



Fans with a red slash mark  
 were not part of the projects  
 under my scope. Did not review

# SUBMITTAL

August 24, 2023

All else - No exceptions taken.

**Project:** Bakersfield City School District HVAC Replacement  
**Location:** Bakersfield, California  
**Owner:** Bakersfield City School District  
**Prepared By:** Dave Nolte | Brooke Jalomo

## Exhaust Fans

### CEILING FANS

Designation	EF-1	EF-3	EF-6	EF-7
Manufacturer	Greenheck	Greenheck	Greenheck	Greenheck
Model	SP-A50-90-VG	Sp-A390-VG	SP-A50-90-VG	SP-A110
Type	Ceiling	Ceiling	Ceiling	Ceiling
CFM	90	178	90	88
ESP (in wg)	0.2	0.2	0.209	0.2
RPM	887	876	887	867
Watts	6	18	6	7
Sones	0.6	2.0	0.7	0.8
Drive	Direct	Direct	Direct	Direct
Volts / Ph	115 / 1	115 / 1	115 / 1	115 / 1
Oper Wt (lbs)	19	32	19	26
Accessories	1 thru 8	1,4 thru 8	1, 3 thru 8	1 thru 8

Accessories:

1. Motor rated for continuous use
2. Motor with thermal overload
3. Motor with 40° ambient temperature
4. UL/cUL 507 Listed – electric fan
5. Flat roof flashing flange, shipped loose
6. Round duct connection
7. Adjustable mounting bracket
8. Standard Grille\Polypropylene wheel material

This fan - not reviewed.

Access doors, interlocking, roofing, controls, timers, starters, mounting hardware, special paints or finishes, and any other accessory **NOT** specifically listed above is **NOT** included.



ROOF FANS

Designation	EF-2	EF-4	EF-5	PEF-1
Manufacturer	Greenheck	Greenheck	Greenheck	Greenheck
Model	CUE-095-VG	CUE-099-VG	CUE-070-VG	CUE-160-VG
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
CFM	250	300	150	1,800
ESP (in wg)	0.5	0.5	0.4	0.4
RPM	1316	1131	1585	843
BHP	0.06	0.05	0.02	0.23
HP	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{15}$	$\frac{1}{2}$
Sones	6.7	5.2	4.1	9.3
Drive	Direct	Direct	Direct	Direct
Volts / Ph	115 / 1	115 / 1	115 / 1	115 / 1
Oper Wt (lbs)	68	73	57	124
Accessories	1 thru 10	1 thru 10	3 thru 10 & 13	3 thru 12

Accessories:

1. Motor – Vari-green EC motor
2. Control – 0-10VDC input, (no control provided, signal supplied by others)
3. Control dial for balancing
4. UL/cUL 705 Listed Power Ventilators
5. NEMA-1 toggle disconnect switch, junction box mounted and wired
6. Foam curb seal, factory applied
7. Stainless steel birdscreen
8. Composite wheel material
9. Damper, shipped loose
10. Pitched roof curb, pitch to be selected prior to releasing
11. Control – Vari-green constant pressure , integral transducer, room tap qty 1
12. Control – Vari-green transformer 85-277VAC to 24VDC, mounted and wired
13. Motor – Vari-green EC motor with dial ONLY (not capable for field conversion to 0-10)

*Access doors, interlocking, roofing, controls, timers, starters, mounting hardware, special paints or finishes, and any other accessory **NOT** specifically listed above is **NOT** included.*

# Model: SP-A50-90-VG

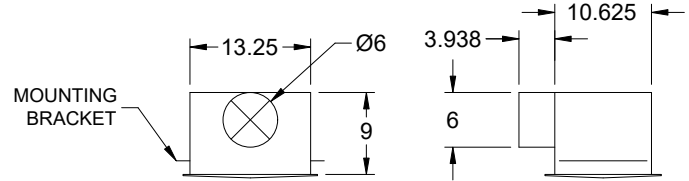
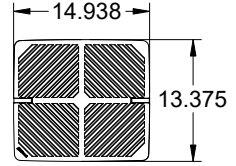
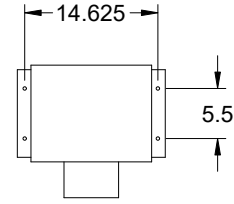
## Ceiling Exhaust Fan

### Standard Construction Features:

- Corrosion resistant galv steel scroll and housing - Sound absorbing insulation - White designer non-yellowing grille - Round outlet duct collar with integral backdraft damper - Double inlet forward curved wheel - Plug type disconnect - Adj. mounting brackets - Field rotatable discharge

### Selected Options & Accessories:

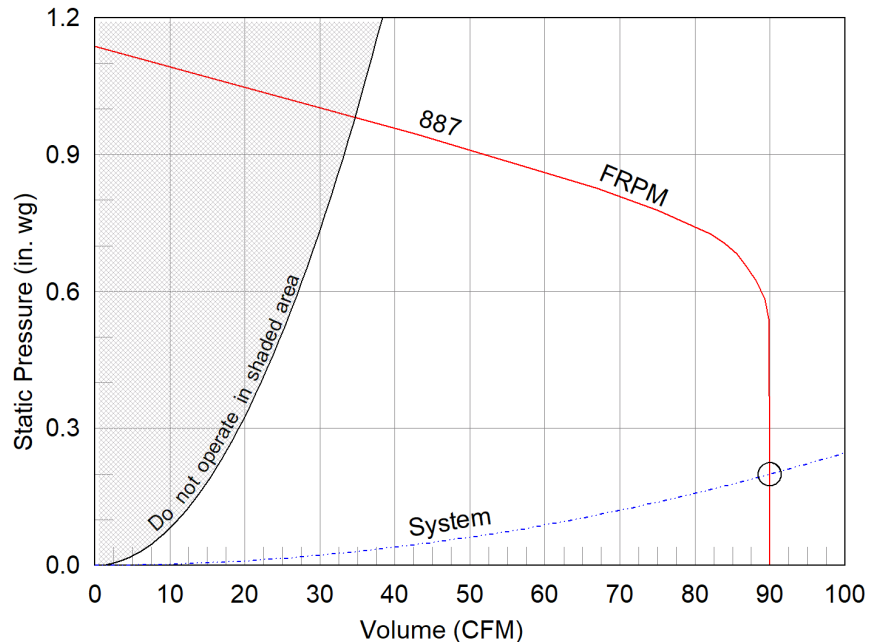
- Motor rated for continuous use
- Motor with CSA Approval
- Motor with 40 Degree C Ambient Temperature
- UL/cUL 507 Listed - Electric Fan
- Flat Roof Flashing Flange (PN: RFC-7) Shipped Loose
- Round Duct Connection
- Adjustable easy installation mounting bracket
- Energy Star Certified
- Standard Grille
- Polypropylene Wheel Material
- Can Be Used to Comply with: ASHRAE 62.2, California Title 24, and Washington State Energy Code



Dimensional	
Quantity	33
Weight w/o Acc's (lb)	12
Weight w/ Acc's (lb)	19

Performance	
Requested Volume (CFM)	90
Actual Volume (CFM)	90
Total External SP (in. wg)	0.2
Fan RPM	887
* FLA (A)	0.29
Elevation (ft)	328
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Sones	0.6

Motor	
Motor Mounted	Yes
** Input Watts (W)	6
Voltage/Cycle/Phase	115/60/1
Enclosure	TEAO



- Operating point at Total External SP
- Fan curve
- - - System curve

### Notes:

- All dimensions shown are in units of in.
- \*FLA is approximate and will vary slightly with the motor.
- Sones - calculated using AMCA 301 at 5 ft
- \*\* Wattage is approximate and may vary between motors.

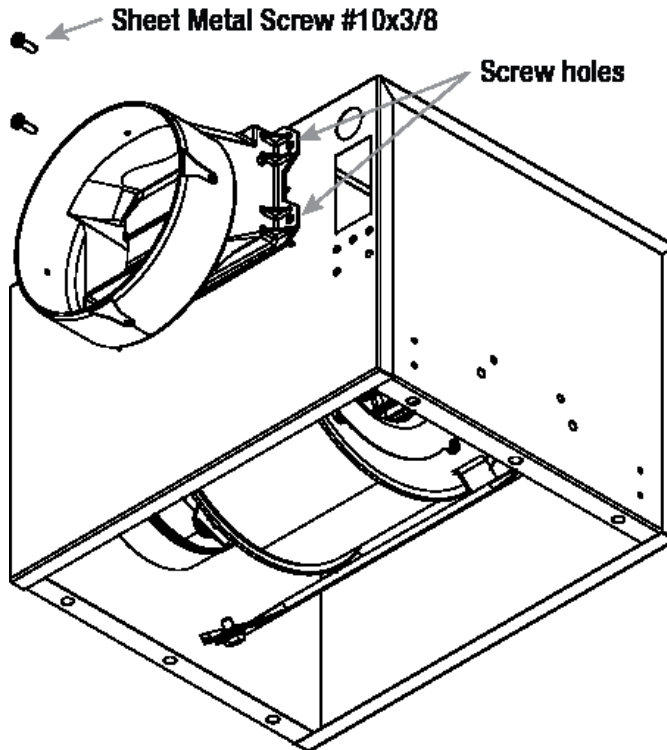


# Round Duct Connector

Model: RDC

## Standard Construction Features:

-Constructed of Polypropylene - Replaces the square discharge duct connector and damper using the existing mounting holes



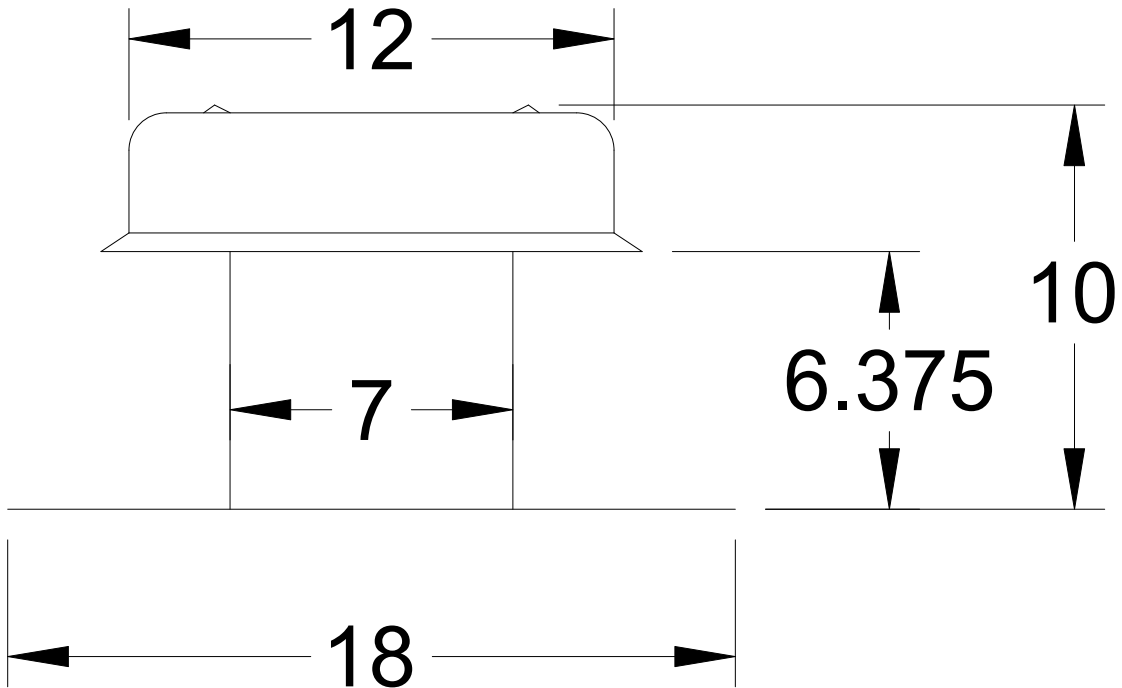
Notes: All dimensions shown are in units of in.

# Discharge Accessory

Type: Roof Cap Flashed

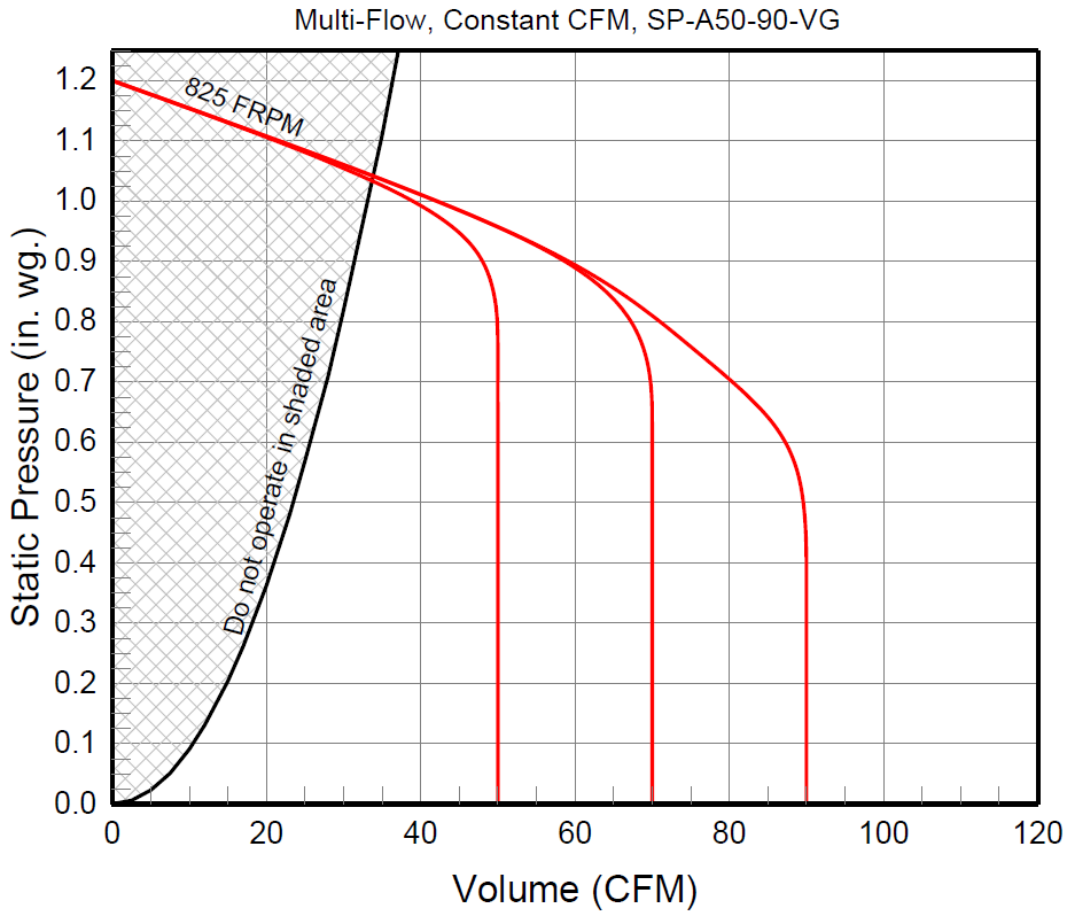
## Standard Construction Features:

- Aluminum Construction - Integral Birdscreen - Built-in Flashing Flange



Notes: All dimensions shown are in units of in.

This is a Constant Airflow fan which will hold a constant airflow as static pressure increases. This is also a Multi-Flow fan capable of three selectable speeds and will run at the user selected speed by the three position switch on the inside of the fan.



## AMCA

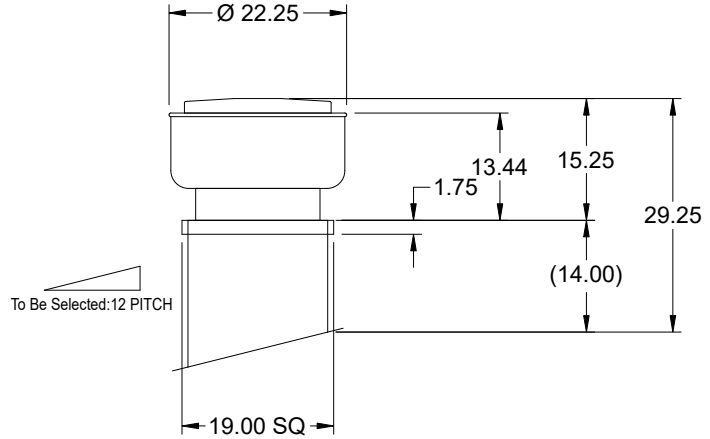


AMCA Licensed for Sound and Air Performance. Power Rating (Watt) includes transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type B: Free inlet, Ducted outlet. Performance ratings include the effects of an inlet grille and backdraft damper. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The watt ratings shown are at free air. The sound ratings shown are for loudness values in spherical sones at 5 ft. (1.5m) in a spherical free field calculated per Annex B of AMCA 311. Values shown are for installation type B: free inlet spherical sone levels. The AMCA Certified Ratings Seal applies to sone ratings only.

# Model: CUE-095-VG

## Direct Drive Upblast Centrifugal Roof Exhaust Fan



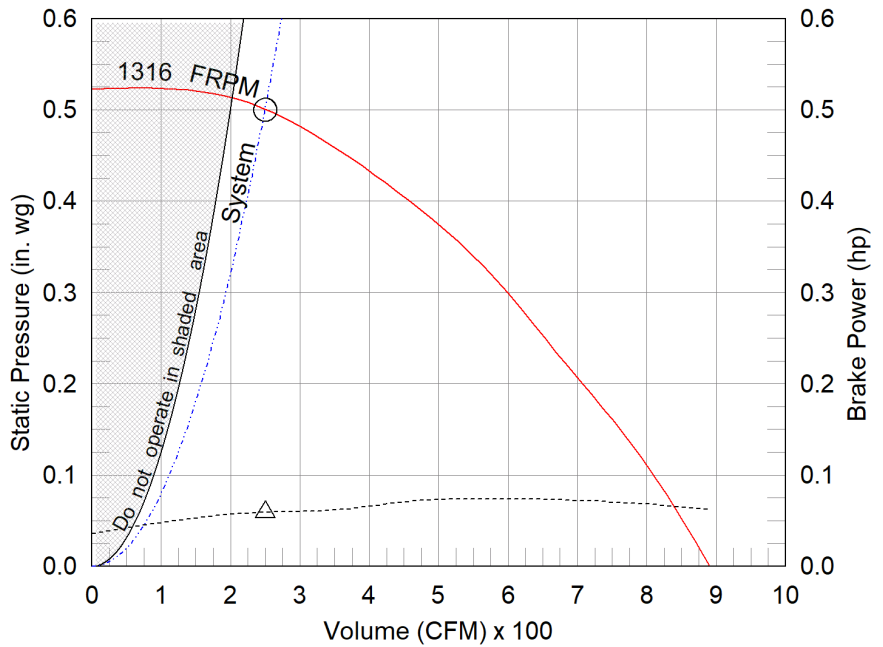
Dimensional	
Quantity	9
Weight w/o Acc's (lb)	34
Weight w/ Acc's (lb)	43
Weight w/ Acc's and Curb (lb)	68
Standard Curb Cap Size (in.)	19 x 19
Optional Damper (in.)	10 x 10
Roof Opening (in.)	15.5 x 15.5

Performance	
Requested Volume (CFM)	250
Actual Volume (CFM)	250
Total External SP (in. wg)	0.5
Fan RPM	1316
Operating Power (hp)	0.06
Elevation (ft)	328
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,746
Static Eff. (%)	33

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	216

Motor	
Motor Mounted	Yes
Size (hp)	1/6
Voltage/Cycle/Phase	115/60/1
Enclosure	TENV
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	2.3
Min. Circuit Ampacity (MCA)	3
Max. Overcurrent Protection (MOP)	15
Short Circuit Current Rtg (SCCR)	5 kA

OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.



- △ Operating Bhp point
- Operating point at Total External SP
- Fan curve
- - - System curve
- - - Brake horsepower curve

**Notes:**

All dimensions shown are in units of in.  
\*NEC FLA, MCA and MOP are for reference only – based on tables 430.248 or 430.25 of National Electric Code 2020. Actual motor FLA may vary, for sizing thermal overload, consult factory.  
MCA and MOP values shown only account for the motor, not accessories (damper actuator, field supplied VFD, etc).  
LwA - A weighted sound power level, based on ANSI S1.4  
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International  
Sones - calculated using ANSI/AMCA 301 at 5 ft

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	79	71	67	59	54	54	46	38	64	52	6.7





## Model: CUE-095-VG

### Direct Drive Upblast Centrifugal Roof Exhaust Fan

#### Standard Construction Features:

- Aluminum housing - Backward curved composite (sizes 60-95) or aluminum (sizes 99-300) wheel - Aluminum curb cap with prepunched mounting holes - Drain trough - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

#### Selected Options & Accessories:

Motor - Vari-Green EC motor  
Control - 0-10VDC Input, (no control provided, signal supplied by others)  
Control - Dial for balancing  
Standard Curb Cap Size - 19 Square  
UL/cUL 705 Listed - "Power Ventilators"  
Switch, NEMA-1, Toggle,  
Junction Box Mounted & Wired  
Foam Curb Seal (Factory Applied)  
Birdscreen: Stainless Steel, nom. 89% Free Area  
Composite Wheel Material  
Conduit Chase Qty 1  
Unit Warranty: 1 Yr (Standard)  
Damper Shipped Loose, WD-100-PB-10X10, Gravity Operated, Not Coated, Nominal Size

#### Selected Sub Marks

See individual submittals for full details  
GPIP-19-G14

***The Vari-Green Motor included in this order has a 'Multi-Voltage' ability. The red wire on the motor is called a 'Voltage Doubler', and when it is connected the motor can be powered by 115V.***

***If the Red wire is disconnected, then the motor can be powered with 208-230/277V. The motor will leave the factory with the voltage doubler wired per the order.***

# Disconnect Switch

Enclosure Rating: NEMA-1

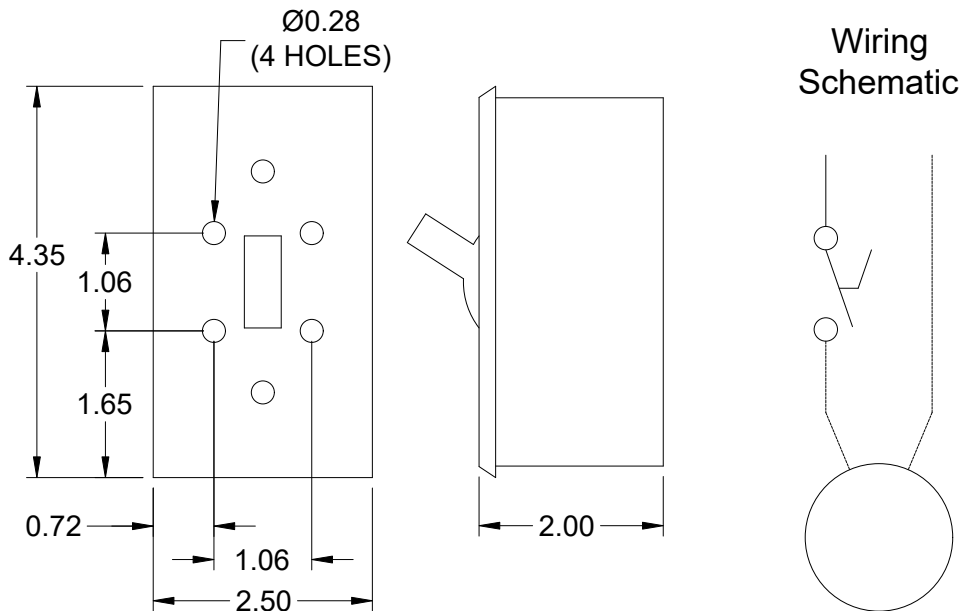
## Standard Construction Features:

Enclosure constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dust. This enclosure meets the rod entry and the indoor corrosion protection design tests. The rod entry test is intended to simulate incidental contact with enclosure equipment. Enclosure is equipped with provision to lockout in the off position with customer supplied lock.

## Disconnect Switch Configuration

Type:	Toggle	Motor Size:	1/6 hp	Voltage:	115	UL Listed:	Yes
Manufacturer:	Pass and Seymour	Cycle:	60	Amperage:	15	CSA Approved:	Yes
Overload Protection:	None	Phase:	1	Switch Pole(s):	1	Rating:	1/2 hp
Junction Box Mtg.:	Mounted and Wired	RPM:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

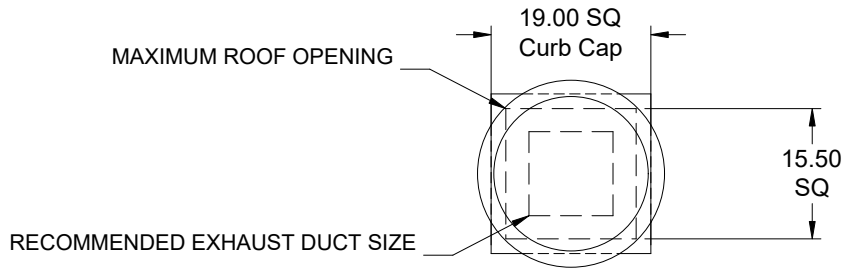
## Electrical Drawing Details



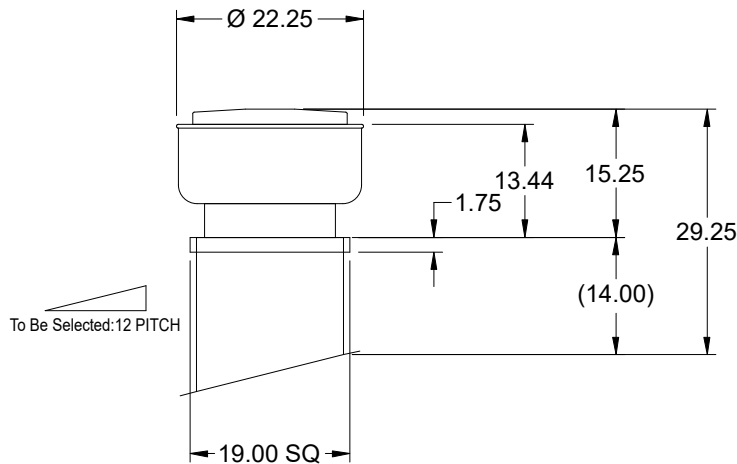
Notes: All dimensions shown are in units of in.

# Assembly Drawing

Type: Direct Drive Upblast Centrifugal Roof Exhaust Fan



DUCT TYPE	SIZE
STANDARD	10 SQ



DUCT DIMENSIONS ARE LARGEST POSSIBLE DUCT TO FIT THROUGH CURB.  
CONSULT SYSTEM DESIGN ENGINEER FOR RECOMMENDED DUCT SIZE.

OVERALL HEIGHT MAY BE GREATER DEPENDING ON  
MOTOR, ADAPTER, AND/OR HINGE BASE.

Notes: All dimensions shown are in units of in..

# Vari-Green Motor & Control Options

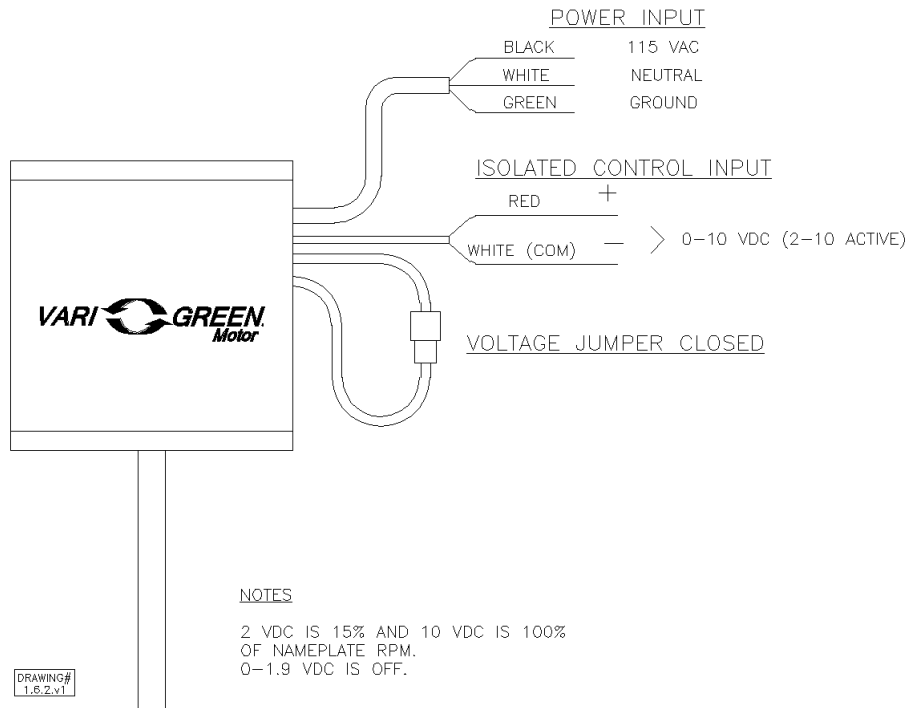
An EC motor that uses AC input power and internally converts it to DC power. Motor accepts a 0-10VDC control signal along with a 24V source to power controls in the motor. Motor is operable in the 2-10VDC range and off while in the 0-1.9VDC range. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated and the motor will automatically reduce speed or turn off if overloaded or it becomes too hot.

