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HAIR CONNECT 2

Control manual



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1 - GENERAL INFORMATION

The **µAIR CONNECT 2** controller is equipment fitted as standard to CIATRONIC systems. Setting and display console equipped with a 160-character LCD screen. The **µAIR CONNECT 2** controller is equipped with a microprocessor and an expansion board to provide the following functions:

- **Filtration**
 - Checking the pressure drop in the filters, by monitoring the air flow and fouling level.
- **Control function (Cooling Mode)**
 - **Chilled water model:**
 - Gradual opening of the three-way valve following an increase in temperature.
 - **Direct expansion model:**
 - Triggering of one or more refrigerating stages following an increase in temperature. (Action on the compressors or on the condensation unit).
- **Control function (Heating Mode)**
 - **Hot water coil model:**
 - Gradual opening of the three-way valve following a decrease in temperature.
 - **Electric heater model:**
 - Triggering of one or two stages following a decrease in temperature.
- **Control function (Dehumidification Mode)**
 - Opening of a chilled water valve or triggering of refrigerating stages, following an increase in humidity.
 - Triggering of heating mode if there is a drift in temperature.
 - As an option, decrease in the air flow to increase the latent part of the cooling capacity.
- **Control function (Humidification Mode)**
 - Triggering of humidification following a decrease in humidity.
- **Fan control**
 - Management of operation and faults for a 1-speed fan or variable-speed control fan.
 - Fan on/off via an outer contact, internal timer.
 - Variable speed control via temperature or humidity control, or raised floor pressure, or for constant flow control.
 - Time-limited post ventilation for an electric heater.
 - Interlock the controls and controllers to operation of the fan.
 - Shift in start-up if there are several units at the same site.
 - Soft start of the ventilation if there is a variable air volume.
- **Safety and alarms**
 - Overheating thermostat (Manual reset) on the electric heater.
 - Pressure sensor for checking the air flow and filter fouling (Thresholds interlocked to the variation in the air flow).
 - High pressure switch with manual reset on the refrigerating circuit.
 - Configurable alarm threshold for high and low temperature.
 - Configurable alarm threshold for high and low humidity.
 - Low supply air temperature limitation sensor (limitation of the cooling capacity).
 - Water leak control.
- **Configurable potential-free (dry) contacts made available for:**
 - Critical fault summary: air flow, fan, compressors, clogged filter, temperature sensor.
 - Non-critical fault summary: filter fouled, electric heater, humidifier, water leak, target temperatures exceeded, target relative humidity exceeded.
- **Memorisation**
 - Memorisation of the last 20 faults with the date and time of each fault, plus the readings of all the analogue input values at the time of the fault.
 - Parameter setting memorisation in the event of a power failure.
- **Remote control**
 - Option of remote control.
- **Metering**
 - Option to display metering for:
 - The number of operating hours for the fans, compressors, electric heater stages, the humidifier, the fault summaries sent with individual reset of each meter.
 - The number of compressor start-ups.

2 - COMPONENTS

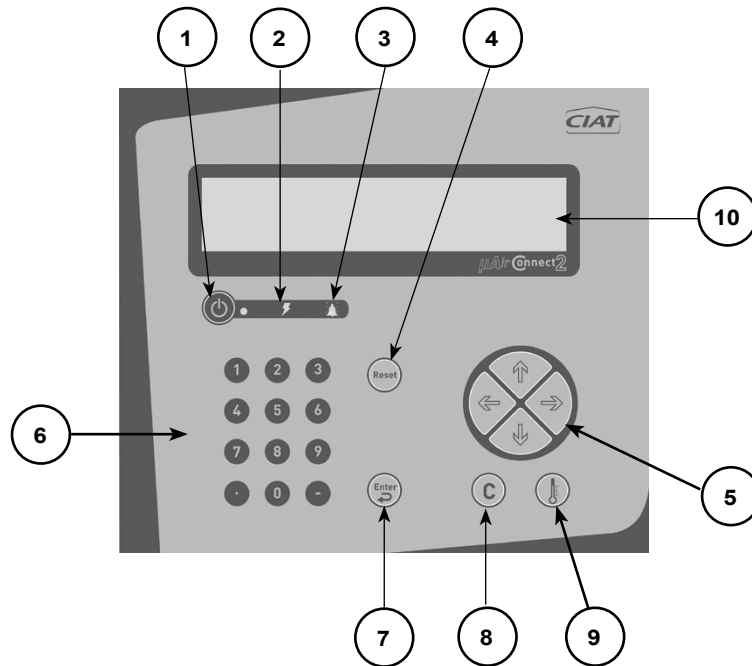
THE μ AIR CONNECT 2 CONTROLLER COMPRISES:

2.1 - On the front:

- A human-machine interface used to carry out adjustments, and signal and display the various states and information
- The display appears on a backlit LCD (4 lines x 40 characters).

DESCRIPTION OF THE FRONT PANEL:



- 1 - Starting up (green LED)
- 2 - "Power on" indicator (yellow LED)
- 3 - Fault signal indicator (red LED)
- 4 - Reset
- 5 - Cursor pad
- 6 - Number pad
- 7 - Validation
- 8 - Correction
- 9 - Setpoints values
- 10 - 160-character LCD screen



The dialogue between the machines and the user is provided by simple, precise text messages on a 160-character LCD screen. The μ AIR CONNECT 2.2 automatically displays information on the operation of the unit.

(Example ► Fault occurrence).

It comprises:

- A backlit crystal screen with 4 lines of 40 characters.
- A forced off or on authorisation push button, equipped with LED indication (green LED).
 - Green LED off → unit off.
 - Green LED flashing → remote control open.
 - Green LED permanently on → unit on
- A voltage on indicator (yellow LED).
- A fault signal indicator (red LED).
- A "RESET" push button for resetting the faults.
- An "ENTER" push button to confirm (modification of a value).
- A  push button to delete the last digit displayed when modifying values.
- A push button  to quickly modify the setpoints for the unit being queried "heating, cooling, humidification, dehumidification" or to quickly modify the trigger setpoint for the extra unit.
- A cursor pad.
- A number pad.

The user can configure or query the machines at any time via a tree menu, the first window for which comprises the following sections

```

MON 10 / 04 / 2017 09 : 30 SYSTEM  $\mu$ RC2 . 2
CONFIGURATION OF NUMBER OF UNITS
UNIT 1 : IN AUTOMATIC MODE
UNIT 2 : STOPPED
    
```

2 - COMPOSITION

NOTE: The text that follows the unit number indicates its operating status.

The first line is simply a display of the date and time. We can access this main menu via the "0" number key from any of the displays.

Move the cursor opposite the line corresponding to the required information using the cursor pad, then hit "ENTER".

The "CONFIGURATION OF NUMBER OF UNITS" line is used to configure the operation of the units connected to the bus.

The "UNIT..." lines are used to query the machine.

To return to the main menu, press the number key "0" several times.

■ Locking the keypad

The control can be locked or unlocked by pressing the "right arrow" and "left arrow" keys simultaneously for 5 seconds.

When the controller is locked, the user can view the information but cannot edit the settings.

2.2 - On the rear:

The various connectors used to connect the various elements required to control the unit.

■ INPUTS

On/off:

- Acquisition of states via the traditional electro-mechanical components.

Analogue:

- Acquisition of temperatures via a thermistor type sensor.
- Acquisition of relative humidities via sensors delivering a voltage varying from 0 to 10 V for relative humidity of 0 to 100 %.
- Acquisition of differential pressures in the air on the filter via a sensor delivering a voltage varying from 0 to 10 V or from 0.5 to 4.5 V for 0 to 1000 Pa.
- Acquisition of differential pressures in the air on the fan (enabling flow rate calculation) via a sensor delivering a voltage varying from 0 to 10 V for 0 to 2500 Pa.

■ OUTPUTS

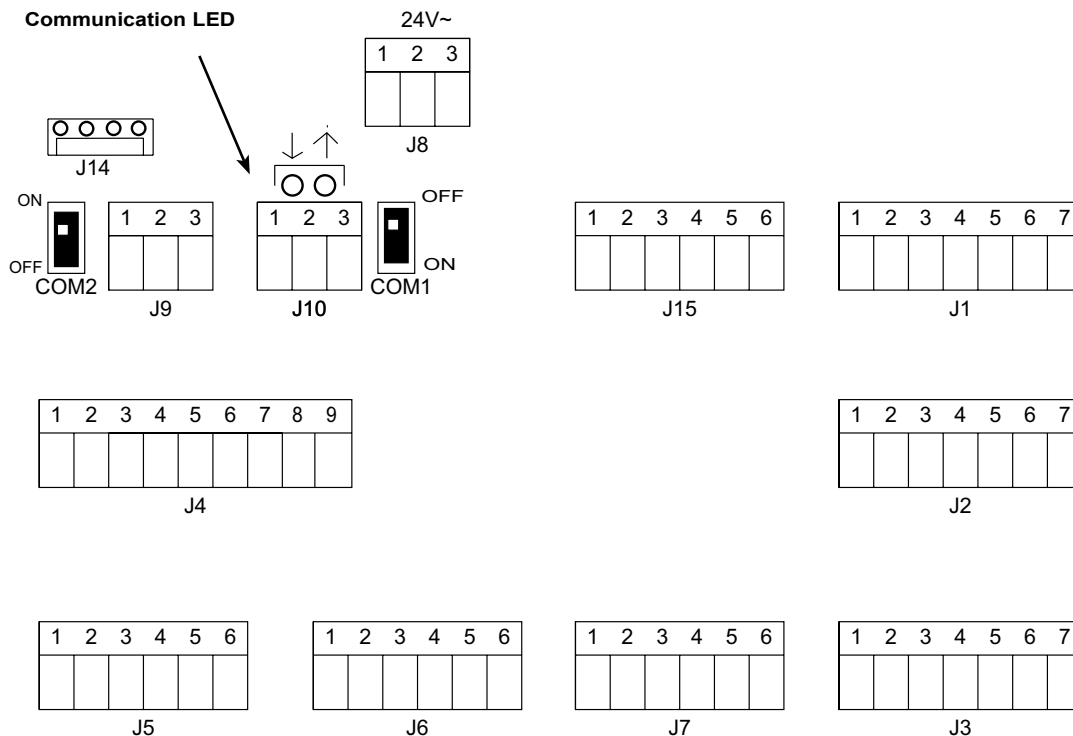
On/off:

- Fan control.
- Electric heater and compressor stage control.
- Critical and non-critical fault summary changeover contacts.

Analogue:

- Control of the three-way valves for the water coils and the electric heater current valve.
- Control of the progressive humidifier.
- Control of the fan speed controller.

LOCATION OF TERMINALS (main board)



2 - COMPOSITION

■ Designation of terminals

- EA = Analogue inputs
- EL = Logic inputs
- SA = Analogue outputs
- SL = Logic outputs

TERMINAL	μ AirConnect		μ AirConnect 2,1 or 2,2
J1 (EA)	1	Target temperature sensor (10 K Ω)	
	2	0 V	
	3	Supply air limit temperature sensor (10 K Ω)	
	4	Target relative humidity sensor (0 - 10 V)	
	5	0 V	
	6	Sensor for controlling the differential pressure on the filter (0-10 V or 0,5 - 4,5 V)	
	7	+12 V	
J2 (EL)	1	Remote control	
	2	Fire detection/External safety	
	3	Supply air fan operation feedback	
	4	Electric heater safety thermostat with manual reset	
	5	Humidifier fault or maintenance	
	6	Water leak	
	7	Logic input common terminal	
J3 (EL)	1	Circuit 1 LP pressure switch fault or summary of faults for condensation unit, circuit 1	Summary of condensation unit circuit 1 faults
	2	HP pressure switch or break in circuit 1	Temperature setpoint shift
	3	Circuit 2 LP pressure switch fault or summary of faults for condensation unit, circuit 2	Summary of condensation unit circuit 2 faults
	4	HP pressure switch or break in circuit 2	Hot water coil or electric heater
	5	Starting order selection: CW/DX or DX/CW	
	6	Not used	Summer or winter mode
	7	Logic input common terminal	
J4 (SA)	1	Heating coil three-way valve	Hot water coil three way valve
	2	0 V	
	3	Chilled water coil or mixed coil three way valve	
	4	Progressive humidifier	
	5	0 V	
	6	Variation of the air flow rate	
	7	Not used	Free cooling damper
	8	0 V	
	9	Not used	Electric heater (TRIAC)
J5 (SL)	1	Critical fault summary common terminal	
	2	Standby contact if P206=0 (or active if P206=1) in the summary of major faults	
	3	Active contact if P206=0 (or standby if P206=1) in the summary of major faults	
	4	Non-critical fault summary common terminal	
	5	Standby contact if P205=0 (or standby if P205=1) in the summary of minor faults	
	6	Active contact if P205=0 (or standby if P205=1) in the summary of minor faults	
J6 (SL)	1	Control of circuit 1 or condensation unit 1 refrigerating stage No. 1	
	2	Control of circuit 1 refrigerating stage No. 2 or hot gas bypass valve stage 1	Not used
	3	Refrigerating stage No. 1 common terminal	
	4	Control of circuit 1 or condensation unit 2 refrigerating stage No. 2	
	5	Control of circuit 2 refrigerating stage No. 2 or hot gas bypass valve stage 2	Not used
	6	Refrigerating stage No. 2 common terminal	

2 - COMPOSITION

TERMINAL		μAirConnect	μAirConnect 2,1 or 2,2
J7 (SL)	1	Control of electric heater stage 1	
	2	Control of electric heater stage 2	
	3	Electric heater control common terminal	
	4	Supply air fan control	
	5	Not used	
	6	Fan control common terminal	
J8	1	24 V AC power supply	
	2	24 V AC power supply	
	3	0 V	
J9	1	RS485 A or + (Link between controllers for master/slave function)	
	2	RS485 B or - (Link between controllers for master/slave function)	
	3	0 V	
J10	1	RS485 A or + (Link with CMS or gateway)	
	2	RS485 B or - (Link with CMS or gateway)	
	3	0 V	
J14	1	+ 12 V	
	2	RS485 A or + (Link with CPY humidifier and/or FMA)	
	3	RS485 B or - (Link with CPY humidifier and/or FMA)	
	4	0 V	
J15 (SA)	1	0 V	
	2	Not used	Outdoor temperature sensor (10 K Ω)
	3	Not used	Outdoor relative humidity sensor (0- 10 V)
	4	Not used	Raised floor differential pressure monitoring sensor (0- 10 V)
	5	Not used	Fan differential pressure sensor (0-10 V) or target temperature sensor (2-10 V) or percentage required on external signal (2-10 V)
	6	5 V	

■ COM SWITCH

- COM 1: line termination resistance on CMS link (see section 13)
- COM 2: BUS polarisation on master-slave link (see section 12)

2.3 - Batteries

This unit is equipped with a CR 2430 type 3V lithium battery.

- Match the +/- polarity
- The batteries supplied are not rechargeable

Warning : there is a risk of explosion if the battery is replaced with the wrong type. Dispose of used batteries in accordance with the instructions. When replacing batteries, make sure the product is correctly and completely refitted.

