



**HD45... AND HD46... SERIES
TRANSMITTERS AND REGULATORS FOR HUMIDITY, TEMPERATURE
AND CO₂**

The instruments of the series **HD45** and **HD46** are transmitters, indicators and controllers, they measure and control, depending on the model, the following environmental parameters:

- Relative humidity (RH)
- Ambient temperature (T)
- Carbon dioxide (CO₂)
- Dew point temperature (DP, calculated measurement)

They are suitable for monitoring the air quality in indoor environments.

Typical applications include checking air quality in all buildings occupied by people (schools, hospitals, auditoria, work places, canteens, etc.).. This analysis allows the managing of conditioning plants (temperature and humidity) and ventilation (recycle air/hour) in order to reach a double purpose: getting a good air quality in accordance with ASHRAE and IMC regulations and energy saving.

The measurement of RH (Relative Humidity) is obtained with a capacitive sensor. In models **HD46** ... the relative humidity and temperature sensor with their calibration data are contained within an easily replaceable module. The instrument can also calculate the information on the dew point.

The temperature T is measured with a high precision NTC sensor.

The measurement of CO₂ (carbon dioxide) is obtained with a special infrared sensor (**NDIR** technology: Non-Dispersive Infrared Technology), which, thanks to a double filter and a particular measurement technique, ensures accurate measurements and stable measurements over time. The infrared sensor is equipped with a protection membrane which provides protection from dust particles and aggressive air agents to assure the sensor's long life. The instrument can be wall mounted and sensors are all inside.

The instruments are factory calibrated and require no further adjustment by the installer.

Versions are available with analog voltage output 0÷10V or connectable to a PC via RS485 with **MODBUS RTU** protocol, which allows connection of multiple transmitters on the same network.

The versions with **relay** allow to monitor the measured environmental parameters when the user-settable thresholds are exceeded. The activation of the control is

highlighted by the LED indicators (only on models HD46 ... R). The operation of the relay is very versatile, having modes of activation above and below the threshold, and with single or double threshold modes. The thresholds are configurable by the user throughout the whole measurement range.

The LCD display option allows instant viewing of all the measurements taken by the instrument.

The model **HD45 BVR** is distinguished by the ability to indicate an immediate level of air quality, through turning on of the LED indicators associated with graphic symbols.

All the functions of the instrument can be quickly and intuitively configured connecting the instrument to the PC.

The instruments are easy to use, with complete configuration possibilities, which makes them versatile and able to meet many needs in various application fields. The instruments come with a standard configuration that makes them immediately operational. Upon request, the devices can be supplied with custom configurations.

HD46 Series models can be equipped with keyboard that allows you to easily configure the instrument even without a connection to a PC. The models having a keypad are fitted with backlit display, activated by pushing a button.

Models of the series **HD45** ... provided with relay have a hardware switch that allows quick selection of the threshold between a set of preset values.

All models perform continuous "logging" of the measures, and data can be transferred to the PC.

The instruments work with 24Vac or 15...35Vdc power supply.

**Technical data
Characteristics of the sensors**

Relative humidity RH (for models HD45 17..., HD46 17... and HD46 17B...)	
Sensor	Capacitive
Measuring range	5...98 % RH -40...+85°C Dew point Td
Working range of the sensor	-40...+80°C
Accuracy	±2% (10..90%RH) @ 20°C, ±2.5% in the remaining range. For Dew point, see table
Resolution	0,1%
Temperature dependance	2% on the whole temperature range
Hysteresis and repeatability	1%RH
Response time (T ₉₀)	<20 sec. (air speed = 2m/sec and stable temperature)
Long-term stability	1%/year

Temperature T (for models HD45 17..., HD45 7B..., HD46 17... and HD46 17B...)	
Sensor type	NTC 10KΩ
Measuring range	-30...+85°C (-22...+185°F)
Accuracy	±0.2°C ±0.15% of the measured value within 0...70°C ±0.3°C ±0.15% of the measured value within -30...0°C and 70...85°C
Resolution	0,1°C
Response time (T ₉₀)	<30 sec. (air speed = 2m/sec)
Long-term stability	0.1°C/year

Carbon dioxide CO₂ (for models HD45 7B..., HD45 B... and HD46 17B...)	
Sensor	Dual wavelength NDIR
Measuring range	0...5000 ppm
Working range of the sensor	-5...50°C
Accuracy	±(50ppm+3% of the measured value) @ 20°C and 1013hPa
Resolution	1ppm
Temperature dependance	0,1%f.s./°C
Response time (T ₉₀)	<120 sec. (air speed = 2m/sec and stable temperature)
Long-term stability	5% of the measured value /5years

Accuracy of the dew point Td (°C)

The dew point is a calculated quantity that depends on the accuracy of the calibration of relative humidity and temperature. The values given below refer to accuracy of ± 0.25 °C, 1013.25mbar, ± 2.5% RH.

