BTI

Performance Vehicle Telemetry Displays

www.btigauges.com

CAN Bus Gauge for AEM V2 and EMS-4
Plug and Play Installation Manual
Doc version 2.0
Notice: This product is intended for Off-Road use only.
Never take your eyes off of the road while using this device.
If you are uncomfortable with wire termination, please have
this device installed by a competent shop.

Patent Pending

Plug and Play harness installation:

Plug and play wiring harness for Infinity V2 ECUs with the AEM wiring harness:

Locate the 4 pin AEM NET wiring connector on the V2 harness. Connect the Plug and play harness into the AEMnet 4 pin harness and run the cable to the desired gauge installation location. Note that the gauge gets power and the CAN signal from this cable and no other wiring is necessary.

AEMnet CONNECTORS

The AEMnet has four wires, two are for communication (white pin 1 and green pin 2) and two are for powering (red pin 3 and black pin 4) certain AEMnet devices. Only the two communication wires (white pin 1 and green pin 2) are needed for the Series 2 EMS to send/receive data as the EMS is not powered by AEMnet. The red and black wires will need to be connected when using the Series 2 EMS with devices that are powered by AEMnet such as the Dyno-Shaft (see individual instructions for details). The AEMnet connectors are shown below in figure 1. See table 1 for the AEMnet connection pinout.
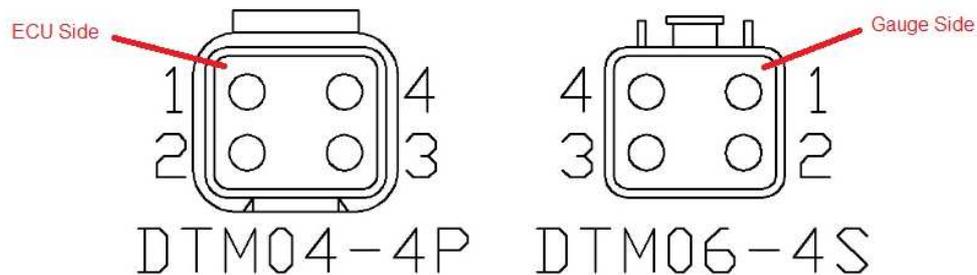
ECU Side

Gauge Side

DTM04-4P   DTM06-4S

Figure 1: AEMnet connectors, wire entry view

AEMnet Connector		Series 2 EMS Connector
Pin 1	White	CAN1H
Pin 2	Green	CAN1L
Pin 3	Red	AEMnet Power (switched 12 volts)
Pin 4	Black	AEMnet Ground

Table 1: AEMnet connector pinout

INSTALLING THE AEMnet ADAPTER HARNESS

4. Table 2 below lists the corresponding CAN1L and CAN1H pin locations for each Series 2 EMS.

EMS	Adapter p/n	CAN1L (Green wire) LOCATION	CAN1H (White wire) LOCATION
30-6100	30-3433	11A	12A
30-6101	30-3433	11A	12A

Table 2: CAN1L and CAN1H pin locations

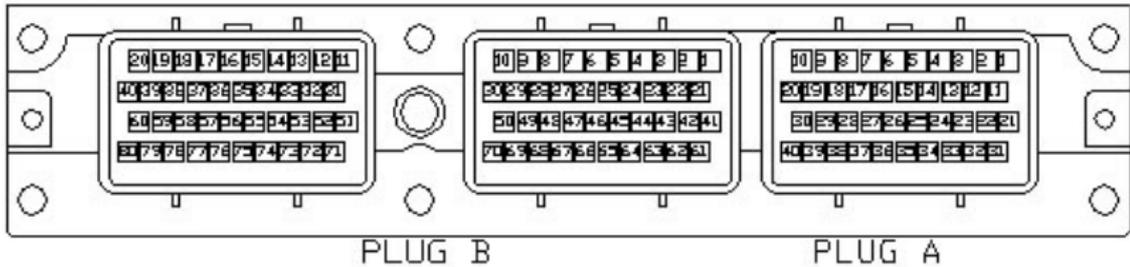Figure 6 below shows the connectors for the Series 2 EMS.

