HYDRONIC
QUINOA GROUP

AX'R

CONTROL MANUAL

NIRR017-S - 03-2019

CONTENTS

EN

1 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:

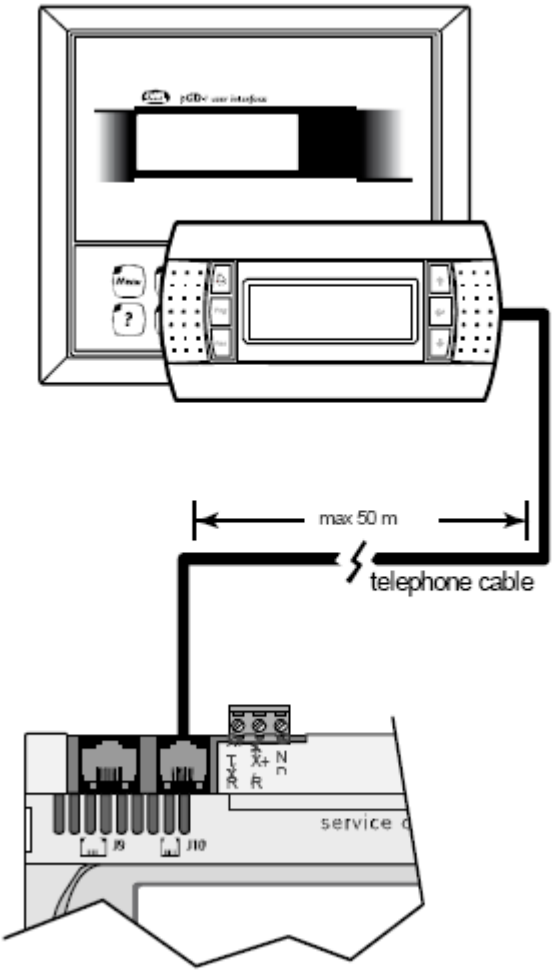
- Values of connected sensors
- Unit on/off cycles
- Calibration of the sensors
- Detection of alarms and log of the last 100 alarms
- Password-protected configuration and operating parameters
- Device running times and time delays
- Management of time programs (4 daily, 4 weekly and 4 yearly programs)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

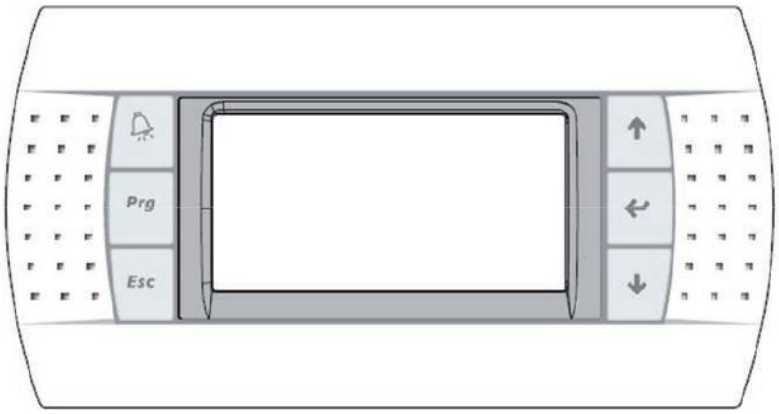
IMPORTANT: To avoid any problems, the password must be known only by qualified personnel.

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



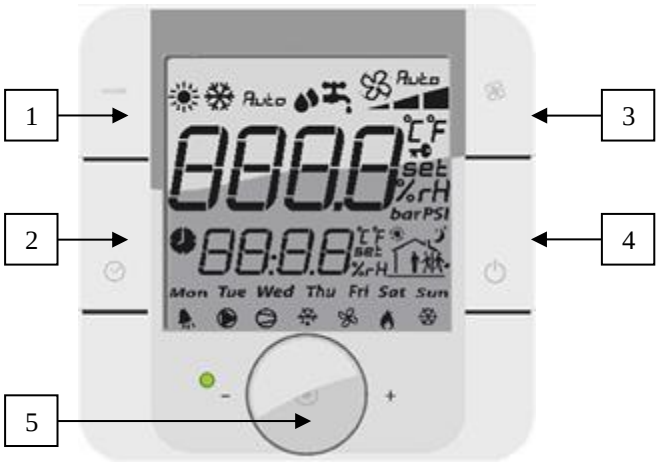
Key	Description
Esc	Returns to the main Menu mask when pressed in any loop. The Menu loop displays the state of the unit.
Prg	Provides access to the "**Menu**"
	The red button is used to display alarms and confirm acknowledgeable faults. It lights up when an alarm is triggered.
	The button has two functions: 1. 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.

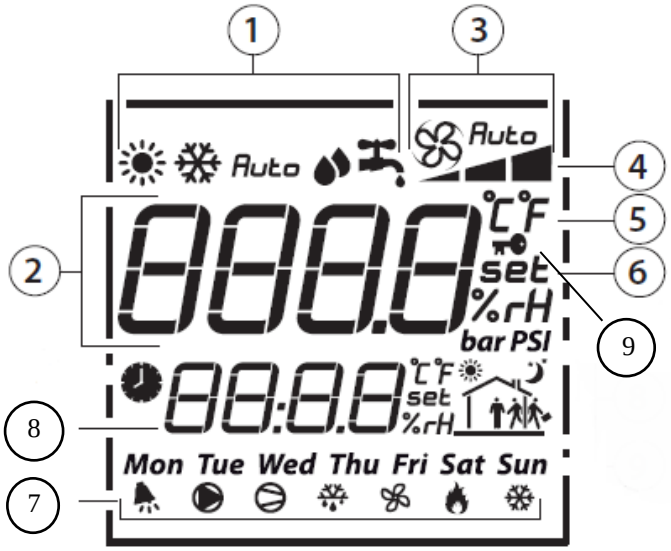
EN

1.3.1 Controls



1. Button not used
2. Key allowing a derogation of a time program (standby, eco temperature, eco pressure or eco flow rate) during a 2 hours period with automatic change to comfort mode during this time.
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



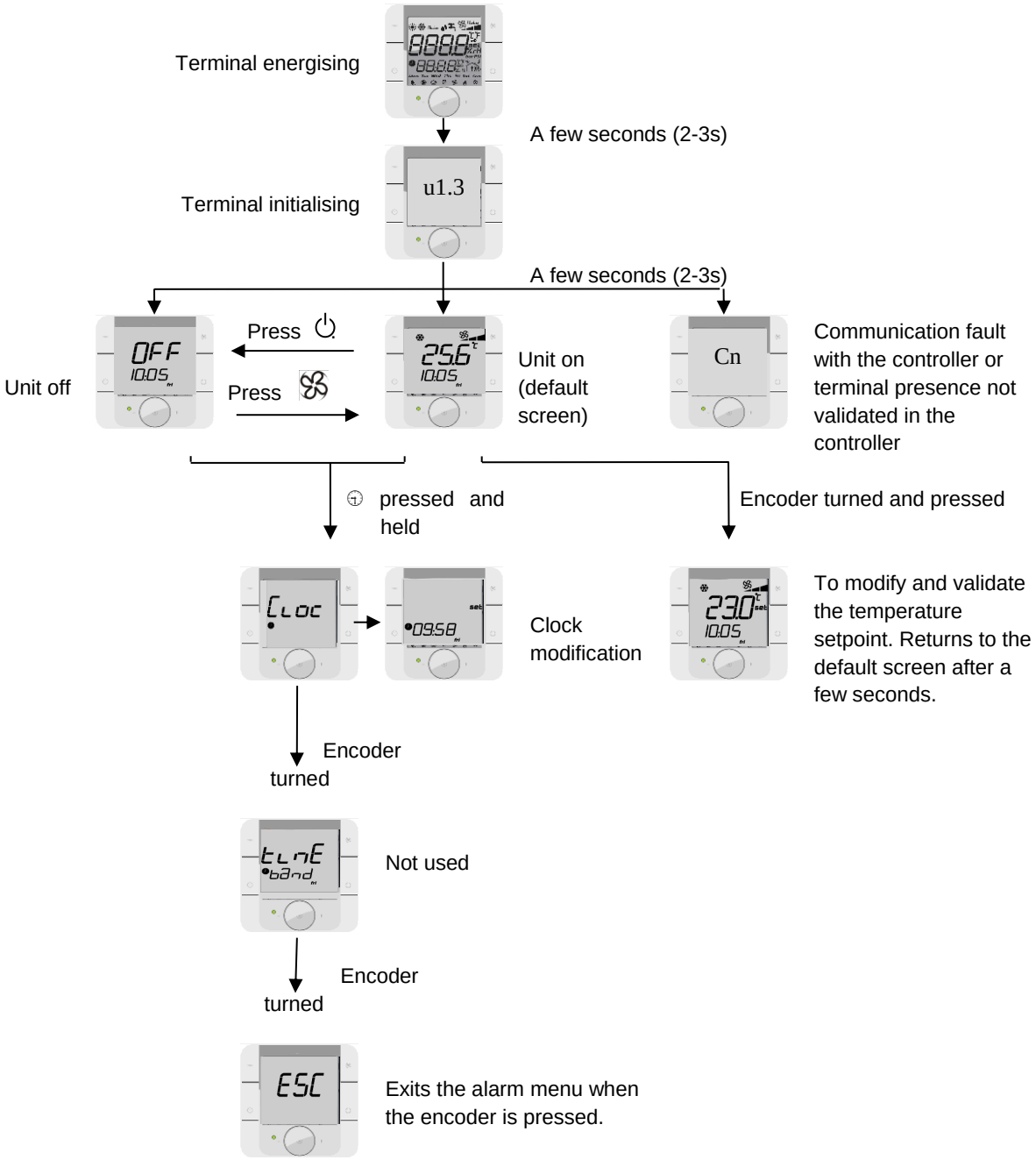
1. Unit operating mode
2. Main display area
3. Ventilation operating mode
4. Ventilation operating speed
5. Temperature unit
6. Indicates whether the value displayed in the main area is a setpoint
7. Operating icons
8. Secondary display area
9. Indicates if a 2-hour time program derogation is in progress

Details:

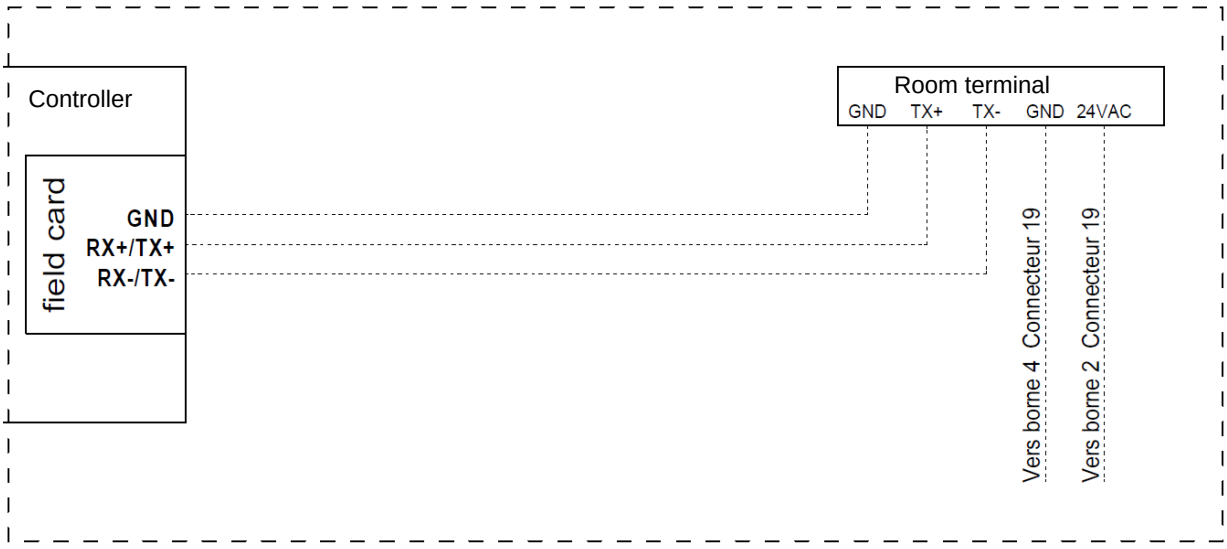
1. Unit operating mode
   - : Unit in heating mode
   - : Unit in cooling mode
2. Main display area
   - Displays "OFF" when the unit is switched off manually via the room terminal
   - Displays the ambient temperature
   - Displays the temperature setpoint when the encoder is turned
   - Displays the 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 **set** indicator.
7. 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.
8. Secondary display area
   Displays the time on the controller. This area can also be used for modifying the controller time
9. Indicates if a 2-hour time program derogation is in progress

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

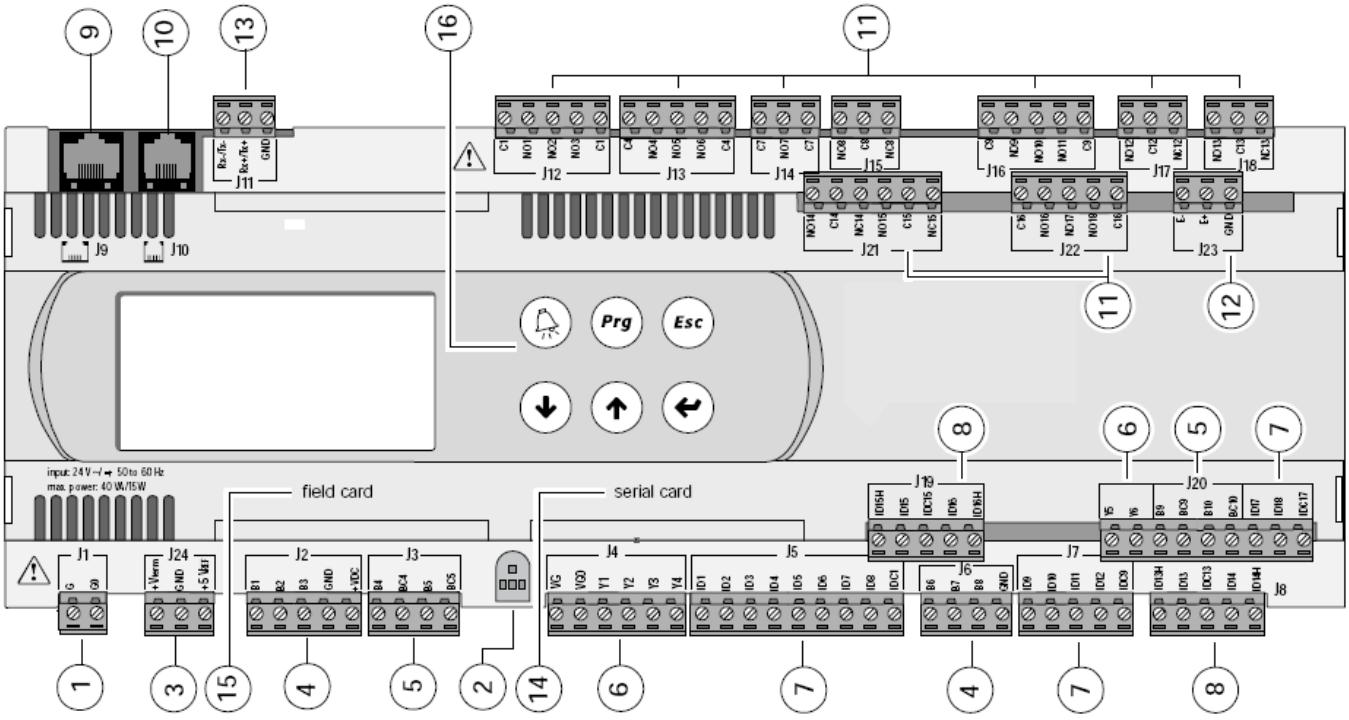


The room terminal and the controller are electrically connected using an **AWG20/22** shielded cable (not supplied) comprising two twisted pairs.
The first and last controller must be no more than **500m** apart. This network must never run parallel to power cables at a distance of less than **50 cm**. 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 (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 (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 Frost protection

Whatever the mode of operation of the unit, if the supply temperature is lower than the threshold (‘Antifreeze prot. temp’ on screen W6) then the unit stops, the duct dampers close and the water coil valves open at 100%. The acknowledgment of the fault is manual.

