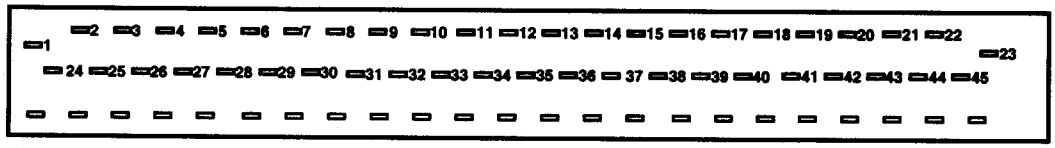
Model:	Engine code:	Year:
Polo 1,0	AER	1996-99
Polo 1,4	AEX/AKV	1995-99
Polo Classic 1,4	AEX/AKV	1995-99
Polo/Classic/Estate/Caddy 1,4	APQ/ANX	1998-99
Caddy 1,4	AEX/AKV	1995-99
Golf/Vento 1,4	AEX/APQ	1995-99

VOLKSWAGEN

Bosch Motronic MP9.0

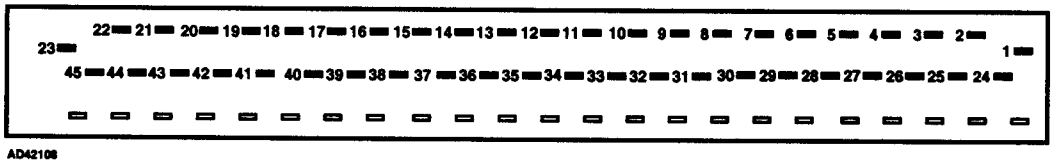
ECM harness multi-plug

Terminal side



AD81645

Wire side



AD42108

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	33			[1]
	35			[1]
Automatic transmission	12			[1]
Battery	21	⬅	Ignition OFF	11-14 V
Closed throttle position (CTP) switch	10	⬅	Ignition ON – throttle closed	0 V
	10	⬅	Ignition ON – throttle slightly open	9 V min.
	17	⊣	Ignition ON	0 V
Crankshaft position (CKP) sensor	8	⇨	Ignition ON	9 V min.
	13	⬅	Ignition ON – engine turned	0 V or 9-14 V
	13	⬅	Engine idling	30 Hz
	13	⬅	3000 rpm	100 Hz
	13	⬅	Engine idling	4
	17	⊣	Ignition ON	0 V
Earth	1		Ignition ON	0 V
Earth – some models	12		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	17	⊣	Ignition ON	0 V
	42	⬅	Ignition ON – coolant temp. 10°C	4,2 V
	42	⬅	Ignition ON – coolant temp. 80°C	1,7 V
Evaporative emission (EVAP) canister purge valve	3	⊣▷	Ignition ON	11-14 V
	3	⊣▷	Engine hot – valve operating	20
Exhaust gas recirculation (EGR) solenoid – if fitted	5	⊣▷	Engine hot – valve operating	19
Fuel pump relay	25	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	25	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	15	⊣	Engine idling	0 V
	38	⬅	Engine idling – engine hot	0-1 V fluctuating
	38	⬅	Engine idling – engine hot	21
Idle speed control (ISC) actuator	2	⇨	Engine idling – engine hot	16-24%
	2	⇨	Engine idling	28
	26	⊣	Engine idling	0 V

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Idle speed control (ISC) actuator position sensor	14	⇨	Ignition ON	4,5 V min.
	16	⬅	Engine idling – engine hot	3 V
	17	⊣	Ignition ON	0 V
Ignition amplifier	24	⇨	Engine idling	30 Hz
	24	⇨	3000 rpm	100 Hz
	24	⇨	Engine idling	32
Ignition switch	23	⬅	Ignition OFF	0 V
	23	⬅	Ignition ON	11-14 V
Immobilizer control module	29	⇔	Ignition ON	11-14 V
Injector 1	7	⊣▷	Ignition ON	11-14 V briefly then 0 V
	7	⊣▷	Engine idling – engine hot	4,8 ms
	7	⊣▷	Engine idling	35
Injector 2	6	⊣▷	Ignition ON	11-14 V briefly then 0 V
	6	⊣▷	Engine idling – engine hot	4,8 ms
	6	⊣▷	Engine idling	35
Injector 3	28	⊣▷	Ignition ON	11-14 V briefly then 0 V
	28	⊣▷	Engine idling – engine hot	4,8 ms
	28	⊣▷	Engine idling	35
Injector 4	4	⊣▷	Ignition ON	11-14 V briefly then 0 V
	4	⊣▷	Engine idling – engine hot	4,8 ms
	4	⊣▷	Engine idling	35
Instrument panel	9		Engine idling – engine hot	30 Hz
	9		3000 rpm	100 Hz
	36			[1]
Instrument panel – some models	27			[1]
Intake air temperature (IAT) sensor	17	⊣	Ignition ON	0 V
	43	⬅	Ignition ON – air temp. 10°C	3,7 V
Knock sensor (KS)	19	⊣	Engine idling	0 V
	39	⬅	Engine idling – accelerate briefly	38
Knock sensor (KS) – screened lead – Polo/Caddy	45	⊣	Engine idling	0 V
Manifold absolute pressure (MAP) sensor	18	⬅	Ignition ON	4 V
	18	⬅	Engine idling – engine hot	1 V
	18	⬅	3000 rpm	0,5 V
	37	⇨	Ignition ON	5 V
Power steering pressure (PSP) switch – AER	11			[1]
	17	⊣	Ignition ON	0 V
Throttle position (TP) sensor	14	⇨	Ignition ON	4,5 V min.
	17	⊣	Ignition ON	0 V
	41	⬅	Ignition ON – throttle closed	4,2 V
	41	⬅	Ignition ON – throttle fully open	0,7 V
Transmission control module (TCM)	30			[1]
	34			[1]

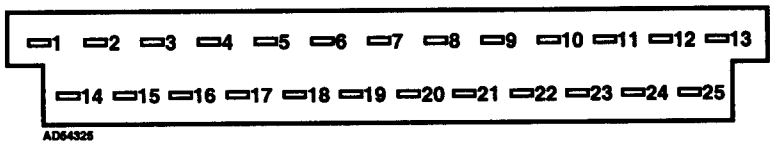
[1] Connected pin - no test data available

Model:	Engine code:	Year:
Polo 1,05	AAK	1989-90
Golf/Jetta 1,8	RP	1987-92
Passat 1,6	1F	1988-90
Passat 1,8	RP	1988-90

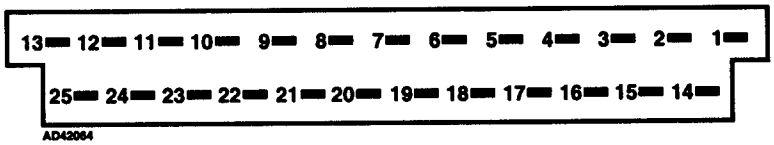
VOLKSWAGEN
Bosch Mono-Jetronic A2.2

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	**15**			[1]
	16			[1]
Battery	**4**	⬅	Ignition OFF	11-14 V
Closed throttle position (CTP) switch	**3**	⬅	Ignition ON – throttle closed	0 V
	3	⬅	Ignition ON – throttle open	11-14 V
Data link connector (DLC) – if fitted	**22**			[1]
Earth	**5**		Ignition ON	0 V
	25		Ignition ON	0 V
Earth – some models	**6**		Ignition ON	0 V
	11		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	**2**	⬅	Ignition ON – coolant temp. 15°C	2 V
	2	⬅	Ignition ON – coolant temp. 80°C	0,4 V
Evaporative emission (EVAP) canister purge valve – if fitted	**12**	⇉	Engine hot – valve operating	20
Evaporative emission (EVAP) canister purge valve – if fitted -7/89	**12**	⇉	Ignition ON	11-14 V
Evaporative emission (EVAP) canister purge valve – if fitted 8/89-	**12**	⇉	Ignition OFF	11-14 V
Fuel pump relay	**17**	⇉	Ignition ON	0-1 V briefly then 11-14 V
	17	⇉	Engine cranking	0-1 V
Heated oxygen sensor (HO2S) – Passat	**20**	⬅	Engine idling – engine hot	0-1 V fluctuating
	20	⬅	Engine idling – engine hot	21
Idle speed control (ISC) actuator	**23 (24)**	⇨	Engine idling – engine hot	Intermittent 27
	24 (23)	⇨	Engine idling – engine hot	Intermittent 27
Ignition amplifier	**1**	⬅	Engine idling	30 Hz
	1	⬅	3000 rpm	100 Hz
	1	⬅	Engine idling	4
Ignition switch	**9**	⬅	Ignition OFF	0 V
	9	⬅	Ignition ON	11-14 V

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Injector	13	⫘	Ignition ON	11-14 V briefly then 0 V
	13	⫘	Engine idling – engine hot	1,6 ms
	13	⫘	Engine idling	35
Intake air temperature (IAT) sensor	14	⬅	Ignition ON – air temp. 10°C	3 V
Malfunction indicator lamp (MIL) – if fitted	22	⫘		[1]
Oxygen sensor (O2S) – Polo/Golf/Jetta	20	⬅	Engine idling – engine hot	0-1 V fluctuating
	20	⬅	Engine idling – engine hot	21
Throttle position (TP) sensor	7	⬅	Ignition ON – throttle closed	2,2 V
	7	⬅	Ignition ON – throttle fully open	4,9 V
	8	⇨	Ignition ON	5 V
	18	⬅	Ignition ON – throttle closed	0 V
	18	⬅	Ignition ON – throttle fully open	4,4 V

[1] **Connected pin - no test data available**

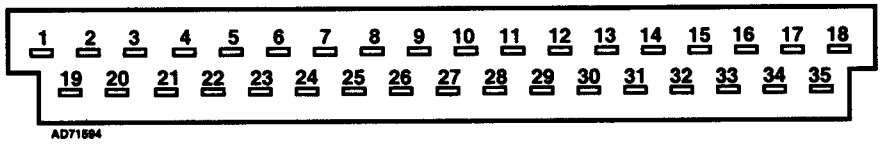
Model:	Engine code:	Year:
Polo 1,05	AAU	1990-93
Polo 1,3	AAV	1990-93
Golf/Vento 1,8	AAM	1991
Passat 1,8	RP/AAM/ABS	1990-92

VOLKSWAGEN

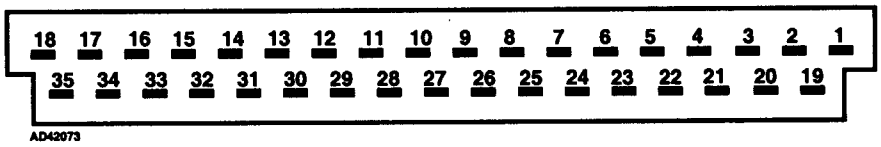
Bosch Mono-Motronic MA1.2/1.2.1 (35-pin)

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	3			[1]
	4			[1]
Automatic transmission	20			[1]
Battery	2	⬅	Ignition OFF	11-14 V
Closed throttle position (CTP) switch	30	⬅	Ignition ON – throttle closed	0 V
	30	⬅	Ignition ON – throttle open	11-14 V
Crankshaft position (CKP) sensor	5	⬅	Ignition ON – engine turned	0 V or 9-14 V
	5	⬅	Engine idling	30 Hz
	5	⬅	3000 rpm	100 Hz
	5	⬅	Engine idling	4
	6	⇨	Ignition OFF	0 V
	6	⇨	Ignition ON	9 V min.
Data link connector (DLC)	22	⇔		[1]
	23	⬅		[1]
Earth	1		Ignition ON	0 V
	11		Ignition ON	0 V
	18		Ignition ON	0 V
Earth – Passat 1990-91	8		Ignition ON	0 V
Earth – some models	21		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	8	⊣	Ignition ON	0 V
	10	⬅	Ignition ON – coolant temp. 20°C	2 V
	10	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Evaporative emission (EVAP) canister purge valve – if fitted	17	⊣▷	Ignition OFF	11-14 V
	17	⊣▷	Engine hot – valve operating	20
Fuel pump relay	12	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	28	⬅	Engine idling – engine hot	0-1 V fluctuating
	28	⬅	Engine idling – engine hot	21
Idle speed control (ISC) actuator	16 (34)	⇨	Engine idling	Intermittent 27
	34 (16)	⇨	Engine idling	Intermittent 27

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Ignition amplifier	13	⇨	Engine idling	30 Hz
	13	⇨	3000 rpm	100 Hz
	13	⇨	Engine idling	32
Ignition switch	19	⬅	Ignition OFF	0 V
	19	⬅	Ignition ON	11-14 V
Ignition switch – AT	9	⬅	Ignition OFF	0 V
	9	⬅	Ignition ON	11-14 V
Injector	35	⇉	Engine idling – engine hot	1,5 ms
	35	⇉	Engine idling	35
Instrument panel	31	⇨	Engine idling – engine hot	100 Hz
Intake air temperature (IAT) sensor	8	⇉	Ignition ON	0 V
	27	⬅	Ignition ON – air temp. 20°C	2,5 V
Intake manifold heater relay	15	⇉	Ignition ON – engine cold	0-1 V
	15	⇉	Ignition ON – engine hot	11-14 V
Oxygen sensor control module – some models	31	⇨	Engine idling – engine hot	100 Hz
Speedometer – some models	29			[1]
Starter motor inhibitor switch relay	21			[1]
Throttle position (TP) sensor	8	⇉	Ignition ON	0 V
	24	⇨	Ignition ON	5 V
	25	⬅	Ignition ON – throttle closed	1,9 V
	25	⬅	Ignition ON – throttle fully open	4,9 V
	26	⬅	Ignition ON – throttle closed	0,1 V
	26	⬅	Ignition ON – throttle fully open	4,5 V

[1] **Connected pin - no test data available**

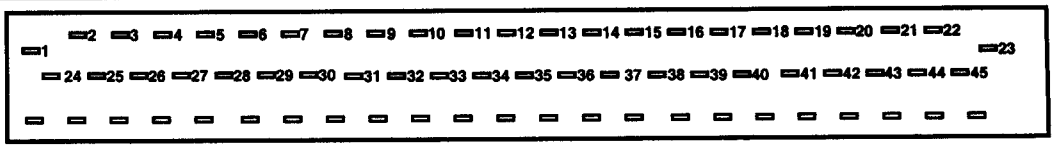
Model:	Engine code:	Year:
Polo 1,05	AAU/AEV	1993-97
Polo 1,3	AAV/ADX	1993-95
Polo 1,6	AEA	1994-95
Polo Classic 1,6/1,8	1F/ADZ	1995-98
Caddy 1,6/1,8	1F/ADZ	1995-98

