EN7565703-02

01 - 2021

FLOWAY

CLASSIC RHE/PHE & VERTICAL PHE

CIAT

Control manual

Compact AHU Control 2 V1

CONTENTS

TRANSLATION OF THE ORIGINAL DOCUMENT

1 - PREAMBLE

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.

An HMI terminal associated with the PLC is used to view and modify the following parameters:
- 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
- Managing time programs (6 weekly and 6 annual)
- Language selection

Various terminal variants are available, to provide adaptability to the widest possible range of requirements:
- Remote terminal
- Terminal sharing between several air handling units
- Simplified remote user control in the room to be conditioned

This device is not designed to be used by persons (including children) with limited physical, sensory or mental capabilities, or by persons with insufficient experience or knowledge.

Only qualified personnel, who have received in-depth training in the equipment, are authorised to work on the machine or modify the PLC's advanced parameters.

If it proves necessary to work on the unit, all the guidelines and instructions given in the maintenance brochures, on the labels or in the instructions accompanying the equipment should first be observed, along with any other applicable safety advice. It is in particular recommended to cut all the power supplies to the unit using the disconnect switch and/or circuit breakers, and wait for the motors and all other moving mechanical parts to stop.

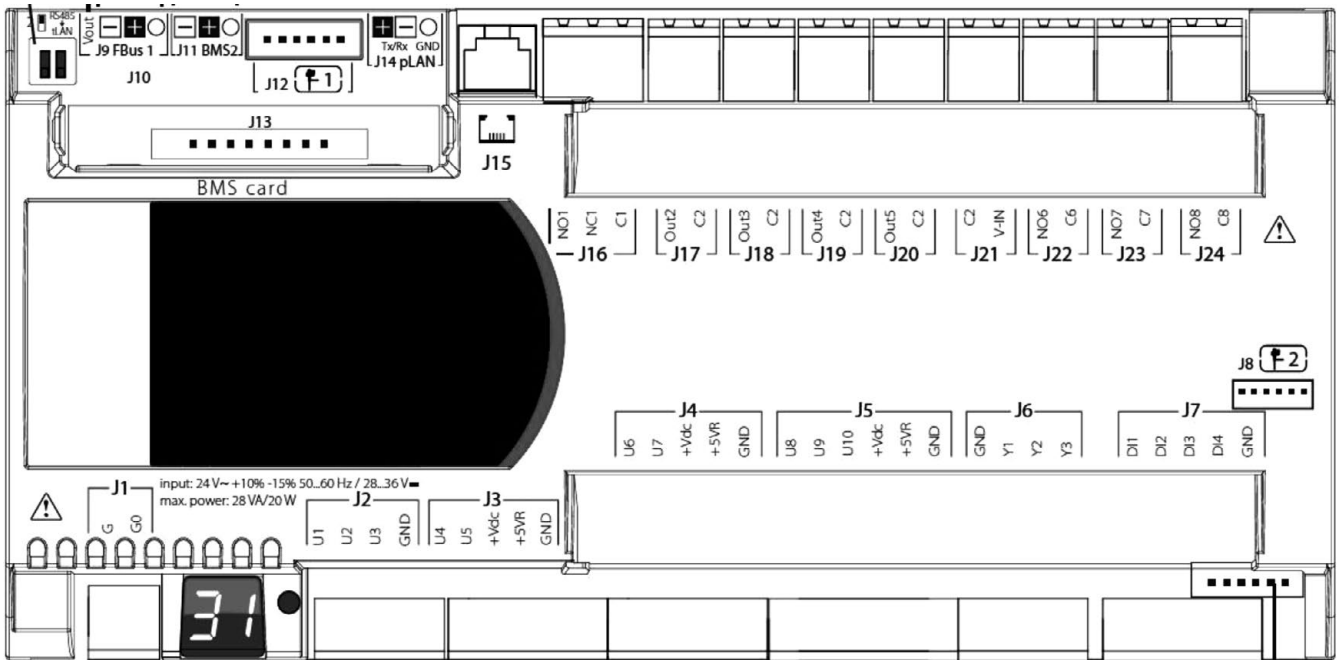
2 - REGULATING CONTROLLER

2.1 - Introduction

The control PLC is used to control and monitor the operating status of the various components of the air handling unit. Depending on the options, it controls the temperature, manages the fans, monitors filter fouling and the air quality level. It can be connected to a CMS so that it can be controlled remotely.

2.2 - Inputs/outputs

The PLC has analogue and on/off inputs/outputs. The list of inputs/outputs is described below (depending on the options installed). The controller is installed in the electrics box.



Input designation	Type
U	Universal input (analogue or on/off)
GND, C	Shared
DI	Dry contact On/Off input
Y	0-10V analogue output
Out	Polarised 24 VAC On/Off output
NO	Normally open potential-free on/off output
NC	Normally closed potential-free on/off output

Connector	Input	Type	Description
J1	G		+24 Vac power supply
	G0		Shared
J2	U1	0-10V	Supply air duct pressure sensor or $_{CO2}$ air quality measurement sensor
	U2	NTC	Temperature sensor (see assignment table below)
	U3	NTC	Temperature sensor (see assignment table below)
	GND		Shared
J3	U4	NTC	Temperature sensor (see assignment table below)
	U5	NTC	Supply air temperature sensor in the additional casing
	+Vdc		Power supply to unit internal pressure sensors
	+5VR		Not used
	GND		Shared
J4	U6	0-10V	Filter differential pressure measurement (see assignment table below)
	U7	0-10V	Fan differential pressure measurement (see assignment table below)
	+Vdc		Not used
	+5VR		Not used
	GND		Shared
J5	U8	0-10V	Filter differential pressure measurement (see assignment table below)
	U9	0-10V	Fan differential pressure measurement (see assignment table below)
	U10	On/off	Setpoint 1 / Setpoint 2 contact
	+Vdc		Not used
	+5VR		Not used
	GND		Shared
J6	GND		Shared
	Y1	0-10V	Hydraulic coil 1 valve control or electric heater triac control
	Y2	0-10V	Hydraulic coil 2 valve control
	Y3	0-10V	Intake fan control
J7	DI1		Pump 1 fault
	DI2		Pump 2 fault
	DI3		Remote control
	DI4		Fire fault
	GND		Shared
J8			Not used
J9	Vout		Not used
	FBus1 -		Remote display connection in Th-Tune room - Tx/Rx -
	FBus1 +		Remote display connection in Th-Tune room - Tx/Rx +
	GND		Remote display connection in Th-Tune room - common
J10			Not used
J11	BMS2 -		ModBus RS485 CMS connection - Tx/Rx -
	BMS2 +		ModBus RS485 CMS connection - Tx/Rx +
	GND		ModBus RS485 CMS connection - shared
J12			Not used
J13	BMS1		Location for KNX, LON, Bacnet IP, Modbus IP, Webserver expansion board
J14	pLAN -		pLAN - Rx/Tx-
	pLAN +		pLAN - Rx/Tx+
	GND		pLAN - shared
J15			pLAN connector for HMI terminal
J16	NO1	On/off	Pump 1 control contact
	NC1		Not used
	C1		+24 Vac power supply
J17	Out2	On/off	Supply air and return air dampers
	C2		Shared
J18	Out3	On/off	Fresh air and exit dampers
	C2		Shared
J19	Out4	On/off	Fresh air rate decrease (mixing damper)
	C2		Shared
J20	Out5	On/off	Fresh air rate increase (mixing damper)
	C2		Shared
J21	C2		Shared
	V-IN		+24 Vac power supply

Connector	Input	Type	Description
J22	NO6	On/off	AHU operating feedback
	C6		Shared
J23	NO7	On/off	Danger fault summary relay
	C7		Shared
J24	NO8	On/off	Maintenance faults summary relay
	C8		Shared
J25	DI7H		Not used
	DI7	On/off	Air intake fan control
	DI7C		Shared
	DI8	On/off	Extraction fan control
	DI8H		Not used
J26	Y4	0-10V	Exhaust fan control
	Y5	0-10V	Rotary heat exchanger speed control or plate heat exchanger bypass servomotor control
	U11	On/off	Changeover thermostat
	GND		Shared
	U12	0-10V	Heat recovery unit differential pressure OR exhaust duct pressure
	GND		Shared
	DI9	On/off	Rotary heat exchanger check
	DI10	On/off	Electric heaters 1 and 2 fault summary
	DI9C		Shared
J27	NO9	On/off	External generator (heater or cooler)
	C9		Shared
	NC9		Not used
	NO10		Not used
	C10		Not used
	NC10		Not used
J28	C11		+24 Vac power supply
	NO11	On/off	Electric heater stage 1 control
	NO12	On/off	Electric heater stage 2 control or preheater control
	NO13	On/off	Pump 2 control
	C11		+24 Vac power supply

Assignment of pressure and temperature sensors, depending on the unit type

	Unit type		
	Classic RHE	Classic PHE	Vertical PHE
Supply air temperature sensor	J2-U3	J2-U3	J2-U3
Return air temperature sensor	J2-U2	J3-U4	J3-U4
Fresh air temperature sensor	J3-U4	J2-U2	J2-U2
Intake fan pressure sensor	J4-U7	J4-U7	J5-U9
Exhaust fan pressure sensor	J5-U9	J5-U9	J4-U7
Intake filter fouling pressure sensor	J4-U6	J5-U8	J5-U8
Exhaust filter fouling pressure sensor	J5-U8	J4-U6	J4-U6

Customer terminals

The following inputs/outputs are provided for the customer's use, to remote control the machine and/or report the AHU's status. This information is fed to unit terminal strips Xf18 and Xf22:

PLC terminals	Customer terminals	Function	Type
J22-NO6/C6	Xf18-1/2	AHU operating feedback	Dry contact output (250 Vac, 1A resistive load, 1A inductive load with cosφ=0.6)
J23-NO7/C7	Xf18-3/4	Danger fault summary relay	Dry contact output (250 Vac, 1A resistive load, 1A inductive load with cosφ=0.6)
J24-NO8/C8	Xf18-4/5	Maintenance faults summary relay	Dry contact output (250 Vac, 1A resistive load, 1A inductive load with cosφ=0.6)
J5-U10/GND	Xf18-6/7	Setpoint 1/Setpoint 2 changeover	Dry contact input, not optically isolated
J7-DI3/GND	Xf18-8/9	Remote control	Dry contact input, not optically isolated
J7-DI4/GND	Xf22-9/10	Fire detection	Dry contact input, not optically isolated

2.3 - Alphanumeric terminal

The terminal is supplied equipped with an alphanumeric screen (8 lines x 22 characters) and 6 keys. It is connected to connector J15 on the PLC via a telephone cable.

It is used to modify the programme parameters and view the machine state.

2.3.1 - Machine status

The terminal is used to view the machine state.

List of symbols and explanations

ON Indicates the unit run or shutdown request

Icon	On/off request for the unit
OFF	Off from the terminal or the CMS
ON flashing	On from the terminal or the CMS and off via the remote control
ON	On from the terminal or the CMS

ON Indicates the state of the time schedule

Icon	Time schedule state
	No validated time schedule
ON	At least one time schedule is validated but not active
OFF	At least one time schedule is validated and active

U:01 Indicates the unit's address on the pLAN bus

15:30 Indicates the time

21.4 °C Indicates the set temperature value (room, extraction or intake)

On Indicates the unit state

Unit status	Description
Off	The unit is off
Off due to a fault	The unit is stopped following a fault
On	The unit is operational
On setpoint 1	The unit is operational with the setpoints 1
On setpoint 2	The unit is operational with the setpoints 2
Night cooling	Night cooling mode is active
Frost protection	The unit is stopped but is providing frost protection
Test mode	Test mode is active
Fire protection	Fire protection is active

Control active Indicates the operating status

Operating status	Description
Damper opening	The isolation damper is in the process of opening
Ventilation start-up	The ventilation is in the process of starting up
Control active	The control functions are active
Control limited	Certain control functions are not authorised (e.g.: flow rate insufficient for operation of the electric heater)
Fan delay	The AHU is in the process of shutting down but the ventilation remains active to cool the electric heaters
Free cooling	Free cooling is in progress
Outdoor temperature limit	The outdoor temperature is too low for the unit to operate
Heat recovery unit defrost preheat	The heat recovery unit is defrosting.

Lower line (symbol fixed if operation requested but inactive, symbol animated if operation requested and active)

Indicates a "Cooling" request

Indicates a "Heating" request

Indicates the operation of the fan(s)

Indicates the "Air quality" operating mode

2.3.2 - Menus

The user interface is organised according to the menus below (certain menus are only accessible when the access level is 2 or 3 (see 3.18), and when the option is present on the machine):

1 / Machine status
2 / Setpoints
3 / Fault
4 / Fault memory
5 / Time schedule
5.1 / Weekly
5.2 / Annually
6 / Access levels
7 / Machine parameters (P01 to P99)
8 / Setting parameters (P100 to P299)
9 / Read parameters (P300 to P549)
10 / Versions (P550 to P599)
11 / Fault level (P600 to P699)
12 / Communication
12.1 / BMS1 (P700 to P709)
12.2 / BMS2 (P710 to P719)
12.3 / pLAN (P720 to P729)
13 / Calibration (P800 to P849)
14 / Direction of the inputs/outputs (P850 to P899)
15 / Prioritisation (P900 to P999)
17 / Intake FMA EC motor (P1200 to P1219)
19 / Exhaust FMA EC motor (P2200 to P2219)
21 / Test mode (P3500 to P3599)
22 / Measured values

2.3.3 - Buttons

The 6 keys on the interface are used to change the parameters, acknowledge faults, and switch the unit on or off. The operation of these keys is described below.

Button	Description
Esc	Used to go up one level in the menu tree and access the machine status menu from the general menu
	This button is used to view the faults on the display and indicates the presence of a fault: 
Prg + 	Acknowledgement of a fault.
↓	This key has several functions: 1. to manage the masks on the display (next mask) 2. to go to the next line in the menu 3. to adjust the values of the monitoring parameters (decrease)
↑	This key has several functions: 1. to manage the masks on the display (previous mask) 2. to go to the previous line in the menu 3. to adjust the values of the monitoring parameters (increase)
Prg + ↑	Switches the unit on.
Prg + ↓	Switches the unit off.
↵	Used to validate the data entered and go into a menu. It is continuously backlit to indicate when the power is on

2.4 - Touchscreen terminal

The terminal supplied is equipped with a 4.3" touchscreen display. It is connected to connector J15 on the PLC via a telephone cable.

It is used to modify the programme parameters and view the machine state

2.4.1 - Machine status

The terminal is used to view the machine state.

- **Return air 21.4°**C — Indicates the controlled temperature value (supply, return or room air)
- **Intake 10,000 m³/h 120 Pa:** — indicates the flow rate or pressure value measured at the intake
- **Exhaust 11,500 m³/h 150 Pa:** — indicates the flow rate or pressure value measured at the exhaust
-  — Indicates the operation of the fan(s) (rotates when the fans are working)

- Unit status **On** — Indicates the unit state

State of the unit	Description
Off	The unit is off
Off due to a fault	The unit is stopped following a fault
On	The unit is operational
On setpoint 1	The unit is operational with the setpoints 1
On setpoint 2	The unit is operational with the setpoints 2
Night cooling	Night cooling mode is active
Frost protection	The unit is stopped but is providing frost protection
Test mode	Test mode is active
Fire protection	Fire protection is active

- **Control active** — Indicates the operating status

Operating status	Description
Damper opening	The isolation damper is in the process of opening
Ventilation start-up	The ventilation is in the process of starting up
Control active	The control functions are active
Control limited	Certain control functions are not authorised (E.g.: flow rate insufficient for the electric heater operation)
Fan delay	The AHU is in the process of shutting down but the ventilation remains active to cool the electric heaters
Free cooling	Free cooling is in progress
Outdoor temperature limit	The outdoor temperature is too low for the unit to operate
Heat recovery unit defrost preheat	The heat recovery unit is defrosting.

- **Current mode:** — symbol grey if operation requested but inactive, symbol coloured if operation requested and active

 Indicates the "Cooling" operating mode

 Indicates the "Heating" operating mode

 Indicates the "Air quality" operating mode

2.4.2 - Menu bar

 Go back to the home screen

 Go back to the top menu level

 Parameter search

 Select the access level

 No active faults.

 Fault present (in this case, the LED bar is lit, red for danger faults, and yellow for maintenance faults). Link to the list of active faults.

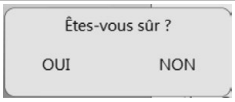
2.4.3 - Menus

Main menu

Main menu	Sub-menu 1	Sub-menu 2	Access level
Information			1
Login			1
Setpoints	Setpoints 1		1
	Setpoints 2		1
	Setpoint change		2
	Setpoint compensation		2
	Night cooling		2
Time program	Weekly 1		1
	Weekly 2		1
	Weekly 3		1
	Weekly 4		1
	Weekly 5		1
	Weekly 6		1
	Annual 1		1
	Annual 2		1
	Annual 3		1
	Annual 4		1
	Annual 5		1
	Annual 6		1
Faults	Current fault		1
	Log		1
	Faults level		2
Value reading	Ventilation		1
	Filters		1
	Coils		1
	Heat recovery units		1
	Dampers		1
	Pumps		1
	Inputs / Outputs		1
	Temperatures		1
	Counters		1
	Setpoint change status		1
	EC FMA	Intake FMA	1
		Exhaust FMA	1
Curves	Temperature curves		1
	Ventilation curves		1
	Filter curves		1

Main menu	Sub-menu 1	Sub-menu 2	Access level
Settings	Language		1
	Date and time		1
	Ventilation	Fan management	2
		Fan PID	2
		Pressure thresholds	2
		Air quality	2
		Downgraded fresh air flow rate	2
		Fire management	2
	Energy optimisation	Night cooling and free cooling	2
		Heat recovery unit	2
	Communication		2
	Temperature	Temperature management	2
		Temperature threshold	2
		Temperature PID	2
		Neutral zone limitation and compensation	2
		Changeover	2
		Frost protection	2
	Input/output management	I/O direction	2
		Calibration	2
	Prioritisation		2
	Time del. / selections	Time delays	2
	EC fans		3
	Emulation PGD		3
	Service	Fault memory full	3
		Machine parameters	3
		Parameters back-up	3
		Operating readings	3

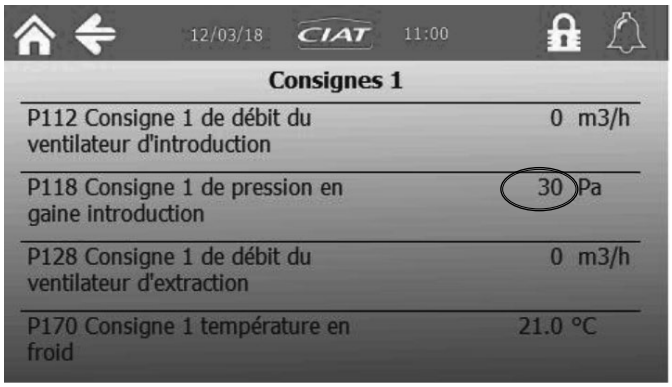
2.4.4 - Use

Action	
Start-up/shutdown	From the home screen, press  and confirm 
Fault acknowledgement	Press the alarm icon in the menu bar  and press 
Status: machine shut down	 red
Status: machine on	 green
Status: run request with the unit shut down	 flashing red/green

Accessing the parameters

In each parameters table, it is possible to scroll down the table with a finger.

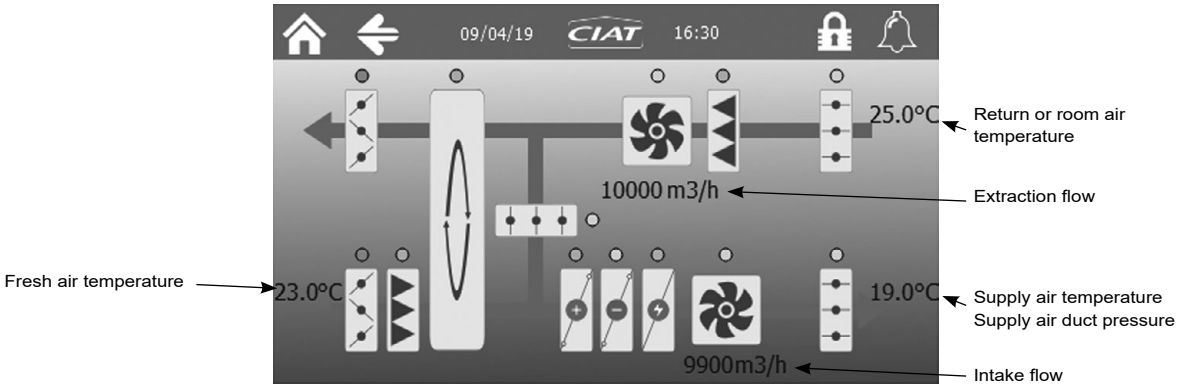
In the setpoint or setting parameters table, it is possible to modify a value by pressing on it. A numeric pad will open, indicating the possible setting range (min. and max.), and this must be validated via 



It is possible to seek a parameter from its number. To do so, press the icon in the menu bar. Enter the parameter number, and validate with . If the parameter exists and your access level is sufficient, you will be automatically redirected to the page containing this parameter. Otherwise, an error message will be displayed.