### Motor Configuration

Input Voltage: 115  
Speed Reference: 0-10VDC  
Permanent Dial: No  
Balance Dial Included: Yes

### Control Configuration

Control Type: By Others  
Transformer: None

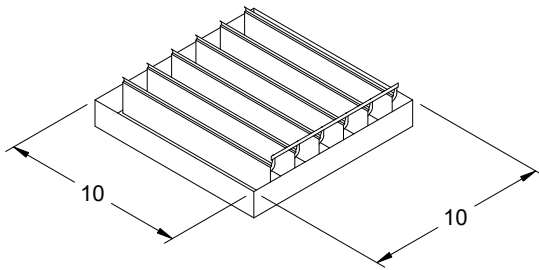


# Horizontal Mount Exhaust Damper

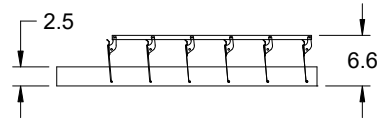
Model: WD-100

## Standard Construction Features:

- Model WD-100 is a horizontal mount exhaust damper (air flow up) and is constructed of 18 ga galvanized steel with pre-punched mounting holes
- Damper blades are 0.025 in. roll formed aluminum with vinyl seals on the closing edge, and spring assisted for ease of opening
- Steel axles are 0.188 in. diameter zinc plated mounted in nylon bushings
- Synthetic axle bearings



DAMPER



TYP. SECTION VIEW

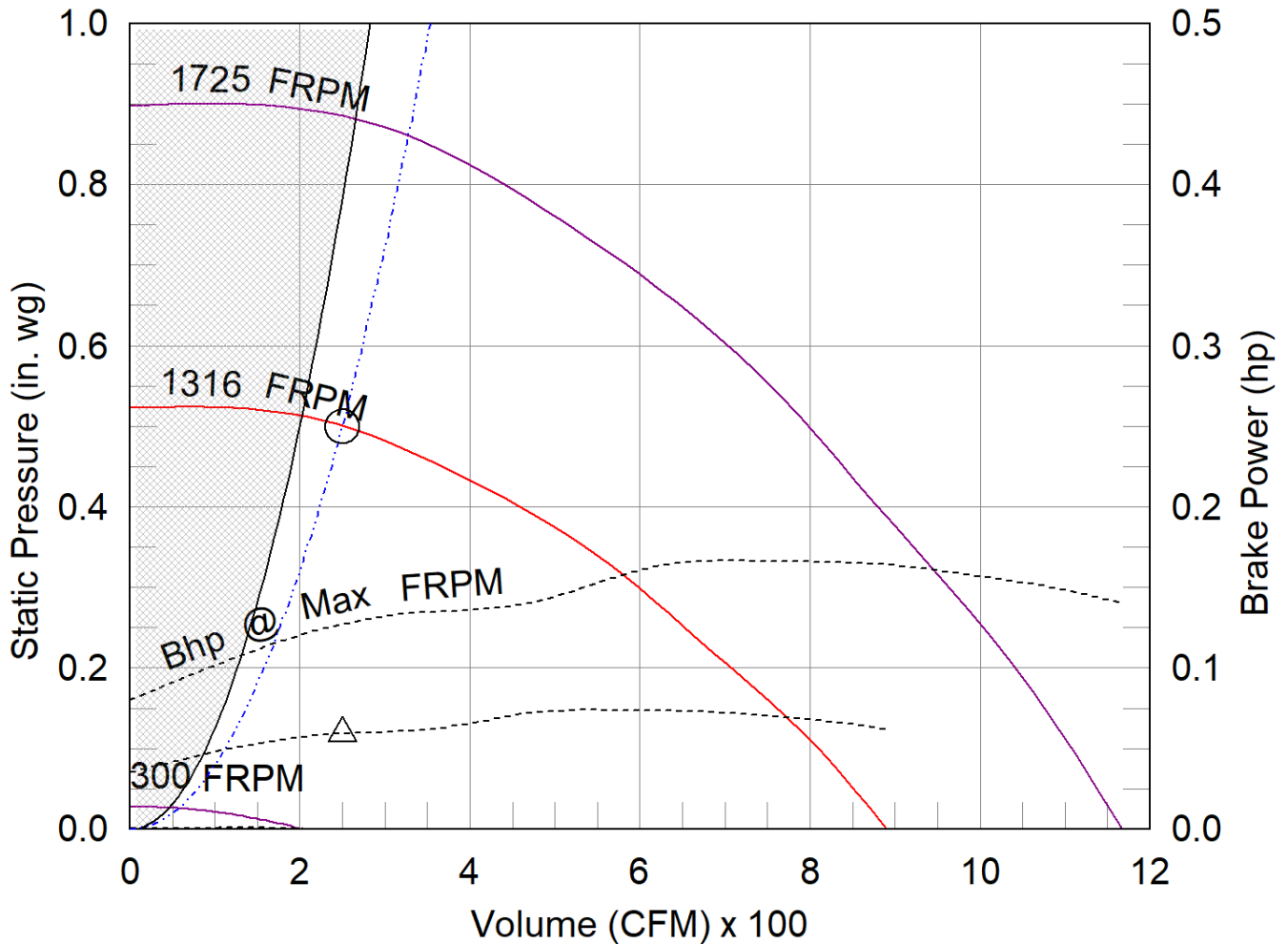
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.125 in. undersize

CUE-095-VG

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
250	250	0.5	1316	0.06



- △ Operating Bhp point
- Operating point at Total External SP
- Construction Limit
- Fan curve
- Min FRPM
- - - System curve
- - - Brake horsepower curve

## Warranty

### 1 Yr (Standard)

WARRANTY AND LIABILITY: SELLER warrants to Buyer that products manufactured are free from defects in material and workmanship for a period of 1 Yr (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's designated shipping point, freight allowed to Buyer's city, (or point of export for shipments outside the conterminous United States) replacement equipment (or at the option of SELLER parts therefore) for all Seller's products not conforming to this warranty and which have been returned to the manufacturer. No liability whatever shall attach to SELLER until said products have been paid for and such liability shall be strictly limited to the purchase price of the equipment shown to be defective. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by SELLER prove defective during this period, they should be returned to the nearest authorized motor service station. SELLER will not be responsible for any removal or installation costs. Electrical components, excluding motors, are warranted only to the extent warranted by the original manufacturer. To the extent that SELLER is entitled to pass through a warranty of the original equipment manufacturer of the electrical goods sold, SELLER will pass through such warranties to Buyer. The legal remedies described in this Warranty are the sole exclusive remedy of Buyer. SELLER MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED, REGARDING ITS PRODUCTS, OR ITS SELECTION AND APPLICATION, INCLUDING, BUT NOT LIMITED TO, COMPLIANCE WITH BUILDING CODES, SAFETY CODES, LAWS, MERCHANTABILITY OR FITNESS OR A PARTICULAR PURPOSE. This warranty is extended solely to the Buyer. It is nontransferable and non-assignable, and the Buyer shall not permit or authorize its employees, agents, representatives or customers to claim, represent or imply that this limited warranty extends or is available to anyone other than the Buyer. ANY MISUSE, NEGLIGENCE, FAILURE TO FOLLOW INSTRUCTIONS OR MANUALS OF INSTALLATION OF MAINTENANCE REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS. THE WARRANTY AND LIABILITY SET FORTH HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES WHETHER IN CONTRACT OR IN NEGLIGENCE, EXPRESSED OR IMPLIED, IN LAW OR IN FACT, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. SELLER PROVIDES NO INDEPENDENT WARRANTY FOR THIRD PARTY PRODUCTS OR COMPONENTS SOLD TOGETHER OR INCORPORATED WITH SELLER'S PRODUCT(S). THE SELLER HAS THE RIGHT TO SETTLE ANY AND ALL DISPUTES REGARDING THE WARRANTY.

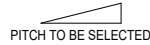
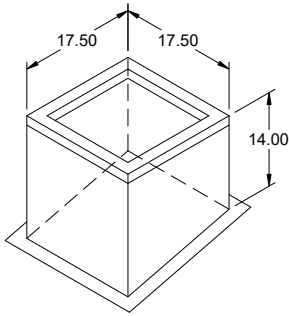
## AMCA



AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type A: Free inlet, Free outlet. Power rating (BHP/kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per ANSI/AMCA Standard 301. Values shown are for installation type A: free inlet hemispherical sone levels. dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal applies to sone ratings only.





## Model: GPIP

### Pitched Roof Curb

#### Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Designed for pitched roofs - Straight sided without a cant - Wood nailer for attachment of roof flashing material - 2 in. mounting flange - 1 in. thick 3 lb density insulation - Height - Available from 12 in. to 24 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension.

#### General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Pitch (in.)	Pitch Run	Weight (lb)	Shipped Assembled	Union Label
	9	GPIP-19	Nominal	1.5	???	Long Side	25	Yes	No Preference

#### Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
14	19	19	17.5	17.5	14	14	18	18

\*May not be applicable

#### Accessories

Material	Security Bars	Liner	Insulation (in.)	Insulation R Value
Galvanized	No	No	1	R4.3

# Model: SP-A390-VG

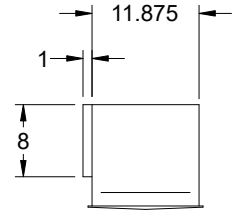
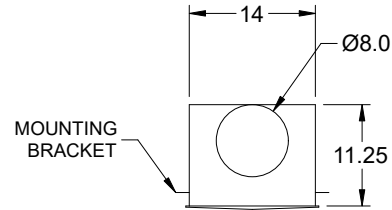
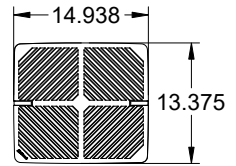
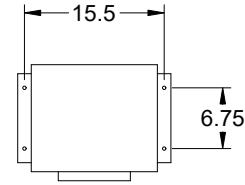
## Ceiling Exhaust Fan

### Standard Construction Features:

- Corrosion resistant galvanized steel scroll and housing - Sound absorbing insulation - White designer non-yellowing grille - Rectangular outlet duct collar with integral spring loaded backdraft damper - Double inlet forward curved wheel - Plug type disconnect - Adjustable mounting brackets - Field rotatable discharge

### Selected Options & Accessories:

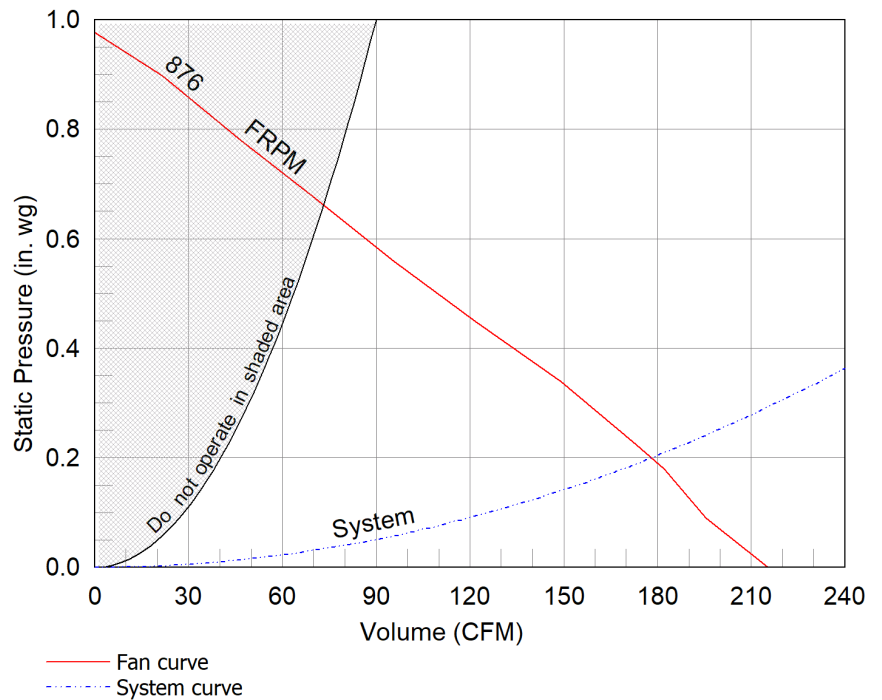
- Motor rated for continuous use
- Motor - Vari-Green EC motor w/Mounted Potentiometer Dial
- UL/cUL 507 Listed - Electric Fan
- Flat Roof Flashing Flange (PN: RFC-7) Shipped Loose
- Round Duct Connector, (PN: RDC-8) Shipped Loose
- Adjustable easy installation mounting bracket
- Standard Grille
- Polypropylene Wheel Material



Dimensional	
Quantity	2
Weight w/o Acc's (lb)	24
Weight w/ Acc's (lb)	32

Performance	
Requested Volume (CFM)	178
Actual Volume (CFM)	178
Total External SP (in. wg)	0.2
Fan RPM	876
* FLA (A)	1.5
Elevation (ft)	328
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Sones	2.0

Motor	
Motor Mounted	Yes
** Input Watts (W)	18
Voltage/Cycle/Phase	115/60/1
Enclosure	TENV
Control Input Voltage	4.8



### Notes:

- All dimensions shown are in units of in.
- \*FLA is approximate and will vary slightly with the motor.
- Sones - calculated using AMCA 301 at 5 ft
- \*\* Wattage is shown at free air.
- \*\* Wattage is approximate and may vary between motors.



# Vari-Green Motor & Control Options

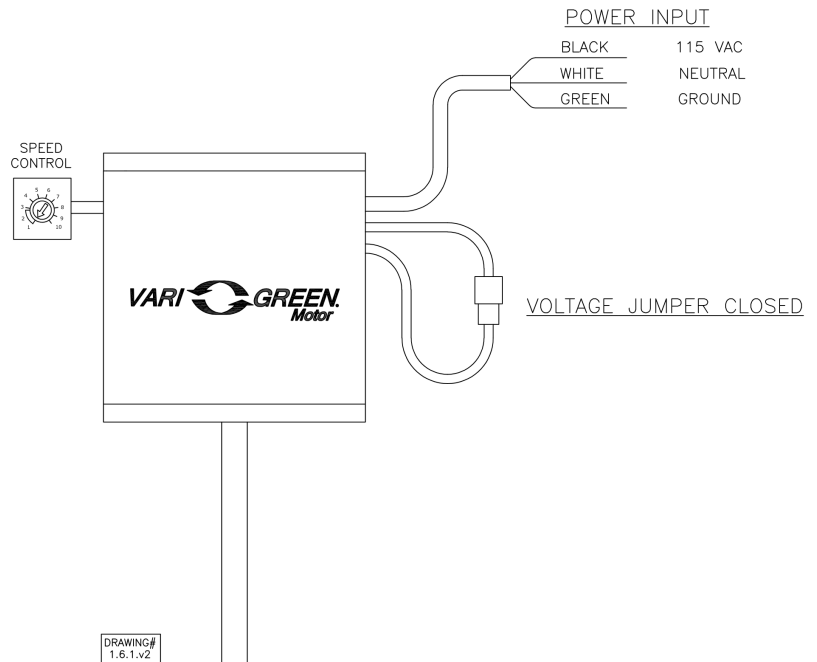
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated and the motor will automatically reduce speed or turn off if overloaded or it becomes too hot.

### Motor Configuration

Input Voltage: 115  
Speed Reference: Dial on Motor  
Permanent Dial: Yes

### Control Configuration

Control Type: N/A  
Transformer: None

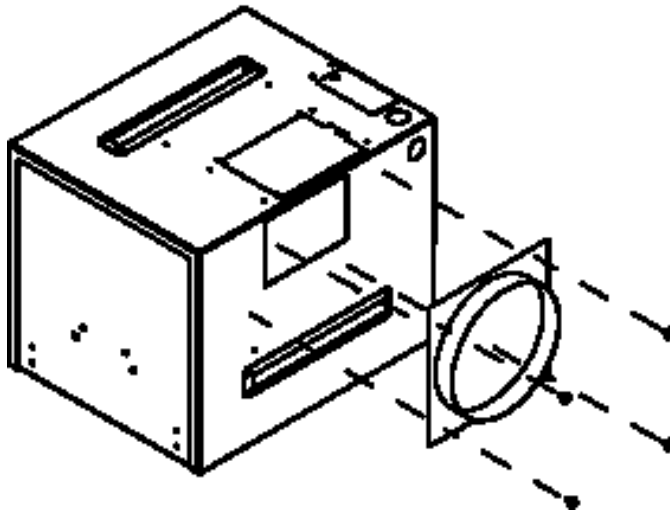


## Round Duct Connector

Model: RDC

### Standard Construction Features:

-Constructed of galvanized steel - Replaces the square discharge duct connector and damper using the existing mounting holes



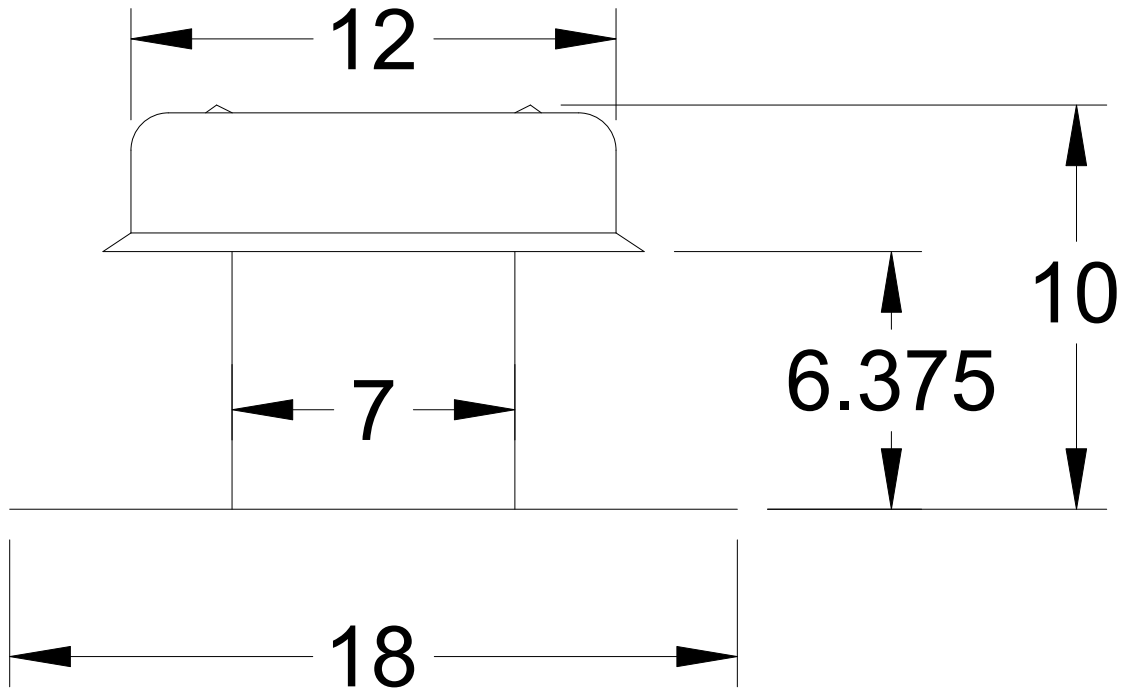
Notes: All dimensions shown are in units of in.

# Discharge Accessory

Type: Roof Cap Flashed

## Standard Construction Features:

- Aluminum Construction - Integral Birdscreen - Built-in Flashing Flange



Notes: All dimensions shown are in units of in.

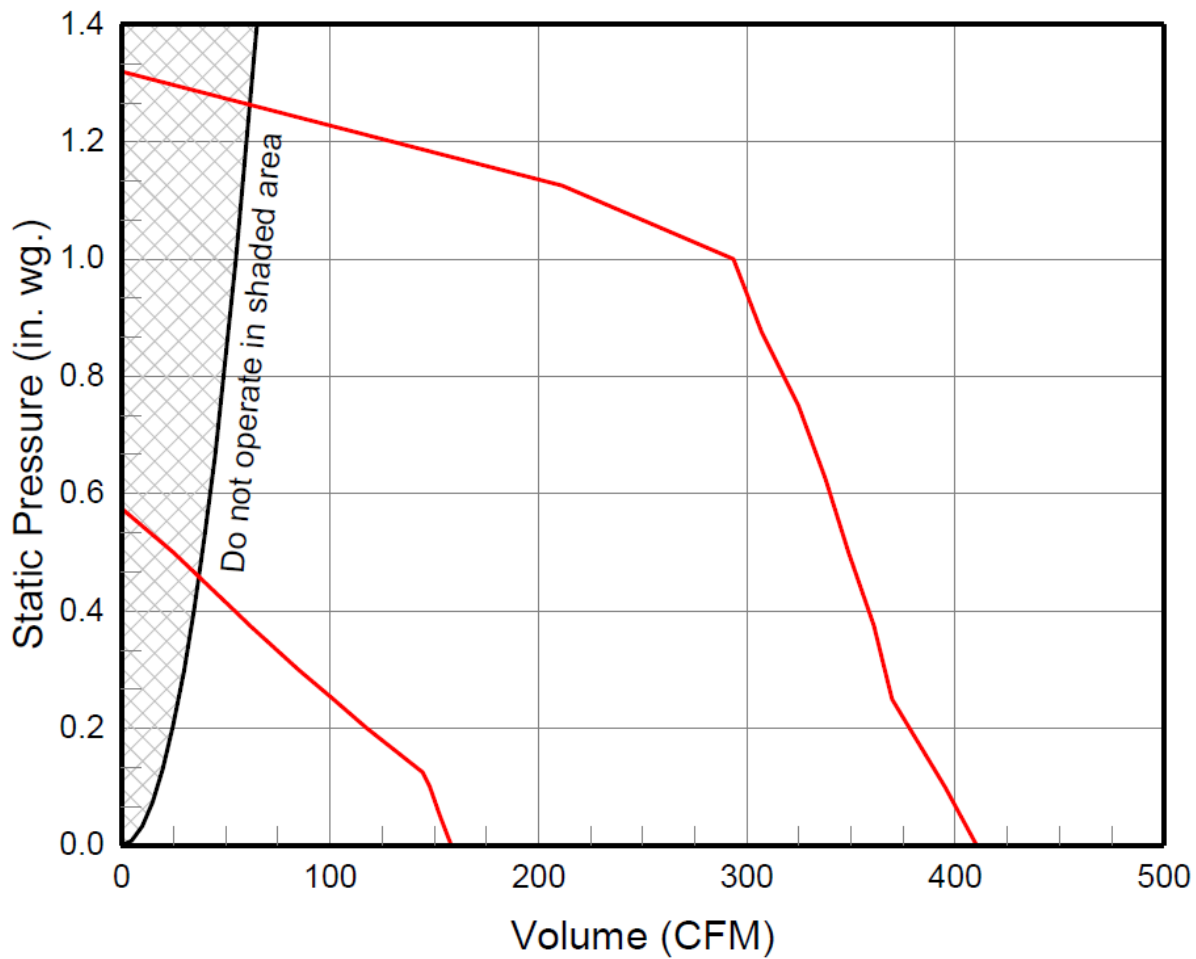
SP-A390-VG

Min/Max Fan Curve

**Performance**

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
178	178	0.2	876	0.02

SP-A390-VG MIN/MAX CURVE



## AMCA

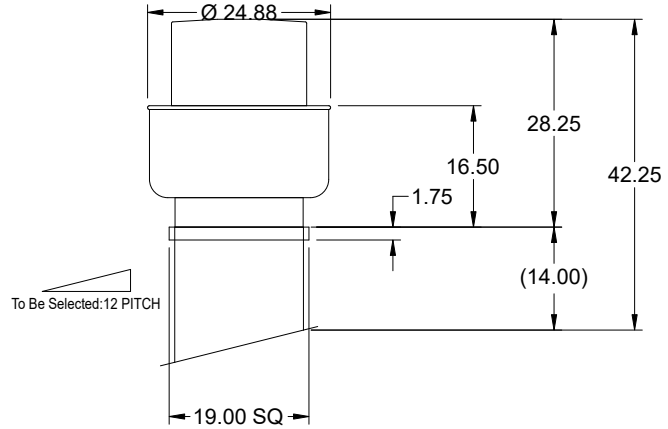


AMCA Licensed for Sound and Air Performance. Power Rating (Watt) includes transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type B: Free inlet, Ducted outlet. Performance ratings include the effects of an inlet grille and backdraft damper. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The watt ratings shown are at free air. The sound ratings shown are for loudness values in spherical sones at 5 ft. (1.5m) in a spherical free field calculated per Annex B of AMCA 311. Values shown are for installation type B: free inlet spherical sone levels. The AMCA Certified Ratings Seal applies to sone ratings only.

# Model: CUE-099-VG

## Direct Drive Upblast Centrifugal Roof Exhaust Fan



Dimensional	
Quantity	16
Weight w/o Acc's (lb)	38
Weight w/ Acc's (lb)	48
Weight w/ Acc's and Curb (lb)	73
Standard Curb Cap Size (in.)	19 x 19
Optional Damper (in.)	12 x 12
Roof Opening (in.)	15.5 x 15.5

Performance	
Requested Volume (CFM)	300
Actual Volume (CFM)	300
Total External SP (in. wg)	0.5
Fan RPM	1131
Operating Power (hp)	0.05
Elevation (ft)	328
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,311
Static Eff. (%)	44

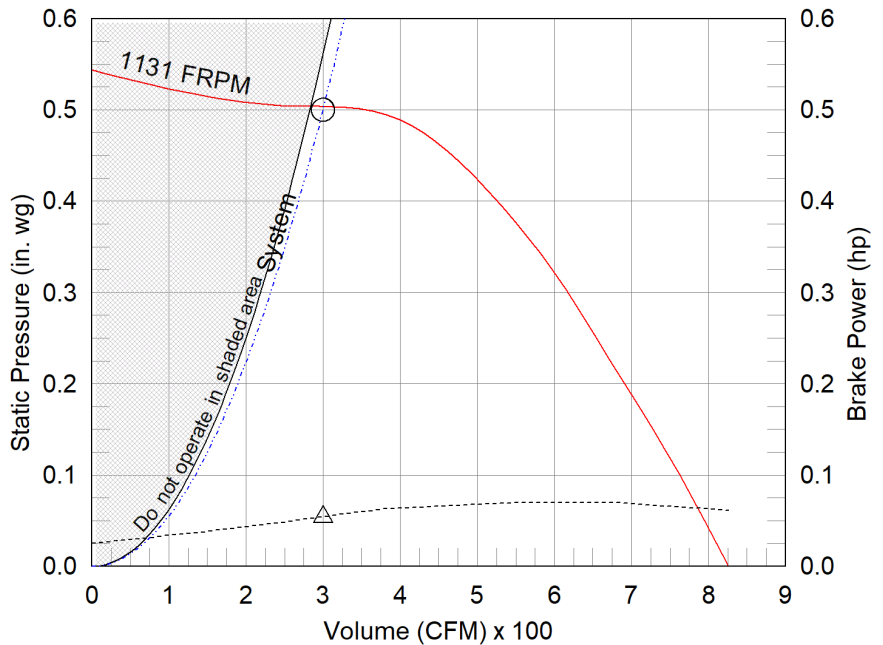
Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	234

Motor	
Motor Mounted	Yes
Size (hp)	1/4
Voltage/Cycle/Phase	115/60/1
Enclosure	TENV
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	2.85
Min. Circuit Ampacity (MCA)	4
Max. Overcurrent Protection (MOP)	15
Short Circuit Current Rtg (SCCR)	5 kA

### Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	72	68	63	54	51	53	46	38	60	49	5.2

OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.



- △ Operating Bhp point
- Operating point at Total External SP
- Fan curve
- - - System curve
- - - Brake horsepower curve

### Notes:

All dimensions shown are in units of in.  
 \*NEC FLA, MCA and MOP are for reference only – based on tables 430.248 or 430.25 of National Electric Code 2020. Actual motor FLA may vary, for sizing thermal overload, consult factory.  
 MCA and MOP values shown only account for the motor, not accessories (damper actuator, field supplied VFD, etc).  
 LwA - A weighted sound power level, based on ANSI S1.4  
 dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International  
 Sones - calculated using ANSI/AMCA 301 at 5 ft





## Model: CUE-099-VG

### Direct Drive Upblast Centrifugal Roof Exhaust Fan

#### Standard Construction Features:

- Aluminum housing - Backward inclined aluminum wheel - Aluminum curb cap with prepunched mounting holes - Drain trough - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

#### Selected Options & Accessories:

Motor - Vari-Green EC motor  
Control - 0-10VDC Input, (no control provided, signal supplied by others)  
Control - Dial for balancing  
Standard Curb Cap Size - 19 Square  
UL/cUL 705 Listed - "Power Ventilators"  
Switch, NEMA-1, Toggle,  
Junction Box Mounted & Wired  
Foam Curb Seal (Factory Applied)  
Birdscreen: Stainless Steel, nom. 86% Free Area  
Conduit Chase Qty 1  
Unit Warranty: 1 Yr (Standard)  
Damper Shipped Loose, WD-100-PB-12X12, Gravity Operated, Not Coated, Nominal Size

#### Selected Sub Marks

See individual submittals for full details  
GPIP-19-G14

***The Vari-Green Motor included in this order has a 'Multi-Voltage' ability. The red wire on the motor is called a 'Voltage Doubler', and when it is connected the motor can be powered by 115V.***

***If the Red wire is disconnected, then the motor can be powered with 208-230/277V. The motor will leave the factory with the voltage doubler wired per the order.***

# Disconnect Switch

Enclosure Rating: NEMA-1

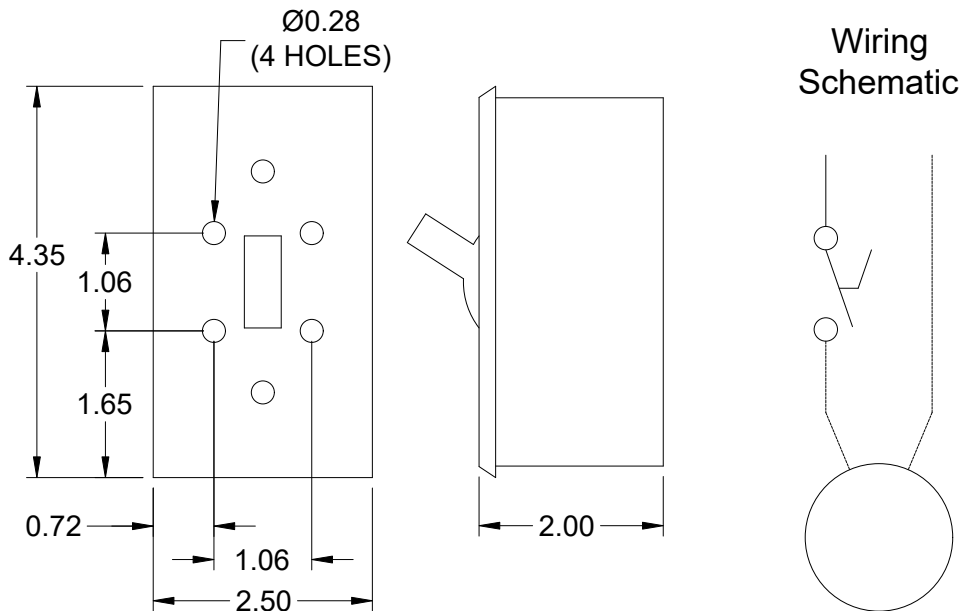
### Standard Construction Features:

Enclosure constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dust. This enclosure meets the rod entry and the indoor corrosion protection design tests. The rod entry test is intended to simulate incidental contact with enclosure equipment. Enclosure is equipped with provision to lockout in the off position with customer supplied lock.

### Disconnect Switch Configuration

Type:	Toggle	Motor Size:	1/4 hp	Voltage:	115	UL Listed:	Yes
Manufacturer:	Pass and Seymour	Cycle:	60	Amperage:	15	CSA Approved:	Yes
Overload Protection:	None	Phase:	1	Switch Pole(s):	1	Rating:	1/2 hp
Junction Box Mtg.:	Mounted and Wired	RPM:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

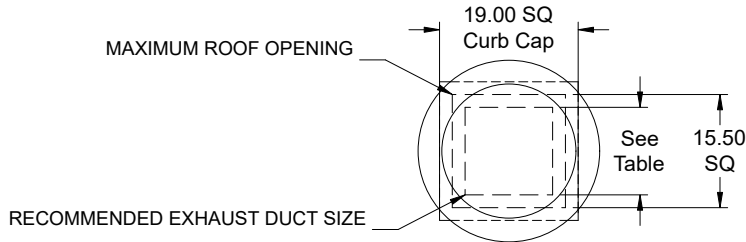
### Electrical Drawing Details



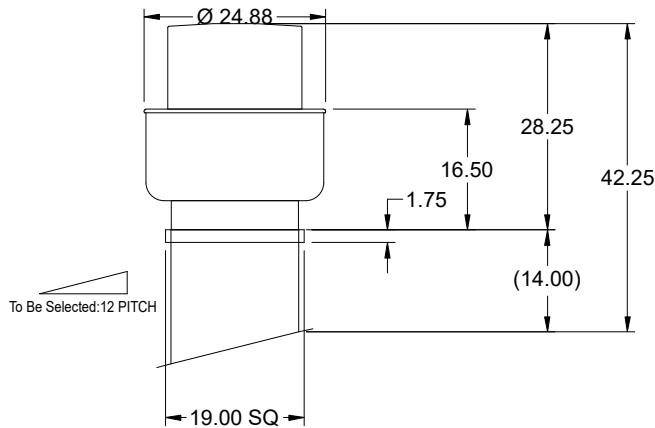
Notes: All dimensions shown are in units of in.

# Assembly Drawing

Type: Direct Drive Upblast Centrifugal Roof Exhaust Fan



DUCT TYPE	SIZE
STANDARD	12 SQ
FIRE-WRAPPED	8 SQ



DUCT DIMENSIONS ARE LARGEST POSSIBLE DUCT TO FIT THROUGH CURB.  
CONSULT SYSTEM DESIGN ENGINEER FOR RECOMMENDED DUCT SIZE.

OVERALL HEIGHT MAY BE GREATER DEPENDING ON  
MOTOR, ADAPTER, AND/OR HINGE BASE.

Notes: All dimensions shown are in units of in..