IMPORTANT for Switzerland: Annex 4.10 to the norm SR 814.013 is applicable to batteries.

Safety guidelines

These instructions must be read carefully and observed. Keep this manual.

Hazard for children

- Batteries could pose a lethal risk if swallowed. The remote control and its batteries must be kept out of the reach of young children. If a child does swallow a battery, seek medical attention immediately.
- Keep the packaging out of the reach of children. Risk of suffocation!

Risk of injuries and health problems

- If the liquid acid leaks or becomes oxidised, avoid any contact with the skin, eyes and mucous membranes. In the event of contact with battery acid, rinse the point of contact immediately with plenty of clean water and seek medical attention immediately.
- Batteries should be removed from the unit when they are spent, or if they are not being used for prolonged periods. This will prevent damage due to leaks.
- Do not expose the batteries to extreme conditions by placing them on radiators, for example. Increased risk of leaks!
- The batteries must not be charged, opened, thrown into fire or short-circuited. Risk of explosion!

Battery recycling

- Do not dispose of batteries with the ordinary household waste. To protect the environment, batteries should be disposed of in line with the regulations in force.
- Do not expose batteries to high temperatures or direct sunlight.
- Do not incinerate them..



3 - MENU TREE

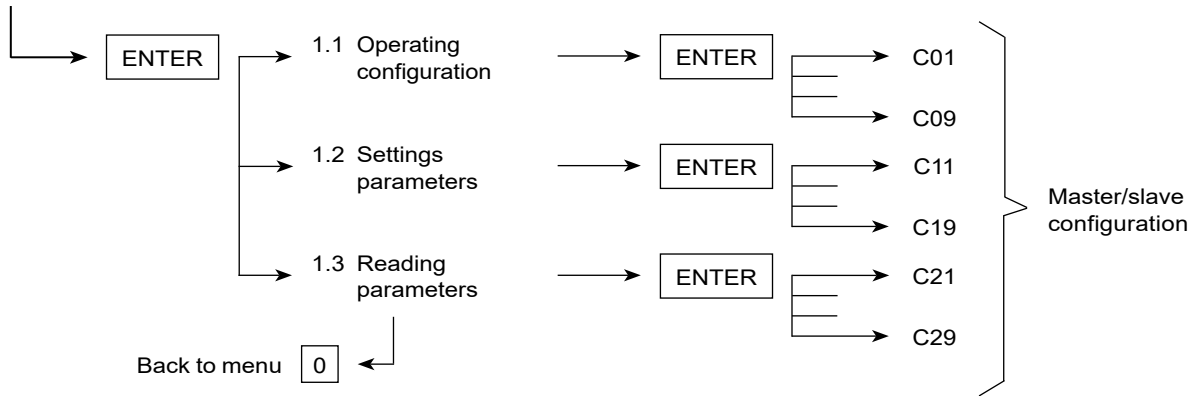
Depending on the configuration, only the menus in use are displayed.

```

MON 10/04/2017 09:30 SYSTEM μRC2.2
CONFIGURATION OF NUMBER OF UNITS
UNIT 1: IN AUTOMATIC MODE
UNIT 2: STOPPED
    
```

With the cursor opposite the "CONFIGURATION OF NUMBER OF UNITS" line, press the Enter key to access the following menus:

Configuration of number of units

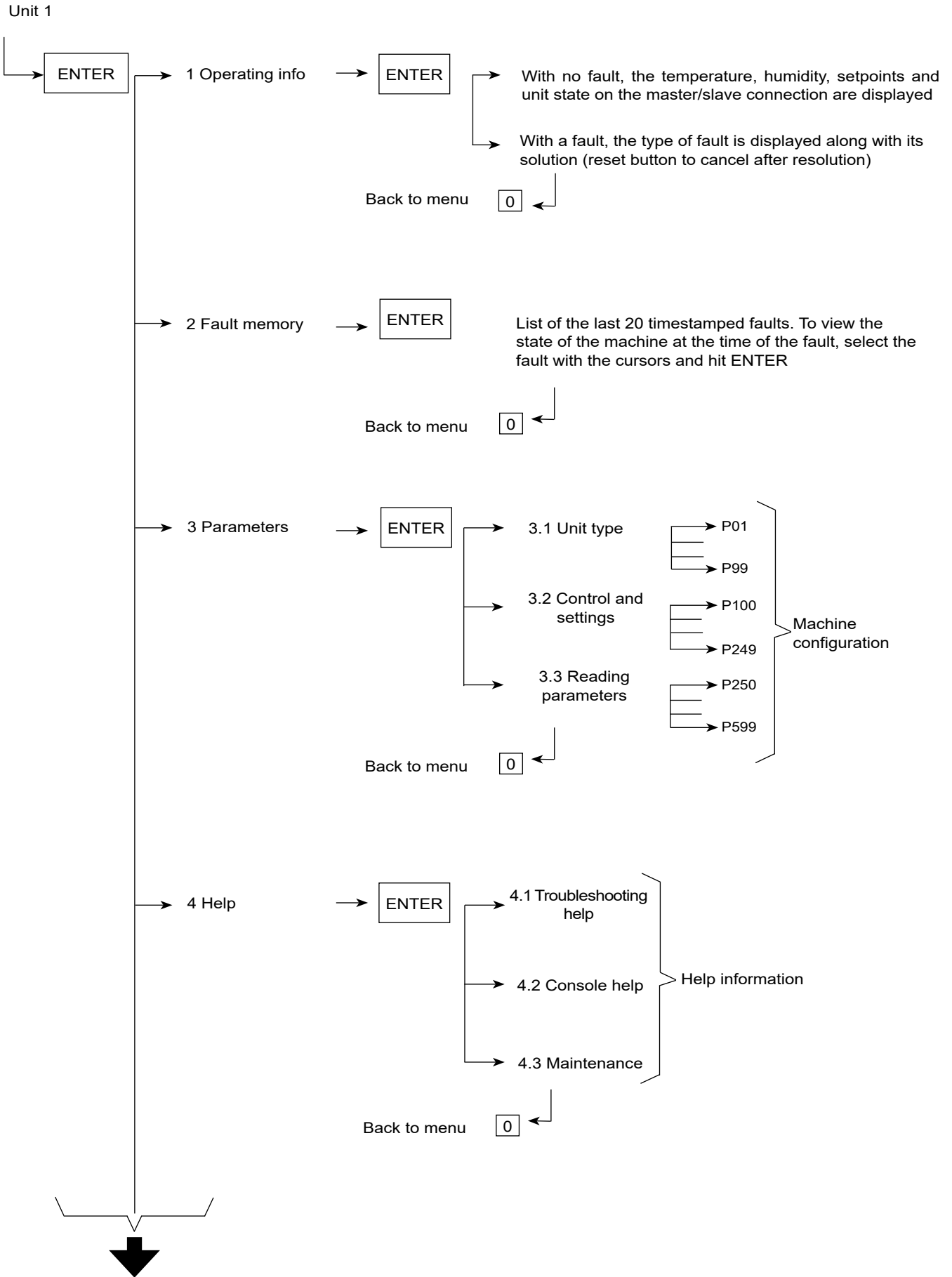


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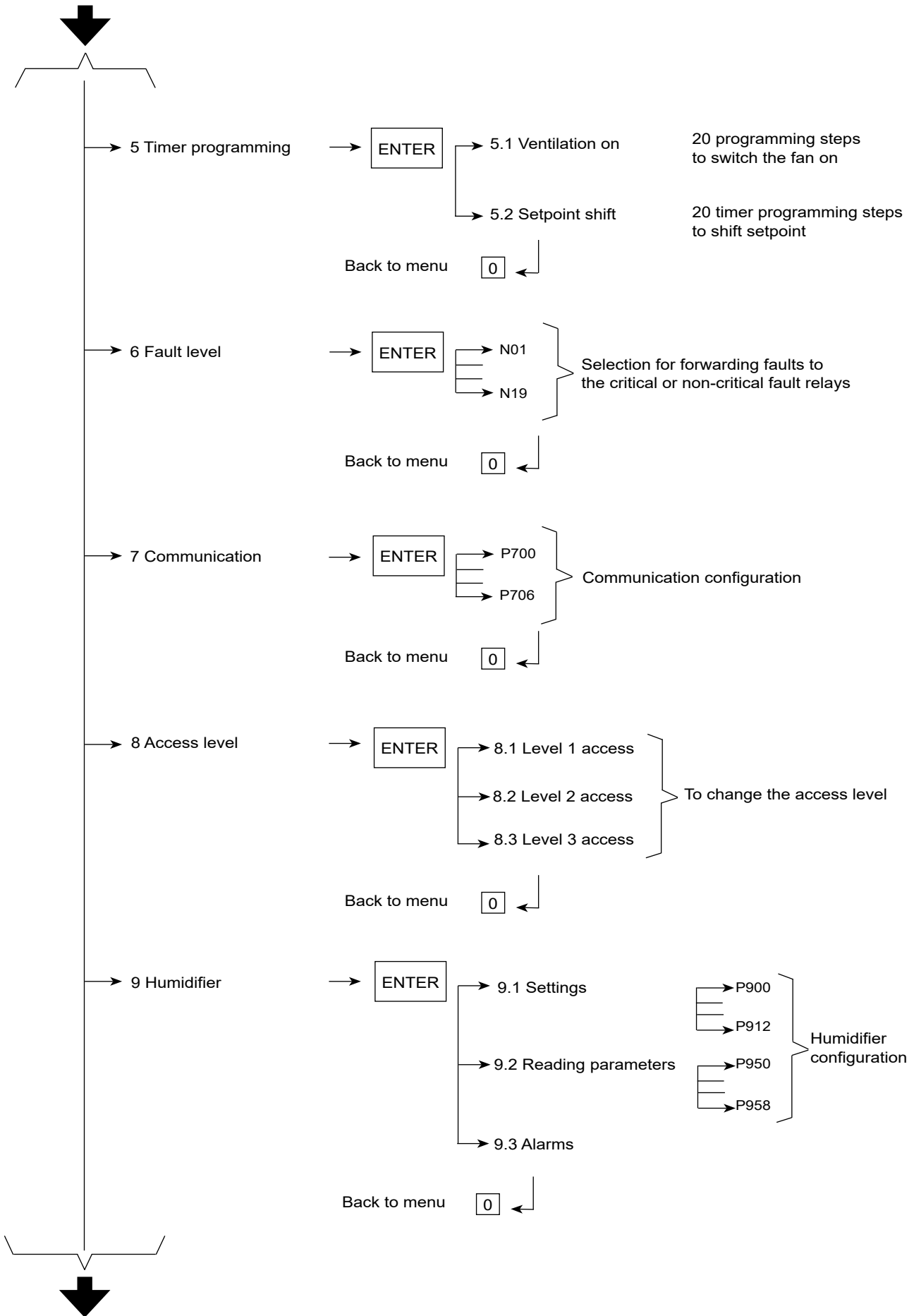
MON 10/04/2017 09:30 SYSTEM μRC2.2
CONFIGURATION OF NUMBER OF UNITS
UNIT 1: IN AUTOMATIC MODE
UNIT 2: STOPPED
    
