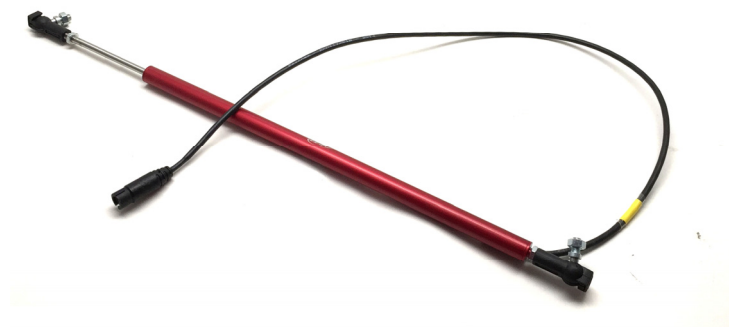


AiM Infotech

Car/bike linear
potentiometer diameter 9,5

Release 1.00



This datasheet explains how to install and configure the car/bike linear potentiometer 9,5 mm diameter and shows its technical characteristics.

1

Introduction

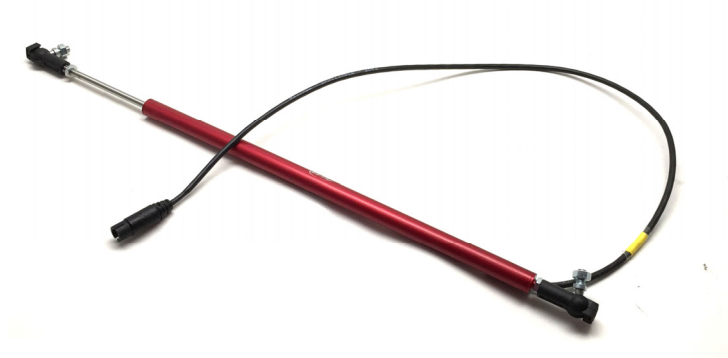
AiM loggers can measure the displacement between two points using a sensor (linear potentiometer) directly connected to the points of measure. This potentiometer can measure linear displacements like:

- dampers compression or extension
- steering rotation measured through the rack displacement

Different use implies different software management as explained in chapters 4 and 5.

2

Part numbers



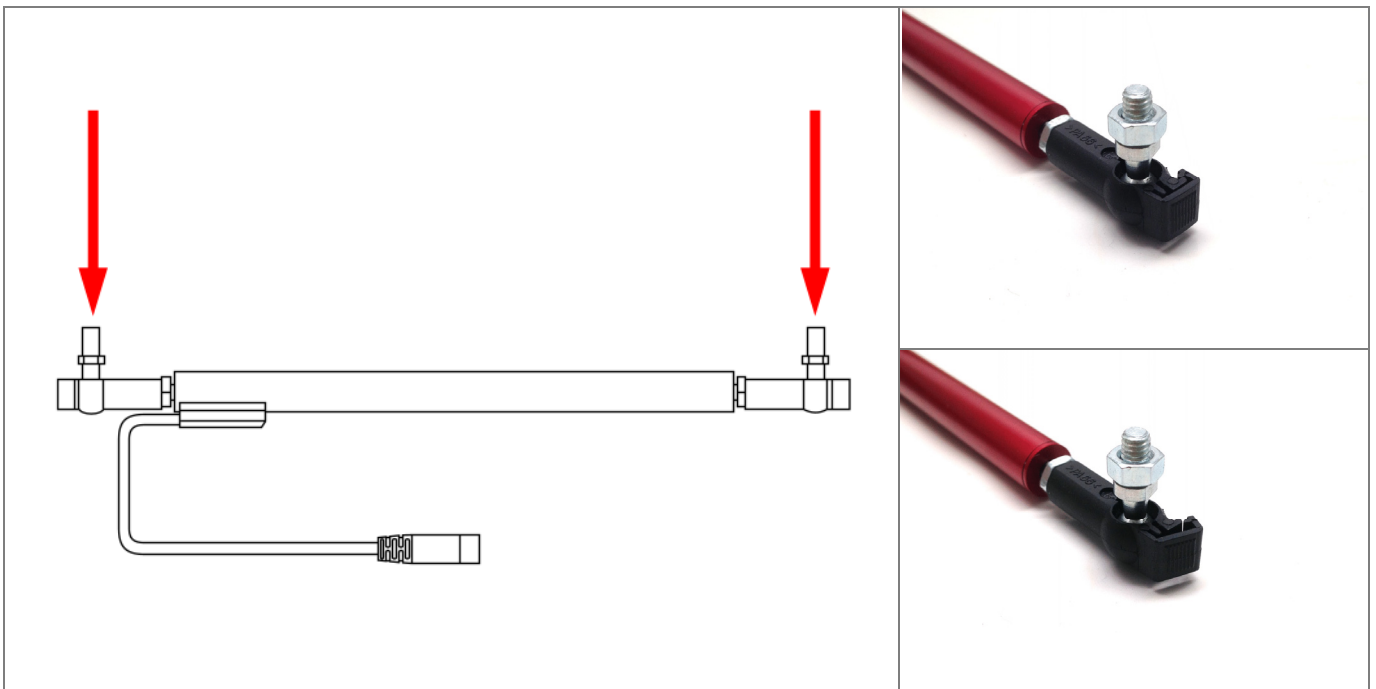
Car/bike linear potentiometer part numbers depends on its travel:

- 75 mm travel potentiometer **X05SNPJ075**
- 150 mm travel potentiometer **X05SNPJ150**

3

Installation

To fix the potentiometer use the two fixing points highlighted here below.



When installing the sensor:

- be very careful avoiding possible bending of the internal cylinder; these bendings, occurring when over tightening the screws or in case of incorrect mounting, can seriously damage the sensor
- extract the internal cylinder for about 5 mm (0.2 inches) from the sensor lower boundary position.
- if you need to open the two pop joints use the black plastic clip ; images here above on the right show the clip closed on top and open on bottom.

Please note: do not use this sensor to measure distances beyond the potentiometer maximum travel.

The car/bike linear potentiometer can be connected to any analog channel of AiM loggers.

4

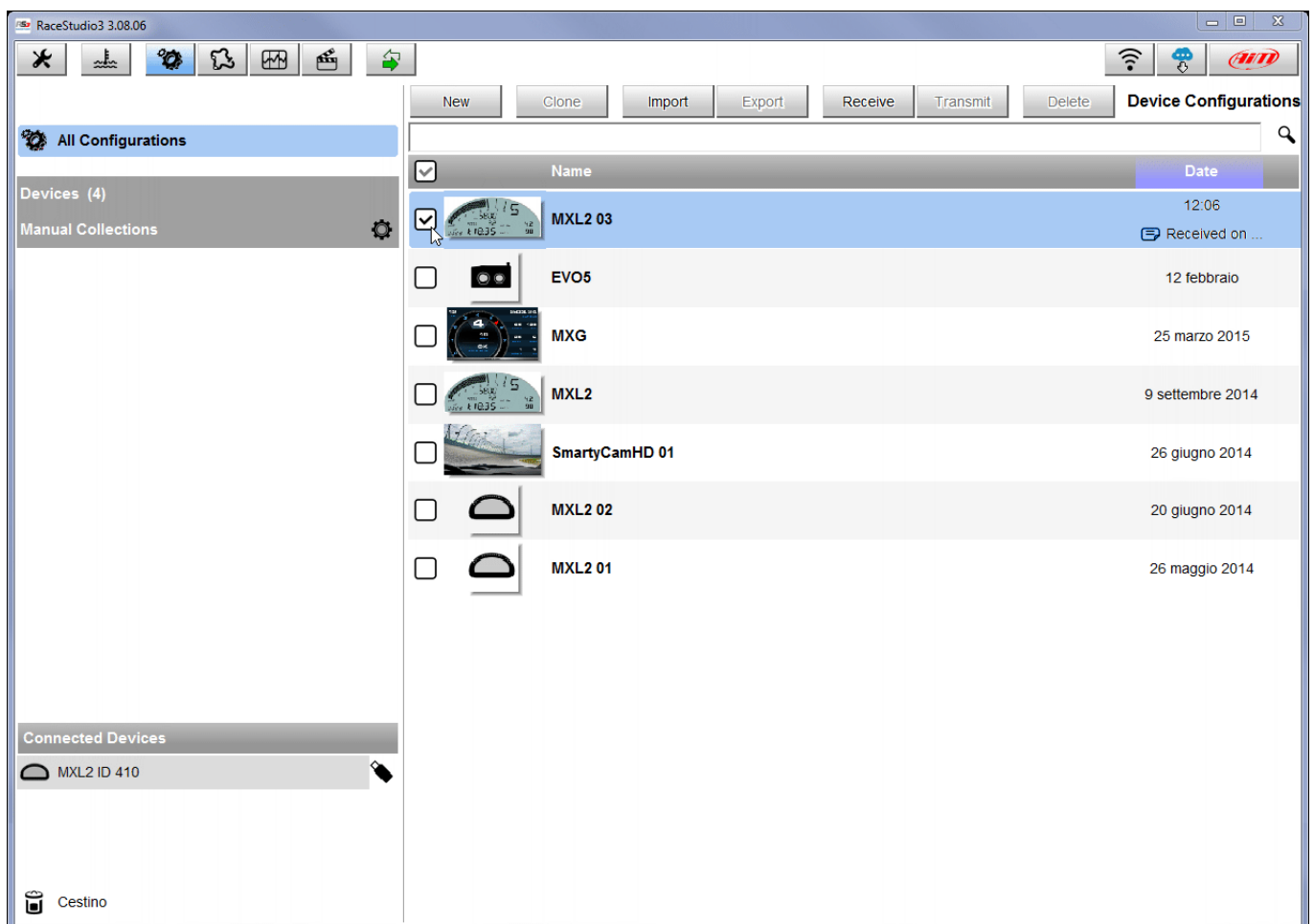
Software setup – suspensions

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

4.1

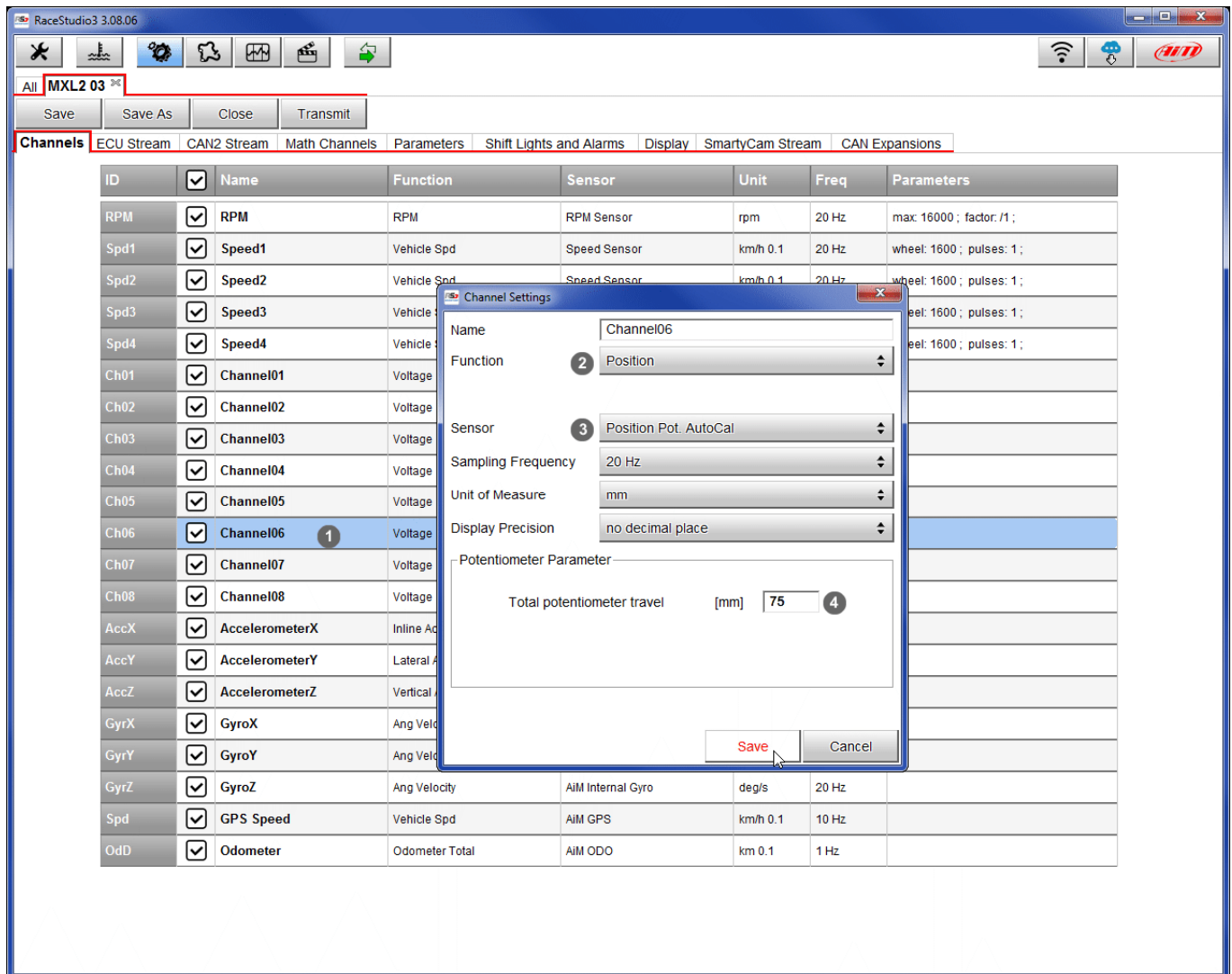
Setup with Race Studio 3

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 6 **(1)** and fill in the panel that shows up
- Function: "Position" **(2)**
- Sensor: "Position Pot. AutoCal" **(3)** – this implies that the potentiometer will be auto-calibrated as shown in the following pages)
- Fill in the other fields
- Fill "Total Potentiometer travel" box with the potentiometer travel in mm – in the example we used a 75 mm travel potentiometer **(4)**
- Click "Save"