Synoptic

From the home screen, pressing will access the machine's functional synoptic. Only the components present in the machine are visible.



Pressing on each component will access the corresponding reading parameters.

A ring positioned beside each component indicates its status:
- Grey: inactive
- Green: in operation
- Orange: maintenance fault
- Red: danger fault

Access level

Pressing on the padlock in the menu bar or main menu will access the access level selection.

The current level is displayed at the bottom of the screen. To go back to level 1, you need to enter the password "1111".

Pressing on the stars will bring up a numeric keypad to enter the password for the desired level:

Once a password has been entered,  is used to view the password, and  is used to validate.

Curves

The screen records the values of the main parameters (temperatures, flow rate, duct pressure and filter differential pressure). It is possible to choose the record duration (1, 6, or 12 months), the oldest values are erased, which sets the sampling period (1 acquisition every 60 s for example))

1 month (1 every 60 s)
6 months (1 every 400 s)
12 months (1 every 800 s)

Pressing  brings up the curve settings:

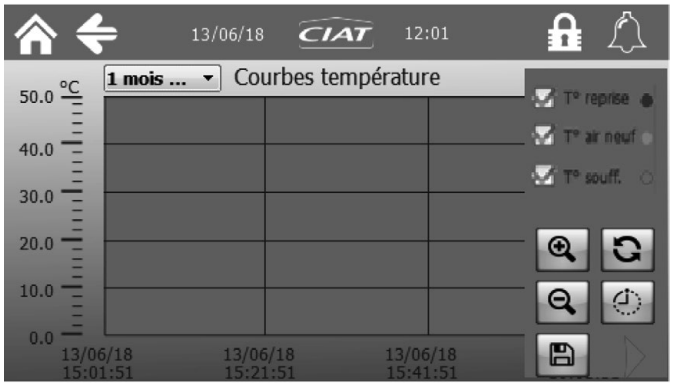
 zoom out on the vertical axis

 zoom out on the vertical axis

 zoom reset

 change horizontal axis duration

 save values to csv on USB stick (level 3?)



3.1 - Management of on and off modes

The unit can be started by the terminal or by the CMS. Parameter P716 is used to authorise or deny CMS control of the unit.

When the unit is operating, an on/off "remote control" input is used to stop the unit.

This may have been previously started up by the HMI in the ON position.

The unit's various operating modes can also be programmed (see time schedule 3.17). The unit has a "frost protection" mode which is only used when the controlled temperature is the room temperature.

When this is activated the unit is off, but it will automatically restart if the room temperature drops below the P228 set threshold.

To be able to start up the unit, the machine parameters must be locked (P99 = yes)

if the unit is shut down via the terminal but remote control is authorised (P716=remote), then the air handling unit may potentially start at any time (if ordered by the CMS, for example).

The unit will only operate if the fresh air temperature is above the minimum threshold (P265). If the unit has been started but the outdoor temperature is too low, a periodic reminder will be issued every hour, to measure the outdoor temperature and check whether it is above the threshold.

99	Configuration locked
716	Control type
228	Frost protection temperature setpoint
265	Fresh air temperature limit for unit operation

3.2 - Managing setpoints

The PLC manages setpoints 2 setpoint levels (setpoint 1 and setpoint 2) for the temperatures and flow rates/pressures. Setpoints 1 are, for example used when the building is occupied and setpoints 2 when the building is unoccupied.

Parameter P160 is used to choose between setpoints 1 and 2, either by time schedule or via the J5-U10 on/off input, as well as by the CMS control or override via the J5-U10 on/off input. In the latter mode, if the On/Off input indicates setpoint 1 mode, it is operating in setpoint 1; otherwise the operation is as per the last order received from the CMS or time schedule.

Parameter P161 is used to select whether the change in setpoint is based on the temperature setpoints, on the ventilation setpoints (flow rate or pressure) or on both.

<table>
<tr><th>Setting P161</th><th colspan="3">Operation</th></tr>
<tr><td></td><td>Setpoint</td><td>Selection
Setpoint 1</td><td>Selection
Setpoint 2</td></tr>
<tr><td rowspan="2">Temperature</td><td>Temperature</td><td>Setpoint 1</td><td>Setpoint 2</td></tr>
<tr><td>Flow rate or pressure and mixing</td><td colspan="2">Setpoint 1</td></tr>
<tr><td rowspan="2">Ventilation</td><td>Temperature</td><td colspan="2">Setpoint 1</td></tr>
<tr><td>Flow rate or pressure and mixing</td><td>Setpoint 1</td><td>Setpoint 2</td></tr>
<tr><td rowspan="2">Temperature + Ventilation</td><td>Temperature</td><td rowspan="2">Setpoint 1</td><td rowspan="2">Setpoint 2</td></tr>
<tr><td>Flow rate or pressure and mixing</td></tr>
</table>

Note: the setpoint selection input is can be configured NO / NC; this table adopts the input as normally closed. If the actuation takes place via the CMS, then the input becomes inactive.

160	Setpoint 1 / Setpoint 2 selection
161	Application of setpoint 1/setpoint 2 selection

3.3 - Safety and isolation damper

The unit may have up to 4 isolation dampers. They are connected to 2 outlets: outdoor side (fresh air/exit air) and building side (supply air/return). The presence of the dampers is given by parameter P26.

The insulating damper is activated by an On/Off servomotor with spring-return. The time required for it to open is P108.

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

It will open upon the unit start-up request, then after a timeout, the unit will switch to "Run" mode, and the damper kept open, until the unit is shut down or a "danger" fault appears.

26	Isolation damper
108	Damper opening time delay

3.4 - Mixing damper

If a mixing damper is present in the unit (P27 = with), it is necessary to configure its opening time (P166).

A minimum opening value can be set using parameters P208 and P209.

The damper operates with 100% fresh air in night cooling or free cooling mode. It is modulated when there is an air quality requirement.

If there is a mixing damper present and the mixing opening demand is greater than 95%, then the outdoor side isolation dampers (if present) close.

The mixing damper can be forced to close using parameter P163 (accessible via BMS).

27	Mixing damper
163	load shedding of mixing damper
166	Mixing damper opening time
208	Mixing damper minimum setpoint 1
209	Mixing damper minimum setpoint 2

3.5 - Filter management

Pressure sensors measure the filter fouling (intake and exhaust), and a fault appears if the filter is fouled (new filter to be ordered and replacement scheduled) or blocked (machine is shut down).

The threshold is calculated automatically according to the filter type (M5, F7, F9, M5+F7, M5+F9, F7+F9) and the air flow rate.

It is possible to view the pressure difference and thresholds for each filter (P312 to P317).

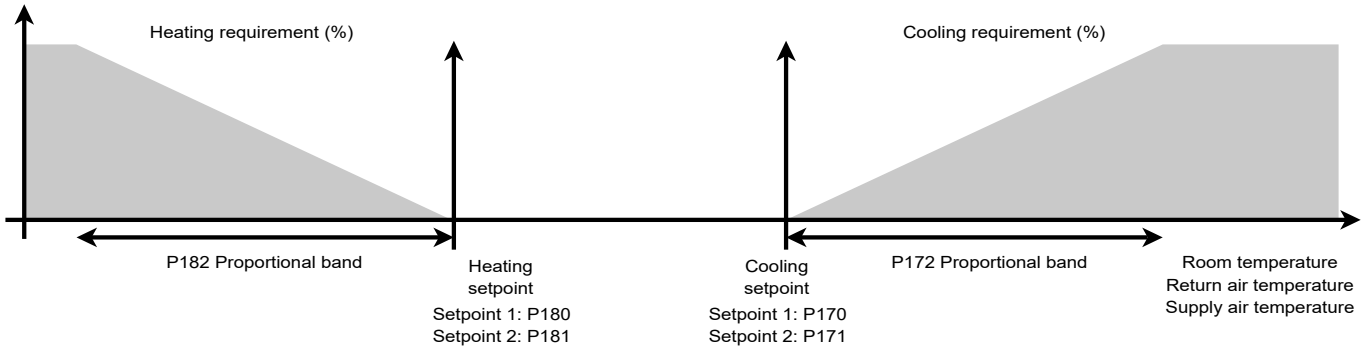
7	Intake filter type
8	Intake filter coefficient
15	Exhaust filter type
16	Exhaust filter coefficient

3.6 - Temperature control

The set temperature may be:
- The return air temperature
- The room temperature (if the Th-Tune room remote control is present)
- The supply air temperature

This choice is made via parameter P154.

The temperature is set via a PID which calculates a heating requirement (P395) or a cooling requirement (P394). There is one heating setpoint (P180) and one cooling setpoint (P170), with the option to have a deadband between these two different setpoints. The calculated requirement is then divided between the heating or cooling elements, in the following order of priority: heat recovery unit, hydraulic coils, electric heater.



- The heating and cooling setpoints must not overlap in automatic mode (P155)
- In heating only or cooling only mode, the setpoints may overlap.

154	Target temperature selection
155	Temperature control mode selection
168	Heating or cooling change authorisation time delay

Cooling PID

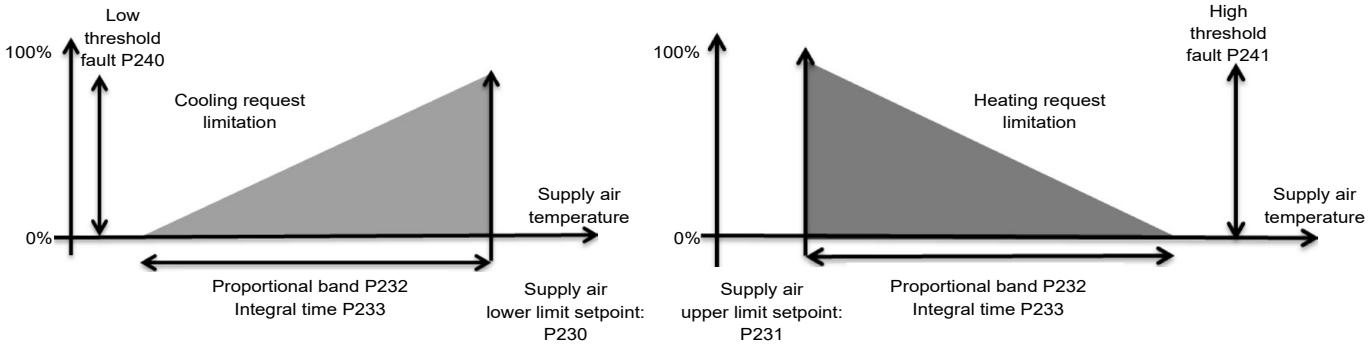
170	Temperature setpoint 1 in cooling mode
171	Temperature setpoint 2 in cooling mode
172	Temperature control PID proportional band (P) in cooling mode
173	Temperature control PID integral time (I) in cooling mode
174	Temperature control PID derivative time (D) in cooling mode

Heating PID

180	Temperature setpoint 1 in heating mode
181	Temperature setpoint 2 in heating mode
182	Temperature control PID proportional band (P) in heating mode
183	Temperature control PID integral time (I) in heating mode
184	Temperature control PID derivative time (D) in heating mode

Supply air limitation

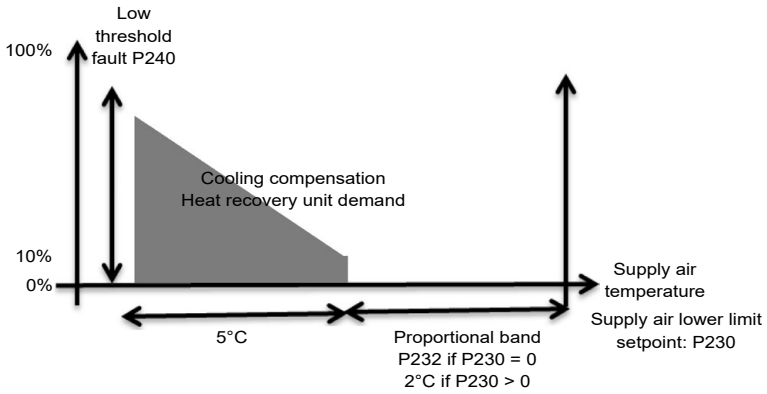
When control is being applied to the return air or room air, the supply air temperature can be limited. This limitation is used to avoid blowing air at too high a temperature in heating mode or too cold a temperature in cooling mode. This limitation is activated by parameter P156. A PI controller (proportional-integral) limits the heating or cooling requirement. If integral control is deactivated (P233=0), the proportional band (P232) must be approximately 5°C, so as to prevent too high or too low a supply air temperature.



156	Supply air limitation = With or Without
230	Supply air temperature low limit setpoint
231	Supply air temperature upper limit setpoint
232	Supply air temperature limit proportional band
233	Supply air temperature limit integral time

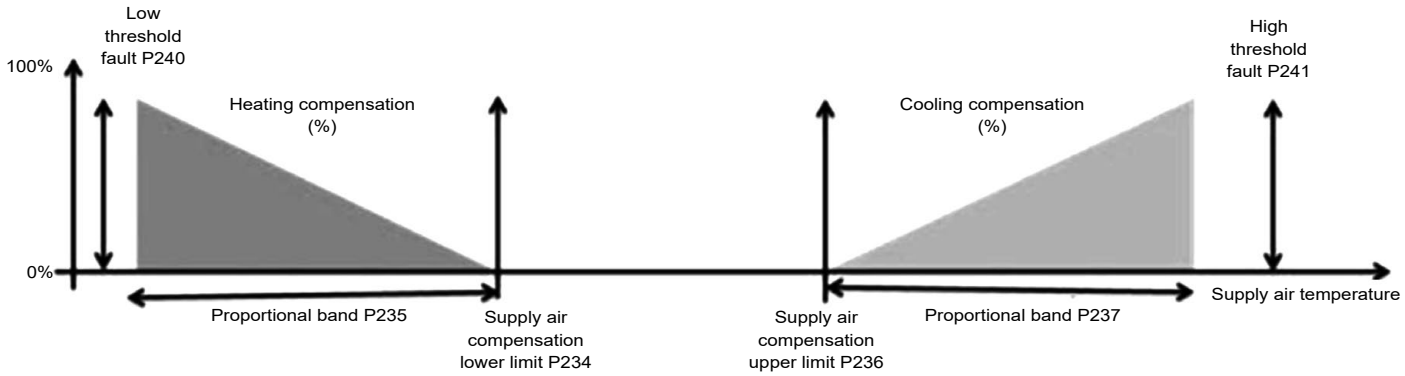
When the cooling requirement is minimised, cooling compensation is used to start up the heat recovery unit or close the bypass if the supply air temperature is less than P230-2°C (if P230>0) or P230-P232 (if P230=0). This function prevents excessively cold supply air (outside air) if there is a cooling requirement and the outside air is cold (excluding night cooling). This compensation is proportional control of a 5°C proportional band.

There is hysteresis on the cooling requirement and supply air temperature, to prevent inadvertent starts/shutdowns.



Supply air compensation

When control is being applied to the return air or room air, the supply air temperature can be compensated. This compensation is used avoid blowing air at too cold or too high a temperature when the control is in deadband mode (no heating or cooling requirement calculated). This compensation is activated by parameter P157.



157	Supply air compensation in deadband = With or Without
234	Low supply air temperature compensation setpoint in deadband
235	Low supply air temperature compensation proportional band in deadband
236	High supply air temperature compensation setpoint in deadband
237	High supply air temperature compensation proportional band in deadband

The temperature upper and lower thresholds (P240 to P245) are used to trigger a fault if the temperature is outside of these limits.

240	Supply air temperature low limit threshold
241	Supply air temperature upper limit threshold
242	Return air temperature low limit threshold
243	Return air temperature upper limit threshold
244	Room temperature low limit threshold
245	Room temperature upper limit threshold

3.7 - Fan control

The controller runs the plug fans with an EC motor. The unit has one intake fan and one exhaust fan. Pressure sensors for measuring the air flow rate are wired on the PLC.

The fans can be under constant duct flow rate control or constant duct pressure control.

Constant air flow control (P104)

The flow rate setpoints are configurable: Intake flow rate setpoints 1 / 2 (P112, P113) and exhaust flow rate setpoints 1 / 2 (P128, P129)

The PID for the intake motor control is managed via P114 to P116, and the exhaust motor control via P130 to P132

Intake flow

112	Air intake fan flow rate setpoint 1
113	Air intake fan flow rate setpoint 2
114	Air intake fan flow control PID proportional band (P)
115	Air intake fan flow rate control PID integral time (I)
116	Air intake fan flow rate control PID derivative time (D)

Extraction flow

128	Air extraction fan flow rate setpoint 1
129	Air extraction fan flow rate setpoint 2
130	Air extraction fan flow rate control PID proportional band (P)
131	Air extraction fan flow rate control PID integral time (I)
132	Air extraction fan flow rate control PID derivative time (D)

Constant duct pressure control

A pressure sensor should be added and installed in the duct before this function is activated. This sensor should be connected to terminal strip Xf19 in the unit. An autozero should be performed when commissioning this sensor. Refer to the unit's manual for the electrical connection and autozero.

The intake pressure setpoints are adjustable: setpoints 1/2 (P118, P119). The PID for the intake motors control is managed via P120 to P122

In this case the exhaust fan operates based on intake flow rate feedback (default setting) with a multiplier coefficient (P106) to create a positive pressure or vacuum pressure at the exhaust.

Intake duct pressure

118	Air intake duct pressure setpoint 1
119	Air intake duct pressure setpoint 2
120	Air intake duct pressure control PID proportional band (P)
121	Air intake duct pressure control PID integral time (I)
122	Air intake duct pressure control PID derivative time (D)
124	Intake duct pressure lower limit threshold
125	Intake duct pressure upper limit threshold

Exhaust duct pressure

The exhaust pressure setpoints are adjustable: setpoints 1/2 (P136, P137). The PID for the intake motors control is managed via P138 to P140

136	Exhaust duct pressure setpoint 1
137	Exhaust duct pressure setpoint 2
138	Exhaust duct pressure control PID proportional band (P)
139	Exhaust duct pressure control PID integration time (I)
140	Exhaust duct pressure control PID derivative time (D)
142	Exhaust duct pressure lower limit threshold
143	Exhaust duct pressure upper limit threshold

Faults

The pressure sensors installed on the fans are also used to detect the presence of the air flow (threshold P111). The PLC triggers a fault if the flow rate is greater or less than the fixed limits.

Flow rate control

110	AHU max flow rate
111	AHU flow rate low limit threshold

Minimum and maximum flow rates depending on the unit model:

Model (P1)	Max. flow rate (P110)	Min. flow rate (P111)
Classic PHE 1000 Alu	1200 m³/h	300 m³/h
Classic PHE 1000 PP	1200 m³/h	300 m³/h
Classic PHE 2000 Alu	2200 m³/h	500 m³/h
Classic PHE 2000 PP	2200 m³/h	500 m³/h
Classic PHE 3000 Alu	3700 m³/h	700 m³/h
Classic PHE 4000 Alu	5100 m³/h	900 m³/h
Classic PHE 6000 Alu	6600 m³/h	1400 m³/h
Classic RHE 1000 Alu	1450 m³/h	300 m³/h
Classic RHE 1000 PP	1450 m³/h	300 m³/h
Classic RHE 2000 Alu	2800 m³/h	500 m³/h
Classic RHE 2000 PP	2800 m³/h	500 m³/h
Classic RHE 3000 Alu	4500 m³/h	700 m³/h

Model (P1)	Max. flow rate (P110)	Min. flow rate (P111)
Classic RHE 4000 Alu	5700 m³/h	900 m³/h
Classic RHE 5000 Alu	7000 m³/h	900 m³/h
Classic RHE 6000 Alu	8500 m³/h	1400 m³/h
Classic RHE 7500 Alu	11,000 m³/h	1400 m³/h
Classic RHE 10000 Alu	14,000 m³/h	2500 m³/h
Classic RHE 15000 Alu	18,000 m³/h	3000 m³/h
Vertical PHE 700 Alu	1200 m³/h	300 m³/h
Vertical PHE 700 PP	1200 m³/h	300 m³/h
Vertical PHE 1500 Alu	2000 m³/h	700 m³/h
Vertical PHE 1500 PP	2000 m³/h	700 m³/h
Vertical PHE 2000 Alu	2600 m³/h	700 m³/h
Vertical PHE 2000 PP	2600 m³/h	700 m³/h

Air intake fan

104	Air intake ventilation control

Air intake fan

105	Air extraction ventilation control
106	Multiplication factor value of the signal sent by the air extraction fan with pressure control in the supply air duct

3.8 - Energy recovery

3.8.1 - Recovery operation

The unit has a variable speed rotary heat exchanger or a plate heat exchanger. This is used to heat fresh air in winter or cool fresh air in summer.

