

# GROUP IGNITION SYSTEM 23

## SECTION 23-03 Ignition System Service—EEC-IV

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### VEHICLE APPLICATION

Mustang.

### DESCRIPTION

This Section is designed to serve as a guide in understanding, testing and servicing the EEC-IV Thick Film Integrated (TFI) ignition system.

#### Ignition System Features

The ignition system features a distributor which is cam gear driven and uses no centrifugal or vacuum advance. The distributor is conventionally mounted on the engine. The distributor has a die-cast base which incorporates an integrally mounted TFI-IV ignition module and a Hall effect stator assembly.

No distributor calibration is required and initial timing adjustment is not normally required unless the distributor has been removed from the engine.

NOTE: Do not change timing by use of different octane rods without first having the proper authorization; federal emission requirements will be affected.

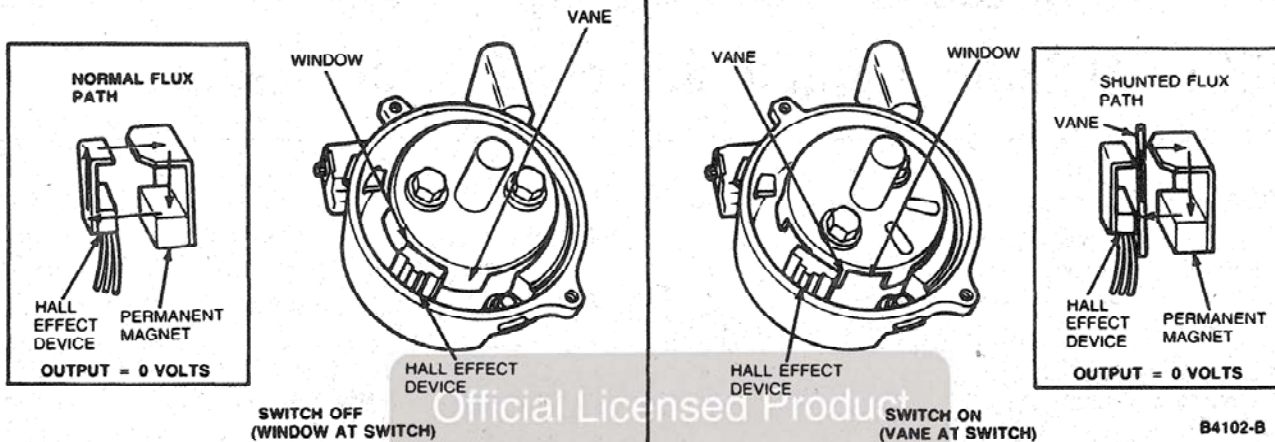
The TFI-IV module used features a "push start" mode. This will allow "push starting" of the vehicle should it be necessary (manual transmission only).

## OPERATION

The operation of the universal distributor is accomplished through the Hall effect stator assembly, causing the ignition coil to be switched off and on by the EEC-IV and TFI-IV modules. The vane switch is an encapsulated package consisting of a Hall sensor on one side and permanent magnet on the other side.

A rotary armature, made of ferrous metal, is used to trigger the Hall effect switch. When the window of the armature is between the magnet and Hall effect device, a magnetic flux field is completed from the

magnet through the Hall effect device and back to the magnet. As the vane passes through this opening, the flux lines are shunted through the vane and back to the magnet. A voltage is produced while the vane passes through the opening. When the vane clears the opening, the window causes the signal to go to zero volts. The signal is then used by the EEC-IV system for crankshaft position sensing and the computation of the desired spark advance, based on engine demand and calibration. The voltage distribution is accomplished through a conventional rotor, cap and ignition wires.



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## REMOVAL AND INSTALLATION

### Distributor Assembly

Replace the distributor assembly if service procedures other than those outlined are required.

#### Removal

1. Disconnect vehicle wiring harness connector from distributor.
2. Using a screwdriver, remove distributor cap and position it and the attached wires aside so as not to interfere with removing the distributor.
3. Remove distributor rotor.
4. Note the position of the shaft plate, armature and rotor locating holes. This should be used as a reference during installation.
5. Remove the distributor hold-down bolt and clamp. The distributor can now be removed from the engine.

