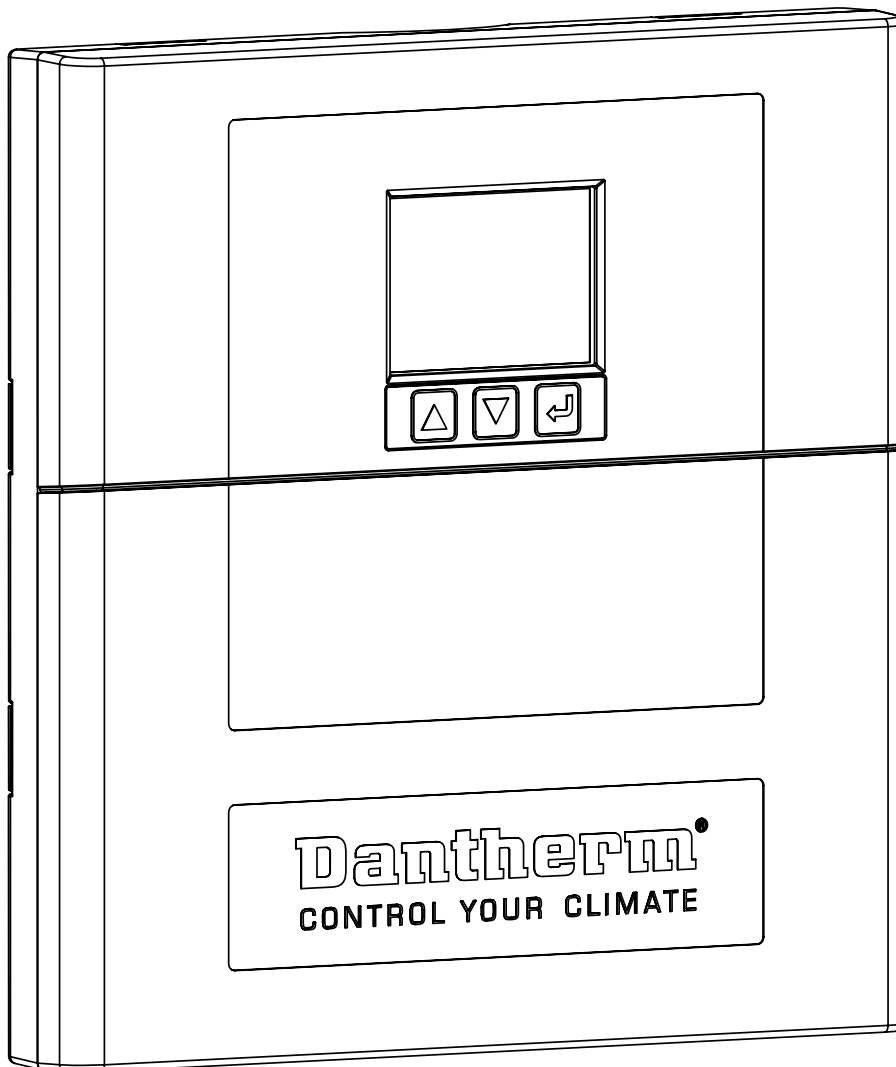




# SERVICE MANUAL

CC 3000 controller





## Introduction

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## About this manual

**Target group** This document is a technical user manual for the CC 3000 free cooling controller intended for trained personnel only.




### Abbreviations in this manual

This manual uses the following abbreviations for ventilation terminologies.

Abb.	Description
GUI/ UI	Graphical User Interface / User Interface
NO/NC	Normally opened (NO) <ul style="list-style-type: none"> <li>a contact that does not flow current in its normal state. Switching it on will close the contact, causing it to allow current flow.</li> </ul> Normally closed (NC) <ul style="list-style-type: none"> <li>a contact that does flow current in its normal state. Switching it on will open the contact and disconnect the flow.</li> </ul>
NOC	Network Operation Center
SELV	Safety Extra Low Voltage
SNMP	Simple Network Management Protocol is an internet standard protocol for collecting and organizing information about devices on IP networks and for modifying that information to change device behaviour.
TCP/IP	Transmission Control Protocol/ Internet Protocol
TTL link	Hardware interface based on the electrical properties of TTL (Transistor-Transistor Logic)

### Symbols in this manual

Following symbols are used in this manual in order to draw attention to danger risks and additional information of high relevance.

Symbols used	
 <b>WARNING</b>	This symbol in connection with the word "Warning" warns of a risk involving severe injury.
 <b>CAUTION</b>	This symbol in connection with the word "Caution" warns of a risk of minor or moderate injury and material damage.
 <b>NOTICE</b>	In connection with this symbol you will find further tips and information concerning the use of the device.

Warning and caution symbols are described in the following way:



#### Type and source of hazard

Further elaboration, if relevant.

- Measures to avert danger or immediate measures if the risk occurs are described in this way

### Copyright

Copying of this service manual, or part of it, is forbidden without prior written permission from Dantherm.

### Reservations

Dantherm reserves the right to make changes and improvements to the product and the service manual at any time without prior notice or obligation.

### Recycling

This unit is designed for long term durability. When total lifetime ends, the unit should be recycled according to national rules and with high environmental protection considerations.

## Safety



**Safety precautions** It is important to acknowledge the correct operating procedures for the free cooling unit and all of its safety precautions. Dantherm accepts no liability with regards to loss of business or personal injury as a consequence of failing to abide by safety procedures. Read the entire manual before using the controller.



**CAUTION**

### **Risk of damaging equipment and human injuries**

- Digital inputs must be connected to potential free contacts only (internal 12V pull up)
  - Do NOT connect 230VAC or 48VDC
  - Comply to SELV (Safety Extra Low Voltage) safe level.
- Alarm outputs are potential free contacts (connect max. 60V DC / 100mA)
  - Do NOT connect 230 VAC on alarm output
  - Comply to SELV (Safety Extra Low Voltage) safe level.

## Declaration of Conformity

---

Dantherm hereby, declare that the unit mentioned below:

No.: 091210 Type: CC 3000

- complies with the following directives:

2014/35/EU Low Voltage Directive

2014/30/EU EMC Directive

2011/65/EU RoHS Directive (Restriction of hazardous substances)

- and is manufactured in compliance with the following harmonized standards:

EN 60950-1:2006 Information technology equipment - Safety - Part 1

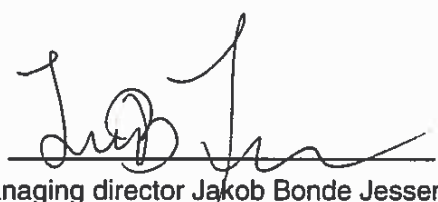
EN 61000-6-2:2019 Electromagnetic compatibility (EMC). Generic standards. Immunity standard for industrial environments

EN 61000-6-3:2007 Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

Skive, 12.08.2019



Product manager



Managing director Jakob Bonde Jessen

## Product description

### Overall description

#### Function description

The CC 3000 is designed as a single board controller, including all connections needed to support free cooling products with or without additional air conditioner. The CC3000 controller is enclosed in a special designed plastic casing, with UL rating 94-V0, dedicated for wall mount. Embedded micro controller is a 32 bit Cortex M3 core.

The CC 3000 controller supports basic temperature and relative humidity control in enclosures - always attempting to minimize energy consumption.

The controller is able to operate following equipment simultaneously:

- two free cooling units
- two motorized exhaust dampers/TC damper
- two AC/DC air conditioners (via 0-24 V DC output)
- one heater (via another 0-24 V DC output)

#### Product illustration

This illustrates the different parts of the CC 3000 controller.

- **C1:** PCB cover
- **C2:** Terminal cover
- **C3:** Main casing
- **C4:** Wall mount

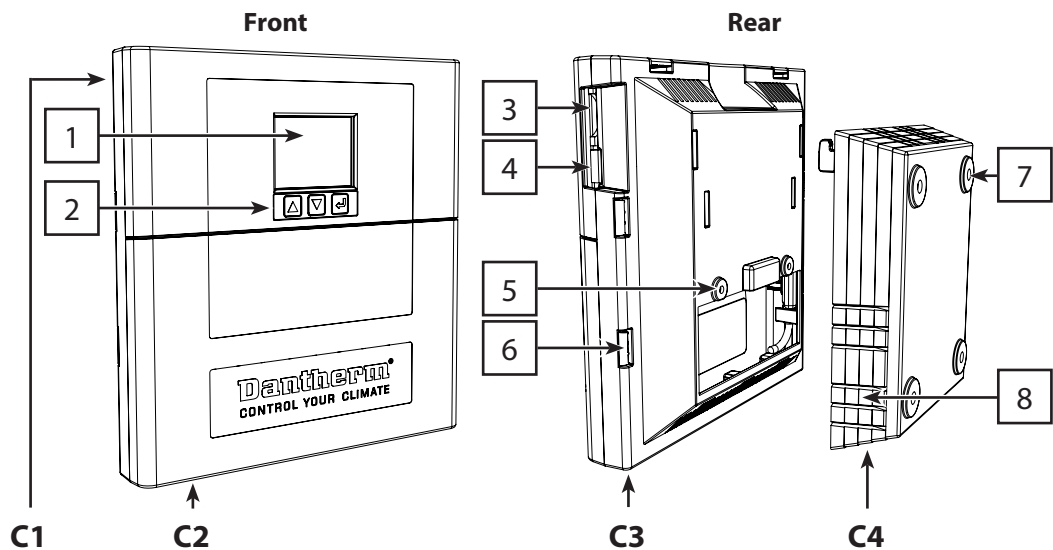


Fig. 1

Pos.	Description	Pos.	Description
1	Display	5	Main casing fixation wholes
2	Control buttons	6	Cover lock
3	Memory (SD) card slot	7	Wall mounting wholes
4	TTL link (J6)	8	Recess for cable outlet

## Electronic control

### Introduction

The control circuit of the CC 3000 is all made of low voltage connections and is designed according to EN/UL 60950.

