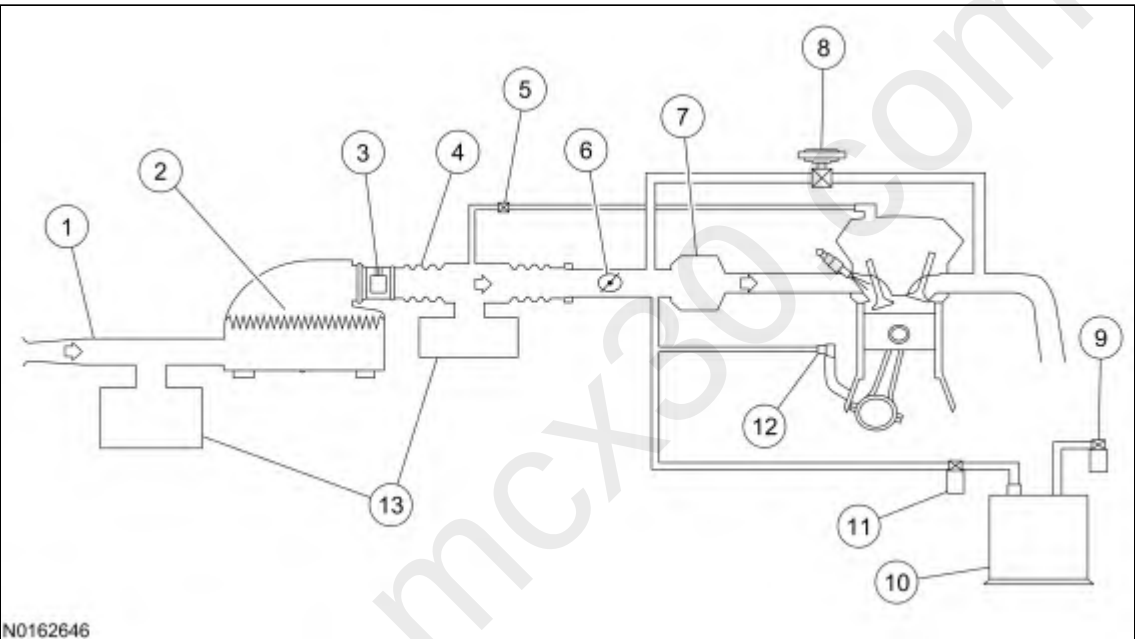


Intake Air Systems

Overview

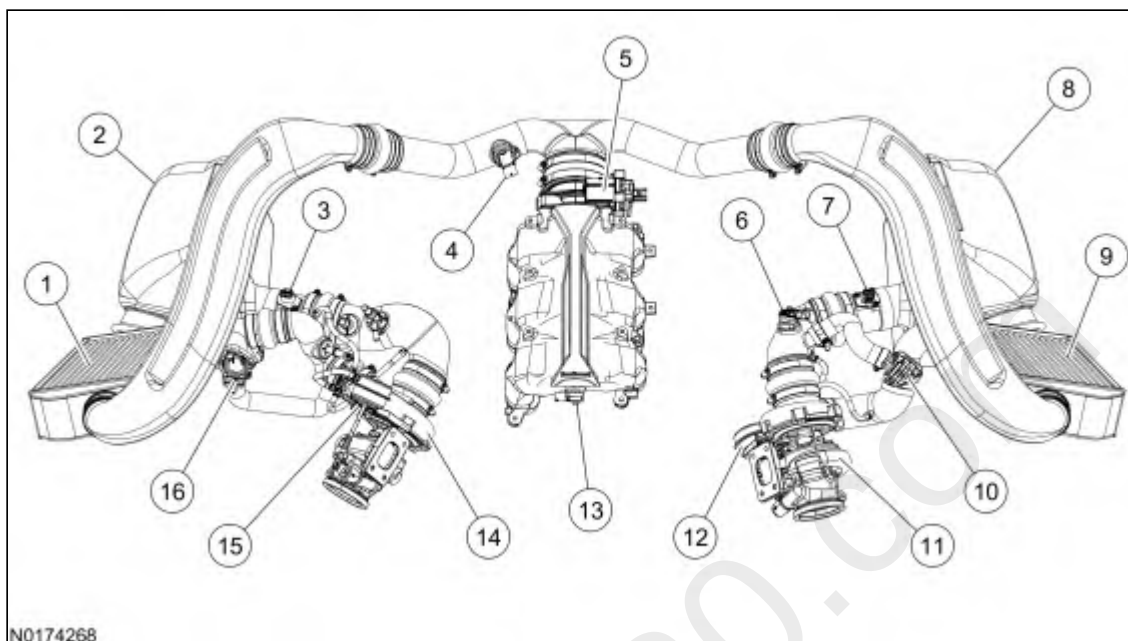
The intake air system provides clean air to the engine, optimizes airflow, and reduces unwanted induction noise. The intake air system consists of an air cleaner assembly, resonator assemblies, and hoses. Some vehicles use a hydrocarbon filter trap to help reduce emissions by preventing fuel vapor from escaping into the atmosphere from the intake when the engine is OFF. It is typically located inside the intake air system. The mass airflow (MAF) sensor (if equipped), is attached to the intake air system and measures the volume of air delivered to the engine. The hydrocarbon trap is part of the evaporative emission (EVAP) system. For more information on the EVAP system, refer to [Evaporative Emission \(EVAP\) Systems](#) in this section. The MAF sensor (if equipped) can be replaced as an individual component. The intake air system also contains a sensor that measures the intake air temperature, which is integrated with the MAF sensor (if equipped). For additional information on the intake air system components, refer to [Engine Control Components](#) in this section. Intake air components can be separate components or part of the intake air housing. The function of a resonator is to reduce induction noise. The intake air components are connected to each other and to the throttle body assembly with hoses.



Typical Intake Air System

Intake Air System	Component
1	Air Cleaner Inlet
2	Air Cleaner Element
3	Mass Airflow/Intake Air Temperature Sensor
4	Air Cleaner Outlet
5	Crankcase Pressure Sensor (If Equipped)