If the fresh air temperature recorded during the AHU shutdown or if the fresh air temperature is below the threshold (screen P5) then the water coil valves open to a minimum (screen P5) when the unit is on stand-by or starting up.

1.9 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.

during the night-cooling restart, if the fresh air temperature is 3°C lower than the outdoor temperature low limit in night cooling mode (screen P17) for more than 5 seconds, the restart is stopped and the AHU returns to stand-by.

1.10 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.

1.11 Mixing management (optional function)

The mixing flap is controlled using time slots: eco recycling, morning heating, night cooling. These time slots can be overridden if an override function is active: free cooling, air quality management.

The mixing opening value can be remotely controlled via the ModBus or Bacnet supervision by activating the "unit control" parameter in menu G1. In this case, the actual mixing opening value is the minimum value between the requirement calculated by the automaton and the setpoint indicated by the CMS.

1.12 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.

1.12.1 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.

1.13 Controller inputs and outputs

This description concerns units in standard position.
The assignment of sensors B1 to B9 depends on the type of unit (see paragraph 1.13.1, page 15)

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 Return air fan flow rate sensor B2

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 Supply air fan flow rate sensor B3

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 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

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 Supply air filter fouling level pressure sensor B8

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, and Comfort temperature. 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 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

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

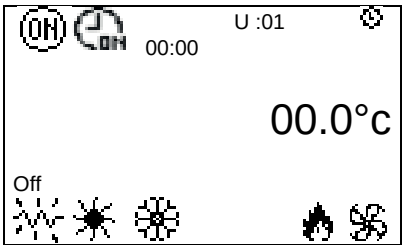
1.13.1 Reversal depending on the unit type

Unit type	Rotary Standard position	Plate Standard position	Plate Vertical position	Plate Ceiling position
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 and flashes if derogation by Th-Tune

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

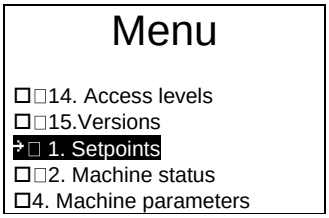
Indicates "Heating" operating mode

Indicates the "Cooling" operating mode

Indicates Fire alarm

Indicates fan operation

"**Prg**" button



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
Degraded	01000m3/h	Fan downgraded flow control setpoint
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

Machine parameters, screen c4

Fig. 1

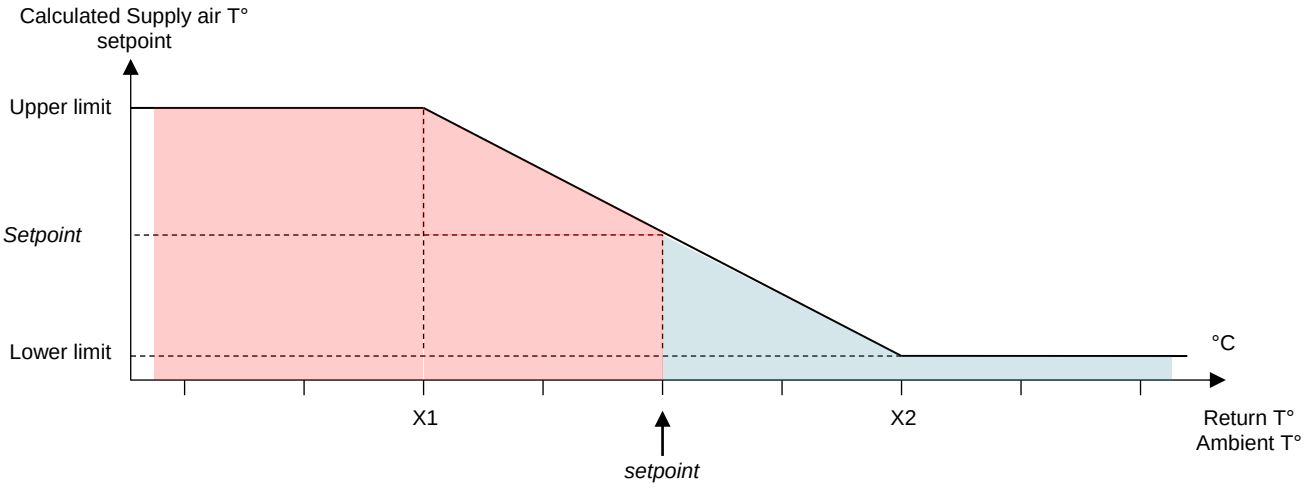
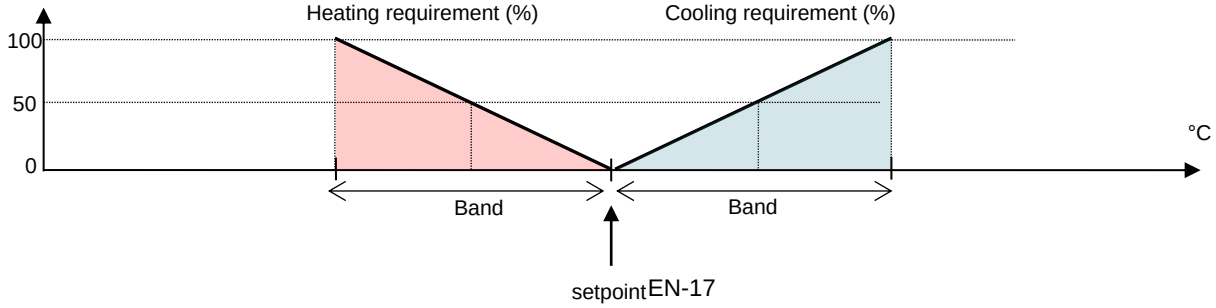


Fig. 2

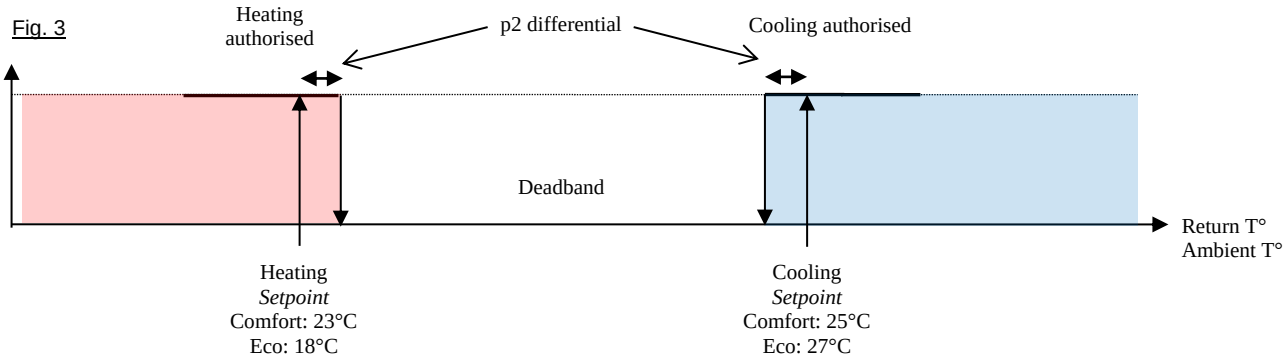


2.2.2 Supply air T° setpoint calculation in "Energy optimisation" mode

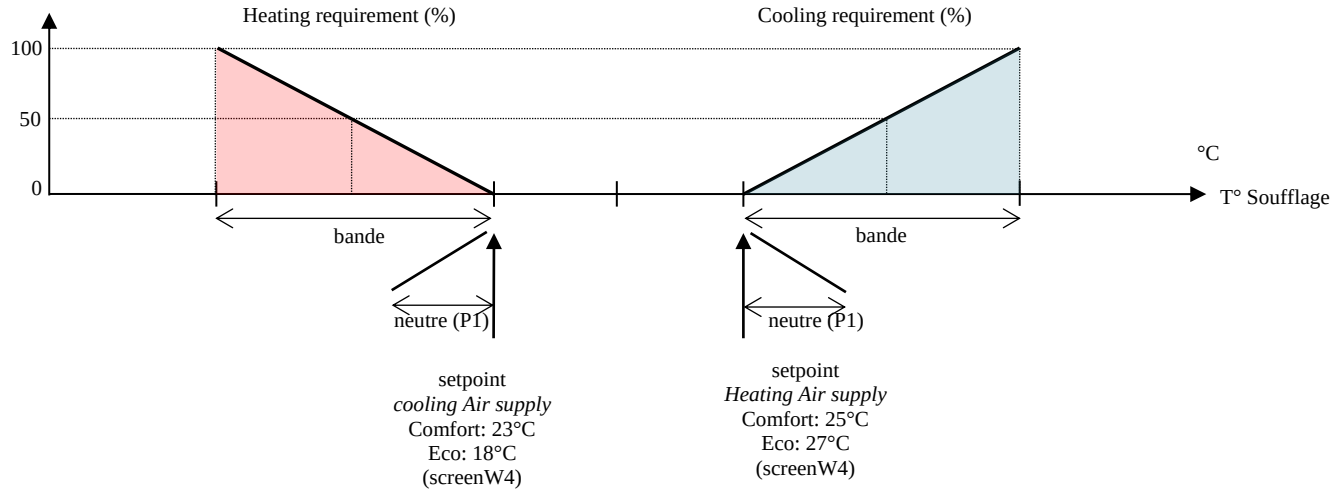
Machine parameters, screen c4

Return air or room temp. control

Fig. 3

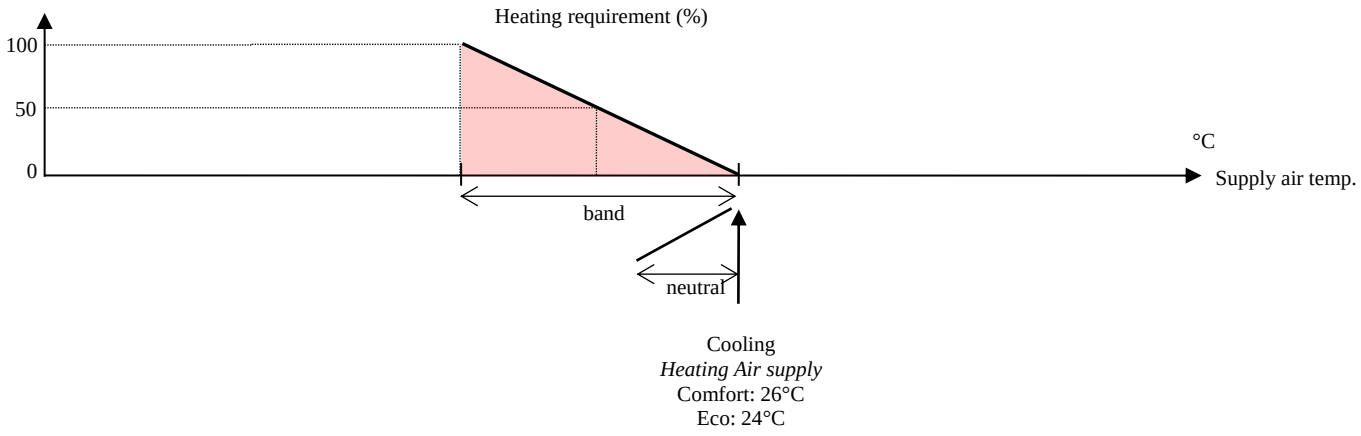


Neutral zone (if neutral zone compensation = with):



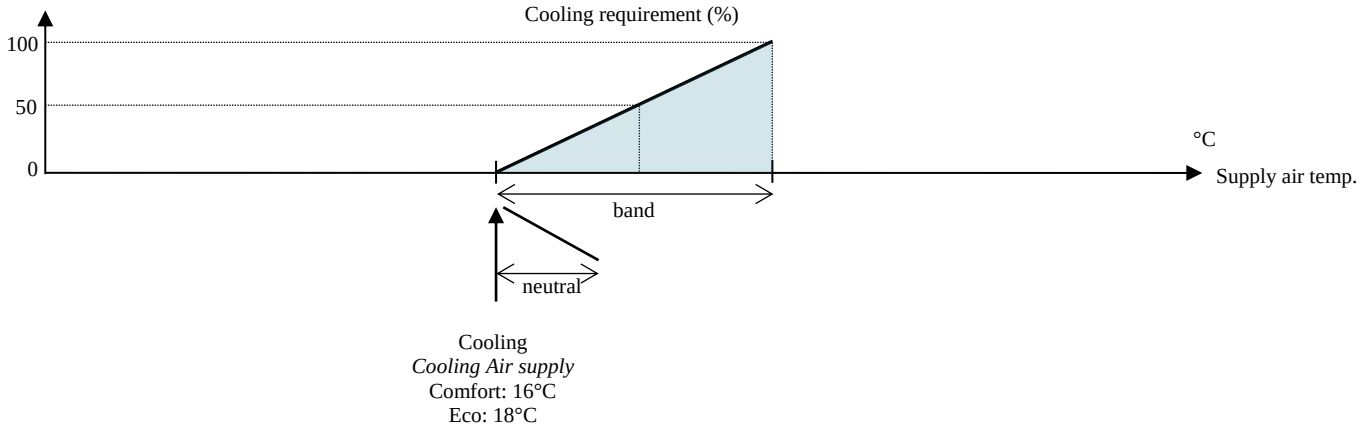
Heating:

