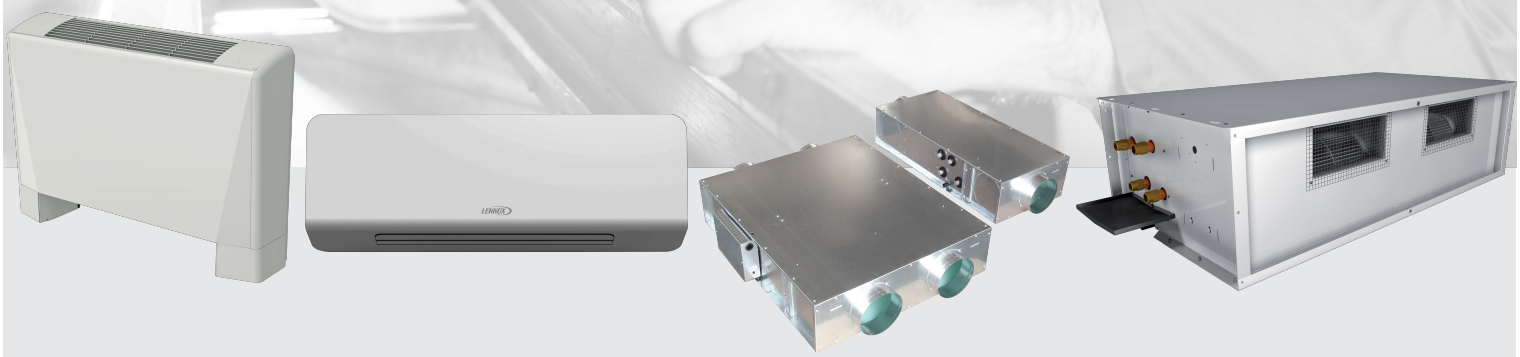
INSTALLATION, USE AND MAINTENANCE MANUAL



MODBUS

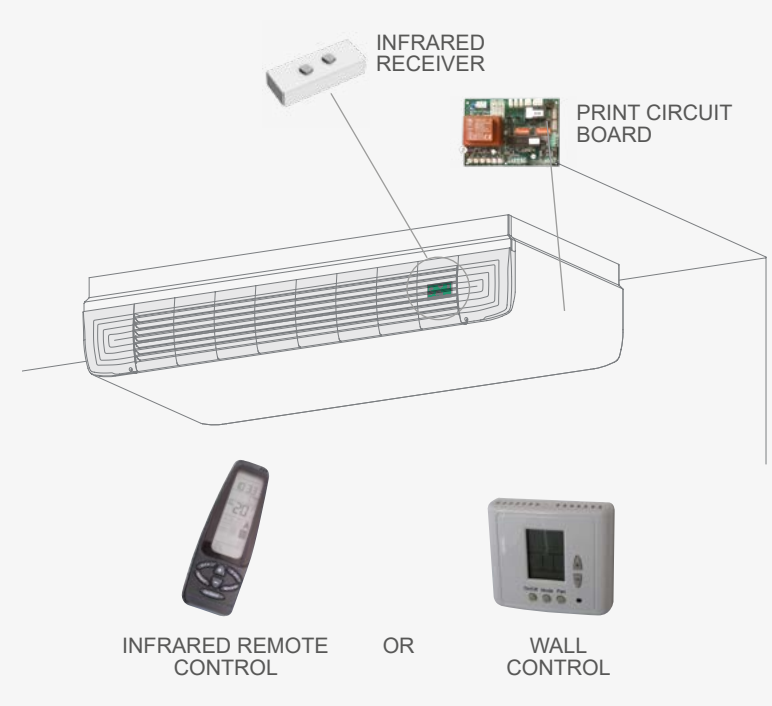
MODBUS-IOM-0822-EN

www.lennoxemea.com

Product type

Infrared remote or wall interface control for 2 or 4 pipe systems
and additional electric heater.

MAIN FUNCTION:
- On-off valves control, modulating (0-10Vdc) or 3 speed fan motor control, on/off electric heater control.
- Water temperature sensors for soft start function in heating and cooling mode; heating and cooling automatic change over; alarm.
- Intake air sensor.
- System programming with dip-switch.
- MODbus communication protocol.
- Master-slave function (only system without MODbus supervision).
- Installation on the unit for print circuit board and receiver.
- Display LCD function control with infrared remote or wall interface.



Technical data

Power supply:	230Vca ±10% 50Hz
Contact capacity - 3 speed motor out:	3 (1,5) A @ 230Vca
Contact capacity - valves and electric heater on/off out:	0,5 A @ 230Vca
Sensor type:	NTC 50 K @ 25°C
Differential:	1°C
Resolution:	1°C
Room temperature regulation range:	10°C .. 30°C

Product and function description

INFRARED REMOTE CONTROL REGULATION
On and off unit;
room temperature setting;
fan speed min-med-max and auto (fan speed automatic control as the desired room temperature approaches).
Send button: send to other units all the settings on the infrared remote control. With this function is possible use a single infrared remote control for all unit regulation.
Function mode: automatic heating/cooling, heating, cooling and fan only.
Clock and daily timer for timed unit operation.

WALL INTERFACE RWI-ECM 1-2 REGULATION
See the specific manual for this product

PRINT CIRCUIT BOARD CONTROL
Water temperature sensor and limit function
Every print circuit board is supplyed with 2 or 3 temperature sensor: depend to the system.

T1
Air temperature sensor: is install on the intake air unit.

T2
Water temperature sensor for mode function: is install in the pipe before the valve to the water inlet:
Heating: water temperature > 32°C
Cooling: water temperature < 15°C

T3
Water temperature sensor for fan activation: is install in the water coil:
Heating and cooling fan start automatic control (2 pipe system)
Heating fan start automatic control (4 pipe system)
Heating: water temperature > 32°C fan on
Cooling: water temperature < 15°C fan on
Antifreeze coil (4°C) and heating maximum (72°C) temperature control

Other input/output
Alarm input
Window or remote on-off or occupied room sensor input

Regulation
2 or 3 way on/off valves control
On/off electric heater control as water integration or substitution
Valves control (fan continuously running) or valves and fan control (thermostatic control on valves and fan).
Automatic change over heating-cooling.
4 pipe system or 2 pipe system with electric heater neutral zone control
Stratification cycle: air mixing in heating mode.
Modulating fan motor control (0-10VDC).

