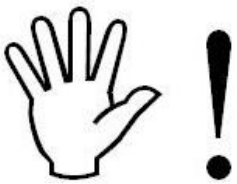
# Instruction Manual

# P/N 30-2212
# 22 CHANNEL CAN SENSOR MODULE



## STOP! - READ THIS BEFORE INSTALL OR USE!

WARNING:
THIS INSTALLATION MAY REQUIRE WELDING OR INTEGRATION INTO A VEHICLE'S ELECTRICAL SYSTEM. DAMAGE TO SENSITIVE ELECTRONICS, FIRE, OR EXPLOSION MAY OCCUR IF PROPER PRECAUTION IS NOT TAKEN. IF THERE IS ANY DOUBT, **DO NOT** ATTEMPT THE INSTALLATION AND CONSULT A PROFESSIONAL.
**NOTE**: IT IS THE RESPONSIBILITY OF THE ENGINE TUNER TO ULTIMATELY CONFIRM THE CALIBRATION USE FOR ANY PARTICULAR ENGINE IS SAFE FOR ITS INTENDED USE. AEM HOLDS NO RESPONSIBILITY FOR ANY ENGINE DAMAGE THAT RESULTS FROM THE MISUSE OF THIS PRODUCT.

The AEM 22 Channel CAN Sensor Module enables a user to put analog, digital, and frequency signals on to an AEMnet or CAN bus. The Sensor Module accommodates a wide variety of sensors and is housed in a sealed IP65 weather-resistant enclosure. Sturdy construction, protected inputs, and simple configuration make this the perfect entry point to get everything required to use an AEM CD-series dash on a carbureted or EFI vehicle. The Sensor Module supports the Bosch CAN 2.0b standard with flexible CAN configuration jumpers making it compatible with many third-party devices. Note: The only AEMnet devices that are compatible with the CAN Sensor Module are the CD-series dash displays.

### Features

- Four (4) dedicated 0-5V analog inputs
- Four (4) user-configurable analog inputs, (jumper selectable; 0-5V, thermistor, or RTD)
- Four (4) temperature (thermistor) inputs
- One (1) dedicated fuel level input (0 to 250 Ohm range)
- Six (6) digital inputs (frequency, duty cycle or simple switch)
- One (1) tachometer/coil input
- Two (2) VR ("magnetic") pair frequency inputs (crank, wheel or drive shaft speeds)
- Jumper selectable CAN bus speeds: 250k, 500k, 1M
- Jumper selectable terminating resistor
- Jumper selectable header length, 11 bit or 29 bit
- Jumper selectable base address, two units can be on the same bus
- IP65 Enclosure - "dust tight" and protected against water spray
- Protected inputs

| PN | QTY | Description |
|---|---|---|
| 35-2212 | 1 | MODULE, 22 CHANNEL CAN SENSOR MODULE |
| 10-2212 | 1 | INST, MODULE, 22 CHANNEL CAN SENSOR MODULE |
| 36-2212 | 1 | HARNESS, MODULE, 22 CHANNEL CAN SENSOR MODULE |
| 4-0126 | 12 | WIRE TERM, 22 AWG YELLOW |
| 4-0127 | 3 | WIRE TERM, 22 AWG RED |
| 4-0128 | 5 | WIRE TERM, 22 AWG BLK |
| 4-0129 | 6 | WIRE TERM, 22 AWG TAN |
| 4-0130 | 6 | WIRE TERM, 22 AWG WHT |
| 4-2069 | 10 | TERMINAL, F, MICRO-PACK 20-22 AWG |
| 4-3027 | 10 | SEAL, BLUE, MICRO-PACK 100W |

# Installation

**Mechanical**

The Sensor Module may be mounted within the vehicle using hook-and-loop fastener or bolted to a suitable structure; a mounting/drill diagram is provided below. The module is weather-resistant (IP65) but is preferably mounted in a cool, dry area such as the driver compartment.

