



Fig. 42. Engine control module (ECM) located in compartment in right-rear of engine compartment (arrow).

NOTE —

Replacement ECMs must be coded with application information (i.e. engine code, transmission type, etc.) prior to installation. Consult an authorized BMW dealer before replacing the ECM.

ECM pin assignments are given in Tables h through Table I. This information can be helpful when diagnosing faults to or from the ECM. If all inputs and wiring are OK but operational problems still exist, the ECM itself may be faulty.

Generally, absence of voltage or continuity means there is a wiring or connector problem. Test results with incorrect values do not necessarily mean that a component is faulty. Check for loose, broken or corroded connections and wiring before replacing components. If the results are still incorrect, test the component itself. For engine management system electrical schematics, see **Electrical Wiring Diagrams**.

CAUTION —

- Always wait at least 40 seconds after turning off the ignition before removing the connector from the engine control module (ECM). If the connector is removed before this time, residual power in the system relay may damage the ECM.
- Always connect or disconnect the control module connector and meter probes with the ignition off.

When making checks at the ECM itself, a breakout box should be used to allow tests to be made with the connector attached to the ECM. This also prevents damage to the small terminals in the connector. As an alternative, the harness connector housing can be separated so that electrical checks can be made from the back of the connector. ECM pin numbering is shown in Fig. 43.

NOTE —

On cars with traction control, do not confuse the throttle position sensor on the main throttle body with the throttle position switch on the secondary throttle body.

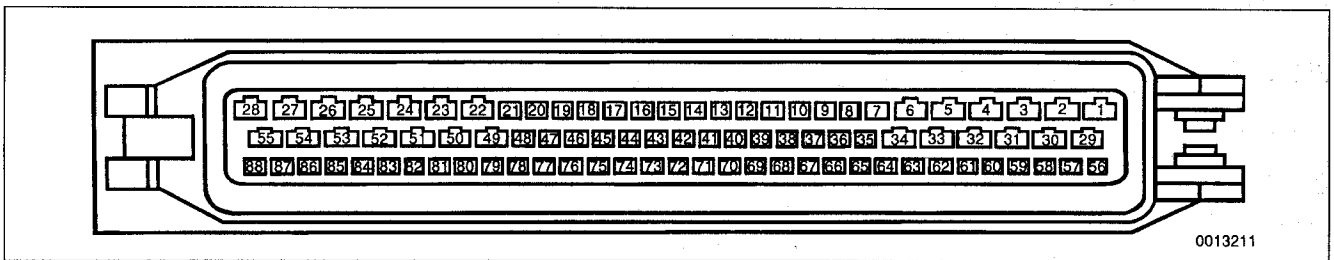


Fig. 43. ECM pin numbers as seen from back of ECM connector.

130-28 FUEL INJECTION

Table h. ECM Pin Assignment—Bosch DME M1.7

Pin	Signal	Component/function	Signal
1	Output	Fuel pump relay control	Fuel pump relay, terminal 85
2	Not used		
3	Output	Cyl. 2 and cyl. 4 fuel injection valve control	Cyl. 2 and cyl. 4 fuel injection valves
4	Not used		
5	Not used		
6	Ground	Ground, fuel injection valve output stages	Ground point
7	Not used		
8	Output	"Check engine" indicator control	Instrument cluster
9	Not used		
10	Not used		
11	Output	DKV potentiometer signal	Transmission control module (EGS)
12	Input	Throttle position sensor	Throttle position signal
13	Not used		
14	Input	Volume air flow sensor	Volume air flow sensor (signal ground)
15	Input	Cyl. 1-2 knock sensor	Cyl. 1-2 knock sensor
16	Input	Camshaft position sensor (cylinder identification)	Camshaft position sensor (cylinder identification)
17	Output	ti measurement signal (fuel consumption)	Instrument cluster
18	Output	Intake air resonance changeover valve (DISA)	Intake air resonance changeover valve
19	Not used		
20	Not used		
21	Not used		
22	Not used		
23	Not used		
24	Output	Cyl. 3 ignition coil control	Cyl. 3 ignition coil
25	Output	Cyl. 1 ignition coil control	Cyl. 1 ignition coil
26	Input	Battery voltage	B + junction point
27	Output	Engine control module relay control	Engine control module relay, terminal 85
28	Ground	Ground for electronics and shielding of sensors	Ground point
29	Output	Idle speed control valve control	Idle speed control valve
30	Not used		
31	Not used		
32	Output	Cyl. 1 and cyl. 3 fuel injection valve control	Cyl. 1 and cyl. 3 fuel injection valves
33	Not used		
34	Ground	Ground, output stages (except for ignition and fuel injection valves)	Ground point
35	Not used		
36	Output	Evaporative emission valve control	Evaporative emission valve
37	Output	Oxygen sensor heater control	Oxygen sensor relay, terminal 85
38	Not used		
39	Not used		
40	Not used		
41	Input	Volume Air Flow sensor	Volume air flow sensor (voltage varies with engine load)
42	Input	Cyl. 3-4 knock sensor	Cyl. 3-4 knock sensor
43	Ground	Ground for sensors	Engine coolant temperature sensor, cyl. 1-2 knock sensor, cyl. 3-4 knock sensor, and throttle position sensor
44	Input	Camshaft position sensor (cylinder identification)	Camshaft position sensor (cylinder identification)

