

Control manual

AirCompact Control



AirCompact

NA 13.12 B
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1 Supervision and control

1.1 The program

This air handling unit is managed by its controller. In addition to its control functions, it also monitors and detects any faults with the air handling unit.

The HMI terminal displays the following data which can be edited at any time:

- . values of connected sensors
- . unit on/off cycles
- . calibration of the sensors
- . detection of alarms and log of the last 100
- . the password-protected configuration and operating parameters
- . device running times and time delays
- . management of time programs (4 daily, 4 weekly and 4 yearly programs)
- . language selection (French)

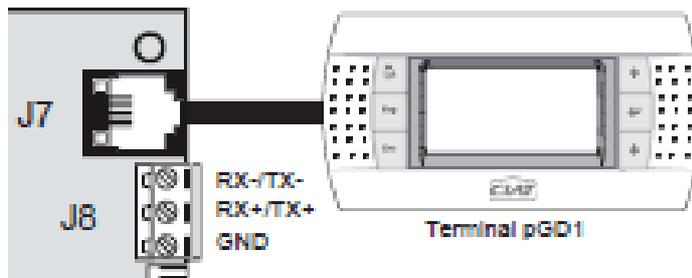
The connection with the pLAN network allows the program to use a terminal mounted on the front of the AHU and/or a wall-mounted terminal installed in the room to be air conditioned.



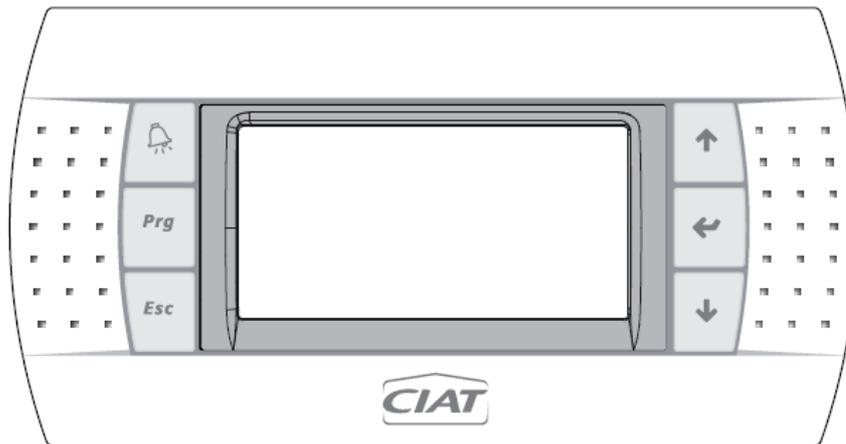
IMPORTANT: To avoid any problems, the password must be known only by qualified personnel.

1.2 The HMI terminal

The terminal provided is equipped with a remote LCD display (8 lines x 22 columns) on the outside of the unit, which has 6 keys (connected with a phone cable, max length 50m). It allows all of the program operations to be carried out. The terminal displays the unit's operating conditions at any point in time and allows the parameters to be modified; in addition, it can be disconnected from the main board as its presence is not strictly required.



1.2.1 Using the HMI terminal keys



Key	Description
	Returns to the main Menu mask when pressed in any loop. The Menu loop displays the state of the unit.
	Provides access to the "Menu"
	Resets all setpoints, parameters and time delay values to their factory settings.
	The red  button is used to display alarms and confirm acknowledgeable faults. It lights up when an alarm is triggered.
	The button has two functions: 1. used to manage the masks on the display (next mask) 2. used to adjust the values of the monitoring parameters (decrease)
	The button has two functions: 1. used to manage the masks on the display (previous mask) 2. used to adjust the values of the monitoring parameters (increase)
	Turns the unit on and off.
	The  button is used to confirm changes. It is continuously backlit to indicate when the power is on.

1.3 The room terminal (Option)

The terminal supplied is equipped with a digital display, 4 buttons and a rotary encoder.

Once installed in the premises, the device can measure the room temperature and enables remote control of the air handling unit.

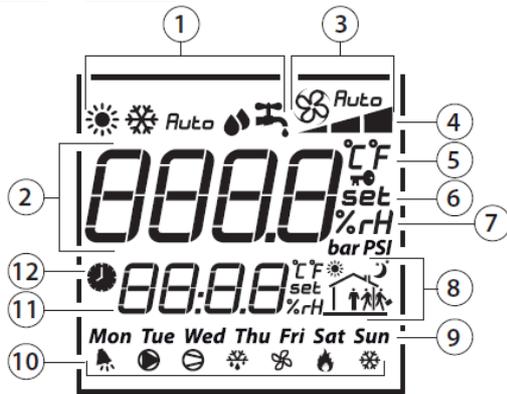


1.3.1 Controls



1. Button not used
2. A short press will activate or deactivate operation in timed zones if the time slot option has been authorised. Press and hold (2 s) to access the timer and timed zones setting menu.
3. Button for changing the ventilation speed
4. Button for switching the unit on or off (press and hold for 2s)
5. Encoder:
 - Press to access the setpoints and confirm
 - Turn to browse between menus and modify the parameters

1.3.2 Displays



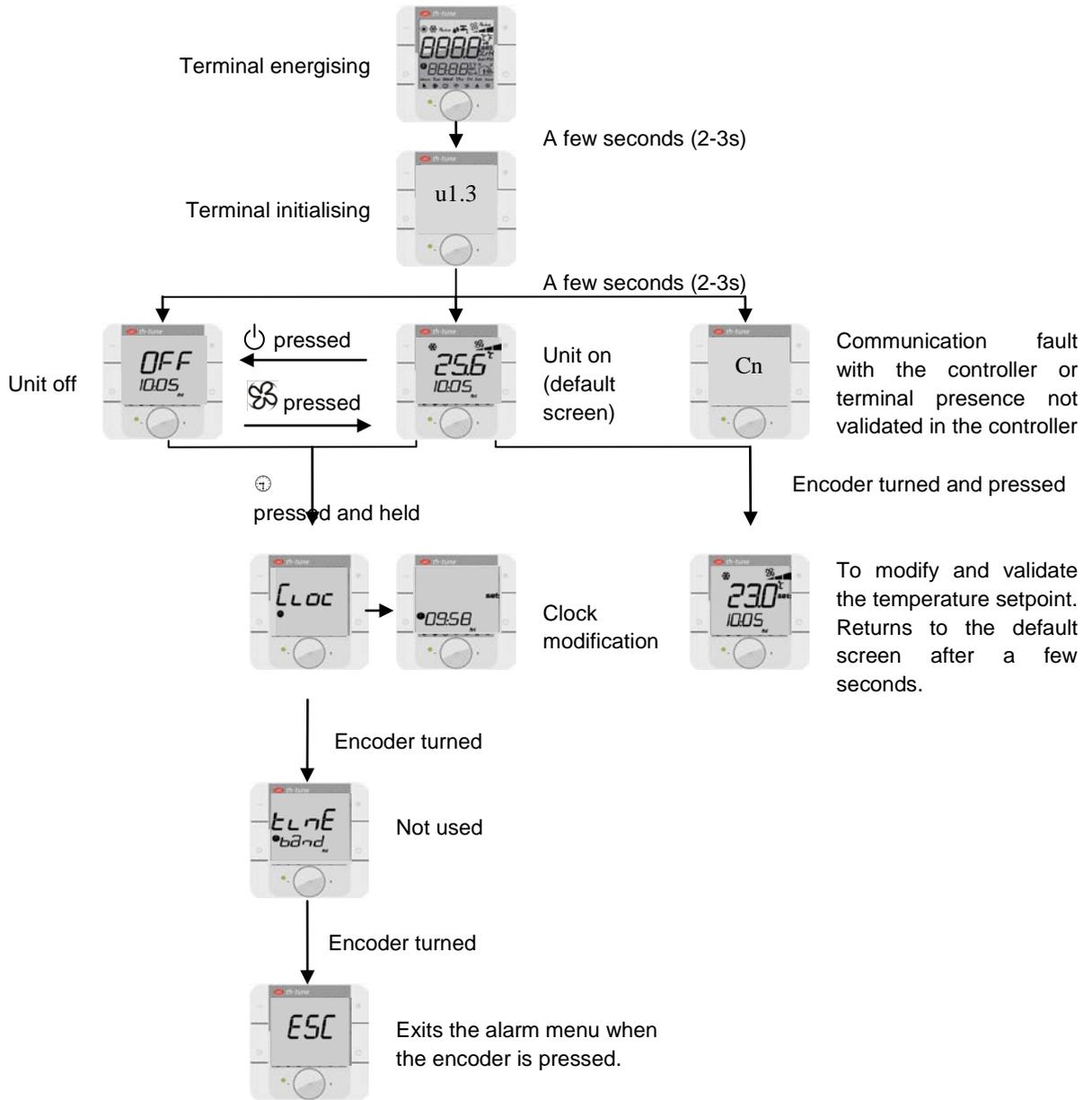
1. Unit operating mode
2. Main display area (Big area)
3. Ventilation operating mode
4. Ventilation operating speed
5. Temperature unit
6. Indicates whether the value displayed in the main area is a setpoint
7. Indicates whether the value displayed in the main area is a humidity
8. Indicates the active time slot zone
9. Day of the week
10. Operating icons
11. Secondary display area (Small area)
12. Run time range mode

Details:

1. Unit operating mode
 - ☀️ : Unit in heating mode
 - ❄️ : Unit in cooling mode
2. Main display area
 - Displays "OFF" when the unit is switched off manually via the room terminal
 - Displays the ambient temperature
 - Displays the temperature setpoint when the encoder is turned
 - Displays the various menus during browsing
 - Displays the various setting parameters
3. Ventilation operating mode
 - 🌀: Indicates that the ventilation is active and in setpoint-based flow or Supply air duct pressure mode.
 - *Auto*: Indicates that the ventilation is in automatic mode based on the regulated temperature.
 - No display: the unit has been switched off by the HMI terminal, by a major fault or to Standby by a time program.
4. Ventilation operating speed
 - 📊: The ventilation is operating at reduced flow or Eco Supply air duct pressure
 - 📈: The ventilation is operating at a nominal flow rate or Comfort Supply air duct pressure
5. Temperature unit
 - °C: temperature expressed in degrees Celsius
 - °F: temperature expressed in degrees Fahrenheit (not used)
6. Indicates whether the value displayed in the main area is a setpoint
 After the encoder has been turned and then pressed, it is possible to modify the temperature setpoint characterised by the indicator **set**.
7. Area not used
8. Area not used
9. Area not used
10. Operating icons
 Only the bell 🛎️ is used. It indicates the presence of a fault. This icon is inhibited when the faults are cleared via the HMI terminal.
11. Secondary display area
 Displays the time on the controller. This area can also be used for modifying the controller time.
12. Run time range mode

1.3.3 Room terminal information, settings and browsing

The diagram below shows the various browsing, information and setting options on the room terminal:

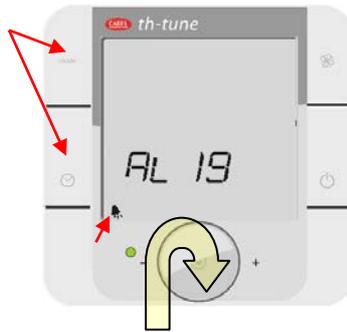


1.3.4 Managing alarms

When an alarm appears, it is accompanied by an acronym on the screen:



To find out the reference for the alarm, simply press the  and "mode" buttons for 3s:



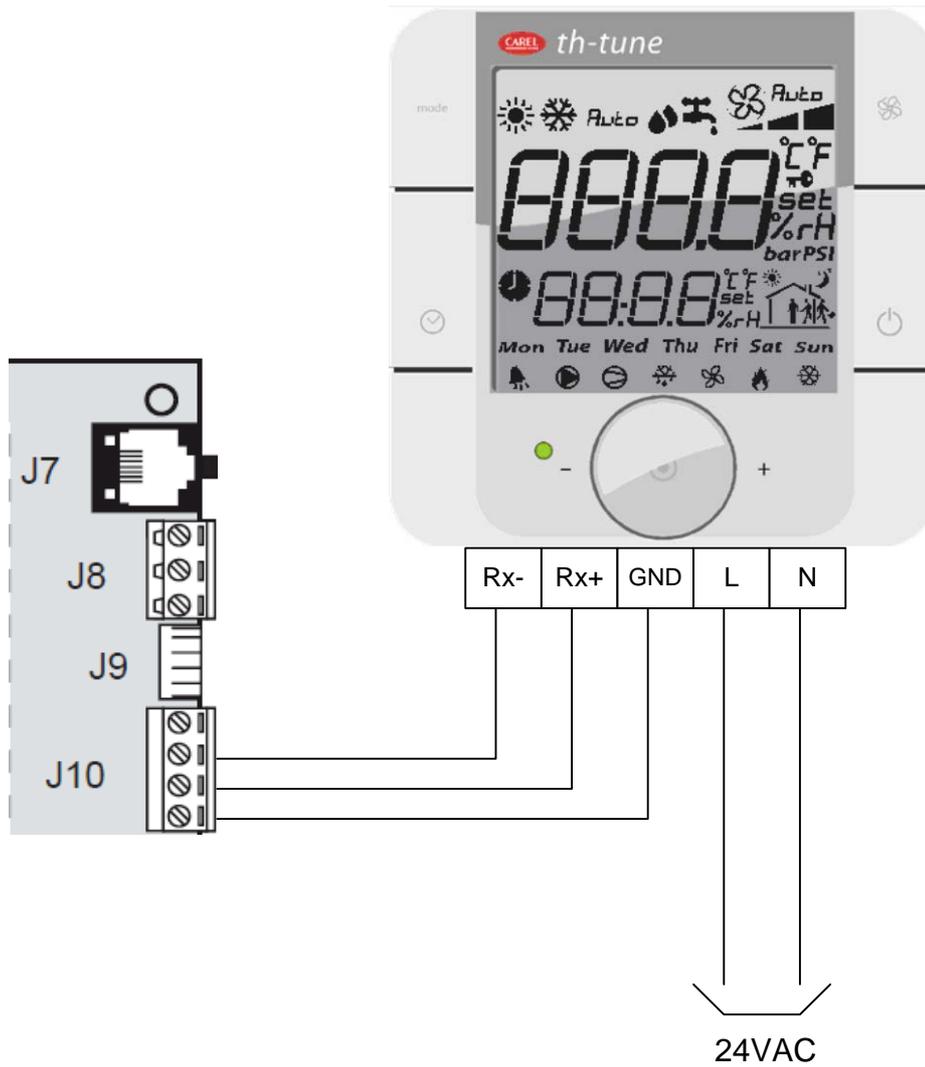
To find out whether there is more than one active alarm, turn the encoder to access the full list.

List of alarms:

Messages Room terminal	Messages HMI terminal
AL01	Supply air motor
AL02	Return air motor
AL03	Supply air filter CF1 dirty
AL04	Supply air filter CF1 clogged
AL05	Return air filter CF1 dirty
AL06	Return air filter CF1 clogged
AL07	Filter CF2 dirty
AL08	Humidifier
AL09	Heat exchanger frosted
AL10	Antifreeze thermostat
AL11	Electric heater safety thermostat
AL12	Supply air temperature too low
AL13	Supply air temperature too high
AL14	Regulated temperature too low
AL15	Regulated temperature too high
AL16	Supply air duct pressure sensor
AL17	Replace the controller battery
AL18	Fire

The disappearance of an alarm is always confirmed via the HMI terminal.

1.3.5 Electrical connections



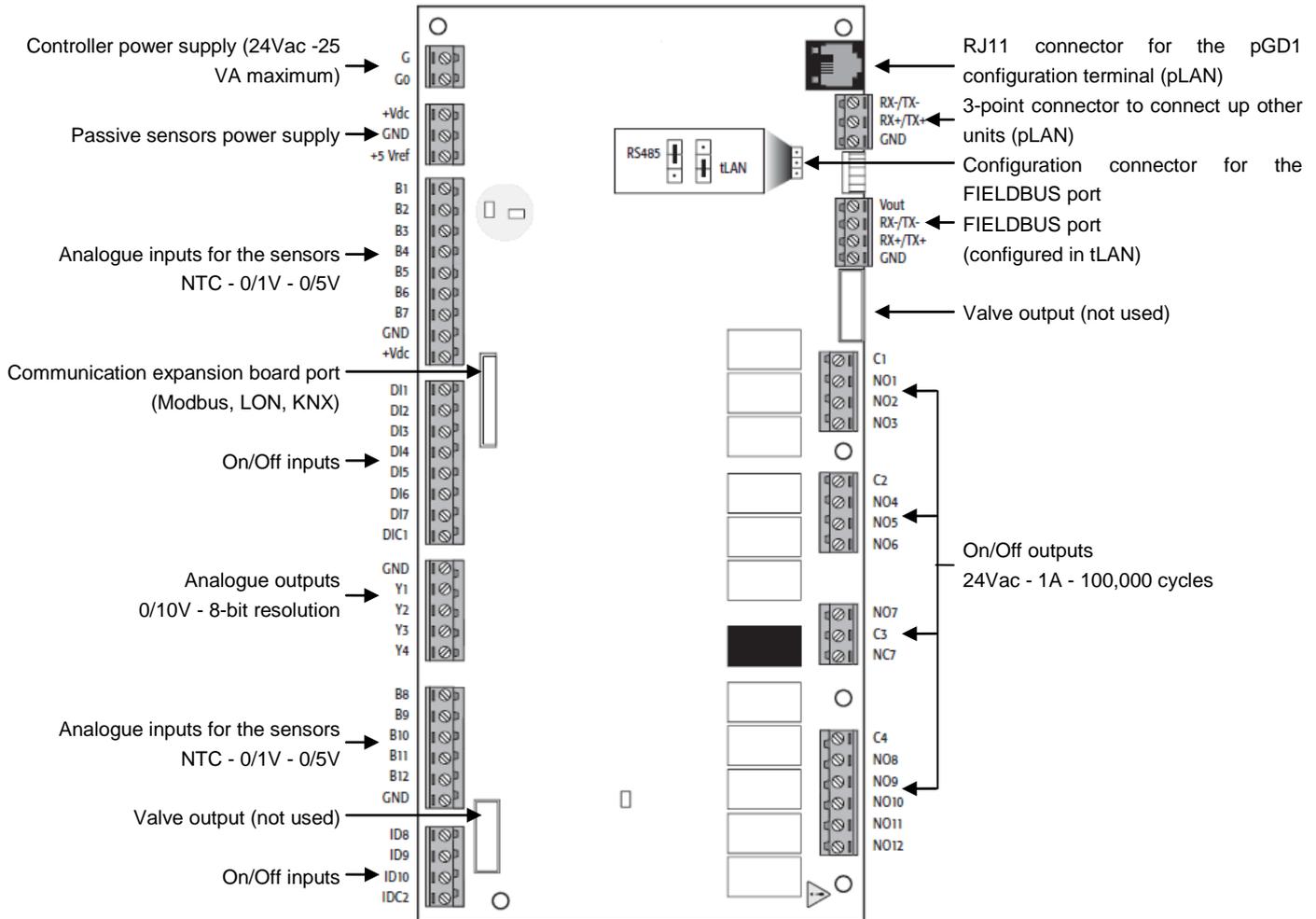
The room terminal and the controller are electrically connected using an **AWG20/22** shielded cable (not supplied by CIAT) comprising two twisted pairs.

The first and last controller must be no more than **500m** apart. This network must never run parallel to power cables at a distance of less than **50 cm**. These cables may cross, but perpendicularly. You are requested not to form a loop with the network cable or the earth braid, and to properly separate the various cable families (control, power, earth and communication bus).

