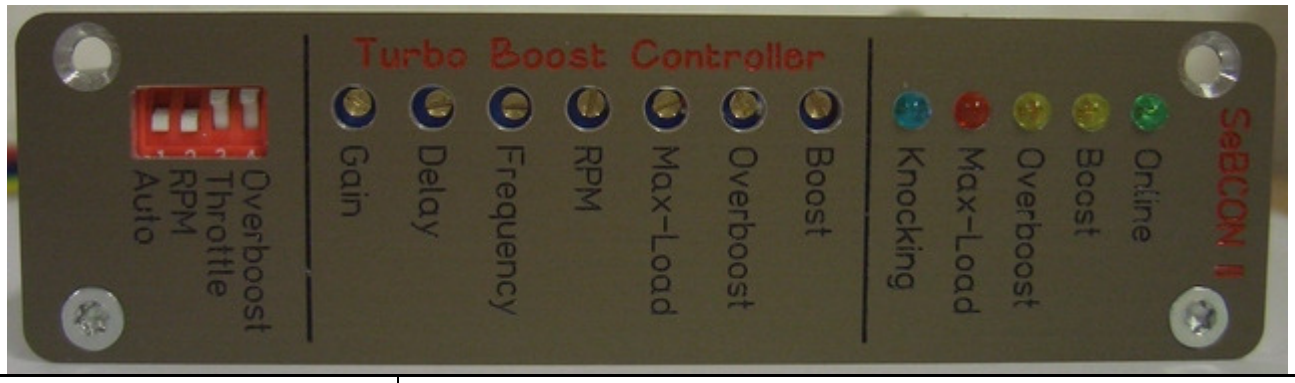
Installation and Adjustment Guide for SeBCON II:



Boost:	+ more boost	- less boost
Overboost:	+ more boost	- less boost
Max-Load:	+ higher threshold	- lower threshold
RPM:	+ lower start rpm	- higher start rpm
Frequency:	+ higher frequency	- lower frequency
Delay:	+ less delay	- more delay
Gain:	+ more gain	- less gain

Status LEDs:

Online:	SeBCON is activated
Boost:	SeBCON provides the Solenoid with an signal
Overboost:	Overboost mode is activ
Max-Load:	Threshold was reached and SeBCON lowers the boost
Knocking:	SeBCON get's an knocksignal and lowers the boost

Potentiometers:

Boost:	Boost adjustment (RPM **and/or** Throttle mode activated, not in Auto mode)
Overboost:	Overboost adjustment (Throttle **and** Overboost mode activated)
Max-Load:	Threshold adjustment
RPM:	RPM adjustment (at which rpm the RPM **or** the Auto mode will be activated)
Frequency:	Solenoid frequency adjustable for different types of solenoids (default =10Hz)
Delay:	Boost-Delay 0.3-1.5 seconds, to minimize boost-spikes and to regulate fluctuations
Gain:	Boost level adjustment in Auto-mode

Switches:

Overboost:	activates the Overboost mode (Throttle must be activated)
Throttle:	activates the Boost buildup with a simple throttle-switch (see signal discription)
RPM:	activates the Boost buildup at a specified rpm
Auto:	activates the Auto boost mode (RPM should be disabled when Auto is activ) - Load signal must be supplied to activate the Auto mode

Frequency:

With the Frequency-Poti it's possible to adjust the Solenoids frequency. Most Solenoids like a frequency from round about 15-30Hz. If you are not sure, leave this poti untouched. With a wrong adjusted rate you will get less boost or a trimmed working-range because the Solenoid can not handle a wrong rate.

