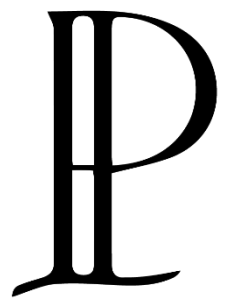


Plimpton Innovations, LLC

Weather Sensor

Instruction Manual



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Introduction

The PI PRO SERIES Weather Sensor is the first sensor of its kind designed specifically for motorsports applications where environmental conditions and maximizing performance meet. Common uses of the sensor are recording weather conditions via aftermarket datalogger, displaying weather conditions to the driver and tuner on an aftermarket programmed dash, and even for minor closed loop tuning adjustments. The sensor output signals can be wired into most aftermarket ECU's capable of 0-5V analog inputs.

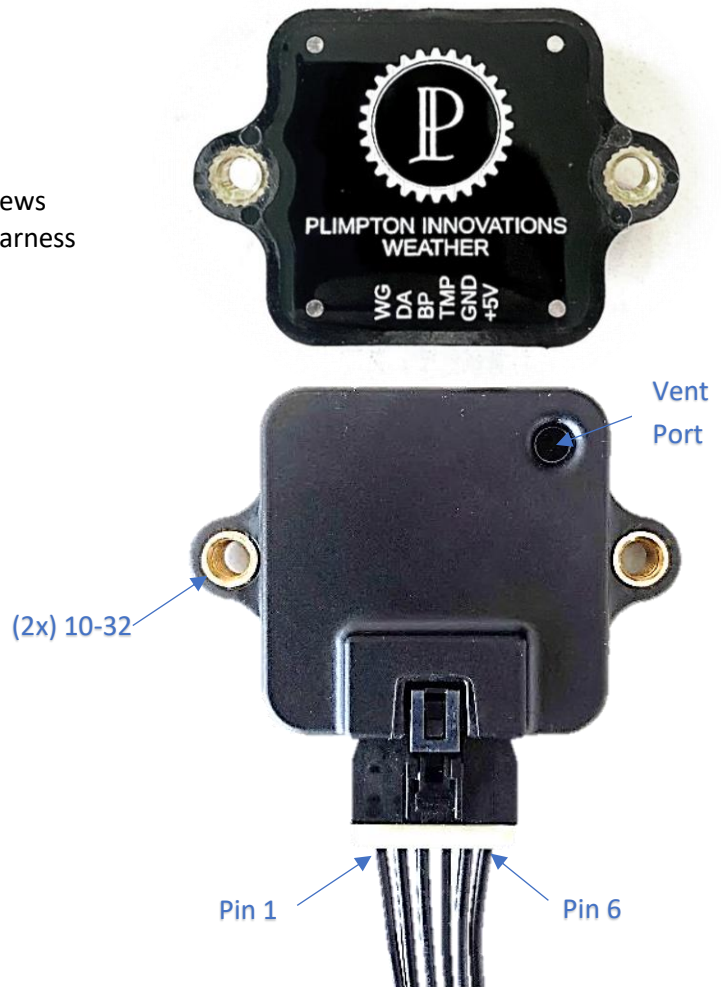
Typical information provided by the sensor are Temperature, Barometric Pressure, Density Altitude, and Watergrains. Some tuners and users may opt for custom channels in specific conditions which must be purchased in addition to the sensor and communicated at time of purchase.

Characteristics

- Power on using 5 Volt sensor power (NO GREATER THAN 5.5V)
- 0-5 Volt Analog outputs
- Low Power Consumption

Package Contents

- Weather Sensor
- Stainless Steel 10-32 Button Head mounting screws
- Components for mending with existing wiring harness
 - 1.5ft Flying Lead Harness
 - Heat shrink
 - Splices (x6)
- Components for DIY Harness
 - Mating connector
 - Wire terminals (minimum one extra)
 - Terminal Lock
- Calibration Card



Terms of Use

The use of this equipment implies in total accordance with the terms described in this manual and exempts the manufacturer from any responsibility regarding product misuse. This product must be installed and tuned by specialized auto shops or professionals with experience in aftermarket motorsports wiring and vehicle tuning. The oversight of any of the warnings or precautions described in this manual can cause damages and lead to warranty void of this product warranty.

This product is not certified or designed for aeronautic purposes or any flying vehicles. In some countries where an annual inspection of vehicles is enforced, no modification in the OEM ECU is permitted. Be informed about local laws and regulations prior to the product installation.

Limited Warranty

This product warranty is limited to one year from the purchase date, only covering manufacturing defects and requiring purchase invoice presentation. Damages caused by failure or misuse of the unit are not covered by the warranty. Warranty void analysis is done exclusively by Plimpton Innovations, LLC technical support team.

Additional Legal Disclaimer

The use of this product is done so at the users own risk and his/her own responsibility. Information furnished by Plimpton Innovations, LLC is believed to be accurate and reliable. However, no responsibility is assumed by Plimpton Innovations, LLC for its use, damages incurred from its use, nor infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under patent or patent rights of Plimpton Innovations, LLC.

