Installation Instructions for
30-4350
AEM Tru Boost

Boost Controller Gauge

<table>
<tr><td colspan="2" align="center">WARNING:</td></tr>
<tr><td>✋ !</td><td>This installation is not for the electrically or mechanically challenged! Use this gauge with <u>EXTREME</u> caution! If you are uncomfortable with anything about this, please refer the installation to an AEM trained tuning shop or call 800-423-0046 for technical assistance. You should also visit the AEM Performance Electronics Forum at http://www.aempower.com

NOTE: AEM holds no responsibility for any engine damage that results from the misuse of this product!</td></tr>
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This product is legal in California for racing vehicles only and should never be used on public highways.

AEM's Tru Boost boost controller gauge is a stand-alone boost controller that features a three digit LED digital readout with 24 sweeping multi color LED's, two programming buttons, and an on-board pressure sensor. The Tru Boost kit contains all necessary components, including an AEM high performance boost control solenoid, to install and use the Tru Boost.

Contents: See Figure 1.
    (1) Tru Boost Gauge assembly
    (1) Appearance kit (Silver bezel, silver pin guide, white faceplate)
    (1) Installation kit (Butt connector, 6 pieces)
    (1) Tru Boost cable
    (1) Boost solenoid
    (1) Instruction manual
    (1) Boost hose 10'
    (1) 1/8" barb to 1/8" NPT fitting
    (1) Sintered Muffler
    (2) –6 to 1/8" NPT fitting
    (2) 3/16" barb to 1/8" NPT fitting

Figure1. Kit Components

Installing the Gauge

The AEM Tru Boost boost controller gauge requires a standard 2 1/16" (52MM) mounting hole and can be mounted in a flat panel or most standard gauge pods. The included cable contains two wire bundles and a 5-pin connector. The 5-pin connector connects to a mating 5-pin connector on the back of the gauge. See Figure 2. Connect the black and red wires in the long 2-wire bundle to the leads from the boost solenoid. Polarity does not matter. Connect the black wire from the 5-wire bundle to a good ground. Connect the 2 red wires to a fused, switched, +12Vdc power source. The gray wire is an optional low side driver output. The orange wire is an optional scramble boost input. The orange and gray wires do not need to be connected for the gauge to function.
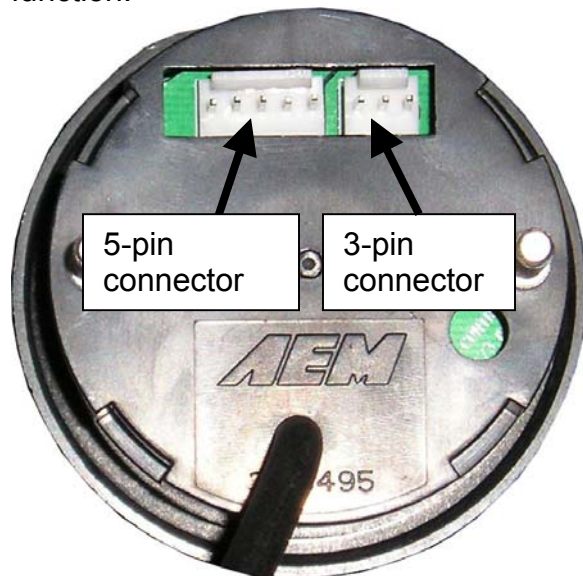

