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ZONiNG

ZITY zoning system Technical and Installation Manual



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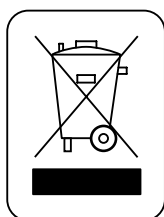


Quick installation guide

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Detailed installation manual

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WEE (WEEE)

Do not dispose of Electrical and Electronic Devices as household waste. These devices should be taken away for recycling. Act according to the legislation in force.

NOTES ON RADIO TRANSMISSION

The central control unit should preferably be located in a high place and away from metal masses and conductive elements. Otherwise, the range between the thermostats and the central control unit may be reduced.

Radio transmission does not take place on an exclusive frequency, so the possibility of interference cannot be excluded. Frequency inhibitors and radio equipment operating in a permanent transmission mode in the same frequency band (433 MHz) may impair the normal operation of the ZONING. The system is designed to work on two different frequencies (433.92 and 434.33 MHz) to minimise this type of problem.



The installation should be carried out by authorised personnel only. Perform the entire installation without supply voltage. Protect the equipment with the usual devices.

ZiTY, quick installation guide (for air zoning systems)*

(*) For other types of installation (boiler, hybrids, VRV, etc.), see the relevant section in the detailed manual.

A Connection of system components

First of all, install and connect all system components, taking the following diagrams into account:

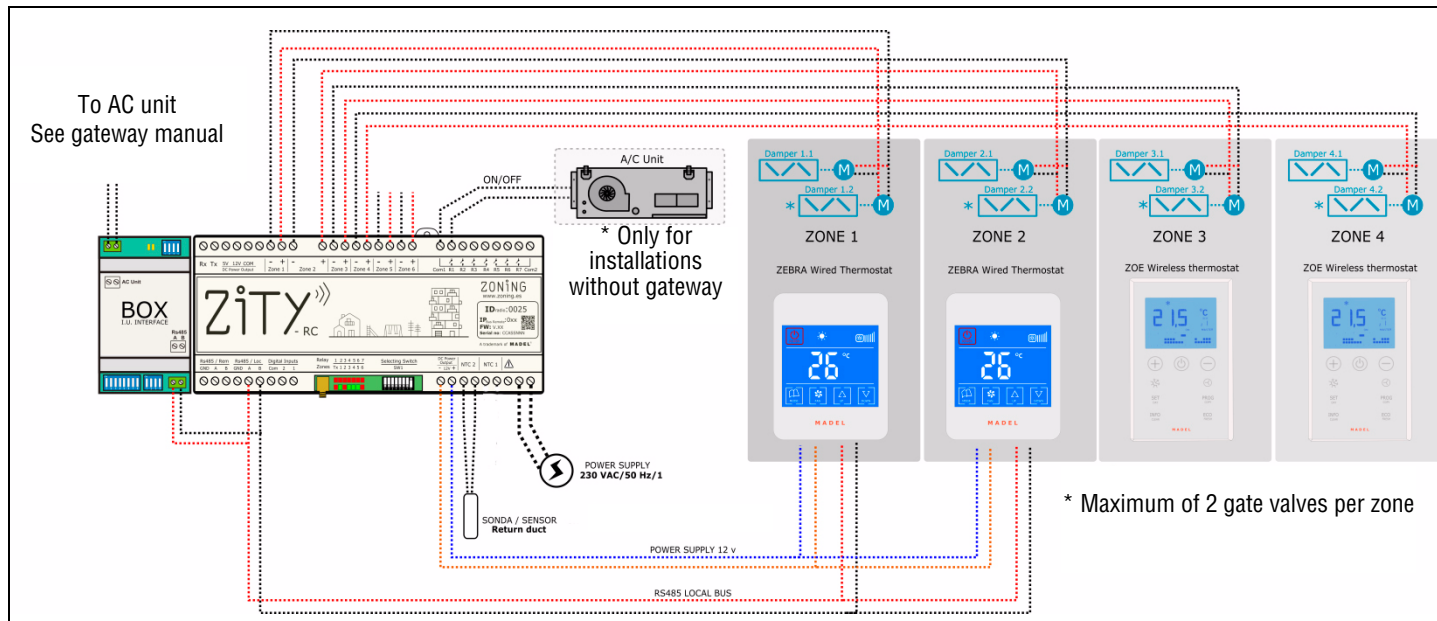


Fig. 1 Installation diagram for DIRECT EXPANSION, system with 4 zones (2 radio ZOE-RC + 2 wired ZEBRA) + communication interface

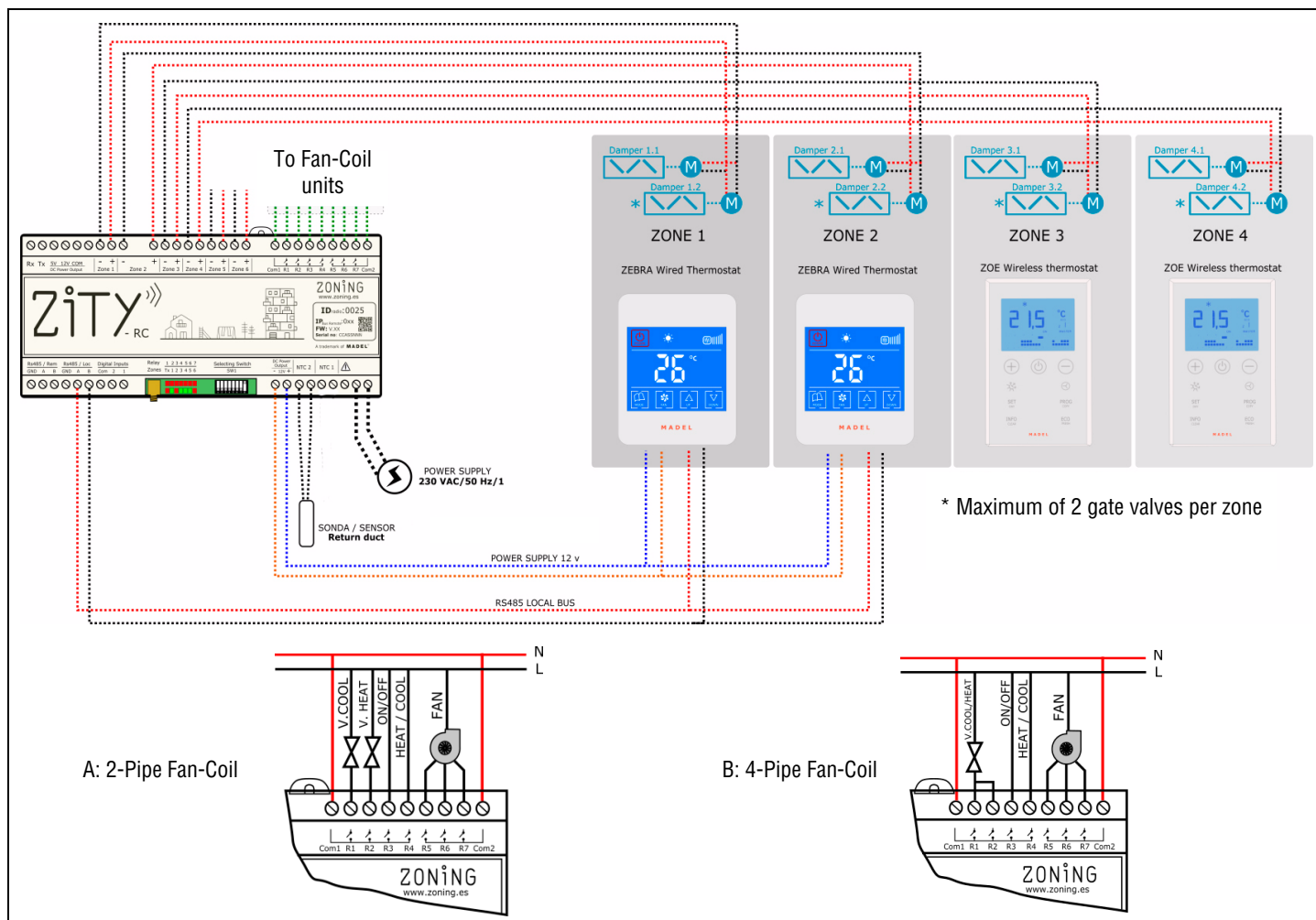


Fig. 2 Installation diagram for 2-PIPE FAN-COIL, system with 4 zones (2 radio ZOE-RC + 2 wired ZEBRA)

ZITY Central control unit

The components to be installed in the system are as follows:

- 1 Zone gate valves: connect the gate valves to the Zone Outputs 1 to 6, respecting the polarity (Red: +, Black: -).
- 2 Thermostats:
 - Via radio: they do not require any wiring, only requires the installation of batteries in the thermostats.
 - Via wires: they operate via Bus and are supplied directly from the central control unit:
 Connect the power supply wires to the "DC Power Output 12V" terminal, respecting the polarity (Orange: -, Blue: +)
 Connect the communication wires to the "Rs485/ Loc" terminal, respecting the polarity (Red: A, Black: B).



+12VDC: blue wire
 -12VDC: orange wire
 A: red wire
 B: black wire

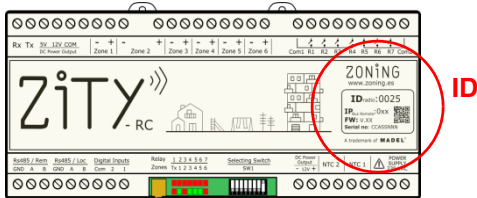
ZEBRA thermostat connection diagram

- 3 Air return sensor: connect it to output NTC2.
- 4 Air conditioning unit:
 - In "Direct Expansion" installations, follow the instructions in the "Interface Manual" for the relevant brand and model.
 - In "Water-operated Fancoil" installations, make the connections according to the type of installation (2T, 4T, conventional or inverter fan).
- 5 ZITY module power supply: connect the power supply to the corresponding 230VAC/50Hz/1 terminals.

B System configuration

After connecting the components, configure the system:

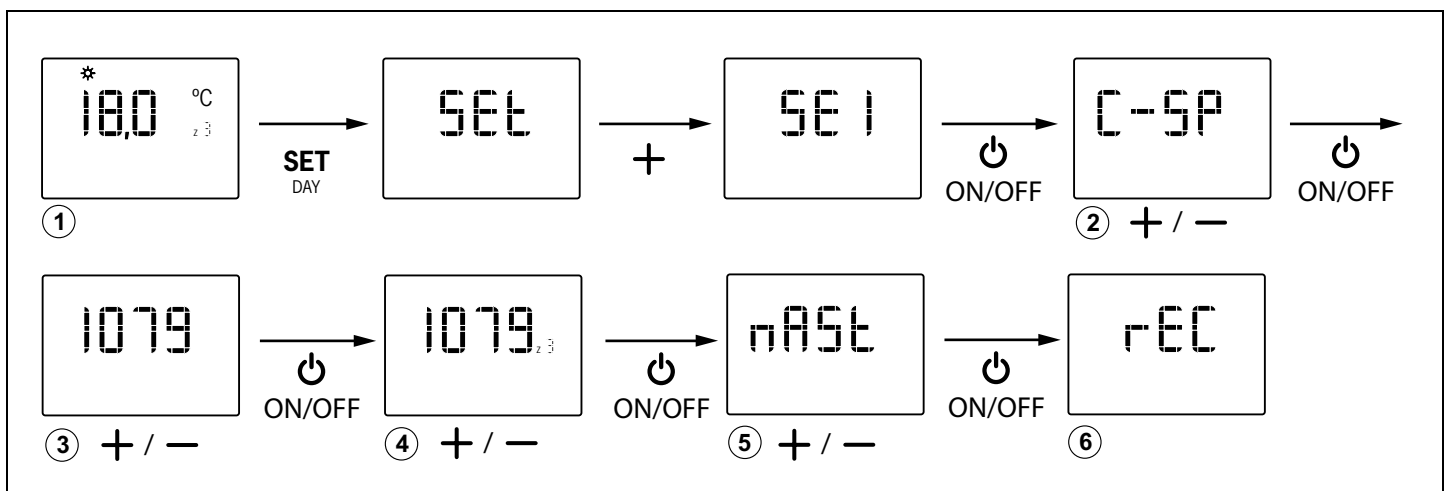
- 1 First of all, connect the thermostats to the central control unit and the corresponding zone:



- associate each thermostat with the central control unit (with the identification number ID)
- assign a zone number to each thermostat (corresponding to the motorised valves connected to outputs 1 to 6 of the central control unit)

The thermostats are connected by using the settings menus for each thermostat:

- ZOE-RC thermostat (communication by radio)



ZITY, quick installation guide (for air zoning systems)

- ZEBRA thermostat (communication by wires)

To enter the programming:

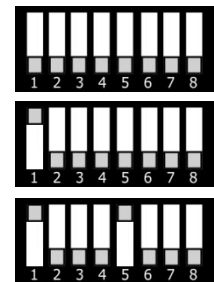
first of all switch off the thermostat (if it is a slave, by pressing "POWER"; if it is a master, by pressing "POWER" continuously for around 3 seconds)

once the thermostat has been switched off, press "MODE" continuously for around 5 seconds until "Pr" appears.

For more information about programming, see the ZEBRA thermostat manual

2 Then configure the switches (SW1) of the central control unit according to the type of installation and the production equipment, so that the equipment executes the relevant control protocol. The three most common cases are shown as examples (air-operated installations type *direct expansion / 2-pipe Fan-coil / 4-pipe Fan-coil*):

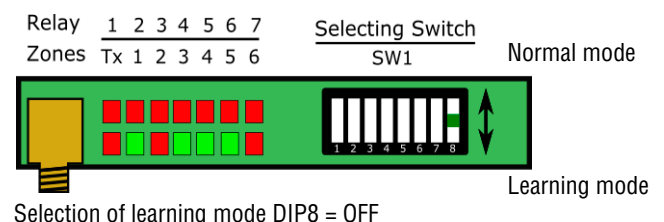
- Direct expansion:
- 2-Pipe Fan-Coil:
- 4-Pipe Fan-Coil:



C Start-up

1 Learning mode: switch DIP8 to OFF; the system starts up automatic recognition of all connected elements (thermostats, interfaces, etc.).

