



HD4817CAL

Software Manual

(for HD48... and HD49... with analog output)

Introduction

HD4817CAL software allows to manage from the PC in a simple and intuitive way the calibration of the relative humidity, dew point and temperature transmitters of the series:

HD4807T, HD4807ET:	Temperature active transmitters with 4 - 20 mA output
HD4801T, HD4801ET:	Relative Humidity active transmitters with 4 - 20 mA output
HD4817T, HD4817ET:	Relative Humidity and Temperature active transmitters with 4 - 20 mA output
HD4877T:	Dew Point and Temperature active transmitters with 4 - 20 mA output
HD48V07T, HD48V07ET:	Temperature active transmitters with 0 - 10 V output
HD48V01T, HD48V01ET:	Relative Humidity active transmitters with 0 - 10 V output
HD48V17T, HD48V17ET:	Relative Humidity and Temperature active transmitters with 0 - 10 V output
HD48V77T:	Dew Point and Temperature active transmitters with 0 - 10 V output
HD4907T, HD4907ET:	Temperature passive transmitters with 4 - 20 mA output
HD4901T, HD4901ET:	Relative Humidity passive transmitters with 4 - 20 mA output
HD4917T, HD4917ET:	Relative Humidity and Temperature passive transmitters with 4 - 20 mA output
HD4977T:	Dew Point and Temperature passive transmitters with 4 - 20 mA output

It is possible to display in real time the measures of the instrument on the PC monitor and to calibrate the relative humidity sensor.

For the complete transmitters characteristics refer to the manuals of the instruments or to the pdf file available in the *Documentation* section of the CD-ROM.

HD4817CAL Start

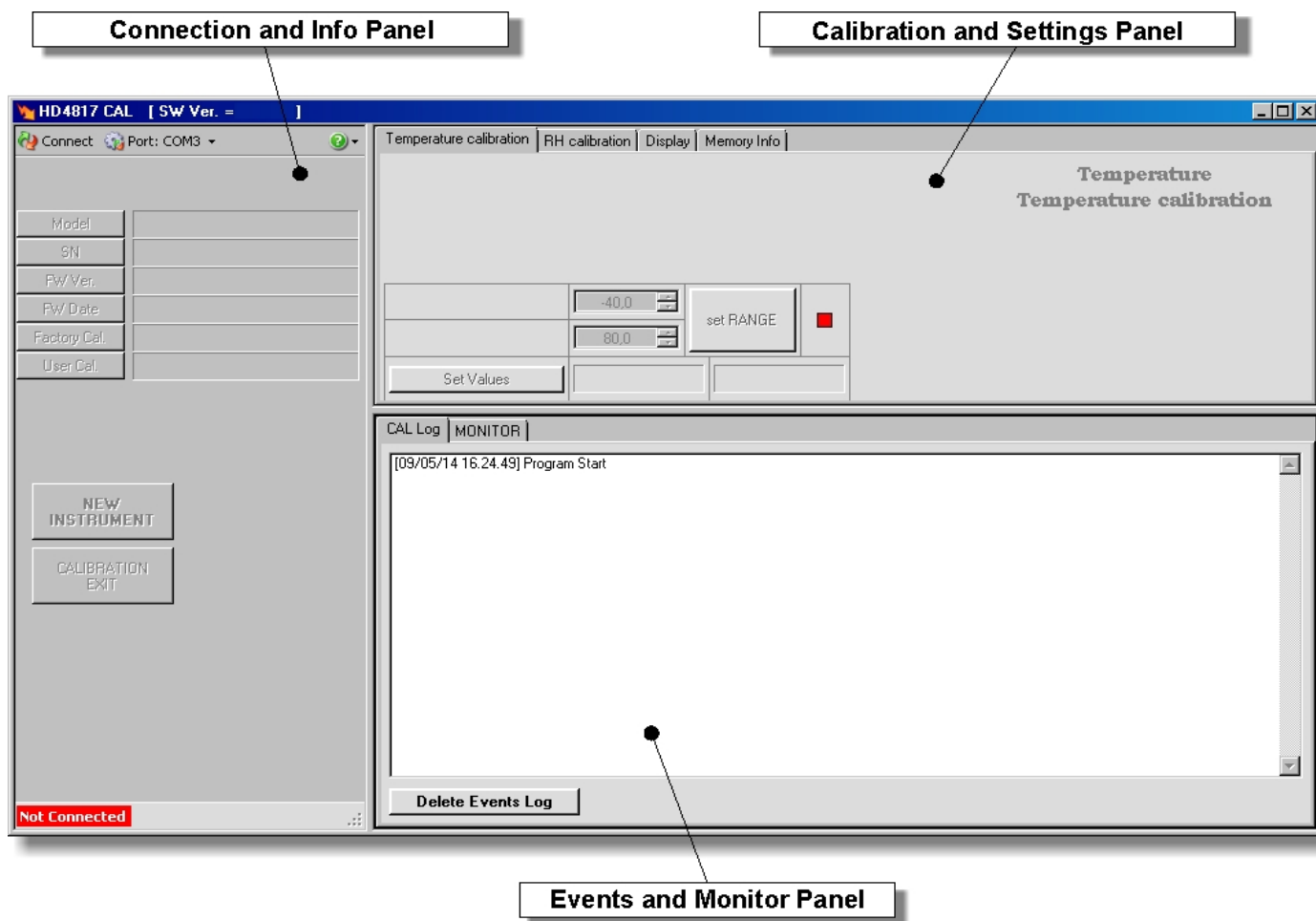
1. Connect the transmitter to a free USB port of the PC through the serial cable **CP27**.

Note: USB connection needs previous installation of the specific drivers supplied with the CD-ROM: see detailed instructions in "*Guide to the USB drivers installation*" in the "*Documentation*" section of CD-ROM.

Note: **with 64-bit operating systems, for the connection it is necessary to disable the driver signature request when the PC is started** (see "*Guide to the USB drivers installation*").

