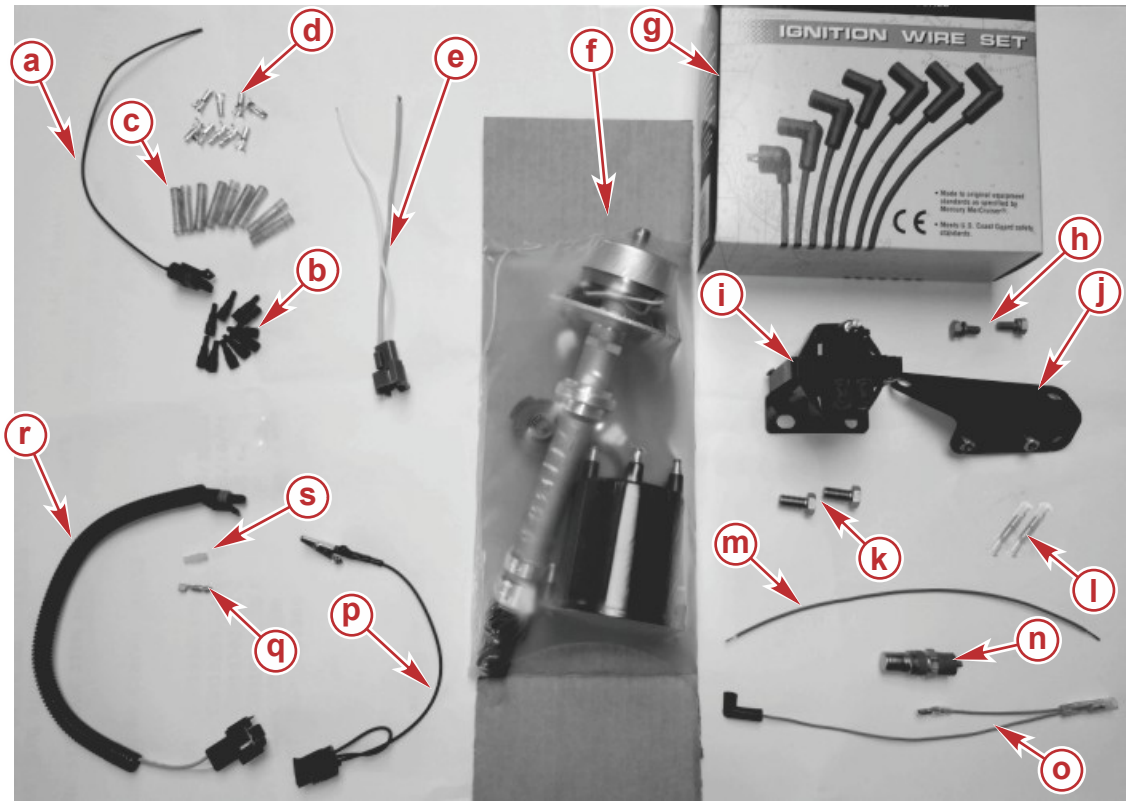
ICM REPLACEMENT KIT
MERCRUISER IGNITION CONTROL MODULE

IMPORTANT: This document guides our dealers, boatbuilders, and company service personnel in the proper installation or service of our products. If you have not been trained in the recommended servicing or installation procedures for these or similar Mercury Marine products, have the work performed by an authorized Mercury Marine dealer technician. Improper installation or servicing of the Mercury product could result in damage to the product or personal injury to those installing or operating the product. Always refer to the appropriate Mercury Marine service manual for component removal and installation instructions.

NOTE: After completing installation, place these instructions with the product for the owner's future use.

Components Contained in Kit



73405

Ref.	Qty.	Description	Part Number
a	1	Single connector single wire harness - distributor to ignition interrupt (black wire). Used for Alpha Sterndrive only	NSS
b	1	Male bullet plugs	13541
c	10	Female bullet insulator	85-17199
d	10	Female bullet terminal	84-814433T
e	1	Single connector coil harness – coil to engine harness (white wire, pink wire)	NSS
f	1	HEI V8 Distributor w/module	8M0184055
g	1	V8 Spark plug wire set (V6 shown, V8 similar)	816608Q71
h	2	Coil to bracket mounting bolts & washers	10-65746 1
i	1	Ignition Coil assembly	898253T27
j	1	Bracket for mounting coil & bracket assembly	8M0184056
k	2	Coil bracket to cylinder head mounting bolts	10-98261
l	2	Wire connector with heat shrink	896711T
m	1	Single purple wire – Coil wire to ignition interrupt (purple wire – 14") Used only with Alpha Sterndrive models	NSS

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Ref.	Qty.	Description	Part Number
n	1	Temperature switch – install in place of temperature sensor. Used with Thunderbolt V models only.	48952
o	1	Audio warning horn harness – Temperature switch to ICM bullet (tan/blue wire). Used with Thunderbolt V models only.	84-8M0180090
p	1	Timing tool	NSS
q	1	Male bullet terminal	814434T
r	1	Dual connector coil harness – coil to distributor (white wire, pink wire)	84-817376T01
s	1	Male bullet insulator	85-184434T

MerCruiser Small Block (5.0 L and 5.7 L) V8 HEI Kit 8M0183360

The legacy Thunderbolt V MerCruiser ignition control module (ICM) used as a service replacement for Carbureted MerCruiser Thunderbolt V and Thunderbolt IV ignition modules is not available. This HEI distributor/coil kit will sufficiently fulfill the necessary functionality requirements of the ICM. The kit comes with a new distributor assembly (HEI), a new GM style coil assembly and wiring necessary to integrate the new components to the existing engine harness. These instructions will direct the modifications necessary to the engine harness for correct and robust connections to the new components.

IMPORTANT: This kit is warranted for component or kit replacement at the discretion of the manufacturer only under conditions of a faulty or improperly manufactured component of this kit. Under no exceptions are consequential damages to engine, drive, transom, transmission or other components warrantable as a condition of the installation of this kit. Further, damages caused by improper installations of this kit, pre-existing engine damages, or other mechanical damages caused by improper propping will not be warrantable under the conditions of this kit sale and installation. Mercury Marine strongly suggests that only qualified and authorized MerCruiser dealers install this kit. The technical skill level required to successfully install these components is considered advanced and expert only.

IMPORTANT: This V8 HEI kit is not equipped with a maximum revolution limiter. Also, the function of the knock module is eliminated from models that were so equipped. Therefore, it is imperative that the ignition timing is set correctly per these instructions and that the boat is correctly propped according to the specifications for the engine.