5-pin connector

3-pin connector

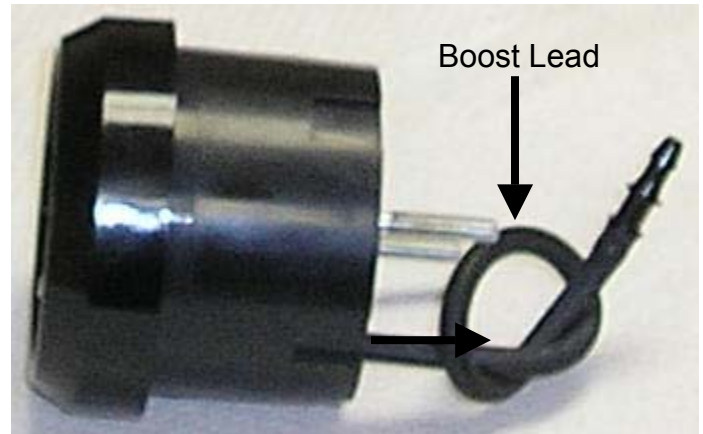Figure 2. Connector Locations

Boost Lead

Figure 3. Hose Lead

The boost lead protruding from the back of the gauge is connected to the on-board pressure sensor. See Figure 3. If using the on-board pressure sensor, the boost lead must be connected to manifold pressure. Connect the boost lead using the supplied boost hose and 1/8" NPT barb, or the supplied boost hose and an existing manifold pressure port. (**NOTE: Do not pull on the boost lead**) See Figure 4 for a connection diagram.

OPTIONAL 75 PSIA SENSOR AND CABLE

MANIFOLD PRESSURE

Tru Boost

BOOST SOLENOID

RED

BLACK

RED (SWITCHED, FUSED +12VDC)

RED (SWITCHED, FUSED +12VDC)

BLACK (POWER GROUND)

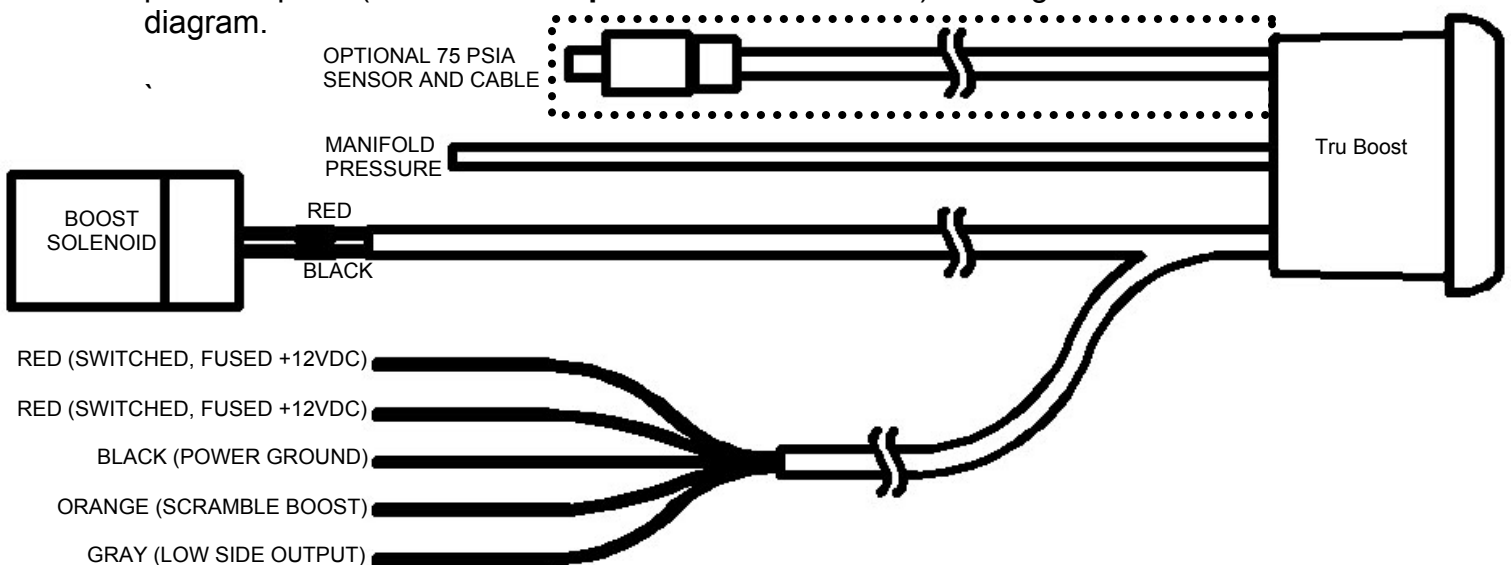ORANGE (SCRAMBLE BOOST)

