



miniClima *Manual EBCeasy*

Topic: Complete instructions for the application, installation, usage, maintenance & care, de-installation, storage and packing-up of the respective devices.

Valid for: miniClima Constant Humidity Devices, Series EBC10/11/12/easy, Type EBCeasy. Optional accessories or extras are described in their respective supplement manuals.



THIS MANUAL CONTAINS IMPORTANT INFORMATION - PLEASE READ IT CAREFULLY BEFORE USING OR INSTALLING YOUR DEVICE!

The devices covered by this manual are not destined for being used by persons (including children) with limited physical, sensory or intellectual abilities and/or by persons lacking the required experiences/skills, except such persons are going to be supervised by a person that is responsible for their safety or such persons have been thoroughly briefed beforehand about the usage of the device and it can be expected that the persons will have comprehended the explanations and that they will also follow them. Children have to be kept well away from the devices, ensuring that they will not play with them.



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1 GENERAL INFORMATION

1.1 What can be expected from the work of an EBCeasy, what can't

1.1.1 Primary purpose

The miniClima Constant Humidity Devices EBC are built for the regulation of the relative air-humidity in both air- and steam-tight enclosed museum showcases, switchboards, deposit cupboards, containers and similar applications (hereinafter only referred to as "cases"). The devices help in reaching and keeping a desired level of relative air-humidity inside the cases. They are not built for the purpose of influencing or changing any other state or condition of the air being processed (e.g. temperature, pollution, etc.), but further equipment¹ can be added to an EBC for filtering dust and particles out of the system air.

1.1.2 Characteristic features

Once set up correctly, the EBC, the case and the interconnections between EBC and case (hosepipes) together form a tight air circulation system. As long as the EBCeasy is turned on and has adjusted its internal air-leading parts, the air circles almost continuously through it. More in detail: The air is exhausted from the case, led to the EBC, where it is going to be either humidified, dehumidified or left unchanged - depending on the set and actual RH values. The conditioned air is then led back into the case. Conditioning is achieved by means of a solid state polymer ionic membrane. On one side of the membrane it splits hydrogen ions (H⁺) from the air, migrates it through the membrane and discharges it on the other side. The membrane can only be used in one direction. Therefore the EBCeasy is equipped with a mechanism to switch the air-stream between both sides of the membrane depending on the necessity to humidify or dehumidify. The respective other side of the membrane is opened to the surrounding air to equalize the generated humidity level. The outside air is never opened to the internal air-stream directly and to avoid the transport of external particles into the internal air-stream, the outside air is filtered by filter-pads of filter-class F6 on the incoming side and of filter-class F3 on the outgoing side while opened to the respective other side of the membrane. When the EBCeasy has to change its operation-state between humidifying, dehumidifying or just circulating, it first stops its circulation fan, adjusts its internal air leading parts by opening and closing appropriate flaps and starts the circulation fan again. During all these times a digital sensor measures the values for relative air humidity and temperature within the case. The EBC receives these values and compares the measured RH value with the setpoint, the hysteresis and the threshold values, which can all be set via the menu

¹ See www.miniclimate.com for our current products and available optional accessories.



prompts on the front panel of the EBC.

Through the work of the EBC, the desired level of the air humidity in the case is constantly approached - duration and speed depending on the initial values, on the conditions (temperature, humidity) the case is exposed to, and on a number of further variables (like the temperature at the EBC's place of installation, the size and shape of the case, the air/steam tightness of the case, the kind of materials stored inside the case, the length of the hosepipes, whether or not the hosepipes are laid in many bends and turns etc). After the setpoint range (=setpoint +/- hysteresis) has been reached, the RH is going to be kept on a constant level. A negligible movement around the setpoint might be observed - the higher the setpoint the more distinct. This behaviour is technically induced and does not constitute an error.

1.2 Risk of use, recommendations

Our devices are first and foremost used for the regulation of the relative humidity of the air surrounding precious and/or irreplaceable works of art or artefacts. It is therefore necessary to cover all possible imponderables, when installing and using the EBCs. For this purpose, please do bear in mind the following recommendations and risks of use.

A clean installation, carried out according to the instructions found in this manual, is the basis for a working system. In particular essential are:

- ✓ The use of a climate-ready case (air-tight, steam-tight).
- ✓ The positioning of the miniClima RH/T sensor on a spot that features the same environmental conditions as the one where the exhibit is placed (see section 3.2.2 "RH/T sensor", p. 13).
- ✓ The design and positions of the air inlets and outlets on the case (see section 3.1 "Setting up the EBC, establishing the hosepipe connections", p. 9).
- ✓ That the air resistance within the air circuit is kept low (short hosepipe connections, avoidance of too many bends and turns when laying the hosepipes etc. - see section 3.1 "Setting up the EBC, establishing the hosepipe connections", p. 9).
- ✓ Preventing different temperatures inside the case (light installations, solar radiation,...). The miniClima RH/T sensor and the exhibit in particular need to be exposed to the very same temperature.
- ✓ The temperature surrounding the EBC and the hosepipes (see section 3.1 "Setting up the EBC, establishing the hosepipe connections", p. 9).
- ✓ Regular visual inspection of the EBCs, regular maintenance and care of the EBCs (see section 7 "Maintenance and care", p. 37).



We recommend a beforehand verification by the user/customer that our product is going to be able to fulfil the individual expectations and needs required for the specific case. Please don't hesitate to get in touch for any questions.

It is further recommended to test the function of a completely installed system (consisting of the case, the interconnections and the EBC(s)) before using it to control the relative air-humidity of sensitive exhibits or components. In doing so, possible errors (i.e. wrong installations) can be discovered early enough to have them corrected.

Please bear in mind that every technical device can break. So, to be on the safe side with respect to the lasting integrity of your sensitive and valuable exhibits or components, further actions should be considered:

- ✓ Regular inspections of the case and the EBC through skilled personnel probably provide for the highest possible safety against technical failures or breakdowns.
- ✓ Installation of external signal devices for every EBC, to be alarmed in time when one of our devices needs attention (see section 3.2.4 "Wirings for the external signals (Composite error alarm and on-off status)" on p. 14).
- ✓ Having a spare unit at hand if need be or when the regular inspection at our workshop becomes due. You can save time and avoid delays during which your case might remain without humidity control. Those who decide for this option should actually best have their EBCs rotate in regular intervals.

Please mind to install, use, maintain, deinstall, pack up, store and ship your EBC and all accessories correctly and in accordance to the instructions.

1.3 Permissible ambient conditions

- ✓ 5-30°C, 15-80%RH, non-condensing (applies to the storage of the EBC as well as to the operation of the completely installed system as a whole).
- ✓ 10-50°C, 20-60%RH, non-condensing (applies to the storage of the RH/T sensor).

⚠ **NOTE:** The values 5-30°C and 15-80%RH refer to the air-conditions surrounding the EBC and the case which are generally obligatory for operation (or damage-free storage) of the EBC. They do not refer to the surrounding air-conditions were the full capacity with respect to the achievable setpoint range (inside the case) will be given (see also section 9 "Technical data", p. 41).



1.4 Further requirements for using EBCs

The EBCeasy has to be operated with 12V DC, 24W. An according wall power supply is usually part of delivery.

1.5 Available types

EBCeasy- device for air volumes of up to approx. 0,5m³.

⚠ NOTE: The capacity of an EBC will differ depending on the ambient conditions, the tightness and constitution of the case, the tightness and constitution of the connections between case and device, the kind and consistency of the materials stored/presented inside the case, and the like.

Every EBC of the current series can be used as both a master unit and a slave. The decision for one of the two hierarchic states is selected automatically dependant upon the type of cable connected to the EBC. If it is the cable of a miniClima RH/T sensor then the EBC becomes a master controller; if it is the control line coming from another EBC then the unit becomes a slave and will duplicate the function of the EBC that is the first in the line (chain of EBCs).

With this it is possible to increase the max. volume of the air that can be conditioned: Every added EBCeasy increases the capacity by approx. 0,5m³.

2 IDENTIFYING YOUR UNIT AND ITS ACCESSORIES/OPTIONS

2.1 Delivered items (per EBC)

- ✓ 1 EBC.. (packed extra in order to avoid transport damages: 1 6pin plug-in connector).
- ✓ 1 Flexible hosepipe (length as ordered or by default 3m for each EBCeasy).
- ✓ 2 Hosepipe fittings for affixing the hosepipes to the case. Depending on the make each hosepipe fitting consists of 1 connector, 1 counter nut, 1 gasket ("GD..").
- ✓ 1 external power supply for 12VDC/24W.
- ✓ Either (for EBCs sold as master units): 1 RH/T sensor with housing, cable (2.5m resp. 5.0m), RJ45 plug and a ferrite core (**⚠ IMPORTANT:** Please see the printed note that has been added your delivery before handling the sensor).
- ✓ Or (for EBCs sold as slave units): 1 control line (2.0m resp. 5.0m; category-5e patch cable, twisted



pair/non-crossed, with RJ45 plugs and ferrite cores on either end).

