

# PERFECT TUNING

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## Universal Gauge

Compatible with



## User Manual v1.4

For hardware revision 4 and up, software version 48

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## **Warning**

All parts are sold for OFF ROAD RACE-ONLY ground-vehicle use only.

Keep your eyes on the road when using this product.

Race parts are inherently dangerous and may cause injury or damage if improperly modified or altered before use. Perfect Tuning will not be held liable for and will not pay you for any injuries or damage caused by misuse, modification, redesign, or alternation of any of our products. Perfect Tuning will not be held in any way responsible for any incidental or consequential damages including direct or indirect labour, towing, lodging, garage, repair, medical, or legal expense in any way attributable to the use of any item in our catalogue or to the delay or inconvenience caused by the necessity of replacing or repairing any such item.

The gauge is not waterproof or water resistant. Avoid putting water over it, on the screen and on the LEDs.

If you're not sure how to install and connect the gauge after reading this user manual, contact a competent shop to do the installation.

Do not use longer screw than provided in the two rear mounting holes. Using too long screws can touch the circuit board inside and damage the gauge.

## **Introduction**

Thank you for your purchase. The customer satisfaction at Perfect Tuning is our biggest priority. If you have any questions, suggestions or issues do not hesitate to contact us at [support@perfecttuning.net](mailto:support@perfecttuning.net) or on Facebook.

The Perfect Tuning Universal Gauge is a good alternative to expensive race dashes or bigger displays. It's a way more than a simple gauge with the possibility to connect up to 3 sensors directly to the gauge and by having the possibility to display values from an aftermarket ECU at the same time!

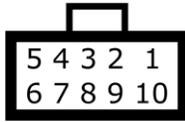
The alarm module is a very nice feature that allows the user to monitor what he wants and never miss an abnormal condition.

Please note that the gauge will fit in a 52 mm pod but keep in mind that the overall dimensions are 69 mm so it might not fit well in a multiple gauge pod where all the gauges are very near each other.

Follow us on Facebook or subscribe to our YouTube channel to be aware of all the software upgrades including all the latest features and newest products.

# 1 Wiring

Always disconnect the vehicle battery when installing the gauge. Do not leave any wires not isolated. Always solder or crimp the wires and protect with heat shrink. Refer to the user manual to connect the sensors.



View when looking at the gauge.

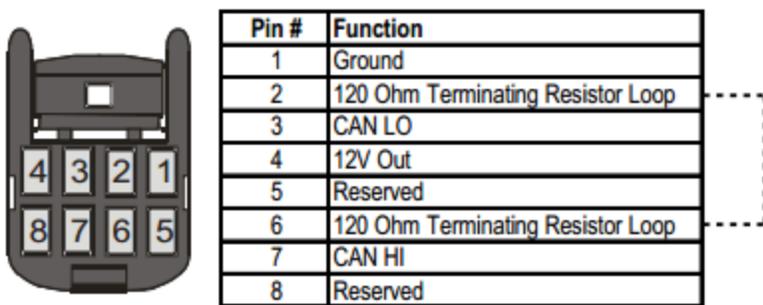
Pin	Color	Function
1	Red	12v ( + ). Always install the gauge on a fused supply (3A)
2	Black	Vehicle Ground ( - )
3	White	0-5v analog input 1 (optional)
4	Yellow	0-5v analog input 2 (optional)
5	Brown	CAN bus H
6	Purple	CAN bus L
7	Orange	0-5v analog input 3 (optional)
8	Gray	Digital input (not available)
9	Blue	5v output (optional)
10	Green	Digital output. Connected to the ground when output is enabled.

## 1.1 Connection to the Haltech ECU.

### 1.1.1 Platinum Pro, Sport and Sprint

Always refer to the user manual and locate the CAN High (CANH) and CAN Low (CANL) pins.

