NA 09.61 N

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FLOWAY Control

Control manual

CIAT

CONTENTS

EN

Supervision and control

1.1 The program

This 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 which can be edited at any time:

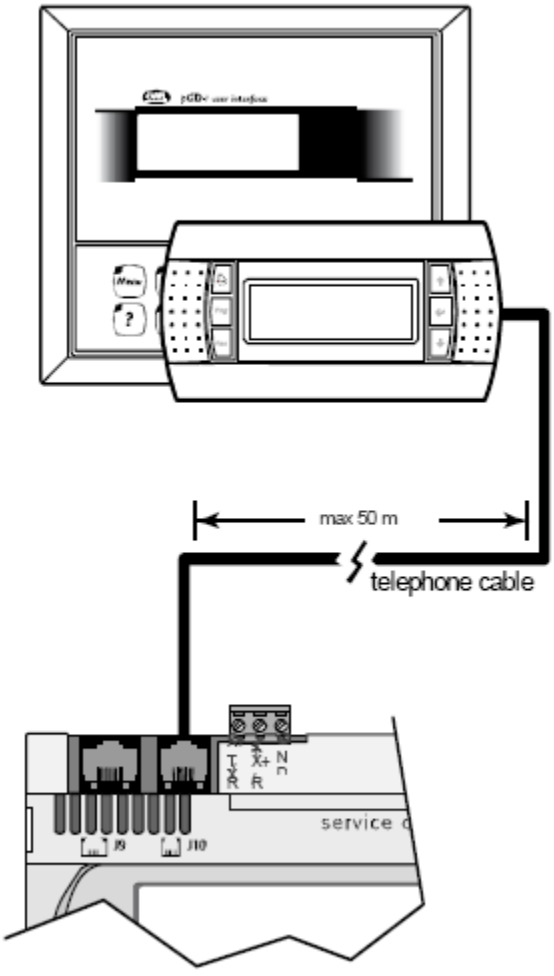
- Values of connected sensors
- Unit on/off cycles
- Calibration of the sensors
- Detection of alarms and log of the last 100 alarms
- Password-protected configuration and operating parameters
- Device running times and time delays
- Management of time programs (4 daily, 4 weekly and 4 yearly programs)
- Language selected (French, English, German, Italian, Spanish, Dutch)

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

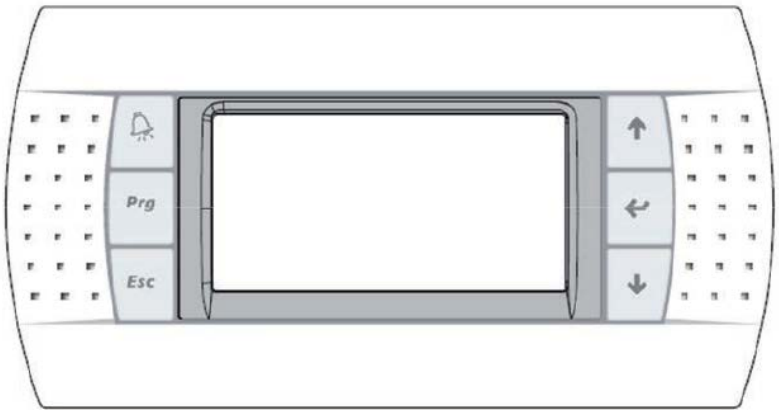
IMPORTANT: To avoid any problems, the password must be known only by qualified personnel.

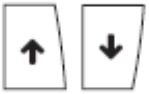
1.2 The HMI terminal

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



1.2.1 Using the HMI terminal keys



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

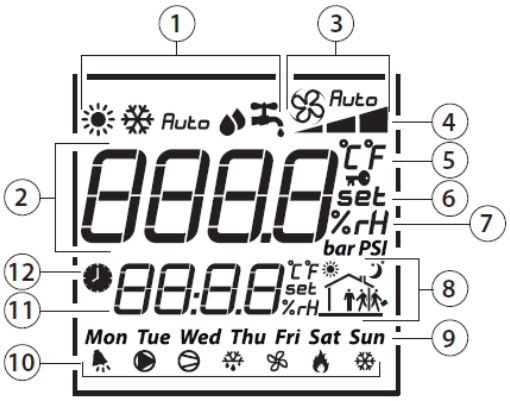
1.3 The room terminal (Option)

The terminal supplied is equipped with a digital display, 4 buttons and a rotary encoder.
Once installed in the premises, the device can measure the ambient temperature and enables remote control of the air handling unit.

1.3.1 Controls

1. Button not used
2. Press and hold (2 s) to access the clock setting menu.
3. Button to switch on the unit and modify the ventilation speed.
4. Button to switch off the unit.
5. Encoder:
   - Press: confirms the new setpoint value
   - Turn: browse between menus and modify the setpoint

1.3.2 Displays



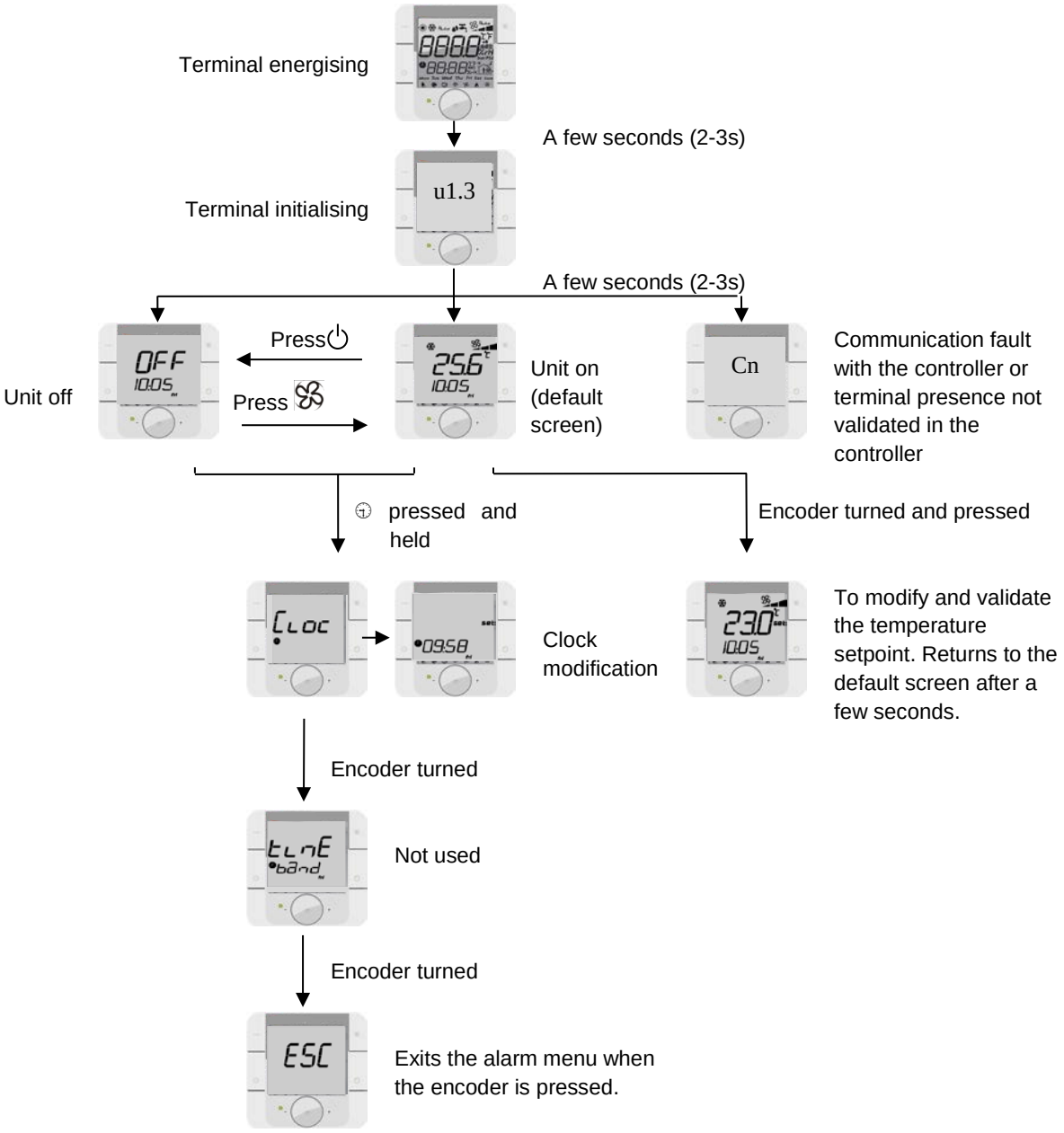
1. Unit operating mode
2. Main display area
3. Ventilation operating mode
4. Ventilation operating speed
5. Temperature unit
6. Indicates whether the value displayed in the main area is a setpoint
7. Indicates whether the value displayed in the main area is a humidity
8. Area not used
9. Day of the week
10. Operating icons
11. Secondary display area
12. Run time range mode

Details:

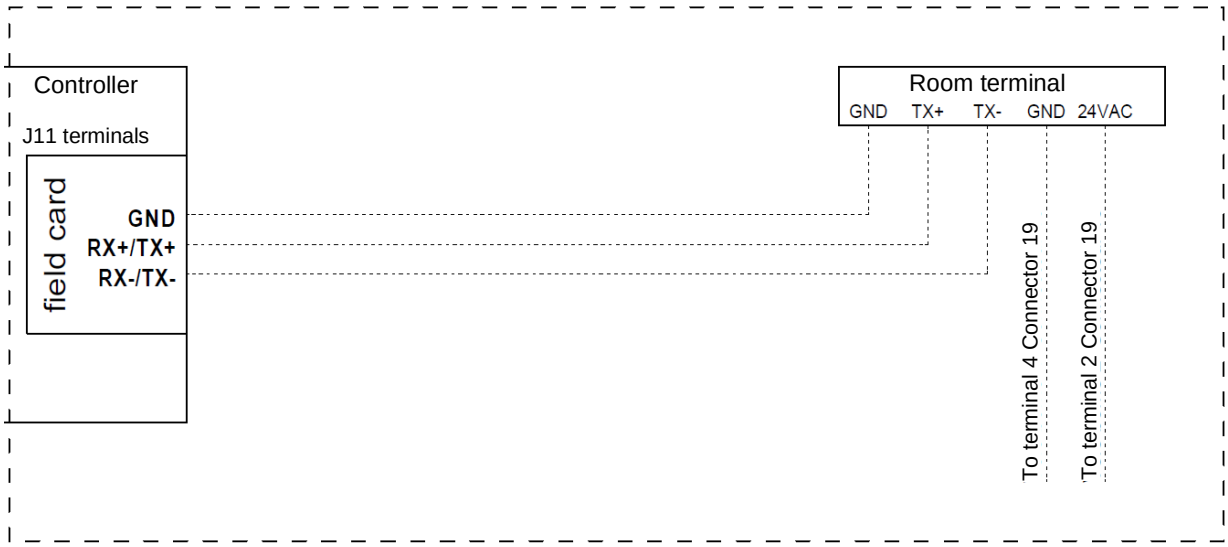
1. Unit operating mode
   - : Unit in heating mode
   - : Unit in cooling mode
2. Main display area
   - Displays "OFF" when the unit is switched off manually via the room terminal
   - Displays the ambient temperature
   - Displays the temperature setpoint when the encoder is turned
   - Displays the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

1.3.3 Room terminal information, settings and browsing

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



1.3.4 Electrical connections

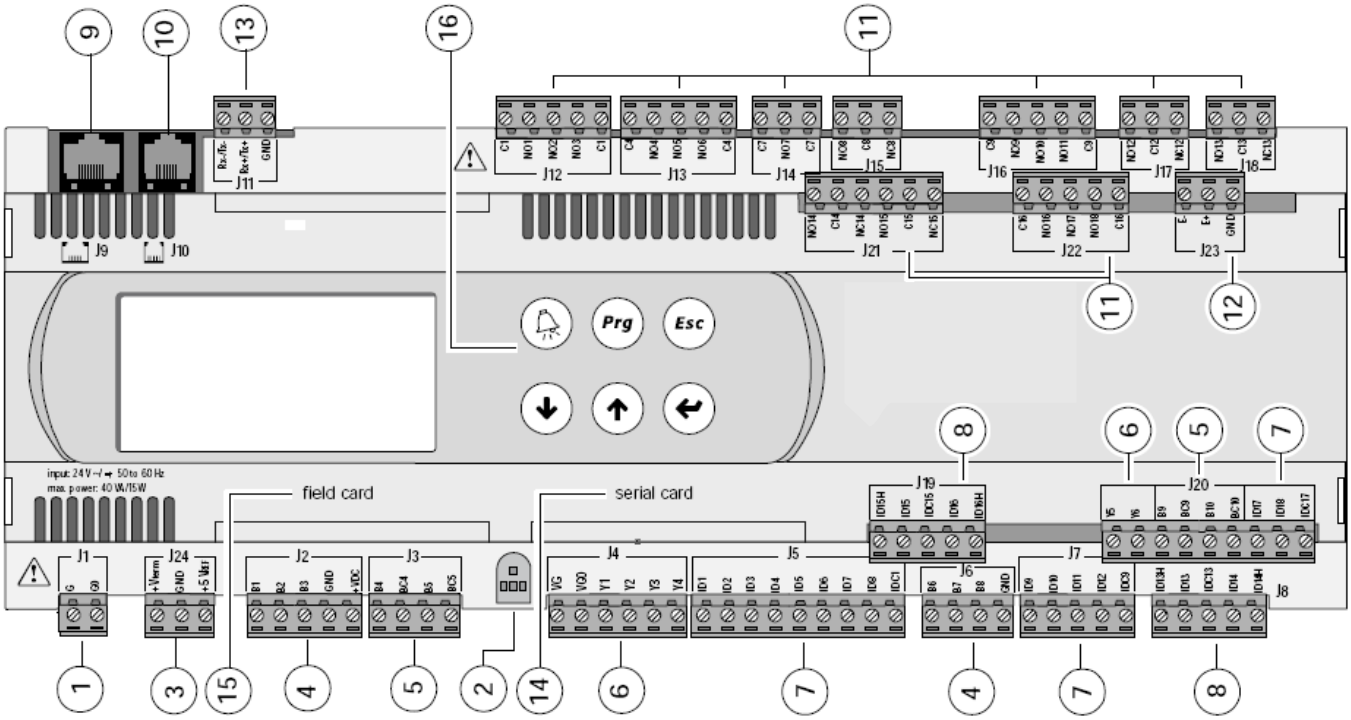


The room terminal and the controller are electrically connected using an **AWG20/22** shielded cable (not supplied) comprising two twisted pairs.
The first and last controller must be no more than **500m** apart. This network must never run parallel to power cables at a distance of less than **50 cm**. These cables may cross, but perpendicularly. You are requested not to form a loop with the network cable or the earth braid, and to properly separate the various cable families (control, power, earth and communication bus).

In case of transmission problems, it is vital to connect a 120Ω ¼W electrical resistor between terminals TX+ and TX- of the room terminal, as indicated in the manual supplied with the room terminal.

1.4 The controller

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



1. 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. NTC, 0-5V, 0-10V universal analogue inputs

5. NTC passive analogue inputs
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/graphical terminal/room terminal network connector
14. housing cover for RS485 serial card, Modbus, LON, KNX
15. cover for inserting the fieldbus card
16. Built-in terminal (LCD, buttons and LED) **(not available)**

1.5 Description of the air handling units

Each air handling unit performs the following functions:
- Air filtration
- Ventilation
- Heating or cooling of air supplied to the room by means of a mixed water coil (hot or cold)
- Control, monitoring, reporting and regulation of its components.

1.6 Temperature regulation functional analysis

By increasing the regulated temperature, the controller will calculate the exact cooling requirement.
If possible it will authorise Free Cooling and then gradually adjust the rotation speed of the heat exchanger wheel (for Classic model only, and if conditions permit), followed by the "Cold" or "Mixed" No.1 water coil valve in cooling mode (authorised by the Changeover thermostat), and then the "Cold" No.2 water coil valve; and it may adjust the fan speeds.
When the temperature drops, the controller will calculate the heat requirement needed to keep this temperature constant.
It will gradually adjust the rotation speed of the heat exchanger wheel (for Classic model only, and if conditions permit), followed by the "Hot" or "Mixed" No.1 water coil valve in heating mode (authorised by the Changeover thermostat), then the "Hot" No.2 water coil valve, and then the electric heater stage(s); and it may adjust the fan speeds.

When managing at constant pressure, if opening the duct dampers is insufficient, operation of the electric heaters is prohibited in order to prevent the heating elements from overheating. The authorised flow rate for the electric heaters is half the nominal flow rate.

1.7 Management of fire faults

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 wired to the fan 0-10V controls to shut them off immediately.

The other faults are described in the alarms table.

1.8 Managing night cooling

Several conditions must be met to activate night cooling:
1- Time range OR override via CMS.
2- Cooling requirement: The return air temperature must be above the cool night temperature setpoint (screen w7).
3- The free-cooling difference (screen p17) must be sufficient: Treturn air – Tfresh air = 3°C (factory value).
4- The outdoor temperature must be above the "temperature low limit" (screen p17).

The night cooling setpoint is always based on the return air (regardless of the control mode).
For supply air temperature control, this is deactivated during night cooling periods.

Periodic restarts: If one of the night cooling activation conditions is not verified (outdoor temperature, free-cooling difference, or cool night setpoint), the air handling unit switches to standby mode.
The fans will be restarted at the night cooling flow rate for 5 minutes each hour, and night cooling will be reactivated if all the conditions are met.

1.9 Free cooling management

Several conditions must be met to activate free cooling:
1- Cooling requirement: The controlled temperature (return air or ambient) must be greater than the setpoint temperature
2- The free-cooling difference (screen p17) must be sufficient: Treturn air – Tfresh air = 3°C (factory value).
3- The outdoor temperature must be above the "temperature low limit" (screen p17).

During operation with a constant supply air temperature, free cooling is inactive as the heating coils are still in use (except on the deadband).

When operating in free cooling mode, the supply air temperature is not controlled. It is important to configure an outdoor temperature low limit (screen p17) which is sufficiently high to ensure no discomfort is caused.

1.10 Control unit for rotary heat exchanger

The control unit is a frequency transformer equipped with additional functions that are needed to ensure optimum operation of a rotary heat exchanger.
Its number of revolutions and degree of efficiency are set by the controller so that the number of turns of the rotor is proportional to the 0-10 V input signal.

1.10.1 Functions built into the control unit

Purging The heat exchanger turns at the min. number of revolutions for 10 sec. every 30 minutes if the input signal is below the threshold value, i.e. the rotor is stopped. The function can be deactivated.
See the DIP transformer setting.

Rotation monitor The rotation monitor (a magnet mounted on the rotor with a magnetic transmitter) switches off the transformer and emits an alarm in case of a broken belt or similar incident. The control unit is activated unless a pulse is received every 5 minutes. The function can be deactivated.
See the DIP transformer setting.

Threshold value The control unit has a threshold value set to 0.1 V.
The rotor stops if the input signal is less than this value.

Reset Via the reset button or in case of power loss.

Restart Automatic start-up after power loss.

Controller inputs and outputs

This description concerns Classic and Classic RHE units.
For Vertical or Ceiling-Mounted units, the descriptions are in Italics.

Connector J1

G 24Vac
G0 Shared

Connector J2

B1 Pressure sensor B1 for return air *(supply)* filter fouling level

The pressure sensor monitors the level of blockage in the filter. If the filter is clogged, the unit is shut off and the corresponding faults are displayed and the LED lights up. If the filter is dirty, the corresponding fault is displayed and the LED lights up, but the unit is not shut off.

