Dantherm®
CONTROL YOUR CLIMATE

Controller CC3000

Service manual
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en

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CC3000

Introduction

Overview

This document is a technical user manual for the new CC 3000 free cooling controller.

The CC 3000 controller is used for free cooling systems with or without additional air conditioner. The controller can operate two Free cooling units, two exhaust dampers/TC damper and two air conditioners.
The controller supports basic temperature control of temperature in enclosures and relative humidity functions, like change of operating mode, in order to minimize energy consumption.
The CC3000 is equipped with a 2,4 inch TFT color display and an ethernet connection for remote monitoring and control.

Warning

Please ensure you read this service manual, and use the correct operating and maintenance procedures.
Read the entire manual before using the controller.
Knowledge of how to operate the controller correctly is important, to avoid damage or injury.

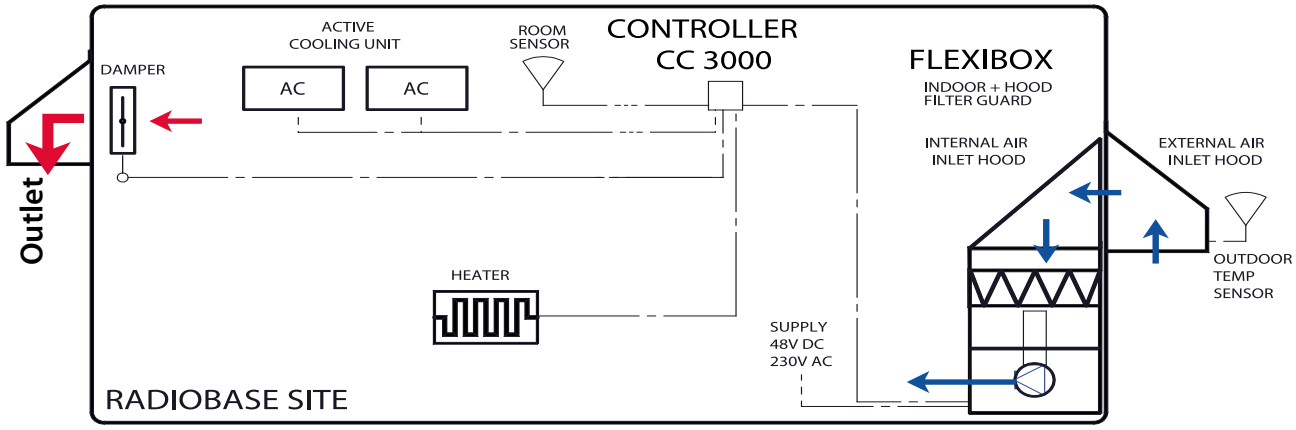
Important

- **Digital inputs must be connected to potential free contacts only. (internal 12V pull up, do not connect 230VAC or 48VDC)**
- **Alarm outputs are potential free contacts. (connect max. 60V DC / 100mA)**

Provisos

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

Free cooling unit Indoor flow -
Example shown with Flexibox 900



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Technical Description

Introduction

The CC3000 controller is fitted with a 2,4 inch TFT color display.
Embedded micro controller is a 32 bit Cortex M3 core.
Product configuration and firmware update can be done by use of standard SD card or network.
The CC3000 controller is enclosed in a special designed plastic casing, with UL rating 94-V0, dedicated for wall mount.
Control circuit is all low voltage and is designed according to EN/UL 60950.

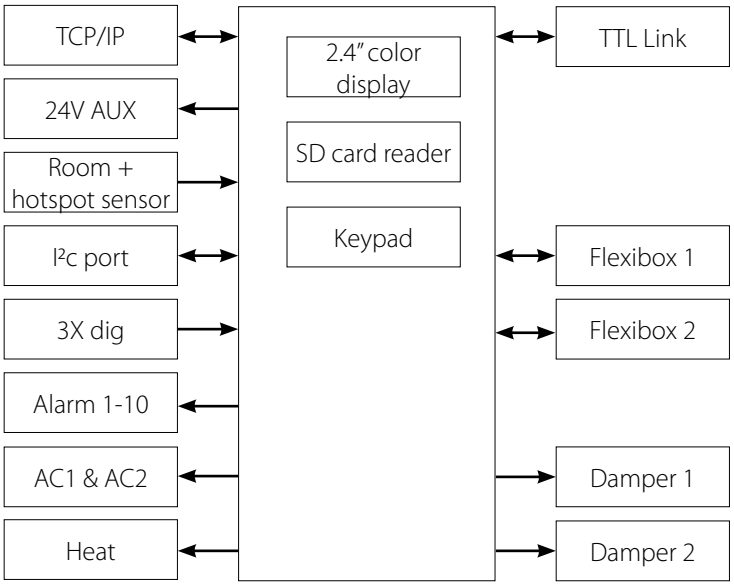
Description

The CC3000 is designed as a single board controller, including all connections needed to support free cooling products.
It has connection for two Free cooling unit/DFC products, two motorized dampers and two drycontacts for start/stop signal to AC/DC air conditioner.A dry contact for signal to heater unit is also provided.
10 dry contacts for alarming, fully configurable.
All connections are done with multi connectors using spring loaded terminations.
LAN connection for remote monitoring and setup using SNMP, Modbus and Web GUI

Technical Data

Items	Values/Range
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
24V DC AUX.	24V DC 100mA
Heater	Dry contact or 24V DC out. NO/NC. Max 60V DC
I2C	Communication interface for 3,3V DC I2C components. (RH sensor, pressure sensor) Max wire length 1,5m
Temperature 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
AC1/AC2 output.	Dry contacts. 2x mechanical relay, NO/NC or 24V DC. Max 60V DC.
Damper 1/Damper 2	24V DC open/close signal.
2x Flexi box	2x 8 wire 0,5mm^2 interface for flexi box.