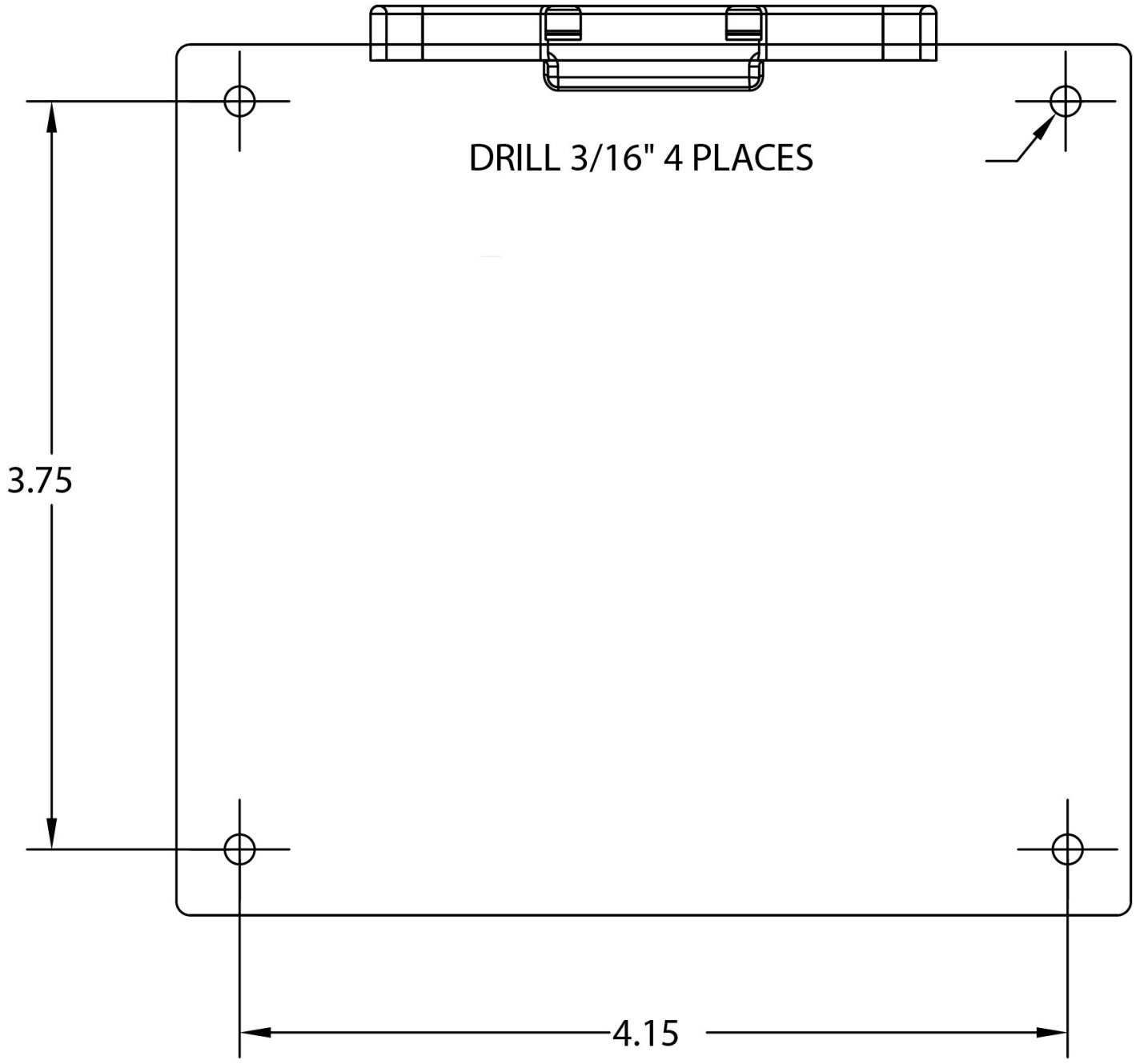



***IMAGE NOT TO SCALE***

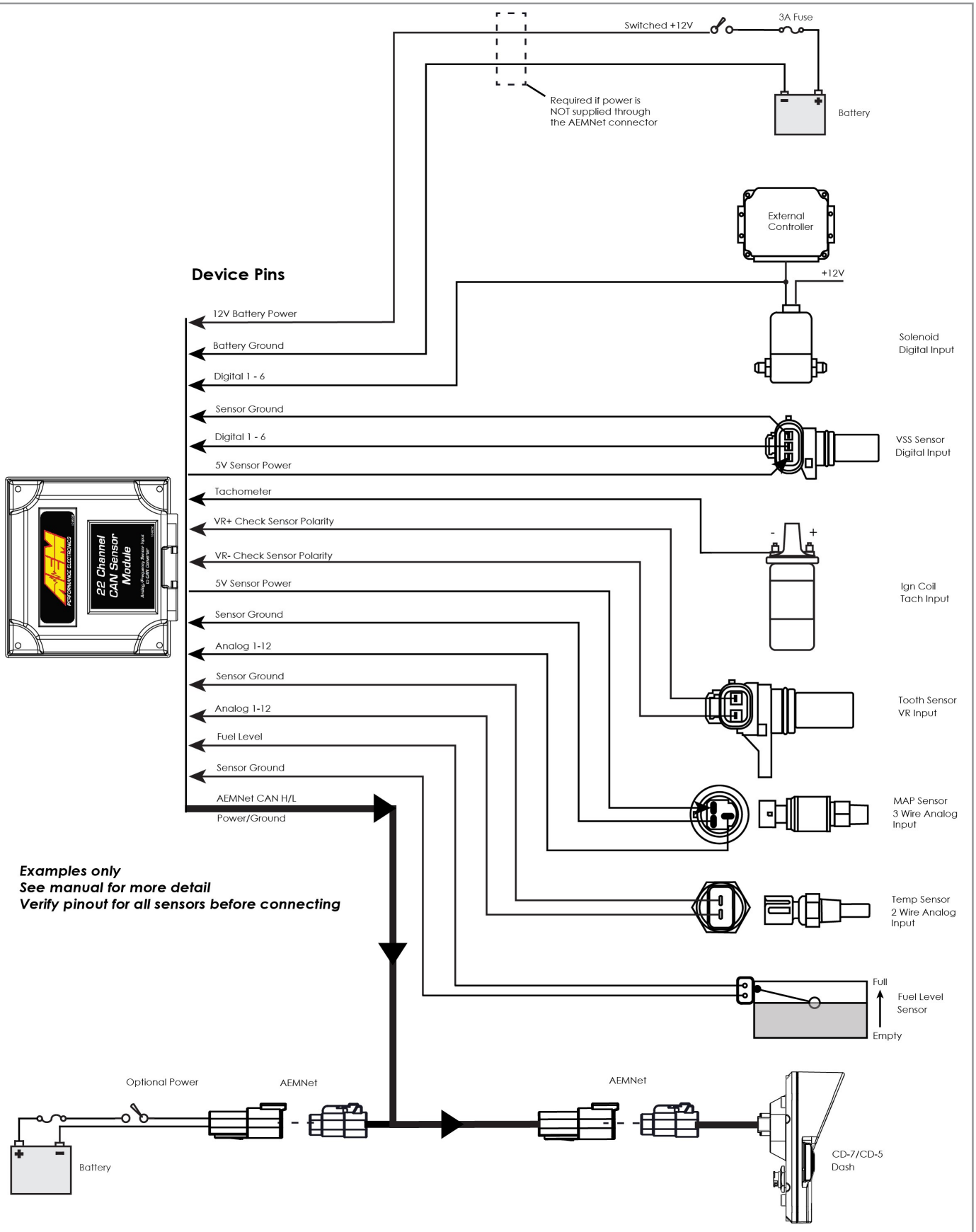
**Electrical**

The supplied 36-2212 harness comes with a pre-terminated AEMnet spur suitable for powering the module and providing AEMnet/CAN connectivity. In addition, pre-terminated lengths of various color wire are supplied for connection to sensors. The harness connector is a multi-piece assembly which has a clear plastic retainer that must be removed prior to inserting the crimped leads into the assembly. Please see instructions later in this manual.