B2 Flow rate sensor B2 for return air *(supply)* fan

The return air fan flow rate sensor compensates for filter fouling and ensures a constant fan flow based on the setpoint.
A difference of up to 10% is possible between the flow rate indicated by the controller and the actual unit flow rate. It is due to the accuracy limit of the sensor and to the air handling unit's system effect.

B3 Flow rate sensor B3 for supply air *(return)* fan

The supply air fan flow rate sensor compensates for filter fouling and ensures a constant fan flow based on the setpoint.
A difference of up to 10% is possible between the flow rate indicated by the controller and the actual unit flow rate. It is due to the accuracy limit of the sensor and to the air handling unit's system effect.

GND Shared
+VDC Power supply for enabled sensors

Connector J3

B4 Supply air temperature sensor B4

The temperature of the air supplied to the room can be regulated based on the setpoint (if selected) 20 seconds after the fans are turned on.

BC4 Common for B4

B5 Fresh air *(return air)* temperature sensor B5

The fresh air temperature sensor protects the heat exchanger from the risk of frost by adjusting the stages of the electric pre-heater (depending on unit configuration), adjusting the bypass for the plate heat exchanger and indicating the fault (+ LED).

BC5 Common for B5

EN

Connector J4

VG 24Vac

VG0 Shared

Y1 Coil 1 valve control (hot water, cold water or triac)

Y2 Rotary heat exchanger wheel speed control

Y3 Supply air fan speed control

Y4 Return air fan speed control

Connector J5

ID1 Fire sensor

If a fire fault is detected, the unit is shut off and the fault is signalled (+ LED)

ID2 Supply air fan monitoring

Feedback from the supply air fan alarms is used to monitor the overload protection system on the motor's electronic commutator. If this feedback is not received, the unit is shut off and the corresponding fault is signalled (+ LED)

ID3 Return air fan monitoring

Feedback from the return air fan alarms is used to monitor the overload protection system on the motor's electronic commutator. If this feedback is not received, the unit is shut off and the corresponding fault is signalled (+ LED)

ID4 Monitoring of electric pre-heater overheating thermostats

In case of a problem on the electric pre-heater, the electric heater is shut off and the fault is signalled (+ LED)

ID5 Monitoring of electric heater overheating thermostats

In case of a problem on the electric heater, the electric heater is shut off and the fault is signalled (+ LED)

ID6 Changeover thermostat

Depending on the state of the thermostat (O = Cooling; C = Heating), the valve on the mixed water coil is adjusted based on the temperature of the water in the supply circuit and the regulation request.

ID7 Rotary heat exchanger monitoring

If a fault occurs on the rotary heat exchanger, it is shut off and the fault is signalled (+ LED)

ID8 Electric heater load shedding contact

When this contact is activated, the electric heaters cannot be started.

IDC1 Shared

Connector J6

B6 Heat exchanger fouling pressure or return air duct pressure sensor B6

The pressure sensor monitors the level of blockage in the heat exchanger. If the heat exchanger is dirty, the corresponding fault is displayed and the LED lights up, but the unit is not shut off.
The return air duct pressure sensor ensures a constant pressure in the duct based on the setpoint. This function is incompatible with the heat recovery unit fouling pressure.

B7 Air quality sensor or intake duct pressure sensor

The air quality sensor is used to monitor the CO2 gas content (measurement range 0 to 2000 ppm) of the air in the room being monitored and to adjust the speed of the fans in order to draw in more fresh air.
The intake duct pressure sensor ensures a constant pressure in the duct based on the

setpoint. This function is incompatible with air quality regulation.

B8 Pressure sensor B8 for supply air *(return)* filter fouling level

The pressure sensor monitors the level of blockage in the filter. If the filter is clogged, the unit is shut off and the corresponding faults are displayed and the LED lights up. If the filter is dirty, the corresponding fault is displayed and the LED lights up, but the unit is not shut off.

GND Shared

Connector J7

ID9 Remote control or Presence detection

*Enables the unit to be remotely controlled or switched off if it is in **On** mode on the main screen.*
If a presence is detected, the air handling unit will automatically switch to Comfort flow rate or to nominal Intake pressure. If this air handling unit was in Standby, it will also be restarted.

ID10 Humidifier monitoring

In case of a problem on the humidifier, the fault is signalled (+ LED)

ID11 Pump 1 monitoring

Monitors either the protection line or the flow presence via a flow-switch on the coil 1 pump, if requested. Conversely, if this feedback is not received, this fault is signalled (+ LED)

ID12 Pump 2 monitoring

Monitors either the protection line or the flow presence via a flow-switch on the coil 2 pump if requested. Conversely, if this feedback is not received, this fault is signalled (+ LED)

IDC9 Shared

Connector J8

ID13 ----------
IDC13 Shared
ID14 ----------

Connector J12

C1 Shared
NO1 "Danger" fault relay

The fault summary output contact opens when a "Danger" fault occurs and causes the unit to shut off.

NO2 "Maintenance" fault relay

The fault summary output contact opens when a "Maintenance" fault occurs.

NO3 Control of damper (frost protection or insulation)
C1 Shared

Connector J13

C4 Shared
NO4 External generator control (boiler or heat pump module)
NO5 Control 1 for the electric heaters
NO6 Control 2 for the electric heaters, on/off stage control.
C4 Shared

Connector J14

C7 Shared
NO7 Power inverter operation authorisation (if Y1>0 then NO7=1, otherwise NO7=0).
C7 Shared

Connector J15

NO8 Humidifier operation authorisation
C8 Shared
NC8 ----------

Connector J16

C9 Shared
NO9 Mixing damper 3-point servomotor opening
NO10 Mixing damper 3-point servomotor closing
NO11 ----------
C10 Shared

Connector J17

NO12 Coil 1 pump control
C12 Shared
NC12 ----------

Connector J18

NO13 Coil 2 pump control
C13 Shared
NC13 ----------

Connector J19

ID15 ----------
ID16 ----------

Connector J20

Y5 Coil 2 valve control (hot water, cold water or Pre-heating triac)
Y6 ----------
B9 Return air *(fresh air)* temperature sensor

The temperature of the air extracted from the room can be regulated based on the setpoint (if selected) 20 seconds after the fans are turned on.

BC9 Shared
B10 Supply air remote temperature sensor

This sensor is used if a heating coil is used in the intake duct after the air handling unit. The temperature of the air drawn into the room will be regulated based on the setpoint (if selected), 20 seconds after the fans are turned on.

BC10 Shared
ID17 ----------
ID18 ----------
IDC17 Shared

Connector J21

NO14 ----------
C14 Shared
NC14 ----------
NO15 ----------
C15 Shared
NC15 ----------

Connector J22

C16 Shared
NO16 Plate heat exchanger bypass damper 3-point servomotor opening
NO17 Plate heat exchanger bypass damper 3-point servomotor closing
NO18 ----------
C16 Shared

Connector J24

+5 Vterm Outdoor terminal power supply
GND Shared

+5 Vref Power supply for enabled sensors

1.10.2 Other

Connector J9 Not used

Connector J10
6-channel connection for a standard user HMI

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

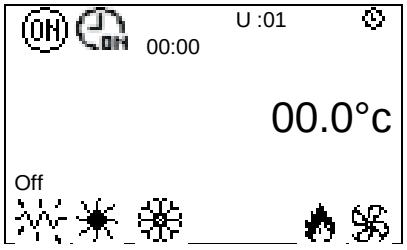
1.10.3 Reversal depending on the unit type

Unit type	CLASSIC RHE	CLASSIC	VERTICAL	CEILING UNIT
Supply air temp. sensor	J3-B4	J3-B4	J3-B4	J3-B5
Return air temp. sensor	J20-B9	J3-B5	J3-B5	J3-B4
Fresh air temp. sensor	J3-B5	J20-B9	J20-B9	J20-B9
Qv supply air pressure sensor	J2-B3	J2-B3	J2-B2	J2-B2
Qv return air pressure sensor	J2-B2	J2-B2	J2-B3	J2-B3
Return air filter fouling pressure sensor	J2-B1	J6-B8	J6-B8	J6-B8
Supply air filter fouling pressure sensor	J6-B8	J2-B1	J2-B1	J2-B1

2 Overview of the screens

2.1 Menu or Esc button

"**Prg**" button



U:00 Indicates the unit's address

Indicates the request to switch the machine on or off

Indicates the presence of an hourly or annual time schedule and the request status

00.0°C Indicates the regulated temperature (ambient, return or supply air)

00:00 Time

Off Indicates the status of the unit: Off, Damper open, On, On after power failure, Standby, Switched off by fault, Switched off by CMS, Post-ventilation, Manual Mode

Indicates "Pre-heating" operating mode

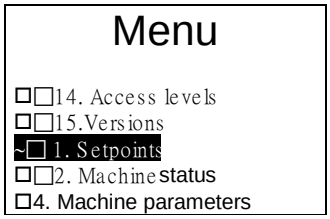
Indicates "Heating" operating mode

Indicates the "Cooling" operating mode

Indicates Fire alarm

Indicates fan operation

"**Prg**" button



EN

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

- 1. Setpoints
- 2. Machine status
- 4. Machine parameters
- 5. Adjustment parameters
- 6. Reading parameters
- 7. Fault memory
- 8. Test mode
- 9. Time schedule
- 11. Communication
- 13. Alarms
- 14. Access levels
- 15. Versions

2.1.1 Access level selection menu

There are now three access levels:

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

2.2 Setpoint menu

Comfort	w0	Indication of the operating mode. *Level 2 access*
Fan flow rate		
Supply air	01000m3/h	Comfort (or maximum) flow regulation setpoint for the supply air fan
Return air	01000m3/h	Comfort (or maximum) flow regulation setpoint for the return air fan
Eco		
Supply air	00500m3/h	Supply air fan Eco flow regulation setpoint
Return air	00500m3/h	Return air fan Eco flow regulation setpoint

Comfort	w1	Indication of the operating mode. *Level 2 access*
Duct pressure		
Comfort supply air	100 Pa	Comfort pressure regulation setpoint for the Supply air duct
Eco supply air	050 Pa	Eco pressure regulation setpoint for the Supply air duct
Comfort return air	100 Pa	Comfort pressure control setpoint for the return air duct
Eco return air	050 Pa	Eco pressure control setpoint for the return air duct

Comfort	w2	Indication of the operating mode for T° regulation in "Precision" mode *Level 1 access*
Return air	20.0°c	Comfort (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)
Eco	15.0°c	Eco (Return or Ambient) temperature control setpoint monitored (0 to 50.0°C)

Supply air		
Upper limit	26.0°c	Upper limit for calculated Supply air T° setpoint
Lower limit	16.0°c	Lower limit for calculated Supply air T° setpoint

2.2.1 Supply air T° setpoint calculation in "Precision" mode

Fig.4

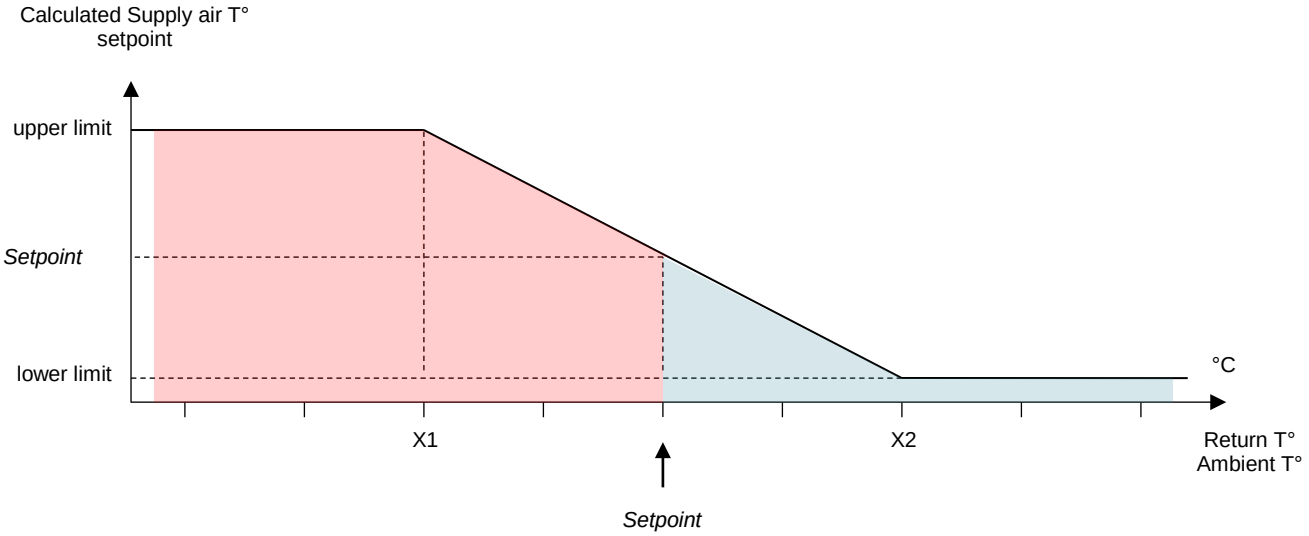
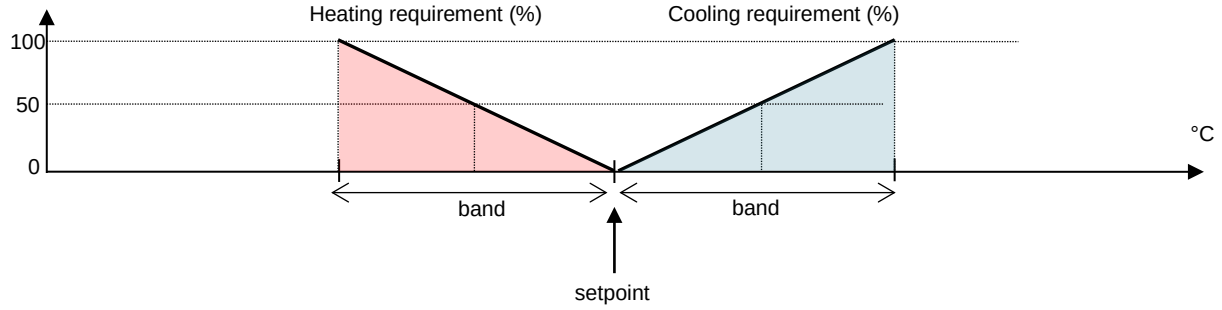


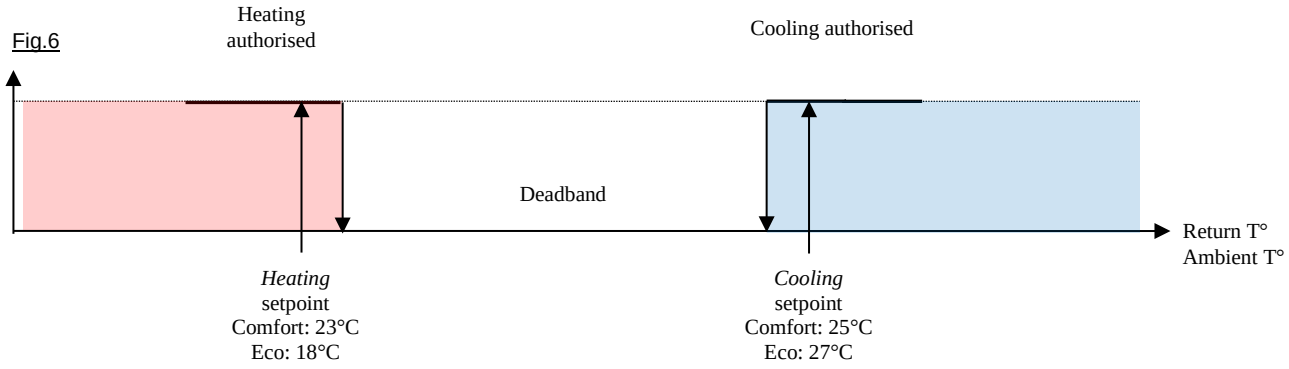
Fig.5



2.2.2 Supply air T° setpoint calculation in "Energy optimisation" mode

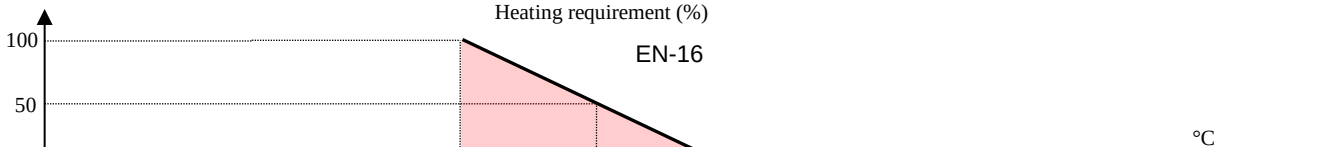
Return air or room temp. control

Fig.6



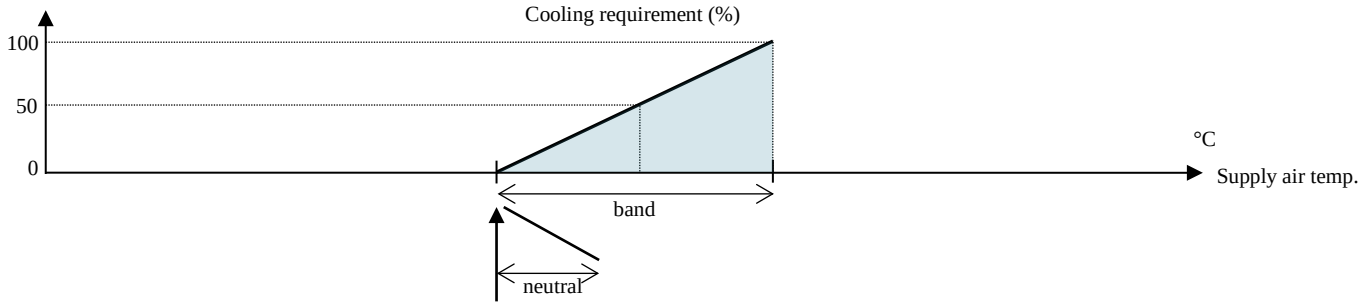
Heating:

Fig.7



Cooling:

Fig.8



Cooling supply air setpoint
Comfort: 16°C
Eco: 18°C

	w3
Air quality	
	0800ppm
Maximum flow rate	
	1000m3/h

Level 2 access

Air quality regulation setpoint

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

Comfort		w4
Return air	Cooling	25.0°c
	Eco	27.0°c
Return air	Heating	23.0°c
	Eco	18.0°c
Deadband		

Indication of the operating mode for T° regulation in "Energy optimisation" mode *Level 1 access*
Comfort Cooling (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)
Cooling Eco (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)

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

Indication of the control state for the monitored temperature

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

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

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

w6	
Pre-heating temperature	2.0°c
Morning heating	23.0°c
Frost protection	17.0°c
Antifreeze prot. temp	2.0°c

Level 2 access
Electric pre-heater stages starting-up temperature in the duct (-5 to 50.0°C)
Control setpoint in mode "Morning heating" mode (0 to 50.0°C)
Unit reactivation setpoint in "Standby" mode (0 to 50.0°C)
Coil antifreeze protection temperature setpoint (0 to 50.0°C)

w7	
Cool night	17.0°c
Supply air	02000m3/h
Return air	02000m3/h

Level 2 access
Control setpoint in mode "Night cooling" mode (0 to 50.0°C)
Supply air fan flow regulation setpoint for night cooling
Return air fan flow regulation setpoint for night cooling

w11	
HEX bypass	-04.0°C
Plates limit	-20.0°C
Wheel limit	-25.0°c

Level 3 access
Heat exchanger frost risk detection temperature setpoint (-10.0 to 50.0°C)
Operating limit temperature for the plate heat exchanger (bypass open) (-20.0 to 50.0°C)
Wheel heat exchanger operating limit temperature setpoint (-40.0 à 50.0°C)

w12	
Min. th-Thune setpoint	15.0°c
Max. th-Thune setpoint	30.0°c

Min. temperature setpoint value regulated via the room terminal.
Max. temperature setpoint value regulated via the room terminal.