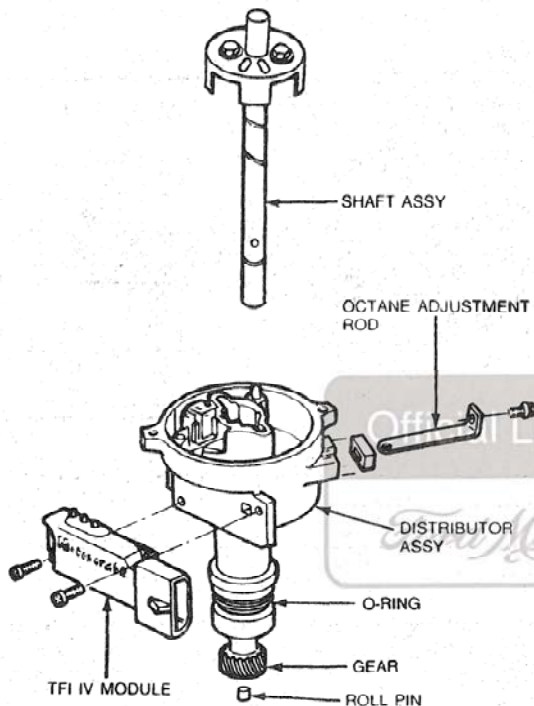
### Installation

1. Rotate distributor by hand to ensure it turns freely.
2. Visually inspect for the presence of the base O-ring.
3. Position the rotor locating holes in the same location as when the distributor was removed. Install the distributor in the engine, maintaining the same orientation of the TFI-IV module to the engine as when removed.
4. Install the distributor hold-down bolt and clamp. Tighten so that the distributor can barely be rotated.
5. Install the distributor rotor.
6. Connect the vehicle wiring harness connector to the distributor.



## REMOVAL AND INSTALLATION (Continued)

7. Install the distributor cap with the attached wires. Tighten the distributor capscrews to 2.0-2.6 N·m (17-23 lb-in). Check all the spark plug wires to ensure they are seated in the cap.
8. Check the ignition timing with a timing light and adjust to specification. Refer to the Vehicle Emission Control Information decal.
9. With the initial timing verified, tighten the distributor hold-down bolt. Refer to Specifications.



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## Ignition Module, TFI-IV

## Removal

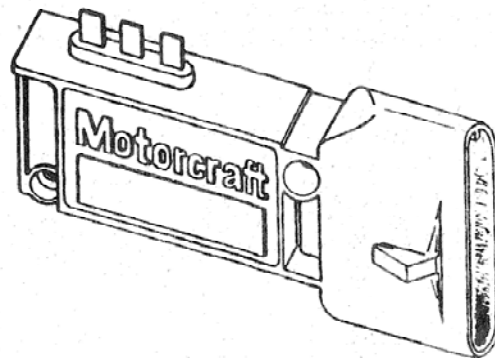
1. Using a screwdriver, remove distributor cap and position it and the attached wires aside so as not to interfere with the work area.
2. Remove TFI harness connector.
3. Remove distributor from engine.
4. Place removed distributor on work bench. Remove the two TFI module attachment screws.
5. Slide the RH side of module down toward the distributor mounting flange and then back up. Then, slide LH side of the module down toward the distributor mounting flange and then back up. Continue alternating, side-to-side, until the module terminals are disengaged from the connector in the distributor base.

With the terminals completely disengaged, slide the module downward. Pull gently away from the mounting surface.

**CAUTION:** Do not attempt to lift module from mounting surface prior to moving entire TFI module toward distributor flange as you will break the pins at the distributor/module connector.

## Installation

1. Coat the metal base plate of the TFI ignition module uniformly with silicone compound, approximately 0.79mm (1/32-inch) thick. Use Silicone Dielectric Compound WA-10, D7AZ-19A331-A (ESE-M1C171-A) or equivalent.
2. Place TFI module on distributor base.
3. Carefully slide TFI module assembly toward distributor connector pins until connector engages and module screw holes line up with tapped holes on base.
4. Install the two TFI module mounting screws. Tighten to 1.7-4.0 N·m (15-35 lb-in).
5. Install distributor on engine.
6. Install distributor cap and tighten cap mounting screws to 2.0-2.6 N·m (17-23 lb-in).
7. Install TFI harness connector.
8. Using an induction timing lamp, verify engine timing per engine decal.
9. If the engine was originally timed with the "positive buy" timing, deface or destroy the "positive buy" timing label.



