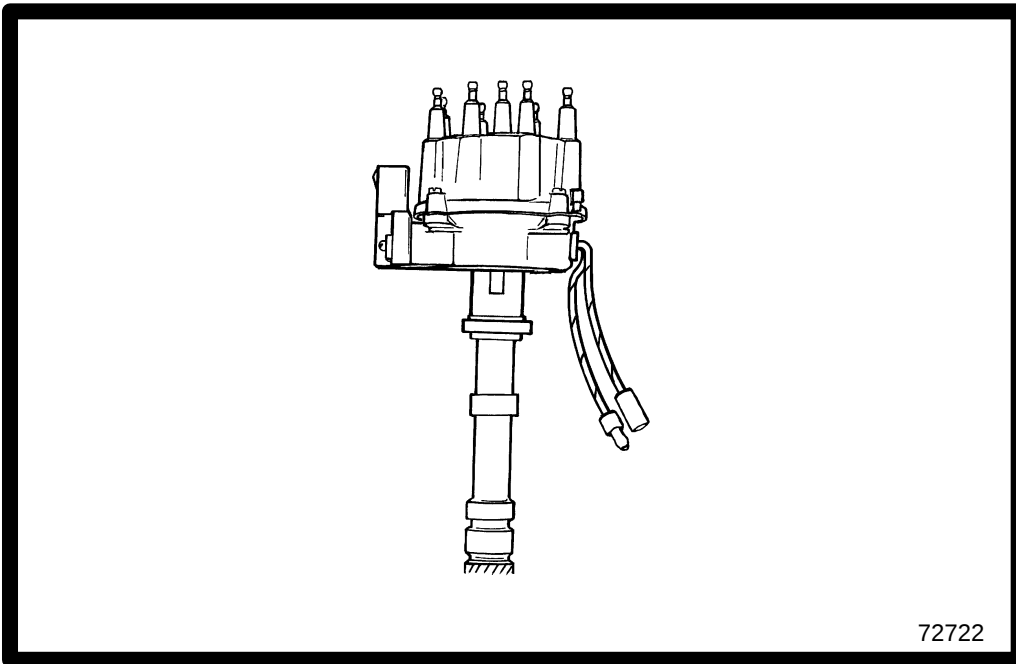


ELECTRICAL SYSTEMS



72722

IGNITION SYSTEM

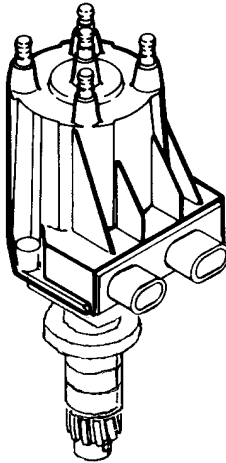
4

B

Table of Contents

	Page
Electronic Spark Timing (3.0L/3.0LX EST) . . .	4B-1
Tools/Lubricants/Sealants	4B-1
Torque Specifications	4B-1
Timing	4B-1
Exploded View of EST Distributor For 3.0L	4B-2
Thunderbolt IV (HEI) Ignition System	4B-3
Tools/Lubricants/Sealants	4B-3
Torque Specifications	4B-3
Coil Specifications	4B-3
Exploded View for Thunderbolt IV Distributor For V-6 and V-8 Engines	4B-4
Thunderbolt V (DESA)	4B-5
Thunderbolt V Ignition System Wiring Diagram	4B-6
Ignition Timing	4B-7
Electronic Spark Timing (EST)	4B-7
Thunderbolt IV	4B-7
EFI Ignition	4B-8
Thunderbolt V	4B-8
Distributor Advance Curves	4B-9

Electronic Spark Timing (3.0L/3.0LX EST)



73593

Special Tools

Mercury Marine Special Tools	
Description	Part Number
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

Kent-Moore Tools	
J24642	Module Tester

Torque Specifications

Description	lb. ft.	N·m
Distributor Clamp 3/8-16	20	27
Spark Plugs 14mm	15	20

Lubricants, Sealers and Adhesives

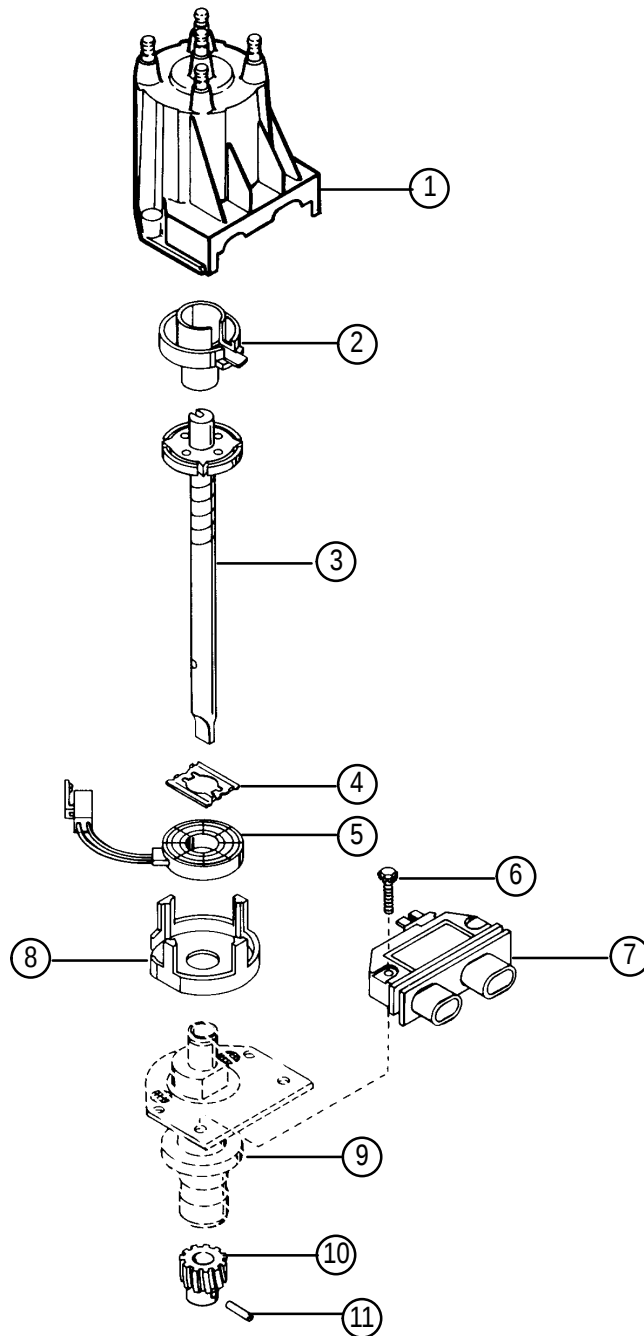
Description	Part Number
92-25711-2	Quicksilver Liquid Neoprene
Obtain Locally	Distributor Cam Lubricant

Timing

At Idle RPM	EST Ignition 1° BTDC See Note
-------------	-------------------------------

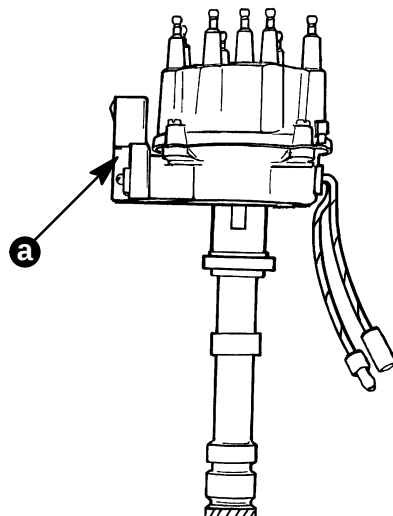
Note: Timing must be set using a special procedure as outlined in this section. Timing cannot be properly set using the conventional method