Fig. 4



Cooling:

Fig. 5



Cooling
Cooling Air supply
Comfort: 16°C
Eco: 18°C

EN

w3	*Level 2 access*
Air quality	
0800ppm	Air quality regulation setpoint
Maximum flow rate	
1000m3/h	Maximum flow rate value of supply air fan for air quality control (see Fig. 14, page 62)

Comfort w4	Indication of the operating mode for T° regulation in "Energy optimisation" mode *Level 1 access*
Return air Cooling 25.0°c	Comfort Cooling (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)
Eco 27.0°c	Cooling Eco (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)
Return air Heating 23.0°c	Heating Comfort (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)
Eco 18.0°c	Heating Eco (Return or Ambient air) temperature control setpoint monitored (0 to 50.0°C)
Deadband	Indication of the control state for the monitored temperature (Deadband, cooling or heating)

Comfort w5	Indication of the operating mode for T° regulation in "Energy optimisation" mode *Level 1 access*
Supply air Cooling 16.0°c	Cooling Comfort Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)
Eco 18.0°c	Cooling Eco Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)
Supply air Heating 26.0°c	Heating Comfort Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)
Eco 24.0°c	Heating Eco Supply air temperature control setpoint (Regulated T° ≠ Supply air) (0 to 50.0°C)

w6	*Level 2 access*
Pre-heating temperature 2.0°c	Electric pre-heater stages start-up temperature in the duct (-20°C to 50.0°C)
Morning heating 23.0°c	Control setpoint in mode "Morning heating" mode (0 to 50.0°C)
Frost protection 10.0°c	Unit reactivation setpoint in "Standby" mode (0 to 50.0°C)
Antifreeze prot. temp 4.0°c	Coil antifreeze protection temperature setpoint (2 to 10.0°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

EN

List of faults:

Code	Description	Significance
01	Supply air motor	Danger
02	Supply air filter dirty	Maintenance
03	Supply air filter clogged	Danger
04	Sensor B1	Maintenance
05	Return air filter dirty	Maintenance
06	Return air filter clogged	Danger
07	Frost on heat exchanger - Fresh air temperature check	Danger
08	Heat recovery unit frosted – Clogging detection	Danger
09	Return air motor	Danger
10	Humidifier	Maintenance
11	Rotary heat exchanger check	Maintenance
12	Sensor B2	Maintenance
13	Sensor B3	Maintenance
14	Sensor B4	Maintenance
15	Sensor B5	Maintenance
16	Sensor B6	Maintenance
17	Air quality sensor	Maintenance
18	Sensor B8	Maintenance
19	Sensor B9	Maintenance
20	Clock lithium battery	Maintenance
21	Internal hydraulic coil frost	Danger
22	Hydraulic coil in duct frost	Danger
23	Electric pre-heater	Maintenance
24	Electric heater	Maintenance
25	Hydraulic coil 1 pump	Maintenance
26	Hydraulic coil 2 pump	Maintenance
27	Supply air duct pressure sensor	Danger
28	Return air duct pressure sensor	Danger

Configuration c0
Type

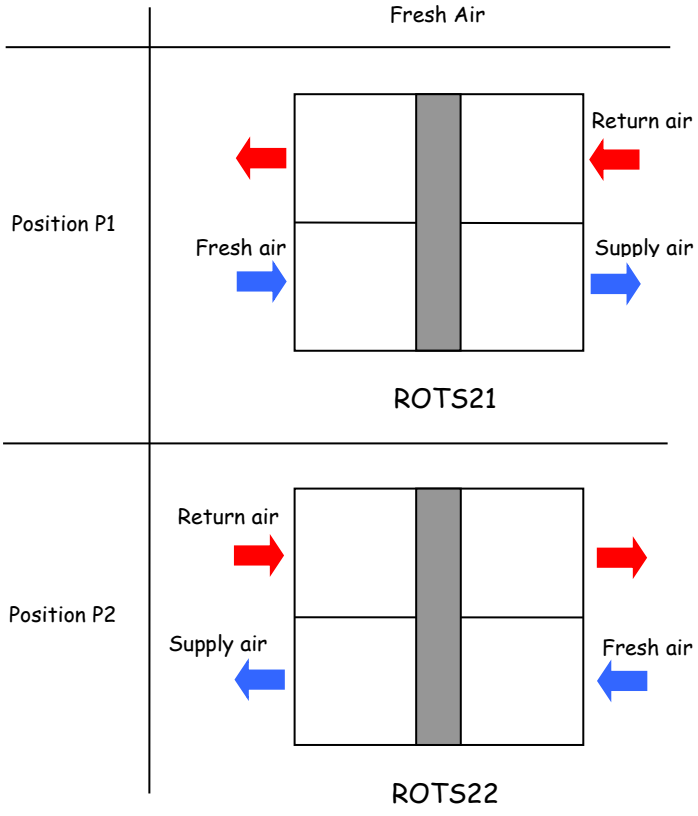
Orientation ----

Level 3 access

Type:
Classic 10 (plate heat exchanger)
Classic 20 (plate heat exchanger)
Classic 30 (plate heat exchanger)
Classic 40 (plate heat exchanger)
Classic 50 (plate heat exchanger)
Classic 60 (plate heat exchanger)
Classic 10 RHE (rotary heat exchanger)
Classic 15 RHE (rotary heat exchanger)
Classic 20 RHE (rotary heat exchanger)
Classic 25R RHE (rotary heat exchanger)
Classic 30 RHE (rotary heat exchanger)
Classic 40 RHE (rotary heat exchanger)
Classic 50 RHE (rotary heat exchanger)
Classic 60 RHE (rotary heat exchanger)
Classic 75 RHE (rotary heat exchanger)
Classic 100 RHE (rotary heat exchanger)
Classic 150 RHE (rotary heat exchanger)
Ceiling-mounted 7 (ceiling unit, plate heat exchanger)
Cieling-mounted 12 (ceiling unit, plate heat exchanger)
Cieling-mounted 16 (ceiling unit, plate heat exchanger)
Vertical 7 (vertical, plate heat exchanger)
Vertical 10 (vertical, plate heat exchanger)
Vertical 15 (vertical, plate heat exchanger)
Vertical 20 (vertical, plate heat exchanger)
)

Orientation (only for standard model with rotary heat exchanger): *ROTS21 or ROTS22*

Orientations (front view, doors open)



Configuration	c1
Supp. air filter coef.	--
Return air filter coef.	--

Level 3 access

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

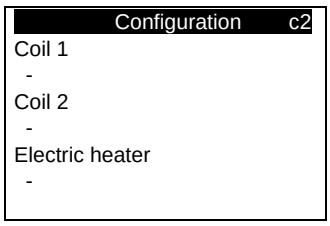
Selection table:

Single filtration

Model	Size	M5			F7			F9		
		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	*7*	10	200	44	20	300	61	30	300	105
	15	15	200	27	20	300	37	30	300	63
	20	15	200	24	20	300	33	30	300	56
Ceiling unit	*7*	N/A	200	N/A	N/A	300	N/A	N/A	300	N/A
	12	N/A	200	N/A	N/A	300	N/A	N/A	300	N/A
	16	N/A	200	N/A	N/A	300	N/A	N/A	300	N/A
Standard (rotary + Plates)	*10*	10	200	25	20	300	38	30	300	88
	20	15	200	16	25	300	24	30	300	53
	30	15	200	10	25	300	16	30	300	36
	40	15	200	6	25	300	9	30	300	22
	50	15	200	6	25	300	9	30	300	22
	60	15	200	4	25	300	6	30	300	15
	75	15	200	4	25	300	6	30	300	15
	100	15	200	5	25	300	7	30	300	14
	150	15	200	4	25	300	6	30	300	13

Double filtration

Model	Size	M5 + F7			M5 + F9			F7 + F9		
		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	*7*	30	500	105	40	500	149	50	600	166
	15	35	500	64	45	500	90	50	600	100
	20	35	500	57	45	500	80	50	600	89
Ceiling unit	*7*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Standard (rotary + Plates)	*10*	30	500	63	40	500	113	50	600	126
	20	40	500	40	45	500	69	55	600	77
	30	40	500	26	45	500	46	55	600	52
	40	40	500	15	45	500	28	55	600	31
	50	40	500	15	45	500	28	55	600	31
	60	40	500	10	45	500	19	55	600	21
	75	40	500	10	45	500	19	55	600	21
	100	40	500	12	45	500	19	55	600	21
	150	40	500	10	45	500	17	55	600	19



Level 3 access

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

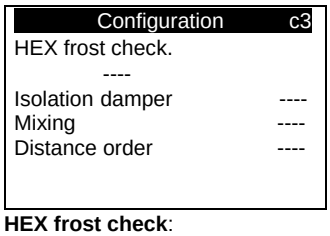
Coil 2:

- *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
- the Internal cold, Internal hot and Internal mixed configurations on coil 2 are selectable only if coil 1 = Mixed in duct, Triac in duct or Triac + on/off control in duct.

Electric heater:

- *Without*: No electric heaters
- *Pre-heat1*: 1-stage electric pre-heater
- *Pre-heat2*: 2-stage electric pre-heater
- *Pre-heat1* + *Heat.1In*: 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.



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)

Isolation damper: *Without, With*

Mixing: *Without, With*

Distance order

- *Without*
- *With*: to start the unit using the pGD, the automatic operation control must be closed

Configuration c4	*Level 3 access*
IR detector ----	
th-Tune ----	
Control priority	*Level 2 access*
,NZ compensation --	

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)***
NZ compensation : without, with (available if control mode = Energy optimisation)
Allows or disables the compensation during the neutral zone.

Configuration c5	*Level 3 access*
Humidifier ----	

Humidifier: *Without, With*

Configuration c6	*Level 3 access*
Air supply fan	
K = -----	
Return air fan	
K = -----	

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

Configuration c7	*Level 3 access*
External generator	

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

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

Humidifier: *Without, With*

Coil pump management:

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

The pumps are controlled (contact closed) if the following is present:
- *A cooling request on the hydraulic coil*
- *A heating request on the hydraulic coil*
- *A coil frost fault*

2.4 Adjustment parameters menu

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

Level 1 access

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

Setting t0	
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

* Displays "Ambient", "Supply air" or "Return air" depending on the selection on p4

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

(See Fig. 3, page 18)

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. 9, page 29)

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. 7, page 28)
Compensated T°: *Without, With* (Regulated temperature compensation as per Fig. 6, page 27)
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 (see Fig. 14, page 62)
Minimum speed value of rotary heat exchanger wheel

p5	
Valve min. threshold	20.0°C
Shutdown valve 1 open	000%
Shutdown valve 2 open	000%

Level 2 access
Maximum fresh air temperature threshold to activate the minimum opening of the valves when AHU is stopped.
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

p6	
Heat recovery frost threshold offset	00Pa

Level 3 access
Plates heat recovery frost threshold offset

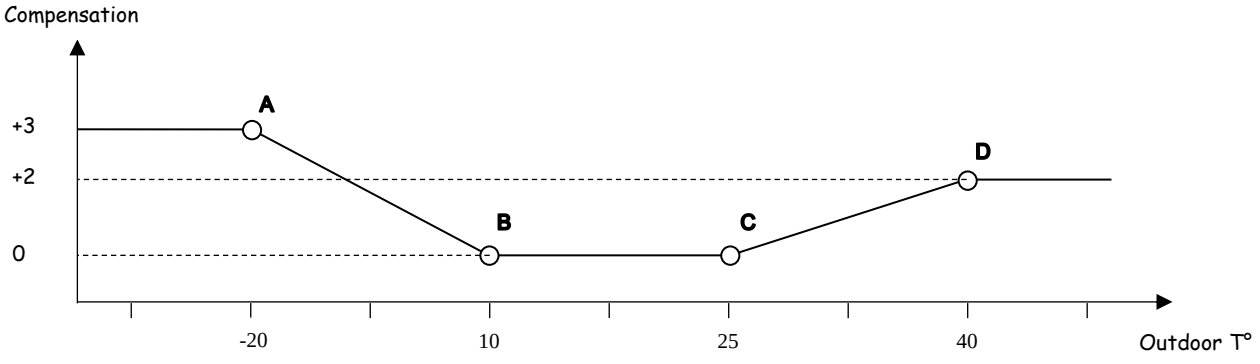
2.4.1 Regulated T° compensation based on the outdoor T°

Values used if compensated T° = with (menu p3)

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. 6



2.4.2 Fan flow rate compensation based on outdoor T°

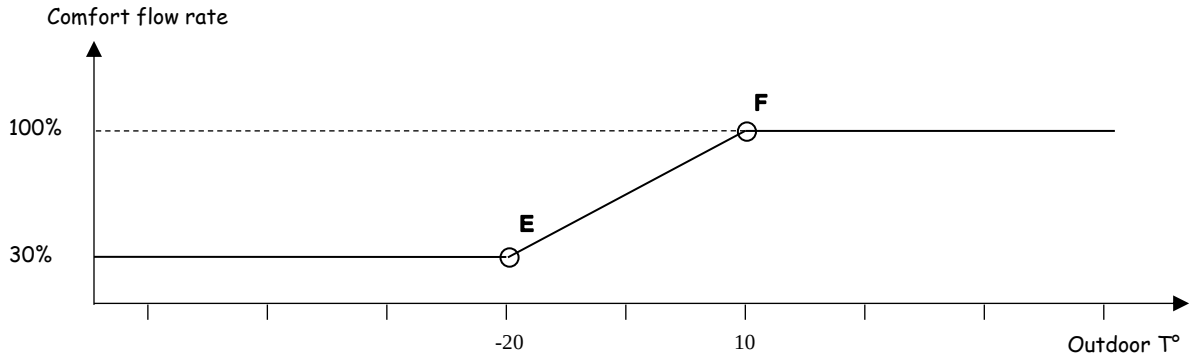
Values used if compensated Qv = with (menu p3)

p8 *Level 2 access*

030% E -20.0°c
100% F 10.0°c

030% K -20.0°c
100% L 10.0°c

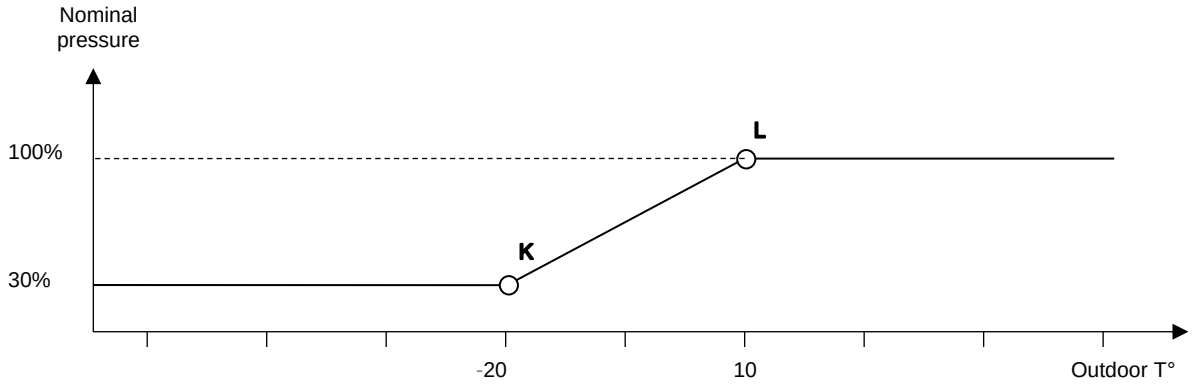
Fig. 7



2.4.3 Duct pressure compensation based on the outdoor T°

Values used if compensated Duct P = with (menu p25)

