



*Quality People. Building Solutions.*

Comfort Systems USA (Arkansas), Inc.  
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**Date:** 2/4/2025

**Return Request:** 2/14/2025

**Project:** City Of Sherwood Public Works (Maintenance Building)

**Supplier:** Airetech

**Manufacturer:** Greenheck

**Submittal:** Exhaust Fans & Vehicle Exhaust Fans

**Submittal Number:** 23 34 23-01

**Drawing # and Installation:** Mechanical Drawings

**ARCHITECT**

Cromwell  
1300 East 6<sup>th</sup> Street  
Little Rock, AR 72202  
501-372-2900

**ENGINEER**

Cromwell  
1300 East 6<sup>th</sup> Street  
Little Rock, AR 72202  
501-372-2900

**GENERAL CONTRACTOR**

Baldwin & Shell  
1000 W. Capitol Ave.  
Little Rock, AR 72201  
501-374-8677

**MECHANICAL SUBCONTRACTOR**

Comfort Systems USA (Arkansas), Inc.  
9924 Landers Rd.  
N. Little Rock, AR 72117  
501-834-3320

Notes:

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**CSUSA PROJECT NO.**

**24-6084**

[sean@comfortar.com](mailto:sean@comfortar.com)

9924 Landers Rd.  
No. Little Rock, AR 72117



## **SUBMITTAL DATA**

EQUIPMENT: Greenheck Exhaust Fans & Vehicle Exhaust Fans

TAGS: Administration Building (EF-1 & 2)  
Maintenance and Operations Building  
(EF-1 thru 5 and VEF-1 thru 4)  
Wash Bay (EF-1)

PROJECT: City of Sherwood Public Works Facilities

LOCATION: Sherwood, Arkansas

ENGINEER:



CONTRACTOR:



DATE: 12/10/2024

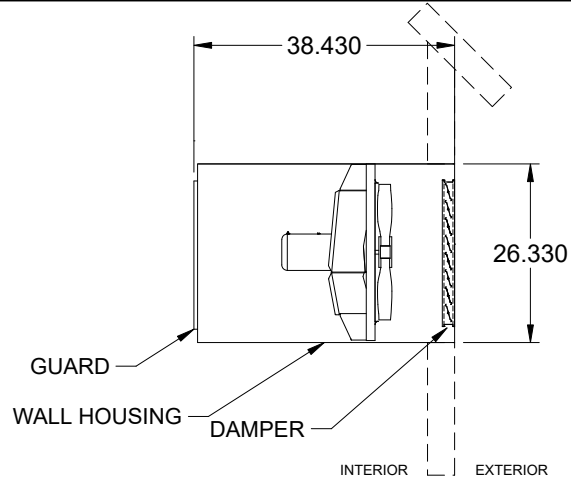
SUBMITTED BY: Forrest Moseley  
forrest@airetechcorp.com

ENGINEER CONTACT: Nick Moore

## Model: AER-20-VGD

Sidewall Direct Drive Fan  
Motor Access From Int. of Bldg.

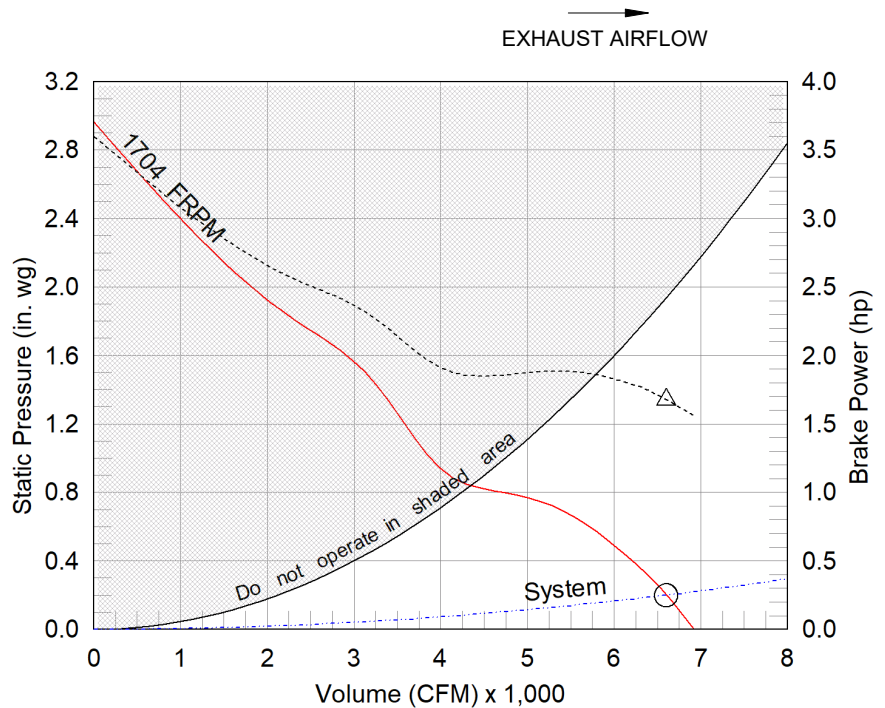
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	88
Weight w/ Acc's (lb)	210
Max T Motor Frame Size	145
Optional Damper (in.)	22 x 22
Wall Opening (in.)	27.5 x 27.5



Performance	
Requested Volume (CFM)	6,600
Actual Volume (CFM)	6,600
Total External SP (in. wg)	0.2
Fan RPM	1704
Operating Power (hp)	1.68
Elevation (ft)	256
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	8,978
Static Eff. (%)	12

Misc Fan Data	
Fan Energy Index (FEI)	0.67
Outlet Velocity (ft/min)	2,915

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	208/60/3
Enclosure	ODP
Motor RPM	1750
Efficiency Rating	NEMA Premium
Windings	1



- △ 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 AMCA 301 at 5 ft  
Sound value does not include carrier frequencies associated with motor controller  
The motor provided on this fan is inverter ready and meets NEMA MG1 Part 31.4.4.2



Nameplate Model: AER-20-02-0630-VGD

### Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	87	89	90	85	83	78	72	67	88	77	27

## Model: AER-20-VGD

### Sidewall Direct Drive Fan

"Greenheck model AER meets or exceeds models SE2/SS2 performance and can be considered a direct replacement for these models."

#### Standard Construction Features:

- Galvanized steel fan panel - Die formed, galvanized steel drive frame assembly
- Fabricated steel blade propeller - Ball bearing motors - Corrosion resistant fasteners

#### Selected Options & Accessories:

"Greenheck model AER meets or exceeds models SE2/SS2 performance and can be considered a direct replacement for these models."

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Motor VFD Rated without Shaft Grounding Protection

Motor with 40 Degree C Ambient Temperature

Vari-Green Drive 100+ 0-10VDC Input Signal

Control - Vari-Green Remote Dial for Indoor Wall Mounting

Airflow Direction: Exhaust

Long Wall Hsg, Flush Exterior, w/OSHA Grd., Factory Installed

Motor Access: From Int. of Bldg.

Mounting Style - Flush

Switch, NEMA-1, Toggle,

Junction Box Mounted & Wired

Closure Angles, Shipped in Crate Unattached

Galvanized Damper Guard, Factory Installed

Unit Warranty: 1 Yr (Standard)

Not available to ship to California

Damper Shipped Loose, EM-31-PB-22X22, Gravity Operated, Not Coated

***The Vari-Green Drive included in this order can operate on any three phase voltage between 208V and 240V.***

## Disconnect Switch

Enclosure Rating: NEMA-1

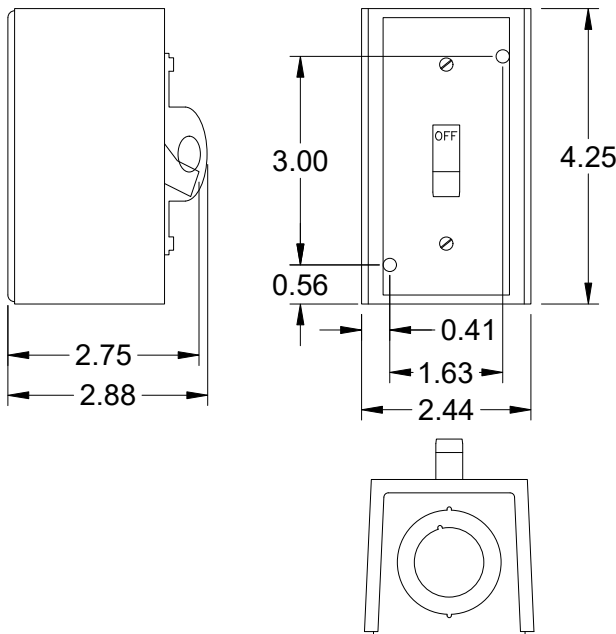
### Standard Construction Features:

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.

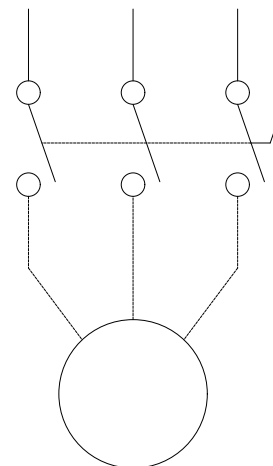
### Disconnect Switch Configuration

Type:	Toggle	Motor Size:	2 hp	Voltage:	208	UL Listed:	Yes
Manufacturer:	Square D	Cycle:	60	Amperage:	30	CSA Approved:	Yes
Overload Protection:	None	Phase:	3	Switch Pole(s):	3	Rating:	10 hp
Junction Box Mtg.:	Mounted and Wired	RPM:	1750	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

### Electrical Drawing Details



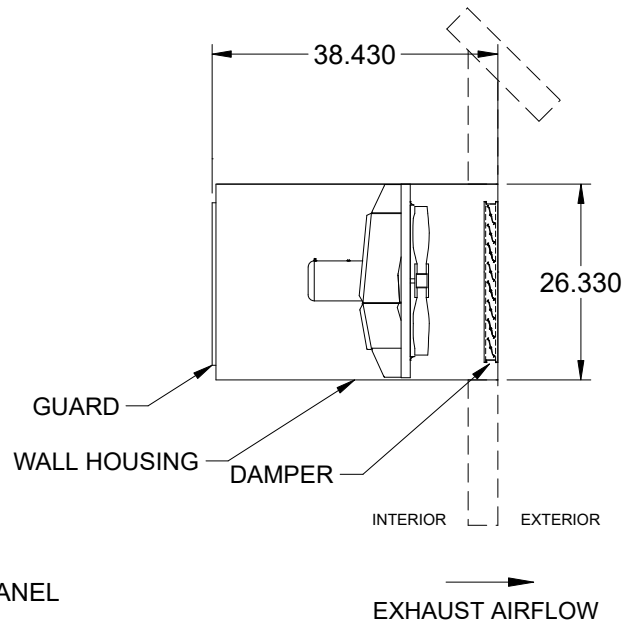
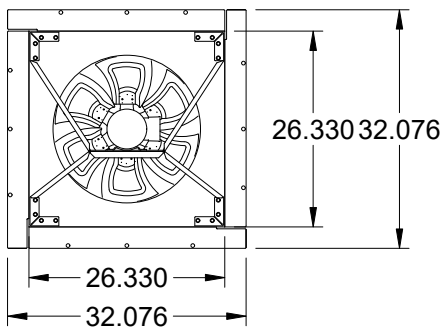
### Wiring Schematic



Notes: All dimensions shown are in units of in.

## Assembly Drawing

Type: Sidewall Direct Drive Fan



END VIEWED FROM INTERIOR  
END VIEW DIMENSIONS ARE FOR HOUSING NOT FAN PANEL  
WALL OPENING 27.33 SQ.  
MOTOR IS ACCESSIBLE FROM INTERIOR OF BUILDING  
THIS IS AN EXHAUST FAN DUE TO MOTOR ORIENTATION

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

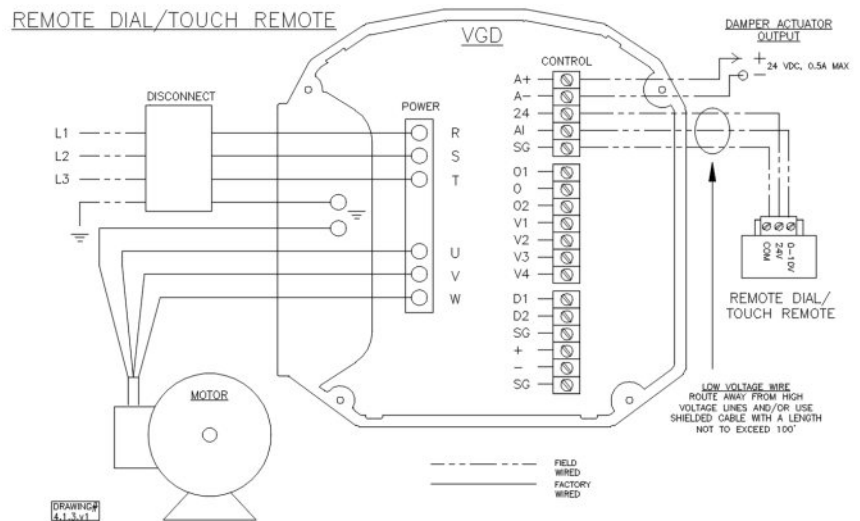
## Vari-Green Drive

The Vari-Green Drive 100+ is factory mounted, wired, and programmed to match the fan and motor characteristics. The Vari-Green Drive can be configured with an on-board potentiometer dial, a 0-10VDC signal, or a 4-20mA signal for speed adjustments. 24VDC power is available for powering additional controls and a motorized damper. Model 100+ has Bluetooth connectivity and can be configured (if needed) through the use of the Vari-Green Drive app.

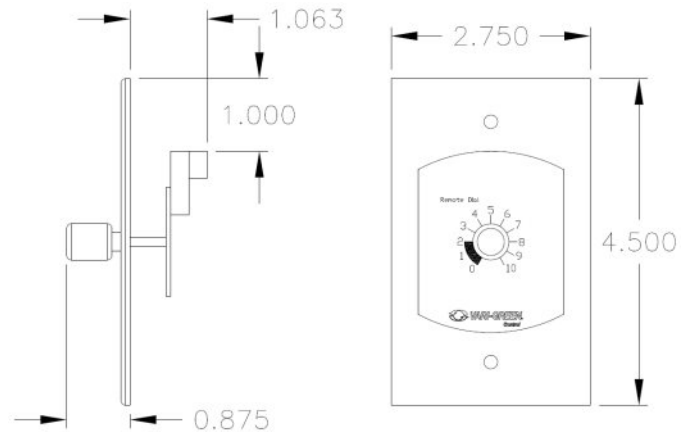
### Control Options

A control that allows remote adjustment to the motor rpm (fan speed). This control includes a wall plate with dial that may be mounted to a standard 2x4 electrical junction box.