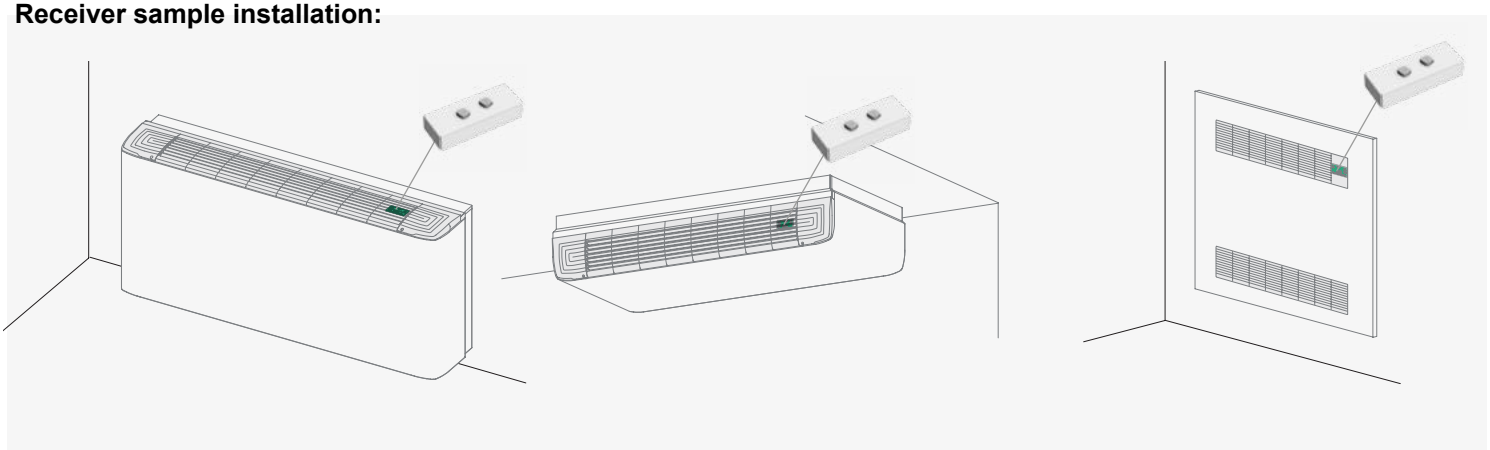
INFRARED RECEIVER
Receiver with led function: operation and alarm; button with manual function and heating/cooling selection in case of the infrared remote control broken.

Applications
Air temperature control where an infrared remote control is required for easy installation and for easy setting for all function.
As an alternative to the infrared remote control, can be use the wall interface.

Suitable for:

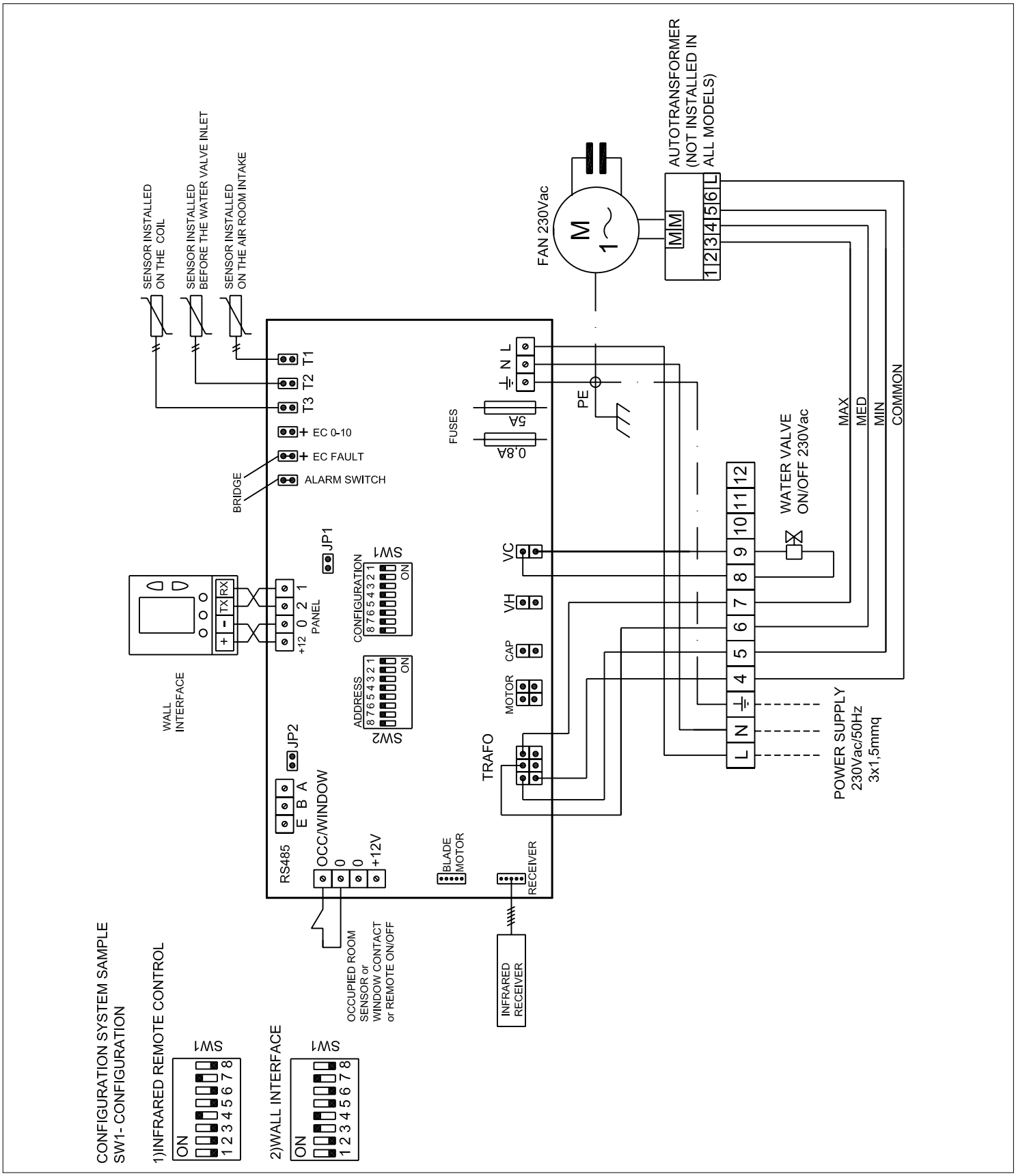
- 2 pipe system + 1 valve
- 4 pipe system + 2 valves
- 2 pipe system + 1 valve + electric heater integration: heating with water coil and electric heater; cooling with water coil
- 2 pipe system + 1 valve + electric heater substitution: heating with electric heater and cooling with water coil

