

SUBMITTAL

Job Name: Ross Dress for Less - Kettering

Engineer: NA

Contractor: Champion Commercial HVAC

Elevation: (ft) 499

Date: 5/09/2023

Submitted By: Jason Schulte

EAP INC

3930 VIRGINIA AVE

CINCINNATI, OH 45227

US

Phone: (513)489-9494

Fax: (513)489-6448

Email Address: jschulte@eapnet.com

SUBMITTAL NOTES:

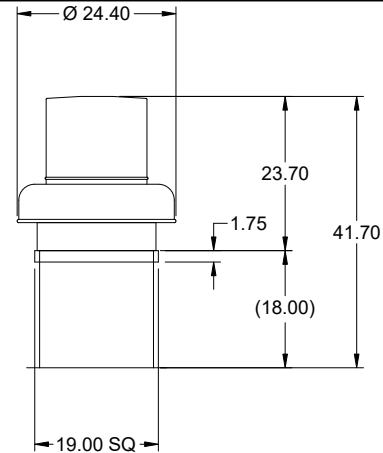
For Approval



P.O. Box 410 Schofield, WI 54476 (715) 359-6171 FAX (715) 355-2399 www.greenheck.com

Model: G-100-VG
Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-103-VG



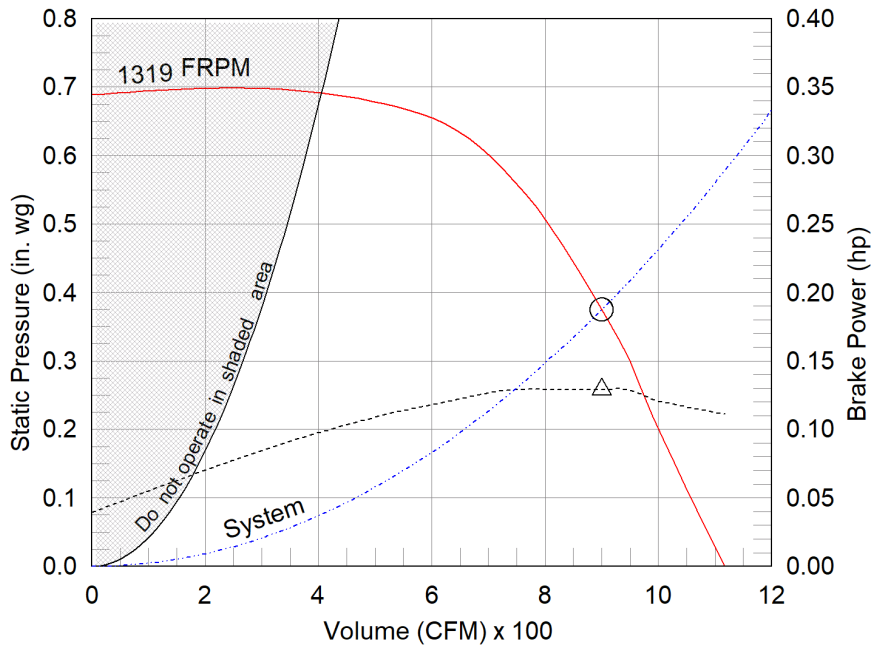
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	36
Weight w/ Acc's (lb)	43
Weight w/ Acc's and Curb (lb)	70
Standard Curb Cap Size (in.)	19 x 19
Optional Damper (in.)	12 x 12
Roof Opening (in.)	15.5 x 15.5

Performance	
Requested Volume (CFM)	900
Actual Volume (CFM)	900
Total External SP (in. wg)	0.375
Fan RPM	1319
Operating Power (hp)	0.13
Elevation (ft)	499
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,840
Static Eff. (%)	41

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	1,000

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

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	71	75	70	65	56	55	49	41	67	55	7.5



Model: G-100-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - 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 - Dial for balancing
Standard Curb Cap Size - 19 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, BD-100-PB-12X12, Gravity Operated, Not Coated, Nominal Size

Selected Sub Marks

See individual submittals for full details
GPI-19-G18

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

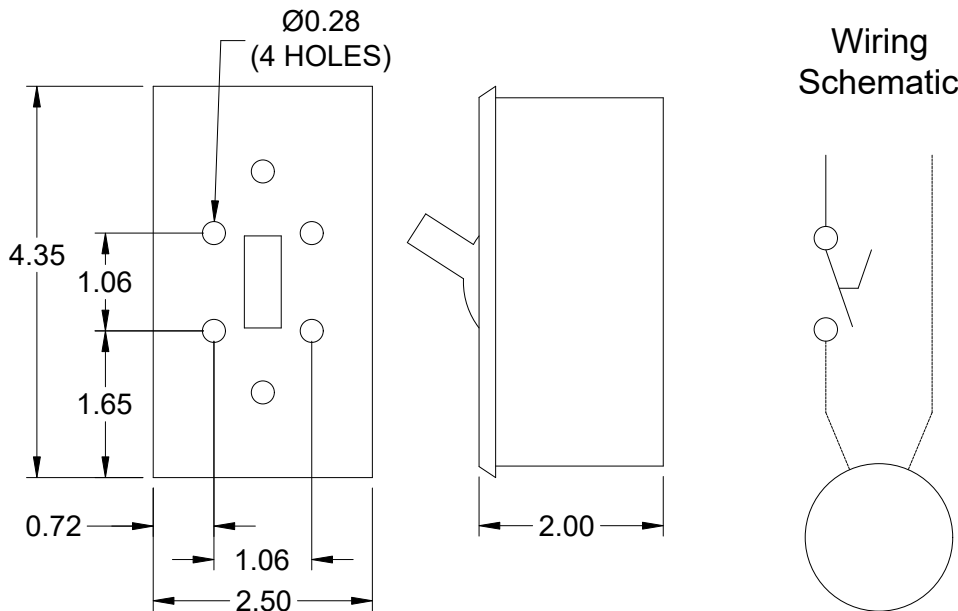
Standard Construction Features:

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						

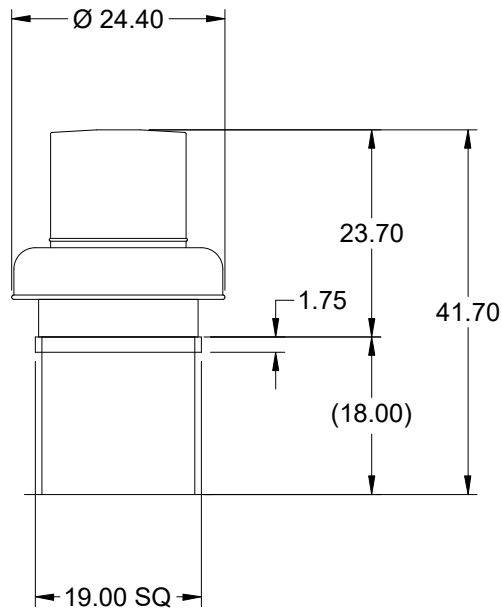
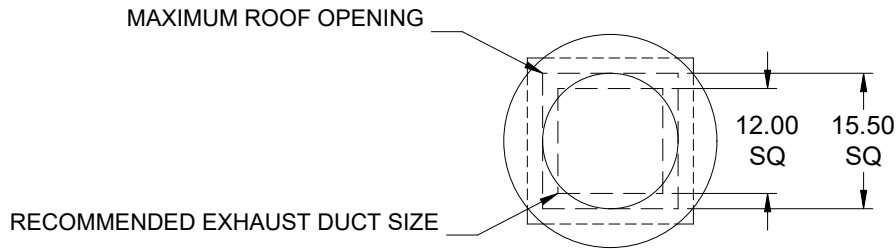
Electrical Drawing Details



Notes: All dimensions shown are in units of in.

Assembly Drawing

Type: Direct Drive Centrifugal Roof Exhaust Fan



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

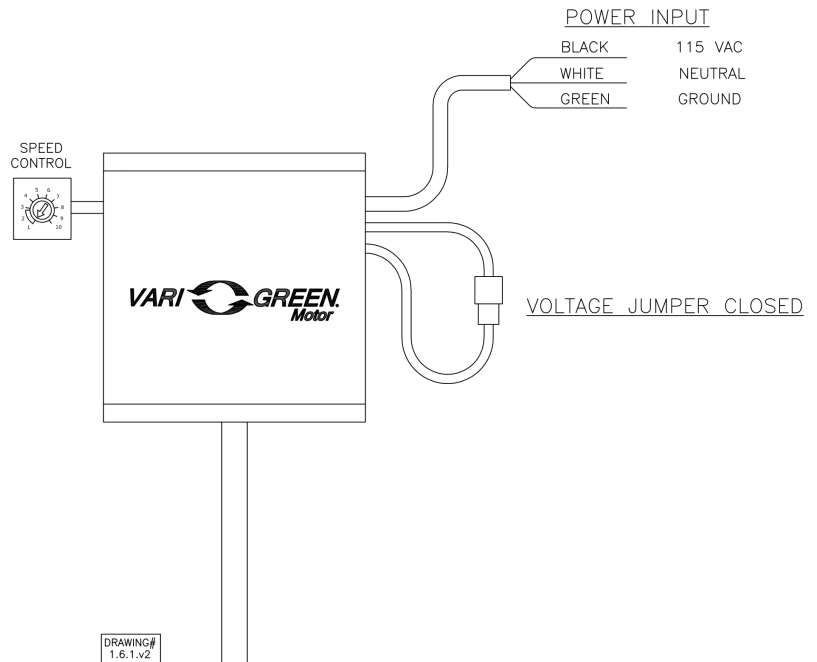
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated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



Horizontal Mount Exhaust Damper

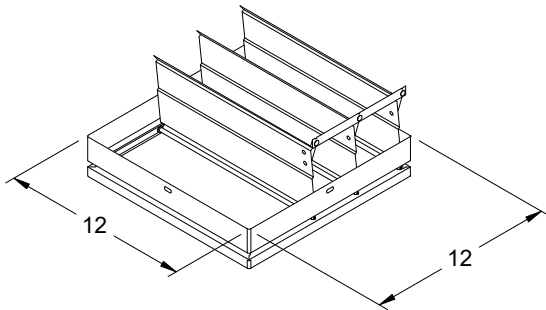
Model: BD-100

Standard Construction Features:

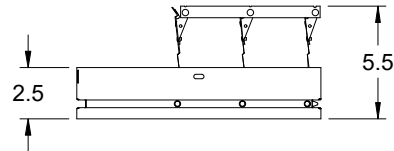
- Model BD-100 is a horizontal mount exhaust damper (air flow up) and is constructed of 24 ga galvanized steel with pre-punched mounting holes
- Damper blades are 0.016 in. roll formed aluminum with vinyl seals on the closing edge, and spring assisted for ease of opening
- Axle/bearing is constructed of fiberglass reinforced nylon



Greenheck Fan Corporation certifies that the models BD-100 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance Ratings.



DAMPER



TYP. SECTION VIEW

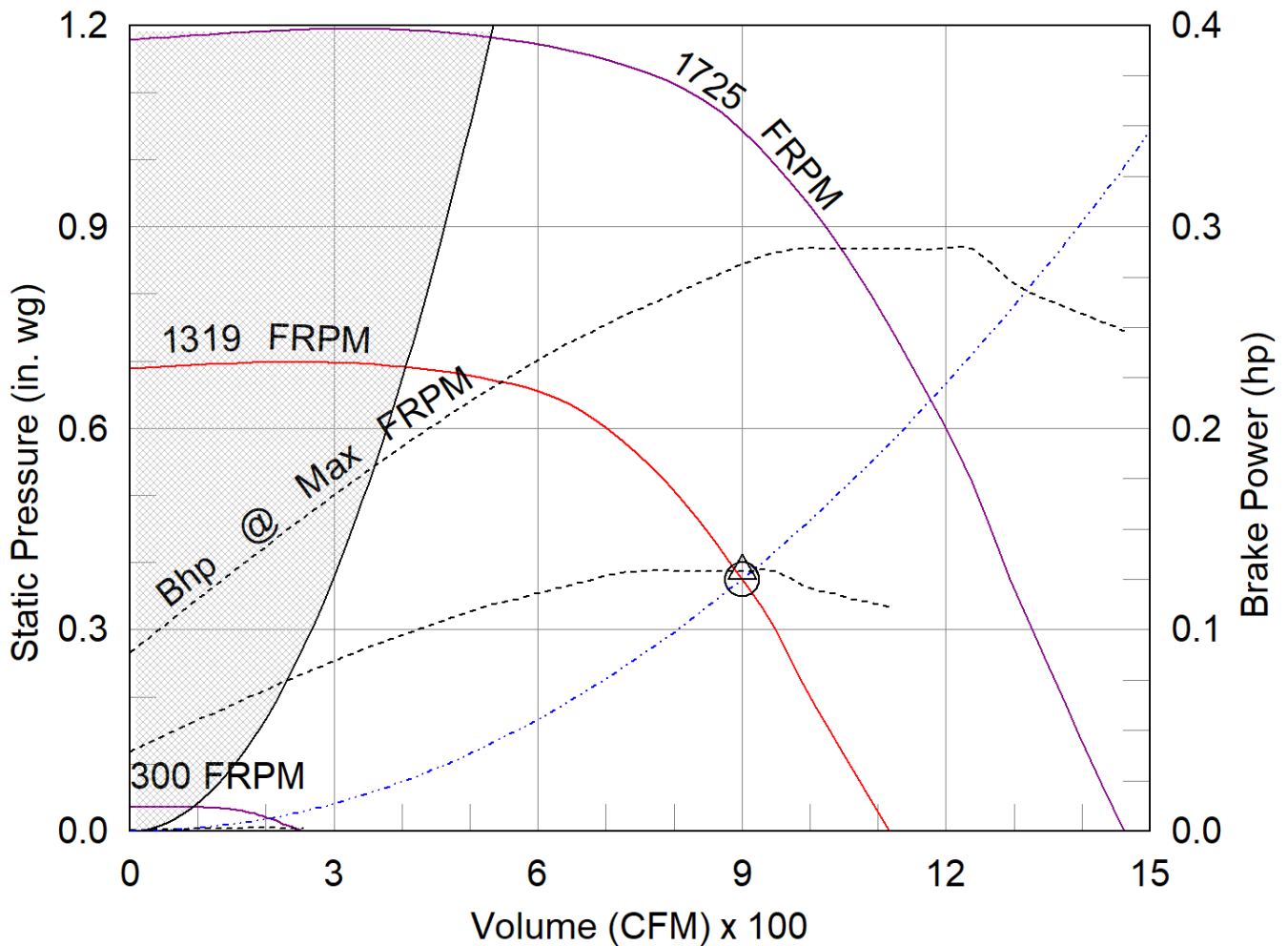
Notes: All dimensions shown are in units of in.

