

# **HD2717T...**

## **ENGLISH**

Our instruments' quality level is the results of the product continuous development. This can bring about differences between the information written in this manual and the instrument that you have purchased. We cannot entirely exclude errors in the manual, for which we apologize.

The data, figures and descriptions contained in this manual cannot be legally asserted. We reserve the right to make changes and corrections without prior notice.

## **HD2717T...**

### **Transmitter, indicator, ON/OFF regulator, temperature and humidity datalogger**

The HD2717T... series instruments are transmitters, indicators, ON/OFF regulators with datalogger function. They measure temperature and humidity.

The main characteristic of these instruments is the ***interchangeable probe***. The user can virtually change the probe without interrupting the process. Then the probe can be calibrated or repaired.

We have models with horizontal (S.TO), vertical (S.TV) or separate (S.TC) probes, connected to the instrument using cables of different lengths. The S.TO and S.TV probes are made of AISI304 steel, the S.TC probes can be made of AISI304 steel or POCAN plastic material.

To measure the dew point in compressed air systems, the probe S.TC2.480.2 can be connected to the HD2717T...

The probe, factory calibrated and ready for use, is fitted with a **SICRAM2** module storing its calibration information and allowing its interchangeability.

The devices measure:

- Temperature in Celsius or Fahrenheit degrees
- Relative humidity

and calculate:

- Absolute humidity
- Mixing ratio
- Dew point
- Wet bulb temperature

All models are fitted with current or voltage analog outputs.

We supply models with two working relays and an alarm relay, user configurable.

All models have a multistandard RS232/RS485 output and an auxiliary RS232C serial output.

You can connect several network devices through the RS485 serial port.

The HD2717T... models can have an LCD display or not. The display shows the relative humidity or a resulting quantity on one line, and the temperature in Celsius or Fahrenheit degrees on the second line.

The **datalogger** function allows recording of the measurements detected by the instrument, according to a frequency set by the user.

The instrument configuration is permanently stored. The internal clock is protected against a mains power failure by a special Lithium battery.

When making the order, you can select the power supply between 24 Vac/dc or universal 90...240Vac.

## **1. Instrument versions and available probes**

### **Display**

---

<b>HD2717Tx-0x</b>	None
<b>HD2717Tx-Dx</b>	Custom LCD

### **Relay**

---

<b>HD2717Tx-x0</b>	None
<b>HD2717Tx-xR</b>	2 working relays with exchange contact, 1 alarm relay with normally open contact.

### **Type of probe**

---

<b>HD2717T.xx</b>	Instrument with vertical probe S.TV or probe with cable S.TC.
<b>HD2717TO.xx</b>	Instrument with horizontal probe S.TO.

### **Probes complete with SICRAM2 module for HD2717T.xx instruments**

---

<b>S.TV</b>	Vertical probe L = 130 mm
-------------	---------------------------

The material of the S.TC... series probe can be chosen between AISI304 steel or POCAN plastic material.

<b>S.TC1.2</b>	Probe L = 135 mm with 2 m cable
<b>S.TC1.2P</b>	Probe L = 135 mm with 2 m cable in POCAN
<b>S.TC1.5</b>	Probe L = 135 mm with 5 m cable
<b>S.TC1.5P</b>	Probe L = 135 mm with 5 m cable in POCAN
<b>S.TC1.10</b>	Probe L = 135 mm with 10 m cable
<b>S.TC1.10P</b>	Probe L = 135 mm with 10 m cable in POCAN
<b>S.TC2.2</b>	Probe L = 335 mm with 2 m cable
<b>S.TC2.2P</b>	Probe L = 335 mm with 2 m cable in POCAN
<b>S.TC2.5</b>	Probe L = 335 mm with 5 m cable
<b>S.TC2.5P</b>	Probe L = 335 mm with 5 m cable in POCAN
<b>S.TC2.10</b>	Probe L = 335 mm with 10 m cable
<b>S.TC2.10P</b>	Probe L = 335 mm with 10 m cable in POCAN

Probe with cable for measuring humidity in pipes

<b>S.TC2.480.2</b>	Cable length 2m. Measuring range: -40...+60°C, -40...+60°C DP. 1/4" Italian standard Quick-fit. Working pressure up to 16bar. Measuring chamber in AISI 304.
--------------------	---

### **Probes complete with SICRAM2 module for HD2717TO.xx instruments**

---

<b>S.TO1</b>	Horizontal probe L = 135 mm
<b>S.TO2</b>	Horizontal probe L = 335 mm

## 2. Upon first start up

Some notes about first start up are reported below. For the details see the various chapters in the manual.

- **Before** turning on, the probe should be connected to the instrument.
- Apply the correct voltage to the instrument. A wrong voltage can cause permanent damages to the instrument that are not covered by the warranty.
- In order to install and connect the instrument, please see the chapters "*Installation and connection*" and "*Terminal board description*".
- To use the analog outputs and relays, please see the chapters "*Current and voltage analog outputs*" and "*Instruments fitted with relay outputs*", respectively.
- For the connection to a PC or network of instruments, please see the chapter "*Serial communication and instrument network*".
- Check the instrument date and time as described in the following chapter.

## 3. Initial setting or date and time update

When you power up the instrument, the date and time check takes about one minute. The "*Time Date Set?*" message is displayed in the comment line.

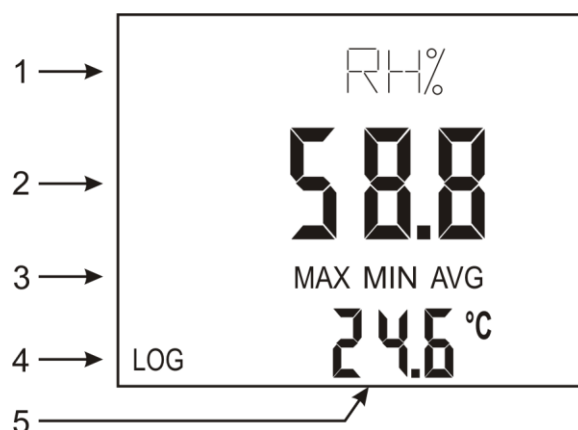
- The date and time are correct: press MENU to go directly to measurement mode.
- The date and time are not correct:
  1. Use the ▲ ▼ arrows to select "YES" and press ENTER.
  2. The date and time appear as follows: year, month, day, hours, minutes. The seconds restart from 00 when pressing ENTER to confirm the minutes.
  3. Modify each item using the ▲ ▼ arrows and confirm with ENTER. You will get to the next one. Repeat for the other items. After the last confirmation you will exit the setting page and return to the menu main screen.
  4. Press MENU to return to measurement mode.

For the next date and time setting, please see the "TIME\_DATE\_SET?" menu item description in the chapter "Description of the menu for the HD2717Tx Dx models with display".

For the instruments without a display, the date and time check or update is performed using the DeltaLog12 software. Connect the instrument to the PC according to the steps described in the chapter "Description of the connection to a PC".

Note: Each menu screen is distinguished by a serial number visible on the lower right of the display and serves to facilitate navigation between the various items: see the chapter "Description of the tools menu for HD2717Tx-Dx models with display."

#### 4. Description of the display for the HD2717Tx-Dx models



**The display constantly shows the humidity on the main line (2) and the temperature on the secondary line (5).**

In addition to relative humidity, the display can show absolute humidity, mixing ratio, dew point or wet bulb temperature on line (2). The symbol corresponding to the chosen quantity will appear on line (1).

The temperature, shown on line (5), can be expressed in Celsius or Fahrenheit degrees.

The first display line (1) is the comment line: it gives the unit of measurement of the relative humidity and correlated measurements displayed on line 2, and the auxiliary indications: i.e. probe serial number, menu item indications, etc.

The MAX, MIN or AVG messages appear on line (3) when pressing the FUNC key activating the maximum, minimum and average measurements.

The LOG symbol (4) indicates that the instrument is logging (please see the details in the chapter "The logging function").

**To select a quantity to be displayed on main line (2) or to change the temperature measuring unit from °C to °F, press the UNIT key.**

**Procedure:**

- Press the UNIT key once
- The comment line flashes
- Use the ▲ ▼ arrows to select the chosen physical quantity among the following.
  - **rH%** corresponds to relative humidity,
  - **G/m<sup>3</sup>** corresponds to absolute humidity,
  - **G/kg** corresponds to index ratio (or mixing ratio),
  - **Td** corresponds to dew point.
  - **TW** corresponds to wet bulb temperature
- Confirm by pressing UNIT once.
- The symbol °C in temperature line (5) flashes. If necessary, modify the displayed measuring unit using the ▲ ▼ arrows.
- Confirm with UNIT key to get back to the measuring mode.

## 5. Description of the keyboard for the HD2717Tx-0x models without display

In the HD2717Tx-0x models face-plate there are two function keys and two LEDs.

### AUX key and LED



PRESS TO AUX COM

On the basic card between the two terminal boards there is a 3-pole connector: it is the AUX COM serial port. You can connect to the PC using the **RS27** cable, and program the transmitter with the DeltaLog12 software.

**By pressing the AUX key you will activate the serial port for one minute. The AUX LED will blink.** During this time interval the instrument is waiting for a possible command through the AUX COM serial port. If no command is received, the instrument automatically returns to the last stored serial port, after one minute.

The lit AUX LED indicates that the instrument is powered and functioning.

Please see the details on RS232/RS485 serial communication in the chapter *"Serial communication and instrument network"*.

### SUSPEND key and LED



PRESS TO PROBE CHANGE

To replace the instrument probe without stopping the control system, you can enable the "SUSPEND" functioning mode.

By pressing this key, the LED on the side will blink and an acoustic beeper will beep for 60 seconds. During this interval, you can replace the probe. When returning to normal state, the instrument will read the new probe calibration parameters and resume functioning.

The "SUSPEND" time can be shortened by pressing and holding down the AUX key.

**Warning:** in order to capture reliable data, the new probe should be thermally preconditioned in the measurement environment, that is, it must be at the same temperature of the previous probe. If necessary, the "suspend" time can be extended 60 seconds by pressing SUSPEND again.

## 6. Description of the keyboard for the HD2717Tx-Dx models with display

The HD2717Tx-Dx models are fitted with an LCD display and a six-key keyboard.



### Up arrow

When used in the menu, it selects an item from a list or increases the selected parameter value. When used in measuring mode, after having pressed the UNIT button, you can choose to display the physical quantity and change the unit of temperature measurement.



### Down arrow

When used in the menu, it selects an item from a list or decreases the selected parameter value. When used in measuring mode, after having pressed the UNIT button, you can choose to display the physical quantity and change the unit of temperature measurement.



### UNIT key

In measuring mode, it selects the physical quantity to be displayed and the unit of measurement of temperature between Celsius and Fahrenheit. Press UNIT button repeatedly to select line to be modified use the arrows to choose the physical quantity to be displayed and/or the unit of temperature measurement, press UNIT to confirm. See the steps in detail in chapter "Description of the display of models HD2717Tx-Dx."



### ESC key

When used in the menu, it goes up one level in the menu hierarchy from a sub-level to an upper level. To go directly from any level to measurement mode, press MENU.



### ENTER/FUNC key

This key has a double function:

- As ENTER key, in the menu, it confirms the selected item.
- As FUNC key, in standard view, it enables the MAX (maximum), MIN (minimum), AVG (average) sequence for the displayed measurement.  
To reset the previous measurements and restart with a new calculation, press ENTER/FUNC until the message "CLR Func?" appears, then use the arrows to select YES and confirm using ENTER.

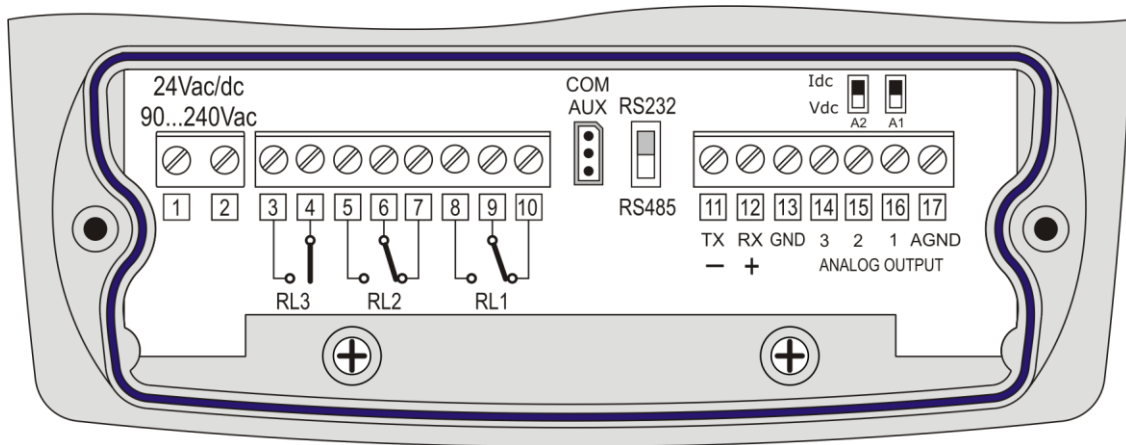


### MENU key

It allows to access the instrument menu main screen. In the menu, it returns to normal measurement.

## 7. Terminal board description

The terminal board is located in the lower part of the instrument, protected against dust and splashes by two doors: the first external, snap-locked, the second internal, fixed with two screws.



Number	Terminal function	Notes		
1 – 2	Power input	When making the order, you can select the power supply between 90...240Vac or 24Vac/dc.		
3 – 4	Alarm relay RL3	For the settings, please see the chapter “ <i>Instruments fitted with relay outputs</i> ”.		
5 – 6 – 7	Working relay RL2	The relay can be associated to any quantity measured by the instrument (relative humidity or correlated measurements, temperature). For the settings, please see the chapter “ <i>Instruments fitted with relay outputs</i> ”.		
8 – 9 – 10	Working relay RL1	The relay can be associated to any quantity measured by the instrument (relative humidity or correlated measurements, temperature). For the settings, please see the chapter “ <i>Instruments fitted with relay outputs</i> ”.		
11 – 12 – 13	RS232C or RS485 serial connection	The communication protocol selection (RS232C or RS485) is performed by using the switch on the left of terminal 11. For the settings, please see the chapter “ <i>Serial communication and instrument network</i> ”		
		Terminal	RS232C mode	RS485 mode
		11	To be connected to TX line of PC (pin 3 of connector DB9)	To be connected to line B (negative of the pair)
		12	To be connected to RX line of PC (pin 2 of connector DB9)	To be connected to line A (negative of the pair)
		13	To be connected to GND line of PC (pin 5 of connector DB9)	To be connected to GND line



Number	Terminal function	Notes
14	Not used	---
15 – 16 – 17	Current and voltage analog outputs	The analog output 1 and 2 can be associated independently to one any of the physical quantities measured by the instrument: relative humidity, absolute humidity, mixing ratio, dew point, wet bulb temperature or temperature For the settings, please see the chapter “ <i>Current and voltage analog outputs</i> ”.
		<b>Terminal</b> <b>Function</b>
		15            Positive output 2. The negative pole is terminal 17.
		16            Positive output 1. The negative pole is terminal 17.
		17            A GND negative pole common to analog outputs.