Figure 6: Wire-side view of pinout for 6100 and 6101 EMS

4. Table 2 below lists the corresponding CAN1L and CAN1H pin locations for each Series 2 EMS.

EMS	Adapter p/n	CAN1L (Green wire) LOCATION	CAN1H (White wire) LOCATION
30-6030	30-3430	C22	C21
30-6050	30-3432	D14	D10
30-6051	30-3432	D14	D10
30-6052	30-3432	D14	D10
30-6053	30-3432	D14	D10
30-6060	30-3432	C28	C29
30-6310	30-3431	77	87
30-6311	30-3431	57/77	67/87
30-6320	30-3435	33	13

Table 2: CAN1L and CAN1H pin locations

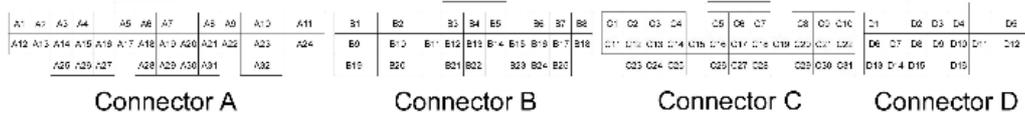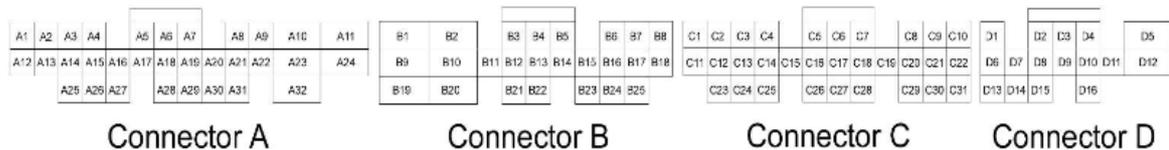Figures 7, 8, 9, and 10 below show the connectors for each Series 2 EMS.

Figure 7: Wire-side view of pinout for 6030

Figure 8: Wire-side view of pinout for 6050, 6051, 6052, 6053, and 6060 EMS

A   B   C   D

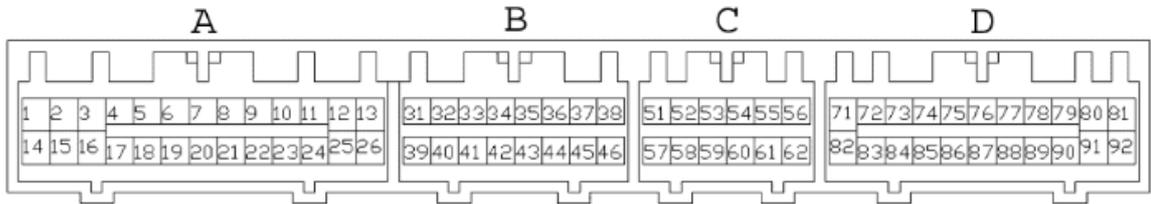| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | | 51 | 52 | 53 | 54 | 55 | 56 | | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | | 57 | 58 | 59 | 60 | 61 | 62 | | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 |

Figure 9: Wire-side view of pinout for 6310 and 6311 EMS

1	2		3	4			5	6		7	8	41	42	43	44				45	46	47	71	72		73	74			75	76	77
9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	48	49	50	51	52	53	54	55	56	57	58	59	78	79	80	81	82	83	84	85	86	87	88	89	90
24	25		26	27	28	29		30	31	32	33		34	35	60	61		62	63	64		65	66		67	68	91	92	93		94	95		96	97	98		99	100