Block Schematic



Connections Diagram

CC3000

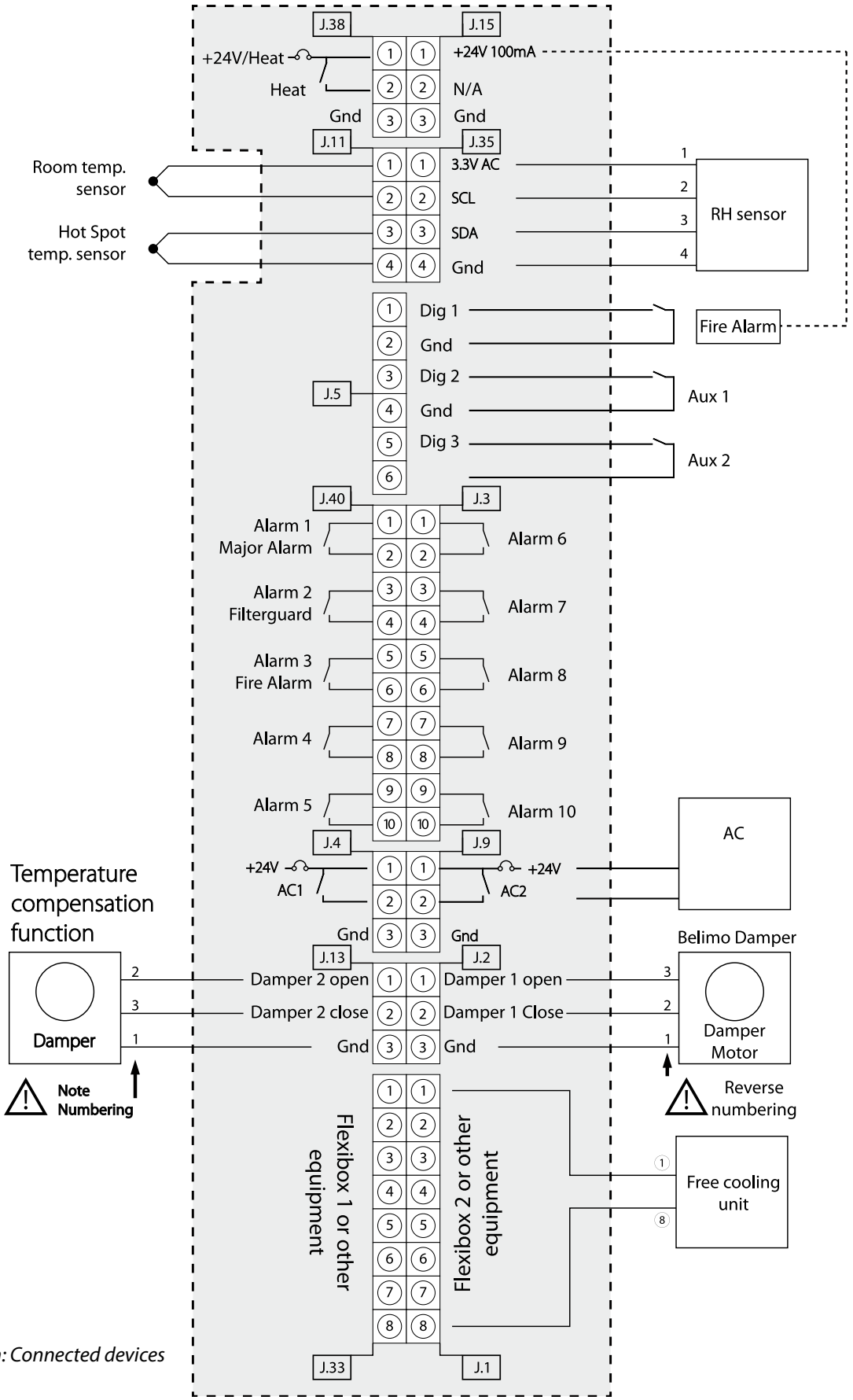


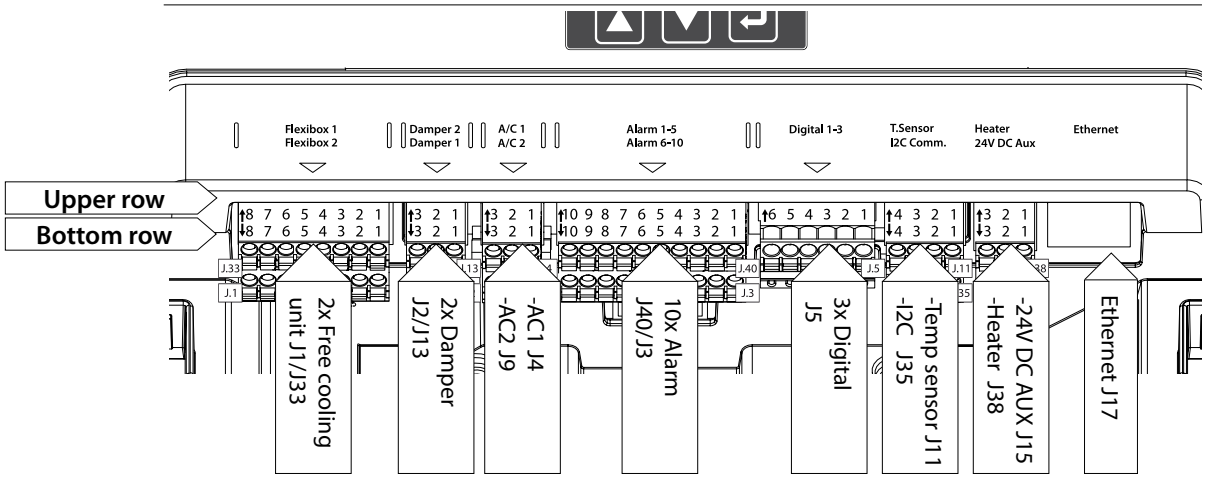
Illustration: Connected devices

Free cooling unit pin location

Bottom row			
Pin and wiring number	J No	Cable type	Bottom Row FUNCTION
1	J.1	0,5mm²	+ 48V
2	J.1	0,5mm²	PWM
3	J.1	0,5mm²	Taco
4	J.1	0,5mm²	GND
5	J.1	0,5mm²	Filter
6	J.1	0,5mm²	GND
7	J.1	0,5mm²	AMB
8	J.1	0,5mm²	GND
1	J.2	0,5mm²	DP Close
2	J.2	0,5mm²	DP Open
3	J.2	0,5mm²	GND
1	J.9	0,5mm²	AC.1
2	J.9	0,5mm²	AC.1
3	J.9	0,5mm²	Common fused
1-2	J.3	0,5mm²	AL.6
3-4	J.3	0,5mm²	AL.7
5-6	J.3	0,5mm²	AL.8
7-8	J.3	0,5mm²	AL.9
9-10	J.3	0,0,5mm²	AL.10
1	J.35	0,5mm²	3,3 V DC
2	J.35	0,5mm²	SCL
3	J.35	0,5mm²	SDA
4	J.35	0,5mm²	GND
1	J.38	0,5mm²	Heat /24V
2	J.38	0,5mm²	Heat
3	J.38	0,5mm²	GND

Upper row			
Pin and wiring number	J No	Cable type	Upper Row FUNCTION
1	J.33	0,5mm²	+ 48V
2	J.33	0,5mm²	PVM
3	J.33	0,5mm²	Taco
4	J.33	0,5mm²	GND
5	J.33	0,5mm²	Filter
6	J.33	0,5mm²	GND
7	J.33	0,5mm²	AMB
8	J.33	0,5mm²	GND
1	J.13	0,5mm²	DP Close
2	J.13	0,5mm²	DP Open
3	J.13	0,5mm²	GND
1	J.4	0,5mm²	AC.2
2	J.4	0,5mm²	AC.2
3	J.4	0,5mm²	Common fused
1-2	J.40	0,5mm²	AL.1
3-4	J.40	0,5mm²	AL.2
5-6	J.40	0,5mm²	AL.3
7-8	J.40	0,5mm²	AL.4
9-10	J.40	0,5mm²	AL.5
1	J.5	0,5mm²	DIGI.1
2	J.5	0,5mm²	GND
3	J.5	0,5mm²	DIGI.2
4	J.5	0,5mm²	GND
5	J.5	0,5mm²	DIGI.3
6	J.5	0,5mm²	GND
1	J.11	0,5mm²	Room Temp
2	J.11	0,5mm²	GND
3	J.11	0,5mm²	Hot Spot temp
4	J.11	0,5mm²	GND
1	J.15	0,5mm²	24 V DC
2	J.15	0,5mm²	NA
3	J.15	0,5mm²	GND

Connector details



Free cooling unit

J1/J33 Anytek KE161151A000G (Mating type Anytek KD161050A000G)
1 +Supply (40-60V DC from Free cooling unit)
2 PWM1/2
3 Tacho 1/2
4 GND
5 Filter 1/2
6 GND
7 Outdoor temperature sensor 1/2
8 GND

Motorized Damper

J2/J13 Anytek KE061151A000G (Mating type Anytek KD061050A000G)
1 Close signal
2 Open signal
3 Common (Fused)

Air Conditioner

J9/J4 Anytek KE061151A000G (Mating type Anytek KD061050A000G)
1 AC1/2 /+24V- 100mA. Output can be configured as dry contact or 0/24 DC output. Default is dry contact. For 0/24V DC output, a jumper on PCB must be set. See illustration next page.
2 AC1/2 - 0/24V DC
3 GND

Alarm

J3/J40 Anytek KE201151A000G (Mating type Anytek KD201050A000G)	
J40,1,2	AL1
J40,3,4	AL2
J40,5,6	AL3
J40,7,8	AL4
J40,9,10	AL5

