iQ Zone™

POWERED BY **A**IRZONE

CONTENTS

1. WARNINGS, ENVIRONMENTAL POLICY AND CERTIFICATIONS

1.1. Warnings

For your safety and the equipment protection, follow the following instructions:
- Do not operate the system when wet or with wet hands.
- Connect the power supply cable, before connecting the AC power.
- Perform any connection or disconnection with the power supply powered off.
- Verify that there is no short circuited connection in the connectors between different cables or with ground.
- Verify for any abnormality in the wiring.

1.2. Environmental Policy

Do not ever dispose of this equipment with household waste. Electrical and electronic products contain substances that can be harmful to the environment if they are not given proper treatment. The symbol of the crossed container indicates separate collection of electronic equipment, unlike the rest of urban garbage. For proper environmental management, the equipment to be disposed must be taken to the proper collection center at the end of its lifespan.

The components part of this equipment can be recycled. Therefore, follow the existing regulations on environmental protection in your area.

The unit must be delivered to your dealer if it is being replaced or sent to a specialized collection center if discard.

2. ZONING SYSTEM OVERVIEW

The iQ Zoning system has been designed to support a maximum of 8 zones, with a maximum of 32 Dampers. Each zone, will have an associated Thermostat. Zones and Dampers can be associated in any combination from 1:1 to 1:24.

3. COMPONENTS OVERVIEW

The Zoning System is composed by three main electronic components and a number of mechanical components like supply dampers and a bypass damper, depending on the installation.

The electronic components are:

1) Airzone Controller
2) Zone Control Module
3) Touch Thermostat

Each system will have (1) Airzone Controller, (1) Zone Control Module for each motorized damper, (1) Touch Thermostat for each Zone, and (1) power supply.

The system may also be set up with remote zone temperature sensors. A variety of dampers styles are available to be use with round or rectangular duct systems.

3.1 Airzone Controller

The Airzone Controller is the main component of the zoning system. The controller is also the interface between the zoning system and the iQ Controller.

This component performs the following functions:

1) gathers information from the Zone Control Modules
2) determine the heating and cooling capacity demand
3) determine zone ventilation requirements
4) manage the opening and closing of the zone dampers.

The Airzone Controller will also provide all the information required by the iQ Controller to control the circulating air blower and the Heating and Cooling equipment to operate at its highest possible performance.

If the Airzone Controller detects a communication problem with any of its components, it will relay the information to the iQ Controller, which will show the information in the appropriate screen.

3.2 Zone Control Module

The Zone Control Module is another important part of the system. There will be one Zone Control Module per Damper.

The Zone Control Module is the interface between the Airzone controller, the damper, and the thermostat. When the Airzone Controller commands to open or close the dampers, the Zone Control Module activates the damper motor accordingly and controls its operation. It is capable of sending error messages to the local Zone Thermostat and to the Airzone Controller if the damper is out of order or blocked. Also, the Zone Control Module communicates the temperature set point and measured zone temperature to the Airzone Controller.

The Zone Control Module stores all parameters related with the zone and has additional capabilities such as:
1) accepting inputs from window or door contact switches
2) motion detector input
3) optional remote temperature sensor input

If the Zone Control Module detects a communication error with the thermostat or an operation failure with the associated damper motor, it will send an error message to the Airzone Controller, which in turn will relay it to the iQ Controller.

3.3 Touch Thermostat

The Touch Thermostat is the interface between the User or Installer and the Zoning System. The Installer will set the Zone Control Module parameters through the thermostat. Those parameters will be saved in the Zone Control Module during a power loss. As for the user, the thermostat will be used to set the zone temperature set point, local ventilation mode, Sleep mode and the time schedule setup.

The Touch Thermostat will allow the user to access any other zone and set the set point temperature, without the need to go to the zone to make the change.

When the environmental conditions in a given zone do not allow the installation of a Touch Thermostat (such as a bathroom), a Remote Temperature Sensor must be used. A thermostat is still required for the zone. In these cases, the Sensor is placed in the space where the temperature needs to be controlled. The thermostat will provide the same user interface functions for the zone.

4. ZONING SYSTEM OPERATION

Some important characteristics of the iQ Zoning System are:

A) It operates with 12 VDC
B) It runs a single 4 conductor, stranded and shielded cable to all system elements
C) The dampers are powered open/powered close
D) The way the Airzone Controller communicates with the Zone Control Modules is based on a communication protocol.
E) It communicates with the iQ Controller over two data wires.

Because of the flexibility of the Zoning System, and the High Performance objectives, each zone requires the setting of some basic parameters in order to activate the system. Those parameters must be set by the installer at the initial power on of the Zoning System and before enabling the Zoning from the iQ Controller. Those basic parameters will indicate:

1) if the Zone Control Module will be a Master or Subordinate
2) the Zone Control Module address
3) Zone weight for a Master Zone Control Module
4) Master Zone number if the Module is defined as a Subordinate.

Each individual Zone Control Module requires a different address to be able to communicate with the Airzone Controller. Zone Control Modules that will have a Thermostat connected to them will have addresses ranging from 1 to 8, and they are called "Master Zone Control Module", while Zone Control Modules that will follow a given Master Controller, will have addresses ranging from 9 through 32. Those Zone Control Modules are called "Subordinate Zone Control Modules".

While the Master Zone Control Module will have stored the Zone Weight, the Subordinate Controller will store the Address of the Master Zone Controller to which it is subordinated.

Subordinate Zone Control Modules have to be used when a given zone requires the use of more than one damper, because of the ductwork layout. In such a situation, to allow the whole zone to be properly conditioned, all dampers will need to be controlled by the single Thermostat connected to the Master Zone Control Module.

5. WIRING

The Zoning System wiring is very simple, but great care must be taken during its lay out and connection. All wiring must be laid out with Plenum Cable, AWG20, Shielded type Belden 6402FE or equivalent. The cable should NOT be stapled in place. If it is required to have the cable fixed to any part of the building structure, clamps with cable protection should be used. DO NEVER strangle the cable.

Failure to follow these recommendations may result in an unreliable installation that will seriously affect the operation of the iQ Zoning system.

Improper wiring is one of the two major causes of installation problems. Care must be taken in following the cable or connector colors table, shielding, tightening of connector screws, short circuits, etc.

Another cause of installation problems is incorrect parameter setting. This can be avoided by writing down were each Zone Control Module is located and how are they configured (mainly Zone Control Module addresses, and master-subordinate relationships).

5.1 Preparing the cables for wiring

All wires that will end in a connector should be prepared as shown below

Fig.1
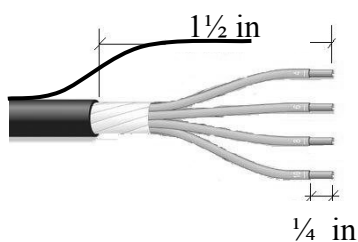
If the cable will end inside the thermostat base, then this is the recommendation to prepare the cable:
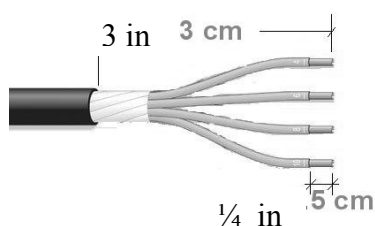

Fig. 2

Notice that when the cable ends at the thermostat base, the shield wire must be cut down, and the shield itself should finish outside of the thermostat base. It is important to follow this recommendation to avoid installation problems related to electrical noise.

5.2 Wiring recommendations

Previous to the wiring lay out, draw a plan schematic, where the thermostats will be located, and then where the dampers will be installed.

Based on the wiring lay out diagram, the cable can be laid out starting from where the Airzone Controller will be installed, (normally next to the AHU or furnace), and from there to the closest damper, and thus following to the other dampers in the System.
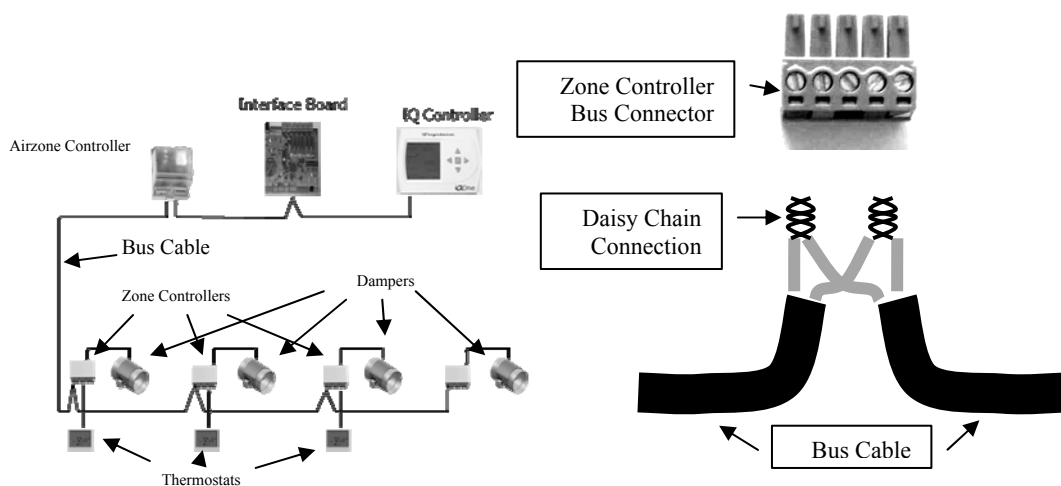Please, see below a typical wiring lay out and Daisy chain connection.

Fig. 3

As mentioned before, shielding is an important factor in the wiring, and it has to be correctly done. Always keep this in mind:
  a) The shield will be connected only to one connector in the system, and that will be the ground connector in the Airzone Controller
  b) At the Zone Control Modules, the shields of inbound and outbound communication cables, and the thermostat cable will be connected together, and isolated. Do not connect the shield to the Zone Control Module Connector.

The cable that connects the thermostat with the Zone Control Module should not exceed 45 ft. Exceeding this length will cause zone operation malfunction.

