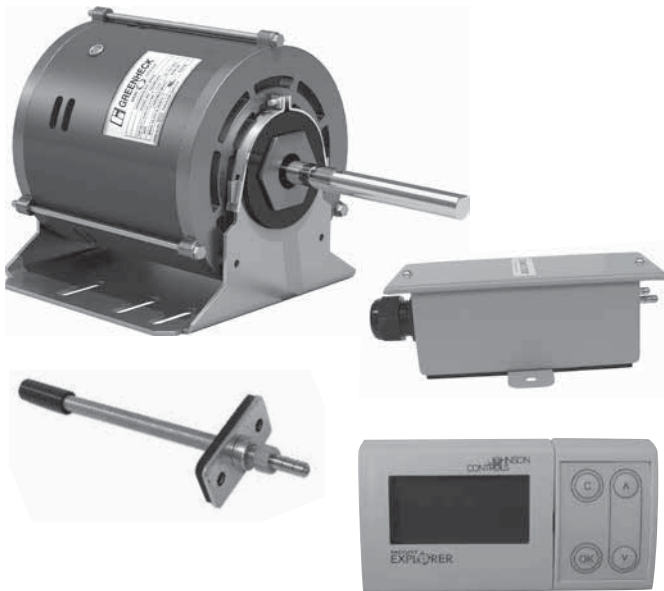


Installation, Operation and Maintenance Manual

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 instructions could result in personal injury and/or property damage!



Vari-Green® Constant Pressure Controls - Outdoor

Vari-Green constant pressure control system is a packaged system designed specifically to exhaust air from high rise buildings, condos, dormitories and hotels. The system includes an exhaust fan with Vari-Green® motor, pressure transducer, pressure tap, and controller. The system is UL Listed and designed with considerations for lint laden air. Performance ranges from 500-3000 CFM and up to 1 inch of pressure. Fan models available are G, CUE, CW, and SQ. Each system shall bear a manufacturers nameplate.

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. Other considerations may be required if high winds or seismic activity are present. If more information is needed, contact a licensed professional engineer before moving forward.

DANGER

Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.

CAUTION

When servicing the fan, motor may be hot enough to cause pain or injury. Allow motor to cool before servicing.

CAUTION

Precaution should be taken in explosive atmospheres.

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.

1. The rotation of the wheel is critical. It must be free to rotate without striking or rubbing any stationary objects.
2. Motor must be securely and adequately grounded.
3. Do not spin fan wheel faster than maximum cataloged fan RPM. Adjustments to fan speed significantly affects motor load. If the fan RPM is changed, the motor current should be checked to make sure it is not exceeding the motor nameplate amps.
4. Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces, or chemicals. Replace cord immediately if damaged.
5. Verify that the power source is compatible with the equipment.
6. Never open access doors to a duct while the fan is running.

Receiving

Upon receiving the product check to make sure all items are accounted for by referencing the bill of lading to ensure all items were received. Inspect each crate for shipping damage before accepting delivery. Notify the carrier if any damage is noticed. The carrier will make notification on the delivery receipt acknowledging any damage to the product. All damage should be noted on all the copies of the bill of lading which is countersigned by the delivering carrier. A Carrier Inspection Report should be filled out by the carrier upon arrival and reported to the Traffic Department. If damaged upon arrival, file a claim with carrier. Any physical damage to the unit after acceptance is not the responsibility of Greenheck Fan Corporation.

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.

Handling

The motor amperage and voltage ratings must be checked for compatibility to supply voltage prior to final electrical connection. Wiring must conform to local and national codes. Consult local code authorities for specific requirements.

Storage

Product is protected against damage during shipment. If the product cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the product during storage. The user assumes responsibility of the product 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 Only - Do not store this product outdoors. The ideal environment for the storage of this product is indoors, above grade, in a low humidity atmosphere which is sealed to prevent the entry of blowing dust, rain or snow. Temperatures should be evenly maintained between 30° to 110°F (-1° to 43°C) (wide temperature swings may cause condensation and “sweating” of metal parts). All accessories must be stored indoors in a clean, dry atmosphere.

