Instruction Manual

AEM
PERFORMANCE ELECTRONICS

Infinity Supported Application
1995 BMW E36 M3 (US Spec)

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READ THIS BEFORE INSTALLING/USING!

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WARNING: This installation is not for the tuning novice! Use this system with EXTREME caution! The AEM Infinity Programmable EMS allows for total flexibility in engine tuning. Misuse or improper tuning of this product can destroy your engine! If you are not well versed in engine dynamics and the tuning of engine management systems DO NOT attempt the installation. Refer the installation to an AEM-trained tuning shop or call 800-423-0046 for technical assistance.

NOTE: All supplied AEM calibrations, Wizards and other tuning information are offered as potential starting points only. IT IS THE RESPONSIBILITY OF THE ENGINE TUNER TO ULTIMATELY CONFIRM IF THE CALIBRATION IS SAFE FOR ITS INTENDED USE. AEM holds no responsibility for any engine damage that results from the misuse or mistuning of this product!

OVERVIEW

The AEM Infinity EMS can be adapted to most fuel injected engines. When possible, AEM will provide "base cal" sessions and configuration files for supported applications that have been verified by AEM engineers. These session and configuration files are starting points only and will need to be modified for your specific application. This manual lists the files available and suggested changes for your engine. It also includes a pinout with suggestions for adapting the Infinity ECU to your engine harness. It is the responsibility of the installer to verify this information before starting the engine.

MODELS

BMW
- 1995 E36 M3 (US spec) with S50usB30 engine
- 1992–1995 E36 325I/IS/IC with M50tuB25 engine

DOWNLOADABLE FILES

Files can be downloaded from www.aeminfinity.com. An experienced tuner must be available to configure and manipulate the data before driving can commence. The Quick Start Guide and Full Manual describe the steps for logging in and registering at www.aeminfinity.com. These documents are available for download in the Support section of the AEM Electronics website: http://www.aemelectronics.com/products/support/instructions.

ADAPTER HARNESS OPTIONS

30-3701 Plug & Pin Kit
This kit includes mating connectors and terminals for the Infinity. It also includes a main relay kit which is necessary for proper power distribution. This kit is best suited for experienced installers who want to build their own harness.

30-3702 Mini Harness with Flying Leads
This harness includes a fused power distribution center with main relay. Pre-terminated connectors are available for the internal UEGO sensors and AEMNet. A bag of multi-color flying leads is included to simplify custom harness builds.

30-3703 Mini Harness with Pins
This harness includes a fused power distribution center with main relay. Pre-terminated connectors are available for the internal UEGO sensors and AEMNet. 100 pins and 30 sealing plugs are included.

30-3600 O2 Sensor Extension Harness
Extension harness to connect AEM UEGO Wideband O2 sensor to 6-pin Deutsch DTM in Infinity Mini Harnesses (30-3702/3703).

30-3601 IP67 Comms Cable
USB Mini-B comms cable; 39" long with right angled connector and bayonet style lock.

30-3602 IP67 Logging Cable
USB A-to-A extension cable: 39" long with right angled connector and bayonet style lock.

IMPORTANT APPLICATION NOTES

The test vehicle used for development of this app was an E36 318 sedan with a full S50usB30 swap from a US spec 1995 E36 M3. The S50usB30 engine is different from the Euro spec M3 engine in that is does NOT have ITBs or dual continuously variable VANOS. The S50usB30 engine has a large plenum style intake manifold with a single throttle body and on/off style VANOS on only the intake cam. The S50usB30 engine appears to be nearly identical to the standard M50tuB25 engine with the only discerning difference being the engine's displacement (3.0L versus 2.5L). Both engines from the models listed above use Bosch DME part number 0 261 200 413. Operation of the Infinity EMS was not verified on the M50tuB25, however, because both engines use the same DME, both have the same wiring harness pin out and use the same injectors and cam/crank/CLT/IAT sensors.

The injectors used for testing were stock "green top" Bosch injectors (part number 0 280 150 415). These injectors are undersized for the application and are marginal in providing enough fuel flow (156cc/min @ 50psi) to support the stock horsepower level. The stock DME runs a high load WOT AFR of 12.8:1. While creating the Infinity base session, targeting a slightly richer AFR of 12.4:1 resulted in hitting the Primary Injector Duty Limit (Plug-ins>Wizards>Setup Wizard>Diagnostics) value of 95%. It is highly recommended that replacing the stock injectors with higher flowing injectors be made a priority in order to support any kind of performance modifications made to the engine.