6	Throttle Body
7	Upper Intake Manifold
8	Exhaust Gas Recirculation (EGR)
9	EVAP Canister Vent Valve

Intake Air System	Component
10	EVAP Canister
11	EVAP Purge Valve
12	Positive Crankcase Ventilation (PCV)
13	Intake Air Resonator



Ford GT 6 Cylinder Dual Intake Air Turbocharger System — Air To Air Cooled (RWD)

Intake Air System	Component
1	Charge Air Cooler (CAC) Left Bank (Bank 2)
2	Air Cleaner Element Left Bank (Bank 2)
3	Mass Airflow Bank 2 Sensor 1/Intake Air Temperature Bank 2 Sensor 1 Sensor (MAF21/IAT21)
4	Turbocharger Boost Pressure/Charger Air Cooler Temperature (TCBP/CACT) Sensor
5	Throttle Body
6	Turbocharger Intake Pressure And Temperature (TCIPT) Sensor
7	Mass Airflow/Intake Air Temperature Sensor (MAF/IAT)
8	Air Cleaner Element Right Bank (Bank 1)
9	Charge Air Cooler (CAC) Right Bank (Bank 1)
10	Turbocharger Bypass Valve Right Bank (TCBY) (Bank 1)
11	Turbocharger Right Bank (Bank 1)
12	Wastegate Right Bank (Bank 1)
13	Manifold Absolute Pressure/Intake Air Temperature 2 (MAP/IAT2) Sensor
14	Turbocharger Left Bank (Bank 2)
15	Wastegate Left Bank (Bank 2)
16	Turbocharger Bypass Valve Left Bank (TCBY2) (Bank 2)

Throttle Body System Overview

The throttle body system meters air to the engine during idle, part throttle, and wide open throttle (WOT) conditions. The throttle body system consists of single or dual bores with butterfly valve throttle plates and a throttle position (TP) sensor.

The major components of the throttle body assembly include the TP sensor and the throttle body housing assembly. For additional information on the intake air system components, refer to [Engine Control Components](#) in this section.