There may be situations where the distance between the Thermostat and the associated Zone Control Module is more than 45ft. In cases like this, the Zone Control Module can be installed in some place closer to the thermostat. Obviously, such action will require an extension of the Damper motor cable. If the damper motor cable needs to be extended, AWG 18 bicolor cable is required. Be extremely careful to keep the color code when extending the motor cable. The Zone Control Module has engraved in the box "M+" and "M-" showing where the red and black cables must be connected. If proper polarity is not followed, the damper will close when it should open and vice versa.
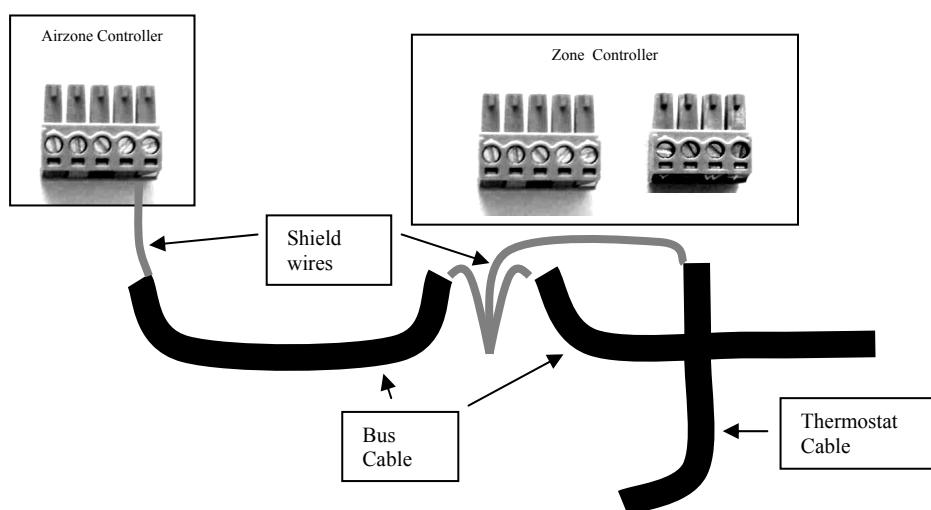
Fig. 4

6. AIRZONE CONTROLLER

6.1 Description and Configuration

The Airzone controller has several inputs and outputs as shown below:
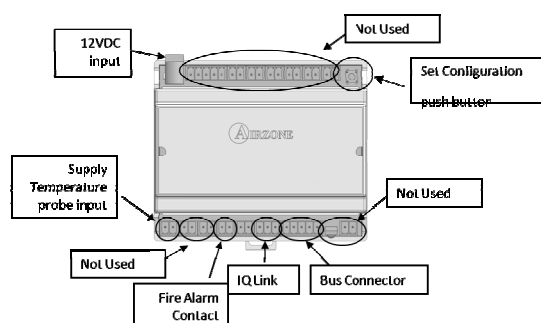
Fig. 5

6.2 Connecting the Airzone Controller

12VDC. The Airzone Controller must be connected to an Airzone Supplied Power Supply. The power supply can be connected to any voltage between 100 VAC and 240 VAC.

Set Configuration Push Button. Once all modules are configured and there are no errors detected, the installer must press this button to save the configuration table in the Airzone Controller. The button must be kept pressed while the IQ Bus Activity/Configuration LEDs stay ON (please, see below IQ Bus Activity/Configuration LEDs).

iQ Link. The cable that connects to the A and B wires in the iQ Interface Board (in the AHU or furnace), must be connected to the A and B terminals of the three pin connector. A and B identification is labeled above the Airzone Controller PC board.

Bus Connector. The identification for the terminals is printed on the PC Board. The wiring must be done according to the following color coding.

Label	Color
Ground	Bare wire
A	White
-	Black
B	Green
+	Red

Fire Alarm Contact. This contact is an open/close circuit sensor. It will detect fire alarm active when it detects an open circuit. If there is no fire alarm connected to it, this contact should be short circuited. (Normally this will be set by the factory). When a fire alarm condition is detected, the Airzone Controller will force all dampers to close, and will inform the iQ Controller of the condition. The iQ Controller will force the system to shut down.

Supply temperature probe input. This input requires a temperature probe connection (supplied with the Airzone Controller), to protect the unit from overheating or overcooling. The probe has to be installed in the supply duct, using the supplied grommet, and being sure that the tip of the probe is exposed to the airflow.

The Airzone Controller has a micro-switch bank that must be set for normal operation. Only one switch has to be changed for normal operation.

Microswitch #8, Must be set to ON. All other MUST be set to OFF (default).

Microswitch # 6 setting depends on the customer request, and it selects the Temperature Units. Switch ON is to operate in F, and OFF is C. (Please check with your support if you need to set up the system to Celsius).

There is also a Jumper (J2), that does not affect the system operation. Before commissioning the System for Customer use, this Jumper must be moved to the ON position. The reason for this jumper, is to activate the battery to keep the clock running in the event of a power outage, and thus avoiding to setup the time and time schedule set points.
In addition, the Airzone Controller provides visual information to help diagnose some operation problems:
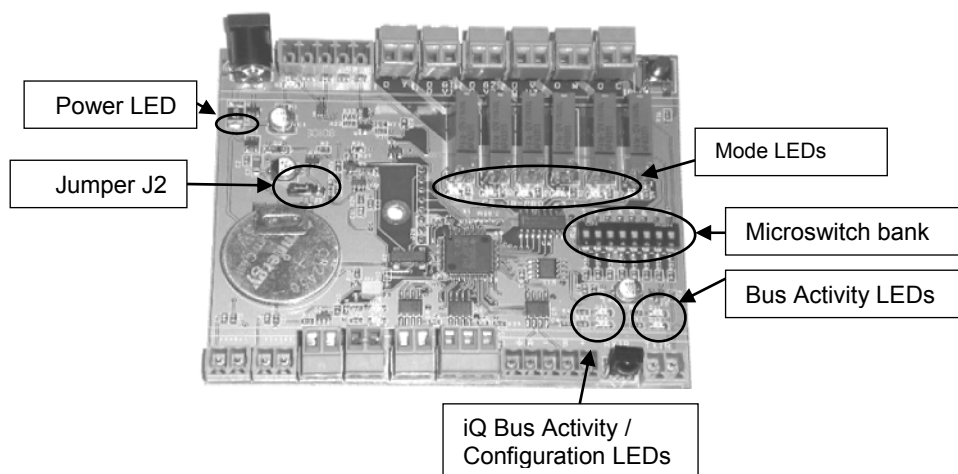
Fig.6

Power LED. This is a red LED that will be ON all time the power supply is connected and active.

Mode LEDs. This set of LEDs provides indication of which mode the IQ Controller has the AC unit working. These are the assignments:
D4: Stop/OFF
D5: Cool
D6: Heat
D7: System Wide Ventilation
D8: Zone Ventilation
D9: Start Bit ON

Bus Activity LEDs. This is a set of green/red LEDs. When the bus is running normally, both will be blinking. If only one is blinking (red), then it means that the bus is not connected to the Zone Control Modules.

iQ Bus Activity/Configuration LEDs. In normal operation, this set of green/red LEDs blinking, indicates that the Airzone Controller is communicating with the iQ Controller. During the process of saving the configuration setup, the LEDs will be ON while receiving information from the Zone Control modules, and will return to OFF once the configuration is saved.

6.3 Installation

The Airzone Controller must be installed mounted on a DIN rail, provided together with the controller, and next to the AHU or furnace.

To install the controller:
1) Attach the DIN rail to a firm surface near the air handler or furnace (Fig.).
2) Place the upper part of the controller (with the power supply receptacle at the upper left) on the upper edge of the rail.
3) Using a screwdriver, *gently* pull downward on the release tab (at the center of the lower edge of the controller) and snap the controller onto the lower edge of the rail.

4) To disassemble, *gently* pull downward on the release tab, and remove the controller from the DIN rail.
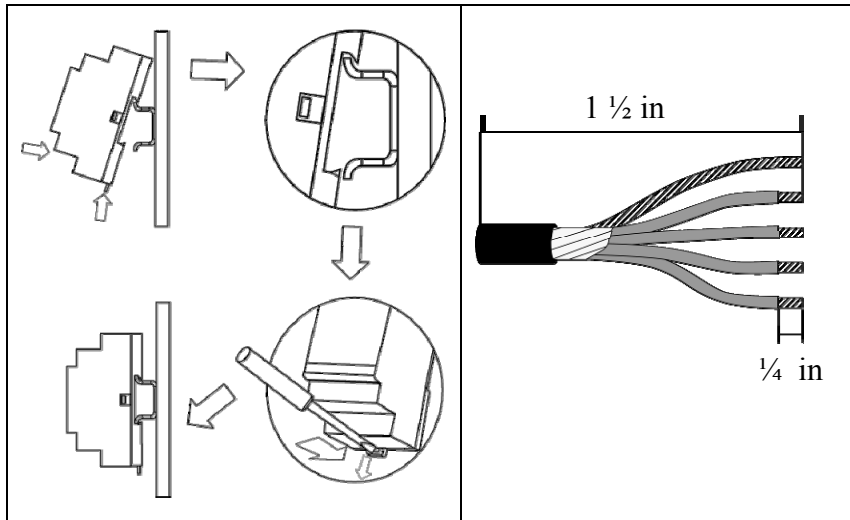

| Fig. 7 | Fig. 8 |

Strip the communication bus cable outer sheath to expose approximately 1½ inches of wire. Strip the wires' insulation approximately ¼ inch (Fig.). Twist the strands, insert the stripped ends into the corresponding connector terminal, and tighten the screws until fixed.

7. POWER SUPPLY

7.1 Functional Description

The universal auto detection power supply has been designed to provide the necessary current and voltage to the Airzone zoning system.

