AirControl

AHU

Control manual

CIAT

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Original text: French Version

1 - MONITORING AND CONTROL

1.1 The program

Each air handling unit is managed by its PLC. 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:

. values of connected sensors
. unit on/off cycles
. calibration of the sensors
. detected alarms
. 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)
. interface language (French and English)

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 an LCD screen (8 lines x 22 characters) installed on the front of the unit's electrics box, which has 6 keys (connected with a phone cable). It allows all of the program operations to be carried out. The terminal can be used to display the unit's operating conditions and change its parameters.
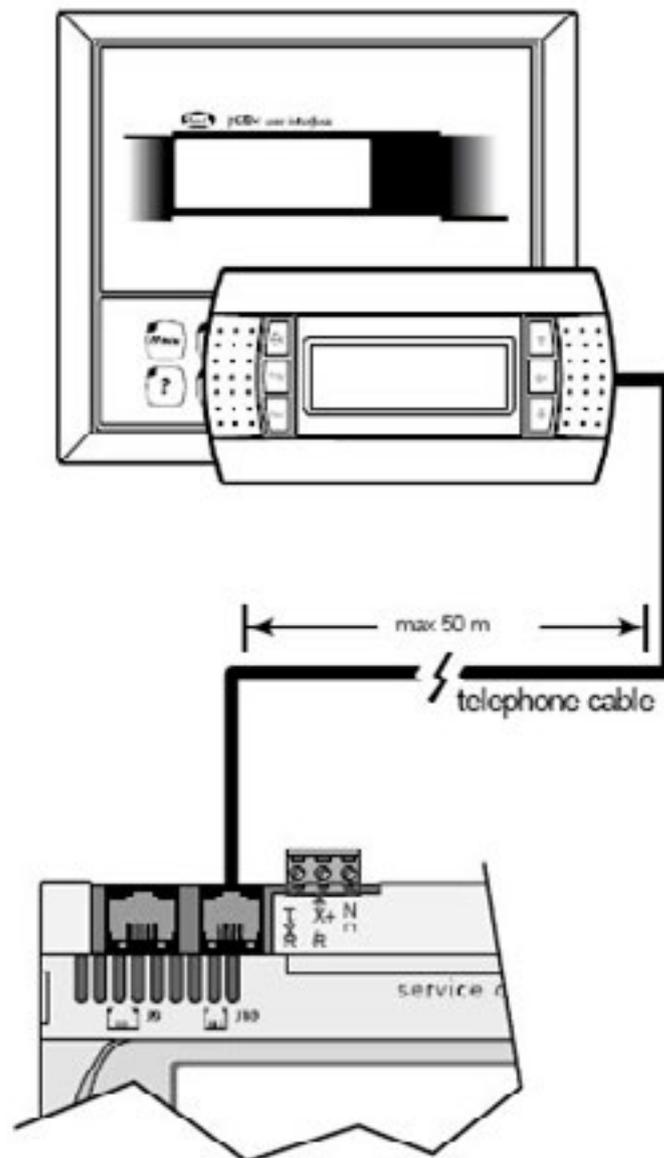
1.2.1 Using the HMI terminal keys

Key	Description
Esc	Returns to the main Menu mask when pressed in any loop. The Menu loop displays the state of the unit.
Prg	Provides access to the "Menu"
🔔	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. to manage the masks on the display (next mask) 2. to adjust the values of the monitoring parameters (decrease)
⬆	The ⬆ button has two functions: 1. to manage the masks on the display (next mask) 2. to adjust the values of the monitoring parameters (increase)
⬆+⬇	Turns the unit on and off.
↩	The ↩ button is used to confirm data entered. It is continuously backlit to indicate when the power is on.

1.3 The controller

The descriptions of the terminals on the controller are provided below.
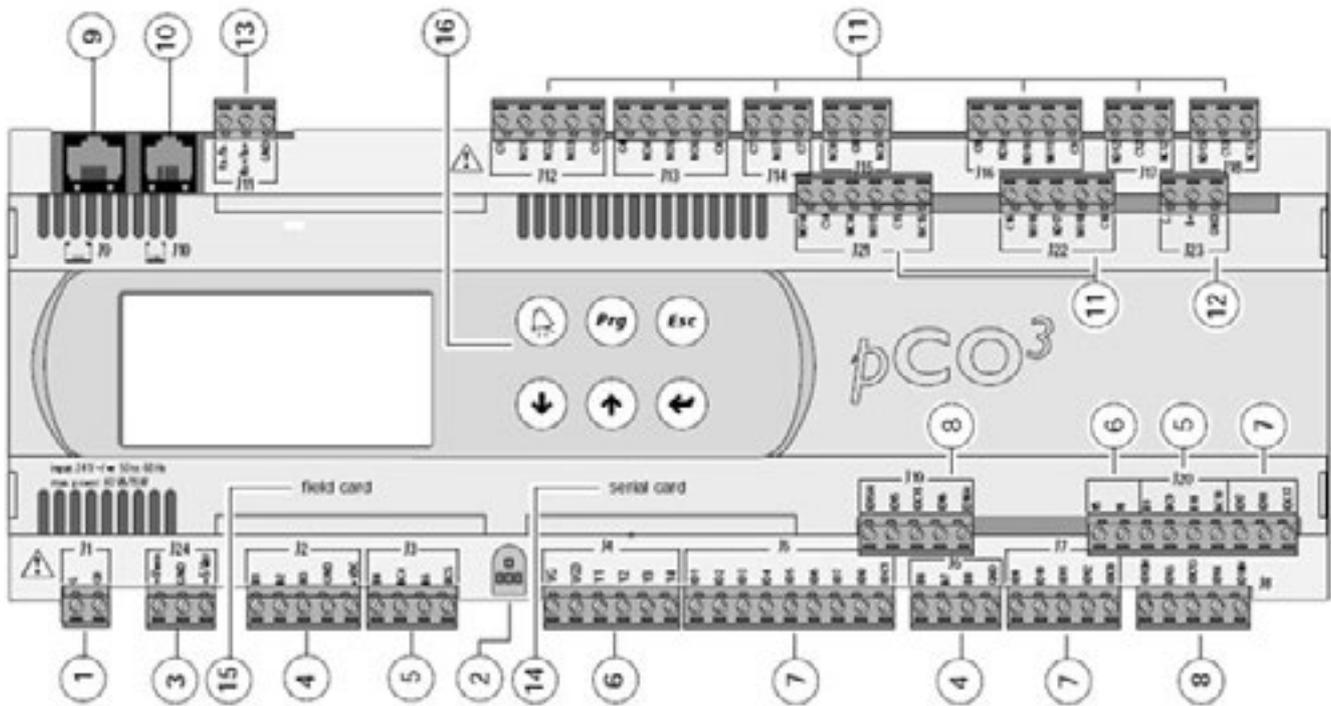
1. power supply connector [G(+), G0(-)]
2. Yellow power LED and red alarm LED
3. additional power supply for terminal and 0-5 V ratiometric sensors
4. universal analogue inputs (NTC, 0-1 V, 0-5 V, 0-10 V, 0-20 mA, 4-20 mA)
5. passive analogue inputs (NTC, PT1000, ON/OFF)
6. 0-10 V analogue outputs
7. 24 V AC/V DC digital inputs
8. 230 V AC or 24 V AC/V DC digital inputs;
9. Not used
10. connector for all HMI terminals and for downloading the application program
11. relay digital outputs
12. I/O expansion card connector
13. pLAN network connector, addressing and LED
14. housing cover for communication card to the CMS (LON, ModBus)
15. housing cover for the fieldbus communication card
16. built-in terminal (LCD, buttons and LED)(not available)

1.4 Description of the air handling units

The unit can perform the following functions:
- Air filtration
- Ventilation and exhaust (option).
- Control, monitoring, reporting and regulation of its components.
- Air cooling by means of a chilled water coil and/or a free cooling damper (option).
- Air heating by means of a hot water coil, an electric heater or a gas-fired unit (option).
- Heat recovery via a rotary or plate heat exchanger (option).
- Control, monitoring, reporting and regulation of its components.

1.5 Functional analysis of the control:1.

1.5.1 Management of on and off modes

Powered up
OR critical fault

```
                          ┌──────────────────────┐
         ┌───────────────▶│       Unit off       │
         │                └──────────────────────┘
         │                  │                           │
         │         On request                   At least 1 override requested
         │         AND on authorisation                 │
         │         AND NO critical fault                │
         │                  ▼                           │
         │                ┌──────────────────────┐      │
         │◀───────────────│   Unit powered up    │      │
         │  Off            └──────────────────────┘      │
         │  request          │                          │
         │           Air flow rate OK                   │
         │                  ▼                           ▼
         │         ┌──────────────────┐      ┌──────────────────┐
         │         │     Unit on      │      │   Manual mode    │
         │         └──────────────────┘      └──────────────────┘
         │              │                          │
         └── Off request┘           No override requested
```
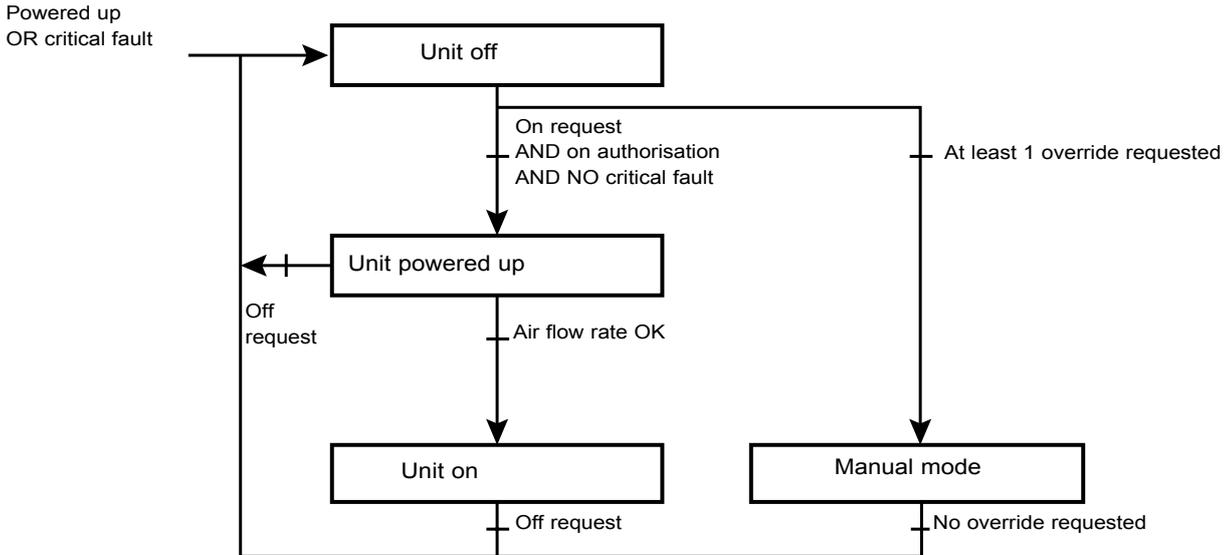
Starting up and switching off will take place locally by pressing on the ↑ and ↓ keys on the display.
Remote control is available and carried out by a potential-free contact between terminals 1 and 2 in place of the factory-installed shunt.
The unit is to be switched on/off by the CMS.
The unit will 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.

1.5.2 Safety and isolation 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 then send the information used to open it back to the PLC (via an end of travel contact); the unit will then be switched to "on" mode and the damper will be kept open until the next unit stop request or, if operating with a safety damper, when the Frost protection alarm appears.

SMR
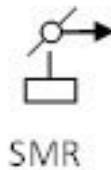
1.5.3 Frost protection thermostat
The frost protection thermostat has a manual reset and it is constantly monitored once the controller is switched on.
If an frost protection alarm is activated, the fresh air damper is closed, the valves on the hot water coil installed in the air handling unit are opened 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.

1.5.4 Fire fault
The optional fire fault contact triggers a close contact relay.
- One contact wired to an input on the controller so that the latter can signal the occurrence of a fire fault.
- A second contact connected to the terminals to feed back information.
- A third contact in series with the control for relays KV1 and KV2 authorising fan operation

The other faults are described in the alarms table.

1.5.5 Fan motors

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

The alarm information fed back from the motor or motors allows their protection to be monitored during an on request via KV1 and KV2. 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 3 following modes:

1. fixed ("Without"), which means that the motors are controlled directly with no variable drive

2. 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 "Settings parameters" menu and the air quality setpoint (option) until the maximum flow rate limit on page **w3** is reached.

3. 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 "Settings parameters" menu.

Control modes available for the management of fans

Without (fixed)	Flow rate	Pressure

MS ·· SP Δρ MS ·· SP Δρ MS
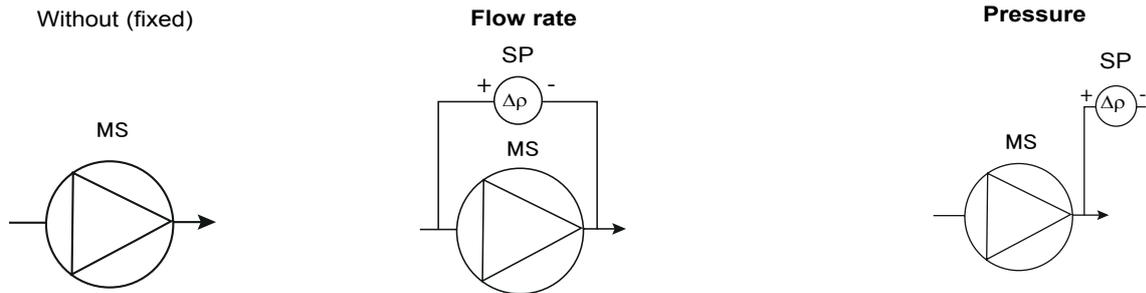
1.5.6 Air flow rate

The presence of air flow in the unit is detected in two different ways depending on the fan control type configuration:

• Fan flow rate control:

The measurement used is the differential pressure on the supply air fan to manage the supply air flow rate
The measurement used is the differential pressure on the return air fan to manage the return air flow rate

• Other types of fan control:

The measurement used is the differential pressure on filter 1 to manage the supply air flow rate
The measurement used is the differential pressure on filter 2 to manage the return air flow rate

0   10 Pa
Sufficient
air flow   Pa

measure−
ment
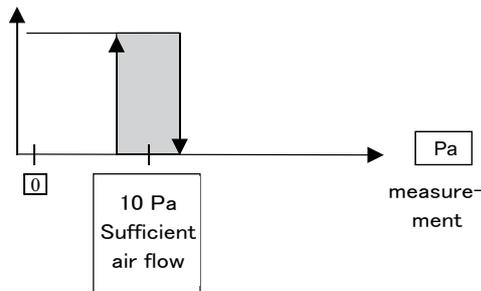
1.5.7 Filtration

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 0-1000 Pa

SP Δp   SP Δp
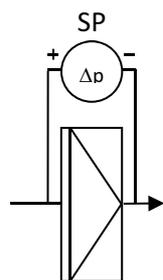
Gravimetric filter   Bag filter

0

250Pa
Dirty
filter
detection threshold

400Pa
Clogged
filter
detection threshold

Pa

Filter pressure
drop
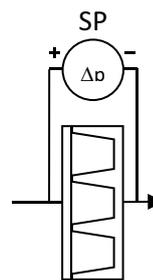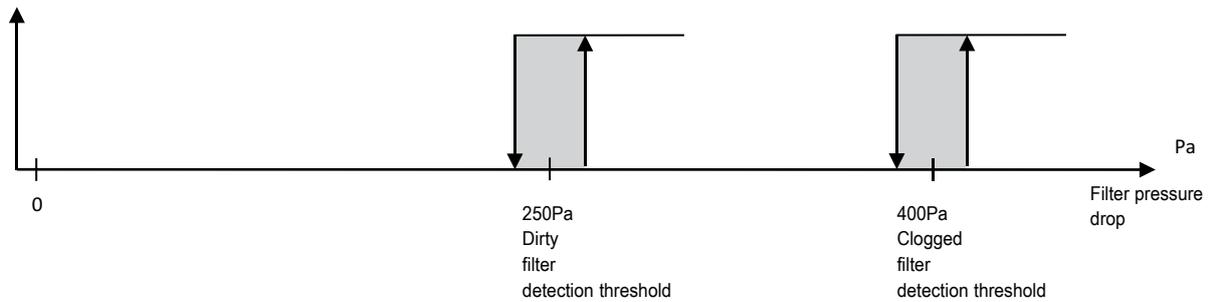
1.5.8 Temperature control

The set 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

Calculated Supply air T°
setpoint

Low threshold
alarm

High threshold
alarm

upper limit

Setpoint

lower limit

Setpoint -5°C

X1
Comfort: -5°C
Eco: -7°C

Setpoint
Comfort: 20°C
Eco: 16°C

X2
Comfort: 5°C
Eco: 7°C

Setpoint +5°C

°C

Return T°
Room T°
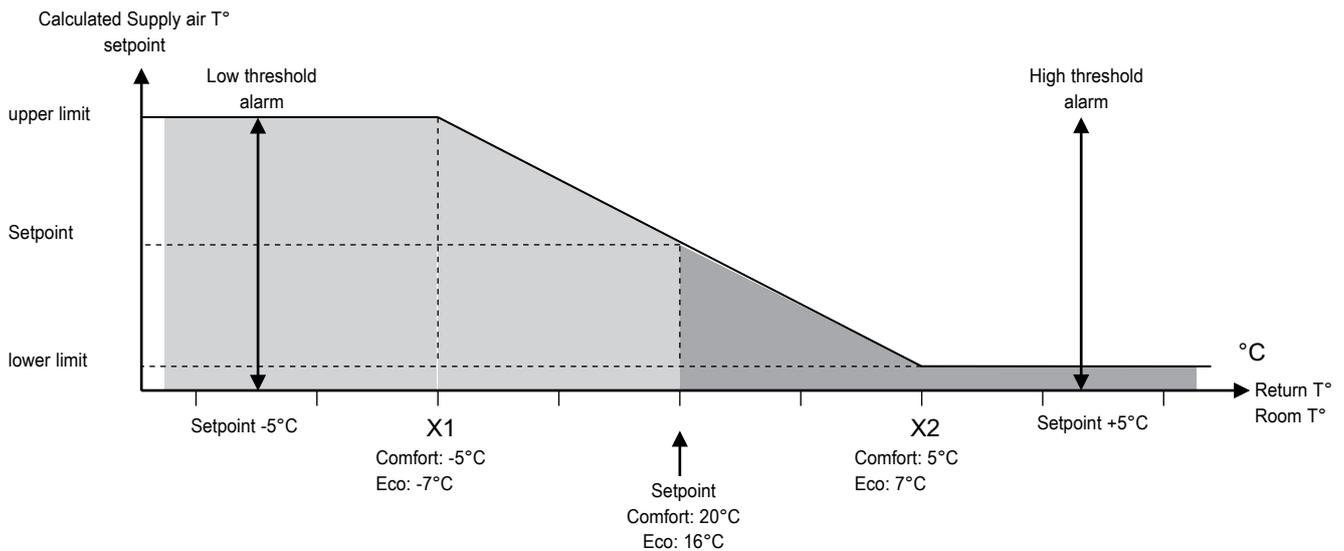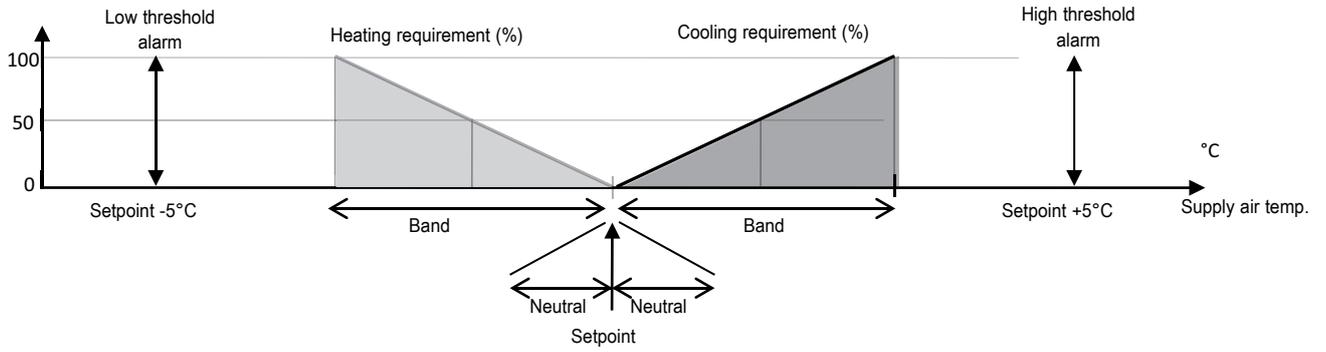
"Energy optimisation" mode:

Deadband:

Heating:

Low threshold
alarm

100

50

0

Cooling requirement (%)

High threshold
alarm

°C
Supply air temp.