Model Identifier

This kit replaces Ignition control modules in the following models: 5.0 L and 5.7 L carbureted versions of MerCruiser and Quicksilver Sterndrive, Alpha and Bravo models. It also applies to 5.7 L carbureted inboard models. The applicable ignition systems of these models were both the Thunderbolt IV (TB IV) and the Thunderbolt V (TB V) electronic ignition systems. Further it applies to engines of those models that have been converted from TB IV to TB V using a TB IV to TB V conversion kit. These models include (Turn-Key Start) TKS carbureted as well as previous production choke-style carbureted MerCruiser products. The following illustrations of the ICM will help determine which ignition system the engine is equipped with. Some instructions in this document are dependent upon which ignition system was used prior to installation of this kit. Other instructions in this document are dependent upon which type of propulsion the boat is equipped with: MerCruiser Alpha sterndrive, MerCruiser Bravo sterndrive, or MerCruiser inboard with transmission.

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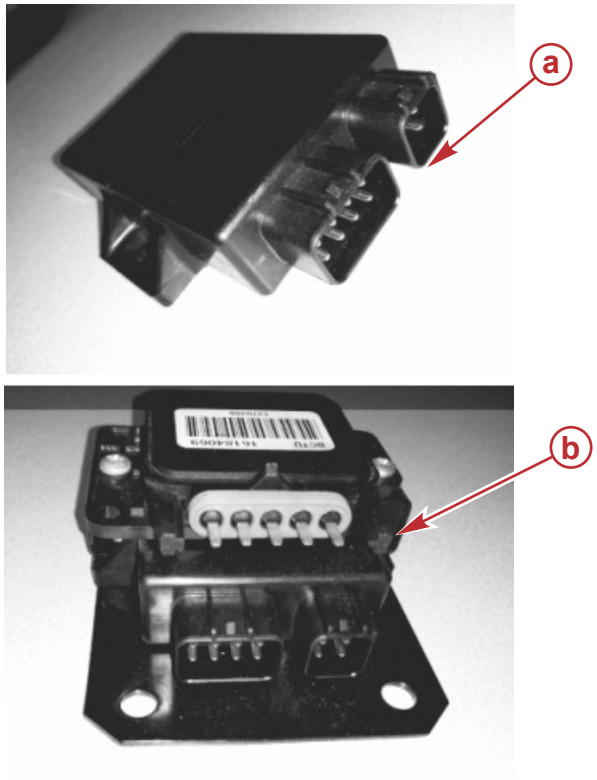
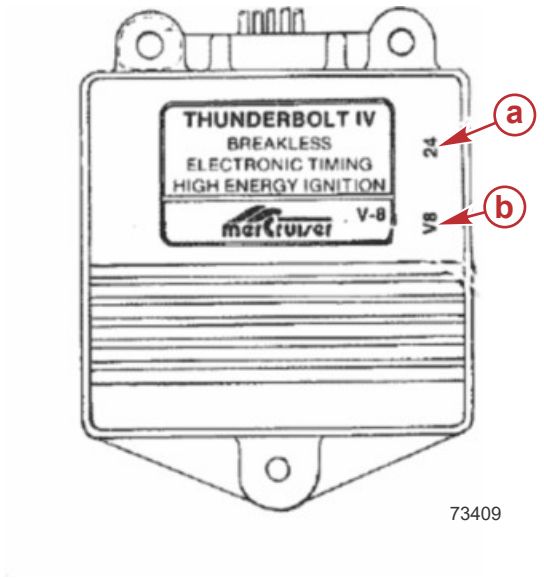
Model Identifier Examples



a - Thunderbolt V ICM
b - Thunderbolt V ICM with knock module mounted on the ICM kock

Original Thunderbolt IV ICM

This module is mounted on the exhaust elbow and has an aluminum housing.



Original Thunderbolt IV ICM
a - Spark advance (degrees)
b - Engine type

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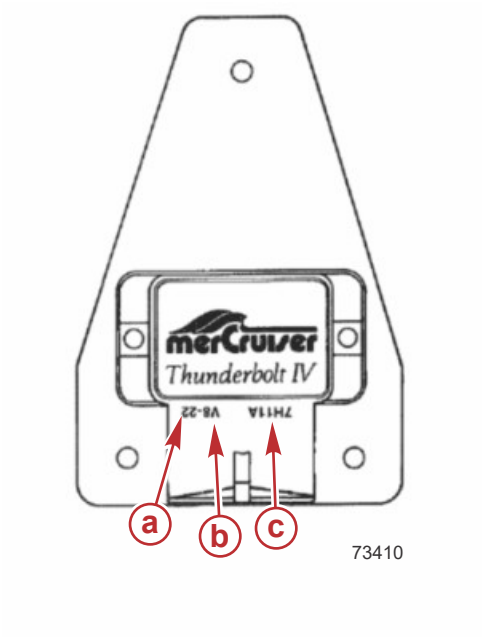
Second-Generation Thunderbolt IV Ignition Control Module

This module is mounted on a triangular plate and requires the use of an adapter harness 15275A1.

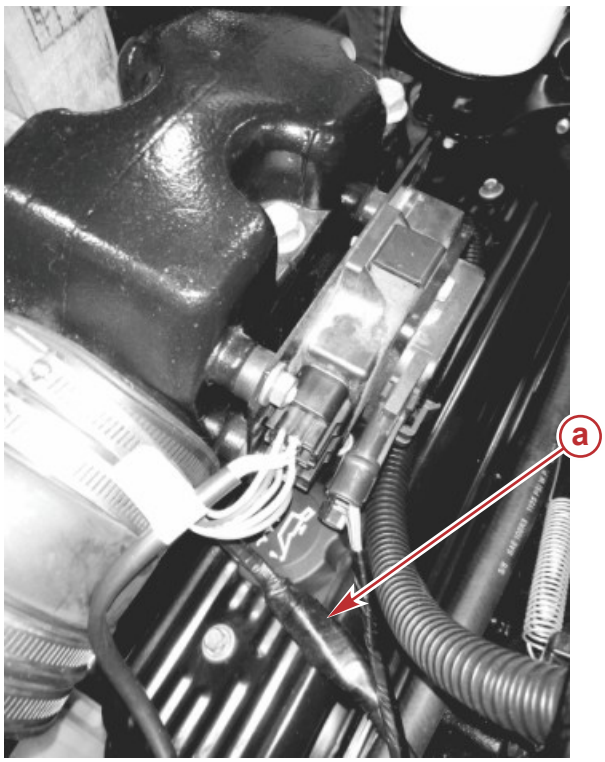


Second-Generation Thunderbolt IV Ignition Control Module on a triangular plate

- **a -** Spark advance (degrees)
- **b -** Engine type
- **c -** Vendor code

Thunderbolt IV to Thunderbolt V Conversion

Note the bulge of clustered bullet connectors in the electrical tape covering the wire harness.



- **a -** Bullet connection cluster

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Thunderbolt IV to V Conversion

Note the bulge of clustered bullet connectors in the electrical tape covering the wire harness.