Fig. 8

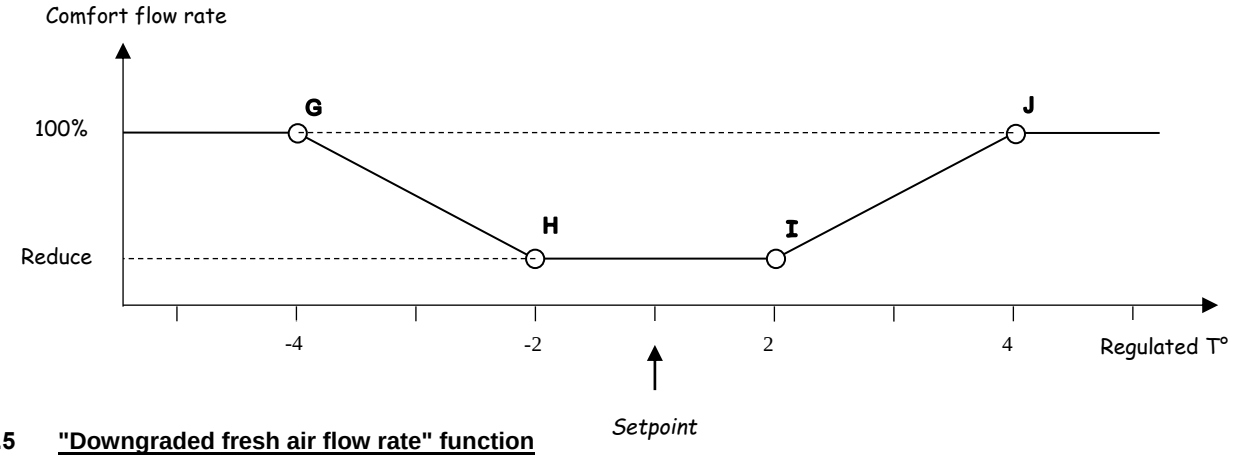


2.4.4 Fan flow rate compensation based on the regulated T°

Values used if Fan management = Qv/Tregul, prop (menu p3)

p9	*Level 2 access*
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

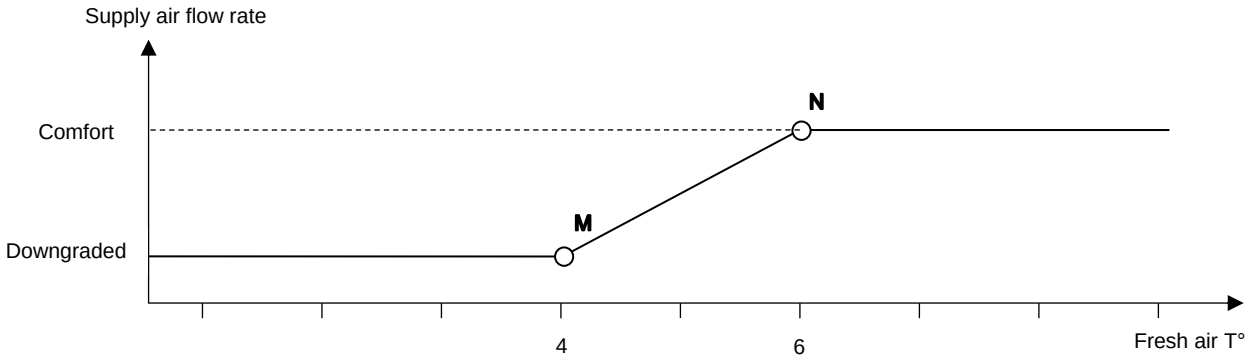
Fig. 9



2.4.5 "Downgraded fresh air flow rate" function

Values used if Downgrad. fresh air flow rate = with (menu p25)

Fig. 10



p10	
Mixing opening	
in "Morning heating" mode	
095%	

"Morning heating" function used in a timed program (*Level 2 access*)

Opening value of mixing damper in "Morning heating" mode

p11	
Mixing opening	
in "ECO Recirculation" mode	
095%	

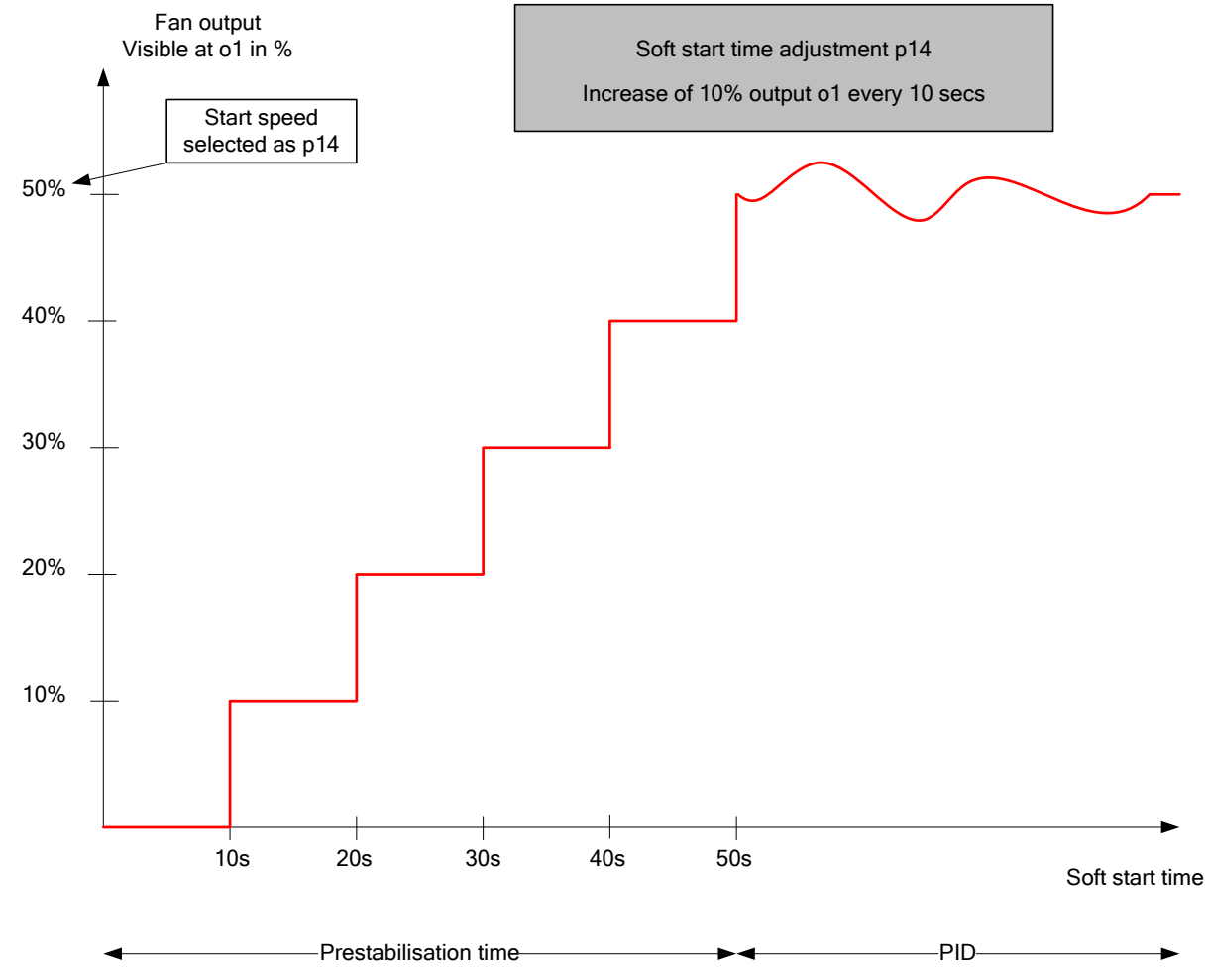
"ECO recycling" function used in a timed program (*Level 2 access*)

Opening value of mixing damper in "ECO Recirculation" mode

Supply air	p14	
Fan band	1400.0	Supply air fan flow control proportional band
Fan IT	0008s	Supply air fan flow control integration time
Start speed	0.0%	Supply air fan speed at the end of the soft start
Return air		
Fan band	1400.0	Return air fan flow control proportional band
Fan IT	0008s	Return air fan flow control integration time
Start speed	0.0%	Return air fan speed at the end of the soft start

Level 3 access

Fig. 11



In this example, start speed = 50%

Supply air	p15	
Duct band	0595Pa	Supply air duct pressure control proportional band
Duct IT	0004s	Supply air duct pressure control integration time
Duct DT	0001s	Supply air duct pressure control derivative time
Return air		
Cst band press.	1200m3/h	Return air fan proportional band in duct pressure operation
Cst pressure IT	0010s	Return air fan integration time in duct pressure operation
Cst pressure TD	0.0s	Return air fan derivative time in duct pressure operation

Level 3 access

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	X1 shift value for the formula for calculating the supply air temperature Comfort setpoint
Eco	-7.0°c	X1 shift value for the formula for calculating the supply air temperature Eco setpoint
X2 offset	5.0°c	X2 shift value for the formula for calculating the supply air temperature Comfort setpoint
Eco	7.0°c	X2 shift value for the formula for calculating the supply air temperature Eco setpoint

Level 3 access

Supply air T° setpoint calculation parameters (See Fig. 1, page 17)

	p17	
FC offset	-3.0°c	Outdoor T° offset from regulated T° for Free Cooling authorisation
Lower limit	15.0°c	Outdoor temperature low limit in free cooling and night cooling mode

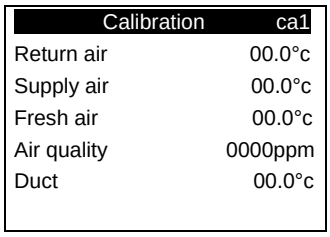
Level 3 access

	p22	
Setpoint min. threshold Filter fouling level supply air	----Pa	Supply air filter fouling minimum threshold (0-100 Pa)
Setpoint min. threshold Filter fouling level return air	---Pa	Return air filter fouling minimum threshold (0-100 Pa)

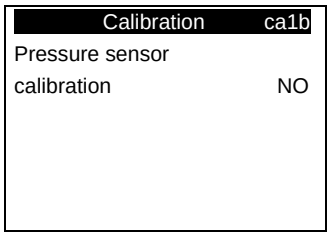
Level 3 access

	p25	
Compensated duct P	-	*Without, With* (Pressure compensation as per Fig. 8, page 28)
FA flow rate down	-	*Without, With* (Downgraded fresh air flow as per Fig. 10, page 29)

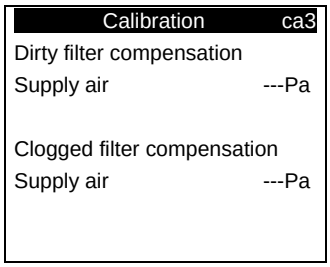
Level 2 access



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



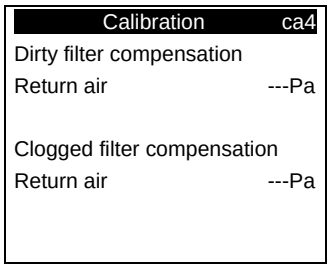
Access Level 3 →Press the prog button from screen ca1
Manual calibration of pressure sensors. Warning: the fans must be completely stopped before using this function.