```

With the cursor opposite the "UNIT 1" line, press the Enter key to access the following menus:

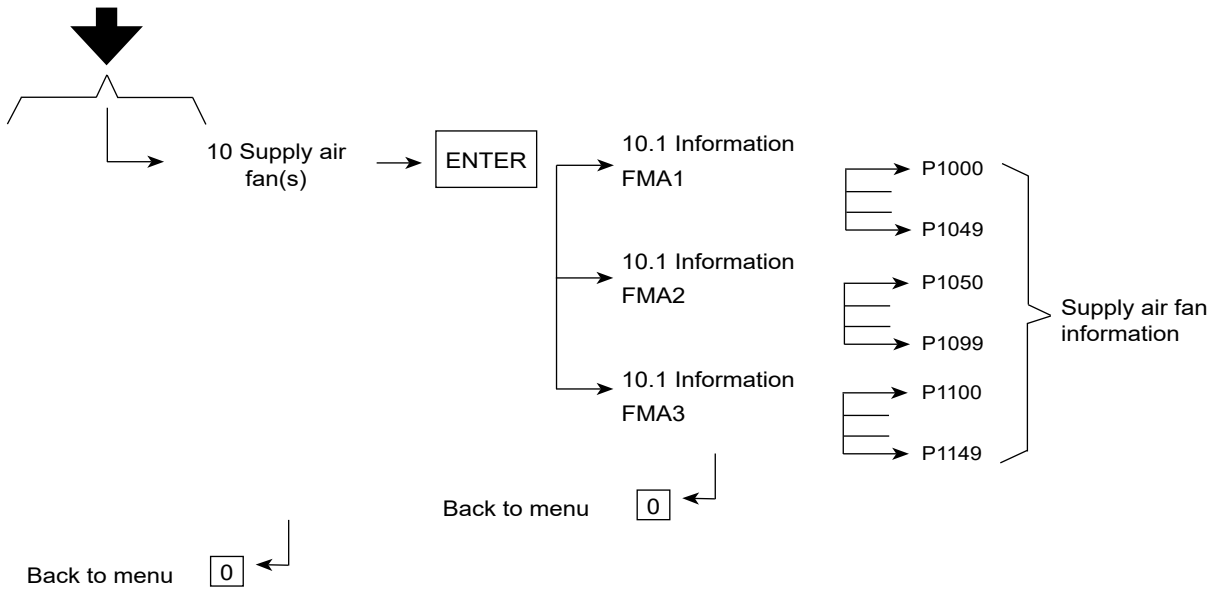
3 - MENU TREE



3 - MENU TREE



3 - MENU TREE



4 - ACCESS LEVEL (MENU 8)

The µAIR CONNECT 2 control has 3 access levels, two of which require an access code. The various levels are accessed using menu 8 in the unit's menu.

■ Access to level 1 (No access code)

This is a general level designed for the end user. This level gives access to all the reading parameters and the settings for the main setpoints and proportional bands:

- Cooling
- Heating
- Humidification
- Dehumidification
- Supply air temperature limits
- Temperature and humidity limit thresholds
- Filter check.

It also allows the language, date and time to be altered.

■ Access to level 2 (editable numeric code)

This level is designed for installers and experienced users. It gives access to the following functionalities:

- Free cooling
- On/off control and configuration lock
- Fixed offsets during heating/cooling
- Limits relating to the speed variations of the forced-draught fans
- Time delay settings
- CMS communication parameter settings

■ Access to level 3 (non-editable numeric code)

This level is designed for the manufacturer's operators and for factory settings. It gives access to all parameters of the control.

5 - CONFIGURING THE NUMBER OF UNITS



These parameters are only visible if parameter P215 = 1 (master unit)

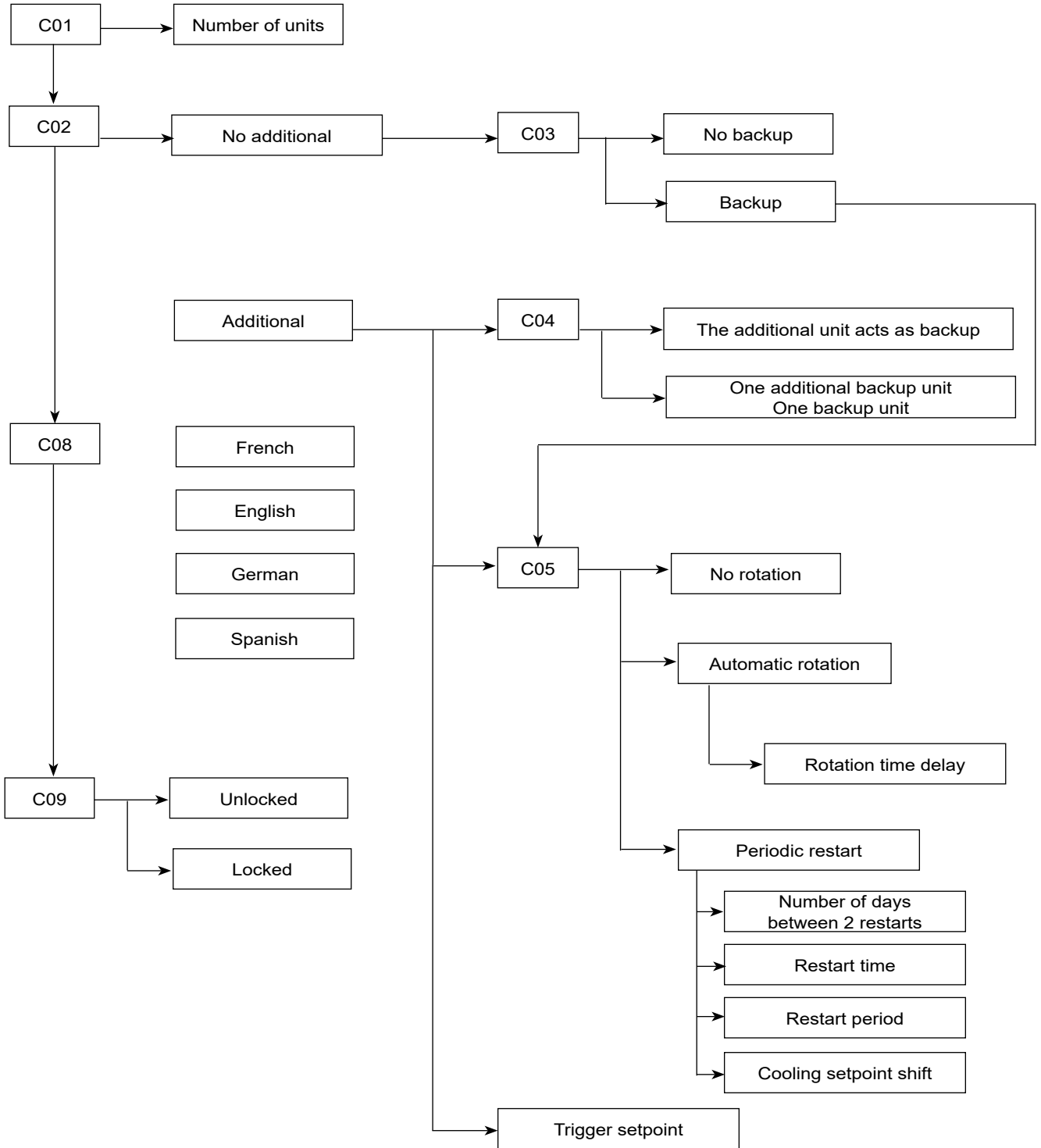
This sub-menu groups together the operating parameters for the units. They can operate individually or grouped as master/slaves.

Access level	No.	Description	Setting	By default	Display condition
OPERATING CONFIGURATION					
2	C01	Number of units	1 to 32: self-contained units 2 to 10: in master/slave	1	
2	C02	Additional unit	0: No additional unit 1: One additional unit	0	C01 > 1 and C01 < 11
2	C03	Backup unit	0: No backup unit 1: One backup unit	0	C01 > 1 and C01 < 11 and C02 = 0
2	C04	Additional backup unit	0: No additional backup unit 1: One additional backup unit	0	C01 > 2 and C01 < 11 and C02 = 1
2	C05	Rotation	0: No rotation (the last unit is the backup unit). 1: Automatic rotation (according to the time delay adjustable using C12) 2: Periodic restart (according to parameters C13 to C16).	0	C02 = 1 or C03 = 1
2	C08	Language used	0: French 1: English 2: German 3: Spanish	0	
2	C09	Locking of the configuration	0: Unlocked (the set master/slave functions are not activated) 1: Locked (the set master/slave functions are activated).	0	
SETTING					
2	C11	Setpoint for activating the additional unit (authorisation setpoint)	15 to 40°C (but always 2 K greater than the highest of the P103 cooling setpoints for the units currently operating)	27°C	C02 = 1
2	C12	Unit rotation time delay	Value adjustable from 0 to 240 h (value '0' is used for testing and corresponds to a period of 5 minutes)	168 h	C05 = 1
2	C13	Number of days between 2 restarts	Value adjustable from 0 to 60 days (value 0 is used for testing and corresponds to a period of 5 minutes between 2 restarts)	30 d	C05 = 2
2	C14	Restart time	Hours/Minutes (this setting is not taken into account if parameter C13=0)	8:00 am	C05=2
2	C15	Restart period	5 to 300 mins.	30 mins.	C05=2
2	C16	Cooling setpoint shift at restart	0 to 5 °C	3°C	C05=2
READ-ONLY					
1	C21	Unit rotation counter	NOTE: This counter counts down in increments and when it reaches 0, it is reset to the value for C12 and the unit whose number precedes the stopped unit or units stops in turn. The unit whose number precedes those currently operating starts.		C05 = 1
1	C22	Additional unit setpoint (calculated setpoint)	NOTE: This gives the actual value of the setpoint, i.e. at least 2 K above the highest cooling setpoint for all units		C02 = 1
1	C23	Number of days before periodic restart	NOTE : This counter counts down in increments every day at 00:00 and when it reaches 0, the unit on standby starts at the time set in C14.	d	C05=2
1	C24	Time before the end of the periodic start	NOTE : This counter displays the time remaining before the end of the periodic restart	min	C05=2
1	C29	Software version number			

5 - CONFIGURING THE NUMBER OF UNITS

TREE FOR CONFIGURING THE NUMBER OF UNITS

(only visible if parameter P215 = 1 "master unit")



6 - CONFIGURING THE UNIT

6.1 - Unit parameters

6.1.1 - UNIT TYPE (sub-menu 3.1)

To limit the amount of different software required whilst meeting our customers' need for applications, µAir connect 2 is provided with a configuration system. It allows the composition of the unit to be configured, along with all the functions which must be managed by the system

To configure the µAIR CONNECT 2, use the menu No.3: PARAMETER and the sub-menu No. 3.1: UNIT TYPE. (Menu on the µAIR CONNECT 2 display)

These parameters are directly linked to the composition of the unit, and they must not be modified on site.

The procedure for saving these parameters is carried out in the workshop. (To view the type of programming specific to your control, refer to the configuration guide attached to the unit).

To modify parameters P01 to P99, the unit must be stopped and the configuration unlocked. Parameter P99 (Locking of configuration) is equipped with a system which counts the number of times the configuration is unlocked.

Most of the parameters can only be modified if the correct authorisation level is accessed in Menu No.8 of the µAIR CONNECT 2 (See paragraph 4 in this guide).

Access level	No.	Description	Setting	By default	Display condition
CONFIGURATION OF THE FANS					
2	1	On control	1: Outer contact (the push button on the console acts as a forced stop) 2: Internal timer (the push button on the console acts as a priority forced stop and the outer contact as a forced start)	1	
3	2	Number of speeds or variation of air flow rate	1: One speed 10: Variation of the rotation speed with increase of the speed via an increase in cooling control. 11: Variation of the rotation speed with increase of the speed via an increase in heating control. 12: Variation of the rotation speed via cooling and heating control. 13: Variation of the rotation speed with decrease of the speed via an increase in dehumidification control. 14: Manual variation of the fan rotation speed. 15: Variation of the rotation speed with pressure increase on the raised floor. 16: Variation of the rotation speed depending on the temperature difference (return/supply air) 17: Variation for constant flow rate control	14	P05 = 0 P07 > 0 P08 > 0 P07 > 0 and P08 > 0 P09 > 0 P04 = 1 or 2 P04 = 1 or 2 P03 = 2 and P04 = 1 or 2) and P05 > 0
3	3	Machine model	1: EXPAIR configuration 2: MAGISTER configuration	1	
3	4	Controller type	0 = µAir connect 2 1 = µAir connect 2,1 2 = µAir connect 2,2	2	
3	5	FMA control	0: On/off or gradual 0-10 V 1: 1 MODBUS gradual FMA 2: 2 MODBUS gradual FMA 3: 3 MODBUS gradual FMA	0	P04 = 1 or 2
CONTROL SELECTION					
3	6	Limitation via the supply air temperature	0: No limitation 1: With limitation (Low limit affecting cooling control, high limit affecting heating control)	0	P11 ≠ 0
3	7	Cooling control	0: No cooling control 1: One chilled water coil 2: One direct expansion system 3: One chilled water coil and one direct expansion system	0	P04 = 0
3	8	Heating control	0: No heating control 1: One hot water coil 2: One electric heater 3: Electric heater or hot water coil via contact	0	P04 = 1 or 2
3	9	Dehumidification control	0: No dehumidification control 1: One chilled water coil 2: One direct expansion system 3: One chilled water coil and one direct expansion system	0	P04 = 0
3	10	Humidification control	0: No humidification control 1: Progressive control 2: Progressive MODBUS	0	
3	11	Free cooling control	0 = Without 1 = With	0	(P04 = 1 or 2) and P07 > 0

6 - CONFIGURING THE UNIT

Access level	No.	Description	Setting	By default	Display condition
CONFIGURATION OF THE EXCHANGERS					
3	16	Electric heater control	1: One on/off output (one stage) 2: Two on/off outputs (three stages) 3: One progressive stage 4: One progressive stage and one on/off stage	1	P08 = 2 or 3
3	17	Direct expansion system control	1: One stage (one compressor) 2: Two stages (one compressor + hot gas) 3: Two stages (two compressors in two circuits) 4: Four stages (two compressors + two hot gas units in two circuits) 5: Control of a staged condensation unit with external management of automatic systems and unit faults. 6: Control of two condensation units with 1 stage with external management of automatic systems and unit faults	1 if P04 = 0 5 if P04 = 1	P04 = 0 and (P07 = 2 to 4 or P09 = 2 to 4) P07 = 2 to 4 or P09 = 2 to 4
3	18	Humidifier type	1: KUESFR 3 kg/h 230 V 2: KUET1 3 kg/h 400 V 3: KUET2 8 kg/h 400 V 4: KUET3 15 kg/h 400 V	1	P10 = 2
3	19	Type of water coil	1: One mixed coil (cooling/heating operation via contact) 2: Two self-contained coils (one cooling coil, one heating coil)	2	(P04 = 1 or 2) and P07 = 1 and (P08 = 1 or 3)
MODE SELECTION					
2	31	Cooling setpoint offset	0: No control 1: Set offset shifted up by outer contact 2: Set offset shifted up by internal timer	0	P07 > 0
2	32	Heating setpoint offset	0: No shift 1: Set offset shifted down by outer contact 2: Set offset shifted down by internal timer	0	P08 > 0
3	33	CW/DX or DX/CW selection	0: Via parameter (P34) 1: CW/DX or DX/CW selection via contact. Chilled water then direct expansion: contact open*. Direct expansion then chilled water: contact closed* 2: CW or DX selection via parameter* 3: CW or DX selection via contact*	0	P04 = 0 and P07 or P09 = 3
3	34	Cooling coil start-up order	0: Chilled water then direct expansion 1: Direct expansion then chilled water: 2: Chilled water only 3: Direct expansion only	0	P04 = 0 and P33 = 0 and (P07 or P09 = 3) P04 = 0 and P33 = 3 and (P07 or P09 = 3)
3	35	Differential pressure measurement	0: Via 0-10 V pressure sensor 1: Via 0,5 - 4,5 V pressure sensor	0	
3	36	HP/LP pressure measurement	0: Via on/off sensors	0	P17 = at 4
3	37	Controlled temperature sensor type	0: CIAT sensor 1: CAREL sensor	0	P07>0 or P08>0
AIR FLOW					
3	40	Max. setpoint for air flow control	4000 to 13300 m ³ /h 4000 to 27000 m ³ /h 4000 to 40000 m ³ /h	13300m ³ /h 27000m ³ /h 40000m ³ /h	P02 = 17 and P05 = 1 P02 = 17 and P05 = 2 P02 = 17 and P05 = 3
FMA DIALOGUE CONFIGURATION					
3	71	FMA1 configuration (*)	0: Not completed 1: Completed	0	P05 = 1 or 2 or 3
3	72	FMA2 configuration (*)	0: Not completed 1: Completed	0	P05 = 2 or 3
3	73	FMA3 configuration (*)	0: Not completed 1: Completed	0	P05 = 3
LOCKING					
2	99	Locking of the configuration	0: Configuration unlocked (The unit cannot be started up; the unit type parameters may be changed). 1: Configuration locked (The unit can be started up by pressing the "On/Off" push button on the console. The unit type parameters may no longer be modified. The number of times the configuration is unlocked is counted.)	0	



(*) When these parameters are modified, a sequence is launched to configure the FMAs.

6 - CONFIGURING THE UNIT

6.1.2 - CONTROL AND SETTINGS (sub-menu 3.2)

Access level	No.	Description	Setting	By default	Display condition
1	100	Language used	0: French 1: English 2: German 3: Spanish	0	
1	101	Date	Day/Month/Year		
1	102	Time	Hours/Minutes		
COOLING CONTROL					
1	103	Temperature setpoint in cooling mode	8,0 to 45,0°C if P08 = 0 MAX (10, P106) to 45 0 °C if P08 > 0	25,0°C	P07 > 0
1	104	Temperature proportional band in cooling mode	1,0 to 10,0 K	2,0 K	P07 > 0
1	105	Temperature integral time in cooling mode	0 min 0 s to 30 min 0 s (0 to 1800 s)	0 min 0 s	P07 > 0
HEATING CONTROL					