Exploded View of EST Distributor For 3.0L



- 1 - Distributor Cap
- 2 - Rotor
- 3 - Shaft and Magnet
- 4 - Retainer
- 5 - Coil
- 6 - Screw
- 7 - Module
- 8 - Pole Piece
- 9 - Distributor Housing
- 10 - Gear
- 11 - Pin

Thunderbolt IV (HEI) Ignition System



72722

a - Ignition Module

Special Tools

Mercury Marine Special Tools	
Description	Part Number
Timing Light	91-99379
Multi Meter/DVA	91-99750
Torch Lamp	91-63209
Insulating Compound	92-41669
Quicksilver Liquid Neoprene	92-25711

Torque Specifications

Description	lb. in.	lb. ft.	N·m
Distributor Clamp 3/8-16		20	27
Spark Plugs (14mm)		15	20
Ignition Module Retaining Screws (Stainless Steel)	10		1.1

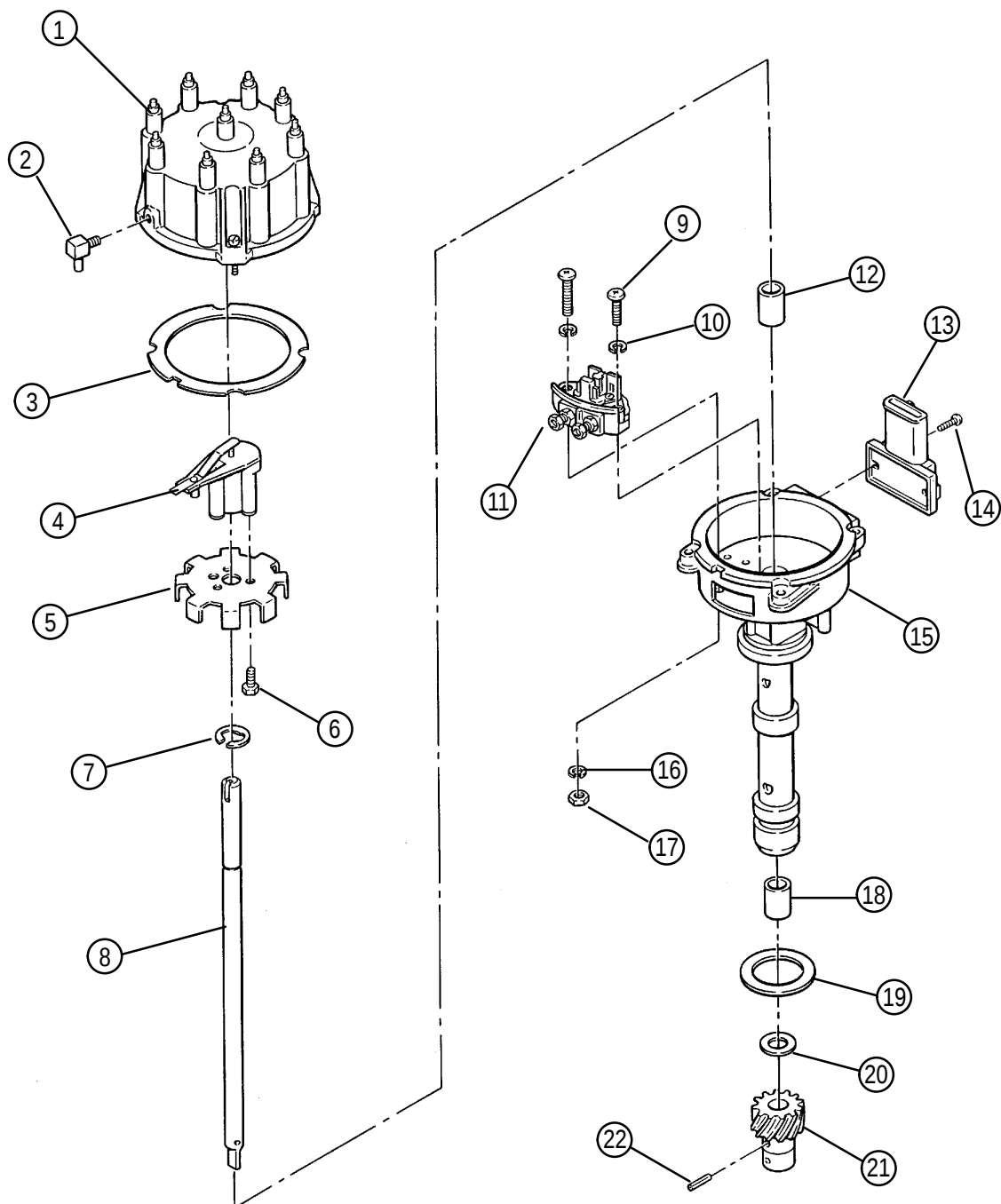
Lubricants, Sealers and Adhesives

Loctite 271	Obtain Locally
Thermalconductive Grease	Obtain Locally

Coil Specifications

Description	Specification
Coil Part Number	392-7803A4
Primary Resistance	.60-.80 Ohms
Secondary Resistance	9.400-11.700 Ohms

Exploded View for Thunderbolt IV Distributor For V-6 and V-8 Engines



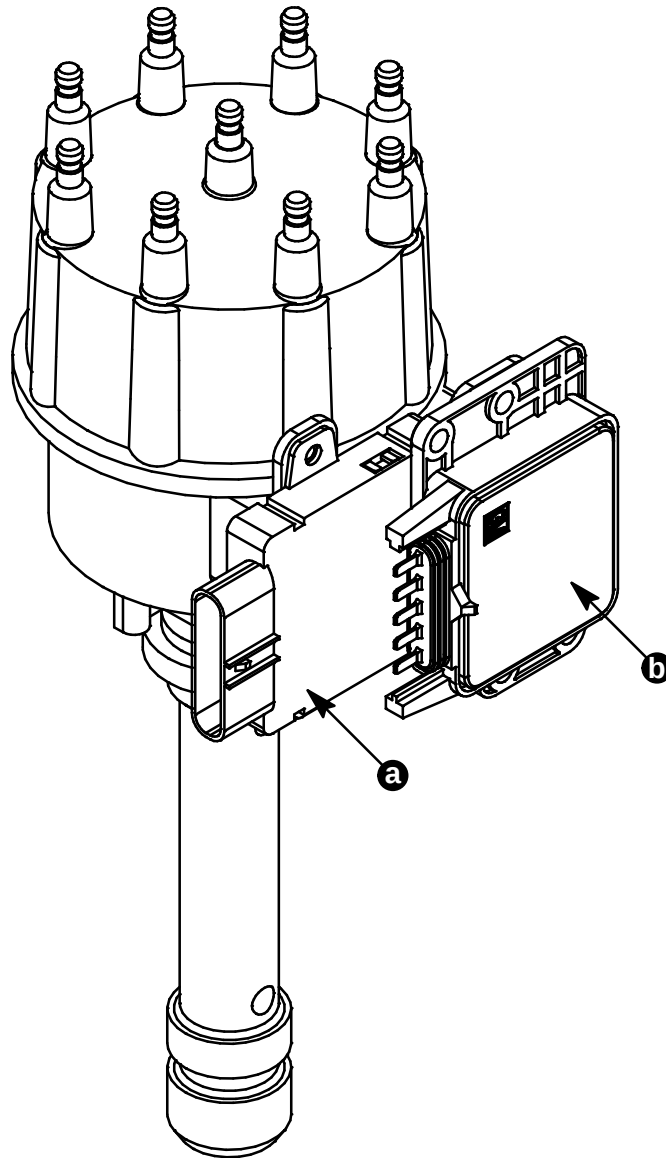
- 1 - Distributor Cap
- 2 - Vent
- 3 - Gasket
- 4 - Rotor
- 5 - Sensor Wheel
- 6 - Screw (3)
- 7 - E-Clip
- 8 - Shaft
- 9 - Screw (2)
- 10- Lockwasher (2)
- 11- Sensor

