AiM Infotech

Throttle potentiometer

Release 1.03

This datasheet explains how to install and configure the throttle potentiometer for car/bike and shows its technical characteristics.

The throttle potentiometer **part number** is: **X05SNRP972**

1 Introduction

AiM instruments can measure the relative displacement between two different points using a sensor (rotary potentiometer) directly connected to the two measure points. This sensor may be used to measure angular displacements, such as throttle position.

2 Installation notes

The 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 the sensor mounted on your vehicle, you can connect the rotating cursor to the throttle or to the pedal or to other moving elements.

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 in its “high” position.

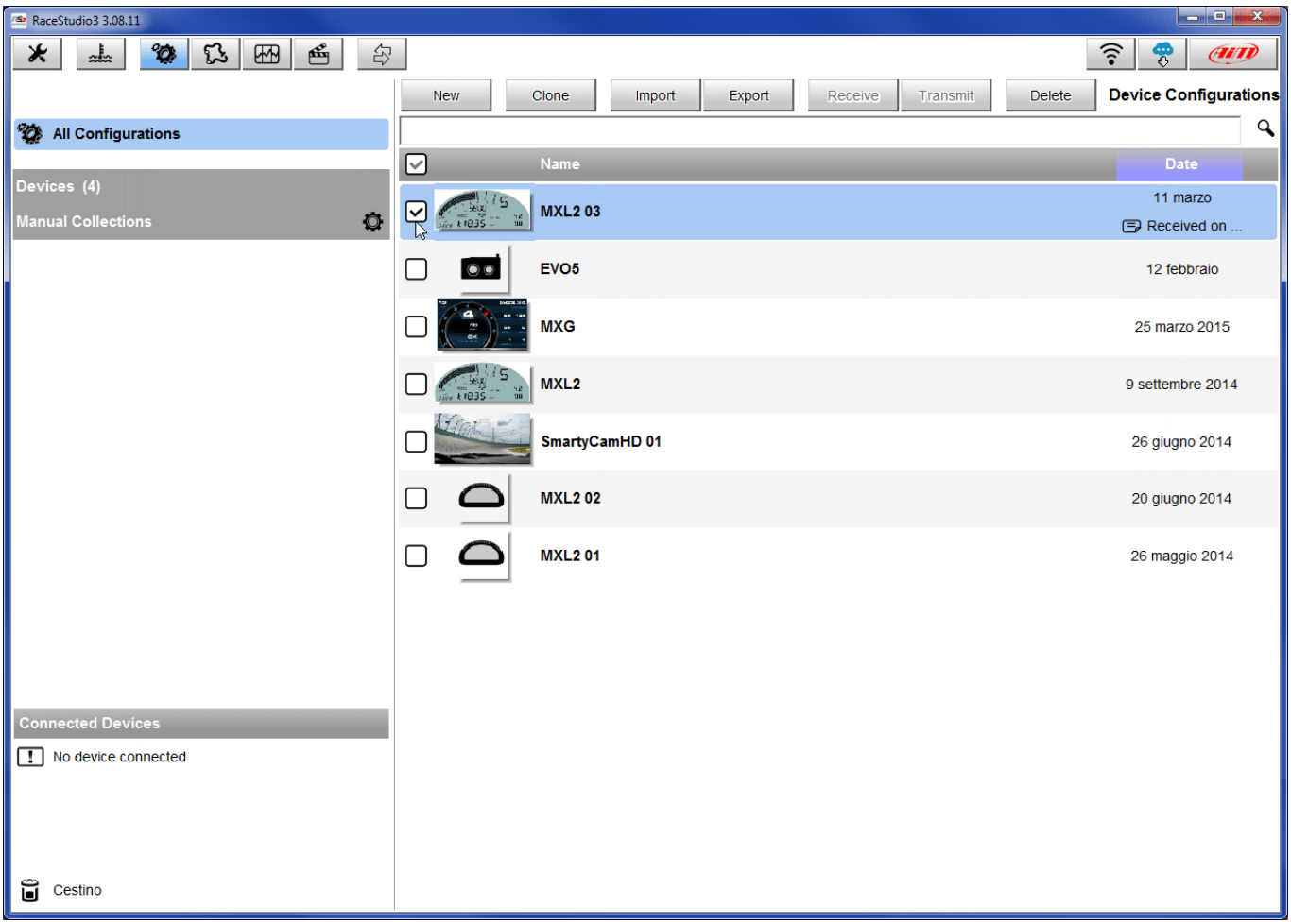
This instrument’s mechanical measure range goes up to 130°, while the electrical measure range goes up to 106°. **Please, do not exceed the instrument maximum measure range**. If you need to measure bigger displacements, please use a different sensor: an incorrect use may seriously damage the sensor.

3
Software setup

Once the potentiometer installed it is necessary to load it in the configuration of its logger and then calibrate it.

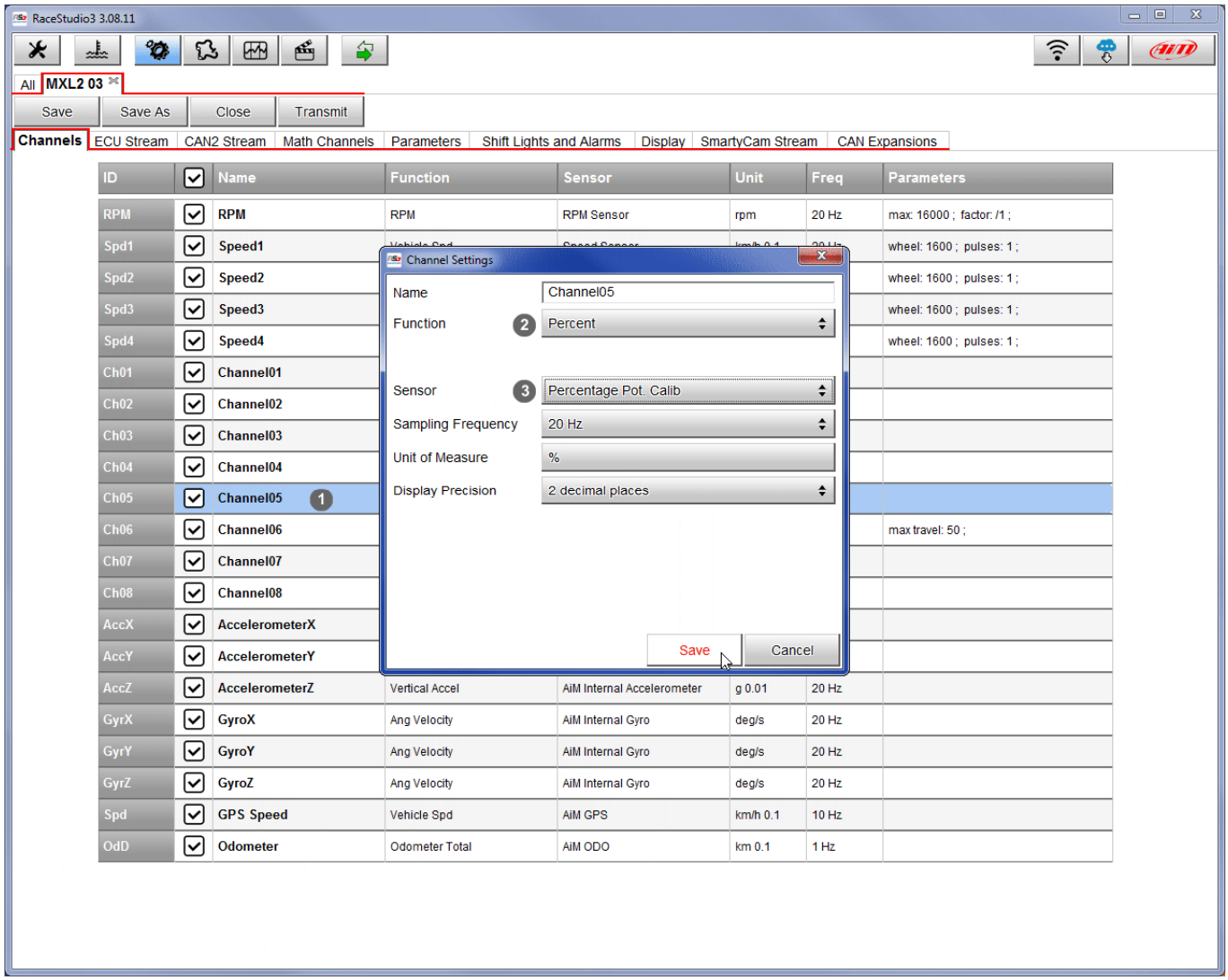
3.1
Setup with Race Studio 3

To load the potentiometer in the logger configuration run the software and select the configuration you are going to load it on.