2.3 Machine parameters menu

This menu is Level 3 access

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

Level 2 access This screen is used to configure the criticality of the faults managed by the regulating controller. If a fault is shown as "Danger" the unit will be shut off. If the fault is shown as "Maintenance", only an alarm message will be given.
Criticality of faults 1 to 9
Criticality of faults 10 to 19
Criticality of faults 20 to 29

List of faults:

Code	Description	Significance
A01	Supply air motor	Danger
A02	Supply air filter dirty	Maintenance
A03	Supply air filter clogged	Danger
A04	Sensor B1	Maintenance
A05	Return air filter dirty	Maintenance
A06	Return air filter clogged	Danger
A07	Frost on heat exchanger - Fresh air temperature check	Danger
A08	Heat recovery unit frosted – Clogging detection	Danger
A09	Return air motor	Danger
A10	Humidifier	Maintenance
A11	Rotary heat exchanger check	Maintenance
A12	Sensor B2	Maintenance
A13	Sensor B3	Maintenance

A14	Sensor B4	Maintenance
A15	Sensor B5	Maintenance
A16	Sensor B6	Maintenance
A17	Air quality sensor	Maintenance
A18	Sensor B8	Maintenance
A19	Sensor B9	Maintenance
A20	Clock lithium battery	Maintenance
A21	Internal hydraulic coil frost	Danger
A22	Hydraulic coil in duct frost	Danger
A23	Electric pre-heater	Maintenance
A24	Electric heater	Maintenance
A25	Hydraulic coil 1 pump	Maintenance
A26	Hydraulic coil 2 pump	Maintenance
A27	Supply air duct pressure sensor	Danger
A28	Return air duct pressure sensor	Danger

Configuration	c0
Type	

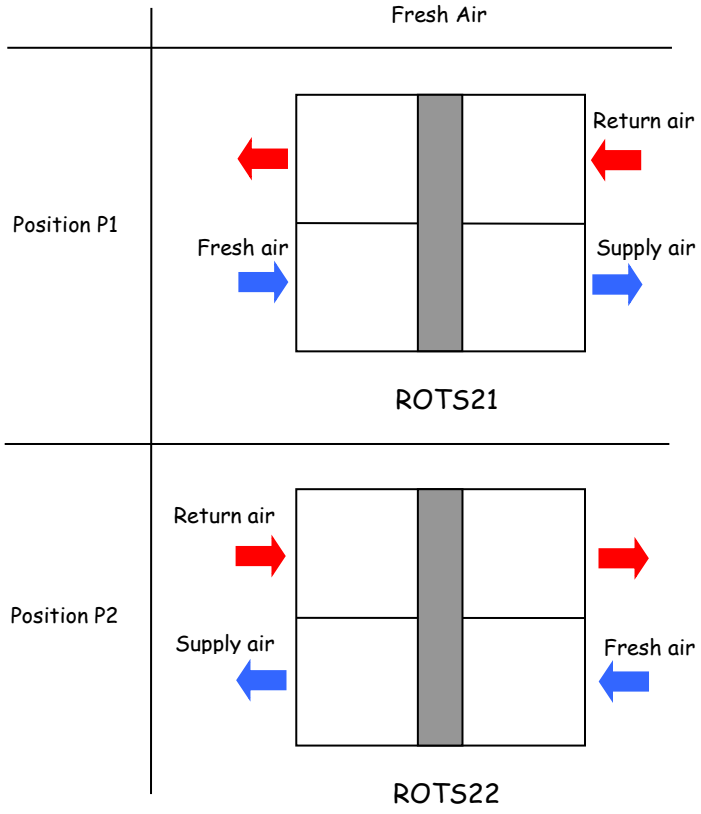
Orientation	----

Level 3 access

Type:
Classic 1000. (plate heat exchanger)
Classic 2000 (plate heat exchanger)
Classic 3000 (plate heat exchanger)
Classic 4000 (plate heat exchanger)
Classic 5000 (plate heat exchanger)
Classic 6000 (plate heat exchanger)
Classic 1000 RHE (rotary heat exchanger)
Classic 1500 RHE (rotary heat exchanger)
Classic 2000 RHE (rotary heat exchanger)
Classic 2500 RHE (rotary heat exchanger)
Classic 3000 RHE (rotary heat exchanger)
Classic 4000 RHE (rotary heat exchanger)
Classic 5000 RHE (rotary heat exchanger)
Classic 6000 RHE (rotary heat exchanger)
Classic 7500 RHE (rotary heat exchanger)
Classic 10000 RHE (rotary heat exchanger)
Classic 15000 RHE (rotary heat exchanger)
Ceiling-mounted 700
Ceiling-mounted 1200
Ceiling-mounted 1600
Vertical 700
Vertical 1000
Vertical 1500
Vertical 2000

Orientation (for Classic RHE type only): *ROTS21 or ROTS22*

Classic RHE model orientations (frontal view, doors open)



Configuration	c1

Level 3 access

Supp. air filter coef.	--
Return air filter coef.	--

Supp. air filter coef.: *Supply air filter coefficient as per selection table*
Return air filter coef.: *Supply air filter coefficient as per selection table*

Selection table:

EN

Single filtration

Model	Size	M5HEE			F7HEE			F9HEE		
		min. fouling level threshold	max. fouling level threshold	Filter coef.	min. fouling level threshold	max. fouling level threshold	Filter coef.	min. fouling level threshold	max. fouling level threshold	Filter coef.
Vertical	700	10	200	30	20	300	44	30	300	74
	1500	15	200	18	20	300	27	30	300	45
	2000	15	200	17	20	300	24	30	300	40
Ceiling unit	700	15	200	24	25	300	38	30	300	64
	1200	15	200	15	25	300	25	30	300	42
	1600	15	200	13	30	300	21	30	300	36
Classic (RHE + Plates)	1000	10	200	24	20	300	37	30	300	61
	2000	15	200	15	25	300	22	30	300	38
	3000	15	200	10	25	300	15	30	300	25
	4000	15	200	6	25	300	9	30	300	15
	5000	15	200	6	25	300	9	30	300	15
	6000	15	200	4	25	300	6	30	300	10
	7500	15	200	4	25	300	6	30	300	10
	10000	15	200	5	25	300	6	30	300	10
	15000	15	200	5	25	300	6	30	300	10

Double filtration

Model	Size	M5HEE + F7HEE			M5HEE + F9 HEE			F7HEE + F9 HEE		
		min. fouling level threshold	max. fouling level threshold	Filter coef.	min. fouling level threshold	max. fouling level threshold	Filter coef.	min. fouling level threshold	max. fouling level threshold	Filter coef.
Vertical	700	30	500	74	40	500	104	50	600	118
	1500	35	500	45	45	500	63	50	600	72
	2000	35	500	41	45	500	57	50	600	64
Ceiling unit	700	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1600	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Classic (RHE + Plates)	1000	30	500	61	40	500	85	50	600	98
	2000	40	500	37	45	500	53	55	600	60
	3000	40	500	25	45	500	35	55	600	40
	4000	40	500	15	45	500	21	55	600	24
	5000	40	500	15	45	500	21	55	600	24
	6000	40	500	10	45	500	14	55	600	16
	7500	40	500	10	45	500	14	55	600	16
	10000	40	500	11	45	500	15	55	600	16
	15000	40	500	11	45	500	15	55	600	16

Configuration c2	*Level 3 access*

Coil 1
-
Coil 2
-
Electric heater
-

Coil 1:
- *Without:* No coil
- *Cold in duct*: Cold water coil installed in Supply air duct
- *Hot in duct*: Hot water coil installed in Supply air duct
- *Internal cold*: Cold water coil built into air handling unit
- *Internal hot*: Hot water coil built into air handling unit
- *Internal mixed*: Cold or hot water coil (with Changeover thermostat) built into the air handling unit
- *Mixed in duct*: Cold or hot water coil (with Changeover thermostat) installed in the Supply air duct
- *Internal triac*: Electric heater with triac built into the air handling unit
- *Triac in duct*: Electric heater with triac installed in the Supply air duct
- *Internal triac + on/off control*: Electric heater with triac built into the air handling unit
- *Triac + on/off control in duct*: Electric heater with triac installed in the Supply air duct

Coil 2:
- *Without*: No coil
- *Cold in duct*: Cold water coil installed in Supply air duct
- *Hot in duct*: Hot water coil installed in Supply air duct
- *Pre-heating Triac*: Electric heater with triac installed in the Fresh Air duct
- *Internal cold*: Cold water coil built into air handling unit
- *Internal hot*: Hot water coil built into air handling unit
- *Internal mixed*: Cold or hot water coil (with Changeover thermostat) built into the air handling unit

Electric heater:
- *Without*: No electric heaters
- *Pre-heat1*: 1-stage electric pre-heater
- *Pre-heat2*: 2-stage electric pre-heater
- *Pre-heat 1 + Heat.1I*: 1-stage electric pre-heater + 1-stage electric heater built into air handling unit
- *Pre-heat 1 + Heat.1Du*: 1-stage electric pre-heater + 1-stage electric heater installed in the Supply air duct
- *Pre-heat1 + Heat.1In*: 1-stage electric heater built into air handling unit
- *Heat.2In*: 2-stage electric heater built into air handling unit
- *Heat.1Du* : 1-stage electric heater installed in the Supply air duct
- *Heat.2Du*: 2-stage electric heater installed in the Supply air duct
- *Pre-heat1n*: 1-stage integrated electric pre-heater
- *Pre-heat1In + Heat1In:* 1-stage integrated electric pre-heater + 1-stage electric heater built into air handling unit
- *Pre-heat1In + Heat1Du:* 1-stage integrated electric pre-heater + 1-stage electric heater installed in the duct

If an electric heater and a hydraulic coil are selected, the hydraulic coil will always be run first.

Configuration	c3
HEX frost check.	

Damper	----
Mixing	----
Distance order	----

Level 3 access

HEX frost check:
- *Without*: No check
- *Temperature*: Fresh air temperature monitoring
- *Fouling:* Monitoring of the upstream/downstream pressure differential in the heat exchanger, fouling control is not available if the AHU is operating with constant pressure on both flows (parameter P3).

Damper: *Without, With*
Mixing: *Without, With*
Distance order: *Without, With*

Configuration	c4

Level 3 access

IR detector ----
th-Tune ----
Control priority
--

Level 2 access

IR detector: *Without, With*
th-Tune: *Without, With*
Control priority: *Precision or Energy optimisation mode* ***(Only available if Regulated T° (P4) = Ambient or Return air. If Regulated T° = Supply air, Control priority is forced to Precision)***

EN

Configuration c5

Humidifier ----

Level 3 access

Humidifier: *Without, With*

Configuration c6

Air supply fan
K = -----

Return air fan
K = -----

Level 3 access

Supply air fan: K coefficient values for the Supply air fan
Return air fan: K coefficient values for the Return air fan

Configuration c7

External generator

Coil 1 pump ----
Coil 2 pump ----

Level 3 access

External generator:
- *None*
- *Boiler*
- *Heat pump (F = Heating)*
- *Heat pump (F = Cooling)*

Humidifier: *Without, With*
Coil 1 pump: *Without, With*
Coil 2 pump: *Without, With*

2.4 Adjustment parameters menu

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

Level 1 access

Controller language selection (French, English, German, Spanish, Italian, Dutch)

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

Level 1 access

Clock time correction value
Clock date correction value

Supply air	p1
CLG band	0005.0
Cooling DB	00.0
T I 0150s	T D 0000s
HTG band	0005.0
Heating DB	00.0
T I 0150s	T D 0000s

Level 2 access
Proportional band for monitored temperature regulation in cooling mode
Deadband value for monitored temperature regulation in cooling mode
Integration time and derivative time for monitored temperature regulation in cooling mode

Proportional band for monitored temperature regulation in heating mode
Deadband value for monitored temperature regulation in heating mode
Integration time and derivative time for monitored temperature regulation in heating mode

Return air	p2
Differential	
Cooling	Heating
0.0	0.0

Level 2 access
Value for the Return or Ambient air T° control differentials in "Energy optimisation" mode
In cooling mode In heating mode

	p3
Fan management	

Duct P sensor	-----
Compensated Qv	----
Compensated T°	----
Free Cooling	----
Fire	----

Level 2 access

Fan management:

- *Qv csts, indep*: Constant flow rates and independent setpoints
- *Intake pressure*: Constant Supply air duct pressure and identical fan speeds
- *Intake+return air pressure:* Constant Supply air duct pressure + constant Return air duct pressure and independent fan speeds.
- *Qv csts, prop/intro*: Constant flow rates and Return air flow rate setpoint proportional (multiplied by M factor) to the Supply air flow rate setpoint
- *Qv csts, prop/extra*: Constant flow rates and Supply air flow rate setpoint proportional (multiplied by M factor) to the Return air flow rate setpoint
- *Qv/Tregul, prop*: Constant flow rates and independent setpoints, but based on the difference between the measurement and regulated temperature setpoint (as per Fig. 3, page 26)

When operating with constant pressure on both air flows, there is no balancing of the two flow rates. It is the set-up technician's responsibility to adjust the minimum opening settings for the duct dampers in order to ensure the statutory recirculation of air on site.

Duct P sensor:

- *0-10V*: Sensor physically wired to the controller
- *com*: Pressure value via the CMS

Compensated Qv: *Without, With* (Fan flow rate compensation as per Fig. 2, page 25)
Compensated T°: *Without, With* (Regulated temperature compensation as per Fig. 1, page 25)
Free Cooling: *Without, With*
Fire: *Without, With*

p4	
Regulated T°	----
Air quality	-----
M factor	01.0
Quality band	100
Wheel min.	000%

Level 2 access
Regulated T°: *Supply, Return or Ambient air (with th-Tune)*
Air quality: *None, 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
Minimum speed value of rotary heat exchanger wheel

p5	
Shutdown valve 1 open	000%
Shutdown valve 2 open	000%

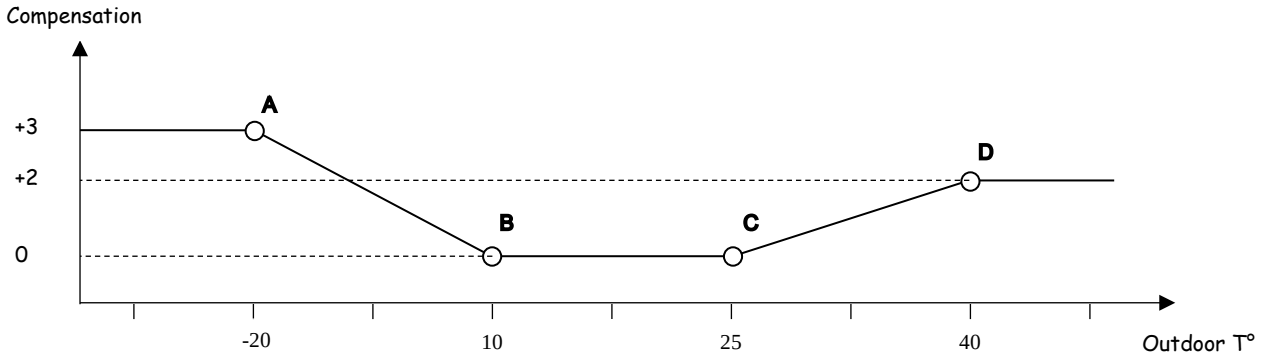
Level 2 access
Opening value for the valve for hydraulic coil 1 when the supply air ventilation is stopped
Opening value for the valve for hydraulic coil 2 when the supply air ventilation is stopped