In case of transmission problems, it is vital to connect a 120Ω $\frac{1}{4}W$ electrical resistor between terminals TX+ and TX- of the room terminal, as indicated in the manual supplied with the room terminal.

1.4 The controller

The descriptions of the terminals on the controller are provided below.



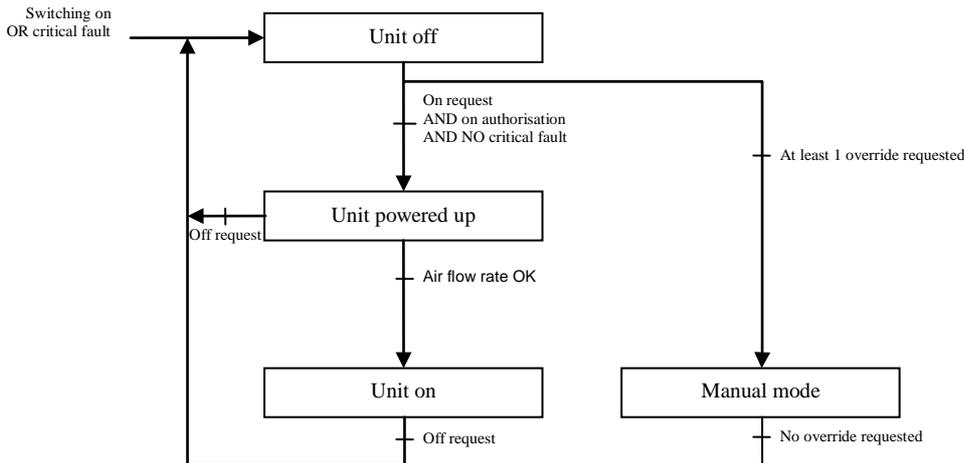
1.5 Description of the air handling units

Each air handling unit performs the following functions:

- Air filtration.
- Supply and return air ventilation (option).
- Heating of the air supplied to the room by means of a hot water coil or an electric heater.
- Heat recovery using a plate heat exchanger (option).
- Cooling of the air supplied to the room by means of a cold water coil or a condensation unit.
- Control, monitoring, reporting and regulation of its components.

1.6 Functional analysis of the control

1.6.1 Management of on and off modes



Starting up and switching off will take place locally by pressing on the \uparrow and \downarrow keys on the display.

Remote control is available and carried out by a potential-free contact between terminals 1 and 2 in place of the factory-installed shunt.

The unit is to be switched on/off by the CMS.

The unit will start up if the 3 running orders are actuated (on the display, on the remote control and via the CMS, depending on the configuration).

If one of the 3 orders is in "Off" mode, the unit will be stopped.

1.6.2 Safety and insulating damper

The insulating damper is activated by an On/Off servomotor with spring-return.

When the unit is stopped, this damper is normally closed.

When unit start-up is requested, it will open and the controller will wait whilst the servomotor opens, then the unit will be switched to "On" and the damper held open until the next request to stop the unit or, if a safety damper is being used, for the appearance of the antifreeze protection alarm.



SMR

1.6.3 Antifreeze thermostat

The antifreeze thermostat has a manual reset and it is constantly monitored once the controller is switched on.

If an antifreeze alarm is activated, the fresh air damper is closed, the valves on the hot water coil installed in the air handling unit are opened fully and the fault is signalled.

A frost prevention function is available once the unit is switched off. This consists of leaving the hot water coil valves slightly open (adjustable value) to maintain pre-heating.

1.6.4 Fire fault

The fire fault contact (option) connected to a PLC input is used to signal the appearance of the fire fault and disables the fans.

1.6.5 Fan motors

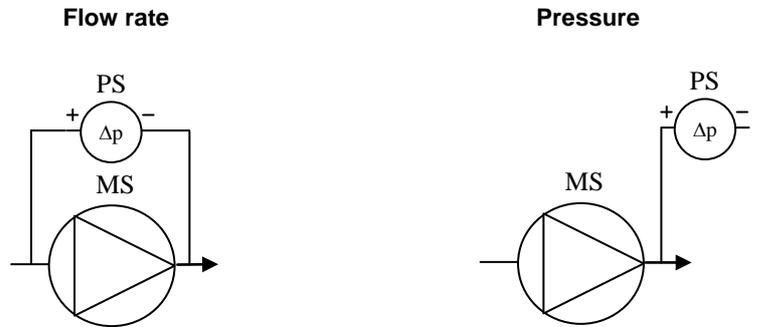
The motor or motors start when the unit is in "On" mode.

The alarm feedback from the motor(s) is used to check their electronic switching protection. If one or other of these signals is not received, the unit is stopped and the faults are signalled.

Their rotation speed is controlled using one of the 2 following modes:

1. to maintain the fans at a constant flow ("Flow rate") in accordance with the setpoint(s) on page **w0**, based on the configuration on page **p3** of the "Adjustment parameters" menu and the air quality setpoint (option) until the maximum flow rate limit on page **w3** is reached.
2. to maintain a constant pressure in the supply air duct ("Pressure") in accordance with the setpoint on page **w1** and based on the configuration on page **p3** of the "Adjustment parameters" menu.

Control modes available for the management of fans

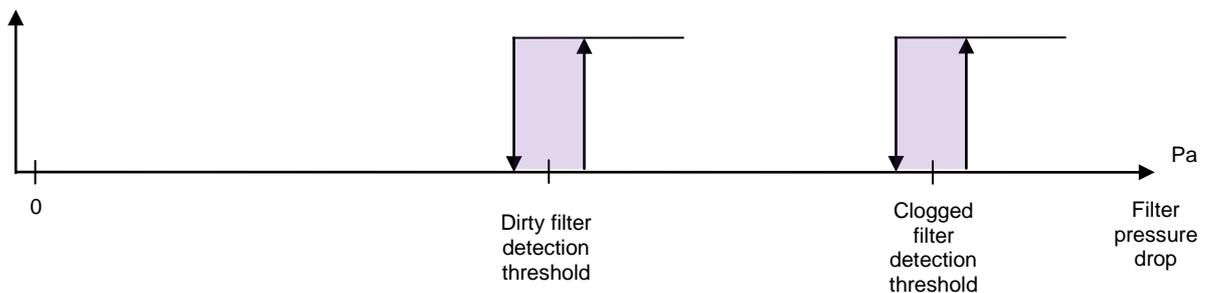
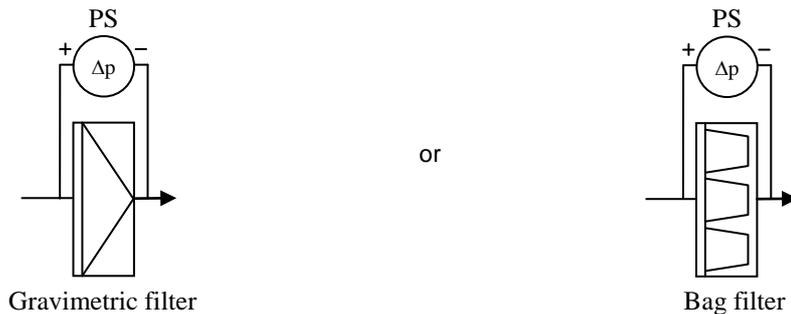


1.6.6 Filtration

3 different filters can be monitored simultaneously: 1 in the Supply air flow, 1 in the Return air flow and 1 additional filter in either of the 2 flows.

To check their fouling level, each filter is equipped with a differential pressure sensor which measures its upstream/downstream pressure drop. This sensor has a measuring range of 0-1250 Pa. In addition to monitoring the fouling level, this sensor also checks for the presence of an air flow crossing the filter, and therefore the unit, in both directions (Supply and return air). This information is required for activating the regulation.

For the additional filter, its pressure drop is checked by a pressure switch which will provide information on the saturation level reached in the controller via a contact.



1.6.7 Temperature control

The regulated temperature may be:

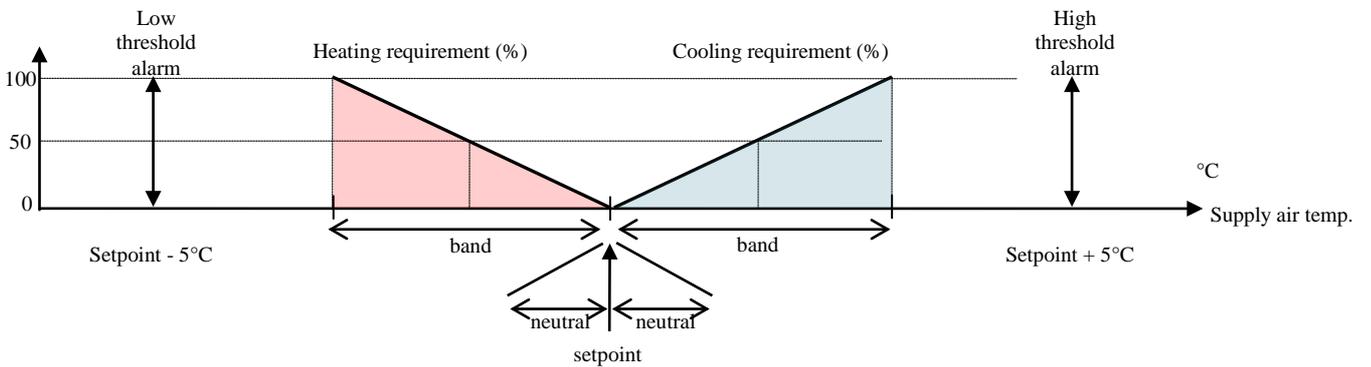
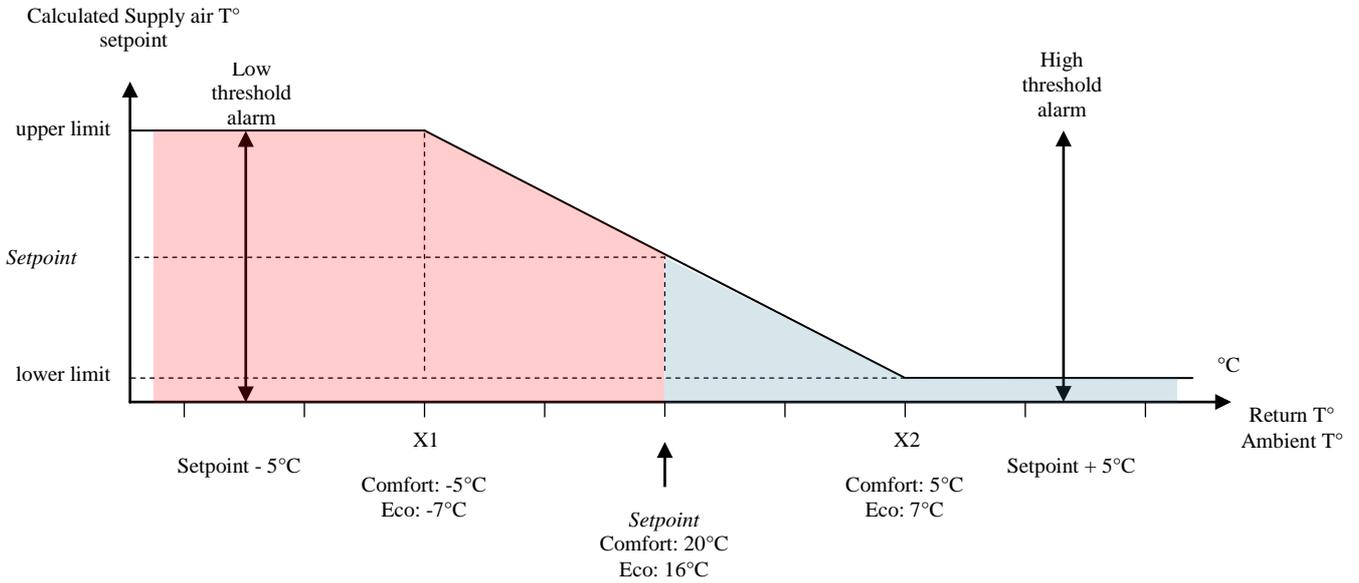
- the return air temperature
- the room temperature
- the supply air temperature

Two temperature control schemes are available:

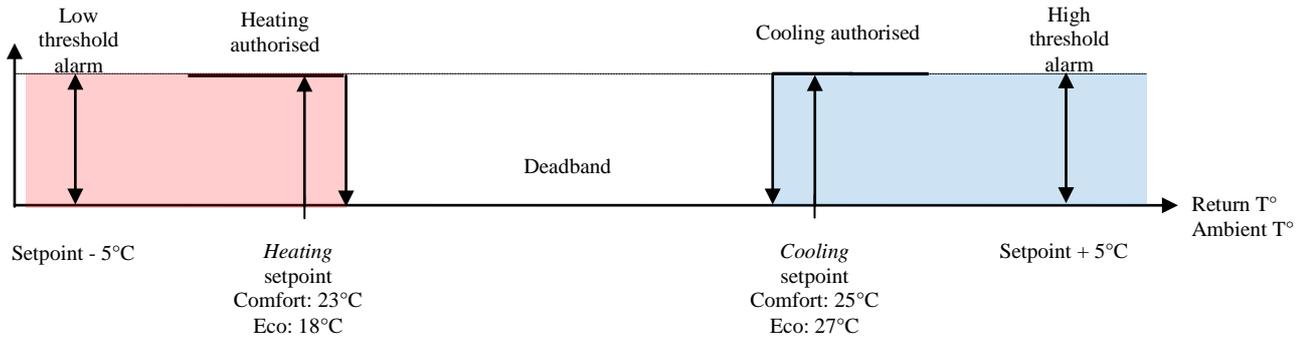
- "Precision" mode, where a low deviation from the reference temperature is requested.
- "Energy optimisation" mode, where the key factor is the cost of energy.

"Precision" mode:

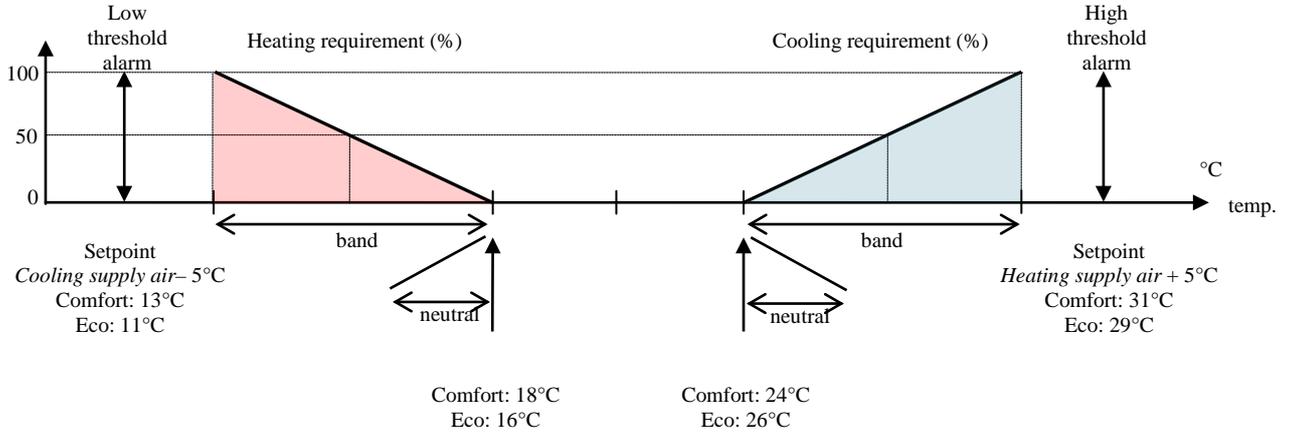
In this case, the regulated temperature is the room or return air temperature and the difference between this temperature and the setpoint enables the setpoint used as the basis for controlling the supply air temperature to be calculated.



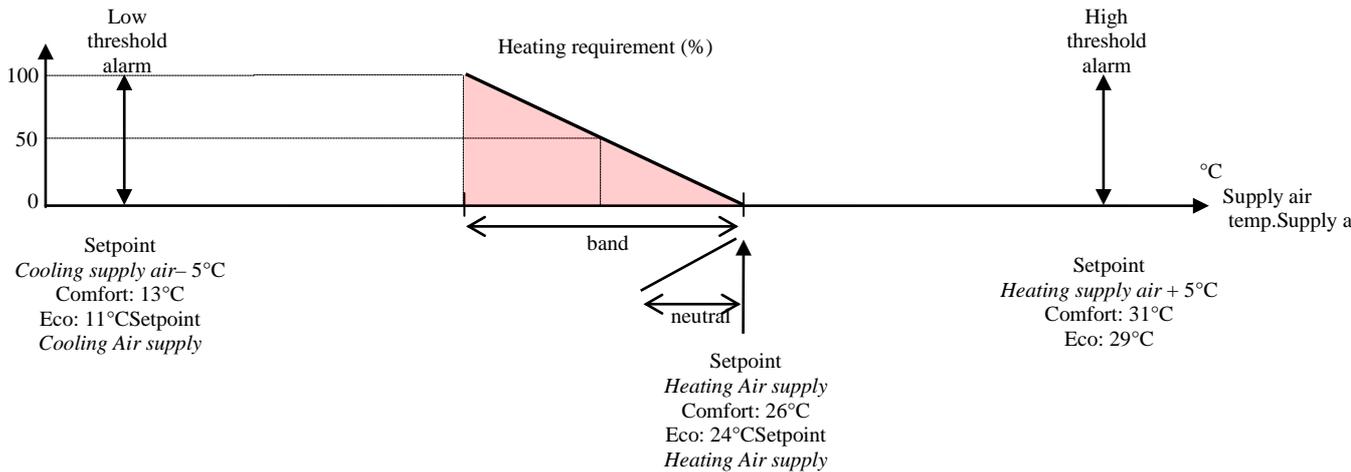
"Energy optimisation" mode:



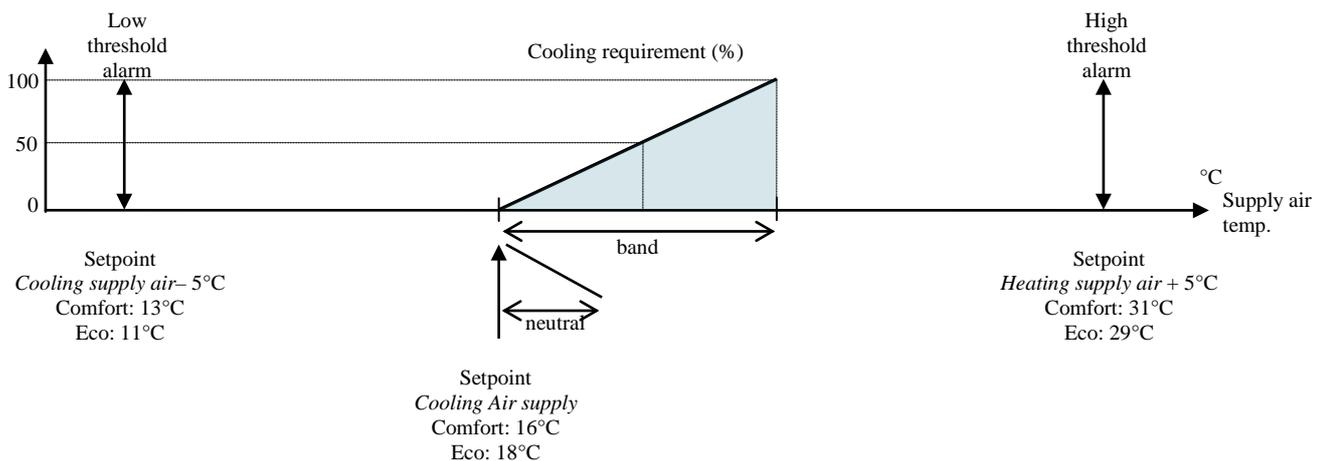
Deadband:



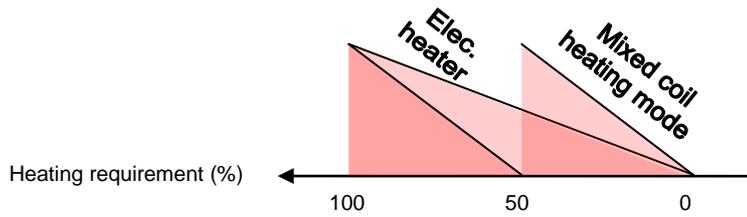
Heating:



Cooling:

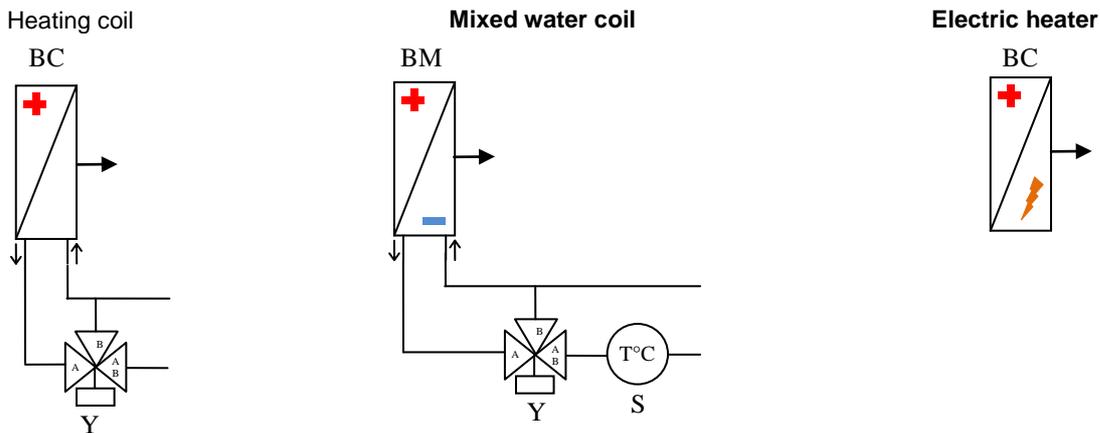


→ When the temperature drops, the controller will calculate the heat requirement needed to keep this temperature constant. This gradually adjusts the output of the 2 heating coils (via a 3-way valve for coil 1, via a triac or using 1 or 2 stages in the case of an electric heater) or a "Mixed" type in heating mode (authorised by the water network temperature sensor for coil 2 only).