		Relative humidity(%)					
Temperature (°C)		10	30	50	70	90	100
	-20	2.50	1.00	0.71	0.58	--	--
	0	2.84	1.11	0.78	0.64	0.56	0.50
	20	3.34	1.32	0.92	0.75	0.64	0.62
	50	4.16	1.64	1.12	0.90	0.77	0.74
	100	5.28	2.07	1.42	1.13	0.97	0.91

Characteristics of the instrument

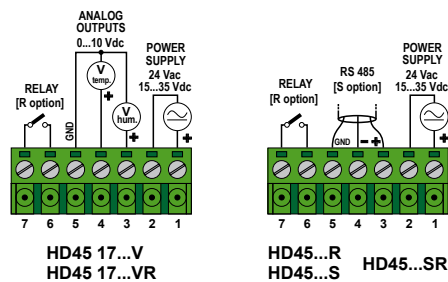
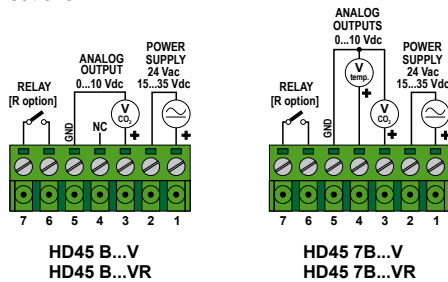
Measuring frequency	1 sample every 3 seconds
Storage capacity	2304 records
Storage interval	Selectable within 30s, 1m, and 5m The stored values represent the average values of samples collected every 3 seconds in selected storage interval.
Serial output	Serial output for USB (mini-USB/USB cable with adapter cod. RS45 or RS45I) RS485 MODBUS-RTU (only HD45...S... and HD46...S...)
Safety of stored data	Unlimited
Analogue output	0...10Vdc ($R_L > 10k\Omega$) (only HD45...V... and HD46...V) 11Vdc outside the measuring range
Relay output	Two-state (only HD45...R and HD46...R) Contact: max 1A @ 30Vdc resistive load
Power supply	24Vac $\pm 10\%$ (50...60Hz) or 15...35Vdc
Power consumption	100 mW
Stabilising time	15 minutes (to guarantee the declared accuracy)
Working temperature of the instrument	0°C ... 50°C
Working humidity of the instrument	0%RH ... 95%RH no condensate
Dimensions (LxHxW)	80 x 80 x 30 mm (HD45.17...) 80 x 80 x 34 mm (HD45.B... and HD45.7B...) 120 x 80 x 30 mm (HD46.17...) 120 x 80 x 34 mm (HD46.17B...)
Housing material	ABS

Installation

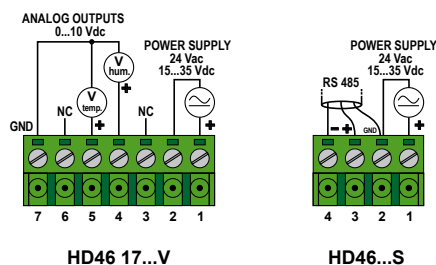
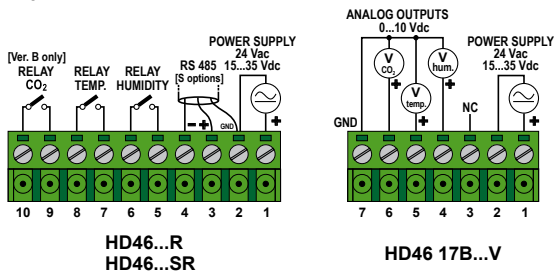
The container is easy and quick to open. Simply press the two tabs of the container to remove the front panel to have immediately access to the terminal block connections and fixing holes.

Electrical connections

Series HD45...