When the LEDs in all the required zones are lit up in green and the LED of relay R1 is not flashing, the system will have completed all recognition.



2 Normal operation: raise the DIP8 of SW1 and cut off the power supply for 10 seconds. The system will start up in normal mode.



3 Check the following steps:

	1	2	3	4	5
	Select 18°C on all thermostats	Check that all grilles open	Wait for the machine to start from cold	Select 30°C on all thermostats	Check that all grilles close and the machine stops
	Select 30°C on all thermostats	Check that all grilles open	Wait for the machine to start from warm	Select 18°C on all thermostats	Check that all grilles close and the machine stops

1 System description

The ZONING system is made up of a set of regulating devices for temperature control in up to 18 separate zones in centralised air conditioning and/or heating installations.

Control is achieved through a central control unit connected to digital thermostats and motorised valves (gate valves), installed in each of the areas to be climate-controlled.

1.1 ZITY central control unit

Electronic control device for surface mounting, designed for air condition and heating equipment from 2 to 18 areas. ZITY can control direct expansion units, hydronic *fan coils* and radiant floor or radiator heating systems. Communication with the zone thermostats can be via radio or wired, depending on the thermostat. It has 2 RS 485 communications ports, one local and the other remote, which make integration possible in building management systems.



Fig. 1 ZITY central control unit

1.2 Timer-thermostats

The timer-thermostats are the user *interfaces* for temperature control in each of the zones, with a maximum interval of +/- 0.5°C.

They allow weekly programming by zone and the adjustment of various parameters for limiting and blocking functions.

1.2.1 ZOE-RC

Digital Timer-Thermostat via radio (RC), to operate together with the Zoning System central control units. Integration of Master/ Slave mode in the same thermostat, selectable through the settings menus. Weekly programming on 2 levels (Comfort/ ECO).

This central control unit regulates the temperature in each zone acting on the relevant gate valves and the air conditioning and/or heating unit. At the same time, the system central control unit allows interaction with other devices in the installation (home automation, digital input, WIFE connection, etc.).

1.1.1 ZITY-RC/M

System central control unit, which communicates with the thermostats via radio or through cables. It is configured by default as the MASTER with respect to the other central units in the installation.

1.1.2 ZITY-RC/S

System central control unit, which communicates with the thermostats via radio or through cables. In this case, it is configured as a SLAVE of the main board. It is used in multiple VRV or *Fan coil* installations with one item of centralised production equipment.

1.1.3 ZITY-W/M

Central control unit with MASTER function over the rest of the system boards. Communication is exclusively by cables. It is configured by default as the MASTER with respect to the other central units in the installation.

1.1.4 ZITY-W/S

System central control unit, which communicates with the thermostats via cables only. It is configured as a SLAVE of the main board. It is used in multiple VRV or *Fan coil* installations with one item of centralised production equipment.

1.1.5 ZITY/ME /MR /MC

Expansion modules for zones or relays.

ZOE-RC thermostats can be set to suit each installation, blocking of functionalities, setpoint temperature limitation, etc. (see settings section).



Fig. 2 ZOE-RC timer-thermostat

1.2.2 ZEBRA

Wired Timer-Thermostat (W), to operate together with the ZITY central control unit. Two-way communication between the central unit and the thermostat. Integration of Master/ Slave mode in the same thermostat, selectable through the settings menus. Weekly programming on 2 levels (Comfort/ ECO). Can be set to suit each installation, blocking of functionalities, setpoint temperature limitation, etc.



Fig. 3 ZEBRA timer-thermostat

1.3 Interfaces

These are the communication gateways between the Zoning system and the direct expansion air conditioning units (see compatible models). Two-way communication between them optimises the operation of the entire system, allowing control of the operating mode, fan speed adjustment and setpoint modulation according to demand from the zones, improving both comfort and energy consumption.



Fig. 4 Interfaces

1.4 NETBOX Interface

The communication *interface* between the ZITY central control unit and the CLOUD application of the ZONING system.

Allows easy and intuitive remote control of your ZONING system from any mobile device (smartphone, tablet) or desktop device (PC), thanks to the *responsive* format Webapp.



Fig. 5 Netbox Interface

1.5 Motorised gate valves

The motorised gate valves (24 VDC) allow On/Off regulation of the air flow in the zones.

They can be installed in a circular or rectangular duct or directly in the drive grid.

1.5.1 ZP-AZ

Motorised gate valve with opposite fins, for Zoning System grids. Made from aluminium and galvanised steel, with polyamide gears and PVC seals.



Fig. 6 ZP-AZ motorised gate valve

1.5.2 ZC/ZR

Motorised circular gate valve with sealed closure, made of galvanised steel, with bearings and rubber gasket. For direct fitting in circular or plenum duct.



Fig. 7 ZC/ZR

1.5.3 ZQ

Motorised rectangular gate valve with sealed closure, made of galvanised steel, with bearings and rubber gasket.



Fig. 8 ZQ motorised gate valve

1.6 Pressure control valves

Devices for controlling the overpressure generated in the duct network due to the opening and closing of the different gate valves in the zone.

This type of system should be installed when the modulation of the fan speeds controlled by the *interfaces* is not sufficient for compensating for the excess pressure in the installation.

Its use is MANDATORY if no communication *interface* is fitted.

1.6.1 Mechanical overpressure gate valves

Adjustable by means of a counterweight. They provide fast and easy adjustment of the pressure variations due to closure of the gate valves in the zone.

1.6.1.1 ZS

Overpressure gate valves adjustable by means of a counterweight, for wall mounting.



Fig. 9 ZS mechanical overpressure gate valve

1.6.1.2 ZK

Overpressure gate valves adjustable by means of a counterweight, for circular duct mounting.



Fig. 10 ZK mechanical overpressure gate valve

1.6.1.3 ZG

Overpressure gate valves adjustable by means of a counterweight, for rectangular duct mounting.



Fig. 11 ZG mechanical overpressure gate valve

1.6.2 Electronic pressure control unit

Electronically-adjustable constant pressure control unit, formed by a KBY control module and a 24 VDC motorised gate valve.

It provides accurate adjustment of the pressure variations due to closure of the gate valves in the zone. It should be installed when the modulation of the fan speeds controlled by the *interfaces* is not sufficient for compensating for the excess pressure in the installation.

This system is recommended for complex duct networks or medium-high pressure equipment.

1.6.2.1 KBY

Constant electronic pressure controller

Provides a 0-10V or PWM 24 Vdc output to activate the pressure control motorised gate valves.



Fig. 12 Electronic pressure controller

1.6.2.2 Motorised gate valves

The motorised gate valves used are models ZP-AZ, ZC/ZR and ZQ, which are described in the section “1.5 Motorised gate valves”.

2 Connection of components

All system components are wired to the central control unit or to its expansion modules.

It is advisable to locate the equipment preferably in a high place away from metal masses and conductive elements, place the control unit in a protected place that can only be accessed by authorised personnel and with the appropriate tools for opening and subsequent handling of the equipment in question.

Attachment to the wall can be with screws (by lifting the rear pins of the box) or by means of the anchors for DIN rail.

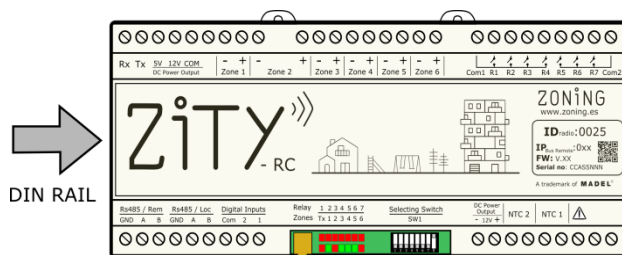


Fig. 13 ZITY central control unit: attach with screws or via DIN rail

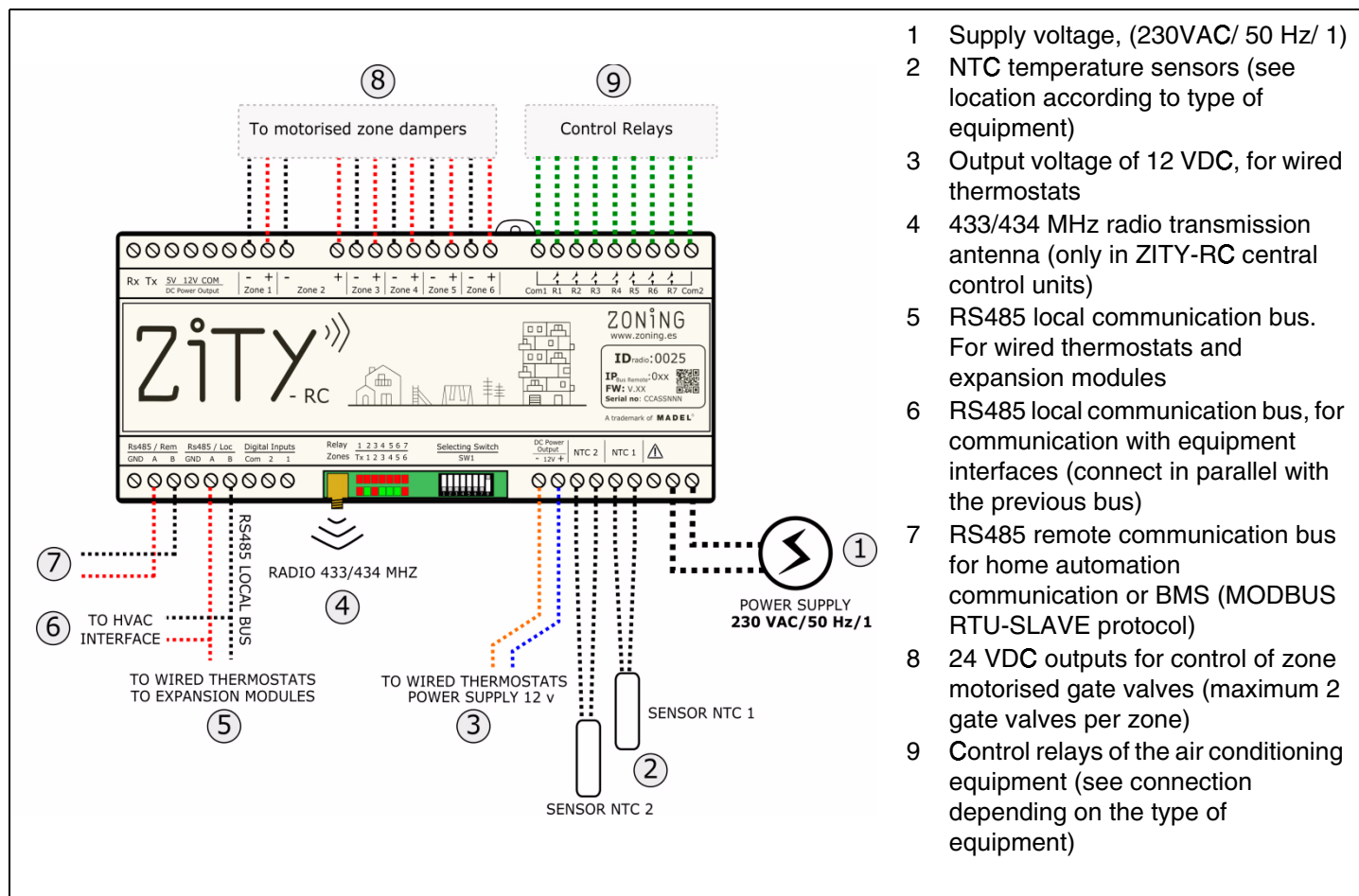


Fig. 14 Connection of all ZONING SYSTEM components in the ZITY control unit

2.1. Power supply

Supplies the central control unit at 230 VAC through the "Power Supply (1)" terminals, using wires with a section of between 1.0 mm² and 1.5 mm².

2.2. Aerial

Only for equipment via radio ZITY-RC: screw in the aerial supplied (4) and position it in the false ceiling in the best position to receive the radio signal.

2.3. Motorised gate valves

Connect the motors of each regulator to terminal strips 1 to 6 on the board (7). Use a red (+) / black (-) wire with a section of between 0.75 mm² and 1.0 mm². If there are two regulators per zone (maximum recommended), connect them in parallel.

In installations with more than 6 zones, 1 or 2 zone expansion modules will be connected. The first expansion module controls zones 7 to 12. A third module can be added, which will control from zone 13 to zone 18. The connection of these modules will take place through the RS485 local bus of the equipment.

