QuantaDat transmitter system

Measuring system with multi-sensor technology

Complete solutions for the process industry

Table of contents

Scope of application:

This manual is valid for all QuantaDat transmitter systems with firmware version V01.00 C001 etc. Changes of the last digit of the firmware version define only minor changes which have no influence on the operation of the device.

1. General

The QuantaDat transmitter has been designed for a fixed mounting and is used for applications with high demands on measurement accuracy, stability and flexibility. This robust measurement transmitter has been developed for the installation in climatic controlling systems and is designed modularly. It employs 4 measurement channels and therefore up to 4 external probes can be operated at once. Besides the 4 analogue outputs, the QuantaDat employs also of a digital RS-485 interface.

Specific characteristics:

- Big graphical display with LED backlight
- Intuitive, self-explanatory device menu, operable by 3 front buttons
- Modular assembly (e.g. with relay contacts)
- Multi-sensor technology (up to 4 probes connectable)
- 4 scalable and adjustable analogue outputs
- 1 integrated RS-485 interface
- Simulations mode for output of fixed values on display and analogue outputs
- Integrated climatic parameter calculator
- Password protected menu access
- Permanent online inspection of all functions
  and many more…

2. Scope of delivery

The QuantaDat contains:

- QuantaDat measurement transmitter
- Protection plugs for cable screw connections
- Cable fixation bar (already integrated in housing bottom)
- Cable glands (already screwed on housing bottom)
- Protection membrane in housing bottom (to be pierced for cable insert from the rear)
- Short operation manual / mounting instructions as hard copy

Please check the contents of the delivery. Incomplete deliveries will be completed immediately by Novasina or your local Novasina distributor.

3. Safety

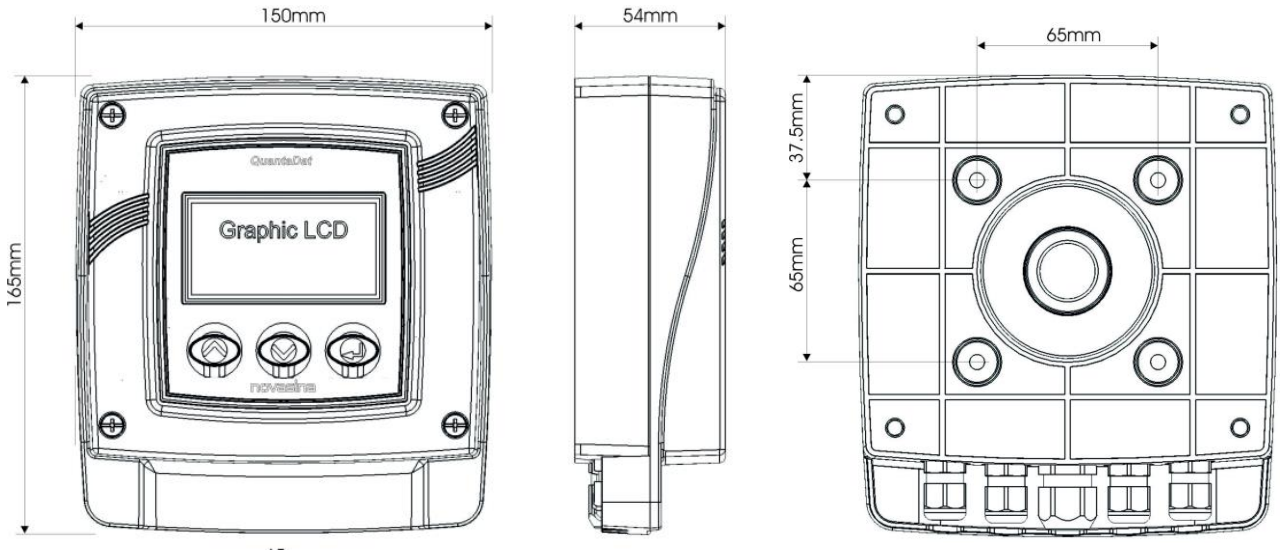
This instrument has left the factory in a faultless condition. No inappropriate modifications are allowed under the terms or the warranty. Please consider all notices and warning signs on the instrument and in this operating manual.

Please also note:

- This instrument has been developed only for the measurement of clean air within the defined specifications, operate the instrument only for this purpose. In case of other applications, outside of these specified uses, the supplier accepts no responsibility for any damage caused.
- The installation work shall be only done by skilled personnel (electrician).
- The instrument may only be operated under the specified operating conditions.
- Any faults that may occur and cause damage to material and people, additional safety precautions should be implemented. In case of any fults, the defined operating conditions have to be observed (e.g. limit switch etc.).
- The instrument is not adequate for the installation in rooms with explosion hazard.
- The installation has to be effected in accordance with the local electrical installation regulations as well as this operating manual.
- The instrument contains ESD-sensitive parts. Please follow the indicated safety measures.
- Use only original Novasina accessories and spare parts.
- Without any written approval by Novasina no adaptations and modifications shall be undertaken on the instrument.

4. Product description

4.1. Dimensions



4.2. Technical data

Description	**QuantaDat** 4 channel multi-sensor transmitter system		
Power supply	24V +/- 15% AC or DC (galvanic isolated) Maximum ratings / permissible voltage range: DC: 19..39V AC: 19..27.6V		
Power consumption	max. approx. 3W		
Display	Graphical display with LED backlight, resolution 128 x 64 Pixel		
Display resolution	Humidity	0.1% RH	
	Temperature	0.1°C	0.1°C
	Mixing ratio	0.001 g/kg	0.01 gr/lb
	Water vap. partial press.	0.01 mbar	
	Dew point temperature	0.1°C td	0.1°F td
	Specific enthalpy	0.1 kJ/kg	0.1 Btu/lbm
	Absolute humidity	0.01 g/m³	0.01 gr/ft³
Analogue outputs (4 outputs)	4 scalable analogue outputs, current 0/4..20mA or voltage 0/2..10V Load (I): min. 0 Ω / max. 500 Ω Load resistance (U): min. 10 kΩ / max. ∞ Ω The analogue outputs are protected against external voltage of ±40V On an unloaded analogue output, a voltage of 15V can be applied if the device output is configured on voltage settings in the device menu.		
Digital outputs	RS-485 *(Modbus-RTU under development)*		
	2 relay contacts, switching power <=50V/2A/60W *(only relay version)*		
Housing material	ABS - lid blue RAL 5014, bottom grey RAL 7035		
Protection class	IP54		
Soldering material	lead free (RoHS compliant)		
Working temp.	0 to 50°C		
Storage temperature	-10 to 60°C (non-condensing)		
CE-/EMC	Safety: IEC 61010-1:2010 EMC: IEC 61000-6-2:2005, EN 61000-6-2:2005 IEC 61000-6-3:2006+A1:2010, EN 61000-6-3:2007+A1:2011		

4.3. Electrical installation

Typically recommended wiring installation :

