# Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with these instructions will result in voiding of the product warranty and may result in personal injury and/or property damage.

The Advanced Touchscreen is a premium controller designed to operate a large quantity of HVLS fans. Featuring the ability to independently operate or group up to 20 fans with optional BACnet® integration (refer to page 3), this controller is an ideal choice for any facility where versatility is a must.

## General Safety Information

Only qualified personnel should install this product. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. If more information is needed, contact a licensed professional engineer before moving forward.

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electrical Code (CEC) and ULC-S650 if installing this product in Canada.
2. Verify that the power source is compatible with the equipment.

### Receiving

Upon receiving the product, check to ensure all items are accounted for by referencing the delivery receipt or packing list. Inspect each crate or carton for shipping damage before accepting delivery. Alert the carrier of any damage detected. The customer will note damage (or shortage of items) on the delivery receipt and all copies of the bill of lading which is countersigned by the delivering carrier. If damaged, immediately contact your local representative. Any physical damage to the unit after acceptance is not the responsibility of the manufacturer.

### Unpacking

Verify that all required parts and the correct quantity of each item have been received. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts. Sometimes it is not possible that all items for the unit be shipped together due to availability of transportation and truck space. Confirmation of shipment(s) must be limited to only items on the bill of lading.
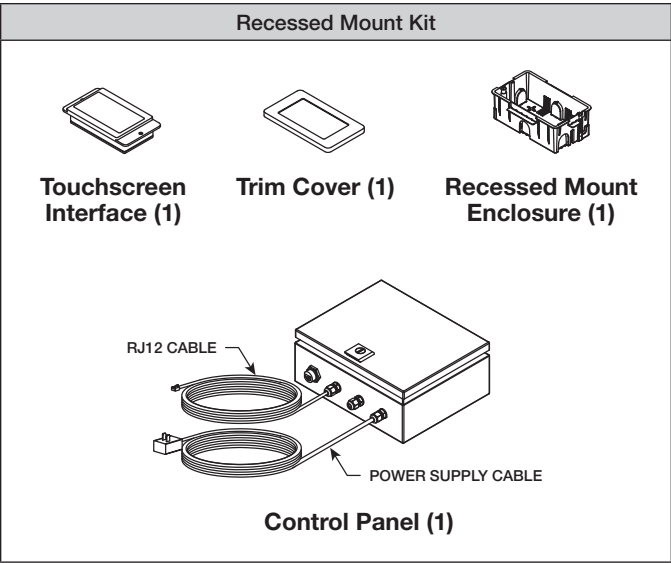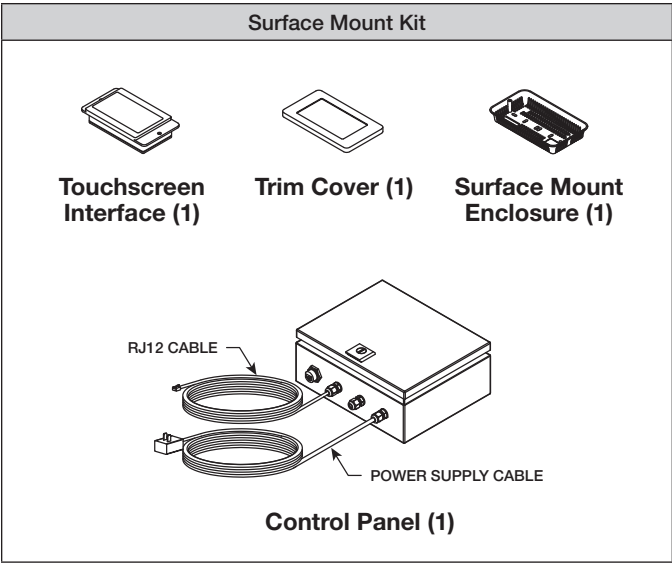
### Storage

Controls are protected against damage during shipment. If the control cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the control during storage. The user assumes responsibility of the control and accessories while in storage. The manufacturer will not be responsible for damage during storage.

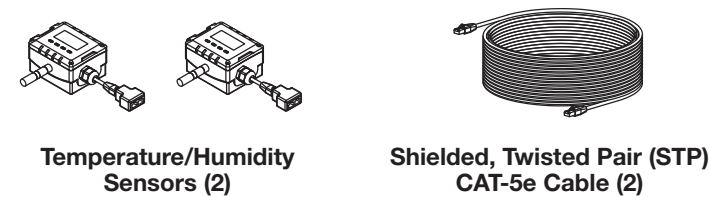**NOTE:** Improper storage which results in damage to the product will void the warranty.