# Vari-Green Motor & Control Options

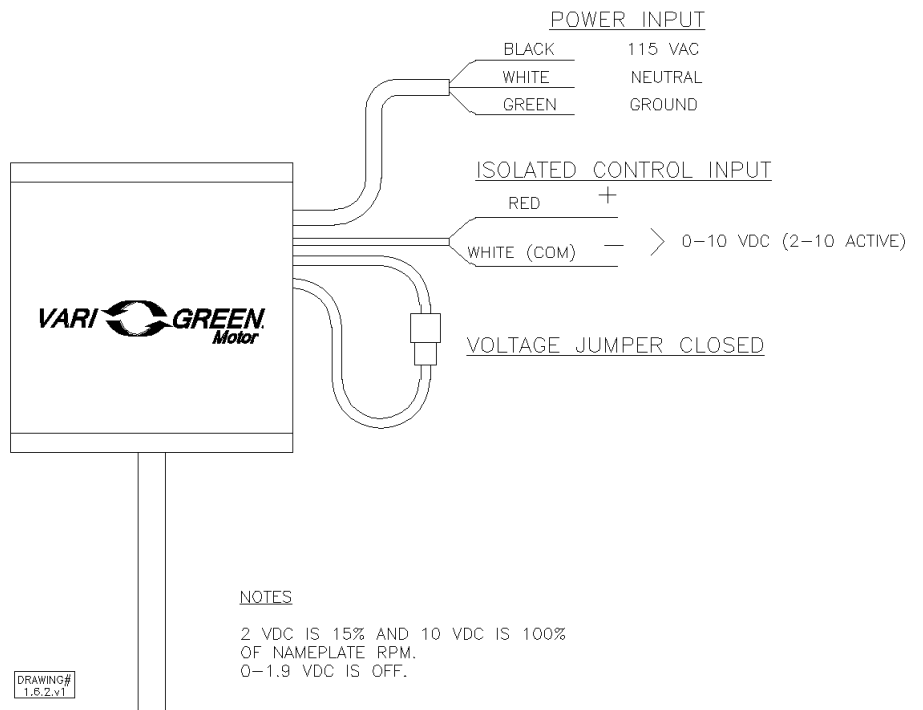
An EC motor that uses AC input power and internally converts it to DC power. Motor accepts a 0-10VDC control signal along with a 24V source to power controls in the motor. Motor is operable in the 2-10VDC range and off while in the 0-1.9VDC range. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated and the motor will automatically reduce speed or turn off if overloaded or it becomes too hot.

### Motor Configuration

Input Voltage: 115  
Speed Reference: 0-10VDC  
Permanent Dial: No  
Balance Dial Included: Yes

### Control Configuration

Control Type: By Others  
Transformer: None

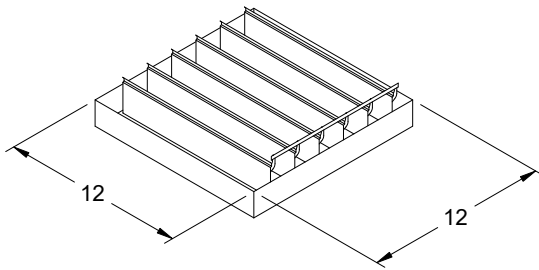


# Horizontal Mount Exhaust Damper

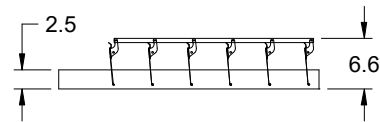
Model: WD-100

## Standard Construction Features:

- Model WD-100 is a horizontal mount exhaust damper (air flow up) and is constructed of 18 ga galvanized steel with pre-punched mounting holes
- Damper blades are 0.025 in. roll formed aluminum with vinyl seals on the closing edge, and spring assisted for ease of opening
- Steel axles are 0.188 in. diameter zinc plated mounted in nylon bushings
- Synthetic axle bearings



DAMPER



TYP. SECTION VIEW

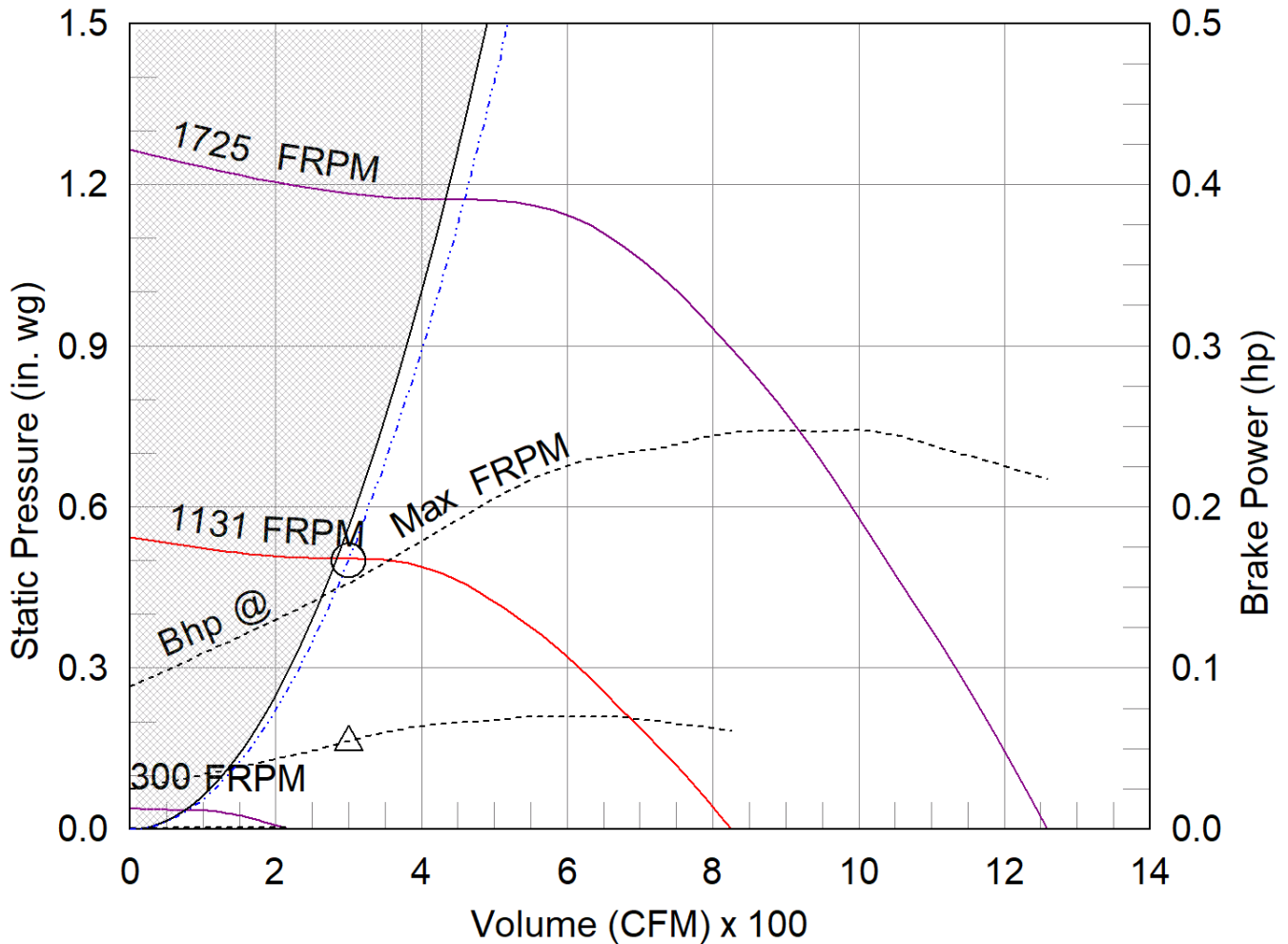
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.125 in. undersize

CUE-099-VG

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
300	300	0.5	1131	0.05



- △ Operating Bhp point
- Operating point at Total External SP
- Construction Limit
- Fan curve
- Min FRPM
- - - System curve
- - - Brake horsepower curve

## Warranty

### 1 Yr (Standard)

WARRANTY AND LIABILITY: SELLER warrants to Buyer that products manufactured are free from defects in material and workmanship for a period of 1 Yr (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's designated shipping point, freight allowed to Buyer's city, (or point of export for shipments outside the conterminous United States) replacement equipment (or at the option of SELLER parts therefore) for all Seller's products not conforming to this warranty and which have been returned to the manufacturer. No liability whatever shall attach to SELLER until said products have been paid for and such liability shall be strictly limited to the purchase price of the equipment shown to be defective. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by SELLER prove defective during this period, they should be returned to the nearest authorized motor service station. SELLER will not be responsible for any removal or installation costs. Electrical components, excluding motors, are warranted only to the extent warranted by the original manufacturer. To the extent that SELLER is entitled to pass through a warranty of the original equipment manufacturer of the electrical goods sold, SELLER will pass through such warranties to Buyer. The legal remedies described in this Warranty are the sole exclusive remedy of Buyer. SELLER MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED, REGARDING ITS PRODUCTS, OR ITS SELECTION AND APPLICATION, INCLUDING, BUT NOT LIMITED TO, COMPLIANCE WITH BUILDING CODES, SAFETY CODES, LAWS, MERCHANTABILITY OR FITNESS OR A PARTICULAR PURPOSE. This warranty is extended solely to the Buyer. It is nontransferable and non-assignable, and the Buyer shall not permit or authorize its employees, agents, representatives or customers to claim, represent or imply that this limited warranty extends or is available to anyone other than the Buyer. ANY MISUSE, NEGLIGENCE, FAILURE TO FOLLOW INSTRUCTIONS OR MANUALS OF INSTALLATION OF MAINTENANCE REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS. THE WARRANTY AND LIABILITY SET FORTH HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES WHETHER IN CONTRACT OR IN NEGLIGENCE, EXPRESSED OR IMPLIED, IN LAW OR IN FACT, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. SELLER PROVIDES NO INDEPENDENT WARRANTY FOR THIRD PARTY PRODUCTS OR COMPONENTS SOLD TOGETHER OR INCORPORATED WITH SELLER'S PRODUCT(S). THE SELLER HAS THE RIGHT TO SETTLE ANY AND ALL DISPUTES REGARDING THE WARRANTY.

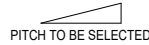
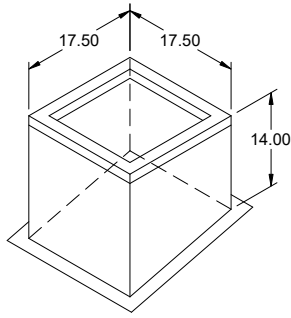
## AMCA



AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type A: Free inlet, Free outlet. Power rating (BHP/kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per ANSI/AMCA Standard 301. Values shown are for installation type A: free inlet hemispherical sone levels. dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal applies to sone ratings only.





## Model: GPIP

### Pitched Roof Curb

#### Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Designed for pitched roofs - Straight sided without a cant - Wood nailer for attachment of roof flashing material - 2 in. mounting flange - 1 in. thick 3 lb density insulation - Height - Available from 12 in. to 24 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension.

#### General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Pitch (in.)	Pitch Run	Weight (lb)	Shipped Assembled	Union Label
	16	GPIP-19	Nominal	1.5	???	Long Side	25	Yes	No Preference

#### Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
14	19	19	17.5	17.5	14	14	18	18

\*May not be applicable

#### Accessories

Material	Security Bars	Liner	Insulation (in.)	Insulation R Value
Galvanized	No	No	1	R4.3

# Model: CUE-070-VG

## Direct Drive Upblast Centrifugal Roof Exhaust Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	22
Weight w/ Acc's (lb)	35
Weight w/ Acc's and Curb (lb)	57
Standard Curb Cap Size (in.)	17 x 17
Optional Damper (in.)	8 x 8
Roof Opening (in.)	13.5 x 13.5

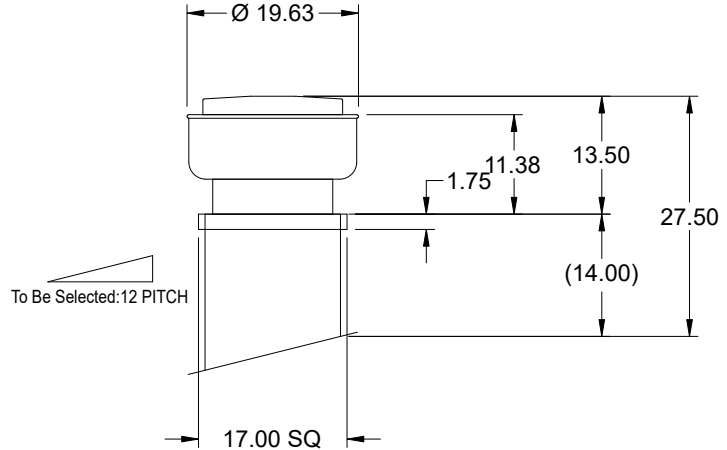
Performance	
Requested Volume (CFM)	150
Actual Volume (CFM)	150
Total External SP (in. wg)	0.4
Fan RPM	1585
Operating Power (hp)	0.02
Elevation (ft)	328
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,371
Static Eff. (%)	43

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	385

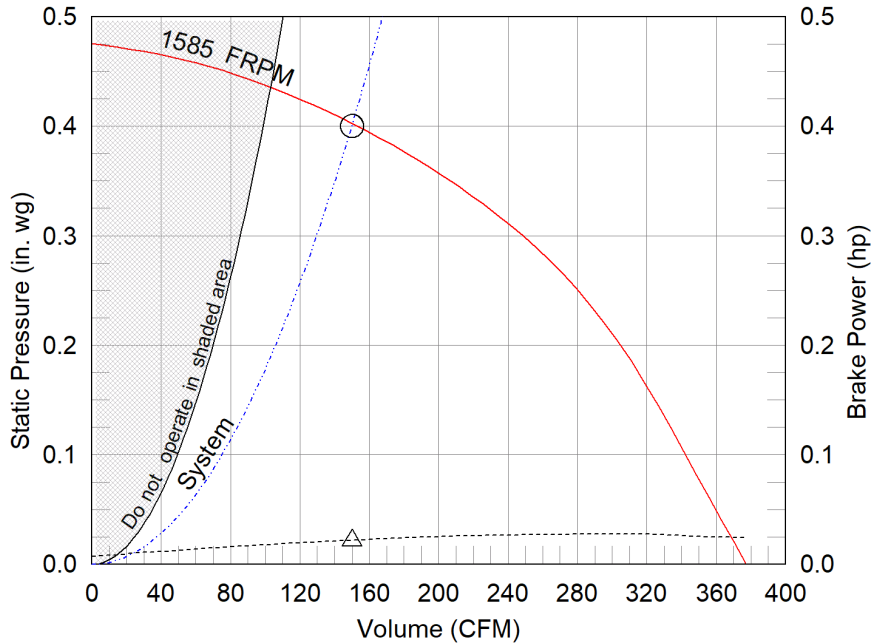
Motor	
Motor Mounted	Yes
Size (hp)	1/15
Voltage/Cycle/Phase	115/60/1
Enclosure	TENV
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	1.3
Min. Circuit Ampacity (MCA)	2
Max. Overcurrent Protection (MOP)	15
Short Circuit Current Rtg (SCCR)	5 kA

### Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	67	69	63	48	42	40	36	34	58	46	4.1



OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.



- △ Operating Bhp point
- Operating point at Total External SP
- Fan curve
- - - System curve
- ..... Brake horsepower curve

### Notes:

All dimensions shown are in units of in.  
\*NEC FLA, MCA and MOP are for reference only – based on tables 430.248 or 430.25 of National Electric Code 2020. Actual motor FLA may vary, for sizing thermal overload, consult factory. MCA and MOP values shown only account for the motor, not accessories (damper actuator, field supplied VFD, etc).  
LwA - A weighted sound power level, based on ANSI S1.4 dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International  
Sones - calculated using ANSI/AMCA 301 at 5 ft



## Model: CUE-070-VG

Direct Drive Upblast Centrifugal Roof Exhaust Fan

### Standard Construction Features:

- Aluminum housing - Backward curved composite (sizes 60-95) or aluminum (sizes 99-300) wheel - Aluminum curb cap with prepunched mounting holes - Drain trough - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

### Selected Options & Accessories:

Motor - Vari-Green EC motor with Dial ONLY (Not capable for field conversion to 0-10)  
Control - Dial for balancing  
Standard Curb Cap Size - 17 Square  
UL/cUL 705 Listed - "Power Ventilators"  
Switch, NEMA-1, Toggle,  
Junction Box Mounted & Wired  
Foam Curb Seal (Factory Applied)  
Birdscreen: Stainless Steel, nom. 87% Free Area  
Composite Wheel Material  
Conduit Chase Qty 1  
Unit Warranty: 1 Yr (Standard)  
Damper Shipped Loose, WD-100-PB-8X8, Not Coated, Nominal Size  
Damper Actuator (MP-100A), 115 VAC Actuated

### Selected Sub Marks

See individual submittals for full details  
GPIP-17-G14

***The Vari-Green Motor included in this order has a 'Multi-Voltage' ability. This motor has the ability to accept 115V or 208-230V Single Phase power. The motor has an auto switch and does not require the user to change anything for the listed voltages.***

# Disconnect Switch

Enclosure Rating: NEMA-1

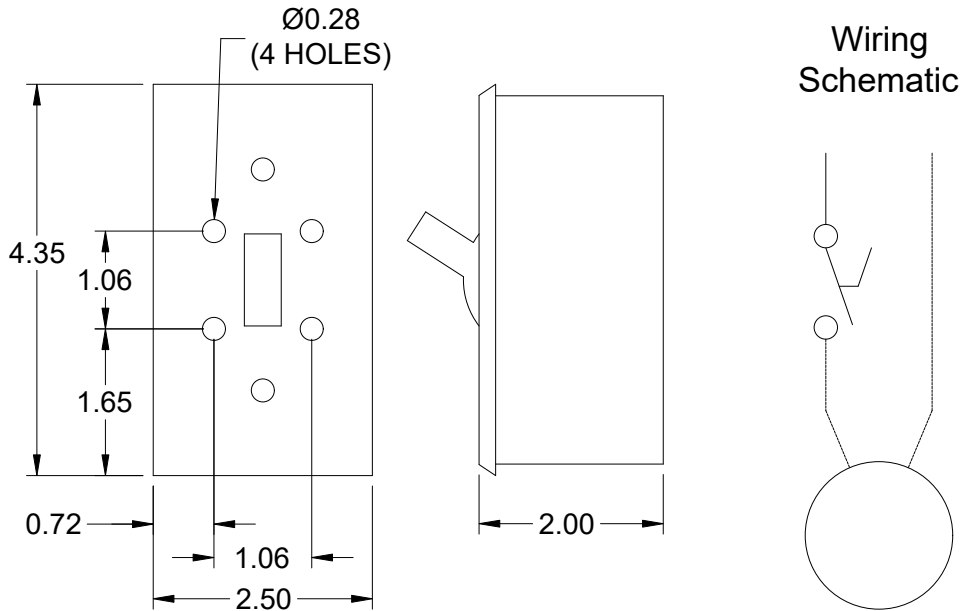
### Standard Construction Features:

Enclosure constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dust. This enclosure meets the rod entry and the indoor corrosion protection design tests. The rod entry test is intended to simulate incidental contact with enclosure equipment. Enclosure is equipped with provision to lockout in the off position with customer supplied lock.

### Disconnect Switch Configuration

Type:	Toggle	Motor Size:	1/15 hp	Voltage:	115	UL Listed:	Yes
Manufacturer:	Pass and Seymour	Cycle:	60	Amperage:	15	CSA Approved:	Yes
Overload Protection:	None	Phase:	1	Switch Pole(s):	1	Rating:	1/2 hp
Junction Box Mtg.:	Mounted and Wired	RPM:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

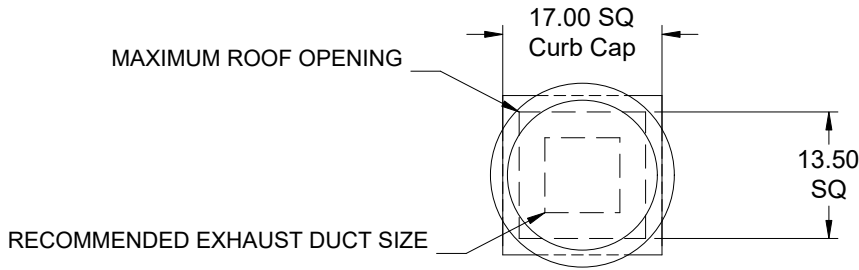
### Electrical Drawing Details



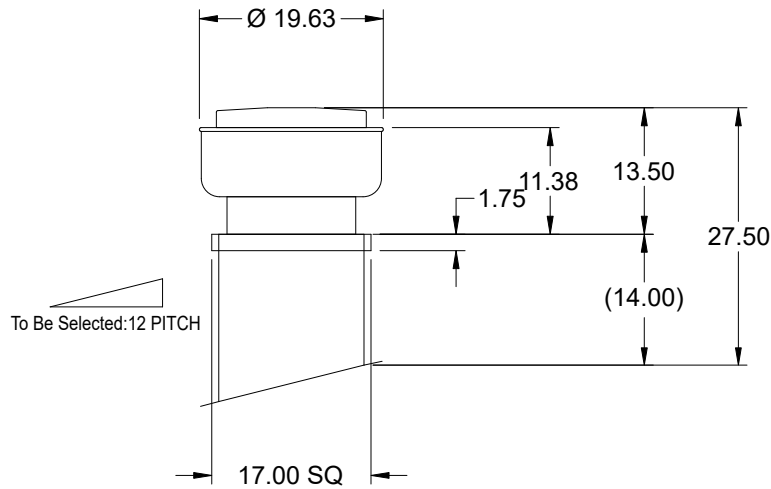
Notes: All dimensions shown are in units of in.

# Assembly Drawing

Type: Direct Drive Upblast Centrifugal Roof Exhaust Fan



DUCT TYPE	SIZE
STANDARD	8 SQ



DUCT DIMENSIONS ARE LARGEST POSSIBLE DUCT TO FIT THROUGH CURB.  
CONSULT SYSTEM DESIGN ENGINEER FOR RECOMMENDED DUCT SIZE.

OVERALL HEIGHT MAY BE GREATER DEPENDING ON  
MOTOR, ADAPTER, AND/OR HINGE BASE.

Notes: All dimensions shown are in units of in..

# Vari-Green Motor & Control Options

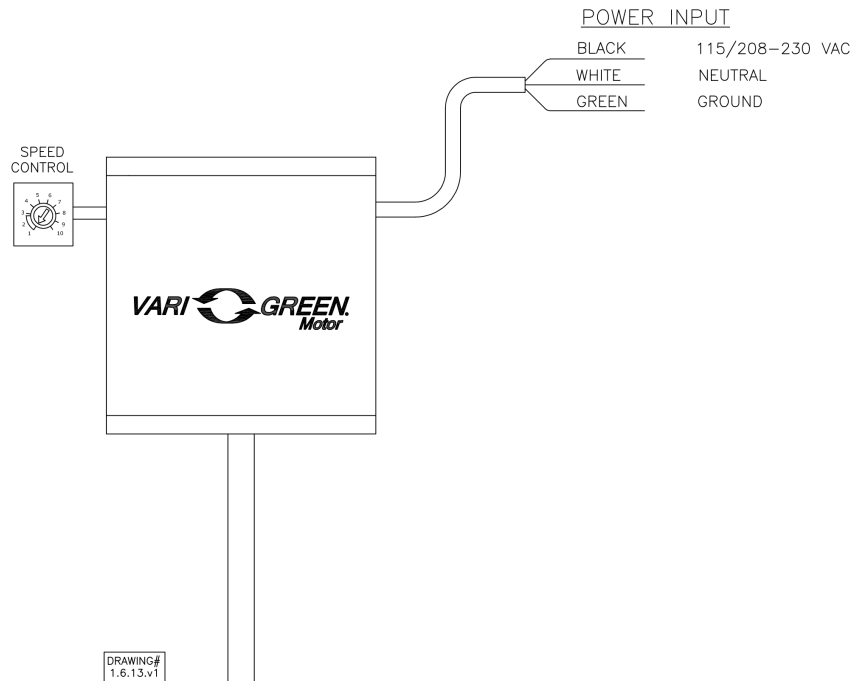
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated and the motor will automatically reduce speed or turn off if overloaded or it becomes too hot.

### Motor Configuration

Input Voltage: 115  
Speed Reference: Dial on Motor  
Permanent Dial: Yes

### Control Configuration

Control Type: N/A  
Transformer: None



DRAWING#  
1.6.13.v1

# Horizontal Mount Exhaust Damper

Model: WD-100

## Standard Construction Features:

- Model WD-100 is a horizontal mount exhaust damper (air flow up) and is constructed of 18 ga galvanized steel with pre-punched mounting holes - Damper blades are 0.025 in. roll formed aluminum with vinyl seals on the closing edge, and spring assisted for ease of opening - Steel axles are 0.188 in. diameter zinc plated mounted in nylon bushings - Synthetic axle bearings

## Damper Configuration:

Actuator Type: 115 VAC

End Switch: No

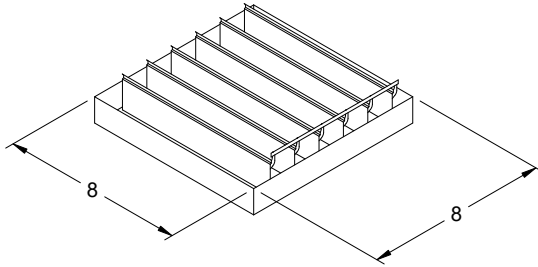
## Actuator Configuration:

Manufacturer: Greenheck Jackshaft Quantity: 0

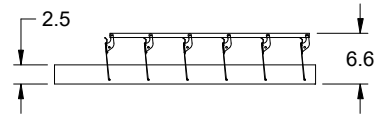
Model: MP-100A

Mounting: Internal

Quantity: 1



DAMPER



TYP. SECTION VIEW

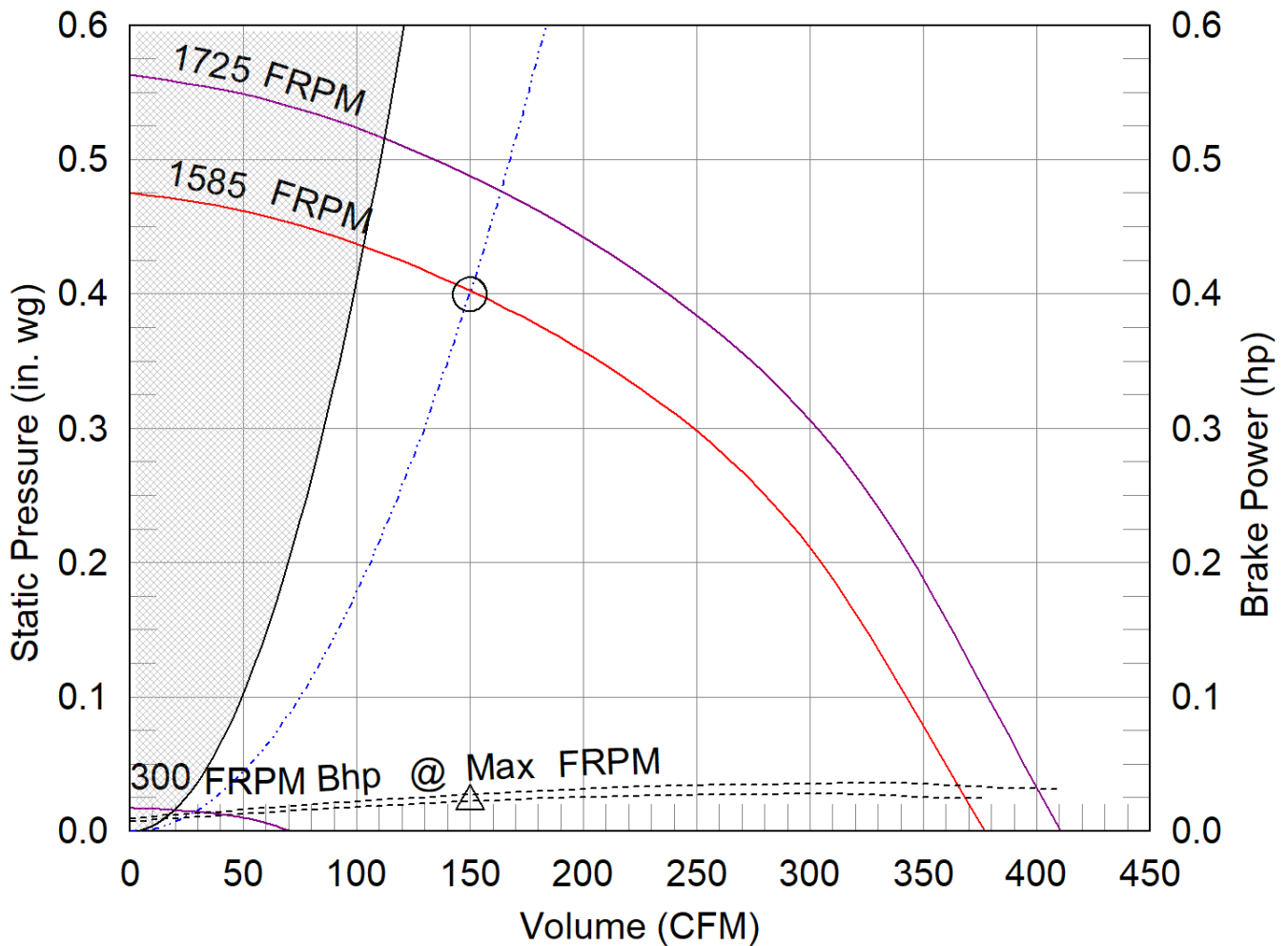
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.125 in. undersize

CUE-070-VG

Min/Max Fan Curve

**Performance**

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
150	150	0.4	1585	0.02



- △ Operating Bhp point
- Operating point at Total External SP
- Construction Limit
- Fan curve
- Min FRPM
- System curve
- - - - Brake horsepower curve



## Warranty

### 1 Yr (Standard)

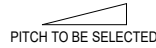
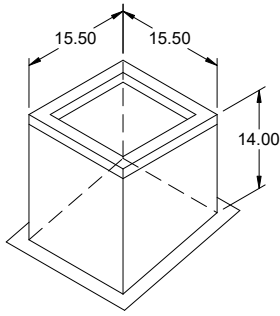
WARRANTY AND LIABILITY: SELLER warrants to Buyer that products manufactured are free from defects in material and workmanship for a period of 1 Yr (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's designated shipping point, freight allowed to Buyer's city, (or point of export for shipments outside the conterminous United States) replacement equipment (or at the option of SELLER parts therefore) for all Seller's products not conforming to this warranty and which have been returned to the manufacturer. No liability whatever shall attach to SELLER until said products have been paid for and such liability shall be strictly limited to the purchase price of the equipment shown to be defective. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by SELLER prove defective during this period, they should be returned to the nearest authorized motor service station. SELLER will not be responsible for any removal or installation costs. Electrical components, excluding motors, are warranted only to the extent warranted by the original manufacturer. To the extent that SELLER is entitled to pass through a warranty of the original equipment manufacturer of the electrical goods sold, SELLER will pass through such warranties to Buyer. The legal remedies described in this Warranty are the sole exclusive remedy of Buyer. SELLER MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED, REGARDING ITS PRODUCTS, OR ITS SELECTION AND APPLICATION, INCLUDING, BUT NOT LIMITED TO, COMPLIANCE WITH BUILDING CODES, SAFETY CODES, LAWS, MERCHANTABILITY OR FITNESS OR A PARTICULAR PURPOSE. This warranty is extended solely to the Buyer. It is nontransferable and non-assignable, and the Buyer shall not permit or authorize its employees, agents, representatives or customers to claim, represent or imply that this limited warranty extends or is available to anyone other than the Buyer. ANY MISUSE, NEGLIGENCE, FAILURE TO FOLLOW INSTRUCTIONS OR MANUALS OF INSTALLATION OF MAINTENANCE REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS. THE WARRANTY AND LIABILITY SET FORTH HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES WHETHER IN CONTRACT OR IN NEGLIGENCE, EXPRESSED OR IMPLIED, IN LAW OR IN FACT, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. SELLER PROVIDES NO INDEPENDENT WARRANTY FOR THIRD PARTY PRODUCTS OR COMPONENTS SOLD TOGETHER OR INCORPORATED WITH SELLER'S PRODUCT(S). THE SELLER HAS THE RIGHT TO SETTLE ANY AND ALL DISPUTES REGARDING THE WARRANTY.