Table h. ECM Pin Assignment—Bosch DME M1.7

Pin	Signal	Component/function	Signal
45	Not used		
46	Not used		
47	Not used		
48	Output	A/C compressor cut-out	Compressor control relay, terminal 85
49	Not used		
50	Not used		
51	Output	Cyl. 4 ignition coil control	Cyl. 4 ignition coil
52	Output	Cyl. 2 ignition coil control	Cyl. 2 ignition coil
53	Not used		
54	Input	Battery voltage from engine control module	Engine control module relay, terminal 87a
55	Ground	Ground, ignition	Ground point
56	Input	Ignition switch, terminal 15	Ignition switch, terminal 15
57	Not used		
58	Not used		
59	Output	Throttle position sensor and volume air flow sensor	Reference voltage (5 VDC)
60	Input	Programming voltage	Data link connector
61	Not used		
62	Not used		
63	Not used		
64	Input	Ignition timing intervention	Transmission control module (EGS)
65	Input	Drive range P/N	Automatic transmission range switch
66	Not used		
67	Input	Crankshaft position RPM sensor	Crankshaft position RPM sensor
68	Input	Crankshaft position RPM sensor	Crankshaft position RPM sensor
69	Not used		
70	Input	Oxygen sensor signal	Heated oxygen sensor
71	Ground	Oxygen sensor signal ground	Heated oxygen sensor
72	Not used		
73	Input	Vehicle speed signal	Instrument cluster
74	Output	Engine speed signal	Instrument cluster
75	Not used		
76	Input	Volume air flow sensor	Volume air flow sensor
77	Input	Intake air temperature sensor (IAT)	Intake air temperature sensor (IAT)
78	Input	Engine coolant temperature	Engine coolant temperature sensor
79	Not used		
80	Not used		
81	Input	Drive-away protection signal (code)	On-board computer
82	Not used		
83	Not used		
84	Not used		
85	Input	A/C pressure	Pressure switch
86	Input	A/C switch	Integrated climate regulation control module
87	Output	RxD diagnosis data line	Data link connector
88	Output-Input	TxD diagnosis data line	Data link connector