### Block schematic

This illustrates the overall system control architecture:

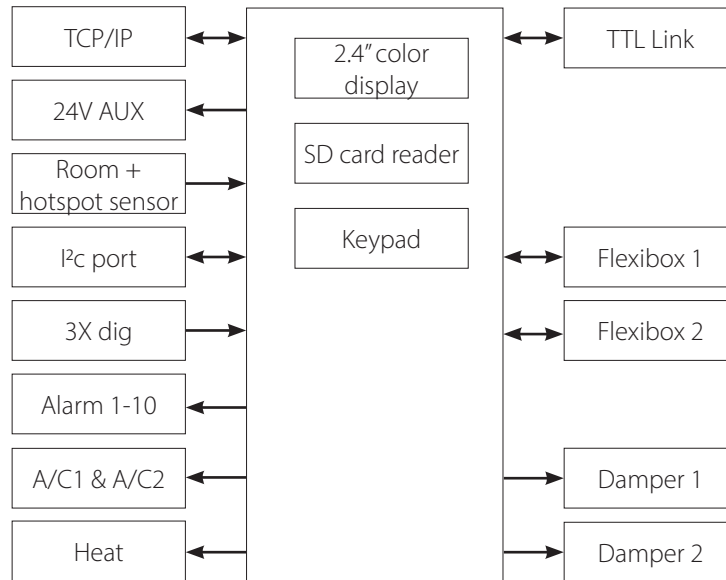


Fig. 2

### External Connections (overview)

This illustration gives an overview of the electrical connections. All connections are done with multi connectors using spring loaded terminations.

See detailed connecting-specifications in the section “External Connections” on page 17.

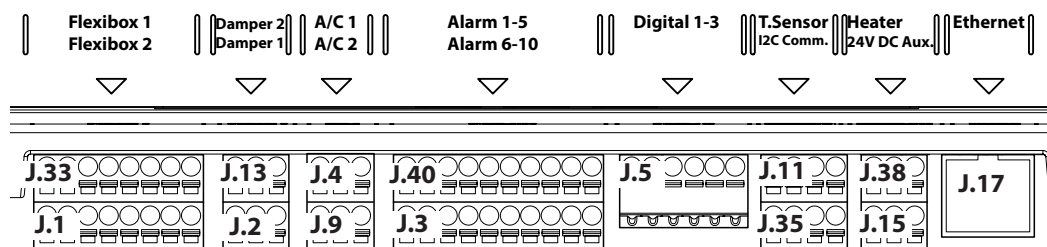


Fig. 3

Pos.	Terminal rail	Description
1	J.33 + J.1	Connecting up to two free cooling units
2	J.13 + J.2	Connecting up to two motorized dampers
3	J.4 + J.9	Connecting up to two air conditioner
4	J.40 + J.3	Alarm outputs
5	J.5	Digital input (e.g. connecting fire/smoke alarm, door switch etc.)
6	J.11 + J.35	Connecting a temp. sensor and humidity sensor
7	J.38 + J.15	Connecting a heater and equipment using 24 V DC
8	J.17	Connecting ethernet/ LAN



## System operation strategy

### Introduction

This section describes the operation strategy according to the possible operation modes: Free cooling mode, Standard mode, Energy save mode and Air Con mode.

### Generic example

The basic operation strategy of the CC 3000 can be described in the following way:

- Connected heater (optional) starts, when temperature is too low (on/off set points for heater can be adjusted).
- Free cooling unit(s) start(s) up slowly, when temperature rises above Min °C set point and fan will increase speed gradually (according to P-band) until Max °C set point is reached.
- P-band starts at Min °C set point and stops at Max °C set point.
  - Most setups will only need a P-band, which continues from Min °C to Max °C without interruption. The set point for Mid<sup>1</sup> and Mid<sup>2</sup> will in this case be exactly the same.
  - The P-band can be separated into two parts, interrupted by Mid<sup>1</sup> and Mid<sup>2</sup> as illustrated in Fig. 4.
- Air Conditioner(s) is/are activated, when the set point for A/C on is reached and stops again, when temperature drops below set point for A/C off.
- Emergency operation is a special boost operation, where all connected cooling units (both free cooling and A/C) starts up at the same time, until temperature drops below emergency off.

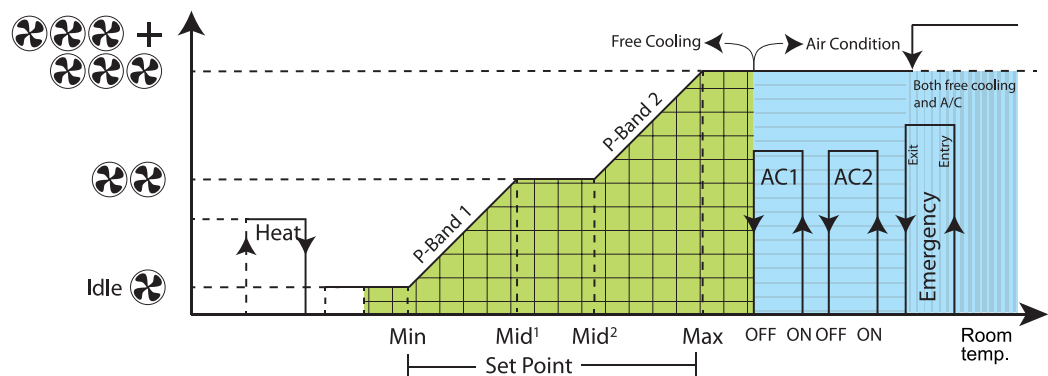


Fig. 4

This table describes the different settings, which can be adjusted with the CC 3000 controller.

Abbr.	Description
OFF	Temperature when fan stops
ON	Temperature when fan starts
Heat	Temperature where heater will be active (optional)
Set point	Desired indoor temperature • fan speed will be adjusted between min °C and max °C
Min °C	Temperature at bottom of P-band
Mid <sup>1</sup>	Top of P-band 1
Mid <sup>2</sup>	Bottom of P-band 2
Max °C	Temperature at top of P-band
P-band (1 & 2)	Regulating fan speed proportionally according to indoor temperature
A/C 1 on	External Air con unit 1 starts up if connected
A/C 1 off	External Air con unit 1 stops if connected
A/C 2 on	External Air con unit 2 starts up if connected
A/C 2 off	External Air con unit 2 stops if connected
Emergency on	Fan runs 100% (Free cooling and Air conditioner active, if installed)
Emergency off	Fan returns to nominal speed

Default values for the above set points can be found in the manual for the free cooling unit.

**Free cooling mode (default)**

Use of free cooling unit(s) only. Free cooling unit will increase/ decrease fan speed gradually between Min °C and Max °C.

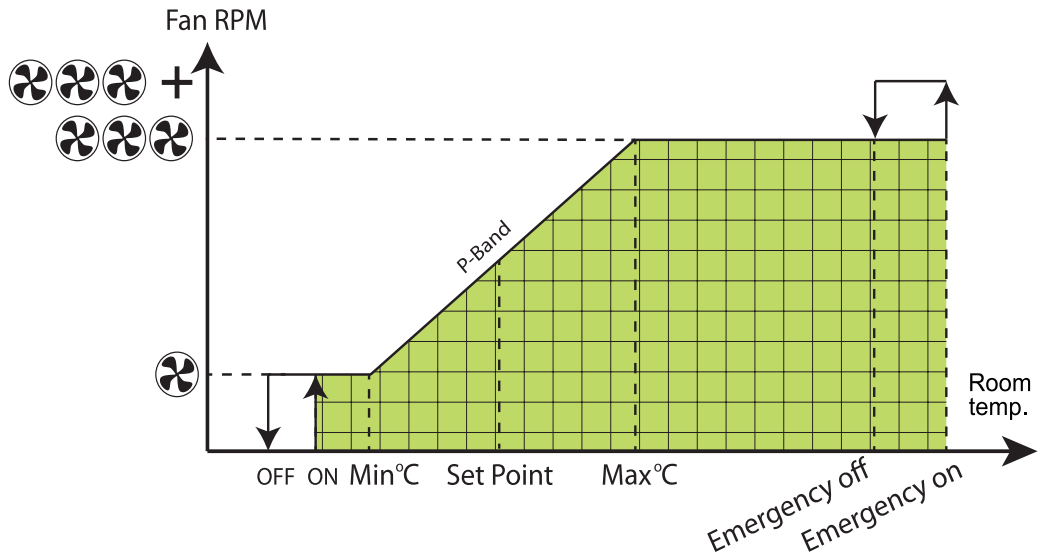


Fig. 5

**Standard mode**

Free cooling unit starts when outdoor temperature is min. 3 °C colder than set point. If outdoor temperature is closer to or above set point and cooling is needed, A/C unit will operate on its own.

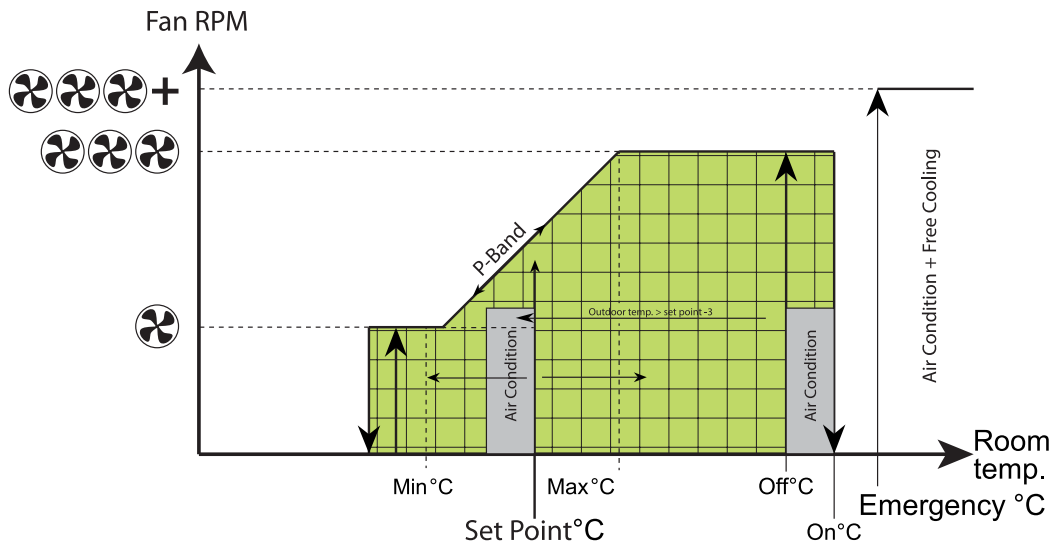


Fig. 6

**Energy save mode** Free cooling unit starts when outdoor temperature is min. 1 °C colder than indoor temperature. If outdoor temperature is closer to or above set point and cooling is needed, A/C unit will operate on its own.