VOLKSWAGEN

Bosch Mono-Motronic MA1.2.2/1.2.3/1.3

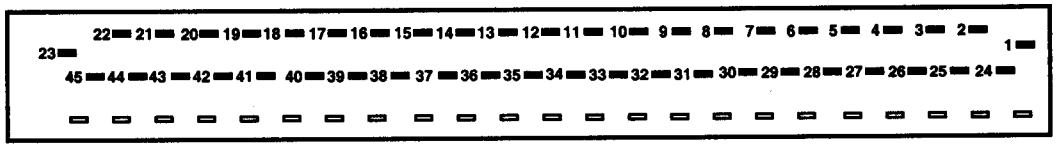
ECM harness multi-plug

Terminal side



AD61645

Wire side



AD42108

Component/circuit description	ECM pin	Signal	Condition	Typical value
Automatic transmission – Caddy/Polo Classic	**34**			[1]
	40			[1]
Battery	**21**	⬅	Ignition OFF	11-14 V
Closed throttle position (CTP) switch	**10**	⬅	Ignition ON – throttle closed	0 V
	10	⬅	Ignition ON – throttle open	11-14 V
Crankshaft position (CKP) sensor	**8**	⇨	Ignition OFF	0 V
	8	⇨	Ignition ON	10 V min.
	13	⬅	Ignition ON – engine turned	0 V or 10-14 V
	13	⬅	Engine idling	30 Hz
	13	⬅	3000 rpm	100 Hz
	13	⬅	Engine idling	4
Data link connector (DLC) – 1993-94	**29**	⬅⇨	Ignition ON	11-14 V
Earth	**1**		Ignition ON	0 V
	20		Ignition ON	0 V
Earth – 1993-94	**15**		Ignition ON	0 V
Earth – 1994-98	**12**		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	**17**	⊣	Ignition ON	0 V
	42	⬅	Ignition ON – coolant temp. 20°C	2 V
	42	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Evaporative emission (EVAP) canister purge valve	**3**	⊣▷	Ignition OFF	11-14 V
	3	⊣▷	engine hot – valve operating	20
Fuel pump relay	**25**	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	25	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	**38**	⬅	Engine idling – engine hot	0-1 V fluctuating
	38	⬅	Engine idling – engine hot	21
Heated oxygen sensor (HO2S) – 1994-97	**15**	⊣	Engine idling	0 V
Idle speed control (ISC) actuator	**2 (26)**	⇨	Engine idling	Intermittent 27
	26 (2)	⇨	Engine idling	Intermittent 27

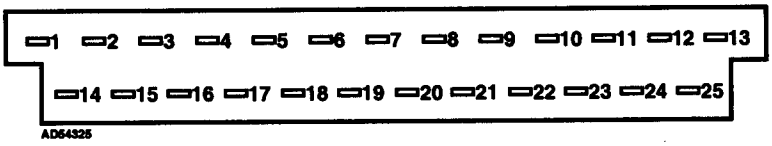
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Idle speed control (ISC) actuator position sensor – except AAU/AAV	16	⬅	Engine idling – engine hot	3 V or 11-14 V – intermittent
	16	⬅	Engine idling – engine hot	Intermittent 31
Ignition amplifier	24	⇨	Engine idling	30 Hz
	24	⇨	3000 rpm	100 Hz
	24	⇨	Engine idling	32
Ignition switch	23	⬅	Ignition OFF	0 V
	23	⬅	Ignition ON	11-14 V
Immobilizer control module – 1994-97	29		Ignition ON	11-14 V
Injector	7	⊣▷	Ignition ON	11-14 V briefly then 0 V
	7	⊣▷	Engine idling – engine hot	1,5 ms
	7	⊣▷	Engine idling	35
Instrument panel	9	⇨		1
Instrument panel – 1994-98	36	⬅		1
Instrument panel – Caddy/Polo Classic	27			1
Intake air temperature (IAT) sensor	17	⊣	Ignition ON	0 V
	43	⬅	Ignition ON – air temp. 20°C	2,5 V
Intake manifold heater relay	28	⊣▷	Ignition ON – engine cold	0-1 V
	28	⊣▷	Ignition ON – engine hot	11-14 V
Knock sensor (KS) – ADX/AEA	19	⊣	Engine idling	0 V
	39	⬅	Engine idling – accelerate briefly	38
Knock sensor (KS) – screened lead – ADX/AEA	45		Engine idling	0 V
Throttle position (TP) sensor	14	⇨	Ignition ON	5 V
	17	⊣	Ignition ON	0 V
	18	⬅	Ignition ON – throttle closed	0,1 V
	18	⬅	Ignition ON – throttle fully open	4,5 V
	41	⬅	Ignition ON – throttle closed	1,9 V
	41	⬅	Ignition ON – throttle fully open	4,9 V

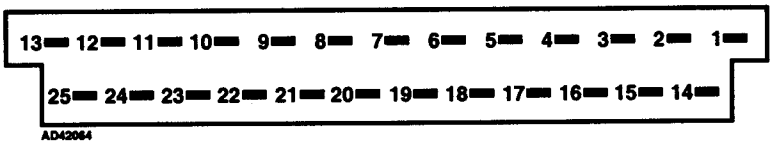
1 Connected pin - no test data available

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Closed throttle position (CTP) switch – if fitted	4	⬅	Ignition ON – throttle closed	0 V
	4	⬅	Ignition ON – throttle slightly open	5 V
Earth	7		Ignition ON	0 V
	25		Ignition ON	0 V
Engine control relay – 1987-92	13	⬅	Ignition OFF	0 V
	13	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	2	⬅	Ignition ON – coolant temp. 20°C	1,5 V
	2	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Fuel pump relay – 1987-92	20	⫘▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S) – 1987-92	5	⬅	Engine idling – engine hot	0-1 V fluctuating
	5	⬅	Engine idling – engine hot	21
Ignition amplifier	1	⬅	Engine idling	30 Hz
	1	⬅	Engine idling	32
Ignition switch	21	⬅	Engine cranking	9 V
Injector 1 – 1986	12	⫘▷	Engine idling – engine hot	1,9 ms
	12	⫘▷	Engine idling	35
Injector 2 – 1986	11	⫘▷	Engine idling – engine hot	1,9 ms
	11	⫘▷	Engine idling	35
Injector 3 – 1986	24	⫘▷	Engine idling – engine hot	1,9 ms
	24	⫘▷	Engine idling	35
Injector 4 – 1986	23	⫘▷	Engine idling – engine hot	1,9 ms
	23	⫘▷	Engine idling	35
Injectors – 1987-92	23	⫘▷	Engine idling – engine hot	1,9 ms
	23	⫘▷	Engine idling	35
Intake air temperature (IAT) sensor	14	⬅	Ignition ON – air temp. 20°C	1 V
Oxygen sensor (O2S) – 1986	5	⬅	Engine idling – engine hot	0-1 V fluctuating
	5	⬅	Engine idling – engine hot	21
Oxygen sensor (O2S) – screened lead – 1986	6	⫘—	Engine idling	0 V

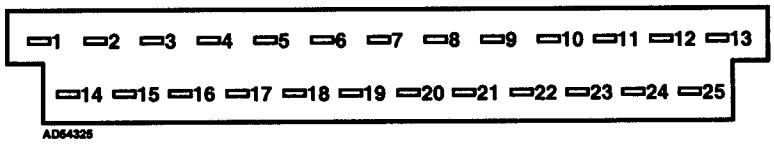
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Relay module – 1986	**13**	⬅	Ignition OFF	0 V
	13	⬅	Ignition ON	11-14 V
	20	⊣▷	Engine cranking	0-1 V
Volume air flow (VAF) sensor	**6**	⊣–	Engine idling	0 V
	15	⬅	Ignition ON – flap closed	0,3 V
	15	⬅	Ignition ON – flap fully open	4,4 V
	15	⬅	Engine idling – engine hot	0,8 V
	19	⇨	Ignition ON	5 V
Wide open throttle (WOT) switch	**4**	⬅	Ignition ON – throttle slightly open	5 V
	4	⬅	Ignition ON – throttle fully open	0 V

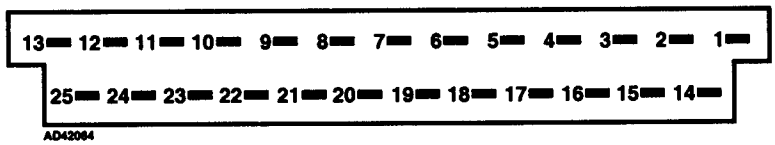
[1] **Connected pin - no test data available**

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Crankshaft position (CKP) sensor	6	⊣	Ignition ON	0 V
	8	⇨	Ignition OFF	0 V
	8	⇨	Ignition ON	10 V min.
	18	⇦	Ignition ON – engine turned	0 V or 10-14 V
	18	⇦	Engine idling	30 Hz
	18	⇦	Engine idling	4
Data link connector (DLC) – if fitted	20	⇦⇨		1
Earth	13		Ignition ON	0 V
Earth – some models	19		Ignition ON	0 V
Engine control relay	14	⇦	Ignition OFF	0 V
	14	⇦	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	6	⊣	Ignition ON	0 V
	10	⇦	Ignition ON – coolant temp. 20°C	1,5 V
	10	⇦	Ignition ON – coolant temp. 80°C	0,2 V
Fuel pump relay	3	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	2	⇦	Engine idling – engine hot	0-1 V fluctuating
	2	⇦	Engine idling – engine hot	21
Ignition amplifier	25	⇨	Engine idling	30 Hz
	25	⇨	3000 rpm	100 Hz
	25	⇨	Engine idling	32
Ignition switch	1	⇦	Engine cranking	8 V min.
Ignition switch – through engine control relay	23	⇦	Ignition OFF	0 V
	23	⇦	Ignition ON	11-14 V
Injectors	12	⊣▷	Engine idling – engine hot	2,4 ms
	12	⊣▷	Engine idling	13
Instrument panel	24	⇨		1
Intake air temperature (IAT) sensor	6	⊣	Ignition ON	0 V
	9	⇦	Ignition ON – air temp. 20°C	1 V

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Throttle position (TP) sensor	**6**	⊣	Ignition ON	0 V
	11	⬅	Ignition ON – throttle closed	0,5-1,5 V
	11	⬅	Ignition ON – throttle fully open	3-5 V
	17	⇨	Ignition ON	5 V
Volume air flow (VAF) sensor	**6**	⊣	Ignition ON	0 V
	17	⇨	Ignition ON	5 V
	21	⬅	Ignition ON – flap closed	0,3 V
	21	⬅	Ignition ON – flap fully open	4,4 V
	21	⬅	Engine idling – engine hot	0,8 V

[1] **Connected pin - no test data available**

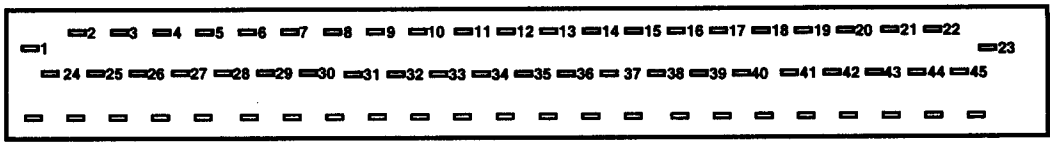
Model:	Engine code:	Year:
Polo 1,4	AFH	1995-99
Polo 1,6	AEE	1995-99
Golf/Vento 1,6	AEE	1995-97
Caddy Pickup 1,6	AEE	1997-99

VOLKSWAGEN

Magneti-Marelli 1AV

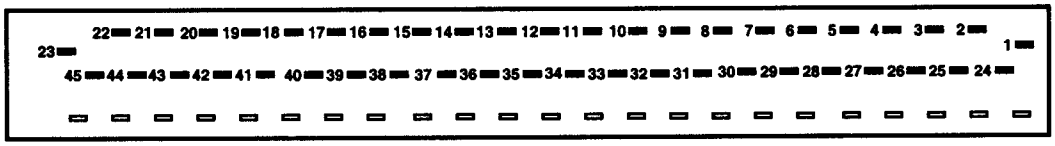
ECM harness multi-plug

Terminal side



AD61645

Wire side



AD42106

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	**33**			[1]
	35			[1]
Automatic transmission	**12**			[1]
Battery	**21**	⬅	Ignition OFF	11-14 V
Closed throttle position (CTP) switch	**10**	⬅	Ignition ON – throttle closed	0 V
	10	⬅	Ignition ON – throttle slightly open	9 V min.
Closed throttle position (CTP) switch – except Caddy Pickup	**17**	⊣	Ignition ON	0 V
Crankshaft position (CKP) sensor	**8**	⇨	Ignition ON	9 V min.
	13	⬅	Ignition ON – engine turned	0 V or 5 V
	13	⬅	Engine idling	4
Crankshaft position (CKP) sensor – except Caddy Pickup	**17**	⊣	Ignition ON	0 V
Earth	**1**		Ignition ON	0 V
Earth – Caddy Pickup	**17**		Ignition ON	0 V
Earth – some models	**12**		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	**42**	⬅	Ignition ON – coolant temp. 10°C	3,2 V
	42	⬅	Ignition ON – coolant temp. 80°C	0,5 V
Engine coolant temperature (ECT) sensor – except Caddy Pickup	**17**	⊣	Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	**3**	⇨	Ignition ON	11-14 V
	3	⇨	Engine hot – valve operating	20
Exhaust gas recirculation (EGR) solenoid – if fitted	**5**			[1]
Fuel pump relay	**25**	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	25	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	**15**	⊣	Engine idling	0 V
	38	⬅	Engine idling – engine hot	0-1 V fluctuating
	38	⬅	Engine idling – engine hot	21

Table continued on next page ➡

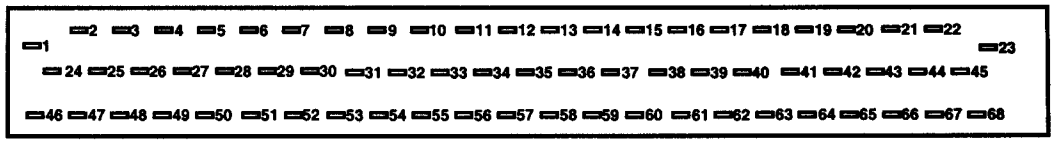
Component/circuit description	ECM pin	Signal	Condition	Typical value
Heated oxygen sensor (HO2S) – screened lead – Caddy Pickup	44	⊣	Engine idling	0 V
Idle speed control (ISC) actuator	2	⇨	Engine idling – engine hot	60-65%
	26	⇨	Engine idling – engine hot	35-40%
	26	⇨	Engine idling	28
Idle speed control (ISC) actuator position sensor	14	⇨	Ignition ON	4,5 V min.
	16	⇦	Engine idling – engine hot	3 V
Idle speed control (ISC) actuator position sensor – except Caddy Pickup	17	⊣	Ignition ON	0 V
Ignition amplifier	24	⇨	Engine idling	32
Ignition switch	23	⇦	Ignition OFF	0 V
	23	⇦	Ignition ON	11-14 V
Immobilizer control module	29	⇦⇨	Ignition ON	11-14 V
Injector 1	7	⊣▷	Ignition ON	11-14 V briefly then 0 V
	7	⊣▷	Engine idling – engine hot	4 ms
	7	⊣▷	Engine idling	35
Injector 2	6	⊣▷	Ignition ON	11-14 V briefly then 0 V
	6	⊣▷	Engine idling – engine hot	4 ms
	6	⊣▷	Engine idling	35
Injector 3	28	⊣▷	Ignition ON	11-14 V briefly then 0 V
	28	⊣▷	Engine idling – engine hot	4 ms
	28	⊣▷	Engine idling	35
Injector 4	4	⊣▷	Ignition ON	11-14 V briefly then 0 V
	4	⊣▷	Engine idling – engine hot	4 ms
	4	⊣▷	Engine idling	35
Instrument panel	9	⇨	Engine idling – engine hot	25-30 Hz
Instrument panel – some models	36			[1]
Intake air temperature (IAT) sensor	43	⇦	Ignition ON – air temp. 10°C	3,2 V
Intake air temperature (IAT) sensor – except Caddy Pickup	17	⊣	Ignition ON	0 V
Knock sensor (KS)	19 (39)	⇨	Engine idling – accelerate briefly	38
	39 (19)	⇨	Engine idling – accelerate briefly	38
Knock sensor (KS) – screened lead – Polo/Caddy Pickup	45	⊣	Engine idling	0 V
Manifold absolute pressure (MAP) sensor	18	⇦	Ignition ON	4 V
	18	⇦	Engine idling – engine hot	1,3 V
	18	⇦	Engine idling – throttle fully depressed briefly	4,2 V
	37	⇨	Ignition ON	5 V
Throttle position (TP) sensor	14	⇨	Ignition ON	4,5 V min.
	41	⇦	Ignition ON – throttle closed	4 V
	41	⇦	Ignition ON – throttle fully open	0,8 V
Throttle position (TP) sensor – except Caddy Pickup	17	⊣	Ignition ON	0 V
Transmission control module (TCM)	30			[1]
	34			[1]