GRAY (LOW SIDE OUTPUT)

Figure 4. Connection Diagram

Scramble Boost Connection (Optional)

Scramble boost is activated when the orange wire is grounded. Connect the orange wire to ground through a switch as shown in Figure 5.
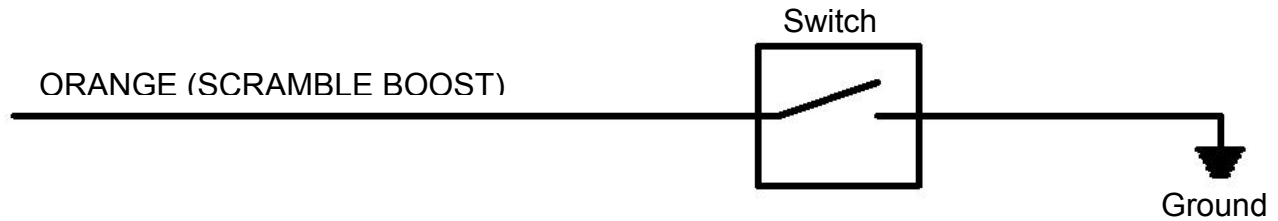

Figure 5. Scramble Boost Connection

Warning Light Connection (Optional)

The Tru Boost will ground the gray wire when the alarm is activated. Connect the gray wire to a warning light as shown in Figure 6.
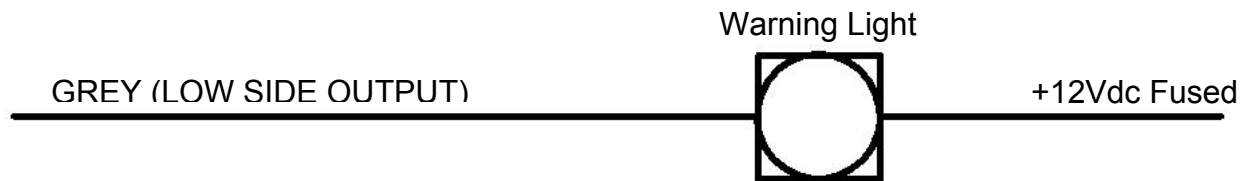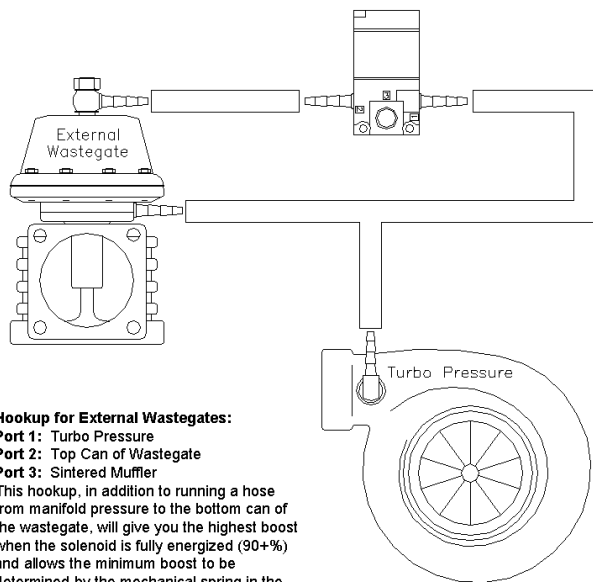

