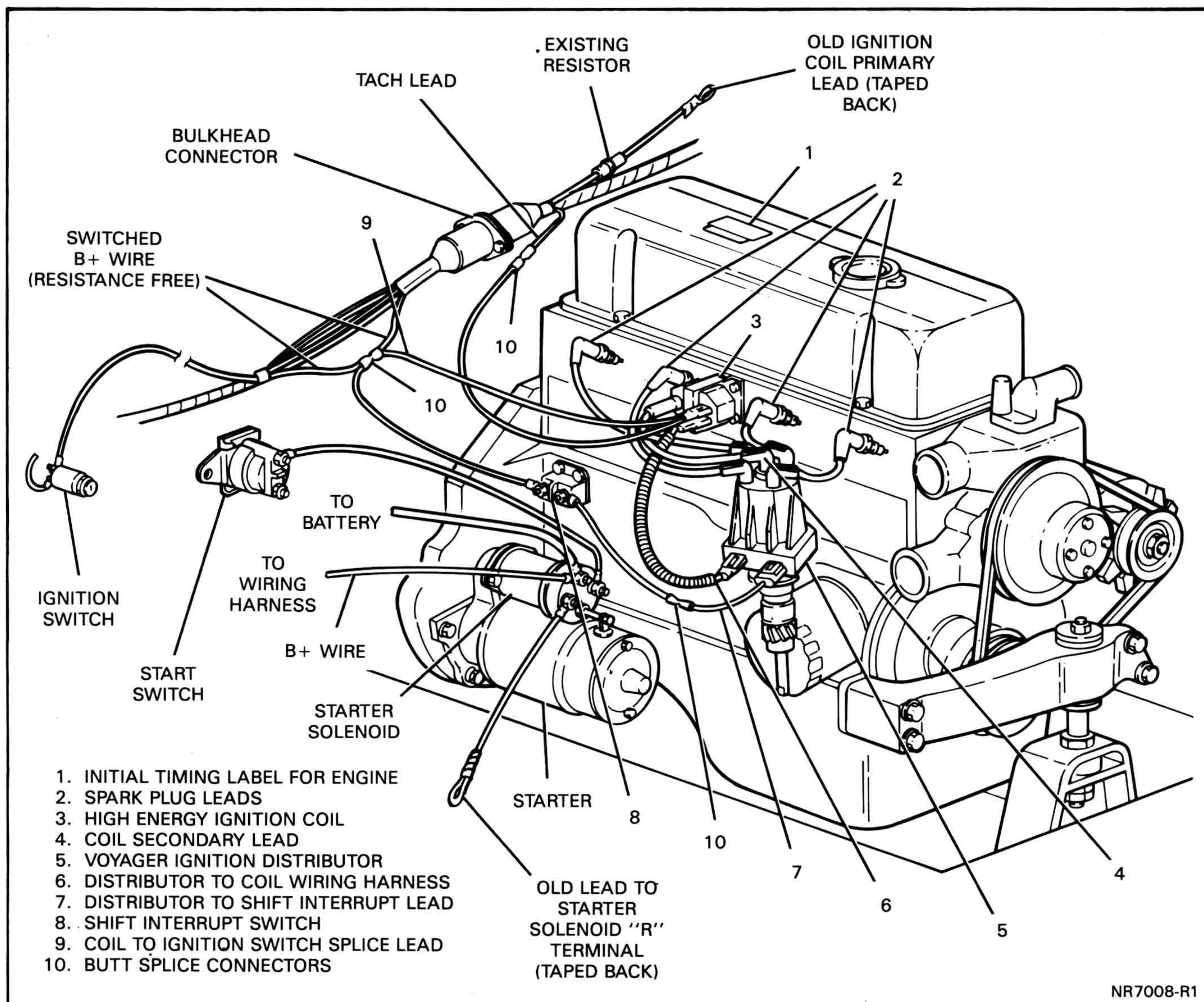


Figure 8 — Typical Delco Voyager Ignition System Wiring

! Important

Use of the shift interrupt circuit requires changing the shift interrupt switch from a momentary grounding switch to one that momentarily supplies B+ voltage to the distributor "R" terminal. Refer to engine manufacturer's wiring diagram and figure 6 for wiring circuits.

a. Disconnect circuits from both sides of old shift interrupt switch, leaving connectors or ends of wires for connecting new circuits as necessary. Tape back ends of old leads to insulate them from accidental contact and to secure them to the wiring harness.