7.2 Component Description

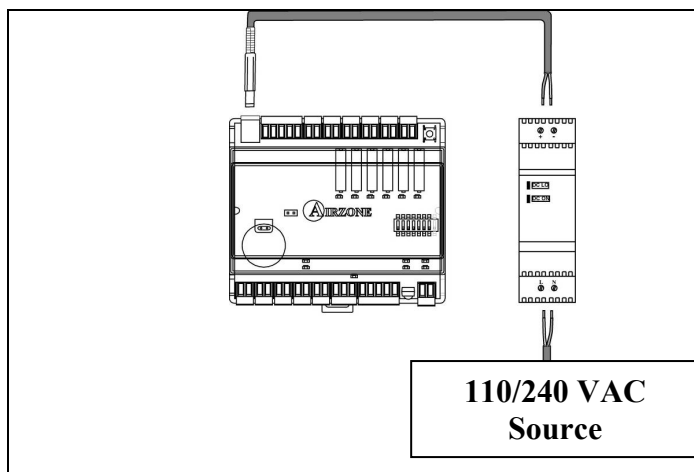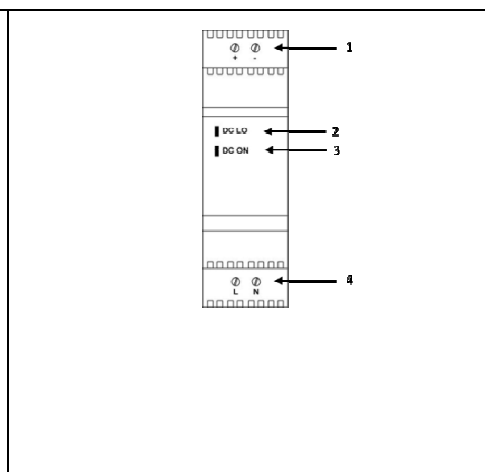|	Nº	
		Description
	1	Output Voltage 12 VDC
	2	Error indication LED (red)
	3	Operation LED (green)
	4	Power supply 110/240 VAC

Fig. 9- Power supply connection

Fig. 10

7.3 Assembly and Connection Instructions

Ventilation holes must be kept clear for a minimum clearance of 1 inch (25 mm) on all sides. To mount, tilt the top of the unit backwards and clip the top edge of the lock onto the metal rail. Tilt the bottom of the unit backwards and click into place.

Ensure that cables used are suitable for the load (see technical data below). Ensure that cables are correctly stripped and fitted. Ensure correct polarity at input and output terminals. The red wire must be connected to the (+) terminal and the black wire to the (-) terminal.

The internal fuse protects the unit and is not user-replaceable. In the event of an internal failure, the unit must be returned to the manufacturer.
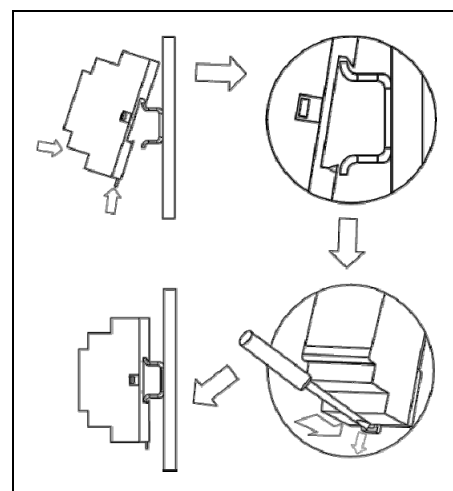
Fig. 11- Rail assembly

8. ZONE CONTROL MODULE

8.1 Installing the Zone control module

This item should be assembled onto the guides located on top of the damper motor box. Disconnect all the connectors, fit the module into the rail on the side of the motor box and slide until fully inserted. Thus the zone module is normally installed mounted to the damper motor, as shown in the following figures. (It is possible, however, to locate the module remotely from the damper motor if necessary, such as to comply with bus wire length limitations. In this case the wiring between the damper motor and the module must be lengthened accordingly.):

| Fig. 12 | Fig 13 | Fig 14 |

8.2 Connecting the Zone control module

The Zone control module has several connectors as shown below
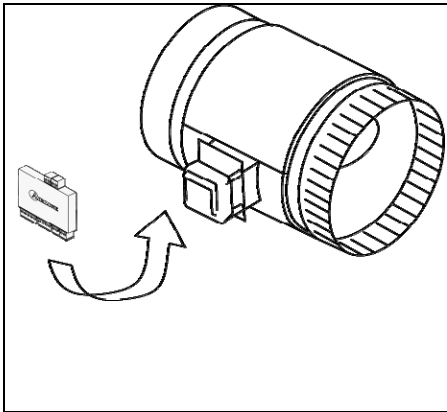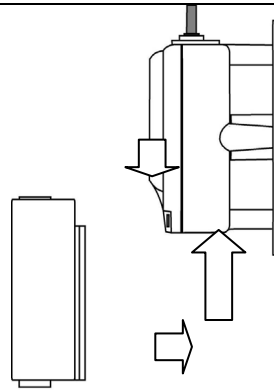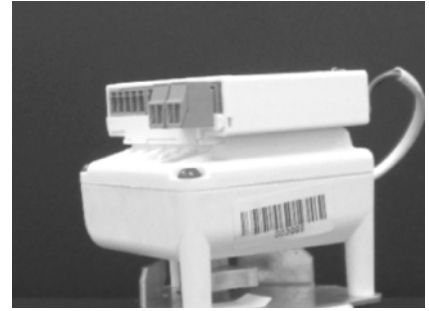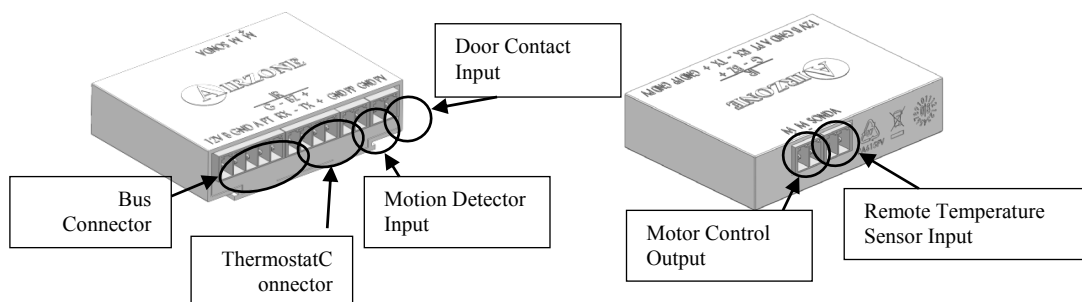

Fig. 15

Bus Connector. This is a 5 terminal connector used to connect the internal bus cable. The function of each contact is engraved in the box.

Thermostat Connector. This is used to connect the Thermostat cable to the Zone Controller this is a 4 terminal connector. The function of each contact is engraved in the box.

Motion Detector Input. This is a dry contact connector. If the user decides to use the functionality of the motion detector, its contact cable has to be connected here. DO NEVER use the 12VDC supplied to the Zone control module to power the Motion Detector. The motion detector is not provided by Airzone or Nortek Global HVAC, and can be purchased in a hardware store. It has to supply NO or NC dry contacts.

Door Contact Input. Same as before, this is a dry contact connector. If the user wants to use a Window or Door Contact, the device can be purchase in a hardware store, and it has to provide NO or NC dry contact.

Motor Control Output. This two terminal connector connects to the damper motor. Engravings in the box shows M+ and M- signs to indicate the positive (red) and negative (black) wires to the motor.

Remote Temperature Sensor Input. This is a two terminal connector, used to connect, when needed, a Remote Temperature Sensor. The sensor has to be purchased as an accessory with the iQ Zoning System. DO NOT USE any remote sensor from any other source. This device is recommended for high humidity locations such as a bathroom or when the zone Thermostat cannot be located where the zone temperature is to be measured.

Fig 16

8.3 Configuration Parameters (Installer Parameters)

The Zone control module has a number of parameters that have to be configured. As indicated before, the Zone control module requires the use of a zone Thermostat to proceed with its configuration.
This is a list of the parameters, their description, and possible selections.

ᴢᴄᴏn Indicates if the Zone control module will have a thermostat connected to it (ᴍᴀ5) and be configured as a Master or will follow the lead of another Zone control module that has a Thermostat connected to it. In this case, this Zone control module is called a Subordinate, and it will have this parameter set to 5ᴜb.

Note. Given that Subordinate Zone control modules will not have a thermostat attached to them, it is required to connect a thermostat temporarily to it, to configure the Subordinate Controllers.

ᴢᴄ ıd **Z**one **C**ontroller **ID**. This is the address that the Zone control module will have to be given so that it can be properly addressed by the Airzone Controller. There cannot be more than one Zone control module with a given address. If the previous parameter was set as Master, the range of addresses allowed is from 1 to 8; if the Controller was designed as Subordinate, the address range will go from 9 to 32.

PErᴄ Zone weight **PERC**entage. If the Zone control module is configured as Master (ᴍᴀ5), the weight percentage must be entered into this parameter. This value goes from 10% to 100%, and represents the proportion of CFM that the zone is using, related to the maximum nominal CFM supplied by the AHU. This parameter will not be available in Subordinate Zone control modules.

ᴛᴄ ıd: **T**hermostat **C**ontroller **ID.** If the Zone control module is a Subordinate, it will be required to define this parameter. The range will be defined by the number of zones (or Master Zone control modules) in the installation. Only existing Master Controller's addresses will be shown when setting this parameter. For example if the Master Control module ID for the living room is 06, and a Subordinate control module needs to control a damper that will serve the living room, then the ᴛᴄ ıd for this zone control module will be 06. It is very important that when configuring a Subordinate Zone control module, the Master Zone control module of that zone, is connected and the thermostat is ON, otherwise, that address will not be available to be selected. It is highly recommended that the installer have an "installation Thermostat", that is, a regular thermostat with its cable, that can used as a tool to configure Subordinate Control modules and diagnose wiring problems on the installed thermostats.

ᴢᴄᴘᴄ: **Z**one **C**ontroller **P**robe **C**onfiguration. (Only in a Master Zone control module). When a Remote Temperature Sensor has to be used with a Zone control module to measure temperature where environmental conditions are beyond the operational conditions required by the Thermostat, this parameter must be set to rPᴛ, otherwise it should stay as the default (ᴏғғ)

$2[5l$: **Z**one **C**ontroller **S**leep **I**nput. When the customer decides to use a motion detector to add another level of efficiency to the air conditioning system, this parameter has to be activated in the Master Zone control module. The possible settings for this parameter, are $0FF$ (default, no motion sensor attached), $n0$ Motion Sensor attached, Activates when closing the circuit, $n[$ Motion Sensor attached, Activates when opening the circuit

$2[rl$: **Z**one **C**ontroller **R**emote **I**nput. When the customer decides to use a door or window contact detector to add another level of efficiency to the air conditioning system, this parameter has to be activated in the Master Zone control module. The possible settings for this parameter, are $0FF$ (default, no remote contact sensor attached), $n0$ Door Contact Sensor attached, Activates when closing the circuit, $n[$ Door Contact Sensor attached, Activates when opening the circuit

$5bdt$: **S**tand **B**y **D**isplay **T**emperature. This parameter allows to select if the thermostat will normally show the ambient temperature (parameter value At) or the set point temperature (parameter value $5t$)

$0F5t$: Offset. This parameter allows the Installer to adjust the zone temperature reading and display in a range from -5 ℉ to 5 ℉.

