

## 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.

With a variety of industry-leading features, Greenheck's HVLS controls are the easiest way to operate and monitor high volume, low speed (HVLS) ceiling fans. Designed for maximum convenience and versatility, the keypad control is an excellent choice for providing essential control features for functional operation with a minimal footprint. And, like all products in Greenheck's HVLS family, installation and set-up are a breeze thanks to a unique plug-and-play system with automatic fan detection.



Surface Mounting Kit



Recessed Mounting Kit

## 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. These suggestions are provided solely as a convenience to the user.

### Indoor

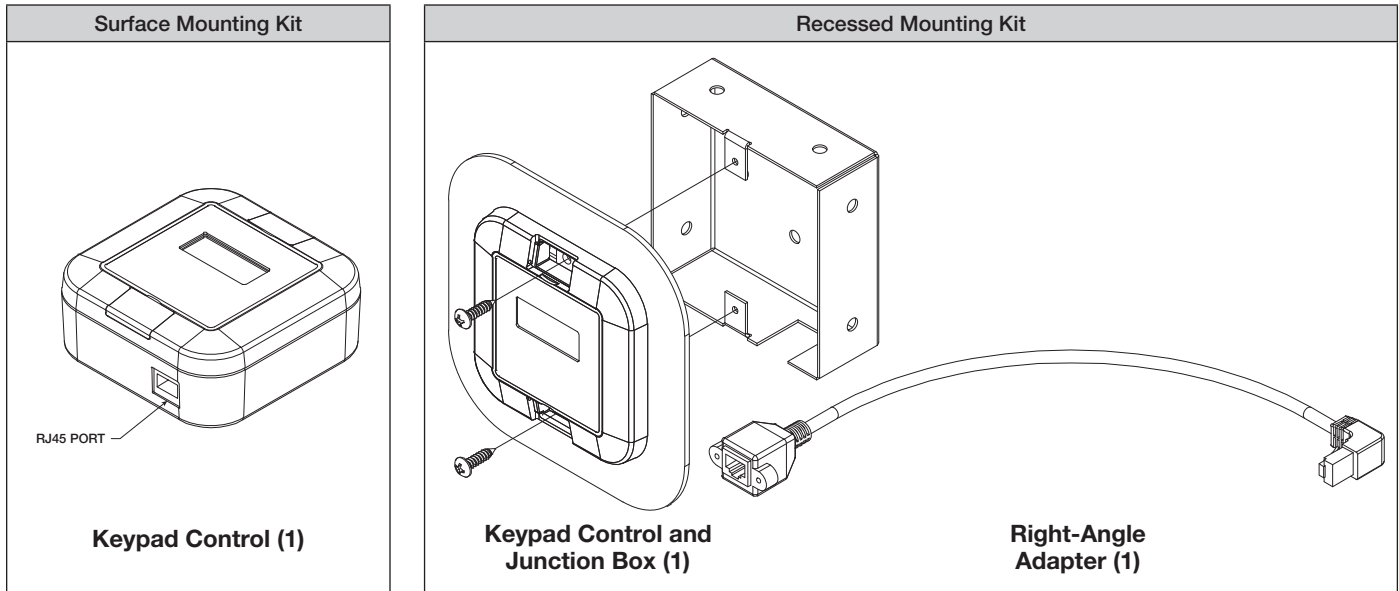
The ideal environment for the storage of controls and accessories is indoors, above grade, in a low humidity atmosphere that is sealed to prevent the entry of blowing dust, rain or snow. Care must be taken to protect controls and accessories from dirt, moisture, and extreme temperature during storage.

**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.



## Installation

### Surface Mounting Kit

The following instructions apply to keypad control installations that were provided with the surface mounting kit. For instructions on installing the recessed mounting kit, refer to page 2.

1. Open the hinged screw covers on the front side of the keypad control.
2. Mount the keypad control to the surface of a wall using the supplied screws.
3. 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.