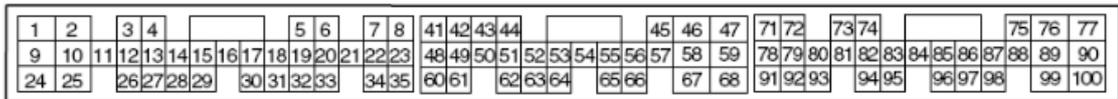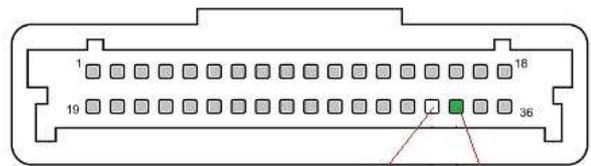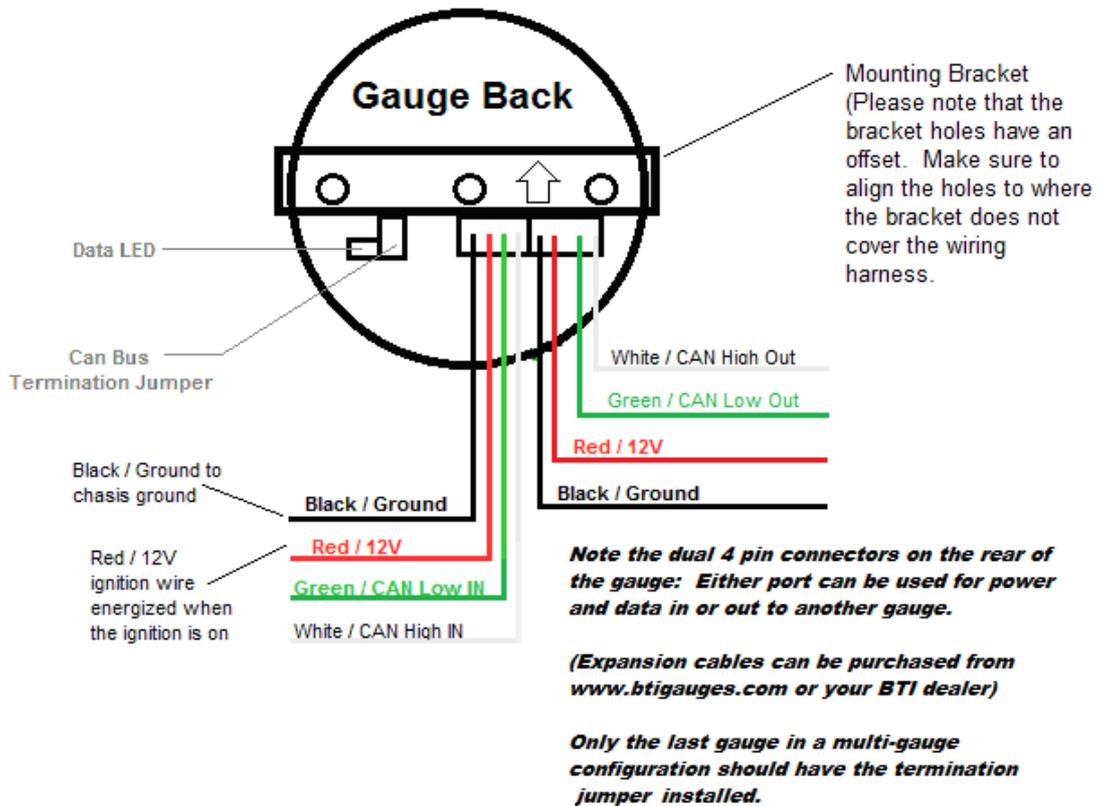## Figure 10: Wire-side view of Pinout for 6320 EMS

EMS-4 CAN Bus wiring:

Pin 33 CAN High
(White Wire)

Pin 34 CAN Low
(Green Wire)

Gauge Back

Data LED

Can Bus Termination Jumper

Black / Ground to chasis ground

Red / 12V ignition wire energized when the ignition is on

Black / Ground

Red / 12V

Green / CAN Low IN

White / CAN High IN

Mounting Bracket (Please note that the bracket holes have an offset. Make sure to align the holes to where the bracket does not cover the wiring harness.

White / CAN High Out

Green / CAN Low Out

Red / 12V

Black / Ground

Note the dual 4 pin connectors on the rear of the gauge: Either port can be used for power and data in or out to another gauge.

(Expansion cables can be purchased from www.btigauges.com or your BTI dealer)

Only the last gauge in a multi-gauge configuration should have the termination jumper installed.

Data LED: This indicator will flash when ever the gauge is energized and CAN communications are present. Use this to confirm communications.

CAN Bus Termination Jumper: Remove this jumper if the gauge is not the last device on the CAN Bus. If there are multiple gauges, the last gauge should be the only gauge with the jumper installed.
Leave the jumper installed if the gauge is a stand alone installation and there is nothing else on the CAN Bus.

Use the Yellow and Blue wires in order to attach multiple gauges to the CAN Bus.

Configuring AEM V2:

According to AEM's documentation, the AEM V2 must be configured to output the telemetry on the CAN Bus (AEMnet):

AEM V2 and EMS-4 Configuration

The AEMnet data stream is compatible with version AEM25 01v23 firmware and later. To activate the AEMnet data stream, open AEMTuner and go to Wizards > Setup Wizard and select the AEMnet Data Stream. See figure 11 below.

Figure 11: Selecting the AEMnet Datastream

Operation:

Upon powering up a properly terminated gauge, the Gauge will display the interface and version number,

The gauge will then display a splash screen if one is programmed.

Following the splash screen, the gauge will display the first screen. (This screen usually has a parameter assigned from testing the gauge after manufacturing)
The remaining 11 screens will display the following message:

"No parameter selected for screen # 1-12"

Use the Left or Right buttons to scroll through the 12 screens.

Use the center button to enter the screen configuration.