Setpoint
Cooling supply air -5°C
Comfort: 13°C
Eco: 11°C

Band

Neutral

Setpoint
Heating supply air +5°C
Comfort: 31°C
Eco: 29°C

Setpoint
Cooling supply air
Comfort: 18°C
Eco: 16°C
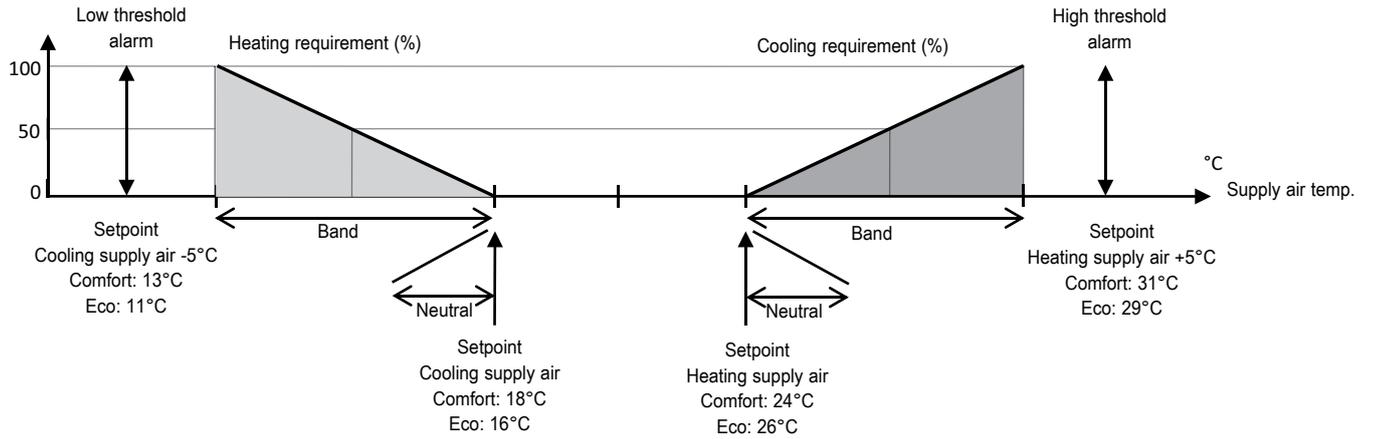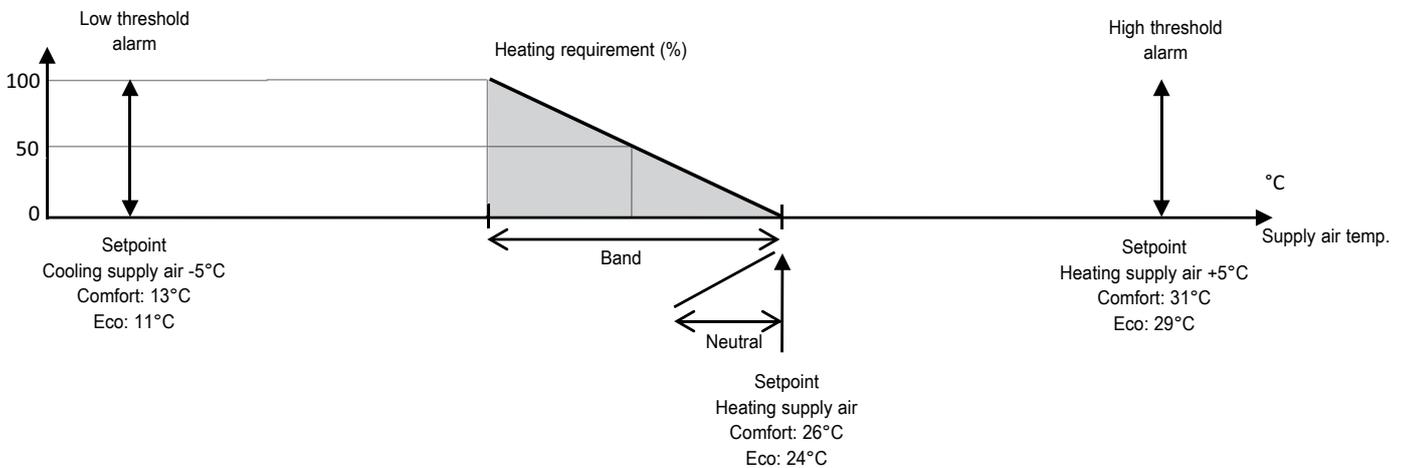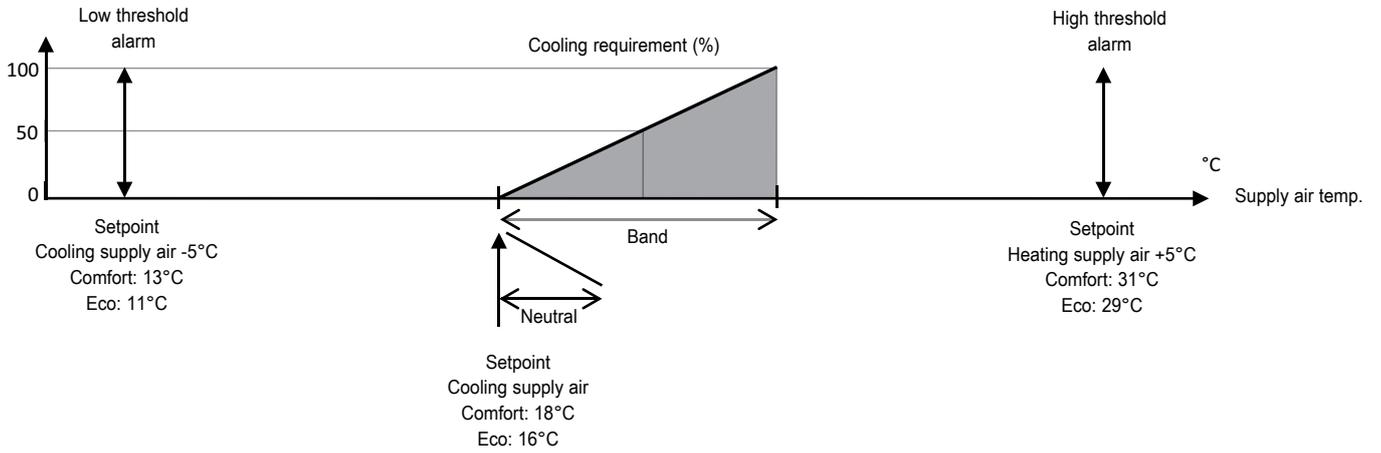
➔ When the temperature drops, the controller will calculate the heat requirement needed to keep this temperature constant.
It will gradually adjust the output of the 5 controllable heat generators:
- 1 variable speed rotary heat wheel
- 1 GGS module (modulating or 2-stage)
- 3 heating coils (via a 3-way valve for hot water for coils 1 and 2, via a TRIAC or using 1, 2 or 3 stages in the case of an electric heater) or a "Mixed" type in heating mode (authorised by the water network temperature sensor for coil 1 only).

Elec. heater

Coil 2.

Coil 1

GGS module

Rotary heat exchanger

Heating requirement (%)

100   80   60   40   20   0
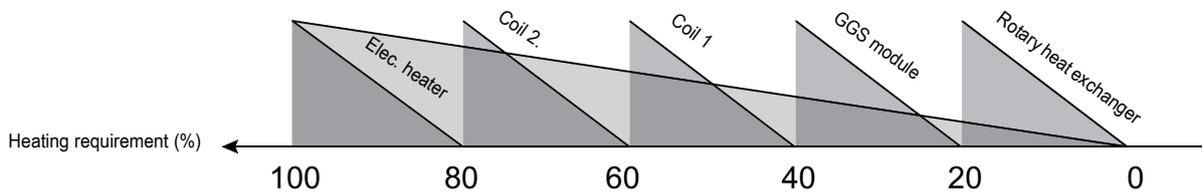
The order in which the various heat generators are activated can be configured.
Coils available to meet the heating requirements

Heating coil

BC

Y

Mixed water coil

BM

Y

T°C

S

Electric heater

BC
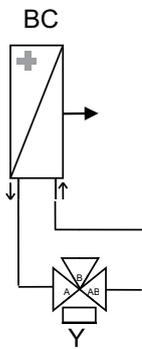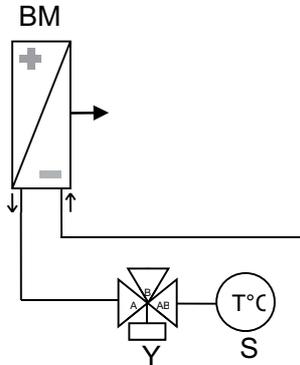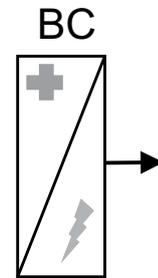
➔ When the regulated temperature rises, the controller will calculate the exact cooling requirement.
If conditions permit, it will authorise Free Cooling then will gradually adjust the output of the rotary heat exchanger, the 2 cooling coils (via a 3-way valve for cold water for coils 1 and 2) or a "Mixed" type in cooling mode (authorised by the water network temperature sensor for coil 1 only).

Free-cooling

Rotary heat exchanger

Coil 1

Coil 2

Cooling requirement (%)

0   25   50   75   100
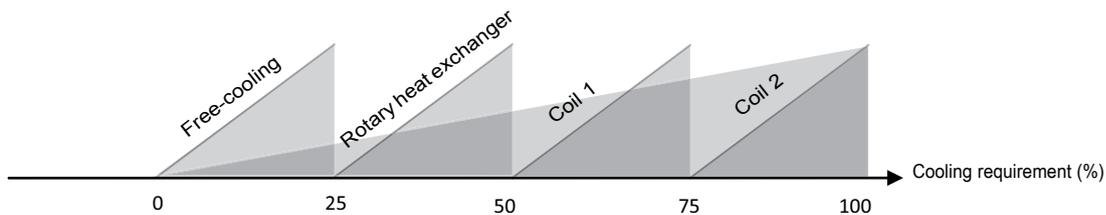
If coil 1 is configured as Mixed, the action on its valve will be limited to prevent a drift in the temperature for the return network to the heat pump.
If there is a fault with the heat pump (information received via a potential-free (dry) contact), an alarm will be displayed.
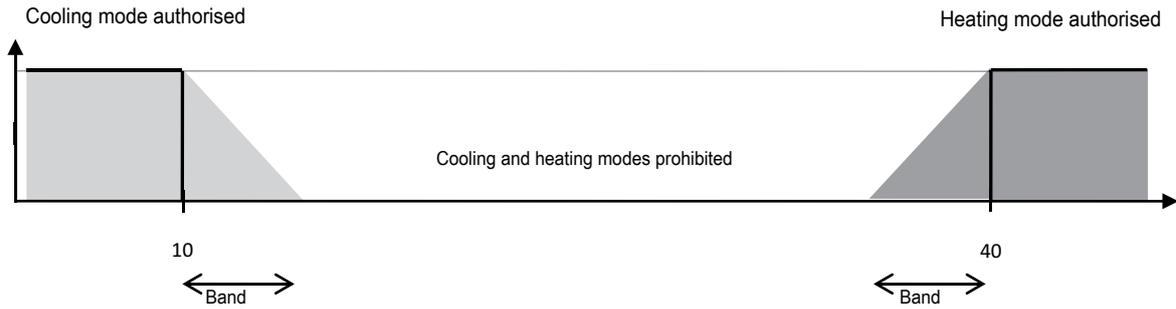
1.5.9 Annual heating operation programming
To use this function, a heating element (excluding heat recovery unit) must be configured.
This function can be selected from the screen on p27 of the settings parameters menu.
If this function is not validated, the heating elements are not disabled.

If this function is validated, the heating operation authorisation can be programmed annually.
The user can choose the period during which the heating elements are used.
This period is set on the screen on p28 of the settings parameters menu.

The heat recovery unit's heating operation is always active, and is not controlled by this program.

1.5.10 Mid-season operation
To use this function, the following conditions must be met:
• Control of return air or room air temperature
• Presence of a fresh air sensor
• Presence of a heating element (excluding heat recovery unit)
This function can be selected from the screen on p27 of the settings parameters menu.

If this function is validated, mid-season operation is activated according to the programmed annual periods.
The user can choose 2 periods during which the mid-season function is activated.
These 2 periods are validated and adjusted on the screen on p29 of the settings parameters menu.

The heat recovery unit's heating operation is always active, and is not controlled by this program.

Annual programming of the heating operation takes priority over the programming of mid-season operating periods. Therefore, if days in the period of heating operation are identical to those in the mid-season operating period, heating operation takes priority.

• Mid-season operation in precision mode
Two conditions define authorisation or prohibition of cooling and heating operation:
● The room temperature/ambient setpoint with hysteresis of 0.5°C.
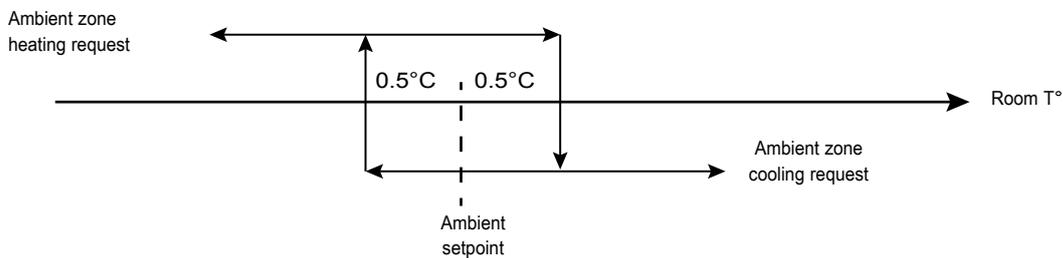
● The outdoor temperature/set mid-season operating threshold (screen p27) with hysteresis of 0.5°C
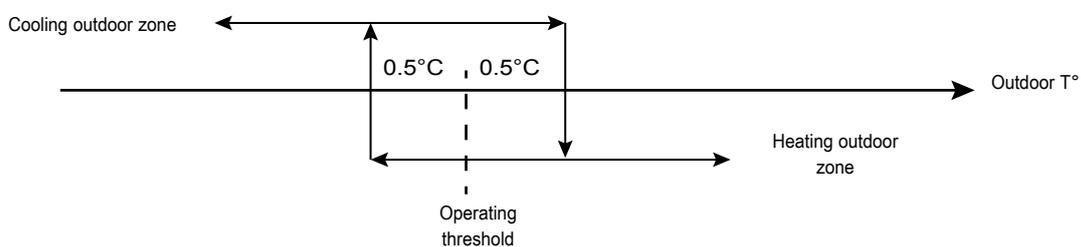
Depending on the states in the 2 previous conditions, the table below shows the authorisation or disabling of cooling and heating operation:

	Ambient zone heating request	Ambient zone cooling request
Heating outdoor zone	Heating authorised Cooling disabled	Heating disabled Cooling authorised
Cooling outdoor zone	Heating authorised Cooling disabled	Heating authorised Cooling authorised

Mid-season operation in energy optimisation mode

Two conditions define authorisation or prohibition of cooling and heating operation:
● The room temperature/ambient setpoint (heating, neutral or cooling zone)

● The outdoor temperature/set mid-season operating threshold (screen p27) with hysteresis of 0.5°C
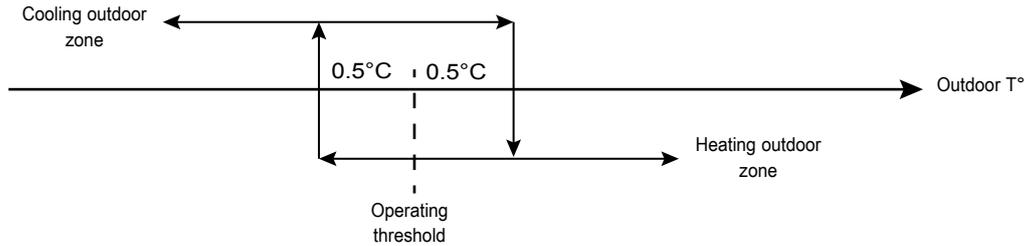
Depending on the states in the 2 previous conditions, the table below shows the authorisation or disabling of cooling and heating operation:

	Heating zone	Deadband	Cooling zone
Heating outdoor zone	Heating authorised Cooling disabled	Heating disabled Cooling authorised	Heating disabled Cooling authorised
Cooling outdoor zone	Heating authorised Cooling disabled	Heating authorised Cooling authorised	Heating disabled Cooling authorised

1.5.11 Heat recovery
The plate recovery unit
A differential pressure sensor is used to check the fouling level on the exhaust 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.
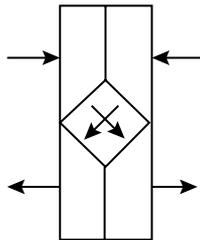
The accumulator heat recovery unit

The operating principle is as follows:
- For recovery in heating mode, the return air temperature (or ambient temperature) must be greater than the fresh air temperature.
- For recovery in cooling mode, the return air temperature (or ambient temperature) must be less than the fresh air temperature.