G-100-VG

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
900	900	0.375	1319	0.13



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

Warranty

1 Yr (Standard)

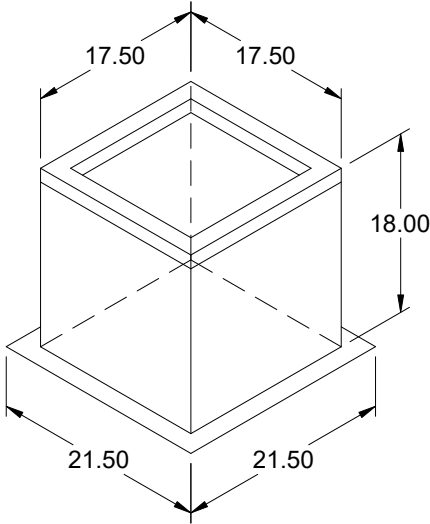
WARRANTY AND LIABILITY: SELLER warrants to Buyer that products manufactured are free from defects in material and workmanship for a period of 1 Yr (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's 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: GPI

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 - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 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. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-19	Nominal	1.5	27	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.)
18	19	19	17.5	17.5	14	14	18	18

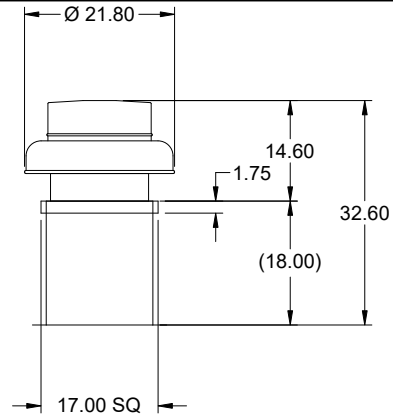
*May not be applicable

Accessories

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

Model: G-095-VG
Direct Drive Centrifugal Roof Exhaust Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	28
Weight w/ Acc's (lb)	34
Weight w/ Acc's and Curb (lb)	58
Standard Curb Cap Size (in.)	17 x 17
Optional Damper (in.)	10 x 10
Roof Opening (in.)	13.5 x 13.5

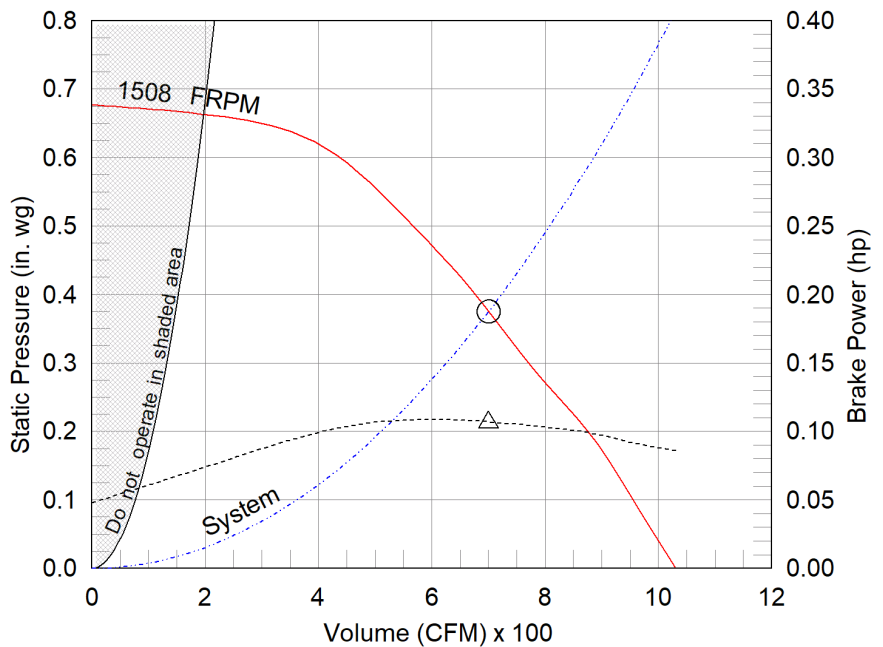


OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Performance	
Requested Volume (CFM)	700
Actual Volume (CFM)	700
Total External SP (in. wg)	0.375
Fan RPM	1508
Operating Power (hp)	0.11
Elevation (ft)	499
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	4,294
Static Eff. (%)	39

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	603

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)	2.2
Min. Circuit Ampacity (MCA)	3
Max. Overcurrent Protection (MOP)	15
Short Circuit Current Rtg (SCCR)	5 kA



- △ 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	77	71	63	58	57	49	40	68	56	8.4



Model: G-095-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - 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 Indoor Air Quality - Temperature & Humidity
Control - Dial for balancing
Control - Vari-Green Transformer 85-277VAC to 24 VDC, Mounted & Wired
Standard Curb Cap Size - 17 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Composite Wheel Material
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, BD-100-PB-10X10, Gravity Operated, Not Coated, Nominal Size

Selected Sub Marks

See individual submittals for full details
GPI-17-G18

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

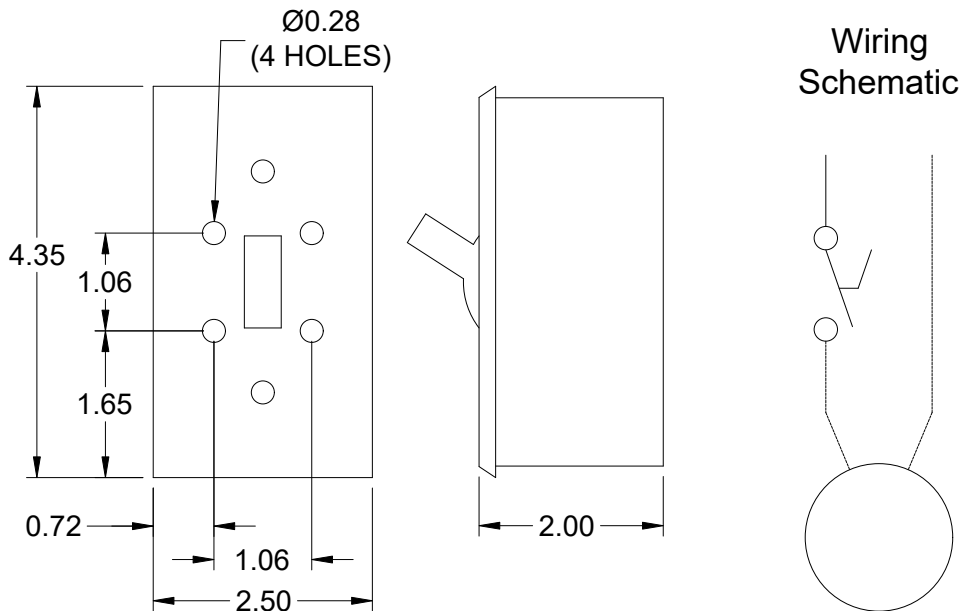
Standard Construction Features:

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						

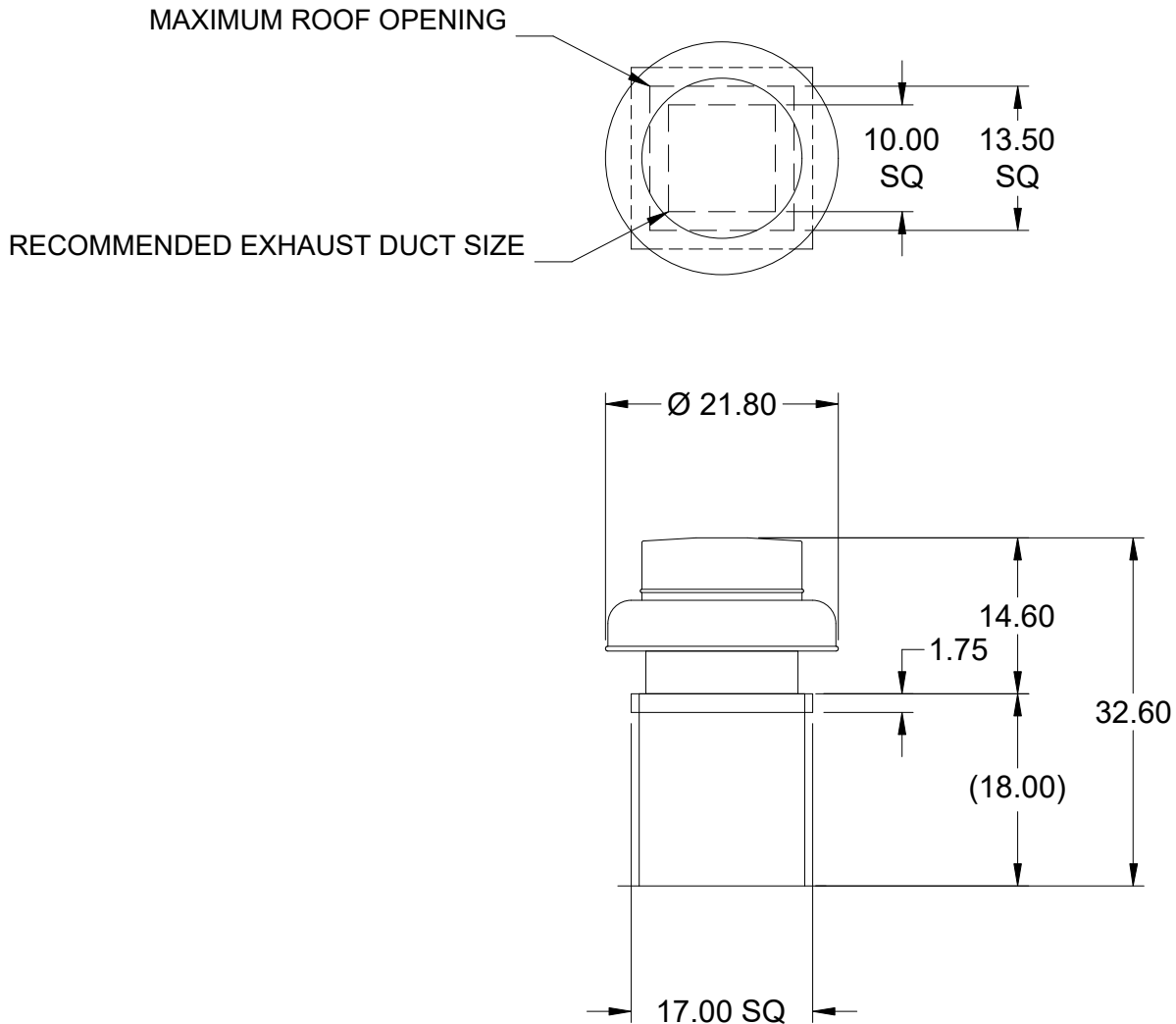
Electrical Drawing Details



Notes: All dimensions shown are in units of in.

Assembly Drawing

Type: Direct Drive Centrifugal Roof Exhaust Fan



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.

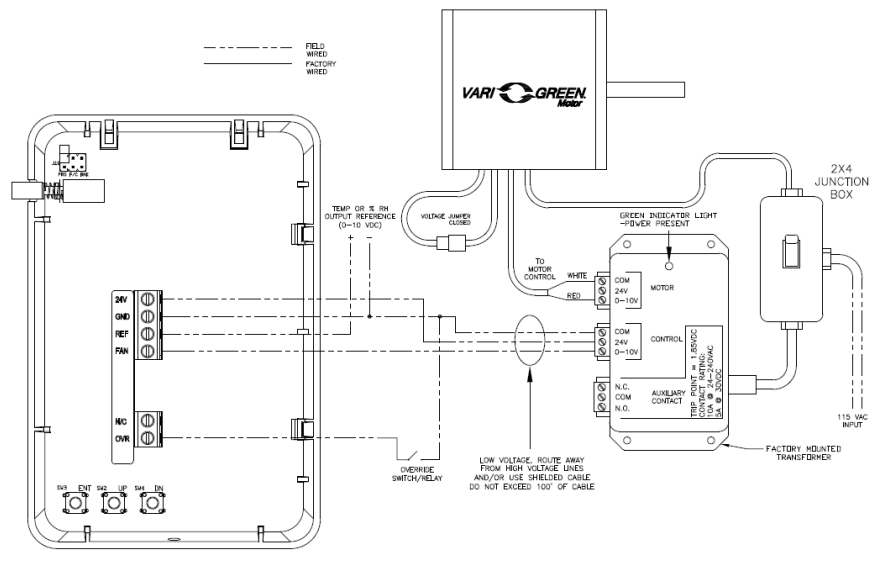
Indoor air quality control package specifically designed to control a fan with a Vari-Green motor via changes in temperature, relative humidity, or both. Range is 32 F to 120 F and 0 to 100% relative humidity. A 24VDC transformer with 85-277VAC input range is provided to power the control.

Motor Configuration

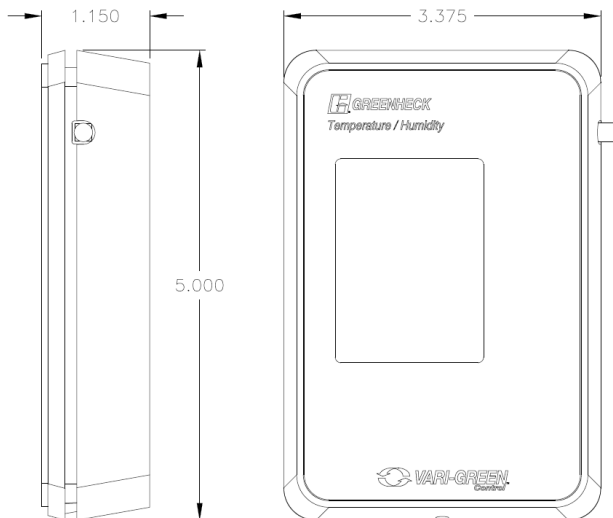
Input Voltage: 115
Speed Reference: 0-10VDC
Permanent Dial: No
Balance Dial Included: Yes

Control Configuration

Control Type: IAQ-Temp/Humidity
Transformer: Transformer Mtd



Dimensional Detail



Horizontal Mount Exhaust Damper

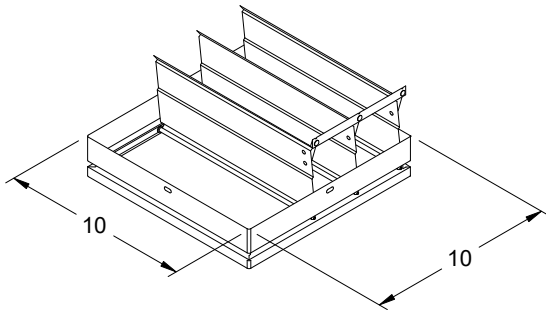
Model: BD-100

Standard Construction Features:

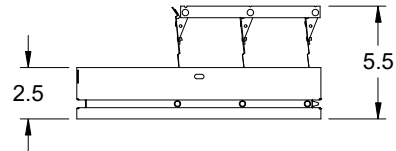
- Model BD-100 is a horizontal mount exhaust damper (air flow up) and is constructed of 24 ga galvanized steel with pre-punched mounting holes
- Damper blades are 0.016 in. roll formed aluminum with vinyl seals on the closing edge, and spring assisted for ease of opening
- Axle/bearing is constructed of fiberglass reinforced nylon



