



Controller 10/20/30 Operation Manual

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Caution & Safety

READ THE ENTIRE MANUAL BEFORE OPERATING THE FAN. Ensure that all safety practices and instructions are followed during the installation, operation, and servicing of the fan. Failure to apply these safety practices could result in death or serious injury. If you do not understand the instructions please call our Technical Department for guidance [Technical Support contact information can be found on page 27].

All fan controls and incoming power should only be installed by qualified technicians familiar with the requirements of the NEC and local codes. Refer to appropriate portions of this manual for other important requirements. Failure to follow these guidelines will void the manufacturer's warranty.

Installation is to be in accordance with the national electrical code, ANSI/NFPA 70-1999 and local codes.

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

Read and understand this manual before installing or operating a fan unit. Installation, adjustment, repair, or maintenance must be performed by qualified personnel.

The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.

Many of the parts of this unit operate at line voltage. **DO NOT TOUCH.**

Install all covers before applying power or starting and stopping the unit.

DAMAGED EQUIPMENT

Do not operate or install any fans or fan accessories that appear to be damaged.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

MAINTENANCE AND SERVICE:

If the fan does not operate properly using the procedures in this manual, **BE CERTAIN TO REMOVE ALL POWER TO THE UNIT** and contact our technical department for further assistance.

Keep all body parts clear of moving part at all times.

All electrical troubleshooting and repair must be done by a qualified technician and meet all applicable codes.

REFER TO FAN INSTALLATION MANUAL(S) FOR FURTHER MAINTENANCE INFORMATION.

Fan Network Ordering

Types of controller:

- **Controller 10** can network up to 10 fans
- **Controller 20** can network up to 20 fans
- **Controller 30** can network up to 30 fans

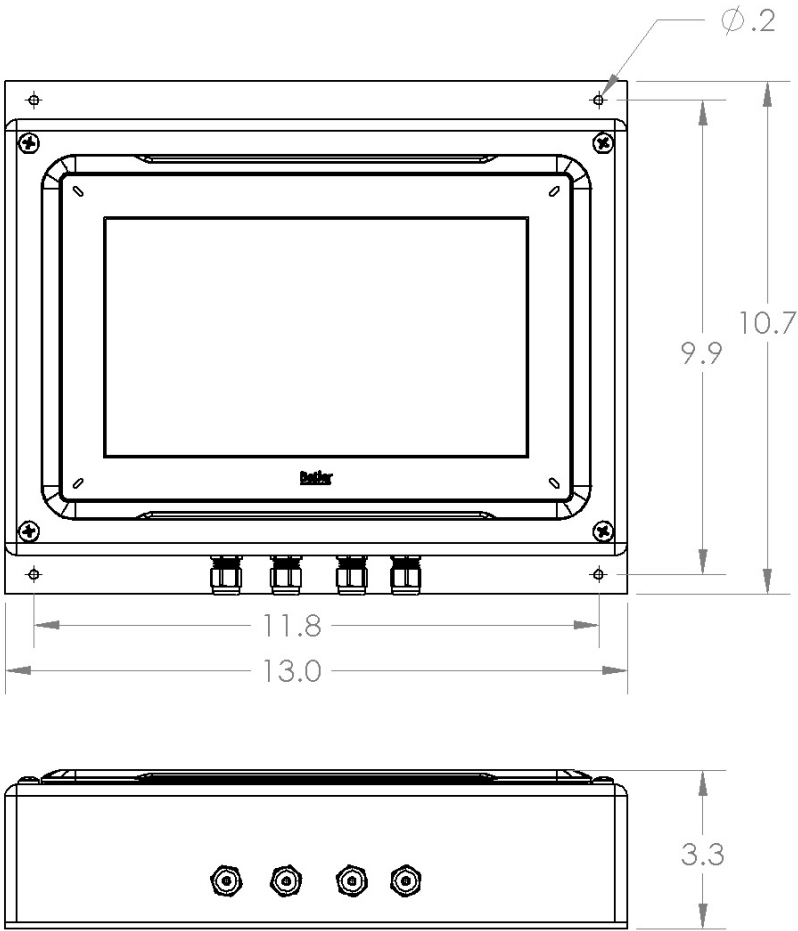
It is important to purchase fans that are setup for a network. MacroAir customizes fan to operate in a network by:

- 1) Addressing the fans and
- 2) Supplying an additional 15ft piece of CAT5

Repeaters/Isolators must be added every 5 fans for stability.

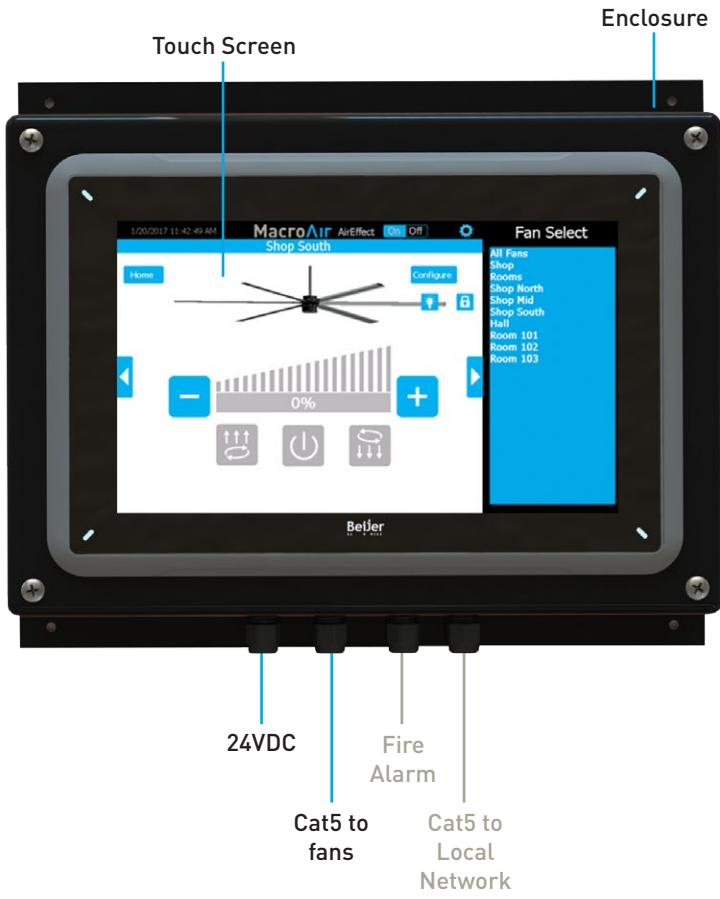
***If you did not order your fans for a network by default they will all have Node Address "2", and you will be missing necessary materials. Contact technical support to modify your fans for networking.**