### AUX-COM connector

The AUX-COM connector (for cable RS27) is an auxiliary RS232C serial port. It is used to temporarily connect the instrument to a PC. Using the DeltaLog12 software you can configure the instrument version without display.

## 8. Measurement probe and calibration of the relative humidity sensor

The instrument only accepts **SICRAM2** type temperature and relative humidity measurement probes. These probes are fitted with an electronic circuit that converts the signal and stores their calibration information.

Thanks to their factory calibration, the probes are interchangeable, directly and immediately.

The probes can be sent to our factory for calibration or repair.

Saturated solutions are available for the humidity probe's checking and calibration.

For the calibration of the humidity sensor, DeltaLog12 software is to be used: see procedure reported in the software's instruction manual.

The calibration of the temperature sensor by the user is not required.

The interchangeable probe allows reducing the instrument down time virtually to zero, in case of faulty probe.

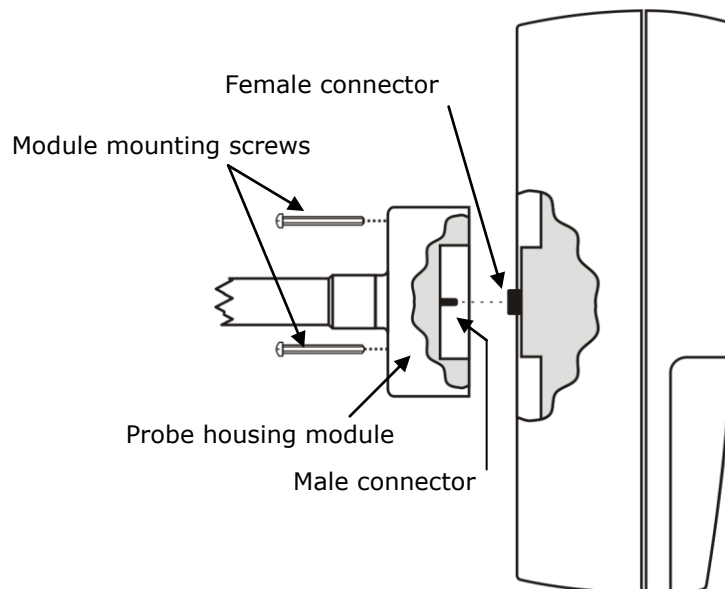
The replacement can be performed without stopping the activity, thanks to the "suspend" functioning mode.

**In the HD2717TO.xx models, the probe is fixed on the instrument back using three screws.**

### To replace the horizontal probe:

- Start the suspend function.
- Unscrew the three screws fixing the probe housing module to the instrument.
- Extract the probe from the instrument connector: the probe to be replaced can be removed.
- Connect the new probe to the instrument.
- Fix the module to the instrument back using the three screws.
- The replacement is complete.

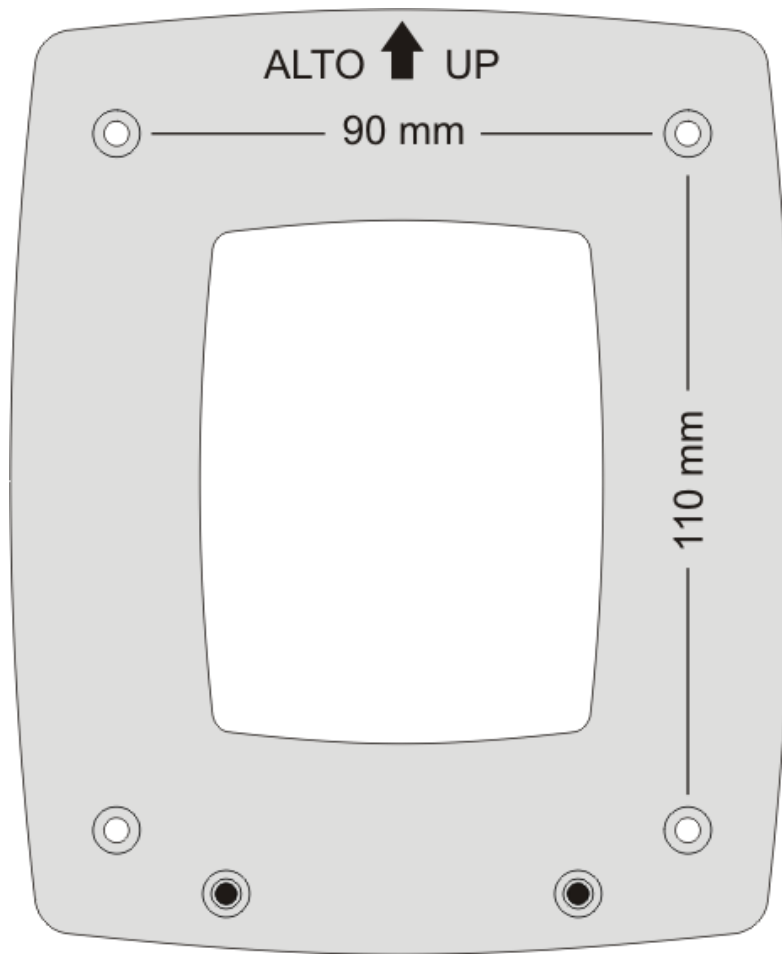
Note: if necessary, you can extend the suspension time by pressing the "Press to probe change" key on the model without display or the ▲ arrow on the model with display.



## 9. Installation and connections

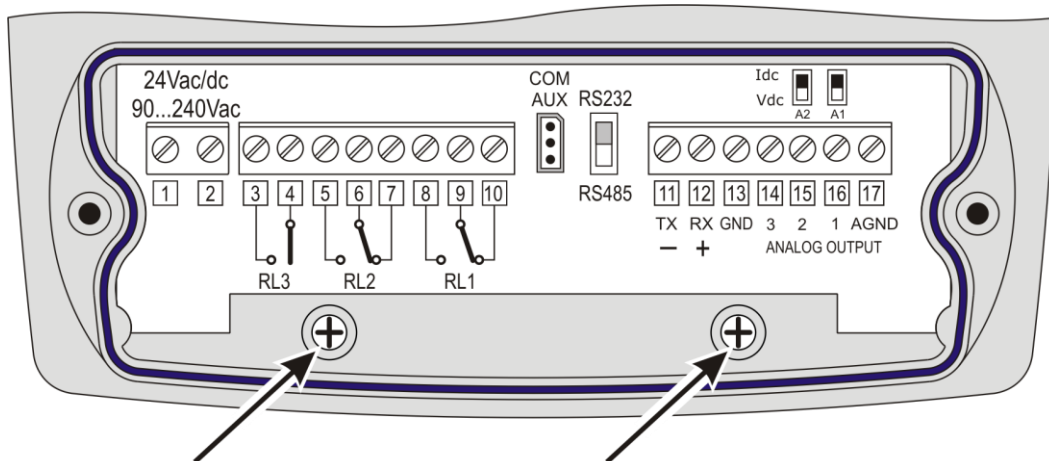
The instrument is set to work indoors.

For wall mounting, the instrument is fitted with a plate to be fixed to the wall. The instrument is attached through a cavity, near the arrow.



As shown in the figure, 4 holes are needed at 90 mm horizontally and 110 mm vertically. The holes have a  $\varnothing 4,5$  mm diameter.

In order to separate the plate from the instrument bottom, open the two front doors to access the instrument terminal board. Unscrew the two screws shown in the following figure and pull the instrument toward yourself.



Fix the plate to the wall using four screws. Lock the instrument in the cavity located at the top and screw again the two screws inside the terminal board housing for final fastening.

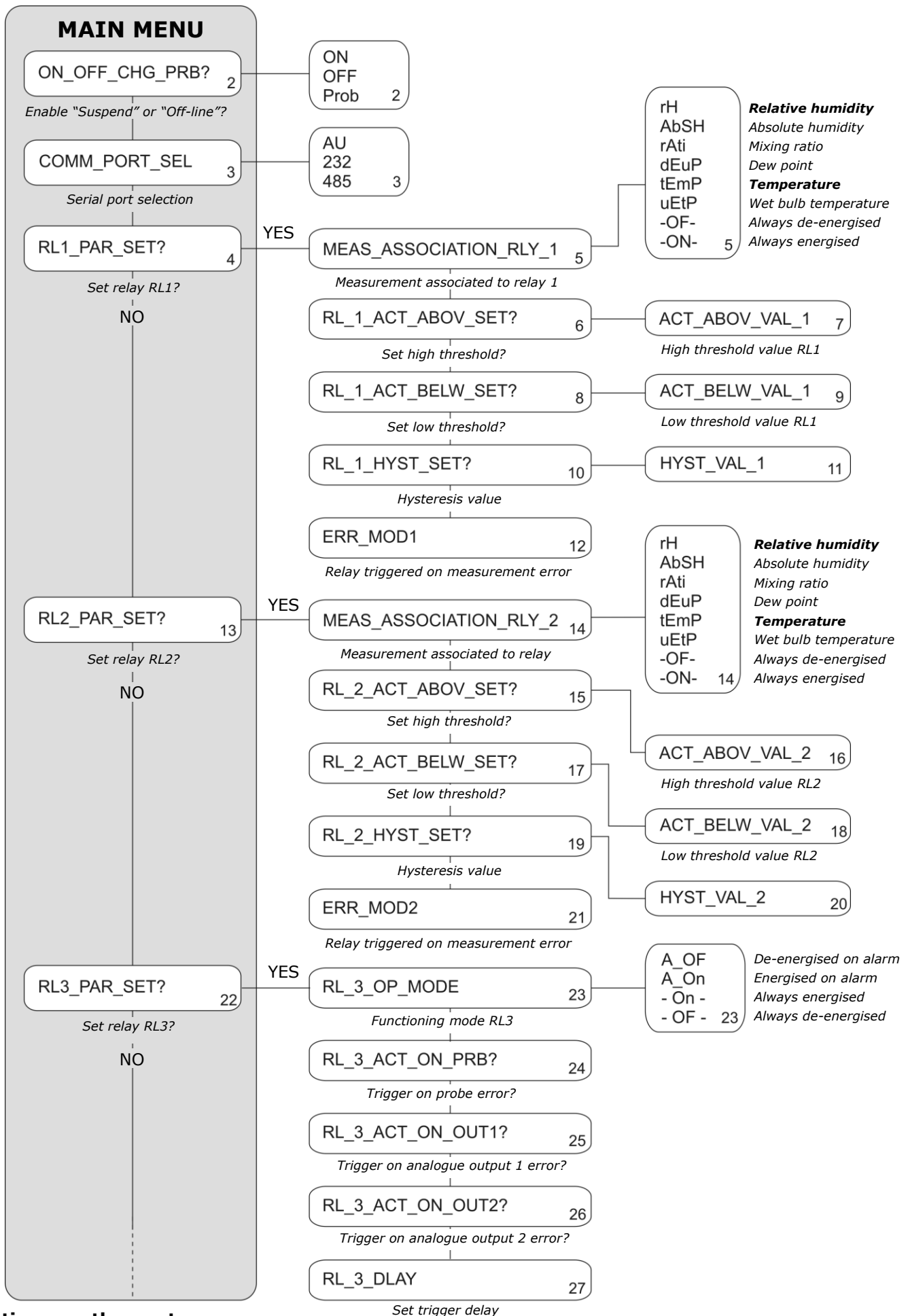
## ***10. Description of the menu for the HD2717Tx-Dx models with display***

The MENU key allows accessing the set of items that regulate the instrument functioning.

- The first menu item is accessed by initially pressing the MENU key.
- Press ENTER to go to the following items.
- To modify the item displayed, use the arrow keys (▲ and ▼).
- The current value is confirmed by pressing the ENTER key and the display moves on to the next parameter.
- Press ESC to cancel the setting.
- The default parameter associated to any main item in the menu does not effect any change but is used, if confirmed with ENTER, to go to the next item.
- To exit the menu and return directly to measurement, press MENU.

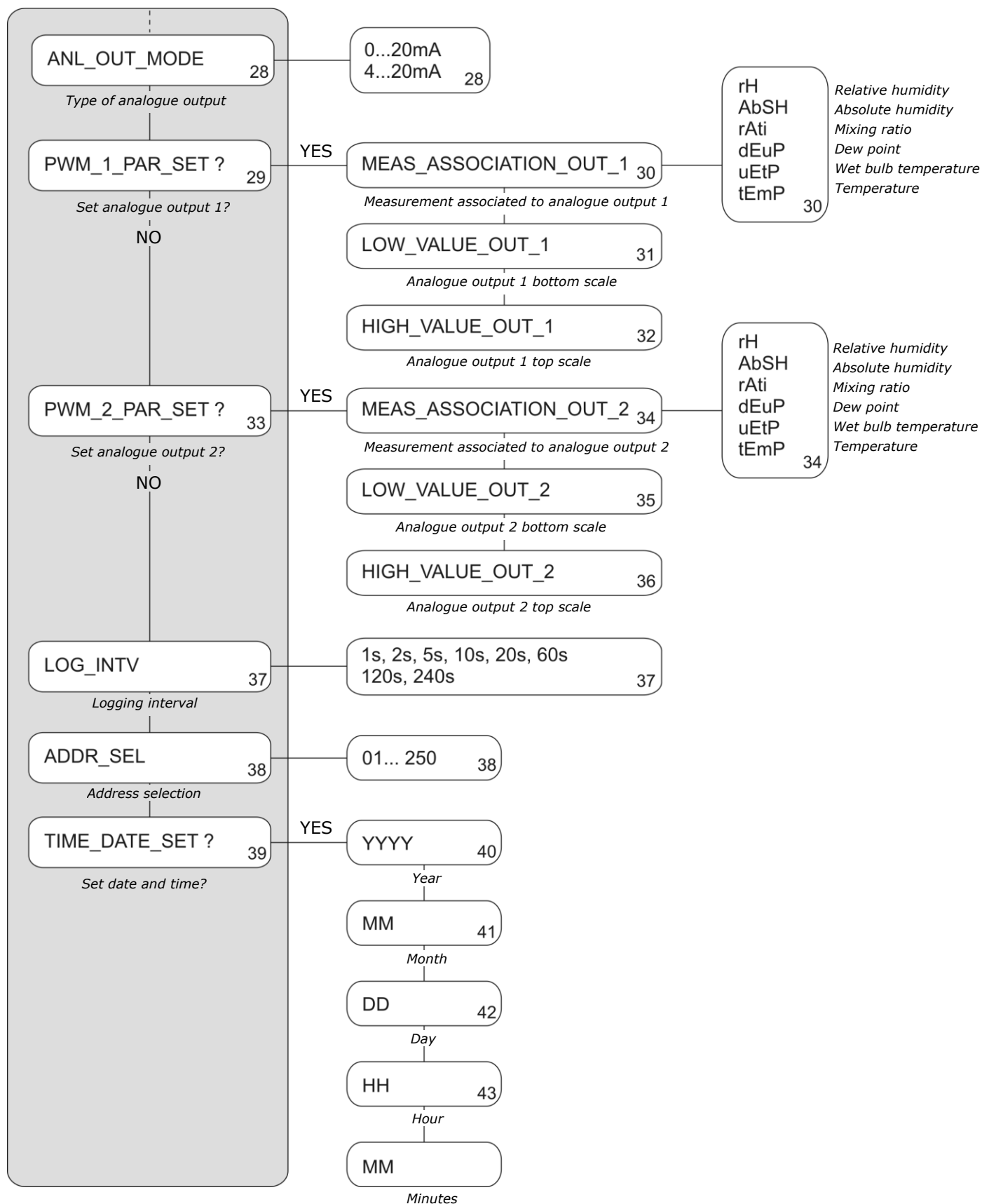
Each page is marked by a progressive index, on the lower right, and is used to ease navigation among the various menu items.

