

## GROUP 13A

# MULTIPOINT FUEL SYSTEM (MFI)

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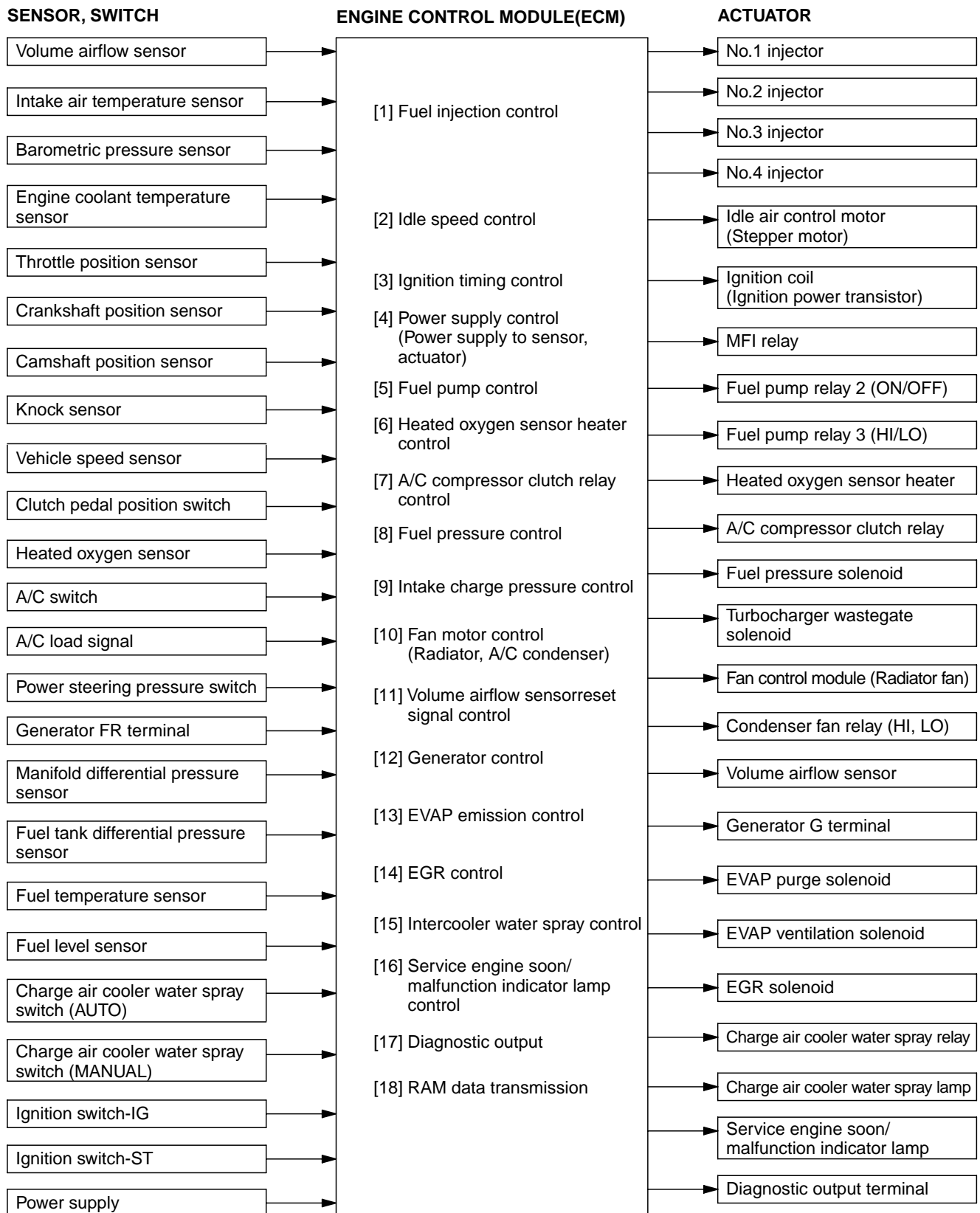
**GENERAL DESCRIPTION**