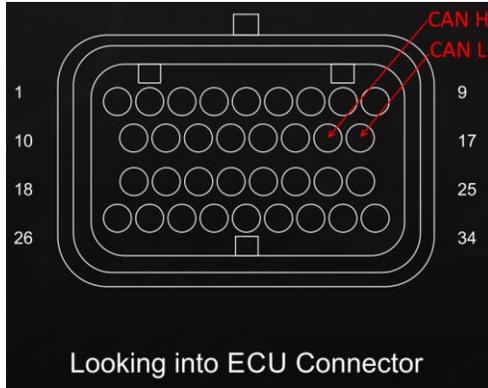
The Haltech Platinum serie has a 8 pin CAN bus plug. The Perfect Tuning Universal Gauge comes with the plug so the installation is plug and play. Here is the pinout for reference.



### 1.1.2 Elite 550, 750 and 950

On the Haltech 550 and 750, the CAN pins are on the main 34P connector.

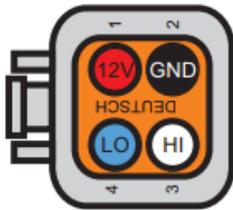
Pin 16 is CAN H, Pin 17 is CAN L.



### 1.1.3 Elite 1000, 1500, 2000 and 2500

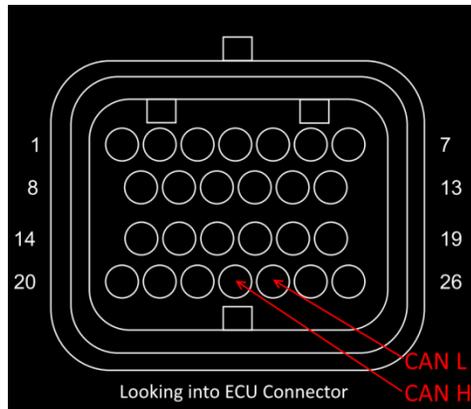
The Haltech Elite ECU's have the CAN bus available at 2 different locations. On the main 26P connector (CANH = pin 23, CANL = pin 24) and also on the Aux CAN Port. You can use either location.

CAN Aux Port



- Pin 1 - 12V
- Pin 2 - Ground
- Pin 3 - CAN High
- Pin 4 - CAN Low

Main 26P Connector (B)



## **2 Menus and buttons**

There are two buttons to navigate through the different menus of the gauge and edit basic settings.

Press left to move to the left or to go up and press the right button to move to the right or go down.

Press both buttons to select or enter. It's not possible to go back. If you entered a menu by error, press both buttons until you're back to the previous screen or power off the gauge.

### **2.1 Real-Time Display Screens**

Almost the real time screens are configurable. First, validate that "Screen designer" is enabled in the Settings menu. Then where a value is displayed, press both buttons to open the screen designer. A rectangle will appear around the value that is selected. Press both buttons to edit this value and a list of inputs will appear. Select the desired value with left and right button and press both to select the value.

### **2.2 Settings**

This section will describe each configuration screen.

#### **2.2.1 Screen Brightness**

Use this menu to change the screen brightness intensity.

#### **2.2.2 LED Brightness**

Use this menu to enable or disable automatic light adjustment. It's possible to specify the led intensity during day and night. Depending on the LEDs intensity, light can be reflected into the light sensor. If you have this issue, it's suggested to disable the automatic dimming of the LEDs.

#### **2.2.3 Units**

This screen is used to select the displayed units for different values on the screen. Do not mix up pressure and MAP. Units are different.

#### **2.2.4 Input Configuration**

Configure the three 0-5v analog inputs by selecting which input to configure, and then select the sensor. For advanced or custom configuration, see the Wi-Fi section.

#### **2.2.5 Wi-Fi hotspot**

Advanced configuration of the gauge is made over the configuration web page. Press both buttons to enable the Wi-Fi hotspot. This will create a Wi-Fi network named PerfectTuning-XXXX (where XXXX will vary on every gauge). The hotspot is not password protected and this is why it cannot be left always active. Leaving this screen will disable the hotspot. Once connected to the PerfectTuning-XXXX hotspot, open a web navigator (Google Chrome is recommended) and navigate to the address 192.168.0.1. This will bring the configuration webpage. See the Wi-Fi section for more information.

### **2.2.6 Safe Mode**

Safe mode is for firmware upgrade recovery in case of problems. Safe mode can also be accessed by pressing both buttons while powering the gauge.