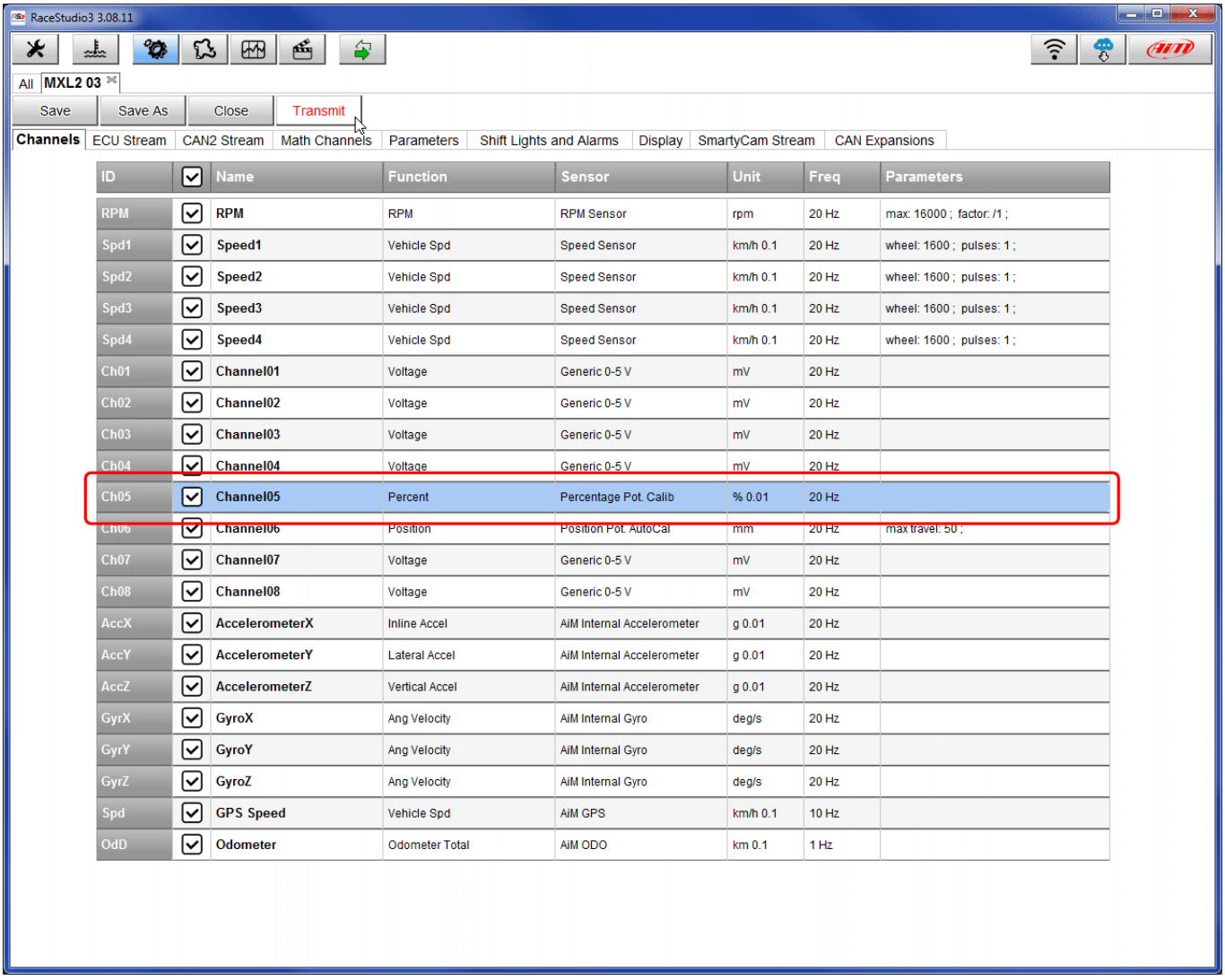
Enter the configuration (in the example MXL2 03) and the related "Channels" layer.

- Select the channel where to set the potentiometer on – in the example channel 5 (**1**) and fill in the panel that shows up
- Function: "Percent" (**2**)
- Sensor: "Percentage Pot. Calib" (**3** – this implies that the potentiometer will be calibrated as shown in the following pages)
- Fill in the other fields
- Click "Save"



When the software comes back to "Channels" layer the potentiometer has been set on the desired channel as shown here below.

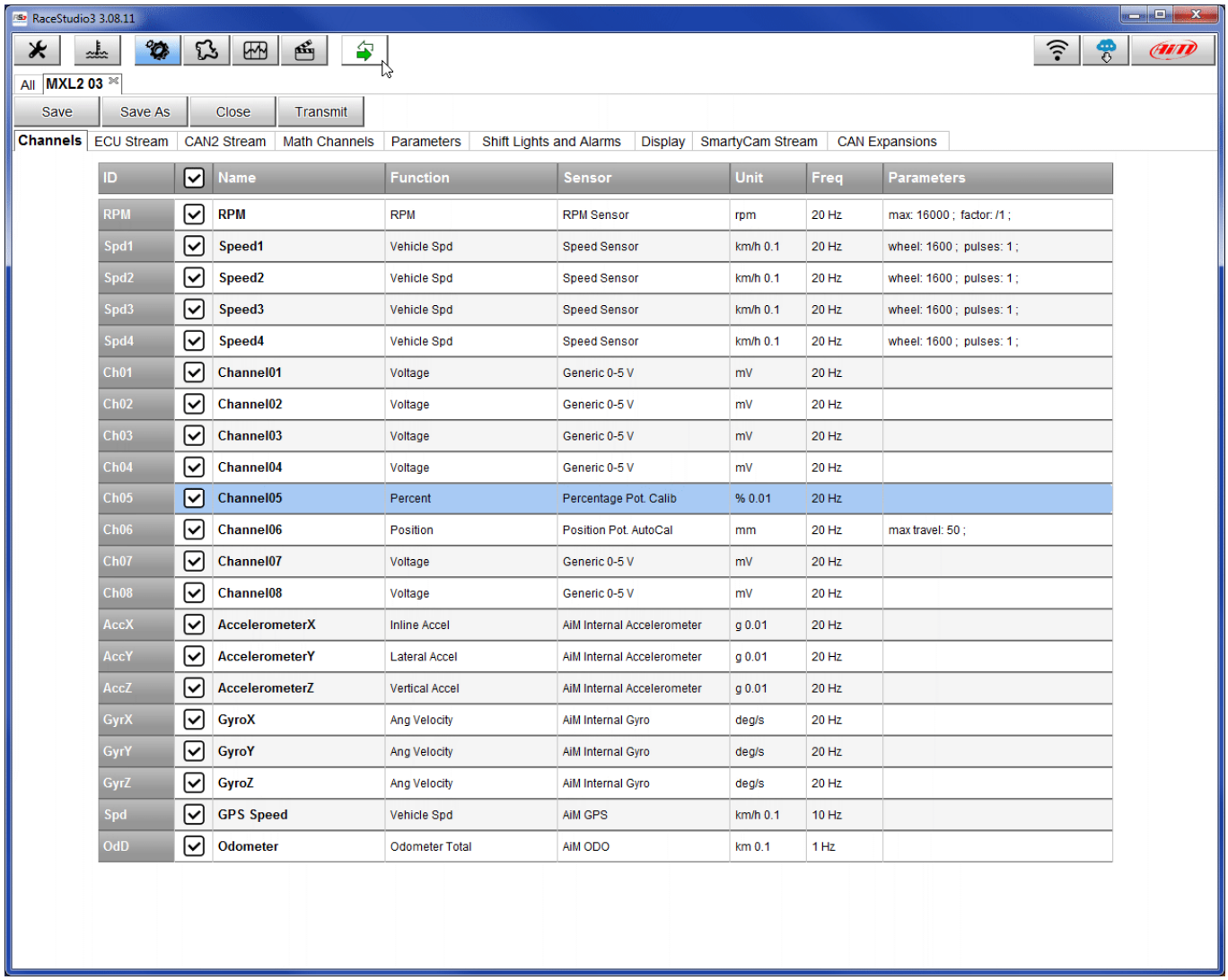
- Transmit the configuration to the logger pressing "Transmit" on the top keyboard.