ZITY Central control unit

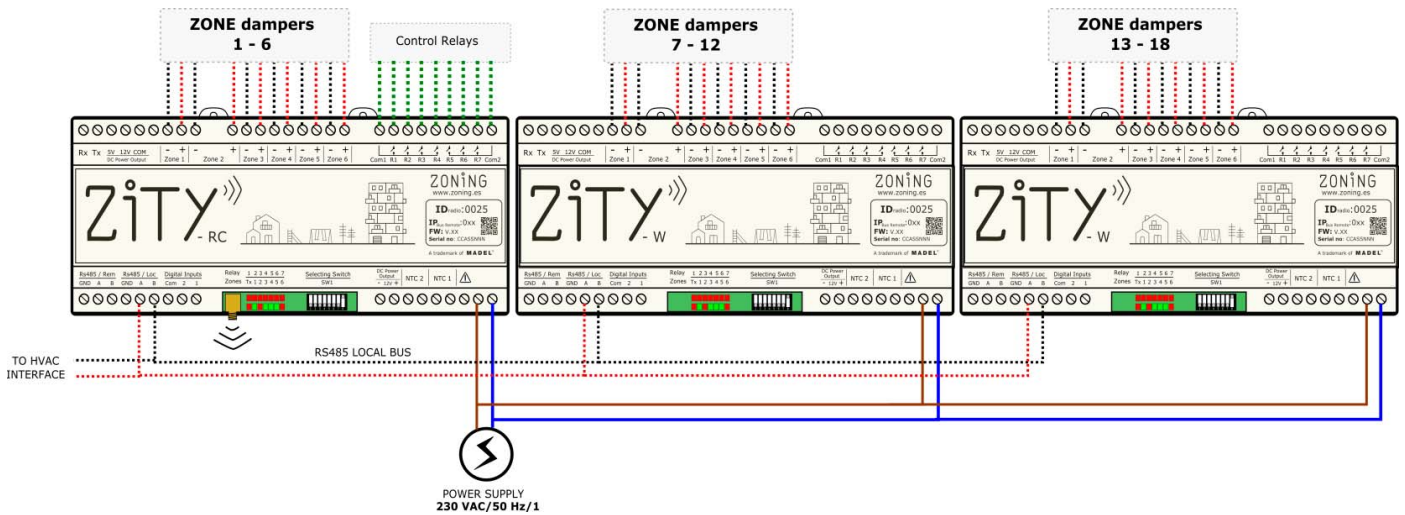


Fig. 15 Control of up to 18 zones through three ZITY control centres

Interconnection with the equipment, NTC sensors, digital inputs, etc., will only take place from the ZITY basic board (outputs 1 to 6). The expansion modules only manage the zones.

2.4. Thermostats

Distribute the thermostats in a prominent place in each of the zones to be climate-controlled.

Place at a height of approximately 1.5 m, avoiding direct heat sources and unwanted air currents.

2.4.1 ZOE-RC Thermostats

Thermostats with communication via radio: insert the batteries supplied with the equipment. They do not require any additional wiring.

2.4.2 ZEBRA Thermostats

Thermostats with communication via wires: the two power supply wires should be connected (orange/ blue: 12VDC) and the 2 communication wires (red/black), according to the diagram opposite.



+12VDC: blue wire
-12VDC: orange wire
A: red wire
B: black wire

Fig. 16 ZEBRA thermostat connection diagram

2.5. Production equipment and NTC probes

The ZITY zoning system is compatible with climate-control installations via air ducts (*direct expansion* or *Fan coil*) and hybrid systems with air conditioning and heating by radiators.

The interconnection between the central control unit and the production equipment varies according to the type of installation, the combination between them and the functionalities required by the user.

In addition, the ZITY central unit has 2 sensor inputs (NTC 1 and NTC 2), whose function depends on the production equipment installed:

- NTC 1: return air temperature sensor in *direct expansion* installations or water intake temperature sensor in *fan coil* installations with 4 pipes.
- NTC 2: water temperature sensor in *fan coil* installations with 2 hybrid pipes. Or return temperature sensor in *direct expansion* installations.

2.5.A. Air duct air conditioning systems

2.5.A.1. Direct expansion equipment with *interface*

The ZITY central control unit is connected to the air conditioning equipment with a communication interface from the corresponding brand (see models available).

Allows automatic fan speed management according to the zones in demand, summer/winter mode change for *master* thermostat of the installation and optimisation of the operation of the *inverter*.

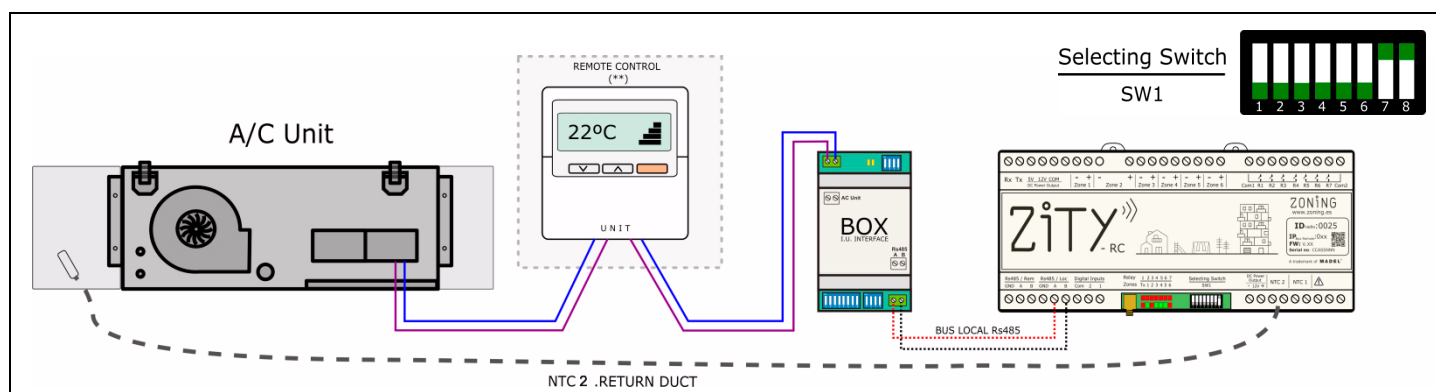


Fig. 17 Standard installation diagram for equipment with *interface*

See the *interface* manual for each brand for detailed connection and settings.

The internal unit control is not mandatory but it is advisable to install it as an alarm display for the air conditioning equipment.

The NTC2 sensor is used to measure the return air temperature in the Interfaces that cannot read this value via communications.

2.5.A.2. ON/OFF direct expansion equipment

In older units that are not compatible with the *interfaces*, the unit control relays can be used for remote start/stop.

The functionalities and output of the zoning system without *interface* are lower than those of systems that do have it, but they allow basic control of the air conditioning equipment.

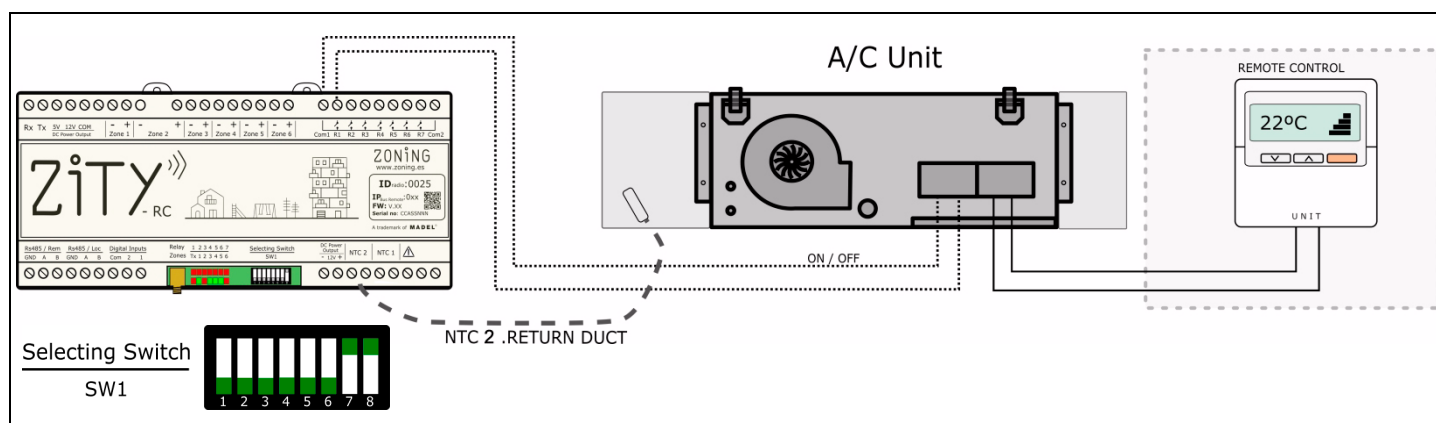


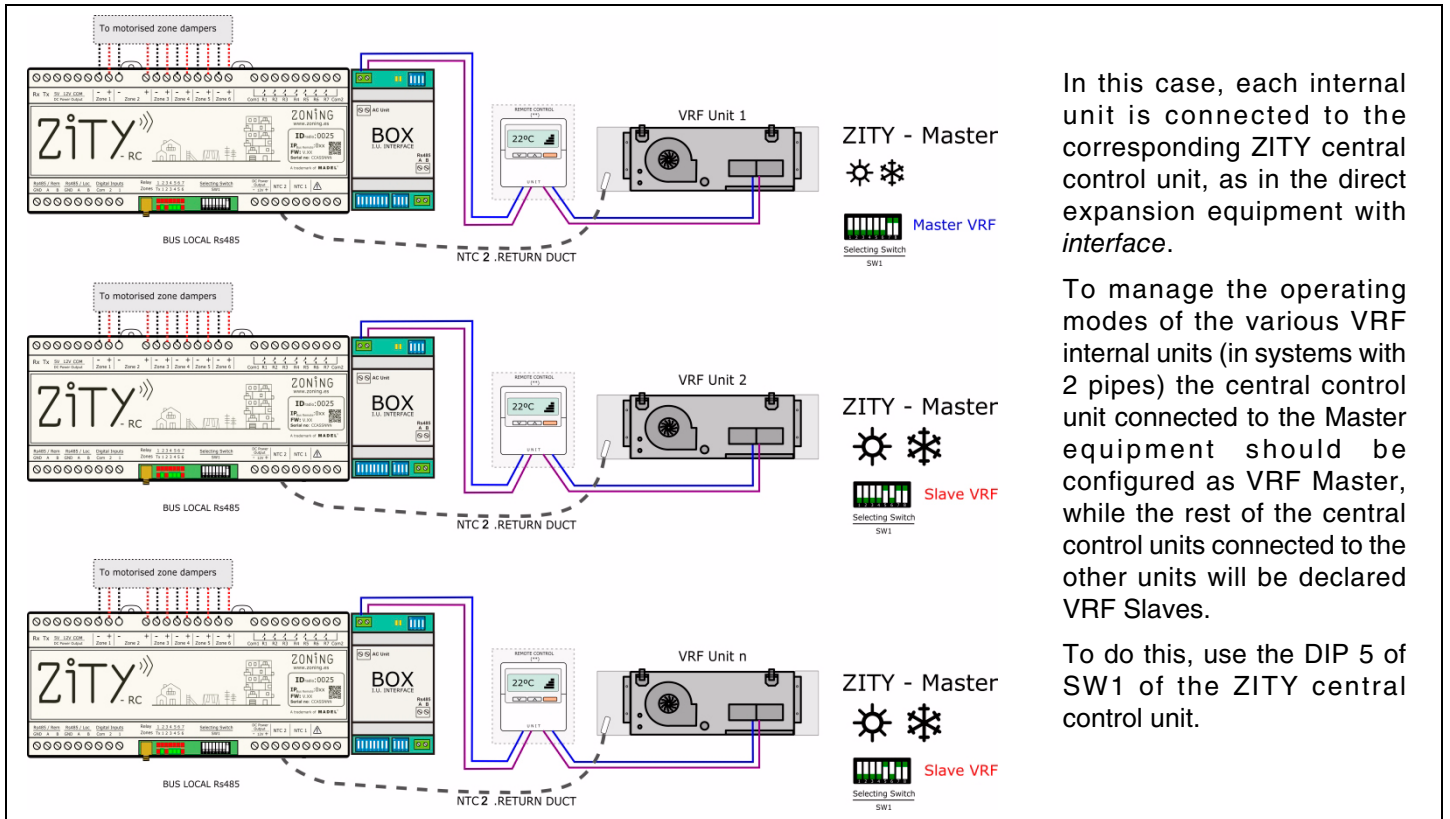
Fig. 18 Standard installation diagram for equipment without *interface*

See the connection diagram for each brand and model. It is mandatory to install the internal unit control for controlling the operating mode and setpoint temperature of the equipment.

The NTC2 sensor is used for safety reasons and it is only mandatory to install it in electromechanical equipment. In all other cases the heating element that comes by default from the factory can be left in place.