Energy recovery (rotary heat exchanger started up or plate heat exchanger bypass closed) starts under the following conditions:
- If the heat recovery unit heating requirement is greater than 0% and the return air temperature is higher than the fresh air temperature + difference P225
- If the heat recovery unit cooling requirement is greater than 0% and the return air temperature is lower than the fresh air temperature - difference P225
- During the ventilation start-up phase

If there is a free cooling or night cooling requirement, the recovery is stopped. There are temperature hystereses to prevent inadvertent starts/shutdowns.

The rotary heat exchanger can be forced to shut down using parameter P158 (accessible via BMS)

158	load shedding of rotary heat exchanger
225	Temperature difference for heat recovery unit run authorisation

		Temperature	
		Return < fresh air –P225	**Return air** > fresh air + P225
Heat recovery unit requirement	Cooling > 0%	On	Off
	None	Off	Off
	Heating > 0%	Off	On
	Free cooling Night cooling	Off	Off

3.8.2 - Heat recovery defrost

Heat recovery unit frosting is monitored as standard via the fresh air temperature, or optionally using a differential pressure sensor (P37).

37	Differential pressure sensor on the heat recovery unit

With preheating coil

There may be an electric heater to prevent frosting of the heat recovery unit.

If there is a pressure sensor, a 5-minute preheating cycle is activated once the pressure difference on the heat recovery unit is above the threshold (P328).

Otherwise, monitoring is carried out via the fresh air temperature sensor. In this case a one-hour preheating cycle is activated once the fresh air temperature drops below the threshold (P227).

31	Electric pre-heater
220	Heat recovery unit min. flow rate pressure drop threshold
221	Heat recovery unit max. flow rate pressure drop threshold
227	Heat recovery unit frost protection temperature threshold
328	Heat recovery unit pressure drop calculated threshold

Without preheating coil

In the absence of a preheating coil or if the coil is unavailable (faulty or load shed), the heat recovery unit bypass is opened 80% (for a cycle 10-minute cycle), or the rotary heat exchanger (for a 5-minute cycle) set to minimum speed, once the pressure difference on the heat recovery unit is above the threshold (P328) or the fresh air temperature is below the threshold (P227).

226	Gradual speed heat recovery unit min. speed

3.9 - Coils

The unit may contain two coils (hydraulic and/or electric).

These coils are configured using parameters P28, P29 and P32.

They may be a cooling coil, a heating coil or a mixed coil (heating or cooling according to the network temperature), or an electric heater.

If a coil is ducted, there is an internal supply air temperature sensor situated at the machine outlet, and an additional sensor situated at the ducted coil outlet.

28	Coil 1
29	Coil 2
32	Electric heater

3.9.1 - Mixed coil scenario

In the case of a mixed coil, the changeover may be made either via an on/off input or via the CMS (settable via parameter P162).

The changeover thermostat must be fitted by the installer on the mixed coil inlet, at a point where water is in constant circulation.

The changeover status (heating or cooling mode) can be viewed via parameter P422.

162	Changeover selection

3.9.2 - Frost protection

The hydraulic coil frost protection is provided by monitoring the unit's supply air temperature. If this is below the threshold P248, the frost protection fault is tripped and the isolation damper is closed, ventilation stops and the coil valves are opened 100%.

A frost prevention function is available once the unit is off (via the HMI, the CMS or a danger fault), or during the ventilation start-up phase. It consists in leaving the hydraulic coil valve slightly open (settable value) to maintain water circulation (P260). This opening is maintained constantly (including when the machine is shut down but still energised).

248	Hydraulic coil frost protection safety threshold
260	Opening percentage for the coil 1 valve when unit stopped
261	Opening percentage for the coil 2 valve when unit stopped

3.9.3 - Pumps

It is possible to control pumps (not supplied). They are actuated as soon as the coil valve opening demand is greater than 0%. Their presence is indicated by parameters P92 and P93, and their status can be viewed in parameters P424 to P427

92	Coil no.1 pump
93	Coil no.2 pump

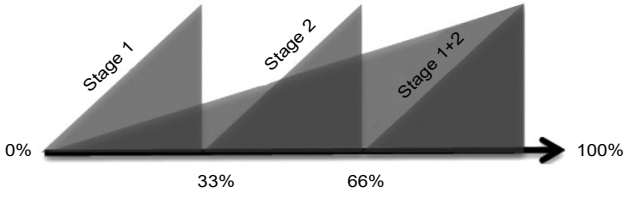
3.9.4 - External generator

It is possible to control an external heater or cooler (selected via parameter P90), which is activated when the associated coil control is greater than 0%

90	External generator

3.9.5 - Electrical heater scenario

The control system is used to control an electric heater comprising 1 on/off stage or 2 on/off stages (3-stage control (stage 1, then stage 2, then stages 1 and 2)) or 1 on/off + triac stage.



Electric heating requirement

A minimum air flow rate is required to use the electric heaters (P126). If the flow rate is below this parameter, the electric heater will not be able to start up and the message "control limited" will appear. This flow rate depends on the size of the AHU.

If an on/off electric heater is installed, the temperature control must not be based on the supply air (P154).

Electric heater configuration

32	Electric heater
126	Minimum flow rate for electric heater operation

Minimum flow rates depending on the unit model:

Model (P1)	Electric heater min. flow rate (P126)
Classic PHE 1000 Alu	500 m³/h
Classic PHE 1000 PP	500 m³/h
Classic PHE 2000 Alu	1000 m³/h
Classic PHE 2000 PP	1000 m³/h
Classic PHE 3000 Alu	1500 m³/h
Classic PHE 4000 Alu	2000 m³/h
Classic PHE 6000 Alu	3000 m³/h
Classic RHE 1000 Alu	500 m³/h
Classic RHE 1000 PP	500 m³/h
Classic RHE 2000 Alu	1000 m³/h
Classic RHE 2000 PP	1000 m³/h
Classic RHE 3000 Alu	1500 m³/h

Model (P1)	Electric heater min. flow rate (P126)
Classic RHE 4000 Alu	2000 m³/h
Classic RHE 5000 Alu	2500 m³/h
Classic RHE 6000 Alu	3000 m³/h
Classic RHE 7500 Alu	3750 m³/h
Classic RHE 10000 Alu	5000 m³/h
Classic RHE 15000 Alu	7500 m³/h
Vertical PHE 700 Alu	350 m³/h
Vertical PHE 700 PP	350 m³/h
Vertical PHE 1500 Alu	750 m³/h
Vertical PHE 1500 PP	750 m³/h
Vertical PHE 2000 Alu	1000 m³/h
Vertical PHE 2000 PP	1000 m³/h

Fan delay

If the electric heater is running and a unit shutdown request appears, a settable post ventilation (P164) is used for cooling the electrical heaters.

164	Fan delay time

3.10 - Free Cooling

Free cooling is used to cool the building when the outdoor temperature is lower than that inside the building. This operating mode is used when the following conditions are met:
- Function activated in parameters P150 (only if control takes place on the return air or room temperature)
- Cooling requirement: the PID output must be greater than 0%
- The difference between the controlled temperature (measured return or room) and the fresh air must be sufficient: fresh air temperature < controlled temperature – P206 (factory value 3°C)
- The fresh air temperature is above the "free cooling temperature low limit" (P207)

In free cooling mode, the supply air temperature is not monitored, and the heat recovery unit and coil are shut down. It is important to configure a fresh air temperature low limit which is sufficiently high to ensure no discomfort is caused.

150	Free cooling control
206	Free cooling and night cooling operating differential compared to the controlled temperature
207	Temperature low limit for free cooling and night cooling

3.11 - Night cooling

The regulated temperature must be the return or room air value. The fans control must be based on flow rate. Night cooling is used to cool the building using the colder night air.

In this case, when night cooling is active, the ventilation flow rate setpoint is the "night cooling" flow rate (P212 and P213).

Several conditions must be met to activate night cooling:
- The function must be activated by parameter P151
- The controller is located in a "night cooling" time slot or this is overridden via the CMS
- Cooling requirement: the controlled temperature must be greater than the night cooling temperature setpoint P210
- There must be sufficient difference between the controlled temperature and the fresh air: fresh air temperature < controlled temperature – P206 (factory value 3°C)
- The fresh air temperature is above the "night cooling temperature low limit" (P207)

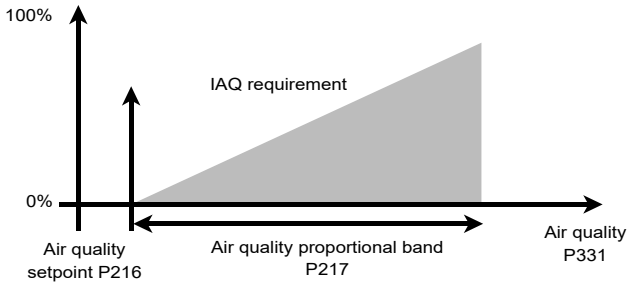
Periodic restarts: if one of the conditions for activation of night cooling is not verified (fresh air temperature, night cooling difference, or cooling requirement), the unit shuts down.

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 verified. Otherwise, the AHU will stop again.

151	Night cooling control
206	Free cooling and night cooling operating differential compared to the controlled temperature
207	Temperature low limit for free cooling and night cooling
210	Control setpoint in night cooling mode
212	Air intake fan flow rate setpoint in night cooling mode
213	Air extraction fan flow rate setpoint in night cooling mode

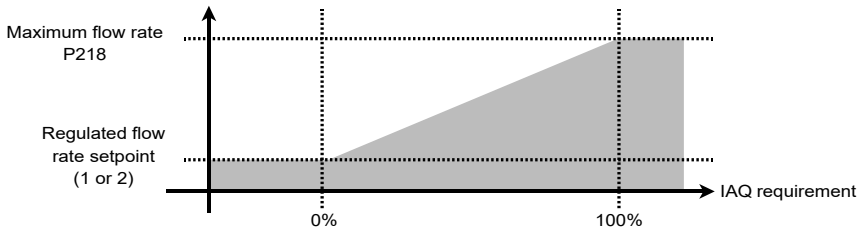
3.12 - CO_2 air quality

Before activating the air quality function (P152), you need to install a CO_2 sensor in the exhaust air flow, and connect it to the terminal strip situated in the electrics box. Refer to the unit's manual for the installation and electrical connection.
This function calculates an IAQ (Indoor Air Quality) requirement thanks to a proportional controller (P217) so that the CO_2 concentration setpoint (P216) can be monitored.

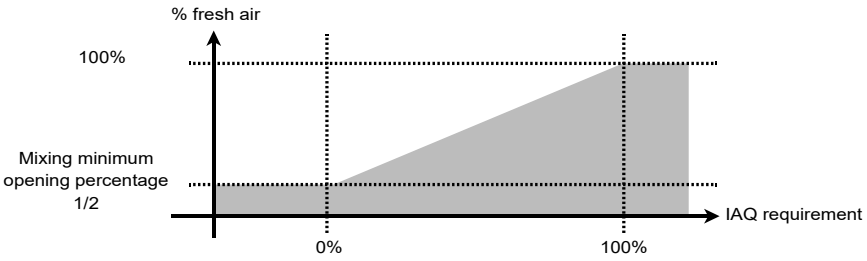


If the fans are under flow rate control:

Air quality control acts primarily on the fresh air rate via the mixing damper (if present), if the fresh air rate reaches 100%, the control system then acts on the ventilation flow rate, increasing the flow rate to a maximum value controlled by parameters P218 and P219.



If the air intake fan is under duct pressure control (P104):
Warning: this function cannot be used if the heat recovery unit's frost level is monitored by a pressure sensor or if the extraction fan is under duct pressure control.
In this scenario where the air intake fan is under duct pressure control, the air quality sensor must be connected to terminal strip J26-U12.
The control function only acts on the opening value of the mixing damper to allow a greater influx of fresh air.



152	Air quality control
216	Air quality setpoint
217	Air quality proportional band
218	Air flow max setpoint on intake for air quality
219	Air flow max setpoint on exhaust for air quality

3.13 - Fire protection

When a DAD (standalone trigger sensor) is connected to the unit, the fire detection function of the control must be activated (P24).
There are several operating modes in case of fire detection:
- Unit shut down
- Intake fan forced to P282 flow rate and exhaust fan shut down
- Exhaust fan forced to P283 flow rate and intake fan shut down
- Intake fan forced to P282 flow rate and exhaust fan to P283 flow rate

24	Fire detection
280	Fire safety operating mode
282	Intake flow rate in case of fire
283	Exhaust flow rate in case of fire

The fire fault management strategy must be chosen according to the regulations in force in the AHU's country of installation. The AHU is not a smoke extraction device.

3.14 - Remote control in Th-Tune room

The Th-Tune (optional) is a room thermostat and is used as a room temperature sensor. It is used to display the unit status (setpoints, operating status, ventilation status). It is used to modify temperature setpoint 1 and force operation to setpoint 1 or 2.

To connect the Th-Tune to the terminal strip located in the electrics box, refer to the unit's wiring diagram. The procedure is as follows:

- Connect the power supply
- Connect the ModBus connection (Tx+/Tx-)
- If the terminal is more than 100 m away, a 120 Ω ¼W resistor must be installed at the start of the line between terminals J9+ and J9- of the controller, and at the end of the line between Th-Tune terminals Tx+ and Tx- (see wiring diagram supplied with the machine).

Symbols	Description
mode	Key has no effect
	Key has no effect
	This key is used to start or shut down the unit
	This knob has 2 functions: - Press: used to alter the setpoint or parameter selected - Rotation: used to select a setpoint or parameter and modify it (for more information see the "temperature, setpoint, time" table below)

Current cooling / heating control status

Symbols	Description
	Current heating control
	Current cooling control

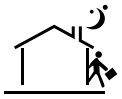
Current air flow rate setpoint

Symbols	Description
No symbol	Ventilation shut down (unit running, but frost protection or night cooling mode in progress, but fresh air temperature condition not met)
	Flow rate setpoint 2 in progress
	Flow rate setpoint 1 in progress

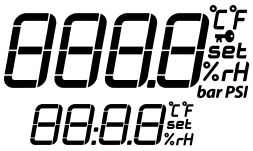
Current unit status

Symbols	Description
	Active fault present (maintenance)
	Fire fault active
	Symbol flashing: ventilation starting Symbol off when the ventilation is in a steady state

Setpoint monitored

Symbols	Description
	Setpoint 1 in progress
	Setpoint 2 in progress

Temperature, setpoint, time (central part of screen)

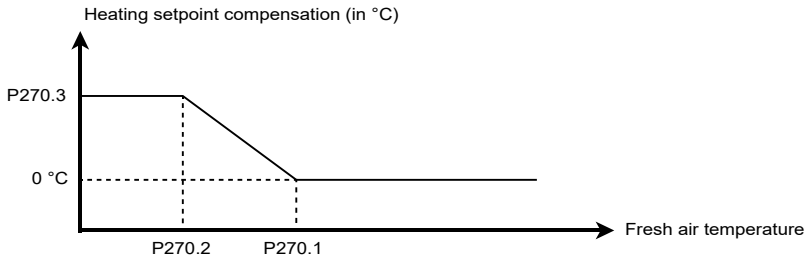
Symbols	Description
	Indicates the ambient temperature if the unit is running, otherwise OFF indicated if the unit is shut down or with a danger fault. If the knob is used, indicates the value of the setpoint or parameter being set.
	By default indicates current time If the knob is used, name of setpoint being set: Mode = selecting setpoint 1 or 2 (this choice is visible only if the setpoint 1 / 2 selection is controlled by time slot or CMS (P160=1) CsgC: heating temperature setpoint 1 value CsgF: cooling temperature setpoint 1 value Cali: room temperature sensor calibration (limited to +/-3°C)

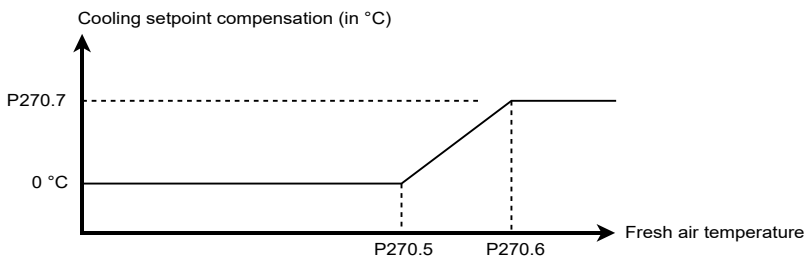
149	Th Tune

3.15 - Temperature setpoint compensation

The temperature setpoint compensation function is used to adjust the temperature setpoint according to the outdoor temperature.

If the temperature setpoint compensation function is selected (P270), a compensation is calculated according to the fresh air temperature, in accordance with the curves below.





The calculated compensations are added to the selected setpoint 1 or 2 to give the setpoint value to be used.

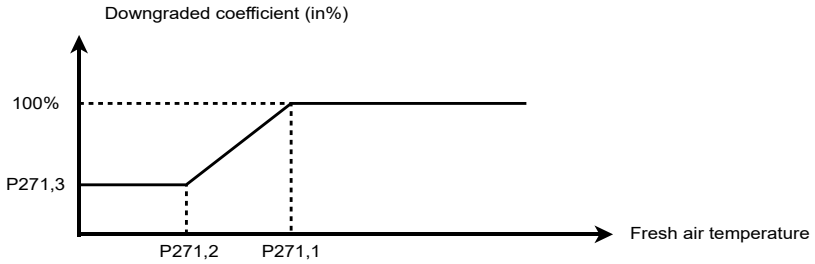
270	Temperature setpoint compensation activation
270,1	Heating compensation start fresh air temp
270,2	Heating compensation end fresh air temp.
270,3	Heating compensation max. setpoint difference (-10.0°C / 10.0°C)
270,5	Cooling compensation start fresh air temp.
270,6	Cooling compensation end fresh air temp.
270,7	Cooling compensation max. setpoint difference (-10.0°C / 10.0°C)

3.16 - Downgraded fresh air flow rate

A downgraded fresh air flow rate function based on the outdoor temperature is used to limit the flow rate if the outdoor temperature is low.

This function is only selectable only if the fans control is based on flow rate.

If the downgraded fresh air flow rate function is selected (P271), a downgraded flow rate coefficient is calculated based on the fresh air temperature, in accordance with the curve below:



The intake flow rate setpoint to be used for control purposes is the selected setpoint 1 or 2 multiplied by the downgrading percentage.

The exhaust flow rate setpoint to be used for control purposes is the selected setpoint 1 or 2 multiplied by the downgrading percentage.

271	Downgraded fresh air flow rate activation
271,1	Downgraded mode start fresh air temperature
271,2	Downgraded mode end fresh air temperature
271,3	% min. flow rate in downgraded mode

3.17 - Time management

The date and time are set using parameters P102 and P103. The date enables annual/monthly/weekly programming to be used and the time at which a fault occurs to be recorded.

The PLC contains a battery to prevent the time being wiped in the event of a power cut. If the time is not stored after a power cut, the battery needs to be replaced (service life approximately 10 years – varies according to ambient conditions).

102	Date
103	Time

3.18 - Time schedule

The time schedule is used to change the unit's operating mode (off, setpoints 1, setpoints 2, frost protection, etc.) according to the time, day of the week or the season.

The PLC authorises 6 weekly programming periods and 6 annual programming periods, which may

overlap and be individually validated.

Requested state	Display condition
Off	
Frost protection	P154 Target temperature selection = room
Night cooling (programmed weekly only)	P151 Night cooling = with
On setpoint 2	P160 Setpoint 1/Setpoint 2 selection = terminal or CMS
Weekly program 1 to 6	

When the ranges overlap, the priority, from least to most important, is as follows:

1. Off
2. Frost protection
3. Night cooling
4. On setpoint 2

By default (no time schedule within the range), the machine is in setpoint 1 mode.

The annual programming takes priority over the weekly programming.

Example of weekly programming:

Programmed shutdown of the unit, every Saturday and Sunday, 09:00 - 16:00.

Example of annual programming:

Annual programming between 15th October and 1st April, the frost protection state will be active.

3.19 - Access level

The PLC comprises 3 access levels, which are used to prevent unauthorised persons from altering certain parameters.

Level 1 is the "customer" level. It is freely accessible and is used to modify the setpoints.

Level 2 is the "installer" level. It is protected by an access code, and is used to modify the setting parameters.

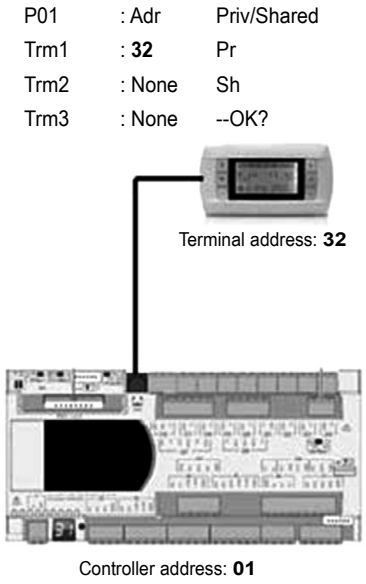
Level 3 is the "manufacturer" level. It is protected by an access code, and is used to modify the machine parameters.