### **2.2.7 Edit text color**

Change the text color in the menus and in few real-time display values.

### **2.2.8 Disable / Enable screen designer**

The screen designer is used to select which value is displayed in the real time screens. To prevent editing these values, disable the screen designer.

### **2.2.9 Select boot mode**

There are eleven different boot sequences that are available to execute when the gauge is powered up.

The number 11 is no boot sequence.

### **2.2.10 General Info**

This menu display general gauge information like hardware version, software version and serial number that can be useful for support.

### **2.2.11 Factory Reset**

Reset all settings to factory default.

### 3 CAN Bus

The gauge can display values coming from the aftermarket ECU over the CAN bus

#### 3.1 CAN bus resistor

On the back of the gauge, there is a jumper for the 120 ohms end of bus resistor next to the cable connector. To disconnect the 120 ohms resistor, remove the jumper. Unless there is more than 1 device connected to the CAN bus, leave the jumper installed.

#### 3.2 Display values from ECU over CAN bus

All this information is available on all models

Not all CAN Packets will always be broadcast.

The Haltech ECU may opt not to broadcast a particular packet if that feature is not enabled.

Channel	Sport	PRO
RPM	1.11	1.11
Manifold Pressure	1.11	1.11
Throttle Position	1.11	1.11
Fuel Pressure	1.11	1.11
Oil Pressure	1.11	1.11
Injector Duty Cycle (Primary)	1.11	1.11
Injector Duty Cycle (Secondary)	1.11	1.11
Ignition Angle (Leading)	1.11	1.11
Ignition Angle (Trailing)	1.11	1.11
Wheel Slip	--	1.11
Lambda 1	1.11	1.11
Lambda 2	1.11	1.11
Lambda 3	--	1.11
Lambda 4	--	1.11
Knock Retard - Bank 1	--	1.11
Knock Retard - Bank 2	--	1.11
NOS Pressure	--	1.11
Wheelspeed Front Left	--	1.11
Wheelspeed Front Right	--	1.11
Wheelspeed Rear Left	--	1.11
Wheelspeed Rear Right	--	1.11
Wheelspeed Front	--	1.11
Wheelspeed Rear	--	1.11
Exhaust Cam Angle #1	--	1.11
Exhaust Cam Angle #2	--	1.11

Boost Control Output	--	1.11
Gear	1.11	1.11
Intake Cam Angle #1	1.11	1.11
Intake Cam Angle #2	1.11	1.11
Fuel Flow	--	1.11
Battery Voltage	1.11	1.11
Target Boost Level	1.11	1.11
Barometric Pressure	1.11	1.11
EGT 1	1.11	1.11
EGT 2	1.11	1.11
EGT 3	1.11	1.11
EGT 4	1.11	1.11
EGT 5	1.11	1.11
EGT 6	1.11	1.11
EGT 7	1.11	1.11
EGT 8	1.11	1.11
Coolant Temp	1.11	1.11
Air Temp	1.11	1.11
Fuel Temp	1.11	1.11
Oil Temp	1.11	1.11
Transmission Oil Temp	--	1.11
Fuel Composition	--	1.11
Fuel Consumption Rate	1.11	1.11
Average Fuel Economy	1.11	1.11
NOS Active flag	1.11	1.11
MIL (check engine light)	1.11	1.11

##### 3.2.1 Haltech configuration

No configuration needed

Not all CAN Packets will always be broadcast. The Haltech ECU may opt not to broadcast a particular packet if that feature is not enabled.

## 4 WiFi

### 4.1 How to connect and access the gauge configuration webpage

The gauge can be configured with any recent smartphone, tablet or laptop that is able to browse a webpage. Only one connection at the same time is supported.

First, go to “**Settings**” on the gauge, and enable the “**Wi-Fi hotspot**”.

Connect to the PerfectTuning-XXXX WiFi hotspot on your device.

Open the browser used to navigate the internet and type 192.168.0.1

Google Chrome web browser is recommended and only one connection is supported.

The home web page will appear.