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DAMPER



TYP. SECTION VIEW

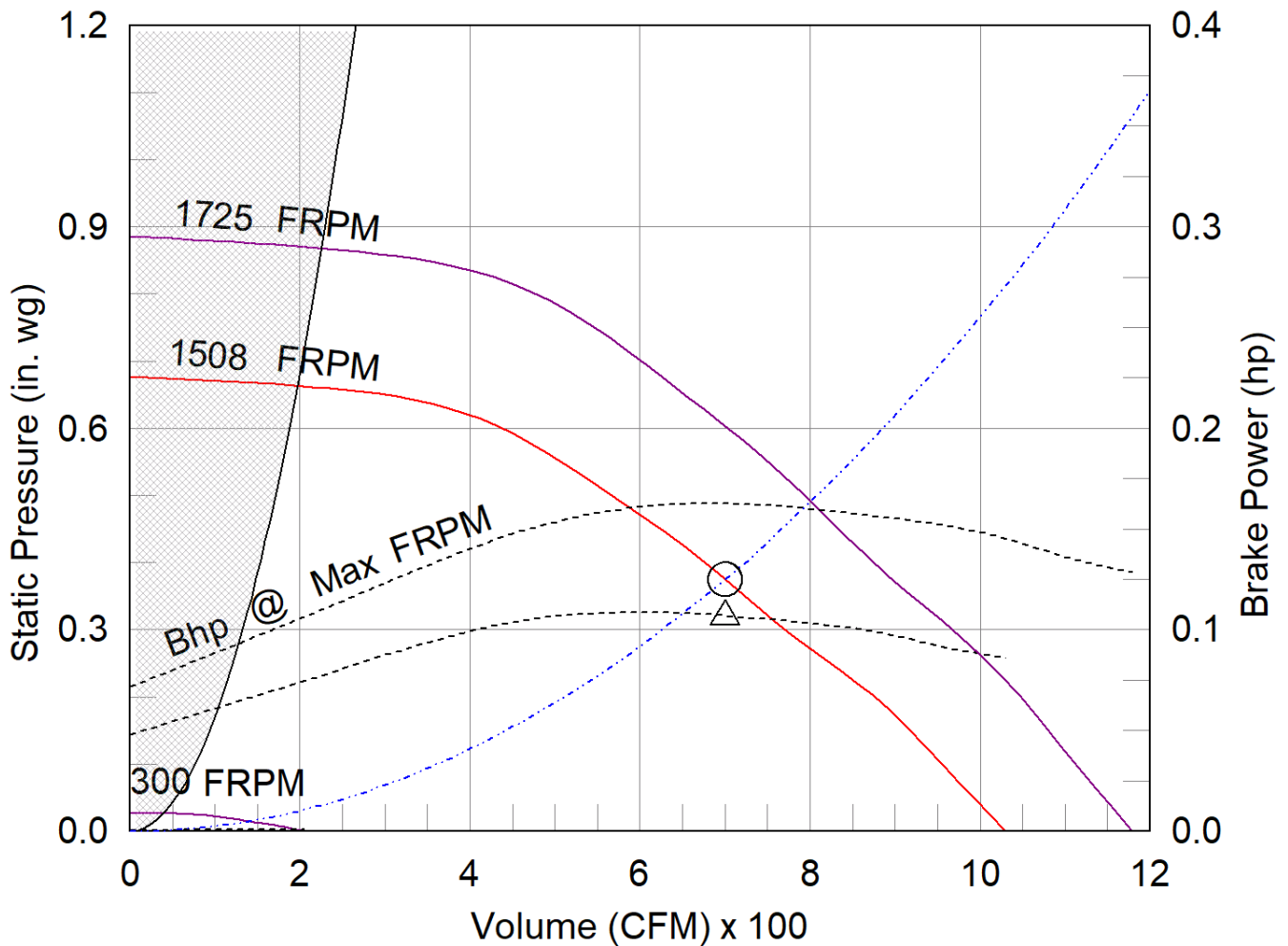
Notes: All dimensions shown are in units of in.

G-095-VG

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
700	700	0.375	1508	0.11



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

Warranty

1 Yr (Standard)

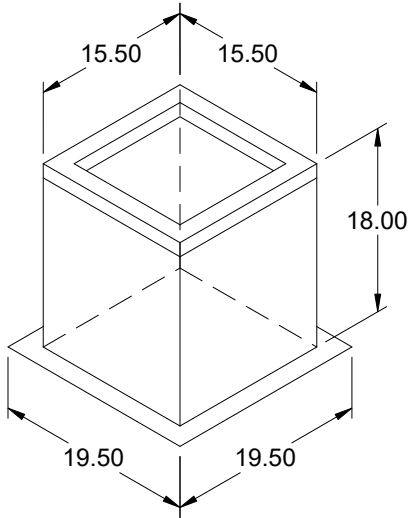
WARRANTY AND LIABILITY: SELLER warrants to Buyer that products manufactured are free from defects in material and workmanship for a period of 1 Yr (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's 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.

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Model: GPI

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 - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 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. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-17	Nominal	1.5	24	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.)
18	17	17	15.5	15.5	12	12	16	16

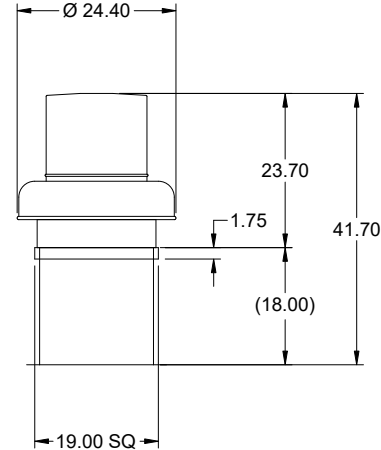
*May not be applicable

Accessories

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

Model: G-100-VG
Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-103-VG



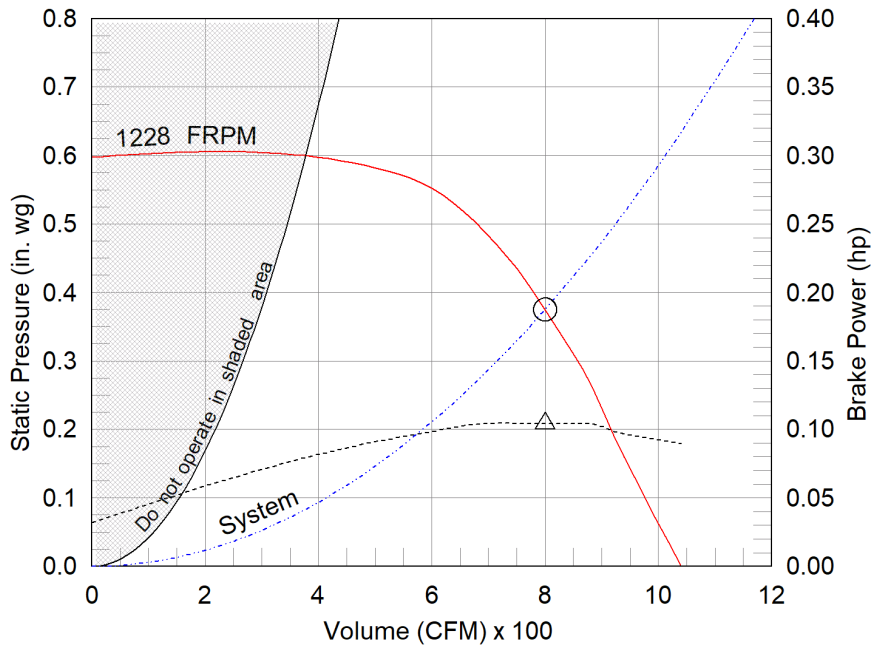
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	36
Weight w/ Acc's (lb)	43
Weight w/ Acc's and Curb (lb)	70
Standard Curb Cap Size (in.)	19 x 19
Optional Damper (in.)	12 x 12
Roof Opening (in.)	15.5 x 15.5

Performance	
Requested Volume (CFM)	800
Actual Volume (CFM)	800
Total External SP (in. wg)	0.375
Fan RPM	1228
Operating Power (hp)	0.1
Elevation (ft)	499
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,577
Static Eff. (%)	45

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	889

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

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	70	72	68	61	53	51	46	38	64	52	6.3



Model: G-100-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - 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 Indoor Air Quality - Temperature & Humidity
Control - Dial for balancing
Control - Vari-Green Transformer 85-277VAC to 24 VDC, Mounted & Wired
Standard Curb Cap Size - 19 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, BD-100-PB-12X12, Gravity Operated, Not Coated, Nominal Size

Selected Sub Marks

See individual submittals for full details
GPI-19-G18

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

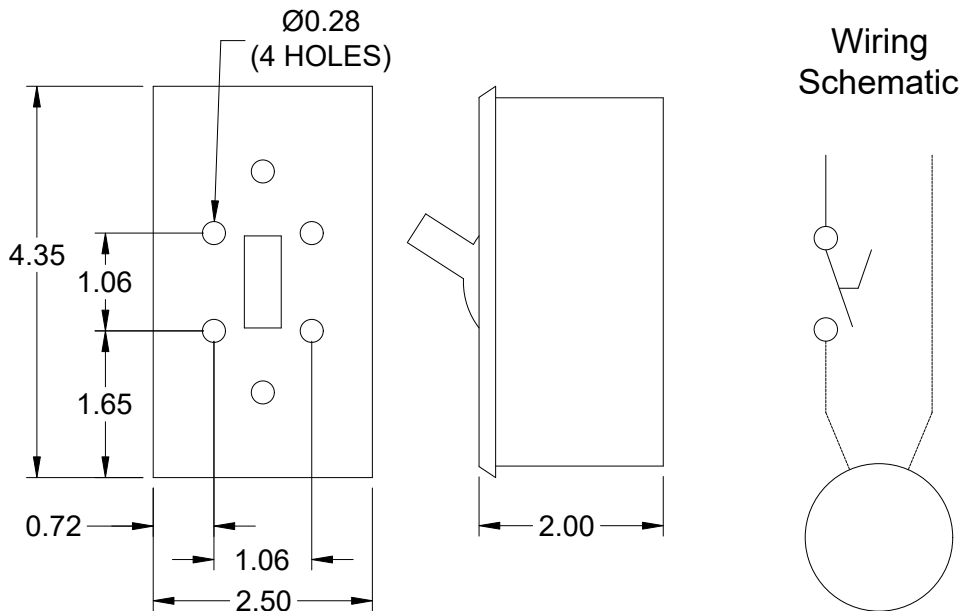
Standard Construction Features:

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						

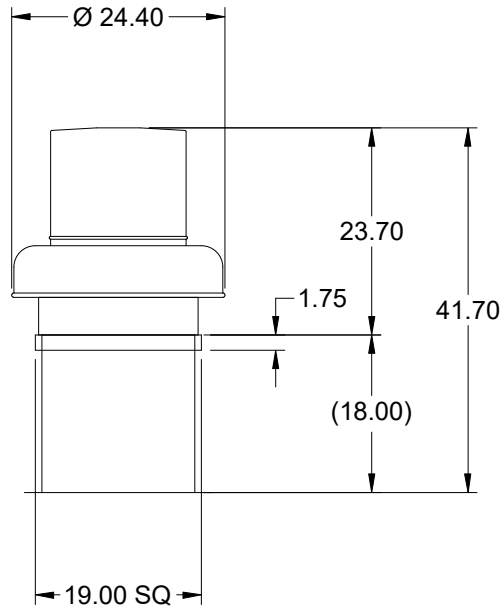
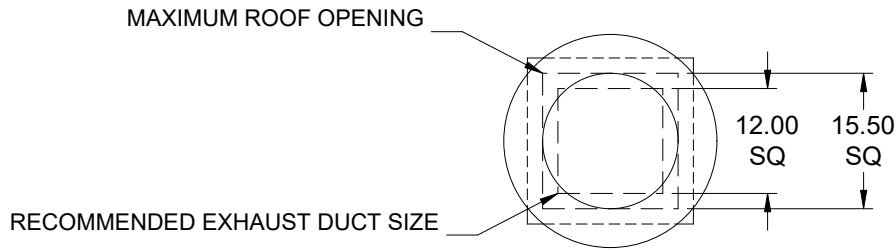
Electrical Drawing Details



Notes: All dimensions shown are in units of in.

Assembly Drawing

Type: Direct Drive Centrifugal Roof Exhaust Fan



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.

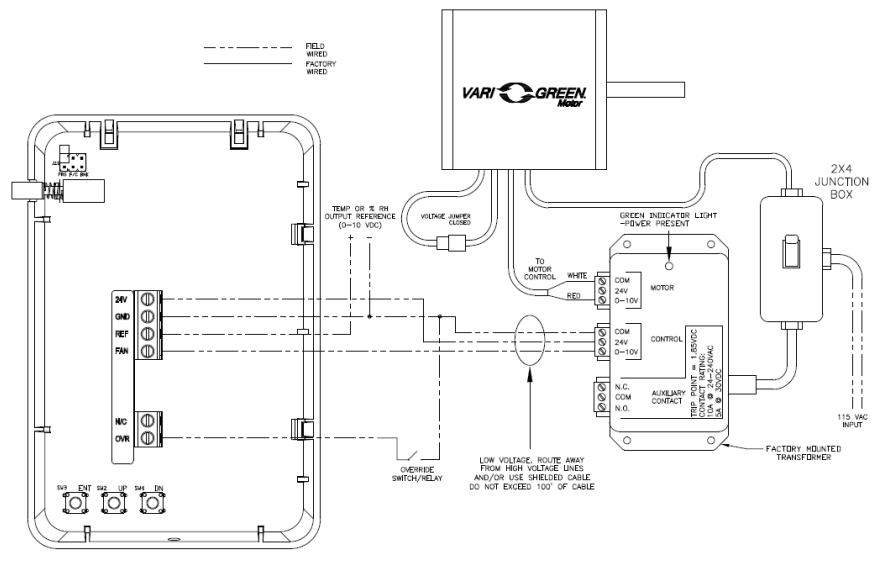
Indoor air quality control package specifically designed to control a fan with a Vari-Green motor via changes in temperature, relative humidity, or both. Range is 32 F to 120 F and 0 to 100% relative humidity. A 24VDC transformer with 85-277VAC input range is provided to power the control.

Motor Configuration

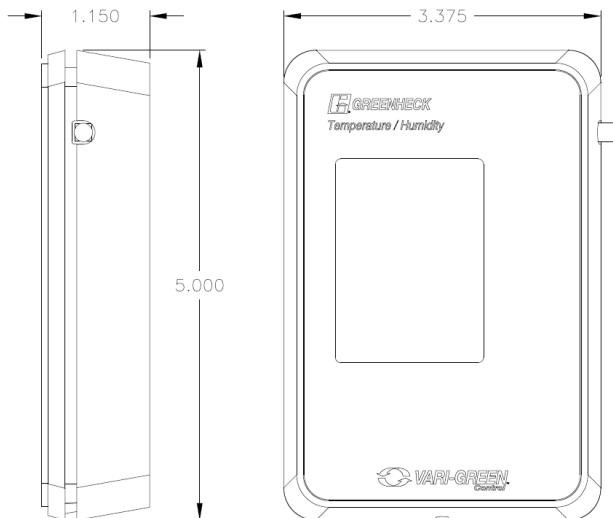
Input Voltage: 115
Speed Reference: 0-10VDC
Permanent Dial: No
Balance Dial Included: Yes

Control Configuration

Control Type: IAQ-Temp/Humidity
Transformer: Transformer Mtd



Dimensional Detail



Horizontal Mount Exhaust Damper

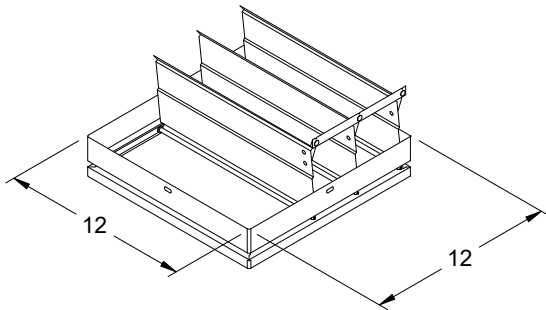
Model: BD-100

Standard Construction Features:

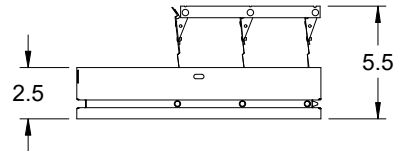
- Model BD-100 is a horizontal mount exhaust damper (air flow up) and is constructed of 24 ga galvanized steel with pre-punched mounting holes
- Damper blades are 0.016 in. roll formed aluminum with vinyl seals on the closing edge, and spring assisted for ease of opening
- Axle/bearing is constructed of fiberglass reinforced nylon



Greenheck Fan Corporation certifies that the models BD-100 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance Ratings.



