Member of GHM GROUP

HD 45…, HD 46…

HD45… AND HD46… SERIES
TRANSMITTERS AND REGULATORS FOR HUMIDITY, TEMPERATURE AND CO_2

The instruments of the series **HD45** and **HD46** are transmitters, indicators and regulators, to measure and control, depending on the model, the following environmental parameters:
- Relative humidity (RH)
- Ambient temperature (T)
- Carbon dioxide (CO_2)
- Dew point temperature (DP, calculated measurement)

They are suitable for monitoring indoor air quality.
A typical application is the examination of air quality in: buildings where there is crowding of people (schools, hospitals, auditoriums, cafeterias, etc.); workplaces to optimize comfort and in general to see if there are small losses CO which may cause explosions or fire. This analysis allows the adjustment of air conditioning (temperature and humidity) and ventilation (changes air/hour) in order to achieve a twofold objective: good air quality according to the ASHRAE and IMC standards and energy savings.
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 CO_2 (carbon dioxide) is obtained with a special infrared sensor (**NDIR** technology: Non-Dispersive Infrared Technology), which, by using a double filter and a particular measurement technique, ensures accurate measurements and stable measurements over time. The presence of a protective membrane, which is spread through the air portion, protects the sensor from dust and weather. The instrument can be wall mounted and sensors are internal to the instrument.
The instruments are factory calibrated and require no further adjustment by the installer.
The instruments are wall mounted and their sensors are installed inside the housing.
There are versions with **analogue output voltage 0÷10V, current output 4÷20mA** 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 environmental parameters measured when exceeding the threshold set by the user. The operation of the relay is very versatile, having modes of activation above and below the threshold, and single or double threshold modes. The thresholds are configurable by the user throughout the whole measurement range.
The LCD display option allows simultaneous viewing of all values measured by the instrument.
The model **HD45 BVR** and the **HD45 BAR** are distinguished by their ability to indicate an immediate level of air quality, through ignition of the LED indicators associated with graphic symbols.
All the functions of the instrument can be configured quickly and intuitively through a PC.
The instruments are easy to use and yet have a complete configuration possibilities, that makes them versatile and able to meet many needs in various application fields. The instruments are supplied with a standard configuration that makes them immediately operational. Upon request, the devices can be supplied with custom configurations.
Models of the series **HD46…** can be equipped with keyboard that allows you to easily configure the instrument even without a PC connection. The models having a keypad are fitted with backlit display, activated by the touch of a button.
Models of the series **HD45…** with relay have a switch hardware that allows quick selection of the threshold between a set of preset values.
All models carry the "logging" of continuous 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	0...100 % RH -40…+85°C Dew point Td
Working range of the sensor	-40...+80°C
Accuracy	±2.5%RH (0..90%RH) ±2%RH (elsewhere) for T=15…35°C ±(1.5+1.5% of the measure)%RH for T=40…+80°C For the dew point please see the relevant table
Resolution	0,1%
Temperature dependence	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 (except for models with current outputs)	±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
Accuracy (for models with 4÷20mA)	±0.5°C ±0.15% of the measured value within -30°C…+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 CO_2 *(for models HD45 7B…, HD45 B…and HD46 17B…)*	
Sensor	Dual wavelength NDIR
Measuring range	0…5000 ppm
Working range of the sensor	0…50°C
Accuracy	±(50ppm+3% of the measured value) @ 20°C and 1013hPa
Resolution	1ppm
Temperature dependence	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.

Temperature (°C)	Relative humidity(%)						
		10	**30**	**50**	**70**	**90**	**100**
	-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

Characteristics of the instrument

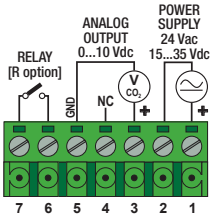
Measuring frequency	1 sample every 3 seconds
Storage capacity	2304 records
Storage interval	Selectable within 30s, 1m, and 5m The stored values represent the average values of samples collected every 3 seconds in selected storage interval.
Serial output	Serial output for USB (mini- USB/USB cable with 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 > 10kΩ) *(only HD45…V…and HD46…V)* 11Vdc outside the measuring range 4÷20mA ($R_{L\ MAX}$ = 400Ω) (only HD45_A and HD46_A) 22mA out of the measuring range Active current output
Relay output	Two-state (*only HD45…R and HD46…R)* Contact: max 1A @ 30Vdc resistive load
Power supply	24Vac ± 10% (50…60Hz) or 15…35Vdc
Power consumption	100 mW (except of the models with current output) 400 mW (for the models with current output)
Stabilizing time	15 minutes (to guarantee the declared accuracy)
Working temperature of the instrument	0°C ... 50°C
Working humidity of the instrument	0%RH ... 90%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
Weight	50g
Protection degree	IP30

Installation

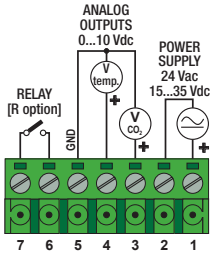
The container is easy and quick to open. Simply press the two tabs of the container to remove the front panel and have immediately available the terminal block connections and fixing holes.