Controller Dimensions



Controller Components

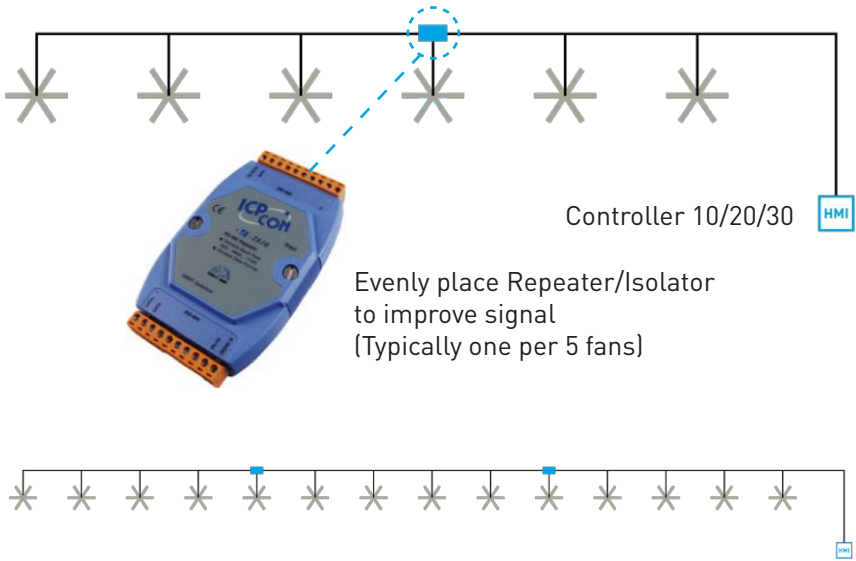
Components



Note: The glands for the fire alarm and CAT5 to local network are plugged from the factory in order to maintain the screen's IP 66 rating when not used. If you are utilizing the fire alarm option and/or remote operation, remove the plugs from any gland you will be using

Network Language

Language = Modbus
Communication Method = RS485



Repeater/Isolator

The Repeater/Isolator boosts the signal along the network preventing signal “loss” and minimizes noise on the line.

Repeaters/Isolators should be evenly placed in the network. Make sure there is at least one Repeater/Isolators every 5 fans.

Network Wiring Requirements

Network Wiring Requirements:

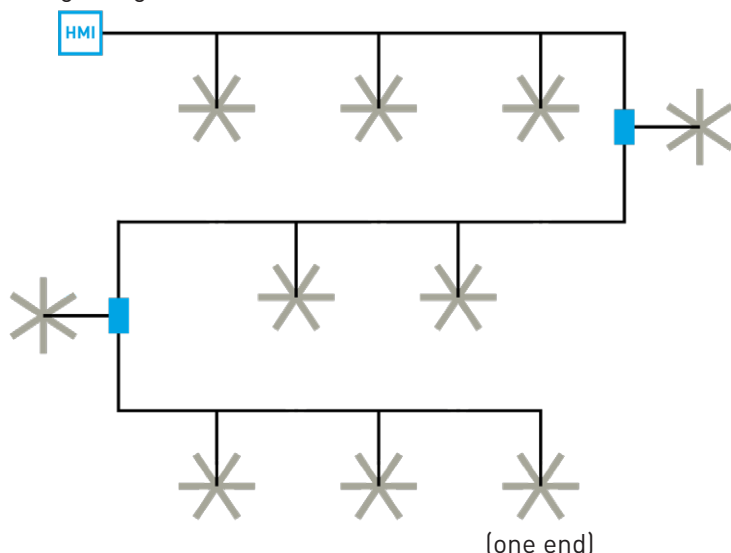
- Use of Twisted Pair, CAT5e (or higher grade) shielded cable
- Minimum 24 AWG (0.5mm) cross section
- Ground the shielding and drain wire at **only one point** of the cable run
- Add Repeaters/Isolator (1/5 fans).
- Route wires as far away as possible from high voltage AC cables, flourescent lights, arc welders, and other equipment that transmits EMI (electromagnetic interference).

Daisy Chain

Networked MacroAir fans must be connected in one single line, referred to in this document as a “**daisy chain**”. The characteristics of a proper daisy chain are: **one beginning** (Controller 10/20/30) and **one end** (last fan).

If the fans are not connected in one line/chain there will be a de-gradation of the communication signal and the network may not function as intended (fans in the network may not operate).

(one beginning)



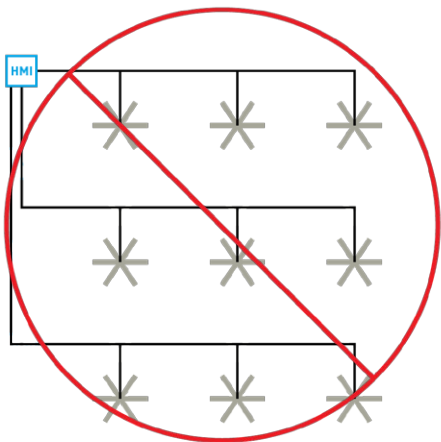
(one end)

Repeater/Isolator

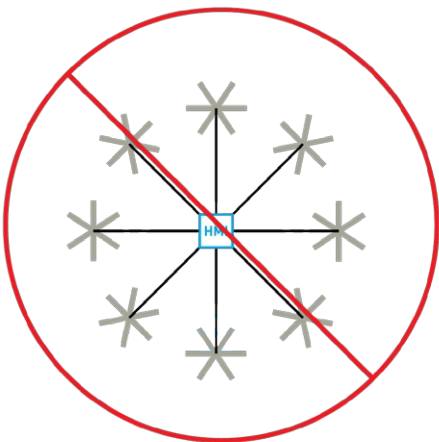
Network Wiring Configurations

Improper Wiring Configuration

End of Line x3

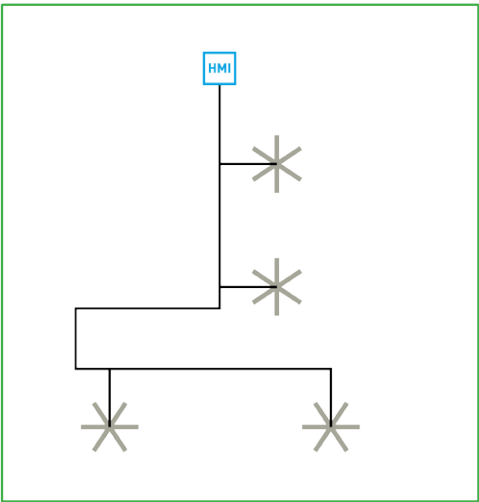
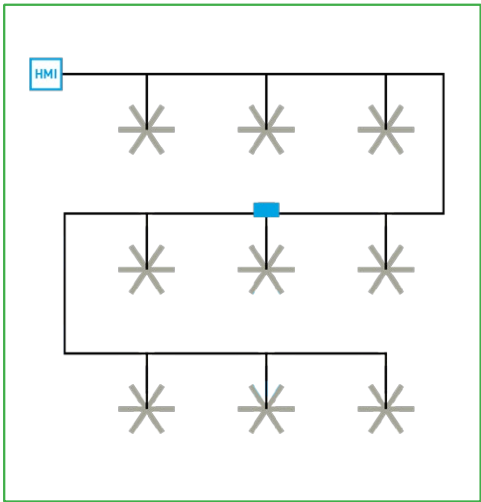