2.4.1 Regulated T° compensation based on the outdoor T°

p7			
3.0°c	A	-20.0°c
0.0°c	B	10.0°c
0.0°c	C	25.0°c
2.0°c	D	40.0°c

Level 2 access

Fig. 1

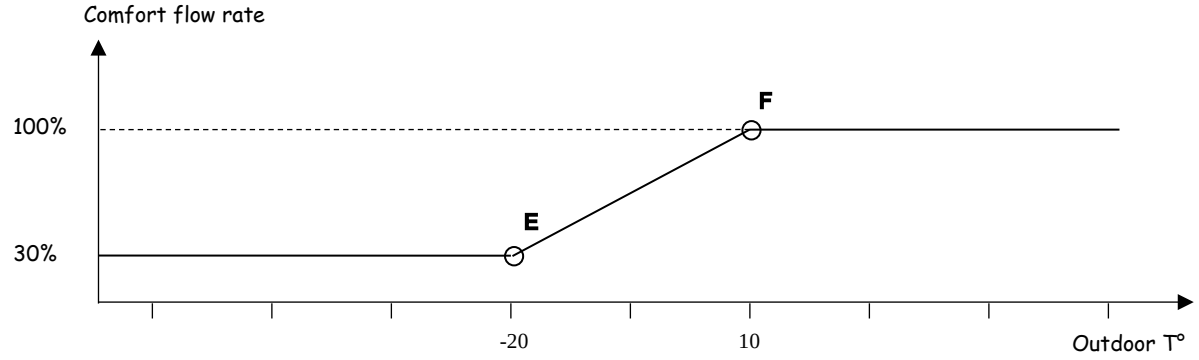


2.4.2 Fan flow rate compensation based on outdoor T°

p8	
030%	E -20.0°c
100%	F 10.0°c
030%	K -20.0°c
100%	L 10.0°c

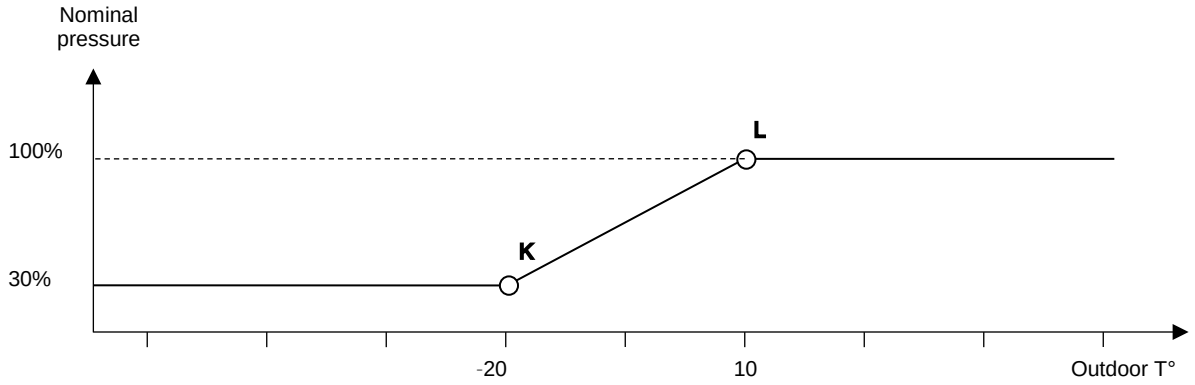
Level 2 access

Fig.2



2.4.3 Duct pressure compensation based on the outdoor T°

Fig. 2b

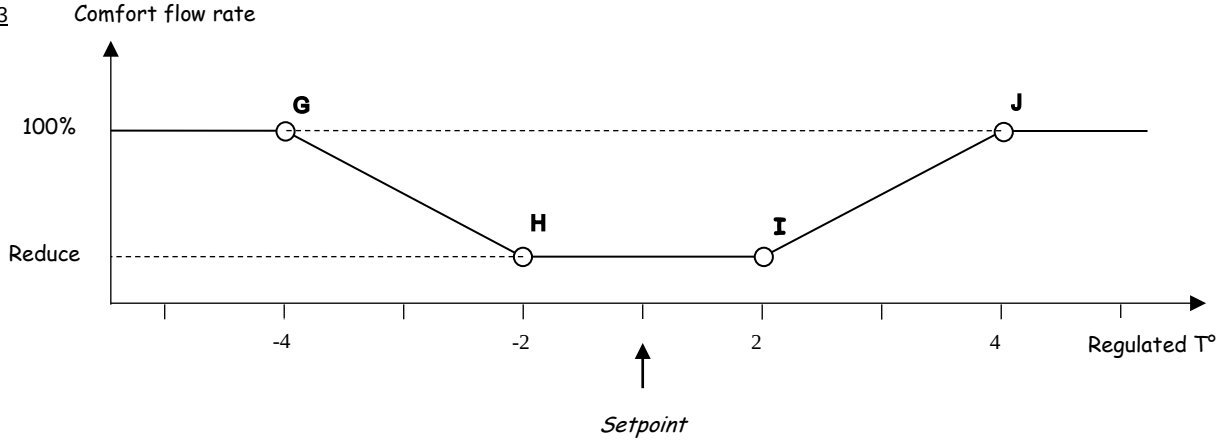


2.4.4 Fan flow rate compensation based on the regulated T°

p9	
	G -04.0°c
	H -02.0°c
	I 02.0°c
	J 04.0°c
Reduced	030%
	M 04.0°c
	N 06.0°c

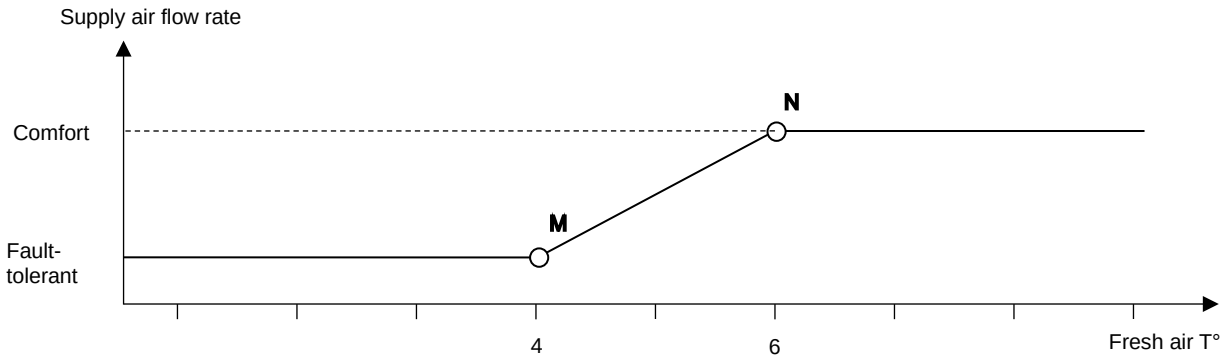
Level 2 access

Fig. 3



2.4.5 "Downgraded fresh air flow rate" function

Fig. 3.bis



p10
Mixing opening
in "Morning heating" mode
095%

Screen appears if the "Morning heating" function is used in a time program (*Level 2 access*)

Opening value of mixing damper in "Morning heating" mode

p11
Mixing opening
in "ECO Recirculation" mode
095%

Screen appears if the "ECO recirculation" function is used in a time program (*Level 2 access*)

Opening value of mixing damper in "ECO Recirculation" mode

Supply air	p14
Fan band 1400.0	
Fan IT	0008s
Start speed	0.0%
Return air	
Fan band 1400.0	
Fan IT	0008s
Start speed	0.0%

Level 3 access

Supply air fan flow control proportional band

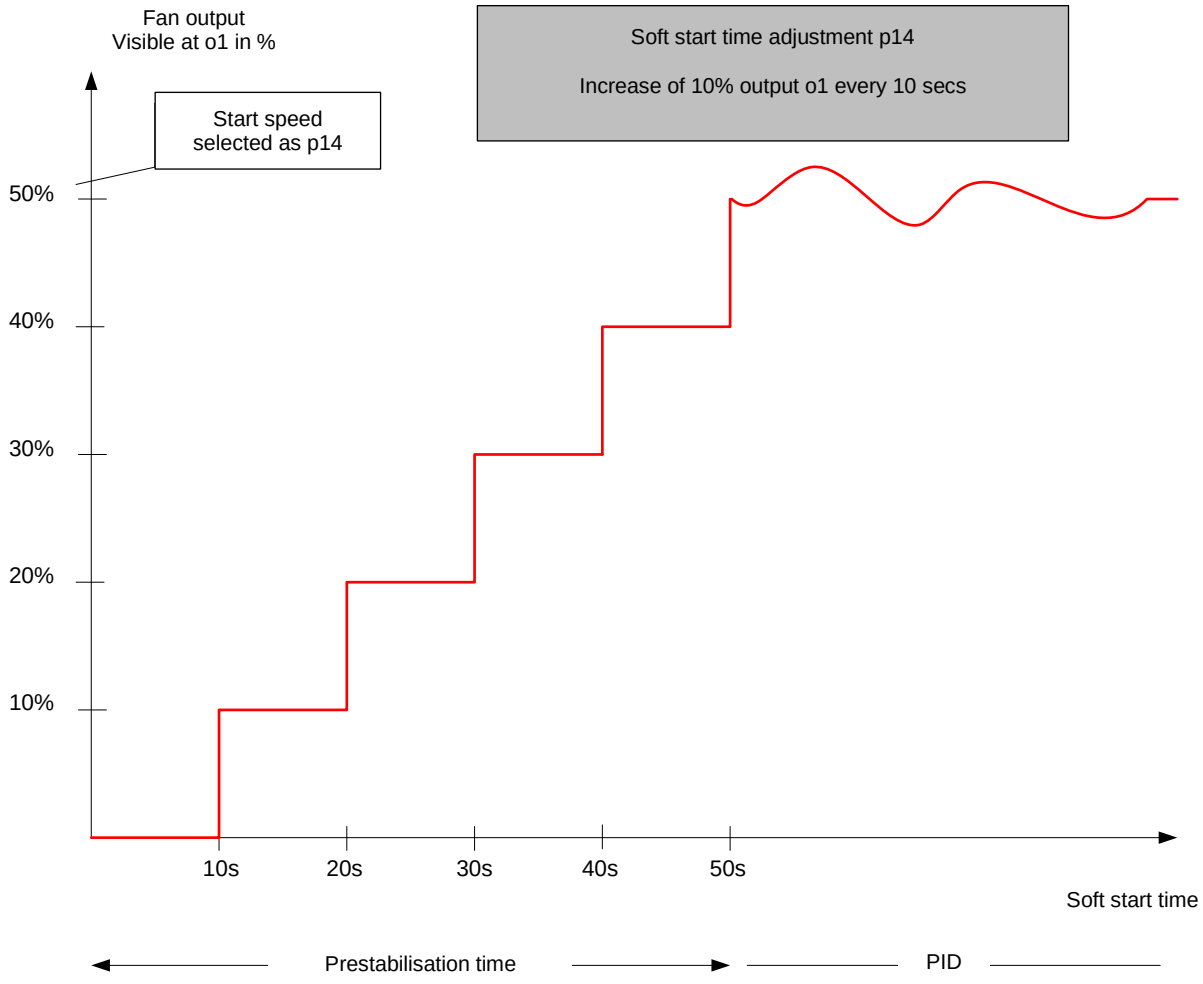
Supply air fan flow control integration time

Supply air fan speed at the end of the soft start

Return air fan flow control proportional band

Return air fan flow control integration time

Return air fan speed at the end of the soft start



In this example, start speed = 50%

Supply air	p15
Duct band	0595Pa
Duct IT	0004s
Duct DT	0001s
Return air	
Cst band press.	1200m3/h
Cst pressure IT	0010s
Cst pressure TD	0.0s

Level 3 access
Supply air duct pressure control proportional band
Supply air duct pressure control integration time
Supply air duct pressure control derivative time

Return air fan proportional band in duct pressure operation
Return air fan integration time in duct pressure operation
Return air fan derivative time in duct pressure operation

In constant pressure control, the return air fan is managed based on the measured supply air flow rate (screen i1) so as to extract as much air as is introduced into the Room or Building, the return air fan therefore takes the supply air fan air flow rate as the control setpoint.

A coefficient called the M factor is used to adapt the return air fan flow rate, to obtain $Q_{v\ supply\ air} > Q_{v\ return\ air}$, or to obtain $Q_{v\ supply\ air} < Q_{v\ return\ air}$

By default, the M factor has the value 1, therefore$Q_{v\ supply\ air} = Q_{v\ return\ air}$

$$M = \frac{Q_{v\ return\ air}}{Q_{v\ supply\ air}}$$

M factor setting range (screen p4): $0.5 \leq M \geq 1.5$.

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

Level 3 access
Supply air temperature setpoint calculation parameters (See Fig. 4, page 19)
X1 shift value for the formula for calculating the supply air temperature Comfort setpoint
X1 shift value for the formula for calculating the supply air temperature Eco setpoint
X2 shift value for the formula for calculating the supply air temperature Comfort setpoint
X2 shift value for the formula for calculating the supply air temperature Eco setpoint

p17	
FC offset	-3.0°c
Lower limit	15.0°c

Level 3 access

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

Outdoor temperature low limit in free cooling and night cooling mode

EN

p22	
Setpoint min. threshold Filter fouling level supply air	----Pa
Setpoint min. threshold Filter fouling level return air	---Pa

Level 3 access

Supply air filter fouling minimum threshold (0-100 Pa)

Return air filter fouling minimum threshold (0-100 Pa)

p25	
Compensated duct P	-
FA flow rate down	-

Level 2 access

Without, With (Pressure compensation as per Fig. 2b, page 26)

Without, With (Fresh air flow rate downgraded as per Fig. 3b, page 26)

Calibration	ca1
Return air	00.0°c
Supply air	00.0°c
Fresh air	00.0°c
Air quality	0000ppm
Duct	00.0°c

Level 3 access

Calibration of the return air or fresh air temperature sensor

Calibration of the supply air temperature sensor

Calibration of the fresh air or return air temperature sensor

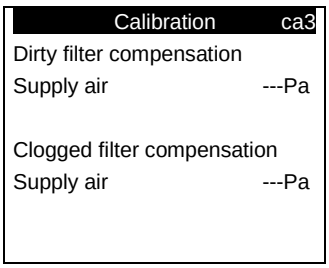
Calibration of air quality sensor

Calibration of the supply air duct remote temperature sensor

Calibration	ca1b
Pressure sensor calibration	NO

Access Level 3 →Press the prog button from screen ca1

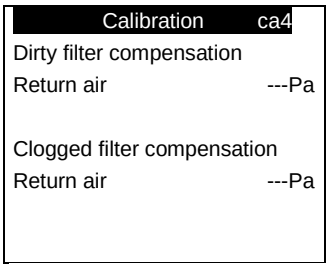
Manual calibration of pressure sensors. Warning: the fans must be completely stopped before using this function.



Level 3 access

Supply air filter dirty detection threshold compensation

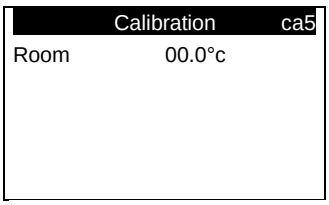
Supply air filter clogged detection threshold compensation



Level 2 access

Return air filter dirty detection threshold compensation

Return air filter clogged detection threshold compensation

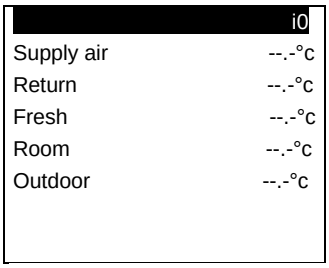


Level 3 access

Calibration of the room terminal temperature sensor

2.5 Read-only parameters menu

2.5.1 Inputs



Level 1 access

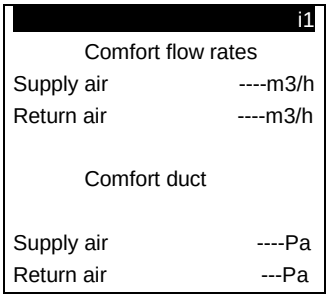
Supply air temperature value

Return air temperature value

Fresh air temperature value

Room air temperature value

Outdoor temperature value



Level 1 access

Indicates flow rate type displayed (Comfort, Eco or auto)

Supply air fan flow rate value

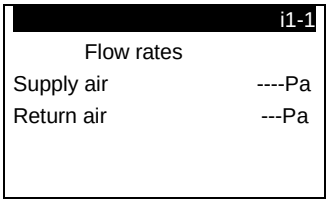
Return air fan flow rate value

Screen visible if Supply air duct pressure regulation selected

Indicates pressure type displayed (Comfort or Eco)

Supply air duct pressure value

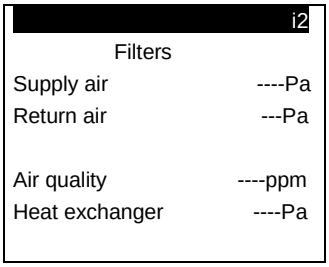
Return air duct pressure value



Level 3 access + ***Prg*** key

Supply air fan flow rate value in Pa

Return air fan flow rate value in Pa



Level 1 access

Supply air filter fouling value

Return air filter fouling value

Air quality value in ppm

Heat exchanger fouling value

Check	i3
Supply air fan	-
Return air fan	-
Fire	-
Rotary heat exchanger	-
Changeover	-----
Pre-heater	-
Elect. heater	-

Level 1 access
Supply air fan operation check state (C = on; O = off)
Return air fan operation check state (C = on; O = off)
Fire detection sensor check state (F = no fire; O = fire detected)
Rotary heat exchanger operation check state (F = on; O = fault)
Changeover thermostat state (Cooling or Heating)
State of electric pre-heater (F = on without fault, O = off or faulty)
State of electric heater heating (F = on without fault, O = off or faulty)

Check	i4
Pump 1	-
Pump 2	-
Humidifier	-
Elec. heater load shedding	
Remote control	-

Level 1 access
Hydraulic coil 1 pump operation check state (F = on, O = off)
Hydraulic coil 2 pump operation check state (F = on, O = off)
Humidifier operation check state (F = on without fault, O = de-energised or faulty)
Electric heater load shedding monitoring state (C=No electric heater start-up, O=Electric heater start-up possible)
Remote control status (C = on; O = off) or "Presence detection"
(C = presence, O = no presence)

2.5.2 Outputs

	o1
Supply air fan	---%
Return air fan	---%
Coil 1 Cooling	---%
Coil 2 Heating	---%
Wheel speed	---%

Level 1 access
Supply air fan control value
Return air fan 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

	o2
Heat exchanger bypass	---%
Control	-

Level 1 access
Screen visible for "Ceiling-Mounted" or "Vertical" units
Heat exchanger bypass damper opening valve
Heat exchanger bypass control state (⇧ = open; ⇩ = closed)

	o3
Faults	
Danger	-
Maintenance	-

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

	o4
Damper	---
Elec. heater 1	---
Elec. heater 2	---

Level 1 access
Unit insulation damper control state
State of electric heaters control 1
State of electric heaters control 2

o5	
Pump 1	---
Pump 2	---
Boiler or heat pump	---
Humidifier	---

Level 1 access
State of hydraulic coil 1 pump control
State of hydraulic coil 2 pump control
State of heat pump or boiler control (Heating or Cooling mode)
Humidifier operation authorisation state

o6	
Mixing damper	
	---%
Control	-

Screen visible for "Classic" units (*Level 1 Access*)

Mixing damper opening value
Mixing damper control state (= opened; = closed)

2.5.3 Setpoints

wc1	
	--.-°C
Calculated heat exchanger frost detector	
	----Pa

Level 1 access

Calculated regulation setpoint for the supply air temperature

Calculated setpoint for heat exchanger frost detection via return air pressure drop measurement

wc2	
Supply air	
Filter dirty	---Pa
Clogged filter	---Pa
Return air	
Filter dirty	---Pa
Clogged filter	---Pa

Level 1 access

Calculated setpoint for detection of the supply air "Filter dirty" level
Calculated setpoint for detection of the return air "Filter dirty" level

Calculated setpoint for detection of the supply air "Filter clogged" level
Calculated setpoint for detection of the return air "Filter clogged" level

2.5.4 Counters

Counters	tt1
Supply air fan	
----.-h	Reset -

Level 3 access

Supply air fan runtime counter reset and time

Counters	tt2
Return air fan	
----.-h	Reset -

Level 3 access

Return air fan runtime counter reset and time

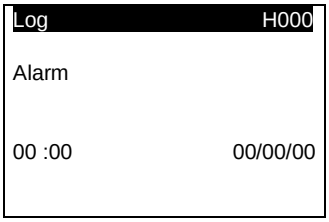
Counters	tt3
Electric heater 1	
----.-h	Reset -
Electric heater 2	
----.-h	Reset -

Level 3 access

Electric heaters output 1 runtime counter time and reset

Electric heaters output 2 runtime counter time and reset

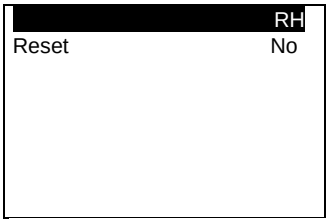
2.6 Fault memory menu



Level 1 access

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

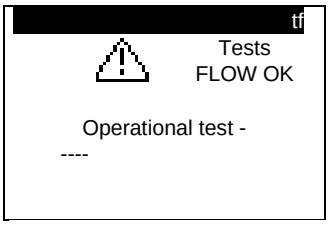
"**Prg**" button



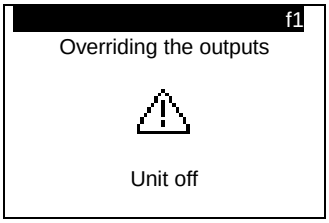
Level 3 access

Reset Reset the alarm log

2.7 Test mode menu



Level 3 access



Level 3 access

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

WARNING!

ACTIVATION OF ALL OVERRIDES IS THE PROGRAMMER'S RESPONSIBILITY

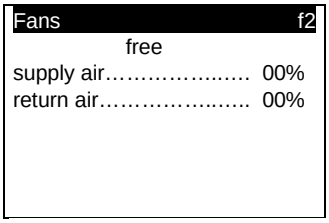
NONE OF THE SAFETY DEVICES IS OPERATIONAL

The unit must be set to "OFF".

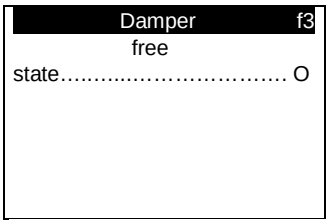
Select the unit to be changed by pressing the ↑ button or the ↓ button. Confirm by pressing **ENTER**.