130-30 FUEL INJECTION

Table i. ECM Pin Assignment—Bosch DME M3.1

Pin	Signal	Component/function	Signal
1	output	Fuel pump relay control	Fuel pump relay switches with engine running or cranking (crankshaft position signal must be present for relay switchover)
2	output	Idle speed control valve	Pulsed ground— close signal (see also pin 29)
3	output	Fuel injector control, cyl. 1	Pulsed ground (injection pulse width in ms) with engine running
4	output	Fuel injector control, cyl. 3	Pulsed ground (injection pulse width in ms) with engine running
5	output	Fuel injector control, cyl. 2	Pulsed ground (injection pulse width in ms) with engine running
6	ground	Ground	Ground for fuel injector output stages
7	vacant	—	—
8	output	Check Engine	Check engine lamp control ground
9	vacant	—	—
10	vacant	—	—
11	output	Throttle valve position	Load signal to transmission control module
12	input	Throttle position sensor	Voltage varies with throttle position
13	output	Mass air flow sensor	Air flow sensor hot wire burn off (voltage for 0.5 seconds after shutdown)
14	ground	Mass air flow sensor	Ground for air flow sensor
15	vacant	—	—
16	input	Cylinder identification sensor	A/C voltage pulse per camshaft revolution (between pin 16 and 44)
17	output	Fuel consumption (ti)	Fuel consumption output (KVA signal) to instrument cluster
18	vacant	—	—
19	vacant	—	—
20	vacant	—	—
21	vacant	—	—
22	vacant	—	—
23	output	Ignition control (terminal 1), cyl. no. 2	Primary signal, ignition coil cyl. no. 2
24	output	Ignition control (terminal 1), cyl. no. 3	Primary signal, ignition coil cyl. no. 3
25	output	Ignition control (terminal 1), cyl. no. 1	Primary signal, ignition coil cyl. no. 1
26	input	Power supply (terminal 30)	Battery voltage (B+) at all times (terminal 30)
27	output	Main relay control	Main relay activation (to relay terminal 85)
28	ground	Ground	Ground for ECM and sensor shielding
29	output	Idle speed control valve	Pulsed ground— open signal (see also pin 2)
30	vacant	—	—
31	output	Fuel injector, cyl. no. 5	Pulsed ground (injection pulse width in ms), cyl. no. 5
32	output	Fuel injector, cyl. no. 6	Pulsed ground (injection pulse width in ms), cyl. no. 6
33	output	Fuel injector, cyl. no. 4	Pulsed ground (injection pulse width in ms), cyl. no. 4
34	ground	Ground	Ground for output stages
35	vacant	—	—
36	output	Evaporative purge valve control	Pulsed ground with engine at normal temperature and varying engine load
37	output	Oxygen sensor heater relay control	Oxygen sensor heater relay activation (ground at terminal 85)
38	vacant	—	—
39	vacant	—	—
40	vacant	—	—
41	input	Mass air flow sensor	Voltage (+)
42	vacant	—	—
43	ground	Ground	Ground for temperature sensors (ECT sensor, IAT sensor, TP sensor)
44	input	Cylinder identification sensor	A/C voltage pulse per camshaft revolution (between pin 16 and 44)

Table i. ECM Pin Assignment—Bosch DME M3.1

Pin	Signal	Component/function	Signal
45	vacant	—	—
46	vacant	—	—
47	vacant	—	—
48	output	A/C compressor control	A/C compressor disabled via compressor control relay
49	vacant	—	—
50	output	Ignition control (terminal 1), cyl. no. 4	Primary signal, ignition coil cyl. no. 4
51	output	Ignition control (terminal 1), cyl. no. 6	Primary signal, ignition coil cyl. no. 6
52	output	Ignition control (terminal 1), cyl. no. 5	Primary signal, ignition coil cyl. no. 5
53	vacant	—	—
54	input	Power supply	Battery voltage (+) from main relay terminal 87
55	ground	Ground	Ground for ignition control
56	input	Power supply (terminal 15)	Battery voltage (+) with key on or engine running
57	vacant	—	—
58	vacant	—	—
59	output	Throttle position sensor	Throttle position sensor supply voltage (5 VDC)
60	input	Data link connector	Programming voltage
61	vacant	—	—
62	vacant	—	—
63	vacant	—	—
64	input	Ignition timing intervention	from A/T control module (only active during gearshift)
65	input	Automatic transmission (A/T) range switch	Transmission park or neutral signal
66	vacant	—	—
67	input	Engine speed/crankshaft position sensor	Crankshaft position/rpm (voltage (VAC) between pins 67 and 68)
68	input	Engine speed/crankshaft position sensor	Crankshaft position/rpm (voltage (VAC) between pins 67 and 68)
69	vacant	—	—
70	input	Oxygen sensor	Oxygen sensor signal (0–1 VDC fluctuating with engine running)
71	ground	Oxygen sensor	Oxygen sensor signal ground
72	vacant	—	—
73	input	Road speed	Road speed signal from instrument cluster
74	output	Engine speed (TD)	Engine speed (TD) signal to instrument cluster
75	vacant	—	—
76	vacant	—	—
77	input	Intake air temperature (IAT) sensor	Intake air temperature (0-5 V, temperature dependent)
78	input	Engine coolant temperature (ECT) sensor	Engine coolant temperature (0-5 V, temperature dependent)
79	vacant	—	—
80	vacant	—	—
81	input	On-board computer	Drive-away protection enable
82	vacant	—	—
83	vacant	—	—
84	vacant	—	—
85	input	A/C pressure switch	From Integrated climate control module via A/C pressure switch
86	input	A/C compressor on	From Integrated climate control module
87	input	Diagnostic connector (RxD)	Diagnostic RxD (receive) signal to pin 15 in Data link connector
88	input/output	Diagnostic connector (TxD)	Diagnostic TxD (transmit) signal to pin 20 in Data link connector