End of Line x8



Proper Wiring Configuration

ONE End of Line



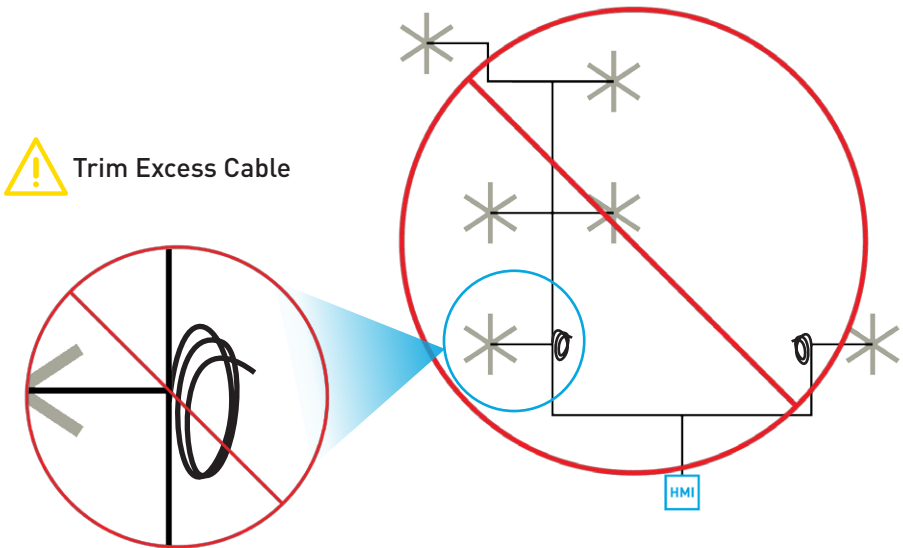
Network Excess Cable

Excess Cable at Connection Point

With noise being emitted throughout a typical industrial/commercial environment, **extra cable should not be coiled up** as the coil itself will create noise/interference in the communication signal. There should be no more than two feet of excess cable at each connection point.

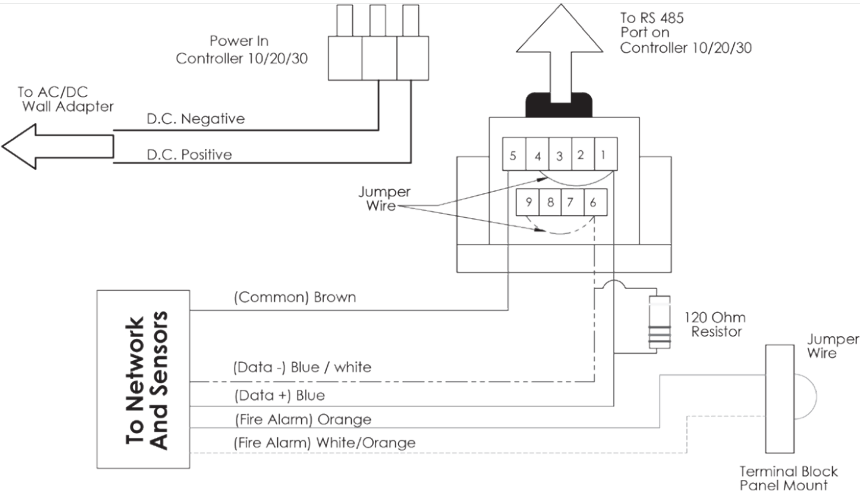
If more than two feet of cable is needed for future relocation of the fan, run the cable up toward the ceiling and back down in a horseshoe shape.

ALWAYS AVOID SHARP BENDS OF THE CABLE.