The complete menu diagram with the messages appearing on the comment line and the relevant numbering are reported below.



Continue on the next page

## Continue from previous page



The menu items are listed in this order:

### 1) **ON\_OFF\_CHG\_PRB?** (Enable the suspend or off-line functions?)

It allows enabling the instrument functioning modes: "suspend" and "off-line". The *suspend* mode is used to replace the probe. It avoids stopping the process and, when

returning to normal state, the instrument reads the new probe calibration parameters. The *off-line* mode turns off the instrument: the relays are de-energised, the analog outputs are set to zero and logging is stopped.

Use the ▲ ▼ arrows to select the parameter and confirm it with ENTER.

- **ON** goes to the next item.
- **OFF** enables the off-line mode. Upon confirmation by pressing ENTER, the display shows "OFF Line". To reactivate the instrument, hold down ENTER for about 10 seconds.
- **Prob** enables the suspend mode. Upon confirmation by pressing ENTER, a 60 second countdown begins. During this time you can change the probe. The time can be extended 60 seconds by pressing the ▲ arrow. The other keys, save the ▲ arrow and ENTER, reduce the remaining time to 3 seconds.

## 2) **COMM\_PORT\_SEL** (*Serial port selection*)

It selects the serial communication port and the relevant protocol.

- **AU** (factory default) enables the RS232 AUX COM serial port.
  - **232** the RS232 serial port at the terminals 11 – 12 – 13.
  - **485** the RS485 serial port connected at the same terminals 11 – 12 – 13.
- To use one of these last two ports, you need to shift the dip-switch located between the AUX COM connector and terminal 11. Select the port using the ▲ ▼ arrows and confirm with ENTER to go to the next point.

## 3) **RL1\_PAR\_SET?** (*Set the working relay 1 parameters?*)

It is used to set the functioning parameters of the working relay 1. Use the ▲ ▼ arrows to select YES and confirm with ENTER to enter the relay setting submenu.

The various parameters are shown in this order.

### a) **MEAS\_ASSOCIATION\_RLY\_1** physical quantity associated to the relay:

- **rH** corresponds to relative humidity,
- **AbSH** corresponds to absolute humidity,
- **rAti** corresponds to mixing ratio,
- **dEuP** corresponds to dew point,
- **tEmP** corresponds to environment temperature,
- **uEtP** corresponds to the wet bulb temperature
- **-OF-** blocks the relay in the OFF state.
- **-ON-** blocks the relay in the ON state.

Select the required parameter with the ▲ ▼ arrows and confirm with ENTER to go to the next point.

### b) **RL\_1\_ACT\_ABOV\_SET?** Access to the setting (optional) of the relay tripping point "Act above" (*upper threshold*): when the measurement increases, it represents the threshold that shifts the relay from de-energised to energised when exceeded. The contact to terminals 9 and 10 goes from closed to open. The contact to terminals 8 and 9 goes from open to closed.

Use the ▲ ▼ arrows to select NO so as not to use it. YES + ENTER to change the threshold value. The trigger threshold value **ACT\_ABOV\_VAL\_1** is displayed: use the ▲ and ▼ arrows to set the desired value and confirm with ENTER. You will get to the next point.

### c) **RL\_1\_ACT\_BELW\_SET?** Access to the setting (optional) of the relay tripping point "Act below" (*lower threshold*): when the measurement decreases, it represents the threshold that shifts the relay from de-energised to energised when exceeded. The contact to terminals 9 and 10 goes from closed to open. The contact to terminals 8 and 9 goes from open to closed.

Use the ▲ ▼ arrows to select NO so as not to use it. YES + ENTER to change the threshold value. The trigger threshold value **ACT\_BELW\_VAL\_1** is displayed: use the ▲ and ▼ arrows to set the desired value and confirm with ENTER. You will get to the next point.

### d) **RL\_1\_HYST\_SET?** Access to the setting (optional) of the hysteresis of the relay RL1, which applies to both thresholds defined above. Use the arrows the ▲ and ▼ arrows to

select NO so as not to use it, YES + ENTER to change the value. Value **HYST\_VAL\_1** appears. Use the ▲ and ▼ arrows to set the desired value and confirm with ENTER. You will get to the next point.

- e) **ERR\_MOD1**. This parameter controls the relay RL1 behavior if the physical quantity associated to the relay goes in error.

The error occurs, e.g. when the measurement exceeds the functioning limits indicated in the technical information, when the probe becomes faulty or gets disconnected.

This parameter can be set to "YES" or "NO":

- If **ERR\_MOD1=NO** (factory default), in case of error, the relay de-energises independently of its current condition. The contact 9 – 10 closes, the contact 8 – 9 opens.
- If **ERR\_MOD1= YES**, in case of error, the relay energises independently of its current condition. The contact 9 – 10 opens, the contact 8 – 9 closes.

This parameter does not depend from other settings (upper or lower threshold, hysteresis, ...) and neither from the relay's state when the error occurs.

Use the ▲ and ▼ arrows to select NO or YES. Confirm by pressing ENTER.

#### 4) **RL2\_PAR\_SET?** (*Set the working relay 2 parameters?*)

It is used to set the functioning parameters of the working relay 2. Use the ▲ ▼ arrows to select YES and confirm with ENTER to enter the relay setting submenu.

The various parameters are shown in this order.

- a) **MEAS\_ASSOCIATION\_RLY\_2** physical quantity associated to the relay:

- **rH** corresponds to relative humidity,
- **AbSH** corresponds to absolute humidity,
- **rAti** corresponds to mixing ratio,
- **dEuP** corresponds to dew point,
- **tEmP** corresponds to environment temperature
- **uEtP** corresponds to the wet bulb temperature,
- **-OF-** blocks the relay in the OFF state
- **-ON-** blocks the relay in the ON state.

Select the required parameter with the ▲ ▼ arrows and confirm with ENTER to go to the next point.

- b) **RL\_2\_ACT\_ABOV\_SET?** Access to the setting (optional) of the relay tripping point "Act above" (*upper threshold*): When the measurement increases, it represents the threshold that shifts the relay from de-energised to energised when exceeded. The contact to terminals 6 and 7 goes from closed to open. The contact to terminals 5 and 6 goes from open to closed.

Use the ▲ ▼ arrows to select NO so as not to use it. YES + ENTER to change the threshold value. The trigger threshold value **ACT\_ABOV\_VAL\_2** is displayed: use the ▲ and ▼ arrows to set the desired value and confirm with ENTER. You will get to the next point.

- c) **RL\_2\_ACT\_BELW\_SET?** Access to the setting (optional) of the relay tripping point "Act below" (*lower threshold*): when the measurement decreases, it represents the threshold that shifts the relay from de-energised to energised when exceeded. The contact to terminals 6 and 7 goes from closed to open. The contact to terminals 5 and 6 goes from open to closed.

Use the ▲ ▼ arrows to select NO so as not to use it. YES + ENTER to change the threshold value. The trigger threshold value **ACT\_BELW\_VAL\_2** is displayed: use the ▲ and ▼ arrows to set the desired value and confirm with ENTER. You will get to the next point.

- d) **RL\_2\_HYST\_SET?** Access to the setting (optional) of the hysteresis of the relay RL1, which applies to both thresholds defined above. Use the arrows the ▲ and ▼ arrows to select NO so as not to use it, YES + ENTER to change the value. Value **HYST\_VAL\_2** appears. Use the ▲ and ▼ arrows to set the desired value and confirm with ENTER. You will get to the next point.



- e) **ERR\_MOD2**. This parameter controls the relay RL2 behavior if the physical quantity associated to the relay goes in error.  
The error occurs, e.g. when the measurement exceeds the functioning limits indicated in the technical information, when the probe becomes faulty or gets disconnected.  
This parameter can be set to "YES" or "NO":
- If **ERR\_MOD1=NO** (factory default) in case of error, the relay de-energises independently of its current condition. The contact 6 – 7 closes, the contact 5 – 6 opens.
  - If **ERR\_MOD1= YES**, in case of error, the relay energises independently of its current condition. The contact 6 – 7 opens, the contact 5 – 6 closes.
- This parameter does not depend from other settings (upper or lower threshold, hysteresis, ...) and neither from the relay's state when the error occurs.  
Use the ▲ and ▼ arrows to select NO or YES. Confirm by pressing ENTER.

5) **RL3\_PAR\_SET?** (*Set the parameters of the alarm relay 3?*)

It is used to set the functioning parameters of the alarm relay 3. Use the ▲ ▼ arrows to select YES and confirm with ENTER to enter the relay setting submenu.  
The various parameters are shown in this order.

- a) **RL\_3\_OP\_MODE** is the relay functioning mode to be selected among the four possible, as listed below. Use the ▲ and ▼ arrows to select one of the items and confirm with ENTER.
- "A\_OF". The functioning relay RL3 is controlled by the error condition of one or more parameters, selected among those listed at the following points b), c) or d). By selecting this functioning mode (**RL\_3\_OP\_MODE=A\_OF**), the relay RL3 de-energises and the contact between terminals 3 and 4 opens, in case one or more parameters go in error. In normal conditions, if the selected parameters are not in error, the relay is energised and the contact between the terminals 3 and 4 is closed.
  - "A\_On". The functioning relay RL3 is controlled by the error condition of one or more parameters, selected among those listed at the following points b), c) or d). By selecting this functioning mode (**RL\_3\_OP\_MODE=A\_ON**), the relay RL3 energises and the contact between terminals 3 and 4 closes, in case one or more parameters go in error. In normal conditions, if the selected parameters are not in error, the relay is de-energised and the contact between the terminals 3 and 4 is open.
  - "- On -" blocks the relay in the energised state, the contact between the terminals 3 and 4 is always closed.
  - "- OF -" blocks the relay in the de-energised state, the contact between the terminals 3 and 4 is always open.

For the "A\_OF" and "A\_On" functioning modes the following 3 alarm sources are provided. You can also select more than one source: the occurrence of any of them triggers the alarm and switches the relay RL3.

To enable them, use the ▲ and ▼ arrows to select "YES" and press ENTER.

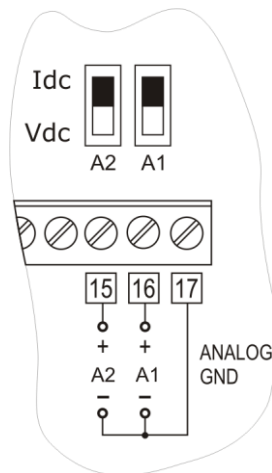
- b) **RL\_3\_ACT\_ON\_PRB?** is triggered when a probe error occurs, e.g. when the measurement exceeds the functioning limits indicated in the technical information, when the probe becomes faulty or gets disconnected.
- c) **RL\_3\_ACT\_ON\_OUT1?** is triggered when the analog output 1 goes in error because the set high or low limits are exceeded.
- d) **RL\_3\_ACT\_ON\_OUT2?** is triggered when the analog output 2 goes in error because the set high or low limits are exceeded.
- e) **RL\_3\_DLAY** represents the delay before generation an alarm. To modify the delay time, set a new value using the ▲ ▼ arrows and press ENTER to confirm and return to the previous menu.

6) **ANL\_OUT\_MODE** (*Set the analog outputs*)

The two dip-switches on the card above the terminals 15 and 16, allow to select if the output is a current **Idc** or voltage **Vdc**, per each analog output A1 and A2.

Use the ▲ ▼ arrows to select the "0 – 20" or "4 – 20" type of output and confirm it with ENTER.

- Selecting "0 – 20" the output is 0...20mA if the dip-switch on the card is set to "Idc" or 0...10Vdc if the dip-switch is set to "Vdc".
- Selecting "4 – 20" the output is 4...20mA if the dip-switch on the card is set to "Idc" or 2...10Vdc if the dip-switch is set to "Vdc".



7) **PWM\_1\_PAR\_SET?** (*Set the analog output 1 parameters?*)

To configure the analog output 1 range, press the ▲ ▼ arrows to select YES and confirm with ENTER: you will open the analog output 1 setting submenu. To go to the next item without making changes, select NO and press ENTER.

The various parameters are shown in this order.

- a) **MEAS\_ASSOCIATION\_OUT\_1** is the physical quantity associated to the analog output 1, and appears on the display main line:
- **rH** corresponds to relative humidity,
  - **AbSH** corresponds to absolute humidity,
  - **rAti** corresponds to mixing ratio,
  - **dEuP** corresponds to dew point.
  - **uEtP** corresponds to the wet bulb temperature
  - **tEmP** corresponds to the environment temperature

Select the chosen physical quantity with the ▲ ▼ arrows and confirm with ENTER to go to the next point.

- b) **LOW\_VALUE\_OUT\_1** is the lower limit of the physical quantity corresponding to the bottom scale value of analog output 1 (i.e. 0,0%RH). Use the ▲ ▼ arrows to change the displayed value and confirm with ENTER. You will get to the next point.

- c) **HIGH\_VALUE\_OUT\_1** is the upper limit of the physical quantity corresponding to the top scale value of the analog output 1 (i.e. 100,0%RH). Use the ▲ ▼ arrows to change the displayed value and press ENTER to confirm and return to the main menu.

8) **PWM\_2\_PAR\_SET ?** (*Set the analog output 2 parameters?*)

To configure the analog output 2 range, press the ▲ ▼ arrows to select YES and confirm with ENTER: you will open the analog output 2 setting submenu. To go to the next item without making changes, select NO and press ENTER.

The various parameters are shown in this order.

- a) **MEAS\_ASSOCIATION\_OUT\_2** is the physical quantity associated to analog output 2.
- **rH** corresponds to relative humidity,
  - **AbSH** corresponds to absolute humidity,

- **rAti** corresponds to mixing ratio,
- **dEuP** corresponds to dew point.
- **uEtP** corresponds to the wet bulb temperature
- **tEmP** corresponds to the environment temperature

Select the chosen physical quantity with the ▲ ▼ arrows and confirm with ENTER to go to the next point.

- LOW\_VALUE\_OUT\_2** is the lower limit of the physical quantity corresponding to the bottom scale value of the analog output 2 (i.e. 0,0°C). Use the ▲ ▼ arrows to change the displayed value and confirm with ENTER. You will get to the next point.
- HIGH\_VALUE\_OUT\_2** is the upper limit of the physical quantity corresponding to the top scale value of the analog output 2 (i.e. 100,0°C). Use the ▲ ▼ arrows to change the displayed value and press ENTER to confirm and return to the main menu.

9) **LOG\_INTV** (*Set the log interval*)

The **LOG\_INTV** item sets the interval in seconds and minutes between two loggings. The available interval are: 1, 2, 5, 10, 20, 60 seconds, 2 and 4 minutes.

Use the ▲ and ▼ arrows to change the interval and press ENTER to confirm. The ESC key is used to return to the menu main screen.