The S50usB30 engine uses a Bosch 3-pin PWM idle air control (IAC) valve. The 3-pin IAC is driven by a standard PWM signal as well as an inverted complementary PWM signal. An external circuit is required to invert the normal PWM output signal as the Infinity is not outfitted with hardware to support this function. A schematic to build this device is provided in this manual.

The E36 M3 uses a Mass Air Flow (MAF) based injection control strategy in stock form. The base sessions and configuration files provided are set up for Speed Density using an AEM 3.5Bar MAP sensor (PN 30-2130-50). The stock MAF sensor is not supported in the provided configuration files. The stock CLT & IAT sensors have been fully characterized and their calibrations have been inputted into the base session.

The adapter harness used to mate the Infinity EMS to the stock wiring harness was set up to use the stock main relay that is already on the vehicle. The stock coolant temp gauge is not supported by the Infinity.

PWM IDLE INVERT

Use the following schematic to create a PWM idle invert circuit. This circuit will need to be wired into the Infinity adapter harness.
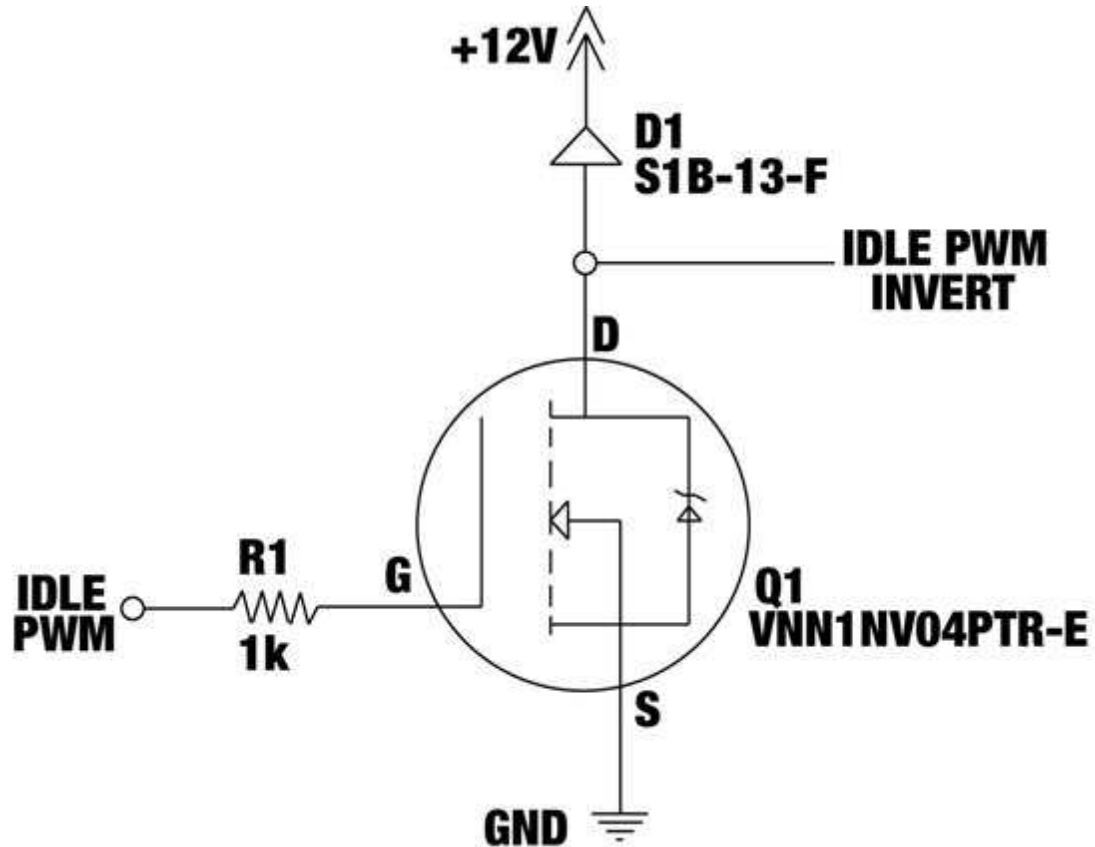
GETTING STARTED

Refer to the **10-7100 for EMS 30-7100 Infinity Quick Start Guide** for additional information on getting the engine started with the Infinity EMS.