2. Start the software double clicking on the desktop program icon or selecting HD4817CAL in the Delta Ohm folder of the start menu. The main window of the program

appears:



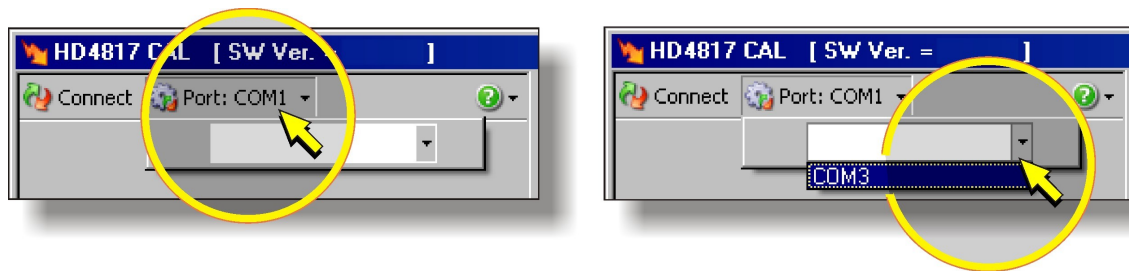
The main window is divided in three panels:

- *Connection and Info Panel* (on the left, it allows to manage the connection and to request the transmitter information);
- *Calibration and Settings Panel* (on the right upper side, it allows to calibrate and configure the instrument);
- *Events Log and Monitor Panel* (on the right lower side, it lists the activities done and allows to display the real time measures).

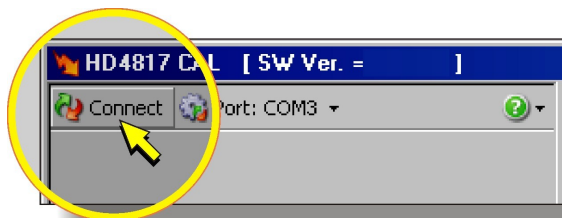
In the first row of the *CAL Log* folder, in the right lower panel, the date and time of the program start are indicated.

Note: the three panels can be resized dragging their borders with the mouse.

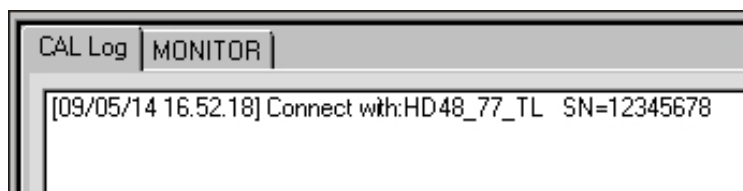
3. On the upper left side of the *connection and info* panel, select the communication port (COM) where the transmitter is connected:



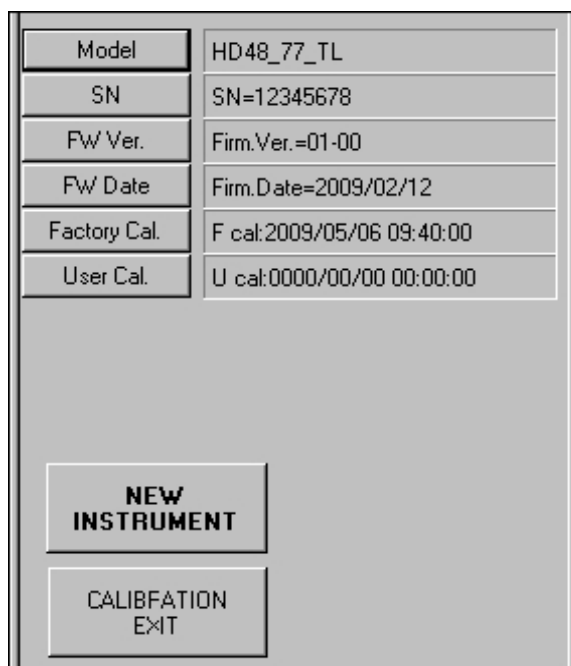
4. Press the *Connect* key:



If the connection is established, the information about the transmitter are automatically loaded and the calibration and configuration commands in the right upper panel becomes enabled. In the *CAL Log* folder of the lower panel it is recorded the performed connection:



The general transmitter information are shown in the left panel: transmitter model, serial number, firmware version, firmware date, date and time of the factory calibration, date and time of the user calibration:



In the case of an already established connection, a single information can be requested selecting the key related to the desired info, or it is possible to ask the transmitter to

send all the available information selecting the *NEW INSTRUMENT* key and answering yes in the operation confirmation window that appears.

The transmitter configuration info are available in the right upper panel: mapping of temperature and dew point analog outputs (if provided with the model), type of display visualization (for models with LCD) and temperature measure unit. Refer to the [transmitter configuration](#) paragraph for the details of such settings.

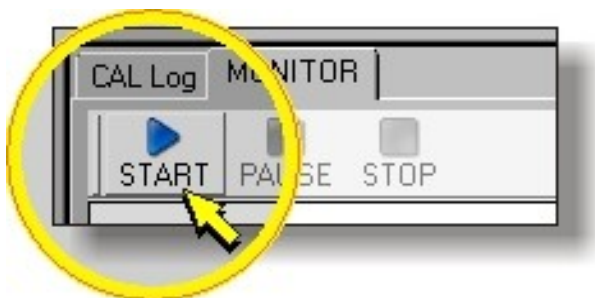
If the connection is not established, in the lower left side it is shown the *Not Connected* indication on a red background:



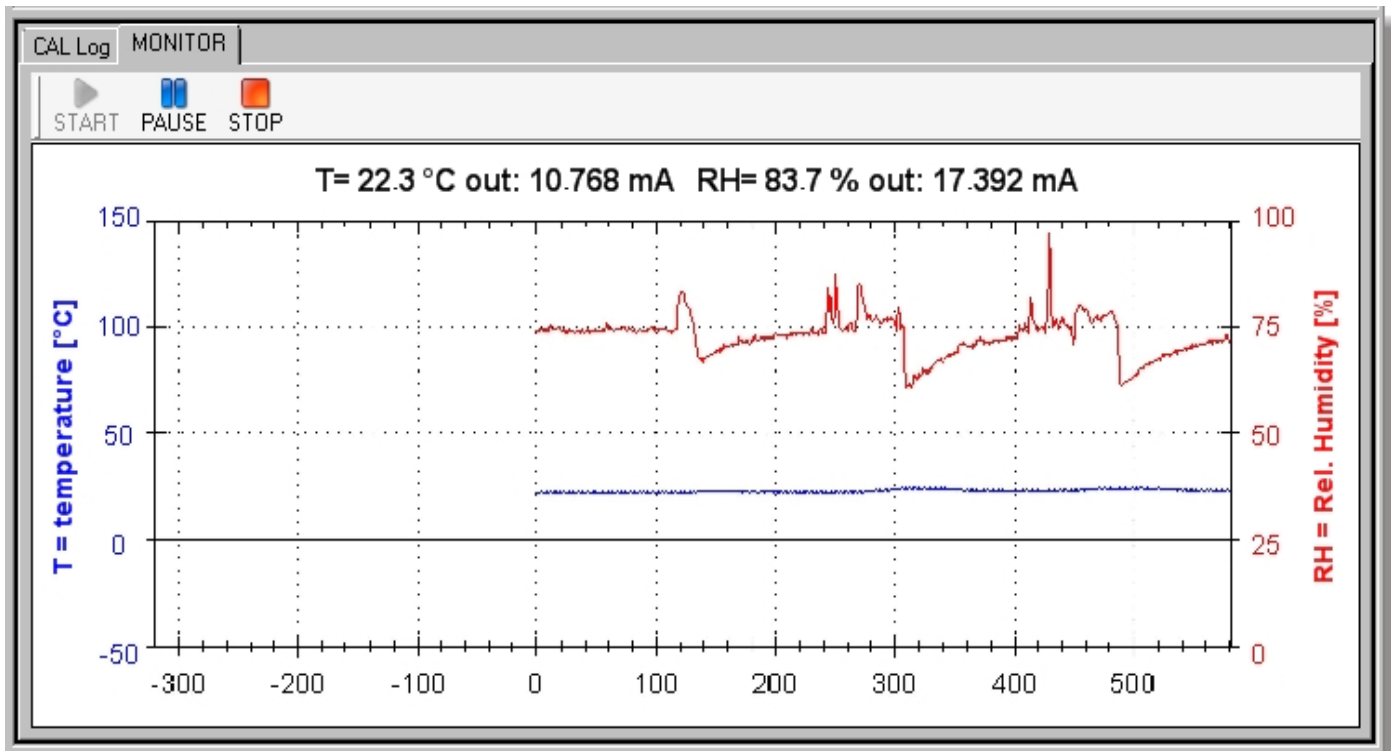
If the program does not connect to the instrument, refer to the [Troubleshooting](#) paragraph of this manual.