VGD Model: 100+  
VGD Control Type: Remote Dial



### Dimensional Detail



## Vari-Green® Drive – 100+

200-240 VAC, 380-480 VAC, 3Ø  
 Factory Mounted, Pre-Programmed, Variable Speed Control  
 R<sup>3</sup> Filtering Technology



The Vari-Green Drive 100+ is factory mounted, wired and programmed to match the fan and motor characteristics. The Vari-Green Drive can be configured with an on-board potentiometer dial; a 0-10VDC or 4-20mA signal for fan speed control. 24VDC power is available for powering Vari-Green Controls as well as a motorized backdraft damper.

Included in price of fan with the Vari-Green Drive:

- Mounting
- Wiring
- Programming

Competitive bids with standalone variable frequency drives should account for these items.

SPECIFICATIONS		Part # 385819	Part # 385820	Part # 386422	Part # 386423
Output Ratings	Voltage	0 - 240VAC	0 – 480 VAC	0 – 240 VAC	0 – 480 VAC
	Max motor FLA	8.0A	6.0A	16.0A	14.0A
	Frequency*: 15 – 240 Hz	Yes	Yes	Yes	Yes
	Phase	3Ø	3Ø	3Ø	3Ø
Input Ratings	Voltage (+15%/-10%)	200-240VAC	380-480VAC	200-240VAC	380-480VAC
	Frequency: 50/60Hz (±5%)	Yes	Yes	Yes	Yes
	Phase	3Ø	3Ø	3Ø	3Ø
	Efficiency, full load	≥ 96%	≥ 98%	≥ 96%	≥ 98%
	Power Factor	≥ 0.9	≥ 0.85	≥ 0.9	≥ 0.85
	% THD (Meets IEEE 519)	32.0	32.0	32.0	32.0
	On Board Fuses	Yes	Yes	Yes	Yes
Environment	Max Ambient Temp	40°C (104°F)	40°C (104°F)	40°C (104°F)	40°C (104°F)
	Storage Temperature	-30 to 65°C (-22°F–149°F)	-30 to 65°C (-22°F–149°F)	-30 to 65°C (-22°F–149°F)	-30 to 65°C (-22°F–149°F)
	Relative Humidity (Non-condensing)	Up to 95% RH	Up to 95% RH	Up to 95% RH	Up to 95% RH
Certifications	Agency Approvals: UL Listed E223975 to 61800-5-1	Yes	Yes	Yes	Yes
	Enclosure Rating	Type 4/IP66	Type 4/IP66	Type 4/IP66	Type 4/IP66

\*Actual frequency range will vary.



Operational Features	VGD 100	VGD 100+
Analog Input 0-10V, 0-24V, 4-20mA (selectable via DIP switch)	Yes	Yes
Damper Actuator Output 24VDC, 0.5A Max	Yes	Yes
Control Voltage Output 24VDC, 50mA Max	Yes	Yes
LEDs (3): Power, Run, Fault	Yes	Yes
Relay Output (2)	No	Yes
Digital Input – Dry (2)	No	Yes
Digital Input – Voltage (2)	No	Yes
RS-485 (Modbus/BACnet)	No	Yes
Bluetooth/Smart Phone Interface	No	Yes
On-Board PID Control	No	Yes
Optional Pressure Transducer	No	Yes

CONTROL WIRING			
Terminal	Description	Rating	Notes
A+	Damper Output	24VDC / 0.5A Max	Programmable activation modes
A-			
24	24VDC Output	24VDC / 50mA Max	Voltage or current input configurable via analog dip switches 1 & 2
AI	Analog Input	0-24V / 0-10V / 4-20mA	
SG			
O1	Relay Output	125VAC-0.5A / 250VAC-0.25A / 30VDC-2.0A / 125VDC-0.24A / 220VDC-0.24A	Can be configured to “N.O.” (default) or “N.C.” Functions: run, fault, ...
O			
O2			
V1	Voltage Input 1	12-250V AC/DC / 8mA Max draw on at 10V min, Off at 3V Max 52kOhm input impedance	Can be configured to “Active High” (default) or “Active Low” Functions: enable, limit switch, fireman’s override, speed A, speed B, shutdown
V2			
V3	Voltage Input 2		
V4			
D1	Dry Input 1	24VDC when open / Short to SG to activate	Can be configured to “Active High” (default) or “Active Low” Functions: enable, limit switch, firemen’s override, speed A, speed B, shutdown
D2	Dry Input 2		
SG	Input Common		
+	RS-485 Communications	N/a	Modbus, BACnet
-			
SG			

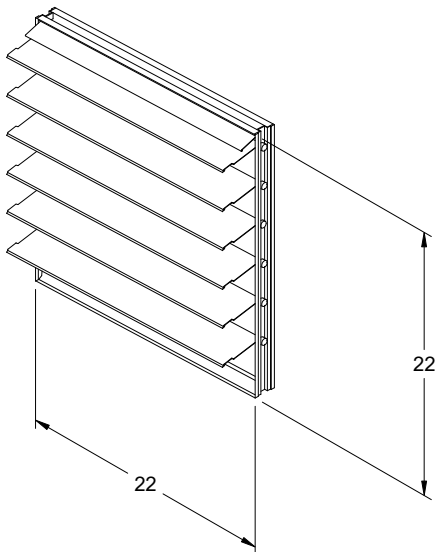
WIRING SIZES AND TERMINAL LUGS							
VFD rating	Terminals	Screw Size Metric	Screw Torque			Conductor Size	
			kgf. cm	lbf.in	Nm	AWG/kcmil	mm <sup>2</sup>
200 – 240VAC 380 – 480VAC	All Control Terminals	M2.6	4.55	3.98	0.4	14 - 26	0.2 – 2.5

## Vertical Mount Backdraft Damper

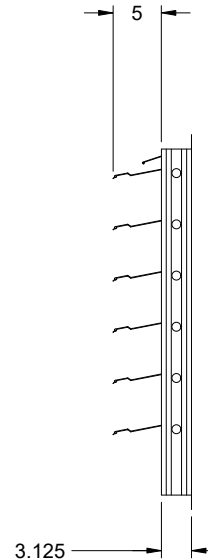
Model: EM-31

### Standard Construction Features:

-Model EM-31 is a gravity backdraft damper mounted vertically to allow horizontal airflow and prevent reverse airflow. Damper frame is heavy gauge 6063T5 extruded aluminum channel, flange on discharge; blades are 6063T5 extruded aluminum; 0.75 in. dia. metallic axles turning in acetal bearings; damper shall be equipped with extruded vinyl blade seals; and internal 0.125 in. plated steel blade-to-blade linkage. Damper is suitable for pressures to 10 in. wg and velocities to 3,500 ft/min.



DAMPER



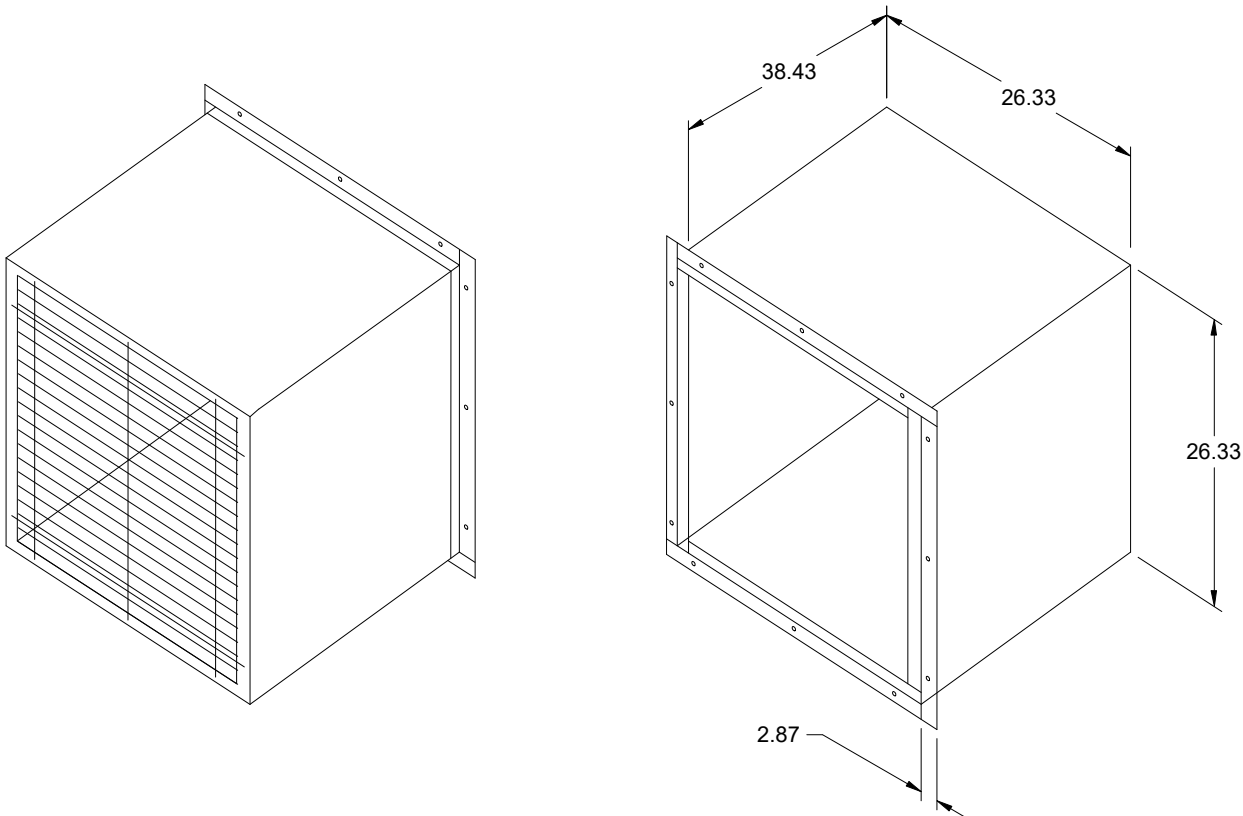
TYP. SECTION VIEW

Notes: All dimensions shown are in units of in.

## Long Wall Housing

### Standard Construction Features:

- Galvanized steel construction - Heavy gauge mounting flanges - Pre-punched mounting holes - Inside flanges allow damper to be mounted - Overlapping weatherhood flange keeps rain out - OSHA Protective guard of welded steel wire completely protects the drive side of the wall housing.



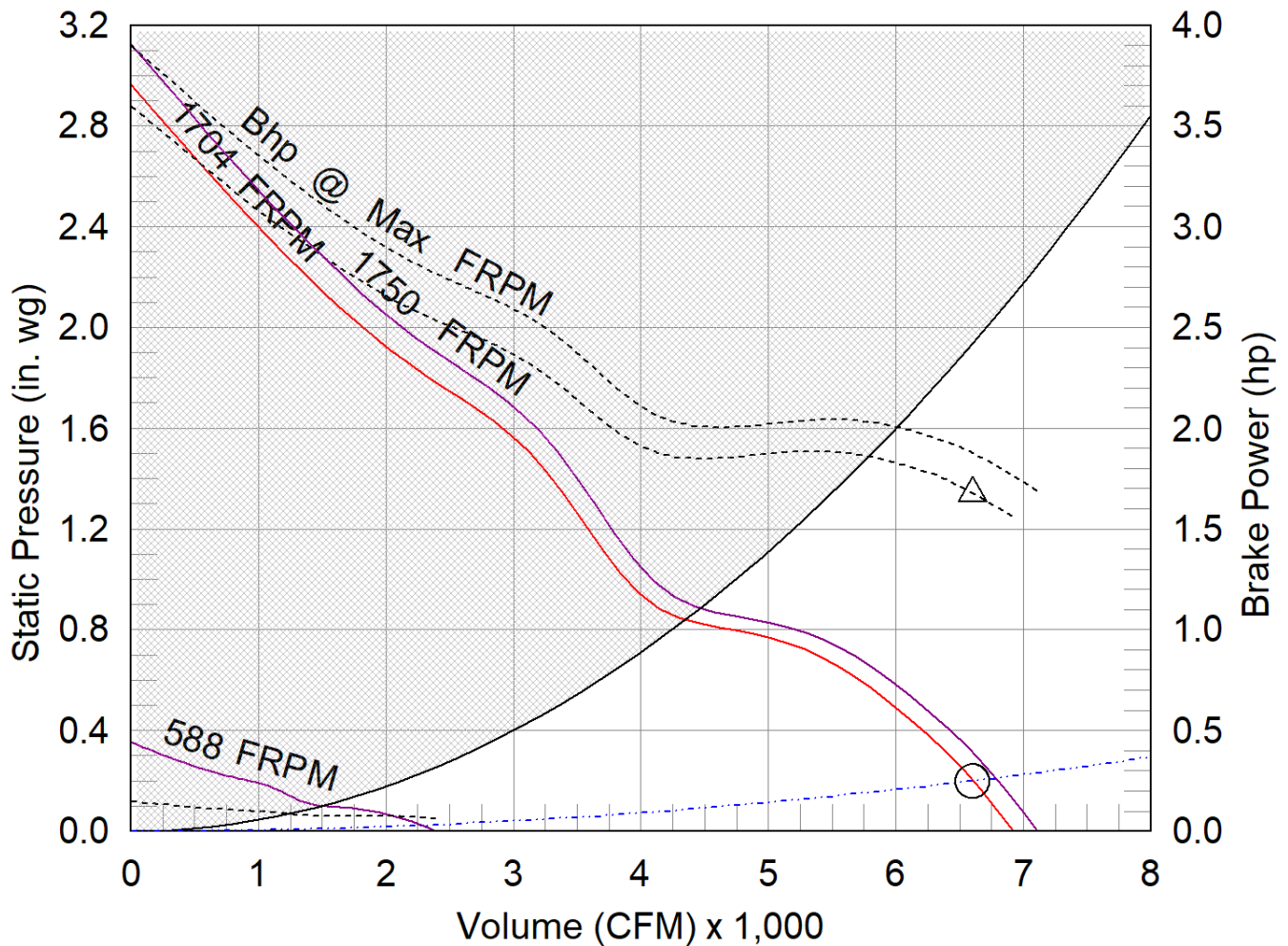
Notes: All dimensions shown are in units of in.

## AER-20-VGD

## Min/Max Fan Curve

### Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
6,600	6,600	0.2	1704	1.68



- △ Operating Bhp point
- Operating point at Total External SP
- Construction/System Limit
- Fan curve
- VFD 20 HZ Limit
- 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.