**Sensor Wiring**

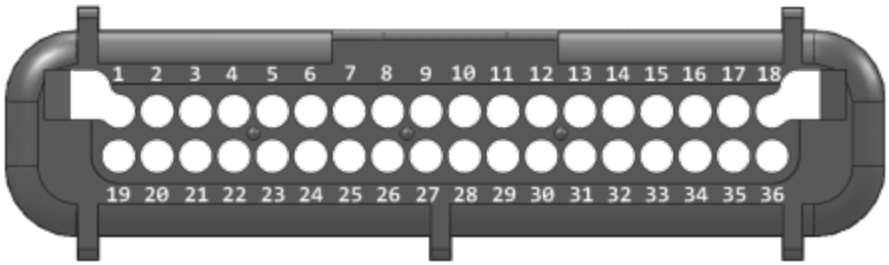
- The Sensor Module should only be powered through the dedicated power and power ground pins, ***not*** sensor ground
- Every connected sensor should be connected to one of the dedicated *sensor* ground pins to ensure accurate readings
- Do not connect the Module's 5V sensor power to anything *other than* dedicated sensors that require 5V power, e.g. pressure sensors
- Route wiring away from sources of noise such as alternators, ignition components, or other high power/frequency wiring
- Shielded wire is suggested to reduce the susceptibility of noise; the shield should only be grounded/drained on one end of the wiring harness
- CAN wiring should utilized twisted pairs (> 1 TPI); shielding is recommended
- This module is **not** compatible with K-type thermocouples **(unless a K-type amplifier is used)**; RTD-style EGT sensors **are** compatible, e.g. AEM PN 30-2050
- The Sensor Module's sensor ground should be at the same level as the sensor ground of any "tapped" sensors, i.e. existing/OEM sensors that are connected to an external ECU/device
- **The device pinout section includes a Suggested Interface column. This may make integration with an AEM Dash easier as sample layouts will be provided that follow these guidelines.**

# System Schematic




| | | | | |
|---|---|---|---|---|
| PERFORMANCE ELECTRONICS | Drawing: SYSTEM SCHEMATIC | | | |
| | 30-2212<br>PRODUCT: 22 CH CAN Sensor Module | Date: 12/7/2017 | Rev: | Engineer: |

## Device Pinout




| Pin | Name | Function | Suggested Interface |
|---|---|---|---|
| 1 | 12V Battery Power (+) | Primary ignition/battery power input | Fused Ignition Switch |
| 2 | AEMnet+ / CANH | AEMnet / CAN bus output | AEMNet +/High (White) |
| 3 | VR1 Positive (+) | VR / Magnetic Sensor input (Crank, wheel, or drive shaft speeds) | Driven Wheel Speed VR |
| 4 | VR1 Negative (-) | VR / Magnetic Sensor input (Crank, wheel, or drive shaft speeds) | |
| 5 | Fuel Level | 0 - 250 Ohm fuel level sensor input | Fuel Level Sensor |
| 6 | Tachometer | Engine speed input (negative coil terminal) 12V pull-up | Tach signal/Coil negative |
| 7 | Sensor Ground | Dedicated sensor ground | Sensor Ground |
| 8 | Sensor Ground | Dedicated sensor ground | Sensor Ground |
| 9 | 5V Sensor Power | 5V sensor reference power output | 5v Reference Voltage |
| 10 | 5V Sensor Power | 5V sensor reference power output | 5v Reference Voltage |
| 11 | Sensor Ground | Dedicated sensor ground | Sensor Ground |
| 12 | Digital 1 | Frequency, duty cycle %, and switch input / Active low, 12V pull-up | Driveshaft Speed |
| 13 | Digital 2 | Frequency, duty cycle %, and switch input / Active low, 12V pull-up | Nitrous Arm Switch |
| 14 | Digital 3 | Frequency, duty cycle %, and switch input / Active low, 12V pull-up | Clutch Switch |
| 15 | Digital 4 | Frequency, duty cycle %, and switch input / Active low, 12V pull-up | Brake Switch |
| 16 | Digital 5 | Frequency, duty cycle %, and switch input / Active low, 12V pull-up | Trans Brake |
| 17 | Digital 6 | Frequency, duty cycle %, and switch input / Active low, 12V pull-up | Spare |
| 18 | Sensor Ground | Dedicated sensor ground | Sensor Ground |
| 19 | Battery Ground (-) | Primary ignition/battery ground input | Battery/chassis ground |
| 20 | AEMnet- / CANL | AEMnet / CAN bus Output | AEMNet -/Low (Green) |
| 21 | VR2 Positive (+) | VR / Magnetic Sensor input (Crank, wheel, or drive shaft speeds) | Non-Driven Wheel Speed VR |
| 22 | VR2 Negative (-) | VR / Magnetic Sensor input (Crank, wheel, or drive shaft speeds) | |
| 23 | Analog 1 | 0-5V Analog input, 100k Ohm 5V pull-up | TPS / Throttle Position Sensor |
| 24 | Analog 2 | 0-5V Analog input, 100k Ohm 5V pull-up | Manifold Pressure Sensor |
| 25 | Analog 3 | 0-5V Analog input, 100k Ohm 5V pull-up | Fuel Pressure Sensor |
| 26 | Analog 4 | 0-5V Analog input, 100k Ohm 5V pull-up | Oil Pressure Sensor |
| 27 | Analog 5 | 0-5V, Thermistor, RTD input, jumper selectable (470, 2200, 100k) 5V pull-up | Air/Fuel Ratio Analog Bank1 |
| 28 | Analog 6 | 0-5V, Thermistor, RTD input, jumper selectable (470, 2200, 100k) 5V pull-up | Air/Fuel Ratio Analog Bank2 |
| 29 | Analog 7 | 0-5V, Thermistor, RTD input, jumper selectable (470, 2200, 100k) 5V pull-up | Nitrous Pressure Sensor |
| 30 | Analog 8 | 0-5V, Thermistor, RTD input, jumper selectable (470, 2200, 100k) 5V pull-up | Brake Pressure |
| 31 | Analog 9 | Temperature / thermistor input, 2200 Ohm 5V pull-up | Coolant Temperature Sensor |
| 32 | Analog 10 | Temperature / thermistor input, 2200 Ohm 5V pull-up | Intake Air Temperature Sensor |

| | | | |
|---|---|---|---|
| 33 | Analog 11 | Temperature / thermistor input, 2200 Ohm 5V pull-up | Oil Temperature Sensor |
| 34 | Analog 12 | Temperature / thermistor input, 2200 Ohm 5V pull-up | Transmission Temp |
| 35 | Sensor Ground | Dedicated sensor ground | Sensor Ground to temp sensors |
| 36 | 5V Sensor Power | 5V sensor reference power output | 5v Reference Voltage |

## Analog Inputs 1 - 4

These inputs have a 100kOhm 5V pull-up resistor and are suitable to measure voltage signals from 0-5V sensors or devices; either sensors that are being added to a vehicle or pre-existing (or OEM) sensors. Pre-existing/OEM sensors are presumed to be already connected to a factory ECU or logging device which will require different wiring considerations. Please refer to the table below for connection examples.