Two types of accumulator heat recovery unit are possible:
- The fixed speed heat recovery unit
- The variable speed heat recovery unit

For the fixed speed version, a self-cleaning procedure is started if the heat recovery unit has not been used for more than 4 hours of unit operation.

For the variable speed version, a 0-10V signal is sent to the heat recovery unit control which manages the various functions (rotation control, monitoring of the belt, self-cleaning, low voltage, etc.). Its sends a summary of the heat recovery unit faults to the controller, via a potential-free (dry) contact. In case of a fault, it stops and an alarm is displayed.

The accumulator heat recovery unit stops if there is a Free cooling request.

A differential pressure sensor is used to check the fouling level on the heat recovery unit and to generate an alarm when the threshold is exceeded when the unit is running
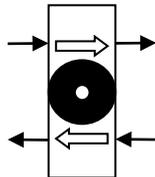
1.5.12 GGS module (heat generator with forced air gas burner)

For management of this module, the upper limit factory value for calculating the supply air T° setpoint automatically switches from 26 to 35°C.

The burner will be authorised to operate if:

- Switch S1 on the front of the unit is in the On position
- There is no burner fault (contact)
- No Combustion chamber overheating fault is present (thermostat)
- If there is a temperature regulation request
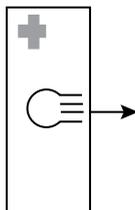
Management of the supply air temperature with a modulating burner
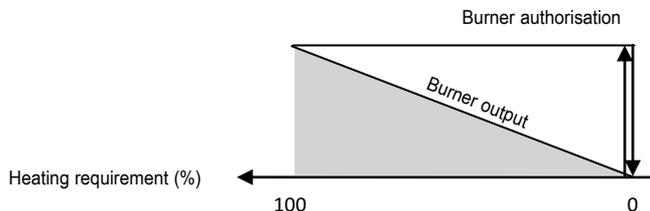
If ramp up/down start is selected, the burner output will increase or decrease gradually based on the difference between the heating requirement and the burner output. Depending on this difference, every second, there will be an action corresponding to the following value: addition or deletion of 100/ramp time.

Management of the supply air temperature with a 2-stage burner

Heating requirement (%)
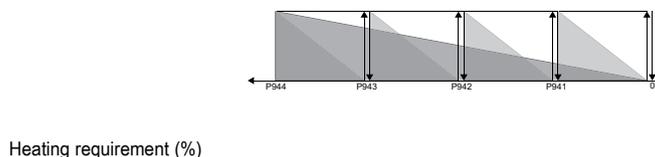
1.5.13 Electric heater

In case of a problem on the electric heater (safety thermostats), the electric heater is shut off and the fault is signalled.

Electric heater load shedding or a choice of heating coil is available.
The aim is to use the same input ID1 to control either:
- Electric heater load shedding (function also available via communication with the CMS)
- The choice of heating coil which can be used (electric or hot water, only for coil 1) (function also available via communication with the CMS)

The configuration of this input ID1 will be accessible from level 3 (Manufacturer) only.
These 2 control principles do not cause an alarm to be created.

1, 2 or 3 stages

Electric heating requirement (%)

100   66,6   33,3   0

Triac

Stage 1

Triac

Heating requirement (%)

100   0

Triac + 1 stage

Stage 2   Stage 1

Triac   Triac

Heating requirement (%)

100   50   0

Triac + 2 stages

Stage 3   Stage 2   Stage 1

Triac   Triac   Triac

Heating requirement (%)

100   66.6   33.3   0
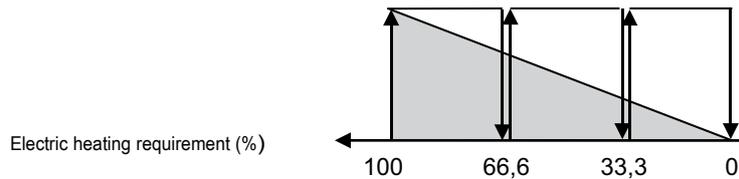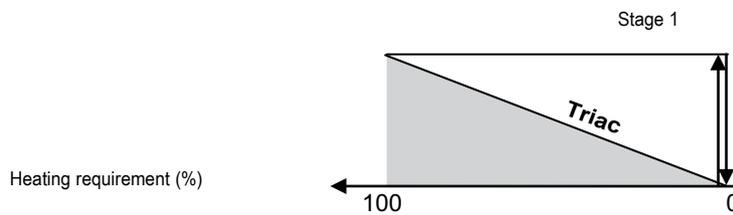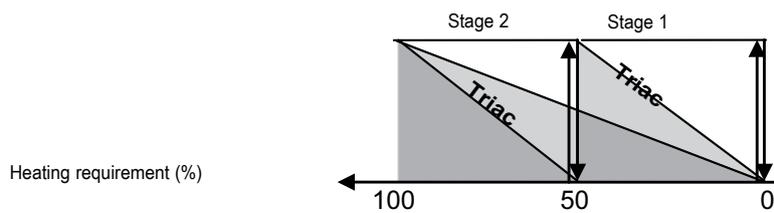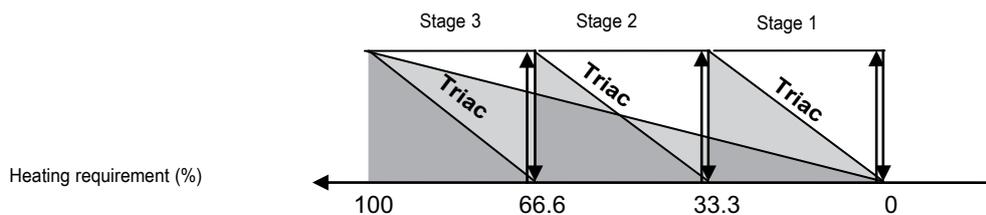
1.5.14 Free cooling

To authorise Free cooling, certain conditions must be fulfilled:
- The fresh air temperature must be greater than 8.0°C (value adjustable from 20.0 to -5.0°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.
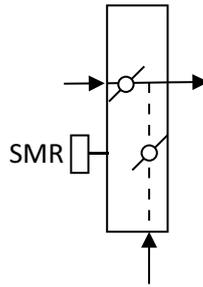
1.5.15 Humidity

The return air or ambient humidity is controlled by one of 3 options:
- In supply only, using a humidifier.
- In dehumidification only, using a cooling coil + heating coil assembly.
- In supply and in dehumidification, using the systems set out above.
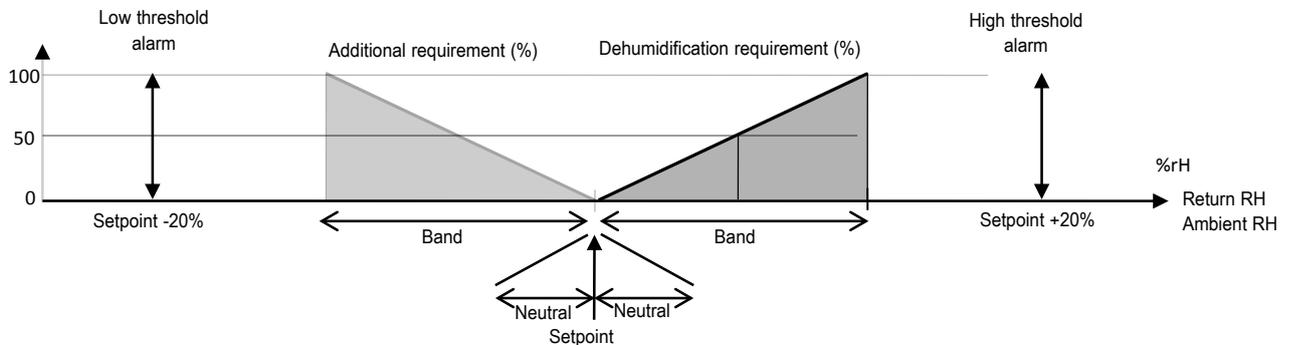
Control using supply

By decreasing the humidity below the setpoint, the control will calculate the requirement needed to constantly maintain this humidity by an action, via a 0-10V signal, on a modulating humidifier.

The management board sends a summary of the humidifier faults to the pCO3, via a potential-free (dry) contact. In case of a fault, it stops and an alarm is displayed.

Control using dehumidification

By increasing the humidity above the setpoint, the control will calculate the requirement needed to constantly maintain this humidity by acting on the cooling coil valve. The heating coil is controlled in order to avoid a drift in the intake temperature.

1.5.16 CO2 air quality

The aim is to regulate the air quality, measured in ppm of CO_2, using a duct sensor measuring the return flow.

It is possible to connect sensors using 2 types of signals for the measurement range of 0 to 2000ppm de CO_2:
- 0-5V
- 0-10V

This control function acts in order, and depending on availability, on the mixing damper opening value to allow a greater fresh air rate than on the supply air fan flow rate.

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

Maximum flow rate

Rated flow

0   100

Need for variation (%)
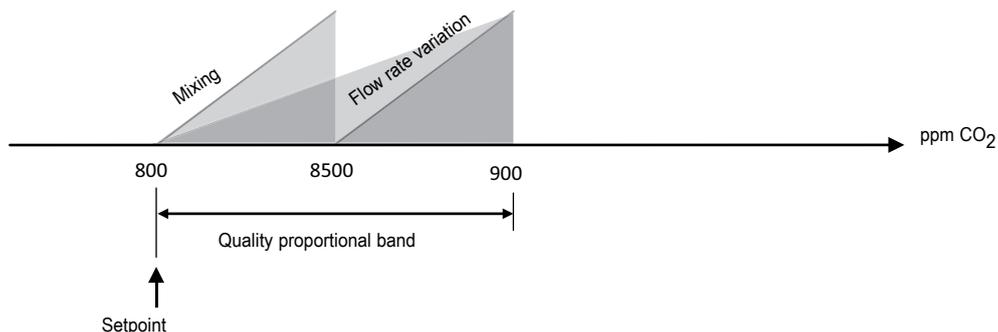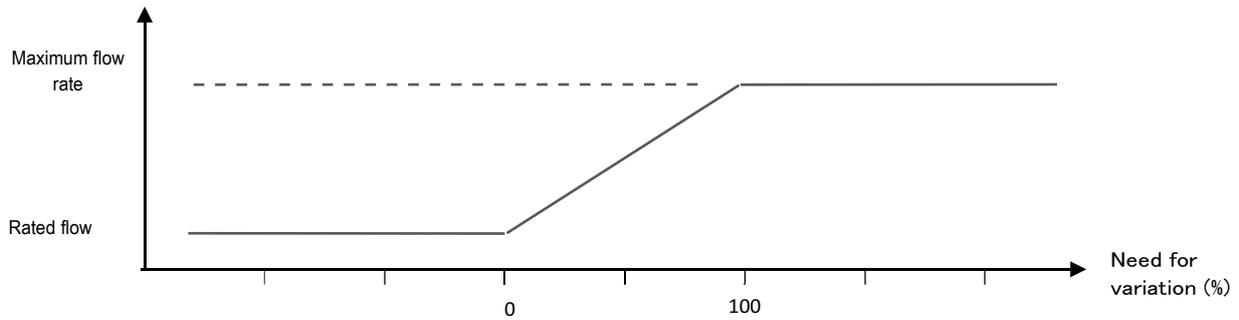
1.5.17 Adiabatic cooling

The aim is to introduce fresh air into the room in question without using the unit's cooling coil during a cooling request.

The action will be to cool the return air flow, which is hot, from a dual-flow unit equipped with a rotary or plate heat exchanger, by increasing its humidity level via a trickle humidifier.

This will allow the fresh air going through the heat recovery unit to be refreshed.

This humidifier will be controlled by the relay output NO17 if:

- The function is requested
- The unit comprises a heat recovery unit
- The unit is operating
- There is a supply air cooling requirement
- The fresh air temperature is greater than the supply air cooling setpoint.

1.5.18 The fault relays

One 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 and holding the
button for 3 seconds if they are no longer present, and once the unit is switched **Off.**

1.6 Controller inputs and outputs

G   24Vac
G0   Shared

Connector J2
B1   Fan flow rate or supply air duct pressure sensor (Option)
B2   Return air fan flow rate sensor (Option)
B3   Pressure sensor for presence of air flow and return air filter 1 fouling
GND   Shared
+VDC   Power supply for enabled sensors

Connector J3
B4   Return air or ambient temperature sensor (Option)
BC4   Shared for B4
B5   Supply air temperature sensor
BC5   Shared for B5

Connector J4
VG   24Vac
VG0   Shared
Y1   Water coil no. 1 valve control (heating, cooling or mixed) (Option)
Y2   Water coil no. 2 valve control (heating or cooling) (Option)
Y3   Supply air fan variable frequency drive control (Option)
Y4   Return air fan variable frequency drive control (Option)

Connector J5
ID1   Bypass or choice of heating coil function (Option)
ID2   Heat pump unit control (Option)
ID3   Supply air fan monitoring
ID4   Frost protection thermostat (Option)
ID5   Damper limit switch (Option)
ID6   Fire sensor (Option)
ID7   Monitoring of electric heater overheating thermostat (Option)
ID8   Remote control
IDC1   Shared

Connector J6
B6   Pressure sensor for presence of air flow and return air filter 2 or CO2 air quality filter fouling (Option)
B7   Pressure sensor for additional filter 3 or CO2 air quality sensor or return or ambient air humidity sensor fouling (Option)
B8   Pressure sensor for heat recovery unit or return or ambient air humidity sensor fouling (Option)
GND   Shared

Connector J7
ID9   Return air fan monitoring (option)
ID10   Switch S1 (Option)
ID11   Burner fault (Option)
ID12   Superheating thermostat (Option)
IDC9   Shared

Connector J8
ID13   Rotary heat exchanger check (Option)
IDC13   Shared
ID14   Humidifier monitoring (Option)

Connector J12
C1   Shared
NO1   Supply air fan control
NO2   Return air fan control (Option)
NO3   Control of damper (frost protection or insulation) (Option)
C1   Shared

Connector J13
C4   Shared
NO4   Electric heater stage 1 control (Option)
NO5   Electric heater stage 2 control (Option)
NO6   Electric heater stage 3 control (Option)
C4   Shared

Connector J14
C7   Shared
NO7   Danger fault relay
C7   Shared

Connector J15
NO8   Maintenance fault relay
C8   Shared
NC8   ----------

Connector J16
C9   Shared
NO9   Burner control (Option)
NO10   Burner output decrease or stage 1 control output (Option)
NO11   Burner output increase or stage 2 control output (Option)
C10   Shared

Connector J17
NO12   Plate heat exchanger bypass damper 3-point servomotor opening (Option)
C12   Shared
NC12   ----------

Connector J18
NO13   Plate heat exchanger bypass damper 3-point servomotor closing (Option)
C13   Shared
NC13   ----------

Connector J19
ID15   ----------
ID16   ----------

Connector J20
Y5   Electric heater triac control (Option)
Y6   Humidifier control or rotary heat exchanger wheel speed control (Option)
B9   Outdoor temperature sensor (Option)
BC9   Shared
B10   Network water temperature sensor (Option)
BC10   Shared
ID17   ----------
ID18   ----------
IDC17   Shared

Connector J21
NO14   Opening of the 3-point servomotor for the Free Cooling or mixing damper (Option)
C14   Shared
NC14   ----------
NO15   Closure of the 3-point servomotor for the Free Cooling or mixing damper (Option)
C15   Shared
NC15   ----------
Not used

Connector J10
6-channel connection for an HMI terminal

Connector J11
Rx-/Tx- RS485 link for the pLAN network
Rx+/Tx+ RS485 link for the pLAN network
GND   RS485 link for the pLAN network

Connector J23
Not used

Connector J22
C16   Shared
NO16   Rotary recovery motor control (Option)
NO17   Adiabatic humidifier control (Option)
NO18   ----------
C16   Shared

Connector J24
+5 Vterm   Outdoor terminal power supply
GND   Shared
+5 Vref Power supply for enabled sensors

1.6.1   Other
Connector J9
Not used

Connector J10
6-channel connection for an HMI terminal

Connector J11
Rx-/Tx- RS485 link for the pLAN network
Rx+/Tx+ RS485 link for the pLAN network
GND   RS485 link for the pLAN network

Connector J23
Not used

2 GENERAL DESCRIPTION OF THE SCREENS

2.1 Esc button
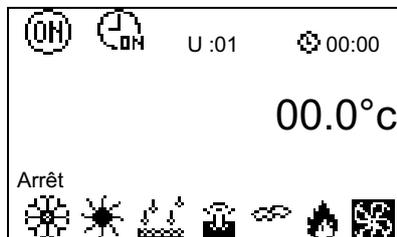
U:01   Indicates the unit's address

⊙   Indicates the request to switch the machine on or off

⏰   Indicates the presence of hourly or annual programming and the request status

00.0°C   Indicates the set temperature (ambient, exhaust or intake)
⏲ 00:00   Indicates the time
Off   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 the "Cooling" operating mode   🔥 Indicates Fire alarm

☀ Indicates "Heating" operating mode   ✺ Indicates the operation of the fan(s)

Indicates the "Dehumidification" operating mode

Indicates the "Humidification" operating mode

Indicates the "Free Cooling" operating mode

"Prg" button

```
┌──────────────────────────────────┐
│             Menu                  │
│   ☐    14. Access level           │
│   ☐    16.Versions                │
│   →    1.Setpoints                │
│   ☐    2.Machine state            │
│   ☐    4.Machine parameters       │
└──────────────────────────────────┘
```

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. Settings parameters
- 6. Reading parameters
- 7. Fault memory
- 8. Test mode
- 9. Timer prog.
- 11. Communication
- 12. Alarms
- 14. Access levels
- 16. Versions

2.2 Setpoint menu

```
┌──────────────────────────┐
│  Comfort            w0    │
│  Fan flow rate           │
│  Supply air    010000m3/h │
│  Return air    010000m3/h │
│          Eco             │
│  Supply air    005000m3/h │
│  Return air    005000m3/h │
└──────────────────────────┘
```
Indication of the operating mode   Level 2 access

Supply air fan Comfort flow rate control setpoint
Return air fan Comfort flow rate control setpoint

Supply air fan Eco flow rate control setpoint
Return air fan Eco flow rate control setpoint

```
┌──────────────────────────┐
│  Comfort            w1    │
│  Duct pressure           │
│                200Pa     │
│            Eco 100Pa     │
│                          │
│                          │
│                          │
└──────────────────────────┘
```
Indication of the operating mode   Level 2 access