M2132000100172

The control functions are basically the same as those for the 2.0-liter turbocharged engine of the previous ECLIPSE (D32A, D33A). In addition to the improvements already adopted on the 2.4-liter engine of the ECLIPSE (D52A), the following improvements have been made:

<b>IMPROVEMENT/ADDITION</b>	<b>REMARK</b>
Clutch pedal position switch	Reduces the amount of hydrocarbon (HC) discharge by making fuel injection volume corrections during shift changes.
Charge air cooler water spray control	Improves output performance during high-load operating conditions by spraying water on the charge air cooler, which cools the intake air (if the AUTO mode is selected).
Fuel pump discharge volume switching control	Reduces the discharge of fuel vapors when the load on the engine is low by decreasing the fuel pump speed, which decreases the fuel return volume. (This function is basically the same as for the 3.0-liter turbocharged engine of the 3000GT.)
Fuel level sensor 2	Along with the adoption of the saddle type fuel tank, a fuel level sensor is provided in each of the main and sub chambers of the fuel tank. The engine control module (ECM) determines individually whether fuel level sensor 1 or fuel level sensor 2 has become stuck.

SYSTEM BLOCK DIAGRAM



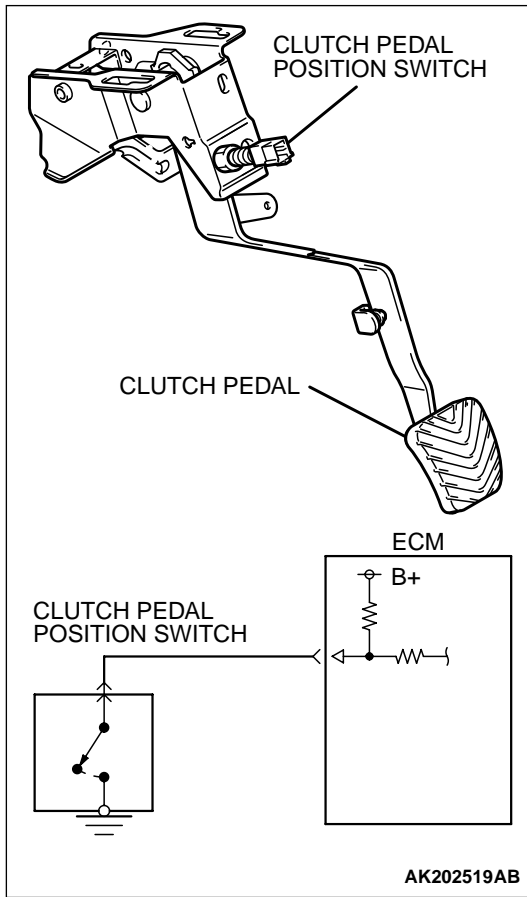
# SENSOR

M2132001000101

## CLUTCH PEDAL POSITION SWITCH

The clutch pedal position switch is a contact type switch that is mounted on the clutch pedal assembly to detect the pressing of the clutch pedal.

When the driver presses the clutch pedal while shifting gears, the contacts of the clutch pedal position switch close. This causes the positive battery voltage applied by the engine control module (ECM) to be grounded to the body via the clutch pedal assembly. Upon detecting this signal, the ECM makes fuel injection volume corrections during a shift change, thus reducing the discharge of hydrocarbon (HC) emissions associated with insufficient release of the accelerator pedal.