## Model: SQ-100

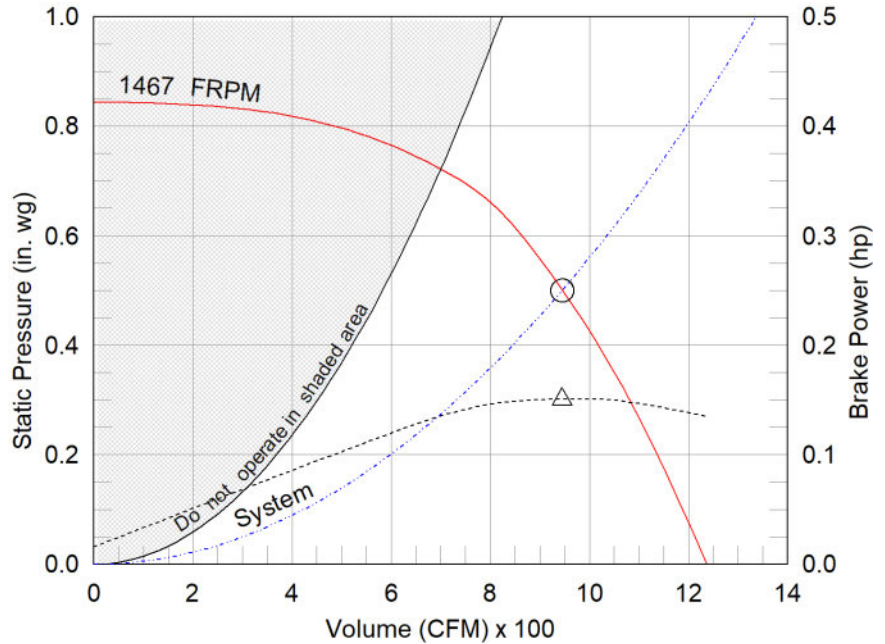
### Direct Drive Centrifugal Inline Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	55
Weight w/ Acc's (lb)	79
Max T Motor Frame Size	56
Optional Damper (in.)	14 x 14

Performance	
Requested Volume (CFM)	945
Actual Volume (CFM)	945
Total External SP (in. wg)	0.5
Fan RPM	1467
Operating Power (hp)	0.15
Elevation (ft)	256
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	4,297
Static Eff. (%)	49

Misc Fan Data	
Fan Energy Index (FEI)	-
Outlet Velocity (ft/min)	721

Motor	
Motor Mounted	Yes
Size (hp)	1/4
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP
Motor RPM	1725
Windings	1
NEC FLA* (Amps)	5.8
Min. Circuit Ampacity (MCA)	7.25
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

### Nameplate Model: SQ-100-X

#### Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	66	70	68	68	64	59	52	50	69	57	8.2
Radiated	67	72	63	62	59	53	46	46	64	53	6.4

#### 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 AMCA 301 at 5 ft



## Model: SQ-100

### Direct Drive Centrifugal Inline Fan

**Greenheck model SQ Mixed Flow meets or exceeds legacy centrifugal models SQ/BSQ in performance and features. SQ Mixed flow is an approved equal and can be considered a direct replacement for these models.**

#### Standard Construction Features:

- Galvanized steel housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-160) wheel - Two bolted access panels - Integral duct connection flanges - Ball bearing motors (sizes 97-160 and all vari-green motors), sleeve bearing motors (sizes 60-95) - Corrosion resistant fasteners

#### Selected Options & Accessories:

PSC Motor

Provided motor meets the motor efficiency requirements set forth in 2024 Title 24/California

UL/cUL 705 Listed - "Power Ventilators"

Junction Box Mounted and Wired

Switch, NEMA-1, Toggle, Shipped Separate

Aluminum Centrifugal Wheel

Motor Cover

Fan: Spring, Hanging, 1 Inch Isolator PN: 850343, Incl. 4 isolators and 4 brackets

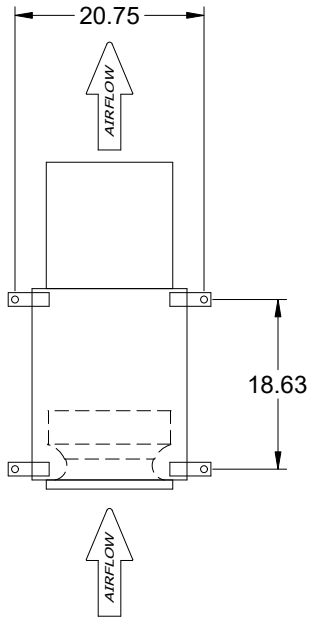
Solid State Speed Control, 6 Amp, Shipped Loose

Damper Shipped Loose, Inline, WD-330-PB-14X14, Gravity Operated, Not Coated

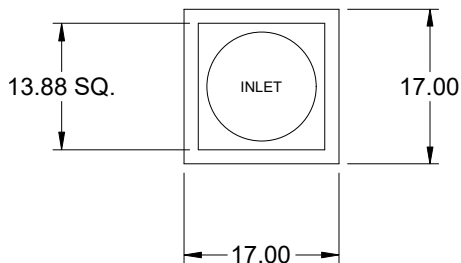
Unit Warranty: 1 Yr (Standard)

# SQ-100

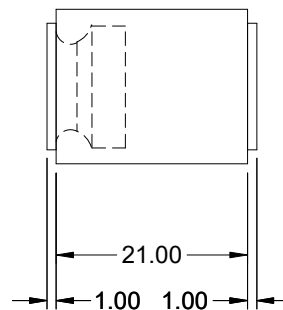
## Direct Drive Centrifugal Inline Fan



TOP VIEW



END VIEW



SIDE VIEW

Notes: All dimensions shown are in units of in.



## Disconnect Switch

Enclosure Rating: NEMA-1

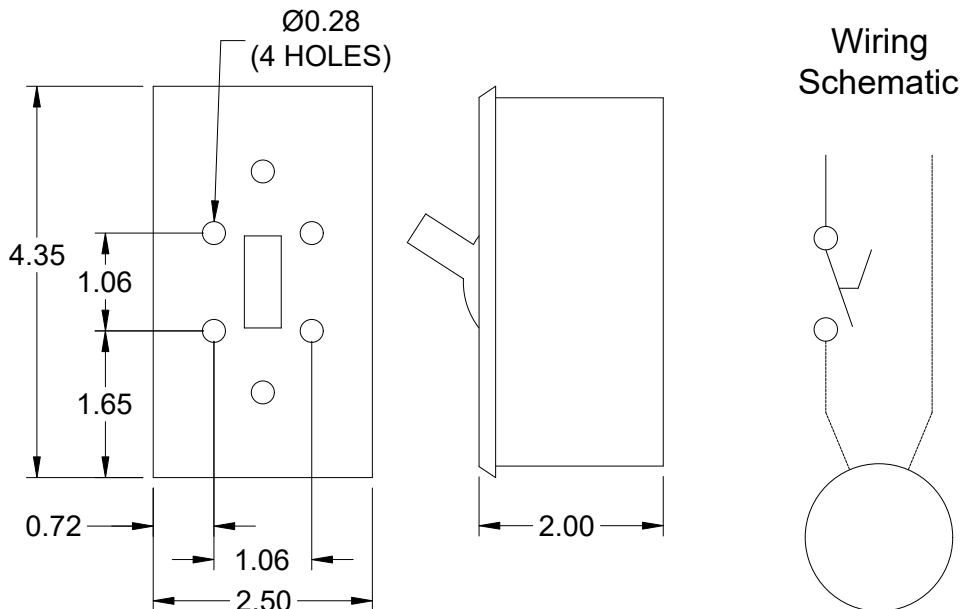
### Standard Construction Features:

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.:	Ship Separate	RPM:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped Separate						

### Electrical Drawing Details



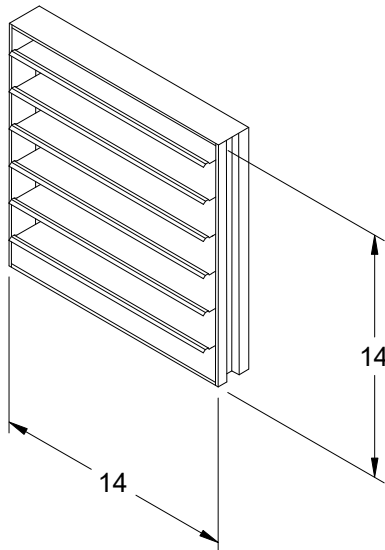
Notes: All dimensions shown are in units of in.

# Vertical Mount Exhaust Damper

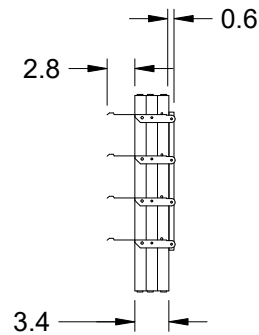
Model: WD-330

## Standard Construction Features:

- Model WD-330 is a vertical mount exhaust damper and is constructed of galvanized steel with pre-punched mounting holes - Damper blades are 0.025 in. roll formed aluminum with vinyl seals on the closing edge - Steel axles are 0.188 in. diameter zinc plated steel - Nylon type bushings



DAMPER



TYP. SECTION VIEW

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

## Fan Isolator

Type: Spring, Hanging, 1 Inch

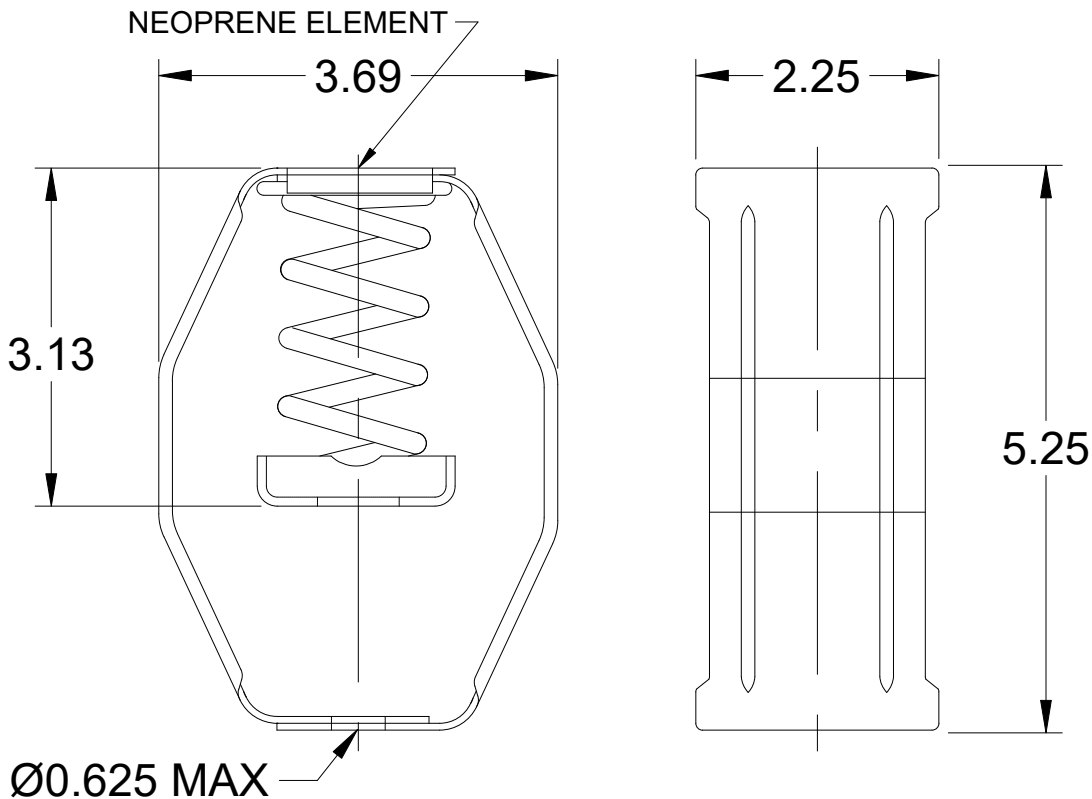
### Standard Construction Features:

The spring hanging isolator is designed to reduce the transmission of vibration and noise produced by suspended equipment and piping. To assure stability, the spring element has a minimum lateral stiffness of 1.0 times the rated vertical stiffness. The hanger will allow a support rod misalignment through a 30 degree arc and the isolation brackets will carry a 500% overload without failure. The isolator has an epoxy powder coated bracket and spring coil which is color coded according to the load capacity and has a noise isolation pad, all which is assembled into a stamped or welded hanger bracket. This part number includes 4 isolators.

### Isolator Configuration

Description:	SH-1-35	Color:	Blue
Manufacturer:	Kinetics Noise Control	Mounting:	Hanging
Load Capacity:	35 lb	Kit Part Number:	850343
Deflection at Full Load:	1.52	Selection Deflection (in.):	0.6

## Spring, Hanging, 1 Inch Deflection - Vibration Isolator



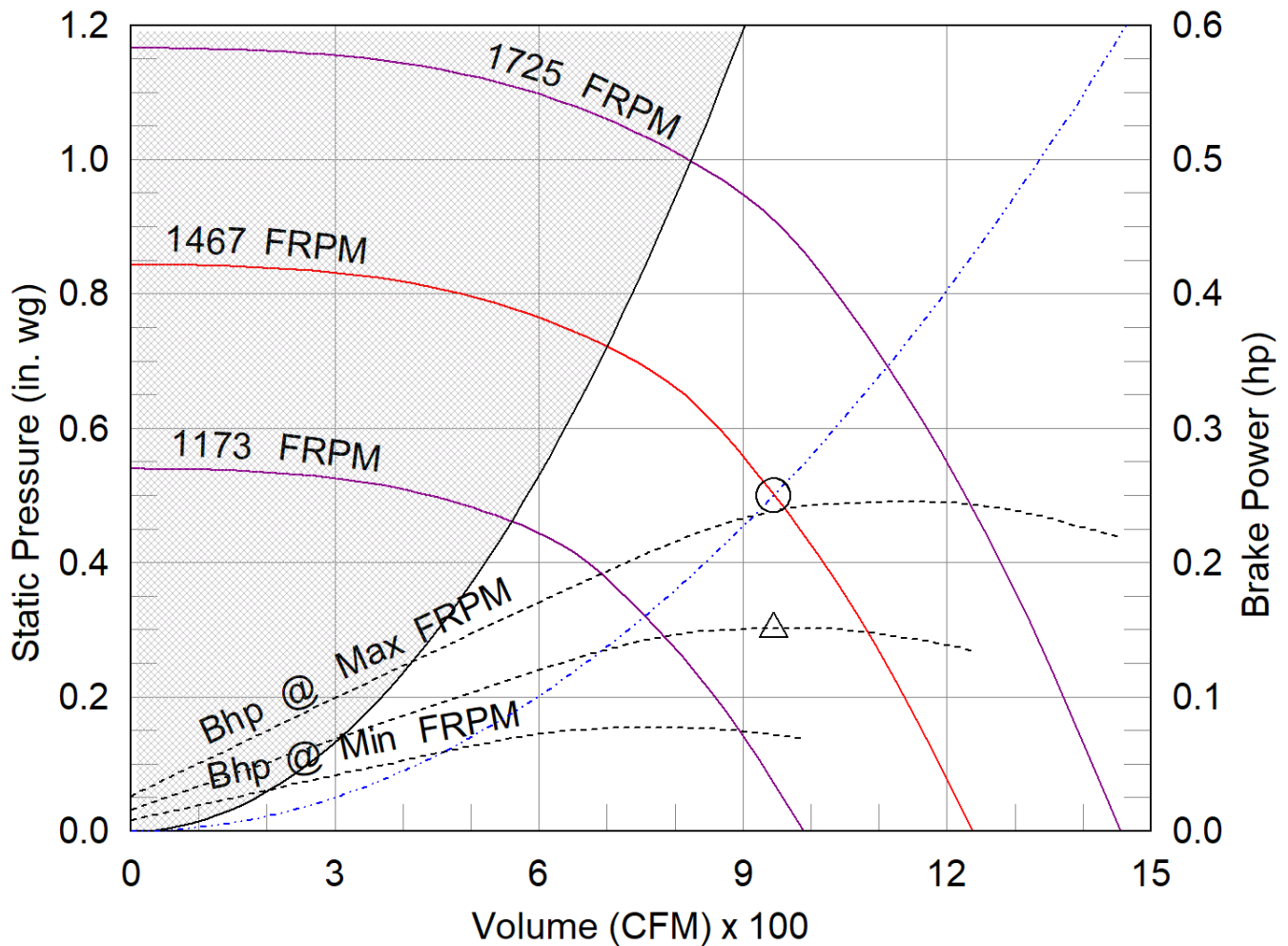
Notes: All dimensions shown are in units of in.