Comfort pressure control setpoint for the supply air duct
Eco pressure control setpoint for the supply air duct

```
┌──────────────────────────┐
│  Comfort            w2    │
│  Return air      20.0°C   │
│            Eco 15.0°C     │
│  Supply air         a    │
│   Upper limit   26.0°C    │
│   Lower limit   16.0°C    │
│                          │
└──────────────────────────┘
```
Indication of the operating mode for T° control in "Precision" mode Level 1 Access

Comfort (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)
Eco (Return or Ambient) temperature control setpoint monitored (0 to 50.0°C)

Upper limit for calculated Supply air T° setpoint
Lower limit for calculated Supply air T° setpoint

```
┌──────────────────────────┐
│                     w3    │
│  Air quality             │
│                0800ppm   │
│  Maximum flow rate       │
│            010000m3/h    │
│                          │
│                          │
└──────────────────────────┘
```
Level 2 access

Air quality regulation setpoint

Maximum flow rate value of supply air fan for air quality control

Comfort	w4

Indication of the operating mode for T° control in "Energy optimisation" mode Level 1 Access

Return air	Cooling 25.0°C

Monitored Comfort Cooling (Return, Ambient or Supply air) temperature control setpoint (0 to 50.0°C)

	Eco 27.0°C

Monitored Eco Cooling (Return, Ambient or Supply air) temperature control setpoint (0 to 50.0°C)

Return air	Heating 23.0°C

Monitored Comfort Cooling (Return, Ambient or Supply air) temperature control setpoint (0 to 50.0°C)

	Eco 18.0°C

Monitored Eco Cooling (Return, Ambient or Supply air) temperature control setpoint (0 to 50.0°C)

Deadband

Indication of the control state for the monitored temperature

Comfort	w5

Indication of the operating mode for T° control in "Energy optimisation" mode Level 1 Access

Supply air	Cooling 16.0°C

Cooling Comfort monitored temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)

	Eco 18.0°C

Cooling Eco monitored temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)

Supply air	Heating 26.0°C

Heating Comfort Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)

	Eco 24.0°C

Heating Eco Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)

U:01	w6

Level 2 access

Frost protection	17.0°C

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

	w7

Level 2 access

Frost protection	17.0°C

Regulation setpoint in "Night cooling" mode

	w8

Level 3 access

Electric heater

	Off	On
Stage 1	000.0%	033.3%
Stage 2	033.3%	066.6%
Stage 3	066.6%	100.0%

Stage 1 on and off setpoint for the electric heater

Stage 2 on and off setpoint for the electric heater

Stage 3 on and off setpoint for the electric heater

	w9

Level 1 access

Humidity	50.0%rH

Control setpoint for the return air humidity

w10	
Free Cooling	17.0°C
Fresh air min.	000%

Outdoor temperature limit value for authorisation of Free Cooling (Level 3 Access)

Fresh air minimum value (Level 2 Access)

w11	
Heat recovery unit fouling level	
	0250Pa

Level 3 access

Plate recovery unit frost saturation level detection setpoint or rotary heat recovery unit fouling detection threshold

w13	
Filter 1 Supply air	
Flow presence	0010Pa
Filter dirty	0250Pa
Filter blocked	0400Pa

Level 2 access

Supply air flow presence detection setpoint

Dirty supply air filter 1 saturation level detection setpoint

Blocked supply air filter 1 saturation level detection setpoint

w14	
Filter 2 Return air	
Flow presence	0010Pa
Filter dirty	0250Pa
Filter blocked	0400Pa

Level 2 access

Return air flow presence detection setpoint

Dirty return air filter 2 saturation level detection setpoint

Blocked return air filter 2 saturation level detection setpoint

w15	
Filter 3 Supplement	
Filter dirty	0250Pa
Filter blocked	0400Pa

Level 2 access

Dirty additional filter 3 saturation level detection setpoint

Blocked additional filter 3 saturation level detection setpoint

w17	
Changeover	
Heating	40.0°C
Cooling	10.0°C
Limitation band	02.0°C

Level 3 access

Value for the changeover limit setpoint in Heating mode and water return temperature

Value for the changeover limit setpoint value in Cooling mode and water return temperature

Value for the water return temperature control proportional band

U:01	w18
Duct pressure sensor check	
Low threshold	10Pa
High threshold	900Pa

Level 3 access

Intake duct pressure low threshold

Intake duct pressure high threshold

2.3 Machine parameters menu

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

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 switched off. If the fault is shown as "Maintenance", only an alarm message will be indicated.

Criticality of faults 1 to 9
Criticality of faults 10 to 19
Criticality of faults 20 to 29

List of faults:

Order	Description	Significance
01	Intake motor	Danger
02	Exhaust motor	Danger
03	poor intake air flow	Danger
04	Intake filter dirty	Maintenance
05	Intake filter clogged	Danger
06	poor exhaust air flow	Danger
07	Exhaust filter dirty	Maintenance
08	Exhaust filter clogged	Danger
09	Additional filter dirty	Maintenance
10	Additional filter clogged	Danger
11	Damper	Danger
12	Burner	Maintenance
13	Overheating	Maintenance
14	Frost protection	Maintenance
15	Electric heater safety thermostat	Maintenance
16	Low intake temperature	Maintenance
17	High intake temperature	Maintenance
18	Low ambient or exhaust temperature	Maintenance
19	High ambient or exhaust temperature	Maintenance
20	Heat pump module	Maintenance
21	Heat recovery unit frosted	Maintenance
22	Variable speed rotary recovery	Maintenance
23	Clock lithium battery	Maintenance
24	Duct pressure	Maintenance
25	Low ambient or exhaust humidity	Maintenance
26	High ambient or exhaust humidity	Maintenance
27	Humidifier	Maintenance
28	Heat recovery unit fouled	Maintenance

Configuration	c1
Add. filter	-----
Return air filter	-----
Return air fan	-----

Level 3 access

Add. filter: Without, With
Return air filter: Without, With
Return air fan: Without, With

```
┌──────────────────────────────────┐
│ Configuration            c2       │
├──────────────────────────────────┤
│ Coil 1               --------     │
│ Coil 2               --------     │
│ Electric heater                   │
│                                   │
│                      --------     │
│                                   │
│                                   │
│                                   │
└──────────────────────────────────┘
```
Level 3 access

Coil 1: Without, Heating, Cooling or Mixed
Return air filter: Without, Heating or Cooling
Return air fan: Without, 1 stage, 2 stages, 3 stages, TRIAC, TRIAC + 1 stage or TRIAC + 2 stages

```
┌──────────────────────────────────┐
│ Configuration            c3       │
├──────────────────────────────────┤
│ Recov. unit pressure    --------  │
│ Heat recovery unit    ----------  │
│ Damper                  --------  │
│                                   │
│                                   │
│ Burner                ----------  │
│                                   │
└──────────────────────────────────┘
```
Level 3 access

Recov.: Without, With
Recov.: Without, Plate, Rotary or Rotary F (fixed speed)
Damper: Without, With
Burner: Without, Modulating, 2-stage

```
┌──────────────────────────────────┐
│ Configuration            c4       │
├──────────────────────────────────┤
│ Frost protection th.    --------  │
│                                   │
│ Choice of heating coil            │
│                                   │
│ ---                               │
│ Control priority                  │
│                                   │
│ ---                               │
└──────────────────────────────────┘
```
Level 3 access

Frost protection th.: Without**,** With
Choice of heating coil: Without, Contact or CMS
Control priority: Precision or Energy optimisation mode

```
┌──────────────────────────────────┐
│ Configuration            c5       │
├──────────────────────────────────┤
│ Humidity regulation               │
│                                   │
│ ----                              │
│ Rh sensor type          ------    │
│ Adiabatic cooling                 │
│                                   │
│                                   │
│ ---                               │
└──────────────────────────────────┘
```
Level 3 access

Humidity regulation: Without, Additional, Dehumidification or Additional + Dehumid.
Rh sensor type: 0-1V, 0-10V
Adiabatic cooling: Without, With

```
┌──────────────────────────────────┐
│ Configuration            c6       │
├──────────────────────────────────┤
│ Supply air fan                    │
│ P sensor         ------           │
│ K -----r        Variable drive ---│
│ Return air fan                    │
│ P sensor         ------           │
│ K ------        Variable drive ---│
└──────────────────────────────────┘
```
Level 3 access

P sensor: 0-1000Pa 10V, 0-2500Pa 10V, 0-5000Pa 10V, 0-1000Pa Ratio, 0-3000Pa Ratio or 0-5000Pa Ratio
K: Fan K coefficient value
Variable drive: No, yes

Configuration	c7
Heat pump unit	-----

Level 3 access

Heat pump unit: Without, With

2.4 Settings parameters menu

	lg
Language	----------

Level 1 access

Controller language selection (French or English)

	t0
Setting	
the clock	
Time	-- / --
Date	--/--/--

Level 1 access

Clock time correction value

Clock date correction value

Supply air	p1
Neutral cooling	00.0
Cooling band	0005.0
I T 0150s D T	0000s
Neutral heating	00.0
Heating band	0005.0
I T 0150s D T	0000s

Level 2 access

Deadband value for intake temperature control in cooling mode

Proportional band for intake temperature control in cooling mode

Integral time and derivative time for intake temperature control in cooling mode

Deadband value for intake temperature control in heating mode

Proportional band for intake temperature control in heating mode

Integral time and derivative time for intake temperature control in heating mode

Return air	p2
Differential	
Cooling	Heating
0.0	0.0

Level 2 access

Value for the Return or Ambient air temperature control differentials

In cooling mode   In heating mode

	p3
Test	--------
Mixing damper	-------
Fire	-------

Level 2 access

Test: Without, Flow rate (Constant flow and independent setpoints) or Pressure (Constant supply air duct pressure and identical fan speeds)

Mixing damper: Without, With

Fire: Without, With

p4	
Regulated T°	-------
Air quality	-------
M factor	01.0
Quality band	100
Adiab. cooling On	0.5

Level 2 access

Regulated T°: Supply, Return or Ambient air

Air quality: Without, 0-5V, 0-10V (not available if the fans are monitored based on constant Supply air duct pressure)

Proportionality factor value for Supply air duct flow rate and pressure control

Air quality regulation proportional band

Adiabatic cooling authorisation shift in relation to the set T° setpoint in cooling mode

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

Humidity	p7
High H shift	20.0
Low H shift	-20.0
Sensor on connector:	

Level 2 access

High humidity threshold shift

Low humidity threshold shift

Level 3 access

Sensor on connector: J6-B7, J6-B8

p14	
Fan	
Supply air	
Band	0595.0
I T 0004s D T	0001s
Return air	
Band	0595.0
I T 0004s D T	0001s

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

p15	
Duct	
Band	0595.0
I T 0004s D T	001s

Level 3 access

Duct pressure control proportional band

Integral time and derivative time for duct pressure

	p16	Level 3 access
Supply air limits		Supply air T° setpoint calculation parameters (See Fig., page 9)
Shift X1	-5.0°C	X1 shift value for the formula for calculating the supply air temperature Comfort setpoint
Eco	-7.0°c	X1 shift value for the formula for calculating the supply air temperature Eco setpoint
Shift X2	5.0°c	X2 shift value for the formula for calculating the supply air temperature Comfort setpoint
Eco	7.0°c	X2 shift value for the formula for calculating the supply air temperature Eco setpoint

Prioritising — p18 — Level 3 access

heat generators

	Start	End	
Wheel	---.-	---.-	Rotary heat exchanger actuation start and end setpoint value
Burner	---.-	---.-	Burner actuation start and end setpoint value
Coil 1	---.-	---.-	Coil 1 actuation start and end setpoint value
Coil 2	---.-	---.-	Coil 2 actuation start and end setpoint value
E heater	---.-	---.-	Electric heater actuation start and end setpoint value

Prioritising — p19 — Level 3 access

Stage distribution
electric heater

Stage 2	033.3%	Setpoint value for the electric heater stage 2 actuation start
Stage 3	066.6%	Setpoint value for the electric heater stage 3 actuation start

Air quality — p20 — Level 3 access

Sensor on connector:

Sensor on connector: J6-B6, J6-B7

p21 — Level 3 access

Heat recovery unit bypass

Neutral	0000	PID deadband value for the plate recovery unit bypass control
Band	005.0	PID proportional band value for the plate recovery unit bypass control
I T 0004s D T 0001s		PID integral time and derivative time for the plate recovery unit bypass control

p23 — Level 3 access

Humidifier

Neutral	0000	Humidifier control PID deadband value
Band	005.0	Humidifier control PID proportional band (P) value
I T 0150s D T 0000s		Humidifier control PID Integral time and derivative time

```
                      p24     Level 3 access

 Dehumidification

Neutral              0000     Dehumidification function control PID deadband value

Band                005.0     Dehumidification function control PID proportional band (P) value

I T     0150s   D T  000s     Dehumidification function control PID Integral time and derivative time
```

```
                      p25     Level 3 access

Post ventilation     060s      post ventilation time

Battery reset           N     Reset the Lithium battery replacement indicator

Damper               180s     Total opening time for damper

C damper             150s     Total opening time for free cooling damper servomotor

Recov. bypass        150s     Total opening time for plate recovery unit bypass damper servomotor

Cooling/heating switch 000mn  Time taken to switch between heating/cooling production and heating/cooling mode
```

```
                      p26     Level 3 access

Burner servo
opening time
                       12s    Total opening time for burner servomotor

Cycle start          060s     Burner start-up cycle start time delay value

Ramp                 -----    Activation of the ramp up/down for burner actuation

Ramp time            200s     Ramp-up time for switching from 0 to 100%
```

Ramp: Without, With

```
                      p27     Level 2 access

Heating oper. period

Selection:           -----    Selection of an annual heating operation period

Mid-season oper. period

Selection            -----     Selection of annual mid-season operating periods

Outdoor T° threshold 15.0°c   Outdoor temperature threshold for authorising heating operation in mid-season period
```

Selection: Without, With

```
                      p28     Level 2 access

   Heating oper. period


Start date:          DD/MM    Start date for the heating operation period

End date:            DD/MM    End date for the heating operation period
```

DD: 1 to 31
MM: 1 to 12

EN

p29
Mid-season oper. period
(1)Validation: ----
(1)Start date: DD/MM
(1)End date: DD/MM
(2)Validation: ----
(2)Start date: DD/MM
(2)End date: DD/MM

Selection: Without, With
DD: 1 to 31
MM: 1 to 12

Level 2 access

Validation of mid-season operation period 1
Start date for mid-season operation period 1
End date for mid-season operation period 1
Validation of mid-season operation period 2
Start date for mid-season operation period 2
End date for mid-season operation period 2

Calibration	ca1
Return air	00.0°c
Supply air	00.0°c
Fresh air	00.0°c
Water system	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	ca2
Fresh air sensor	-
Filter sensors	-
Humidity	00.0%
Air quality	000ppm

Level 3 access

Selection of the presence of a fresh air temperature sensor (Display only)
Selection of the type of pressure sensors which monitor filter fouling
Humidity sensor calibration
Calibration of air quality sensor

Calibration	cam
Pressure sensor calibration	
	-
Humidity	NO

Level 3 Access →Press the prog button from screen ca1 or ca2
Manual calibration of pressure sensors. Warning: the fans must be completely stopped before using this function.

Input direction	se1
Heat pump control	NC
S.A fan control	NC-
Frost protection thermostat	NO
Damper end of travel	NC
Fire sensor	NC
Elec heater safety	NC
Remote control	NC

Level 3 access

Direction of the heat pump control information during operation
Direction of the supply air fan sensor information during operation
Direction of the frost protection thermostat control information during operation
Direction of the damper end of travel control information in the open position
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
R.A fan control	NC
	-
Humidifier control	NC
Burner control	
Burner fault	NC
Overheating therm.	NC

Level 3 access

Direction of the return air fan sensor information during operation

Direction of the humidifier check information during operation

Direction of the burner control information when "On"

Direction of the burner fault control information during operation

Direction of the burner safety control information during operation

Input direction	se3
Wheel control	NC
Load shedding-Choice	NO

Level 3 access

Direction of the rotary recovery control information during operation

Direction of "Bypass/Selection" control information

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 air	--.-°c
Fresh air	--.-°c
Water system	--.-°c
	---.-%
Humidity	---.-%

Supply air temperature value

Controlled temperature value (return or ambient)

Fresh air temperature value

Network water temperature value

Humidity value

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

Supply air fan pressure value

Return air fan pressure value

Return air fan flow rate value

Return air fan flow rate value

Supply air duct pressure value

	i2
Filters	
1 Supply air	------Pa
2 Return air	----Pa
3 Additional	----Pa
Air quality	----ppm
Heat recovery unit	----Pa

Supply air filter 1 fouling value

Return air filter 2 fouling value

Additional filter 3 fouling value

CO_2 air quality value

Heat exchanger fouling value

	i3
Supply air fan	-
Return air fan	-
Fire	-
Wheel control	-

Supply air fan operation check state (C = on; O = off)

Return air fan operation check state (C = on; O = off)

Fire detection sensor control state (C = no fire; O = fire detected)

Rotary recovery module control state (C = no fault; O = fault)

	i4
	-
	-
Humidifier control	-
Elec heater load shedding	---
Remote control	-

Humidifier check state (C = no faults; O = fault detected)

Bypass or Heating Selection control state (On = Bypass; HW = hot water)

Remote control state (C = on; O = off)

Note: The Heating Selection function is used to choose between the electric heater and the Heating coil 1.

	i5
Elec. heater safety	-
Damper end of travel	-
Frost protection thermostat.	-
Burner control	-
Burner fault	-
Overheating thermost.	-
Heat pump control	-

State of electric heater safety thermostat (C = fault detected; O = no faults)

State of damper limit switch contact (C = damper open; O = damper closed)

Frost protection thermostat state (C = fault detected; O = no faults)

Burner operation control state (C = on; O = off)

Burner operation state (C = fault detected; O = no faults)

Overheating thermostat state (C = fault detected; O = no faults)

Heat pump control state (C = fault detected; O = no faults)

Note: The Heating Selection function is used to choose between the electric heater and the Heating coil 1.