Figure 6. Warning Light Connection
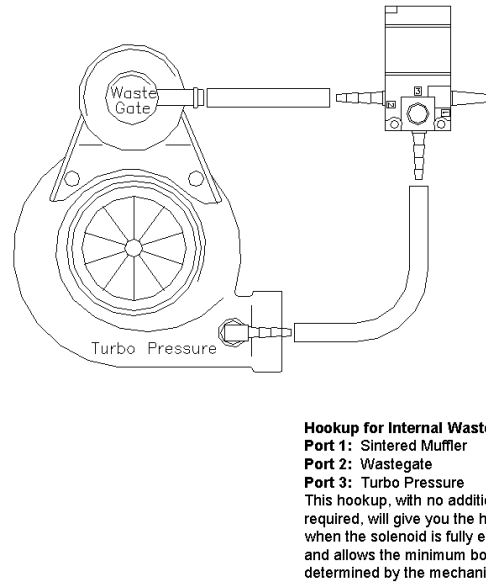
Boost Solenoid Connections

When energized, ports 1 & 2 are connected, when de-energized, ports 2 & 3 are connected. The port numbers are clearly noted on the solenoid body. See Figures 7 and 8 for plumbing instructions.

Hookup for External Wastegates:
Port 1: Turbo Pressure
Port 2: Top Can of Wastegate
Port 3: Sintered Muffler
This hookup, in addition to running a hose from manifold pressure to the bottom can of the wastegate, will give you the highest boost when the solenoid is fully energized (90+%) and allows the minimum boost to be determined by the mechanical spring in the wastegate when the solenoid is not powered (0-10% duty) .

Hookup for Internal Wastegates:
Port 1: Sintered Muffler
Port 2: Wastegate
Port 3: Turbo Pressure
This hookup, with no additional hoses required, will give you the highest boost when the solenoid is fully energized (90%) and allows the minimum boost to be determined by the mechanical spring in the wastegate when the solenoid is not powered (0-10% duty).

Figure 7. External Wastegate Connection   Figure 8. Internal Wastegate Connection

External Pressure Sensor

      The Tru Boost is capable of reading boost levels up to 50 psig when using the optional external sensor kit. The 30-4351 sensor kit comes with an AEM 75psia sensor and a harness to connect the sensor to the Tru Boost. See Figure 9. Plug the single row 3-pin connector into the mating connector on the back of the gauge. See Figure 2. Plug the black 3-pin connector into the pressure sensor. In order for the Tru Boost to read the external sensor, the external sensor (E) must be selected in the pressure sensor (SEn) option.

Figure 9. 30-4351 Tru Boost External Sensor Kit

Configuring the Tru Boost

      The Tru Boost has 9 user adjustable options. Descriptions of each option are below:

Display Units: (UnI)

      Use the buttons on the front of the gauge to change the units displayed by the gauge. Select from Psig (PSI), Bar (bAr), Kpg (PAS), and Kg/cm2 (gC).

Scramble Boost: (SCb)

      Set the scramble boost duty cycle output. Duty cycle can be set between 10% and 90%. The Tru Boost will output the selected duty cycle when the scramble boost input is grounded.

Scramble Boost Time: (SCr)

      Select the duration of time (0-25.5 seconds) the Tru Boost will output the scramble boost duty cycle when the scramble boost input is grounded.

Pressure Sensor: (SEn)

      Select the pressure sensor to be used by the Tru Boost. The internal sensor (I) is used for boost levels up to 29 psig. The optional external sensor (E) is used for boost levels above 29 psig, up to 50 psig.

Alarm: (ALA)

      Set the boost pressure at which the alarm will activate. When the alarm is activated, the LED lights flash yellow and the low side driver is pulled to ground.

Waste Gate Crack Pressure: (gAE)

Enter the boost pressure at which the waste gate starts to open. The Tru Boost will keep the boost solenoid open from 1 psi until boost exceeds the selected value. This value can be adjusted to reduce lead in boost spikes or reduce spool up time.

