



SYSTEM OUTLINE

THE ENGINE CONTROL SYSTEM UTILIZES A MICROCOMPUTER AND MAINTAINS OVERALL CONTROL OF THE ENGINE. AN OUTLINE OF ENGINE CONTROL IS GIVEN HERE.

1. INPUT SIGNALS

(1) ENGINE COOLANT TEMP. SIGNAL SYSTEM

THE ENGINE COOLANT TEMP. SENSOR DETECTS THE ENGINE COOLANT TEMP. AND HAS A BUILT-IN THERMISTOR WITH A RESISTANCE WHICH VARIES ACCORDING TO THE ENGINE COOLANT TEMP. THUS THE ENGINE COOLANT TEMP. IS INPUT AS A CONTROL SIGNAL TO **TERMINAL THW** OF THE ENGINE CONTROL MODULE.

(2) INTAKE AIR TEMP. SIGNAL SYSTEM

THE INTAKE AIR TEMP. SENSOR IS DETECTS THE INTAKE AIR TEMP., WHICH IS INPUT AS A CONTROL SIGNAL TO **TERMINAL THA** OF THE ENGINE CONTROL MODULE.

(3) OXYGEN SENSOR SIGNAL SYSTEM

THE HEATED OXYGEN DENSITY IN THE EXHAUST EMISSIONS IS DETECTS AND INPUT AS A CONTROL SIGNALS TO **TERMINALS OX1, OX2** OF THE ENGINE CONTROL MODULE.

(4) RPM SIGNAL SYSTEM

CRANKSHAFT POSITION IS DETECTED BY THE CRANKSHAFT POSITION SENSOR CRANKSHAFT POSITION IS INPUT AS A CONTROL SIGNAL TO **TERMINAL NE** OF THE ENGINE CONTROL MODULE.

(5) THROTTLE SIGNAL SYSTEM

THE THROTTLE POSITION SENSOR DETECTS THE THROTTLE VALVE OPENING ANGLE, WHICH IS INPUT AS A CONTROL SIGNAL TO **TERMINAL VTA** OF THE ENGINE CONTROL MODULE, OR WHEN THE VALVE IS FULLY CLOSED, TO **TERMIANL IDL**.

(6) VEHICLE SPEED SIGNAL SYSTEM

THE VEHICLE SPEED SENSOR INSTALLED INSIDE THE COMBINATION METER, DETECTS THE VEHICLE SPEED AND INPUTS A CONTROL SIGNAL TO **TERMINAL SPD** OF THE ENGINE CONTROL MODULE.

(7) PARK/NEUTRAL POSITION SW SIGNAL SYSTEM

THE PARK/NEUTRAL POSITION SW DETECTS WHETHER THE SHIFT POSITION IS IN NEUTRAL OR NOT, AND INPUTS A CONTROL SIGNAL TO **TERMIANL NSW** OF THE ENGINE CONTROL MODULE.

(8) A/C SIGNAL SYSTEM

THE OPERATING VOLTAGE OF THE A/C MAGNETIC CLUTCH IS DETECTED AND INPUT IN THE FORM OF A CONTROL SIGNAL TO **TERMINAL AC1** OF THE ENGINE CONTROL MODULE.

(9) BATTERY SIGNAL SYSTEM

VOLTAGE IS CONSTANTLY APPLIED TO **TERMINAL BATT** OF THE ENGINE CONTROL MODULE. WHEN THE IGNITION SW IS TURNED TO ON, VOLTAGE FOR ENGINE CONTROL MODULE OPERATION IS APPLIED VIA THE EFI RELAY TO **TERMINAL +B** OF THE ENGINE CONTROL MODULE.

(10) INTAKE AIR VOLUME SIGNAL SYSTEM

INTAKE AIR VOLUME IS DETECTED BY THE MANIFOLD ABSOLUTE PRESSURE SENSOR AND IS INPUT AS A CONTROL SIGNAL TO **TERMINAL PIM** OF THE ENGINE CONTROL MODULE.

(11) STARTER SIGNAL SYSTEM

TO CONFIRM THAT THE ENGINE IS CRANKING, THE VOLTAGE APPLIED TO THE STARTER MOTOR DURING CRANKING IS DETENTES AND IS INPUT AS A CONTROL SIGNAL TO **TERMINAL STA** OF THE ENGINE CONTROL MODULE.

