

2008 ENGINE PERFORMANCE

Fuel Charging & Controls - 4.6L (3V) - Mustang

SPECIFICATIONS

Material

Item	Specification	Fill Capacity
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A	-

TORQUE SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Fuel pump driver module (FPDM) bolts	10	-	89
Fuel rail stud bolts	10	-	89
Strut tower cross brace	35	26	-
Throttle body (TB) nuts	10	-	89
TB stud 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.
- fuel pump driver module.

The fuel charging and controls system is:

2008 Ford Mustang

2008 ENGINE PERFORMANCE Fuel Charging & Controls - 4.6L (3V) - Mustang

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

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 PCM controls the fuel injection system. Injector pulse width is varied to control the amount of fuel flow. Varying fuel pump output controls fuel pressure. The PCM commands the fuel pump driver module, which directly controls the fuel pump. The throttle body is electronically controlled by the engine management system (EMS). Throttle plate angle is changed electronically in response to throttle pedal movements initiated by the driver.

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 plate.
- is not adjustable.
- must be removed from the vehicle to be cleaned.

Refer to **Throttle Body**.

Fuel Injectors

The fuel injectors:

- are electronically operated by the PCM.
- atomize the fuel as the fuel is delivered.
- each have an internal solenoid that opens a needle valve, which injects fuel into the intake port in the cylinder head.
- are deposit resistant.

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

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.

2008 Ford Mustang

2008 ENGINE PERFORMANCE Fuel Charging & Controls - 4.6L (3V) - Mustang

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 Rail Pressure and Temperature Sensor

The fuel rail pressure and temperature sensor:

- measures the pressure and temperature of the fuel rail and sends these signals to the PCM.
- uses intake manifold vacuum as a pressure reference.

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

Fuel Pump Driver Module (FPDM)

The fuel pump driver module (FPDM):

- receives signals from the PCM.
- duty cycles the fuel pump.

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

DIAGNOSTIC TESTS

FUEL CHARGING AND CONTROLS

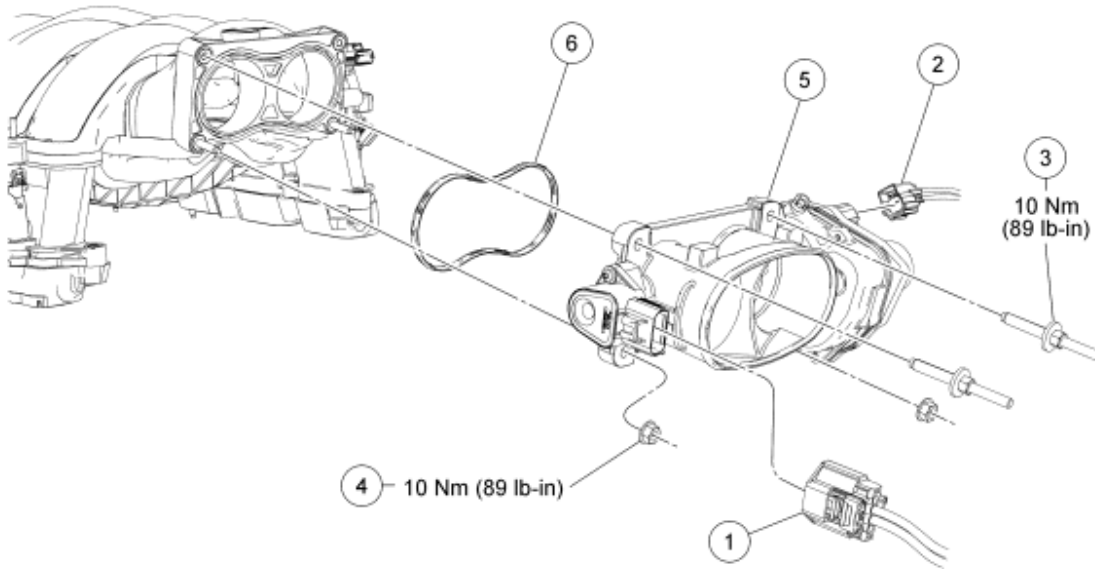
Refer to the **Introduction - Gasoline Engines** article.