73415

Removal of Components for all Models

⚠ CAUTION

Disconnecting or connecting the battery cables in the incorrect order can cause injury from electrical shock or can damage the electrical system. Always disconnect the negative (-) battery cable first and connect it last.

1. Disconnect the battery cables (negative first) from the cranking battery.
2. Position engine with piston #1 at top dead center.
   a. Remove cylinder #1 spark plug and insert a compression tester in cylinder #1 spark plug hole.
   b. Use the compression tester to ensure that piston #1 is on compression stroke by watching the gauge as you rotate the engine by hand.
   c. Align the marks on the timing tab and harmonic balancer to ensure that 0 degrees top dead center is achieved.
3. Prior to removing distributor cap, mark the position of the #1 tower post below the distributor on the intake manifold with visible tape or a paint pen.
4. Do not remove distributor cap wires. Instead remove the distributor cap leaving the spark plug wires intact and connected to the spark plugs, lay the cap aside. This way , the old cap and wires can be used as a guide for the new spark plug wire routing and correct connections.
5. Disconnect the green/white and red/white wires connecting distributor to engine harness.
6. Remove distributor bolt and distributor hold down clamp and retain for reuse.
7. Remove distributor base and inspect the drive gear for excessive wear.
   a. If wear is found, inspect the camshaft gear with a borescope through the distributor mounting hole.
   b. If excessive camshaft gear wear is identified, replace camshaft prior to proceeding.

   NOTE: *Cover the distributor hole and clean away debris or gasket material to prevent debris from entering crankcase.*
8. Disconnect ignition module and knock module (if equipped) from the engine harness.
9. Remove mounting hardware and bracket for ignition module and knock module. This kit installation does not reuse the ignition module or knock module. However, these components may be requested to be returned on the warranty claim if applicable.
10. Disconnect all engine wire harness connections to the primary sides of the ignition coil.
11. Disconnect the Secondary coil wire from distributor cap and ignition coil. This coil wire will not be reused.
12. Remove ignition coil mounting bracket and hardware from the engine. This kit installation does not reuse the tower style ignition coil. However, these components may be requested to be returned on the warranty claim.
13. **For Thunderbolt V models only:** Remove the two-wire engine coolant temperature sensor from the port side of the thermostat housing.

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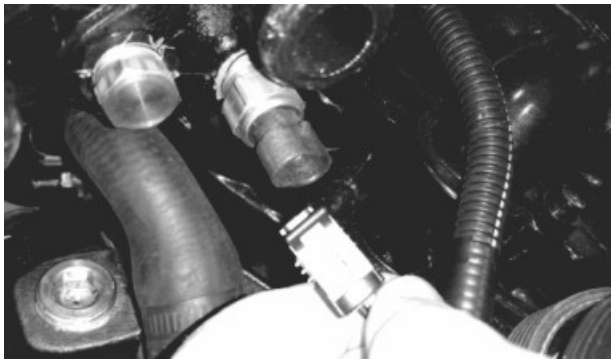
NOTE: *The criteria for whether the temperature sensor should be removed is that a two wire Packard style connector will connect to the temperature sensor mounted in the thermostat housing as shown in the image below. If you have a single wire switch installed in the thermostat housing and a sender with a single wire going to it on the starboard side of the thermostat housing, do not remove the single wire switch.*



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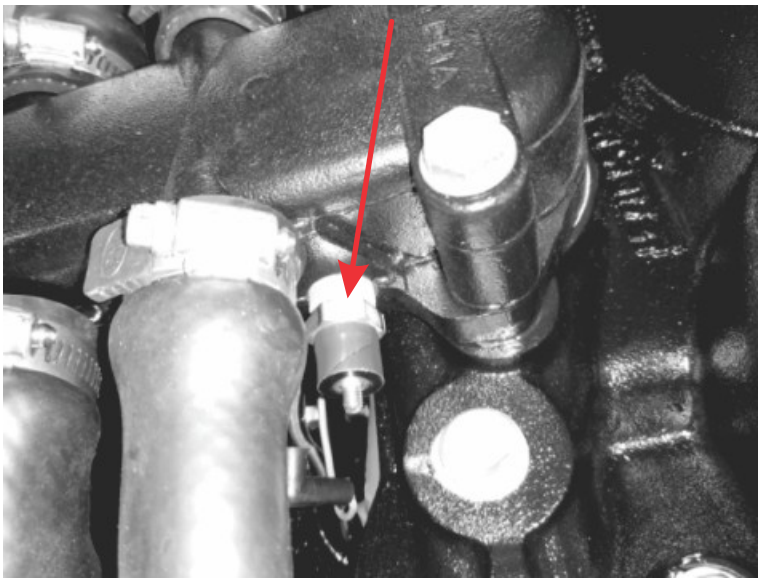
Two-wire coolant temperature sensor

Installation of Components

1. **Thunderbolt V models only:** Install the new engine coolant temperature switch in the thermostat housing where the two-wire Packard switch was removed.



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New temperature switch from HEI kit installed

2. **Thunderbolt V models only:** Connect the audio warning horn harness to the newly installed engine coolant temperature switch in the thermostat housing. Use the 90 degree fitting on the harness to connect to the switch.
   a. Route the harness along the port side of the intake valley away from heat sources.
   b. The male bullet connector will connect with the tan/blue wire in a later step.

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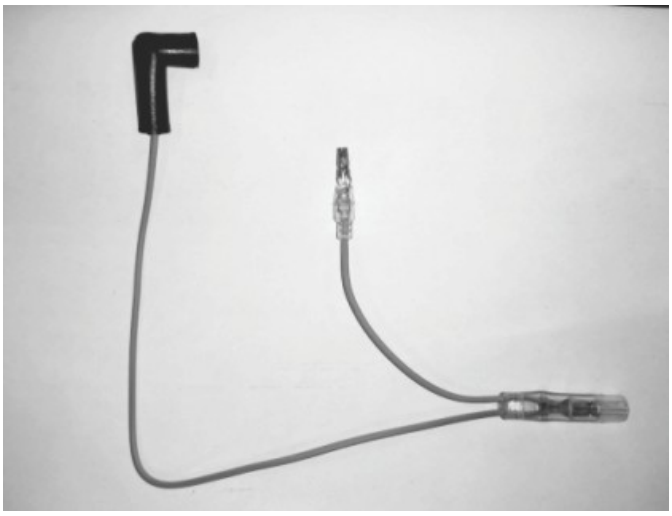
c. The female bullet will be unused.