| New / Added Sensors | 5V Sensor Power | Sensor Signal | Sensor Ground | Examples |
|---|---|---|---|---|
| Three wire pressure | ✓ | ✓ | ✓ | Manifold pressure, oil/water pressure, etc |
| Three wire position | ✓ | ✓ | ✓ | Throttle/pedal position, linear potentiometer, etc |
| Three wire flow | ! | ✓ | ✓ | Check with manufacturer, some MAFs require 12V power yet output a 0-5V signal |
| Device | ✘ | ✓ | ✓ | AEM 30-4110 UEGO Gauge with 0-5V Output |
| **Existing / OEM Sensors** | | | | |
| Three wire pressure | ✘ | ✓ | ✓ | Manifold pressure, oil/water pressure, etc |
| Three wire position | ✘ | ✓ | ✓ | Throttle/pedal position, linear potentiometer, etc |
| Two wire temperature | ✘ | ✓ | ✓ | Intake, coolant/oil temperature, etc |
| Three wire flow | ✘ | ✓ | ✓ | 0-5V voltage-style MAF sensor |
| Device | ✘ | ✓ | ✓ | AEM 30-4110 UEGO Gauge with 0-5V Output |

✓=Connect ✘=Don't connect

**CAN Output**

The measured voltage will be output via CAN and will have to be scaled to the desired units (e.g. temperature, pressure, percentage, etc) in the receiving device. A thermistor's voltage/resistance varies non-linearly with temperature and thus the receiving device will likely require a look-up table to properly log or display temperature. Most non-temperature sensors require a simpler linear scaling. The AEM CD series of dashes have both of these capabilities; please refer to the appropriate documentation.

# Analog Inputs 5 - 8

These inputs have a jumper-selectable 5V pull-up resistor and are suitable for a variety of sensors, either sensors that are being added to a vehicle or pre-existing (or OEM) sensors. Pre-existing/OEM sensors are presumed to be already connected to a factory ECU or logging device which will require different wiring and jumper setting considerations. Please refer to the table below for connection examples.

| New / Added Sensors | Jumper/Pull-up | 5V Sensor Power | Sensor Signal | Sensor Ground | Notes |
|---|---|---|---|---|---|
| Three wire pressure | 100k | ✓ | ✓ | ✓ | Manifold pressure, oil/water pressure, etc |
| Three wire position | 100k | ✓ | ✓ | ✓ | Throttle/pedal position, linear potentiometer, etc |
| Three wire flow | 100k | ! | ✓ | ✓ | Check with manufacturer, some MAFs require 12V power yet output a 0-5V signal |
| Two wire temperature | 2200 | ✗ | ✓ | ✓ | Intake, coolant/oil temperature, etc (thermistor only) |
| Two wire RTD EGT | 470 | ✗ | ✓ | ✓ | Exhaust Gas Temperature (RTD Only) |
| Device | 100k | ✗ | ✓ | ✓ | AEM 30-4110 UEGO Gauge with 0-5V Output |
| **Existing / OEM Sensors** | | | | | |
| Three wire pressure | 100k | ✗ | ✓ | ✓ | Manifold pressure, oil/water pressure, etc |
| Three wire position | 100k | ✗ | ✓ | ✓ | Throttle/pedal position, linear potentiometer, etc |
| Two wire temperature | 100k | ✗ | ✓ | ✓ | Intake, coolant/oil temperature, etc |
| Three wire flow | 100k | ✗ | ✓ | ✓ | 0-5V voltage-style MAF sensor |
| Device | 100k | ✗ | ✓ | ✓ | AEM 30-4110 UEGO Gauge with 0-5V Output |

✓= Connect ✗=Don't connect ! = Read Notes

**CAN Output**

The measured voltage and resistance will be output via CAN and will have to be scaled to the desired units (e.g. temperature, pressure, percentage, etc) in the receiving device. A thermistor's voltage/resistance varies non-linearly with temperature and thus the receiving device will likely require a look-up table to properly log or display temperature. Most non-temperature sensors require a simpler linear scaling. The AEM CD series of dashes have both of these capabilities; please refer to the appropriate documentation.

Note: The resistance value output via CAN is not valid when the pull-up jumper is in the "100kOhm" position. Please refer to the voltage output.

# Analog Inputs 9 - 12

These inputs have a 2200 Ohm 5V pull-up resistor and are suitable for two-wire thermistor temperature sensors. It is not recommended to connect these inputs to pre-existing/OEM sensors that are already connected to a factory ECU or logging device. Please refer to the table below for connection examples.

| New / Added Sensors | 5V Sensor Power | Sensor Signal | Sensor Ground | Examples |
|---|---|---|---|---|
| Two wire temperature | ✗ | ✓ | ✓ | Intake, coolant/oil temperature, etc |

✓= Connect ✗=Don't connect ! = Read Notes

**CAN Output**

The measured resistance will be output via CAN and will have to be scaled to temperature in the receiving device. A thermistor's resistance varies non-linearly with temperature and thus the receiving device will likely require a look-up table to properly log or display temperature. The AEM CD series of dashes have this capability; please refer to the appropriate documentation.

## VR (Variable Reluctance) Inputs 1 -2

These inputs are suitable for connection to two-wire VR (variable reluctance) or "magnetic" style speed sensors. Each input is composed of a pair of wires, positive (+) and negative (-), which must be connected to the sensor's respective terminals. You may connect the Sensor Module to existing/OEM sensors or new sensors that have been added to the vehicle. Common uses for these inputs would be for use with wheelspeed or driveshaft speed sensors.

**Input Sensitivity / Jumper Selection**
The "VR Sense" jumper configures the sensitivity, high or low, for these inputs. The default/recommended position is "HI" which should work well for most situations. The "LOW" setting may be tried if there are low-speed signal dropouts. Please refer to the section entitled *Jumper Configuration* for more information on how to change jumper settings.

**CAN Output**
The measured frequency will be output in Hertz via CAN and will have to be scaled to speed (RPM, MPH, KPH, etc) in the receiving device. The AEM CD series of dashes have this capability; please refer to the appropriate documentation.

## Tachometer Input

This input is suitable for measuring engine speed from a variety of sources such as an ignition coil's negative (-) terminal or an ignition box/driver's 'tachometer' output. If your vehicle is equipped with an aftermarket high-output or multi-strike ignition system, do ***not*** connect this input to the ignition coil. Instead, use the dedicated tachometer output wire from your ignition system. "Flying Magnet" or VR style sensors should be connected to one of the VR inputs and *not* the tachometer input.