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## Distributor Cap

## Removal

Loosen distributor cap hold-down screws. Remove the cap straight off the distributor to prevent damage to the rotor points and spring.

**REMOVAL AND INSTALLATION (Continued)****Cleaning and Inspection**

Wash both inside and outside surfaces of the distributor cap with soap and water. Dry the cap with compressed air. Inspect the cap for cracks, broken carbon button, carbon tracks or dirt or corrosion on the terminals. Replace the cap if it is damaged.

**Installation**

1. Position distributor cap on the distributor base noting the square alignment locator. Tighten the hold-down screws to 2.0-2.6 N·m (17-23 lb-in). Care should be taken to prevent damage to rotor blade and spring.
2. Install secondary wires, noting correct locations on distributor cap.

**Distributor Rotor****Removal**

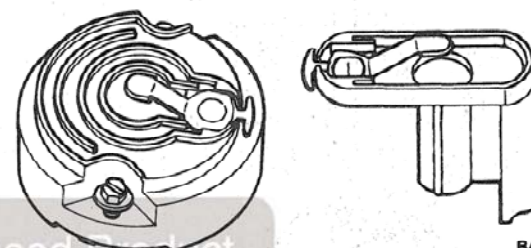
1. Using a screwdriver, remove the distributor cap and position it and the attached wires aside.
2. Remove the rotor.

**Cleaning and Inspection**

Wash the rotor with soap and water. Dry with compressed air. Inspect and replace rotor if cracks, carbon tracks, burns, damaged points or spring are observed.

**Installation**

1. Align locating boss with hole on armature and seat rotor on shaft.



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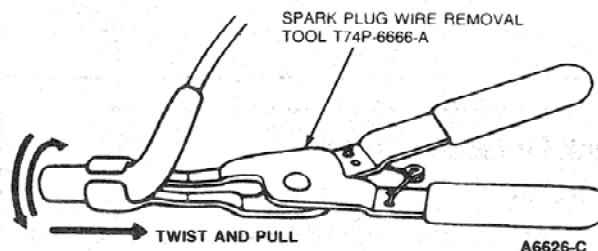
**Spark Plug Wires****Inspection**

Without removing the high tension wires from the spark plugs, distributor cap or coil, inspect them for visible damage such as cuts, pinches, cracks or torn boots. Replace only wires that are damaged. If only the spark boot is damaged, replace just the boot.

**Removal**

When removing wires from spark plugs, use Spark Plug Wire Removal Tool T74P-6666-A or equivalent. Grasp and twist the boot back and forth on the plug insulator to free boot. Use the special tool to pull the boot from the plug. Do not pull on the wire directly, or it may become separated from the connector inside the boot.

When removing wires from the distributor cap or coil, grasp the boot by hand and remove with a twisting and pulling motion. **Do not pull on the wire.**