The following are read only parameters that allow the service person to know the firmware version of all components in the system.

$2[Fu$ **Z**one **C**ontrol Module **F**irmware **V**ersion

$2tFu$ **Z**one **T**hermostat **F**irmware **V**ersion

$5[Fu$ **S**ystem **C**ontroller **F**irmware **V**ersion (Airzone Controller)

9. THERMOSTAT

9.1 General Description

The Touch Thermostat, is the access panel for the installer to configure the Zone control module, and also, for the user to change the temperature setting for the zone and configure time scheduled set points.
There are no push buttons, jumpers or any mechanical hardware in the thermostat. The only access to the thermostat is its touch panel screen.
The thermostat measures the ambient temperature, and stores the zone's time schedule set points.
If the thermostat is set to OFF, it will normally have the dampers closed. However, when the IQ Controller sets the operation to wide ventilation mode, enters into calibration mode, or if the Zoning is disabled from the IQ Controller, all dampers will open regardless if the thermostats are ON or OFF

In general, the following considerations must be taken into account for thermostat location:

- Locate the thermostat where it is exposed to air circulation typical of the room(s) comprising the zone.
- Do not locate the thermostat where it will be in direct sunlight (Fig.).
- Do not locate the thermostat where it is exposed to air currents. (Fig. 1).
- Do not locate the thermostat over sources of heat (Fig. 2).
- Do not locate the thermostat on external walls.
- Do not locate the thermostat near a register.
- Do not locate the thermostat in high humidity locations such as a bathroom. A remote temperature sensor should be used in these applications.
- It is advisable to locate the thermostat at a height h of between 55 to 70 inches (1.4 to 1.8 m) above the floor of the room (Fig.).
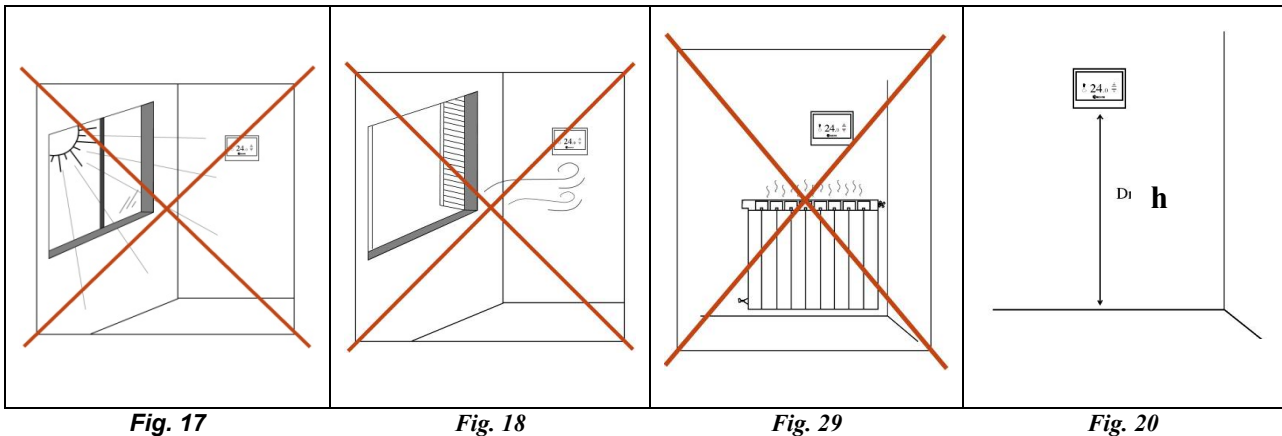
Fig. 17	Fig. 18	Fig. 29	Fig. 20

The thermostat consists of three parts: base, cover and touch screen. Follow these steps for correct installation and wiring:

1) Attach the base to the wall with two screws, passing the communication bus wires through the circular hole provided.
2) Separate the cover from the touch screen, using the slot provided in the bottom of the cover (use a coin to do this rather than a sharp object).
3) Pass the communication bus wires through the hole in the cover. Mount the cover onto the two top hinges, pushing the center of the cover so that the tabs of the base stick through and retain the cover (Fig.). The cover may be positioned at a slight angle or parallel to the wall.
4) Connect the communication -bus wires to the terminals on the cover (see electrical diagram). Insert them under the metal tabs, and screw firmly in place (Fig.).
5) Mount the top of the touch screen onto the hinges of the cover. Pull gently down and back until the two parts are joined (Fig.).
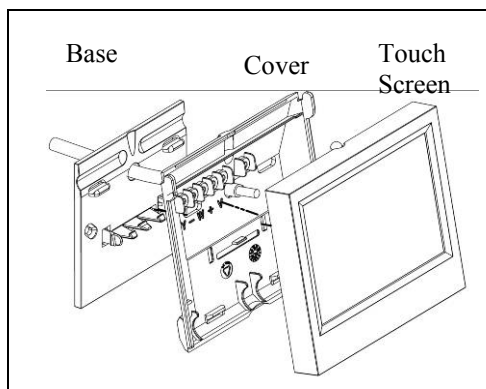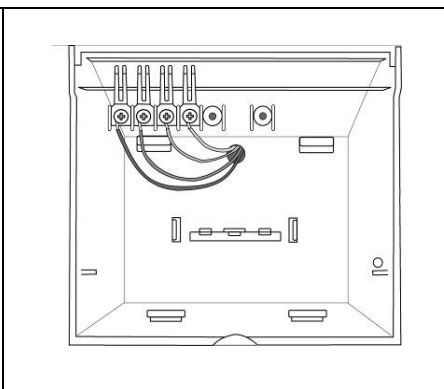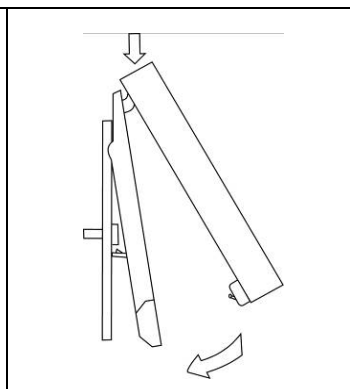
Fig. 21   Fig. 22   Fig. 23

NOTE: Take care when connecting the wires so that strands do not come into contact with other terminals or with the circuit board of the touch screen. Be sure the cable shield and ground wire are left outside the thermostat base so they do not contact the circuit board of the touch screen.

Please, refer to the User Manual to learn the use of the User Settings and how to define the Time Scheduled Set Points

9.2 Icon Description

It is very important to be familiar to the icons in the thermostat, not only for installation process but also to understand and support the end user, on service calls.
Following are shown the thermostat icons related to a given functionality, for simplicity reasons.
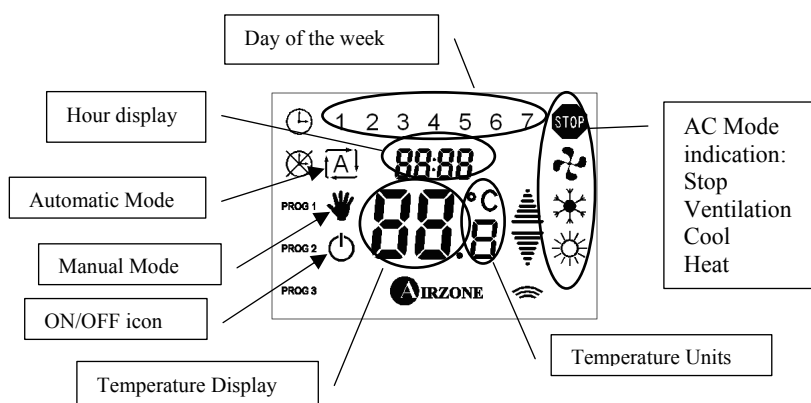
9.2.1 Normal Display Icons

Fig. 24

AC Mode: The AC mode is set in the IQ Thermostat. When the temperature display is touched the Mode Icon will flash for 5 seconds.

Temperature Units: It will show if the temperature reading is set for Celsius or Fahrenheit.

Temperature Display. In normal mode it will show the ambient temperature. By giving a short touch on the display, it will show the set point temperature.

ON/OFF icon. It is used to power the thermostat ON or OFF. If the thermostat is set to OFF, the associated zone will be inactive.

Manual Mode. If on, it will indicate that the set point temperature is set manually. When the thermostat is used in Automatic Mode, Manual mode is the equivalent to Permanent Hold.

Automatic Mode: When on, indicates that the thermostat is following a time schedule set points, and in such situation, the temperature display should show the set point temperature for the active program. The customer will not be able to change the current set point, unless it goes to Manual Mode first.

Important Note: If the user sets the thermostat for Automatic Mode, and there is not a program set up for the current time and day, the thermostat will go automatically to OFF mode, and will stay there until the mode is set to Manual.

Hour Display. In normal mode, it will show the time of the day, in 24 HR format.

Day of the Week. It will show the current day of the week, representing Monday with the number 1.
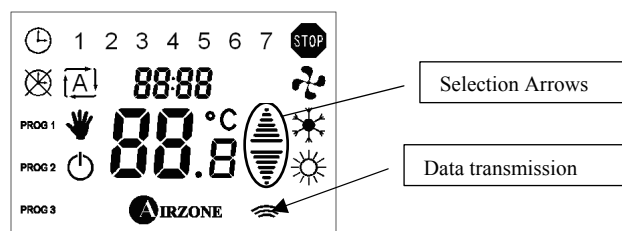
9.2.2 Temperature Set icons

Fig. 25

Selection Arrow. The selection arrows will appear in the display when the thermostat enters in the set point temperature mode. The arrows will increase or decrease the set point temperature in 1 F or 0.5 C, depending on the units being used.

