Model	Year	Engine	Gearbox
S60 (-09)	2005	B5254T4	M66 AWD

284 : Signal specification, engine control module (ECM), B5254T4

Signal specification

General

All values stated below are measured between each connection in column 2 (Conn. control module) and breakout box connection #B3 unless otherwise noted in column 6 (Other). The control module's connections #A1-#A70 correspond to #A1-#B10 on the breakout box, #B1-#B50 correspond to #B11- #B60 on the breakout box.

Note!

It is important to connect the breakout box and check the ground terminals before taking readings.

Hint:

If the numbering of the connector is different from the numbering on the breakout box, the connector number is given first, #A61, followed by the breakout box number in brackets, #B1. Example: #A61 (#B1).

U=	DC voltage in volts (V)	U_{AC} =	AC voltage in volts (V)
U_{bat} =	Battery voltage (V)	f =	Frequency in Hertz (Hz)
U_{low} =	Voltage approximately 0 V	% duty =	Duty cycle (pulse ratio) in percent (%)
t =	Time in milliseconds (ms)	I =	Current in amperes (A)

Connector A

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Miscellaneous
#A1	#A1	Signal electronic throttle module, potentiometer 1 (circuit 1)	U≈ 0.4 - 4 V	-	The voltage varies depending on the position of the throttle. U increases with increased throttle opening.
#A2	#A2	Fuel pressure sensor signal	-	350 - 400 kPa (absolute pressure) U=1.8-2 V	The voltage increases with increased fuel pressure.
#A3	#A3	Fuel temperature sensor signal	-	U≈ 0.5 V- 4.5 V	The voltage falls with rising fuel temperature. The fuel temperature sensor is integrated into the fuel pressure sensor.
#A4	#A4	Signal engine temperature sensor	-	(+30°C) U=1.22 V (+80°C) U=0.29 V (+100 °C) U=0.17 V	
#A5	#A5	Intake air temperature sensor signal	-	(+20°C) U=3.50 V (+30°C) U=3.00 V (+40°C) U=2.50 V	The intake air temperature sensor is integrated in the boost pressure sensor.
#A6	#A6	Control signal preheating rear oxygen sensor	U = U_{bat}	Preheating of: $U=U_{bat}$ Preheating on:	

				$U=U_{low}$	
#A7	#A7	Engine cooling fan control signal	Pulse width modulation (PWM) signal U_{high} min. 70% of U_{bat} U_{low}=1.2 V f = 100 Hz Pulse ratio= 10-95%		
#A8	#A8	-	-	-	
#A9	#A9	Control signal EVAP valve	$U = U_{bat}$	-	PWM signal during activation of the EVAP valve
#A10	#A10	-	-	-	
#A11	#A11	-	-	-	
#A12	#A12	-	-	-	
#A13	#A13	Control signal, intake camshaft reset valve	-	Pulse width modulation (PWM) signal $U_{top}=U_{bat}$ f=250 Hz (±12.5 Hz) Pulse ratio 20-95%	Pulse ratio controls control of the camshaft
#A14	#A14	Control signal injector no. 5	$U = U_{bat}$	t = 2-3 ms	t increases with engine speed (RPM) and load
#A15	#A15	Control signal injector no. 3	$U = U_{bat}$	t = 2-3 ms	t increases with engine speed (RPM) and load
#A16	#A16	Control signal injector no. 1	$U = U_{bat}$	t = 2-3 ms	t increases with engine speed (RPM) and load
#A17	#A17	Power supply	$U = U_{bat}$	-	Supplied via system relay
#A18	#A18	Control signal, front oxygen sensor preheating	$U = U_{bat}$	Preheating of: $U=U_{bat}$ Preheating on: $U=U_{low}$	
#A19	#A19	Signal ground electronic throttle module, potentiometer 1 and 2	$U=U_{low}$	-	
#A20	#A20	Signal electronic throttle module, potentiometer 2 (circuit 2)	U≈4-0.4 V	-	The voltage varies depending on the position of the throttle. U decreases with increasing throttle opening.
#A21	#A21	Exhaust camshaft reset valve control signal	-	Pulse width modulation (PWM) signal $U_{top}=U_{bat}$ f=250 Hz (±12.5 Hz) Pulse ratio 20-95%	Pulse ratio controls control of the camshaft