DAMPER



TYP. SECTION VIEW

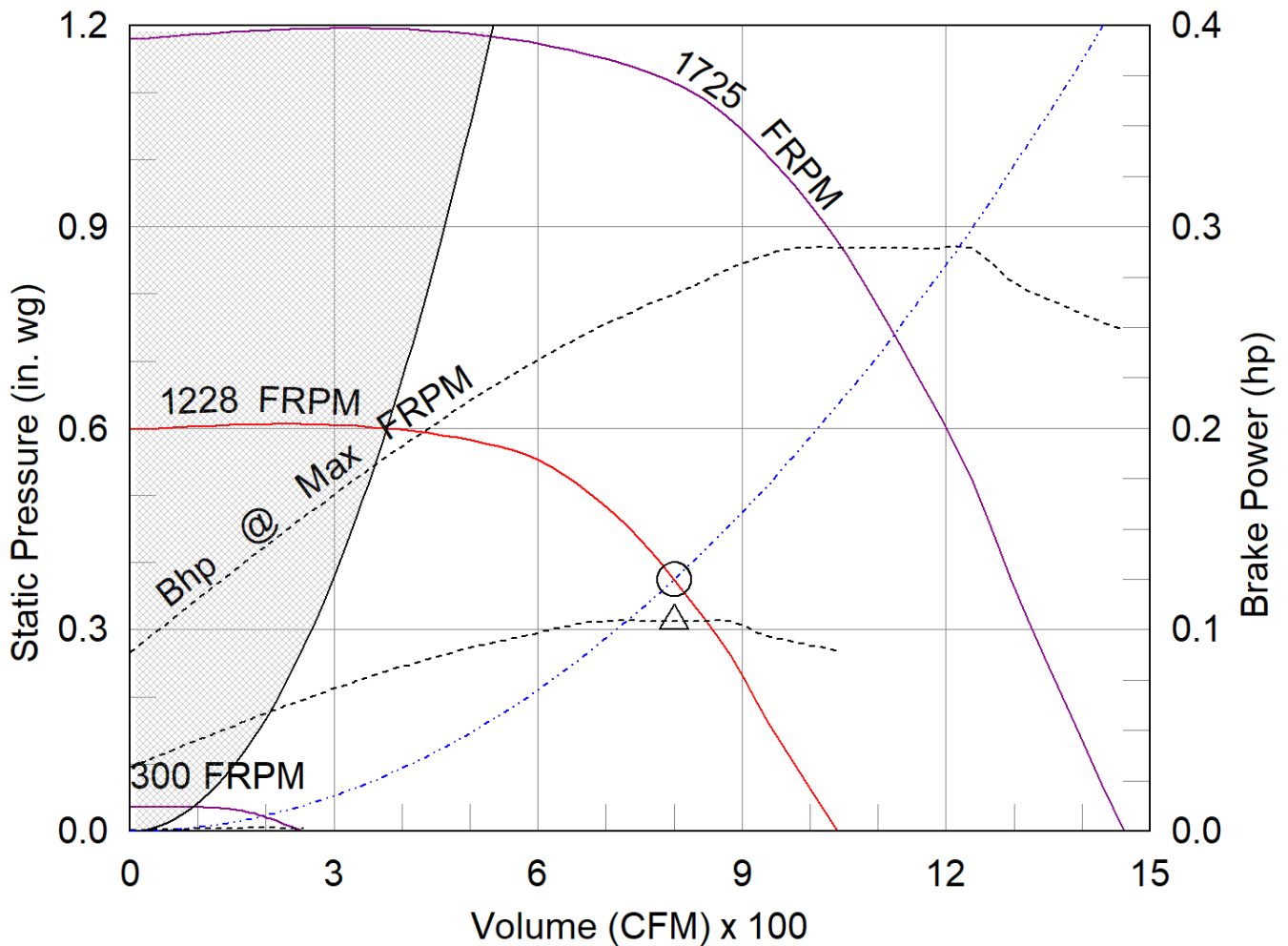
Notes: All dimensions shown are in units of in.

G-100-VG

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
800	800	0.375	1228	0.1



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

Warranty

1 Yr (Standard)

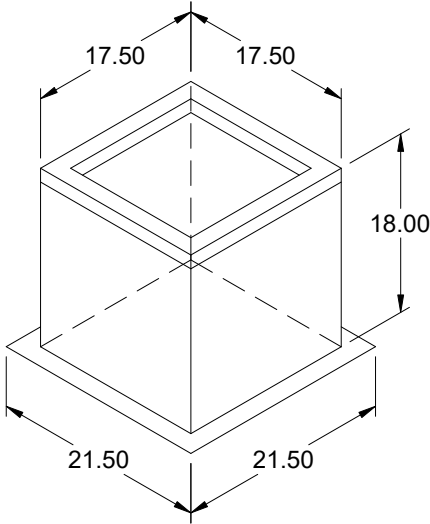
WARRANTY AND LIABILITY: SELLER warrants to Buyer that products manufactured are free from defects in material and workmanship for a period of 1 Yr (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's 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: GPI

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 - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 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. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-19	Nominal	1.5	27	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.)
18	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-A200

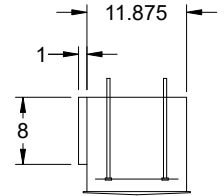
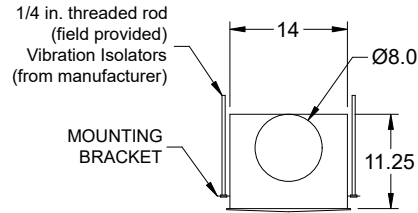
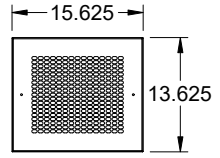
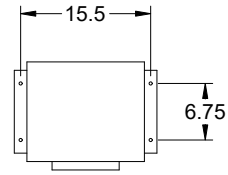
Ceiling Exhaust Fan

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:

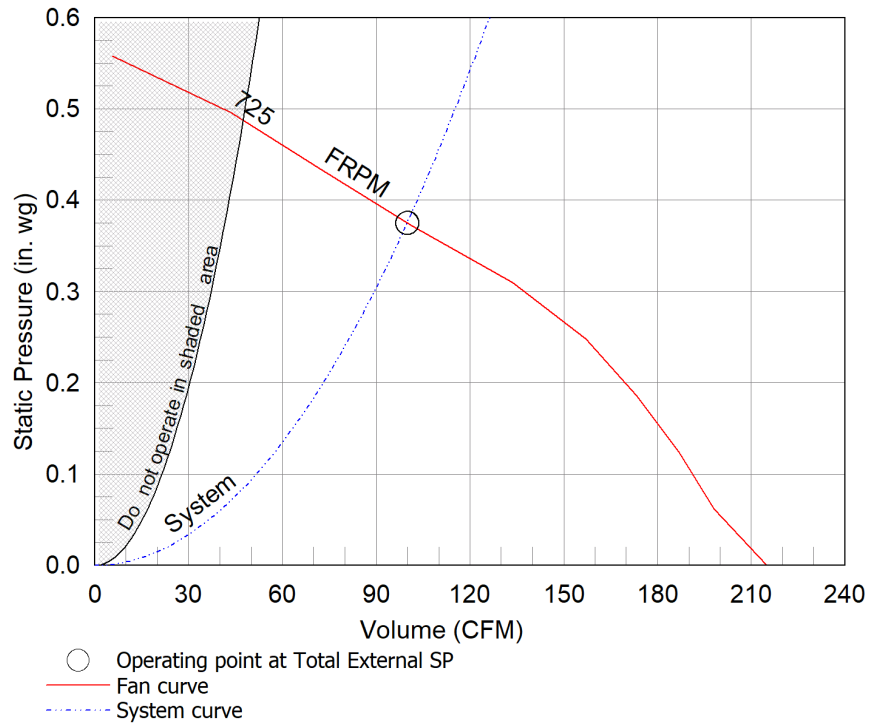
- Motor rated for continuous use
- Motor with Thermal Overload
- Motor with CSA Approval
- Motor with 40 Degree C Ambient Temperature
- UL/cUL 507 Listed - Electric Fan
- Solid State Speed Control, 6 Amp, Shipped Loose
- 1 Function Switch, Single Pole Rocker (PN: 872243), Shipped Loose
- Thermostat, Cooling, (PN: 386367) Shipped Loose
- Round Duct Connector, (PN: RDC-8) Shipped Loose
- Isolation Kit, (PN: VI KIT-SP/CSP), Shipped Loose
- Adjustable easy installation mounting bracket
- Energy Star Certified
- Aluminum Grille with White Enamel Finish, (PN: 504879)
- 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)	24
Weight w/ Acc's (lb)	30

Performance	
Requested Volume (CFM)	100
Actual Volume (CFM)	100
Total External SP (in. wg)	0.375
Fan RPM	725
* FLA (A)	0.46
Elevation (ft)	499
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Sones	2.0

Motor	
Motor Mounted	Yes
** Input Watts (W)	25
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.

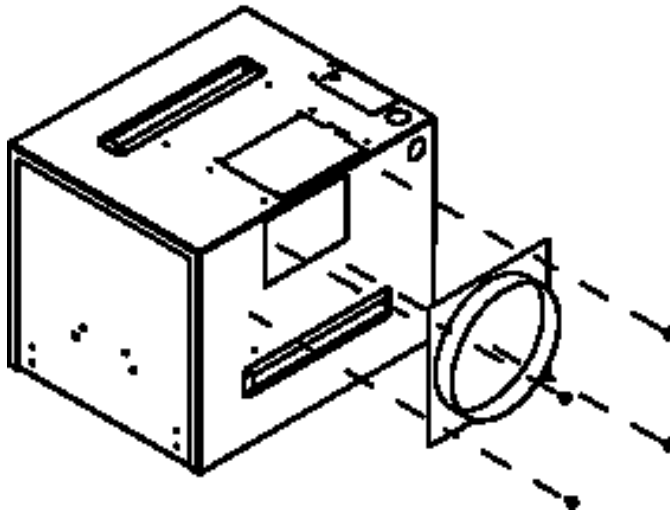


Round Duct Connector

Model: RDC

Standard Construction Features:

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



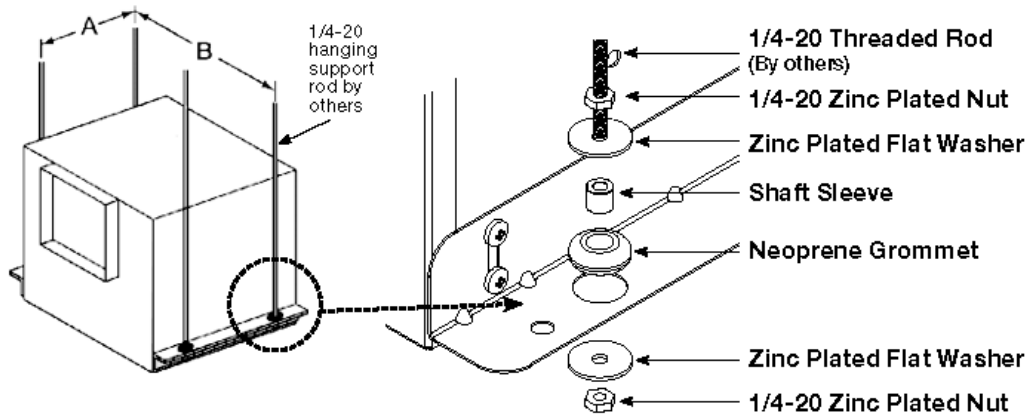
Notes: All dimensions shown are in units of in.

Isolation Kit

Type: Hanging

Standard Construction Features:

- Neoprene vibration isolation for hanging installation - Kit includes four isolators and all hardware necessary for mounting one unit except for the 0.25 in. x 20 in. threaded rod to be supplied by others - Fan mounting brackets include prepunched mounting holes for ease of installation



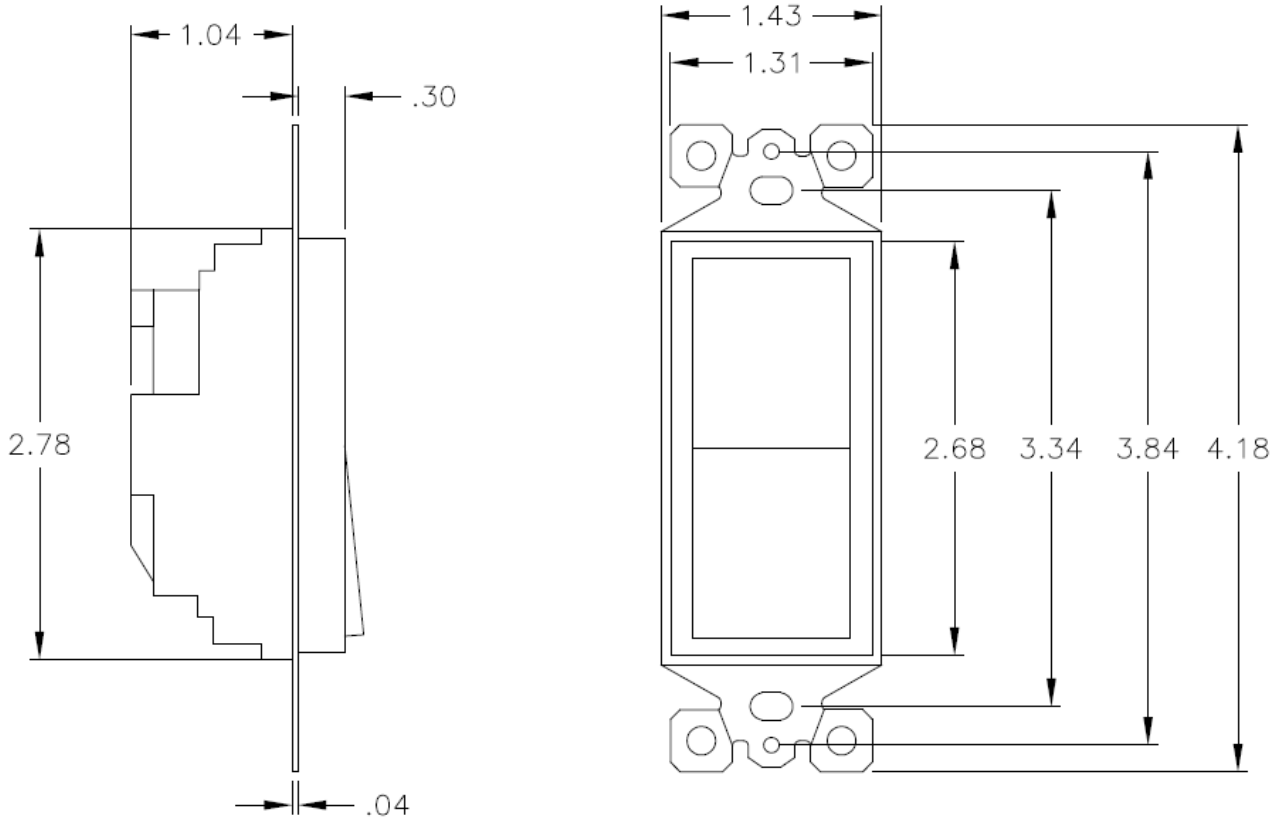
Unit Size	A	B
B50-B200	4 1/2 (114)	15 5/8 (397)
A50-A190	5 1/2 (140)	14 5/8 (371)
A200-A390	6 3/4 (171)	15 1/2 (394)
A410, A510, A710, A780	9 1/4 (235)	19 5/8 (498)
A700	5 1/2 (140)	25 1/8 (638)
A900 - A1050, A1410 - A1550	9 1/4 (235)	25 3/8 (645)
A1750, A2150	9 1/4 (235)	36 3/4 (933)
A3600	9 1/4 (235)	48 5/8 (1235)
All dimensions shown in inches (millimeters).		