Measures display

After the [connection](#) is established correctly, to display the real time measures of the instrument on the PC monitor select the *Monitor* folder of the *Events Log and Monitor Panel* in the lower right side, then press the *START* key to start the acquisition of the measured values.

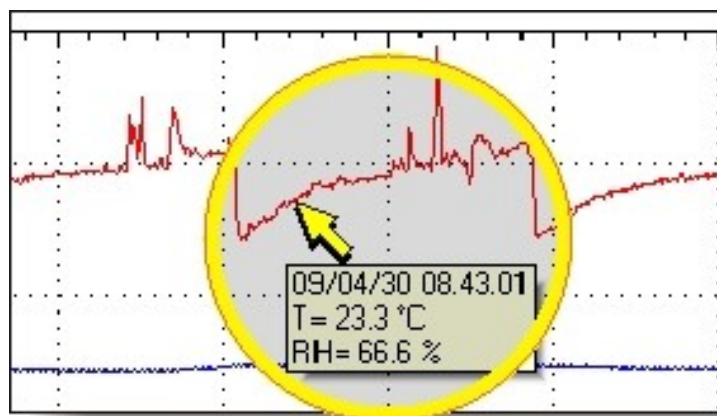


The time progress of the measured values is displayed graphically: the temperature is indicated with the blue color, while the relative humidity or the dew point (depending on the model connected) is indicated with the red color. The current measured values are reported in the upper part of the graph, along with the correspondent theoretical values of the respective analog outputs:

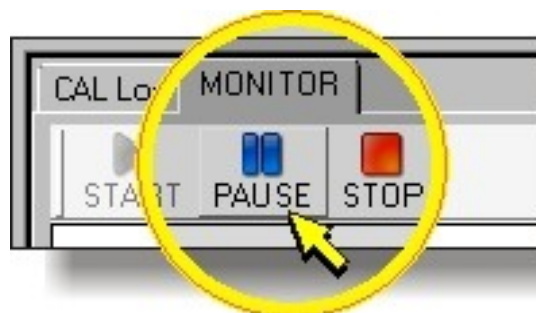


The time progress is drawn starting from the point "0" and move to the left on the PC monitor. The measured values are updated every two seconds.

Placing the mouse in a point of the graph, the acquisition time and the measured values in that point are displayed:

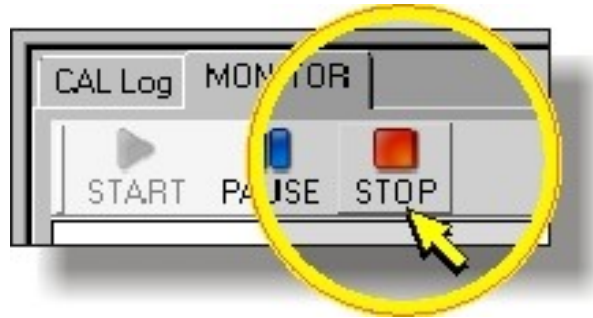


Press the *PAUSE* key to temporarily stop the acquisition of the measured values:



The *PAUSE* key blinks to indicate the acquisition temporary stop. If after a pause command the acquisition is restarted, the time progress restarts from the time the acquisition was stopped, the time progress up to the pause time is not deleted.

Press the *STOP* key to definitively stop the acquisition of the measured values and clear the graph of the time progress:



The time progress remains displayed even if the instrument is disconnected, but it is deleted after a new connection.

Note: during the acquisition the commands of the left panel are disabled (except the *Disconnect* command) to not interfere with the acquisition process. In the case the acquisition of the measured values is started when the *calibration and settings* panel is still active, an eventual calibration command causes the stop of the acquisition, while the configuration commands (display visualization and measure unit) are executed normally without stopping the acquisition.

Transmitter configuration

Temperature analog output mapping

The models provided with the temperature analog output are factory set to map the temperature analog output range to the full measuring range, that is for the models with current output:

4 mA = -20°C, 20 mA = +80°C (for the models HD4807T, HD4817T, HD4877T, HD4907T, HD4917T and HD4977T)

4 mA = -40°C, 20 mA = +150°C (for the models HD4807ET, HD4817ET, HD4907ET and HD4917ET)

and for the models with voltage output:

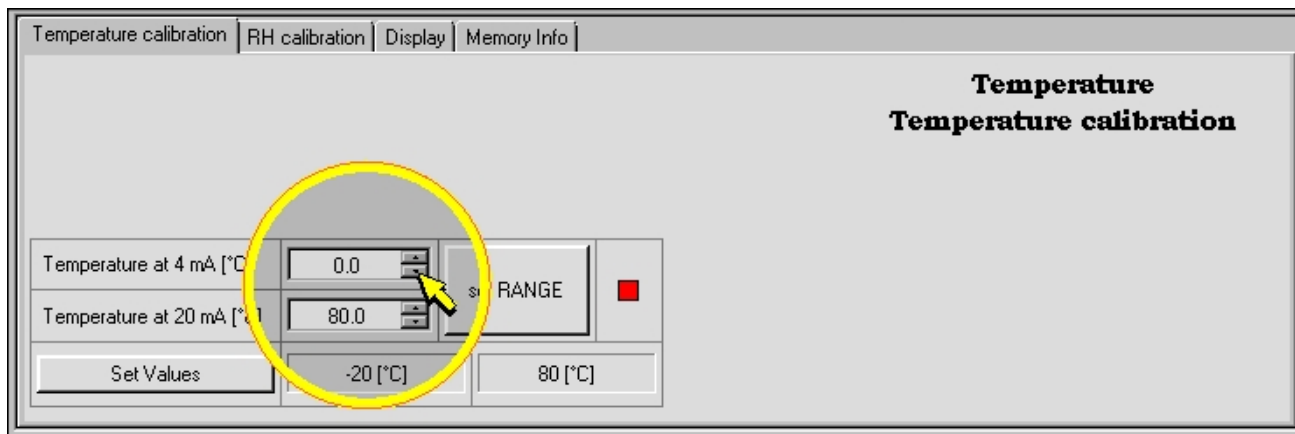
0 Vdc = -20°C, 10 Vdc = +80°C (for the models HD48V07T, HD48V17T and HD48V77T)

0 Vdc = -40°C, 10 Vdc = +150°C (for the models HD48V07ET and HD48V17ET)

It is possible to have the analog output range corresponding to a reduced interval of the measuring range. For example in a model with current output it could be desired to have 4 mA corresponding to 0°C and 20 mA to +60°C.

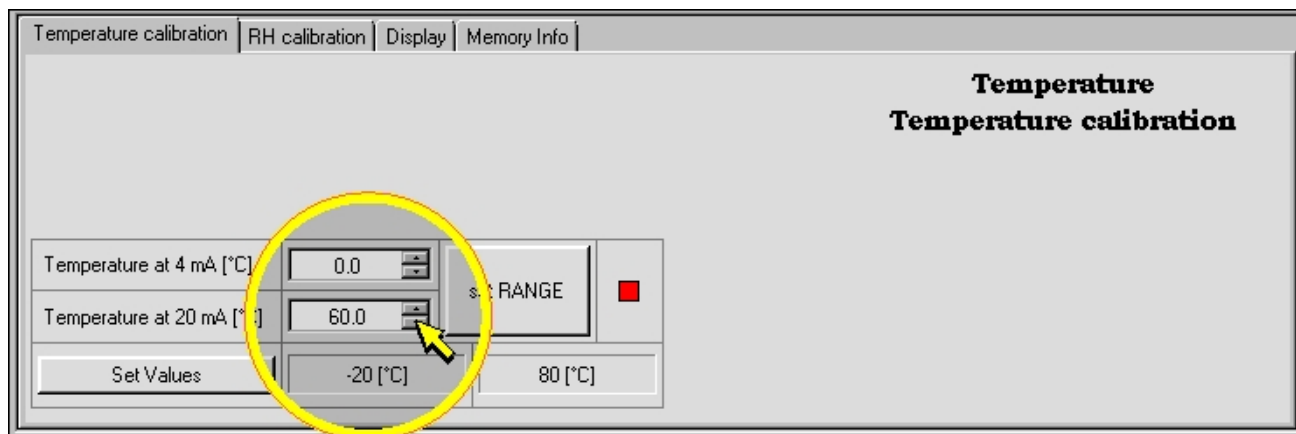
Note: 0...60°C is the suggested mapping for the HD48...TV and HD49...TV models.

To change the output configuration, insert the temperature value corresponding to 4 mA in the field on the right of the *Temperature at 4 mA* indication in the *Temperature Calibration* folder of the right upper panel, using the small arrows on the right of the field or directly writing the value:

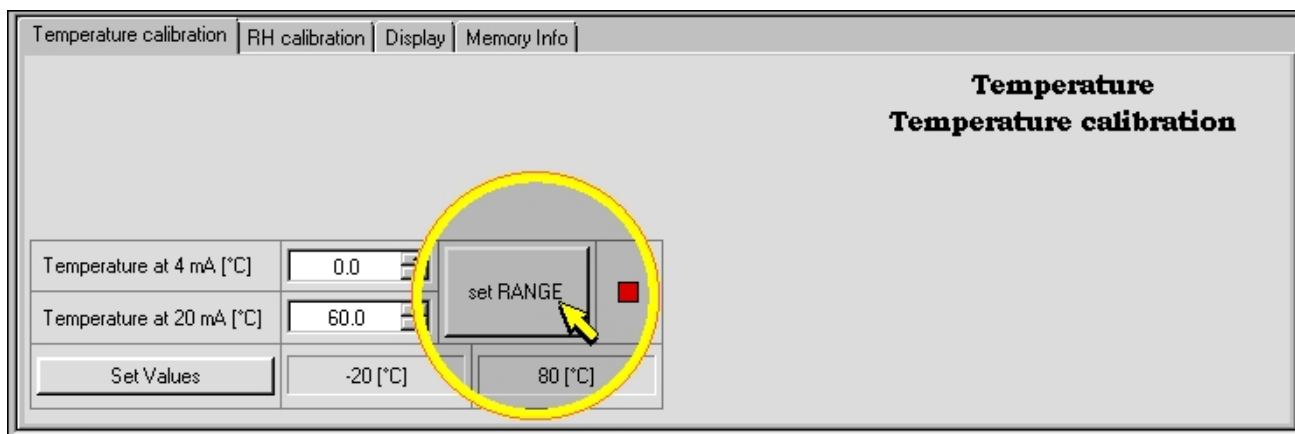


Note: the *calibration and settings* panel is automatically enabled after a connection operation. To protect the instrument from inadvertent settings of the calibration or configuration parameters, the panel is automatically disabled after about 4 minutes from the last operation performed inside the panel, or after about 4 minutes from the connection if operations were not executed, in such a case press the *NEW INSTRUMENT* key to activate again the panel.

Similarly, insert the temperature value corresponding to 20 mA in the field on the right of the *Temperature at 20 mA* indication:



Select the *Set RANGE* key to activate the new settings:



The new values are stored in the instrument and the indicator next to the key changes from red to green. The fields corresponding to the initial and full scale of the analog output in the *Set Values* row are automatically updated:

Temperature at 4 mA [°C]	00	set RANGE	☒
Temperature at 20 mA [°C]	60.0		
Set Values	0 [°C]	60 [°C]	

The mapping operation is recorded in the *CAL Log* folder of the right lower panel:

CAL Log	MONITOR
[09/05/15 08.04.57] Connect with:HD48_17_TL SN=12345678 [09/05/15 08.25.55] Mapped Temperature @ 4mA [09/05/15 08.25.59] Mapped Temperature @ 20mA	

Note: the new values inserted in the editable fields are associated to the analog output only after selecting the *Set RANGE* command. Until such command is not selected, the new settings are not effective and the output remains associated to the previous values reported in the *Set Values* row.