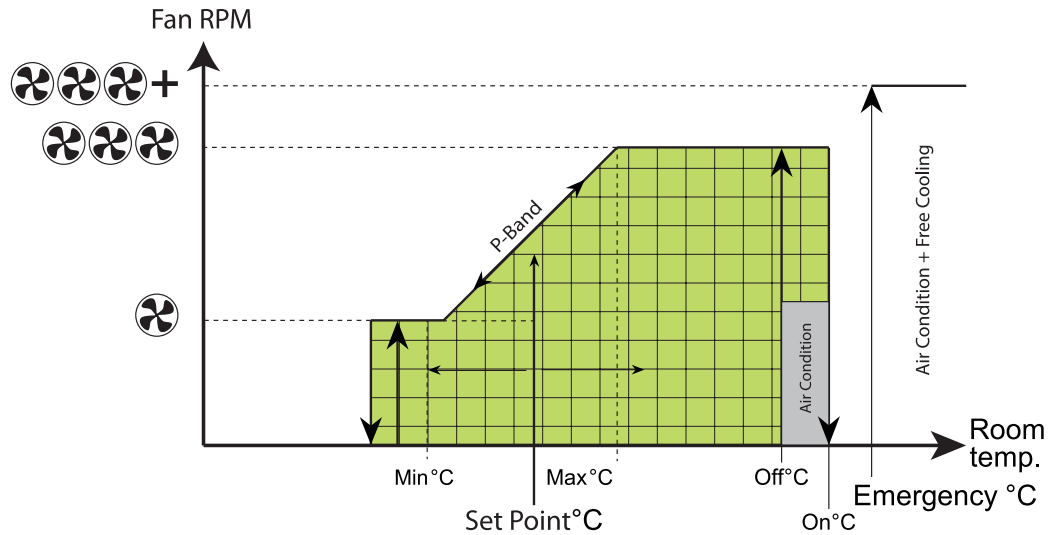


Fig. 7

**Air Con mode** The free cooling unit is not active. Only the connected Air conditioner is operating.

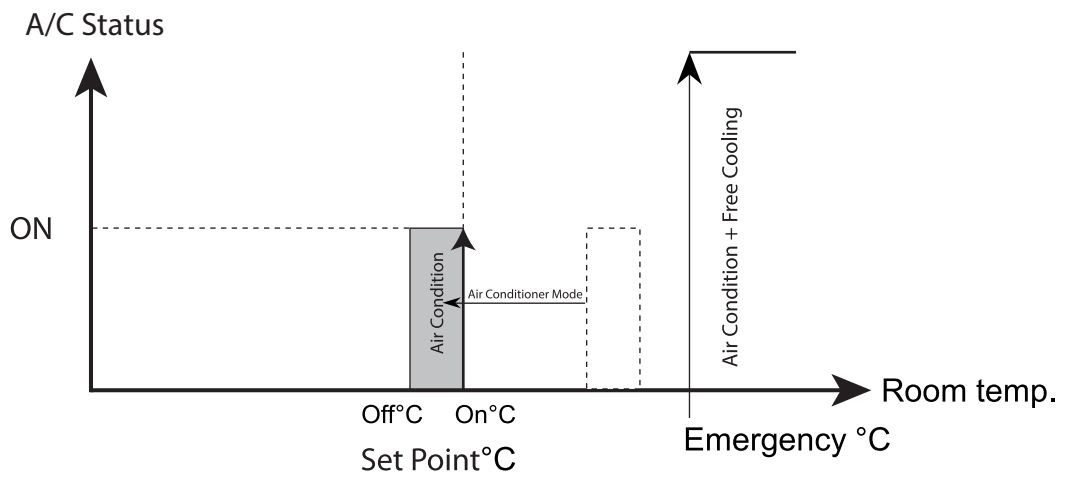


Fig. 8

## Transport and unwrapping

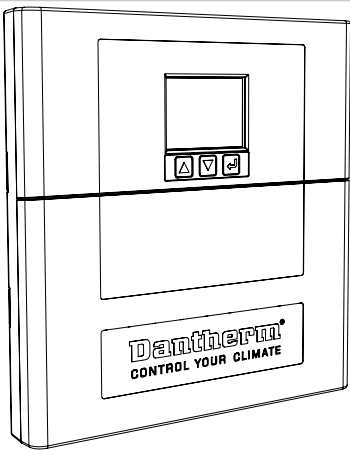




### Unwrapping

#### Check for transport damages

Step	Action
1	Report any obvious damage to the carrier, parcel service, postal service etc. immediately on delivery and note down the damage on the shipping document or carrier's document.
2	Check the content of the box.
3	Should any transport damage be detected after unpacking of the device, or should the delivery be incomplete, contact your salesman in charge or specialised dealer without delay.

#### Content of the box

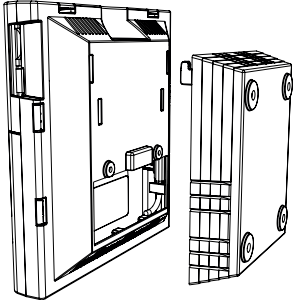
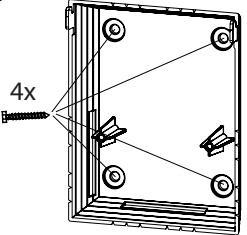
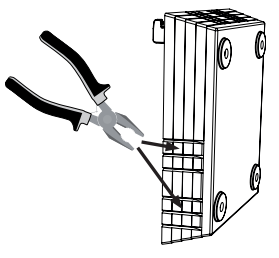
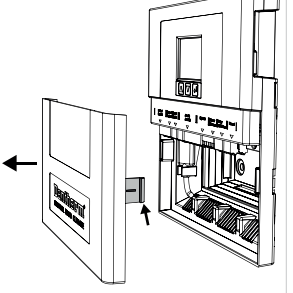
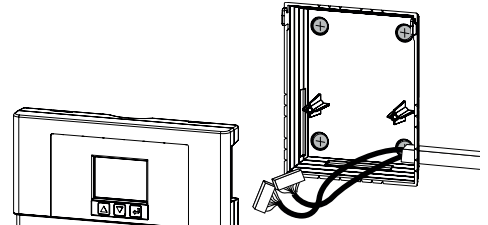
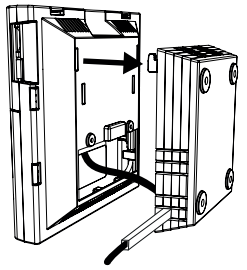
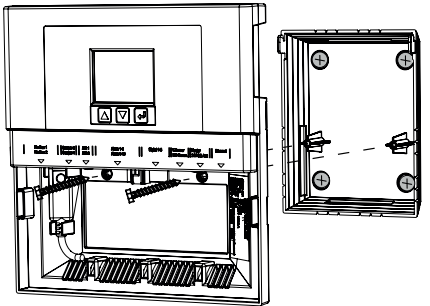
The scope of delivery includes:

Amount	Description	Illustration
1	CC 3000 controller	
1	bag incl.:	
4	rawlplug (8x 40)	
4	screws for brick wall (pan head, pozidriv, A2 - ø4,8 x 38)	
4	screws for metal wall (self drilling sheet metal screw, pan head, pozidriv, ø4,8 x 32)	
2	screws for mounting main casing to wall mount (pan head, torx plus ø4,0 x 12)	

## Installation

### Mounting of the unit

#### Installation & wall mounting

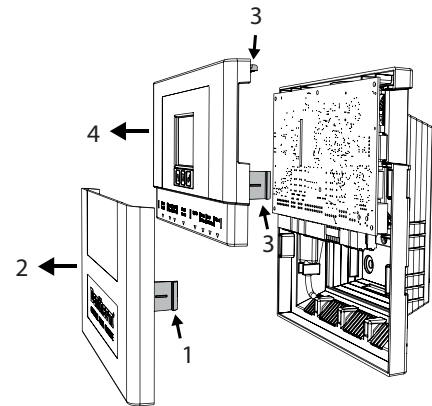
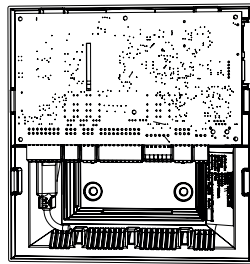
Step	Action	Illustration
1	Remove wall mount from the main casing.	
2	Fix the wall mount to the wall.	
3	Press cover lock on both sides in order to release terminal cover.	
4	Break away some blocks from the wall mount in order to integrate cable trays.	
5	Lead the cables from the external desired equipment through the wall mount and into the main casing.	
6	Click the main casing on the wall mount.	
7	Fix the main casing to the wall mount with the two screws, which are part of delivery.	
8	Connect the external equipment to the terminal rail. See section "External Connections" on page 17 for further connecting details. <ul style="list-style-type: none"> <li>• Check page 14 if you need to change the configuration of output (NO/NC).</li> </ul>	

## Configuration of output

### Accessing PCB

Access PCB in order to change configuration output:

1. Press cover lock on both sides in order to release the terminal cover.
2. Pull out terminal cover
3. Press cover lock on both sides and at the top in order to release the PCB cover.
4. Pull out PCB cover.



### Configuration options

This illustrates the default jumper positions on the PCB and the possible configurations.

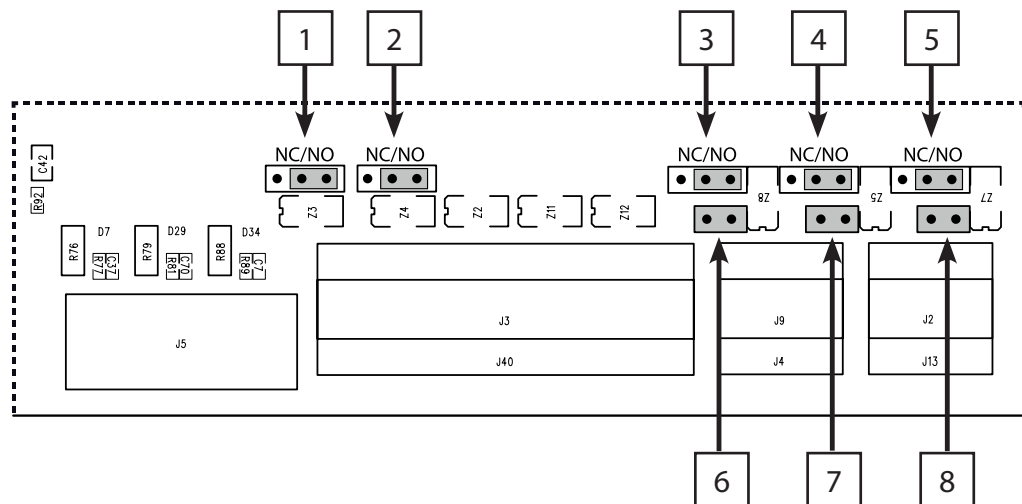


Fig. 9

#### Jumper 1-5: Config. 1

- Moving the jumpers make it possible to change the configuration of the corresponding outputs from normally opened (NO) to normally closed (NC).