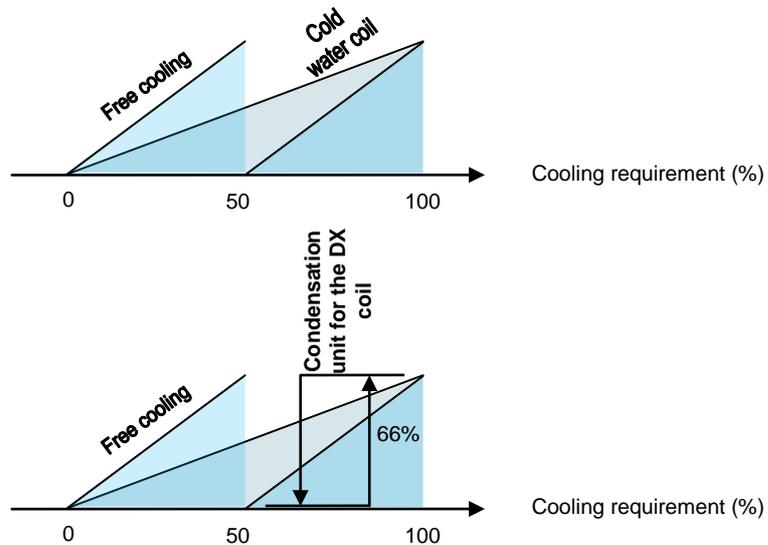


The order in which the various heat generators are activated can be configured.

Coils available to meet the heating requirements

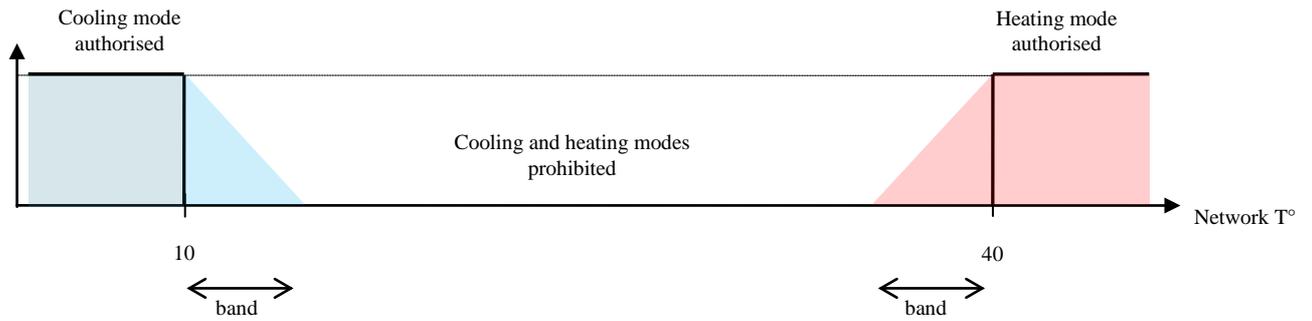


→ By increasing the regulated temperature, the controller will calculate the exact cooling requirement. If conditions permit, it will authorise Free Cooling then gradually adjust the output of the cooling coil (via a three-way valve), "Mixed" type in cooling mode (authorised by the water network temperature sensor for coil 2 only) or DX type (direct expansion) and will request that the condensation unit starts up when the level of demand from the coil reaches 66% (adjustable) and that it stops when the demand is 33% (adjustable). If Free Cooling is disabled, the requirement will be taken over by the coil. The distribution of the requirement between the Free Cooling and the coil is adjustable.



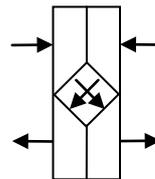
If coil 2 is configured as Mixed, the action on its valve will be limited to prevent a drift in the temperature for the return network to the heat pump.

If there is a fault with the heat pump (information received via a potential-free (dry) contact), an alarm will be displayed.



1.6.8 Plate recovery

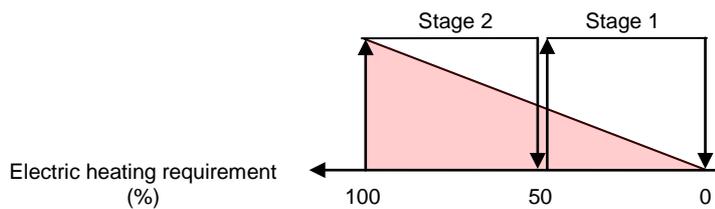
A differential pressure switch is used to check the fouling level on the return side of the heat recovery unit and to manage the frost protection safety function when the unit is running. This safety function activates the bypass damper. This damper is also activated if there is a Free cooling request.



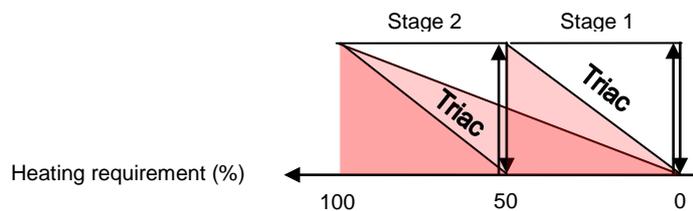
1.6.9 Electric heater

In case of a problem on the electric heater (safety thermostats), the electric heater is shut off and the fault is signalled. Load shedding of the electric heater via the input ID6 is available (function also available through communication with the CMS). The aim is to use the same input ID1 to control either: This control principle does not cause an alarm to be created.

1 or 2 stages



Triac + 1 stage



1.6.10 Free cooling

The aim of this function is to make use of fresh outdoor air before starting to use the cooling coil to cool the building's supply air.

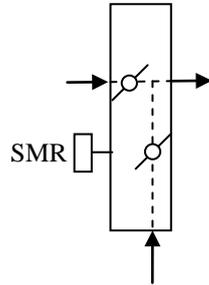
This function is only available if there is a mixing box or a plate heat exchanger equipped with a bypass damper.

Free Cooling management is based on actuating the mixing damper servomotor to alter the proportion of fresh air brought into the building and opening the plate heat exchanger bypass, if present.

To authorise Free cooling, certain conditions must be fulfilled:

- The fresh air temperature must be below 17°C.
- The fresh air temperature must be below the return (or ambient) air temperature – 3°K

If there is a mixing damper, the percentage of fresh air depends on the cooling request sent by the regulation. A minimum value of fresh air supply when the unit is stopped is adjustable.



1.6.11 Humidifier

Humidification of the intake air is managed via a self-contained humidifier equipped with a humidity sensor and authorised to operate in accordance with the order given by the controller once the unit is running at optimum levels.

A summary of faults will be sent back to the controller via a potential-free (dry) contact so an alarm is displayed.

1.6.12 CO₂ air quality

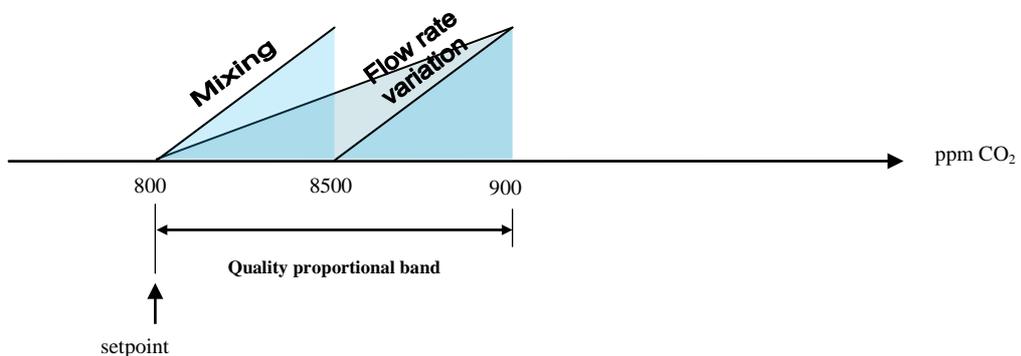
The aim is to regulate the air quality, measured in ppm of CO₂, using a duct sensor measuring the return flow, the measurement range for which is 0 to 2000ppm.

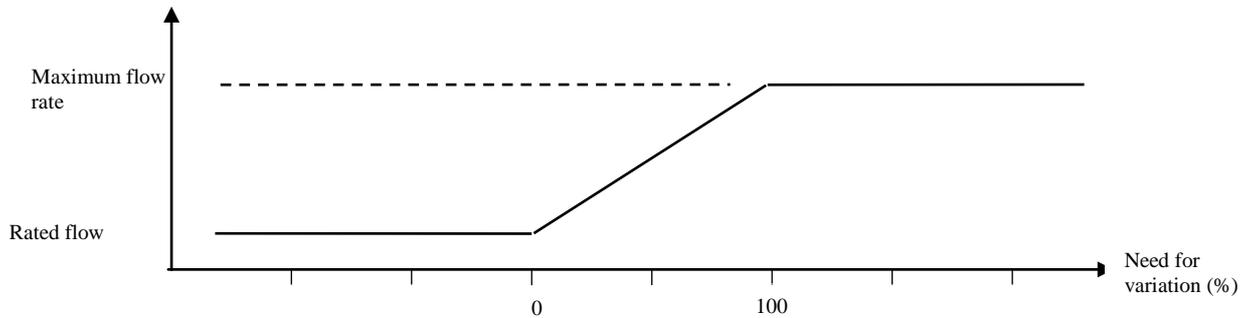
There are two possible actions to manage the air quality, which can be combined:

- Either the mixing damper is managed to alter the proportion of fresh air supplied to the building
- Or the fan flow rate is varied

In the event that the two actions are selected, the controller will actuate the mixing damper, then alter the fan flow rate.

This management is incompatible with pressure regulation in the supply air duct.





1.6.13 Night cooling

The aim of this function is to use the coolness of fresh air from outdoors during the night within the building, with an option of over-ventilation, as far as the system will allow.

This function is only available if there is a mixing box or a plate heat exchanger equipped with a bypass damper. It is activated by a timer or the CMS, whilst the room air or return air temperature is checked against a setpoint.

1.6.14 The fault relays

1 relay per fault summary level is provided:

- "Maintenance" fault summary
- "Danger" fault summary

"Maintenance" faults are alarms which only send information to notify the operator. They can be validated by pressing the  key for 3 seconds if they have disappeared.

The "Danger" faults, which are of a higher level, are alarms which send information to notify the operator, but also start a process to secure the unit. They can be validated by pressing the  key for 3 seconds if they have disappeared, and after the unit has been switched **off**.

It is possible to select the type for each fault (Danger or Maintenance), apart from for the Fire fault. It is also possible to select the direction of action for the summary relays.

1.7 Controller inputs and outputs

G 24Vac
G0 Shared

1.7.1 Analogue inputs

Connector J3

B1 Return air temperature sensor (Option)
B2 Supply air temperature sensor
B3 Fresh air temperature sensor (Option)
B4 Network water temperature sensor (Option)
B5 Supply air filter CF1 fouling level pressure sensor
B6 Supply air fan flow rate pressure sensor (Option)
B7 Return air fan flow rate pressure sensor (Option)
GND Shared

Connector J18

B8 -----
B9 -----
B10 Return air filter CF1 fouling level pressure sensor
B11 Air quality sensor (Option)
B12 Supply air duct pressure sensor (Option)

1.7.2 Digital inputs

Connector J4

DI1 Supply air fan monitoring
DI2 Return air fan monitoring
DI3 Filter CF2 pressure switch (optional)
DI4 Frost protection thermostat (Option)
DI5 Remote control
DI6 Load shedding (Option)
DI7 Monitoring of electric heater overheating thermostat (Option)
DIC1 Shared

Connector J16

DI8 Fire (Option)
DI9 Humidifier fault summary (Option)
DI10 Heat recovery unit fouling level pressure switch (Option)
DIC2 Shared

1.7.3 Analogue outputs

Connector J5

Y1 Supply air fan speed 0-10V control
Y2 Return air fan speed 0-10V control (Option)
Y3 0-10V control for the coil 1 water valve (Option)
Y4 0-10V control for the coil 2 water valve (Option)
GND Shared

1.7.4 Digital outputs

Connector J12

NO1 -----
NO2 -----
NO3 Condensation unit On control
C1 Shared

Connector J13

NO4 Stage 1 control for the electric heaters
NO5 Stage 2 control for the electric heaters
NO6 Danger alarms summary relay
C2 Shared

Connector J14

NO7 Maintenance alarms summary relay
C3 Shared

Connector J15

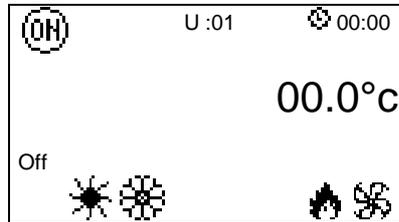
NO8 Mixing damper opening control
NO9 Mixing damper closing control
NO10 Plate heat exchanger bypass damper control
NO11 Insulation damper control
NO12 Humidifier control
C4 Shared

2 Overview of the HMI module screens

2.1 Esc button



"Prg" button



U:01



00.0°C

00:00

Off



Indicates the unit's address

Indicates the request to switch the machine on or off

Indicates the controlled temperature (ambient, exhaust or intake)

Indicates the time

Indicates the state of the unit: on, off, on after a power failure, standby, switched off by a fault, switched off by CMS, post ventilation, manual mode

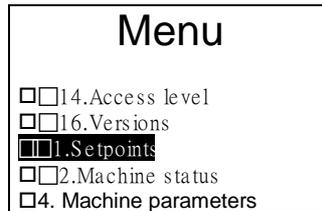
Indicates "Heating" operating mode

Indicates the "Cooling" operating mode

Indicates Fire alarm

Indicates the operation of the fan(s)

"Prg" button



To switch to another menu, press the **↑** or **↓** buttons to scroll through the available menus. The selected menu is opposite the arrow and on a black background. To confirm your choice, simply press **enter** or **↵**.

The available menus are as follows:

- 1. Setpoints
- 2. Machine status
- 4. Machine parameters
- 5. Adjustment parameters
- 6. Reading parameters
- 7. Fault memory
- 8. Test mode
- 9. Timer prog.
- 11. Communication
- 12. Alarms
- 14. Access levels
- 16. Versions

2.1.1 Access level selection menu

There are now three access levels:

- Level 1: User
- Level 2: Installer
- Level 3: Manufacturer

2.2 Setpoint menu

Comfort	w0	Indication of the operating mode.	<i>Level 2 access</i>
Fan flow rate			
Supply air	02000m3/h	Supply air fan Comfort flow rate control setpoint	
Return air	02000m3/h	Return air fan Comfort flow rate control setpoint	
Eco			
Supply air	01000m3/h	Supply air fan Eco flow control setpoint	
Return air	01000m3/h	Return air fan Eco flow control setpoint	
Comfort	w1	Indication of the operating mode.	<i>Level 2 access</i>
Duct pressure			
	200Pa	Comfort pressure control setpoint for the Supply air duct	
	Eco 100Pa	Eco pressure control setpoint for the Supply air duct	
Comfort	w2	Indication of the operating mode for T° regulation in "Precision" mode	<i>Level 1 access</i>
Return air	20.0°c	Comfort (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)	
	Eco 15.0°c	Eco (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)	
Supply air			
Upper limit	26.0°c	Upper limit for calculated Supply air T° setpoint	
Lower limit	16.0°c	Lower limit for calculated Supply air T° setpoint	
	w3	<i>Level 2 access</i>	
Air quality			
	0800ppm CO2	Air quality control setpoint	
Maximum flow rate			
	03000m3/h	Maximum flow rate value of supply air fan for air quality control	
Comfort	w4	Indication of the operating mode for T° regulation in "Energy optimisation" mode	<i>Level 1 access</i>
Return air	Cooling 25.0°c	Comfort Cooling (Return, Ambient or Supply air) temperature control setpoint monitored (0 to 50.0°C)	
	Eco 27.0°c	Eco Cooling (Return, Ambient or Supply air) temperature control setpoint monitored (0 to 50.0°C)	
Return air	Heating 23.0°c	Comfort Cooling (Return, Ambient or Supply air) temperature control setpoint monitored (0 to 50.0°C)	
	Eco 18.0°c	Eco Cooling (Return, Ambient or Supply air) temperature control setpoint monitored (0 to 50.0°C)	
Deadband		Indication of the control state for the monitored temperature	

Comfort		w5
Supply air	Cooling	16.0°C
	Eco	18.0°C
Supply air	Heating	26.0°C
	Eco	24.0°C

Indication of the operating mode for T° regulation in "Energy optimisation" mode *Level 1 access*
 Cooling Comfort Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)
 Cooling Eco Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)
 Heating Comfort Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)
 Heating Eco Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)

U :01		w6
Frost protection		17.0°C

Level 2 access
 Unit reactivation setpoint in "Standby" mode when there is an ambient temperature sensor

		w7
Night cooling		17.0°C
Duct		200Pa
Supply air		02000m ³ /h
Return air		02000m ³ /h

Level 2 access
 Control setpoint in "Night cooling" mode
 Supply air duct pressure control setpoint for night cooling
 Supply air fan Comfort flow rate control setpoint for night cooling
 Return air fan Comfort flow rate control setpoint for night cooling

Electric heater			w8
	Off	On	
Stage 1	000.0%	050.0%	
Stage 2	050.0%	066.6%	

Level 3 access
 Stage 1 on and off setpoint for the electric heater
 Stage 2 on and off setpoint for the electric heater

		w10
Free cooling		17.0°C
Min fresh air ctrl		000%

Outdoor temperature limit value for authorisation of free cooling (*Level 3 Access*)
 Fresh air minimum value (*Level 2 Access*)

		w12
Min. th-Tune setpoint		15.0°C
Max. th-Tune setpoint		30.0°C

Level 3 access
 Min. temperature setpoint value regulated via the room terminal
 Max. temperature setpoint value regulated via the room terminal

w13	
Filter CF1	
Filter dirty	0250Pa
Filter clogged	0400Pa

Level 2 access

Dirty supply air filter 1 saturation level detection setpoint
Blocked supply air filter 1 saturation level detection setpoint

w16		
DX coil		
	Off	On
State	033.3%	066.6%

Level 3 access

DX coil on and off setpoint

w17	
Changeover	
Heating	40.0°C
Cooling	10.0°C
Band limit	02.0°C

Level 3 access

Changeover limit setpoint value in Heating mode and water return temperature
Changeover limit setpoint value in Cooling mode and water return temperature
Value for the water return temperature control proportional band

U :01 w18	
Checking duct pressure sensor	
Low threshold	10Pa
High threshold	900Pa

Level 3 access

Intake duct pressure low threshold
Intake duct pressure high threshold

2.3 Machine parameters menu

This menu is Level 3 access

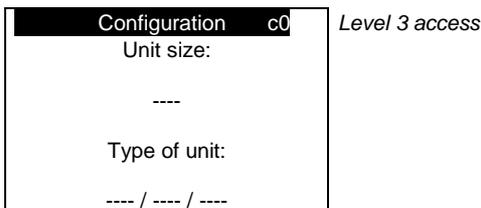
Fault type d1	
M=Maintenance	D=Danger
0x	0 1 2 3 4 5 6 7 8 9
1x	D D M D M D M M D
2x	D M M M M M D M
3x	

Level 2 access This screen is used to configure the criticality of the faults managed by the regulating controller. If a fault is shown as "Danger" the unit will be shut off. If the fault is shown as "Maintenance", only an alarm message will be given.