The screenshot shows the RaceStudio3 3.08.06 software interface. The 'Channels' tab is selected, and a 'Channel Settings' dialog box is open for 'Channel06'. The dialog box contains the following fields:

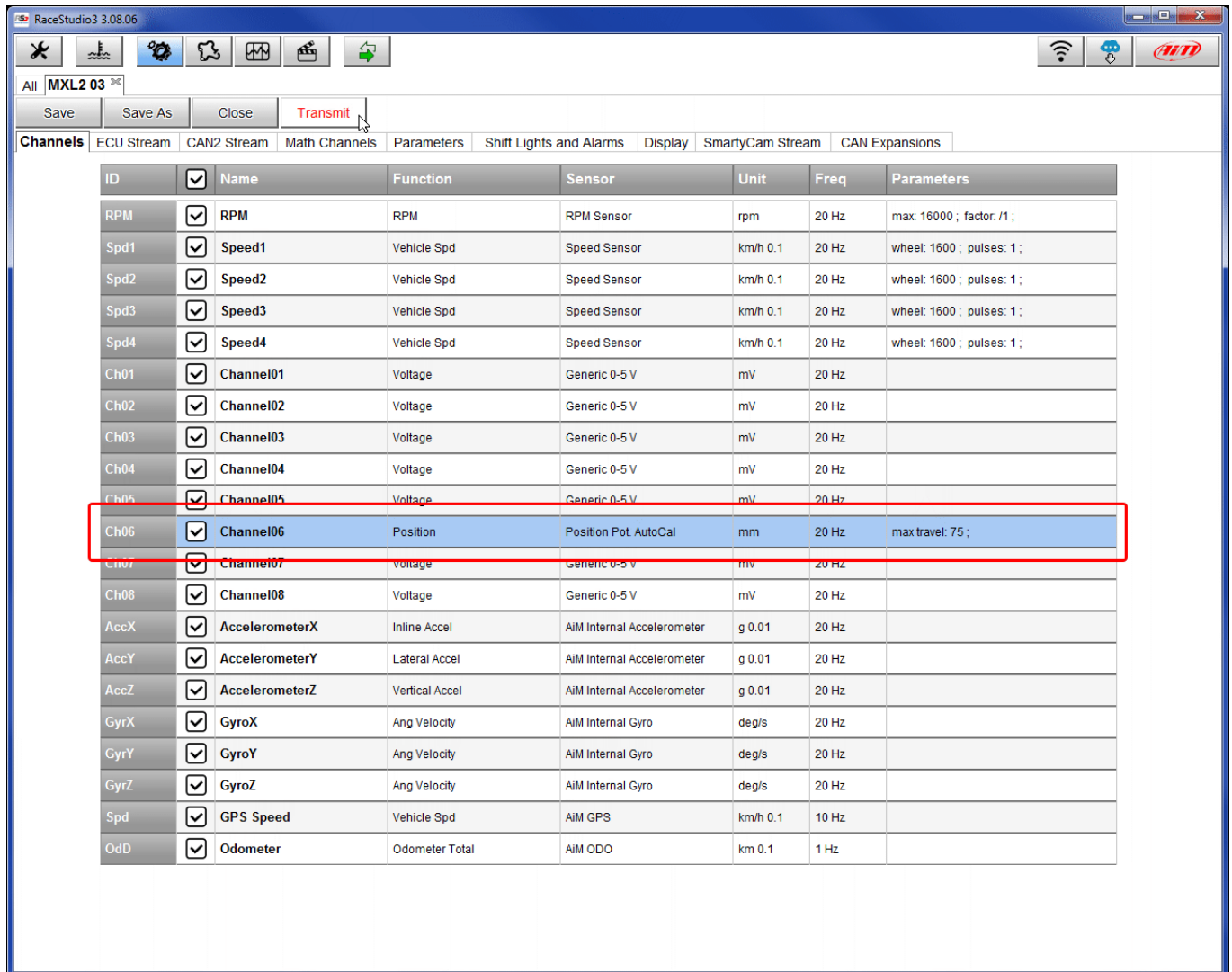
- Name: Channel06
- Function: Position **(2)**
- Sensor: Position Pot. AutoCal **(3)**
- Sampling Frequency: 20 Hz
- Unit of Measure: mm
- Display Precision: no decimal place
- Potentiometer Parameter: Total potentiometer travel [mm] 75 **(4)**

The 'Save' button is highlighted with a mouse cursor.

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				
Ch02	✓	Channel02	Voltage				
Ch03	✓	Channel03	Voltage				
Ch04	✓	Channel04	Voltage				
Ch05	✓	Channel05	Voltage				
Ch06	✓	Channel06	Voltage				
Ch07	✓	Channel07	Voltage				
Ch08	✓	Channel08	Voltage				
AccX	✓	AccelerometerX	Inline Acc				
AccY	✓	AccelerometerY	Lateral Acc				
AccZ	✓	AccelerometerZ	Vertical Acc				
GyrX	✓	GyroX	Ang Velocity				
GyrY	✓	GyroY	Ang Velocity				
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	

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.

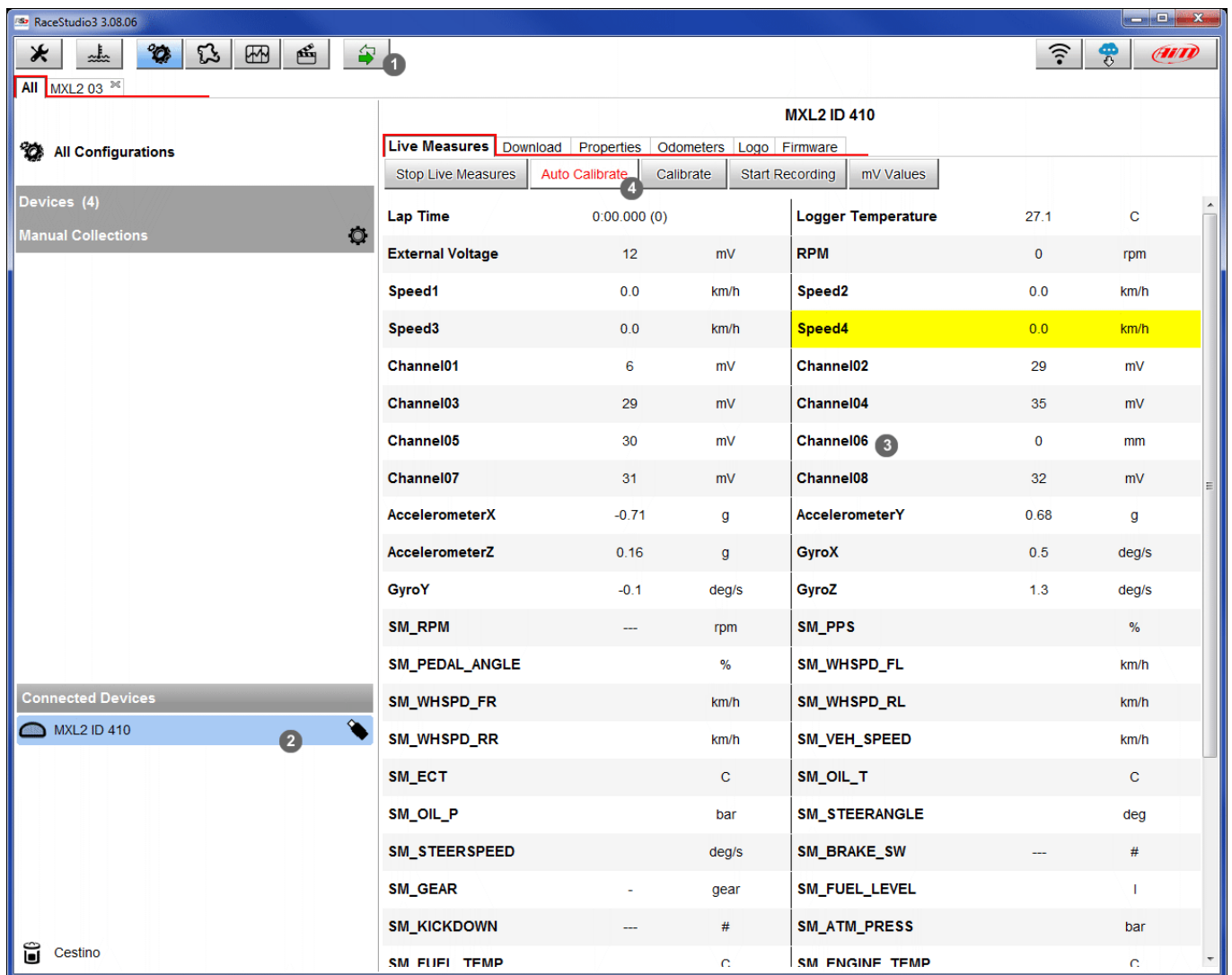


The screenshot shows the RaceStudio3 3.08.06 software interface. The top toolbar includes buttons for Save, Save As, Close, and Transmit. The 'Channels' tab is selected, displaying a table of configured channels. The table has columns for ID, Name, Function, Sensor, Unit, Freq, and Parameters. Channel06 is highlighted in blue and enclosed in a red rectangle, indicating it is the selected channel for the potentiometer.