Description	Qty
Neoprene Grommets	4
1 x 32 Zinc Plated Nuts	8
Zinc Plated Flat Washers	8
3/8 x 3/16 Shaft Sleeves	4

Manual Switch
Model: 1 Function

Standard Construction Features:

Single pole rocker switch assembly with plate cover, rated for 120/277V, 15A, UL Listed.

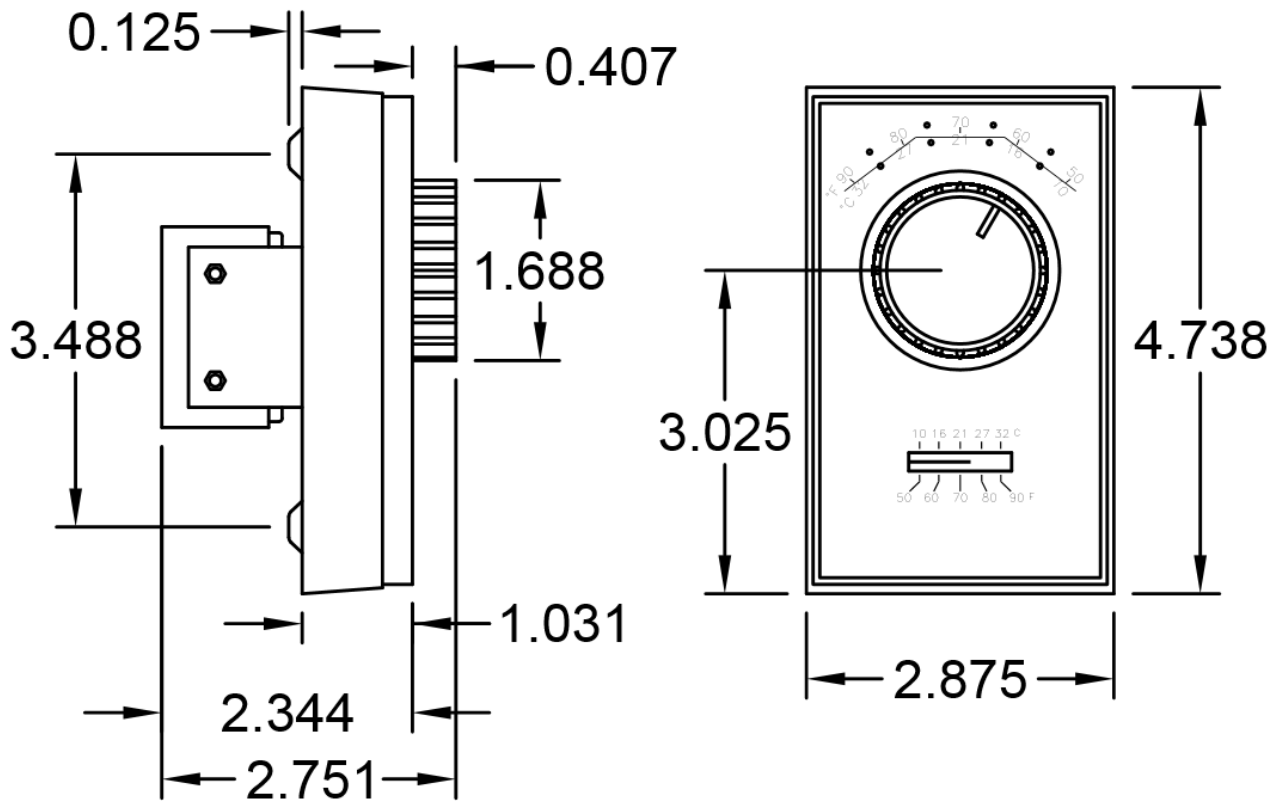


Notes: All dimensions shown are in units of in.

Thermostat
Model: Cooling

Standard Construction Features:

White, wall mount, UL Listed, line voltage thermostat. Temperature range of 50 degrees F to 90 degrees F (10 degrees C to 32 degrees C). 22 Amps at 125/277 VAC.



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 some 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.

Shipping Container Information from United States

Ship QTY	Mark Name	Model	Length (in.)	Width (in.)	Height (in.)	Volume (Total) (ft3)	Weight (Total) (lb)
1	EF-1	G-100-VG	31	31	28	16.0	48
1	EF-1 - Roof Curb	GPI-19-G18	23	23	22	6.7	30
1	EF-2	G-095-VG	31	24	20	9.0	38
1	EF-2 - Roof Curb	GPI-17-G18	20	20	22	5.1	26
1	EF-3	G-100-VG	31	31	28	16.0	48
1	EF-3 - Roof Curb	GPI-19-G18	23	23	22	6.7	30
1	EF-4	SP-A200	18	15	16	3.0	33
US Totals						62.6	252

NOTES : 1. Volume, weight, length, width, and height data are only an estimate of packaged product dimensions.
2. All values are subject to change and/or may vary depending on selected options and accessories.
3. Please consult factory (C/F) for additional information.

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			
	317886						
	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	

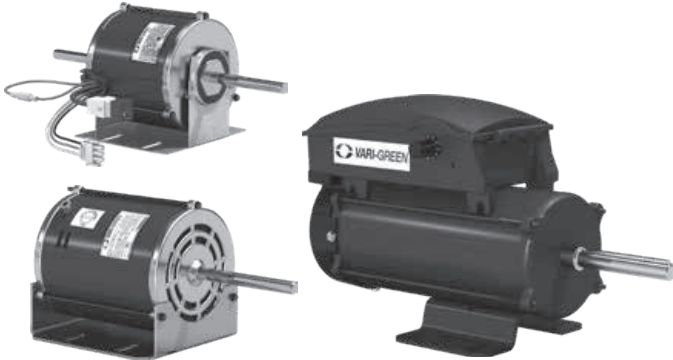
HP	Voltage	* RPM Range	Encl.	FLA	Control Method	Motor Part No.	Pg.
1/2	115	300-2500	ODP	4.0	0-10V Only	310307	3
				6.5	Pot Only	310476	
				6.9	Pot/0-10V	312360	3
	208-240	350-2500	ODP	4.9	Pot/0-10V	317706	3
	277	350-2500	ODP	3.27	Pot/0-10V	317707	3
	115/208- 230/277	300-1750	ODP	6.4/3.8- 3.6/3.2	Pot/0-10V	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.

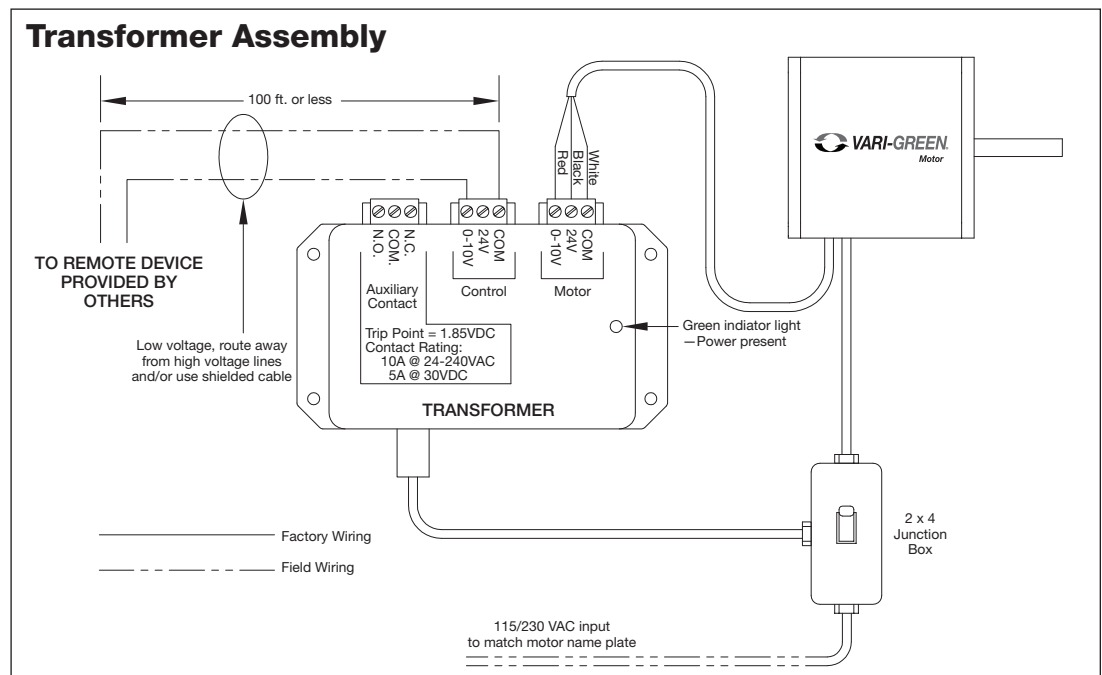
NOTE

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 12K Ω	

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
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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
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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.

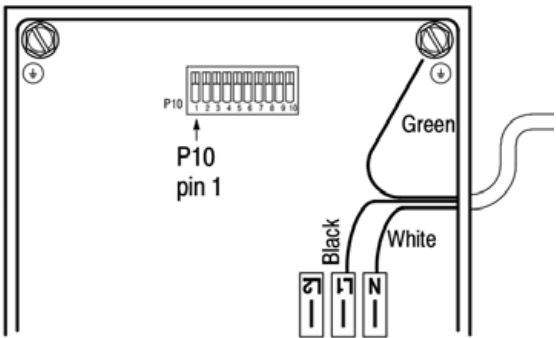
0-10 VDC Signal - From 0-1.9V, the motor will be off, and will operate in the 2-10V range. This motor does not require 24V power for operation.

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

Wiring

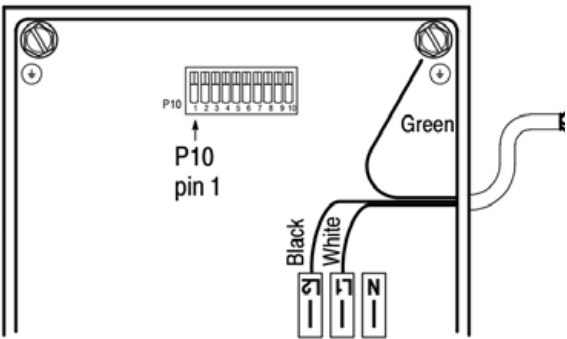
1. All high and low voltage wiring connections are made inside the motor control box at the factory. Normally, there is no reason to enter the control box of the motor. If there is a need to enter the control box, disconnect power and wait at least five minutes to allow the capacitors to discharge.
2. 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.



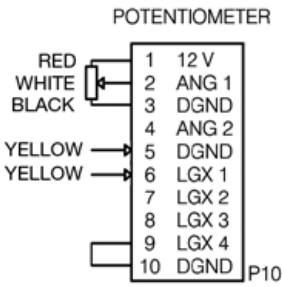
115V Connection inside control box

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



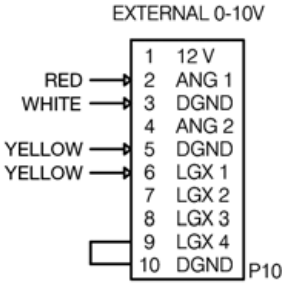
208-240V Connection inside control box

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.

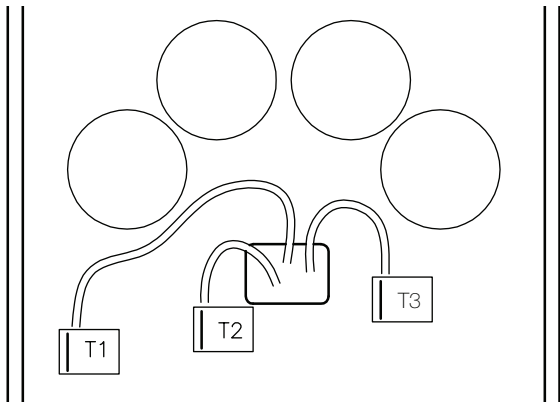


0-10 VDC signal connection inside control box

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

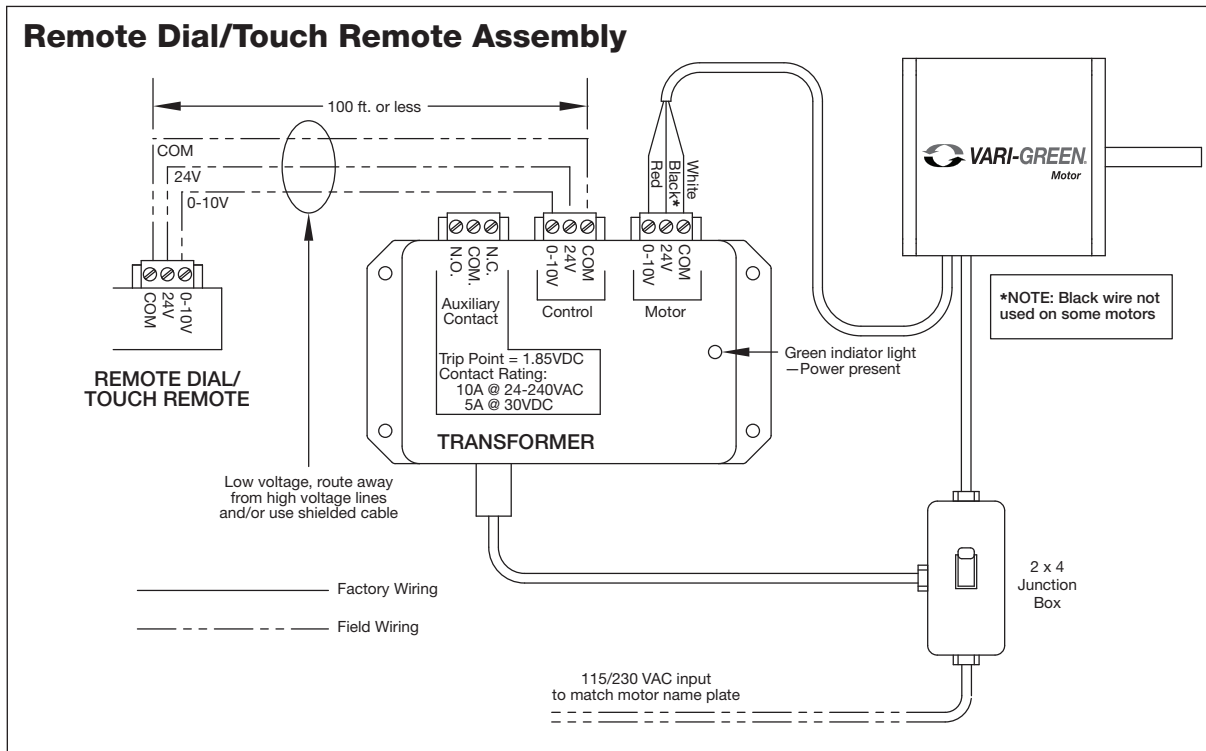
Follow installation instructions for remote dial above. After power is applied to the system, operate as follows:

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.