ID	Name	Function	Sensor	Unit	Freq	Parameters
RPM	RPM	RPM	RPM Sensor	rpm	20 Hz	max: 16000 ; factor: /1 ;
Spd1	Speed1	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd2	Speed2	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd3	Speed3	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd4	Speed4	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Ch01	Channel01	Voltage	Generic 0-5 V	mV	20 Hz	
Ch02	Channel02	Voltage	Generic 0-5 V	mV	20 Hz	
Ch03	Channel03	Voltage	Generic 0-5 V	mV	20 Hz	
Ch04	Channel04	Voltage	Generic 0-5 V	mV	20 Hz	
Ch05	Channel05	Percent	Percentage Pot. Calib	% 0.01	20 Hz	
Ch06	Channel06	Position	Position Pot. AutoCal	mm	20 Hz	max travel: 50 ;
Ch07	Channel07	Voltage	Generic 0-5 V	mV	20 Hz	
Ch08	Channel08	Voltage	Generic 0-5 V	mV	20 Hz	
AccX	AccelerometerX	Inline Accel	AiM Internal Accelerometer	g 0.01	20 Hz	
AccY	AccelerometerY	Lateral Accel	AiM Internal Accelerometer	g 0.01	20 Hz	
AccZ	AccelerometerZ	Vertical Accel	AiM Internal Accelerometer	g 0.01	20 Hz	
GyrX	GyroX	Ang Velocity	AiM Internal Gyro	deg/s	20 Hz	
GyrY	GyroY	Ang Velocity	AiM Internal Gyro	deg/s	20 Hz	
GyrZ	GyroZ	Ang Velocity	AiM Internal Gyro	deg/s	20 Hz	
Spd	GPS Speed	Vehicle Spd	AiM GPS	km/h 0.1	10 Hz	
OdD	Odometer	Odometer Total	AiM ODO	km 0.1	1 Hz	

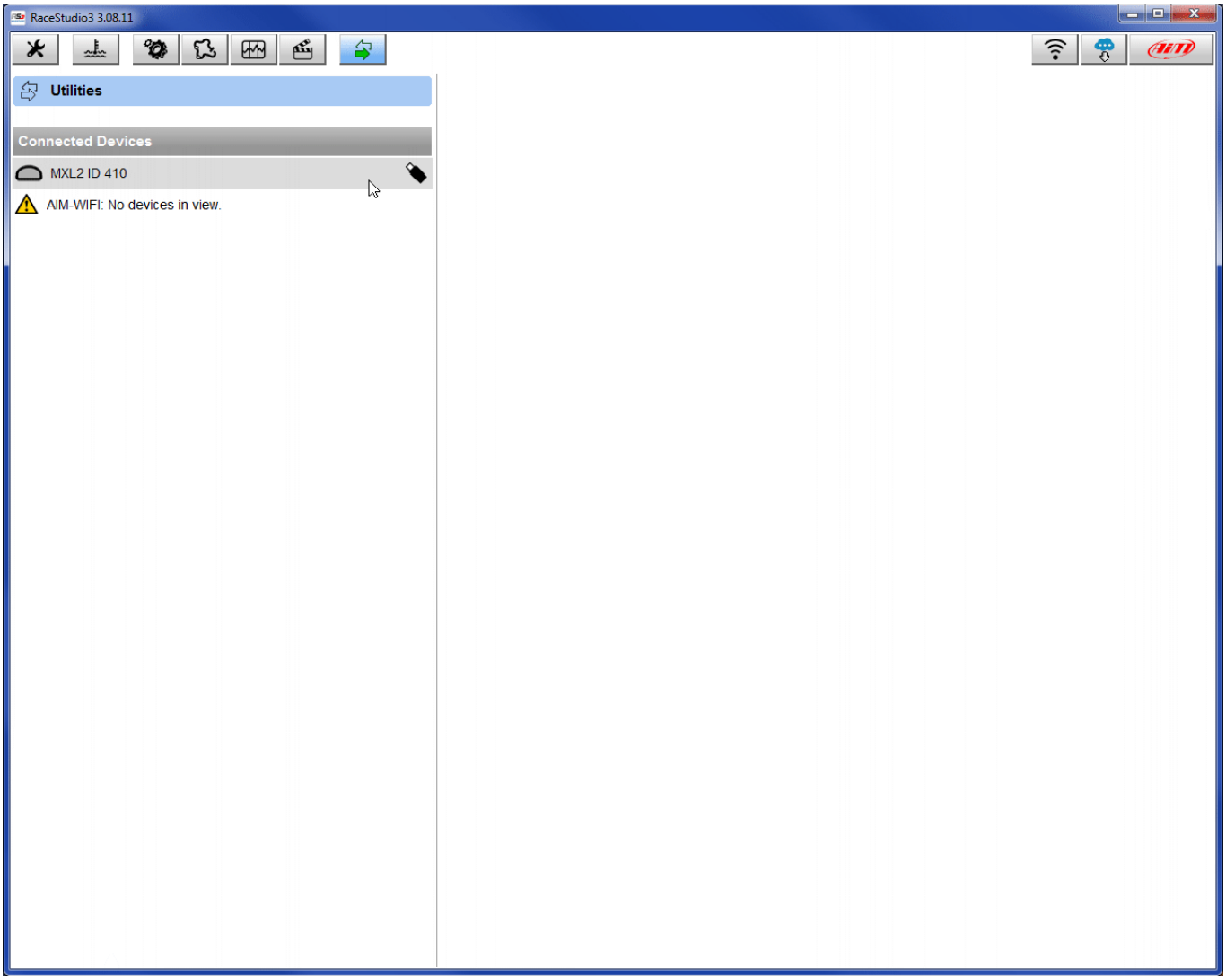
To calibrate the potentiometer:

- press "Device" on the top keyboard

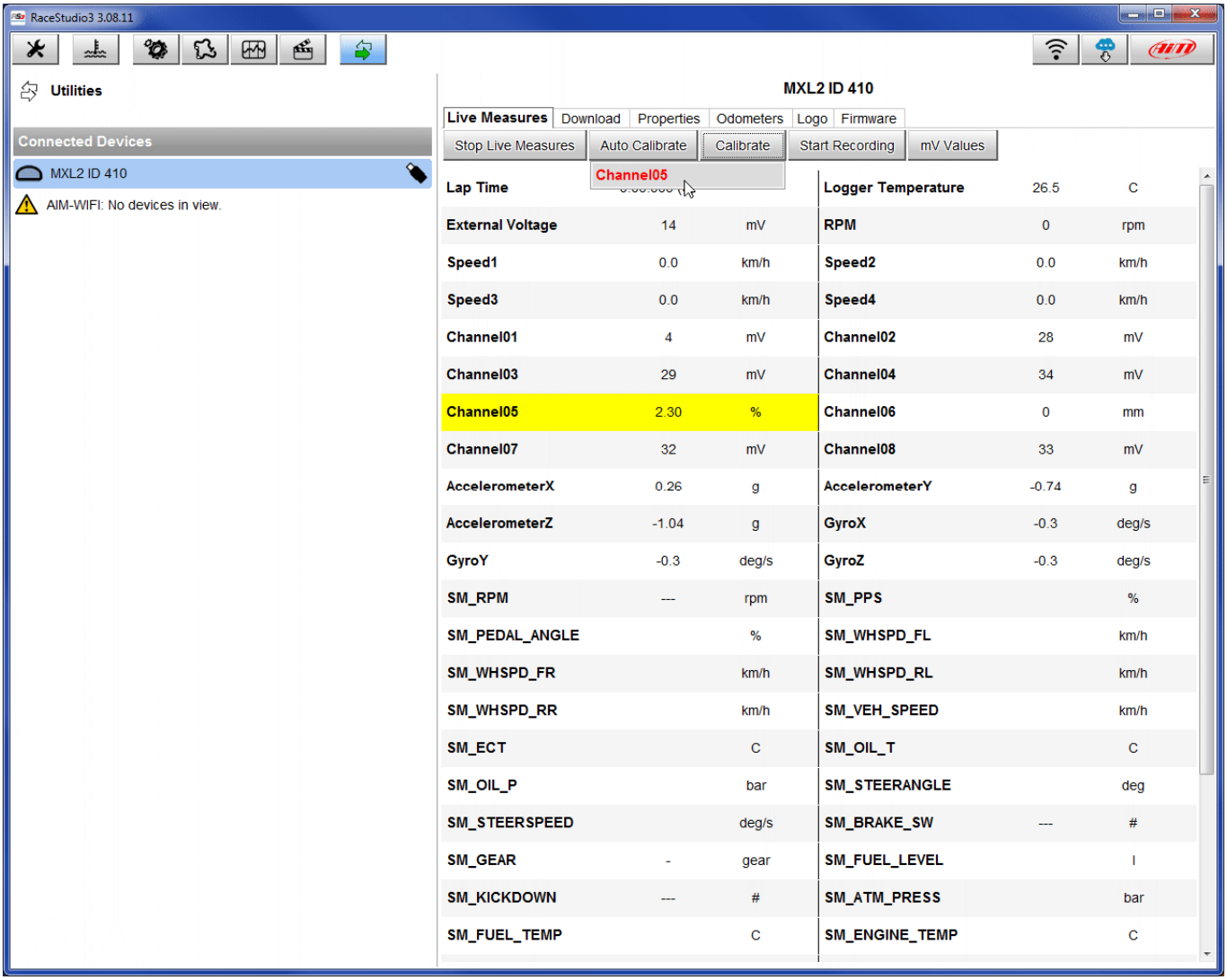


ID		Name	Function	Sensor	Unit	Freq	Parameters
RPM	☑	RPM	RPM	RPM Sensor	rpm	20 Hz	max: 16000 ; factor: /1 ;
Spd1	☑	Speed1	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd2	☑	Speed2	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd3	☑	Speed3	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd4	☑	Speed4	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Ch01	☑	Channel01	Voltage	Generic 0-5 V	mV	20 Hz	
Ch02	☑	Channel02	Voltage	Generic 0-5 V	mV	20 Hz	
Ch03	☑	Channel03	Voltage	Generic 0-5 V	mV	20 Hz	
Ch04	☑	Channel04	Voltage	Generic 0-5 V	mV	20 Hz	
Ch05	☑	Channel05	Percent	Percentage Pot. Calib	% 0.01	20 Hz	
Ch06	☑	Channel06	Position	Position Pot. AutoCal	mm	20 Hz	max travel: 50 ;
Ch07	☑	Channel07	Voltage	Generic 0-5 V	mV	20 Hz	
Ch08	☑	Channel08	Voltage	Generic 0-5 V	mV	20 Hz	
AccX	☑	AccelerometerX	Inline Accel	AiM Internal Accelerometer	g 0.01	20 Hz	
AccY	☑	AccelerometerY	Lateral Accel	AiM Internal Accelerometer	g 0.01	20 Hz	
AccZ	☑	AccelerometerZ	Vertical Accel	AiM Internal Accelerometer	g 0.01	20 Hz	
GyrX	☑	GyroX	Ang Velocity	AiM Internal Gyro	deg/s	20 Hz	
GyrY	☑	GyroY	Ang Velocity	AiM Internal Gyro	deg/s	20 Hz	
GyrZ	☑	GyroZ	Ang Velocity	AiM Internal Gyro	deg/s	20 Hz	
Spd	☑	GPS Speed	Vehicle Spd	AiM GPS	km/h 0.1	10 Hz	
OdD	☑	Odometer	Odometer Total	AiM ODO	km 0.1	1 Hz	

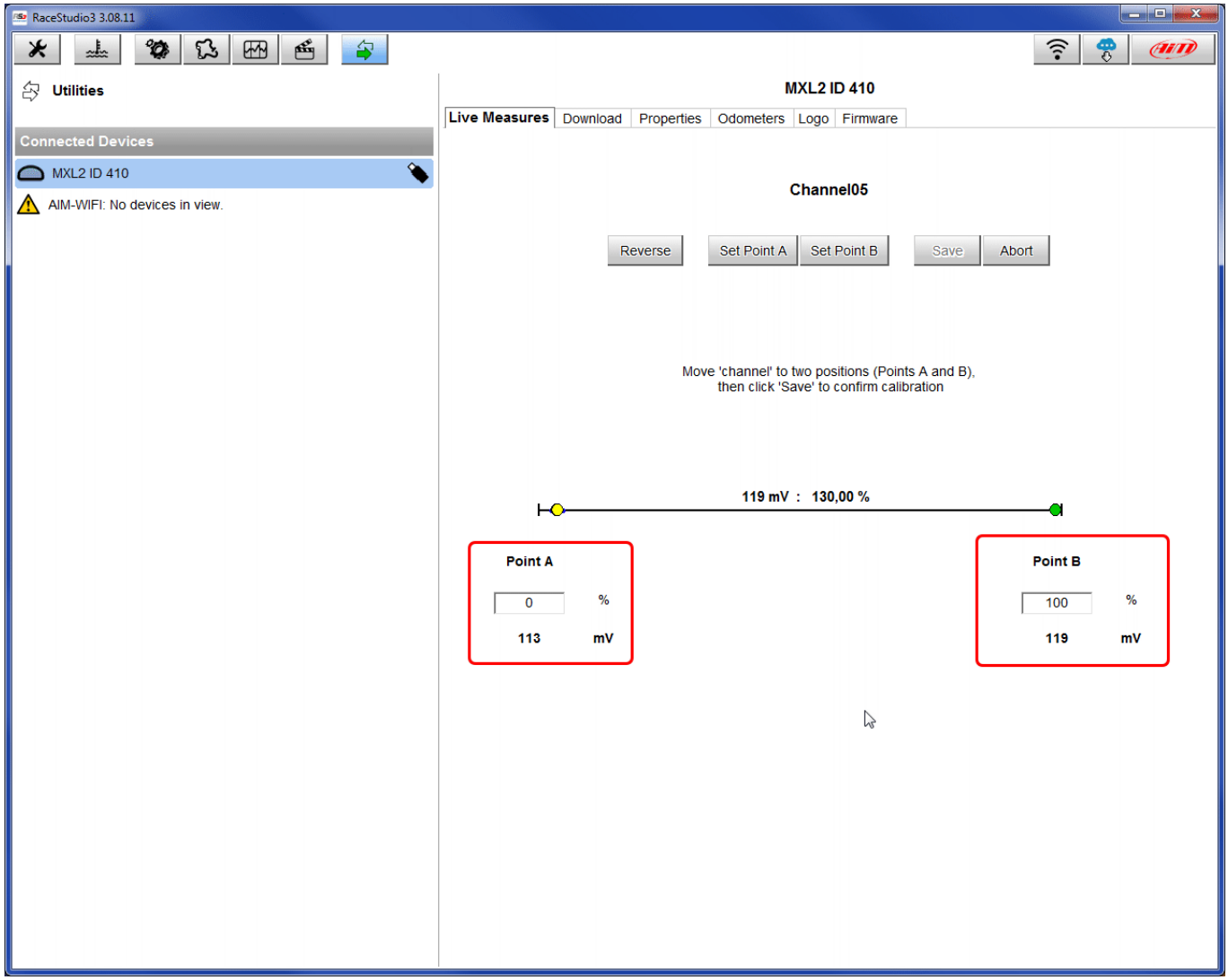
- select the configuration – in the example "MXL2 ID 410"