**CAN Output**
The measured frequency will be output in Hertz via CAN and will have to be scaled to engine speed (RPM) in the receiving device. The AEM CD series of dashes have this capability; please refer to the appropriate documentation.

## Fuel Level Sensor Input

This input is suitable for connection to a resistive fuel level sensor. The output of these sensors typically varies from slightly above 0 Ohms to a maximum of 240 Ohms. It is important that the AEM CAN Sensor Module is the only device connected to the fuel level sensor. Tapping on to a sensor that is already connected to an OEM ECU (or similar) will result in inaccurate readings.

**CAN Output**
The measured resistance will be output via CAN and will have to be scaled (typically linear) to fuel level (or percentage) in the receiving device. The AEM CD series of dashes have this capability; please refer to the appropriate documentation.

Note: The CAN output value, in Ohms, may appear to be slow to respond to input sensor signal changes. This is as-intended since this input is heavily filtered to account for fuel level slosh.

## Digital Inputs 1 - 6

These inputs are suitable for measuring the frequency, duty cycle, and state of 0 - 12V signals. Each input measures and outputs all three parameters without further configuration. Examples of common digital sensor signals and typical applications are listed below.

| Digital signal examples | Frequency (Hz) | Duty Cycle (%) | State (On/Off) | Notes |
|---|---|---|---|---|
| Vehicle Speed Sensor (VSS) | ✓ | | | VSS frequency is proportional to vehicle speed. |
| Injector* | | ✓ | | Injector duty cycle is proportional to amount of fuel used** |
| Boost Solenoid* | | ✓ | | Boost solenoid duty cycle is proportional to boost/MAP |
| Transmission Solenoid* | | ✓ | | Solenoid duty cycle is proportional to line pressure |
| Clutch Switch / Trans Brake* | | | ✓ | The output will change to '1' or 'ON' when grounded |
| MAF Sensor | ✓ | | | Frequency is proportional to airflow |

| | | | | |
|---|---|---|---|---|
| Flex Fuel Sensor | ✓ | ✓ | | Frequency = Ethanol Content<br>Duty Cycle = Fuel Temperature |

* Duty Cycle and State are active low inputs ** The Sensor Module does support OEM ECU multi-pulse signals

*Note: These inputs are flyback protected but only suitable for low-energy signals. Do not connect these inputs to ignition coils or VR sensors. Please refer to the device specifications further in this manual.*

**CAN Output**
Each input will output the following three parameters:

*Frequency (Hz)* - The reciprocal of the period of a signal where the period is the amount of time between two rising (or falling) edges.

*Duty Cycle (%) [Active Low]* - The fraction of one period in which the signal is low.

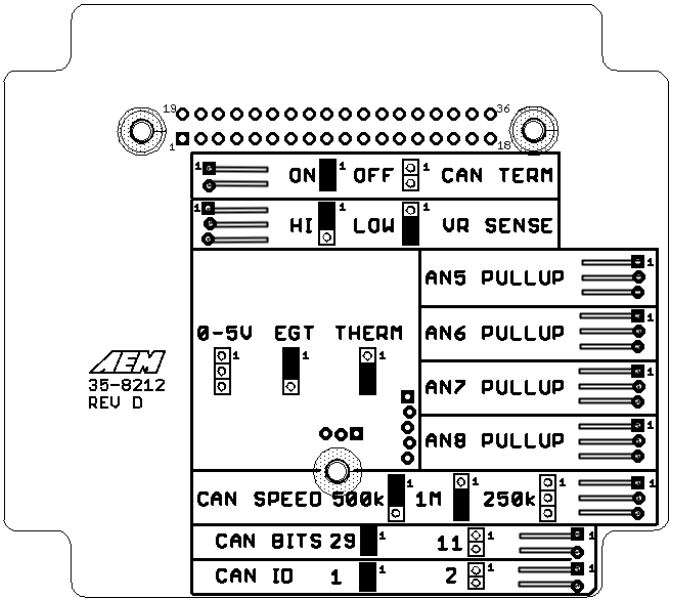
*State [Active Low]* - This output will be "1" or "ON" when the input is grounded and "0" or "OFF" when disconnected or above the threshold voltage of ~7.5V. Note that this output is de-bounced and not suitable for fast changing signals (> ~1Hz). It is best suited for mechanical driver-operated switches with two positions.

# Jumper Configuration

Several configuration jumpers are located beneath the rear cover of the Sensor Module. The rear cover may be removed by unscrewing the four external screws to change the jumper positions if needed. The Sensor Module is delivered from the factory in the most common configuration suitable for use with AEMnet (and other) devices; changing the jumper positions is not typically necessary.

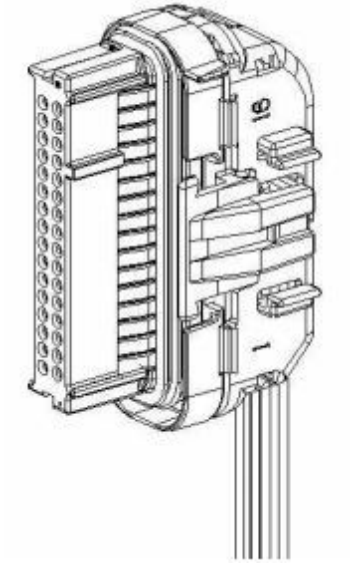
*CAN TERM* - A maximum of two termination resistors should be active per CAN bus installation. Please refer to the documentation for the other devices on your network.
*VR SENSE* - The default/recommended position is "HI" which should work well for most situations. The "LOW" setting may be tried if there are low-speed signal dropouts.
*ANx PULLUP* - Please refer to the 'Analog Inputs 5 - 8' section of this manual.
*CAN SPEED* - The default position of 500k is correct for AEMnet. Please refer to the manufacturer's documentation if you are using any third-party devices.
*CAN BITS* - The default position of 29 is correct for AEMnet. Please refer to the manufacturer's documentation if you are using any third-party devices.
*CAN ID* - The default position of 1 is correct if there is only a single AEM CAN Sensor Module installed on your network. If you are using two Sensor Modules, the first unit must be set to '1' and the second to '2'. The second Sensor Module on a network with two modules will transmit at half the rate of the first to prevent overloading the bus.

