VT520 / AC voltage monitor

## Function and purpose

The sensor is needed for the measurement of AC 90-250V

Technical specifications

Feature	Description/Value
Sensor type	Analog sensor
Product dimensions	(Length, Width, Height) 63×40×67 mm
Packaging weight	125 g
Measured voltage	0 .. 240 V
Input	power socket IEC C14
Output	USB to RJ11 6P4C
Power Consumption	60 mW
Operating temperature	Temperature: Min. -10° C - Max.+80° C
Mounting possibilities	Insert in the socket, IEC C14
Max. distance from the unit	100 m
Manufactured in (country)	Manufactured in Slovak Republic, E.U.
HS Code	9030 33 300
Certificates	LVD, ROHS, CE

Cable wiring/pinouts

RJ11	USB	Conductor	
1	1	Red	
2	3	Green	
3	2	White	
4	4	Black	
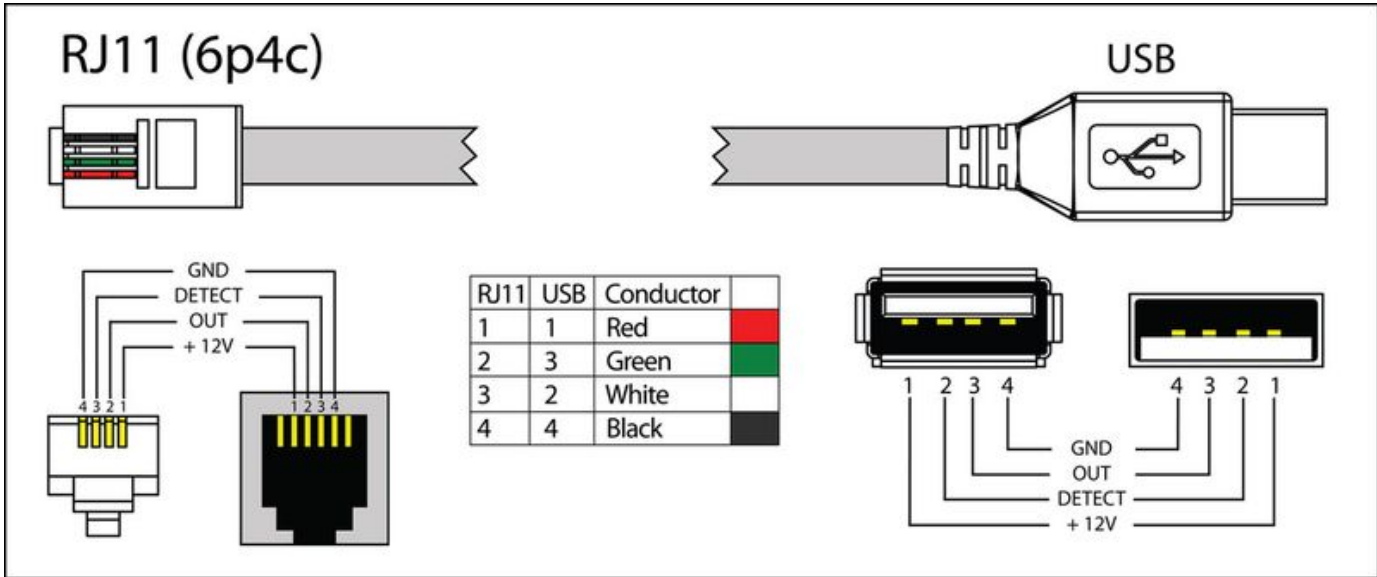
Package includes

| Package content	Description
	Voltage monitor
	RJ11/RJ12 6P4C to USB cable 1.8 meters