Data Transmission icon. This is an important icon as it provides a level of troubleshooting. Each time a parameter or temperature is changed, that information is sent to the Zone control module, and the Data Transmission icon will flash, indicating that the data was sent. When an acknowledge is received from the Zone control module indicating that the information was received without errors and stored, the Manual mode Icon will blink once.
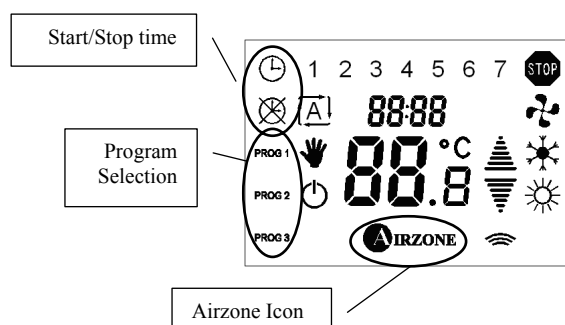
9.2.3 Time Schedule Set Points Icons

Fig. 26

Start/Stop time. The clean Clock Icon will blink to indicate that the day and time for a given program is the start day and time. Similarly, the crossed out clock blinking, indicates the program end time.

Program Selection. These icons will appear when entering the time schedule set points, and will allow the user to select and configure any of the three program mode.

Airzone Icon. This icon will allow the installer and user to enter to different configuration modes, and when into the parameter configuration mode, it will be used to enable parameter change and to confirm its selection.

10. ZONING SYSTEM INSTALLATION PROCEDURE

Once the wiring is layered out and verified, proceed to connect the modules, power on the AZCB, verify the wiring in the thermostat bases, and install the thermostats on them. All thermostats should show the start-up screen indicating that the initial setup should be executed. As a general guideline, keep in mind that a blinking value for a parameter means that the parameter is enabled to be changed. If the parameter is not blinking, make a short touch on the Airzone icon to enable the parameter change, and select the new value with the arrows. To set that parameter, a short touch on the Aizone icon, will store that parameter in memory. When that happens, the parameter will stay on.

10.1 Initial Configuration

Be sure, before starting the initial configuration that all thermostats are ON during the whole process. If any thermostat at the initial power on shows a non-blinking parameter, it means that it was previously configured. This will not be the case in a new hardware installation. If the parameter is not blinking, the installer must to perform a module reset procedure (please see section 9.4 below).

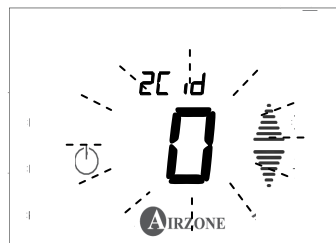## 10.2 Master Zone Control Module Initial Configuration

As said before, at initial power on, all thermostats will start in the initial set up screen, requesting the set-up of the three initial parameters of the associated zone control module.

The first parameter to set, will indicate if the associated zone control module will have a thermostat attached to it (master) or not (subordinate). Because the way the configuration process is designed, it is recommended that the Master Zone control modules are to be configured first.

This is the very first screen that the installer will see:

Where the default value will be flashing. When the Zone control module has a thermostat attached to it, this parameter has to be changed to MASTER. To do so, touch the up arrow once. Now, $\overline{m}A5$ will be flashing. To set this parameter touch on the Airzone icon once. That action will cause the $\overline{m}A5$ to stay fixed and the next parameter request will appear on the screen.

After setting the Zone control module parameter to MASTER, the screen will appear as follows:

The second parameter, will request the installer to assign to the Zone control module its network address ($2C\ id$). The address range for a Master Zone control modules are 1 to 8.

Initially, address 0 will be blinking, however, <u>No Zone control module address can be configured as 0</u>, therefore, the installer has to scroll to the next available address number. If there are no other Zone control module already configured, the first number will be 1. However, the installer can choose any number from 1 to 8, by choosing the one desired with the arrow keys. If there is any other Zone control module already configured, its address will not appear as available when scrolling the addresses with the arrows. For example, if there is one Zone control module already configured with address 2, when scrolling the available addresses, it will show 1, 3, 4, 5, 6, 7, 8, and back to 1. Like before, when the selected address is flashing on the screen, by pushing the Airzone icon, it will set the parameter, and the screen will go to the third parameter, which is $PErC$.

PERC represents the Zone Weight. This is the Zone CFM related to the nominal CFM delivered by the System. Given that the ductwork was designed to evenly distribute conditioned air to every room in the house, the size of the ducts connected to a given area will give the installer a good idea of the Zone's CFM share. For example if the System delivers 900 CFM (3 Ton unit), and the Zone takes 200 CFM, then the PERC will be (200/900) x 100= 22%.

The PERC range is from 10% to 100% in steps of 1%. When scrolling with the arrow keys, the display will show the balance of PERC remaining from 100%. Therefore if a zone was already configured with PERC= 20, the display will show 80, and the installer has to choose the percentage for the zone that is being configured. This is done to help the installer to properly adjust and balance the required CFM by zone in the house. This is a very important factor to achieve maximum comfort and efficiency from the iQ Zoning System.

When the thermostat enters into this parameter setup, the display will look like the following

When the selected value is flashing on the screen, a touch on the Airzone icon will set the parameter, and force the thermostat to the OFF mode, exiting from the initial set up mode. Upon entering this parameter, the thermostat will go to OFF mode. Be sure to power it on again before proceeding to configure the next Zone control module.

10.3 Subordinate Zone Control Module Initial Set up

Once all Zone control modules with a thermostat attached to them are configured, all those Zone control modules that are subordinated to each Master Zone control module, must be configured. To be able to configure those Zone control modules, a thermostat has to be temporarily connected to them.

When connecting the auxiliary thermostat it will show the same screen as before. The 2Con parameter in this case has to be set to 5Ub, with a touch on the Airzone icon. The following parameter, same as for the Master Zone control module, will be the address (2C id). In this case the address available range will be from 9 to 32. Once the address is selected, the next parameter will be tCl d.

tCl d, stands for Thermostat Controller ID, or in other words, is the address of the Master Zone control module to which this zone control module will be subordinated. When scrolling with the arrow keys, the display will show the addresses of all the Master Zone control modules that have a thermostat connected to it. If the Master Zone control module does not have a thermostat connected to it at the time of the configuration, its address will not show

as available. This is the reason why it is recommended to use a separate thermostat to configure the Subordinate zone control modules.
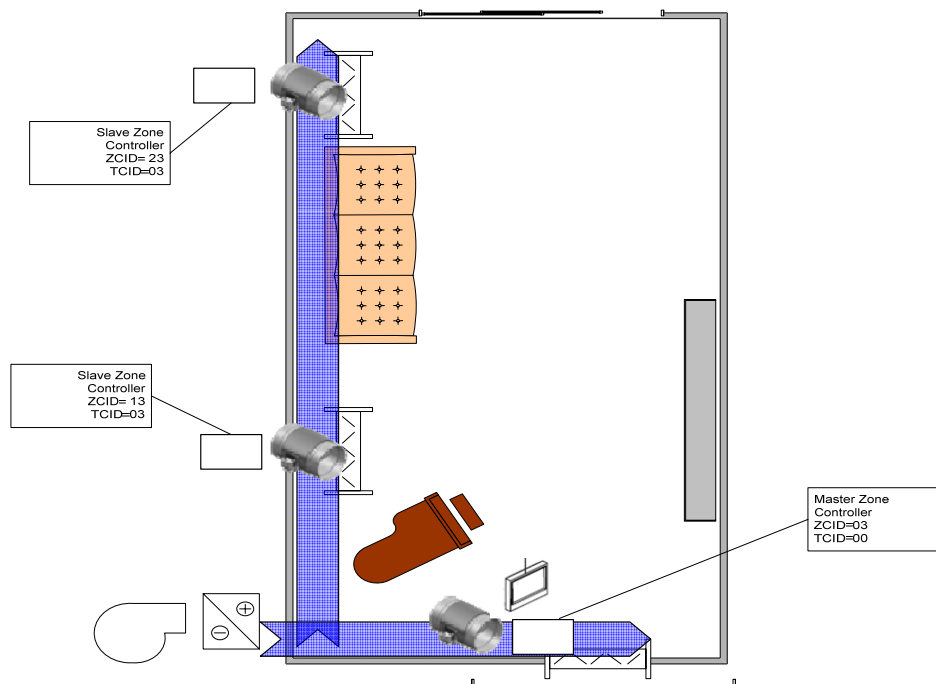
The figure above shows an example of a Master Zone with two Subordinate Zones. While the Master Zone will have $2C$ $id=03$ and $tCId=0$, indicating that it has a thermostat connected to it, the two Subordinate Zones have $tCId=03$, indicating that they are Subordinates of the Zone control module 03. The addresses of the Subordinate Zones can be any number between 09 and 32. They do not need to be sequential. The installer can choose any address of his/her choice.

Upon entering this parameter, the thermostat will go to OFF mode. Be sure to power it on again before proceeding to configure the next Zone control module.

10.4 Zone control module General Parameters

### 10.4.1 Entering the Installer's Parameters area

After the initial configuration, the installer must configure the general Zone parameters, both in the Master Zone control modules and the Subordinate Zone control modules.

There are two steps to enter the Installer's Parameters area.

With the thermostat in OFF mode, like shown below:

Push on the Airzone icon and hold until the thermostat enters into the icon test mode as shown in the figure below:
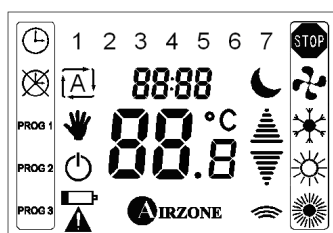

Once past the icon test, the thermostat will show the ambient temperature, but different from the normal mode, it will not show the Manual icon or the time, but the characters *tEriP* instead. That will indicate that the installer can execute the second step to enter into the Installer's Parameters area.
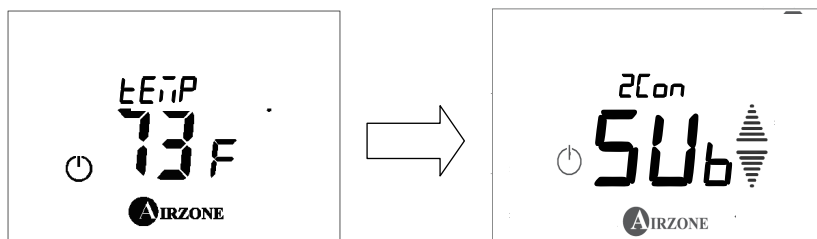
A second push and hold of the Airzone icon will make the Zone control module enter into the Installer parameters mode and the first parameter (*2Con*) will appear on the screen. But this time the setting *riAS* (or *5Ub* if a Subordinate Zone) will be fixed.