The cursor places itself below the override authorisation (**free** or **overridden**). Confirm by pressing **ENTER**.
The cursor places itself under the override value. Display the new value by pressing the ↑ button or the ↓ button. Confirm by pressing **ENTER**.
The unit is now in "manual mode".
When overriding the electric heater, make sure that the air flow rate is at least half the nominal flow rate. **FIRE RISK**

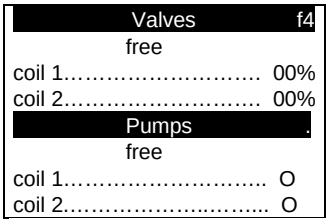
The overrides are cancelled when the unit is set back to "on"



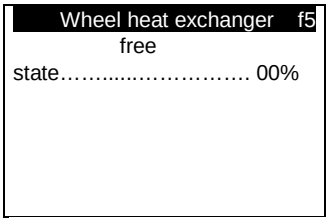
Level 3 access



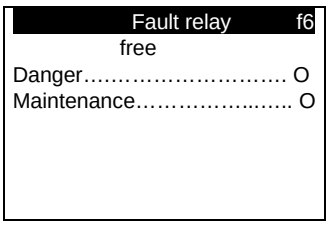
Level 3 access



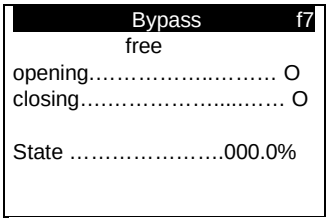
Level 3 access



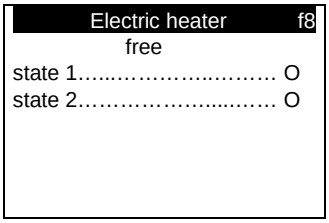
Level 3 access



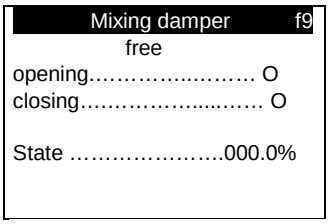
Level 3 access



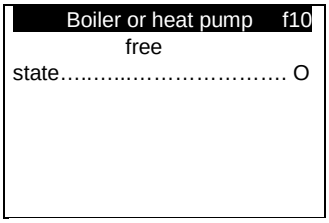
Level 3 access



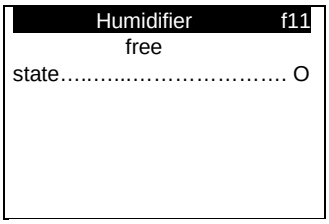
Level 3 access



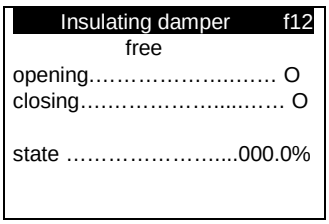
Level 3 access



Level 3 access



Level 3 access

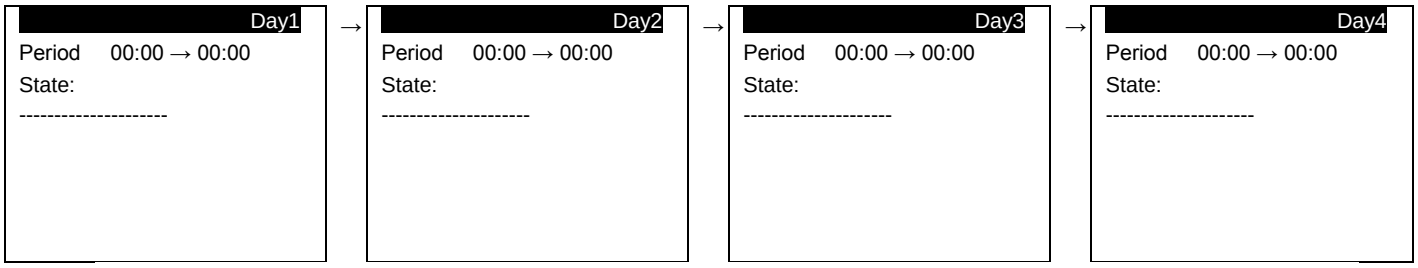


Level 3 access

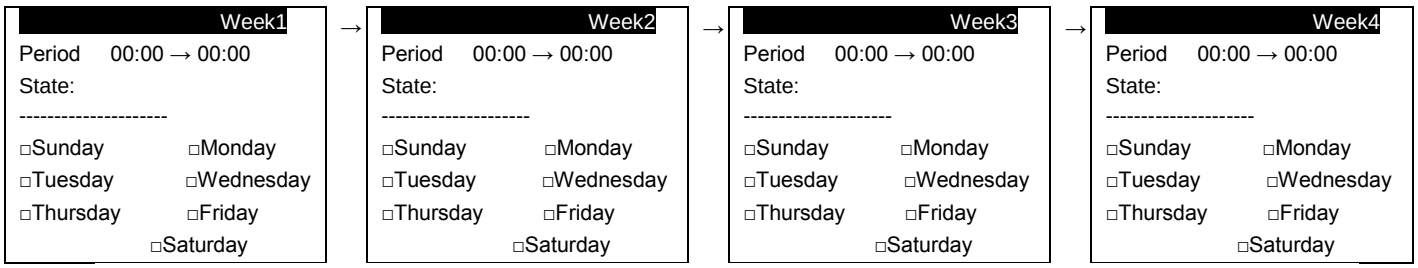
EN

2.8 Time prog menu

Level 1 access

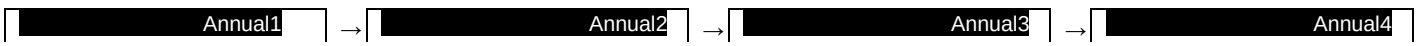


Period 00:00 → 00:00 Start and end times (hour and minute) of daily time program period
State: Selection of the state during this period: ------
Eco T°
Comfort T°
Eco flow rate
Comfort flow rate
Eco pressure
Comfort pressure
Standby
ECO Recirculation
Morning heating
Cool night



Period 00:00 → 00:00 Start and end times (hour and minute) of weekly time program period
State: Selection of the state during this period: ------
Eco T°
Comfort T°
Eco flow rate
Comfort flow rate
Eco pressure
Comfort pressure
Standby
ECO Recirculation
Morning heating
Cool night

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



Period 00:00 → 00:00 State: ---------- Date 00/00/2000	Period 00:00 → 00:00 State: ---------- Date 00/00/2000	Period 00:00 → 00:00 State: ---------- Date 00/00/2000	Period 00:00 → 00:00 State: ---------- Date 00/00/2000

Period 00:00 → 00:00 Start and end times (hour and minute) of annual time program period
State: Selection of the state during this period: ------
Eco T°
Comfort T°
Eco flow rate
Comfort flow rate
Eco pressure
Comfort pressure
Standby
ECO Recirculation
Morning heating
Cool night

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

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

pt1	
Battery reset	N
Damper	180s
Supply air fan delay	90s
Fan delay	030s
Bypass min.	600s
Mixing damper	150s
Bypass damper	150s

Reset the Lithium battery replacement indicator
Value of complete damper opening time
Supply air fan start-up time delay value
Post ventilation time
Minimum opening time for plate heat exchanger bypass
Total opening time for mixing damper servomotor
Total opening time for heat exchanger bypass damper servomotor

pt2	
Summer/Winter:	ACTIVE
Transit. time	060min
Start:LAST	SUNDAY
in MARCH	at 02.00
End:LAST	SUNDAY
in OCTOBER	at 03.00

Daylight Saving Time and Standard Time switchover management activated

2.9 Communication menu

SUPERVISION g1		
Protocol	----------	
Speed	-----	bds
Address		---
Parity		---
Stop bits		---
Unit control	----	
Table version 3		NO

Level 1 access
Choice of the communication protocol with the CMS (LON, MODBUS RTU, KNX, WEB, MODBUS TCP, BACNET IP)
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®)
Parity: *None, odd, even*
Number of stop bits: *1 or 2*
Selection of the On/Off control via the CMS
Option to use the addresses from the register (Modbus + Bacnet Ip) for the V3.x software versions if the CMS has been created using these, see COM table N09.61D manual (switch off the power to take these into account).

pLAN NETWORK pL1

Level 1 access

pCO3 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 **alarm** button (or on the remote terminal) 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:

PROGRAM pr1

No alarms!

Level 1 access

2.11 Access level menu

Access levels

Current level: 1

Displays the current level

Access level 1 ->
Level 2 access
Level 3 access

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

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

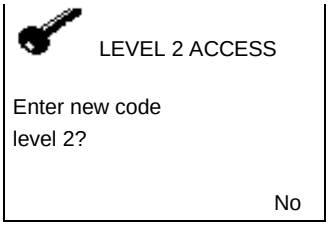
LEVEL 2 ACCESS

Password: 0000

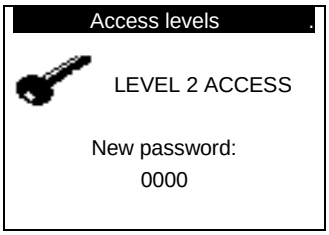
Re-enter the installer password

Access levels

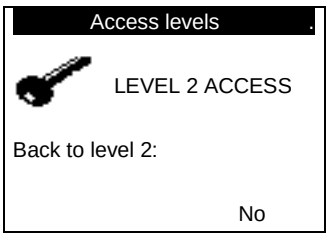
If password ok



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

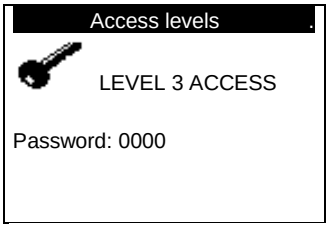


Re-enter the new installer password



If access level 2 selected and access level = 3

If yes back to access level 2

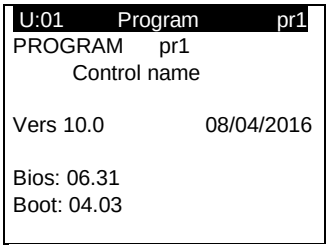


If access level 2 selected and access level = 1

Re-enter the manufacturer password

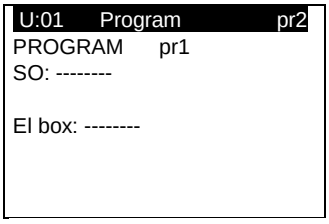
The level 2 password can be reset to the factory value. To do this, go to level 2 access and press the "**Prg"** button for 10 seconds.

2.12 Versions menu



Level 1 access

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



Level 1 access

Indicates the order number for the unit and the electrics box serial number.

3 Managing a network of controllers

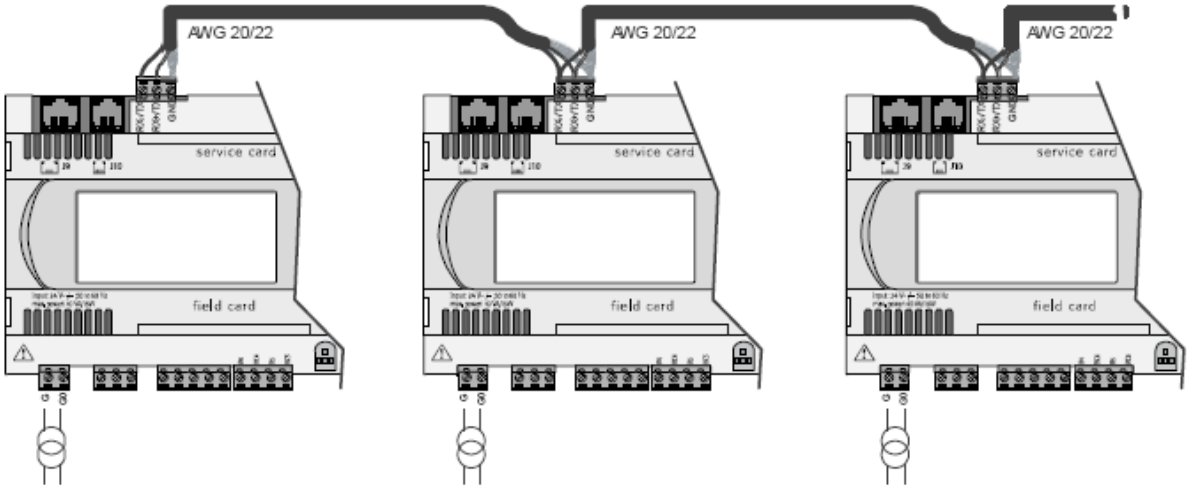
The pLAN network (**p**ersonal **L**ocal **A**rea **N**etwork) is the name of the physical network that links controllers to remote HMI terminals.

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

3.1 pLAN electrical connections

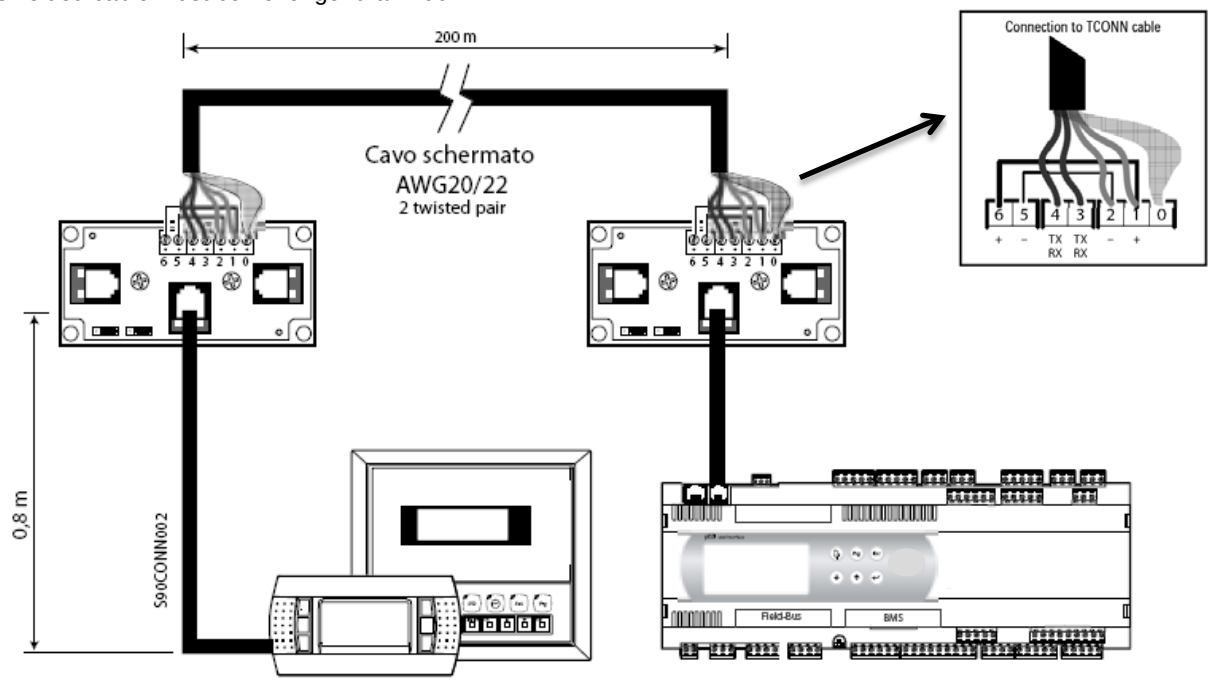
3.1.1 Connecting controllers to the pLAN

The electrical connection between the controllers under the pLAN network (RS485) is carried out using an AWG20/22 shielded cable composed of a twisted pair and a shield. The cards must be connected in parallel using the J11 connector.
The first and last controller must be no more than **500m** apart.



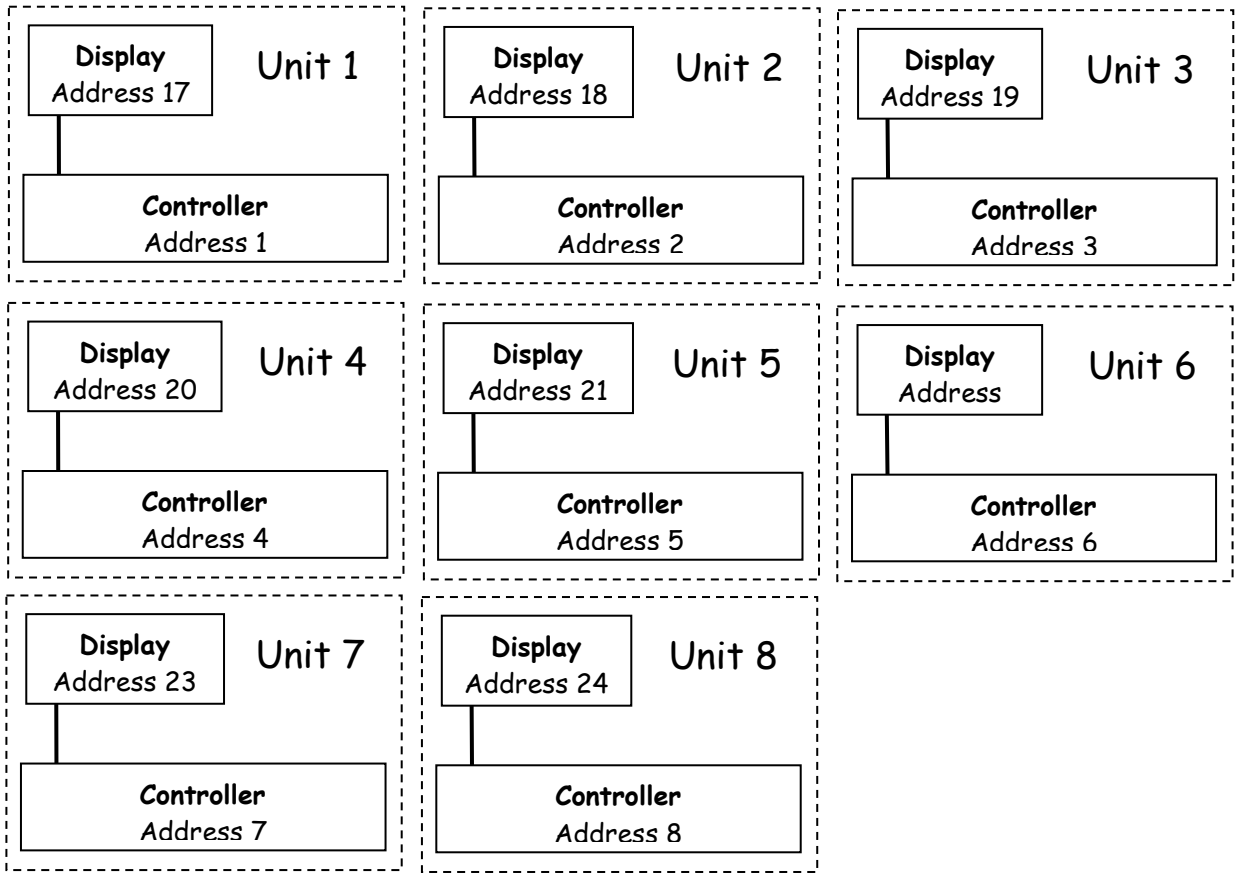
3.1.2 Connecting a remote screen to the pLAN

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



3.2 Addressing the pLAN

Once the controllers are connected over the pLAN network, the controllers and the terminals must be addressed.
There is a range of 32 possible addresses (binary logic). As a result, a total of 32 controllers and terminals can be connected over the pLAN network.
The pLAN network will not work if the same address is shared by two components!
The controllers and displays must be addressed as illustrated below:



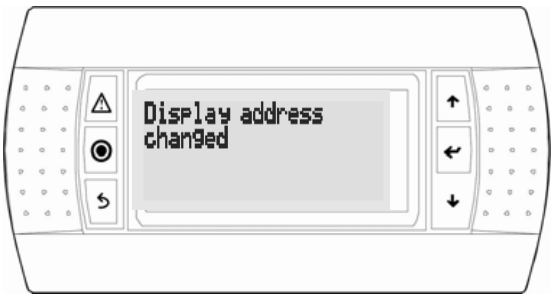
3.3 Changing the controller address

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

3.3.1 Addressing the HMI terminals

The value of the factory-set address is '17'.
In order to be able to configure the terminal's address, it must first be powered via the telephone connector.
To enter configuration mode, press buttons ↑ ↓ and ↵ (even if the terminal is already on) simultaneously for at least five seconds. The mask of the screen below appears and the pointer flashes at the top left corner:

• to change the terminal's address (display address setting) press the ↵ button once. The pointer will move to the address field (02).
• using the ↑↓ buttons, select the desired value, and confirm by pressing the ↵ button again. If the value selected is different from that stored previously, the mask of the screen below is displayed and the new value will be stored in the display's permanent memory.