| | No Jumper | 1 - 2 | 2 - 3 | Description |
|---|---|---|---|---|
| CAN TERM | OFF | ON* | | Sets 120 Ohm CAN termination resistor |
| VR SENSE | | HI* | LOW | VR inputs 1 -2 trigger sensitivity |
| AN5 PULLUP | 100k* | 470 | 2200 | Analog input 5 pull-up resistor (Ohms) |
| AN6 PULLUP | 100k* | 470 | 2200 | Analog input 6 pull-up resistor (Ohms) |
| AN7 PULLUP | 100k* | 470 | 2200 | Analog input 7 pull-up resistor (Ohms) |
| AN8 PULLUP | 100k* | 470 | 2200 | Analog input 8 pull-up resistor (Ohms) |
| CAN SPEED | 250k | 500k* | 1M | CAN bus speed (kbit/sec) |
| CAN BITS | 29* | 11 | | CAN bus ID length (bits) |
| CAN ID | 1* | 2 | | First or second Sensor module on bus |

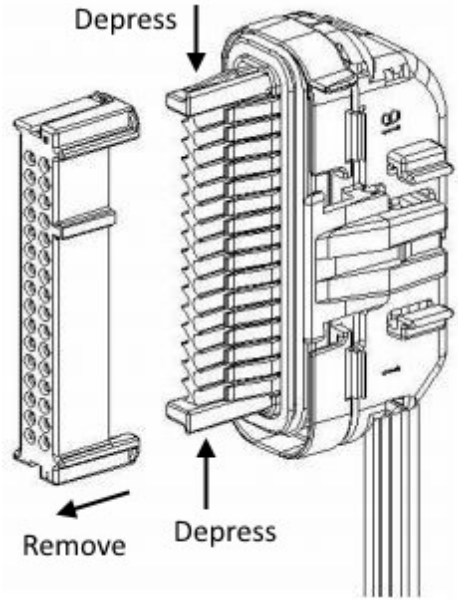


Jumper Position ( * = Default Position)

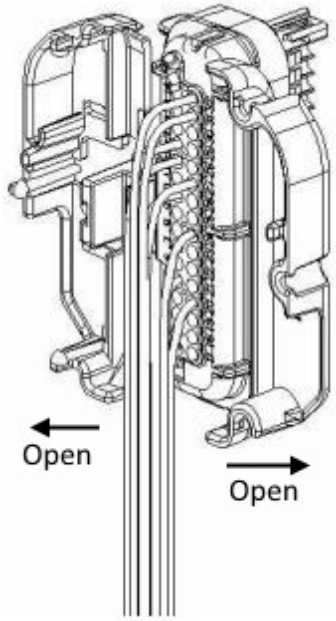
## Inserting / Removing Pins



The clear retainer will have to be removed to insert/remove pins




Depress the two black tabs and slide retainer off




Unsnap and open the grey wings to insert new pins

***Note that 10 blue seals are included with the kit. For terminal locations that aren't being used, these must be inserted to seal out water or other contaminants.***

## Connector and Accessory Part Numbers

The following is a list of compatible AEMnet accessories as well as part numbers for the main Module connector and terminals.

| Delphi PN | Description |
|---|---|
| 12110487 | 36P Female 100W Series (Black) |
| 12110490 | Strain Relief Lock (Grey) |
| 12110488-B | 36P Retainer Lock (Clear) |
| 12110489-B | 36P Seal (Green) |
| 12084913 | Terminal (20-22 AWG) |
| 15356825 | Cavity Sealing Plugs (Blue) |

| AEM PN | Description |
|---|---|
| 35-2624 | DTM-Style 4-Way Plug Connector Kit. Includes Plug, Wedge Lock & 5 Female Pins |
| 35-2625 | DTM-Style 4-Way Receptacle Connector Kit. Includes Receptacle, Wedge Lock & 5 Male Pins |
| 35-2626 | DTM-Style 4-Way Connector Kit. Includes Plug, Receptable, 2 Wedge Locks, 5 Female Pins & 5 Male Pins |
| 30-3606 | AEMnet CAN bus Extension Cable, 2 ft |
| 30-3607 | AEMnet CAN bus Extension Cable, 5 ft |
| 30-3608 | AEMnet CAN bus Extension Cable, 10 ft |
| 35-3440-F | AEMnet Female Termination Plug |
| 35-3440-M | AEMnet Male Termination Plug |

## Compatible AEM Sensors

The following is a list of compatible AEM sensors as well as the type of input class and pull-up value it should be connected to.

| AEM PN | Description | Input Type | Pull-Up Value (Ohms) |
|---|---|---|---|
| 30-2010 | Air Temp Sensor Kit. 3/8"NPT | Analog | 2200 |
| 30-2011 | Water Temp Sensor Kit. 3/8"NPT | Analog | 2200 |
| 30-2012 | Water Temp Sensor Kit. 1/8"NPT | Analog | 2200 |
| 30-2013 | Fluid Temperature Sensor DTM-Style Kit | Analog | 2200 |
| 30-2014 | Air Temp Sensor DTM-Style Kit | Analog | 2200 |
| 30-2050 | RTD Temperature Sensor Kit. Inconel Body. M14 X 6H | Analog | 470 |
| 30-2064 | Exhaust Back Pressure Sensor Install Kit | Analog | 100,000 |
| 30-2130-7 | 100 PSIa or 7 Bar Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-15 | 15 PSIa or 1 Bar Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-30 | 30 PSIa or 2 Bar Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-50 | 50 PSIa or 3.5 Bar Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-75 | 75 PSIa or 5 Bar Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-100 | 100 PSIg Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-150 | 150 PSIg Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-500 | 500 PSIg Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-1000 | 1000 PSIg Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2130-2000 | 2000 PSIg Stainless Sensor Kit. Stainless Steel Sensor Body | Analog | 100,000 |
| 30-2131-15G | 15 PSIg Brass Sensor Kit. Brass Sensor Body | Analog | 100,000 |
| 30-2131-30 | 30 PSIa or 2 Bar Brass Sensor Kit. Brass Sensor Body | Analog | 100,000 |
| 30-2131-50 | 50 PSIa or 3.5 Bar Brass Sensor Kit. Brass Sensor Body | Analog | 100,000 |
| 30-2131-75 | 75 PSIa or 5 Bar Brass Sensor Kit. Brass Sensor Body | Analog | 100,000 |
| 30-2131-100 | 100 PSIg Brass Sensor Kit. Brass Sensor Body | Analog | 100,000 |
| 30-2131-150 | 150 PSIg Brass Sensor Kit. Brass Sensor Body | Analog | 100,000 |
| 30-2200 | Ethanol Content Flex Fuel Sensor Kit (Barbed) | Digital | N/A |