## SQ-100

## Min/Max Fan Curve

### Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
945	945	0.5	1467	0.15



- △ 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.

Performance	
Quantity	2
Volume (CFM)	1,600
Total External SP (in. wg)	5
Operating Power (hp)	1.92
Required Power (hp)	1.92
Fan RPM	3018
Max Fan RPM	3,151
Oper. Frequency (Hz)	60
Elevation (ft)	256
Start-up Temp.(F)	70
Operating Temp.(F)	70

Fan Configuration	
Size	12
Wheel Type	BI
Arrangement	10
Drive Type	Belt
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Steel
Wheel Material	Steel
Inlet Cone Material	Steel
Pedestal Material	Steel

Equipment Weights	
Fan (LMD)(lb)	141
Motor/Drive (lb)	89
Accessories (lb)	4
Fan Total (lb)	234

Misc Fan Data	
Fan Energy Index (FEI)	1.31
Outlet Velocity (ft/min)	1,853
Static Efficiency (%)	70
Tip Speed (ft/min)	9,679
Shaft Bearing Type	Standard
Bearing Life Calculation	Operating Point
L10 - Bearing Life (hrs.)	1,000,000

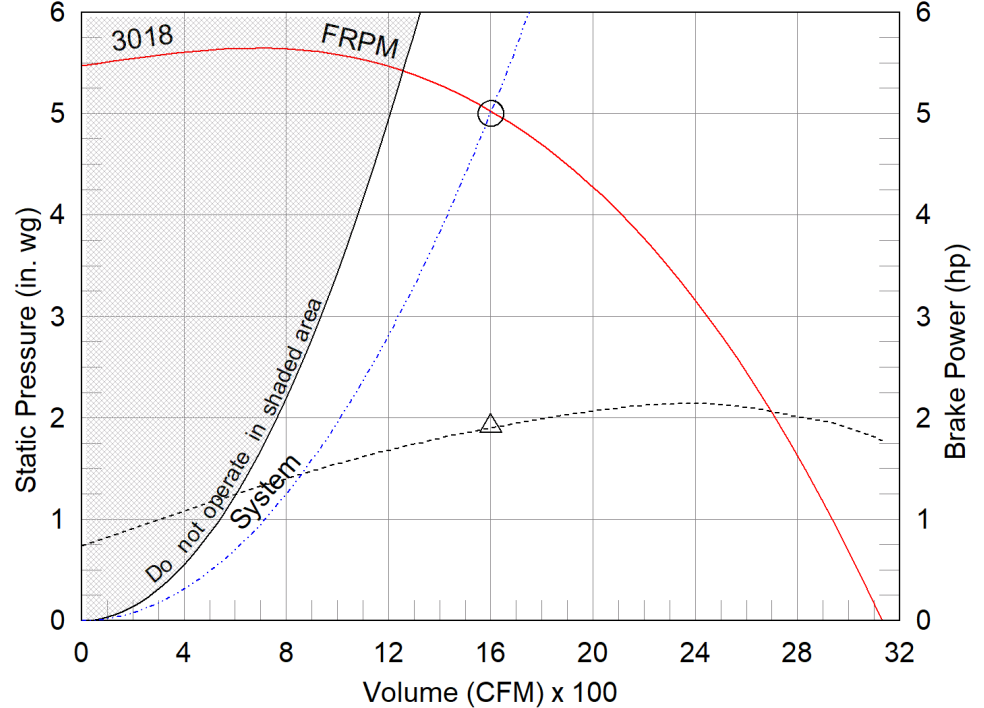
Motor and Drives	
Motor	Included
Size (hp)	3
RPM	3600
Enclosure	TEFC
V/C/P	208/60/3
Frame Size	182T
Max Frame Size	184
Location	Centered
Pulley Type	Constant
Drive Loss (%)	4.9
Drives	Standard
Drive Service Factor	1.5
MCA* (Amps)	13.25
MOP* (Amps)	15
SCCR* (Kiloamps)	5

## Model: USF-12

### Universal Single Width Fan

Tags: VEF-1 VEF-2

### Operating Performance



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

Nameplate Model: USF-12-5-B6-00-02-02

### Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	85	84	85	84	79	76	74	68	85	74	23
Outlet	99	91	88	85	79	78	73	70	87	75	29

\*Values are estimated and subject to change. Actual values provided on fan at time of manufacture.

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 AMCA 301 at 5 ft



## Model: USF-12

Universal Single Width Fan

### Standard Construction Features:

HOUSING: Class II and under feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Outlet flange standard on sizes 27 - 73 and all class III fans - Untreated steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high-performance powder coating. Sizes 24 and less are rotatable in 45 deg. increments. Sizes 27 to 40 are rotatable in 90 deg. increments. Sizes greater than 40 and all class III are not rotatable.

BEARINGS, SHAFT, AND WHEEL: Air handling quality, self-aligning, ball bearing in pillow block housing - Polished, solid steel shafts with rust inhibitor - Centrifugal wheel

### Selected Options & Accessories:

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Switch - NEMA-3R, Toggle, For Indoor or Outdoor Use, Mounted & Wired

Motor with Class B or Greater Insulation

Standard Drives

Finish - Coated

Coating - Permatecor, Concrete Gray-RAL 7023, Fan and Attached Accessories

Direct Mount Isolators, Isolator-Spring, Restrained, 1 Inch, Indoor / Outdoor Use, Base Coating - N/A

Bearings - L10 Standard Life, 1000k hours at OperatingPoint

Housing - PermaLock

Wheel - Backward Inclined

UL Listed for UL/cUL-705 - "Power Ventilators"

Polished Steel Shaft

Access Door - Bolted

Extended Lube Lines - Nylon

Inlet Connection, Slip Fit

Outlet Flange, Punched

Weatherhood - Steel Construction

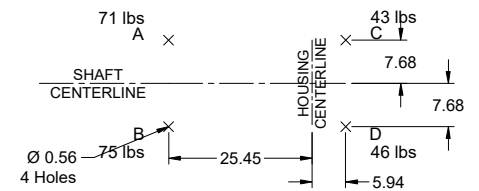
Fasteners - Standard

Factory Vibration Test, 0.15 in/sec, Peak, Filter-in as measured at the fan RPM

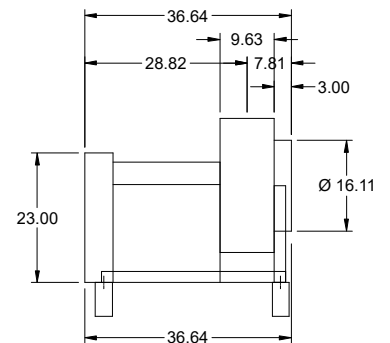
Motor Starter

Unit Warranty: 1 Yr (Standard)

## Universal Single Width Fan



### FOOTPRINT VIEW



END VIEW

Notes: All dimensions shown are in units of in.



## Isolators

Type: Spring, Restrained, 1 Inch

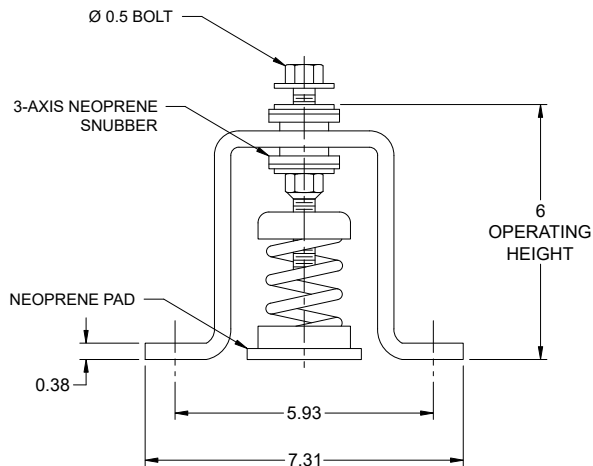
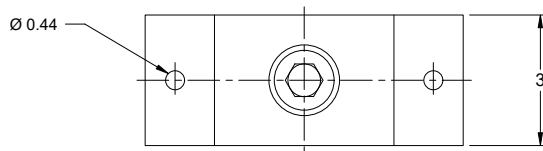
### Standard Construction Features:

Designed for horizontal and vertical restraint. Housings can be bolted or welded to supporting structure. Housings may be used for blocking during installation. Springs are color coded or identified to indicate load capacity. Neoprene pad for noise reduction.

### Fan Configuration

Model: USF-12  
Arrangement: 10  
Rotation: CW  
Motor Position: Centered  
Isolator Color A: Gray  
Isolator Color C: Green  
Isolator Description A: FHS-1-120  
Isolator Description C: FHS-1-70  
Isolator Manufacturer: Kinetics

Discharge Position: UB  
Class: I  
Motor Frame Size: 182T  
Isolator/Deflection: Spring, Restrained, 1 Inch  
Isolator Color B: Gray  
Isolator Color D: Green  
Isolator Description B: FHS-1-120  
Isolator Description D: FHS-1-70



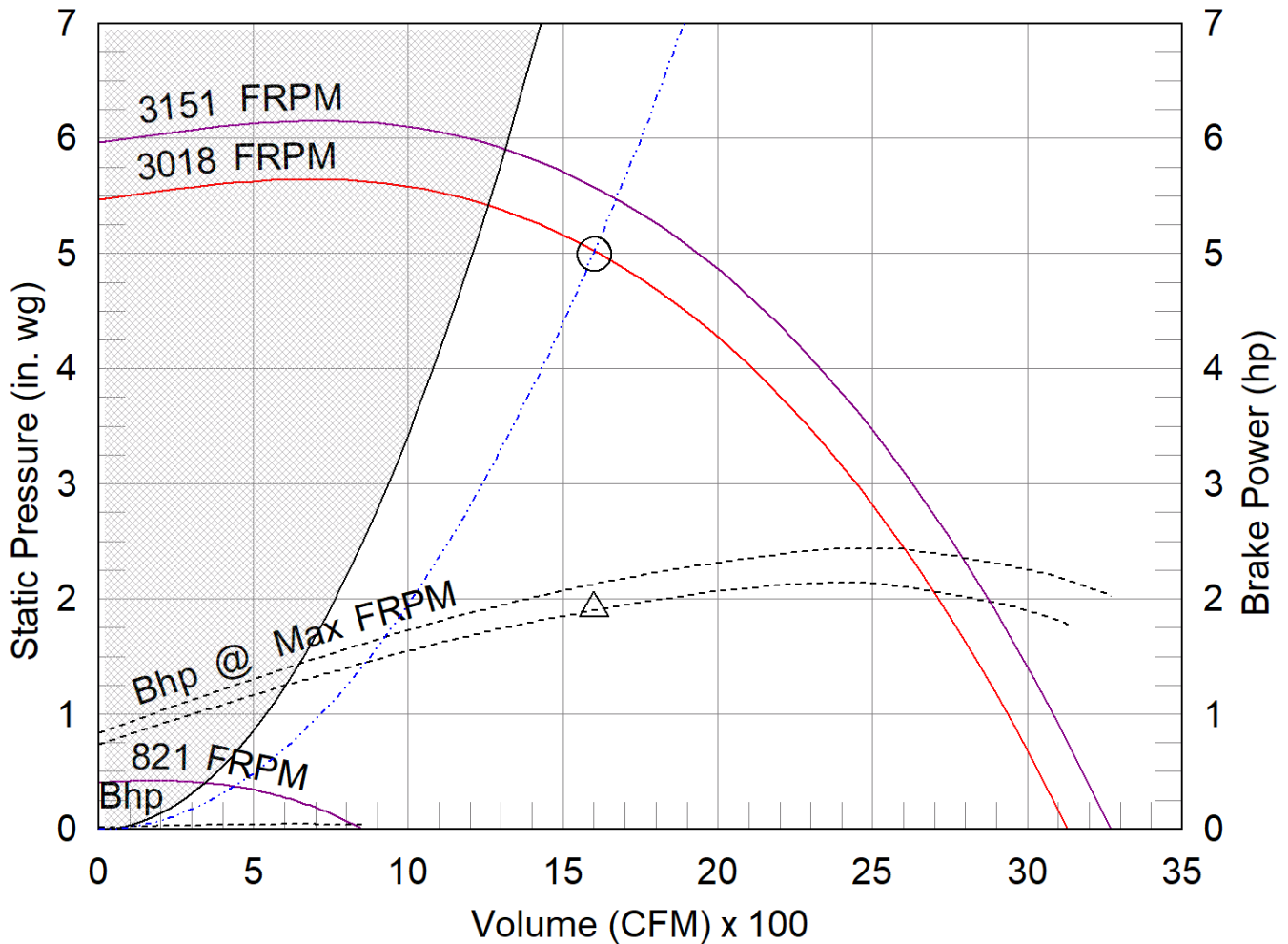
Notes: All dimensions shown are in units of in.