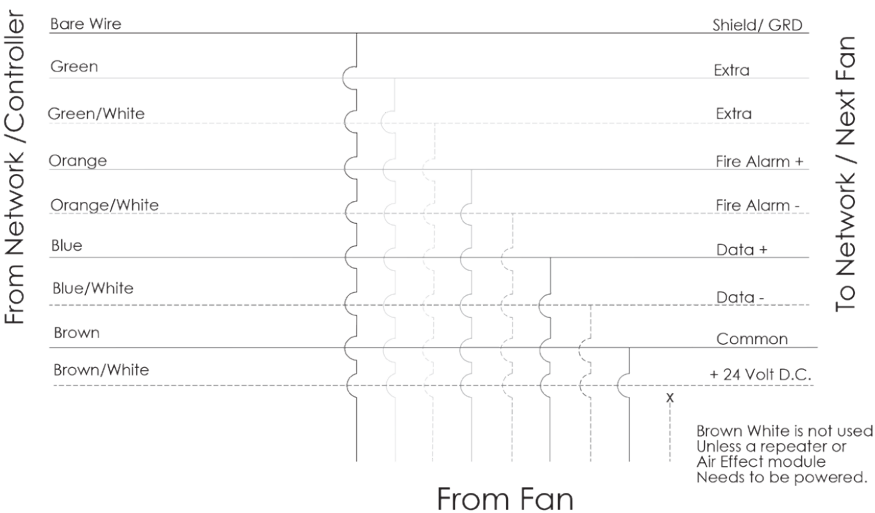
Wiring Diagrams

Wiring: Inside Controller 10/20/30 Enclosure



Wiring: Fan to Network

Typical T-Splice of CAT5 Network Cable

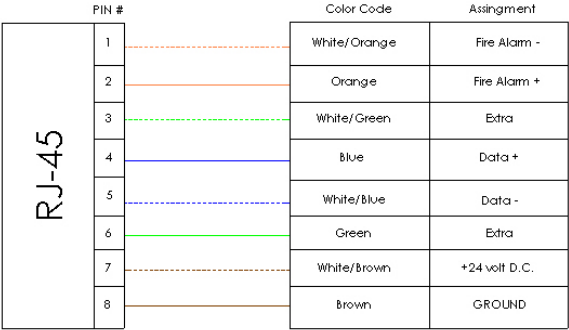


Wiring Diagrams

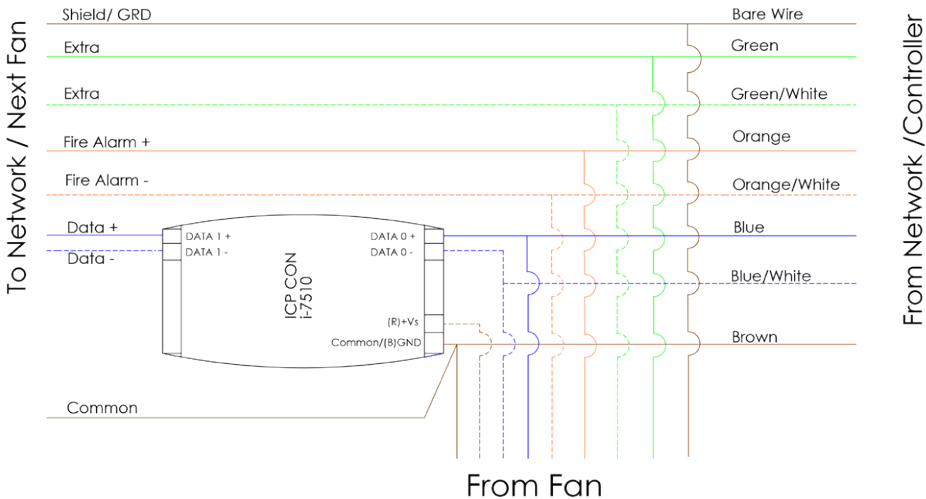
Wiring: CAT5 Pin-Out

CAT5-B to MacroAir Equipment Pin-Out

Cat 5-B pinout



Wiring: Repeater

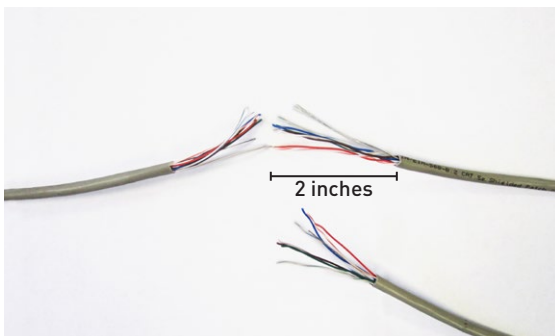


Connection Method

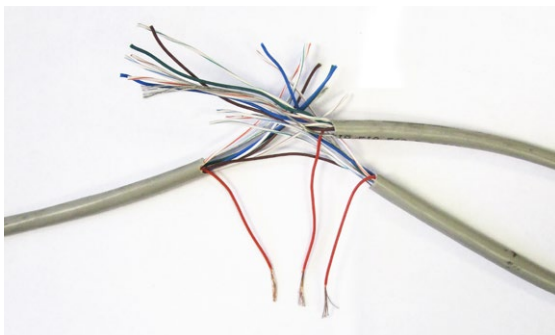
1. Take the incoming CAT5 from the network, the CAT5 from the fan, and the CAT5 going to the rest of the network. Give some slack (no more than 24") on each CAT5 to strip the wires and splice them together. Run the slack up towards the ceiling and back down in a horseshoe shape. **DO NOT roll the excess slack into a circle or coil because this creates a place for the network to pickup noise on the lines.**



2. Strip jacketing off the three CAT5 cables and separate each color wire leaving approximately 2 inches of each wire exposed including the drain/shield wire.

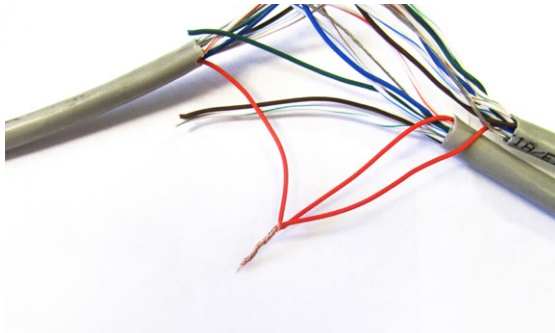


3. Strip approximately 1/2 inch off each color wire leaving the bare copper exposed.

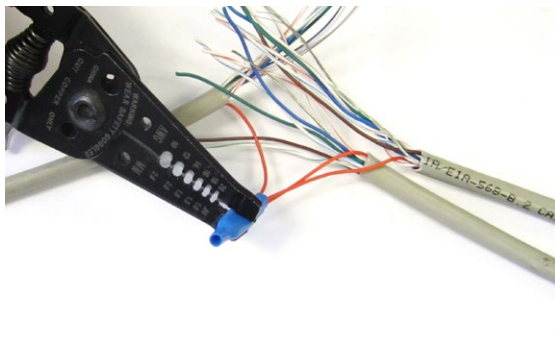


Connection Method

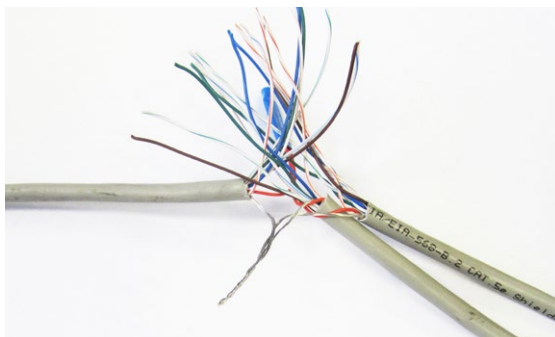
4. Twist the 3 wires of same color from each CAT5 together.



5. Place a gel filled bean crimp onto the end of the 3 wires and use a small crimper or pliers to crimp the bean tight on the wires.

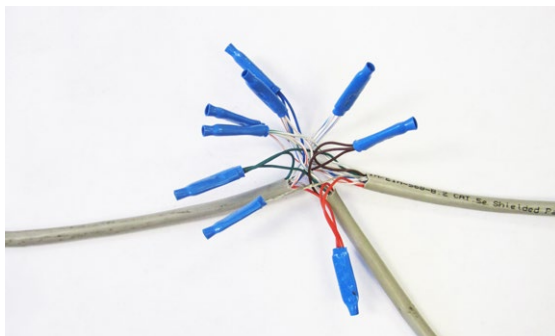


6. Double check that the 3 drain wire/bare wires are also crimped together as this is what continues the shielding throughout the network. The shielding and drain wire **MUST** be connected to Earth Ground at **only one point** of the cable run.



Connection Method

7. Repeat steps 3-5 for all the wires EXCEPT the Brown/White wire. **The Brown/White wire is only needed for wiring in a repeater or AirEffect sensor (pg 15).** Please refer to the repeater wiring diagram (pg.11) and instructions.



8. Once all the wires are crimped, carefully twist the wires up. Then fold them back and tape them up with electrical tape to clean up your wiring.



9. Make sure to tape or zip tie all 3 CAT5 lines to the structure to support the 3 way splice and provide strain relief.

AirEffect Sensor Installation

Note: This section of the manual is applicable only if you ordered optional AirEffect feature.

WARNING:

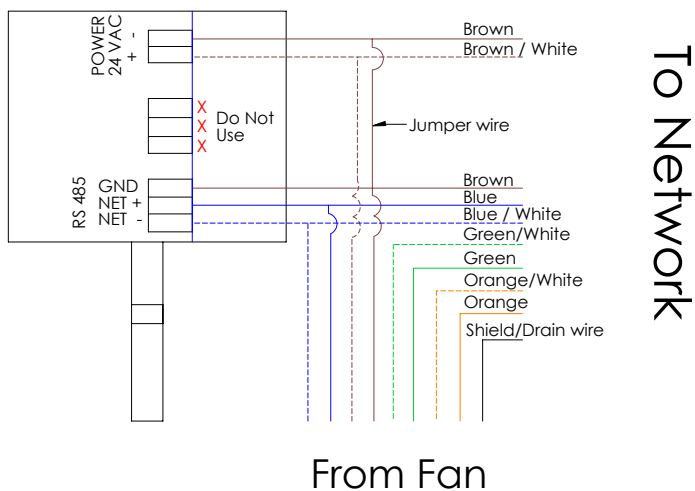
Do not mount the temperature probe on metal as it will then be reading the temperature of the metal rather than the air temperature.