Import Base Session

E36 BMW M3 base session located in C:\Documents\AEM\Infinity Tuner\Sessions\Base Sessions

IMPORTANT APPLICATION SPECIFIC SETTINGS

Infinity Tuner Wizard Setup

Engine

In the Wizard Engine tab confirm the following settings:

Engine Displacement (L) = *3.00*
Number of Cylinders = 6
Engine Cycle Type = 4 Stroke
Ignition Type = Sequential (Coil On Plug)
Firing Order = 1-5-3-6-2-4

Ignition Sync

Add a text grid control to your layout and select the following channels. Once the channels have been added, right click and set them to Initial Value. Make sure their values match the settings below for initial timing sync.

TrigOffset [degBTDC] = 5.5

CamSyncAdjustment = 65

See QuickStart Guide section **Setup: Ignition Sync** for instructions on timing sync.

Cam/Crank

In the Wizard Cam/Crank tab confirm the following setting:

Universal 60-2 Mag Crank & 1 Hall Cam

Injector Setup

In the Wizard Injector Setup tab confirm the following setting:

Number of Injectors = 6

Low Side Assignment – Malfunction Indicator Lamp

In the Wizard LowSide Assignment tab confirm the following settings:

LS2 Setup:
- *Frequency* = 30 Hz
- *LS2_Duty X-Axis* = Engine Speed [RPM]
- *LS2_Duty Y-Axis* = MILOutput

LowSide Assignment – PWM Idle

In the Wizard LowSide Assignment tab confirm the following settings:

LS3 Setup:
- *Frequency*   = 100 Hz
- *LS3_Duty X-Axis*   = Engine Speed [RPM]
- *LS3_Duty Y-Axis*   = Idle Position

LowSide Assignment – VANOS

In the Wizard LowSide Assigment tab confirm the following settings:

LS4 Setup:
- *Frequency*   = 30 Hz
- *LS4_Duty X-Axis*   = Engine Speed [RPM]
- *LS4_Duty Y-Axis*   = VTEC_Active

In the Wizard Honda VTEC tab confirm the following settings:

VTEC Off Below RPM   = 2000
VTEC On Above RPM   = 2100
VTEC Off Below Throttle   = 35
VTEC On Above Throttle   = 40

Input Function Assignment

In the Input Function Assignment tab, choose Vehicle Speed Input and confirm the following setting:

Vehicle Speed Calibration = 0.50

PINOUT

Infinity Pin	Hardware Reference	BMW E36 M3 Function	BMW E36 M3 Pin Destination	Hardware Specification	Notes
C1-1	LowsideSwitch_4	VANOS	7	Lowside switch, 4A max, NO internal flyback diode.	See Setup Wizard Page "LowSide Assignment Tables" for output assignment, Honda VTEC for VANOS triggering and 2D table "LS3_Duty [%]" for on/off activation.
C1-2	LowsideSwitch_5	LS5		Lowside switch, 4A max with internal flyback diode. Inductive load should NOT have full time power.	See Setup Wizard Page "LowSide Assignment Tables" for output assignment and 2D table "LS5_Duty [%]" for activation.
C1-3	LowsideSwitch_6	LS6		Lowside switch, 4A max with internal flyback diode. Inductive load should NOT have full time power.	See Setup Wizard Page "LowSide Assignment Tables" for output assignment and 2D table "LS6_Duty [%]" for activation.
C1-4	UEGO 1 Heat	UEGO 1 Heat	Use 30-3600 Infinity O2 Sensor Extension Harness	Bosch UEGO controller	Lowside switch for UEGO heater control. Connect to pin 4 of Bosch UEGO sensor. NOTE that pin 3 of the Sensor is heater (+) and must be power by a fused/switched 12V supply.
C1-5	UEGO 1 IA	UEGO 1 IA			Trim Current signal. Connect to pin 2 of Bosch UEGO sensor
C1-6	UEGO 1 IP	UEGO 1 IP			Pumping Current signal. Connect to pin 6 of Bosch UEGO sensor
C1-7	UEGO 1 UN	UEGO 1 UN			Nernst Voltage signal. Connect to pin 1 of Bosch UEGO sensor
C1-8	UEGO 1 VM	UEGO 1 VM			Virtual Ground signal. Connect to pin 5 of Bosch UEGO sensor.
C1-9	Flash_Enable	Flash Enable		10K pulldown	Not usually needed for automatic firmware updates through Infinity Tuner. If connection errors occur during update, connect 12 volts to this pin before proceeding with upgrade. Disconnect the 12 volts signal after the update.
C1-10	+12V_R8C_CPU	Battery Perm Power	26	Dedicated power management CPU	Full time battery power. MUST be powered before the ignition switch input is triggered (See C1-65).
C1-11	Coil 4	Coil 4	23	25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C1-12	Coil 3	Coil 3	52	25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C1-13	Coil 2	Coil 2	51	25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C1-14	Coil 1	Coil 1	50	25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C1-15	Coil 6	Coil 6	24	25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C1-16	Coil 5	Coil 5	25	25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.