Installation

Before installation, ensure power to the vehicle is off and the battery is disconnected.

Mounting Location

There are multiple locations and orientations the sensor can be mounted. Follow the checklist below for determining if the location is suitable:

- Sensor is away from high temperatures
 - engine/drivetrain bays, turbo(s), exhaust piping/manifolds, or heat exchanger devices (Radiator, intercooler, exc.)
- Sensor is away from harsh chemicals
- Sensor is out of direct sunlight and rainfall
- Sensor vent port is open to environmental air
- Sensor is spaced off panels that may get warm from conductive, convective, or radiative effects (Achievable with nylon spacers, see Figure 1)
 - firewall, exterior vehicle paneling in direct sunlight for long durations (Like a racecar wing)

Acceptable mounting locations on the vehicle may include:

- a. On the taillight panel (License plate area) if covered sufficiently with overhanging panels and/or wing.
- b. In the passenger cabin near the door jam, out of sunlight - consider an alternative location if your vehicle is sealed via weatherstrip or if running cabin temperature controls
- c. Under a Drag racing style flat wing, with sufficient spacer between the sensor and wing
- d. Behind a bumper

Once a suitable location is determined, fasten the sensor using the supplied hardware in the enclosure.

Figure 1: Weather Sensor mounted with spacers.



Standard Pinnout and Calibration

The standard sensor pin out is shown below. If a custom programmed sensor was purchased, the alternative pin out will be provided on the calibration card supplied in the original package.

Table 1: Standard Programming Wiring Pinout and Calibration.

PIN	DESCRIPTION		
P1	5V Sensor Power (5.5V MAX)		
P2	Sensor Ground	0 VOLTS	5 VOLTS
P3	Temperature (Analog)	0 °F	150 °F
P4	Barometric Pressure (Analog)	16 inHg	32 inHg
P5	Density Altitude (Analog)	-3,000 Ft	12,000 Ft
P6	Water Grains (Analog)	0 gpp	150 gpp

ATTENTION: Please follow the calibration examples in your ECU Provider’s setup section closely as some of the units and values may be changed to accommodate ECU.

A white shrink label displaying “+5V” is preshrunk on the pin 1 wire of the pigtail. For further clarity, small abbreviations of the channels are shown on the backing plate and align with each corresponding pin.

Figure 2: Weather Sensor Backing Plate with Nomenclature.



Wiring

The wiring harness must be protected from sharp edges that may damage wires and cause short-circuits. Pay close attention when passing the wiring harness through holes, always using rubber shields or other kind of wire protection. Route the wiring through areas that aren’t exposed to chemicals, excessive heat, and away from moving parts. Follow the following steps for wiring the sensor via pigtail.

1. Ensure power in the vehicle is off
2. Strip ¼” of the wire insulation away on pigtail (20awg wires supplied)
3. Strip ¼” of the wire insulation away on vehicle wires
4. Use proper size crimp style splice connector to join wires and protect splice with heat shrink
5. Push Molex connector into weather sensor until latching occurs
6. Once sensor is tightened, secure the wiring harness to body or chassis between 0.75”-1.5” away from sensor connection using a zip tie or wire clamp

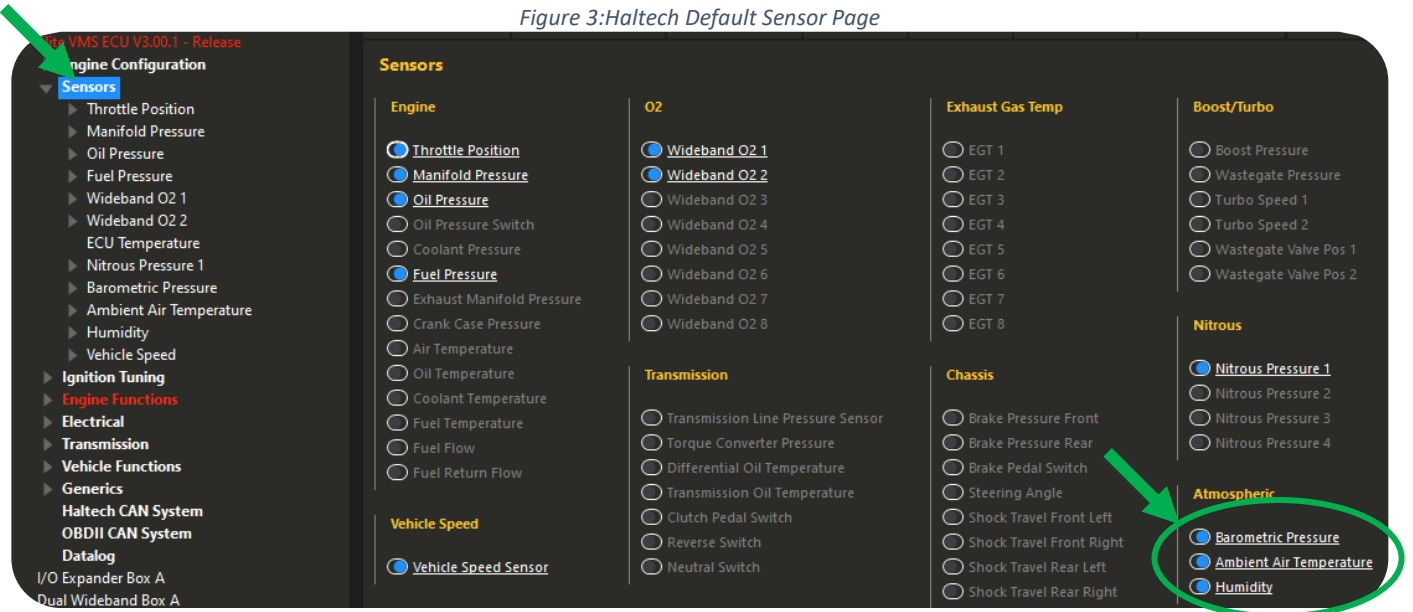
For DIY wiring harness, please refer to the Nano-fit Molex Application Specification:

https://www.molex.com/pdm_docs/as/AS-105300-100-001.pdf

Haltech Setup

1. Unplug the weather sensor.
2. Navigate to the “Sensors” page and enable Air Temperature, Barometric Pressure, and Humidity channels or channels as needed.

Figure 3: Haltech Default Sensor Page



3. For each input newly enabled on the “Sensors” page
 - a. Navigate to the Sensor/Settings page
 - b. Setup the sensor wiring, and calibrations as follows:

Figure 4: Haltech Ambient Air Temperature Configuration

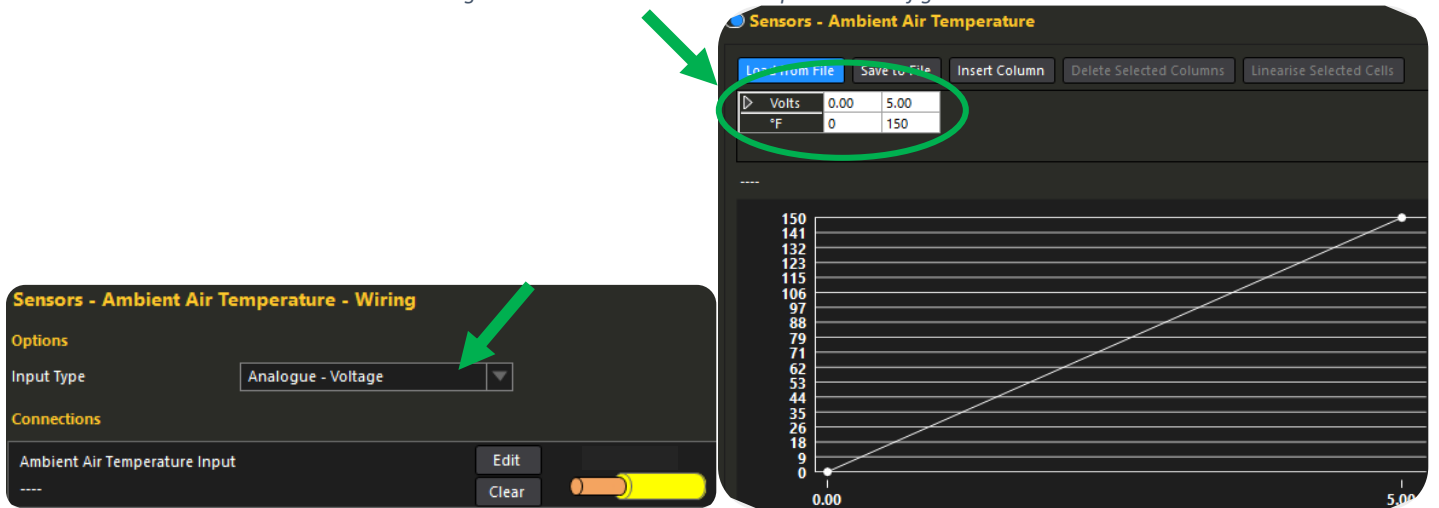


Figure 5: Haltech Barometric Pressure Configuration

ATTENTION

Haltech does not currently offer a unit type of “inHg” so this setup example uses real adjusted units as psi. New Values:
0 Volts = 7.9psi | 5 Volts = 15.7Psi
** one could simply replace the units and leave values as they are in table 1