Criticality of faults 1 to 9
Criticality of faults 10 to 19

List of faults:

Order	Description	Significance
01	Supply air motor	Danger
02	Return air motor	Danger
03	Supply air filter dirty	Maintenance
04	Supply air filter clogged	Danger
05	Return air filter CF1 dirty	Maintenance
06	Return air filter CF1 clogged	Danger
07	Filter CF2 dirty	Maintenance
08	Humidifier	Maintenance
09	Heat recovery unit frosted – Clogging detection	Danger
10	Antifreeze protection	Danger
11	Electric heater safety thermostat	Maintenance
12	Low supply air temperature	Maintenance
13	High supply air temperature	Maintenance
14	Low room or return air temperature	Maintenance
15	High room or return air temperature	Maintenance
16	Duct pressure sensor	Danger
17	Clock lithium battery	Maintenance



Unit size: ---, 25, 40 1V, 40 2V, 60

Type of unit: Special boxes/Main box/Return air box

1. Special boxes:

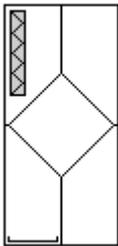
- CM3: 3-way mixer

CM3



- PLA: plate heat exchanger

RECPLA



2. Main box:

- F: Filter (always in 1st position)
- F2: 2 Filters
- V: Fan
- C: Hydraulic heating coil
- E: 2-stage electric heating coil
- T: Triac electric heating coil + 1 stage
- F: Hydraulic cooling coil
- M: Mixed hydraulic coil
- X: DX cooling coil (direct expansion)

See appended table

3. Return air box

The flow of return air cannot be FV only.

Configuration c1		Level 3 access
Filter CF2	----	Presence of a second filter at the inlet
Return air unit	----	

Filter CF2 : *Without, With*

Return air unit: *Without, With*

Configuration c2		Level 3 access
Heating coil	----	
Cooling coil	----	
Electric heater	----	

Heating coil:

- *Without:* No coil
- *Hydro:* Hot water coil
- *Elec:* Electric heater

Cooling coil:

- *Without:* No coil
- *Hydro:* Cold water coil
- *DX:* Refrigerant fluid direct expansion coil
- *Mixed:* Cold or hot water coil monitored by a network water T° sensor

Electric heater:

- *Without:* No electric heater
- *2-stage + On/Off:* 2-stage on/off electric heater
- *On/Off + Triac:* 1-stage On/Off or 1-stage Triac electric heater

Configuration c3		Level 3 access
Heat recovery unit	----	
Damper	----	
Mixing	----	

Heat recovery unit : *Without, With*

Damper: *Without, With*

Mixing: *Without, With*

Configuration c4		Level 3 access
Frost protection th.	----	
th-Tune	----	
Control priority	--	

Th. Antifreeze protection: *Without, With*

th-Tune: *Without, With*

Control priority: *Precision or Energy optimisation mode*

Configuration c5		Level 3 access
Humidifier	----	

Humidifier: *Without, With*

p4	
Regulated T°	----
Air quality	-----
M factor	01.0
Quality band	100

Level 2 access

Proportionality factor value for Supply air duct flow rate and pressure control
Air quality regulation proportional band

Regulated T°: *Supply, Return or Ambient air*

Air quality: *Without, With* (not available if the fans are monitored based on constant Supply air duct pressure)

Supply air p5	
High T shift	05.0
Low T shift	-05.0
Shutdown valve 1 open	000%
Shutdown valve 2 open	000%

Level 2 access

High supply air temperature threshold shift
Low supply air temperature threshold shift

Opening value for the valve for heating coil 1 when the supply air ventilation is stopped
Opening value for the valve for heating coil 2 when the supply air ventilation is stopped

Return air p6	
High T shift	05.0
Low T shift	-05.0

Level 2 access

High return (or ambient) air temperature threshold shift
Low return (or ambient) air temperature threshold shift

Fans p14	
Fans	
Supply air	
Band	1200.0
T I 0010s	T D 0000s
Return air	
Band	1200.0
T I 0010s	T D 0000s

Level 3 access

Supply air fan flow rate control proportional band
Integral time and derivative time for supply air fan flow rate control
Return air fan flow rate control proportional band
Integral time and derivative time for return air fan flow rate control

Duct p15	
Duct	
Band	0595.0
T I 0004s	T D 0001s

Level 3 access

Duct pressure control proportional band
Integral time and derivative time for duct pressure

Supply air limits p16	
Supply air limits	
X1 offset	-5.0°c
	Eco -7.0°c
X2 offset	5.0°c
	Eco 7.0°c

Level 3 access

Supply air T° setpoint calculation parameters (See the first figure on page 14)
X1 shift value for the formula for calculating the supply air temperature Comfort setpoint
X1 shift value for the formula for calculating the supply air temperature Eco setpoint
X2 shift value for the formula for calculating the supply air temperature Comfort setpoint
X2 shift value for the formula for calculating the supply air temperature Eco setpoint

p17	
FC offset	-3.0°C

Level 3 access

Outdoor T° offset from regulated T° for Free Cooling authorisation

Prioritisation p18		
heating coils		
	Start	End
Coil 1	---.-	---.-
Coil 2	---.-	---.-

Level 3 access

Coil 1 actuation start and end setpoint value

Coil 2 actuation start and end setpoint value

p19	
Coil distribution	
Electric with triac	
Stage 2	050.0%

Level 3 access

Setpoint value for the electric heater stage 2 actuation start

p20	
Air quality	
Quality band	100

Level 3 access

Air quality regulation proportional band

Calibration ca1	
Return air	00.0°C
Supply air	00.0°C
Fresh air	00.0°C
Water network	00.0°C

Level 3 access

Calibration of the regulated temperature sensor (return or room)

Calibration of the supply air temperature sensor

Calibration of the fresh air temperature sensor

Calibration of network water temperature sensor

Calibration cam	
Pressure sensor calibration	
	NO

Level 3 access -> Accessible by pressing the Prg key from the mask ca1

Manual calibration of pressure sensors. Warning: the fans must be completely stopped before using this function.

Calibration ca2	
Air quality	000ppm

Level 3 access

Calibration of air quality sensor

Input direction		se1
Supply air fan control	NC	
Antifreeze thermostat	NO	
CF2 pressure switch	NC	
Fire sensor	NC	
Elec heater safety	NC	
Remote control	NC	

Level 3 access

Direction of the supply air fan sensor information during operation
 Direction of the antifreeze thermostat control information during operation
 Direction of the filter CF2 pressure switch control information during operation
 Direction of the fire sensor control information during operation
 Direction of the electric heater control information during operation
 Direction of the control information for the remote control when "On"

Input direction		se2
Return air fan control	NC	
Elec heater load shedding	NO	
Humidif. check	NC	
Exch. pressure switch	NC	

Level 3 access

Direction of the return air fan sensor information during operation
 Direction of the electric heater "load shedding" check information
 Direction of the humidifier check information during operation
 Direction of the plate heat exchanger pressure switch control information during operation

Output direction		ss1
Danger	NC	
Maintenance	NC	

Level 3 access

Controller contact state when there are no "Danger" faults (NO or NC)
 Controller contact state when there are no "Maintenance" faults (NO or NC)

2.5 Read-only parameters menu

2.5.1 Inputs

		i0
Supply air	--.°c	
Return	--.°c	
Fresh air	--.°c	
Water network	--.°c	

Level 1 access

Supply air temperature value
 Controlled temperature value (return or ambient)
 Fresh air temperature value
 Network water temperature value

		i1
Fan flow rate		
Supply air	-----m3/h	
Return air	-----m3/h	
Duct pressure		
	----Pa	

Level 1 access

Supply air fan flow rate value
 Return air fan flow rate value
 Supply air duct pressure value

		i2
Filters		
CF1	----Pa	
CF1 Return	----Pa	
Pressure switch CF2	-	
Air quality		
	----ppm	

Level 1 access

Supply air CF1 filter fouling value
 Return air filter CF1 fouling value
 Additional filter CF2 fouling pressure switch state
 CO₂ air quality value

i3		Level 1 access
Supply air fan	-	Supply air fan operation check state (C = on; O = off)
Return air fan	-	Return air fan operation check state (C = on; O = off)
Fire	-	Fire detection sensor check state (F = no fire; O = fire detected)

i4		Level 1 access
Humidif. check	-	Humidifier check state (C = no faults; O = fault detected)
Elec heater load shedding	-	Load shedding command state (C = Load shedding; O = No load shedding)
Remote control	-	Remote control state (F = on; O = off)

i5		Level 1 access
Elec. heater safety	-	State of electric heater safety thermostat (C = fault detected; O = no faults)
Antifreeze thermostat	-	Frost protection thermostat state (C = fault detected; O = no faults)
Exch. pressure switch	-	Plate heat exchanger pressure switch state (C = fault detected, O = no faults)

2.5.2 Outputs

o1		Level 1 access
Fan	---%	Supply air fan variable frequency drive control value
Return air fan	---%	Return air fan variable frequency drive control value
Coil 1 Heating	---%	Water coil 1 valve control value (Heating or Triac)
Coil 2 Cooling	---%	Water coil No.2 valve control value in "Cooling" mode (or Heating)

o2		Level 1 access
Recov. bypass	---	Plate heat exchanger bypass damper control state

o3		Level 1 access
Danger	-	"Danger" fault summary relay state
Maintenance	-	"Maintenance" fault summary relay state

o4		Level 1 access
Damper	---	Damper control state (frost protection or insulation)
Electric heater		
Stage 1	---	Electric heater stage 1 control state
Stage 2	---	Electric heater stage 2 control state

o5		Level 1 access
DX module	---	DX module control state
Humidifier	---	Humidifier operation authorisation state

o6		
Mixing	---%	Mixing damper opening value
Control	-	Mixing damper control state (⬆ = opened; ⬇ = closed)

2.5.3 Calculated setpoints

wc1		
Calculated	---°C	Control setpoint calculated for the Supply air temperature when the regulated temperature is Return or Room

2.5.4 Counters

Counters		tt1	
Supply air fan			
-----h	Reset-		Supply air fan runtime counter reset and time

Counters		tt2	
Return air fan			
-----h	Reset-		Return air fan runtime counter reset and time

Counters		tt3
Electric heater		
Stage 1	-----h	Reset -
Stage 2	-----h	Reset -

Electric heater stage 1 runtime counter reset and time

Electric heater stage 2 runtime counter reset and time

Counters		tt4
Humidifier		
-----h		Reset-

Humidifier runtime counter reset and time

Counters		tt5
DX module		
-----h		Reset-

DX module runtime counter reset and time

Counters		tt6
Bypass		
-----h		Reset-

Plate heat exchanger bypass servomotor runtime counter reset and time

2.6 Fault memory menu

Log		H000
Alarm		
00 :00		00/00/00

H000 Indicates the log number for the alarm
00/00/00 Indicates the date of the alarm
00:00 Indicates the time of the alarm
Alarm Indicates the alarm

"Prg" button

		RH
Reset		No

Level 3 access

Reset Reset the alarm log

2.7 Versions menu

```

U :01 PROGRAM pr1
    AirCompact Control

V 02.00          09/03/15

Bios: 06.08
Boot: 04.05
    
```

Indicates the reference of the program installed on the controller, the controller version and pLAN address.

```

U :01 PROGRAM pr2

SO: -----

EI box: -----
    
```

Order number for the unit

Serial number for the unit electrics box

2.8 Time schedule menu

If the unit is configured to be switched on by the CMS (Unit control = With), the menu of time schedules is not accessible and this screen appears:

```

Time schedules



Functions carried out
By the CMS
    
```

Otherwise:

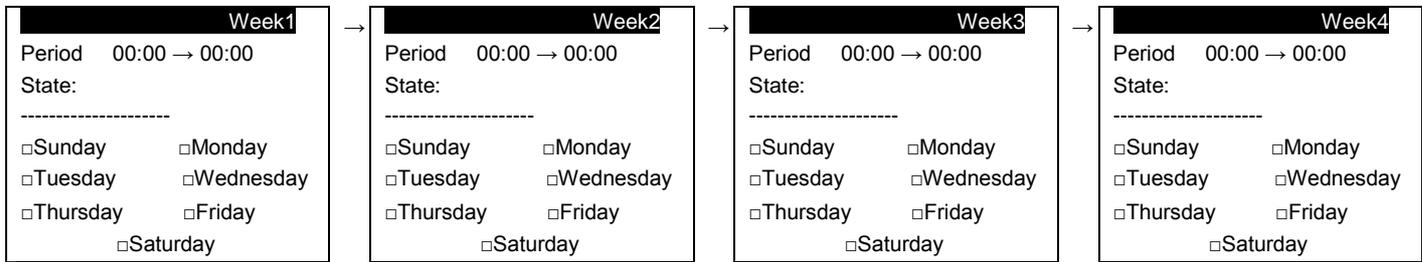
```

Day1 → Day2 → Day3 → Day4
Period 00:00 → 00:00   Period 00:00 → 00:00   Period 00:00 → 00:00   Period 00:00 → 00:00
State: -----         State: -----         State: -----         State: -----
    
```

Period 00:00 → 00:00 Start and end times (hour and minute) of daily time program period

State: Selection of the state during this period: -----

- Eco T°
- Comfort T°
- Eco flow rate
- Comfort flow rate
- Eco pressure
- Comfort pressure
- Standby
- Cool night

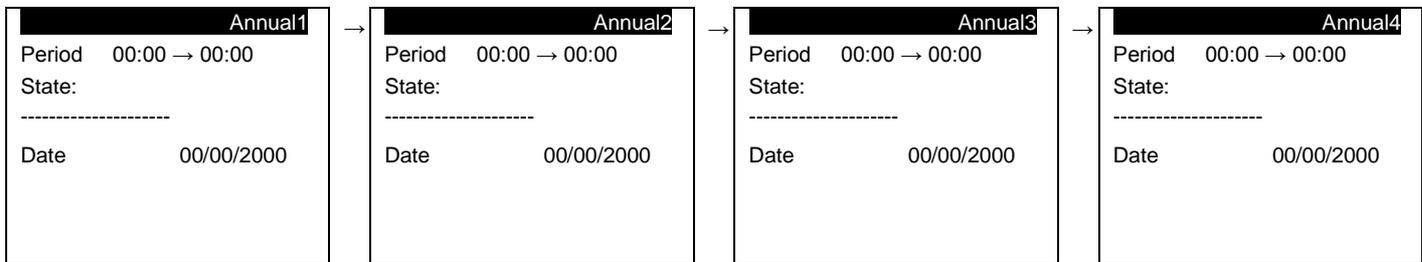


Period 00:00 → 00:00 Start and end times (hour and minute) of weekly time program period

State: Selection of the state during this period: -----
 Eco T°
 Comfort T°
 Eco flow rate
 Comfort flow rate
 Eco pressure
 Comfort pressure
 Standby
 Cool night

- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

Day of the week on which the weekly time program is applied (■= day selected)



Period 00:00 → 00:00 Start and end times (hour and minute) of annual time program period

State: Selection of the state during this period: -----
 Eco T°
 Comfort T°
 Eco flow rate
 Comfort flow rate
 Eco pressure
 Comfort pressure
 Standby
 Cool night

Date 00/00/2000 Day, month and year of yearly time program

Access to the following group of screens via the **Prg** button is protected by level 3 access

t1		
Fan delay	060s	post ventilation time
Battery reset	N	Reset the Lithium battery replacement indicator
Damper	180s	Total opening time for complete damper
Mixing damper	150s	Opening time value for the mixing damper servomotor
Defrost	150s	Minimum opening time value for plate heat exchanger defrost

Timer t2	
Summer/Winter:	ACTIVE
Transit. time	060min
Start:LAST	SUNDAY
in MARCH	at 02.00
End:LAST	SUNDAY
in OCTOBER	at 03.00

Daylight Saving Time and Standard Time switchover management activated

2.9 Communication menu

SUPERVISION g1	
Protocol	-----
Speed	---- bauds
Address	---
Unit control	----

Level 3 access

Choice of the communication protocol with the CMS (CAREL, LON, MODBUS RTU, KNX, WEB, MODBUS TCP)

Selection of the speed of communication with the CMS (4800 mandatory for LonWorks®)

Address of the controller on the network for communication with the CMS (001 mandatory for LonWorks®)

Selection of the On/Off control via the CMS

pLAN NETWORK pL1							
Controller address	01						
<table border="1"> <tr> <td>1</td> <td>□</td> <td>16</td> </tr> <tr> <td>17</td> <td>□</td> <td>32</td> </tr> </table>		1	□	16	17	□	32
1	□	16					
17	□	32					

Address of the controller on the pLAN communication network to the user terminal

pLAN network state

When the system starts up, the pLAN network may encounter a number of problems (card fault and terminal start-up) caused by incorrect connections or a wrong address. The state of the pLAN network can be displayed in real time on this special mask in order to identify which devices (controller or terminal) are correctly connected and addressed.

Network addresses 1 to 32 are displayed. The small rectangles □ represent the terminals and the large rectangles ▣ the controllers.

If the symbols flash, the pLAN may be unstable or, more likely, two components share the same address.

The example indicates that the network is formed of 1 controller with the address 1 and 1 terminal with the address 17.

2.10 Alarms menu

Pressing the  button confirms and clears all faults that are no longer present.