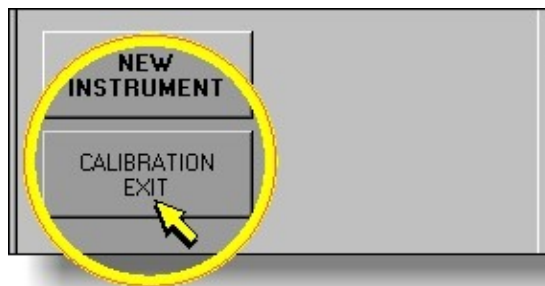
If it is attempted to set a value outside the measure range of the instrument, it is automatically set the limit value of the allowed range.

It is also possible to reverse the working mode of the temperature analog output, in such a way that the output decreases when the measure increases. To reverse the output mode it is sufficient to insert in the *Temperature at 4 mA* field a temperature value higher than the one inserted in the *Temperature at 20 mA* field:

Temperature at 4 mA [°C]	60.0	set RANGE	☒
Temperature at 20 mA [°C]	00		
Set Values	60 [°C]	0 [°C]	

Note: during the storing of the set values in the instrument memory, the *calibration and settings* panel is temporarily disabled.

After the mapping operation is completed, press the *CALIBRATION EXIT* key to protect the instrument from inadvertent settings of the calibration or configuration parameters (the panel is anyway automatically disabled after about 4 minutes from the last operation performed; the operations completed before the automatic disabling remain stored in the instrument):



For the models with voltage output proceed in a similar way, setting the *Temperature at 0 V* and *Temperature at 10 V* fields.

The difference between the temperature value correspondent to the analog output full scale (20 mA or 10 V) and the one correspondent to the analog output initial scale (4 mA or 0 V) must be at least 25°C. If it is attempted to set a lower interval the value is not accepted and the following error message will be shown:



The mapped values set in the instrument are automatically loaded in the fields on the right of the *Set Values* key when a connection operation is performed and when the *NEW INSTRUMENT* key is selected. The values can be requested clicking on the *Set Values* key as well.

Dew Point analog output mapping

The models provided with the dew point analog output are factory set to map the range of the related analog output to the full measuring range, that is for the models with current output:

$$4 \text{ mA} = -20^{\circ}\text{C}, 20 \text{ mA} = +80^{\circ}\text{C}$$

and for the model with voltage output:

$$0 \text{ Vdc} = -20^{\circ}\text{C}, 10 \text{ Vdc} = +80^{\circ}\text{C}$$

It is possible to have the analog output range corresponding to a reduced interval of the measuring range. For example in a model with current output it could be desired to have 4 mA corresponding to 0°C and 20 mA to +60°C.

To change the output configuration, insert the dew point value corresponding to 4 mA in the field on the right of the *Dew Point at 4 mA* indication in the *RH Calibration* folder of the right upper panel, using the small arrows on the right of the field or directly writing the value:

Temperature calibration		RH calibration		Display		Memory Info	
75% RH Calibration				75.40	CAL 75%	☐	
33% RH Calibration				33.00	CAL 33%	☐	
Dew Point Mapping							
Dew Point at 4 mA [°C]				0.0	set RANGE	☐	
Dew Point at 20 mA [°C]				80.0			
Set Values				-20 [°C]	80 [°C]		

Rel. Humidity Calibration

Note: the *calibration and settings* panel is automatically enabled after a connection operation. To protect the instrument from inadvertent settings of the calibration or configuration parameters, the panel is automatically disabled after about 4 minutes from the last operation performed inside the panel, or after about 4 minutes from the connection if operations were not executed, in such a case press the **NEW INSTRUMENT** key to activate again the panel.

Similarly, insert the dew point value corresponding to 20 mA in the field on the right of the *Dew Point at 20 mA* indication:

Temperature calibration		RH calibration		Display		Memory Info	
75% RH Calibration				75.40	CAL 75%	☐	
33% RH Calibration				33.00	CAL 33%	☐	
Dew Point Mapping							
Dew Point at 4 mA [°C]				0.0	set RANGE	☐	
Dew Point at 20 mA [°C]				60.0			
Set Values				-20 [°C]	80 [°C]		

Rel. Humidity Calibration

Select the **Set RANGE** key to activate the new settings:

Temperature calibration		RH calibration		Display		Memory Info	
75% RH Calibration				75.40	CAL 75%	☐	
33% RH Calibration				33.00	CAL 33%	☐	
Dew Point Mapping							
Dew Point at 4 mA [°C]				0.0	set RANGE	☐	
Dew Point at 20 mA [°C]				60.0			
Set Values				-20 [°C]	80 [°C]		

Rel. Humidity Calibration

The new values are stored in the instrument and the indicator next to the key changes

from red to green. The fields corresponding to the initial and full scale of the analog output in the *Set Values* row are automatically updated:

Dew Point Mapping			
Dew Point at 4 mA [°C]	00	set RANGE	☒
Dew Point at 20 mA [°C]	60.0		
Set Values	0 [°C]	60 [°C]	

The mapping operation is recorded in the *CAL Log* folder of the right lower panel:

CAL Log	MONITOR
[09/05/15 08.41.11] Connect with:HD48_77_TL SN=12345678	
[09/05/15 08.53.36] Mapped Dew Point at 4mA	
[09/05/15 08.53.40] Mapped Dew Point at 20mA	

Note: the new values inserted in the editable fields are associated to the analog output only after selecting the *Set RANGE* command. Until such command is not selected, the new settings are not effective and the output remains associated to the previous values reported in the *Set Values* row. The mapped values set in the instrument can be requested clicking on the *Set Values* key.

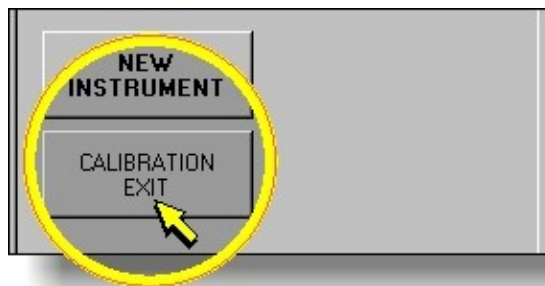
If it is attempted to set a value outside the measure range of the instrument, it is automatically set the limit value of the allowed range.

It is also possible to reverse the working mode of the dew point analog output, in such a way that the output decreases when the measure increases. To reverse the output mode it is sufficient to insert in the *Dew Point at 4 mA* field a value higher than the one inserted in the *Dew Point at 20 mA* field:

Dew Point Mapping			
Dew Point at 4 mA [°C]	60.0	set RANGE	☒
Dew Point at 20 mA [°C]	00		
Set Values	60 [°C]	0 [°C]	

Note: during the storing of the set values in the instrument memory, the *calibration and settings* panel is temporarily disabled.