#### Jumper 6-8: Config. 2

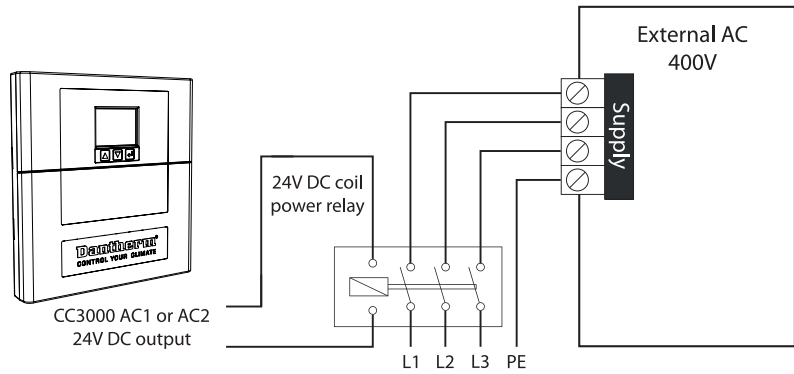
- Removing the jumpers changes the configuration of the corresponding outputs from 24V DC to dry contact. (For connection examples see "Installation options - air conditioner" on page 15)

Contacts	Jumper	Config. 1	Jumper	Config. 2
Alarm 1	1	Configurable as: • NO (default) • NC	-	Dry contacts (fixed)
Alarm 2	2			
A/C 1 (air conditioner 1)	3		6	Configurable as: • 24 V DC (default) • Dry contact
A/C 2 (air conditioner 2)	4		7	
Heater	5		8	

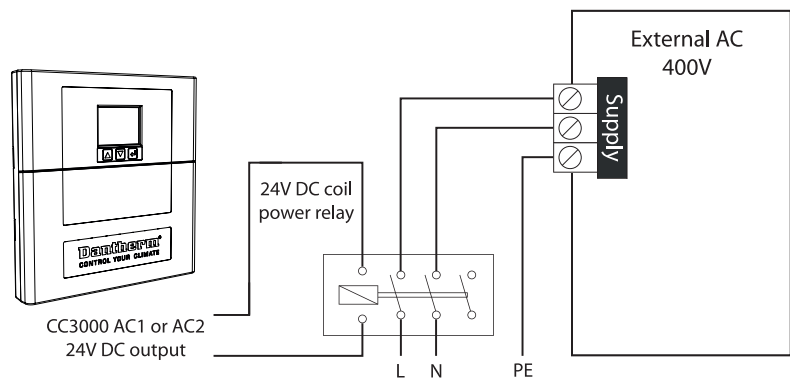
## Installation options - air conditioner

**Config. 2:**  
**24V DC (Default)**

Option 1



Option 2



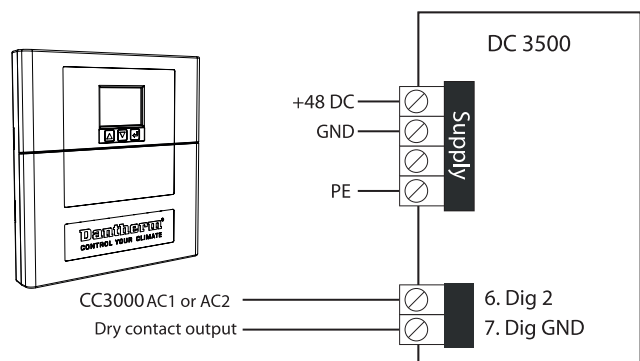
**Config. 2:**  
**Dry contact (altered)**

Change jumper 6-8 (see "Configuration of output" on page 14) from 24V DC (default) to dry contact, when connecting AC as illustrated in option 3 and 4.

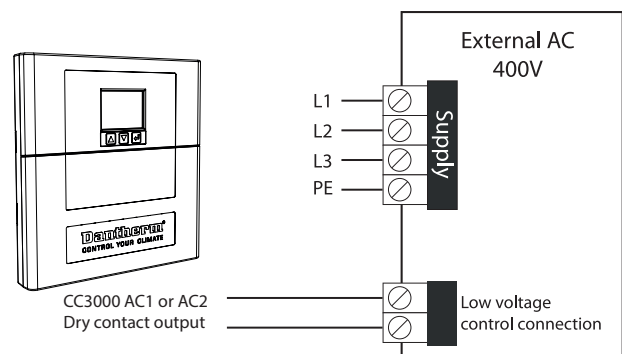
Option 3

CC 3000 must be set in energy save mode or standard mode when A/C is connected.

DC 3500 Split Air conditioner must be configured for COD when connected to CC 3000.



Option 4

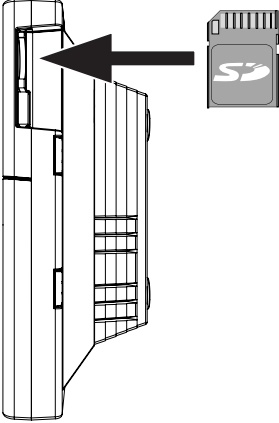


## Configuration of digital input (NO/NC)

**Change from  
NO to NC**

In case the digital inputs are used together with external transducers like a fire/ smoke alarm, it may be necessary to change the input from normally opened (NO) to normally closed (NC).

The only way to do this is via the configuration file. Follow these steps:

Pos.	Action	Illustration
1	Put SD card into your PC SD card reader.	
2	Open the .txt file with the file name that match your product. <ul style="list-style-type: none"> <li>The .txt file can be opened with wordpad</li> </ul>	
3	Go to system control configuration section and change line 57/58/59 to match your requirement: <ul style="list-style-type: none"> <li>57.Dig.1 NO/NC Type [0/1]: 0</li> <li>58.Dig.2 NO/NC Type [0/1]: 0</li> <li>59.Dig.3 NO/NC Type [0/1]: 0</li> </ul> <p>Note: (NO=0 NC=1)</p>	
4	When required change is done, save and close the file.	
5	Insert the SD card into the controller.	
6	Go to "Product configuration". (see "Fig. 13" on page 23 for menu overview) and select the file name on the list. Press Enter. New settings will now be uploaded.	

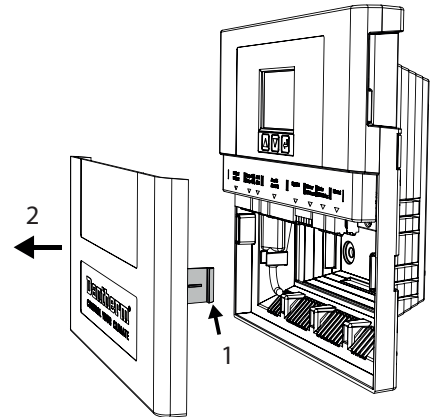
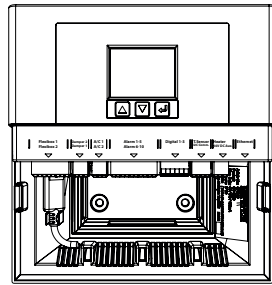


## External Connections

### Accessing terminals

Access connection terminals:

1. Press cover lock on both sides in order to release the terminal cover.
2. Pull out terminal cover.



### Illustration Detail 1

This illustration shows the terminals to be used for connecting the free cooling unit(s), damper(s), air conditioner and alarm.

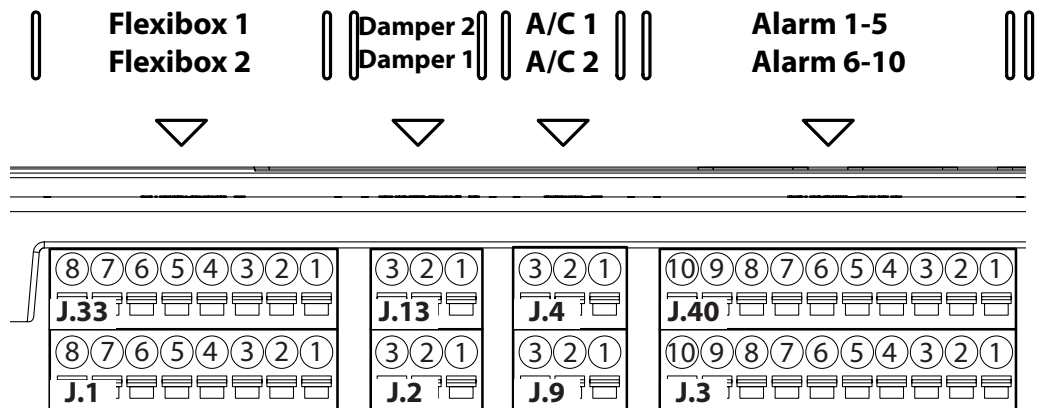


Fig. 10

### Illustration Detail 2

This illustration shows the terminals to be used for connecting accessory to the digital input, temperature sensor/I<sup>2</sup>C comm. (humidity sensor), 24 V DC AUX/heater and ethernet.

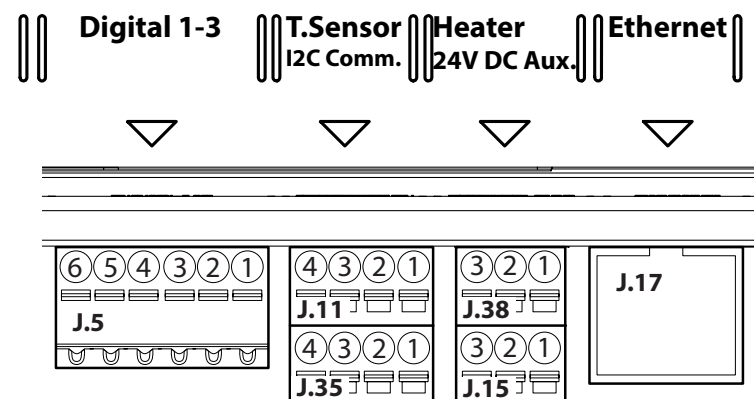


Fig. 11

**Free cooling units  
(Fig. 10)**

The terminal rails J.33 and J.1 are to be used for connecting up to two free cooling units.

- Terminal type: Anytek KE161151A000G (Mating type Anytek KD161050A000G).

Pin	J.33 Flexibox 1	J.1 Flexibox 2	Cable type
1	+48 V supply (40-60 V DC from free cooling unit)		0,5 mm <sup>2</sup>
2	PWM		
3	Tacho		
4	GND		
5	Filter		
6	GND		
7	Outdoor temp. sensor		
8	GND		

**Motorized dampers  
(Fig. 10)**

The terminal rails J.13 and J.2 are to be used for connecting up to two motorized dampers.

- Terminal type: Anytek KE061151A000G (Mating type Anytek KD061050A000G).

