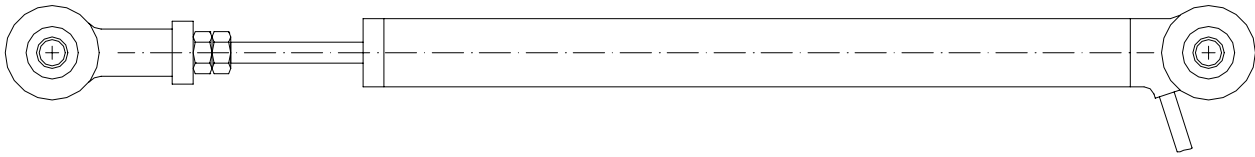


<b>SENSOR DOCUMENTATION</b>	<b>30/04/2003</b>	<b>DISPLACEMENT</b>	<b>Suspensions potentiometer</b>
Notes: <b>Suspensions potentiometer</b> technical documentation, dimensions and pinout.			



**Figure 1:** Suspension potentiometer (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 linear displacements, such as:

- Suspension spring cushion compression or extension.
- Steering column rotation measured by rack displacement.

## Installation notes

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

In order to get correct and accurate informations from the sensor, the potentiometer has to be fixed, using the two ball joints placed on the end points of the instrument.

When installing the sensor, Aim recommends to be very careful to avoid possible bendings of the internal cylinder: these bendings, caused by overtightened nuts or an uncorrect mounting, may seriously damage the sensor.

Aim also recommends, while installing the sensor, to extract the internal cylinder from the external one for about 5 mm (0.2 inches) starting from the sensor’s lower boundary position.

This biggest instrument’s measure range goes up to 150 mm (5.91 inches). If you need to measure bigger displacements, please use a different sensor: an incorrect use may seriously damage the potentiometer.

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

## Software

Once the potentiometer has been installed, it is necessary to configure it. In order to correctly configure the potentiometer, please use **Race Studio 2**, a software properly developed by Aim to configure your data logger and to analyze stored data.

## Race Studio 2

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

## Sensor configuration

Once reached the “Logger manager” main window, please press “Channels” button to set the sensors that you have installed on your vehicle. It will appear the following screenshot.

N	Channel ider	Enabled/Dis	Channel name	Sampling	Sensor type	Measur	Lower bound	Upper bound	Param. 1	Param. 2
1	RPM	Enabled	Engine	10 Hz	Engine revolution speed	rpm	0.000	20000.000	1.000	25000.000
2	SPD_1	Enabled	Speed_1	10 Hz	Speed	km/h	0.000	250.000	1666.000	1.000
3	SPD_2	Disabled	Speed_2	10 Hz	Speed	km/h	0.000	250.000	1666.000	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	Potentiometer distance	mm	0.000	150.000	100.000	
7	CH_4	Enabled	Channel_4	10 Hz	Potentiometer distance	°C	0.000	500.000		
8	CH_5	Enabled	Channel_5	10 Hz	Zero based potentiometer	mm	0.000	150.000		
9	CH_6	Enabled	Channel_6	10 Hz	Mid zero potentiometer	°C	0.000	500.000		
10	CH_7	Enabled	Channel_7	10 Hz	Lambda sond	°C	0.000	150.000		
11	CH_8	Enabled	Channel_8	10 Hz	Lambda sond NGK FL711	°C	0.000	500.000		
12	ACC_1	Enabled	Acc_1	10 Hz	DJ temperature Flarewall on	g 0.x	-3.000	3.000		
13	ACC_2	Enabled	Acc_2	10 Hz	Wagon temp [1210]	g 0.x	-3.000	3.000		
14	LOG_TEMP	Enabled	Datalogger_Temp	10 Hz	Cold part	°C	0.000	50.000		
15	BATT	Enabled	Battery	1 Hz	Battery	V 0.x	5.000	15.000		

To set a sensor it is necessary to double-click in the box corresponding to the “Sensor type” column and to the “Ch\_x” (where x represents the channel number) row: it will appear a menu like the one reported in the previous photo. It will be possible to choose between 3 different kind of potentiometers:

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

If you select a “Distance potentiometer” (recommended), it will appear a new screenshot where you have to insert the “Total potentiometer travel” (10 mm in this case).