Receiver sample installation:

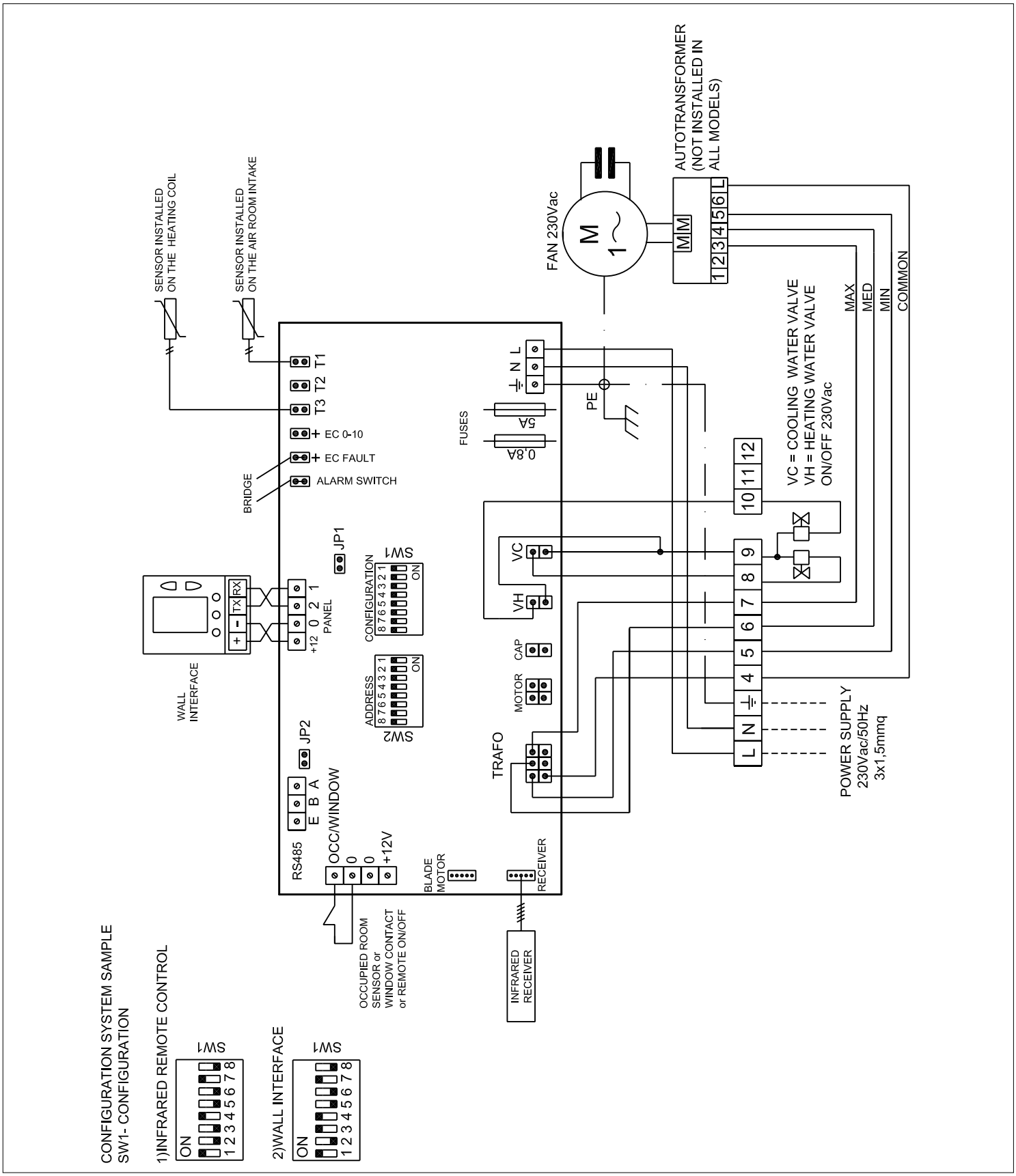


General wiring diagrams

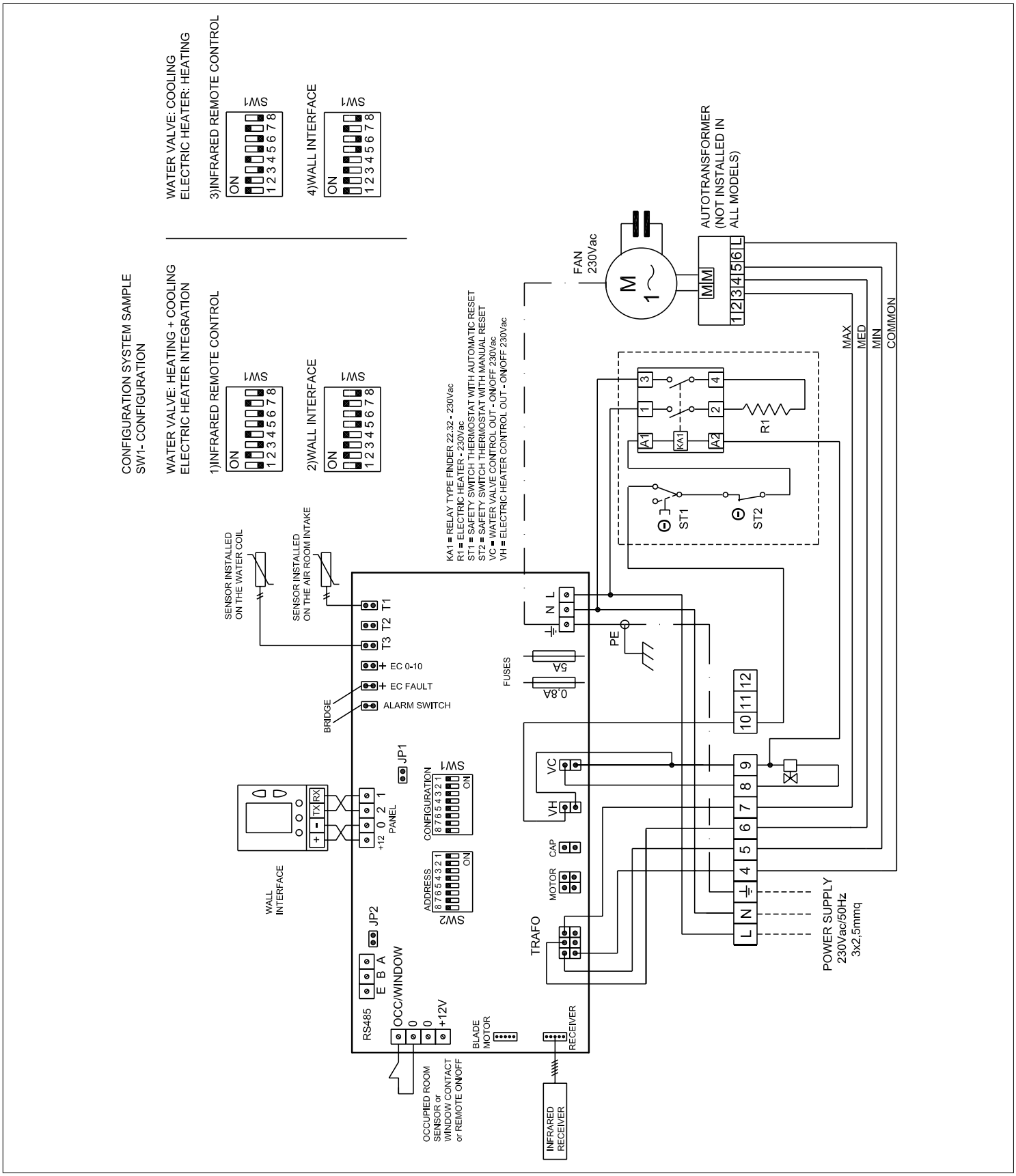
2 PIPE SYSTEM WITH 3 SPEED FAN



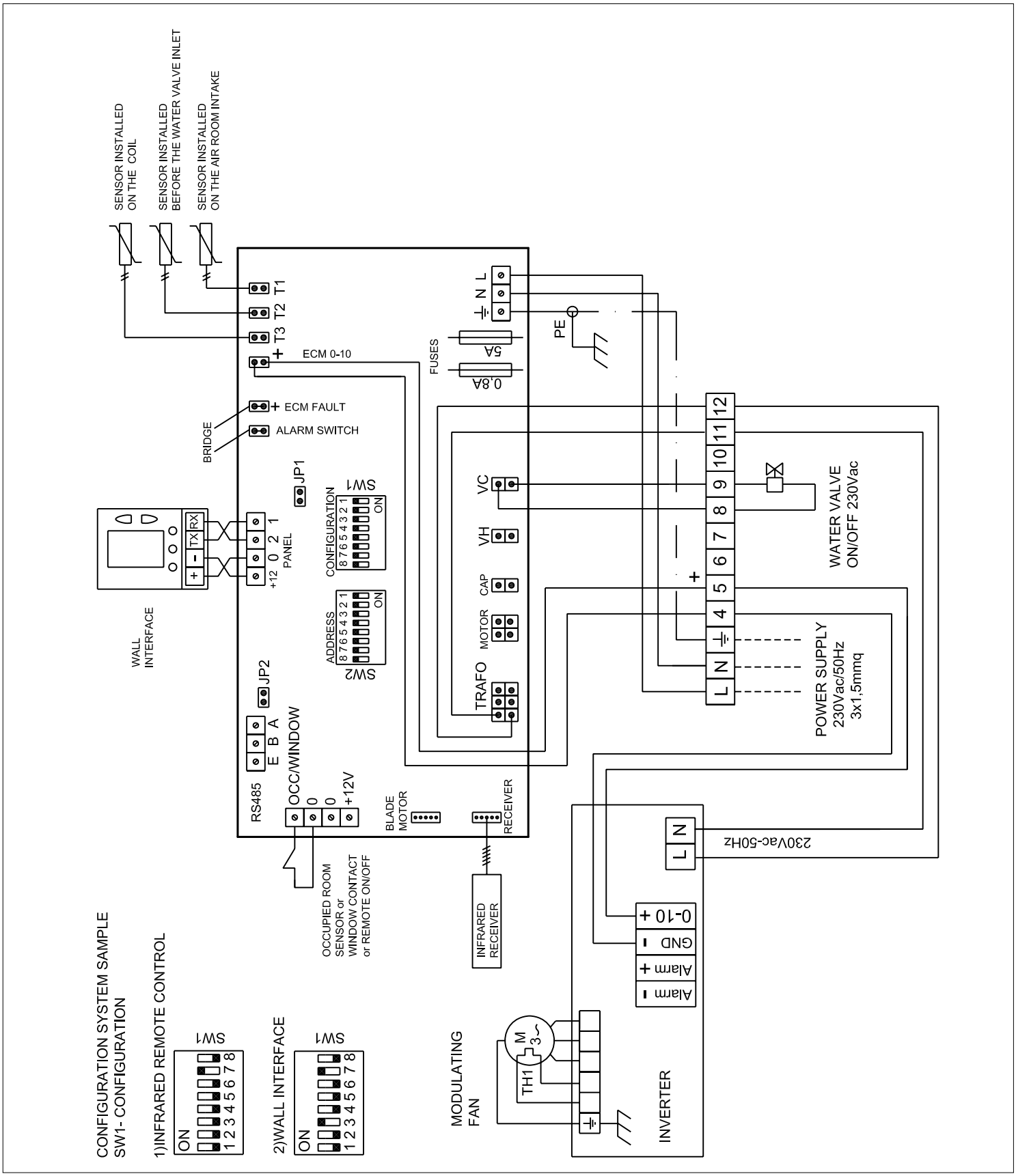
4 PIPE SYSTEM WITH 3 SPEED FAN



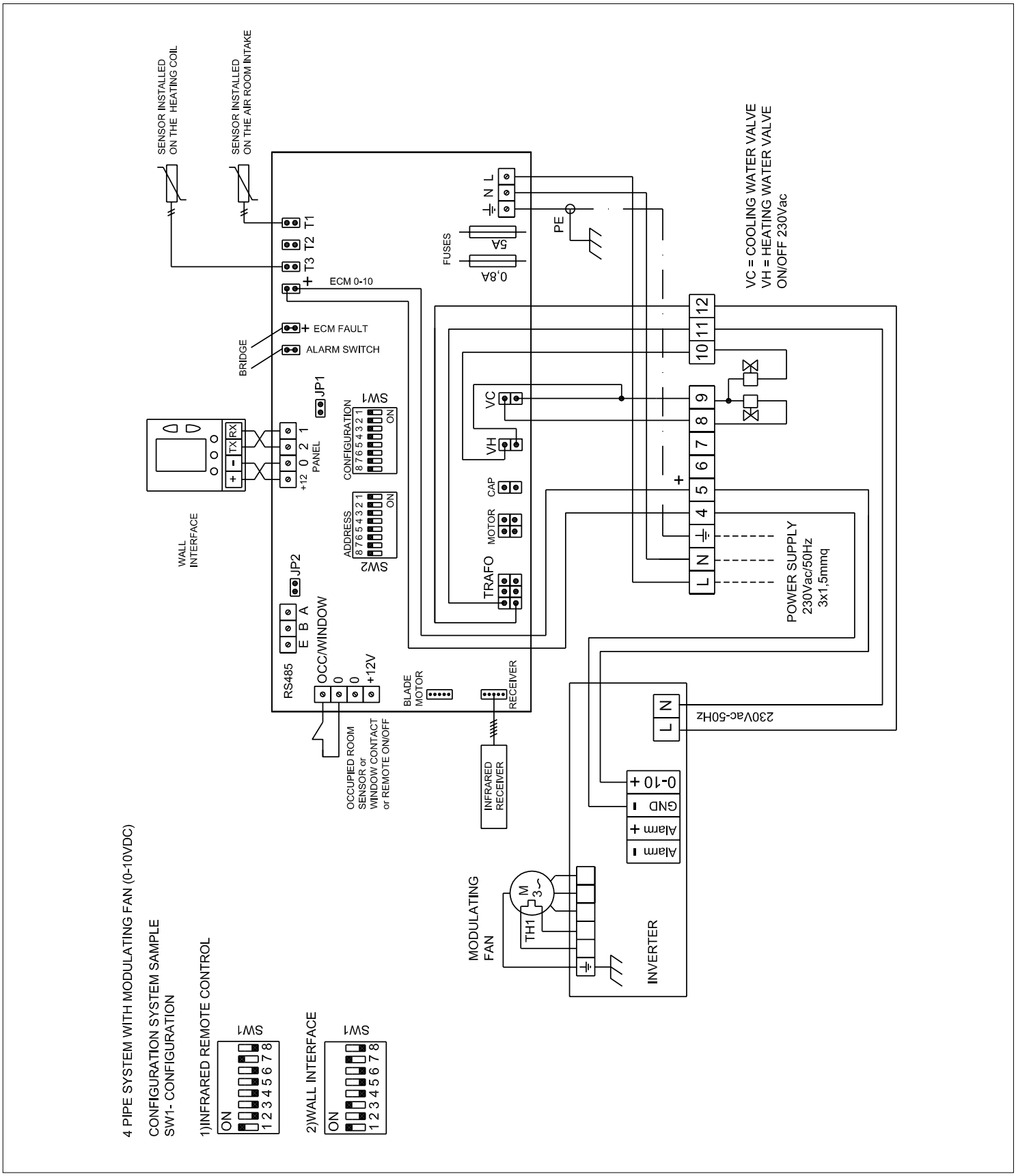