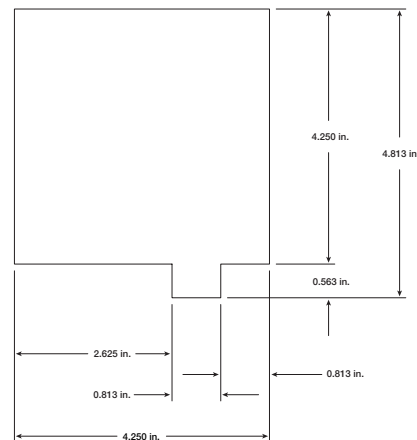
**NOTE:** Keypad control is powered via shielded, twisted pair CAT-5e communication cable from the HVLS fan(s). No additional power source is required.

**IMPORTANT:** Keypad controls 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.

### Recessed Mounting Kit

The following instructions apply to keypad control installations that were provided with the recessed mounting kit. For instructions on installing the surface mounting kit, refer to page 2.

1. Refer to the dimensions below, mark and cut an opening in the surface of the wall for installation of the recessed mounting junction box.



2. Route the shielded, twisted pair CAT-5e communication cable from the HVLS fan to the wall opening and secure appropriately.

**IMPORTANT:** Keypad controls 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.

3. Connect the included right-angle adapter to the CAT-5e communication cable.
4. Open the hinged screw covers on the front side of the keypad control and remove the supplied screws to separate the keypad control from the recessed mounting junction box. Set screws aside.

5. Route the male end of the right-angle adapter through the cutout on the bottom of the recessed mounting junction box.
6. Set the recessed mounting junction box in the wall opening and secure to the wall using appropriate fasteners (provided by others).
7. Plug the male end of the supplied, shielded CAT-5e right-angle adapter into the keypad control.
8. Mount the keypad control to the recessed mounting junction box using the screws set aside in step 4.

**NOTE:** Keypad control is powered via shielded, twisted pair CAT-5e communication cable from the HVLS fan(s). No additional power source is required.

## 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, turn to page 5 to continue with control operation.

### Daisy-Chain Communication Wiring

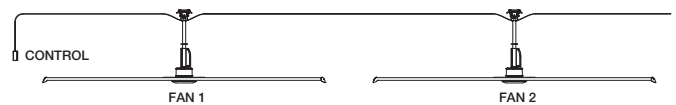
For proper network communication, HVLS fans must be daisy-chained together using the following instructions.

**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 RJ45 splitter located at the top of the fan's downtube.

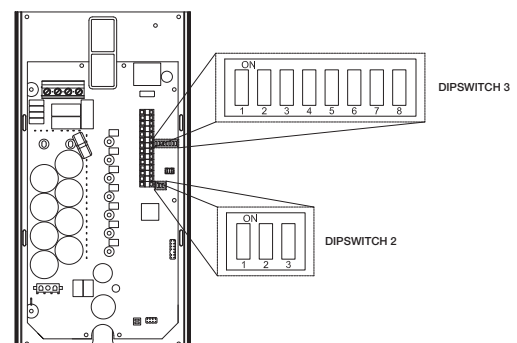
**IMPORTANT:** Touchscreen controls, temperature/humidity sensors, and HVLS fans must be installed with the supplied CAT-5e communication cable or shielded, twisted pair CAT-5e (by others) that complies with the following specifications. Cable must be twisted pair, shielded 26 ga. CAT-5e cable with a 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 2-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 2-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 the drawing below.

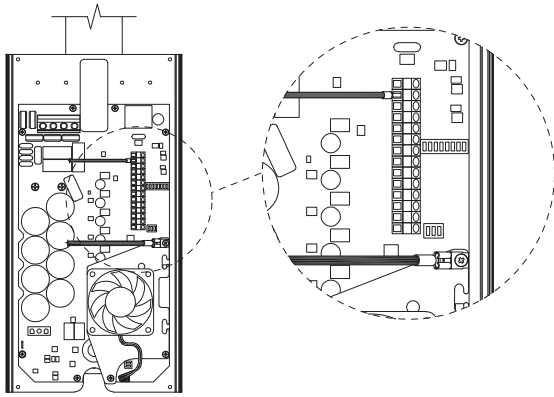


## Fan Networking

If networking multiple fans to run using a single control source, the dipswitch settings on each fan's VFD circuit board may need to be adjusted using the following instructions.