# Specifications

| | | | |
|---|---|---|---|
| **Dimensions** | width | 4.7 / 120 | in / mm |
| | length | 4.3 / 110 | in / mm |
| | height | 1.4 / 36 | in / mm |
| | mass | 6.3 / 180 | oz / g |
| **Supply Voltage** | min | 7 | VDC |
| | max | 18 | VDC |
| **Supply Current (13.8V)** | nominal | 165 | mA |
| **Operating Temperature** | min | -4 / -20 | degF / degC |
| | max (16V Supply) | 185 / 85 | degF / degC |
| **5V Sensor Supply** | Current | 250 | mA |
| **Analog Inputs 1 - 4** | Range | 0 - 5 | VDC |
| | Resolution | 0.001 (12-bit) | VDC |
| | Pull-up (5V) | 100,000 | Ohm |
| | CAN Transmit Rate (Unit 1) | 100 | Hz |
| | CAN Transmit Rate (Unit 2) | 50 | Hz |
| **Analog Inputs 5 - 8** | Range | 0 - 5 | VDC |
| | Resolution | 0.001 (12-bit) | VDC |
| | Range | 0 - 65535 | Ohm |
| | Resolution | 1 (12-bit) | Ohm |
| | Selectable Pull-up (5V) | 470, 2200, or 100000 | Ohm |
| | CAN Transmit Rate (Unit 1) [Voltage/ Resistance] | 100 / 10 | Hz |
| | CAN Transmit Rate (Unit 2) [Voltage / Resistance] | 50 / 5 | Hz |
| **Analog Inputs 9 - 12** | Range | 0 - 65535 | Ohm |
| | Resolution | 1 (12-bit) | Ohm |
| | Pull-up (5V) | 2,200 | Ohm |
| | CAN Transmit Rate (Unit 1) | 10 | Hz |
| | CAN Transmit Rate (Unit 2) | 5 | Hz |
| **Fuel Level Input** | Range | 0 - 255 | Ohm |
| | Resolution | 1 (12-bit) | Ohm |
| | Pull-up | 5 | VDC |
| | CAN Transmit Rate (Unit 1) | 50 | Hz |
| | CAN Transmit Rate (Unit 2) | 25 | Hz |
| **VR Inputs 1 - 2** | Range | 0 - 15000 | Hz |
| | Resolution | 1 | Hz |
| | CAN Transmit Rate (Unit 1) | 50 | Hz |
| | CAN Transmit Rate (Unit 2) | 25 | Hz |
| **Tachometer Input** | Range | 0 - 1500 | Hz |
| | Resolution | 0.1 | Hz |
| | Pull-up | 12 | VDC |
| | Minimum Trigger Voltage | 3 | VDC |
| | Maximum Voltage (Sustained) | 18 | VDC |
| | CAN Transmit Rate (Unit 1) | 50 | Hz |
| | CAN Transmit Rate (Unit 2) | 25 | Hz |
| **Digital Inputs 1 - 6** | Frequency Range | 0 - 15000 | Hz |
| | Frequency Resolution | 1 | Hz |
| | Duty Cycle Range | 0 - 100 | % |
| | Duty Cycle Resolution | 1 | % |
| | Minimum Trigger Voltage | 7.5 | VDC |
| | Maximum Voltage | 18 | VDC |
| | Pull-up | 12 | VDC |
| | CAN Transmit Rate (Unit 1) | 50 | Hz |
| | CAN Transmit Rate (Unit 2) | 25 | Hz |

# FAQ / Troubleshooting

**My CAN Sensor Module doesn't seem to be outputting anything.**

Confirm that your CAN bus is properly terminated and that all nodes are configured for the right bus speed. In addition, any receiving devices/nodes must be specifically configured to receive as the Module is configured to transmit; specifically, the CAN ID, bus speed, and number of ID bits.

**Can I use the CAN Sensor Module with my AEM AQ-1, AEM CAN Gauge, or AEM ECU?**

No, the CAN Sensor Module is only compatible with the CD-series dash displays and other third-party devices at this time.

**Where can I find AEM .dbc files?**

AEM dbc files are available via the AEM Forum and within the AEM CD-series dash display software installer. Please visit www.aemelectronics.com for more information and downloads.

*For support, contact AEM Technical Support at 1-800-423-0046 or gentech@aemelectronics.com.*

# AEMnet (CAN Bus) Output

**WHITE WIRE = AEMnet+ / CANH**
**GREEN WIRE = AEMnet- / CANL**

**Bus Termination**

All AEMnet/CAN networks must be terminated to have an equivalent of approximately 60 Ohms of resistance. Generally, this means a 120 Ohm resistor connected in parallel to AEMnet+/AEMnet- (or CANH/CANL) at both physical ends of the bus run. Select termination via jumper position as suitable for your network.

CAN DBC definition files are available at www.aemelectronics.com

| | | |
|---|---|---|
| bit rate | Selectable via Jumper | kb/sec |
| format | Selectable via Jumper | bit ID |
| terminating resistor | Selectable via Jumper | |
| endianness | big / Motorola | |
| DLC | 8 | |

**Unit 1: 0x500(11) / 0x0000B000 (29) at 100Hz** **Unit 2: 0x600(11) / 0x0000C000(29) at 50Hz**

| Byte | Label | Data Type | Scaling | Offset | Range |
|---|---|---|---|---|---|
| 0 | Analog1 | 16 bit unsigned | 0.001 V/bit | 0 | 0 to 65.535 V |
| 1 | | | | | |
| 2 | Analog2 | 16 bit unsigned | 0.001 V/bit | 0 | 0 to 65.535 V |
| 3 | | | | | |
| 4 | Analog3 | 16 bit unsigned | 0.001 V/bit | 0 | 0 to 65.535 V |
| 5 | | | | | |
| 6 | Analog4 | 16 bit unsigned | 0.001 V/bit | 0 | 0 to 65.535 V |
| 7 | | | | | |