2 PIPE SYSTEM + ELECTRIC HEATER WITH 3 SPEED FAN



2 PIPE SYSTEM WITH MODULATING FAN (0-10)



4 PIPE SYSTEM WITH MODULATING FAN (0-10)

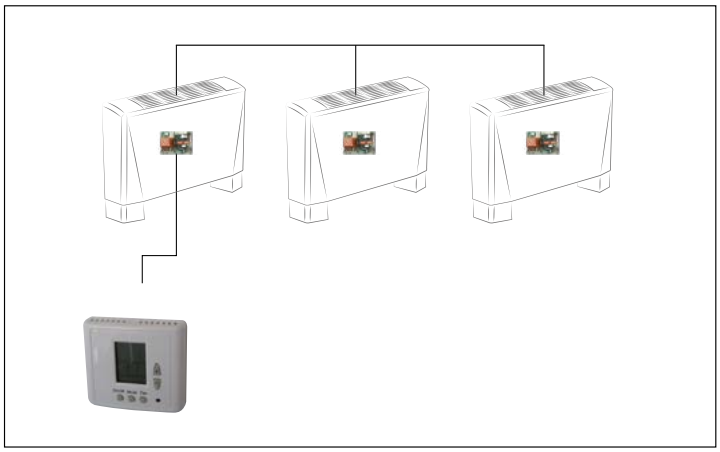


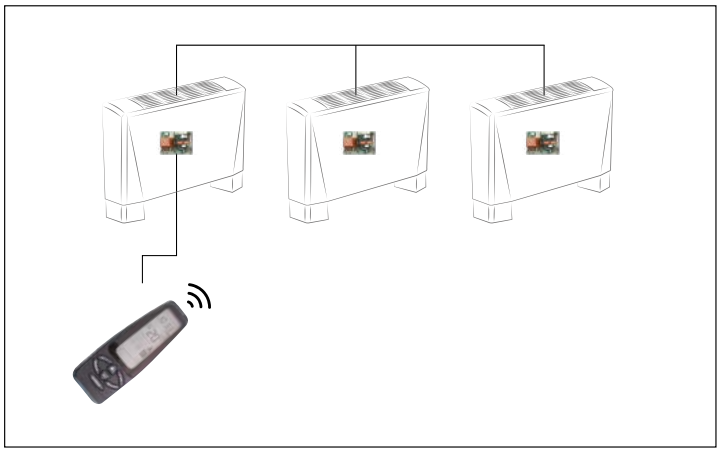
Master-Slave function

The master-slave function is only possible if MODbus supervision is not provided on the system because the connection used on the print circuit board is the same as for the MODbus communication.

The master-slave function is done with connections and settings of the dip switches on the print circuit board
One master and up to 59 slaves.