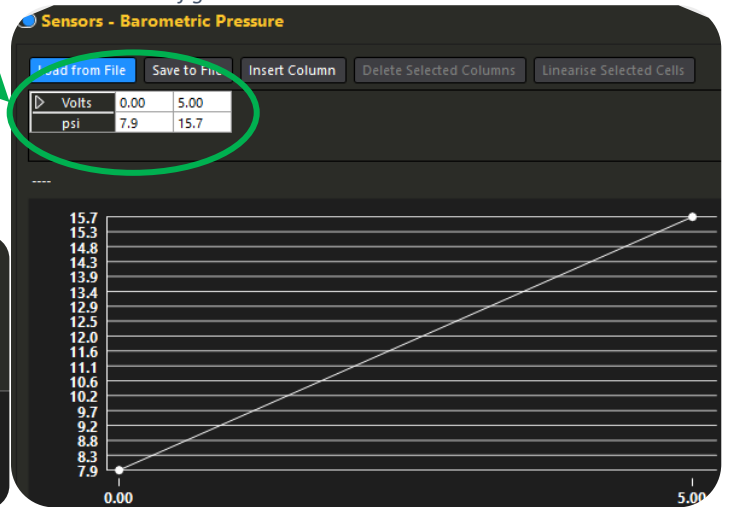
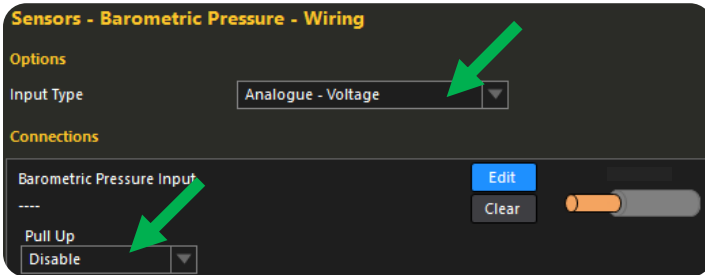
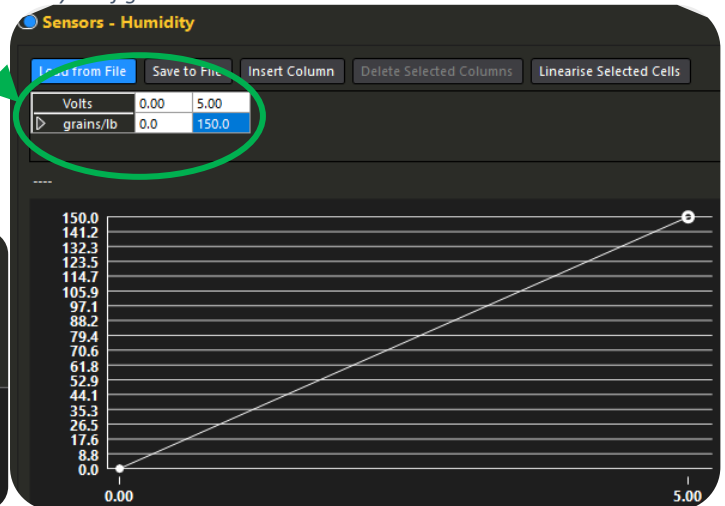
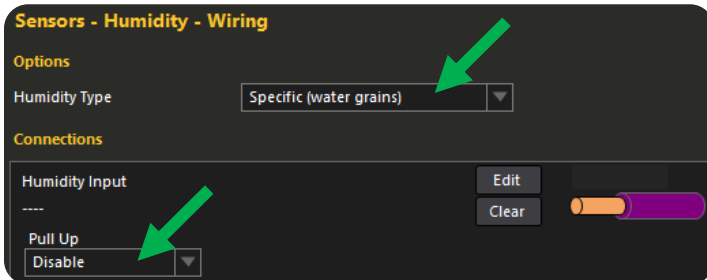
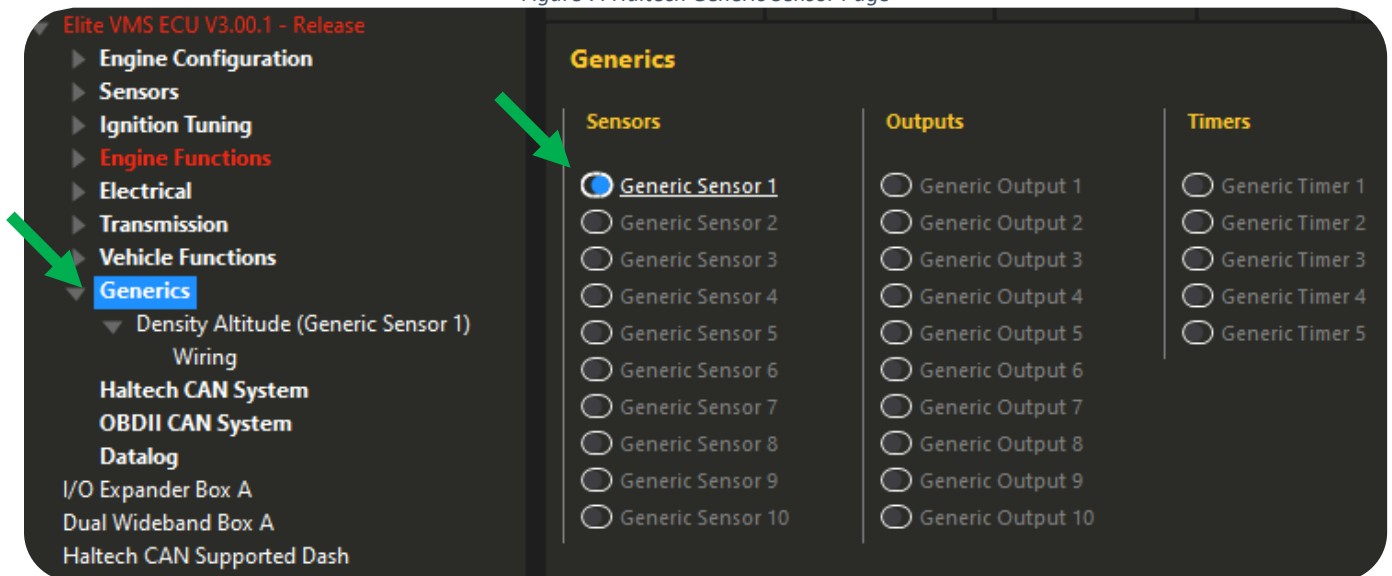


