PC-090 Ambient Heater User Manual

Version 1.0

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1. Short description:

PC-090 is ambient heater equipment. It is intended for heating ambient air in small indoor air volumes, as bird cages, pet houses etc.

Device is equipped with 90W heater and a temperature/humidity sensor for measuring and control of ambient temperature. Temperature control range can be set from +10°C up to +40 °C. Ambient humidity measurement is made only for giving information for user, ambient humidity control is not possible with device.

Device is usable only for heating ambient temperature and/or circulating air, cooling function is not integrated. The efficiency of heating is dependent of internal volume, structure and air circulation characteristics of heated ambient. For bigger volumes with wrong structure may occur that higher set point temperatures can not be reached.

The required ambient temperature, fan speed (in non-heating mode) and display backlight can be set. Settings can be made in Menu mode using touch-type buttons. Adjusted parameters are stored in the memory of device. The actual adjusted parameters are retained after switching off and reads when user are going to switch on the device next time.

The controller is equiped with socket for connecting user lighting devices (LED lamps, LED-strips etc.). The output is +12V DC voltage, the available power is up to 1.8W. This source is primarily intended for driving LED light sources, but can be used for driving other equipments which use 12 V DC up to 1.8W power rating. The +12 V output is protected with blow-out type fuse.

The device is equiped with 2-line alphanumeric LCD display, with orange background. The measured temperature, humidity and other parameters can be seen using LCD display.

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2. Technical Specifications:

Power:	220-240 V AC/50 Hz 100 VA
Heating power:	90W
Output:	+12V DC max. 150 mA (max. 1.8W)
Ambient temperature (outer surface):	0...+30 °C
Ambient humidity (outer surface):	10...90% RH
Measurement range:	
Temperature:	0…+50°C

Humidity:	0…100% RH
Temperature control range (inner surface):	+20…+40 °C
Heating power control range:	0…100% (automatic)
Fan speed adjust range:	50…100%
Display backlight adjust range:	10…100%
Mounting direction:	horizontal/vertical
Dimension:	126x126x110 mm
Weight:	1.5 kg
Fuses:	
Fuse 220-240 V AC:	T 630 mA Slow blow (5x20 mm)
Fuse +12 V DC:	T 160 mA Slow blow (5x20 mm)

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3. Detailed description:

Modes of operation:
The controller can work in two operation modes.

1) Control mode:

After switching on the device is in control mode. It measures temperature and humidity and sets output power according to temperature difference between measured temperature and temperature set by user (set point). If the temperature set point is higher than actual temperature then controller turns on the heater and transmits heat using air circulation. If the measured temperature reaches the temperature set point then the controller lowers output power all the way down to zero.
If the actual temperature is higher than the temperature set point, the heater is switched off.
The measured temperature, relative humidity, temperature set point and the output power can be seen on display.

Warning: When the actual temperature is lower then set point and heater power is on the fan works on maximum (100%) speed. This is necessary to reach the maximum transfer of heat into ambient air and to avoid overheating of device. The fan sets to user pre set speed if measured temperature is higher than set point (and heater power is zero) or measured temperature is in narrow range around set point (aprox. +/-1 °C).

2) Menu mode:

In this mode the user are able to set the temperature set point, the fan speed (in non-heating mode) and the brightness of display background. The detailed description and usage of Menu mode can de found below, in Chapter 4.

4. Installation and usage:

Installation:

Unpack the device.

The content of package is:
- PC-090 temperature controller device
- Temperature/humidity sensor with cable
- This user manual

To proper install the device, the **109x109 mm** cut out must be made on wall of bird cage, pet house etc. according to picture (Figure 1).