- ✓ CD-ROMs (1 set per order) with the relevant user manuals, information and the miniClima software (further copies of the CDs on request).

2.2 Possibly delivered other (optional) accessories (excerpt)

- ✓ Aluminium flanges for fixing the hosepipe fittings on a case wall of more than 6mm thickness.
- ✓ Air circulation filters.
- ✓ Air distribution boxes LVB20 (see the additionally delivered manual).
- ✓ Detached operating unit (cable-bound remote control; see the additionally delivered manual).
- ✓ Serial data cable RS232 for plugging the EBC to a PC.
- ✓ "Serial2USB" adapter with cable and driver² for plugging the EBC to a PC without RS232 interface.
- ✓ I²C Expander for enhancing the signal of the RH/T sensor if the latter is installed more than 7.5m away from the EBC³ (see the additionally delivered manual).
- ✓ Serial2IP converter for hooking the EBC to your local LAN or WiFi (see the additionally delivered manual).
- ✓ Extern LED unit for displaying the alarm/on-off status of the EBC (see the additionally delivered manual).
- ✓ Add. control lines and/or RH/T sensors.

2.3 Verifying the series and type

The series is indicated on the rating plate on the backside of the unit (see Fig. 1). It should read "EBCeasy". If not, please note the actual series and get in touch with us, so that we can provide you with the appropriate manual.

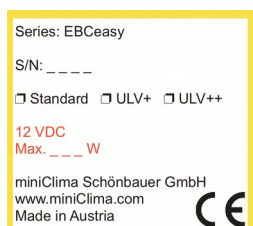


Fig. 1 - Rating plate with series ID, S/N and indication of the built-in air circulation fan (Standard-ULV, ULV+ or ULV++).

² ⚠ **CAUTION:** The driver CD might have a diameter of <12 cm. Such Mini-CDs are not applicable for slot-loading disc drives. Do check with your hardware documentation if uncertain!

³ Admissible max. length of the sensor cable (as of processor version V121107.02): 5+2.5=7.5m (earlier versions: 5m). The mentioned expanders are required for greater distances.



2.4 Identifying the serial number (S/N)

The serial number (four digits labelled S/N) is indicated on the rating plate on the backside of the EBC (see Fig. 1).

3 INSTALLATION

3.1 Setting up the EBC, establishing the hosepipe connections

1) ... the filter grills on the sides are blocked in any other fashion and that edge distances of min. 10mm (right side, left side) are kept for an adequate ventilation;

⚠ **NOTE:** If you have ordered air-distribution-boxes (LVB20), filter capsules, or other accessories relevant for the hosepipe connections, do also regard their additional installation manuals at this point.

The EBC should be positioned as close as possible to the case, to keep the air resistance, which increases with the length of the used hosepipes, low. The EBC should not be located in the air-conditioned part of the case itself. The device has to be installed horizontally and firm. The device has to be given the possibility to emit its self-produced heat during the operation. It is therefore necessary to ensure, that...

2) ...the device's place of installation (mostly the plinth of the case) is aired (e.g. by means of ventilation holes in the plinth⁴, or by ventilation fans, if necessary);

3) ...the EBC is placed on a plain surface

4) ...the air slits are vacuum cleaned regularly, if necessary, and the filter(s) behind the air grill(s) on the right and/or left side are regularly checked and replaced (see section 7 "Maintenance and care", p. 37).

⚠ **CAUTION:** Absence of ventilation at the device's place of installation or blocked cooling air in-/outlets of the device might overheat the device, as well as reduce the dehumidification and humidification capacity of the device.

Two hosepipe connections for the air circulation have to be established between each EBC and the case. Follow the steps described below for each device that shall be connected to the case (includ. every slave

⁴ Recommended sizes and positions for the ventilation holes: 2x50cm² per EBCeasy: top & bottom panel of the plinth and/or both side panels of it.



unit, if any):

The device itself is already equipped with two hosepipe fittings. The hosepipe fittings on the case wall need to be affixed now. You need two hosepipe fittings for every EBC - one for the air inlet, one for the air outlet. Firstly define the ideal positions of the air in-/outlets on the case so as to best enable an equal distribution of the conditioned air.

📌 **NOTE:** The positions shown in Fig. 2 do not represent a general solution or recommendation.

Mind the following rules before deciding:

- 1) As already mentioned above, all used EBCs should be positioned as close as possible to their respective cases, though they can also be placed some meters away, if necessary. Due to the growing air resistance the efficiency of the EBCs diminishes a little with the length of the tubes. Mind the total length of the hosepipe provided with your EBC.
- 2) The hoses must not be laid next to heat-emitting parts.
- 3) In- and outlets (even those of different EBCs) must not be located directly next to each other on the case wall (you may position inlets next to inlets and outlets next to outlets). If they need to be positioned close to each other, anyway, the inner construction of the case should be realised along the ideas presented in Fig. 2.
- 4) The constructions on the inside of the case should be realised in a way that enables the air to stream over the whole volume of the case. Should i.e. some air in- and outlets be located behind the same partition wall or divider, the inlets need to be sealed off from the outlets even if much space is left between those in- and outlets - see Fig. 2.
- 5) For partition walls / dividers / sealed off separations between in- and outlets: The overall surface of the openings between each partition / separated part and the rest of the case should at least be of the same size as the sum of the cross-sections of all hosepipes connected to this partition / separated part, thus ensuring that the air does not need to overcome a higher air resistance there than it does inside the hosepipes.

- 6) There is no universally valid figure for the permissible max. total length of the hosepipe connections per air circuit between EBC and case but the length that is usually delivered with a device (3m) can be taken as a reference.

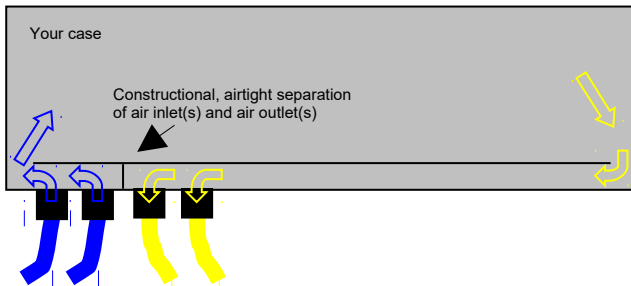


Fig. 2 - The shown positions of the hose fittings do not represent a general solution or recommendation.

As soon as the positions are fixed, you need to clarify whether the thickness of the case walls exceeds 6mm on those positions where you want to bring on the hosepipe fittings. If the thickness is 6mm or less you may cut, drill, or crack the holes for the hosepipe fittings directly in the case wall⁵: EBCeasy: Ø 20mm. If the thickness is above 6mm on the other hand, you need to use intermediate pieces (not part of the delivery by default) whose thicknesses actually are max. 6mm, e.g. metal plates like our flanges. The necessary diameters for the boreholes when using flanges or the like result from the size of the counter nut and gasket of the respective hosepipe fitting: VE20.. (EBCeasy): Ø ??mm; (depending on the make of the counter nut - please take measurements on the delivered parts.)

⚠ **IMPORTANT:** Mind the necessity that every air in-/outlet on the case has to be carried out airtight.

Hosepipe fittings, which are fitted directly to the case wall with the delivered gasket, need no further sealing.

For intermediate pieces that come without gaskets the additional use of silicone will be required.

3.1.1 Handling the hosepipe fittings

3.1.1.1 Handling VE20_V3

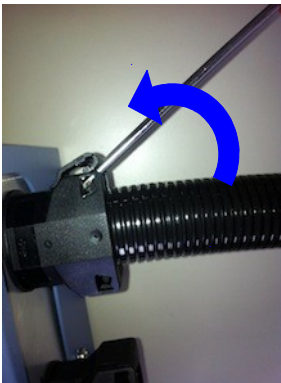
- 1) Cut the hosepipe as straight and even as possible. We recommend the use of nippers built for that purpose (can be ordered with us).
- 2) The connectors have to be affixed to either the showcase wall or to an intermediate piece/flange using the rubber gasket and the counter nut (make sure that this connection is air-tight).

⁵ Mind that purpose-made models might be equipped differently. Always measure off the delivered parts before cutting/drilling/cracking. Also, EBCs that shall be used together with LVBs will need different boreholes on the case walls - see the delivered installation manual for the LVBs.

- 3) Finally, simply press the delivered hosepipe into the connector until it stops. Have the fixing clips of the connector closed while doing so. There is no need to open them up in the beginning. There is also no need for the use of any tools for this process.