Pin	J.13 Damper 2	J.2 Damper 1	Cable type
1	Closed signal		0,5 mm <sup>2</sup>
2	Open signal		
3	Common (fused)		

**Air Conditioner  
(Fig. 10)**

The terminal rails J.9 and J.4 are to be used for connecting up to two air conditioner.

- Terminal type: Anytek KE061151A000G (Mating type Anytek KD061050A000G).

Pin	J.9 A/C 1	J.4 A/C 2	Cable type
1	24 V AC - 100 mA. Output can be configured as dry contact or 0/24 V DC output. For 0/24 V DC output, a jumper on PCB must be set (see page 14).		0,5 mm <sup>2</sup>
2	0/24 V DC		
3	GND		

**Alarm  
(Fig. 10)**

The terminal rails J.40 and J.3 contain 10 dry contacts for the alarm output, fully configurable.

- Terminal type: Anytek KE201151A000G (Mating type Anytek KD201050A000G).

Pin	J.40 Alarm 1-5	J.3 Alarm 6-10	Cable type
1	Alarm 1	Alarm 6	0,5 mm <sup>2</sup>
2	• mechanical relay with NO/NC contact	• solid state type: NO contact	
3	Alarm 2	Alarm 7	
4	• mechanical relay with NO/NC contact	• solid state type: NO contact	
5	Alarm 3	Alarm 8	
6	• solid state type: NO contact	• solid state type: NO contact	
7	Alarm 4	Alarm 9	
8	• solid state type: NO contact	• solid state type: NO contact	
9	Alarm 5	Alarm 10	
10	• solid state type: NO contact	• solid state type: NO contact	

**Digital input  
(Fig. 11)**

The terminal rail J.5 is to be used for connecting other accessory as e.g. a fire/smoke alarm or door switch.

- Terminal type: FCI 20020110-C061A01LF (Mating type Anytek KD0610500000G).

Pin	J.5 Digital 1-3	Cable type
1	DIG 1 (1K pull up to 12 V DC)	0,5 mm <sup>2</sup>
2	GND	
3	DIG 2 (1K pull up to 12 V DC)	
4	GND	
5	DIG 1 (1K pull up to 12 V DC)	
6	GND	

**Temp. sensor/  
I<sup>2</sup>C Comm.  
(humidity sensor)  
(Fig. 11)**

The terminal rail J.11 is to be used for connecting one or two temperature sensors.

The terminal rail J.35 is to be used for connecting a humidity sensor.

- Terminal type: Anytek KE081151A000G (Mating type Anytek KD081050A000G).

Pin	J.11 T. sensor	J.35 I <sup>2</sup> C Comm. (humidity sensor)	Cable type
1	Room temp. sensor (NTC type)	+3,3 V DC	0,5 mm <sup>2</sup>
2	GND	SCL	
3	Hotspot temperature sensor (NTC type)	SDA	
4	GND	GND	

**Heater/  
24 V DC AUX  
(Fig. 11)**

The terminal rail J.38 is to be used for connecting a heater.

The terminal rail J.15 is to be used for connecting other equipment using 24 V DC.

- Terminal type: Anytek KE061151A000G (Mating type Anytek KD061050A000G).


Pin	J.38 Heater	J.15 24 V DC	Cable type
1	Heat/ +24 V Output can be configured as dry contact or 0/24 V DC output, set jumper on PCB (see page 14).	24 V DC 100mA	0,5 mm <sup>2</sup>
2	Heat - 0/24 V DC	NC	
3	GND	GND	

**Ethernet  
(Fig. 11)**

J17 is a RJ45 LAN connector CAT5/CAT6 . PulseJack J00011D21BNL

## Starting up

### Install product specific configuration

Step	Action	Illustration
1	Insert SD card into memory card slot.	
2	Switch power on.  <b>Note:</b> The CC 3000 controller is powered via the free cooling unit.	
3	The CC 3000 controller will now start up with a short delay and automatically install newest firmware and run a GFX update.   Wait while the firmware is installed. Do NOT switch off the power or remove the SD card during this process.	
4	When the installation process is finished, the display will automatically open the product configuration menu.  Choose and confirm your product. The controller will now read the corresponding configuration.	
5	Default language pack is English. You can choose another language in the language setting menu. (Follow procedure in section "Language settings" on page 29)	
6	Save your customized configuration to the SD card, if you want a backup or want to copy it to other controllers. <ul style="list-style-type: none"> <li>Go to menu item "Other settings" on page 30(see "Fig. 13" on page 23 for menu overview) → setting option: "Backup".</li> <li>The controller will now save a backup on the SD card. (Backup file is named cc_cfg.txt, but can be renamed with max 8 characters)</li> </ul>	
7	<u>Data log needed:</u> Leave SD card in the slot, if an operational data log is required. (See also section "Firmware, datalog & communication" on page 33)  <u>NO data log needed:</u> Remove SD card from the slot, if no data log is required. Settings are now stored in onboard nonvolatile memory.	

### Installation check

Step	Action
1	Start a self test (automatic or manual) in order to see if the system is set up and connected correctly. See how to run self test on page 26.
2	Go to HOME display and check that indoor/ outdoor temperature reading and set point is correct. <ul style="list-style-type: none"> <li>In case shelter temperature is below set point, indoor temperature sensor can be heated by hand, to check that fan starts when temperature reach set point</li> <li>Be aware that if sensor temperature reach air conditioner set point and air conditioner is started, it has a minimum runtime of 3 minutes.</li> </ul>

## Operation

### Modes and settings (overview)

#### General operation parameters

The CC 3000 controller makes it possible to customize the cooling strategy so it fits to the local setup. Thus following main operation parameters can be adjusted/selected:

1. Main operation mode
2. Override modes
3. Dual zone
4. Unit specific set points

#### Main operation mode

The CC3000 controller can operate in 4 different modes. In case additional equipment such as air conditioner is connected to the controller it is important that operating mode is set so it matches the actual setup:

- Free cooling mode (default)
- Standard mode
- Energy save mode
- Air-conditioning mode

(See "System operation strategy" on page 9)

(See how to change operation mode in section "Cooling mode zone 1 & 2" on page 28)

#### Override modes

Besides the main operation mode there is a possibility to enable following override modes:

- Humidity control  
Changes operation when humidity is too high (see more on page 28).
- Night mode  
Changes operation within a defined time span each day (see more on page 29).
- Occupied mode  
Changes operation while service is performed and returns back to normal operation strategy, when time (defined via the settings in occupied mode) has passed (see more on page 25).

#### Dual zone

It is possible to divide the operation area into 2 different zones with individual settings. See how to enable dual zone in the section "Other settings" on page 30.

#### Unit specific set points

Set points and operation can be adjusted for each connected equipment separately:

- Free cooling unit(s)
- Air conditioner
- Heater
- Damper
- Alarms

(See more in section "Sub-menu: System setting level" on page 27)

## Display and menu overview

### Display and navigation

The following illustrates the layout of the display and navigation buttons and describes the different fields on the display.

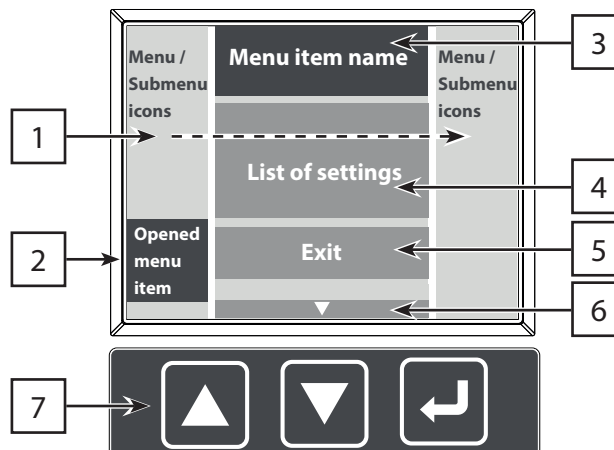


Fig. 12

Pos.	Field	Description
1	Menu/ submenu icons	Displays the menu or submenu
2	Opened menu item	To open a menu item move the cursor to the desired menu icon via the navigation buttons.
3	Menu item name	Displays the name of the selected menu item.
4	List of settings	Displays the list of settings, which can be activated/ changed under the selected menu item.
5	Exit/save button	The exit/save button is placed at the bottom of the list of settings. <ul style="list-style-type: none"> <li>Save changes and return to menu/ submenu.</li> </ul> <p><b>NOTICE</b></p> <p>The Exit button is non-existing in info items such as "operational status", "alarm status" and "system information"</p>
6	Next page	Indicates that the list of settings continue on the next page.
7	Navigation buttons	<p>↑ ↓ UP &amp; DOWN:</p> <ul style="list-style-type: none"> <li>Toggle up and down through the menu or list of settings.</li> </ul> <p>↵ ENTER:</p> <p><u>Short press</u></p> <ul style="list-style-type: none"> <li>Select list of settings</li> <li>Select/ change a specific setting/value.</li> </ul> <p><u>Long press</u></p> <ul style="list-style-type: none"> <li>Return to home menu without saving changes.</li> </ul>

**Menu overview**

This illustration shows the menu and submenu items of the CC 3000 controller.