! Important

Shift interrupt lead must not be routed against any of the ignition secondary wires or induced voltages may cause engine to cut out or run rough.

b. Determine proper routing and length of black shift interrupt lead from distributor to shift interrupt switch. Secure lead to existing wiring harness with continuous tape wrap so that free length of wire does not exceed 30 inches. Use suitable butt splice connector (in kit) to splice lead from distributor to wire from one side of switch. Strip insulation from each wire to be joined 1/4" from end. Insert stripped end of one wire into connector, then crimp to secure. Insert stripped end of other wire into other end of connector, then crimp to secure. Use heat gun to shrink plastic coating on connector and seal the connection.

c. Use 18 AWG purple wire (cut free in step 16 or extra length provided in kit) to route lead from switched B+ source (see step 16 and figures 6 and 8) to other side of shift interrupt switch. Secure lead to existing wiring harness with continuous tape wrap so that free length of wire does not exceed 30 inches. Use butt splice connector

(in kit) to splice purple lead to remaining lead on switch. Strip insulation from each wire to be joined $\frac{1}{4}$ " from end. Insert stripped end of one wire into connector, then crimp to secure. Insert stripped end of other wire into other end of connector, then crimp to secure. Use heat gun to shrink plastic coating on connector and seal the connection.

19. Use suitable butt splice connector to join four wires at splice location for switched B+ source determined in step 16. Two wires will be inserted into each end of the splice connector. Strip insulation from each wire to be joined $\frac{1}{4}$ " from end. Insert stripped ends of two wires into one end of connector, then crimp to secure. Insert stripped ends of other two other wires into other end of connector, then crimp to secure. Use heat gun to shrink plastic coating on connector and seal the connection.
20. Reconnect negative battery cable.

21. **NOTICE:** Do not use timing light that requires piercing of secondary insulation. Use only timing light with inductive pick-up or jumper type connector. Piercing secondary insulation will cause spark plug misfiring and may damage internal conductor resulting in failure of secondary wire later.

Install timing light at #1 spark plug lead, per manufacturer's instructions.

22. **NOTICE:** Do not connect alligator clip lead of Initial Timing Connector to a B+ source until after engine is started. If initial timing connector is connected to B+ source while engine is started, the ignition control module (ICM) in the distributor may be damaged. If engine must be restarted while Initial Timing Connector is installed, detach alligator clip lead from B+ source to avoid damaging ICM.

Start engine and allow to warm to operating temperature. (Follow engine manufacturer's instructions if operating engine out of water.)

23. If application uses a shift interrupt circuit, detach connector with shift interrupt lead from distributor. If application does not use shift interrupt, remove terminal plug from distributor.

NOTICE: Do not attempt to shift drive unit into gear or out of gear with shift interrupt circuit disconnected from distributor. Damage to outdrive unit may result, particularly if boat is in water.

24. Install initial timing connector provided in kit to 4-terminal connector on distributor (in place of shift interrupt connector or terminal plug) (see figure 4). Be sure connector is seated in distributor.
25. Connect alligator clip on long lead of initial timing connector to convenient B+ voltage source, such as battery terminal on starter solenoid (see figure 8).

This removes all advance from electronic spark timing. Engine will probably slow down when connection is made. Engine speed should be around 650 RPM.

26. Loosen distributor clamp screw just enough to rotate distributor, and set base timing to new specification shown on new initial timing label for engine (in kit). This may not be the same as the base timing specified by the manufacturer for the old ignition system. The new timing specification is used with the Delco Voyager Marine Distributor Ignition System provided in this kit only.
27. When timing is set to specification, secure distributor in position with clamp screw.