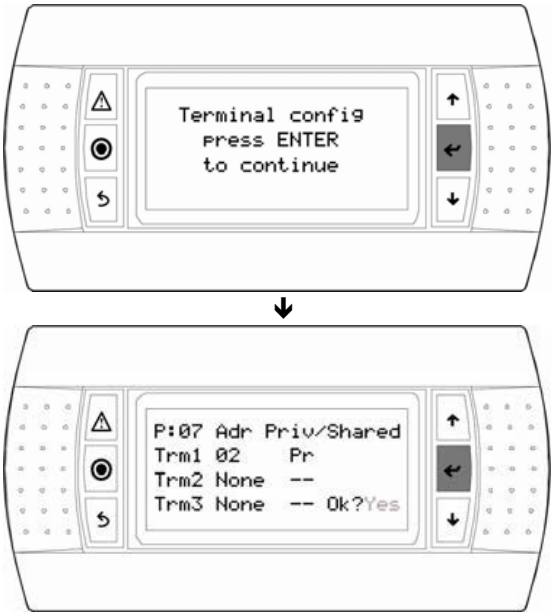


If the "setting" field is set to '0', the terminal will use the Point-to-Point Protocol (not the pLAN) to communicate with the controller and the "I/O board address: 07" field will disappear as it will not be necessary.

3.3.2 Assigning private and shared terminals

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

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



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

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

The fields in the "Adr" column contain the addresses of the terminals associated with the controller whose address is 07; the "Priv/Shared" column shows the terminal type.
Warning: HMI terminals do not have a printer output and therefore cannot be configured as "Sp" (shared printer).
If the terminal remains inactive (no buttons pressed) for more than 30 seconds, it will automatically exit configuration mode without saving any changes made.

3.3.3 Checking the pLAN address

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

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 (screen tp1)

5 Supervision

The controller may be connected to a local or remote supervision PC or to most types of CMS (Modbus, Lonworks, KNX). For the listed functions to be used, optional cards (Rs485, KNX, LON, *p*CO Web) 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 not provided by the manufacturer. They must be provided by the installer, and require the involvement of an integrator.

5.1 CMS

Various communication standards can be used to connect with a CMS. Expansion boards are inserted in the "Serial Card" port on the controller.
Modbus®RTU: insert the RS485 expansion board and connect it as instructed 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 *p*Co Web card and connect it as instructed in the manual. Validating the protocol on the user terminal (screen **g1**):

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

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

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

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

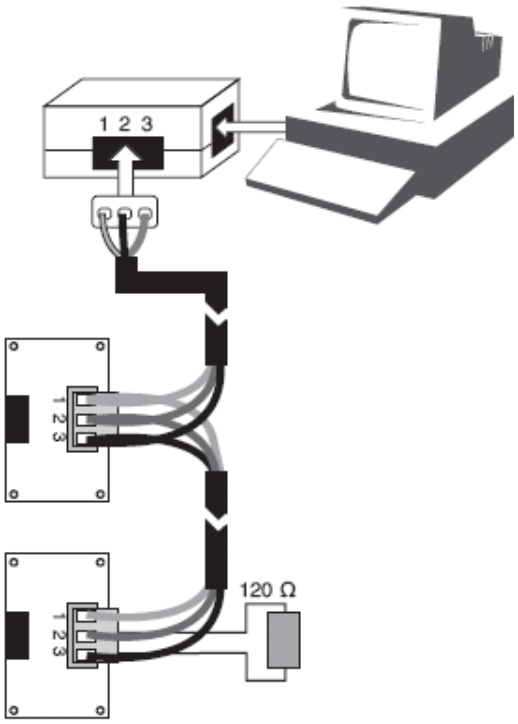
- **Protocol** *KNX*
- **Speed** *9600* bds (Obligatory)
- **Address** *001* (Obligatory)

5.2 The datapoint database

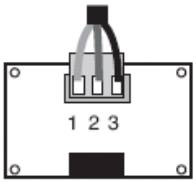
The unit comes with a communication database that includes the most important datapoints for the program, from the values of the sensors to the parameters displayed in the masks. The database contains three types of datapoint: digital datapoints, integer datapoints and analogue datapoints. The tables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

5.3 Modbus

5.3.1 Modbus RTU connection diagram



5.3.2 RS485 connection close-up



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

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

- An asynchronous half duplex RS485 serial card in RTU mode, connected to each controller.
- A standard RS485/USB converter for connection to a PC (not supplied by the manufacturer). The converter can be connected to any network RS485 card.
- An electrical network using an **AWG20/22** shielded cable (not supplied by the manufacturer) 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 the manufacturer).

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

The format of the data frame is as follows: 8 data bits, stop bits and adjustable 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

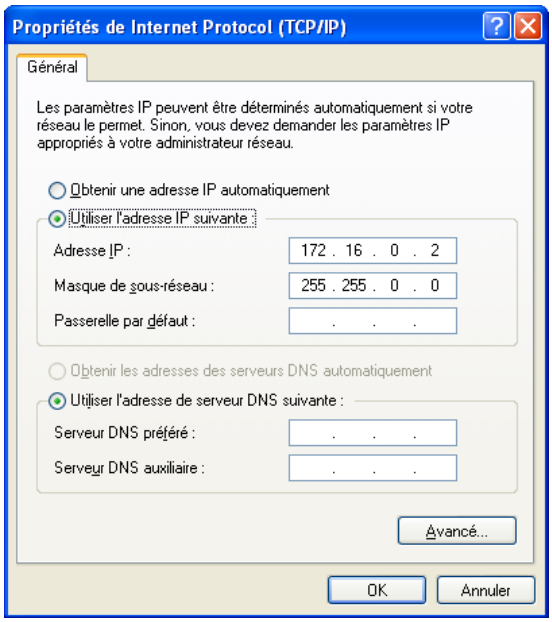
- 11: Read event counter
- 15: Write n bits
- 16: Write multiple registers (16 bits)

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.

PC local IP address: 172.16.0.2
Subnet mask: 255.255.0.0



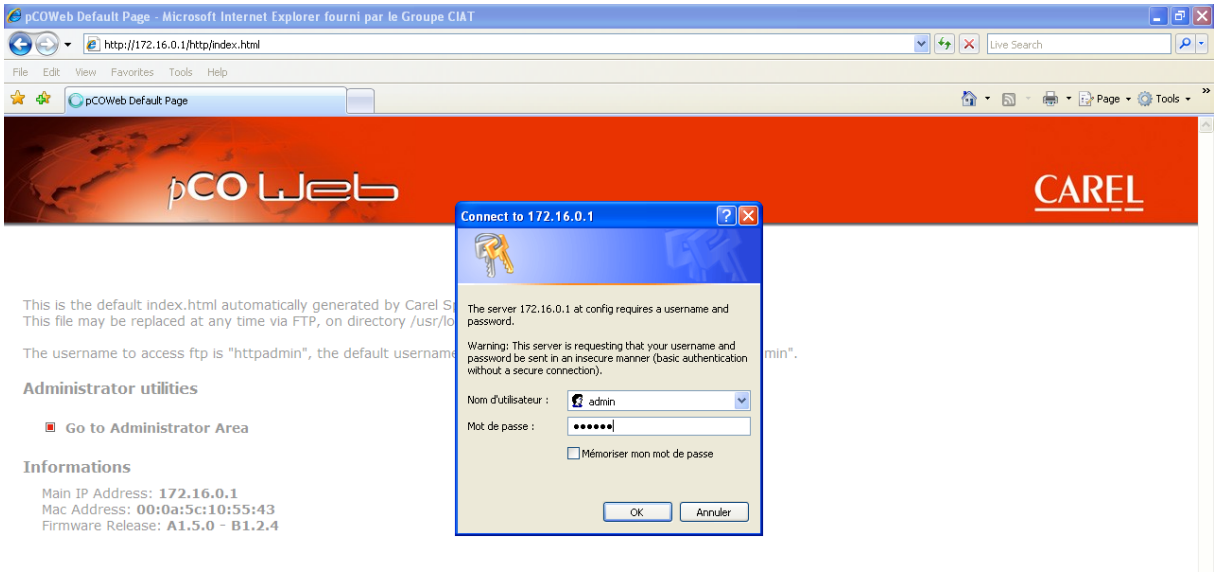
pCOWeb card IP address: 172.16.0.1

Setting the card to its factory configuration (shown above):
Disconnect the power supply to the controller – Press the button on the pCOWeb card – Keep pressing, and switch the power to the controller back on – The green LED on the left flashes then goes off (after approx. 30 secs) – Now release the button.

Configuring communication on the controller:
Protocol: CAREL
Speed: 19200

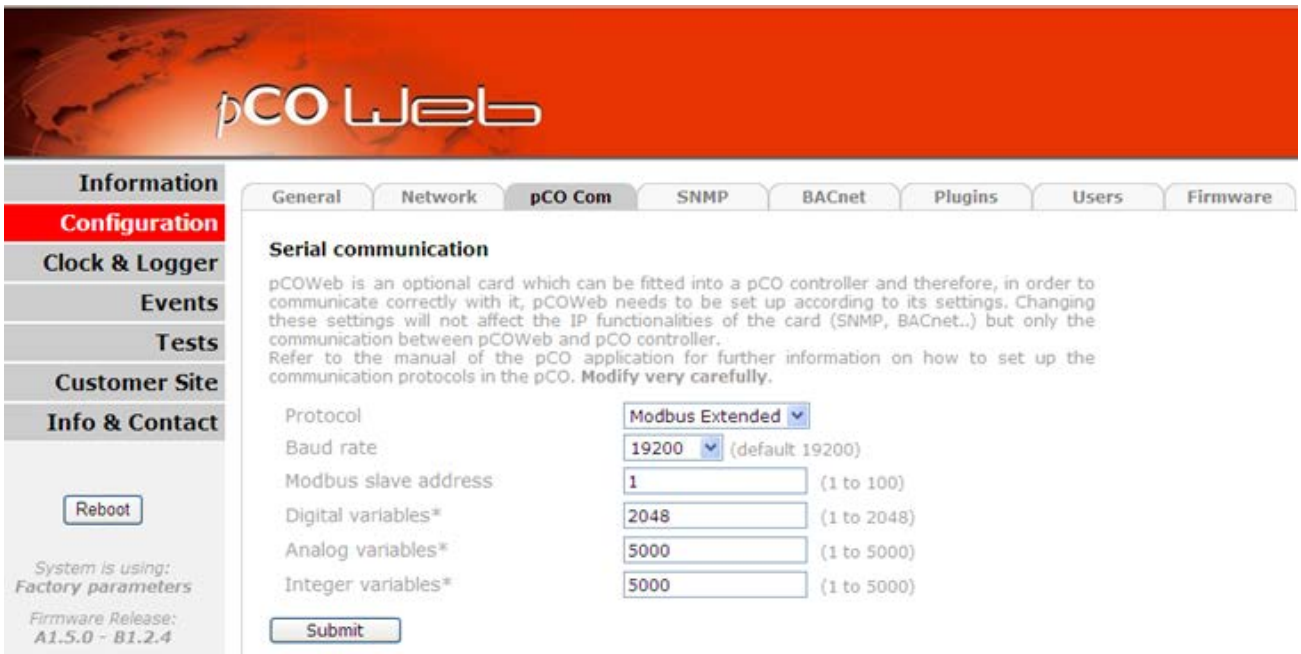
During normal operation, with the cable connected and the IP correctly set, the LED on the left is green and flashing and the LED on the right is green and constant.

Enter the address http://172.16.0.1 in a web browser
Click “Go to Administrator Area”
User name: admin
Password: fadmin



Click Configuration then pCO Com.
In Protocol: Modbus Extended OR BACNET IP
Baud rate: 19200
Then the button: Submit

The speed (baud rate) must be identical in the communication menu



5.3.4 Variables

5.3.4.1 Controls

Register hex. no.	Register decimal no.	Description	Format	Type
Registers accessible in read-only mode (functions 1 or 2) for Booleans and write mode (functions 5 for char or 15)				
0x118	280	Remote start/stop control (1 = On)	Boolean	Read-only/Write
0x119	281	Acknowledging faults (1 = Acknowledgement)	Boolean	Read-only/Write
0x11A	282	Electric/heater load shedding (1 = Load shedding)	Boolean	Read-only/Write
0x11B	283	Machine running in Eco/Comfort temperature mode (0: Comfort/1: Eco)	Boolean	Read-only/Write
0x11C	284	Machine running in Eco/Comfort flow rate mode (0: Comfort/1: Eco)	Boolean	Read-only/Write
0x11D	285	Machine running in Eco/Comfort pressure mode (0: Comfort/1: Eco)	Boolean	Read-only/Write
0x11E	286	Standby command	Boolean	Read-only/Write
0x11F	287	ECO recirculation command	Boolean	Read-only/Write
0x120	288	"Morning heating" command	Boolean	Read-only/Write
0x121	289	"Cool night" command	Boolean	Read-only/Write

5.3.4.2 Setpoints

Register hex. no.	Register decimal no.	Description	Format	Type	Adjustable values
Registers accessible in read-only mode (functions 3 or 4) for integers and write mode (functions 6 for char or 16) Registers accessible in read-only mode (functions 1 or 2) for Booleans and write mode (functions 5 for char or 15)					
0x0190	400	Supply air Comfort flow rate regulation setpoint	Integer	Read-only/Write	m^3/h
0x0191	401	Return air Comfort flow rate regulation setpoint	Integer	Read-only/Write	m^3/h
0x0192	402	Supply air Eco flow rate regulation setpoint	Integer	Read-only/Write	m^3/h
0x0193	403	Return air Eco flow rate regulation setpoint	Integer	Read-only/Write	m^3/h
0x0195	405	Nominal pressure control setpoint in the intake duct	Integer	Read-only/Write	Pa
0x0196	406	Minimum pressure control setpoint in the intake duct	Integer	Read-only/Write	Pa
0x0197	407	Nominal pressure control setpoint in the exhaust duct	Integer	Read-only/Write	Pa
0x0198	408	Nominal pressure control setpoint in the exhaust duct	Integer	Read-only/Write	Pa
0x019A	410	Regulation setpoint for the monitored Comfort temperature	Integer	Read-only/Write	°C x10
0x019B	411	Regulation setpoint for the monitored Eco temperature	Integer	Read-only/Write	°C x10
0x1A1	417	Air quality regulation setpoint	Integer	Read-only/Write	ppm
0x1A2	418	Maximum flow rate value of supply air fan for air quality regulation	Integer	Read-only/Write	m^3/h
0x1B2	434	Electric pre-heater stages regulation setpoint	Integer	Read-only/Write	°C x10
0x1B3	435	Temperature setpoint in "Morning heating" mode	Integer	Read-only/Write	°C x10

Register hex. no.	Register decimal no.	Description	Format	Type	Adjustable values
0x1B4	436	Unit reactivation setpoint in "Standby" mode	Integer	Read-only/Write	°C x10
0x1B9	441	Regulation setpoint in "Night cooling" mode	Integer	Read-only/Write	°C x10
0x1BB	443	Supply air fan flow rate setpoint during a "Cool night" time program	Integer	Read-only/Write	m^3/h
0x1BC	444	Return air fan flow rate setpoint during a "Cool night" time program	Integer	Read-only/Write	m^3/h
0x1C6	454	Plate heat exchanger frost risk detection outdoor temperature setpoint	Integer	Read-only/Write	°C x10
0x1C7	455	Plate heat exchanger operating limit temperature setpoint	Integer	Read-only/Write	°C x10
0x1C8	456	Wheel heat exchanger operating limit temperature setpoint	Integer	Read-only/Write	°C x10
0x1CA	458	Min. temperature setpoint value via the th-Tune	Integer	Read-only/Write	°C x10
0x1CB	459	Max. temperature setpoint value via the th-Tune	Integer	Read-only/Write	°C x10

5.3.4.3 Reading parameters

Register hex. no.	Register decimal no.	Description	Format	Type	Values
Registers accessible in read-only mode (functions 3 or 4) for integers Registers accessible in read-only mode (functions 1 or 2) for Booleans					
0x44C	1100	Supply air temperature	Integer	Read-only	Value x10
0x44D	1101	Return air temperature	Integer	Read-only	Value x10
0x44E	1102	Room air temperature	Integer	Read-only	Value x10
0x44F	1103	Fresh air temperature	Integer	Read-only	Value x10
0x451	1105	Outdoor temperature value	Integer	Read-only	Value x10
0x454	1108	Supply air flow rate	Integer	Read-only	
0x455	1109	Return air flow rate	Integer	Read-only	
0x456	1110	Supply air duct pressure value	Integer	Read-only	
0x457	1111	Return air duct pressure value	Integer	Read-only	
0x458	1112	Supply air filter fouling	Integer	Read-only	
0x459	1113	Return air filter fouling	Integer	Read-only	
0x45C	1116	Air quality in ppm	Integer	Read-only	
0x45D	1117	Heat exchanger clogged on air return	Integer	Read-only	
0x45E	1118	Supply air fan monitoring	Boolean	Read-only	0 = Fault 1 = No fault
0x45F	1119	Return air fan monitoring	Boolean	Read-only	0 = Fault 1 = No fault
0x460	1120	Fire detection	Boolean	Read-only	0 = Fault 1 = No fault
0x461	1121	Rotary heat exchanger monitoring	Boolean	Read-only	0 = Fault 1 = No fault
0x462	1122	Changeover thermostat	Boolean	Read-only	0 = Cooling 1= Heating

Register hex. no.	Register decimal no.	Description	Format	Type	Values
0x463	1123	Electric pre-heater	Boolean	Read-only	0 = Fault 1 = No fault
0x464	1124	Electric heater	Boolean	Read-only	0 = Fault 1 = No fault
0x465	1125	Hydraulic coil 1 pump monitoring	Boolean	Read-only	0 = Fault 1 = No fault
0x466	1126	Hydraulic coil 2 pump monitoring	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 control	Boolean	Read-only	0 = Authorised 1 = Prohibited
0x469	1129	Remote control or Presence detection	Boolean	Read-only	0 = Off 1 = On/Presence
0x474	1140	Intake fan control	Integer	Read-only	value in % x10
0x475	1141	Exhaust fan control	Integer	Read-only	value in % x10
0x476	1142	Hydraulic coil 1 valve control	Integer	Read-only	value in % x10
0x477	1143	Hydraulic coil 2 valve control	Integer	Read-only	value in % x10
0x478	1144	Heat exchanger wheel speed control	Integer	Read-only	value in % x10
0x47B	1147	Heat exchanger bypass damper opening value	Integer	Read-only	value in % x10
0x47C	1148	Heat exchanger bypass control state	Integer	Read-only	0: no control 1: open 2: closed
0x47D	1149	"Danger" fault summary relay	Boolean	Read-only	0 = No fault 1 = Fault
0x47E	1150	"Maintenance" fault summary relay	Boolean	Read-only	0 = No fault 1 = Fault
0x483	1155	Unit insulation damper control	Boolean	Read-only	0 = Damper closed 1 = Damper open
0x484	1156	Control 1 for the electric heaters	Boolean	Read-only	0 = Off 1 = On
0x485	1157	Control 2 for the electric heaters	Boolean	Read-only	0 = Off 1 = On
0x48A	1162	Hydraulic coil 1 pump control	Boolean	Read-only	0 = Off 1 = On
0x48B	1163	Hydraulic coil 2 pump control	Boolean	Read-only	0 = Off 1 = On
0x48D	1165	External heat production control (boiler or heat pump)	Boolean	Read-only	0 = Off 1 = On
0x48E	1166	Humidifier operation authorisation	Boolean	Read-only	0 = Off 1 = On
0x491	1169	Mixing damper opening value	Integer	Read-only	value in % x10
0x492	1170	Mixing damper control state	Integer	Read-only	0: no control 1: open 2: closed
0x49E	1182	Calculated regulation setpoint for the supply air temperature	Integer	Read-only	

