

## AQ-Climate Control Datasheet (Air Quality Interior Climate Monitor)



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## 1. Features

The AQ-Climate Control is a network-compatible sensor system that measures important parameters of the interior climate: air quality by means of the carbon dioxide content, relative humidity and temperature. An integrated microprocessor processes the measured signals and makes them available via a TCP/IP interface.

The AQ-Climate Control has its own web server which makes it possible to call up data in a network from any point using a web browser. Moreover, the AQ-Climate Control also delivers its data via the Modbus TCP/IP protocol and using special configuration software (MBConfigTool), it can be configured from the PC and integrated in a local network or the Internet.

The data can be stored in a separated text file in the PC using logger software (WebLogger) which then can be imported into Excel. As a result, the user can then analyse the data according to his specifications and use it to control downstream devices such as air conditioning systems and fans.

The AQ-Climate Control is equipped with a very exact, yet nevertheless economical two-beam infrared measuring system (NDIR) for carbon dioxide (CO<sub>2</sub>), which has a new digital evaluation algorithm and a novel sample cell. This compact, robust, durable and maintenance free system will determine the absolute CO<sub>2</sub> content of the ambient air in . The entire measuring range is linear.

In addition, the AQ-Climate Control contains a temperature sensor (bandgap) and a hygrometer (capacitive polymer). The relay (actuator) can be controlled via a web browser. The housing is made of plastic and is suitable for wall mounting.

The system monitors its own functions continuously and reports hardware and software malfunctions. Both the 48 V DC supply voltage and data are transmitted via the Ethernet connection (Power over Ethernet, PoE).

Because the device has its own web server it is independent of any other server or PC. Moreover, the measured values can be called up or displayed without the need for an additional system.

Calibration is not necessary in normal applications, but can be carried out by a specialist if required.

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## 2. Sensor system design

A two-beam infrared sensor (NDIR) is mounted on a sensor holder inside the plastic housing and above a diffusion opening to measure the carbon dioxide concentration. The sensors for the relative humidity (15 to 95 % RH) and temperature (0 to 50° C) are located in a sensing element made of PVC protruding from the bottom of the housing. The microprocessor for processing data, the digital outputs and an actuator (relay contact) are additionally integrated in the housing (see Fig. 1).



**Fig. 1:** AQ-CLIMATE CONTROL sensor system.

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## 3. Technical data

Transmitter		
Power supply and data transmission		RJ45 jack
	Current	Approx. 100 mA
	Voltage	Power over Ethernet 48 V DC (PoE)
	PoE classification (classification level)	Class 2 (max. 6.49 W)
	Transmission speed	10 MBit/s
Ambient temperature	0° C to +50° C	
Air pressure	900 hPa to 1100 hPa	
Permissible humidity	15-95% relative humidity	Non-condensing
Housing	Plastic	White
Protection class of housing	IP 20	
Housing weight	Approx. 180 g	
Housing size	Approx. L120 x W80 x H25 mm	
Size of temperature and humidity sensor	Approx. L50 x ø 8 mm	Plastic
RJ45 jack connection	LAN/PoE	Standard patch cable
4-pole connection Modular jack	Relay output	4-pole standard modular plug (Western plug 4/4)
Optical display of measured value	Green LED	[CO <sub>2</sub> ] < 1,500 ppm
	Yellow LED	1,500 ppm < [CO <sub>2</sub> ] < 2,500 ppm
	Red LED	[CO <sub>2</sub> ] > 2,500 ppm
	Red LED flashes	[CO <sub>2</sub> ] > 3,000 ppm
Malfunction	Hard- and software	Yellow LED flashes
CO <sub>2</sub> sensor		
Measuring principle	Two-beam infrared photometer	
Gas access	By diffusion	
Measuring range	0-3,000 ppm CO <sub>2</sub>	
Warm-up time	5 min	
Accuracy	± 2% at 25° C	FS = Full Scale
Reproducibility	± 1%	
Reaction time	Approx. 30 s	