Bar Graph Full Scale: (FUL)

Set the full-scale value of the sweeping LED lights. The LED lights start at 0 psig and stop at the full-scale value, increasing in 24 equal increments.

Boost Setting A: (AXX)

Set the output duty cycle (10%-90%) for setting A. For setting A, the duty cycle is displayed as "AXX". When setting duty cycle, the display will alternate between the current manifold pressure and current duty cycle until manifold pressure exceeds 1 psig. For pressures above 1 psig, only the current manifold pressure is displayed for easy real time adjustment.

Boost Setting B: (bXX)

Same as A, except duty cycle is displayed as "bXX".

To enter the program menu, hold both buttons down for 2 seconds. The gauge will display "PRG". Hold both buttons again for 2 seconds to move to the first option. Push both buttons at the same time to move to the next option. The order of options is shown in the menu tree below. As a shortcut, the gauge will skip to boost setting A if only the left button is pressed after "PRG" is displayed.

RUN MODE
↓
BOTH BUTTONS, HOLD
↓
PROGRAM

LEFT BUTTON
↓
BOOST SETTING A (A)
↓
BOTH BUTTONS
↓
BOOST SETTING B (b)
↓
BOTH BUTTONS
↓
RUN

BOTH BUTTONS
↓
DISPLAY UNITS (Unl)
↓
BOTH BUTTONS
↓
SCRAMBLE BOOST
DUTY (SCb)
↓
BOTH BUTTONS
↓
SCRAMBLE BOOST TIME
(SCr)
↓
BOTH BUTTONS
↓
SENSOR SELECTION
(Sen)
↓
BOTH BUTTONS
↓
ALARM SETTING (ALA)
↓
BOTH BUTTONS
↓
WASTE GATE CRACK
PRESSURE (gAE)
↓
BOTH BUTTONS
↓
BAR GRAPH FULL
SCALE (FUL)
↓
BOTH BUTTONS
↓
BOOST SETTING A
(AXX)
↓
BOTH BUTTONS
↓
BOOST SETTING B (bXX)
↓
BOTH BUTTONS
↓
RUN MODE

Using the Tru Boost

The Tru Boost has 3 running modes. In all modes, the sweeping LED lights will not illuminate when manifold pressure is less than 0 psig. In mode A, the gauge will output the duty cycle selected for boost setting A. The gauge will output the duty cycle selected for boost setting B when in mode B. In the "OFF" mode, the solenoid output is turned off. Press and hold the left button for 2 seconds to change run modes. The order of run modes is shown in the menu tree below. The gauge also remembers the peak boost level achieved. Press and hold the right button for 2 seconds to display the peak boost. Press and hold the right button for 5 seconds to clear the peak boost value.

```
       RUN MODE                          RUN MODE
          ↓                                 ↓
      LEFT BUTTON                      RIGHT BUTTON
          ↓                                 ↓
           A                          PEAK BOOST (HI)
          ↓                                 ↓
      LEFT BUTTON                        RUN MODE
          ↓                                 ↓
           B                       RIGHT BUTTON, HOLD
          ↓                                 ↓
      LEFT BUTTON                    CLEAR PEAK BOOST
          ↓                                (CLr)
          OFF                               ↓
          ↓                              RUN MODE
      LEFT BUTTON
          ↓
           A
```
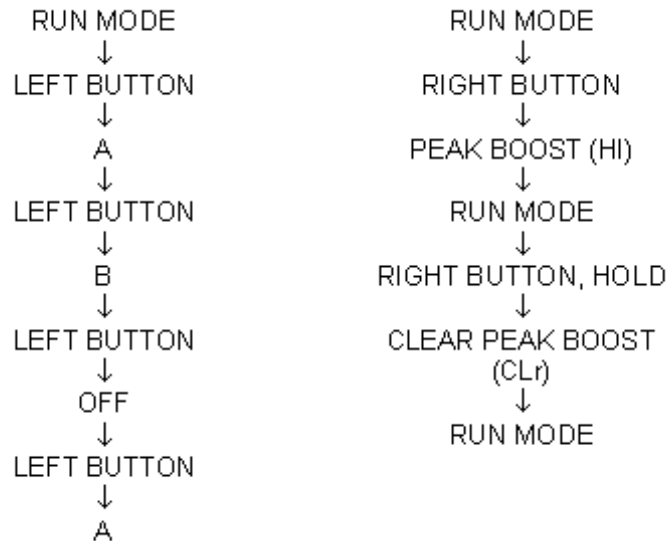
Scramble Boost