Drawings

VT520 v4 AC vol...onitor DWGs.pdf

Sensor installation

1. Plug the sensor to any of the "A1...A8 analog ports" of the Vutlan monitoring system using a supplied "RJ11 6P4C to USB cable".
2. Plug the sensor into the IEC14 socket.
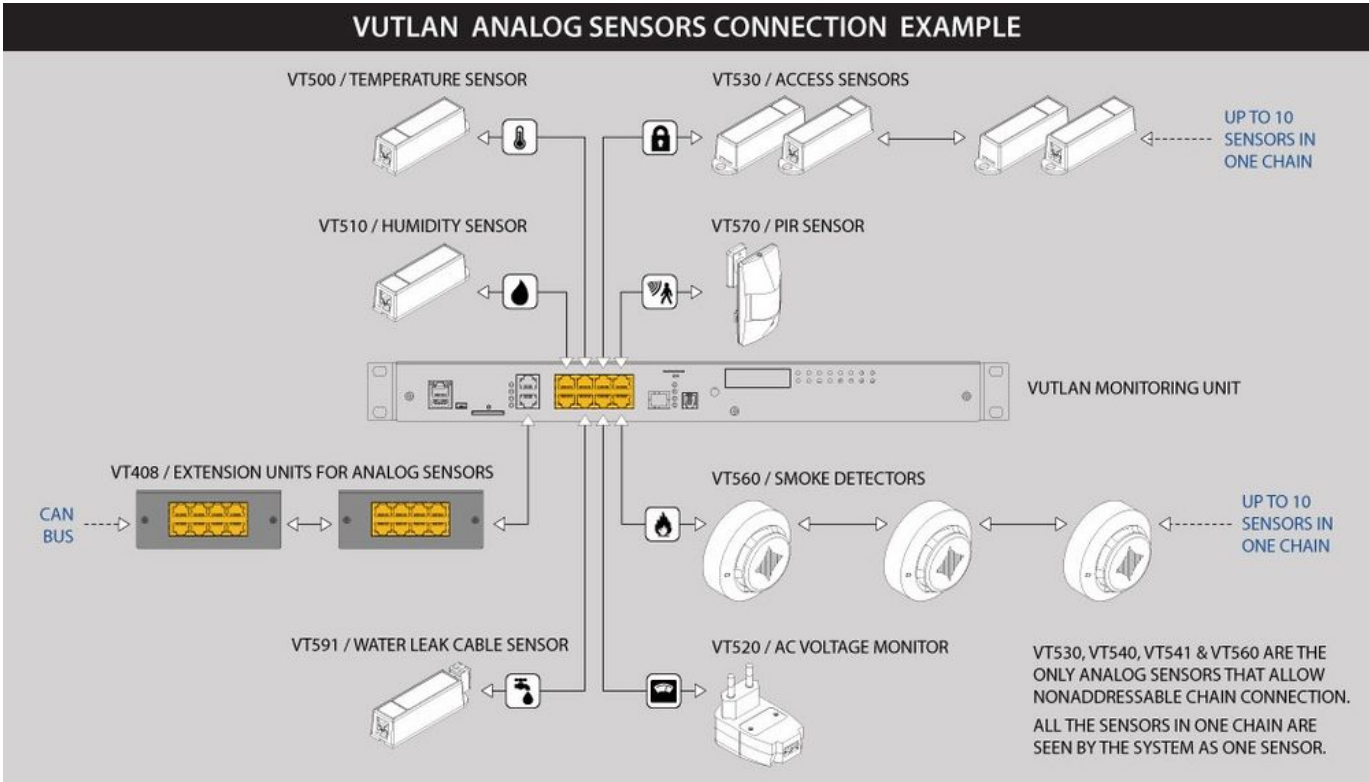3. The sensor will be detected by the system automatically.