PINOUT:

Brown - 24VAC- jumpered to GND
Brown/white - 24VAC+
Blue - Net+
Blue/white - Net-

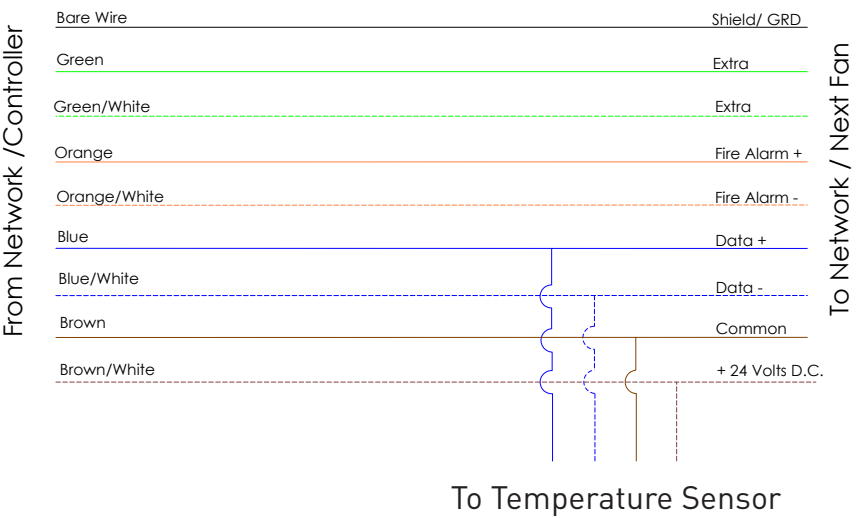
Mounting

1. Mount the ceiling temperature sensor at least 1ft bellow the ceiling in the same room where the fan/fans are placed. Use caution when placing the sensor making sure not to place it where there is any contact with direct sunlight. Each sensor has a small mounting holes for attachment with screws.
2. Once the module has been placed it can be wired into the network. Use the brown pair to power the temperature sensor and the blue pair for communication. If there is enough slack in the cable you can run the wiring directly in and out at the same point on the sensor module.
3. Please refer to the wiring diagram.

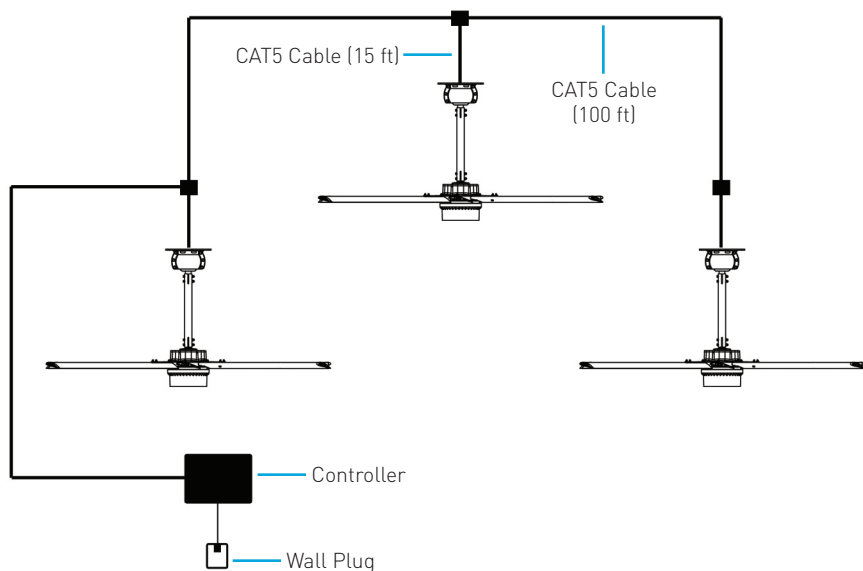


AirEffect Sensor Installation (Cont.)

- 4. Mount the floor temperature sensor in the room where the fan/fans are placed within 6ft of the ground. Use caution when placing the sensor making sure not to place it where there is any contact with direct sunlight. Each sensor has a small mounting hole for attachment with a screw.
- 5. Repeat steps 2-3 and refer to the wiring diagram.
- 6. If there is not enough wire to pull in and out of the sensor splice a length of cable keeping length to a minimum. Use the bean crimps supplied by Macro Air to wire the lead into the network. Please refer to network wiring diagram on the following page.



Connect Fans To Network



Instructions:

1. Refer to the fan installation manual(s) for fan installation instructions. Fans that are ordered for networks are labeled with their assigned addresses. **Take note of the addresses and ensure that the fans are installed in the desired locations.**
2. Mount the controller in the desired location and apply power using the provided wall plug.
3. Connect all fans as described in the previous pages. Ensure that the 15 ft CAT5 cables are connected directly to the fans.
4. Review safety and caution information in the fan installation manual(s) and apply power to all of the fans.

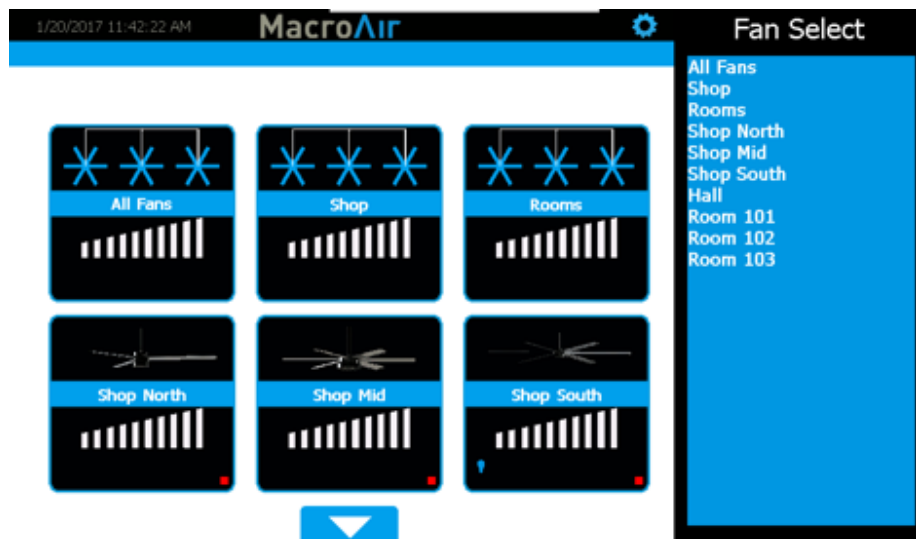
Controller Setup

The touchscreen will require additional setup before operating the fans. Please refer to the steps below to properly configure your controller.