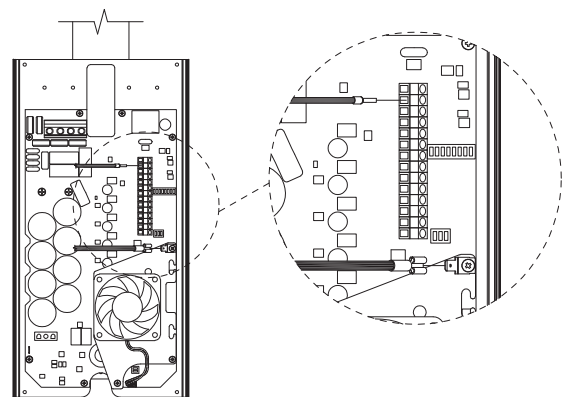
## First Fan



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. 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
4. 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).
  - Position 1 – On
  - Position 2 – Off
  - Position 3 – Off
  - Position 4 – Off
  - Position 5 – Off
  - Position 6 – On
  - Position 7 – Off
  - Position 8 – Off
5. Reinstall the front VFD cover.

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

## 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.
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.
  - Position 1 – Off
  - Position 2 – Off
  - Position 3 – Off
5. Reinstall the front VFD cover.

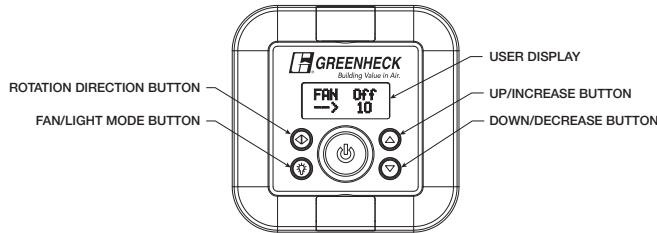
**IMPORTANT:** Positions 6-8 are used to set parameters needed for fan operation and should not be adjusted.

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

Modbus Address Settings - Dipswitch 3						
Modbus Address	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6, 7, 8
2	On	Off	Off	Off	Off	Do Not Modify
3	Off	On	Off	Off	Off	
4	On	On	Off	Off	Off	
5	Off	Off	On	Off	Off	
6	On	Off	On	Off	Off	
7	Off	On	On	Off	Off	
8	On	On	On	Off	Off	
9	Off	Off	Off	On	Off	
10	On	Off	Off	On	Off	
11	Off	On	Off	On	Off	

## Operation

After applying power to the connected HVLS fan(s), the keypad control will start up and default to fan operation mode. The current operation mode will be displayed on the user display in the top left corner of the screen. “FAN” denotes fan operation mode, while “LIGHT” denotes light operation mode.



**NOTE:** If ordered for multi-fan operation, keypad control can be used to operate multiple HVLS fans of the same model and size at the same speed setting (0-10) with the same direction of rotation. Refer to page 3 for details on daisy-chaining multiple fans.

### Initial Setup

1. While in fan operation mode, press and hold the rotation direction button for (4) seconds to enter the user menu.
2. Press the up/increase button until “BladeNum” is displayed on the screen.
3. Using the rotation direction button, scroll through the available blade quantities until the appropriate number of blades is displayed on the screen.
4. Press the power button to confirm the blade number selection. An asterisk will appear to the right of the selected blade number to denote that the selection has been saved.
5. Press the up/increase button until “BladeLen” is displayed on screen.
6. Using the rotation direction button, scroll through the available fan sizes until the appropriate size is displayed on screen.
7. Press the power button to confirm the fan size selection. An asterisk will appear to the right of the selected fan size to denote that the selection has been saved.

**NOTE:** Due to continuous development, Greenheck reserves the right to update software without notice.

### Fan Operation Mode

The keypad control buttons will have the following functions:

#### Power Button

- Press the power button to toggle the fan(s) on or off. The current power setting will be displayed on the user display in the top right corner of the screen.

#### Rotation Direction Button

- Press the rotation direction button to toggle the rotation of the fan between forward and reverse operation. The current direction of rotation will be displayed on the user display in the bottom left corner of the screen. “←” denotes forward rotation, while “→” denotes reverse rotation.
- Press and hold the rotation direction button for (4) seconds to open the user menu screen. Refer to User Menu Navigation.