#A22	#A22	Mass air flow sensor signal	U = 1 V	U=1.7 V	U increases with increasing air mass
#A23	#A23	Signal boost pressure sensor	U=1.96 V	-	U increases with increasing boost pressure.
#A24	#A24	Front oxygen sensor, pump current	-	-	Pulsed current measurement, not measured
#A25	#A25	-	-	-	
#A26	#A26	Oil pressure switch signal	$U=U_{low}$	$U = U_{bat}$	
#A27	#A27	Signal camshaft position sensor 2, camshaft exhaust	U =5 V	U= Pulsed signal U_{top}=5 V U_{offset}= 2.5 V	The frequency varies according to engine speed (RPM)
#A28	#A28	Front oxygen sensor, calibration current	-	-	Not measured
#A29	#A29	Voltage feed 5 V camshaft position sensor	U =5 V	-	
#A30	#A30	Control signal ignition coil C, cylinder 4	$U=U_{low}$	U=2.5 V t_{high}=2 ms	The frequency varies according to engine speed (RPM)
#A31	#A31	Control signal ignition coil B, cylinder 2	$U=U_{low}$	U=2.5 V t_{high}=2.5 ms	The frequency varies according to engine speed (RPM)
#A32	#A32	-	-	-	
#A33	#A33	Control signal injector no. 4	$U = U_{bat}$	t_{low}=2-3 ms	t increases with engine speed (RPM) and load
#A34	#A34	Control signal injector no. 2	$U = U_{bat}$	t_{low}=2-3 ms	t increases with engine speed (RPM) and load
#A35	#A35	Control signal (+) electronic throttle module's damper motor	-	Pulse width modulation (PWM) signal $U_{top}=U_{bat}$ Pulse ratio 0-100% The polarity of the control signal switches when the damper motor is to be controlled in the opposite rotational direction.	The throttle motor is controlled using a PWM signal from the integrated power amplifier in the Engine Control Module (ECM) measured to terminal #A36 (#A36)
#A36	#A36	Control signal (-) electronic throttle module's damper motor	-	Pulse width modulation (PWM) signal $U_{top}=U_{bat}$ Pulse ratio 0-100% The polarity of the control signal switches when the damper motor is to be controlled in the opposite rotational direction.	The throttle motor is controlled using a PWM signal from the integrated power amplifier in the Engine Control Module (ECM) measured to terminal #A35 (#A35)
#A37	#A37	-	-	-	