1	106	Temperature setpoint in heating mode	10,0 to 35,0°C 10,0 to MIN (35,0, P103)°C	20,0°C	P08 > 0
1	107	Proportional band Temperature in heating mode	1,0 to 10,0 K	2,0 K	P08 > 0
1	108	Integral time Temperature in heating mode	0 min 0 s to 30 min 0 s (0 to 1800 s)	0 min 0 s	P08 > 0
DEHUMIDIFICATION CONTROL					
1	109	Humidity setpoint during dehumidification	20 to 90% if P10 = 0 MAX (20, P115) to 90 % if P10 > 0	60 %	P09 > 0
1	110	Humidity proportional band in dehumidification mode	5 to 30%	10%	P09 > 0
1	111	Humidity integral time in dehumidification mode	0 min 0 s to 30 min 0 s (0 to 1800 s)	0 min 0 s	P09 > 0
HUMIDIFICATION CONTROL					
1	115	Humidity setpoint during humidification	20 to 90% if P09 = 0 MAX (20, P109) to 90 % if P09 > 0	40%	P10 > 0
1	116	Humidity proportional band in humidification mode	5 to 30%	10%	P10 > 0
1	117	Humidity integral time in humidification mode	0 min 0 s to 30 min 0 s (0 to 1800 s)	0 min 0 s	P10 > 0
RETURN TEMPERATURE LIMITATION					
1	121	Downward shift of the temperature limit	0,0 to 10,0 K	2 K	P06 = 0 and P09 > 0
1	122	Proportional band for reduction of the cooling demand	1,0 to 10 K	2 K	P06 = 0 and P09 > 0
FREE COOLING CONTROL					
2	125	Free cooling activation differential	3 to 20 K	3 K	P11 = 1
2	126	Free cooling activation low limit setpoint	-5 to 20°C	0°C	P11 = 1
2	128	Free cooling opening limit	0 to 100%	100 %	P11 = 1
2	129	External weight in water low limit setpoint	0 to 15 g	4 g	P11 = 1 and (P09>0 or P10>0)
2	130	External weight in water high limit setpoint	8 to 18 g	12 g	p11 = 1 and (P09>0 or P10>0)
LIMITATION OF THE SUPPLY AIR TEMPERATURE					
1	140	Low limit setpoint	5 to 30 °C	14°C	P06 = 1 and (P07 > 0 or P09 > 0)
1	141	Proportional band for the low limit	1 to 20 K	4 K	P06 = 1 and (P07 > 0 or P09 > 0)
1	142	High limit setpoint	30 at 60°C	50°C	P06 = 1 and P08 > 0
1	143	Proportional band for the high limit	1 to 20 K	4 K	P06 = 1 and P08 > 0
TEMPERATURE SETPOINT SHIFT					
2	144	Cooling setpoint offset	0 to 30 K	5 K	P31 > 0
2	145	Heating setpoint offset	0 to 20 K	5 K	P32 > 0

6 - CONFIGURING THE UNIT

Access level	No.	Description	Setting	By default	Display condition
AIR FLOW					
2	146	Air flow rate setpoint	4000 to (P40) m ³ /h	10000 m ³ /h	P02 = 17
2	147	Air flow rate proportional band	100 to 80000 m ³ /h	50000 m ³ /h	P02 = 17
2	148	Air flow rate integration time	0 to 1800 s	30 s	P02 = 17
2	149	Air flow rate derivation time	0 to 1800 s	0 s	P02 = 17
FLOOR PRESSURE					
2	150	Discharge pressure setpoint	20 to 250 Pa	100 Pa	P2 = 15
2	151	Discharge pressure proportional band	20 to 1000 Pa	50 Pa	P2 = 15
2	152	Discharge pressure integral time	0 min 0 s to 30 min 0 s (0 to 1800 s)	3 min 0 s	P2 = 15
2	153	Discharge pressure derivative time	0 min 0 s to 30 min 0 s (0 to 1800 s)	3 min 0 s	P2 = 15
LIMITING THE POWER OF THE GRADUAL ELECTRIC HEATER					
2	154	Electric heater maximum percentage	0 to 100%	100%	(P08 = 2 or 3) and (P16 = 3 or 4)
LIMITATION OF THE FAN ROTATION VARIABLE SPEED CONTROL					
2	155	Percentage of the rotation speed	P156 to P157	(P156+P157)/2	
2	156	Minimum percentage of the rotation speed	0 to 90 % if P08 = 0 or 1 and P10 = 0 50 to 90% if P08 > 1 or P10 > 0	60 %	P02 > 9
2	157	Maximum percentage of the rotation speed	P156 to 100%	100 %	P02 > 9
2	158	Percentage of proportional bands reserved for controlling just the valves	0 to 100%	50 %	P02 = 10 to 13
RETURN/SUPPLY AIR TEMPERATURE CONTROL					
2	159	Return/supply air temperature differential setpoint	5,0 to 20,0°C	10,0°C	P2 = 16
2	160	Return/supply air temperature proportional band	1,0 to 10,0°C	2,0°C	P2 = 16
CHECK THE FILTERS					
The values correspond to the unit's maximum air flow. If there is a variation in the fan speed, these values are reduced proportionally					
1	161	Setpoint for differential pressure indicating air flow present	10 to 80 Pa	30 Pa	P02 ≠ 17
1	162	Setpoint for differential pressure indicating filter fouling	60 to 500 Pa	150 Pa	
1	163	Setpoint for differential pressure indicating filter blocked	100 to 550 Pa	190 Pa	
AIR FLOW CONTROL					
2	164	Air flow rate low limit	0 to MIN (P146,10,000)	4000 m ³ /h	P02 = 17
COMPRESSOR VALIDATION					
3	181	Validation of compressor circuit 1	0: Compressor stopped 1: Compressor authorised	1	P17 = 1 to 16
3	182	Validation of compressor circuit 2	0: Compressor stopped 1: Compressor authorised	1	P17 = 3, 4 or 6
TIME DELAY					
2	185	Warm-up at fan start-up (validation of detection of T° and RH exceeded)	5 to 180 min	30 min	
2	186	Application of control at fan start-up	10 to 180 s	30 s	
2	188	Fault taken into account when temperature or relative humidity exceeded	1 to 5 min	2 min	
2	190	Post ventilation of electric heater	1 to 300 min	10 min	P08 = 2 or 3
2	191	Delayed fan control after operation request	0 to 480 s	0 s	
2	192	Duration of fan soft start incline	0 to 500 s	30 s	P02 > 9
2	193	Rotation time delay for refrigeration circuits	0 to 240 h	240 h	P17 = 3, 4 or 6
CHECKING WHETHER TEMPERATURE THRESHOLDS ARE EXCEEDED					
1	200	Temperature upper limit threshold	30 to 75°C if P07 = 0 (P103 + P104) to 75°C if P07 > 0	40°C	P07 or P08 > 0
1	201	Temperature low limit threshold	30 to 75°C if P08 = 0 5°C to (P106 - P107) if P08 > 0	10°C	P07 or P08 > 0

6 - CONFIGURING THE UNIT

Access level	No.	Description	Setting	By default	Display condition
CHECKING WHETHER HUMIDITY THRESHOLDS ARE EXCEEDED					
1	202	Humidity upper limit threshold	40 to 100% RH if P09 = 0 (P109 + P110) to 100% RH if P09 > 0	80% RH	P09 or P10 > 0
1	203	Humidity low limit threshold	10 to 40% RH if P10 = 0 10% RH to (P115 - 116) of P10 > 0	20% RH	P09 or P10 > 0
TEST MODE					
3	204	Test mode	0: no 1: yes	0	P17 > 0
FAULT RELAY					
1	205	Minor fault relay direction of action	0: Standard standby/active contacts 1: Reversed standby/active contacts	1	
1	206	Major fault relay direction of action	0: Standard standby/active contacts 1: Reversed standby/active contacts	1	
CONTROLLED TEMPERATURE ORIGIN SELECTION					
2	207	Controlled temperature origin	0: Sensor connected to the controller 1: Value received by ModBus	0	P07 > 0 or P08 > 0
2	208	Time before switch to controller sensor when value not received by ModBus	5 to 180 s	30 s	(P07 > 0 or P08 > 0) and P207 = 1
2	209	Low temperature (2 V)	-40,0 to 99,9 °C	-20,0 °C	(P07 > 0 or P08 > 0) and P207 = 2
2	210	High temperature (10 V)	-40,0 to 99,9 °C	80,0 °C	(P07 > 0 or P08 > 0) and P207 = 2
2	211	Cooling temperature setpoint with 2-10 V sensor fault	8,0 to 45,0 if P08=0 MAX (8, P212) to 45,0 °C if P08>0	25,0 °C	P07 > 0 and P207 = 2
2	212	Heating temperature setpoint with 2-10 V sensor fault	10,0 to 35,0 if P07=0 10,0 to MIN (35,0,P211) if P07>0	20,0 °C	P08 > 0 and P207 = 2
MASTER/SLAVE BUS					
2	215	Unit number on console	1 to 32	1	

6.1.3 - Reading parameters (sub-menu 3.3)

This third sub-menu gives access to all the values (temperatures, relative humidities, pressures, time delays, meters, input and output states, etc.) managed by the **µAir connect 2**. Only the useful parameters are displayed. They cannot be modified

The meters can be reset to zero. To do this, place the cursor on the chosen meter and simultaneously press the Reset and 0 keys for 5 to 6 seconds.

All these parameters are accessible from the "customer" access level.

Access level	No.	Description	Unit	Display condition
CALCULATED SETPOINT				
1	250	Cooling setpoint value	°C	P07 > 0
1	251	Temperature setpoint value in heating mode	°C	P08 > 0
1	252	Air flow activation threshold value	Pa	P02 ≠ 17
1	253	Filter fouling activation threshold value	Pa	
1	254	Filter clogging activation threshold value	Pa	
MEASURED VALUE				
1	255	Target temperature	°C	P07 > 0 or P08 > 0
1	256	Target relative humidity	%	P09 > 0 or P10 > 0
1	257	Filter differential pressure	Pa	
1	258	Outdoor temperature	°C	P11 = 1
1	259	Supply air temperature	°C	P06 = 1
1	265	Outdoor humidity	%	(P09>0 or P10>0) and P11=1
1	266	Raised floor differential pressure	Pa	P2 = 16
1	267	Fan 1 differential pressure	Pa	P02 = 17
1	268	External weight in water	g/Kg	(P09>0 or P10>0) and P11=1
1	269	Air flow rate	m³/h	P02 = 17

6 - CONFIGURING THE UNIT

Access level	No.	Description	Unit	Display condition
LOGIC INPUT STATE (ON/OFF)				
1	270	Electric heater safety thermostat with manual reset	default = off	
1	271	Summary of condensation unit 1 faults	default = on	P17 > 5
1	272	Summary of condensation unit 2 faults	default = on	P17 > 6
1	273	Low pressure fault 1	default = on	P17 = 1 to 4 and P36 = 0
1	274	High pressure or circuit break fault 1	default = off	P17 = 1 to 4
1	275	Low pressure fault 2	default = on	P17 = 3 to 4 and P36 = 0
1	276	High pressure or circuit break fault 2	default = off	P17 = 3 or 4
1	277	CW/DX, DX/CW, CW or DX selection	CW/DX or CW = off	P07 or P09 > 2
1	278	External safety contact		
1	279	On request contact		
1	281	Humidifier maintenance, fault or operation feedback	default = off	P10=1
1	282	Fan operation feedback	default = off	
1	284	Water leak contact	default = off	
1	287	Hot water coil or electric heater selection contact	electric off hot water on	P08=3
1	288	Summer or winter mode contact	summer off winter on	P19=1
PERCENTAGE FOR ANALOGUE OUTPUTS				
1	290	Opening of the heating coil three-way valve or electric heater percentage Opening of the heating coil three-way valve	%	P04 = 0 and (P08 = 1 or (P08 = 2 and (P16 = 3 or P16 = 4)) (P04 = 1 or 2) and (P08 = 1 or 3)
1	291	Opening of the cooling coil three-way valve or mixed coil three-way valve	%	(P07 = 1 or 3) or (P09 = 1 or 3)
1	294	Progressive humidifier percentage	%	P10 = 1
1	295	Fan rotation speed	%	P02 > 9
1	296	Fresh air percentage	%	P11 = 1
1	297	Electric heater percentage	%	P04 = 1 and ((P08 = 2 or P08 = 3) and (P16 = 3 or P16 = 4))
STATE OF THE COMPRESSOR CONTROLS				
1	300	Condensation unit 1 or circuit 1 compressor 1	Off/On	P17 > 0
1	301	Short-cycle protection time countdown for compressor 1	mins	P17 > 0
1	302	Number of start-ups for condensation unit 1 or circuit 1 compressor 1		P17 > 0
1	303	Condensation unit 1 or circuit 1 compressor 1 operating-hour meter	h	P17 > 0
1	304	Condensation unit 2 or circuit 2 compressor 1	Off/On	P17 = 3,4 or 6
1	305	Short-cycle protection time countdown for condensation unit 2 or circuit 2 compressor 1	mins	P17 > 0
1	306	Number of starts for condensation unit 2 or circuit 2 compressor 1		P17 > 0
1	307	Condensation unit 2 or circuit 2 compressor 1 operating-hour meter	h	P17 > 0
STATE OF THE HOT GAS BYPASS CONTROLS				
1	315	State of the hot gas bypass valve for circuit 1	Off/On	P17 = 2 or 4
1	316	Operating-hour meter for opening of the hot gas bypass valve for circuit 1	h	P17 = 2 or 4
1	315	State of the hot gas bypass valve for circuit 2	Off/On	P17 = 4
1	316	Operating-hour meter for opening of the hot gas bypass valve for circuit 2	h	P17 = 4
STATE OF THE ELECTRIC HEATER CONTROLS				
1	320	Electric heater stage 1	Off/On	P16 = 2
1	321	Operating-hour meter for electric heater stage 1	h	P16 = 2
1	322	Electric heater stage 2	Off/On	P16 = 2 or 4
1	323	Operating-hour meter for electric heater stage 2	h	P16 = 2 or 4
STATE OF THE FAN CONTROLS				
1	330	Fan control state	Off/On	
1	331	Fan operating-hour meter	h	

6 - CONFIGURING THE UNIT

Access level	No.	Description	Unit	Display condition
STATE OF THE FAULT SUMMARY CONTROLS				
1	350	Indication of the critical faults	Off/On	
1	351	Operating-hour meter indicating the critical faults	h	
1	352	Indication of the non-critical faults	Off/On	
1	353	Operating-hour meter indicating the non-critical faults	h	
STATE OF THE FAN CONTROLS				
1	360	Fan on request	Off/On	P01 = 2
1	361	Temperature setpoint shift request	Off/On	P31 = 2 or P32 = 2
TIME DELAY COUNTDOWN				
1	362	Warm-up	mins	
1	363	Activation time delay for the compressor stages	mins	P17 = 3 or 4
