

U.S. Army Corps of Engineers (USACE) <b>TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR          MANUFACTURER'S CERTIFICATES OF COMPLIANCE</b> For use of this form, see ER 415-1-0; the proponent agency is CECW-CE	DATE 3/20/2023	TRANSMITTAL NO. 23 30 00-2.2
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**SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS** (This section will be initiated by the contractor)

TO: 81st RSC Geographic District ROs 69A Hagood Avenue Charleston, SC 29403-5107	FROM: TEAM CONSTRUCTION 825 Gum Branch Rd. STE 128 JACKSONVILLE NC 28540-6312 USA	CONTRACT NO. W912HP21D6006 W912HP22F1176	CHECK ONE: <input type="checkbox"/> THIS IS A NEW TRANSMITTAL <input checked="" type="checkbox"/> THIS IS A RESUBMITTAL OF TRANSMITTAL 23 30 00-2
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SPECIFICATION SEC. NO. (Covers only one section with each transmittal) 23 30 00-HVAC Air Distribution	PROJECT TITLE AND LOCATION 01 FY22 81st NC026 HEP Reset; W'ville, NC, Winterville, NC	THIS TRANSMITTAL IS FOR: (Check one) <input checked="" type="checkbox"/> FIO <input type="checkbox"/> GA <input type="checkbox"/> DA <input type="checkbox"/> CR <input type="checkbox"/> DA/CR <input type="checkbox"/> DA/GA
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ITEM NO. <small>(See Note 3)</small>	DESCRIPTION OF SUBMITTAL ITEM <small>(Type size, model number/etc)</small>	SUBMITTAL TYPE CODE <small>(See Note 8)</small>	NO. OF COPIES	CONTRACT DOCUMENT REFERENCE		CONTRACTOR REVIEW CODE	VARIATION <small>Enter "Y" if requesting a variation (See Note 6)</small>	USACE ACTION CODE <small>(Note 9)</small>
				SPEC. PARA. NO.	DRAWING SHEET NO.			
a.	b.	c.	d.	e.	f.	g.	h.	i.
12	Centrifugal Fans	03 - PRODUCT	1	2.9.1.1		A	No	
13	In-Line Centrifugal Fans	03 - PRODUCT	1	2.9.1.2		A	No	
14	Centrifugal Type Power Wall Ventilators	03 - PRODUCT	1	2.9.1.3		A	No	
15	Centrifugal Type Power Roof Ventilators	03 - PRODUCT	1	2.9.1.4		A	No	
16	Ceiling Exhaust Fans	03 - PRODUCT	1	2.9.1.6		A	No	

REMARKS  
 This is a resubmittal.

	I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.
NAME OF CONTRACTOR	 SIGNATURE OF CONTRACTOR

**SECTION II - APPROVAL ACTION**

ENCLOSURES RETURNED (List by Item No.)	NAME AND TITLE OF APPROVING AUTHORITY	SIGNATURE OF APPROVING AUTHORITY	DATE
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CROMWELL

### SUBMITTAL REVIEW FORM

1300 EAST 6<sup>TH</sup> STREET  
LITTLE ROCK, AR 72202  
PHONE: 501-372-2900  
FAX: 501-372-0482

Reviewing is only for conformance with the design concepts of the Project and compliance with the information given in the contract documents. The Contractor is responsible for dimensions to be confirmed or correlated at the site; for information that pertains solely to the fabrication process, or to the means, methods, techniques, sequences, and procedures of construction; and for coordination of the work of all other trades

**JOB TITLE: 81<sup>st</sup> RSC Reset NC026 Winterville NC**  
**JOB NO: 2020-147**  
**SUBMITTAL NO: 233000-2.2 Centrifugal Exhaust Fans - Revised**  
**BY: CRB**  
**DATE: 04/11/2023**

Item No.	Description (See contractor transmittal for corresponding description)	No Exception Taken	Make Corrections Noted	Revise and Resubmit	Not Accepted	Comments
						Review of revised Transmittal No. 233000-2.2 from Team Construction dated 3/20/2023.
1	Submittal Comments (pg. 3 of 90)	X	X			<ul style="list-style-type: none"> <li>-No shaft grounding option on RF-03, will send into factory for special. <b>No Exception Taken</b></li> <li>-Verify existing curb sizes, and what height. Flat? Verify 115v on dampers. <b>Make Corrections Noted: (1) Contractor to verify existing curb sizes; (2) Refer to detail 4/M-502 for curb adapter dimensions; (3) Coordinate with the Contractor on damper voltage.</b></li> <li>-RF-01,3 don't see flexible inlet option. We selected companion flange. <b>Make Corrections Noted: Companion flange is acceptable, Sheet metal contractor to provide flexible connection.</b></li> </ul>
2	EF-01-T	X	X			<ul style="list-style-type: none"> <li>Fan is "No Exception Taken". See Item "1" above for damper and adapter curb coordination.</li> <li></li> </ul>
3	EF-02-T (and 03-T, 06-T)	X	X			<ul style="list-style-type: none"> <li>Fans are "No Exception Taken". See Item "1" above for damper power and adapter curb coordination</li> </ul>
4	EF-04-T	X	X			<ul style="list-style-type: none"> <li>Fan is "No Exception Taken". See Item "1" above for damper power and adapter curb coordination.</li> </ul>

5	EF-05-T	X	X			<ul style="list-style-type: none"> <li>Fan is "No Exception Taken". See Item "1" above for adapter curb coordination.</li> </ul>
6	EF-07-T	X	X			<ul style="list-style-type: none"> <li>Fan is "No Exception Taken". See Item "1" above for adapter curb coordination.</li> </ul>
7	EF-08-T		X			<ul style="list-style-type: none"> <li>Weatherhood not required, this fan connects to an existing louver plenum.</li> <li>Provide a low-leak damper as scheduled.</li> <li>Coordinate damper voltage with Contractor, the damper is fed from an existing circuit.</li> </ul>
8	EF-09-T	X	X			<ul style="list-style-type: none"> <li>Fan is "No Exception Taken". See Item "1" above for damper power coordination.</li> </ul>
9	EF-11-T		X			<ul style="list-style-type: none"> <li>Provide a wall collar.</li> </ul>
10	EF-12-T		X			<ul style="list-style-type: none"> <li>Provide 10"-dia. Wall cap as scheduled.</li> </ul>
11	RF-01		X			<ul style="list-style-type: none"> <li>Inlet guard not required.</li> <li>Inlet companion flange is acceptable, sheet metal Contractor to provide flexible connection.</li> <li>See Item "1" above for damper power coordination.</li> </ul>
12	RF-03		X			<ul style="list-style-type: none"> <li>Provide an outlet guard, not an Inlet guard.</li> <li>Provide an Inlet companion flange, sheet metal Contractor to provide flexible connection.</li> <li>See Item "1" above for damper power coordination.</li> </ul>
13	GH-01	X				
14	EF-10-T		X			<ul style="list-style-type: none"> <li>Weatherhood not required, this fan connects to an existing louver plenum.</li> <li>Provide a low-leak damper as scheduled.</li> <li>Coordinate damper voltage with Contractor, the damper is fed from an existing circuit.</li> </ul>



# SUBMITTAL DATA SHEET

To:

Project:

Architect:

Engineer:

Product:


Supplier:

Spec Section:

Drawing:

Submittal Notes:

## APPROVAL STAMPS

<p>East Bound Mechanical 3195-B Airport Blvd. Wilson, NC 27896</p>  <p><b>Reviewed - Furnish Pending A/E Approval/Review</b></p> <p><b>Notes Indicated</b></p> <p><b>Resubmittal - See Comments</b></p> <p>Reviewed By:</p> <p>Date:</p> <p>Review of this drawing and or data does not indicate approval of variations to the contract documents or coordination with other trades as may be required.</p>	<p><b>General Contractor</b></p>	<p><b>Architect/Engineer</b></p>
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**DATE:** 3.6.23

*Rev. 1*

**SALESMAN:** Cory Adcroft

**ORDER**  
#620.628.11138

**PROJECT:** *NC 026 Reset 81<sup>st</sup>  
Winterville, NC*

**ENGINEER:** *US Army Corps of Engineers*

**CONTRACTOR:** *Eastbound Mechanical  
Winterville, NC*

**MANUFACTURER(S):** *Greenheck  
Exhaust Fans, Relief Fans and Hood*

- No shaft grounding option on RF-03, will send into factory for special.
- Verify existing curb sizes, and what height. Flat? Verify 115v on dampers.
- RF-01,3 don't see flexible inlet option. We selected companion flange.

**APPROVAL REQUIRED**



**SUBMITTAL DATA**

**HOFFMAN      HOFFMAN, INC.**

HVAC Manufacturers Representative  
Website: [www.hoffman-hoffman.com](http://www.hoffman-hoffman.com)

Asheville, NC	(828) 296-0111	Charleston, SC	(843) 884-3201
Charlotte, NC	(704) 364-4700	Columbia, SC	(803) 765-9360
Raleigh, NC	(919) 781-8011	Greenville, SC	(864) 676-1888
Wilmington, NC	(910) 791-4775	Chesapeake, VA	(757) 548-1700
Chattanooga, TN	(423) 693-2890	Richmond, VA	(804) 272-1500
Knoxville, TN	(865) 540-9770	Roanoke, VA	(540) 725-8701

Corporate: Greensboro, NC (336) 292-8777

We have exercised care in the preparation of this submittal. We believe it satisfies our interpretation of the designer's intent and scope. It contains the list of materials, quantities, sizes, style and the finish as we propose to furnish for this job. Please examine and check carefully that all items are exactly as required and that our interpretation of the applicable plans and/or specifications are consistent with the design. Approval by the engineer and purchaser will be required before release of this equipment for production. If any discrepancies are discovered, please notify us as soon as possible.

## EQUIPMENT SCHEDULE

Job Name: Army Corps of Engineers- NW

Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter

EF-01-T	1	SQ-99-VG	11.187	900	0.5	1835	0.32	68	16.2	3/4	115	60	1	ODP	2200	VariGreen	No
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Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter

EF-02-T,03-T and 06-T	3	SQ-80-VG	10.875	296	0.488	1725	0.07	57	8.7	1/10	115	60	1	TENV	1725	VariGreen	No
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Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter

EF-04-T	1	SQ-130-VG	13.125	1,600	0.75	1526	0.43	62	11.7	3/4	115	60	1	ODP	1725	VariGreen	No
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Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter

EF-05-T	1	CUBE-180-10	18.5	3,053	0.9	1109	0.9	66	14.9	1	460	60	3	ODP	1725	-	Yes
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Fans			Motor Specifications		
Mark	Qty	Model	Size (hp)	Volt	Ph

EF-05-T	1	MSAC-1-9/J-G2.5-40	1	460	3
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Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter

EF-07-T	1	CUE-095-VG	10.876	450	0.3	1184	0.05	49	5.4	1/6	115	60	1	TENV	1725	VariGreen	No
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Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter

EF-08-T	1	SBE-1H24-5	24	1,600	0.361	841	0.31	64	13.2	1/2	460	60	3	ODP	1725	-	No
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## EQUIPMENT SCHEDULE

Job Name: Army Corps of Engineers- NW

Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter
EF-09-T	1	BSQ-160	16.625	3,200	0.75	1334	0.96	67	16.0	1	460	60	3	ODP	1725	-	No

Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter
EF-11-T	1	SE1-14-440-VG	14	500	0.2	839	0.06	50	5.5	1/2	115	60	1	ODP	1725	VariGreen	No

Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter
EF-12-T	1	SQ-98-VG	11.187	325	0.5	1340	0.1	57	9.6	1/4	115	60	1	ODP	1725	VariGreen	No

Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter
RF-01	1	BSQ-180	18.5	4,750	1	1399	1.98	71	19.5	2	460	60	3	ODP	1725	-	No

Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter
RF-03	1	BSQ-100	11.187	1,000	1	1822	0.41	65	14.0	1/2	460	60	3	ODP	1725	-	No

Fans				Actual Performance						Motor Specifications							
Mark	Qty	Model	Wheel Dia.	Volume (CFM)	Total External SP (in. wg)	Fan RPM	Power (hp)	dBA	Sone s	Size (hp)	Volt	Hz	Ph	Enc	RPM	EC Motor	Motor Starter
EF-10-T	1	SBE-2H24-7	24	2,200	0.591	1093	0.65	72	21	3/4	460	60	3	ODP	1725	-	No

ID#	Tag	Mark Name	Qty	Model	Method	Volume (CFM)	Total External SP (in. wg)	Throat Velocity (ft/min)	Throat Area (ft2)
1-1	GH-01	GH-01	1	GRSR-12	Size	-	-	-	-

# EQUIPMENT SCHEDULE

Job Name: Army Corps of Engineers- NW

ID#	Tag	Mark Name	Qty	Type	Fan Model	Fan Size	Cap Width (in.)	Cap Length (in.)	Actual Adapted Width (in.)	Actual Adapted Length (in.)
2-1	GH-01 Adapt	GH-01 Curb Adaptor	1	Adapter	Other	N/A	21.5	21.5	26	26

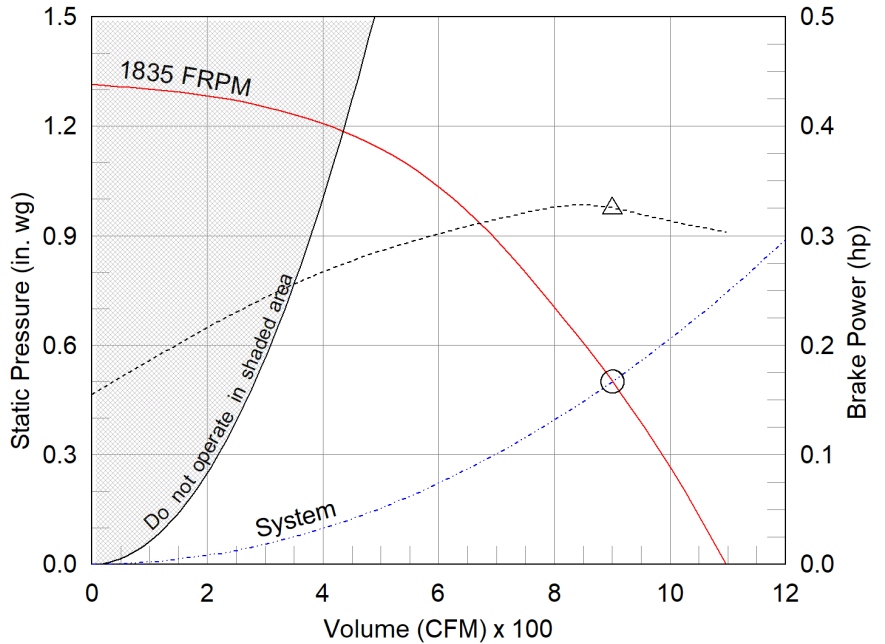
**Model: SQ-99-VG**  
Direct Drive Centrifugal Inline Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	57
Weight w/ Acc's (lb)	87
Optional Damper (in.)	12 x 12

Performance	
Requested Volume (CFM)	900
Actual Volume (CFM)	900
Total External SP (in. wg)	0.5
Fan RPM	1835
Operating Power (hp)	0.32
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	5,375
Static Eff. (%)	22

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	687

Motor	
Motor Mounted	Yes
Size (hp)	3/4
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP
Motor RPM	2200
Windings	1
FLA (Amps)	10.5
Min. Circuit Ampacity (MCA)	13
Max. Overcurrent Protection (MOP)	20
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-99-VG**

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	78	84	78	80	69	64	64	62	79	68	16.2
Radiated	79	86	72	74	64	58	58	58	75	64	14.0

**Notes:**

All dimensions shown are in units of in.  
\*Please consult factory for actual motor amp draw  
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-99-VG

### Direct Drive Centrifugal Inline Fan

#### 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:

Motor - Vari-Green EC motor

Control - Vari-Green Dial on Exterior of Fan Housing, Mounted and Wired  
UL/cUL 705 Listed - "Power Ventilators"

Junction Box Mounted and Wired

Switch, NEMA-1, Toggle, Shipped Separate

Aluminum Wheel Material

Motor Cover

Unit Warranty: 1 Yr (Standard)

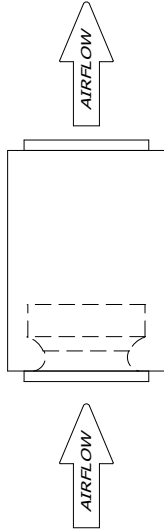
Damper Shipped Loose, Inline, VCD-23-OB-12X12, Not Coated

Damper Actuator (MS4103F1225), 115 VAC Actuated

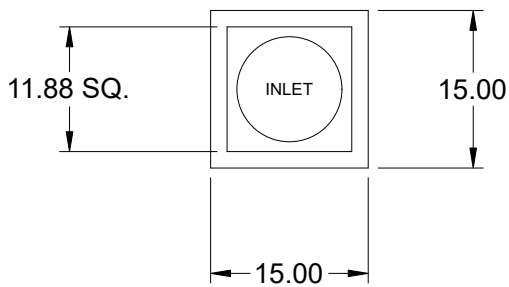
End Switch

SQ-99-VG

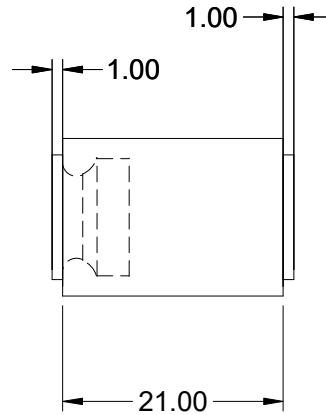
Direct Drive Centrifugal Inline Fan



TOP VIEW



END VIEW



SIDE VIEW

Notes: All dimensions shown are in units of in.

# Disconnect Switch

Enclosure Rating: NEMA-1

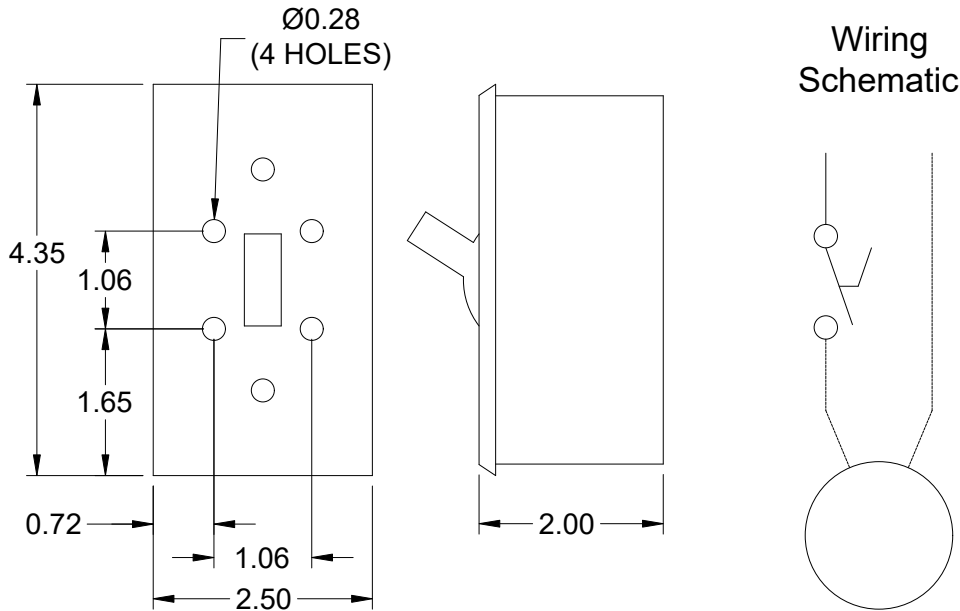
**Standard Construction Features:**

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.

**Disconnect Switch Configuration**

Type:	Toggle	Motor Size:	3/4 hp	Voltage:	115	UL Listed:	Yes
Manufacturer:	Pass and Seymour	Cycle:	60	Amperage:	20	CSA Approved:	Yes
Overload Protection:	None	Phase:	1	Switch Pole(s):	1	Rating:	1 hp
Junction Box Mtg.:	Ship Separate	RPM:	2200	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped Separate						

Electrical Drawing Details



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.

An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the fan housing 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.