4 - MANAGING THE CONNECTION BETWEEN CONTROLLERS AND ALPHANUMERIC TERMINALS

This section applies only to alphanumeric terminals. The touch screen terminal does not need to be addressed; it dialogues directly with the controller at address 1, and does not manage communication with other controllers. The touch screen cannot be used to network multiple controllers on the pLAN.

To establish communication between controllers and alphanumeric terminals, it is necessary to give each of the elements an address.

This addressing is performed at the factory, but if a faulty component is replaced (controller or terminal), it may have to be performed on site.



4.1 - One controller and one LCD terminal

The terminal addressing procedure is described in section 4.4.2. The procedure for the controller is in section 4.4.3. The controller and terminal must have different addresses.

The example above shows one addressing option

4.2 - Several controllers and terminals:

Several terminals or controllers may be interconnected, without any additional components, using the pLAN (local area network). This enables several terminals to be used to display the parameters from one controller or, conversely, one terminal can be used to display the parameters from several controllers.

The electrical connection and addresses configuration should be performed by the user.

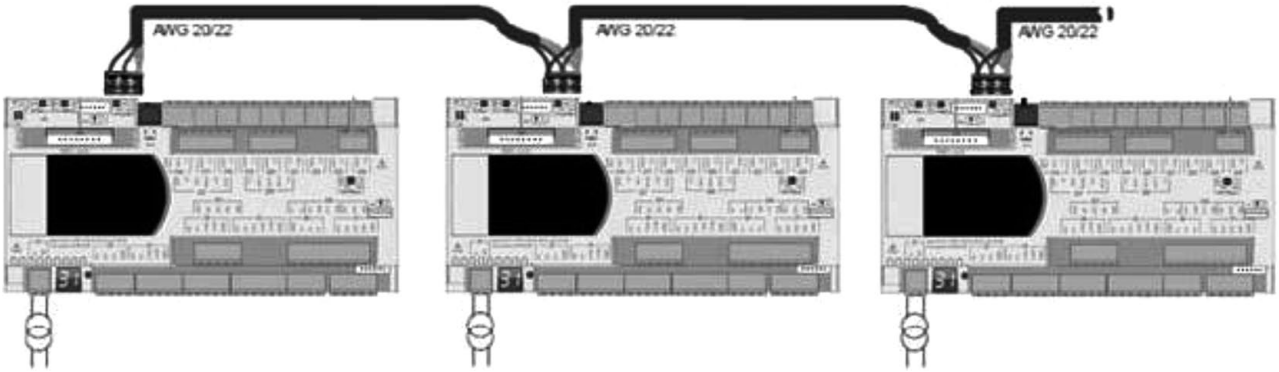
4 - MANAGING THE CONNECTION BETWEEN CONTROLLERS AND ALPHANUMERIC TERMINALS

4.3 - Electrical connections for the pLAN (local area network)

4.3.1 - Connecting controllers to the pLAN

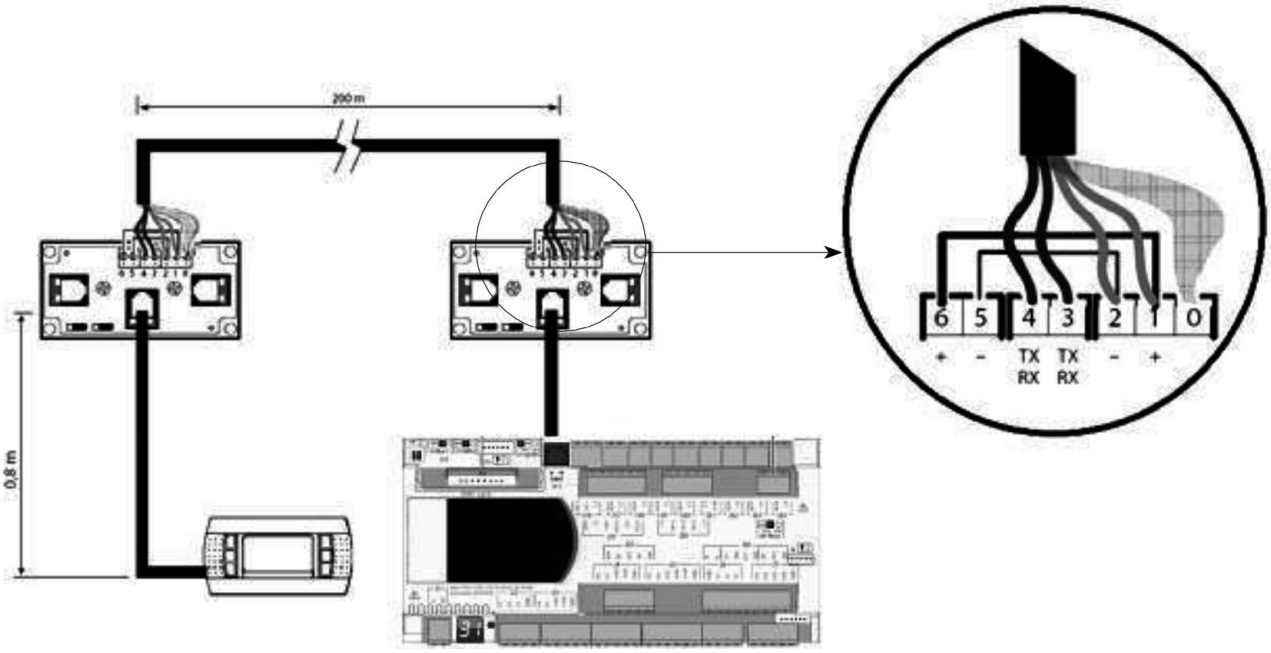
The electrical connection between the controllers under the pLAN (RS485) is carried out using an AWG20/22 shielded cable composed of a twisted pair and a shield. The cards must be connected in parallel using the J14 connector.

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



4.3.2 - Connecting a remote screen to the pLAN

The user can connect a user terminal to connector J15 up to a distance of 50m. For a greater distance, 2 TCONN boards and a AWG20/22/24 shielded cable comprising 2 twisted pairs and shielding must be used. The shielded cable must be no longer than 200m.



4 - MANAGING THE CONNECTION BETWEEN CONTROLLERS AND ALPHANUMERIC TERMINALS

4.4 - Addressing the pLAN

4.4.1 - Operation

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

The range of addresses usable is from 1 to 32.

This means that a total of 32 controllers and terminals can be connected over the pLAN. The pLAN cannot work if the same address is shared by two network elements.

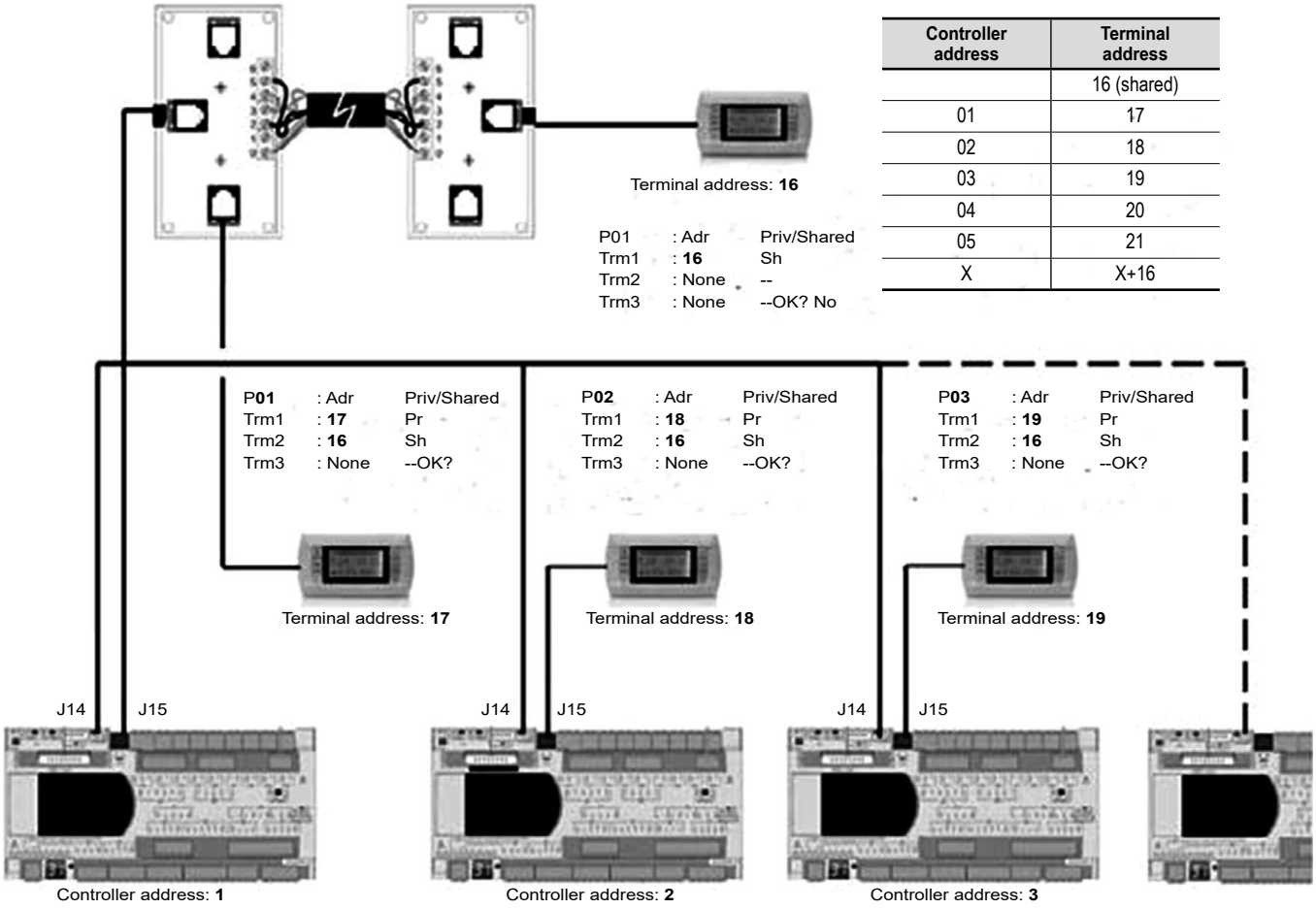
Recommended addressing

It is generally recommended to use a commonly used system of addressing:

The address for the terminals must be equal to the: **controller address +16**

The shared terminal address must be equal to 16

Please ensure the addressing diagram below is respected:



Controller address	Terminal address
	16 (shared)
01	17
02	18
03	19
04	20
05	21
X	X+16

In the following procedures, it is possible that the message "NO LINK" will appear. If this occurs, please repeat the procedure.

4.4.2 - Modifying the HMI LCD terminal addresses

It is only possible to modify the address of the terminal when it is connected to the controller (telephone connector) and when the controller is powered on.

- To enter configuration mode, simultaneously press the ↑↓ and ↵ buttons, holding for at least 5 seconds; the page shown opposite will be displayed, with the cursor flashing in the top left corner
- To modify the terminal's address (Display address setting) press the ↵ button once: the cursor will move to the address field (nn)
- Select the desired value using the ↑↓ buttons, and confirm by pressing the ↵ button again

If the value selected is different from that previously stored in the memory, the page shown below will appear and the new value will be stored in the terminal's permanent memory.

Please note: if you need to change the address of a controller using a terminal, you may only do so with a terminal with the address 0.

After having changed the controller address, remember to change the terminal address from 0 to a different value to ensure normal operation.

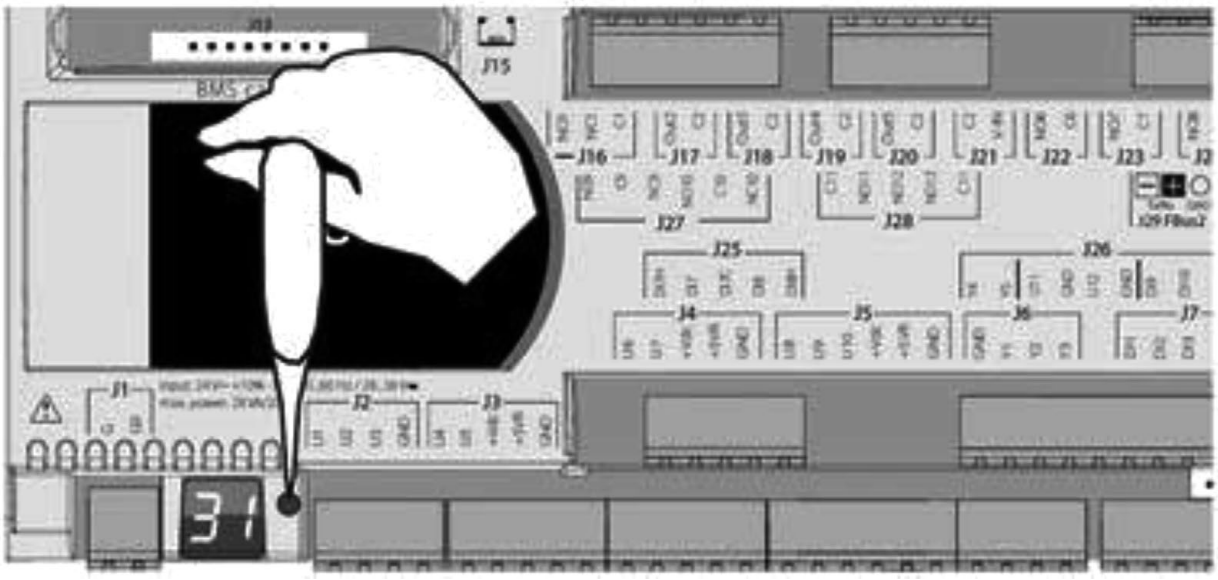
4.4.3 - Modifying the controller addresses

The value of the factory-set address is '1'. The controller pLAN address can be modified, if the controller needs to be networked.

Directly from the controller

To modify the address, it is necessary to use a screwdriver and to follow the procedure below:

- Press the button for 5 seconds: the address should flash
- Press the button several times or press and hold until the desired address is obtained
- Wait for the address to flash rapidly
- The address is now saved
- Disconnect then reconnect the controller (powering off confirms the change)

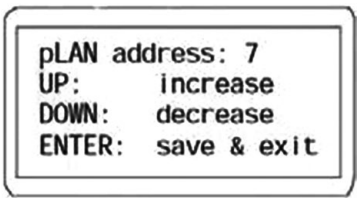


4 - MANAGING THE CONNECTION BETWEEN CONTROLLERS AND ALPHANUMERIC TERMINALS

From a terminal

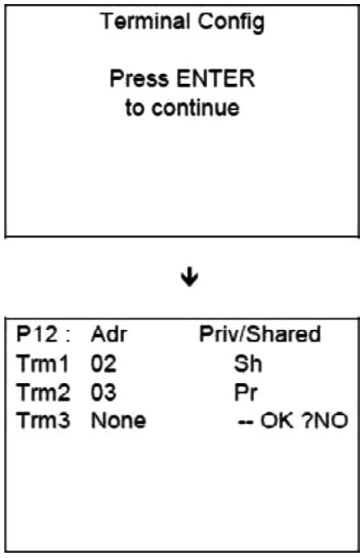
To modify the address for the controllers:
- The terminal must have an address set to 0 (see the procedure in section 4.4.2)
- Switch off the power
- Once the machine is re-energised, press the + buttons simultaneously until the screen below is displayed, then release.

- Select the controller address using the buttons, and confirm with the button



4.4.4 - Allocating private and shared HMI terminals

To define the list of terminals associated with each controller, you need to follow the procedure below:
- Enter configuration mode via the and buttons, as described in the previous section
- Press until the cursor moves to the (I/O board address) field
- Using the buttons, select the desired address for the controller. The only values selectable will be those of the controllers that are on the network. If the pLAN network is not working correctly or if no controllers are present, the field will not be modifiable, and will display only "—"
- Pressing the button again will bring up the mask sequences here on the right
- Here too, the button will move the cursor from field to field. The buttons will change the value of the current field. The P:xx field shows the address of the selected controller. In the example shown, No. **12** is selected



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 12; the "Priv/Shared" column shows the terminal type.

Shared = Sh= means that this terminal 02 may also be used with the other controllers present on the loop (shared terminal)

Priv = Pr= means that this terminal 03 can only operate with this controller no.12 (private terminal)
- To exit the configuration procedure and store the data, select "YES" in response to "OK?" and confirm with the button.

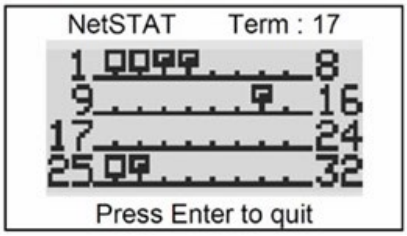
If the terminal remains inactive (no buttons pressed) for more than 30 seconds, it will automatically exit configuration mode without saving any changes made.

4.4.5 - Checking the pLAN address

The pLAN address is displayed at the top of the main screen, in the centre. It is also possible to access parameter P720 in the configuration parameters, so as to read the controller address on the pLAN.

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

To display the special page, simultaneously press the ↑↓ and ↵ buttons on any other network terminal for at least 10 seconds. After the first 5 seconds, a page is displayed; after 5 more seconds, the following page appears:



Controllers

Terminals

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

4.4.6 - Accessing the various controllers on a network from a shared HMI terminal

If a terminal is shared so that it can be used with several controllers, simultaneously pressing the ***Esc*** + ↓ keys switches between controllers. The pLAN address for the controller is displayed on the "Machine state" screen, providing information on which control the HMI is connected to.

For example, the screen below is the main screen for the board with the address 1:

5 - CONNECTING TO A CMS

The controller may be connected to a local or remote supervision PC via most communication protocols (ModBus RTU, ModBus IP, LonWorks, KNX or BACnet IP).

Using KNX, LonWorks, ModBus IP or BACnet IP requires the installation of optional boards. The Modbus/BACnet, KNX and LON communication tables are available separately.

NOTE:

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

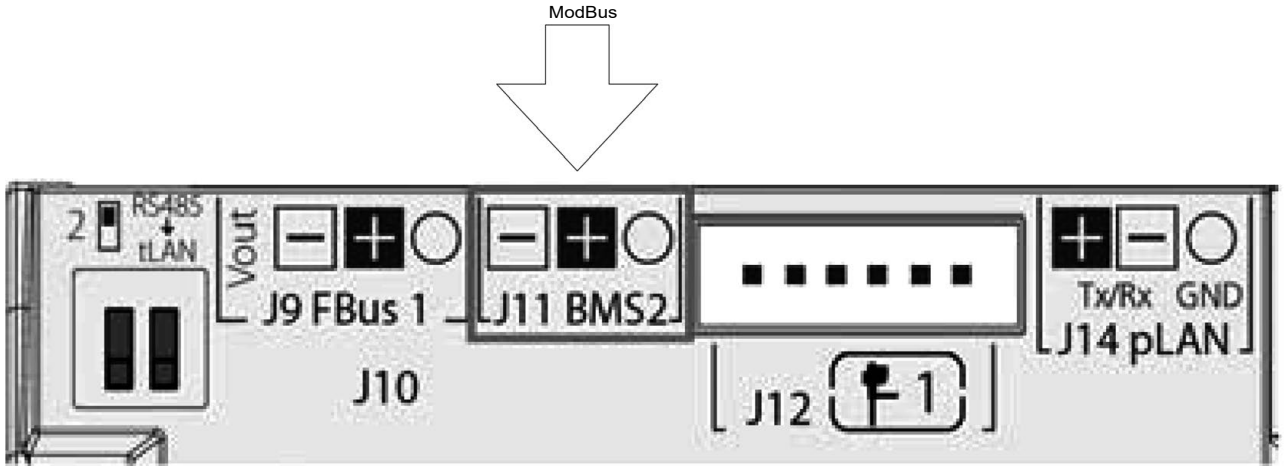
Parameter P716 indicates whether buses BMS1 and BMS2 are operating in read only mode (local control) or read/write mode (remote control).

149	Th Tune	0: local 1: Remote

5.1 - Modbus RTU

The controller has a RS485 port and can natively communicate via ModBus RTU. The controller is a ModBus slave on port J11-BMS2. Parameters P710 to P716 are used to configure this port.

710	Selecting the communication protocol type used on the BMS2 port	1: ModBus RTU
711	Selection of the transmission speed on the BMS2 port	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200
712	Parity on the BMS2 port	0: without 1: odd 2: even
713	Number of stop bits on the BMS2 port	
715	Selection of the controller address on the BMS2 bus	
149	Control type	0: Local 1: Remote



The cable must be a type AWG20/22/24 (Filotex FMA-2P, Belden ref. 9842 / 9842NH 24AWG or equivalent) shielded cable (not supplied), comprising a twisted pair and shielding, and must be no longer than 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 120 Ω ¼W electrical heater must be connected to the RS485 serial board, in the last position on the bus.

The data format (16 bits, signed or Boolean) is ModBus standard, except for analogue data which is in the format "Integer multiplied by 10".