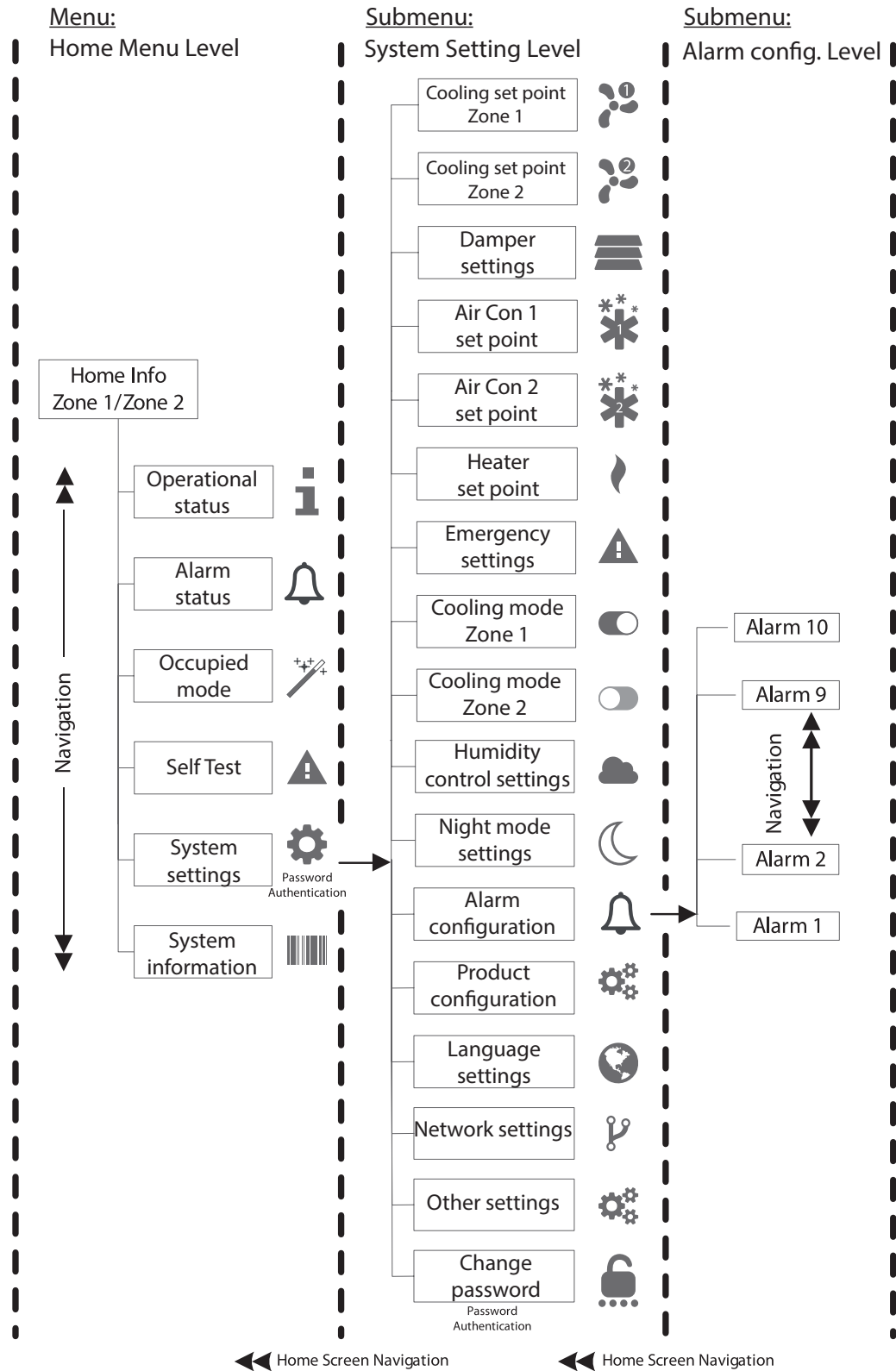


Fig. 13

## Home menu level

### Home display

The following illustrates and describes the information found on the HOME display.

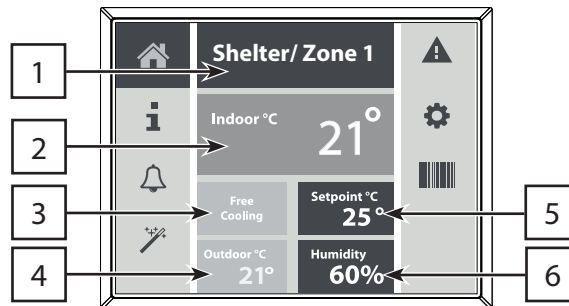




Fig. 14

Pos.	Information	Description
1	Shelter/ Zone	The HOME screen either displays the values of: <ul style="list-style-type: none"> <li>Shelter/ Zone 1</li> <li>Shelter/ Zone 2</li> </ul>  <b>NOTICE</b> Press  to shift between Shelter/Zone 1 and Shelter/Zone 2 <ul style="list-style-type: none"> <li>Only possible when dual zone is enabled (see how to enable dual zone in "Other settings" on page 30)</li> </ul>
2	Indoor temperature	Displays current indoor temperature (°C)
3	Operation status	Shows the current operation status: <ul style="list-style-type: none"> <li>In-active</li> <li>Heating</li> <li>Free-cooling</li> <li>Active-cooling (A/C operation)</li> <li>Alert</li> </ul>
4	Outdoor temperature	Displays the current outdoor temperature (°C)
5	Cooling set point	Shows the chosen cooling set point (°C)
6	Humidity	Displays the current level of humidity (%RH)

### Operational status



The operational status informs about duration (in hours) of the different connected units.

Counters can only be reset over SNMP or TTL link.

List of operational time (in hours):

- Fan 1 (Free cooling unit 1)
- Fan 2 (Free cooling unit 2)
- Air Con 1
- Air Con 2
- Heater



## Alarm status



Alarm status shows, which alarms are present currently (historical alarms are not visible).

- Only alarms that are mapped to any of the 10 hardware alarm outputs are visible in this menu. (see also "Sub-menu: Alarm config. level" on page 31)

### List of available alarms:

- Low volt (DC supply)
- High volt (DC supply)
- Temp low (low indoor temperature)
- Temp high 1 (high indoor temperature level 1)
- Temp high 2 (high indoor temperature level 2)
- Temp high 3 (high indoor temperature level 3)
- Humidity low (low indoor humidity)
- Humidity high (high indoor humidity)
- Filter flow 1 - filter pressure level 1 (analog pressure sensor optional)
- Filter flow 2 - filter pressure level 2 (analog pressure sensor optional)
- Fan 1
- Fan 2
- Onboard (temperature) sensor
- Indoor (temperature) sensor
- Hotspot (temperature) sensor
- Ambient 1 sensor (outdoor temperature sensor 1)
- Ambient 2 sensor (outdoor temperature sensor 2)
- Digital (input) 1
- Digital (input) 2
- Digital (input) 3
- Filter guard 1 (Standard)
- Filter guard 2 (Standard)
- Network (LAN connection)
- Memory (Internal non volatile memory)
- SD card (Read/write failure)

## Occupied mode



This override mode can be used by service personnel to obtain a suitable temperature in shelter during service job (duration can be changed).

- The controller will automatically return back to normal operation strategy, when time (defined via settings) has passed.
- Free cooling fan is limited to idle RPM.

### List of settings:

- Set point °C (10-30 °C)
- Duration in minutes. (maximum 480 minutes)
- Disable/enable

---

## Self test



Self test function can be used for diagnostics of system.

It runs through either

- an automatic sequency where all components are activated or
- a manual function of each component

### Automatic self test:

1. Use "stop/start" for enabling/disabling automatic sequency.
2. Perform the visual check, while the different components are activated one by one.  
(Time duration for activation of each component is 2 minutes, which should be sufficient for the installer to perform the visual check.)
3. Note down the status of the different components.
4. Test steps can be bypassed by pressing DOWN key.

### Manual self test:

1. Enable each component manually, if only relevant outputs have to be checked.
2. Perform the visual check, while the components are activated individually.
3. Note down the status of the different components.
4. Set back to "None" (normal mode), when visual check has been completed.

List of components:

- Dampers open
- Fans (max RPM 75% duty cycle)
- Dampers close
- Heater
- Air Con 1
- Air Con 2
- Alarm 1-10 (The corresponding alarm output will be toggled)

---

## System settings



Enter sub menu, where system settings can be done.

All vital parameters for the system can be set in this menu.

- To enter this menu, password is needed. (default password is: 0000)

See sub menu on page 27.

---

## System Information



Following product information is available under the information menu item.

- FW. (Controller firmware version)
- MAC Adress

If you have entered the corresponding information you will also find:

- SN. (Controller serial number)
  - FB 1. (information or serial number of Free cooling unit 1)
  - FB 2. (information or serial number of Free cooling unit 2)
  - A/C 1. (information or serial number of air conditioner 1)
  - A/C 2. (information or serial number of air conditioner 2)
-

## Sub-menu: System setting level

### Cooling set point (dual zone)

#### Zone 1



#### Zone 2



Adjust cooling set points for the free cooling unit(s).

If two free cooling units are connected to the CC 3000 and placed in different rooms, the settings can be adjusted for each free cooling unit separately.



#### NOTICE

Zone 2 is only available, if dual zone is enabled.  
(for enabling dual zone see "Other settings" on page 30)



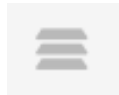
#### NOTICE

Be aware that temperature settings cannot be set in conflict with heater and air conditioner settings: Set point cannot be moved outside P-band. Move P-band first and then set point.

#### List of settings:

- Set point °C (Defines the shelter temperature where cooling performance increases)
- Min. °C (Defines the shelter temperature where cooling performance is minimum)
- Max. °C (Defines the shelter temperature where cooling performance is maximum)
- Midpoint 1 °C (Defines P-band 1, between min. and midpoint 1)
- Midpoint 2 °C (Defines P-band 2, between midpoint 2 and max.)
- Midpoint RPM (Defines fan speed in % of max speed)

### Damper settings



Defines how the motorized damper is operated. It Can be set to two different modes:

- Normal mode is used for exhaust dampers
- Dynamic mode is used for intake dampers with integrated bypass function.

#### List of settings:

- 1 - Normal/Dynamic. (Normal: Damper open/close, Dynamic: Damper 0-100%)
- 2 - Normal/Dynamic. (Normal: Damper open/close, Dynamic: Damper 0-100%)

### Air Con 1 & 2 set point

#### Air Con 1



#### Air Con 2



Adjust cooling set points for each air conditioner separately.  
Zone division is not needed in this case.

#### List of settings:

- ON °C (shelter temperature where air conditioner starts)
- OFF °C (shelter temperature where air conditioner stops)
- Disable/Enable

### Heater set point



To ensure a min. temperature in the shelter a heater can be connected.  
Adjust heater start and stop set point.

#### List of settings:

- ON °C (shelter temperature where heater starts)
- OFF °C (shelter temperature where heater stops)

### Emergency settings



Settings for emergency operation.  
In emergency operation free cooling is at full performance (100% fan speed) and A/C will be activated, if installed.

List of settings:

- Entry °C (shelter temperature where emergency cooling starts)
- Exit °C (shelter temperature where emergency cooling stops)

### Cooling mode zone 1 & 2



**Zone 1** **Zone 2** Choose between four different cooling modes (cooling mode can be chosen for each zone individually).



**NOTICE**

Zone 2 is only available, if dual zone is enabled.  
(for enabling dual zone see "Other settings" on page 30)

List of modes:

- 1. Free cooling mode (default)**  
A/C function is disabled. Only free cooling available. Best energy performance.
- 2. Standard mode**  
Free cooling and A/C are interchanged based on outdoor temperature. If dT is not above specified value, A/C set point is moved down to free cooling set point. Medium/high energy consumption, and fixed temperature set point.
- 3. Energy save mode**  
Free cooling starts up first and A/C is only activated as backup. Medium energy consumption, higher temperature set point for A/C Cooling.
- 4. Air-conditioning mode**  
Free cooling function disabled. Only A/C available. High energy consumption.

See the corresponding system operation strategy on page 9.

