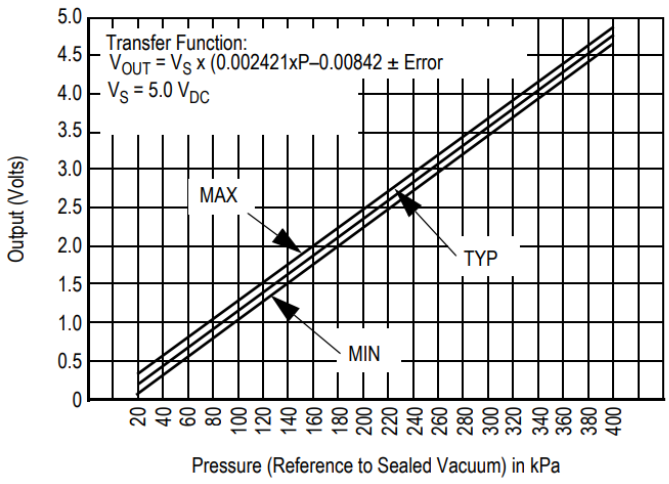
Sensor Ratiometric Correction

Information Sheet

Rev 1.0

Pressure Sensors



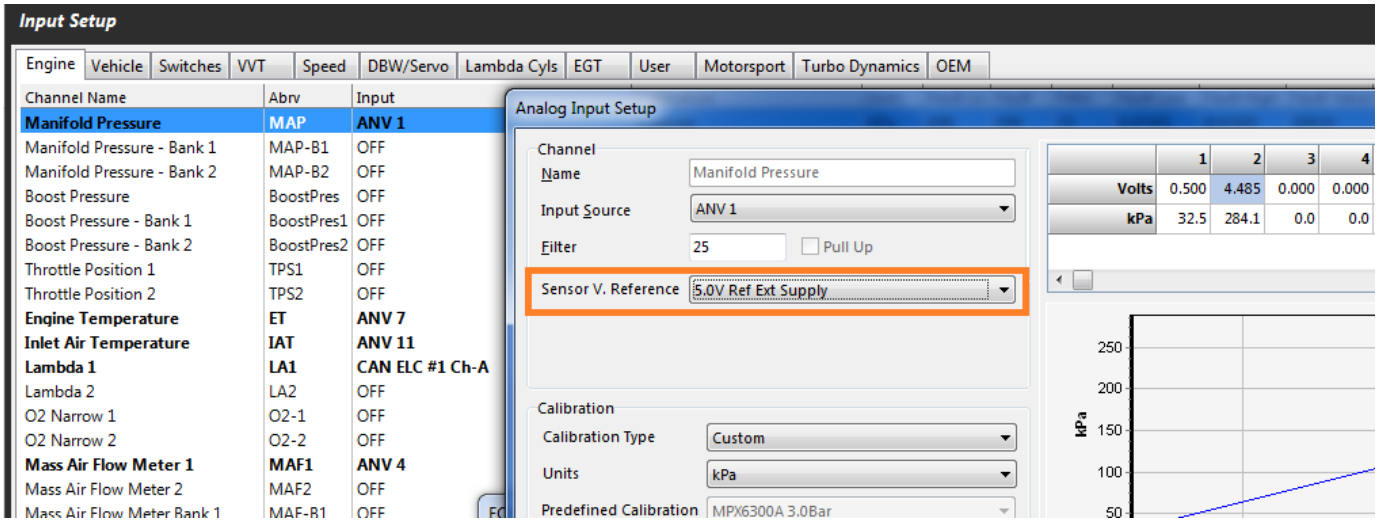
Overview

A sensors analog output is always proportional (ratiometric) to its supply voltage. The lower the supply voltage, the lower the sensor output voltage. The ECU can correct for this variation in supply voltage and improve sensor performance by applying a ratiometric correction; this is a ratio of the actual sensor supply to the calibrated/ideal sensor supply(5.0V). To do this the ECU must know what supply has been wired to the sensor.