#### Fan/Light Mode Button

- Press the fan/light mode button to toggle between fan operation mode and light operation mode (refer to Light Operation Mode). The current operation mode will be displayed on the user display in the top left corner of the screen. “FAN” denotes fan operation mode, while “LIGHT” denotes light operation mode. A flashing “?” icon after the current operation mode on the user display indicates a fan status warning or the occurrence of a fault. Refer to User Menu Navigation and table of fault codes.

#### Up/Increase Button

- Press the up/increase button to increase fan speed by whole number values up to a maximum of 10 (max speed). The current speed setting will be displayed on the user display in the bottom right corner of the screen. The keypad control will retain the fan(s) last speed setting and resume operation at this setting when fan(s) are powered off and on again.

#### Down/Decrease Button

- Press the down/decrease button to decrease fan speed by whole number values down to a minimum of 0 (fan off). The current speed setting will be displayed on the user display in the bottom right corner of the screen. The keypad control will retain the fan(s) last speed setting and resume operation at this setting when fan(s) are powered off and on again.

## Light Operation Mode (Optional)

The keypad control's buttons will have the following functions:

### Power Button

- Press and hold the power button for 2 seconds to power off the fan(s).

**NOTE:** The optional LED light accessory is powered by a 115V circuit on the building's light grid. Keypad control cannot be used to turn the light on or off.

### Rotation Direction Button

- Press the rotation direction button to toggle the rotation of the fan between forward and reverse operation. The current direction of rotation will be displayed on the user display in the bottom left corner of the screen. "←" denotes forward rotation, while "→" denotes reverse rotation.
- Press and hold the rotation direction button for 4 seconds to open the user menu screen. Refer to User Menu Navigation.

### Fan/Light Mode Button

- Press the fan/light mode button to toggle between fan operation mode and light operation mode (refer back to Fan Operation Mode). The current operation mode will be displayed on the user display in the top left corner of the screen. "FAN" denotes fan operation mode, while "LIGHT" denotes light operation mode. A flashing "?" icon after the current operation mode on the user display indicates a fan status warning or the occurrence of a fault. Refer to User Menu Navigation and table of fault codes.

### Up/Increase Button

- Press the up/increase button to increase the brightness of the optional light accessory by whole number values up to a maximum of 10 (maximum brightness). The current brightness setting will be displayed on the user display in the bottom right corner of the screen. The keypad control will retain the light(s) last brightness setting and resume operation at this setting when light(s) are powered off and on again.

### Down/Decrease Button

- Press the down/decrease button to decrease the brightness of the optional light accessory by whole number values down to a minimum of 0 (light off). The current brightness setting will be displayed on the user display in the bottom right corner of the screen. The keypad control will retain the light(s) last brightness setting and resume operation at this setting when light(s) are powered off and on again.

## User Menu Navigation

To change universal settings or view fan diagnostic information such as fault codes and current operating status, the user menu screen can be accessed by pressing and holding the rotation direction button for 4 seconds. On the user menu screen, the keypad control buttons will have the following functions:

### Power Button

- Press the power button to select the menu function that is currently displayed on the user display.

### Rotation Direction Button

- The rotation direction button is only active for the "DIM Ctrl", "Monitor", "BladeNum" and "BladeLen" menu functions. Press the rotation direction button to scroll through the available parameters or diagnostic information for the menu function that is currently displayed on the user display.

### Fan/Light Mode Button

- Press the fan/light mode button to exit the user menu and return the user to the fan operation mode screen.

### Up/Increase Button

- Press the up/increase button to scroll up through the available menu functions on the user menu screen.

### Down/Decrease Button

- Press the down/decrease button to scroll down through the available menu functions on the user menu screen.

## User Menu Functions

The available menu functions on the user menu screen are explained below:

### OpStatus

- The OpStatus menu function is used to view the current operating status of the fan, including any fan status warnings. To access the OpStatus function, press the power button when “OpStatus” is displayed on the user display.