C1-17	LowsideSwitch_2	MIL	8	Lowside switch, 4A max, NO internal flyback diode.	See Wizard page "LowSide Assignment Tables" for output assignment and 2D table "LS4_Duty [%]" for activation. MIL Activates when any of the following flags are true: ErrorAirTemp, ErrorBaro, ErrorCoolantTemp, ErrorEBP, ErrorFuelPressure, UEGO_0_Diag_error, UEGO_1_Diag_error, ErrorMAFAnalog, ErrorMAFDigital, ErrorMAP, ErrorOilPressure, ErrorThrottle.
C1-18	LowsideSwitch_3	PWM IDLE	2	Lowside switch, 4A max with internal flyback diode. Inductive load should NOT have full time power.	See Setup Wizard Page "LowSide Assignment Tables" for output assignment and 2D table "LS2_Duty [%]" for activation. **3-wire IAC requires inverted signal to pin 29**
C1-19	AGND_1	Sensor Ground	44	Dedicated analog ground	Analog 0-5V sensor ground
C1-20	AGND_1	Sensor Ground	to MAP sensor	Dedicated analog ground	Analog 0-5V sensor ground
C1-21	Crank Position Sensor Hall	Crank Position Sensor Hall		10K pullup to 12V. Will work with ground or floating switches.	See Setup Wizard page Cam/Crank for options.
C1-22	Cam Position Sensor 1 Hall	Cam Position Sensor 1 Hall	17	10K pullup to 12V. Will work with ground or floating switches.	See Setup Wizard page Cam/Crank for options.
C1-23	Digital_In_2	Cam Position Sensor 2 Hall		10K pullup to 12V. Will work with ground or floating switches.	See Setup Wizard page Cam/Crank for options.
C1-24	Digital_In_3	Turbo Speed Hz		10K pullup to 12V. Will work with ground or floating switches.	See Setup Wizard page Turbo Speed for calibration constant. TurboSpeed [RPM] = Turbo [Hz] * Turbo Speed Calibration.
C1-25	Digital_In_4	Vehicle Speed Sensor	42	10K pullup to 12V. Will work with ground or floating switches.	See Setup Wizard page Vehicle Speed for calibration constant.
C1-26	Digital_In_5	Flex Fuel		10K pullup to 12V. Will work with ground or floating switches.	See channel FlexDigitalIn [Hz] for raw frequency input data.
C1-27	Knock Sensor 1	Knock Sensor 1	70	Dedicated knock signal processor	See Setup Wizard page Knock Setup for options.
C1-28	Knock Sensor 2	Knock Sensor 2	69	Dedicated knock signal processor	See Setup Wizard page Knock Setup for options.
C1-29	+12V_Relay_Control	+12V Relay Control	27	0.7A max ground sink for external relay control	Will activate at key on and at key off according to the configuration settings.
C1-30	Power Ground	Ground	6	Power Ground	Connect directly to battery ground
C1-31	CANL_Aout	AEMNet CANL		Dedicated High Speed CAN Transceiver	Recommend twisted pair (one twist per 2") with terminating resistor. Contact AEM for additional information.
C1-32	CANH_Aout	AEMNet CANH		Dedicated High Speed CAN Transceiver	Recommend twisted pair (one twist per 2") with terminating resistor. Contact AEM for additional information.
C1-33	LowsideSwitch_1	Boost Control		Lowside switch, 4A max with internal flyback diode. Inductive load should NOT have full time power.	See Setup Wizard page Boost Control for options. Monitor BoostControl [%] channel for output state.
C1-34	LowsideSwitch_0	Fuel Pump	1	Lowside switch, 4A max, NO internal flyback diode.	Switched ground. Will prime for 2 seconds at key on and activate if RPM > 0.