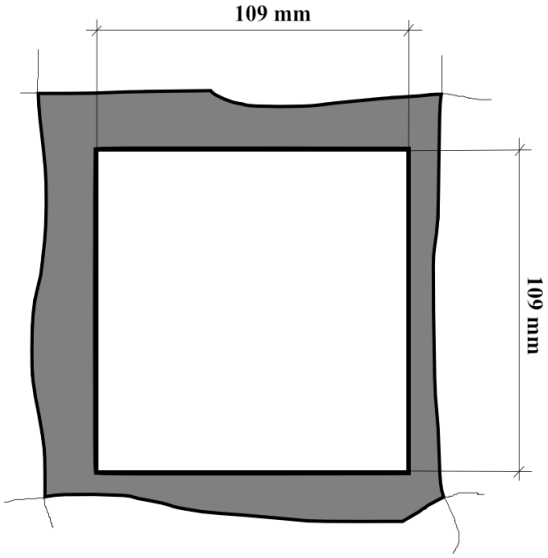


Figure 1: Cut out

The installation direction can be horizontal or vertical (Figure 2). The top side(face) of device can be directed up or side look (downside is prohibited). If cut out is made put the device into cut out. The upper face area of device is on outside surface of wall. The air ventillation area of device is inside the cage or housing (Figure 2). If necessary put little amount of Silicone addhesive onto the corners of cut out before putting in the device.

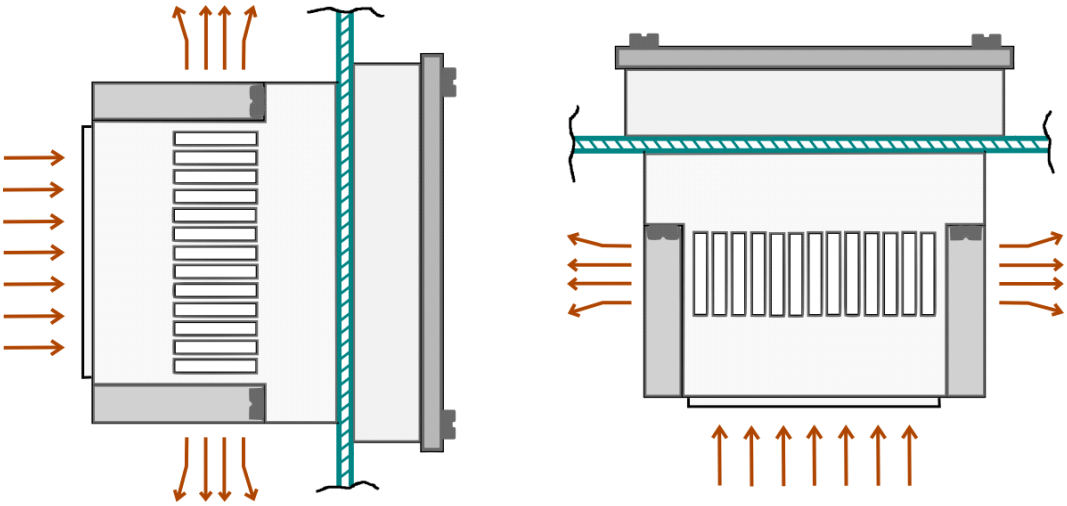


Figure 2: Mounting directions

Warning: The lower surface and side surfaces of device must be **minimum 10cm** far from

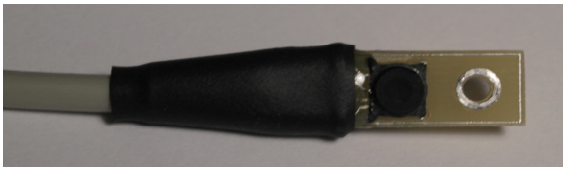
any other surface,wall in cage (box etc.), to secure the correct and **efficient circulation of warm air**! The air circulation is made into/out-from (across) this surfaces (down-air in, side-air out).

Position of sensor:

Important: The temperature control is made using temperature value measured by the sensor! The proper position of temperature/humidity sensor, and its active surface is very important.

The sensor must be fixed somewhere **in the air circulation path**, if possible **not far as 0.5 m** from air ventillation source. If sensor is fixed somewhere far away from outflowing warm air or fixed somewhere in some isolated corner , the temperature control can be very difficult, and there will be unwanted significant temperature difference between sensor air environment and other air areas near controller.