In rare occasion, it’s possible that some device have trouble connecting to the hotspot. Specifying a fixed IP of 192.168.0.2 might help or try rebooting the gauge.

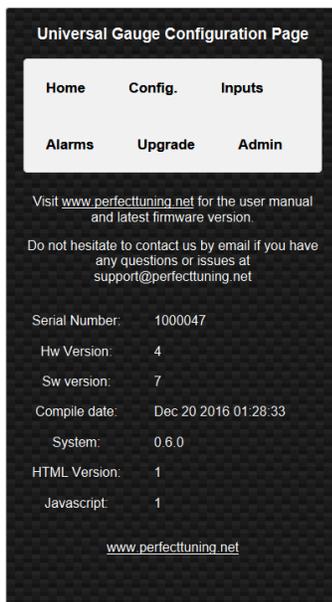
### 4.2 Help

Click on the question mark logo  in the web pages for more information about each option.

### 4.3 Web pages

#### 4.3.1 Home

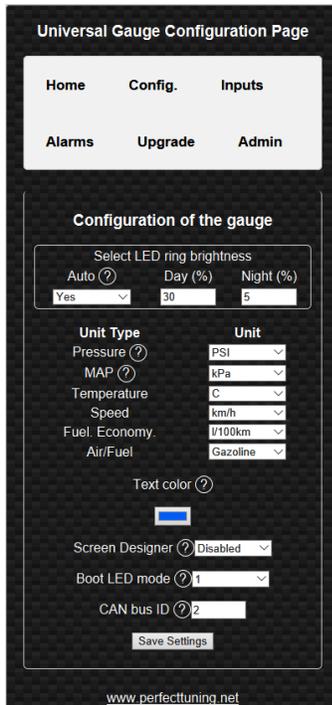
The home page display information related to the gauge like the serial number, software version, hardware version, html version, JavaScript version and system version.



### 4.3.2 Config.

The configuration page allows changing general settings of the gauge like units, LED ring intensity and more. The color tool is not available on IOS devices like iPhones and iPads. IOS users must enter the text color value in hexadecimal.

Always hit "Save Settings" before going to another page.

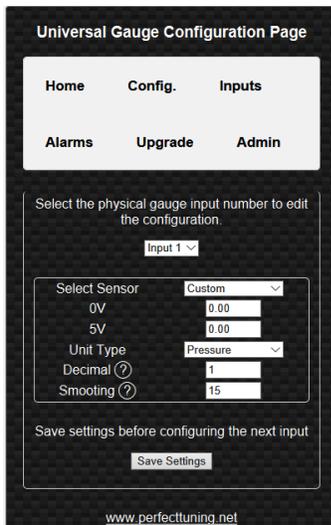


### 4.3.3 Inputs

The input page allows editing the analog input configuration. It is possible to select between the different supported sensors or enter custom values for a different sensor. Custom thermistor tables are not supported.

Smoothing is important. The default value is 100. 100 mean no smoothing. 15 mean maximum smoothing. Change this setting to smooth or increase response of the analog inputs.

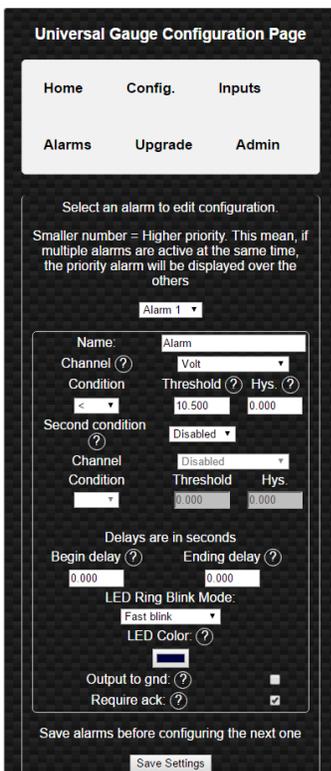
Always hit "Save Settings" before configuring next input.



#### 4.3.4 Alarms

This page is used to configure up to 16 alarms on the gauge. Each alarm can contain 2 conditions. Each field is explained by clicking on the question mark logo .

Alarms with a smaller number have higher priority.  
Always hit "Save Settings" before configuring next alarm.