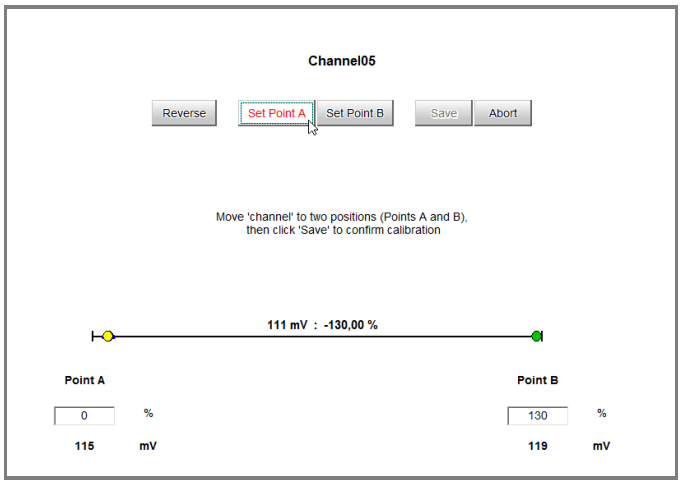
- press "Calibrate";
- the system shows all channels to be calibrated: choose the one where the potentiometer has been set – in the example "Channel 5"

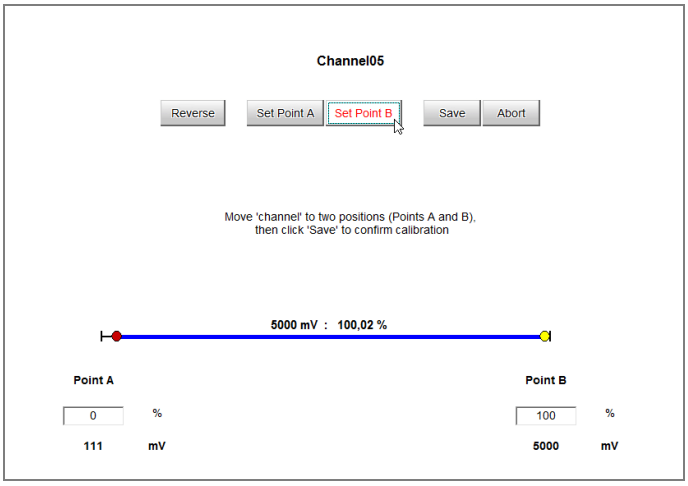


- fill in the values corresponding to the two measure points:
    - "0" for point "A"
    - "100" for point "B"



- with the potentiometer in its zero position press "Set Point A" as shown here below on the left;
- with the throttle all open press "Set Point B" as shown here below on the right
- press "Save"