To view faults that are still present, press the buttons  

The following screen appears when no faults are present:

No alarms!	
------------	--

2.11 Test mode menu

f1	
Overriding the outputs	
	
Unit off	

If all the controller's outputs are overridden, the alarms will not be signalled on the door of the electrical box or on the display. Disconnecting the display will maintain the override and may result in damage to the hardware. This menu can only be accessed in level 3 and with the unit off.

WARNING!

ACTIVATION OF ALL OVERRIDES IS THE PROGRAMMER'S RESPONSIBILITY

NONE OF THE SAFETY DEVICES IS OPERATIONAL

The unit must be set to "OFF".

Select the unit to be changed by pressing the **↑** button or the **↓** button. Confirm by pressing **ENTER**.

The cursor places itself below the override authorisation (**free** or **overridden**). Confirm by pressing **ENTER**.

The cursor places itself under the override value. Display the new value by pressing the **↑** button or the **↓** button. Confirm by pressing **ENTER**.

The unit is now in "manual mode".

The overrides are cancelled when the unit is set back to "on"

Fans	f2

Supply air.....	--
Return air.....	--
Damper	.

Control state.....	--

Fault relay	f3

Danger.....	--
Maintenance.....	--

Valves	f4

Coil 1.....	--%
Coil 2.....	--%
DX module.....	--
Electric heater	.

Stage 1.....	--
Stage 2.....	--

Mixing	f5

Opening.....	-
Closing.....	-
State.....	--%

Bypass	f6

Control state.....	--
Humidifier	.

Control state.....	--

2.12 Access level menu

<p>Access levels</p> <p>Current level: 1</p> <p>Access level 1 -> Level 2 access Level 3 access</p>	<p>Displays the current level</p> <p>Visible only if the current level = 2 or 3, used to access or return to level 1 Visible only if the current level = 1 or 3, used to access or return to level 2 Visible only if the current level = 1 or 2, used to access or return to level 3</p>
<p>Access levels</p> <p> LEVEL 1 ACCESS</p> <p>Back to level 1:</p> <p>No</p>	<p><i>If level 1 access selected</i></p> <p>If yes back to access level 1</p>
<p>Access levels</p> <p> LEVEL 2 ACCESS</p> <p>Password: 0000</p>	<p><i>If access level 2 selected and access level = 1</i></p> <p>Re-enter the installer password</p>
<p>Access levels</p> <p> LEVEL 2 ACCESS</p> <p>Enter new code level 2?</p> <p>No</p>	<p><i>If password ok</i></p> <p>If yes, change the installer password; if no, back to current access level page</p>
<p>Access levels</p> <p> LEVEL 2 ACCESS</p> <p>New password: 0000</p>	<p>Re-enter the new installer password</p>
<p>Access levels</p> <p> LEVEL 2 ACCESS</p> <p>Back to level 2:</p> <p>No</p>	<p><i>If access level 2 selected and access level = 3</i></p> <p>If yes back to access level 2</p>
<p>Access levels</p> <p> LEVEL 3 ACCESS</p> <p>Password: 0000</p>	<p><i>If access level 2 selected and access level = 1</i></p> <p>Re-enter the manufacturer password</p>

The level 2 password can be reset to the factory value. To do this, go to level 2 access and press the "**Prg**" button for 10 seconds.

2.13 Master/Slave menu

The Master/Slave function is used to manage several units (maximum of 8) supplying air to the same room and providing automatic weekly rotation (168 hours). This is done to ensure uniform wearing of the AHUs.

A backup/additional function is also available.

m0	
Additional	----
Unit within network	----

Additional: *Without, With* (Authorisation of the Additional function for the rotation of the units)

Unit within network: *Without, With* (Authorisation of "autonomous" operation after break with bus or absence of power for rotating the units)

m1	
Unit rotation	
U1: -	
U2: -	
U3: -	
U4: -	
U5: -	
U6: -	

Only on the unit whose address is '1'.

U1: *With rotation* (unit linked and integrated into a rotation loop), *Without rotation* (unit linked and outside of the rotation loop), *Not present* (unit not linked and outside of the rotation loop)

U2: *With rotation, Without rotation, Not present*

U3: *With rotation, Without rotation, Not present*

U4: *With rotation, Without rotation, Not present*

U5: *With rotation, Without rotation, Not present*

U6: *With rotation, Without rotation, Not present*

m2	
U7: -	
U8: -	
Unit(s) on standby	-
1 rotation per	168h

Only on the unit whose address is '1'.

U7: *With rotation, Without rotation, Not present*

U8: *With rotation, Without rotation, Not present*

Unit(s) on standby : 1 to 7 (according to the total number of units linked and integrated into a rotation loop – 1)

1 rotation per : 0 to 999h (when the value 0 is applied, this allows the rotation to be checked as it will be carried out every 5 minutes)

3 Managing a network of controllers

The pLAN network is the name of the physical network that links controllers to remote HMI terminals.

pLAN = personal Local Area Network

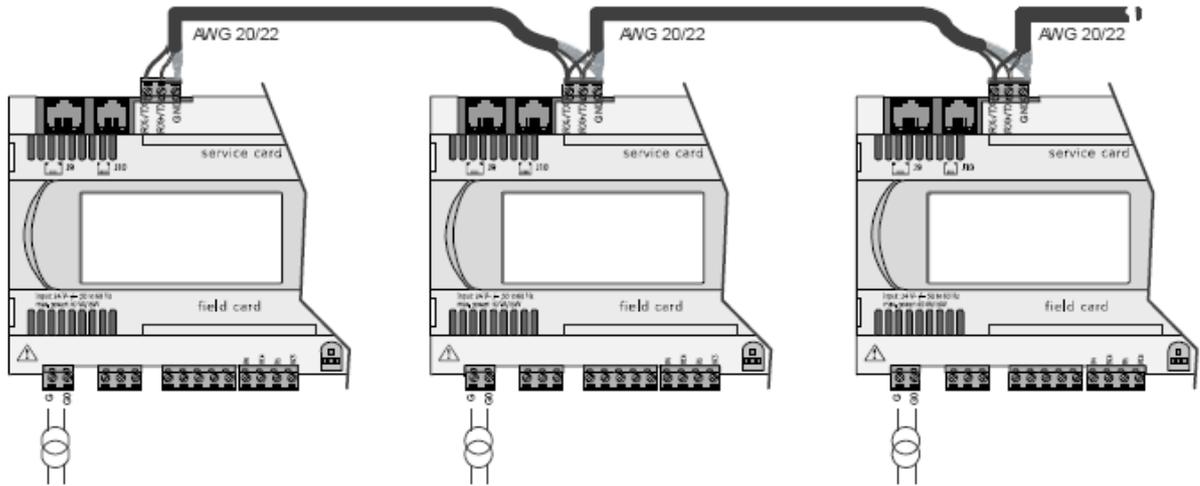
The connection of the controllers via the pLAN network allows the datapoints of one controller to be exchanged for another, following the logic set out by the program, i.e. the direction that these datapoints must follow and that from which they come. As a consequence, they are not programmed by the user, who must only carry out the electrical connection.

3.1 pLAN electrical connections

3.1.1 Connecting controllers to the pLAN

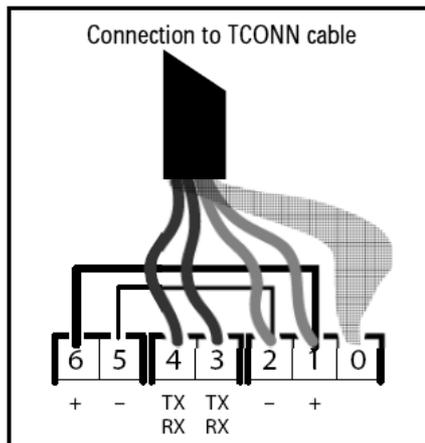
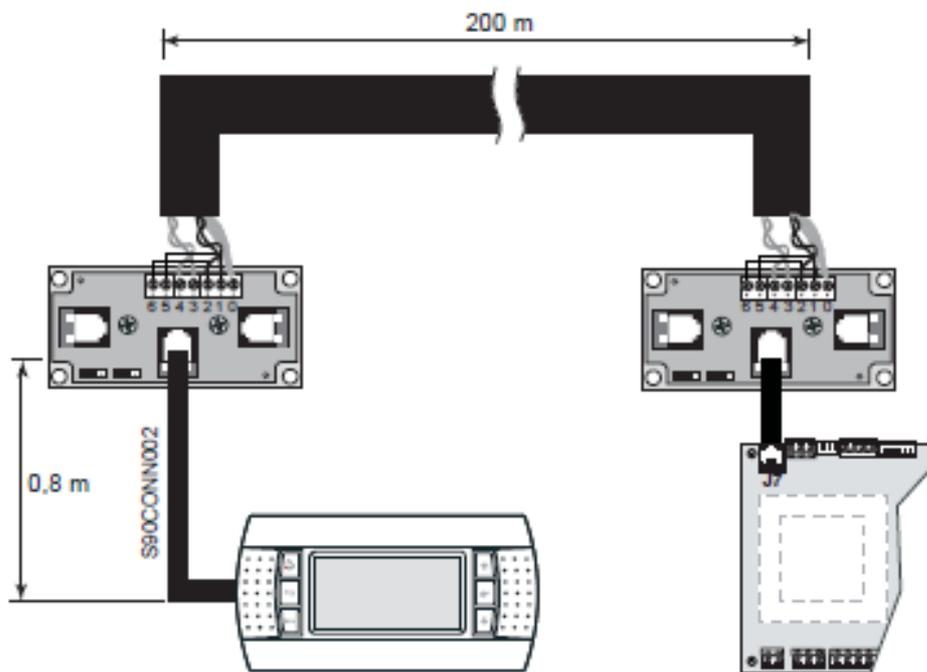
The electrical connection between the controllers under the pLAN network (RS485) is carried out using an AWG20/22 shielded cable composed of a twisted pair and a shield. The cards must be connected in parallel using the J11 connector.

The first and last controller must be no more than **500m** apart.



3.1.2 Connecting a remote screen to the pLAN

A remote user terminal can be connected to each controller on the pLAN network (RS485) using two cards (CIAT code: **7122917**) and one shielded cable consisting of three AWG24 twisted pairs and a shield. The shielded cable must be no longer than **200m**.



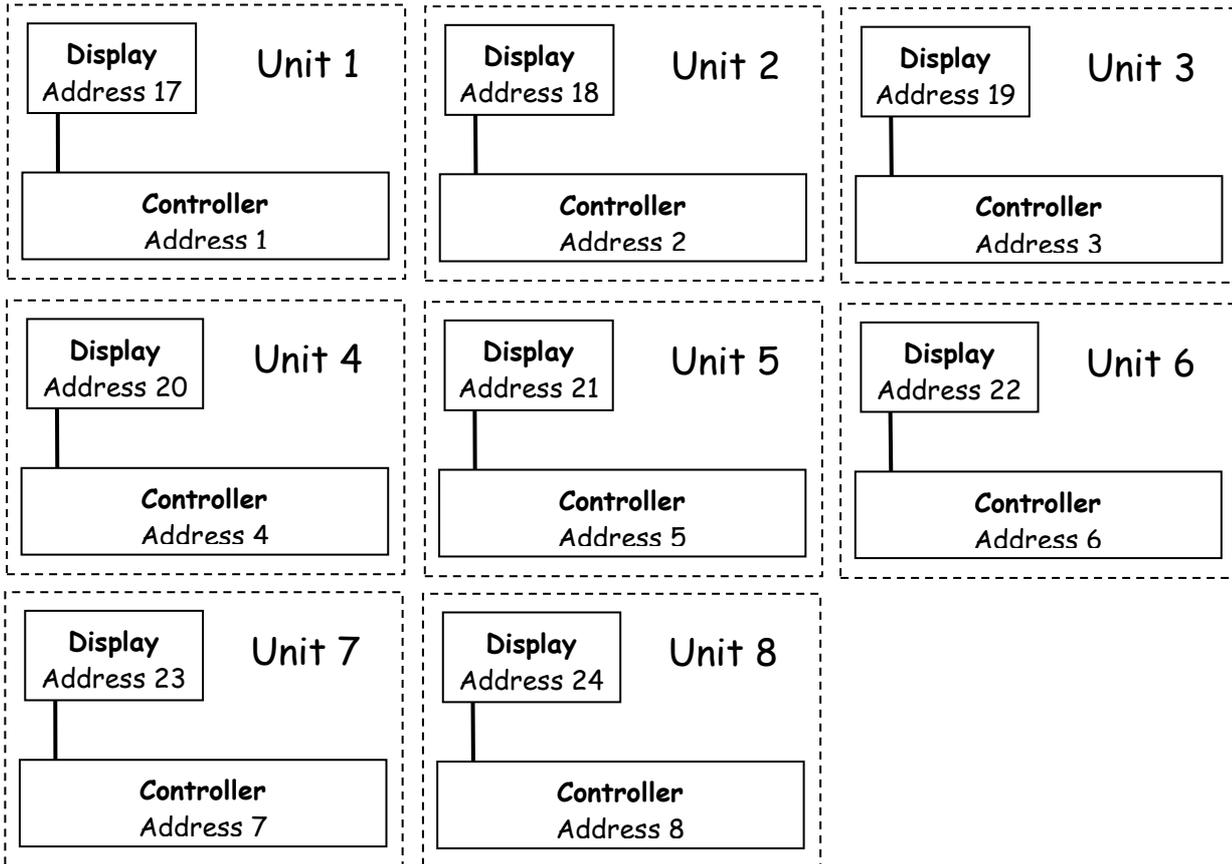
3.2 Addressing the pLAN

Once the controllers are connected over the pLAN network, the controllers and the terminals must be addressed.

There is a range of 32 possible addresses (binary logic). As a result, a total of 32 controllers and terminals can be connected over the pLAN network.

The pLAN network will not work if the same address is shared by two components!

The controllers and displays must be addressed as illustrated below:



3.3 Changing the controller address

The controller pLAN address can be changed, when creating a rotation loop, in page pL1 of the Parameters menu, following the diagram shown above.

3.3.1 Addressing the HMI terminals

The value of the factory-set address is '17'.

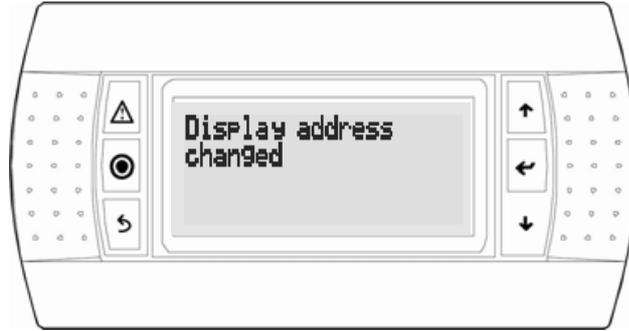
In order to be able to configure the terminal's address, it must first be powered via the telephone connector.

To enter configuration mode, press and buttons \uparrow \downarrow and \leftarrow (even if the terminal is already on) simultaneously for at least five seconds. The mask of the screen below appears and the pointer flashes at the top left corner:



- to change the terminal's address (display address setting) press the \leftarrow button once. The pointer will move to the address field (02).

- select the desired value using the \uparrow \downarrow buttons and confirm by pressing the \leftarrow button. If the value selected is different from that previously stored in memory, the mask of the screen below will appear and the new value will be stored in the display's permanent memory.

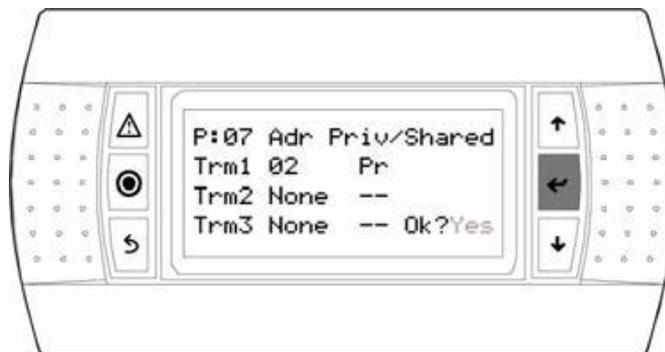


If the nn field is set to '0', the terminal will use the Point-to-Point Protocol (not the pLAN) to communicate with the controller and the "I/O Board address: 07" field will disappear as it will not be necessary.

3.3.2 Assigning private and shared terminals

Follow the procedure below if, at this point, it is necessary to change the list of terminals associated with each controller:

- enter configuration mode by pressing the \uparrow \downarrow and \leftarrow buttons as described in the previous section;
- press **enter** until the pointer moves to the "I/O board address" field;
- using the \uparrow \downarrow buttons, select the address of the desired controller. The only values selectable will be those of the controllers that are on the network. If the pLAN network is not working correctly or if no controllers are present, the field cannot be changed and will display a "—";
- press the **enter** button once more. the following mask sequences will be displayed:



- as above, press **enter** to move the pointer from field to field. Press the \uparrow \downarrow buttons to change the value of the current field. The P:xx field shows the address of the selected controller. In the example above, controller No. 07 is selected;
- to exit the configuration procedure and store the data, select "YES" in response to "OK?" and confirm with the \leftarrow button.

In the case of a shared display for a set of units (maximum 31), the terminal must be configured on each unit in "Sh" mode.

The fields in the "Adr" column contain the addresses of the terminals associated with the controller whose address is 07; the "Priv/Shared" column shows the terminal type.

Warning: HMI terminals do not have a printer output and therefore cannot be configured as "Sp" (shared printer).

If the terminal remains inactive (no buttons pressed) for more than 30 seconds, it will automatically exit configuration mode without saving any changes made.

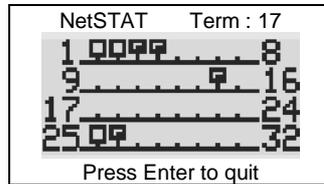
3.3.3 Checking the pLAN address

The pLAN address is displayed in the top left of the main screen, the pLAN NETWORK pL1 screen in the "Communication" menu and the Program pr1 screen of the "Versions" menu.

3.4 State of the pLAN

When the system starts up, the pLAN network may encounter a number of problems (card fault and terminal start-up) caused by incorrect connections or a wrong address. The state of the pLAN network can be displayed in real time on a special mask in order to identify which devices (controller or terminal) are correctly connected and addressed.

To display this special page, simultaneously press \uparrow \downarrow and \leftarrow on any other terminal on the network for at least 10 seconds. After the first 5 seconds, a page is displayed; after 5 more seconds, the next page appears:



Once on the screen, network addresses 1 to 32 are displayed. The small rectangles represent the terminals and the large rectangles, the controllers. If symbols appear then disappear, the pLAN may be unstable or, more likely, two components share the same address. The number after **Term** indicates the address of the terminal used. The example shows that the network is made up of 3 controllers with the addresses 1, 2, 25 and 4 terminals with the addresses 3, 4, 15 and 26. Once the page has been verified, turn off the power, check the connections and addresses, then turn the power back on.

4 Replacing the lithium battery

The lithium battery must be replaced by the customer when the notification alarm appears, approximately 10 years after the unit is commissioned on site.

Once the replacement has been carried out, do not forget to reset the battery check (mask tp1)

5 Supervision

The controller may be connected to a local or remote supervision PC or to most types of CMS (Modbus, Lonworks, KNX). For the listed functions to be used, optional cards (Rs485, KNX, LON) or gateways (devices able to interpret various communication protocols) must be installed

NOTE:

If using a communication bus, the routing and processing of the available data are outside CIAT's scope of supply. They must be provided by the installer, and require the involvement of an integrator.