## FUEL INJECTION CONTROL

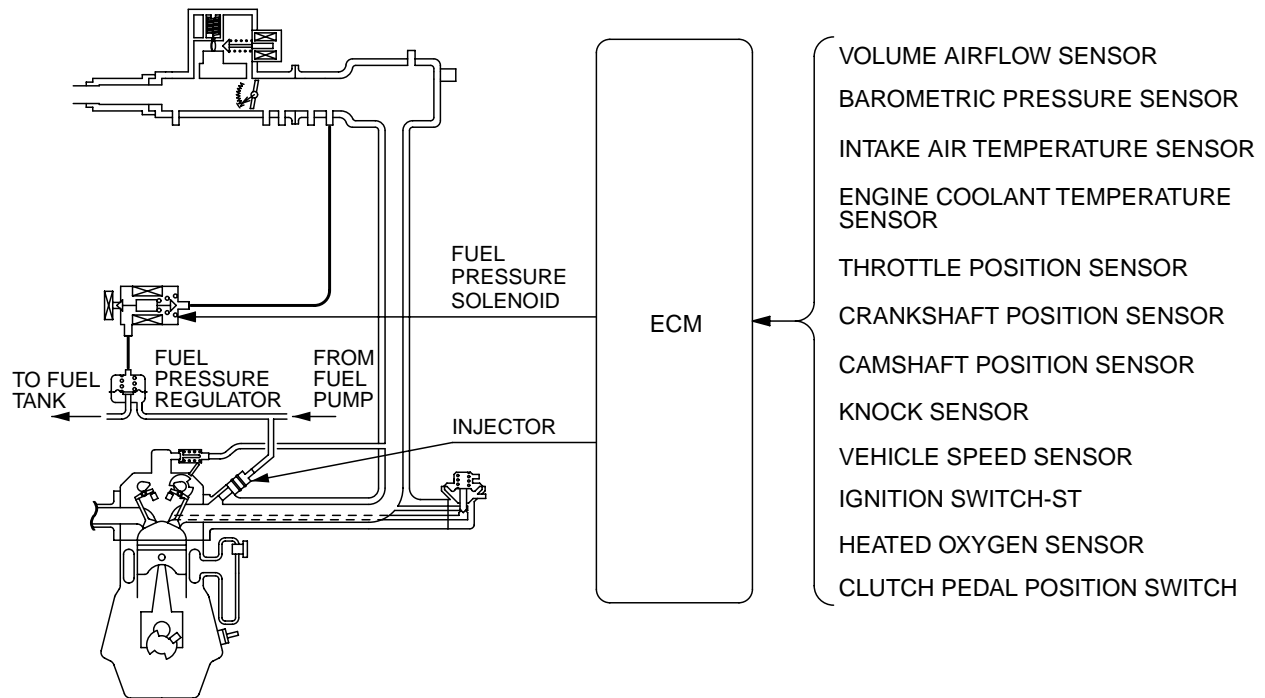
M2132003000130

The fuel injection control is basically the same as that for the 2.0-liter turbocharged engine installed on the previous ECLIPSE.

A clutch pedal position switch has been newly added to provide fuel correction control during shift changes.

When the driver presses the clutch pedal while shifting gears, this control changes the fuel injection volume for a predetermined length of time after the verification time has elapsed.

### System Configuration Diagram



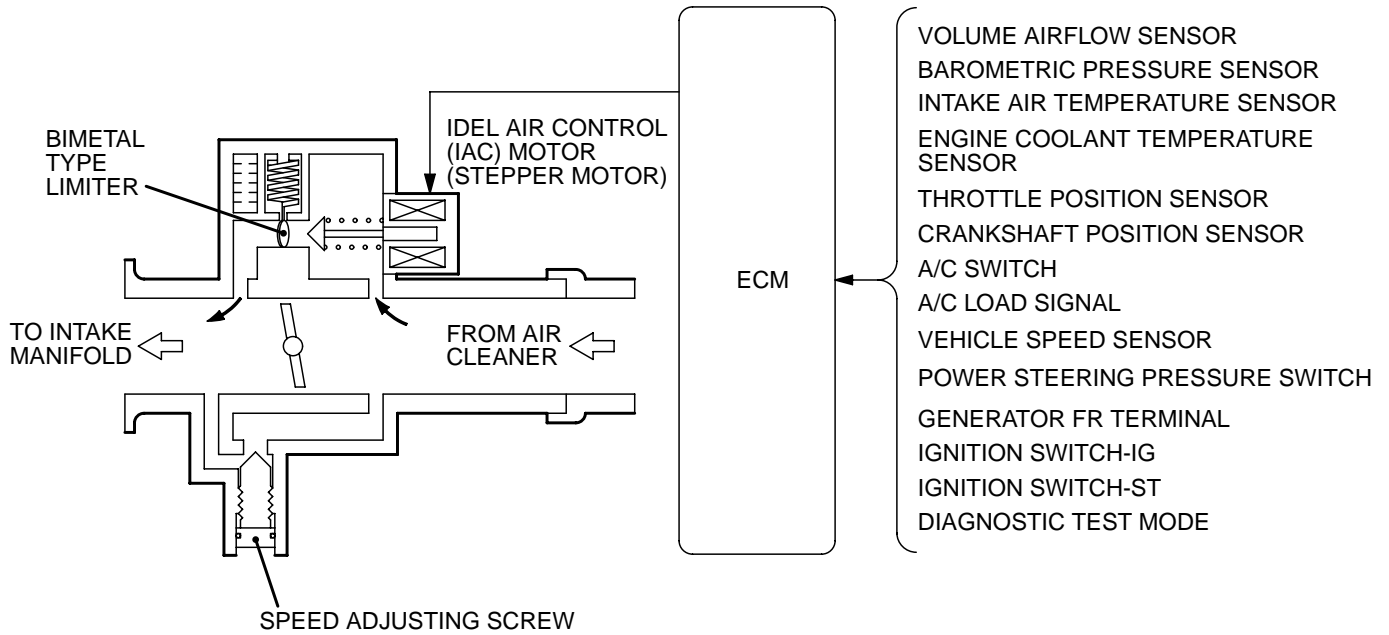
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# IDLE AIR CONTROL (IAC)