# Control Components

Verify that all of the following parts and hardware have been received prior to beginning installation. Contact your local representative or the manufacturer if replacement parts are required.

**NOTE:** Additional parts (provided by others) may be required to complete the control installation, including additional wiring and hardware for mounting the control to the building structure.

| Surface Mount Kit |
|---|



**Touchscreen Interface (1)**     **Trim Cover (1)**     **Surface Mount Enclosure (1)**

RJ12 CABLE

POWER SUPPLY CABLE

**Control Panel (1)**

| Recessed Mount Kit |
|---|



**Touchscreen Interface (1)**     **Trim Cover (1)**     **Recessed Mount Enclosure (1)**

RJ12 CABLE

POWER SUPPLY CABLE

**Control Panel (1)**

# Optional Control Components



**Temperature/Humidity Sensors (2)**     **Shielded, Twisted Pair (STP) CAT-5e Cable (2)**

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# Installation

## Control Panel

1. Identify the intended mounting location for the touchscreen interface.

2. Identify an appropriate mounting location for the control panel within 50 feet of the touchscreen interface's intended mounting location. Control panel can be mounted in a location where it is not visible in the space, but the panel must be accessible for troubleshooting and maintenance. Examples of acceptable mounting locations include: the surface of a wall or ceiling, above a drop ceiling, or in a mechanical room or maintenance closet.

3. Verify that there is a 115V outlet within 6 feet of the control panel mounting location. If an outlet is not available, identify a new mounting location for the control panel or install an outlet making sure to follow all local and national electrical codes.

4. Open the front of the control panel enclosure using a flathead screwdriver.

5. Mount the control panel enclosure to the structure using the four mounting holes located in the corners on the inside of the enclosure (mounting hardware provided by others to accommodate various mounting surfaces).

6. If BACnet MSTP communication to a building management system (BMS) is required, route an RS-485 communication cable (provided by others) from the BMS to the control panel through the unused cable gland on the exterior of the control panel enclosure. Connect the RS-485 communication cable to the BACnet terminal block on the control panel circuit board, as shown in Figure 1.
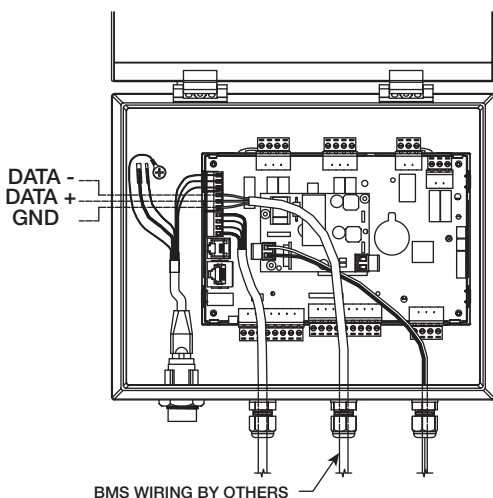


**Figure 1**

DATA −
DATA +
GND

BMS WIRING BY OTHERS

**IMPORTANT:** Touchscreen controls with BACnet MS/TP communication must be installed with shielded, twisted pair RS-485 communication cable. The minimum cable requirements are 3 insulated conductors and 1 uninsulated shield drain. Distributed capacitance between conductors shall be less than 30 pF per foot (100 pF per meter). Distributed capacitance between conductors and shield shall be less than 60 pF per foot (200 pF per meter). Foil or braided shields are acceptable. The maximum recommended length of an MS/TP segment is 4000 feet (1200 meters) with AWG 18 (0.82 mm2 conductor area) cable. The use of greater distances and/or different wire gauges shall comply with the electrical specifications of EIA-485.

7. Close the front of the control panel enclosure using a flathead screwdriver.

8. Plug the factory-wired power supply cable into a 115V outlet.

9. Plug one end of the shielded, twisted pair CAT-5e communication cable that was provided with the HVLS fan(s) into the open RJ45 port on the exterior of the control panel enclosure.

**IMPORTANT:** Touchscreen controls, temperature/humidity sensors, and HVLS fans must be installed with the supplied CAT-5e communication cable or shielded, twisted pair CAT-5e (by others) that complies with the following specifications. Cable must be twisted pair, shielded 26 ga. CAT-5e cable with a drain wire and must be compliant with ISO 11801. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout. Individual CAT-5e cable lengths must not exceed 200 ft. in order to prevent network communication issues.

10. Route the factory-installed, 50 ft. RJ-12 cable from the control panel to the intended mounting location for the touchscreen interface.

## Touchscreen with Surface Mount Kit

The following instructions apply to touchscreen control installations provided with the surface mount kit.