- 12- Upper Bushing
- 13- Ignition Module
- 14- Screw (2)
- 15- Distributor Housing
- 16- Lockwasher
- 17- Nut
- 18- Lower Bushing
- 19- Gasket
- 20- Washer
- 21- Gear
- 22- Roll Pin

72058

Thunderbolt V (DESA)

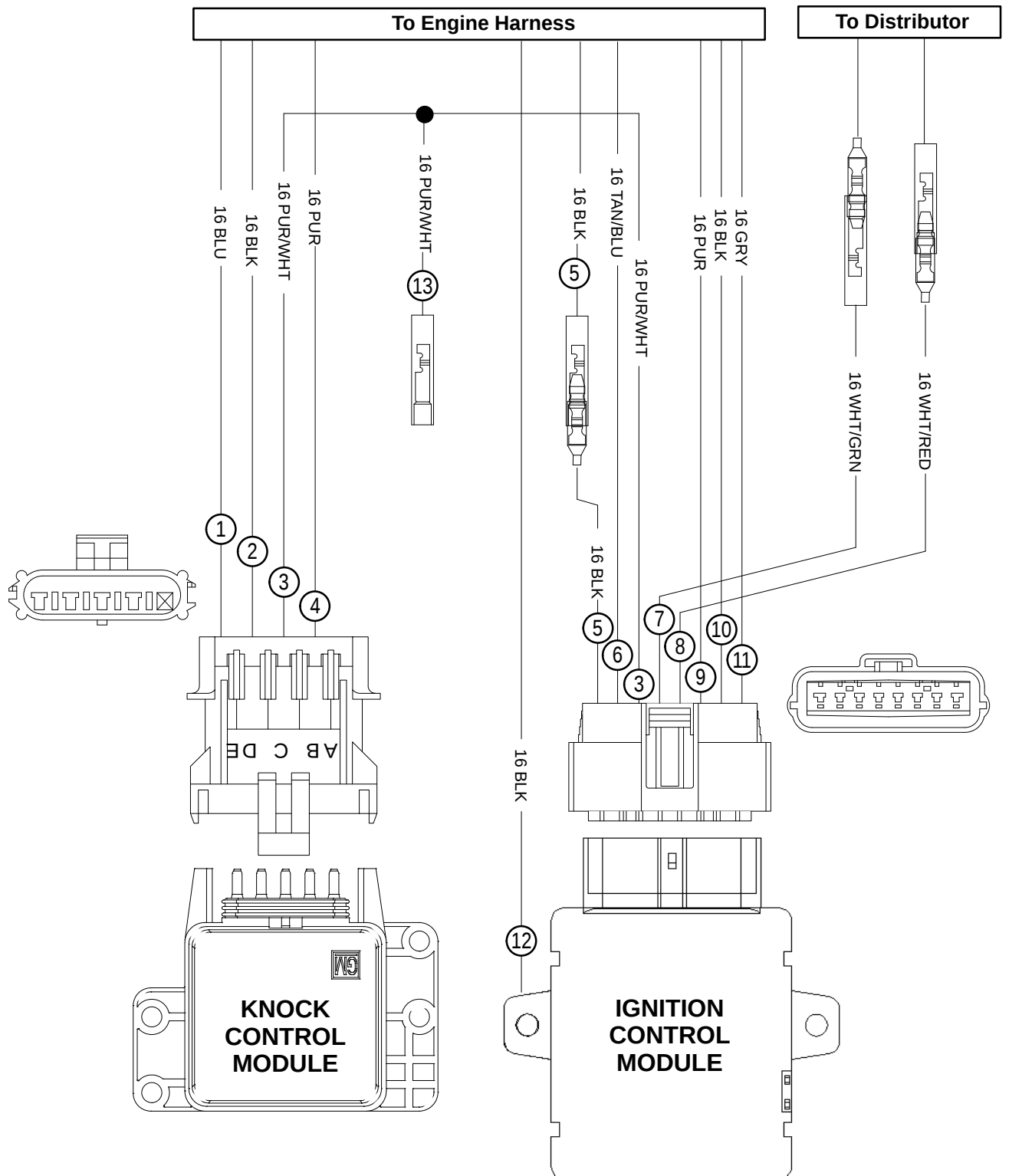
The Thunderbolt V ignition system uses the same distributor as the Thunderbolt IV system. The system has a new Ignition Control Module with Digital Electronic Spark Advance (D.E.S.A.). There is also a Knock Control Module that is mounted with the ignition control module.



73999

- a - Ignition Control Module
- b - Knock Control Module

Thunderbolt V Ignition System Wiring Diagram



1. Knock Sensor Wire
2. Ground Wire (-) for Knock Module
3. Knock Module Signal Wire
4. Battery (+) Positive Wire to Knock Module
5. Ground (-) Wire for Future Options
6. Audio Warning System Wire
7. Distributor Wire

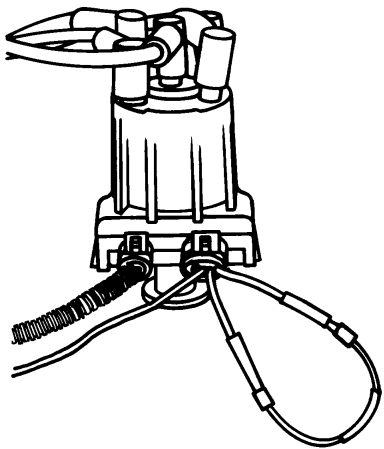
8. Distributor Wire
9. Battery (+) Positive Wire to Ignition Module
10. Ground (-) Wire for Ignition Module
11. Tachometer Wire
12. Ignition Module Case Ground (-)
13. Timing Lead (For Setting Timing and Other Tests)

Ignition Timing

Electronic Spark Timing (EST)

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

1. Start engine and allow it to reach operating temperature.
2. With engine running install a jumper wire (b) across the two white leads (a) on the distributor using PN 91-818812A1 or fabricate one using a 6 in. (150 mm) section of 16 gauge wire with two male bullet terminal ends connected.



00000

3. Bypass the shift interrupt switch by disconnecting wires at shift interrupt switch and temporarily joining together.

IMPORTANT: Do not fail to reconnect these two wires at the shift interrupt when timing procedures are complete.

4. With timing light connected, check timing. Timing should be 1 degree BTDC.
5. Loosen distributor hold down clamp and rotate to obtain specified timing, If required.
6. Secure distributor hold clamp,, and recheck timing as above.
7. Reconnect the two jumper wires at shift interrupt switch. Remove jumper wire at distributor white leads.