M2132004000133

The idle air control is basically the same as that for the 2.4L engine installed in the ECLIPSE.

## System Configuration Diagram



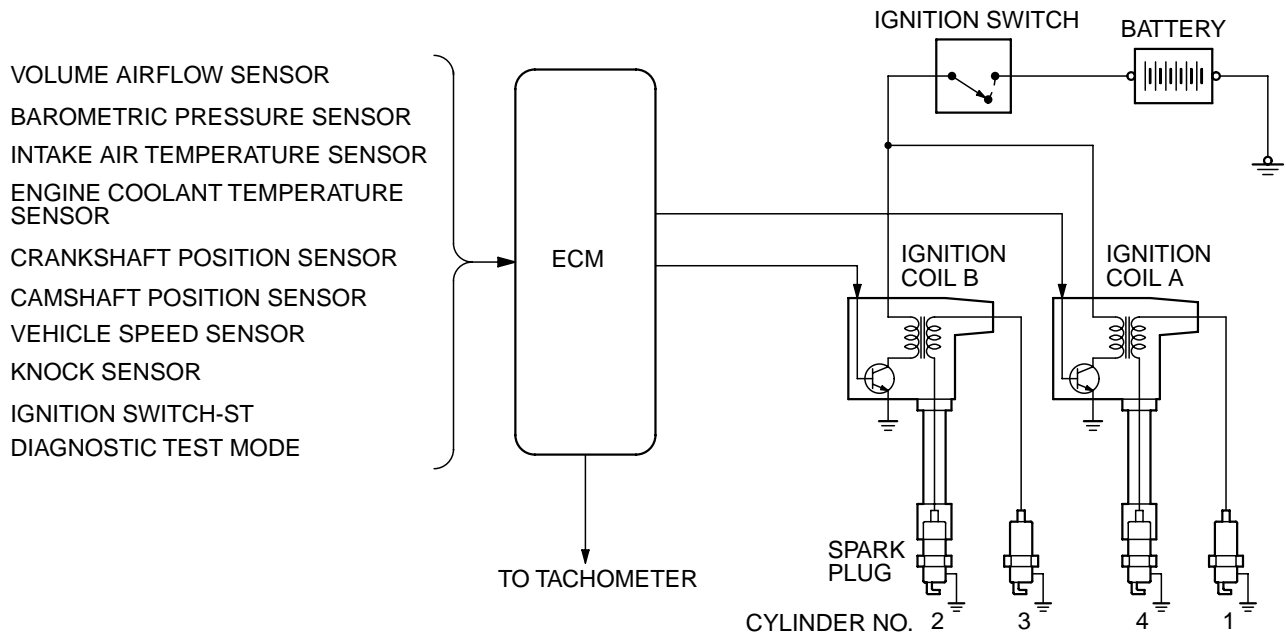
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# IGNITION TIMING AND DISTRIBUTION CONTROL

M2132005000136

The ignition timing and distribution control is basically the same as that for the 2.4L engine installed in the ECLIPSE.