The codes for the ModBus functions used are:
- 1 or 2: Read several bits
- 3 or 4: Read several registers (16 bits)
- 5: Write one bit
- 6: Write one register (16 bits)
- 15: Write several bits
- 16: Write several registers (16 bits)

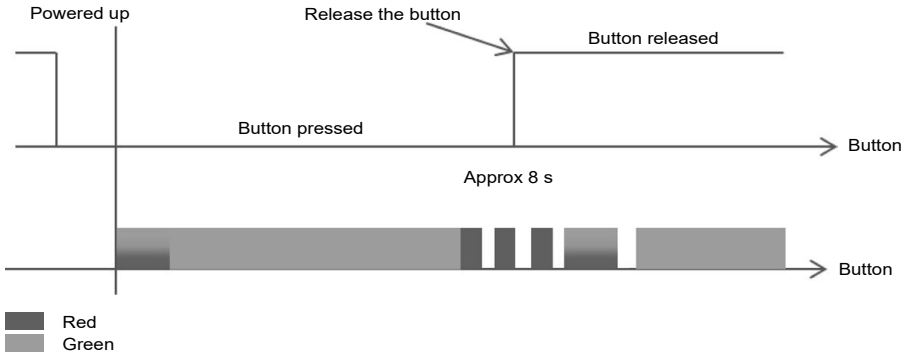
5.2 - Modbus TCP/IP and BACnet IP

Configuring the board

The board is factory fitted. If this is not the case, switch off the controller and insert the board in J13 (entitled BMS card or BMS1) on the controller.

Press the button found on the board whilst switching the power to the controller back on. The left-hand LED will start to flash rapidly.

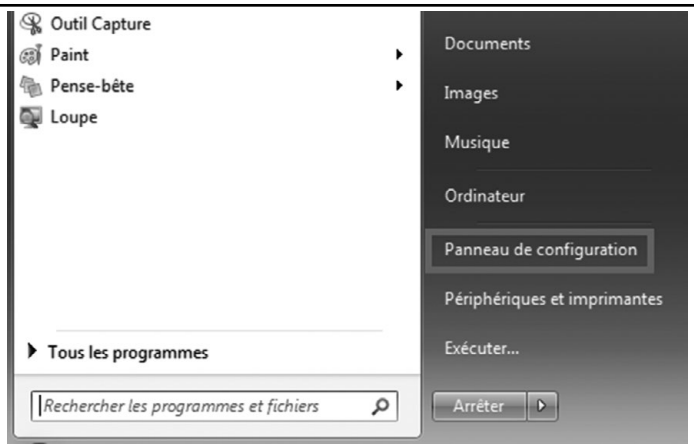
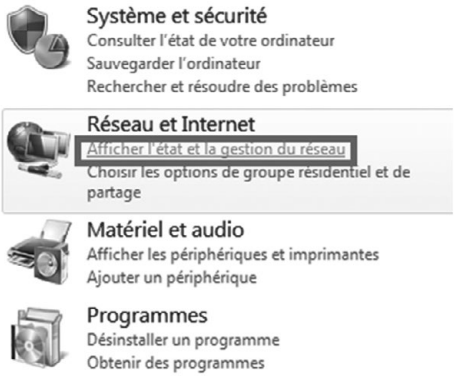
Keep pressing the reset button. After approximately 8 seconds, the left-hand LED (status LED) changes from green to red, and then starts flashing. At this point, release the button.



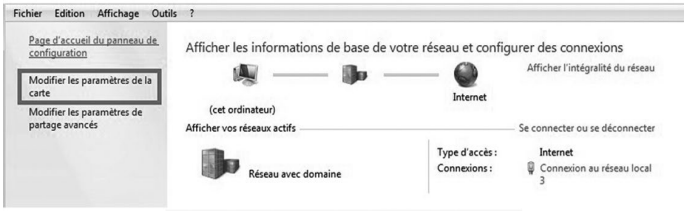
The board is now initialised to the address 172.16.0.1. You will now need to configure your PC to a fixed IP.

Procedure for Windows 7:

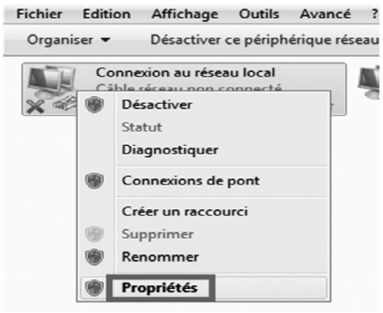
Important: you must have administrator rights to your computer

Go to the **Start** menu on your PC then **Control Panel**.	
In the Network and Internet section, click the link **View network status and tasks**.	

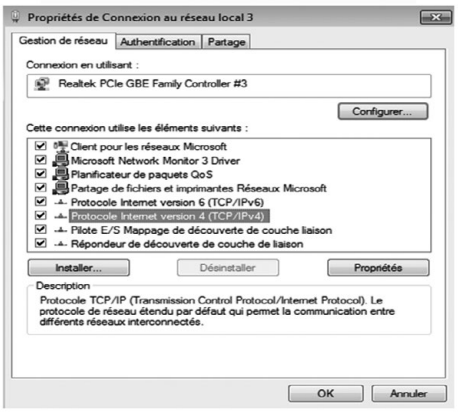
A new window will open.
In the left-hand section, select **Change adapter settings**.



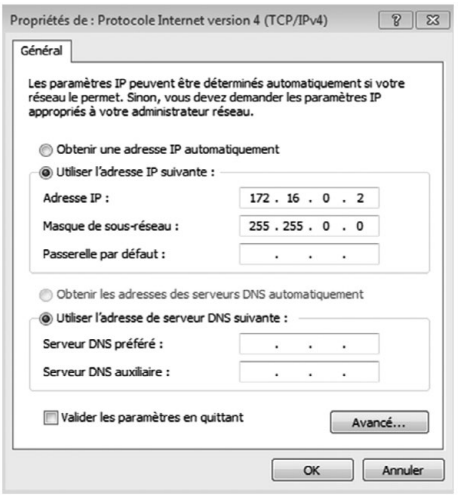
Right-click with the mouse on the name of the network connection you wish to configure.
In the menu which appears, select **Properties**.



Select the row **Internet Protocol Version 4 (TCP/IPv4).**
Click the **Properties** button.



Enter the IP address: **172.16.0.2.**
Subnet mask: **255.255.0.0**
Then, confirm



5 - CONNECTION TO A CMS

Once these elements have been modified, connect a network cable between your PC and the board.

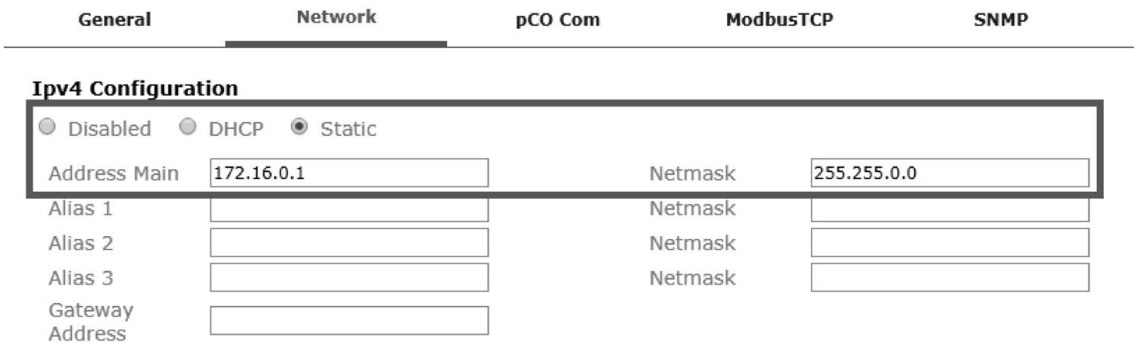
Open an internet browser (Internet explorer, Chrome, Firefox, etc.) and enter http://172.16.0.1 in the address bar

You will now be connected to the web server.

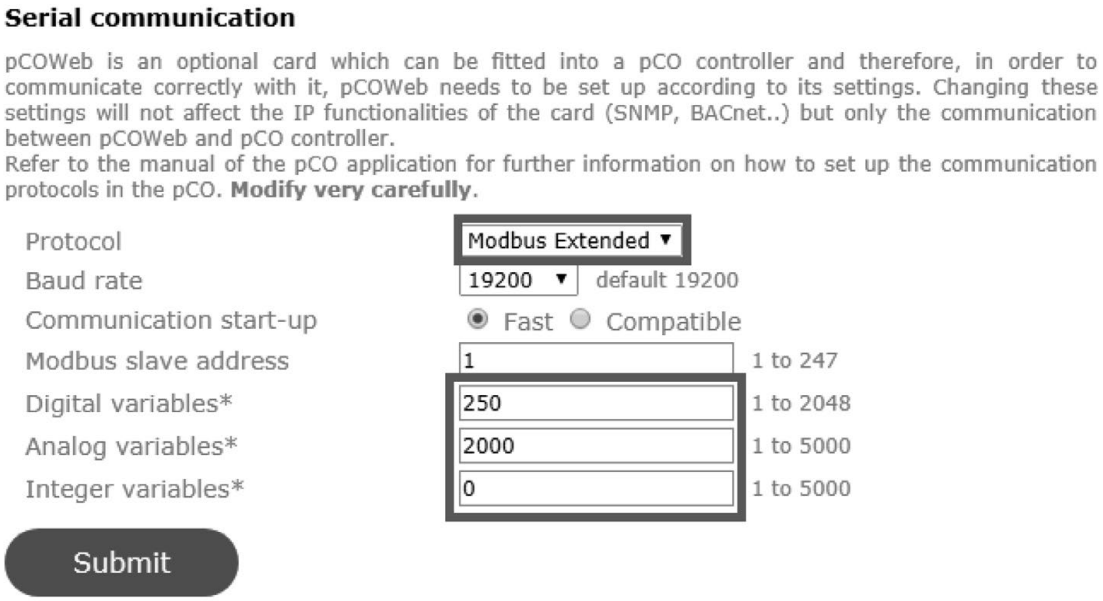
For access, the login is: admin
The password is fadmin

Click in the **Configuration** menu, and select the **Network** tab.

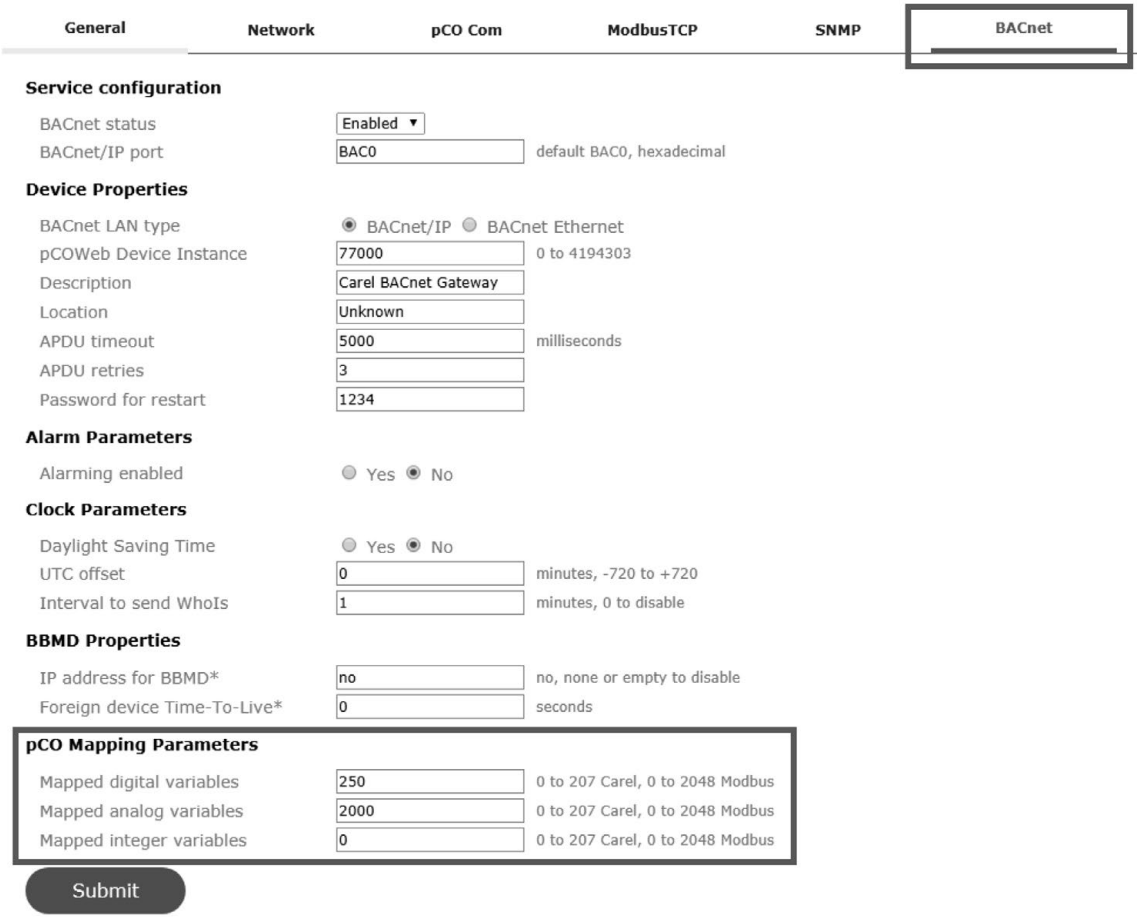
Complete this page with the information for your local network (IP address & Netmask).



Then in the pCO Com tab, change the protocol to Modbus Extended, and enter 200 digital variables, 1550 analogue variables and 0 integer variables.



Next, in the BACnet tab (for BACnet communication), check that this is activated and set the parameters as required.



Once complete, confirm the page, disconnect your PC, restart the PLC and connect it to the network.

For use with Modbus TCP/IP, configure P700 = Modbus TCP. For use with BACnet IP, configure P700 = BACNET IP.

The PLC only manages Bacnet variables in Binary format (address type DXXX) and Analogue format (address type AXXX). By default the instance number is 77000.

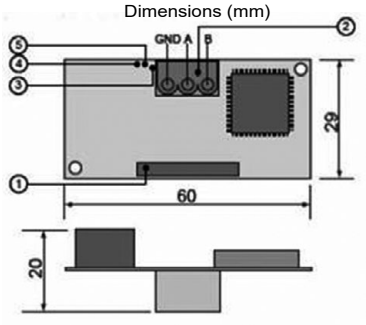
5.3 - LON

Use of LON requires a board (type FTT-10A), supplied pre-loaded by the manufacturer.

The board is factory fitted. If this is not the case, switch off the controller and insert the board in J13 (entitled BMS card or BMS1) on the controller.

It may be recharged on-site using the "nxe" file available on request.

1. Connector for the controller
2. Disconnectable terminal for connection of the LonWorks® network (GND, A, B)
3. Service pin (create a temporary shunt between the 2 terminals to create a service PIN, disconnect this shunt after finishing the operation)
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 an installation issue (incorrect connection to the PLC) or communication configuration issue (check parameter P700)



5 - CONNECTION TO A CMS

To validate the LON communication protocol on the PLC, adjust the following values in the "Communication" menu on the user terminal:

- P700 = Protocol = LON
- P716 = Control type = Local for LON access to the read-only variables (nvo)

Remote for LON access to the read and write datapoints (nvi/nvo)

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

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

Task	Brand	Integrator	Installer
Supply of the loaded LON communication board	X		
Supply of the .XIF integration file	X		
Installation of units equipped with LON controller			X
Record of barcodes (NeuronID)		X*	X*
Creation of the LON database		X	
Addressing and configuration of LON network		X	
Definition of the bindings between LON controllers and with the BMS		X	
Definition of BMS setpoints and time schedules		X	

X* Method to be defined jointly by the integrator and installer.

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.

Configuration process

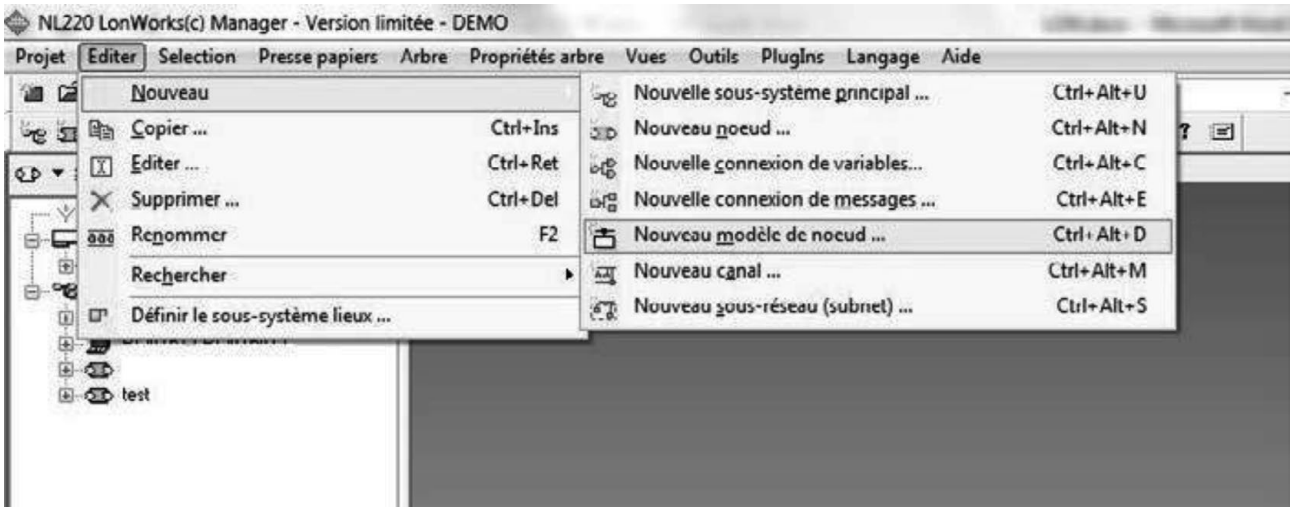
The creation of the LNS database requires the use of a LON configuration tool such as NL220, NLFacilities or LonMaker. This step is performed OFFline (i.e. whilst disconnected from the network) and consists of defining the list of controllers present, the configured parameters, the bindings, etc.

To facilitate this, the manufacturer provides an xif file describing the LON communication table for the supplied controller. This file enables the integrator to create the corresponding model in his/her LNS database. This can then be duplicated as many times as there are controllers present on the bus.

The air handling units do not require Resource Files other than the LonMarkResourceFiles1400 included as standard in all of the official LON tools.