### Humidity control settings



Humidity control can be enabled or disabled. When enabled and humidity is surpassing humidity threshold, controller can operate in two different ways:

- Change to another cooling mode or
- Operate according to set point offset

List of settings:

- Max humidity level % (Humidity threshold)
- Set point offset. (Offsets cooling set point)
- Free cooling. (Only free cooling available)
- Standard. (Free cooling and A/C available)
- Energy save. (Free cooling and A/C available)
- Air-conditioning. (Only A/C available)
- Outdoor. (location of RH sensor)
- Disable/enable. (Humidity function)

### Night mode settings



When night mode is enabled and starts, the controller can change to another cooling mode, limit max fan speed or do set point offset.

**NB:** If this function is used, current date and time must be set.

#### List of settings:

- Disable/enable (Night mode function)
- Start time. (Defines at which time night mode function is active)
- End time. (Defines at which time night mode function is in-active)
- Current time. (clock setting)
- Current date. (Calendar setting)
- Max speed %. (Defines max.fan speed in % during night mode)
- Set point offset. (Cooling set point offset during night mode)
- Free cooling. (Only free cooling available)
- Standard. (Free cooling and A/C available)
- Energy save. (Free cooling and A/C available)
- Air-conditioning. (Only A/C available)

### Alarm configuration

All alarms can be configured to any of the 10 hardware alarm outputs.  
See more in section "Alarm configuration" on page 29.

### Product configuration



Product configuration is used to setup controller for the right product.  
When SD card is inserted and controller is started up for the first time the controller will automatically open the product configuration menu. Choose the right product for the application.

### Language settings



Default language is set to English.  
Use this menu item to change to another language.

#### Change to local language:

- Insert SD card which contains different language packs.
- Choose and confirm desired language from list.
- Language update will take approximately 3 minutes. The controller is inactive and shows black screen during update.
- Do not disconnect power during update.

#### Change back to English language:

- Go to "Other settings" and change back to default language (English). (See page 30)

### Network settings



Adjust and change following settings for Ethernet connection and SNMP trap management.

#### List of settings:

- Static/DHCP. (static or dynamic IP address)
- IP address. (Read/write Controller IP address)
- Subnet mask.
- Gateway IP
- Trap manager 1 IP. (IP address of alarm trap manager 1)
- Trap manager 2 IP. (IP address of alarm trap manager 2)

---

### Other settings



Find backup configuration, reset CC 3000 controller to default settings and default language or enable/disable generic parameters as e.g.:

- Dual zone
- Lead/ lag function of Air conditioner

#### List of settings:

- Lead/lag (Enables Air conditioner lead/lag function)
- Dual zone. (Enables dual zone cooling configuration)
- English. (Enables English display language)
- Unit DgC/F. (Switch between Celsius or Fahrenheit display units)
- Backup (uploads present configuration to SD card)
- Default setting. (Back to default product settings)

---

### Change password



Current password (default password: 0000) must be entered, before it can be changed to new password.  
Passwords for TTL, GUI and web UI are the same.

---

## Sub-menu: Alarm config. level

### Alarm Config



Alarm configuration for the 10 hardware alarm outputs.  
Any alarm that is configured to any of the 10 hardware alarm output, will also be sent as SNMP alarm trap.

- Each of the 10 hardware alarm outputs can be configured individually.
- Alarm 1 and 2 output can take multiple alarms.
- Alarm 3-10 can only handle single alarms/errors.

Alarm list	Default Alarm output no.
<b>Low voltage. (DC supply voltage low alarm )</b>	<b>5</b>
<b>High voltage. (DC supply voltage high alarm)</b>	<b>6</b>
<b>Temp. low. (Low temperature alarm.)</b>	<b>4</b>
<b>Temp. high 1. (High temperature 1 alarm)</b>	<b>9</b>
Temp. high 2. (High temperature 2 alarm)	-
Temp. High 3. (High temperature 3 alarm)	-
Humidity low. (Low humidity alarm)	-
<b>Humidity high. (High humidity alarm)</b>	<b>10</b>
Filter flow 1 (Pressure level 1 alarm)	-
Filter flow 2 (Pressure level 2 alarm)	-
<b>Fan 1. (Fan 1 alarm. Wrong RPM)</b>	<b>1</b>
Fan 2. (Fan 2 alarm. Wrong RPM)	-
Onboard sensor (NTC fail)	-
<b>Room sensor. (NTC fail )</b>	<b>7</b>
Hotspot sensor. (NTC fail)	-
<b>Ambient sensor 1 (Outdoor 1 sensor. NTC fail)</b>	<b>8</b>
Ambient sensor 2 (Outdoor 2 sensor. NTC fail)	-
<b>Digital 1. (Digital 1 input active) Fail Alarm</b>	<b>3</b>
Digital 2. (Digital 2 input avtive)	-
Digital 3. (Digital 3 input active)	-
<b>Filterguard 1. (Digital filterguard 1 alarm)</b>	<b>2</b>
<b>Filterguard 2. (Digital filterguard 2 alarm)</b>	<b>2</b>
Network. (Network fail. Ethernet)	-
Memory. (Internal memory fail)	-
SD card. (SD card fail)	-
NO/NC. (alarm output normally open or normally closed)	

## Access via WEB interface

### WEB Interface

The CC3000 controller has a WEB interface (GUI) implemented, which can be used as a supplement to the CC3000 display. The interface is very intuitive and provides a good overview of the CC 3000 operational functions and settings.

The WEB interface can thus be used for easy configuration of most vital settings and monitoring of the system.

To access WEB interface use standard browser, and type in IP address of controller. Insert then:

- Username: admin
- Password: 0000

The screenshot displays the Dantherm WEB interface. On the left is a navigation menu with the following items: SYSTEM STATUS (selected), COOLING STRATEGY, SYSTEM CONFIG, ALARM CONFIG, and SYSTEM INFORMATION. The main content area is titled 'i SYSTEM STATUS' and is divided into several sections:

- ZONE 1:**
  - INDOOR TEMP. °C: 26.3
  - OUTDOOR TEMP. °C: 17.0
  - STATUS: FREE COOLING
  - SETPOINT: 25.0
  - HUMIDITY RH%: 35
- ZONE 2:**
  - INDOOR TEMP. °C: 0.0
  - OUTDOOR TEMP. °C: -41.0
  - STATUS: INACTIVE
  - SETPOINT: 0.0
- OPERATIONAL TIMERS:**
  - FAN 1: 1442:29
  - FAN 2: 1441:27
  - A/C 1: 345:8
  - A/C 2: 157:43
  - HEATER: 7:24
- ALARMS:**
  - LOW VOLTAGE: [Warning Icon]

Fig. 15



## Service

### Firmware, datalog & communication

**Software update** If SD card contains a firmware upgrade file, it will automatically be uploaded to the controller, when the SD card is inserted. The controller will then upgrade firmware and reboot.

- **NB:** Display will show status during firmware upgrade.

**Data log** If operational data log is required, an SD card must be present in the memory (SD) card slot (see "Fig. 1" on page 7). CC3000 will automatically generate a log file named stat\_log.txt (CSV file that can be imported to excel).

Default log interval is set to 1 minute. (log interval can be changed in configuration file)

SD Card specifications:

- The controller supports SD card of size 1/2/4/8/16/32GB.
- The card must be formatted in FAT/FAT32.

**TTL link** The J6 connection / TTL link (see "Fig. 1" on page 7) is to be used with a standard USB to TTL cable.

Use TTL link for following purposes:

- Reading out system status information
- Changing configuration and settings
- Override function to verify correct connection of system components like free cooling unit, dampers, sensors etc.  
(All configuration overrides are password protected)

Connect to TTL link in this way:

Step	Action
1	Connect the serial cable between host and controller. <b>NB:</b> The TTL cable connector black wire must point downwards when inserted into TTL link.
2	Start up a "Terminal" application in the host PC with following serial ports settings: <ul style="list-style-type: none"> <li>• baud rate - 9600</li> <li>• data bits - 8</li> <li>• parity - none</li> <li>• stop bits - 1</li> <li>• flow control - none.</li> </ul>
3	Now the controller is ready to be accessed.

Specifications:

- The TTL link is isolated galvanically.
- TTL cable type : TTL-232R-3V3 or TTL-232R-5V
- Link: <http://www.ftdichip.com/Products/Cables/USBTTLSerial.htm>
- Terminal type: AMP 281698-6

Pin	J.6 TTL link
1	GND
2	NC
3	+5 V input
4	TXD
5	RXD
6	NC

**Ethernet**

The CC3000 Controller has a standard RJ45 connection for network connection, an SNMP interface and modbus over TCP/IP included.

- Network settings are done via WEB GUI, TTL link, SD card or Modbus configuration setup.

The SNMP interface makes it possible to add the CC3000 controller to your existing network and enables you to interact (both “get/set” and “trap” functions) with the CC3000 controller from your NOC (Network Operation Center).

Firmware upgrade and file transfer between CC3000 and NOC can be done using TFTP. See this table:

Options for use	TFTP-examples
• Download configuration file.*	Tftp -i [ip address] get cc_cfg.txt
• Upload configuration file*	Tftp -i [ip address] put cc_cfg.txt
• Download log file. (from SD card)*	Tftp -i [ip address] get stat_log.txt
• Upload firmware * **	Tftp -i [ip address] put cc3k_app.bin

\*(from CC3000 controller to NOC)

\*\* Note: After upload of new firmware a controller reset must be initiated by either power cycling the controller or by activating reset in WEB GUI.

**To check IP address of controller:**

- Use WEB GUI and go to network settings.

Specifications:

- Supporting up to 3 different trap managers.
- MIB file is available. RFC 1213
- SNMP uses Version 1 protocol.

**WEB GUI**

The CC3000 controller has a WEB interface (GUI) implemented, for easy access via IP address. It can advantageously be used for monitoring the system. See more on page 32.

## Maintenance

### Activate occupied mode

Activate and adjust occupied mode in order to obtain a suitable temperature in shelter during service job (duration can be changed). Occupied mode is a temporary override mode, where the system returns back to normal operation mode, when the set time has passed.

(see "Menu overview" on page 23, in order to navigate to occupied mode or see setting options in "occupied mode" on page 35)

### Replace battery

We recommend to replace battery coin cell 2032 every 5<sup>th</sup> year, in order to preserve clock and calendar settings during power off.

See how to access the battery in Fig. 16.