[1] Connected pin - no test data available

Model:	Engine code:	Year:
Polo Classic 1,6	AFT/AKS	1995-99
Golf/Vento 1,6/2,0	AFT/AKS/ADY/AGG/AKR	1995-98
Passat 1,6	AFT/AKS	1995-97
Passat/Syncro 2,0	ADY/AGG/AKR	1994-97
Corrado 2,0	ADY	1994-95
Transporter 2,5	AET	1996-98

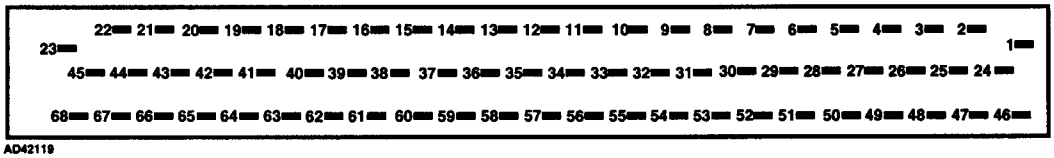
ECM harness multi-plug

Terminal side



AD61718

Wire side



AD42119

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	13			[1]
	39			[1]
Automatic transmission	5			[1]
	15			[1]
Camshaft position (CMP) sensor	35	⊣	Ignition ON	0 V
	44	⬅	Ignition ON – engine turned	0 V or 10-14 V
	44	⬅	Engine idling	30 Hz
	44	⬅	3000 rpm	100 Hz
	44	⬅	Engine idling	34
	45	⇨	Ignition ON	10 V min.
Closed throttle position (CTP) switch	18	⬅	Ignition ON – throttle closed	0 V
	18	⬅	Ignition ON – throttle slightly open	9 V min.
	35	⊣	Ignition ON	0 V
Crankshaft position (CKP) sensor	16	⊣	Engine idling	0 V
	67	⬅	Engine idling	19
	68	⇨	Ignition ON	11-14 V
Earth	1		Ignition ON	0 V
Engine control relay	23	⬅	Ignition OFF	0 V
	23	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	12	⬅	Ignition ON – coolant temp. 10°C	2,8 V
	12	⬅	Ignition ON – coolant temp. 80°C	0,4 V
	35	⊣	Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	33	⊣▷	Ignition ON	11-14 V
	33	⊣▷	Engine hot – valve operating	20
Fuel pump relay	31	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	17	⬅	Ignition ON	1,3-1,4 V
	17	⬅	Engine idling – engine hot	21
	20	⊣▷	Engine idling	0 V
	42	⊣	Engine idling	0 V
Heated oxygen sensor (HO2S) – 1,6	17	⬅	Engine idling – engine hot	0,2-1 V fluctuating
Heated oxygen sensor (HO2S) – 2,0/2,5	17	⬅	Engine idling – engine hot	0-1,1 V fluctuating

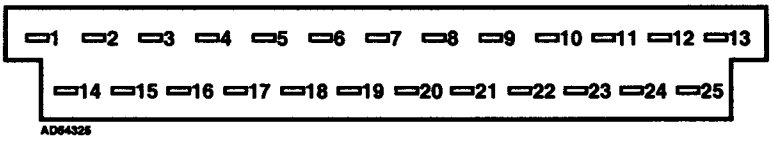
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Heated oxygen sensor (HO2S) – screened lead	21		Engine idling	0 V
Idle speed control (ISC) actuator	25 (30)		Engine idling	Intermittent 27
	30 (25)		Engine idling	Intermittent 27
Idle speed control (ISC) actuator position sensor	28		Engine idling – engine hot	3,7 V
	35		Ignition ON	0 V
	41		Ignition ON	4-6 V
Ignition amplifier	7		Engine idling	32
Ignition switch	38		Ignition OFF	0 V
	38		Ignition ON	11-14 V
Ignition switch – some models	32		Engine cranking	9 V min.
Ignition switch – through engine control relay	8		Ignition OFF	0 V
	8		Ignition ON	11-14 V
Immobilizer control module	43		Ignition ON	11-14 V
Injector 1	2		Engine idling – engine hot	3,8 ms
	2		Engine idling	35
Injector 2	46		Engine idling – engine hot	3,8 ms
	46		Engine idling	35
Injector 3	47		Engine idling – engine hot	3,8 ms
	47		Engine idling	35
Injector 4	48		Engine idling – engine hot	3,8 ms
	48		Engine idling	35
Injector 5 – 2,5	49		Engine idling – engine hot	3,8 ms
	49		Engine idling	35
Instrument panel	11		Ignition ON – vehicle pushed	0 V or 11-14 V
	11		Vehicle moving	43
	19			[1]
Instrument panel – except 2,5	10			[1]
Intake air temperature (IAT) sensor	37		Ignition ON – air temp. 10°C	2 V
Intake air temperature (IAT) sensor – 1,6	35		Ignition ON	0 V
Intake air temperature (IAT) sensor – 2,0/2,5	29		Ignition ON	0 V
Intake manifold air control solenoid – 1,6	22		Engine idling	11-14 V
	22		Above 4000 rpm	0-1 V
Knock sensor (KS) 1	34		Engine idling – accelerate briefly	38
	36		Engine idling	0 V
Knock sensor (KS) 1 – screened lead	9		Engine idling	0 V
Knock sensor (KS) 2 – Transporter	56		Engine idling – accelerate briefly	38
	57		Engine idling	0 V
Knock sensor (KS) 2 – screened lead – Transporter	55		Engine idling	0 V
Mass air flow (MAF) sensor	14		Engine idling – engine hot	1,2 V
	14		3000 rpm	1,7 V
	26		Ignition ON	0 V
Mass air flow (MAF) sensor – 2,5	35		Ignition ON	0 V
Throttle position (TP) sensor	35		Ignition ON	0 V
	40		Ignition ON – throttle closed	4,3 V
	40		Ignition ON – throttle fully open	0,7 V
	41		Ignition ON	4-6 V

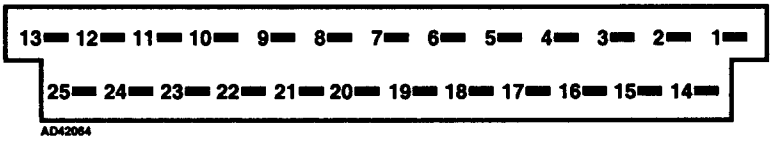
[1] Connected pin - no test data available

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Closed throttle position (CTP) switch	6	⊣	Ignition ON	0 V
	11	←	Ignition ON – throttle closed	0 V
	11	←	Ignition ON – throttle slightly open	5 V
CO adjustment resistor – 1990-94	5	←	Ignition ON	0,1-4,1 V – varies with CO level
	6	⊣	Ignition ON	0 V
Crankshaft position (CKP) sensor	6	⊣	Ignition ON	0 V
	8	⇨	Ignition ON	10 V min.
	18	←	Ignition ON – engine turned	0 V or 10-14 V
	18	←	Engine idling	30 Hz
	18	←	Engine idling	4
Data link connector (DLC) – if fitted	20	⇔		1
Earth	13		Ignition ON	0 V
Earth	19		Ignition ON	0 V
Engine control relay	14	←	Ignition OFF	0 V
	14	←	Ignition ON	11-14 V
	23	←	Ignition OFF	0 V
	23	←	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	6	⊣	Ignition ON	0 V
	10	←	Ignition ON – coolant temp. 20°C	1,5 V
	10	←	Ignition ON – coolant temp. 80°C	0,2 V
Engine oil pressure warning module – some models	24	⇨		1
Fuel pump relay	3	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	2	←	Engine idling – engine hot	0-1 V fluctuating
	2	←	Engine idling – engine hot	21
Heated oxygen sensor (HO2S) – screened lead – 1987-90	19	⊣	Engine idling	0 V
Ignition amplifier – 1990-94	25	⇨	Engine idling	
Ignition coil – 1987-90	25	⊣▷	Engine idling	33
Ignition switch	1	←	Engine cranking	8 V min.

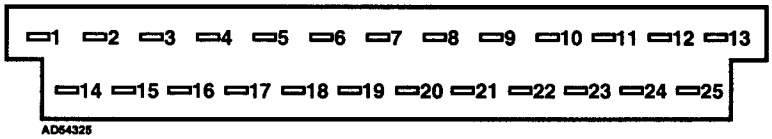
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Injectors	12	⊣▷	Engine idling – engine hot	2,4 ms
	12	⊣▷	Engine idling	35
Intake air temperature (IAT) sensor	6	⊣	Ignition ON	0 V
	9	⬅	Ignition ON – air temp. 20°C	1 V
Knock sensor (KS)	4	⬅	Engine idling – accelerate briefly	38
	7	⊣	Engine idling	0 V
Knock sensor (KS) – 1987-90	5	⊣	Engine idling	0 V
Tachometer	24	⇨		1
Volume air flow (VAF) sensor – 1987-90	6	⊣	Ignition ON	0 V
	17	⇨	Ignition ON	5 V
	21	⬅	Ignition ON – flap closed	0,3 V
	21	⬅	Ignition ON – flap fully open	4,4 V
	21	⬅	Engine idling – engine hot	0,8 V
Wide open throttle (WOT) switch	6	⊣	Ignition ON	0 V
Wide open throttle (WOT) switch – 1987-90	11	⬅	Ignition ON – throttle slightly open	5 V
	11	⬅	Ignition ON – throttle fully open	0 V
Wide open throttle (WOT) switch – 1990-94	15	⬅	Ignition ON – throttle slightly open	5 V
	15	⬅	Ignition ON – throttle fully open	0 V

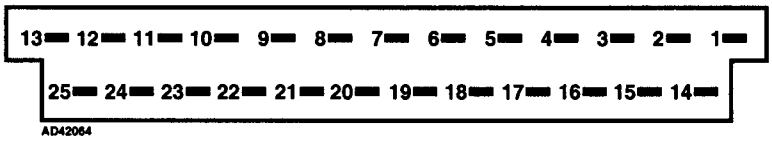
1 Connected pin - no test data available

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Closed throttle position (CTP) switch – if fitted	4	⬅	Ignition ON – throttle closed	0 V
	4	⬅	Ignition ON – throttle slightly open	5 V
Earth	7		Ignition ON	0 V
	25		Ignition ON	0 V
Engine control relay	13	⬅	Ignition OFF	0 V
	13	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	2	⬅	Ignition ON – coolant temp. 20°C	1,5 V
	2	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Fuel pump relay	20	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	5	⬅	Engine idling – engine hot	0-1 V fluctuating
	5	⬅	Engine idling – engine hot	21
Ignition amplifier	1	⇨	Engine idling	30 Hz
	1	⇨	Engine idling	32
Injectors	12	⊣▷	Engine idling – engine hot	1,9 ms
	12	⊣▷	Engine idling	35
Intake air temperature (IAT) sensor	14	⬅	Ignition ON – air temp. 20°C	1 V
Volume air flow (VAF) sensor	6	⊣	Engine idling	0 V
	15	⬅	Ignition ON – flap closed	0,3 V
	15	⬅	Ignition ON – flap fully open	4,4 V
	15	⬅	Engine idling – engine hot	0,8 V
	19	⇨	Ignition ON	5 V
Wide open throttle (WOT) switch	4	⬅	Ignition ON – throttle slightly open	5 V
	4	⬅	Ignition ON – throttle fully open	0 V

[1] Connected pin - no test data available

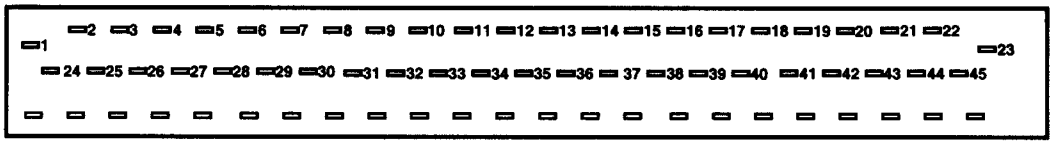
VOLKSWAGEN

Bosch Mono-Motronic MA1.2.2/1.2.3

Model:	Engine code:	Year:
Golf/Vento 1,4	ABD	1991-95
Golf/Vento 1,6	ABU/AEA	1992-95
Golf/Vento 1,8 (45 pin)	AAM	1991-98
Golf/Vento 1,8	ABS/ADZ	1991-98
Golf/Vento 1,8	ANN/ANP	1998

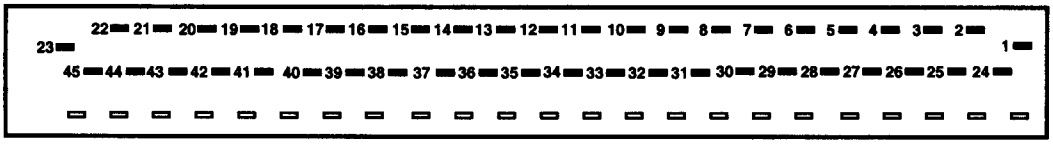
ECM harness multi-plug

Terminal side



AD81645

Wire side



AD42108

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning – 1,6/1,8	33			1
	35			1
Automatic transmission – 1,8	34		Ignition ON	11-14 V
Battery	21	⬅	Ignition OFF	11-14 V
Closed throttle position (CTP) switch	10	⬅	Ignition ON – throttle closed	0 V
	10	⬅	Ignition ON – throttle open	11-14 V
Crankshaft position (CKP) sensor	8	⇨	Ignition OFF	0 V
	8	⇨	Ignition ON	10 V min.
	13	⬅	Ignition ON – engine turned	0 V or 11-14 V
	13	⬅	Engine idling	30 Hz
	13	⬅	3000 rpm	100 Hz
	13	⬅	Engine idling	4
Data link connector (DLC) – 1991-94	29	⇦	Ignition ON	11-14 V
Data link connector (DLC) – some models	11	⬅	Ignition ON	8 V
Earth	1		Ignition ON	0 V
	20		Ignition ON	0 V
Earth – 1,8 1991-94	15		Ignition ON	0 V
Earth – 1997-98	32		Ignition ON	0 V
Earth – some models	12		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	17	⊣	Ignition ON	0 V
	42	⬅	Ignition ON – coolant temp. 20°C	2 V
	42	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Evaporative emission (EVAP) canister purge valve	3	⊣▷	Ignition OFF	11-14 V
	3	⊣▷	Engine hot – valve operating	20
Fuel pump relay	25	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	25	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	38	⬅	Engine idling – engine hot	0-1 V fluctuating
	38	⬅	Engine idling – engine hot	21