5.1 CMS

Modbus[®] RTU: insert the RS485 expansion board (CIAT code: **7119749**) and connect it as described in the manual. Validating the protocol on the user terminal (screen **g1**):

- **Protocol** *MODBUS RTU*
- **Speed** *---- bds (Set in accordance with the CMS speed)*
- **Address** *001 (Different to 0)*

Modbus[®] TCP: insert the pCo Web card (CIAT code: **7119753**) and connect it as described in the manual. Validating the protocol on the user terminal (screen **g1**):

- **Protocol** *MODBUS TCP*
- **Speed** *19200 bds (Obligatory)*
- **Address** *001 (Different to 0)*

LonWorks[®]: insert the expansion board (CIAT code: **7323026** (type FTT-10A)) and connect it as instructed in the manual. Validating the protocol on the user terminal (screen **g1**):

- **Protocol** *LON*
- **Speed** *4800 bds (Obligatory)*
- **Address** *001 (Obligatory)*

KNX[®]: insert the expansion board (CIAT code: **7265072**) and connect it as instructed in the manual. Validating the KNX protocol on the user terminal (screen **g1**):

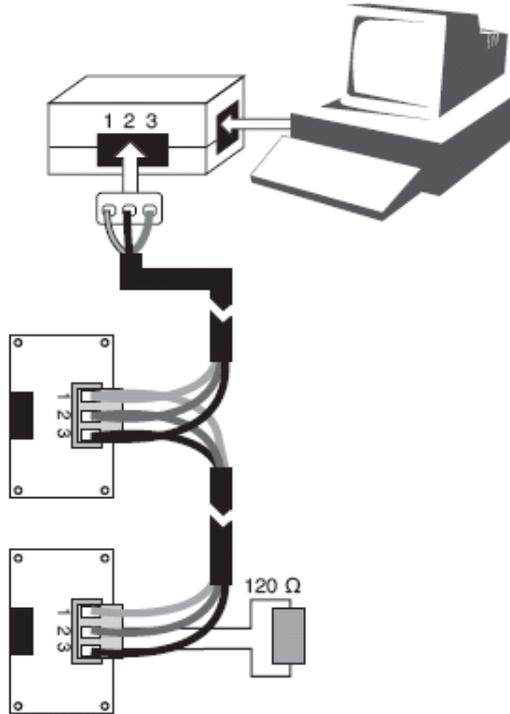
- **Protocol** *KNX*
- **Speed** *9600 bds (Obligatory)*
- **Address** *001 (Obligatory)*

5.2 The datapoint database

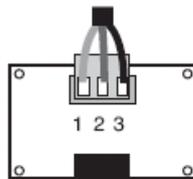
The unit comes with a communication database that includes the most important datapoints for the program, from the values of the sensors to the parameters displayed in the masks. The database contains three types of datapoint: digital datapoints, integer datapoints and analogue datapoints. The tables below list the names of these datapoints, their addresses and types (read-only (R) or read/write (R/W)).

5.3 Modbus

5.3.1 Modbus RTU connection diagram



5.3.2 RS485 connection close-up



Pin	Description
1	GND
2	RX+/TX+
3	RX-/TX-

The components required for connection to the remote and/or local ModBus supervision system are as follows:

- An RS485 serial card (CIAT code: **7119749**) connected to each controller.
- A standard RS485/USB converter for connection to a PC (not supplied by CIAT). The converter can be connected to any network RS485 card.
- An electrical network using an **AWG20/22** shielded cable (not supplied by CIAT) comprising a twisted pair and shielding with a max length of **1000 m**. This network must never run parallel to power cables at a distance of less than **50 cm**. These cables may cross, but perpendicularly. You are requested not to form a loop with the network cable or the earth braid, and to properly separate the various cable families (control, power, earth and communication bus).
- A supervision program installed on a PC (not supplied by CIAT).

An 120Ω ¼W electrical resistor must be connected to the RS485 serial card in last position on the bus, as shown in the connection diagram.

The format of the data frame, which cannot be modified, is as follows: 8 data bits, 2 stop bits and without parity on 2 words (2 bytes), high-order, low-order.

The data format (16 bits, signed) is standard for Modbus except for analogue data which is in the format "Integer divided by 10"

The codes for the Modbus functions used are:

- 1 or 2: Read n bits
- 3 or 4: Read multiple registers (16 bits)
- 5: Write one bit
- 6: Write one register
- 8: Read diagnostics counters
- 11: Read event counter
- 15: Write n bits
- 16: Write multiple registers (16 bits)

NB: The JBus addresses are equal to the "Modbus address" - 1

5.3.3 Modbus TCP connection

The Modbus TCP protocol connection requires a communication card to be connected and configured as shown below. The speed (baud rate) must be identical in the communication menu.

The screenshot displays the pCO Web configuration interface. The top navigation bar includes tabs for General, Network, pCO Com (selected), SNMP, BACnet, Plugins, Users, and Firmware. The left sidebar contains menu items: Information, Configuration (highlighted), Clock & Logger, Events, Tests, Customer Site, and Info & Contact. The main content area is titled "Serial communication" and contains the following text: "pCOWeb is an optional card which can be fitted into a pCO controller and therefore, in order to communicate correctly with it, pCOWeb needs to be set up according to its settings. Changing these settings will not affect the IP functionalities of the card (SNMP, BACnet..) but only the communication between pCOWeb and pCO controller. Refer to the manual of the pCO application for further information on how to set up the communication protocols in the pCO. **Modify very carefully.**" Below this text are configuration fields: Protocol (Modbus Extended), Baud rate (19200), Modbus slave address (1), Digital variables* (2048), Analog variables* (5000), and Integer variables* (5000). A "Submit" button is located at the bottom of the configuration area. The left sidebar also features a "Reboot" button and system information: "System is using: Factory parameters" and "Firmware Release: A1.5.0 - B1.2.4".

5.3.4 Variables

5.3.4.1 Commands

Register hex. no.	Register decimal no.	Description	Format	Type	Adjustable values
Registers accessible in read-only mode (function 1) and write mode (function 5)					
0x118	280	Remote on/off command	Boolean	Read-only/Write	0: Off/1: On
0x119	281	Fault acknowledgement	Boolean	Read-only/Write	0: No/1: Acknowledgement
0x11A	282	Electric heater load shedding	Boolean	Read-only/Write	0: Free / 1: Load shedding
0x11B	283	Unit actuation at eco/comfort temperature	Boolean	Read-only/Write	0: Comfort / 1: Eco
0x11C	284	Unit actuation at eco/comfort flow rate	Boolean	Read-only/Write	0: Comfort / 1: Eco
0x11D	285	Unit actuation at eco/comfort pressure	Boolean	Read-only/Write	0: Comfort / 1: Eco

5.3.4.2 Setpoints

Register hex. no.	Register decimal no.	Description	Format	Type	Adjustable values
Dampers accessible in read-only mode (functions 3 or 4) and write mode (functions 6 for char or 16)					
0x0190	400	Supply air fan Comfort flow rate setpoint value	Integer	Read-only/Write	m3/h /10
0x0191	401	Return air fan Comfort flow rate setpoint value	Integer	Read-only/Write	m3/h /10
0x0192	402	Supply air fan Eco flow rate setpoint value	Integer	Read-only/Write	m3/h /10
0x0193	403	Return air fan Eco flow rate setpoint value	Integer	Read-only/Write	m3/h /10
0x0195	405	Supply air duct Comfort pressure setpoint value	Integer	Read-only/Write	Pa
0x0196	406	Supply air duct Eco pressure setpoint value	Integer	Read-only/Write	Pa
0x019A	410	Comfort heating regulated temperature setpoint value	Integer	Read-only/Write	°C x10
0x019B	411	Eco heating regulated temperature setpoint value	Integer	Read-only/Write	°C x10
0x019C	412	Supply air temperature maximum limit value	Integer	Read-only/Write	°C x10
0x019D	413	Supply air temperature minimum limit value	Integer	Read-only/Write	°C x10
0x1A1	417	Air quality control setpoint	Integer	Read-only/Write	ppm
0x1A2	418	Supply air fan maximum flow rate value for air quality regulation	Integer	Read-only/Write	m3/h /10
0x1A6	422	Cooling Comfort regulated temperature setpoint	Integer	Read-only/Write	°C x10
0x1A7	423	Cooling Eco regulated temperature setpoint	Integer	Read-only/Write	°C x10
0x1A8	424	Heating Comfort regulated temperature setpoint	Integer	Read-only/Write	°C x10
0x1A9	425	Heating Eco regulated temperature setpoint	Integer	Read-only/Write	°C x10
0x1AC	428	Cooling Comfort supply air temperature setpoint	Integer	Read-only/Write	°C x10
0x1AD	429	Cooling Eco supply air temperature setpoint	Integer	Read-only/Write	°C x10
0x1AE	430	Heating Comfort supply air temperature setpoint	Integer	Read-only/Write	°C x10
0x1AF	431	Heating Eco supply air temperature setpoint	Integer	Read-only/Write	°C x10
0x1B4	436	Frost protection setpoint value when the unit is in Standby	Integer	Read-only/Write	°C x10
0x1B9	441	Temperature control setpoint in "Night cooling" mode	Integer	Read-only/Write	°C x10
0x1BA	442	Duct pressure control setpoint in "Night cooling" mode	Integer	Read-only/Write	Pa
0x1BB	443	Supply air fan flow rate control setpoint in "Night cooling" mode	Integer	Read-only/Write	m3/h /10

0x1BC	444	Return air fan flow rate control setpoint in "Night cooling" mode	Integer	Read-only/Write	m3/h /10
0x1BD	445	Stage 1 and off setpoint value for the electric heater	Integer	Read-only/Write	%
0x1BE	446	Stage 1 on setpoint value for the electric heater	Integer	Read-only/Write	%
0x1BF	447	Stage 2 off setpoint value for the electric heater	Integer	Read-only/Write	%
0x1C0	448	Stage 2 on setpoint value for the electric heater	Integer	Read-only/Write	%
0x1C4	452	Free Cooling authorisation limit setpoint value in relation to the fresh air temperature	Integer	Read-only/Write	°C x10
0x1C5	453	Value of the minimum % of fresh air during Free cooling management	Integer	Read-only/Write	%
0x1D0	464	High threshold for supply air filter CF1 fouled fault	Integer	Read-only/Write	Pa
0x1D1	465	High threshold for supply air filter CF1 clogged fault	Integer	Read-only/Write	Pa
0x1D5	469	High threshold for return air filter CF1 fouled fault	Integer	Read-only/Write	Pa
0x1D6	470	High threshold for return air filter CF1 clogged fault	Integer	Read-only/Write	Pa
0x1DB	475	Stage off setpoint value for the DX coil	Integer	Read-only/Write	%
0x1DC	476	Stage on setpoint value for the DX coil	Integer	Read-only/Write	%
0x1E5	485	Changeover limit setpoint value in Heating mode and water return temperature	Integer	Read-only/Write	°C x10
0x1E6	486	Changeover limit setpoint value in Cooling mode and water return temperature	Integer	Read-only/Write	°C x10
0x1E7	487	Value for the water return temperature control proportional band	Integer	Read-only/Write	°C x10
0x1EB	491	Duct pressure sensor fault low threshold	Integer	Read-only/Write	Pa
0x1EC	492	Duct pressure sensor fault high threshold	Integer	Read-only/Write	Pa

5.3.4.3 Reading parameters

Register hex. no.	Register decimal no.	Description	Format	Type	Values displayed
Dampers accessible in read-only mode (functions 3 or 4)					
0x44C	1100	Supply air temperature	Integer	Read-only	Value x10
0x44D	1101	Return air temperature	Integer	Read-only	Value x10
0x44E	1102	Ambient temperature	Integer	Read-only	Value x10
0x44F	1103	Fresh air temperature	Integer	Read-only	Value x10
0x450	1104	Water network temperature	Integer	Read-only	Value x10
0x453	1107	Filter CF2 pressure switch control input state	Boolean	Read-only	0 = No fault 1 = Fault
0x454	1108	Supply air fan flow rate	Integer	Read-only	Value /10
0x455	1109	Return air fan flow rate	Integer	Read-only	Value /10
0x456	1110	Duct pressure	Integer	Read-only	
0x458	1112	Supply air filter CF1 fouling	Integer	Read-only	
0x459	1113	Return air filter CF1 fouling	Integer	Read-only	
0x45C	1116	Air quality in ppm of CO ₂	Integer	Read-only	
0x45E	1118	Supply air fan monitoring input state	Boolean	Read-only	0 = Contact open 1 = Contact closed
0x45F	1119	Return air fan monitoring input state	Boolean	Read-only	0 = Contact open 1 = Contact closed
0x460	1120	Fire input state	Boolean	Read-only	0 = Fault 1 = No fault
0x467	1127	Humidifier monitoring	Boolean	Read-only	0 = Fault 1 = No fault
0x468	1128	Electric heater load shedding command or Selection of heating coil	Boolean	Read-only	0 = Not Shed / EC 1 = Load shedding / EL
0x469	1129	Remote control input state	Boolean	Read-only	0 = Off 1 = On
0x46C	1132	Electric heater safety thermostat input state	Boolean	Read-only	0 = Fault 1 = No fault
0x46E	1134	Antifreeze thermostat input state	Boolean	Read-only	0 = No fault 1 = Fault
0x474	1140	Supply air variable drive command signal	Integer	Read-only	
0x475	1141	Return air variable drive command signal	Integer	Read-only	
0x476	1142	Opening percentage for coil 1	Integer	Read-only	
0x477	1143	Opening percentage for coil 2	Integer	Read-only	
0x47D	1149	"Danger" fault summary relay	Boolean	Read-only	0 = No fault 1 = Fault
0x47E	1150	"Maintenance" fault summary relay	Boolean	Read-only	0 = No fault 1 = Fault
0x483	1155	Damper servomotor state	Boolean	Read-only	0 = Damper closed 1 = Damper open
0x484	1156	Stage 1 state for the electric heater	Boolean	Read-only	0 = Off 1 = On
0x485	1157	Stage 2 state for the electric heater	Boolean	Read-only	0 = Off 1 = On
0x488	1160	Stage state for the DX coil	Boolean	Read-only	0 = Off 1 = On
0x48E	1166	Humidifier operation authorisation output state	Boolean	Read-only	0 = Off 1 = On
0x491	1169	Mixing output value	Integer	Read-only	
0x492	1170	Mixing command direction of action	Integer	Read-only	0:Non 1:Opening 2:Closed

0x49E	1182	Calculated supply air setpoint value	Integer	Read-only	Value x10
0x4A5	1189	Supply air fan runtime counters	Integer	Read-only	in hours
0x4A6	1190	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4AB	1195	Return air fan runtime counters	Integer	Read-only	in hours
0x4AC	1196	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4B2	1202	Stage 1 electric heater runtime counters	Integer	Read-only	in hours
0x4B3	1203	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4B4	1204	Stage 2 electric heater runtime counters	Integer	Read-only	in hours
0x4B5	1205	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4B8	1208	Humidifier runtime counters	Integer	Read-only	in hours
0x4B9	1209	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4BA	1210	DX module runtime counters	Integer	Read-only	in hours
0x4BB	1211	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4BC	1212	Heat recovery unit bypass runtime counters	Integer	Read-only	in hours
0x4BD	1213	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4DA	1242	Software version number	Integer	Read-only	
0x4DB	1243	Suffix number	Integer	Read-only	
0x4DC	1244	Day	Integer	Read-only	
0x4DD	1245	Month	Integer	Read-only	
0x4DE	1246	Year	Integer	Read-only	
0x4DF	1247	Bios version	Integer	Read-only	
0x4E0	1248	Bios suffix	Integer	Read-only	
0x4E1	1249	Boot version	Integer	Read-only	
0x4E2	1250	Boot suffix	Integer	Read-only	
0x4E3	1251	SO number part 1	Integer	Read-only	
0x4E4	1252	SO number part 2	Integer	Read-only	
0x4E5	1253	Box number part 1	Integer	Read-only	
0x4E6	1254	Box number part 2	Integer	Read-only	
0x500	1280	Unit state	Integer	Read-only	0: Off 1: On 2: On after cutout 3: Standby 4: Stop by fault by CMS 5: Post 6: ventilation 7: Manual mode
0x501	1281	Heating requirement supplied by unit	Integer	Read-only	
0x502	1282	Cooling requirement supplied by unit	Integer	Read-only	

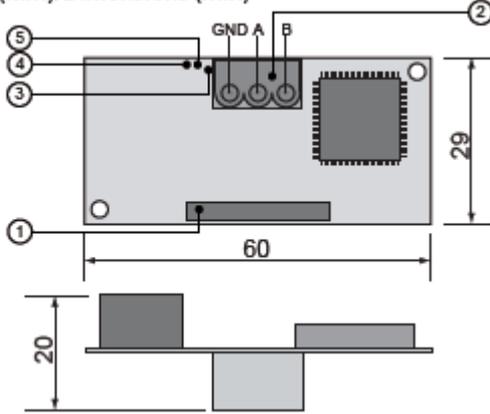
5.3.4.4 Alarms

Register hex. no.	Register decimal no.	Description	Format	Type
Dampers accessible in read-only mode (functions 3 or 4)				
0x514	1300	Level 0 fault (critical fault)	Boolean	0 or 1
0x515	1301	Level 10 fault (Non-critical fault)	Boolean	0 or 1
0x516	1302	Supply air motor alarm	Boolean	0 or 1
0x518	1304	Filter 1 dirty alarm	Boolean	0 or 1
0x51C	1308	Fire alarm	Boolean	0 or 1
0x51D	1309	Antifreeze alarm	Boolean	0 or 1
0x51E	1310	Electric heater overheating alarm	Boolean	0 or 1
0x51F	1311	Supply air temperature too high alarm	Boolean	0 or 1
0x520	1312	Supply air temperature too low alarm	Boolean	0 or 1
0x521	1313	Room or return air temperature too high alarm	Boolean	0 or 1
0x522	1314	Room or return air temperature too low alarm	Boolean	0 or 1
0x523	1315	Return air motor alarm	Boolean	0 or 1
0x524	1316	Filter 1 blocked alarm	Boolean	0 or 1
0x526	1318	Filter 2 dirty alarm	Boolean	0 or 1
0x527	1319	Filter 2 blocked alarm	Boolean	0 or 1
0x528	1320	Filter 3 dirty alarm	Boolean	0 or 1
0x52B	1323	Heat recovery unit alarm in frosting phase	Boolean	0 or 1
0x52C	1324	Timer battery replacement alarm	Boolean	0 or 1
0x52E	1326	Duct pressure alarm	Boolean	0 or 1
0x530	1328	Humidifier alarm	Boolean	0 or 1
0x531	1329	Ambient or return air humidity too high alarm	Boolean	0 or 1
0x532	1330	Ambient or return air humidity too low alarm	Boolean	0 or 1
0x541	1345	Heat recovery unit fouled alarm	Boolean	0 or 1

5.4 LON

The communication card is supplied preloaded. The information data is retrieved via the CMS using a shunt on the Pin Service on the front panel of the expansion board.

Dimensioni (mm)/Dimensions (mm)



1. Connector for the controller
2. Disconnectable terminal for connection of the LonWorks® network (GND, A, B)
3. Pin service
4. Green service LED: state of the node, lit during the pin service, flashing when the board receives a command from the network, if permanently lit = board faulty
5. Red fault LED: signals a board installation problem (connection, communication speed 4800bds)

On request, the "Air_Technologies_110905.XIF" file is available.