Electrical connections

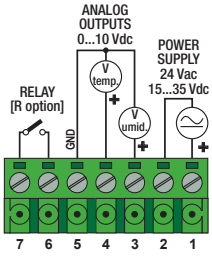
Series HD45...



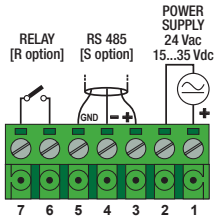
HD45 B...V
HD45 B...VR



HD45 7B...V
HD45 7B...VR

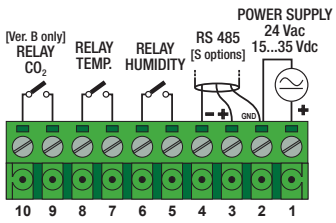


HD45 17...V
HD45 17...VR

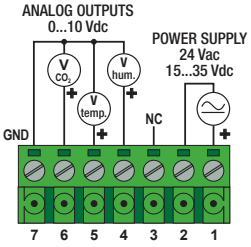


HD45...R
HD45...S
HD45...SR

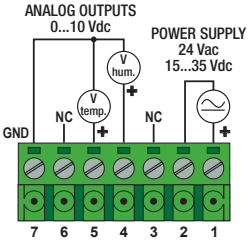
Series HD46...



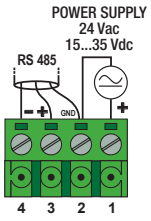
HD46...R
HD46...SR



HD46 17B...V



HD46 17...V



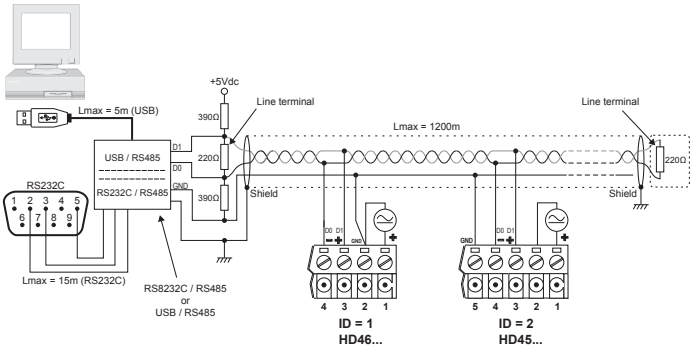
HD46...S

Configuration

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

RS485 Connection

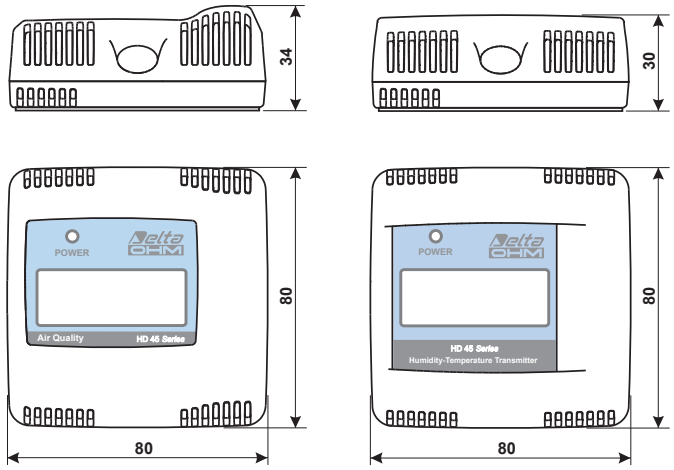
Models with RS485 output function using the **MODBUS RTU** protocol. For PC connection, insert a converter RS232C/RS485 or USB/RS485.



Dimensions of the housing

All dimensions are expressed in mm.