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Heated oxygen sensor (HO2S) – except 1,8 1991-94	**15**	⊣	Engine idling	0 V
Heated oxygen sensor (HO2S) – screened lead – ABD/ABU	**44**	⊣	Engine idling	0 V
Idle speed control (ISC) actuator	**2 (26)**	⇨	Engine idling	Intermittent 27
	26 (2)	⇨	Engine idling	Intermittent 27
Idle speed control (ISC) actuator position sensor – if fitted	**16**	⇦	Engine idling – engine hot	3 V or 11-14 V – intermittent
	16	⇦	Engine idling – engine hot	Intermittent 31
Ignition amplifier	**24**	⇨	Engine idling	30 Hz
	24	⇨	3000 rpm	100 Hz
	24	⇨	Engine idling	32
Ignition switch	**23**	⇦	Ignition OFF	0 V
	23	⇦	Ignition ON	11-14 V
Ignition switch – AT 1,8 1994-98	**40**	⇦	Ignition OFF	0 V
	40	⇦	Ignition ON	11-14 V
Immobilizer control module – 1994-98	**29**		Ignition ON	11-14 V
Injector	**7**	⊣▷	Ignition ON	11-14 V briefly then 0 V
	7	⊣▷	Engine idling – engine hot	2 ms
	7	⊣▷	Engine idling	13
Instrument panel	**9**	⇨		[1]
Instrument panel – 1,8	**27**			[1]
Instrument panel – except ABD	**36**	⇦	Ignition ON – vehicle pushed	0 V or 11-14 V
Intake air temperature (IAT) sensor	**17**	⊣	Ignition ON	0 V
	43	⇦	Ignition ON – air temp. 20°C	2,3 V
Intake manifold heater relay	**28**	⊣▷	Ignition ON – engine cold	0-1 V
	28	⊣▷	Ignition ON – engine hot	11-14 V
Throttle position (TP) sensor	**14**	⇦	Ignition ON	5 V
	17	⊣	Ignition ON	0 V
	18	⇦	Ignition ON – throttle closed	0,1 V
	18	⇦	Ignition ON – throttle fully open	4,5 V
	41	⇦	Ignition ON – throttle closed	1,9 V
	41	⇦	Ignition ON – throttle fully open	4,9 V

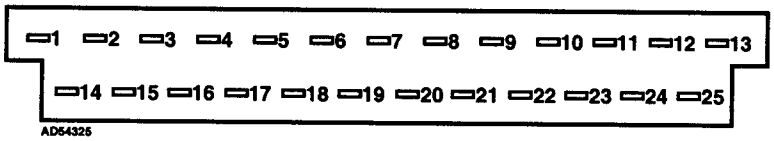
[1] **Connected pin - no test data available**

VOLKSWAGEN
VAG
Digifant ML6.1/6.1.4

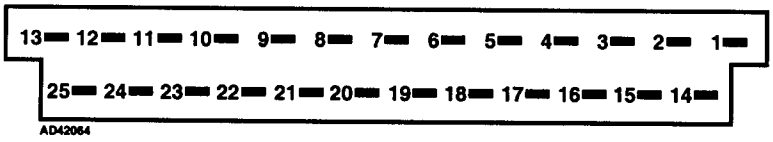
Model:	Engine code:	Year:
Golf/Jetta GTi 1,8	PB	1987-92
Golf/Jetta 1,8	PF	1987-92
Golf/Jetta/Syncro 1,8	1P	1988-91
Golf Cabrio 1,8	2H	1989-93
Passat 1,8	PB/PF	1988-91

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	**16**			[1]
Automatic transmission – Passat	**7**			[1]
	24			[1]
Closed throttle position (CTP) switch	**6**	⊣	Ignition ON	0 V
	11	⬅	Ignition ON – throttle closed	0 V
	11	⬅	Ignition ON – throttle slightly open	5 V
Crankshaft position (CKP) sensor	**6**	⊣	Ignition ON	0 V
	8	⇨	Ignition ON	10 V min.
	18	⬅	Ignition ON – engine turned	0 V or 11-14 V
	18	⬅	Engine cranking	10 Hz
	18	⬅	Engine idling	30 Hz
	18	⬅	3000 rpm	100 Hz
	18	⬅	Engine idling	4
Earth	**13**		Ignition ON	0 V
	19		Ignition ON	0 V
Engine control relay	**14**	⬅	Ignition OFF	0 V
	14	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	**6**	⊣	Ignition ON	0 V
	10	⬅	Ignition ON – coolant temp. 10°C	1,6 V
	10	⬅	Ignition ON – coolant temp. 20°C	1 V
	10	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Fuel pump relay	**3**	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	3	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S) – if fitted	**2**	⬅	Engine idling – engine hot	0-1 V fluctuating
	2	⬅	Engine idling – engine hot	21
Idle air control (IAC) valve	**22**	⇨	Engine idling – engine hot	25%
	22	⇨	Engine idling	24
	23	⊣	Engine idling	0 V

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Ignition amplifier	**25**	⇨	Engine cranking	10 Hz
	25	⇨	Engine idling	30 Hz
	25	⇨	3000 rpm	100 Hz
	25	⇨	Engine idling	32
Ignition switch	**1**	⬅	Engine cranking	8 V min.
Injectors	**12**	⊣▷	Ignition ON	11-14 V briefly then 0 V
	12	⊣▷	Engine idling – engine hot	2,4 ms
	12	⊣▷	Engine idling	35
Intake air temperature (IAT) sensor	**6**	⊣	Ignition ON	0 V
	9	⬅	Ignition ON – air temp. 10°C	1,6 V
	9	⬅	Ignition ON – air temp. 20°C	1 V
Knock sensor (KS)	**4**	⬅	Full throttle briefly	38
	5	⊣	Engine idling	0 V
Knock sensor (KS) – screened lead – Golf/Jetta	**7**	⊣	Engine idling	0 V
Spare cable – Passat	**20**			[1]
Volume air flow (VAF) sensor	**6**	⊣	Ignition ON	0 V
	17	⇨	Ignition ON	5 V
	21	⬅	Ignition ON – flap closed	0,3 V
	21	⬅	Ignition ON – flap fully open	4,6 V
	21	⬅	Engine idling – engine hot	1 V
	21	⬅	3000 rpm	1,7 V
Wide open throttle (WOT) switch	**6**	⊣	Ignition ON	0 V
	11	⬅	Ignition ON – throttle slightly open	5 V
	11	⬅	Ignition ON – throttle fully open	0 V

[1] **Connected pin - no test data available**

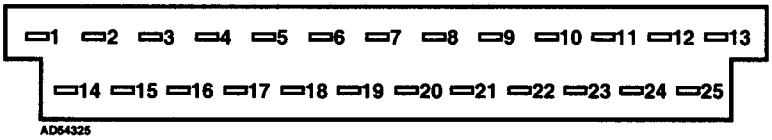
VOLKSWAGEN

VAG Digifant MP4.0 (25-pin)

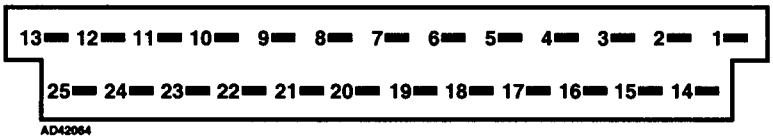
Model:	Engine code:	Year:
Golf/Rallye G60	PG	1990-91
Golf Rallye	1H	1989
Passat/Syncro 1,8 G60	PG	1989-93
Corrado 1,8 G60	PG	1989-92

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	16			1
Closed throttle position (CTP) switch – 1989-92	6	⊣	Ignition ON	0 V
	11	⬅	Ignition ON – throttle closed	0 V
	11	⬅	Ignition ON – throttle slightly open	5 V
CO adjustment resistor	5	⬅	Ignition ON	0,1-4,1 V – varies with CO level
	6	⊣	Ignition ON	0 V
Crankshaft position (CKP) sensor	6	⊣	Ignition ON	0 V
	8	⇨	Ignition ON	10 V min.
	18	⬅	Ignition ON – engine turned	0 V or 10-14 V
	18	⬅	Engine idling	30 Hz
	18	⬅	Engine idling	4
Earth	13		Ignition ON	0 V
	19		Ignition ON	0 V
Engine control relay	14	⬅	Ignition OFF	0 V
	14	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	6	⊣	Ignition ON	0 V
	10	⬅	Ignition ON – coolant temp. 20°C	1,5 V
	10	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Fuel pump relay	3	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	2	⬅	Engine idling – engine hot	0-1 V fluctuating
	2	⬅	Engine idling – engine hot	21
Idle air control (IAC) valve	22	⊣▷	Engine idling	24
Ignition coil	25	⇨	Engine idling	33
Ignition switch	1	⬅	Engine cranking	8 V min.
Ignition switch – through engine control relay – some models	23	⬅	Ignition OFF	0 V
	23	⬅	Ignition ON	11-14 V
Injectors	12	⊣▷	Engine idling – engine hot	2,4 ms
	12	⊣▷	Engine idling	35

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Instrument panel – some models	**24**			[1]
Intake air temperature (IAT) sensor	**6**	⊣	Ignition ON	0 V
	9	⬅	Ignition ON – air temp. 20°C	1 V
Knock sensor (KS)	**4**	⬅	Engine idling – accelerate briefly	WW 38
	7	⊣	Engine idling	0 V
Oxygen sensor control module – without cat	**24**			[1]
Spare cable	**20**			[1]
	21			[1]
Throttle position (TP) sensor – 1992-93	**6**	⊣	Ignition ON	0 V
	11	⬅	Ignition ON – throttle closed	0,5-1,5 V
	11	⬅	Ignition ON – throttle fully open	3-5 V
	15	⇨	Ignition ON	5 V
Wide open throttle (WOT) switch – 1989-92	**6**	⊣	Ignition ON	0 V
	15	⬅	Ignition ON – throttle slightly open	5 V
	15	⬅	Ignition ON – throttle fully open	0 V

[1] **Connected pin - no test data available**

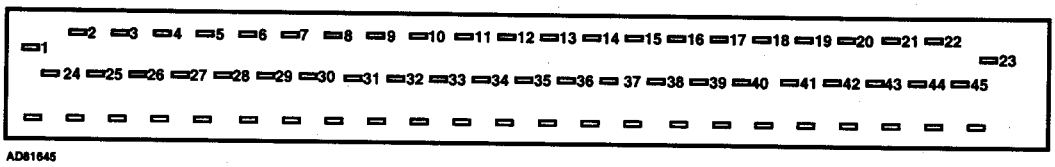
VOLKSWAGEN

VAG Digifant ML5.9

Model:	Engine code:	Year:
Golf/Vento 2,0	2E	1991-94
Corrado 2,0	2E	1993-94

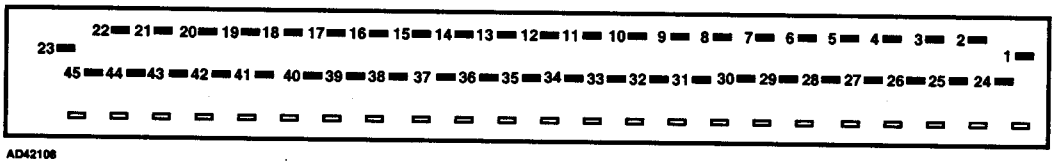
ECM harness multi-plug

Terminal side



AD81645

Wire side



AD42108

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	39			[1]
Automatic transmission	15			[1]
Cold start injector – Golf 1991-93	6		Ignition ON	11-14 V
	6		Engine cranking – engine cold	0 V briefly then 11-14 V
Crankshaft position (CKP) sensor	35		Ignition ON	0 V
	44		Ignition ON – engine turned	0 V or 10-14 V
	44		Engine idling	30 Hz
	44		3000 rpm	100 Hz
	44		Engine idling	4
	45		Ignition ON	10 V min.
Data link connector (DLC)	43			[1]
Earth	1		Ignition ON	0 V
Engine control relay	23		Ignition OFF	0 V
	23		Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	12		Ignition ON – coolant temp. 20°C	1,5 V
	12		Ignition ON – coolant temp. 80°C	0,2 V
	35		Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	33		Ignition ON	11-14 V
	33		Engine hot – valve operating	20
Fuel pump relay	31		Ignition ON	0-1 V briefly then 11-14 V
	31		Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	17		Engine idling – engine hot	0-1 V fluctuating
	17		Engine idling – engine hot	21
	20		Engine idling	0 V
	42		Engine idling	0 V
Heated oxygen sensor (HO2S) – screened lead	21		Engine idling	0 V
Idle air control (IAC) valve	30		Engine idling	24

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Ignition amplifier	**7**	⇨	Engine idling	30 Hz
	7	⇨	3000 rpm	100 Hz
	7	⇨	Engine idling	32
Ignition switch	**32**	⇦	Engine cranking	8 V min.
Ignition switch – through engine control relay	**8**	⇦	Ignition OFF	0 V
	8	⇦	Ignition ON	11-14 V
Injectors	**2**	⇉	Ignition ON	11-14 V briefly then 0 V
	2	⇉	Engine idling	2,3 ms
	2	⇉	Engine idling	35
Instrument panel	**10**			[1]
	11			[1]
	19			[1]
Intake air temperature (IAT) sensor	**35**	⇇	Ignition ON	0 V
	37	⇦	Ignition ON – air temp. 20°C	1,4 V
Knock sensor (KS)	**34 (36)**	⇨	Engine idling – accelerate briefly	38
	36 (34)	⇨	Engine idling – accelerate briefly	38
	9	⇇	Engine idling	0 V
Throttle position (TP) sensor	**35**	⇇	Ignition ON	0 V
	40	⇦	Ignition ON – throttle closed	0,5-1,5 V
	40	⇦	Ignition ON – throttle fully open	3-5 V
	41	⇨	Ignition ON	5 V
Volume air flow (VAF) sensor	**14**	⇦	Ignition ON – flap closed	0,3 V
	14	⇦	Ignition ON – flap fully open	4,4 V
	14	⇦	Engine idling	0,8 V
	16	⇨	Ignition ON	5 V
	35	⇇	Ignition ON	0 V