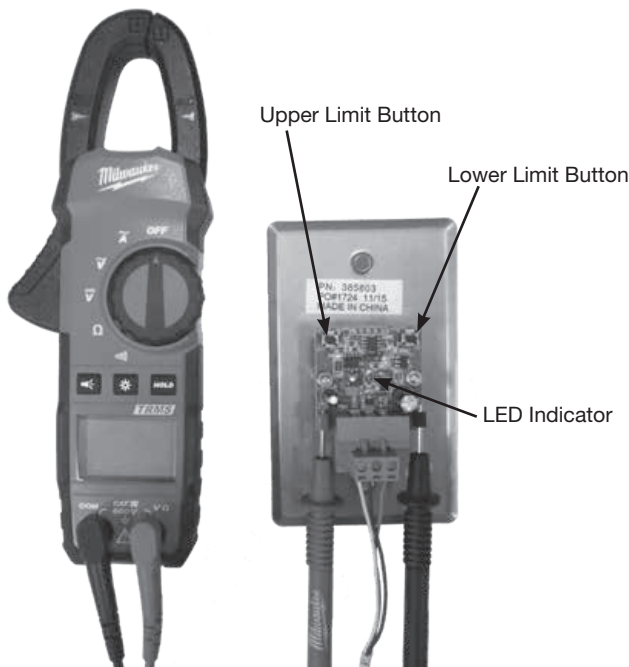
Other Vari-Green® controls, such as the Constant Pressure and Air Quality families of controls, have their own manual that ship with the controller. They can also be found on Greenheck.com. See table on page 11 for document numbers.

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

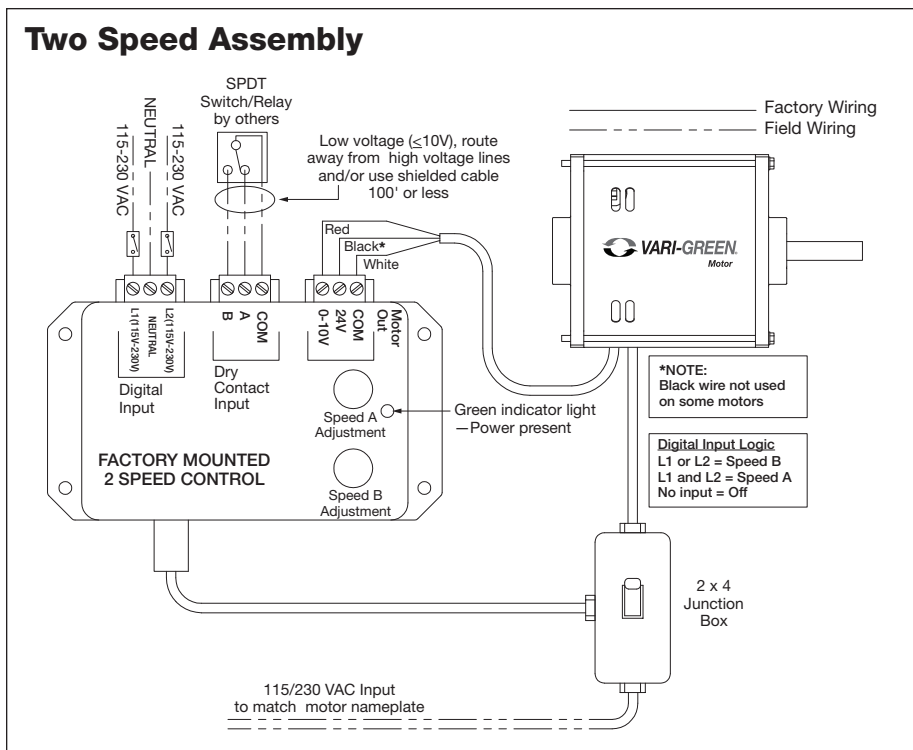


Troubleshooting - Remote Dial/Touch Remote

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.

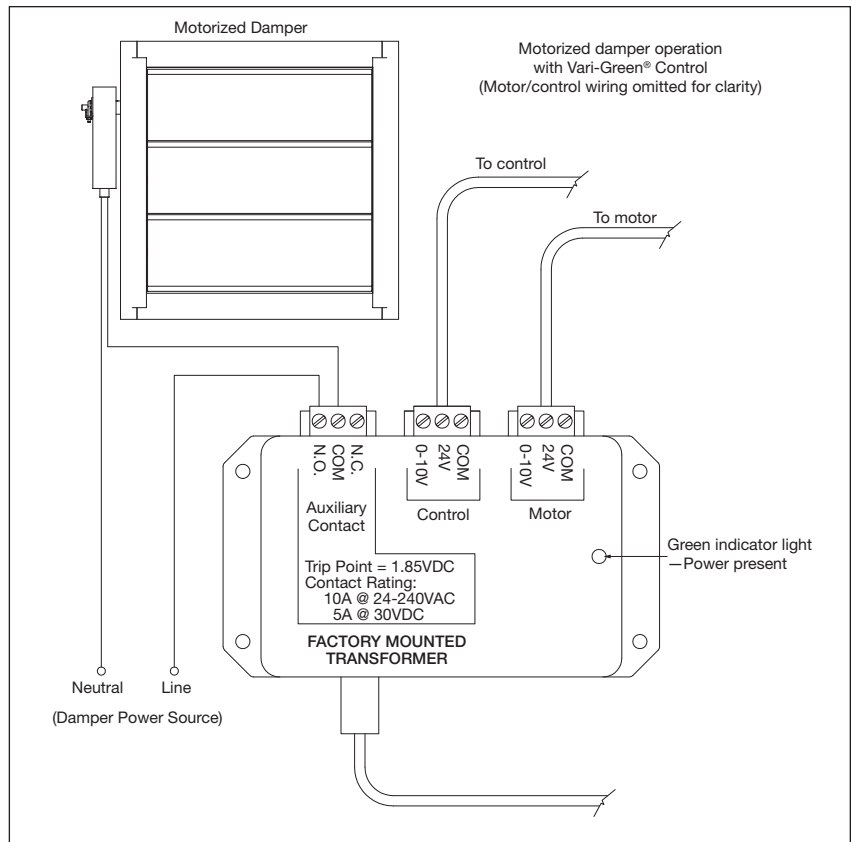
Motorized Backdraft Damper Control

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.

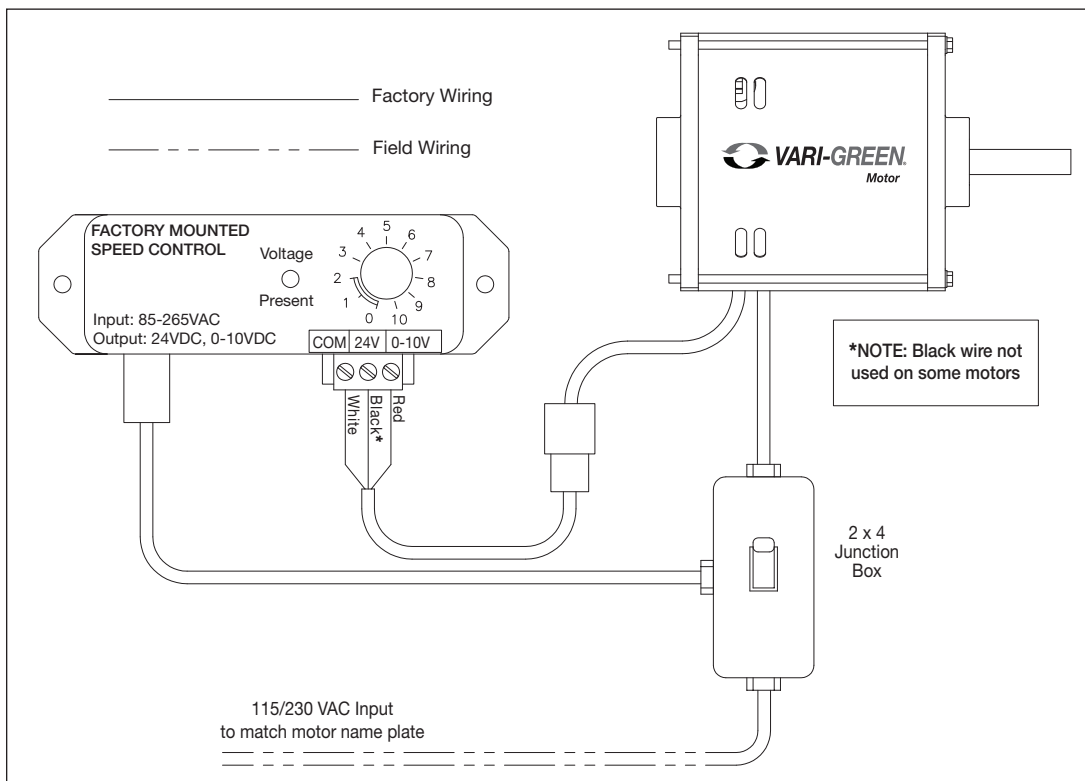
Contact Rating:

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



Fans Where Dial on Motor is Not Accessible

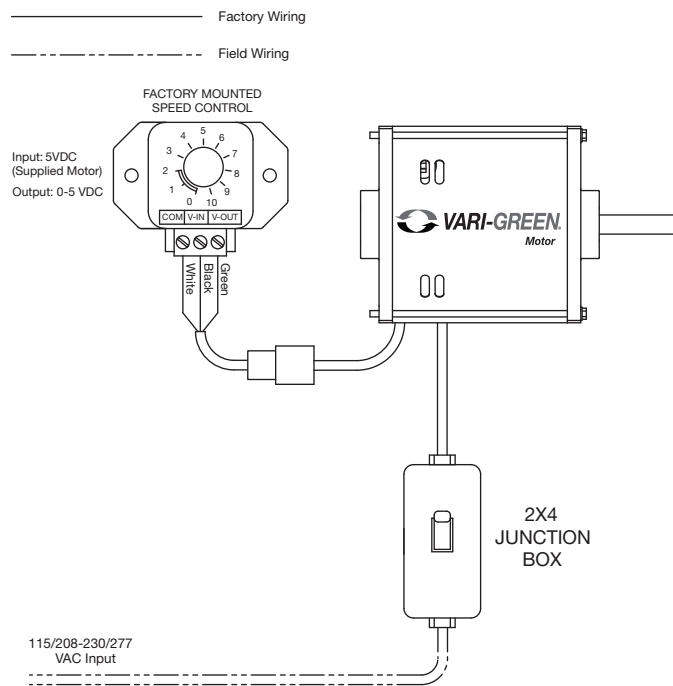
A control is available to mount on the outside of a fan where the dial on motor may be difficult to access (model SQ). This control is powered by the line voltage entering the fan and will send 24 VDC and 0-10 VDC to the motor. Control Part Number is 385611



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.



Installation, Operation and Maintenance Manual

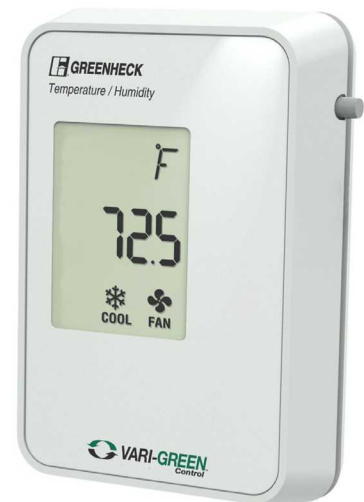
Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property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

Temperature and Humidity Controller (PN 387127)

The Temperature and Humidity Controller is specifically designed to control a Vari-Green fan motor. The Temperature and Humidity Controller will sense the temperature and humidity in the space and will automatically adjust the speed of a supply or exhaust fan to adjust the ventilation rate accordingly. The temperature measurement will be compared to a field adjustable temperature setpoint, processed through a Proportional/Integral/Derivative (PID) control algorithm to produce a 2 to 10 VDC fan motor control output. The humidity measurement will be compared to a field adjustable humidity setpoint, processed through a PID control algorithm to produce a 2 to 10 VDC fan motor control output. If the unit is in temperature only mode the temperature algorithm's output shall be used to provide the fan motor control output. When the unit is in humidity-only mode the humidity algorithm's output shall be used to provide the fan motor control output. When the unit is in temperature and humidity mode the algorithm with the greatest output shall be used to provide the fan motor control output.

When all active algorithms are satisfied, the output voltage shall be set to its lowest value, 2 VDC. If the temperature is 1°F below the temperature

setpoint in temperature control and the humidity is 3% below the humidity setpoint in humidity control or both in temperature and humidity control, the voltage output may be set to zero (optional cutout mode). The unit will resume normal fan operation if the temperature changes by 1°F or the humidity changes by 5%.



Ventilating based on the temperature and humidity measurements assures that the space will not be over or under ventilated while using the Vari-Green motor technology to operate quietly and efficiently. The Temperature and Humidity Controller has adjustments for setpoint, minimum and maximum fan speed. The fan speed and temperature or humidity level are available as an analog output to be read by a building control system or other device.

General Safety Information

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

DANGER

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

CAUTION

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

CAUTION

Precaution should be taken in explosive atmospheres.

Electrical Safety Information

Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the National Fire Protection Agency (NFPA). Where applicable, follow the Canadian Electric Code.

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

Receiving

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

Unpacking

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

Electrical

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

Storage

Product is protected against damage during shipment. If the product cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the product during storage. The user assumes responsibility of the product and accessories while in storage. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user.

Indoor Only

Do not store this product outdoors. The ideal environment for the storage of this product is indoors, above grade, in a low humidity atmosphere which is sealed to prevent the entry of blowing dust, rain or snow. Temperatures should be evenly maintained between 30° to 110°F (-1° to 43°C) (wide temperature swings may cause condensation and “sweating” of metal parts). All accessories must be stored indoors in a clean, dry atmosphere.

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

Inspection and Maintenance During Storage

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

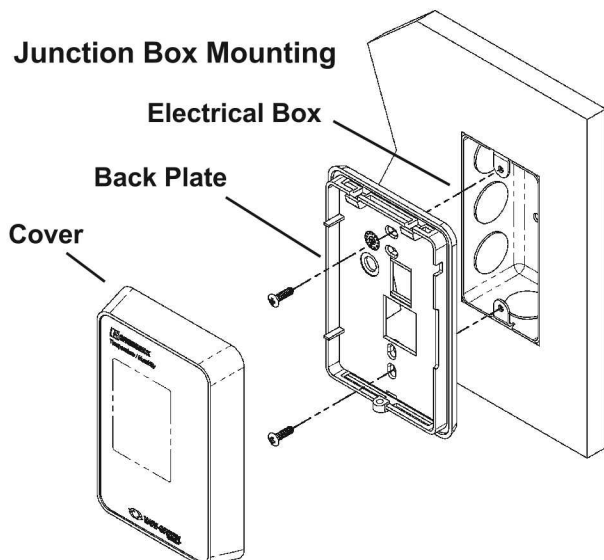
Installation and Setup Guide

This guide provides instructions for how to install, wire and program the control system for use when constant pressure in a duct or room system is required. This does not cover ductwork recommendations or other considerations.