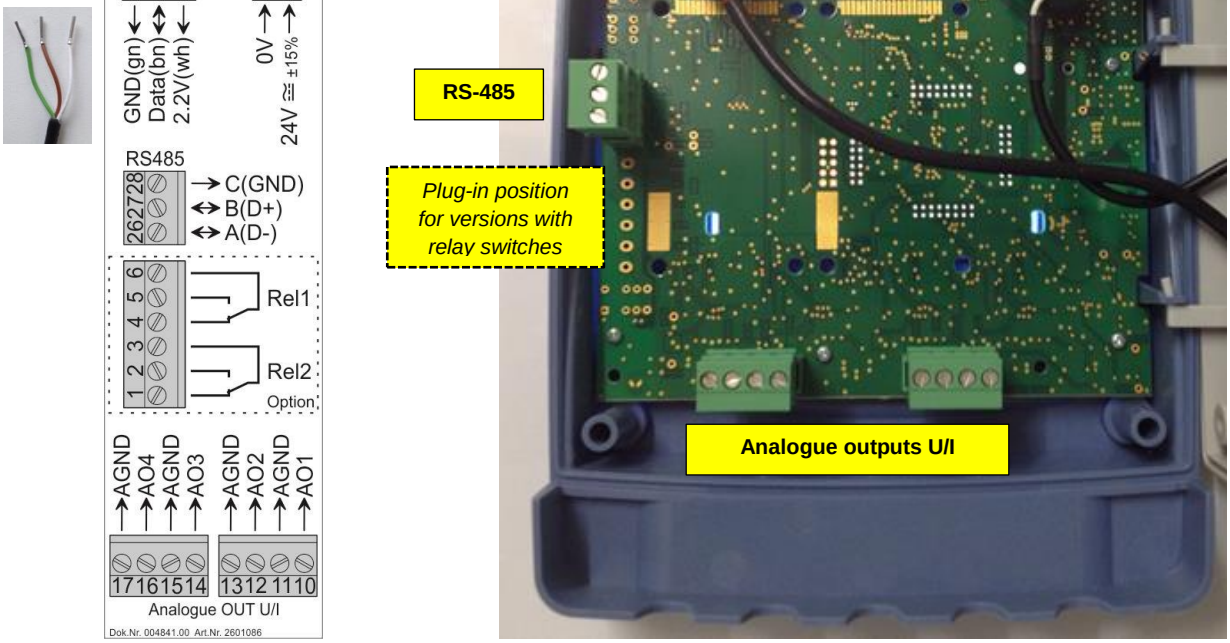
	Cable specification	**Comment**
Power supply	Single cable of 0.5...0.75 mm2 (22 ... 18 AWG) with PVC isolation or equivalent 2-fold cord cable.	Clamping range of connecting terminal: 0.2 - 2.5 mm2
Signal outputs	Single cable of 0.25...0.5 mm2 (24 ... 20 AWG) twisted with screen & PVC isolation or equivalent 2/4/6/8 multi-core cable.	Clamping range of connecting terminal: 0.2 - 2.5 mm2
RS-485 interface	1 twisted pair + C(GND) connection recommended, screened	acc. to EIA-485
Relay contacts	Cable dimensions dependant on the switching power needed	only for version with relay

Note: cable specifications depend on the installation and have to be defined by the designer or installer.

EMC: if environmental conditions vary from the standards (see Technical data) it is recommended to take the following measures:

- Wires emitting interference must be separated from measurement and analysis units
- Parallel guidance of measurement- and electrical power-cables should be avoided
- Twisted Pair and shield is not required for communication cables (probes)

Wiring diagram:



Remark: If more than 1 probe is connected, the single wires can be fixed in parallel in the same screw terminal.

5. Initial operation

Before the initial operation the power supply wiring and the analogue output configuration should be checked (see wiring diagram). Before the power supply is switched on, the housing lid must be closed.

Important remark: Antecedent, the power supply fuse protection has to be verified according to the local prescription. Voltages over 39VDC/27.6VAC result in a severe damage of the device!

After switching on the power supply an automatic start-up is carried out. During the first 3 seconds no display appears since the device runs is starting-up. Afterwards the text „novasina/QuantaDat" as well as the actual instrument software is displayed for 5 seconds. Subsequently the connected probes are read out and the measurement starts respectively the actual measurement values are displayed. In case of possible hard- or software failures, the system shows an „Error“ message and a failure code. The device is monitored permanently and failures are displayed immediately.

5.1. Multi-sensor device architecture

On the QuantaDat system, measuring points (Meas. Point), which are identified with A to D and channels (Channel), which are identified from 1 to 4 are distinguished. A measuring point defines the physical probe respectively the point, where the reading is taken, e.g. measuring point A is located in room A and reads relative humidity and temperature if a nSens-HT is connected.

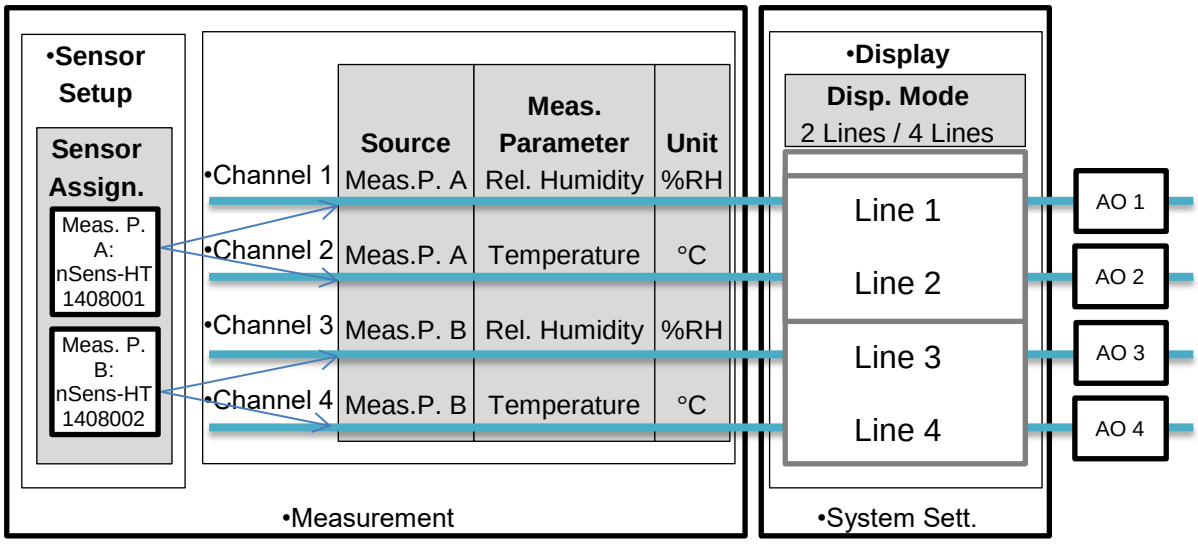
On the other hand, a channel defines a data path of a measuring parameter. To each channel an available measuring parameter can be assigned. The assignment defines the display line as well as the analogue output, means the measuring value from channel 1 is output to line 1 and analogue output 1. This assignment is fixed. The measuring parameter allocation is carried out by definition of the data source (Source), e.g. measuring point A (Meas. Point A) in the channel. Afterwards one of the measuring parameters (Meas. Parameter) which is provided by the measuring point can be selected and the measuring unit (Unit) can be defined.