[1] **Connected pin - no test data available**

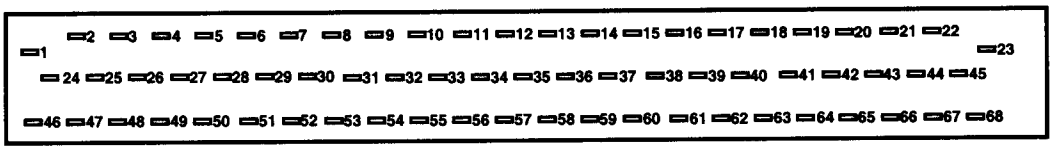
VOLKSWAGEN

VAG Digifant MP4.4

Model:	Engine code:	Year:
Golf/Vento 2,0 16V	ABF	1992-98
Passat 2,0 16V	ABF	1994-96

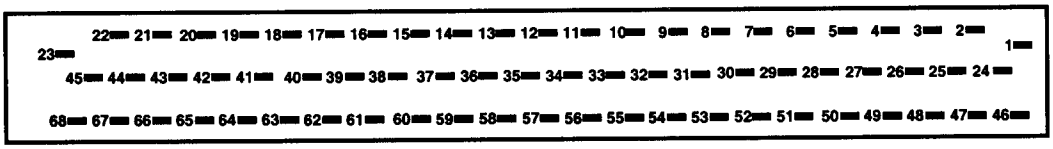
ECM harness multi-plug

Terminal side



AD61718

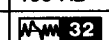
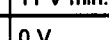
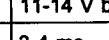
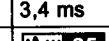
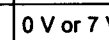
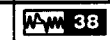
Wire side



AD42119

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	39			1
Automatic transmission	11			1
	18			1
Camshaft position (CMP) sensor	44	⬅	Engine idling	34
	45	⇨	Ignition ON	11-14 V
Closed throttle position (CTP) switch	21	⬅	Ignition ON – throttle closed	0 V
	21	⬅	Ignition ON – throttle fully open	11-14 V
Crankshaft position (CKP) sensor	67	⬅	Engine idling	19
	68	⇨	Ignition ON	11-14 V
Data link connector (DLC) – 1992-94	43	⬌	Engine idling	11-14 V
Earth	1		Ignition ON	0 V
	33		Ignition ON	0 V
Engine control relay	23	⬅	Ignition OFF	0 V
	23	⬅	Ignition ON	11 V min.
Engine coolant temperature (ECT) sensor	14	⬅	Ignition ON – coolant temp. 10°C	1 V
	14	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Evaporative emission (EVAP) canister purge valve	31	⇉	Ignition ON	11-14 V
	31	⇉	Engine hot – valve operating	20
Fuel pump relay	6	⇉	Ignition ON	0-1 V briefly then 11-14 V
	6	⇉	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	20	⬅	Engine idling – engine hot	0-1 V fluctuating
	20	⬅	Engine idling – engine hot	21
	42	⇉	Engine idling	0 V
Heated oxygen sensor (HO2S) – screened lead	65	⇉	Engine idling	0 V
Idle air control (IAC) valve	27	⇉	Engine idling	24
	27	⇉	Engine idling – engine hot	50%

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Ignition amplifier	**8**	⇨	Engine idling	30 Hz
	8	⇨	3000 rpm	100 Hz
	8	⇨	Engine idling	
Ignition switch	**7**	⇦	Engine cranking	8 V min.
	38	⇦	Ignition OFF	0 V
	38	⇦	Ignition ON	11 V min.
Ignition switch – through engine control relay	**9**	⇦	Ignition OFF	0 V
	9	⇦	Ignition ON	9 V min.
Immobilizer control module – 1994-98	**43**		Engine idling	11-14 V
Injector 1	**24**	⇉	Ignition ON	11-14 V briefly then 0 V
	24	⇉	Engine idling – engine hot	3,4 ms
	24	⇉	Engine idling	
Injector 2	**25**	⇉	Ignition ON	11-14 V briefly then 0 V
	25	⇉	Engine idling – engine hot	3,4 ms
	25	⇉	Engine idling	
Injector 3	**26**	⇉	Ignition ON	11-14 V briefly then 0 V
	26	⇉	Engine idling – engine hot	3,4 ms
	26	⇉	Engine idling	
Injector 4	**2**	⇉	Ignition ON	11-14 V briefly then 0 V
	2	⇉	Engine idling – engine hot	3,4 ms
	2	⇉	Engine idling	
Instrument panel	**22**			[1]
	35	⇦	Ignition ON – vehicle pushed	0 V or 7 V
	51			[1]
Intake air temperature (IAT) sensor	**36**	⇦	Ignition ON – air temp. 10°C	1,6 V
Knock sensor (KS) 1	**32 (34)**	⇦	Engine idling – accelerate briefly	
	34 (32)	⇦	Engine idling – accelerate briefly	
	10	⇇	Engine idling	0 V
Knock sensor (KS) 2	**56 (57)**	⇦	Engine idling – accelerate briefly	
	57 (56)	⇦	Engine idling – accelerate briefly	
	55	⇇	Engine idling	0 V
Oxygen sensor heater relay	**28**	⇉	Ignition ON	0-1 V
Throttle position (TP) sensor	**40**	⇦	Ignition ON – throttle closed	0,5-1,5 V
	40	⇦	Ignition ON – throttle fully open	3-5 V
	41	⇨	Ignition ON	5 V

[1] **Connected pin - no test data available**

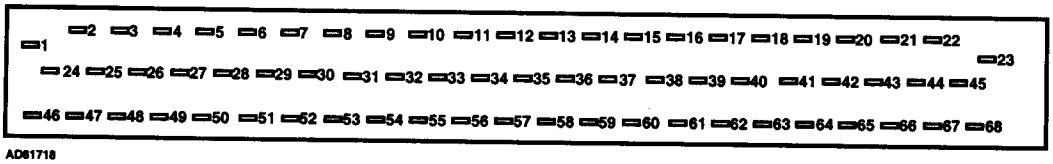
VOLKSWAGEN

Bosch Motronic M2.9

Model:	Engine code:	Year:
Golf/Vento 2,8	AAA	1991-92
Passat 2,8	AAA	10/91-92
Corrado 2,9	ABV	1991-7/92

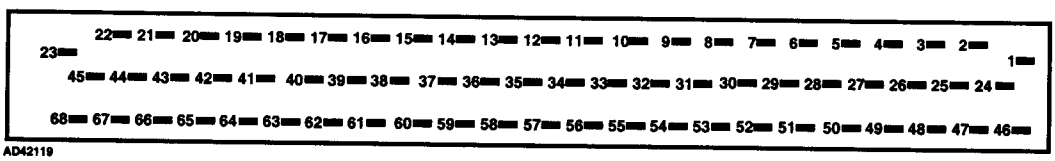
ECM harness multi-plug

Terminal side



AD61718

Wire side



AD42119

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	37			1
	39			1
Automatic transmission	18			1
	58			1
Battery	54	⬅	Ignition OFF	11-14 V
Camshaft position (CMP) sensor	44	⬅	Engine idling	34
Crankshaft position (CKP) sensor	67	⬅	Engine idling	2
	68	⊣	Engine idling	0 V
Data link connector (DLC)	21			1
	43		Engine idling	11-14 V
Earth	1		Ignition ON	0 V
	55		Ignition ON	0 V
	56		Ignition ON	0 V
Earth – some models	7		Ignition ON	0 V
Engine control relay	9	⊣▷	Ignition OFF	11-14 V
	9	⊣▷	Ignition ON	0-1 V
	23	⬅	Ignition OFF	0 V
	23	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	14	⬅	Ignition ON – coolant temp. 5°C	1,5 V
	14	⬅	Ignition ON – coolant temp. 80°C	0,3 V
	33	⊣	Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	31	⊣▷	Engine hot – valve operating	20
Fuel pump relay	6	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	6	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	20	⬅	Engine idling – engine hot	0-1 V fluctuating
	20	⬅	Engine idling – engine hot	21
	42	⊣	Engine idling	0 V
Idle air control (IAC) valve	27 (53)	⇨	Engine idling	28
	53 (27)	⇨	Engine idling	28

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Ignition amplifier	8	⇨	Engine idling	32
Ignition switch	38	⬅	Ignition OFF	0 V
	38	⬅	Ignition ON	11-14 V
Injector 1	24	⊣▷	Ignition ON	11-14 V
	24	⊣▷	Engine idling – engine hot	3,3 ms
	24	⊣▷	Engine idling	35
Injector 2	3	⊣▷	Ignition ON	11-14 V
	3	⊣▷	Engine idling – engine hot	3,3 ms
	3	⊣▷	Engine idling	35
Injector 3	26	⊣▷	Ignition ON	11-14 V
	26	⊣▷	Engine idling – engine hot	3,3 ms
	26	⊣▷	Engine idling	35
Injector 4	4	⊣▷	Ignition ON	11-14 V
	4	⊣▷	Engine idling – engine hot	3,3 ms
	4	⊣▷	Engine idling	35
Injector 5	25	⊣▷	Ignition ON	11-14 V
	25	⊣▷	Engine idling – engine hot	3,3 ms
	25	⊣▷	Engine idling	35
Injector 6	2	⊣▷	Ignition ON	11-14 V
	2	⊣▷	Engine idling – engine hot	3,3 ms
	2	⊣▷	Engine idling	35
Instrument panel	22			[1]
	65	⬅	Ignition ON – vehicle pushed	0 V or 11-14 V
Instrument panel – Golf/Vento	51			[1]
Intake air temperature (IAT) sensor	33	⊣—	Ignition ON	0 V
	36	⬅	Ignition ON – air temp. 5°C	1,5 V
Knock sensor (KS) 1	33	⊣—	Engine idling	0 V
	34	⬅	Engine idling – accelerate briefly	38
Knock sensor (KS) 2	33	⊣—	Engine idling	0 V
	57	⬅	Engine idling – accelerate briefly	38
Mass air flow (MAF) sensor	16	⊣—	Engine idling	0 V
	17	⬅	Engine idling – engine hot	2,3 V
	17	⬅	3000 rpm	2,8 V
Mass air flow (MAF) sensor – filament burn-off	59	⇨	Engine idling – engine hot	0 V
	59	⇨	Engine hot – switch ignition OFF – wait 4 seconds	4 V briefly
Oxygen sensor heater relay	28	⊣▷	Engine idling	0-1 V
Spare cable – Passat/Corrado	51			[1]
Spare cable – some models	15			[1]
Throttle position (TP) sensor	33	⊣—	Ignition ON	0 V
	40	⬅	Ignition ON – throttle closed	0,6 V
	40	⬅	Ignition ON – throttle fully open	4,6 V
	41	⇨	Ignition ON	5 V

[1] Connected pin - no test data available

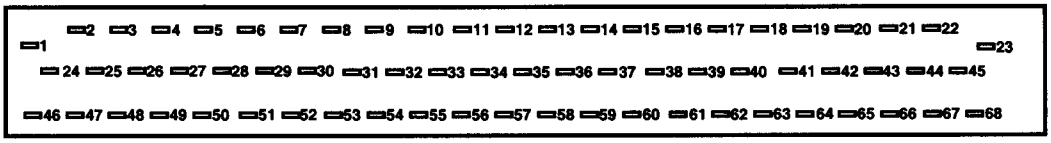
VOLKSWAGEN

Bosch Motronic M2.9/M2.9.1

Model:	Engine code:	Year:
Golf/Vento 2,8	AAA	1993-07/95
Golf Syncro 2,9	ABV	1994-07/95
Passat 2,8	AAA	1993-07/95
Passat Syncro 2,9	ABV	1994-07/95
Corrado 2,8	AAA	1992-94
Corrado 2,9	ABV	08/92-95

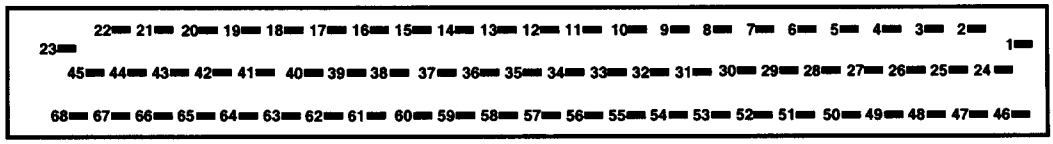
ECM harness multi-plug

Terminal side



AD61718

Wire side



AD42119

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	**37**			1
	39			1
Automatic transmission	**11**			1
	18			1
Battery	**54**	⬅	Ignition OFF	11-14 V
Camshaft position (CMP) sensor	**44**	⬅	Engine idling	34
	67	⬅	Engine idling	2
	68	⊣	Engine idling	0 V
Data link connector (DLC) – 1992-94	**43**		Engine idling	11-14 V
Data link connector (DLC) – some models	**21**			1
Earth	**1**		Ignition ON	0 V
	7		Ignition ON	0 V
	55		Ignition ON	0 V
	56		Ignition ON	0 V
Earth – AT	**58**		Ignition ON	0 V
Engine control relay	**9**	⊣▷	Ignition OFF	11-14 V
	9	⊣▷	Ignition ON	0-1 V
	23	⬅	Ignition OFF	0 V
	23	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	**14**	⬅	Ignition ON – coolant temp. 5°C	1,5 V
	14	⬅	Ignition ON – coolant temp. 80°C	0,3 V
	33	⊣	Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	**31**	⊣▷	Engine hot – valve operating	20
Fuel pump relay	**6**	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	6	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	**20**	⬅	Engine idling – engine hot	0-1 V fluctuating
	20	⬅	Engine idling – engine hot	21
	42	⊣	Engine idling	0 V
Idle air control (IAC) valve	**27 (53)**	⇨	Engine idling	28
	53 (27)	⇨	Engine idling	28

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Ignition amplifier	8	⇨	Engine idling	32
	52	⇨	Engine idling	32
	60	⇨	Engine idling	32
Ignition switch	38	⇦	Ignition OFF	0 V
	38	⇦	Ignition ON	11-14 V
Immobilizer control module – 1994-95	43		Engine idling	11-14 V
Injector 1	24	⇉	Ignition ON	11-14 V
	24	⇉	Engine idling – engine hot	3,3 ms
	24	⇉	Engine idling	35
Injector 2	3	⇉	Ignition ON	11-14 V
	3	⇉	Engine idling – engine hot	3,3 ms
	3	⇉	Engine idling	35
Injector 3	26	⇉	Ignition ON	11-14 V
	26	⇉	Engine idling – engine hot	3,3 ms
	26	⇉	Engine idling	35
Injector 4	4	⇉	Ignition ON	11-14 V
	4	⇉	Engine idling – engine hot	3,3 ms
	4	⇉	Engine idling	35
Injector 5	25	⇉	Ignition ON	11-14 V
	25	⇉	Engine idling – engine hot	3,3 ms
	25	⇉	Engine idling	35
Injector 6	2	⇉	Ignition ON	11-14 V
	2	⇉	Engine idling – engine hot	3,3 ms
	2	⇉	Engine idling	35
Instrument panel	22			[1]
	65	⇦	Ignition ON – vehicle pushed	0 V or 11-14 V
Instrument panel – some models	51			[1]
Intake air temperature (IAT) sensor	33	⇇	Ignition ON	0 V
	36	⇦	Ignition ON – air temp. 5°C	1,5 V
Knock sensor (KS) 1	33	⇇	Engine idling	0 V
	34	⇦	Engine idling – accelerate briefly	38
Knock sensor (KS) 2	33	⇇	Engine idling	0 V
	57	⇦	Engine idling – accelerate briefly	38
Mass air flow (MAF) sensor	16	⇇	Engine idling	0 V
Mass air flow (MAF) sensor – 4-wire	17	⇦	Engine idling – engine hot	0,8 V
	17	⇦	3000 rpm	1,7 V
Mass air flow (MAF) sensor – 5-wire	17	⇦	Engine idling – engine hot	2,3 V
	17	⇦	3000 rpm	2,8 V
Mass air flow (MAF) sensor – filament burn-off – 5-wire	59	⇨	Engine idling – engine hot	0 V
	59	⇨	Engine hot – switch ignition OFF – wait 4 seconds	4 V briefly
Oxygen sensor heater relay	28	⇉	Engine idling	0-1 V
Throttle position (TP) sensor	33	⇇	Ignition ON	0 V
	40	⇦	Ignition ON – throttle closed	0,6 V
	40	⇦	Ignition ON – throttle fully open	4,6 V
	41	⇨	Ignition ON	5 V