ZITY Central control unit

2.5.A.3. VRF 2T direct expansion equipment with imposition of operating mode by VRF Master Equipment



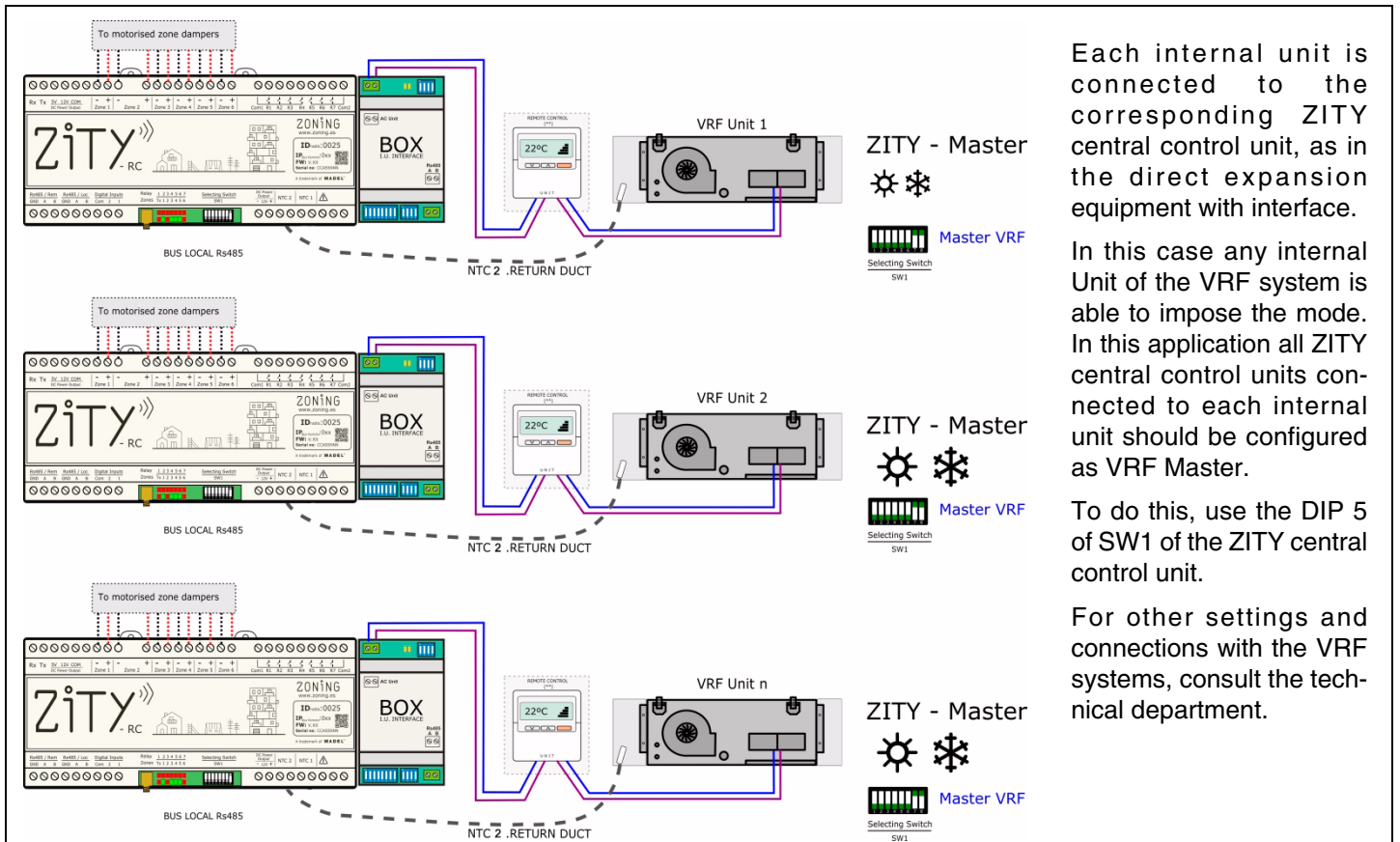
In this case, each internal unit is connected to the corresponding ZITY central control unit, as in the direct expansion equipment with interface.

To manage the operating modes of the various VRF internal units (in systems with 2 pipes) the central control unit connected to the Master equipment should be configured as VRF Master, while the rest of the central control units connected to the other units will be declared VRF Slaves.

To do this, use the DIP 5 of SW1 of the ZITY central control unit.

Fig. 19 VRF direct expansion with imposition of operating mode by VRF Master Equipment

2.5.A.4. VRF 2T direct expansion equipment with imposition of Last Order operating mode



Each internal unit is connected to the corresponding ZITY central control unit, as in the direct expansion equipment with interface.

In this case any internal Unit of the VRF system is able to impose the mode. In this application all ZITY central control units connected to each internal unit should be configured as VRF Master.

To do this, use the DIP 5 of SW1 of the ZITY central control unit.

For other settings and connections with the VRF systems, consult the technical department.

Fig. 20 VRF direct expansion with imposition of Last Order operating mode

2.5.A.5. Fan-coil 2T hydronic equipment, 0-10V Inverter fan control

The ZITY central control unit is directly connected to the fan-coil and to the 2-tube battery valve. The KBY system controls constant pressure via the inverter fan through the 0-10 V output.

The NTC1 sensor is connected to the intake pipe of the fan-coil to detect the water temperature. This avoids starting up the fan at undesired temperatures.

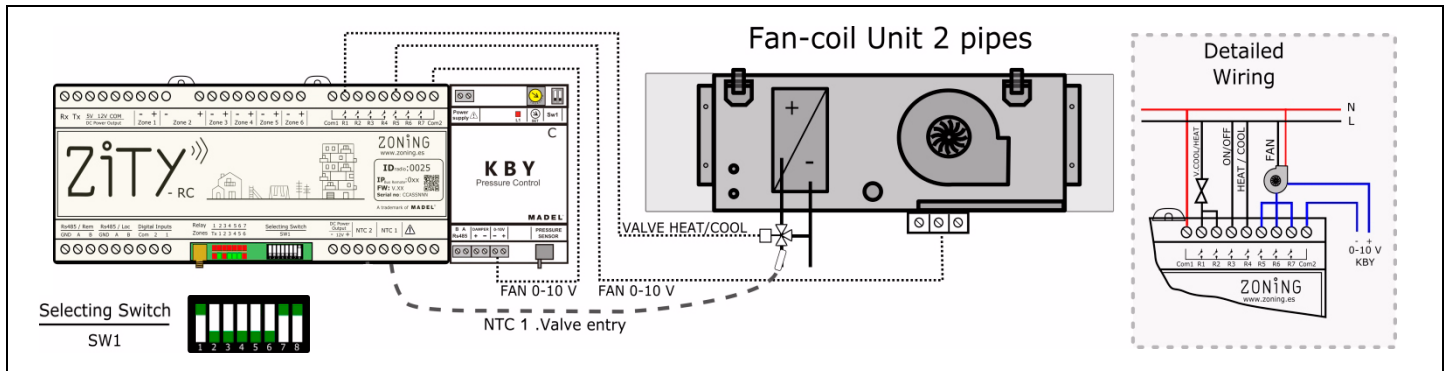


Fig. 21 Fan-coil 2T, 0-10V Inverter fan control

2.5.A.6. Fan-coil 2T hydronic equipment, 3-speed fan control

The system is directly connected to the fan-coil and to the 2-tube battery valve.

As in the previous case, the NTC 1 sensor is connected to the fan-coil intake pipe.

No additional equipment control is required.

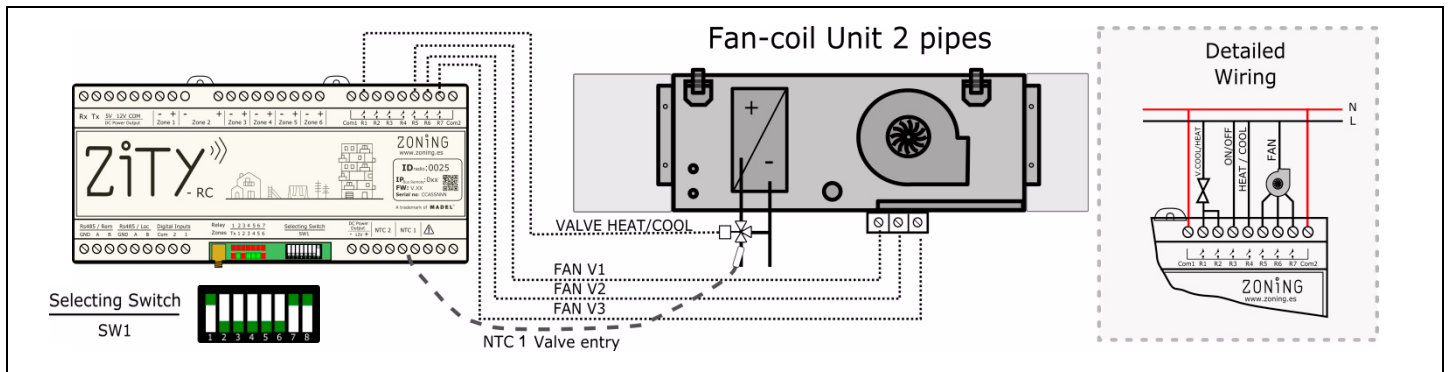


Fig. 22 Fan-coil 2T, 3-speed fan control

2.5.A.7. Fan-coil 4T hydronic equipment, 0-10V Inverter fan control

The system is directly connected to the fan-coil and to the 4-tube battery valve.

In 4 T installations the 2 sensors should be connected. NTC 1 measures the hot water temperature and NTC 2 the cold water temperature.

The KBY system controls the inverter fan at constant pressure through the 0-10 V output.

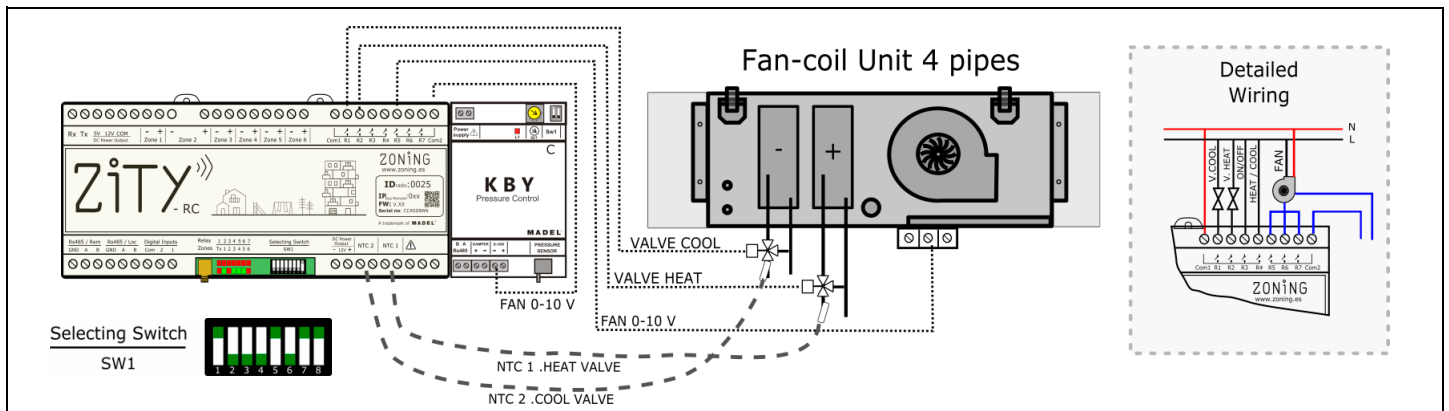


Fig. 23 Fan-coil 4T, 0-10V Inverter fan control

2.5.A.8. Fan-coil 4T hydronic equipment

The system is directly connected to the fan-coil and to the 4-tube battery valve.

The NTC sensors perform the same function as in the previous case.

No additional equipment control is required.

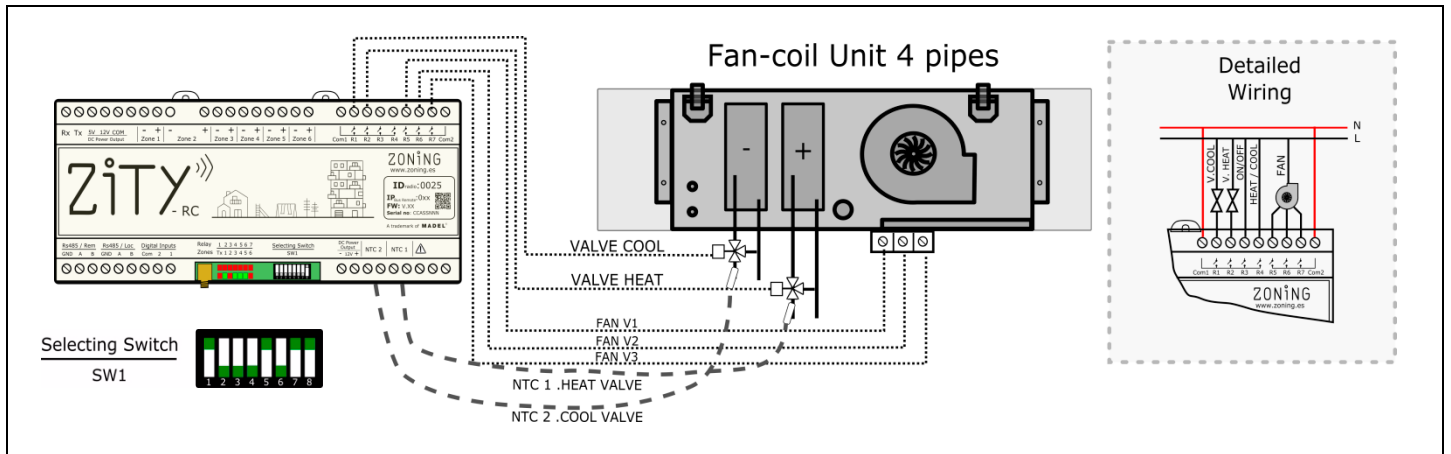


Fig. 24 Fan-coil 4T

2.5.B. Water-operated heating equipment and hybrid heating/direct expansion equipment

2.5.B.1. Water-operated heating

Allows zoning of a conventional heating installation, by radiators or radiant floor.

The NTC sensors are used as protection against discharge temperatures that are too high or too low.

The system manages the thermostatic zone valves on the one hand and, on the other the boiler start/stop.

NTC 1 is used for the boiler and NTC 2 for the radiant floor temperature.