- 4) Use a tool (i.e. a screw driver) for opening up the connection again. Push the latches on both sides to the outside in order to do so:



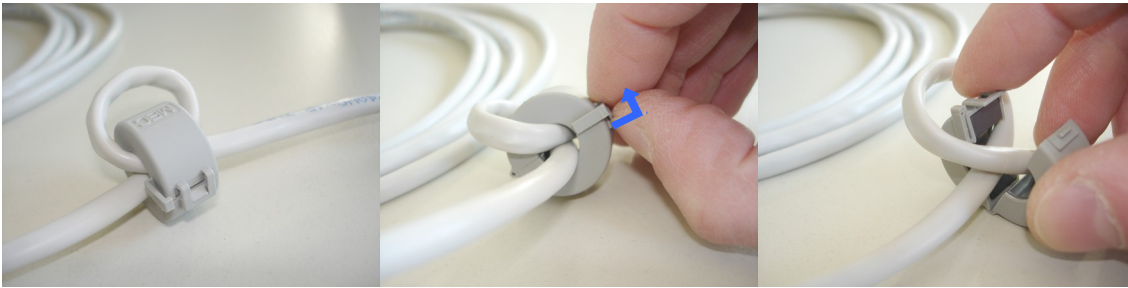
3.1.2 Connecting the hosepipes to the EBC

Dispose of the protective coverings on the hosepipe fittings of the EBC, if any. After that, proceed as described above in order to attach the hosepipes to the EBC's fittings. Mind the different types of fittings mentioned above.

3.2 Electrical connections

3.2.1 Handling the ferrite core

In case you need to take off the ferrite core(s) of the RH/T sensor cable or the control line temporarily, this can be done easily (kind and colours of the cores vary):



⚠ **IMPORTANT:** Do not forget to put the core(s) back on the cable before using the EBC: Wind the cable through each core once - see the pictures above. The core(s) should be positioned next to the RJ45 plug of the sensor cable or next to each of the RJ45 plugs of the control line respectively.

3.2.2 RH/T sensor

(Applies to EBCs used as master units only.)

Please see the printed note that has been added your delivery before handling the sensor.

⚠ **IMPORTANT:** The RH/T sensor has to be affixed at a suitable point inside the case, which ideally is in the close surrounding of the humidity sensitive objects stored/presented in the case. The sensor does not necessarily have to be placed in the visible part of the case, but even so, it has to be positioned on a spot and under conditions that are comparable to those of the exhibit in the case. Especially lighting installations and their effect on the temperature of the air surrounding the sensor may have a heavy impact on the functioning of a correct humidity control. Do not cover, wrap, or in any other fashion separate the sensor from the air that surrounds the exhibit.

By default the sensor comes complete with housing, a 2.5m or 5m cable, a RJ45 plug and a ferrite core. As neither all parts of the sensor housing nor the plug can be detached from the cable, you need a borehole of min. Ø 13mm in the case wall so as to be able to lead the cable (sensor sided) through. ⚠ **IMPORTANT:** The chip of sensor is an easily damageable electronic component and it juts out a bit from the housing. Therefore it is important to take good care to not harm it when leading it through the wall! It is also essential to take care for an airtight lead-through of the sensor cable through the wall of the case.

Once the sensor is positioned and mounted inside the case, verify that the EBC is still not plugged to the mains connection. Then plug the sensor cable to its jack on the front plate of your EBC, labelled **Sensor & Control** in. With the sensor plugged in, the EBC is already defined to be a master unit.

⚠ **IMPORTANT:** Do not plug or unplug the sensor to/from the EBC during operation! Always turn the EBC off,



wait for the completion of the pumping process (if any) and then pull the mains connection before handling the sensor cable. Otherwise the electronics of the EBC might be harmed and/or unexpected malfunctions might occur.

3.2.3 Control lines

(Applies to master/slave-systems only.)

⚡ **IMPORTANT:** Do not plug or unplug the control line to/from any affected EBC master or slave set as long as they are operating! Always turn the master off (all slaves follow automatically), wait for the completion of the pumping process (if any) and then and pull the mains connection cables of the affected EBCs before handling the control line(s) interconnecting the EBCs. Otherwise the electronics of the EBCs might be harmed and/or unexpected malfunctions might occur.

Every EBC that is ordered as a slave unit is going to be delivered with a 2m or 5m control line - a customary category-5e patch cable, twisted pair/non-crossed, with RJ45 plugs and ferrite cores on either end. Verify all EBCs are still not plugged to the mains connection, then plug one RJ45 to the master unit's jack labelled **Control out** and the other to **Sensor & Control in** on your slave. In case two or more slave units shall be controlled by one master unit, continue by always leading the control lines from **Control out** of the first/previous slave unit to **Sensor & Control in** of the following one.

3.2.4 Wirings for the external signals (Composite error alarm and on-off status)

Every miniClima Constant Humidity Device is equipped with two potential-free changeover contacts that can be used for the installation of external signals, i.e. red/green lights in a control room, or sirens. One signal indicates whether the EBC is turned on or off, the other switches whenever the EBC issues an alarm.

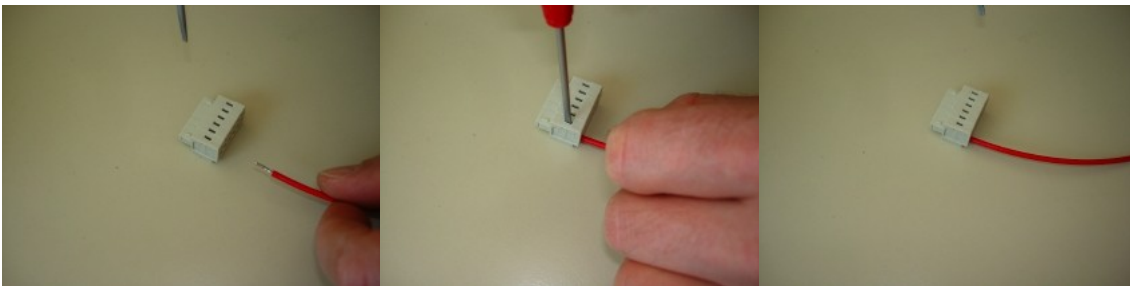
⚡* **CAUTION:** Max. voltage/ampereage for using of the changeover contacts: 48V/4A.

The wires that shall be connected to the changeover contacts of the EBC have to be put to the EBC's 6pin plug-in connector. Proceed as follows for handling the plug-in connector:

- 1) Grip the plug-in connector on its sides with index and thumb and pull it off from its connection plug. Hold the EBC with your free hand when doing so, to keep it from being torn away (⚡ **IMPORTANT:** The connector has to be pulled off the EBC for all works that shall be done on it):



- 2) For removing or adding wires to the 6pin plug-in connector, press a small screwdriver into the hole to open the according clamp beneath and pull/push the wire out/in at the same time:



- 3) It is best to accomplish all wished cable connections at once. For putting the plug-in connector back on the device it has to be pressed onto the connection plug. Do hold the EBC with your free hand when doing so, to keep it from slipping away.

Clamp positions: The live wire for each external signal has to be plugged to the resp. leftmost clamp, which is clamp 1 for the on-off signal and clamp 4 for the alarm signal (left to right; see the diagram below).

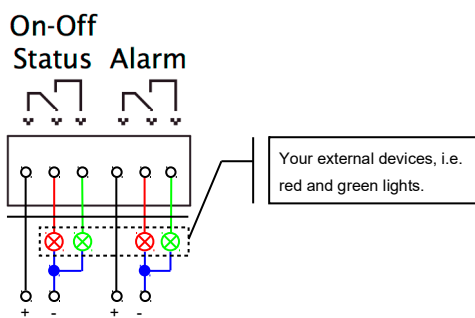


Fig. 3 - Wiring diagram and clamp positions for the external signals on the front plate of the EBC (max. voltage/ampereage: 48V/4A).

The changeover contacts of the EBC, the EBC's display and the status LED react to the following circumstances as noted here:



Status of the EBC		Display text	LED	Changeover contact for the external display of the EBC's on-off status			Changeover contact for the external display of any alarm currently issued by the EBC		
				Clamp 1, Live Wire	Clamp 2, Break Contact	Clamp 3, Make Contact	Clamp 4, Live Wire	Clamp 5, Break Contact	Clamp 6, Make Contact
No mains connection		(Off)	(Off)	+	+		+	+	
Stand by		Stand By	Green	+	+		+		+
On	No alarm	50% Humidify (or) 50% Dehumidify (or) 50% In Range	Green	+		+	+		+
On	Flaps alarm	50% FlapsALARM	Red	+		+	+	+	
On	Signal error alarm	Signal ERROR	Red	+		+	+	+	
On	Reset signal error alarm, but persistent cause	Signal ERROR	Green	+		+	+		+
On	EomTemp alarm	50% EomTemp ALARM	Red	+		+	+	+	
On	Reset EomTemp error alarm, but persistent cause	50% EomTemp ALARM	Green	+		+	+		+
On	Humidity alarm	50% HumidityALARM	Red	+		+	+	+	
On	Reset humidity alarm, but persistent cause (EBC retries and in case of failure issues the humidity alarm again after 30 minutes)	50% Humidify (or) 50% Dehumidify (or) 50% In Range	Green	+		+	+		+

Table 1 - Possible alarm and status messages/signals (50% is used as an exemplary value).