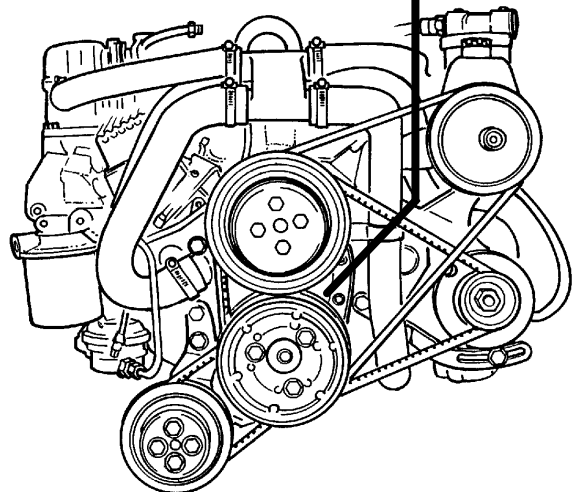
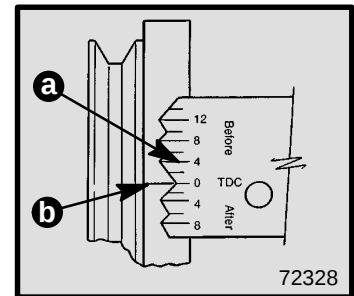
IMPORTANT: Be sure to remove jumper wire before returning engine to service, otherwise timing will not advance.

8. With timing light still connected, and engine at idle, verify that timing did advance to 12 degrees BTDC, (± 2 degrees). At 2400-2800 RPM maximum (total) advance is obtained and should be 27 degrees BTDC (± 2 degrees).

Thunderbolt IV

1. Connect timing light to No. 1 spark plug. Connect power supply leads on light to 12 volt battery. Refer to "Specifications" for cylinder numbering and location.
2. Connect tachometer to engine.
3. Start engine and run at normal idle speed.
4. Aim timing light at timing tab, located on timing gear cover and crankshaft torsional damper.

IMPORTANT: GM engine timing marks (on tab) are in 2-degree increments. MCM and MIE LH engines will have "A" (Advance) mark to the left of "0." MIE RH engines will have the "A" mark on the right of "0." Timing must be set on the "A" side of "0" (Top Dead Center).



a - Degree Marks
b - Timing Mark

5. Adjust timing by loosening distributor clamp and rotating distributor body as required until timing mark on damper or pulley lines up with the mark on tab specified in "Specifications." Tighten clamp and recheck location of timing mark.
6. Stop engine and remove timing light.

EFI Ignition

Engine must be at normal operating temperature for this adjustment. Two items of test equipment are required: an inductive pickup timing light and one of either a Scan Tool, Marine Diagnostic Code Tool or MerCruiser Special Timing Tool (PN 91-805747A1).

1. Connect timing light to number 1 ignition wire
2. Manually adjust the engine throttle to 1800 RPM.
3. Connect the appropriate tool (as listed above) to the DLC connector of the wiring harness.
4. **If Not Using MerCruiser Timing Tool:** With engine running, set the scan tool or Marine Diagnostic Code Tool to the service mode.
5. Shine the timing light at the timing mark indicator located on the timing chain cover.

NOTE: Timing Specification is 8 degrees BTDC. If adjustment is required, loosen the distributor bolt and rotate the distributor clockwise or counterclockwise to adjust the timing.

6. Torque distributor hold down bolt to 30 Lb. Ft. (40 N·m).
7. Set Scan Tool Or Marine Diagnostic Code Tool to normal Mode. If using the MerCruiser Special Timing Tool, disconnect it from the DLC connector.
8. Manually close the throttle to bring engine RPM back to idle.

Thunderbolt V

1. Connect timing light to number 1 spark plug. Connect timing light power supply leads (if applicable) to 12 volt source.
2. Connect a shop tachometer to engine.
3. Using a jumper wire, connect the ignition system timing lead "13" (PUR/WHT wire) to a good engine ground (-). This locks the ignition module into the "Base Timing Mode".
4. Start engine and run at normal idle speed. Allow engine to reach normal operating temperature.
5. Aim timing light at timing tab, located on the timing gear cover and crankshaft torsional dampner.
6. Adjust timing using the conventional method.

IMPORTANT: Be sure to disconnect the jumper wire from the ignition system test terminal before attempting to resume normal operations. If the jumper wire is left in place, the ignition module will operate in the "Base Timing Mode". This means that the additional timing advance features would not function.

7. Make sure that the distributor has been tightened. Remove the jumper wire from the timing terminal.
8. Stop engine and remove timing light.

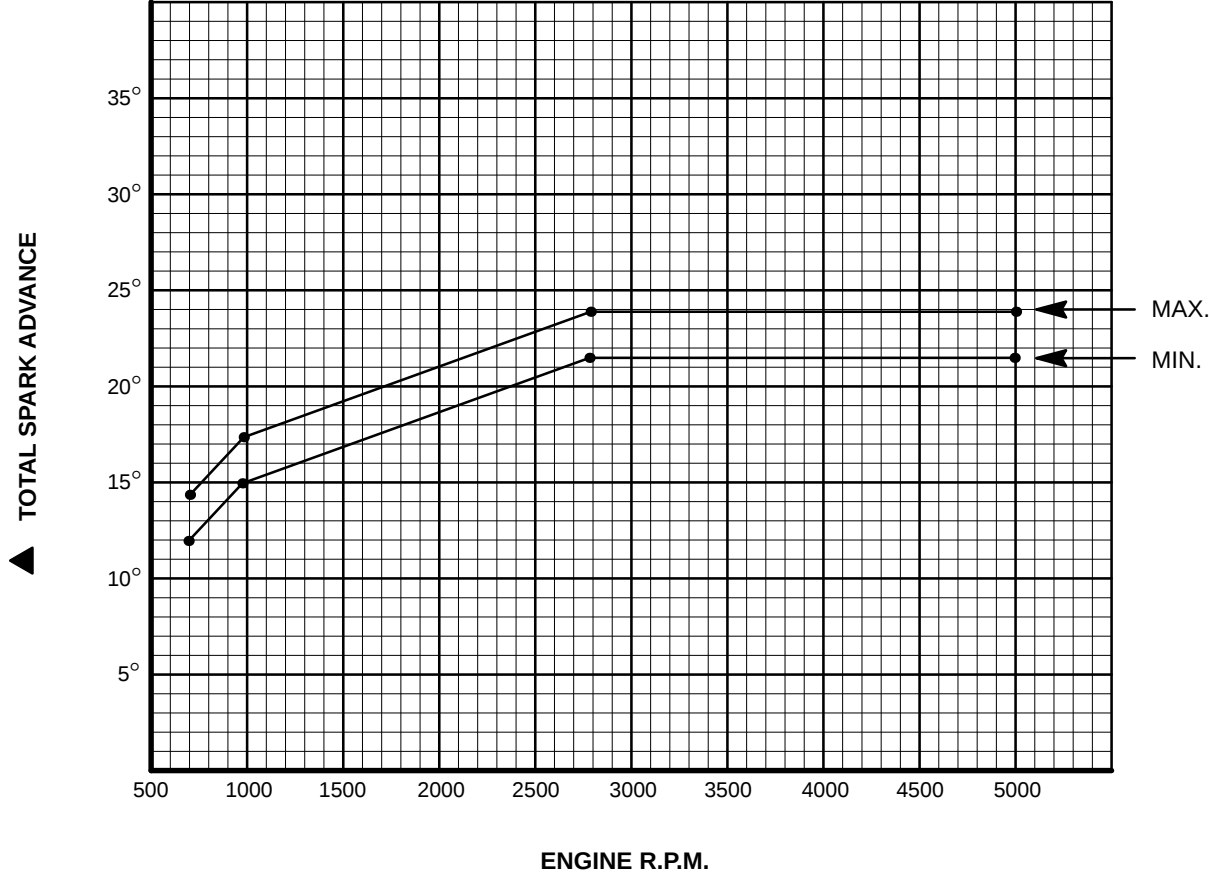
Distributor Advance Curves

MCM 3.0LX with EST

Module Part Number: 811637
Module Advance: See Notice
Initial Timing: 1 Degree BTDC
Total Advance: 23°