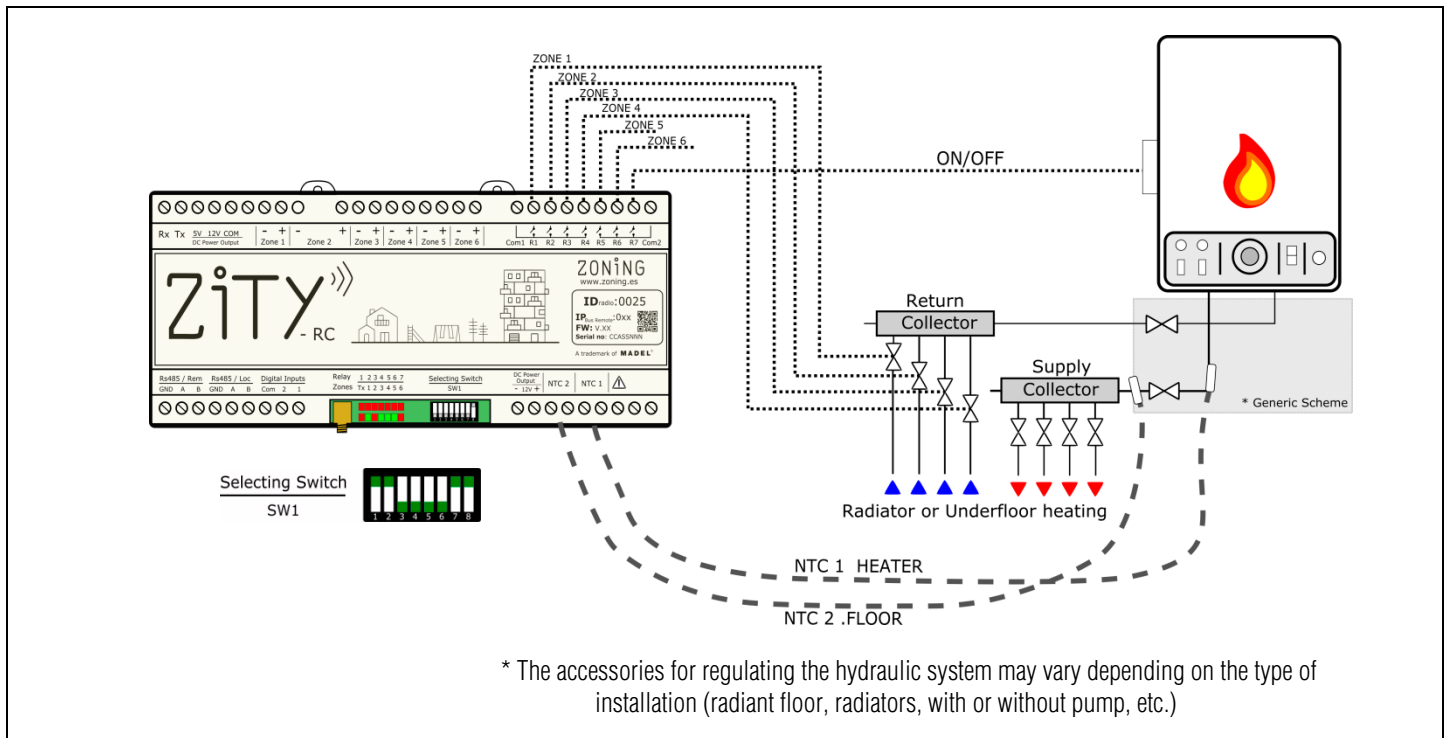


Fig. 25 Water-operated heating

2.5.B.2. Combined heating / direct expansion hybrids

In this application it is possible to control a conventional heating system and at the same time an air conditioning unit by direct expansion with Interface, integrating in a single type of thermostat all the functionalities of both systems separately.

Two ZITY central control units are installed, one to control the direct expansion unit (with or without gateway) and the other to control the heating system by radiators or radiant floor.

Both central control units are joined by a Communication Bus, which manages either central control unit depending on the operating mode (Cold/heat by air, or radiant heat). The first one is defined as the Master Central Control Unit and the second one as Slave.

The NTC sensors have the functionality of each of the production equipment separately.

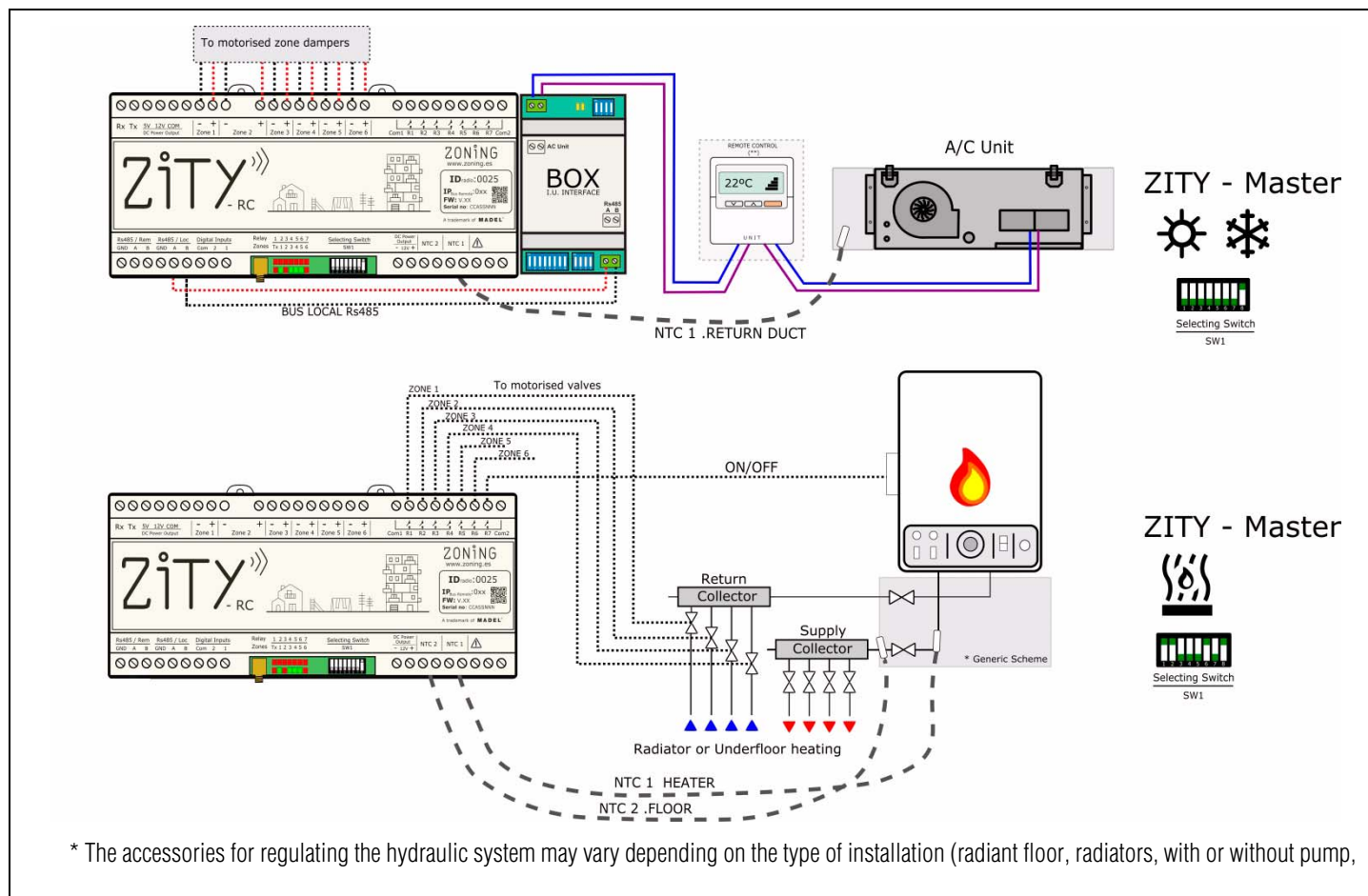


Fig. 26 Combined heating / direct expansion

2.5.C. Hybrid aérothermal heating / water-operated air conditioning equipment

The same installation can combine water-operated heating systems with radiators and/or radiant floor and fan-coils with ducts for controlling air conditioning and/or air-operated heating.

2.5.C.1. Water-operated heating and 3v Fan-coil with 2 pipes

Two ZITY central control units are installed, one for controlling the Fancoil with ducts by zone and the other for the heating system by radiant floor or radiators.

As in the previous case, the board that controls the fan-coil is configured as the MASTER and the one that controls the heating is configured as the SLAVE. With this configuration the MASTER is the one that acts on the internal Unit of the

Aerothermal equipment to produce the ON/OFF and also set the operating mode. This control takes place via 2 voltage-free contacts. Consult the wiring diagram for each Aerothermal brand and model.

Consult Madel for other Aerothermal applications and settings.

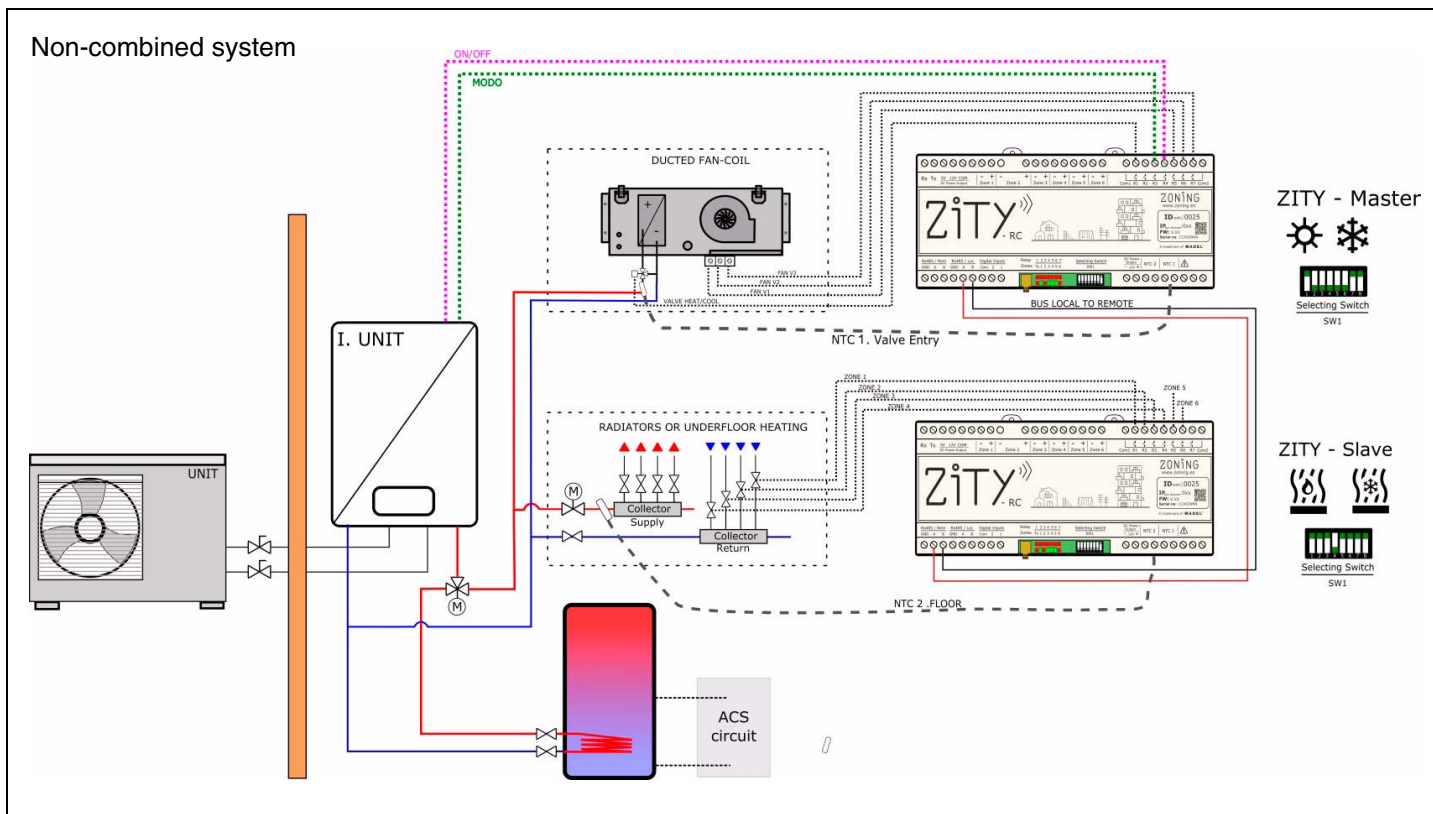


Fig. 27 Water-operated heating and 3v Fan-coil with 2 pipes

2.6. RS485 / Loc

RS485 internal communication bus between the various elements of the zoning system. The following items are connected to it:

- ZEBRA wired thermostats
- Communication interfaces with direct expansion units
- Zone extension modules
- ZITY slave boards for combined installations.

This bus owns the ZITY system and it should only be used for the items described above, do not connect it to any other external communication system.

2.7. RS485 / Rem

RS485 remote bus for communication between the ZITY system and other items of the installation in the home or building. Communication via Modbus RTU.

Request the specific documentation and the memory map for communication with the RS485/Rem port.

3 System configuration

The system configuration consists of two steps:

- 1 Connect the thermostats to the central control unit and the corresponding zone
- 2 Configure the switches of the ZITY central control unit according to the type of installation

3.1. Connect the thermostats

This consists of associating each thermostat with the central control unit (with the identification number ID of the central control unit) and assigning it a zone number (corresponding to the motorised gate valves connected to outputs 1 to 6 of the central control unit).

These operations will be carried out via the settings menus of each thermostat, as indicated below. You can find additional information in the thermostat instruction manuals.