J3,1,2	AL6
J3,3,4	AL7
J3,5,6	AL8
J3,7,8	AL9
J3,9,10	AL10

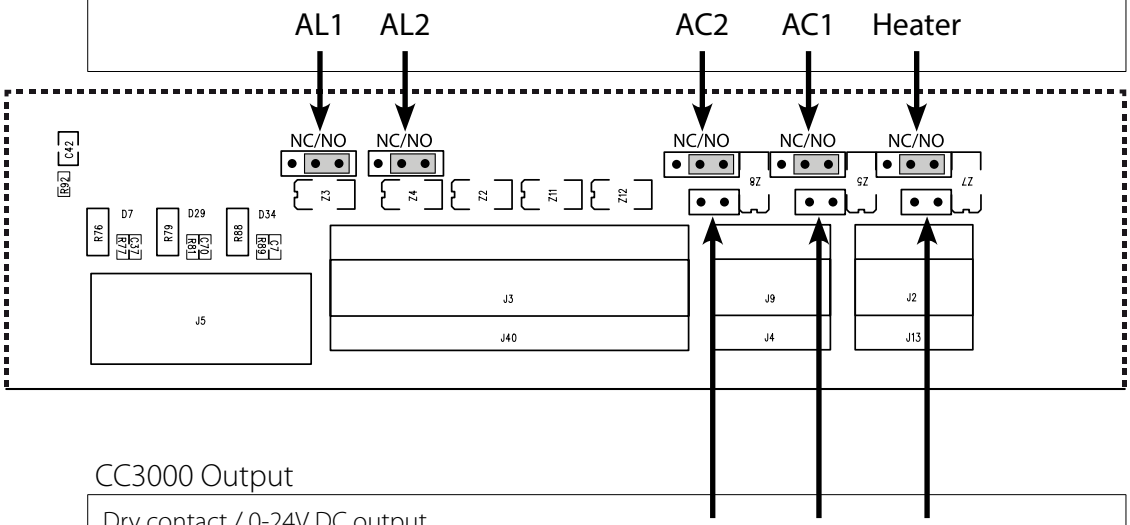
Note: Alarm outputs are dry contacts.
Alarm 1 and 2 output are mechanical relay contact with NO/NC contact
Alarm 3-10 is solid state type. NO contact.

Configuration of outputs

Configuration of outputs

- AL1 , AL2, AC1, AC2 and Heater outputs can be configured as either normally open (NO) or as normally closed (NC) contacts by change of jumper settings.
- AL1 and AL2 are dry contacts.
  AC1, AC2 and heater can be configured as either dry contacts or as 0-24V DC output.

Illustration:
Section of PCB - Jumper settings



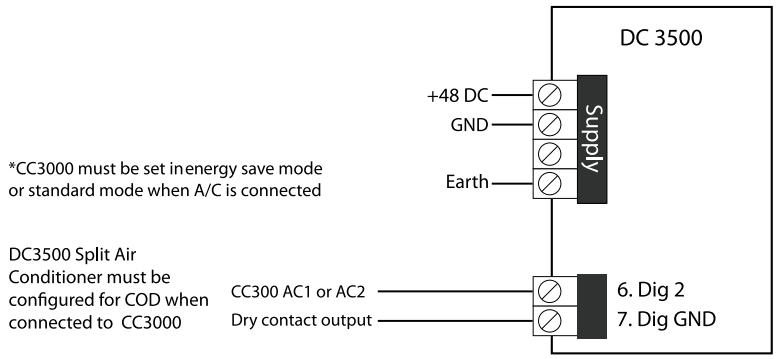
CC3000 Output

Dry contact / 0-24V DC output.
By default the jumpers are not mounted. Jumpers are not included.

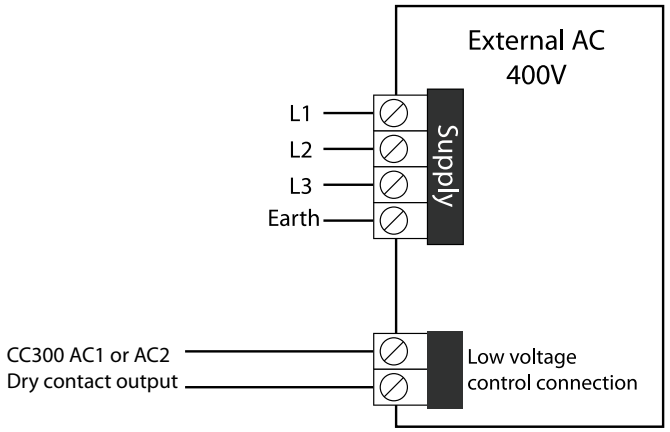
24V Contacts	If you mount jumpers AC and Heater output can drive power contactors with 24V DC coil direct. (Max 125mA)
	Use pin 2-3 in J.4, J.9, J.38 (See illustration: Connected devices, page 4)
Dry Contacts	If you don´t mount jumpers AC and Heater output can be used as dry contacts. (max 500 mA @ 60V DC)
	Use pin 1-2 in J.4, J.9, J.38 (See illustration: Connected devices, page 4)

Connect Air Conditioner to CC3000

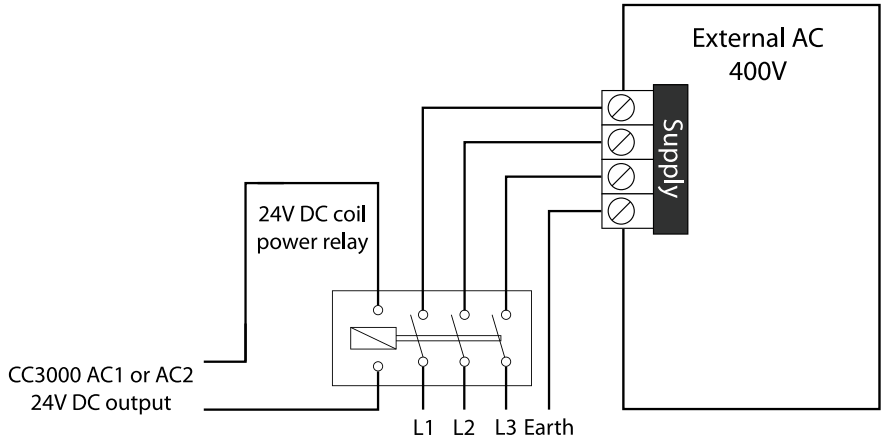
Option 1



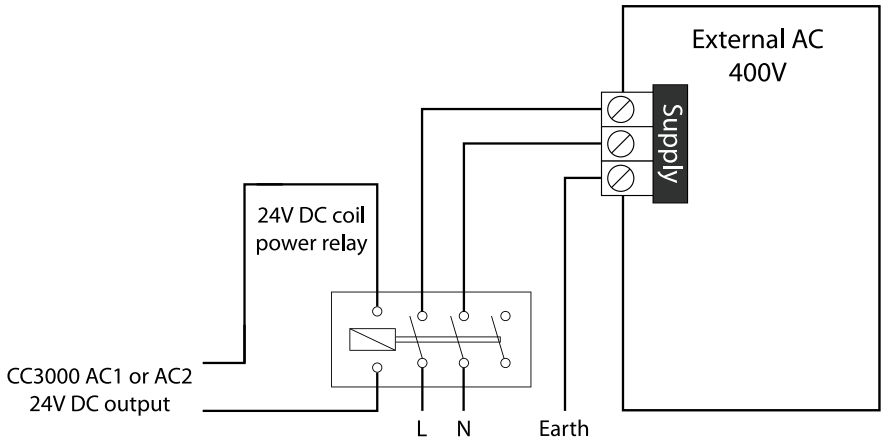
Option 1a



Option 2



Option 3



Connection Detail

Digital Input

J5 FCI 20020110-C061A01LF (Mating type Anytek KD0610500000G)
1 DIG1 (1K pull up to 12V DC)
2 GND
3 DIG2 (1K pull up to 12V DC)
4 GND
5 DIG3 (1K pull up to 12V DC)
6 GND

Temperature sensor/ I²C comm.