Master/Slave samples:

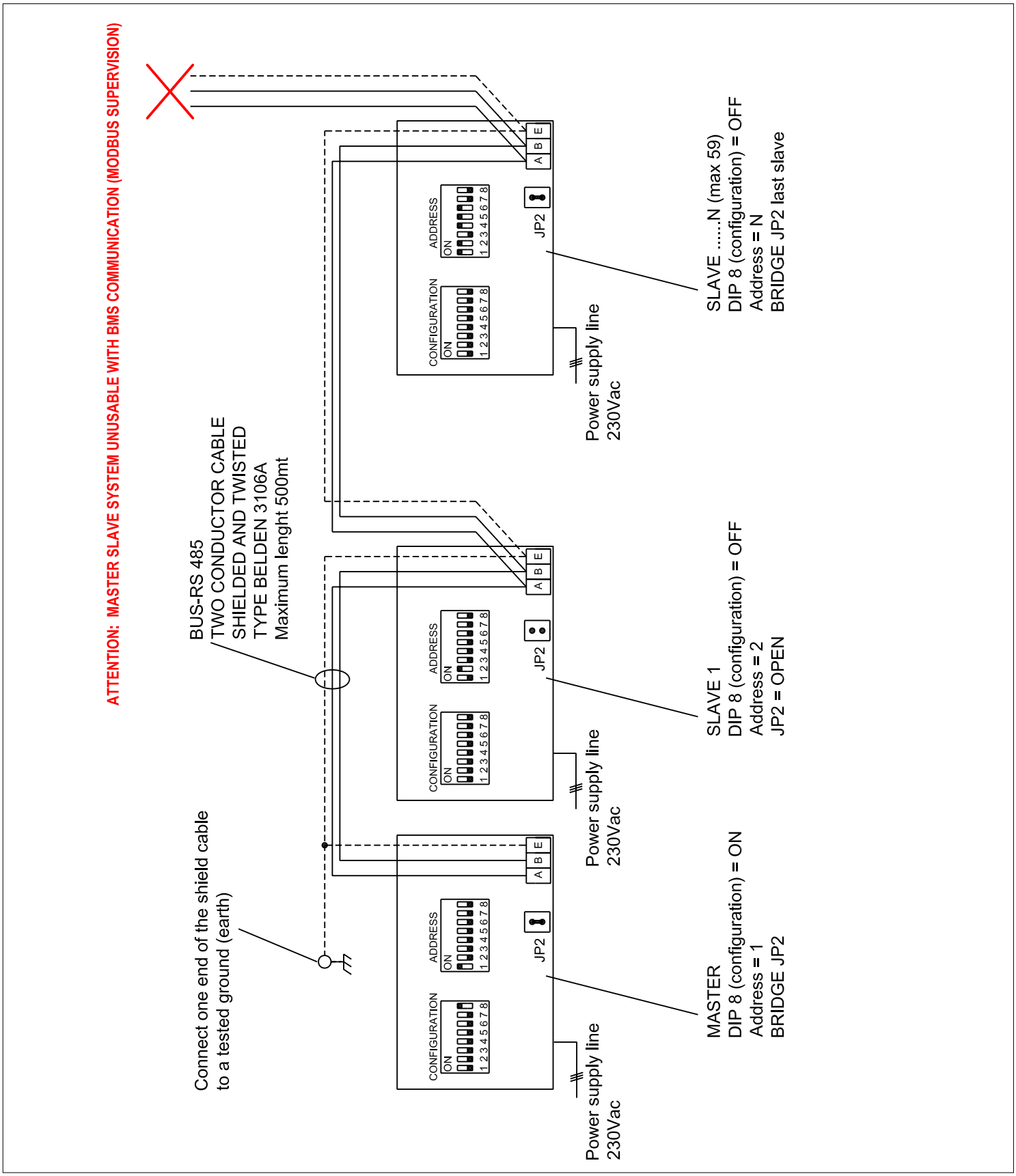




The information that is transferred from the master board to the slave boards are:
- ON / OFF
- Operating mode (heating-cooling-fan only)
- Fan speed (max-med-min-auto)
- Room temperature setting (set-point)

NOTE
1) The window contact function is not transferred from the master board to the slave boards
2) The information is transferred from the master board to the slave boards at each:
    - Remote control or wall interface command.
    - Cut off the power supply.
3) The slave boards can be managed locally with the infrared remote control, but in any case resume the commands from the master board at each:
    - Command given to the master board by remote control or wall interface
    - Cut off the power supply.
4) The commands given to each individual slave board do not pass to the master board and neither to the other slave boards.

Master/slave system: wiring diagram and settings



MODbus supervision general indication
RS485 network installation

1. Cable definition
Use shielded twisted cables for RS485 network consists of one twisted pairs and screens with the following characteristics:
- Impedance 120 Ohm at 1 MHZ
- Max capacity 50pF/m

Example:
- Belden 3106A
- Belden 9841

2. Wiring scheme
Connect all print circuit board by “daisy chain” topology.

3. Network limitations
The network should not be longer than 500 meters (longer distances to be covered by means of repeaters).
The maximum amount of print circuit board network should be not more than 60 units.

