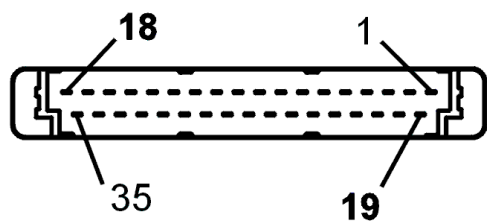


Control module



Note! All values shown are between the terminal shown in column 1 and terminal #5 on breakout box unless otherwise stated in brackets. It is important that this ground terminal is correctly installed on the battery battery negative terminal before taking measurements.

- U_{bat} = Battery voltage
- f = Frequency in Hertz (Hz)
- U_{low} = voltage approaching 0 V
- % duty = duty cycle in %

Terminal	Signal type Function	Ignition on.	Idling	Engine speed (RPM) higher than idling
1	Engine speed (RPM) signal. Information from EZ 116 K (#17) that engine is turning. This information is used to calculate injection period.	700 - 750 mV	7-8 V approximately 27 Hz	Frequency increases with engine speed (RPM)
2	Throttle position switch (TP switch). Information that throttle position (TP) switch on. Used for a special idle program for idling speed, injection period etc. Also used when fuel shut-off operational.	$U = U_{low}$	$U = U_{low}$	> 10 V
3	Full load switch (not used on turbocharged engines). Information that the throttle is at WOT (wide open throttle). Used for full load enrichment.	> 10 V	> 10 V	U_{low} (maximum throttle angle)
4	Battery voltage (+ 30). power supply for the on-board diagnostic system (OBD) memory and adaptive functions.	U_{bat}	U_{bat}	
5	Signal ground. Signal ground on intake manifold for control module electronics	U_{bat}	U_{bat}	
6	Mass air flow (MAF) sensor ground	U_{bat}	U_{bat}	
7	Mass air flow (MAF) sensor, signal	≈ 1.4 V	≈ 2.3 V	Increases with engine load
8	Burning off mass air flow (MAF) sensor. Burning off sensor wire in mass air flow (MAF) sensor	U_{low}	U_{low}	≈ 4 V burn-off
9	Power supply. Power supply to control module via system relay	U_{bat}	U_{bat}	
10	Engine cooling fan (FC) low-speed	Engine cooling fan (FC) on: U_{low}		

11	Engine cooling fan (FC) high-speed	Engine cooling fan (FC) off: U_{bat}		
12	Data link connector (DLC). Communication with data link connector (DLC)	8 - 9 V.		
13	Engine coolant temperature (ECT) sensor. Information on engine coolant temperature. Used by the control module to calculate injection period during warming-up.	≈ 350 mV, warm engine, the signal drops as temperature rises, the signal increases as the temperature drops. NOTE! For cars from 1992 onwards the value is not stable		
14	Air conditioning (A/C) compressor. Information that the air conditioning (A/C) compressor is engaged. Used to keep idling speed constant when air conditioning (A/C) compressor starts.	Air conditioning (A/C) off: U_{low}	Air conditioning (A/C) off: U_{low} Air conditioning (A/C) on: U_{bat}	
15	Air conditioning (A/C) control. Information that the air conditioning (A/C) control is on. Used to prepare the CIS valve before air conditioning (A/C) compressor starts.	Air conditioning (A/C) off: U_{low}	Air conditioning (A/C) off: U_{low} OFF/OFF	
16	-	-	-	-
17	Power ground. Power ground connected at intake manifold. Used for pulse signals from injectors and idle air control (IAC) valve which demand power.	U_{low}	U_{low}	U_{low}
18	Injectors control. Grounded when the injectors are to open	U_{bat} (#5)	Turbo 190-200 mV (#35). Others: 250 - 350 mV	Increases as engine speed (RPM) increases
19	Ground. Ground terminal on intake manifold. Grounds control module internally	U_{low}	U_{low}	
20	Pump relay control. Grounded when engine speed (RPM) signal on #1. Used for activating pump relay	U_{bat}	≈ 0.9 V	
21	System relay control. Grounded when voltage on #35. Used for activating the system relay	≈ 1.1 V	≈ 1.1 V	
22	Malfunction indicator lamp (MIL)	≈ 1.5 V	U_{bat}	
23	-	-	-	-
	Heated oxygen sensor (HO2S) signal.			

24	Information from heated oxygen sensor (HO2S) on oxygen content in exhaust gases. Adjusts injection period so that the HO2S value is always 1.	$\approx 0.5 \text{ V}$	$\approx 0.1 - 0.9 \text{ V}$.	
25	Load signal. Digital output signal to ignition system (# 8) for engine load data.	250 - 300 mV	$\approx 370 \text{ mV}$	Increases with engine load
26	Shift indicator (USA/Calif, manual)	-	-	-
27	Canister purge (CP) valve control (Only B234 F). Output signal to canister purge (CP) valve. Control module regulates the opening status of the canister purge (CP) valve so that the EVAP canister is ventilated to optimum level	U_{low}	U_{low}	Increases throttle opening
28	Knock enrichment (not B204 FT/GT, B230 F)	900 - 950 mV	$\approx 7.5 \text{ V}$	Drops during knock enrichment
29	Signal ground. Ground connected on intake manifold, grounds control module internally	U_{low}	U_{low}	
30	Park/Neutral position (PNP) switch (automatic transmission). Information on gear selector position. Used to keep idling speed constant when gear is selected.	P N position: U_{low} , D 1 2 3 R positions: U_{bat} Manual: U_{low}		-
31	-	-	-	-
32	Cold start valve control signal. Grounded when the temperature is below $-16 \text{ }^{\circ}\text{C}$ when it activates the cold start valve.	U_{bat}	U_{bat}	Drops at temperatures below $-16 \text{ }^{\circ}\text{C}$
33	Idle air control (IAC) valve, signal. Grounded output signal. The control module adjusts idle air control (IAC) valve opening so that idling speed is kept constant regardless of load. During engine braking the signal is used together with engine speed (RPM) and load signal too keep a constant pressure in the intake manifold in order to control crankcase ventilation	U_{bat}	7.5 - 9.5 V, approximately 42%	Drops on load at idle. % increases with load
34	Speedometer signal. Vehicle speed signal from the speedometer. Used to adjust idling speed during engine braking and for constant idle speed compensation.	$U_{\text{low}}/U_{\text{bat}}$	$U_{\text{low}}/U_{\text{bat}}$	$\approx 6-7 \text{ V}$, $v > 10 \text{ km/h}$
35	Power supply. Power supply to certain control module internal functions	U_{bat}	U_{bat}	