VERSION NUMBER				
1	365	µAir Connect 2,2 software version number		
TEMPERATURE FOR CONTROL				
1	370	Temperature measured by the controller	°C	P207 = 1 and P207=2
1	371	Temperature received by ModBus	°C	P207 = 1
1	373	Percentage on external signal	%	(P07>0 and P08=0) and P207=3
ORDER NUMBER				
1	570	SO order number		
1	571	OF number		

6.2 - Humidifier parameters (visible if P10 =2)

6.2.1 - Settings (sub-menu 9.1)

Access level	No.	Description	Setting	By default	Display condition
3	900	Maximum production	20 to 100%	100 %	P10 = 2
3	901	Off delay time	0 s to 120 s	0 s	P10 = 2
3	902	Water conductivity (0 = automatic measurement > 0 = forced conductivity)	0 to 125 µS/cm	0 µS/cm	P10 = 2
3	903	Conductivity pre-alarm threshold	0 to 2000 µS/cm	1500 µS/cm	P10 = 2
3	904	Conductivity alarm threshold	0 to 2000 µS/cm	2000 µS/cm	P10 = 2
3	905	Foam detection threshold control (0 = foam detection excluded 1 = max. foam detection sensitivity; 100 = min. foam detection sensitivity)	0 to 100%	50 %	P10 = 2
3	906	Internal conductivity adjustment of the cylinder during warm-up in relation to the nominal conductivity (less than 100 %: conductivity increases)	50 to 200%	100 %	P10 = 2
3	907	Control of the duration of release for dilution	50 to 200%	100 %	P10 = 2
3	908	Cylinder maintenance limit time (0 = "CY" cylinder life and maintenance alarm no longer appears as a matter of course)	0 h to 4000 h	3000 h	P10 = 2
3	909	Limit time between two periodic releases	1 h to 240 h	24 h	P10 = 2
3	910	Days of inactivity awaiting release	1 to 199 days	3 days	P10 = 2
2	911	Manual drain	0: without 1: with		P10 = 2
2	912	Prewashing	0: without 1: with		P10 = 2

6 - CONFIGURING THE UNIT

6.2.2 - Reading parameters (sub-menu 9.2)

Access level	No.	Description	Unit	Display condition
1	950	Outdoor request display	%	P10 = 2
1	951	Display of the instantaneous steam flow rate (instantaneous steam)	kg/h	P10 = 2
1	952	Conductivity of supply water	μS/cm	P10 = 2
1	953	Current consumed	A	P10 = 2
1	954	Maximum production display (corresponding to the configured P900 value)	kg/h	P10 = 2
1	955	Nominal steam production	kg/h	P10 = 2
1	956	Cylinder hours counter (can be reset to 0 by pressing the reset+0 keys for 5 secs)	h	P10 = 2
1	957	Machine hours counter (cannot be reset to zero; read only)	h	P10 = 2
1	958	Humidifier state 0: Not activated 1: Evaporation cycle start 2: Charging with water 3: Evaporating 4: AFS drain 5: Water drain (for dilution or manual) 6: Water drain ended 7: Complete drain for extended period of inactivity 8: Network or manually requested complete drain 9: Water shortage management 10: Prewash 11: Periodic drain		P10 = 2

6.2.3 - Alarm (sub-menu 9.3)

Alarm	Description
	The humidifier has no fault
Mn	Replace the cylinder
EC	Water conductivity too high
E1	Configuration parameter error
E0	Internal memory error
EH	Electrode overcurrent
EP	Low steam flow rate during reduced production
EU	Water level raised without humidification request
EF	Lack of supply water
ED	Drain problem



To acknowledge a fault on the humidifier, go to the "ALARM" menu (menu 9.3) and press the "Reset" key

6 - CONFIGURING THE UNIT

6.3 - Supply air fan parameters (visible if P05 = 1 or 2 or 3)

6.3.1 - FMA1 information (sub-menu 10.1)

Access level	No.	Description	Unit	Display condition
1	1000	FMA1 max. speed	rpm	P05 = 1, 2 or 3
1	1001	FMA1 requested speed	rpm	P05 = 1, 2 or 3
1	1002	FMA1 current speed	rpm	P05 = 1, 2 or 3
1	1003	FMA1 current consumed	A	P05 = 1, 2 or 3
1	1004	FMA1 peak supply voltage	V	P05 = 1, 2 or 3
1	1005	FMA1 power input	W	P05 = 1, 2 or 3
1	1010	FMA1 fault summary	Off/On	P05 = 1, 2 or 3
1	1011	FMA1 start-up fault	Off/On	P05 = 1, 2 or 3
1	1012	FMA1 rotation direction fault	Off/On	P05 = 1, 2 or 3
1	1013	FMA1 current limitation	Off/On	P05 = 1, 2 or 3
1	1014	FMA1 temperature limitation	Off/On	P05 = 1, 2 or 3
1	1015	FMA1 off	Off/On	P05 = 1, 2 or 3
1	1020	FMA1 internal DC voltage	V	P05 = 1, 2 or 3
1	1021	FMA1 IGBT temperature	°C	P05 = 1, 2 or 3
1	1022	FMA1 indoor room temperature	°C	P05 = 1, 2 or 3
1	1023	FMA1 MCU temperature	°C	P05 = 1, 2 or 3
1	1048	FMA1 product code		P05 = 1, 2 or 3
1	1049	FMA1 software version		P05 = 1, 2 or 3

6.3.2 - FMA2 information (sub-menu 10.2)

Access level	No.	Description	Unit	Display condition
1	1050	FMA2 max. speed	rpm	P05 = 2 or 3
1	1051	FMA2 requested speed	rpm	P05 = 2 or 3
1	1052	FMA2 current speed	rpm	P05 = 2 or 3
1	1053	FMA2 current consumed	A	P05 = 2 or 3
1	1054	FMA2 peak supply voltage	V	P05 = 2 or 3
1	1055	FMA2 power input	W	P05 = 2 or 3
1	1060	FMA2 fault summary	Off/On	P05 = 2 or 3
1	1061	FMA2 start-up fault	Off/On	P05 = 2 or 3
1	1062	FMA2 rotation direction fault	Off/On	P05 = 2 or 3
1	1063	FMA2 current limitation	Off/On	P05 = 2 or 3
1	1064	FMA2 temperature limitation	Off/On	P05 = 2 or 3
1	1065	FMA2 off	Off/On	P05 = 2 or 3
1	1070	FMA2 internal DC voltage	V	P05 = 2 or 3
1	1071	FMA2 IGBT temperature	°C	P05 = 2 or 3
1	1072	FMA2 indoor room temperature	°C	P05 = 2 or 3
1	1073	FMA2 MCU temperature	°C	P05 = 2 or 3
1	1098	FMA2 product code		P05 = 2 or 3
1	1099	FMA2 software version		P05 = 2 or 3

6.3.3 - FMA3 information (sub-menu 10.3)

Access level	No.	Description	Unit	Display condition
1	1100	FMA3 max. speed	rpm	P05 = 3
1	1101	FMA3 requested speed	rpm	P05 = 3
1	1102	FMA3 current speed	rpm	P05 = 3
1	1103	FMA3 current consumed	A	P05 = 3
1	1104	FMA3 peak supply voltage	V	P05 = 3
1	1105	FMA3 power input	W	P05 = 3
1	1110	FMA3 fault summary	Off/On	P05 = 3
1	1111	FMA3 start-up fault	Off/On	P05 = 3
1	1112	FMA3 rotation direction fault	Off/On	P05 = 3
1	1113	FMA3 current limitation	Off/On	P05 = 3
1	1114	FMA3 temperature limitation	Off/On	P05 = 3
1	1115	FMA3 off	Off/On	P05 = 3
1	1120	FMA3 internal DC voltage	V	P05 = 3
1	1121	FMA3 IGBT temperature	°C	P05 = 3
1	1122	FMA3 indoor room temperature	°C	P05 = 3
1	1123	FMA3 MCU temperature	°C	P05 = 3
1	1148	FMA3 product code		P05 = 3
1	1149	FMA3 software version		P05 = 3

7 - FAULT LEVEL (MENU 6)

Each type of fault can be forwarded to one of the following two changeover contact relays:

- Non-critical fault relay.
- Critical fault relay.

This menu is used to configure which type of fault will be forwarded to which relay (critical or non-critical).

No.	Description	Setting	Unit	Display condition
N02	No air flow (*)	0: Non-critical fault 1: Critical fault	1	
N03	Fan (*)	0: Non-critical fault 1: Critical fault	1	
N04	Compressors (Condensation unit Low pressure for each circuit High pressure or circuit breaking for each circuit)	0: Non-critical fault 1: Critical fault	1	P17 > 0
N05	Filtration fouled	0: Non-critical fault 1: Critical fault	0	
N06	Filtration blocked (*)	0: Non-critical fault 1: Critical fault	1	
N07	Temperature sensors (10 KΩ)	0: Non-critical fault 1: Critical fault	1	
N08	Electric heater	0: Non-critical fault 1: Critical fault	0	P16 > 0
N09	Humidifier	0: Non-critical fault 1: Critical fault	0	P10 > 0
N11	Water leak	0: Non-critical fault 1: Critical fault	0	
N13	Temperature set high	0: Non-critical fault 1: Critical fault	0	P07 > 0 or P08 > 0
N14	Temperature set low	0: Non-critical fault 1: Critical fault	0	P07 > 0 or P08 > 0
N15	Relative humidity set high	0: Non-critical fault 1: Critical fault	0	P09 > 0 or P10 > 0
N16	Relative humidity set low	0: Non-critical fault 1: Critical fault	0	P08 > 0 or P10 > 0

NOTE:

- Faults marked (*) shut down the machine
- If the master/slave function is used, the faults defined as critical stop the unit.

8 - WEEKLY PROGRAMMING (MENU 5)

This menu is only accessible if at least one timer channel is used. Only the configured channels are displayed. The two channels can be programmed over a week. Each day can have different time schedules. Each channel can have twenty different programmes.

A program includes the hours and the days for activation and deactivation of the channel.

TIMER CHANNELS:

8.1 - Ventilation on sub-menu 5.1

This menu is only visible if P01 = 2 is configured.

When the channel is activated, the fan is authorised to start up. (To ensure this channel is active, check that no shunt has been created on terminals 1 and 7 of terminal block J2).

8.2 - Shifting the temperature setpoints (sub-menu 5.2)

This menu is only visible if P31 = 2 or P32 = 2 is configured.

When the channel is activated, the setpoint shift is activated.

8.3 - Using the weekly program

Weekly program

V E N T I L A T I O N	O N	T I M E R	P R O G R A M
P R O G . : 0 1	A C T I V A T E	D E A C T I V A T E	C O N F I R M
S C H E D U L E :	0 0 : 0 0	0 0 : 0 0	N O
D A Y :	M O	T U	W E T H F R S A S U 0 : M E N U

The first line indicates the timer channel (example VENTILATION ON). On the second line, the digit indicates the step for the programme currently being viewed. With the cursor positioned on the \updownarrow box, use the \uparrow and \downarrow buttons to scroll through the program steps.

The third line is used to enter the time for activating and deactivating the displayed program step. You can enter the hours and minutes using the number pad.

With the cursor positioned on the NO box, press the \uparrow button to bring up the word "YES"; this program step is taken into account. Press the \downarrow button to bring up the word "NO"; this program step is not taken into account. The cursor switches to the "NO" box after having moved to the fourth line.

The fourth line is used to select the days of the week. They are in the following order: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday.

Position the cursor on the selected day and press the \uparrow button to bring up the abbreviation for the day or press the \downarrow key to clear the text. Only the displayed days are taken into account.

Each operating day needs to be programmed.

The text "0: MENU" is only displayed if the cursor is on the \updownarrow box on line 2. In this position only, the 0 digit key can be used to return to the previous menu.

9 - CONTROL

9.1 - Progressive control

This may be proportional or proportional integral.

9.1.1 - Proportional control

To obtain the strictly proportional, set the integral time (setting configuration) to the value of 0 seconds. Control is carried out continuously. At each scan, the controller compares the measurement and the setpoint and calculates the control value proportionally to the discrepancy. With this type of control, there is always a discrepancy between the measurement and the setpoint.

To stabilise the control, the proportional band must be increased. This type of control is recommended if all stages are controlled as on/off (example: electric heater, direct expansion coil).

9.1.2 - Proportional-integral control

Proportional control is carried out continuously (see above). The integral calculation is carried out every 15 seconds. The value obtained is added to that calculated proportionally. The proportional action allows the response to the measurement to be accelerated based on the discrepancy between the measurement/setpoint. A high proportional band value allows the control loop to be stabilised, but decreases the response speed. A value which is too large will lead to oscillations of a high amplitude during start-up.

The integral action allows this discrepancy between the measurement and the setpoint to be cancelled. A high integral time allow the control loop to be stabilised, but increases the time taken to cancel the discrepancy.

9.1.3 - Staged control

If the value measured differs from the setpoint upwards or downwards depending on the type of control to be obtained, the first stage is triggered. If this value differs from the differential calculated between stages, the second stage is triggered, and so on and so forth