Important: The Solenoid frequency is adjusted to 30Hz by default.
You can order SeBCON with your favorite frequency in case you have not the ability to adjust SeBCON yourself. **The adjustment range is from 5Hz to 60Hz.**

Discription of the 5 big separate cables:

Power:

Red: +12Volt (please use a fuse with at least 1Amp., max. 5Amp.)
Black: Ground (use at least cable with 1.5mm2)

Solenoid:

Blue: Solenoid (use at least cable with 1.5mm2)
- The 2nd cable of the Solenoid must be on +12Volt
- The maximum current which SeBCON can handle: 10 Ampere

Ignition coil:

Green/Yellow: KL 15, ignition +12Volt (brings SeBCON online, the Online LED should flash)
Brown: KL 1, ignition coil (RPM signal)

Discription of the 8 small separate cables:

Brown: Throttle signal
Brown/White: Knock signal
Orange: Load signal
Orange/White: Max-Load signal
Blue/White: Ground

Optional external boost regulator (Potentiometer):
Blue: middle
Green: left
Green/White: right

Discription of the signals:

Throttle signal:
The throttle signal must be a ground signal. The Throttle-Switch **and the RPM or the Overboost-Switch** has to be activated (**and** you have to adjust a minimum amount of boost with the **Boost or Overboost Poti**), then the Boost or the Overboost LED should flash.

Load signal:
Signal between 0 and 12Volt, ~2Volt is 10% and ~10Volt is 100% Solenoid pulse wide. If the signal is duly **and** you have activated the Auto-function, the Boost LED should flash.

Knock signal:
The knock signal must be either a ground signal (less than 0.7Volt) or a +12Volt signal (greater than 10Volt). If the signal is duly, the Knocking LED should flash and you should not have any additional boost over stock.

Max-Load signal:
Signal must be between >0 and 12 Volt. The threshold is adjustable with the Max-Load Poti. Give the signal you wish to use on the Max-Load input and adjust the Poti in that way, that the Max-Load LED just begins flashs, this is the threshold on which SeBCON begins to lower the boost.

KL 1, ignition coil (RPM signal):
Activates the Auto **and/or** the RPM function at the adjusted threshold (rpm).

How to start:
In most cases there are two possible modes, the 'mechanical' way for a engine with carburator and a mechanical ingnition distributor and the 'electronical' way for a engine with ECU and ICU.

I will discribe these two ways, but there are other possible options, just let you inspire and think about the possibilitys with the Input-signals.

Before we start, i assume that you have already connected SeBCON to the power net, provide the red cable with +12Volt (dont forget the fuse), the black cable with Ground and the Solenoid should also be correct connected with the blue cable at one cable, the other cable from the Solenoid must go to +12Volt (it's not a bad idea, the use a 10Amp. fuse in the +12 connection).

We also need Kl. 1 and Kl. 15 from the ignition coil, the green/yellow cable goes to Kl. 15 ignition and the brown cable goes to Kl. 1, the RPM signal. If all is fine, switch on the ignition and the Online LED should flash. If not, we have a major problem which must be solved before we proceed.

1. 'Mechanical Stage':
SeBCON is now already connected to buildup boost. You can just switch on the RPM-Switch, increase boost with a few turns on the Boost-Poti (clockwise), start the engine and hold rpm at e.g. 2500rpm, then turn the RPM-Poti (clockwise) until the Boost LED begins to flash. Now you can adjust the boost with the Boost-Poti by driving in town and have a look at the hopefully installed Boost-Gauge.

When you are familiar with this function, you can connect a full-throttle switch to the Throttle cable (brown cable from the small ones) and activate the Throttle-Switch. Now you will get the previously adjusted boost level as soon as you kick down the gas pedal or when the engines exceeds the adjusted rpm.

The next step is to activate the Overboost-Switch. This switch needs a activated Throttle-Switch because his function bases on the throttle switch. The function is the same as before with the difference, that you can bring the engine into the Overboost, which will be adjusted with the Overboost-Poti.

It's up to you, which switch you use to bring the engine into the Overboost mode, it can also be a push-button on the steering gear instead of a full throttle switch.

2. 'Electronical Stage':
Let's start with SeBCON's main funtion, the Auto-mode. To activate the Auto-mode, SeBCON needs a load signal at the Load input. The Load function is bound to the RPM function, this means, that the Auto mode ist active when the rpm exceeds the adjusted threshold.
(Note that the RPM-Switch is OFF while using the rpm function in Auto-mode)

To adjust the rpm in the Auto mode, start the engine and hold rpm at e.g. 2500rpm, then turn the RPM-Poti (clockwise) until the Boost LED begins to flash. The amount on boost depends on the signal which comes through the Load input. Drive around in town and have a look what's the max-boost, you will get the max-boost only on heavy engine load.