ID	<input checked="" type="checkbox"/>	Name	Function	Sensor	Unit	Freq	Parameters
RPM	<input checked="" type="checkbox"/>	RPM	RPM	RPM Sensor	rpm	20 Hz	max: 16000 ; factor: /1 ;
Spd1	<input checked="" type="checkbox"/>	Speed1	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd2	<input checked="" type="checkbox"/>	Speed2	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd3	<input checked="" type="checkbox"/>	Speed3	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd4	<input checked="" type="checkbox"/>	Speed4	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Ch01	<input checked="" type="checkbox"/>	Channel01	Voltage	Generic 0-5 V	mV	20 Hz	
Ch02	<input checked="" type="checkbox"/>	Channel02	Voltage	Generic 0-5 V	mV	20 Hz	
Ch03	<input checked="" type="checkbox"/>	Channel03	Voltage	Generic 0-5 V	mV	20 Hz	
Ch04	<input checked="" type="checkbox"/>	Channel04	Voltage	Generic 0-5 V	mV	20 Hz	
Ch05	<input checked="" type="checkbox"/>	Channel05	Voltage	Generic 0-5 V	mV	20 Hz	
Ch06	<input checked="" type="checkbox"/>	Channel06	Position	Position Pot. AutoCal	mm	20 Hz	max travel: 75 ;
Ch07	<input checked="" type="checkbox"/>	Channel07	Voltage	Generic 0-5 V	mV	20 Hz	
Ch08	<input checked="" type="checkbox"/>	Channel08	Voltage	Generic 0-5 V	mV	20 Hz	
AccX	<input checked="" type="checkbox"/>	AccelerometerX	Inline Accel	AIM Internal Accelerometer	g 0.01	20 Hz	
AccY	<input checked="" type="checkbox"/>	AccelerometerY	Lateral Accel	AIM Internal Accelerometer	g 0.01	20 Hz	
AccZ	<input checked="" type="checkbox"/>	AccelerometerZ	Vertical Accel	AIM Internal Accelerometer	g 0.01	20 Hz	
GyrX	<input checked="" type="checkbox"/>	GyroX	Ang Velocity	AIM Internal Gyro	deg/s	20 Hz	
GyrY	<input checked="" type="checkbox"/>	GyroY	Ang Velocity	AIM Internal Gyro	deg/s	20 Hz	
GyrZ	<input checked="" type="checkbox"/>	GyroZ	Ang Velocity	AIM Internal Gyro	deg/s	20 Hz	
Spd	<input checked="" type="checkbox"/>	GPS Speed	Vehicle Spd	AIM GPS	km/h 0.1	10 Hz	
OdD	<input checked="" type="checkbox"/>	Odometer	Odometer Total	AIM ODO	km 0.1	1 Hz	

To auto-calibrate the potentiometer:

- enter "All" layer and press "Device" (1)
- select the logger – in the example MXL2 ID 410 (2)
- in "Live Measures" layer, keeping the potentiometer in its zero position, select the channel where the potentiometer has been set – in the example channel 6 (3)
- press "Auto Calibrate" (4)



RaceStudio3 3.08.06

All MXL2 03

MXL2 ID 410

Live Measures Download Properties Odometers Logo Firmware

Stop Live Measures Auto Calibrate Calibrate Start Recording mV Values

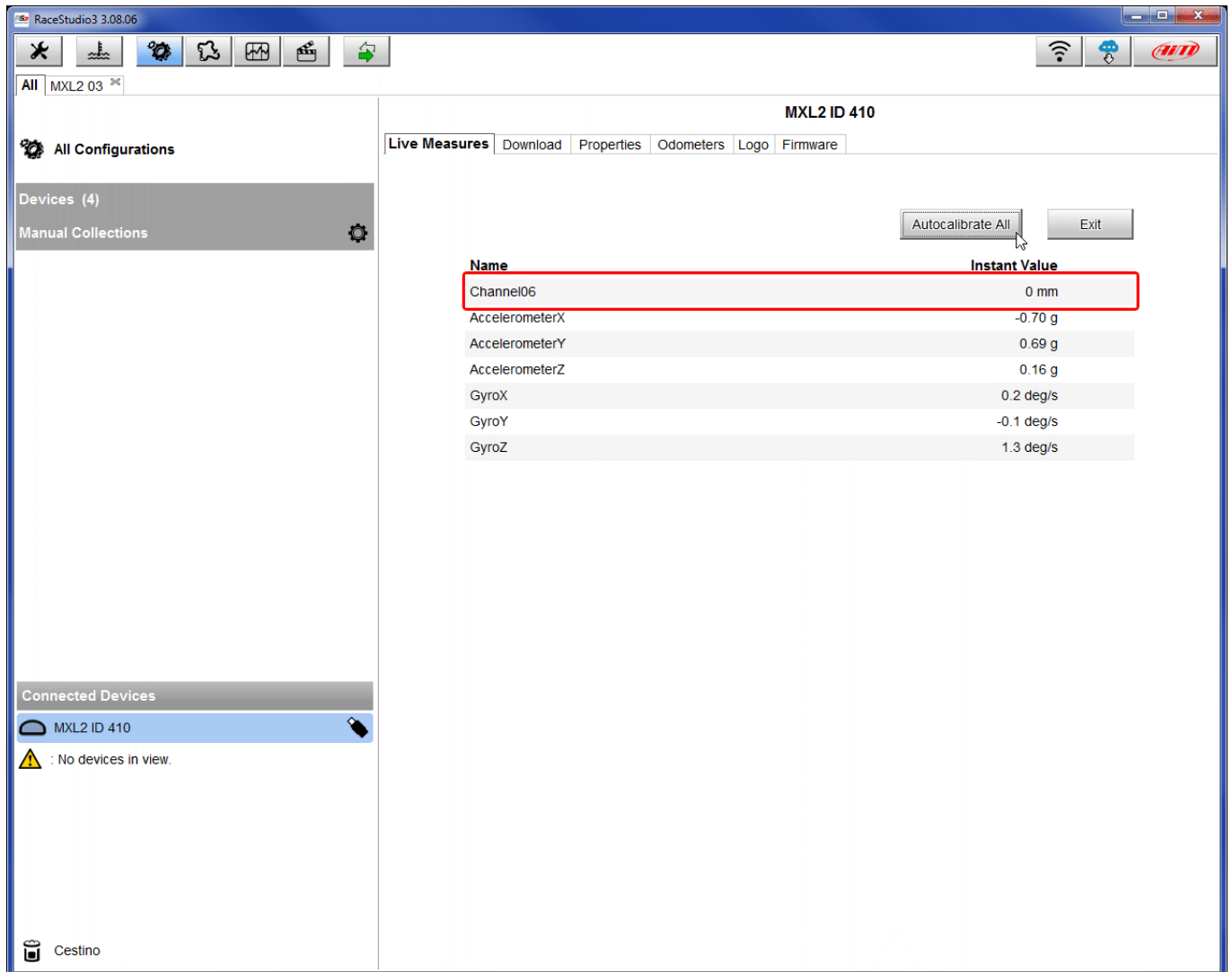
Lap Time	0.00.000 (0)	Logger Temperature	27.1	C
External Voltage	12 mV	RPM	0	rpm
Speed1	0.0 km/h	Speed2	0.0	km/h
Speed3	0.0 km/h	Speed4	0.0	km/h
Channel01	6 mV	Channel02	29	mV
Channel03	29 mV	Channel04	35	mV
Channel05	30 mV	Channel06	0	mm
Channel07	31 mV	Channel08	32	mV
AccelerometerX	-0.71 g	AccelerometerY	0.68	g
AccelerometerZ	0.16 g	GyroX	0.5	deg/s
GyroY	-0.1 deg/s	GyroZ	1.3	deg/s
SM_RPM	---	SM_PPS		%
SM_PEDAL_ANGLE	%	SM_WHSPD_FL		km/h
SM_WHSPD_FR	km/h	SM_WHSPD_RL		km/h
SM_WHSPD_RR	km/h	SM_VEH_SPEED		km/h
SM_ECT	C	SM_OIL_T		C
SM_OIL_P	bar	SM_STEERANGLE		deg
SM_STEERSPEED	deg/s	SM_BRAKE_SW	---	#
SM_GEAR	- gear	SM_FUEL_LEVEL		l
SM_KICKDOWN	---	SM_ATM_PRESS		bar
SM_FLUID_TEMP	C	SM_ENGINE_TEMP		C

Connected Devices

MXL2 ID 410

Cestino

- Keep the potentiometer in its zero position as shown here below
- Press "Auto calibrate All".



RaceStudio3 3.08.06

MXL2 ID 410

Live Measures | Download | Properties | Odometers | Logo | Firmware

Autocalibrate All | Exit

Name	Instant Value
Channel06	0 mm
AccelerometerX	-0.70 g
AccelerometerY	0.69 g
AccelerometerZ	0.16 g
GyroX	0.2 deg/s
GyroY	-0.1 deg/s
GyroZ	1.3 deg/s

Connected Devices

MXL2 ID 410

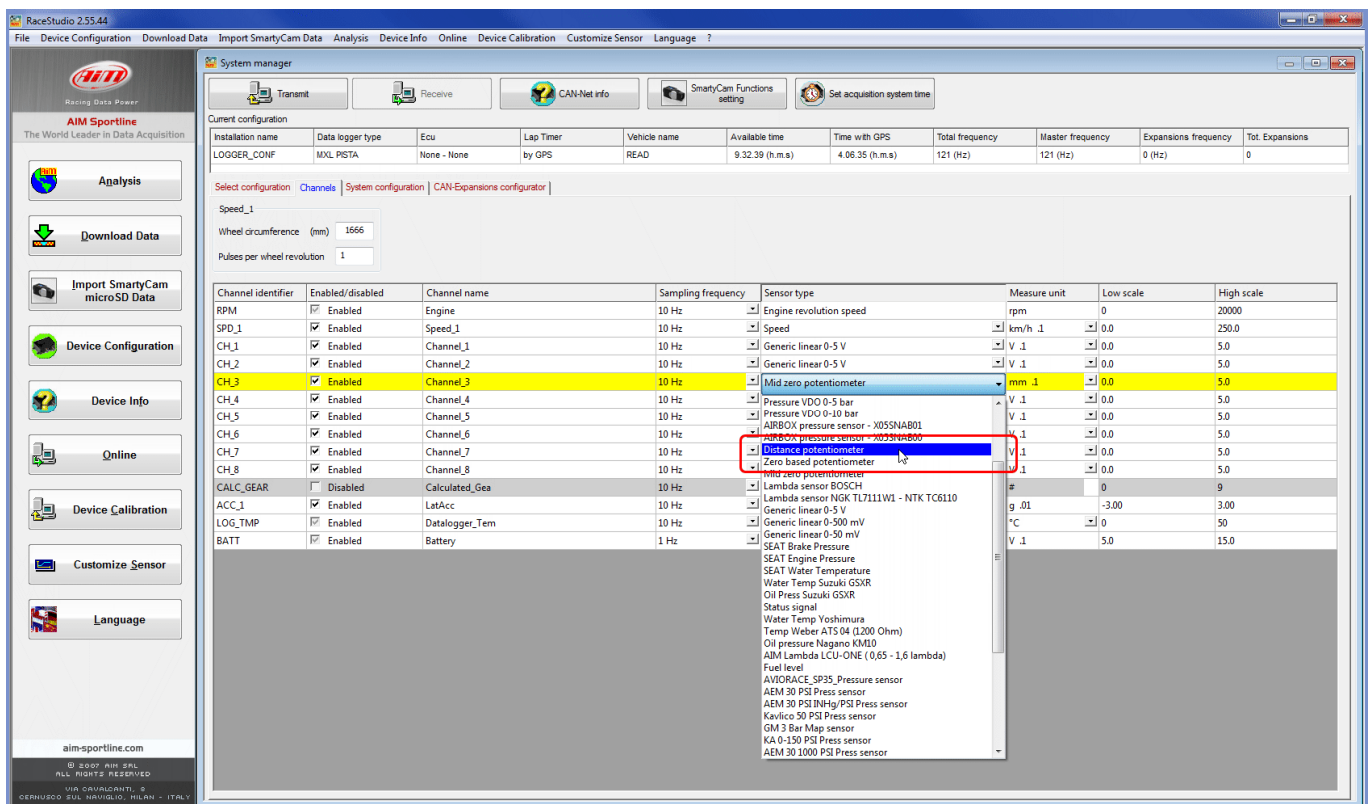
No devices in view.

Cestino

4.2 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 3) and select "Distance potentiometer" in "Sensor type" column as shown here below.



The screenshot shows the RaceStudio 2.55.44 software interface. The 'Channels' tab is selected in the 'System manager' section. The 'Current configuration' table shows various channels, with 'CH_3' highlighted in yellow. The 'Sensor type' column for 'CH_3' is set to 'Distance potentiometer', which is also highlighted in yellow and has a red box around it. The 'Measure unit' for 'CH_3' is 'mm'. The 'Low scale' is '0.0' and the 'High scale' is '5.0'.

Channel identifier	Enabled/disabled	Channel name	Sampling frequency	Sensor type	Measure unit	Low scale	High scale
RPM	Enabled	Engine	10 Hz	Engine revolution speed	rpm	0	20000
SPD_1	Enabled	Speed_1	10 Hz	Speed	km/h	0.0	250.0
CH_1	Enabled	Channel_1	10 Hz	Generic linear 0-5 V	V	0.0	5.0
CH_2	Enabled	Channel_2	10 Hz	Generic linear 0-5 V	V	0.0	5.0
CH_3	Enabled	Channel_3	10 Hz	Distance potentiometer	mm	0.0	5.0
CH_4	Enabled	Channel_4	10 Hz	Pressure VDO 0-5 bar	V	0.0	5.0
CH_5	Enabled	Channel_5	10 Hz	Pressure VDO 0-10 bar	V	0.0	5.0
CH_6	Enabled	Channel_6	10 Hz	AIRBOX pressure sensor - X055NAB01	V	0.0	5.0
CH_7	Enabled	Channel_7	10 Hz	AIRBOX pressure sensor - X055NAB00	V	0.0	5.0
CH_8	Enabled	Channel_8	10 Hz	Zero based potentiometer	V	0.0	5.0
CALC_GEAR	Disabled	Calculated_Gear	10 Hz	Mid zero potentiometer	#	0	9
ACC_1	Enabled	LatAcc	10 Hz	Lambda sensor BOSCH	g	-3.00	3.00
LOG_TMP	Enabled	Datalogger_Temp	10 Hz	Lambda sensor NGK TL7111W1 - NTK TC6110	°C	0	50
BATT	Enabled	Battery	1 Hz	Generic linear 0-5 V	V	0.0	15.0



- click out of the cell
- a panel appears bottom left of the layer as below
- insert potentiometer maximum travel (in the example 75 mm)
- transmit the configuration to the logger pressing "Transmit" in the software top keyboard.