2. CONTROL SYSTEM

* SFI SYSTEM

THE SFI SYSTEM MONITORS THE ENGINE CONDITION THROUGH THE SIGNALS, WHICH ARE INPUT FROM EACH SENSOR (INPUT SIGNALS FROM (1) TO (11) ETC.). THE BEST FUEL INJECTION VOLUME IS DECIDED BASED ON THIS DATA AND THE PROGRAM MEMORIZED BY THE ENGINE CONTROL MODULE, AND THE CONTROL SIGNAL IS OUTPUT TO **TERMINALS #10, #20, #30, AND #40** OF THE ENGINE CONTROL MODULE TO OPERATE THE INJECTOR (INJECT THE FUEL). THE SFI SYSTEM PRODUCES CONTROL OF FUEL INJECTION OPERATION BY THE ENGINE CONTROL MODULE IN RESPONSE TO THE DRIVING CONDITIONS.

DURING ENGINE CRANKING (SIGNAL INPUT TO **TERMINAL STA**) OR FOR APPROX. 2 SECONDS AFTER NE SIGNAL INPUT, ENGINE CONTROL MODULE OPERATION ENERGIZED (POINT CLOSED) THE FUEL PUMP CIRCUIT INSIDE THE CIRCUIT OPENING RELAY, CAUSING THE FUEL PUMP TO OPERATE.

* ESA SYSTEM

THE ESA SYSTEM MONITORS THE ENGINE REVOLUTIONS USING THE SIGNALS (INPUT SIGNALS (1, 4, 5, 10, 11)) INPUT TO THE ENGINE CONTROL MODULE FROM EACH SENSOR. BASED ON THIS DATA AND THE PROGRAM MEMORIZED IN THE ENGINE CONTROL MODULE, THE MOST APPROPRIATE IGNITION TIMING IS DECIDED AND CURRENT IS OUTPUT TO **TERMINAL IGT1 AND IGT2** OF THE ENGINE CONTROL MODULE. THIS OUTPUT CONTROLS THE IGNITER TO PRODUCE THE MOST APPROPRIATE IGNITION TIMING FOR THE DRIVING CONDITIONS.

* IDLE AIR CONTROL SYSTEM

THE IDLE AIR CONTROL SYSTEM INCREASES THE RPM AND PROVIDES IDLING STABILITY FOR FAST IDLE-UP WHEN THE ENGINE IS COLD AND WHEN THE IDLE SPEED HAS DROPPED DUE TO ELECTRICAL LOAD, ECT. THE ENGINE CONTROL MODULE EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1, 4, 5, 6, 7, 8)), OUTPUTS CURRENT TO **TERMINAL RSC AND RSO**, AND CONTROLS THE IDLE AIR CONTROL VALVE.

* A/C CUT CONTROL SYSTEM

WHEN THE VEHICLE SUDDENLY ACCELERATES FROM LOW ENGINE SPEED, THIS SYSTEM CUTS OFF AIR CONDITIONING OPERATION FOR A FIXED PERIOD OF TIME IN RESPONSE TO THE VEHICLE SPEED, THROTTLE VALVE OPENING ANGLE AND INTAKE MANIFOLD PRESSURE IN ORDER TO MAINTAIN ACCELERATION PERFORMANCE. THE ENGINE CONTROL MODULE RECEIVES INPUT SIGNALS (4, 5, 6, 7, AND 10), AND OUTPUTS SIGNALS TO **TERMINAL ACT**.

3. DIAGNOSIS SYSTEM

WITH THE DIAGNOSIS SYSTEM, WHEN THERE IS A MALFUNCTIONING IN THE ENGINE CONTROL MODULE SIGNAL SYSTEM, THE MALFUNCTION SYSTEM IS RECORDED IN THE MEMORY THE MALFUNCTIONING SYSTEM CAN THEN BE FOUND BY READING THE DISPLAY (CODE) OF THE MALFUNCTION INDICATOR LAMP.

4. FAIL-SAFE SYSTEM

WHEN A MALFUNCTIONING OCCURS IN ANY SYSTEM, IF THERE IS A POSSIBILITY OF ENGINE TROUBLE BEING CAUSED BY CONTINUED CONTROL BASED ON THE SIGNALS FROM THAT SYSTEM. THE FAIL-SAFE SYSTEM EITHER CONTROLS THE SYSTEM BY USING DATA (STANDARD VALUED) RECORDED IN THE ENGINE CONTROL MODULE MEMORY OR ELSE STOPS THE ENGINE.