## System Configuration Diagram

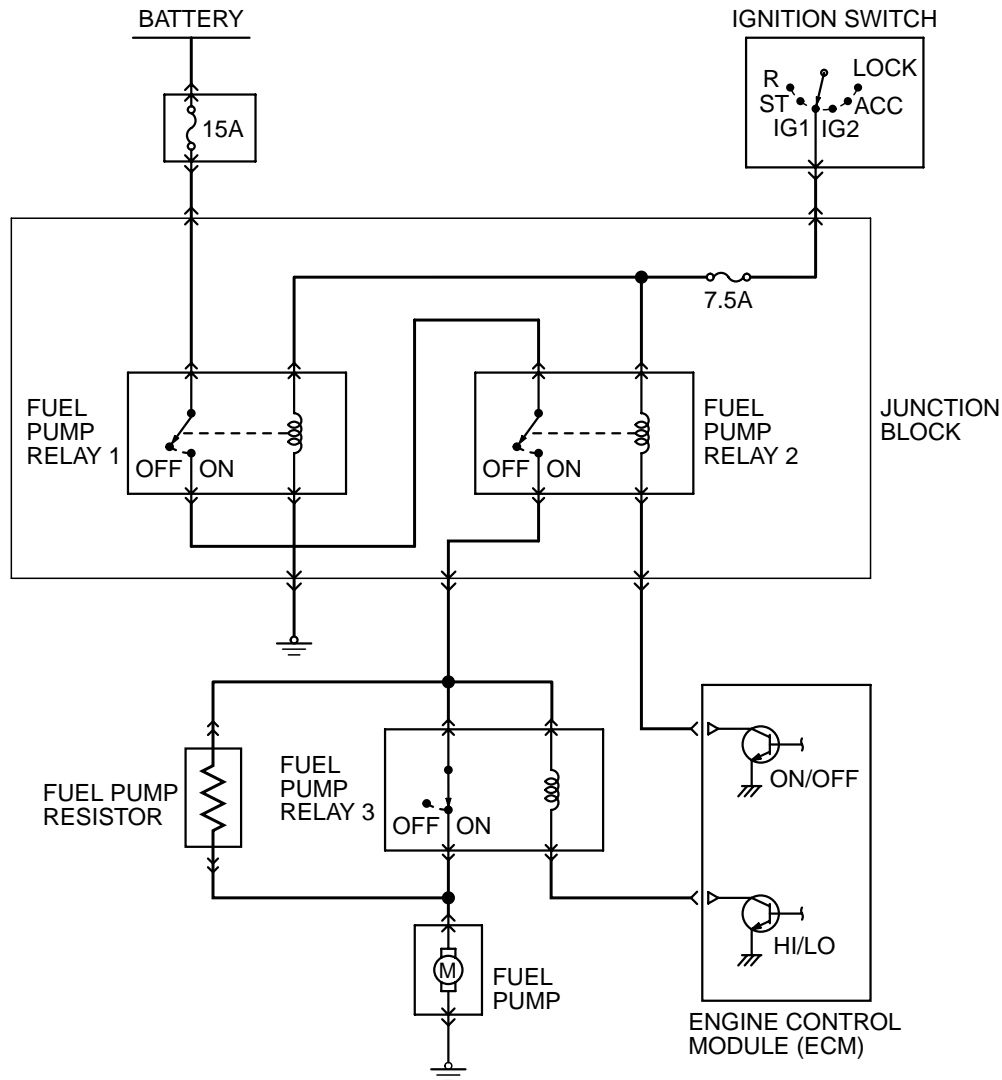


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## FUEL PUMP CONTROL

M2132017500019

- A relay circuit has been added in order to supply the power for actuating the fuel pump directly from the battery. This system is the same as the one used on the 2.0L engine (4G94) of the Lancer.
- A control function has been added to change the fuel discharge volume of the fuel pump in two stages in accordance with the engine load. When the load on the engine is low if the fuel consumption volume is also low, this control actuates the fuel pump at a lower speed. As a result, the fuel return volume decreases, reducing the discharge of fuel vapors.