Level 3 access

Supply air filter dirty detection threshold compensation

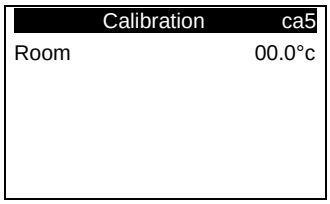
Supply air filter clogged detection threshold compensation



Level 2 access

Return air filter dirty detection threshold compensation

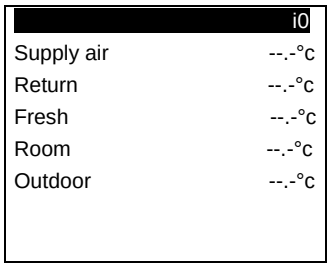
Return air filter clogged detection threshold compensation



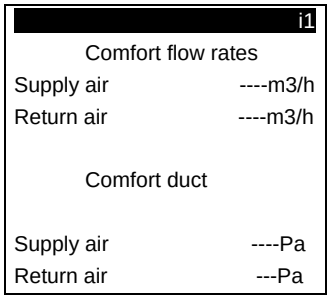
Level 3 access
Calibration of the room terminal temperature sensor

2.5 Read-only parameters menu

2.5.1 Inputs

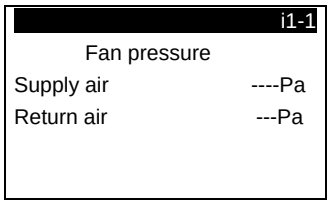


Level 1 access
Supply air temperature value
Return air temperature value
Fresh air temperature value
Room air temperature value
Outdoor temperature value



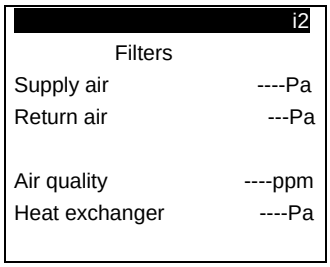
Level 1 access
Indicates flow rate type displayed (Comfort, Eco or auto)
Supply air fan flow rate value
Return air fan flow rate value

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

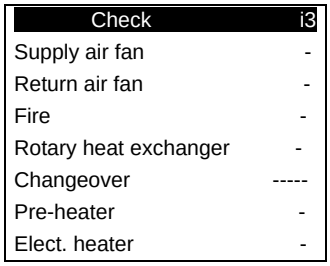
Supply air fan pressure value in Pa
Return air fan pressure value in Pa



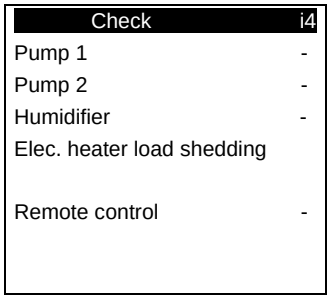
Level 1 access

Supply air filter fouling value
Return air filter fouling value

Air quality value in ppm
Heat exchanger fouling value

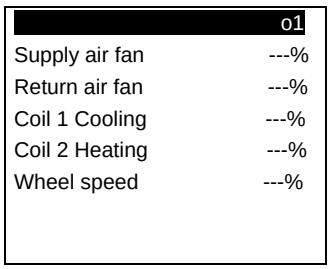


Level 1 access
Supply air fan operation check state (C = on; O = off)
Return air fan operation check state (C = on; O = off)
Fire detection sensor check state (F = no fire; O = fire detected)
Rotary heat exchanger operation check state (F = on; O = fault)
Changeover thermostat state (Cooling or Heating)
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)

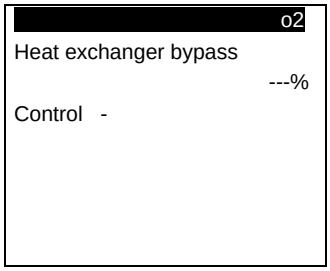


Level 1 access
Hydraulic coil 1 pump operation check state (F = on, O = off)
Hydraulic coil 2 pump operation check state (F = on, O = off)
Humidifier operation check state (F = on without fault, O = de-energised or faulty)
Electric heater load shedding monitoring state (C=No electric heater start-up,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

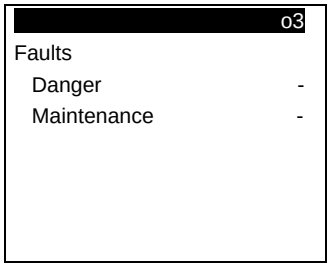
2.5.2 Outputs



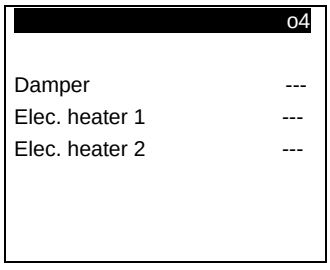
Level 1 access
Supply air fan control value
Return air fan control value
Water coil No.1 valve control value in "Cooling" mode (or Heating)
Water coil No.2 valve control value in "Heating" mode (or Cooling)
Heat exchanger wheel speed control value



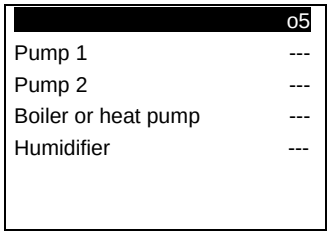
Level 1 access
Screen visible for units with plate heat exchanger
Heat exchanger bypass damper opening valve
Heat exchanger bypass control state (⇧ = open;⇩ = closed)



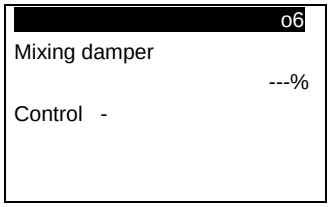
Level 1 access
"Danger" fault summary relay state
"Maintenance" fault summary relay state



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

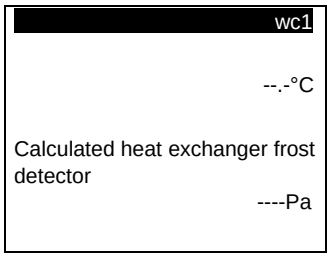


Level 1 access
State of hydraulic coil 1 pump control
State of hydraulic coil 2 pump control
State of heat pump or boiler control (Heating or Cooling mode)
Humidifier operation authorisation state



Screen visible for standard units (*Level 1 Access*)
Mixing damper opening value
Mixing damper control state (⇧ = opened;⇩ = closed)

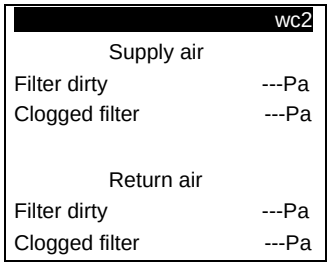
2.5.3 Setpoints



Level 1 access

Calculated regulation setpoint for the supply air temperature

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



Level 1 access

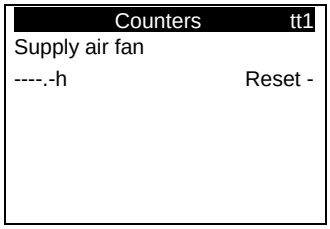
Calculated setpoint for detection of the supply air "Filter dirty" level

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

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

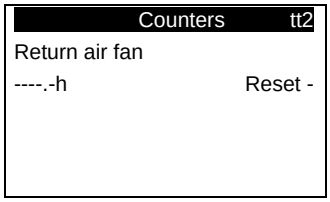
Calculated setpoint for detection of the return air "Filter clogged" level

2.5.4 Counters



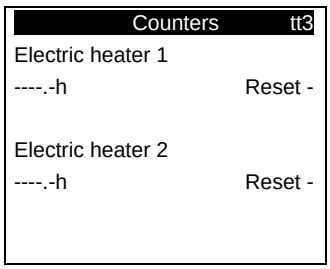
Level 3 access

Supply air fan runtime counter reset and time



Level 3 access

Return air fan runtime counter reset and time



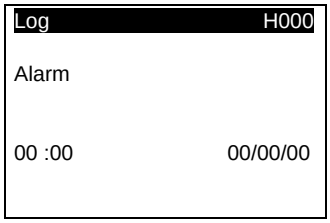
Level 3 access

Electric heaters output 1 runtime counter time and reset

Electric heaters output 2 runtime counter time and reset

EN

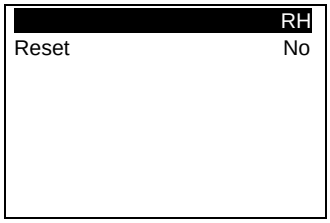
2.6 Fault memory menu



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

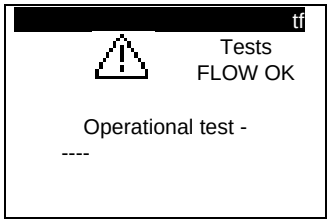
"**Prg**" button



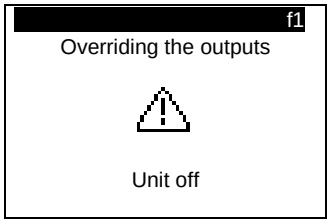
Level 3 access

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**.

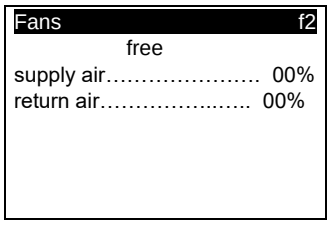
WARNING!

ACTIVATION OF ALL OVERRIDES IS THE PROGRAMMER'S RESPONSIBILITY

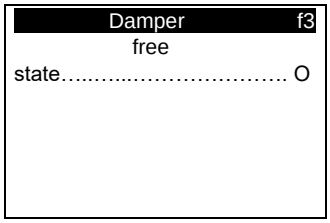
NONE OF THE SAFETY DEVICES IS OPERATIONAL

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**

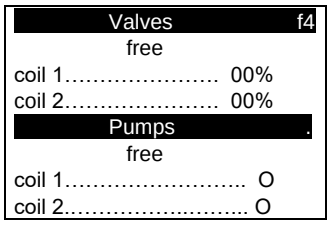
The overrides are cancelled when the unit is set back to "on"



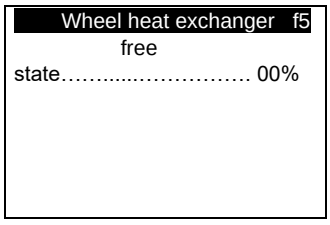
Level 3 access



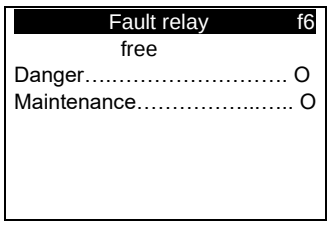
Level 3 access



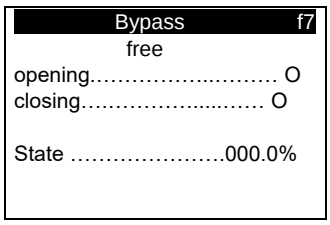
Level 3 access



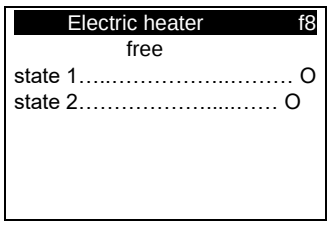
Level 3 access



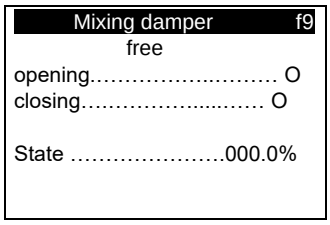
Level 3 access



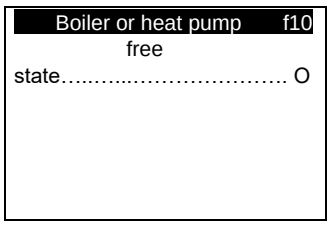
Level 3 access



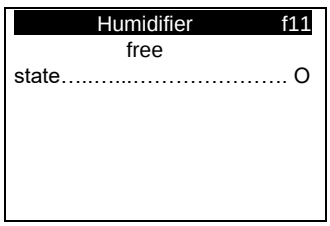
Level 3 access



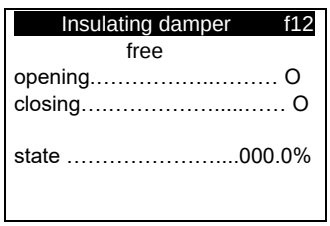
Level 3 access



Level 3 access



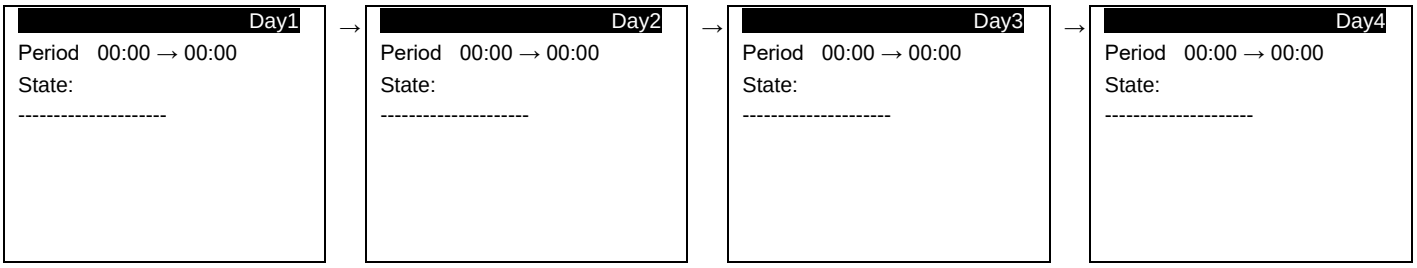
Level 3 access



Level 3 access

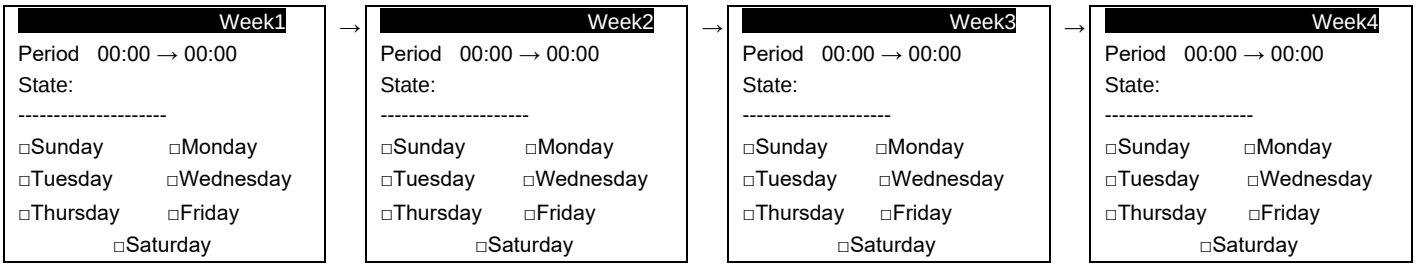
2.8 Time prog menu

Level 1 access



EN

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°
Eco flow rate
Eco 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°
Eco flow rate
Eco 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**

Annual1	→	Annual2	→	Annual3	→	Annual4
Period 00:00 → 00:00		Period 00:00 → 00:00		Period 00:00 → 00:00		Period 00:00 → 00:00
State:		State:		State:		State:
----------		----------		----------		----------
Date 00/00/2000		Date 00/00/2000		Date 00/00/2000		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°
Eco flow rate
Eco 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

2.8.1Time program derogation by Th-tune

When a Th-Tune is present, a derogation is possible when the AHU is in standby or in eco mode with a time program (temperature, flow rate or pressure).

 keypress triggers a restart of the machine for 2 hours in comfort mode. Then a small key  is displayed on the Th-Tune and the time program logo  of the terminal flashes.

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*

YES: remote control by CMS (on/off and mixing opening)

NO: local control

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)

EN

pLAN NETWORK	pL1
pCO3 address	01
1 16	
17 32	

Level 1 access

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

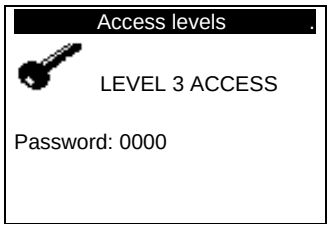
Pressing the **alarm** button (or on the remote terminal) confirms and clears all faults that are no longer present.
To view faults that are still present, press the buttons ↑↓
The following screen appears when no faults are present:

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 .  LEVEL 1 ACCESS Back to level 1: No	*If level 1 access selected* If yes back to access level 1
Access levels .  LEVEL 2 ACCESS Password: 0000	*If access level 2 selected and access level = 1* Re-enter the installer password
Access levels .  LEVEL 2 ACCESS Enter new code level 2? No	*If password ok* If yes, change the installer password; if no, back to current access level page
Access levels .  LEVEL 2 ACCESS New password: 0000	Re-enter the new installer password
Access levels .  LEVEL 2 ACCESS Back to level 2: No	*If access level 2 selected and access level = 3* If yes back to access level 2



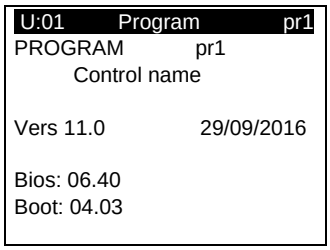
If access level 2 selected and access level = 1

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.