5.4.1 LON scope of supply

Recap of on-site LON tasks by CIAT/Installer/Integrator for commissioning:

Task	CIAT	Integrator	Installer
Commissioning service			
Supply of .XIF integration file			
Installation of units equipped with LON controller			
Addressing and configuration of LON network			
Definition of master/slave zones			
Definition of setpoints and time programs			

5.4.2 The digital datapoints

Type	Index	NV name	SNVT	Direction	Description
DGT	1	nvi_GTC_OnOff	95	input	Unit On/Off command via CMS
DGT	1	nvo_GTC_OnOff	95	output	Unit On/Off command return via CMS
DGT	--	nvo_entree_dig_1	83	output	State of digital inputs bit 0 <i>Not used</i> bit 1 <i>Not used</i> bit 2 <i>Supply air fan control state</i> bit 3 <i>Antifreeze thermostat control state</i> bit 4 <i>Not used</i> bit 5 <i>Fire sensor state</i> bit 6 <i>Electric heater thermostat sensor input</i> bit 7 <i>Remote control state</i> bit 8 <i>Return air fan control state</i> bit 9 <i>Not used</i> bit 10 <i>Not used</i> bit 11 <i>Not used</i> bit 12 <i>Not used</i>
DGT	--	nvo_sortie_dig_1	83	output	State of digital outputs bit 0 <i>Danger fault output</i> bit 1 <i>Maintenance fault output</i> bit 2 <i>Not used</i> bit 3 <i>Not used</i> bit 4 <i>Damper control</i> bit 5 <i>Electric heater stage 1 control</i> bit 6 <i>Electric heater stage 2 control</i> bit 7 <i>Stage control for the DX coil</i> bit 8 <i>Humidifier authorisation control</i> bit 9 <i>Plate heat exchanger bypass servomotor control</i>
DGT	--	nvo_alarm_01_16	83	output	Alarm 1 value: bit 0 <i>Motor alarm</i>

				bit 1 bit 2 bit 3 bit 4 bit 5 bit 6 bit 7 bit 8 bit 9 bit 10 bit 11 bit 12 bit 13 bit 14 bit 15	<i>Return air motor alarm</i> <i>Not used</i> <i>Supply air filter 1 dirty alarm</i> <i>Supply air filter 1 blocked alarm</i> <i>Not used</i> <i>Return air filter 2 dirty alarm</i> <i>Return air filter 2 blocked alarm</i> <i>Additional filter 3 dirty alarm</i> <i>Not used</i> <i>Not used</i> <i>Not used</i> <i>Not used</i> <i>Fire alarm</i> <i>Antifreeze alarm</i> <i>Electric heater safety thermostat alarm</i>
DGT	--	nvo_alarm_17_32	83	output bit 0 bit 1 bit 2 bit 3 bit 4 bit 5 bit 6 bit 7 bit 8 bit 9 bit 10 bit 11 bit 12	Alarm 2 value: <i>Low supply air temperature alarm</i> <i>High supply air temperature alarm</i> <i>Low ambient or return air temperature alarm</i> <i>High ambient or return air temperature alarm</i> <i>Humidifier alarm</i> <i>Heat recovery unit fouled alarm</i> <i>pLAN alarm</i> <i>Clock lithium battery alarm</i> <i>Duct pressure alarm</i> <i>Not used</i> <i>Not used</i> <i>Not used</i> <i>Not used</i>

5.4.3 The analogue datapoints

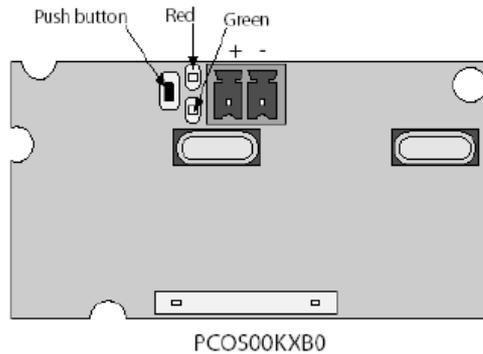
Type	Index	NV name	SNVT	Direction	Description
ANL	1	nvo_custom_1	113	output	Supply air filter CF1 fouling level
ANL	2	nvo_custom_2	113	output	Supply air duct pressure
ANL	3	nvo_custom_3	113	output	Return air filter CF1 fouling level
ANL	5	nvo_custom_5	113	output	Heat exchanger fouling
ANL	8	nvo_custom_8	161	output	Supply air fan flow rate
ANL	9	nvo_custom_9	161	output	Return air fan flow rate
ANL	16	nvo_custom_16	105	output	Room or return air temperature
ANL	17	nvo_custom_17	105	output	Supply air temperature
ANL	18	nvo_custom_18	105	output	Fresh air temperature
ANL	19	nvo_custom_19	105	output	Network water temperature
ANL	25	nvo_sortie_ana_1	9	output	Coil No.1 capacity
ANL	26	nvo_sortie_ana_2	9	output	Coil No.2 capacity
ANL	27	nvo_sortie_ana_3	9	output	Supply air variable drive
ANL	28	nvo_sortie_ana_4	9	output	Return air variable drive
ANL	37	nvo_etat_unite	9	output	Unit operating state: Value 0 <i>off</i> Value 1 <i>opening of damper</i> Value 2 <i>on</i> Value 3 <i>switched on after a power failure</i> Value 4 <i>standby</i> Value 5 <i>switched off by a fault</i> Value 6 <i>switched off by CMS</i> Value 7 <i>post ventilation</i>
ANL	44	nvi_T_regul	105	input	Comfort regulated temperature setpoint in "Precision" mode (return or ambient)
ANL	44	nvo_T_regul	105	output	<i>Comfort regulated temperature setpoint return in mode "Precision" mode (return or ambient)</i>
ANL	48	nvi_D_regul	161	input	Comfort supply air fan flow rate setpoint
ANL	48	nvo_D_regul	161	output	<i>Comfort supply air fan flow rate setpoint return</i>
ANL	49	nvi_P_regul	113	input	Comfort duct pressure setpoint
ANL	49	nvo_P_regul	113	output	<i>Comfort duct pressure setpoint return</i>

5.5 KNX

The bus used is a TP1, with a transmission speed of 9600 Bds.

This bus requires a special external power supply (supplied as an option; CIAT code: **7222279**)

5.5.1 Description of KNX communication card



LED		Meaning	Cause / solution
Red	Constantly lit	No communication between KNX card and the controller	Check the configuration: - controller address incorrect - transmission speed incorrect - wrong protocol
	Flashing	Communication error between KNX card and the controller	The card has been configured with a version or address not recognised by the controller BIOS
	Off	Communication with the pCO3 is established	
Green	Constantly lit	The button has been pressed to allocate the address, and the card is awaiting the corresponding procedure from ETS3	
	Rapidly flashing	- the XML file has not been downloaded - a rapid flash indicates receipt of the address after the button has been pressed	Proceed with configuration
	Slow flashing	Configuration in progress: the XML file is being downloaded by ETS3	
Green + Red	Both constantly lit	No power supply on KNX bus	Check: KNX bus power supply, electrical connections and polarity of connections on the connector + and - terminals

5.5.2 Variables

The KSet software for configuring the group addresses is provided alongside the Carel_plugin_21.PR4 file for the ETS3 software tool (not provided) (Carel_plugin_30.PR5 file for the ETS4 software (not provided)) and the CTA-V30.XML file for the database below:

Description	Datapoint Name	Datapoint TypeName	Datapoint TypeCode	IN/OUT	Index	TYPE
Supply air filter CF1 fouling level	Filtre1	DPT_Value_Temp	9.001	OUT	1112	REG
Supply air duct pressure	PressionGaine	DPT_Value_Temp	9.001	OUT	1110	REG
Supply air temperature	TemperatureSoufflage	DPT_Value_Temp	9.001	OUT	1100	REG
Return air temperature	TemperatureReprise	DPT_Value_Temp	9.001	OUT	1111	REG
Return air filter CF1 fouling level	Filtre2	DPT_Value_Temp	9.001	OUT	1113	REG
Fresh air or outdoor temperature	TemperatureNeuf	DPT_Value_Temp	9.001	OUT	1103	REG
Ambient temperature	TemperatureAmbiante	DPT_Value_Temp	9.001	OUT	1102	REG
Supply air fan flow rate	DebitVentilSoufflage	DPT_Value_Temp	9.001	OUT	1108	REG
Return air fan flow rate	DebitVentilReprise	DPT_Value_Temp	9.001	OUT	1109	REG
CO ₂ air quality	QualiteAir	DPT_Value_Temp	9.001	OUT	1116	REG
Network water temperature	TemperatureReseau	DPT_Value_Temp	9.001	OUT	1104	REG
Water coil valve No. 1	Batterie1	DPT_Value_Temp	9.001	OUT	1142	REG
Supply air fan control	VitesseVentilSoufflage	DPT_Value_Temp	9.001	OUT	1140	REG
Return air fan control	VitesseVentilReprise	DPT_Value_Temp	9.001	OUT	1141	REG
Water coil valve No. 2	Batterie2	DPT_Value_Temp	9.001	OUT	1143	REG
Mixing damper	Melange	DPT_Value_Temp	9.001	OUT	1169	REG
Supply air fan Comfort flow rate control setpoint	WVentSConfort	DPT_Value_Temp	9.001	IN	400	REG
Supply air fan Comfort flow rate control setpoint return	WVentSConfort	DPT_Value_Temp	9.001	OUT	400	REG
Return air fan Comfort flow rate control setpoint	WVentRConfort	DPT_Value_Temp	9.001	IN	401	REG
Return air fan Comfort flow rate control setpoint return	WVentRConfort	DPT_Value_Temp	9.001	OUT	401	REG
Supply air fan Eco flow control setpoint	WVentSEco	DPT_Value_Temp	9.001	IN	402	REG
Supply air fan Eco flow rate control setpoint return	WVentSEco	DPT_Value_Temp	9.001	OUT	402	REG
Return air fan Eco flow control setpoint	WVentREco	DPT_Value_Temp	9.001	IN	403	REG
Return air fan Eco flow rate control setpoint return	WVentREco	DPT_Value_Temp	9.001	OUT	403	REG
Comfort pressure control setpoint for the Supply air duct	WPressionConfort	DPT_Value_Temp	9.001	IN	405	REG
Comfort pressure control setpoint return for the Supply air duct	WPressionConfort	DPT_Value_Temp	9.001	OUT	405	REG
Eco pressure control setpoint for the Supply air duct	WPressionEco	DPT_Value_Temp	9.001	IN	406	REG
Eco pressure control setpoint return for the Supply air duct	WPressionEco	DPT_Value_Temp	9.001	OUT	406	REG
Control setpoint for the monitored Comfort temperature in "Precision" mode	WTempRegulConfort	DPT_Value_Temp	9.001	IN	410	REG
Control setpoint return for the monitored Comfort temperature in	WTempRegulConfort	DPT_Value_Temp	9.001	OUT	410	REG

"Precision" mode						
Control setpoint for the monitored Eco temperature in "Precision" mode	WTempRegulEco	DPT_Value_Temp	9.001	IN	411	REG
Control setpoint return for the monitored Eco temperature in "Precision" mode	WTempRegulEco	DPT_Value_Temp	9.001	OUT	411	REG
Upper limit for the calculated Supply air T° setpoint in "Precision" mode	Limite MaxTSouffl	DPT_Value_Temp	9.001	IN	412	REG
Upper limit return for the calculated Supply air T° setpoint in "Precision" mode	Limite MaxTSouffl	DPT_Value_Temp	9.001	OUT	412	REG
Low limit for the calculated Supply air T° setpoint in "Precision" mode	Limite MinTSouffl	DPT_Value_Temp	9.001	IN	413	REG
Low limit return for the calculated Supply air T° setpoint in "Precision" mode	Limite MinTSouffl	DPT_Value_Temp	9.001	OUT	413	REG
CO₂ air quality setpoint	WQualiteAir	DPT_Value_Temp	9.001	IN	417	REG
CO₂ air quality setpoint return	WQualiteAir	DPT_Value_Temp	9.001	OUT	417	REG
Maximum flow rate value of supply air fan for air quality control	WVentSMaxQualite	DPT_Value_Temp	9.001	IN	418	REG
Supply air fan maximum flow rate value return for air quality control	WVentSMaxQualite	DPT_Value_Temp	9.001	OUT	418	REG
Control setpoint for the monitored Comfort Cooling temperature in "Energy optimisation" mode						
Control setpoint return for the monitored Comfort Cooling temperature in "Energy optimisation" mode	WTempRegulConfortFroid	DPT_Value_Temp	9.001	OUT	422	REG
Control setpoint for the monitored Eco Cooling temperature in "Energy optimisation" mode	WTempRegulEcoFroid	DPT_Value_Temp	9.001	IN	423	REG
Control setpoint return for the monitored Eco Cooling temperature in "Energy optimisation" mode	WTempRegulEcoFroid	DPT_Value_Temp	9.001	OUT	423	REG
Control setpoint for the monitored Comfort Heating temperature in "Energy optimisation" mode						
Control setpoint return for the monitored Comfort Heating temperature in "Energy optimisation" mode	WTempRegulConfortChaud	DPT_Value_Temp	9.001	OUT	424	REG
Control setpoint for the monitored Eco Heating temperature in "Energy	WTempRegulEcoChaud	DPT_Value_Temp	9.001	IN	425	REG

optimisation" mode						
Control setpoint return for the monitored Eco Heating temperature in "Energy optimisation" mode	WTempRegulEcoChaud	DPT_Value_Temp	9.001	OUT	425	REG
Control setpoint for the Comfort Cooling supply air temperature in "Energy optimisation" mode	WTempSoufflConfortFroid	DPT_Value_Temp	9.001	IN	428	REG
Control setpoint return for the Comfort Cooling supply air temperature in "Energy optimisation" mode	WTempSoufflConfortFroid	DPT_Value_Temp	9.001	OUT	428	REG
Control setpoint for the Eco Cooling supply air temperature in "Energy optimisation" mode	WTempSoufflEcoFroid	DPT_Value_Temp	9.001	IN	429	REG
Control setpoint return for the Eco Cooling supply air temperature in "Energy optimisation" mode	WTempSoufflEcoFroid	DPT_Value_Temp	9.001	OUT	429	REG
Control setpoint for the Comfort Heating supply air temperature in "Energy optimisation" mode	WTempSoufflConfortChaud	DPT_Value_Temp	9.001	IN	430	REG
Control setpoint return for the Comfort Heating supply air temperature in "Energy optimisation" mode	WTempSoufflConfortChaud	DPT_Value_Temp	9.001	OUT	430	REG
Control setpoint for the Eco Heating supply air temperature in "Energy optimisation" mode	WTempSoufflEcoChaud	DPT_Value_Temp	9.001	IN	431	REG
Control setpoint return for the Eco Heating supply air temperature in "Energy optimisation" mode	WTempSoufflEcoChaud	DPT_Value_Temp	9.001	OUT	431	REG
Unit reactivation setpoint in "Standby" mode when there is an ambient temperature sensor	WTempHorsGel	DPT_Value_Temp	9.001	IN	436	REG
Unit reactivation setpoint return in "Standby" mode when there is an ambient temperature sensor	WTempHorsGel	DPT_Value_Temp	9.001	OUT	436	REG
Control setpoint in "Night cooling" mode	WTempNocturne	DPT_Value_Temp	9.001	IN	441	REG
Control setpoint return in "Night cooling" mode	WTempNocturne	DPT_Value_Temp	9.001	OUT	441	REG
Unit operating state <i>0 = off</i> <i>1 = on</i> <i>2 = on after power failure</i> <i>3 = standby</i> <i>4 = off by a fault</i> <i>5 = off by CMS</i> <i>6 = post ventilation</i>	EtatUnite	DPT_Value_2_Ucount	7.001	OUT	1280	REG
Alarm 1 value:	Alarme1	DPT_Value_2_Ucount	7.001	OUT	27	REG

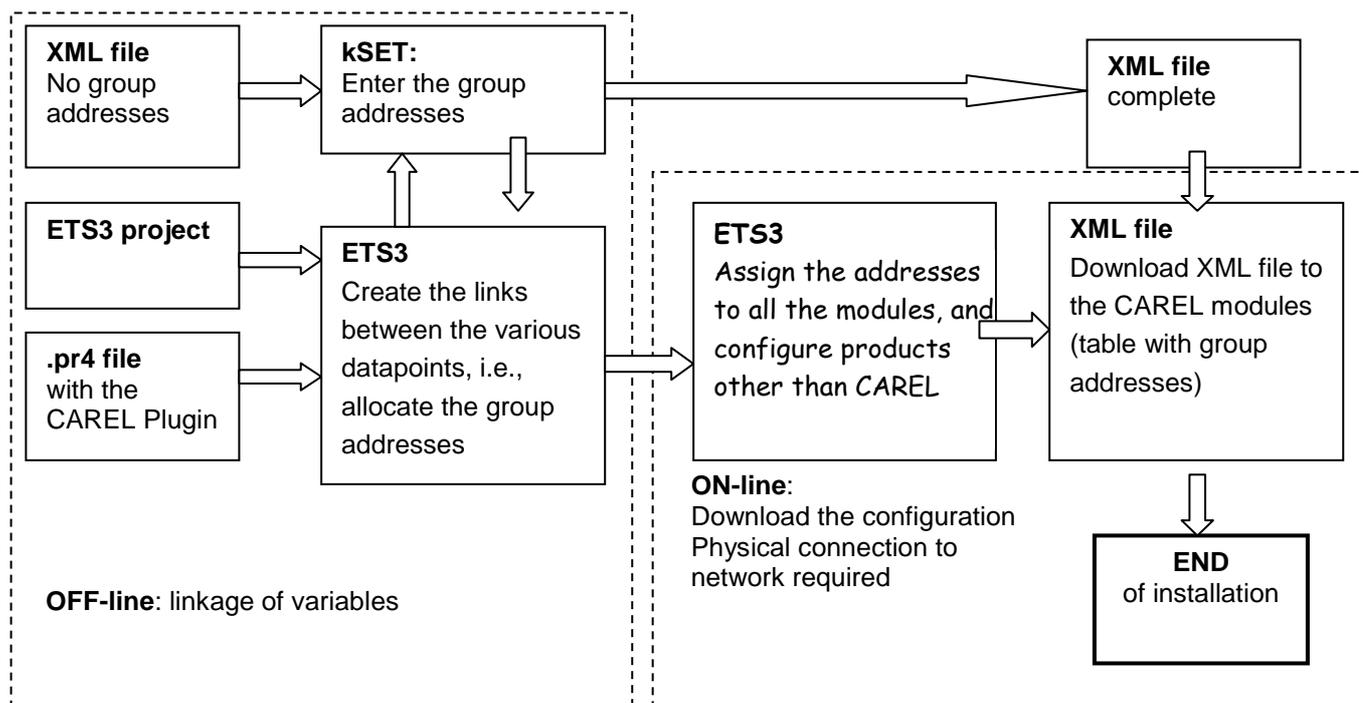
Bit 0 = Supply air motor alarm
Bit 1 = Return air motor alarm
Bit 2 = Not used
Bit 3 = Supply air filter CF1 dirty alarm
Bit 4 = Supply air filter CF1 blocked alarm
Bit 5 = Not used
Bit 6 = Return air filter CF1 dirty alarm
Bit 7 = Return air filter CF1 blocked alarm
Bit 8 = Additional filter CF2 dirty alarm
Bit 9 = Not used
Bit 10 = Not used
Bit 11 = Not used
Bit 12 = Not used
Bit 13 = Fire alarm
Bit 14 = Antifreeze protection alarm
Bit 15 = Electric heater safety thermostat alarm