There are currently 4 options:

1. OFF (ECU applies no sensor ratiometric correction)
2. ECU 5V Ref (Pin D21 on a KV Series ECU OR Pin B2 on SL series ECU)
3. ECU 5V Ref2 (Pin D22 on a KV Series ECU)
4. 5V Ref Ext Supply

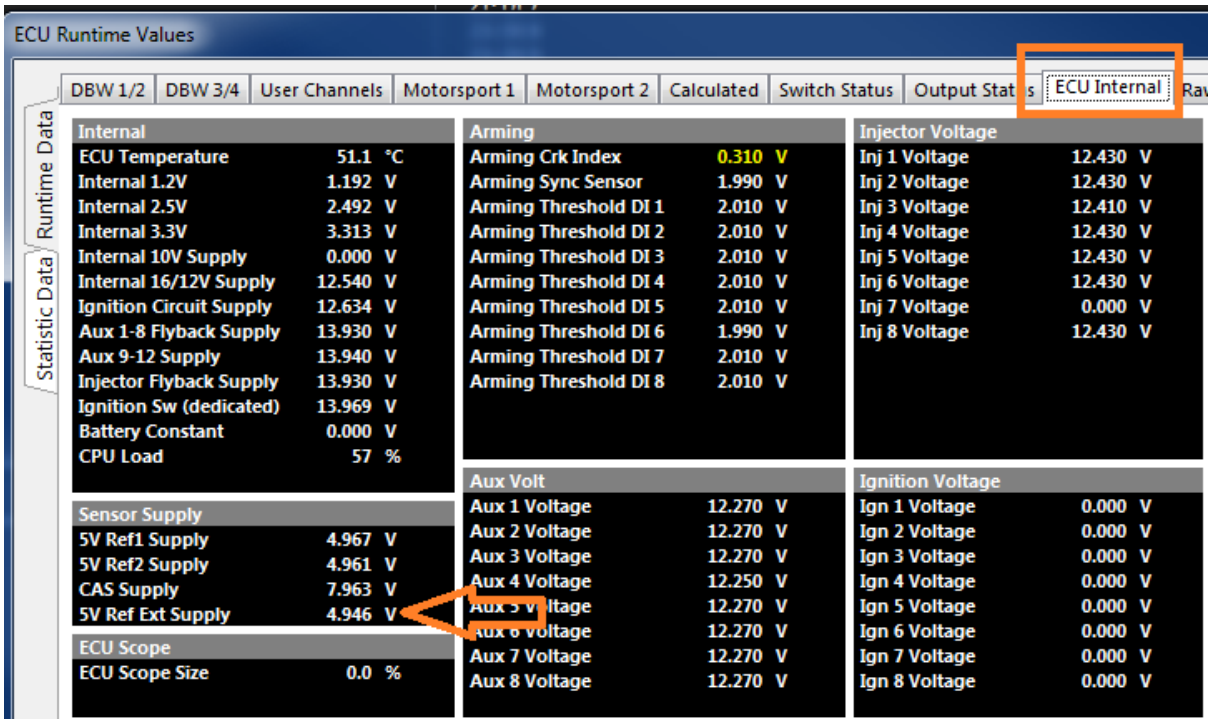
The sensor reference supply can be selected from Emtune by opening the Setup panel of a selected Input Channel.



NOTE 5V Ref Ext Supply: Some sensors may be supplied from an external voltage/supply source. For the ECU to apply ratiometric correction to a sensor the ECU needs to know this voltage so it must be wired into the ECU for measurement. Setup as follows:

1. Connect to the ECU with Emtune. Config View -> Channels -> Calculated runtime -> Main. Select the “5V Ref Ext Supply” setting and pick an input source from the list.

2. This runtime can now be viewed from the Runtime menu(F3) -> ECU Internal tab. This runtime will be used for the “5V Ref Ext Supply” ratiometric correction so it must accuracy represent the sensor supply voltage.



Example

The following test was completed using a 3.0-Bar MAP sensor operating at barometric pressure. A comparison is shown in Table 1.0 between the Ratiometric Correction OFF and ON. With the Ratiometric Correction ON the ECU is able to generate a consistent output for variations in the sensor supply voltage.

5V Ref Supply (V)	MAP (Vref Correction OFF)	MAP (Vref Correction ON)
5.000V	99.9 kPa	99.9 kPa
4.996V	99.8 kPa	99.9 kPa
4.975V	99.4 kPa	99.9 kPa
4.950V	98.8 kPa	99.8 kPa
4.900V	98.0 kPa	99.8 kPa
4.850V	96.8 kPa	99.8 kPa
4.700V	93.7 kPa	99.8 kPa

Table 1.0 MAP Sensor output Ratiometric OFF/ON Comparison

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