4 INITIAL AND CONTINUED OPERATION

As soon as all hosepipe connections and all required cable connections on the front panel are established, you can continue with setting the device into operation. Proceed as follows:

4.1 Initial step 2 - mains connection

Use the delivered wall power supply. At first plug the cable to the socket-inlet (backside) of the device. Then plug the cable to an appropriate (see section 1.4 "Further requirements", p. 7) socket-outlet. If necessary, you can use any common and approved international mains plug adapter - still, voltage and frequency of the mains connection have to be within the above (p. 7) mentioned range, and the connection has to be fuse protected and earthed.

NOTE: In case of a power outage (or when the mains connection has been cut in any other way), the EBC will always return to the last mode it had been working in (Stand-by or humidity control) as soon as the power supply becomes reestablished. Also, all settings that had been taken on the EBC will remain intact despite of any power outage.



4.2 Stand-by mode

Once a working mains connection has been established the EBC's LED lights up green and the display indicates the software version programmed into the EBC's processor. After some seconds the display switches to ("ser_no" corresponds to the respective serial number):



Fig. 4 - Display message during stand-by mode (Master sets).

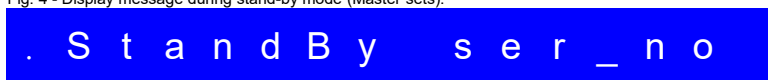


Fig. 5 - Same message on a slave unit. Slave mode requires an established connection to the master and both the slave and the master have to be plugged to the mains supply.

The EBC adjusts its internal flaps to control the internal air-stream, the according engine noise can be heard for some seconds. While in stand-by mode, an EBC will neither circulate the air between case and EBC, nor will it start/continue with any pumping, humidifying or dehumidifying processes. Also no data will be logged or provided live on the RS232 interface at this stage. Previously recorded data can be read out during stand-by, though, and the menu on the EBC's front panel is accessible, too (see section 4.4 "Settings and read-outs - working with the menu", p. 18).

4.3 Switching on and off

Push the **On-Off/Reset** button for about a second to set the device into operation. Slave sets are switched automatically with the master, they can neither be switched on nor off separately.

Depending on the actual settings and the values in the case the unit (or chain of units) will immediately switch into the respective mode of operation, and so the message on the display of the master unit can now be one of these ("50%" being an exemplary value):

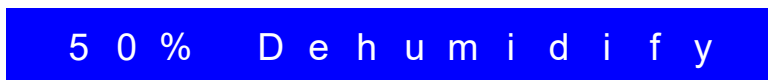


Fig. 6 - Possible display messages during normal operation (Master sets).



The humidity value displayed to the left resembles the actual humidity in the case as measured by the miniClima RH/T sensor.

EBCs used as slave units will always copy the display of the chain's master unit, except for an arrow symbol on the leftmost display element. This arrow marks any slave unit for better recognisability (the arrow is not prompted in menu mode):



Fig. 7 - Possible display messages during normal operation (Slave sets).

🔗 **NOTE:** In case the messages on your display are in German please turn to section 4.4.6 "Menu entry for the display and menu language" on p. 24 to see how to change the menu language.

If wished, press **On-Off/Reset** (on the master unit) again for about a second to set the device (or chain) back into stand-by mode.

4.4 Settings and read-outs - working with the menu

🔗 **NOTE:** The menu can be used both during operation and while the EBC is in stand-by mode.

The following variables can be set with the menu on the EBC front panel:

- ✓ The setpoint for the desired level of the relative humidity inside the case (%RH) - Menu entry 1.
- ✓ The upper and lower thresholds for the humidity alarm (%RH) - Menu entries 2 & 3.
- ✓ The acoustic alarm (On/Off) - Menu entry 4.
- ✓ The delay for the first humidity alarm (Days) - Menu entry 5.
- ✓ The menu and display language (English/German) - Menu entry 6.
- ✓ The correction for the interpretation of the data coming from the RH/T sensor (Calibration; %RH) - Menu entry 11.
- ✓ The hysteresis - Menu entry 12



Furthermore the following data can be read out from within the menu:

- ✓ The temperature inside the case as read from the RH/T sensor (°C) - Menu entry 7.
- ✓ The temperature at the membrane inside the EBC (°C) - Menu entry 8.
- ✓ The temperature at the electric circuits inside the EBC (°C) - Menu entry 9.
- ✓ The hours of operation of the EBC (Hrs) - Menu entry 10.

🔔 **IMPORTANT:** Note down the current hours of operation of your EBC for future reference (cp. section 7.3 "General service" on p. 39).

🔔 **NOTE:** The menu is identical at masters and slaves, but some settings can only be taken on masters. If you i.e. try to alter the setpoint or one of the alarm thresholds within the menu of a slave unit, the software will switch back to the value set in the master shortly after.

🔔 **NOTE:** Any EBC will cancel the menu mode after a few seconds of inactivity. All changes that have been made and then confirmed with **↵Enter** will remain intact. All changes that have not been confirmed before will be rejected.

4.4.1 Menu entry Setpoint

With this entry you can set the desired level for the relative humidity inside your case (master units only) - this is the core function of an EBC (or a chain of EBCs). Default setting is 50%RH (might also be factory-set to a client-specific value). The EBC master unit always compares the value it receives from the RH/T sensor inside your case to the one defined here. It then starts/continues with its work to bring the measured value inside the case in line with the one set by you. All connected slaves will duplicate this work.

Press **Menu/Esc** to call up the menu of the master unit. The display reads:



Fig. 8 - Display message in menu mode, 1st menu entry.

4.4.1.1 Description/options

Setpoint is the variable that can be altered with this menu entry; **50%** (example) is the currently set value of this variable (in %RH).



Press **Menu/Esc** once more to leave the menu mode without changing any values.

↑ indicates that you can move up the menu to go to the next menu entry by pressing **↑ Up**. No changes will be made to the setpoint value by doing so.

↵ indicates that this variable can be set by pressing **↵Enter**.

Press **↵Enter** to alter the value for Setpoint (possible range: 10-85%). The two digits resembling the value on the display start to blink. Use the **↑ Up** and **↓ Down** buttons to make your changes, and confirm the new value with **↵Enter**. The value will not be stored as long as you do not press this button.

4.4.2 Menu entry AlarmMax

With this entry you can define an upper threshold value for the humidity alarm to go off (master units only). If the relative humidity inside the case rises beyond this value and if it remains there for at least 30 minutes (standard alarm delay), an alarm will be issued from your EBC. Depending on the settings taken via the menu entry for the first Alarm (see p. 23) the first humidity alarm can additionally be delayed for 1 to 99 days.

By default the AlarmMax value is usually stored 10 points above the value for the setpoint. The minimum spacing required between AlarmMax and the setpoint is five points. Every time the setpoint is altered the upper threshold value will be moved analogously to keep the same spacing that has been set before. If you have, for instance, set an upper threshold value of 60% and you alter the setpoint from 50% to 55%, the value for AlarmMax will be moved to 65% automatically. **⚠ NOTE:** If the setpoint is put to its highest possible value (85%), the distance to AlarmMax is automatically reduced to 5 points, as otherwise the highest possible value for AlarmMax (90%) would have been crossed. Once the difference came to rest at 5 points by this it will be kept there - even if you chose a lower value for the setpoint shortly after. With a setpoint chosen low enough, AlarmMax can of course be raised again manually, though.

Press **Menu/Esc** to call up the menu, then press **↑ Up** once to move to the menu entry for the upper threshold value (AlarmMax). The display reads:



Fig. 9 - Display message in menu mode, 2nd menu entry.

4.4.2.1 Description/options

AlarmMax is the variable that can be altered with this menu entry; **65%** (example) is the currently set value of



this variable (in %RH).

Press **Menu/Esc** once more to leave the menu mode without changing any values.

↑ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing

↑ Up or **↓** Down. No changes will be made to the AlarmMax value by doing so.

↵ indicates that this variable can be set by pressing **↵Enter**.

Press **↵Enter** to alter the value for AlarmMax (possible range: min. 5 points above the setpoint; max. 90%).

The two digits resembling the value on the display start to blink. Use the **↑** Up and **↓** Down buttons to make your changes, and confirm the new value with **↵Enter**. The value will not be stored as long as you do not press this button.

