

2008 ENGINE PERFORMANCE

Fuel Charging & Controls - 5.4L (4V) - Mustang

SPECIFICATIONS

Material

Item	Specification	Fill Capacity
Motorcraft SAE 5W-50 Full Synthetic Motor Oil XO-5W50-QGT or equivalent	WSS-M2C931-B	-

TORQUE SPECIFICATIONS

Description	Nm	lb-in
Fuel pump driver module (FPDM) bolts	4	35
Fuel rail bolts	10	89
Throttle body (TB) bolts	10	89
TB spacer bolts	10	89

DESCRIPTION AND OPERATION

FUEL CHARGING AND CONTROLS

Sequential Multiport Fuel Injection (SFI)

WARNING: Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

The fuel charging and controls system consists of the:

- throttle body (TB).
- fuel injectors.
- fuel rail.
- fuel rail pressure and temperature sensor.
- two fuel pump driver modules.

The fuel charging and controls system is:

- a sequential multiport fuel injection (SFI) system.
- pulse-width modulated (PWM).
- mass air flow (MAF) controlled.

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Fuel is metered into each intake port in a sequential firing order. Fuel injectors pulse to follow engine firing order, in accordance with engine demand, on a tuned intake manifold.

The basic fuel requirement of the engine is determined from the data supplied to the PCM by the MAF sensor, which measures the amount of air being drawn into the engine.

The various sensors detect any changes in the operating conditions and send signals to the PCM. This permits the PCM to control the opening duration (pulse width) of the fuel injectors and maintain optimum exhaust emission control and engine performance for all operating conditions.

Throttle Body (TB)

CAUTION: Do not hold the throttle plate open with any object that could scratch the bore or plate while servicing or cleaning the throttle body (TB). Refer to Throttle Body.

The TB:

- controls air supply to the intake manifold by electronically positioning the throttle plates.
- is not adjustable.
- must be removed from the vehicle to be cleaned.

Refer to Throttle Body.

Fuel Rail

CAUTION: The fuel injectors and the fuel rail must be handled with extreme care to prevent damage to sealing areas and sensitive fuel-metering orifices.

The fuel rail:

- receives fuel from the fuel supply tube.
- delivers fuel to the fuel injectors.

For removal and installation, refer to Fuel Rail and Fuel Injector - Exploded View and Fuel Rail.

Fuel Injectors

The fuel injectors:

- are electronically operated by the PCM.
- atomize the fuel as the fuel is delivered.
- each have an internal solenoid which opens a needle valve to inject fuel into the intake manifold.
- are deposit-resistant.

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For removal and installation, refer to **Fuel Rail and Fuel Injector - Exploded View** and **Fuel Rail**.

Fuel Rail Pressure and Temperature Sensor

The fuel rail pressure and temperature sensor:

- maintains constant fuel pressure to the fuel injectors and throughout the fuel system.
- is spring-loaded and operated by intake manifold vacuum.

For removal and installation, refer to **ELECTRONIC ENGINE CONTROLS** article.

Fuel Pump Driver Modules (FPDM)

The fuel pump driver modules (FPDMs):

- each controls one fuel pump.
- receives signals from the PCM.
- duty cycles the fuel pumps.

For removal and installation, refer to **Fuel Pump Driver Module (FPDM)**.

DIAGNOSTIC TESTS

FUEL CHARGING AND CONTROLS

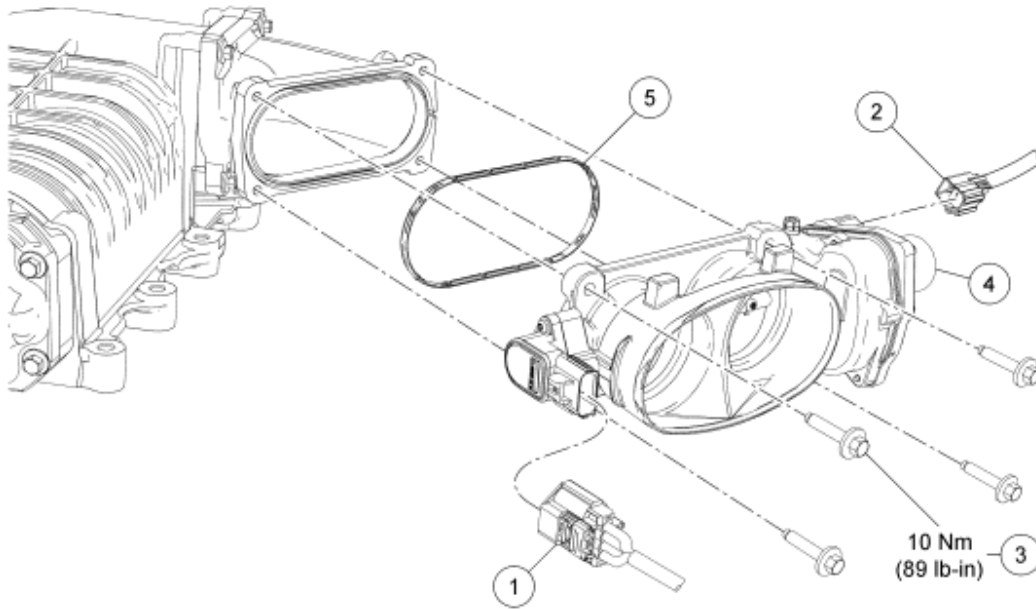
Refer to the **Introduction - Gasoline Engines** article.