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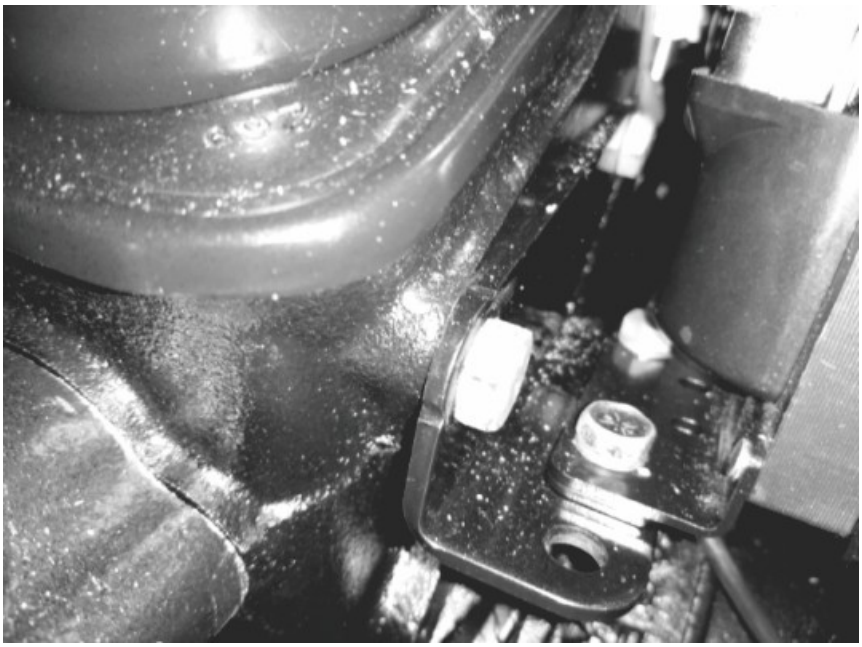
Audio warning horn harness – TB V models only

3. All models: Mount the coil bracket on the rear surface of the port cylinder head using the two coil bracket to the cylinder head mounting bolts. One of the holes was used to mount the tower coil. The other hole was previously unused. Tighten the two coil bracket to engine mounting bolts to the specified torque.



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Description	Nm	lb-in.	lb-ft
Coil bracket to the engine bolts (2)	24	–	18

4. All models: Mount the ignition coil to the coil bracket using the two coil to bracket mounting bolts and washers. Tighten the bolts with washers to the specified torque.

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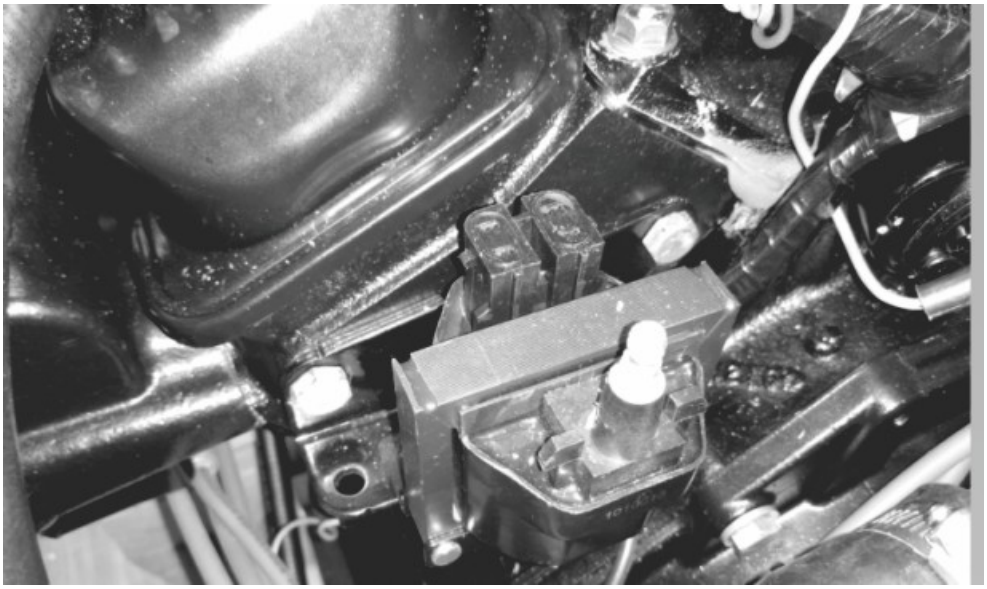
Description	Nm	lb-in.	lb-ft
Ignition coil bracket to the mounting bracket bolts with washers (2)	20	–	15



73431

5. All models: Install the distributor base gasket onto the distributor.
6. All models: Install the distributor base into the engine while aligning the rotor tab to the position marked on the intake corresponding to the #1 post on the distributor cap.
   a. The position of the rotor should be pointing toward the physical location of the #1 cylinder **on** the distributor cap.
   b. Ensure that the oil pump driver rod aligns with the distributor. If not, the distributor will not seat all the way into the hole in the intake manifold. Do not force it.
   c. If the distributor will not seat into position, remove it and verify the position of the oil pump drive rod by looking into the distributor mounting hole with a flashlight. Adjust the position of the oil pump drive with a long flat-blade screwdriver. Insert the distributor.
7. All models: Install the distributor hold-down clamp and bolt loosely to allow for distributor rotation when setting final ignition timing.
8. All models: Connect each new spark plug wire from the HEI kit to the distributor cap and each plug wire end to spark plug, beginning with #1. Use the old cap and wires as a guide for routing and length of wires to select for each cylinder. Refer to the images below for firing order and orientation of wire ends.

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NOTE: *Right-hand rotation V8's are usually installed as port engine in twin engine inboard applications.*

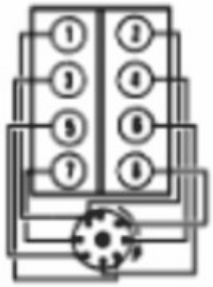

Figure 1. Left-Hand (Standard) Rotation Engine

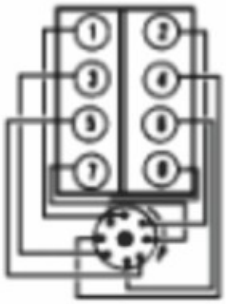

Figure 2. Right-Hand (Opposite) Rotation Engine

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Engine Harness Modifications and Kit Harness Connections

NOTICE
This kit contains terminals that must be applied using the proper crimping tool for secure terminations. Improper crimps may lead to loss of ignition or intermittent operation of the engine. Use Mercury part number 91-808696 or an equivalent crimping tool to assure proper application of the terminals.

1. All models: Locate the wires that were previously attached to the ignition coil (purple wire and gray wires).
   a. Cut off the ring terminals from the engine harness purple wire and gray wire(s) as shown below.
   b. Strip 1/4 inch of insulation from the ends of the gray wire(s) and the purple wire to expose the copper wire for the wire connector with heat shrink.