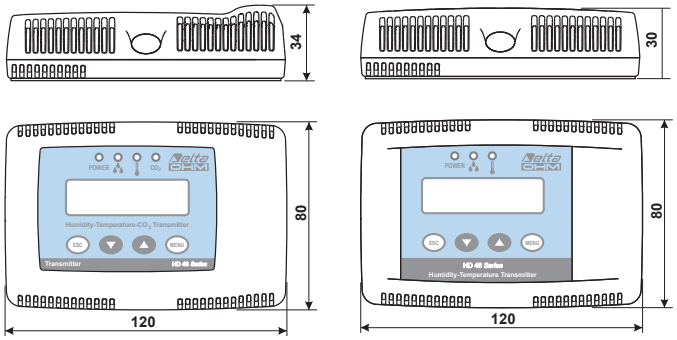
Series HD45...



HD45 B...
HD45 7B...

HD45 17...

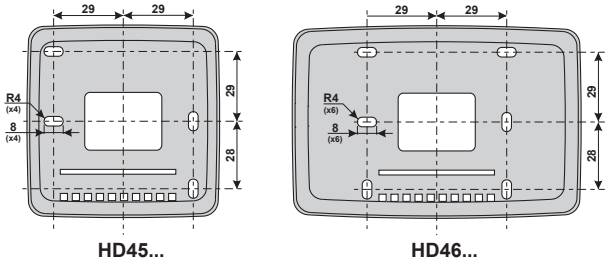
Series HD46...



HD46 17B...

HD46 17...

Fixing holes



HD45...

HD46...

ORDERING CODES

HD45 ☐☐☐

AVAILABLE OPTIONS

A = Analogue output 4÷20mA
V = Analog output 0÷10Vdc
S = RS485 output
R = Relay output
VR = Analog output 0÷10Vdc + relay
AR = Analog output 4÷20mA + relay
SR = RS485 + relay
It is not possible to have the analogue output when you have the RS485, and vice versa.

D = With display
No character = without display

Sensors
17 = Relative humidity + temperature
7B = Temperature + CO_2
B = CO_2

HD46 ☐☐☐

AVAILABLE OPTIONS

A = Analogue output 4÷20mA
V = Analogue output 0÷10Vdc
S = Output RS485
R = Relay output
SR = RS485 output + relay outputs
It is not possible to have the analogue output when you have the RS485, and vice versa.
Option V includes one analogue output for each measured quantity.
Options R and SR include one analogue output for each measured quantity.

D = With display
DT = With display and keyboard
No character = Without display and without keyboard
Option DT is available only together with option R or SR.

Sensors
17 = Humidity + temperature
17B = Humidity, temperature and CO_2

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

Upon request it is possible to have the option with 0 ... 10Vdc analogue output (option **V**) or 4÷20mA option (option **A**) for each quantity measured by the instrument or RS485 MODBUS-RTU serial output (option **S**). There are no models with both types of output.

It is available the option with relay only (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 outputs) together with serial output RS485 MODBUS-RTU (option **SR**).