If the boost is not high enough, it's possible to raise boost with the GAIN-Poti. The Gain-Poti is for the case if the Load signal is not high enough, e.g. when the signal comes from an Air-Mass-Meter. If the Load signal which you use is in the range from 2-10Volt, the GAIN should be set to the minimum (GAIN=1), if the signal ist not high enough, like from the AMM, than a higher Gain is indicated. So, in Auto mode the boost height will be adjusted automatically or if necessary increased with the GAIN-Poti.

Additional to the Auto-mode it's possible to use all the other modes stated in the 'Mechanical Stage', means Boost or Overboost via Throttle or RPM. My advice is, to combine the Auto mode which should be set to around 3000 rpm with the Full Throttle Overboost mode. This gives you a engine which runs under low throttle with factory settings, under normal load with a good amount of boost and if you wan't power, you will get it in form of the Overboost by hitting down the gas pedal.

Delay:
The Delay function is there to minimize boost spiking. The delay can be adjusted from ~0.3 sec. up to 2 sec., means that this is the timedelay from stock to max. boost and vice versa.

Max-Load:
The Max-Load function needs a proper signal between 1 -12Volt to work, and with the Max-Load-Poti it's possible to adjust which voltage is the threshold. If the signal exceeds the threshold, SeBCON begins to lower the boost until the signal is under the threshold, than the boost will increase again up to the threshold and down under the threshold.

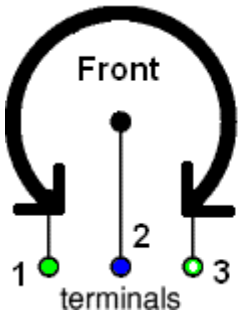
What's the point? I will explain it with a example. Some cars have a so called 'Fuel-Cut' build into the ECUs' software. The Fuel-Cut occurs e.g. when the signal from the AMM exceeds 5.1Volt. If you give this signal onto the Max-Load input and adjust the Max-Load input to be activated by 5.0Volt, SeBCON lowers the boost if the AMM sends a signal greater than 5.0Volt. This reduction of the boost will cause a lower Voltage on the AMM (less boost) and prevents the engine before to run into the Fuel-Cut.

Since this function is a 'closed loop' function, SebCON gives you exactly the amount of boost which is currently possible under the circumstances. So the engine can run at WOT at the ECU's edge.

Knocking:
The Knock function works in exactly the same way as the Max-Load function, but with a different input signal. On regular operation the Knock-Input should be potential-free or between a voltage from 1 to 9Volt, voltages less than 0.7Volt or greater than 10Volt will activate the Knock function. As knock detector it's possible to use third party products or if available, the abilitys of the present ICU.

Optional external Potentiometer:

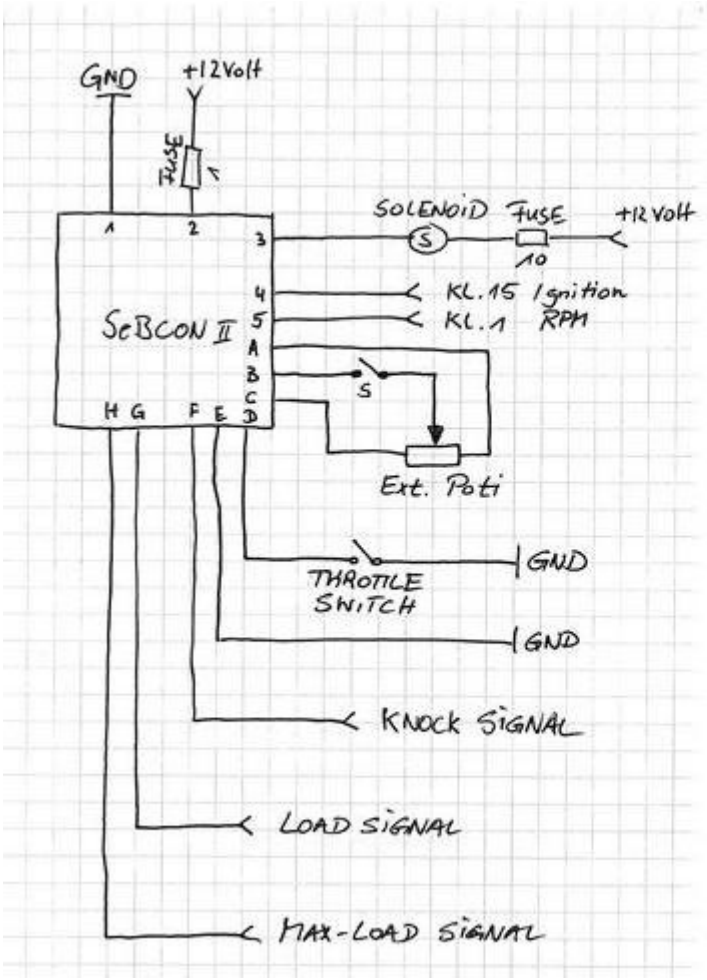
With the external Poti it's possible to overwrite the internal boost settings and increase the boost as far as the internal settings are not already at the maximum boost. After use you should not forget to set the Poti to minimum or switch it off, otherwise SeBCON can not manage the boost accordingly.