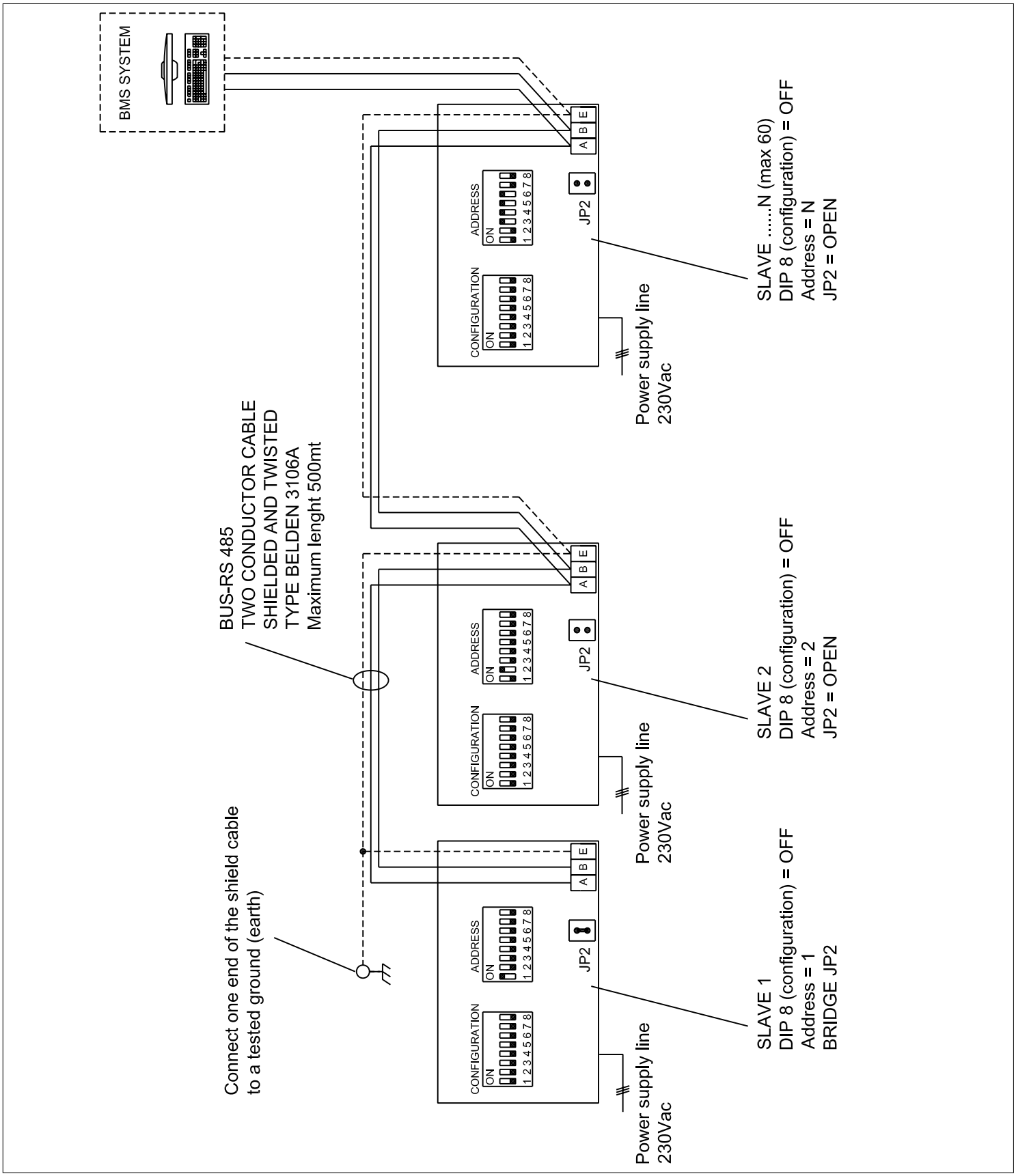
4. Installation remarks
• When pulling the cable, do not use force that may stretch the cable and distort its insulation and transmission properties.
• Do not allow the cable to kink, knot, snag, or fray when rolling it out or securing it.
• Do not splice cable segments. Use continuous runs of cable from one print circuit board to another.
• Do not cinch cables ties too tightly. Do not crushcables when securing them with staples or supports.
• Maintain the color-coding of all cabling throughout your system.
• Maintain wire twisting and run the cable jacket as close as possible to the termination point.
• Install cables and controllers to minimize the possibility of accidental contact with other, potentially hazardous and disruptive power and lighting cables.
Do not run communication cables in the same conduit of electrical cables and if you cross an electrical cable, cross at a 90° angle.
• Do not place communication cables near other bare power cables, lightning rods, antennas, transformers, steam or hot water pipes, in any conduit, box, channel, duct or other enclosure containing power or lighting circuits of any type. Keep communication cables and controllers at least 2 meters from large inductive loads (power distribution panels, lighting ballasts, motors, etc.).

5. Addressing
Use the address table on the next page to correctly define the addressing of the print circuit board

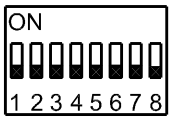
6. Termination
First and last devices in the communication line should be terminated with a 120 Ohm resistor to prevent signal reflection.
Use the jumper JP2 in the prin circuit board.

7. Grounding
Connect one end of the shield (at the end of the communication line) to a tested ground (earth).
Leave the other end of the shield not connected (floating).

Communication system: wiring diagram and settings



Address table (dip switch SW2 address in the print circuit board)
ADDRESS - SW2



ADDRESS	DIP SWITCHES TO PUT ON
0	NOT USED
1	1
2	2
3	1,2
4	3
5	1,3
6	2,3
7	1,2,3
8	4
9	1,4
10	2,4
11	1,2,4
12	3,4
13	1,3,4
14	2,3,4
15	1,2,3,4
16	5
17	1,5
18	2,5
19	1,2,5
20	3,5
21	1,3,5
22	2,3,5
23	1,2,3,5
24	4,5
25	1,4,5
26	2,4,5
27	1,2,4,5
28	3,4,5
29	1,3,4,5
30	2,3,4,5

ADDRESS	DIP SWITCHES TO PUT ON
31	1,2,3,4,5
32	6
33	1,6
34	2,6
35	1,2,6
36	3,6
37	1,3,6
38	2,3,6
39	1,2,3,6
40	4,6
41	1,4,6
42	2,4,6
43	1,2,4,6
44	3,4,6
45	1,3,4,6
46	2,3,4,6
47	1,2,3,4,6
48	5,6
49	1,5,6
50	2,5,6
51	1,2,5,6
52	3,5,6
53	1,3,5,6
54	2,3,5,6
55	1,2,3,5,6
56	4,5,6
57	1,4,5,6
58	2,4,5,6
59	1,2,4,5,6
60	3,4,5,6

Print Circuit Board

DIP SWITCH CONFIGURATION AND OPERATION LOGIC (Dip switch SW1 CONFIGURATION in the board)

N° DIP	FUNCTION	ON	OFF	Default
1	System type	4 pipe	2 pipe	see wiring diagram
2	VH out	Electric heater	Heat valve	
3	Interface type	Wall interface	Infrared control	
4	Motor type	3 speed	0-10Vdc (EC)	
5	Fan in cool mode	Thermostatic control	Continuously running	
6	Fan in heat mode	Thermostatic control	Continuously running	
7	Fan delay time at set point reached	No delay	3 min. delay	
8	Master/Slave*	Master	Slave	

* If not connected in a master-slave system, all boards must be configured as slave.

JUMPER OPERATION LOGIC

N° DIP	FUNCTION	OPEN	CLOSED	Default
JP1	Destratification in heating mode Fan activated at minimum speed once set-point reached. Ton = 1 minute Toff = 5 minutes	Active	Not active	Open
JP2	End resistor in a system with communication bus	Resistor 120 Ohm not inserted	Resistor 120 Ohm inserted	Open

LED INDICATION (NORMAL OPERATION)