130-32 FUEL INJECTION

Table j. ECM Pin Assignment—Bosch DME M3.3.1

Pin	Signal	Component/function	Signal
1	output	Fuel pump relay control	Fuel pump relay switches with engine running or cranking (crankshaft position signal must be present for relay switchover)
2	output	Idle speed control valve	Pulsed ground—close signal (see also pin 29)
3	output	Fuel injector control, cyl. 5	Pulsed ground (injection pulse width in ms) cyl. 5
4	output	Fuel injector control, cyl. 6	Pulsed ground (injection pulse width in ms) cyl. 6
5	output	Fuel injector control, cyl. 4	Pulsed ground (injection pulse width in ms) cyl. 4
6	ground	Ground	Ground for fuel injector output stage
7	output	Camshaft actuator (VANOS solenoid) control	Camshaft actuator (VANOS solenoid)
8	output	Check Engine	Instrument cluster, Check Engine lamp
9	vacant	—	—
10	vacant	—	—
11	output	Throttle position	Throttle angle signal to A/T control module
12	vacant	—	—
13	input	Oxygen sensor	Oxygen sensor signal (0-1 VDC fluctuating with engine running)
14	input	Mass air flow sensor	Mass air flow sensor
15	ground	Ground	Ground
16	input	Crankshaft position/rpm sensor	Voltage pulse (VAC) between pin 16 and 43 (crank position/rpm sensor)
17	input	Camshaft position sensor	Hall effect camshaft sensor
18	vacant	—	—
19	vacant	—	—
20	vacant	—	—
21	vacant	—	—
22	vacant	—	—
23	output	Ignition coil control, cyl. 4	Ignition coil 4
24	output	Ignition coil control, cyl. 6	Ignition coil 6
25	output	Ignition coil control, cyl. 5	Ignition coil 5
26	input	Power supply (terminal 30)	Battery voltage (B+) at all times
27	input	Main relay control	Main relay activation (terminal 85)
28	ground	Ground	Ground for ECM and sensor shielding
29	output	Idle speed control valve	Pulsed ground—open signal (see also pin 2)
30	vacant	—	—
31	output	Fuel injector control, cyl. 3	Injection pulse width in ms—cyl. 3
32	output	Fuel injector control, cyl. 2	Injection pulse width in ms—cyl. 2
33	output	Fuel injector control, cyl. 1	Injection pulse width in ms—cyl. 1
34	ground	Ground	Ground for remaining output stages
35	vacant	—	—
36	output	Evaporative purge valve control	
37	vacant	—	—
38	output	Oxygen sensor heater relay control	Oxygen sensor heater relay switchover (terminal 85)
39	vacant	—	—
40	ground	Oxygen sensor	Oxygen sensor signal ground
41	input	Mass air flow sensor	Mass air flow voltage signal
42	input	Vehicle speed	Vehicle speed signal from instrument cluster
43	input	Crankshaft position/rpm sensor	Voltage pulse (VAC) between pin 16 and 43
44	ground	Ground	Ground for intake air temp. sensor, engine coolant temp. sensor, throttle position sensor