1. Using the plastic surface mounting enclosure as a template, mark and cut an opening in the surface of the wall for the RJ-12 communication cable from the control panel.

2. Mount the surface mount enclosure to the wall (mounting hardware provided by others to accommodate various mounting surfaces).

3. Route the RJ-12 cable through the wall opening and plug into the open port on the rear side of the touchscreen interface.

4. Mount the touchscreen interface to the surface mounting enclosure using the included hardware.

5. Snap the decorative trim cover into the front of the touchscreen interface.

## Touchscreen with Recessed Mount Kit

The following instructions apply to touchscreen control installations provided with the recessed mount kit.

1. Mark and cut a 5.8 x 3.25 inch opening in the surface of the wall for installation of the recessed mounting junction box.

```
Wall Opening
5.8 in. x 3.25 in.
```

2. Remove the appropriate pre-scored knockout from the recessed mounting junction box for the RJ-12 communication cable from the control panel.

3. Route the RJ-12 cable through the knockout opening and secure appropriately.

4. Set the recessed mounting junction box in the wall opening and secure to the wall using the attached mounting screws. Tighten the mounting screws until hand-tight, alternating to ensure pressure is distributed evenly.

5. Plug the RJ-12 cable into the open port on the rear side of the touchscreen interface.

6. Mount the touchscreen interface to the recessed mounting junction box using the included hardware.

7. Snap the decorative trim cover into the front of the touchscreen interface.

## Temperature/Humidity Sensor (Optional)

The following instructions apply to touchscreen control installations that were provided with the optional temperature/humidity sensor package.



1. Plug one end of a shielded, twisted pair CAT-5e cable that was provided with the temperature/humidity sensor package into the 2-way RJ45 splitter located at the top of the downtube on the last fan in the daisy chain. For daisy-chain communication wiring between fans, refer to instructions on page 5.

**IMPORTANT:** Touchscreen controls, temperature/humidity sensors, and HVLS fans must be installed with the supplied CAT-5e communication cable or shielded, twisted pair CAT-5e (by others) that complies with the following specifications. Cable must be twisted pair, shielded 26 ga. CAT-5e cable with a drain wire and must be compliant with ISO 11801. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout. Individual CAT-5e cable lengths must not exceed 200 ft. in order to prevent network communication issues.

2. Plug the other end of the shielded, twisted pair CAT-5e cable into the shielded 2-way RJ45 splitter located on the temperature/humidity sensor labelled "CEILING".

3. Open the front of the enclosure on the temperature/humidity sensor labelled "CEILING" by turning the slotted screws in the enclosure one quarter turn.

4. Mount the temperature/humidity sensor labelled "CEILING" in the desired mounting location using the three mounting holes on the inside of the enclosure (mounting hardware provided by others to accommodate various mounting surfaces).

5. Close the front of the enclosure on the temperature/humidity sensor labelled "CEILING".

6. Plug one end of a second shielded, twisted pair CAT-5e cable that was provided with the temperature/humidity sensor package into the shielded 2-way RJ45 splitter on the temperature/humidity sensor labelled "CEILING".

7. Plug the other end of the shielded, twisted pair CAT-5e cable into the shielded 2-way RJ45 splitter located on the temperature/humidity sensor labelled "ROOM".

8. Repeat steps 3-5 to mount the temperature/humidity sensor labelled "ROOM" at occupant height.

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# Pre-Start-Up Checks

If one control will be used to operate multiple fans, verify that the following fan networking steps have been completed prior to control start-up. Otherwise, continue on to the Operation section.

## Daisy-Chain Communication Wiring

For proper network communication, HVLS fans must be daisy-chained together using the following instructions.

**NOTE:** All communication wiring must be installed in compliance with NEC 800-52 or similar. All communication wiring needs a minimum separation of 2 inches from high voltage unless installed in separate raceways/conduit. When possible, maintain 24 inch of separation.

1. Connect the first HVLS fan in the daisy-chain to the control using the shielded, twisted pair CAT-5e communication cable that was provided with the HVLS fan. CAT-5e cable can be plugged into any open receptacle on the shielded RJ45 splitter located at the top of the fan's downtube.

**IMPORTANT:** Touchscreen controls, temperature/humidity sensors, and HVLS fans must be installed with the supplied CAT-5e communication cable or shielded, twisted pair CAT-5e (by others) that complies with the following specifications. Cable must be twisted pair, shielded 26 ga. CAT-5e cable with a drain wire and must be compliant with ISO 11801. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout. Individual CAT-5e cable lengths must not exceed 200 ft. in order to prevent network communication issues.

2. Plug an additional shielded, twisted pair CAT-5e control cable into the shielded 3-way RJ45 splitter located at the top of the downtube on the first fan. Connect the other end of this CAT-5e cable into the 3-way splitter on the next fan.