## AMCA



AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type A: Free inlet, Free outlet. Power rating (BHP/kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per ANSI/AMCA Standard 301. Values shown are for installation type A: free inlet hemispherical sone levels. dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal applies to sone ratings only.



## Model: GPIP

### Pitched Roof Curb

#### Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Designed for pitched roofs - Straight sided without a cant - Wood nailer for attachment of roof flashing material - 2 in. mounting flange - 1 in. thick 3 lb density insulation - Height - Available from 12 in. to 24 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension.

#### General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Pitch (in.)	Pitch Run	Weight (lb)	Shipped Assembled	Union Label
	1	GPIP-17	Nominal	1.5	???	Long Side	22	Yes	No Preference

#### Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
14	17	17	15.5	15.5	12	12	16	16

\*May not be applicable

#### Accessories

Material	Security Bars	Liner	Insulation (in.)	Insulation R Value
Galvanized	No	No	1	R4.3

# Model: SP-A50-90-VG

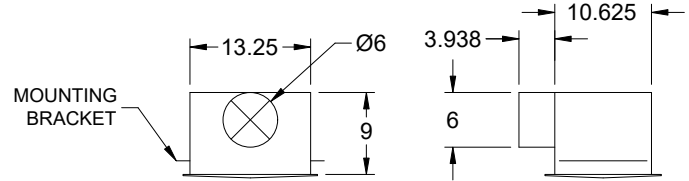
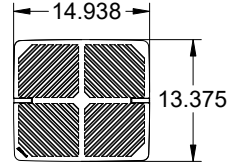
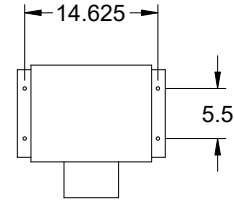
## Ceiling Exhaust Fan

### Standard Construction Features:

- Corrosion resistant galv steel scroll and housing - Sound absorbing insulation - White designer non-yellowing grille - Round outlet duct collar with integral backdraft damper - Double inlet forward curved wheel - Plug type disconnect - Adj. mounting brackets - Field rotatable discharge

### Selected Options & Accessories:

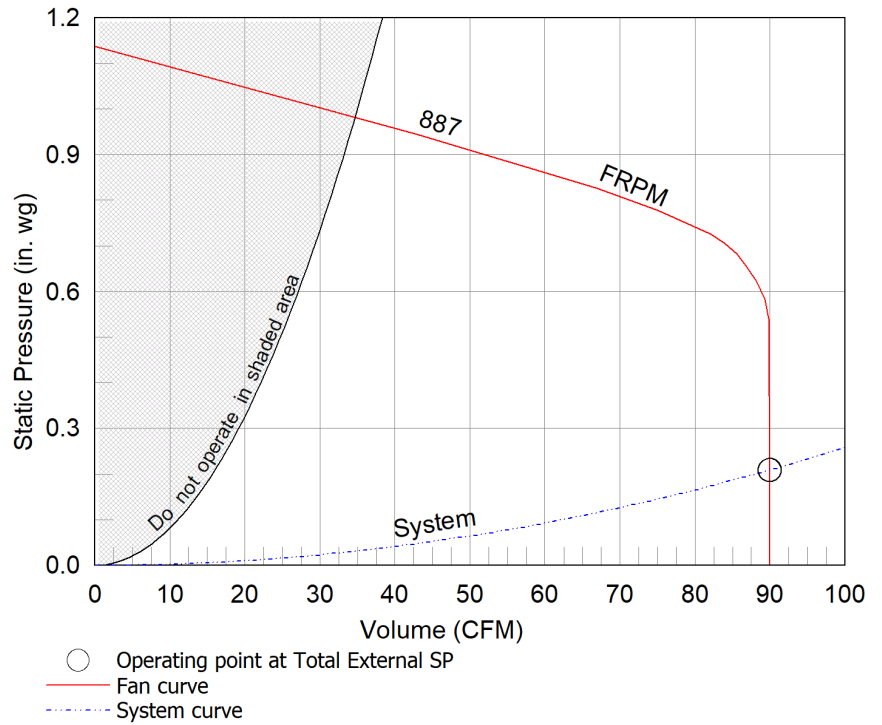
- Motor rated for continuous use
- Motor with CSA Approval
- Motor with 40 Degree C Ambient Temperature
- UL/cUL 507 Listed - Electric Fan
- Flat Roof Flashing Flange (PN: RFC-7) Shipped Loose
- Round Duct Connection
- Adjustable easy installation mounting bracket
- Energy Star Certified
- Standard Grille
- Polypropylene Wheel Material
- Can Be Used to Comply with: ASHRAE 62.2, California Title 24, and Washington State Energy Code



Dimensional	
Quantity	1
Weight w/o Acc's (lb)	12
Weight w/ Acc's (lb)	19

Performance	
Requested Volume (CFM)	88
Actual Volume (CFM)	90
Total External SP (in. wg)	0.209
Fan RPM	887
* FLA (A)	0.29
Elevation (ft)	328
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Sones	0.7

Motor	
Motor Mounted	Yes
** Input Watts (W)	6
Voltage/Cycle/Phase	115/60/1
Enclosure	TEAO



### Notes:

- All dimensions shown are in units of in.
- \*FLA is approximate and will vary slightly with the motor.
- Sones - calculated using AMCA 301 at 5 ft
- \*\* Wattage is approximate and may vary between motors.

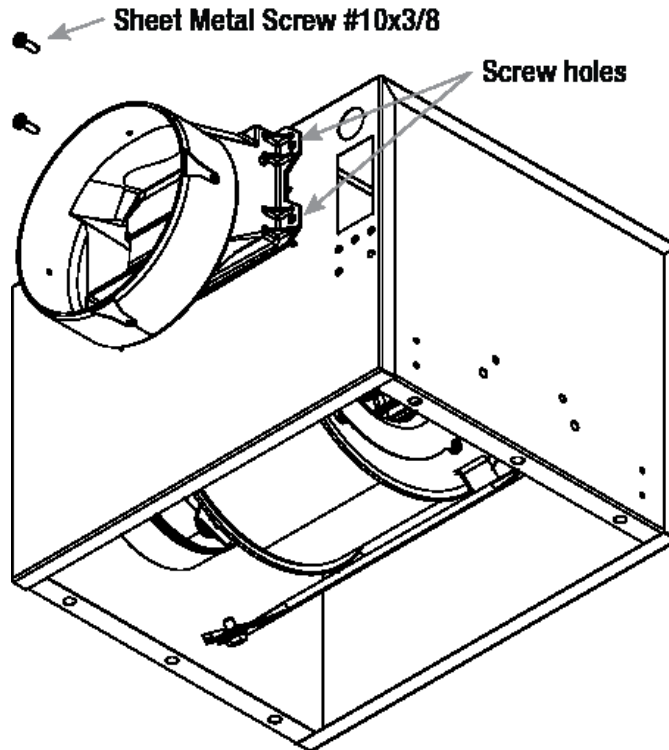


# Round Duct Connector

Model: RDC

## Standard Construction Features:

-Constructed of Polypropylene - Replaces the square discharge duct connector and damper using the existing mounting holes



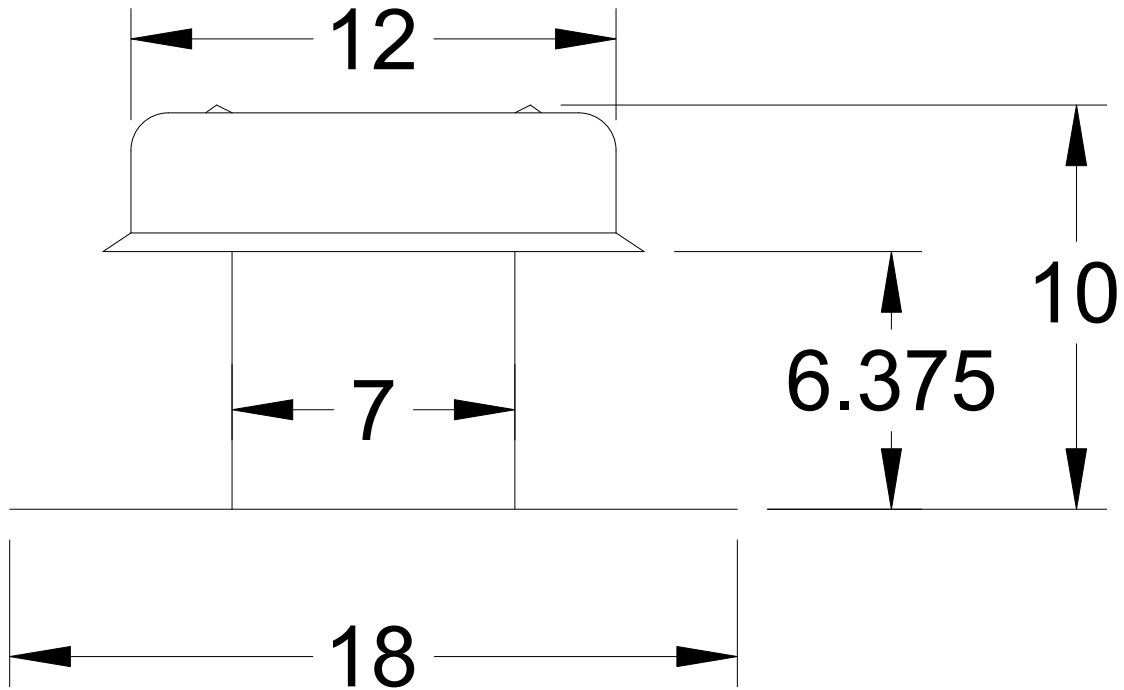
Notes: All dimensions shown are in units of in.

# Discharge Accessory

Type: Roof Cap Flashed

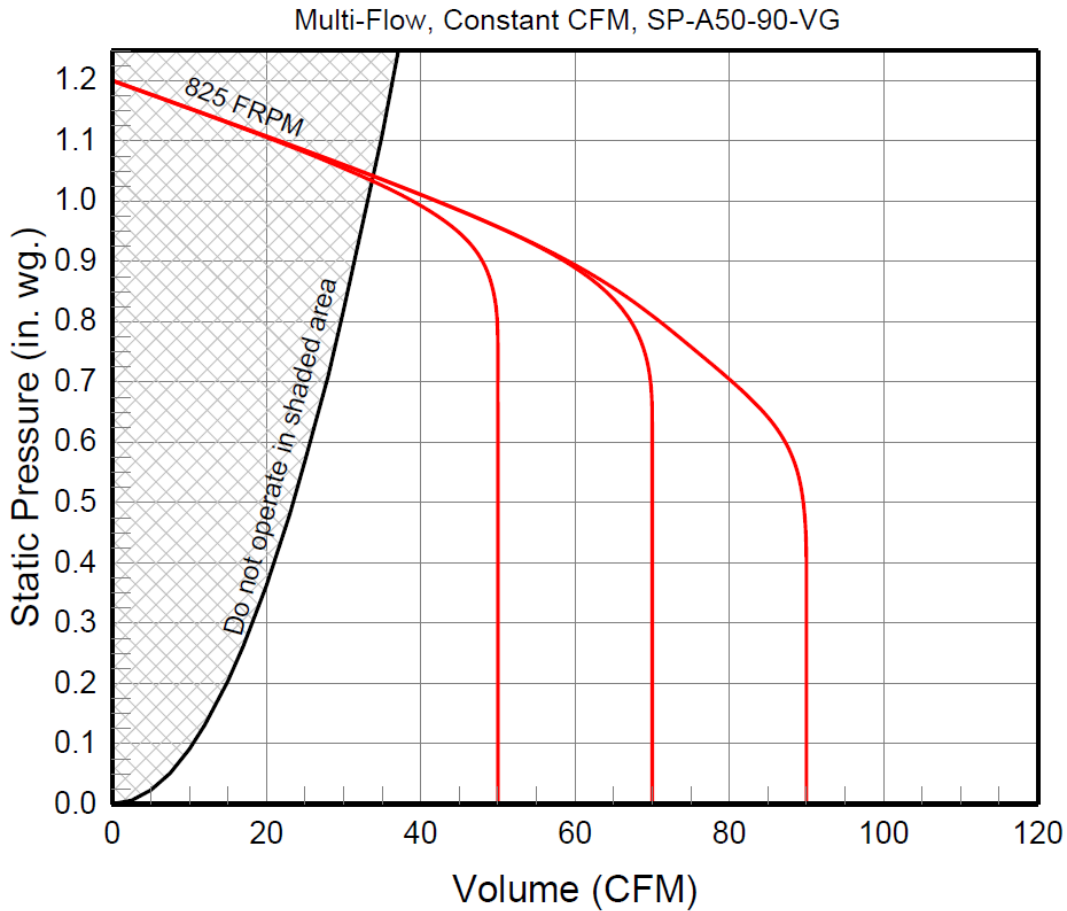
## Standard Construction Features:

- Aluminum Construction - Integral Birdscreen - Built-in Flashing Flange



Notes: All dimensions shown are in units of in.

This is a Constant Airflow fan which will hold a constant airflow as static pressure increases. This is also a Multi-Flow fan capable of three selectable speeds and will run at the user selected speed by the three position switch on the inside of the fan.



## AMCA



AMCA Licensed for Sound and Air Performance. Power Rating (Watt) includes transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type B: Free inlet, Ducted outlet. Performance ratings include the effects of an inlet grille and backdraft damper. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The watt ratings shown are at free air. The sound ratings shown are for loudness values in spherical sones at 5 ft. (1.5m) in a spherical free field calculated per Annex B of AMCA 311. Values shown are for installation type B: free inlet spherical sone levels. The AMCA Certified Ratings Seal applies to some ratings only.



# Model: SP-A110

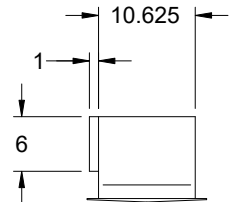
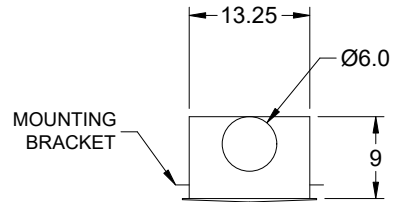
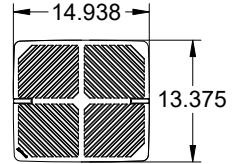
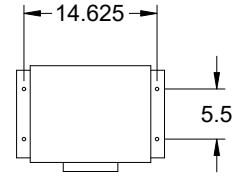
## Ceiling Exhaust Fan

### Standard Construction Features:

- Corrosion resistant galvanized steel scroll and housing - Sound absorbing insulation - White designer non-yellowing grille - Outlet duct collar with integral spring loaded backdraft damper - Double inlet forward curved wheel - Plug type disconnect - Adjustable mounting brackets - Field rotatable discharge

### Selected Options & Accessories:

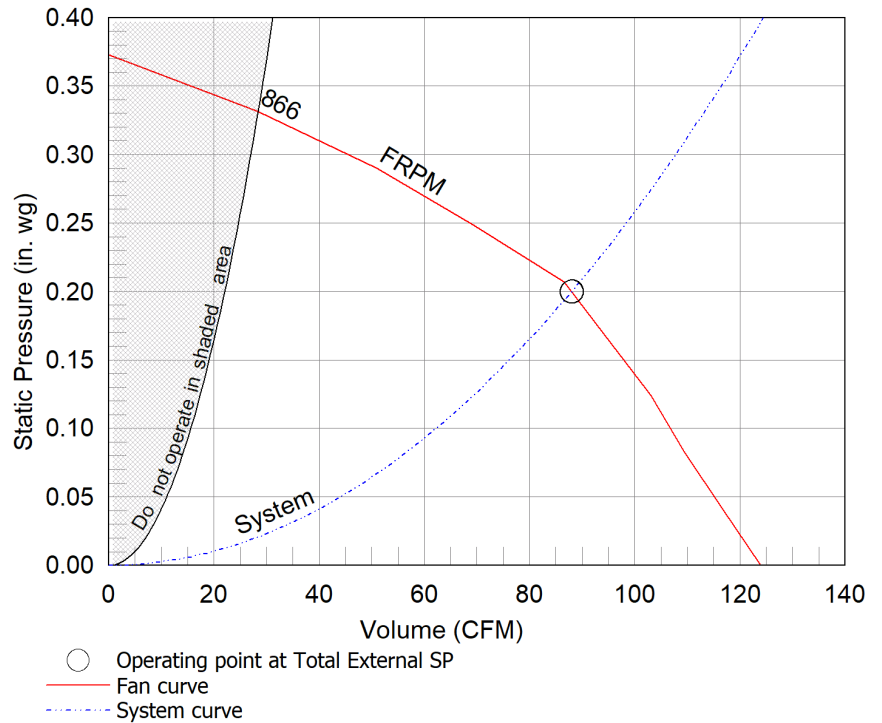
Motor rated for continuous use  
Motor with Thermal Overload  
Motor with CSA Approval  
Motor with 40 Degree C Ambient Temperature  
UL/cUL 507 Listed - Electric Fan  
Solid State Speed Control, 6 Amp, Mounted and Wired Internally  
Flat Roof Flashing Flange (PN: RFC-7) Shipped Loose  
Round Duct Connector, (PN: RDC-6) Shipped Loose  
Adjustable easy installation mounting bracket  
Energy Star Certified  
Standard Grille  
Polypropylene Wheel Material  
Can Be Used to Comply with: ASHRAE 62.2, California Title 24, and Washington State Energy Code



Dimensional	
Quantity	4
Weight w/o Acc's (lb)	17
Weight w/ Acc's (lb)	26

Performance	
Requested Volume (CFM)	88
Actual Volume (CFM)	88
Total External SP (in. wg)	0.2
Fan RPM	866
* FLA (A)	0.19
Elevation (ft)	328
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Sones	0.3

Motor	
Motor Mounted	Yes
** Input Watts (W)	13
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP



### Notes:

All dimensions shown are in units of in.  
\*FLA is approximate and will vary slightly with the motor.  
Sones - calculated using AMCA 301 at 5 ft  
\*\* Wattage is approximate and may vary between motors.

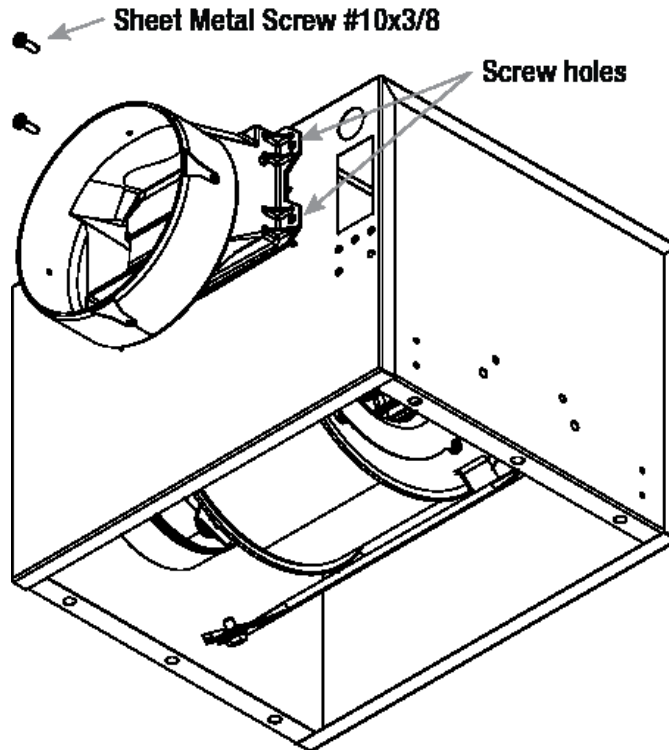


# Round Duct Connector

Model: RDC

## Standard Construction Features:

-Constructed of Polypropylene - Replaces the square discharge duct connector and damper using the existing mounting holes



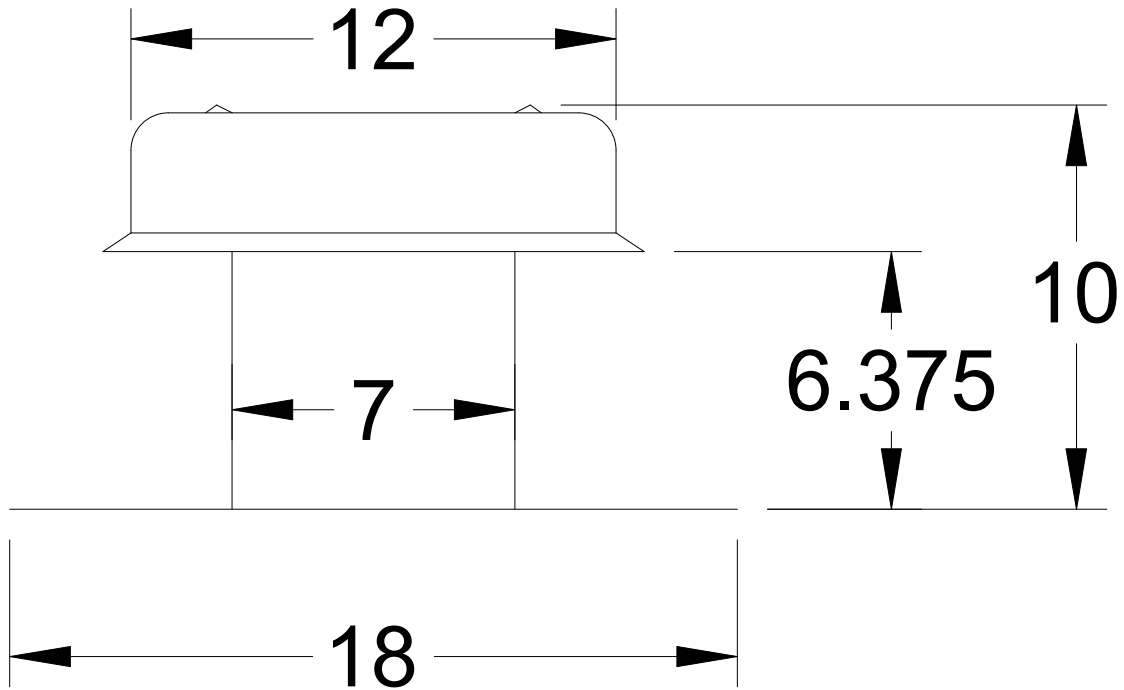
Notes: All dimensions shown are in units of in.

## Discharge Accessory

Type: Roof Cap Flashed

### Standard Construction Features:

- Aluminum Construction - Integral Birdscreen - Built-in Flashing Flange



Notes: All dimensions shown are in units of in.

## AMCA



AMCA Licensed for Sound and Air Performance Without Appurtenances (Accessories). Power rating (BHP/kW) does not include transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type B: Free inlet, Ducted outlet. Performance ratings include the effects of an inlet grille and backdraft damper. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The watt ratings shown are at free air. The sound ratings shown are for loudness values in spherical sones at 5 ft. (1.5m) in a spherical free field calculated per Annex B of AMCA 311. Values shown are for installation type B: free inlet spherical sone levels. The AMCA Certified Ratings Seal applies to sone ratings only.

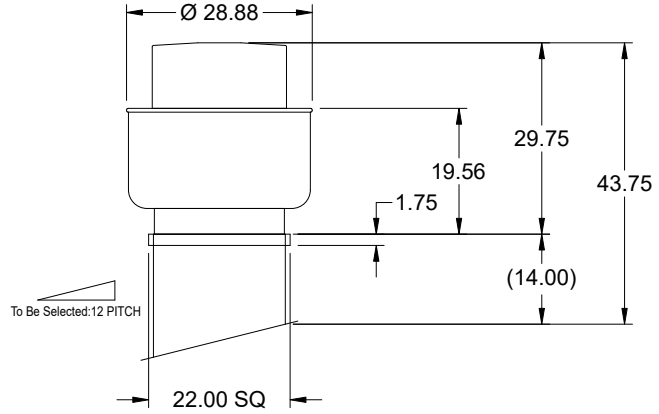
The AMCA licensed air and/or sound performance data has been modified for installation, appurtenances or accessories, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.

# Model: CUE-160-VG

Direct Drive Upblast Centrifugal Roof Exhaust Fan

Previously: CUE-161-VG

Dimensional	
Quantity	2
Weight w/o Acc's (lb)	74
Weight w/ Acc's (lb)	94
Weight w/ Acc's and Curb (lb)	124
Standard Curb Cap Size (in.)	22 x 22
Optional Damper (in.)	16 x 16
Roof Opening (in.)	18.5 x 18.5



Performance	
Requested Volume (CFM)	1,800
Actual Volume (CFM)	1,800
Total External SP (in. wg)	0.4
Fan RPM	843
Operating Power (hp)	0.23
Elevation (ft)	328
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,668
Static Eff. (%)	50

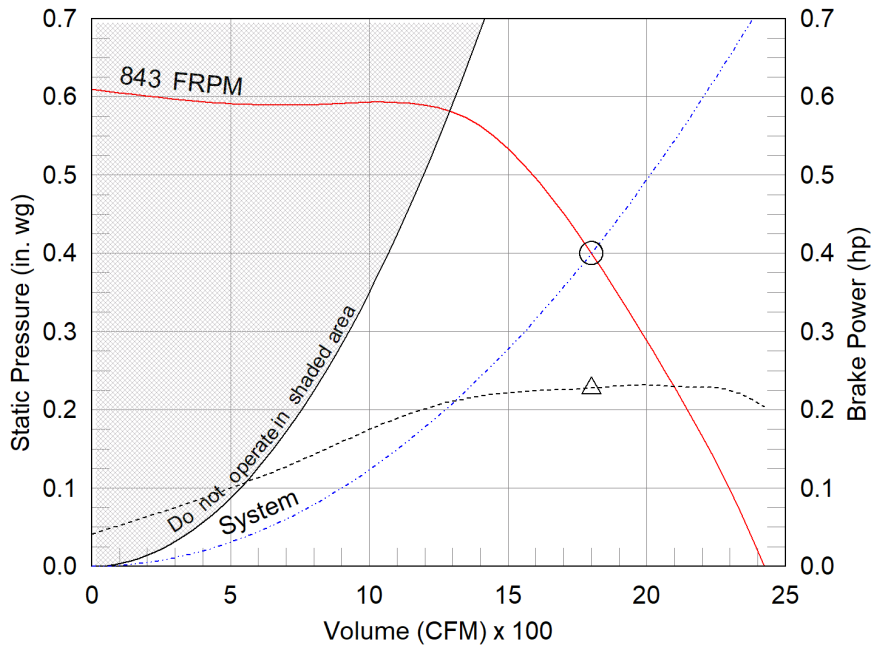
Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	1,047

Motor	
Motor Mounted	Yes
Size (hp)	1/2
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP
Motor RPM	1000
Efficiency Rating	High
Windings	1
FLA (Amps)	6.2
Min. Circuit Ampacity (MCA)	8
Max. Overcurrent Protection (MOP)	15
Short Circuit Current Rtg (SCCR)	5 kA

### Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	70	76	71	67	65	62	56	51	71	59	9.3

OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.



- △ Operating Bhp point
- Operating point at Total External SP
- Fan curve
- - - System curve
- - - Brake horsepower curve

### Notes:

All dimensions shown are in units of in.  
\*NEC FLA, MCA and MOP are for reference only – based on tables 430.248 or 430.25 of National Electric Code 2020. Actual motor FLA may vary, for sizing thermal overload, consult factory.  
MCA and MOP values shown only account for the motor, not accessories (damper actuator, field supplied VFD, etc).  
LwA - A weighted sound power level, based on ANSI S1.4  
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International  
Sones - calculated using ANSI/AMCA 301 at 5 ft



## Model: CUE-160-VG

Direct Drive Upblast Centrifugal Roof Exhaust Fan

### Standard Construction Features:

- Aluminum housing - Backward inclined aluminum wheel - Aluminum curb cap with prepunched mounting holes - Drain trough - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

### Selected Options & Accessories:

Motor - Vari-Green EC motor  
Control - Vari-Green Constant Pressure, Integral Transducer, Room Tap Qty 1  
Control - Dial for balancing  
Control - Vari-Green Transformer 85-277VAC to 24 VDC, Mounted & Wired  
Standard Curb Cap Size - 22 Square  
UL/cUL 705 Listed - "Power Ventilators"  
Switch, NEMA-1, Toggle,  
Junction Box Mounted & Wired  
Foam Curb Seal (Factory Applied)  
Birdscreen: Stainless Steel, nom. 85% Free Area  
Conduit Chase Qty 1  
Unit Warranty: 1 Yr (Standard)  
Damper Shipped Loose, EM-10-PB-16X16, Gravity Counterbalance Operated, Not Coated, Nominal Size

### Selected Sub Marks

See individual submittals for full details  
GPIP-22-G14

***The Vari-Green Motor included in this order has a 'Multi-Voltage' ability. The red wire on the motor is called a 'Voltage Doubler', and when it is connected the motor can be powered by 115V.***

***If the Red wire is disconnected, then the motor can be powered with 208-230/277V. The motor will leave the factory with the voltage doubler wired per the order.***

# Disconnect Switch

Enclosure Rating: NEMA-1

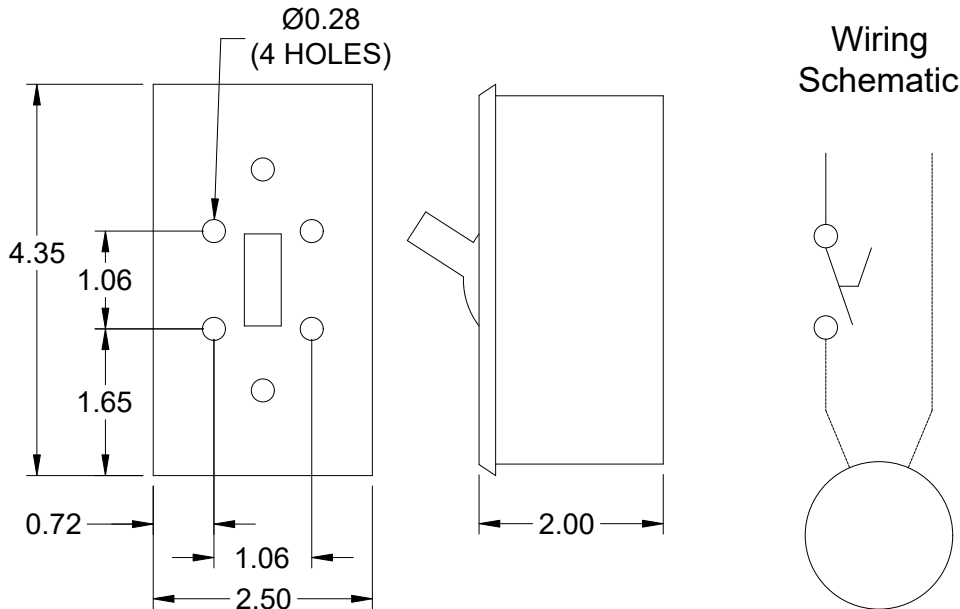
### Standard Construction Features:

Enclosure constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dust. This enclosure meets the rod entry and the indoor corrosion protection design tests. The rod entry test is intended to simulate incidental contact with enclosure equipment. Enclosure is equipped with provision to lockout in the off position with customer supplied lock.