1: Green (left)
2: Blue (middle)
3: Green/White (right)

Potentiometer 10KOhm linear

Connection scheme:



1: black	Ground
2: red	+12 Volt
3: blue	Solenoid
4: gr/ye	Kl.15 Ignition
5: brown	Kl.1 RPM
A: green	Poti left connect
B: blue	Poti middle connect
C: gr/wh	Poti right connect

S: switch off the manual boost poti

D: brown	Throttle signal
E: bl/wh	Ground
F: br/wh	Knock signal
G: orange	Load signal
H: or/wh	Max-Load signal

This site is only for Volvo B230FT's of interest

Signals LH2.4 and EZ116K:

AMM Signal: AMM Pin3 cable BL/R or LH2.4 PIN7
Knocksignal: LH2.4 PIN28 or EZ116K PIN4, or con. right wheel house tower, POS.1, R/G cable
Throttle-Signal: Connector right wheel house tower, POS.7, R/W cable

BL/R = Blue/Red
R/G = Red/Grey
R/W = Red/White

Signals LH2.2 and EZ117K:

AMM Signal: Pin7 ECU
Knocksignal: Pin15 EZK (only Turbo EZK's !)
Throttle-Signal: -

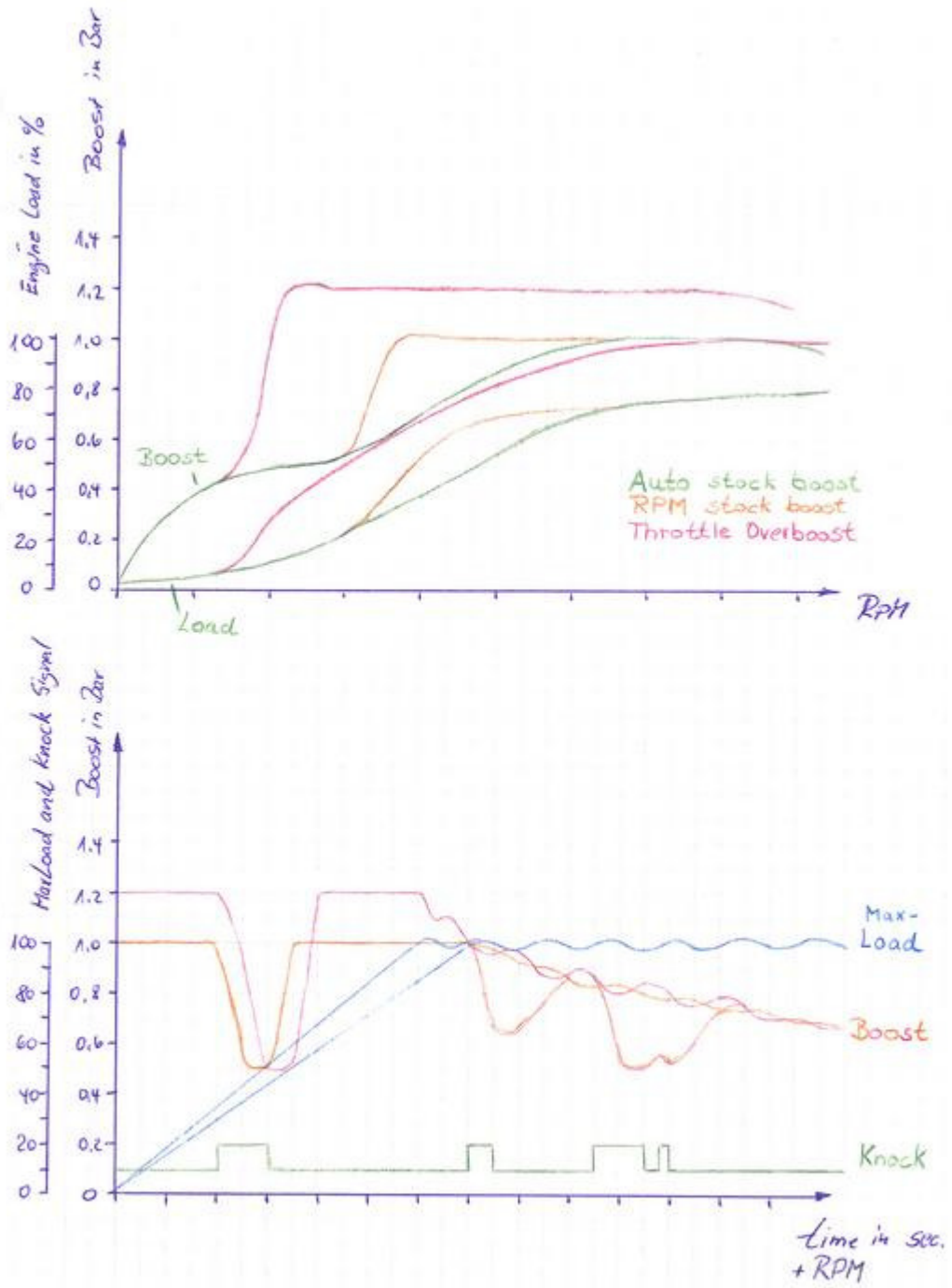
DEUTSCH: Signale am Volvo 7/9'er B230FT LH2.4:

Schwarz = Masse
Rot = Dauerplus Batterie o.a.
Blau = Solenoid