J11/J35 Anytek KE081151A000G (Mating type Anytek KD081050A000G)	
J11,1	Room temperature sensor. NTC type
J11,2	GND
J11,3	Hotspot temperature sensor NTC type
J11,4	GND
J35,1	+3,3V DC
J35,2	SCL
J35,3	SDA
J35,4	GND

24V DC AUX/ Heater

J15/J38 Anytek KE061151A000G (Mating type Anytek KD061050A000G)
1 +24V DC 100mA
2 NC
3 GND
1 Heat/+24V - Output can be configured as dry contact or 0/24 DC output. Default is dry contact. For 0/24V DC output, set jumper on PCB. See illustration on page 7.
2 Heat - 0/24V DC
3 GND
Heater output can be configured as dry contact or 0/24 DC output. 100mA Default is dry contact

TTL Link

J6 AMP 281698-6
1 GND
2 NC
3 +5V input
4 TXD
5 RXD
6 NC
TTL link can be used with standard USB to TTL cable. TTL link is isolated galvanically.

Ethernet

J17 RJ45 LAN connector CAT5/CAT6. PulseJack J0011D21BNL

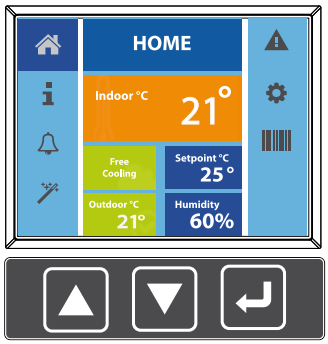
Operation

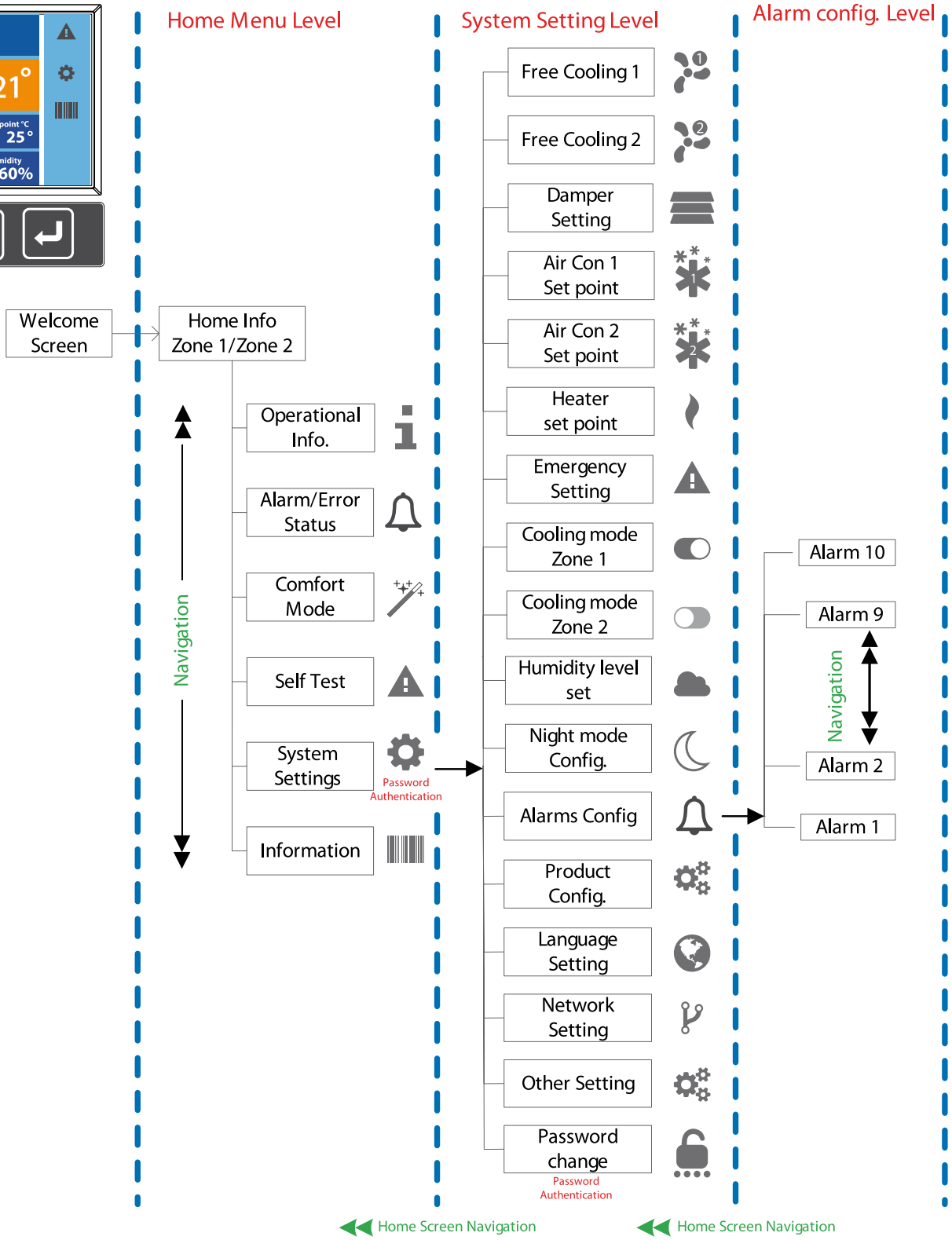
Controller operation GUI

Graphical User Interface

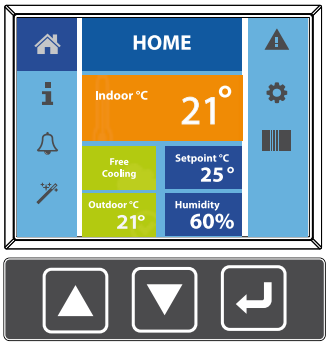
The CC3000 controller has a Graphical User Interface, GUI.
GUI uses 2,4 Inch TFT color display and 3 button keypad for menu navigation.
Display main page holds vital status information about operating conditions.
Sub menus are available for detailed information or change of controller settings.
Setting menus are password protected.

Menu overview





Home Menu

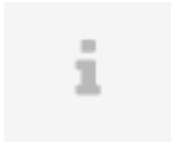


Home menu gives information about :

- Indoor temperature.
- Cooling set point
- Outdoor temperature
- Humidity. (if humidity sensor is connected)
- Operational status. (In-active, Heating, Free-cooling, Active-cooling, Alert)

Note: Long press on enter key will return direct to home menu.
Note: Press on enter will shift between shelter1/shelter 2 home menu
- only when dual zone is enabled.

Operational Status



Operational status menu informs about duration of the different operating states.

- Fan 1 operational duration in hours
- Fan 2 operational duration in hours
- A/C 1 operational duration in hours
- A/C 2 operational duration in hours
- Heater operational duration in hours

Fan 1 & 2 hour counters are increased when free cooling system is in operation.
A/C 1 & 2 hour counters are increased when air conditioner is in operation
Heater hour counter is increased when heater is in operation
Counters can only be reset over SNMP or TTL link.

Alarm Status

Alarm status menu gives information about which alarms is present currently.
Only alarms that are mapped to any of the 10 hardware alarm outputs are visible in this menu.
Only present alarms are visible, not historical alarms.

Available alarms:	
Low DC supply voltage	Onboard temperature sensor
High DC supply voltage	Indoor temperature sensor
Low indoor temperature	Hotspot temperature sensor
High indoor temperature level 1	Outdoor temperature sensor 1
High indoor temperature level 2	Outdoor temperature sensor 2
High indoor temperature level 3	Digital input 1
Low indoor humidity	Digital input 2
High indoor humidity	Digital input 3
Filter pressure level 1 (analog pressure sensor optional)	Filter guard 1 (Standard)
Filter pressure level 2 (analog pressure sensor optional)	Filter guard 2 (Standard)
Fan 1	Network (LAN connection)
Fan 2	Memory (Internal non volatile memory)
	SD card - Read/write failure

Occupied mode

Occupied mode can be used by service personnel to obtain a suitable temperature in shelter during service job. Free cooling fan is limited to idle RPM.
Temperature set point can be changed and the duration for the set point change.

- Setpoint °C (10-30 °C)
- Duration in minutes. (maximum 480 minutes)
- Disable/enable
- Exit. (Exits occupied mode and returns to normal mode)

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.