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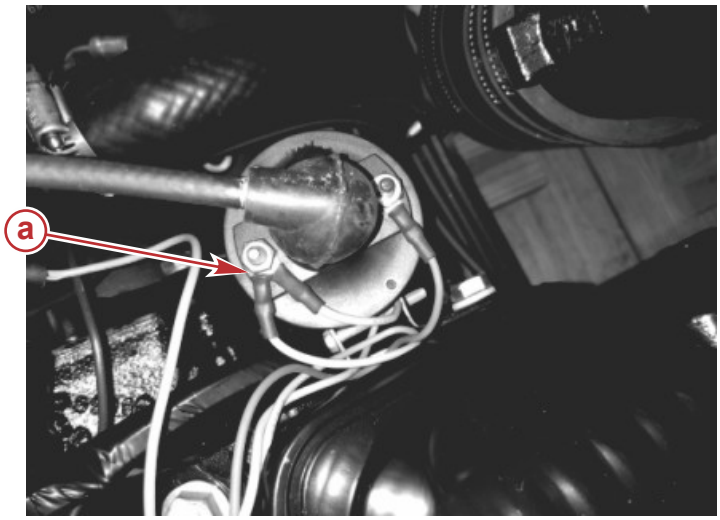
NOTE: TB IV models have a single wire going to the ignition coil negative terminal. If your application has two wires on the negative terminal of the coil, both gray wires must have the ring terminals removed as shown below.



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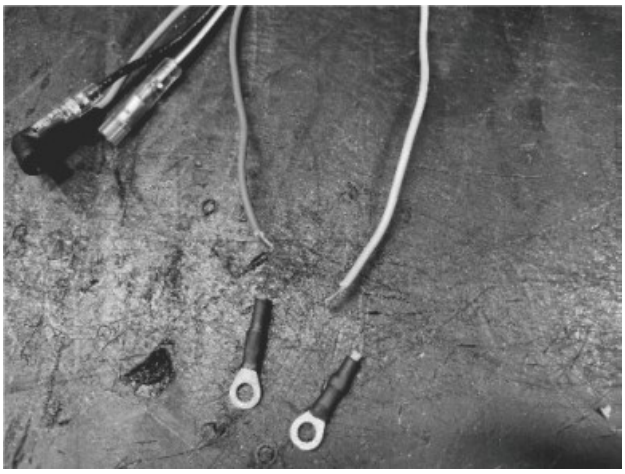
Coil connections

a - Gray wires



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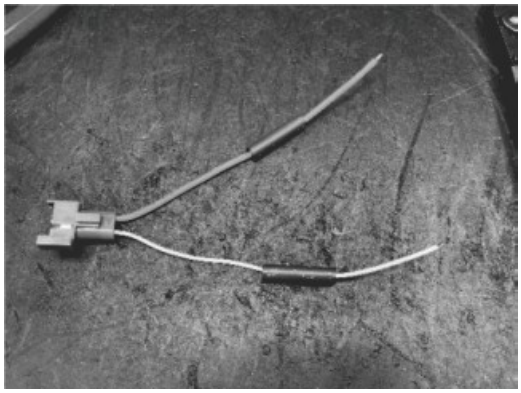
2. **Bravo sterndrive and Inboard models only:**Splice the pink wire from the HEI kit single connector two wire coil harness to the purple wire from engine harness, previously from positive side of the coil.
   a. Ensure there is at least 1/4 inch of bare wire stripped at the end of each wire pink and gray.
   b. Install and crimp one end of wire connector with heat shrink onto pink wire of the single connector two wire coil to engine harness.



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Single connector two wire coil to engine harness

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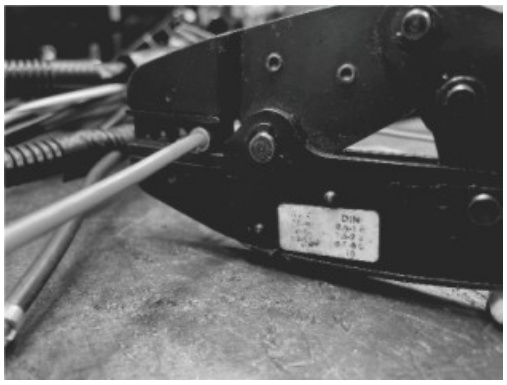
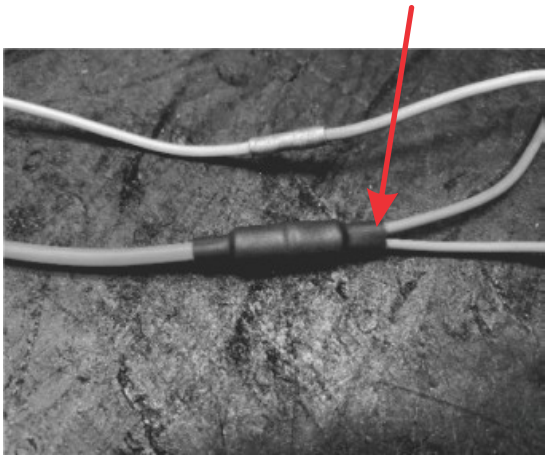
c. Crimp the other side of the wire connector with heat shrink to the purple wire from the engine harness.



73441

Description	Part Number
Crimping tool	91-808696

3. **Alpha sterndrive models only:** Using a wire connector with heat shrink, connect the pink wire from the HEI kit's coil to engine harness to the purple wire from the engine harness, (previously from positive side of the coil) and the length of single purple wire from the HEI kit. Use a wire connector with heat shrink as shown in the illustrations and steps below. The HEI kit purple wire should be crimped in the butt splice adjacent to the purple wire from the engine harness as illustrated.
   a. Ensure there is at least 1/4 inch of bare wire stripped at the end of each wire pink and purple.
   b. Crimp one end of the wire connector with heat shrink connector to the pink wire on the coil to the engine harness.
   c. Crimp the other end of the wire connector with heat shrink to the purple wire from the engine harness and the purple length of wire from the HEI kit.



73442

Two purple wires

   d. Use a heat gun to apply heat over the entire area of the wire connector to activate the sealant in the heat shrink.
4. **Alpha sterndrive models only:**
   a. Install the female bullet connector insulator and crimp the female bullet terminal onto the other end of the HEI kit's single purple wire end as follows:

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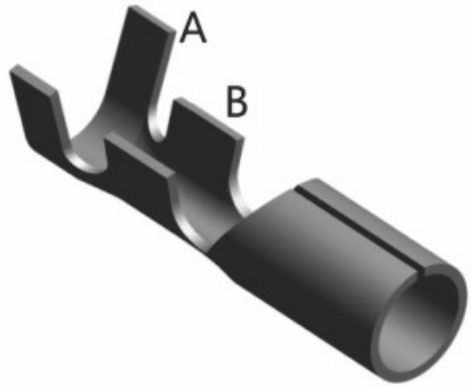
b. Thread the wire into the terminal. There will be two sets of prongs on the terminal. The prongs labeled "A" will crimp onto the insulation of the purple wire, and those labeled "B" will crimp onto the actual bare, stripped wire.