| C1-35	Analog_In_7	Throttle Position Sensor	73	12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See the Setup Wizard Set Throttle Range page for automatic min/max calibration. Monitor the Throttle [%] channel. Also DB1_TPSA [%] for DBW applications.
C1-36	Analog_In_8	MAP Sensor	to MAP sensor	12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See the Setup Wizard Set Manifold Pressure page for setup and calibration. Monitor the MAP [kPa] channel.
C1-37	Analog_In_9	Fuel Pressure		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See the Setup Wizard Fuel Pressure page for setup and calibration. Monitor the FuelPressure [psig] channel.
C1-38	Analog_In_10	Baro Sensor		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See the Setup Wizard Barometric Pressure page for setup and calibration. Monitor the BaroPress [kPa] channel.
C1-39	Analog_In_11	Shift Switch Input		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See the 1D lookup table 'ShiftSwitch' for setup. Also assignable to multiple functions. See Setup Wizard for details.
C1-40	Analog_In_12	Mode Switch		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See the 1D lookup table 'ModeSwitch' for input state. A multi-position rotary switch such as AEM P/N 30-2056 is recommended. Also assignable to multiple functions. See Setup Wizard for details.
C1-41	+5V_Out_1	+5V Out	59	Regulated, fused +5V supply for sensor power	Analog sensor power
C1-42	+5V_Out_1	+5V Out	to MAP sensor	Regulated, fused +5V supply for sensor power	Analog sensor power
C1-43	HighsideSwitch_1	HS1 (switched 12V)		0.7A max, High Side Solid State Relay	See Setup Wizard page 'HighSide Assigment Tables' for configuration options. See 2D lookup table 'HS1_Table' for activation settings.
C1-44	HighsideSwitch_0	HS0 (switched 12V)		0.7A max, High Side Solid State Relay	See Setup Wizard page 'HighSide Assigment Tables' for configuration options. See 2D lookup table 'HS0_Table' for activation settings.
C1-45	Crank Position Sensor VR+	Crank Position Sensor VR+	16	Differential Variable Reluctance Zero Cross Detection	See Setup Wizard page Cam/Crank for options.
C1-46	Crank Position Sensor VR-	Crank Position Sensor VR-	43		

C1-47	Cam Position Sensor 1 VR-	Cam Position Sensor 1 VR-		Differential Variable Reluctance Zero Cross Detection	See Setup Wizard page Cam/Crank for options.
C1-48	Cam Position Sensor 1 VR+	Cam Position Sensor 1 VR+			
C1-49	VR+_In_2	Non Driven Left Wheel Speed Sensor +		Differential Variable Reluctance Zero Cross Detection	See Non Driven Wheel Speed Calibration in the Setup Wizard Vehicle Speed page.
C1-50	VR-_In_2	Non Driven Left Wheel Speed Sensor -			
C1-51	VR-_In_3	Driven Left Wheel Speed Sensor -		Differential Variable Reluctance Zero Cross Detection	See Driven Wheel Speed Calibration in the Setup Wizard Vehicle Speed page.
C1-52	VR+_In_3	Driven Left Wheel Speed Sensor +			
C1-53	DBW1 Motor -	DBW Motor Control Close		5.0A max Throttle Control Hbridge Drive	+12V to close
C1-54	DBW1 Motor +	DBW Motor Control Open		5.0A max Throttle Control Hbridge Drive	+12V to open
C1-55	Power Ground	Ground	28	Power Ground	Connect directly to battery ground
C1-56	Injector 6	Injector 6	4	Saturated or peak and hold, 3A max continuous	Injector 6
C1-57	Injector 5	Injector 5	3	Saturated or peak and hold, 3A max continuous	Injector 5
C1-58	Injector 4	Injector 4	5	Saturated or peak and hold, 3A max continuous	Injector 4
C1-59	Injector 3	Injector 3	31	Saturated or peak and hold, 3A max continuous	Injector 3
C1-60	Power Ground	Ground	34	Power Ground	Connect directly to battery ground
C1-61	+12V	+12V In		12 volt power from relay	12 volt power from relay. Relay must be controlled by +12V Relay Control signal, pin C1-29 above.
C1-62	Injector 2	Injector 2	32	Saturated or peak and hold, 3A max continuous	Injector 2
C1-63	Injector 1	Injector 1	33	Saturated or peak and hold, 3A max continuous	Injector 1
C1-64	+12V	+12V In	54	12 volt power from relay	12 volt power from relay. Relay must be controlled by +12V Relay Control signal pin C1-29 above.
C1-65	+12V_SW	Ignition Switch	56	10K pulldown	Full time battery power must be available at C1-10 before this input is triggered.
C1-66	Analog_In_Temp_1	Coolant Temp Sensor	78	12 bit A/D, 2.49K pullup to 5V	See "Coolant Temperature" Setup Wizard for selection.
C1-67	Analog_In_Temp_2	Intake Air Temperature	77	12 bit A/D, 2.49K pullup to 5V	See "Air Temperature" Setup Wizard for selection.
C1-68	Harness_Analog_In_Temp_3	Oil Temperature Sensor		12 bit A/D, 2.49K pullup to 5V	See 1D table OilTempCal table for calibration data and OilTemp [C] for channel data.