3. Repeat step 2 for subsequent fans until all fans in the chain are connected in series, as shown in Figure 2.
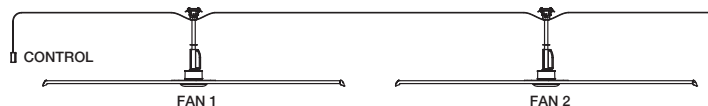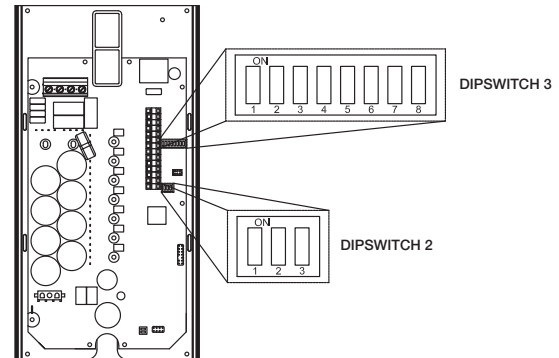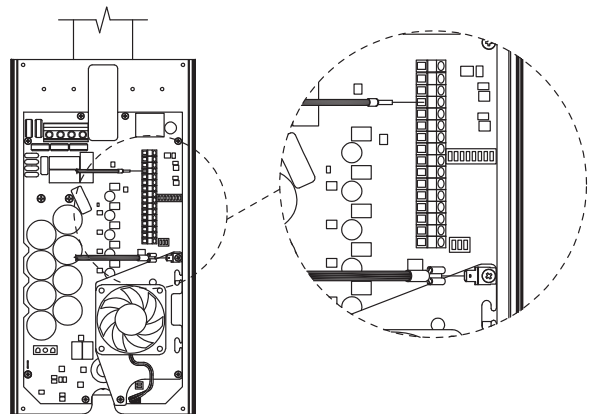


**Figure 2**

## Fan Networking

For proper network communication, the dipswitch settings and wiring on each fan's variable frequency drive circuit board may need to be adjusted using the following instructions.



## First Fan



1. Determine the first fan in the network daisy-chain by identifying the fan that is connected directly to the control source.

2. Remove the front VFD cover from the first fan in the network using a phillips screwdriver.

3. On the communication wiring terminal strip, remove the 24V (brown-white) wire and cap with a wire nut or heat shrink. Additionally, remove the stranded silver drain wire that is attached to the circuit board mounting screw and isolate from all circuit board components using heat shrink.

4. Dipswitch 2 is used to set parameters that improve network function. Verify that each of the switches on dipswitch 2 are set as follows:

   Position 1 – Off

   Position 2 – On

   Position 3 – On

5. Verify that each of the switches on dipswitch 3 are set as follows. Positions 1 – 5 are used to set the Modbus address of the fan and should be set as shown below from the factory (Modbus address #2).

**IMPORTANT:** Positions 6-8 are used to set parameters needed for fan operation and should not be adjusted.

Position 1 – On

Position 2 – Off

Position 3 – Off

Position 4 – Off

Position 5 – Off

Position 6 – On

Position 7 – Off

Position 8 – Off

6. Reinstall the front VFD cover.

## All Remaining Fans
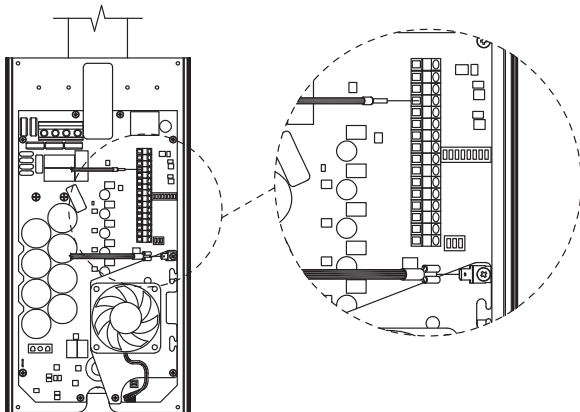


1. Remove the front VFD cover using a phillips screwdriver.

2. On the communication wiring terminal strip, remove the 24V (brown-white) wire and cap with a wire nut or heat shrink. Additionally, remove the stranded silver drain wire that is attached to the circuit board mounting screw and isolate from all circuit board components using heat shrink.

**IMPORTANT:** If touchscreen control was provided with the optional temperature/humidity sensor package, do not remove the 24V (brown-white) wire from the communication wiring terminal strip on the last fan in the daisy-chain (furthest fan away from the control source).