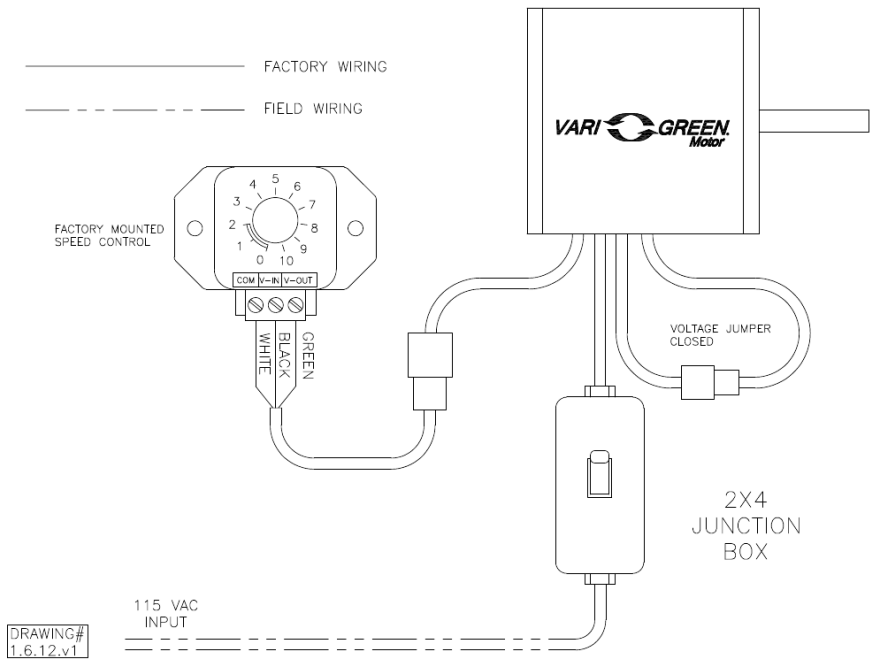
### Motor Configuration

Input Voltage: 115  
Speed Reference: 0-10VDC  
Permanent Dial: No  
Balance Dial Included: N/A

### Control Configuration

Control Type: Dial on Fan  
Transformer: None

## Vari-Green



# Control Damper

Model: VCD-23

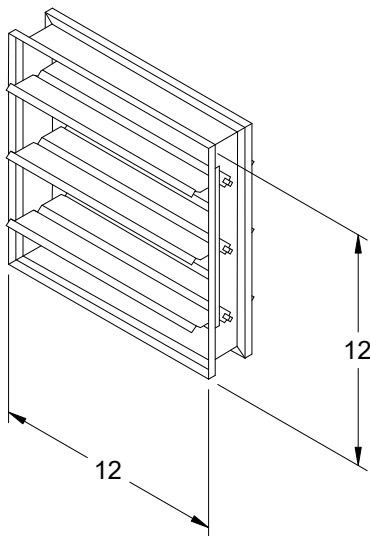
## Standard Construction Features:

- Model VCD-23 is a well built low leakage control damper for automatic control or manual balancing applications - Galvanized 16 ga channel frame - Galvanized blades with reinforcements - Side mounted steel linkage is concealed in the frame to prevent additional pressure drop - Axles are steel and 0.5 in. dia.- Synthetic axle bearings - Width and height furnished approximately 0.25 in. undersized - Field wiring is required to individual components

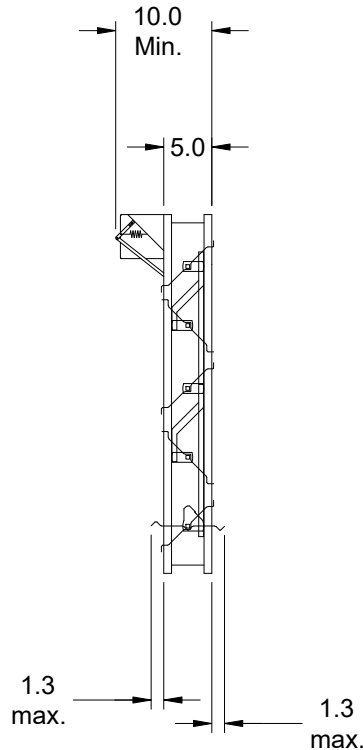
## Damper Configuration:

**Actuator Type:** 115 VAC

**End Switch:** Yes



DAMPER



TYP. SECTION VIEW

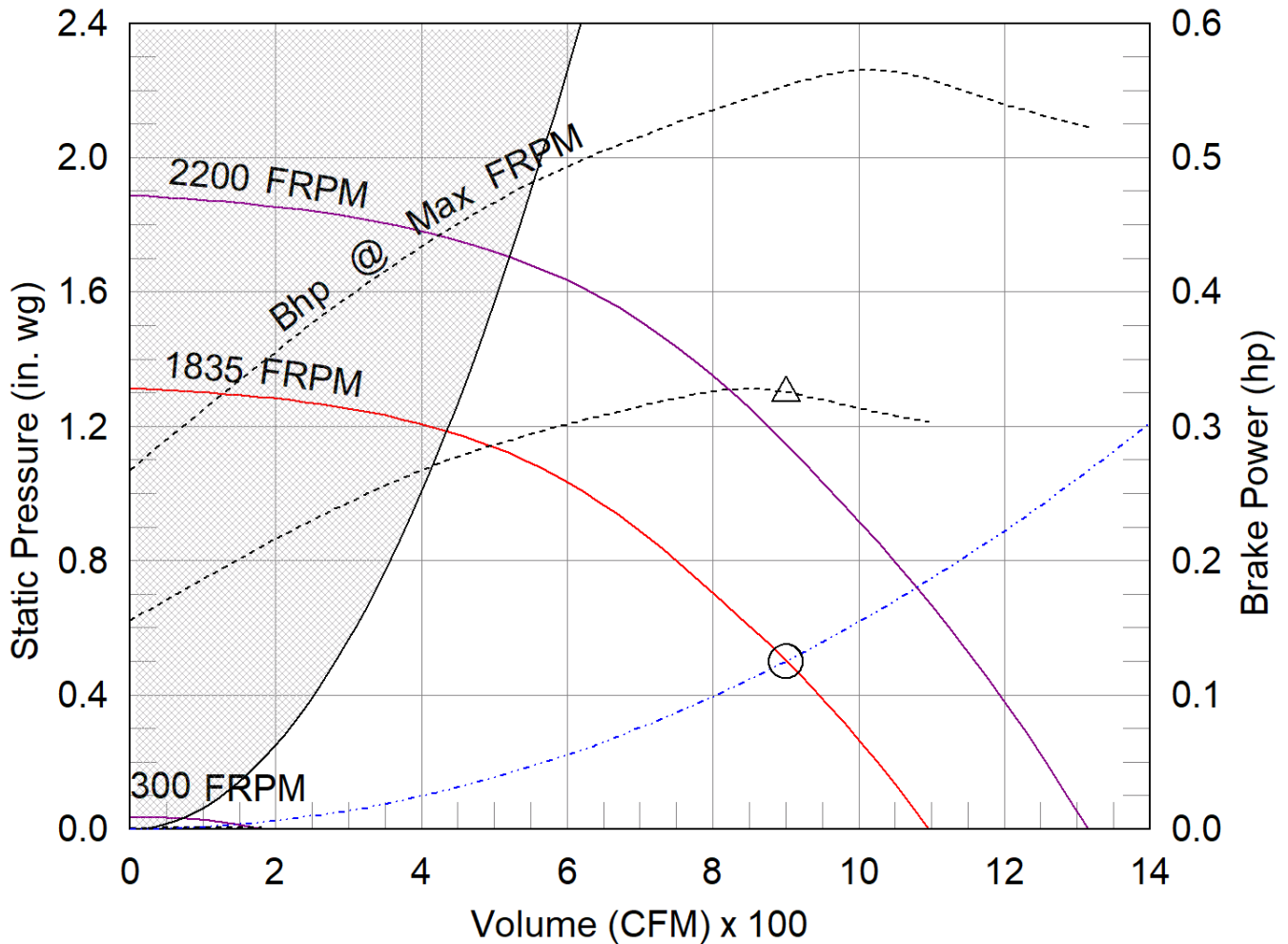
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.25 in. undersize

SQ-99-VG

Min/Max Fan Curve

**Performance**

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
900	900	0.5	1835	0.32



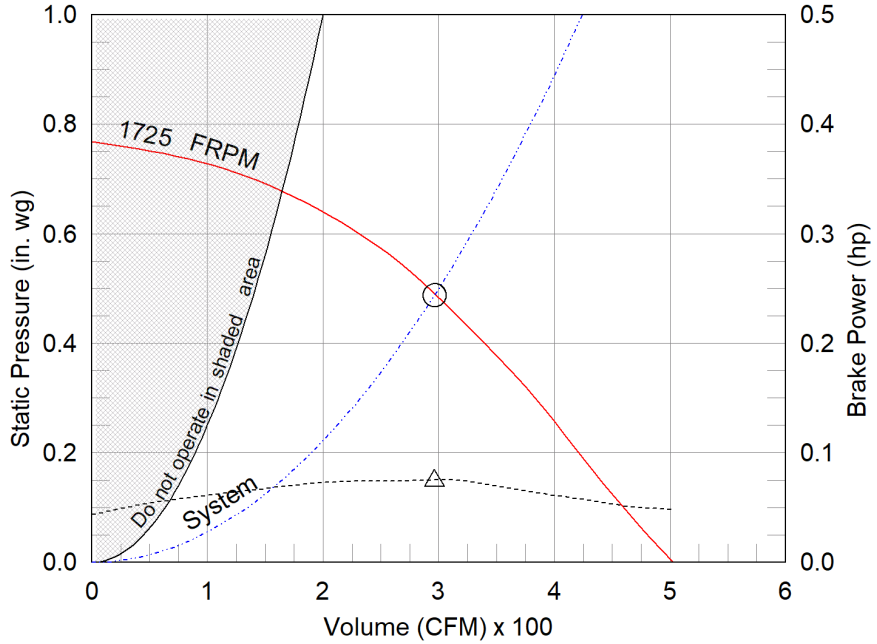
- △ Operating Bhp point
- Operating point at Total External SP
- Construction Limit
- Fan curve
- Min FRPM
- System curve
- Brake horsepower curve

**Model: SQ-80-VG**  
Direct Drive Centrifugal Inline Fan

Dimensional	
Quantity	3
Weight w/o Acc's (lb)	48
Weight w/ Acc's (lb)	78
Optional Damper (in.)	12 x 12

Performance	
Requested Volume (CFM)	300
Actual Volume (CFM)	296
Total External SP (in. wg)	0.488
Fan RPM	1725
Operating Power (hp)	0.07
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	4,911
Static Eff. (%)	31

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	296



Motor	
Motor Mounted	Yes
Size (hp)	1/10
Voltage/Cycle/Phase	115/60/1
Enclosure	TENV
Motor RPM	1725
Windings	1
FLA (Amps)	1.38
Min. Circuit Ampacity (MCA)	2
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

**Static Pressure Calculations**

External SP	0.5 in. wg
Direct Drive RPM Adjustment	-0.012 in. wg
<b>Total External SP</b>	<b>0.488 in. wg</b>

**Nameplate Model: SQ-80-VG**

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	69	75	72	65	62	60	55	49	69	57	8.7
Radiated	70	77	66	59	57	54	49	45	65	54	7.6

**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-80-VG

### Direct Drive Centrifugal Inline Fan

Tags: EF-02 EF-03 EF-06

#### 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:

Motor - Vari-Green EC motor

Control - Vari-Green Dial on Exterior of Fan Housing, Mounted and Wired

UL/cUL 705 Listed - "Power Ventilators"

Junction Box Mounted and Wired

Switch, NEMA-1, Toggle, Shipped Separate

Composite Wheel Material

Motor Cover

Unit Warranty: 1 Yr (Standard)

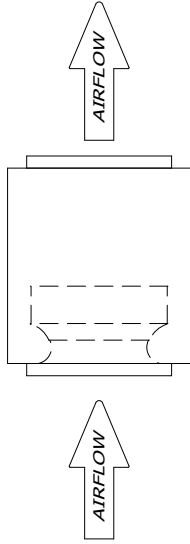
Damper Shipped Loose, Inline, VCD-23-OB-12X12, Not Coated

Damper Actuator (MS4103F1225), 115 VAC Actuated

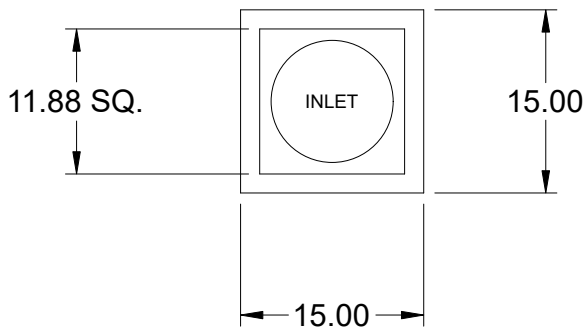
End Switch

SQ-80-VG

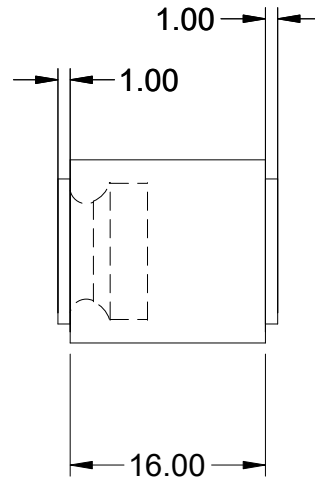
Direct Drive Centrifugal Inline Fan



TOP VIEW



END VIEW



SIDE VIEW

Notes: All dimensions shown are in units of in.

# Disconnect Switch

## Enclosure Rating: NEMA-1

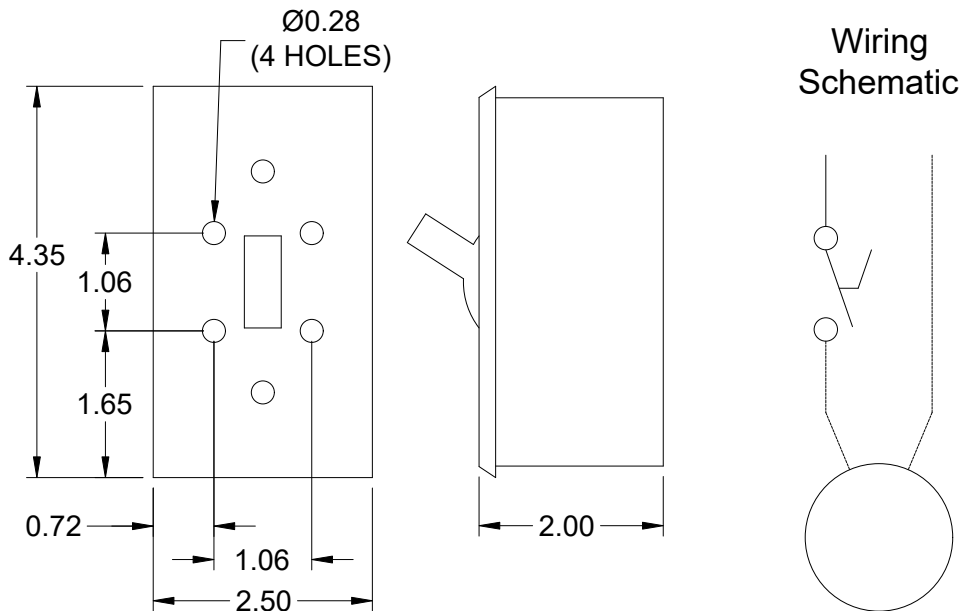
### Standard Construction Features:

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:	1/10 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.

# 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.

An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the fan housing 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.

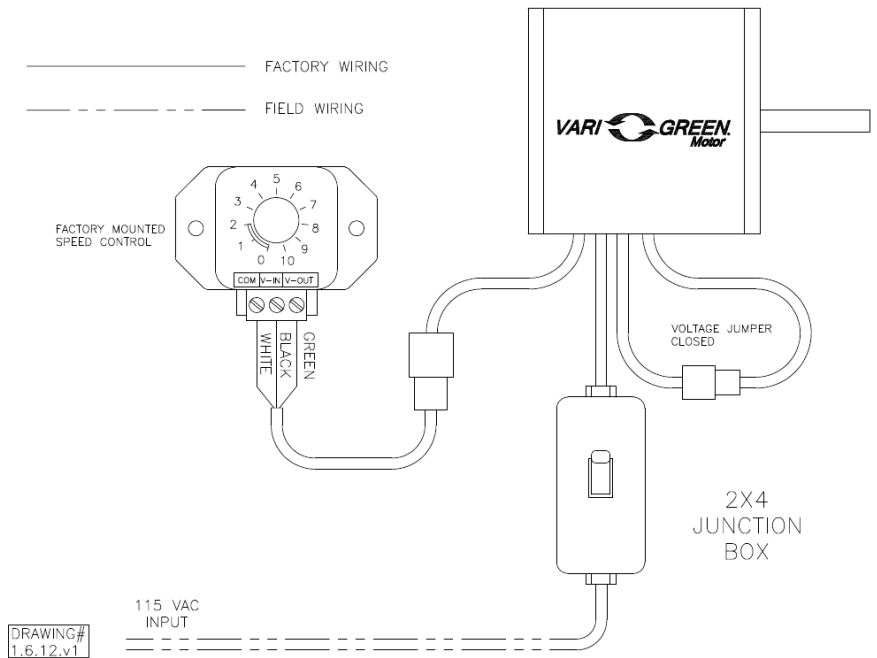
### Motor Configuration

Input Voltage: 115  
Speed Reference: 0-10VDC  
Permanent Dial: No  
Balance Dial Included: N/A

### Control Configuration

Control Type: Dial on Fan  
Transformer: None

## Vari-Green



# Control Damper

Model: VCD-23

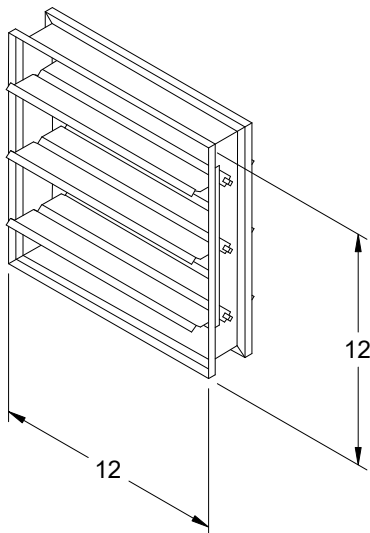
## Standard Construction Features:

- Model VCD-23 is a well built low leakage control damper for automatic control or manual balancing applications - Galvanized 16 ga channel frame - Galvanized blades with reinforcements - Side mounted steel linkage is concealed in the frame to prevent additional pressure drop - Axles are steel and 0.5 in. dia.- Synthetic axle bearings - Width and height furnished approximately 0.25 in. undersized - Field wiring is required to individual components

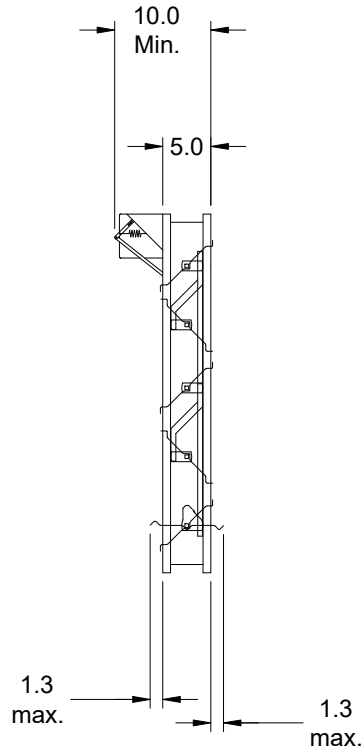
## Damper Configuration:

**Actuator Type:** 115 VAC

**End Switch:** Yes



DAMPER



TYP. SECTION VIEW

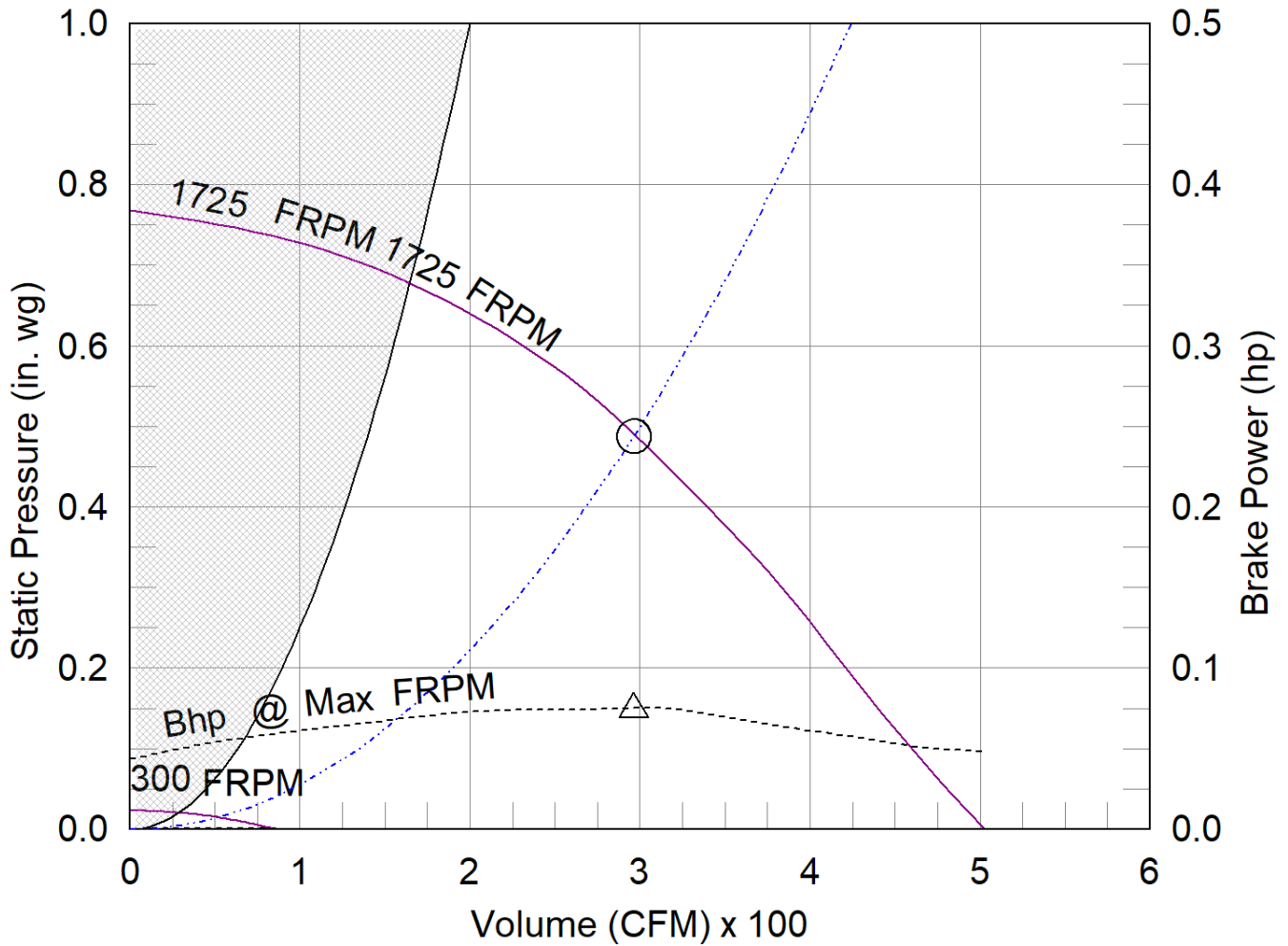
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.25 in. undersize

SQ-80-VG

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
300	296	0.488	1725	0.07



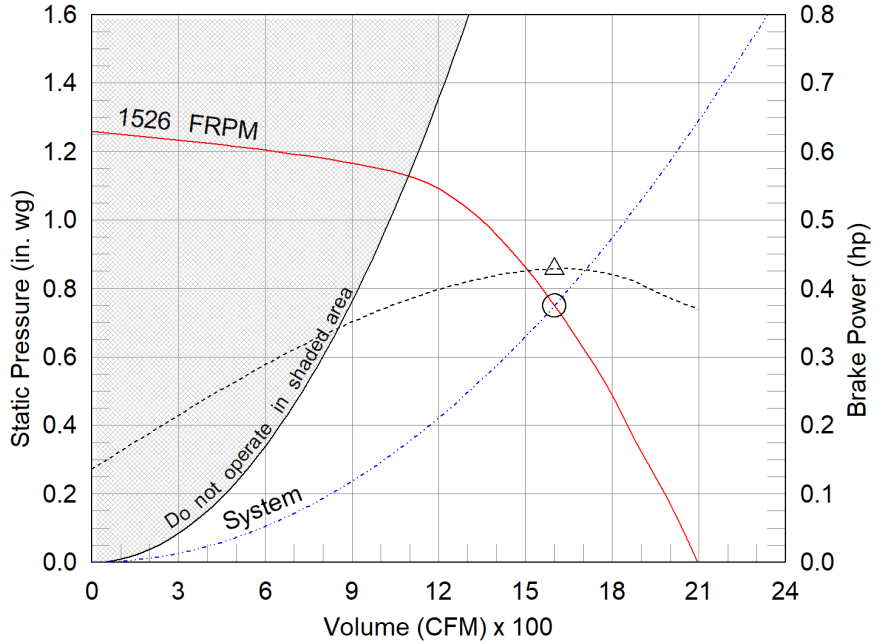
- △ Operating Bhp point
- Operating point at Total External SP
- Construction Limit
- Fan curve
- Min FRPM
- System curve
- - - - Brake horsepower curve

**Model: SQ-130-VG**  
Direct Drive Centrifugal Inline Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	57
Weight w/ Acc's (lb)	97
Optional Damper (in.)	18 x 18

Performance	
Requested Volume (CFM)	1,600
Actual Volume (CFM)	1,600
Total External SP (in. wg)	0.75
Fan RPM	1526
Operating Power (hp)	0.43
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	5,242
Static Eff. (%)	44

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	731



Motor	
Motor Mounted	Yes
Size (hp)	3/4
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP
Motor RPM	1725
Windings	1
FLA (Amps)	8.8
Min. Circuit Ampacity (MCA)	11
Max. Overcurrent Protection (MOP)	20
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-130-VG**

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	71	76	78	72	64	63	59	54	74	62	11.7
Radiated	72	78	73	66	59	57	53	50	69	58	9.1

**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-130-VG

### Direct Drive Centrifugal Inline Fan

#### 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:

Motor - Vari-Green EC motor

Control - Vari-Green Dial on Exterior of Fan Housing, Mounted and Wired  
UL/cUL 705 Listed - "Power Ventilators"

Junction Box Mounted and Wired

Switch, NEMA-1, Toggle, Shipped Separate

Aluminum Wheel Material

Motor Cover

Unit Warranty: 1 Yr (Standard)

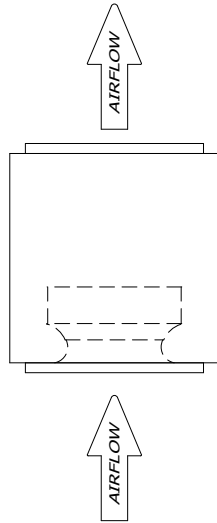
Damper Shipped Loose, Inline, VCD-23-OB-18X18, Not Coated

Damper Actuator (MS4103F1225), 115 VAC Actuated

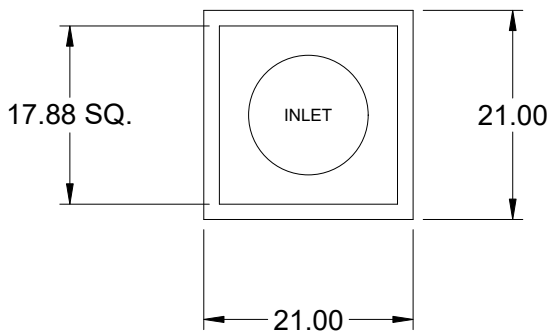
End Switch

SQ-130-VG

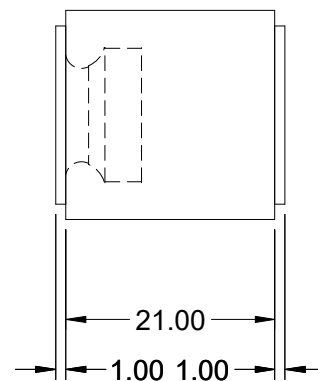
Direct Drive Centrifugal Inline Fan



TOP VIEW



END VIEW



SIDE VIEW

Notes: All dimensions shown are in units of in.