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## DESCRIPTION OF FUEL DISCHARGE VOLUME CONTROL

When the load on the engine is low, the engine control module (ECM) turns the power transistor ON, which causes the current to flow through the coil of the fuel pump relay 3. Accordingly, the contacts of the relay open, causing the current to the fuel pump to flow via the fuel pump resistor. Because the resistor drops the voltage of the current, the supply voltage to the fuel pump decreases. As a result, the pump speed decreases, thus reducing the fuel discharge volume of the fuel pump.

When the load on the engine is higher than the prescribed value, the ECM turns OFF the power transistor, which causes the contacts in fuel pump relay 3 to close. This eliminates the voltage drop by the resistor. As a result, the pump speed increases, thus increasing the fuel discharge volume of the fuel pump.



## FAN MOTOR CONTROL

M2132008000061

To control the radiator fan motor, the same stepless control system with pulse wide modulation (PWM) that is used on the 2.4-liter engine of the ECLIPSE (D52A), has been adopted.

To control the condenser fan motor, the same two-stage control system with two relays that is used on the 2.0-liter turbocharged engine of the previous ECLIPSE (D32A, D33A), has been adopted.

## FUEL PRESSURE CONTROL, INTAKE CHARGE PRESSURE CONTROL

M2132018000017

These controls are basically the same as those on the 2.0-liter turbocharged engine of the previous ECLIPSE (D32A, D33A).

## CHARGE AIR COOLER WATER SPRAY CONTROL

M2132018500012

When the charge air cooler water spray switch is turned ON in the AUTO mode and the engine is operating at high load conditions, the ECM turns the charge air cooler spray relay ON to spray water on the charge air cooler and illuminates the charge air cooler spray lamp on the combination meter.

When the charge air cooler water spray switch is pressed in the MANUAL mode, the ECM turns ON the charge air cooler spray relay.

For further details on the charge air cooler water spray system, refer to GROUP15 - Air Intake System - Charge Air Cooler Water Spray [P.15-3](#).

## OTHER CONTROL FUNCTIONS

M2132010000110

The following control items are basically the same as those on the 2.4-liter engine of the ECLIPSE (D52A):

- Power supply control
- Heated oxygen sensor heater control
- A/C compressor clutch relay control
- Volume airflow sensor reset signal control
- Generator control
- EVAP emission control
- EGR control

**ON-BOARD DIAGNOSTICS**

M2132009000138

The powertrain control module (PCM) has been provided with the following functions for easier system inspection.

**Diagnostic Trouble Code (DTC) and Service Engine Soon/Malfunction Indicator Lamp (MIL) Function**

The diagnostic trouble code (DTC) and service engine soon/malfunction indicator lamp MIL items are shown in the following table.

<b>DTC</b>	<b>DIAGNOSTIC ITEM</b>	<b>MIL ITEM</b>
–	Engine control module (ECM) malfunction	×
P0090	Fuel pressure solenoid circuit	×
P0101	Volume airflow circuit range/performance problem	×
P0102	Volume airflow circuit low input	×
P0106	Barometric pressure circuit range/performance problem	×
P0107	Barometric pressure circuit low input	×
P0108	Barometric pressure circuit high input	×
P0111	Intake air temperature circuit range/performance problem	×
P0112	Intake air temperature circuit low input	×
P0113	Intake air temperature circuit high input	×
P0116	Engine coolant temperature circuit range/performance problem	×
P0117	Engine coolant temperature circuit low input	×
P0118	Engine coolant temperature circuit high input	×
P0121	Throttle position sensor circuit range/performance problem	×
P0122	Throttle position sensor circuit low input	×
P0123	Throttle position sensor circuit high input	×
P0125	Insufficient coolant temperature for closed loop fuel control	×
P0128	Coolant thermostat (Coolant temperature below thermostat regulating temperature)	×
P0130	Heated oxygen sensor circuit (sensor 1)	×
P0131	Heated oxygen sensor circuit low voltage (sensor 1)	×
P0132	Heated oxygen sensor circuit high voltage (sensor 1)	×
P0133	Heated oxygen sensor circuit slow response (sensor 1)	×
P0134	Heated oxygen sensor circuit no activity detected (sensor 1)	×
P0135	Heated oxygen sensor heater circuit (sensor 1)	×
P0136	Heated oxygen sensor circuit (sensor 2)	×
P0137	Heated oxygen sensor circuit low voltage (sensor 2)	×
P0138	Heated oxygen sensor circuit high voltage (sensor 2)	×
P0139	Heated oxygen sensor circuit slow response (sensor 2)	×
P0141	Heated oxygen sensor heater circuit (sensor 2)	×
P0171	System too lean	×