2.5.2 Outputs

	o1
Supply air.	---%
Return air variable drive	---%
Coil 1 Cooling.	---%
Coil 2 Heating	---%
Wheel speed	---%
Humidifier	---%
	-

Supply air fan variable frequency drive control value

Return air fan variable frequency drive control value

Water coil No.1 valve control value in "Cooling" mode (or Heating)

Water coil No.2 valve control value in "Heating" mode (or Cooling)

Heat exchanger wheel speed control value

Humidifier control value

o3
Danger -
Maintenance -
-

"Danger" fault summary relay state

"Maintenance" fault summary relay state

o4
Damper ---
Electric heater
Stage 1 ---
Stage 2 ---
Stage 3 ---
Triac ---%
-

Damper control state (frost protection or insulation)

Electric heater stage 1 control state

Electric heater stage 2 control state

Electric heater stage 3 control state

Triac control value

o5
Adiabatic cooling ---
-

Adiabatic cooling control state

o6
Free cooling ---%
Control (-) :--- (+) :---
-

Free cooling damper opening value

Free cooling damper (-) closing (+) opening control state   : Off or On

o7
Fans
Supply air ---
Return air ----
Wheel ---
-

Supply air fan control state

Return air fan control state

Fixed speed rotary heat exchanger motor control state

o8
Burner ---
Demand ---%
1st stage ----
2nd stage ----
Control (-) :--- (+) :---
Power ---%
-

Burner commissioning control state

Power demand value

Burner stage 1 control state

Burner stage 2 control state

Burner power (-) decrease (+) increase control state   : Off or On

Burner power value

o9
Heat recovery unit bypass
---%
Control (-) :--- (+) :---
-

Heat exchanger bypass damper opening valve

Heat recovery unit bypass damper (-) closing (+) opening control state : Off or On

2.5.3 Calculated setpoints

wc1
Calculated   --.-°c
-

Control setpoint calculated for the Supply air temperature when the regulated temperature is

Return or Ambient in "Precision" mode

2.5.4 Calculated demand

c1
Cooling demand   ---.-%
Heating demand   ---.-%
Dehumid. demand   ---.-%
Humid. demand   ---.-%
Cooling block   ---
Heating block   ----

Calculated cooling demand calculation value

Calculated heating demand calculation value

Dehumidification demand calculation value

Calculated humidification demand calculation value

Information on whether the cooling operation is blocked (no, yes)

Information on whether the heating operation is blocked (no, yes)

dc2
Annual program
Heating oper.   ---
Mid-season oper.   ---
Heating oper. valid.   ---
Cooling oper. valid.   ----

State (inactive, active) of the heating operation annual programming

State (inactive, active) of the mid-season operation annual programming

Validation (no, yes) of heating operation by annual programming (heating and mid-season)

Validation (no, yes) of cooling operation by annual programming (heating and mid-season)

2.5.5 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   │
│                           -     │
│                                 │
│ Stage 3        -----h   reset - │
├─────────────────────────────────┤
└─────────────────────────────────┘
```
Electric heater stage 1 runtime counter reset and time

Electric heater stage 2 runtime counter reset and time

Electric heater stage 3 runtime counter reset and time

```
┌─────────────────────────────────┐
│ Counters                   tt4  │
├─────────────────────────────────┤
│ Humidifier                      │
│                                 │
│ -----h                reset -   │
│                                 │
│                                 │
│                                 │
│                                 │
│                                 │
├─────────────────────────────────┤
│                                 │
└─────────────────────────────────┘
```
Humidifier runtime counter reset and time

```
┌─────────────────────────────────┐
│ Counters                   tt7  │
├─────────────────────────────────┤
│ Burner                          │
│                                 │
│ -----h                reset -   │
│                                 │
│                                 │
│                                 │
│                                 │
│                                 │
├─────────────────────────────────┤
│                                 │
└─────────────────────────────────┘
```
Burner runtime counter reset and time

```
┌─────────────────────────────────┐
│ Counters                   tt8  │
├─────────────────────────────────┤
│ Rotary heat exchanger           │
│                                 │
│ -----h                reset -   │
│                                 │
│                                 │
│                                 │
│                                 │
│                                 │
├─────────────────────────────────┤
│                                 │
└─────────────────────────────────┘
```
Rotary heat exchanger runtime counter reset and time

```
┌─────────────────────────────────┐
│ Counters                   tt9  │
├─────────────────────────────────┤
│ Adiabatic cooling               │
│                                 │
│ -----h                reset -   │
│                                 │
│                                 │
│                                 │
│                                 │
│                                 │
├─────────────────────────────────┤
│                                 │
└─────────────────────────────────┘
```
Adiabatic cooling runtime counter reset and time

2.6 Fault memory menu

```
┌─────────────────────────┐
│      Log          H000  │
├─────────────────────────┤
│                         │
│ Alarm                   │
│                         │
│                         │
│                         │
│ 00 :00          00/00/00│
│                         │
│                         │
├─────────────────────────┤
│                         │
└─────────────────────────┘
```

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

"Prg" button

```
┌─────────────────────────┐
│                    RH   │
├─────────────────────────┤
│ Reset              No   │
│                         │
│                         │
│                         │
│                         │
│                         │
│                         │
├─────────────────────────┤
│                         │
└─────────────────────────┘
```

Reset Alarm log reset

2.7 Versions menu

```
┌─────────────────────────┐
│ U :01  ROGRAM     pr1   │
├─────────────────────────┤
│      AHU Control        │
│ V10.00                  │
│ 22/03/16                │
│                         │
│ Bios: 06.31             │
│ Boot: 05.02             │
├─────────────────────────┤
└─────────────────────────┘
```

Shows the name and version of the program installed on the microprocessor.

```
┌─────────────────────────┐
│ U :01  ROGRAM     pr2   │     Level 1 access
├─────────────────────────┤
│                         │
│ SO: --------            │     Indicates the order number for the unit
│                         │
│                         │
│ El box: --------        │     Indicates the electrics box serial number.
│                         │
│                         │
├─────────────────────────┤
└─────────────────────────┘
```
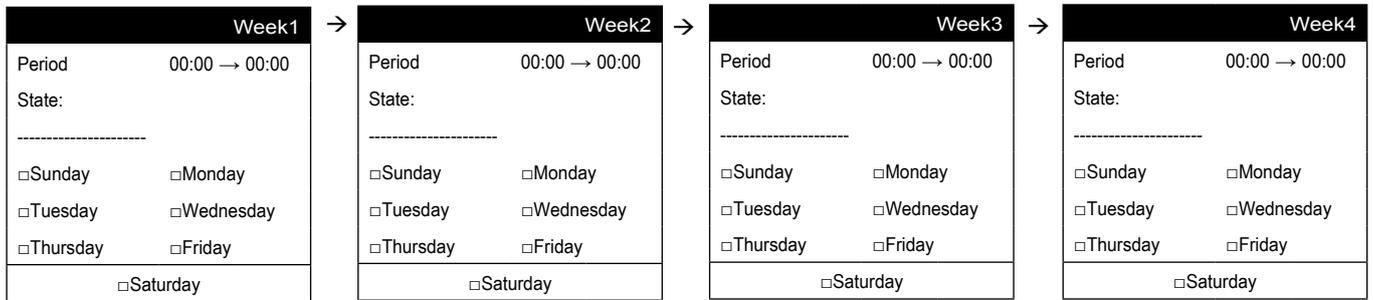
2.8 Time schedule menu

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:
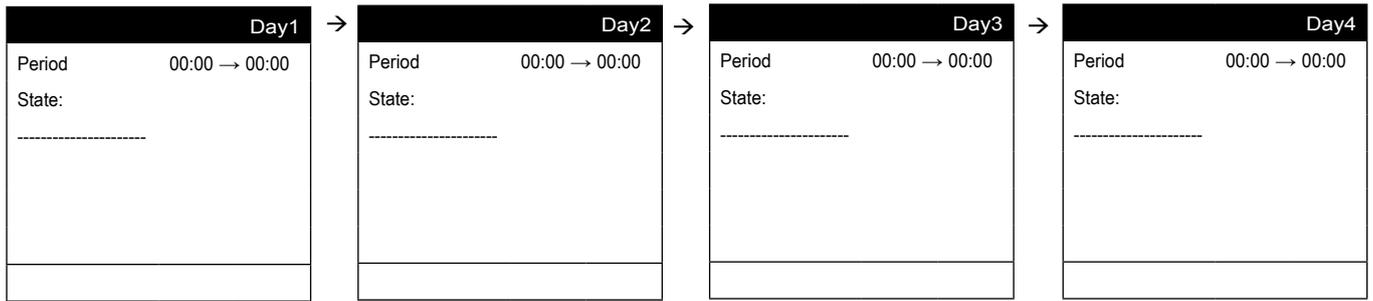
```
┌─────────────────────────┐
│ Time schedules      .   │
├─────────────────────────┤
│                         │
│         🔑              │
│                         │
│   Functions carried out │
│       By the CMS        │
│                         │
└─────────────────────────┘
```

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: Inactive
                                                                                                Reduced T°
                                                                                                Normal T°
                                                                                                Min flow rate
                                                                                                Nominal flow rate
                                                                                                Min. pressure
                                                                                                Nominal pressure
                                                                                                Standby

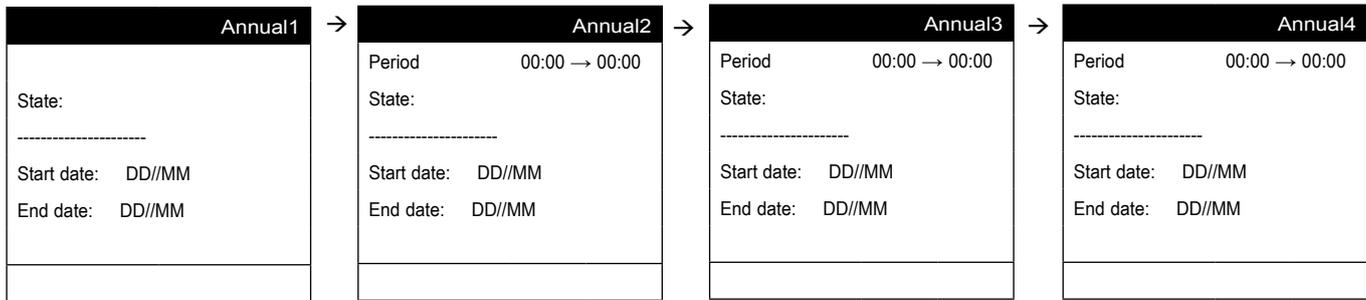| Week1	→	Week2	→	Week3	→	Week4
Period 00:00 → 00:00		Period 00:00 → 00:00		Period 00:00 → 00:00		Period 00:00 → 00:00
State:		State:		State:		State:
----------------------		----------------------		----------------------		----------------------
□Sunday □Monday		□Sunday □Monday		□Sunday □Monday		□Sunday □Monday
□Tuesday □Wednesday		□Tuesday □Wednesday		□Tuesday □Wednesday		□Tuesday □Wednesday
□Thursday □Friday		□Thursday □Friday		□Thursday □Friday		□Thursday □Friday
□Saturday		□Saturday		□Saturday		□Saturday

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: Inactive
                                                                                                Reduced T°
                                                                                                Normal T°
                                                                                                Min flow rate
                                                                                                Nominal flow rate
                                                                                                Min. pressure
                                                                                                Nominal pressure
                                                                                                Standby

□Sunday
□Monday
□Tuesday
□Wednesday   Day of the week on which the weekly time schedule is applied (■□= day selected)
□Thursday
□Friday
□Saturday

Annual1	→	Annual2	→	Annual3	→	Annual4

Annual1

State:

Start date: DD//MM

End date: DD//MM

Annual2

Period   00:00 → 00:00

State:

Start date: DD//MM

End date: DD//MM

Annual3

Period   00:00 → 00:00

State:

Start date: DD//MM

End date: DD//MM

Annual4

Period   00:00 → 00:00

State:

Start date: DD//MM

End date: DD//MM

State: Selection of the state during this period: Inactive
                                                                                                Reduced T°
                                                                                                Normal T°
                                                                                                Min flow rate
                                                                                                Nominal flow rate
                                                                                                Min. pressure
                                                                                                Nominal pressure
                                                                                                Standby

Date   DD: day (1 to 31)
                            MM: month (1 to 12

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

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

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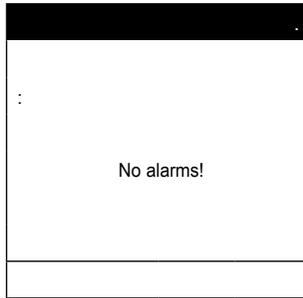
If the symbols flash, the pLAN may be unstable or, more likely, two components share the same address.

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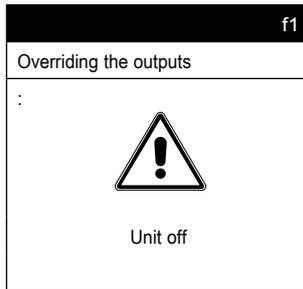
2.10 Alarms menu

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

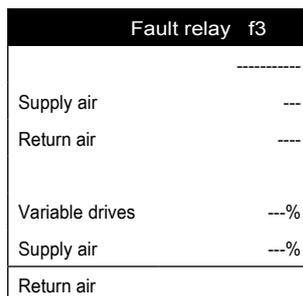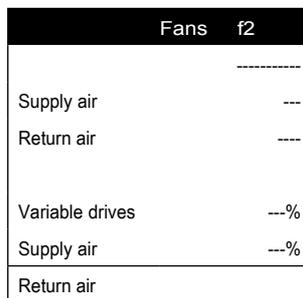---

The unit must be set to "⏻ ".

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             ---- │
│                             │
│ Variable drives         ---%│
│ Supply air              ---%│
├─────────────────────────────┤
│ Return air                  │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│        Fault relay   f3     │
├─────────────────────────────┤
│                 ----------- │
│ Supply air              --- │
│ Return air             ---- │
│                             │
│ Variable drives         ---%│
│ Supply air              ---%│
├─────────────────────────────┤
│ Return air                  │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│      electric heater    f4  │
├─────────────────────────────┤
│                 ----------  │
│ Stage 1            -----    │
│ Stage 2            ----     │
│ Stage 3            ----     │
│ Triac              ---%     │
│                             │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│         Valves          f5  │
├─────────────────────────────┤
│                 ----------  │
│ Stage 1            -----    │
│ Stage 2            ----     │
│ Stage 3            ----     │
│ Triac              ---%     │
│                             │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│         Damper          f6  │
├─────────────────────────────┤
│                 ----------  │
│ State              ----     │
│                             │
│                             │
│                             │
│                             │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│         Burner          f7  │
├─────────────────────────────┤
│                 ----------  │
│ On                 ----     │
│ Decrease/stage 1   ---      │
│ Decrease/stage 2   ---      │
│                             │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│      Free Cooling       f8  │
├─────────────────────────────┤
│                 ----------  │
│ Opening            -        │
│ Closing            -        │
│                             │
│ State              ---%     │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│         Bypass          f9  │
├─────────────────────────────┤
│                 ----------  │
│ Opening            -        │
│ Closing            -        │
│                             │
│ State              ---%     │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

```
          Wheel        f10
                  -----------
State                 ---%-
Constant                   -



```

```
         Humidifier   f11
                  -----------
State                 -----%
                           -




```

```
       Adiabatic cooling    f12
                  -----------
State                 -----%
                           -




```

2.12 Access level menu

```
     Access level        .
Current level: 1          Displays the current level



Access level 1 ->         Visible only if the current level = 2 or 3, used to access or return to level 1
Level 2 access            Visible only if the current level = 1 or 3, used to access or return to level 2
Level 3 access            Visible only if the current level = 1 or 2, used to access or return to level 3

```

```
     Access levels       .     If level 1 access selected

          LEVEL 1 ACCESS



Back to level 1:

            No                  If yes back to access level 1
```

```
     Access levels       .     If access level 2 selected and access level = 1

          LEVEL 2 ACCESS



Password: 0000                  Re-enter the installer password


```

```
┌─────────────────────────────┐
│      Access levels      .   │
├─────────────────────────────┤
│                             │
│  🔑      LEVEL 2 ACCESS     │
│                             │
│                             │
│  Enter new code             │
│  level 2?                   │
├─────────────────────────────┤
│                        No   │
└─────────────────────────────┘
```

If password ok

If yes, change the installer password; if no, back to current access level page

```
┌─────────────────────────────┐
│      Access levels      .   │
├─────────────────────────────┤
│                             │
│  🔑      LEVEL 2 ACCESS     │
│                             │
│                             │
│        New password:        │
│           0000              │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

Re-enter the new installer password

```
┌─────────────────────────────┐
│      Access levels      .   │
├─────────────────────────────┤
│                             │
│  🔑      LEVEL 2 ACCESS     │
│                             │
│                             │
│  Back to level 2:           │
│                             │
├─────────────────────────────┤
│                        No   │
└─────────────────────────────┘
```