Remove any accumulations of dirt, water, ice, or snow and wipe dry before moving to indoor storage. Allow cold parts to reach room temperature to avoid “sweating” of metal parts. To dry parts and packages, use a portable electric heater to get rid of any moisture buildup. Leave coverings loose to permit air circulation and to allow for periodic inspection. The unit should not be stored on the floor.

Inspection and Maintenance during Storage

While in storage, inspect product once per month. Keep a record of inspection and maintenance performed. If moisture or dirt accumulations are found on parts, the source should be located and eliminated.

Installation and Setup Guide

This guide provides instructions for how to install, wire and program the Vari-Green control system for use when constant pressure in a duct system is required. This does not cover ductwork recommendations or other considerations. When installed, this control system will automatically vary the speed of a booster fan to maintain a constant pressure within the system. A Greenheck exhaust fan with a Vari-Green motor is required for use with the controls and must be ordered separately.

Parts List - provided by Greenheck

Pressure Tap



Pressure Transducer



Control Box



Parts Required - not provided by Greenheck

- 18 - 20 gauge 3-wire plenum rated control wire
- 1/4 inch inside diameter plastic tubing
- Switch for optional remote override

Installation

Pressure Tap

- In the duct of the system that you intend to control, drill a 13/32 inch hole. The location will depend on the layout of the system. For stacked systems, locate the pressure tap 1/3 of the way from the bottom of the duct. The pressure tap should be a least 6 feet away from the fan inlet.
- Install pressure tap using two screws. Orientation does not matter.

Pressure Transducer

- The pressure transducer should be mounted indoors and as close as possible to the pressure tap in an accessible location to minimize the length of tubing necessary to connect them. This will minimize chances of kinks or punctures in the tubing.
- Mount the pressure transducer in the vertical position with the tubing connectors in the down position.
- Connect the pressure tap to the pressure transducer using 1/4-inch tubing. Connection to the pressure transducer is made on the high connector. The low connector remains open to atmosphere.

Control Box

- The control box should be securely mounted in an accessible location that will allow for programming and use of the controller. Common locations include: utility closet, mechanical room, etc. The enclosure is also NEMA-3R rated for outdoor mounting such as on a roof curb provided that liquid-tight conduit is used.

Additionally, the control box should be mounted in a location less than 100 feet from the exhaust fan and the pressure transducer to avoid signal losses in the low-voltage control wire.

Wiring

See diagram on page 6 for wiring overview.

- Pressure Transducer to Control Box

| Pressure Transducer Terminal | | Controller Terminal |
|------------------------------|----|---------------------|
| + | to | 1 |
| - | to | 2 |
| 0 | to | 4 |

- Control Box to Motor

| | Controller Terminal | | Motor |
|----------------------------|---------------------|----|-------|
| Low-voltage control wiring | 1 | to | Black |
| | 2 | to | White |
| | 3 | to | Red |
| High-voltage power wiring | L1 | to | Black |
| | L2 | to | White |
| | G | to | Green |

IMPORTANT

Low-voltage control wire and high-voltage power wiring must be run from the controller to the fan in separate conduit.

- Connect 115 volt, single-phase power to the disconnect switch on the outside of the control box.
- Optional Remote Override
Connect a normally-open switch between connection 11 and 12 on the top of the controller. Closing this switch will activate the remote override feature. Opening the switch will de-activate the override.

Controller Display and Navigation

The controller consists of four buttons. Clear (C), OK, Up (^), and Down (v). The display has two menus with the following information displayed under each menu:



Display

Home

- Static Pressure in Inches wg
 - This is the real-time duct pressure measured at the tap. For all instances, -10 on the display refers to -0.10 in. wg.
- Output (percent)
 - This displays the percent output of motor speed from 20-100%.

Settings

- Set point (in. wg)
 - This is the pressure set point you want the system to maintain. Again, -10 on the display refers to -0.10 in. wg.
- Cutout Value (percent)
 - This value is a percentage of the motor output from 0-100%. This is set as a threshold for turning the fan off when no demand is present in the system.
- Delay (second)
 - This value is the amount of time that will elapse after there is no demand on the system before shutting the fan off. This value has a minimum of 15 seconds.