9.2 - Control of the "Target" temperature

This is proportional or proportional integral.

9.2.1 - Cooling control

The master control is increased if the temperature exceeds the setpoint. This value is broken down according to the parameter settings (unit type parameter) and is:

- Progressive for the chilled water valve control.
- Staged for the control of compressors or condensation units.
- Progressive for the control of the fan speed controller. This slave control exists regardless of the parameter settings.
- Staged for indicating that the upper temperature limit has been exceeded.
- Limitation of the cooling demand if the lower air supply limit setpoint has been exceeded. (Progressive on CW, staged on DX model).

Depending on the strictly proportional composition of the unit, a discrepancy may remain between the setpoint and the measurement, even with all the elements at 0.

9.2.2 - Heating control

The master control is increased if the temperature drops below the setpoint. This value is broken down according to the parameter settings (unit type parameter) and is:

- Progressive for the electrical current or hot water valve control.
- Progressive for the limitation of the dehumidification control. This slave control exists regardless of the parameter settings.
- Staged for indicating that the lower temperature limit has been exceeded. Depending on the composition of the unit, as strictly proportional, a discrepancy may remain between the setpoint and the measurement, even with all the elements at 0.

9.2.3 - Operation in free cooling mode

CW (chilled water) units

- Return air temperature sensor: gradual operation of motorised dampers then the three-way valve.
- Supply air temperature sensor: limitation of the three-way valve then the FRESH AIR damper.

DXA (direct expansion) units

- Return air temperature sensor: progressive operation of the dampers (condensation units off).
- Supply air temperature sensor: FRESH AIR damper limit

9.3 - Control of the "Target" relative humidity

This is proportional or proportional integral.

9.3.1 - Dehumidification control

The master control is increased if the relative humidity exceeds the setpoint. This value is broken down according to the parameter settings (unit type parameter) and is:

- Progressive for the chilled water valve control.
- Staged for the control of the direct expansion coil.
- Staged for indicating that the upper relative humidity limit has been exceeded.

Depending on the strictly proportional composition of the unit, a discrepancy may remain between the setpoint and the measurement, even with all the elements at 0.

This control is limited by the lower drift of the target temperature.

NOTE: If the cooling and dehumidification controls control the same component, it is the largest value which counts.

9 - CONTROL

9.3.2 - Humidification control

The master control is increased if the relative humidity drops below the setpoint.

This value is broken down according to the parameter settings (unit type parameter) and is:

- Progressive for the humidifier control.
- Staged for indicating that the lower relative humidity limit has been exceeded.

Depending on the composition of the unit, as strictly proportional, a discrepancy may remain between the setpoint and the measurement, even with all the elements at 0.

10 - SENSORS

10.1 - Sensor specifications

10.1.1 - NTC temperature sensor

- Measurement range: -40 to 99.9 °C
- Tolerance: ± 0.2 °C from 0 to 70 °C
- Thermistor: NTC 10 k at 25 °C reference 10K3A1
- Adjustment of the controlled and outdoor temperature sensors from -5 to +5 °C (reserved for the manufacturer access level)

Example of adjustment on controlled temperature:

1. Reading parameters (menu 3.3) ENTER
2. Cursor opposite parameter P255 Controlled temperature ENTER
3. Modify the adjustment (-5 to 5 °C)
4. Confirm with the ENTER key

- Failure to connect, wire cut or short circuit feedback
The fault is displayed. It stops the corresponding controls and controllers
For example, the "outdoor sensor" fault can stop the free cooling control.
It is released automatically.

10.1.2 - 2-10 V temperature sensor

- Measurement range: -40 to 100 °C
- Low value adjustable at 2 V: from -40 to 99.9 °C
- High value adjustable at 10 V: from -40 to 99.9 °C
- Linear scale between 2 and 10 V
- Sensor fault indicated if the measurement value is < 1.5 V
The fault is displayed and the control switches to the controlled temperature sensor (NTC) with specific setpoints for the 2-10 V sensor fault.
It is released automatically if the measurement value is >2.0 V

10.1.3 - Humidity sensor 0-10 V

- Measurement range: 0 to 100 %
- Adjustment of the controlled and outdoor humidity sensor from -10 to 10 % (reserved for the manufacturer access level)

10.1.4 - Filter differential pressure sensor:

- Measurement range if P35 = 0 : 0-10 V 0-1000 Pa
- Measurement range if P35 = 1 : 0.5-4.5 V 0-1000 Pa

10.1.5 - Fan differential pressure sensor:

- Measurement range 0: 0-10 V 0-2500 Pa

11 - COMMISSIONING

1. Power up.
2. The yellow voltage present indicator on the console comes on.
3. Adjust the setpoint and settings parameters as explained in sections 4 and 5.
4. Press the power button (if the green LED does not come on, check whether parameter P99 is locked "P99 = 1").
5. The green indicator flashes if the external control contact is open; if the timer is not set to operate the unit then it remains on standby.
6. If the green indicator comes on, the unit will be started.

11.1 - Master/slave unit operating status

- **Stopped:** The units are operating individually. The unit in question is authorised by the console button and by the external safety contact. The unit is not faulty, it is powered up. The unit is stopped by the on/off control (contact or timer).
- **Forced stop:** The unit in question is stopped by the console button or by the external safety contact. It is not faulty, it is powered up.
- **Operating:** The units are operating individually. The unit in question is authorised by the console button and by the external safety contact. The unit is not faulty, it is powered up. The unit is authorised by the on/off control (contact or timer).
- **Automatic operation:** The units are operating as master/slaves. At least one unit is configured as backup or additional. The unit in question is authorised by the console button and by the external safety contact. The unit is not faulty, it is powered up. The unit is not controlled by the on/off (contact or timer). The unit is not selected as a backup or additional unit.
- **Override:** The units are operating as master/slaves. At least one unit is configured as backup or additional. The unit in question is authorised by the console button and by the external safety contact. The unit is not faulty, it is powered up. The unit is controlled by the on/off (contact or timer).
- **Standby:** The units are operating as master/slaves. At least one unit is configured as backup or additional. The unit in question is authorised by the console button and by the external safety contact. The unit is not faulty, it is powered up. The unit is not controlled by the on/off (contact or timer). The unit is selected as a backup or additional unit, but it is not operating as a backup or additional unit.
- **Backup:** The units are operating as master/slaves. One unit is configured as backup or additional. The unit in question is authorised by the console button and by the external safety contact. The unit is not controlled by the on/off (contact or timer). The unit is selected as a backup or additional unit, it is operating as a backup but not as an additional unit.
- **Additional:** The units are operating as master/slaves. One unit is configured as additional. The unit in question is authorised by the console button and by the external safety contact. The unit is not faulty, it is powered up. The unit is not controlled by the on/off (contact or timer). The unit is selected as an additional unit, it is operating as an additional unit but not as backup.
- **Additional and backup:** The units are operating as master/slaves. One unit is configured as additional. The unit in question is authorised by the console button and by the external safety contact. The unit is not controlled by the on/off (contact or timer). The unit is selected as an additional unit, it is operating as an additional and backup unit.
- **Periodic restart:** The units are operating as master/slaves. At least one unit is configured as backup or additional. The unit in question is authorised by the console button and by the external safety contact. The unit is not malfunctioning, it is powered up. The unit is not controlled by the on/off switch (contact or timer). The unit is selected as an additional or backup unit and is periodically restarted.
- **With non-critical fault:** The unit in question is powered up. It has at least one non-critical fault, but no critical faults.
- **With critical fault:** The unit in question is powered up. It has at least one critical fault.
- **Powered off:** The µAIR CONNECT 2 for the unit in question is not responding. It is not powered up or the bus connection is broken.

11.2 - Operating information for each unit (menu 1 "operating info")

■ Unit with no fault

- **The first line:** displays the values measured by the target relative humidity and/or temperature sensors.
- **The second line:** displays the target relative humidity and/or temperature setpoint values.

For the two values, the value displayed is the setpoint for the last control mode (heating or cooling, humidification or dehumidification).

If the measurement value is below the heating or humidification setpoint, it is this setpoint which is displayed. If the measurement value is above the cooling or dehumidification setpoint, it is this setpoint which is displayed. If the measurement value is between the two setpoints, the value displayed does not change.

- **The third line displays the unit's operating status:**

■ Unit shut down:

The fan and all controls and automatic controllers are shut down.

■ Unit operating:

The one-speed or variable-speed fan is operating, the controls are authorised, the temperature setpoints are calculated based on the normal value.

■ Unit in post ventilation:

Unit shutdown is requested, the controls and automatic controllers are no longer authorised. The fan operates until post ventilation is finished.

■ Unit shut down by the safety contact:

The external safety contact is open. The unit stop has been requested.

■ Unit faulty:

The last fault that appeared is displayed with a text indicating the components which have been stopped and the first verifications to be carried out before acknowledging the fault.

11 - COMMISSIONING

11.3 - Table of alarms

Faults	Sources	Causes	Solutions
Filtration fouled	Pressure sensor	Filter fouled	• Clean or replace the filter
Filtration blocked		Filter too dirty (ventilation stopped)	• Replace the filter
No air flow		Belts	• Check the tension • Replace the belts
		Filters	• Clean or replace
		Fan	• See fan fault
		Damper	• Check the opening • Check the servomotor
		Motor	• Check the direction of rotation
	Network	• Check the network pressure drop	
Fan/motor	Belts Switch Circuit breaker Embedded thermistor	Fan stopped	• Check the belts
		Motor	• Check the motor's power supply • Check the switch, the circuit breaker setting, the motor's embedded thermistor • Check the motor cooling • Measure the input current