"VT520 / AC voltage monitor" connection

VT520
AC voltage
monitor

Power strip
with IEC C14
sockets

Max. 3680W
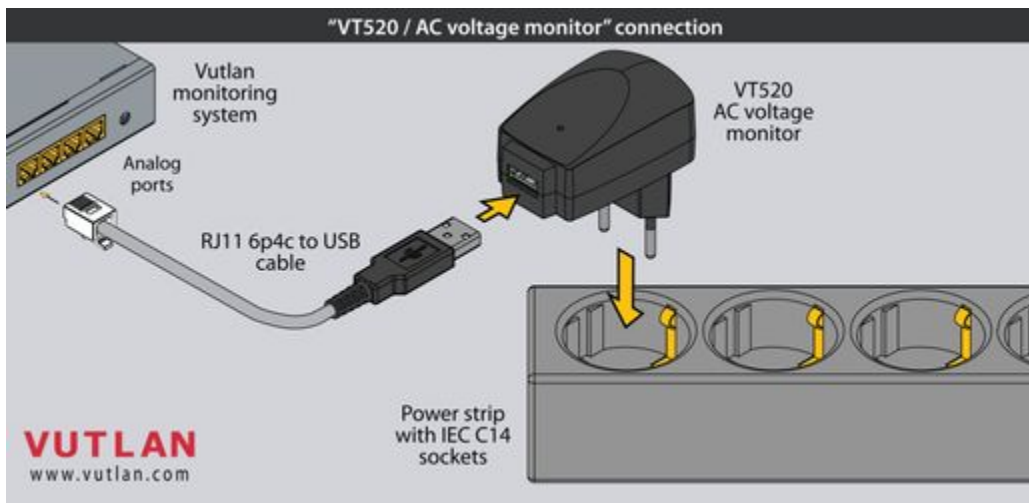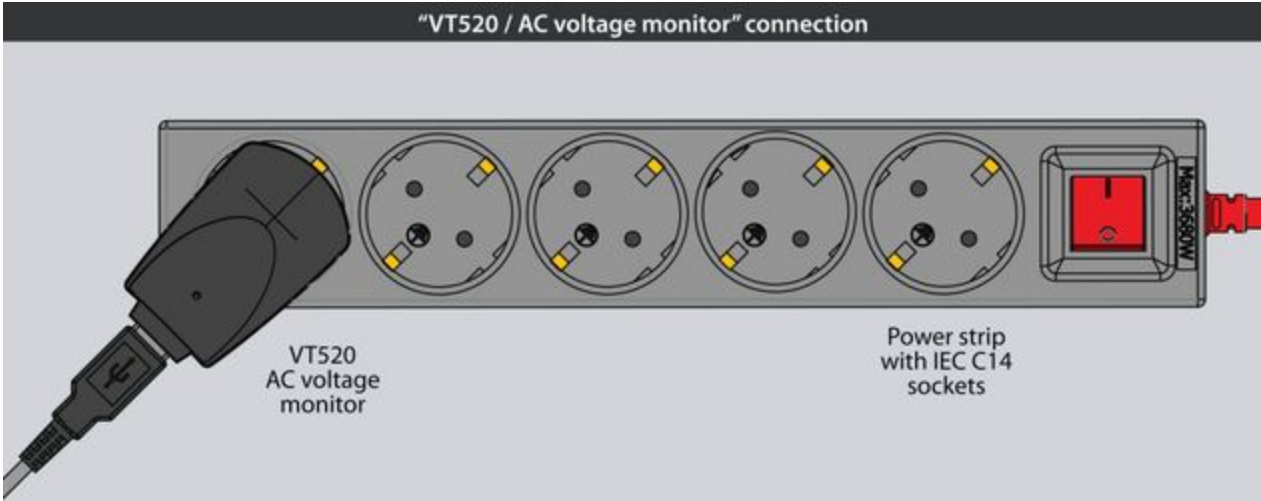
Analog sensor connection

Analog sensors connection

Connect the analog sensor by a supplied RJ-11 (6P4C) cable to any analog port "A1 .. A8" or "Sensor" port. The determination of the sensor type and connection will occur automatically.

VUTLAN ANALOG SENSORS CONNECTION EXAMPLE

VT500 / TEMPERATURE SENSOR

VT530 / ACCESS SENSORS

UP TO 10 SENSORS IN ONE CHAIN

VT510 / HUMIDITY SENSOR

VT570 / PIR SENSOR

VUTLAN MONITORING UNIT

VT408 / EXTENSION UNITS FOR ANALOG SENSORS

CAN BUS

VT560 / SMOKE DETECTORS

UP TO 10 SENSORS IN ONE CHAIN

VT591 / WATER LEAK CABLE SENSOR

VT520 / AC VOLTAGE MONITOR

VT530, VT540, VT541 & VT560 ARE THE ONLY ANALOG SENSORS THAT ALLOW NONADDRESSABLE CHAIN CONNECTION.

ALL THE SENSORS IN ONE CHAIN ARE SEEN BY THE SYSTEM AS ONE SENSOR.

⚠ If strong electromagnetic interference is present, we recommend using 3-pair cable CAN FTP for sensor connection!