For the logging function details, please see the dedicated chapter.

10) **ADDR\_SEL** (*Set the address number of a network instrument*)

The **ADDR\_SEL** item sets the instrument address to be able to use it within a network. The numbers from 01 (factory default) to 250 are available. The number 0 and the numbers 251 to 255 are reserved. For the details, please see the paragraph dedicated to serial communication.

11) **TIME\_DATE\_SET ?** (*Set or modify the instrument date and time?*)

The "TIME\_DATE\_SET" item allows access to modify the instrument date and time. An internal circuit fitted with backup battery ensures the correct functioning of the clock even in case of mains power failure.

The date and time are configured in sequence: year, month, day, hours, minutes. The seconds start from 00 when pressing ENTER to confirm the minutes. Modify each item using the ▲ ▼ arrows and confirm with ENTER. You will get to the next item through the other items to be set or changed. After the last confirmation you will exit the setting page and return to the menu main screen.

## 11. Current and voltage analog outputs

The instruments have two analog outputs that can be configured as voltage or current outputs: 0...20mA, 4...20mA, 0...10Vdc or 2...10Vdc.

The two analog outputs (terminals 16 and 17 the first, and 15 and 17 the second) can be associated, independently from each other, to one of the following physical quantities:

- Relative Humidity RH,
- Absolute Humidity AH,
- Mixing Ratio MR,
- Dew Point TD,
- Wet bulb temperature TW
- Temperature T

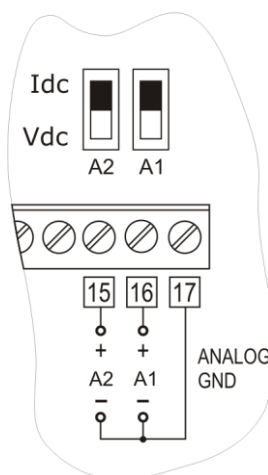
The second analog output (terminals 15 and 17) is permanently associated to temperature.

**The physical quantities associated to the two analog outputs A1 and A2 appear, respectively, in the central line and the secondary bottom line.**

The relationship between measurement range of the input physical quantity and the analog output range (0...20mA, 4...20mA, 0...10Vdc, 2...10Vdc) can be configured from the menu.

To configure the outputs:

1. Use the dip-switches A1, A2
2. Set the "PWM\_x\_PAR\_SET ?" menu item on the instrument or use the PC through the DeltaLog12 software.



The various combination are outlined in the following table in which the relevant output is reported according to the menu choice.

"ANL_OUT_MODE" menu item	0...20mA/0...10Vdc		4...20mA/2...10Vdc	
Position of the dip-switches A1 and A2	Idc	Vdc	Idc	Vdc
Selected output	0...20mA	0...10Vdc	4...20mA	2...10Vdc

You can simultaneously use current and voltage outputs provided that they belong to the same group selected from the menu, e.g. the 0...20mA and 0...10Vdc or the 4...20mA and 2...10Vdc outputs. You cannot select the 0...20mA and 4...20mA or 0...10Vdc and 2...10Vdc outputs.

**In case of error, e.g. sensor fault or violation of the measurement range set from the menu, the corresponding analog output of the probe shifts to 22mA (current) or 11Vdc (voltage).**

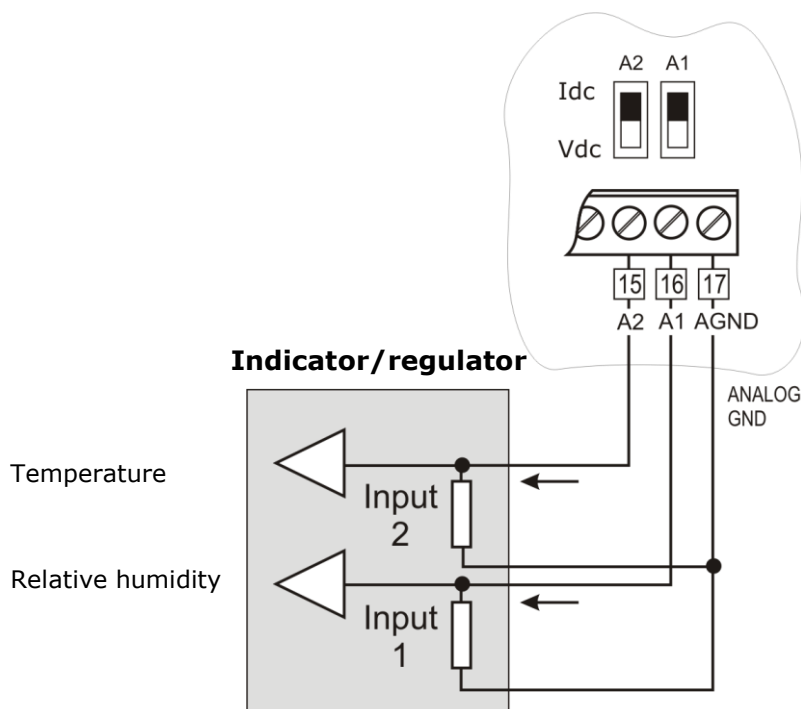
For correct functioning, **abide by the load resistance specifications concerning the analog outputs reported in the technical information.**

### 11.1. Numerical example

Let's suppose you need to connect the HD2717T to a two-input indicator/regulator (e.g. the Delta Ohm DO9404) using the two 4...20mA current outputs for relative humidity and temperature, and that the ratio between the physical quantities input range and the 4...20mA output range is the one reported in the following table:

Input	Analog output
0...100%RH	A1 = 4...20mA
0...150°C	A2 = 4...20mA

#### Procedure



1. Connect the HD2717T to the indicator/regulator as illustrated in the picture.
2. Set the two dip-switches A1 and A2 to "**Idc**" (current).
3. Press MENU and then ENTER several times until the "**ANL\_OUT\_MODE**" message (Set analog outputs) appears up on the display, in the comment line.
4. Use the  $\blacktriangle$   $\blacktriangledown$  arrows to select "**4 - 20**" and confirm with ENTER.
5. In the next screen "**PWM\_1\_PAR\_SET ?**" (Set the analog output 1 parameters?) select **YES** using the  $\blacktriangle$   $\blacktriangledown$  arrows and confirm with ENTER to configure the analog output A1 associated in this example to relative humidity.
6. The "**MEAS\_ASSOCIATION\_OUT\_1**" message appears (Physical quantity associated to the analog output 1): use the  $\blacktriangle$  and  $\blacktriangledown$  arrows to select "**rH**" and confirm with ENTER.
7. The "**LOW\_VALUE\_OUT\_1**" message appears (Lower limit of the physical quantity corresponding to the analog output 1 bottom scale): use the  $\blacktriangle$  and  $\blacktriangledown$  arrows to set the relative humidity bottom scale value "**0,0**" and confirm with ENTER.

8. The "**HIGH\_VALUE\_OUT\_1**" message appears (*Upper limit of the physical quantity corresponding to the analog output 1 top scale*): use the ▲ and ▼ arrows to set the relative humidity top scale value "**100,0**" and confirm with ENTER.
9. In the next screen "**PWM\_2\_PAR\_SET ?**" (*Set the analog output 2 parameters?*) select **YES** using the ▲ ▼ arrows and confirm with ENTER to configure the analog output A2 associated in this example to temperature.
10. The "**MEAS\_ASSOCIATION\_OUT\_2**" message appears (*Physical quantity associated to the analog output 2*): "**tEmP**" is already selected, confirm with ENTER.
11. The "**LOW\_VALUE\_OUT\_2**" message appears (*Lower limit of the temperature corresponding to the analog output 2 bottom scale*): use the ▲ and ▼ arrows to set the temperature bottom scale value "**0,0**" and confirm with ENTER.
12. The "**HIGH\_VALUE\_OUT\_2**" message appears (*Upper limit of the temperature corresponding to the analog output 2 top scale*): use the ▲ and ▼ arrows to set the temperature top scale value "**150,0**" and confirm with ENTER.
13. Press MENU to exit the menu and return to measurement mode.

The procedure is complete.

## 12. Instruments fitted with relay outputs

The HD2717Tx-xR models are fitted with three relays with ON/OFF or control and alarm functions.

The RL1 and RL2 relays have a free potential exchange contact, the RL3 alarm relay has a free potential normally open contact.

The three relays can be configured independently. You can associate one of the six available physical quantities (temperature, relative humidity, absolute humidity, mixing ratio, dew point, wet bulb temperature) to the RL1 and RL2 relays.

The RL3 relay is employed for the alarms.

**To set the relays parameters, you can use these menu item:**

- **RL1\_PAR\_SET?**
- **RL2\_PAR\_SET?**
- **RL3\_PAR\_SET?**

When the relays are de-energised, the state of the contacts is that reported in the silk screen on the terminal board: it is the same when the instrument is not powered or in "off-line" mode. Please account for this during configuration of the instrument.

In "suspend" mode the contacts are maintained in the same position in which they were when the suspend mode occurred.

<b>Relay idle, with instrument non powered or in OFF-LINE mode</b>	<b>Contact</b>
RL1	9 – 10    Closed contact
	9 – 8     Open contact
RL2	6 – 7    Closed contact
	5 – 6    Open contact
RL3	3 – 4    Open contact

To simplify the system maintenance operations or to check the correct configuration, the relays can be blocked in the ON or OFF fixed position from the menu.

A special menu item (*ERR\_MOD1* and *ERR\_MOD2*) controls the behavior of the RL1 and RL2 relays, if the measurement associated to each one goes in error. The error can occur when the measurement exceeds the functioning limits indicated in the technical information, and when the probe becomes faulty or gets disconnected.

### 12.1. Working relays RL1 and RL2

The following parameters should be set per each working relay (**RL1** and **RL2**):

1) The quantity associated to the relay functioning (*MEAS\_ASSOCIATION\_RLY\_x* in the menu).

Per each relay you can select one of these items (between parenthesis the indication shown on the display):

- Relative Humidity (**rH**)
- Absolute Humidity (**AbSH**)
- Mixing Ratio (**rAti**)
- Dew Point (**dEuP**)
- Wet bulb temperature (**uEtP**)
- Temperature (**tEmP**)
- (Force OFF) blocks the relay in a de-energised state (**-OF-**)
- (Force ON) blocks the relay in an energised state (**-ON-**)

The last two items are useful during system maintenance and instrument configuration.

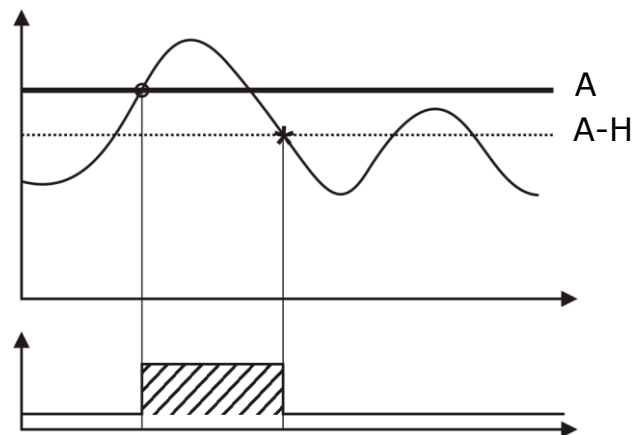
- 2) The trigger threshold **Act above** (*high tripping point*): when the measurement **increases**, it represents the threshold (ACT\_ABOV\_VAL\_x in the menu) that shifts the relay from de-energised to energised when exceeded. The contacts 5-6 and 8-9 will close, the contacts 6-7 and 9-10 will open. The trigger threshold can be disabled.
- 3) The trigger threshold **Act below** (*low tripping point*): when the measurement **decreases**, it represents the threshold (ACT\_BELW\_VAL\_x in the menu) that shifts the relay from de-energised to energised when exceeded. The contacts 5-6 and 8-9 will close, the contacts 6-7 and 9-10 will open. The trigger threshold can be disabled.
- 4) The hysteresis value applies to both thresholds defined above (HYST\_VAL\_x in the menu). The hysteresis prevents the relay from toggling between the states when the measurement comes close to the set threshold. The relay is energised when the measurement reaches one of the two trigger thresholds. When the measurement returns toward the value of the set threshold, the relay does not shift on the threshold value but on the threshold  $\pm$  hysteresis value.  
*Notes:*
  - a) You can disable the hysteresis, but we recommend to maintain it to avoid any malfunctioning near the relay trigger point.
  - b) The hysteresis width should be lesser than the difference between the two trigger thresholds *Act above (high threshold)* and *Act below (low threshold)*.
  - c) If the *Act above (high)* threshold is lesser than the *Act below (low)* threshold, the hysteresis works contrariwise: the relay **de-energises** when the measurement exceeds the threshold and not, as in the opposite case, the threshold  $\pm$  **the hysteresis**.
- 5) Behaviour of the relay if the associate physical quantity goes in error (ERR\_MOD1 and ERR\_MOD2 in the menu).
  - a) The error can occur when the measurement exceeds the functioning limits indicated in the technical information,
  - b) When the probe becomes faulty or gets disconnected.
  - c) Selecting ERR\_MOD1=NO, in case of error of the controlled quantity, the RL1 relay de-energises.
  - d) Selecting ERR\_MOD1=YES, in case of error of the controlled quantity, the RL1 relay energises.



### Functioning examples of the working relays RL1 and RL2.

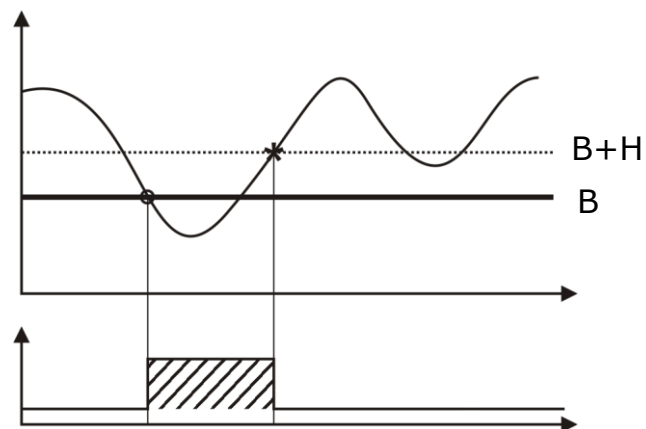
If the thresholds are enabled or not and depending from the set trigger level of each, you can have four different functioning modes.

#### 1. The *Act above* (high) threshold is enabled.



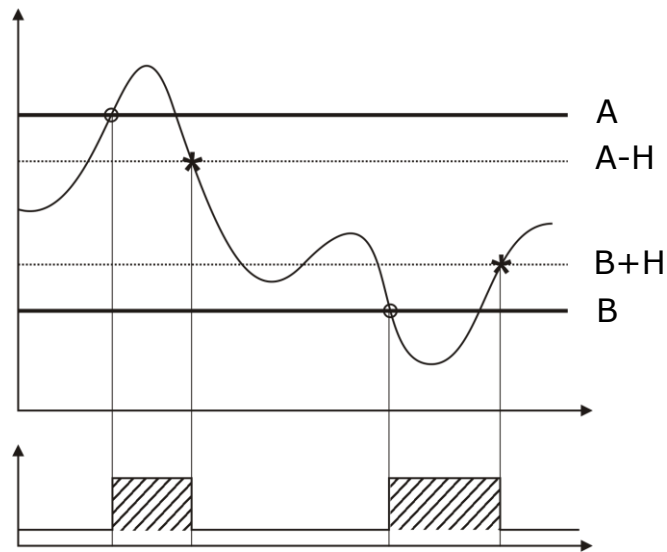
The relay is energised when the associate measurement exceeds threshold **A**, and de-energised when the measurement falls below threshold **A - H**.