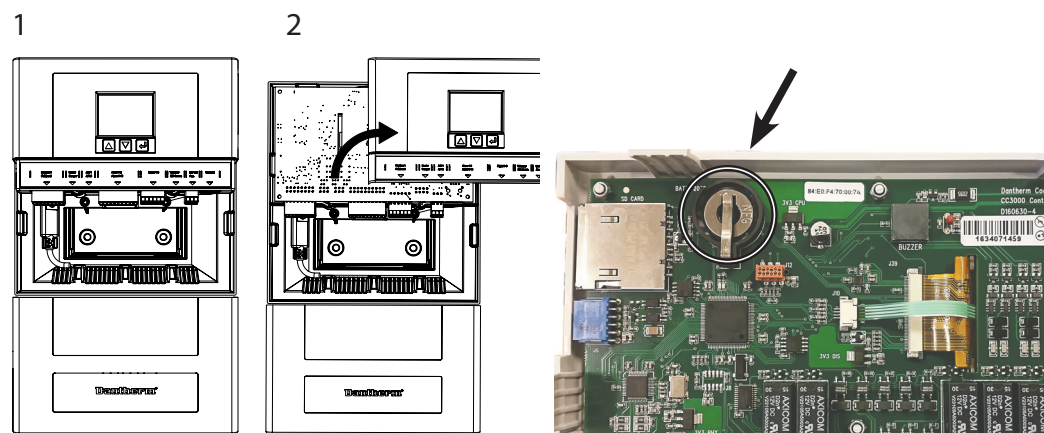


Fig. 16

## Appendix

### Technical Data

Data sheet

Items	Values/ Rane
Power supply voltage	40-60V DC
Internal power consumption	< 4W
Battery socket	CR2032
SD card socket	Standard SD card up to 32GB
TTL link	Serial communication line. Service Port. 5V signalling - TX, RX, gnd, 5V
Ethernet	Magnetics RJ45 with status LEDs, SNMP, Modbus, WEB GUI
24 V DC AUX	24V DC 100mA
Heater	Dry contact or 24V DC out. NO/NC. Max. 60V DC
I <sup>2</sup> C	Communication interface for 3,3V DC I <sup>2</sup> C components. (RH sensor, pressure sensor) Max wire length 1,5 m
Temp. sensors, room, hotspot	NTC type NTCLE100E3272GB0
3x digital input	For use with dry contacts. 1K pull up to 12V DC.
10x Alarm output	Dry contacts. 2x mechanical relay NO/NC. Max. voltage 60V DC/ 100mA 8x solid state relay. Max voltage 60V DC/ 100mA
A/C1/A/C 2 output	Dry contacts. 2x mechanical relay, NO/NC or 24V DC. Max 60V DC
Damper 1/ Damper 2	24V DC open/closed signal
2x free coling unit (Flexibox)	2x 8 wire 0,5mm <sup>2</sup> interface for free cooling unit.

## Schematics

### Connection diagram (PCB)

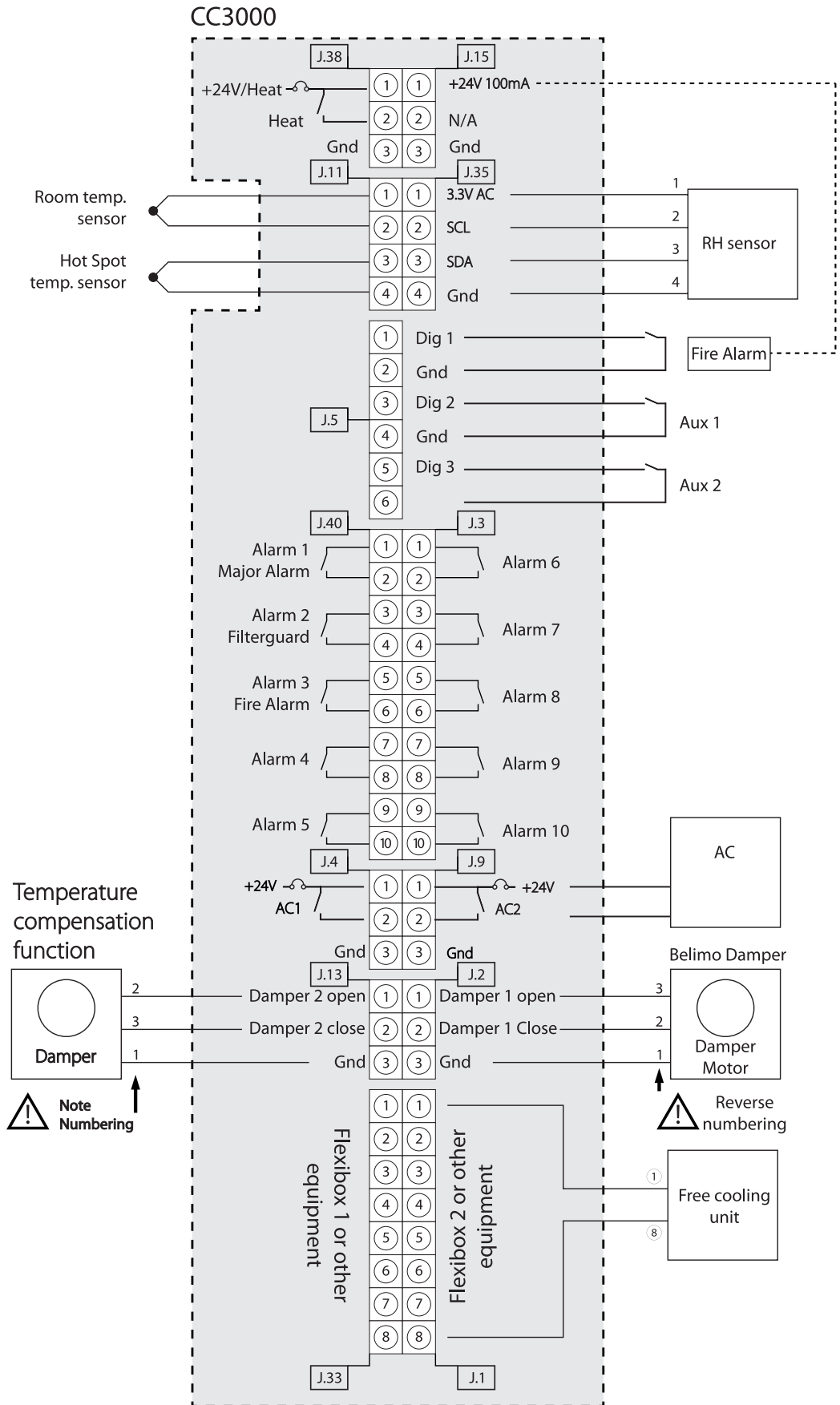
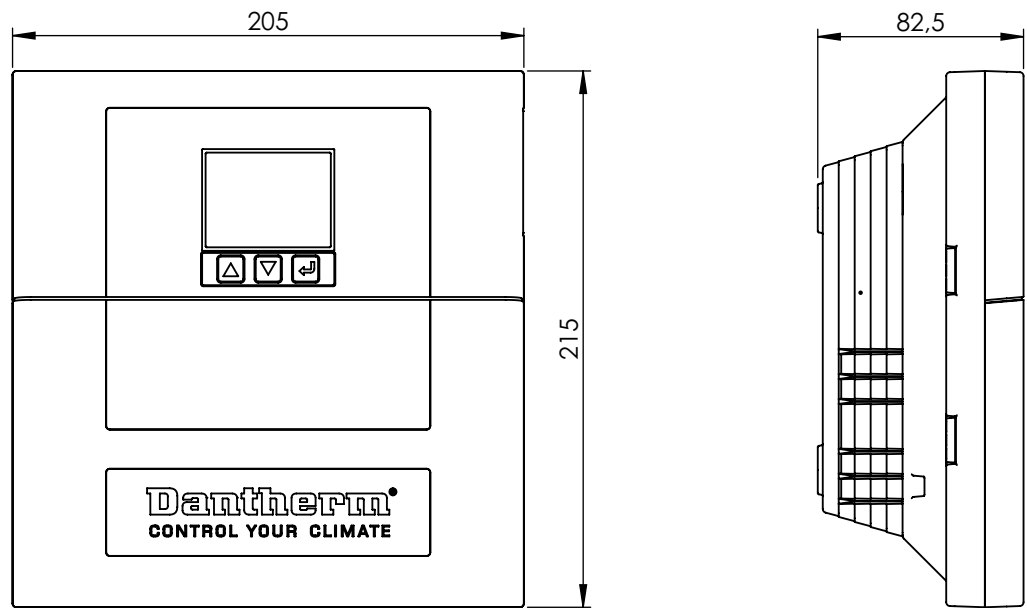


Fig. 17

## Enclosure dimensions



## Rear Cover

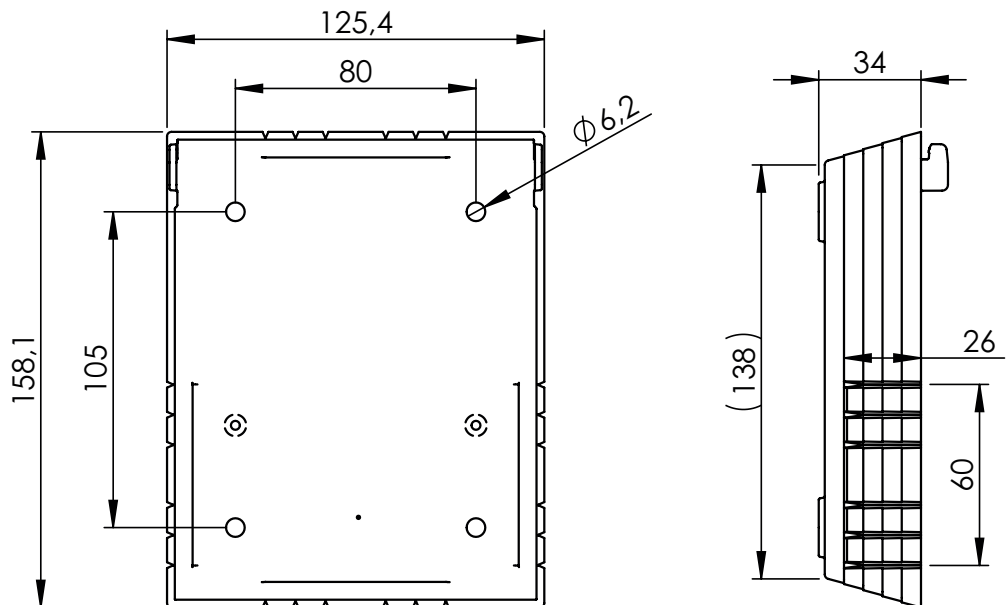


Fig. 18





**Dantherm A/S**  
Marienlystvej 65  
7800 Skive  
Denmark  
support.dantherm.com



093913

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Dantherm can accept no responsibility for possible errors and changes (en)  
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