REMOVAL AND INSTALLATION

THROTTLE BODY

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Fig. 1: Exploded View Of Throttle Body Components With Torque Specification
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	14A464	Throttle position (TP) sensor electrical connector (part of 12B637)
2	14A464	Electronic throttle control electrical connector (part of 12B637)
3	N806154	Throttle body (TB) bolt (4 required)
4	9F991	TB
5	9E936	TB-to-TB spacer gasket

REMOVAL AND INSTALLATION

CAUTION: The throttle body (TB) must be removed from the vehicle to be cleaned. Do not hold the throttle plate open with any object that could scratch the bore or plate while servicing or cleaning the TB.

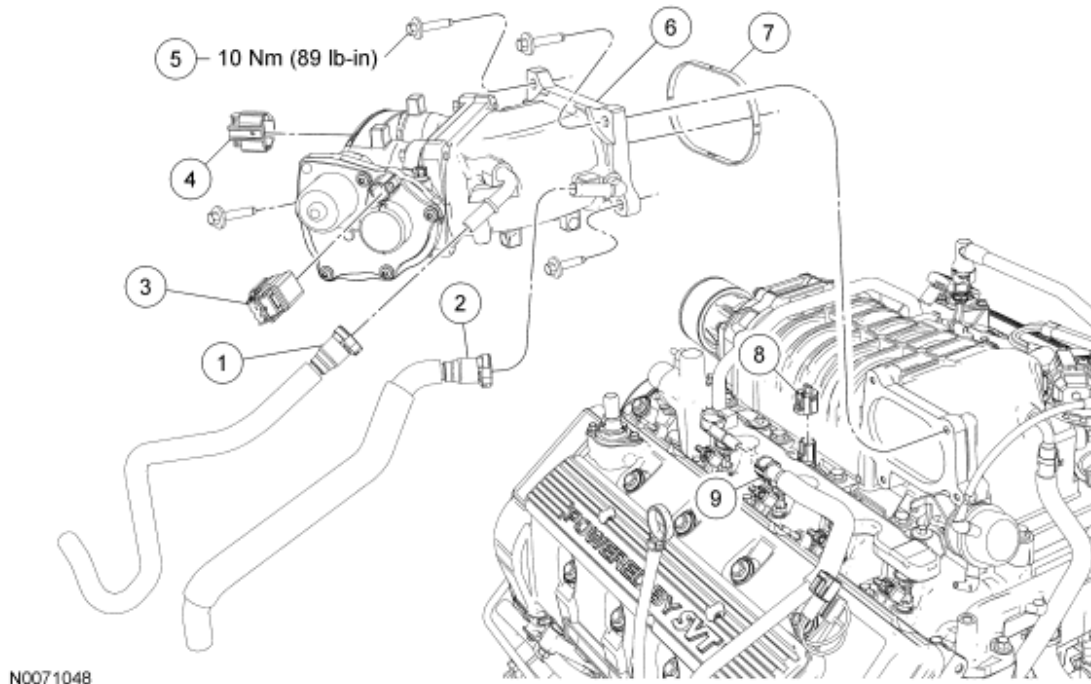
1. Remove the air cleaner outlet pipe. For additional information, refer to **INTAKE AIR DISTRIBUTION AND FILTERING** article.
2. Disconnect the throttle position (TP) sensor electrical connector.
3. Disconnect the electronic throttle control electrical connector.
4. Remove the 4 bolts and the throttle body (TB) and discard the gasket.
 - To install, tighten to 10 Nm (89 lb-in).

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5. To install, reverse the removal procedure.
 - Install a new TB gasket.