Tighten

- Clamp screw to torque specified in Table 1.
28. Recheck timing to assure that distributor did not move during tightening. If it did, repeat steps 23 and 24.

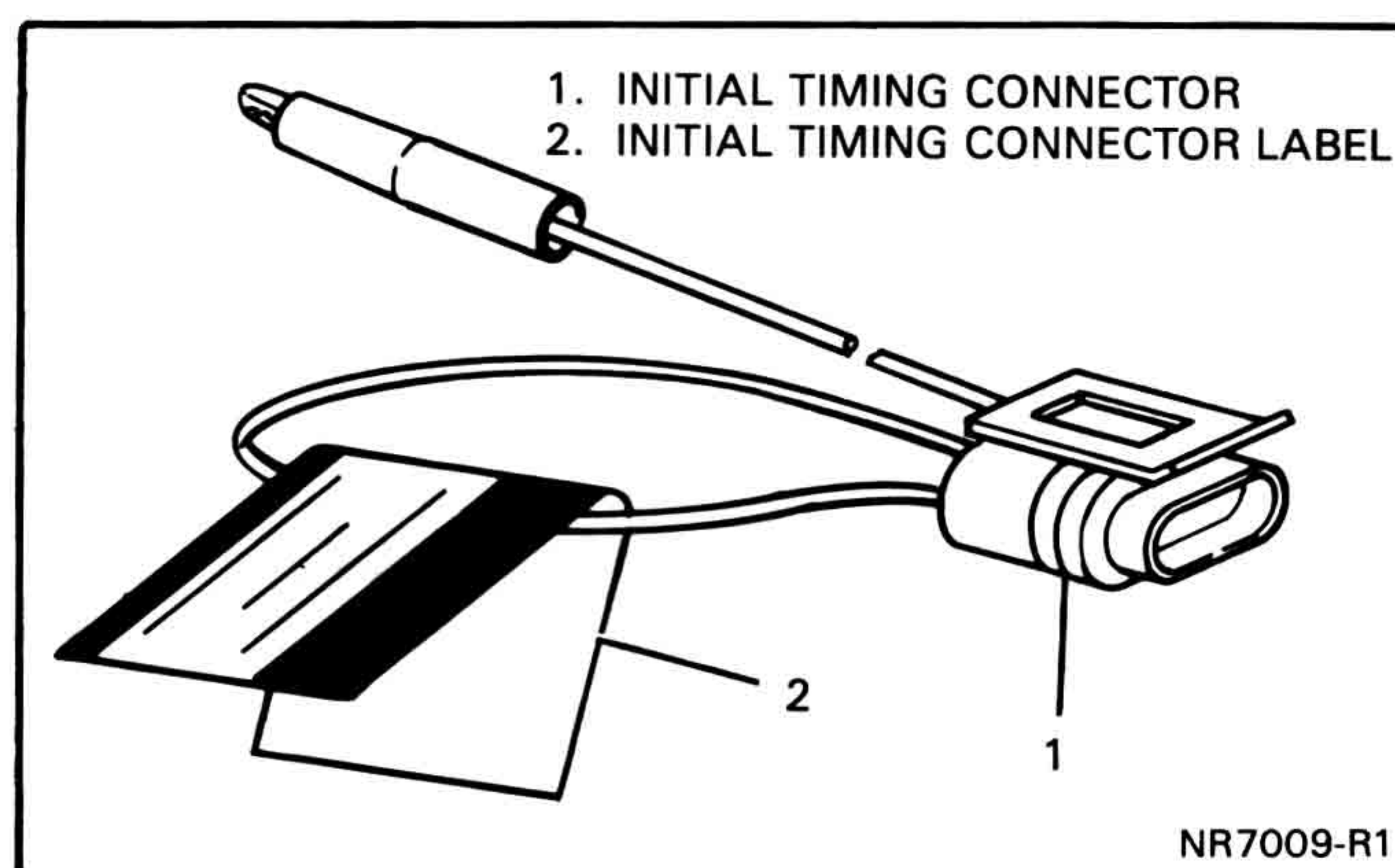


Figure 9 — Installing Initial Timing Connector Label

29. Disconnect initial timing connector from B+ source and remove connector from distributor. Label initial timing connector as shown in figure 9 by folding adhesive label (in package) over one of the wires, matching the edges to cover the adhesive. Store connector in safe place; keep with engine for future use.