Mounting

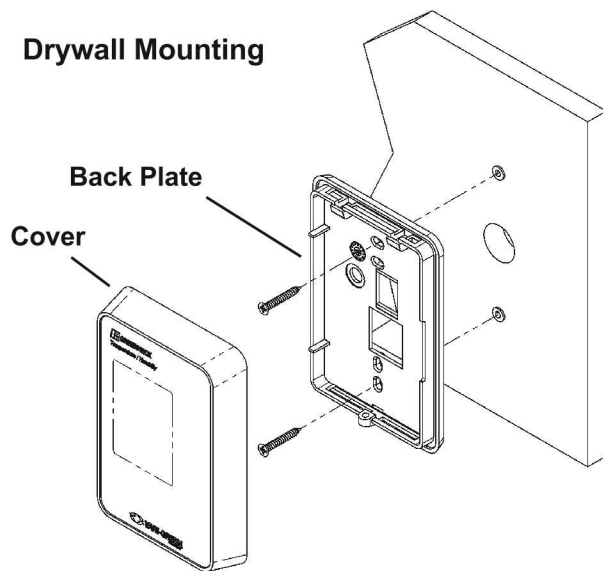
Mount the controller in the space to be controlled. Keep wire lengths between the controller and the fan to 100 feet or less.

Junction Box Mounting



1. Separate the unit from the back plate by driving in the Allen screw until the two pieces come free.
2. Pull the wire through the wall and out of the junction box, leaving about six inches free.
3. Pull the wire through the hole in the back plate.
4. Secure the plate to the box using the #6-32 x 5/8 inch mounting screws provided.
5. Terminate the unit wiring.
6. Mold the foam on the unit's base to the wire bundle to prevent drafts. (see note below)
7. Attach Cover by latching it to the top of the base, rotating the cover down and snapping it into place.
8. Secure the cover by backing out the lock-down screw using a 1/16 inch Allen wrench until it is flush with the bottom of the cover.

Drywall Mounting



1. Separate the unit from the back plate by driving in the Allen screw until the two pieces come free.
2. Place the back plate against the wall where you want to mount the sensor.
3. Using a pencil mark out the two mounting holes and the area where the wires will come through the wall.
4. Drill two 3/16 inch holes in the center of each marked mounting hole, DO NOT punch the holes or the drywall anchors will not hold. Insert a drywall anchor into each hole.
5. Drill one 1/2 inch hole in the middle of the marked wiring area.
6. Pull the wire through the wall and out of the 1/2 Inch hole, leaving about six inches free.
7. Pull the wire through the hole in the back plate.
8. Secure the base to the drywall anchors using the #6 x 1 inch mounting screws provided.
9. Terminate the unit wiring.
10. Mold the foam on the unit's base to the wire bundle to prevent drafts. (see note below)
11. Attach cover by latching it to the top of the base, rotating the cover down and snapping it into place.
12. Secure the cover by backing out the lock-down screw using a 1/16 inch Allen wrench until it is flush with the bottom of the cover.

NOTE: In any wall-mount application, the air within the wall cavity can cause erroneous readings. The mixing of room air and air from within the wall cavity can lead to condensation, erroneous readings and sensor failure. To prevent these conditions, Greenheck recommends sealing the conduit leading to the junction box, filling the junction box with fiberglass insulation or sealing the wall cavity.

Wiring

All wiring for the Greenheck Temperature and Humidity Controller is Class II low-voltage control wiring. See the Wiring Diagram on Page 7 for the wiring overview.

Control box to factory mounted transformer control input.

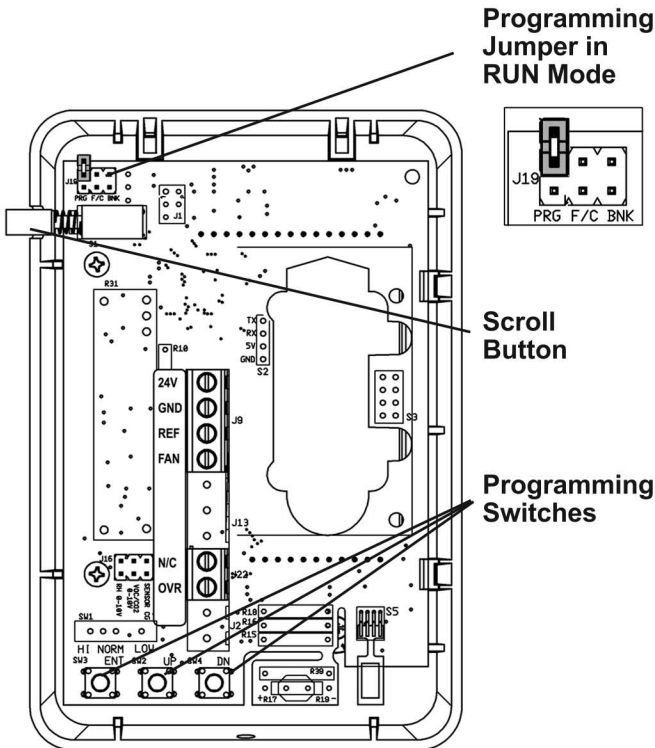
Controller Terminal	Transformer Control Terminal
J9-FAN	0 to 10V
J9-GND	COM
J9-24V	24V

Optional Remote Override

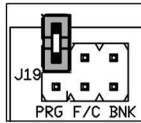
Connect a normally-open switch between terminals J22-OVR and J9-GND on the controller. Closing this switch will activate the remote override feature. Opening the switch will de-activate the override.

Optional Output Reference

A 0 to 10VDC signal is available from J9-REF to J9-GND. The signal is 15° to 130° F (-10° to 55°C) or 0 to 100% Relative Humidity depending on the value of parameter P10 (see pg 6).



Programming Jumper in RUN Mode

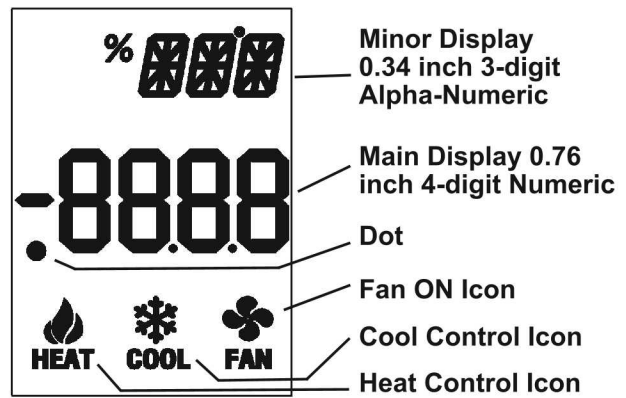


Scroll Button

Programming Switches

User Interface

A scroll button protrudes through the case. The programming switches and programming jumper are inside the case.



Display Features

The minor display is used to describe the units displayed and the main display shows the numeric value. The fan icon is illuminated whenever the fan output voltage is at or above the minimum specified in parameter P8, Minimum % Fan Speed. The Cool and Heat Icons are illuminated in each control mode respectively. The dot in the lower left is used to signal fan cut-out mode.

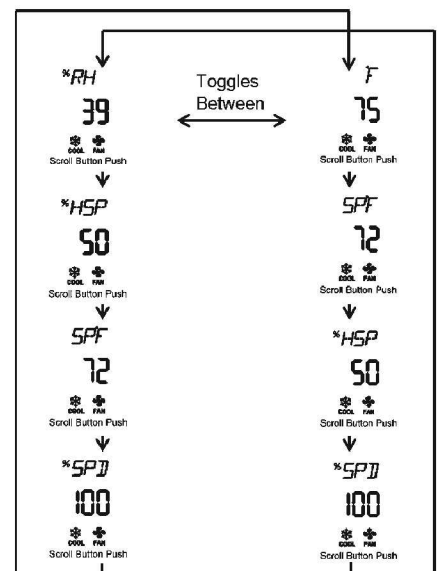
Normal Operation (J19 = RUN)

The Greenheck Indoor Air Quality – Temperature/Humidity Controller ships with the following factory settings: Cooling Control, Temperature Setpoint 72°F, Fan Control output at 2 to 10 Volts and Cut-Out Disabled. Pressing the scroll button at any time shows the Temperature setpoint, a second push shows the fan speed in percent.

The scroll button will change the display momentarily to view other information such as setpoints and fan speed. These are for reference only, and cannot be adjusted. The exact sequence will depend on the settings of parameters P0, P1, P2 and P4. For examples, see the two figures below.



Scroll Button Sequence, Temperature Control Cooling Mode, °F Temperature and Display in run.



Scroll Button Sequence, Temperature & Humidity Control Cooling Mode, °F Temperature and Display in run.

Programming (J19 = PRG)

The unit shall ship with factory default parameter setpoints. Parameter setpoints may be edited in the field by HVAC technicians. During parameter editing, the output voltage shall be set to zero.

General Programming

- Enter the edit mode by removing the unit from its base and placing jumper J19 on the PRG pins. The minor display shall show the parameter name and the major display shall show the parameter number.
- Press the UP or DN switch to select the parameter you wish to edit.
- Press the ENT switch to select the parameter and enter the parameter edit mode. The minor display shall show the parameter name and the major display shall show the parameter value.
- Press the UP or DN switch to change the parameter value. Pressing and holding the switch will scroll through the values.
- If a parameter has more than one sub-menu (see tables pgs 6-7), press the ENT switch to reach the 1st sub-menu and edit the parameter, then push the ENT switch to reach the 2nd sub-menu and edit the parameter. Continue until all sub-menus are edited. Pushing the ENT switch once more will save and return to the parameter menu.
- Return to normal operation by placing jumper J19 on a single pin.



J19 Edit Mode

Restore Factory Default Parameter Values, Parameter P3

Factory Default = OFF

FAC OFF = Entry screen, leave current values

FAC On = Restore factory values

Display Format, Parameter P4

Factory Default = run

DIS OFF = Turn minor and major displays off, leave control mode and fan icons on.

DIS FAn = Unit shows fan speed until scroll button pushed

DIS run = Unit shows temp or humidity values in temp or humidity control. Unit toggles between temp and humidity if both control modes are enabled.

Fan Cutout Timer, Parameter P5

Factory Default = OFF, 30 seconds

CUT OFF = Cutout timer off

CUT On = Cutout timer on

CTM # = Cutout time, 0 to 300 secs in 1 sec increments

The cutout function turns off the fan when the temperature and humidity are below their setpoints for a predetermined amount of time.

Cutout Disabled

The algorithm is run and the FAN output is always between the min and max speed (Parameters P8 & P9).

Cutout Enabled

When the temp and humidity are below setpoint, the cutout timer is started and the dot icon on the display starts flashing. If the timer runs out before the temp and humidity raises above setpoint, then the FAN output is set to zero, the dot icon is on steady and the fan icon is turned off. If the temp and humidity rises above setpoint (1°F or 3%RH), then the dot turns off, the fan icon is illuminated and the FAN resumes algorithm control. The Scroll Button behaves normally during cutout.

Fan Override, Parameter P6

Factory Default = 100% Fan Speed

%OVR # = Fan Speed of 0%, or 20% to 100% in 1% increments

During normal operation, when the remote override switch is closed, the fan will immediately ramp to P6 speed and stay there until the remote override switch is opened. The override can be activated by any normally-open, voltage-free contact. Closing the contact will activate the override. The fan icon shall turn on and the display will show %OVR and the %Speed.

Manual Fan Speed Override, Parameter P7

Factory Defaults = OFF, 50% Manual Fan Speed

SPD OFF = Algorithm control

SPD On = Manual control

%SPD # = 0%, or 20% to 100% in 1% increments

Parameter Descriptions

Temperature Control, Parameter P0

Factory Defaults = On, COOL, Setpoint 72°F

TMP OFF = Temperature control Off

TMP On = Temperature control On

ACT COOL = Cool Mode, operate fan to lower temp

ACT HEAt = Heat Mode, operate fan to raise temp

SP°F # = Temp Setpoint, 15° to 130°F in 1° increments

SP°C # = Temp Setpoint, -10° to 55°C in 0.5° increments
(°C or °F Temp Setpoint is defined by P1 below)

Temperature Units, Parameter P1

Factory Default = F

DEG F = Fahrenheit degrees

DEG C = Celsius degrees

Humidity Control, Parameter P2

Factory Defaults = OFF, Humidity Setpoint 50%RH

HMD OFF = Humidity control off

HMD On = Humidity control on,
operate fan to decrease humidity

%HSP # = Humidity Setpoint,
0 to 100%RH in 1% increments

Parameter P7 continued....

Allows manual control of the fan speed for system setup and commissioning tests. Exiting this parameter returns the controller to normal operation.

When entering this parameter, the value shall be OFF (normal operation). Press the UP button to set the parameter value to On and then press the ENT button. The unit is now in manual control.

The major display shall read 50 for 50% output (5 VDC out). The minor display shall show %SPD.

Pressing the UP button shall increase the displayed value and proportionally change the fan speed. Pressing the DN button shall decrease the displayed value and proportionally change the fan speed.

Allowed values are 0% and 20 to 100%, for 0 VDC and 2 to 10 VDC fan motor control voltage.

The fan speed will remain at the displayed value until the ENT button is pressed placing the unit back to the parameter selection mode.

Minimum Fan Speed, Parameter P8

Factory Default = 20%

Parameter P8 continued...

%MIN # = 20% to 100% in 1% increments

Sets the min fan speed that the controller may control to. Note: the controller will not allow the output min to be set higher than the output max.

Maximum Fan Speed, Parameter P9

Factory Default = 100%

%MAX # = 20% to 100% in 1% increments

Sets the max fan speed that the controller may control to. Note: the controller will not allow the output max to be set lower than the output min.



Analog Output Reference, Parameter P10

Factory Default = Temperature

REF H = Humidity, 0 to 10V for 0 to 100%RH

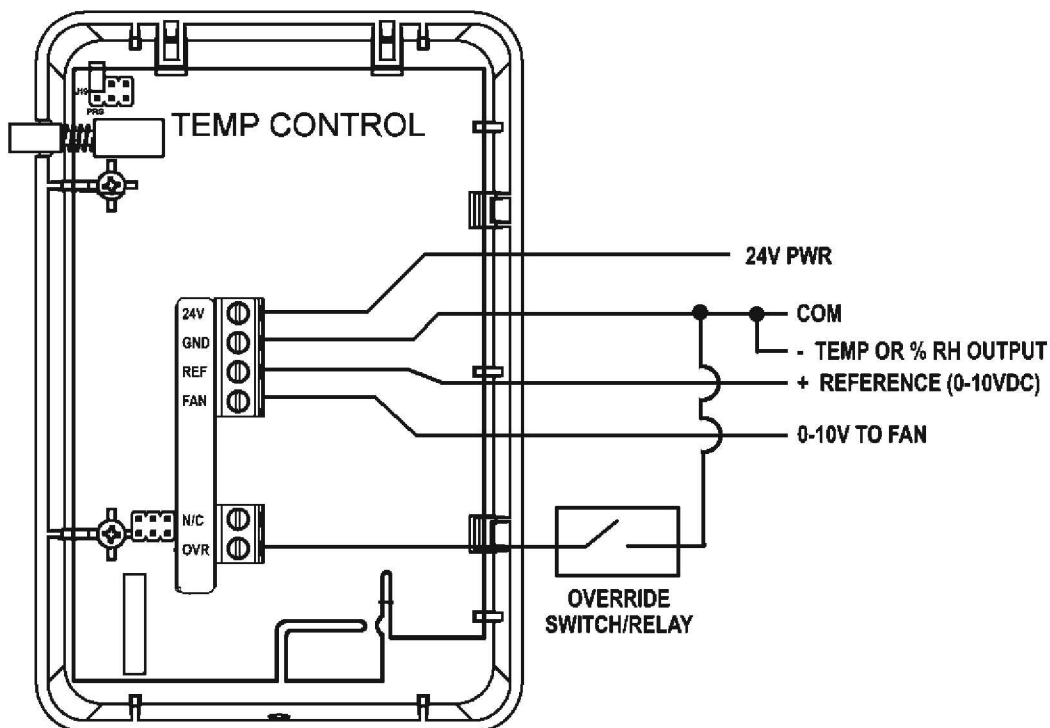
REF t = Temperature,
0 to 10V for 15° to 130°F (-10° to 55°C)

An analog output across J9 terminals “REF” and “GND” for the measured temp or humidity.