Navigation

The home screen will be displayed by default. To reach the settings screen, first press the Clear button, then press OK. You are now in the settings screen. To modify the values, arrow up or down to the value you intend to change and press OK. Use the arrow buttons to adjust the value, then press OK to accept your entry.

To return to the home screen, press the Clear button twice. Note, the values on the home screen are read only and cannot be changed.

Programming

After making all of the wiring connections and energizing the controller, the system will begin to function with a default set point of -0.10 in. wg.

There are some additional customization features that can be utilized if deemed necessary and are listed below.

Set Point

- Navigate to the settings screen and enter your desired set point. This will range from -0.40 in. wg to +0.40 in. wg. Remember, -40 represents a static pressure of -0.40 in. wg.

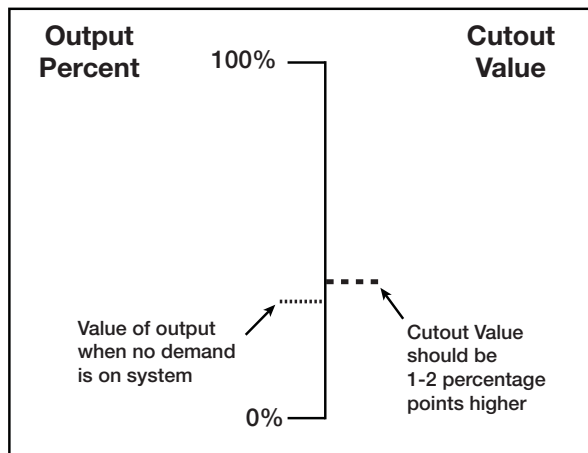
Cutout Value

The cutout feature can only be used if the system utilizes powered fans such as bathroom fans or dryers. It will not function properly if passive devices are installed in the system such as motorized dampers.

This value needs to be set if you would like the exhaust fan to turn off when there is no demand on the system. The default value is set at zero. If the exhaust fan is required to operate at all times, leave this value at zero and the programming is done.

When the output percent dips below this value, it activates a timer and after the time has elapsed the fan will shut off.

Note that this value is only valid for a discreet pressure set point. When the set point is changed, the cutout value must be adjusted as well. It is recommended that you make sure your set point is correct before continuing.



To set this value, the following steps need to be followed:

- Energize the system and verify it is maintaining the desired pressure set point with no other equipment (dryers, bathroom fans, etc.) operating.
- After the pressure has stabilized at the set point, navigate to the output screen on the home menu of the controller. Take note of this value. (The value will fluctuate slightly within +/- 2%. A mental average will be adequate.)

- The recommended Cutout Value is 1-2 percentage points above the value you noted in the previous step. Refer to page 4 for a graphical representation.

When the system is running and the output percent has dropped below the cutout value, the “L” icon will appear on the display. This shows that the delay timer has started and after the set time, the fan will turn off. When the fan turns off, an icon will blink on the display.

One of two things must happen for the system to return to normal operating mode:

- The controller will sense when a dryer, bathroom fan, etc. is turned on and will vary the exhaust fan speed appropriately.
- If for some reason the system needs to be manually awakened from cutout mode, hold the Clear button for 2 seconds and the system will return to normal operating mode.

Delay

The default is 60 seconds. If a different delay duration is required, change this value before the fan is shut off.

Programming of the controller is now complete. If power to the controller is lost, all settings will be retained.

No further attention to the settings is necessary other than set point adjustments. Remember, a set point change will require an adjustment of the cutout value if applicable.

Remote Override

When the remote override is activated, the fan will immediately ramp to 100% speed and stay there until it is disabled. The override can be activated by any normally-open voltage-free contact. Closing the contact will activate the override.

The display screen will turn red and scroll “Override” when it is activated.