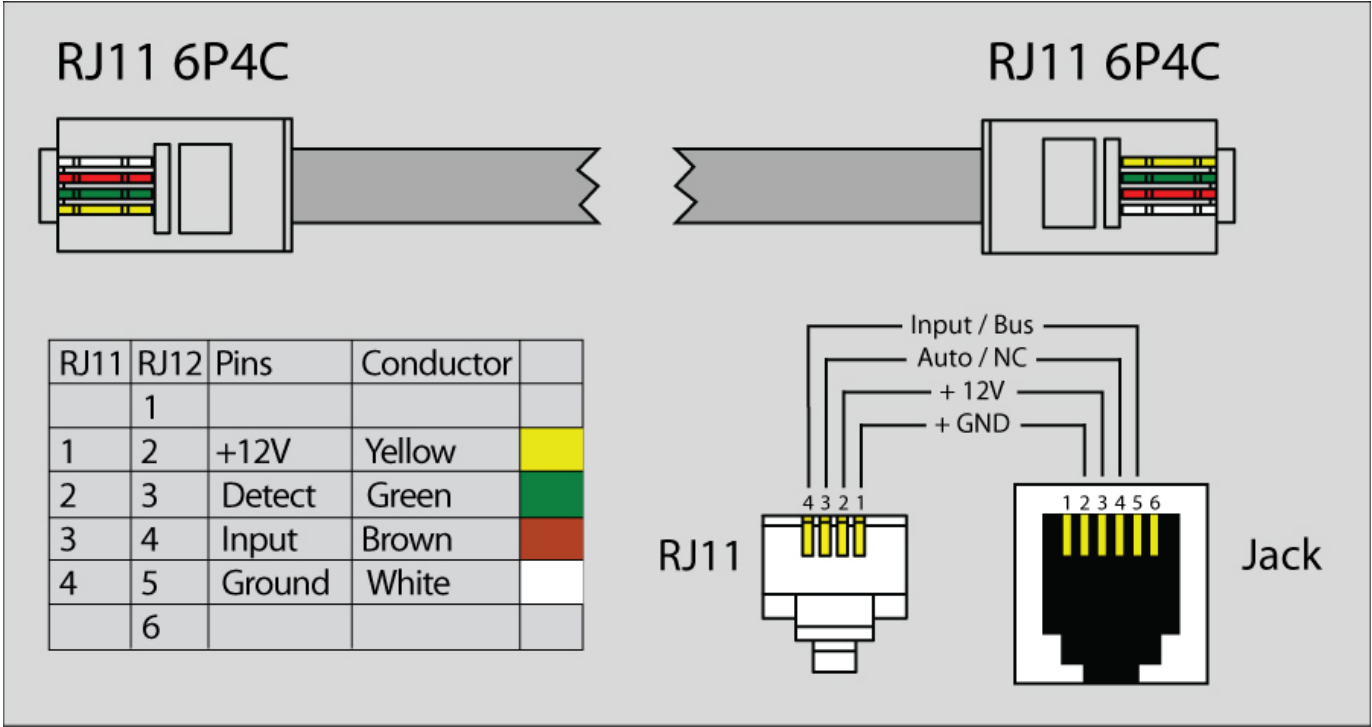## 6P4C RJ11 cable wiring / pinouts
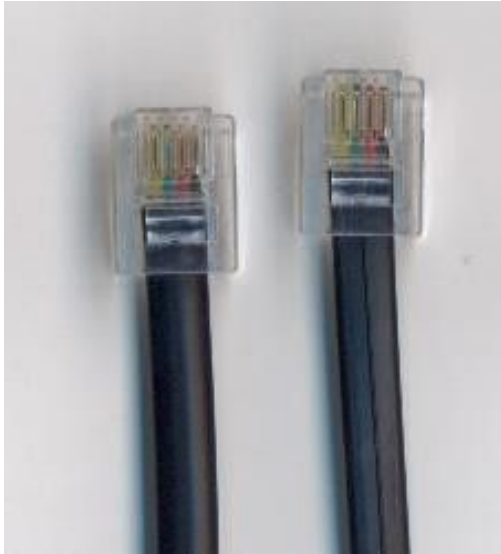
1- Yellow, 2- Green, 3- Red, 4 - Black

Colors are true for this telephone cable. Both ends match the colors and pinouts (identical).

