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HD 45... HD 46...
TRANSMITTERS AND REGULATORS FOR HUMIDITY, TEMPERATURE AND CO_2

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 análisis 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.

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_I > 10k∧) (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± 10% (50/60Hz) or 15…35Vdc
Power consumption	100 mW
Stabilising time	15 minutes (to guarantee the declared accuracy)
Working temperature	0 a 50 ºC
Working humity	0%RH ... 95%RH no condensate
Dimensions	80 x 80 x 30 mm (HD45.17…) 80 x 80 x 34 mm (HD45.B HD45.7B) 120 x 80 x 30 mm (HD46.17…) 120 x 80 x 34 mm (HD46.17B…)
Housing material	ABS

Instalación
La instalación es muy sencilla, basta con pulsar las dos pestañas de la tapa frontalpra extraerla y dejar al descubierto las conexiones y los agujeros de fijación

CHARACTERISTICS OF THE SENSORS

| Relative humidity RH (for models HD45 17…, HD46 17… and HD46 17B…)	
Sensor	Capacitive
Measuring range	5 to 98 % HR -40 to 85 ºC Dew point Td
Working temperature	-40 a 80 ºC
Accuracy	±2% (10..90%HR) @ 20°C, ±2.5% in the remaning range For Dew point see table
Resolution	0,1%
Temperature dependance	2% on the whole temperature range
Hyteresis and repeatability	1% HR
Reponse Time (T_{90})	<20seg air speed = 2 m/s ad stable Temp
Long-term stability	1% / year
Temperaturae (for models HD45 17.., HD45 7B..,HD46 17..,y HD46 17B..)	
Sensor	NTC 10 kΩ
Measuring range	-30 a 85 ºC (-22 a 185 ºF)
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 y 70…85°C
Resolution	0,1 ºC
Reponse Time (T_{90})	<30seg air speed = 2 m/s
Long-term stability	1ºC year
Carbon dioxide CO_2 (for models HD45 7B..,HD45 B..,y HD46 17B..)	
Sensor	Dual wawelength NDIR
Measuring range	0 a 5000 ppm
Working temperature	-5 to 50 ºC
Accuracy	±(50 ppm+3% of the measured value @ 20 ºC y 1013 hPa
Resolution	1 ppm
Temperature dependance	0,1%f.s. / ºC
Reponse Time (T_{90})	<120sec air speed = 2 m/s ad stable Temp
Long-term stability	5% of the measured value / 5 years

Accuracy of the dew point Td (°C)
The dew point is calculated quqntity that depends on the accuracy of the calibration of relativi humudity and temperature The values given below refer to accuracy of ±0,25 ºC, 1013 mbar, ±2,5% HR

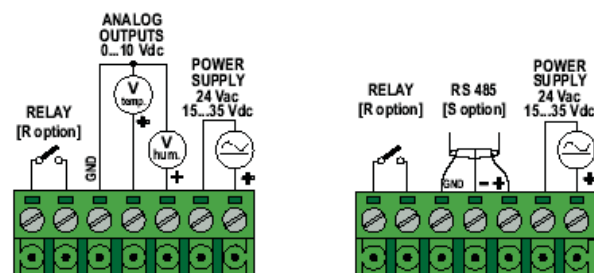|		Relative humidity (%)					
		10	30	50	70	90	100
Temperature ºC	-20	2.50	1.00	0.71	0.58	-	-
	0	2.84	1.11	0.78	0.64	0.56	0.50
	20	3.34	1.32	0.92	0.75	0.64	0.62
	50	4.16	1.64	1.12	0.90	0.77	0.74
	100	5.28	2.07	1.42	1.13	0.97	0.91