System manager

Current configuration

Installation name	Data logger type	Ecu	Lap Timer	Vehicle name	Available time	Time with GPS	Total frequency	Master frequency	Expansions frequency	Tot. Expansions
LOGGER_CONF	MXL PSTA	KTM - X-BOW	by GPS	READ	3.42.47 (h.m.s)	2.27.06 (h.m.s)	311 (Hz)	311 (Hz)	0 (Hz)	0

Select configuration: Channels | System configuration | CAN-Expansions configurator

Speed_1

Wheel circumference (mm) 1666

Pulses per wheel revolution 1

Channel identifier	Enabled/disabled	Channel name	Sampling frequency	Sensor type	Measure unit	Low scale	High scale
RPM	<input type="checkbox"/> Disabled	Engine	10 Hz	Engine revolution speed	rpm	0	20000
SPD_1	<input checked="" type="checkbox"/> Enabled	Speed_1	10 Hz	Speed	km/h .1	0.0	250.0
CH_1	<input checked="" type="checkbox"/> Enabled	Channel_1	10 Hz	Generic linear 0-5 V	V .1	0.0	5.0
CH_2	<input checked="" type="checkbox"/> Enabled	Channel_2	10 Hz	Generic linear 0-5 V	V .1	0.0	5.0
CH_3	<input checked="" type="checkbox"/> Enabled	Channel_3	10 Hz	Distance potentiometer	mm .1	0.0	5.0
CH_4	<input checked="" type="checkbox"/> Enabled	Channel_4	10 Hz	Generic linear 0-5 V	V .1	0.0	5.0
CH_5	<input checked="" type="checkbox"/> Enabled	Channel_5	10 Hz	Generic linear 0-5 V	V .1	0.0	5.0
CH_6	<input checked="" type="checkbox"/> Enabled	Channel_6	10 Hz	Generic linear 0-5 V	V .1	0.0	5.0
CH_7	<input checked="" type="checkbox"/> Enabled	Channel_7	10 Hz	Generic linear 0-5 V	V .1	0.0	5.0
CH_8	<input checked="" type="checkbox"/> Enabled	Channel_8	10 Hz	Generic linear 0-5 V	V .1	0.0	5.0
CALC_GEAR	<input type="checkbox"/> Disabled	Calculated_Gea	10 Hz	Calculated Gear	#	0	9
ACC_1	<input checked="" type="checkbox"/> Enabled	LatAcc	10 Hz	Lateral accelerometer	g .01	-3.00	3.00
LOG_TMP	<input checked="" type="checkbox"/> Enabled	Datalogger_Tem	10 Hz	Cold joint	°C	0	50
BATT	<input checked="" type="checkbox"/> Enabled	Battery	1 Hz	Battery	V .1	5.0	15.0
ECU_1	<input checked="" type="checkbox"/> Enabled	KTM_RPM	10 Hz	Engine speed sensor	rpm	0	10000
ECU_2	<input checked="" type="checkbox"/> Enabled	KTM_WH_SPD_FL	10 Hz	Speed sensor	km/h .1	0.0	300.0
ECU_3	<input checked="" type="checkbox"/> Enabled	KTM_WH_SPD_FR	10 Hz	Speed sensor	km/h .1	0.0	300.0
ECU_4	<input checked="" type="checkbox"/> Enabled	KTM_WH_SPD_RL	10 Hz	Speed sensor	km/h .1	0.0	300.0
ECU_5	<input checked="" type="checkbox"/> Enabled	KTM_WH_SPD_RR	10 Hz	Speed sensor	km/h .1	0.0	300.0
ECU_6	<input checked="" type="checkbox"/> Enabled	KTM_PPS1	10 Hz	Throttle position sensor	% .1	0.0	105.0

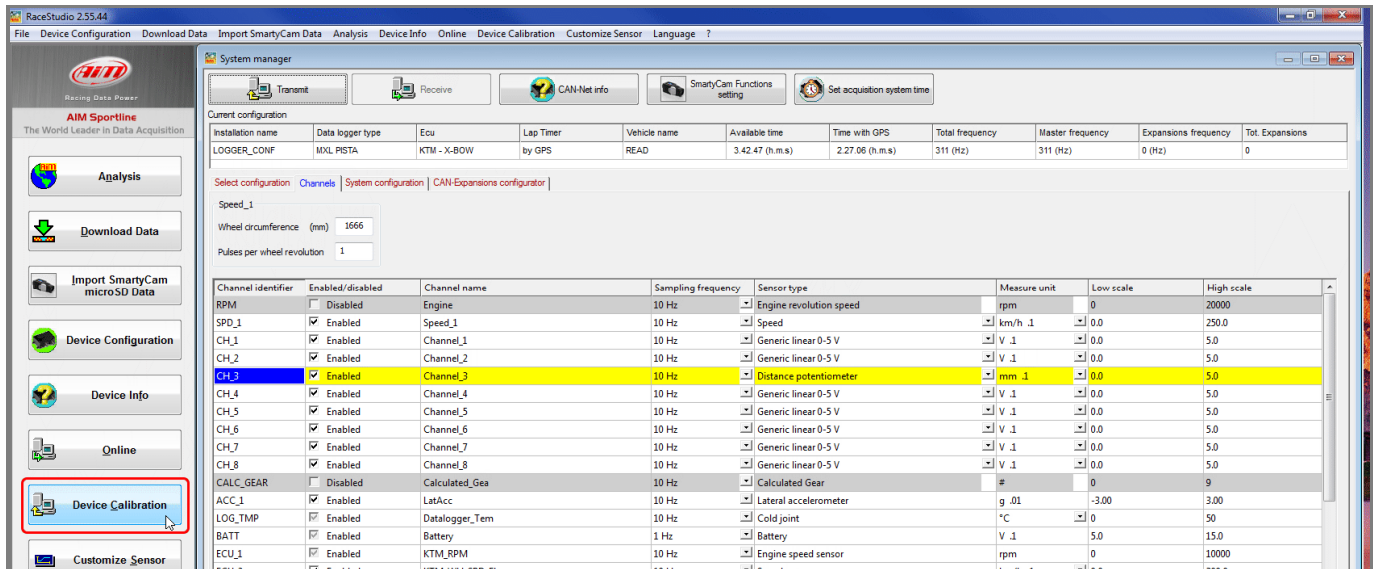
Channel Name: Channel_3, Sensor type: Distance potentiometer, Measure unit: mm .1

Parameters

1 Maximum used travel of potentiometer 75

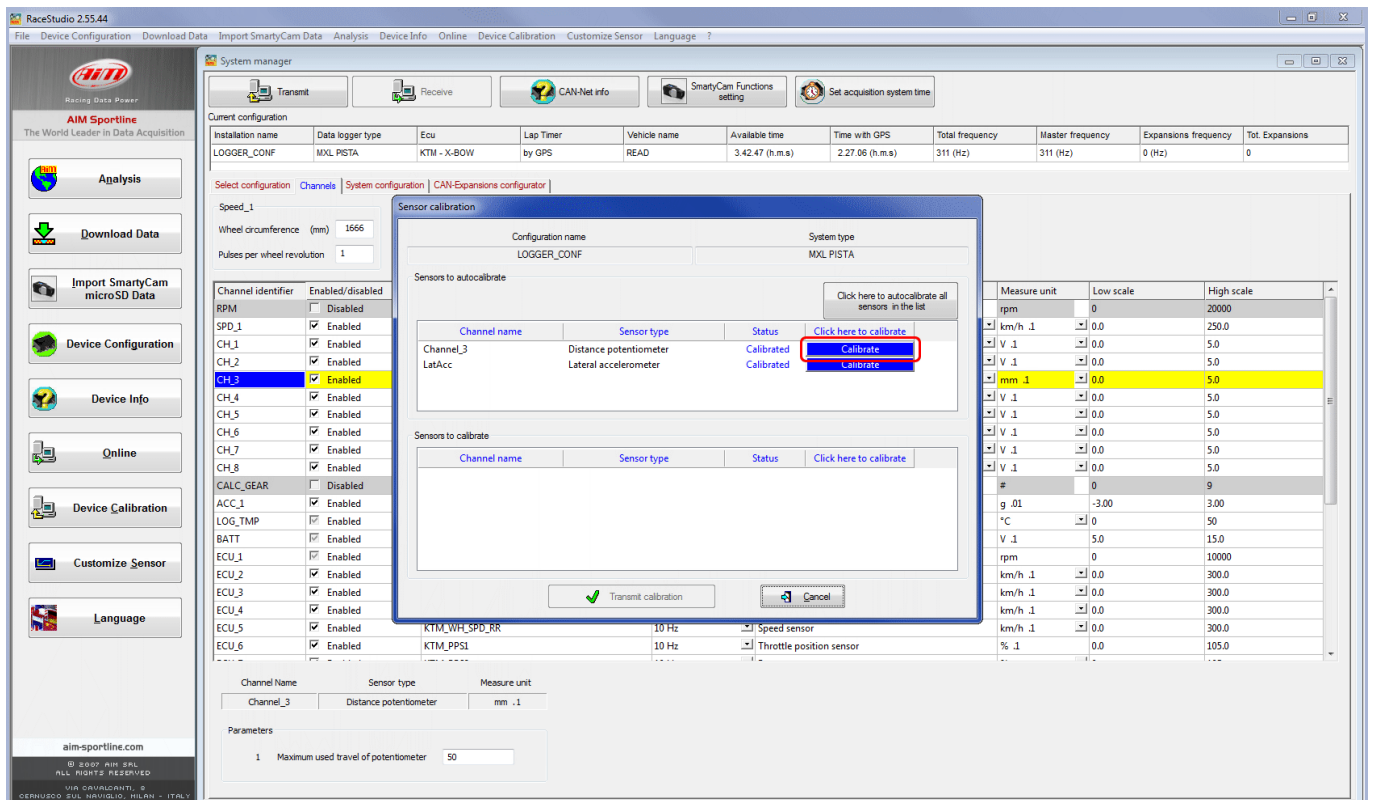
To calibrate the potentiometer:

- Press "Device calibration"