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C1-69	Stepper_2A	Stepper 2A		Automotive, Programmable Stepper Driver, up to 28V and ±1.4A	Be sure that each internal coil of the stepper motor are properly paired with the 1A/1B and 2A/2B ECU outputs. Supports Bi-Polar stepper motors only.
C1-70	Stepper_1A	Stepper 1A		Automotive, Programmable Stepper Driver, up to 28V and ±1.4A	Be sure that each internal coil of the stepper motor are properly paired with the 1A/1B and 2A/2B ECU outputs. Supports Bi-Polar stepper motors only.
C1-71	Stepper_2B	Stepper 2B		Automotive, Programmable Stepper Driver, up to 28V and ±1.4A	Be sure that each internal coil of the stepper motor are properly paired with the 1A/1B and 2A/2B ECU outputs. Supports Bi-Polar stepper motors only.
C1-72	Stepper_1B	Stepper 1B		Automotive, Programmable Stepper Driver, up to 28V and ±1.4A	Be sure that each internal coil of the stepper motor are properly paired with the 1A/1B and 2A/2B ECU outputs. Supports Bi-Polar stepper motors only.
C1-73	Power Ground	Ground	55	Power Ground	Connect directly to battery ground
C2-1	DBW2 Motor +	DBW Motor Control Open		5.0A max Throttle Control Hbridge Drive	+12V to open
C2-2	DBW2 Motor -	DBW Motor Control Close		5.0A max Throttle Control Hbridge Drive	+12V to close
	Power Ground	Ground		Power Ground	Connect directly to battery ground
C2-4	Injector 7	Injector 7		Saturated or peak and hold, 3A max continuous	Injector 7
C2-5	Injector 8	Injector 8		Saturated or peak and hold, 3A max continuous	Injector 8
C2-6	Injector 9	Injector 9		Saturated or peak and hold, 3A max continuous	Injector 9
C2-7	Injector 10	Injector 10		Saturated or peak and hold, 3A max continuous	Injector 10
C2-8	Power Ground	Ground		Power Ground	Connect directly to battery ground
C2-9	+12V	+12V In		12 volt power from relay	12 volt power from relay. Relay must be controlled by +12V Relay Control signal, pin C1-29 above.
C2-10	Injector 11	Injector 11		Saturated or peak and hold, 3A max continuous	Not used
C2-11	Injector 12	Injector 12		Saturated or peak and hold, 3A max continuous	Not used
C2-12	Analog_In_17	A/C Analog Request		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See Setup Wizard Input Functions page for input selection. See AC_Request_In 1-axis table for activation logic.
C2-13	Analog_In_18	DBW_APP1 [%]		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU.
C2-14	Analog_In_19	DBW_APP2 [%]		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU.
C2-15	Analog_In_Temp_4	Charge Out Temperature		12 bit A/D, 2.49K pullup to 5V	See ChargeOutTemp [C] table for calibration data and ChargeOutTemp [C] for channel data.

C2-16	Analog_In_Temp_5	Airbox Temperature		12 bit A/D, 2.49K pullup to 5V	See AirboxTemp [C] table for calibration data and AirboxTemp [C] for channel data.
C2-17	Analog_In_Temp_6	Fuel Temperature		12 bit A/D, 2.49K pullup to 5V	See FuelTemp [C] table for calibration data and FuelTemp [C] for channel data.
C2-18	Analog_In_13	Oil Pressure		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See Setup Wizard Oil Pressure page for setup options. See OilPressure [psig] for channel data.
C2-19	Analog_In_14	Traction Control Mode / Sensitivity		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See the TC_SlipTrgtTrim [MPH] 1-axis table. A multi-position rotary switch such as AEM P/N 30-2056 is recommended.
C2-20	Analog_In_15	Exhaust Back Pressure		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See Setup Wizard Exhaust Pressure page for setup options. See EBPress [kPa] for channel data.
C2-21	Analog_In_16	DBW1_TPSB [%]		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU.
C2-22	+5V_Out_2	+5V Out		Regulated, fused +5V supply for sensor power	Analog sensor power
C2-23	+5V_Out_2	+5V Out		Regulated, fused +5V supply for sensor power	Analog sensor power
C2-24	+5V_Out_2	+5V Out		Regulated, fused +5V supply for sensor power	Analog sensor power
C2-25	VR+_In_5	Driven Right Wheel Speed Sensor +		Differential Variable Reluctance Zero Cross Detection	See Driven Wheel Speed Calibration in the Setup Wizard Vehicle Speed page.
C2-26	VR-_In_5	Driven Right Wheel Speed Sensor -			
C2-27	VR-_In_4	Non Driven Right Wheel Speed Sensor -		Differential Variable Reluctance Zero Cross Detection	See Non Driven Wheel Speed Calibration in the Setup Wizard Vehicle Speed page.
C2-28	V R+_In_4	Non Driven Right Wheel Speed Sensor +			
C2-29	LowsideSwitch_9	Tachometer	47	Lowside switch, 4A max with internal flyback diode, 2.2K 12V pullup. Inductive load should NOT have full time power.	See Setup Wizard page Tacho for configuration options.
C2-30	AGND_2	Sensor Ground		Dedicated analog ground	Analog 0-5V sensor ground
C2-31	AGND_2	Sensor Ground		Dedicated analog ground	Analog 0-5V sensor ground
C2-32	AGND_2	Sensor Ground		Dedicated analog ground	Analog 0-5V sensor ground