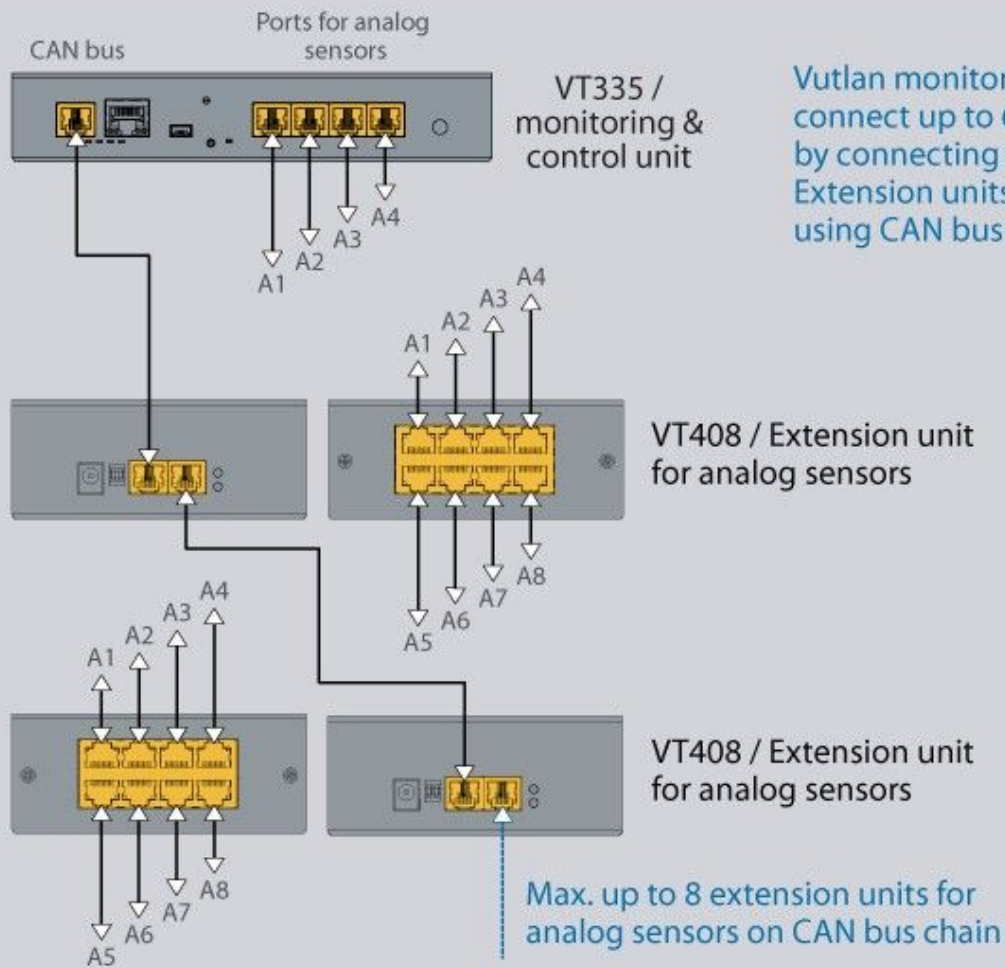Please refer to the RJ connectors comparison table:

RJ11	RJ12	Pins	Conductor	
	1			
1	2	+12V	Yellow	🟨
2	3	Detect	Green	🟩
3	4	Input	Brown	🟫
4	5	Ground	White	⬜
	6			

Daisy chain connection

Some of the analog sensors can be connected in a daisy chain. Please refer to the article "Chain connection of analog sensors".

Extending the number of analog sensors

Using CAN extension "VT408 / Sensor extension unit" it is possible to increase the number of analog sensors connected to the monitoring unit up to 80 sensors.

VUTLAN ANALOG SENSORS CONNECTION EXAMPLE

Sensor configuration

Sensor configurations

To configure a sensor, go to "Main menu" >> "System tree" and click on the sensor element in the tree. A modal window with sensor properties will pop up. Change the needed settings and click "OK" or "Apply" at the bottom of the "Properties" window.

Temperature ✕

Settings Charts All data

Name	MPU Temperature
ID	**201001**
Type	**temperature**
Class	**analog**
Current state	Normal
Current value	41.0 °C

Low alarm level	0
Low warning level	5
High warning level	45
High alarm level	50

-50 — 110

Hysteresis type	value
Value	0.30
K from (k*x + b) ❓	1.000
B from (k*x + b) ❓	0.000

OK Apply Cancel

All sensors include:

1	Name	Name is given by the system automatically. You can change it to anything you want.
3	ID	System ID of the element.
4	Type	Example: temperature, humidity, vibration.
5	Class	Examples: analog, CAN, switch, discrete.
6	Hardware port	The external port number on the device panel to which the sensor is connected (if the sensor is external).