REMOVAL AND INSTALLATION

THROTTLE BODY

2008 Ford Mustang

2008 ENGINE PERFORMANCE Fuel Charging & Controls - 4.6L (3V) - Mustang



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

Item	Part Number	Description
1	14A464	Electronic throttle control electrical connector (part of 12B637)
2	14A464	Throttle position (TP) sensor electrical connector (part of 12B637)
3	N806154	Throttle body (TB) stud bolt (2 required)
4	N805320	TB nut (2 required)
5	9F991	TB
6	9E936	TB gasket

REMOVAL AND INSTALLATION

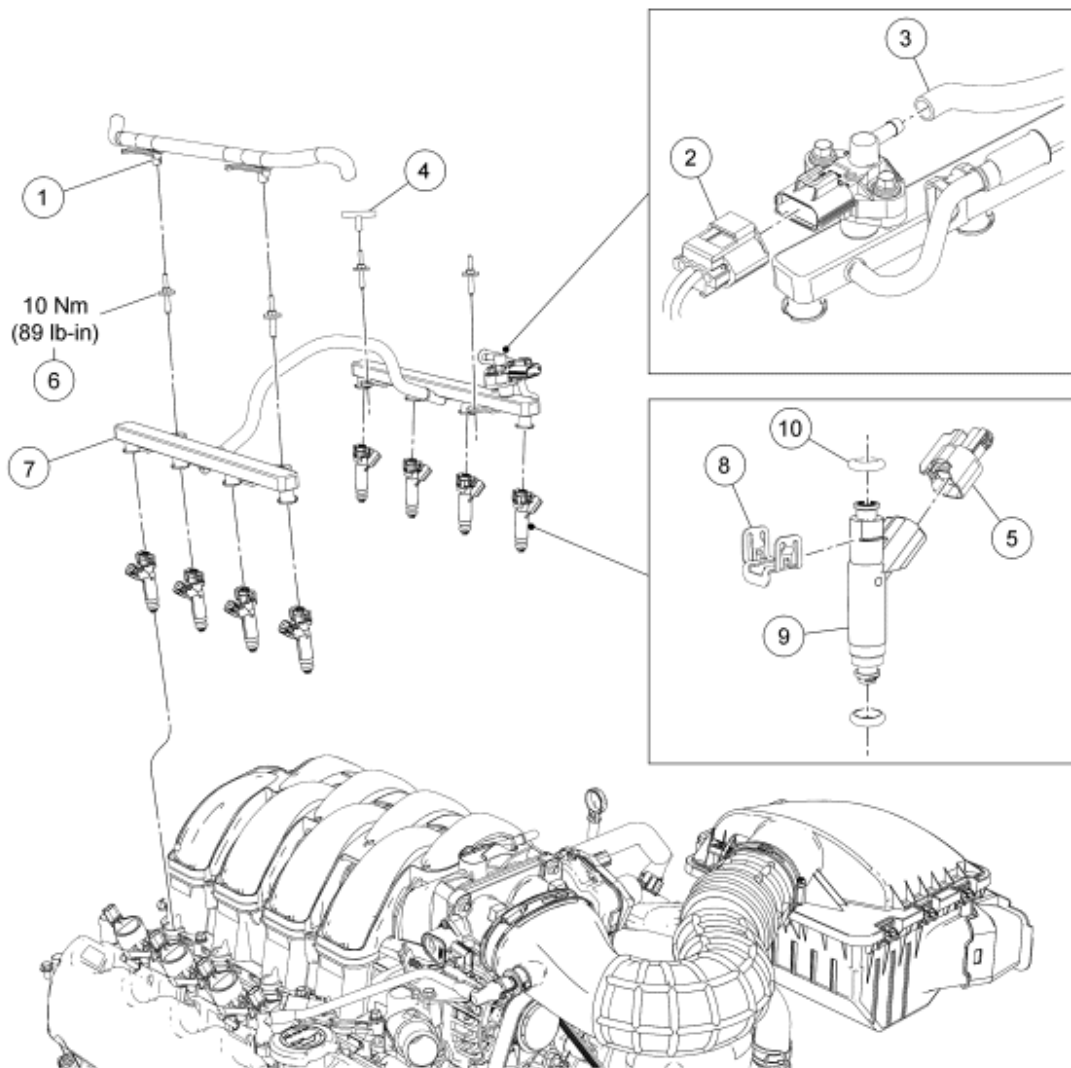
CAUTION: The throttle body (TB) must be removed from the vehicle to be cleaned. Do not hold the throttle plate open with any object that could scratch the bore or plate while servicing or cleaning the TB.

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.

NOTE: Discard the TB gasket.

4. Remove the 2 stud bolts, 2 nuts and the TB.
 - To install, tighten to 10 Nm (89 lb-in).
5. To install, reverse the removal procedure.