### Disconnect Switch Configuration

Type:	Toggle	Motor Size:	1/2 hp	Voltage:	115	UL Listed:	Yes
Manufacturer:	Pass and Seymour	Cycle:	60	Amperage:	15	CSA Approved:	Yes
Overload Protection:	None	Phase:	1	Switch Pole(s):	1	Rating:	1/2 hp
Junction Box Mtg.:	Mounted and Wired	RPM:	1000	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

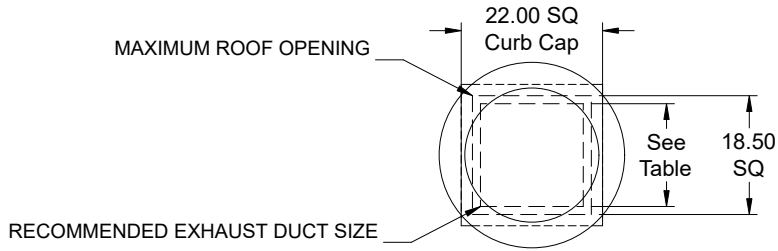
### Electrical Drawing Details



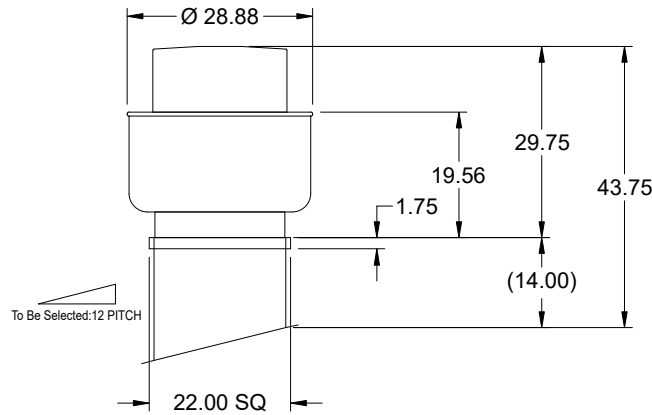
Notes: All dimensions shown are in units of in.

# Assembly Drawing

Type: Direct Drive Upblast Centrifugal Roof Exhaust Fan



DUCT TYPE	SIZE
STANDARD	16 SQ
FIRE-WRAPPED	12 SQ



DUCT DIMENSIONS ARE LARGEST POSSIBLE DUCT TO FIT THROUGH CURB.  
CONSULT SYSTEM DESIGN ENGINEER FOR RECOMMENDED DUCT SIZE.

OVERALL HEIGHT MAY BE GREATER DEPENDING ON  
MOTOR, ADAPTER, AND/OR HINGE BASE.

Notes: All dimensions shown are in units of in..



# Vari-Green Motor & Control Options

An EC motor that uses AC input power and internally converts it to DC power. Motor accepts a 0-10VDC control signal along with a 24V source to power controls in the motor. Motor is operable in the 2-10VDC range and off while in the 0-1.9VDC range. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated and the motor will automatically reduce speed or turn off if overloaded or it becomes too hot.

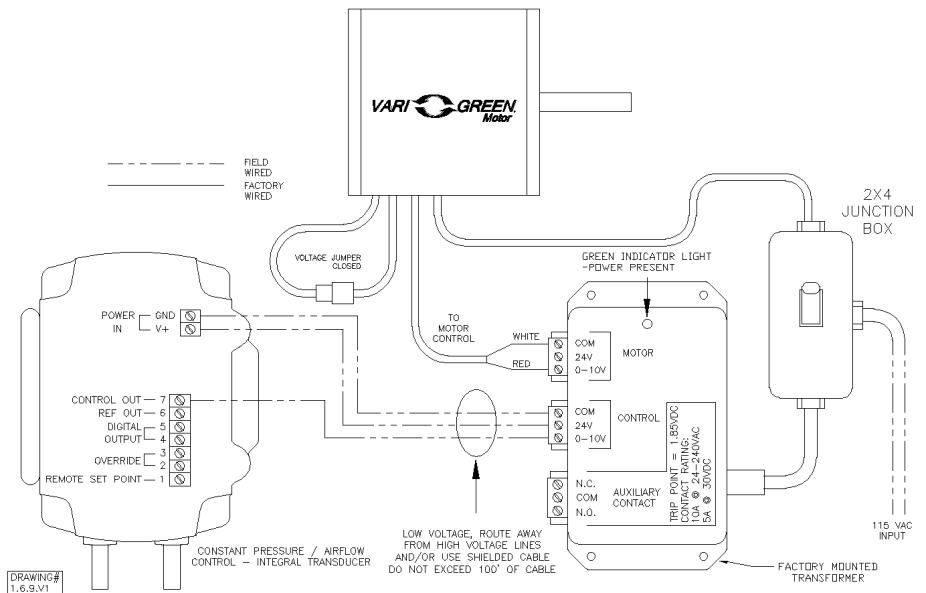
Constant pressure control with integral pressure transducer can maintain a constant static pressure on the inlet or outlet of a fan. Integral pressure transducer range is +/- 1.00 " W.C. A 24VDC transformer with 85-277VAC input range is provided to power the control.

### Motor Configuration

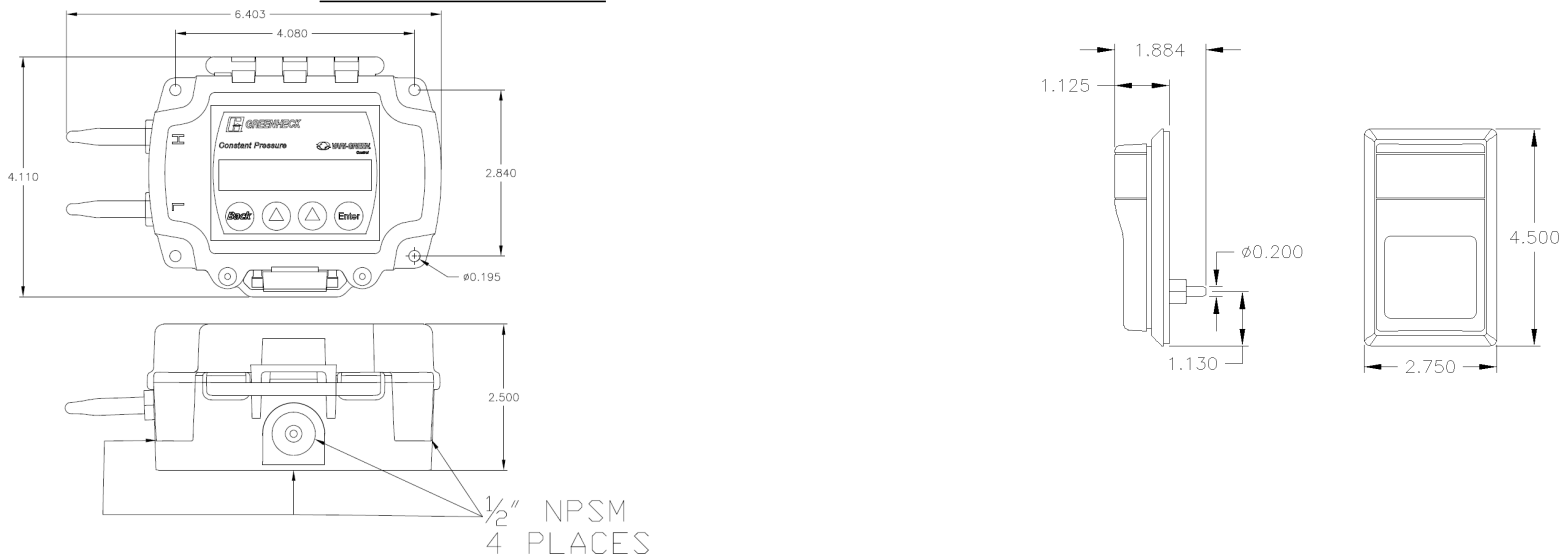
Input Voltage: 115  
Speed Reference: 0-10VDC  
Permanent Dial: No  
Balance Dial Included: Yes

### Control Configuration

Control Type: Constant Pressure  
Transformer: Transformer Mtd  
Pressure Transducer: Integral  
Location: Room Static  
Probe Type: Room Static



### Dimensional Detail

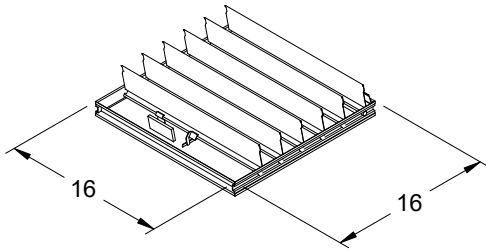


# Commercial Backdraft Damper

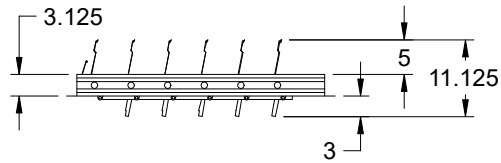
Model: EM-10

## Standard Construction Features:

- Model EM-10 is a horizontal mount exhaust damper (air flow up) which is constructed of heavy gauge 0.125 in. extruded Aluminum. Damper blades are of heavy gauge 0.07 in. extruded aluminum with vinyl seals on the closing edge and counterbalance weights to assist opening. Metallic axles are 0.75 in., mounted in acetal bushings – Synthetic axle bearings. Maximum Velocity of 3,500 ft/min



DAMPER



TYP. SECTION VIEW

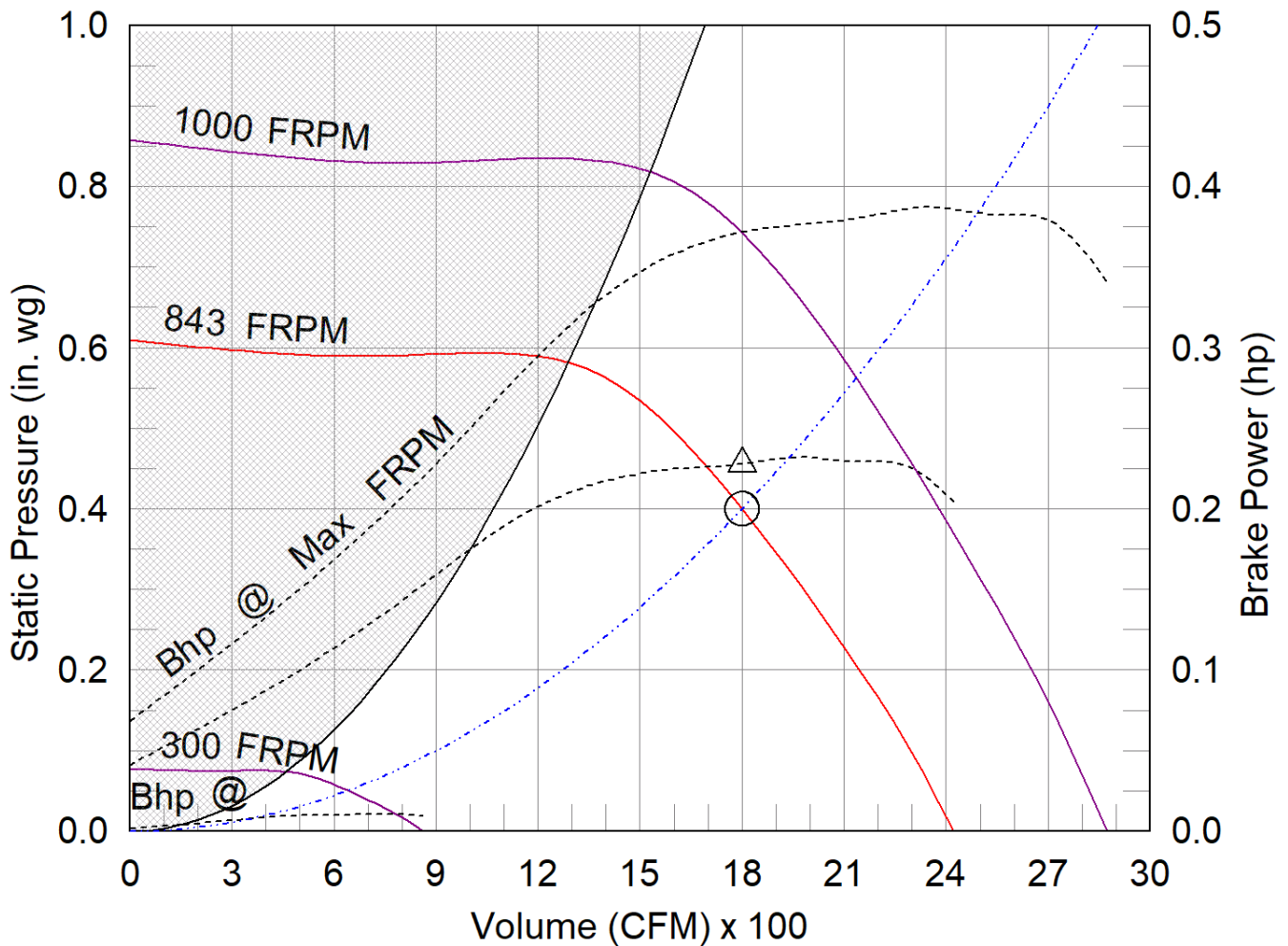
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.25 in. undersize

CUE-160-VG

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
1,800	1,800	0.4	843	0.23



- △ Operating Bhp point
- Operating point at Total External SP
- Construction Limit
- Fan curve
- Min FRPM
- System curve
- - - - Brake horsepower curve

## Warranty

### 1 Yr (Standard)

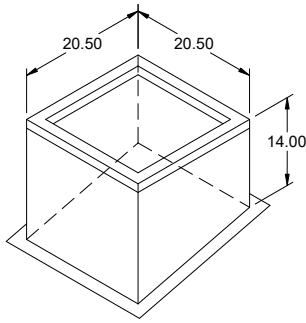
WARRANTY AND LIABILITY: SELLER warrants to Buyer that products manufactured are free from defects in material and workmanship for a period of 1 Yr (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's designated shipping point, freight allowed to Buyer's city, (or point of export for shipments outside the conterminous United States) replacement equipment (or at the option of SELLER parts therefore) for all Seller's products not conforming to this warranty and which have been returned to the manufacturer. No liability whatever shall attach to SELLER until said products have been paid for and such liability shall be strictly limited to the purchase price of the equipment shown to be defective. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by SELLER prove defective during this period, they should be returned to the nearest authorized motor service station. SELLER will not be responsible for any removal or installation costs. Electrical components, excluding motors, are warranted only to the extent warranted by the original manufacturer. To the extent that SELLER is entitled to pass through a warranty of the original equipment manufacturer of the electrical goods sold, SELLER will pass through such warranties to Buyer. The legal remedies described in this Warranty are the sole exclusive remedy of Buyer. SELLER MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED, REGARDING ITS PRODUCTS, OR ITS SELECTION AND APPLICATION, INCLUDING, BUT NOT LIMITED TO, COMPLIANCE WITH BUILDING CODES, SAFETY CODES, LAWS, MERCHANTABILITY OR FITNESS OR A PARTICULAR PURPOSE. This warranty is extended solely to the Buyer. It is nontransferable and non-assignable, and the Buyer shall not permit or authorize its employees, agents, representatives or customers to claim, represent or imply that this limited warranty extends or is available to anyone other than the Buyer. ANY MISUSE, NEGLIGENCE, FAILURE TO FOLLOW INSTRUCTIONS OR MANUALS OF INSTALLATION OF MAINTENANCE REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS. THE WARRANTY AND LIABILITY SET FORTH HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES WHETHER IN CONTRACT OR IN NEGLIGENCE, EXPRESSED OR IMPLIED, IN LAW OR IN FACT, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. SELLER PROVIDES NO INDEPENDENT WARRANTY FOR THIRD PARTY PRODUCTS OR COMPONENTS SOLD TOGETHER OR INCORPORATED WITH SELLER'S PRODUCT(S). THE SELLER HAS THE RIGHT TO SETTLE ANY AND ALL DISPUTES REGARDING THE WARRANTY.

## AMCA



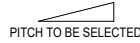
AMCA Licensed for Sound and Air Performance. Power rating (BHP/kW) does not include transmission losses.

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. Performance certified is for installation type A: Free inlet, Free outlet. Power rating (BHP/kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per ANSI/AMCA Standard 301. Values shown are for installation type A: free inlet hemispherical sone levels. dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal applies to sone ratings only.



## Model: GPIP

### Pitched Roof Curb



#### Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Designed for pitched roofs - Straight sided without a cant - Wood nailer for attachment of roof flashing material - 2 in. mounting flange - 1 in. thick 3 lb density insulation - Height - Available from 12 in. to 24 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension.

#### General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Pitch (in.)	Pitch Run	Weight (lb)	Shipped Assembled	Union Label
	2	GPIP-22	Nominal	1.5	???	Long Side	30	Yes	No Preference

#### Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
14	22	22	20.5	20.5	17	17	21	21

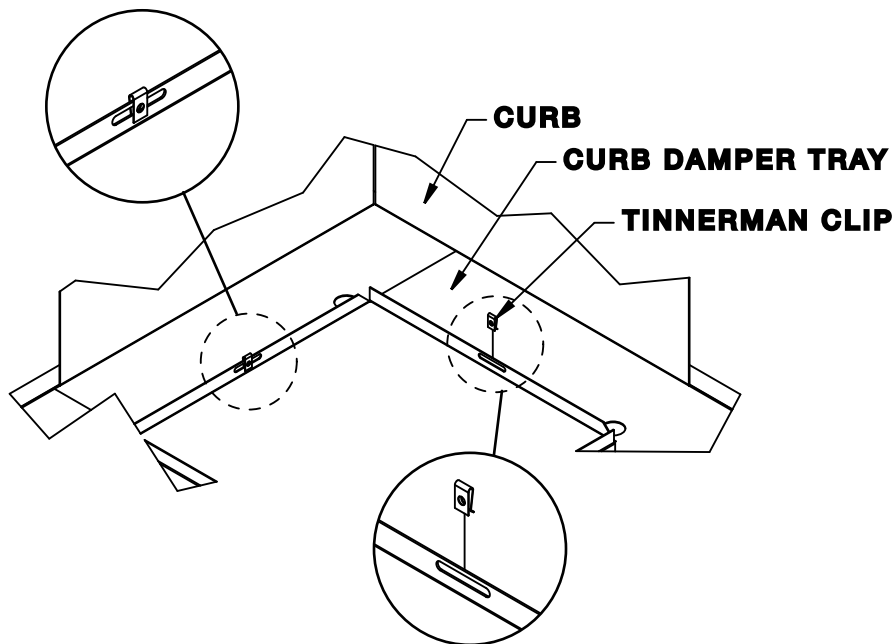
\*May not be applicable

#### Accessories

Material	Security Bars	Liner	Insulation (in.)	Insulation R Value
Galvanized	No	No	1	R4.3

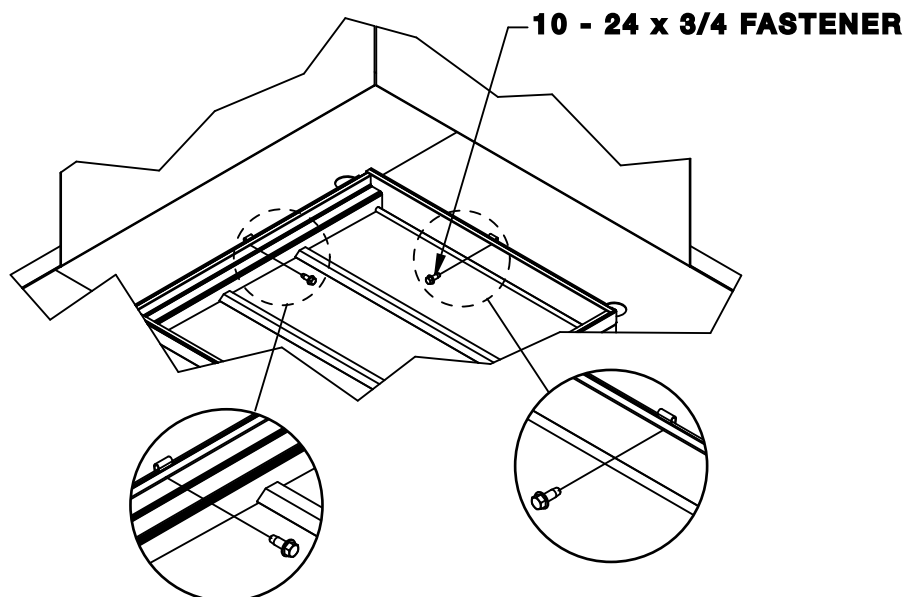
## Assembly & Installation Instructions

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!



Apply the number 10 clip nuts to the slots provided in the roof curb damper tray. The clip flat side should face towards the damper. Small damper sizes will require one clip per side whereas the larger sizes will require two per side.

Insert the damper into the roof curb tray so the damper and tray edges are flush at the topside. Insert the number 10-24 x 3/4 fasteners through the 7/32 inch diameter holes in the damper sides into the clips. Slide the clips for alignment as required. Insert all fasteners but tighten them only after they have all been inserted.



## 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.

### Table of Contents

Reference part number listed in chart to locate specific motor information page number.

HP	Voltage	* RPM Range	Encl.	FLA	Control Method	Motor Part No.	Pg.
1/15	115-120/ 208-230	300-1750	TENV	1.3/0.65	0-5V Only	328447	5
					Pot Only	328448	5
1/10	115	300-1725	TENV	1.5	Pot/0-10V	318003	4
	115/208- 230/277	300-1750	ODP	1.38/ 0.84/0.73	Pot/0-10V	319356	4
	115/208- 230/277	350-1750	TENV	1.5/1.1/ 0.9	Pot/0-10V	328128	4
1/6	115/208- 230/277	300-1750	ODP	2.2/1.3/ 1.1	Pot/0-10V	319357	4
	115/208- 230/277	350-1750	TENV	2.3/1.5/ 1.2	Pot/0-10V	328129	4
	115	300-1750	TENV	2.6	Pot/0-10V	318004	4
				3.1	0-10V Only	311352	3
				3.1	Pot Only	311353	3
				3.1	Pot/0-10V	311731	3
						312359	
	2.45	Pot/0-10V	313712	3			
	208-240	300-1750	TENV	1.6	Pot/0-10V	313233	3
						313713	
277	350-1750	TENV	1.15	Pot/0-10V	316495	3	
1/4	115/208- 230/277	300-1750	ODP	2.85/ 1.7/1.5	Pot/0-10V	318013	4
	115/208- 230/277	350-1750	ODP	4.2/2.6/ 2.4	Pot/0-10V	328130	4
	115	300-1725	ODP	3.9	0-10V Only	310107	3
					Pot Only	310108	
				3.5	Pot/0-10V	311377	3
	313714						
	317887						
	208-240	300-1725	ODP	2.3	Pot/0-10V	313234	3
313715							
277	300-1725	ODP	1.8	Pot/0-10V	316496	3	
1/3	115/208- 230/277	300-1750	ODP	4.4/2.6- 2.4/2.2	Pot/0-10V	320587	4
	115/208- 230/277	350-1200	TENV	4.75/ 2.95/2.4	Pot/0-10V	328173	4
	115/208- 230/277	350-1550	TENV	4.1/2.4 2.2	Pot/0-10V	328174	4
1/2	115	300-1725	ODP	6.2	0-10V Only	309025	3
				5.5	Pot Only	309028	
				6.2	Pot/0-10V	311812	3
	208-240	300-1725	ODP	4.2	Pot/0-10V	313235	3
277	350-1725	ODP	3.3	Pot/0-10V	316497	3	

HP	Voltage	* RPM Range	Encl.	FLA	Control Method	Motor Part No.	Pg.
1/2	115	300-2500	ODP	4.0	0-10V Only	310307	3
				6.5	Pot Only	310476	
				6.9	Pot/0-10V	312360	3
	208-240	350-2500	ODP	4.9	Pot/0-10V	317706	3
	277	350-2500	ODP	3.27	Pot/0-10V	317707	3
	115/208- 230/277	300-1750	ODP	6.4/3.8- 3.6/3.2	Pot/0-10V	320588	4
115/208- 230/277	350-1750	ODP	6.2/4.0/ 3.2	Pot/0-10V	328131	4	
115/208- 230/277	350-2500	ODP	6.6/4.0/ 3.25	Pot/0-10V	328178	4	
3/4	115	300-1725	ODP	10.1	0-10V Only	309026	3
				10.1	Pot Only	309029	
				10.6	Pot/0-10V	311388	3
	312619						
	208-240	300-1725	ODP	6.6	Pot/0-10V	314534	3
	277	350-1725	ODP	5.4	Pot/0-10V	316498	3
	115	300-2200	ODP	11.3	0-10V Only	310306	3
				11.3	Pot Only	310475	
				11.3	Pot/0-10V	312361	3
	208-240	350-2200	ODP	5.6	Pot/0-10V	317708	3
277	350-2200	ODP	4.7	Pot/0-10V	317709	3	
115/208- 230/277	300-1750	ODP	8.8/5.4- 5.0/4.8	Pot/0-10V	320589	4	
115/208- 230/277	350-1750	ODP	11.0/ 7.0/6.3	Pot/0-10V	328132	4	
115/208- 230/277	350-2200	ODP	10.5/ 6.5/5.0	Pot/0/10V	328179	4	
1	115	300-1725	ODP	12.4	Pot/0-10V	310359	3
						312362	
	115/ 208-240	300-1725	TEFC	12.0/6.0	Pot/0-10V	311156	5
	208-240	300-1725	ODP	8.6	Pot/0-10V	314945	3
	277	350-1725	ODP	7.3	Pot/0-10V	316499	3
115/208- 230/277	300-1750	TENV	11.5/7.0- 6.5/5.8	Pot/0-10V	320590	4	
115/208- 230/277	350-1750	ODP	13.0/ 8.0/6.7	Pot/0-10V	328133	4	
2	208-240	300 - 1725	TEFC	12.0	Pot/0-10V	310420	5

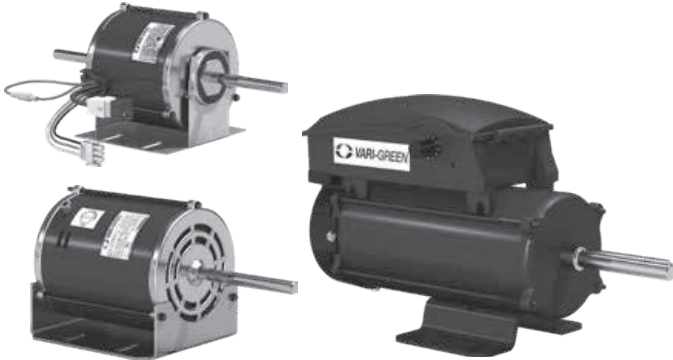
\*Actual maximum RPM may vary. See RPM column in chart on page 11 for specific motor and fan combinations.

Controls . . . . . 7-11  
Maximum RPM Table . . . . . 12



# Vari-Green® Motor

The Vari-Green Motor is an electronically commutated (EC) motor that uses AC input power and internally converts it to a DC power supply which provides an 80% turndown capability and increased energy savings.



## Features, Operation and Wiring, and Troubleshooting

### Features

**Soft start** – All motors feature soft-start technology which eliminates inrush current at start-up. The motors will reliably start at any speed setting.



**Overload protection** – If the motor becomes overloaded, it will automatically reduce its speed until it is no longer overloaded. This means that the motor will never operate in the “service factor” which is possible with many AC motors.

**Locked rotor protection** – If the motor ever encounters a locked-rotor scenario, the motor will automatically shut itself down. It will try to restart up to 3 times, and if after the 3rd time the motor will still not rotate, the motor will not attempt to start again until power is cycled.

**Thermal protection** – The motors have a one-shot fuse thermal protector. This is meant to protect the motor from a severe temperature rise. Additionally, the motors have on-board temperature sensors which will reduce the speed of the motor should it become too hot. The fuse is used as a last resort to prevent a fire.

**RPM measurement** – The motors have a small shaft extension on the end of the motor to measure motor RPM with either a contact or optical tachometer.

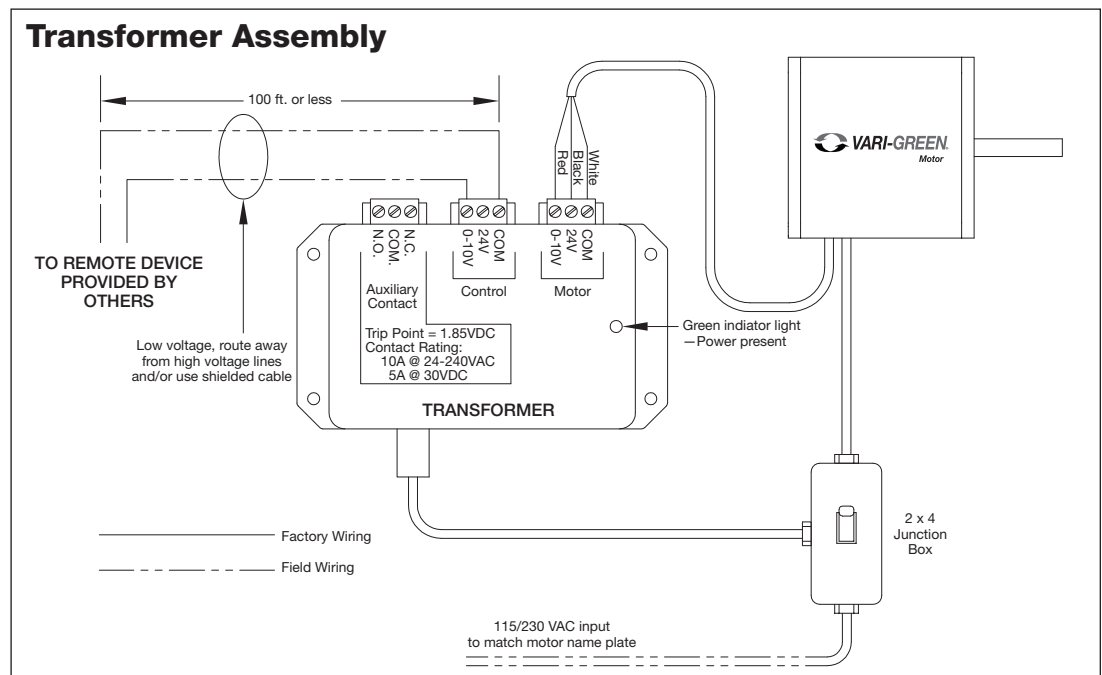
### NOTE

When using a clamp meter to measure input amp draw, the meter must be capable of reading a non-linear current. Erroneous readings will occur otherwise.

### WARNING

To reduce the risk of fire or electric shock, do not use this motor with any solid-state speed control device.

Fig. 1 0-10 VDC External connection with factory mounted transformer (See page 4 for details)



## Operation and Wiring

### - Potentiometer Dial Only

Part Numbers Covered in this Section				
309028	309029	310108	310475	310476
311353				

These motors feature a potentiometer dial on the motor for speed adjustment. A small screwdriver can be used to make the speed adjustment. To increase the speed, rotate the dial clockwise. To decrease the speed, rotate the dial counterclockwise.

The motor is pre-wired at the factory and cannot be changed inside the motor. Connect single-phase power at the voltage listed on the nameplate.

These motors cannot be converted to receive a remote control signal – a different motor is needed. Please consult the factory.

## Operation and Wiring

### - 0-10V Input Only

Part Numbers Covered in this Section				
309025	309026	310107	310306	310307
311352				

These motors will accept a 0-10 VDC control signal for speed control. From 0-1.9V, the motor will be off, and will operate in the 2-10V range. 24 VAC/DC power is also required for operation. The motor will consume 0.7VA at 24 VAC or 25mA at 24 VDC. A factory mounted transformer is available to supply this voltage. (See Fig. 1)

The motor is pre-wired at the factory and cannot be changed inside the motor. Connect single-phase power at the voltage listed on the nameplate, along with the 0-10 VDC and 24V signal for speed control.

NOTE: The motor will not operate without the proper control voltages.

## Operation and Wiring

### - Potentiometer Dial and 0-10V Input

Part Numbers Covered in this Section				
310359	311731	311377	311388	311812
312359	312360	312361	312362	312619
313233	313234	313235	313712	313713
313714	313715	314534	314945	316495
316496	316497	316498	316499	317706
317707	317708	317709	317886	317887

These motors have both a potentiometer dial on the motor for speed adjustment AND have the ability to accept a 0-10 VDC signal for remote speed control.

There is a 4 second delay between the application of power and the motor starting.

The motor is pre-wired at the factory and cannot be changed inside the motor. Connect single-phase power at the voltage listed on the nameplate. If remote control is desired, connect the 0-10 VDC and 24V signal for remote speed control.