Table j. ECM Pin Assignment—Bosch DME M3.3.1

Pin	Signal	Component/function	Signal
45	ground	Ignition circuit shield	Ground shield for ignition circuit monitoring
46	output	Fuel consumption (KVA signal)	To instrument cluster
47	output	Crankshaft rpm	Engine speed (TD) signal to instrument cluster
48	output	A/C compressor control	A/C compressor relay terminal 85
49	vacant	—	—
50	output	Ignition coil control, cyl. 1	Primary signal, ignition coil 1
51	output	Ignition coil control, cyl. 2	Primary signal, ignition coil 2
52	output	Ignition coil control, cyl. 3	Primary signal, ignition coil 3
53	vacant	—	—
54	input	Power supply	Battery voltage from main relay (terminal 87a)
55	ground	Ground	Ground for ignition control
56	input	Power supply (terminal 15)	Battery voltage with key on or engine running
57	input	Ignition timing intervention	From A/T control module
58	vacant	—	—
59	output	Throttle position sensor (TPS)	Voltage supply to TPS (5 VDC)
60	input	Programming voltage	Data link connector
61	vacant	—	—
62	vacant	—	—
63	vacant	—	—
64	input	A/C on signal	From integrated climate control module
65	input	A/C pressure signal	From integrated climate control module via A/C pressure switch
66	input	On-board computer	Drive-away protection enable (starter immobilization relay)
67	vacant	—	—
68	vacant	—	—
69	input	Knock sensor #2 (cyl. 4, 5, 6)	Knock sensor #2 signal
70	input	Knock sensor #1 (cyl. 1, 2, 3)	Knock sensor #1 signal
71	ground	Ground	Ground for knock sensors and shields
72	vacant	—	—
73	input	Throttle position sensor (TPS)	Throttle position signal
74	vacant	—	—
75	vacant	—	—
76	vacant	—	—
77	input	Intake air temperature	Intake air temperature sensor (0-5 VDC)
78	input	Engine coolant temperature	Engine coolant temperature sensor (0-5 VDC)
79	vacant	—	—
80	vacant	—	—
81	input	Automatic transmission gear position/neutral safety switch	A/T park or neutral position signal
82	vacant	—	—
83	vacant	—	—
84	vacant	—	—
85	vacant	—	—
86	vacant	—	—
87	input	Diagnostic connector (RxD)	Diagnostic RxD (receive) signal to pin 15 in Data link connector
88	input/output	Diagnostic connector (TxD)	Diagnostic TxD (transmit) signal to pin 20 in Data link connector

Table k. ECM Pin Assignment—Bosch DME M5.2

Pin	Signal	Component/function	Signal
1	output	Oxygen sensor (monitoring sensor) heater	Oxygen sensor heater control (switched ground)
2	output	Idle speed control valve	Pulsed ground—close signal (see also pin 29)
3	output	Fuel injector control, cyl. 1	Pulsed ground (injection pulse width in ms) cyl. 1
4	output	Fuel injector control, cyl. 4	Pulsed ground (injection pulse width in ms) cyl. 4
5	not used	—	—
6	ground	Ground	Ground for fuel injector output stage
7	not used	—	—
8	output	Check Engine	Instrument cluster, Check Engine lamp
9	not used	—	—
10	input	Electronic immobilizer control (EWS II)	Electronic immobilizer control (EWS II) module
11	output	Automatic climate control	Automatic climate control, to evaporator controller
12	not used	—	—
13	not used	—	—
14	not used	—	—
15	not used	—	—
16	input	Intake air temperature	Intake air temperature signal
17	input	Mass air flow meter	Intake air signal
18	not used	—	—
19	input	Oxygen sensor (monitoring sensor)	Oxygen sensor control
20	output	Crankshaft/rpm sensor	Crankshaft/rpm sensor control
21	input	Camshaft position sensor	Camshaft position signal
22	output	Ignition coil control, cyl. 3	Primary signal, ignition coil 3
23	output	Ignition coil control, cyl. 4	Primary signal, ignition coil 4
24	not used	—	—
25	not used	—	—
26	input	Power supply (terminal 30)	Battery voltage (B+) at all times
27	input	Main relay control	Main relay activation (terminal 85)
28	ground	Ground	Ground for ECM and sensor shielding
29	output	Idle speed control valve	Pulsed ground—open signal (see also pin 2)
30	output	Oxygen sensor (monitoring sensor) heater	Oxygen sensor heater control (switched ground)
31	output	Fuel injector control, cyl. 3	Pulsed ground (injection pulse width in ms) cyl. 3
32	output	Fuel injector control, cyl. 2	Pulsed ground (injection pulse width in ms) cyl. 2
33	not used	—	—
34	ground	Ground	Ground for ECM/ output stages
35	not used	—	—
36	input	A/C compressor relay	A/C compressor relay control
37	not used	—	—
38	not used	—	—
39	not used	—	—
40	input	Knock sensor #2 (cyl. 3,4)	Knock sensor #2 signal
41	not used	—	—
42	input	Vehicle speed	Vehicle speed signal from instrument cluster
43	not used	—	—
44	output	Throttle position sensor (TPS)	Throttle position reference signal