Example: Installation of two humidity/temperature sensors in one room each.

- Sensor A = Measuring point A is installed in room A
- For channel 1 the data source of measuring point A with parameter relative humidity and unit %RH is defined
- For channel 2 the data source of measuring point A with parameter temperature and unit °C is defined
- Sensor B = Measuring point B is installed in room B
- For channel 3 the data source of measuring point B with parameter relative humidity and unit %RH is defined
- For channel 4 the data source of measuring point B with parameter temperature and unit °C is defined

Output: Display line 1 & AO1 = Measuring value %RH from room A
Display line 2 & AO2 = Measuring value °C from room A
Display line 3 & AO3 = Measuring value %RH from room B

Display line 4 & AO4 = Measuring value °C from room B



5.2. Probe management

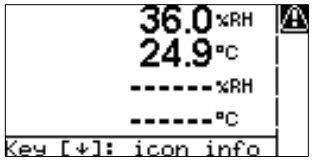
To the QuantaDat transmitter up to 4 external probes can be installed and operated at once. The system searches after the first start-up automatically for connected probes and assigns the measuring points (A to D). The automatically defined probe assignment can be adapted manually if required.

The probes are assigned by an internal and unique identification number and keep their original measuring point assignment. If the assignment fails because the probe does not respond, the search can be also started manually. With a manual search the found probes are not assigned to any measuring point. This can be carried out with a manual assignment in menu "•Measurement" →"•Sensor Setup" →"•Sensor Assign."

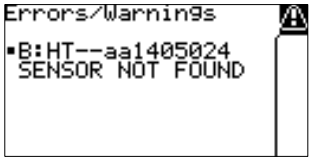
Important remark: Already known probes keep their measuring point assignment. Only newly found probes must be assigned to free measuring points.

If more than 4 probes are available, only the first 4 identified are considered. After this the search is aborted.

If no probe is found, the system can be started anyway for e.g. output a fixed measuring value through the analogue outputs using the manual value function.



If a known probe cannot be found anymore because it was disconnected and the address was not assigned to a new probe, the instrument indicates an error at the assigned measuring point. This is indicated by a triangle symbol in the right ICON column.



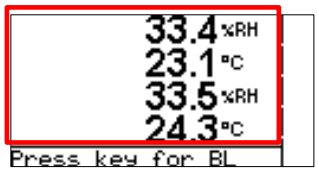
If the "Arrow down" button is pressed, the corresponding ICON message is shown.

In the menu point "Sensor Assign." a not found but already assigned probe is shown with the addition nf (not found) behind the serial no. (in this example for measuring point B)

As soon as the probe is connected again, respectively found, all measuring values are displayed on the measuring screen.

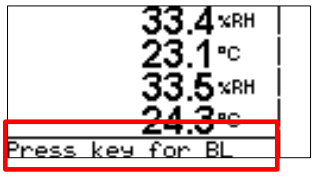
Remark: After connecting the probe, the display in menu point "Sensor Assign" is not refreshed automatically and the addition nf is still shown. It will only be switched off when the display is refreshed, for example by changing to another menu point or changing to the measuring screen.

5.3. Device display in the measuring mode



Measuring screen

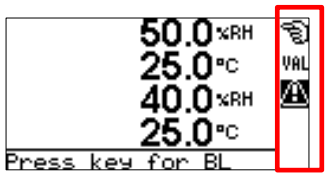
Shows the actual measured values and parameters.



Info line

Display of button commands

- "Return key" for menu access
- "Return key" or "Arrow button" for backlight activation
- "Arrow up button" for display of probe assignments, measuring unit, probe type and serial number

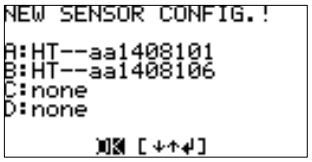


ICON column

Display of error messages (triangle symbol), manual value override status (hand symbol) and use of a simulation value probe (VAL symbol).

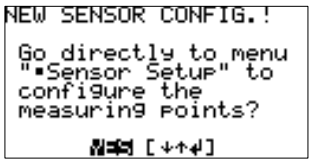
5.4. Sequence for first system start

Device searches automatically for new connected probes, which are assigned automatically to the measuring points. The probe, which is first found will be assigned to measuring point A, subsequently measuring point B etc. This search routine is only carried out if the system has not any identified probes yet.



As soon as all probes are found, the system checks the compatibility. Afterwards confirm with "OK".

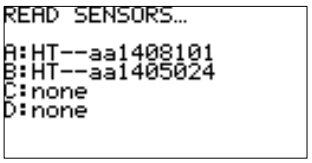
In case of an incompatibility the probe won't be removed from the list but the following error message appears:
(example measuring point A)
NEW SENSOR CONFIG.!
A:Capability error(▲)



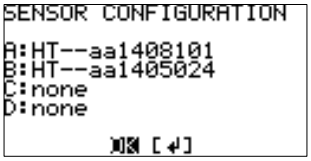
Only valid if more than 1 probes are connected:
As from the 2nd connected probe, there is the possibility to access with "YES" directly to the "•Sensor Setup" →"•Sensor Assign." menu for manual assignment of the measuring points.

If confirmed with "NO", the automatic measuring point assignment is adopted.

5.5. Sequence for system start without changes



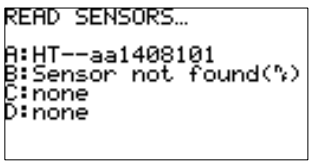
The device initialises all known probes.



All outputs are operated as soon as the search has been completed.

After 10s the system switches automatically to the measuring mode (display of measured values) or if preceding confirmed with "OK".

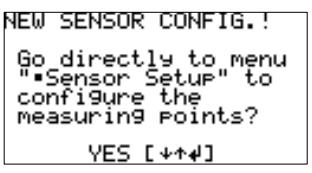
5.6. Sequence for system start with changes (e.g. after a probe replacement)



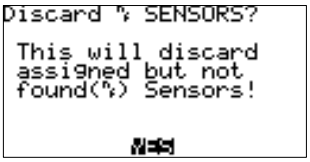
Device searches for configured probes. In case of not found probes the message "Sensor not found (nf)" is shown instead of probe type and serial number.

The display freezes at "New sensor config.!" but continues to operate the outputs of the found measuring points.

Confirm by pressing the return key



Confirm with "YES" to access to menu "•Sensor Setup" and the menu command "Search Sensors".



Confirm by pressing the return key again, the system asks if the measuring point assignments of not found but assigned sensors should be discarded/deleted.

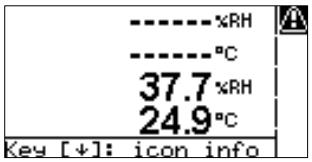
Confirm with "YES" by pressing the return key

Remark:
If confirmed with "NO" the measuring point assignments of not found probes will be kept and new probes can be assigned to free measuring points if some are available.

The new probe is found and can be assigned manually in the menu "•Sensor Setup"→ menu parameter "Sensor Assign."

probe replacement with operational system

The nSens-HT, nSens-T and nSens-VAL-HT can be replaced during their operation.