1. Power on the screen. The program will load automatically and take you directly to the home Screen (pg 19).
2. All fans connected to the network will be displayed on the screen. If no fans are detected, or if any fans are missing, check the CAT5 splices and ensure that the fans are powered on, then rescan the network using the tool on the settings screen (pg 22). Occasionally a fault code will be present on one or more fans; this is normal. Faults can be reset from the fan control screen (pg 20). If a fault does not reset, refer to the fan manual for fault code descriptions and contact technical support if you require further assistance.
3. Depending on your fan model, further setup may be necessary before attempting operation. AVD-780,550, and AVD3-450 models **REQUIRE** the diameter to be programmed via the fan configuration screen (pg 21). For 450 models, make sure that you change "6 blades" to "3 blades".
4. Once the diameter is programmed, and no fault codes are present, the fan should be ready for operation. Give the fan a speed and direction command via the fan control screen (pg 20). The fan will now run according to the specified speed and direction.
5. Repeat the above steps for each fan. Once all fans are properly configured and operating correctly, more advanced options can be enabled, such as grouping, scheduling, and AirEffect (optional).
6. Grouping allows you to create a button for multiple fans to run after being given one direction and speed command, rather than turning them all on individually. To create a group, refer to the groups screen (pg 24).
7. Scheduling allows you to set up time periods for the fans to turn on and off automatically, requiring no manual input. You can set up schedules for individual fans, all fans, or groups of fans. To create a schedule, refer to the schedules screen (pg 25).
8. AirEffect is an optional control system that senses and automatically maintains a desired room temperature range by calculating the fans' ideal operating speeds and direction and automatically runs the fans accordingly. AirEffect can be enabled to be always on, or turned on and off via scheduling. To set up AirEffect, refer to the AirEffect instructions (pg 27)

Controller Home Screen

The home screen will display all the available fans that are on the network, as well as any groups you have created.



Gear - Takes you to the settings screen

Fan Status Box - Displays the status of the fan. Pressing this button takes you to that fan's control screen

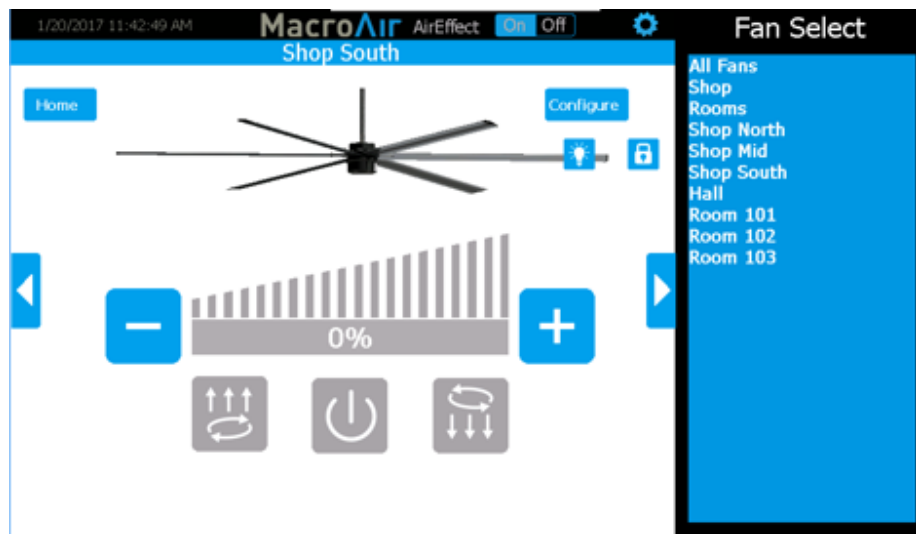
Fan Select - Allows you to select any fan, even ones not currently displayed on the page

Up/Down Arrow - Takes you to the next set of fans

If the installation has been verified, but no fans have been detected contact **Technical Support** (pg 31).

Fan Control Screen

Tapping on a fan status box on the home screen will take you to the fan control screen. This screen allows you to configure and control the fans individually, or issue a command to multiple fans if you clicked the "All Fans" button or a group button. Please ensure that the fans are configured correctly before attempting to run them (see Fan Configuration page?).



AirEffect On/Off: Toggles AirEffect on or off for the selected fan or group, allowing manual control

+ - - Increase or decrease the speed between 0-100%

Up Button - Runs the fan clockwise to pull air up. This setting is useful to achieve destratification without creating a discernable breeze.

Down Button - Runs the fan counter-clockwise to blow air down. This is the main setting used for cooling
Power Button - Stops the fan if it is running

Right/left arrows - Takes you to the next fan/group (if any exist)

Reset - Resets any present fault displayed. Hidden if no fault is present

Home -Takes you to the home screen

Configure - Takes you to the fan's configure screen

Lock - Locks and unlocks control of fan and functions (requires admin login, refer to Settings Screen pg 22)

Light (optional) - Toggles the light on or off if a light kit is installed

Fan Configure Screen

Tapping the Configure button on the fan control screen will bring you to the fan configure screen. This screen allows you to set the diameter of the fan to allow it to run properly*, along with other options. This screen also provides fields to input information that may prove useful for reference or troubleshooting.

1/20/2017 11:43:12 AM

MacroAir
Fan Configuration

Done

Fan Name: Shop South

Fan Location: South

Notes: Cleaned 1/4/25

AirVolution ID: 550/700

Node Address: 3

Operating Hours: 0912

FW Version: 10117

Light: Enabled

Size: 6 blades

Serial #: 2130-03

Panel: P32

Breaker: 23/24/25

Fan Select

All Fans
Shop
Rooms
Shop North
Shop Mid
Shop South
Hall
Room 101
Room 102
Room 103

Fan Name: Changes the name that is displayed on the home screen for the fan

Fan Location: Allows you to input a location (ex. loading dock) which can help identify the fan

Notes: Any additional notes on the fan you would like to include

Type: Displays the fan model

Node Address: Displays the network address of the fan

Operating Hours/Voltage: Displays the run-time hours of the fan for AVDs and voltage for Legacies

FW Version: Displays the firmware version of the fan

Light: Allows you to display or hide the light button on the fan control page

Size: Allows you to set the fan size.* For AVD3-450 fans, press "6 blades" to change to "3 blades"

Serial: Allows you to input the serial number of the fan for easy reference

Panel: Allows you to specify the electrical panel the breaker is in for easy reference

Breaker: Allows you to specify the breaker number the fan is on for easy reference

*370, AVD3-430, and Legacy models do not need to have the diameter programmed into the screen to run properly.

Settings Screen

Tapping the Settings button will bring you to the settings screen. This screen contains information on the touchscreen and configuration options for the network.



Home – Goes back to the Home screen

Software Version – Indicates firmware of the screen is it screen firmware? Or board firmware?

Date – Displays the Programmed Date what is the programmed date?

Mkey - Displays the code that can be given to MacroAir Tech Support to grant access to Comm settings

Language – Allows selection of alternate languages (English, Spanish, French, Malay)

Re-scan Network on Exit – When selected, rescans the network to detect any changes. Used after adding/removing fans or changing addresses

AirEffect (Optional): Provides access to AirEffect options. This will only be available if AirEffect was ordered with your network (page [not sure yet])

Groups: Provides access to the Groups page (page [not sure yet])

Schedule: Provides access to the Schedule page (page [not sure yet])

Advanced Settings: Displays the Advance Settings page (page [not sure yet])

Admin Login: Brings up the Admin Login page. You will need to be logged in under admin to access most of the other pages on the Settings screen. The default username AND password is "admin"

Advanced Settings Screen

Tapping on the “Advanced Settings” button will bring you to the Advanced Settings screen. This screen is very similar to the Settings screen, but contains 3 additional advanced options (Ethernet, Date/Time, and Comm).