Features Of The Throttle Body Assembly Include:

1. A preset stop to locate the WOT position.
2. A throttle body mounted TP sensor.
3. A coating sealant on the throttle bore and throttle plate makes the throttle body airflow tolerant to engine intake sludge accumulation. Some vehicles have a decal advising not to clean.
4. A non adjustable stop screw for close plate idle airflow.

Intake Manifold Runner Control (IMRC) And Intake Manifold Tuning Valve (IMTV)

 **WARNING: Substantial opening and closing torque is applied by this system. To prevent injury, be careful to keep fingers away from lever mechanisms when actuated. Failure to follow these instructions may result in personal injury.**

There are 2 basic types of intake air subsystems:

- IMRC
- IMTV

There are several different styles of hardware used to control airflow within the engine air intake system. In general, the devices are defined based on whether they control charge motion or manifold tuning.

The IMRC modifies the air charge motion in the intake manifold. The IMRC is located at the rear of the intake manifold. The IMRC system must have a monitor feedback system in order to meet OBD II regulations.

The IMTV modifies the airflow volume of the manifold by connecting multiple plenums or inlets within the intake manifold. The IMTV control valve is located in the center of the intake manifold. The IMTV system does not have to be monitored for OBD II regulations.

These subsystems provide increased intake airflow to improve torque, emissions and performance. The overall volume of air metered to the engine is controlled by the throttle body.

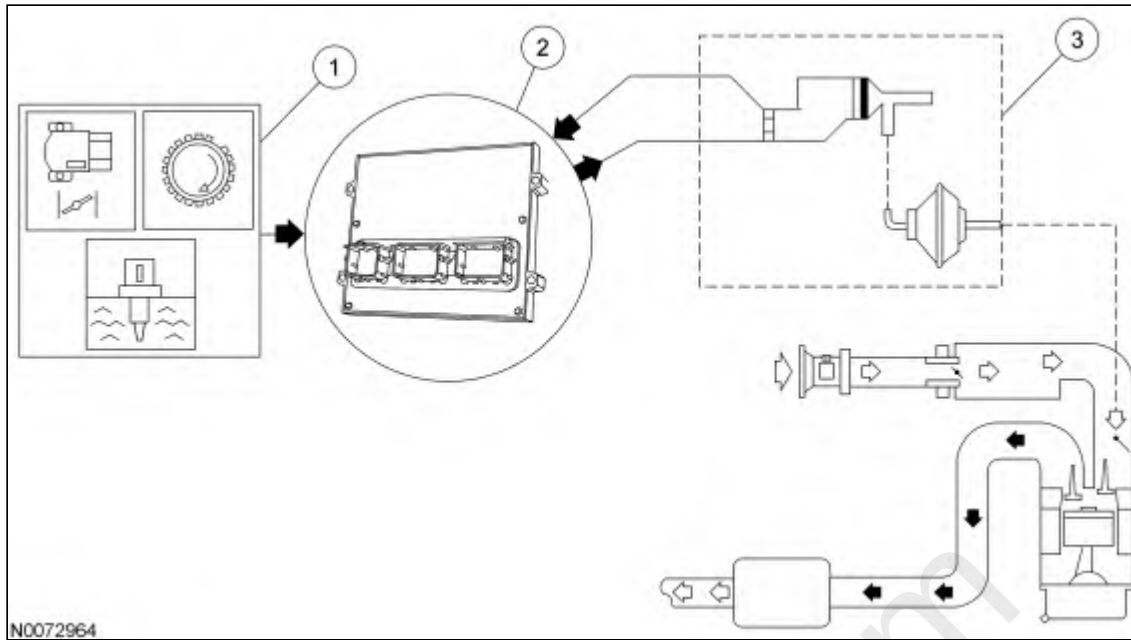
Intake Manifold Runner Control (IMRC) System

 **WARNING: Substantial opening and closing torque is applied by this system. To prevent injury, be careful to keep fingers away from lever mechanisms when actuated. Failure to follow these instructions may result in personal injury.**

The IMRC system consists of a manifold mounted vacuum actuator and a PCM controlled electric solenoid. For additional information on IMRC vacuum actuated components, refer to [Engine Control Components](#) in this section. The linkage from the actuator attaches to the manifold plate lever. The IMRC vacuum actuator and manifold has a single intake air passage for each cylinder. The passage has a valve plate that blocks a large percentage of the opening when actuated, leaving the top of the passage open to generate turbulence. The housing uses a return spring to hold the valve plates open. The IMRC sensors provide feedback to the PCM indicating the valve plate position.