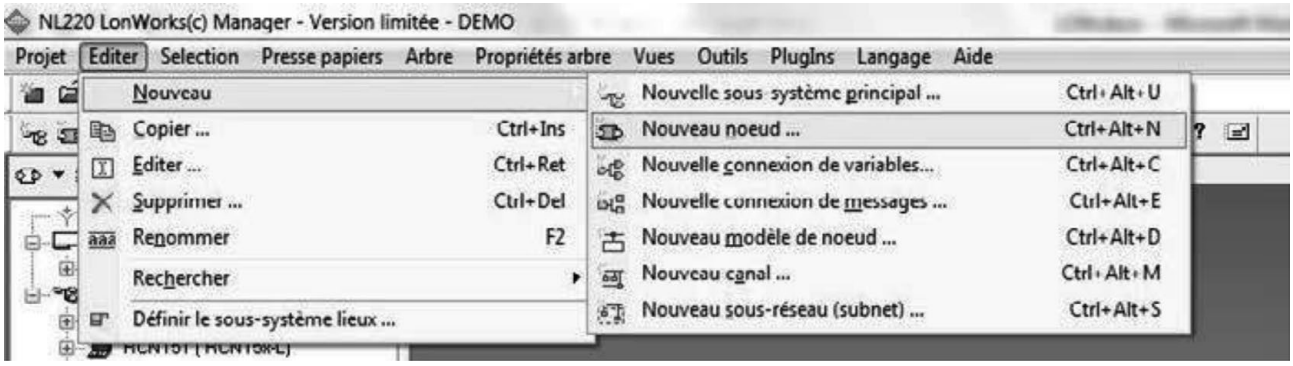
Example of import of the xif file with NL220:

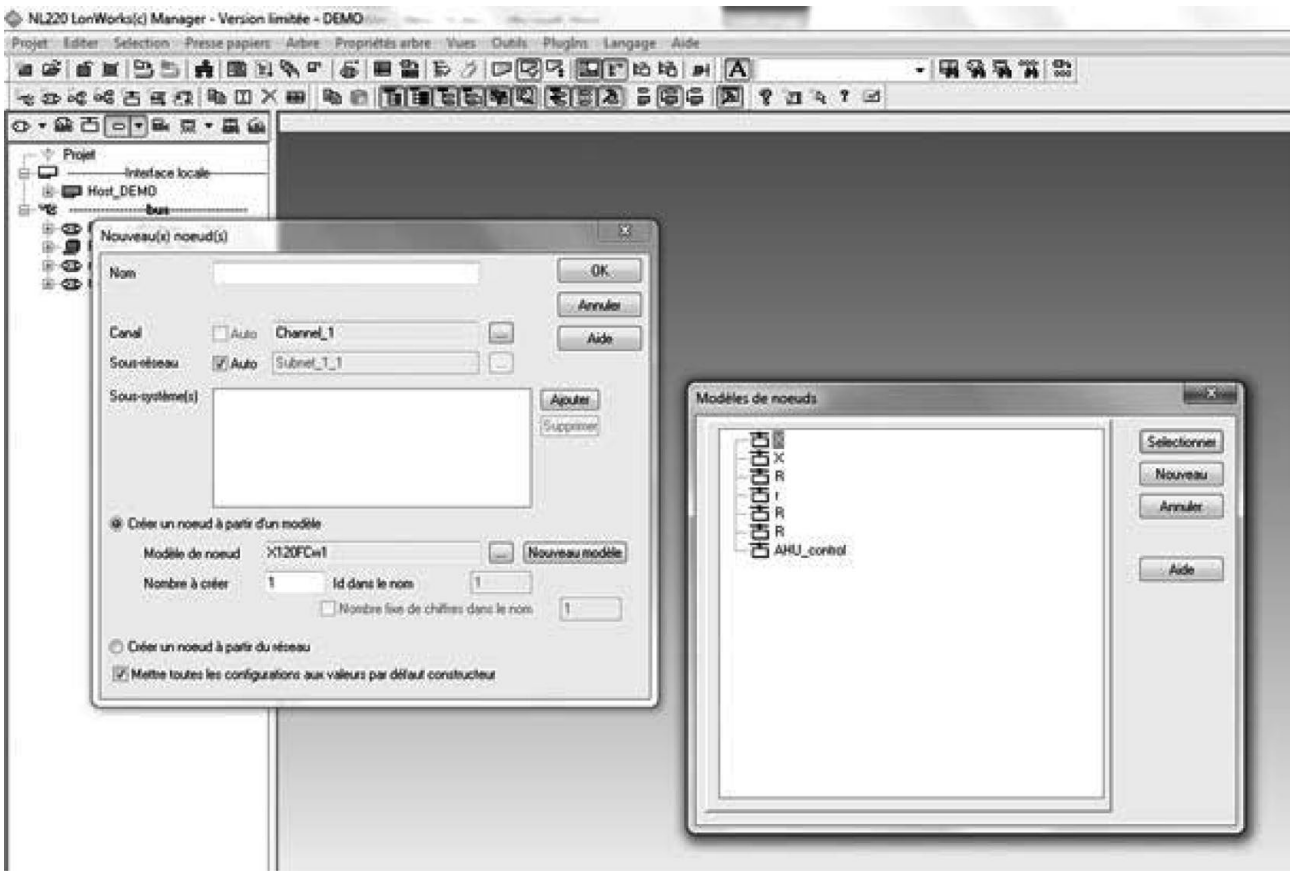
Once the project has been opened, create a new node model:



Give this model a name and, in the description box, select the xif provided using the " ... " key.

The air handling unit controller will now appear in the list of node models, which will enable as many controllers to be created in the database as there are controllers present on the network.



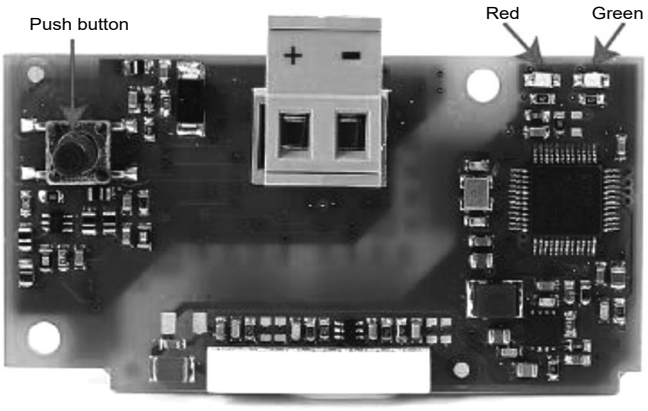


The rest of the configuration (creation of the bindings on the nvi/nvo type datapoints) is carried out normally, as it would be for any other LON product. Our PLC does not have any nci/SCPT/UCPT type datapoints. The configuration parameters are only accessible from the HMI terminal.

5.4 - KNX

The use of KNX requires an optional board. The board is factory fitted. If this is not the case, switch off the controller and insert the board in J13 (entitled BMS card or BMS1) on the controller.

The bus used is a TP1, with a transmission speed of 9600 Bds. This bus requires a specific external power supply.



LED		Meaning	Cause / solution
Red	Constantly lit	No communication between KNX board and the controller.	Check the configuration: - controller address incorrect - transmission speed incorrect - wrong protocol
	Flashing	Communication error between KNX card and the controller	The board 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 board has not been loaded	Perform configuration from ETS.
	Slow flashing	Configuration in progress: ETS is loading the configuration	
Green + Red	Both constantly lit	No power supply on KNX bus	Check: KNX bus power supply (29V DC), electrical connections and polarity of connections on the connector + and - terminals

To validate the KNX communication protocol on the PLC, adjust the following values in the "Communication" menu on the user terminal:

- P700 = Protocol = KNX
- P716 = Control type = Local for KNX access to the read only datapoints
  Remote for KNX access to the read and write datapoints

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 and expert 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.

Configuration process

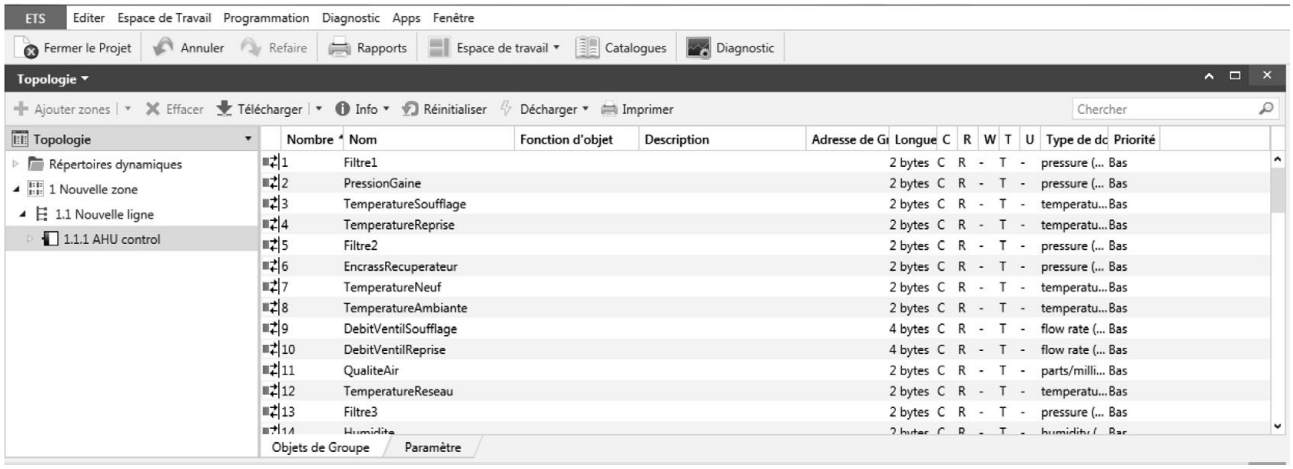
The first step of the configuration is performed OFFline (i.e. disconnected from the network). It consists of defining, within ETS, the list of products used in the project and of defining the group addresses (i.e. the data which will be exchanged between the KNX controllers). To do so, the manufacturer supplies a knxproj file (ETS compatible from version 5.6) describing the KNX communication table for the delivered controller. This file contains a preconfigured PLC model, which can be duplicated as many times as there are controllers on the bus.

The air handling unit program uses the KNX Datapoint types below:

Name type	Standard ID	Format	KNX range
Boolean (DPT_Switch)	1.xxx	1 bit	Off / On
Unsigned 8 bit (DPT_Value_1_Ucount)	5.xxx	Unsigned 8 bits	0 to 255
Unsigned 16 bits (DPT_Value_2_Ucount)	7.xxx	Unsigned 16 bits	0 to 65535
Floating 16 bits (DPT_KNX_Float)	9.xxx	Floating 16 bits	-671 088.64 to +670 760.96
32-bit signed (DPT_Value_4_Count)	13.xxx	32-bit signed	-2 147 483 648 to +2 147 483 647

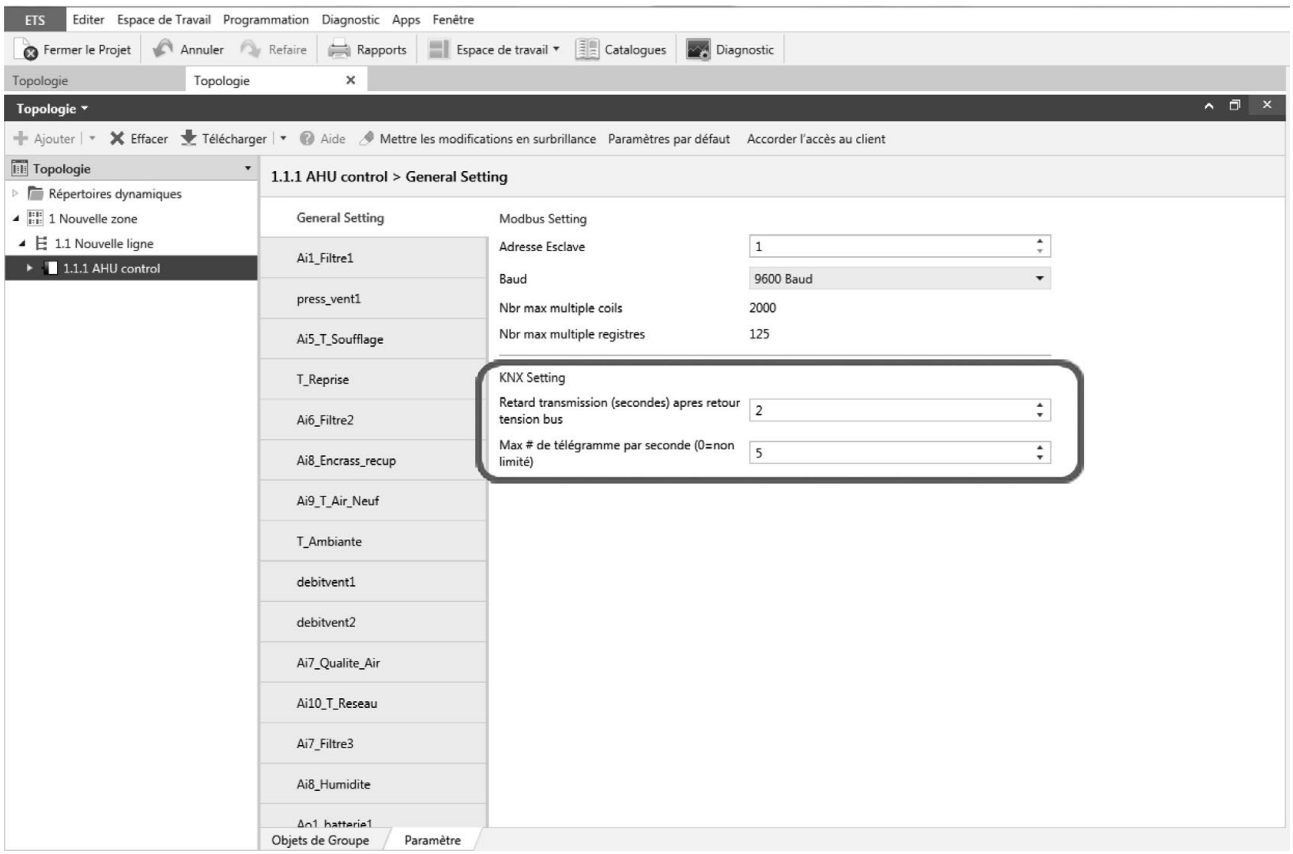
The air handling unit PLC comes as standard in the knxproj file with 2 tabs:

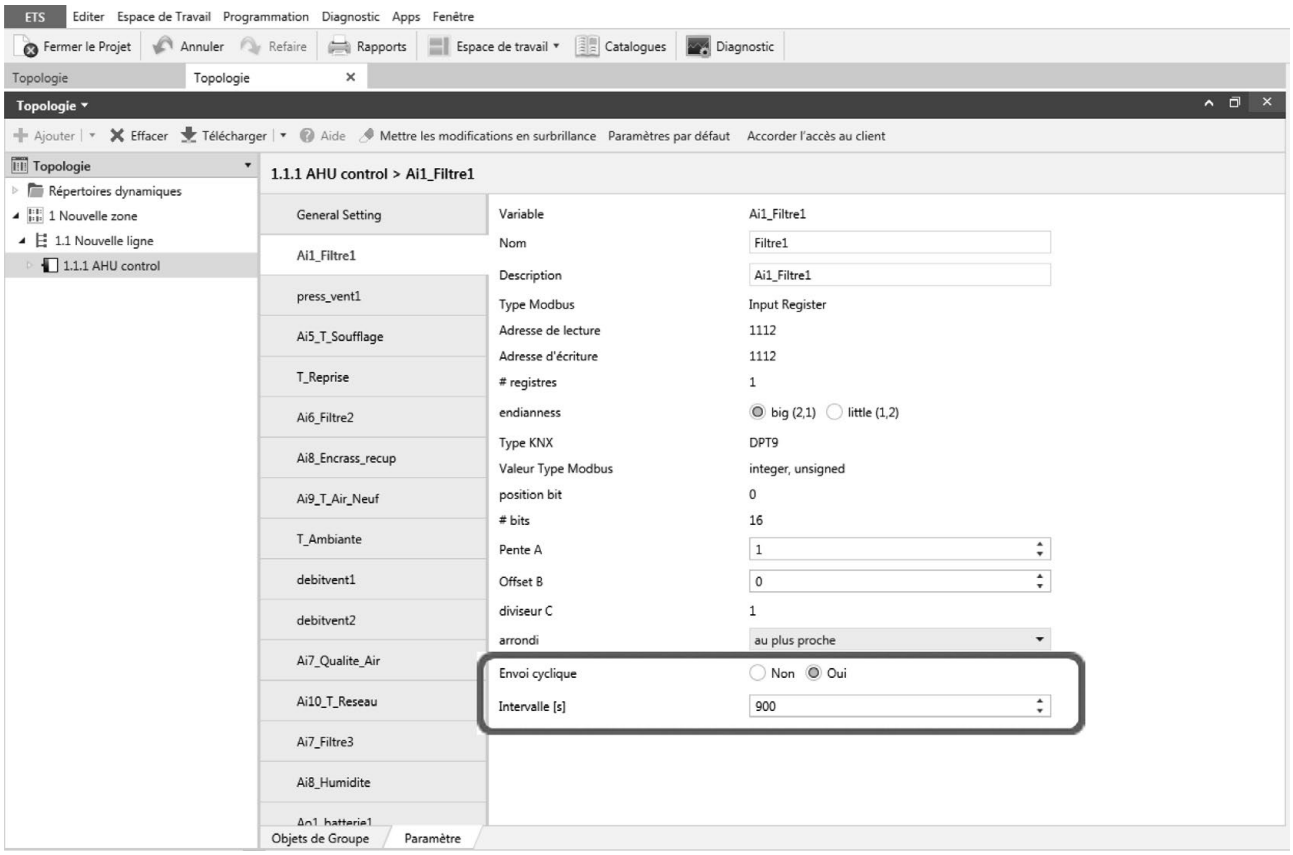
- The Group objects tab is used to select and address the desired KNX datapoints



- The Parameter tab is used to adjust the variables emission frequencies in order to optimise the bus bandwidth. The others parameters have been preset, and must not be modified.
  None of the machine configuration parameters are available in KNX, they are only accessible from the air handling unit's HMI terminal.

5 - CONNECTION TO A CMS





The assignment of the individual address, and the loading of the addresses and parameters are carried out as normal, for any other KNX product.

6.1 - Actions required prior to commissioning

To perform commissioning on the air handling unit, it is necessary to check that the electric wiring complies with the diagram and with best industry practice. The air handling and hydraulic circuits must be compliant and in working order.

Once these actions are complete, it is necessary to complete the "assembly completion notice" document and to return it to your regional office at least 15 days before the intended system start-up date. No movement can take place until your office has received this document.

If commissioning should prove impossible due to a failure to comply with the instructions in the assembly completion notice, additional costs would be incurred at the applicable rate.

6.2 - Test mode

Test mode is a mode used to test the PLC's different outputs individually. In this mode, faults are no longer managed.

If the display is disconnected, the override is maintained and may result in damage to the equipment. This menu can only be accessed in level 3.

ANY OVERRIDE IS THE USER'S RESPONSIBILITY
NONE OF THE SAFETY DEVICES ARE OPERATIONAL

To access test mode, you first need to set P99 = no, so as to shut down the unit.

Then go to the test menu, and set P3500 (override validated) = yes.

Choose the output to force by setting "on" for the on/off outputs, or by setting the desired percentage for the analogue outputs.

The last settings made in this menu remain in the memory after exiting test mode. It is strongly recommended to return all the outputs to "off" or 0% at the end of the tests, to prevent any undesired override when next back in test mode.

To return to normal mode, set P3500 = no, and then P99 = yes.

6.3 - Calibration

The "Calibration" menu is used to correct an offset between a read value and a measured value.

It is possible to add an offset of +/- 5°K to the values read by the temperature sensors, and +/- 200 ppm to the values read by the CO_2 sensor

The pressure sensors are calibrated by a wizard: in the calibration menu, when the parameter corresponding to the sensor which requires calibration has switched to "yes" then the measured value is saved and used as the offset. The adjusted value then becomes 0.

To calibrate the pressure sensors, the unit must be stopped and the air flow must be zero. It is also recommended to temporarily disconnect the connection tubing from the pressure sensor.

7 - FAULTS

When the PLC detects an issue, it triggers a fault.

7.1 - Type of faults

Faults may either be "maintenance" or "danger" type faults.

"Maintenance" faults are information provided to the user and signal that the unit is not operating correctly, but that this does not have any immediate consequences (a fouled filter, for example). These may be cleared once the issue has been resolved.

"Danger" faults are issues which prevent the unit from operating; the unit will shut down immediately (or after the fan delay). The issue must be resolved before the unit can be restarted. The faults may be cleared once the AHU has been shut down and the fault has disappeared.

"Maintenance" faults may be configured as "danger" faults using parameters P600 to P653. Conversely, for safety reasons, it is not possible to configure "danger" faults as "maintenance" faults.

7.2 - Fault relays

The PLC contains a "maintenance" faults summary relay and a "danger" faults summary relay. These are 250V AC / 1A type relays. They are tripped when at least one "maintenance" or "danger" fault, respectively, is present.

Their direction of action is configurable (P880 and P881).

7.3 - Fault memory

The PLC stores the last 100 faults and the date and time that each of these faults occurred. This is the "fault memory" menu. This memory cannot be cleared.