Home – Goes back to the Home screen

Version – Indicates firmware of the screen see above comment

Date – Displays the Programmed Date see above comment

Language – Allows selection of alternate languages see above comment

Re-scan Network on Exit – When selected, rescans the network to detect any changes. Used after adding/removing fans or changing addresses

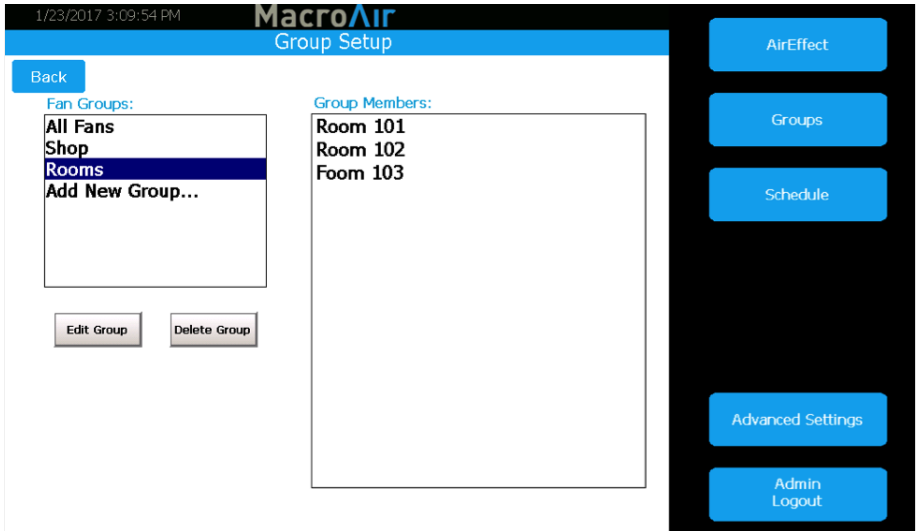
Ethernet – This page displays the Ethernet information for the screen. This information is used to remotely control the screen with a program such as VNC viewer. More information is available in the Remote Operation section of the manual [pg 26]

Date/Time: This screen allows you to set the date/time. This is very important for scheduling, as the screen will run schedules according to the programmed date/time.

Comm: This screen provides access to the Modbus communications page. This is a password-protected page and is only accessible with MacroAir technical support on the phone. If you need access to this page, please call us at (866)668-3247.

Groups Screen

Tapping on the “Groups” button will bring you to the Groups screen. This screen allows you to create groups and assign fans to them, easily allowing control of multiple fans at the same time.



Back: Takes you back to the previous screen

Fan Groups: Displays fan groups you have created. Click “Add New Group” to add a new group

Edit Group: Allows you to change the group name or group members of the selected group

Delete group: Deletes the selected group

Group Members: Displays all fans with checkboxes to indicate which fans are part of the group. Check boxes to add fans to the group, remove checks to remove fans from the group

Edit Group Name: Allows you to edit the group name. Press Accept to save changes, or Cancel to cancel any changes made. (Only visible when “Edit Group” is pressed.)

Schedules Screen

Tapping the Schedules button will bring you to the schedules screen. This screen allows you to set a schedule for fans or groups to run and stop automatically.

The screenshot shows the 'MacroAir Schedule Setup' interface. At the top left, the date and time are '1/20/2017 11:48:30 AM'. The title bar says 'MacroAir Schedule Setup'. On the left, under 'Schedules:', there is a list with 'Work Day', 'Air Flow Start', and 'Add New Task...'. The 'Add New Task...' option is highlighted. The main area contains a 'Schedule Setup' form. It has a 'Name:' field, an 'Active' toggle, a day-of-the-week selector (Sun-Sat), 'Start:' and 'End:' time pickers, an 'AirEffect' checkbox, a dropdown for 'All Fans', a 'Speed: 100%' field, and a 'Direction: Forward' button. 'Cancel' and 'Accept' buttons are at the bottom of the form. On the right sidebar, there are buttons for 'AirEffect', 'Groups', 'Schedule', 'Advanced Settings', and 'Admin Logout'.

Schedules: Allows you to select an existing schedule or create a new schedule via “Add New Task”

Name: Names the schedule

Active/Inactive: Enables or disables the schedule

Sun-Sat: Selects which days to run the schedule. Red X's indicate days where the schedule is not in effect

Start: Specifies when the fans come on

End: Specifies when the fans stop

AirEffect (Optional): Runs fans according to AirEffect during the schedule

Drop Menu: Allows you to select a fan or group. If AirEffect is selected, zones are displayed instead

Speed: Specifies the speed the fans will run. If AirEffect is selected, this field is ignored

Direction: Specifies the direction the fans will run. If AirEffect is selected, this field is ignored

Accept: Save Changes

Cancel: Cancel Changes

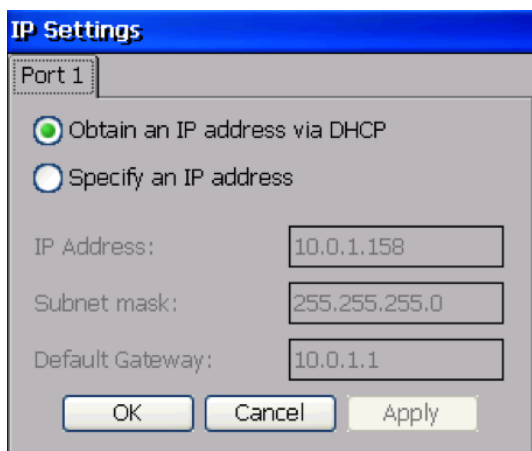
Edit Schedule: Allows you to edit a selected existing schedule (visible when a schedule is selected)

Delete Schedule: Allows you to delete a selected existing schedule (visible when a schedule is selected)

Remote Operation

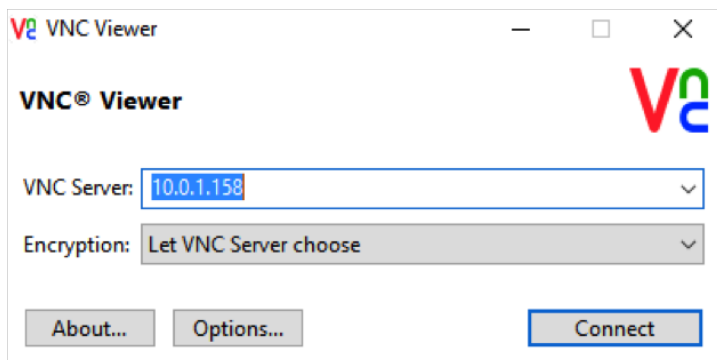
MacroAirControllers are capable of being controlled remotely, allowing access from any computer or smart device on the same local network. Please follow the steps below to properly set up remote operation:

1. Plug your controller into your internet network via the Ethernet port on the back of the screen.
2. In the settings screen of the controller click on "Ethernet" to check the IP address



You can let it obtain an IP address or specify one.