Stop/Start (Automatic sequency)	Alarm 1 (Alarm output will be toggled)
None. (No components are activated. Normal mode)	Alarm 2 (Alarm output will be toggled)
Dampers open.	Alarm 3 (Alarm output will be toggled)
Fans Max RPM (75%) duty cycle.	Alarm 4 (Alarm output will be toggled)
Dampers close.	Alarm 5 (Alarm output will be toggled)
Heater	Alarm 6 (Alarm output will be toggled)
Air Con 1	Alarm 7 (Alarm output will be toggled)
Air Con 2	Alarm 8 (Alarm output will be toggled)
	Alarm 9 (Alarm output will be toggled)
	Alarm 10 (Alarm output will be toggled
	Exit (Exits self test menu, and returns to normal mode)

System settings

Entry to sub menu, where system settings can be done.
To enter this menu, password is needed. (***default password is: 0000***)
All vital parameters for the system can be set in this menu.

System information

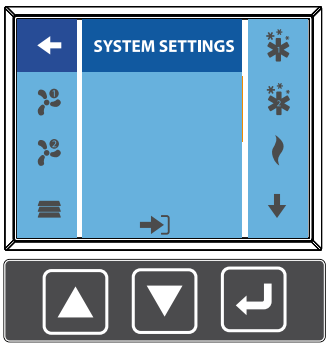
Product information is available under system information.

- FW. (Controller firmware version)
- MAC Adress

If you have entered the infomation 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)

System settings



Cooling set point zone 1

Free cooling unit 1 fan control settings.
Defines where cooling performance will have its minimum, maximum and start temperature.
P-band is between minimum and maximum.
Dual P-band can be configured.

- 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)
- Exit. (saves data and exits menu)

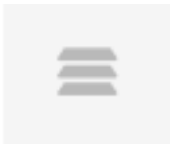
If dual P-band is not used set midpoint 1 and 2 to same value as max °C and midpoint (RPM to 100%)

Cooling set point zone 2

Free cooling unit 2 fan control settings.
Defines where cooling performance will have its minimum, maximum and start temperature.
P-band is between minimum and maximum.
Dual P-band can be configured.

- 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)
- Exit. (saves data and exits menu)

Damper settings



Defines how the motorized damper is operated. Can be set to two different modes.
Normal mode is used for exhaust dampers and dynamic mode is used for intake dampers with integrated bypass function.

- 1. Normal/Dynamic. (Normal: Damper open/close, Dynamic: Damper 0-100%)
- 2. Normal/Dynamic. (Normal: Damper open/close, Dynamic: Damper 0-100%)
- Exit. (Saves settings and exits menu.)

Air Conditioner 1 set point

Settings for Air Conditioner 1 output. (AC1)

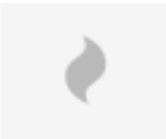
- ON °C (shelter temperature where air conditioner starts)
- OFF °C (shelter temperature where air conditioner stops)
- Disable/Enable
- Exit. (Saves settings and exits menu.)

Air Conditioner 2 set point

Settings for Air Conditioner 2 output. (AC2)

- ON °C (shelter temperature where air conditioner starts)
- OFF °C (shelter temperature where air conditioner stops)
- Disable/Enable
- Exit. (Saves settings and exits menu.)

Heater set point



Settings for heater output.

- ON °C (shelter temperature where heater starts)
- OFF °C (shelter temperature where heater stops)
- Exit. (Saves settings and exits menu.)

Emergency settings

Settings for emergency operation. In emergency operation free cooling is at full performance.

- -Entry °C (shelter temperature where emergency cooling starts)
- -Exit °C (shelter temperature where emergency cooling stops)
- -Exit. (Saves settings and exits menu.)

Cooling mode zone 1

Settings for cooling mode in cooling zone 1. Four different cooling modes can be set.

- 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)
- Exit. (Saves settings and exits menu.)

Note:

Freecooling mode:	A/C function is disabled. Best energy performance.
Standard mode:	Freecooling and A/C are interchanged based on outdoor temperature. If dT is not above specified value, A/C setpoint is moved down to free cooling setpoint. Medium/high energy consumption, and fixed temperature setpoint.
Energy save mode:	Freecooling and A/C as backup. Medium energy consumption, higher temperature setpoint for A/C Cooling.
Aircon mode:	Freecooling function disabled. High energy consumption.

See page 22.

Cooling mode zone 2

Settings for cooling mode in cooling zone 2. Four different cooling modes can be set.

- 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)
- Exit. (Saves settings and exits menu.)

Humidity control settings

Settings for humidity control. Controller can change between the four different cooling modes or do set point offset, when surpassing humidity threshold

- Max humidity level % (Humidity threshold)
- Setpoint offset. (Offsets cooling setpoint)
- 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)
- Exit. (Saves settings and exits menu.)

Night mode settings

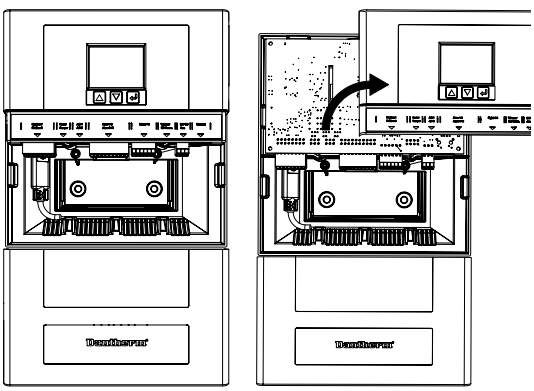
In night mode settings, controller can change between the four different cooling modes, limit max fan speed or do set point offset when night program starts.
If this function is used, current date and time must be set.

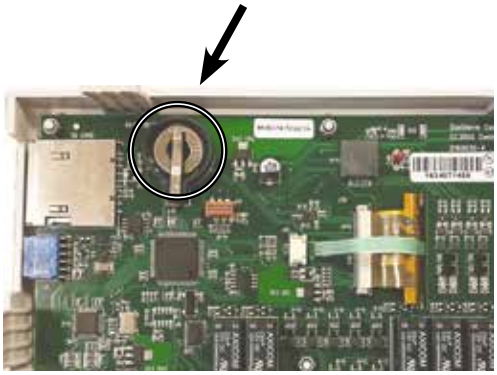
- Disable/enable (Night mode function)
- Start time. (Defines at which time night mode function is active)
- End time. (Defines at which time night mode function is in-active)
- Current time. (clock setting)
- Current date. (Calendar setting)
- Max speed %. (Defines max.fan speed in % during night mode)
- Setpoint 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)
- Exit. (Saves settings and exits menu.)

Note: To preserve clock and calendar settings during power off, a battery coin cell 2032 must be placed in battery socket.
If controller is connected to network and NTP is used, battery is not needed.

Access to battery

1 2





Product configuration

Product configuration menu is used to setup controller for the right product.
The CC3000 controller can be used for different free cooling products.
SD card must be inserted, and product list will pop up on display.
Please choose right product for the application.

- -Product name. (list of different product names)
- -Exit. (Saves settings and exits menu.)

Language settings

List of optional languages.
Insert SD card with language pack and select the desired language.

- **Note**: Language update will take approximately 3 minutes.
  The controller is inactive and shows black screen during update.
  Do not disconnect power.

English is default language. To change back to English - go to Other settings.

Network settings

Settings for Ethernet connection and SNMP trap management.

- 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)
- Exit. (Saves settings and exits menu.)

Other settings

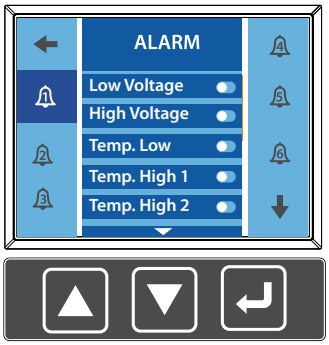
Settings for generic parameters

- 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 configuration. (uploads present configuration to SD card)
- Default setting. (Back to default product settings)
- Exit. (Saves settings and exits menu.)