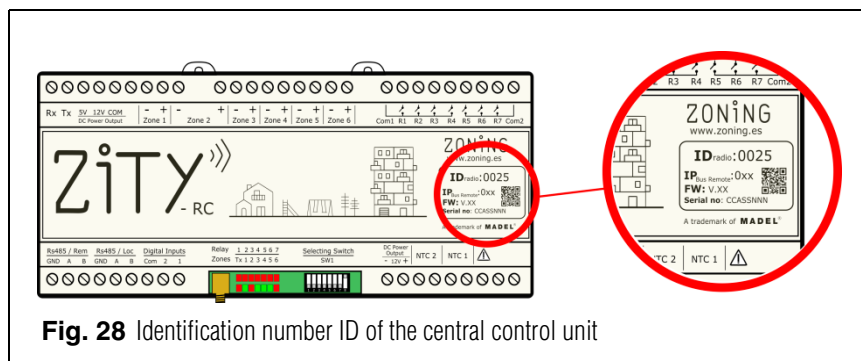


Fig. 28 Identification number ID of the central control unit

3.1.A. ZOE-RC thermostat (communication via radio)

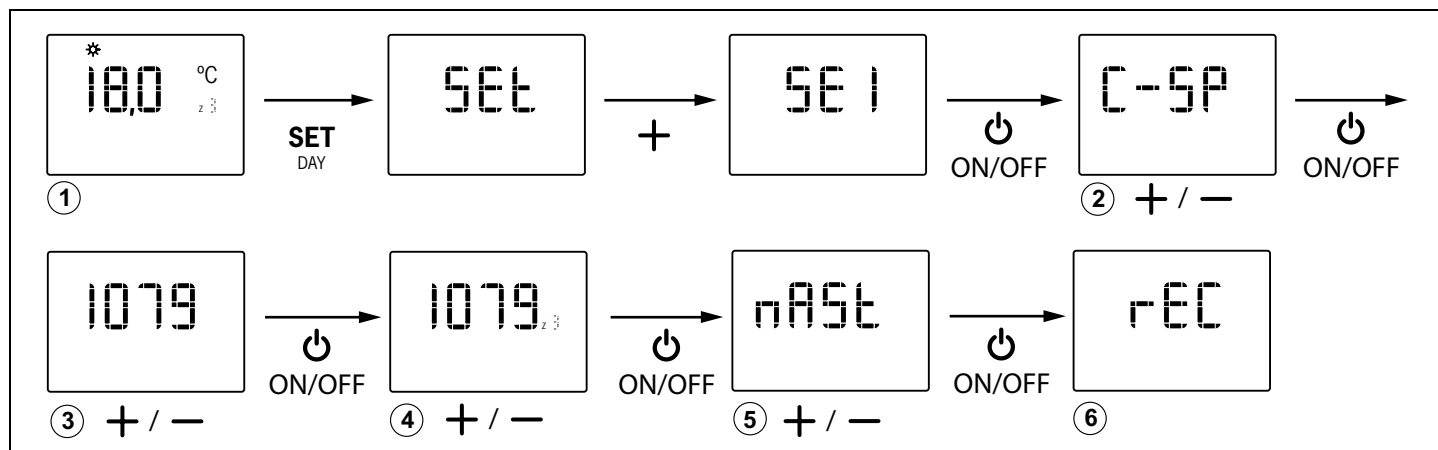


Fig. 29 Basic configuration of the ZOE thermostat: ZITY model central control unit, central control unit ID number, zone number and master/slave

3.1.B. ZEBRA thermostat (communication by wires)

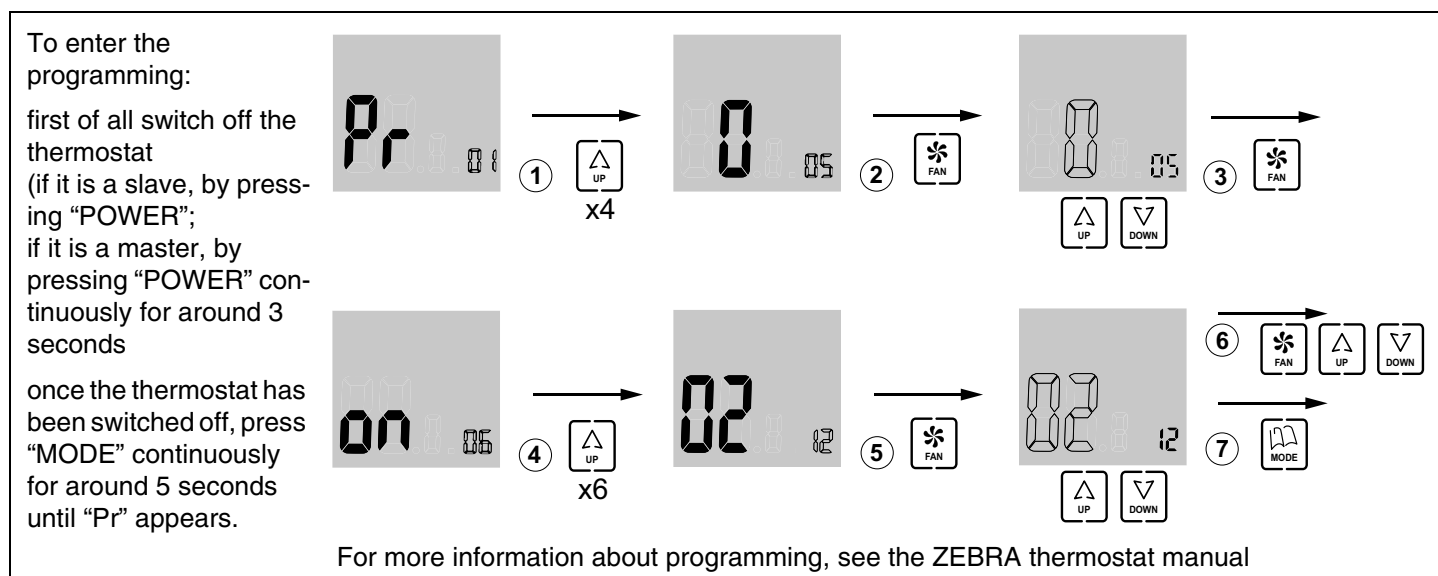


Fig. 30 Basic settings of the ZEBRA thermostat: master/slave and zone No.

3.2. Configure the central control unit

The *switch* SW1 is used to configure the ZITY central control unit according to the type of installation and operating frequency.

The DIP 8 is used to position the equipment in learning mode during start-up of the installation (see the corresponding section).

Selecting Switch
SW1

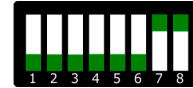


Fig. 31 SW1, to configure the ZITY central control unit

Switch SW1								Description
1	2	3	4	5	6	7	8	
↑	x	x	x	x	x	x	x	The production equipment is water-operated
↓	x	x	x	x	x	x	x	The production equipment is Direct Expansion (DX) (default option)
x	↑	x	x	x	x	x	x	Internal <i>Fan-coil</i> type unit
x	↓	x	x	x	x	x	x	DX internal unit (Split or VRV) or Boiler if SW1 is ON (by default)
x	x	↑	x	x	x	x	x	Centralised system. The equipment only obeys the commands that reach it from the RS485/Rem bus
x	x	↓	x	x	x	x	x	Distributed system. The equipment obeys the last order that arrives, whether from the RS485/Rem bus or from the thermostats. Without any priority. (default option)
x	x	x	↑	x	x	x	x	Radio transmission frequency 433 Mhz. Corresponds to Fr00 of the ZOE-RC thermostats
x	x	x	↓	x	x	x	x	Radio transmission frequency 434 Mhz. Corresponds to Fr01 of the ZOE-RC thermostats (default option)
x	x	x	x	↑	x	x	x	For DX installation (DIP 1 OFF) board defined as mode Slave in VRV installations. For Water-operated installation (DIP 1 ON) 2-pipe installation defined.
x	x	x	x	↓	x	x	x	For DX installation (DIP 1 OFF) board defined as mode Master in VRV installations. (default option) For Water-operated installation (DIP 1 ON) 4-pipe installation defined.
x	x	x	x	x	↑	x	x	The operating mode is defined by a Remote system via the RS485/Rem remote bus.
x	x	x	x	x	↓	x	x	The operating mode is locally defined by the Master thermostat of the system. (default option)
x	x	x	x	x	x	↑	x	Not combined. There is a single item of production equipment; air or water. (by default)
x	x	x	x	x	x	↓	x	Combined. Items of air and water production equipment are combined.
x	x	x	x	x	x	x	↑	Equipment in operating mode.
x	x	x	x	x	x	x	↓	Equipment in learning mode. For start-up of the installation

In green, the default position of the dips

Consult the diagrams for each type of installation to see the combination of the different DIPs.

For remote connections with BMS, combined installations between Master/ Slave boards, consult the technical department.

3.3. Advanced settings of thermostats

Both ZOE and ZEBRA timer-thermostats have an expert menu for setting various system parameters.

3.3.A. ZOE, expert mode settings (menu SE2)

Advanced settings have the following menus:

- Fr00: 433 / Fr01: 434 (radio frequency)
- tC00: setpoint / tC01: ambient + setpoint
- HC00: cold, heat, boiler / HC01: cold only / HC02: heat only / HC03: boiler only

- Pr00: with timer programming / Pr01: without timer programming
- bL00: without locking / bL01: complete locking except +/-ON/OFF / bL02: mode locking / bL03: Master and mode OFF
- Fn00: with fan active / Fn01: without fan active
- Maximum and minimum temperatures (for both heat and cold).

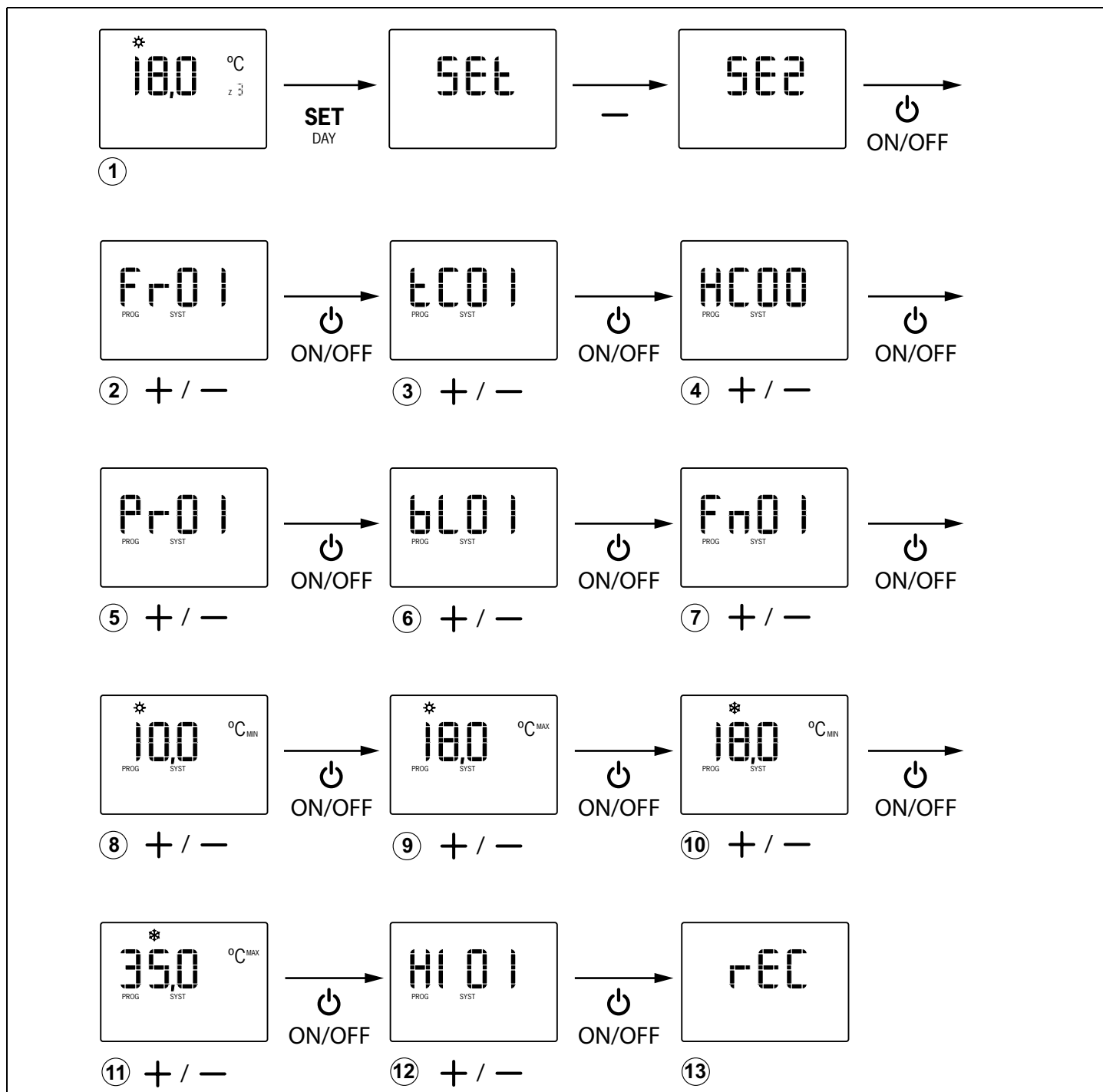


Fig. 32 ZOE thermostat advanced settings

Advanced programming of the ZOE thermostat is carried out as follows (follow the diagram in figure 32):

- 1 With the thermostat on, press “SET”, then “-” (the display shows SE2) followed by “ON/OFF” to confirm.
- 2 Use the “+” and “-” keys to choose the required option (“Fr01” / “Fr00”) and press “ON/OFF” to confirm.
- 3 Use the “+” and “-” keys to choose the required option (“tC01” / “tC00”) and press “ON/OFF” to confirm.
- 4 Use the “+” and “-” keys to choose the required option (“HC03” / “HC02” / “HC01” / “HC00” /) and press “ON/OFF” to confirm.
- 5 Use the “+” and “-” keys to choose the required option (“Pr01” / “Pr00”) and press “ON/OFF” to confirm.
- 6 Use the “+” and “-” keys to choose the required option (bL00: without locking / bL01: complete locking except +/-/ON/OFF / bL02: mode locking /bL03: Master and mode OFF) and press “ON/OFF” to confirm.
- 7 Use the “+” and “-” keys to choose the required option (“Fn01” / “Fn00”) and press “ON/OFF” to confirm.
- 8 Use the “+” and “-” keys to choose the minimum temperature for heat mode, and press “ON/OFF” to confirm.
- 9 Use the “+” and “-” keys to choose the maximum temperature for heat mode, and press “ON/OFF” to confirm.
- 10 Use the “+” and “-” keys to choose the minimum temperature for cold mode, and press “ON/OFF” to confirm.
- 11 Use the “+” and “-” keys to choose the maximum temperature for cold mode, and press “ON/OFF” to confirm.
- 12 Use the “+” and “-” keys to choose the required option (Hi02/Hi03/Hi04/Hi05/CSP) to set the control hysteresis. The option CSP is selected for KSP equipment with version prior to V20.
- 13 The display shows “rEC” and programming finishes.