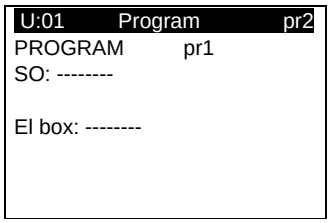
EN

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

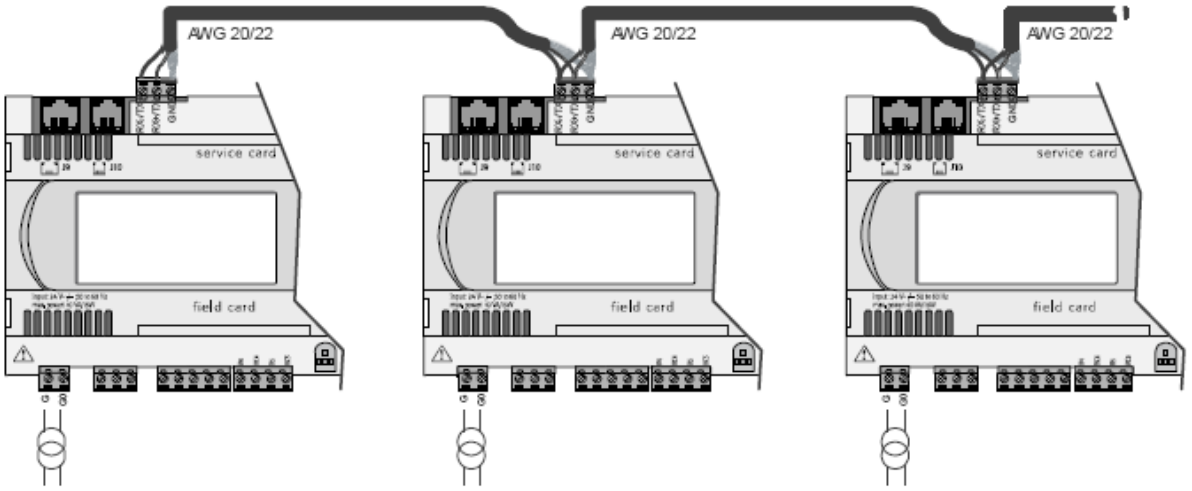
The pLAN network (**p**ersonal **L**ocal **A**rea **N**etwork) is the name of the physical network that links controllers to remote HMI terminals.

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

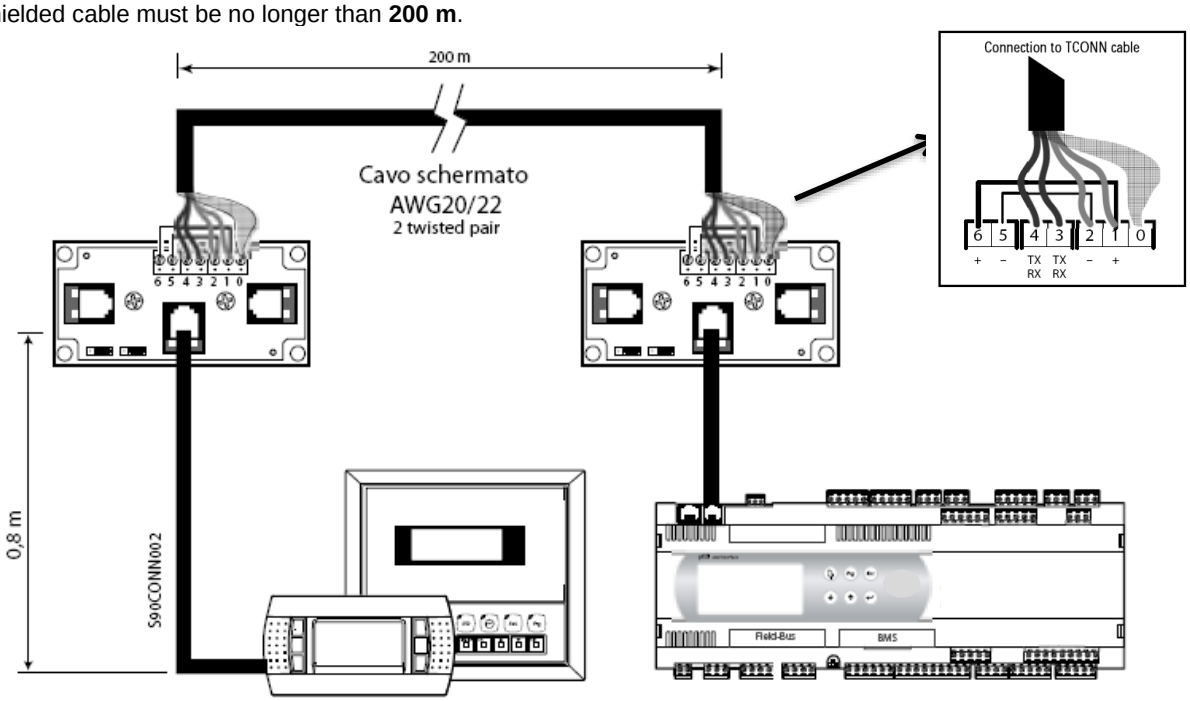
3.1.1 Connecting controllers to the pLAN

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.



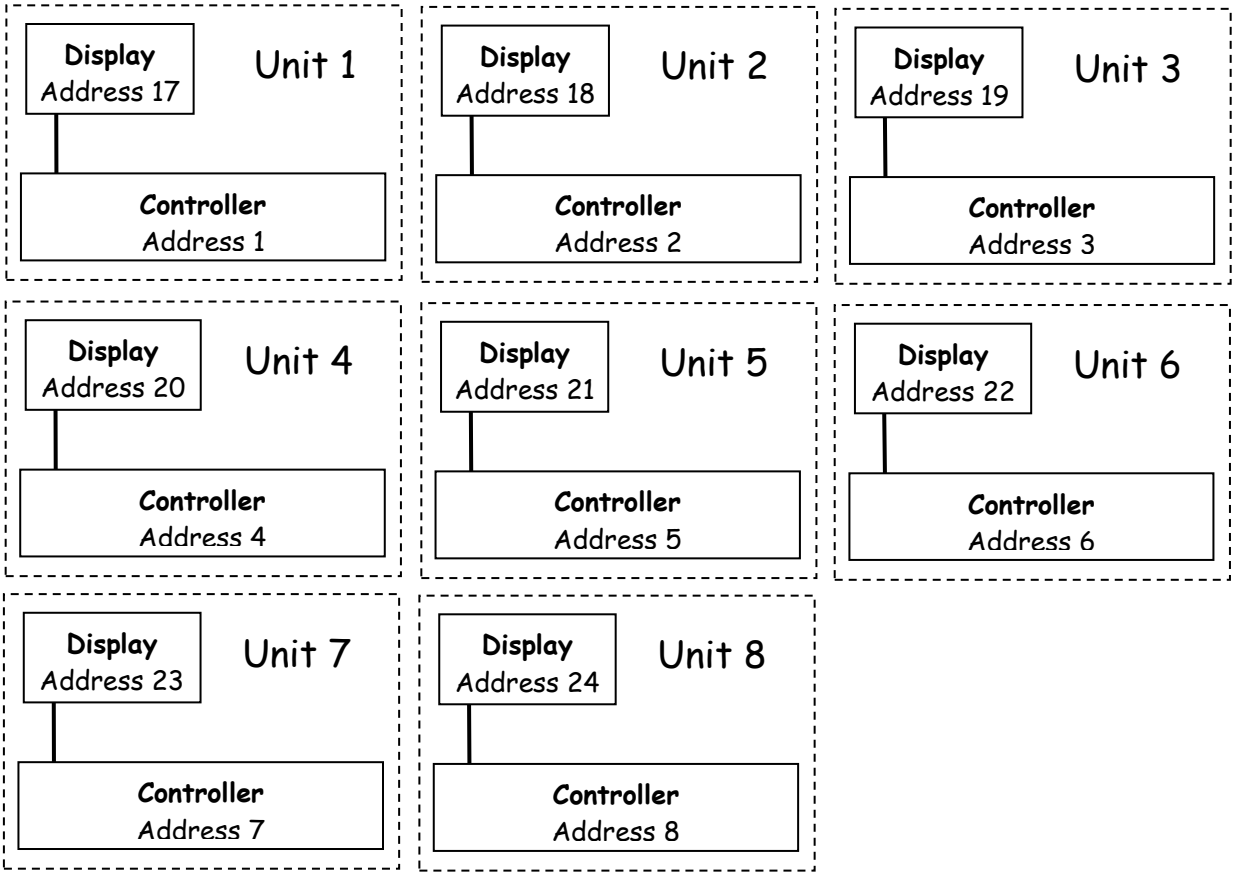
3.1.2 Connecting a remote screen to the pLAN

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:



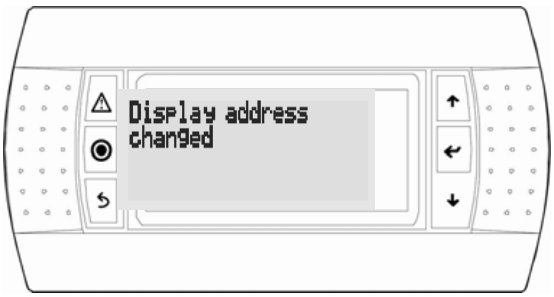
3.3 Changing the controller address

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:

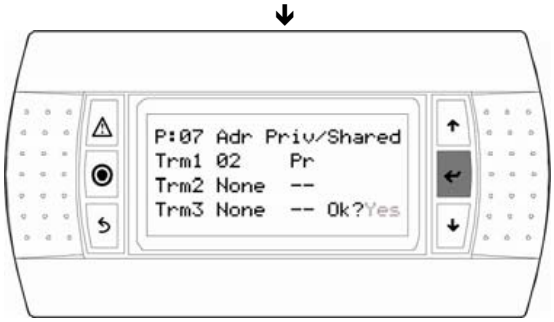
• to change the terminal's address (display address setting) press the↵ button once. The pointer will move to the address field (02).
• using the ↑↓ buttons, select the desired value, and confirm by pressing the↵button again. If the value selected is different from that stored previously, the mask of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

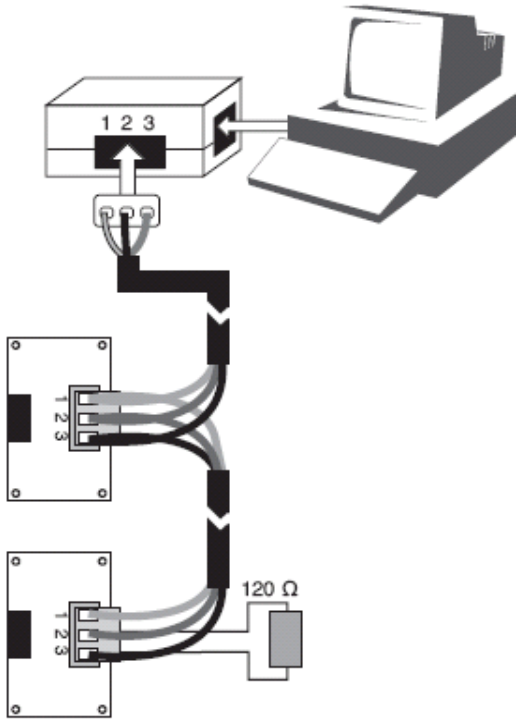
- **Protocol** *KNX*
- **Speed** *9600* bds (Obligatory)
- **Address** *001* (Obligatory)

5.2 The datapoint database

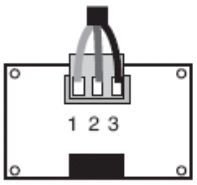
The unit comes with a communication database that includes the most important datapoints for the program, from the values of the sensors to the parameters displayed in the masks. The database contains three types of datapoint: digital datapoints, integer datapoints and analogue datapoints. The tables 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

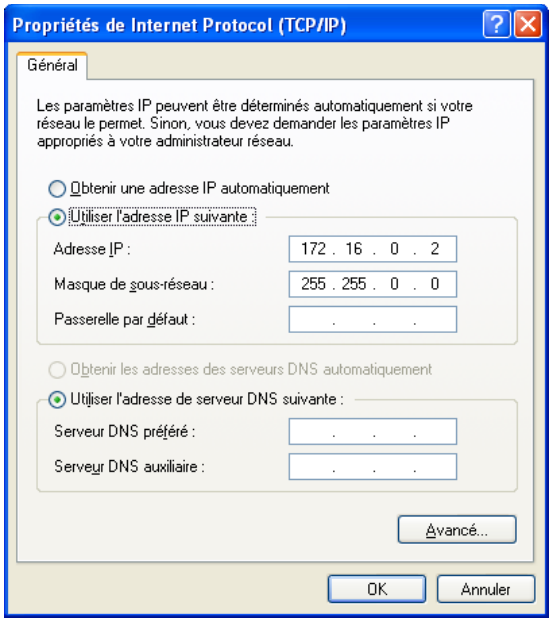
- 8: Read diagnostics counters
- 11: Read event counter
- 15: Write n bits
- 16: Write multiple registers (16 bits)