The sensor must not be covered to proper measure the temperature. The sensor is protected from dust and splash water with protective cap. During maintenance the dust and other contamination can be removed from active area of sensor cover with brush or dry cloth. The active area of sensor is behind the round black surface on sensor cover.



The hole on the upper side of sensor is made to help fixing the sensor on sidewall or other surface of cage or box. Use this hole and some screw or use some kind of clamp or tie to fix or hang the sensor. Do not fix on lower (ground) surface. Fix or hang sensor in vertical direction with sensor area looking sideways (Figure 3), if possible toward the outgoing air circulation.

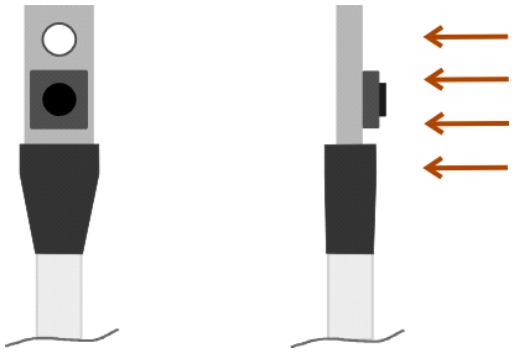


Figure 3: Sensor mounting

Connect the sensor cable onto the socket on downside of device (Figure 4).

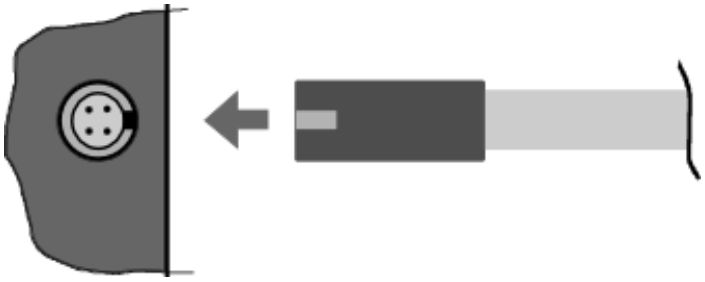


Figure 4: Connecting sensor cable

Connect the +12V DC device :

To use +12 V DC source and sink current from device to power LED light sources or other equipments use standard 2,5mm DC Barrel plug (Figure 5). The positive pole of plug is on internal connection, the negative pole is on external connection (Figure 5). The +12V DC output is not switched. If user do not want to use this source, simply unplug the DC Barrel plug.

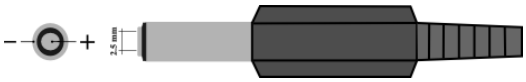


Figure 5: DC Plug polarity

Warning: Avoid making short circuit on this output. Check connected external equipment and DC plug before connect it to DC socket. The output is protected by blow-out type fuse. If +12V not appears on output and external device, LED lamp etc. is not working check the proper connection, proper polarity or check the fuse. If fuse replacement is necessary use fuses defined in Technical Specifications chapter (Chapter 2.).

Power On device :

Connect the device main cable into AC outlet.

Power On the device.

After short initialisation the user can read the actual temperature and humidity, temperature setpoint and output power (percent) on display.

The default (manufacturing) setting for parameters are:
-Temperature setpoint is set to +20°C
-Fan speed is set to 100%

-Display backlight brightness is set to 100%

To change default parameters user have to enter into Menu mode to change parameters and set required temperature set point.

Using Menu settings:

By entering into Menu mode measurement and temperature control is disabled , the heater power is set to zero. The fan speed remains unchanged. The temperature measurement/control continues after exiting the Menu mode.

In Menu mode the user can set 3 parameters:
- Temperature set point
- Fan speed in non-heating mode
- Display backlight brightness

In Addition maximum temperature setpoint can be set in Advanced Menu mode.

