



These sensors are intended for general-purpose application in control and regulation systems for the temperature and humidity measurement in interior. The output is the voltage or current signal fully adjustable in the range 0÷10V or 0÷20mA.

Alternatively is possible a combination of active voltage or current output for humidity measurement and passive resistance output for temperature measurement (Pt100, Pt1000, Ni1000, NTC ...).

The electronic system of the sensor consists of two parts. The T+RH sensor and LCD (if possible) are located in the front panel and the main part with terminal boards is located in the box that is inserted in the installation box.

Device configuration is performed by connecting a standard USB mini B cable to PC using Windows free USB_SET application.



List of available types

Type of outputs	Humidity = I/U, Temperature = I/U		Humidity = I/U, Temperature = resistance sensor	
	without LCD	with LCD	without LCD	with LCD
View option	HTV-N	HTV-D	HTV-N-x	HTV-D-x

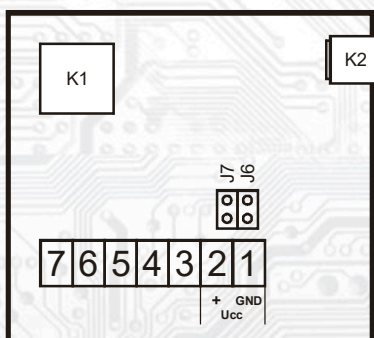
List of type of resistance sensors....x

Type of resistance sensor	Placement after x (eg HTV-N-P)
Pt 100 / 3850 ppm	P
Pt 1000 / 3850 ppm	PA
Ni 1000 / 6180 ppm	S
Ni 1000 / 5000 ppm	L
Ni 891 / 6371 ppm	J
Ntc 20kΩ	H

Basic technical parameters:

Supply voltage (Ucc)	15 - 30 VDC
Max. consumption (without load outputs)	15mA
Max. consumption (with load outputs)	55mA (OUT_1 = 20mA, OUT_2 = 20mA)
Temperature/humidity resolution	0,1°C / 0,1%RH
Accuracy - temperature	± 0,5°C (20 ÷ 40°C), ± 1°C (0 ÷ 60°C)
Accuracy - humidity	± 3% (20 ÷ 80 %RH)
Type of sensor	SHT31
Load impedance of voltage outputs	> 50kΩ
Load impedance of current outputs	< (Ucc - 13) x 50 [Ω]
Range of working temperature and humidity	max. 80°C
Range of recommended working temp	-30 ÷ 60 °C
Range of recommended storage temp. / RH	10 ÷ 50 °C / 20 ÷ 60 %RH
Protection type - head/sensor	IP40
Terminal board	CPP (max. 1mm ²)
Configuration program	USB_SET; freeware; www.regmet.cz
FW upgrade program	USB_BOOT; freeware; www.regmet.cz

Connection plan (fig.1):

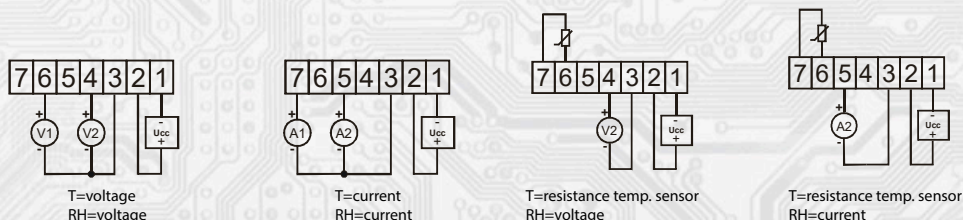


K1....connection sensor T+RH
 K2...connector USB mini B
 J6...device configuration
 J7... reset

Terminal 1.....GND, negative pole
 Terminal 2.....+Ucc, positive pole
 Terminal 3.....common pole GND
 Terminal 4.....OUT_2 (RH) - _voltage
 Terminal 5.....OUT_2 (RH) - current
 Terminal 6.....OUT_1 (T) - _voltage
 Terminal 7.....OUT_1 (T) - current

Terminal 1 and terminal 3 are galvanically connected

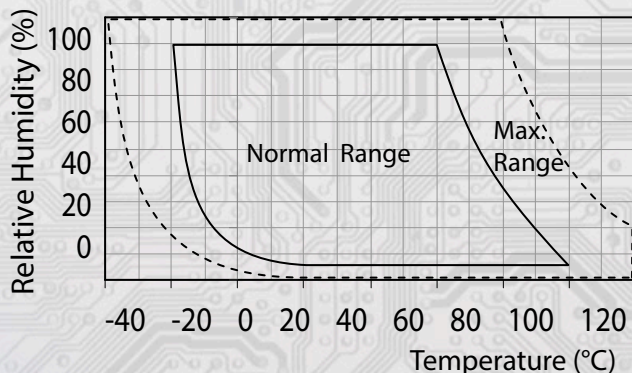
Connection of output signals and power supply (Fig. 2):