One of the following OpStatus codes will be displayed on the user display:

OpStatus Code	Meaning
0	System is functioning normally
1	Comm CRC errors
2	Drive (VFD) fault
3	Motor temperature warning
4	Drive (VFD) warning
5	Fire relay input is active (VFD is inhibited)
6	Wind shut down is active

### Speed (RPM)

- Shows the fan speed in RPM.

### BladeNum

- Sets the quantity of blades for the fan(s) being operated by the keypad control. Refer back to Initial Setup for more detail.

### BladeLen

- Sets the size of the fan(s) being operated by the keypad control. Refer back to Initial Setup for more detail.

### Max Speed

- Sets the maximum operating speed setting (0-10) of the fan(s) being operated by the keypad control. Default value is 10.

### DIM Ctrl

- The DIM Ctrl menu function is used to activate or deactivate the automatic dimming feature of the keypad control interface. To access the DIM Ctrl function, press the rotation direction button while “DIM Ctrl” is displayed on the user display to change the parameter, then press the power button to save the new parameter setting. When “ON”, the screen backlight will dim after 15 seconds of no activity. Pressing any button will bring the display back to 100% brightness.

### Monitor

- The Monitor menu is used to view diagnostic information on the fan, including fault codes. To access the Monitor function, press the rotation direction button while “Monitor” is displayed on the user display to scroll through the available diagnostic readings. Diagnostic readings are refreshed every second and the available diagnostics are listed in this section. Fault codes

can be displayed by pressing the power button when the appropriate fault code diagnostic (last, second last, third last, fourth last, fifth last) is displayed on the user display.

Diagnostic Reading	Description	Meaning
Status	Status	Operational Status (see above)
ExtTemp	External Temperature	Temperature Read at the Thermistor
FltHist1	Last Fault Code	Last Recorded Fault
FltHist2	Second Last Fault Code	Second Last Recorded Fault
FltHist3	Third Last Fault Code	Third Last Recorded Fault
FltHist4	Fourth Last Fault Code	Fourth Last Recorded Fault
FltHist5	Fifth Last Fault Code	Fifth Last Recorded Fault
DriveVer	Firmware Version – Drive	Current Firmware on the Drive
Disp Ver	Firmware Version – HMI	Current Firmware on the Keypad Control
Run Time	Operating Hours	Operating Hours of the Fan System
Speed	Motor RPM	Rotational Speed of the Fan
DC Bus	Voltage, DC Bus	Used for Manufacturer Diagnostics
PH Volt	Voltage, Motor Output RMS	Used for Manufacturer Diagnostics
PH Curr	Current, Motor RMS	Used for Manufacturer Diagnostics
Mtr Temp	Temperature, Motor	Temperature of Motor
Drv Temp	Temperature, Transistor	Temperature of Transistor
MCU Temp	Temperature, Microcontroller Unit (MCU)	Temperature of MCU
Spd Redc	Thermal Speed Derate	Speed derate in the Event of High Temperature
CommErrs	Communication Errors	Shows any Communication Errors
Run Cmd	Run Command	Value Being Sent to the Fan System
Spd Req	Speed Reference	Percentage Torque Request
LiteReq	Light Control	Percentage of Light Brightness

## Fault Code Causes and Possible Solutions

CODE	FAULT	DESCRIPTION
0	No Fault	
1	Modbus Timeout	No activity on Modbus (check control connection)
2	Impact Detection	Unexpected change in speed and/or torque indicates impact
3	Motor Over Temperature	Motor temperature exceeds 110°C
4	Drive Over Temperature	Drive components over 110°C
5	Bus Over Voltage	DC Bus voltage is greater than 385v
6	Bus Under Voltage	DC Bus voltage is less than 140v
7	Phase Over Current	Phase Current is greater than 6A RMS
8	Microcontroller High Temp	Microcontroller Unit Temperature is greater than 110°C
9	Overspeed Fault	Blade Speed is greater than 300 rpm

## Our Commitment

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

Product warranties can be found online at [Greenheck.com](http://Greenheck.com), either on the specific product page or in the literature section of the website at [Greenheck.com/Resources/Library/Literature](http://Greenheck.com/Resources/Library/Literature).

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at [www.amca.org](http://www.amca.org).

