

RS3

Pull-up resistor value calculation

Question:

How do I have to calculate the value of the pull-up resistor which must be used when connecting a third-parties resistive sensor (i.e.: thermoresistors, VDO pressure/temperature sensors) to one of my AiM device channels?

Answer:

When connecting a third-parties resistive sensor, the pull-up resistor value is automatically calculated during the sensor characterization procedure, which must be executed from the Custom Sensors section of Race Studio 3, following the steps below:

• Run Race Studio 3, enter the Custom Sensor section (and create a new custom sensor, pressing "New": the popup window allows to add a name and a comment (following image). Once done, press "OK".

 * RaceStudio3 (64 bit) 331.06 ★ 29 F2 13 65 			- 0 ×
All Custom Sensors	New Import Export Delete	Custom Sensors	
Sensor Types Manual Collections	0 0 Name	Туре	Date
	Iff: Set Sensor Name and Notes X Sensor Name		



- After "Measure Type", "Calibration Type"(can be set as "None"), and "Ohm" as "Input Type" have been set, in the tab below, insert corresponding resistance values to each sensor reading breakpoint, which are generally specified in the sensor datasheet.
- Once done, pressing "Calc" button, it is possible to know the value of the pull-up resistor to use, automatically calculated by the software ("Ohm for pull-up resistor" field).



• Press "Save" to save the sensor, including it in the existing custom sensors list, available from the section main page (following image).

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All Custom Sensors	New Import Export Delete	Custom Sensors	
Sensor Types	0/1 Name	Туре	Q (?)
Manual Collections	Custom_Sensor01	Temperature	13:11



Entering the device configuration section, from the "Channels" tab it is possible to configure an analog channel with the created sensor (following image).

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All MXr	1.24										
Save	Save A	s Close	Transmit								
Channe	s ECU Stream	CAN Expansions	Math Channels	Status Var	ables	Parameters	Shift Lights and Alarms F	Power Outputs Display	SmartvCam Stream CA	N Output	
1				ID		Name	Function	Sensor	Unit	Freq	Parameters
				RPM		RPM	Engine RPM	RPM Sensor	mm	20 HZ	mar 16000 : factor /1 :
				Spd1	H	Speed1	Vehicle Spd	Speed Sens	or km/h 0,1	20 Hz	wheel: 1600 ; pulses; 1 ;
				Spd2	H	Speed2	Vehicle Spd	Speed Sens	or km/h 0.1	20 Hz	wheel: 1600 ; pulses: 1 ;
				Ch01	n	Channel01	Voltage	Generic 0-5	/ mV	20 Hz	
				Ch02		Channel02	Voltage	Generic 0-5	/ mV	20 Hz	
				Ch03		Channel03	Channel Settings			×	
				Ch04		Channel04	Name	Channel02			
				Acc1		InlineAcc	Function	Temperature		\$	
				Acc2	-	LateralAcc					
				Acc3	•	VerticalAcc					
				Accu	4	GPS Accuracy	Sensor	Custom_Sensor01		¢	
				Spd	-	GPS Speed	Sampling Frequency	20 Hz		\$	
				Alt	4	Altitude	Unit of Measure	с		÷	
				OdD	•	Odometer					
				Luma		Luminosity	Display Precision	no decimal place		÷	
									Save	Cancel	
							L				-

N.B.: if an arbitrary resistor cannot be used, it is possible to fill the "Ohm for pull-up resistor" field with the value of the pull-up resistor that will be used. In this way the sensor characteristic curve will be calculated according to this pull-up resistor value and not to the one calculated by the software.