#### 2. The *Act below* (low) threshold is enabled.



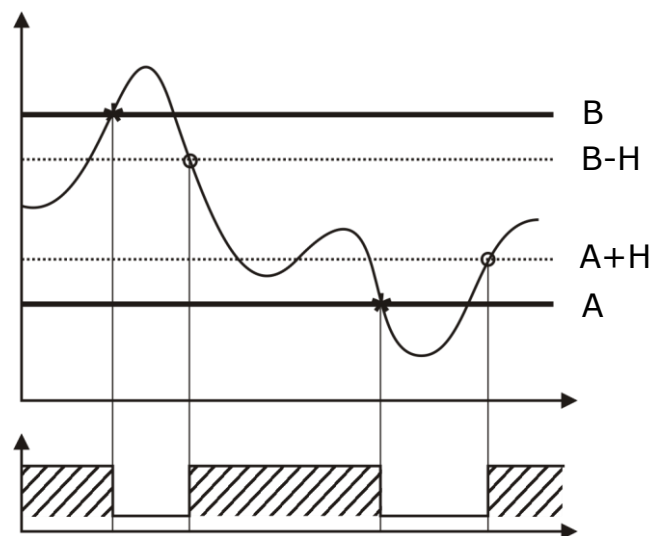
The relay is energised when the associate measurement falls below threshold **B**, and de-energised when the measurement exceeds threshold **B + H**.

3. Both thresholds are enabled, the *Act above* (high) threshold is higher than the *Act below* (low) threshold.



The relay is energised when the associate measurement is outside the thresholds **A** and **B**, and de-energised when the measurement is within the thresholds **A - H** and **B + H**.

4. Both thresholds are enabled, the *Act above* (high) threshold is lesser than the *Act below* (low) threshold.



The relay is energised when the associate measurement is within the thresholds **A+H** and **B-H**, and de-energised when exceeding the thresholds **A** and **B**.

The configured relay can be used to control a quantity and generate an alarm, if the measurement falls outside the set range, the sensor becomes faulty or in case of mains failure.

## 12.2. Numerical example

Let's suppose you need to set the relay RL1 as in figure 3 of the previous paragraph. The parameters to be set are summarized in the following table:

Parameter	Value
Control physical quantity	Temperature
High threshold	A = 100.0°C
Low threshold	B = 50.0°C
Hysteresis	H = 5.0°C

### Procedure

1. Press MENU and then ENTER several times until the **"RL1\_PAR\_SET?"** message appears up on the display, in the comment line. (*Set the working relay 1 parameters?*). The relay 1 was chosen for temperature.
2. Use the ▲ and ▼ arrows to select **"YES"** and confirm with ENTER.
3. In the next screen **"MEAS\_ASSOCIATION\_RLY\_1"** (*Physical quantity associated to the relay RL1*) select **"tEmp"** using the ▲ ▼ arrows and confirm with ENTER to associate the relay functioning to temperature.
4. The **"RL\_1\_ACT\_ABOV\_SET?"** (*Set the high trigger threshold of the relay?*) message appears: use the ▲ and ▼ arrows to select **"YES"** and confirm with ENTER.
5. The high trigger threshold value **"ACT\_ABOV\_VAL\_1"** is displayed: use the ▲ and ▼ arrows to set the value **"100.0"** and confirm with ENTER.
6. The **"RL\_1\_ACT\_BELW\_SET?"** (*Set the low trigger threshold of the relay?*) message appears: use the ▲ and ▼ arrows to select **"YES"** and confirm with ENTER.
7. The low trigger threshold value **"ACT\_BELW\_VAL\_1"** is displayed: use the ▲ and ▼ arrows to set the value **"50.0"** and confirm with ENTER.
8. **RL\_1\_HYST\_SET?** appears (*set hysteresis?*): Use the arrows the ▲ and ▼ arrows to select to select **"YES"** and confirm with ENTER.
9. The **"HYST\_VAL\_1"** (*Value of the relay RL1 hysteresis*): use the ▲ and ▼ arrows to set the value **"5.0"** and confirm with ENTER.
10. The **"ERR\_MOD1"** (*Behaviour of the relay in case of a temperature measurement error*): use the ▲ and ▼ arrows to select **"NO"** and confirm with ENTER. if the temperature goes in error, the relay RL1 de-energises.
11. Press MENU to exit the menu and return to measurement mode.

The procedure is complete.

## 12.3. Alarm relay RL3

The alarm relay RL3 is energised in case of malfunctioning of one or more sensors and/or malfunctioning of one or more analog outputs.

Possible alarm causes are:

- Sensor error (temperature or humidity),
- Probe not communicating with the instrument (possible SICRAM2 module fault),
- Unexpected type of probe (wrongly connected, e.g. a SICRAM module probe instead of a SICRAM2 module),
- Probe disconnected,
- Faulty probe,
- Error of one or more analog outputs because the set limits have been exceeded. An analog output gives an error if the associate quantity falls outside the set measurement limits: for example, if the limits of output 2, associated to temperature, are 0°C = 4mA and 100°C = 20mA, and the measured temperature exceeds 100°C or is lesser than 0°C, an error is generated.

You can select multiple error sources: any of them can trigger the alarm.

You can set a delay before generation of an alarm (DLAY\_RL\_3). During this time the relay does not switch and no alarm is signaled. The alarm time is expressed in seconds. If you set this parameter to 0, there is no trigger delay. For example, if you set 10 seconds, the alarm triggers after 10 seconds if the error condition persists during this time.

Position of the relay RL3 contact in case of alarm:

- Mode "A\_On": in normal conditions the relay contact is open. In case of alarm, the contact will close.
- Mode "A\_OF": in normal conditions the relay contact is closed. In case of alarm, the contact will open. This condition can be used to check the correct power supply of the instrument: indeed, as soon as it is interrupted, the instrument turns off and the relay RL3 contact opens. The opening can generate an alarm through an external device.
- Mode "- OF -" blocks the relay contact in the always-open state.
- Mode "- On -" blocks the relay contact in the always-closed state.

### 13. The logging function

**The logging function is always ON, both for the instruments with or without display.** The instrument can store 9000 samples. The memory is arranged in circular mode: once full, the most recent data will overwrite the oldest ones. There is no memory clearing command.

Each sample stores date and time, temperature, relative humidity, absolute humidity, mixing ratio, dew point, wet bulb temperature, analog outputs value and state of the three relays (if present).

When modifying the logging interval the current logging session is ended and a new one is started.

The sessions are numbered from 0 to 255, the number is incremented until 255, then it restarts from 0. The progressive index is used to mark the different sessions.

The following brings about a session change:

- Modifying the log interval
- Modifying the date and time
- Suspend mode
- Off-line mode
- Power failure

After a power failure, the instrument can restart logging, from the session after the power failure, **provided that the internal clock battery is not discharged**. If the clock battery is discharged, the instrument will start from the initial page zero, overwriting the existing data. In this case, this date is wrong.

The available logging interval are: 1, 2, 5, 10, 20, 60, 120, 240 seconds.

**Each stored data represents the AVERAGE of the measurements performed every second during the logging interval.** For example, by selecting a 20 second logging interval, each stored data is the average over 20 seconds. Therefore, the instrument does not log the immediate quantity measured at the end of the interval, but the average on the entire interval. The instrument performs a measurement every second. In the example, you will get an average over 20 samples.

The state of each relay is stored as follows: "0" if, during the logging interval, the relay is always de-energised, "1" if it is always energised, "V" for both conditions.

The memory capacity goes from a minimum of 2 hours and 30 minutes to a maximum of 25 days, as reported in the table below.

Logging interval (sec)	Storage capacity
1	2 hours and 30 minutes
2	5 hours
5	12 hours and 30 minutes
10	1 day and 1 hour
20	2 days and 6 hours
60	4 days and 4 hours
120	8 days and 8 hours
240	25 days

The sessions in the memory can be downloaded to a PC using the DeltaLog12 software: during download, the system continues to log the new measurements, without interruption. To protect the logged data and avoid overwriting, you can stop logging using the DeltaLog12 software. After the download, you can restart logging using the DeltaLog12 software.

### **Setting the log interval on instruments with display**

Press the MENU key.

Press ENTER several times until the "**LOG\_INTV**" (*Setting log interval*) item appears.

Use the ▲ and ▼ arrows to change the log interval and press ENTER to confirm.

Press MENU to return to measurement mode.

### **Setting the log interval on instruments without display**

The log interval is set using the DeltaLog12 software: for the details on the connection to a PC, please see the chapter "*Serial communication and instrument network*".

### **Dump LOG**

The logged data download is performed by connecting the instrument to a PC using the DeltaLog12 software: please see the chapter "*Serial communication and instrument network*" and the DeltaLog12 software manual.

## 14. "Suspend" and "Off-line" functioning modes

The HD2717T... instruments have three different functioning modes:

- 1) **Standard** functioning,
- 2) **Suspend** mode functioning,
- 3) **Off-line** mode functioning.

### 1) **Standard mode**

It is the normal functioning mode: continuous measurement, data logging, analog outputs, and active relays...

### 2) **"Suspend" mode**

The so-called *suspend* mode is mainly used to replace the probe without stopping the control system. This state expires automatically after 60 seconds indicated by a beep, progressively accelerated.

While this function is active, the instrument maintains the measurement and output (analog outputs and relays) values at the moment of the suspension. Logging is interrupted and resumed at the end of the suspension, with a new logging session.

When returning to normal state, the instrument will read the new probe calibration parameters.

The "*suspension*" state allows replacement with a new calibrated probe, without causing anomalies or alarms in the control system.

**Note:** in order to provide reliable data, when performing the replacement, the new probe should be thermally preconditioned in the measurement environment.

### 3) **"Off-line" mode**

This state is the same as interrupting power to the instrument: the relays are de-energised, the analog outputs are set to zero (0mA e 0V), and logging is stopped.



**WARNING: The Off-line mode is the same as interrupting power to the instrument but does not entail physical disconnection from the mains. The instrument remains under voltage: during each intervention on the system, follow the normal security procedures that include disconnection from the mains.**

## 14.1. "Suspend" and "Off-line" modes on instruments with display

### "Suspend" mode

The *suspension* procedure is enabled from the menu item "MENU >> ON\_OFF\_CHG\_PRB? >> Prob".

The suspension time can be extended 60 seconds by pressing the ▲ arrow. The other keys, save the ▲ arrow and ENTER, reduce the remaining time to 3 seconds.

The suspension procedure can be completely managed from the PC using the DeltaLog12 software: you can set its duration, start it and, if needed, stop it before the set time.

### **"Off-line" mode**

The *Off-line* procedure is enabled from the menu item "MENU >> ON\_OFF\_CHG\_PRB? >> *Off-line*".

To exit the *Off-line* mode, hold down ENTER for about 10 seconds.

Using the DeltaLog12 software, the user can enable and disable the *Off-line* function directly from the PC.

## **14.2. "Suspend" and "Off-line" modes on instruments without display**

### **"Suspend" mode**

The *suspension* procedure is enabled by pressing "PRESS TO PROBE CHANGE". The LED on the side will blink.

The suspension time can be extended 60 seconds by pressing again the "PRESS TO PROBE CHANGE" key.

When pressing "PRESS TO AUX COM" the remaining time is reduced to 3 seconds.

The suspension procedure can be completely managed from the PC using the DeltaLog12 software: you can set its duration, start it and, if needed, stop it before the set time.

### **"Off-line" mode**

The instruments without display are set in *Off-line* mode exclusively from the PC using the DeltaLog12 software.

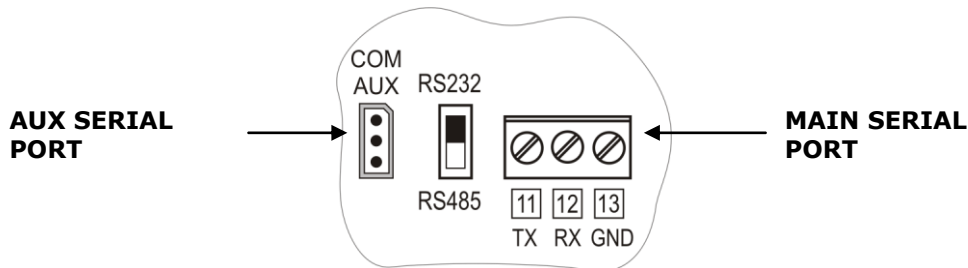
To exit the *Off-line* mode, hold down either key for about 10 seconds.



## 15. Serial communication and instrument network

The instrument is fitted with a main multistandard serial communication port RS232C/RS485 and an auxiliary AUX COM serial port RS232C.

The main port is connected to terminals 11, 12 and 13, the auxiliary AUX COM port has its own 3-pole connector near terminal 10.



For fixed connection to a PC, instrument management, RS485 network connection, etc. you will use the standard port. The auxiliary port is used for temporary connections, e.g. instrument configuration. By using the auxiliary port, you don't have to disconnect and reconnect the cables fixed to the terminal board.

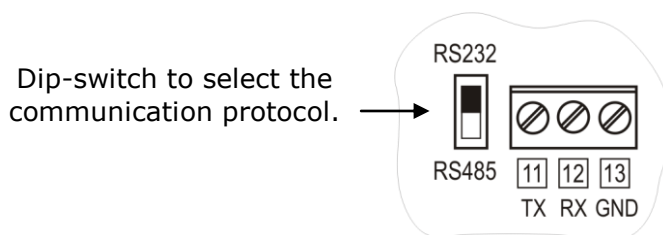
Thanks to the RS485 protocol it is possible to connect more than one instrument to form a network managed by the DeltaLog12 software provided.

### 15.1. Selection of the communication protocol

The **communication protocol** (RS232C or RS485) is selected by shifting the dip-switch on the board between terminals 10 and 11.

The selection of the main **physical port** RS232C, RS485 or auxiliary RS232C AUX COM is performed from the menu "MENU >> COMM\_PORT\_SEL" or using the DeltaLog12 software.

**For the models without display, the port selection is only done using DeltaLog12 with the PC connected to the AUX COM port:** in this case you first need to enable the auxiliary port, pressing AUX.

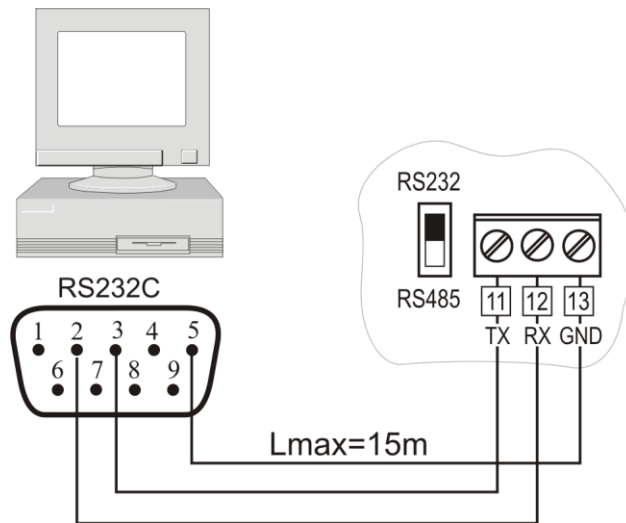


To ease configuration, the instruments are set up in the factory for communication through the AUX COM port.