3. Set dipswitch 2 as shown below. Dipswitch 2 is used to set parameters that improve network function and will need to be adjusted for all fans in the network except for the first fan.

Position 1 – Off

Position 2 – Off

Position 3 – Off

4. Adjust positions 1-5 on dipswitch 3 so that each successive fan has a unique Modbus address. A table with possible Modbus addresses is shown below.

**IMPORTANT:** Positions 6-8 are used to set parameters needed for fan operation and should not be adjusted.

**NOTE:** It is good practice to use successive Modbus addresses for networked fans, but this is not necessary for proper functioning of the network.

5. Reinstall the front VFD cover.

| Fan Number | Modbus Address | Position 1 | Position 2 | Position 3 | Position 4 | Position 5 | Position 6, 7, 8 |
|---|---|---|---|---|---|---|---|
| N/A | 1 | Reserved for HVLS Fan Control | | | | | Do Not Modify |
| 1 | 2 | On | Off | Off | Off | Off | |
| 2 | 3 | Off | On | Off | Off | Off | |
| 3 | 4 | On | On | Off | Off | Off | |
| 4 | 5 | Off | Off | On | Off | Off | |
| 5 | 6 | On | Off | On | Off | Off | |
| 6 | 7 | Off | On | On | Off | Off | |
| 7 | 8 | On | On | On | Off | Off | |
| 8 | 9 | Off | Off | Off | On | Off | |
| 9 | 10 | On | Off | Off | On | Off | |
| 10 | 11 | Off | On | Off | On | Off | |

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# Operation

## Initial Setup

1. Follow the on screen prompts for initial control setup.
2. Initialize auto detect by tapping ⬛RUN AUTO DETECT⬛; this will take 30 seconds to complete.
3. Verify that the correct number of fans have been detected.
4. Tap the green ⊘ to continue.
5. Enter the mark name, blade count, and fan size for each installed fan by tapping on the boxes.

**IMPORTANT:** To achieve correct performance, accurate blade count and fan size must be selected.

6. Record serial number(s) and Modbus address information.
7. Tap the home icon to complete fan setup.

**NOTE:** Pages will initialize the first time they are entered. It may take up to 5 seconds for a page to load initially, or the first time after a power cycle.

## Security

Upon initial startup, the control will be in guest mode. The touchscreen is setup with two levels of security which include guest and full. The level of access for each is as follows:

- guest – full read access and the ability to turn the fans on/off
- full – full access to all settings and menus

**NOTE:** The 🔒 image in the bottom left corner of all home screens indicates the control is in guest mode.

### FULL LOGIN

1. To login with full access, tap ⚙ to access the global settings and then tap 🔒 to enter the security page.
2. Tap 👤 (login) and enter Username *full* and Password *0000*.
3. After clicking sign in, a prompt will show to change initial password.

**NOTE:** Once the password is changed, it is highly recommended to maintain this password in a safe place. **If the password is lost, it cannot be recovered.**

**OPTIONAL:** To return to guest mode, tap 👤 (logout). The guest account can only turn fans on or off. They cannot adjust speed or make any other changes.

## Clock Setup (Optional)

1. From the fan home screen, tap ⚙ to access global settings.
2. Tap on 🕐.
3. Tap in the set Date/Time box to update time.
4. Tap the green ⊘ to complete setup.

## Group Setup (Optional)

1. From the fan home screen, tap ⚙ to access global settings.
2. Tap ❄ to enter group setup.
3. Using the drop down menu, assign fans to desired group(s).

**NOTE:** Fans assigned to a group will only respond to group commands, not individual fan commands. Fans that belong to a group will display a blue power icon on the fan home screen.

## Scheduling (Optional)

1. From the fan home screen, tap ⚙ to access global settings.
2. Tap 📅 to enter scheduling.
3. Select one of the available Schedule ID values from the dropdown menu.
4. Tap weekday or weekend to set a schedule.
5. Schedule as desired. Each schedule is divided into four time periods, with two time periods available for weekdays and an additional two for weeken .

## Assign Fan(s) or Group(s) to a Schedule (Optional)

1. Navigate to the fan or group home screen.
2. Tap the fan or group that should be added to a schedule.
3. Tap ⚙ to enter fan or group settings.
4. Use the dropdown menu to select a schedule to assign the fan or group to.

## Assign Light(s) to Fan(s) or Group(s) (Optional)

1. Navigate to the fan or group home screen.
2. Tap the fan or group that should be added to a schedule.
3. Tap ⚙ to enter fan or group settings.
4. Use the dropdown menu to select Light as LED, UVC, or OFF.
5. For additional information on lights, contact technical support.