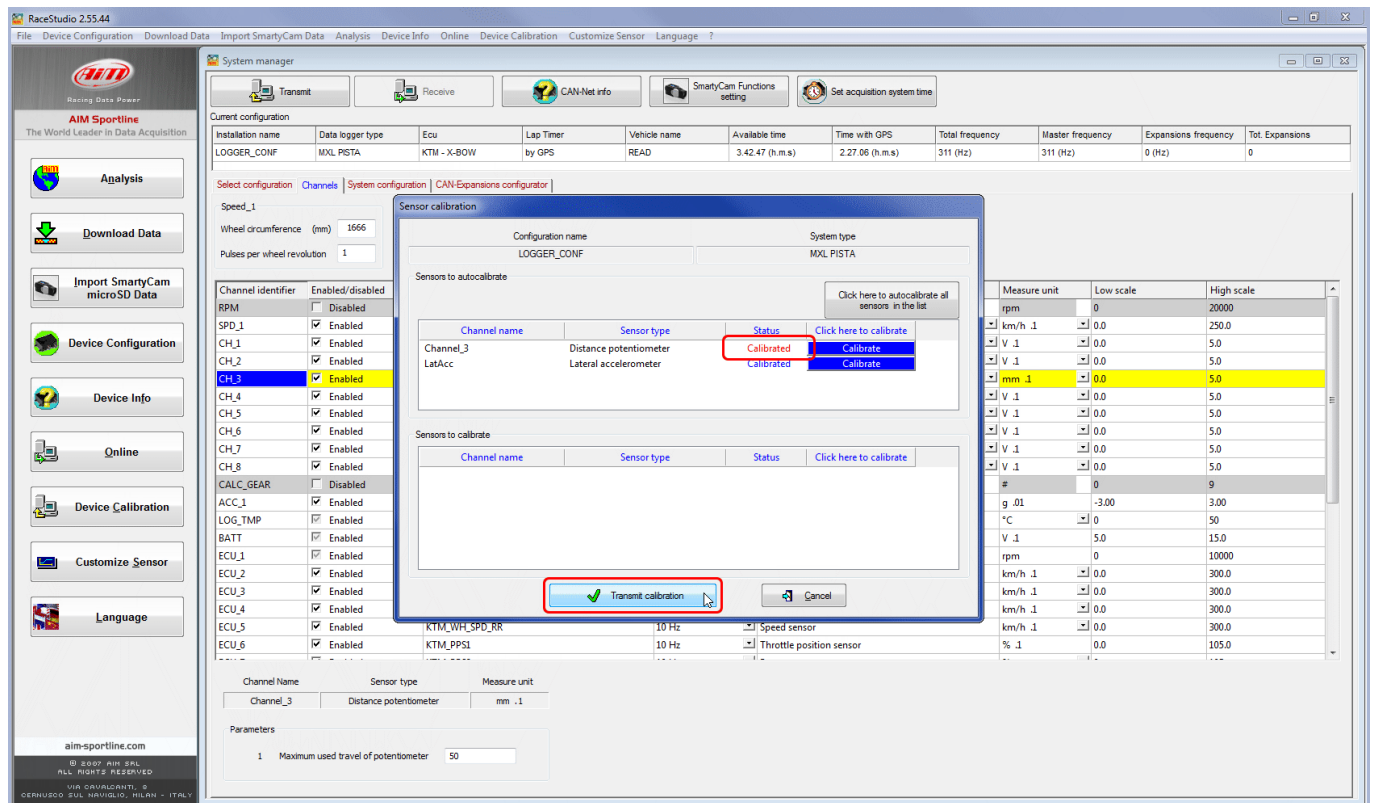
Calibration panel shows up:

- Press "Calibrate" button of distance potentiometer



Once the calibration over potentiometer status will be red and turn to "Calibrated":

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



The screenshot shows the RaceStudio 2.55.44 software interface. The main window displays the 'System manager' tab with various configuration options. A 'Sensor calibration' dialog box is open, showing the 'Configuration name' as 'LOGGER_CONF' and 'System type' as 'MXL PISTA'. The dialog box has two sections: 'Sensors to autocalibrate' and 'Sensors to calibrate'. In the 'Sensors to autocalibrate' section, the 'Status' column for 'Channel_3' is highlighted in red and labeled 'Calibrated'. Below this, the 'Transmit calibration' button is highlighted with a red box. The background window shows a list of channels (RPM, SPD_1, CH_1, CH_2, CH_3, CH_4, CH_5, CH_6, CH_7, CH_8, CALC_GEAR, ACC_1, LOG_TMP, BATT, ECU_1, ECU_2, ECU_3, ECU_4, ECU_5, ECU_6) and their respective sensor types and measure units. A table on the right side of the window lists various units and their scales.

Measure unit	Low scale	High scale
rpm	0	20000
km/h .1	0.0	250.0
V .1	0.0	5.0
V .1	0.0	5.0
V .1	0.0	5.0
V .1	0.0	5.0
V .1	0.0	5.0
V .1	0.0	5.0
#	0	9
g .01	-3.00	3.00
°C	0	50
V .1	5.0	15.0
rpm	0	10000
km/h .1	0.0	300.0
km/h .1	0.0	300.0
km/h .1	0.0	300.0
km/h .1	0.0	300.0
% .1	0.0	105.0

5

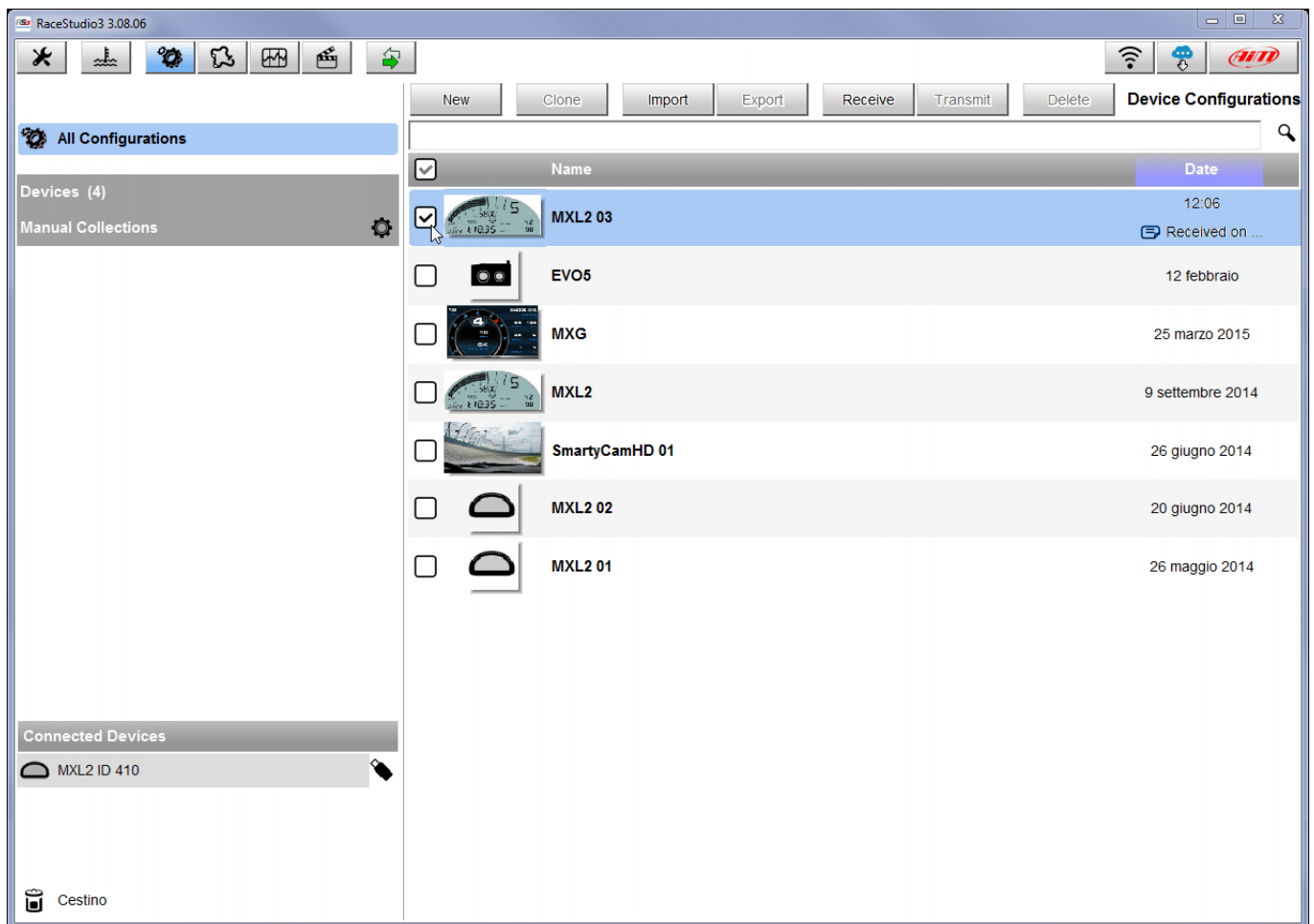
Software setup – steering angle

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

5.1

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: "Angle" (2)
- Sensor: " Angular Pot. Calib" (3 – this implies that the potentiometer will be calibrated as shown in the following pages)
- Fill in the other fields
- Fill "Total Potentiometer travel" box with the potentiometer travel in degrees: 180° (4)
- Click "Save"

The screenshot shows the RaceStudio3 3.08.06 software interface. The 'Channels' tab is selected, displaying a list of channels. Channel05 is highlighted with a red circle (1). The 'Channel Settings' dialog box is open for Channel05, showing the following configuration:

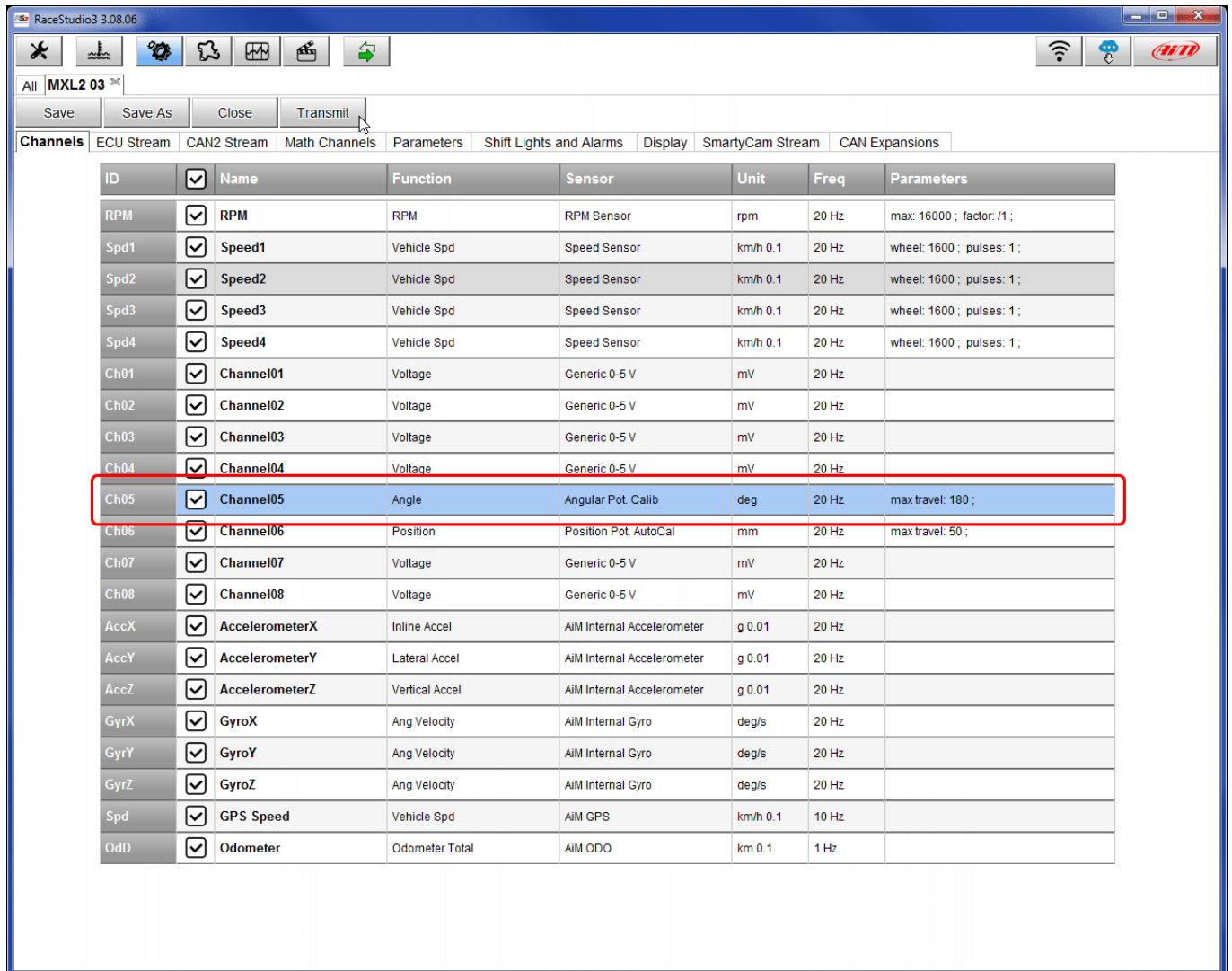
- Name: Channel05
- Function: Angle (2)
- Sensor: Angular Pot. Calib (3)
- Sampling Frequency: 20 Hz
- Unit of Measure: deg
- Display Precision: no decimal place
- Potentiometer Parameter: Total potentiometer travel [deg] 180 (4)

The 'Save' button is highlighted with a mouse cursor.