# Disconnect Switch

Enclosure Rating: NEMA-1

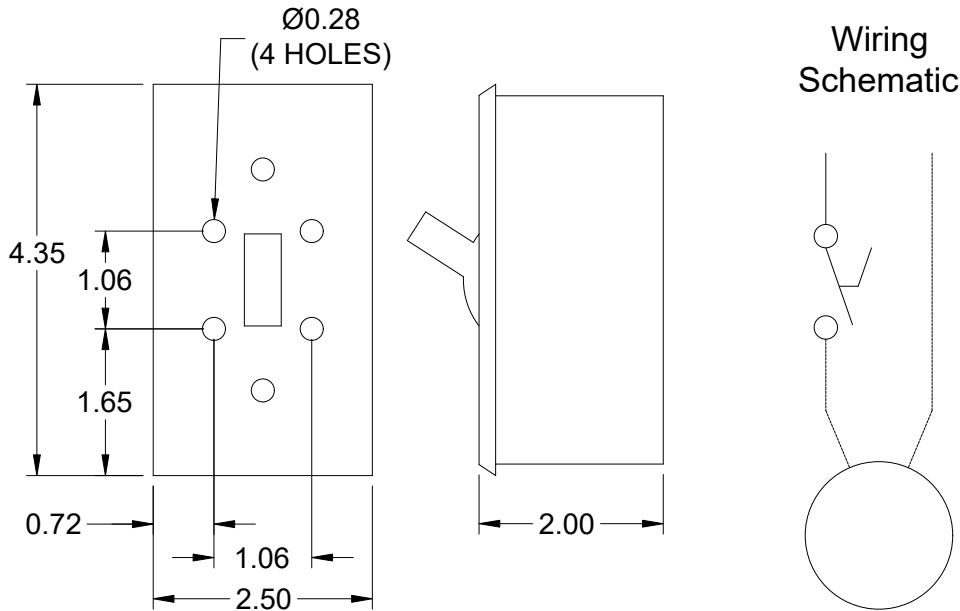
### Standard Construction Features:

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.

### Disconnect Switch Configuration

Type:	Toggle	Motor Size:	3/4 hp	Voltage:	115	UL Listed:	Yes
Manufacturer:	Pass and Seymour	Cycle:	60	Amperage:	20	CSA Approved:	Yes
Overload Protection:	None	Phase:	1	Switch Pole(s):	1	Rating:	1 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.

# 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.

An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the fan housing 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.

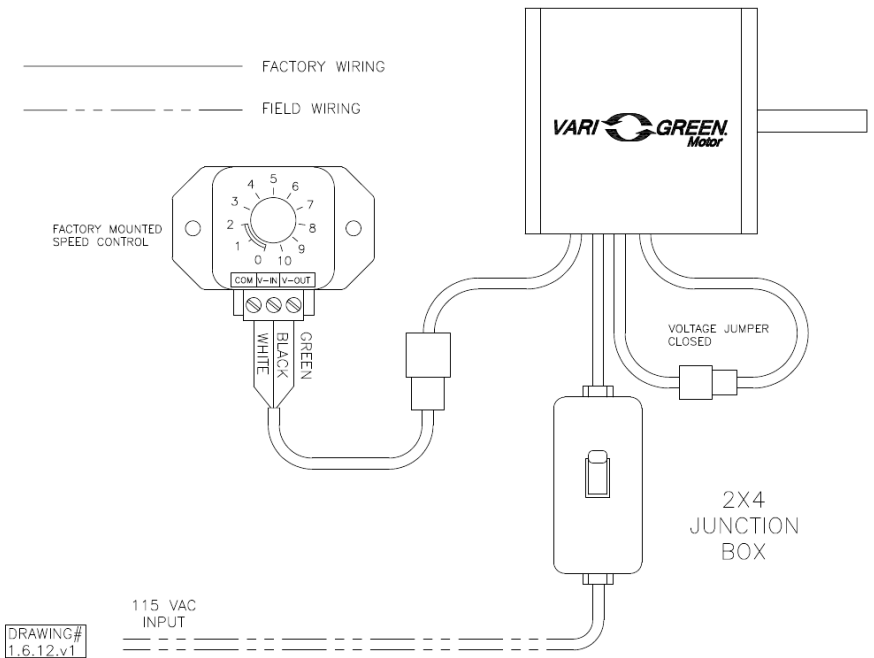
### Motor Configuration

Input Voltage: 115  
Speed Reference: 0-10VDC  
Permanent Dial: No  
Balance Dial Included: N/A

### Control Configuration

Control Type: Dial on Fan  
Transformer: None

## Vari-Green



# Control Damper

Model: VCD-23

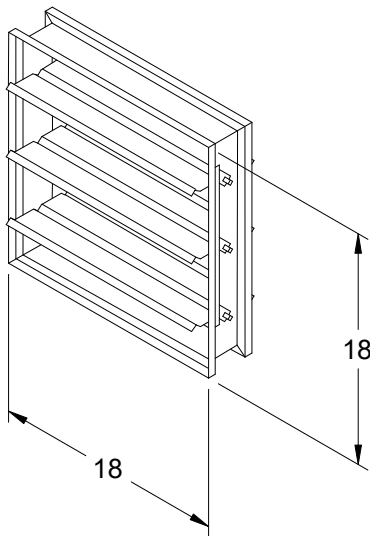
## Standard Construction Features:

- Model VCD-23 is a well built low leakage control damper for automatic control or manual balancing applications - Galvanized 16 ga channel frame - Galvanized blades with reinforcements - Side mounted steel linkage is concealed in the frame to prevent additional pressure drop - Axles are steel and 0.5 in. dia.- Synthetic axle bearings - Width and height furnished approximately 0.25 in. undersized - Field wiring is required to individual components

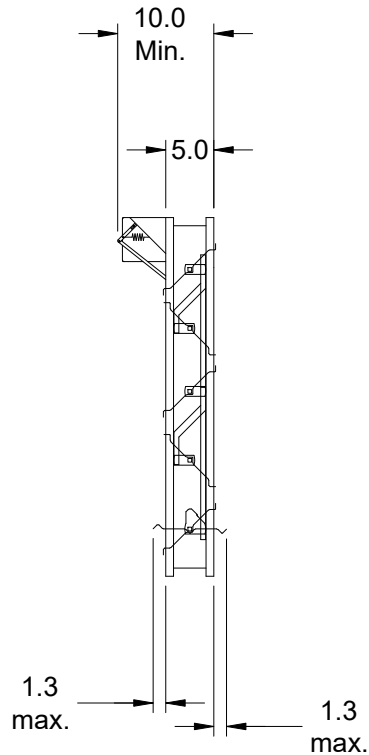
## Damper Configuration:

**Actuator Type:** 115 VAC

**End Switch:** Yes



DAMPER



TYP. SECTION VIEW

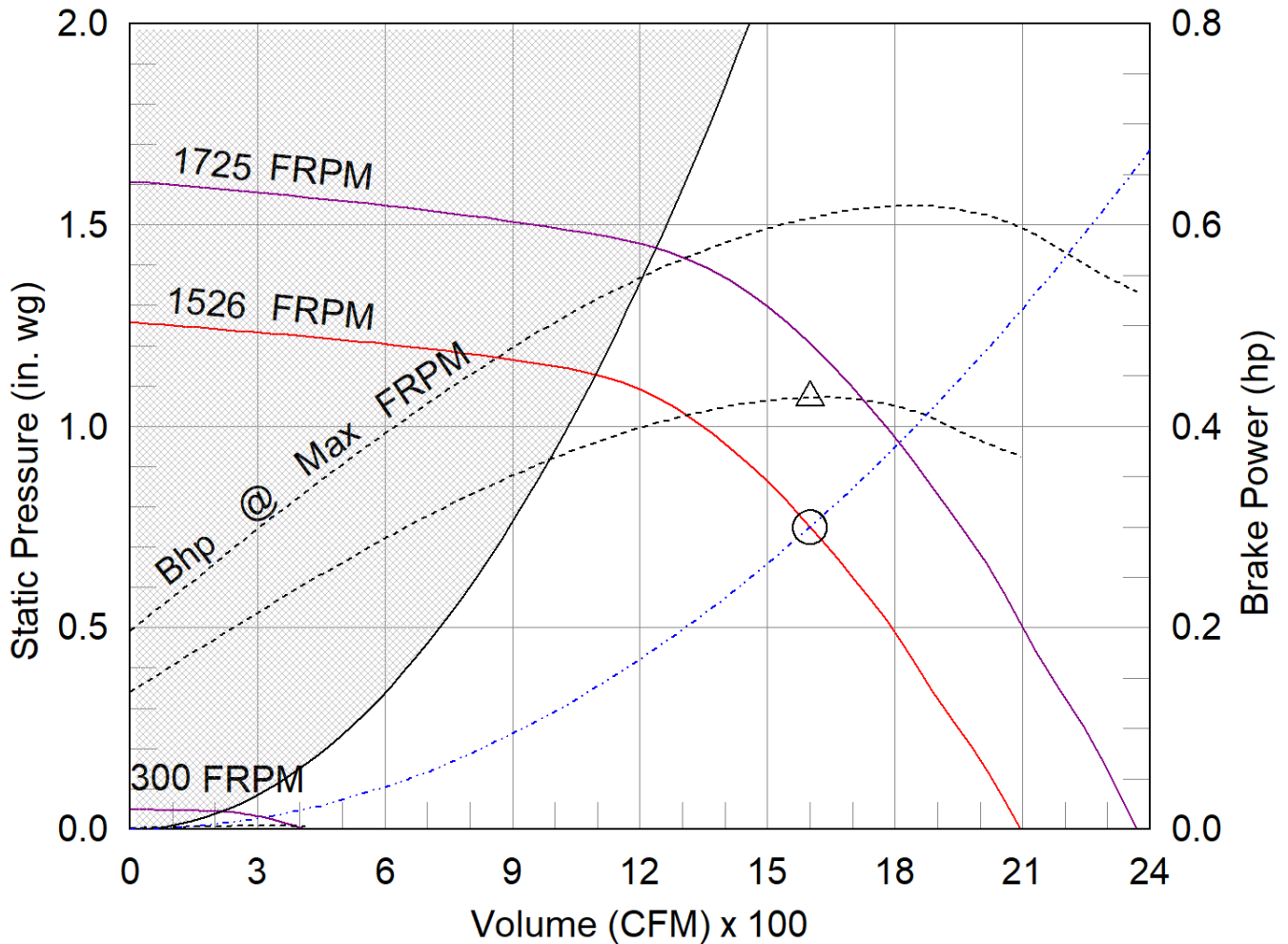
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.25 in. undersize

SQ-130-VG

Min/Max Fan Curve

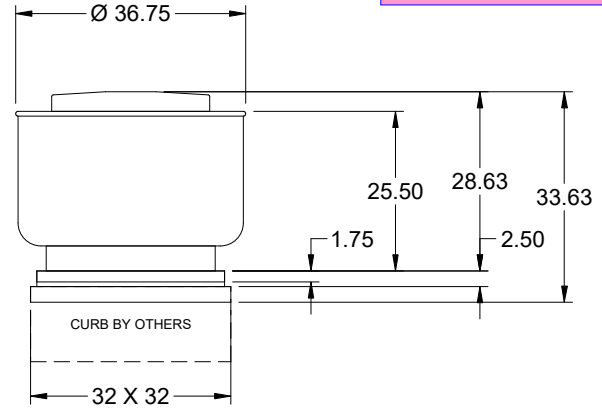
**Performance**

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
1,600	1,600	0.75	1526	0.43



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

**Model: CUBE-180-10**  
Belt Drive Upblast Centrifugal Roof Exhaust Fan



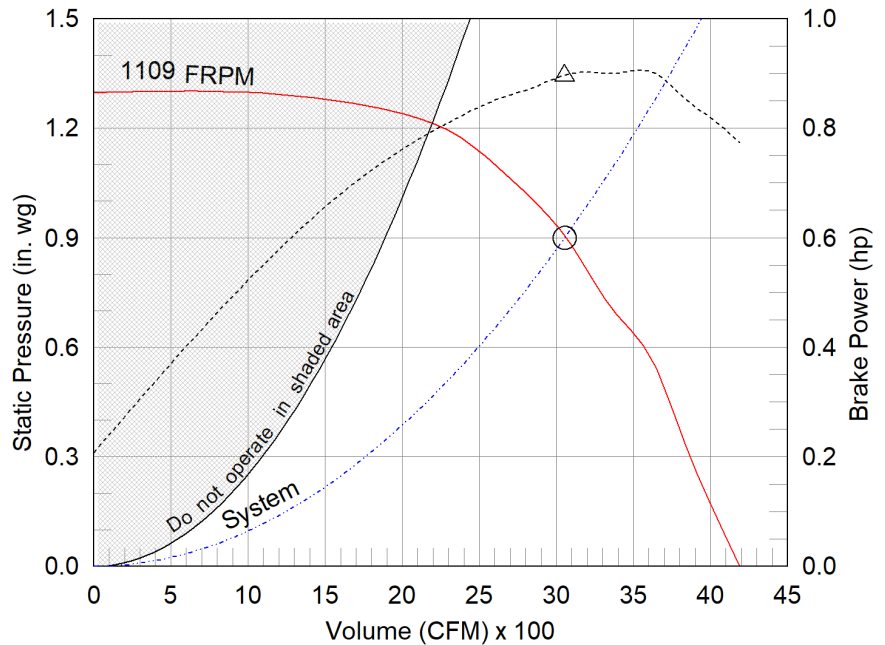
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	106
Weight w/ Acc's (lb)	168
Max T Motor Frame Size	184
Standard Curb Cap Size (in.)	30 x 30
Roof Opening (in.)	26.5 x 26.5

Performance	
Requested Volume (CFM)	3,053
Actual Volume (CFM)	3,053
Total External SP (in. wg)	0.9
Fan RPM	1109
Operating Power (hp)	0.9
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Drive Loss (%)	6.4
Tip Speed (ft/min)	5,372
Static Eff. (%)	52

Misc Fan Data	
Fan Eff. Index (FEI)	1.34
Outlet Velocity (ft/min)	1,046

Motor	
Motor Included	Yes
Size (hp)	1
Voltage/Cycle/Phase	460/60/3
Enclosure	ODP
Motor RPM	1725
Efficiency Rating	Standard
Windings	1
NEC FLA* (Amps)	2.1
Min. Circuit Ampacity (MCA)	2.63
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	75	79	83	75	68	69	62	57	78	66	14.9



## Model: CUBE-180-10

### Belt Drive Upblast Centrifugal Roof Exhaust Fan

#### Standard Construction Features:

- Aluminum housing - Backward inclined aluminum wheel - Curb cap with prepunched mounting holes - Motor and drives isolated on shock mounts - Drain trough - Ball bearing motors - Adjustable motor pulley - Adjustable motor plate - Fan shaft mounted in ball bearing pillow blocks - Bearings meet or exceed temperature rating of fan - Static resistant belts - Corrosion resistant fasteners - Internal lifting lugs

#### Selected Options & Accessories:

Automatic Belt Tensioner  
Spare Belt(s) - 1 Set (Attached)  
Standard Curb Cap Size - 30 Square  
UL/cUL 705 Listed - "Power Ventilators"  
Switch, NEMA-1, Toggle, Shipped with Unit  
Junction Box Mounted & Wired  
Adapter-Galv., Curb Cap Adapted to 32 x 32 (Attached)  
Stainless Steel Fasteners - 300 Series  
Stainless Steel Shaft - 300 Series  
Birdscreen: Stainless Steel, nom. 86% Free Area  
Heat Baffle (Attached)  
Unit Warranty: 1 Yr (Standard)

#### Selected Sub Marks

*See individual submittals for full details*  
MSAC-1-9/J-G2.5-40

# Disconnect Switch

## Enclosure Rating: NEMA-1

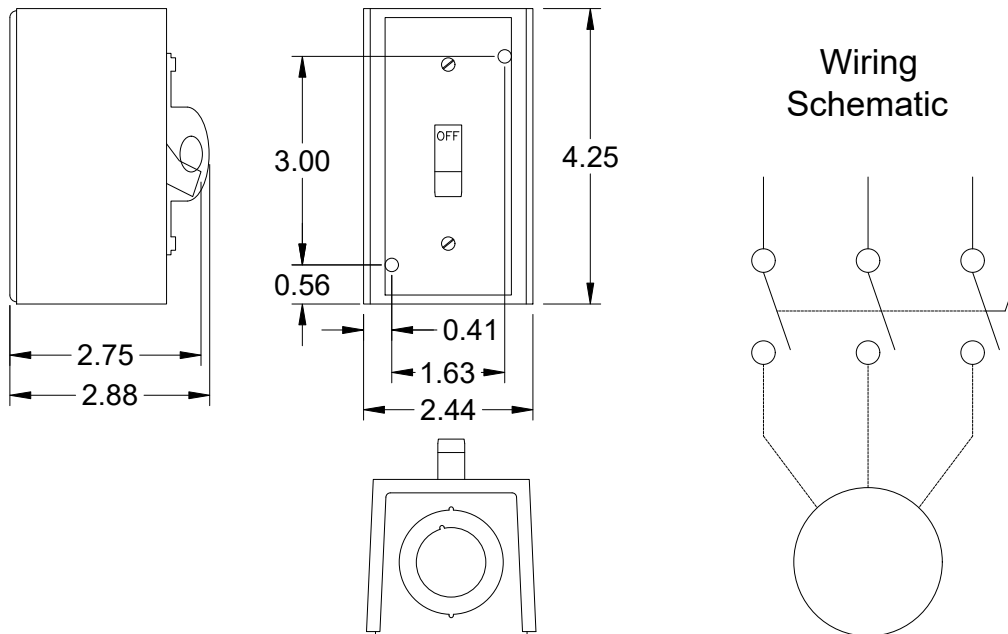
### Standard Construction Features:

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 hp	Voltage:	460	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:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

### Electrical Drawing Details



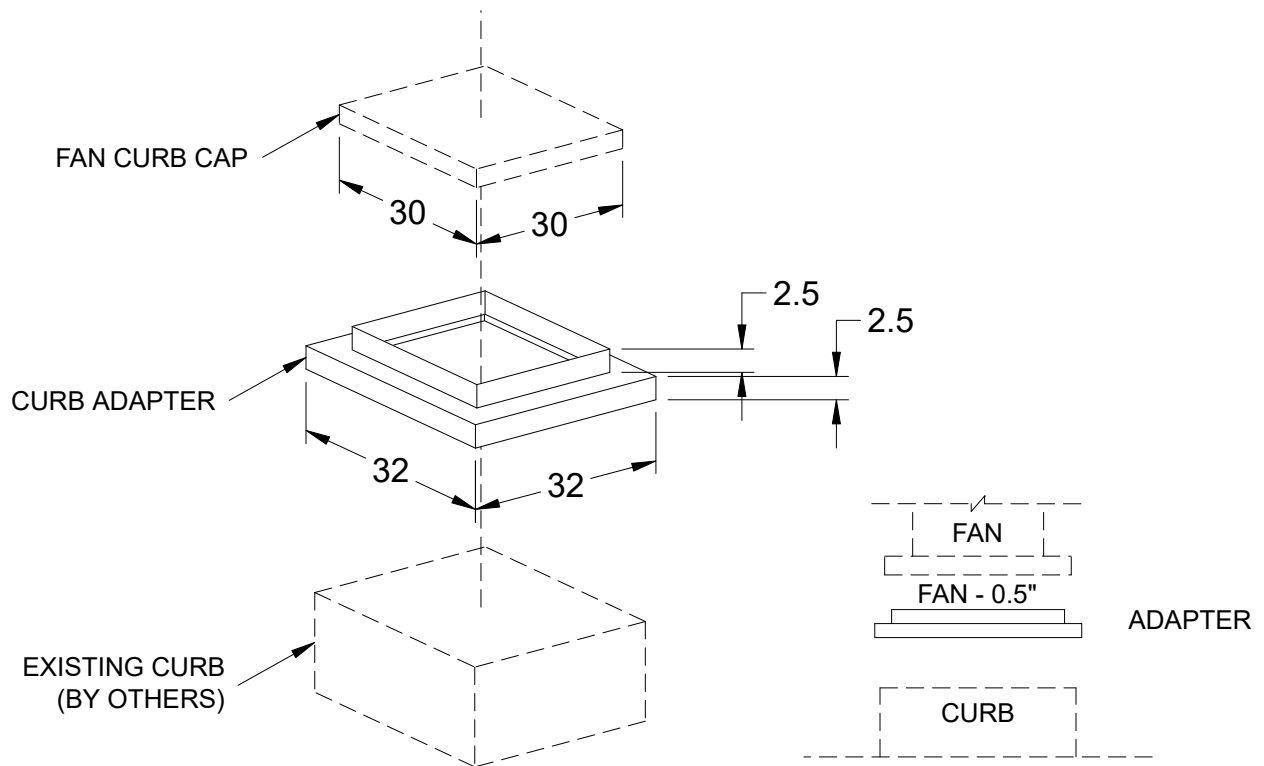
Notes: All dimensions shown are in units of in.

# Curb Cap Adapter

Type: Adapter

## Standard Construction Features:

Curb adapters are designed to adapt standard curb cap dimensions to non-standard curb sizes. Adapters may be constructed of either aluminum or galvanized steel. Curb reducers may reduce by a maximum of 10 in. and curb adapters may extend up to 20 in. beyond the standard curb cap size.