4.4.3 Menu entry AlarmMin

With this entry you can define a lower threshold value for the humidity alarm to go off (master units only). If the relative humidity inside the case falls beyond this value and if it remains there for at least 30 minutes (standard alarm delay), an alarm will be issued from your EBC. Depending on the settings taken via the menu entry for the first alarm (see p. 23) the first humidity alarm can additionally be delayed for 1 to 99 days.

By default the AlarmMin value is usually stored 10 points below the value for the setpoint. The minimum spacing required between AlarmMin and the setpoint is five points. Every time the setpoint is altered the lower threshold value will be moved analogously to keep the same spacing that has been set before. If you have, for instance, set a lower threshold value of 40% and you alter the setpoint from 50% to 55%, the value for AlarmMin will be moved to 45% automatically. **⚠ NOTE:** If the setpoint is put to its lowest possible value (10%), the distance to AlarmMin is automatically reduced to 5 points, as otherwise the lowest possible value for AlarmMin (5%) would have been crossed. Once the difference came to rest at 5 points by this it will be kept there - even if you chose a higher value for the setpoint shortly after. With a setpoint chosen high enough, AlarmMin can of course be lowered again manually, though.

Press **Menu/Esc** to call up the menu, then press **↑** Up twice to move to the menu entry for the lower threshold value (AlarmMin). The display reads:



Fig. 10 - Display message in menu mode, 3rd menu entry.



4.4.3.1 Description/options

AlarmMin is the variable that can be altered with this menu entry; **45%** (example) is the currently set value of this variable (in %RH).

Press **Menu/Esc** once more to leave the menu mode without changing any values.

↑ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing **↑ Up** or **↓ Down**. No changes will be made to the AlarmMin value by doing so.

↵ indicates that this variable can be set by pressing **↵Enter**.

Press **↵Enter** to alter the value for AlarmMin (possible range: min. 10%; max. 5 points below the setpoint).

The two digits resembling the value on the display start to blink. Use the **↑ Up** and **↓ Down** buttons to make your changes, and confirm the new value with **↵Enter**. The value will not be stored as long as you do not press this button.

4.4.4 Menu entry AlarmBeep

With this entry you choose to be alarmed not only visually on the front panel of the EBC but also acoustically by a beeper that is built into the EBC (masters and slaves likewise). With an issued alarm and an activated beeper a clearly audible tone will be issued every three minutes by the EBC. The default setting for the acoustic alarm is "Off".

NOTE: The three minutes interval is constantly counted down in the background, even if no alarm is due. Therefore it can take up to three minutes before the beeper goes off for the first time after an alarm has been prompted visually via the LED and the display. You can test the alarm sound by activating it as described below and by then lifting the bottle up the upper water level sensor (turquoise plate), so that the water level in the bottle is above the sensor. Wait for up to three minutes to hear the sound.

Press **Menu/Esc** to call up the menu, then press **↑ Up** three times to move to the menu entry for the acoustic alarm (AlarmBeep). The display reads:



A l a r m B e e p O f f →

Fig. 11 - Display message in menu mode, 4th menu entry.



4.4.4.1 Description/options

AlarmBeep is the variable that can be altered with this menu entry; **Off** (example) is the currently set value of this variable.

Press **Menu/Esc** once more to leave the menu mode without changing any values.

↑ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing **↑ Up** or **↓ Down**. No changes will be made to the AlarmBeep value by doing so.

↵ indicates that this variable can be set by pressing **↵Enter**.

Press **↵Enter** to alter the value for AlarmBeep (possible values: Off, On). The letters resembling the value on the display start to blink. Use the **↑ Up** or **↓ Down** buttons to make your changes, and confirm the new value with **↵Enter**. The value will not be stored as long as you do not press this button.

4.4.5 Menu entry 1. Alarm

With this entry you define whether or not you want the EBC to delay its first humidity alarm (master units only). This function is useful i.e. for newly installed systems or after the doors of the controlled case have been opened for redecorations or the like. Default setting is "01D" (=one day, 24 hrs). At a set value of 00D the first humidity alarm will be issued after the usual delay of 30 minutes. This minimum delay is always kept for the EBCs to have some time for balancing the system air.

⚠ NOTE: If you intend to use this function and the EBC has possibly already issued a humidity alarm since it was last pulled from the mains connection, you should now turn the EBC off, wait for the completion of the possibly following pumping process, and then pull the mains plug. Wait for some minutes before plugging the EBC back on. Then continue as intended.

Press **Menu/Esc** to call up the menu, then press **↑ Up** four times to move to the menu entry for the delay of the first humidity alarm (1. Alarm). The display reads:



Fig. 12 - Display message in menu mode, 5th menu entry.

4.4.5.1 Description/options

1. Alarm is the variable that can be altered with this menu entry; **01D** (example) is the currently set value of



this variable (in Days).

Press **Menu/Esc** once more to leave the menu mode without changing any values.

↑ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing

↑ Up or **↓** Down. No changes will be made to the 1. Alarm value by doing so.

↵ indicates that this variable can be set by pressing **↵Enter**.

Press **↵Enter** to alter the value for 1. Alarm (possible range: 0 to 99 days). The digits resembling the value on the display start to blink. Use the **↑** Up or **↓** Down buttons to make your changes, and confirm the new value with **↵Enter**. The value will not be stored as long as you do not press this button.

4.4.6 Menu entry for the display and menu language

With this entry you choose the preferred display and menu language for the EBC (masters and slaves likewise). Default setting is "English" (might also be factory-set differently).

Press **Menu/Esc** to call up the menu, then press **↑** Up five times to move to the menu entry for the display and menu language. Depending on the set value the display will now issue one of these texts:

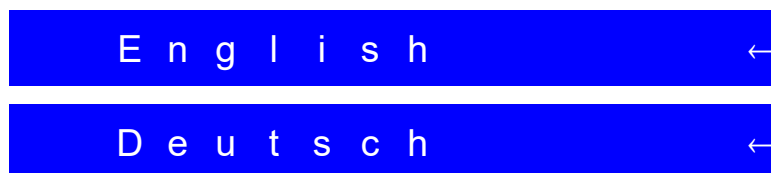


Fig. 13 - Possible display messages in menu mode, 6th menu entry.

4.4.6.1 Description/options

English or **Deutsch** is the currently set value of this variable.

Press **Menu/Esc** once more to leave the menu mode without changing any values.

↑ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing

↑ Up or **↓** Down. No changes will be made to the set language by doing so.

↵ indicates that this variable can be set by pressing **↵Enter**.

Press **↵Enter** to alter the menu language (possible values: English, German ("Deutsch")). The letters resembling the value on the display start to blink. Use the **↑** Up or **↓** Down buttons to make your changes, and confirm the new value with **↵Enter**. The value will not be stored as long as you do not press this button.



4.4.7 Menu entry t@Sensor

With this entry you can check for the present temperature (in °C) inside the case as measured from the RH/T sensor (possible with masters and slaves likewise - the value is always taken from the RH/T sensor in the case, thus identical).

Press **Menu/Esc** to call up the menu, then press **↑ Up** six times to move to the menu entry for the temperature at the RH/T sensor (t@Sensor). The display reads:



Fig. 14 - Display message in menu mode, 7th menu entry.

4.4.7.1 Description/options

t@Sensor is the variable that can be read out with this menu entry; **20°C** (example) is the currently present value of this variable.

Press **Menu/Esc** once more to leave the menu mode.

↑ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing **↑ Up** or **↓ Down**.

A missing **↔** symbol indicates that this is a read out menu entry, where no variables can be set.

4.4.8 Menu entry t@Eom

With this entry you can check for the present temperature (in °C) at the specific EBC's (master or slave) membrane.

Press **Menu/Esc** to call up the menu, then press **↑ Up** seven times to move to the menu entry for the temperature at the condenser (t@Eom). The display reads:



Fig. 15 - Display message in menu mode, 8th menu entry.



4.4.8.1 Description/options

t@Eom is the variable that can be read out with this menu entry; **35°C** (example) is the currently present value of this variable.

Press **Menu/Esc** once more to leave the menu mode.

⬆ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing **⬆ Up** or **⬇ Down**.

A missing **⬆** symbol indicates that this is a read out menu entry, where no variables can be set.

4.4.9 Menu entry **t@EBC**

With this entry you can check for the present temperature (in °C) at the specific EBC's (master or slave) internal electric circuit.

Press **Menu/Esc** to call up the menu, then press **⬆ Up** eight times to move to the menu entry for the temperature at the heat sink (**t@EBC**). The display reads:



Fig. 16 - Display message in menu mode, 9th menu entry.

4.4.9.1 Description/options

t@EBC is the variable that can be read out with this menu entry; **30°C** (example) is the currently present value of this variable.

