

Figure 1: Throttle potentiometer (front and side view)

Introduction

Aim instruments can measure the relative displacement between two different points using a sensor (potentiometer) directly connected to the two measure points.

This sensor may be used to measure angular displacements, such as:

- Throttle position.

Installation notes

This sensor has been designed to measure rotational displacements between a fixed point, called “reference point”, and a movable one.

The first installation step consists in fixing the potentiometer to the chassis using two M3 screws or a self-made iron bracket. Once mounted the sensor on your car, you can connect rotating cursor to the throttle.

Please ensure that, when the throttle is in its “zero position” (i.e. when the throttle is not pressed), the potentiometer is in its “zero position” too and, when the throttle is completely pressed, the potentiometer is not in its “upper boundary” position.

This instrument’s mechanical measure range goes up to 130°, while the electrical measure range goes up to 106°.

Please, do not exceed the instrument’s maximum measure range.

If you need to measure bigger displacements, please use a different sensor: an incorrect use may seriously damage the sensor.

Software

Once the potentiometer has been installed, it needs to be configured. To correctly configure the potentiometer, please use **Race Studio 2**, the software properly developed by Aim to configure its instruments and analyze stored data.

Race Studio 2

In **Race Studio 2** main window you can choose the instrument where you wish to install the angular potentiometer (EVO 3, Drack, MyChron 3 Gold CAR, MyChron 3 Gold XG...). Once selected the gauge, please press “System manager” button.

Sensor configuration

Once reached “System manager” main window, please press “Channels” button to set the sensors you have installed on your vehicle. The following screenshot appears.

Channel	Enabled	Channel name	Sampling	Sensor type	Minimal	Lower bound	Upper bound	Factor 1	Factor 2
1 RPM	Enabled	Engine	10 Hz	Engine rotation speed	rpm	0.000	3500.000	1.000	3500.000
2 SPD_1	Enabled	Speed_1	10 Hz	Speed	km/h	0.000	250.000	1000.000	1.000
3 SPD_2	Enabled	Speed_2	10 Hz	Speed	km/h	0.000	250.000	1000.000	1.000
4 CH_1	Enabled	Channel_1	10 Hz	Zero based potentiometer	mm	0.000	150.000		
5 CH_2	Enabled	Channel_2	10 Hz	Mid zero potentiometer	mm	0.000	50.000		
6 CH_3	Enabled	Channel_3	10 Hz	Distance potentiometer	mm	0.000	150.000		
7 CH_4	Enabled	Channel_4	10 Hz	Temperature sensor	°C	0.000	500.000		
8 CH_5	Enabled	Channel_5	10 Hz	Mid zero potentiometer	mm	0.000	150.000		
9 CH_6	Enabled	Channel_6	10 Hz	Mid zero potentiometer	mm	0.000	500.000		
10 CH_7	Enabled	Channel_7	10 Hz	Lambda sensor	°C	0.000	150.000		
11 CH_8	Enabled	Channel_8	10 Hz	Lambda sensor NGK TL711	°C	0.000	500.000		
12 ACC_1	Enabled	Acc_1	10 Hz	Push plate sensor	g, G+	-1.000	3.000		
13 ACC_2	Enabled	Acc_2	10 Hz	Oil temperature sensor	g, G+	-1.000	3.000		
14 LOG_Temp	Enabled	Drivetrain_Temp	10 Hz	Coolant	°C	0.000	50.000		
15 BATT	Enabled	Battery	1 Hz	Battery	V, G+	0.000	15.000		

To set a sensor double-click in the box corresponding to “Sensor type” column and to “Ch_x” row (where x represents the channel number): a pop up menu like the one reported above appears.

You can choose between 3 different kind of potentiometers:

- Zero based potentiometer (recommended)
- Mid zero potentiometer
- Distance potentiometer

Note: if you select a “Distance potentiometer”, a new screenshot where you have to insert the “Total potentiometer travel” (106° in this case) appears.

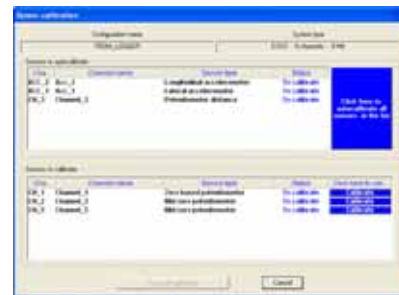
Once the correct potentiometer set, please transmit the configuration to your gauge by pressing “Transmit” button.

