

**Powertrain Control Module**

	Pin	Description and Characteristic
C	C98-A3	CAN +
C	C98-A4	CAN -
I	C98-C4	KNOCK SENSOR 2 SIGNAL: DIFFERENTIAL -ve. VOLTAGE DEPENDENT ON ENGINE VIBRATION
I	C98-D1	FRP SENSOR SIGNAL, NOMINAL 0 - 5 V: VOLTAGE INCREASES AS PRESSURE INCREASES
I	C98-D3	KNOCK SENSOR 2 SIGNAL: DIFFERENTIAL +ve. VOLTAGE DEPENDENT ON ENGINE VIBRATION
I	C98-D4	KNOCK SENSOR 1 SIGNAL: DIFFERENTIAL -ve. VOLTAGE DEPENDENT ON ENGINE VIBRATION
I	C98-E1	EGR THROTTLE POSITION SENSOR SIGNAL: NOMINAL 0 - 5 V
I	C98-E4	KNOCK SENSOR 1 SIGNAL: DIFFERENTIAL +ve. VOLTAGE DEPENDENT ON ENGINE VIBRATION
I	C98-F3	INERTIA SWITCH: NORMALLY CLOSED / OPEN CIRCUIT WHEN ACTIVATED
O	C98-H3	ROTARY ELECTRONIC ACTUATOR 1, VARIABLE VANE TURBO: PWM, 300 Hz
O	C98-H4	ROTARY ELECTRONIC ACTUATOR 2, VARIABLE VANE TURBO: PWM, 300 Hz
O	C98-K4	INLET PORT DEACTIVATION SOLENOID: PWM, 250 Hz
SG	C98-C3	CAN SHIELD: GROUND
SG	C98-E2	FRP SENSOR GROUND: GROUND
SG	C98-F2	EGR THROTTLE POSITION SENSOR GROUND: GROUND
SS	C98-D2	FRP SENSOR POWER SUPPLY: NOMINAL 5 V
SS	C98-F1	EGR THROTTLE POSITION SENSOR POWER SUPPLY: NOMINAL 5 V
I	C99-A2	EGR VALVE POSITION SENSOR 2: NOMINAL 0 - 5 V
I	C99-A3	EGR VALVE POSITION SENSOR 1: NOMINAL 0 - 5 V
I	C99-B1	ACT SENSOR SIGNAL: NOMINAL 0 - 5 V: NTC SENSOR - VOLTAGE DECREASES AS TEMPERATURE INCREASES
I	C99-B2	EFT SENSOR SIGNAL, NOMINAL 0 - 5 V: NTC SENSOR - VOLTAGE DECREASES AS TEMPERATURE INCREASES
I	C99-C1	MAP SENSOR SIGNAL, NOMINAL 0 - 5 V: VOLTAGE INCREASES AS MANIFOLD ABSOLUTE PRESSURE INCREASES
I	C99-C2	ECT SENSOR SIGNAL, NOMINAL 0 - 5 V: NTC SENSOR - VOLTAGE DECREASES AS TEMPERATURE INCREASES
I	C99-E1	EOT SENSOR SIGNAL, NOMINAL 0 - 5 V: NTC SENSOR - VOLTAGE DECREASES AS TEMPERATURE INCREASES
I	C99-F1	CKP SENSOR SIGNAL: PULSED SIGNAL, 70 PULSES PER ENGINE CYCLE
I	C99-F2	GENERATOR FAULT; CHARGE WARNING
I	C99-G4	CMP SENSOR SIGNAL: PULSED SIGNAL, 4 PULSES PER ENGINE CYCLE
O	C99-H1	EGR VALVE 1: +ve PWM
O	C99-H2	EGR VALVE 1: -ve PWM
O	C99-J1	EGR VALVE 2: +ve PWM
O	C99-J4	EGR THROTTLE MOTOR DRIVE: +ve PWM
O	C99-K1	EGR VALVE 2: -ve PWM
O	C99-K4	EGR THROTTLE MOTOR DRIVE: -ve PWM
SG	C99-G2	CKP SENSOR SIGNAL GROUND: GROUND
SG	C99-H3	CMP SENSOR GROUND: GROUND
SG*	C99-D2	EGR VALVE POSITION SENSOR 1 GROUND (EOT SENSOR): GROUND
SG*	C99-D2	EOT SENSOR GROUND (EGR VALVE POSITION SENSOR 1): GROUND
SG*	C99-E2	ECT SENSOR GROUND (MAP SENSOR): GROUND