<b>DTC</b>	<b>DIAGNOSTIC ITEM</b>	<b>MIL ITEM</b>
P0172	System too rich	×
P0181	Fuel tank temperature sensor circuit range/performance	×
P0182	Fuel tank temperature sensor circuit low input	×
P0183	Fuel tank temperature sensor circuit high input	×
P0201	Injector circuit – Cylinder 1	×
P0202	Injector circuit – Cylinder 2	×
P0203	Injector circuit – Cylinder 3	×
P0204	Injector circuit – Cylinder 4	×
P0234	Turbocharger wastegate actuator malfunction	×
P0243	Turbocharger wastegate solenoid circuit	×
P0300	Random/multiple cylinder misfire detected	×
P0301	Cylinder 1 misfire detected	×
P0302	Cylinder 2 misfire detected	×
P0303	Cylinder 3 misfire detected	×
P0304	Cylinder 4 misfire detected	×
P0325	Knock sensor circuit	×
P0335	Crankshaft position sensor circuit	×
P0340	Camshaft position sensor circuit	×
P0401	Exhaust gas recirculation flow insufficient detected	×
P0403	Exhaust gas recirculation control circuit	×
P0420	Catalyst efficiency below threshold	×
P0441	Evaporative emission system incorrect purge flow	×
P0442	Evaporative emission system leak detected (Small leak)	×
P0443	Evaporative emission system purge control valve circuit	×
P0446	Evaporative emission system vent control circuit	×
P0451	Evaporative emission system pressure sensor range/performance	×
P0452	Evaporative emission system pressure sensor low input	×
P0453	Evaporative emission system pressure sensor high input	×
P0455	Evaporative emission system leak detected (Gross leak)	×
P0456	Evaporative emission system leak detected (Very small leak)	×
P0461	Fuel level sensor circuit range/performance (sensor 1)	×
P0500	Vehicle speed sensor	×
P0506	Idle control system RPM lower than expected	×
P0507	Idle control system RPM higher than expected	×
P0551	Power steering pressure sensor circuit range/performance	×
P0554	Power steering pressure sensor circuit intermittent	×
P0622	Generator field FR terminal circuit malfunction	×

DTC	DIAGNOSTIC ITEM	MIL ITEM
P0830	Clutch pedal position switch circuit range/ performance	–
P1400	Manifold differential pressure sensor circuit malfunction	×
P1603	Battery backup circuit malfunction	×
P2066	Fuel level sensor circuit range/performance (sensor 2)	×
P2263	Intake charge system malfunction	–

### Data List Function

The data list items are shown in the following table.

*NOTE: Data list items consist of MUT-II/III items and GST items. GST items can be accessed through the use of a general scan tool.*

*NOTE: When MUT-II/III is used, MUT-II/III items appear alphabetically; then, GST items appear alphabetically. The black and white characters of the GST items are inverted from the MUT-II/III items.*