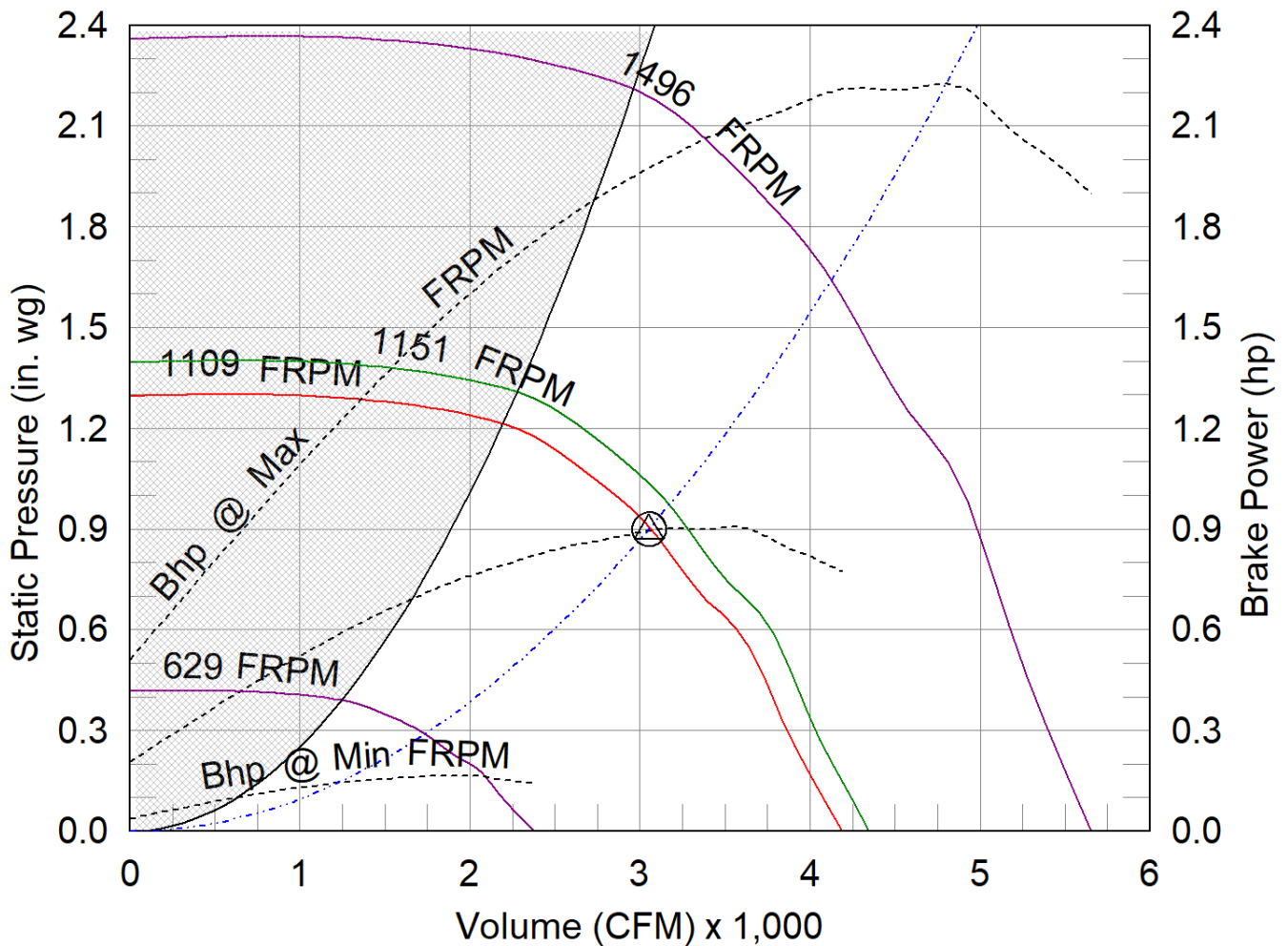
Notes: All dimensions shown are in units of in.

CUBE-180-10


Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
3,053	3,053	0.9	1109	0.9



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

Motor Starter Advanced Control with  SMARTSTART™

Qty: 1 Model: MSAC-1-9/J-G2.5-40

**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:**

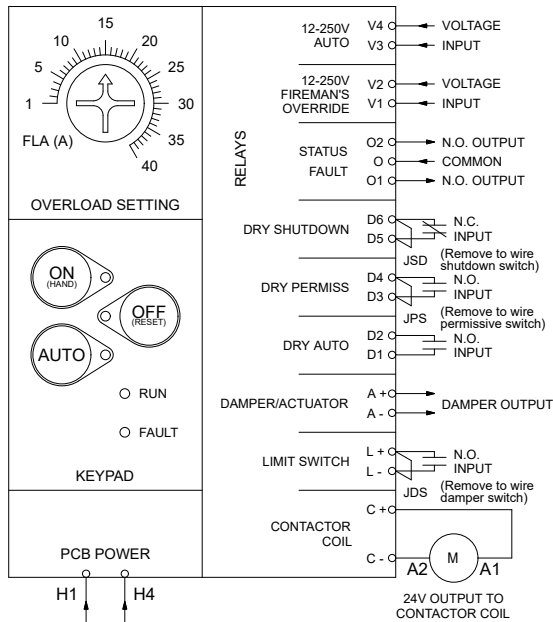
Series:	Type:	Enclosure:	Material:	HP:	Power:	Nema Size:
MSAC	Combination	NEMA-1	16 Ga Steel	1	460/60/3	00

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

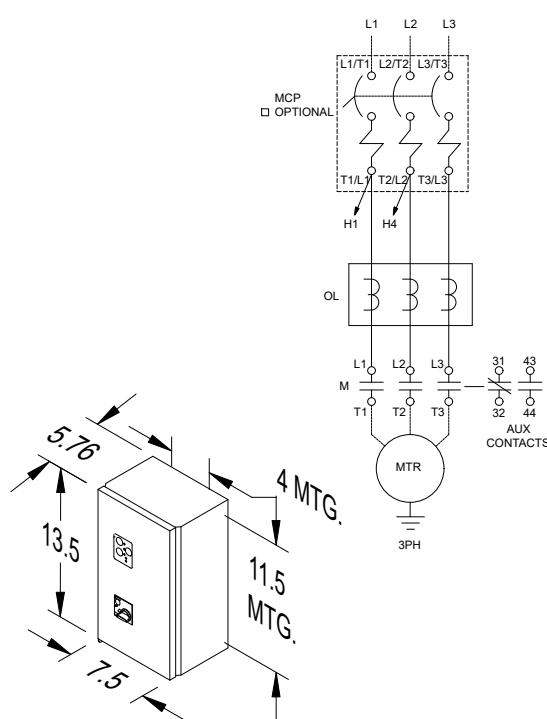
Overload	Trip Class	OL Reset	OL Type	FLA Range	Phase Unbalance	Phase Loss
MSAC	10 or 20	Manual or Auto	Electronic Thermal	1-40A	Trip in 3 sec @ 25%	Trip in 3 sec

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-2.5	2.5	32.5	IP20	100	65	25

MSAC CONTROL WIRING



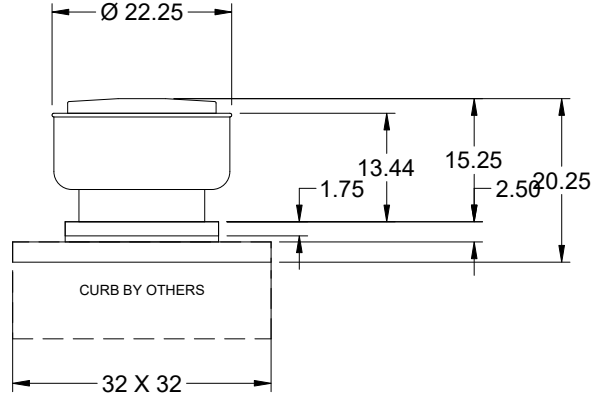
MSAC STARTER POWER WIRING 200-600 VAC INPUT



Notes: All dimensions shown are in units of in.

**Model: CUE-095-VG**  
Direct Drive Upblast Centrifugal Roof Exhaust Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	34
Weight w/ Acc's (lb)	75
Standard Curb Cap Size (in.)	19 x 19
Optional Damper (in.)	10 x 10
Roof Opening (in.)	15.5 x 15.5

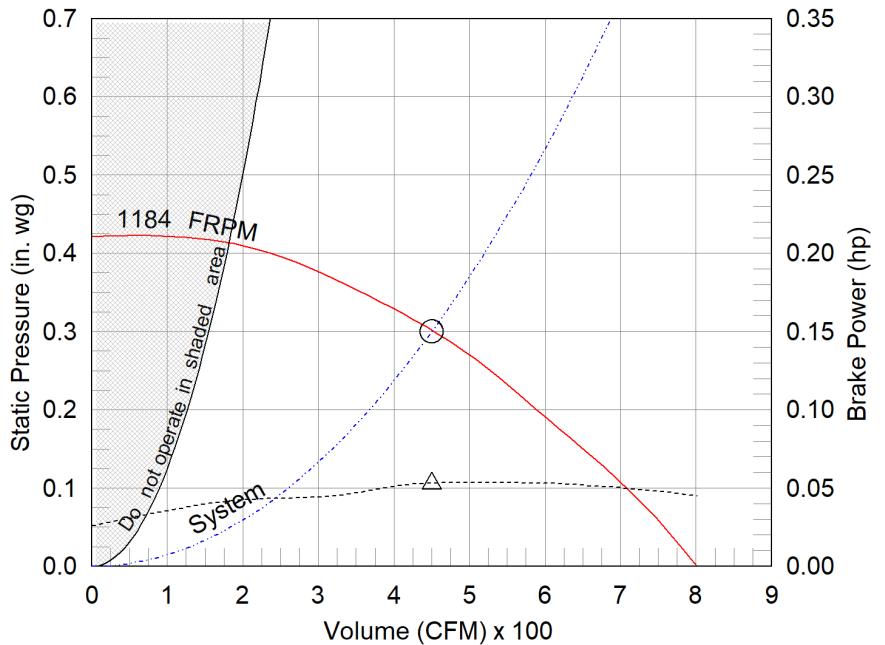


OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Performance	
Requested Volume (CFM)	450
Actual Volume (CFM)	450
Total External SP (in. wg)	0.3
Fan RPM	1184
Operating Power (hp)	0.05
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,371
Static Eff. (%)	40

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	388

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



- △ 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	76	69	63	55	50	51	44	37	60	49	5.4



## Model: CUE-095-VG

### Direct Drive Upblast Centrifugal Roof Exhaust Fan

#### Standard Construction Features:

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

#### Selected Options & Accessories:

Motor - Vari-Green EC motor  
Control - 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  
Adapter-Galv., Curb Cap Adapted to 32 x 32 (Attached)  
Birdscreen: Stainless Steel, nom. 89% Free Area  
Composite Wheel Material  
Unit Warranty: 1 Yr (Standard)  
Damper Shipped Loose, BD-100-PB-10X10, 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

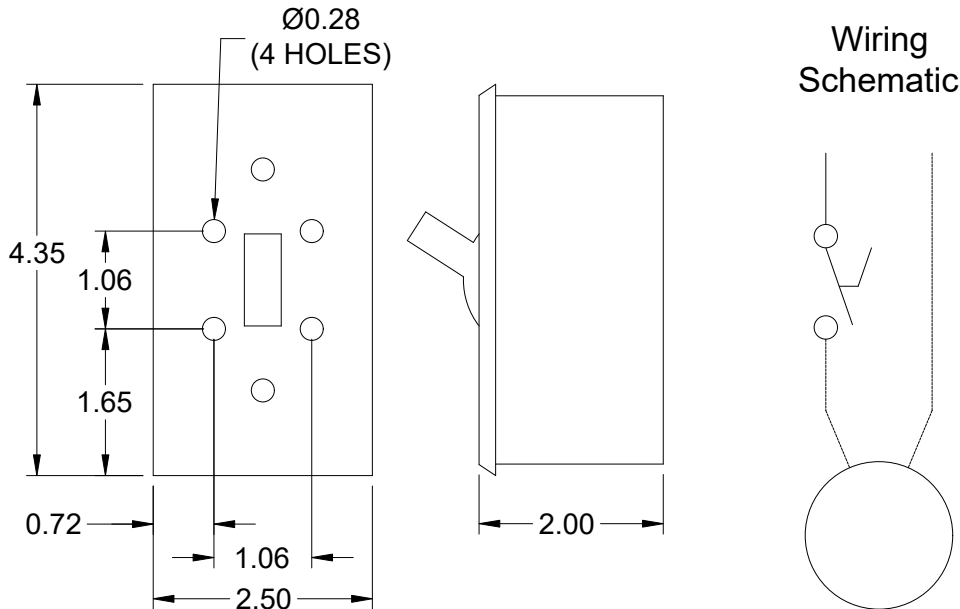
### Standard Construction Features:

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:	1/6 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.

# Vari-Green Motor & Control Options

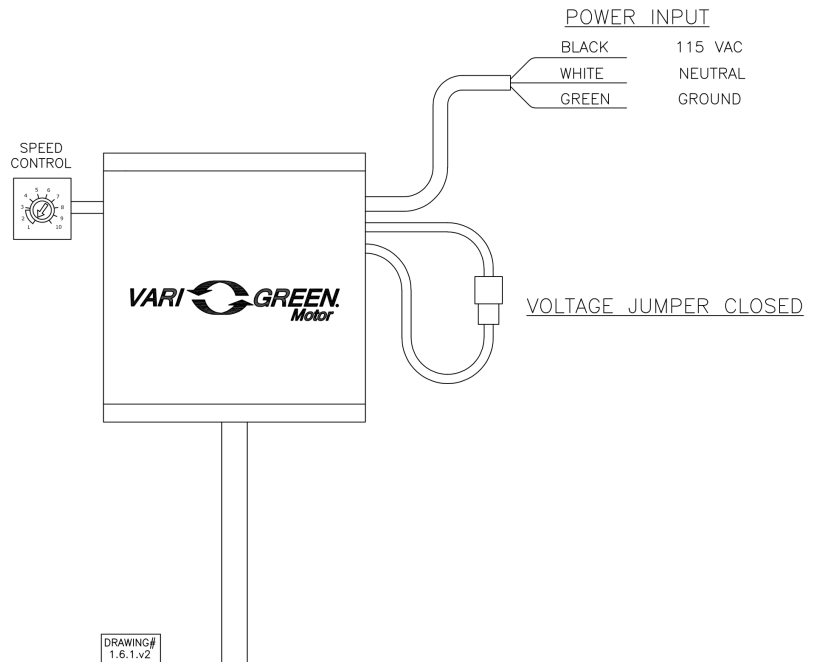
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated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

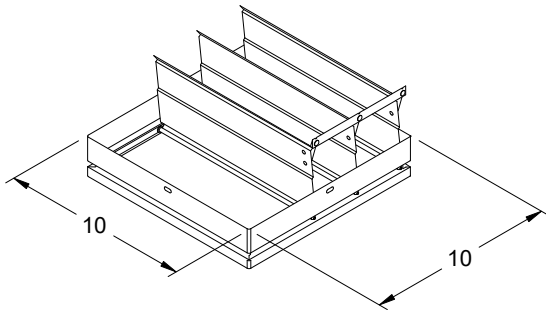
Model: BD-100

## Standard Construction Features:

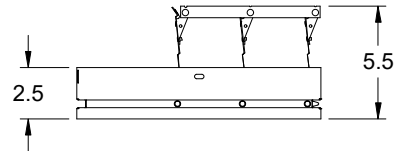
- Model BD-100 is a horizontal mount exhaust damper (air flow up) and is constructed of 24 ga galvanized steel with pre-punched mounting holes - Damper blades are 0.016 in. roll formed aluminum with vinyl seals on the closing edge, and spring assisted for ease of opening - Axle/bearing is constructed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

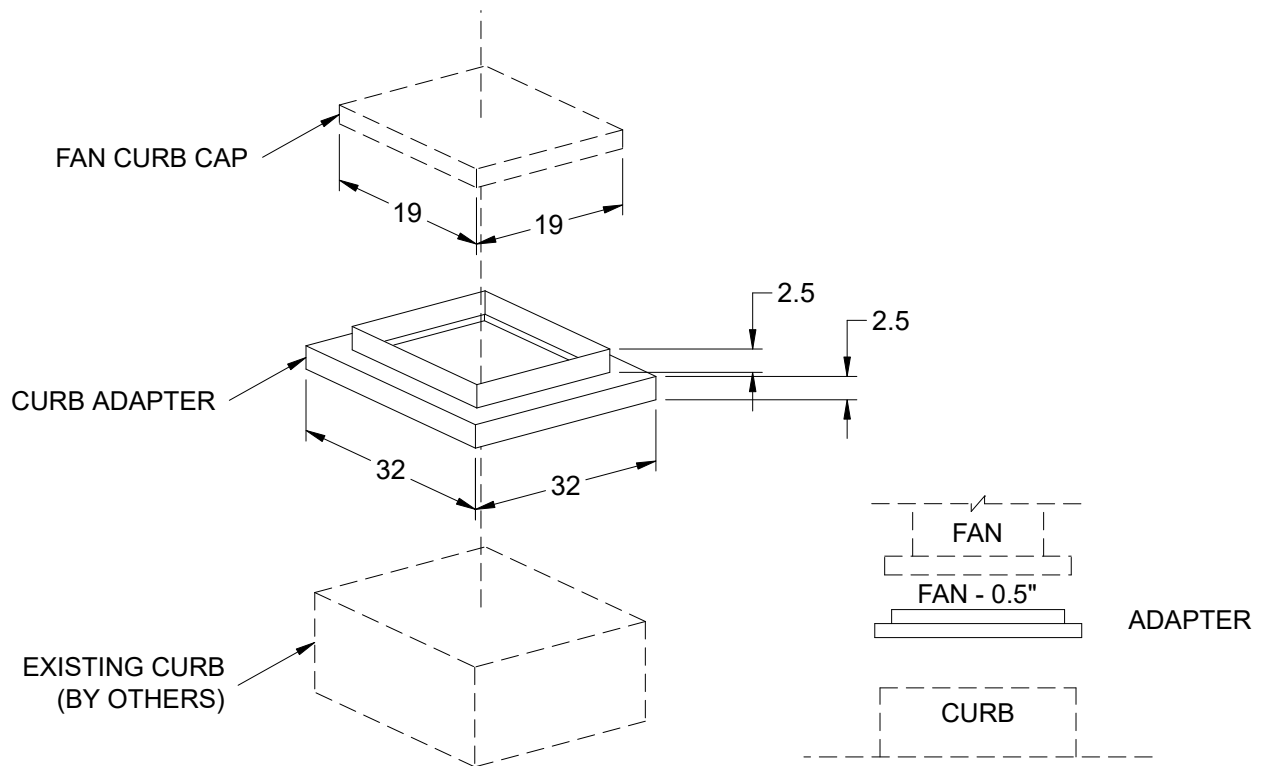
Notes: All dimensions shown are in units of in.

# Curb Cap Adapter

Type: Adapter

## Standard Construction Features:

Curb adapters are designed to adapt standard curb cap dimensions to non-standard curb sizes. Adapters may be constructed of either aluminum or galvanized steel. Curb reducers may reduce by a maximum of 10 in. and curb adapters may extend up to 20 in. beyond the standard curb cap size.



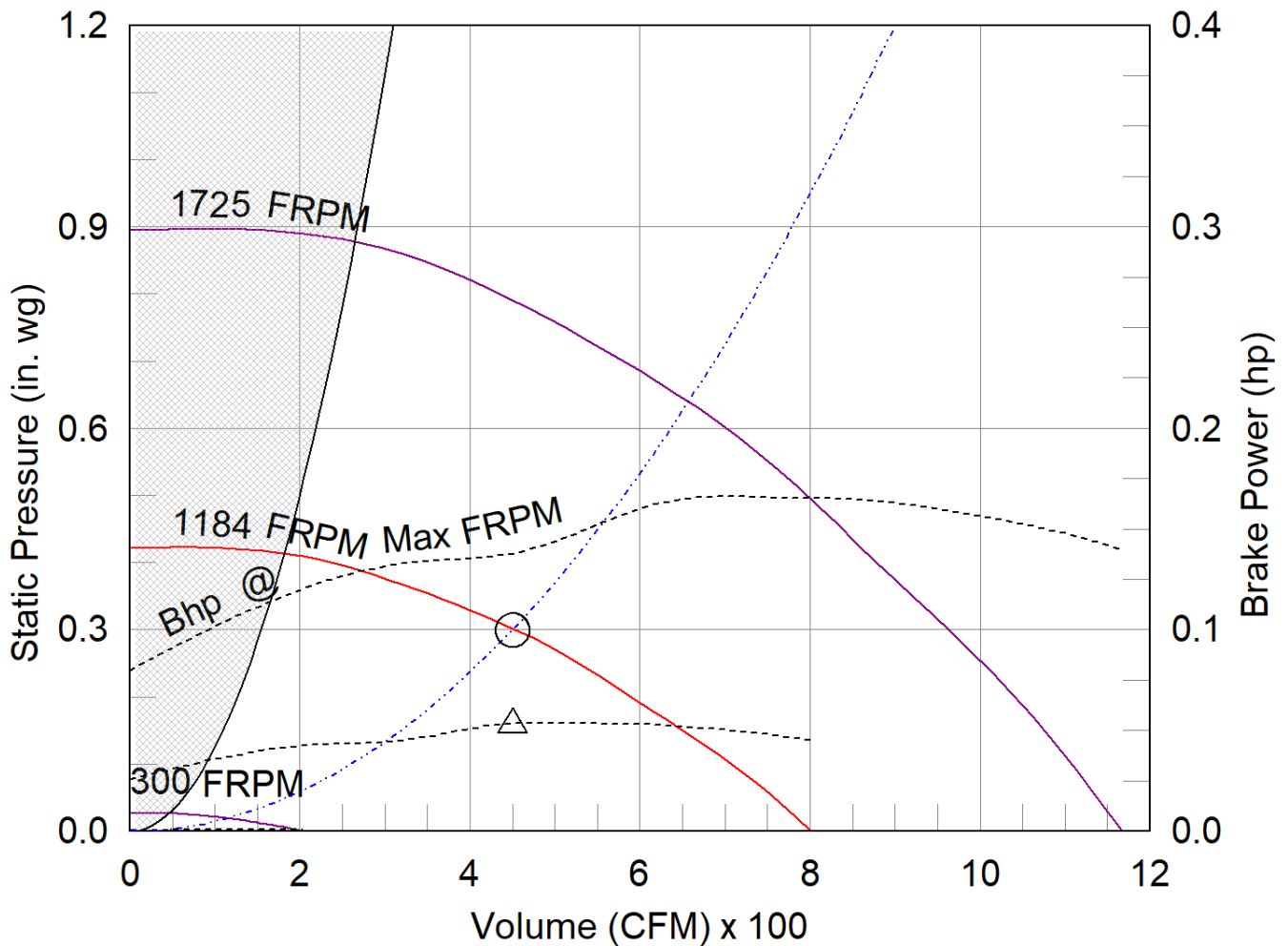
Notes: All dimensions shown are in units of in.