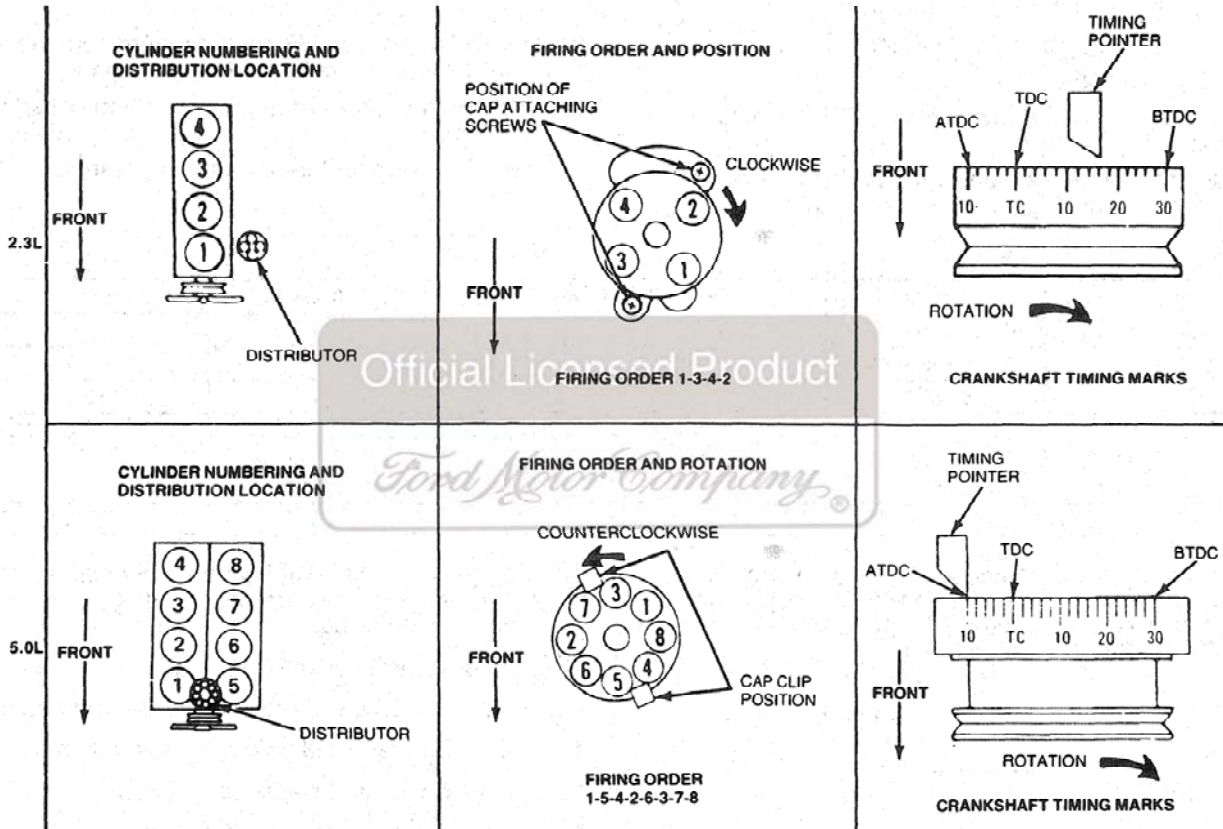


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**REMOVAL AND INSTALLATION (Continued)****Installation**

1. Whenever a high tension wire is removed for any reason from a spark plug, coil or distributor cap or a new high tension wire is installed, Silicone Dielectric Compound D7AZ-19A331-A (ESE-M1C171-A) or equivalent must be applied to the boot before it is connected. Using a small clean tool, coat the entire interior surface of the boot with Motorcraft Silicone Dielectric Compound D7AZ-19A331-A (ESE-M1C171-A) or equivalent.
2. Insert each wire on the proper terminal of the distributor cap. Ensure wires are all the way down over their terminals. The No. 1 terminal is identified on the cap. Install the wires starting with No. 1. Refer to illustration for specific engine firing order.
3. Remove the wire retaining separators for the old high tension wire set and install them on the new set in the same relative position. Install the separators to the valve rocker arm cover stud.
4. Connect the wires to the proper spark plugs.
5. Install the coil wire.



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**Spark Plug****Removal**

1. Remove spark plug wire from spark plug using Spark Plug Wire Removal Tool T74P-6666-A or equivalent with a twisting-pulling motion. Do not pull directly on spark plug wire.
2. Inspect spark plug wires for physical damage. Replace as necessary.
3. Clean area around each spark plug port with compressed air.

4. Remove spark plug.

**Installation**

1. Set spark plug gap to specification shown on Vehicle Emission Control Information decal.
2. Install spark plug and tighten to specification.
3. Coat the inside of the spark plug wire boot with silicone compound and install on spark plug.

**REMOVAL AND INSTALLATION (Continued)****Universal Distributor**

Except for the cap, rotor, TFI module, O-ring and stator assembly, no other distributor assembly parts are replaceable. There is no calibration required with the universal distributor.