Series HD46...

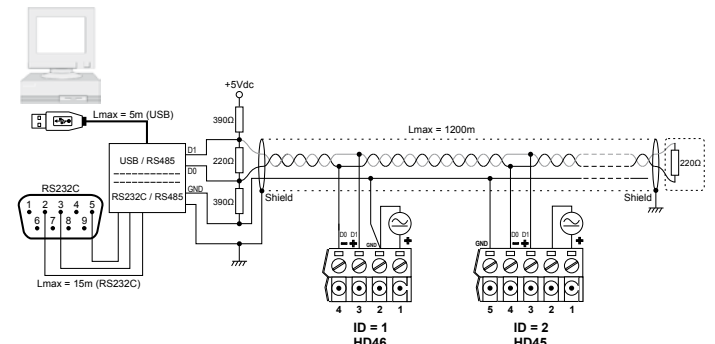


Configuration

Instruments are provided with serial output, easily accessible on the side of the instrument that allows you to connect to the USB port of your PC using the cable **RS45** or **RS45I** with built-in adapter, to get custom configurations. With the **RS45** cable, the instrument is powered directly from the USB port of your PC, thus enabling the configuration of the instrument in the field using a laptop before installing fixed.

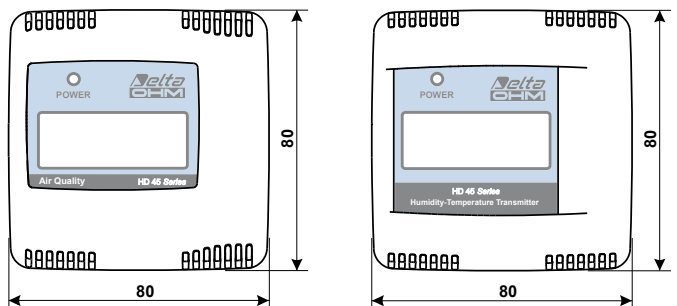
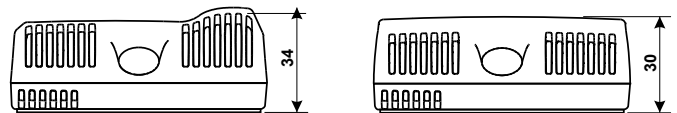
RS485 Connection

Models with RS485 output use the **MODBUS RTU** protocol.
To connect to the PC, interpose a RS232C/RS485 or USB/RS485 converter.



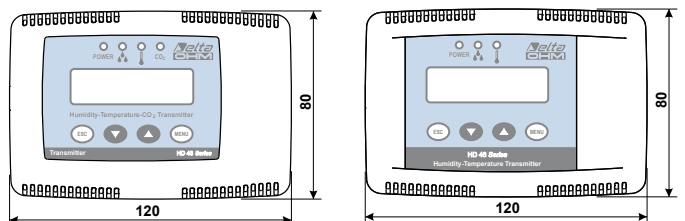
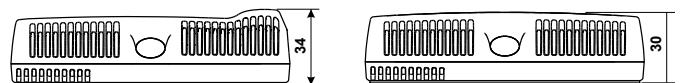
Dimensions of the housing

All dimensions are expressed in mm.
Series HD45...



**HD45 B...
HD45 7B...**

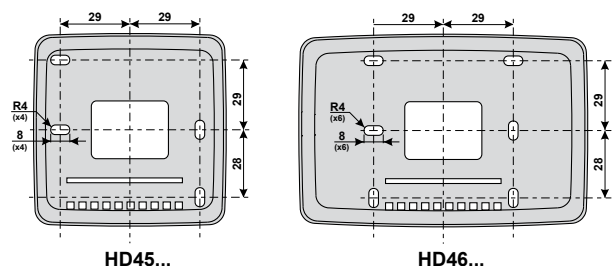
Series HD46...



HD46 17B...

HD46 17...

Fixing holes



Humidity

Available models

The instruments are available in the following versions:

HD45 17...	Humidity and temperature
HD45 7B...	Temperature and CO ₂
HD45 B...	CO ₂
HD46 17B...	Humidity, temperature, and CO ₂
HD46 17...	Humidity and temperature

Optionally you can have the analog output 0 ... 10Vdc for each quantity measured by the instrument (option **V**), or RS485 serial output (option **S**). There are no models with both types of output.