Change password

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

Alarm configuration



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.

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

Firmware upgrade

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.

- **Please note:**
  Display will show status during firmware upgrade.

Communication

Overview

During installation, the CC3000 controller must be configured for the specific product setup.
When CC3000 is initially powered up with 48V DC, it will enter the product setup menu.
Operator must insert SD card with list of supported products, and chose correct product, matching the actual site setup.
Default language pack is English. Local language pack can be uploaded from SD card.
When product and language pack information is uploaded, remove SD card from controller.
Settings are now stored in onboard nonvolatile memory.

If operational data log is required, a SD card must be present in the SD card socket.
CC3000 will 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)

TTL interface

The serial interface between host and controller established using a USB to serial TTL converter cable assembly.
Connect the serial cable between host and controller. Start up a "Terminal" application in the host PC with following serial ports settings.

- baud rate - 9600
- data bits - 8
- parity - none
- stop bits - 1
- flow control - none.

Now the controller is ready to be accessed.

TTL cable type : TTL-232R-3V3 or TTL-232R-5V
Link: http://www.ftdichip.com/Products/Cables/USBTTLSerial.htm

Ethernet

CC3000 Controller has a standard RJ45 connection for network connection.
This interface has a SNMP and modbus over TCP/IP included.
The SNMP function supports get/set and trap functions.
MIB file is available. RFC 1213
Supports up to 3 different trap managers.
Network settings is done via GUI, SD/TTL card or Modbus configuration setup.

The CC3000 controller has a WEB GUI implemented.
To access WEB GUI use standard browser, and type in IP address of controller.
From WEB GUI most vital control parameters can be setup and monitored
* Note: WEB GUI is password protected - **User: admin - Password: 0000**
To check IP address of controller, use GUI and go to network settings.
Upload and download of configuration, logfiles and firmware can be done via Ethernet port.

Use TFTP. Examples:

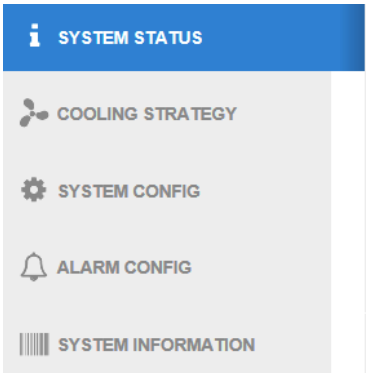
• Download configuration file.	Tftp -i [ip address] get cc_cfg.txt
• Upload configuration file.	Tftp -i [ip address] put cc_cfg.txt
• Download log file. (from SD card)	Tftp -i [ip address] get stat_log.txt
• Upload firmware.	Tftp -i [ip address] put cc3k_app.bin

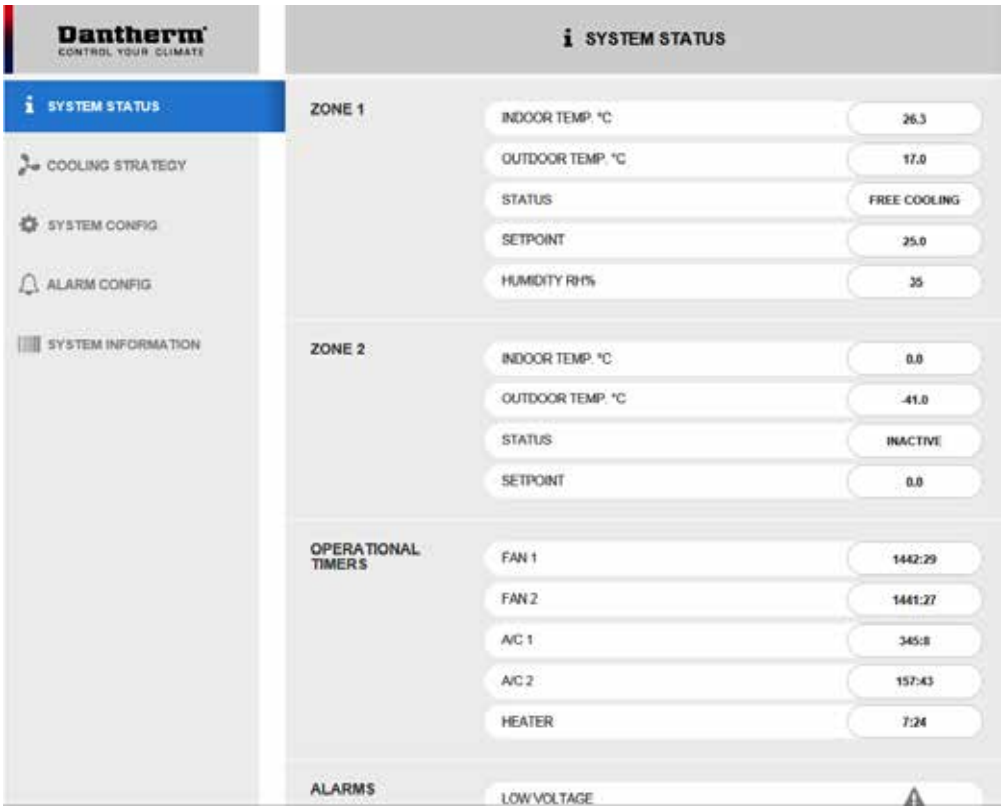
Note: After upload of new firmware a controller reset must be initiated by either power cycling the controller or by activating reset in WEB GUI.

Web GUI
Graphical User Interface

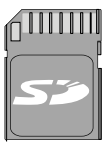
WEB GUI can be used for easy configuration and monitoring.
Easy navigation between sections. Click and edit.

When WEB GUI is accessed via browser, user must enter username (**admin**) and password (**0000**).





SD Card Interface



SD Card type: The controller supports SD card of size 1/2/4/8/16/32GB.
The card must be formatted in FAT/FAT32.
SD card is used for upload of product configuration, language pack, firmware update and can be used for storage of operational log data.

NOTE:

- It is allowed, only to modify the data field mentioned in the configuration file and data should be within the specified range.
- Remember to close the updated configuration file (config.txt) from the SD card, before ejecting it from the host PC.

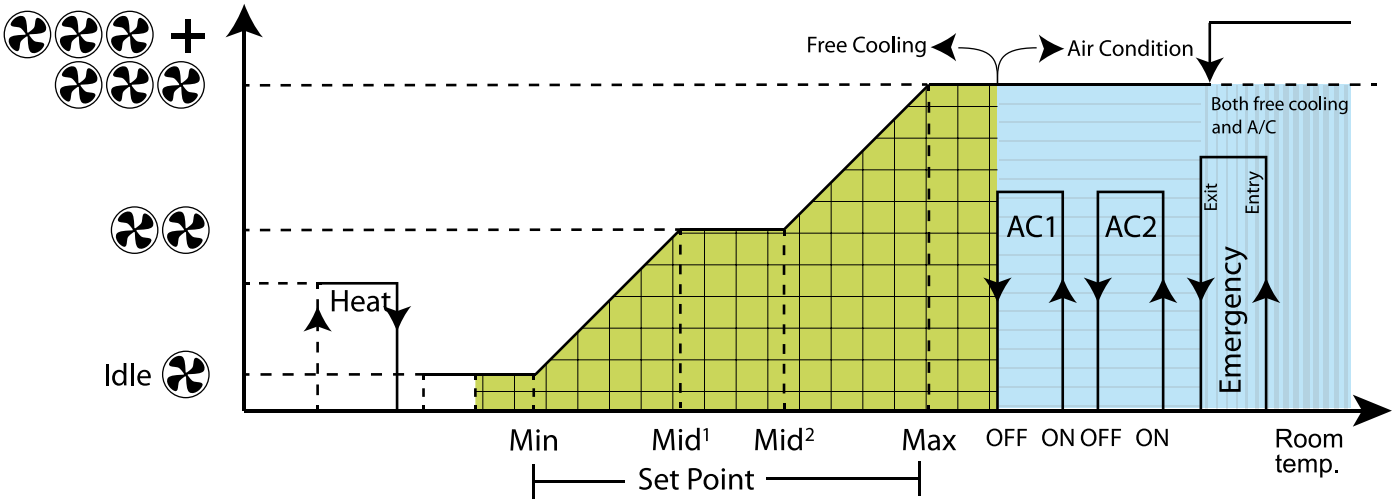
Functional description

Default Cooling strategies (can be changed using the CC3000 controller.)