Zweites Kabel vom Solenoid = +12V mit Sicherung (5-10 Amp.), Dauerplus oder Zuendungsplus
Gruen/Gelbe = +12V Zuendungsplus
Braun = Zuendspule, Klemme1 Drehzahlsignal, Zuendspule ist am Anschluss mit Kl.1 beschriftet
D = Vollast-Signal: Konnektor rechter Federbeindom, 2 Kabelverbinder POS.7, R/W Kabel, oder direkt am Drosselklappenschalter, der Kontakt mit dem Massesignal bei Volllast
F = Klopfsignal, LH2.4 Pin28
G = Lastsignal, LH2.4 Pin7
H = Maxload, LH2.4 Pin7
G+H zusammen an LH 2.4 Pin7 !!

Signals at Volvo 7/9'er B230FT LH2.4:

Black = ground
Red = permanent positive, e.g. Batterie
Blue = Solenoid
Second cable from the solenoid = +12V with fuse, permanent positive or ignition positive
Green/Yellow = +12V ignition positive
Brown = ignition coil, Kl.1 rpm-signal, there is a mark KL.1 on the ignition coil
D = throttle-signal: Connector right wheel house tower, POS.7, R/W cable
F = knock signal, LH2.4 Pin28
G = Load signal, LH2.4 Pin7
H = Maxload, LH2.4 Pin7

Example boost diagram:



Solenoids:

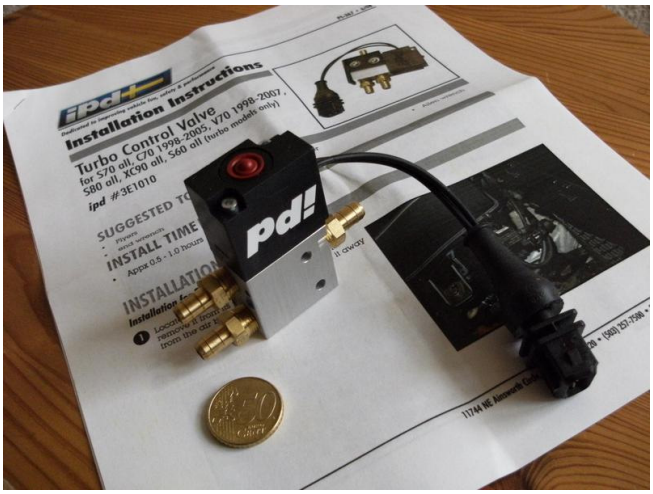
Pierburg: 7.21559.00 12V DC 0032 / **Volvo Part: 3517757** -
from the original Volvo Turbo+Kit (B204FT and B230FT)

2-Port Bleed-Valve 2-Port Solenoids use a "T" connector to plug into the boost control line. Top-boost is slightly weak, maybe problems with spiking (only when boost is set to more than ~14psi). 	**Markers on the valve:** red (top): turbocharger blue (middle): drain yellow (bottom): wastegate The regulated Airflow from this Solenoid is ~50% because there is all the time an amount of pressure which goes to the wastegate. If the Solenoid is off, 100% pressure goes to the WG, if the Solenoid is fully open it may be ~50% pressure which goes to the WG. In other words, you can regulate 50% control pressure with 100% pulse-width. Therefore a very fine adjustment is possible, but the top boost is not as high as with a real 3-port valve. To increase top boost i have figured out, that the line to the WG must be restricted to 2mm diameter, then top boost goes up 4-5psi, it's still very good adjustable then. **For pressure up to 1Bar/14.5psi (with mod. 18-20psi)**

Pierburg 7.22240.13.0 12V / **Volvo Part: 30670448**
from Volvo S/C/V70, S60, S80 and XC90 Turbo Models

3-Port Valve (**preffered device**) 3-Port Solenoids allows completely to interrupt the boost signal to the wastegate. 	**Markers on the valve:** red: turbocharger yellow: wastegate blue: drain The regulated Airflow from this Solenoid is 100%. If the valve is closed, all the pressure goes to the wastegate, if fully open, the wastegate is fully connected to the drain. So you can regulate 100% control pressure with 100% pulse-width. In other words, you can regulate more control pressure with the same pulse-width, the boost which can be adjusted is much higher then with the above device, but it's not as smooth adjustable as with the above 2-port bleed valve. **For pressures more than 1Bar/14.5psi**

iPd Heavy Duty Turbo Control Valve 3E1010 HD

3-Port Valve 3-Port Solenoids allows completely to interrupt the boost signal to the wastegate. 	red: turbocharger yellow: wastegate blue: drain The regulated Airflow from this Solenoid is 100%. If the valve is closed, all the pressure goes to the wastegate, if fully open, all the pressure goes to the drain. So you can regulate 100% Mass with 100% pulse-width. To get this device better adjustable, it's a good idea to restrict the input line (red) to 1-1.5mm diameter.

<u>Other Solenoids:</u>

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http://www.stonis-world.net/docs/pierburg_electric_valves.pdf
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3-Port Valve:
GM Typhoon Solenoid - Part Nr. #1997152 #http://www.gmpartsdirect.com/
http://www.tarmacwolf.org/dokuwiki/doku.php?id=3-port_boost_solenoid
http://forums.turbobricks.com/showthread.php?t=80599
-
3-Port Valve:
Volvo C70 S40 S60 S70 S80 V40 V70
Pierburg 7.22240.13.0
Up to 2001: Volvo Part Nr. 9473212
From 2002: Volvo Part Nr. 30670448
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3-Port Valve:
Volvo V70:
Pierburg 7.28197.01 / Volvo 9465528
Pierburg 7.28197.03 / Volvo 30670449
-
iPd Turbo Controller Valve (#3E1010 HD)
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Perrin EBCS Electronic Boost Control Solenoid (SKU: #ASM-INT-720)