### 4.3.5 Upgrade

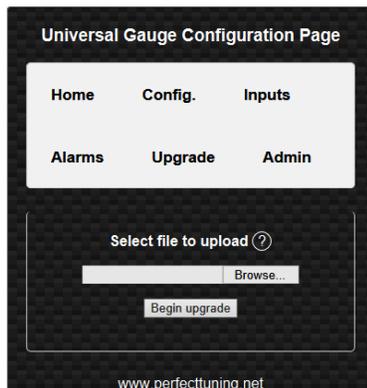
You can look at the

This page is used to do a firmware upgrade of the gauge. Firefox browser is not supported. Use Google Chrome on a computer to do the firmware upgrade. On IOS devices, this is tricky because the IOS devices cannot store a .bin file easily; the user must save the firmware file in iCloud first. And then select the file from there. Press “Begin upgrade” and accept the warning popup. Wait and don’t do anything else. The device will reboot when the upgrade is finished.

Optional: This page can also be used to change the boot logo image.

**There is no support regarding changing the boot image and if there is any problem related to this, this won't be covered under the warranty.**

Create a .bmp file with 24 bits color depth in paint with a dimension of 160x128 pixels. Name this file boot.bmp and use the upgrade tab to upload the file to the gauge.



### 4.3.6 Admin

The admin page is used to do a factory reset of the gauge.

The WiFi credentials section is for support and advanced users only. These settings are not related to the Wi-Fi hotspot SSID and password so do not try to change this.

## 5 Alarms

The alarms are not configurable directly on the gauge. See the Wi-Fi section of the user manual to understand how to connect to the web interface of the gauge and configure the alarms.

An alarm can be ignored by pressing any button. Pressing both buttons when an alarm is active will disable the alarm until next reboot.

Alarms are only displayed when the real time screens are active. The alarms won't be generated if the gauge is in the settings menu.

In each alarm configuration, it's possible to set a custom name.

Then select on which channel this alarm will be set. Select a condition (< Smaller, > Bigger, = Equal), a threshold value and a hysteresis value.

Second condition is use to make combination of condition to generate an alarm. The condition "AND" (condition 1 AND condition 2 must be active for the alarm to be generated) or "Or" (condition 1 or condition 2 must be active to generate the alarm) can be selected.

A begin and ending delay can be specified in seconds.

Select the LED ring mode (fast blink, slow blink, solid, off) and LED ring color.

The output to ground check box can be used to ground the digital output when the alarm is active.

Require Ack is used to leave the alarm active as long as the user doesn't acknowledge the alarm by pressing a button on the gauge.

Eg: Channel is MAP (PSI). Condition is bigger, threshold is set to 20 and hysteresis is set to 1. Begin delay is set to 1 and end delay is set to 0.

When the MAP value will go over 20 psi for at least 1 second the alarm will be generated. Because there is a hysteresis value set to 1. The value must go under 19 psi for 0 seconds for the alarm to end. When the alarm is active, the LED ring will blink in red quickly. As soon as the value is under 19 psi, the gauge will display the previous real time screen.

**Universal Gauge Configuration Page**

Home    Config.    Inputs

Alarms    Upgrade    Admin

Select an alarm to edit configuration.

Smaller number = Higher priority. This mean, if multiple alarms are active at the same time, the priority alarm will be displayed over the others

Alarm 1 ▾

Name: Alarm

Channel: Volt ▾

Condition: ▾    Threshold: 10.500    Hys: 0.000

Second condition: Disabled ▾

Channel: Disabled ▾

Condition: ▾    Threshold: 0.000    Hys: 0.000

Delays are in seconds

Begin delay: 0.000    Ending delay: 0.000

LED Ring Blink Mode: Fast blink ▾

LED Color:

Output to gnd:

Require ack:

Save alarms before configuring the next one

Save Settings

## 6 Accessories and Sensors

### 6.1 Perfect Tuning Wideband controller:



Wires color of the Perfect Tuning wideband controller.