Press **Menu/Esc** once more to leave the menu mode.

⬆ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing **⬆ Up** or **⬇ Down**.

A missing **⬆** symbol indicates that this is a read out menu entry, where no variables can be set.

4.4.10 Menu entry **OpHours**

With this entry you can check for the time (in hrs) your specific EBC (master or slave) has been in operation.

🔔 **NOTE:** Due to thorough test runs before delivery, even new units will have been in use for some hours.



Press **Menu/Esc** to call up the menu, then press **↑ Up** nine times to move to the menu entry for the hours of operation (OpHours). The display reads:

Fig. 17 - Display message in menu mode, 10th menu entry.

4.4.10.1 Description/options

OpHours is the variable that can be read out with this menu entry; **000200** (example) is the currently present value of this variable (in hrs).

Press **Menu/Esc** once more to leave the menu mode.

↑ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing **↑ Up** or **↓ Down**.

A missing **↵** symbol indicates that this is a read out menu entry, where no variables can be set.

4.4.11 Menu entry rH Corr

With this entry the EBC's interpretation of the data for the present RH value that is measured from the RH/T sensor can be corrected (master units only). This function is required for calibrating the system in case a metered (third party) instrument, which is positioned on the very same spot as the miniClima RH/T sensor, provides clearly different values than the EBC does (via its display). Default setting is "+00%" (=no correction of the signal).

⚠ NOTE: The value in the menu entry rH Corr can be altered on a slave unit, too, but this won't have any effect as long as this EBC is used as a slave. Once the unit is plugged to a RH/T sensor (and thus becomes a master), the EBC will use the last alteration for the interpretation of the incoming RH value, even if the alteration has been made during slave mode. You can check and alter the setting at any time.

Press **Menu/Esc** to call up the menu, then press **↑ Up** ten times to move to the menu entry for the correction of the RH value as it is measured in the case (rH Corr). The display reads:

Fig. 18 - Display message in menu mode, 11th menu entry.



4.4.11.1 Description/options

rH Corr is the variable that can be altered with this menu entry; **-01%** (example) is the currently set value of this variable (in %RH). This value will be added to or subtracted from the read out value that comes in from the RH/T sensor (i.e. 50%RH - 1%RH = 49%RH). Therefore, in the example the EBC will display and consider 49% to be the current relative humidity during normal operation.

Press **Menu/Esc** once more to leave the menu mode without changing any values.

↑ indicates that you can move up and down the menu to go to the next/previous menu entries by pressing **↑ Up** or **↓ Down**.

↵ indicates that this variable can be set by pressing **↵Enter**.

Press **↵Enter** to alter the value for rH Corr (possible range: -5 to +5%RH). The digits resembling the value on the display start to blink. Use the **↑ Up** or **↓ Down** buttons to make your changes, and confirm the new value with **↵Enter**. The value will not be stored as long as you do not press this button.

4.4.12 Menu entry Hyst.

With this entry you can set the value for the hysteresis (masters and slaves likewise). The hysteresis defines a setpoint range around the setpoint chosen in menu entry 1. At a setpoint of i.e. 50% and a hysteresis of i.e. 2% the EBC will delay switching between its modes of operation (humidification, being in range, dehumidification), so that for instance humidification will only start when the humidity level has fallen to 50-2=48%. On the other hand, dehumidification would only start once the humidity level has reached 50+2=52%. Altogether, the hysteresis helps in flattening the curve for the relative air humidity inside the case. As of Revision 2 all units out of series EBC10/11/12 offer this menu entry, enabling the user to choose a value from 1 to 4% for the hysteresis, rather than to have this value being fixed at 2%, as it was the case with all previous models of series EBC10/11/12. The factory-set value remains to be at "02%".

⚠ NOTE: Due to technical reasons the hysteresis has to be chosen for every single unit being part of a chain of EBCs. So, changing the hysteresis on the master unit does not change the respective setting in any of the slaves. Please do check the menu of all slaves, so that the different EBCs will not eventually work against each other.

Press (one after the other on all EBCs, starting with the Master) **Menu/Esc** to call up the menu, then press **↑ Up** eleven times to move to the menu entry for the hysteresis (Hyst.). The display reads:



Fig. 19 - Display message in menu mode, 12th menu entry.

4.4.12.1 Description/options

Hyst. is the variable that can be altered with this menu entry; **02%** (example) is the currently set value of this variable (in %RH).

Press **Menu/ESC** once more to leave the menu mode without changing any values.

↓ indicates that you can move down the menu to go to the previous menu entry by pressing **↓ Down**. No changes will be made to the rH Corr value by doing so.

↵ indicates that this variable can be set by pressing **↵Enter**.

Press **↵Enter** to alter the value for Hyst. (possible range: 1-4%). The digits resembling the value on the display start to blink. Use the **↑ Up** or **↓ Down** buttons to make your changes, and confirm the new value with **↵Enter**. The value will not be stored as long as you do not press this button.

4.5 Procedures during operation

During normal operation every EBC (master or slave) always displays the currently present humidity level (in %RH) and whether this level is in range (=setpoint plus/minus hysteresis) or not. If not, the display prompts the kind of process that is currently activated in order to approach the setpoint (humidification or dehumidification) - see Fig. 6 and Fig. 7 (p. 17). Slave units additionally prompt a rightwards arrow in the display (leftmost symbol), in order to be immediately recognised as working in slave mode.

The LED on the front plate is on and gleaming green, signalling that the system works properly. The changeover contacts for your (possibly installed) external status display devices are both switched ("make contact"; cp. Table 1, p. 16) according to the EBC's status of being switched on and having not issued any alarm. During all times the intern fan for the circulation of the air between EBC and case is running with a silent buzz.

When the EBC changes its status, it stops its circulation fan, arranges its internal flaps to force the internal air-stream to pass the membrane on the appropriate side and starts its circulation fan again. This is done by electric motors that can be heard for some seconds. While in one of the states dehumidifying or humidifying a second fan is running to exchange the air on the other side of the membrane with the outside air to balance the differing humidity level. The air is sucked to the inside of the EBC on one of the unit's sides through air



grill(s) and filter-pads of filter-class F6. The air is blown out of the EBC on the same side through air grill(s) and filter-pads of filter-class F3. Those air grills have to be kept clean and an edge distance of about 1cm shall be left.

NOTE: In case of a power outage (or when the mains connection has been cut in any other way), the EBC will always return to the last mode it had been working in (Stand-by or humidity control) as soon as the power supply becomes reestablished. Also, all settings that had been taken on the EBC will remain intact despite of any power outage.

5 ALARMS - WHAT THEY MEAN AND HOW TO REACT

miniClima Constant Humidity Devices are equipped with several alarms that go off when an intervention by the user is needed. In the event of an alarm the EBC's LED turns red and the display provides immediate information about the kind of problem. Additionally any alarm switches the potential-free contact for the external display of the alarm status (see section 3.2.4 "Wirings for the external signals (Composite error alarm and on-off status)" on p. 14. Pushing the **On-Off/Reset** button next to the LED shortly resets the alarms according to the rules provided in Table 1 (p. 16).

5.1 Humidity alarm



Fig. 20 - Display message for the humidity alarm. The digits highlighted in red blink. The words "Humidity" and "ALARM" light up rotationally.

5.1.1 Description of the alarm

This alarm does not necessarily point to any sort of malfunction, but first of all provides the user with the information that the desired humidity level has not (yet) been reached. The EBC will continue with its work uninterrupted. The alarm appears when the actual RH value inside the case remains for at least 30 minutes beyond one of the predefined thresholds (see sections 4.4.2 "Menu entry AlarmMax" on p. 20 and 4.4.3 "Menu entry AlarmMin" on p. 21).

NOTE: In case the mains connection has recently been pulled (i.e. newly installed EBCs, power outage,...), the humidity level inside your case might not have been in range over a longer period of time than



those 30 minutes. It might in fact have been outside that range for up to the time span set in the menu for the first humidity alarm, instead (see section 4.4.5 "Menu entry 1. Alarm", p. 23).