73443

Terminal prongs

73444

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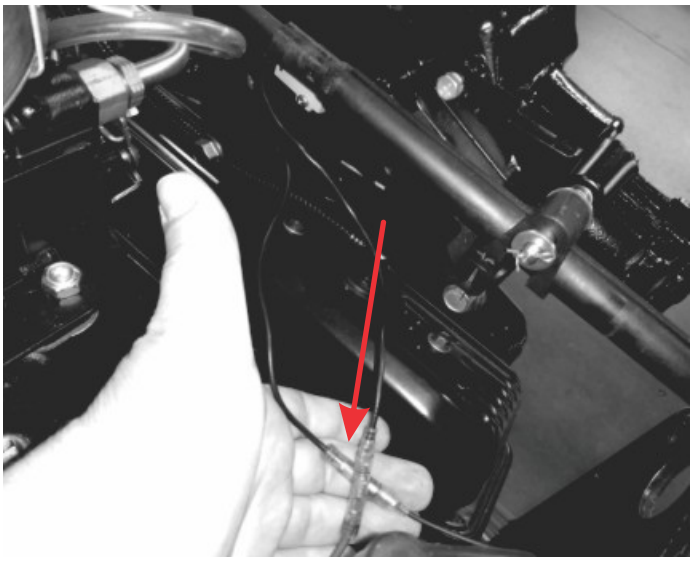
c. Slide the insulator over the newly crimped female bullet terminal, covering the female bullet.

d. Connect the purple wire with the female bullet purple wire from the HEI kit to the male bullet of the black wire from the shift interrupt switch.



73445

Alpha shift interrupt switch connected to purple wire from HEI kit

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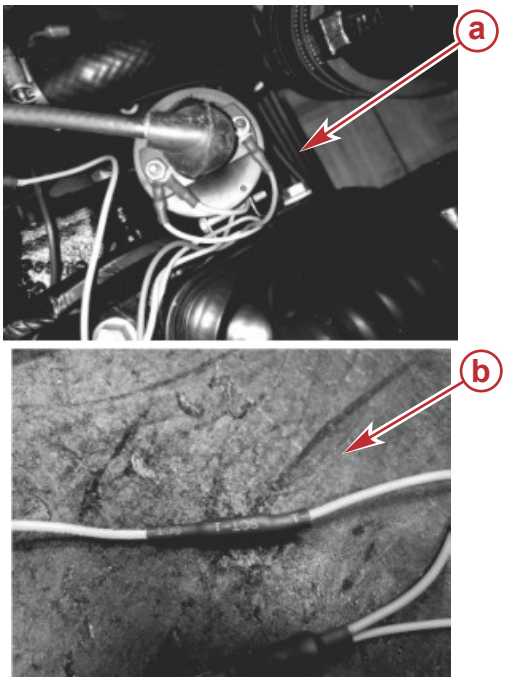
5. All models: Connect the single wire coil connector and the dual wire coil connector, both from the HEI kit onto the ignition coil. Use care to align male and female terminals as connectors are placed on coil.
6. All models: Splice the white wire from the HEI kit single connector coil harness to the cut gray wire(s) from the engine harness, previously connected to the negative coil connection.

   NOTE: *Some models (Thunderbolt V) had two gray wires going to the ignition coil negative terminal. Other models (Thunderbolt IV) had a single wire going to the ignition coil negative terminal. If your application has two wires, both must be installed into the bullet connector adjacent to one another. For applications with a single wire connected to the coil, only one gray wire is required in the wire connector with heat shrink.*

   a. Install and crimp the wire connector with heat shrink onto the white wire of the coil to the engine harness from the HEI kit.
   b. Crimp the other side of the wire connector with heat shrink to the gray wire(s) from the engine harness.
   c. Apply the heat shrink over the entire length of the wire connector, using a heat gun for the heat shrink to provide a seal to the wire.



73474

a - Illustration showing two gray wires to tower style coil (Thunderbolt V models)

b - Gray wire from engine harness connected to white wire from HEI kit coil harness

7. **Alpha sterndrive models only:** Connect the distributor to the shift interrupt switch bullet connector as follows:
   a. Locate the single connector, single wire harness (black wire) from the HEI kit and remove 1/4" insulation to expose the copper wiring. Slide male bullet connector insulator over black wire in the orientation illustrated in the image.

73475

Single wire harness (black wire) from the HEI kit

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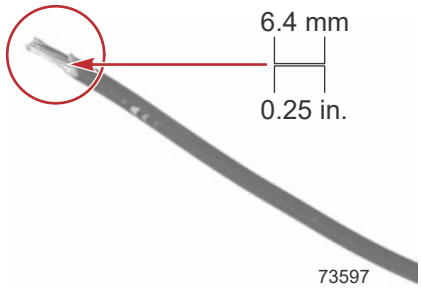
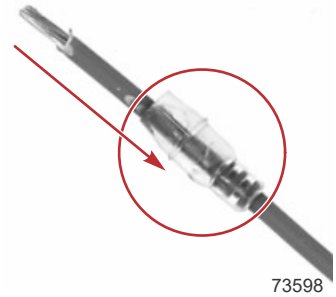
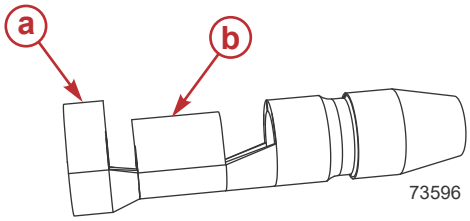


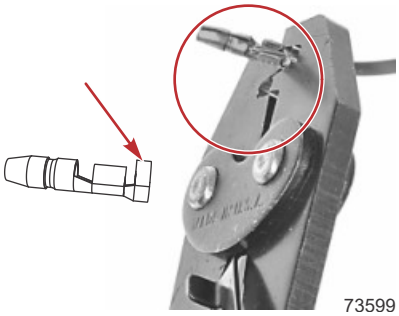
1/4” Insulation removed to expose wire



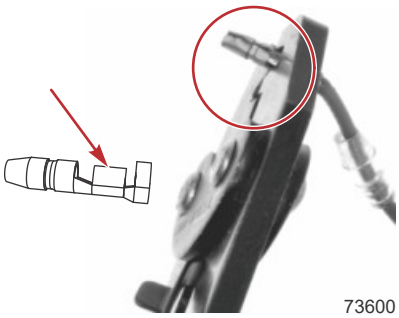
Slide male bullet connector insulator over the black wire

b. Install the male bullet connector insulator and crimp the male bullet terminal onto the black wire end as follows:





Crimping prongs A to insulation of wire



Crimping prongs B to bare wire

c. Slide the insulator over the newly crimped male bullet terminal leaving the male bullet end exposed.

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d. Connect the black wire with the male bullet from HEI harness to the female bullet of the black wire from the shift interrupt switch.

e. Connect the Packard style connector to distributor as shown in illustration.