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



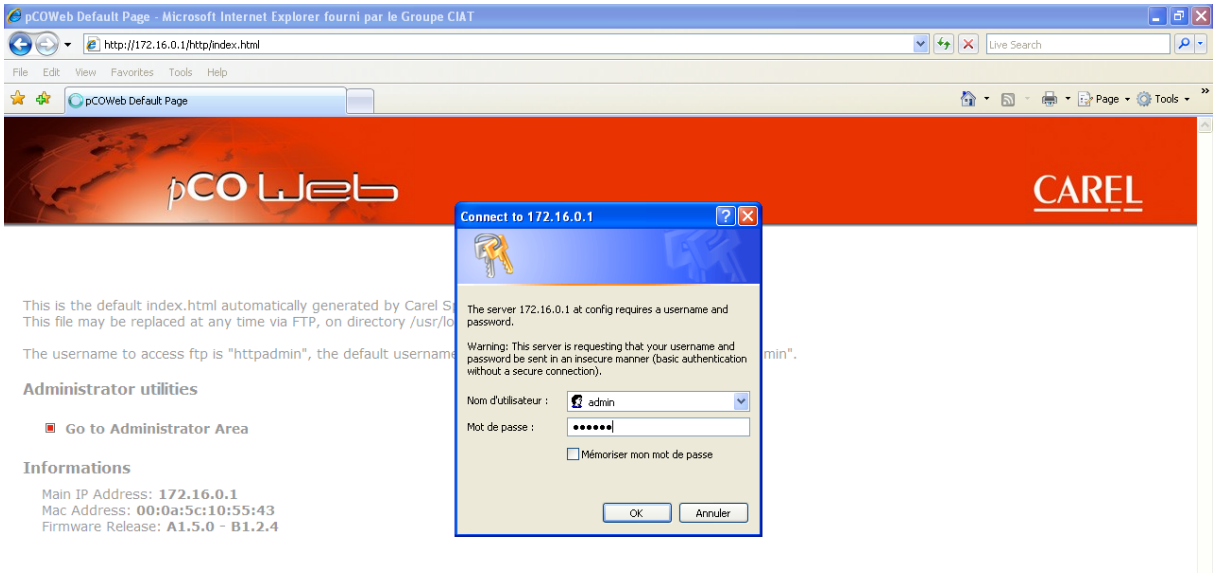
pCOWeb card IP address: 172.16.0.1

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

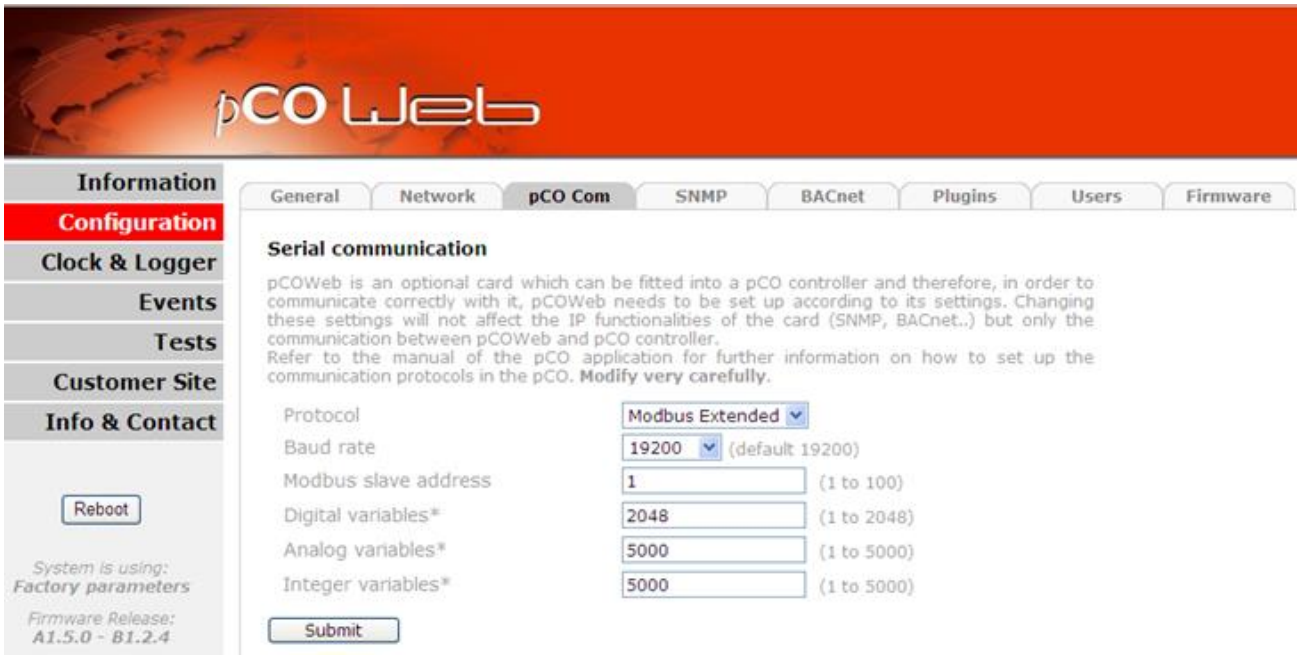
During normal operation, with the cable connected and the IP correctly set, the LED on the left is green and flashing and the LED on the right is green and constant.

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

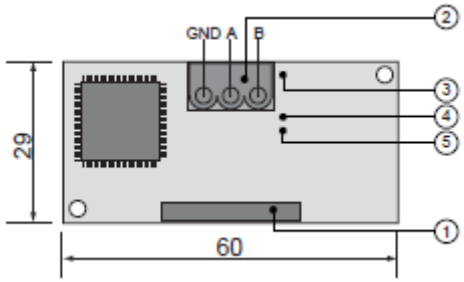


5.3.4 Variables

Table available upon request.

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)

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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:

Task	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	NV code	NV 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*

Type	Index	NV name	NV code	NV type	Direction	Description
					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*

5.4.3 The analogue datapoints

Type	Index	NV name	NV code	NV 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*

Type	Index	NV name	NV code	NV type	Direction	Description
					Value 5 Value 6	*switched off by CMS* *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

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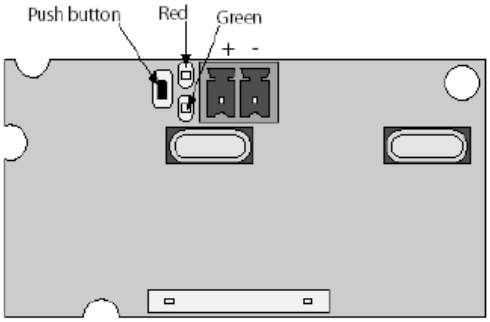
5.5 KNX

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

5.5.2 Configuration process

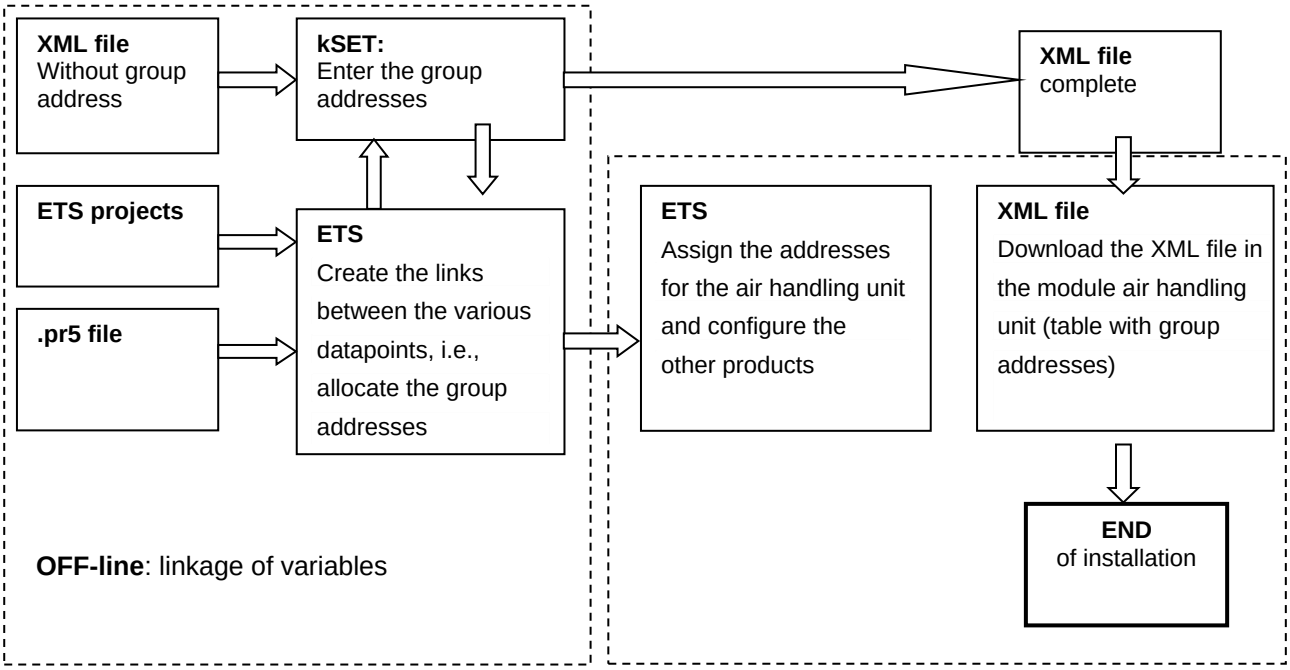
The manufacturer does not provide a system start-up, configuration, parameter setting or KNX network addressing service. The configuration of this type of network requires the creation of an ETS database. This database may only be used and managed by personnel trained in the use of KNX configuration tools and their associated specifications. Refer to the recommendations issued by the KNX association (www.knx.org) for more information on this matter.

To ensure the KNX network is correctly configured, each party must undertake to adhere to the following roles.

Task	Brand	Integrator	Installer
Supply of the KNX communication board	x		
Supply of the KSet software, the plug-in and the xml integration file	x		
Installation of units equipped with KNX controller			x
Creation of the ETS database		x	
Addressing and configuration of the KNX network		x	
Definition of the links between KNX controllers and with the BMS		x	
Definition of BMS setpoints and time schedules		x	

Considering the central role of the integrator, it is essential that the latter is included in the project as early as possible so as to be able to anticipate and validate the BMS architectures, integration tools, etc.

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



The first step of the configuration is performed OFFline (i.e. disconnected from the network). It consists of defining, within ETS, the list of products used in the project and of defining the group addresses (i.e. the data which will be exchanged between the KNX controllers).
The special feature of the KNX controller for air handling units is that the allocation of the group addresses is not performed from ETS but from the KSet software.

The creation of air handling controllers in the ETS project requires the use of a plug-in, which also enables the xml file generated with KSet to be imported and uploaded to the air handling unit controller.

KSet software

To allocate the group addresses OFFline, install and open the KSet software. In the File menu, open the xml file provided, which contains 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_2_Count	8.001	OUT	11	REG
Return air fan flow rate	DebitVentilExtra	DPT_Value_2_Count	8.001	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* *Bit 2 = Sensor B3* *Bit 3 = Sensor B4*	Alarme2	DPT_Value_2_Ucount	7.001	OUT	29	REG

Description	DatapointName	Datapoint TypeName	Datapoint TypeCode	IN/OUT	Index	COIL/REG
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

When all the group addresses have been defined, save the xml file (File menu) with another name.

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.

The plugin

Declaring the air handling unit controller in the ETS project requires the use of a plug-in:

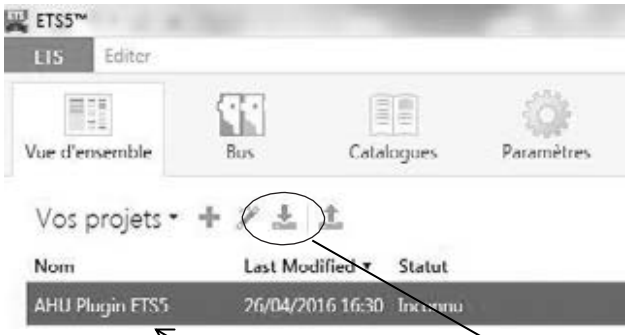
AHU_plugin_21 for ETS3
AHU_plugin_30 for ETS4
AHU_plugin_ETS5 for ETS5

This plugin is used to allocate the individual addresses for the controllers and to download the table created by KSet, which is the XML file.

Installing the plugin with ETS5

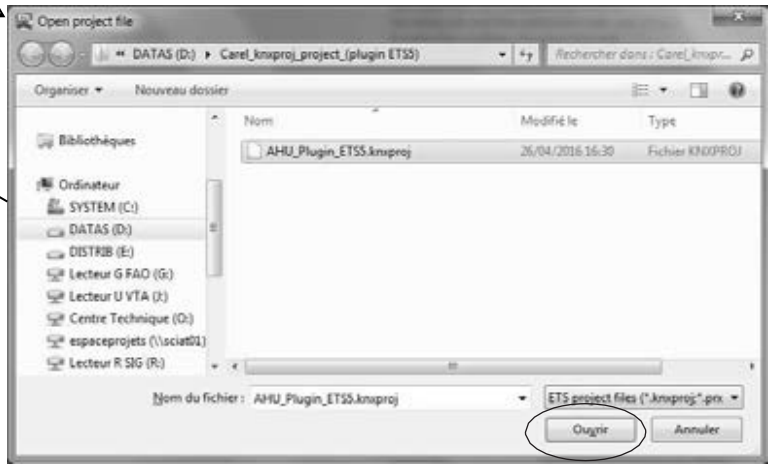
Carry out installation of the plugin AHU_Plugin_ETS5.knxproj provided.

Import "AHU_plugin_ETS5.knxproj" as shown below.



Select the plugin
and follow the instructions

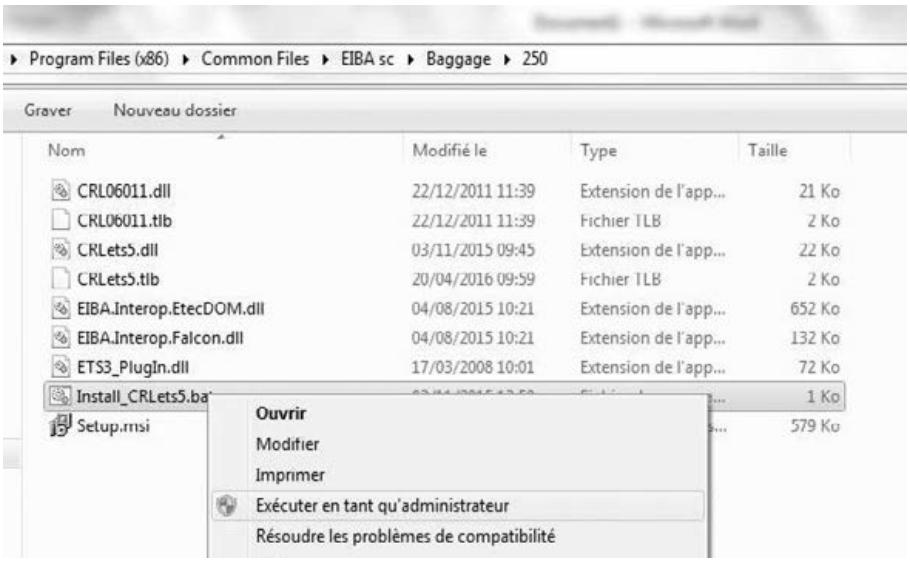
Once import is complete,
"AHU_plugin_ETS5" should
appear in the list of projects



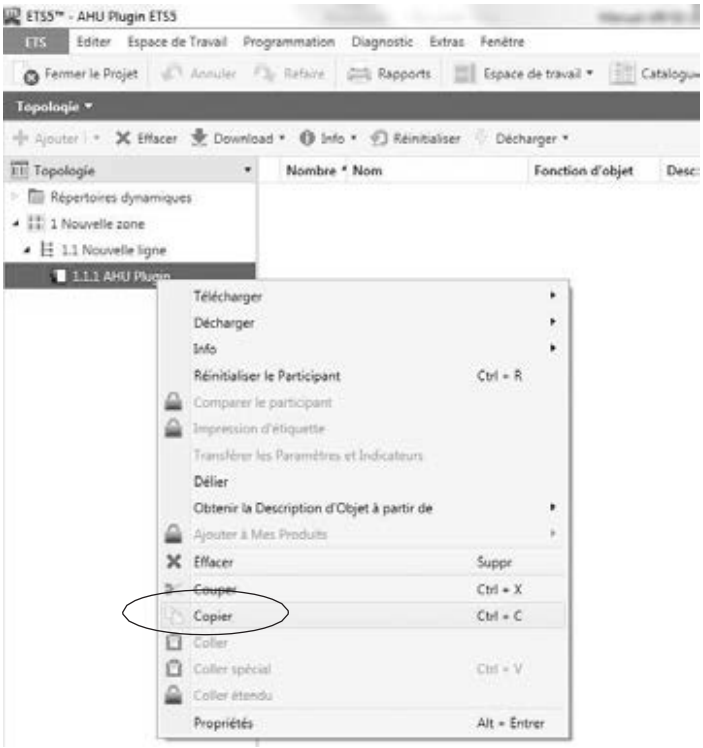
Close ETS.