CUE-095-VG

Min/Max Fan Curve

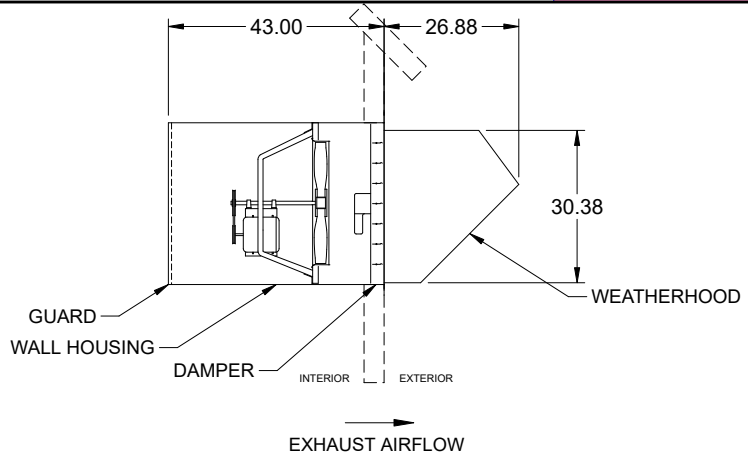
Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
450	450	0.3	1184	0.05



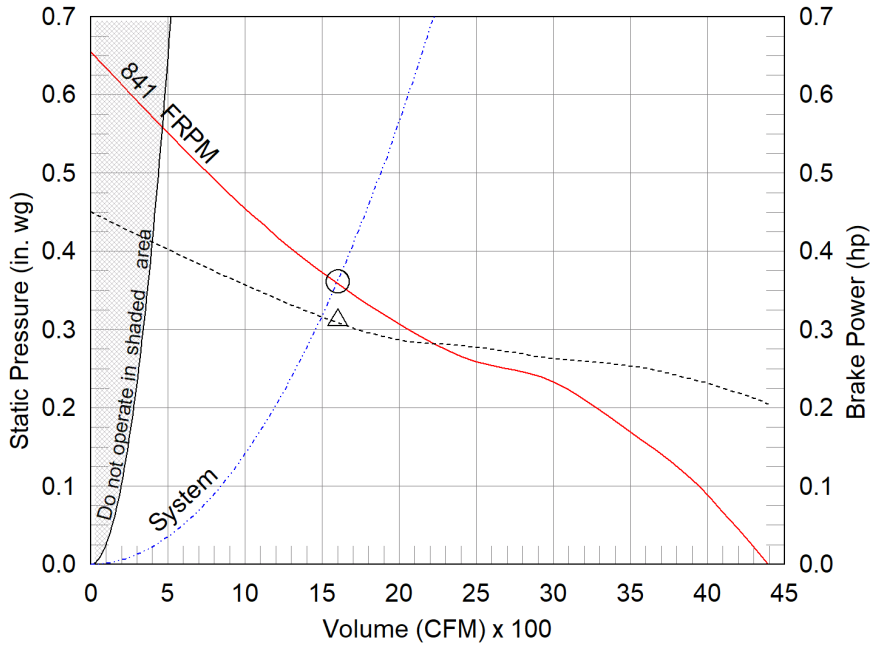
- △ Operating Bhp point
- Operating point at Total External SP
- Construction Limit
- Fan curve
- Min FRPM
- System curve
- Brake horsepower curve

**Model: SBE-1H24-5**  
Sidewall Belt Drive Fan  
Motor Access From Int. of Bldg.



Dimensional	
Quantity	1
Weight w/o Acc's (lb)	79
Weight w/ Acc's (lb)	267
Max T Motor Frame Size	145
Optional Damper (in.)	26 x 26
Wall Opening (in.)	33.75 x 33.75

Performance	
Requested Volume (CFM)	1,600
Actual Volume (CFM)	1,600
Total External SP (in. wg)	0.361
Fan RPM	841
Operating Power (hp)	0.31
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Drive Loss (%)	10.8
Tip Speed (ft/min)	5,281
Static Eff. (%)	33



Motor	
Motor Mounted	Yes
Size (hp)	1/2
Voltage/Cycle/Phase	460/60/3
Enclosure	ODP
Motor RPM	1725
Efficiency Rating	Standard
Windings	1
NEC FLA* (Amps)	1.1

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

**Static Pressure Calculations**

External SP	0.3 in. wg
Damper	0.061 in. wg
<b>Total External SP</b>	<b>0.361 in. wg</b>

**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 Power by Octave Band**

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	82	80	77	73	70	66	61	58	76	64	13.2



## Model: SBE-1H24-5

### Sidewall Belt Drive Fan

#### Standard Construction Features:

- Galvanized steel fan panel - Die formed, galvanized steel drive frame assembly
- Fabricated steel propeller for Levels 1 and 2, welded and painted steel for Level 3
- Adjustable motor pulley - Ball bearing motors - Fan shaft mounted in ball bearing pillow blocks - Static resistant belts - Corrosion resistant fasteners

#### Selected Options & Accessories:

- Motor with Thermal Overload
- Automatic Belt Tensioner
- Spare Belt(s) - 1 Set (Attached)
- UL/cUL 705 Listed - "Power Ventilators"
- Airflow Direction: Exhaust
- Long Wall Hsg, Flush Exterior, w/OSHA Grd., Factory Installed
- Motor Access: From Int. of Bldg.
- Switch, NEMA-1, Toggle, Shipped with Unit
- Junction Box Mounted & Wired
- Weatherhood, Galvanized 45 deg. with Bird Screen, Shipped Loose From Factory
- Unit Warranty: 1 Yr (Standard)
- Damper Mounted, WD-320-PB-26X26, Not Coated
- Damper Actuator (MP-310), 115 VAC Actuated
- End Switch

# Disconnect Switch

## Enclosure Rating: NEMA-1

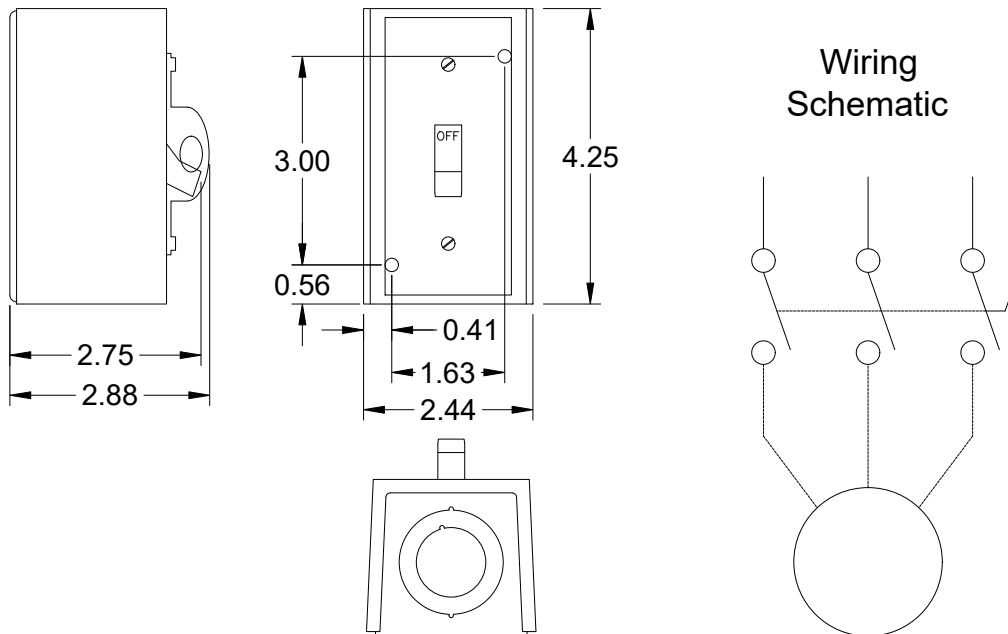
### Standard Construction Features:

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:	460	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:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

### Electrical Drawing Details



Notes: All dimensions shown are in units of in.

# Vertical Mount Exhaust Damper

Model: WD-320

## Standard Construction Features:

- Model WD-320 is a vertical mount exhaust damper and is constructed of 18 ga galvanized steel with pre-punched mounting holes and a flanged frame - 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 mounted steel in nylon bushings - Synthetic axle bearings

## Damper Configuration:

Actuator Type: 115 VAC

End Switch: Yes

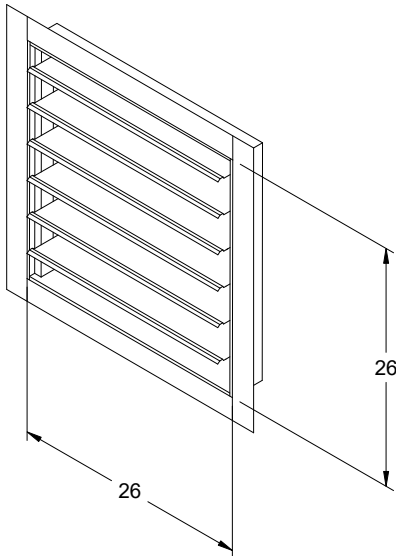
## Actuator Configuration:

Manufacturer: Greenheck Jackshaft Quantity: 0

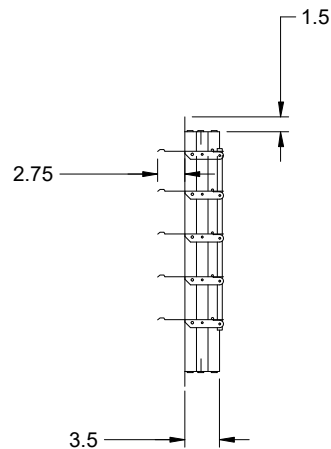
Model: MP-310

Mounting: Internal

Quantity: 1



DAMPER



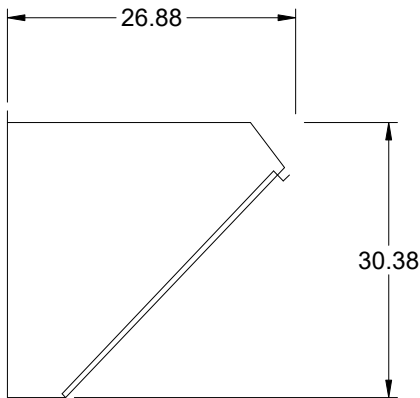
TYP. SECTION VIEW

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

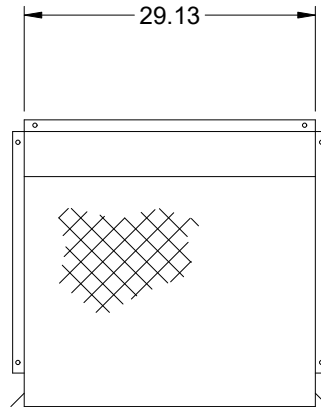
# 45 Degree Weatherhood

**Standard Construction Features:**

Galvanized Steel or aluminum construction. 0.5 welded wire birdscreen. Prepunched mounting holes. Field assembled.



SIDE VIEW

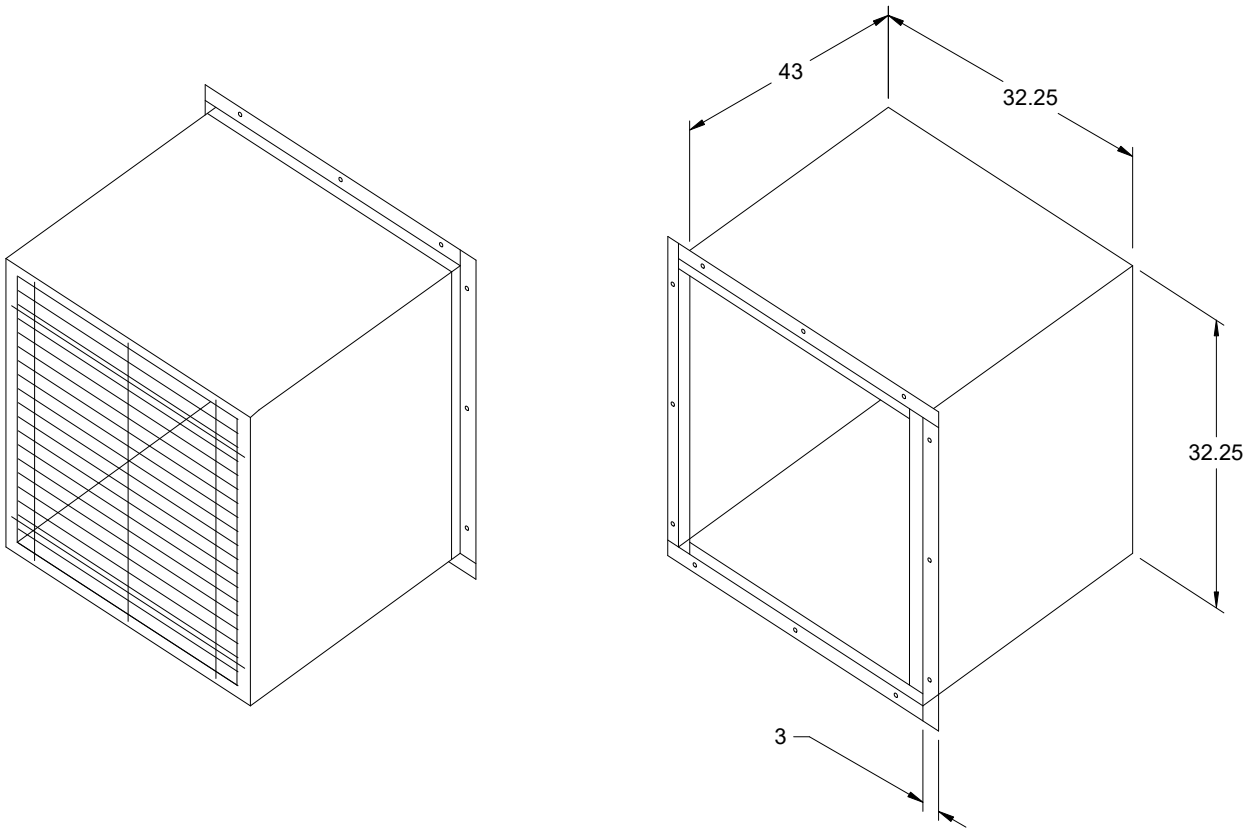


ELEVATION VIEW

## 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.



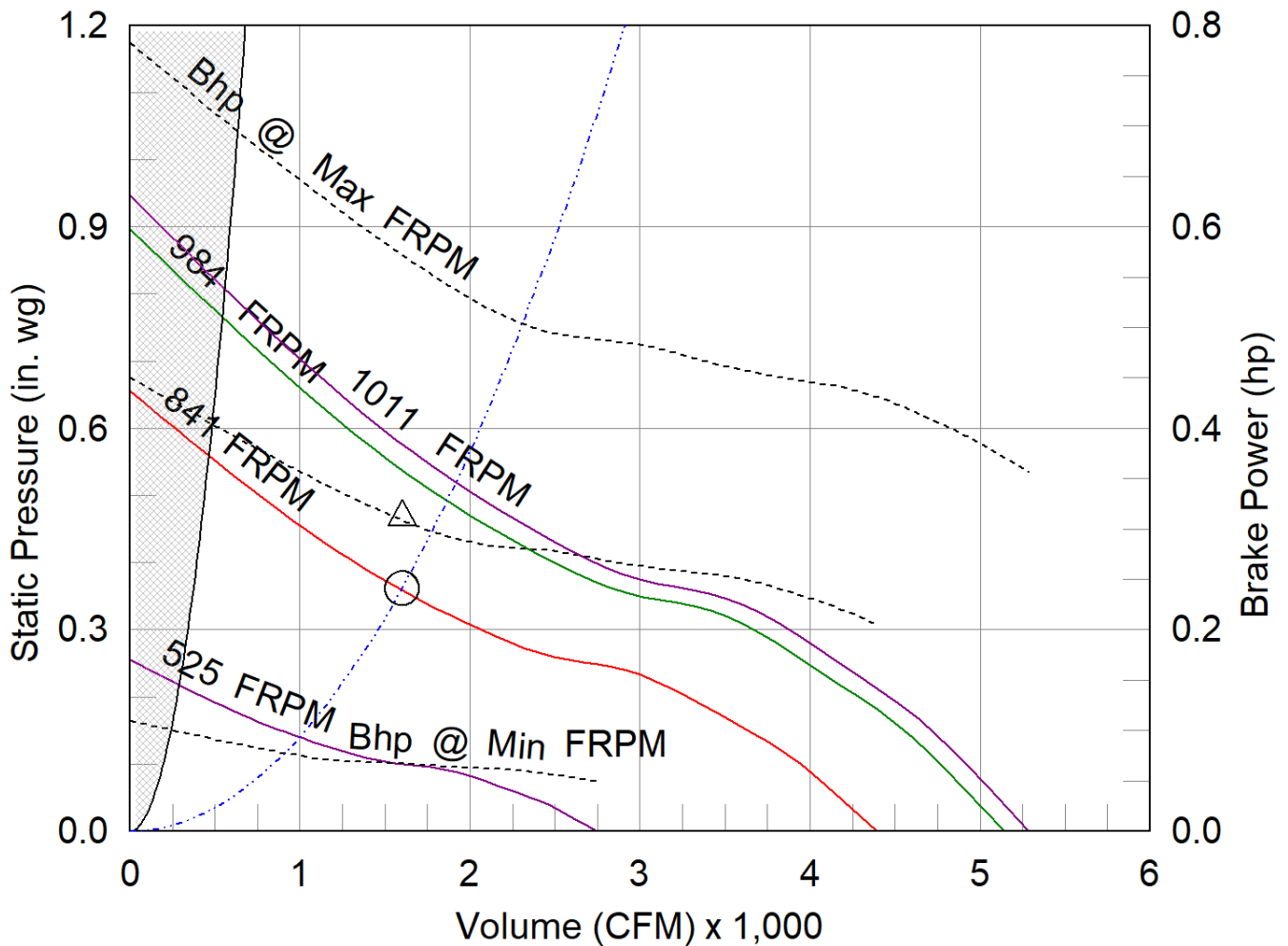
Notes: All dimensions shown are in units of in.

SBE-1H24-5

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
1,600	1,600	0.361	841	0.31



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

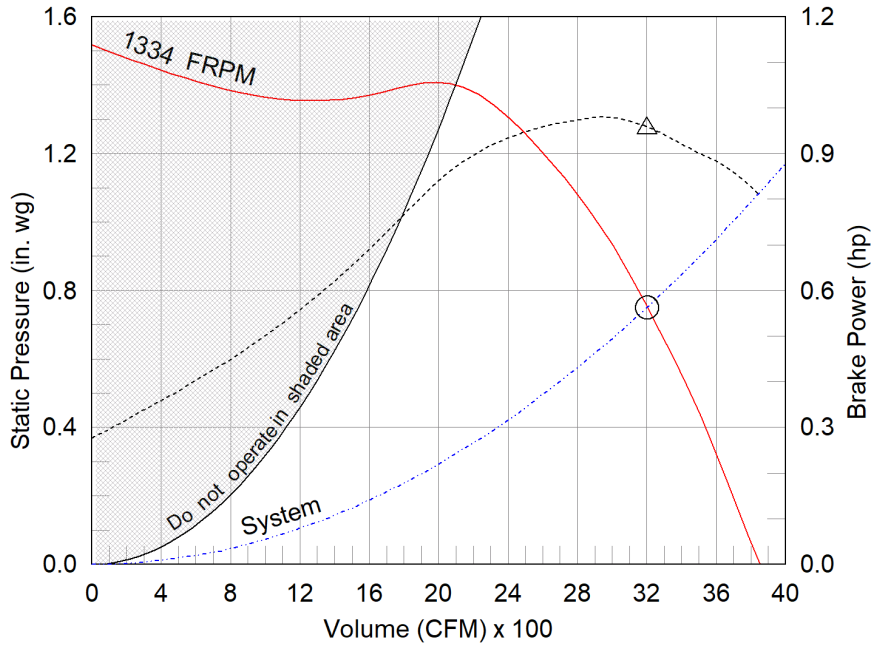
**Model: BSQ-160**  
Belt Drive Centrifugal Inline Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	134
Weight w/ Acc's (lb)	211
Max T Motor Frame Size	184
Optional Damper (in.)	23 x 23

Performance	
Requested Volume (CFM)	3,200
Actual Volume (CFM)	3,200
Total External SP (in. wg)	0.75
Fan RPM	1334
Operating Power (hp)	0.96
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Drive Loss (%)	6.3
Tip Speed (ft/min)	5,807
Static Eff. (%)	42

Misc Fan Data	
Fan Eff. Index (FEI)	1.12
Outlet Velocity (ft/min)	891

Motor	
Motor Mounted	Yes
Size (hp)	1
Voltage/Cycle/Phase	460/60/3
Enclosure	ODP
Motor RPM	1725
Windings	1
NEC FLA* (Amps)	2.1
Min. Circuit Ampacity (MCA)	2.63
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: BSQ-160**

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	79	81	83	77	70	69	65	60	79	67	16.0
Radiated	82	82	79	71	62	54	47	44	74	62	11.3

**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: BSQ-160

### Belt Drive Centrifugal Inline Fan

#### Standard Construction Features:

- Galvanized steel housing - Backward inclined aluminum wheel - Two bolted access panels - Integral duct connection flanges - Ball bearing motors - Adjustable motor pulley - Adjustable motor plate - Fan shaft mounted in ball bearing pillow blocks - Static free belts - Corrosion resistant fasteners

#### Selected Options & Accessories:

Automatic Belt Tensioner

Spare Belt(s) - 1 Set (Attached)

UL/cUL 705 Listed - "Power Ventilators"

Switch, NEMA-1, Toggle, Shipped Separate

Motor Cover

Fan: Spring, Hanging, 1 Inch Isolator PN: 850344, Incl. 4 isolators and 4 brackets

Bearings with Grease Fittings, L10 life of 100,000 hrs (L50 avg. life 500,000 hrs)

Unit Warranty: 1 Yr (Standard)

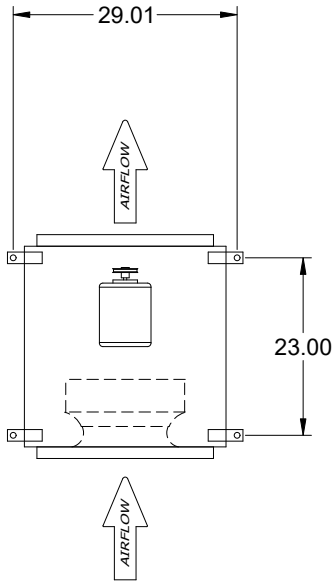
Damper Shipped Loose, Inline, VCD-23-OB-23X23, Not Coated

Damper Actuator (MS4103F1225), 115 VAC Actuated

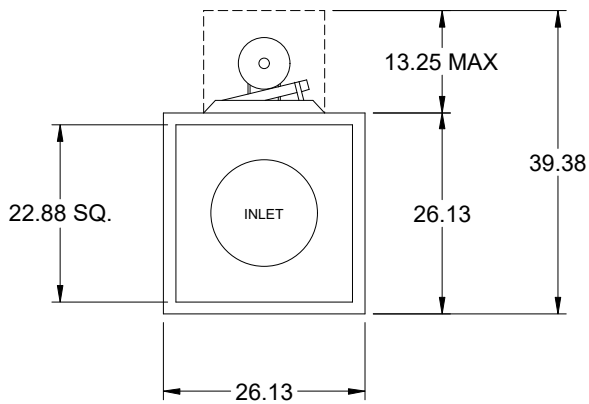
End Switch

BSQ-160

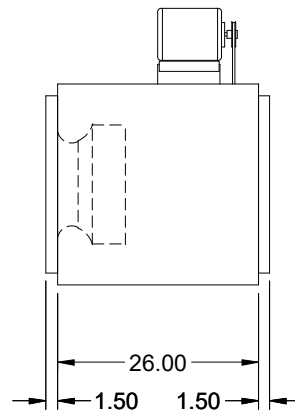
Belt Drive Centrifugal Inline Fan



TOP VIEW



END VIEW



SIDE VIEW

Notes: All dimensions shown are in units of in.