ELECTRICAL CONNECTIONS

Serie HD45....
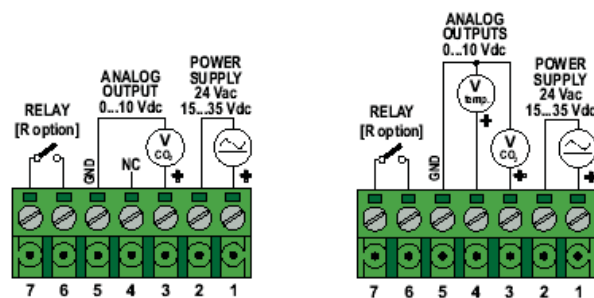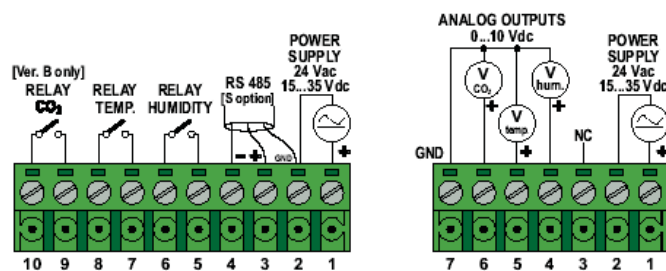

HD45 B...V
HD45 B...VR

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

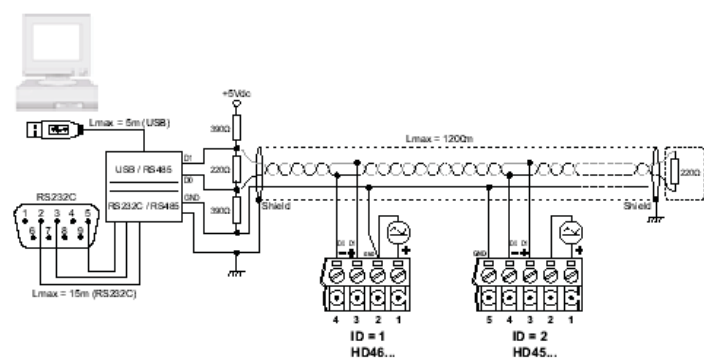Serie HD46....

HD46...R
HD46...SR
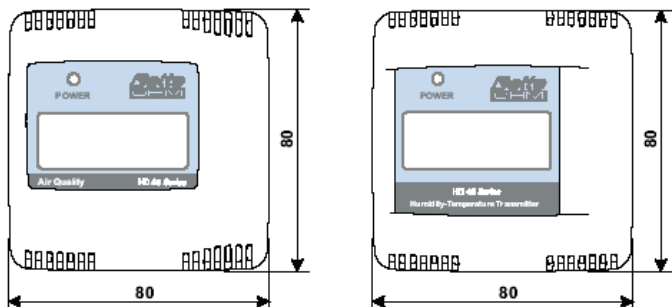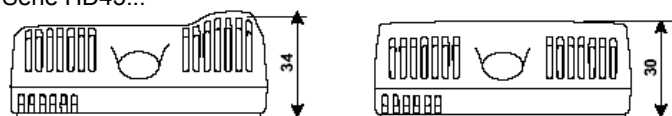
HD46 17B...V

Configuration

Instruments are provided with serial output, easily accesible on the side of the instrument that allows you to connect to the USB port of your PC using the cable **RS45** or **RS451** with builtiin adapter, to get customconfigurations.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
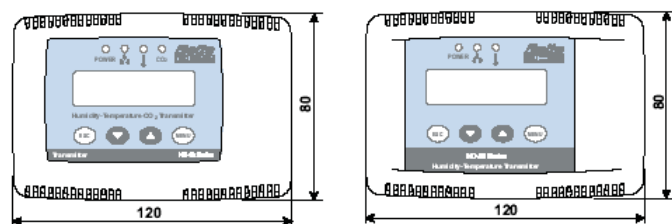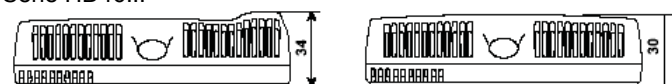To connect to the PC, interpose a RS232 / RS485 or USB / RS485 converter

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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**). The 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 quqntity 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 posible 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 supled with LCD (option **D**).

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

Dimensions of the housing (all dimensions are expressed in mm

Serie HD45...

HD45 B...
HD45 7B...

HD45 17...

Serie HD46...

HD46 17B...

HD46 17...

Fixing holes

HD45...

HD46...

Ordering codes

HD45☐☐☐

AVAILABLE OPTIONS

V = Analog output 0÷10Vdc
S = RS485 output
R = Relay output
VR = Analog output 0÷10Vdc + 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

V = Analogue outputs 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 + CO_2

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$_2$