Circuit breaker LP HP/compressor	Switch Circuit breaker	Compressor stopped	• Check the compressor's power supply • Check the switch, the circuit breaker setting • Measure the input current
	Low pressure pressostat		• Check the charge, top up • Measure the air temperature at the coil intake, • Check the operation of the expansion valve, the valves, the condition of the dryer, • Check that the water loop is bled correctly
	High pressure switch		• Check the charge • Check the operation of the expansion valve, the valves and the condenser selection value, • Reset the pressure switch (clear the fault before resetting) • Check the compressor input current • Check the power supply
Electric heater	Electric heater	Overheating	• Check the air flow rate • Measure the input current • Measure the supply voltage • Check the fan delay duration
		No heating	• Check the supply voltage • Check the switches, the circuit breakers, the triac (option), the control component • Reset the thermostat (clear the fault before resetting)
Humidifier	Humidifier	The humidifier does not work	• Check the supply voltage • Check the switch, the circuit breaker, the control component and the humidifier control panel
	Cylinder	Cylinder dirty	Change the cylinder
	No production of steam	No water in the cylinder	• Check the water supply • Check that the valve is operating correctly • Check the power supply to the electrodes • Add a handful of salt to the cylinder • Refer to the indications on the humidifier control panel
	Drain	Pan overflowing	• Check that the drain valve is operating correctly • Check that the drain circuit is not blocked
Condensation unit		Refrigeration stopped	• Refer to the manual or to the unit's controller to troubleshoot the fault
Water leak	Water leak sensor	Pan overflowing	• Check that the siphon is of the correct design • Check the priming of the siphon • Check that the condensate is draining correctly • Check that the air flow is not too high
		Coil or humidifier leak	• Find the leak and stop it
Sensor	Temperature sensor		• Check the sensor • Check the connection and continuity of the cable
No more operation or display		Eprom memory	• Contact CIAT After-Sales
The time is wrong		Fault with the CPU board battery - the timer has stopped working	• Change the battery

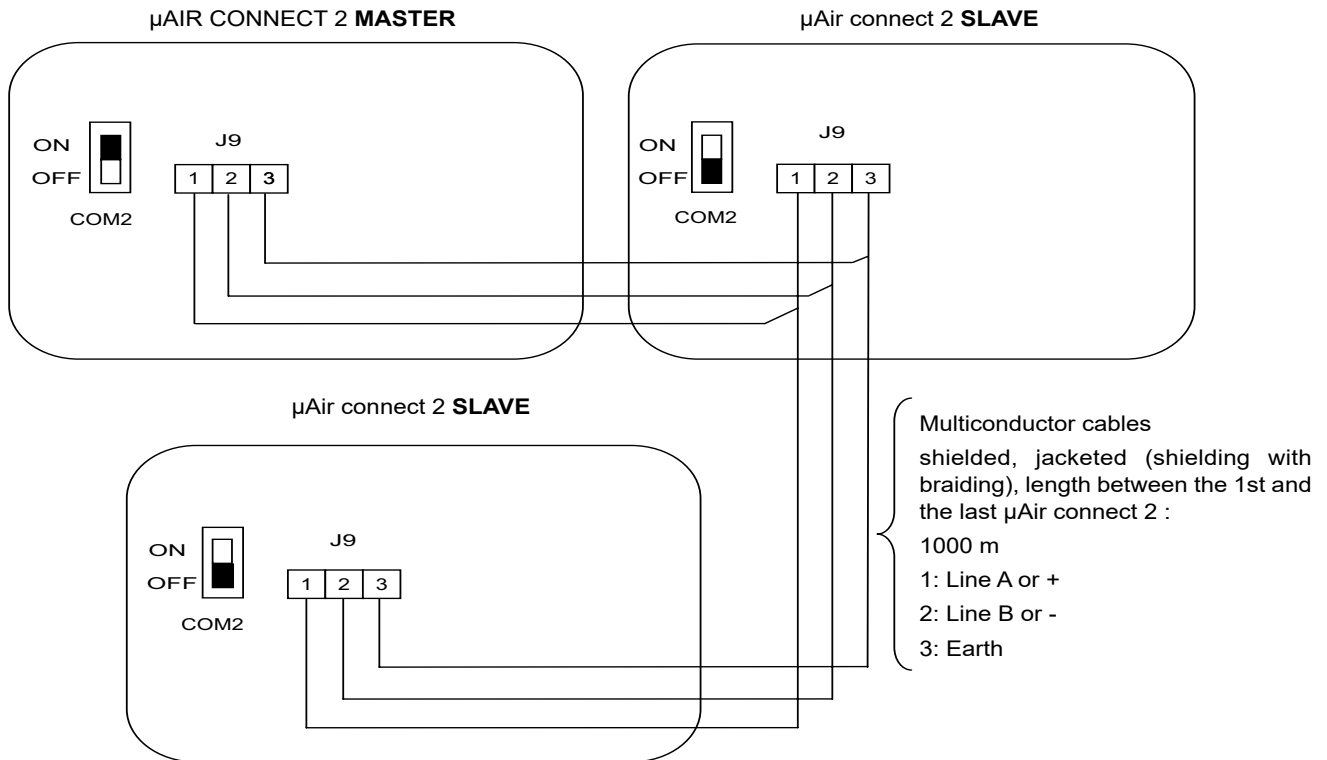
11 - COMMISSIONING

Faults	Sources	Causes	Solutions
Low temperature	Temperature sensor	Sensor	<ul style="list-style-type: none"> • Check the sensor • Replace the sensor
		Malfunction	<ul style="list-style-type: none"> • Check the stability of the control • Check the operation of the heating valve or the electric heater
		Drift in dehumidification mode	<ul style="list-style-type: none"> • Internal load insufficient
High temperature	Temperature sensor	Sensor	<ul style="list-style-type: none"> • Check the sensor • Replace the sensor
		Malfunction	<ul style="list-style-type: none"> • Check the stability of the control • Check the operation of the cooling valve, the compressors
		Room overheated	<ul style="list-style-type: none"> • Revise the room loads
Low humidity	Humidity sensor	Sensor	<ul style="list-style-type: none"> • Check the sensor • Replace the sensor
		Malfunction	<ul style="list-style-type: none"> • Check the stability of the control • Check the operation of the humidifier • Revise the room loads
High humidity	Humidity sensor	Sensor	<ul style="list-style-type: none"> • Check the sensor • Replace the sensor
		Malfunction	<ul style="list-style-type: none"> • Check the stability of the control • Check the operation of the cooling valve, the compressors
		Excessively high humidity	<ul style="list-style-type: none"> • Revise the room loads

12 - BUS FOR MASTER/SLAVE FUNCTION

12.1 - Bus connection

BETWEEN THE VARIOUS UNITS



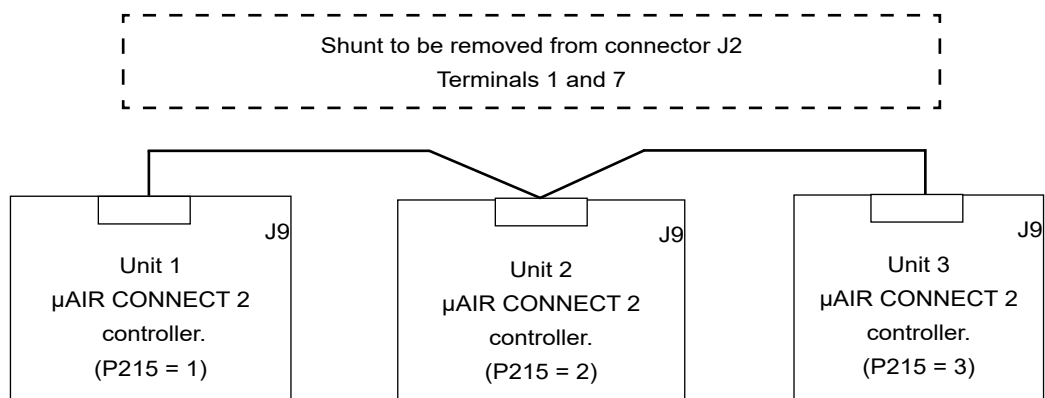
COM2: Bus polarisation switch
 Master unit = ON
 Slave unit = OFF

12.2 - Addressing procedure for the units

The first time the power is switched on, all the boards are initialised with the parameter **P215 "UNIT NUMBER ON CONSOLE"** having the value 1.



Connection diagram



On the controller for unit 1, in the "**CONFIGURATION OF NUMBER OF UNITS**" menu, "**OPERATING CONFIGURATION**", adjust the parameter "**C01 NUMBER OF UNITS**": (3 in the example).

Addressing units

The parameter P215 must be set on each unit.

Position the cursor opposite unit 1 and press the "**ENTER**" key'.

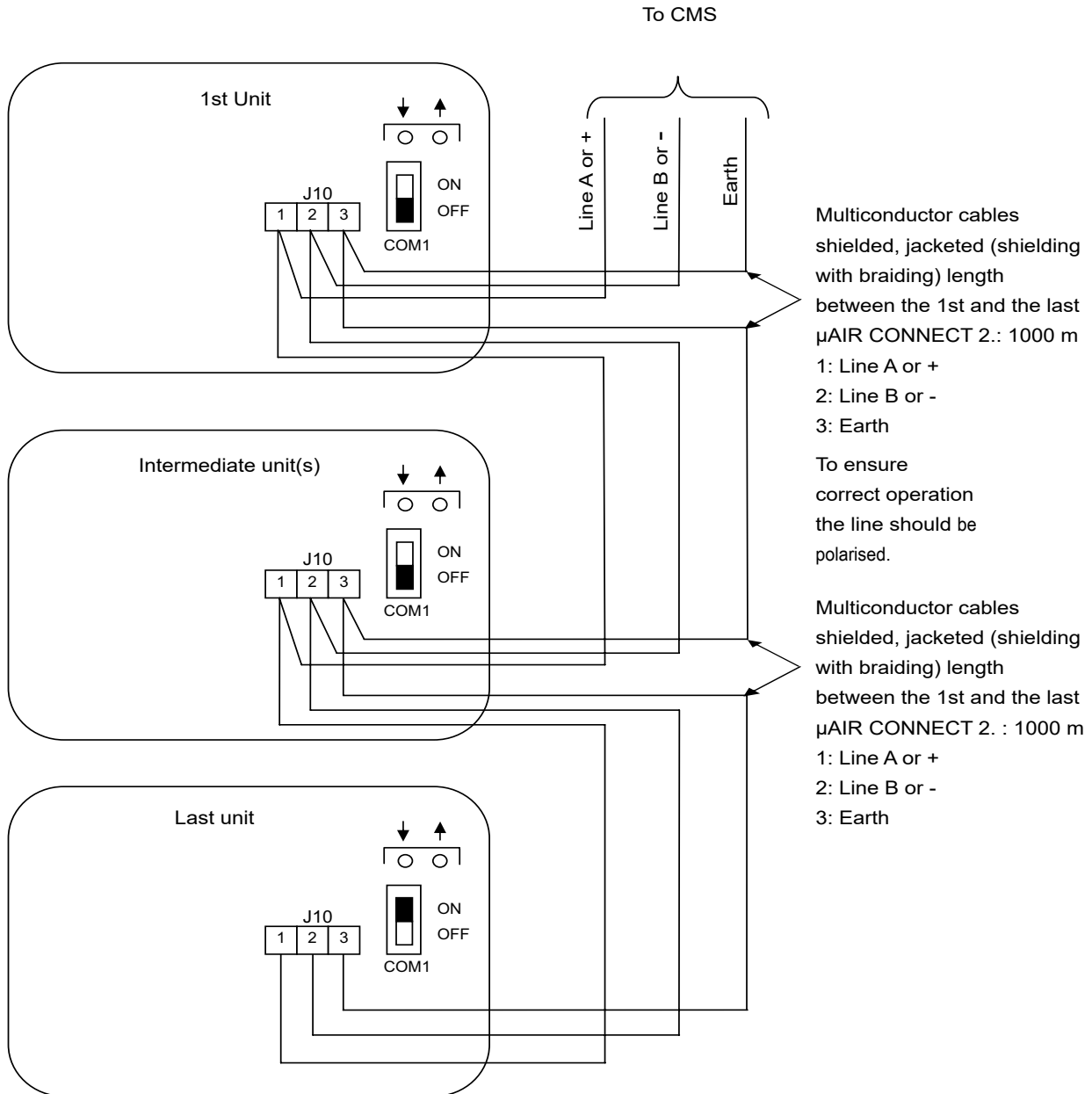
In the "**PARAMETERS**", "**SETTINGS PARAMETERS**" menu, set parameter **P215** to the value corresponding to the unit number.

13 - BUS FOR CONNECTION TO AN RS485 MODBUS CMS

13.1 - Bus connection between the units and the CMS

The communication bus between the units and the CMS is a 2-wire RS485 bus

The green light indicates that the data sent by the CMS to the μ Air Connect 2 has been received.
 The yellow light indicates that data has been sent by the μ Air Connect 2 to the CMS.



COM1: Line termination resistor switch
 First unit = OFF
 Intermediate unit = OFF
 Last unit = ON

13 - BUS FOR CONNECTION TO AN RS485 MODBUS CMS

13.2 - Configuring the communication bus parameters (menu 7)

This menu gives access to all parameters used to define the communication protocol and the 2-wire RS485 serial link parameters.

Access level	No.	Description	Setting	By default	Display condition
2	700	Communication mode	1: MODBUS/JBUS	1	
2	701	Communication speed	0: 4800 bauds 1: 9600 bauds 2: 19200 bauds	1	
2	702	Parity	0: None 1: Even 2: Odd	0	
2	703	Number of stop bits	1: stop bit 2: stop bits	1	
2	704	Actual number format reversed	0: No 1: Yes	0	
2	705	Slave number	1 to 255	1	
2	706	Control type*	1: Local 2: Remote	1	

* If the selected control type is local, the controller data can be accessed in read only mode by the PLC; with remote selection, the controller data can be accessed in read and write mode by the PLC.

13.3 - ModBus protocol

■ RS485 2-wire communication support

- 3-pin connector (J10)
- Terminal 1: A or +
- Terminal 2: B or –
- Terminal 3: 0 V
- Line termination resistor: Connected if COM1 is ON
- Not connected if COM1 is OFF
- External BUS polarisation.

■ Transmission mode

- Series, asynchronous, half duplex, one start bit, eight data bits,
- Parity configured by P702 (none, odd or even)
- Number of stop bits configured by P703 (1 stop bit or 2 stop bits)
- Communication speed configured by P701 (4800, 9600 or 19200)
- Slave no. on the bus configured by P705

■ Protocol

- ModBus (Gould Modicon)
- Compatible: JBUS (Merlin Gerin)
- RTU (GENERAL ELECTRIC protocol)

■ Codes of functions used

- 1 or 2: read n bits
- 3 or 4: Read multiple registers (16 bits) Maximum of 126 registers read
- 5: Write one bit
- 6: Write one register
- 8: Read diagnostic counter
- 11: Read event counter
- 15: Write n bits
- 16: Write multiple registers (16 bits)

■ Analogue value encoding

- Standard 32-bit IEEE format (2 registers).
- The byte order can be reversed with P704 (0:not reversed or 1:reversed)

NOTE: the register numbers correspond to the addresses coded on 16 bits.

■ Register definitions

- Function 3 or 4 is used for reading,
- Function 6 or 16 is used for writing.

13 - BUS FOR CONNECTION TO AN RS485 MODBUS CMS

Register No.	Description	Format	Type	Unit	Min	Max	No adjustment	Scale
1	Controller type	Decimal	R	43 = μ AirConnect 2,2				
3 and 4	P258 Controlled temperature	Float	R					
5 and 6	P255 Controlled temperature	Float	R	°C	-40,0	99,9		1
7 and 8	P256 Controlled humidity	Float	R	% RH	0	100		1
9 and 10	P250 Temperature setpoint in cooling mode	Float	R	°C	8,0	35,0		
11 and 12	P251 Temperature setpoint in heating mode	Float	R	°C	10,0	35,0		
13 and 14	P265 Outdoor humidity	Float	R	% RH	0	100		1
15 and 16	P269 Air flow rate	Float	R	m ³ /h	0	99999		
17 and 18	P370 Measured temperature (J1,1-2)	Float	R	°C	-40,0	99,9		1
19 and 20	P371 Temperature received for control by ModBus	Float	R/W	°C	-40,0	99,99	0,1	1
21 and 22	P372 Measured temperature (J15, 5-1)	Float	R	°C	-40,0	99,9		1
23 and 24	P373 percentage of external signal	Float	R	%	0	100		1
32 and 33	P303 operating-hour meter for compressor 1	Float	R	h	0	999999		1
34 and 35	P307 operating-hour meter for compressor 2	Float	R	h	0	999999		1
36 and 37	P321 stage 1 electric heater operating-hour meter	Float	R	h	0	999999		1
38 and 39	P323 stage 2 electric heater operating-hour meter	Float	R	h	0	999999		1
40 and 41	P331 supply air fan operating-hour meter	Float	R	h	0	999999		1
48	P290 heating coil percentage	Decimal	R	%	0	100		1
49	P291 cooling coil percentage	Decimal	R	%	0	100		1
50	P294 humidifier percentage	Decimal	R	%	0	100		1
51	P295 air flow rate percentage	Decimal	R	%	0	100		1
52	P296 fresh air percentage	Decimal	R	%	0	100		1
53	P297 electric heater percentage	Decimal	R	%	0	100		1
257 and 258	P103 temperature setpoint in cooling mode	Float	R/W	°C	8,0	45,0	0,1	1
259 and 260	P106 temperature setpoint in heating mode	Float	R/W	°C	10,0	35,0	0,1	1
261	P109 humidity setpoint during dehumidification	Decimal	R/W	% RH	20	90	1	1
262	P115 humidity setpoint during humidification	Decimal	R/W	% RH	20	90	1	1
263 and 264	P144 fixed setpoint shift in cooling mode	Float	R/W	°C	0,0	30,0	0,1	1
265 and 266	P145 fixed setpoint shift heating	Float	R/W	°C	0,0	30,0	0,1	1
300 and 301	P146 Air flow rate setpoint	Float	R/W	m ³ /h	4000	40000	1	1
512	P101 year	Decimal	R/W		0	99	1	1
513	P101 month	Decimal	R/W		1	12	1	1
514	P101 day of the month	Decimal	R/W		1	31	1	
515	P101 day of the week	Decimal	R/W	1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday				
516	P102 time	Decimal	R/W	h	0	23	1	1
517	P102 minute	Decimal	R/W	min	0	59	1	1

13 - BUS FOR CONNECTION TO AN RS485 MODBUS CMS

- Bit composition
 - Function 1 or 2 is used for reading
 - Function 5 or 15 is used for writing

Register No.	Description	Format	Type	Unit
1	P706 control type	Binary	R	0 = Local 1 = Remote
16	P330 supply air fan operation	Binary	R	0 = Off 1 = On
17	P300 compressor 1 operation	Binary	R	0 = Off 1 = On
18	P304 compressor 2 operation	Binary	R	0 = Off 1 = On
19	P320 stage 1 electric heater operation	Binary	R	0 = Off 1 = On
20	P322 stage 2 electric heater operation	Binary	R	0 = Off 1 = On
32	P279 start-up request	Binary	R	0 = Open 1 = Closed
33	P287 Hot water coil or electric heater contact	Binary	R	0 = Open 1 = Closed
34	P288 Summer or winter mode contact	Binary	R	0 = Open 1 = Closed
48	P350 critical fault summary	Binary	R	0 = Inactive 1 = Active
49	P352 non-critical fault summary	Binary	R	0 = Inactive 1 = Active
50	Supply air fan fault	Binary	R	1 = Fault
51	Air flow fault	Binary	R	1 = Fault
52	Filter fouled fault	Binary	R	1 = Fault
53	Clogged filter fault	Binary	R	1 = Fault
55	Electric heater fault	Binary	R	1 = Fault
56	Humidifier fault	Binary	R	1 = Fault
57	Water leak fault	Binary	R	1 = Fault
58	Condensation unit 1 fault	Binary	R	1 = Fault
59	Condensation unit 2 fault	Binary	R	1 = Fault
60	High temperature fault	Binary	R	1 = Fault
61	Low temperature fault	Binary	R	1 = Fault
62	High humidity fault	Binary	R	1 = Fault
63	Low humidity fault	Binary	R	1 = Fault
64	Controlled temperature sensor fault	Binary	R	1 = Fault
65	Outlet temperature sensor fault	Binary	R	1 = Fault
66	Outdoor temperature sensor fault	Binary	R	1 = Fault
67	Brine temperature sensor fault	Binary	R	1 = Fault
68	EEPROM fault	Binary	R	1 = Fault
70	Humidifier connection fault	Binary	R	1 = Fault
71	FMA1 connection fault	Binary	R	1 = Fault
72	FMA2 connection fault	Binary	R	1 = Fault
73	FMA3 connection fault	Binary	R	1 = Fault
74	Update fault with the temperature value controlled by Modbus	Binary	R	1 = Fault
75	Controlled temperature sensor fault (2-10 V)	Binary	R	1 = Fault