After disconnection of the probe to be replaced, no measuring values are displayed and the error message ICON shows up.

When the replacement probe is connected, the system asks automatically if this should replace the old probe.

By pushing the return key this is confirmed and the replaced probe is assigned to the same measuring point. Thereby the originally defined parameters are not changed.

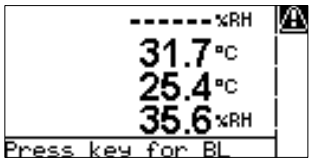
Afterwards the system operates immediately, the measuring values are displayed and the signal outputs are activated.

Important! To be observed when probes are replaced!

Since the QuantaDat is a system, which can operate several probes at once the automatic probe assignment should be used carefully. During the replacement of several probes at once there might be the risk to mix up the probes. In order to avoid this, the automatic probe search routine is stopped as soon as more than one probe is disconnected.

If a probe has been identified but the message "NEW SENSOR FOUND!" not confirmed yet and another probe is removed, the message "AUTO SEARCH STOPPED!" is shown.

In such cases the assignment must be done manually using the menu ●Measurement/●Sensor Setup/Sensor Assign. Or the original status must be restored by reconnecting the "old" probes and replace them one by one.

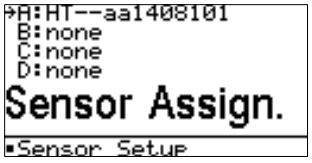


If a probe is replaced by another type of probe, which is unable to provide a measuring parameter which was already assigned to a measuring channel, an error message ICON appears.

Example: a nSens- HT (humidity/temperature) probe is replaced by a nSens-T (only temperature) and on channel 1 the parameter relative humidity is configured -> on this line no value is displayed and ------%RH is shown.

The error message details are shown if requested.

5.8. Manual change of sensor assignment



Select the serial number of the probe, which is placed at the correspondent measuring point in menu "•Measurement"→ "•Sensor Setup" →"Sensor Assign."

By pushing the return key, the serial number starts flashing. Use the "Arrow up" and "Arrow down" button to select and assign the identified probe.

By pushing the return key again, the assignment is confirmed.

If an already assigned probe is assigned to another measuring point, it will be removed from the original measuring point. At the original measuring point an exclamation mark is shown behind the probe serial number, which warns from the upcoming removal of the assignment. If the new assignment is confirmed by pushing the return key, the indication "none" appears on the original assignment display line.

Attention in case of manual probe assignment!

The channel assignments refer to the measuring point. If 2 probes, which for example are installed in one room each are interchanged, the measuring value of the other (wrong) room is shown the correspondent analogue outputs are operated. Therefore a manual probe assignment makes only sense for the first start-up after the automatic assignment routine. For example to get a logic sequence of the probes.

6. Calibration / verification of measuring values

For calibration and verification of the humidity points Novasina humidity standards are recommended. These humidity generators are easy to use and are reusable.

For the verification of the whole measurement range Novasina offers a set with 5 SAL-SC including carrying case and probe adapter rings. For an optimal calibration and/or verification the room temperature should be between 15...30°C and should not vary more than +/-0,2°C. In order to allow the standards to generate an accurate and stable air humidity the SAL-SC must be well sealed around the probe. For this purpose an adapter with O-ring can be used, which is put inside the SAL-SC hole and then put over the probe. The standards should be adapted to the climatic ambient conditions approx. 1 hour before they are used.

If handled properly the SAL-SC generate very stable and accurate relative humidity and can be used as veritable humidity generators.

Art. No. 1110885 - SAL-SC 11
Art. No. 1110855 - SAL-SC 33
Art. No. 1110857 - SAL-SC 53
Art. No. 2600219 - SAL-SC 58

Sensor-Checks SAL-SC

(rh standards)

Reusable humidity standards based on saturated salt solutions in plastic cylinders with moisture permeable membranes. Each salt is delivered in a well-sealed box. Sensor Checks SC are obtainable for the following values (at 25°C) :

11.3 % rh	75.3 % rh
32.8 % rh	84.3 % rh
52.9 % rh	90.1 % rh
57.6 % rh	97.3 % rh

Humidity values in the temperature range 15°.... 30°C:

11.3 ..... 11.3% rh / 15....30°C
33.3 ..... 32.4% rh / 15....30°C
55.9 ..... 51.4% rh / 15....30°C
60.7 ..... 56.0% rh / 15....30°C
75.6 ..... 75.1% rh / 15....30°C
85.9 ..... 83.6% rh / 15....30°C
90.9 ..... 89.9% rh / 15....30°C
97.9 ..... 97.0% rh / 15....30°C

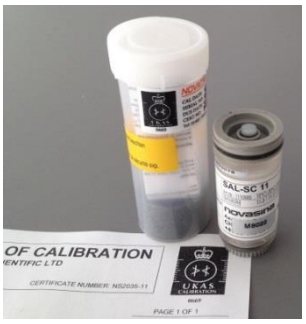
The precision corresponds to the

Art. No. 1110859 - SAL-SC 75
Art. No. 2518965 - SAL-SC 84
Art. No. 1110896 - SAL-SC 90
Art. No. 2518966 - SAL-SC 97

Important: please consult the operation manual of your instrument to see which points can be calibrated. Other SAL-SC can be used for verification.

Greenspan Report 1977
typically +/- 0.3 % rh

Weight : 90 g



Art. No.1111044 - SAL-SC 11C
Art. No.1111037 - SAL-SC 33C
Art. No.1111040 - SAL-SC 53C
Art. No.1111035 - SAL-SC 75C
Art. No.1111032 - SAL-SC 90C

Sensor-Checks SAL-SC with European certificate

Reusable humidity standards based on saturated salt solutions in plastic cylinders with moisture permeable membranes. Each salt is delivered in a well-sealed box. Sensor Checks SAL-SC are obtainable for the following values (at 25°C) :

11.3 % rh
32.8 % rh
52.9 % rh
75.3 % rh
84.3 % rh
90.1 % rh

Internationally accredited laboratory

UKAS CALIBRATION

All Novasina humidity standards can also be supplied with an internationally recognised certificate from an accredited European laboratory (UKAS England).

Weight : 90 g

Art.No. 111 7847
Check set *(standard)*

Art. No. 1117841
Case without content

Set with 5 Humidity Generators SAL-SC

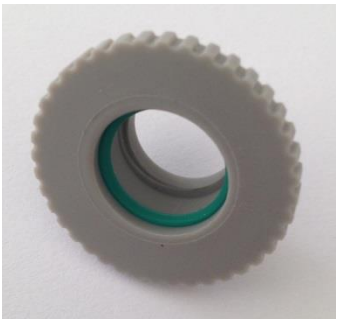
Reusable humidity standards SAL-SC in a case delivered incl. the needed adapters for Novasina probes and factory calibration certificates.
Case set contains:
- SAL-SC 11
- SAL-SC 33
- SAL-SC 53
- SAL-SC 75
- SAL-SC 90
- Factory calibration certificates of SAL-SC
- 2 adapters for Novasina probes

Humidity values in the temperature range 15°... 30°C :

11.3 ..... 11.3% rh / 15....30°C
33.3 ..... 32.4% rh / 15....30°C
55.9 ..... 51.4% rh / 15....30°C
75.6 ..... 75.1% rh / 15....30°C
90.9 ..... 89.9% rh / 15....30°C

The precision corresponds to the Greenspan Report 1977
typically +/- 0.3 % rh

Weight : 900 g



Art. No. 2601143

Adapter SAL-SC for nSens probes

Plastic adapter for humidity standards. Used for diameter reduction and radial sealing around the nSens probe with diameter 13mm.