# Disconnect Switch

## Enclosure Rating: NEMA-1

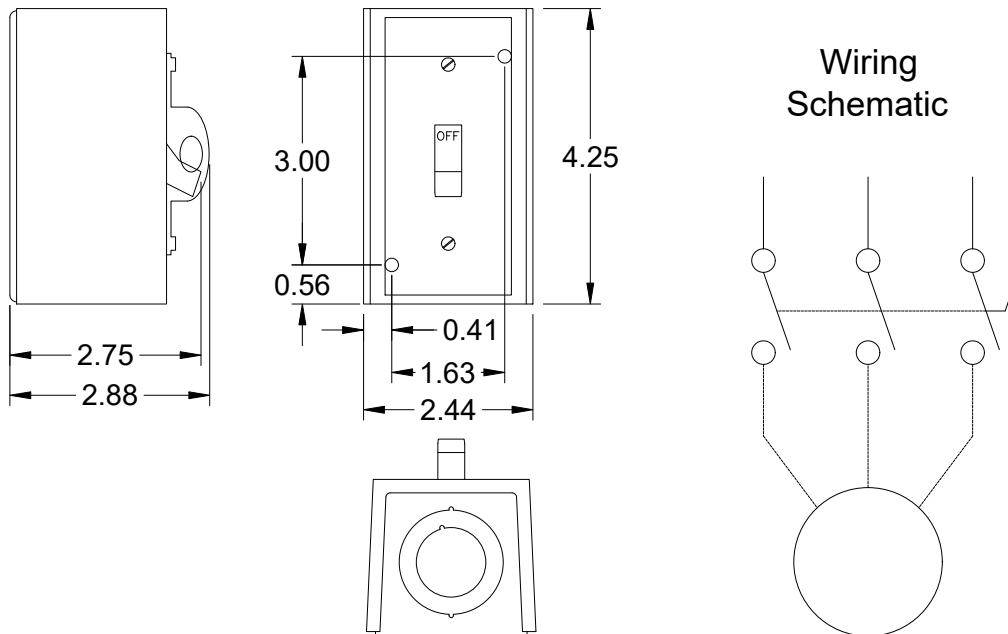
### Standard Construction Features:

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 hp	Voltage:	460	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.:	Ship Separate	RPM:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped Separate						

### Electrical Drawing Details



Notes: All dimensions shown are in units of in.

# Control Damper

Model: VCD-23

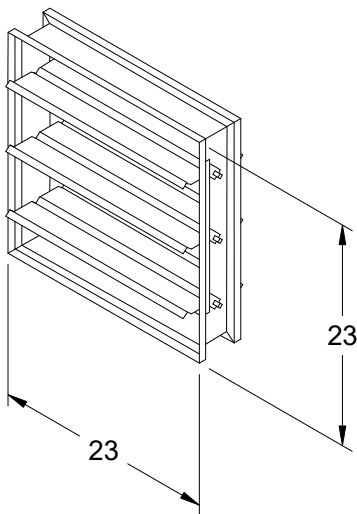
## Standard Construction Features:

- Model VCD-23 is a well built low leakage control damper for automatic control or manual balancing applications - Galvanized 16 ga channel frame - Galvanized blades with reinforcements - Side mounted steel linkage is concealed in the frame to prevent additional pressure drop - Axles are steel and 0.5 in. dia.- Synthetic axle bearings - Width and height furnished approximately 0.25 in. undersized - Field wiring is required to individual components

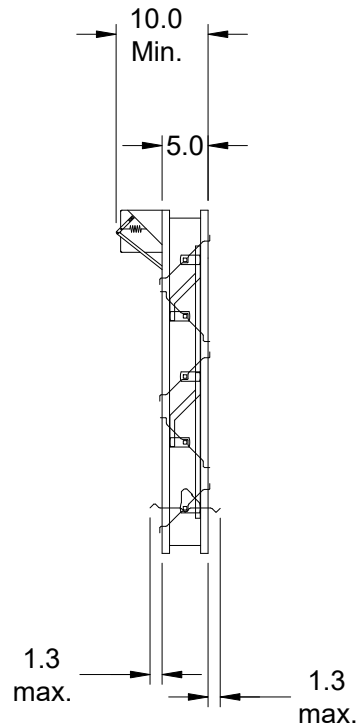
## Damper Configuration:

**Actuator Type:** 115 VAC

**End Switch:** Yes



DAMPER - INLINE DISCHARGE



TYP. SECTION VIEW

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

# Fan Isolator

Type: Spring, Hanging, 1 Inch

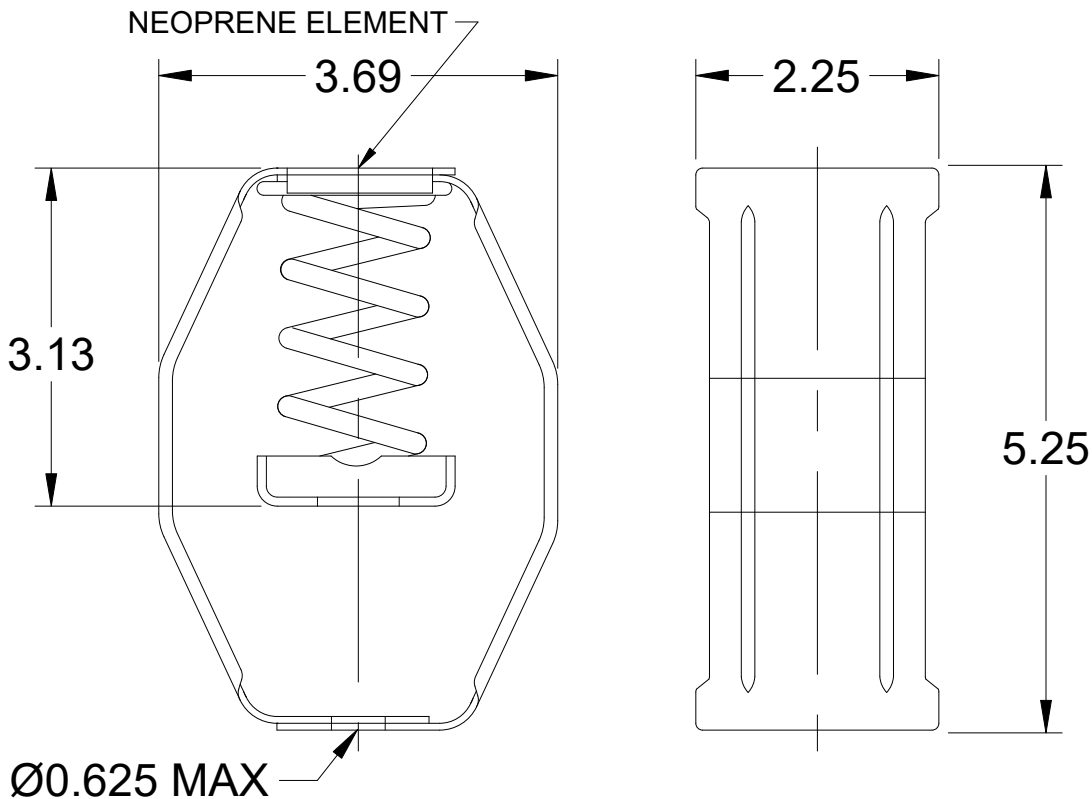
### Standard Construction Features:

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-1-70	Color:	Green
Manufacturer:	Kinetics Noise Control	Mounting:	Hanging
Load Capacity:	70 lb	Kit Part Number:	850344
Deflection at Full Load:	1.36	Selection Deflection (in.):	0.34

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



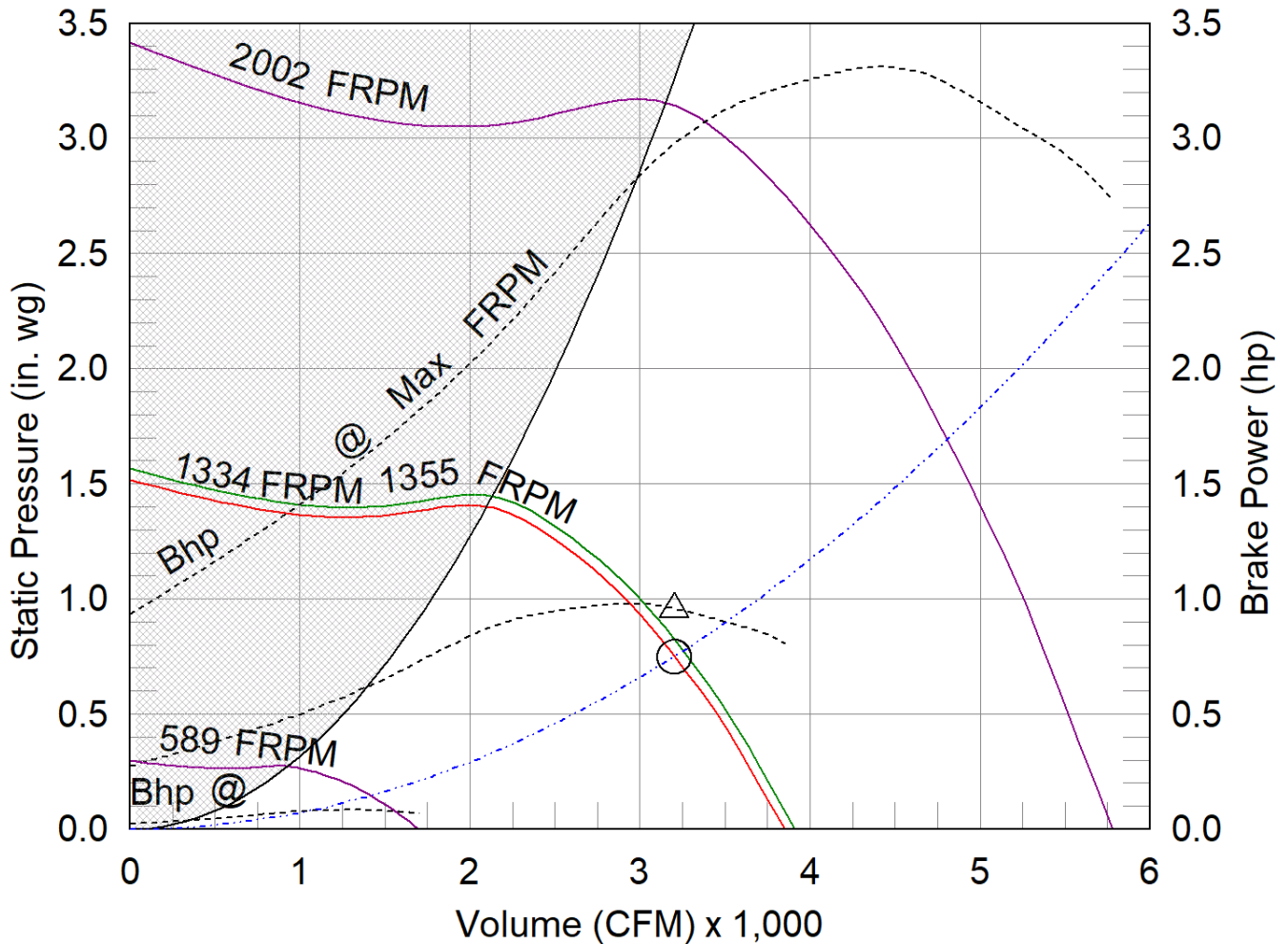
Notes: All dimensions shown are in units of in.

BSQ-160

Min/Max Fan Curve

**Performance**

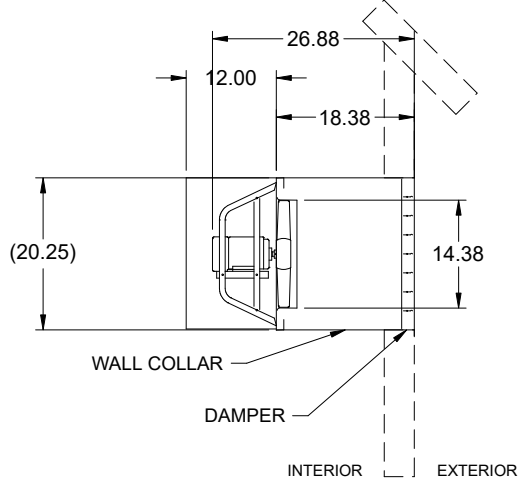
Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
3,200	3,200	0.75	1334	0.96



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

**Model: SE1-14-440-VG**  
Sidewall Direct Drive Fan  
Motor Access From Int. of Bldg.

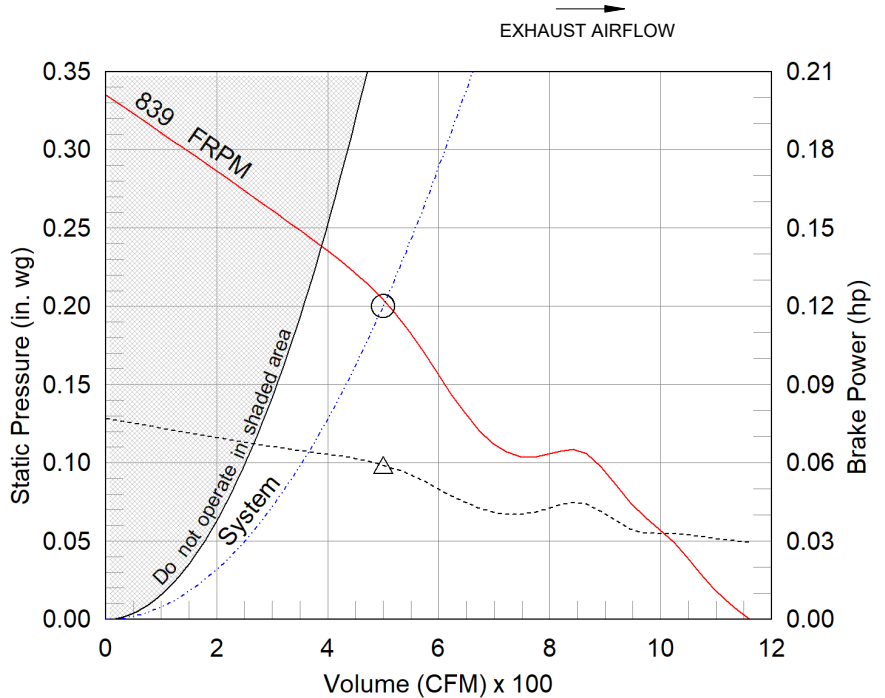
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	33
Weight w/ Acc's (lb)	96
Optional Damper (in.)	16 x 16
Wall Opening (in.)	21.25 x 21.25



Performance	
Requested Volume (CFM)	500
Actual Volume (CFM)	500
Total External SP (in. wg)	0.2
Fan RPM	839
Operating Power (hp)	0.06
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,075
Static Eff. (%)	27

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	450

Motor	
Motor Mounted	Yes
Size (hp)	1/2
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	6.4



- △ 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 Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	66	66	63	60	52	52	51	40	62	50	5.5



## Model: SE1-14-440-VG

### Sidewall Direct Drive Fan

#### Standard Construction Features:

- Fan panels of galvanized steel - Aluminum blade propeller - Die formed, galvanized steel drive frame assembly - Corrosion resistant fasteners

#### Selected Options & Accessories:

Motor - Vari-Green EC motor

Control - Dial for balancing

Union Label Required

Airflow Direction: Exhaust

Motor Access: From Int. of Bldg.

Wall Collar Assembled, Factory Installed

Switch, NEMA-1, Toggle, Shipped with Unit

Junction Box Mounted & Wired

OSHA Approved Motor Side Guard, Factory Installed

Unit Warranty: 1 Yr (Standard)

Damper Mounted, WD-320-PB-16X16, 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

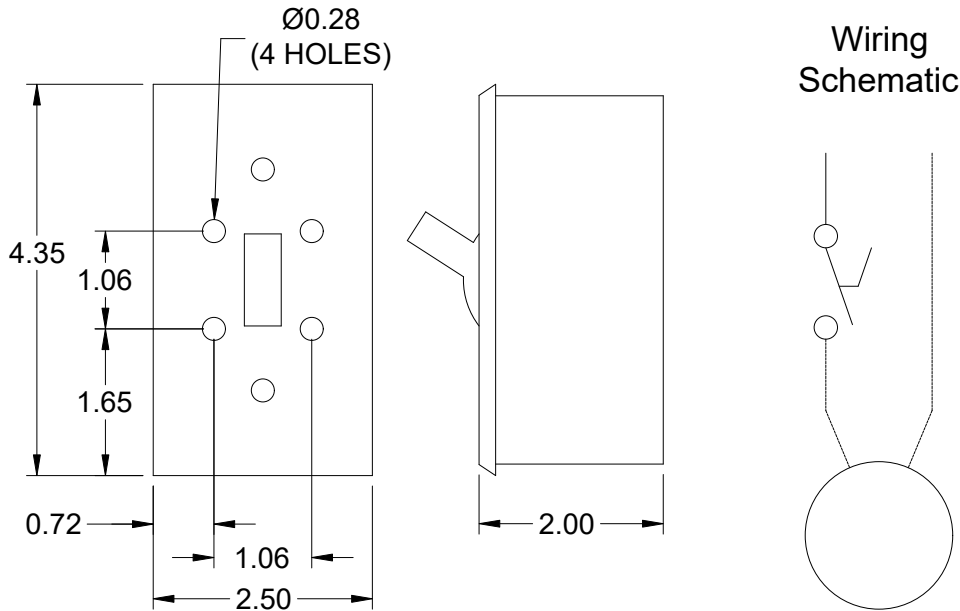
### Standard Construction Features:

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:	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.

# Vari-Green Motor & Control Options

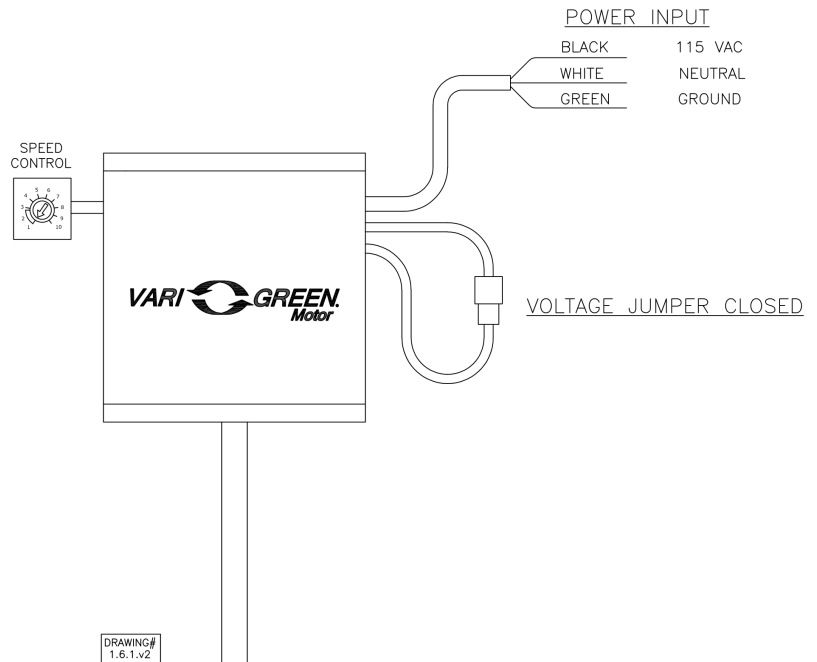
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated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

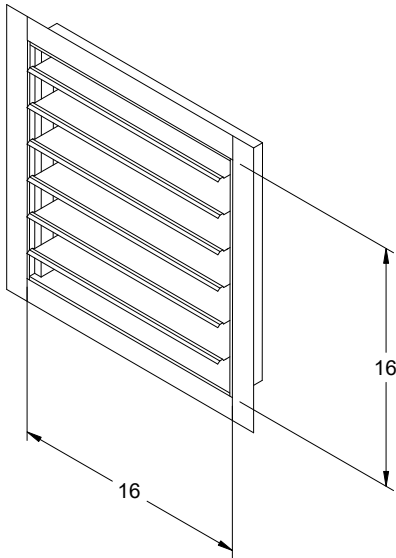


# Vertical Mount Exhaust Damper

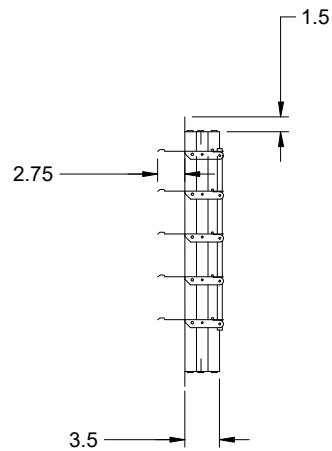
Model: WD-320

## Standard Construction Features:

- Model WD-320 is a vertical mount exhaust damper and is constructed of 18 ga galvanized steel with pre-punched mounting holes and a flanged frame - 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 mounted steel in nylon bushings - Synthetic axle bearings



DAMPER



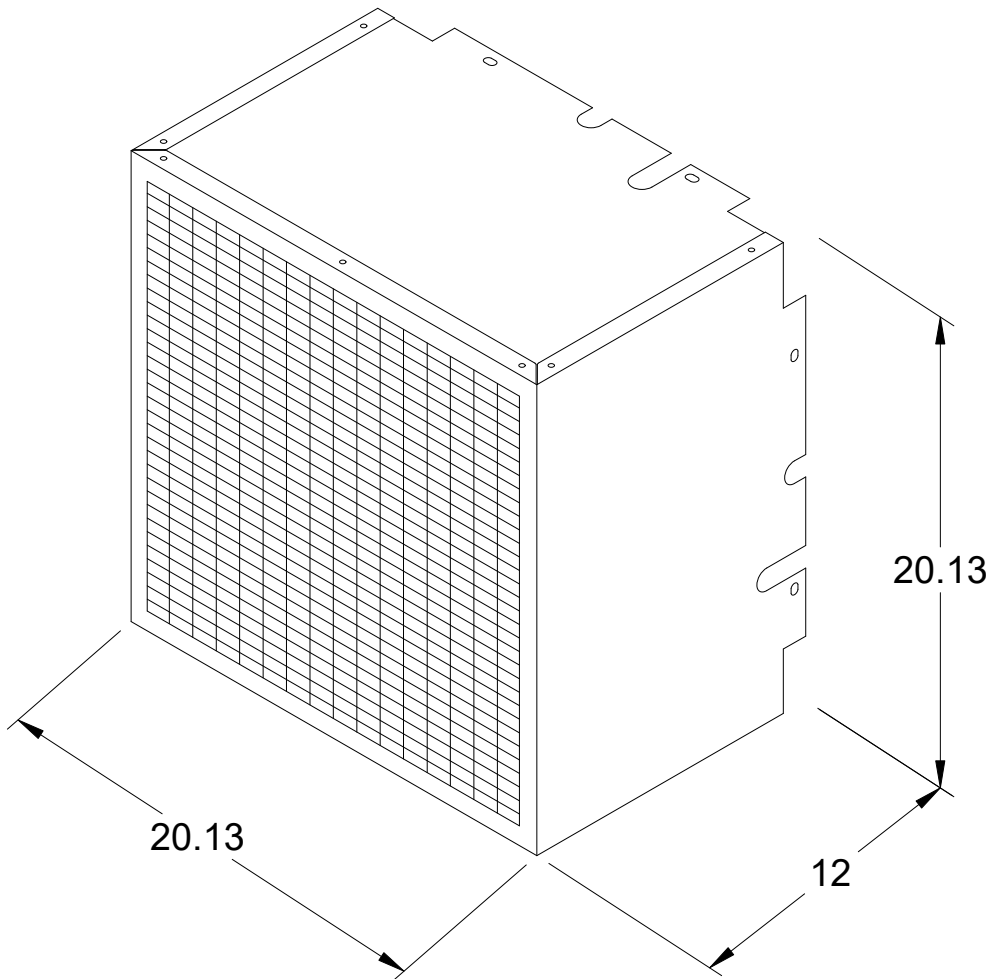
TYP. SECTION VIEW

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

# OSHA Motor Side Guard

**Standard Construction Features:**

- Protective guards with solid steel side panels and an expanded metal screen end panel are available to completely enclose the motor and drive side of the fan.