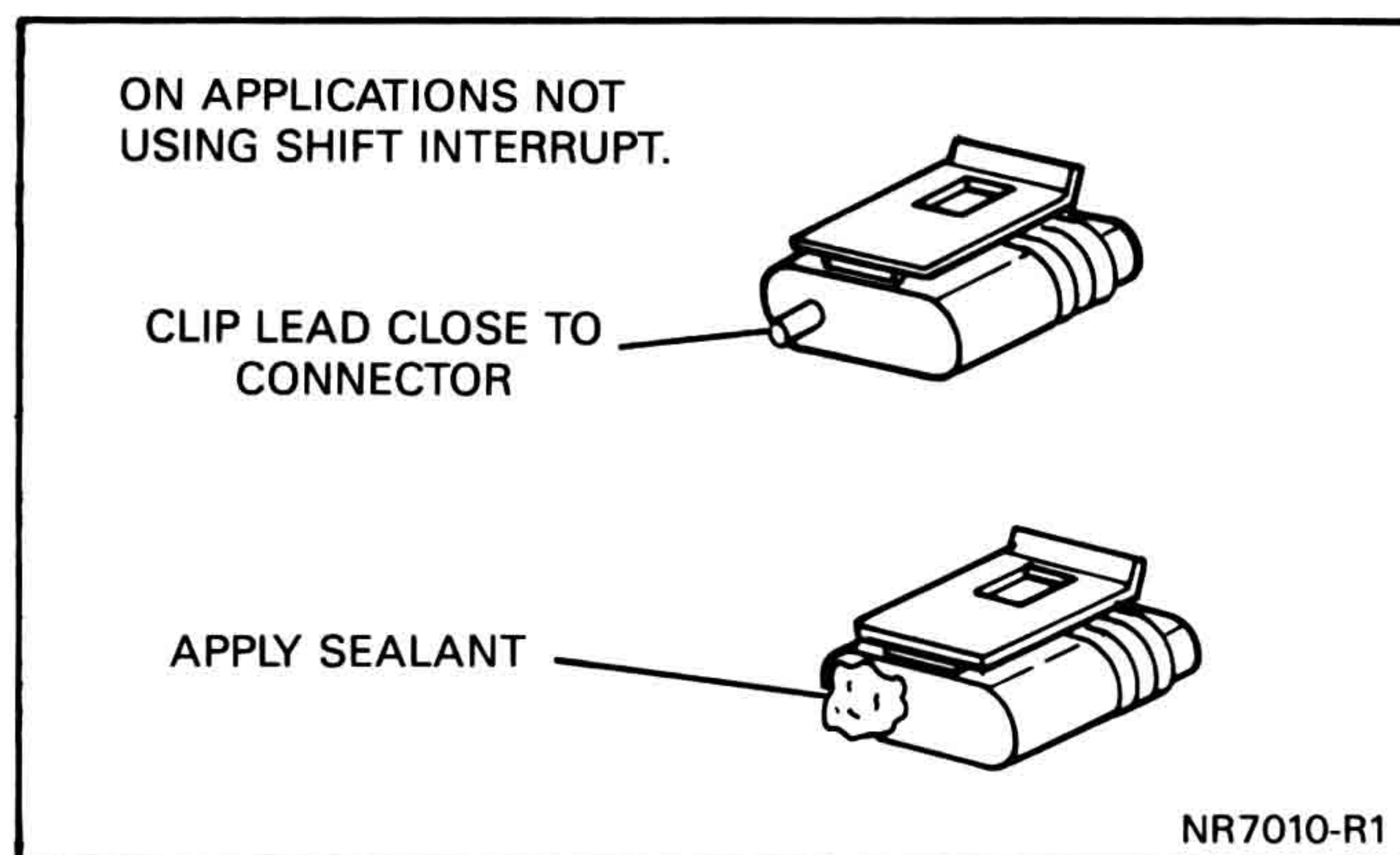


Figure 10 — Sealing Shift Interrupt Connector

30. If shift interrupt is not used, clip lead wire close to shift interrupt connector body and place a dab of adhesive sealant (such as RTV) over the cut end of the wire to seal it from moisture (see figure 10). Install shift interrupt connector to distributor. Connector must be installed to seal the terminals regardless of whether application uses shift interrupt. Be sure shift interrupt lead is not routed against any secondary leads and that connector is fully seated and latched.
31. Follow engine manufacturer's instructions for setting idle speed. Idle speed may have been changed by installation of new ignition system. On some engines it may be possible to use a lower idle speed than originally specified, giving better fuel economy. Adjust idle speed to satisfactory level.
32. Clean suitable area on or near engine for application of adhesive label (supplied in kit) showing new initial timing specification for engine with Voyager Distributor Ignition System. The label information and initial timing connector are important for future servicing of engine if timing must be reset.
33. **CAUTION: When checking shift interrupt operation with boat in water, stay clear of other boats or objects in surrounding water. Incorrect operation of the shifting mechanism or shift interrupt feature can make it difficult to get the outdrive out of gear. If this happens, turn the ignition off immediately to stop the engine. Personal injury or damage may result if surrounding area is not kept clear while checking operation.**

On engines with shift interrupt feature, check operation with outdrive immersed in water. If shift action is normal, no adjustment of the shift interrupt system should be needed.

If engine does not shift in or out of gear properly with propeller running in water, there may be too little or no actuation of the shift interrupt switch, or it may be improperly timed. Adjustment of shift linkage and/or shift interrupt switch actuator may be necessary. Refer to manufacturer's instructions for adjustment procedures.