Color	Function
Red	12v with 5A fuse.
White	Power ground. Connect to the same ground of the gauge.
Black	Sensor ground. Connect to the same ground of the gauge.
Green	0-5v linear output connected to any analog inputs of the gauge.
Orange	Narrowband output is unused

Blue	Led output for the heater is unused.
------	--------------------------------------

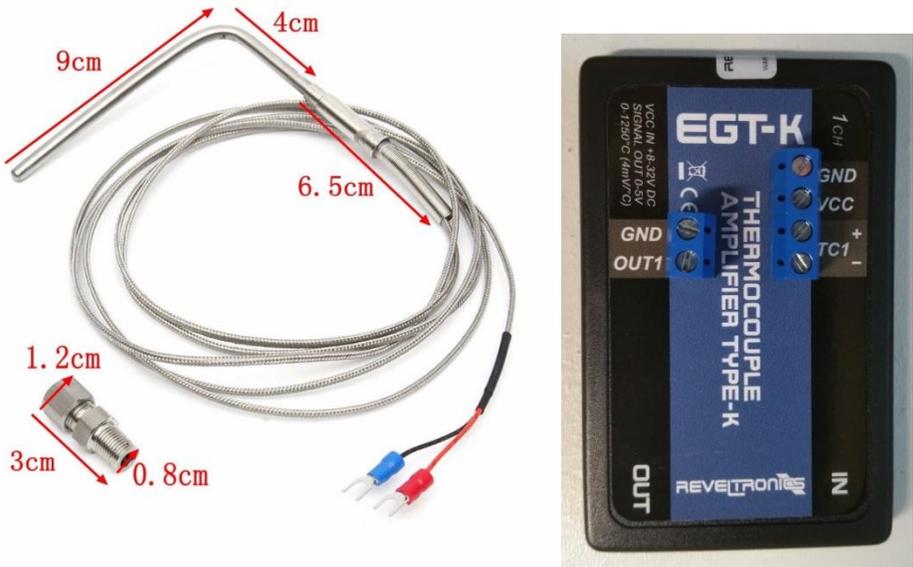
**6.1.1 Calibration procedure**

When the wideband sensor is selected in the Inputs configuration menu, a reboot will be required for calibration. This will work only with the Perfect Tuning wideband controller. To cancel this calibration, press both buttons during the calibration sequence.

**6.2 EGT**

Power the EGT-K controller VCC pin to 12v and GND to ground. Connect the OUT1 to any analog input of the gauge (white, yellow or pink wire) and the output GND to the black wire of the gauge.

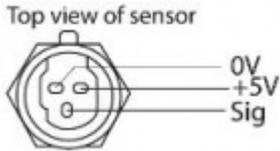
Connect the EGT probe black wire to the TC1- pin and red wire to TC1+.



**6.3 Oil pressure sensor**

The oil pressure sensor is compatible with oil, fuel, water or air pressure. Accuracy: within 1.5% of reading (full scale). Thread: 1/8"-27 NPT. Wiring connector: water sealed quick disconnect. Mating connector and wire harness (pigtail) are included.

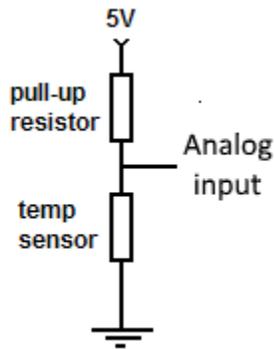
Red	5v (blue wire of the gauge)
Black	Ground (black wire of the gauge)
Blue	Signal (white, yellow or pink wire of the gauge).



## 6.4 Oil, coolant and air temperature sensor

Thermistors must be connected with a 1k provided pull up resistor to 5v and grounded at the same place where the gauge is grounded.

Resistor is connected to the blue wire of the gauge (5v output) and the other side is connected to any input (white, yellow or pink wire). Thermistor is connected to the same analog input and the other pin to the black wire of the gauge. The polarity of the resistor and thermistor is not important.