Alarm 2 value:	Alarme2	DPT_Value_2_Ucount	7.001	OUT	28	REG
Bit 0 = Low supply air temperature alarm						
Bit 1 = High supply air temperature alarm						
Bit 2 = Low ambient or return air temperature alarm						
Bit 3 = High ambient or return air temperature alarm						
Bit 4 = Humidifier alarm						
Bit 5 = Heat recovery unit fouled alarm						
Bit 6 = pLAN alarm						
Bit 7 = Timer lithium battery alarm						
Bit 8 = Duct pressure alarm						
Bit 9 = Not used						
Bit 10 = Not used						
Bit 11 = Not used						
Bit 12 = Not used						
Heating requirement supplied by unit	Chaud	DPT_Value_2_Ucount	7.001	OUT	1281	REG
Cooling requirement supplied by unit	Froid	DPT_Value_2_Ucount	7.001	OUT	1282	REG
Unit On/Off command via CMS	OnoffGTC	DPT_Switch	1.001	IN	280	COIL
Unit On/Off command return via CMS	OnoffGTC	DPT_Switch	1.001	OUT	280	COIL
Reset of alarms not present command	ResetAlarmes	DPT_Switch	1.001	IN	281	COIL
Reset of alarms not present command return	ResetAlarmes	DPT_Switch	1.001	OUT	281	COIL
Electric heater load shedding	Delestage	DPT_Switch	1.001	IN	282	COIL
Electric heater load shedding return	Delestage	DPT_Switch	1.001	OUT	282	COIL
Temperature-dependent machine actuation in Eco / Comfort mode	ConfortEcoTemp	DPT_Switch	1.001	IN	283	COIL
Temperature-dependent machine actuation return in Eco / Comfort mode	ConfortEcoTemp	DPT_Switch	1.001	OUT	283	COIL
Flow rate-dependent	ConfortEcoDebit	DPT_Switch	1.001	IN	284	COIL

machine actuation in Eco / Comfort mode						
Flow rate-dependent machine actuation return in Eco / Comfort mode	ConfortEcoDebit	DPT_Switch	1.001	OUT	284	COIL
Pressure-dependent machine actuation in Eco / Comfort mode						
Pressure-dependent machine actuation return in Eco / Comfort mode	ConfortEcoPression	DPT_Switch	1.001	IN	285	COIL
Pressure-dependent machine actuation return in Eco / Comfort mode	ConfortEcoPression	DPT_Switch	1.001	OUT	285	COIL
"Danger" fault summary	DefautDanger	DPT_Switch	1.001	OUT	1149	COIL
"Maintenance" fault summary	DefautMaintenance	DPT_Switch	1.001	OUT	1150	COIL
Damper control (frost protection or insulation)	Registre	DPT_Switch	1.001	OUT	1155	COIL
Electric heater stage 1 control	BattElec1	DPT_Switch	1.001	OUT	1156	COIL
Electric heater stage 2 control	BattElec2	DPT_Switch	1.001	OUT	1157	COIL
DX coil stage control	BattElec3	DPT_Switch	1.001	OUT	1160	COIL

5.5.3 Configuration process

The diagram below illustrates the phases of the "configuration process" required for configuring the card correctly:



The types of KNX Datapoint available and the respective conversion methods are listed in the table below:

Type Name	Standard ID	Format	KNX range	Range available in the controller
Boolean (DPT_Switch)	1.001	1 bit	Off / On	Off / On
Unsigned 8 bit (DPT_Value_1_Ucount)	5.010	Unsigned 8 bits	0 to 255	0 to 255
Signed 8 bit (DPT_Value_1_Count)	6.010	Signed 8 bits	-128 to +127	-128 to +127
Unsigned 16 bits (DPT_Value_2_Ucount)	7.001	Unsigned 16 bits	0 to 65535	0 to 32767
Signed 16 bits (DPT_Value_2_Count)	8.001	Signed 16 bits	-32768 to +32767	-32768 to +32767
Floating 16 bits (DPT_Value_Temp)	9.001	Floating 16 bits	-671088.64 to +670760.96	-3276.8 to +3276.7

It is important to remember that the same group address cannot be assigned to more than one Datapoint.

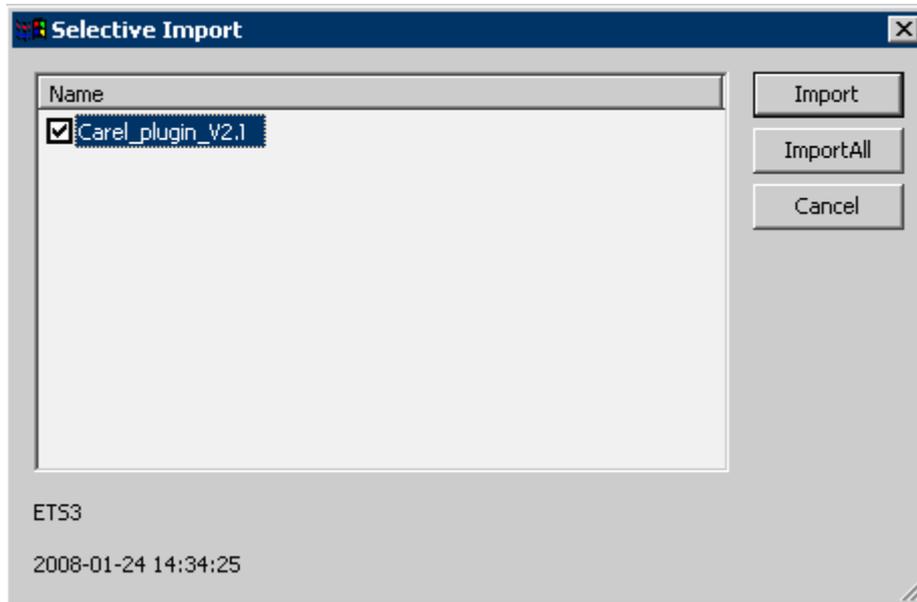
5.5.4 CAREL plugin

As is the case for other manufacturers' devices, the ETS3 data archives must be loaded with a specific description of the device. CAREL distributes a plugin in the form of a "project database", which assigns the addresses and downloads the table created by K-Set, i.e., the XML file.

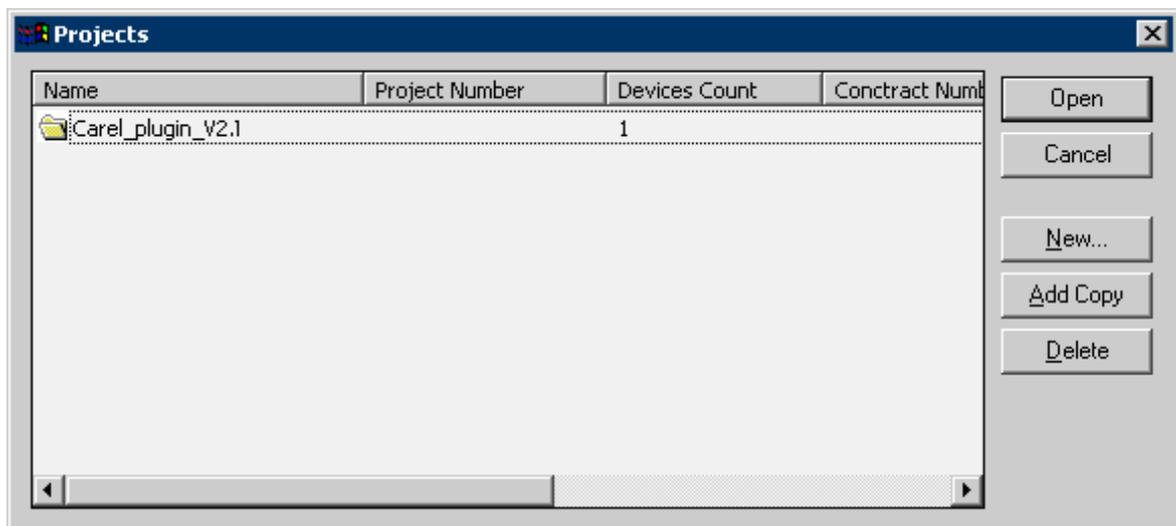
5.5.5 Installing the plugin

The plugin is installed as follows:

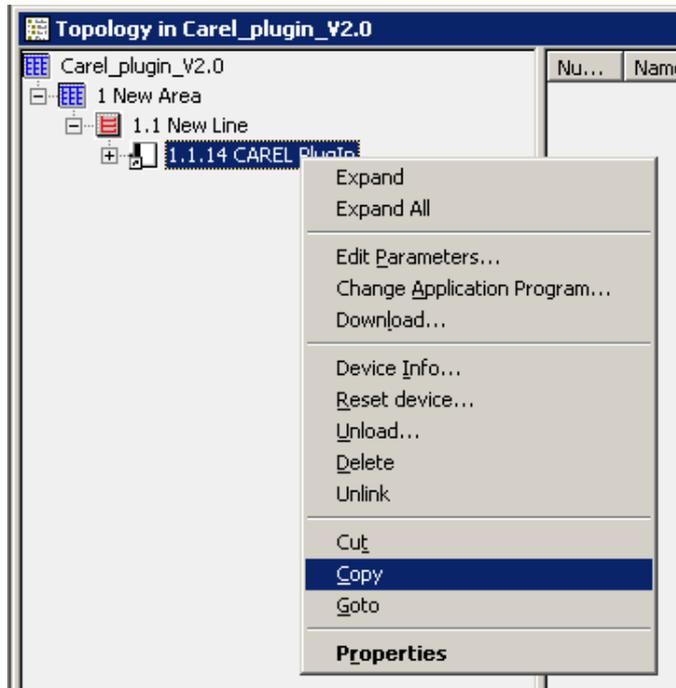
- . Find the file "Carel_plugin_21.pr4" (the updated version of the plugin is available from ksa.carel.com)
- . Import "Carel_plugin_21.pr4" using *Files* → *Import* as shown below:



- . Select *Import all*
- . Using *Files* → "*Open/Manage projects...*", open the project named *Carel_plugin_V2.1* (or above):



- . Open the project using *Open*, select the device "*CAREL Plugin*", right-click on the mouse and select *Copy*:



. Open or create the final project for the system and right-click on the mouse to paste the CAREL plugin, once or more according to the number of CAREL devices to be integrated. The address of each device is automatically incremented. If necessary, you can manually change the address of a device in *Properties*.

5.5.6 Assigning the physical address

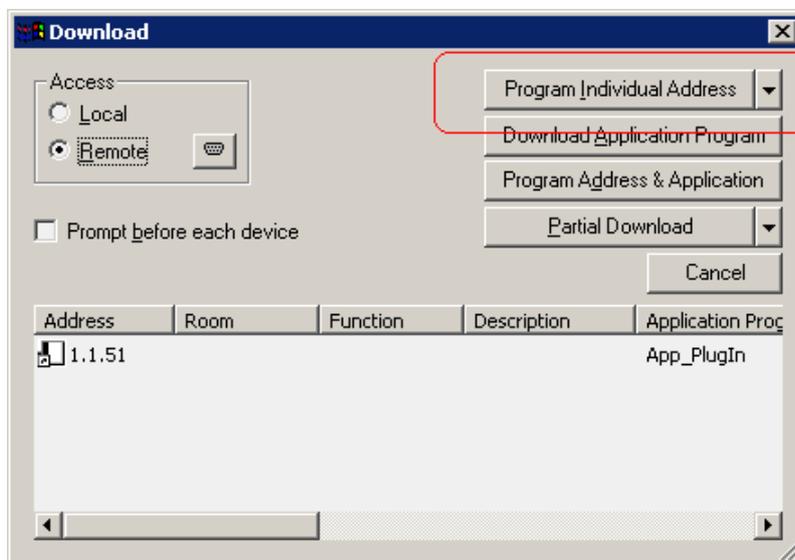
The physical address of the CAREL KNX card is assigned using the standard procedure.

You must be sure that:

- . the Bus wire network is drawn out and connected
- . the Bus is energised
- . the CAREL card is connected to the KNX network
- . the controller is powered on

Use the mouse to select the controller to be configured, right-click to open the "Download" menu, Fig.7.d and Fig.7.e.

Select "Program Individual Address" to activate the configuration procedure and press the button on the card. The green LED on the card goes out to indicate when the operation is complete. If the card address has already been configured, the message "The address is already used by another device" is displayed.

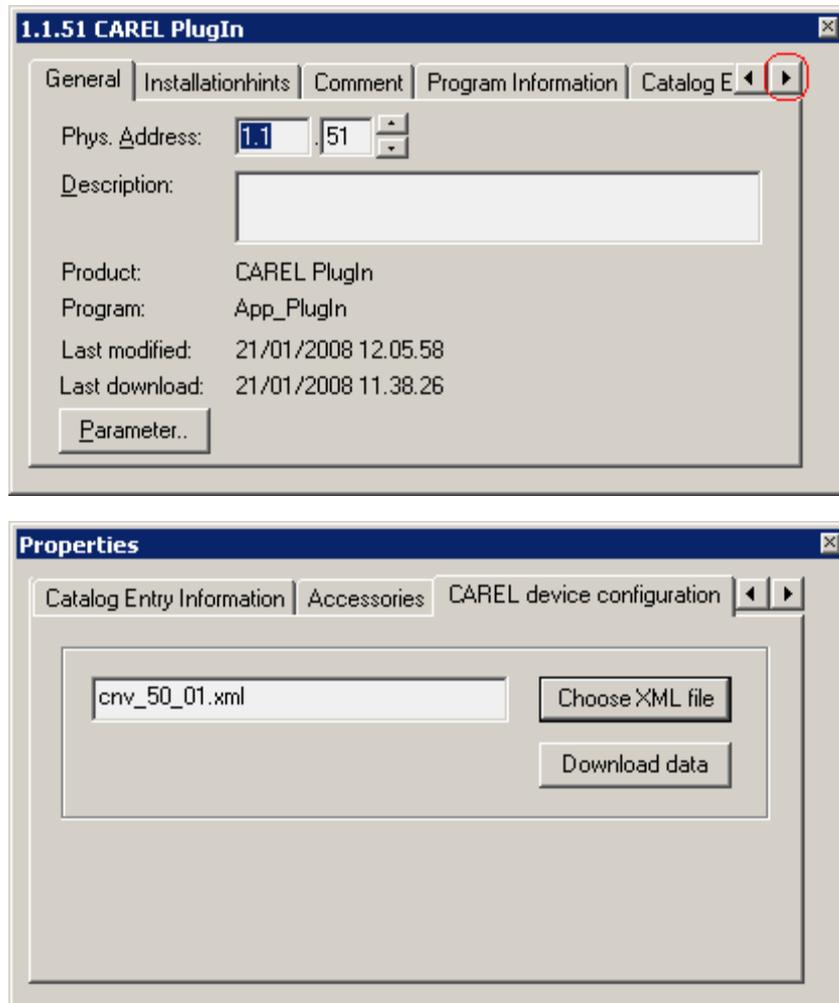


5.5.7 Downloading the XML file

You must be sure that:

- . the Bus wire network is drawn out and connected
- . the Bus is energised
- . the CAREL card is connected to the KNX network
- . the controller is powered on

Use the mouse to select the controller to be configured, right-click to open the "Properties" menu; scroll down the list using the arrows at the top right until the label "CAREL device configuration" is displayed.



Use "Choose XML file" to open the XML configuration file required.

Click on "Download data" and wait for the "Success" message to be displayed. During this phase indicated by the "Performing operation" message and the LED on the card flashing green, no other operation may be performed. The download time may vary according to the size of the XML file and the network traffic; for a maximum size file, this time may be 2 minutes.

In extreme cases, i.e. high traffic and large XML files, the bus may be disconnected and ETS3 will signal an error. In this case, simply repeat the download.

NB: This procedure is specific for the CAREL card, and is the sole configuration operation permitted by the ETS3 program, in addition to allocating the address.

6 Table of alarms

* All possible options are covered by this table

Alarm	Sources	Causes	Solutions
Room or return air temperature too high	Return air B1 or ambient air th-Tune temperature sensor	- Malfunction - Sensor disconnected - Room overheated	- Replace sensor - Reconnect sensor - Revise room loads
Ambient or return air temperature too low		- Malfunction - Sensor short-circuit	- Replace sensor - Check sensor
Supply air temperature too high	Supply air temperature sensor B2	- Malfunction - Sensor disconnected	- Replace sensor - Reconnect sensor
Supply air temperature too low		- Malfunction - Sensor short-circuit	- Replace sensor - Check sensor
Supply air filter CF1 clogged	Supply air flow rate pressure sensor 0-1000 Pa B5	- Filter too dirty	- Replace filter
Supply air filter CF1 dirty		- Filter fouled	- Clean or replace filter
Return air filter CF1 clogged	Return air flow rate pressure sensor 0-1000 Pa B10	- Filter too dirty	- Replace filter
Return air filter CF1 dirty		- Filter fouled	- Clean or replace filter
Filter 3 dirty	Filter CF2 fouling level pressure switch ID3	- Filter fouled	- Clean or replace filter
Humidifier	Cylinder Water ID9	- Cylinder dirty - Water insufficiently conductive	- Change cylinder - Add a handful of salt
Supply air motor	Supply air fan monitoring ID1	- Rotor blocked - Phase check - Voltage too low - Thermal protection - Short-circuit	- See causes - Check wiring - Monitor supply voltage - Monitor starting current - See causes
Antifreeze protection	Antifreeze thermostat ID4	- Thermostat faulty	- See causes
Electric heater overheat	Electric heater safety thermostat ID6	- Thermostat faulty	- See causes
Return air motor	Return air fan monitoring ID2	- Rotor blocked - Phase check - Voltage too low - Thermal protection - Short-circuit	- See causes - Check wiring - Monitor supply voltage - Monitor starting current - See causes
Heat recovery unit fouled	Heat recovery unit fouling level pressure switch ID10	- Fouling level greater than the setpoint	- Clean the heat exchanger

Appendix: Component table - Control code (Main flow)

	FV	F2V	FCV	F2CV	FEV	FTV	F2EV	F2TV	FCFV	FCMV	FCXV	F2CFV	F2CMV	F2CXV	FEFV	FTFV
Filter CF2	Without	With	Without	With	Without	Without	With	With	Without	Without	Without	With	With	With	Without	Without
Coil 1	Without	Without	Heating	Heating	Elec	Triac	Elec	Triac	Heating	Heating	Heating	Heating	Heating	Heating	Elec	Triac
Coil 2	Without	Cooling	Mixed	DX	Cooling	Mixed	DX	Cooling	Cooling							

	FEMV	FTMV	F2EFV	F2TFV	F2EMV	F2TMV	F2FCV	F2MVCV	F2XCV	FFEV	FTTV	FMEV	FMTTV			
Filter CF2	Without	Without	With	With	With	With	Without	Without	Without	With	With	With	Without	Without	Without	Without
Coil 1	Elec	Triac	Elec	Triac	Elec	Triac	Cooling	Mixed	DX	Cooling	Mixed	DX	Cooling	Cooling	Mixed	Mixed
Coil 2	Mixed	Mixed	Cooling	Cooling	Mixed	Mixed	Heating	Heating	Heating	Heating	Heating	Heating	Elec	Triac	Elec	Triac

	FXEV	FXTV	F2FEV	F2FTV	F2MEV	F2MTV	F2XEV	F2XTV	FFV	FMV	FXV	F2FV	F2MV	F2XV
Filter CF2	Without	Without	With	With	With	With	With	With	Without	Without	Without	With	With	With
Coil 1	DX	DX	Cooling	Cooling	Mixed	Mixed	DX	DX	Cooling	Mixed	DX	Cooling	Mixed	DX
Coil 2	Elec	Triac	Elec	Triac	Elec	Triac	Elec	Triac	Without	Without	Without	Without	Without	Without

* DX -> Direct expansion



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