C2-33	Analog_In_20	Spare Analog Input		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU.
C2-34	Analog_In_21	3 Step Enable Switch		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See 3StepSwitch 1-axis table for setup.
C2-35	Analog_In_22	USB Logging Activate		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See USBLoggingRequestIn channel for input state. See Setup Wizard page USB Logging for configuration options.
C2-36	Analog_In_23	Charge Out Pressure		12 bit A/D, 100K pullup to 5V	0-5V analog signal. Use +5V Out pins as power supply and Sensor Ground pins as the low reference. Do not connect signals referenced to +12V as this can permanently damage the ECU. See ChargeOutPress [kPa] channel for input state. See Setup Wizard page Charge Out Pressure for calibration options.
C2-37	Digital_In_6	Spare Digital Input		No pullup. Will work with TTL signals.	Input can be assigned to different pins. See Setup Wizard page Input Function Assignments for input mapping options.
C2-38	Digital_In_7	Clutch Switch		No pullup. Will work with TTL signals.	See ClutchSwitch 1-axis table for setup options. Input can be assigned to different pins. See Setup Wizard page Input Function Assignments for input mapping options.
C2-39	Power Ground	Ground		Power Ground	Connect directly to battery ground
C2-40	Power Ground	Ground		Power Ground	Connect directly to battery ground
C2-41	CanH_Bout	CANH		Dedicated High Speed CAN Transceiver	Not used
C2-42	CanL_Bout	CANL		Dedicated High Speed CAN Transceiver	Not used
C2-43	LowsideSwitch_8	LS8		Lowside switch, 4A max with internal fly back diode. Inductive load should NOT have full time power.	See Setup Wizard Page "LowSide Assignment Tables" for output assignment and 2D table "LS8_Duty [%]" for activation.
C2-44	LowsideSwitch_7	LS7		Lowside switch, 4A max with internal fly back diode. Inductive load should NOT have full time power.	See Setup Wizard Page "LowSide Assignment Tables" for output assignment and 2D table "LS7_Duty [%]" for activation.
C2-45	UEGO 2 VM	UEGO 2 VM		Bosch UEGO Controller	Virtual Ground signal. Connect to pin 5 of Bosch UEGO sensor.
C2-46	UEGO 2 UN	UEGO 2 UN			Nernst Voltage signal. Connect to pin 1 of Bosch UEGO sensor
C2-47	UEGO 2 IP	UEGO 2 IP			Pumping Current signal. Connect to pin 6 of Bosch UEGO sensor
C2-48	UEGO 2 IA	UEGO 2 IA			Trim Current signal. Connect to pin 2 of Bosch UEGO sensor
C2-49	UEGO 2 HEAT	UEGO 2 HEAT			Lowside switch for UEGO heater control. Connect to pin 4 of Bosch UEGO sensor. NOTE that pin 3 of the Sensor is heater (+) and must be power by a fused/switched 12V supply.