Execute the batch file in the directory below as an administrator:

For 64-bit Windows: C:\Program Files (x86)\Common Files\EIBA sc\Baggage\250\Install_CRLets5.bat
For 32-bit Windows: C:\Program Files\Common Files\EIBA sc\Baggage\250\Install_CRLets5.bat



Reopen ETS5 and open the "AHU_plugin_ETS5" project.



Copy and paste the plugin model for each device to be included in your project. The address of each device is automatically incremented. If necessary, you can manually change the address of a device in Properties.

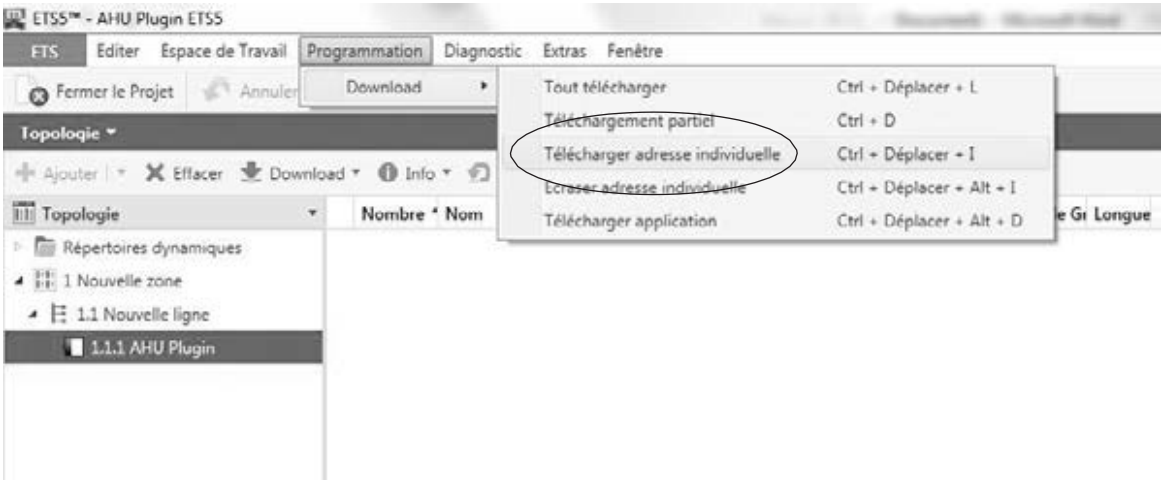
Assigning the physical address

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

- The Bus wire network is drawn out and connected
- The Bus is powered on
- The optional KNX board is connected to the network
- The controller is powered on

Use the mouse to select the controller which must be configured, and right-click to select "Download" (or in the Programming menu, select "Download").

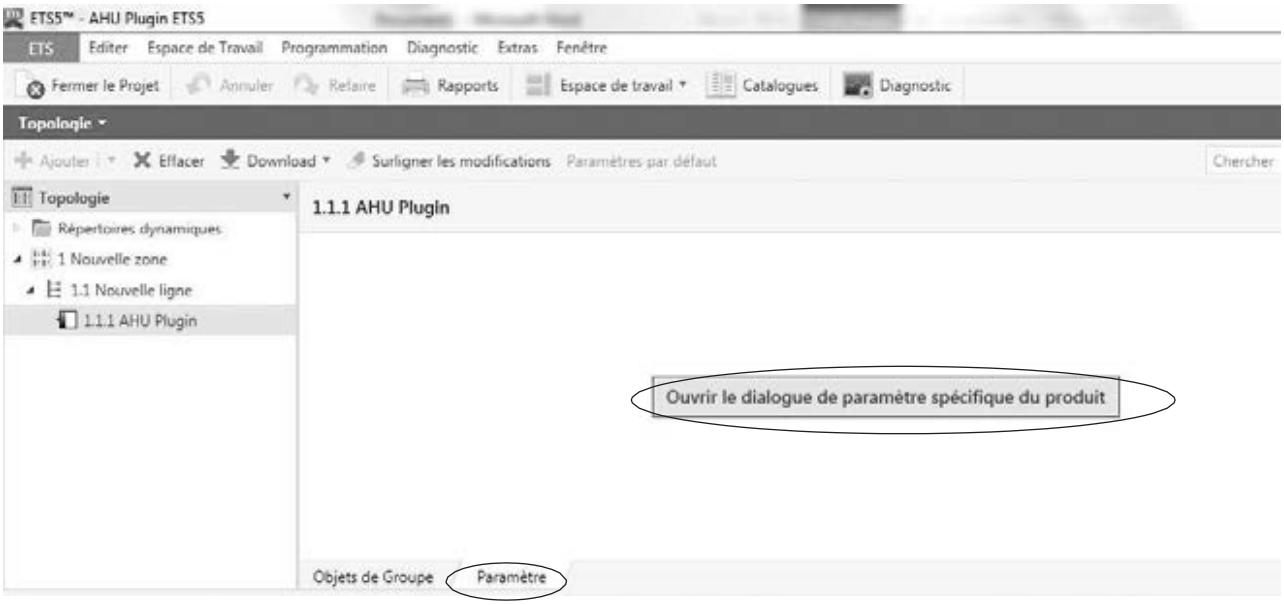
Select "Download individual address" to activate the configuration procedure and press the button on the board. The green LED on the board goes out to indicate when the operation is complete. If the board address has already been configured, the message "The address is already used by another device"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



Downloading the XML file

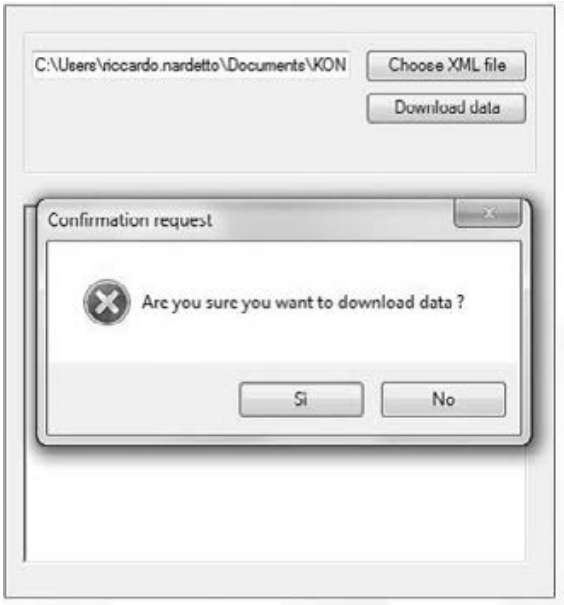
You must ensure that:
- The Bus wire network is drawn out and connected
- The Bus is powered on
- The KNX board is connected to the network
- The controller is powered on

On ETS5, use the mouse to select the controller which needs to be configured, select the "Parameter" tab and click "Open the dialogue box for parameters specific to the product".



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

Click on "Download data" and confirm the confirmation request.
Wait for the message "Memory access closed successfully" to be displayed. During the loading phase indicated by the drop-down control lines under ETS5, and while the green LED on the board is flashing, no other operation can 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 ETS5 will signal an error. In this case, simply repeat the download.



NOTE:

This procedure is specific to the KNX board and is the only configuration operation permitted by the ETS5 program, other than allocation of the address.

The KNX datapoints loaded via this plug-in do not appear in the Group Objects tab. To check and/or modify your group addresses, you need to re-open your xml file from KSet and, once the modifications are complete, upload it via the ETS plugin.

Our PLC does not have any configuration parameters accessible within KNX. They can only be accessed from the HMI terminal.

6 Table of alarms

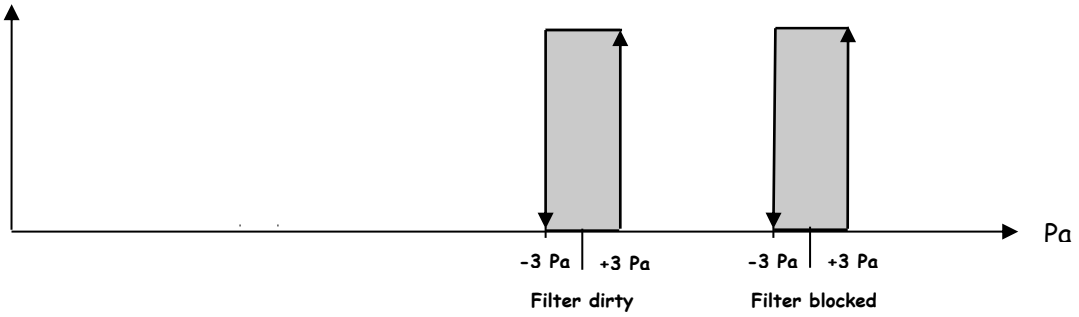
All possible options are covered by this table.

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

Fig. 12



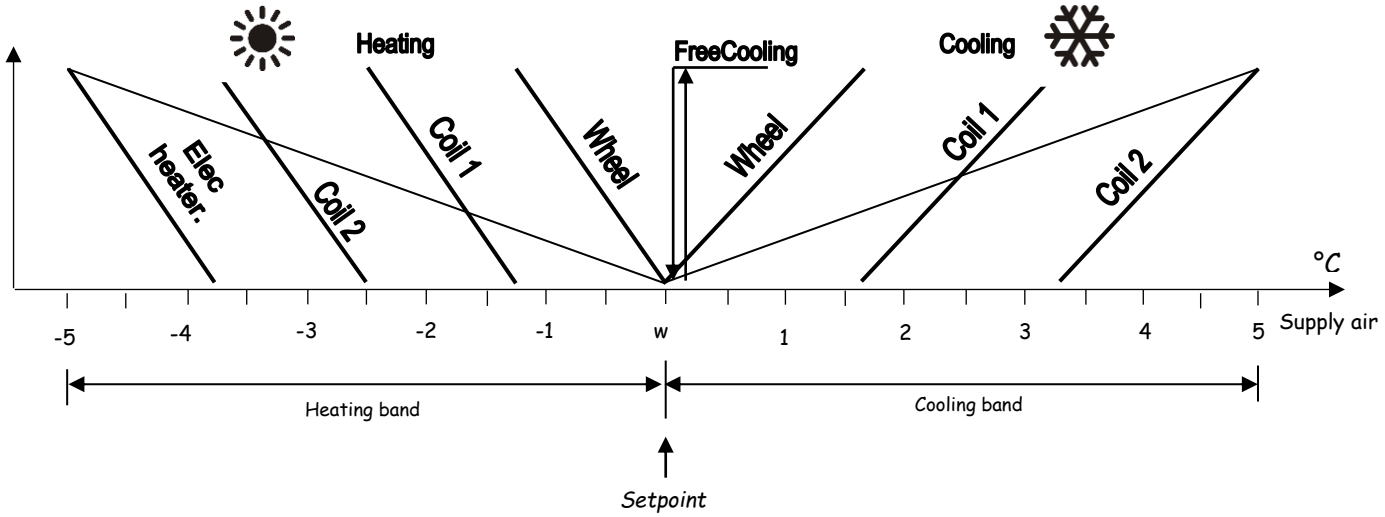
ΔP > "Filter dirty": Clogged filter, maintenance alarm
ΔP > "Filter blocked": Filter blocked, system shut off alarm

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

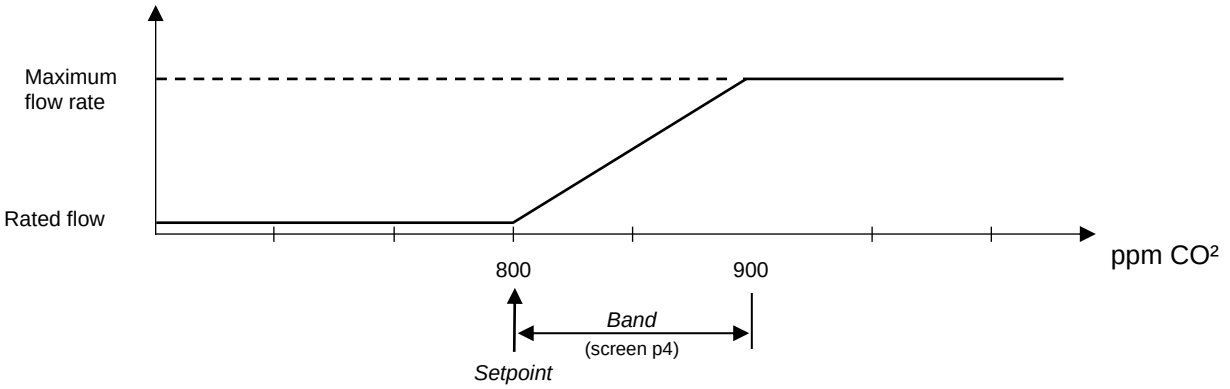
Fig. 13



7.3 Air quality check

Fig. 14

If a mixing damper is present, the machine is forced to 100% fresh air as soon as the measured air quality is higher than the setpoint.



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