3.3.B. ZEBRA, expert mode settings

Advanced settings of the ZEBRA thermostat are carried out through the following menus:

- Menu No. 3, temperature compensation: allows you to perform temperature compensation from -8°C/°F to +8°C/°F,
- Menu No. 4, screen backlighting: on selecting the “ON” option the screen remains lit up continuously (although its intensity is reduced); on selecting the “OFF” option it switches off after 15 seconds,
- Menu No. 6, fan control: on selecting the “ON” option the fan remains active and its speed may be varied by using the “FAN” button; on selecting the “OFF” option the fan remains inactive and the “FAN” button does not have any effect,
- Menu No. 7, restore factory settings: if you select “ON” the factory settings will be restored,
- Menu No. 8, Celsius (°C) or Fahrenheit (°F): allows you to select °C or °F,
- Menu No. 9, operating modes available: allows you to select the modes that will be available during use. The possible options are:
 - “0”: Cooling + Fan;
 - “1”: Heating + Fan;
 - “2”: Cooling + Heating + Fan;
 - “3”: Floor Heating;
 - “4”: Floor Cooling;
 - “5”: Floor Heating + Floor Cooling;
 - “6”: Floor Heating + Heating + Fan;
 - “7”: Floor Cooling + Cooling + Fan;
 - “8”: Floor Heating + Heating + Floor Cooling + Cooling + Fan;
 - “9”: Cooling + Fan + Dehumidifying;
 - “10”: Cooling + Heating + Fan + Dehumidifying;
 - “11”: Floor Cooling + Cooling + Fan + Dehumidifying;
 - “12”: Floor Heating + Heating + Floor Cooling + Cooling + Fan + Dehumidifying;
- Menu No. 10, maximum temperature limit: allows you to select the maximum temperature value, which can be adjusted during use, between 10°C and 30°C (59°F and 86°F),
- Menu No. 10, minimum temperature limit: allows you to select the minimum temperature value, which can be adjusted during use, between 10°C and 30°C (59°F and 86°F),
- Menu No. 14, pushbutton locking: allows you to lock some pushbuttons to avoid inadvertent handling. The locking indicator will light up (11 in fig. 3). The possible options are:
 - “00”: unlocking, no pushbutton locked;
 - “01”: all locked;
 - “02”: “UP” and “DOWN” locked;
 - “03”: “MODE” locked;
 - “04”: “FAN” locked;
 - “05”: “MODE” and “FAN” locked;
 - “06”: “FAN”, “UP” and “DOWN” locked;
 - “07”: “FAN”, “UP”, “DOWN” and “MODE” locked;
 - “08”: “MODE”, “UP” and “DOWN” locked
- Menu No. 15, action on loss of power supply: on selecting option “0”, the thermostat will remain switched off when the power supply returns; on selecting the value “1” it will return to the status it was in when the power supply was lost,

- Menu No. 17, activation of weekly programming. The possible options are:
 - “0”: weekly programming is deactivated, indicator 6 lights up (fig. 3 in the manual) and the temperature can be set during operation using the “UP” and “DOWN” buttons

To enter the programming, do the following:

- first of all switch off the thermostat
 - if it is a slave, by pressing “POWER”;
 - if it is a master, by pressing “POWER” continuously for around 3 seconds
- once the thermostat has been switched off, press “MODE” continuously for around 5 seconds until “Pr” appears.

When you are in programming (screen displaying “Pr”), do the following (see figure 33):

- 1 When you are in programming menu No. 1, press “UP” twice, which will display menu No. 3 on temperature compensation.
- 2 Press “FAN” to enter this menu: the temperature digit appears flashing; use “UP” and “DOWN” to select the desired value.
- 3 Press “FAN” to accept and the following menu will appear (No. 4, screen backlighting).
- 4 Press “FAN” to enter the menu: the selection digit appears flashing; use “UP” and “DOWN” to select the desired value (“ON”: remains switched on; “OFF”: switches off after 15 seconds).
- 5 Press “FAN” to accept and the following menu will appear (No. 5). Press “UP” to move forward to the following menu (No. 6, fan control).
- 6 Press “FAN” to enter the menu: the selection digit appears flashing; use “UP” and “DOWN” to select the desired value (“ON”: fan active; “OFF”: fan inactive).
- 7 After selecting the required option press “FAN” to accept and the following menu will appear (No. 7, factory settings). Leave it on “OFF” to continue with the settings (if you put it on “ON” it will return to the factory settings).
- 8 Press “UP” to move forward to the following menu (No. 8, (Celsius or Fahrenheit)).
- 9 Press “FAN” to enter the menu and use “UP” and “DOWN” to select the required value (°C or °F).
- 10 Press “FAN” to accept and it will move on to the following menu (No. 9, operating modes available during use).
- 11 Press “FAN” to enter the menu: the digits of the options will be flashing. Use “UP” and “DOWN” to select the required value.
- 12 Press “FAN” to accept and the following menu will appear (No. 10, maximum temperature limit).
- 13 Press “FAN” to enter the menu and the temperature digits will be flashing. Use “UP” and “DOWN” to select the required value (between 10°C and 30°C or 59°F and 86°F).
- 14 Press “FAN” to accept and it will move on to the following menu (No. 11, minimum temperature limit).
- 15 Press “FAN” to enter the menu and the temperature digits will be flashing. Use “UP” and “DOWN” to select the required value (between 10°C and 30°C or 59°F and 86°F).
- 16 Press “FAN” to accept and the following menu will appear (No. 12). Press “UP” twice and it will move forward to menu No. 14 (locking of pushbuttons).
- 17 Press “FAN” to enter this menu and the option digits will be flashing. Use “UP” and “DOWN” to select required option (from “00” to “08”).
- 18 Press “FAN” to accept and the following menu will appear (No. 15, action on loss of power supply).
- 19 Press “FAN” to enter this menu and the option digit will be flashing. Use “UP” and “DOWN” to select the required option (“0”: switch off when power supply returns; “1”: previous status when power supply returns).
- 20 Press “FAN” to accept and the following menu will appear (No. 16). Press “UP” to move forward to the next menu (No. 17, activation of weekly programming).
- 21 Press “FAN” to enter this menu and use the “UP” and “DOWN” buttons to select the required option (“0”: weekly programming deactivated; “1”: weekly programming activated).
- 22 Press “FAN” to accept and you will exit this menu. Press “MODE” and you will exit the settings menus.

“1”: the weekly programming defined in menu No. 1 is activated and indicators 7 and 8 light up (fig. 3 in the manual). If you wish, the temperature can be set during operation using the “UP” and “DOWN” buttons, which will light up the indicator 6 (fig. 3 in the manual).

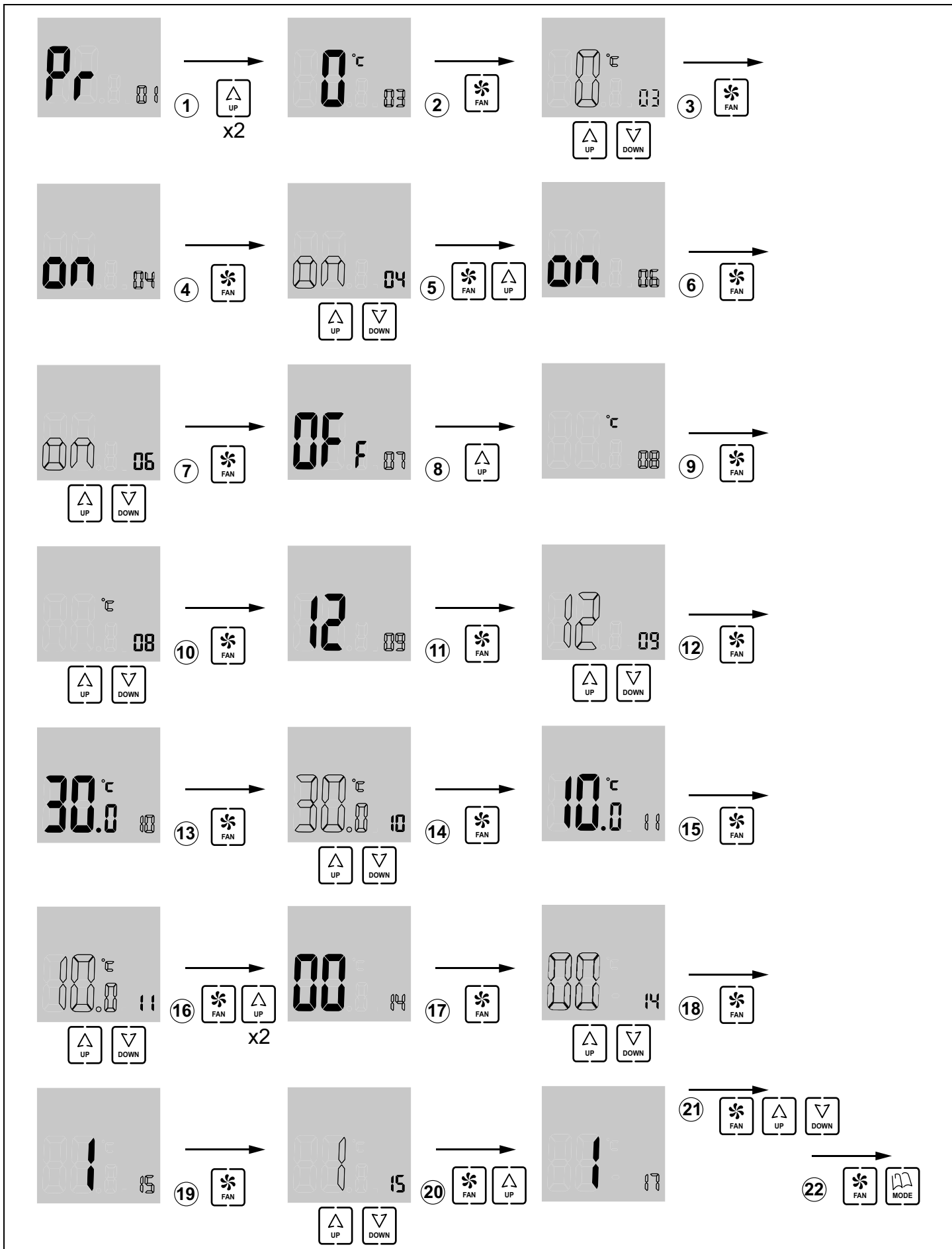
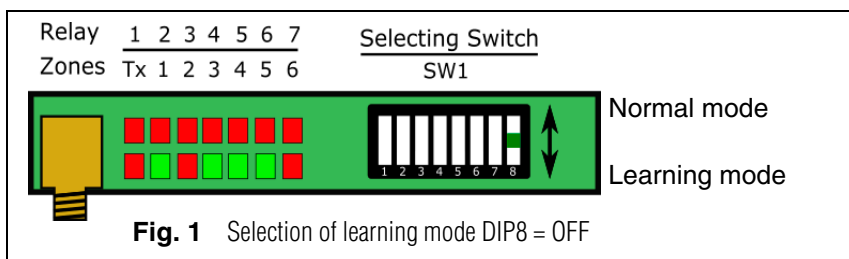


Fig. 33 ZEBRA thermostat advanced settings (menus No. 3, No. 4, No. 6, No. 7, No. 8, No. 9, No. 10, No. 11, No. 14, No. 15 and No. 17)

4 Start-up

4.1. Selection of learning mode

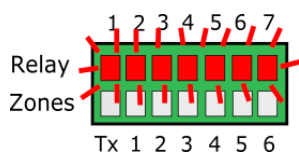
With the power supply of the ZITY central control unit disconnected, position the DIP8 of the central control unit at OFF so that the central control unit performs the protocol of recognition of all elements installed in the system (thermostats, interfaces, SLAVE boards and expansion modules).



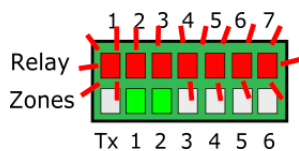
4.2. Recognition of components

1 Connect the 230VAC power supply of the ZITY central control unit.

2 The central control unit is positioned in learning mode and the 7 LEDs corresponding to the relays begin to flash.



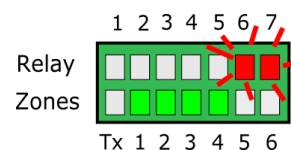
3 Every time the thermostat of one of the zones is recognised by the central control unit, the LED corresponding to the zone lights up in green.