Figure 6: Haltech Humidity Configuration



4. Now navigate to the “Generics” Page and under the “Sensor” column enable the next open Generic Sensor

Figure 7: Haltech Generic Sensor Page

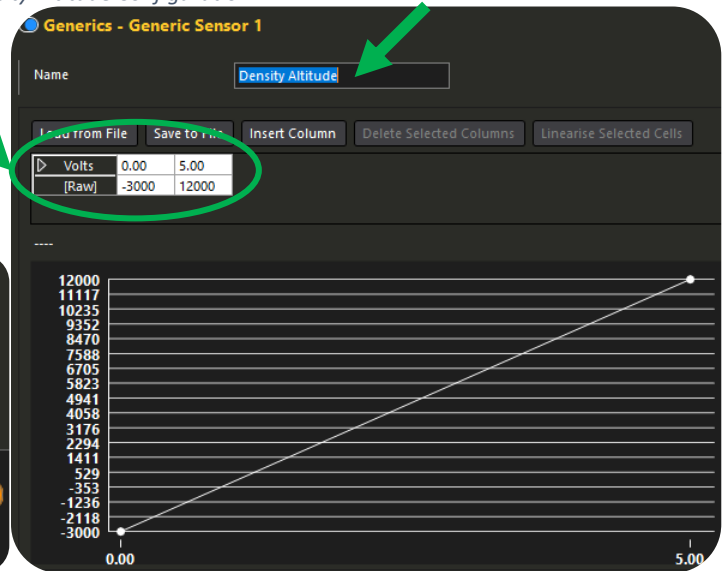
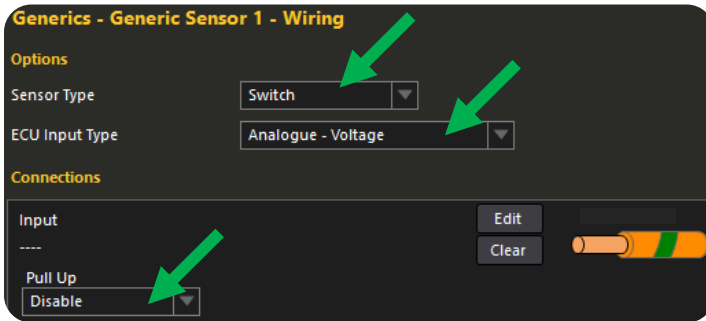