- Upon turning on, the instrument switches the serial port to AUX COM for one minute. This allows sending, through the AUX COM port, the command selecting the desired configuration.
- If no command is received, after one minute, the instrument loads the last stored configuration.
- **WARNING:** The instrument supports only one communication channel at a time. Consequently, if the instrument is used into an RS485 network or is connected to an external device or to a PC through RS232, when the AUX COM port is selected, it won't be detected in the network and will not reply to the commands sent by other network devices.

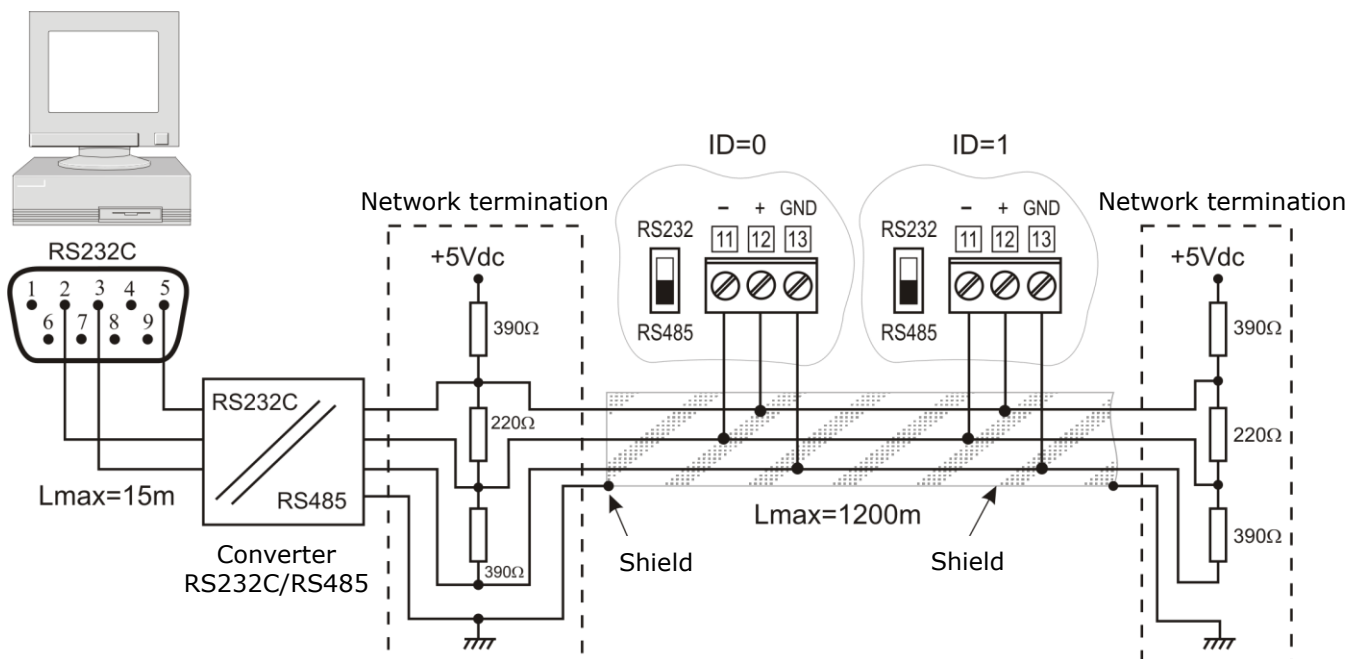
## 15.2. Connection types

The instrument can be connected directly to a PC through the RS232C serial port. The maximum distance between instrument and PC is 15 m.



**Connection PC / instrument with the RS232C serial communication protocol.**

To cover longer distances (up to 1200 m) you should use the RS485 serial output. This port allows creation of a network according to the diagram in the following figure. To manage this network and download the data you should use the DeltaLog12 software.



**Connection PC / instrument with the RS485 communication protocol for distances up to 1200 m using the RS232C/RS485 converter.**

A network is formed by a maximum of **250** devices tandem-connected through a **shielded** twisted pair cable for signals and a third wire for grounding.

The cable should be "type A" with these characteristics: impedance  $150\Omega$ , capacity  $C < 30pF/m$ , section  $> 0.34mm^2$ , loop resistance  $< 110\Omega/km$ , wire diameter  $> 0.64mm$ .

To guarantee the best performance, a special **termination** should be used, as indicated in the dotted boxes in the figure. The cable shield should be connected at both ends of the line.

If you need to connect over 32 instruments, insert a signal repeater between a group and the next one. **At the beginning and at the end of each segment you should apply the line terminator.**

The data line should be kept separate from any power line in order to avoid interferences on the transmitted signal.

Each instrument should be identified by **a unique address**. On the first start up, the instrument address is automatically set to "001": this number can be changed and stored to insert new network components from the menu item "MENU >> ADDR\_SEL (*Select the address number*)" or directly from DeltaLog12 through the AUX COM port. The addresses from 1 to 250 are allowed, the address 0 and the addresses from 251 to 255 are reserved.

### 15.3. Description of the connection to a PC

The necessary steps to connect the instrument to a PC in order to download the data from the memory, read the measurements detected from the instrument or set the instrument parameters directly from the PC, are outlined below.

#### ***For the instruments with display***

- Connect to the terminals 11-12-13 as reported in the previous paragraph diagrams: for the RS485 protocol connection, you need to insert an RS232/RS485 converter.
- Select the type of protocol by shifting the dip-switch on the left of terminal 11 to RS232 or RS485.
- Open the menu using the *MENU* button. Then press ENTER until the "**COMM\_PORT\_SEL**" (*Serial port selection*) message appears in the comment line.
- Use the ▲ ▼ arrows to select "232" or "485" and confirm with ENTER.
- If you are installing an RS485 network, assign a different address to each instrument: press ENTER until the "**ADDR\_SEL**" (*Set the address number*) message appears. Use the ▲ and ▼ arrows to assign an address number and confirm with ENTER.
- Press MENU to exit the menu and return to measurement mode.
- Turn on the PC on which you have installed the DeltaLog12 software.
- Start DeltaLog12, connect the PC to the instrument using the specific connection command of DeltaLog12. Follow the instructions given in the software on-line help about: network instrument management, memory download, instrument configuration, continuous measurement reading.

#### ***For the instruments without display***

You need to configure the instrument using the DeltaLog12 software, connecting it to a PC through the RS232 AUX COM serial port: this is a temporary connection. The permanent connection is done on terminals 11-12-13. The PC used to configure the instrument can be the permanently connected one or a different one.

- Connect the instrument AUX COM port to the PC using the special RS27 cable.
- Install the DeltaLog12 software on the PC.
- Start DeltaLog12.
- Press AUX on the instrument: the RS232 serial communication port is enabled for one minute. The lit AUX LED indicates that the AUX COM port is functioning.
- Within one minute, before the AUX LED stops blinking, connect the PC to the instrument using the specific connection command of DeltaLog12.
- When the connection is established, configure the permanent RS232 or RS485 serial port to be connected to the terminals 11-12-13, following the instructions given in the software on-line help. In particular, select the RS232 or RS485 protocol, and assign the network address number to the instrument. Each instrument should have a unique address.

- Save the configuration in the instrument memory as described in the software on-line help.
- Disconnect the cable from the AUX COM port.

The instrument is ready to be permanently connected to the PC or instrument network through the terminals 11-12-13.

- If it is not yet installed, install the DeltaLog12 software.
- Connect permanently to the terminals 11-12-13 as reported in the previous paragraph diagrams: for the RS485 protocol connection, you need to insert an RS232/RS485 converter.
- Select the type of protocol by shifting the dip-switch on the left of terminal 11 to RS232 or RS485.
- Start DeltaLog12, connect the PC to the instrument using the specific connection command of DeltaLog12. Follow the instructions given in the software help on network instrument management, memory download, instrument configuration, continuous measurement reading.

## 16. Backup battery replacement

The instrument is fitted with a backup battery that ensures the correct functioning of the clock even in case of mains power failure.

The battery operates only when the instrument is not powered by the mains.

**There is no control on the battery's charge status, therefore it should be replaced at least every four years.**

It is a coin BR2032 3V Lithium battery. The battery housing is located on the back of the display card.

**Before replacing the battery, turn off the instrument disconnecting the power cable.**



Internal view of the instrument

### Procedure

1. Separate the instrument from the mounting plate (please see the chapter "*Installation and connection*").
2. Unscrew the 6 screws on the back.
3. Lift the front from the back making sure the flat cables that connect the various instrument parts are not disconnected.
4. Extract the flat battery from its housing.
5. Put the new battery in, **making sure the polarity is correct: the negative pole is turned downwards.**
6. Close the instrument back using the 6 screws.
7. Refit the instrument on the mounting plate.

## 17. Instrument signals and faults

The following table lists the instrument error indications (only models with display).

Display indication	Explanation
<b>PROB ERR</b>	This message appears if the probe SICRAM2 is disconnected or a probe with SICRAM module has been inserted when not admissible for that instrument. If the probe is disconnected, the "Prob comm lost" message is displayed in the upper line of the display.
<b>CAL LOST</b>	Program error: it appears after turning on for a few seconds. Contact the instrument's supplier.
<b>OVER</b>	Measurement overflow: indicates that the probe is measuring a value exceeding the measuring range.
<b>ERR</b>	This message appears near the single measurement, it indicates a measurement error (faulty sensor, broken cable,...).

**In the two-key versions, without display,** any anomaly is shown by the two LEDs simultaneous blinking.

## **18. Functioning notes and operating security**

### **Authorized use**

Comply with the technical specifications outlined in the "*Technical characteristics*" chapter. Its use is authorized only in conformity with the instructions written in this manual. Any different use is considered improper.

### **General instructions on security**

This instrument has been manufactured and tested according to safety regulation EN 61010-1 concerning electronic measurement instruments and was delivered ex factory in perfect security conditions.

Its regular functioning and operating security can be ensured only if all the normal safety measures as well as the specifications described in this manual are complied with.

Its regular functioning and operating security can be ensured only within the climatic conditions specified in the chapter "*Technical characteristics*".

Do not use or store the instrument in ways and/or places in which there are:

- Quick environment temperature changes that could cause condensation.
- Corrosive or inflammable gases.
- Direct vibrations or shocks against the instrument.
- High intensity electromagnetic fields, static electricity.

If the instrument is moved from a cold to a hot environment or vice versa, the condensation can disturb its functioning. In this case, you need to wait for the instrument to reach the environment temperature before using it.

### **User obligations**

The user of the instrument must ensure that the following regulations and directives concerning the handling of hazardous materials are complied with:

- CEE directives on job safety
- National laws on job safety
- Accident prevention regulations

## 19. Appendix - The communication protocol

The communication parameters are common to all RS232 and RS485 ports and are:

- Baud rate: 9600 Baud,
- Parity: None,
- Data bits: 8,
- Stop bits: 2,
- Protocol: Xon-Xoff.

The serial command "KBH" allows setting the Baud rate to 57600. This choice is not permanent, upon the next power on the Baud rate is restored to 9600.

Each command sent to the instrument is preceded by the address string **AxxZ**, where xx is the address assigned to the instrument, and terminated by the Carriage Return (ASCII 0D).

When the AUX COM communication port is selected, the instrument replies to any address. This way the communication through the AUX COM can occur without setting the instrument address, for example always using the string A00Z.

The instrument only replies to commands and queries preceded by the correct address string. For example, A01ZP0 is the "Ping" to which the instrument with the address 01 has to reply with the confirmation character.

A confirmation character usually precedes the reply strings generated by the instrument (with some exceptions).

The instrument **response character** is:

"&" when in normal mode,

"\$" when in suspend mode,

"#" when in OFF-LINE mode.

For example, the command AxxZK1 receives back a string containing the performed measurement. If the string is preceded by "\$", it means the instrument is sending an old measurement, "frozen" at the moment of suspension. But some commands are not enabled or effective in OFF-LINE mode (e.g. the command K1).

If the commands are not correctly addressed, no response is obtained.

The correctly addressed commands, but wrongly formulated or illegal, get back a "?".

A detailed description of the connection to a PC is reported in the chapter *"Description of the connection to a PC"*.

### 19.1. Permanent changes of the functioning mode

All commands requiring permanent changes of the functioning mode should be preceded by the request to enable modifications **"AxxZYU"**, otherwise they will get back the rejection character ("?"). This includes date and time setting, logging interval, etc.

The modification enablement expires after about 8 minutes. The enablement expiration is not notified, but is renewed each time a next enablement serial command is sent. In case of doubt, you can simply place the enablement string before the desired command.

**Warning:** to prevent the internal device managing serial communication from stopping, the instrument resets it when the line is idle for **two minutes**.

It could happen that a command gets skipped because it occurred during reset. Due to this, the communication protocol should provide for command reiteration before generating a fault signal.

As the normal response latency does not exceed one second, the reiteration should occur after a two-second timeout.

**The querying of multiple instruments of a network can occur every second.**



## 19.2. Print command "K1"

The "**K1**" command starts the continuous printing of instant data, that is, not averaged over the logging interval.

You can set an automatic print interval using the **WAAx** command. (The index x defines the interval, as reported below.)

x interval index	Print interval in seconds
0	Print single request
1	1
2	2
3	5
4	10
5	20
6	60
7	120
8	240

To obtain a continuous printing you should send the two WAAx commands (with x=1, 2, 3, etc.) and then K1.

Notes:

1. In RS485 mode, the WAAx command should not be used if multiple instruments are connected on the same line.
2. The print interval index, set using WAAx, is not recorded in the permanent memory and the instrument, after turn off and turn on, restarts with the index at 0, that is, ready for single print.
3. Due to the response time limits (a query per second and maximum 5 records in 2 seconds), you should dimension the number of instruments in the network according to the update speed required by the application. For example, if an update every minute is enough, you can connect up to 60 instruments in order to get a response in "real" time.
4. The measurements obtained using the K1 command are immediate measurements, not averaged over the set interval, while the stored measurements are averaged according to the logging interval.
5. The reading of the memory is performed using the KRxxxx yyyy command. You will get the printing of pages from xxxx to yyyy inclusive.  
The RM command gives the current logging page. The most recently complete page, already available for printing, is the previous one. The system does not prevent the reading of the current page: as the instrument memory is arranged in circular mode (endless loop), the current page is partly formed by the last stored data and partly by the information stored during a previous session that have not yet been overwritten.