76	2-10 V control signal fault	Binary	R	1 = Fault
80	Low pressure fault circuit 1	Binary	R	1 = Fault
81	High pressure or circuit 1 break fault	Binary	R	1 = Fault
96	Low pressure fault circuit 2	Binary	R	1 = Fault
97	High pressure or circuit 2 break fault	Binary	R	1 = Fault
112	FMA1 fault summary	Binary	R	1 = Fault
128	FMA2 fault summary	Binary	R	1 = Fault
144	FMA3 fault summary	Binary	R	1 = Fault
512	On/Off	Binary	R/W	0 = Off 1 = On

14 - BUS FOR CONNECTION TO A CMS (BACNET IP OR MSTP)

As an option integrated into the cabinet, CIAT provides a MODBUS RTU --> BACNET IP or MODBUS RTU --> BACNET MSTP gateway.

The gateway is used to translate the main information available in MODBUS into BACNET.

It is possible to connect 1 to 2 units to the BACNET gateway.

This option can also be added to a cabinet which is already operating.

	RESPONSIBILITY		
	CIAT	Installer	Integrator
If option "sold separately" /		X	
Checking connection of the gateway RS 485 MODBUS side/		X	
Checking connection of the gateway kit RS 485 - BACNET side/		X	
CIAT unit system start-up	(1)	(2)	
			X

(1) CIAT service if a CIAT warranty extension (including system start-up) was sold

(2) Installer service if no CIAT system start-up sold



NOTE: The MODBUS RS485/BACNET gateway can only operate correctly if it is connected to a Centralised Management System (not supplied by CIAT).

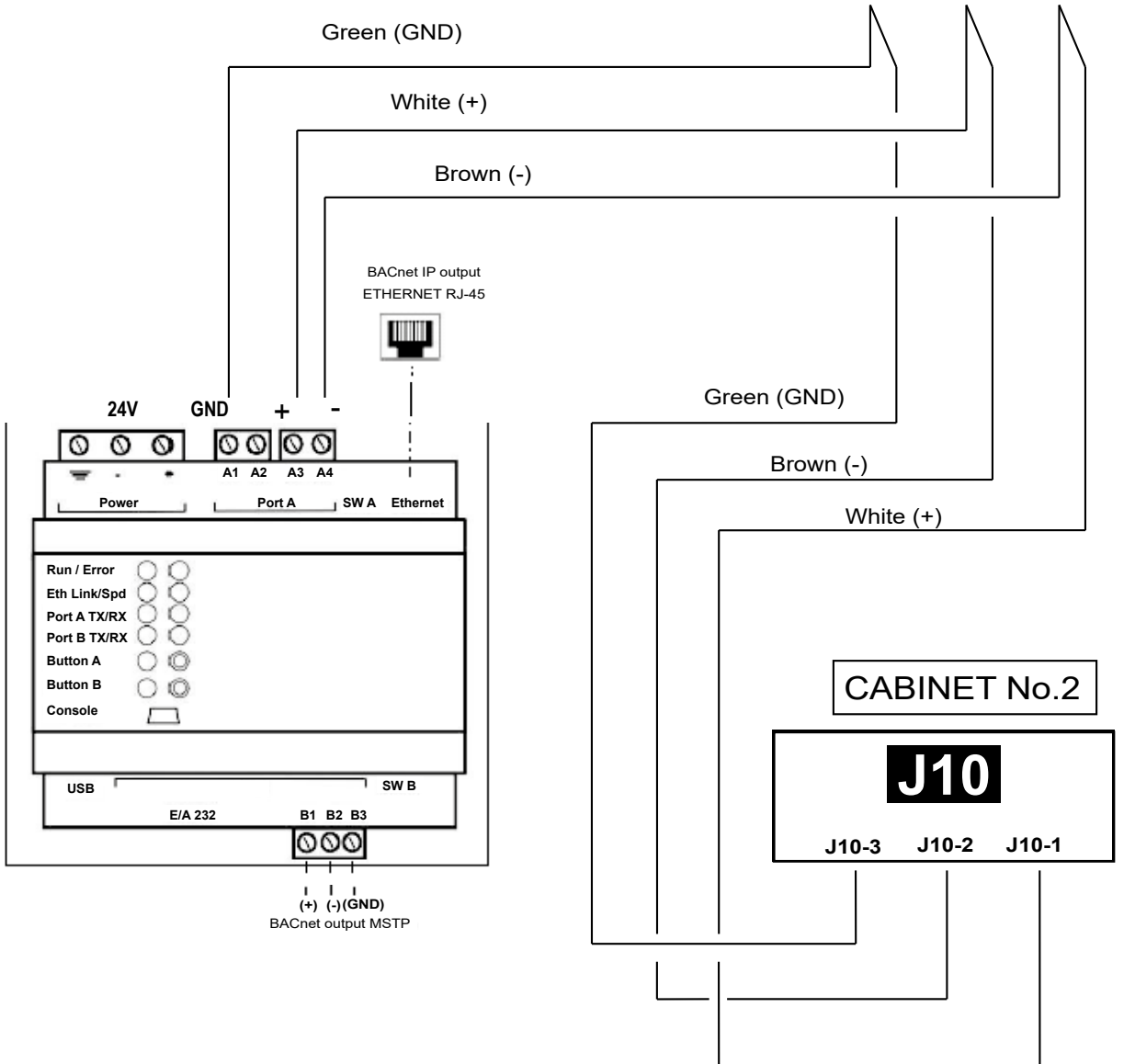
14 - BUS FOR CONNECTION TO A CMS (BACNET IP OR MSTP)

14.1 - Bus connection between the controllers, the gateway and the CMS

Modbus:

The distance between the gateway and the last controller must be less than 1000 metres.

- A maximum of 1 cabinet can communicate with the BacNet gateway
- The communication cable to be used must be:
 - AWG24 - 22 type (1 shielded twisted pair)
- Please note that, beyond a certain distance and depending on the cabling carried out, it may be necessary to use additional equipment (not provided - e.g. polarisation device, etc.) It is strongly recommended that the distance between the gateway and controller is limited.



BACnet MSTP:

- The communication cable to be used must be: AWG22 type (3 twisted shielded wires). A cable with 2 pairs must also be used (1 pair for communication and 1 of the 2 wires from the other pair for shared use)
- The maximum length of a section is 1500 metres (at 38400 bauds and with a AWG22 cable)
- The connections on the BACnet MSTP side must observe the restrictions imposed by the BACnet association (continuity of shielding, end of line terminating resistors, etc.).

BACnet IP:

- The distances must observe the specifications recommended in the Ethernet IP networks
- The communication cable to be used must be a minimum of CAT 6. We recommend using a paired shielded cable (type S/FTP)
- The network cable must be a "straight through" type cable

15 - INFORMATION FOR THE INTEGRATOR

15.1 - ModBus

Modbus RTU communication is preconfigured on the gateway kit. To guarantee communication with the controller, it is necessary to configure the following parameters on the machine:

- Precision air conditioning controllers:
 - P700 = Modbus
 - P701 = 9600 bauds (speed)
 - P702 = Without (parity)
 - P703 = 1 (stop bit)
 - P704 = no (not swapped)
 - P705 = 1 (Bus no.)
 - P706 = Remote
- Note:
 - Versions compatible with the gateway:
 - Precision air conditioning: from version V21

For earlier versions, the service must update the machine controller, otherwise communication errors may occur.

15.2 - BACnet IP

BACnet communication must be implemented using a BACnet integrator.

- The BACnet IP gateway kit is configured to the following specifications:
 - Protocol: BACnet IP UDP/IP slave. The CMS must be a "client" (or "master") type system.
 - DeviceID: the default device ID is 1003 for the precision air conditioning controller. If there is a duplication on the network (another item of equipment with this ID or several gateway kits in use on the same installation), it will be necessary to ask the service technician to modify this parameter
 - Name of the equipment: the name published on the BACnet network is AHU, depending on the gateway reference.
 - Communication port: standard port 47808
 - Publication of objects: the names of the objects published use mnemonics. It is necessary to use the table at the end of the document to find the meaning
 - Segmentation: segmentation is not supported by the BACnet kit. It is recommended to explore the equipment object by object (deactivation of read all).

15.3 - BACnet MSTP

BACnet communication must be implemented using a BACnet integrator.

- The BACnet MSTP gateway kit is configured to the following specifications:
 - Protocol: BACnet MSTP Slave. The CMS must be a "client" (or "master") type system.
 - Support: RS485 2-wire (+ shared)
 - DeviceID: the default device ID is 1003 for the precision air conditioning controller. If there is a duplication on the network (another item of equipment with this ID or several gateway kits in use on the same installation), it will be necessary to ask the service technician to modify this parameter
 - Name of the equipment: the name published on the BACnet network is AHU, depending on the gateway reference.
 - Highest master: the maximum number of "masters" on the bus is 1 (can be modified by the service technician if necessary)
 - Publication of objects: the names of the objects published use mnemonics. It is necessary to use the table at the end of the document to find the meaning
 - Communication:
 - Speed: 38400 bauds
 - Data bits: 8 bits
 - Stop bits: 1 bit
 - Parity: without
 - Segmentation: segmentation is not supported by the BACnet kit. It is recommended to explore the equipment object by object (deactivation of read all).

15 - INFORMATION FOR THE INTEGRATOR

15.4 - Precision air conditioning controller

Registers accessible to customer

Register No.	Description	Mnemonic	BACnet object	Read/Write	Format	Unit/ Enumeration
AHU no.1 – AHU_1.mnemonic						
3 and 4	Outdoor temperature (P258)	OutdoorTemp	AV0002	R	Float	°C
5 and 6	Controlled temperature (P255)	TempRegulee	AV0001	R	Float	°C
7 and 8	Controlled humidity (P256)	HygroRegulee	AV0015	R	Float	% RH
13 and 14	Outdoor humidity (P265)	OutdoorHygro	AV0003	R	Float	% RH
257 and 258	Cooling temperature setpoint (P103)	CoolSetpt	AV0007	R/W	Float	°C
259 and 260	Heating temperature setpoint (P106)	HeatSetpt	AV0004	R/W	Float	°C
5382 and 5383	Filter differential pressure (P257)	PresDiffiltre	AV0010	R	Float	Pa
5384 and 5385	Supply air temperature (P259)	TempSouff	AV0011	R	Float	°C
5428 and 5427	Raised floor differential pressure (P266)	PresPlancher	AV0009	R	Float	Pa
48	Heating coil percentage (P291)	PourBatChaud	AV0022	R	Word	%
49	Cooling coil percentage (P292)	PourBatFroid	AV0021	R	Word	%
50	Humidifier percentage (P294)	PourHumidif	AV0024	R	Word	%
51	Air flow rate percentage (P295)	PourDebitAir	AV0020	R	Word	%
52	Fresh air percentage (P296)	PourAirNeuf	AV0025	R	Word	%
53	Electric heater percentage (P297)	PourBatElec	AV0023	R	Word	%
261	Humidity setpoint during dehumidification (P109)	DeshuSetpt	AV0005	R/W	Word	% RH
262	Humidity setpoint during humidification (P115)	HumidSetpt	AV0006	R/W	Word	% RH
4638	Rotation speed percentage (P155)	FanSpeedCmd	AV0008	R/W	Word	%
AHU no.2 – AHU_2.mnemonic						
3 and 4	Outdoor temperature (P258)	OutdoorTemp	AV0052	R	Float	°C
5 and 6	Controlled temperature (P255)	TempRegulee	AV0050	R	Float	°C
7 and 8	Controlled humidity (P256)	HygroRegulee	AV0051	R	Float	% RH
13 and 14	Outdoor humidity (P265)	OutdoorHygro	AV0053	R	Float	% RH
257 and 258	Cooling temperature setpoint (P103)	CoolSetpt	AV0057	R/W	Float	°C
259 and 260	Heating temperature setpoint (P106)	HeatSetpt	AV0054	R/W	Float	°C
5382 and 5383	Filter differential pressure (P257)	PresDiffiltre	AV0060	R	Float	Pa
5384 and 5385	Supply air temperature (P259)	TempSouff	AV0061	R	Float	°C
5428 and 5427	Raised floor differential pressure (P266)	PresPlancher	AV0059	R	Float	Pa
48	Heating coil percentage (P291)	PourBatChaud	AV0071	R	Word	%
49	Cooling coil percentage (P292)	PourBatFroid	AV0070	R	Word	%
50	Humidifier percentage (P294)	PourHumidif	AV0073	R	Word	%
51	Air flow rate percentage (P295)	PourDebitAir	AV0069	R	Word	%
52	Fresh air percentage (P296)	PourAirNeuf	AV0074	R	Word	%
53	Electric heater percentage (P297)	PourBatElec	AV0072	R	Word	%
261	Humidity setpoint during dehumidification (P109)	DeshuSetpt	AV0055	R/W	Word	% RH
262	Humidity setpoint during humidification (P115)	HumidSetpt	AV0056	R/W	Word	% RH
4638	Rotation speed percentage (P155)	FanSpeedCmd	AV0058	R/W	Word	%

15 - INFORMATION FOR THE INTEGRATOR

Register No.	Description	Mnemonic	BACnet object	Read/Write	Format	Unit/ Enumeration
AHU no.1 – AHU_1.mnemonic						
16	Supply air fan operation (P330)	VentilSouf	BV0014	R	Bit	1=On/0=Off
58	Compressor 1 - Condensation unit 1 operation (P300)	GroupCond1	BV0016	R	Bit	1=On/0=Off
59	Compressor 2 - Condensation unit 2 operation (P304)	GroupCond2	BV0017	R	Bit	1=On/0=Off
19	Stage 1 electric heater operation (P320)	Eta1BatElec	BV0018	R	Bit	1=On/0=Off
20	Stage 2 electric heater operation (P322)	Eta2BatElec	BV0019	R	Bit	1=On/0=Off
32	Start-up request (P279)	DemMarche	BV0012	R	Bit	1=On / 0=Off
48	Critical fault summary (P350)	DefImportant	BV0028	R	Bit	1=Fault
49	Non-critical fault summary (P352)	DefSimple	BV0027	R	Bit	1=Fault
50	Supply air fan fault	DefVentilSouf	BV0029	R	Bit	1=Fault
51	Air flow fault	DefDebitAir	BV0030	R	Bit	1=Fault
52	Filter fouled fault	DefFiltreEnc	BV0031	R	Bit	1=Fault
53	Clogged filter fault	DefFiltreBou	BV0032	R	Bit	1=Fault
55	Electric heater fault	DefBatElec	BV0033	R	Bit	1=Fault
56	Humidifier fault	DefHumidif	BV0036	R	Bit	1=Fault
57	Water leak fault	DefFuiteEau	BV0041	R	Bit	1=Fault
58	Condensation unit 1 fault	DefGroupCon1	BV0034	R	Bit	1=Fault
59	Condensation unit 2 fault	DefGroupCon2	BV0035	R	Bit	1=Fault
60	High temperature fault	DefTempHaut	BV0037	R	Bit	1=Fault
61	Low temperature fault	DefTempBas	BV0038	R	Bit	1=Fault
62	High humidity fault	DefHygroHaut	BV0039	R	Bit	1=Fault
63	Low humidity fault	DefHygroBas	BV0040	R	Bit	1=Fault
512	On/Off	OnOff	BV0013	R/W	Bit	1=On/0=Off
4104	External safety (P278)	SecuExt	BV0026	R	Bit	0=Open
AHU no.2 – AHU_2.mnemonic						
16	Supply air fan operation (P330)	VentilSouf	BV0064	R	Bit	1=On/0=Off
58	Compressor 1 - Condensation unit 1 operation (P300)	GroupCond1	BV0065	R	Bit	1=On/0=Off
59	Compressor 2 - Condensation unit 2 operation (P304)	GroupCond2	BV0066	R	Bit	1=On/0=Off
19	Stage 1 electric heater operation (P320)	Eta1BatElec	BV0067	R	Bit	1=On/0=Off
20	Stage 2 electric heater operation (P322)	Eta2BatElec	BV0068	R	Bit	1=On/0=Off
32	Start-up request (P279)	DemMarche	BV0062	R	Bit	1=On / 0=Off
48	Critical fault summary (P350)	DefImportant	BV0077	R	Bit	1=Fault
49	Non-critical fault summary (P352)	DefSimple	BV0076	R	Bit	1=Fault
50	Supply air fan fault	DefVentilSouf	BV0078	R	Bit	1=Fault
51	Air flow fault	DefDebitAir	BV0079	R	Bit	1=Fault
52	Filter fouled fault	DefFiltreEnc	BV0080	R	Bit	1=Fault
53	Clogged filter fault	DefFiltreBou	BV0081	R	Bit	1=Fault
55	Electric heater fault	DefBatElec	BV0082	R	Bit	1=Fault
56	Humidifier fault	DefHumidif	BV0085	R	Bit	1=Fault
57	Water leak fault	DefFuiteEau	BV0090	R	Bit	1=Fault
58	Condensation unit 1 fault	DefGroupCon1	BV0083	R	Bit	1=Fault
59	Condensation unit 2 fault	DefGroupCon2	BV0084	R	Bit	1=Fault
60	High temperature fault	DefTempHaut	BV0086	R	Bit	1=Fault
61	Low temperature fault	DefTempBas	BV0087	R	Bit	1=Fault
62	High humidity fault	DefHygroHaut	BV0088	R	Bit	1=Fault
63	Low humidity fault	DefHygroBas	BV0089	R	Bit	1=Fault
512	On/Off	OnOff	BV0063	R/W	Bit	1=On/0=Off
4104	External safety (P278)	SecuExt	BV0075	R	Bit	0=Open