NOTICE

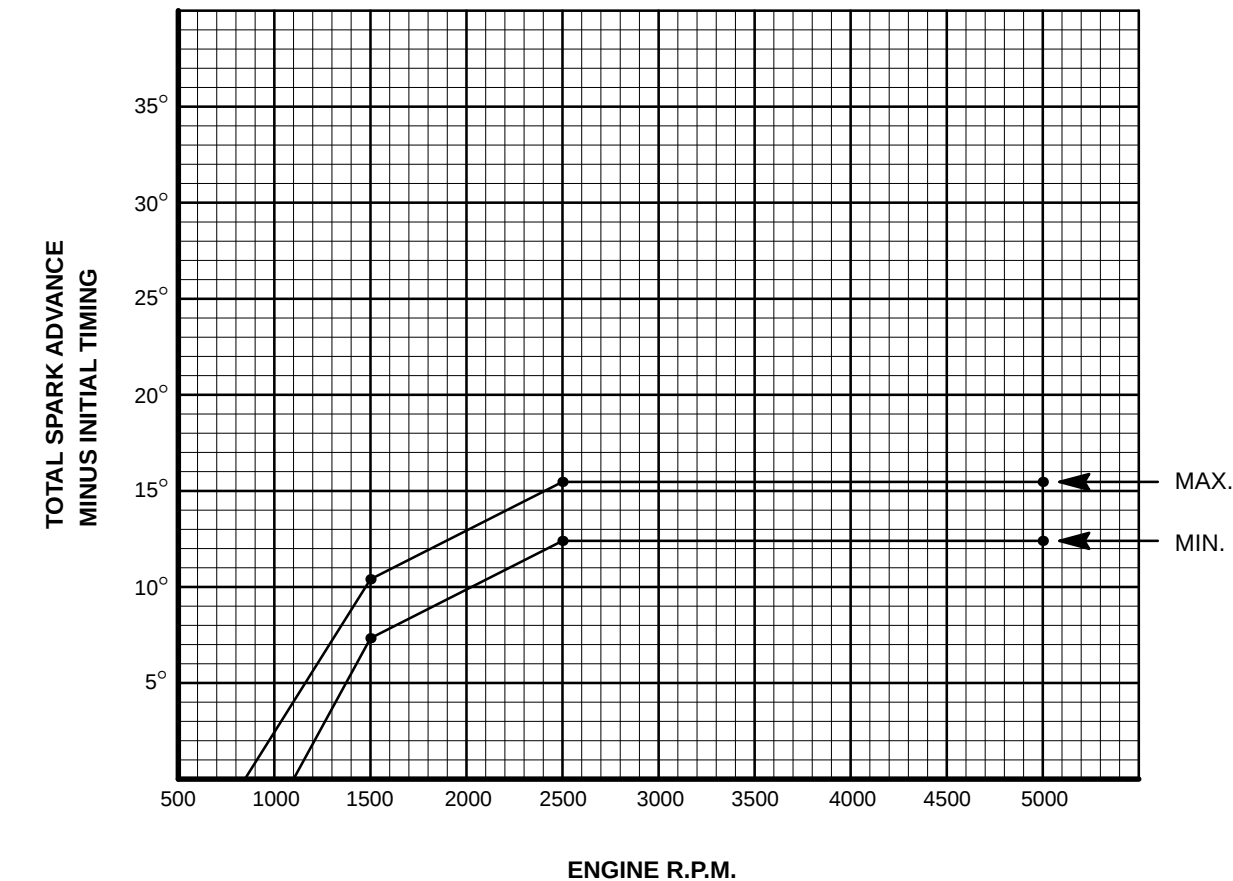
Advance curve includes initial timing. DO NOT add initial timing degrees to total advance degrees.



70808-15

MCM V-6 262 CID (4.3L) with Thunderbolt IV

Module Part Number: 805361T-1
Identification Mark: V6-14
Module Advance: 14°
Initial Timing: 8° BTDC
Total Advance: 22°