There is the option with only relay (option **R**). In models **HD46 ...** there is one relay for each quantity measured by the instrument. In models **HD45 ...** there is one relay that can be associated with one of the quantities measured by the instrument

It is possible to have the relay output (or the outputs) together with serial output RS485 (option **SR**).

The relay output together with the analog output (option **VR**) is only available on models HD45. All models can be supplied with LCD (option **D**).

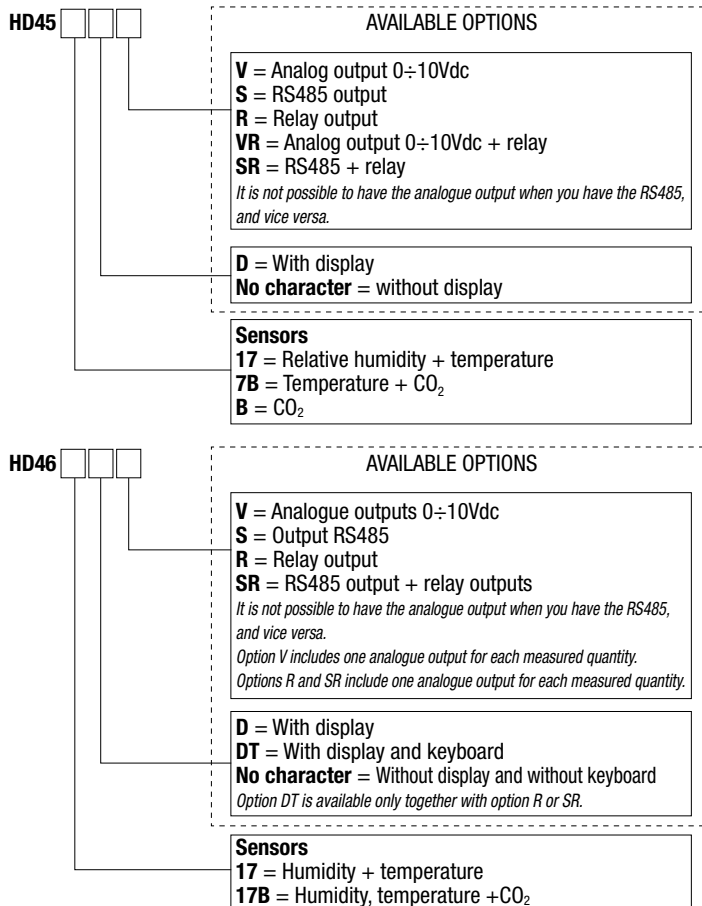
In the series **HD46 ...**, versions with relay outputs are available with display and keyboard (option **DT**)

The following table lists the available models:

Model	RH	T	CO ₂	Analog output	RS485 output	Relay output	LCD	LED
HD45 17V	✓	✓		✓ (2 outputs)				Power
HD45 17S	✓	✓			✓			Power
HD45 17R	✓	✓				✓ (1 output)		Power
HD45 17SR	✓	✓			✓	✓ (1 output)		Power
HD45 17VR	✓	✓		✓ (2 outputs)		✓ (1 output)		Power
HD45 17DV	✓	✓		✓ (2 outputs)			✓	Power
HD45 17DS	✓	✓			✓		✓	Power
HD45 17DR	✓	✓				✓ (1 output)	✓	Power
HD45 17DSR	✓	✓			✓	✓ (1 output)	✓	Power
HD45 17DVR	✓	✓		✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 7BV		✓	✓	✓ (2 outputs)				Power
HD45 7BS		✓	✓		✓			Power
HD45 7BR		✓	✓			✓ (1 output)		Power
HD45 7BSR		✓	✓		✓	✓ (1 output)		Power
HD45 7BVR		✓	✓	✓ (2 outputs)		✓ (1 output)		Power
HD45 7BDV		✓	✓	✓ (2 outputs)			✓	Power
HD45 7BDS		✓	✓		✓		✓	Power
HD45 7BDR		✓	✓			✓ (1 output)	✓	Power
HD45 7BDSR		✓	✓		✓	✓ (1 output)	✓	Power
HD45 7BDVR		✓	✓	✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 BV			✓	✓ (1 output)				Power
HD45 BS			✓		✓			Power
HD45 BR			✓			✓ (1 output)		Power
HD45 BSR			✓		✓	✓ (1 output)		Power
HD45 BVR			✓	✓ (1 output)		✓ (1 output)		4 LED CO ₂ level
HD45 BDV			✓	✓ (1 output)			✓	Power
HD45 BDS			✓		✓		✓	Power
HD45 BDR			✓			✓ (1 output)	✓	Power
HD45 BDSR			✓		✓	✓ (1 output)	✓	Power
HD45 BDVR			✓	✓ (1 output)		✓ (1 output)	✓	Power