**Stator Assembly (Hall Effect Switch)****Removal**

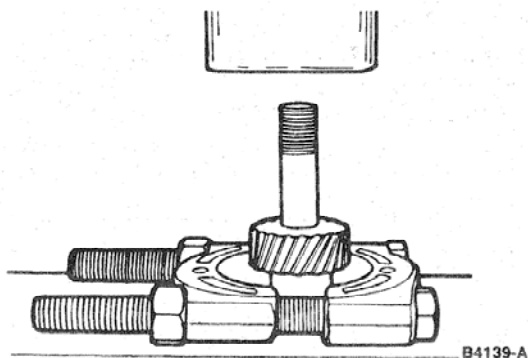
1. Using a screwdriver, remove distributor cap. Position the cap and wires aside so as not to interfere with work area.
2. Remove TFI module connector.
3. Remove distributor from block.
4. Remove rotor.
5. Remove two screws holding TFI module to base.
6. Remove module, wipe grease from base and module, keeping surfaces free of dirt.
7. Remove two screws holding armature and remove armature.  
NOTE: Hold gear to loosen armature screws, do not hold armature.
8. To assist in assembly, mark the armature, gear and collar, if present, to note position.
9. Remove and discard pins in gear and collar, if present.
10. Remove gear and gear collar, if present.

Engine	Gear Pin	Gear Roll Pin Extrusion	Collar	Collar Pin
2.3L OHC	67555-S	Flush		
3.8L	67555-S	Flush	X	67555-S
5.0L	67555-S	Flush	X	67555-S

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11. Invert the distributor and place in the Axle Bearing/Seal Plate T75L-1165-B or equivalent, and press off the gear using Bearing Remover D79L-4621-A or equivalent.



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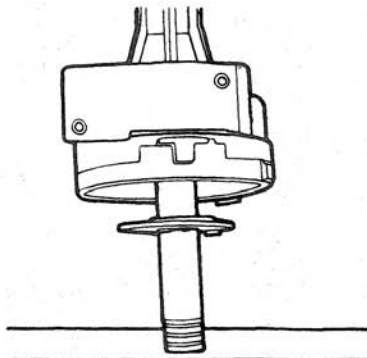
12. Deburr and polish shaft with emery paper and wipe clean so that the shaft slides out freely from distributor base.
13. Remove shaft assembly.
14. Remove octane rod retaining screw and retain.
15. Remove octane rod assembly and retain.
16. Remove two stator assembly screws.
17. Remove stator assembly from top of bowl.
18. Inspect base bushing for wear or signs of excess heat concentration. Replace complete distributor assembly if damaged.
19. Inspect base O-ring for cuts or damage and replace O-ring if necessary.
20. Inspect base for cracks and wear. Replace distributor assembly if damaged.



## REMOVAL AND INSTALLATION (Continued)

## Installation

1. Place stator assembly over bushing and press down to seat.
2. Place stator connector in position. Tab should fit in notch on base and fastening eyelets should be aligned with screw holes.
3. Position wires away from moving parts.
4. Install two stator screws and tighten to 1.7-4.0 N·m (15-35 lb-in).
5. Install octane rod inserting rod through base hole.
6. Place end of octane rod onto same post as original stator. Only one post should easily fit in rod hole.
7. Firmly seat octane rod seal into housing.
8. Install octane rod screw and tighten to 1.7-4.0 N·m (15-35 lb-in).
9. Apply a light coat of Motor Oil ESF-M2C70-A or equivalent to the distributor shaft below the armature. **Do not overlubricate.**
10. Insert shaft through the base bushing.
11. Place collar, if required, over shaft and line up mark on armature and original drill hole. If not present, proceed to Step 15.
12. Insert new roll pin (Part No. 67555-S) through collar and shaft. Pin should be flush with both sides of collar when seated.
13. Place a 1/2-inch deep well socket over shaft, invert and place on arbor plate.



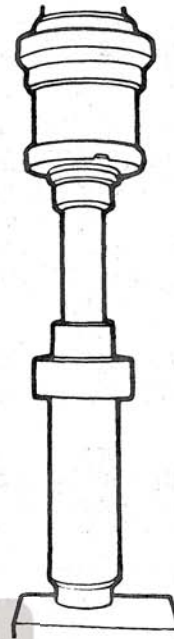
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14. Place distributor gear on shaft and line up mark on armature and gear.

NOTE: The hole in the shaft and gear must be lined up as accurately as possible to ensure ease of roll pin insertion.

15. Place a 5/8-inch deep well socket well over shaft and gear and press gear to align with original drill hole.

NOTE: If the gear holes do not align, the gear must be removed and repressed on. A drift punch will not align the holes. As in the collar, the holes should align.