FUEL RAIL AND FUEL INJECTOR - EXPLODED VIEW



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Fig. 2: Exploded View Of Fuel Rail & Fuel Injector With Torque Specification (1 Of 3)
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	9G271	Evaporative emission (EVAP) canister purge valve vapor tube-to-throttle body spacer quick connect coupling
2	2B432	Brake booster-to-throttle body (TB) spacer quick connect coupling
3	14A464	Electronic throttle control electrical connector (part of 12B637)
4	14A464	Throttle position (TP) sensor electrical connector (part of 12B637)
5	N806154	TB spacer bolt (4 required)
6	9E822	TB spacer assembly
7	9L437	TB spacer-to-supercharger (SC) gasket
8	14A464	Intake air temperature 2 (IAT2) sensor electrical connector (part of 12B637)
9	9J280	Fuel supply tube-to-fuel rail quick connect coupling

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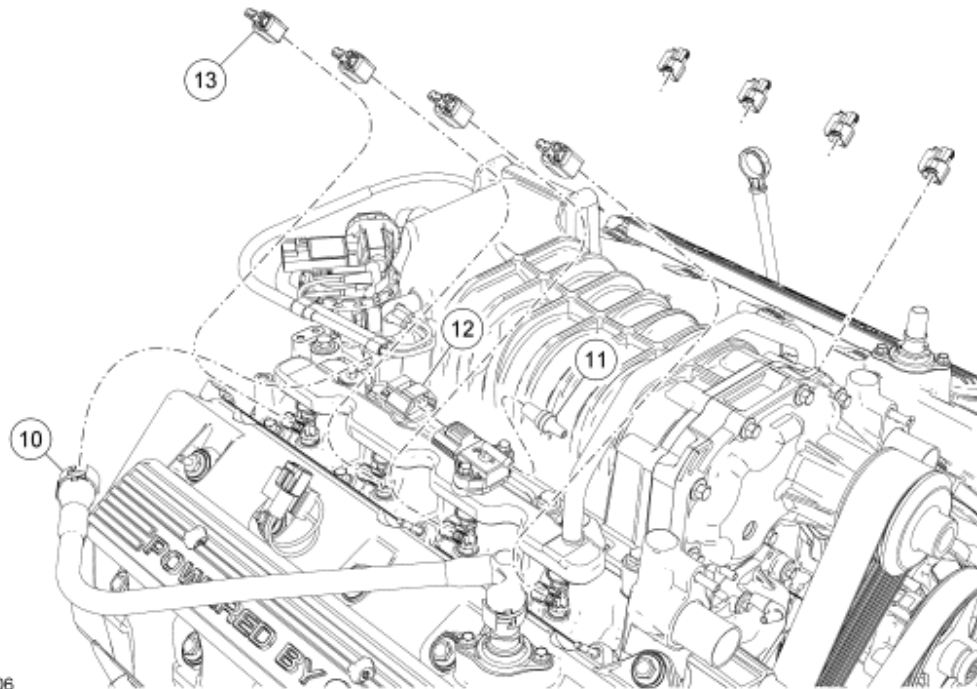


Fig. 3: Exploded View Of Fuel Rail & Fuel Injector (2 Of 3)
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
10	6K817	PCV valve-to-supercharger (SC) tube
11	9E498	Fuel rail pressure and temperature sensor vacuum hose
12	14A464	Fuel rail pressure and temperature sensor electrical connector (part of 12B637)
13	14A464	Fuel injector electrical connector (8 required) (part of 12B637)