All sensors have threshold controls:

Current state	Normal
Current value	41.0 °C

Low alarm level	0
Low warning level	5
High warning level	45
High alarm level	50

-50   110
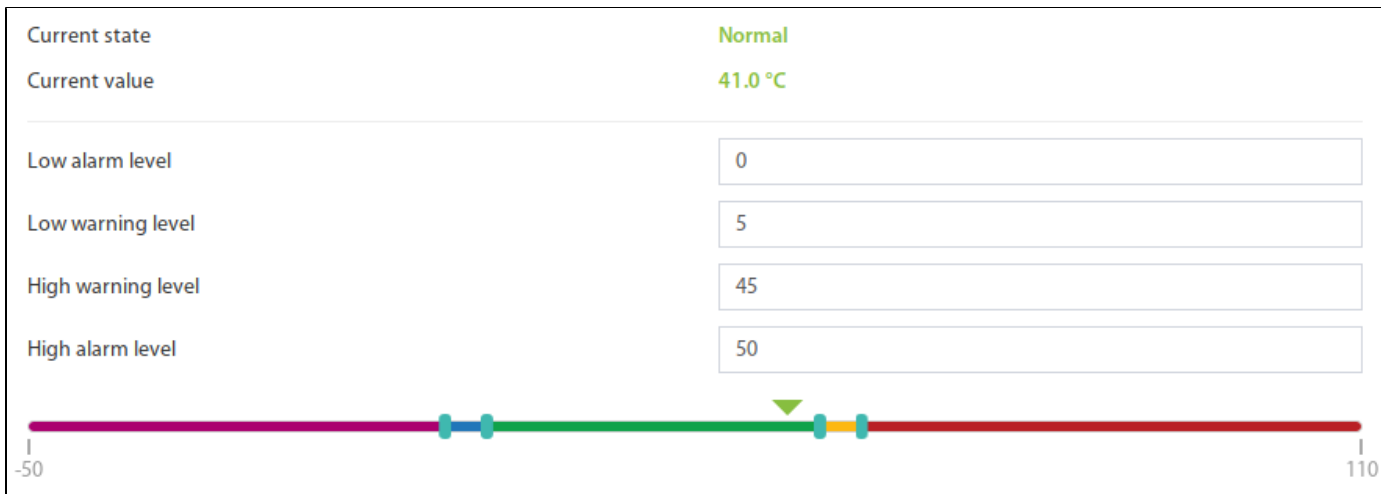
On the picture above, "Current value" equals 41.0 and is represented by the small triangle. Currently the triangle is green because it is situated in an "Normal" range. Hence the sensor says that "Current state" is "Normal". This value is used by the system "Logic schemes" menu to notify the administrator or take action.

Hysteresis

Sensors have the option of setting the hysteresis state. Hysteresis can be a time, a value or it can be disabled.

If the hysteresis is set in a time, the sensor will transmit to a new state with a delay of the specified number of seconds in the corresponding field. The time counting will begin from the moment when the measured value value of the sensor has left the current range.

Hysteresis type	time
Low alarm	1
Low warning	1
Normal	0
High warning	1
High alarm	1

If you set the hysteresis by value, the sensor transition to a new state will occur when the measured value of the sensor exits beyond the current range, adjusted for the specified hysteresis value.

Hysteresis type	value
Value	0.30

You can calibrate the sensors. Use K and B coefficients. After the calibration, please, save the values in flash memory.

⚠ To save sensor properties in the device flash memory press " 🖫 " then "OK" to confirm.

ⓘ

> ℹ️ **Example: Why do we need to use Hysteresis**
> Let's say that we have a temperature sensor. Let's say that we have set up threshold values.
>
> We have set the value 25.5 °C to be a threshold value between Normal/Alarm states.
>
> If the temperature drops just below 25.5 °C You will have a "Normal" state.
>
> If the temperature goes just above 25.5 °C You will have a "Warning" state.
>
> Sometimes the temperature may stay at 25.5 °C and jump up and down by 0.1-0.3 °C. In this case, You will get too many notifications that the sensor is showing Warning or Normal state.
>
> In this case, we need to use a Hysteresis.
>
> If the type "time" is chosen, the system will wait for a specified time before the State of the sensor is declared.
>
> If type "value" is used, unless the temperature drops by a larger amount than specified, the sensor state will not be declared.

Tuning the sensor value

Sensor readings can be tunned by a linear formula "y = k * x - b"

Example VT407 + HAT-100Q1 / AC current converter:

Metered current for HAT: from 0 to 100A (This means that the range equals 100, **k = 100**)

The output of VT407 is 0-5V (That means that the range is equal to 5)

"b" = the value that the sensor shown in WebUI when there's no current. Let's say that **b = + 0.021**

You should use the following formula for HAT: **100/5*(x-y)**

The expression formula would be 20*(x-0.021)

Example: Using fuel tanks.

Each fuel tank has it's own formula for volume vs height. Please see this useful resource for finding out such a formula.

https://www.calculatorsoup.com/calculators/construction/tank.php

In this can, You need to use non-linear formula.

- Tuning the sensor value

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