[1] Connected pin - no test data available

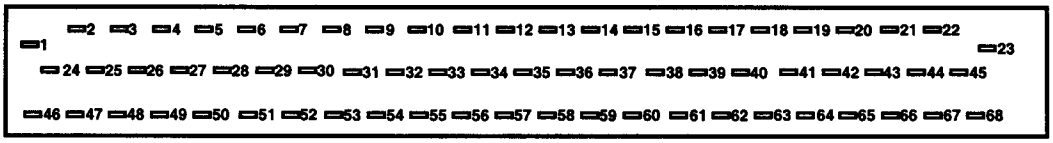
VOLKSWAGEN

Bosch Motronic M3.8.1

Model:	Engine code:	Year:
Golf/Vento 2,8	AAA	08/95-98
Golf Syncro 2,9	ABV	08/95-97
Passat 2,8	AAA	08/95-96
Passat Syncro 2,9	ABV	07/95-96
Sharan 2,8	AAA/AMY	1995-98

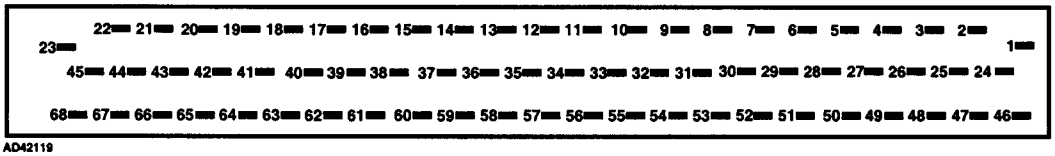
ECM harness multi-plug

Terminal side



AD81718

Wire side



AD42119

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	37			[1]
	39			[1]
Automatic transmission	11			[1]
	18			[1]
Automatic transmission – Sharan	7		Ignition ON	0 V
Battery	54	⬅	Ignition OFF	11-14 V
Camshaft position (CMP) sensor	44	⬅	Engine idling	34
Camshaft position (CMP) sensor – Golf/Vento	41	⇨	Ignition ON	5 V
Closed throttle position (CTP) switch	10	⬅	Ignition ON – throttle closed	0 V
	10	⬅	Ignition ON – throttle open	11-14 V
	33	⊣	Ignition ON	0 V
Crankshaft position (CKP) sensor	67	⬅	Engine idling	2
	68	⬅	Engine idling	2
Data link connector (DLC) – Passat	21			[1]
Earth	1		Ignition ON	0 V
	56		Ignition ON	0 V
Earth – except Sharan AT	7		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	14	⬅	Ignition ON – coolant temp. 10°C	2,8 V
	14	⬅	Ignition ON – coolant temp. 80°C	0,4 V
	33	⊣	Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	31	⊣▷	Engine hot – valve operating	20
Exhaust gas recirculation (EGR) solenoid – Sharan	30	⊣▷		[1]
Exhaust gas recirculation temperature (EGRT) sensor – Sharan	15	⬅		[1]
	33	⊣	Ignition ON	0 V
Fuel pump relay – except Sharan 1998-99	6	⊣▷	Engine cranking	0-1 V
Fuel pump relay – through crash control module – Sharan 1998-99	6	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	12	⊣▷	Engine idling – engine cold	0-1 V
	20	⬅	Engine idling – engine hot	0-1 V fluctuating
	20	⬅	Engine idling – engine hot	21
	42	⊣	Engine idling	0 V

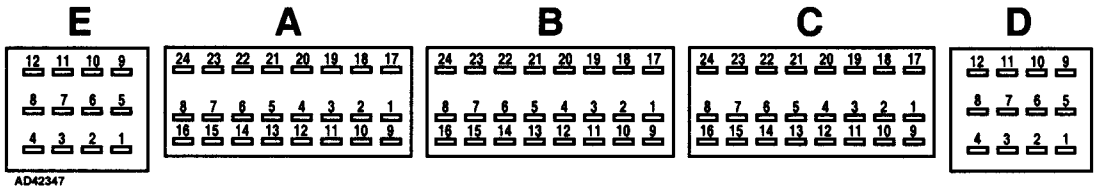
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Idle speed control (ISC) actuator	**27 (53)**	⇨	Engine idling	28
	53 (27)	⇨	Engine idling	28
Idle speed control (ISC) actuator position sensor	**33**	⊣	Ignition ON	0 V
	41	⇨	Ignition ON	5 V
	62	⇦	Engine idling – engine hot	3,7 V
Ignition amplifier	**8**	⇨	Engine idling	32
	52	⇨	Engine idling	32
	60	⇨	Engine idling	32
Ignition switch	**23**	⇦	Ignition OFF	0 V
	23	⇦	Ignition ON	11-14 V
Immobilizer control module	**43**	⇦	Engine idling	11-14 V
Injector 1	**24**	⊣▷	Engine idling – engine hot	3,3 ms
	24	⊣▷	Engine idling	35
Injector 2	**25**	⊣▷	Engine idling – engine hot	3,3 ms
	25	⊣▷	Engine idling	35
Injector 3	**26**	⊣▷	Engine idling – engine hot	3,3 ms
	26	⊣▷	Engine idling	35
Injector 4	**2**	⊣▷	Engine idling – engine hot	3,3 ms
	2	⊣▷	Engine idling	35
Injector 5	**3**	⊣▷	Engine idling – engine hot	3,3 ms
	3	⊣▷	Engine idling	35
Injector 6	**4**	⊣▷	Engine idling – engine hot	3,3 ms
	4	⊣▷	Engine idling	35
Instrument panel	**22**			[1]
	51	⇨	Engine idling	30 Hz
	51	⇨	3000 rpm	100 Hz
	65	⇦	Ignition ON – vehicle pushed	0 V or 11-14 V
Instrument panel – Passat	**5**			[1]
Intake air temperature (IAT) sensor	**33**	⊣	Ignition ON	0 V
	36	⇦	Ignition ON – air temp. 10°C	2,8 V
Knock sensor (KS) 1	**33**	⊣	Engine idling	0 V
	34	⇦	Engine idling – accelerate briefly	38
Knock sensor (KS) 2	**33**	⊣	Engine idling	0 V
	57	⇦	Engine idling – accelerate briefly	38
Mass air flow (MAF) sensor	**16**	⊣	Engine idling	0 V
	17	⇦	Engine idling – engine hot	0,8 V
	17	⇦	3000 rpm	1,6 V
Secondary air injection (AIR) pump relay – Sharan	**49**	⊣▷	Engine idling – engine cold	0-1 V
	49	⊣▷	Engine idling – engine hot	11-14 V
Secondary air injection (AIR) solenoid – Sharan	**50**	⊣▷	Engine idling – engine cold	0-1 V
	50	⊣▷	Engine idling – engine hot	11-14 V
Throttle position (TP) sensor	**33**	⊣	Ignition ON	0 V
	40	⇦	Ignition ON – throttle closed	4,3 V – after 20 seconds
	40	⇦	Ignition ON – throttle fully open	0,7 V
	41	⇨	Ignition ON	5 V

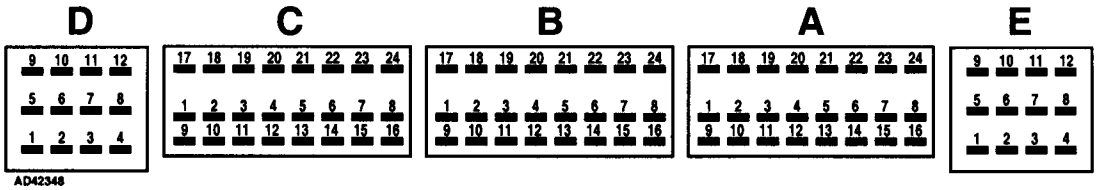
[1] Connected pin - no test data available

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	**C14**			[1]
Automatic transmission	**B1**			[1]
	B9			[1]
	B11			[1]
Battery	**D9**	⬅	Ignition OFF	11-14 V
Camshaft position (CMP) sensor	**A3**	⇨	Ignition ON	5 V
	A15	⊣	Ignition ON	0 V
	B2	⬅	Ignition ON – engine turned	0 V or 11-14 V
	B2	⬅	Engine idling	34
Closed throttle position (CTP) switch	**A15**	⊣	Ignition ON	0 V
	B4	⬅	Ignition ON – throttle closed	0 V
	B4	⬅	Ignition ON – throttle open	11-14 V
Crankshaft position (CKP) sensor	**B15**	⊣	Engine idling	0 V
	B16	⬅	Engine idling	2
Earth	**D11**		Ignition ON	0 V
	D12		Ignition ON	0 V
	E11		Ignition ON	0 V
	E12		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	**A5**	⬅	Ignition ON – coolant temp. 10°C	2 V
	A5	⬅	Ignition ON – coolant temp. 80°C	0,4 V
	A15	⊣	Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	**D4**	⊣▷	Engine hot – valve operating	20
Fuel pump relay	**D6**	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	**A10**	⊣	Engine idling	0 V
	A11	⬅	Engine idling – engine hot	0-1 V fluctuating
	A11	⬅	Engine idling – engine hot	21
Idle speed control (ISC) actuator	**D1 (D5)**	⇨	Engine idling	28
	D5 (D1)	⇨	Engine idling	28

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Idle speed control (ISC) actuator position sensor	**A3**	⇨	Ignition ON	5 V
	A13	⬅	Engine idling – engine hot	3,6 V
	A15	⊣	Ignition ON	0 V
Ignition amplifier	**B5**	⇨	Engine idling	32
Ignition switch	**D10**	⬅	Ignition OFF	0 V
	D10	⬅	Ignition ON	11-14 V
Injector 1	**E1**	⊣▷	Engine idling – engine hot	2-3,5 ms
	E1	⊣▷	Engine idling	35
Injector 2	**E6**	⊣▷	Engine idling – engine hot	2-3,5 ms
	E6	⊣▷	Engine idling	35
Injector 3	**E5**	⊣▷	Engine idling – engine hot	2-3,5 ms
	E5	⊣▷	Engine idling	35
Injector 4	**E2**	⊣▷	Engine idling – engine hot	2-3,5 ms
	E2	⊣▷	Engine idling	35
Instrumentation control module	**A7**	⇨	Ignition ON	11-14 V
	C10	⇨	Engine idling	30 Hz
	C10	⇨	3000 rpm	100 Hz
	C12			[1]
	C13	⬅	Ignition ON – vehicle pushed	0 V or 11-14 V
Knock sensor (KS)	**A8**	⬅	Engine idling – accelerate briefly	38
	A15	⊣	Engine idling	0 V
Mass air flow (MAF) sensor	**A1**	⬅	Engine idling	1,2 V
	A1	⬅	2000 rpm	1,6 V
	A1	⬅	4000 rpm	2,2 V
	A9	⊣	Engine idling	0 V
Throttle position (TP) sensor	**A3**	⇨	Ignition ON	5 V
	A14	⬅	Ignition ON – throttle closed	4 V
	A14	⬅	Ignition ON – throttle fully open	0,6 V
	A15	⊣	Ignition ON	0 V

[1] **Connected pin - no test data available**

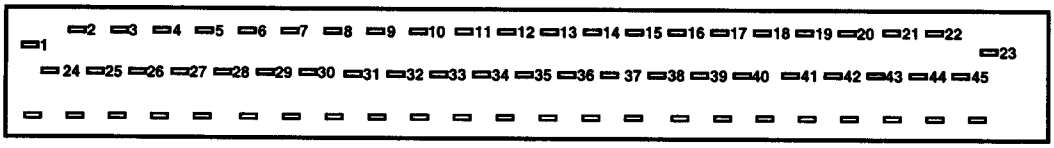
VOLKSWAGEN

Bosch Mono-Motronic MA1.2.2/3 (45-pin)

Model:	Engine code:	Year:
Passat 1,8	AAM	1992-96
Passat 1,8	ABS	1992-95
Passat 1,8	ADZ	1994-96

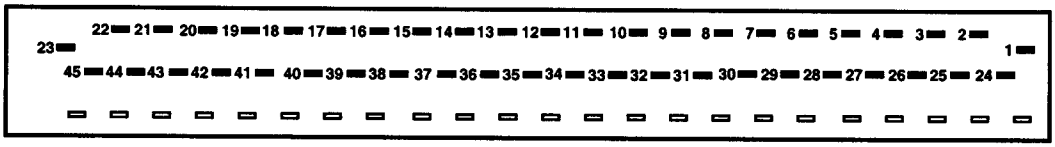
ECM harness multi-plug

Terminal side



AD81645

Wire side



AD42106

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	33			[1]
	35			[1]
Automatic transmission	34			[1]
Automatic transmission – some models	12			[1]
Battery	21	⬅	Ignition OFF	11-14 V
Closed throttle position (CTP) switch	10	⬅	Ignition ON – throttle closed	0 V
	10	⬅	Ignition ON – throttle open	11-14 V
Crankshaft position (CKP) sensor	8	⇨	Ignition OFF	0 V
	8	⇨	Ignition ON	10 V min.
	13	⬅	Ignition ON – engine turned	0 V or 10-14 V
	13	⬅	Engine idling	30 Hz
	13	⬅	3000 rpm	100 Hz
	13	⬅	Engine idling	4
Data link connector (DLC) – 1992-94	29	⬅⇨	Ignition ON	11-14 V
Data link connector (DLC) – some models	11	⬅	Ignition ON	8 V
Earth	1		Ignition ON	0 V
	20		Ignition ON	0 V
Earth – 1992-94	15		Ignition ON	0 V
Earth – some models	12		Ignition ON	0 V
Engine coolant temperature (ECT) sensor	17	⊣	Ignition ON	0 V
	42	⬅	Ignition ON – coolant temp. 20°C	2 V
	42	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Evaporative emission (EVAP) canister purge valve	3	⊣▷	Ignition OFF	11-14 V
	3	⊣▷	Engine hot – valve operating	20
Fuel pump relay	25	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	25	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	38	⬅	Engine idling – engine hot	0-1 V fluctuating
	38	⬅	Engine idling – engine hot	21
Heated oxygen sensor (HO2S) – 1994-96	15	⊣	Engine idling	0 V