When cycling through the different parameters with the arrow keys, all of them will show fixed either because they were previously set. Otherwise, they will be the default values.

Scrolling through the parameters with the arrow keys will use the following sequence:
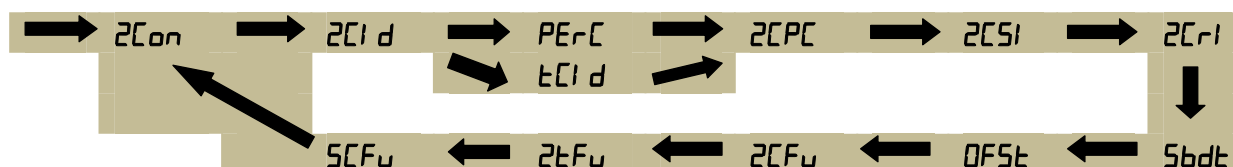
11.2.2. Changing a parameter

From the Installer's parameter menu
scroll with the up/down arrows until
the parameter to be changed shows up.

Make a short touch on the Airzone icon
to enable the parameter change. The
current parameter will start blinking

Change the parameter value with
the selection arrows until the desired
value shows in the screen.

Set the selected value, with a short
touch on the Airzone icon. The selected
value will stay on.

11.2.3 Exiting the Installer Parameters Area

At any time during the configuration process, the installer can exit the Configuration Mode by touching the ON/OFF icon. This will put the thermostat in the OFF mode. Touch the ON/OFF icon again to turn it back to ON which is the normal operation mode.

### 11.2.4 Resetting a Zone Control Module

If on the initial power ON the thermostat displays the ambient temperature, it means that the Zone control module already has a configuration saved. New Zone control modules from the factory will not arrive with a saved configuration. It is recommended, in such a situation to reset the Zone control module, and proceed to configure it from the beginning. To reset the Zone control module to default factory values, follow this procedure:
Enter in the installer parameter area.
Temporarily, change the setting of the 2COn parameter. This action will force the Zone control module to enter into the reset mode.

Upon confirmation of the parameter change, the next parameter that will show in the screen will be r5t.

Select ON with the arrow keys and confirm with a touch to the Airzone icon.
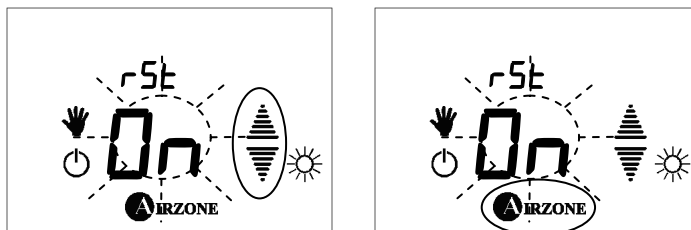
The thermostat will go to the initial setup screen

At this point the thermostat is ready to enter into the Initial Configuration (section 11.1)

11. ACTIVATING THE SYSTEM CONFIGURATION

Once all parameters have been set, the installer needs to indicate to the Airzone Controller that the configuration has been set, and the system is ready. This is done by pressing the Set Configuration button on the Airzone Controller. While pressing and holding the Set Configuration button LEDs D13 and D14 will light up. Continue pressing the button until both LEDs turn off.

The Airzone Controller is now ready to be connected to the iQ Controller.

12. DAMPERS INSTALLATION

Dampers must be installed in full compliance with the local building code. Since the iQ Zoning dampers are not spring loaded, they have no air flow direction restrictions. Always install the dampers in such a way that there will be proper access for maintenance. If the damper has to be installed in a limited access area, install the Zone control module remote from the damper in an accessible place. Extend the damper motor cables using AWG18, bicolor, two conductor stranded cable. In horizontal ducts, avoid installing the damper with the motor underneath the duct. Although the motor is protected, having the motor on the side of the duct is the ideal location.

12.1 Circular motorized damper retrofit (cmdr)

12.1.1 Functional Description

This device is designed to be inserted in existing metallic round ducts to upgrade the house to use zoning systems with minimum changes. Once inserted in the duct, it will act as a regular circular damper controlling the air flow in the duct as commanded by the zoning system.

12.1.2 Component Description

The damper is composed of a gate with rubber foam to seal the duct, a face plate with rubber foam to seal the installation, and a motor.
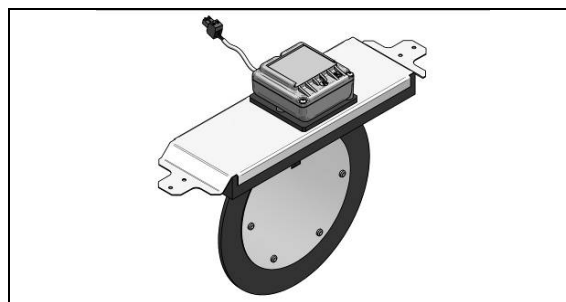

Fig. 3 - Retrofit round damper

12.1.3 Assembly and Connection Instructions

Follow this procedure to install the Retrofit Round Damper:
1) Align the cut out template supplied with the damper along the center of the metal duct.(Fig. 4).
2) Make a cut out in the duct according to the shaded area in the template.
3) Drill two screw bite holes on each side where the circles in the template are located. It is important to have the damper installed properly to avoid interferences between the damper mechanism and the edges of the cut out area.
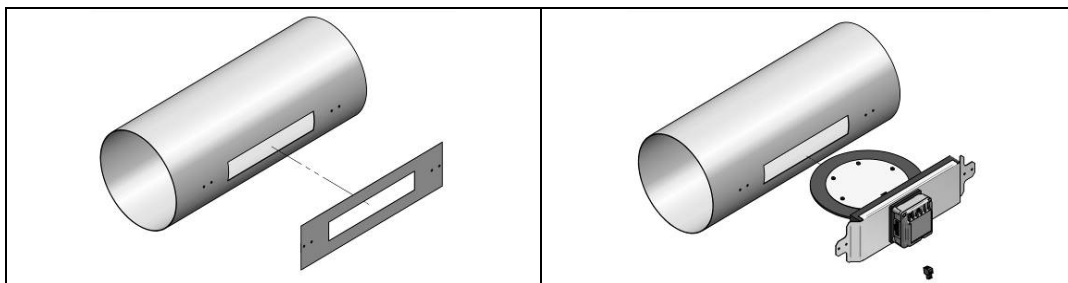4) Insert the damper and attach it to the duct with (4) sheet metal screws. (Fig. 5).

| *Fig. 4* | *Fig. 5* |

13. ROUND MOTORIZED DAMPER (RMDN)

13.1 Functional Description

This damper is designed to be used either in-line with flexible, solid fiber, or metal ducts. It controls the air flow into an area, under the command of the zoning system.
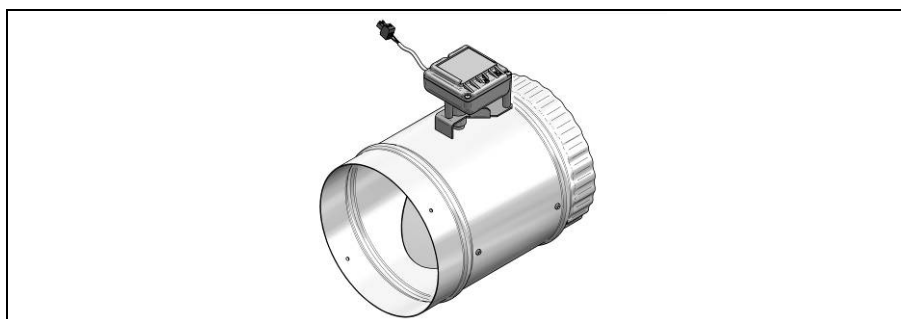
13.2 Component Description

Fig. 6 - Round Motorized Damper

13.2.1 Assembly and Connection Instructions

If the damper is mounted horizontally, it is recommended that the motor stay on the side of the damper, rather than above or below it., This will provide easy access for maintenance.

Mounting the damper in a sheet metal duct

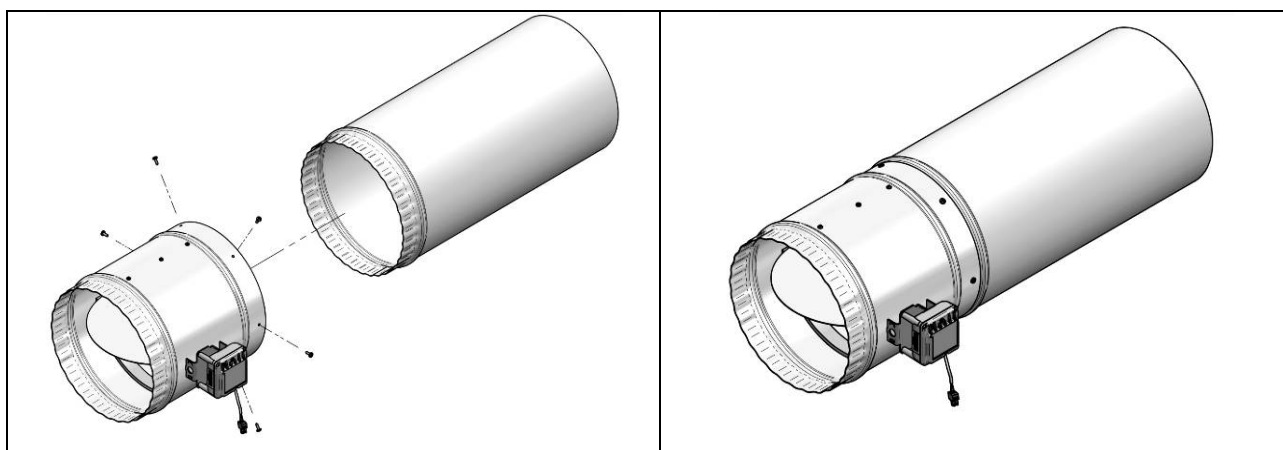Use at least four self-tapping screws to attach the damper to the sheet metal duct.