**Dial on Motor** – A small screwdriver can be used to make the speed adjustment. To increase the speed, rotate the dial clockwise. To decrease the speed, rotate the dial counterclockwise. There is no need to connect the control wires.

**0-10 VDC signal** – The dial on the motor must be rotated fully clockwise to achieve the full speed range. If this is not done, the dial will act as a maximum speed limiter.

From 0-1.9V, the motor will be off, and will operate in the 2-10V range. 24 VAC/DC power is also required for operation. The motor will consume 0.7VA at 24 VAC or 25mA at 24 VDC. A factory mounted transformer is available to supply this voltage. (See Fig. 1, page 2)

A low voltage wiring harness is needed to supply the 0-10V signal to the motor. This harness is available from the factory if conversion is necessary.

Low Voltage Harness Part Numbers			
Type	Use with Motor	18 in. long	36 in. long
3-pin	311731, 310359	384431	384432
9-pin	311377, 311812, 311388, 312359, 312360, 312361, 312362, 312619, 313233, 313234, 313235, 313712, 313713, 313714, 313715, 314534, 314945, 316495, 316496, 316497, 316498, 316499, 317706, 317707, 317708, 317709, 317886, 317887	384804	384805

### NOTE

The 9-pin connector on the motor contains 6 wires. The red, black and white wires are used for the external control signal and the other three are used for factory initialization and programming.

### 0-10V Analog input connection

Red	+ 0-10 VDC
White	Common*
Black	+24 VAC/DC
*Common is shared between both 24V power and 0-10V signal.	
The impedance of 0-10V circuit is 12KΩ	

## Troubleshooting

### Motor does not operate

1. Check all wiring connections to ensure they are correct and secure.
2. Verify that all voltages are present at the motor, including 24V and 0-10 VDC, if applicable.
3. Make sure that the fan wheel will rotate freely and there are no foreign objects in the wheel. If fan wheel does not rotate freely, disconnect power from the motor and adjust the wheel or housing until the wheel can freely rotate. Apply power and the motor should restart.
4. If motor has both the dial on the motor and 0-10 VDC control option, control wiring issues can be tested by disconnecting the control wires from the motor. The motor should then operate using the dial on the motor for speed control.

### Motor will not reach maximum speed

1. Make sure dial is rotated full clockwise, if applicable.
2. Make sure motor is receiving 10 VDC, if applicable.
3. There are some motor/fan combinations where the motor may not reach nameplate RPM. See Max RPM table on page 11 for the maximum motor speed for your application.

### Factory Mounted Transformer (Fig. 1, page 2)

A factory mounted transformer is available to supply 24 VDC power to the motor when the 0-10V signal is by others. This transformer has the capability to power a remote device if desired. The power available to a remote device is 400mA at 24 VDC. If the remote device is powered by a different source, connect the analog output to the 0-10V and COM terminals of the transformer. This will pass the signal through to the motor.

#### WARNING

Do not connect an external 24V supply to the transformer's control terminal labeled 24V. If the external device providing the 0-10V signal is powered elsewhere, this terminal can remain unused.

## Operation and Wiring

### - Potentiometer and 0-10V Input

Part Numbers Covered in this Section				
318003	318004	318013	319356	319357
320587	320588	320589	320590	328128
328129	328130	328131	328132	328133
328173	328174	328178	328179	

These motors have the ability to accept a plug-in potentiometer for speed adjustment AND the ability to accept a 0-10V signal for remote control.

There is a 4 second delay between the application of power and the motor starting.

**Motor part numbers 318003, 318004** – The motor is prewired at the factory and cannot be changed inside the motor. Connect single-phase power at the voltage listed on the nameplate.

**Motor part numbers 318013, 319356, 319357, 320587, 320588, 320589, 320590, 328128, 328129, 328130, 328131, 328132, 328133, 328173, 328174, 328178, and 328179** – The motor is prewired at the factory and can operate on 115v up to 277v. Operating voltage is changed via voltage red jumper wire.

**Voltage jumper** – For 115v the red jumper wire on the side of the motor must be connected (closed). For 208v-277v operation the red jumper must be disconnected (open). If disconnected, red jumper wire has 120 VAC potential. Ensure leads are capped/covered.

**Dial on Motor** – A potentiometer (PN 385806) can be plugged into the 9-pin connector of the motor. To increase speed, rotate the dial clockwise. To decrease speed, rotate the dial counterclockwise.

**0-10 VDC Signal** – From 0-1.9V, the motor will be off, and will operate in the 2-10V range. A low voltage wiring harness is needed to supply the 0-10V signal to the motor. The harness is available from the factory if conversion is necessary.

**0-5 VDC Signal** – From 0-0.9V, the motor will be off and will operate in the 1-5V range. A low voltage wiring harness is needed to supply the 0-5V signal to the motor. The harness is available from the factory if conversion is necessary.

Low Voltage Harness Part Numbers			
Type	Use with Motor	18 in. long	36 in. long
9-pin	318003, 318004, 318013, 319356, 319357, 320587, 320588, 320589, 320590, 328128, 328129, 328130, 328131, 328132, 328133, 328173, 328174, 328178, 328179	385821 (0-10 VDC only)	385822 (0-10 VDC only)
		386518 (0-5 VCD and 0-10V DC compatible)	386519 (0-5 VCD and 0-10V DC compatible)

#### NOTE

The 9-pin connector on the motor contains 6 wires. The yellow, orange, red and white wires are used for external control. The other two wires are used for factory initialization and programming.

#### 0-10V Analog Input Connection

Red	+ 0-10 VDC
White	Common
Green	+0-5 VDC Signal
Black	5 VDC Supply

## Troubleshooting

### Motor does not operate

1. Verify the motor is wired correctly and all connections are secure.

2. If using dial on motor, verify the potentiometer is fully seated in the 9-pin connector.
3. If using 0-10 or 0-5 VDC, verify that all voltages are present at the motor.

#### Motor does not reach maximum speed

1. Make sure dial is rotated full clockwise, if applicable.
2. Make sure motor is receiving 10 or 5 VDC, if applicable.
3. There are some motor/fan combinations where the motor may not reach nameplate RPM. See Max RPM table on page 11 for the maximum motor speed for your application.
4. Make sure black wire is disconnected when using 0-10 VDC.

### Operation and Wiring

#### - 0-5V Input

##### Part Numbers Covered in this Section

328447	328448
--------	--------

Motor PN 328447 has the ability to accept 0-5V signal for speed adjustment via a 0-5V dial on fan, PN 386512. Motor PN 328448 has the ability to accept a 0-5V signal for speed adjustment via a plug-in potentiometer PN 385806.

There is a four second delay between the application of power and the motor starting.

**Motor part numbers 328447, 328448** - the motor is prewired at the factory and can operate at single phase 115-120V or 208-230V. The motor detects the incoming voltage and automatic switches adjust for it inside the motor. All that is required is to connect single phase power at the voltage listed on the nameplate.

**Dial on Motor** – A potentiometer (PN 385806) can be plugged into the 9-pin connector of the motor. To increase speed, rotate the dial clockwise. To decrease speed, rotate the dial counterclockwise.

**0-5V Dial on Fan** – From 0-1V, the motor will be off and will operate in the 2-5V range. The low voltage wiring harness is built into the design of the motor PN 328447.

#### NOTE

The 9-pin connector on the motor contains 3 wires. The green, white and black wires in the white jacketing are used for external control.

#### 0-10V Analog Input Connection

Green	+0-5 VDC Signal
White	Ground
Black	5 VDC Supply

### Troubleshooting

#### Motor does not operate

1. Verify the motor is wired correctly and all connections are secure.
2. If using dial on motor, verify the potentiometer is fully seated in the 9-pin connector.
3. If using 0-5V dial on fan controller, verify that all voltages are present at the motor.

#### Motor does not reach maximum speed

1. Make sure dial is rotated full clockwise, if applicable.
2. Make sure motor is receiving 5 VDC.

#### Part Numbers Covered in this Section

310420	311156
--------	--------

### Features

#### Speed control -

These motors can be controlled by either a dial on the motor or a 0-10 VDC signal for remote control.



**Soft start** – All motors feature soft-start technology which eliminates inrush current at start-up. The motors will reliably start at any speed setting. There will be up to a 30 second delay between the application of power and the motor starting. The motor will "rock" back and forth upon startup as part of its normal operation.

**Overload protection** – If the motor becomes overloaded, it will automatically shut itself down. The maximum programmed motor speeds have been selected to prevent this from happening in normal operation.

**Locked rotor protection** – If the motor encounters a locked-rotor scenario, it will automatically shut itself down. It will try to restart up to 3 times, and if after the 3rd time the motor will still not rotate, the motor will not attempt to start again until power is cycled.

**Thermal protection** – The motors have an automatic reset thermal protector. This is meant to protect the motor from a severe temperature rise.

**RPM measurement** – The motor RPM can be measured by removing the cooling fan cover and using a contact or optical tachometer. Be sure to replace the cooling fan cover when finished.

**Reversible rotation** – The motor direction has been pre-set at the factory for the rotation of the fan but can be reversed if necessary.

### Operation and Wiring

These motors can be controlled by either a dial on the motor or a 0-10 VDC signal for remote control. The motor will be supplied from the factory with the correct accessory depending on what was ordered.

**Dial on Motor** - Turn the dial with your fingers to adjust. To increase the speed, rotate the dial clockwise. To decrease the speed, rotate the dial counterclockwise. Turning the dial full Counter Clock Wise will turn the motor off.

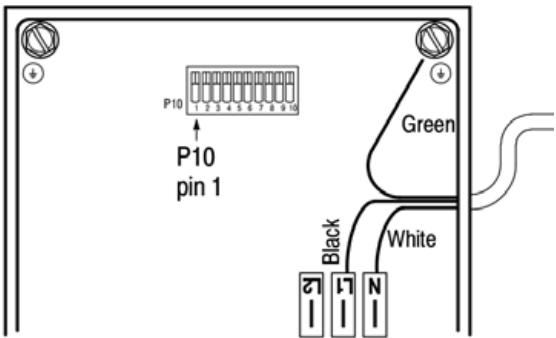
**0-10 VDC Signal** - From 0-1.9V, the motor will be off, and will operate in the 2-10V range. This motor does not require 24V power for operation.

0-10V Analog Input Connection	
Red	+ 0-10 VDC
White	Ground

**Wiring**

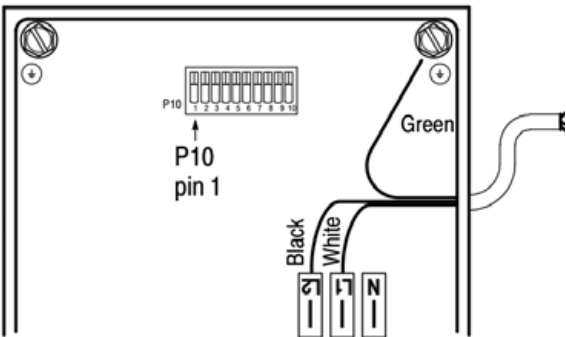
1. All high and low voltage wiring connections are made inside the motor control box at the factory. Normally, there is no reason to enter the control box of the motor. If there is a need to enter the control box, disconnect power and wait at least five minutes to allow the capacitors to discharge.
2. The motors are factory wired for the ordered voltage. If the factory wired voltage does not match the desired voltage, the voltage can be changed, with exception of the 2HP motor (310420), which is 208-240V only.

**115V:** Connect 115 VAC to L1, connect Neutral to N. The L2 terminal remains empty. Connect ground to grounding stud.



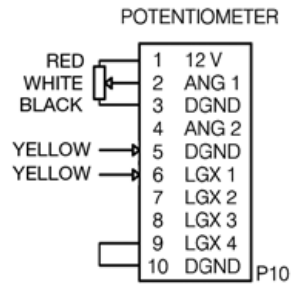
115V Connection inside control box

**208-240V** - Connect line voltage to L1 and L2. The N terminal remains empty. Connect the ground to the grounding stud.



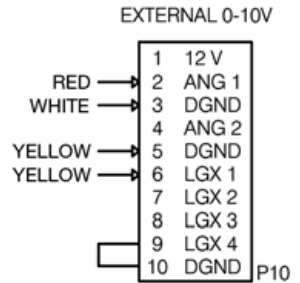
208-240V Connection inside control box

**Dial on Motor** - the dial is factory-wired into the low voltage terminal block inside the control box. The wires are connected as shown.



Dial on motor connection inside control box

**0-10 VDC Signal** - a two-wire pigtail is factory-wired into the low voltage terminal block. The wires are connected as shown.

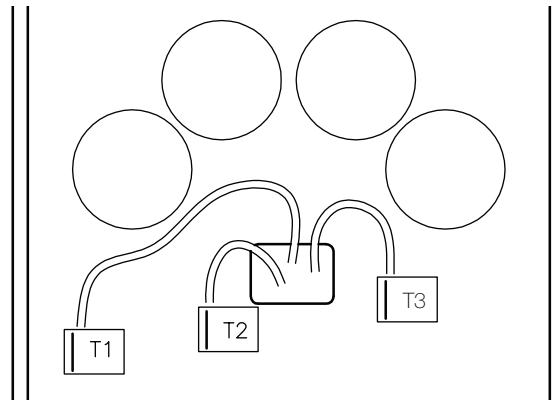


0-10 VDC signal connection inside control box

If the motor needs to be tested before the 0-10 VDC signal is available, a jumper can be placed between terminals 1 and 2. This will force the motor to run at full speed.

**Motor Rotation**

To reverse the rotation of the motor, swap any two of the red, black and blue wires connecting the control board to the motor at terminals T1, T2 and T3. Note that motor warranty is void if motor is rotating in the wrong direction. See fan instruction manual for correct rotation direction.



Rotation selection wires inside control box



## Troubleshooting

These motors have a diagnostic red LED on the circuit board inside the control box, or on the exterior of the control box, that will be solid (not flashing) when power is applied to the motor and the motor is operating normally. The LED may be solid even if the motor is not spinning, such as when power is applied but the motor may be commanded to be off with a 0-1.9V VDC signal.

1. If external LED is not present, to view the status of the LED the control box cover must be removed while power is applied to the motor. If the control box cover is removed while power is applied, extreme care must be taken not to touch any of the components inside the box.
2. If a fault occurs, the LED will blink a specific number of times to identify the fault that has occurred. The fault indications are as follows:

Number of Blinks	Indicated Fault
2	Hardware Fault
3	Overvoltage
4	Undervoltage
5	Communication Error
6	Sync Loss
7	Spin Fault
8	Motor Overload
9	Motor Over Temperature

3. When the LED is blinking, it will consecutively blink from 2 to 9 times, followed by a pause, and repeat the blink sequence. It is best to count the number of flashes 2 or 3 times to ensure accuracy.
4. Under most fault conditions the motor will automatically restart. If a motor overload fault occurs more than 10 times in one hour, the motor will shut down and require a power cycle to reset.
5. If the fault persists, consult the factory.

## Motor does not operate

1. Verify the motor is wired for the correct voltage.
2. Verify that the dial on the motor is properly connected to the control board - or - verify that the 0-10 VDC wires are properly connected to the control board.
3. Verify that the Status LED is solid red.
4. Verify that a jumper is in place between terminals 9 and 10. The motor will not run without this jumper in place.
5. Verify that the two yellow wires coming from the motor are in place on terminals 5 and 6.

## Controls: Operation, Wiring and Troubleshooting Remote Dial/Touch Remote and 2-Speed Control

### Remote Dial

Installation Overview: The remote dial is provided with the fan, shipped loose for remote installation. It also includes a factory mounted 24 VDC transformer.

1. Disconnect power to the fan.
2. Identify where the remote dial will be mounted.
3. Mount a standard single-gang 2x4 junction box.
4. Run a 3-wire control cable from the remote dial to the fan motor compartment. The maximum distance from the fan to the remote dial is 100 feet. If a greater distance is required, signal loss may occur and cause the fan to operate erratically.
5. Connect control cable to transformer mounted inside fan motor compartment. Connect control cable to remote dial.
6. Secure remote dial to 2x4 junction box.

### Remote Dial with Min/Max Setting

Remote dials (PN 385803) are capable of setting minimum and maximum voltage limits. Setting voltage limits will require a multi-meter. To set a voltage span:

1. Install and wire remote dial as previously instructed.
2. Install multi-meter probes into the red (0-10v) and black (ground) connectors.
3. To set maximum voltage limit, apply power to the motor, transformer and remote dial. With remote dial set to zero (0), hold the Upper Limit button down and turn the dial until the desired voltage is displayed on your multi-meter. Release button to save max voltage setting.
4. To set lower voltage, turn remote dial back to zero (0). Hold down Lower Limit button while turning dial to desired voltage on your multi-meter. Release button to set minimum voltage limit.
5. To reset to default (0-10v) limits, hold both Upper and Lower limit buttons down simultaneously until the LED indicator lights up. Then release buttons and default levels will be restored.

**NOTE:** Upper voltage limit must be set prior to setting lower voltage limit. Upper and lower limits can only be within 0.5v of each other.

## Touch Remote

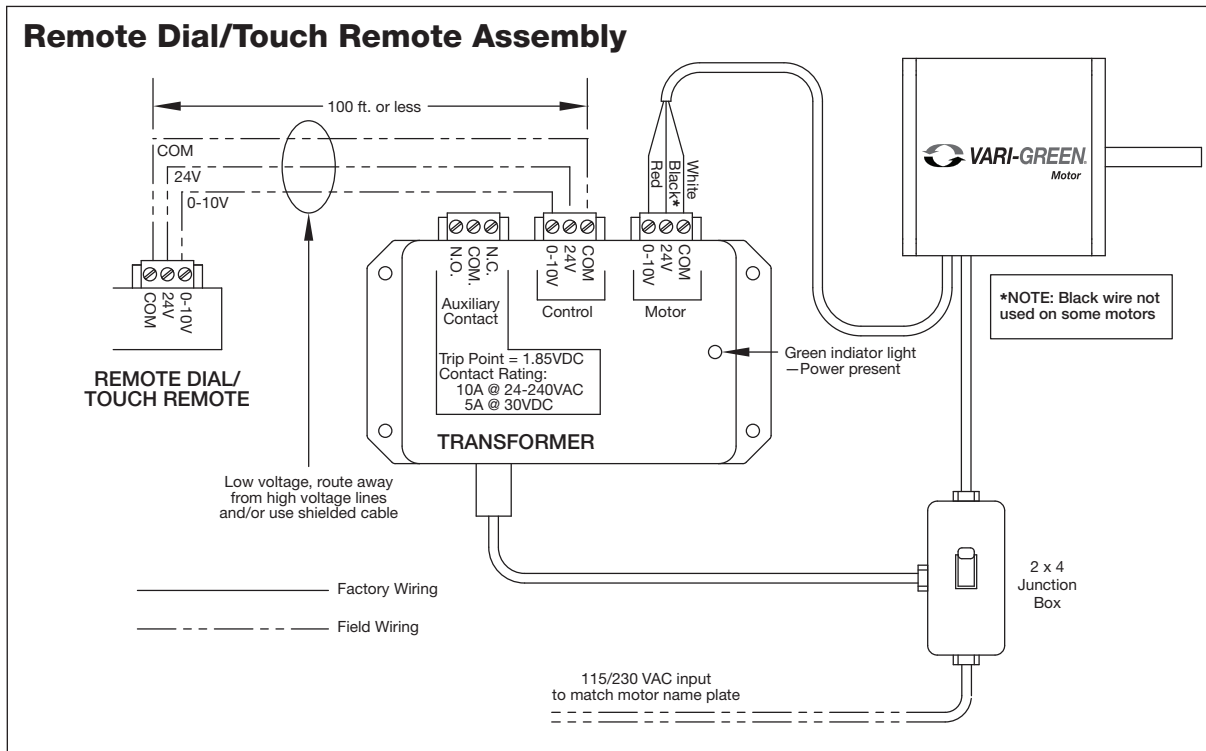
Follow installation instructions for remote dial above. After power is applied to the system, operate as follows:

1. Touch power button to turn fan on.
2. Touch UP/DOWN arrow to increase/decrease speed.
3. Subsequent touches of the power button will start the countdown timer of 90, 60, 30 or 10 minutes.
4. LED's will turn off after a period of inactivity.
5. To lock/unlock buttons, hold the UP and DOWN arrows for 3 seconds. When locked, the power button will light up red.

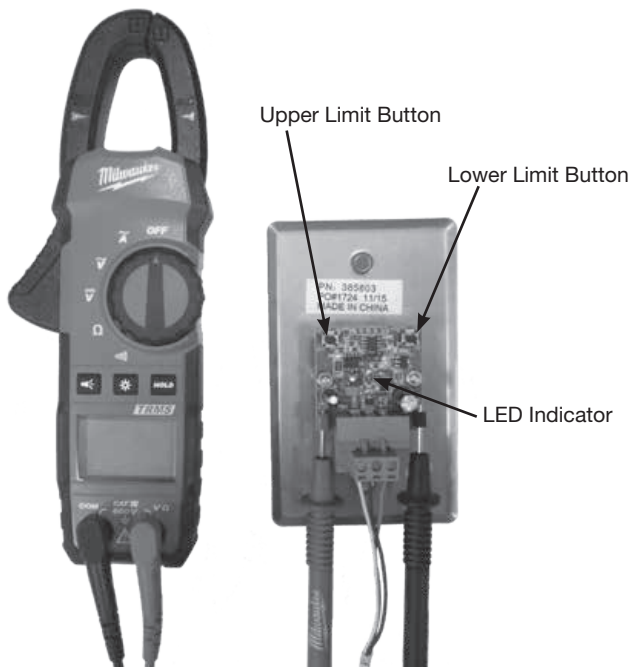
Other Vari-Green® controls, such as the Constant Pressure and Air Quality families of controls, have their own manual that ship with the controller. They can also be found on Greenheck.com. See table on page 11 for document numbers.

### CAUTION

Even though the motor may not be operating, high voltage power may still be present at the motor. Make sure to disconnect power to the fan before servicing.



## Remote Dial with Min/Max Setting

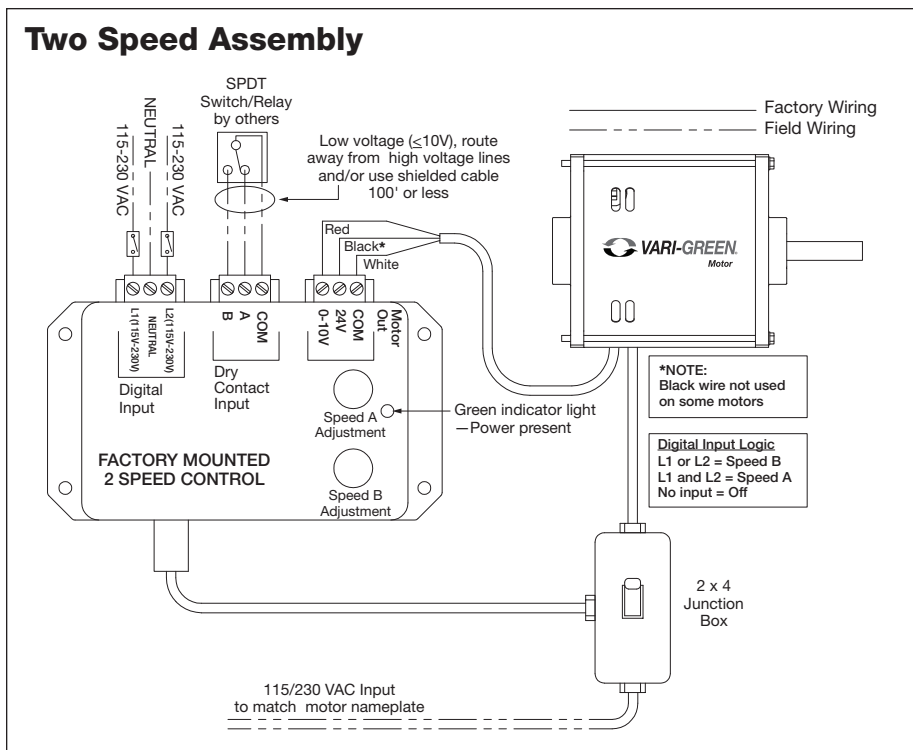


## Troubleshooting - Remote Dial/Touch Remote

### Remote Dial does not adjust motor RPM

1. Check voltage to ensure the motor and transformer are receiving the correct line voltage.
2. Check voltage at the remote dial. 24 VDC should be present across the 24V and COM terminals. 0-10 VDC should be present across the 0-10V and COM terminals.
3. Verify all of the connections at the transformer and make certain that they are secure.
4. Touch remote: Verify that the touch remote is unlocked.
5. To reset to default (0-10v) limits, hold both Upper and Lower limit buttons down simultaneously until the LED indicator lights up. Then release buttons and default levels will be restored.

Terminals	Desired Voltage
24V-COM	24 VDC Nominal
0-10V-COM	0-10 VDC (varies with dial position)



## Two Speed Control

Installation Overview: The two speed control is factory mounted to the fan and may be set to provide any two speeds the application requires. It also includes a 24 VDC transformer. A green LED will be illuminated when the 2-speed control is powered.

1. There are two methods of toggling between speed A and speed B:

a. **Dry contact input** - this utilizes an external switching device such as a relay or SPDT switch to toggle between the two speeds.

- Connect terminal "A" to "COM" for speed A.
- Connect terminal "B" to "COM" for speed B.

If no contact is made between either terminal the motor will be off.

b. **AC digital input** - this input allows an AC voltage signal to be fed directly into the 2-speed control to change speeds.

- Send 115-230V AC to L1 **OR** L2 for speed B.
- Send 115-230V AC to L1 **AND** L2 for speed A.

If no voltage is applied to either terminal, the motor will be off.

c. **DO NOT CONNECT BOTH DRY CONTACT AND DIGITAL INPUTS SIMULTANEOUSLY.**

2. To test fan operation before the external control devices are installed, a jumper wire can be connected between the COM and A or B terminal on the dry contact input for fan operation.

## Troubleshooting - Two Speed Control

1. Check all wiring connections to ensure they are correct and secure.
2. Verify AC line voltage is present at the motor and 2-speed control.
3. Verify 24 VDC is present at the 24V and COM terminals of the "Motor" terminal block.
4. Measure DC voltage between the 0-10V and COM terminals of the "Motor" terminal block. This voltage should match the dial position of the active dial.
  - a. If using dry contact input - ensure contact closure is connecting the proper terminals.
  - b. If using AC digital input - disconnect connector from 2-speed control and measure voltage between L1 and Neutral or L2 and Neutral.



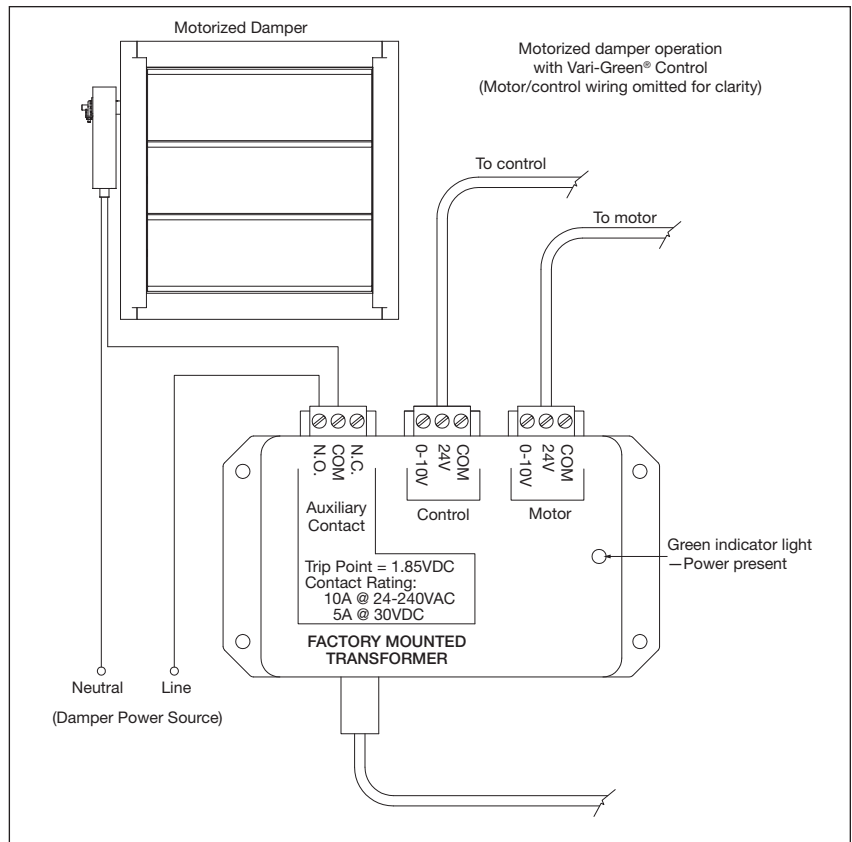
## Motorized Backdraft Damper Control

The available factory mounted transformer (PN 385253) has the ability to signal a motorized back draft damper to open/close as the motor starts/stops.

A N.O./N.C. set of contacts is provided which will change state when above or below a control voltage of 1.85 VDC. See wiring diagram for example.

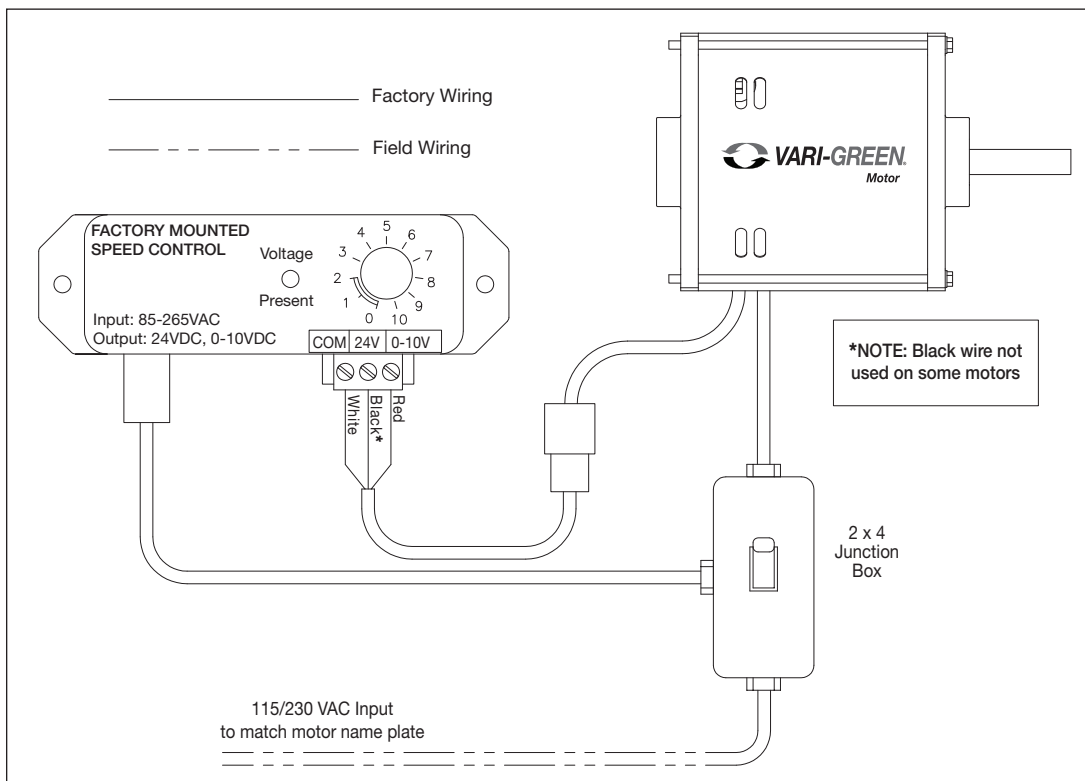
### Contact Rating:

- 10A @ 24-240 VAC
- 5A @ 30 VDC



## Fans Where Dial on Motor is Not Accessible

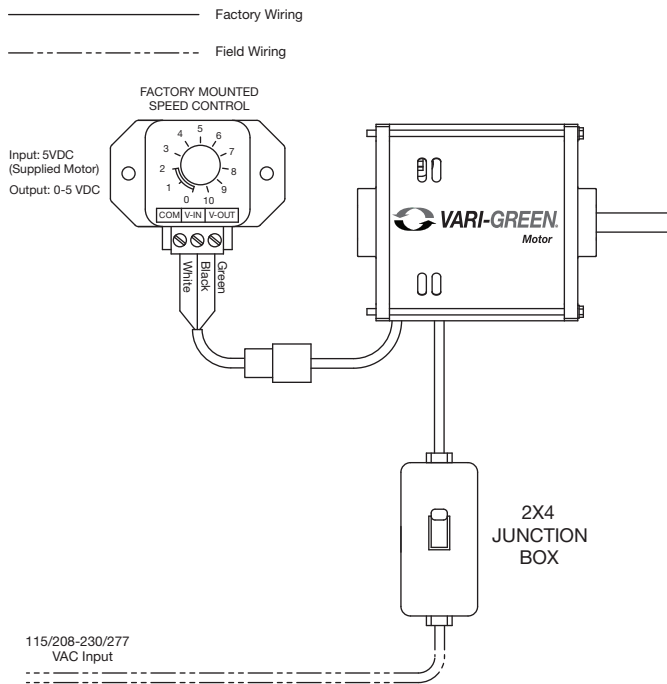
A control is available to mount on the outside of a fan where the dial on motor may be difficult to access (model SQ). This control is powered by the line voltage entering the fan and will send 24 VDC and 0-10 VDC to the motor. Control Part Number is 385611



## Alternative: Fans Where Dial on Motor is Not Accessible

A control is available to mount on the outside of a fan where the dial on motor may be difficult to access (model SQ). In many cases, the tri-voltage platform of VG motors can work off either 0-5V signal or a 0-10V signal. This control is powered by 5VDC output signal wire of the motor and will send a 0-5VDC to the motor to adjust the speed. Control PN 386512.