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Relative humidity sensor		
Measuring principle	Capacitive polymer	
Measuring range	15-95% relative humidity	Non-condensing
Temperature sensor		
Measuring principle	Bandgap temperature sensor	
Measuring range	0 to +50° C	
Pin assignment RJ45		
X5 LAN/PoE	Pin 1	TX +
	Pin 2	TX –
	Pin 3	RX +
	Pin 4	PoE / G
	Pin 5	PoE / G
	Pin 6	RX –
	Pin 7	PoE / -48 V
	Pin 8	PoE / -48 V
Relay output		
All-or-nothing relay	Modular jack, Pin 1	Contact 100 V, 0.5 A maximum continuous current, 0.1 A switching capacity
	Modular jack, Pin 2	Contact 100 V, 0.5 A maximum continuous current, 0.1 A switching capacity
	Modular jack, Pin 3-4	NC

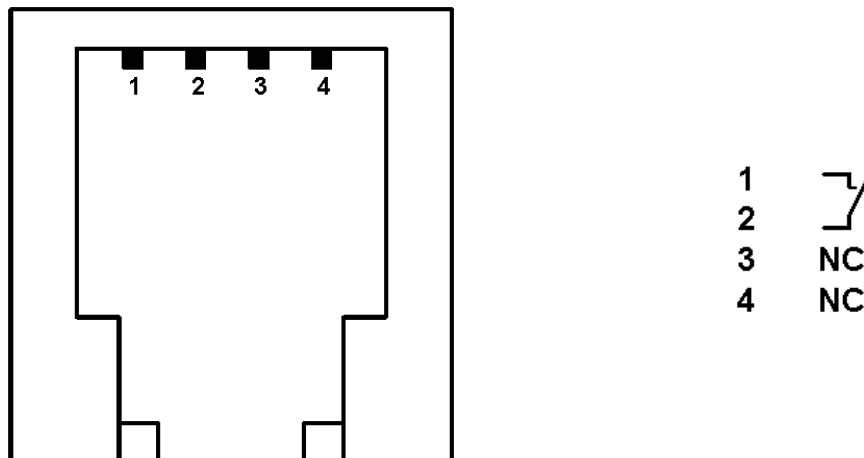
## 4. Power over Ethernet (PoE)

The climate guard is as a rule supported by all current PoE switches, PoE hubs and PoE power supply units. The climate guard must be connected to the Ethernet by means of a standard patch cable.

Pin	Connection	Pin	Connection
1	TX +	5	PoE / G
2	TX –	6	RX –
3	RX +	7	PoE / -48 V
4	PoE / G	8	PoE / -48 V

**Fig. 2:** RJ45 jack pin assignment for Power over Ethernet.

## 5. Relay Connection scheme



**Fig. 3:** Pin assignment for relay contacts (actuator). Contact 100 V; 0.5 A maximum continuous current; 0.1 A switching capacity.

## 6. Web server

The AQ-Climate Control has its own web server which displays the measured values as well as the status of the LEDs and the relay. You can call up the website by means of a web browser via the standard Port 80. Standard address: "http://192.168.178.30".

## 7. Configuration

A tool (MBConfigTool) is supplied for integrating one or more AQ-Climate Controls in a local network or the Internet. It can be used to configure the IP address, subnet mask, gateway, DNS and measured variables and units. For this the tool uses Modbusport 502. A register description is available for integration in other modbus systems.

## 8. Calibrating the climate guard

Since the device is maintenance-free in normal applications, calibration is not generally necessary. It can, however, be carried out by a specialist if required.

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## 9. Other information

The user should always determine the precise suitability of the AQ-Climate Control by means of appropriate tests conducted under the specified conditions and with particular regard for material compatibility. The sample cell, for example, must not corrode under any circumstances, and the filters must not become tarnished.

<p><b>WARNING</b> <b>Personal Injury</b> DO NOT USE these products as safety or Emergency Stop devices or in any other application where failure of the product could result in personal injury. <b>Failure to comply with these instructions could result in death or serious injury.</b></p>	<p><b>CAUTION</b> Do not exceed maximum ratings <b>Failure to comply with these instructions may result in product damage.</b></p> <p><b>It is the customer's responsibility to ensure that this product is suitable for use in their application.</b></p>
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