If engine dies during shifting, shift interrupt switch may be held "on" too long by shift linkage. Refer to manufacturer's instructions for adjustment procedure.

NOTE: If engine shifting was normal before installation of Delco Voyager Ignition System, chances are it will also be normal after installation. However, if previous service of engine or shift linkage was performed to compensate for abnormal shifting action, system may have to be readjusted to assure proper performance.

SERVICE PARTS LIST

FIG. 1 INDEX NO.	DESCRIPTION	ENGINE			
		4-CYL 2.5, 3.0L	V6 4.3L	V8 5.0, 5.7L	V8 7.4, 8.2L
—	KIT NO.	10457090	10457091	10457092	10457093
1	DISTRIBUTOR*	1103782	1103798	1103799	1103799
2	IGNITION COIL	1115491	1115498	1115498	1115499
3 & 13	SECONDARY LEAD KIT	10486136	10486137	10486138	10486138
4	DIST. TO COIL HARNESS	12097982	12097982	12097982	12097982
9	COIL TO IGN. SW. HARNESS WITH TACH LEAD	10486134	10486134	10486134	10486134
11	DIST. TO SHIFT INTERRUPT LEAD	10486135	10486135	10486135	10486135
12	INITIAL TIMING CONNECTOR	10486133	10486133	10486133	10486133
5	GASKET KIT	10132896	10108445	10108445	10108445

* Distributor not available as a complete unit. Serviced by parts only. Refer to Delco Remy catalog sheet for this distributor part number.

IGNITION COIL MOUNTING HARDWARE (ALL METAL PARTS TO BE CORROSION PROTECTED):

- Hex Head Cap Screws: 5/16-18 x 3/4 in. long or 3/8-18 x 3/4 in. long.
- Flat Washers: 5/16 or 3/8 in. as needed.
- Lockwashers: 5/16 or 3/8 in. as needed.

Delco Voyager[®] MARINE DISTRIBUTOR IGNITION SYSTEM

Marine Electronic Spark Timing is MORE Efficient and Reliable.

State-of-the-Art Design

Delco Voyager[®] Marine Distributor Ignition System with EST accomplishes the spark timing function electronically. This results in longer spark plug life, eliminates mechanical contacts and scheduled maintenance, provides better cold weather starting, and is environmentally protected.