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16. Insert new roll pin through gear and shaft. Pin should have proper extrusion.
17. Install armatures.
18. Install and tighten screws on armature to 2.8-4.0 N·m (25-35 lb-in).
19. Check distributor for free movement over full rotation of shaft.  
NOTE: If armature hits stator, replace entire distributor.
20. Wipe back of module and distributor module mounting face free of all dirt.
21. Apply Silicone Dielectric Compound D7AZ-19A331-A or equivalent to back of module and spread thinly and evenly.
22. Turn distributor base upside down so that stator connector is in full view.
23. Insert module and ensure that three module pins are inserted into stator connector. Fully seat module into connector and against base.
24. Install two module screws and tighten to 1.7-4.0 N·m (15-35 lb-in).
25. Install distributor into block.
26. Connect TFI module to wiring harness.
27. Replace rotor and tighten screws to specification.
28. Replace cap and tighten screws to specification.
29. Retime engine.

## Tachometer Connection

The ignition coil connector allows a tachometer connection using an alligator clip without removing the coil connector.

## CLEANING AND INSPECTION

### Distributor Assembly

Clean distributor using compressed air.

### Distributor Cap

Wash the distributor cap with soap and water. Dry the cap with compressed air. Inspect the cap for cracks, broken carbon button, carbon tracks or dirt or corrosion on the terminals. Replace the cap if it is damaged. Refer to Distributor Cap, Removal and Installation.

### Rotor

Wipe the rotor with a clean, damp cloth. Dry with compressed air. Inspect and replace rotor if cracks, carbon tracks, burns, damaged points or spring is observed.

### Ignition Coil

Wipe coil tower with a clean cloth dampened with soap and water. Remove any soap film and dry with compressed air. Inspect for cracks, carbon tracking and dirt.

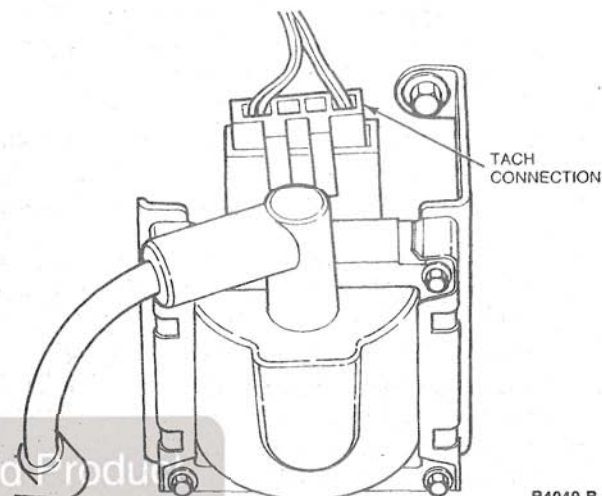
### Spark Plug Wires

Without removing the high tension wires from the spark plugs, distributor cap or coil, wipe the wires with a clean, damp cloth and inspect them for visible damage such as cuts, pinches, cracks or torn boots. Replace only wires that are damaged. Refer to Spark Plug Wire, Removal and Installation.

### Tachometer Connection

The ignition coil connector allows a tachometer connection using an alligator clip, without removing the coil connector. This is accomplished by inserting the alligator clip into the back of the connector, onto the dark green/yellow dotted wire.

**CAUTION:** Do not allow this clip to accidentally ground to a metal surface. It may permanently damage the coil.



B4049-B

## SPECIFICATIONS

### TORQUE SPECIFICATIONS

Description		N·m	Lb·Ft
Distributor Hold-down Bolts	2.3L/3.8L	19-29.8	14-22
	5.0L/5.8L	23-33.9	17-25
Distributor Cap Hold-down Screws		2.0-2.6	18-23 lb-in
TFI Ignition Module Mounting Screws		1.7-4.0	15-35 lb-in

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## SPECIAL SERVICE TOOLS

Tool Number	Description
T74P-6666-A	Spark Plug Wire Removal Tool
T75L-1165-B	Bearing Remover
D79L-4621-A	Bearing Cone Remover

CB4075-D

### ROTUNDA EQUIPMENT

Number	Description
059-00006	Advance Timing Analyzer

CB4401-A