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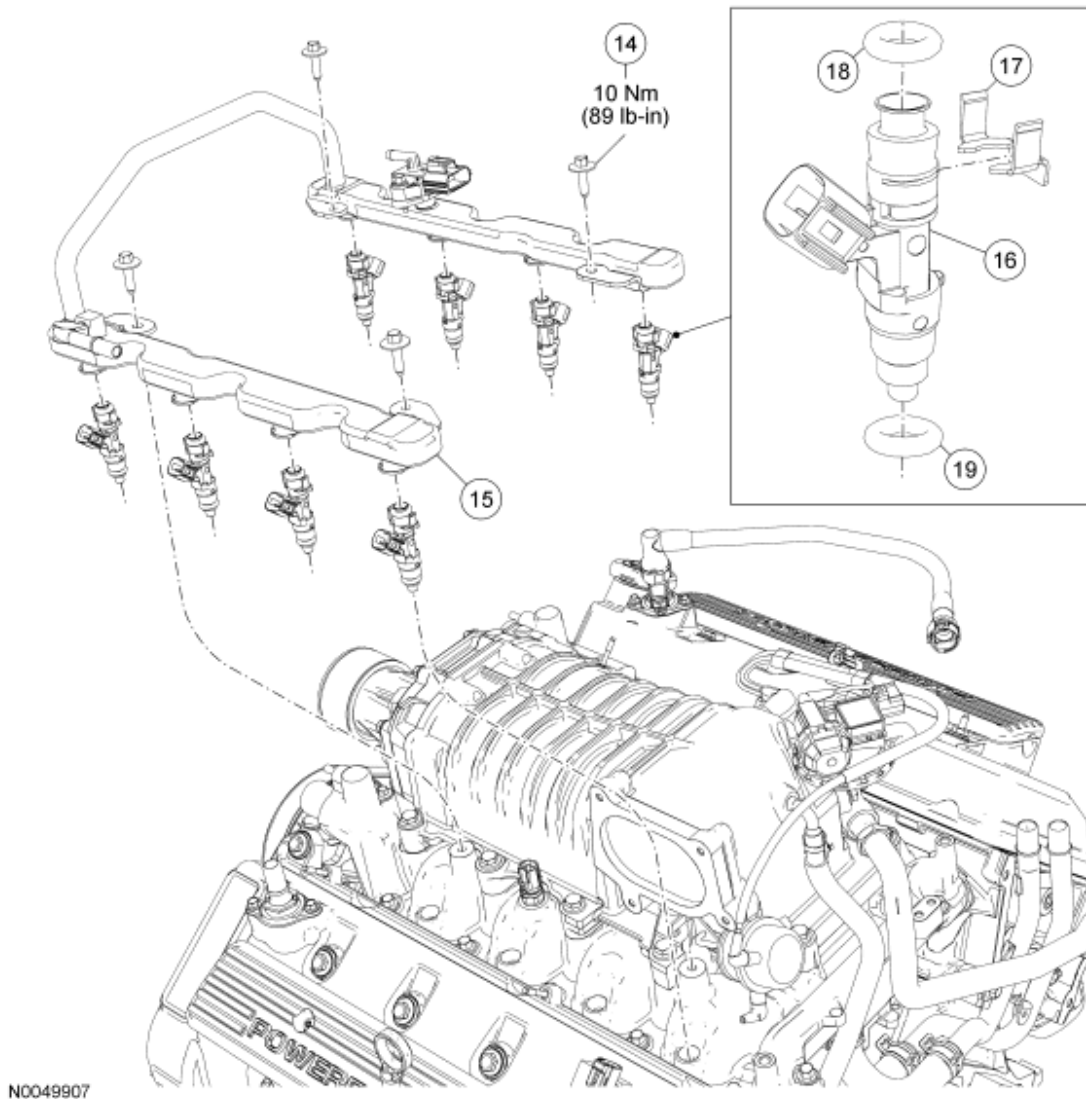


Fig. 4: Exploded View Of Fuel Rail & Fuel Injector With Torque Specification (3 Of 3)
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
14	N804394	Fuel rail bolt (4 required)
15	9F792	Fuel rail
16	9F593	Fuel injector (8 required)
17	9F907	Fuel injector clip (8 required)
18	-	Upper fuel injector O-ring seal (8 required) (part of 9F593)
19	-	Lower fuel injector O-ring seal (8 required) (part of 9F593)

1. For additional information, refer to the procedures.

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FUEL RAIL

Material

Item	Specification
Motorcraft SAE 5W-50 Full Synthetic Motor Oil XO-5W50-QGT or equivalent	WSS-M2C931-B

REMOVAL AND INSTALLATION

WARNING: Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

WARNING: Before working on or disconnecting any of the fuel tubes or fuel system components, relieve the fuel system pressure to prevent accidental spraying of fuel. Fuel in the fuel system remains under high pressure, even when the engine is not running. Failure to follow this instruction may result in serious personal injury.