USF-12

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	Fan RPM	Operating Power (hp)
1,600	1,600	5	5	3018	1.92



- △ 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. SELLER may make further warranty protection available on an option extra-cost basis and which must be authorized and in writing.

Motors furnished are warranted by the motor manufacturer for a period of one year for single phase motors and three years for 3-phase motors after shipment from Greenheck. Should motors furnished by Greenheck prove defective during this period, motors with frame sizes 254T and larger should be returned to the nearest authorized motor service station. Motors with a frame size of 215T and smaller must submit a motor label to Greenheck using the motor warranty claim form located at: <https://www.greenheck.com/resources/warranties>. Greenheck 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.

ANY MISUSE, NEGLIGENCE, FAILURE TO FOLLOW INSTRUCTIONS OR MANUALS OF INSTALLATION OR 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).

## Motor Starter Advanced Control with SMARTSTART™

Qty: 2 Model: MSAC-1-18/J-G13-40

### Standard Construction Features:

NEMA and IEC, dual-rated contactor – HOA keypad – Hand, off, auto, run and fault lights – Conduit plate knockouts – Solid-state, electronic overload – Stall protection – Locked rotor trip – Max start time monitoring – Overload out of calibration protection – Adjustable power failure restart mode – 3 inputs for remote control; 12-250V direct voltage input, N.O.dry contact and fireman's override – 2 output relays; motor status and fault alarm – Damper actuator control, 24VDC, 30VA max – Damper limit switch input - UL, cUL

### Motor Starter Configuration:

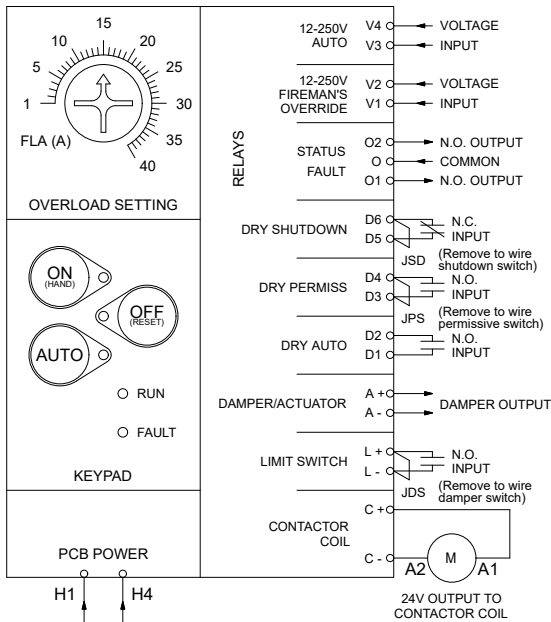
Series:	Type:	Enclosure:	Material:	HP:	Power:	Nema Size:
MSAC	Combination	NEMA-1	16 Ga Steel	3	208/60/3	0

Contactor	NEMA Size	Rated Operational Voltage	Rated Insulation Voltage	Rated Thermal Current 3ø (0 ≤ 55 C) [HP]			
				200V	240V	460V	500V
MRC-18	0	690V	1000V	5	7.5	10	15

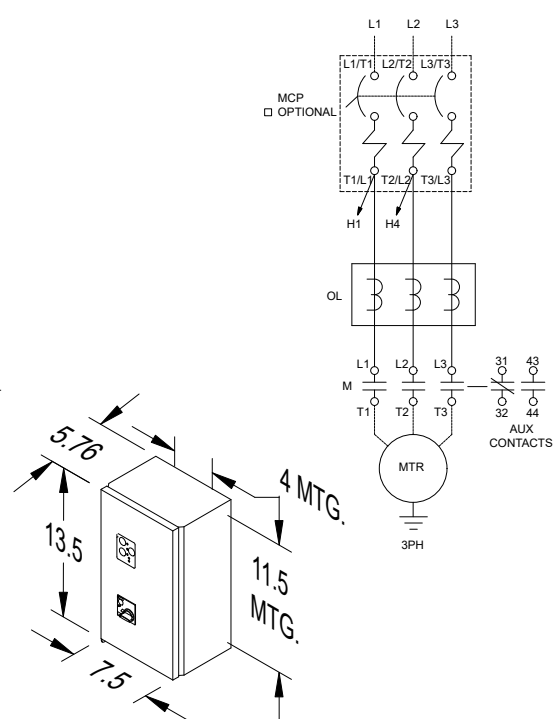
Overload	Trip Class	OL Reset	OL Type	FLA Range	Phase Unbalance	Phase Loss
MSAC	10 or 20	Manual or Auto	Electronic Thermal	1-40A	Trip in 3 sec @ 25%	Trip in 3 sec

Disconnect Part Number	Rated Operational Current [A]	Magnetic Release Operating Current [A]	Protection Degree	Max Short Circuit Current [KAIC]		
				200/240V	480V	600V
CMS-32HI-13	13	169	IP20	100	50	10

MSAC CONTROL WIRING



MSAC STARTER POWER WIRING 200-600 VAC INPUT



Notes: All dimensions shown are in units of in.

Performance	
Quantity	2
Volume (CFM)	1,200
Total External SP (in. wg)	5
Operating Power (hp)	1.45
Required Power (hp)	1.45
Fan RPM	3552
Max Fan RPM	3,694
Oper. Frequency (Hz)	60
Elevation (ft)	256
Start-up Temp.(F)	70
Operating Temp.(F)	70

Fan Configuration	
Size	10
Wheel Type	BI
Arrangement	10
Drive Type	Belt
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Steel
Wheel Material	Steel
Inlet Cone Material	Steel
Pedestal Material	Steel

Equipment Weights	
Fan (LMD)(lb)	123
Motor/Drive (lb)	49
Accessories (lb)	4
Fan Total (lb)	176

Misc Fan Data	
Fan Energy Index (FEI)	1.39
Outlet Velocity (ft/min)	1,892
Static Efficiency (%)	70
Tip Speed (ft/min)	9,764
Shaft Bearing Type	Standard
Bearing Life Calculation	Operating Point
L10 - Bearing Life (hrs.)	1,000,000

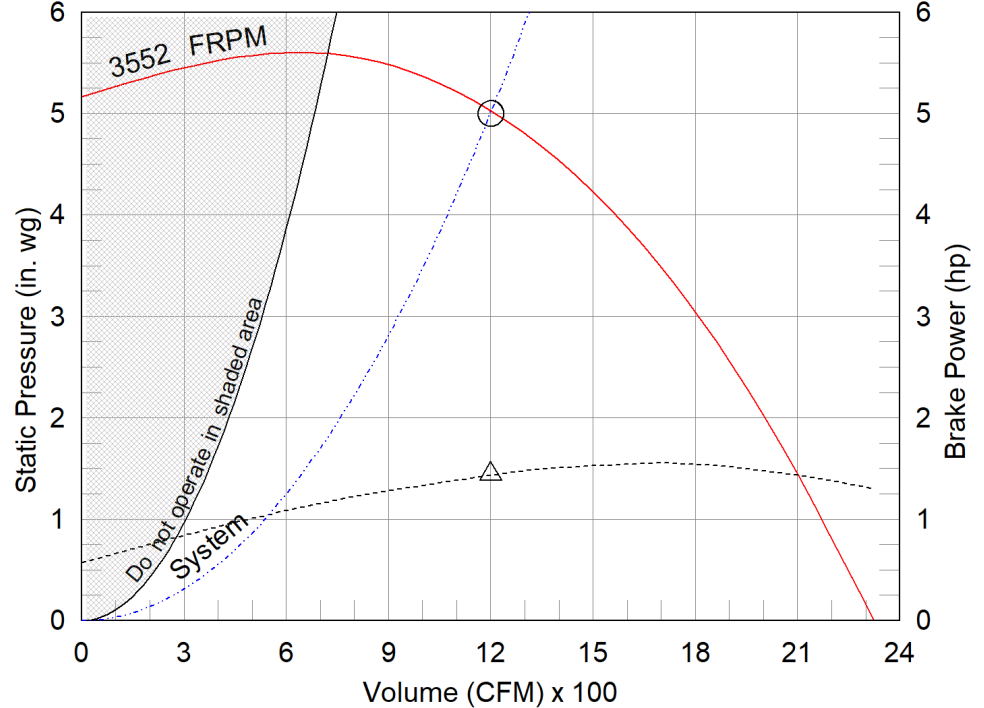
Motor and Drives	
Motor	Included
Size (hp)	2
RPM	3600
Enclosure	TEFC
V/C/P	208/60/3
Frame Size	145T
Max Frame Size	145
Location	Centered
Pulley Type	Constant
Drive Loss (%)	5.4
Drives	Standard
Drive Service Factor	1.5
MCA* (Amps)	9.38
MOP* (Amps)	15
SCCR* (Kiloamps)	5

## Model: USF-10

### Universal Single Width Fan

Tags: VEF-3 VEF-4

### Operating Performance



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

Nameplate Model: USF-10-5-B6-00-02-02

### Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	98	88	86	87	83	79	78	78	89	77	32
Outlet	99	99	90	89	82	81	77	73	91	79	36

\*Values are estimated and subject to change. Actual values provided on fan at time of manufacture.

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 AMCA 301 at 5 ft



## Model: USF-10

Universal Single Width Fan

### Standard Construction Features:

HOUSING: Class II and under feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Outlet flange standard on sizes 27 - 73 and all class III fans - Untreated steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high-performance powder coating. Sizes 24 and less are rotatable in 45 deg. increments. Sizes 27 to 40 are rotatable in 90 deg. increments. Sizes greater than 40 and all class III are not rotatable.

BEARINGS, SHAFT, AND WHEEL: Air handling quality, self-aligning, ball bearing in pillow block housing - Polished, solid steel shafts with rust inhibitor - Centrifugal wheel

### Selected Options & Accessories:

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Switch - NEMA-3R, Toggle, For Indoor or Outdoor Use, Mounted & Wired

Motor with Class B or Greater Insulation

Standard Drives

Finish - Coated

Coating - Permatecor, Concrete Gray-RAL 7023, Fan and Attached Accessories

Direct Mount Isolators, Isolator-Spring, Restrained, 1 Inch, Indoor / Outdoor Use, Base Coating - N/A

Bearings - L10 Standard Life, 1000k hours at OperatingPoint

Housing - PermaLock

Wheel - Backward Inclined

UL Listed for UL/cUL-705 - "Power Ventilators"

Polished Steel Shaft

Access Door - Bolted

Extended Lube Lines - Nylon

Inlet Connection, Slip Fit

Outlet Flange, Punched

Weatherhood - Steel Construction

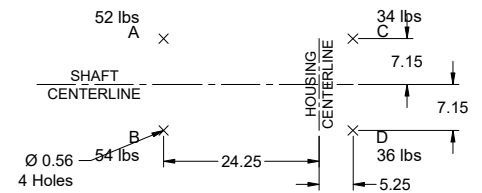
Fasteners - Standard

Factory Vibration Test, 0.15 in/sec, Peak, Filter-in as measured at the fan RPM

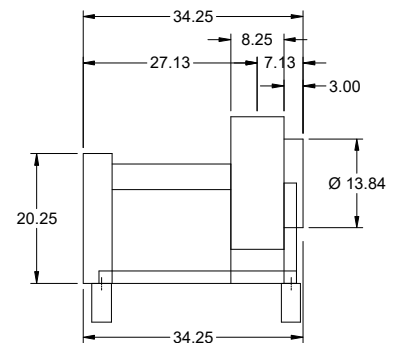
Motor Starter

Unit Warranty: 1 Yr (Standard)

## Universal Single Width Fan



## FOOTPRINT VIEW



END VIEW

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## Isolators

Type: Spring, Restrained, 1 Inch

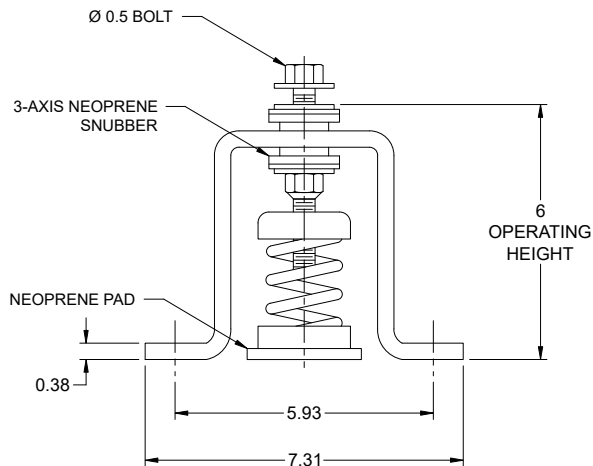
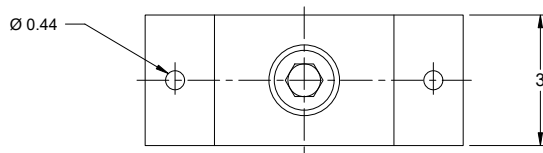
### Standard Construction Features:

Designed for horizontal and vertical restraint. Housings can be bolted or welded to supporting structure. Housings may be used for blocking during installation. Springs are color coded or identified to indicate load capacity. Neoprene pad for noise reduction.

### Fan Configuration

Model: USF-10  
Arrangement: 10  
Rotation: CW  
Motor Position: Centered  
Isolator Color A: Green  
Isolator Color C: Green  
Isolator Description: FHS-1-70

Discharge Position: UB  
Class: I  
Motor Frame Size: 145T  
Isolator/Deflection: Spring, Restrained, 1 Inch  
Isolator Color B: Green  
Isolator Color D: Green  
Isolator Manufacturer: Kinetics



Notes: All dimensions shown are in units of in.