C2-50	+12V_R8C_CPU	Battery Perm Power		Dedicated power management CPU	Optional full time battery power. MUST be powered before the ignition switch input is triggered (See C1-65).
C2-51	Coil 7	Coil 7		25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C2-52	Coil 8	Coil 8		25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C2-53	Coil 9	Coil 9		25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C2-54	Coil 10	Coil 10		25 mA max source current	0-5V Falling edge fire. DO NOT connect directly to coil primary. Must use an ignitor OR CDI that accepts a FALLING edge fire signal.
C2-55	HighsideSwitch_2	Fuel Pump		Multi-function pin depending on hardware configuration	+12V High Side Drive. Will prime for 2 seconds at key on and activate if RPM > 0.
C2-56	Not used	Not used		Not used	Not used
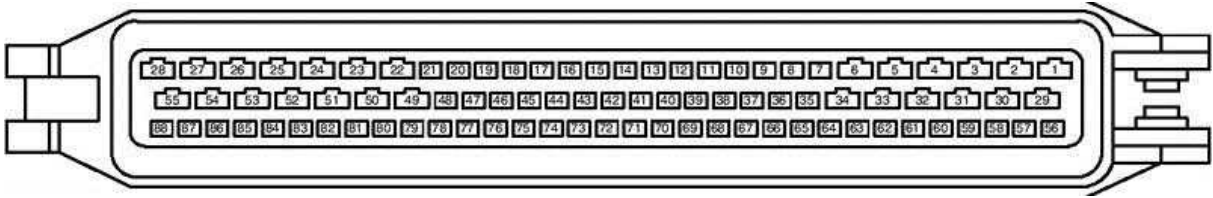
BMW E36 M3 Harness Connector Viewed from Terminal Side
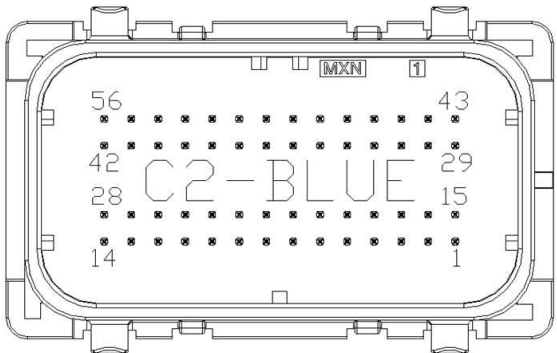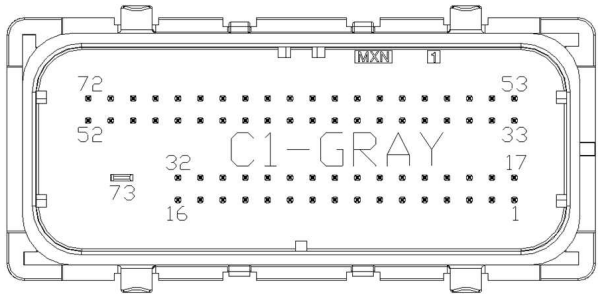
AEM Infinity Connectors Viewed from Wire Side

12 MONTH LIMITED WARRANTY

Advanced Engine Management Inc. warrants to the consumer that all AEM High Performance products will be free from defects in material and workmanship for a period of twelve (12) months from date of the original purchase. Products that fail within this 12-month warranty period will be repaired or replaced at AEM's option, when determined by AEM that the product failed due to defects in material or workmanship. This warranty is limited to the repair or replacement of the AEM part. In no event shall this warranty exceed the original purchase price of the AEM part nor shall AEM be responsible for special, incidental or consequential damages or cost incurred due to the failure of this product. Warranty claims to AEM must be transportation prepaid and accompanied with dated proof of purchase. This warranty applies only to the original purchaser of product and is non-transferable. All implied warranties shall be limited in duration to the said 12-month warranty period. Improper use or installation, accident, abuse, unauthorized repairs or alterations voids this warranty. AEM disclaims any liability for consequential damages due to breach of any written or implied warranty on all products manufactured by AEM. Warranty returns will only be accepted by AEM when accompanied by a valid Return Merchandise Authorization (RMA) number. Product must be received by AEM within 30 days of the date the RMA is issued.

Please note that before AEM can issue an RMA for any electronic product, it is first necessary for the installer or end user to contact the EMS tech line at 1-800-423-0046 to discuss the problem. Most issues can be resolved over the phone. Under no circumstances should a system be returned or a RMA requested before the above process transpires.

AEM will not be responsible for electronic products that are installed incorrectly, installed in a non-approved application, misused, or tampered with.

Any AEM electronics product can be returned for repair if it is out of the warranty period. There is a minimum charge of $50.00 for inspection and diagnosis of AEM electronic parts. Parts used in the repair of AEM electronic components will be extra. AEM will provide an estimate of repairs and receive written or electronic authorization before repairs are made to the product.