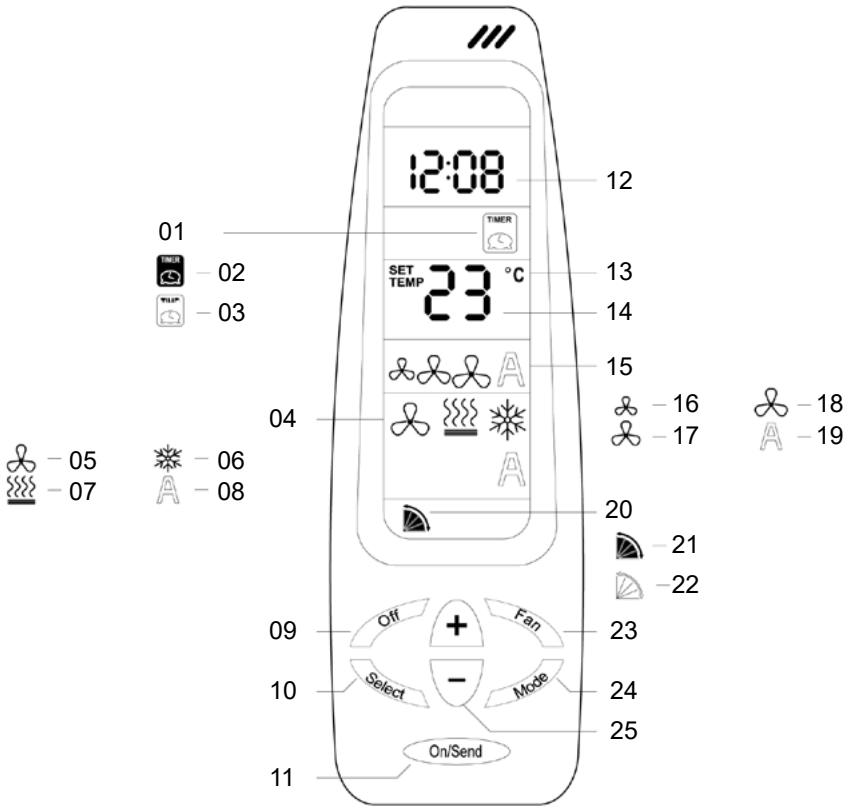
LED INDICATION	MEANING	UNIT STATUS
LED off	Unit OFF or in FAN mode	Unit OFF or in FAN mode
Solid blue LED	Cooling mode	Operating mode
Solid red LED	Heating mode	Operating mode
Blue flashing LED - 1 sec. ON - 1 sec. OFF	Window contact open	Unit OFF
Red/blue flashing LED	Water temperature read in progress	Standby mode

LED INDICATION (ALARM)

LED INDICATION	MEANING	UNIT STATUS
Flashing red led 2 flashes and one pause	ALARM SWITCH input open	Water level alarm in condensation (Stop in alarm)
Flashing red led 3 flashes and one pause	EC FAULT input open	ECM motor alarm (not used)
Flashing red led 4 flashes and one pause	T3=75°C T3=4°C	High water temperature alarm or low water temperature alarm (Stop in alarm)
Flashing red led 5 flashes and one pause	T1 probe disconnected or short-circuited	(Stop in alarm)
Flashing red led 6 flashes and one pause	T2 probe disconnected or short-circuited	(Stop in alarm)
Flashing red led 7 flashes and one pause	T3 probe disconnected or short-circuited	(Stop in alarm)

Infrared remote control

01. Timer
02. Active
03. Not active
04. Modes display
05. Fan only
06. Cool
07. Heat
08. Auto
09. Turn system OFF
10. Clock, timer and blades adjustment
11. Turn system ON / send changes
12. Real time clock
13. Temperature unit
14. Set-point display
15. Fan speeds display
16. Low
17. Medium
18. High
19. Auto
20. (Function not available)
21. (Function not available)
22. (Function not available)
23. Fan speed selection
24. Mode selection
25. Set-point adjustment



CLOCK ADJUSTMENT

• Press the [Select] button – “CLOCK SET” will flash.
• Press the [+] or [-] buttons - the hours will flash.
• Adjust the hours using the [+] or [-] buttons.
• Press the [Select] again - minutes will flash.
• Adjust the minutes using the [+] or [-] buttons.
• Press the [Select] again to return to normal display.
• Press the [On/Send] button to send information to the unit.

ON/OFF DAILY TIMER

Start Time

• Press the [Select] button twice – “PROGRAM & START” will flash on display.
• Adjust the hours using the [+] or [-] buttons.
• Press the [Select] button - the minutes will flash.
• Adjust the minutes using the [+] or [-] buttons.
• Press the [Select] button to return at normal display.

Stop Time

• Press 3 times the [Select] button – “PROGRAM & STOP” will flash on display.
• Adjust the hours using the [+] or [-] buttons.
• Press the [Select] button - the minutes will flash.
• Adjust the minutes using the [+] or [-] buttons.
• Press the [Select] button to return at normal display.

Run the timer

• Press 4 times the [Select] button - TIMER will blink
• Select TIMER ON ( ) or OFF ( ) using the [+] or [-] buttons.
• Press the [On/Send] button to send the information to the unit.

EMERGENCY ON/OFF BUTTON

The IR receiver contains an [On/Off] emergency button which can be used for turning the system ON and OFF when the infrared remote control is broken. The [On/Off] button should be pressed for more than 3 seconds and until the unit beeps (but not more than 10 seconds). Once pressed, the unit will turn ON or OFF.

When turned ON using the emergency button, the unit will operate in Auto change over mode using preset set-point temperatures for heating (21°C) and cooling (24°C). The fan will run in medium speed.

INTAKE AIR SENSOR CALBRATION (T1) FROM INFRARED REMOTE CONTROL

After measuring the exact temperature in the room, please follow the indications below:

- With the unit ON press and hold the emergency button [located on the receiver] for more than 15 seconds. The system will enter to a “Calibration” mode. In this mode the beeper will beep each 5 seconds, and both blue and red LED’s will flash together and beep sound will continue until out of the calibration mode.
- Once the system is in “calibration mode” the technician will adjust the set point in the infrared remote control as the measured actual room temperature, and send to the IR receiver [SEND].
- The temperature will be acquired by the system as a new sensor temperature value.
- To save the temperature acquired by the system, the unit must be turned OFF and then ON by the infrared remote control.
- If no information will be sent from the infrared remote control, after 2 minutes from the opening of the calibration mode, the system will return to the normal operating mode.

AGENCES COMMERCIALES :

BELGIQUE ET LUXEMBOURG

+ 32 3 633 3045

FRANCE

+33 1 64 76 23 23

ALLEMAGNE

+49 (0) 211 950 79 60

ITALIE

+ 39 02 495 26 200

PAYS-BAS

+ 31 332 471 800

POLOGNE

+48 22 58 48 610

PORTUGAL

+351 229 066 050

ESPAGNE

+34 915 401 810

UKRAINE

+38 044 585 59 10

ROYAUME-UNI ET IRELANDE

+44 1604 669 100

AUTRES PAYS :

LENNOX DISTRIBUTION

+33 4 72 23 20 20

CE

MODBUS-IOM-0822-EN

www.lennoxemea.com