Control	Compatible Motor P/N
386512	328447, 319356, 328128, 319357, 328129, 318013, 328130, 320587, 320588, 328131, 320589, 328132, 320590, 328133, 328173, 328174



## Multiple Motors on One Control

Refer to the table below for the recommended number of motors to be driven from one controller. Note that the controllers do not have the ability to distinguish between more than one motor, therefore all motors will receive the same control voltage. Control voltage must be wired in parallel to all motors.

Controls	Max. Motor Quantity
Remote Dial	4
2-speed	6
Constant Pressure/Airflow	4
Temperature/Humidity	2
VOC	2

## Maintenance

Vari-Green® motors use brushless technology with sealed bearings. No routine maintenance is required other than keeping any debris from accumulating on the motor and controls.

## Other Vari-Green® Control Instruction Manuals

Description	Document Number
Indoor Air Quality - VOC	475407
Indoor Air Quality - Temperature/Humidity	475573
Constant Pressure Control	474766
Generation 2 Constant Pressure/Airflow Control	479653

## Maximum RPM Table

This table will show the available motor and fan combinations with the correlating maximum motor RPM for each combination.

CUE/CW	Max RPM	Motor HP
60, 70	1725	1/15
80, 90	1725	1/10
95	1725	1/6
99	1725	1/4
101	1725	1/4
101HP	1725	1/4
	2500	1/2
121	1400	1/4
	1725	1/2
131	1200	1/4
	1450	1/2
	1725	3/4
141	1000	1/4
	1300	1/2
	1550	3/4
	1725	1
141HP	1450	1/4
	1725	1/2
	2200	3/4
161	1000	1/2
	1200	3/4
	1300	1
	1725	2
161HP	1300	1/2
	1650	3/4
	1725	1
180	875	3/4
	1000	1
	1325	2

SQ	Max RPM	Motor HP
60, 70	1725	1/15
80, 90	1725	1/10
95	1725	1/6
97	1725	1/4
	2500	1/2
98	1725	1/4
	2200	3/4
99	1725	1/4
	2200	3/4
100	1725	1/4
120	1725	1/2
130	1725	3/4
130HP	1250	1/4
	1450	1/2
	1950	3/4
140	1500	3/4
	1725	1
140HP	1100	1/2
	1450	3/4
	1725	1
160	1140	3/4
	1300	1
	1725	2
160HP	850	1/2
	1000	3/4
	1600	1
	1725	2

USF	Max RPM	Motor HP
4	1660	1/4
	1725	1/2
	1725	3/4
6	1660	1/4
	1725	1/4
	1725	1/2
	1725	3/4
7	1140	1/4
	1725	1/2
8	1660	1/4
	1725	1/2
	1725	3/4
10	1660	1/4
	1725	1/2
	1725	3/4
13	1370	1/4
	1725	1/2
	1725	3/4
15	1110	1/4
	1400	1/2
	1600	3/4
16	910	1/4
	1150	1/2
	1320	3/4
18	740	1/4
	940	1/2
	1050	3/4

LD/LDP	Max RPM	Motor HP
80-90	1725	1/10
95	1725	1/6
100	1725	1/4
120	1725	1/2

SP/CSP	Max RPM	Motor HP
510	1275	1/6
710	1450	1/4
700	1750	1/3
1050	1225	1/3

G	Max RPM	Motor HP
60, 70	1725	1/15
80, 90	1725	1/10
95	1725	1/6
97-99	1725	1/4
103	1725	1/4
103HP	1725	1/4
	2500	1/2
123	1200	1/4
	1725	1/2
133	1150	1/4
	1550	1/2
	1725	3/4
143	900	1/4
	1200	1/2
	1300	3/4
	1725	1
143HP	1500	1/4
	1725	1/2
	2200	3/4
163	750	3/4
	1200	1
	1725	2
183	900	3/4
	1000	1
	1325	2

SE1/SS1	Max RPM	Motor HP
8-440*	1725	1/15
8-440*	1725	1/10
10-440*	1725	1/15
10-440*	1725	1/6
12-426	1725	1/4
12-432	1725	1/4
12-436	1725	1/4
14-432	1725	1/4
14-436	1725	1/2
14-440	1725	1/2
16-421	1725	1/2
16-426	1725	1/2
16-428	1725	3/4
16-436	1725	3/4
18-424	1725	3/4
18-429	1725	3/4
20-420	1725	1

**\*SE1 Model Only**

## 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, either on the specific product page or in the literature section of the website at 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).



## Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Report any damaged equipment to the shipper immediately. 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!

### Removal of Original Rectangular Outlet:

1. Remove the four (4) sheet metal screws that hold the duct connector to the blower box assembly on the discharge side. Refer to Figure 1.

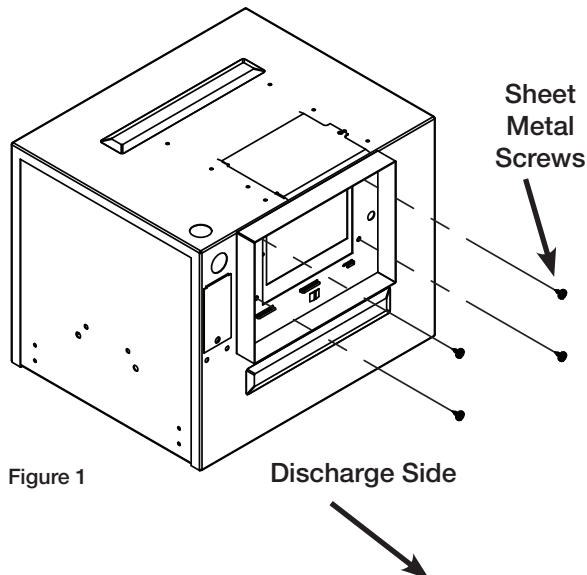


Figure 1

### Attachment of New Round Outlet:

2. Attach the round duct connector to the blower box assembly using the four (4) original sheet metal screws. Refer to Figure 2.

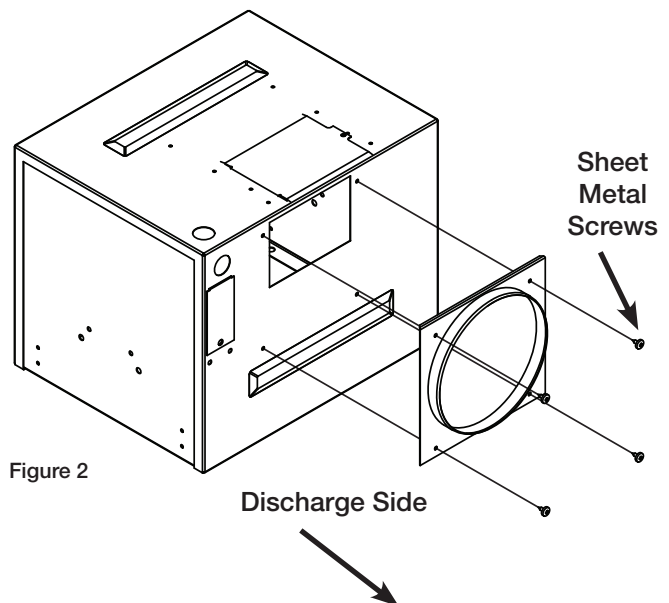


Figure 2

### Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

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## 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!

This document is for transformer/2-speed control-  
ler mounting only. Reference the Vari-Green Motor  
Document No. 473681 for wiring details.

### NOTE

There will be extra hardware and parts included  
with this kit that may not be used for your specific  
application.

### Section 1

For Motor Part Numbers				
309025	309026	310107	310306	310307
310359	311377	311388	311731	311812
312359	312360	312361	312362	312619
313233	313234	313235	314534	314945
316495	316496	316497	316498	316499
317706	317707	317708	317709	

### Side of Motor Mounting (Fig. 1)

For use on G, CUE, CW, LD, and LDP units

- Fasten transformer to mounting bracket via (4) supplied screws (#10 x 1/2).
- Bend top of bracket away from transformer, by hand, along laser stitched line, forming a 90 degree angle.
- Attach bracket to top of motor via (2) motor thru-bolts. Fasten down with supplied nuts.

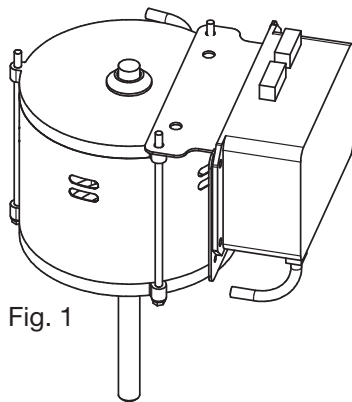


Fig. 1

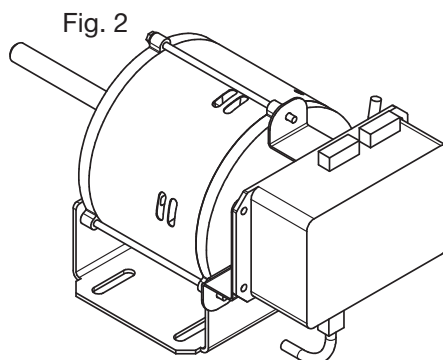


Fig. 2

### End of Motor Mounting (Fig. 2)

For use on SE/SS Sidewall Prop units and SFD units

- Fasten transformer to mounting bracket via (4) supplied screws (#10 x 1/2).
- Attach bracket to end of motor via motor thru bolts. Fasten down with supplied nuts.
- For a SFD make sure transformer is mounted under weatherhood.

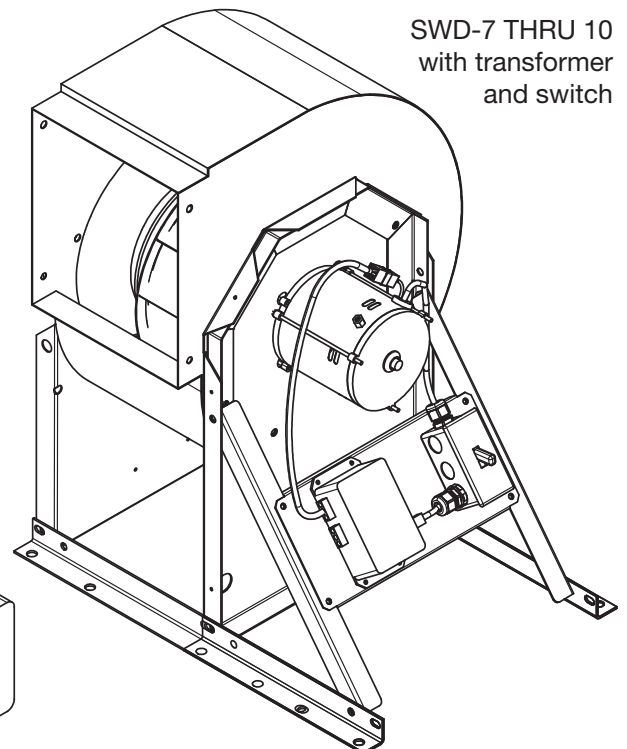
### Fan Housing Mounting

For use on SQ units

- Fasten transformer directly to outside of unit via (4) supplied screws (#10 x 1/2).

For use on SWD units

- Fasten transformer to Drive Frame Angles using the pre-existing holes and the (4) supplied screws (#10 x 1/2)



SWD-7 THRU 10  
with transformer  
and switch

## Section 2

### For Motor Part Numbers

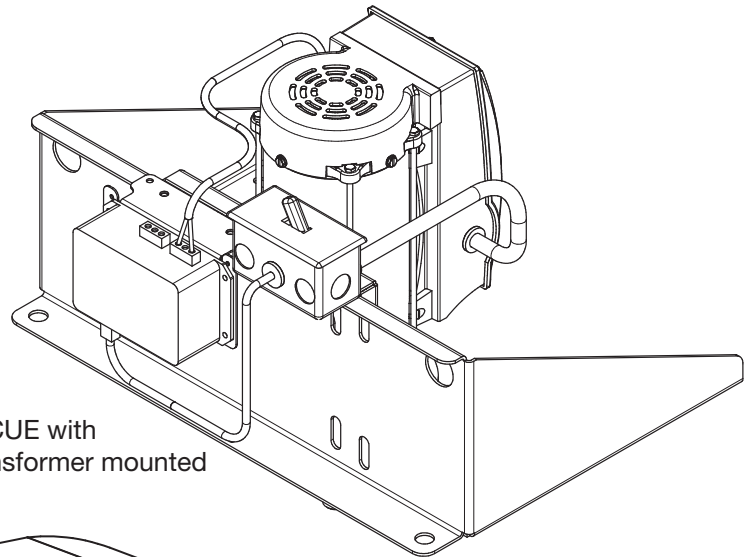
310420

311156

### Drive Frame Mounting

For use on G, CUE and CW units

- Fasten transformer to mounting bracket via (4) supplied screws (#10 x 1/2).
- Bend top of bracket away from transformer, by hand, along laser stitched line, forming a 90 degree angle.
- Attach bracket to drive frame angles, using the pre-existing holes and the (2) supplied screws (#10 x 1/2).



G/CUE with transformer mounted

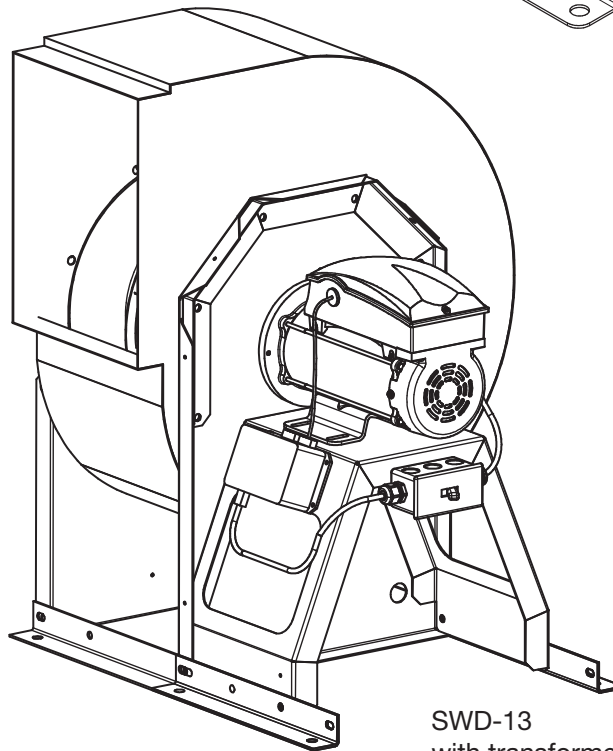
### Fan Housing Mounting

For use on SQ units

- Fasten transformer directly to outside of unit via (4) supplied screws (#10 x 1/2).

For use on SWD units

- Fasten transformer to Drive Frame Angles using the pre-existing holes and the (4) supplied screws (#10 x 1/2).



SWD-13 with transformer and switch

## Our Commitment

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Specific Greenheck product warranties are located on [greenheck.com](http://greenheck.com) within the product area tabs and in the Library under Warranties.

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).



# WALL-MOUNT SPEED CONTROL

## Application

- Motor Types
  - Shaded Pole
  - Permanent Split Capacitor
  - Universal
- Loads
  - Equipment specifically marked for use with a solid state controller.

## Models

6 Amp, 120 Volt	PN: 385031
6 Amp, 220-240 Volt	PN: 380896
6 Amp, 277 Volt	PN: 382136
8 Amp, 120 Volt	PN: 381907
8 Amp, 220-240 Volt	PN: 385032

## Wiring

**IMPORTANT**

The equipment must be properly grounded. Be sure to ground control using the green wire.

**WARNING**

Power must be turned off before wiring. Connect the control in series with the motor and line voltage.

**CAUTION**

Never connect the Speed Controller across line voltage.

## Mounting

- Use a 2 inch deep standard electrical box.
- Secure control with the outer bracket tabs.

## Minimum Speed Adjustment

**WARNING**

This device is supplied with a minimum speed adjustment feature. Ensure that this device operates with the sufficient torque to prevent stalling while at its lowest speed control setting.



**WARNING**

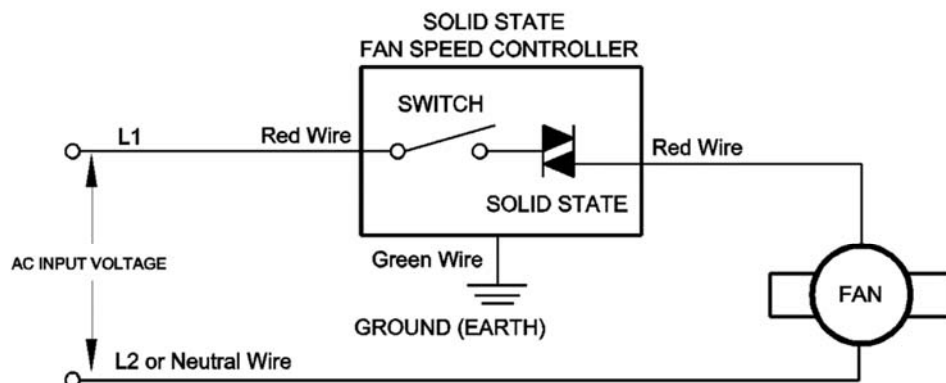
Installation should be completed by a qualified electrician in accordance with the National Electrical Code and any local applicable codes.

**CAUTION**

Improper wiring may result in personal injury or property damage. The manufacturer is not responsible for damage to, or failure of the unit caused by faulty wiring.

Adhere to all warnings and rating limitations included on this device.

## Connection Diagram



FSC6-120 (GPN: 382278) – 115Vac 50/60Hz  
 FSC6-230 (GPN: 380896) – 230Vac 50/60Hz  
 FSC6-277 (GPN: 382136) – 277Vac 50/60Hz

## 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!



Controller with  
Integral Transducer



Controller with  
Remote Transducer

Remote  
Transducer



### Precautions and Warnings

To prevent injury and property damage, follow these instructions. Failure to adhere to installation/operation procedures and all applicable codes may result in hazards as indicated by warning codes outlined below:

#### DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to limit to the most extreme situations.

#### WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

#### CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



This is the safety alert symbol. Read and follow instructions carefully to avoid a dangerous situation.



This symbol alerts the user to the presence of "dangerous voltage" inside the product that might cause harm or electrical shock.

### Safety Instructions

#### DANGER

Equipment can start automatically. Lockout/tagout before servicing.

#### CAUTION

As with all electrical products, read manual thoroughly. Only qualified, expert personnel should perform maintenance and installation. Contact the nearest authorized service facility for examination, repair, or adjustment. Do not disassemble or repair unit unless described in this manual; death or injury to electrical shock or fire hazard may result. Specifications and manual data subject to change. Consult factory for additional information.

#### DANGER



#### HAZARDOUS VOLTAGE

- Disconnect and lock out all power before installing or servicing equipment.
- This equipment may require locking out multiple power sources prior to service.
- Install and wire in accordance with all applicable local and national electrical and construction codes.

#### WARNING

**FAILURE TO FOLLOW THESE INSTRUCTIONS  
MAY RESULT IN DEATH OR SERIOUS INJURY.**



## Constant Pressure Control

The Greenheck Constant Pressure Control is designed to maintain a constant level of static pressure or airflow by automatically adjusting the speed of a fan or position of damper. The Constant Pressure Control output is compatible with the Vari-Green® Motor, many variable frequency drives (VFDs), or dampers with modulating actuators.

The Constant Pressure Control is available with duct or room mounted probes for static pressure control, as well as a pitot tube or Greenheck's AMS (Airflow Monitoring Station) for maintaining airflow. Common applications include:

- Multi-story
- Variable volume exhaust systems serving bathrooms
- Residential kitchen hoods or clothes dryers
- Room pressurization and filtered supply/exhaust where constant airflow is required as the filters become dirty

### Receiving

Upon receiving the control, 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 make notification of 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 Greenheck Representative. 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.

### 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 any 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 control 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.

## Removing from Storage

As controls are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion until the control goes into operation.

## Installation

### Parts Needed

- Control voltage wiring – 18-20ga recommended
- Pressure tubing – 1/4 inch (6mm)
- Fasteners for mounting
- Conduit fittings (1/2 inch (13mm) NPSM)

**Note:** Mounting hole pattern for controller and transducer on page 11.

### Controller – Integral Pressure Transducer

The controller with integral pressure transducer is a NEMA-4 rated enclosure. Mount the controller in a location where it can be accessed for programming and status viewing. The controller should be mounted in an environment where the temperature remains between 45° and 80° F. (7° and 27°C). This temperature range is due to the temperature compensation range of the integral pressure transducer. If the controller needs to be mounted in a location that will routinely exceed this range, the controller that accepts a remote transducer should be used.

The controller should be mounted with the hinge of the door on top. Keep in mind wiring and tubing lengths when selecting a location.

### Controller – Remote Pressure Transducer

The controller with remote pressure transducer is used for applications where the controller must be mounted in areas where the temperature may exceed the compensation range of the pressure transducer. Both the controller and remote pressure transducer are in a NEMA-4 rated enclosure. The pressure transducer should be mounted in an environment where the temperature remains between 45° and 80°F (7° and 27°C)

#### Maximum Recommended Distances

	Tubing	Wiring
Probe to Transducer	100 feet (30.5m)	N/A
Transducer to Controller	N/A	200 feet (61m)
Controller to Fan/Motor/VFD	N/A	100 feet (30.5m)

### Conduit Fittings

Connections - A stepped drill bit can be used to create openings in the conduit fittings. Take care to not damage the components inside the housing when drilling.

### Pressure Probes

A duct static, room static, 2-piece pitot tube and AMS are available from Greenheck. Other pressure probes may be used as well.

#### Duct Static Probe (FIG. 1)

The duct static probe must be located in the duct where

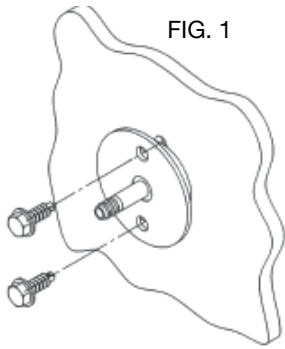


FIG. 1

you intend to control the static pressure. It should be located a minimum of 10' away from the inlet/outlet of the fan/damper to ensure stable operation.

The duct static probe is always connected to the "H" port of the control/transducer. The "L" port is the reference port and can remain open to atmosphere or plumbed to another location.

### Room Static Probe

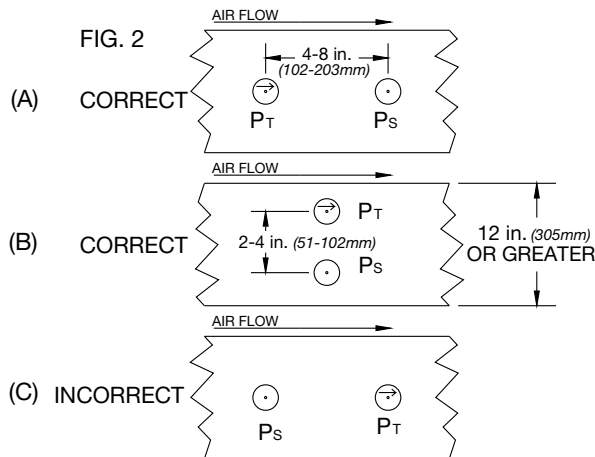
The room static probe is used to sample the pressure in an open space such as a room or hallway. The pressure controlled room must be connected to the "H" port. The "L" port is the reference port and can remain open to atmosphere or plumbed to another location.

Alternatively, if the controller/transducer is mounted in the space in which the pressure is to be controlled, the "H" port can remain open and the "L" port must be plumbed to another location for reference.

### 2-Piece Pitot Tube

The 2-piece pitot tube consists of a total pressure ( $P_T$ ) probe and a static pressure ( $P_S$ ) probe. These probes should be mounted in a straight section of ductwork located away from elbows or transitions. The total pressure probe can be identified by a 45 deg. cut at the end and the arrow identifying airflow direction on the mounting flange.

Examples for mounting the probes are shown in FIG. 2 (A, B, C).



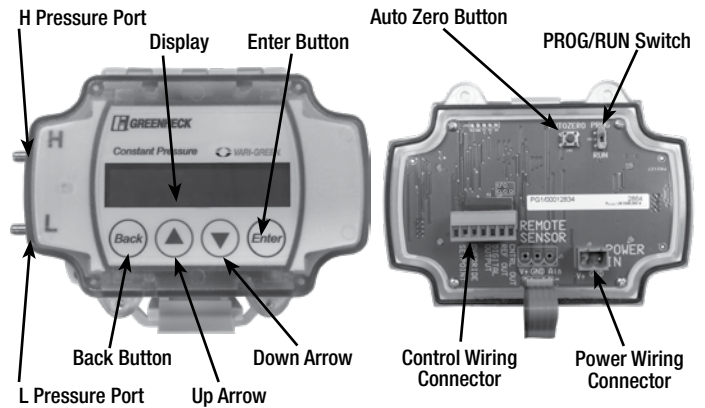
Connect the total pressure probe to the "H" port of the control/transducer and the static pressure probe to the "L" port.

### AMS (Airflow Measuring Station)

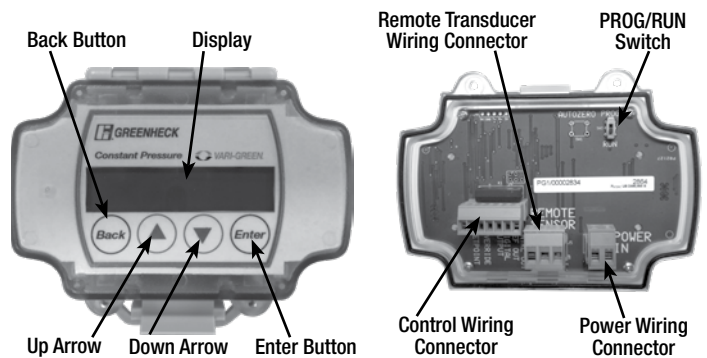
The AMS should be mounted away from elbows and transitions. Connect the "HIGH" port of the AMS to the "H" port and the "LOW" port of the AMS to the "L" port of the control/transducer.

## General Operation

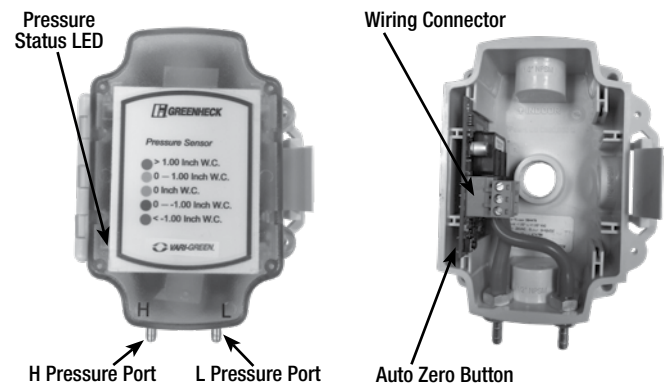
### Controller with Integral Transducer



### Controller with Remote Transducer



### Remote Transducer



### Display

The 2-line multi character display is backlit and is used to read the status of the control as well as setting parameters during programming.

### Touch Buttons

The buttons on the front of the control are touch sensitive, similar to the touch screen of a smartphone. Gloves must be removed to ensure it senses your finger. In RUN mode, the arrow buttons can be used to display different process variables. In PROG mode, the arrow, enter and back buttons are used to navigate the menus and set parameters. When using the arrows to set parameters, holding the button down will increase the scrolling speed.

## LED Status

A status LED exists on the control and remote pressure transducer.

### Control:

- Green = Normal Operation
- Pink = Programming/manual mode
- Flashing Yellow = Cutout timer is active
- Solid Yellow = Cutout mode is active
- Red = Override active

### Transducer:

- Red = >1.00 in.WC (>249Pa)
- Green = 0 – 1.00 in.WC (0-249Pa)
- Yellow = 0 in.WC (0Pa)
- Blue = 0 – -1.0 in.WC (249Pa)
- Pink = < -1.00 in.WC (249Pa)

## Pressure Transducer Auto Zero

The integral and remote pressure transducer includes an auto zero function. There is an auto zero button on the inside of the enclosure. If the controller is already installed, remove field tubing and connect the “H” and “L” port of the pressure transducer together with a short piece of tubing (Fig. 3). Press the auto zero button inside the enclosure. When the LED stops flashing, remove the tubing and reconnect the existing field tubing.

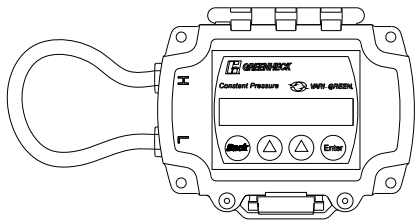


FIG. 3  
Pressure tubing connected for auto zero

## Inputs/Outputs

The controller contains the following inputs/outputs:

### Inputs:

- Remote Override (digital, dry contact)
  - Activating this input will force the Fan Speed output to a fixed % (adjustable)
- Remote Setpoint (analog, 0-10V or 2-10V)
  - A voltage signal can be sent to the control to remotely adjust the setpoint.
- Remote Transducer (analog, 0-10V)
  - Not available on controller with integral transducer.

### Outputs:

- Fan Speed (analog, 0-10V, 2-10V)
- Pressure/Airflow Reference (analog, 0-10V)
  - The output will send the actual pressure/airflow value to another device, such as BMS.
- Relay (digital, 0.5A rating)
  - The relay output will close when the Fan Speed output is above a set % (adjustable). Common uses are to signal a dirty filter in airflow mode or signal another device that the fan is being called to run.

## RUN/PROG Mode

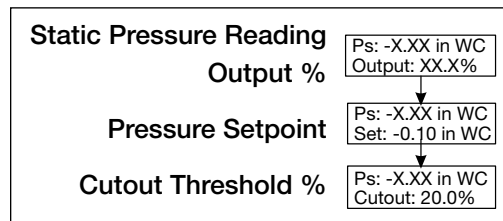
Run and Program mode are set using the selector switch on the inside of the control. Open the control enclosure to access the switch.

### RUN Mode

This control has two major functions – constant pressure mode and constant airflow mode.  
(Set using initial set up menu, page 6 & 7)

**Constant Pressure Mode** - the control will automatically adjust the speed of the fan to maintain a constant static pressure in a duct or room.