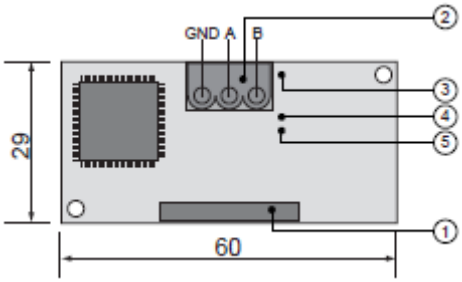
Register hex. no.	Register decimal no.	Description	Format	Type	Values
0x49F	1183	Calculated setpoint for heat exchanger frost detection via return air pressure drop measurement	Integer	Read-only	
0x4A1	1185	Calculated setpoint for detection of the supply air "Filter dirty" level	Integer	Read-only	
0x4A2	1186	Calculated setpoint for detection of the return air "Filter dirty" level	Integer	Read-only	
0x4A3	1187	Calculated setpoint for detection of the supply air "Filter clogged" level	Integer	Read-only	
0x4A4	1188	Calculated setpoint for detection of the return air "Filter clogged" level	Integer	Read-only	
0x4A5	1189	Supply air fan runtime counter	Integer	Read-only	in hours
0x4A6	1190	Supply air fan runtime counter reset	Boolean	Read-only	
0x4AB	1195	Return air fan runtime counter	Integer	Read-only	in hours
0x4AC	1196	Return air fan runtime counter reset	Boolean	Read-only	
0x4B2	1202	Electric heater 1 runtime counter	Integer	Read-only	in hours
0x4B3	1203	Electric heater 1 counter reset	Boolean	Read-only	
0x4B4	1204	Electric heater 2 runtime counter	Integer	Read-only	in hours
0x4B5	1205	Electric heater 2 counter reset	Boolean	Read-only	
0x500	1280	Unit state	Integer	Read-only	0: Off 1: Open damper 2: On 3: On after power failure 4: Standby 5: Off by a fault 6: Off by CMS 7: Post ventilation 8: Standalone 9: Manual mode
0x501	1281	Heating requirement supplied by unit	Integer	Read-only	
0x502	1282	Cooling requirement supplied by unit	Integer	Read-only	
0x503	1283	Free cooling status	Boolean	Read-only	0: Inactive/1: Active
0x504	1284	Night cooling status	Boolean	Read-only	0: Inactive/1: Active

5.3.4.4 Alarms

Register hex. no.	Register decimal no.	Description	Format	Type
Registers accessible in read-only mode (functions 3 or 4) for integers Registers accessible in read-only mode (functions 1 or 2) for Booleans				
0x514	1300	Danger fault summary	Boolean	0 or 1
0x515	1301	Maintenance fault summary	Boolean	0 or 1
0x516	1302	Supply air fan motor assembly protection detection alarm	Boolean	0 or 1
0x518	1304	Dirty supply air filter detection alarm	Boolean	0 or 1
0x51C	1308	Fire detection alarm	Boolean	0 or 1
0x51D	1309	Hydraulic coil internal frost risk detection alarm	Boolean	0 or 1
0x51E	1310	Electric heater detection alarm	Boolean	0 or 1
0x523	1315	Return air fan motor assembly protection detection alarm	Boolean	0 or 1
0x524	1316	Clogged supply air filter detection alarm	Boolean	0 or 1
0x526	1318	Dirty return air filter detection alarm	Boolean	0 or 1
0x527	1319	Clogged return air filter detection alarm	Boolean	0 or 1
0x52A	1322	Rotary heat exchanger alarm	Boolean	0 or 1
0x52B	1323	Frosted heat exchanger alarm present. Fouling check	Boolean	0 or 1
0x52C	1324	Replace clock battery detection alarm	Boolean	0 or 1
0x52E	1326	Supply air duct pressure alarm	Boolean	0 or 1
0x52F	1327	Return air duct pressure alarm	Boolean	0 or 1
0x530	1328	Humidifier detection alarm	Boolean	0 or 1
0x533	1331	Frosted heat exchanger alarm present. Operating temperature too low	Boolean	0 or 1
0x534	1332	B1 pressure sensor fault alarm	Boolean	0 or 1
0x535	1333	B2 pressure sensor fault alarm	Boolean	0 or 1
0x536	1334	B3 pressure sensor fault alarm	Boolean	0 or 1
0x537	1335	B4 pressure sensor fault alarm	Boolean	0 or 1
0x538	1336	B5 pressure sensor fault alarm	Boolean	0 or 1
0x539	1337	B6 pressure sensor fault alarm	Boolean	0 or 1
0x53A	1338	Air quality sensor fault alarm	Boolean	0 or 1
0x53B	1339	B8 pressure sensor fault alarm	Boolean	0 or 1
0x53C	1340	B9 pressure sensor fault alarm	Boolean	0 or 1
0x53D	1341	Hydraulic coil duct frost risk detection alarm	Boolean	0 or 1
0x53E	1342	Electric pre-heater alarm	Boolean	0 or 1
0x53F	1343	Pump 1 alarm	Boolean	0 or 1
0x540	1344	Pump 2 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 file "Air_Technologies_110905.XIF" (Program ID: 90:00:94:82:00:0A:04:01) is available.

5.4.1 LON scope of supply

Recap of on-site LON tasks by Manufacturer/Installer/Integrator for system start-up:

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

5.4.2 The digital datapoints

Type	Index	NV name	Code Type	Type Type	Direction	Description
DGT	1	nvi_GTC_OnOff	95	SNVT_switch	input	Unit On/Off command via CMS
DGT	1	nvo_GTC_OnOff	95	SNVT_switch	output	Unit On/Off command return via CMS
DGT	--	nvo_entree_dig_1	83	SNVT_state	output	State of digital inputs
					bit 0	*Fire detection input*
					bit 1	*Supply air fan monitoring input*
					bit 2	*Return air fan monitoring input*
					bit 3	*Electric pre-heater safety check input*
					bit 4	*Electric heater safety check input*
					bit 5	*Changeover thermostat input*
					bit 6	*Wheel check input*
					bit 7	*Presence detection or Remote Control input*
					bit 8	*Humidifier check input*
					bit 9	*Pump 1 check input*
DGT	--	nvo_sortie_dig_1	83	SNVT_state	output	State of digital outputs
					bit 0	*Critical fault output*
					bit 1	*Non-critical fault output*
					bit 2	*Damper control output (frost-protection or insulating)*
					bit 3	*External generator control output (boiler or heat pump)*
					bit 4	*Electric heater stage 1 control output*
					bit 5	*Electric heater stage 2 control output*
					bit 6	*Humidifier control output*
					bit 7	*Pump 1 control output*
					bit 8	*Pump 2 control output*
DGT	--	nvo_alarm_01_16	83	SNVT_state	output	Alarm 1 value:
					bit 0	*Return air filter clogged alarm*
					bit 1	*Supply air filter clogged alarm*
					bit 2	*Return air filter dirty alarm*

					bit 3	*Supply air filter dirty alarm*
					bit 4	*Heat exchanger frost alarm - Clogging detection*
					bit 5	*Heat exchanger frost alarm - Fresh air temperature check*
					bit 6	*Fire alarm*
					bit 7	*Return air motor alarm*
					bit 8	*Supply air motor alarm*
					bit 9	*Rotary heat exchanger alarm*
					bit 10	*Clock lithium battery alarm*
					bit 11	*Internal hydraulic coil frost alarm*
					bit 12	*Hydraulic coil in duct frost alarm*
					bit 13	*Electric Pre-heater alarm*
					bit 14	*Electric Heater alarm*
DGT	--	nvo_alarm_17_32	83	SNVT_state	output	Alarm 2 value:
					bit 0	*B1 sensor alarm*
					bit 1	*B2 sensor alarm*
					bit 2	*B3 sensor alarm*
					bit 3	*B4 sensor alarm*
					bit 4	*B5 sensor alarm*
					bit 5	*B6 sensor alarm*
					bit 6	*IAQ sensor alarm*
					bit 7	*B8 sensor alarm*
					bit 8	*B9 sensor alarm*
					bit 9	*Hydraulic coil 1 pump alarm*
					bit 10	*Hydraulic coil 2 pump alarm*

EN

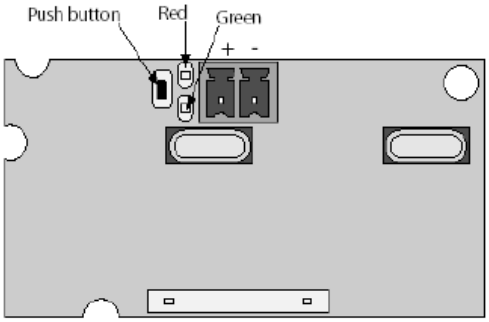
5.4.3 The analogue datapoints

Type	Index	NV name	Code Type	Type Type	Direction	Description
ANL	1	nvo_custom_1	113	SNVT_press_p	output	Supply air filter fouling level
ANL	2	nvo_custom_2	113	SNVT_press_p	output	Supply air duct pressure
ANL	3	nvo_custom_3	113	SNVT_press_p	output	Return air filter fouling level
ANL	4	nvo_custom_4	113	SNVT_press_p	output	Heat exchanger fouling
ANL	8	nvo_custom_8	161	SNVT_flow_p	output	Air supply fan flow rate
ANL	9	nvo_custom_9	161	SNVT_flow_p	output	Return air fan flow rate
ANL	10	nvo_custom_10	29	SNVT_ppm	output	Air quality via the unit sensor
ANL	16	nvo_custom_16	105	SNVT_temp_p	output	Supply air temperature
ANL	17	nvo_custom_17	105	SNVT_temp_p	output	Return air temperature
ANL	18	nvo_custom_18	105	SNVT_temp_p	output	Fresh air or outdoor temperature
ANL	19	nvo_custom_19	105	SNVT_temp_p	output	Ambient temperature
ANL	23	nvo_custom_23	9	SNVT_count_inc	output	Heat exchanger insulating damper position
ANL	24	nvo_custom_24	9	SNVT_count_inc	output	Mixing damper position
ANL	25	nvo_sortie_ana_1	9	SNVT_count_inc	output	Coil 1 valve
ANL	26	nvo_sortie_ana_2	9	SNVT_count_inc	output	Rotary heat exchanger speed
ANL	27	nvo_sortie_ana_3	9	SNVT_count_inc	output	Supply air fan speed
ANL	28	nvo_sortie_ana_4	9	SNVT_count_inc	output	Return air fan speed
ANL	29	nvo_sortie_ana_5	9	SNVT_count_inc	output	Coil 2 valve
ANL	30	nvo_sortie_ana_6	9	SNVT_count_inc	output	Heat exchanger bypass position
ANL	37	nvo_etat_unite	9	SNVT_count_inc	output	Unit operating state:
					Value 0	*off*
					Value 1	*on*
					Value 2	*switched on after a power failure*
					Value 3	*standby*
					Value 4	*switched off by a fault*
					Value 5	*switched off by CMS*
					Value 6	*post ventilation*
ANL	44	nvi_T_regul	105	SNVT_temp_p	input	Regulated temperature setpoint
ANL	44	nvo_T_regul	105	SNVT_temp_p	output	Regulated temperature setpoint feedback
ANL	49	nvi_P_regul	113	SNVT_press_p	input	Supply air duct pressure via a communicating sensor
ANL	49	nvo_P_regul	113	SNVT_press_p	output	Return air duct pressure via a communicating sensor
ANL	50	nvi_Q_regul	29	SNVT_ppm	input	CO_2 air quality setpoint
ANL	50	nvo_Q_regul	29	SNVT_ppm	output	CO_2 air quality setpoint feedback

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)

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 controller is established	
Green	Constantly lit	The button has been pressed to allocate the address, and the card is awaiting the corresponding procedure from ETS3	
	Rapidly flashing	- the XML file has not been downloaded - a rapid flash indicates receipt of the address after the button has been pressed	Proceed with configuration
	Slow flashing	Configuration in progress: the XML file is being downloaded by ETS3	
Green + Red	Both constantly lit	No power supply on KNX bus	Check: KNX bus power supply, electrical connections and polarity of connections on the connector + and - terminals

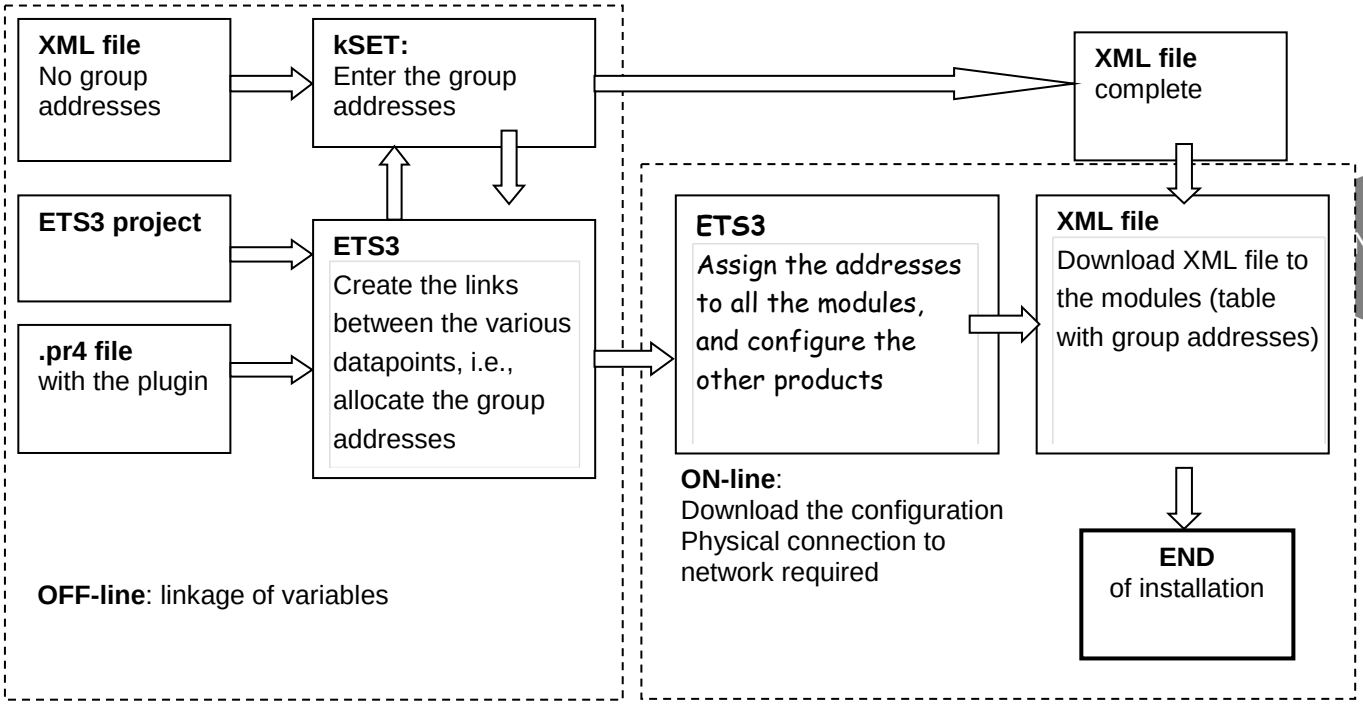
5.5.2 Variables

The KSet software is supplied for configuring the group addresses, as is the Carel_plugin_21.PR4 file for the ETS3 software (not supplied) and the CDFP2-V22.XML file from the database below:

Description	DatapointName	Datapoint TypeName	Datapoint TypeCode	IN/OUT	Index	COIL/REG
Supply air filter fouling level	FiltreIntroduction	DPT_Value_Temp	9.001	OUT	1	REG
Supply air duct pressure	PressionGaineIntro	DPT_Value_Temp	9.001	OUT	3	REG
Supply air temperature	TemperatureIntro	DPT_Value_Temp	9.001	OUT	4	REG
Return air temperature	TemperatureExtra	DPT_Value_Temp	9.001	OUT	5	REG
Return air filter fouling level	FiltreExtraction	DPT_Value_Temp	9.001	OUT	7	REG
Heat exchanger fouling	EncrassRecuperateur	DPT_Value_Temp	9.001	OUT	8	REG
Fresh air or outdoor temperature	TemperatureNeuf	DPT_Value_Temp	9.001	OUT	9	REG
Ambient temperature	TemperatureAmb	DPT_Value_Temp	9.001	OUT	10	REG
Air supply fan flow rate	DebitVentilIntro	DPT_Value_Temp	9.001	OUT	11	REG
Return air fan flow rate	DebitVentilExtra	DPT_Value_Temp	9.001	OUT	24	REG
Quality via the unit sensor	QualiteAir	DPT_Value_Temp	9.001	OUT	18	REG
Water coil valve No. 1	Batterie1	DPT_Value_Temp	9.001	OUT	12	REG
Heat exchanger wheel speed	VitesseRecupRotatif	DPT_Value_Temp	9.001	OUT	13	REG
Supply air fan control	VitesseVentilIntro	DPT_Value_Temp	9.001	OUT	14	REG
Return air fan control	VitesseVentilExtra	DPT_Value_Temp	9.001	OUT	15	REG
Water coil valve No. 2	Batterie2	DPT_Value_Temp	9.001	OUT	16	REG
Plate heat exchanger bypass damper	BipasseRecup	DPT_Value_Temp	9.001	OUT	17	REG
Plate heat exchanger insulating damper	Isolement	DPT_Value_Temp	9.001	OUT	25	REG
Mixing damper	Melange	DPT_Value_Temp	9.001	OUT	26	REG
Controlled temperature setpoint	WTemperatureRegul	DPT_Value_Temp	9.001	IN	19	REG
Regulated temperature setpoint feedback	WTemperatureRegul	DPT_Value_Temp	9.001	OUT	19	REG
Supply air duct pressure via a communicating sensor	PressionGaine	DPT_Value_Temp	9.001	IN	22	REG
Return air duct pressure via a communicating sensor	PressionGaine	DPT_Value_Temp	9.001	OUT	22	REG
CO_2 air quality setpoint	WQualiteAir	DPT_Value_Temp	9.001	IN	23	REG
CO_2 air quality setpoint feedback	WQualiteAir	DPT_Value_Temp	9.001	OUT	23	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	27	REG
Alarm 1 value: *Bit 0 = Return air filter clogged* *Bit 1 = Supply air filter clogged* *Bit 2 = Return air filter dirty* *Bit 3 = Supply air filter dirty* *Bit 4 = Heat recovery unit frosted – Fouling level monitoring* *Bit 5 = Heat recovery unit frosted – Fresh air temperature check* *Bit 6 = Fire* *Bit 7 = Return air motor* *Bit 8 = Supply air motor* *Bit 9 = Rotary heat exchanger* *Bit 10 = Clock lithium battery* *Bit 11 = Internal hydraulic coil frost* *Bit 12 = Duct hydraulic coil frost* *Bit 13 = Electric pre-heater* *Bit 14 = Electric heater* *Bit 15 = Humidifier*	Alarme1	DPT_Value_2_Ucount	7.001	OUT	28	REG
Alarm 2 value: *Bit 0 = Sensor B1* *Bit 1 = Sensor B2*	Alarme2	DPT_Value_2_Ucount	7.001	OUT	29	REG

Bit 2 = Sensor B3 *Bit 3 = Sensor B4* *Bit 4 = Sensor B5* *Bit 5 = Sensor B6* *Bit 6 = IAQ sensor* *Bit 7 = Sensor B8* *Bit 8 = Sensor B9* *Bit 9 = Hydraulic coil 1 pump* *Bit 10 = Hydraulic coil 2 pump*						
Unit On/Off command via CMS	OnoffGTC	DPT_Switch	1.001	IN	1	COIL
Unit On/Off command return via CMS	OnoffGTC	DPT_Switch	1.001	OUT	1	COIL
Fire detection	ControleIncendie	DPT_Switch	1.001	OUT	2	COIL
Air supply fan monitoring	ControleVentilIntro	DPT_Switch	1.001	OUT	3	COIL
Return air fan monitoring	ControleVentilExtra	DPT_Switch	1.001	OUT	4	COIL
Electric pre-heater safety monitoring	ControleBattElecPre	DPT_Switch	1.001	OUT	5	COIL
Electric heater safety monitoring	ControleBattElecChauf	DPT_Switch	1.001	OUT	6	COIL
Changeover thermostat	ThermChangeOver	DPT_Switch	1.001	OUT	7	COIL
Rotary heat exchanger check	ControleRecupRotatif	DPT_Switch	1.001	OUT	8	COIL
Presence detection or remote control	DetectionCAD	DPT_Switch	1.001	OUT	10	COIL
Humidifier monitoring	ControleHum	DPT_Switch	1.001	OUT	11	COIL
Pump 1 monitoring	ControlePompe1	DPT_Switch	1.001	OUT	12	COIL
Pump 2 monitoring	ControlePompe2	DPT_Switch	1.001	OUT	13	COIL
Critical faults	DefautImportant	DPT_Switch	1.001	OUT	17	COIL
Non-critical faults	DefautSimple	DPT_Switch	1.001	OUT	18	COIL
Damper control (frost protection or insulation)	Registre	DPT_Switch	1.001	OUT	19	COIL
External generator control (boiler or heat pump)	Generateur	DPT_Switch	1.001	OUT	21	COIL
Electric heater stage 1 control	BattElec1	DPT_Switch	1.001	OUT	22	COIL
Electric heater stage 2 control	BattElec2	DPT_Switch	1.001	OUT	23	COIL
Humidifier control	Humidificateur	DPT_Switch	1.001	OUT	24	COIL
Pump 1 control	Pompe1	DPT_Switch	1.001	OUT	25	COIL
Pump 2 control	Pompe2	DPT_Switch	1.001	OUT	26	COIL

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.