TTL link

The TTL link interface is used for service / test purposes.
System status information can be read out.
Configuration and settings can be changed.
Override function to verify correct connection of system components like Free cooling unit , dampers, sensors, etc.
All configuration overrides are password protected.

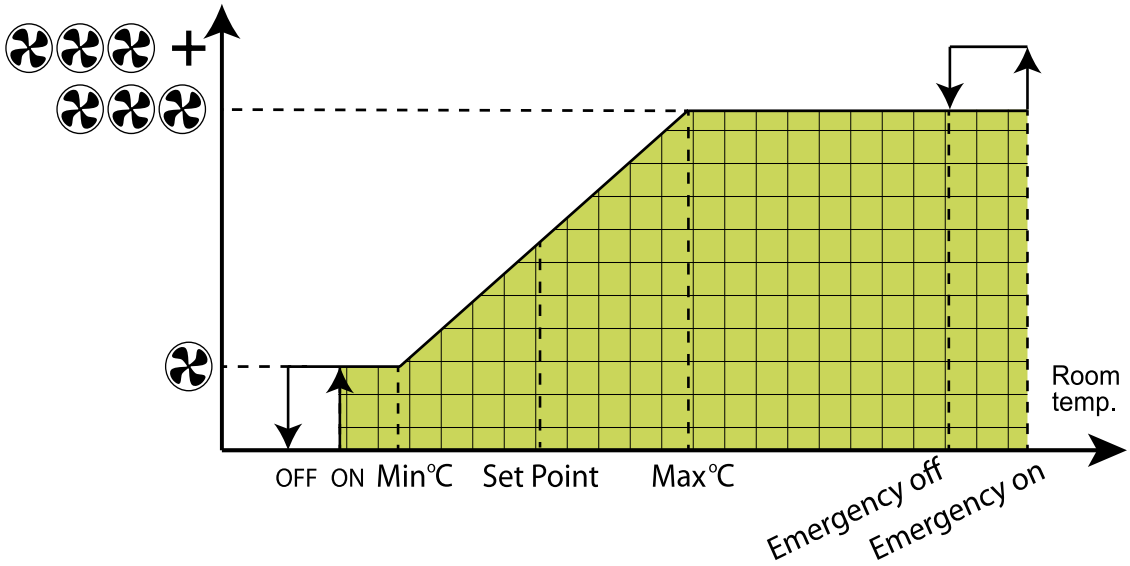
Cooling strategy - example



Default Cooling strategies, *continued*

Free Cooling Mode

	Description	Value
Off	Temperature when fan stops	20
On	Temperature when Fan starts	23
Min °C	Temperature at bottom of P-band	25
Max °C	Temperature at top of P-band	29
Set Point	The wanted indoor temperature; fan speed will be adjusted between Min°C and Max °C	27
Emergency on	Fan run 100%	38
Emergency off	Fan go back to nominal speed	36

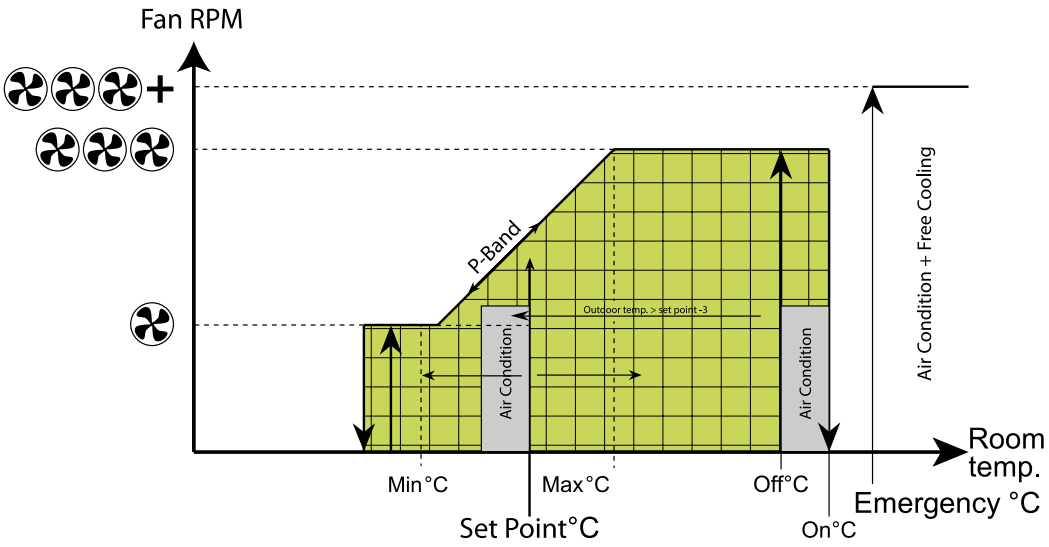


Default Cooling strategies, *continued*

Standard Mode (Freecooling <> A/C)

	Description	Value
Off	Temperature when fan stops	20
On	Temperature when Fan starts	23
Min °C	Temperature at bottom of P-band	25
Max °C	Temperature at top of P-band	29
Set Point	The wanted indoor temperature; fan speed will be adjusted between Min°C and Max °C	27
A/C 1 on	External Air Con unit 1 start if connected	31
A/C 1 off	External Air Con unit 1 stops if connected	29
A/C 2 on	External Air Con unit 2 start if connected	33
A/C 2 off	External Air Con unit 2 stops if connected	31
Emergency on	Fan run 100% and both A/C 1 and A/C 2 starts	38
Emergency off	Fan stops both A/C 1 and A/C 2 continue to run	36

A/C unit 1 start at set point if outdoor temperature is less than 3°K colder than set point.
If outdoor temperature is more than 3°K colder than setpoint the A/C unit 1 will start at 31°C

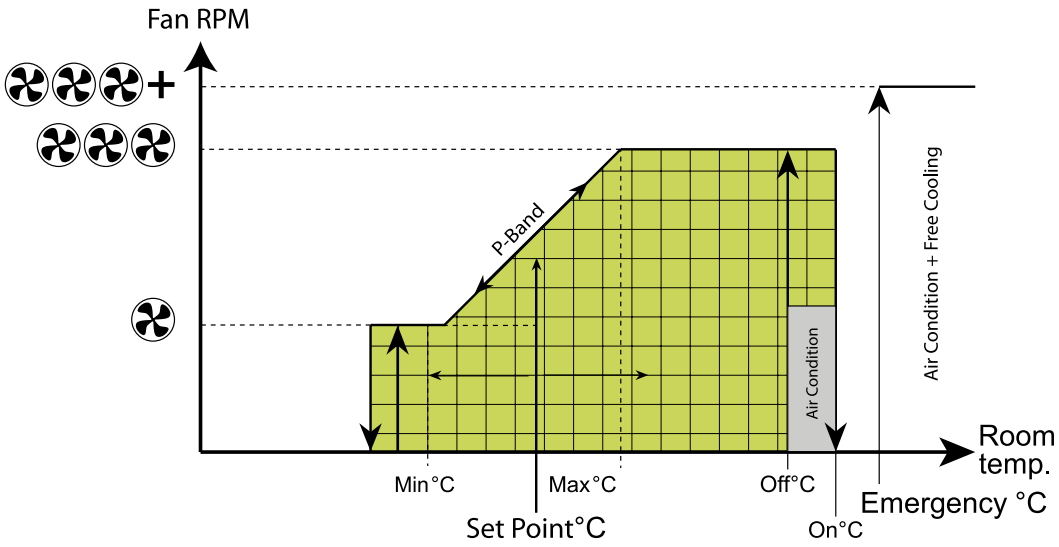


Default Cooling strategies, *continued*

Energy save Mode (Freecooling > A/C)

	Description	Value
Off	temperature when fan stops	20
On	Temperature when Fan starts	23
Min °C	temperature at bottom of P-band	25
Max °C	Temperature at top of P-band	29
Set Point	The wanted indoor temperature; fan speed will be adjusted between Min°C and Max °C	27
A/C 1 on	External Air Con unit 1 start if connected	31
A/C 1 off	External Air Con unit 1 stops if connected	29
A/C 2 on	External Air Con unit 2 start if connected	33
A/C 2 off	External Air Con unit 2 stops if connected	31
Emergency on	Fan run 100% and both A/C 1 and A/C 2 starts	38
Emergency off	Fan stops both A/C 1 and A/C 2 continue to run	36

If outdoor temperature is less than 1°C colder than indoor room temperature the Flexibox Fan will stop.
The connected Air-con units will start and stop according to the table above.