5. Navigate to the newly enabled Generic Sensor dropdown and setup sensor wiring and calibration as follows:

Figure 8: Haltech Density Altitude Configuration

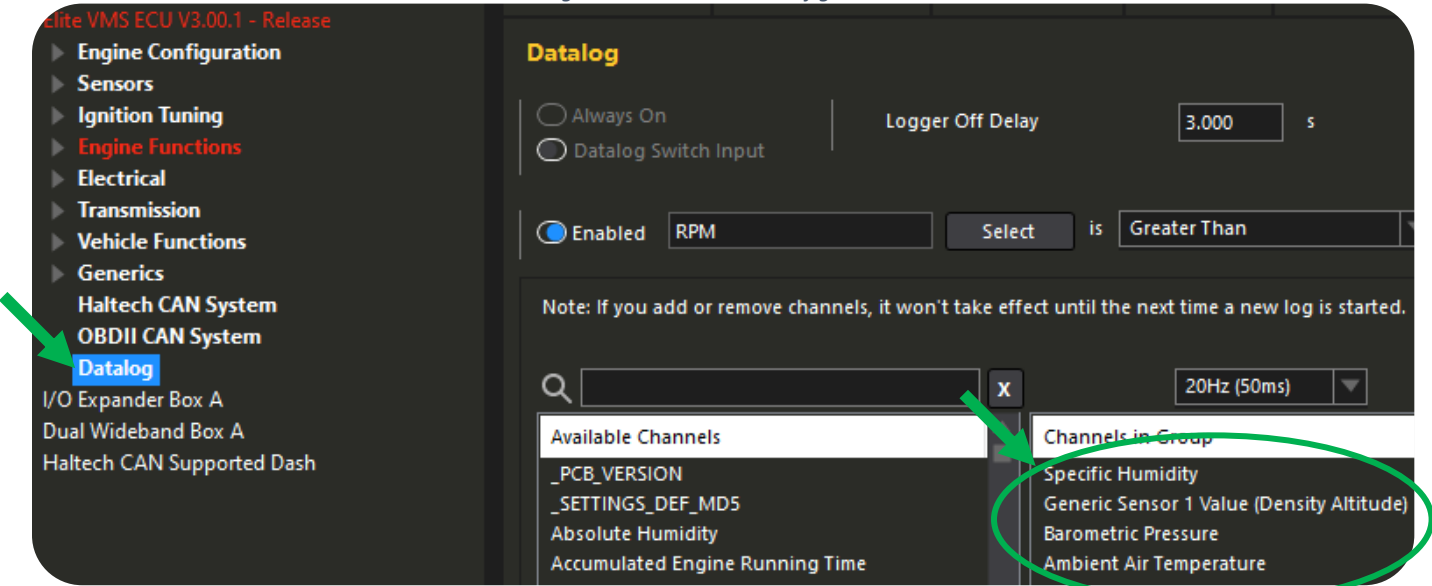
ATTENTION

Haltech does not currently offer unit type of "Ft" so this setup example a unit type of "switch".



6. Navigate to the "Datalog Page" and add the new channels into a lower frequency log list.

Figure 9: Haltech Data Configuration



7. Once desired channels are complete, save configuration to ECU
8. Power the vehicle off, plug sensor in, and then return the vehicle electrical power back on
9. Reconnect with the ECU and verify appropriate values
 - a. This can be easily accomplished by adding digital gauges in the screen bottom dash and selecting appropriate "Custom" channels.

Holley Setup

1. Unplug the weather sensor
2. Navigate to the I/O Screen
3. Complete the following sections using the ACTUAL designated inputs wired for the sensor from **your** vehicle!

Figure 10: Holley Inputs/Outputs Page Setup

NAME	TYPE	ECU PIN	ENABLE
#1	DIGITAL SPEED/FREQ	NOT DEFINED	<input type="checkbox"/> Enable
#2	DIGITAL SPEED/FREQ	NOT DEFINED	<input checked="" type="checkbox"/> Enable
#3 Air Temperature	5 VOLT	NOT DEFINED	<input checked="" type="checkbox"/> Enable
#4 Barometric Pres	5 VOLT	NOT DEFINED	<input checked="" type="checkbox"/> Enable
#5 Density Altitude	5 VOLT	NOT DEFINED	<input checked="" type="checkbox"/> Enable
#6 Water Grains	5 VOLT	NOT DEFINED	<input checked="" type="checkbox"/> Enable

4. Once enabled, setup the configurations and calibrations as follows:

Figure 11: Holley Ambient Air Temperature Configuration

SETTINGS

- Type: Custom 5V
- Units: F
- Format: 1.2
- Sensor Min: 0.0 °F
- Display Min: 0.0 °F
- Caution Min: 0.0 °F
- Normal Min: 32.0 °F
- Sensor Max: 150.0 °F
- Display Max: 150.0 °F
- Caution Max: 150.0 °F
- Normal Max: 110.0 °F

CALIBRATION TABLE

Voltage (volts)	Air Temperature (F x10)
0.00	0.0
0.32	10.0
0.67	20.0
1.00	30.0
1.33	40.0
1.67	50.0
2.00	60.0
2.33	70.0
2.67	80.0
3.00	90.0
3.33	100.0
3.67	110.0
4.00	120.0
4.33	130.0
4.67	140.0
5.00	150.0

Figure 12: Holley Barometric Pressure Configuration

ATTENTION
Holley ECU does not currently offer a unit type of "inHg" so this setup example uses units of "PSI" in its' place!

SETTINGS

- Type: Custom 5V
- Units: psi
- Format: 1.23
- Sensor Min: 16.00 psi
- Display Min: 16.00 psi
- Caution Min: 16.00 psi
- Normal Min: 16.00 psi
- Sensor Max: 32.00 psi
- Display Max: 32.00 psi
- Caution Max: 32.00 psi
- Normal Max: 32.00 psi

CALIBRATION TABLE

Voltage (volts)	Barometric Pres (psi x10)
0.00	16.00
0.32	17.07
0.67	18.13
1.00	19.20
1.33	20.27
1.67	21.33
2.00	22.40
2.33	23.47
2.67	24.53
3.00	25.60
3.33	26.67
3.67	27.73
4.00	28.80
4.33	29.87
4.67	30.93
5.00	32.00

Figure 13: Holley Density Altitude Configuration

ATTENTION

Holley ECU does not currently offer a unit type of "Ft" so this setup example uses units of "kPa" in its' place! High Calibration values are:
9900 kPa = 4.3Volts