Parameter Menu	Sub-Menu 1	Sub-Menu 2	Sub-Menu 3	Description	Factory Default
^{TMP} P0				Page 0, Temperature Control	
	^{TMP} OFF			Temperature Control Off	
	^{TMP} On			Temperature Control On	ON
		^{FACT} COOL 		Cooling Mode, moving cooling air to space	COOL
		^{FACT} HEAT 		Heating Mode, moving heating air to space	
			^{SPF} 72	Temperature Setpoint in Degrees Fahrenheit, 15° to 130°, by 1°, Units Controlled by P1	72°F
			^{SPF} 22.5	Temperature Setpoint in Degrees Celsius, -10° to 55°, by 0.5°, Units Controlled by P1	
^{DEG} P1				Page 1, Temperature Units	
	^{DEG} F			Fahrenheit Degrees	F
	^{DEG} C			Celsius Degrees	
^{HMD} P2				Page 2, Humidity Control	
	^{HMD} OFF			Humidity Control Off	OFF
	^{HMD} On			Humidity Control On	
		^{HSP} 50		Humidity Setpoint, 0 to 100 %RH by 1 %RH	50%
^{FAC} P3				Page 3, Restore Factory Default Menu Values	
	^{FAC} OFF			Entry Screen, Leave Current Values	OFF
	^{FAC} On			Restore Factory Values	
^{DIS} P4				Page 4, Display Format	
	^{DIS} OFF			Turn Minor and Major Display Off, Mode Icons On	
	^{DIS} FAN			Show % Fan Speed	
	^{DIS} run			Show Space Temperature and Humidity, Depends on control mode	run

Parameter Menu	Sub-Menu 1	Sub-Menu 2	Sub-Menu 3	Description	Factory Default
^{CUT} P5				Page 5, Fan Cutout Timer	
	^{CUT} OFF			Fan Cutout Off	OFF
	^{CUT} On			Fan Cutout On	
		^{CTH} 30		Cutout Timer, 0 to 300 seconds	30
^{OVR} P6				Page 6, Override % Fan Speed	
	^{OVR} 100			Fan Speed, 0%, or 20% to 100% in 1% increments	100
^{SPD} P7				Page 7, Manual Fan Speed Override	
	^{SPD} OFF			Manual Fan Speed Override Off	OFF
	^{SPD} On			Manual Fan Speed Override On	
		^{SPD} 50*		Manually Set Fan Speed, 0%, or 20% to 100% in 1% increments	50
^{MIN} P8				Page 8, Minimum % Fan Speed	20
	^{MIN} 20			Minimum % Fan Speed Value, 20% to 100% in 1% increments	
^{MAX} P9				Page 9, Maximum % Fan Speed	
	^{MAX} 100			Maximum % Fan Speed Value, 20% to 100% in 1% increments	100
^{REF} P10				Page 10, Analog Output Reference	
	^{REF} H			0 to 100 %RH, for 0 to 10 VDC	
	^{REF} t			15° to 130°F or -10° to 55°C, for 0 to 10 VDC, Units Controlled by P1	t

Wiring Diagram



Troubleshooting

Problem	Potential Solution
Fan always at minimum speed	<ul style="list-style-type: none"> Blow into the bottom of the unit. Your breath should increase the humidity measurement and raise the temperature measurement. The fan speed should increase within a few minutes.
Fan always at high speed	<ul style="list-style-type: none"> Check that the temperature and humidity measurements are decreasing. Setpoint may be incorrect for the persistent load.
Fan Cutout not working properly	<ul style="list-style-type: none"> Setpoint may be incorrect for the persistent load. If the controller will not turn the fan off, verify that the measured temperature is at least 0.9°F below and the relative humidity is at least 3% below set point. Verify that the cutout timer has started by looking for the flashing dot. If the controller will not restart the fan, verify that the measured temperature is at least 1°F above the setpoint and the relative humidity is at least 5% above the setpoint.

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipment 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.

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

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

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



Phone: (715) 359-6171 • Fax: (715) 355-2399 • E-mail: gfcinfo@greenheck.com • Web site: www.greenheck.com

Assembly Instructions

Please read these instructions carefully before attempting to assemble 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!

1. Upon receiving kit, check for any damage and report it immediately to the shipper. Also, check to see that all parts are accounted for (see reverse side for parts list).
2. Determine desired location of mounting bracket on SP/CSP fan, 9/64 inch diameter holes are factory prepunched for attaching mounting brackets. If different locations are desired, drilling will be required.

CAUTION: When drilling be certain not to penetrate motor or electrical components.

3. Insert neoprene grommets into large holes in mounting brackets. Thread one nut into each 1/4-20 threaded support rod (supplied by others) followed by one flat washer and a shaft sleeve. Insert end of support rod and sleeve into grommet. Install another flat washer and nut on end of support rod, refer to Figure 1.
4. Install hanging support rods using the following vibration isolator centerline dimensions shown in table below.
5. Adjust support rods as required and tighten all fasteners.

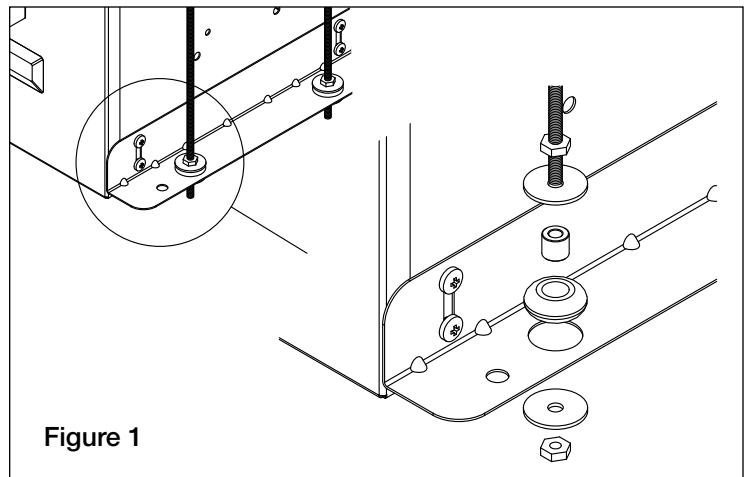


Figure 1

Isolator Centerline Dimensions		
Unit Size	A	B
B50-B200	4½ (114)	15⅝ (397)
A50-A190	5½ (140)	14⅝ (371)
A200-A390	6¾ (171)	15½ (394)
A410, A510, A710, A780	9¼ (235)	19⅝ (497)
A700	5½ (140)	25⅝ (638)
A900-A1050, A1410-A1550	9¼ (235)	25⅝ (645)
A1750, A2150	9¼ (235)	36¾ (933)
A3600	9¼ (235)	48⅝ (1235)

All dimensions shown in inches (millimeters).

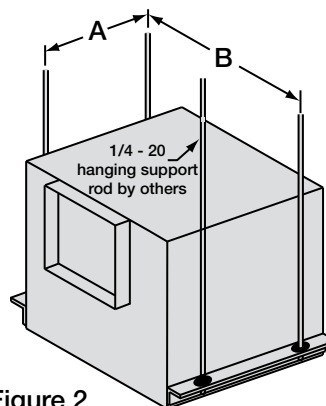


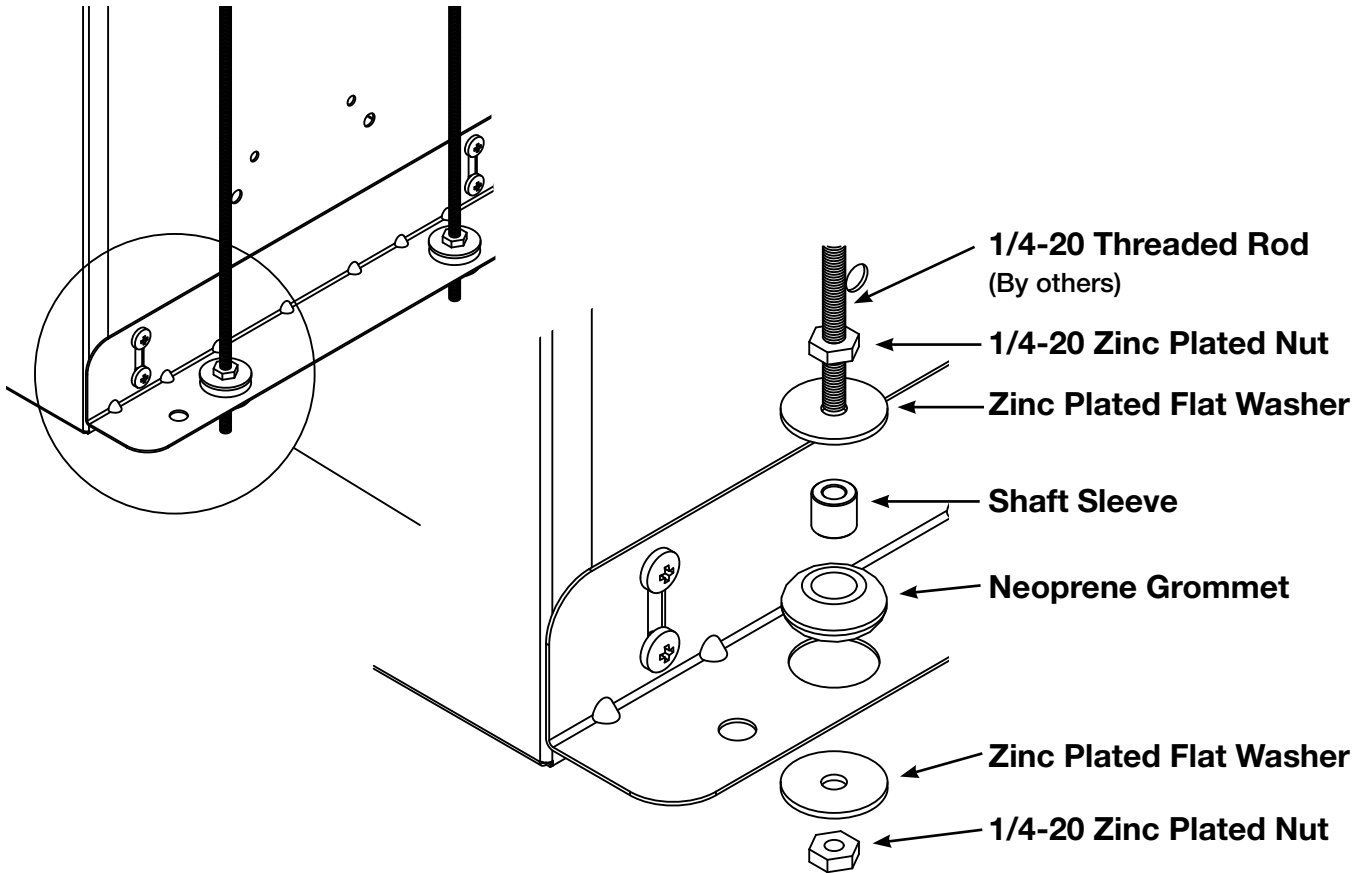
Figure 2

Maintenance

All fasteners should be checked for tightness each time maintenance checks are performed prior to restarting unit. A proper maintenance program will help these units deliver years of dependable service.

NOTE: Make certain unit is not capable of operation during repairs.

Hanging Vibration Isolator Parts List



Quantity	Part Number	Item Description
4	370007	Neoprene Grommets
8	415386	1/4-20 Zinc Plated Nuts
8	415084	Zinc Plated Flat Washers
4	472045	3/8 x 1/4 Shaft Sleeves



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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.

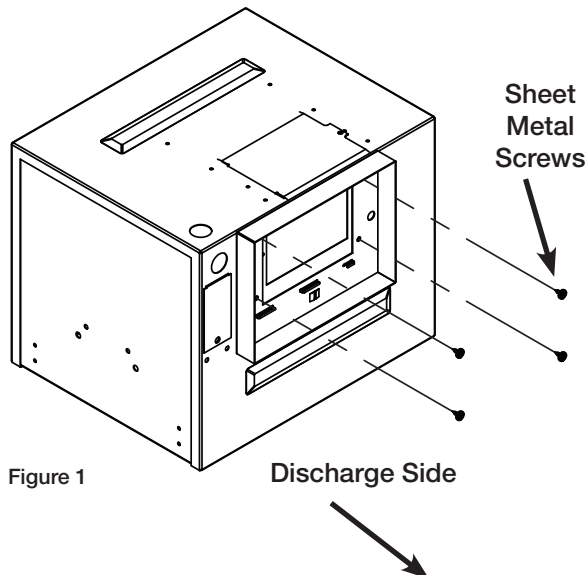


Figure 1

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.

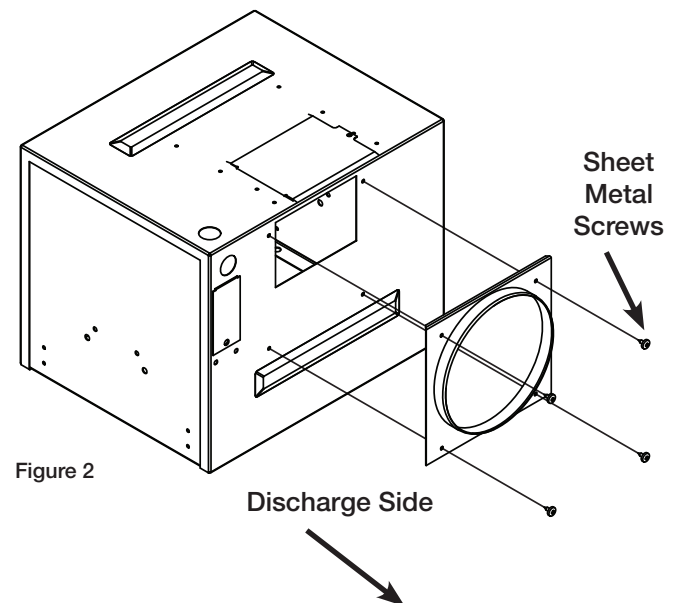


Figure 2

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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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

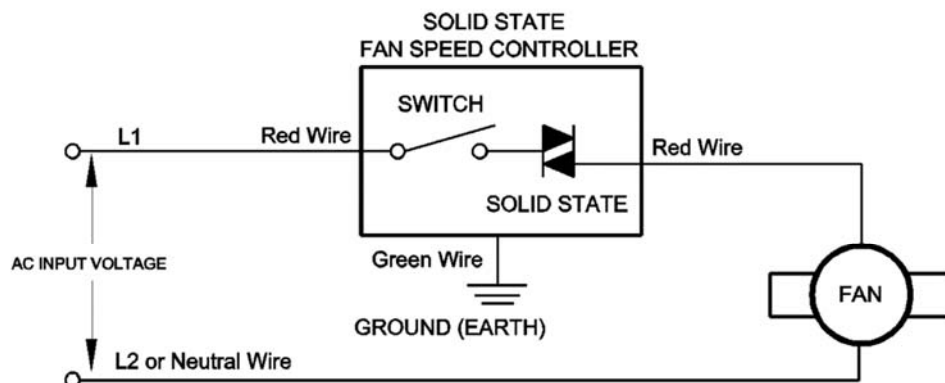
Installation should be completed by a qualified electrician in accordance with the National Electrical Code and any local applicable codes.

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