With integrated green coloured rubber sealing ring

Dimension : Out.diameter 30 mm
Inner diam.13 mm

Weight : 5 g

Material : Thermoplastic resin

Thermal insulation styrofoam box

A styrofoam box providing optimal insulation and temperature stabilisation of a SAL-SC check during the calibration procedure. Consisting of two half-covers for simple temporary mounting.

Dimension : 100 x 65 x 50 mm

Weight : 10 g

Material : thermal insulating styrofoam PPE

Art. No. 1117847

7. Device menu / function overview

7.1. Standard menu

Menu point	Function - Short description	Display	Factory settings	Remarks & links
•Measurement	Access to main menu **Measurement**			chapter 8.1
•Sensor Setup	Access to submenu "Sensor Setup"			
Search Sensors	Start searching process			
Sensor Assign. A	Selection of probe serial no. for measuring point A	→A:HT--aa1408101 B:none C:none D:none Sensor Assign. •Sensor Setup		
Sensor Assign. B	Selection probe S/N measuring point B			
Sensor Assign. C	Selection probe S/N measuring point C			
Sensor Assign. D	Selection probe S/N measuring point D			
Replace Mode	Selection replacement mode. Behaviour in case of probe replacement Confirmation, Manual, Automatic		Confirmation	
Exit	Quit submenu			
•Channel 1	Access to submenu "Channel 1"			
Source	Selection of measuring point source, None, Meas. Point A...Meas. Point n	Meas. Point A Source •Channel 1	Meas. Point A	
Meas. Parameter	Selection of measuring parameter (depending on selected source) Rel. Humidity, Temperature, Mix. Ratio, Vap.Part.Press., Dew point, Spec. Enth., Abs. Humidity.	Rel. Humidity Meas. Parameter •Channel 1	Rel. Humidity	
Unit	Selection of measuring unit for defined parameter	%RH Unit •Channel 1	%RH	
Exit	Quit submenu			
•Channel 2	Access to submenu "Channel 2"			
Source	ditto	Meas. Point A Source •Channel 2	Meas. Point A	

Menu point	Function - Short description	Display	Factory settings	Remarks & links
Meas. Param.	ditto	Temperature Meas. Parameter ▪Channel 2	Temperature	
Unit	ditto	°C Unit ▪Channel 2	°C	
Exit	ditto			
•Channel 3	Access to submenu "Channel 3"			
Source	ditto		None	
Meas. Param.	ditto		-	
Unit	ditto		-	
Exit	ditto			
•Channel 4	Access to submenu "Channel 4"			
Source	ditto		None	
Meas. Param.	ditto		-	
Unit	ditto		-	
Exit	ditto			
Abs. P. Const.	Value setting for absolute ambient pressure	1013.25hPa Abs. P. Const. ▪Measurement	1013.25hPa	
Exit	Quit submenu			

Menu point	Function - Short description	Display	Factory settings	Remarks & links
•Analog Outs	Access to main menu **Analogue Outputs**			**chapter 8.2**
Signal Type	Signal type setting for all 4 outputs 4..20mA, 0..20mA, 2..10V, 0..10V	4..20mA Signal Type ▪Analog Outs	4..20mA	
•Analog Out 1	Access to submenu "Analog Out 1" Source is value of channel 1			
Range L	Measuring value for 0V/0mA resp. 2V/4mA output value. depending on defined source	0.0%RH Range L ▪Analog Out 1	0%RH	
Range H	Measuring value for 10V/20mA output value. depending on defined source	100.0%RH Range H ▪Analog Out 1	100%RH	
On Fail	Output in case of sensor failure The current respectively the voltage value can be defined.	0.0mA On Fail ▪Analog Out 1	0mA/0V	
Adj. Clear	Clear adjustment. Displayed only if analogue output is adjusted.			
Adjust...	Adjusting of analogue output			

Menu point	Function - Short description	Display	Factory settings	Remarks & links
	Low range corresponds to 20% of the defined full measuring range. High range corresponds to 80% of the defined full measuring range.	020.0 %RH 1st Adj. Val.? Enter ext. disp. val. 080.0 %RH 2nd Adj. Val.? Enter ext. disp. val.		
Exit	Quit submenu			
•Analog Out 2	Access to submenu "Analog Out 2" Source is value of channel 2			
Range L	ditto		-20°C	
Range H	ditto		60°C	
On Fail	ditto		0 mA	
Adj. Clear	ditto			
Adjust…	ditto			
Exit	ditto			
•Analog Out 3	Access to submenu "Analog Out 3" Source is value of channel 3			
...	ditto			
Exit	ditto			
•Analog Out 4	Access to submenu "Analog Out 4" Source is value of channel 4			
...	ditto			
Exit	ditto			
Exit	Quit submenu			

Menu point	Function - Short description	Display	Factory settings	Remarks & links
•Manual Value	Access to main menu **Manual value**			**chapter 8.3**
Channel 1	Setting for manual value override Unit depending on defined measuring point A	50.0 %RH Channel 1 •Manual Values	50%RH	
Channel 2	Setting for manual value override Unit depending on defined measuring point B	25.0 °C Channel 2 •Manual Values	25°C	
Channel 3	Setting for manual value override Unit depending on defined measuring point C	12.0 °C td Channel 3 •Manual Values	12°C td	
Channel 4	Setting for manual value override Unit depending on defined measuring point D	45.47 kJ/kg Channel 4 •Manual Values	45.47 kJ/kg	
Override Active	No: manual values deactivated Yes 10min: manual values activated for 10 minutes Yes: manual values activated	No Override Active •Manual Values	No	
Exit	Quit submenu			

•System Sett.	Access to main menu **Settings**			chapter 8.4
•Display	Access to submenu "Display".			
Contrast	Settings contrast (0..9).	5 Contrast •Display	5	
Backlight M.M.	Settings backlight intensity Measuring mode (0..9). For menu navigation always on level 9	0 Backlight M.M. •Display	0	
Disp. Mode	Selection of line display Automatic, 2 Lines, 2.5 Lines, 4 Lines, No val. disp.	Automatic Disp. Mode •Display	Automatic	
Exit	Quit submenu			
•Menu Lock	Access to submenu Menu Lock			
Lock	Immediate menu lock. This menu point is only visible if the lock code is set to uneven 0000.			
Set Code	Setting for menu lock code. With 0000 the lock is deactivated	0000 Set Code •Menu lock	0000	
Exit	Quit submenu			
Restart...	Restart device			