Calibration

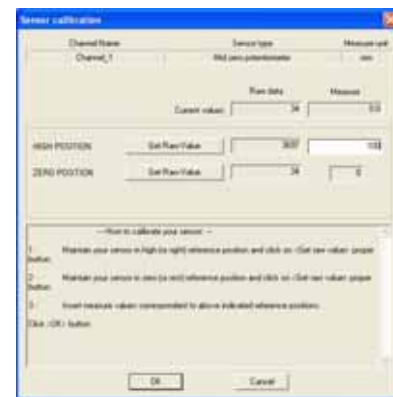
The configuration transmitted to the gauge, the potentiometer needs to be calibrated.

In this datasheet is described how to calibrate the **Zero based potentiometer** (recommended for throttle displacement acquisition).

Please click on “Calibrate” button: the screenshot on top of right column appears.



Press button “Calibrate” corresponding to the “Zero based potentiometer”: the following screenshot appears:



Follow this procedure to correctly calibrate the “Zero based potentiometer”:

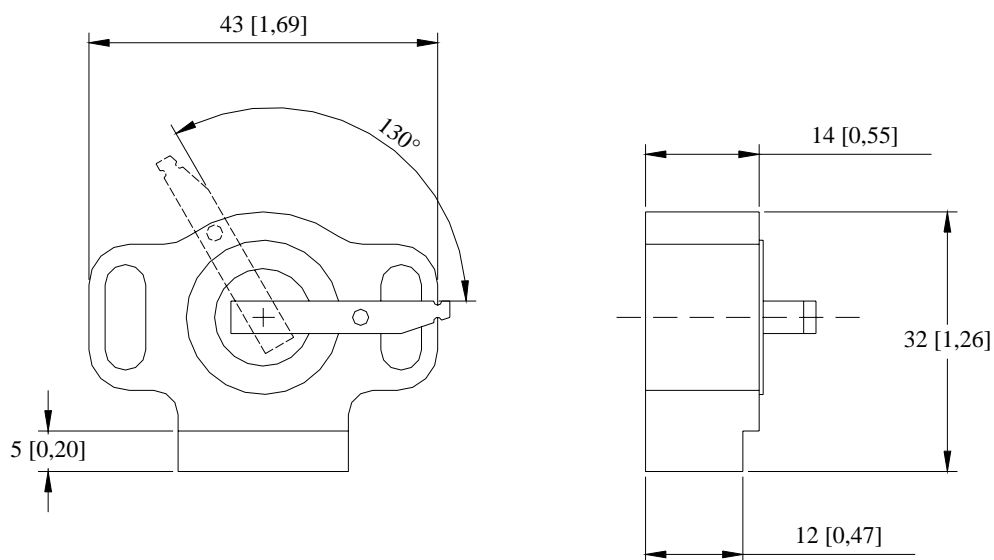
- Strongly push down the throttle pedal and press button “Get raw data” corresponding to “HIGH POSITION”;
- Remove the feet from the throttle pedal and press button “Get raw data” corresponding to “ZERO POSITION”;
- Insert the value you want to see when the throttle pedal is pushed down (usual value **100**);
- Press “OK”.

Once the sensor calibration procedure has finished, press the button “Transmit calibration”.



Please note: it is absolutely necessary to transmit the calibration, otherwise the logger will not be able to acquire correct data.

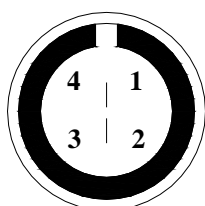
Dimensions



Dimensions in millimeters [inches]

Connector pinout

Pin	Function	Pin	Function
1	Analog signal 0-5 V	3	Not connected
2	GND	4	V reference (4.5 V)



4 pins Binder 719 male connector: solder termination view

Technical characteristics

Electrical characteristics	Value
Nominal Resistance	5 k Ω , linear
Tolerance	± 20 %
Linearity	± 2 %
Electrical travel	106°

Mechanical characteristics	Value
Mechanical travel	130°
Fatigue life	10 ⁶ complete cycles
Cable length	150 mm