

IDLE AIR CONTROL (IAC) OPERATION [LF]

B3E014018881T09

Determination of IAC valve energization time

- The PCM determines the duty signal sent to the IAC valve that corresponds to the calculated intake air amount (IAC target air amount) necessary to regulate idle speed.
- The IAC valve receives the duty signal from the PCM which moves the plunger, and by adjusting the surface area of the opening, the idle speed is controlled to the target speed.
- When the ignition switch is turned to the ON position, the energization time of the IAC valve is fixed at the minimum value and the IAC valve closes.
- When the engine is being cranked, the energization time of the IAC valve is set to the engine coolant temperature and the valve opens as much as the set value.

IAC target airflow amount

- The target IAC airflow amount is the estimated value of intake air amount that does not pass through the IAC valve (airflow amount flowing from the gap in the throttle valve) subtracted from the intake airflow amount required to regulate idling as calculated by the PCM (required mass).

Required volume airflow

- The required volume airflow is the calculated amount of intake airflow according to the change in intake airflow amount due to the difference in negative pressure that occurs before and after the throttle valve based on the target charging efficiency, and the change in intake air density occurring with the change in intake airflow temperature.

Target charging efficiency

- The target charging efficiency is the charging efficiency* required for the engine operation conditions.
 - The target charging efficiency is calculated by adding the corrections according to engine operation conditions to the basic charging efficiency determined by the engine coolant temperature.
- * : The charging efficiency is the ratio of the actual amount of intake air to the maximum air charging amount of the cylinder mass. This value is large in proportion to the increase in engine load.

Correction	Target	Conditions	Correction amount
A/C load correction	Prevents decrease in idle speed due to A/C operation.	A/C is operating.	A/C operation time→correction
Electrical load correction	Prevents decrease in idle speed due to electrical load operation.	Idle speed during electrical load operation and under any condition during driving	High electrical load→large correction
D-range correction (ATX)	Prevents decrease in idle speed due to shifting into D-range	D-range signal is input.	Low idle speed when shifted to D range→large correction
Dashpot correction	Prevents decrease in idle speed due to insufficient intake air amount during deceleration.	Decelerated	High engine speed→large correction
Correction at engine start	Prevents decrease in idle speed after engine start.	After cranking and engine start	Low ECT→large correction
Hot engine	Prevents decrease in idle speed	Just after cranking and engine start when the ECT is 60 °C	High intake airflow

restart correction	from hot engine restart.	{140 °F} or more the IAT is 50 °C {122 °F} or more	temperature→large correction
Feedback correction A	Sets idle speed to target engine speed.	Idle speed during idling (vehicle is stopped) is over or under the target engine speed (except during test mode when the engine speed is 300 rpm or less).	Actual idle speed Target engine speed or less→volume increase correction Target engine speed or more→volume decrease correction
Feedback correction B	Sets to the target engine speed when the idle speed has decreased in the range not corrected by feedback correction A, and prevents a decrease in idle speed.	At fully closed throttle, the engine speed is the target engine speed or more and when the feedback correction A is not performed (except during test mode).	Large difference between actual idle speed and target engine speed→large correction
Learning correction	Stores intake air volume changes based on differences between engines and changes due to aged deterioration, and feedback.	During feedback correction A when ECT is 85 °C {185 °F} or more .	During idling→average value of feedback correction A

Target idle speed

- The target idle speed for various engine operation conditions are as follows:

Standard

Condition	Engine speed (rpm)*1		
	MTX	ATX	
	Neutral position	N range	D range
No load	600-700	650-750	600-700
Electrical loads*2 ON (38-48A)	650-750	650-750	600-700
Electrical loads*2 ON (Above 48A)	700-800	700-800	670-770
A/C ON and refrigerant pressure switch (middle) OFF	700-800	650-750	650-750
A/C ON and refrigerant pressure switch (middle) ON	700-800	750-850	750-850

*1 : Excludes temporary idle speed drop just after the electrical loads are turned on.

*2 : Alternator generating current value.

Inhibition condition

- If the IAC valve is damaged (when DTC P0511 is detected), power to the IAC valve is cut (IAC valve closes) preventing a sudden increase in engine speed.