Once in the screen configuration, use the Left or Right buttons to scroll to the desired parameter or compound parameters that you wish to assign to the selected screen number. After the desired parameter or parameters have been selected, use the Center button to complete the screen assignment.

When the gauge is powered off, the last screen that was used for more than 60 seconds will be the next screen displayed when power is reapplied to the gauge.

Configuring the MAP and Fuel pressure sensors:

Common Sensor multipliers and offsets:

Manufacturer	Model #	Multiplier	Offset
AEM 3.5 Bar	30-2130-50	12.5	-6.25
AEM 5 Bar	30-2130-75	18.750	-9.375
Omni 3 Bar	MAP-STI-3BR	9.122	.164
Omni 4 Bar	MAP-STI-4BR	12.086	.169
GM 3 Bar	12223861	8.94	.1604

Both the MAP and Fuel pressure sensors must be configured in BTI gauge for operation of those two parameters.

In order to configure the MAP sensor, hold the Right button down after applying power to the gauge. Promptly release the Right button once the MAP sensor scale screen appears. You must enter the MAP sensor multiplier on this screen. Use the LEFT button to decrement the value and use the RIGHT button to increment the value (holding the buttons for longer than 10 seconds will speed up this process)

Hint: AEM 3.5 bar sensor has a multiplier of 12.5 which means that this particular sensor outputs 12.5 PSI / volt.

Press the CENTER button labeled "Accept" once you have entered the multiplier.

Next you will be prompted to enter in an offset. Again use the LEFT and RIGHT buttons to increment and decrement the value. Take notice that the AEM and Zeitronix sensors have a negative offset while the Omni and GM sensors have a positive offset.

Press the CENTER button labeled "Accept" to store the value.   You will now be prompted to enter the fuel pressure settings.

Fuel Pressure Sensor Configuration:

Common Sensor multipliers
(Note that these sensors are not absolute and do not require an offset, but an offset can be programmed if needed)

Manufacturer	Model #	Multiplier	Offset
AEM 100 PSI	30-2130-100	25	0
AEM 150 PSI	30-2130-150	37.75	0
AEM 500 PSI	30-2130-500	125	0

You must enter the Fuel Pressure sensor multiplier on this screen. Use the LEFT button to decrement the value and use the RIGHT button to increment the value (holding the buttons for longer than 10 seconds will speed up this process)

Press the CENTER button labeled "Accept" once you have entered the multiplier.

Next you will be prompted to enter in an offset. Again use the LEFT and RIGHT buttons to increment and decrement the value. Typically there will not need to be an offset entered here.

Press the CENTER button labeled "Accept" to store the value.
You will now be prompted to enter a channel. The following Channels are available on the CAN Bus: ADRC 8, ADRC 11, ADRC 13, ADRC 14, ADRC 15, ADRC 16, ADRC 17, and ADRC 18.
These are the analog channels that can be read on the CAN Bus.

AEM has informed us that each model of V2 ECU will use different analog (ADRC) channels for the fuel pressure. You will have to determine which channel the fuel pressure is tied to on your particular ECU.

**Note that in some cases, AEM does not have the Fuel Pressure tied to any of these analog channels. A work-around is to tie (jumper) the fuel pressure sensor to a vacant analog input that you are not using.

Example: The Supra TT V2 ECU does not have one of the listed analog channels tied to the fuel pressure. The fuel pressure sensor output could be tied to ADRC 14 which is the Auto transmission temp input (assuming this is not being used) Tie the sensor to 24B.

Press the CENTER button labeled "Accept" and test the Fuel Pressure output.

Shift Light Configuration:
Press and hold the left button after energizing the gauge until the shift light configuration screen appears. The menu will prompt you to enter an RPM number for each gear (1-5). Use the left and right button to increment or decrement the RPM value. Use the center button to save the value for each gear. The shift light will flash once the setup is complete.

Warranty:

All BTI Gauges carry a 1 year warranty effective at the time of purchase.

- This warranty extends only to products distributed and/or sold by BTI Gauges. It is effective only if the products are purchased and operated in the USA. (Within the USA including US 48 States, Alaska and Hawaii.)
- This warranty covers only normal use of the computer. BTI Gauges shall not be liable under this warranty if any damage or defect results from (i) misuse, abuse, neglect, improper shipping or installation; (ii) disasters such as fire, flood, lightning or improper electric current; or (iii) service or alteration by anyone other than an authorized BTI Gauge representative.
- You must retain your bill of sale or other proof of purchase to receive warranty service.
- No warranty extension will be granted for any replacement part(s) furnished to the purchaser in fulfillment of this warranty.