73480

Packard style connector

8. All models: Connect the coil to the distributor harness Packard style connector to the left plug on the distributor.

73481

9. All models: Locate the connectors for ICM and knock module (if equipped) on the engine harness. Remove the insulating tape on the portions of engine harness going to these connectors to prep for cutting the wires.
10. All models: Remove the knock module connector (if equipped) by cutting each of the four wires, purple, purple/white, blue and the black. Install and crimp four female bullet connectors (as instructed previously) and use four male bullet plugs to seal each wire.
11. All models: Remove the ICM connections as follows:
    a. **For Thunderbolt IV models,** remove the ICM connector from the engine harness by cutting each of the five wires connected to the connector from the engine harness: grey, black, purple, purple/white, and white/green.
    b. **For Thunderbolt V models,** remove both of the ICM connectors from the engine harness by cutting each of the wires at the ICM connectors: purple, tan/blue, purple/white, yellow, black, and green/white
    c. **For Thunderbolt IV previously converted to thunderbolt V,** locate the bundle of bullet connectors, remove the electrical tape and disconnect these bullet connections.
12. Install female bullet connectors on each of the cut wires from the ICM connector and the cut wires from the knock module connector.
    a. Expose 1/4" of bare wire from each wire.
    b. Slide female bullet connector insulator onto wire in correct orientation with wider end facing the cut end of the wire.

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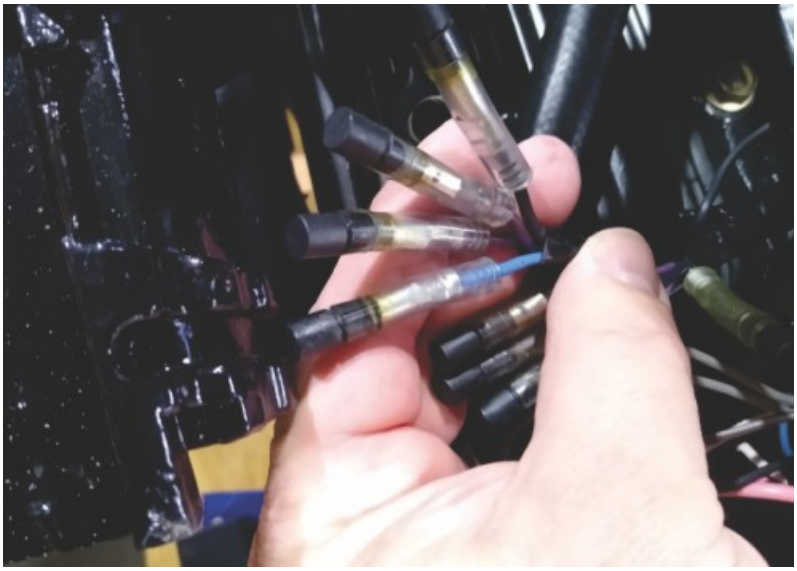
c. Crimp female bullet to insulation and wire as instructed previously in this instruction sheet for bullet connector installation.

d. Slide female bullet connector insulator over bullet connector terminal.



73482

Bullet connectors

13. Install a male bullet plug into each of the female bullet connectors.
14. **Thunderbolt V models only:** Locate the end of the audio warning horn harness. This harness was previously connected to the new engine coolant temperature sender.
    a. Route this harness alongside the port valve cover away from throttle brackets and heat.
    b. Connect the male bulleted end of this audio warning horn harness to the tan wire with a blue tracer that is among the bundle of female bulleted wires that previously went to ICM.

Setting Final Ignition Timing

IMPORTANT: Failure to follow the timing procedure instructions will result in improper timing, causing performance problems and possible severe engine damage.

⚠ CAUTION

Disconnecting or connecting the battery cables in the incorrect order can cause injury from electrical shock or can damage the electrical system. Always disconnect the negative (-) battery cable first and connect it last.

1. Reconnect the battery cables positive first, then negative.
2. Connect an inductive timing light as the timing light instructions direct. The inductive pickup should be connected around the #1-cylinder spark plug wire.
3. Before starting the engine ensure that the timing tab and mark on the damper are clean. Use light chalk or a white paint pen on the timing marks on the timing tab, as well as on the harmonic balancer to make the indications more visible.
4. Supply cooling water to the engine and start the engine. Adjustment to the distributor may be necessary to get the engine to start and continue to run.

   IMPORTANT: When the timing tool is connected to the distributor, connecting or disconnecting the alligator clip to a 12-volt battery positive source as instructed in the following steps can be detrimental if the engine is not running.
5. Remove the cover from the starter solenoid, exposing the stud.

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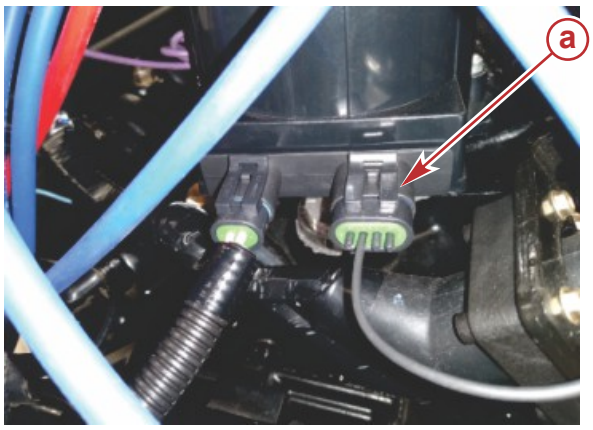
6. Connect the HEI kit timing tool to the right-side distributor connector.

73584

HEI kit timing tool

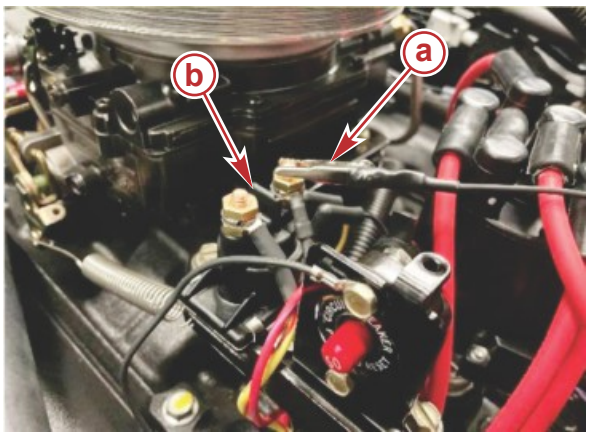
a. For Alpha sterndrive models, disconnect the shift interrupt switch wire connection at the distributor before connecting the timing tool, as they both use the same connector at the distributor.



a - Four prong connector where timing tool will be installed

73583

7. Connect the alligator clip to the starboard stud on the starter relay as shown.



a - Alligator clip
b - Starter relay

73662

8. Once the engine has achieved a nominal operating temperature, adjust idle to the engine speed specified for idle on the engines flame arrestor decal. If unavailable use 650 rpm.
9. Adjust the distributor while using a timing light to set base timing to 10 degrees before top dead center (BTDC).
10. Remove the HEI kit timing tool from the distributor and starter relay stud before shutting the engine off.
11. Shut the engine off.
12. For Alpha sterndrive models, reconnect the shift interrupt switch connector to the distributor.