If access level 2 selected and access level = 3

If yes back to access level 2

```
┌─────────────────────────────┐
│      Access levels      .   │
├─────────────────────────────┤
│                             │
│  🔑      LEVEL 3 ACCESS     │
│                             │
│                             │
│  Password: 0000             │
│                             │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

If access level 2 selected and access level = 1

Re-enter the manufacturer password

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.

3 MANAGING A NETWORK OF MULTIPLE CONTROLLERS

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

pLAN = **p**ersonal **L**ocal **A**rea **N**etwork

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.
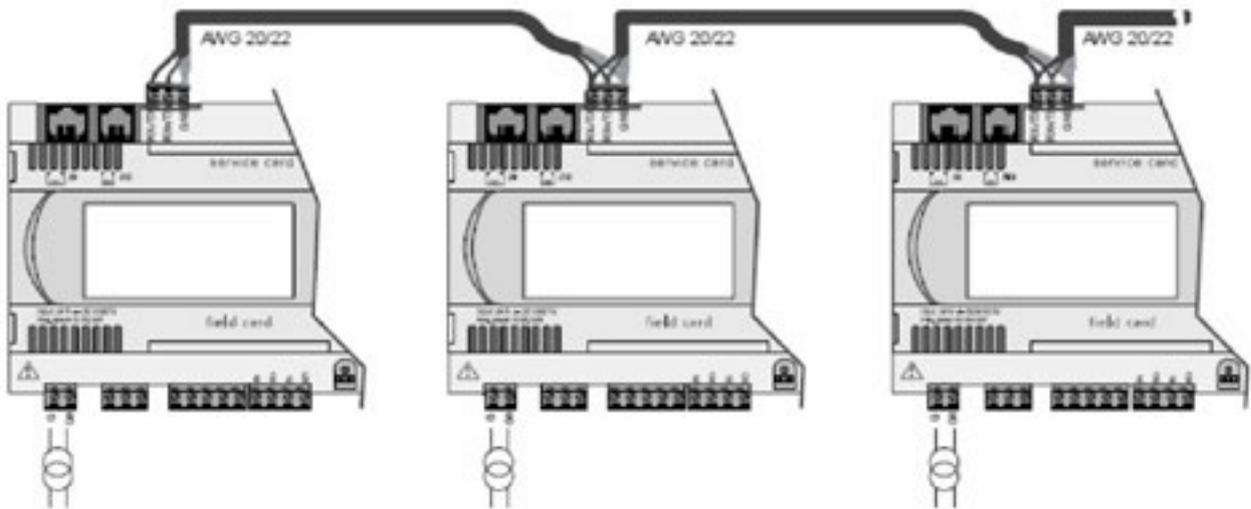
3.1.2 Connecting a remote screen or screens to the pLAN

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.**
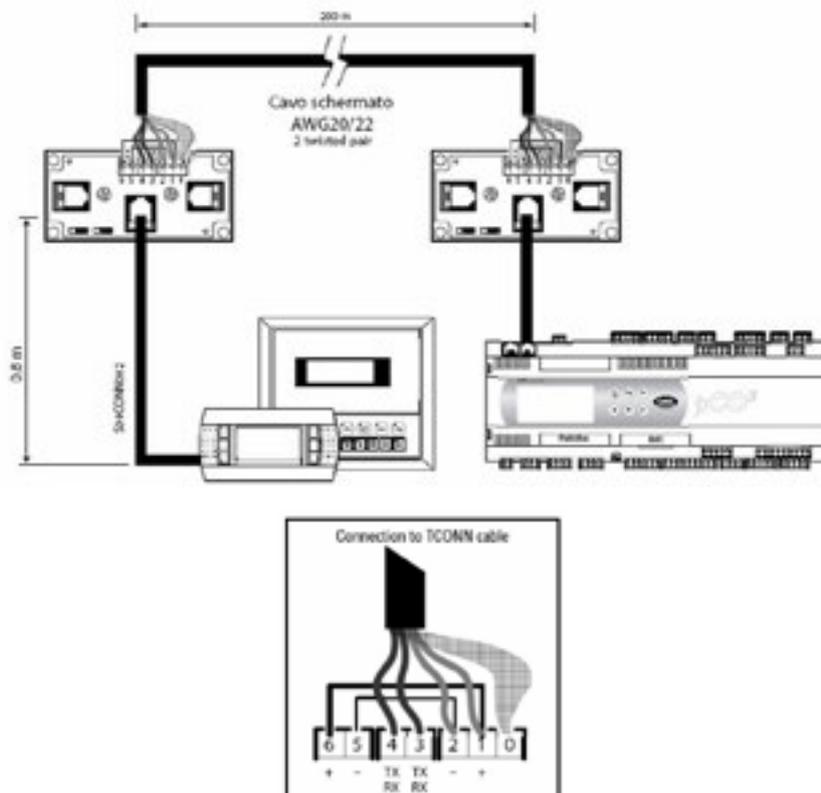
3.2 Addressing the pLAN

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:

Display Addressing17 — Unit 1	Display Addressing18 — Unit 2	Display Addressing19 — Unit 3
Controller Address 1	Controller Address 2	Controller Address 3

Display Addressing20 — Unit 4	Display Addressing21 — Unit 5	Display Addressing22 — Unit 6
Controller Address 4	Controller Address 5	Controller Address 6

Display Addressing23 — Unit 7	Display Addressing24 — Unit 8
Controller Address 7	Controller Address 8

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 change the terminal's address, it must first be powered via the telephone connector.

To switch to configuration mode, simultaneously press the ↑ ↓ and ↵ keys for at least 5 seconds; the page shown below will be displayed, with the cursor flashing in the top left corner:

```
Display address
setting............................ : nn

I/O Board address      : xx
```

• to change the terminal's address (display address setting) press ↵once: the pointer will move to the address field (nn).

• select the desired value using the ↑ ↓ buttons and confirm by pressing the ↵button. If the value selected is different from that previously stored in the memory, the page shown below will appear and the new value will be stored in the terminal's permanent memory.

```
Display address
changed


□
```

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: xx" field will disappear as it will not be necessary.

3.3.2 Assigning private and shared HMI 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 ↑ ↓ and ↵buttons as described in the previous section;
• press ↵until the cursor moves to the "I/O board address" field;
• using the ↑ ↓ buttons, select the desired address for the 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 ↵button once more. the following mask sequences will be displayed:

```
        Terminal Config

         Press ENTER
          to continue




              ↓

P12 :  Adr      Priv/Shared
Trm1   02           Sh
Trm2   03           Pr
Trm3   None      -- OK ?NO
```
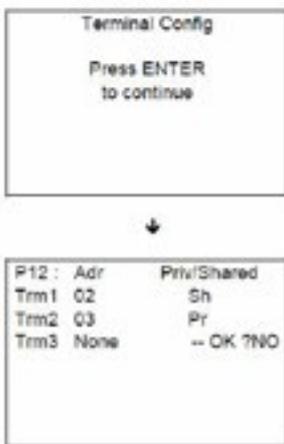
• the ↵button also moves the cursor between fields and the ↑ ↓ buttons change the value in the active field. The P:xx field shows the address of the selected controller. In the example above, controller No. 01 is selected;
• to exit the configuration procedure and store the data, select "YES" in response to "OK?" and confirm with the ↵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 01; 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 and the pr1 screen of the "Prog" 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 ↑ ↓ and ↵on any 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:

```
NetSTAT      Term : 17
1 ▯▯▯▯ . . . . . .  8
9 . . . . . . . ▯ . 16
17 . . . . . . . . . 24
25 ▯▯ . . . . . . . 32
    Press Enter to quit
```
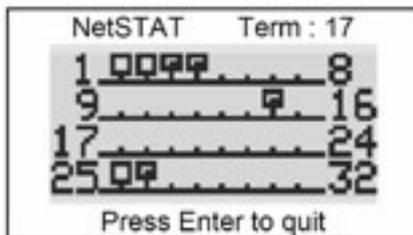
Once on the screen, network addresses 1 to 32 are displayed. The small rectangles represent the terminals and the large rectangles , the controllers. If symbols appear then disappear, the pLAN may be unstable or, more likely, two components share the same address. The number after **Term** indicates 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 MONITORING

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 (Mandatory)

- **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 (Mandatory)

- **Address**   001 (Mandatory)

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 (Mandatory)

- **Address**   001 (Mandatory)

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
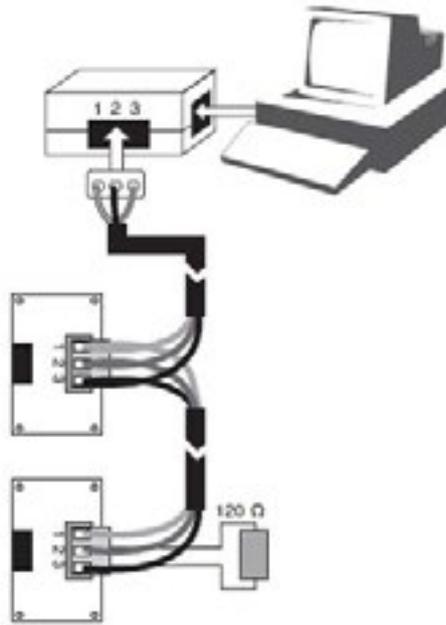
5.3.2 RS485 connection close-up
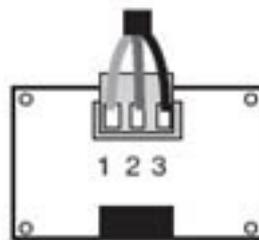
Pin	Description
1	GND
2	RX+/TX+
3	RX-/TX-

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).

A 120Ω ¼W electrical heater 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.
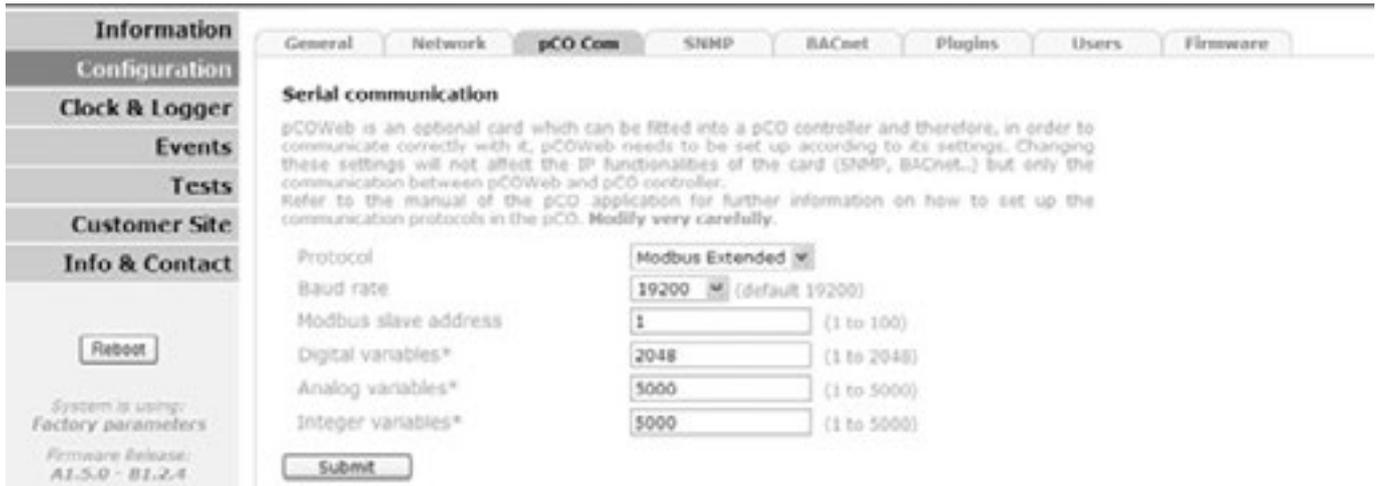
5.3.4 Variables
5.3.4.1 Orders

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/Write	0: Off/1: On
0x119	281	Fault acknowledgement	Boolean	Read/Write	0: No/1: Acknowledgement
0x11A	282	Electric heater load shedding	Boolean	Read/Write	0: Free / 1: Load shedding
0x11B	283	Unit actuation at eco/comfort temperature	Boolean	Read/Write	0: Comfort / 1: Eco
0x11C	284	Unit actuation at eco/comfort flow rate	Boolean	Read/Write	0: Comfort / 1: Eco
0x11D	285	Unit actuation at eco/comfort pressure	Boolean	Read/Write	0: Comfort / 1: Eco
0x122	290	Choice of heating coil	Boolean	Read/Write	0 : Electric heater 1 : Hot water coil 1

5.3.4 Variables
5.3.4.1 Orders

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 flow rate setpoint value	Integer	Read/Write	m3/h /10
0x0191	401	Return air fan flow rate setpoint value	Integer	Read/Write	m3/h /10
0x0192	402	Supply air fan reduced flow rate setpoint value during a time program	Integer	Read/Write	m3/h /10
0x0193	403	Return air fan ECO flow rate setpoint value during a time program	Integer	Read/Write	m3/h /10
0x0195	405	Supply air duct pressure setpoint value	Integer	Read/Write	Pa
0x0196	406	Supply air duct Eco pressure setpoint value during a time program	Integer	Read/Write	Pa
0x019A	410	Comfort heating regulated temperature setpoint value	Integer	Read/Write	°C x10
0x019B	411	Eco heating regulated temperature setpoint value during a time program	Integer	Read/Write	°C x10
0x019C	412	Supply air temperature maximum limit value	Integer	Read/Write	°C x10
0x019D	413	Supply air temperature minimum limit value	Integer	Read/Write	°C x10
0x1A1	417	Air quality regulation setpoint	Integer	Read-only/Write	ppm
0x1A2	418	Supply air fan maximum flow rate value for air quality regulation	Integer	Read/Write	m3/h /10
0x1A6	422	Cooling Comfort regulated temperature setpoint	Integer	Read/Write	°C x10
0x1A7	423	Cooling Eco regulated temperature setpoint	Integer	Read/Write	°C x10
0x1A8	424	Heating Comfort regulated temperature setpoint	Integer	Read/Write	°C x10
0x1A9	425	Heating Eco regulated temperature setpoint	Integer	Read/Write	°C x10
0x1AC	428	Cooling Comfort supply air temperature setpoint	Integer	Read/Write	°C x10
0x1AD	429	Cooling Eco supply air temperature setpoint	Integer	Read/Write	°C x10
0x1AE	430	Heating Comfort supply air temperature setpoint	Integer	Read/Write	°C x10
0x1AF	431	Heating Eco supply air temperature setpoint	Integer	Read/Write	°C x10
0x1B4	436	Frost protection setpoint value when the unit is in Standby during a time program	Integer	Read/Write	°C x10
0x1B9	441	Regulation setpoint in "Night cooling" mode	Integer	Read/Write	°C x10
0x1BD	445	Stage 1 and off setpoint value for the electric heater	Integer	Read/Write	%
0x1BE	446	Stage 1 on setpoint value for the electric heater	Integer	Read/Write	%
0x1BF	447	Stage 2 off setpoint value for the electric heater	Integer	Read/Write	%
0x1C0	448	Stage 2 on setpoint value for the electric heater	Integer	Read/Write	%
0x1C1	449	Stage 3 and off setpoint value for the electric heater	Integer	Read/Write	%
0x1C2	450	Stage 3 on setpoint value for the electric heater	Integer	Read/Write	%
0x1C3	451	Set humidity setpoint	Integer	Read/Write	%rH
0x1C4	452	Free Cooling authorisation limit setpoint value in relation to the fresh air temperature	Integer	Read/Write	°C x10
0x1C5	453	Value of the minimum % of fresh air during Free cooling management	Integer	Read/Write	%
0x1C9	457	Heat recovery unit bypass control setpoint value	Integer	Read/Write	Pa
0x1CF	463	Low threshold for supply air flow presence fault	Integer	Read/Write	Pa
0x1D0	464	High threshold for supply air filter 1 fouled fault	Integer	Read/Write	Pa
0x1D1	465	High threshold for supply air filter 1 blocked fault	Integer	Read/Write	Pa
0x1D4	468	Low threshold for return air flow presence fault	Integer	Read/Write	Pa
0x1D5	469	High threshold for return air filter 2 fouled fault	Integer	Read/Write	Pa
0x1D6	470	High threshold for return air filter 2 fouled fault	Integer	Read/Write	Pa
0x1D9	473	High threshold for additional filter 3 fouled fault	Integer	Read/Write	Pa
0x1DA	474	High threshold for additional filter 3 blocked fault	Integer	Read/Write	Pa
0x1E5	485	Changeover limit setpoint value in Heating mode and water return temperature	Integer	Read/Write	°C x10
0x1E6	486	Changeover limit setpoint value in Cooling mode and water return temperature	Integer	Read/Write	°C x10
0x1E7	487	Value for the water return temperature control proportional band	Integer	Read/Write	°C x10
0x1EB	491	Duct pressure sensor fault low threshold	Integer	Read/Write	Pa
0x1EC	492	Duct pressure sensor fault high threshold	Integer	Read/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
0x452	1106	Room or return air humidity	Integer	Read-only	Value x10
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 1 fouling level	Integer	Read-only	
0x459	1113	Return air or filter 2 fouling level	Integer	Read-only	
0x45A	1114	Additional filter 3 fouling level	Integer	Read-only	
0x45C	1116	Air quality in ppm of CO_2	Integer	Read-only	
0x45D	1117	Heat recovery unit fouling level on return air	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
0x461	1121	Wheel check 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
0x46D	1133	Damper end of travel input state	Boolean	Read-only	0 = Damper closed 1 = Damper open
0x46E	1134	Frost protection thermostat input state	Boolean	Read-only	0 = No fault 1 = Fault
0x46F	1135	Burner control input state	Boolean	Read-only	0 = Off 1 = On
0x470	1136	Burner fault input state	Boolean	Read-only	0 = No fault 1 = Fault
0x471	1137	Thermostat overheating input state	Boolean	Read-only	0 = No fault 1 = Fault
0x472	1138	Heat pump check 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	
0x478	1144	Control signal for the rotary heat exchanger control	Integer	Read-only	
0x479	1145	Humidifier control signal	Integer	Read-only	
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
0x486	1158	Stage 3 state for the electric heater	Boolean	Read-only	0 = Off 1 = On
0x487	1159	TRIAC output state	Integer	Read-only	
0x48F	1167	Adiabatic cooling output state	Boolean	Read-only	0 = Off 1 = On
0x491	1169	Free cooling output value	Integer	Read-only	
0x492	1170	Free cooling control direction of action	Integer	Read-only	0:None 1:Opening 2:Closed
0x493	1171	Supply air fan state	Boolean	Read-only	0 = Off 1 = On

Register hex. no.	Register decimal no.	Description	Format	Type	Values displayed
0x494	1172	Return air fan state	Boolean	Read-only	0 = Off 1 = On
0x495	1173	Fixed speed rotary heat exchanger control signal	Boolean	Read-only	
0x497	1175	Burner control output state	Boolean	Read-only	0 = Off 1 = On
0x498	1176	Burner stage 1 state	Boolean	Read-only	0 = Off 1 = On
0x499	1177	Burner stage 2 state	Boolean	Read-only	0 = Off 1 = On
0x49A	1178	burner power percentage	Integer	Read-only	
0x49B	1179	Burner command direction of action	Integer	Read-only	0:None 1:Increase 2:Decrease
0x49C	1180	Heat recovery unit bypass output value	Integer	Read-only	
0x49D	1181	Heat recovery unit bypass control direction of action	Integer	Read-only	0:None 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
0x4B6	1206	Stage 3 electric heater runtime counters	Integer	Read-only	in hours
0x4B7	1207	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
0x4CC	1228	Burner runtime counters	Integer	Read-only	in hours
0x4CD	1229	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4D2	1234	Rotary heat exchanger runtime counters	Integer	Read-only	in hours
0x4D3	1235	Option to reset the counters	Boolean	Read/Write	1 = Reset
0x4D8	1240	Adiabatic cooling runtime counter	Integer	Read-only	in hours
0x4D9	1241	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 power failure 3: Standby 4: Off by a fault 5: Off by CMS 6: Post 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	Danger fault	Boolean	0 or 1
0x515	1301	Maintenance fault	Boolean	0 or 1
0x516	1302	Supply air motor alarm	Boolean	0 or 1
0x517	1303	Supply air flow rate alarm	Boolean	0 or 1
0x518	1304	Filter 1 dirty alarm	Boolean	0 or 1
0x519	1305	Burner alarm	Boolean	0 or 1
0x51A	1306	Defective damper alarm	Boolean	0 or 1
0x51B	1307	Combustion chamber overheating alarm	Boolean	0 or 1
0x51C	1308	Fire alarm	Boolean	0 or 1
0x51D	1309	Frost protection 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
0x525	1317	Return air flow rate 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
0x529	1321	Filter 3 blocked alarm	Boolean	0 or 1
0x52A	1322	Variable speed rotary heat exchanger 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
0x52D	1325	Heat pump module 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.
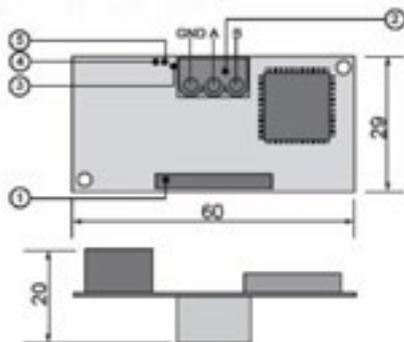
1. Connector for the controller
2. Disconnectable terminal for connection of the LonWorks® network (GND, A, B)
3. Pin service
4. Green service LED: state of the node, lit during the pin service, flashing when the board receives a command from the network, if permanently lit = board faulty
5. Red fault 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 Digital variables

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 control return via CMS
DGT	--	nvo_entree_dig_1	83	output	State of digital inputs
				bit 0	Not used
				bit 1	Heat pump unit control state
				bit 2	Supply air fan control state
				bit 3	Frost protection thermostat control state
				bit 4	Damper end of travel state
				bit 5	Fire sensor state
				bit 6	Electric heater thermostat sensor input
				bit 7	Remote control state
				bit 8	Return air fan control state
				bit 9	Burner control state
				bit 10	Burner fault state
				bit 11	Overheating fault state
				bit 12	Rotary heat exchanger check state
DGT	--	nvo_sortie_dig_1	83	output	State of digital outputs
				bit 0	Danger fault output
				bit 1	Maintenance fault output
				bit 2	Supply air fan control
				bit 3	Return air fan control
				bit 4	Damper control
				bit 5	Electric heater stage 1 control
				bit 6	Electric heater stage 2 control
				bit 7	Electric heater stage 3 control
				bit 8	Burner commissioning control
				bit 9	Burner stage 1 control
				bit 10	Burner stage 2 control
				bit 11	Constant speed rotary recovery motor control

Type	Index	NV name	SNVT	Direction	Description
DGT	--	nvo_alarm_01_16	83	output	Alarm 1 value:
				bit 0	Motor alarm
				bit 1	Return air motor alarm
				bit 2	Poor supply air flow alarm
				bit 3	Supply air filter 1 dirty alarm
				bit 4	Supply air filter 1 blocked alarm
				bit 5	Poor return air flow alarm
				bit 6	Return air filter 2 dirty alarm
				bit 7	Return air filter 2 blocked alarm
				bit 8	Additional filter 3 dirty alarm
				bit 9	Additional filter 3 blocked alarm
				bit 10	Damper alarm
				bit 11	Burner alarm
				bit 12	Overheating alarm
				bit 13	Fire alarm
				bit 14	Frost protection alarm
				bit 15	Electric heater safety thermostat alarm
DGT	--	nvo_alarm_17_32	83	output	Alarm 2 value:
				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	Heat pump unit alarm
				bit 5	Frosted heat exchanger alarm
				bit 6	Rotary heat exchanger alarm
				bit 7	Clock lithium battery alarm
				bit 8	Duct pressure alarm
				bit 9	Low ambient or return air humidity alarm
				bit 10	High ambient or return air humidity alarm
				bit 11	Humidifier alarm
				bit 12	Heat recovery unit fouled alarm

5.4.3 Analogue variables

Type	Index	NV name	SNVT	Direction	Description
ANL	1	nvo_custom_1	113	output	Supply air filter 1 fouling level
ANL	2	nvo_custom_2	113	output	Supply air duct pressure
ANL	3	nvo_custom_3	113	output	Return air filter 2 fouling level
ANL	4	nvo_custom_4	113	output	Additional filter 3 fouling level
ANL	5	nvo_custom_5	113	output	Heat recovery unit fouling level
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	Water coil No.1 capacity
ANL	26	nvo_sortie_ana_2	9	output	Water 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	29	nvo_sortie_ana_5	9	output	Triac
ANL	30	nvo_sortie_ana_6	9	output	Rotary heat exchanger speed
ANL	37	nvo_etat_unite	9	output	Unit operating state:
				Value 0	off
				Value 1	opening of damper
				Value 2	on
				Value 3	switched on after a power failure
				Value 4	standby
				Value 5	switched off by a fault
				Value 6	switched off by CMS
				Value 7	post ventilation