SG*	C99-E2	MAP SENSOR GROUND (ECT SENSOR): GROUND
SG*	C99-G3	ACT SENSOR GROUND (EGR VALVE 2, EFT SENSOR): GROUND
SG*	C99-G3	EGR VALVE POSITION SENSOR 2 GROUND (ACT SENSOR, EFT SENSOR): GROUND
SG*	C99-G3	EFT SENSOR GROUND (ACT SENSOR, EGR VALVE POSITION SENSOR 2): GROUND
SS	C99-C3	EGR VALVE POSITION SENSORS POWER SUPPLY: NOMINAL 5 V
SS	C99-C3	EOT SENSOR POWER SUPPLY: NOMINAL 5 V
SS	C99-D1	MAP SENSOR POWER SUPPLY: NOMINAL 5 V
SS	C99-G1	CKP SENSOR POWER SUPPLY: NOMINAL 5 V
SS	C99-H4	CMP SENSOR POWER SUPPLY: NOMINAL 5 V
SG	FH13-A2	APP SENSOR SHIELD: GROUND
O	FH13-B1	STARTER RELAY DRIVE: TO ACTIVATE, PCM SWITCHES CIRCUIT TO GROUND
SG	FH13-B2	APP SENSOR 2 GROUND: GROUND
I	FH13-B4	SPEED CONTROL SWITCHES SIGNAL GROUND: GROUND
SG	FH13-C1	APP SENSOR 1 GROUND: GROUND
I	FH13-C2	APP SENSOR 2 SIGNAL: NEGATIVE-GOING VOLTAGE SLOPE, TYPICAL IDLE VOLTAGE = 3.445V TO 3.305V; TYPICAL FULL PEDAL VOLTAGE = 2.05 V
SS	FH13-C4	SPEED CONTROL SWITCH REQUEST: STEPPED RESISTANCE
I	FH13-D1	APP SENSOR 1 SIGNAL: POSITIVE-GOING VOLTAGE SLOPE, TYPICAL IDLE VOLTAGE = 0.61V TO 0.89V; TYPICAL FULL PEDAL VOLTAGE = 3.4 V
SS	FH13-D2	APP SENSOR 2 POWER SUPPLY: NOMINAL 5 V
I	FH13-D4	AUTOMATIC - PARK / NEUTRAL SIGNAL: B+ WHEN ACTIVATED
SS	FH13-E1	APP SENSOR 1 POWER SUPPLY: NOMINAL 5 V
I	FH13-E3	BRAKE CANCEL SWITCH: NORMALLY CLOSED / GROUND WHEN ACTIVATED
I	FH13-F1	IAT SENSOR (INTEGRAL TO MAF SENSOR) SIGNAL, NOMINAL 0 - 5 V: NTC SENSOR - VOLTAGE DECREASES AS TEMPERATURE INCREASES
I	FH13-F3	ENGINE CRANK: B+
I	FH13-F4	MAF SENSOR 1 SIGNAL: TIME PERIOD (FREQUENCY) SIGNAL, PROPORTIONAL TO AIR FLOW
I	FH13-G2	BRAKE ON / OFF SWITCH: NORMALLY OPEN / B+ WHEN ACTIVATED
I	FH13-G4	MAF SENSOR 2 SIGNAL: TIME PERIOD (FREQUENCY) SIGNAL, PROPORTIONAL TO AIR FLOW
O	FH13-J3	EMS CONTROL RELAY DRIVE: TO ACTIVATE, PCM SWITCHES CIRCUIT TO GROUND
O	FH13-K2	COOLING FAN MODULE CONTROL: PWM, 140 Hz, POSITIVE DUTY CYCLE RANGE 7% - 95%
B+	FH13-K3	IGNITION SWITCHED POWER (RUN): PJB, F4, 5A
B+	FH13-K4	BATTERY POWER SUPPLY: B+
B+	FH13-L1	EMS SWITCHED POWER SUPPLY 1: FPDB, F20, 30A
B+	FH13-L2	EMS SWITCHED POWER SUPPLY 2: FPDB, F20, 30A
B+	FH13-L3	EMS SWITCHED POWER SUPPLY 3: FPDB, F20, 30A
SG	FH13-L4	MAF (INTEGRAL IAT) SENSORS GROUND: GROUND
PG	FH13-M1	POWER GROUND: GROUND
PG	FH13-M2	POWER GROUND: GROUND
PG	FH13-M3	POWER GROUND: GROUND
PG	FH13-M4	POWER GROUND: GROUND