**Unit 1: 0x501(11) / 0x0000B001 (29) at 100Hz** **Unit 2: 0x601(11) / 0x0000C001 (29) at 50Hz**

| Byte | Label | Data Type | Scaling | Offset | Range |
|---|---|---|---|---|---|
| 0 | Analog5 | 16 bit unsigned | 0.001 V/bit | 0 | 0 to 65.535 V |
| 1 | | | | | |
| 2 | Analog6 | 16 bit unsigned | 0.001 V/bit | 0 | 0 to 65.535 V |
| 3 | | | | | |
| 4 | Analog7 | 16 bit unsigned | 0.001 V/bit | 0 | 0 to 65.535 V |
| 5 | | | | | |
| 6 | Analog8 | 16 bit unsigned | 0.001 V/bit | 0 | 0 to 65.535 V |
| 7 | | | | | |

**Unit 1: 0x502(11) / 0x0000B002 (29) at 10Hz** **Unit 2: 0x602(11) / 0x0000C002 (29) at 5Hz**

| Byte | Label | Data Type | Scaling | Offset | Range |
|---|---|---|---|---|---|
| 0 | Analog5Resistance | 16 bit unsigned | 1 Ohm/bit | 0 | 0 to 65535 Ohm |
| 1 | | | | | |
| 2 | Analog6Resistance | 16 bit unsigned | 1 Ohm/bit | 0 | 0 to 65535 Ohm |
| 3 | | | | | |
| 4 | Analog7Resistance | 16 bit unsigned | 1 Ohm/bit | 0 | 0 to 65535 Ohm |
| 5 | | | | | |
| 6 | Analog8Resistance | 16 bit unsigned | 1 Ohm/bit | 0 | 0 to 65535 Ohm |

| | | | | | |
|---|---|---|---|---|---|
| 7 | | | | | |

**Unit 1: 0x503(11) / 0x0000B003 (29) at 10Hz Unit 2: 0x603(11) / 0x0000C003 (29) at 5hz**

| Byte | Label | Data Type | Scaling | Offset | Range |
|---|---|---|---|---|---|
| 0 | Analog9Resistance | 16 bit unsigned | 1 Ohm/bit | 0 | 0 to 65535 Ohm |
| 1 | | | | | |
| 2 | Analog10Resistance | 16 bit unsigned | 1 Ohm/bit | 0 | 0 to 65535 Ohm |
| 3 | | | | | |
| 4 | Analog11Resistance | 16 bit unsigned | 1 Ohm/bit | 0 | 0 to 65535 Ohm |
| 5 | | | | | |
| 6 | Analog12Resistance | 16 bit unsigned | 1 Ohm/bit | 0 | 0 to 65535 Ohm |
| 7 | | | | | |

**Unit 1: 0x504(11) / 0x0000B004 (29) at 50Hz Unit 2: 0x604(11) / 0x0000C004 (29) at 25hz**

| Byte | Label | Data Type | Scaling | Offset | Range |
|---|---|---|---|---|---|
| 0 | VR1 | 16 bit unsigned | 1 Hz/bit | 0 | 0 to 65535 Hz |
| 1 | | | | | |
| 2 | VR2 | 16 bit unsigned | 1 Hz/bit | 0 | 0 to 65535 Hz |
| 3 | | | | | |
| 4 | Tacho | 16 bit unsigned | 0.1 Hz/bit | 0 | 0 to 6553.5 Hz |
| 5 | | | | | |
| 6 | FuelLevel | 8 bit unsigned | 1 Ohm/bit | 0 | 0 to 255 Hz |
| 7 | Battery Voltage | 8 bit unsigned | 0.1 V/bit | 0 | 0 to 25.5 V |

**Unit 1: 0x505(11) / 0x0000B005 (29) at 50Hz Unit 2: 0x605(11) / 0x0000C005 (29) at 25hz**

| Byte | Label | Data Type | Scaling | Offset | Range |
|---|---|---|---|---|---|
| 0 | Digital1Frequency | 16 bit unsigned | 1 Hz/bit | 0 | 0 to 65535 Hz |
| 1 | | | | | |
| 2 | Digital2Frequency | 16 bit unsigned | 1 Hz/bit | 0 | 0 to 65535 Hz |
| 3 | | | | | |
| 6 | Digital1DutyCycle | 8 bit unsigned | 1 %/bit | 0 | 0 to 255 % |
| 7 | Digital2DutyCycle | 8 bit unsigned | 1 %/bit | 0 | 0 to 255 % |
| 6 | Digital1State | 8 bit unsigned | 1 | 0 | 0 to 255 |
| 7 | Digital2State | 8 bit unsigned | 1 | 0 | 0 to 255 |

**Unit 1: 0x506(11) / 0x0000B006 (29) at 50Hz Unit 2: 0x606(11) / 0x0000C006 (29) at 25Hz**

| Byte | Label | Data Type | Scaling | Offset | Range |
|---|---|---|---|---|---|
| 0 | Digital3Frequency | 16 bit unsigned | 1 Hz/bit | 0 | 0 to 65535 Hz |
| 1 | | | | | |
| 2 | Digital4Frequency | 16 bit unsigned | 1 Hz/bit | 0 | 0 to 65535 Hz |
| 3 | | | | | |
| 6 | Digital3DutyCycle | 8 bit unsigned | 1 %/bit | 0 | 0 to 255 % |
| 7 | Digital4DutyCycle | 8 bit unsigned | 1 %/bit | 0 | 0 to 255 % |
| 6 | Digital3State | 8 bit unsigned | 1 | 0 | 0 to 255 |
| 7 | Digital4State | 8 bit unsigned | 1 | 0 | 0 to 255 |

**Unit 1: 0x507(11) / 0x0000B007 (29) at 50Hz Unit 2: 0x607(11) / 0x0000C007 (29) at 25Hz**

| Byte | Label | Data Type | Scaling | Offset | Range |
|---|---|---|---|---|---|
| 0 | Digital5Frequency | 16 bit unsigned | 1 Hz/bit | 0 | 0 to 65535 Hz |
| 1 | | | | | |
| 2 | Digital6Frequency | 16 bit unsigned | 1 Hz/bit | 0 | 0 to 65535 Hz |
| 3 | | | | | |
| 6 | Digital5DutyCycle | 8 bit unsigned | 1 %/bit | 0 | 0 to 255 % |
| 7 | Digital6DutyCycle | 8 bit unsigned | 1 %/bit | 0 | 0 to 255 % |

| | | | | | |
|---|---|---|---|---|---|
| 6 | Digital5State | 8 bit unsigned | 1 | 0 | 0 to 255 |
| 7 | Digital6State | 8 bit unsigned | 1 | 0 | 0 to 255 |

# 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.

UEGO oxygen sensors are considered wear items and are not covered under warranty.

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.