EST achieves new standards of distributor ignition performance by providing 40% more output voltage and 85% higher energy level. With higher energy available, combustion is more reliable and complete.

Applications

Available for GM based L4, V6, and V8 marine engines.

Excellent Reliability

- Reduced spark plug fouling
- Fewer electrical connections
- Magnetic Sensors
- Coil epoxy impregnated for environmental protection

Increased Performance

- Precise Electronic Spark Timing and "Closed Loop Dwell Control"
- Increased Spark Advance
- "Stand-alone" capability
- Improved Fuel Economy

High Energy

- Faster Voltage Rise Time
- 35kV Output to Plugs
- 125mJ Stored Energy
- 1800 microseconds burntime

Advanced Technology

- High-efficiency coil
- Tamper resistant timing
- Reduced size and weight

Complete Retrofit Package

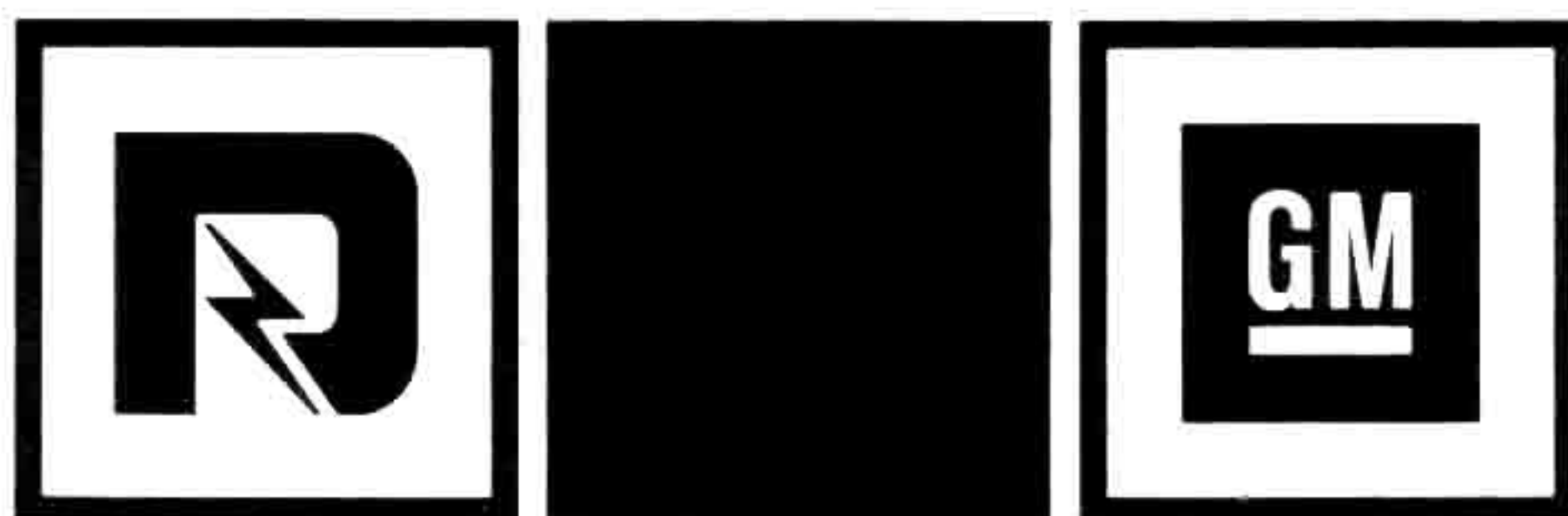
■ Can be installed in 2 hours

■ Available at AC-Delco Outlets

Includes

- Instruction Sheet
- Distributor
- Ignition Coil
- Coil Harness
- Initial Timing Connector
- Coil Splice Lead
- Shift Interrupt Connector
- Secondary Leads
- All Screws, Washers, and Butt Splice Connectors Required

This Equipment Complies with U.S. Coast
Guard Safety Standards in Effect On
The Date of Packaging Stamped on the Box Label.



Delco Remy

DIVISION OF GENERAL MOTORS
2401 COLUMBUS AVENUE
ANDERSON, INDIANA 46018