### MUT-II/III Item

MUT-II/III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	UNIT
A/C RELAY	49	A/C compressor clutch relay	ON/OFF
A/C SWITCH	28	A/C switch	ON/OFF
BARO SENSOR	25	Barometric pressure sensor	kPa (in.Hg)
BATT VOLTAGE	16	Power supply voltage	V
CKP SENSOR	22	Crankshaft position sensor	r/min
CRANK. SIGNAL	18	Cranking signal (ignition switch-ST)	ON/OFF
ECT SENSOR	21	Engine coolant temperature sensor	°C (°F)
FUEL TEMP	4A	Fuel tank temperature sensor	°C (°F)
HO2S BANK1 S1	11	Heated oxygen sensor (front)	mV
HO2S BANK1 S2	59	Heated oxygen sensor (rear)	mV
IAC VALVE POS	45	Idle air control (stepper) position	STEP
IAT SENSOR	13	Intake air temperature sensor	°C (°F)
IG. TIMING ADV	44	Ignition coils and ignition power transistor	°BTDC
INJECTOR	41	Injectors	mS
MDP SENSOR	95	Manifold differential pressure sensor	kPa (in.Hg)
PSP SWITCH	27	Power steering pressure switch	ON/OFF
TANK PRS. SNSR	73	Fuel tank differential pressure sensor	kPa (in.Hg)
TP SENSOR	14	Throttle position sensor	mV (%)
VAF SENSOR	12	Volume airflow sensor (mass airflow rate)	Hz (gm/s)

### GST Item

MUT-II/III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	UNIT
ECT SENSOR	21	Engine coolant temperature sensor	°C (°F)
ENGINE LOAD 2	87	Calculated load value	%
ENGINE SPEED	22	Crankshaft position sensor	r/min
HO2S BANK1 S1	A1	Heated oxygen sensor (front)	V

<b>MUT-II/III SCAN TOOL DISPLAY</b>	<b>ITEM NO.</b>	<b>INSPECTION ITEM</b>	<b>UNIT</b>
HO2S BANK1 S2	A2	Heated oxygen sensor (rear)	V
IAT SENSOR	13	Intake air temperature sensor	°C (°F)
IG. TIMING ADV	44	Ignition coils and ignition power transistor	°
LONG TRIM B1	81	Long-term fuel trim	%
SHORT TRIM B1	82	Short-term fuel trim	%
SYS. STATUS B1	88	Fuel system status	Closed loop/ Open circuit drive condition
TP SENSOR	8A	Throttle position sensor	V (%)
VAF SENSOR	12	Volume airflow sensor (mass airflow rate)	gm/s
VSS	24	Vehicle speed sensor	km/h (mph)

**Actuator Test Function**

The actuator test items are shown in the following table.

<b>MUT-II/III SCAN TOOL DISPLAY</b>	<b>ITEM NO.</b>	<b>INSPECTION ITEM</b>	<b>ACTIVATING CONTENT</b>
BASIC TIMING	17	Basic ignition timing	Set ignition timing adjustment mode
CONDEN.FAN.HI	37	Condenser fan Relay (HI)	Condenser fan motor operates at high speed
CONDEN.FAN.LO	38	Condenser fan Relay (LO)	Condenser fan motor operates at Low speed
EGR VACUUM REGULATOR SOLENOID VALVE	10	EGR vacuum regulator solenoid valve	Solenoid valve turns from OFF to ON
EVAP PURGE SOL	08	Evaporative emission purge solenoid	Solenoid valve turns from OFF to ON
EVAP VENT SOL	29	Evaporative emission ventilation solenoid	Solenoid valve turns from OFF to ON
FUEL PRSS SOL	09	Fuel pressure solenoid	Solenoid valve turns from OFF to ON
FUEL PUMP	07	Fuel pump	Fuel pump operates at low speed and fuel is recirculated
F/P SPD. CHANGE	13	Fuel pump relay 3	Fuel pump operates at high speed
NO. 1 INJECTOR	01	Injectors	Cut fuel to No. 1 injector
NO. 2 INJECTOR	02		Cut fuel to No. 2 injector
NO. 3 INJECTOR	03		Cut fuel to No. 3 injector
NO. 4 INJECTOR	04		Cut fuel to No. 4 injector
RADIAT. FAN LO	21	Fan control module	Drives the fan motor
TC TURBOCHARGER WASTEGATE	12	Turbocharger wastegate solenoid	Solenoid valve turns from OFF to ON

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## NOTES