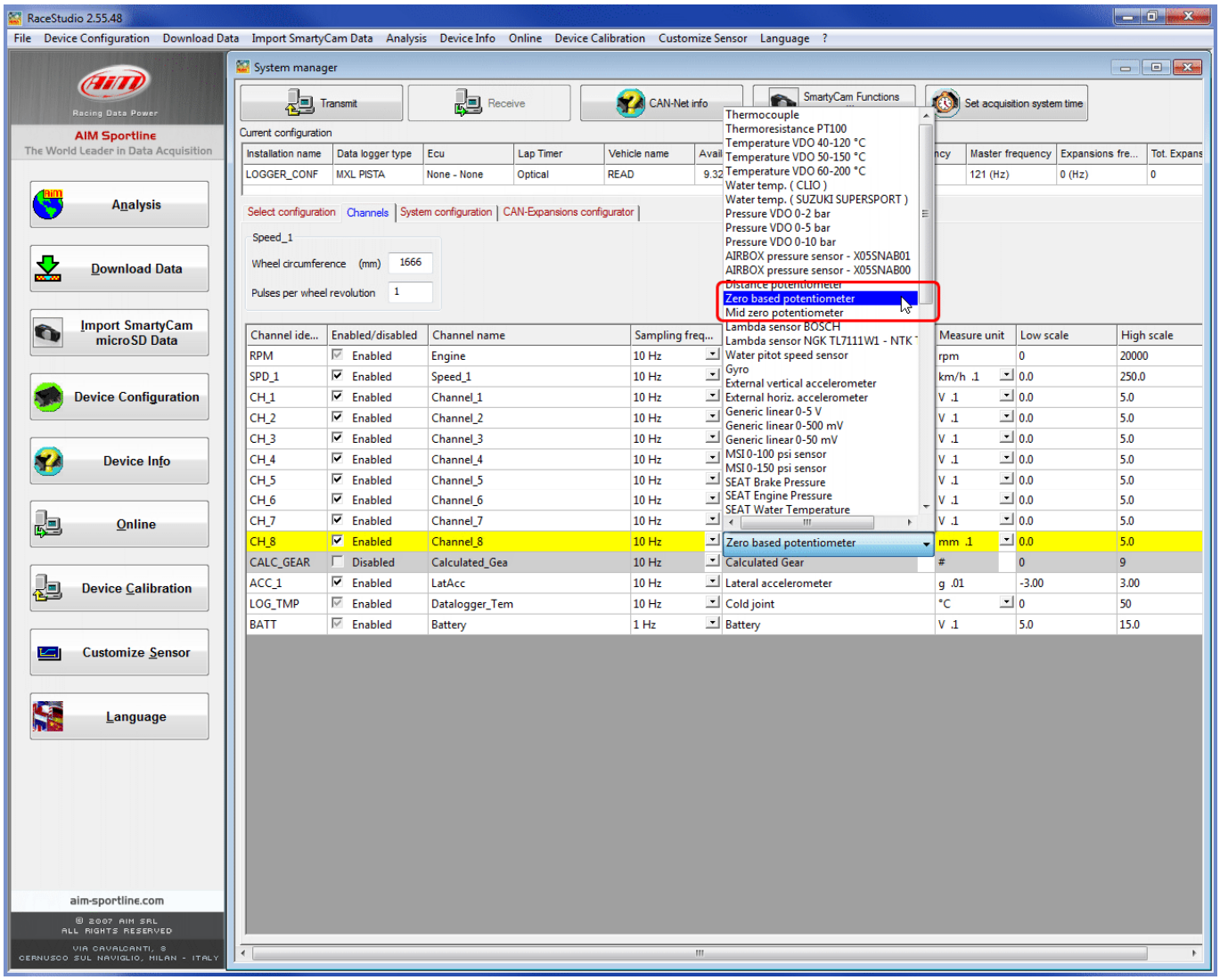




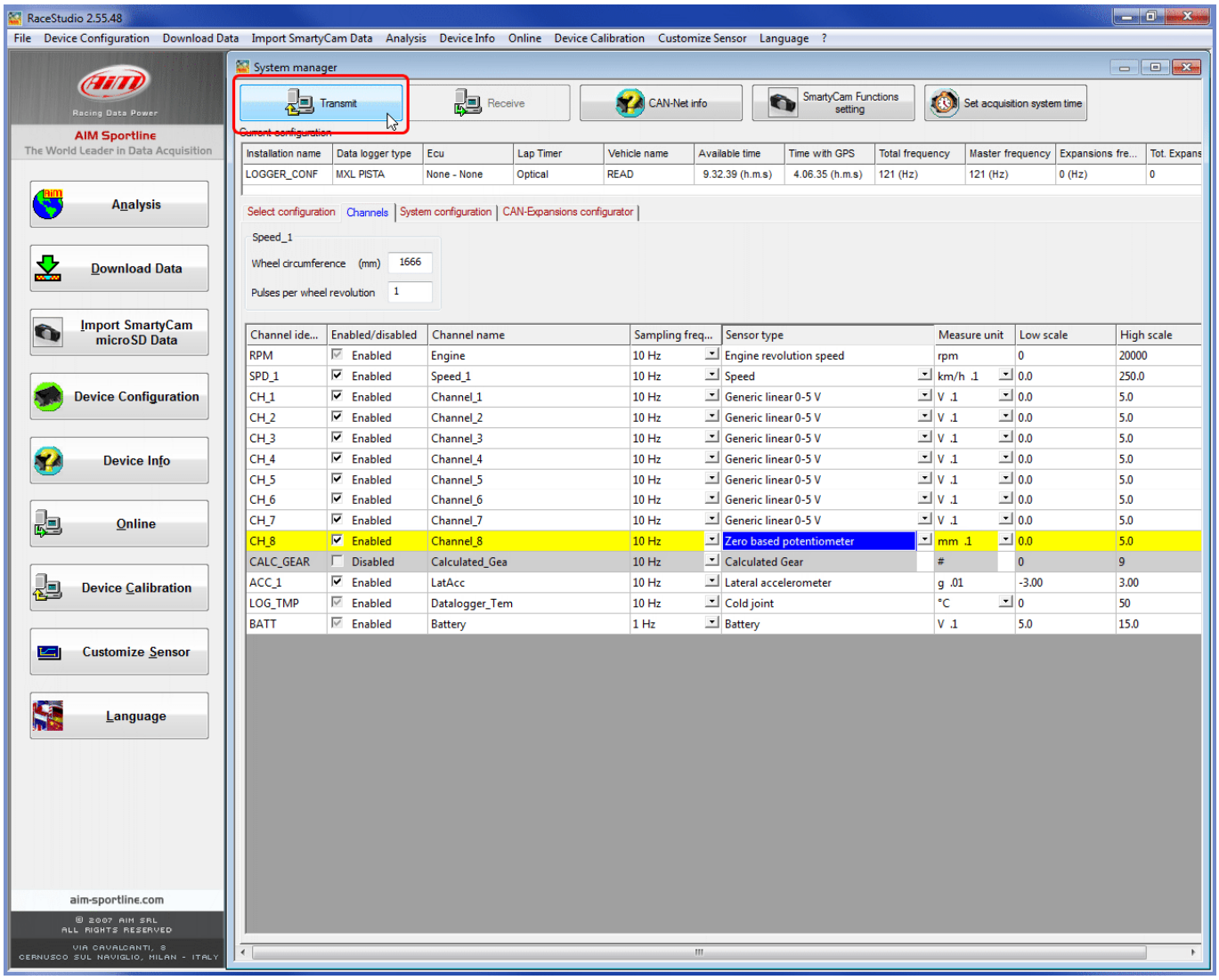
3.2
Setup with Race Studio 2

To load the potentiometer in AiM logger configuration:

- run the software
- select the logger in use and the configuration to set the potentiometer on
- enter "Channels" layer
- select the channel where to set the potentiometer on (in the example channel 8) and select "Zero based potentiometer" in "Sensor type" column as shown here below.

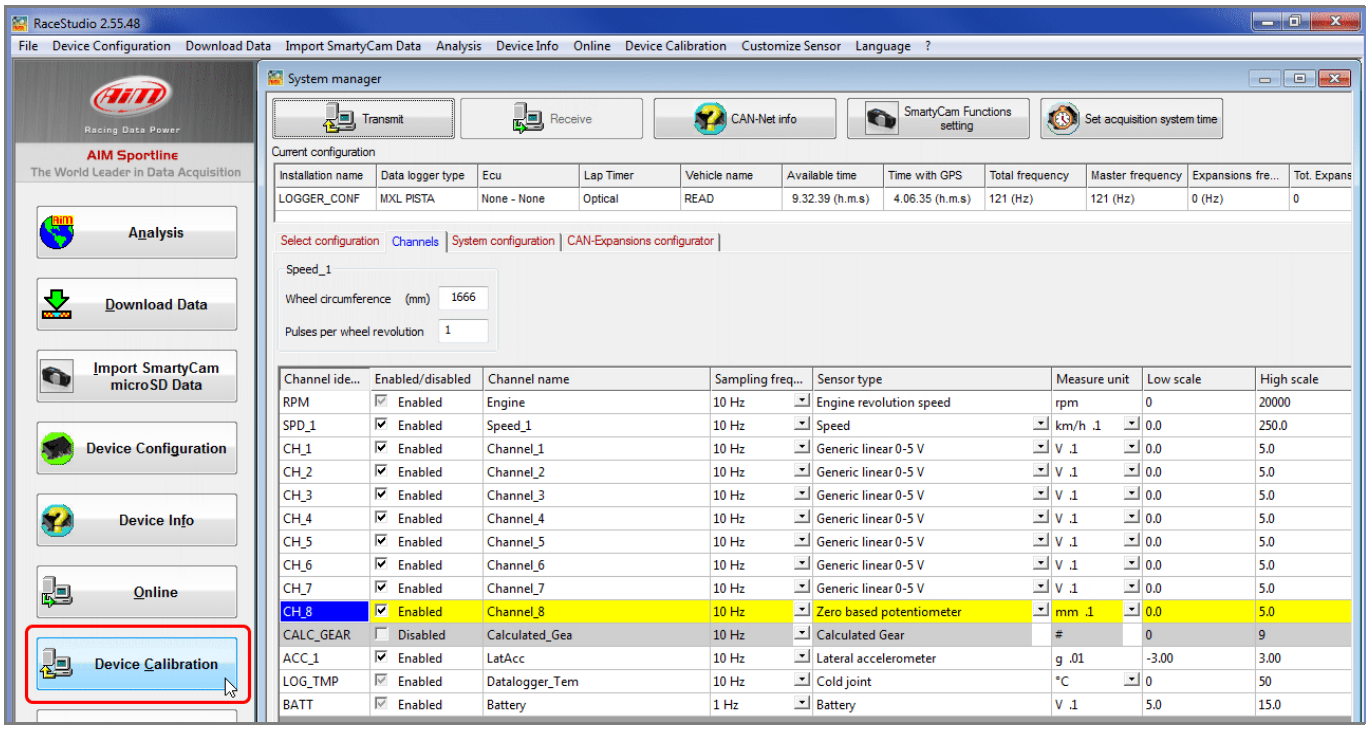


Transmit the configuration to the logger pressing "Transmission".