## Assign Fan(s) for BACnet Communication with Building Management System (Optional)

1. Navigate to the BMS menu by tapping the 🖥️ on the global settings page.
2. Adjust BACnet settings as required for the BMS network.
3. Navigate to the fan home screen.
4. Tap the fan that should be controlled with BACnet.
5. Tap ⚙️ to enter fan settings.
6. Use the schedule dropdown menu to select BMS.

**NOTE:** BMS control of HVLS fan(s) can be temporarily suspended by tapping the chain icon on the fan or group page. A countdown timer will display the remaining amount of time before the fan reverts to BMS control.

## Assign Group1 for Automatic Temperature/Humidity Control (Optional)

1. Navigate to the auto detect page by tapping [AutoDetect Page] on the global settings page.
2. Tap "None" in the sensors box, then select "Temp/RH" from the dropdown menu.
3. Tap the green ✓ to return to the fan home page.
4. Navigate to group setup page by tapping ✳️ on the global settings page.
5. Assign fan(s) that should be automatically controlled to Group1.
6. Navigate to the group home page by tapping ✳️ on the fan home page.
7. Tap Group1.
8. Tap 🅒 to enter automatic control mode.
9. Tap the operating mode for the appropriate season (☀️ summer or ❄️ winter), or tap ⚙️ to return to manual operation.
10. Tap 🌡️ to view current temperature and humidity sensor measurements.

**NOTE:** To adjust automatic temperature/humidity operation settings, navigate to the group settings page by tapping ⚙️. Then tap 📶 to open the automatic operation settings page.

## SUMMER MODE

1. Tap the Start Temp value to enter the desired starting temperature for fan operation. When the temperature or heat index measured at the floor sensor meets or exceeds the entered value, the fan(s) will begin to operate and automatically adjust fan speed to provide appropriate cooling for building occupants. The factory default value is 77°F.
2. Tap the Max Speed Temp value to enter the desired temperature for fan(s) to operate at max speed. If the temperature or heat index measured at the floor sensor meets or exceeds the entered value, the fan(s) will operate at their maximum speed. The factory default value is 86°F.
3. Tap the Max Speed value to enter the maximum desired operating speed for the fan(s) during summer operation. The factory default value is 7.

## WINTER MODE

1. Tap the Start Delta value to enter the desired temperature differential between the floor and ceiling sensors that should trigger fan operation. When the difference between the temperatures measured by the floor and ceiling sensors meets or exceeds the entered value, the fan(s) will begin to operate and automatically adjust fan speed to evenly distribute warm air in the building (destratification). The factory default value is 10°F.
2. Tap the Max Speed value to enter the maximum desired operating speed for the fan(s) during winter operation. Max Speed for winter operation is typically 3-4 values lower than Max Speed for summer operation. The factory default value is 5.

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# Fault Code Causes and Possible Solutions

| Code | Fault | Description | Possible Cause(s) | Solution |
|------|-------|-------------|-------------------|----------|
| 0 | No Fault | Fan is operating as expected | - | - |
| 1 | Modbus Timeout | Inconsistent Modbus RTU communication between control and drive resulting in incorrect fan operation | 1. Loose CAT-5e cable connections<br>2. Unshielded or damaged CAT-5e cables and RJ45 splitters<br>3. Incorrect network biasing settings<br>4. Incorrect low voltage wiring on euro connector<br>5. Incorrect supply power applied to VFD<br>6. Supply power phase imbalance | 1. Verify that all CAT-5e cable connections are fully seated and secure<br>2. Replace cables with the provided networking components (green shielded CAT-5e cables and black shielded 3-way RJ45 splitters) or components that comply with specifications on page 34<br>3. Refer to Fan Networking instructions on pages 36-39<br>4. Refer to Fan Networking instructions on pages 36-39<br>5. Verify that supply voltage is within +/- 10% of the VFD's rated voltage<br>6. Verify that current is consistent across all phases of supply power |
| 2 | Impact Detection | Unexpected change in fan speed and/or motor torque resulting in fan shutdown | 1. Fan blades and/or hub are obstructed<br>2. Motor power and/or hall cables not connected to VFD, not fully seated, or connected in incorrect orientation<br>3. Incorrect blade count and/or fan size selected in control<br>4. Fan operating without blades installed | 1. Remove any obstructions preventing fan rotation<br>2. Unplug and reconnect motor power and hall cables, refer to pages 30-32 for proper orientation<br>3. Set fan size and blade count to match physical product using instructions on in appropriate control manual<br>4. Install blades on fan |
| 3 | Motor Over Temperature | Internal motor temperature exceeds maximum value resulting in reduced fan speed or shutdown | Ambient temperature too high at the ceiling | Allow motor to cool before increasing speed or restarting fan |
| 4 | Drive Over Temperature | Internal VFD temperature exceeds maximum value resulting in reduced fan speed or shutdown | Ambient temperature too high at the ceiling | Allow VFD to cool before increasing speed or restarting fan |
| 5 | Bus Over Voltage | Internal VFD voltage is higher than expected resulting in fan shutdown | Incorrect supply voltage | Verify that supply voltage is within +/- 10% of the VFD's rated voltage |
| 6 | Bus Under Voltage | Internal VFD voltage is lower than expected resulting in fan shutdown | 1. Incorrect supply voltage<br>2. Rapid power-cycling at circuit breaker | 1. Verify that supply voltage is within +/- 10% of the drive's rated voltage<br>2. After turning power off, wait 30-60 seconds before turning power back on |
| 7 | Phase Over Current | Current is higher than expected on at least one phase of supply power resulting in fan shutdown | 1. Incorrect supply power<br>2. Supply power phase imbalance | 1. Verify that supply power meets all power quality requirements on page 33 and that supply voltage is within +/- 10% of the drive's rated voltage<br>2. Verify that current is consistent across all phases of supply power |
| 8 | Microcontroller High Temp | Microcontroller temperature exceeds maximum value resulting in reduced fan speed or shutdown | Ambient temperature too high at the ceiling | Allow VFD to cool before increasing speed or restarting fan |
| 9 | Overspeed Fault | Motor speed is greater than maximum allowable speed resulting in reduced fan speed or shutdown | 1. Incorrect blade count and/or fan size selected in control<br>2. Wind gusts in building | 1. Set fan size and blade count to match physical product using instructions in the control manual<br>2. Close overhead doors, etc. or relocate fan |

