

3. Air Line (AT Vehicles)

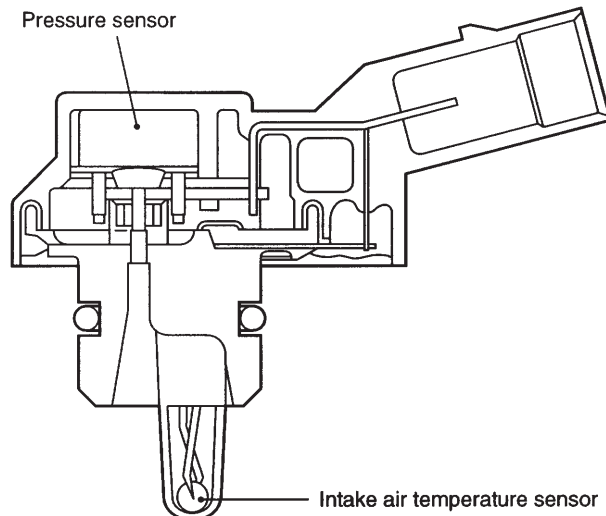
A: GENERAL

Air which is drawn in and filtered by the air cleaner is metered and sent to the throttle body. From the throttle body, the air is regulated by the open-close operation of the throttle valve and is delivered to the intake manifold. It is then distributed to the respective cylinders to mix with fuel injected by the fuel injectors. Thus, the air-fuel mixture is delivered into the cylinder. Part of the air branched at the upstream of the throttle body is sent to the idle air control solenoid valve which regulates engine idle speed.

B: PRESSURE SENSOR

- The pressure sensor is of the type that is made integral with an intake air temperature sensor and is mounted on the intake manifold to measure the absolute air pressure in the intake manifold as well as its temperature.

The measured pressure and temperature of the air is then converted into electrical signals and sent to the ECM. The ECM uses those signals from the sensor to control injection and ignition timing as well as the fuel injection amount.

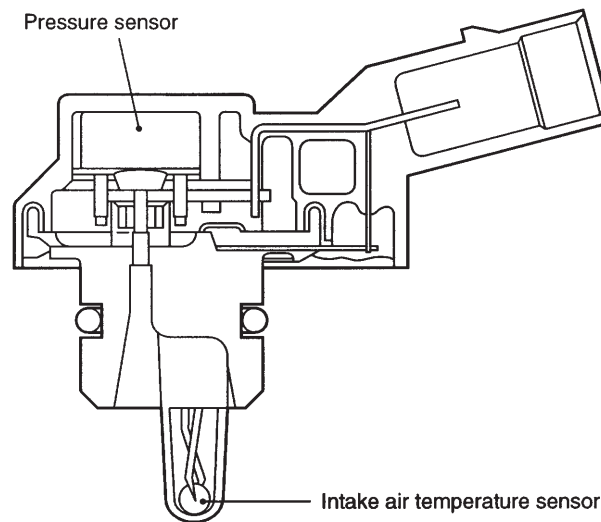


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MECHANISM AND FUNCTION**[M3C0] 2-7**
3. Air Line (AT Vehicles)**C: INTAKE AIR TEMPERATURE SENSOR**

- The intake air temperature sensor is of the type that is made integral with a pressure sensor and is mounted on the intake manifold to measure the temperature of the intake air introduced through the air intake duct as well as its pressure.

The measured temperature and pressure of the air is then converted into electrical signals and sent to the ECM. The ECM uses those signals from the sensor to control the fuel injection amount as well as injection and ignition timing.



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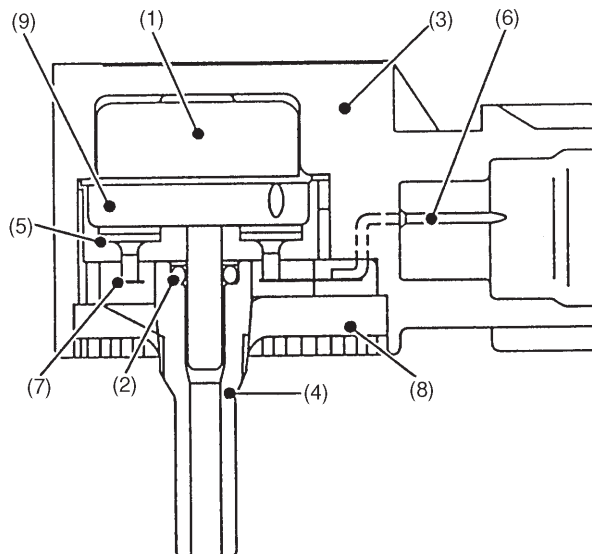
2-7 [M3D0]

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MECHANISM AND FUNCTION

D: ATMOSPHERIC PRESSURE SENSOR

The atmospheric pressure sensor receives the atmospheric pressure, converts the pressure values into signals, and sends the signals to ECM.