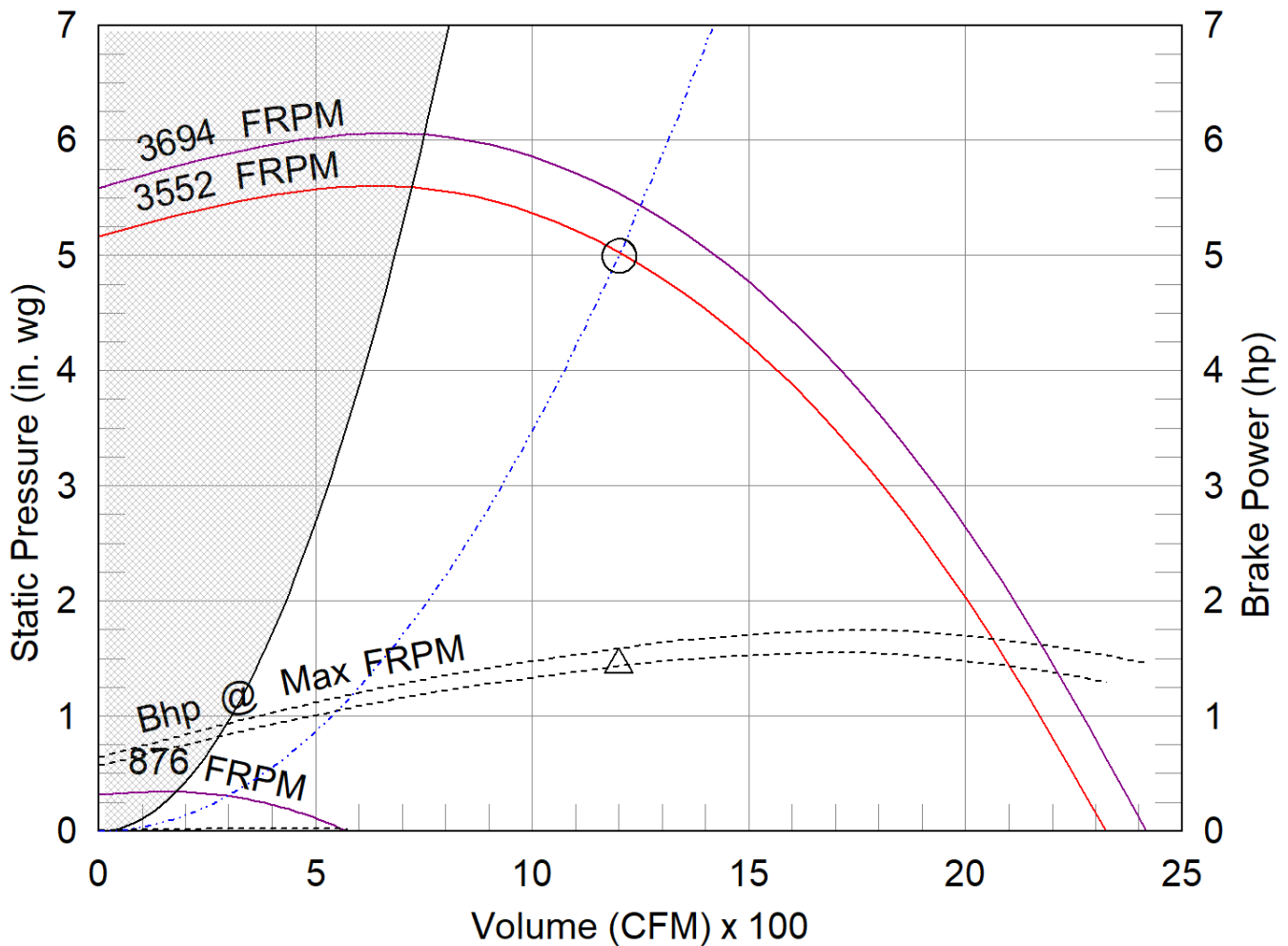


## USF-10

## Min/Max Fan Curve

### Performance

Requested Volume (CFM)	Actual Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	Fan RPM	Operating Power (hp)
1,200	1,200	5	5	3552	1.45



- △ 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. SELLER may make further warranty protection available on an option extra-cost basis and which must be authorized and in writing.

Motors furnished are warranted by the motor manufacturer for a period of one year for single phase motors and three years for 3-phase motors after shipment from Greenheck. Should motors furnished by Greenheck prove defective during this period, motors with frame sizes 254T and larger should be returned to the nearest authorized motor service station. Motors with a frame size of 215T and smaller must submit a motor label to Greenheck using the motor warranty claim form located at: <https://www.greenheck.com/resources/warranties>. Greenheck 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.

ANY MISUSE, NEGLIGENCE, FAILURE TO FOLLOW INSTRUCTIONS OR MANUALS OF INSTALLATION OR 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).

## Motor Starter Advanced Control with SMARTSTART™

Qty: 2 Model: MSAC-1-9/J-G8-40

### Standard Construction Features:

NEMA and IEC, dual-rated contactor – HOA keypad – Hand, off, auto, run and fault lights – Conduit plate knockouts – Solid-state, electronic overload – Stall protection – Locked rotor trip – Max start time monitoring – Overload out of calibration protection – Adjustable power failure restart mode – 3 inputs for remote control; 12-250V direct voltage input, N.O.dry contact and fireman's override – 2 output relays; motor status and fault alarm – Damper actuator control, 24VDC, 30VA max – Damper limit switch input - UL, cUL

### Motor Starter Configuration:

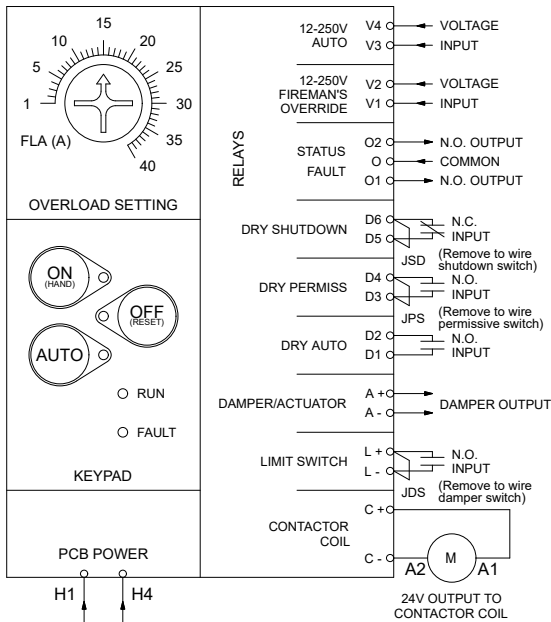
Series:	Type:	Enclosure:	Material:	HP:	Power:	Nema Size:
MSAC	Combination	NEMA-1	16 Ga Steel	2	208/60/3	00

Contactor	NEMA Size	Rated Operational Voltage	Rated Insulation Voltage	Rated Thermal Current 3ø (0 ≤ 55 C) [HP]			
				200V	240V	460V	500V
MRC-9	00	690V	1000V	2	3	5	7.5

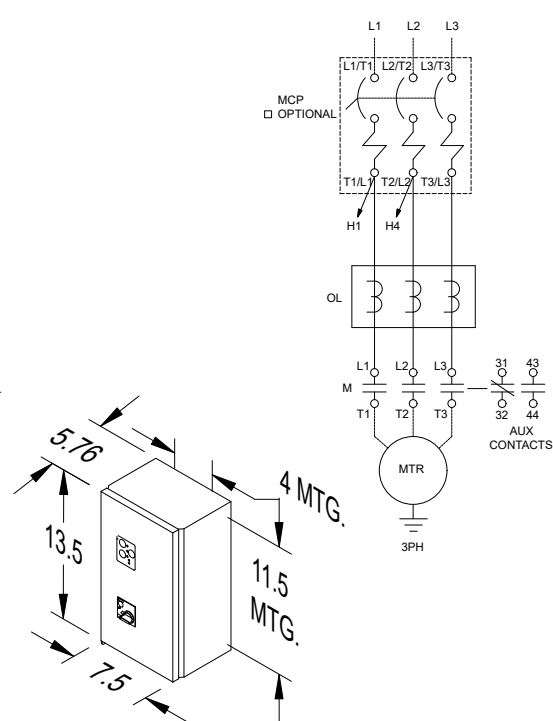
Overload	Trip Class	OL Reset	OL Type	FLA Range	Phase Unbalance	Phase Loss
MSAC	10 or 20	Manual or Auto	Electronic Thermal	1-40A	Trip in 3 sec @ 25%	Trip in 3 sec

Disconnect Part Number	Rated Operational Current [A]	Magnetic Release Operating Current [A]	Protection Degree	Max Short Circuit Current [KAIC]		
				200/240V	480V	600V
CMS-32HI-8	8	104	IP20	100	65	25

MSAC CONTROL WIRING



MSAC STARTER POWER WIRING 200-600 VAC INPUT



Notes: All dimensions shown are in units of in.

## Model: CSP-A390

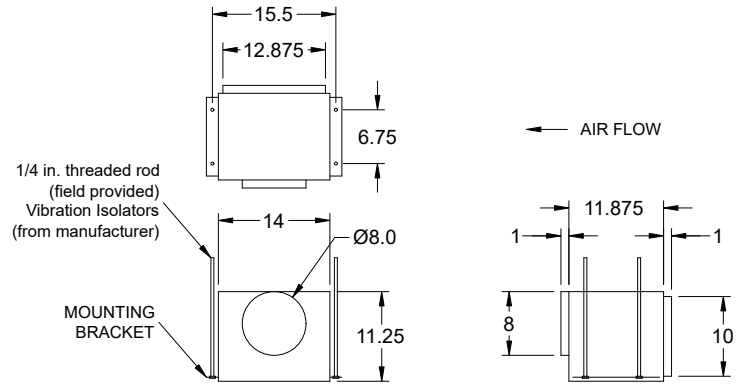
### Inline Cabinet Fan

#### Standard Construction Features:

- Corrosion resistant galvanized steel scroll and housing - Sound absorbing insulation - Rectangular inlet and outlet duct collar - Outlet with integral spring loaded back draft damper - Double inlet forward curved wheel - Plug type disconnect - Adjustable mounting brackets - Field rotatable discharge

#### Selected Options & Accessories:

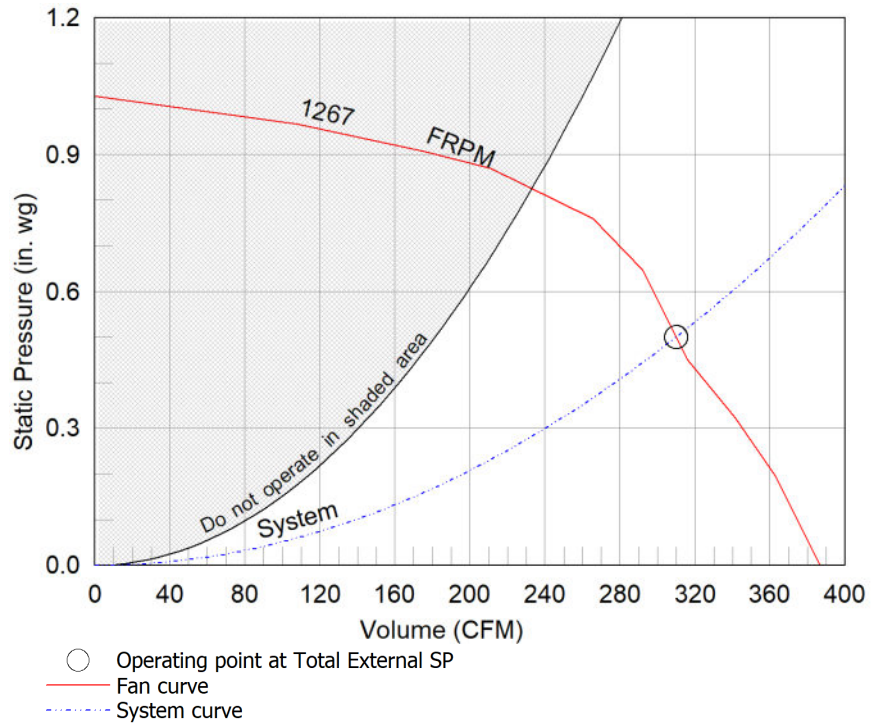
Motor rated for continuous use  
Motor with Thermal Overload  
Motor with CSA Approval  
Motor with 40 Degree C Ambient Temperature  
UL/cUL 507 Listed - Electric Fan  
Solid State Speed Control, 6 Amp, Mounted and Wired Internally  
Round Duct Connector, (PN: RDC-8) Shipped Loose  
Isolation Kit, (PN: VI KIT-SP/CSP), Shipped Loose  
Adjustable easy installation mounting bracket  
Polypropylene Wheel Material



Dimensional	
Quantity	1
Weight w/o Acc's (lb)	23
Weight w/ Acc's (lb)	26

Performance	
Requested Volume (CFM)	310
Actual Volume (CFM)	310
Total External SP (in. wg)	0.5
Fan RPM	1267
* FLA (A)	1.42
Elevation (ft)	256
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Sones	3.5

Motor	
Motor Mounted	Yes
** Input Watts (W)	114
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.

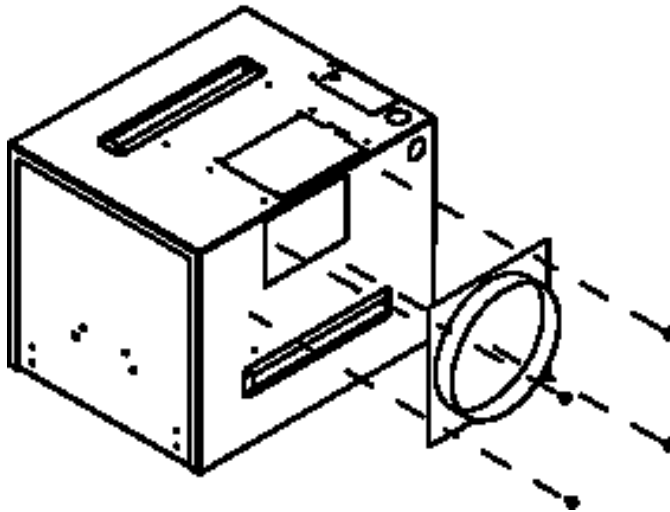


## Round Duct Connector

Model: RDC

### Standard Construction Features:

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



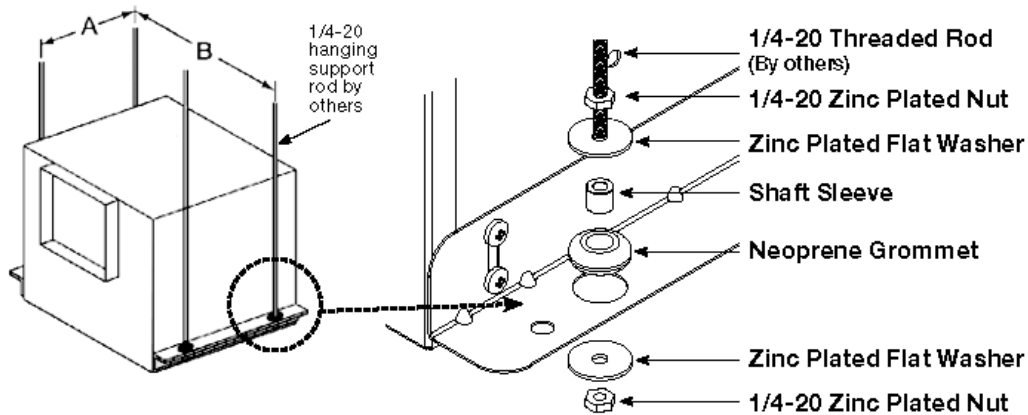
Notes: All dimensions shown are in units of in.