#A38	#A38	Control signal turbo control valve	U = U_{bat}	-	For turbo control: PWM-signal f=32 Hz
#A39	#A39	Voltage supply sensor 5 V	U =5 V		See relevant wiring diagram for information about connected sensor
#A40	#A40	Oil level sensor	-	Pulse width modulation (PWM) signal U_{top}=5 V Pulse ratio 17-83% T=120ms Pulse train with three pulses, then pause of 1.2 seconds. Pulse no. 1= oil temperature. Pulse no. 2 = oil level. Pulse no. 3= oil quality. The pulse ratio for pulse changes based on current: - oil temperature - oil level - oil quality.	The PWM signal is generated by the oil level sensor.
#A41	#A41	Signal (+), front oxygen sensor	-	-	Pulsed current signal, not measured
#A42	#A42	Signal (-), front oxygen sensor	-	-	Pulsed current signal, not measured
#A43	#A43	-	-	-	
#A44	#A44	-	-	-	
#A45	#A45	Signal (+) rear knock sensor	U=U_{low}	-	
#A46	#A46	Signal (+) front knock sensor	U=U_{low}	-	
#A47	#A47	Signal camshaft position sensor 1, camshaft intake	U =5 V	U= Pulsed signal U_{top}=5 V U_{offset}= 2.5 V	The frequency varies according to engine speed (RPM)
#A48	#A48	Signal (+), flywheel sensor	U=2.5 V	U=sinus voltage U_{top}=5 V U_{offset}= 2.5 V	Measured to #A66 (#B6) The frequency increases with engine speed (RPM)
#A49	#A49	-	-	-	
#A50	#A50	Control signal ignition coil A, cylinder 1	U=U_{low}	U=2.5 V t_{high}=2 ms	The frequency varies according to engine speed (RPM)
#A51	#A51	Control signal ignition coil E, cylinder 3	U=U_{low}	U=2.5 V t_{high}=2 ms	The frequency varies according to engine speed (RPM)
#A52	#A52	Control signal ignition coil D, cylinder 5	U=U_{low}	U=2.5 V t_{high}=2 ms	The frequency varies according to engine speed (RPM)
#A53	#A53	Power ground 3	U_{low}	-	Ground terminal, con-

					nected to the chassis
#A54	#A54	Power ground 2	U_{low}	-	Ground terminal, connected to the chassis
#A55	#A55	Control modules communication cable (CAN L)	-	-	-
#A56	#A56	-	-	-	
#A57	#A57	-	-	-	
#A58	#A58	Signal ground mass airflow sensor	$U=U_{low}$	-	
#A59	#A59	Voltage feed 5 V electronic throttle module, potentiometer 1 and 2	U =5 V	-	
#A60	#A60	Signal ground sensor	$U=U_{low}$	-	See relevant wiring diagram for information about connected sensors
#B1	#A61	Signal (+), Rear oxygen sensor	U≈0.50 V	Above 0.6 V or below 0.3 V	
#B2	#A62	Signal (-), rear oxygen sensor	$U=U_{low}$	$U=U_{low}$	
#B3	#A63	Signal ground	$U=U_{low}$	-	Ground terminal, connected to the chassis
#B4	#A64	Signal (-) front knock sensor	$U=U_{low}$	-	
#B5	#A65	Signal ground camshaft position sensor	$U=U_{low}$	-	
#B6	#A66	Signal (-) flywheel sensor	U=2.5 V	U=sinus voltage U_{top}=5 V U_{offset}= 2.5 V	Measured to #A48 (#A48) The frequency increases with increasing engine speed
#B7	#A67	Signal (-) rear knock sensor	$U=U_{low}$	-	
#B8	#A68	Signal AC pressure sensor	U=0.9 V (at approximately 20°C)	-	U increases with increasing pressure in the AC-system
#B9	#A69	-	-	-	
#B10	#A70	-	-	-	

Connector B

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Miscellaneous
#B11	#B1	Control modules communication cable (CAN L)	-	-	-
#B12	#B2	-	-	-	
#B13	#B3	-	-	-	
#B14	#B4	Signal ground sensor	$U=U_{low}$	-	See relevant wiring diagram for information about connected sensors