To enter Menu mode and made settings:
1) Touch **MINUS** and **SET/STORE** buttons at the same time and do not touch **PLUS** button.

2) Wait aprox. 3 sec.

3) The temperature setting message appears on display

4) Untouch the buttons

5) To set temperature use **PLUS** or **MINUS** button. The setting can be made in +/-0.1 °C steps.
If **PLUS** or **MINUS** is pressed continually for 10 steps then step jumps to +/-1 °C decrements/increments to speed up settings. If user want to jump back to +/-0.1 °C simply untouch the button(s), wait little and continue settings by touching **PLUS** or **MINUS** button.

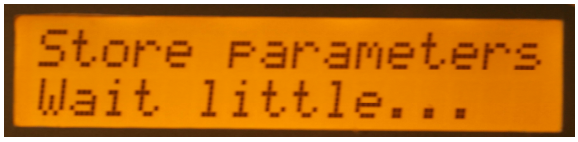
6) If proper temperature is set untouch the **PLUS** or **MINUS** button and touch the **SET/STORE** button. The next menu point, fan speed setting message appears on display. Untouch the **SET/STORE** button to set fan speed using **PLUS** or **MINUS** button. To skip this menu point wait little and touch again **SET/STORE** button.

7) Set fan speed with **PLU**S or **MINUS** button. The speed settings are performed imediately and fan speed changing can be audible.

8) If proper fan speed is set untouch the **PLUS** or **MINUS** button and touch the **SET/STORE** button. The next menu point, backlight brightness setting message appears on display. Untouch the **SET/STORE** button to set display backlight brightness using **PLUS** or **MINUS** button. To skip this menu point wait little and touch again **SET/STORE** button.

9) Set display backlight brightness with **PLUS** or **MINUS** button. The settings are performed imediately and display backlight brightness changing can be visible on display.

10) If display backlight brightness is set untouch the **PLUS** or **MINUS** button and touch the **SET/STORE** button.
The next screen appears on display for aprox. 2sec. ('Store parameters..Wait little' etc.), in meantime device stores adjusted parameters into memory.



After 2 sec. the device exits Menu mode, the standard measurement/control display screen appears on display and device continues in Control mode, performing temperature measurement and control.

To enter Advanced Menu mode and made settings:

1) Touch **PLUS** and **SET/STORE** buttons at the same time and do not touch **MINUS** button.

2) Wait aprox. 3 sec.

3) The temperature max. point setting message appears on display

4) Untouch the buttons

5) To set max. temperature setpoint use **PLUS** or **MINUS** button. The setting can be made in +/-1 °C steps, in the range +35°…+40°C.

6) If proper max. temperature setpoint is set untouch the **PLUS** or **MINUS** button and touch the **SET/STORE** button.

The next screen appears on display for aprox. 2sec. (’Store parameters..Wait little’ etc.), in meantime device stores adjusted parameters into memory. Next time, when temperature setpoint adjust will be performed in Menu mode, the max. setpoint will be the temperature adjusted in Advanced Menu mode.

After 2 sec. the device exits Advanced Menu mode, the standard measurement/control display screen appears on display and device continues in Control mode, performing temperature measurement and control.

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5. Maintenance:

During maintenance the device must be switched off and main plug must be removed from AC outlet.

The upper surface of device can be cleaned using wet and dry cloth. Use brush to remove dust and other contamination from air ventillation surfaces. The active surface of sensor cap can be cleaned with brush and dry cloth. The upper surface of sensor cap is waterproof and breathable laminate. Care must be taken not to damage this surface of sensor cap during maintenance and cleaning and also not to seal the laminate.

6. Warnings:

It is prohibited to:

- Immerse device or sensor into water or other liquid!

- Splash water or other liquid on device!

- Cover any surface of device!

- Cover the active surface of sensor!

- Open, reassemble the device!

- Touch any inner components of device thru the air ventillation slots!

- Power the device with main voltage different than specified in technical specification!

- Use different fuses than specified!

- Use device outdoor!