ID	Name	Function	Sensor	Unit	Freq	Parameters
RPM	RPM	RPM				
Spd1	Speed1	Vehicle Spd				
Spd2	Speed2	Vehicle Spd				
Spd3	Speed3	Vehicle Spd				
Spd4	Speed4	Vehicle Spd				
Ch01	Channel01	Voltage				
Ch02	Channel02	Voltage				
Ch03	Channel03	Voltage				
Ch04	Channel04	Voltage				
Ch05	Channel05	Voltage				
Ch06	Channel06	Position				
Ch07	Channel07	Voltage				
Ch08	Channel08	Voltage				
AccX	AccelerometerX	Inline Acc				
AccY	AccelerometerY	Lateral Acc				
AccZ	AccelerometerZ	Vertical Acc				
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	

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.

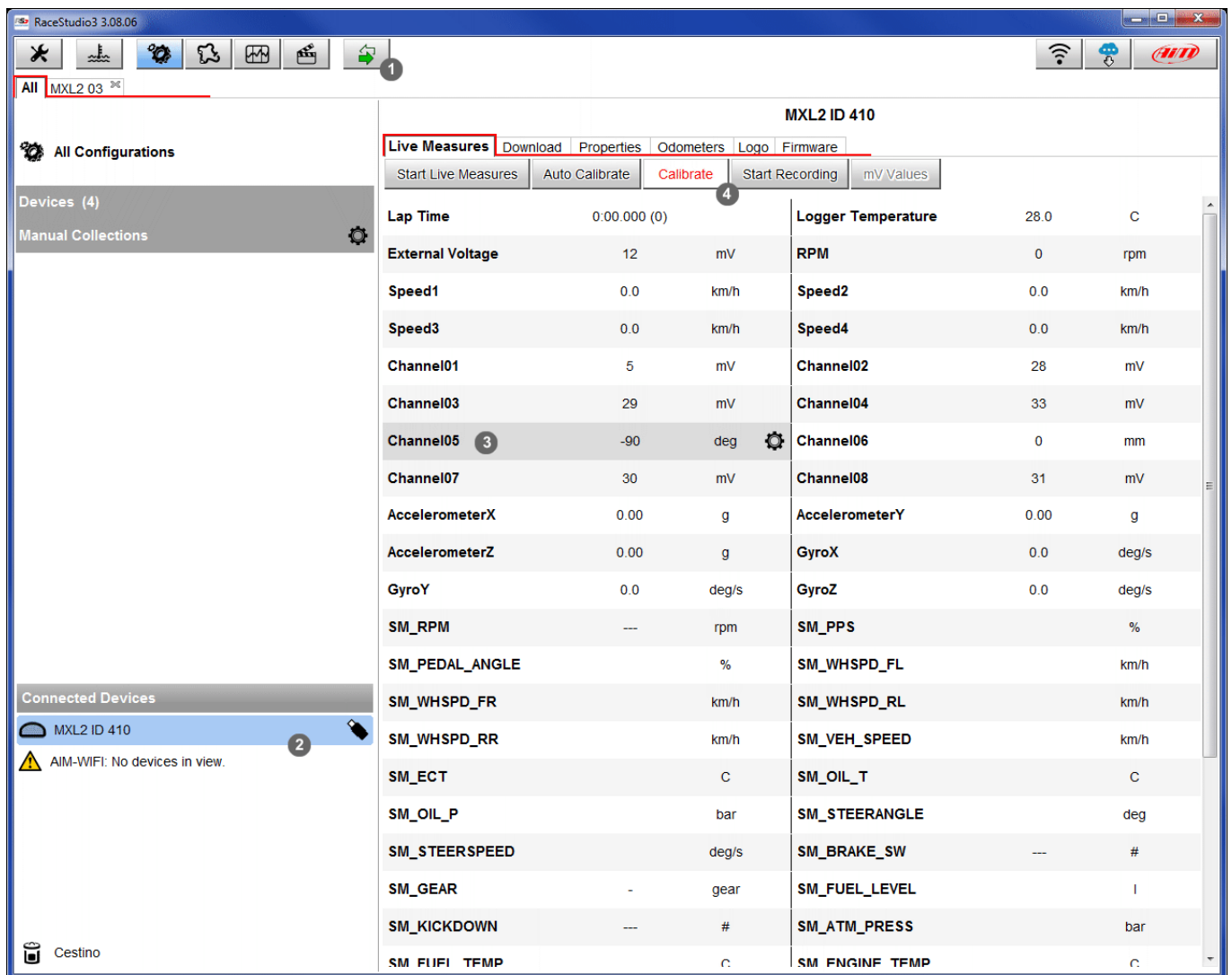


The screenshot shows the RaceStudio3 3.08.06 software interface. The top toolbar includes buttons for Save, Save As, Close, and Transmit. The Channels tab is selected, displaying a table of sensor configurations. The 'Transmit' button is highlighted in the top toolbar. The Channels table lists various sensors and their configurations, with Channel05 (Angle) highlighted in blue.

ID	<input checked="" type="checkbox"/>	Name	Function	Sensor	Unit	Freq	Parameters
RPM	<input checked="" type="checkbox"/>	RPM	RPM	RPM Sensor	rpm	20 Hz	max: 16000 ; factor: /1 ;
Spd1	<input checked="" type="checkbox"/>	Speed1	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd2	<input checked="" type="checkbox"/>	Speed2	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd3	<input checked="" type="checkbox"/>	Speed3	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Spd4	<input checked="" type="checkbox"/>	Speed4	Vehicle Spd	Speed Sensor	km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
Ch01	<input checked="" type="checkbox"/>	Channel01	Voltage	Generic 0-5 V	mV	20 Hz	
Ch02	<input checked="" type="checkbox"/>	Channel02	Voltage	Generic 0-5 V	mV	20 Hz	
Ch03	<input checked="" type="checkbox"/>	Channel03	Voltage	Generic 0-5 V	mV	20 Hz	
Ch04	<input checked="" type="checkbox"/>	Channel04	Voltage	Generic 0-5 V	mV	20 Hz	
Ch05	<input checked="" type="checkbox"/>	Channel05	Angle	Angular Pot. Calib	deg	20 Hz	max travel: 180 ;
Ch06	<input checked="" type="checkbox"/>	Channel06	Position	Position Pot. AutoCal	mm	20 Hz	max travel: 50 ;
Ch07	<input checked="" type="checkbox"/>	Channel07	Voltage	Generic 0-5 V	mV	20 Hz	
Ch08	<input checked="" type="checkbox"/>	Channel08	Voltage	Generic 0-5 V	mV	20 Hz	
AccX	<input checked="" type="checkbox"/>	AccelerometerX	Inline Accel	AIM Internal Accelerometer	g 0.01	20 Hz	
AccY	<input checked="" type="checkbox"/>	AccelerometerY	Lateral Accel	AIM Internal Accelerometer	g 0.01	20 Hz	
AccZ	<input checked="" type="checkbox"/>	AccelerometerZ	Vertical Accel	AIM Internal Accelerometer	g 0.01	20 Hz	
GyrX	<input checked="" type="checkbox"/>	GyroX	Ang Velocity	AIM Internal Gyro	deg/s	20 Hz	
GyrY	<input checked="" type="checkbox"/>	GyroY	Ang Velocity	AIM Internal Gyro	deg/s	20 Hz	
GyrZ	<input checked="" type="checkbox"/>	GyroZ	Ang Velocity	AIM Internal Gyro	deg/s	20 Hz	
Spd	<input checked="" type="checkbox"/>	GPS Speed	Vehicle Spd	AIM GPS	km/h 0.1	10 Hz	
OdD	<input checked="" type="checkbox"/>	Odometer	Odometer Total	AIM ODO	km 0.1	1 Hz	

To calibrate the potentiometer:

- enter "All" layer and press "Device" (1)
- select the logger – in the example MXL2 ID 410 (2)
- in "Live Measures" layer, keeping the potentiometer in its zero position, select the channel where the potentiometer has been set – in the example channel 5 (3)
- press "Calibrate" (4)



1

All MXL2 03

MXL2 ID 410

Live Measures Download Properties Odometers Logo Firmware

Start Live Measures Auto Calibrate Calibrate Start Recording mV Values

2

3

4

Lap Time	0.00.000 (0)	Logger Temperature	28.0	C
External Voltage	12 mV	RPM	0	rpm
Speed1	0.0 km/h	Speed2	0.0	km/h
Speed3	0.0 km/h	Speed4	0.0	km/h
Channel01	5 mV	Channel02	28	mV
Channel03	29 mV	Channel04	33	mV
Channel05	-90 deg	Channel06	0	mm
Channel07	30 mV	Channel08	31	mV
AccelerometerX	0.00 g	AccelerometerY	0.00	g
AccelerometerZ	0.00 g	GyroX	0.0	deg/s
GyroY	0.0 deg/s	GyroZ	0.0	deg/s
SM_RPM	---	SM_PPS		%
SM_PEDAL_ANGLE	%	SM_WHSPD_FL		km/h
SM_WHSPD_FR	km/h	SM_WHSPD_RL		km/h
SM_WHSPD_RR	km/h	SM_VEH_SPEED		km/h
SM_ECT	C	SM_OIL_T		C
SM_OIL_P	bar	SM_STEERANGLE		deg
SM_STEERSPEED	deg/s	SM_BRAKE_SW	---	#
SM_GEAR	- gear	SM_FUEL_LEVEL		l
SM_KICKDOWN	---	SM_ATM_PRESS		bar
SM_FUEL_TFMP	C	SM_ENGINE_TFMP		C

Connected Devices

MXL2 ID 410

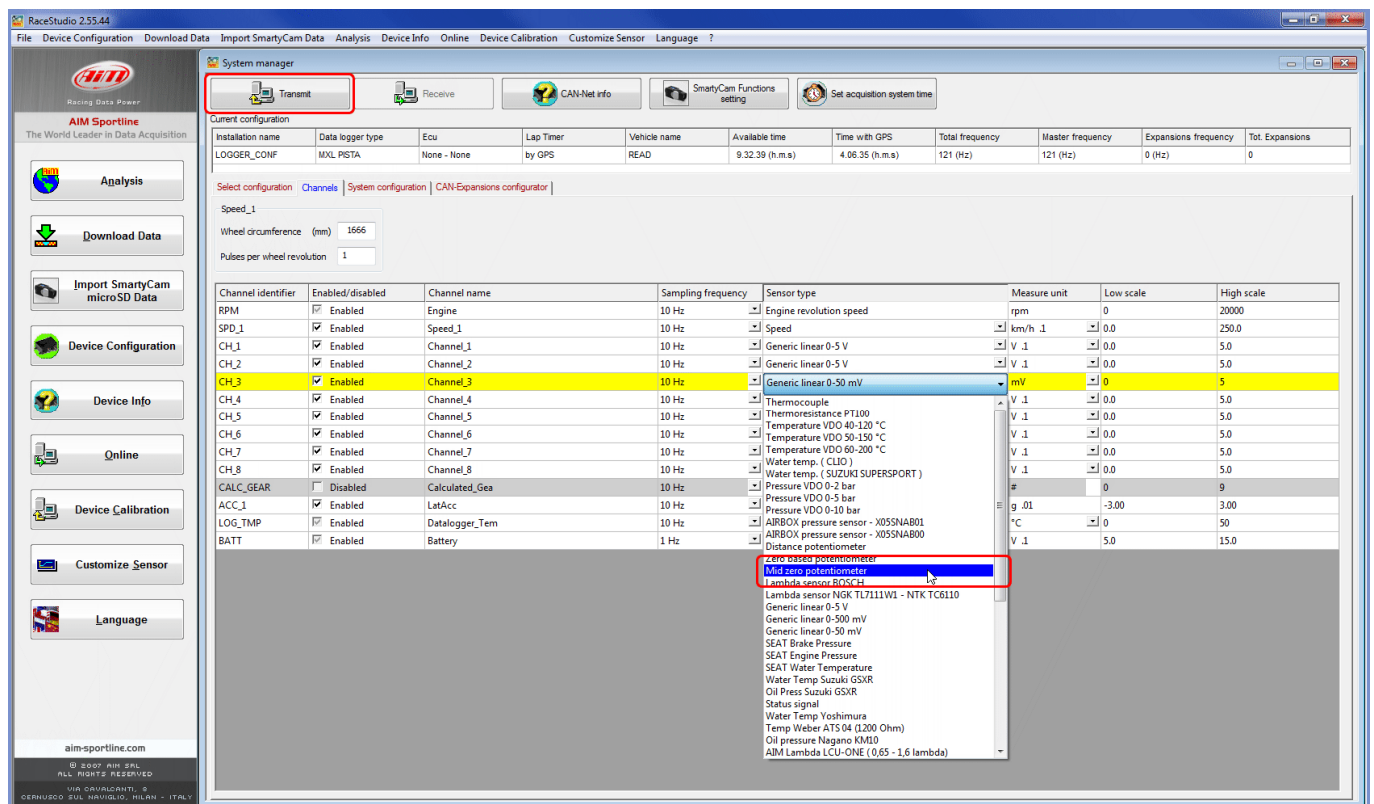
AIM-WiFi: No devices in view.