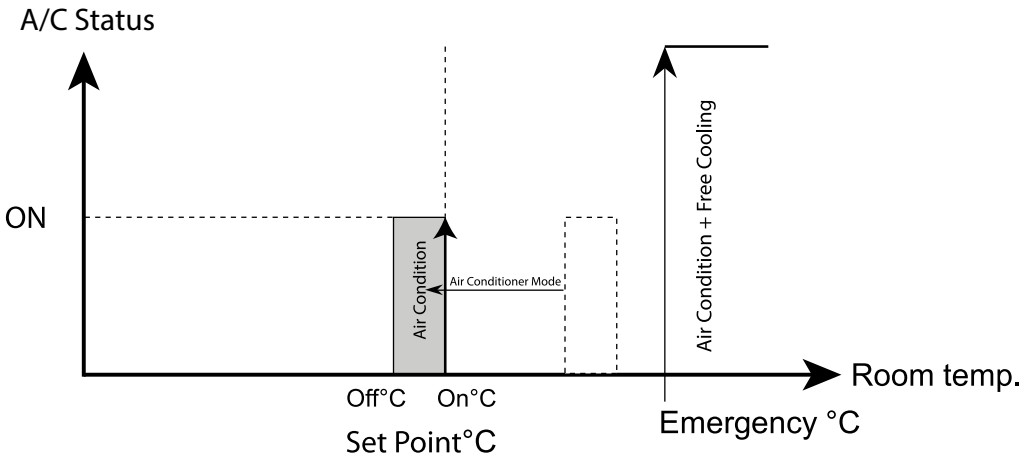


Default Cooling strategies, *continued*

Air Conditioner Mode

	Description	Value
Set Point	External Air Con unit 1 start if connected	27
A/C 1 off	External Air Con unit 1 stops if connected	25
A/C 2 on	External Air Con unit 2 start if connected	29
A/C 2 off	External Air Con unit 2 stops if connected	27
Emergency on	Fan run 100% and both A/C 1 and A/C 2 starts	38
Emergency off	Fan stops both A/C 1 and A/C 2 continue to run	36

The free cooling unit is not active, only the connected Air conditioners



How To:

Change Cooling 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.
To change cooling mode enter the system settings on main menu and go to icon.

See page15 -16

Change set point.

In case default free cooling set point is not suitable for your application, the set point can be changed.
To change free cooling set point, enter the system settings from main menu and go to icon

See page 14

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 setpoint.

Change NO/NC configuration on Digital input.

In case the digital inputs are used together with external transducers like a fire alarm, it may be necessary to change the input from normally open NC to normally closed NC.
This is only way to do this is via configuration file.
Remove the SD card from the controller and put it into your PC SD card reader.
Open the .txt file with the file name that match your product.
The .txt file can be opened with wordpad.
Go to system control configuration section and change line 57/58/59 to match your requirement.
Marked with **bold**

```
57.Dig.1 NO/NC Type                    [0/1]: 0
58.Dig.2 NO/NC Type                    [0/1]: 0
59.Dig.3 NO/NC Type                    [0/1]: 0
```

Note. (NO=0 NC=1)

When required change is done, save and close the file.
Insert the SD card into the controller and go to product configuration menu.

See page 18.

Now select the file name on the list and press enter.
New settings will be uploaded.

How To, *continued*

Connect air conditioner and heater.

The CC3000 controller can give on/off signal to one heater and two air conditioners.
Signal output can be configured as dry contacts or 0/24V DC.
Dry contact configuration is used if air conditioner or heater has a logic control input.
0/24V DC output configuration is used if heater or air conditioner is controlled by power relays with 24V DC coil voltage.
See page 8 in manual, for configuration of control outputs.
Page 21 shows different types of air conditioner connections.

When connecting A/C

Important:
Change cooling mode to energy save or standard mode. See page 15

Change product configuration.

The CC3000 controller can be used with different types of cooling products.
It is important that the controller is configured to match the cooling product it is connected to.
During the very first power up of controller, it will automatically go the product configuration menu.
Now the SD card must be inserted, and a list of product names will pop up on display.
Chose the product name that match the product installed.
If product is changed later on, go to product configuration menu, and chose matching product.
See page 18 in manual.

If custom made configuration is done, temperature setpoints, operating mode, alarms etc, these settings can be saved to SD card, and used for setting up other controllers.
See page 17 in manual. Other settings menu.
Back up file is named cc_cfg.txt.
This file can be renamed, but max 8 characters are allowed. Xxxxxxxx.txt

Check correct installation.

After installation of controller and cooling product, correct connectivity can be checked by use of a selftest function.
See page 13.

If automatic sequence is started, controller will activate all outputs one by one.
Time duration for each step is 3 minutes, which should be sufficient for the installer to check that fans, dampers, air conditioners, heaters and alarms are correctly connected.
Test steps can be bypassed by pressing down key.

A manual sequence can also be used, if only relevant outputs are checked.
Use up/down key to choose output and press enter. Output is now activated.
Pressing enter again, will deactivate output.

After connectivity check, go to main menu and check that indoor/outdoor temperature reading is correct and that set point is correct.

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.

Be aware that if sensor temperature reach air conditioner set point and air conditioner is started, it has a minimum runtime of 3 minutes.

Dantherm
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Declaration of Conformity for Machinery

CE

Dantherm Air Handling A/S
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DK - 7800 Skive

Tel.: +45 96 14 37 00
Fax: +45 96 14 38 00

Declaration of following product:

Product name: **CC3000**

Product No: 091210

- 2006/42/EC Directive on the safety of machines
- 2014/35/EU Low Voltage Directive
- 2014/30/EU EMC Directive
- 2011/65/EU RoHS Directive

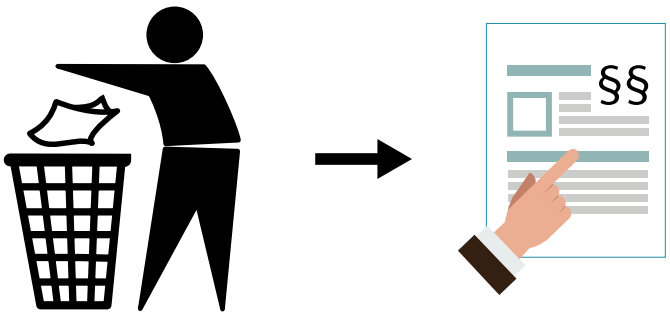
- and is manufactured in conformity with the following harmonised standards::

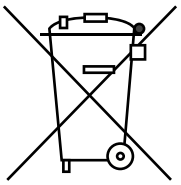
- EN 12100:2011 Safety of Machinery
- EN 60950-1:2006 Safety
- EN 61 000-6-2:2005 Immunity
- EN 61 000-6-3:2007 Emission

Skive, 29.08.2016

Recycling

The unit should be recycled according to national rules and procedures to protect the environment. Please consult your local authorities for further information.





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Dantherm can accept no responsibility for possible errors and changes.
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