Fig. 7 – Metal Duct

Mounting the damper in a flexible duct

Connect the damper to the internal duct liner using the proper tie-wraps and tape. Slide the external insulation over the damper, and use a tie-wrap to attach it to the damper. In unconditioned spaces, it is recommended to insulate the complete damper assembly with only the motor exposed. Seal the joints with the appropriate tape and sealing spray. Be sure to leave the motor outside of the insulation and verify that there is no interference with the movement of the motor shaft.
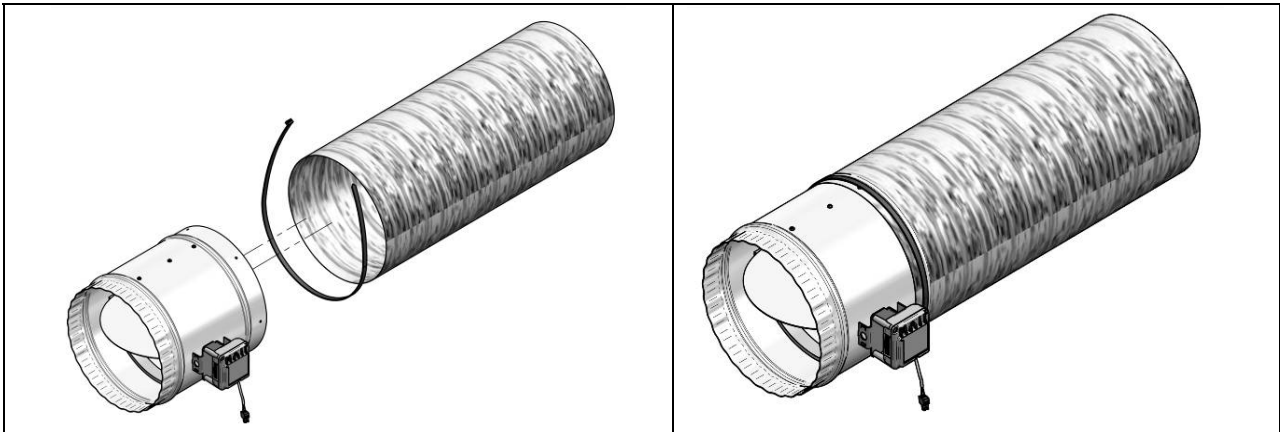

Fig. 8 - Flexible Duct

13.3 Rectangular motorized damper retrofit (RMDR)

13.3.1 Functional Description

This product is designed to be inserted in a rectangular duct.

13.3.2 Component Description

This damper is designed to be used in any of the following types of ductwork, without requiring any adaptor or accessory:

- Sheet metal rectangular duct.
- Sheet metal rectangular duct with fiberglass insulation.

To insert the damper in any duct, it is required to make a rectangular cut out to allow the damper to be inserted into the duct work. This cut out has to be centered in the duct, and its size has to be 6 inches wide by ½ inch smaller than the duct height.

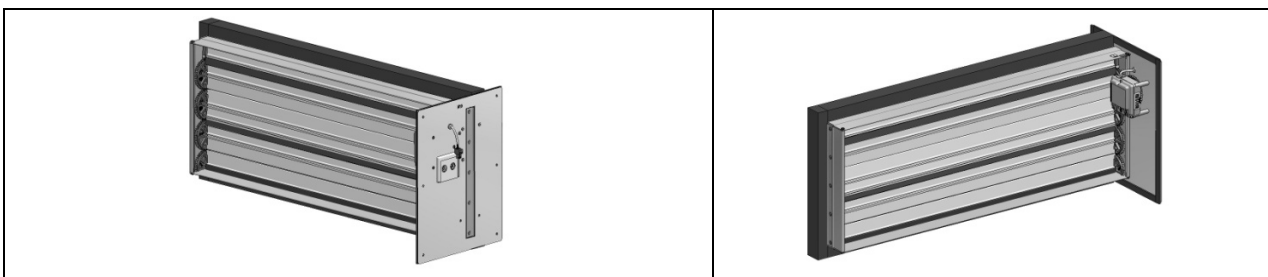The damper is not sensitive to the air flow direction.

Fig. 9 - Retrofit Rectangular Damper

13.3.3 Assembly and Connection Instructions

The damper can be inserted either horizontally or vertically in a horizontal duct, or on any side of a vertical duct.
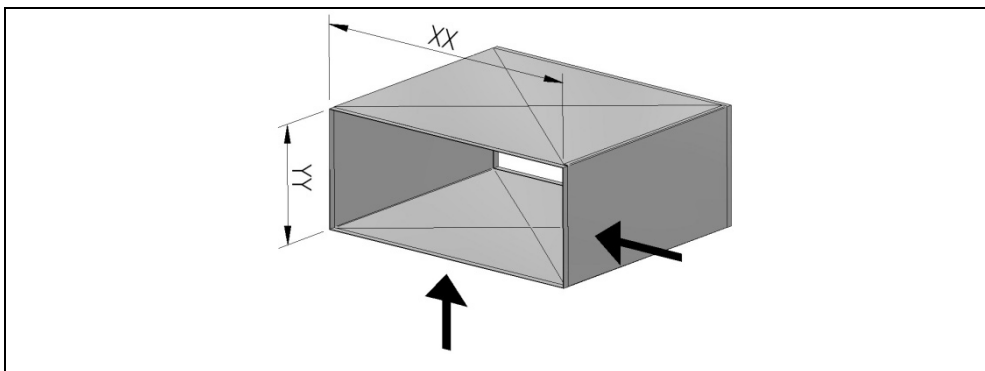

Fig. 10 - Vertical or horizontal insertion

Installation:

Regardless of the type of ductwork, cut out a rectangle measuring 6 inches wide by the duct height minus ½ inch. This will allow 1/4 inch clearance for the seal.

1) Insert the damper into the duct through the cut out. The face plate has to be flush with the duct's external surface if the duct is metallic.
2) Once the damper is in position, if the duct is sheet metal, screw the face plate to seal the duct, and seal the joint as needed.
3) After installing the damper, connect the motor cable to the zone module.
   Although the damper has been specifically designed to be used in metal ducts, it can be installed in fiber board ducts, but the installer will need to be sure that the damper will stay in position and operate as expected.
   In this case, the cut out will be 8 inches wide by the height of the duct.
4) Fully insert the damper into the duct, perpendicular to the air flow, make a hole in the cut out to pass through the motor cable, and re-position the cut out into the duct, sealing it as appropriate.
5) Fix the zone module to the duct wall using aluminum tape, being very careful to avoid any contact between the tape and any wire connected to the zone module, including the wire shield that has to be fully isolated.
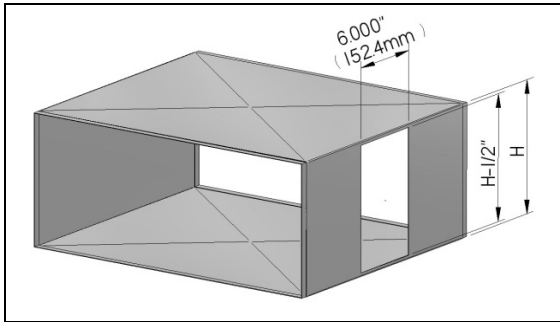6) Connect the motor, bus and thermostat (if a master zone module) cables to the zone module.
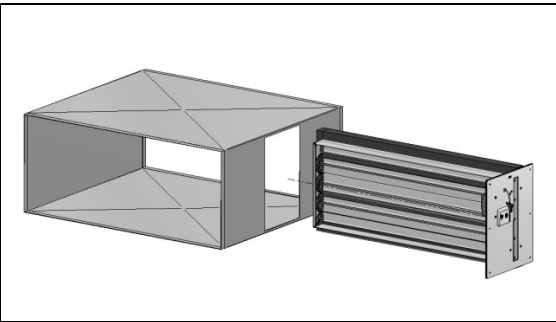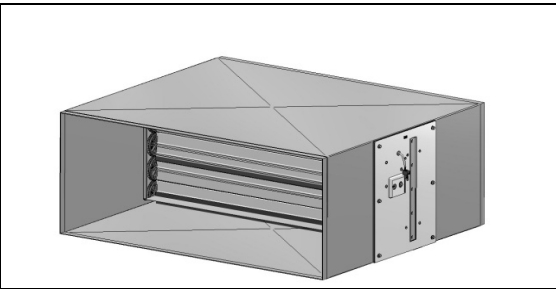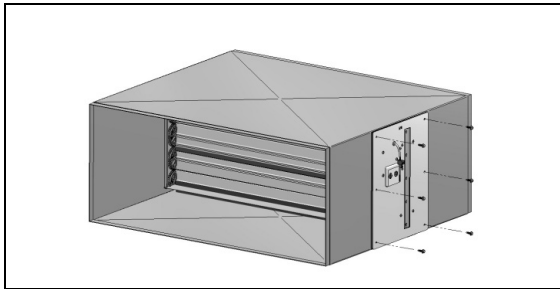
| Fig. 11 | Fig. 12 |

13.4 Bypass

13.4.1 Bypass Installation

The zoning system supplies treated air exclusively to the areas that need it according to the user's selection. Since some zones are closed, part of the supply air from the system must be diverted to avoid overpressure in the supply duct. This function is performed by the bypass damper thus maintaining a stable pressure in the duct system.

13.4.2 Types of Bypass Dampers

Airzone has two types of bypass dampers to be used depending on the installation. They are free release bypass dampers and ducted bypass dampers.

The following requirements must be satisfied for any type of bypass damper whether free release or ducted:

A) The bypass damper gate must not interfere with the airflow coming from the return.
B) There must be sufficient space in the installation site of the bypass damper to avoid any interference to the operation of the bypass damper counterweight.
C) Easy access must be guaranteed to the damper counterweight in order to adjust the operation of the bypass damper.