Scramble boost is a feature that allows the driver to momentarily change the duty cycle output of the Tru Boost. The output duty cycle for scramble boost is set in the scramble boost (SCb) option. The scramble boost duration is set by the scramble boost time (SCr) option. Scramble boost is activated by grounding the orange scramble boost input wire.

Alarm

All 24 LED lights will flash yellow if manifold pressure exceeds the alarm level for more than 1 second. The low side driver output will also switch to ground. The LED lights will continue to flash and the output will stay grounded until either button is pushed or the gauge is turned off.

Over-Boost

The boost solenoid will shut off and all 24 LED lights will flash red if manifold pressure exceeds the alarm value by 10% for more than 1 second or if manifold pressure exceeds the alarm level by 20% for more than 200 milliseconds. The solenoid will remain off and the LED lights will continue to flash until either button is pushed or the gauge is turned off.

Error Detection

ErP- If the external sensor is shorted or disconnected, the LED lights will flash red and the center digits will display "ErP". The error code will not activate when using the internal pressure sensor.

ErS- If the boost solenoid is shorted or disconnected, the LED lights will flash red and the center digits will display "ErS". The error code will not activate when the Tru Boost is on the off mode. Note: The solenoid always has a small pwm signal to allow for fault detection.

Changing the gauge configuration
The AEM Tru Boost comes configured with the black bezel, black pin guide, and the black faceplate. However, a silver bezel, a silver pin guide, and a white faceplate are also included in the gauge kit. To change the faceplate, pin guide, or bezel, orient the gauge so you are looking at the faceplate. Rotate the bezel counter-clockwise to unscrew it from the gauge cup. The bezel, lens, pin guide, rubber spacer, faceplate, diffuser, and anti-glare shield are all removable. Reassemble the gauge as shown in Figure 10. Make sure the small light holes in the faceplate, diffuser, and anti-glare shield line up with the light sensor on the circuit board. Do not over tighten the bezel when reassembling the gauge.
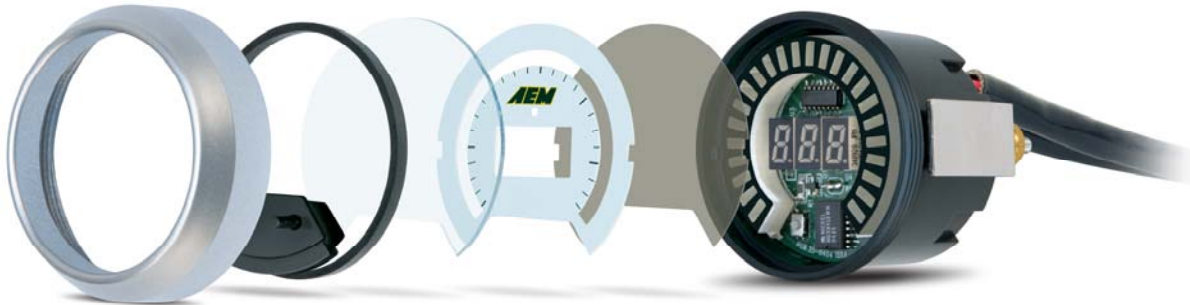

Figure 10. Tru Boost Gauge Assembly

AEM Electronics warranty

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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.