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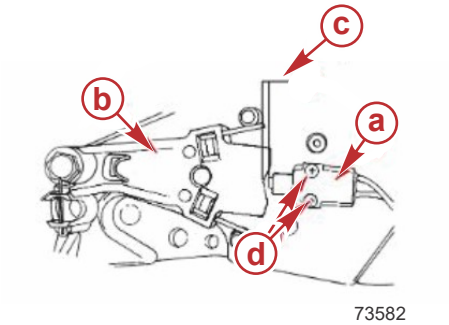
Water Test/Component Function Verification

IMPORTANT: Prior to delivery there are several points of function that must be verified with a water test. The boat must be launched for these components to be tested.

Alpha Sterndrive Models Shift Test

1. Launch the vessel following standard safety protocols.
2. Start the engine and allow it to reach operating temperature. Idle RPM should match the specified engine idle RPM found on the flame arrestor decal or in the service/owner's manual for the engine.
3. Place the drive in forward gear.
4. With a firm and quick motion bring the remote control lever into neutral. Ensure that the engine does not stall with this action. Repeat this action 10 times.
5. Place the drive in reverse gear.
6. With a firm and quick motion bring the remote control lever into neutral. Ensure that engine does not stall with this action. Repeat this action 10 times.
7. If the engine stalls in any shifts for either the forward or reverse shift motions:
   a. Verify engine idle rpm according to the flame arrestor decal.
   b. Verify base ignition timing was set correctly.
   c. Verify the shift switch distance from the actuator is 0.8 mm (1/32 in) when static as displayed in the image below. Using a 1/32 in. drill bit or other suitable accurate measurement device, loosen the two mounting screws for the shift interrupt switch and tighten when the correct distance has been set. Check the distance after tightening.



73582

Checking cutout switch timing (models with plunger type switch)

a - Switch/plunger pin
b - Activating lever assembly
c - 0.8 mm (1/32 in.) adjustment
d - Screws (2)

While holding the retainer nuts on the back of the shift plate, loosen the two phillips head screws on the shift cutoff switch and slowly move the switch either forward or aft.

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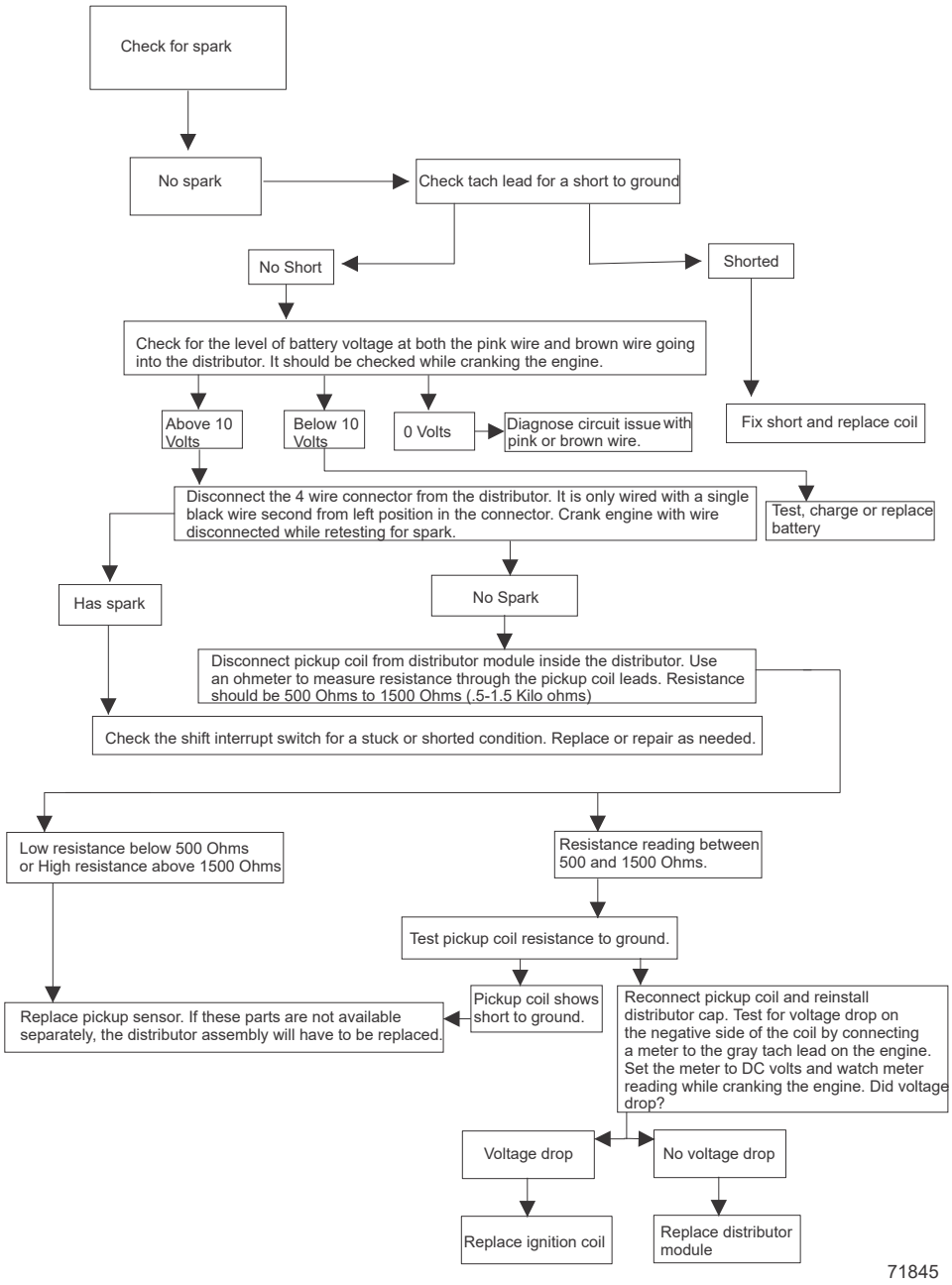
Diagnostics for the HEI Distributor



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I understand and agree that there are no refunds or exchanges whatsoever for this kit.

I also agree that I have read and understand these instructions and that either myself or the person/company doing the installation is fully qualified to install this kit.

_____ **print name**

_____ **signature**

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W6250 Pioneer Road
Fond du Lac, WI 54936-1939

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