ANL	44	nvi_T_regul	105	input	Regulated temperature setpoint (return or room)
ANL	44	nvo_T_regul	105	output	Regulated temperature setpoint return (return or room)
ANL	45	nvi_T_souf_B	105	input	Supply air only temperature setpoint
ANL	45	nvo_T_souf_B	105	output	Supply air only temperature setpoint return
ANL	48	nvi_D_regul	161	input	Supply air fan flow rate setpoint
ANL	48	nvo_D_regul	161	output	Supply air fan flow rate setpoint return
ANL	49	nvi_P_regul	113	input	Supply air duct pressure setpoint
ANL	49	nvo_P_regul	113	output	Supply air duct pressure setpoint return

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
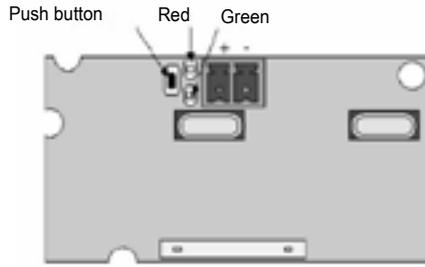
LED		Meaning	Cause / solution
Red	Constantly lit	No communication between KNX card and the controller	Check the configuration: - controller address incorrect - transmission speed incorrect - wrong protocol
	Flashing	Communication error between KNX card and the controller	The card has been configured 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 board is awaiting the corresponding procedure from ETS	
	Rapidly flashing	- the XML file has not been downloaded - a rapid flash indicates receipt of the address after the button has been pressed	
	Slow flashing	Configuration in progress: the XML file is being downloaded by ETS	
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	Data	Data type	Code type	IN/OUT	Index	TYPE
Supply air filter 1 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 2 fouling level	Filtre2	DPT_Value_Temp	9.001	OUT	1113	REG
Heat recovery unit fouling level	EncrassRecuperateur	DPT_Value_Temp	9.001	OUT	1117	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
CO2 air quality	QualiteAir	DPT_Value_Temp	9.001	OUT	1116	REG
Network water temperature	TemperatureReseau	DPT_Value_Temp	9.001	OUT	1104	REG
Additional filter 3 fouling level	Filtre3	DPT_Value_Temp	9.001	OUT	1114	REG
Humidity	Humidite	DPT_Value_Temp	9.001	OUT	1106	REG
Water coil valve No. 1	Batterie1	DPT_Value_Temp	9.001	OUT	1142	REG
Heat exchanger wheel speed	VitesseRecupRotatif	DPT_Value_Temp	9.001	OUT	1144	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
Plate heat exchanger bypass damper	BipasseRecup	DPT_Value_Temp	9.001	OUT	1180	REG
Triac	Triac	DPT_Value_Temp	9.001	OUT	1159	REG
Mixing damper	Melange	DPT_Value_Temp	9.001	OUT	1169	REG
Burner output	Bruleur	DPT_Value_Temp	9.001	OUT	1178	REG
Humidifier	Humidificateur	DPT_Value_Temp	9.001	OUT	1145	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 rate 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 rate 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

Description	Data	Data type	Code type	IN/OUT	Index	TYPE
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 "Precision" mode	WTempRegulConfort	DPT_Value_Temp	9.001	OUT	410	REG
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 feedback	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 flow maximum 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	WTempRegulConfortFroid	DPT_Value_Temp	9.001	IN	422	REG
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	WTempRegulConfortChaud	DPT_Value_Temp	9.001	IN	424	REG
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 optimisation" mode	WTempRegulEcoChaud	DPT_Value_Temp	9.001	IN	425	REG
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

Description	Data	Data type	Code type	IN/OUT	Index	TYPE
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
Control setpoint for the return air humidity	WHumRegulee	DPT_Value_Temp	9.001	IN	451	REG
Control setpoint return for the return air humidity	WHumRegulee	DPT_Value_Temp	9.001	OUT	451	REG
Unit operating state 0 = off 1 = on 2 = on after power failure 3 = standby 4 = off by a fault 5 = off by CMS 6 = post ventilation	EtatUnite	DPT_Value_2_Ucount	7.001	OUT	1250	REG
Alarm 1 value: Bit 0 = Supply air motor alarm Bit 1 = Return air motor alarm Bit 2 = Poor supply air flow alarm Bit 3 = Supply air filter 1 dirty alarm Bit 4 = Supply air filter 1 blocked alarm Bit 5 = Poor return air flow alarm Bit 6 = Return air filter 2 dirty alarm Bit 7 = Return air filter 2 blocked alarm Bit 8 = Additional filter 3 dirty alarm Bit 9 = Additional filter 3 blocked alarm Bit 10 = Damper alarm Bit 11 = Burner alarm Bit 12 = Overheating alarm Bit 13 = Fire alarm Bit 14 = Frost protection alarm Bit 15 = Electric heater safety thermostat alarm	Alarme1	DPT_Value_Temp	7.001	OUT	28	REG

Description	Data	Data type	Code type	IN/OUT	Index	TYPE
Alarm 2 value: 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 = Heat pump unit alarm Bit 5 = Heat recovery unit frosted alarm Bit 6 = Rotary heat exchanger alarm Bit 7 = Timer lithium battery alarm Bit 8 = Duct pressure alarm Bit 9 = Low ambient or return air humidity alarm Bit 10 = High ambient or return air humidity alarm Bit 11 = Humidifier alarm Bit 12 = Heat recovery unit alarm	Alarme2	DPT_Value_2_Ucount	7.001	OUT	29	REG
Heating requirement supplied by unit	Chaud	DPT_Value_2_Ucount	7.001	OUT	1251	REG
Cooling requirement supplied by unit	Froid	DPT_Value_2_Ucount	7.001	OUT	1252	REG
Unit On/Off command via CMS	OnoffGTC	DPT_Switch	1.001	IN	280	COIL
Unit On/Off control 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 machine actuation in Eco / Comfort mode	ConfortEcoDebit	DPT_Switch	1.001	IN	284	COIL
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	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
Choice of heating coil	ChoixBatterieChaud	DPT_Switch	1.001	IN	290	COIL
Choice of heating coil return	ChoixBatterieChaud	DPT_Switch	1.001	OUT	290	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
Electric heater stage 3 control	BattElec3	DPT_Switch	1.001	OUT	1158	COIL
Adiabatic cooling control	RafraichissementAdiab	DPT_Switch	1.001	OUT	1167	COIL
Supply air fan control	VentilateurSoufflage	DPT_Switch	1.001	OUT	1171	COIL
Return air fan control	VentilateurReprise	DPT_Switch	1.001	OUT	1172	COIL
Fixed speed rotary heat exchanger control	RoueFixe	DPT_Switch	1.001	OUT	1173	COIL
Burner order command	OrdreBruleur	DPT_Switch	1.001	OUT	1175	COIL
Burner stage 1 command	BruleurAllure21	DPT_Switch	1.001	OUT	1176	COIL

Description	Data	Data type	Code type	IN/OUT	Index	TYPE
Burner stage 2 command	BruleurAllure2	DPT_Switch	1.001	OUT	1177	COIL
"Danger" fault summary	DefautDanger	DPT_Switch	1.001	OUT	1300	COIL
"Maintenance" fault summary	DefautMaintenance	DPT_Switch	1.001	OUT	1301	COIL

5.5.3 Configuration process

The diagram below illustrates the phases of the "configuration process" required for configuring the card correctly:
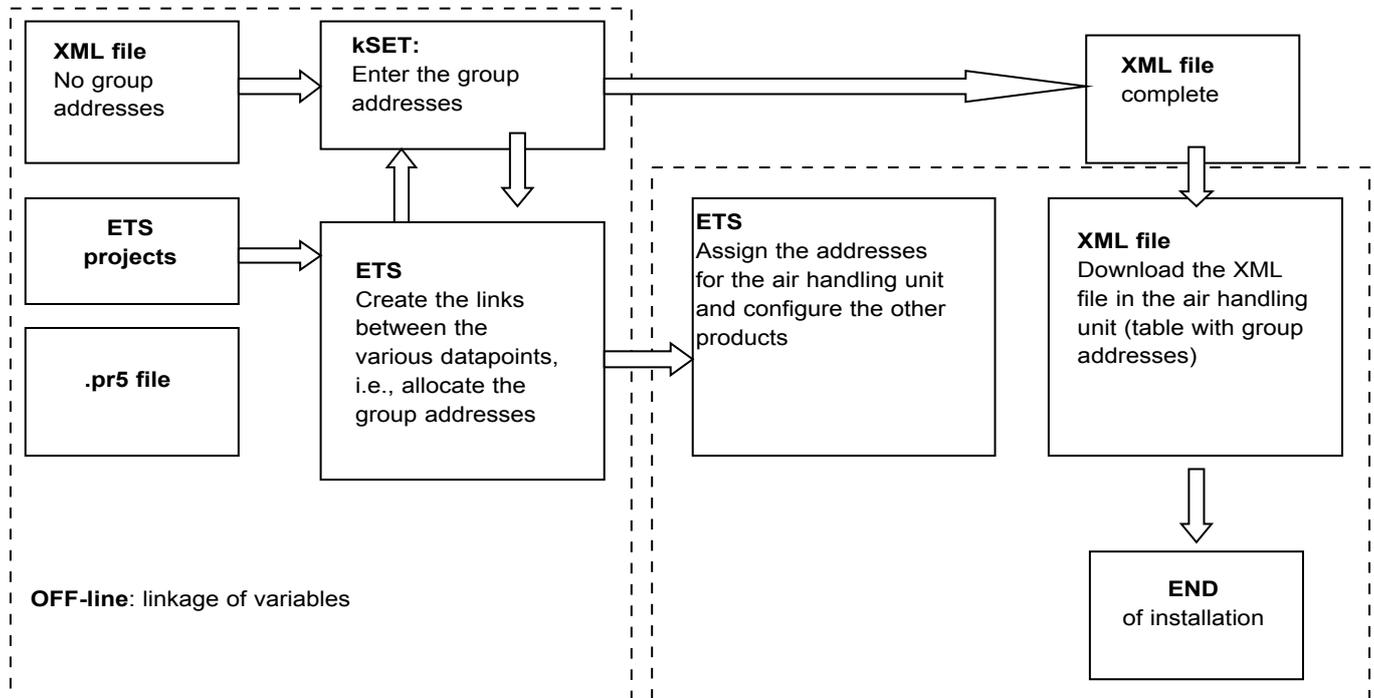
The types of KNX Datapoint available and the respective conversion methods are listed in the table below:

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 or ETS4 databases 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 Procedure for ETS3

5.5.5.1 Installing the plugin for ETS3

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:
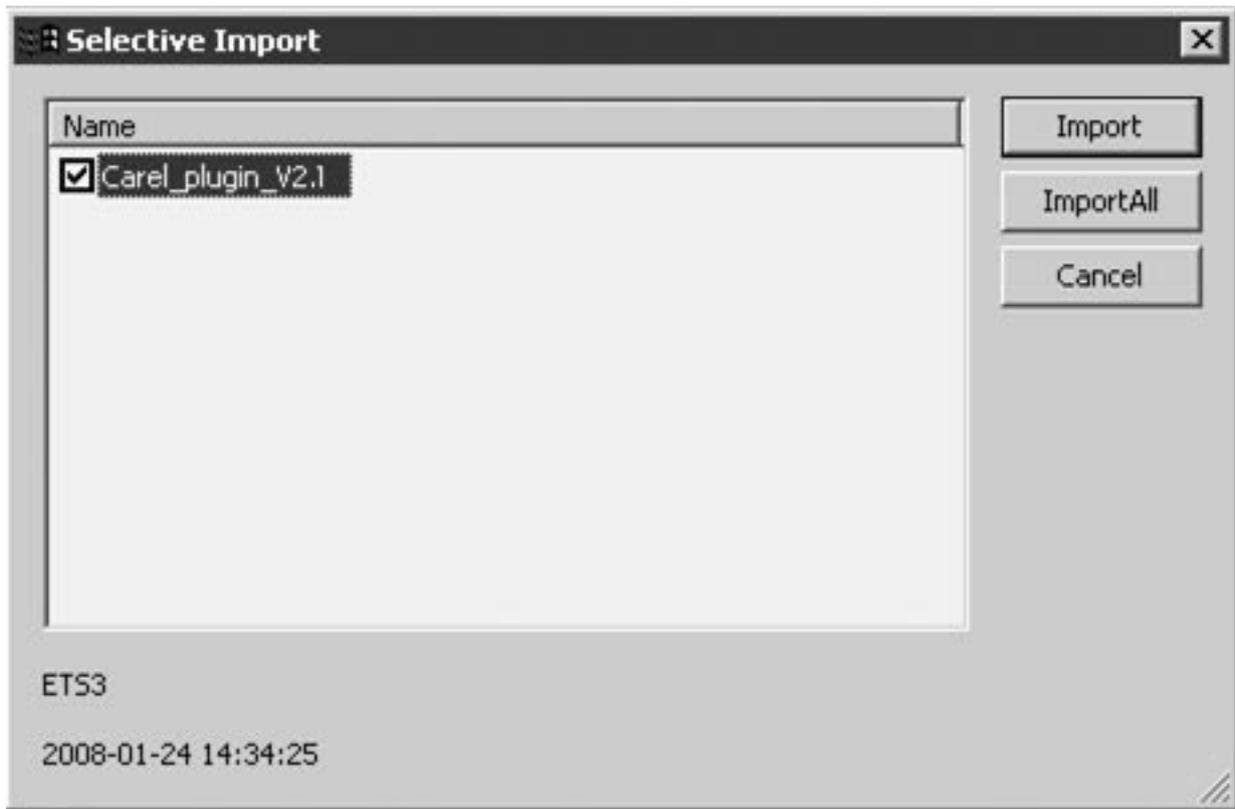
Select Import all
- Using Files → "Open/Manage projects…", open the project named Carel_plugin_V2.1 (or above):
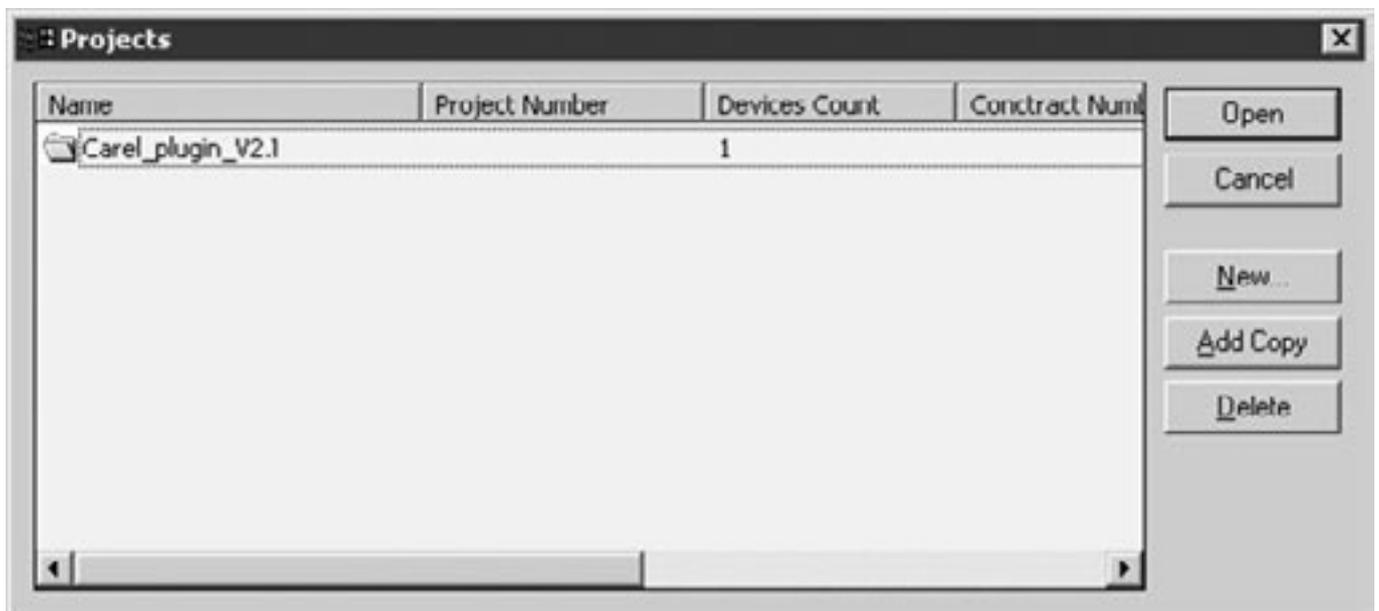
. Open the project using Open, select the device "CAREL Plugin", right-click on the mouse and select Copy:
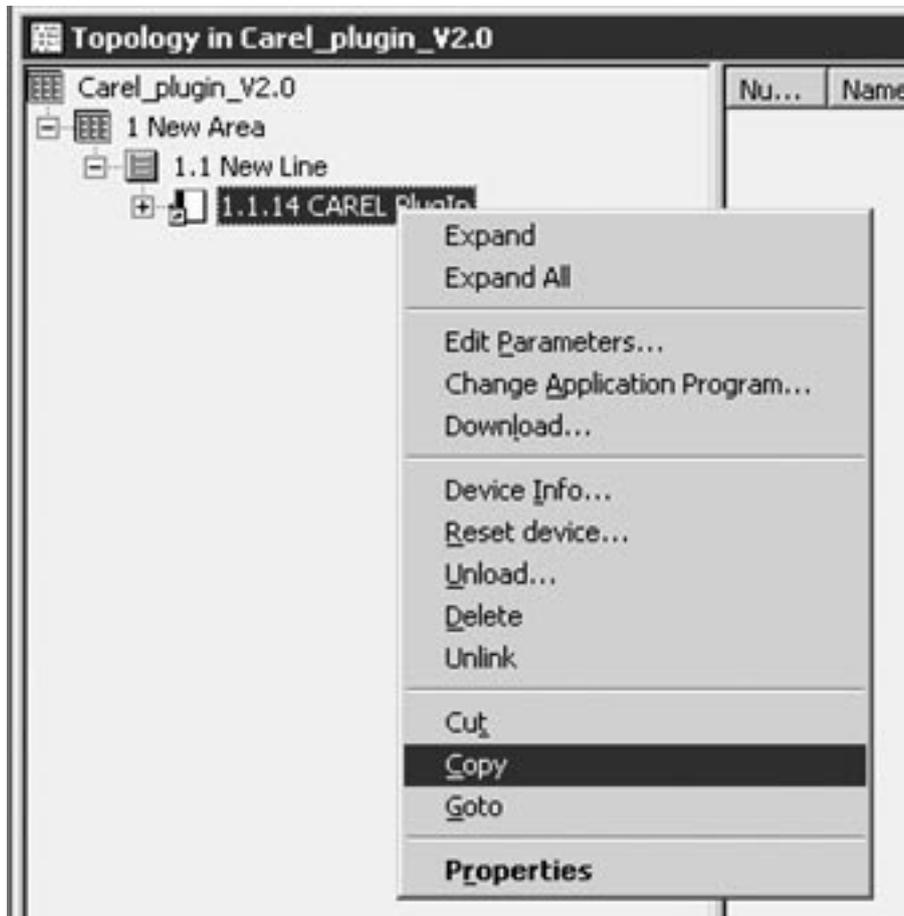
. Open or create the final project for the system and right-click on the mouse to paste the CAREL plugin, once or more according to the number of CAREL devices to be integrated. The address of each device is automatically incremented. If necessary, you can manually change the address of a device in Properties.

5.5.5.2 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 powered on
- 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.

5.5.5.3 Downloading the XML file

You must be sure that:
- the Bus wire network is drawn out and connected
- the Bus is powered on
- the CAREL card is connected to the KNX network
- the controller is powered on

First, open the xml file using the KSet software: set all the desired group addresses then save the xml file.
Close Kset.

On ETS3, 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.
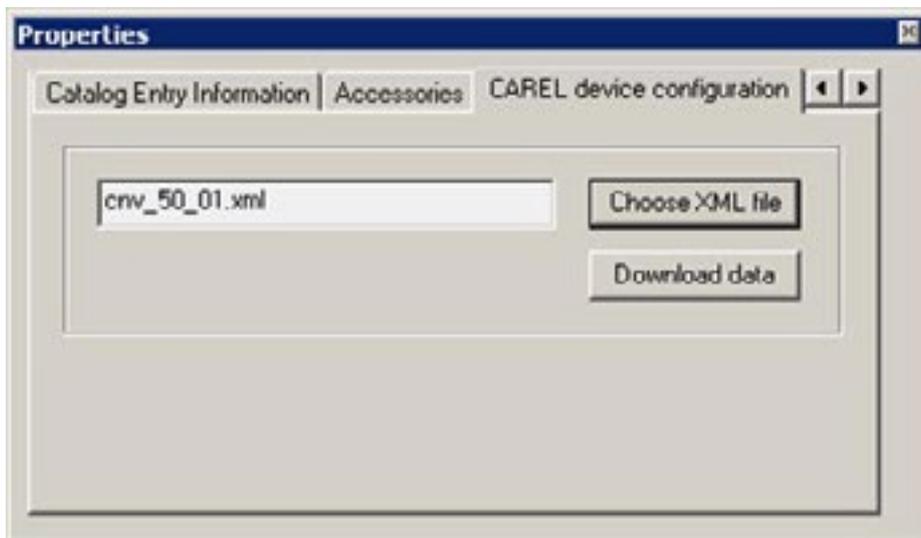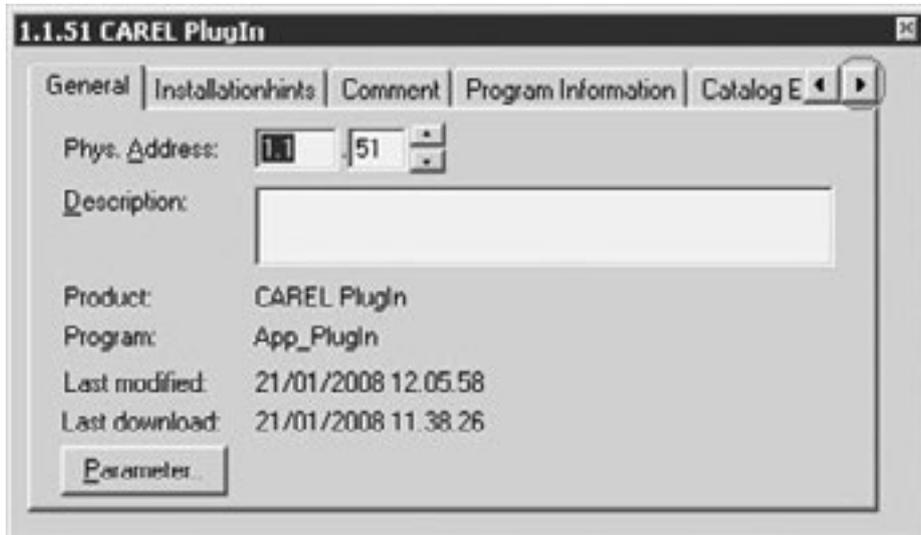
Use "Choose XML file" to open the XML configuration file required.

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.

5.5.6 Procedure for ETS4

5.5.6.1 Installing the ETS4 plugin

The plugin is installed as follows:
    . Find the file "Carel_plugin_30.pr5" (the updated version of the plugin is available from ksa.carel.com)
. Import "Carel_plugin_30.pr5" using Files → Import as shown below:
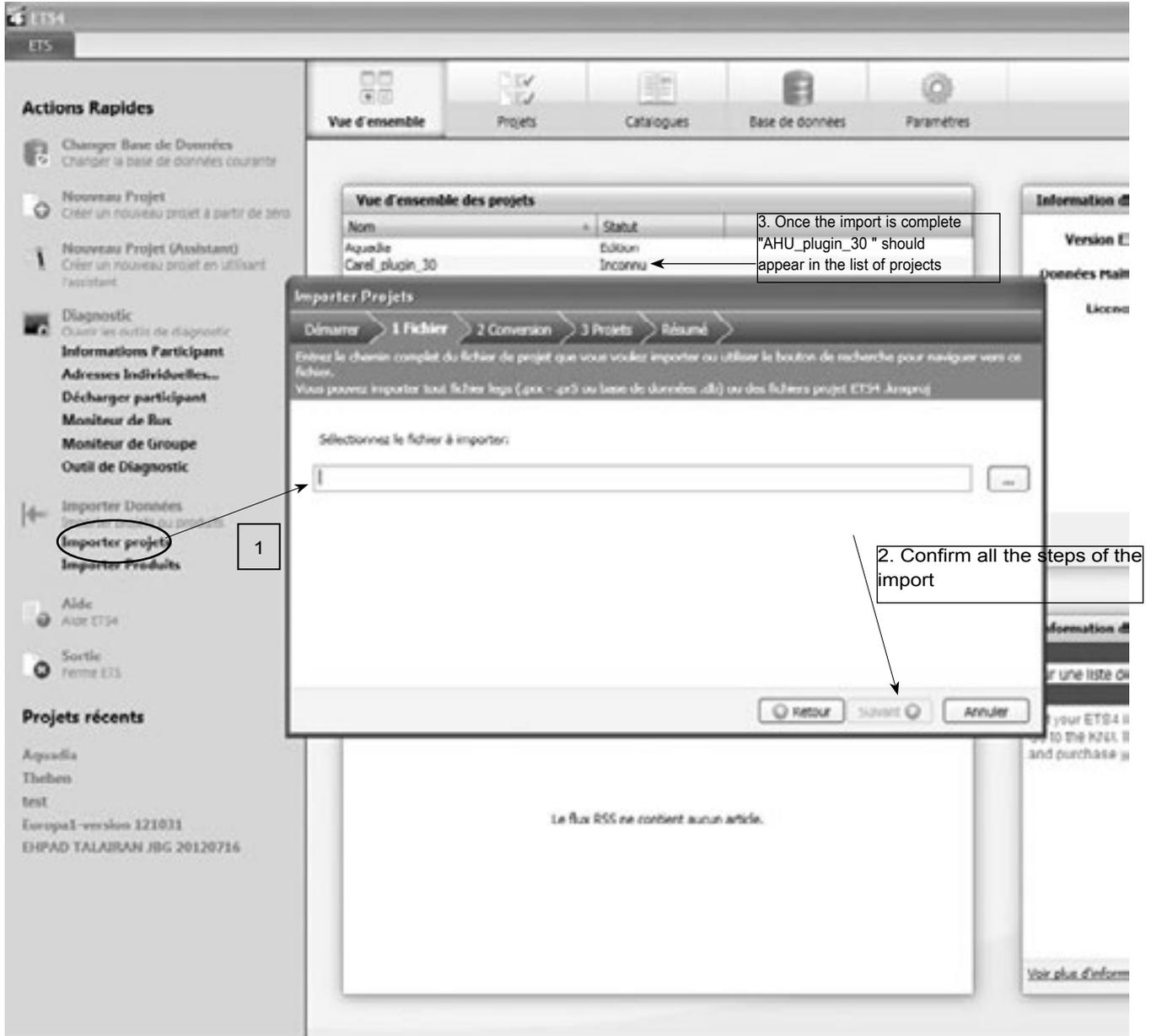
Open the project " AHU_plugin30"
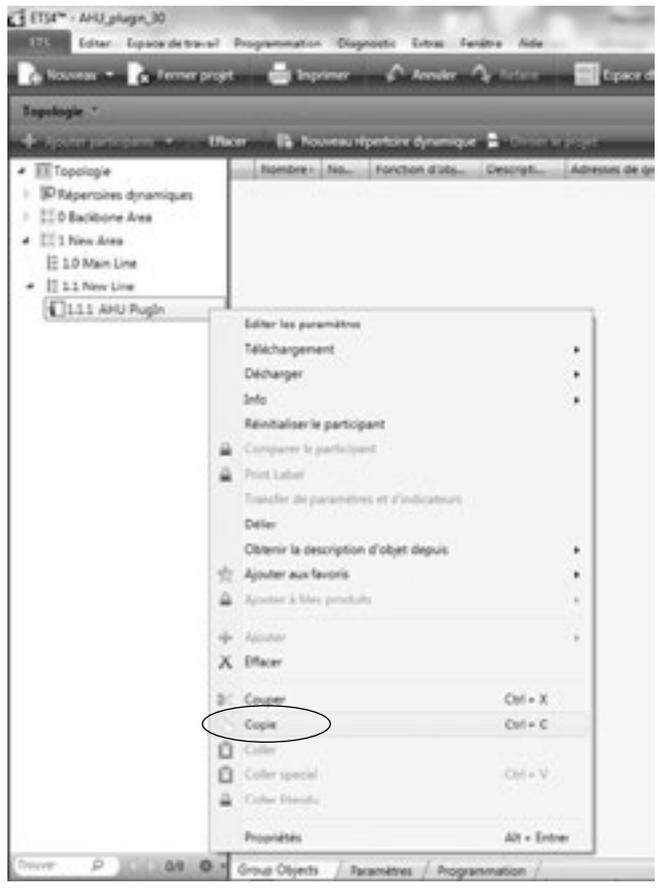
Open or create the final project for the system and right-click on the mouse to paste the CAREL plugin, once or more depending on the number of CAREL devices to be integrated. The address of each device is automatically incremented. If necessary, you can manually change the address of a device in Properties.

5.5.6.2 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 powered on
- 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.

5.5.6.3 Downloading the XML file

You must be sure that:
- the Bus wire network is drawn out and connected
- the Bus is powered on
- the CAREL card is connected to the KNX network
- the controller is powered on

First, open the xml file using the KSet software: set all the desired group addresses then save the xml file.
Close Kset.

On ETS4, use the mouse to select the controller which needs to be configured, select the "parameters" tab and click "open the dialogue box for parameters specific to the product"

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 ETS4 will signal an error. In this case, simply repeat the download.

NB: This procedure is specific to the CAREL card, and is the sole configuration operation permitted by the ETS4 program, in addition to allocating the address.

6 TABLE OF ALARMS

* All possible options are covered by this table

Fault	Sources	Causes	Solutions
Room or return air temperature too high	Ambient or return air temperature sensor B4	- Malfunction - Sensor disconnected - Room overheated	- Replace sensor - Reconnect sensor - Revise room loads
Room or return air temperature too low		- Malfunction - Sensor short-circuit	- Replace sensor - Check sensor
Supply air temperature too high	Supply air temperature sensor B5	- Malfunction - Sensor disconnected	- Replace sensor - Reconnect sensor
Supply air temperature too low		- Malfunction - Sensor short-circuit	- Replace sensor - Check sensor
Supply air flow rate	Supply air flow rate pressure sensor 0-1000 Pa B3	- Belt faulty - Filter not installed - Malfunction - Sensor disconnected - Fan	- Change belt - Install filter - Replace sensor - Reconnect sensor - See fan fault
Filter 1 blocked		- Filter too dirty	- Replace filter
Filter 1 dirty		- Filter fouled	- Clean or replace filter
Return air flow rate	Return air flow rate pressure sensor 0-1000 Pa B6	- Belt faulty - Filter not installed - Malfunction - Sensor disconnected - Fan	- Change belt - Install filter - Replace sensor - Reconnect sensor - See fan fault
Filter 2 blocked		- Filter too dirty	- Replace filter
Filter 2 dirty		- Filter fouled	- Clean or replace filter
Filter 3 blocked	Additional filter 3 fouling level pressure sensor 0-1000 Pa B7	- Filter too dirty	- Replace filter
Filter 3 dirty		- Filter fouled	- Clean or replace filter
Room or return air humidity too high	Return or ambient air humidity sensor B8	- Malfunction - Sensor disconnected - Excessively high humidity	- Replace sensor - Reconnect sensor - Revise room loads
Room or return air humidity too low		- Malfunction - Sensor short-circuit - Humidifier faulty - Room load too low	- Replace sensor - Reconnect sensor - Check humidifier - Revise room loads
Humidifier	Water Cylinder ID14	- Cylinder dirty - Water insufficiently conductive	- Change cylinder - Add a handful of salt
Heat pump module	Heat pump module control ID4	- Heat pump module fault	- See causes
Supply air motor	Supply air fan power and control circuit ID3	- Embedded thermistor faulty - Circuit breaker (QV1) - Current too high - Contactor coil (KV1)	- See causes - Reset or replace - Monitor starting current - Replace coil or contactor
Frost protection	Frost protection thermostat ID4	- Thermostat faulty	- See causes
Damper faulty	Damper limit switch ID5	- Closing problem	- See causes
Electric heater overheat	Electric heater safety thermostat ID7	- Thermostat faulty	- See causes

Fault	Sources	Causes	Solutions
Return air motor	**Return air fan power and control circuit** **ID9**	- Embedded thermistor faulty - Circuit breaker (QV2) - Current too high - Contactor coil (KV2)	- See causes - Reset or replace - Monitor starting current - Replace coil or contactor
Burner	**Ignition transformer** **ID11**	- Ignition failure	- See causes
Overheating of the combustion chamber	**Overheating thermostat** **ID12**	- Air temperature, downstream of the combustion chamber, too high - Thermostat faulty	- See causes
Variable speed rotary heat recovery unit	**Variable speed rotary recovery module control** **ID13**	- Variable speed rotary recovery module fault	- See causes
Heat recovery unit fouled	**Heat exchanger fouling pressure sensor** **0-1000 Pa** **B8**	- Fouling level greater than the setpoint	- Clean the heat exchanger

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