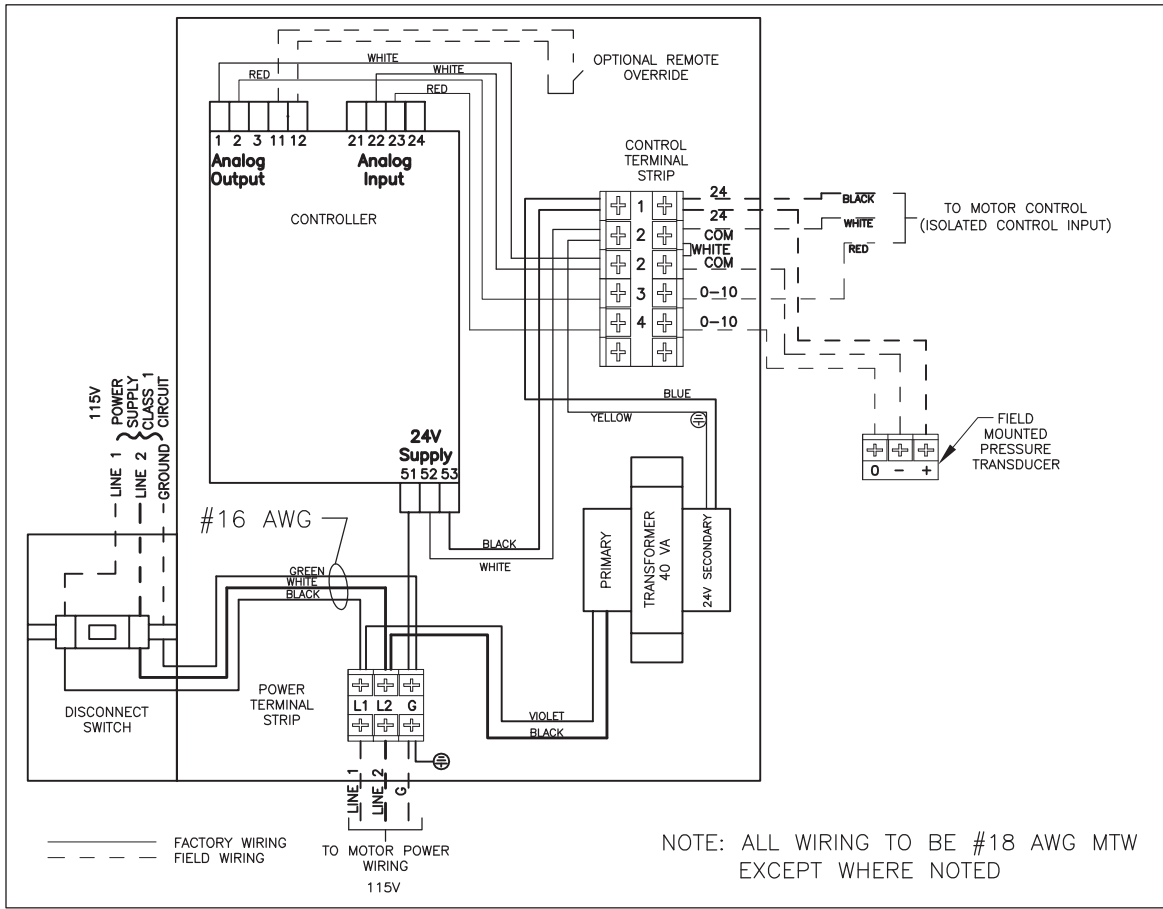
Troubleshooting

WARNING

Before taking any corrective action, make certain unit is not capable of operation during repairs.

| PROBLEM | CORRECTIVE ACTION |
|--|---|
| Controller will not shut fan off. | Verify that the cutout value is correct and that the timer has started by looking for the “L” icon on the display. If this icon is not displayed, then the cutout value needs to be adjusted. Remember that this value should be set when there is no demand on the system. |
| Controller shuts fan off when there is demand on the system. | The cutout value is set too high. Lower the value and observe the operation of the system. |

Wiring Diagram



Our Commitment

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

Specific Greenheck product warranties are located on greenheck.com within the product area tabs and in the Library under Warranties.

Greenheck Vari-Green® Motor catalog provides additional information describing the equipment, fan performance, available accessories, and specification data.

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.



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