## 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

## Model: SP-B80

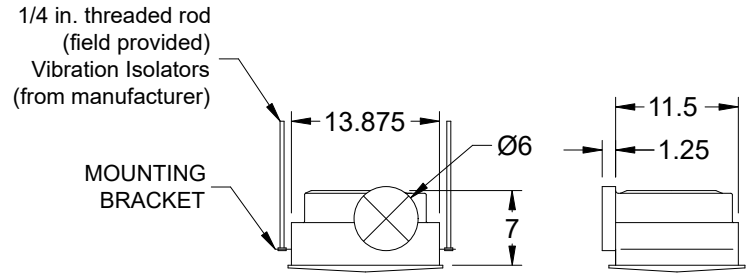
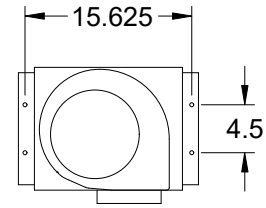
### Ceiling Exhaust Fan

#### Standard Construction Features:

- Corrosion resistant galvanized steel scroll and housing - White designer non-yellowing grille - Round outlet duct collar with integral backdraft damper - Single inlet forward curved wheel - Plug type disconnect - Adjustable mounting brackets

#### Selected Options & Accessories:

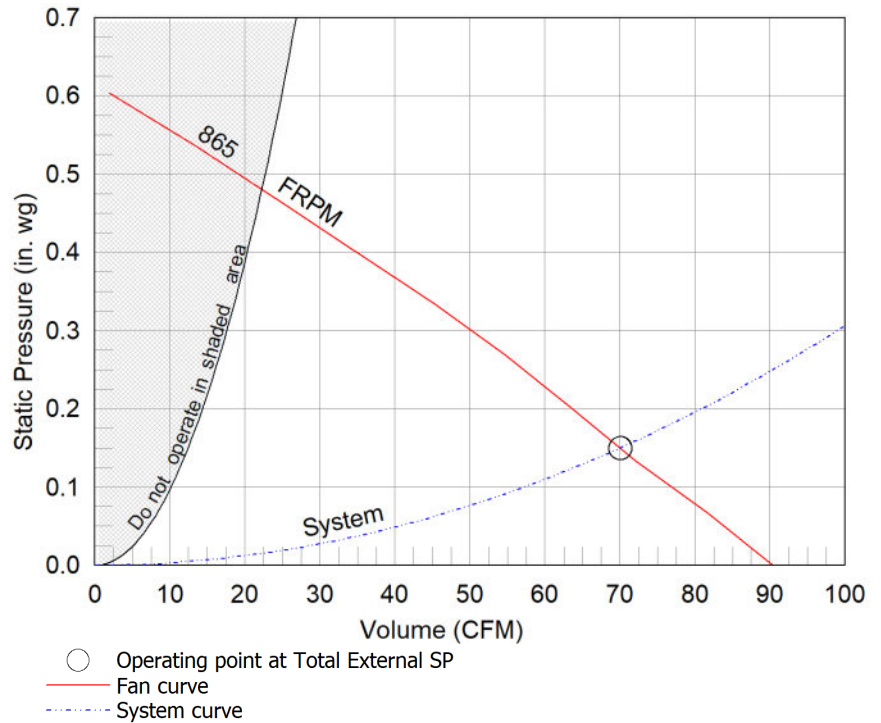
Motor rated for continuous use  
Motor with Thermal Overload  
Motor with CSA Approval  
Motor with 40 Degree C Ambient Temperature  
UL/cUL 507 Listed - Electric Fan  
Solid State Speed Control, 6 Amp, Mounted and Wired Internally  
Round Duct Connection  
Isolation Kit, (PN: VI KIT-SP/CSP), Shipped Loose  
Adjustable easy installation mounting bracket  
Aluminum Grille, (PN: 486006) Shipped Loose  
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)	9
Weight w/ Acc's (lb)	12

Performance	
Requested Volume (CFM)	70
Actual Volume (CFM)	70
Total External SP (in. wg)	0.15
Fan RPM	865
* FLA (A)	0.16
Elevation (ft)	256
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Sones	0.5

Motor	
Motor Mounted	Yes
** Input Watts (W)	16
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP



#### Notes:

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

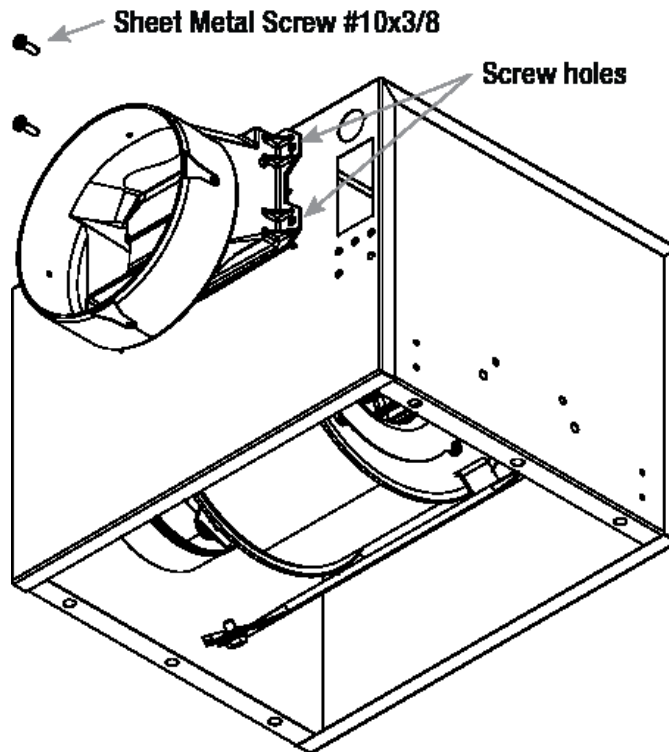


## Round Duct Connector

Model: RDC

### Standard Construction Features:

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



Notes: All dimensions shown are in units of in.

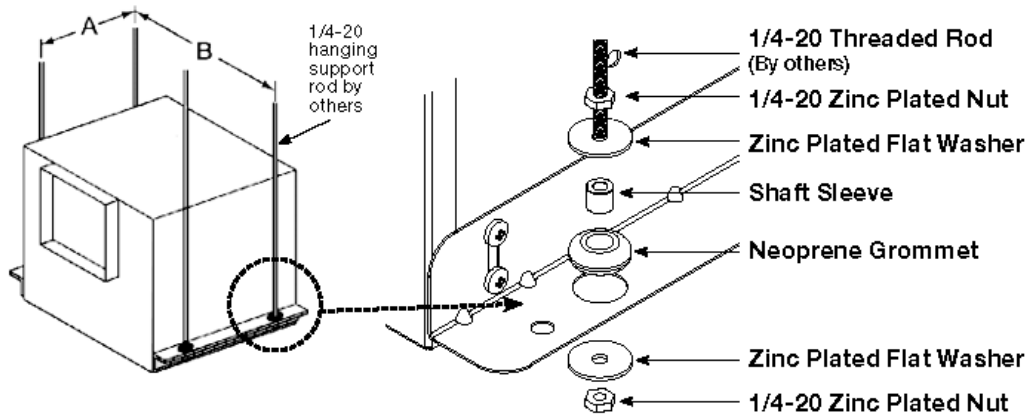


## Isolation Kit

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



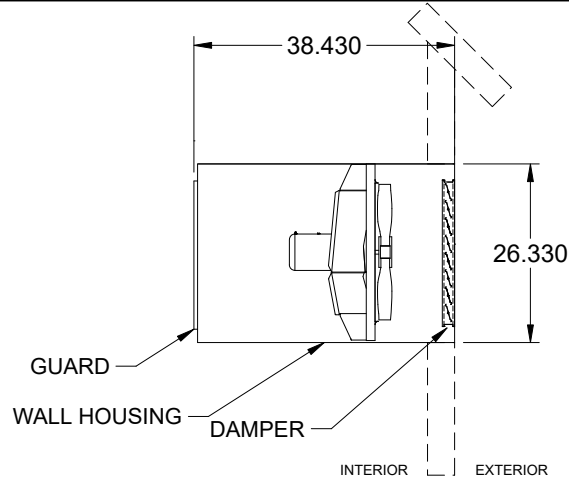
Unit Size	A	B
B50-B200	4 1/2 (114)	15 5/8 (397)
A50-A190	5 1/2 (140)	14 5/8 (371)
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A410, A510, A710, A780	9 1/4 (235)	19 5/8 (498)
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A900 - A1050, A1410 - A1550	9 1/4 (235)	25 3/8 (645)
A1750, A2150	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

## Model: AER-20-VG

Sidewall Direct Drive Fan  
Motor Access From Int. of Bldg.

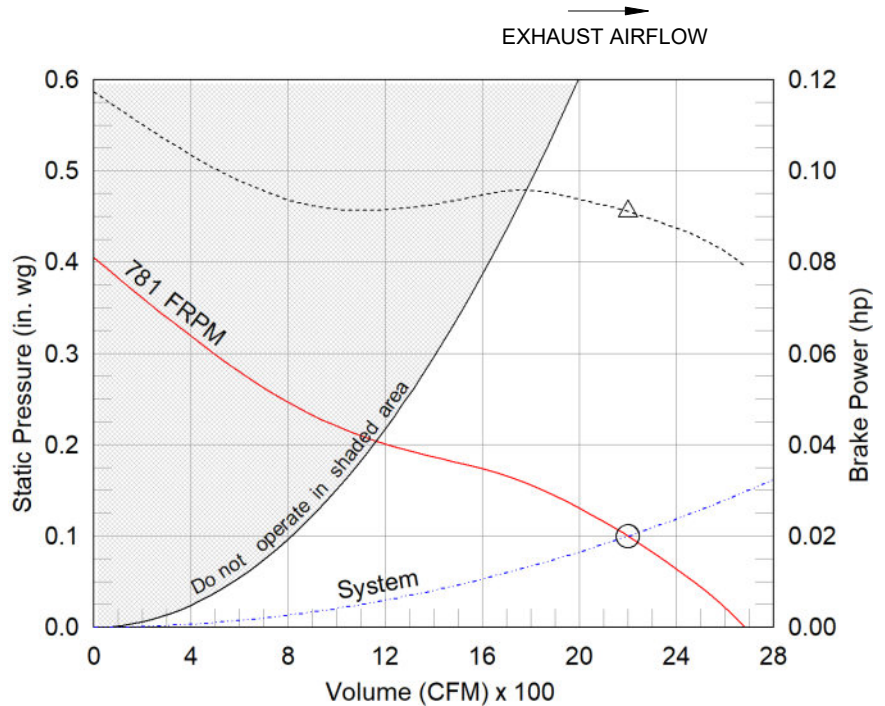
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	64
Weight w/ Acc's (lb)	174
Optional Damper (in.)	22 x 22
Wall Opening (in.)	27.5 x 27.5



Performance	
Requested Volume (CFM)	2,200
Actual Volume (CFM)	2,200
Total External SP (in. wg)	0.1
Fan RPM	781
Operating Power (hp)	0.09
Elevation (ft)	256
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	4,113
Static Eff. (%)	38

Misc Fan Data	
Fan Energy Index (FEI)	-
Outlet Velocity (ft/min)	972

Motor	
Motor Mounted	Yes
Size (hp)	1/2
Voltage/Cycle/Phase	208/60/1
Enclosure	ODP
Motor RPM	1025
Efficiency Rating	High
Windings	1
FLA (Amps)	3.8



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

### Static Pressure Calculations

External SP	0.1 in. wg
Direct Drive RPM Adjustment	0 in. wg
Total External SP	0.1 in. wg

### 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 AMCA 301 at 5 ft



Nameplate Model: AER-20-03-0625-VG

### Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	76	76	72	67	62	58	55	57	70	58	9.5

## Model: AER-20-VG

### Sidewall Direct Drive Fan

#### Standard Construction Features:

- Galvanized steel fan panel - Die formed, galvanized steel drive frame assembly
- Cast aluminum airfoil blade propeller - Ball bearing motors - Corrosion resistant fasteners

#### Selected Options & Accessories:

Motor - Vari-Green EC motor  
Control - Dial for balancing  
Airflow Direction: Exhaust  
Long Wall Hsg, Flush Exterior, w/OSHA Grd., Factory Installed  
Motor Access: From Int. of Bldg.  
Mounting Style - Flush  
Switch, NEMA-1, Toggle,  
Junction Box Mounted & Wired  
Closure Angles, Shipped in Crate Unattached  
Galvanized Damper Guard, Factory Installed  
Unit Warranty: 1 Yr (Standard)  
Damper Shipped Loose, EM-31-PB-22X22, Gravity Operated, Not Coated

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

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

## Disconnect Switch

Enclosure Rating: NEMA-1

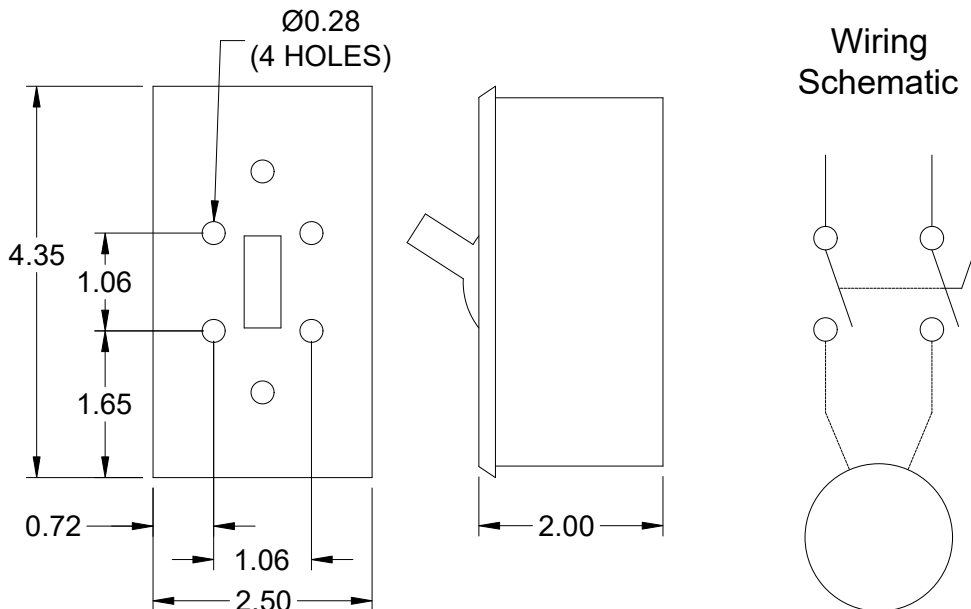
### Standard Construction Features:

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

### Disconnect Switch Configuration

Type:	Toggle	Motor Size:	1/2 hp	Voltage:	208	UL Listed:	Yes
Manufacturer:	Pass and Seymour	Cycle:	60	Amperage:	20	CSA Approved:	Yes
Overload Protection:	None	Phase:	1	Switch Pole(s):	2	Rating:	2 hp
Junction Box Mtg.:	Mounted and Wired	RPM:	1025	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

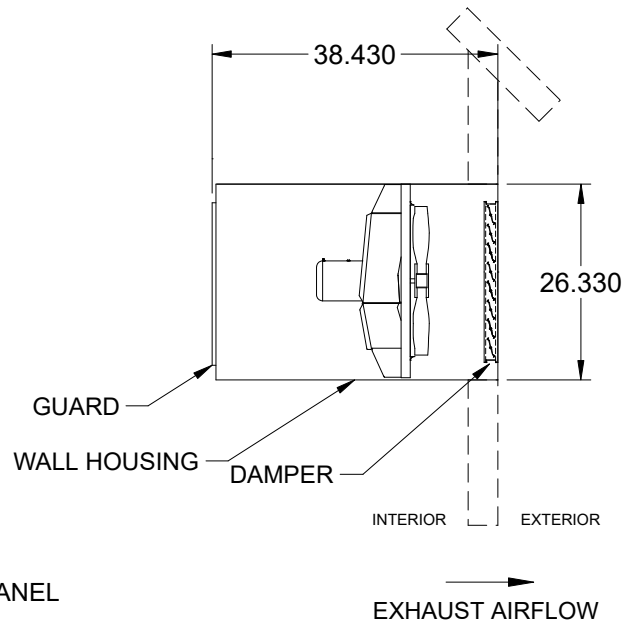
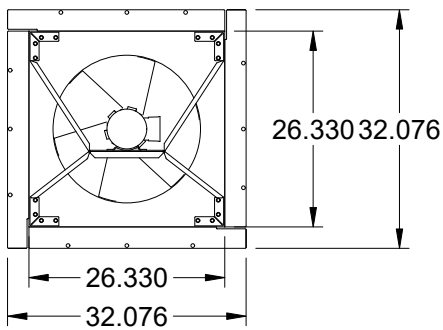
### Electrical Drawing Details



Notes: All dimensions shown are in units of in.

## Assembly Drawing

Type: Sidewall Direct Drive Fan



END VIEWED FROM INTERIOR  
END VIEW DIMENSIONS ARE FOR HOUSING NOT FAN PANEL  
WALL OPENING 27.33 SQ.  
MOTOR IS ACCESSIBLE FROM INTERIOR OF BUILDING  
THIS IS AN EXHAUST FAN DUE TO MOTOR ORIENTATION

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

## Vari-Green Motor & Control Options

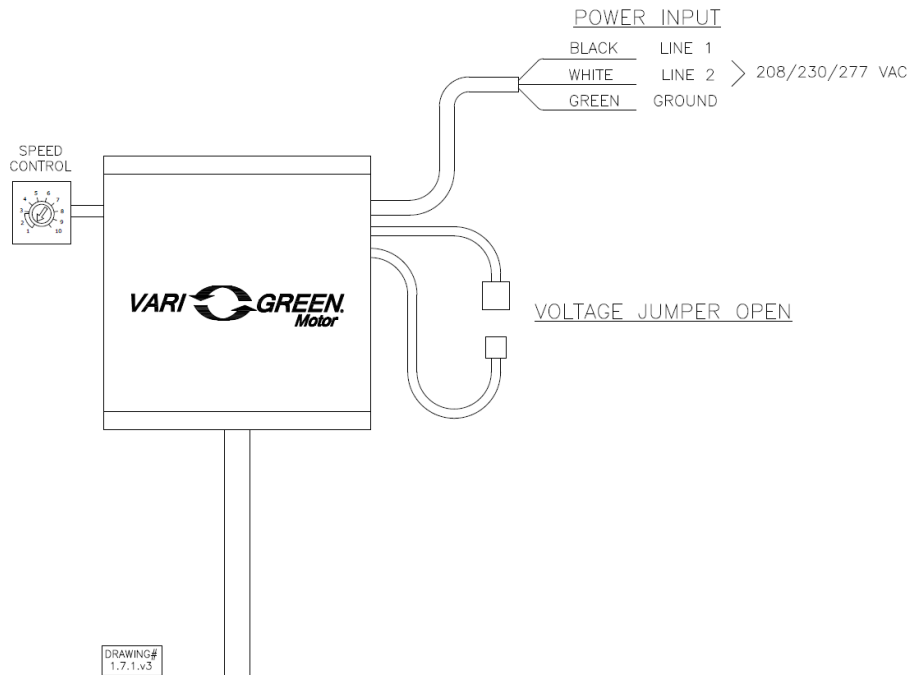
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated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

### Motor Configuration

Input Voltage: 208  
Speed Reference: Dial on Motor  
Permanent Dial: Yes

### Control Configuration

Control Type: Dial on Motor  
Transformer: None

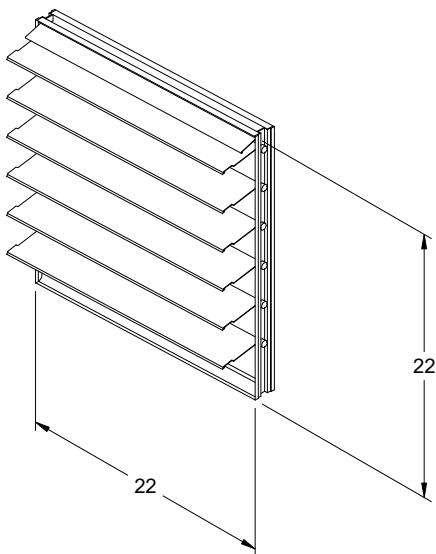


## Vertical Mount Backdraft Damper

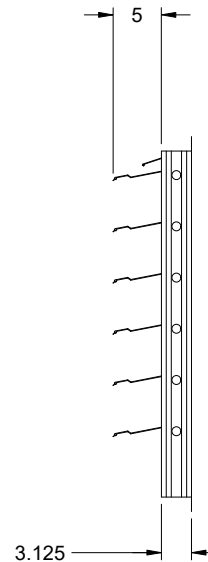
Model: EM-31

### Standard Construction Features:

-Model EM-31 is a gravity backdraft damper mounted vertically to allow horizontal airflow and prevent reverse airflow. Damper frame is heavy gauge 6063T5 extruded aluminum channel, flange on discharge; blades are 6063T5 extruded aluminum; 0.75 in. dia. metallic axles turning in acetal bearings; damper shall be equipped with extruded vinyl blade seals; and internal 0.125 in. plated steel blade-to-blade linkage. Damper is suitable for pressures to 10 in. wg and velocities to 3,500 ft/min.



DAMPER



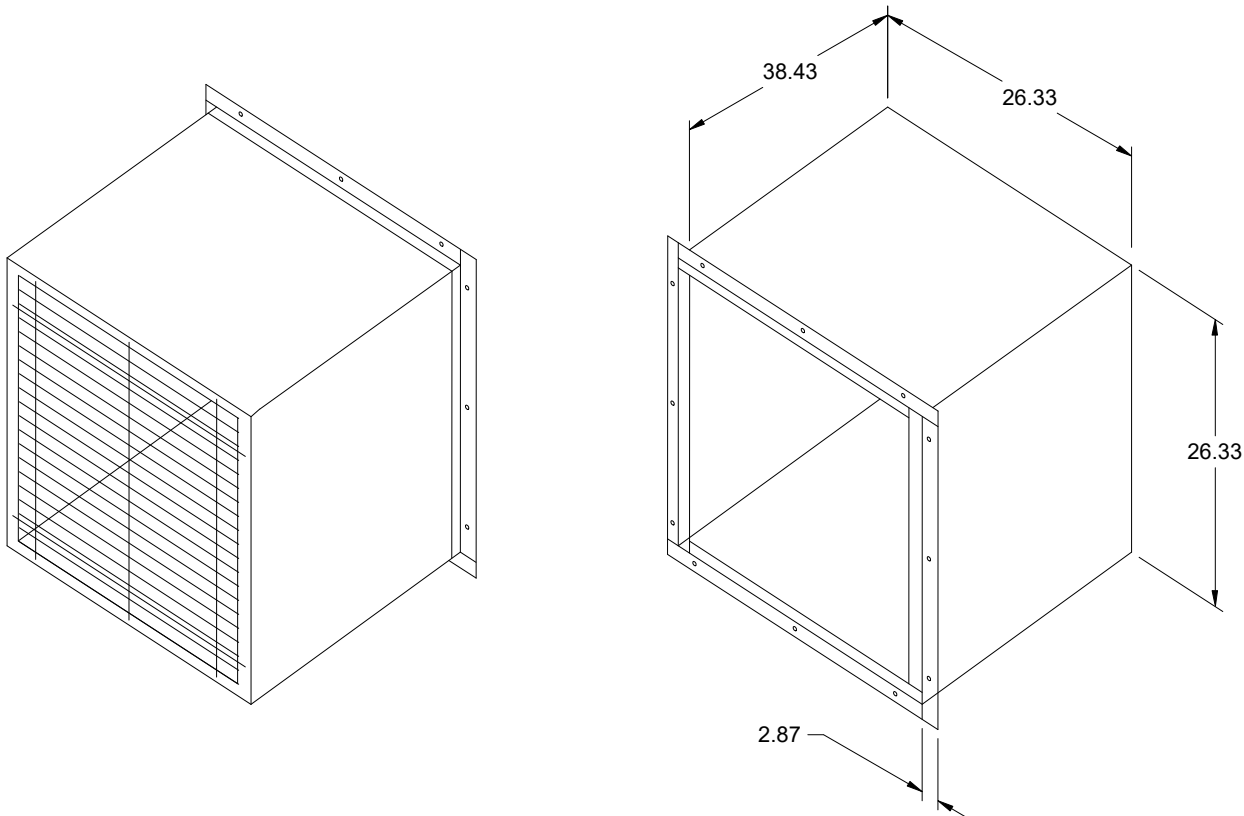
TYP. SECTION VIEW

Notes: All dimensions shown are in units of in.

## Long Wall Housing

### Standard Construction Features:

- Galvanized steel construction - Heavy gauge mounting flanges - Pre-punched mounting holes - Inside flanges allow damper to be mounted - Overlapping weatherhood flange keeps rain out - OSHA Protective guard of welded steel wire completely protects the drive side of the wall housing.



Notes: All dimensions shown are in units of in.

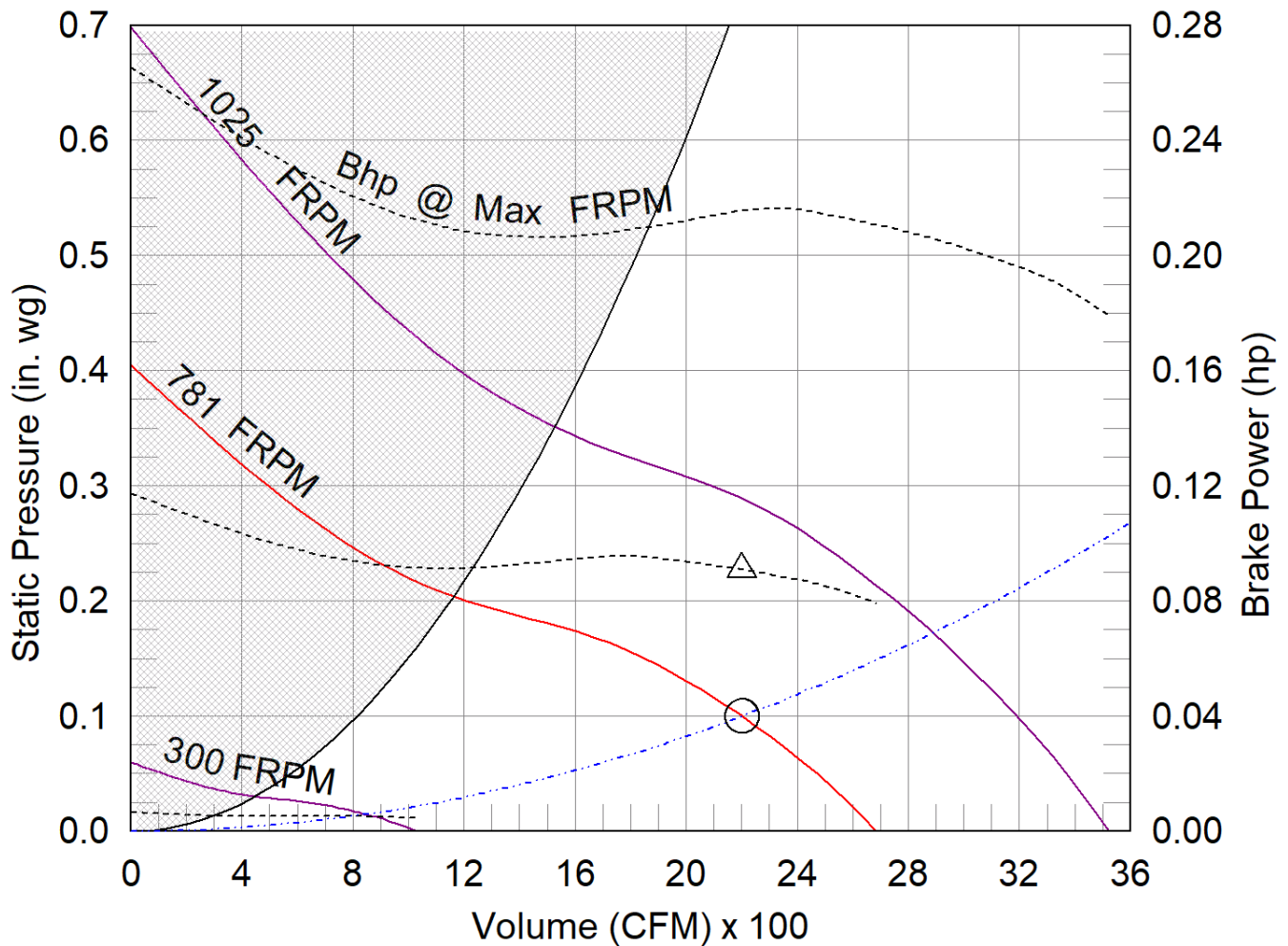


## AER-20-VG

## Min/Max Fan Curve

### Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
2,200	2,200	0.1	781	0.09



- △ 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, NEGLECT, 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.