5.1.2 Remaining EBC functions during this alarm

- ✓ Humidify: Yes
- ✓ Dehumidify: Yes
- ✓ Air circulation between case and EBC: Yes
- ✓ Slave control: Yes

5.1.3 Possible reasons and solutions

- ✓ Absence of ventilation for the device's self-produced heat. Check the filter(s) at the ventilation air inlet(s) - it/they might need cleaning or replacement (see section 7 "Maintenance and care", p. 37). Keep the device's ventilation air grills/slits always free and provide for enough ventilation at the device's place of installation! Beware that the EBC might overheat otherwise! See also section 3.1 "Setting up the EBC, establishing the hosepipe connections", p. 9.
- ✓ Case doors are open or have recently been open (i.e. for works within the case). Reset the alarm and let the system balance for some more time. See also section 4.4.5 "Menu entry 1. Alarm" on p. 23.
- ✓ The alarm delay is chosen too short for the concrete system (i.e. due to exceptionally humid artefacts). Reset the alarm and let the system balance for some more time. See also section 4.4.5 "Menu entry 1. Alarm" on p. 23.
- ✓ Inappropriate application/installation/handling of the device, especially regarding airtight hosepipe connections, an airtight lead-through of the sensor cable through the case wall and the position of the sensor in the case. Please read the manual again section by section and check/change the realised application/installation/handling.
- ✓ Broken case sealing/unqualified case. Please get in touch with the manufacturer/distributor of your case.
- ✓ Chosen setpoint is too ambitious - see section 9 "Technical data", p. 41.
- ✓ Due general service or faulty device - see section 7 "Maintenance and care", p. 37.



5.2 Flaps alarm



Fig. 21 - Display message for the flaps alarm. The words "Flaps" and "ALARM" light up rotationally.

5.2.1 Description of the alarm

The EBC's system for adjusting the internal air-stream is troubled or broken. The EBC stops all activities until the alarm gets reset manually.

5.2.2 Remaining EBC functions during this alarm

- ✓ Humidify: No
- ✓ Dehumidify: No
- ✓ Air circulation between case and EBC: No
- ✓ Slave control: Yes (succeeding slaves continue to work normally - includ. humidification and dehumidification)

5.2.3 Possible reasons and solutions

Please investigate in the outlined order:

- 1) At first try whether resetting (short push on **On-Off/Reset**) resolves the problem lastingly. If not continue as follows.
- 2) Turn the EBC off (by pushing and holding **On-Off/Reset** for about a second). Slaves are switched automatically with their master. (⚡ **IMPORTANT**) Pull the mains plug.
- 3) Plug the EBC back on and restart it. If the error reappears, the EBC needs to be sent in - see section 8 "Deinstalling / packing up / storing / shipping" on p. 39.



5.3 EomTemp alarm



Fig. 22 - Display message for the bottle alarm. The words "Bottle" and "ALARM" light up rotationally.

5.3.1 Description of the alarm

The temperature around the membrane is at least 45°C. This may harm the membrane, therefore the membrane is switched off until the temperature falls to 43°C or the alarm is reset manually.

5.3.2 Remaining EBC functions during this alarm

- ✓ Humidify: No
- ✓ Dehumidify: No
- ✓ Air circulation between case and EBC: Yes
- ✓ Slave control: Yes

5.3.3 Possible reasons and solutions

Please investigate in the outlined order:

- 1) Absence of ventilation for the device's self-produced heat. Check the filter(s) at the air inlet(s) - it/they might need cleaning or replacement (see section 7 "Maintenance and care", p. 37). Keep the device's air grills/slits always free and provide for enough ventilation at the device's place of installation! Beware that the EBC might overheat otherwise! See also section 3.1 "Setting up the EBC, establishing the hosepipe connections", p. 9.
- 2) If neither of the above helps, do get in touch to discuss the next steps.

5.4 Signal error alarm



S i g n a l E R R O R

Fig. 23 - Display message for the signal error alarm.

5.4.1 Description of the alarm

The unit in question receives no or a too weak signal from the RH/T sensor (if it's a masters) or from the foregoing EBC (if it's a slave) for its operations.

5.4.2 Remaining EBC functions during this alarm

- ✓ Humidify: No
- ✓ Dehumidify: No
- ✓ Air circulation between case and EBC: Yes
- ✓ Slave control: No

5.4.3 Possible reasons and solutions

⚡ **NOTE:** If the measured humidity inside the case reaches 5%RH or 95%RH respectively, the EBC master unit interprets this signal as being incorrect and issues the signal error alarm. In consequence the EBC stops conditioning the air and will only continue once the measured value comes back to the permissible range again (see section 9 "Technical data" on p. 41). This is not a failure, but an intended safety reaction programmed into the EBC, as with humidity levels measured to be so extreme, it is anticipated that the sensor is actually broken, delivering false values.

For master units issuing the alarm: the controller does not receive a correct or any signal from the RH/T sensor. If the actual humidity level in the case is not beyond the permissible values (see above), continue as follows (investigating in the outlined order):

- 1) Check the cable, the RJ45 plug on the front of the EBC and whether it is plugged to the correct jack (Sensor & Control in).
- 2) If all seems to be in order, check the sensor inside the case for any obvious flaws (damages on the cable, damages on the sensor housing or on the sensor chip that juts out on the end of the housing,...).
- 3) If you have a spare miniClima RH/T sensor (of the same kind) at hand (i.e. from other installations), try if the alarm goes away with another sensor plugged on (not forgetting to turn off, to wait for the possible



pumping process to be finished and to pull the mains before handling any sensor cables). If the alarm goes away with another sensor, do get in touch to receive a replacement.

- 4) If the alarm remains/comes again even with a second miniClima sensor, and in those cases where a second sensor is not at hand for this test at all, do please get in touch to discuss the next steps.

On EBCs in slave mode, the controller does not receive a correct or any signal from the foregoing unit (the master or another slave in the chain). If the foregoing unit does not issue any alarm, continue as follows (investigating in the outlined order):

🔧 **NOTE:** Always treat the first unit of a chain of EBCs that issues an alarm first.

- 1) See whether the foregoing master and/or the foregoing slave(s) are turned on and if yes, whether any of them issues an alarm, too (in which case this unit, that is to say: the very first in the line, that issues an alarm, has to be examined first).
- 2) Check the cable connection between the affected EBC and the foregoing one, check both RJ45 plugs and whether they are plugged to the correct jacks: **Sensor & Control in** on the affected unit, **Control out** on the foregoing one.
- 3) If all seems to be in order, you might need to replace the cable. Do get in touch or try replacing the control line with a common category-5e patch cable, twisted pair/non-crossed, with RJ45 plugs on either end. Please do take off the ferrite cores from the original cable and use them with the new cable. Please do also remember the necessity to turn the chain of EBCs off (via the master unit), to wait for the possible pumping processes to be finished and to pull the mains of the affected units before handling a control line.
- 4) If a new cable doesn't help get in touch to discuss the next steps.

6 TROUBLESHOOTING

6.1 The unit stops dehumidifying before it reaches the setpoint

At certain conditions and a setpoint of 50%RH or less, it might become necessary to choose the setpoint even lower than required. The EBC tries to slow down its work before it reaches the setpoint, so that it won't overshoot the desired value. Especially at low setpoints this can lead to a situation where the setpoint is actually constantly missed disregarding the fact that the EBC could easily do it. Choose a setpoint somewhat beneath your desired value and see whether the sought condition in the case will now be met.



6.2 The desired humidity level is not reached at all

Please read the comments on the humidity alarm (p. 30ff).

6.3 The humidity level displayed on the EBC is different to the one of a third party instrument that has been put inside the case

Please do only use metered instruments to verify the humidity level measured by the EBC. Third party instruments for measuring/verifying the humidity level might display different levels when positioned differently (not exposed to the very same conditions). Also the accuracy of all used sensors (even metered ones) has to be taken into account. Please, mind that measuring the relative humidity is never 100% accurate. If you still feel the miniClima sensor gives out false values, consider using the correction menu on the EBC front (see section 4.4.11 "Menu entry rH Corr" on page 27) or give us a call.

6.4 A red LED lights up on the front panel

The unit displays an alarm. Note the kind of the alarm (display messages) and turn to p. 30ff (section 5 "Alarms - what they mean and how to react") for further investigation.

6.5 When pulling or plugging in the sensor cable or the control line the EBC reacts in an unexpected way

Never plug or unplug a sensor or control line during operation. Your EBC can become seriously damaged through electrostatic discharges. Always turn all interconnected units off (via the master), wait for the completion of the possibly following pump process and pull their mains connections before pulling or plugging in those signal cables.

6.6 The device won't react in any sort of way anymore, neither the LED nor the display are on, despite of the device being plugged on correctly

Possible sources of error: A broken power supply or mains connection cable (please verify by using a different (known to be working) cable with the affected EBC); a broken or non-powered socket outlet (please verify by using a different (known to be working) socket outlet). If neither of the above applies and your EBC still won't react, the EBC needs to be sent in for inspection/repair (see section 8 "Deinstalling / packing up / storing / shipping" on p. 39).