70808-7

MCM/MIE 305 CID (5.0L) with Thunderbolt IV HEI

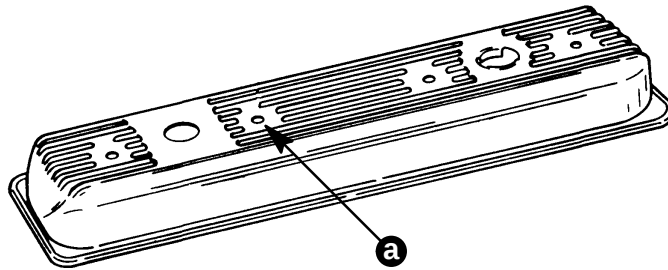
Module Part Numbers: 805361T-3

Identification Mark: V8-22

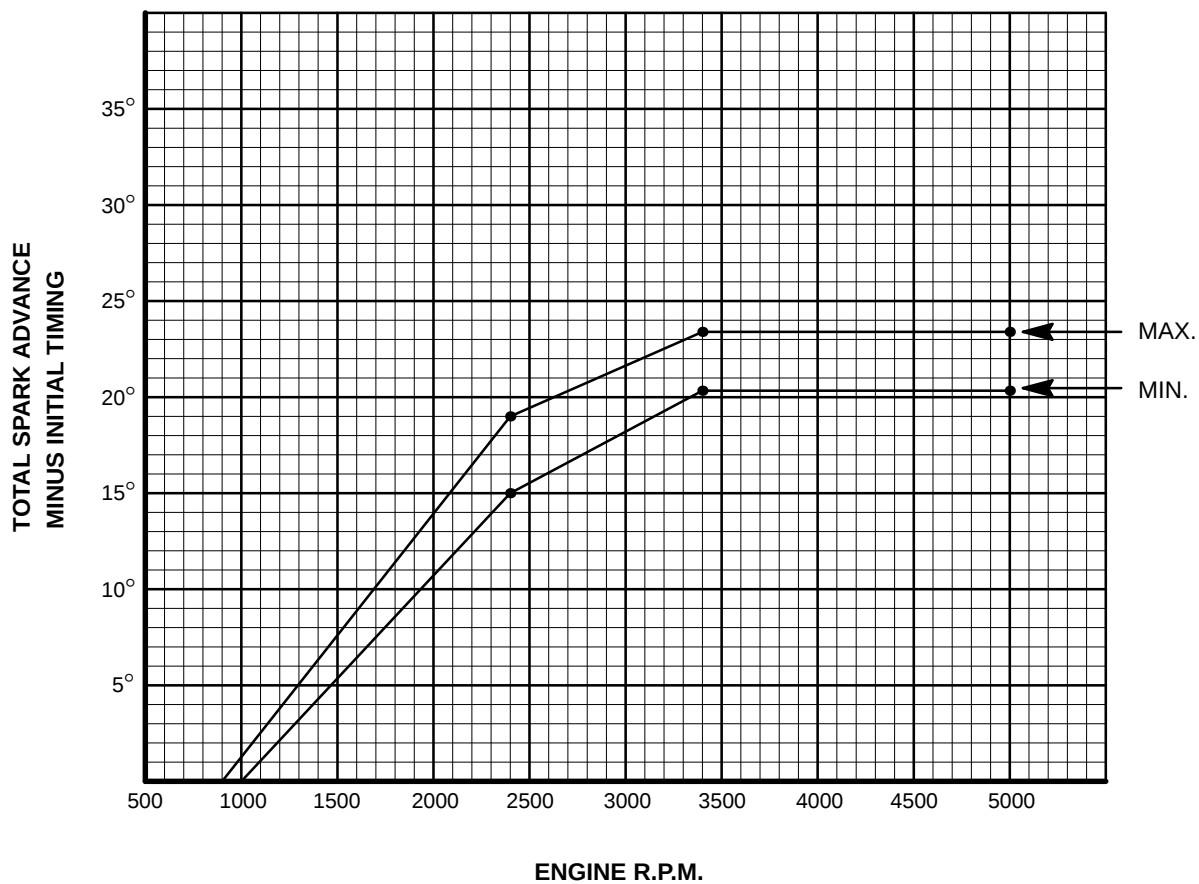
Module Advance: 22°

Initial Timing: 8° BTDC

Total Advance: 30°



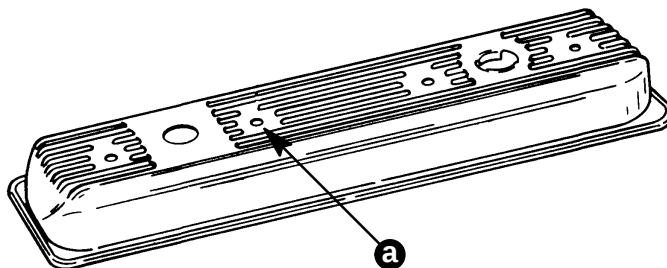
Rocker Cover held to cylinder head by bolt thru top (a) of cover.



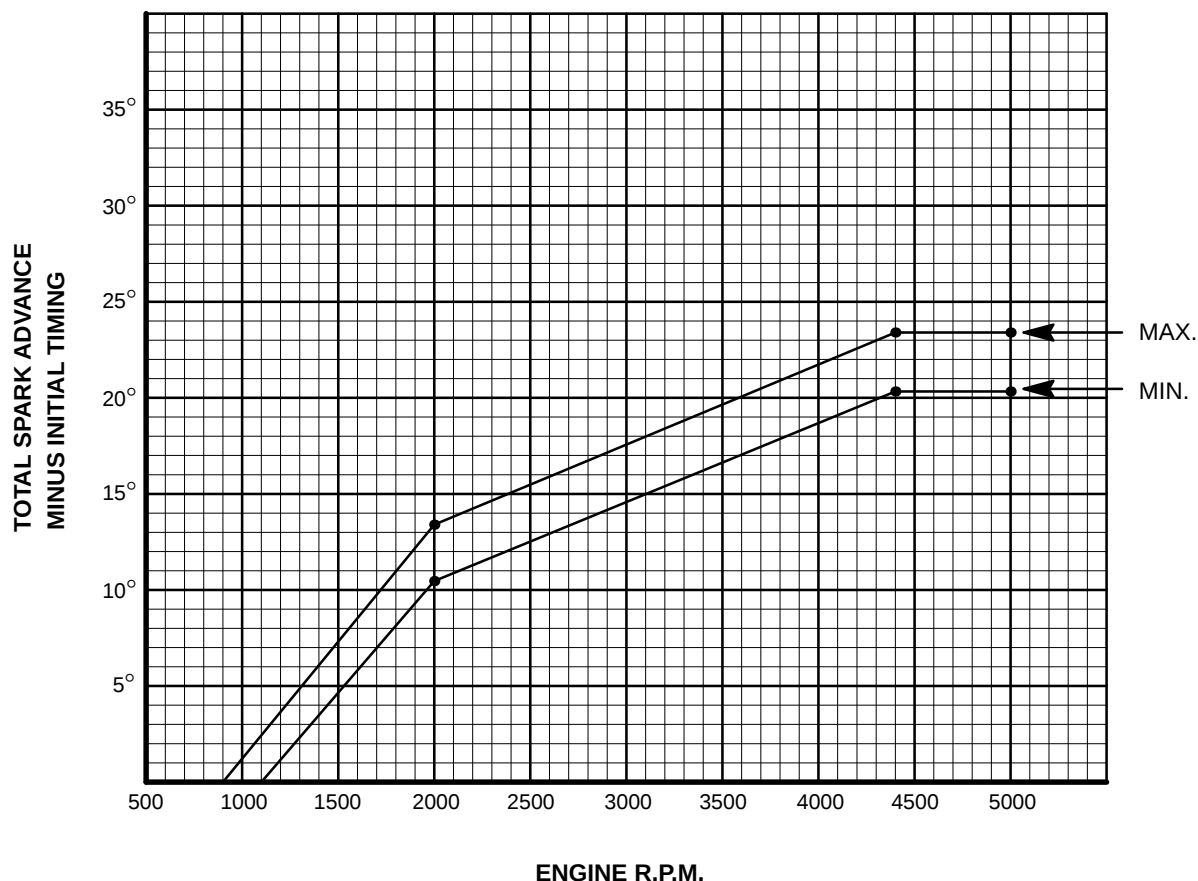
70808-9

MCM/MIE 350 CID (5.7L) (Except MCM 350 Magnum, 5.7L Bravo, 5.7L Competition Ski, 350 Magnum Tournament Ski) with Thunderbolt IV HEI and Rocker Cover "B"

Models: MCM 5.7L Alpha
MIE 5.7L: All
Module Part Number: 805361T-4
Identification Mark: V8-22A
Module Advance: 22°
Initial Timing: 8° BTDC
Total Advance: 30°



Rocker Cover "B": Held to cylinder head by bolt thru top (a) of cover.



70808-10

MCM 350 Magnum Alpha, MCM 5.7L Bravo, MCM 7.4L Bravo Three, MIE 5.7L Competition Ski and MIE 350 Magnum Tournament Ski

Models: MCM 350 Magnum Alpha
MCM 5.7L Bravo
MCM 7.4L Bravo Three 0D838819 and above
MIE 5.7L Competition Ski
MIE 350 Magnum Tournament Ski