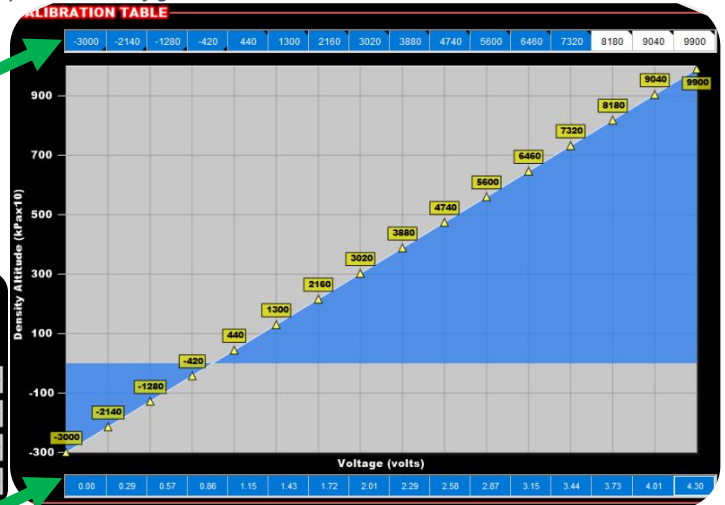
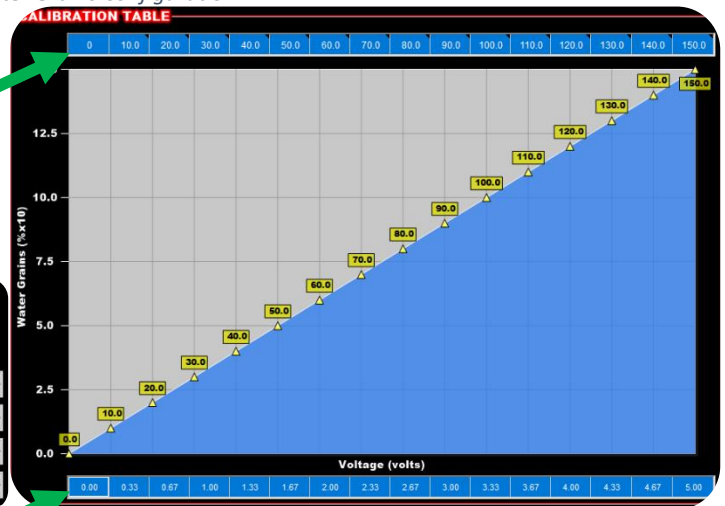


Figure 14: Holley Water Grains Configuration

ATTENTION

Holley ECU does not currently offer a unit type of "GPP" so this setup example uses units of "%" in its' place!



- Select the "PIN MAP" Button and assign the newly added Inputs to the corresponding pins on YOUR vehicle using the drag and drop method. Press done when complete.

Figure 15: Holley Pin Map Setup

Holley EFI ECU Pin Map

View Inputs | View LCD | View Outputs | View Injectors | View Fixed | Drag and Drop I/O to Available Pins | Done

UNASSIGNED INPUTS

- G N20 Input #1
- G N20 Enable
- F
- G Shift Mstr Enable
- G Race Trans Launch
- H Launch Input

CONNECTOR J1

Pin	Input Number	Input Type
A12	Input #1	Water Grains
A3	Input #2	5 Air Temperature
A13	Input #3	5 Barometric Pres
A4	Input #4	5 Density Altitude

CONNECTOR J2

Pin	Input Number	Input Type
A10	Input #5	5 2 T H G
A1	Input #6	5 2 T H G
A27	Input #7	5 2 T H G
A19	Input #8	5 2 T H G
A11	Input #9	5 2 T H G
A2	Input #10	5 2 T H G
A28	Input #11	5 2 T H G
A20	Input #12	5 G
A12	Input #13	5 G
A3	Input #14	5 G
A29	Input #15	G Rev-Limiter #2
A21	Input #16	F S
A13	Input #17	F S
A4	Input #18	F S
A30	Input #19	F S
A14	Input #20	5 H G
A5	Input #21	5 H G
A31	Input #22	5 H G
A23	Input #23	5 H G
A15	Input #24	5 H G
A6	Input #25	5 H G
A32	Input #26	5 H G
A24	Input #27	5 H G

CONNECTOR J3

Pin	Input Number	Input Type
B21	Input #28	5
B15	Input #29	5
B9	Input #30	5
B2	Input #31	5
B3	Input #32	5
B23	Input #33	5
B25	Input #34	5
B24	Input #35	H ECU Log Trig
B18	Input #36	5 2 T H G

CONNECTOR J4

Pin	Input Number	Input Type
B17	Input #37	H Rev Limiter #1
B25	Input #38	5 2 T H G
B18	Input #39	F S
B19	Input #40	F S
B21	Input #41	5 H G
B15	Input #42	5 H G
B22	Input #43	5 H G
B23	Input #44	5 H G
B9	Input #45	5 H G
B8	Input #46	5 H G
B10	Input #47	5 H G
B16	Input #48	5 H G
B24	Input #49	F 5 G
B26	Input #50	F 5 G

- If done correctly, you will see the CORRECT corresponding pin assignment next to the inputs!