Table k. ECM Pin Assignment—Bosch DME M5.2 (continued)

Pin	Signal	Component/function	Signal
45	output	Mass air flow meter	Intake air signal
46	output	Oxygen sensor (monitoring sensor)	Oxygen sensor control
47	not used	—	—
48	not used	—	—
49	output	Ignition coil control, cyl. 1	Primary signal, ignition coil 1
50	output	Ignition coil control, cyl. 2	Primary signal, ignition coil 2
51	not used	—	—
52	not used	—	—
53	input	Throttle position sensor	Throttle position signal
54	input	Power supply	Battery voltage from main relay (terminal 87)
55	ground	Ground	Ground for ECM
56	input	Power supply (terminal 15)	Battery voltage with key on or engine running
57	output	Activate cooling fan (man. trans.) control	Normal speed relay
58	not used	—	—
59	not used	—	—
60	input	Programming voltage	Programming voltage via data link connector, pin 18
61	output	Evaporative emission valve	Evaporative emission valve control
62	vacant	—	—
63	output	Fuel pump relay	Fuel pump relay control
64	not used	—	—
65	not used	—	—
66	not used	—	—
67	not used	—	—
68	input	Signal above 80°C (man. tran.)	Double temperature switch
69	input	Automatic climate control	Automatic climate control
70	input	Knock sensor #1 (cyl. 1,2)	Knock sensor #1 signal
71	ground	Ground	Ground for analog signals and knock sensors
72	not used	—	—
73	not used	—	—
74	input	Engine coolant temperature sensor	Engine coolant temperature signal
75	not used	—	—
76	not used	—	—
77	output	Oxygen sensor (regulating sensor)	Oxygen sensor control
78	input	Crankshaft/rpm sensor	Crankshaft position/rpm signal
79	input	ABS or traction control	ABS or AST control
80	input	Engine speed	Engine speed signal
81	not used	—	—
82	not used	—	—
83	input	On-board computer	From On-board computer (terminal 4)
84	not used	—	—
85	not used	—	—
86	not used	—	—
87	input	Diagnostic connector (RxD)	Diagnostic RxD (receive) signal to pin 15 in Data link connector
88	output	Diagnostic connector (TxD)	Diagnostic TxD (transmit) signal to pin 17 in Data link connector

Table I. ECM Pin Assignment—Siemens DME MS 41.1

Pin	Signal	Component/function	Signal
1	output	Ignition coil control, cyl. 2	Primary signal, ignition coil 2
2	output	Ignition coil control, cyl. 4	Primary signal, ignition coil 4
3	output	Ignition coil control, cyl. 6	Primary signal, ignition coil 6
4	ground	Ground	Ground
5	output	Fuel injector control, cyl. 2	Pulsed ground (injection pulse width in ms) cyl. 2
6	output	Fuel injector control, cyl. 1	Pulsed ground (injection pulse width in ms) cyl. 1
7	output	Mass air flow meter	Mass air meter signal
8	input	Mass air flow meter	Mass air meter signal
9	output	Instrument cluster	Fuel consumption signal
10	output	Engine coolant temperature (ECT) sensor	ECT signal
11	output	Fuel tank pressure sensor	Fuel tank pressure sensor control
12	input	Throttle position sensor (TPS)	Throttle position signal
13	—		
14	input	Intake air temperature (IAT) sensor	Intake air temperature signal
15		Traction control	AST module
16	input	Automatic climate control	Automatic climate control
17	—		
18	input	Electronic immobilizer control (EWS II)	Electronic immobilizer control (EWS II) module
19		Automatic climate control	Automatic climate control
20	—	Instrument cluster	Instrument cluster
21	output	Camshaft actuator (VANOS solenoid) control	Camshaft actuator (VANOS solenoid), switched ground
22	output	Fuel injector control, cyl. 3	Pulsed ground (injection pulse width in ms) cyl. 3
23		Fuel injector control, cyl. 6	Pulsed ground (injection pulse width in ms) cyl. 6
24		Fuel injector control, cyl. 4	Pulsed ground (injection pulse width in ms) cyl. 4
25	output	Oxygen sensor heater control	Oxygen sensor heater ground
26	input	Power supply (terminal 30)	Battery voltage (B+) at all times
27	output	Idle speed control valve	Pulsed ground—open signal (see also pin 53)
28	ground	Ground	Ground
29	output	Ignition coil control, cyl. 1	Primary signal, ignition coil 1
30	output	Ignition coil control, cyl. 3	Primary signal, ignition coil 3
31	output	Ignition coil control, cyl. 5	Primary signal, ignition coil 5
32	ground	Ground	Ground
33	output	Fuel injector control, cyl. 5	Pulsed ground (injection pulse width in ms) cyl. 5
34	ground	Ground	Ground
35	output	Secondary air injection	Secondary air injection pump relay control
36	output	Engine speed output	Engine speed signal
37	—		
38	ground	Knock sensor	Shielding for knock sensors
39	output	Intake air temperature sensor (IAT Sensor) Engine coolant temperature (ECT) sensor	Voltage supply to IAT sensor and ECT sensor
40	output	Crankshaft position sensor (Hall effect)	Crankshaft position sensor control
41	ground	Camshaft position (CMP) sensor	Shielding for CMP sensor
42	output	Throttle position sensor (TPS)	TPS ground
43	input	Camshaft position/rpm sensor	Camshaft position/rpm sensor control
44	output	Throttle position sensor (TPS)	Voltage supply to TPS (5 VDC)
45		Traction control	AST module
46	—	Instrument cluster	Instrument cluster