#B15	#B5	Signal ground accelerator pedal sensor	$U=U_{low}$	-	
#B16	#B6	-	-	-	
#B17	#B7	Control signal, leak diagnostic unit, pump	Pump motor running: $U=U_{low}$ Pump motor not running: $U=U_{bat}$	-	
#B18	#B8	Signal, coolant level sensor	$U=U_{low}$	Low coolant level: $U=U_{bat}$ Normal coolant level: U=Ulow	
#B19	#B9	Power supply, 5 V accelerator pedal position sensor	U =5 V	-	
#B20	#B10	-	-	-	
#B21	#B11	30-supply (Power supply from the battery)	$U = U_{bat}$	$U = U_{bat}$	Ignition off: $U = U_{bat}$
#B22	#B12	-	-	-	
#B23	#B13	Communication cable control module (CAN H)	-	-	
#B24	#B14	-	-	-	
#B25	#B15	Clutch pedal sensor signal	Unaffected: U=3.3 V Fully depressed: 100 mm U=2.2 V	-	U varies depending on the position of the clutch pedal
#B26	#B16	-	-	-	
#B27	#B17	Signal, accelerator pedal position sensor	U=0.4±0.1 V for unactuated accelerator pedal U=2.5-4.4 V for fully depressed accelerator pedal On certain vehicles, the accelerator pedal's position is all the way down before the signal reaches 4.4 V.	-	U varies depending on the position of the accelerator pedal
#B28	#B18	-	-	-	
#B29	#B19	-	-	-	
#B30	#B20	-	-	-	
#B31	#B21	-	-	-	
#B32	#B22	Diagnostic lead C-link	$U=90\%$ of U_{bat}	-	Other values apply if a generic fault-tracing instrument is connected to the data link connector (DLC)
#B33	#B23	Signal crank, 50-supply	$U=U_{low}$	$U=U_{low}$	At crank: $U = U_{bat}$
#B34	#B24	-	-	-	

#B35	#B25	Signal, accelerator pedal position sensor	U_{top} =12 V t = 4 ms pulse ratio=8%±2% for unactuated accelerator pedal and 50% - 90% for fully depressed accelerator pedal On certain vehicles, the accelerator pedal's position is all the way down before the signal reaches 90%.	-	PWM-signal from the accelerator pedal position sensor to the engine control module
#B36	#B26	Brake light switch signal	When brake pedal is actuated: U=U_{bat} When brake pedal is not actuated U=U_{low}	-	
#B37	#B27	-	-	-	
#B38	#B28	-	-	-	
#B39	#B29	Signal, outside temperature sensor	(0 °C) U=4.32 V (+15 °C) U=3.75 V (+30 °C) U=3.00 V	-	Temperature range: -48 to +120 °C
#B40	#B30	-	-	-	
#B41	#B31	-	-	-	
#B42	#B32	-	-	-	
#B43	#B33	-	-	-	
#B44	#B34	Control signal, leak diagnostic unit, heating element		-	Heating element activated: U=Ulow Heating element not activated: U=Ubat
#B45	#B35	-	-	-	
#B46	#B36	-	-	-	
#B47	#B37	Signal, ignition on, 15-supply	U = U_{bat}	U = U_{bat}	Ignition off: U=U_{low}
#B48	#B38	System relay control signal	-	U=U_{low}	Relay activated: U=U_{low} Relay not activated: U=U_{bat} The system relay runs on (2-5 minutes)
#B49	#B39	-	-	-	
#B50	#B40	Control signal, leak diagnostic unit, valve	-	-	Valve activated: U=U low Valve not activated: U=U bat
#B51	#B41	-	-	-	
#B52	#B42	-	-	-	
#B53	#B43	-	-	-	
#B54	#B44	Control signal, air conditioning (A/C) relay	-	-	AC-relay activated: U=U_{low} AC-relay not activated: U=U_{bat}

#B55	#B45		-	-	
#B56	#B46	Malfunction indicator lamp (MIL) control signal	$U=U_{low}$	Not activated $U=U_{bat}$ Activated: $U=U_{low}$	
#B57	#B47	Control signal fuel pump control module	-	PWM signal pulse ratio 35% (+/-5%) engine at operating temperature	PWM signal transmitted by the engine control module (ECM) to the fuel pump control module. The pulse ratio varies with the requested fuel pressure.
#B58	#B48	Control signal, engine cooling fan, control modules	-	Not activated $U=U_{bat}$ Activated: $U=U_{low}$	The cooling fan is controlled by the engine control module (ECM).
#B59	#B49	-	-	-	
#B60	#B50	-	-	-	