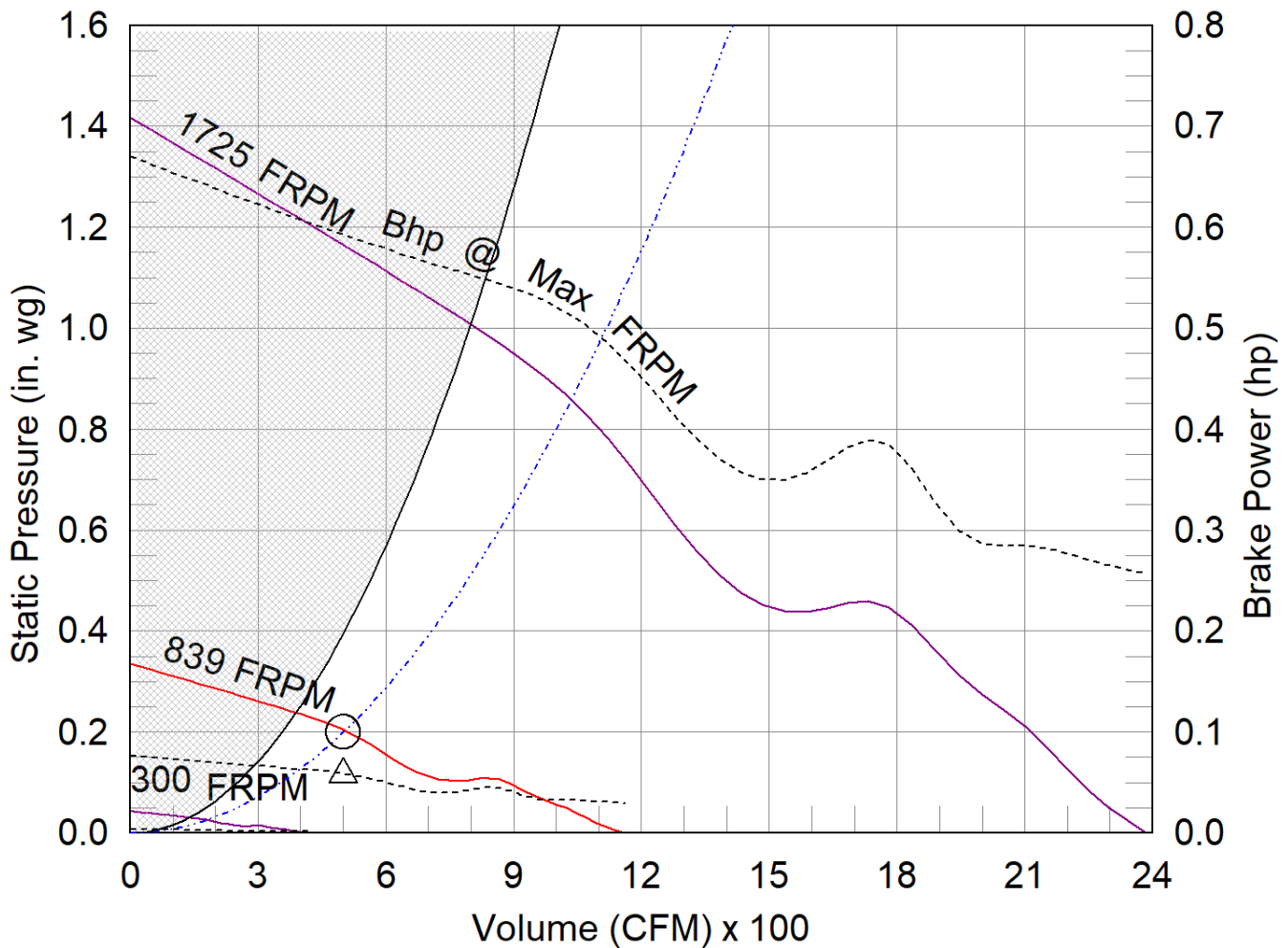
Notes: All dimensions shown are in units of in.

SE1-14-440-VG

Min/Max Fan Curve

**Performance**

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
500	500	0.2	839	0.06



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

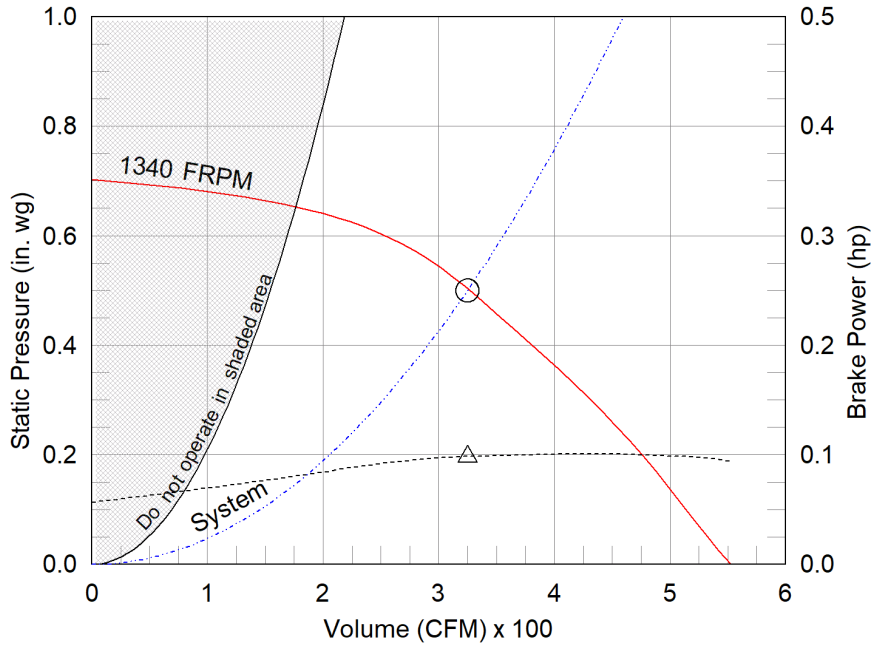
**Model: SQ-98-VG**  
Direct Drive Centrifugal Inline Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	48
Weight w/ Acc's (lb)	78
Optional Damper (in.)	12 x 12

Performance	
Requested Volume (CFM)	325
Actual Volume (CFM)	325
Total External SP (in. wg)	0.5
Fan RPM	1340
Operating Power (hp)	0.1
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	3,926
Static Eff. (%)	26

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	248

Motor	
Motor Mounted	Yes
Size (hp)	1/4
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP
Motor RPM	1725
Windings	1
FLA (Amps)	3.5
Min. Circuit Ampacity (MCA)	4
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-98-VG**

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	79	80	68	66	58	54	51	46	69	57	9.6
Radiated	80	82	62	60	53	48	45	42	68	56	9.1

**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-98-VG

### Direct Drive Centrifugal Inline Fan

#### 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:

Motor - Vari-Green EC motor

Control - Vari-Green Dial on Exterior of Fan Housing, Mounted and Wired  
UL/cUL 705 Listed - "Power Ventilators"

Junction Box Mounted and Wired

Switch, NEMA-1, Toggle, Shipped Separate

Aluminum Wheel Material

Motor Cover

Unit Warranty: 1 Yr (Standard)

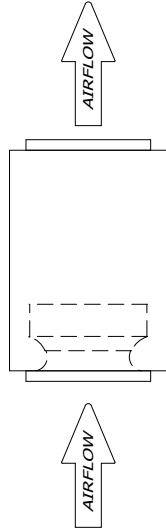
Damper Shipped Loose, Inline, VCD-23-OB-12X12, Not Coated

Damper Actuator (MS4103F1225), 115 VAC Actuated

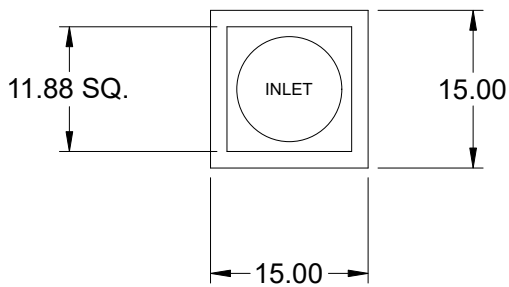
End Switch

SQ-98-VG

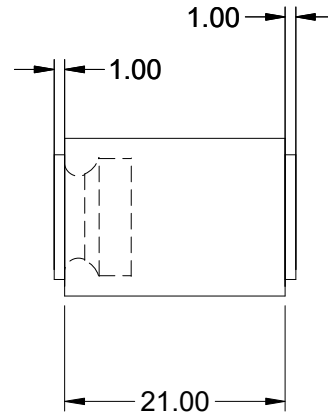
Direct Drive Centrifugal Inline Fan



TOP VIEW



END VIEW



SIDE VIEW

Notes: All dimensions shown are in units of in.

# Disconnect Switch

## Enclosure Rating: NEMA-1

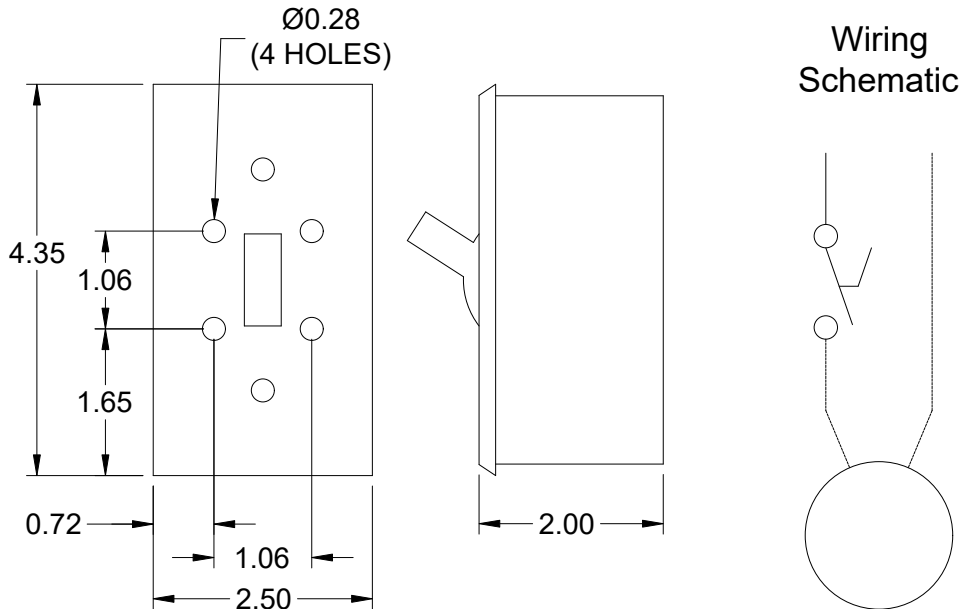
### Standard Construction Features:

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.

# 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.

An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the fan housing 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.

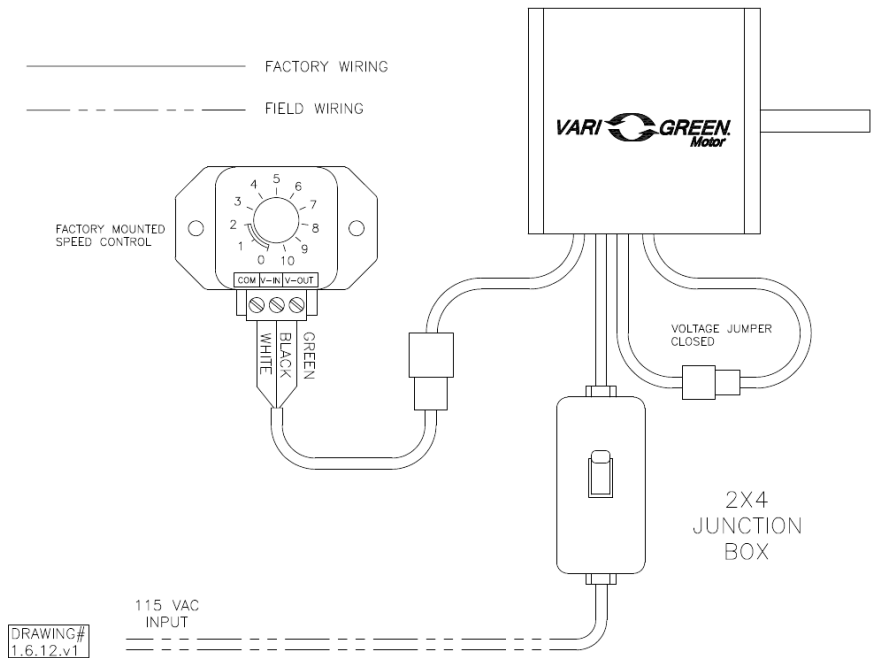
### Motor Configuration

Input Voltage: 115  
Speed Reference: 0-10VDC  
Permanent Dial: No  
Balance Dial Included: N/A

### Control Configuration

Control Type: Dial on Fan  
Transformer: None

## Vari-Green



# Control Damper

Model: VCD-23

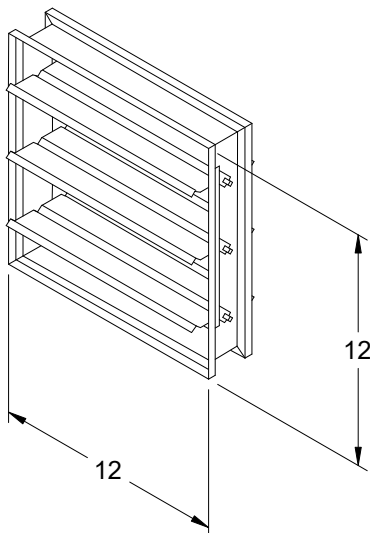
## Standard Construction Features:

- Model VCD-23 is a well built low leakage control damper for automatic control or manual balancing applications - Galvanized 16 ga channel frame - Galvanized blades with reinforcements - Side mounted steel linkage is concealed in the frame to prevent additional pressure drop - Axles are steel and 0.5 in. dia.- Synthetic axle bearings - Width and height furnished approximately 0.25 in. undersized - Field wiring is required to individual components

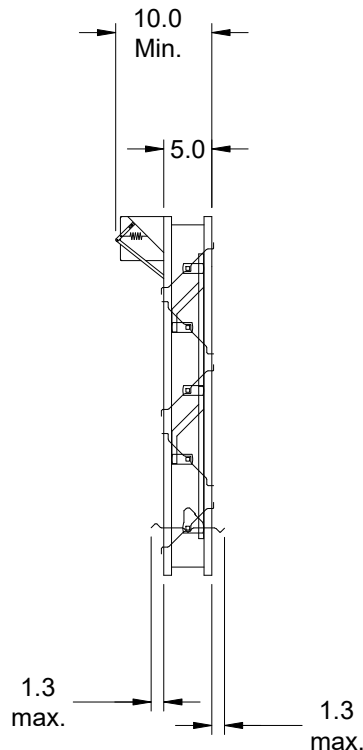
## Damper Configuration:

**Actuator Type:** 115 VAC

**End Switch:** Yes



DAMPER



TYP. SECTION VIEW

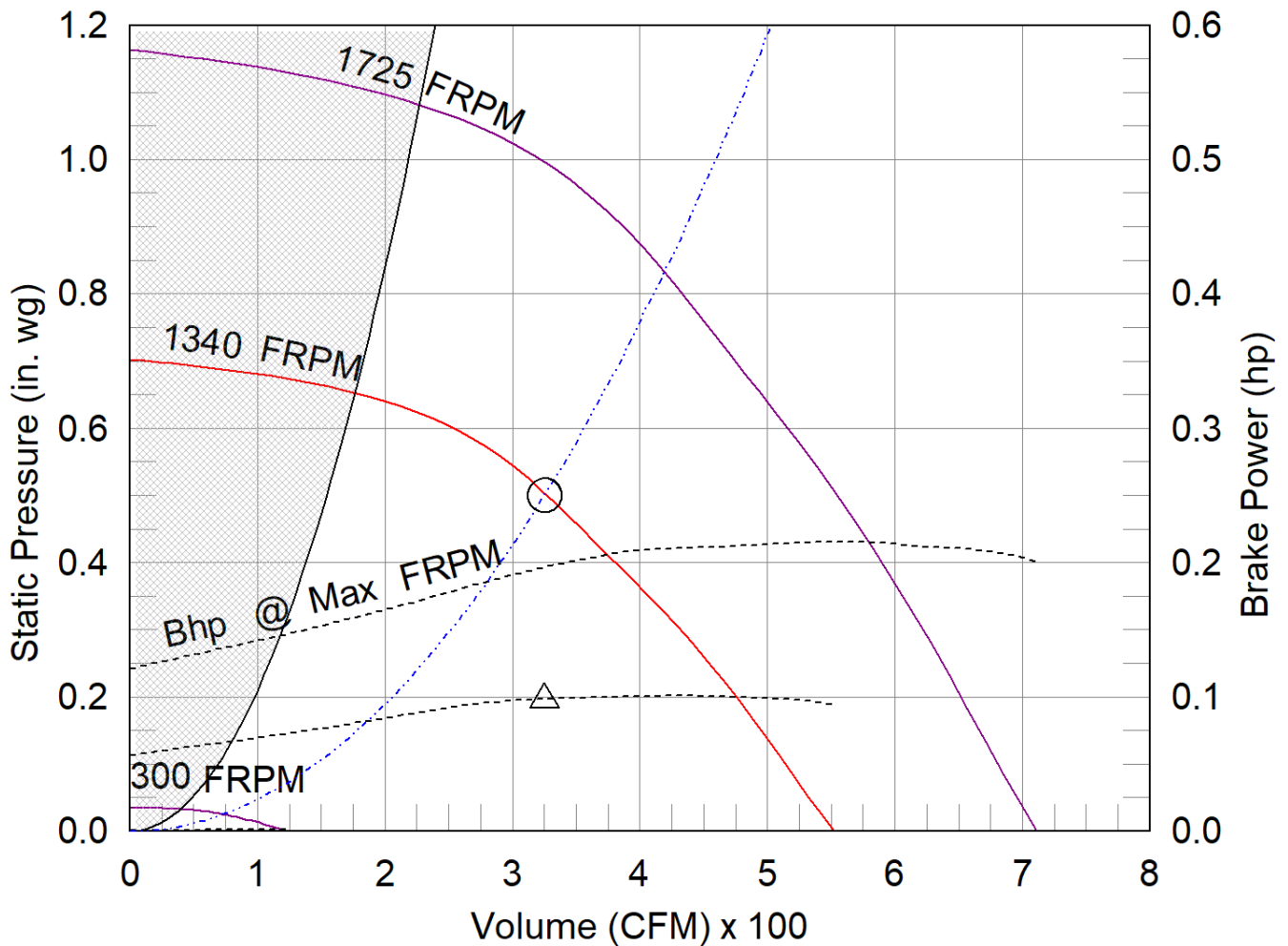
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.25 in. undersize

SQ-98-VG

Min/Max Fan Curve

**Performance**

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
325	325	0.5	1340	0.1



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

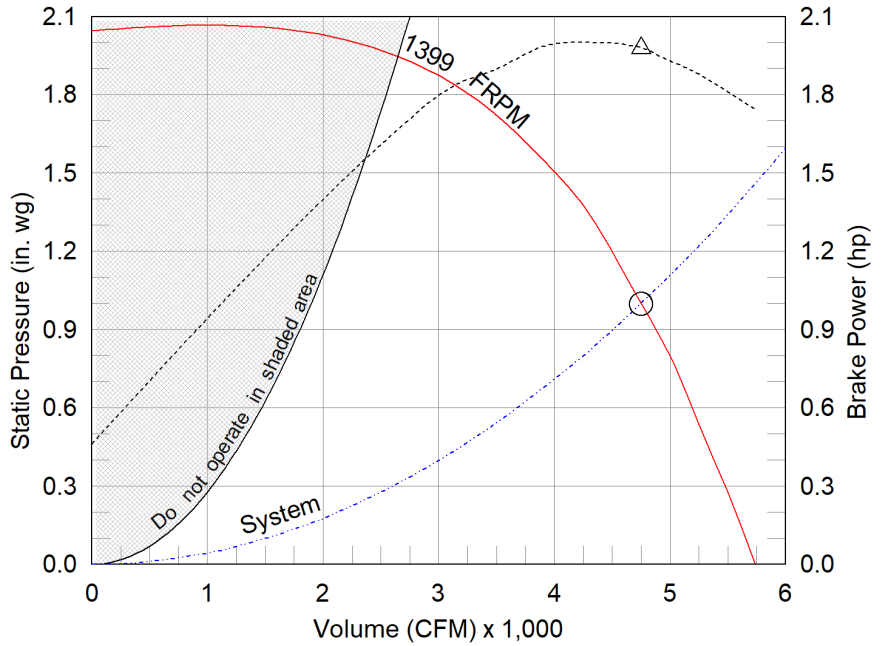
**Model: BSQ-180**  
Belt Drive Centrifugal Inline Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	158
Weight w/ Acc's (lb)	249
Max T Motor Frame Size	184
Optional Damper (in.)	24 x 24

Performance	
Requested Volume (CFM)	4,750
Actual Volume (CFM)	4,750
Total External SP (in. wg)	1
Fan RPM	1399
Operating Power (hp)	1.98
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Drive Loss (%)	4.9
Tip Speed (ft/min)	6,776
Static Eff. (%)	40

Misc Fan Data	
Fan Eff. Index (FEI)	0.94
Outlet Velocity (ft/min)	1,212

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	ODP
Motor RPM	1725
Windings	1
NEC FLA* (Amps)	3.4
Min. Circuit Ampacity (MCA)	4.25
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: BSQ-180**

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	83	82	86	81	74	72	67	65	83	71	19.5
Radiated	86	83	82	75	66	57	49	49	77	65	13.8

**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: BSQ-180

### Belt Drive Centrifugal Inline Fan

#### Standard Construction Features:

- Galvanized steel housing - Backward inclined aluminum wheel - Two bolted access panels - Integral duct connection flanges - Ball bearing motors - Adjustable motor pulley - Adjustable motor plate - Fan shaft mounted in ball bearing pillow blocks - Static free belts - Corrosion resistant fasteners

#### Selected Options & Accessories:

Motor VFD Rated with Shaft Grounding Protection

Motor with Shaft Grounding

Automatic Belt Tensioner

Spare Belt(s) - 1 Set (Attached)

UL/cUL 705 Listed - "Power Ventilators"

Switch, NEMA-1, Toggle, Shipped Separate

Motor Cover

Fan: Spring, Hanging, 1 Inch Isolator PN: 850344, Incl. 4 isolators and 4 brackets

Inlet Guard

Outlet Guard

Inlet/Outlet Companion Flange

Bearings with Grease Fittings, L10 life of 100,000 hrs (L50 avg. life 500,000 hrs)

Unit Warranty: 1 Yr (Standard)

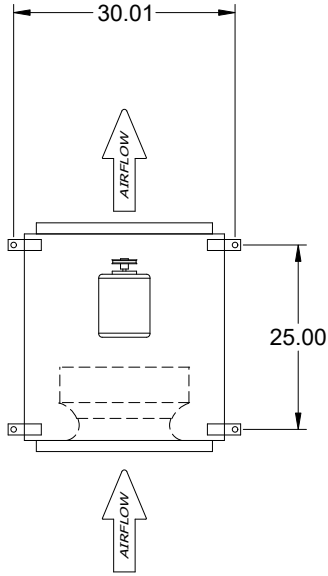
Damper Shipped Loose, Inline, VCD-23-OB-24X24, Not Coated

Damper Actuator (MS4103F1225), 115 VAC Actuated

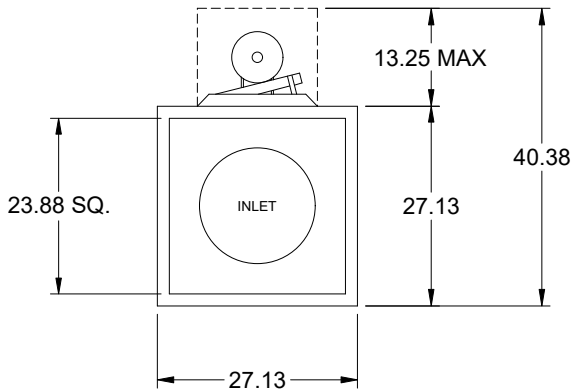
End Switch

BSQ-180

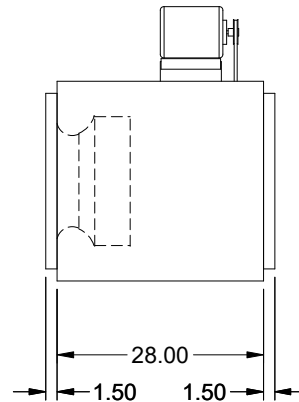
Belt Drive Centrifugal Inline Fan



TOP VIEW



END VIEW



SIDE VIEW

Notes: All dimensions shown are in units of in.