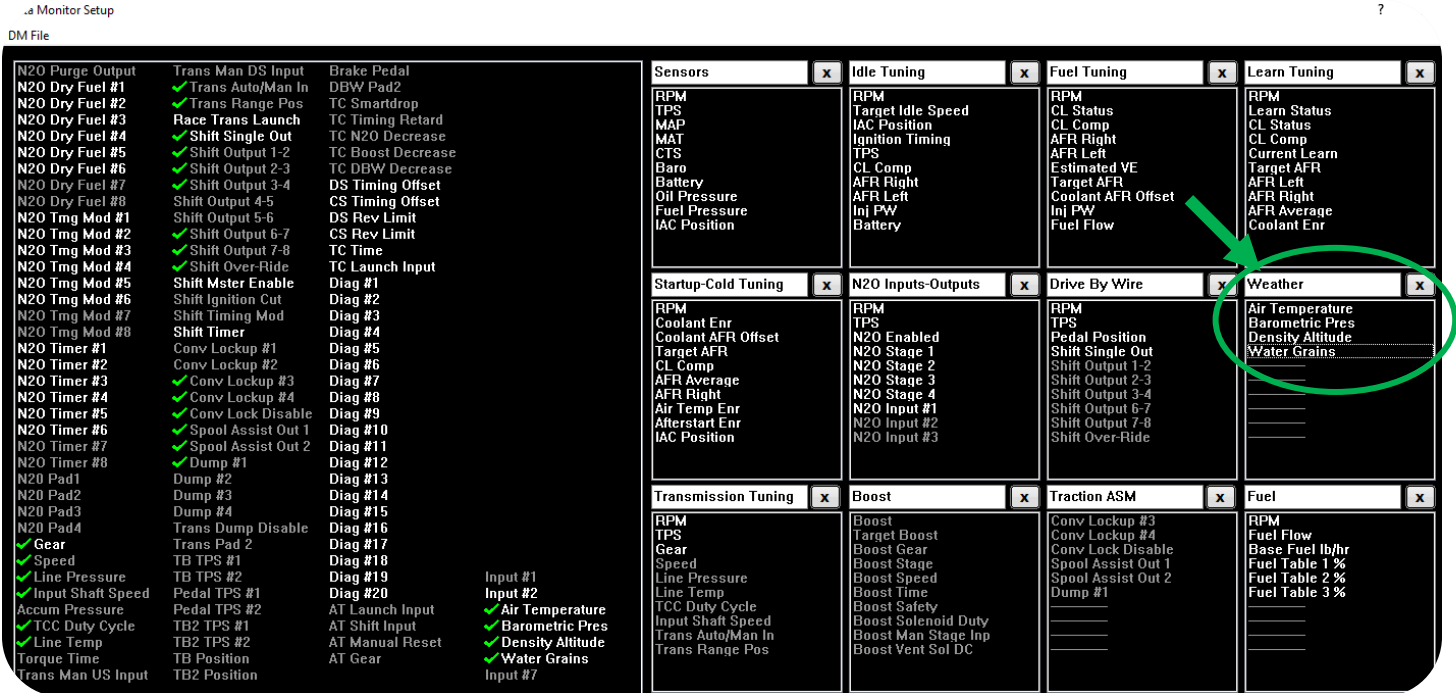
Figure 16: Holley Input Pin Assignment Check

INPUTS

	NAME	TYPE	ECU PIN
#1		DIGITAL SPEED/FREQ	NOT DEFINED
#2		DIGITAL SPEED/FREQ	NOT DEFINED
#3	Air Temperature	5 VOLT	J1-A3
#4	Barometric Pres	5 VOLT	J1-A13
#5	Density Altitude	5 VOLT	J1-A4
#6	Water Grains	5 VOLT	J1-A12

- Once desired channels are complete, navigate to the Data Manager screen and setup a “Weather Page” or add to an existing section.

Figure 17: Holley Data Manager Setup



- Save setup and configuration to ECU
- Power the vehicle off, plug sensor in, and then return the vehicle electrical power back on
- Reconnect with the ECU and verify appropriate values
 - This can be easily accomplished by toggling through the data manager viewer pages on the bottom-left side of the main screen.

FuelTech Setup

1. Unplug the weather sensor
2. Navigate to the Sensor and Calibration Screen
3. For each input used, complete the sections as follow

Figure 18: Temperature

Figure 20: Density Altitude

Figure 19: Barometric Pressure

Figure 21: Water Grains

4. Once desired channels are complete, save ECU configuration
5. Power the vehicle off, plug sensor in, and then return the vehicle electrical power back on
6. Reconnect with the ECU and verify appropriate values
 - a. This can be easily accomplished by adding digital gauges in the screen bottom dash and selecting appropriate "Custom" channels

Revision

Version	Change	Date
V1.0	Initial Release	
V1.1	Grammatical Corrections	June 4 th , 2022