After the mapping operation is completed, press the *CALIBRATION EXIT* key to protect the instrument from inadvertent settings of the calibration or configuration parameters (the panel is anyway automatically disabled after about 4 minutes from the last operation performed; the operations completed before the automatic disabling remain stored in the instrument):



For the models with voltage output proceed in a similar way, setting the *Dew Point at 0 V* and *Dew Point at 10 V* fields.

The difference between the dew point value correspondent to the analog output full scale (20 mA or 10 V) and the one correspondent to the analog output initial scale (4 mA or 0 V) must be at least 25°C. If it is attempted to set a lower interval the value is not accepted and the following error message will be shown:



Display visualization

In the models provided with LCD it is possible to set the measure type to be displayed. The available settings are the following:

- *Temperature*

The instrument displays the temperature value only:



- *Relative Humidity or Dew Point* (depending on the transmitter model)

Depending on the instrument model the display shows the relative humidity value only:

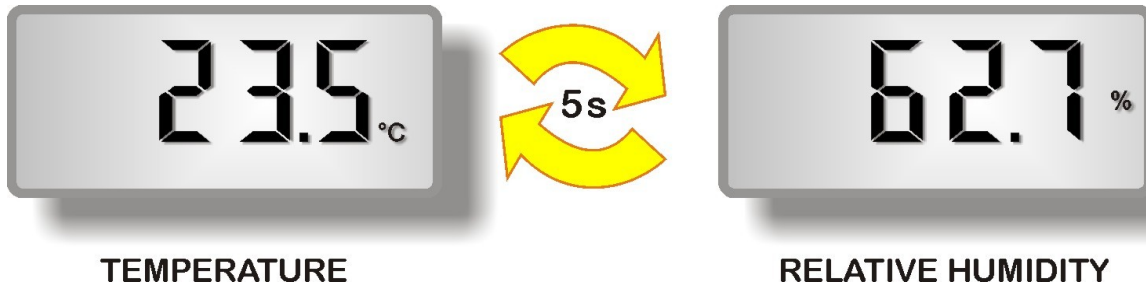


or the dew point only:



- *Temperature and Relative Humidity or Dew Point* (depending on the transmitter model)

Depending on the instrument model the display alternatively shows the temperature and the relative humidity values (the values are swapped every 5 seconds approximately):

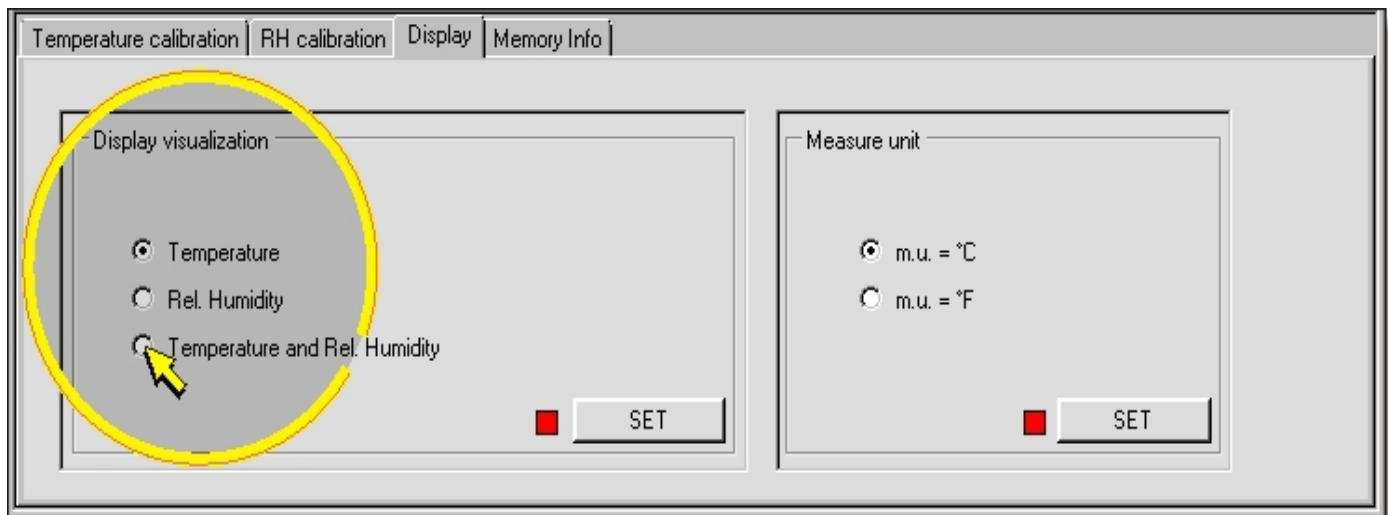


or the temperature and the dew point values:

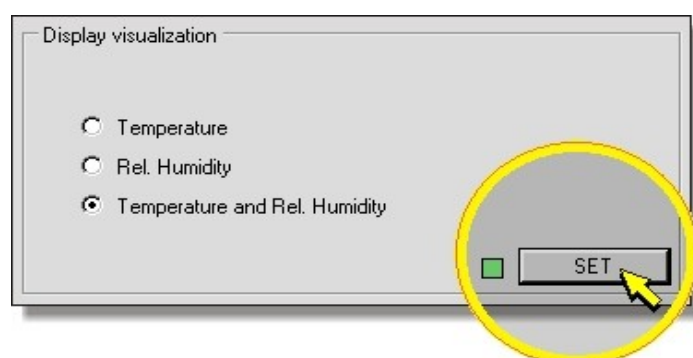


When both the temperature and dew point values are displayed, the temperature is identified by an upward arrow, while the dew point is identified by a downward arrow.