**NOTE:** SG\* indicates shared-signal grounds, (sharing sensors shown in parentheses).

**NOTE:** Refer to the Appendix at the rear of this book for Network Messages.

The following abbreviations are used to represent values for Control Module Pin-Out data

<b>I</b>	<b>Input</b>	<b>PG</b>	<b>Power Ground</b>	<b>C</b>	<b>CAN Network</b>	<b>D</b>	<b>Serial and Encoded Data</b>
<b>O</b>	<b>Output</b>	<b>SS</b>	<b>Sensor / Signal Supply V</b>	<b>S</b>	<b>SCP Network</b>	<b>V</b>	<b>Voltage (DC)</b>
<b>B+</b>	<b>Battery Voltage</b>	<b>SG</b>	<b>Sensor / Signal Ground</b>	<b>D2</b>	<b>D2B Network</b>	<b>PWM</b>	<b>Pulse Width Modulated</b>

**CAUTION:** The information on this data page is furnished to aid the user in understanding circuit operation. THIS INFORMATION SHOULD BE USED FOR REFERENCE ONLY.

**NOTE:** The values listed are approximately those that can be expected at the control module connector pins with all circuit connections made and all components connected and fitted.

**Fig. 03.7**

**COMPONENTS**

Component	Connector(s)	Connector Description	Location
ACT SENSOR	C69	2-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
APP SENSOR	CA88	6-WAY / BLACK	TOP OF ACCELERATOR PEDAL
BRAKE ON / OFF SWITCH	CA37	2-WAY / BLACK	TOP OF BRAKE PEDAL
CKP SENSOR	C77	3-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
CMP SENSOR	C25	3-WAY / GREY	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
ECT SENSOR	C34	2-WAY / GREY	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
EFT SENSOR	C35	2-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
EGR VALVE 1	C70	6-WAY / GREY	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
EGR VALVE 2	C71	6-WAY / GREY	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
EOT SENSOR	C28	3-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
FRP SENSOR	C30	3-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
INLET PORT DEACTIVATION SOLENOID	C36	4-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
KNOCK SENSOR 1	C87	2-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
KNOCK SENSOR 2	C88	2-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
MAF SENSOR 1	FH14	4-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
MAF SENSOR 2	FH15	4-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
MAP SENSOR	C31	3-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
POWERTRAIN CONTROL MODULE	C98	48-WAY / BROWN	FRONT BULKHEAD, PASSENGER SIDE
	C99	48-WAY / GREY	
	FH13	48-WAY / BLACK	
ROTARY ELECTRONIC ACTUATOR 1	C40	5-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
ROTARY ELECTRONIC ACTUATOR 2	C41	5-WAY / BLACK	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33
EGR THROTTLE BODY	C39	6-WAY / GREY	REFER TO SENSORS AND ACTUATORS, PAGE 32 OR 33

**HARNESS IN-LINE CONNECTORS**

Connector	Connector Description / Location	Location
FC12	14-WAY / GREY / FASCIA HARNESS TO FRONT HARNESS	BEHIND INSTRUMENT PANEL, PASSENGER SIDE
FC26	16-WAY / BLUE / CABIN HARNESS TO FASCIA HARNESS	BEHIND INSTRUMENT PANEL, DRIVER SIDE
PI41	42-WAY / BLACK / ENGINE HARNESS TO VEHICLE HARNESSES	ENGINE COMPARTMENT, BULKHEAD, PASSENGER SIDE

**GROUNDS**

Ground	Location
FH4	ENGINE COMPARTMENT, REARWARD OF RH WHEEL ARCH

**FOR CONTROL MODULE PIN-OUT INFORMATION, UNFOLD PAGE TO LEFT.**

Refer to the front of this book for detailed information and illustrations regarding the location and identification of harnesses, relays, fuses, grounds, control modules and control module pins.