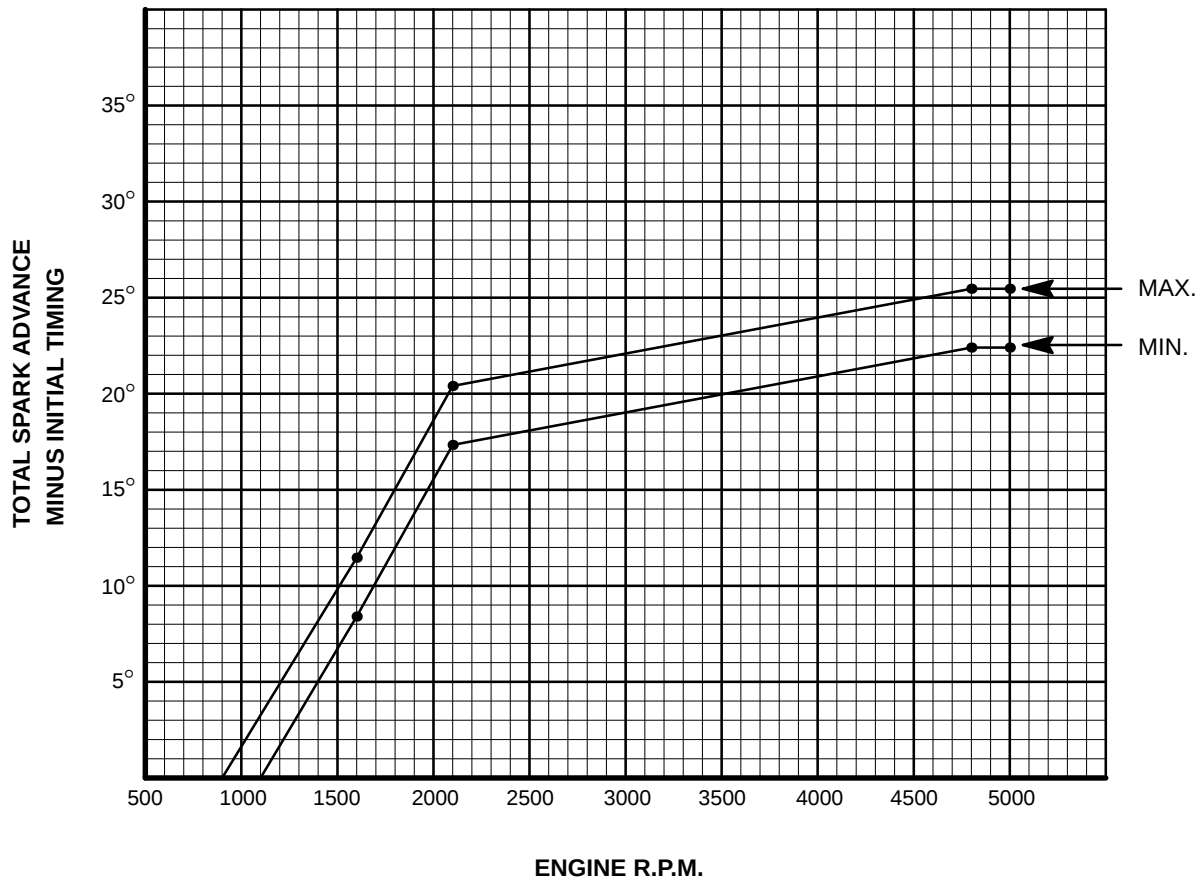
Module Part Number: 805361T-6

Identification Mark: V8-24S

Module Advance: 24°

Initial Timing: 8° BTDC

Total Advance: 32°



70808-1

MCM/MIE 454 CID (7.4L) (Except MCM 7.4L Bravo Three) with Thunderbolt IV HEI

Models: MCM 7.4L Bravo
MCM 454 Magnum
MIE 7.4L Inboard

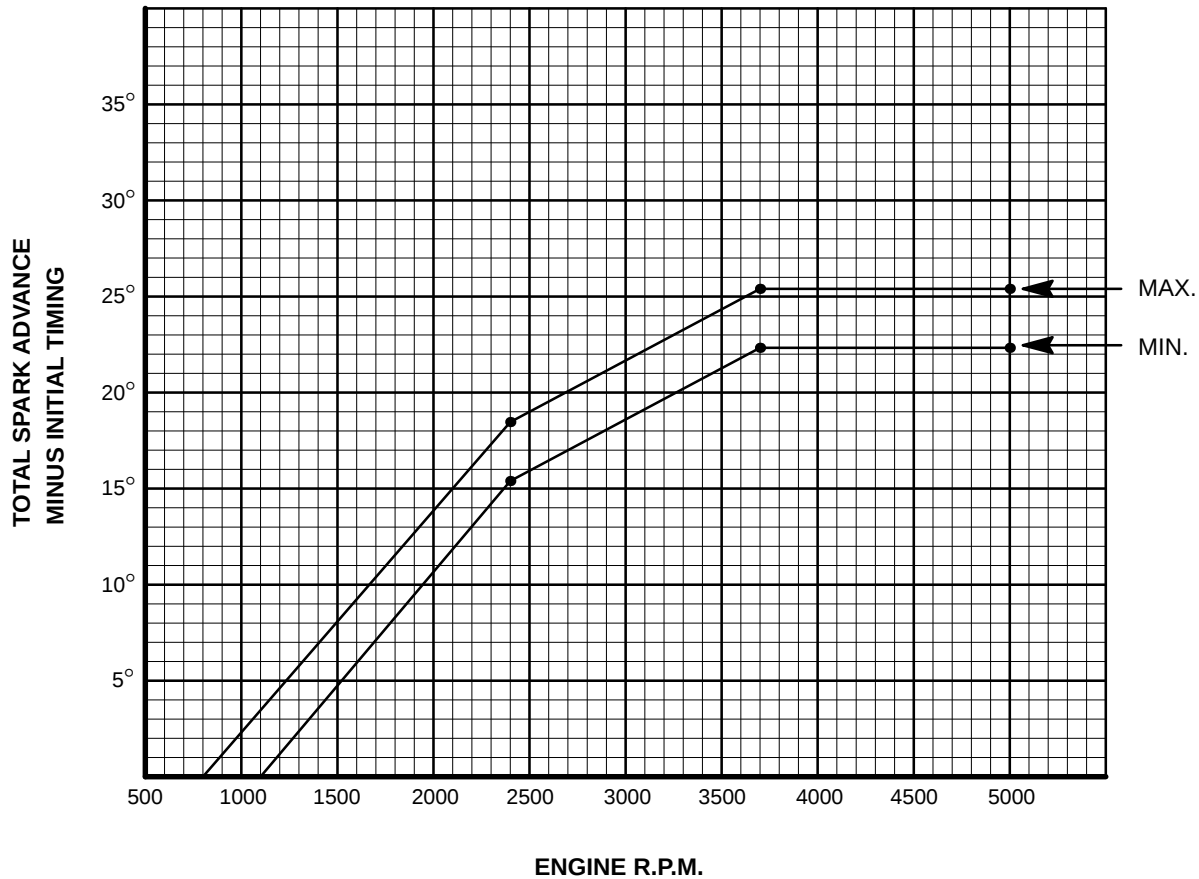
Module Part Numbers: 805361T-2

Identification Mark: V8-24

Module Advance: 24°

Initial Timing: 8° BTDC

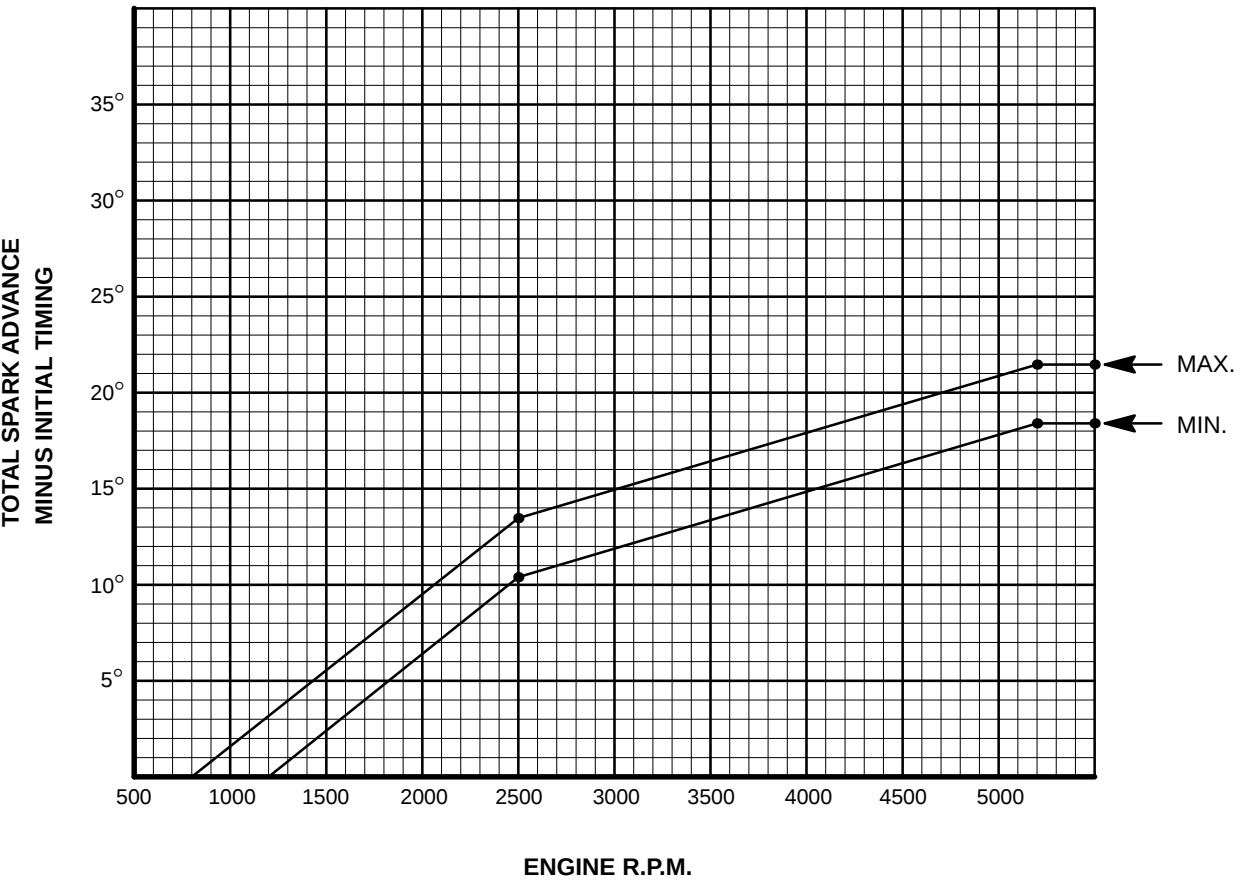
Total Advance: 32°



70808-8

MIE 502 CID (8.2L) with Thunderbolt IV HEI

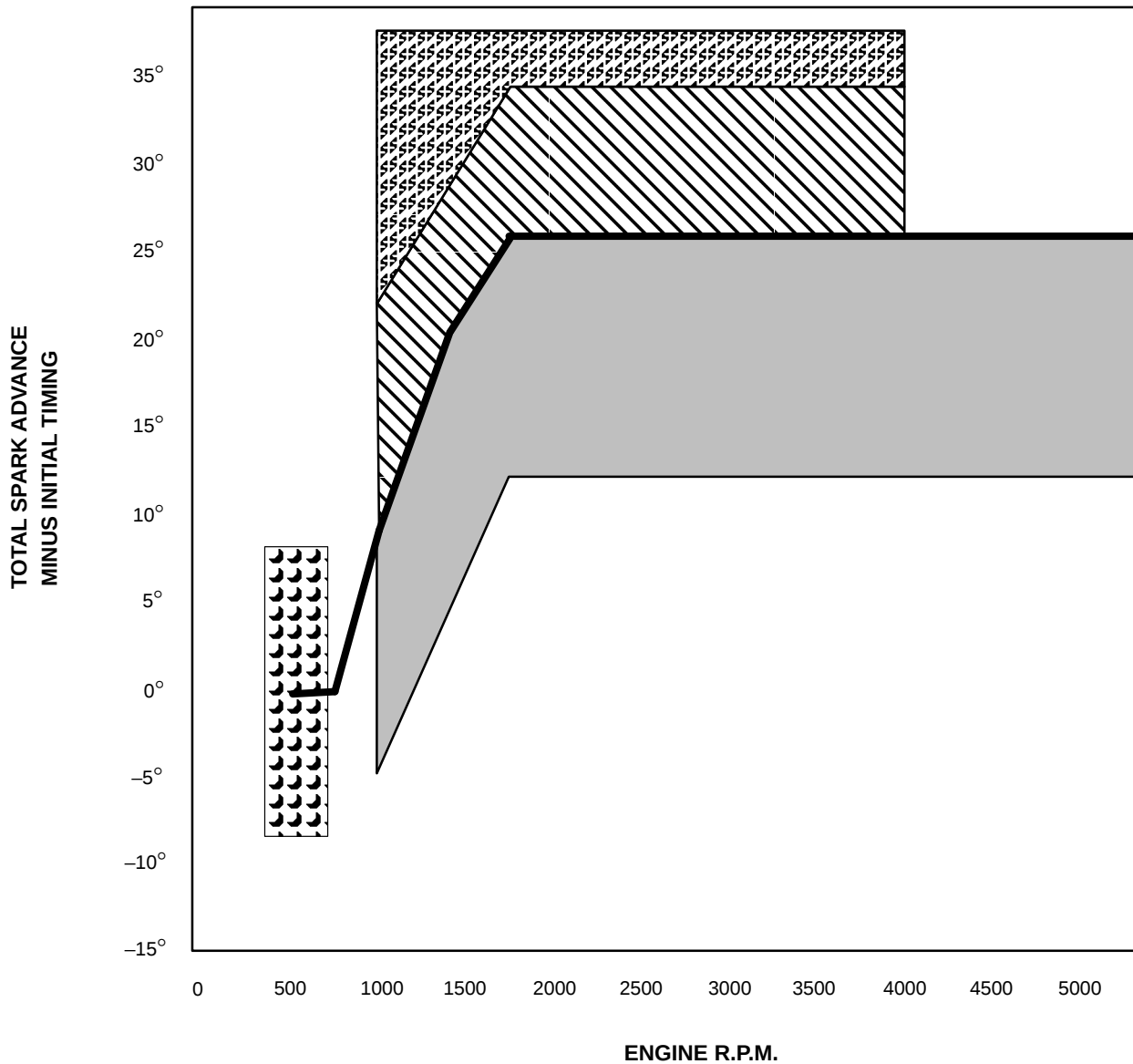
Models: MIE 8.2L Inboard
Module Part Number: 817509T or 805361T-5
Identification Mark: V8-20R
Module Advance: 20°
Initial Timing: 8° BTDC
Total Advance: 28°



70808-14

Thunderbolt V Spark Control Graph

IMPORTANT: The graph below shows the typical advance envelopes for a Thunderbolt V ignition control module. The numbers plotted on the graph are not representative of any particular model. It is only presented to provide an understanding of how the system functions.



-  = Base Timing Advance Curve
-  = Idle Speed Advance Envelope
-  = Knock Retard Envelope
-  = Acceleration Advance Envelope
-  = MBT Advance Envelope