Assembly and connection:

The sensors are designed to be installed into the standard installation boxes (KU68). The electrical connection of the conductors is done on the terminal, which is on the main part of the instrument by a conductor with a maximum cross section of 1mm² according to Fig. 1 and 2. Once the terminal box is connected, the box with the main part of the instrument is inserted into the installation box, where it is advisable to fasten it somehow. Then, screw the frame of the instrument onto the installation box and connect both parts of the electronics by a flat conductor. Insert the front cover into the frame of the instrument. This completes the mechanical installation. For disassembly, proceed in the reverse order.

Working conditions of the sensor SHT31 (figure 1.)



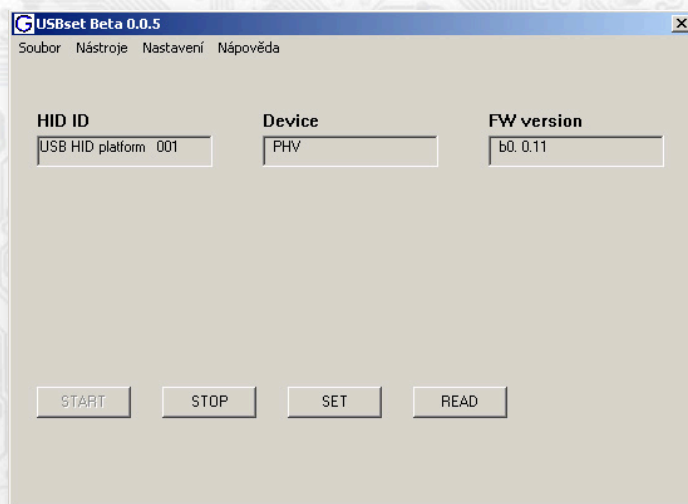
The sensor steadily works within the recommended measurement range that is 10 + 80 % RH. The long-term exposition to the high humidity, namely >80% RH causes the gradually increasing reading deviation of RH (+3% RH after 60 hours >80% RH). After returning back to normal range the RH measurement gets slowly back to calibrated values. It is possible to speed up the return to calibrated values after long-term high humidity exposition by drying at 100 - 105° C at < 5% RH for 10 hours. Long-term exposition to extreme conditions can speed up the sensor aging.

Detailed information on conditions of long-term use of the sensor SHT31 under conditions out of the standard range, especially at the relative humidity >80% RH, are shown directly at the producer's website at: <http://www.sensirion.com>

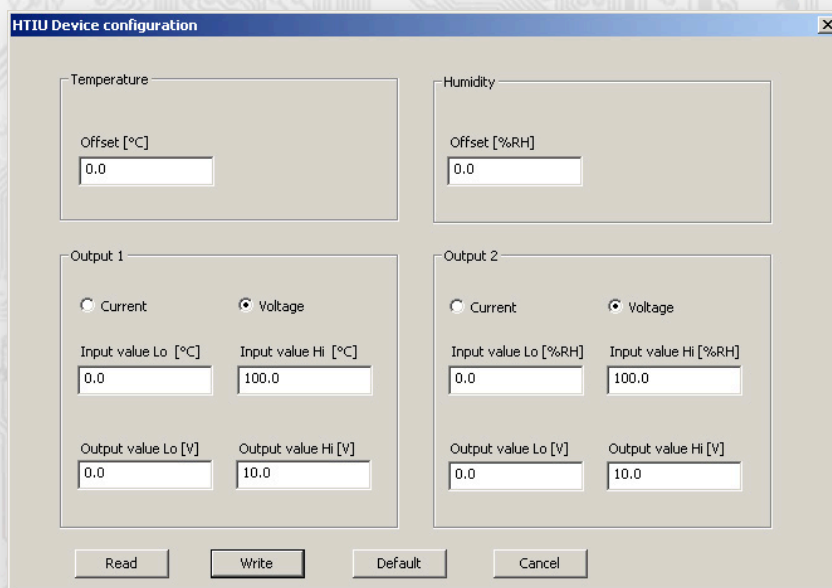
SW configuration of sensor using the USBset program:

The configuration application USBset is freely available at producer's web pages. The controlled can be configured only when the jumper J6 is inserted before the connection of supply voltage (reset). The sensor is connected with PC using the cable of USB mini B type. With connected cable the USB communication has the priority over the line RS485.