FUEL RAIL AND FUEL INJECTOR - EXPLODED VIEW



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

Item	Part Number	Description
1	14A163	Wiring harness retainer (2 required) (part of 12B637)
2	14A464	Fuel rail pressure and temperature sensor electrical connector

2008 Ford Mustang
2008 ENGINE PERFORMANCE Fuel Charging & Controls - 4.6L (3V) - Mustang

		(part of 12B637)
3	9C482	Fuel rail pressure and temperature sensor vacuum hose
4	-	Fuel rail pressure and temperature sensor vacuum hose retainer (part of 9C482)
5	14A464	Fuel injector electrical connector (8 required) (part of 12B637)
6	W705870	Fuel rail stud bolt (4 required)
7	9F792	Fuel rail
8	9C995	Fuel injector retaining clip (8 required)
9	9F593	Fuel injector
10	9F798	O-ring seal (16 required)

- For additional information, refer to the procedures.

FUEL RAIL

Material

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Synthetic Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A

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.

All vehicles

- Release the fuel system pressure. For additional information, refer to **FUEL SYSTEM - GENERAL INFORMATION** article.
- Disconnect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES** article.

Bullitt vehicles

3. Remove the 4 nuts and the strut tower cross brace.
 - To install, tighten to 35 Nm (26 lb-ft).

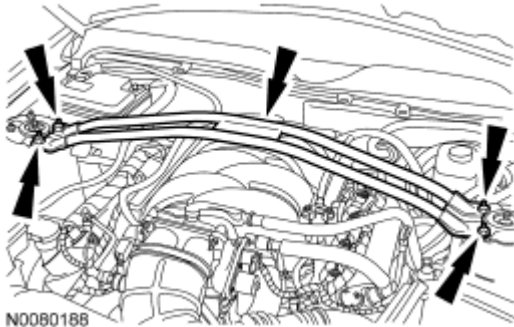


Fig. 3: Locating Strut Tower Cross Brace & Nuts
Courtesy of FORD MOTOR CO.

All vehicles

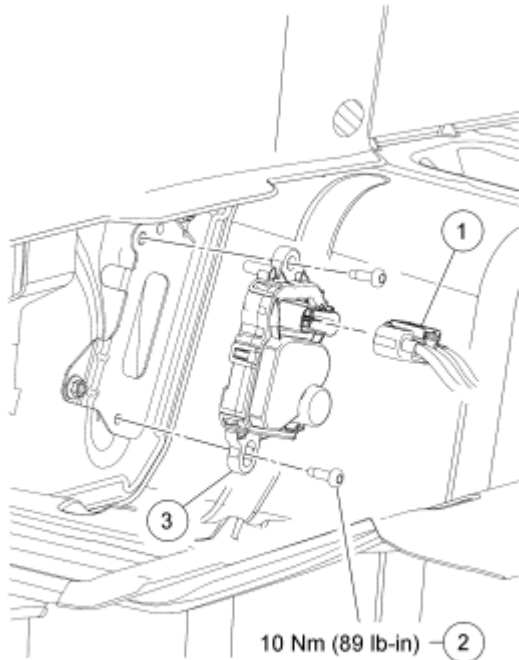
4. Disconnect the fuel supply tube spring lock coupling. For additional information, refer to **FUEL SYSTEM - GENERAL INFORMATION** article.
5. Detach the 2 wiring harness retainers from the fuel rail stud bolts and position the harness aside.
6. Disconnect the fuel rail pressure and temperature sensor vacuum hose retainer from the fuel rail stud bolt.
7. Disconnect the fuel rail pressure and temperature sensor electrical connector and vacuum hose.
8. Disconnect the 8 fuel injector electrical connectors.
9. Remove the 4 fuel rail stud bolts.
 - To install, tighten to 10 Nm (89 lb-in).
10. Remove the fuel rail and fuel injectors as an assembly from the intake manifold.

NOTE: The fuel injector clip can be reused if it is not damaged during removal. If the clip is reused, the 2 sides of the clip should be squeezed back into shape by placing it between index finger and thumb.

11. Remove the retaining clips and fuel injectors from the fuel rail.

CAUTION: Use O-ring seals that are made of special fuel-resistant material. Use of ordinary O-ring seals may cause the fuel system to leak. Do not reuse the O-ring seals.

12. Remove and discard the fuel injector O-ring seals.
13. To install, reverse the removal procedure.
 - Lubricate the new 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. 4: Exploded View Of Fuel Pump Driver Module (FPDM) With Torque Specification
Courtesy of FORD MOTOR CO.

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

REMOVAL AND INSTALLATION

NOTE: The fuel pump driver module (FPDM) is located in the spare tire stowage compartment.

1. Disconnect the FPDM electrical connector.
2. Remove the 2 bolts and the FPDM.
 - To install, tighten to 10 Nm (89 lb-in).
3. To install, reverse the removal procedure.