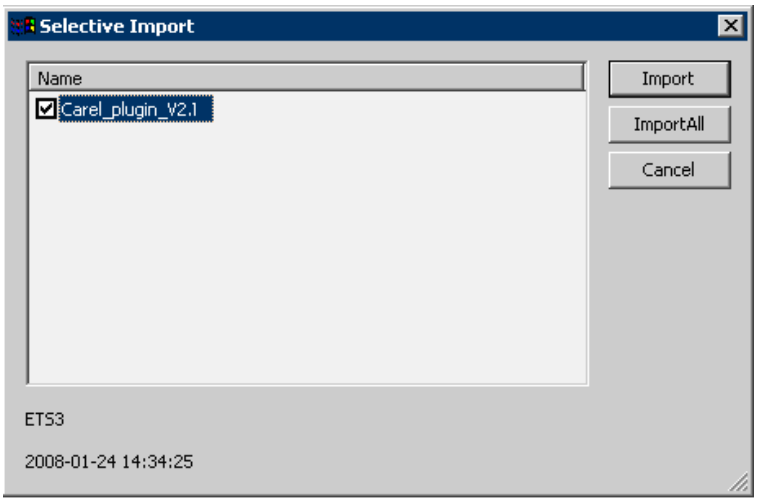
5.5.3 The plugin

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

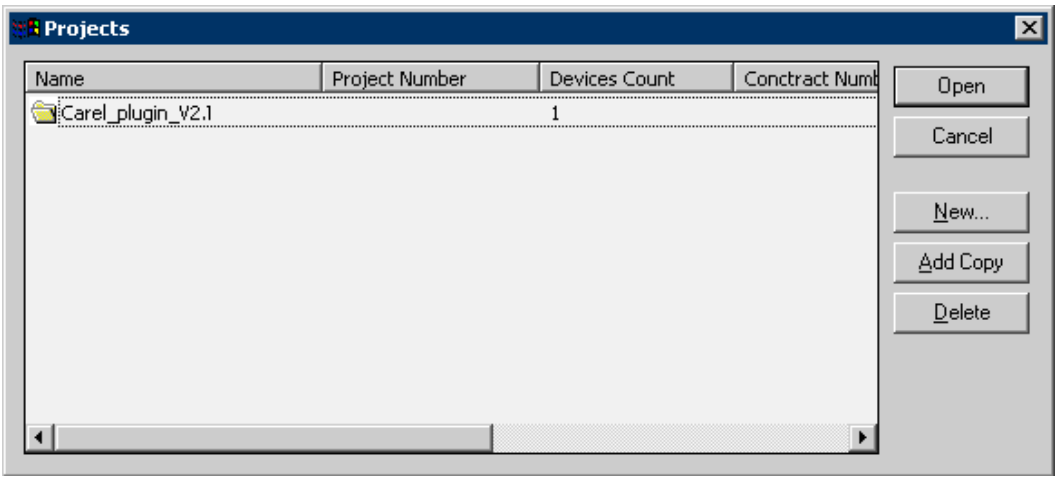
5.5.4 Installing the plugin

The plugin is installed as follows:

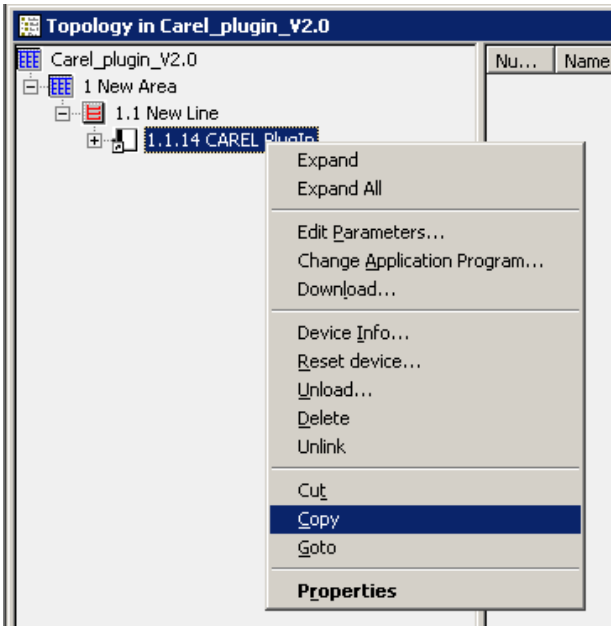
. Find the file "Carel_plugin_21.pr4" (the updated version of the plugin is available from ksa.carel.com)
. Import "Carel_plugin_21.pr4" using *Files* → *Import* as shown below:



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



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



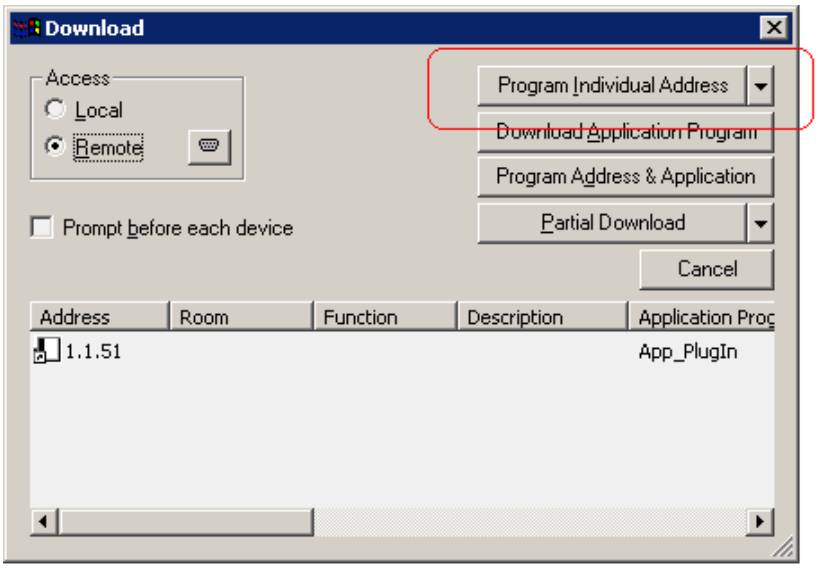
Open or create the final project for the system and right-click on the mouse to paste the plugin, once or several times depending on the number of devices to be integrated. The address of each device is automatically incremented. If necessary, you can manually change the address of a device in *Properties*.

5.5.5 Assigning the physical address

The physical address of the KNX card is assigned using the standard procedure.
You must ensure that:

. the Bus wire network is drawn out and connected
. the Bus is energised
. the 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.

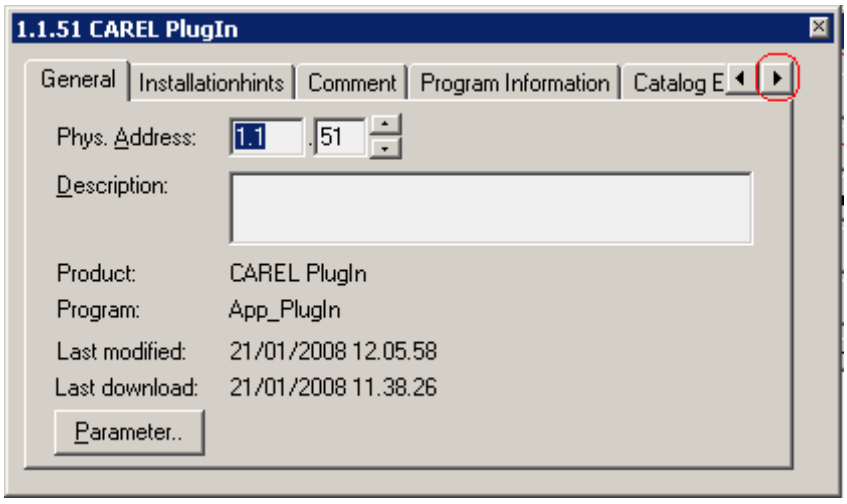


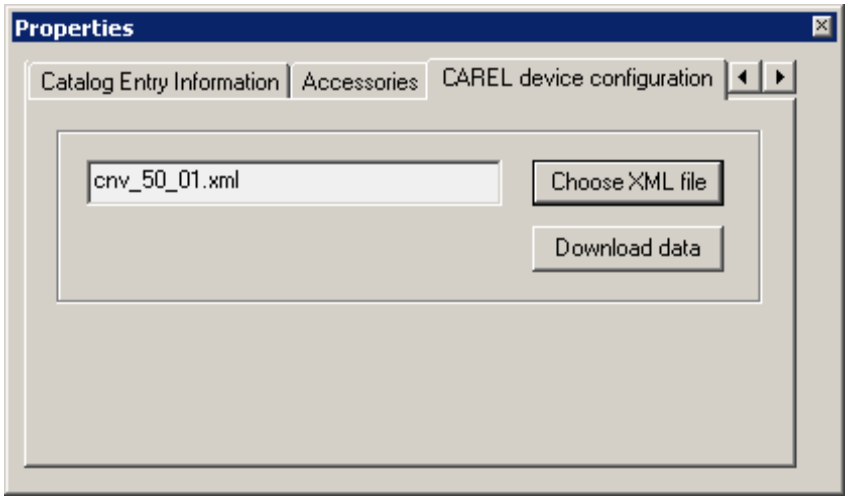
5.5.6 Downloading the XML file

You must ensure that:

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

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





Use "*Choose XML file*" to open the XML configuration file required.
Click on "*Download data*" and wait for the "*Success*" message to be displayed. During this phase indicated by the "*Performing operation*" message and the LED on the card flashing green, no other operation may be performed. The download time may vary according to the size of the XML file and the network traffic; for a maximum size file, this time may be 2 minutes.
In extreme cases, i.e. high traffic and large XML files, the bus may be disconnected and ETS3 will signal an error. In this case, simply repeat the download.

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

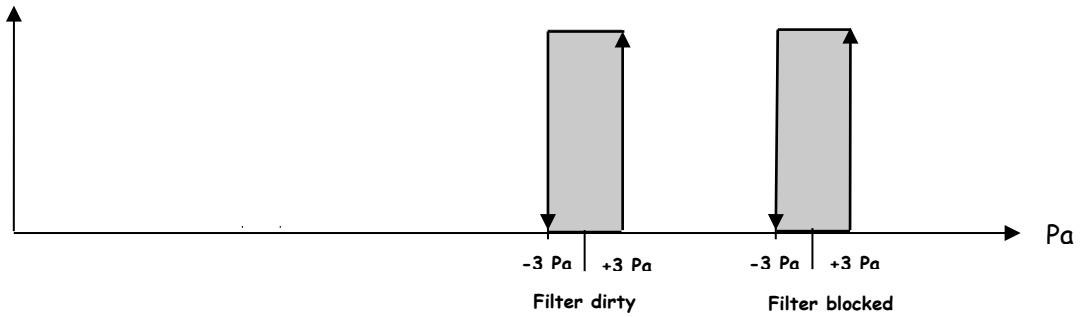
6 Table of alarms

* All possible options are covered by this table

Alarm	Source	Causes	Solutions
Supply air filter clogged	Supply air filter fouling pressure sensor 0-1000 Pa B1	- Filter too dirty	- Replace filter
Supply air filter dirty		- Filter fouled	- Clean or replace filter
Frosted heat exchanger; operating temperature too low	Fresh air temperature sensor B5 or B9	- Heat exchanger fouled - Heat exchanger frosted	- Clean the heat exchanger - See causes
Heat recovery unit frosted **Fouling level detection**	Heat exchanger fouling pressure sensor 0-1000 Pa B6	- Heat exchanger fouled - Heat exchanger frosted	- Clean the heat exchanger - See causes
Return air filter clogged	Return air filter fouling pressure sensor 0-1000 Pa B8	- Filter too dirty	- Replace filter
Return air filter dirty		- Filter fouled	- Clean or replace filter
Supply air fan motor assembly protection	Supply air fan monitoring ID2	- Rotor blocked - Phase check - Voltage too low - Thermal protection - Short-circuit	- See causes - Check wiring - Monitor supply voltage - Monitor starting current - See causes
Return air fan motor assembly protection	Return air fan monitoring ID3	- Rotor blocked - Phase check - Voltage too low - Thermal protection - Short-circuit	- See causes - Check wiring - Monitor supply voltage - Monitor starting current - See causes
Rotary heat exchanger	Heat exchanger control unit ID7	- Controller fault	- See causes
Electric pre-heater	Safety thermostats and circuit breaker QR1 ID4	- Thermostats fault - Circuit breaker (QR1) - Current too high - Short-circuit	- See causes - Reset or replace - Monitor current - See causes
Electric heater	Safety thermostats and circuit breaker QR2 ID5	- Thermostats fault - Circuit breaker (QR2) - Current too high - Short-circuit	- See causes - Reset or replace - Monitor current - See causes
Humidifier	Tank Water ID10	- Cylinder dirty - Water insufficiently conductive	- Change cylinder - Add a handful of salt
Coil 1 pump	Pump 1 monitoring ID11	- Electrical protection fault - No water flow	- See causes - See causes
Coil 2 pump	Pump 2 monitoring ID12	- Electrical protection fault - No water flow	- See causes - See causes
Clock battery must be replaced	Controller	- Flat battery	- Replace the battery

7 Control curves

7.1 Filter and heat exchanger fouling check

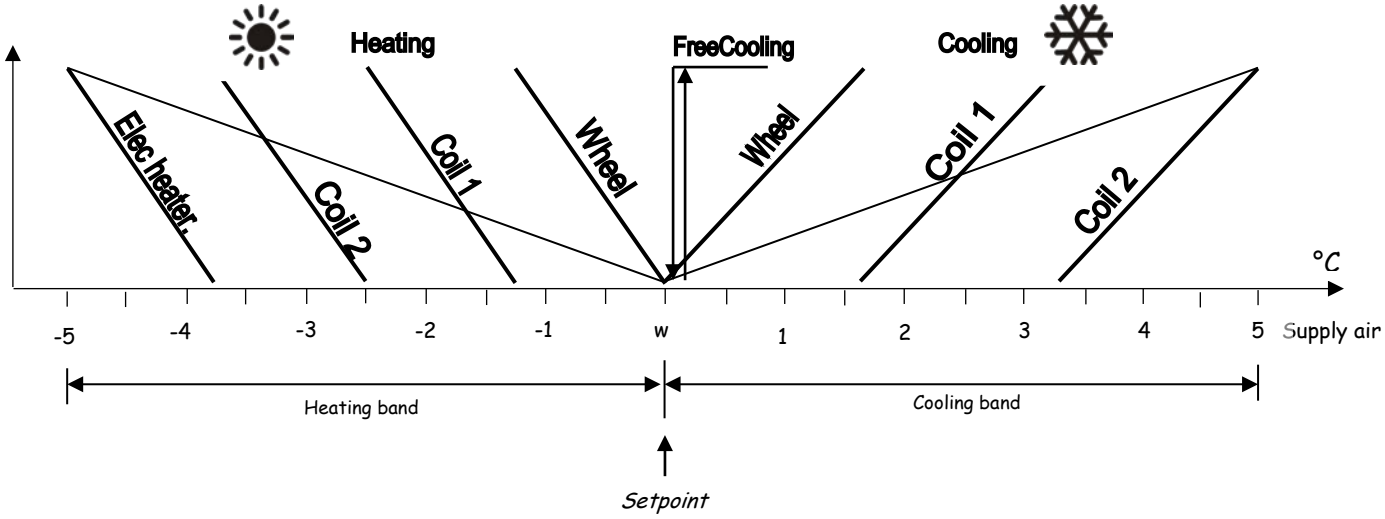


ΔP > "Filter dirty": Clogged filter, maintenance alarm
ΔP > "Filter blocked": Filter blocked, system shut off alarm

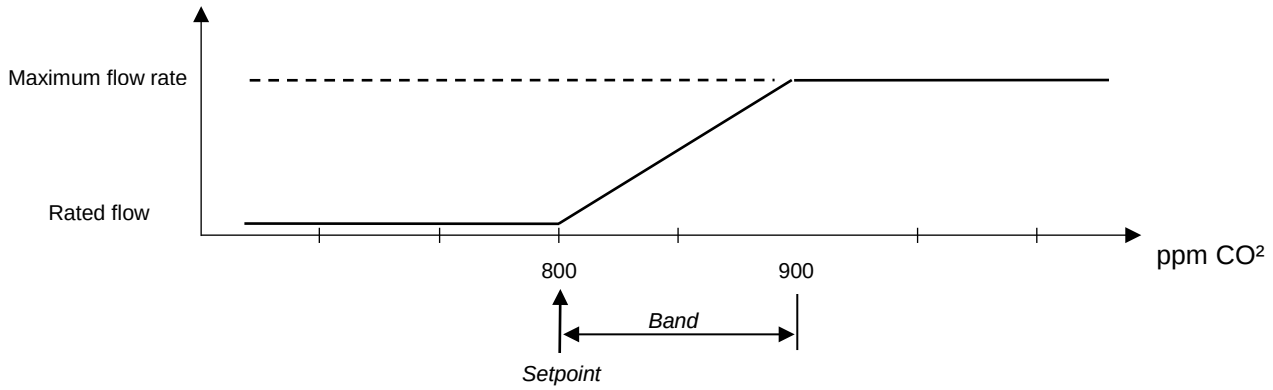
The ***Filter dirty*** and ***Filter blocked*** setpoints are calculated automatically (screen **w4**) by the controller according to the unit size and type, the type of filters and the instantaneous flow rates.

The networks and pressure drops on the two ducts, fresh air suction and exhaust air, must be balanced (ceiling model)

7.2 Supply air temperature control



7.3 Air quality check



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