7 MAINTENANCE AND CARE

7.1 Replacing the chip of the RH/T sensor

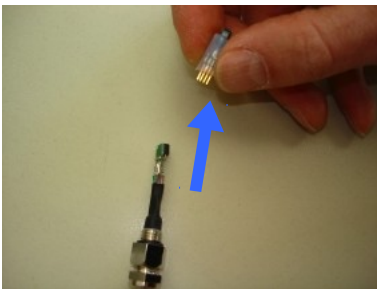
Even if it happens rarely, it might one day become necessary to replace the sensing part of the RH/T sensor (hereinafter referred to as "chip")⁶. To do so, neither the housing, nor the cable, nor other parts need to be dismantled, just the chip itself.

At first, please do turn the EBC off and pull the mains plug once the possible pump process has been finished. Then continue as outlined:

- 1) Unscrew the plastic part of the housing:



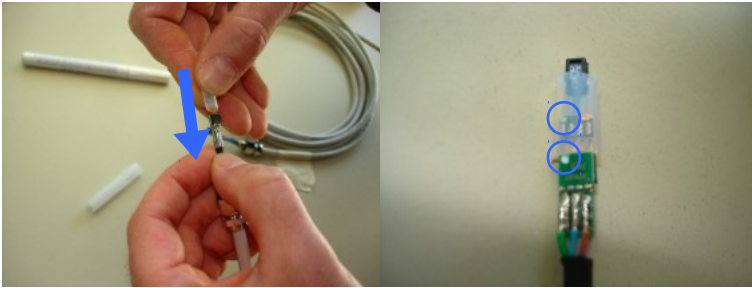
- 2) Pull the old chip off⁷:



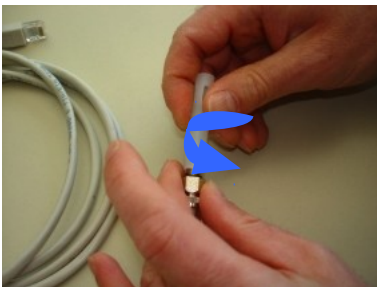
- 3) Push the new chip cautiously onto the socket. **⚠ IMPORTANT:** Note the markings for the correct polarity - a white dot on both the chip and socket. The two white dots have to be on the same position and side (see the blue circles in the picture below):

⁶ A new chip can be ordered via your EBC supplier or directly with us.

⁷ Please do put the old chip in a padded envelope (along with your contact data, the S/N and/or type number of your EBC, as well as with a brief description of the reason for the exchange) and return it to our address.



4) Screw the plastic part of the housing back on:

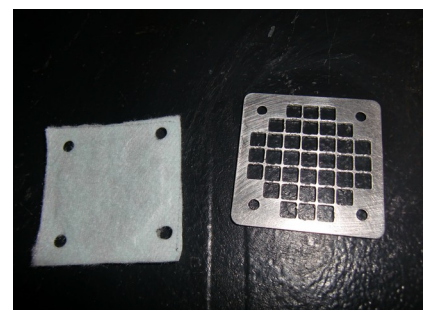


5) Once done, you can set your EBC back to work.

7.2 Filter-pads for air in-/outlets

Dust on the ventilation air grill(s) blocks the airflow, which might in consequence overheat the device and/or reduce its dehumidification capacity. Therefore, and depending on the condition of the surrounding air, the air inlets on the sides have to be checked/cleaned regularly: Vacuum clean the mounted grill(s) from the outside regularly. From time to time you should take the filter(s) out for replacing it/them:

- 1) Turn the EBC off by pushing and holding **On-Off/Reset** for about a second. Slaves are switched automatically with their master. Then (**! IMPORTANT**) pull the mains plug.
- 2) Unscrew the respective grill, take out the filter, and replace it with a new one.





- 3) Put the new filter back on its place and fix the grill on the device again.
- 4) Plug the mains back on and put the EBC back to work.

Finally, do check regularly whether adequate ventilation is still given at the device's place of installation (see section 3.1 "Setting up the EBC, establishing the hosepipe connections", p. 9).

7.3 General service

A general service of the device carried out by the manufacturer is recommended after 25,000 hours of operation (equals approx. three years when permanently in use; see section 4.4.10 "Menu entry OpHours" on p. 26 to see how to check for the hours of operation your EBC has been in use so far). Please contact us to make an appointment (see page header). Please also read and follow the instructions on how to deinstall, pack up, and store the device below.

8 DEINSTALLING / PACKING UP / STORING / SHIPPING

⚠ NOTE: If the device in question is to be shipped for service/repair, it is enough to send the EBC alone - all other parts and installations (hosepipes, case-sided hosepipe fittings, RH/T sensors with their cables and plugs, control lines, 6pin plug-in connectors, RS232 cables, Serial2USB adapters includ. cables, mains connection cables, optional accessories) can stay in place.

- 1) Turn the EBC off (by pushing and holding **On-Off/Reset** for about a second). Slaves are switched automatically with their master.
- 2) Pull the mains plug off the socket outlet, then pull the mains plug from the mains connection on the backside of the device.
- 3) Loosen the hook-and-loop-fastener that fixes the bottle and pull the silicone pipe out of the bottle.
- 4) Pull all cables from the front plate of the EBC and dismantle the hosepipes on the backside. If the device is not going to be packed dust/particle protected as a whole, use rubber bands to fix small pieces of foil for covering the openings of the adapters.
- 5) Pack up and store/ship the device in a way that protects it against external hazards. Do label every parcel plainly visible as being "Fragile".

⚠ IMPORTANT: If the device in question has been in use on showcases and/or objects containing hazardous

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Firmenbuchnummer | Trade Register Number: 267137z (Landesgericht | Regional Court of Wiener Neustadt)

substances - in particular but not limited to Asbestos - do not send in this device prior to informing us on the matter in detail. We will require exact information on the kind of dangers we might be exposed to and on how to effectively protect us. Mind that for service and repair, your EBC is going to be dismantled completely and that all air and water handling parts will usually lay open in our hands. Furthermore, please do not at all send in units that have been exposed to a relevant level of radioactivity.

⚠ **IMPORTANT:** An EBC has to be stored in a non-condensing environment at max./min. 5-35°C, 15-80%RH. The RH/T sensors need a non-condensing environment at max./min. 10-50°C, 20-60%RH when being stored.

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9 TECHNICAL DATA

9.1 Figures

	EBCeasy
Recommended max. volume of the case (per connected EBC) ⁸	0,5m ³
Exemplarily equivalent achievable min. dehumidification capacity at ambient conditions of 25°C, 50%RH ^{1,9}	1,0g/h
Exemplarily equivalent achievable min. humidification capacity at ambient conditions of 25°C, 50%RH ^{1,2}	1,0g/h
Exemplarily achievable setpoint range at ambient conditions of 22°C, 50%RH ^{1,10}	30-75%RH
Theoretical (adjustable) setpoint range	10-85%RH
Permissible highest value for the rel. humidity inside the case (the EBC issues a signal error if beyond)	94%RH
Permissible lowest value for the rel. humidity inside the case (the EBC issues a signal error if beyond)	6%RH
Airflow at the air inlet of the case ^{1,11}	3,00m/s
Permissible ambient conditions for operation and storage of an EBC ¹²	5-30°C, 15-80%RH, non-condensing
Permissible ambient conditions for the storage of the RH/T sensor	10-50°C, 20-60%RH, non-condensing
Tolerance ^{1,13} - at a setpoint of 30%RH	typically achievable +/-2%RH, max. +/-3%RH
- at a setpoint of 75%RH	typically achievable +/-3%RH, max. +/-5%RH
System voltage	12VDC
Power consumption	max. 24W
Weight (device without accessories, bottle, hosepipes or cables etc)	5,5kg
Max. noise emission - free-standing, measured from 1m	tbd
- built-in, measured from 1m	tbd
Housing material and colour	coated steel sheet (1.5mm), pigeon-blue (RAL5014)

9.2 Dimensions

EBCeasy	
<i>Width (mm)</i>	
EBC	205
Required space	215
<i>Height (mm)</i>	
EBC	133,50
Required space	133,50
<i>Depth (mm)</i>	
EBC (includ. hosepipe connectors & screws)	335,00
Space for hosepipes (back), plugs & cables (front)	105
Required space	440,00

⁸ Approximately.

⁹ Condensed/evaporated water in equivalent grammes per hour. Used build up for the tests: EBCs with respective standard accessories and standard lengths for the hosepipes.

¹⁰ The actual setpoint range in a given specific situation can be both bigger and smaller, as it depends on a variety of further variables - additionally to the ambient conditions (such as the kind of materials stored in the case or the quality of the case sealing etc).

¹¹ At typical installations using the hosepipe lengths that are usually delivered (3m) and without any other accessories that may have an impact on the airflow, like air filters FLT.

¹² Applies to the conditions generally obligatory for operation or damage-free storage, but not to the conditions were the full capacity with respect to the achievable setpoint range is given.

¹³ The tolerance rises with the chosen setpoint.

Applies analogously to the individual products of type EBCeasy. As of 31.10.2016. Subject to modification.