### 19.3. List of serial commands

Command	Response (*)	Description
DA080102030410	&	Setting the system data in the format "yymmddhhmmss", hexadecimal. It should be preceded by the YU command to enable user calibration.
FA	&070812092A2B	Reading the instrument clock date
FC	&0708120A2B02	Reading the factory calibration date
FS	&XXX	Instrument status. If the instrument is in Log mode, the first letter is L, in Print mode the second is P, if the probe is in error the third is E
G0	HD27_17T_DR	Instrument name
G1	M=Smart transmitter	Instrument type
G2	SN=12345678	Instrument serial number
G3	Firm.Ver.=01-00	Firmware version and revision
G4	Firm.Date=2007/12/15	Firmware date
G5	cal 2007/12/16 09:15:20	Calibration date and time
G6	Probe=Sicram2 RH-Pt100	Type of probe
G7	Probe SN=11119999	Probe serial number
G8	F=2008/01/02 02:33:09; U=2008/10/11 12:13:14	Probe calibration date (factory-user)
GB	User ID=0000000000000000	User code (set with T2xxxxxxxxxxxxxxxxxx)
GE	T; 0x05; 300.0; 59.5; 1.0; RH; 0x06; 39.5; -10.0; 1.0; 0xBF; 0	Characteristics of relay 1, 2, 3 The following are reported on each relay: status code (see table **), high threshold Active above, low threshold Active below, hysteresis.
GH	RH; 0.0; 100.0; T; 0.0; 200.0;	Characteristics of analog outputs 1 and 2
K0	&	Stop continuous printing
K1	&	Start continuous printing (single print if print interval=0)
K4	&	Start log
K5	&	Stop log
KBH		Change baud rate to 57600 (not permanent!)
KBx		Set baud rate to 9600 (any except H)
Koff	#	Enable OFF-LINE mode
Kon	#	Disable OFF-LINE mode
KRxxxx yyyy	Print	Print log from page xxxx to page yyyy
KSxx	&	Start SUSPEND mode according to xx=03...60 second interval. From the keyboard, you can increase the time to 60s or reduce it to 3s when changing the probe.
P0	&	Ping
RAA		Read print interval
RAB		Read log interval
RM		Read active page pointer (number of the page going to be written)
RX		Read 0-20 or 4-20 mode
RY		Read RS485 address
RZA		Read humidity units
RZB		Read temperature units
T2yyyyyyyyyyyyyyyyyy	&	Write user code. It should be preceded by the YU command to enable user calibration.

<b>Command</b>	<b>Response (*)</b>	<b>Description</b>
WAA <sub>n</sub>	&	Setting PRINT interval. "n" is a decimal number 1...8 that represents the position of the interval in the list 1, 2, 5, 10, ..., 240 seconds.
WAB <sub>n</sub>	&	Setting LOG interval. "n" is a decimal number 1...8 that represents the position of the interval in the list 1, 2, 5, 10, ..., 240 seconds.
WB <sub>n</sub>	&	Measurement associated to relay 1 (0=always OFF, 1=RH%, 2=AH, 3=mix ratio, 4=dew point, 5=temp, 6= TW, 9=always ON)
WC <sub>n</sub>	&	Trigger code, relay 1 (see table **)
WD <sub>nnn.n</sub>	&	High threshold "active above" value, relay 1
WE <sub>nnn.n</sub>	&	Low threshold "active below" value, relay 1
WF <sub>nnn.n</sub>	&	Hysteresis value, relay 1
WG <sub>n</sub>	&	Measurement associated to relay 2 (0=always OFF, 1=RH%, 2=AH, 3=mix ratio, 4=dew point, 5=temp, 6= TW, 9=always ON)
WH <sub>n</sub>	&	Trigger code, relay 2 (see table **)
WI <sub>nnn.n</sub>	&	High threshold "active above" value, relay 2
WJ <sub>nnn.n</sub>	&	Low threshold "active below" value, relay 2
WK <sub>nnn.n</sub>	&	Hysteresis value, relay 2
WL <sub>n</sub>	&	Trigger code, relay 3 (see table ***)
WM <sub>n</sub>	&	Trigger delay, relay 3
WN000 <sub>n</sub>	&	Measurement associated to analog output 1 (1=RH%, 2=AH, 3=mix ratio, 4=dew point, 5=Temp., 6=TW)
WO <sub>nnn.n</sub>	&	Lower limit of the physical quantity corresponding to the analog output 1 bottom scale
WP <sub>nnn.n</sub>	&	Upper limit of the physical quantity corresponding to the analog output 1 top scale
WQ000 <sub>n</sub>	&	Measurement associated to analog output 2 (1=RH%, 2=AH, 3=mix ratio, 4=dew point, 5=Temp., 6=TW)
WR <sub>nnn.n</sub>	&	Lower limit of the physical quantity corresponding to the analog output 2 bottom scale
WS <sub>nnn.n</sub>	&	Upper limit of the physical quantity corresponding to the analog output 2 top scale
WW <sub>n</sub>	&	Interface selection 0=RS232, 1=RS485, 2=AUX
WX <sub>z</sub>	&	z=0 or 4, offset choice 4mA
WY <sub>xx</sub>	&	Setting instrument address. Hexadecimal number xx= 01...FA (01...250)
WZB <sub>x</sub>	&	Write temperature units: °C (x=0), °F (x=1)
YU	USER CAL MODE ON	User calibration enablement. It expires if the serial port is idle for 5 minutes or because of a wrong command.
YX	CAL MODE OFF	User calibration disablement string. Any wrong command disables user calibration.

(\*) Response & is replaced by \$ or # according to the instrument current functioning mode.

**(\*\*) Table of status codes of RL1 and RL2 relays**

Bit									
7	6	5	4	3	2	1	0		Meaning
1	1	1	1	1	1	1	1	0xFF	Force energised
0	0	0	0	0	0	0	1	0x01	Active_below (low threshold)
0	0	0	0	0	0	1	0	0x02	Active_above (high threshold)
0	0	0	0	0	0	1	1	0x03	Active_on_both (both are active)
0	0	0	0	0	0	0	0	0x00	Idle
0	0	0	0	0	1	x	x	0x04	Hysteresis
0	0	0	0	1	x	x	x	0x08	Force energised on error(please see the items ERR_MOD1 and ERR_MOD2 in the menu description)

**(\*\*\*) Table of status codes of RL3 relay**

Bit									
7	6	5	4	3	2	1	0		Meaning
0	1	x	x	x	x	x	x		Force de-energised
1	1	x	x	x	x	x	x		Force energised
0	0	x	x	x	x	x	1		Normally de-energised, energised on probe 1 error
1	0	x	x	x	x	x	1		Normally energised, de-energised on probe 1 error
0	0	x	x	x	x	1	0		Normally de-energised, energised on probe 2 error
1	0	x	x	x	x	1	0		Normally energised, de-energised on probe 2 error
0	0	x	x	x	x	1	1		Normally de-energised, energised on probe 1 or 2 error
1	0	x	x	x	x	1	1		Normally energised, de-energised on probe 1 or 2 error
x	x	x	x	x	1	x	x		Analog output 1 out of range
x	x	x	x	1	x	x	x		Analog output 2 out of range

## 20. Technical information (@ 24Vdc and 20°C)

Inputs		
Temperature	Sensor	Pt100 Class 1/3 DIN
	Sensor working range	-50 ... +200°C (-58 ... +392°F)
Humidity	Relative humidity %RH	0 ... 100%RH
	Temperature sensor working range	-50 ... +150°C (Special configurations on request up to 180°C)
	Dew Point TD	-50 ... +100°C
	Absolute humidity	0 ... 600g/m <sup>3</sup>
	Mixing ratio	0 ... 2000g/kg of dry air
	Wet bulb temperature	-50...+100°C
Accuracy of the measured physical quantities	Pt100 Temperature	±0.25°C
	Relative humidity %RH	±1.5%RH (0...90%RH), ±2.0%RH for remaining range, for T=15...35°C ±(1.5+1,5% of the measured value)%RH for remaining temperature range
Accuracy of the calculated physical quantities	Please see the tables on the next paragraph	Accuracy of the Dew Point @T=20°C ± 2°C DP (-40...-20°C DP) ±1,5°C DP (-20...0°C DP) ±1°C DP (0...20°C DP)
Response time		3min with strainer (at 20°C and 0.5m/s)

Outputs		
Communications	Type	RS232C and Multidrop RS485
	Baud rate	9600 baud 57600 baud not permanent
Physical quantities	Measured	Temperature, relative humidity
	Calculated	Absolute humidity, mixing ratio, dew point, wet bulb temperature
Analog outputs	Number	2
	Type of outputs	4...20mA; 0...20mA 0...10Vdc; 2...10Vdc
	Load resistance	Current output: 500Ω max Voltage output: 100kΩ min
	Resolution	16bit
	Accuracy of analog outputs	±0.05% f.s. @20°C
	In case of measurement error (out of functioning limits, faulty or disconnected probe,...)	Idc = 22mA Vdc = 11V
Relay	Working relay	2 x 3A/250Vac resistive load, 1 exchange contact
	Alarm relay	1 x 3A/250Vac resistive load, 1 normally open contact

Instrument		
Power	Versions	24Vdc / 24Vac 50...60Hz, $\pm 10\%$
	Average consumption	90 ... 240Vac 50...60Hz 3W
Datalogger	Storage capacity	9000 samples in 256 sessions max
	Type of memory	Circular memory
	Logged parameters	Temperature, relative humidity, absolute humidity, mixing ration, dew point, wet bulb temperature, analog outputs 1 and 2, status of relays 1, 2, 3
	Logging interval	1, 2, 5, 10, 20, 60 seconds, 2 and 4 minutes
Internal clock	Type	In real time with lithium backup battery
	Accuracy	$\pm 1$ min/month
Software		DeltaLog12 for Windows® from 98
Display	LCD	Custom segment
Electronics environment conditions	Functioning temperature	-20...+60°C
	Relative humidity	0...90%RH - without condensation
	Sensor working static pressure	12 bar max
	Storage temperature	-30...+80°C
Case	W x H x D	143x154x61
	Weight	600g
	Material	ABS
	Protection degree	Electronic IP65

For TC2.480.2 probe for measuring humidity in pipes, apply the above specifications with the following exceptions:

S.TC2.480.2		
Temperature	Measuring range	-40 ... +60°C
Humidity	Dew Point TD	-40 ... +60°C DP
Environmental conditions	Operating temperature	-40...+60°C
	Operating pressure	16 bar max

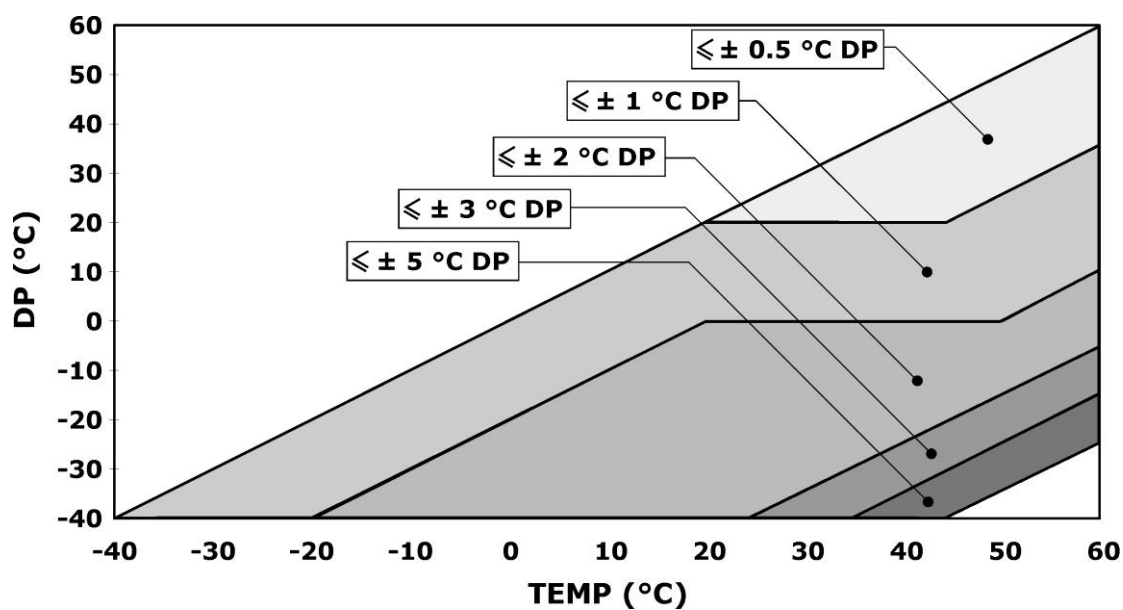
## 20.1. Accuracy of the calculated physical quantities

The accuracy of the calculated physical quantities depends on the calibration accuracy of relative humidity and temperature.

**Dew point TD accuracy (°C), expressed as a function of the relative humidity**

		Relative humidity (%)					
		10	30	50	70	90	100
Temperature (°C)	-20	0.92	0.49	0.30	0.22	--	--
	0	1.05	0.56	0.35	0.25	0.20	0.18
	20	1.18	0.75	0.45	0.34	0.27	0.23
	50	1.27	0.88	0.56	0.42	0.33	0.30
	100	1.30	1.17	0.76	0.58	0.47	0.42

**Dew point TD accuracy (°C)**



**Absolute humidity accuracy (g/m<sup>3</sup>)**

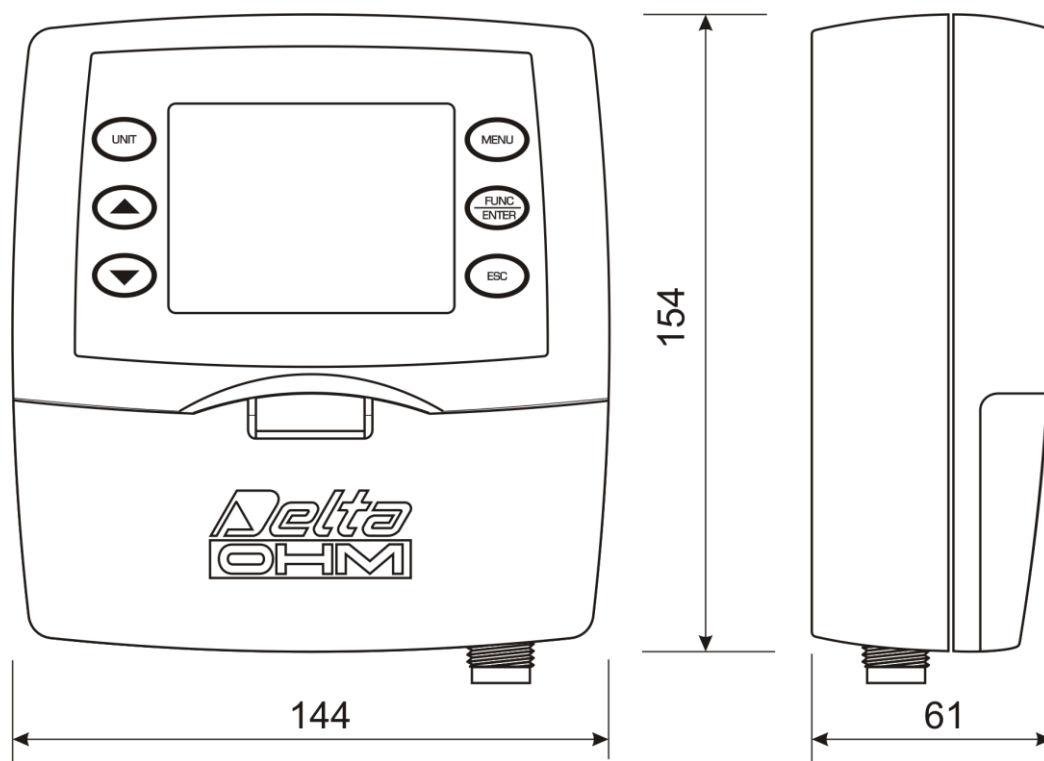
		Relative humidity (%)					
		10	30	50	70	90	100
Temperature (°C)	-20	0.015	0.020	0.025	0.030	---	---
	0	0.08	0.10	0.11	0.13	0.14	0.15
	20	0.28	0.33	0.40	0.44	0.50	0.55
	50	1.36	1.56	1.74	1.92	2.13	2.19
	100	9.37	10.2	11.3	12.3	13.2	13.5