Configuration:

- Select "Oil temp" if the sensor looks like this



even sensor is

- Select GM CLT if the sensor looks like this:



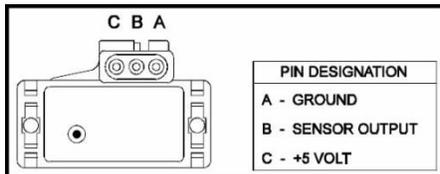
- Select GM IAT if the sensor looks like this:



## 6.5 Map sensors

### 6.5.1 GM 3 bar map sensor

The GM 3 bar (29 psi) and 4 bar (44 psi) must be connected this way. The 5v out is available on the blue wire of the gauge. NEVER CONNECT THE MAP SENSOR TO 12v. The ground pin must be connected to the black wire of the gauge. Sensor output can be connected to any of the three analog inputs of the gauge (white, yellow or pink).



## 6.6 12v Buzzer

A 12v buzzer can be used with the gauge to generate a sound when an alarm occurs. Connect the red wire of the buzzer to the positive 12v of the gauge and connect the black wire of the buzzer to the Output pin of the gauge (green).

Red	Connect to 12v
Black	Connect to gauge output green wire



## 7 12 Month Limited Warranty

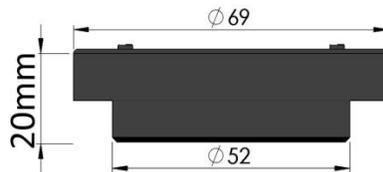
Opening the gauge will void the warranty.

Perfect Tuning warrants to the consumer that all products will be free from defects in material and workmanship for a period of twelve (12) months from the date of the original purchase. Damage cause by water is excluded. Products that fail within this 12-month warranty period will be repaired or replaced at Perfect Tuning's option, when determined by Perfect Tuning that the product failed due to defects in material or workmanship. This warranty is limited to the repair or replacement of the Perfect Tuning part. In no event shall this warranty exceed the original purchase price of the Perfect Tuning part nor shall Perfect Tuning be responsible for special, incidental or consequential damages or cost incurred due to the failure of this product. Warranty claims to Perfect Tuning must be transportation prepaid and accompanied with dated proof of purchase. This warranty applies only to the original purchaser of products 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. Perfect Tuning disclaims any liability for consequential damages due to a breach of any written or implied warranty on all products manufactured by Perfect Tuning. Warranty returns will only be accepted by Perfect Tuning when accompanied by a valid Return Merchandise Authorization (RMA) number. Products must be received by Perfect Tuning within 30 days of the date the RMA is issued.

Oxygen sensors are considered wear items and are not covered under warranty. Please note that before Perfect Tuning can issue an RMA for any electronic product, it is first necessary for the installer or end user to contact us at [support@perfecttuning.net](mailto:support@perfecttuning.net) to discuss the problem. Under no circumstances should a system be returned or a RMA requested before the above process transpires. Perfect Tuning will not be responsible for electronic products that are installed incorrectly, installed in a non-approved application, misused, or tampered with. Any Perfect Tuning electronics product can be returned for repairs if it is out of the warranty period. There is a minimum charge of \$50.00 for inspection and diagnosis of Perfect Tuning electronic parts. Parts used in the repair of Perfect Tuning electronic components will be extra. Perfect Tuning will provide an estimate of repairs and receive written or electronic authorization before repairs are made to the product

## 8 Dimensions

The gauge fits in a 52 mm pod but the overall dimension is 69 mm



## 9 Contact

If you found a bug, have suggestions, issues, or questions, you can contact us at [support@perfecttuning.net](mailto:support@perfecttuning.net). We can give remote desktop and phone support. Just contact us by email first.

## 10 Compatible accessories:

- Wideband controller with Bosch LSU 4.9 sensor.
- Fast response GM intake air temperature sensor (open element IAT)
- GM intake air temperature sensor or coolant temperature sensor (close element).
- Generic oil or coolant temperature sensor (1/8 NPT).
- Exhaust gas temperature sensor. Up to 1250 Celsius with interface board.
- Oil, fuel, air, water pressure sensor in different range from 100 psi to 2500.
- MAP sensors 1, 3 or 4 bar.
- Dash mount gauge holder

Visit <http://perfecttuning.net> for more information or contact us at [support@perfecttuning.net](mailto:support@perfecttuning.net).