4 Every time the system recognises a peripheral, a LED in the Relay row switches off.

The correspondence between the LEDs and the peripherals connected is as follows:

- LED R1: Communication interface
- LED R2: Zone expansion board 1
- LED R3: Zone expansion board 2
- LED R4: Slave board 1
- LED R5: Slave board 2
- LED R6: Slave board 3
- LED R7: Slave board 4



- If none of the boards or expansions are available, the system will not recognise them but it will operate normally.

4.3. Exit from learning mode



- 1 Wait for 30s and exit learning mode, positioning DIP8 in ON.
- 2 Cut off the power supply of the ZITY central control unit.

4.4. Start-up in normal operating mode

- 1 For the system to start up in normal operating mode, make sure that DIP8 is in the ON position.
- 2 When power is supplied to the central control unit it will begin to operate normally according to the configuration specified in SW1.

4.5. Check operation

Check the operation of all zones by following this table:

	1	2	3	4	5
	Select 18°C on all thermostats	Check that all grilles open	Wait for the machine to start from cold	Select 30°C on all thermostats	Check that all grilles close and the machine stops
	Select 30°C on all thermostats	Check that all grilles open	Wait for the machine to start from warm	Select 18°C on all thermostats	Check that all grilles close and the machine stops

4.6. Adjusting the overpressure gate valves

If the speed modulation of the gateway or the *fan-coil* is not sufficient to balance the pressure in the duct, it is advisable to install an overpressure control system.

4.6.A. Mechanical pressure control systems

Position the counterweight at the end furthest from the gate valve or axle.

Move the weight gradually inwards or towards the axle, until the gate valve opens and the air speed in the diffusion element is equal to or lower than 4 m/s, or if an anemometer is not available, that the movement of air does not produce any noise in the above-mentioned element.

The nearer the counterweight is to the gate valve, the greater the by-pass volume will be. On the other hand, the further away it is, the lower the by-pass air volume will be. If necessary, the rod and the counterweight can be done without.

The pressure control system may be mechanical (by counterweight) or electronic (using the KBY control).

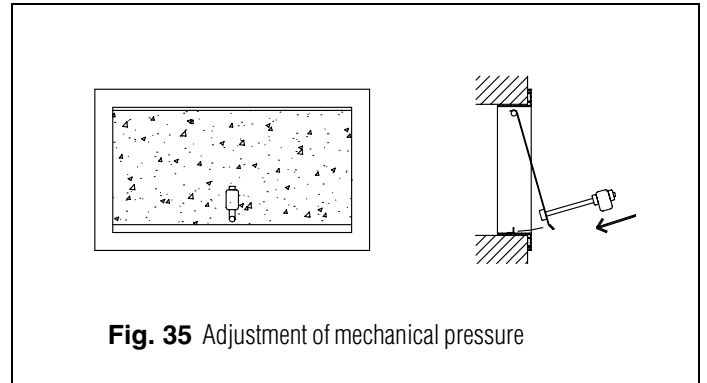


Fig. 35 Adjustment of mechanical pressure

4.6.B. Electronic pressure control systems

Made up of a KBY control device and optionally a motorised gate valve.

It provides accurate adjustment of the pressure variations due to closure of the gate valves in the zone.

In the KBY control unit the required pressure is calibrated (normally with all the grilles open) and the KBY control unit acts either on an EC 0-10V inverter fan or on a proportional regulation gate valve, in order to guarantee a constant pressure in the duct.

Consult the KBY control manual for settings and calibration.

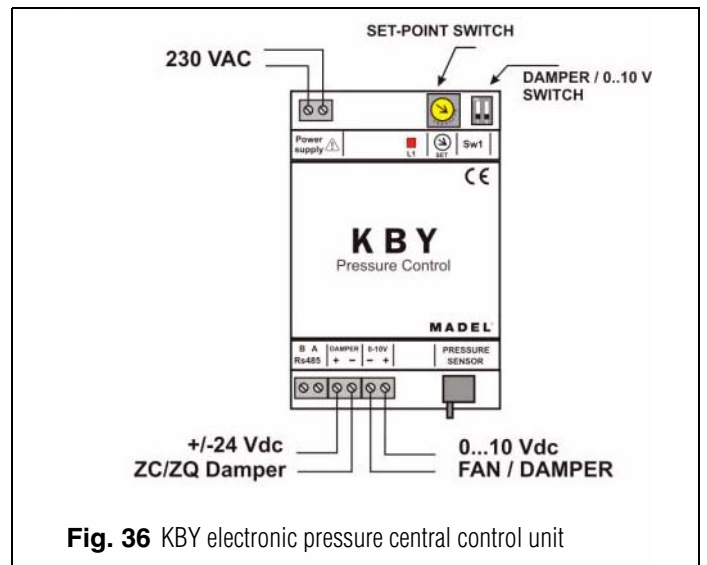


Fig. 36 KBY electronic pressure central control unit

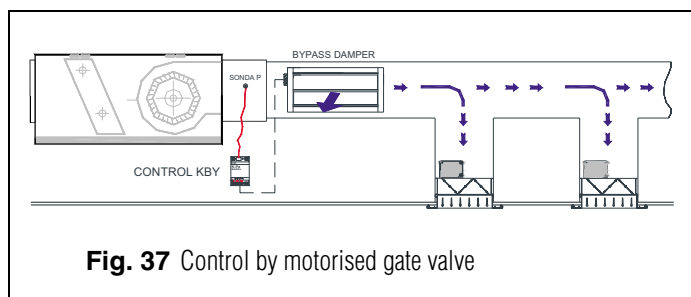


Fig. 37 Control by motorised gate valve

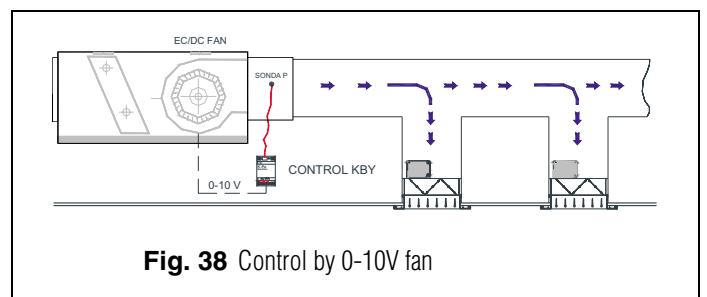
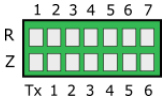
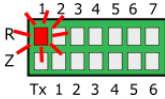
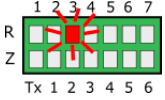
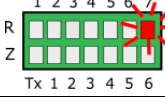
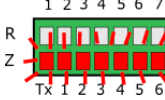
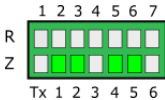
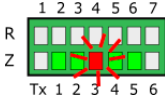
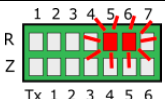
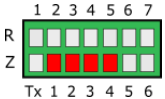
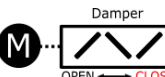
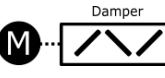
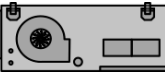


Fig. 38 Control by 0-10V fan

5 Most common errors

ERROR	INDICATOR	CAUSE	SOLUTION
1 On supplying 230 VAC to the central control unit, no LED lights up on the central control unit		Lack of voltage	<ul style="list-style-type: none"> Check that voltage is reaching the ZITY control unit (230VAC ±10%)
2 LED R1 in the row of relays is flashing. The system does not start up		Mode error	<ul style="list-style-type: none"> The operating mode is not sent. Impose a thermostat as MASTER and put the central control unit into Local mode. In the case of remote systems check that the mode is sent by channel Rs485/Rem
3 LED R3 in the row of relays is flashing. The system is blocked		Sensor error	<ul style="list-style-type: none"> NTC sensor not connected or temperature outside range.
4 LED R7 in the row of relays is flashing. The system is blocked		Communication error with interface	<ul style="list-style-type: none"> In direct expansion installations, loss of communication with the machine interface. Check connections.
4 5 minutes after switching on the central control unit, all zone LEDs start to flash and all grilles are closed		Incorrect settings	<ul style="list-style-type: none"> Check the settings of the thermostats. Make sure that they are connected to the central control unit. Repeat the learning process. In Radio systems, check whether it works at a shorter distance and relocate the aerial.
5 Some of the zone LEDs do not light up and the rest do		Learning error	<ul style="list-style-type: none"> The thermostat corresponding to the led switched off has not been recognised in the learning process. Reprogramme the thermostat and repeat the learning process, making sure that all LEDs light up during the process and that you wait 30s before completing.
6 Some of the zone LEDs are flashing and the gate valves of these zones close		Poor communication	<ul style="list-style-type: none"> The control settings have been changed since the learning process. Configure it again. Check that the thermostat is in the installation. Check the location and the batteries in the thermostats via Radio. Checking the wiring in the wired thermostats.
7 LEDs R5 and R6 are flashing		More than one master	<ul style="list-style-type: none"> There are 2 thermostats declared as Master in the installation. Re-set the thermostats in conflict and leave just one Master.
8 The central control unit does not show any error but the equipment does not start up		Timer programming	<ul style="list-style-type: none"> Check that the thermostat PROG function is not activated and whether it corresponds to a switch-off time or is not set correctly.
9 When the grille has to open it closes (and vice versa)		Motors incorrectly connected	<ul style="list-style-type: none"> Check motor connection. Polarity (black -, red +) Check that it is tested in the correct operating mode (Cold/heat)
10 One of the grilles is not working		Zone regulator connection	<ul style="list-style-type: none"> Check motor connection. Polarity (black -, red +). Check that the regulator is not obstructed.
11 All grilles are operating correctly, but the air conditioning equipment does not work		Air conditioning equipment incorrectly connected	<ul style="list-style-type: none"> Check the central control unit settings according to the type of equipment. Check the connection of the equipment with the board.

6 Technical characteristics

MADEL ATD hereby declares that the ZOE / ZEBRA / ZITY equipment complies with the essential requirements and any other applicable or enforceable provisions of Directives 2014/35/EU LVD, 2014/30/EU EMC and 2014/53/EU RED, 2011/65/EU ROHS, 2001/95/EC General product safety, 2012/19/EU RAEE and Regulation 1907/2006 REACH.

ZITY central control unit

- Power 230 VAC/50-60 Hz
- ZITY consumption: 6 VA
- Mean range Radio: 50 m in open field, 20 m in habitat.
- Orientable external antenna.
- Frequency 434.33 MHz (Optional: 433.92 MHz). Work cycle <10%
- For installation up to 2000 m above sea level.
- Receiver, CAT II.
- 230 VAC/5A relay outputs (maximum load: 5A, $\cos \phi = 1$)
- Protection grade: IP 20
- Electrical insulation protection, CAT II
- Operating temperature: 0°C to 55°C
- Storage temperature: -10°C to 60°C
- Dimensions (LxHxZ): 160x90x65 mm
- Weight 0.5 kg

ZOE Thermostat

- Power 2 1.5 V LR06 AA batteries (alkaline)
- Average battery life 1 year (or longer). The batteries are supplied with the unit
- Battery life indicator.
- Carrier frequency (ISM band, Standard I-ETS 300-220): 433.34 MHz (Optional: 434.92 MHz)
- Mean range: 50 m in open field, 20 m in habitat
- Operating temperature: 0°C to 55°C
- Storage temperature: -10°C to 60°C
- Humidity Range: 10-90% (no condensation)
- Wall mount with bolts (supplied)
- Protection grade: IP 20
- NTC10K Temperature sensor. Accuracy 0.1°C
- Configurable control hysteresis +/-0.2 to 0.5°C
- CA control accuracy according to Standard EN15500. CA=0.3 (Test report CLMS17-741. CSTB)
- Economy ECO mode ($\pm 3^\circ\text{C}$ setpoint temperature variation)
- Frost protection for $T < 7^\circ\text{C} \pm 3^\circ\text{C}$
- Dimensions (LxHxZ): 70x110x19 mm
- Weight 0.13 kg (with batteries)

ZEBRA Thermostat

- Power supply: 12 VDC
- Consumption: < 0.3 VA
- Control output: Modbus RTU Rs485
- Wiring: S <1.5 mm²
- Operating temperature: 0°C to 50°C
- Storage temperature: -20 °C to 60 °C
- Humidity Range: 10-90% (no condensation)
- Wall mount with bolts (supplied)
- Protection grade: IP 20
- NTC10K Temperature sensor. Accuracy 0.1°C
- CA control accuracy according to Standard EN15500. CA=0.4 (Test report CLMS17-742. CSTB)
- Economy ECO mode ($\pm 3^\circ\text{C}$ setpoint temperature variation)
- Frost protection for: $T < 7^\circ\text{C} \pm 3^\circ\text{C}$
- Dimensions (LxHxZ): 85x108x13 mm
- Weight 0.11 kg

WARRANTY

MADEL ATD guarantees all its products against production defects for a period of two (2) years. This period will start from the date of delivery of the merchandise to the DISTRIBUTOR. The warranty will only cover replacement of defective products, not including labour, travel, replacement of other damaged products, etc., or any other disbursement, expenses or consequential damages. The warranty will not cover the damage incurred in the products due to incorrect installation, handling or storage in poor conditions.

The procedure to follow in the case of return under warranty of the equipment of the Madel ZONING system is the following: If there is any problem, you should contact the MADEL technical support service (902.550.290) who will try to solve any problems and answer any questions about the installation. It is important to call from the place where the equipment is installed in order to carry out the necessary tests to diagnose the equipment. If any anomaly is detected, the return of the equipment for factory inspection will be authorised. Our technical support will provide a written authorisation for the return of the equipment under warranty. This authorisation can only be completed by Madel technical staff and should be attached to the equipment. It will also serve for monitoring its return, which should be made through your usual distributor.

All returned equipment must be in perfect conditions of use and must have all the initial additional components, such as sensors, aerial, etc.

ZONiNG

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