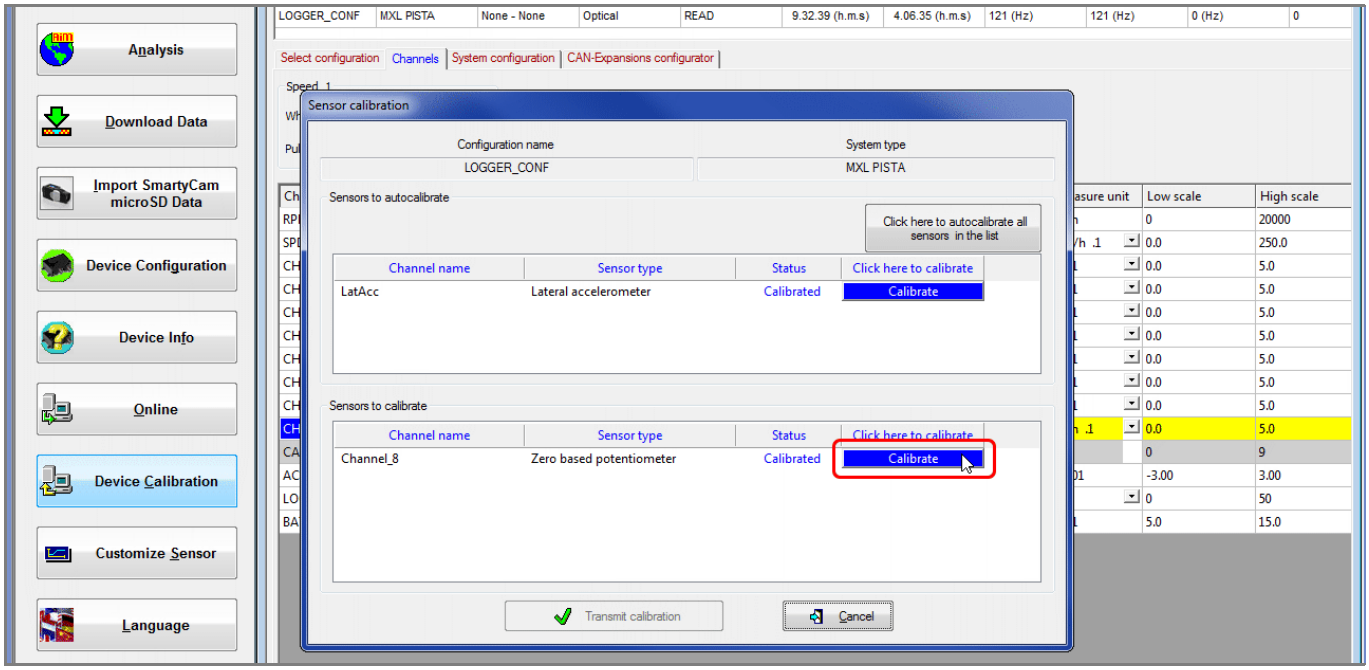
To calibrate the potentiometer:

- Press "Device Calibration"



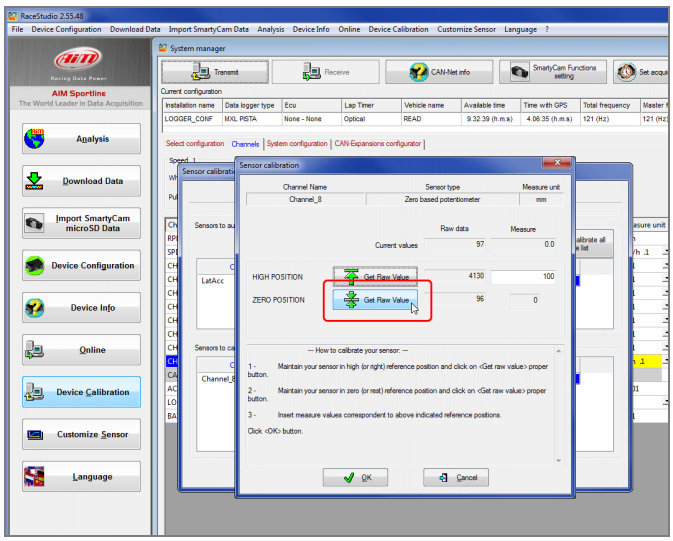
Calibration panel shows up:

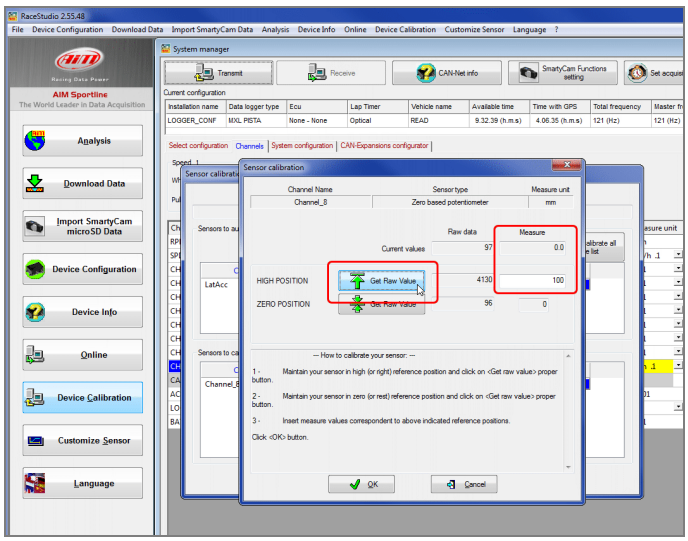
- Press "Calibrate" button of "Zero based potentiometer"



To learn the calibration points the software shows the related panel:

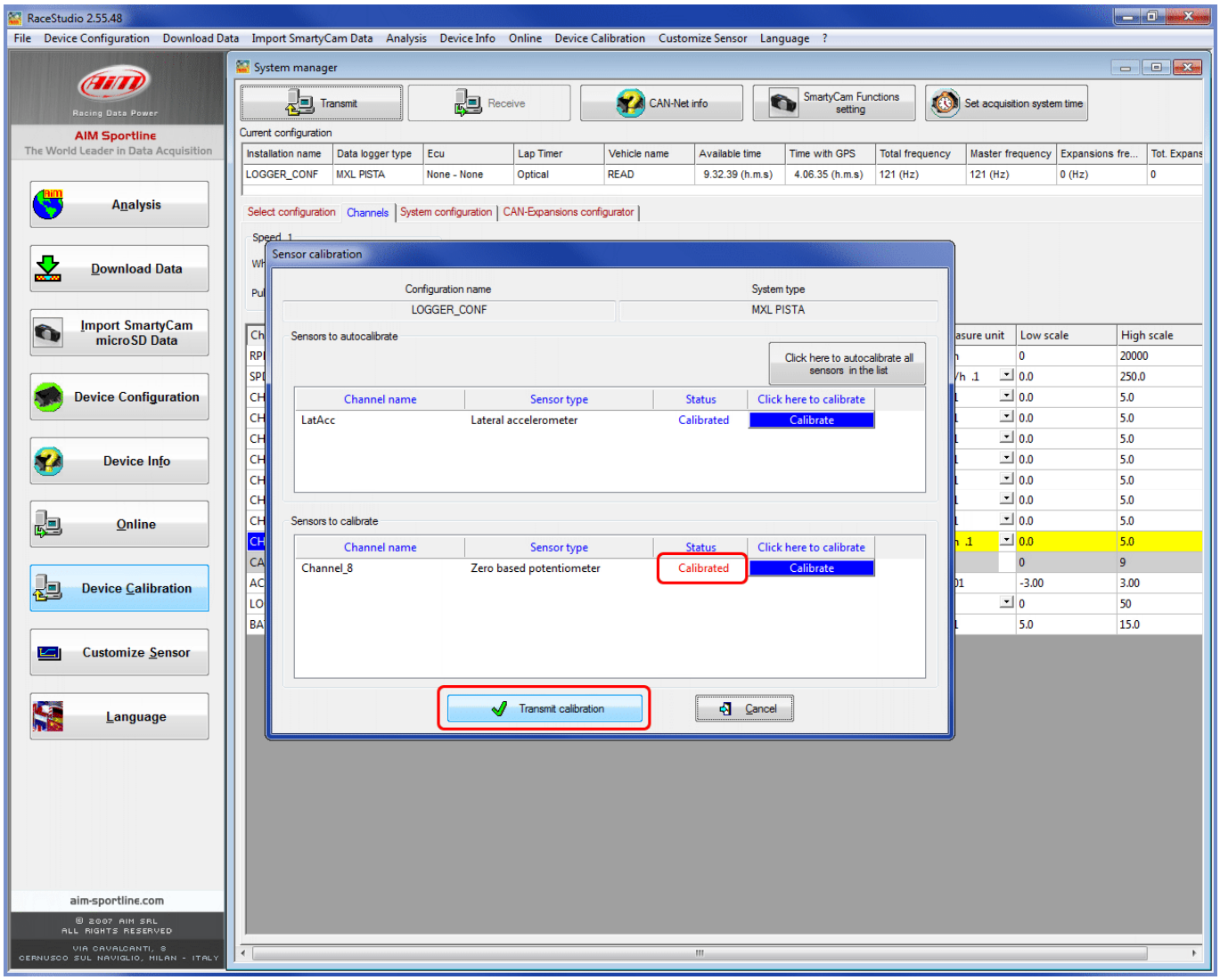
- with the throttle in its zero position press "Get raw value" corresponding to zero position (image here below on the left)
- with the throttle in its high position press "Get raw value" corresponding to high position, fill in the reference value in the related cells highlighted here below on the right
    - "0" for zero position
    - "100" for high position
- press "OK"