7.4 - List of faults

No.	Designation of faults	Fault level
1	Powered down	-
2	Fire protection	Danger
4	Frost protection	Danger
11	Intake EC motor	Danger
31	Exhaust EC motor	Danger
48	Intake air flow low limit	Danger
49	Extraction air flow low limit	Danger
52	Air intake filter 1 fouled	Maintenance
53	Intake filter 1 blocked	Danger
58	Exhaust filter 1 fouled	Maintenance
59	Extraction filter 1 blocked	Danger
62	Intake filter pressure sensor fault	Danger
63	Exhaust filter pressure sensor fault	Danger
65	Rotary heat exchanger	Maintenance
66	Heat recovery frosted	Danger
71	Electric heater safety thermostat	Maintenance
80	Intake duct pressure too low	Maintenance
81	Intake duct pressure too high	Maintenance
82	Supply air temperature too low	Maintenance

No.	Designation of faults	Fault level
83	Supply air temperature too high	Maintenance
84	Return temperature too low	Maintenance
85	Return temperature too high	Maintenance
86	Room temperature too low	Maintenance
87	Room temperature too high	Maintenance
90	Fresh air temperature sensor	Danger
91	Supply air temperature sensor	Danger
92	Return air temperature sensor	Danger
93	Room air temperature sensor	Maintenance
94	Intake flow rate pressure sensor	Danger
95	Exhaust flow rate pressure sensor	Danger
141	Loss of communication with the heat recovery unit outlet temperature sensor, intake side	Maintenance
150	Loss of communication with Th-Tune	Maintenance
151	Coil 1 pump fault	Maintenance
152	Coil 2 pump fault	Maintenance
153	Heat recovery unit pressure sensor fault	Danger
154	Additional casing supply air sensor fault	Danger
155	Exhaust duct pressure too low	Maintenance
156	Exhaust duct pressure too high	Maintenance

7.5 - Diagnostics

Fault	Sources	Causes	Solutions
Powered down	The power supply has been cut	The circuit breaker has been triggered	Check the wiring and the components
		Voluntary stop	Empty
Fire protection	The "fire protection" contact has been triggered	Triggered by the fume detector or by the external fire contact managed by the operator	Check the condition of the contacts
Frost protection	The supply air temperature sensor detects a temperature below threshold P248 (4°C by default)	The air temperature at the outlet for the 1st hydraulic coil is too cold	Check the operation of the first coil: valve jammed, no flow, no hot water, etc.
Intake EC motor	An EC motor is indicating a fault	Overvoltage, motor overload, motor power supply problem, etc.	Check the condition of the intake motor(s)
Exhaust EC motor			Check the condition of the exhaust motor(s)
Intake air flow low limit Extraction air flow low limit	The air flow rate is below the fixed limit P111	The air passage is blocked	Check the pressure drops and ensure there are no foreign bodies in the ducts and the unit
		The pressure measurement sensor is defective	Check the operation of the sensor
		Constant pressure control: the pressure drops in the network are too great	Check the opening/closing of the duct network dampers
Intake filter 1 fouled	The pressure drop in the filter is greater than the "filter fouled" threshold	The filter is dirty	Schedule replacement of the filter before it becomes clogged
Exhaust filter 1 fouled			
Intake filter 1 blocked	The filter pressure drop is greater than the "filter blocked" threshold	The filter is blocked	Replace the filter
Exhaust filter 1 blocked			
Intake flow rate pressure sensor	The pressure sensor signal is less than 0.5 V	The sensor is faulty	Replace the sensor
Extraction filter pressure sensor			
Intake flow rate pressure sensor		Incorrect connection	Check the electrical connection and tightness of the connections
Exhaust flow rate pressure sensor			
Heat recovery unit pressure sensor			
Rotary heat exchanger	The rotary heat recovery unit indicates a fault	The heat recovery unit controller has detected a fault	Check the operation of the heat recovery unit and the condition of the belt
Heat recovery frosted	The pressure drops measurement for the heat recovery unit is greater 345 Pa	Operating problem with the differential pressure sensor	Check the operation of the sensor
		The heat recovery unit is clogged	Clean the heat recovery unit
		The heat recovery unit is frozen	Wait for the heat recovery unit to be defrosted
Electric heater safety thermostat	One of the safety thermostats for an electric heater has been tripped	The temperature in the electric heater is greater than the thermostat limit (80 °C)	Check that the air flow is sufficient and check the condition of the switches and the electric heater
Intake duct pressure too low	The duct pressure is below the fixed limit P124	Operating problem with the intake pressure sensor	Check the operation of the sensor
		Operating problem with the FMAs	Check the maximum frequency of the inverter/ motor and check that the motor turns correctly
Intake duct pressure too high	The duct pressure is above the fixed limit P125	Operating problem with the intake pressure sensor	Check the operation of the sensor
		Operating problem with the FMAs	Check the maximum frequency of the inverter/ motor
Exhaust duct pressure too low	The duct pressure is below the fixed limit P142	Operating problem with the intake pressure sensor	Check the operation of the sensor
		Operating problem with the FMAs	Check the maximum frequency of the inverter/ motor and check that the motor turns correctly
Exhaust duct pressure too high	The duct pressure is above the fixed limit P143	Operating problem with the intake pressure sensor	Check the operation of the sensor
		Operating problem with the FMAs	Check the maximum frequency of the inverter/ motor
Supply air temperature too low	The supply air temperature is below the fixed limit P240	Operating problem with the supply air temperature sensor	Check the operation of the sensor
		Operating problem with the heating elements	Check the operation of the valves, heat recovery unit, mixing box, etc.
		Operating problem with the cooling elements	Check the operation of the valves, heat recovery unit, mixing box, etc.
Supply air temperature too high	The supply air temperature is below above the fixed limit P241	Operating problem with the supply air temperature sensor	Check the operation of the sensor
		Operating problem with the heating elements	Check the operation of the valves, heat recovery unit, mixing box, etc.
		Operating problem with the cooling elements	Check the operation of the valves, heat recovery unit, mixing box, etc.

Fault	Sources	Causes	Solutions
Return temperature too low	The return temperature (or room temperature) is below the fixed limit P242 (or P244)	Temperature sensor operating problem	Check the operation of the sensor
		Supply air temperature limits incorrectly configured	Check the configuration
Room temperature too low		Operating problem with the heating elements	Check the operation of the valves, heat recovery unit, mixing box, etc.
		Operating problem with the cooling elements	Check the operation of the valves, heat recovery unit, mixing box, etc.
Return temperature too high	The return temperature (or room temperature) is above the fixed limit P243 (or P245)	Temperature sensor operating problem	Check the operation of the sensor
		Supply air temperature limits incorrectly configured	Check the configuration
Room temperature too high		Operating problem with the heating elements	Check the operation of the valves, heat recovery unit, mixing box, etc.
		Operating problem with the cooling elements	Check the operation of the valves, heat recovery unit, mixing box, etc.
Fresh air temperature sensor	Temperature measurement <-50° C or >90° C	Temperature sensor open circuit or short-circuit	Check the sensor wiring or replace the sensor
Supply air temperature sensor			
Return air temperature sensor			
Room air temperature sensor			
Additional casing supply air sensor			
Loss of communication with Th-Tune	The Th-Tune is no longer communicating with the PLC	The wiring between the PLC and the Th-Tune is damaged	Check the wiring between the PLC and the Th-Tune, check for the line termination resistors
Coil 1 pump fault	The pump motor is indicating a fault	Reversal in fault contact direction	Check parameters P362 and P363
Coil 2 pump fault		Overvoltage, motor overload, motor power supply problem, etc.	Check the condition of the pump motors

8 - PARAMETERS

Here is the list of parameters settable by:
- The user (access level 1 - no password on alphanumeric terminals, password 1111 on touch screen terminals)
- The installer (access level 2)
- The manufacturer (access level 3)

The level 2 password can be requested from your technical support. Some parameters are not always visible and depend on the machine's configuration.

8.1 - Machine parameters

No.	Description	Setting		Display conditions	Access level
		Enumeration	By default		
1	Unit model				3
3	Number of intake EC fans	1 or 2	as per P1	Visible as read-only	3
4	Characteristics of the pressure sensor for the air intake fan	1: 0-1000 Pa 10V 2: 0-2500 Pa 10V 3: 0-5000 Pa 10V 4: 0-1600 Pa 0.3-5V 5: 0-1000 Pa 0.5-4.5V 6: 0-3000 Pa 0.5-4.5V	as per P1	Visible as read-only	3
5	Coefficient value K for the intake fan		as per P1	Visible as read-only	3
7	Intake filter type	1: M5 2: F7 3: F9	1		3
		4: M5 + F7 5: M5 + F9 6: F7 + F9	1	P1 = Classic RHE or Classic PHE or Vertical PHE	3
8	Intake filter coefficient		as per P1 and P7		3
9	Characteristics of the pressure sensor for the air intake filter	1 : 0-1000 Pa 0,5-4,5V 2 : 0-800 Pa 0,5-4,5V	2		3
11	Number of EC air exhaust fans	1 or 2	as per P1	Visible as read-only	3
12	Characteristics of the pressure sensor for the air extraction fan	1: 0-1000 Pa 10V 2: 0-2500 Pa 10V 3: 0-5000 Pa 10V 4: 0-1600 Pa 0.3-5V 5: 0-1000 Pa 0.5-4.5V 6: 0-3000 Pa 0.5-4.5V	as per P1	Visible as read-only	3
13	Coefficient value K for the exhaust fan		as per P1	Visible as read-only	3
15	Exhaust filter type	1: M5 2: F7 3: F9	1		3
16	Exhaust filter coefficient		as per P1 and P15		3
17	Characteristics of the pressure sensor for the air exhaust filter	1 : 0-1000 Pa 0,5-4,5V 2 : 0-800 Pa 0,5-4,5V	2		3
24	Fire detection	0: Without 1: With	0		3
26	Isolation damper	0: Without 1: Outdoor sides 2: Building side 3: Outdoor + building sides	0		3
27	Mixing damper	0: Without 1: With	0	P1 = Classic RHE	3
28	Coil no.1	0: None	0		3
		1: Cold water		P32 Elec heat = Without or 1 on/off stage or 2 on/off stages	
		3: Hot water 4: Mixed (water)		P32 Elec heat = Without or 1 on/off stage or 2 on/off stages	
29	Hydraulic coil no.2	0: Without 1: Cooling 2: Heating 4: Mixed (water)	0		3
31	Electric pre-heater	0: Without 1: With	0	P32 = Without or 1 on/off stage or 1 gradual stage	3
32	Electric heater	0: Without 1: 1 on/off stage	0		3
		2: 2 On/Off stages		P31 = Without	
		5: 1 gradual stage		P29 = without	
		6: 1 gradual stage and 1 On/Off stage		P29 = Without and P31 = Without	

No.	Description	Setting		Display conditions	Access level
		Enumeration	By default		
36	Heat recovery unit	0: Without 1: Plate 3: Gradual speed heat recovery unit	as per P1	Read-only	3
37	Differential pressure sensor on the heat recovery unit	0: Without 1: With	0	P01 = Classic RHE or Vertical PHE or (P01 = Classic PHE and P31 Electric preheater = without)	3
38	Heat recovery unit outlet temperature sensor, intake side	0: Without 1: With	0		3
90	External generator	0: None	0		3
		1: Heater		P28 Coil 1 = Hot water or P29 Coil 2 = Hot water	
		2: Cooler		P28 Coil 1 = Cold water or P29 Coil 2 = Cold water	
92	Coil no.1 pump	0: Without 1: With	0	P28 Coil 1 = Cold water or Hot water or mixed	3
93	Coil no.2 pump	0: Without 1: With	0	P29 Coil 2 = Cold water or Hot water or mixed	3
99	Configuration locked	0: unlocked 1: locked	0		3

8.2 - Setting parameter

No.	Description	Setting		Unit	Display conditions	Access level
		Enumeration	By default			
100	Language	0: French 1: English 2: German 3: Spanish 4: Italian 5: Dutch	0			1
102	Date	DD/MM/YYYY				1
103	Time	HH/MM				1
104	Air intake ventilation control	1: Flow rate 2: Duct pressure	1			2
105	Air extraction ventilation control	0: Intake fan control feedback 1: Intake fan flow rate feedback	0		P104 Extraction ventilation control = Duct pressure	2
		2: Duct pressure			P104 Exhaust fan ventilation control = Duct pressure and P37 Differential pressure sensor on heat recovery unit = without	
106	Multiplication factor value of the signal sent by the air extraction fan with pressure control in the supply air duct		1		P104 Intake ventilation control = Duct pressure and (P105 Exhaust fan control = Control feedback or flow rate feedback)	2
108	Damper opening time delay		180	s	P26 Isolation damper ≠ Without	3
110	AHU max flow rate		As per P1	m^3/h	Visible as read-only	3
111	AHU flow rate low limit threshold		As per P1	m^3/h	Visible as read-only	3
112	Air intake fan flow rate setpoint 1		As per P1	m^3/h	P104 Air intake ventilation control = Flow rate	1
113	Air intake fan flow rate setpoint 2		As per P1	m^3/h	P104 Intake ventilation control = Flow rate and P160 Setpoint 1/setpoint 2 selection = time sched/CMS or on/off input or on/off override and P161 Application of setpoint 1/setpoint 2 selection = ventilation or temperature + ventilation	1
114	Air intake fan flow control PID proportional band (P)		6000	m^3/h	P104 Air intake ventilation control = Flow rate	2
115	Air intake fan flow rate control PID integral time (I)		4	s	P104 Air intake ventilation control = Flow rate	2
116	Air intake fan flow rate control PID derivative time (D)		0	s	P104 Air intake ventilation control = Flow rate	2
118	Intake duct pressure setpoint 1		200	Pa	P104 Air intake ventilation control = Duct pressure	1

No.	Description	Setting		Unit	Display conditions	Access level
		Enumeration	By default			
119	Air intake duct pressure setpoint 2		100	Pa	P104 Intake ventilation control = Duct pressure and P160 Setpoint 1/setpoint 2 selection = time sched/CMS or on/off input or on/off override and P161 Application of setpoint 1/setpoint 2 selection = ventilation or temperature + ventilation	1
120	Air intake duct pressure control PID proportional band (P)		50	Pa	P104 Air intake ventilation control = Duct pressure	2
121	Air intake duct pressure control PID integral time (I)		4	s	P104 Air intake ventilation control = Duct pressure	2
122	Air intake duct pressure control PID derivative time (D)		1	s	P104 Air intake ventilation control = Duct pressure	2
124	Intake duct pressure lower limit threshold		10	Pa	P104 Air intake ventilation control = Duct pressure	2
125	Intake duct pressure upper limit threshold		900	Pa	P104 Air intake ventilation control = Duct pressure	2
126	Minimum flow rate for electric heater operation		As per P1	m^3/h	P31 Electric preheater = with or (P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage + 1 on/off stage)	3
128	Extraction fan flow rate setpoint 1		As per P1	m^3/h	P104 Air intake ventilation control = Flow rate	1
129	Extraction fan flow rate setpoint 2		As per P1	m^3/h	P104 Intake ventilation control = Flow rate and P160 Setpoint 1/setpoint 2 selection = time sched/CMS or on/off input or on/off override and P161 Application of setpoint 1/setpoint 2 selection = ventilation or temperature + ventilation	1
130	Air extraction fan flow rate control PID proportional band (P)		6000	m^3/h	P104 Air intake ventilation control = Flow rate or P105 Air exhaust ventilation control = Copy of the air intake fan flow rate	2
131	Air extraction fan flow rate control PID integral time (I)		4	s	P104 Air intake ventilation control = Flow rate or P105 Air exhaust ventilation control = Copy of the air intake fan flow rate	2
132	Air extraction fan flow rate control PID derivative time (D)		0	s	P104 Air intake ventilation control = Flow rate or P105 Air exhaust ventilation control = Copy of the air intake fan flow rate	2
136	Exhaust duct pressure setpoint 1		200	Pa	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	1
137	Exhaust duct pressure setpoint 2		100	Pa	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure and P160 Setpoint 1/setpoint 2 selection = time sched/CMS or on/off input or on/off override and P161 Application of setpoint 1/setpoint 2 selection = ventilation or temperature + ventilation	1
138	Exhaust duct pressure control PID proportional band (P)		50	Pa	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	2
139	Exhaust duct pressure control PID integration time (I)		4	s	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	2

No.	Description	Setting		Unit	Display conditions	Access level
		Enumeration	By default			
140	Exhaust duct pressure control PID derivative time (D)		1	s	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	2
142	Exhaust duct pressure lower limit threshold		10	Pa	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	2
143	Exhaust duct pressure upper limit threshold		900	Pa	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	2
149	Th Tune	0: Without 1: With	0			2
150	Free cooling control	0: Without 1: With	1			2
151	Night cooling control	0: Without 1: With	0		P104 Air intake ventilation control = Flow rate	2
152	Air quality control	0: Without 1: With	0		P104 Air intake ventilation control = Flow rate or (P104 Air Intake ventilation control = Pressure and P37 Heat recovery unit differential pressure sensor = Without and P105 Exhaust ventilation control = pressure)	2
154	Target temperature selection	0 : Supply air	1		P150 Free cooling control = Without and P151 Night cooling control = Without	2
		1 : Return				
		2: Ambient			P149 Th-Tune = With	
155	Temperature control mode selection	0: Automatic 1: Cooling only 2: Heating only	0			2
156	Supply air limitation	0: without 1: with	1		P154 Target temperature selection = return or room air	2
157	Supply air compensation in deadband	0: without 1: with	1		P154 Target temperature selection = return or room air	2
158	load shedding of rotary heat exchanger	0 : free 1 : forced stoped	0		P36 Heat recovery unit = Gradual speed	2
160	Setpoint 1/Setpoint 2 selection	0: Without 1: Time sched or CMS 2: on/off input only 3: On/off input override	0			2
161	Application of setpoint 1/setpoint 2 selection	0: Temperature 1: Ventilation 2: Temperature and ventilation	0		P160 = Setpoint 1/setpoint 2 selection = time sched/CMS or On/Off override	2
162	Changeover selection	0: CMS 1: on/off input	1		P28 hydraulic coil = mixed or P29 hydraulic coil 2 = mixed	2
163	load shedding of mixing damper	0 : free 1 : forced closed	0		P27 Mixing damper = With	2
164	Fan delay time		240	s	P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage and 1 on/off stage or P31 Electric preheater = with	3
166	Mixing damper opening time		150	s	P27 Mixing damper = With	3
168	Heating or cooling change authorisation time delay		1	min		2
170	Temperature setpoint 1 in cooling mode		25,0	°C		1
171	Temperature setpoint 2 in cooling mode		30,0	°C	P160 Setpoint 1/setpoint 2 selection = time sched/CMS or ON/OFF input or on/off override and P161 Application of setpoint 1/setpoint 2 selection = temperature or temperature + ventilation	1
172	Temperature control PID proportional band (P) in cooling mode		5,0	°C		2
173	Temperature control PID integral time (I) in cooling mode		150	s		2

No.	Description	Setting		Unit	Display conditions	Access level
		Enumeration	By default			
174	Temperature control PID derivative time (D) in cooling mode		0	s		2
180	Temperature setpoint 1 in heating mode		23,0	°C		1
181	Temperature setpoint 2 in heating mode		18,0	°C	P160 Setpoint 1/setpoint 2 selection = time sched/CMS or ON/OFF input or on/off override and P161 Application of setpoint 1/setpoint 2 selection = temperature or temperature + ventilation	1
182	Temperature control PID proportional band (P) in heating mode		5,0	°C		2
183	Temperature control PID integral time (I) in heating mode		150	s		2
184	Temperature control PID derivative time (D) in heating mode		0	s		2
206	Free cooling and night cooling operating differential compared to the controlled temperature		3,0	°C	P150 Free cooling control = With or P151 Night cooling control = With	2
207	Temperature low limit for free cooling and night cooling		15,0	°C	P150 Free cooling control = With or P151 Night cooling control = With	2
208	Mixing damper minimum setpoint 1		80	%	P27 Mixing damper = With	2
209	Mixing damper minimum setpoint 2		80	%	P27 Mixing damper = With and P160 Setpoint 1/setpoint 2 selection = time sched/CMS or on/off input or on/off override and P161 Application of setpoint 1/setpoint 2 selection = ventilation or temperature + ventilation	2
210	Control setpoint in night cooling mode		17,0	°C	P151 Night cooling control = With	1
212	Air intake fan flow rate setpoint in night cooling mode		P110	m^3/h	Night cooling control = With and P104 Intake ventilation control =Flow rate	2
213	Air extraction fan flow rate setpoint in night cooling mode		P110	m^3/h	Night cooling control = With and P104 Intake ventilation control =Flow rate	2
214	Intake fan pressure setpoint in night cooling mode		200	Pa	P151 Night cooling control = With and P104 Intake ventilation control = Pressure	2
215	Exhaust fan pressure setpoint in night cooling mode		200	Pa	P151 Night cooling control = With and P104 Intake ventilation control = Pressure and P105 Exhaust ventilation control = duct pressure	2
216	Air quality setpoint		800	ppm	P152 Air quality control = With	2
217	Air quality proportional band		100	ppm	P152 Air quality control = With	2
218	Air flow max setpoint on intake for air quality		P110	m^3/h	P152 Air quality control = With and P104 Air intake ventilation control = Flow rate	2
219	Air flow max setpoint on exhaust for air quality		P110	m^3/h	P152 Air quality control = With and P104 Air intake ventilation control = Flow rate	2
220	Heat recovery unit min. flow rate pressure drop threshold		as per P1	Pa	P37 Heat recovery unit pressure sensor = With	3
221	Heat recovery unit max. flow rate pressure drop threshold		as per P1	Pa	P37 Heat recovery unit pressure sensor = With	3
225	Temperature difference for recovery unit run authorisation		3	°C		2
226	Gradual speed heat recovery unit min. speed		10	%	P36 Heat recovery unit = Gradual speed	3
227	Heat recovery unit frost protection temperature threshold		-15	°C	P36 Heat recovery unit = Gradual speed and P37 Heat recovery unit differential pressure sensor = Without	3
			-3		P36 Heat recovery unit = Plate and P37 Heat recovery unit differential pressure sensor = Without	
228	Frost protection temperature setpoint		17,0	°C	P154 Target temperature selection = room	2
230	Supply air temperature low limit setpoint		16,0	°C	156 Supply air limitation = with	2
231	Supply air temperature upper limit setpoint		26,0	°C	P156 Supply air limitation = with	2
232	Supply air temperature limit proportional band		20,0	°C	P156 Supply air limitation = with	2
233	Supply air temperature limit integral time		150	s	P156 Supply air limitation = with	2