Menu point	Function - Short description	Display	Factory settings	Remarks & links
•Info	Access to main menu **Info**			chapter 8.5
Instrument	Display of instrument description	QuantaDat Instrument •Info	QuantaDat	
Serial Number	Display of serial number	1409007 Serial Number •Info	xxxxxxx	
Firmware	Display of firmware version and cap level	V01.00 C001 Firmware •Info	Vx.xx Cxxxx	
HW Level	Display of hardware version	00 HW Level •Info		
•Meas. Point A	Measuring point A (=Sensor A)			
Type	Display probe type	nSens-HT-ENS Type •Meas. Point A	nSens-xx-xxxx	

Serial Number	Display probe serial number	HT--aa1408101 Serial Number •Meas. Point A	xxxxxx	
Firmware	Display probe firmware version and cap level	V01.24 C004 Firmware •Meas. Point A	Vx.xx Cxxxx	
Exit	Quit submenu			
•Meas. Point n	Measuring point n (=Sensor n)		For all connected probes	
Type	ditto		nSens-xx-xxxx	
Serial Number	ditto		xxxxxx	
Firmware	ditto		Vx.xx Cxxxx	
Exit	Quit submenu			
Exit	Quit submenu			
Exit	Quit main menu			

8. Functional overview

8.1. Main menu point Measurement

•Sensor Setup	
Search Sensors	**Manual search process for new installed probes**
Sensor Assign.	**Probe assignment** With this function new found or already installed probes can be assigned manually to the respective measuring points A to D using the range of probe identification and serial number.
Replace mode	**Probe replacement mode** • Confirmation (factory setting): In case of probe replacement the system asks for a confirmation before assignment of new sensor in place of the old sensor. • Automatic: In case of probe replacement the systems assigns automatically the new sensor in place of the old sensor. • Manual: In case of probe replacement the new probe/sensor must be searched and assigned manually to the measuring point.

•Channel 1 - 4	
Source	**Data source selection** Selection of the measuring point which should be used for the corresponding channel. If a channel is not used, the data source it set to "None".
Meas. Parameter	**Measuring parameter selection** • Rel. Humidity • Temperature • Mixing Ratio • Vap. Part. Press. • Dew point • Spec. Enth. • Abs. Humidity Note: the analogue outputs are set-up according to the selected measuring parameter.
Unit	Measuring unit selection according to the previously selected parameter.
Abs. P. Const.	
Abs. P. Const.	**Absolute pressure setting** This factor might influence the parameters calculated from the relative humidity and temperature. With this function the average absolute pressure of the measured medium can be set in order to get a more accurate result for the following calculated parameters • Mixing ratio • Vapour partial pressure • Specific enthalpy

Measuring ranges of the adjustable measuring parameters

Adjustment range editor: column value range

Description	Unit	DP[1]	Value range editor[2]	nSens-HT[3]	Remark
Relative air humidity	%RH	1	-999.9...999.9	0..100	provided by sensor
Temperature	°C	1	-999.9...999.9	-20..80	provided by sensor
	°F	1	-999.9...999.9	-4..176	calculated
Dew point temperature	°C td	1	-999.9...999.9	-94..80	calculated
	°F td	1	-999.9...999.9	-136..176	calculated
Specific enthalpy	kJ/kg	0..2	-999'999...999'999	-20..1546	calculated
	Btu/lb_m	0..2	-999'999...999'999	-1..672	calculated
Mixing ratio	g/kg	0..2	-99'999...99'999	0..553	calculated
	gr/lb	0..2	-99'999...99'999	0..3872	calculated
Absolute humidity	g/m³	1..2	-999.9...999.9	0..292	calculated
	gr/ft³	1..2	-999.9...999.9	0..128	calculated
Vapour partial pressure	mbar/hPa	0..2	-99'999...99'999	0..477	calculated
	psi	0..4	-999.9…999.9	0..7	calculated

1 Decimal place

2 Range covering the possible measuring values. Basis -20°C/1%RH .. 99.9°C/99.9%RH. Some extreme values are not representable.

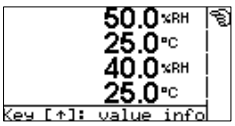
3 Calculated with 0.01%RH/-20.0°C..100%RH/80°C, integer rounded.

8.2. Main menu point Analogue Outputs

Signal Type	**Output signal setting** • 4…20mA • 0…20mA • 2…10V • 0…10V Note: this setting is adopted for all 4 analogue outputs.
•Analog Out 1 - 4	
Range L	**Setting of lower analogue output range** Example: if the analogue output signal is set to 4…20mA and Range L to 0.0%RH, the signal at 0.0%RH corresponds to 4mA. Note: depending on the measuring parameter set, the corresponding unit is displayed (e.g. dew point, absolute humidity etc.)
Range H	**Setting of higher analogue output range** Example: if the analogue output signal is set to 4…20mA and Range H to 100.0%RH, the signal at 100.0%RH corresponds to 20mA. Note: depending on the measuring parameter set, the corresponding unit is displayed (e.g. dew point, absolute humidity etc.)
On Fail	**Output value setting in mA or V in case of a sensor failure (e.g. interrupted communication with probe)**

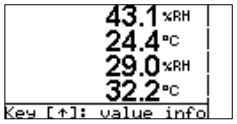
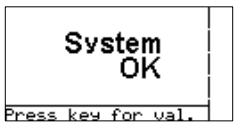
	Note: depending on the set analogue output signal, mA or V are adopted.
Adj. Clear	**Deletion of adjustment** This menu command is only shown if the analogue output was previously adjusted. Note: if the analogue output was adjusted (Adjust..), values outside of the typical range (0..10V/0..20mA) might not be reached.
Adjust…	**Output signal adjustment by setting 20% and 80% of the defined measuring range** Functionality: If this function is activated, 20% and 80% of the output signal is emitted alternatively. This allows the value reading at the signal receiver (e.g. a control unit). By entering the read values at 1st Adj. Val (20%) and 2nd Adj. Val (80%), the transmitter output signal is adjusted accordingly. Note: the defined measuring parameter incl. unit as well as the output signal scaling are adopted.

8.3. Main menu point Manual Values

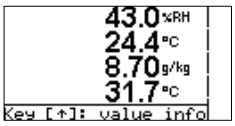
Channel 1…4	**Manual override of output values on display and output signals** Functionality: enables the setting of fixed values and therefore a simulation of measuring values.  With activated manual override function a hand symbol is displayed on the ICON column. Note: this function is used if for example a facility has to be maintained during operation (e.g. probe replacement, calibration etc.).
Override Active	**Setting of manual override function status** Selection of • No -> inactive • Yes 10min -> active during 10 minutes and afterwards deactivated automatically • Yes -> active permanently

8.4. Main menu point System Sett. (System Settings)

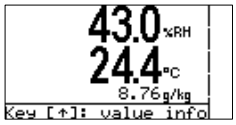
•Display	
Contrast	**Setting of display contrast** • 1 -> minimum • 9 -> maximum
Backlight M.M.	**Backlight setting of measuring display** The device is provided with a graphical display with LED backlight. During the menu navigation as well as during pressing one of the 3 navigation buttons, the backlight is set to the maximum luminance. After a timeout the luminance is switched back to the configured one. The active backlight luminance can be configured as follows. • 1 - 9 -> permanent activated (9 = max. luminance) • 0 -> backlight deactivated Note: a permanently high luminance setting might reduce the luminance of the LED in the length of time.