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Idle speed control (ISC) actuator	**2 (26)**	⇨	Engine idling	Intermittent 27
	26 (2)	⇨	Engine idling	Intermittent 27
Idle speed control (ISC) actuator position sensor – AAM/ADZ 1994-96	**16**	⇦	Engine idling – engine hot	3 V or 11-14 V – intermittent
	16	⇦	Engine idling – engine hot	Intermittent 31
Ignition amplifier	**24**	⇨	Engine idling	30 Hz
	24	⇨	3000 rpm	100 Hz
	24	⇨	Engine idling	32
Ignition switch	**23**	⇦	Ignition OFF	0 V
	23	⇦	Ignition ON	11-14 V
Ignition switch – AT	**40**	⇦	Ignition ON	11-14 V
Immobilizer control module – 1994-96	**29**		Ignition ON	11-14 V
Injector	**7**	⇉	Ignition ON	11-14 V briefly then 0 V
	7	⇉	Engine idling – engine hot	2 ms
	7	⇉	Engine idling	35
Instrument panel	**9**	⇨		[1]
	36	⇦		[1]
Instrument panel – some models	**27**			[1]
Intake air temperature (IAT) sensor	**17**	⇇	Ignition ON	0 V
	43	⇦	Ignition ON – air temp. 20°C	2,3 V
Intake manifold heater relay	**28**	⇉	Ignition ON – engine cold	0-1 V
	28	⇉	Ignition ON – engine hot	11-14 V
Throttle position (TP) sensor	**14**	⇨	Ignition ON	5 V
	17	⇇	Ignition ON	0 V
	18	⇦	Ignition ON – throttle closed	0,1 V
	18	⇦	Ignition ON – throttle fully open	4,5 V
	41	⇦	Ignition ON – throttle closed	1,9 V
	41	⇦	Ignition ON – throttle fully open	4,9 V

[1] Connected pin - no test data available

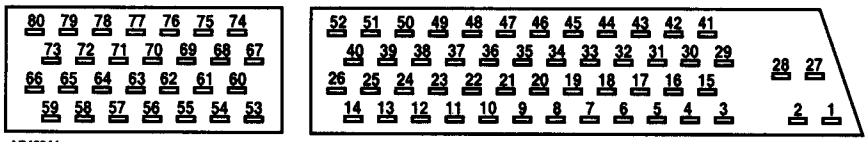
VOLKSWAGEN

Bosch Motronic M3.8.2

Model:	Engine code:	Year:
Passat 1,8	ADR	1996-99
Passat 1,8 Turbo	AEB	1996-99

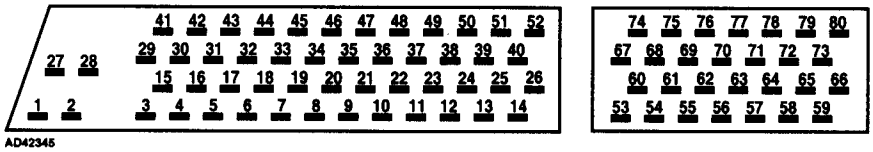
ECM harness multi-plug

Terminal side



AD42344

Wire side



AD42345

Component/circuit description	ECM pin	Signal	Condition	Typical value
ABS control module – AT – Turbo	**5**			[1]
Air conditioning	**8**		Engine idling – AC OFF	0 V
	8		Engine idling – AC ON – AC compressor ON	11-14 V
Air conditioning – except Turbo 1997-99	**10**			[1]
Automatic transmission	**7**			[1]
	22			[1]
	23			[1]
Automatic transmission – Turbo	**49**			[1]
Barometric pressure (BARO) sensor – Turbo	**61**	⬅	Ignition ON – at sea level	4 V
	61	⬅	Ignition ON – 1000 m above sea level	3 V
	61	⬅	Ignition ON – 2000 m above sea level	2,1 V
	62	⇨	Ignition ON	5 V
	67	⊣	Ignition ON	0 V
Battery	**3**	⬅	Ignition OFF	11-14 V
Camshaft position (CMP) actuator – non-Turbo	**55**	⊣▷	Engine idling	11-14 V
	55	⊣▷	Accelerate – in first gear (MT) – in second gear (AT) – 1800-3200 rpm	0-1 V briefly
Camshaft position (CMP) sensor	**67**	⊣	Ignition ON	0 V
	76	⬅	Engine idling	34
Camshaft position (CMP) sensor – non-Turbo	**62**	⇨	Ignition ON	5 V
Camshaft position (CMP) sensor – Turbo	**11**	⇨	Ignition ON	5 V
Closed throttle position (CTP) switch	**67**	⊣	Ignition ON	0 V
	69	⬅	Ignition ON – throttle closed	0 V
	69	⬅	Ignition ON – throttle open	11-14 V
Crankshaft position (CKP) sensor	**56**	⬅	Engine idling	2
	63	⬅	Engine idling	2
Earth	**2**		Ignition ON	0 V

Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Engine coolant temperature (ECT) sensor	53	⬅	Ignition ON – coolant temp. 10°C	2 V
	53	⬅	Ignition ON – coolant temp. 80°C	0,4 V
	67	⊣	Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	15	⊣▷	Engine hot – valve operating	20
Fuel pump relay	4	⊣▷	Ignition ON	0 V briefly then 11-14 V
	4	⊣▷	Engine idling	0-1 V
Heated oxygen sensor (HO2S)	25	⊣	Engine idling	0 V
	26	⬅	Engine idling – engine hot	0-1 V fluctuating
	26	⬅	Engine idling – engine hot	21
	27	⊣▷	Engine idling	0-1 V
Idle speed control (ISC) actuator	59 (66)	⇨	Engine idling	28
	66 (59)	⇨	Engine idling	28
Idle speed control (ISC) actuator position sensor	67	⊣	Ignition ON	0 V
	74	⬅	Engine idling – engine hot	3,6-3,9 V
Idle speed control (ISC) actuator position sensor – non-Turbo	62	⇨	Ignition ON	5 V
Idle speed control (ISC) actuator position sensor – Turbo	11	⇨	Ignition ON	5 V
Ignition amplifier	71	⇨	Engine idling	32
	78	⇨	Engine idling	32
Ignition amplifier – Turbo	70	⇨	Engine idling	32
	77	⇨	Engine idling	32
Ignition switch	1	⬅	Ignition OFF	0 V
	1	⬅	Ignition ON	11-14 V
Injector 1	73	⊣▷	Engine idling	35
Injector 1 – non-Turbo	73	⊣▷	Engine idling – engine hot	2-5 ms
Injector 1 – Turbo	73	⊣▷	Engine idling – engine hot	1-3 ms
Injector 2	80	⊣▷	Engine idling	35
Injector 2 – non-Turbo	80	⊣▷	Engine idling – engine hot	2-5 ms
Injector 2 – Turbo	80	⊣▷	Engine idling – engine hot	1-3 ms
Injector 3	58	⊣▷	Engine idling	35
Injector 3 – non-Turbo	58	⊣▷	Engine idling – engine hot	2-5 ms
Injector 3 – Turbo	58	⊣▷	Engine idling – engine hot	1-3 ms
Injector 4	65	⊣▷	Engine idling	35
Injector 4 – non-Turbo	65	⊣▷	Engine idling – engine hot	2-5 ms
Injector 4 – Turbo	65	⊣▷	Engine idling – engine hot	1-3 ms
Instrumentation control module	6	⇨	Engine idling	30 Hz
	18			1
	19		Engine idling	11-14 V
	20	⬅	Ignition ON – vehicle pushed	0 V or 11-14 V
Intake air temperature (IAT) sensor	54	⬅	Ignition ON – air temp. 10°C	2 V
	67	⊣	Ignition ON	0 V
Intake manifold air control solenoid – non-Turbo	64	⊣▷	Engine idling	11-14 V
	64	⊣▷	Engine idling – throttle fully open briefly	0-1 V briefly

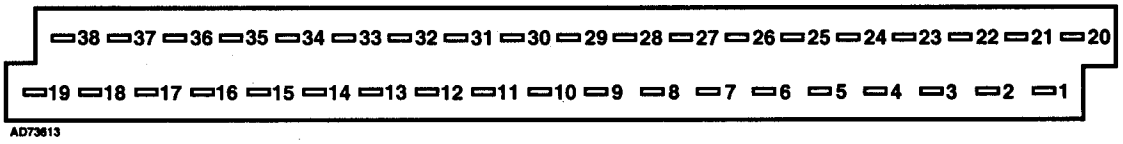
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Knock sensor (KS) 1	**60**	⬅	Engine idling – accelerate briefly	38
	67	⊣	Engine idling	0 V
Knock sensor (KS) 2	**67**	⊣	Engine idling	0 V
	68	⬅	Engine idling – accelerate briefly	38
Mass air flow (MAF) sensor	**12**	⊣	Engine idling	0 V
	13	⬅	Engine idling – engine hot	0,8-1,1 V
	13	⬅	3000 rpm	1,7-2 V
Throttle position (TP) sensor	**67**	⊣	Ignition ON	0 V
	75	⬅	Ignition ON – throttle closed	4,3 V after 20 seconds
	75	⬅	Ignition ON – throttle fully open	0,6 V
Throttle position (TP) sensor – non-Turbo	**62**	⇨	Ignition ON	5 V
Throttle position (TP) sensor – Turbo	**11**	⇨	Ignition ON	5 V
Turbocharger (TC) wastegate regulating valve	**64**	⊣▷	Engine idling	11-14 V
	64	⊣▷	Vehicle moving – accelerate – full load	1-99%

1 **Connected pin - no test data available**

ECM harness multi-plug

Terminal side



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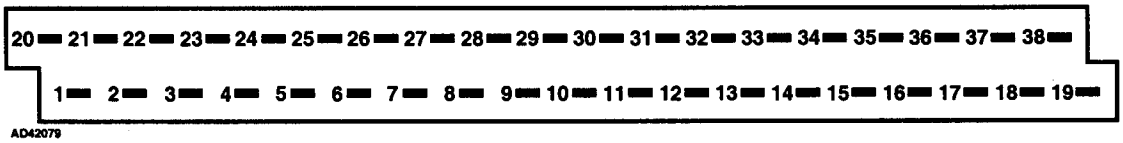
Wire side



AD42079

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	37			[1]
Alarm system control module – if fitted 1994-95	7			[1]
Automatic transmission – 1991-95	31			[1]
CO adjustment resistor	13	⊣	Ignition ON	0 V
	35	⬅	Ignition ON	0-5 V – varies with CO level
Cold start injector – 1990-93	3	⊣▷	Ignition ON	11-14 V
	3	⊣▷	Engine cranking – engine cold	0-1 V briefly then 11-14 V
Crankshaft position (CKP) sensor	11	⬅	Ignition ON – engine turned	0 V or 10-14 V
	11	⬅	Engine idling	30 Hz
	11	⬅	3000 rpm	100 Hz
	11	⬅	Engine idling	[4]
	13	⊣	Ignition ON	0 V
	30	⇨	Ignition OFF	0 V
	30	⇨	Ignition ON	10 V min.
Data link connector (DLC) – 1992-95	32			[1]
Earth	20		Ignition ON	0 V
Earth – 1990-93	29		Ignition ON	0 V
Engine control relay	38	⬅	Ignition OFF	0 V
	38	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	13	⊣	Ignition ON	0 V
	14	⬅	Ignition ON – coolant temp. 20°C	1 V
	14	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Fuel pump relay – without alarm	7	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	7	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	8	⬅	Engine idling – engine hot	0-1 V fluctuating
	8	⬅	Engine idling – engine hot	[21]
Heated oxygen sensor (HO2S) – 1993-95	29	⊣	Engine idling	0 V
Heated oxygen sensor (HO2S) – screened lead – 1993-95	33	⊣	Engine idling	0 V

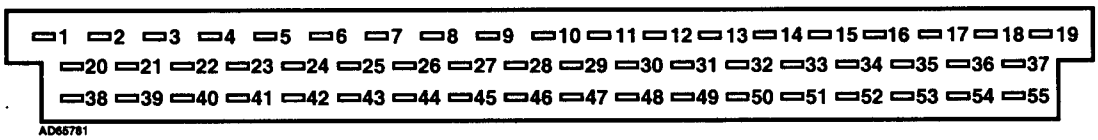
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Idle air control (IAC) valve	**25**		Engine idling	24
Ignition amplifier	**27**		Engine cranking	10 Hz
	27		Engine idling	30 Hz
	27		3000 rpm	100 Hz
	27		Engine idling	32
Ignition switch	**26**		Engine cranking	10 V
Ignition switch – through engine control relay	**36**		Ignition OFF	0 V
	36		Ignition ON	11-14 V
Injector	**2**		Ignition ON	11-14 V briefly then 0 V
	2		Engine idling – engine hot	2,3 ms
	2		Engine idling	35
Instrument panel	**10**			[1]
Instrument panel – 1992-95	**24**			[1]
Intake air temperature (IAT) sensor	**13**		Ignition ON	0 V
	15		Ignition ON – air temp. 20°C	1,4 V
Knock sensor (KS)	**16**		Engine running accelerate briefly	38
	17		Engine running	0 V
Knock sensor (KS) – screened lead	**34**		Engine running	0 V
Spare cable – 1993-95	**6**			[1]
Throttle position (TP) sensor	**1**		Ignition ON	5 V
	12		Ignition ON – throttle closed	0,5-1,5 V
	12		Ignition ON – throttle fully open	3-5 V
Volume air flow (VAF) sensor	**13**		Ignition ON	0 V
	19		Ignition ON – flap closed	0,3 V
	19		Ignition ON – flap fully open	4,4 V
	19		Engine idling – engine hot	0,8 V
	28		Ignition ON	5 V

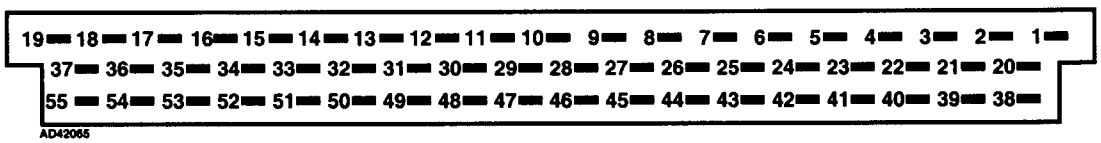
[1] **Connected pin - no test data available**