No.	Description	Setting		Unit	Display conditions	Access level
		Enumeration	By default			
234	Low supply air temperature compensation setpoint in deadband		16,0	°C	P157 Supply air compensation in deadband	2
235	Low supply air temperature compensation proportional band in deadband		5,0	°C	P157 Supply air compensation in deadband	2
236	High supply air temperature compensation setpoint in deadband		35,0	°C	P157 Supply air compensation in deadband	2
237	High supply air temperature compensation proportional band in deadband		5,0	°C	P157 Supply air compensation in deadband	2
240	Supply air temperature low limit threshold		15,0	°C		2
241	Supply air temperature upper limit threshold		35,0	°C		2
242	Return air temperature low limit threshold		15,0	°C	P154 Target temperature selection = return air	2
243	Return air temperature upper limit threshold		35,0	°C	P154 Target temperature selection = return air	2
244	Room temperature low limit threshold		15,0	°C	P154 Target temperature selection = room	2
245	Room temperature upper limit threshold		35,0	°C	P154 Target temperature selection = room	2
248	Frost protection threshold		4,0	°C	P28 Water coil no.1 = Cooling or Heating or Mixed or P29 = cold water or hot water or mixed	3
260	Min. opening percentage for coil 1 valve when unit off		0	%	P28 Water coil no.1 = Cooling or Heating	2
261	Opening percentage for the coil 2 valve when unit stopped		0	%	P29 Water coil no.2 = Cooling or Heating or Mixed	2
265	Fresh air temperature limit for unit operation		-12	°C	P36 Heat recovery unit = Plate and P31 Electric preheater = without	
			-20		P36 Heat recovery unit = Plate and P31 Electric preheater = with	3
			-25		P36 Heat recovery unit = Gradual speed	3
270	Temperature setpoint compensation activation	0: Without 1: With	0			2
270.1	Heating compensation start fresh air temp.		10,0	°C	P270 = With	2
270.2	Heating compensation end fresh air temp.		-20.0	°C	P270 = With	2
270.3	Heating compensation max. setpoint difference		3,0	°C	P270 = With	2
270.5	Cooling compensation start fresh air temp.		25,0	°C	P270 = With	2
270.6	Cooling compensation end fresh air temp.		40,0	°C	P270 = With	2
270.7	Cooling compensation max. setpoint difference		2,0	°C	P270 = With	2
271	Downgraded fresh air flow rate activation	0: Without 1: With	0			2
271.1	Downgraded mode start fresh air temperature		10,0	°C	P271 = With	2
271.2	Downgraded mode end fresh air temperature		-20.0	°C	P271 = With	2
271.3	% min. flow rate in downgraded mode		30,0	%	P271 = With	2
280	Fire safety operating mode	0: off	0		P24 = with	2
		1: Intake override/exhaust stop 2: Exhaust override/intake stop 3: Intake and exhaust override			P24 = with and P104 = flow rate control	
282	Intake flow rate in case of fire		P110	m^3/h	P280 = 1 or 3	2
283	Exhaust flow rate in case of fire		P110	m^3/h	P280 = 2 or 3	2

8.3 - Reading parameter

No.	Description	Setting				Unit	Display conditions	Access level
		Enumeration	Min.	Max.	Increment			
300	Calculated intake flow rate setpoint		0	150000	10	m^3/h	P104 Air intake ventilation control = Flow rate	1
301	Air intake fan flow rate		0	320000	10	m^3/h		1
302	Intake fan differential pressure		0	5000	1	Pa		1
304	Intake duct calculated pressure setpoint		0	5000	1	Pa	P104 Air intake ventilation control = Duct pressure	1
305	Intake duct pressure		0	5000	1	Pa	P104 Air intake ventilation control = Duct pressure	1
306	Calculated extraction flow rate setpoint		0	150000	10	m^3/h	P104 Intake ventilation control = Flow rate or P104 Intake ventilation control = Duct pressure and P105 = Exhaust ventilation control = Flow rate feedback	1
307	Air extraction fan flow rate		0	320000	10	m^3/h		1
308	Extraction fan differential pressure		0	5000	1	Pa		1
310	Exhaust duct pressure calculated setpoint		0	5000	1	Pa	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	1
311	Exhaust duct pressure		0	5000	1	Pa	P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	1
312	Intake filter differential pressure		0	1000	1	Pa		1
313	Exhaust filter differential pressure		0	1000	1	Pa		1
314	Fouled intake filter differential pressure calculated threshold		0	1000	1	Pa		1
315	Blocked intake filter differential pressure calculated threshold		0	1000	1	Pa		1
316	Fouled exhaust filter differential pressure calculated threshold		0	1000	1	Pa		1
317	Blocked exhaust filter differential pressure calculated threshold		0	1000	1	Pa		1
320	Calculated cooling setpoint		0,0	50,0	0,1	°C		1
321	Calculated heating setpoint		0,0	50,0	0,1	°C		1
322	Supply air temperature		-99.0	99,9	0,1	°C	Last sensor in the direction of airflow	1
323	Fresh air temperature		-99.0	99,9	0,1	°C		1
324	Return air temperature		-99.0	99,9	0,1	°C		1
325	Internal supply air temperature		-99.0	99,9	0,1	°C	(P03 < 2) and ((Number of coils >1) or (P29 > 0)) or Number of coils > 0 and P01 = ceiling unit	1
326	Room temperature		-99.0	99,9	0,1	°C	P154 Target temperature selection = Room	1
327	Heat recovery unit outlet temperature, intake side		-99,0	99,9	0,1	°C	P38 Temperature sensor upstream of heat recovery unit = With	1
328	Heat recovery unit pressure drop calculated threshold		0	345	1	Pa	P37 Differential pressure sensor on the heat recovery unit = With	1
329	Heat recovery unit DP		0	1000	1	Pa	P37 Differential pressure sensor on the heat recovery unit = With	1
331	CO_2 air quality		0	2000	1	ppm	P152 Air quality control = With	1
340	Remote control	0: C (closed) 1: O (open)	0	1	1			1
341	Setpoint 1 / Setpoint 2	0: C (closed) 1: O (open)	0	1	1		P160 setpoint 1/setpoint 2 selection = on/off input or on/off override	1
342	Fire	0: C (closed) 1: O (open)	0	1	1		P24 Fire detection = With	1
345	Mixed coil changeover thermostat	0: C (closed) 1: O (open)	0	1	1		P28 Water coil no.1 = Mixed or P29 Water coil no.2 = Mixed and P162 Changeover selection = On/off input	1
346	Air intake fan control	0: C (closed) 1: O (open)	0	1	1			1
348	Extraction fan control	0: C (closed) 1: O (open)	0	1	1			1

No.	Description	Setting				Unit	Display conditions	Access level
		Enumeration	Min.	Max.	Increment			
351	Rotary heat recovery unit control	0: C (closed) 1: O (open)	0	1	1		P36 Heat recovery unit = Gradual speed heat recovery unit	1
356	Electric heater safety thermostat	0: C (closed) 1: O (open)	0	1	1		P31 Elec preheater = with or P32 Elec heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage + 1 on/off stage	1
362	Pump 1 monitoring	0: C (closed) 1: O (open)	0	1	1		P92 Coil 1 pump = With	1
363	Pump 2 monitoring	0: C (closed) 1: O (open)	0	1	1		P93 Coil 2 pump = With	1
370	Building side isolation damper	0: off 1: on	0	1	1		P26 Isolation damper = Outdoor side + building or Building side	1
371	Outdoor side isolation damper	0: off 1: on	0	1	1		P26 Isolation damper = Outdoor side + building or Outdoor side	1
373	Air intake fan operating-hour meter		0	999999,9	0,1	h		1
374	Air intake fan percentage		0	100	1	%		1
377	Extraction fan operating-hour meter		0	999999,9	0,1	h		1
378	Extraction fan percentage		0	100	1	%		
380	AHU operating feedback	0: off 1: on	0	1	1			1
382	Calculated air quality demand		0	100	1	%	P152 Air quality = with	1
384	Mixing damper closing control	0: off 1: on	0	1	1		P27 Mixing damper = With	1
385	Mixing damper opening control	0: off 1: on	0	1	1		P27 Mixing damper = With	1
386	Mixing damper opening percentage		0	100	1	%	P27 Mixing damper = With	1
392	Setpoint 1 / setpoint 2 status	0: setpoint 1 1: setpoint 2	0	1	1		P160 Setpoint 1/setpoint 2 selection = Time sched/CMS or on/off input only, or on/off override	1
394	Calculated cooling demand		0	100	1	%		1
395	Calculated heating demand		0	100	1	%		1
398	Cooling block	0: no 1: yes	0	1	1			1
399	Heating block	0: no 1: yes	0	1	1			1
400	Coil 1 Cooling		0	100	1	%	P28 Coil no.1 = mixed or cold water	1
401	Coil 1 Heating		0	100	1	%	P28 Coil no.1 = mixed or hot water	1
404	Coil 2 Cooling		0	100	1	%	P29 Water coil no.2 = cooling or mixed	1
405	Coil 2 Heating		0	100	1	%	P29 Water coil no.2 = heating or mixed	1
410	Stage 1 electric heater	0: off 1: on	0	1	1		P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage + 1 on/off stage	1
411	Stage 1 electric heater operating-hour meter		0	999999,9	0,1	h	P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage + 1 on/off stage	1
412	Gradual electric heater stage percentage		0	100	1	%	P32 Electric heater = 1 gradual stage or 1 gradual stage and 1 on/off stage	1
414	Stage 2 electric heater	0: off 1: on	0	1	1		P31 Electric preheater = with or (P32 Electric heater = 2 on/off stages or 1 gradual stage + 1 on/off stage)	1
415	Stage 2 electric heater operating-hour meter		0	999999,9	0,1	h	P31 Electric preheater = with or (P32 Electric heater = 2 on/off stages or 1 gradual stage + 1 on/off stage)	1
420	Electric heater load shedding status	0: inactive 1: active	0	1	1		(P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage + 1 on/off stage)	1
421	Electric preheater load shedding status	0: inactive 1: active	0	1	1		P31 = with	
422	Changeover status	0: heating 1: cooling	0	1	1		P28 Coil no.1 = mixed or P29 Coil no.2 = mixed	1
424	Pump 1	0: off 1: on	0	1	1		P92 Coil 1 pump = With	1
425	Pump 1 operating-hour meter		0	999999,9	0,1	h	P92 Coil 1 pump = With	1

No.	Description	Setting				Unit	Display conditions	Access level
		Enumeration	Min.	Max.	Increment			
426	Pump 2	0: off 1: on	0	1	1		P93 Coil 2 pump = With	1
427	Pump 2 operating-hour meter		0	999999,9	0,1	h	P93 Coil 2 pump = With	1
430	External generator run order	0: off 1: on	0	1	1		P90 External generator = heater or cooler	1
451	Heat recovery unit operating-hour meter		0	999999,9	0,1	h	P36 Heat recovery unit = Gradual speed heat recovery unit	1
452	Heat recovery unit speed percentage		0	100	1	%	P36 Heat recovery unit = Gradual speed heat recovery unit	1
453	Recovery unit efficiency		0	100	1	%	P38 Temperature sensor upstream of heat recovery unit = Without	1
454	Heat recovery unit instantaneous efficiency		0	100	1	%	P38 Temperature sensor upstream of heat recovery unit = With	1
456	Heat recovery unit bypass opening percentage		0	100	1	%	P36 Heat recovery unit = Plate	1
470	Maintenance faults summary	0: off 1: on	0	1	1			1
471	Danger fault summary	0: off 1: on	0	1	1			1
490	Weekly programming request	0: inactive 1: active	0	1	1			1
491	State requested by the weekly programming	0: Off 1: Frost protection 2: Night cool 3: Setpoint 2 on 5: On	0	5	1			1
492	Annual programming request	0: inactive 1: active	0	1	1			1
493	State requested by the annual programming	0: Off 1: Frost protection 2: Night cool 3: Setpoint 2 on 5: On 11: Weekly prog. 1 12: Weekly prog. 2 13: Weekly prog. 3 14: Weekly prog. 4 15: Weekly prog. 5 16: Weekly prog. 6	0	16	1			1

8.4 - Versions

No.	Description	Access level
551	AHU software version	1
552	AHU Bios version	1
553	AHU boot version	1
556	SO number	3

8.5 - Fault level

No.	Description	Setting		Display conditions	Access level
		Enumeration	By default		
602	Air intake filter 1 fouled	0: Maintenance 1: Danger	0		2
606	Exhaust filter 1 fouled	0: Maintenance 1: Danger	0		2
609	Electric heater safety thermostat	0: Maintenance 1: Danger	0	P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage and 1 on/off stage or P31 Electric preheater = with	3
615	rotary heat exchanger	0: Maintenance 1: Danger	0	P36 Heat recovery unit = Gradual speed heat recovery unit	2
620	Supply air temperature too low	0: Maintenance 1: Danger	0		2
621	Supply air temperature too high	0: Maintenance 1: Danger	0		2
622	Return temperature too low	0: Maintenance 1: Danger	0	P146 Target temperature selection = return air	2
623	Return temperature too high	0: Maintenance 1: Danger	0	P146 Target temperature selection = return air	2
624	Room temperature too low	0: Maintenance 1: Danger	0	P146 Target temperature selection = room	2
625	Room temperature too high	0: Maintenance 1: Danger	0	P146 Target temperature selection = room	2
628	supply air duct pressure too low	0: Maintenance 1: Danger	0	P104 Air intake ventilation control = Duct pressure	2
629	supply air duct pressure too high	0: Maintenance 1: Danger	0	P104 Air intake ventilation control = Duct pressure	2
632	Loss of communication with energy meter	0: Maintenance 1: Danger	0	P44 Energy meter = With	2
635	Loss of communication with Th Tune	0: Maintenance 1: Danger	0	P149 = with	2
636	Loss of communication with the heat recovery unit outlet sensor, intake side	0: Maintenance 1: Danger	0	P38 Temperature sensor upstream of heat recovery unit = With	2
640	room temperature sensor	0: Maintenance 1: Danger	0	P149 = with	2
642	energy meter	0: Maintenance 1: Danger	0	P44 Main unit energy meter = With	2
650	Coil 1 pump fault	0: Maintenance 1: Danger	0	P92 Coil no. 1 pump = with	2
651	Coil 2 pump fault	0: Maintenance 1: Danger	0	P93 Coil no. 2 pump = with	2
652	exhaust duct pressure too low	0: Maintenance 1: Danger	0	P105 Exhaust ventilation control = Duct pressure	2
653	exhaust duct pressure too high	0: Maintenance 1: Danger	0	P105 Exhaust ventilation control = Duct pressure	2

8.6 - Communication parameters

No.	Description	Setting		Display conditions	Access level
		Enumeration	By default		
	BMS1				
700	Selection of the type of communication protocol used on the BMS1 port	0: None 1: MODBUS RTU 2: LON 3: KNX 4: MODBUS TCP 5: BACNET IP 6: WEB	0		2
701	Selection of the transmission speed on the BMS1 port	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200	3 if P700=1 or 3 2 if P700=2 4 if P700=4, 5 or 6	P700 = 1	2
702	Parity on the BMS1 port	0: without 1: even 2: odd	0	P700 = 1	2
703	Number of stop bits on the BMS1 port		1	P700 = 1	2
705	Selection of the controller address on the BMS1 bus		1	P700 = 1	2
706	Control type	0: Local 1: Remote	0		2
	port				
710	Selection of the type of communication protocol used on the BMS2 port	1: ModBus RTU	0		2
711	Selection of the transmission speed on the BMS2 port	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200	3		2
712	Parity on the BMS2 port	0: without 1: even 2: odd	0		2
713	Number of stop bits on the BMS2 port		1		2
715	Selection of the controller address on the BMS2 bus		1		2
716	Control type	0: Local 1: Remote	0		2
	pLAN				
720	pCO address on the pLAN network		1		

8.7 - Calibration

No.	Description	Setting		Unit	Display conditions	Access level
		Min.	Max.			
800	Calibration of the air intake fan flow rate sensor					3
801	Calibration of the air extraction fan flow rate sensor					3
802	Intake duct pressure sensor calibration				P104 Air intake ventilation control = Duct pressure	3
803	Exhaust duct pressure sensor calibration				P104 Intake ventilation control = Duct pressure and P105 Exhaust ventilation control = Duct pressure	3
804	Intake filter differential pressure					3
805	Exhaust filter differential pressure					3
808	Supply air duct temperature sensor calibration	-5.0	5,0	°C	Sensor present	3
809	Internal supply air temperature sensor calibration	-5.0	5,0	°C		3
810	Calibration of fresh air temperature sensor	-5.0	5,0	°C		3
811	Return air temperature sensor calibration	-5.0	5,0	°C		3
813	Calibration of the room air temperature sensor	-3.0	3,0	°C	P149 = with in read-only, modifiable from Th-Tune	3
814	Calibration of the heat recovery unit outlet temperature sensor, intake side	-3,0	3,0	°C	P38 Temperature sensor upstream of heat recovery unit = With	3
816	Calibration of CO_2 Air Quality sensor	-200	200	ppm	P149 Air quality control = With	3
817	Heat recovery unit DP pressure sensor calibration				P37 Differential pressure sensor on the heat recovery unit = With	3

8.8 - SW direction

No.	Description	Enumeration	Display conditions	Access level
850	Remote control input direction	0: Normally Open 1: Normally Closed		2
851	Setpoint 1/Setpoint 2 input direction	0: NO for setpoint 1 1: NC for setpoint 1	P160 setpoint 1/setpoint 2 selection = on/off input or on/off override	2
852	Fire detection input direction	0: Normally Open 1: Normally Closed	P24 Fire detection = With	3
855	Changeover thermostat input direction	0: Open in heating 1: Closed in cooling	P28 = mixed coil and P162 = On/Off input	3
860	Air intake fan check input direction	0: Normally Open 1: Normally Closed		3
861	Extraction fan check input direction	0: Normally Open 1: Normally Closed		3
863	Wheel heat recovery unit control input direction	0: Normally Open 1: Normally Closed	P36 Heat recovery unit = Gradual speed heat recovery unit	3
872	Electric heater manual safety input direction	0: Normally Open 1: Normally Closed	P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage and 1 on/off stage or P31 Electric preheater = with	3
878	Pump 1 check input direction	0: Normally Open 1: Normally Closed	P92 Coil 1 pump = With	3
879	Pump 2 check input direction	0: Normally Open 1: Normally Closed	P93 Coil 2 pump = With	3
880	Maintenance fault reporting output direction	0: Normally Open 1: Normally Closed		2
881	Danger fault reporting output direction	0: Normally Open 1: Normally Closed		2
885	AHU operating feedback output direction	0: Normally Open 1: Normally Closed		2

8.9 - Prioritisation

No.	Description	Setting			Unit	Display conditions	Access level
		Min.	Max.	Increment			
902	Heat recovery unit operation start cooling percentage	0	P903	1	%		2
903	Heat recovery unit operation end cooling percentage	P902	100	1	%		2
904	Coil 1 operation start cooling percentage	0	P905	1	%	P28 Water coil no.1 = Cooling or Mixed	2
905	Coil 1 operation end cooling percentage	P904	100	1	%	P28 Water coil no.1 = Cooling or Mixed	2
906	Hydraulic coil 2 operation start cooling percentage	0	P907	1	%	P29 Water coil no.2 = Cooling or Mixed	2
907	Hydraulic coil 2 operation end cooling percentage	P906	100	1	%	P29 Water coil no.2 = Cooling or Mixed	2
920	Heat recovery unit operation start heating percentage	0	P921	1	%		2
921	Heat recovery unit operation end heating percentage	P920	100	1	%		2
924	Coil 1 operation start heating percentage	0	P925	1	%	P28 Hydraulic coil no.1 = Heating or Mixed	2
925	Coil 1 operation end heating percentage	P924	100	1	%	P28 Hydraulic coil no.1 = Heating or Mixed	2
926	Hydraulic coil 2 operation start heating percentage	0	P927	1	%	P29 Water coil no.2 = Heating or Mixed	2
927	Hydraulic coil 2 operation end heating percentage	P926	100	1	%	P29 Water coil no.2 = Heating or Mixed	2
930	Electric heater operation start heating percentage	0	P931	1	%	P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage and 1 on/off stage	2
931	Electric heater operation end heating percentage	P930	100	1	%	P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage and 1 on/off stage	2
941	Electric heater stage 1 range end percentage	0	P942	1	%	P32 Electric heater = 1 on/off stage or 2 on/off stages or 1 gradual stage or 1 gradual stage and 1 on/off stage	2
942	Electric heater stage 2 range end percentage	P941	P943	1	%	P32 Electric heater = 2 on/off stages or 1 gradual stage and 1 on/off stage	2
943	Electric heater stage 3 range end percentage	P942	100	1	%	P32 Electric heater = 2 On/Off stages	2

8.10 - Intake FMA EC motor

No.	Description	Setting			Unit	Display conditions	Access level
		Min.	Max.	Increment			
1200	Min. speed percentage	0	P1201	1	%		3
1201	Max. speed percentage	P1200	100	1	%		3

8.11 - Exhaust FMA EC motor

No.	Description	Setting			Unit	Display conditions	Access level
		Min.	Max.	Increment			
2200	Min. speed percentage	0	P2201	1	%		3
2201	Max. speed percentage	P2200	100	1	%		3

Manufacturer: CIAT SA, Culoz, France.
Manufacturer reserves the right to change any product specifications without notice.

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