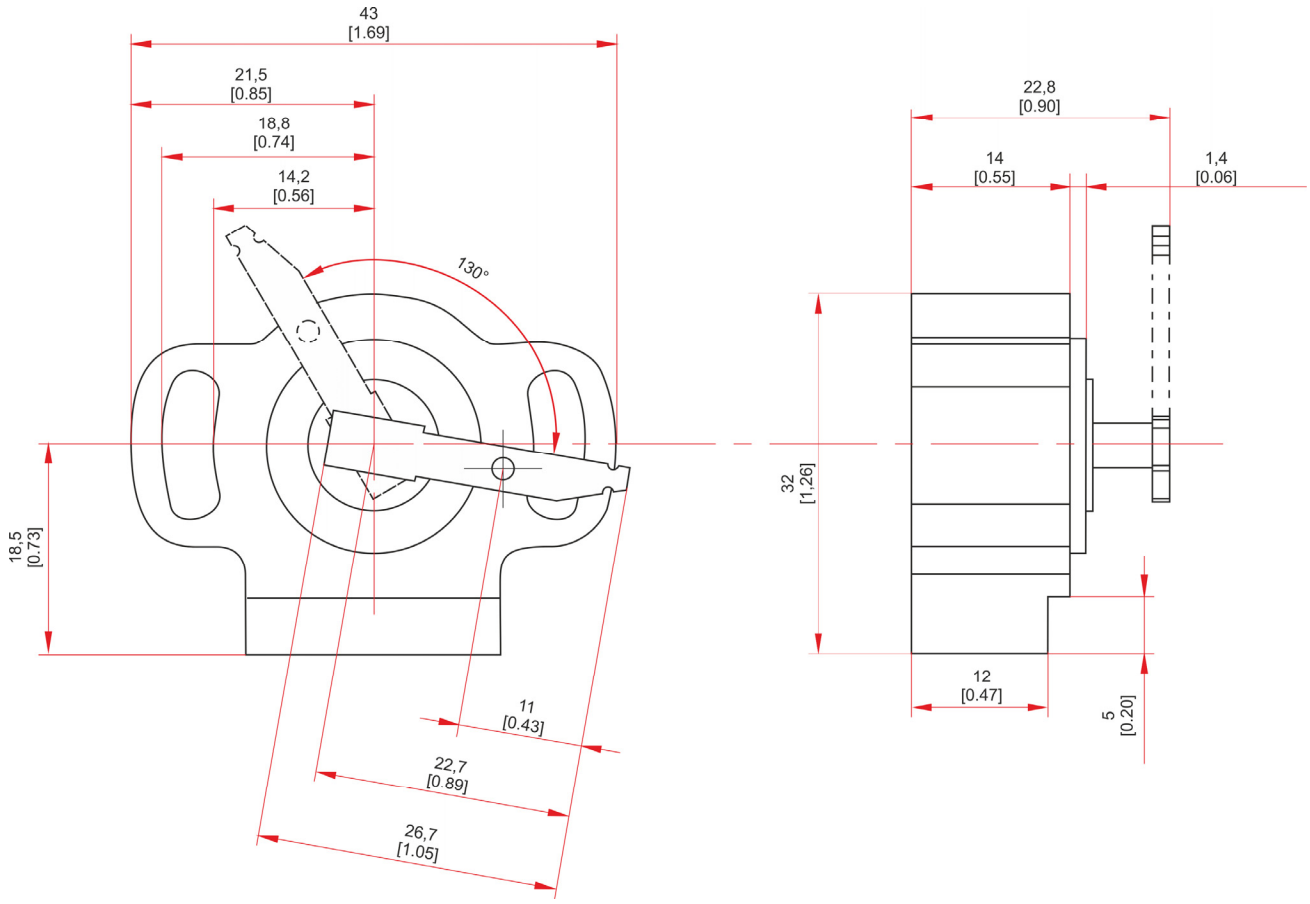
When calibration is over potentiometer status will turn to "Calibrated" and become red:

- Transmit the calibration to the logger pressing "Transmit Calibration"

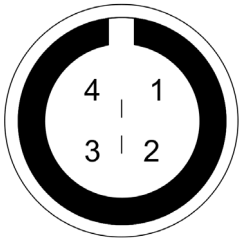


4
Dimensions, pinout and technical characteristics

The drawing here below shows the throttle potentiometer dimensions in mm [inches].



The potentiometer cable ends with a 4 pins Binder 719 male plastic connector. The image here below shows the connector pinout from solder termination view.



Binder connector pin	Function
1	Analog signal 0-5 V
2	GND
3	Not connected
4	Vreference (4.5V)

The potentiometer **electrical characteristics** are:

- nominal resistance: 5kΩ linear
- tolerance ±20 %
- linearity ±2 %
- electrical displacement 106°

The potentiometer **mechanical characteristics** are:

- mechanical displacement 130°
- fatigue life 10^6 complete cycles
- cable length 240 mm

5 Extension cables

The potentiometer comes with a 24 cm cable and standard lengths extension cables are available as optional; it is also possible to ask for specific length extension cables. Extension cables part numbers change according to their length and to the device the sensor is to be connected to.

Please note: extension cables are mandatory for connection with AiM Channel Expansion and EVO4.

Extension cable for connection with:

- Channel Expansion
- EVO4

Part numbers:
V02PCB05BTXG – cable length: 500mm
V02PCB10BTXG – cable length: 1000mm
V02PCB15BTXG – cable length: 1500mm
V02PCB20BTXG – cable length: 2000mm
V02PCB25BTXG – cable length: 2500mm
V02PCB30BTXG – cable length: 3000mm

Extension cable for connection with:

- MXG
- MXS
- MXL2
- EVO5
- MXL Strada
- MXL Pista
- MXL Pro05

Part numbers:
V02PCB05B – cable length: 500mm
V02PCB10B – cable length: 1000mm
V02PCB15B – cable length: 1500mm
V02PCB20B – cable length: 2000mm
V02PCB25B – cable length: 2500mm
V02PCB30B – cable length: 3000mm