After the launching of USBset program, the basic window is opened and the connected sensor is automatically connected with the hosting PC.



With clicking on the button "SET" the configuration window gets opened.



By clicking on the "Read" button, the configuration values are read from the flash memory of the sensor.

After setting the required values and quantities, to clicking on the "Write" button, the new configuration values will be saved to flash memory sensor.

The condition for writing to the flash memory is to insert jumper J6 (enable writing of configuration values) before clicking the button "Write".

Click on the "Cancel" button to close the configuration window.

After disconnecting the USB cable, pull jumper J6 and reset the device by briefly shorting the RST jumper (J7).

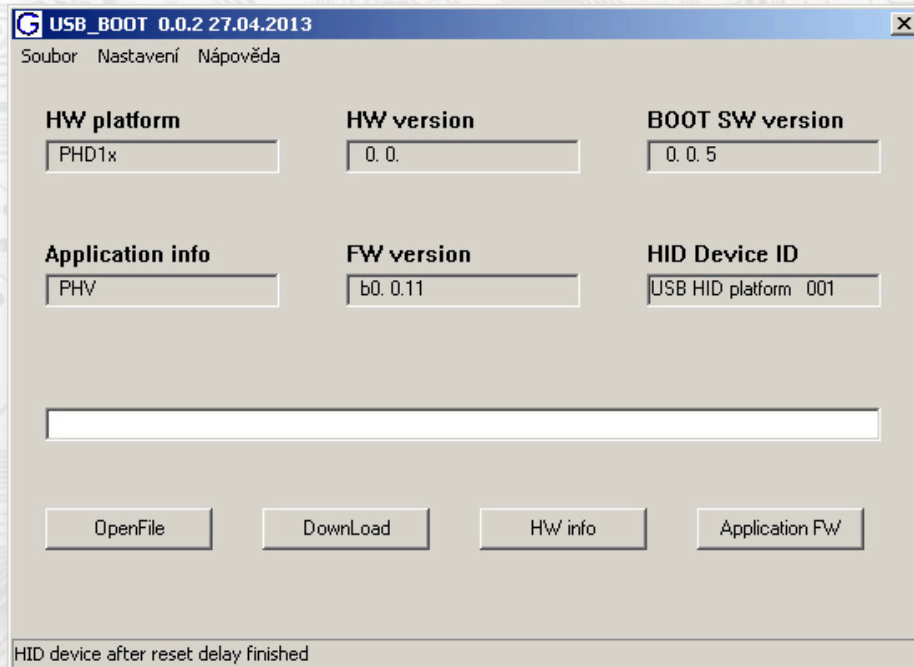
Factory default settings:

Temperature: $0 \div 50^{\circ}\text{C} = 0 \div 10\text{V}$

Relative humidity: $0 \div 100\% = 0 \div 10\text{V}$

Variation of the application part FW:

After the USBset program launching click on the Tools – BootLoader and the windows gets opened:



The work with application is conditioned by insertion of the jumper J6 (authorisation for configuration values recording).

Using the button "OpenFile" the new application FW is chosen and using the button "DownLoad" the FW variation gets started, being automatically controlled by PC and the device.

For the maximum simplicity and safety every device has unambiguous identification of HW platform. This designation describes HW topology and also defines what application FW can be used for the specific type of HW. This information can be read through the button "HW info".

The application FW are distributed in data format ".reg". In case of application variation the information on HW platform and HW version are always read after the connection of PC with the device. At the same time, the HW platforms descriptors and HW versions from the file ".reg" are read. Provided HW platform and HW version are not compatible, the FW variation cannot be done. Provided the communication failure occurs during the application FW variation, for example due to the supply voltage drop, the application SW will not be functional. In such case the automatic launching of "bootload" process as well as the automatic reading of HW info will not work. The Bootloader in the device gets always activated after the reset, thus it is necessary to reset manually. Using the RESET jumper or the simple disconnection and subsequent connection of supply voltage.

Provided the automatic sequence of FW variation launching is damaged:

- switch off the device or connect the jumper at RESET pins
- launch the bootload process using the button "DownLoad"
- switch on the supply voltage or release the RESET jumper
- delay between the activation of button "DownLoad" and the switching on or by the RESET shall be shorter than 2s.

After the USB cable disconnection the jumper J6 is pulled out and the device reset is performed using the short shorting of RST jumper (J7)

The integrity check of content of memory:

The bootloader as well as the application are protected by control total sums. Provided the data integrity is broken, the content of FLASH memory MCU is damaged and the damaged program will not be launched.