Free Bypass Damper

This type of bypass damper releases the surplus static air pressure into the conditioned air space. The location of this component is parallel to the supply air direction and next to the air handler or furnace as shown in the following figures.
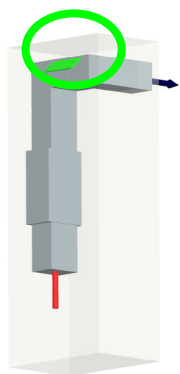
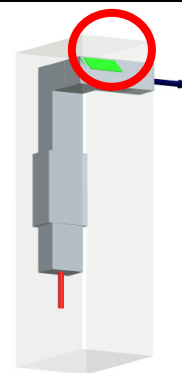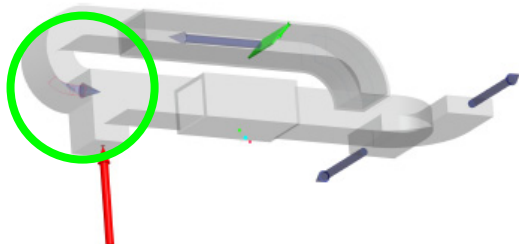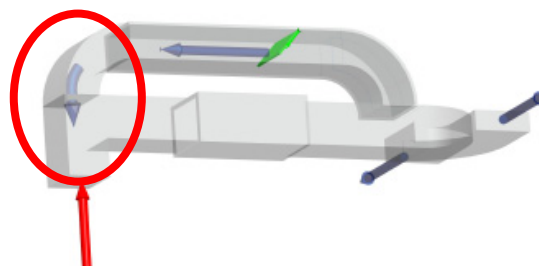|	
Fig. 13 - Correct placement of the Bypass Damper	*Fig. 14 – Incorrect placement of the Bypass Damper*
Fig. 15 – Correct connection of the bypass duct to the return duct	*Fig. 16 - Incorrect connection of the bypass duct to the return duct*

Airzone has two types of free release bypass dampers: rectangular and circular (the latter is characterized by the fact that it can be used in both free release or ducted bypass dampers. Traditionally, the rectangular bypass damper is installed in rectangular fiber ducts or sheet metal ducts while the circular bypass damper is usually installed in plenums with flexible ducts.
A circular bypass damper installed in a plenum must meet the same application guidelines as a rectangular bypass damper.
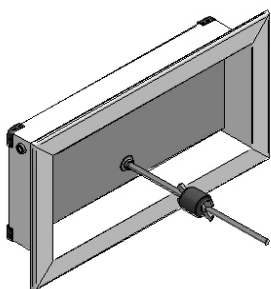
Fig. 17 – Rectangular Full-Return Bypass Damper	*Fig. 18 – Circular Bypass Damper*

Ducted Bypass Damper.

This type of bypass damper releases the surplus static air pressure from the supply air duct to the return duct thus linking both ducts. These bypass dampers are specifically designed to be inserted into the supply duct in order to be connected with the return duct. The placement of this component is parallel to the supply air flow as shown in the following figure
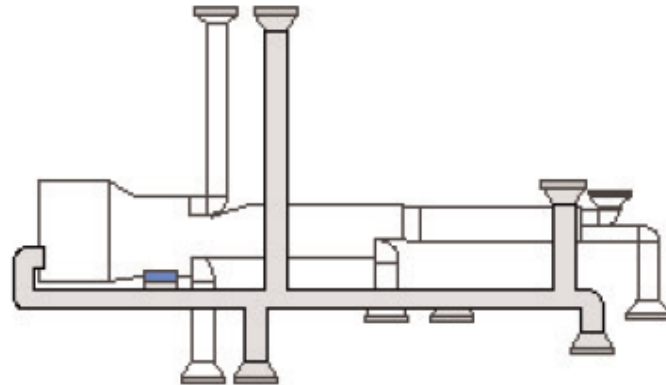

Fig. 19 - Bypass Damper in Controlled Return Ducts
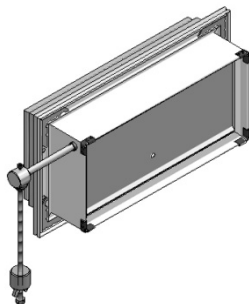
Fig. 20 – Controlled Rectangular Bypass Damper

Fig. 21 – Circular Bypass Damper

13.4.3 Bypass Damper Installation Recommendations

The following recommendations should be followed for correct operation of the bypass damper:
1) Since bypass dampers are directional, verify that the gate opens in the same direction as the supply air flow (from the supply duct to the registers/grilles).
2) Verify that the rotation axle of the bypass damper has been installed horizontally.
3) Verify that the counterweight has been installed in the threaded rod of the bypass damper as shown in the above figures.
4) Verify that the location of the bypass damper is easily accessible for adjustments.
5) Verify that the gate moves without anything hindering its motion.

14. TEMPERATURE SENSOR (SONDAREMOTAI)

14.1 Functional Description

The remote temperature sensor is an optional accessory that can be used when the ambient conditions are beyond the conditions defined for the touch thermostat. An example of the application is in the bathroom where there is high humidity and the risk of condensation or any place where the user prefers to have the thermostat outside of the room where the temperature is to be controlled. In this case, the set point is set in the thermostat but the reading shown will be that of the room with the remote sensor.

The remote temperature sensor should be installed under the same precautions described for the zone thermostat. (Fig. 13 through 16).

14.2 Component description

The remote temperature sensor must be connected to the Master Zone Control Module in the connector next to the motor connector. Also, when the temperature sensor is used the zone module parameter $2CPC$ must be set to rPt.
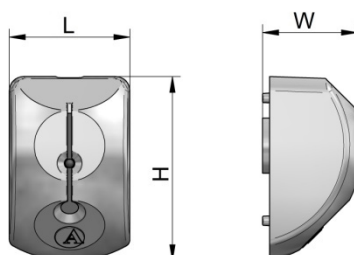
Fig.55

Dimensions	
L in (mm)	1.5 (38)
W in (mm)	1.3 (33.4
H in (mm)	2.4 (61)

14.3 Connection instructions

This temperature sensor has to be mounted on a surface.

Please follow the steps below:

1) Lever the back of the receiver in order to remove the rear cover.
2) Fit the rear cover to an area of the wall that is free of obstacles and has good air circulation.
3) Pass the probe cable through the opening at the rear cover and connect the connector.
4) Place the receiver on the cover and press firmly until it is correctly fitted.

The connections for this probe must be made with the Master Zone Control Module.
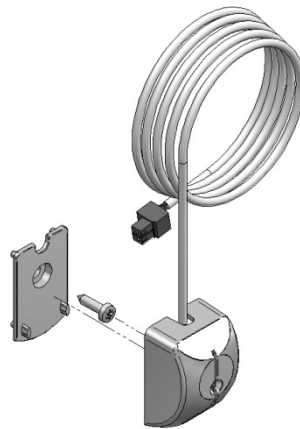
15. Table 1 Installer Parameters

PARAMETER	DESCRIPTION	VALUE
2COn	Zone control module Type	ⅿAS - SUb
2CId	Zone control module Address	1-8 9-32
PErC	Percentage (Only for Master Zone control modules)	10 - 100
tCId	Master Zone control module Address (only for Subordinate Zone control modules)	1-8
2CPC	Zone control module Remote Temperature Sensor (Only for Master Zone control modules)	On-OFF
2CSI	Zone control module Motion Detector Input (Only for Master Zone control modules)	OFF-nC-nO
2CrI	Zone control module Door Input (Only for Master Zone control modules)	OFF-nC-nO
Sbdt	Stand By display temperature (Only for Master Zone control modules)	At-StP
OFSt	Temperature display offset (Only for Master Zone control modules)	1-5
2CFu	Zone control module Firmware Version	Read Only
2tFu	Thermostat Firmware Version	Read Only
2CFu	Airzone Controller Firmware Version	Read Only

16. Table 2 Troubleshooting

Error	Description	Corrective action
Err 1	Local communication error	• Check the connections and wiring between the zone control and the thermostat
Err 2	Bus communications error	• Check the zone control's connection to the bus.
Err 3	Damper not connected	• Check the zone control's connection to the motorized system. • Check that the motorized system is not free.
Err 4	Damper blocked	• Check that the zone control's connection to the motorized system has not shorted out. • Check that the motorized system is not blocked.
Err 5	No zone control sensor	• Check that the circuit of the sensor connected to the zone control (if any) is not open. • Check the configuration of the " " parameter.
Err 6	Zone-control sensor short-circuit	• Check that the circuit of the sensor connected to the zone control (if any) has not shorted out. • Check the configuration of the " " parameter.

Whenever the system detects an error, the message "Err" will be displayed in the zone where the error has occurred. To consult the relevant error code, press "Err" when it appears.

Errors 1 and 2 have a blocking effect, and if either of them appears the thermostat cannot be used until the error has been fixed. For the other errors, the letters "Err" will appear on the hour digits. Pressing them displays the error code on the temperature digits.

Press the Airzone icon to clear the error and return to normal mode.
The grille and sensor errors (3, 4, 5 and 6) will only appear if these components have been set up (the grille is set up by default and the sensor not).

17. Table 3 Cable Length

Between	AWG	Distance (ft)	Condition
Airzone Controller to nearest Zone Module	20	20	WCS
Zone module to next zone module	20	20	WCS
Thermostat to Master Module	20	45	MAX
Zone module to Motor	18	65	MAX
Remote temperature sensor to Master Module	20	65	MAX
Total wire length in the network	20	650	WCS

Condition references:
WCS worst case scenario.
MAX maximum allowed.
Those cases indicated by WSC, are based in an installation including 32 Zone modules.
Maximum distances will depend on the number of modules needed. If distances longer than those in the table are required, please fill up the table below and send it back to Airzone USA for feasibility review.

From previous module to module #	ft	From previous module to module #	ft	From previous module to module #	ft
1		12		23	
2		13		24	
3		14		25	
4		15		26	
5		16		27	
6		17		28	
7		18		29	
8		19		30	
9		20		31	
10		21		32	
11		22			

The first distance (module 1), is the distance between the Airzone Controller and the first module.

Annex A Power Supply

The supplied power supply is a switching type, and can be connected to any AC voltage between 100 VAC and 240 VAC. A bicolor cable with the power connector is included with the power supply.

There are clear identifications in the power supply for voltage in and out and polarity. Please, follow them carefully.

The power supply also includes a DIN rail, where it should be mounted, as explained in the Installer's guide included in the Airzone Controller Board.

There are no ground connections to the power supply.

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MTAYU207