The display will show the following variables (touch the arrow buttons to change the display):



**Cutout** – The following definitions will be used to provide clarity in the explanation of the cutout feature.

#### Primary Fan:

The controller is connected to this fan.

#### Secondary Fan:

Any fan, other than the primary fan, that influences the pressure in the system

The cutout feature is available to turn the primary fan off in times of no demand from the secondary fans.

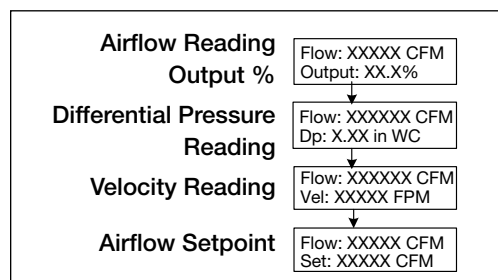
There are three parameters related to the cutout function: Cutout %, Cutout Delay Time and Return from Cutout Pressure Setpoint.

Cutout mode is activated when the fan speed output % is less than the cutout % setpoint. After the Cutout Delay Time has elapsed, the control will turn the output OFF.

A change in system pressure is needed to turn the output back ON. This value is adjustable to prevent false pressure fluctuations from turning the fan back on.

**Constant Airflow Mode** – the control will automatically adjust the speed of a fan to maintain a constant airflow rate in a duct.

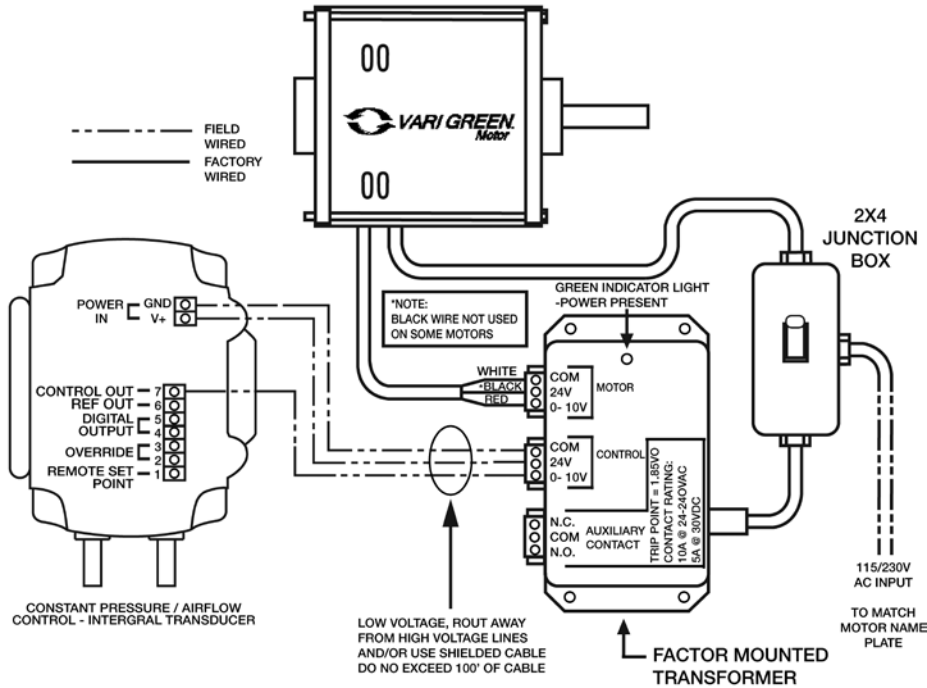
The display will show the following variables(touch the arrow buttons to change the display):



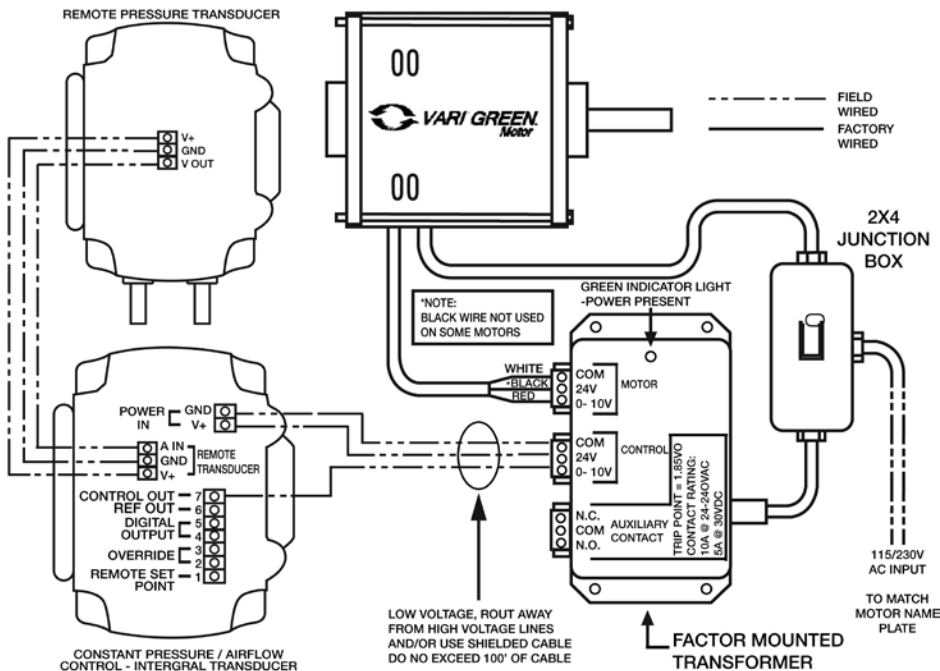
# Wiring Diagrams Overview

**Note:** These diagrams show connections when using a Vari-Green® motor and transformer. Other inputs/outputs on the control are not shown for clarity. See page 10 for more details.

## Integral Transducer:



## Remote Transducer:

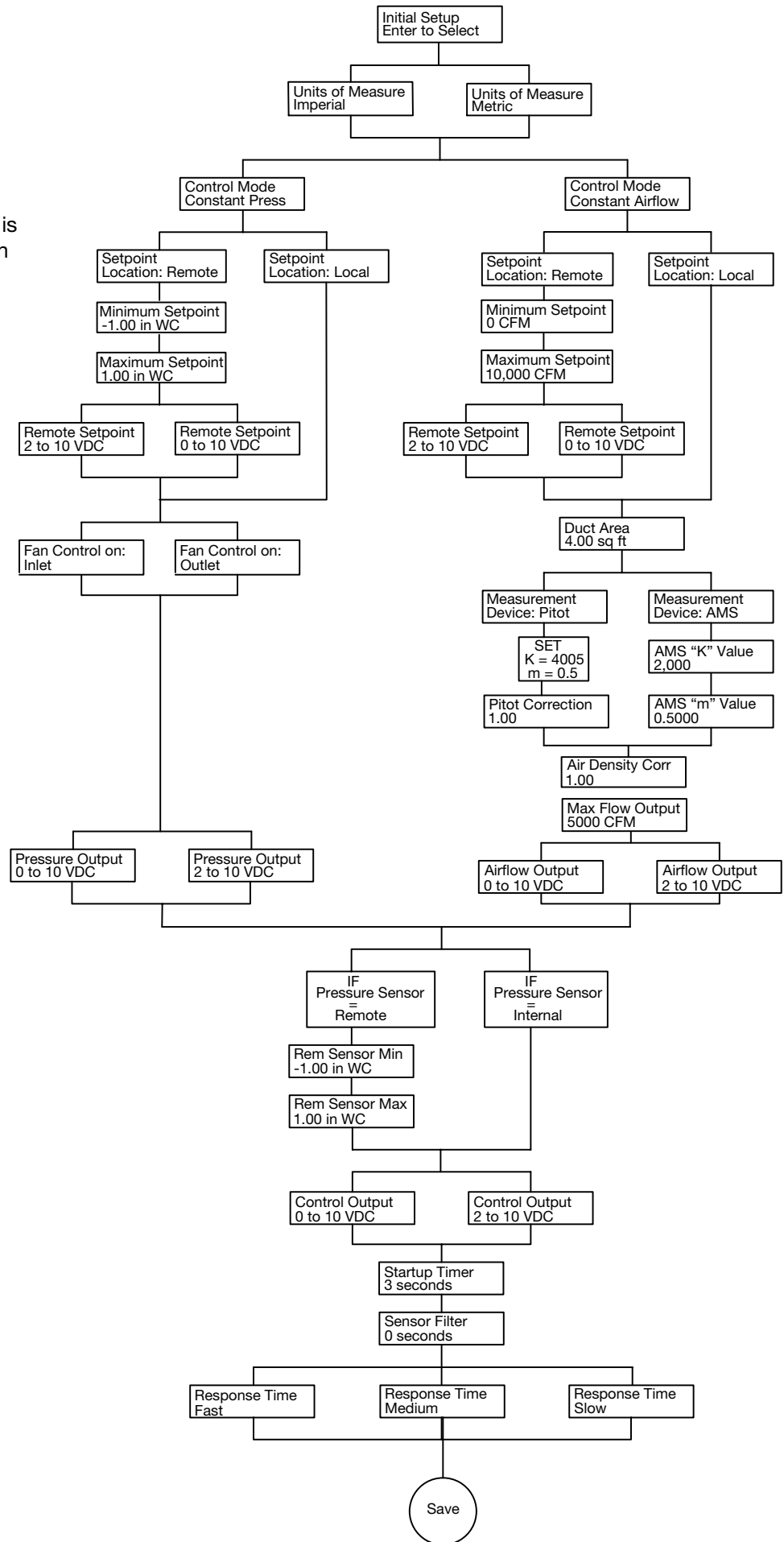
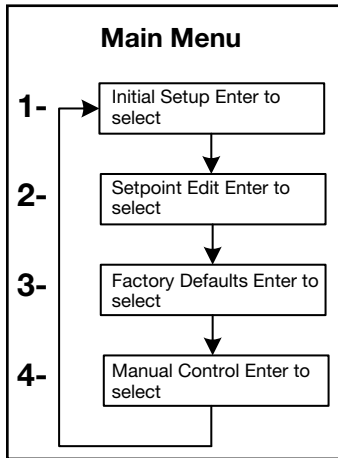


## PROG Mode:

Set the control to program mode to adjust initial settings and setpoints. A manual mode also exists to manually set the output of the control.

## Menu Structure

The structure of the program menu is shown below. A detailed description of the parameters follows the diagram.



**1 - Initial Setup** – select this menu to change settings related to the application of the control, such as:

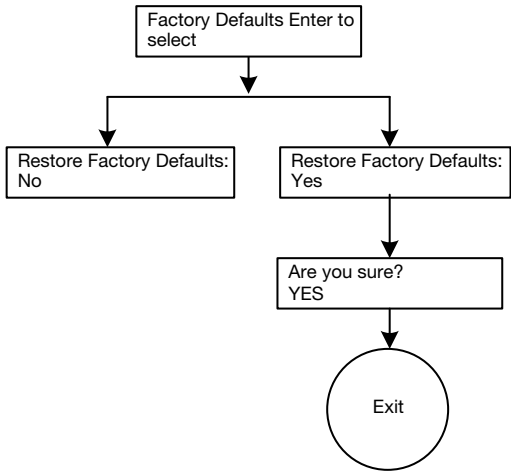
- Pressure or airflow mode
- Local or remote setpoint
- Fan inlet or outlet control

The **Setpoint Edit** menu (page 8) is then used to adjust the common setpoints, such as:

- Pressure or airflow mode
- Cutout settings
- Min/max output %
- Override, digital output %

<b>1 Initial Setup Menu Parameters</b>			
Parameter Name	Values	Default	Description
Units	Imperial, Metric	Imperial	Units used for settings within controller
Control Mode	Constant Pressure, Constant Airflow	Constant pressure	This sets the main function of the control.
Setpoint Location	Local, Remote	Local	Determines where the pressure or airflow setpoint will be set. If local, set using the setpoints menu. If remote, connect a 0-10V signal to remotely set the setpoint.
Min Pressure/Flow Setpoint		Bottom end of pressure transducer span	This value will correspond to the minimum voltage (0 or 2V) from the remote setpoint signal. Only available when setpoint is set to [remote].
Max Pressure/Flow Setpoint		Top end of pressure transducer span	This value will correspond to a 10V signal from the remote setpoint signal. Only available when setpoint is set to [remote].
Remote Setpoint Voltage	0-10V, 2-10V	0-10V	Change this setting based on the signal for the remote setpoint. If 0-10V, 0V refers to the minimum setpoint. If 2-10V, 2V refers to the minimum setpoint. Only available when setpoint is set to [remote].
Fan Inlet/Outlet	Inlet, Outlet	Inlet	Set this parameter to match where the pressure probe is located in relation to the fan the control is controlling. Only available in [pressure] mode.
Duct Area	0-100 sq. ft (0-9.29 sq. m)	4 sq ft (0.37 sq. m)	Input the area of the duct where the pitot tube is located. If using an AMS, input the area from the AMS label. Only available in [airflow] mode.
Measurement Device	Pitot Tube, AMS	Pitot Tube	Select the measurement probe type being used. Only available in [airflow] mode.
AMS "K" value			When AMS is used, set to "K" value on AMS label. Only available in [airflow] mode.
AMS "m" value			When AMS is used, set to "m" value on AMS label. Only available in [airflow] mode.
Pitot Correction Factor	0.50 to 2.00	1.00	Corrects the airflow measurement for the airflow device being used. Adjust the value if using a pitot tube by others. Only available in [airflow] mode.
Air Density Correction Factor	0-5.00	1.00	Adjust this value to match the density of the air flowing through the system. Select the value from the table on page 11. Only available in [airflow] mode
Max Flow Output	0-100,000 CFM 0-m <sup>3</sup> /hr 169,901	500 CFM 8495 m <sup>3</sup> /hr	Sets the top of the span for the reference output in [airflow] mode. Adjust this setting to give more resolution to the remote airflow reading.
Pressure/Airflow Output	0-10V, 2-10V	0-10V	This sets the span of the reference output.
Remote Sensor Min Pressure		-1.00 in. WC (-249Pa)	Set this value to the minimum pressure value of the remote pressure transducer. Only available with remote pressure transducer model.
Remote Sensor Max Pressure		1.00 in. WC (249Pa)	Set this value to the minimum pressure value of the remote pressure transducer. Only available with remote pressure transducer model.
Control output	0-10V, 2-10V	0-10V	This value will change the span of the control output. Vari-Green motors use 0-10V.
Startup Timer	1-30 Seconds	3 Seconds	The control output will be set to the minimum value at startup for this amount of time.
Sensor Filter	0-10 Seconds	0	Adjust this value if the pressure reading is unstable. Increasing the value increases the stability of the pressure reading.
Response Time	Fast, Medium, Slow	Fast	This value adjusts the response time of the controller. Set to Medium or Slow if the fan is unstable/oscillating.

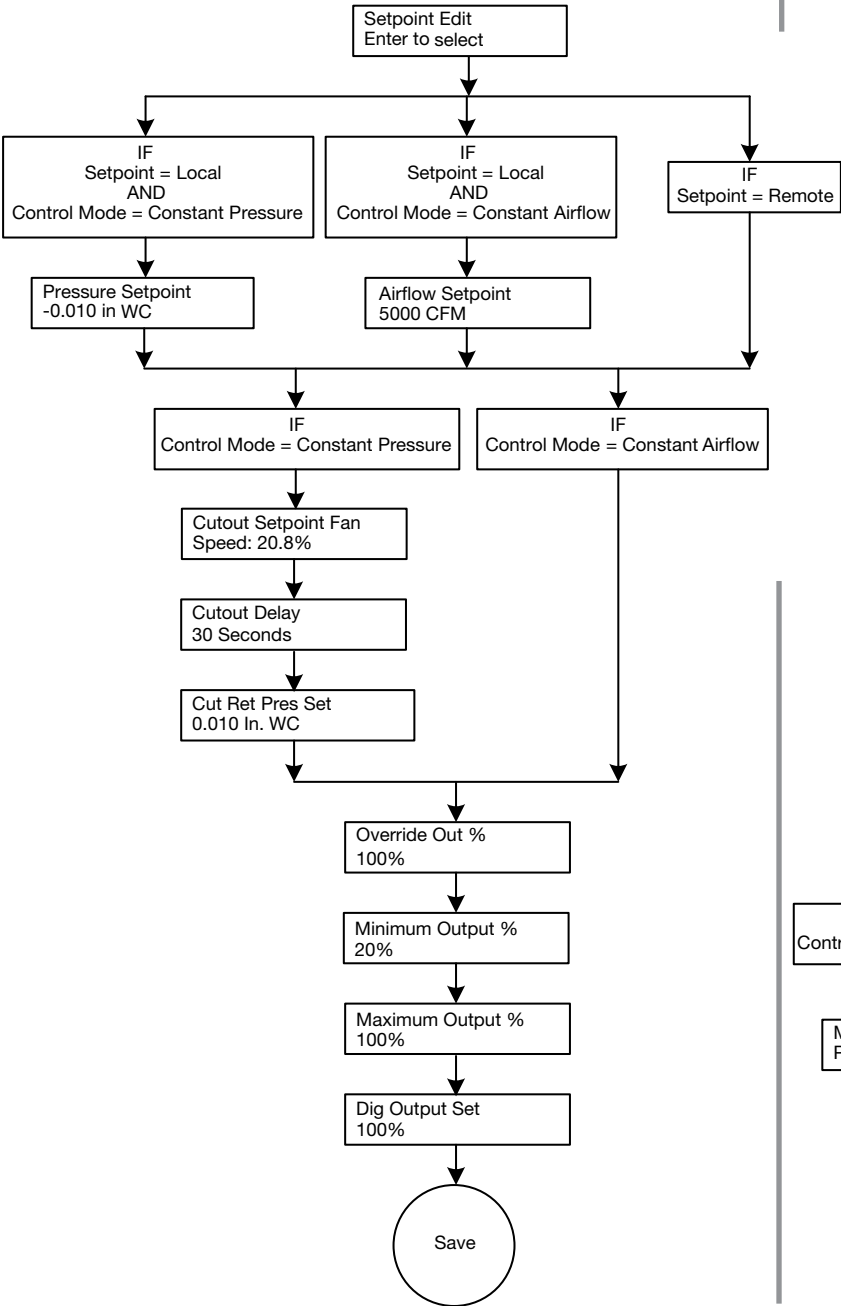
**3 - Factory Defaults** – select this to reset all parameters to their default values.



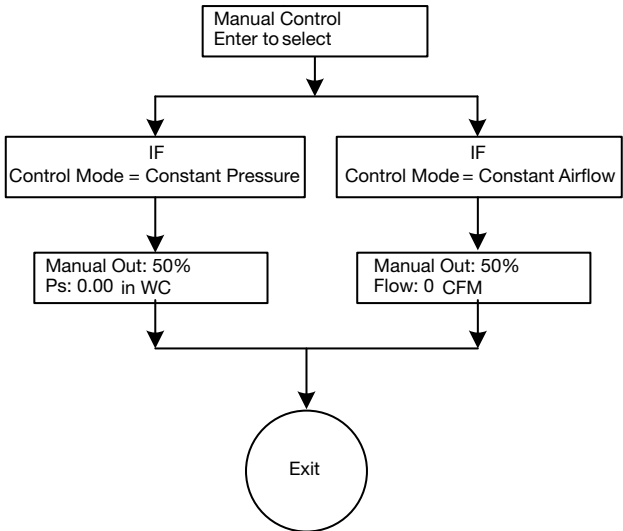
**2 - Setpoint Edit Menu Structure:**

The **Setpoint Edit** menu is then used to adjust the common setpoints, such as:

- Pressure or airflow mode
- Cutout settings
- Min/max output %
- Override, digital output %



**4 - Manual Control** – select this menu to operate the fan manually. Use the arrow buttons to adjust speed up and down. The display will also show the live pressure or airflow reading (depending on setting).



2		Setpoint Edit Menu Parameters	
Parameter Name	Values	Default	Description
Pressure setpoint	-1.00 to +1.00 in WC (-249 to +249Pa)	-0.10 in. WC (-24.9Pa)	Pressure setting the control will maintain. Only available in [Pressure Mode] <b>and</b> when [Local Setpoint] is selected.
Airflow setpoint			Airflow setting the control will maintain. Only available in Airflow mode and when [Local Setpoint] is selected.
Cutout % *	20 – 100%	20%	When the output value falls below this setting, the output will turn off after the delay time has elapsed. This is used to turn the primary fan off in times of no demand. Only available in [Pressure mode].
Cutout delay time	0-300 seconds	30 seconds	The output value must be below the cutout threshold for this amount of time before the fan will turn off. Only available in [Pressure mode].
Cutout return pressure setpoint	-0.250 in WC– 0.250 in WC (-62.27 to + 62.27Pa)	inlet mode: 0.01 in. WC (2.49Pa) outlet mode: -0.01 in. WC (2.49Pa)	This is the threshold that the secondary fan(s) output must pass for the primary fan to turn back on while in cutout mode. <ul style="list-style-type: none"> <li>Inlet Mode: Measured static pressure must be more <b>positive</b> than the return from cutout value.</li> <li>Outlet Mode: Measured static pressure must be more <b>negative</b> than the return from cutout value.</li> </ul> Only available in [Pressure mode].
Override output %	0, 20-100%	100%	When the digital input is closed, the fan output will be set to this value until the digital input is opened.
Minimum output %	20-100%	20%	Sets the minimum output value of the controller during [Run] mode.
Maximum output %	20-100%	100%	Sets the maximum output value of the controller during [Run] mode.
Digital output set %	20-100%	20% (pressure mode) 97% (airflow mode)	The digital (relay) output will close when the fan output is above this value. Useful as a dirty filter switch in [Constant Airflow] mode.

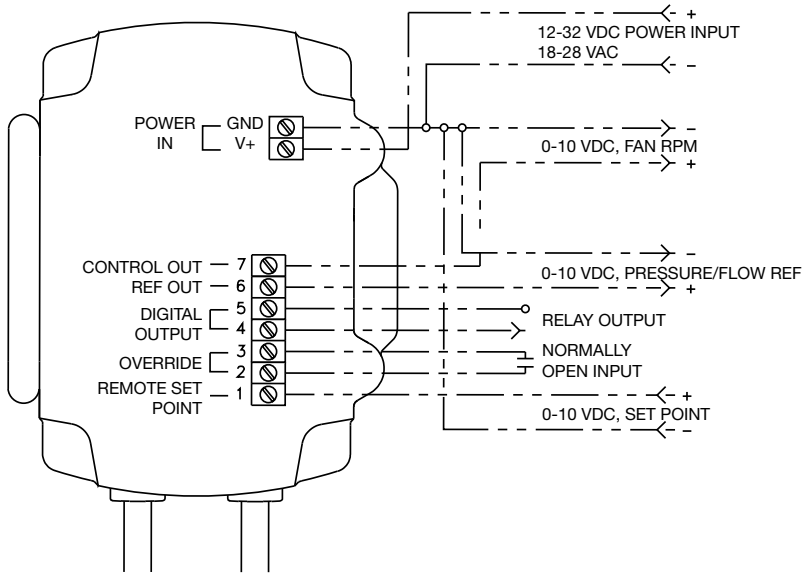
**\* More Information about the cutout feature:**

- The cutout % value is only valid for a discreet pressure set point. If the pressure setpoint is changed, the cutout % must be adjusted as well. Make sure the pressure setpoint is correct before continuing to set the cutout.
- Steps to determine cutout %:
  - o Verify pressure setpoint is correct and that the entire system is in the state where it is desired for the fan to turn off (such as no secondary fans operating).
  - o While viewing the display of the control, make sure that the Output % value is shown. If not, touch the up/down arrow on the control until the Output % value is shown.
  - o After the pressure has stabilized at the setpoint (usually 2-3 mins), take note of the Output %. The value will fluctuate slightly, a mental average is adequate.
  - o The recommended cutout value is 1-2 percentage points above the value noted in the previous step.
- o EXAMPLE: With no secondary fans in the system operating, the controller is running the primary fan at 43.5% to maintain the pressure setpoint. The cutout value is set at 45%. Now, any time that the output of the control drops below 45% (after the cutout delay time has elapsed) the fan will turn off.
- When the Output % is less than the Cutout %, the LED on the control will flash Yellow, signaling that the Cutout Delay Timer has started. When the Cutout Delay Time has elapsed, the LED will turn solid Yellow and the Output % will show OFF.
- Troubleshooting:
  - o If the fan will not turn off when desired, the cutout value is set too low.
  - o If the fan turns off when it is not desired, the cutout value is set too high.
  - o If the fan turns off as desired, but does not turn back on when desired:
    - The cutout return pressure setpoint can be adjusted up or down to match the system needs.
    - A pressure change must be present. If there is nothing upstream/downstream of the fan that will force a pressure change in the system then the fan will not come back on and the cutout feature should not be used.

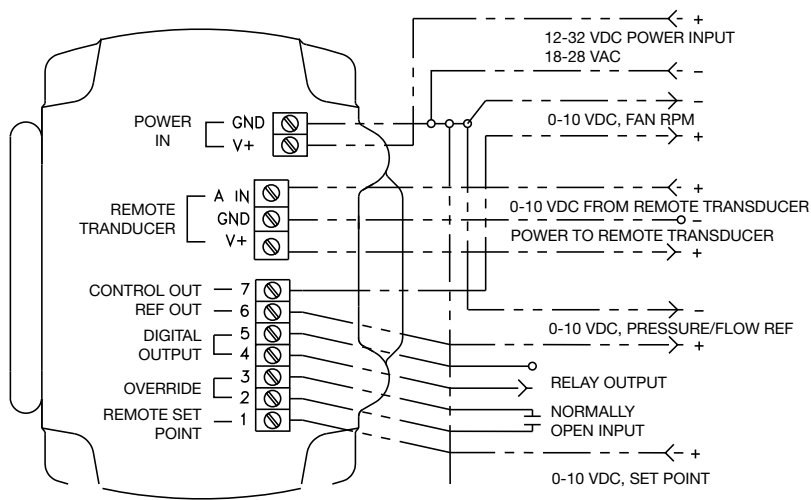


Note: Wiring diagrams show detail of all inputs/outputs available.

PRESSURE CONTROL DETAIL



PRESSURE CONTROL DETAIL, REMOTE TRANSDUCER



**Part Number Table**

Indiv. Part No.	Description	Photo
385604	Controller with Integral Transducer (+/- 1")	
385605	Controller for Remote Transducer	
385606	Remote Transducer (+/- 1")	
474748	Duct Static Pressure Probe	
474770	Room Static Pressure Probe	
475106	Duct Total Pressure Probe	



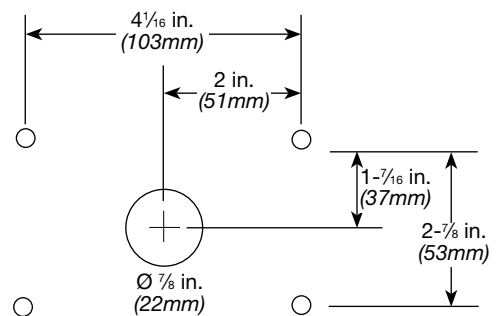
Duct Air Temp	Air Density Correction Factors													
	Elevation Dimensions in feet and (meters)													
°F (Deg. C)	0 (0)	500 (152.4)	1000 (304.8)	1500 (457.2)	2000 (609.6)	2500 (762)	3000 (914.4)	3500 (1066.8)	4000 (1219.2)	4500 (1371.6)	5000 (1524)	5500 (1676.4)	6000 (1828.8)	
-40 (-40)	0.79	0.81	0.82	0.84	0.85	0.87	0.88	0.9	0.92	0.93	0.95	0.97	0.99	
-20 (-29)	0.83	0.85	0.86	0.88	0.89	0.91	0.93	0.94	0.96	0.98	0.99	1.02	1.04	
0 (-18)	0.87	0.88	0.9	0.92	0.93	0.95	0.97	0.99	1	1.02	1.04	1.06	1.08	
20 (-7)	0.91	0.92	0.94	0.96	0.97	0.99	1.01	1.03	1.05	1.07	1.08	1.11	1.13	
40 (4)	0.94	0.96	0.98	1	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.16	1.18	
70 (21)	1	1.02	1.04	1.06	1.08	1.1	1.12	1.14	1.16	1.18	1.2	1.22	1.25	
80 (27)	1.02	1.04	1.06	1.08	1.1	1.12	1.14	1.16	1.18	1.2	1.22	1.25	1.27	
100 (38)	1.06	1.08	1.1	1.12	1.14	1.16	1.18	1.2	1.22	1.25	1.27	1.29	1.32	
120 (49)	1.09	1.11	1.13	1.16	1.18	1.2	1.22	1.24	1.27	1.29	1.31	1.34	1.37	
140 (60)	1.13	1.15	1.17	1.2	1.22	1.24	1.26	1.29	1.31	1.34	1.36	1.39	1.41	
160 (71)	1.17	1.19	1.21	1.24	1.26	1.28	1.31	1.33	1.35	1.38	1.4	1.43	1.46	
180 (82)	1.21	1.23	1.25	1.28	1.3	1.32	1.35	1.37	1.4	1.42	1.45	1.48	1.51	
200 (93)	1.25	1.27	1.29	1.32	1.34	1.36	1.39	1.42	1.44	1.47	1.49	1.53	1.55	

Specifications	
<b>Input Power:</b>	<b>Current Usage:</b>
12-32VDC, 18-28VAC	100 mA Max
<b>Output:</b>	<b>LCD Display:</b>
0-10VDC (PID Output)	Pressure, CFM, Output %
0-10VDC (Pressure or Flow)	<b>Control Modes:</b>
N.O. Digital (configurable)	Pressure (Direct and Rev. Acting)
<b>Input:</b>	Airflow (CFM) (M <sup>3</sup> /hr)
Override (Dry Contact)	<b>Mounting:</b>
<b>Setpoint Range:</b>	Four Ext. holes for #10 Screws
-1.00" to +1.00" WC (+/-249Pa)	<b>Enclosure Material:</b>
0-10,000 CFM (16.990 m <sup>3</sup> /hr)	UV-Resistant Polycarbonate, UL94V-0
<b>Accuracy:</b>	<b>Enclosure Rating:</b>
+/- 1.0% FS @ 80F	IP66, NEMA-4
<b>Temperature Compensation Range:</b>	Environmental Operating Range:
45 to 80°F (7 to 26°C)	-13 to 175°F (-25 to 79°C)
<b>Port Connection:</b>	0-95% RH non-condensing
1/4 inch (6mm) Tubing (1/8 to 3/16 inch ID) (3 to 5mm ID)	
<b>Burst Pressure:</b>	
1.5psi (either port) (10.342Pa)	

Units:	Imperial	Metric
Length	In. / ft.	mm / m
Flow	CFM	m <sup>3</sup> /hr
Pressure	In. WC	Pa
Velocity	FPM	m/hr

Assembly Part Numbers		
Description	Assembly P/n	Includes
Controller w/ Integral Transducer, 1 Duct Static Tap	872982	385604, 474748
Controller w/ Integral Transducer, 1 Room Static Tap	872983	385604, 474770
Controller w/ Integral Transducer, 2 Room Static Taps	872984	385604, 474770 (2)
Controller w/ Integral Transducer, 1 Duct Static and 1 Duct Total Tap	872985	385604, 474748, 475106
Controller, Remote Transducer, 1 Duct Static Tap	872986	385605, 385606, 474748
Controller, Remote Transducer, 1 Room Static Tap	872987	385605, 385606, 474770
Controller, Remote Transducer, 2 Room Static Taps	872988	385605, 385606, 474770 (2)
Controller, Remote Transducer, 1 Duct Static and 1 Duct Total Tap	872989	385605, 385606, 474748, 475106
Controller, Remote Transducer	872990	385605, 385606

### Mounting Hole Pattern



**Note:**  
Four (4) #10 screws recommended with 5/32 in. (4mm) pilot holes.

## Our Commitment

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*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](http://greenheck.com) within the product area tabs and in the Library under Warranties.