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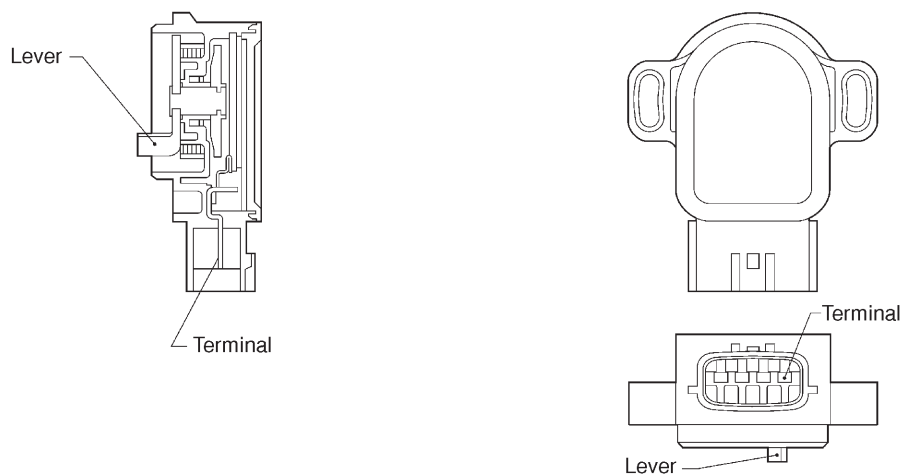
- | | |
|----------------------|----------------|
| (1) Sensor unit | (6) Terminal |
| (2) O-ring | (7) Inner lead |
| (3) Case | (8) Resin |
| (4) Pipe | (9) Metal lid |
| (5) Through capacity | |

E: THROTTLE BODY

- In response to the depressing stroke of the throttle pedal, the throttle body opens/closes its valve to regulate the air volume to be taken in the combustion chamber.
- During idling, the throttle valve is almost fully closed and the air flow through the throttle body is less than that passing through the carburetor.
- More than half of the air necessary for idling is supplied to the intake manifold via the idle air control solenoid valve.
- And the idle air control solenoid valve properly controls the engine idle speed, so it does not need to be adjusted.

F: THROTTLE POSITION SENSOR

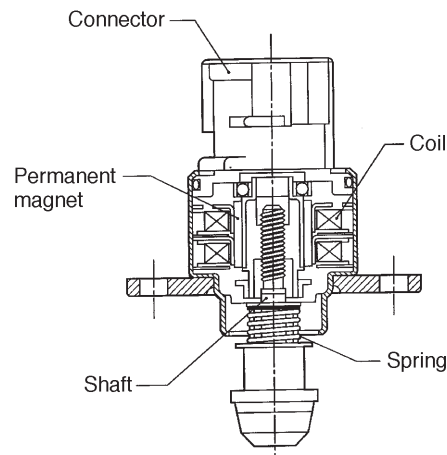
- A throttle position sensor is provided with a potentiometer which is interlocked with the throttle valve shaft.
- This throttle position sensor sends the ECM a potentiometer output signal corresponding to the opening of the throttle valve. When the level of this signal exceeds a predetermined value, the ECM interprets it as complete closure of the throttle valve and makes a control most suitable for the engine operation with the throttle valve fully closed. For correcting error of this signal, the ECM is provided with a learning function.
- Thus, the ECM precisely controls the air-fuel ratio during acceleration and deceleration as well as engine idling.