The relay output together with the analogue output (option **VR** or **AR**) is available only on the 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 17A	✓	✓		✓ (2 outputs)				Power
HD45 17S	✓	✓			✓			Power
HD45 17R	✓	✓				✓ (1 output)		Power
HD45 17SR	✓	✓			✓	✓ (1 output)		Power
HD45 17VR	✓	✓		✓ (2 outputs)		✓ (1 output)		Power
HD45 17AR	✓	✓		✓ (2 outputs)		✓ (1 output)		Power
HD45 17DV	✓	✓		✓ (2 outputs)			✓	Power
HD45 17DA	✓	✓		✓ (2 outputs)			✓	Power
HD45 17DS	✓	✓			✓		✓	Power
HD45 17DR	✓	✓				✓ (1 output)	✓	Power
HD45 17DSR	✓	✓			✓	✓ (1 output)	✓	Power
HD45 17DVR	✓	✓		✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 17DAR	✓	✓		✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 7BV		✓	✓	✓ (2 outputs)				Power
HD45 7BA		✓	✓	✓ (2 outputs)				Power
HD45 7BS		✓	✓		✓			Power
HD45 7BR		✓	✓			✓ (1 output)		Power
HD45 7BSR		✓	✓		✓	✓ (1 output)		Power
HD45 7BVR		✓	✓	✓ (2 outputs)		✓ (1 output)		Power
HD45 7BAR		✓	✓	✓ (2 outputs)		✓ (1 output)		Power
HD45 7BDV		✓	✓	✓ (2 outputs)			✓	Power
HD45 7BDA		✓	✓	✓ (2 outputs)			✓	Power
HD45 7BDS		✓	✓		✓		✓	Power
HD45 7BDR		✓	✓			✓ (1 output)	✓	Power
HD45 7BDSR		✓	✓		✓	✓ (1 output)	✓	Power
HD45 7BDVR		✓	✓	✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 7BDAR		✓	✓	✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 BV			✓	✓ (1 output)				Power
HD45 BA			✓	✓ (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 BAR			✓	✓ (1 output)		✓ (1 output)		**4 LED CO_2 level**
HD45 BDV			✓	✓ (1 output)			✓	Power
HD45 BDA			✓	✓ (1 output)			✓	Power
HD45 BDS			✓		✓		✓	Power
HD45 BDR			✓			✓ (1 output)	✓	Power
HD45 BDSR			✓		✓	✓ (1 output)	✓	Power
HD45 BDVR			✓	✓ (1 output)		✓ (1 output)	✓	Power
HD45 BDAR			✓	✓ (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 17A	✓	✓		✓ (2 outputs)				Power
HD46 17S	✓	✓			✓			Power
HD46 17R	✓	✓				✓ (2 outputs)		Power UR + T
HD46 17SR	✓	✓			✓	✓ (2 outputs)		Power UR + T
HD46 17DV	✓	✓		✓ (2 outputs)			only LCD	Power
HD46 17DA	✓	✓		✓ (2 outputs)			only LCD	Power
HD46 17DS	✓	✓			✓		only LCD	Power
HD46 17DTR	✓	✓				✓ (2 outputs)	✓	Power UR + T
HD46 17DTSR	✓	✓			✓	✓ (2 outputs)	✓	Power UR + T
HD46 17BV	✓	✓	✓	✓ (3 outputs)				Power
HD46 17BA	✓	✓	✓	✓ (3 outputs)				Power
HD46 17BS	✓	✓	✓		✓			Power
HD46 17BR	✓	✓	✓			✓ (3 outputs)		Power UR +T+ CO_2
HD46 17BSR	✓	✓	✓		✓	✓ (3 outputs)		Power UR +T+ CO_2
HD46 17BDV	✓	✓	✓	✓ (3 outputs)			only LCD	Power
HD46 17BDA	✓	✓	✓	✓ (3 outputs)			only LCD	Power
HD46 17BDS	✓	✓	✓		✓		only LCD	Power
HD46 17BDTR	✓	✓	✓			✓ (3 outputs)	✓	Power UR +T+ CO_2
HD46 17BDTSR	✓	✓	✓		✓	✓ (3 outputs)	✓	Power UR +T+ CO_2

EXAMPLES OF ORDERING CODES*

HD45 7BDVR: Transmitter, indicator and regulator for temperature and CO_2. Two analogue outputs 0 ÷ 10V, one configurable relay to control temperature or CO_2.

HD45 BVR: Transmitter, indicator and regulator for CO_2. Without display, with LED indicators of the CO_2 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 17AR: Transmitter and regulator for humidity and temperature. Without display, with two analogue outputs 4÷20mA, one configurable relay to control 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 CO_2. Without display, with RS485 output, no analogue output, with one configurable relay to control temperature or CO_2.

HD46 17BDV: Transmitter and indicator for humidity, temperature and CO_2. 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 CO_2. Display and keyboard, three relay outputs, RS485 output.

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

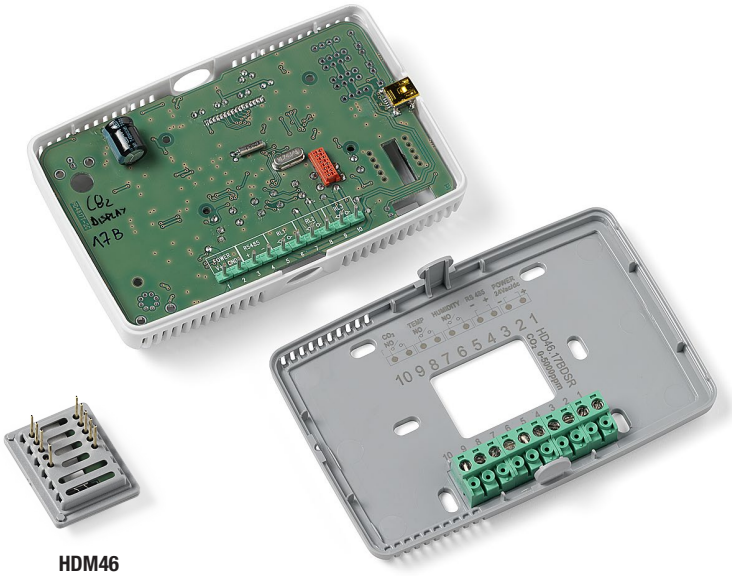
* All models include **DeltaLog14,** software (downloadable from Delta OHM website) for connecting to the PC via the serial output, for the configuration of the instrument and data download. For Windows®operating systems.

ACCESSORIES

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.



HDM46

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