**Mixing ratio accuracy (g/kg)**

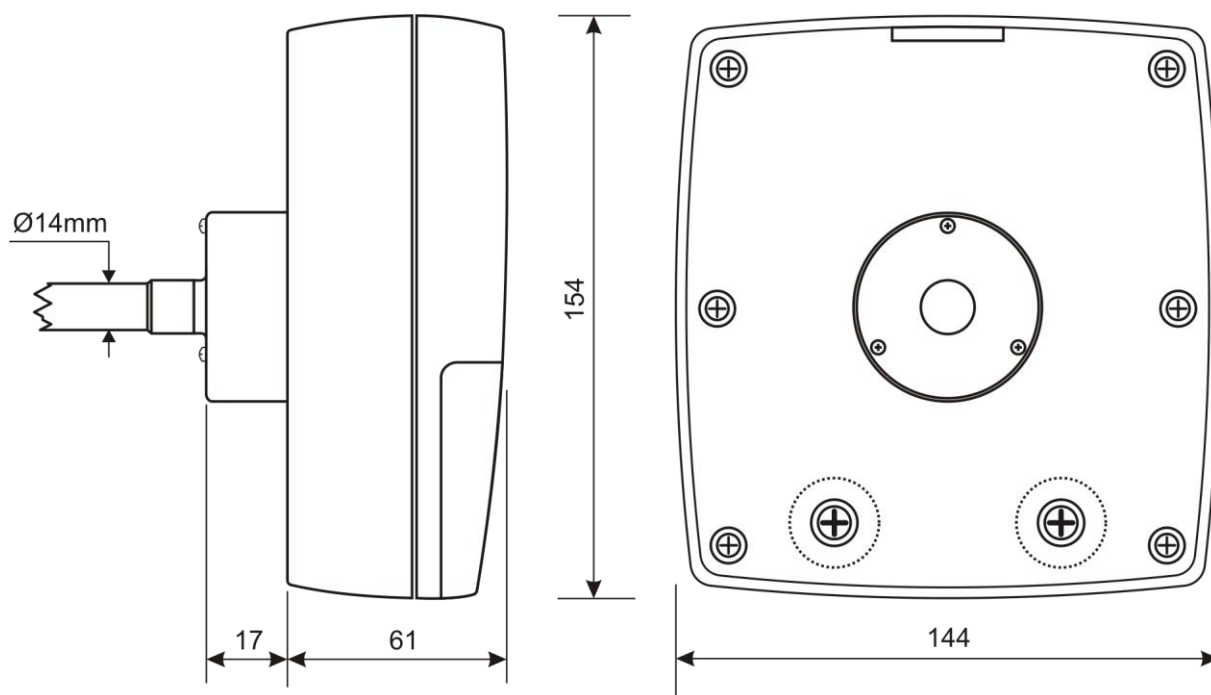
		Relative humidity (%)					
		10	30	50	70	90	100
Temperature (°C)	-20	0.014	0.017	0.020	0.024	---	---
	0	0.06	0.08	0.09	0.10	0.12	0.13
	20	0.24	0.29	0.34	0.39	0.44	0.45
	50	1.28	1.54	1.85	2.20	2.53	2.66
	100	12.5	23.2	46.2	136.0	---	---



## 21. Sizes



**HD2717T.xx versions for vertical probe or with cable**



**HD2717TO... version for horizontal probe**

## 22. Order codes

**HD2717T...** Transmitter, indicator, ON/OFF regulator, temperature and humidity datalogger fitted with two analog outputs: current output (0...20mA and 4...20mA), voltage output (0...10Vdc and 2...10Vdc). RS232/RS485 serial outputs for PC connection. **It uses SICRAM2 interchangeable probes** with microprocessor for calibration information recording. You can select the power supply between 24 Vac/dc or universal 90...240Vac. It includes DeltaLog12 software, user manual. (Supplied with RS27 cable for transmitters without display.)  
**When making the order, please specify power supply, type of probe and accessories.**

### Models with vertical probe (S.TV) or separate probe with cable (S.TC)

**HD2717T.00** Model without display, and without relay.  
**HD2717T.0R** Model without display, with two working relays and an alarm relay, configurable.  
**HD2717T.D0** Model with custom display, without relay.  
**HD2717T.DR** Model with custom display, with two working relays and an alarm relay, configurable.

### Models with horizontal probe (S.TO)

**HD2717TO.00** Model without display, and without relay.  
**HD2717TO.0R** Model without display, with two working relays and an alarm relay, configurable.  
**HD2717TO.D0** Model with custom display, without relay.  
**HD2717TO.DR** Model with custom display, with two working relays and an alarm relay, configurable.

### Probes with SICRAM2 module, interchangeable, for temperature and humidity, vertical S.TV or with cable S.TC

**S.TV** Vertical probe. Rod length 130mm.

The material of the S.TC... series probe can be chosen between AISI304 steel or POCAN plastic material.

**S.TC1.2** Probe with cable. Rod length 135mm, cable length 2m.  
**S.TC1.2P** Probe with cable. Rod length 135mm, cable length 2m. In POCAN.  
**S.TC1.5** Probe with cable. Rod length 135mm, cable length 5m.  
**S.TC1.5P** Probe with cable. Rod length 135mm, cable length 5m. In POCAN.  
**S.TC1.10** Probe with cable. Rod length 135mm, cable length 10m.  
**S.TC1.10P** Probe with cable. Rod length 135mm, cable length 10m. In POCAN.  
**S.TC2.2** Probe with cable. Rod length 335mm, cable length 2m.  
**S.TC2.2P** Probe with cable. Rod length 335mm, cable length 2m. In POCAN.  
**S.TC2.5** Probe with cable. Rod length 335mm, cable length 5m.  
**S.TC2.5P** Probe with cable. Rod length 335mm, cable length 5m. In POCAN.  
**S.TC2.10** Probe with cable. Rod length 335mm, cable length 10m.

**S.TC2.10P** Probe with cable. Rod length 335mm, cable length 10m. In POCAN.

**S.TC2.480.2** Probe with cable for the measurement of humidity in the air pipes. Cable length 2m. 1/4" Italian standard Quick-fit. Measuring chamber in AISI 304.

**Probes with SICRAM2 module, interchangeable, for temperature and humidity, horizontal S.TO**

**S.TO1** Horizontal probe for instrument HD2717TO.xx. Rod length 135mm.

**S.TO2** Horizontal probe for instrument HD2717TO.xx. Rod length 335mm.

**Accessories**

**RS27** Connection cable RS232 serial (null modem) with 9-pole female connector for PC and three-pole connector for AUX COM port. (Supplied with transmitters without display).

**CP27** Connection cable / converter AUX COM port to USB.

**DeltaLog12** Further copy of the software for connection to a PC, memory download, instrument configuration, network instrument management. For Windows® operating systems.

**HD75** 75%RH saturated solution to check and calibrate the relative humidity sensor, complete with ring for Ø 14mm and Ø 26mm probes.

**HD33** 33%RH saturated solution to check and calibrate the relative humidity sensor, complete with ring for Ø 14mm and Ø 26mm probes.

**HD11** 11%RH saturated solution to check and calibrate the relative humidity sensor, complete with ring for Ø 14mm and Ø 26mm probes.

**HD9008.21.1** Flange with brace, hole Ø 26mm to install S.TC probes vertically, distance from the wall 250mm. The S.TC series probes need the HD9008.26/14 adapter from Ø 26mm to Ø 14mm.

**HD9008.21.2** Flange with brace, hole Ø 26mm to install S.TC probes vertically, distance from the wall 125mm. The S.TC series probes need the HD9008.26/14 adapter from Ø 26mm to Ø 14mm.

**HD9008.26/14** Adapter from Ø 26mm to Ø 14mm for HD9008.21.1 and HD9008.21.2 braces for S.TC series probes.

**HD9008.31** Wall flange with fairlead for Ø 14mm probe mounting.

**PG16** Fairlead in AISI304 PG16 for Ø 14mm probes.

**P5** Stainless steel grid protection for probes Ø 14 mm. M12x1 thread.

**P6** 20µm sintered protection made of stainless steel for probes Ø14 mm, M12x1 thread.

**P7** 10µm sintered protection made of PTFE for probes Ø 14 mm. M12x1 thread.

**P8** Stainless steel grid and Pocan protection for probes Ø 14 mm. M12x1 thread.

**HD2717**

**Tx** . **x** **x**

**Relay**

**0** = without relay

**R** = with relay

**Display**

**0** = without display

**D** = with display

**Probe type**

**T** = model for vertical probe or with cable (S.TV, S.TC)

**TO** = model for horizontal probe(S.TO)

# Contents

1. Instrument versions and available probes.....	3
2. Upon first start up .....	4
3. Initial setting or date and time update .....	4
4. Description of the display for the HD2717Tx-Dx models.....	5
5. Description of the keyboard for the HD2717Tx-0x models without display .....	6
6. Description of the keyboard for the HD2717Tx-Dx models with display .....	7
7. Terminal board description .....	8
8. Measurement probe and calibration of the relative humidity sensor .....	10
9. Installation and connections.....	11
10. Description of the menu for the HD2717Tx-Dx models with display .....	12
11. Current and voltage analog outputs .....	20
11.1. Numerical example.....	21
12. Instruments fitted with relay outputs .....	23
12.1. Working relays RL2 and RL2 .....	23
12.2. Numerical example.....	27
12.3. Alarm relay RL3 .....	27
13. The logging function.....	29
14. "Suspend" and "Off-line" functioning modes.....	31
14.1. "Suspend" and "Off-line" modes on instruments with display.....	31
14.2. "Suspend" and "Off-line" modes on instruments without display .....	32
15. Serial communication and instrument network.....	33
15.1. Selection of the communication protocol.....	33
15.2. Connection types.....	34
15.3. Description of the connection to a PC .....	35
16. Backup battery replacement.....	37
17. Instrument signals and faults.....	38
18. Functioning notes and operating security.....	39
19. Appendix - The communication protocol.....	40
19.1. Permanent changes of the functioning mode.....	40
19.2. Print command "K1" .....	41
19.3. List of serial commands.....	42
20. Technical information (@ 24Vdc and 20°C).....	45
20.1. Accuracy of the calculated physical quantities.....	47
21. Sizes.....	49
22. Order codes .....	50



# CERTIFICATO DI CONFORMITÀ DEL COSTRUTTORE

MANUFACTURER'S CERTIFICATE OF CONFORMITY

rilasciato da  
issued by

**DELTA OHM SRL** STRUMENTI DI MISURA

**DATA**

DATE

2011/10/11

Si certifica che gli strumenti sotto riportati hanno superato positivamente tutti i test di produzione e sono conformi alle specifiche, valide alla data del test, riportate nella documentazione tecnica.

*We certify that below mentioned instruments have been tested and passed all production tests, confirming compliance with the manufacturer's published specification at the date of the test.*

Le misure effettuate presso un Laboratorio di Taratura Accredia sono garantite da una catena di riferibilità ininterrotta, che ha origine dalla taratura dei campioni di prima linea del Laboratorio presso l'istituto metrologico nazionale.

*Measurements performed in an Accredia Calibration Laboratory are guaranteed by a uninterrupted reference chain which source is the calibration of the Laboratory first line standards at the national metrological institute.*

**Tipo Prodotto:**

Product Type:

**Trasmettitore, indicatore regolatore di temperatura e umidità**

Temperature/ Humidity transmitter, indicator and regulator

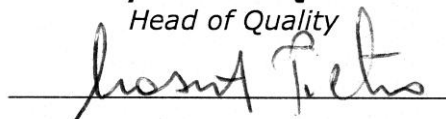
**Nome Prodotto:**

Product Name:

**HD2717T...**

**Responsabile Qualità**

Head of Quality



**DELTA OHM SRL**

**35030 Caselle di Selvazzano (PD) Italy**

**Via Marconi, 5**

Tel. +39.0498977150 r.a. - Telefax +39.049635596

Cod. Fisc./P.Iva IT03363960281 - N.Mecc. PD044279

R.E.A. 306030 - ISC. Reg. Soc. 68037/1998

# GUARANTEE



## TERMS OF GUARANTEE

All DELTA OHM instruments are subject to accurate testing, and are guaranteed for 24 months from the date of purchase. DELTA OHM will repair or replace free of charge the parts that, within the warranty period, shall be deemed non efficient according to its own judgement. Complete replacement is excluded and no damage claims are accepted. The DELTA OHM guarantee only covers instrument repair. The guarantee is void in case of incidental breakage during transport, negligence, misuse, connection to a different voltage than that required for the appliance by the operator. Finally, a product repaired or tampered by unauthorized third parties is excluded from the guarantee. The instrument shall be returned FREE OF SHIPMENT CHARGES to your dealer. The jurisdiction of Padua applies in any dispute.



The electrical and electronic equipment marked with this symbol cannot be disposed of in public landfills. According to the UE Directive 2002/96/EC, the European users of electrical and electronic equipment can return it to the dealer or manufacturer upon purchase of a new one. The illegal disposal of electrical and electronic equipment is punished with an administrative fine.

This guarantee must be sent together with the instrument to our service centre.

IMPORTANT: Guarantee is valid only if coupon has been correctly filled in all details.

**Instrument Code:**                      ☐ **HD2717T**\_\_\_\_\_

Serial number \_\_\_\_\_

## RENEWALS

Date \_\_\_\_\_

Inspector \_\_\_\_\_

Date \_\_\_\_\_

Inspector \_\_\_\_\_

Date \_\_\_\_\_

Inspector \_\_\_\_\_

Date \_\_\_\_\_

Inspector \_\_\_\_\_

Date \_\_\_\_\_

Inspector \_\_\_\_\_

Date \_\_\_\_\_

Inspector \_\_\_\_\_



### CE CONFORMITY

Safety requirements for electrical equipment.	EN61010-1
EMC Generic standards. Immunity for industrial environments.	EN61000-6-2:2005
EMC Generic standards. Emission standards.	EN61000-6-3:2007
Electrostatic discharge immunity test.	EN61000-4-2 level 3
Radiated, radio-frequency, electromagnetic field immunity test.	EN61000-4-3 level 3
Electrical fast transient/burst immunity test.	EN61000-4-4 level 3
Immunity to conducted disturbances, induced by RF fields.	EN61000-4-6
Electromagnetic Interference - Line-conducted disturbances.	EN55022:2007 class B
Electromagnetic Interference - Radiated emissions.	IEC/CISPR 22 class B