To configure the visualization type, select the *Display* folder in the right upper panel. Choose the desired option in the *Display visualization* section:



Press the *SET* key to apply the setting, the indicator on the left of the key changes from red to green:

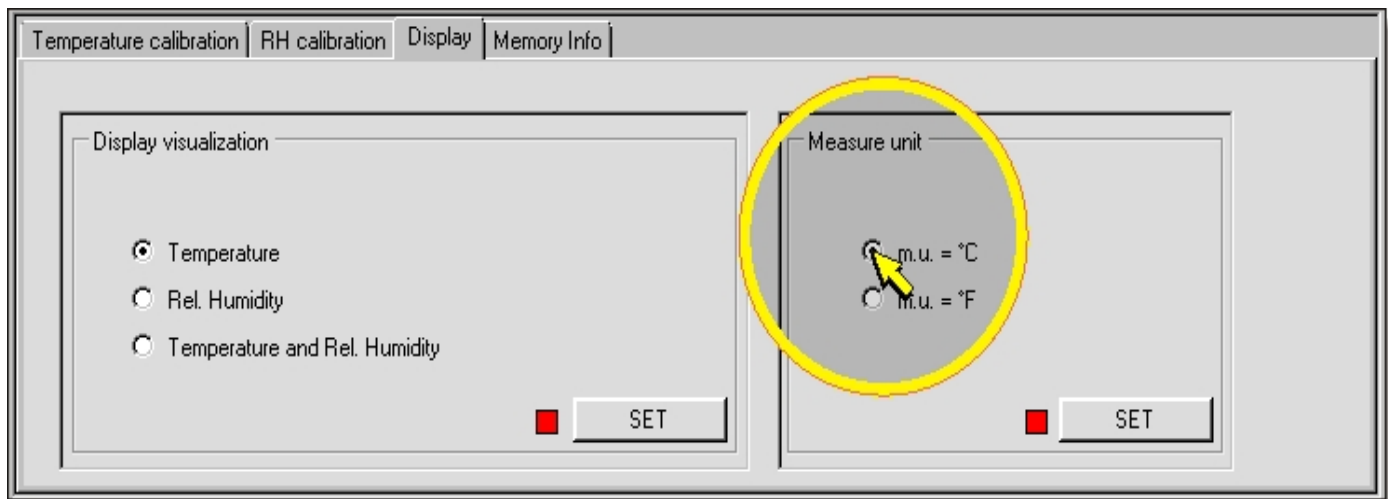


Note: the *calibration and settings* panel is automatically enabled after a connection operation. To protect the instrument from inadvertent settings of the calibration or configuration parameters, the panel is automatically disabled after about 4 minutes from the last operation performed inside the panel, or after about 4 minutes from the connection if operations were not executed, in such a case press the *NEW INSTRUMENT* key to activate again the panel.

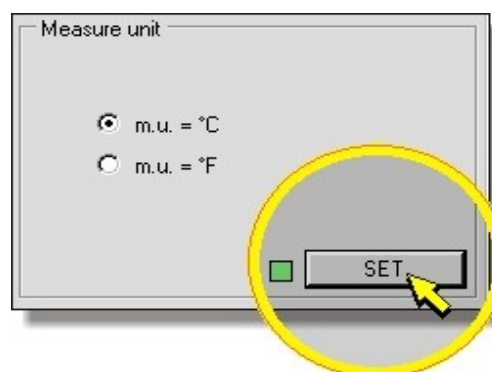
After the settings are completed press the *CALIBRATION EXIT* key.

Measure unit

To set the temperature measure unit, select the *Display* folder in the right upper panel. Choose the desired option between *m.u. = °C* and *m.u. = °F* in the *Measure unit* section:



Press the *SET* key to apply the setting, the indicator on the left of the key changes from red to green:



Note: the *calibration and settings* panel is automatically enabled after a connection operation. To protect the instrument from inadvertent settings of the calibration or configuration parameters, the panel is automatically disabled after about 4 minutes from the last operation performed inside the panel, or after about 4 minutes from the connection if operations were not executed, in such a case press the *NEW INSTRUMENT* key to activate again the panel.

After the settings are completed press the *CALIBRATION EXIT* key.

Relative Humidity calibration

The HD4817CAL software allows to perform the relative humidity sensor calibration in the two points 33% and 75%RH.

It is not possible to calibrate the temperature sensor.

For a correct probe calibration it is fundamental the knowledge and the respect of the physical phenomena on which the measurement is based: for that reason it is highly recommended to strictly follow what it is reported below and to perform new calibrations only if you have adequate technical know-how.

Before starting the calibration process, it is convenient to verify, with the help of the 33%RH and 75.4%RH saturated salt solutions, the need for a new calibration: only if a measurement error of a few percentage points of relative humidity in at least one of the two verified points occurs, proceed with the calibration.

For the verification and the calibration use **only** the saturated solutions HD75 - HD33 marked "R 2009".



The calibration procedure deletes the data of the previous calibrations.

For a correct sensor calibration, the first point must be at 75%RH and the second one at 33%RH.

Preliminary calibration operations:

Check that inside the chamber with the saturated salt solution are present at the same time:

- salt in the solid state,
- liquid solution or wet salt, especially for the 75%RH solution.

The instrument and the saturated solution to be used must be placed in an environment with a stable temperature for the entire time of the calibration. Wait for at least a couple of hours at stable temperature to allow the instrument and the saturated solution to reach the thermal equilibrium with the environment before starting the calibration procedure. For a good calibration it is important that the sensor and the solution are at the same temperature. Keep in mind that the plastics is a bad heat transfer material.

Procedure

1. Unscrew the probe protection grid and the saturated solution closing cap.

Note: to prolong the saturated solutions life, it is important that the solutions remain open only the time strictly necessary to insert the sensor.

2. It could happen that some liquid is formed inside the measuring chamber, in such a case dry it with clean absorbing paper.

3. Screw the provided M12X1 threaded adapter to the measuring probe.

4. Screw the adapter with the probe to the saturated solution bottle. Avoid any contact of the sensor with hands or other objects or liquids.

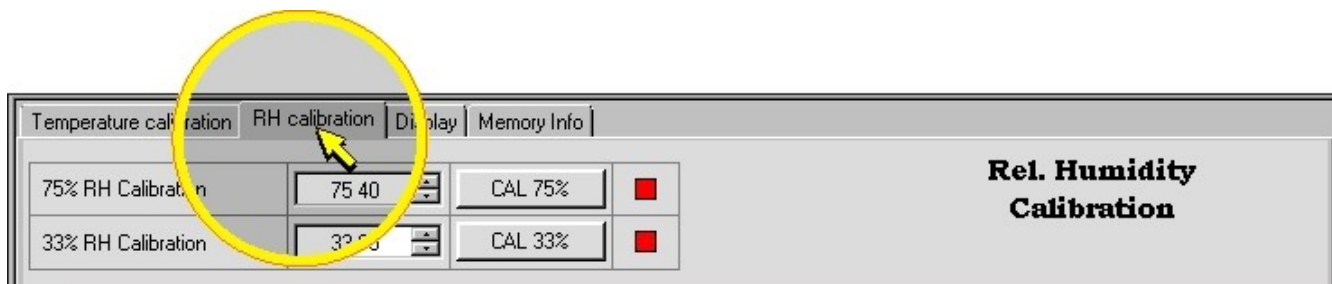
5. Once the sensor is inserted, wait for at least 30÷45 minutes.