Model	RH	T	CO ₂	Analog output	RS485 output	Relay output	LCD keyboard	LED
HD46 17V	✓	✓		✓ (2 outputs)				Power
HD46 17S	✓	✓			✓			Power
HD46 17R	✓	✓				✓ (2 outputs)		Power RH + T
HD46 17SR	✓	✓			✓	✓ (2 outputs)		Power RH + T
HD46 17DV	✓	✓		✓ (2 outputs)			only LCD	Power
HD46 17DS	✓	✓			✓		only LCD	Power
HD46 17DTR	✓	✓				✓ (2 outputs)	✓	Power RH + T
HD46 17DTSR	✓	✓			✓	✓ (2 outputs)	✓	Power RH+ T
HD46 17BV	✓	✓	✓	✓ (3 outputs)				Power
HD46 17BS	✓	✓	✓		✓			Power
HD46 17BR	✓	✓	✓			✓ (3 outputs)		Power RH+T+ CO ₂
HD46 17BSR	✓	✓	✓		✓	✓ (3 outputs)		Power RH +T+ CO ₂
HD46 17BDV	✓	✓	✓	✓ (3 outputs)			only LCD	Power
HD46 17BDS	✓	✓	✓		✓		only LCD	Power
HD46 17BDTR	✓	✓	✓			✓ (3 outputs)	✓	Power RH +T+ CO ₂
HD46 17BDTSR	✓	✓	✓		✓	✓ (3 outputs)	✓	Power RH +T+ CO ₂

ORDERING CODES



Examples of ordering codes

HD45 7BDVR: Transmitter, indicator and regulator for temperature and CO₂. Two analogue outputs 0 ÷ 10V, one configurable relay to control temperature or CO₂.

HD45 BVR: Transmitter, indicator and regulator for CO₂. Without display, with LED indicators of the CO₂ level, with analogue output 0 ÷ 10V, with relay.

HD45 17VR: Transmitter and regulator for humidity and temperature. Without display, with two analogue outputs 0 ÷ 10V, one configurable relay to control the humidity or temperature.

HD45 17DV: Transmitter and indicator for humidity and temperature. With display, two analogue outputs 0 ÷ 10V, without relay.

HD45 7BSR: Transmitter and regulator for temperature and CO₂. Without display, with RS485 output, no analogue output, with one configurable relay to control temperature or CO₂.

HD46 17BDV: Transmitter and indicator for humidity, temperature and CO₂. With display, without keyboard, with three analogue outputs 0 ÷ 10V, without relays and without RS485.

HD46 17BDTSR: Transmitter, indicator and regulator for humidity, temperature and CO₂. Display and keyboard, three relay outputs, RS485 output.

HD46 17S: Humidity and temperature transmitter. No display and no keyboard, no relays, with RS485 output.

Accessories

DeltaLog14: Software for connecting to the PC via the serial output, for the configuration of the instrument and data download. For operating systems from Windows® 98 to Windows Vista®.

HDM46: Calibrated humidity and temperature replacement module (only for models HD46...)

RS45: **Not isolated** serial connection cable with built-in adapter. USB connector for PC and mini-USB connector for the serial port of the instrument. The cable powers the instrument.

RS45I: **Isolated** serial connection cable with built-in adapter. USB connector for PC and mini-USB connector for the serial port of the instrument. The cable does not power the instrument.

HD45TCAL: The Kit includes the **RS45** cable with built-in adapter and the CD-ROM with the **DeltaLog14** software for Windows operating systems. The cable is provided with USB connector on the PC side and mini-USB connector for the serial port of the instrument.

HD45TCALI: The Kit includes the **RS45I** cable with built-in adapter and the CD-ROM with the **DeltaLog14** software for Windows operating systems. The cable is provided with USB connector on the PC side and mini-USB connector for the serial port of the instrument.