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	**40**			1
	41			1
Automatic transmission	**51**			1
Battery	**18**	⬅	Ignition OFF	11-14 V
Camshaft position (CMP) sensor	**8**	⬅	Engine idling	34
	12	⇨	Ignition ON	4,5 V min.
Crankshaft position (CKP) sensor	**48**	⊣	Engine idling	0 V
	49	⬅	Engine idling	2
Data link connector (DLC)	**13**			1
	55			1
Earth	**14**		Ignition ON	0 V
	19		Ignition ON	0 V
	24		Ignition ON	0 V
	42		Ignition ON	0 V
Earth – AT	**54**		Ignition ON	0 V
Engine control relay	**36**	⊣▷	Ignition OFF	11-14 V
	36	⊣▷	Ignition ON	0-1 V
	37	⬅	Ignition OFF	0 V
	37	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	**30**	⊣	Ignition ON	0 V
	45	⬅	Ignition ON – coolant temp. 5°C	1,5 V
	45	⬅	Ignition ON – coolant temp. 80°C	0,3 V
Evaporative emission (EVAP) canister purge valve	**5**	⊣▷	Engine hot – valve operating	20
Fuel pump relay	**3**	⊣▷	Ignition ON	0-1 V briefly then 11-14 V
	3	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	**10**	⊣	Engine idling	0 V
	28	⬅	Engine idling – engine hot	0-1 V fluctuating
	28	⬅	Engine idling – engine hot	21

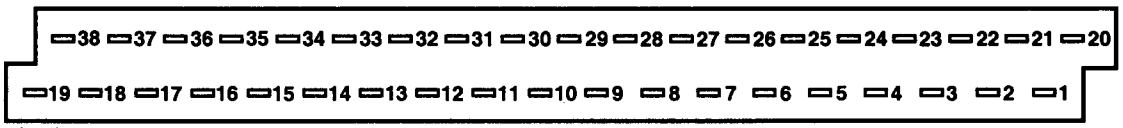
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Idle air control (IAC) valve	4	⊣▷	Engine idling	25
	22	⊣▷	Engine idling	25
Ignition amplifier	1	⇨	Engine idling	32
Ignition switch	27	⬅	Ignition OFF	0 V
	27	⬅	Ignition ON	11-14 V
Injector 1	17	⊣▷	Ignition ON	11-14 V
	17	⊣▷	Engine idling – engine hot	3,3 ms
	17	⊣▷	Engine idling	35
Injector 2	15	⊣▷	Ignition ON	11-14 V
	15	⊣▷	Engine idling – engine hot	3,3 ms
	15	⊣▷	Engine idling	35
Injector 3	35	⊣▷	Ignition ON	11-14 V
	35	⊣▷	Engine idling – engine hot	3,3 ms
	35	⊣▷	Engine idling	35
Injector 4	33	⊣▷	Ignition ON	11-14 V
	33	⊣▷	Engine idling – engine hot	3,3 ms
	33	⊣▷	Engine idling	35
Injector 5	16	⊣▷	Ignition ON	11-14 V
	16	⊣▷	Engine idling – engine hot	3,3 ms
	16	⊣▷	Engine idling	35
Injector 6	34	⊣▷	Ignition ON	11-14 V
	34	⊣▷	Engine idling – engine hot	3,3 ms
	34	⊣▷	Engine idling	35
Instrument panel	6			[1]
	9	⬅	Ignition ON – vehicle pushed	0 V or 11-14 V
Knock sensor (KS) 1	11	⬅	Engine idling – accelerate briefly	38
	30	⊣	Engine idling	0 V
Knock sensor (KS) 2	29	⬅	Engine idling – accelerate briefly	38
	30	⊣	Engine idling	0 V
Mass air flow (MAF) sensor	7	⬅	Engine idling – engine hot	2,3 V
	7	⬅	3000 rpm	2,8 V
	26	⊣	Engine idling	0 V
Mass air flow (MAF) sensor – filament burn-off	25	⇨	Engine idling – engine hot	0 V
	25	⇨	Engine hot – switch ignition OFF – wait 4 seconds	4 V briefly
Throttle position (TP) sensor	12	⇨	Ignition ON	4,5 V min.
	30	⊣	Ignition ON	0 V
	53	⬅	Ignition ON – throttle closed	0,6 V
	53	⬅	Ignition ON – throttle fully open	4,6 V

[1] Connected pin - no test data available

ECM harness multi-plug

Terminal side



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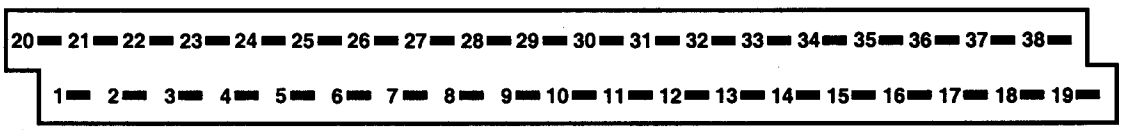
Wire side



AD42079

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	**32**			[1]
Automatic transmission	**14**			[1]
CO adjustment resistor	**10**	⬅	Ignition ON	0-5 V – varies with CO level
	28	⊣	Ignition ON	0 V
Crankshaft position (CKP) sensor	**28**	⊣	Ignition ON	0 V
	37	⬅	Ignition ON – engine turned	0 V or 10-14 V
	37	⬅	Engine idling	[4]
	38	⇨	Ignition ON	10 V min.
Data link connector (DLC)	**4**			[1]
	17			[1]
	36			[1]
Earth	**1**		Ignition ON	0 V
	35		Ignition ON	0 V
Engine control relay	**19**	⬅	Ignition OFF	0 V
	19	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	**11**	⬅	Ignition ON – coolant temp. 20°C	1,5 V
	11	⬅	Ignition ON – coolant temp. 80°C	0,2 V
	28	⊣	Ignition ON	0 V
Fuel pump relay	**24**	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	**16**	⬅	Engine idling – engine hot	0-1 V fluctuating
	16	⬅	Engine idling – engine hot	[21]
Heated oxygen sensor (HO2S) – screened lead	**9**	⊣	Engine idling	0 V
Idle air control (IAC) valve	**23**	⊣▷	Engine idling	[24]
Ignition amplifier	**6**	⇨	Engine idling	[32]
Ignition switch	**25**	⬅	Engine cranking	8 V min.
Ignition switch – through engine control relay	**7**	⬅	Ignition OFF	0 V
	7	⬅	Ignition ON	11-14 V
Injector 1	**20**	⊣▷	Engine idling – engine hot	2,3 ms
	20	⊣▷	Engine idling	[35]

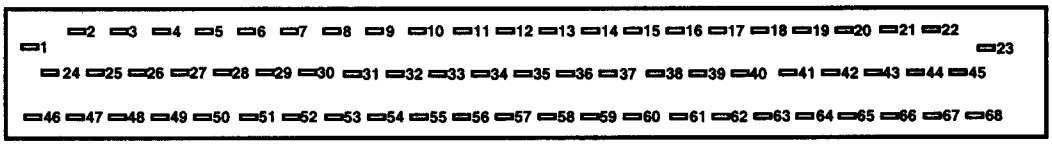
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Injector 2	**21**	⊣▷	Engine idling – engine hot	2,3 ms
	21	⊣▷	Engine idling	35
Injector 3	**3**	⊣▷	Engine idling – engine hot	2,3 ms
	3	⊣▷	Engine idling	35
Injector 4	**2**	⊣▷	Engine idling – engine hot	2,3 ms
	2	⊣▷	Engine idling	35
Instrument panel	**8**			[1]
	18			[1]
Intake air temperature (IAT) sensor	**28**	⊣—	Ignition ON	0 V
	30	◀	Ignition ON – air temp. 20°C	1 V
Knock sensor (KS)	**27**	⊣—	Engine idling	0 V
	29	◀	Engine idling – accelerate briefly	38
Throttle position (TP) sensor	**28**	⊣—	Ignition ON	0 V
	33	◀	Ignition ON – throttle closed	0,3-1,7 V
	33	◀	Ignition ON – throttle fully open	3-5 V
	34	⇨	Ignition ON	5 V

[1] **Connected pin - no test data available**

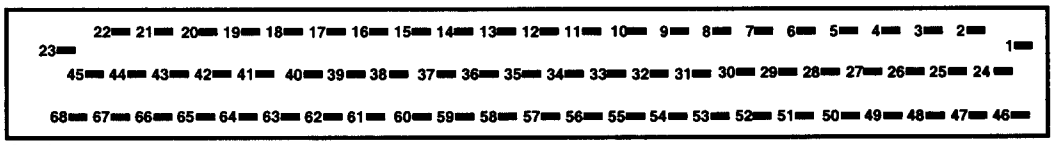
ECM harness multi-plug

Terminal side



AD61718

Wire side



AD42119

Component/circuit description	ECM pin	Signal	Condition	Typical value
Air conditioning	13			[1]
	39			[1]
Automatic transmission	5			[1]
	13			[1]
	15			[1]
Camshaft position (CMP) sensor	35	⊣	Ignition ON	0 V
	44	⬅	Ignition ON – engine turned	0 V or 10-14 V
	44	⬅	Engine idling	30 Hz
	44	⬅	3000 rpm	100 Hz
	44	⬅	Engine idling	34
	45	⇨	Ignition ON	10 V min.
Closed throttle position (CTP) switch	18	⬅	Ignition ON – throttle closed	0 V
	18	⬅	Ignition ON – throttle slightly open	9 V min.
	35	⊣	Ignition ON	0 V
Crankshaft position (CKP) sensor	16	⊣	Engine idling	0 V
	67	⬅	Engine idling	19
	68	⇨	Ignition ON	11-14 V
Earth	1		Ignition ON	0 V
Engine control relay	23	⬅	Ignition OFF	0 V
	23	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	12	⬅	Ignition ON – coolant temp. 10°C	2,8 V
	12	⬅	Ignition ON – coolant temp. 80°C	0,4 V
	35	⊣	Ignition ON	0 V
Evaporative emission (EVAP) canister purge valve	33	⊣▷	Ignition ON	11-14 V
	33	⊣▷	Engine hot – valve operating	20
Exhaust gas recirculation (EGR) solenoid	22	⊣▷	Ignition ON	11-14 V
	22	⊣▷	Engine hot – valve operating	19
Fuel pump relay – 1995-98	31	⊣▷	Engine cranking	0-1 V

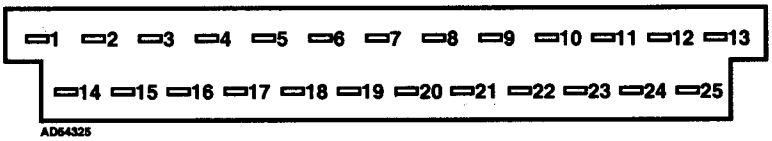
Table continued on next page ➡

Component/circuit description	ECM pin	Signal	Condition	Typical value
Fuel pump relay – through crash control module – 1998	31	⊣▷	Engine cranking	0-1 V
Heated oxygen sensor (HO2S)	17	⬅	Engine idling – engine hot	0-1,1 V fluctuating
	17	⬅	Engine idling – engine hot	21
	20	⊣▷	Engine idling	0 V
	42	⊣	Engine idling	0 V
Heated oxygen sensor (HO2S) – screened lead	21	⊣	Engine idling	0 V
Idle speed control (ISC) actuator	25 (30)	⇨	Engine idling	Intermittent 27
	30 (25)	⇨	Engine idling	Intermittent 27
Idle speed control (ISC) actuator position sensor	28	⬅	Engine idling – engine hot	3,7 V
	35	⊣	Ignition ON	0 V
	41	⇨	Ignition ON	4-6 V
Ignition amplifier	7	⇨	Engine idling	32
Ignition switch	32	⬅	Engine cranking	9 V min.
	38	⬅	Ignition OFF	0 V
	38	⬅	Ignition ON	11-14 V
Ignition switch – through engine control relay	8	⇨	Ignition OFF	0 V
	8	⇨	Ignition ON	11-14 V
Immobilizer control module	43	⬅		[1]
Injector 1	2	⊣▷	Engine idling – engine hot	3,8 ms
	2	⊣▷	Engine idling	35
Injector 2	46	⊣▷	Engine idling – engine hot	3,8 ms
	46	⊣▷	Engine idling	35
Injector 3	47	⊣▷	Engine idling – engine hot	3,8 ms
	47	⊣▷	Engine idling	35
Injector 4	48	⊣▷	Engine idling – engine hot	3,8 ms
	48	⊣▷	Engine idling	35
Instrument panel	10			[1]
	11	⬅		[1]
	19			[1]
Intake air temperature (IAT) sensor	37	⬅	Ignition ON – air temp. 10°C	2 V
	29	⊣	Ignition ON	0 V
Knock sensor (KS)	34	⬅	Engine idling – accelerate briefly	38
	36	⊣	Engine idling	0 V
Knock sensor (KS) – screened lead	9	⊣	Engine idling	0 V
Mass air flow (MAF) sensor	14	⬅	Engine idling – engine hot	1,2 V
	14	⬅	3000 rpm	1,7 V
	26	⊣	Ignition ON	0 V
Throttle position (TP) sensor	35	⊣	Ignition ON	0 V
	40	⬅	Ignition ON – throttle closed	4,3 V
	40	⬅	Ignition ON – throttle fully open	0,7 V
	41	⇨	Ignition ON	4-6 V

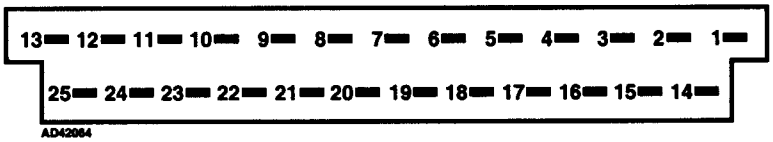
[1] Connected pin - no test data available

ECM harness multi-plug

Terminal side



Wire side



Component/circuit description	ECM pin	Signal	Condition	Typical value
Earth	7		Ignition ON	0 V
	25		Ignition ON	0 V
Engine control relay	13	⬅	Ignition OFF	0 V
	13	⬅	Ignition ON	11-14 V
Engine coolant temperature (ECT) sensor	2	⬅	Ignition ON – coolant temp. 20°C	1,5 V
	2	⬅	Ignition ON – coolant temp. 80°C	0,2 V
Fuel pump relay	20	⫞▷	Engine cranking	0-1 V
Ignition amplifier	1	⬅	Engine idling	30 Hz
	1	⬅	Engine idling	32
Ignition switch	21	⬅	Engine cranking	9 V
Injector 1	12	⫞▷	Engine idling – engine hot	1,9 ms
	12	⫞▷	Engine idling	35
Injector 2	11	⫞▷	Engine idling – engine hot	1,9 ms
	11	⫞▷	Engine idling	35
Injector 3	24	⫞▷	Engine idling – engine hot	1,9 ms
	24	⫞▷	Engine idling	35
Injector 4	23	⫞▷	Engine idling – engine hot	1,9 ms
	23	⫞▷	Engine idling	35
Intake air temperature (IAT) sensor	14	⬅	Ignition ON – air temp. 20°C	1 V
Volume air flow (VAF) sensor	6	⫞—	Engine idling	0 V
	15	⬅	Ignition ON – flap closed	0,3 V
	15	⬅	Ignition ON – flap fully open	4,4 V
	15	⬅	Engine idling – engine hot	0,8 V
	19	⇨	Ignition ON	5 V
Wide open throttle (WOT) switch	4	⬅	Ignition ON – throttle slightly open	5 V
	4	⬅	Ignition ON – throttle fully open	0 V

1 Connected pin - no test data available