1. Release the fuel system pressure. For additional information, refer to **FUEL SYSTEM - GENERAL INFORMATION** article.
2. Disconnect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES** article.
3. Remove the air cleaner outlet pipe. For additional information, refer to **INTAKE AIR DISTRIBUTION AND FILTERING** article.
4. Disconnect the evaporative emission (EVAP) canister purge valve vapor tube-to-throttle body (TB) spacer quick connect coupling. For additional information, refer to **FUEL SYSTEM - GENERAL INFORMATION** article.
5. Disconnect the brake booster-to-TB spacer quick connect coupling. For additional information, refer to **FUEL SYSTEM - GENERAL INFORMATION** article.
6. Disconnect the electronic throttle control electrical connector.
7. Disconnect the throttle position (TP) sensor electrical connector.
8. Remove the 4 TB spacer (SC) assembly-to-supercharger bolts and the TB spacer assembly.
 - Discard the gasket.
 - To install, tighten to 10 Nm (89 lb-in).
9. Disconnect the intake air temperature 2 (IAT2) sensor electrical connector.
10. Disconnect the fuel supply tube quick connect coupling from the fuel rail. For additional information, refer to **FUEL SYSTEM - GENERAL INFORMATION** article.
11. Disconnect the PCV valve tube-to-SC quick connect coupling and position aside. For additional information, refer to **FUEL SYSTEM - GENERAL INFORMATION** article.
12. Disconnect the fuel rail pressure and temperature sensor electrical and vacuum connectors.

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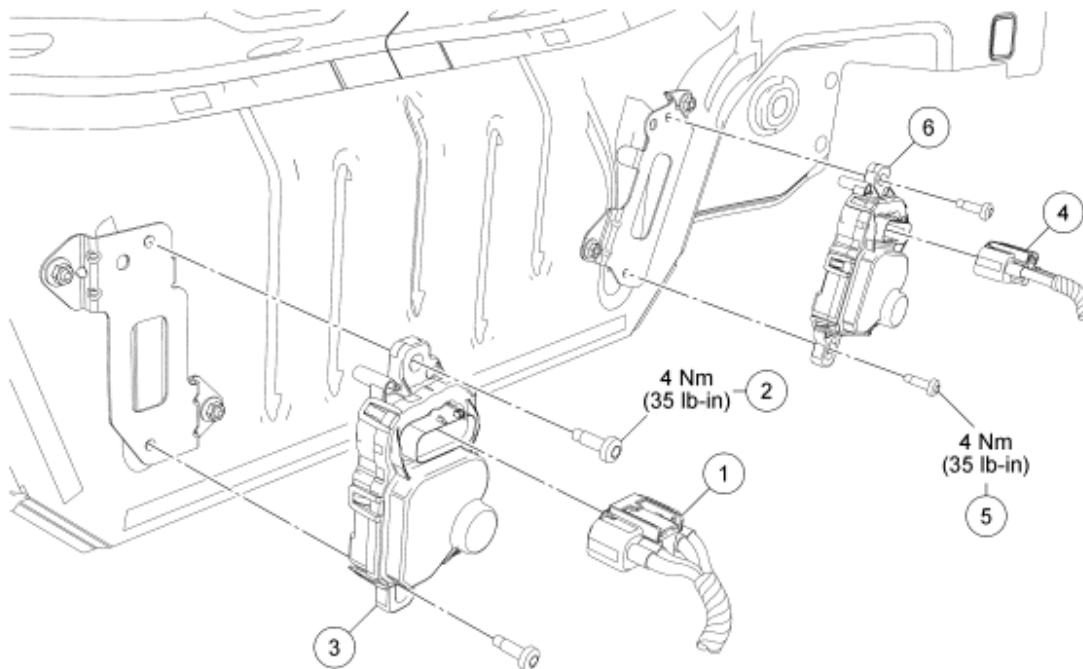
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13. Disconnect the 8 fuel injector electrical connectors.
14. Remove the 4 fuel rail bolts.
 - To install, tighten to 10 Nm (89 lb-in).
15. Remove the fuel rail and the 8 fuel injectors.

NOTE: The fuel injector clip can be reused if it is not damaged during removal.

16. Remove the fuel injector clips and the fuel injectors.
17. Inspect the fuel injector O-ring seals for damage.
18. To install, reverse the removal procedure.
 - Lubricate the upper and lower fuel injector O-ring seals with clean engine oil prior to installation.

FUEL PUMP DRIVER MODULE (FPDM)



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Fig. 5: Exploded View Of Fuel Pump Driver Module (FPDM) With Torque Specifications
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	14A464	RH fuel pump driver module (FPDM) electrical connector (part of 14A005)
2	W504755	RH FPDM bolt (2 required)
3	9D370	RH FPDM
4	14A464	LH FPDM electrical connector (part of 14A005)

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5	W504755	LH FPDM bolt (2 required)
6	9D370	LH FPDM

REMOVAL AND INSTALLATION

NOTE: **The fuel pump driver modules (FPDM) are located in the spare tire stowage compartment and are serviced separately.**

- 1. Disconnect the FPDM electrical connector.
- 2. Remove the 2 bolts and the FPDM.
 - To install, tighten to 4 Nm (35 lb-in).
- 3. To install, reverse the removal procedure.