6. Connect the transmitter to the PC.

7. Start the HD4817CAL program and perform the [connection](#). Verify that the *calibration and settings* panel is enabled.

Note: the *calibration and settings* panel is automatically enabled after a connection operation. To protect the instrument from inadvertent settings of the calibration or configuration parameters, the panel is automatically disabled after about 4 minutes from the last operation performed inside the panel, or after about 4 minutes from the connection if operations were not executed, in such a case press the **NEW INSTRUMENT** key to activate again the panel. The operations completed before the automatic disabling remain stored in the instrument.

8. Select the *RH Calibration* folder in the right upper panel:



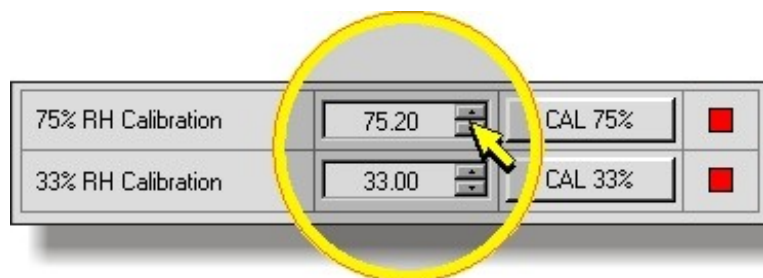
9. Read the temperature measured by the probe. If the transmitter is not provided with LCD, to display on the PC monitor the temperature measured by the instrument select the *Monitor* folder in the right lower panel, then press the *START* key to start the [measured values acquisition](#).

10. Read in the relative humidity-temperature correspondence table of the saturated solution the relative humidity value correspondent to the measured temperature. For the 75%RH saturated solution (code HD75) the table is the following:

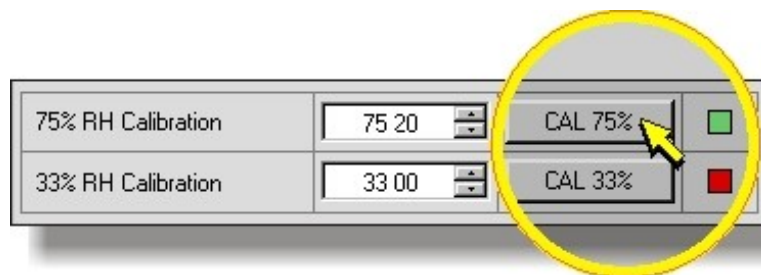
Temp. °C	Solution 75%RH
10	75.6
15	75.6
20	75.4
25	75.2
30	75.0
35	74.8
40	74.6
45	74.5
50	74.4

Note: the calibration must be performed at a temperature between 15 and 30°C. If the temperature is outside such interval, the calibration value will not be accepted by the instrument and on the monitor it will appear a warning message.

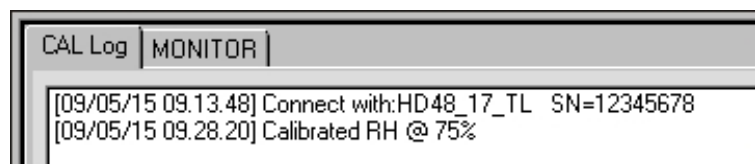
11. Insert the relative humidity value of the saturated solution read from the correspondence table, using the small arrows on the right of the field or directly writing the value:



12. Press the *CAL 75%* key to calibrate the point at 75%RH, the indicator on the right of the field changes from red to green:

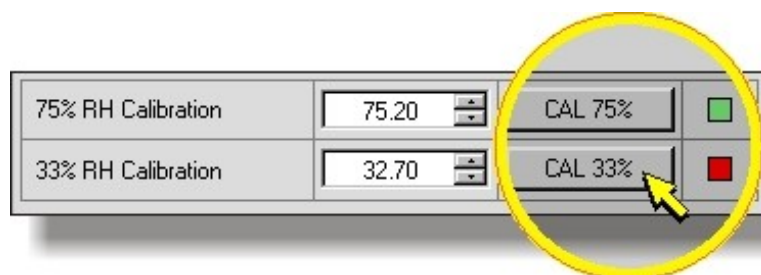


The operation is recorded in the *CAL Log* folder in the lower panel:



Note: during the storing of the calibration parameter in the instrument memory, the *calibration and settings* panel is temporarily disabled.

13. Repeat the previous steps using the second saturated solution to calibrate the point at 33%RH:



Following is the relative humidity-temperature correspondence table of the 33%RH saturated solution (code HD33):

Temp. °C	Solution 33%RH
10	33.4
15	33.3
20	33.0
25	32.7
30	32.4
35	32.0
40	31.6
45	31.1
50	30.5

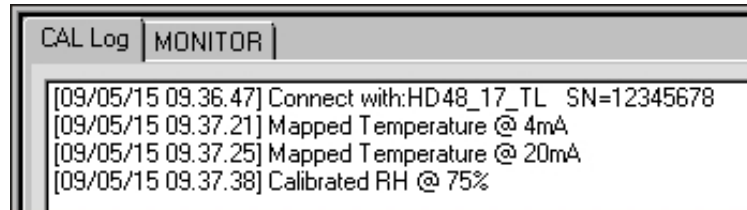
14. After the calibration procedure is completed, press the *CALIBRATION EXIT* key to protect the instrument form inadvertent settings of the calibration or configuration parameters:



Unscrew the M12X1 adapter from the probe and replace the sensor protection grid, avoiding to touch the sensor. Immediately close with its cap, after the use, the saturated solution used.

Events log

The operations concerning the connection and the calibration are recorded in the *CAL Log* folder in the right lower panel:



This allows to keep track of the activities done during the current session.

To delete the events list press the *Delete Events Log* key in the lower side of the panel:



The events list remains displayed even if the instrument is disconnected, but it is cleared after a new connection.

Reading of the memory parameters

The *calibration and settings* panel contains a folder named *Memory Info* used to read the values of the parameters in the memory of the instrument. The purpose of the folder is for the technical service. The execution of the commands in the folder has no effect on the functioning of the instrument.

Information

For further information concerning the software version and license agreement, as well as to open the software manual, select the info box indicated by a question mark:



Troubleshooting

Connection failure

If the program cannot connect, check the following:

Make sure that there are no other programs using the serial ports (e.g. Hyperterminal). If so, close such applications and try again.

Do not use any extension for the serial cable.

If other devices are connected to the other serial ports (e.g. a modem), it could happen that they may interfere with the HD4817CAL program.

Make sure that the USB driver of the converter is installed in the PC. **With Windows 7 and 64-bit operating systems, for the connection it is necessary to disable the driver signature request when the PC is started.**

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