3. You will need a computer or device that is on the same network as the Controller with a VNC viewer installed ("VNC-Viewer" used below)



4. Open the VNC and input the IP address of the controller
5. Select connect and the controller screen should show up.

AirEffect Setup

In order for AirEffect to operate properly, some setup is required. Please follow the below steps to ensure a smooth operation:

1. Use the zone setup screen to add or remove fans from the desired zone(s).
2. Once the zone is properly set up, input your minimum and maximum speeds for each fan. Note that while all fans may be shown, you only need to input values for fans that are in the zone.
3. Input the distance to the next fan or wall. If you have more than one distance, such as a fan between two other fans, use the smaller value or an average of the distance. Check boxes are available for you to specify whether the distance is to a fan or wall.
4. Input the roof height, fan height, and ground sensor height.
5. Under "Check Every", specify the interval at which the system will rescan for changes to temperature and humidity and make the appropriate adjustments.
6. Under "Desired Cool", input the temperature at which you desire the fans to begin cooling the space.
7. Under "Desired Heat", input the temperature at which you desire the fans to begin warming the space.
8. Under "Max Humidity", input the percentage at which you desire the fans to circulate more air, thereby lowering the humidity.
9. Once everything is set up, check the "Zone Enabled" box. This zone will now run according to the parameters you specified.

AirEffect Screen

If your network was ordered with the AirEffect option, the AirEffect control screen can be accessed by tapping the "AirEffect" button. AirEffect allows your fans to run automatically based on temperature, humidity, and user preferences, creating the most comfortable environment possible.

	Minimum Speed (%)	Maximum Speed (%)	Distance to Nearest Fan/Wall
Shop North	10	100	50 ft from fan
Shop Mid	10	100	50 ft from fan
Shop South	10	50	50 ft from fan
Hall	10	65	30 ft from wall
Room 101	10	40	20 ft from wall
Room 102	10	40	20 ft from wall
Foom 103	10	40	20 ft from wall

Zone Settings	
Zone 1	
<input checked="" type="checkbox"/> Zone Enabled	
Roof Height	Roof Temp
30	53.2
Fan Height	Ground Temp
25	52.9
Sensor Height	Ground Humid
3	81.8
Check Every	Desired Cool
5	72
Max Humidity	Desired Heat
66	72
Units are in ft and °F	

Back: Takes you back to the previous screen

Fan Name: Displays the name of the fan

Minimum Speed (Default 0): Sets the minimum speed the fan is allowed to operate at. Useful if the fan is mounted high in the ceiling and effects cannot be felt below a certain speed

Maximum Speed(Default 100): Sets the maximum speed the fan is allowed to operate at. Useful if running at high speeds causes undesired effects (ex. papers blowing or welding)

Distance to Next Fan: Specifies the distance from this fan to the next fan or a wall

Zone Setup: Takes you to the zone setup screen

Zone Settings: Allows you to select a zone to view/input data

Zone Enabled: This check box allows control of which zones turn on

Roof Height: Allows you to specify the distance between the floor and the roof of the zone

Fan Height: Allows you to specify the height of the blades above the floor

Sensor Height: Allows you to specify the height of the ground sensor (default 3 ft above floor)

AirEffect Screen (Cont.)

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MacroAir

AirEffect Settings

Back

	Minimum Speed (%)	Maximum Speed (%)	Distance to Nearest Fan/Wall
Shop North	10	100	50 ft from fan
Shop Mid	10	100	50 ft from fan
Shop South	10	50	50 ft from fan
Hall	10	65	30 ft from wall
Room 101	10	40	20 ft from wall
Room 102	10	40	20 ft from wall
Room 103	10	40	20 ft from wall

Zone Setup

Zone Settings

Zone 1

☒ Zone Enabled

Roof Height	Roof Temp
30	53.2
Fan Height	Ground Temp
25	52.9
Sensor Height	Ground Humid
3	81.8
Check Every	Desired Cool
5	72
Max Humidity	Desired Heat
66	72

Units are in ft and °F

AirEffect

Groups

Schedule

Advanced Settings

Admin Logout

Check Every: Allows you to specify how often AirEffect will check for changes in the environment and adjust accordingly

Desired Cool: Allows you to set a temperature threshold that will cause AirEffect to cool the environment

Desired Heat: Allows you to set a temperature threshold that will cause AirEffect to warm the environment

Max Humidity: Allows you to set a desired maximum humidity as a condition for the fans to run

Roof Temp: Displays the temperature measured by the roof sensor

Ground Temp: Displays the temperature measured by the ground sensor

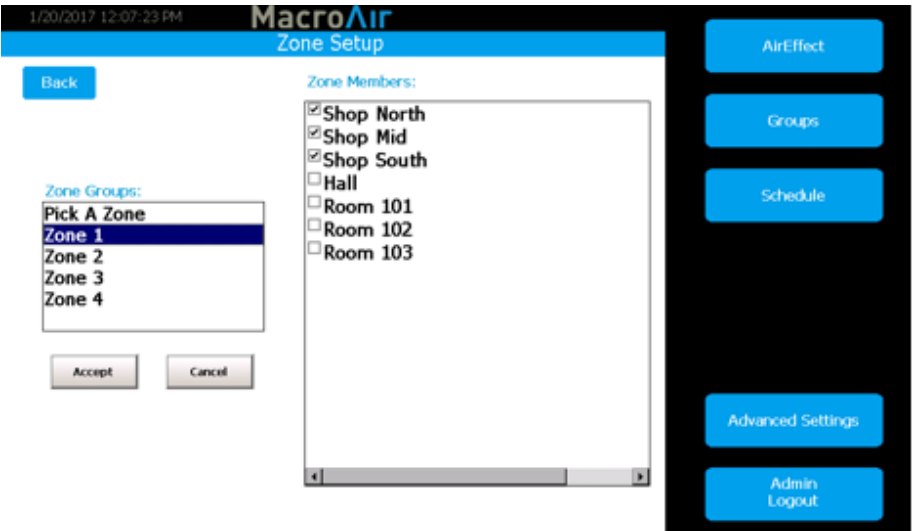
Ground Humid: Displays the humidity measured by the ground sensor

Units are in ft and F: Displays the units currently being used on the screen. Press the button to toggle between feet and Fahrenheit, or meters and Celsius

Zone Enabled: Checking this box enables AirEffect for the zone, unchecking this box disables AirEffect for the zone and places the fans in manual mode

Zone Setup Screen

Pressing the “Zone Setup” button on the AirEffect screen will bring you to the zone setup page. This page allows you add or remove fans from zones. Multiple zones are useful if you have fans in multiple rooms/environments that need to be run differently. Please note that two sensors are required per zone.



Back: Takes you back to the AirEffect screen

Zone Groups: Displays the zone groups

Zone Members: Displays the fans when a zone group is selected. Check boxes to add fans to the zone, uncheck boxes to remove them

Accept: Saves any changes you made

Cancel: Cancels any changes you made

Technical Support

For installation assistance, application questions, technical support & any other inquiries, please contact our Technical Support team at (866) 668-3247.