# BACnet MSTP Communication Points (Optional)

The following communication points list applies to installations that will be integrated with a building management system (BMS) via BACnet MSTP communication. BACnet points must be programmed into BMS (by others) for proper communication.

**IMPORTANT:** BACnet priority arrays are not supported by the Advanced Touchscreen control.

| KEY |
| --- |
| **X** = Modbus address of fan |

## HVLS Fan Points

| Type | Instance | Variable Name | Read/Write | DataType | Description |
|------|----------|---------------|------------|----------|-------------|
| AnalogInput | 0 | MS_ToBACnet.BN_NumberOfFans | Read Only | Real | Total number of fans found by controller. |
| AnalogValue | 1 | BMSPass1 | Read/Write | Real | 1st digit of writable BMS password. Default value is 1. |
| AnalogValue | 2 | BMSPass2 | Read/Write | Real | 2nd digit of writable BMS password. Default value is 2. |
| AnalogValue | 3 | BMSPass3 | Read/Write | Real | 3rd digit of writable BMS password. Default value is 3. |
| AnalogValue | 4 | BMSPass4 | Read/Write | Real | 4th digit of writable BMS password. Default value is 4. |
| BinaryValue | 5 | BMSSecurityEnable | Read/Write | Bool | Enables password protection of touchscreen interface through BMS. 0 = DISABLE; 1 = ENABLE |
| BinaryInput | **X** | Fan[**X**].Enabled | Read Only | Bool | Fan at Modbus address [**X**] found in system |
| BinaryValue | **X**01 | BMSFanOffOn[**X**] | Read/Write | Bool | BMS Off/On command for fan at Modbus address [**X**] |
| BinaryValue | **X**02 | Fan[**X**].Override | Read/Write | Bool | Fan at Modbus address [**X**] override command |
| BinaryInput | **X**03 | FanCommand.OverrideStatus[**X**] | Read Only | Bool | Local override for fan at Modbus address [**X**] enabled |
| AnalogValue | **X**04 | BN_LightSet[**X**] | Read/Write | Real | Percentage light for fan at Modbus address [**X**] |
| MultiStateInput | **X**05 | MS_ToBACnet.BN_RunCommand[**X**] | Read Only | UInt | OFF; COOLING; HEATING - Status of fan at Modbus address [**X**] |
| AnalogValue | **X**06 | BN_SpeedSet[**X**] | Read/Write | Real | Fan at Modbus address [**X**] speed command when BMS security is disabled on instance 5. Min = 0; Max = 10 |
| MultiStateInput | **X**07 | MS_ToBACnet.BN_OpStatus[**X**] | Read Only | UInt | OK; CRC ERROR; DRIVE FAULT; MOTOR TEMP WARNING; IGBT TEMP WARNING; FIRE INPUT; WIND SHUT DOWN - Hardware status of fan at Modbus address [**X**] |
| AnalogInput | **X**08 | MS_ToBACnet.BN_GroupNumber[**X**] | Read Only | Real | Fan at Modbus address [**X**] group number |
| AnalogInput | **X**09 | MS_ToBACnet.BN_ScheduleNumber[**X**] | Read Only | Real | Fan at Modbus address [**X**] schedule number |
| MultiStateInput | **X**10 | MS_ToBACnet.BN_Fault[**X**] | Read Only | UInt | NO FAULT; MODBUS TIMEOUT; IMPACT DETECTION; MOTOR OVER TEMP; DRIVE OVER TEMP; BUS OVER VOLT; BUS UNDER VOLT; PHASE OVER CURRENT; MCU HIGH TEMP; OVERSPEED - Drive status of fan at Modbus address [**X**] |
| BinaryValue | **X**11 | Fan[X].ForwardReverse | Read/Write | Bool | Forward/Reverse command for fan at Modbus address [**X**] |
| AnalogInput | **X**12 | MS_ToBACnet.BN_MotorRPM[**X**] | Read Only | Real | Fan at Modbus address [**X**] speed reference |
| BinaryInput | **X**13 | AI_FanOffline_**X**.Trigger | Read Only | Bool | Communication status for fan at Modbus address [**X**]. 0 = ONLINE; 1 = OFFLINE |
| AnalogValue | **X**14 | BN_WatchDog[**X**] | Read/Write | Real | Watchdog for fan at Modbus address [**X**]. If communication is lost, fan will stop running after programmed number of seconds. 0 = DISABLE; Default = 30; Max = 65535 |
| AnalogValue | **X**15 | BMS_SpeedSet[**X**] | Read/Write | Real | Fan at Modbus address [**X**] torque command when BMS security is enabled on instance 5. Refer to Modbus register 2 torque tables for appropriate values. Min = 0; Max = 100 |