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G: IDLE AIR CONTROL SOLENOID VALVE

- The idle air control solenoid valve is incorporated in the throttle body and regulates the amount of intake air which bypasses the throttle valve built into the throttle body. It is activated by a signal sent from the ECM to mainly maintain engine idle speed to the target engine speed.
- The idle air control solenoid valve is a “stepping motor” type solenoid valve which consists of coils, shaft, permanent magnet, spring and housing. The housing is integral with the throttle body.
- In stepping motor type air control solenoid valve, current flows sequentially through a series of paired coils which are arranged face to face with the shaft between, while alternating the polarity for each pair of coils.
- The shaft is provided with threads at the rear end around which permanent magnets are arranged.
- As current flows through a series of paired coils sequentially while alternating the polarity, the N and S poles of the permanent magnets of the shaft end are repelled by the same poles of the coils, which causes the shaft to turn. The shaft, provided with threads, goes upward or downward like a screw when it is turned.
- This upward and downward motions of the shaft open or close the valve port, adjusting the amount of bypass air.
- The shaft changes its turning direction when the current flowing direction is reversed.

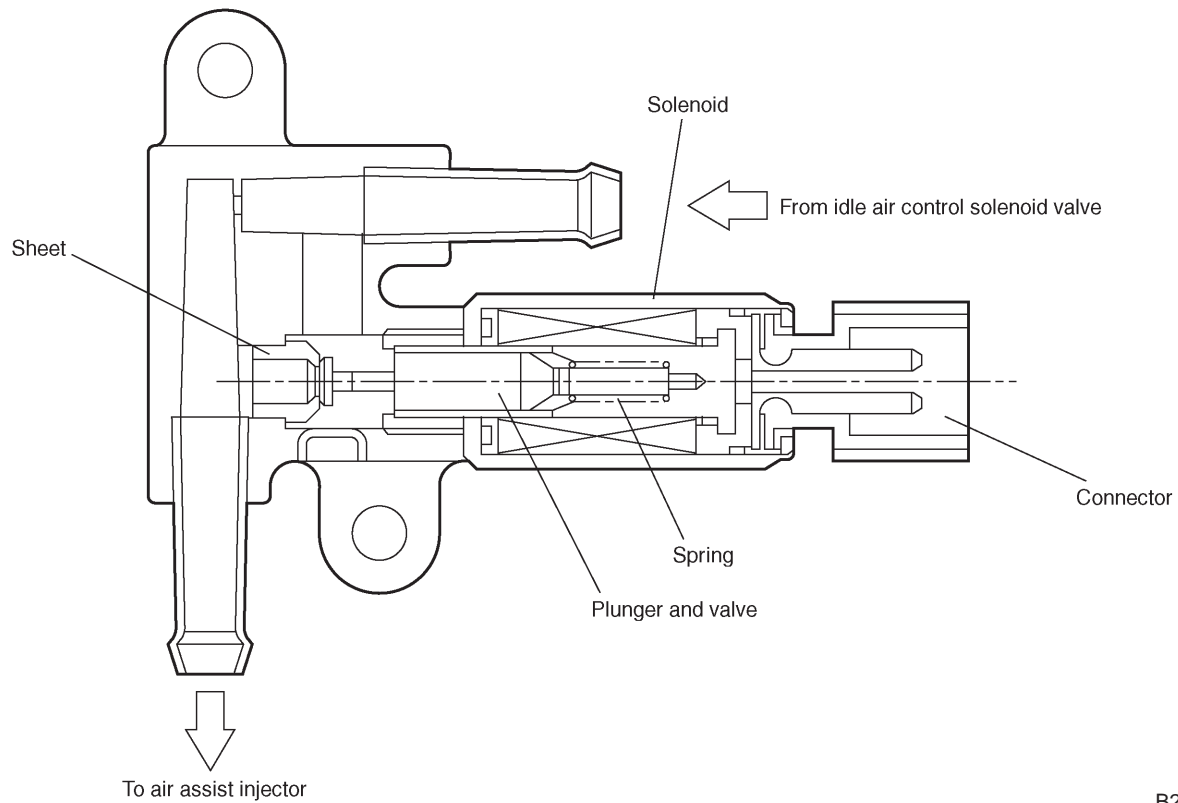


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H: AIR ASSIST INJECTOR SOLENOID VALVE

The air assist injector solenoid valve is located in the piping between the throttle body and the air assist injector and secured on the intake manifold.

This solenoid valve is opened or closed according to signals from ECU, adjusting the air flow rate supplied to the air assist injector.



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