ECM PIN ASSIGNMENTS

Table I. ECM Pin Assignment—Siemens DME MS 41.1 (continued)

Pin	Signal	Component/function	Signal
47	—		
48	input	Crankshaft position sensor (Hall effect)	Crankshaft position sensor control
49	input	Power supply (terminal 15)	Battery voltage with key on or engine running
50	output	Solenoid valve (running losses)	Running losses
51	output	Carbon canister valve	Carbon canister valve control
52	vacant	—	—
53	output	Idle speed control valve	Pulsed ground—close signal (see also pin 29)
54	input	Power supply	Battery voltage from main relay (terminal 87)
55	vacant	—	—
56	—		
57	input	Knock sensor (cyl. 1-3)	Knock sensor input signal
58	output	Knock sensor (cyl. 1-3)	Knock sensor control
59	input	Knock sensor (cyl. 4-6)	Knock sensor input signal
60	input/output	Diagnostic connector (TxD)	Diagnostic TxD (transmit) signal to pin 18 in Data link connector
61	output	Oxygen sensor heater (monitoring sensor)	Oxygen sensor heater ground
62	output	Secondary air injection	Secondary air injection control valve
63	output	Knock sensor (cyl. 4-6)	Knock sensor control
64	input	Camshaft position/rpm sensor	Camshaft position/rpm sensor control
65	input	Camshaft position/rpm sensor	Camshaft position/rpm sensor control
66	—		
67	output	Oxygen sensor	Oxygen sensor reference voltage
68	output	Evaporative purge valve control	Pulsed ground with engine at normal temperature and varying engine load
69	output	Fuel pump relay control	Fuel pump relay switches with engine running or cranking (crankshaft position signal must be present for relay switchover)
70	vacant	—	—
71	output	Oxygen sensor heater (regulating sensor)	Oxygen sensor heater ground
72	output	Oxygen sensor (monitoring sensor)	Oxygen sensor reference voltage
73	input	Main relay control	Main relay activation (terminal 85)
74	output	A/C compressor control	A/C compressor relay control
75	input	Oxygen sensor	Oxygen sensor signal
76	not used	—	—
77	input	Oxygen sensor (regulating sensor)	Oxygen sensor signal
78	input	Oxygen sensor (monitoring sensor)	Oxygen sensor signal
79	output	Oxygen sensor (regulating sensor)	Oxygen sensor reference voltage
80		Traction control	AST module
81		Traction control	AST module
82		Traction control	AST module
83	output	Crankshaft position sensor (Hall effect)	Crankshaft position sensor control
84	vacant	—	—
85	output	Automatic transmission	Automatic transmission control module
86	input	Automatic transmission	Automatic transmission control module
87	input	Power supply	Battery voltage from main relay (terminal 87)
88	input/output	Diagnostic connector (TxD)	Diagnostic TxD (transmit) signal to pin 17 in Data link connector