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## Optional Temp/Humidity Sensor Points

| Type | Instance | Variable Name | Read/Write | DataType | Description |
|---|---|---|---|---|---|
| BinaryValue | 0 | SummerWinterMode | Read/Write | Bool | Summer or winter mode for temp/humidity operation |
| AnalogInput | 1 | RoomTemp.Val | Read Only | Real | Temperature in C |
| AnalogInput | 2 | RoomRH.Val | Read Only | Real | Percentage RH |
| AnalogInput | 3 | CeilingTemp.Val | Read Only | Real | Temperature in C |
| AnalogInput | 4 | CeilingRH.Val | Read Only | Real | Percentage RH |

**EXAMPLE:** Below is an example of BACnet addressing for the fan at address 29.

| Type | Instance | Variable Name | Read/Write | DataType | Description |
|---|---|---|---|---|---|
| MultiStateInput | 2905 | MS_ToBACnet.BN_RunCommand[29] | Read Only | UInt | OFF; COOLING; HEATING - Status of fan at Modbus address [29] |

## Typical BMS Integration Sequence

1. Read currentValue of AI0. This is the number of fans found in the system. Does this match the intended number of fans on this controller? If not, troubleshoot network issues.
   a. If there are **5** fans, and AI0 = **4**, one fan is turned off or not communicating.
   b. If there are **5** fans, and AI0 = **5**, all fans have been seen on the network.
2. Look at BI1, BI2, BI3, etc. These are the Modbus addresses of the fans found by the controller.
   a. If BI**3** = TRUE, then use "**3**" for "X" when setting up the point list.
   b. If BI**10** = TRUE, then use "**10**" for "X" when setting up the point list.
3. Use the values from BI1-BI20 to identify the fans on the network. Next, set up a points list for each connected fan. See below for examples.

**EXAMPLE:** Below are examples of typical point lists for fans at various addresses. Not all options are displayed in these examples, other points may be integrated as well.

| Typical point list for fan address **3**: |
|---|
| BI**3**01 BMSFanOffOn[**3**] |
| AV**3**06 BN_SpeedSet[**3**] |
| BV**3**11 Fan[**3**].ForwardReverse |
| AI**3**12 MS_ToBACnet.BN_MotorRPM[**3**] |
| MSI**3**10 MS_ToBACnet.BN_Fault[**3**] |

| Typical point list for fan address **10**: |
|---|
| BI**10**01 BMSFanOffOn[**10**] |
| AV**10**06 BN_SpeedSet[**10**] |
| BV**10**11 Fan[**10**].ForwardReverse |
| AI**10**12 MS_ToBACnet.BN_MotorRPM[**10**] |
| MSI**10**10 MS_ToBACnet.BN_Fault[**10**] |

## Our Commitment

*As a result of our commitment to continuous improvement, Venco reserves the right to change specifications without notice.*

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