Disp. Mode	**Measuring value lines setting in display mode** 5 different display options are selectable: • Automatic -> The number of lines is adapted automatically to the number of assigned probes with activated channels and defined measuring points. If a data source is deactivated ("NONE"), the line is not displayed. The max. no. of lines is 4.  2 or 4 lines are displayed at a time Channel 1/2 ≠ None -> 2 lines Channel 3/4 ≠ None -> 4 lines • No val. disp. -> "System OK" is displayed instead of the measuring values. By pressing one of the front buttons, the measuring display is activated and measuring values are displayed. After the timeout the system switches back to "System OK".  The measuring display properties correspond to the Automatic mode.

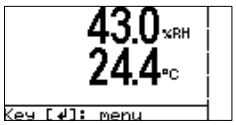
- 4 Lines -> 4 lines with same font size (small) are displayed permanently. If a channel has a deactivated data source ("NONE") this line remains blank.



- 2.5 Lines -> The first 2 lines of channel 1 and 2 are displayed in a big and the line of channel 3 in small font size.



- 2 Lines -> 2 lines with same font size (big) are displayed permanently. If a channel has a deactivated data source ("NONE") this line remains blank.



Note: the requirement for a measuring value display is the assignment of a data source (measuring point) to a channel. If the assignment is set to "NONE", no measuring value is shown on the corresponding line.

•Menu lock

Set Code

Menu lock code setting

4-digit numerical password activation of the menu lock.

Activation of menu lock password:

- Enter of 4-digit numerical password
- Press "Arrow up" button -> message "Lock" appears
- Press "Enter" button -> confirmation by message "DONE"
- Menu lock is activated

Note: after the activation the instrument switches back to the measuring value display mode and on the Info line the message "Menu locked" is shown.
The additional information (info line) are still available by pressing the arrow buttons. The lock applies only to the menu.

Deactivation of menu lock password & access to menu:

- Press "Enter" button -> instrument queries for "Code?"
- Press again "Enter" button and enter the 4-digit code (please go through each single digit).
- Menu access is established

With code 0000 the lock is set back.

	Important: please note the password and keep it in a safe place. A loss of the password requires a setting back to factory settings.
Restart…	
Restart…	**Device is restarted** The instrument settings remain unchanged. This function can be used for example to set back all manual override functions at once.

8.5. Main menu point Info

Instrument	**Display of transmitter type** QuantaDat
Serial Number	**Display of transmitter serial number** e.g. 1409007
Firmware	**Display of transmitter firmware version** e.g. V01.00 C001
HW Level	**Display of transmitter hardware version** e.g. 00
•Meas. Point A…D	
Type	**Display of probe type** e.g. nSens-HT-ENS
Serial Number	**Display of probe serial number** e.g. HT--aa1408101
Firmware	**Display of probe firmware** e.g. V01.24 C004

9. Probes for QuantaDat

9.1. nSens-HT-ENS / humidity- and temperature probe

Digital nSens-HT (Humidity/Temperature) probe with resistive-electrolytic humidity sensor and NTC temperature sensor. The calibration points are stored directly on the probe. The verification/calibration is done with the calibration software nSoft-CAL. The plug-in probe can be replaced quickly and easily.

Technical Data *Art. no. 2601068*

Description	**nSens-HT-ENS** Resistive-electrolytic humidity measurement NTC temperature measurement		
Measurement ranges	Humidity	0 ... 100% RH	
	Temperature	-20 ... +80°C	
Measurement accuracy	Humidity*	15 … 30°C	typically +/- 0.5% RH

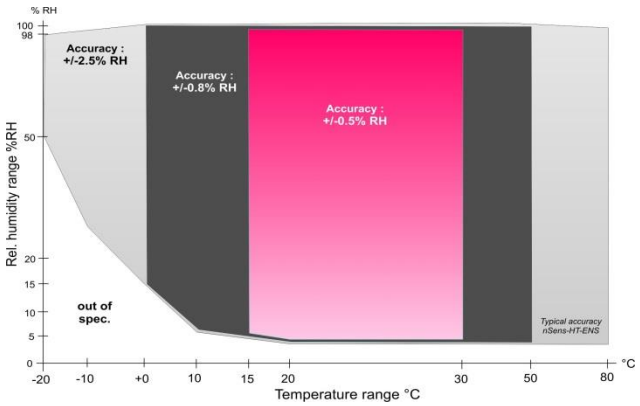
incl. reproducibility and hysteresis		0 … 50°C -20 … +80°C	typically +/- 0.8% RH typically +/- 2.5% RH
	Temperature	0 … +70°C -20 … +80°C	typically +/- 0.1K typically +/- 0.2K
Number of calibration points	Humidity	13 points over full measurement range	
	Temperature	2 points over full measurement range	
Signal transmission	digital (nBus Bus-System)		
Housing material	PVDF black		
Mechanical sensor protection	nCap-PS Polyethylene / silver oxide filter protection cap		
Working temperature	-20 to +80°C		
Storage temperature	-10 to +60° C (non-condensing)		

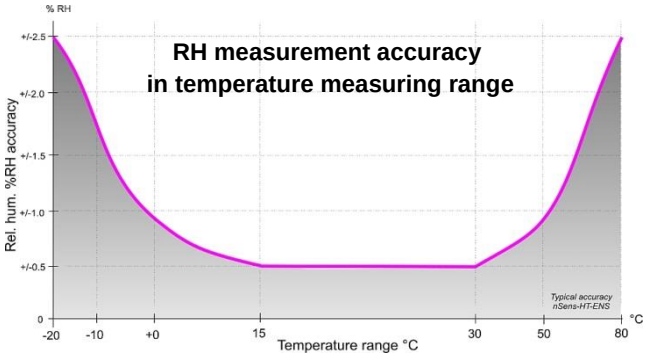
* The humidity accuracy refers to the nominal values of Novasina humidity standards, which refer to the Greenspan Report.

Features

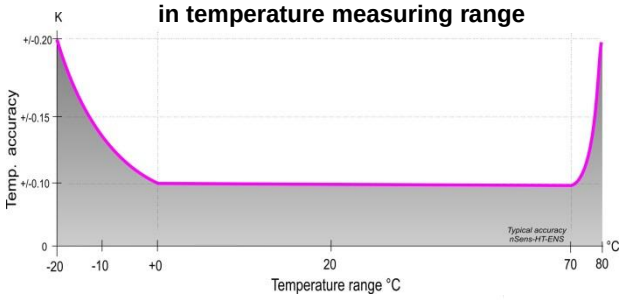
- Intelligent probe with internal calibration point storage
- High measurement accuracy
- Linear response over full working range
- Factory calibration including certificate
- Calibration with nSoft-CAL software

RH measurement accuracy - RH & Temp. range





Temperature measurement accuracy in temperature measuring range



9.2. nSens-T-NBS / temperature probe

Digital nSens-T temperature probe with NTC temperature sensor. The calibration points are stored directly on the probe. The verification and calibration is done with the calibration software nSoft-CAL. The plug-in probe can be replaced quickly and easily.