Cestino

5.2 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 3) and select "Mid zero potentiometer" in "Sensor type" column as shown here below.



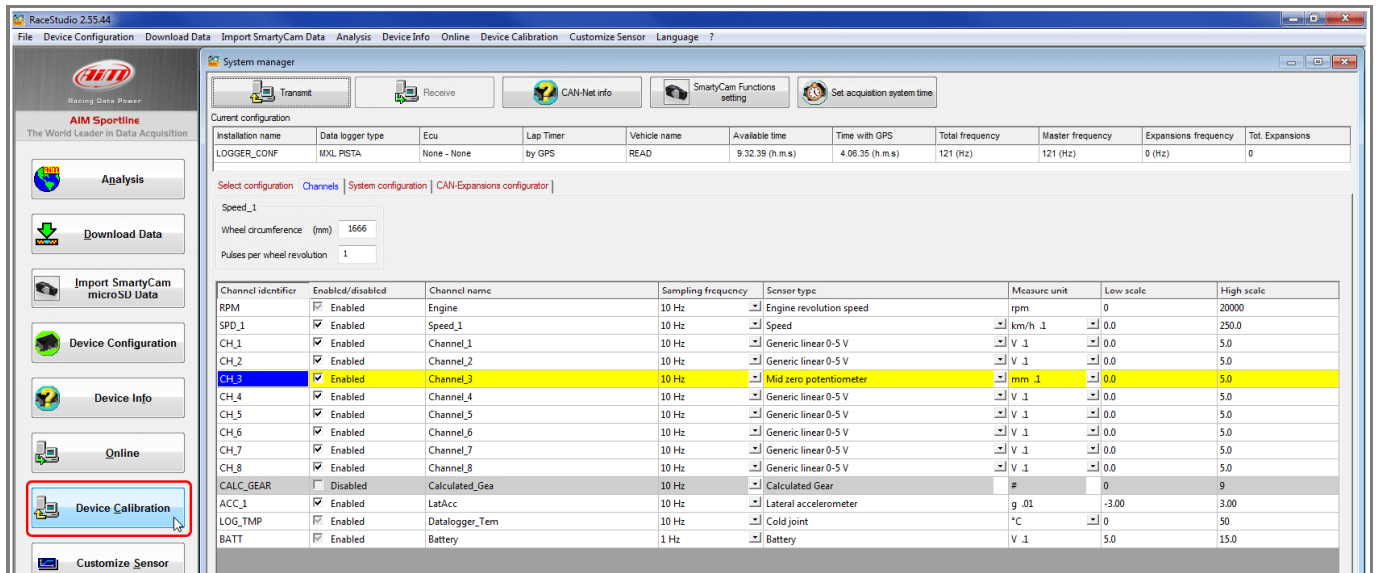
The screenshot shows the RaceStudio 2.55.44 interface. The 'Transmit' button in the top toolbar is highlighted with a red box. The 'Channels' tab is active, displaying a table of channels. Channel 3 is selected, and the 'Sensor type' dropdown menu is open, showing 'Mid zero potentiometer' as the selected option.

Channel identifier	Enabled/disabled	Channel name	Sampling frequency	Sensor type	Measure unit	Low scale	High scale
RPM	<input checked="" type="checkbox"/> Enabled	Engine	10 Hz	Engine revolution speed	rpm	0	20000
SPD_1	<input checked="" type="checkbox"/> Enabled	Speed_1	10 Hz	Speed	km/h	0.0	250.0
CH_1	<input checked="" type="checkbox"/> Enabled	Channel_1	10 Hz	Generic linear 0-5 V	V	0.0	5.0
CH_2	<input checked="" type="checkbox"/> Enabled	Channel_2	10 Hz	Generic linear 0-5 V	V	0.0	5.0
CH_3	<input checked="" type="checkbox"/> Enabled	Channel_3	10 Hz	Generic linear 0-50 mV	mV	0	5
CH_4	<input checked="" type="checkbox"/> Enabled	Channel_4	10 Hz	Thermocouple	V	0.0	5.0
CH_5	<input checked="" type="checkbox"/> Enabled	Channel_5	10 Hz	Thermoresistance PT100	V	0.0	5.0
CH_6	<input checked="" type="checkbox"/> Enabled	Channel_6	10 Hz	Temperature VDO 40-120 °C	V	0.0	5.0
CH_7	<input checked="" type="checkbox"/> Enabled	Channel_7	10 Hz	Temperature VDO 50-150 °C	V	0.0	5.0
CH_8	<input checked="" type="checkbox"/> Enabled	Channel_8	10 Hz	Temperature VDO 60-200 °C	V	0.0	5.0
CALC_GEAR	<input type="checkbox"/> Disabled	Calculated_Gear	10 Hz	Water temp. (CLIO)	V	0.0	5.0
ACC_1	<input checked="" type="checkbox"/> Enabled	LatAcc	10 Hz	Water temp. (SUZUKI SUPERSPORT)	#	0	9
LOG_TMP	<input checked="" type="checkbox"/> Enabled	Datalogger_Temp	10 Hz	Pressure VDO 0-2 bar	g	-3.00	3.00
BATT	<input checked="" type="checkbox"/> Enabled	Battery	1 Hz	Pressure VDO 0-5 bar	°C	0	50
				Pressure VDO 0-10 bar	V	5.0	15.0
				AIRBOX pressure sensor - X055NAB01			
				AIRBOX pressure sensor - X055NAB00			
				Distance potentiometer			
				Mid zero potentiometer			
				Lambda sensor B70C14			
				Lambda sensor NGK TL711W1 - NTK TC6110			
				Generic linear 0-5 V			
				Generic linear 0-500 mV			
				Generic linear 0-50 mV			
				SEAT Brake Pressure			
				SEAT Engine Pressure			
				SEAT Water Temperature			
				Water Temp Suzuki GSXR			
				Oil Press Suzuki GSXR			
				Status signal			
				Water Temp Yoshimura			
				Temp Weber ATS 04 (1200 Ohm)			
				Oil pressure Nagano KM10			
				AiM Lambda LCU-ONE (0.65 - 1.6 lambda)			

- click out of the cell
- transmit the configuration to the logger pressing "Transmit" on the software top keyboard.

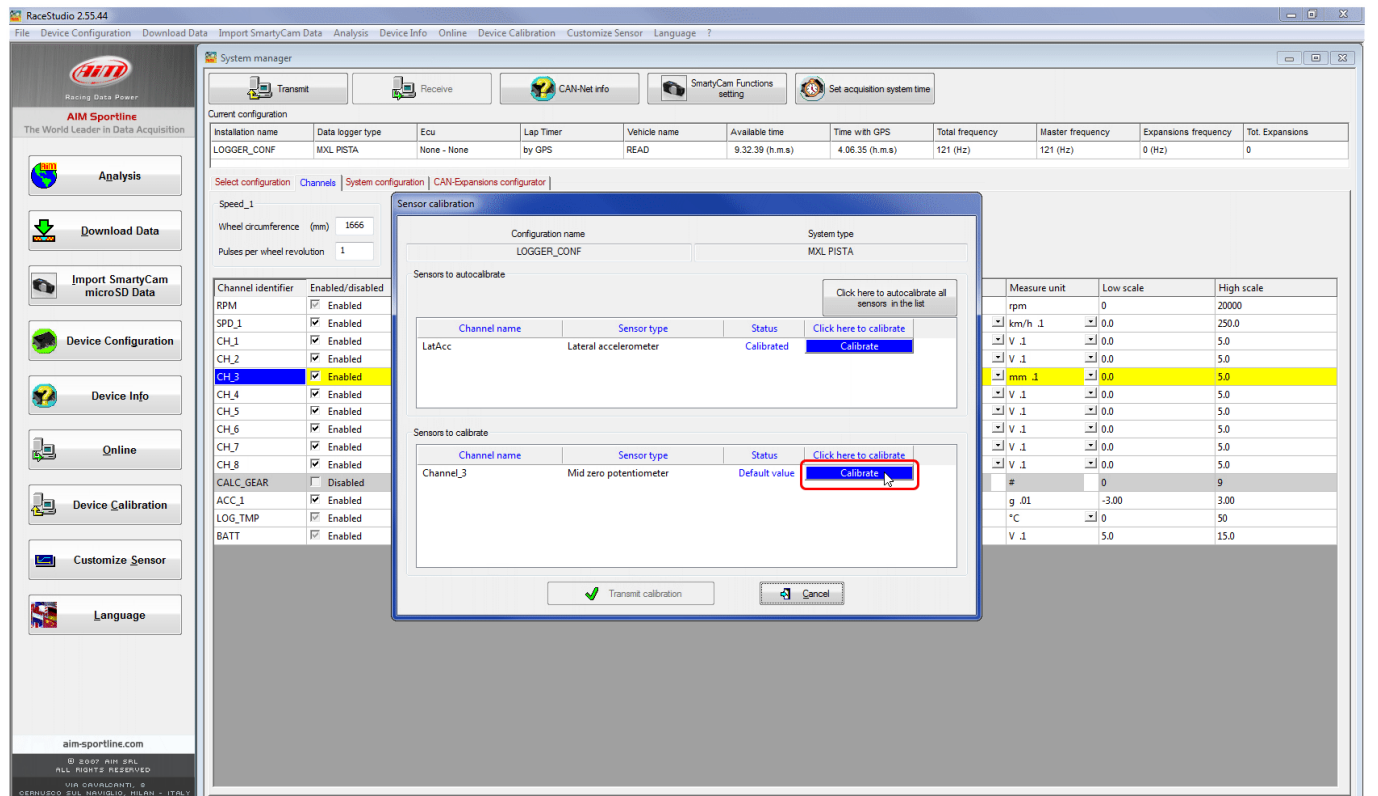
To calibrate the potentiometer:

- Press "Device Calibration"



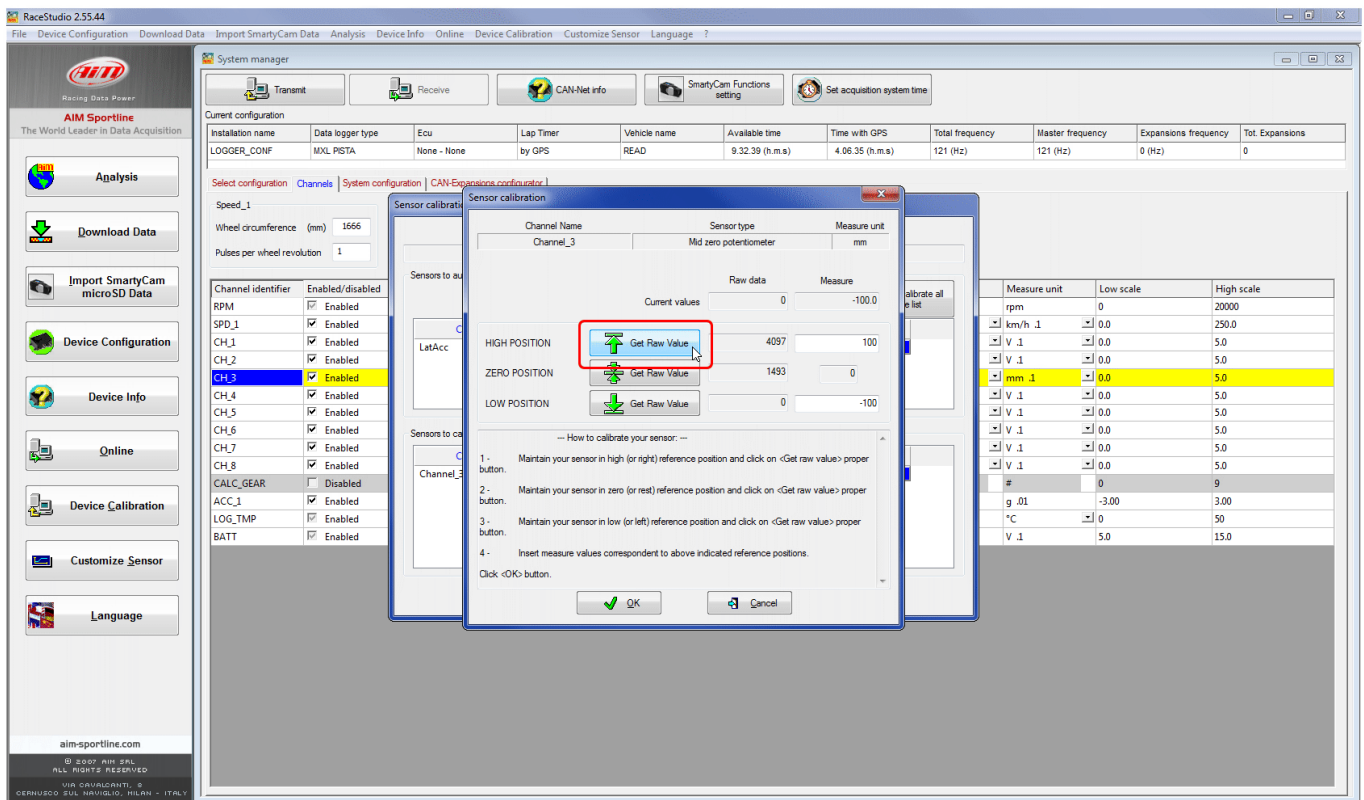
Calibration panel shows up:

- Press "Calibrate" button of "Mid zero potentiometer"

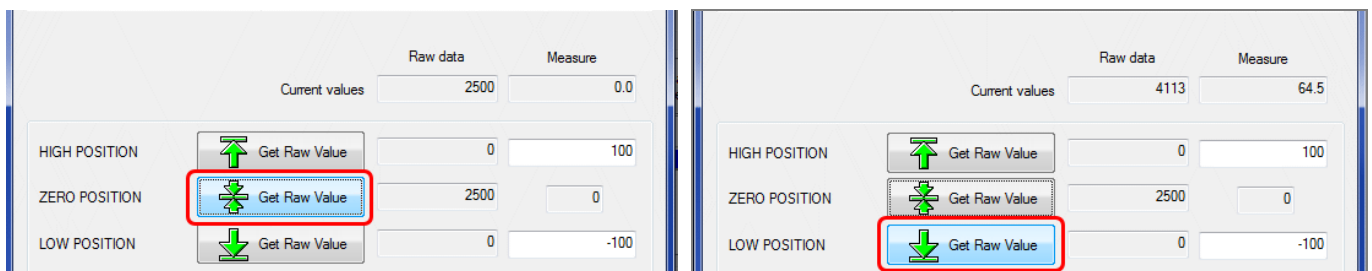


The software shows "Calibration panel" to learn the three calibration points:

- swerve to the left stop and press "Get raw value" corresponding to "High position"

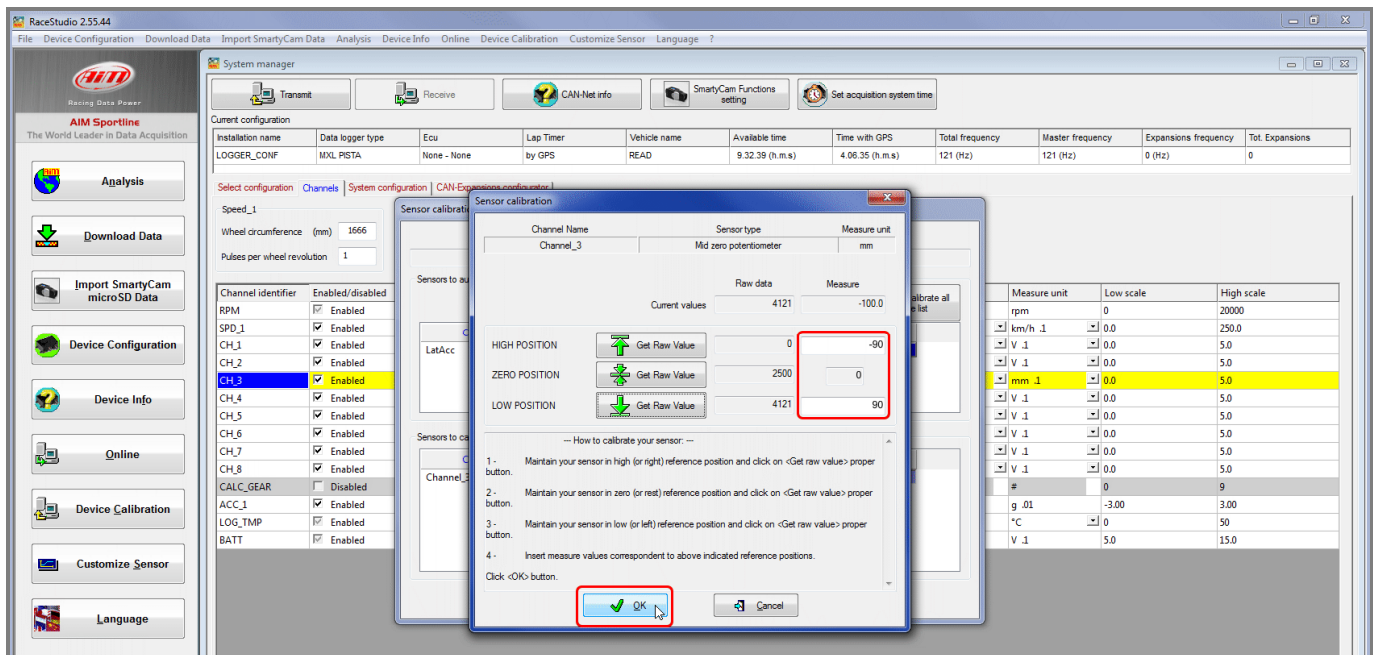


- place the steering in its zero position and press "Get raw value" corresponding to "Zero position" (image below on the left)
- swerve to the right stop and press "Get raw value" corresponding to "Low position" (image below on the right)



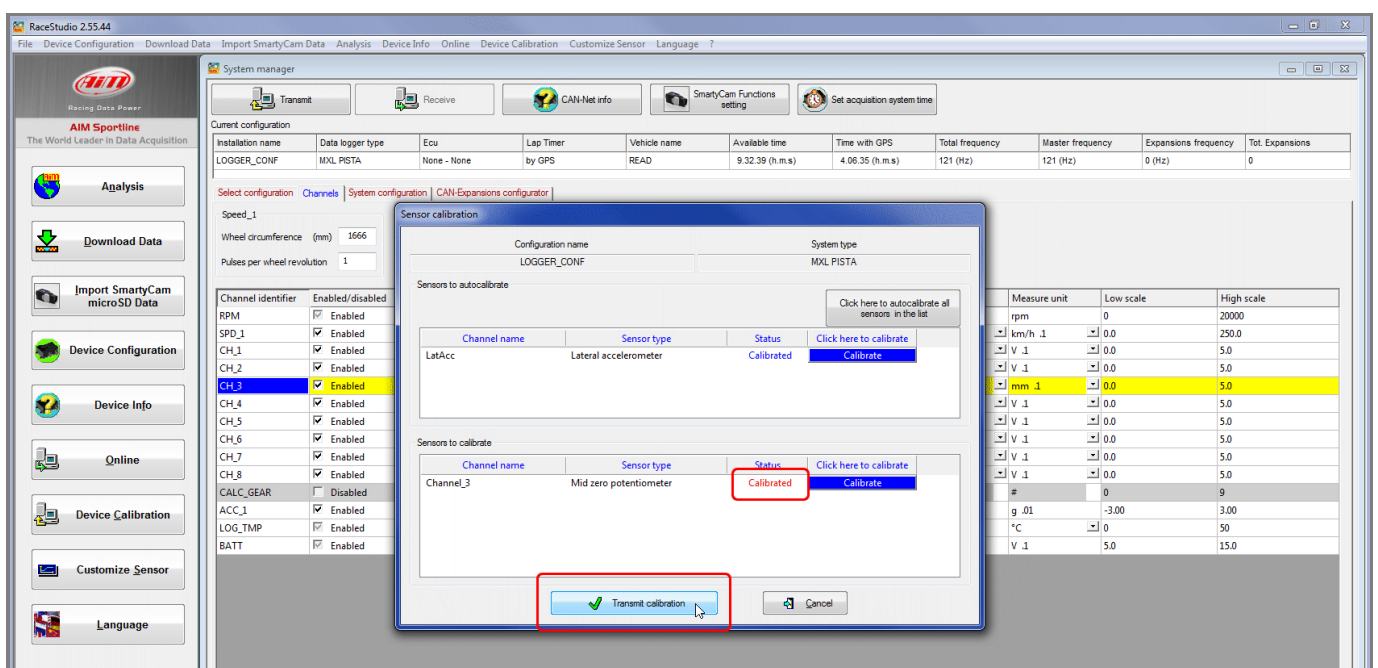
When calibration points have been learnt:

- manually fill in values corresponding to the three angular position: -90, 0 and 90.
- press OK



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

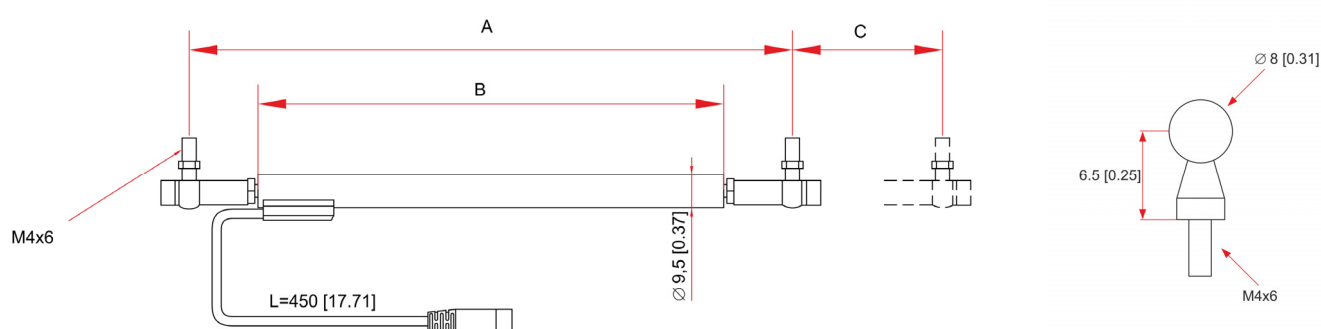
- Transmit the calibration to the logger pressing "Transmit Calibration"



6

Dimensioni, pinout e caratteristiche tecniche

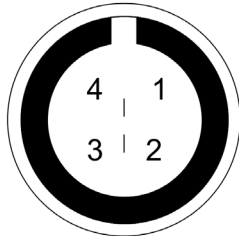
The drawing below shows sensors dimensions in millimetres [inches] on the left and pop joints dimensions on the right.



With reference to the drawing above the table here below shows the proportional growth of "A", "B" and "C" dimensions.

Potentiometer travel (C)	"A" – Retracted mounting distance	"B" Sensor body length
75 mm (2.95")	175 mm (6.88")	157 mm (6,18")
150 mm (5.91")	260 mm (10.23")	232 mm (9.13")

The potentiometer ends with a 4 pins Binder 719 male connector. The image below shows the connector from solder termination side.



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

Car/Bike linear potentiometer **technical characteristics** are:

- Maximum supply voltage: 40 Vdc
- Resolution: essentially infinite
- Repeatability: ≤ 0.01 mm
- Operational speed: 10 m/s max
- Mechanical life: >25 millions cycles
- Temperature range: from -40° to $+150^{\circ}$
- Protection: IP67
- Independent linearity: $\leq \pm 0.5\%$
- Cable type: Raychem 55M 26 AWG, Viton Sleeve
- Cable length: 450 mm
- Housing: Aluminium
- Mechanical fixing: Pop joints (2x Ball Pins $\varnothing 8$ mm – M4x6 mm)
- Weight: 26÷46 g

7

Extension cables

The potentiometer is sold with a 45 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.

Extension cable for connection with:

- MXG
- MXS
- MXL2
- EVO5
- EVO4S
- EVO4
- Channel Expansion
- MyChron Expansion

Part numbers:

V02PCB05BTXG – cable length: 500 mm

V02PCB10BTXG – cable length: 1000 mm

V02PCB15BTXG – cable length: 1500 mm

V02PCB20BTXG – cable length: 2000 mm

V02PCB25BTXG – cable length: 2500 mm

V02PCB30BTXG – cable length: 3000 mm

Extension cable for connection with:

- 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