1. The PCM monitors the TP sensor, cylinder head temperature (CHT) sensor, and CKP sensor signals to determine activation of the IMRC system. There must be a positive change in voltage from the TP sensor along with the increase in RPM at the correct engine temperature to open the IMRC valve plates.
2. The PCM uses the information from the input signals to control the IMRC solenoid based upon changes in the throttle position, the engine temperature, and the RPM.

3. The PCM energizes the IMRC solenoid with the ignition ON and the engine running. Vacuum is then applied to the actuator to pull the valve plates closed.



IMRC Vacuum Actuated System

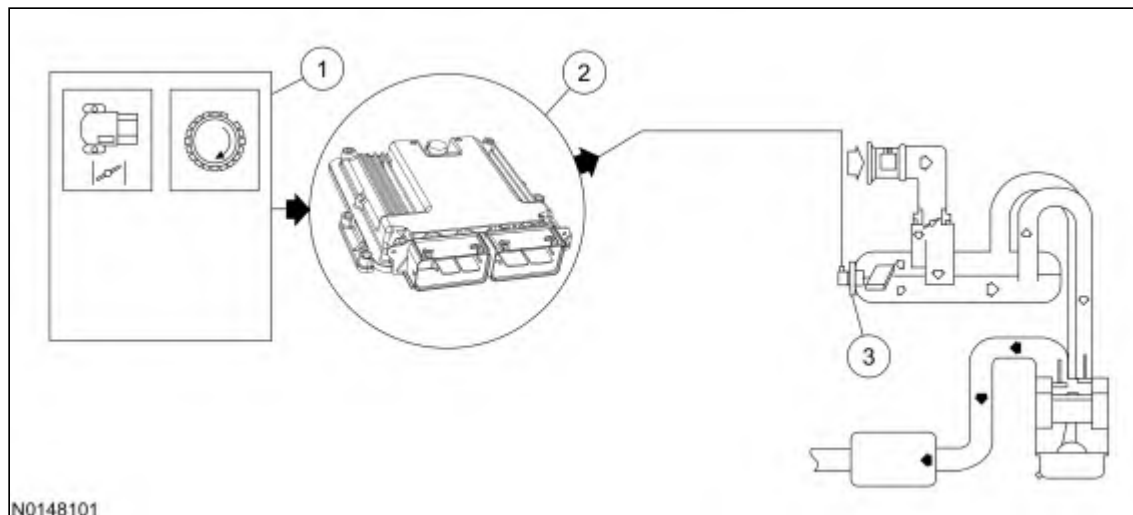
Intake Manifold Tuning Valve (IMTV) System

⚠ WARNING: Substantial opening and closing torque is applied by this system. To prevent injury, be careful to keep fingers away from lever mechanisms when actuated. Failure to follow these instructions may result in personal injury.

The IMTV is a motorized actuated unit mounted directly to the intake manifold. For additional information on IMTV components, refer to [Engine Control Components](#) in this section.

The motorized IMTV unit is disabled below a calibrated RPM. The shutter is in the closed position preventing airflow blend in the intake manifold. Above a calibrated RPM the motorized unit is enabled. The motorized unit is initially commanded ON by the PCM at a 100 percent duty cycle to move the shutter to the open position, and then falling to approximately 50 percent to continue to hold the shutter open.

1. The PCM uses the TP sensor and CKP sensor signals to determine activation of the IMTV system. There must be a positive change in voltage from the TP sensor along with the increase in RPM to open the shutter.
2. The PCM uses the information from the input signals to control the IMTV.
3. When commanded ON by the PCM, the motorized actuator shutter opens up the end of the vertical separating wall at high engine speeds to allow both sides of the manifold to blend together.



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IMTV

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