Channel Name: Channel\_3    Sensor type: Potentiometer distance    Measure unit: mm

Parameters:

1 Maximum potentiometer used travel: 100

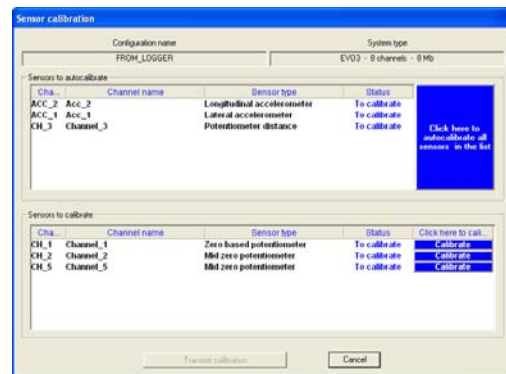
Buttons: OK, Cancel

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

## Calibration

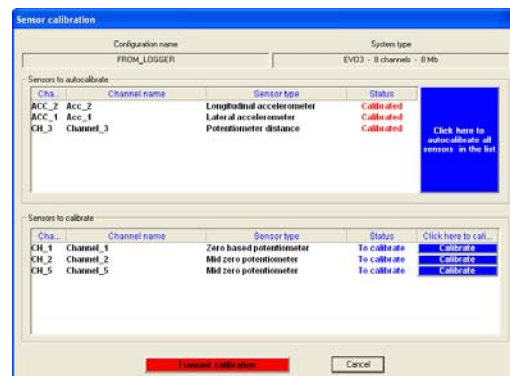
Once the configuration has been correctly transmitted to your gauge, it is necessary to calibrate the potentiometer. In this datasheet it is described how to calibrate the **Distance potentiometer** (recommended for suspension displacement acquisition).

Please click on the “Calibrate” button: it will appear the following screenshot



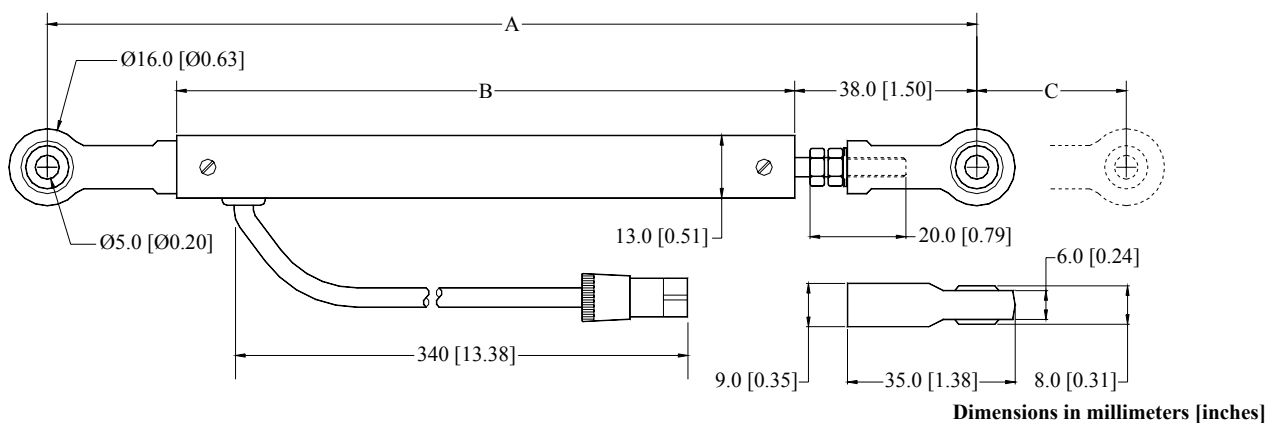
Press button “Click here to autocalibrate all sensors in the list”: the “Potentiometer distance” and the internal accelerometers will be automatically autocalibrated.

Once the sensor’s autocalibration procedure has finished, press the red button “Transmit calibration”, as shown in the following screenshot.



It is reminded that it is absolutely necessary to transmit the calibration, otherwise the logger will not be able to acquire correct data.

## Dimensions



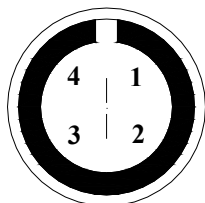
Dimensions in millimeters [inches]

## Dimensions table

Stroke Length (C)	A	B
50 mm (1.97")	193 mm (7.6")	129 mm (5.09")
75 mm (2.95")	218 mm (8.58")	154 mm (6.06")
100 mm (3.93")	243 mm (9.57")	179 mm (7.05")
150 mm (5.91")	293 mm (11.54")	229 mm (9.02")

## Connector pinout

Pin	Function	Pin	Function
1	Analog signal 0-5V	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	1 k $\Omega$ / 25 mm stroke
Operating mode	Voltage divider
Mechanical characteristics	Value
Operating temperature range	From $-50^{\circ}\text{C}$ to $+85^{\circ}\text{C}$
Maximum shaft velocity	1000 mm/s
Operating force	2.45 N horizontal
Measure range	Up to 150 mm
Cable length	300 mm