Technical Data *Art. no. 2601084*

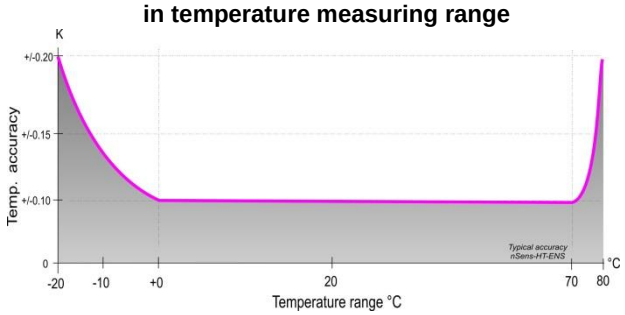
Description	**nSens-T-NBS** NTC temperature measurement		
Measurement range	Temperature	-20 ... +80°C	
Measurement accuracy	Temperature	0 … +70°C	typically +/- 0.1K

incl. reproducibility and hysteresis		-20 … +80°C	typically +/- 0.2K
Number of calibration points	2 points over full measurement range		
Signal transmission	digital (nBus Bus-System)		
Housing material	PVDF black		
Mechanical sensor protection	nCap-E protection cap		
Working temperature	-20 to +80°C		
Storage temperature	-10 to +60° C (non-condensing)		

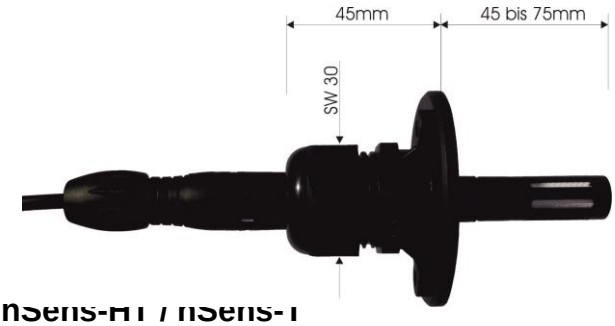
Features

- Intelligent probe with internal calibration point storage
- High measurement accuracy
- Linear response over full working range
- Factory calibration including certificate
- Calibration with nSoft-CAL software

Temperature measurement accuracy in temperature measuring range



Dimensions



9.3. Cable for nSens-HT / nSens-T

nSens cable 3*0.25mm²

- Robust
- Halogen free
- With fast plug-in plug for nSens

nSens cable 100 meters - Art. no. 2601226
nSens cable 60 meters - Art. no. 2601225
nSens cable 30 meters - Art. no. 2601078
nSens cable 10 meters - Art. no. 2601079
nSens cable 5 meters - Art. no. 2601080

Technical data

	Composition	Characteristics
Temperature range -40°C to +90°C **Working peak voltage** (not for high voltage installations) >0,14 mm² = 500 V **Testing voltage** >0,14 mm² = 1200 V **Isolation resistance** min. 2 GOhm x km **Min. bending radius** ca. 7,5x cable-ø	• Cu-cord blank, fine wiring according DIN VDE 0812 at 0,34 mm² cable composition 7x0,25 mm • PE-isolation mantle, mixing type L/MD according DIN VDE 0819-103 / DIN EN 50290-2-23 • Cord identification according DIN 47100 without colour replication • Wires with optimal length of twist stranded in layers • Sheath material cross-linked Polyolefin, black • nSens plugs soldered • Wire termination	• Ozone-resistant according to EN 50396 • Weather- and UV-resistant according to HD605/A1 • Halogen free according to EN 50267-2-1, EN 60684-2 • Acid- and leach-resistant according to EN 60811-2-1 • Flame retardant according to VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 • Very robust and abrasion-resistant mantle according to DIN EN 53516 • Short-circuit-proof to +200°C with double isolation, short-circuit temperature 200°C/ 5s • Hydrolysis- and ammonia-resistant

CE = the product is compliant to the EC low voltage directives 2006/95/EC.

Dimensions / Plug

Wire termination / Core colours

Required cable specifications (for existing cable installations)

- Minimum wire cross section 3*0.25mm^2, from 30m 3*0.5mm^2
- Maximum operation capacity wire/wirer <70 nF/km resp. 70pF/m. Higher capacities are only permitted if the total capacity of 28nF (conductor to conductor) for all - to nBus - connected cables is not exceeded.
- Shield and Twisted Pair are not required.

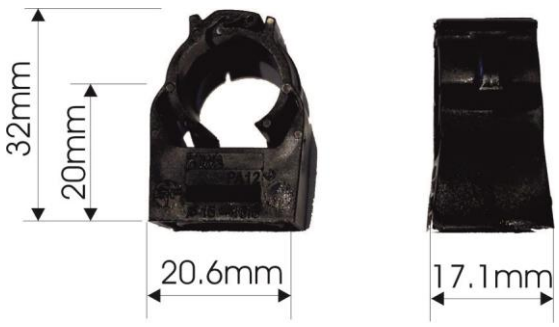
9.4. Mounting kit (nSens probe fixing)

Art. no. 2601083 - included with nSens cables

consisting of wall mounting clip & duct mounting flange:

Wall mounting clip

Dimensions

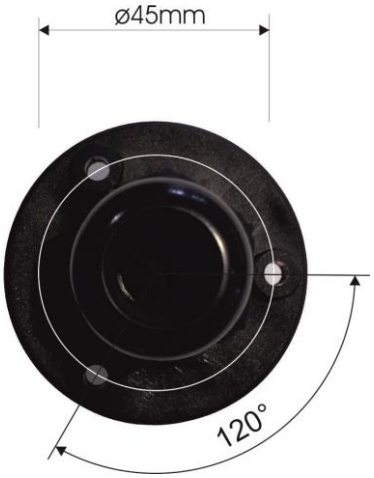


Technical data

Nominal diameter	15 mm
Diameter clamping range	14.3… 16.8 mm
Material	Polyamide P12 - colour black RAL 9011
Working temperature	-20 to +80°C
Storage temperature	-10 to +60° C (non-condensing)

Duct mounting flange

Dimensions



Technical data

Diameter clamping range	9 … 14 mm
Seal burst strength	up to 3 bar
Wrench size screw connection	30 mm
Material	PP Verton 25% GF black
Working temperature	-20 to +80°C
Storage temperature	-10 to +60° C (non-condensing)

9.5. nSens-VAL-HT / simulator

Used for fixed value outputs of relative humidity and temperature. The value settings are made with the nSoft-CAL calibration software. Simulators are used for test and validation of measurement and control loops.

Technical data *Art. no. 2601126*

Description	**nSens-VAL-HT** Measurement value simulator
Signal transmission	digital (nBus Bus-System)
Marking / Identification	Red shrink hose

Mechanical protection	Plastic protection cap
Housing material	PVDF black
Working temperature	-20 to +80°C
Storage temperature	-10 to +60° C (non-condensing)

9.6. nSoft-CAL calibration software

For verification and calibration of nSens-HT-Exx and nSens-T-Nxx probes as well as for the fixed value settings of the nSens-VAL-HT simulator.

Art. no. 2601094

consisting of CD with software & nLink-USB data cable:

Technical data subject to change without prior notice