# Disconnect Switch

## Enclosure Rating: NEMA-1

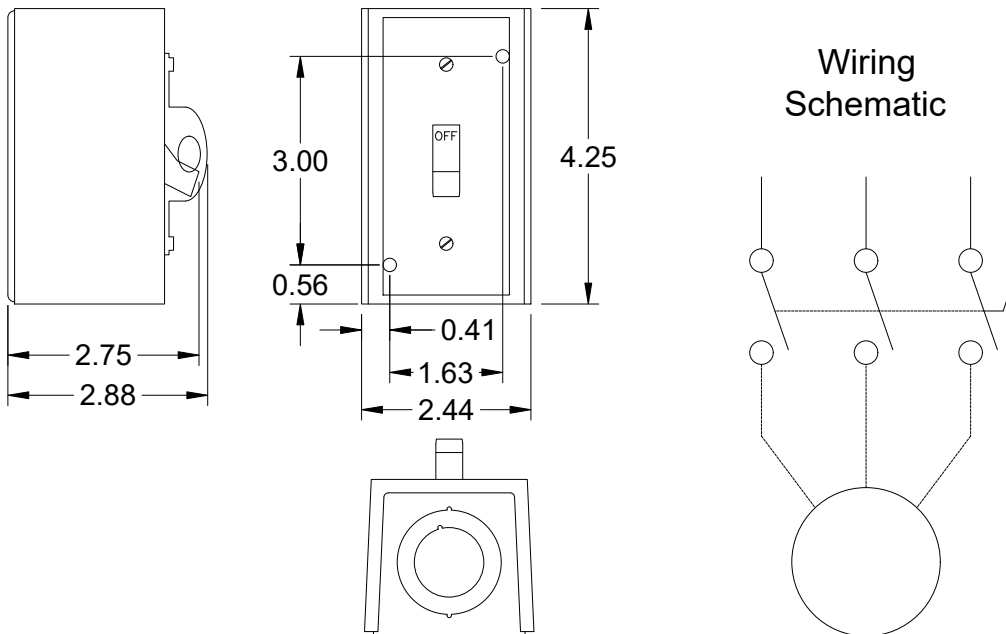
### Standard Construction Features:

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:	2 hp	Voltage:	460	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.:	Ship Separate	RPM:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped Separate						

### Electrical Drawing Details



Notes: All dimensions shown are in units of in.

# Control Damper

Model: VCD-23

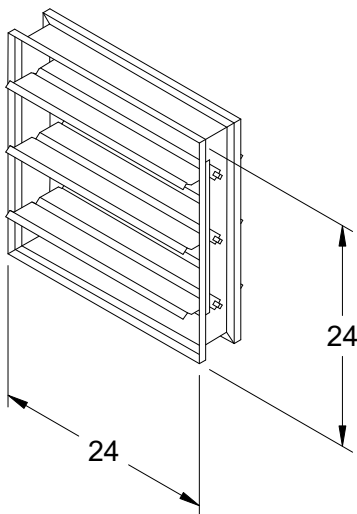
## Standard Construction Features:

- Model VCD-23 is a well built low leakage control damper for automatic control or manual balancing applications - Galvanized 16 ga channel frame - Galvanized blades with reinforcements - Side mounted steel linkage is concealed in the frame to prevent additional pressure drop - Axles are steel and 0.5 in. dia.- Synthetic axle bearings - Width and height furnished approximately 0.25 in. undersized - Field wiring is required to individual components

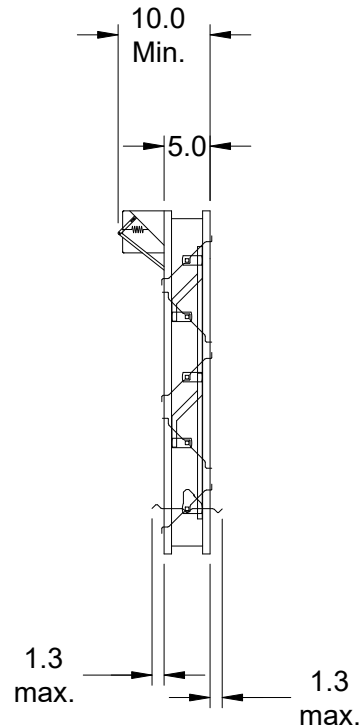
## Damper Configuration:

**Actuator Type:** 115 VAC

**End Switch:** Yes



DAMPER - INLINE DISCHARGE



TYP. SECTION VIEW

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

# Fan Isolator

Type: Spring, Hanging, 1 Inch

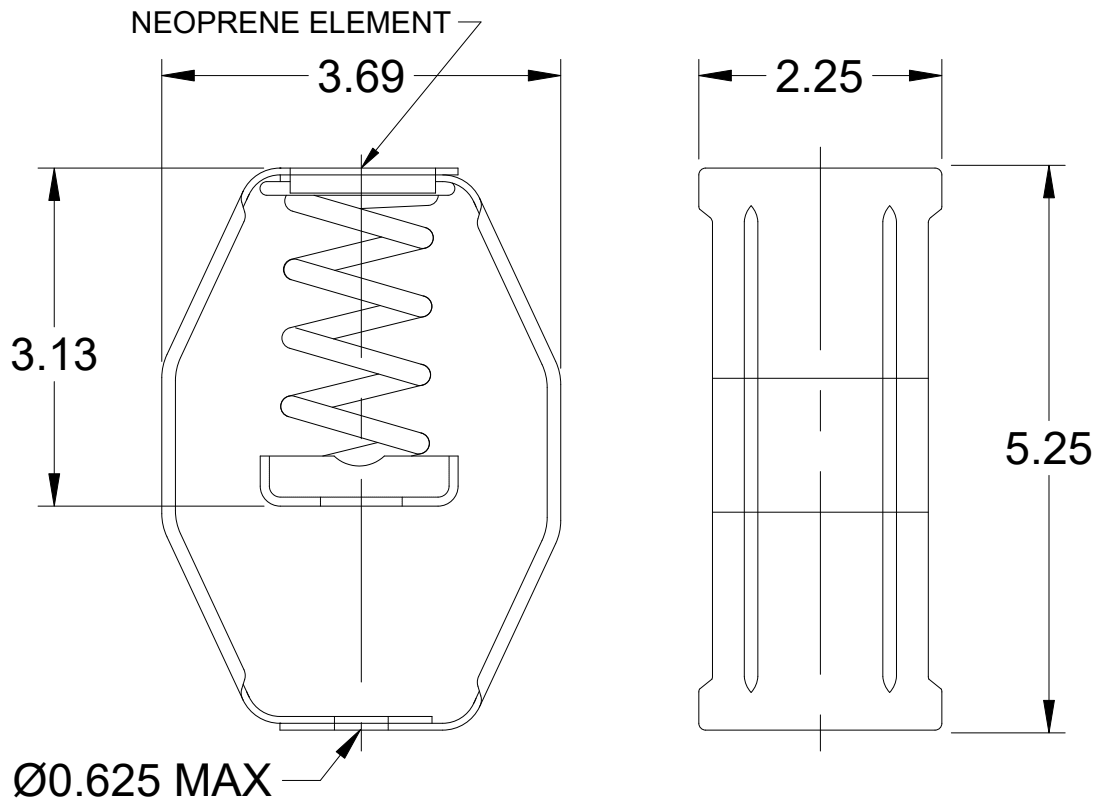
## Standard Construction Features:

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-1-70	Color:	Green
Manufacturer:	Kinetics Noise Control	Mounting:	Hanging
Load Capacity:	70 lb	Kit Part Number:	850344
Deflection at Full Load:	1.36	Selection Deflection (in.):	0.4

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



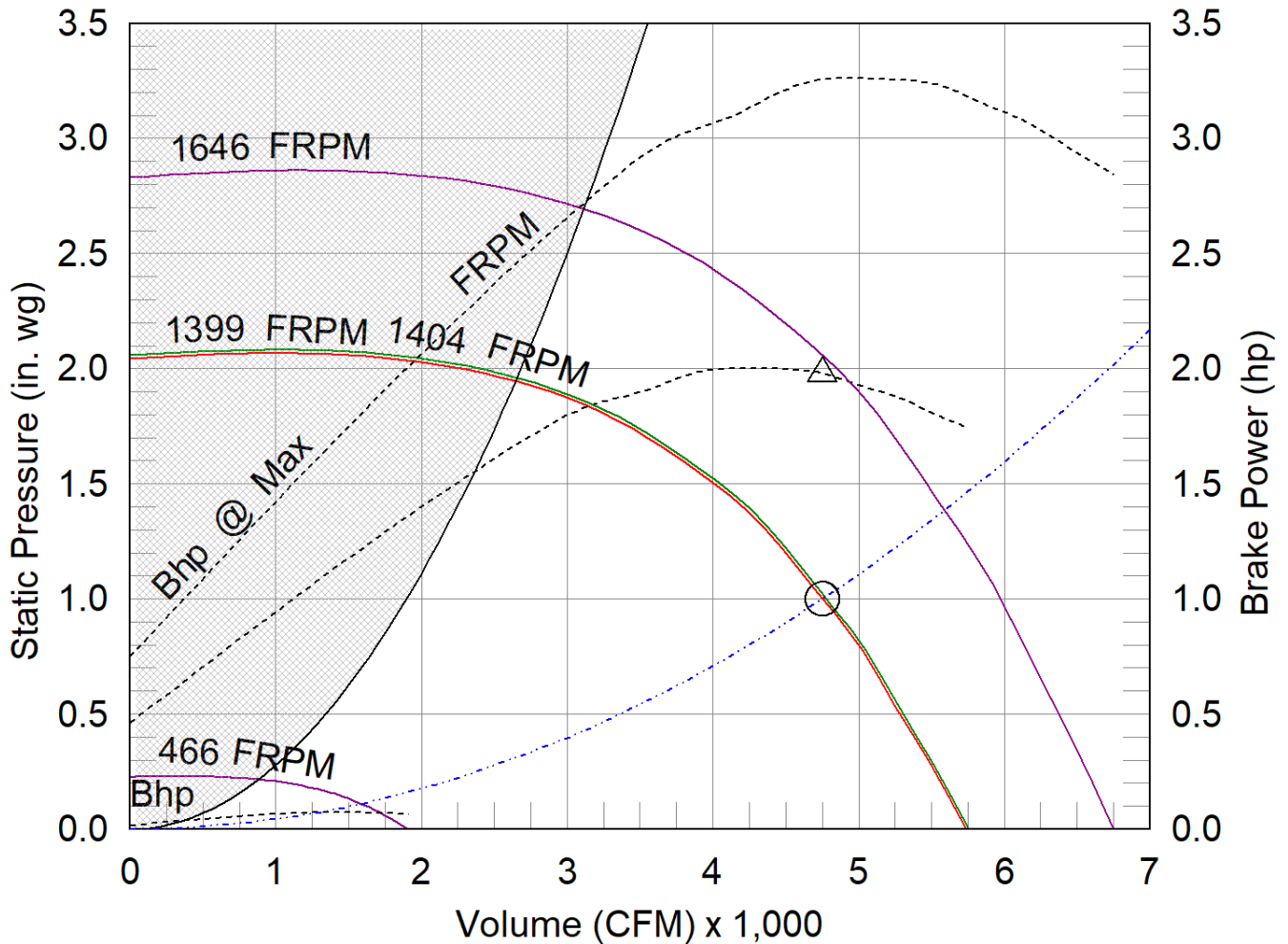
Notes: All dimensions shown are in units of in.

BSQ-180

Min/Max Fan Curve

Performance

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
4,750	4,750	1	1399	1.98



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

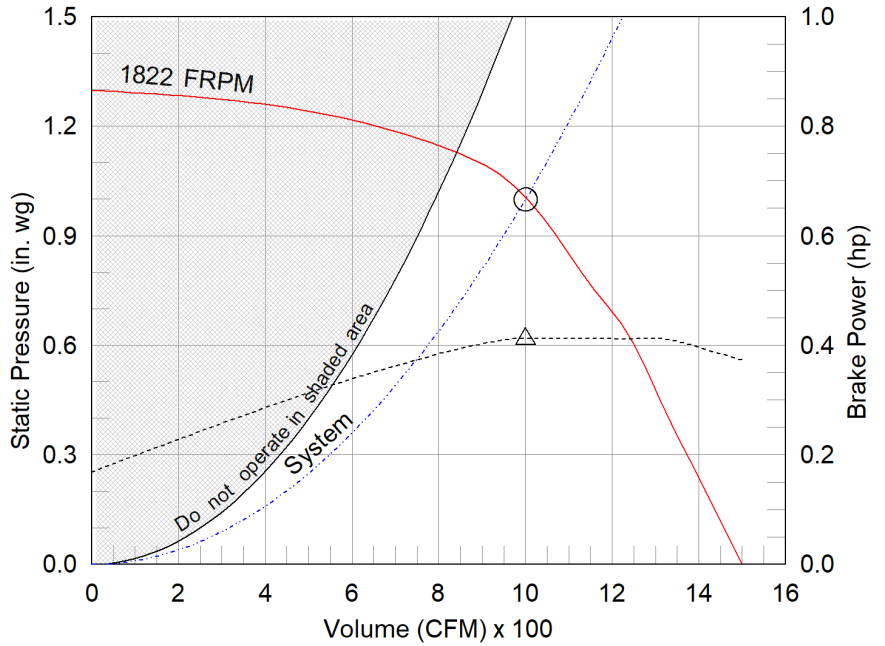
**Model: BSQ-100**  
Belt Drive Centrifugal Inline Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	84
Weight w/ Acc's (lb)	137
Max T Motor Frame Size	145
Optional Damper (in.)	14 x 14

Performance	
Requested Volume (CFM)	1,000
Actual Volume (CFM)	1,000
Total External SP (in. wg)	1
Fan RPM	1822
Operating Power (hp)	0.41
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Drive Loss (%)	9.3
Tip Speed (ft/min)	5,337
Static Eff. (%)	42

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	763

Motor	
Motor Mounted	Yes
Size (hp)	1/2
Voltage/Cycle/Phase	460/60/3
Enclosure	ODP
Motor RPM	1725
Windings	1
NEC FLA* (Amps)	1.1
Min. Circuit Ampacity (MCA)	1.38
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: BSQ-100**

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	78	84	75	76	67	62	61	57	76	65	14.0
Radiated	79	86	69	70	62	56	55	53	73	62	12.9

**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: BSQ-100

### Belt Drive Centrifugal Inline Fan

#### Standard Construction Features:

- Galvanized steel housing - Backward inclined aluminum wheel - Two bolted access panels - Integral duct connection flanges - Ball bearing motors - Adjustable motor pulley - Adjustable motor plate - Fan shaft mounted in ball bearing pillow blocks - Static free belts - Corrosion resistant fasteners

#### Selected Options & Accessories:

Motor VFD Rated without Shaft Grounding Protection

Automatic Belt Tensioner

Spare Belt(s) - 1 Set (Attached)

UL/cUL 705 Listed - "Power Ventilators"

Switch, NEMA-1, Toggle, Shipped Separate

Motor Cover

Inlet Guard

Unit Warranty: 1 Yr (Standard)

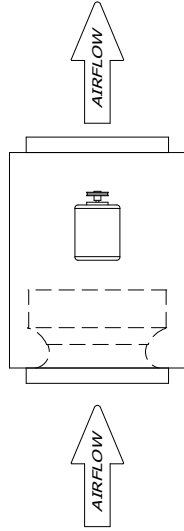
Damper Shipped Loose, Inline, VCD-23-OB-14X14, Not Coated

Damper Actuator (MS4103F1225), 115 VAC Actuated

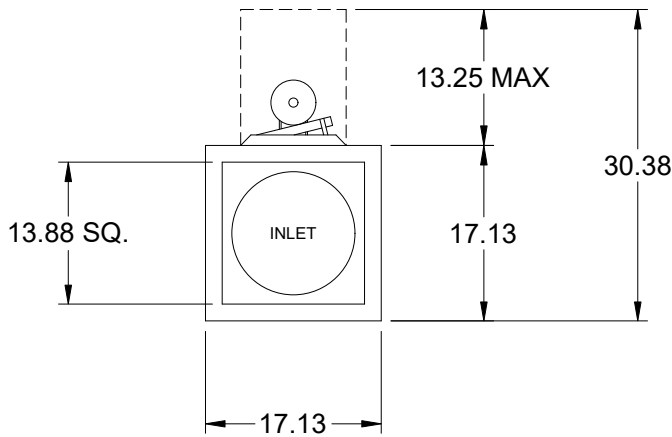
End Switch

BSQ-100

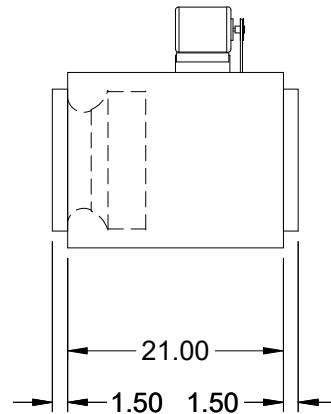
Belt Drive Centrifugal Inline Fan



TOP VIEW



END VIEW



SIDE VIEW

Notes: All dimensions shown are in units of in.

# Disconnect Switch

## Enclosure Rating: NEMA-1

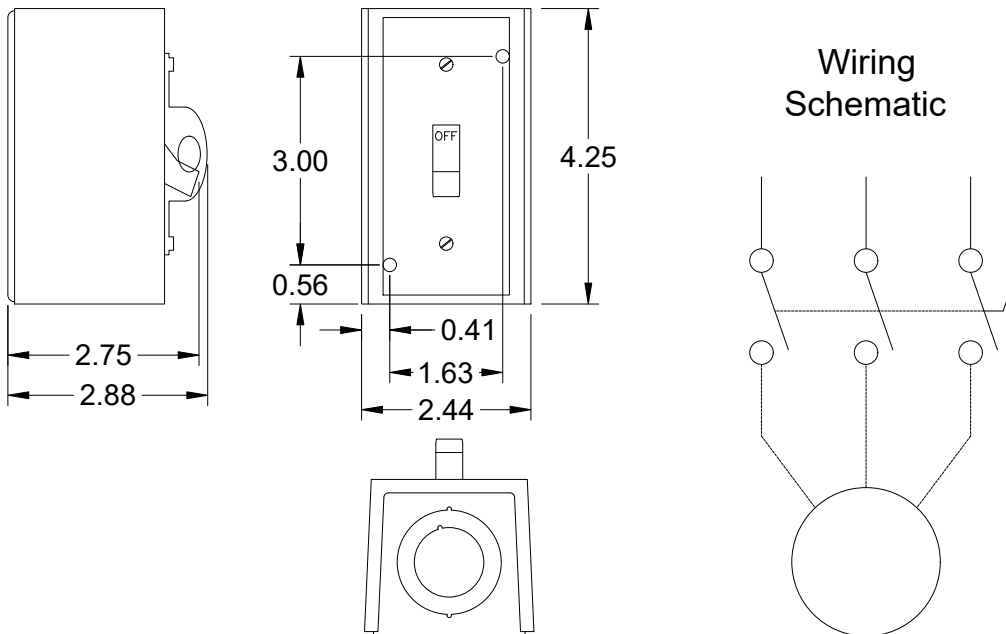
### Standard Construction Features:

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:	1/2 hp	Voltage:	460	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.:	Ship Separate	RPM:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped Separate						

### Electrical Drawing Details



Notes: All dimensions shown are in units of in.

# Control Damper

Model: VCD-23

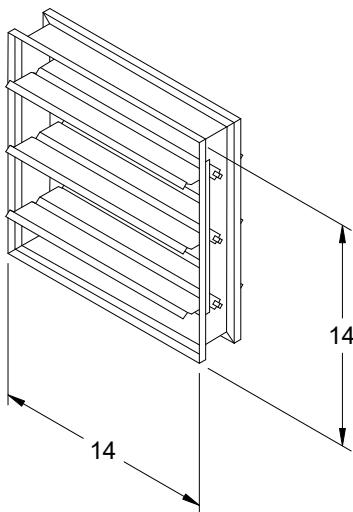
## Standard Construction Features:

- Model VCD-23 is a well built low leakage control damper for automatic control or manual balancing applications - Galvanized 16 ga channel frame - Galvanized blades with reinforcements - Side mounted steel linkage is concealed in the frame to prevent additional pressure drop - Axles are steel and 0.5 in. dia.- Synthetic axle bearings - Width and height furnished approximately 0.25 in. undersized - Field wiring is required to individual components

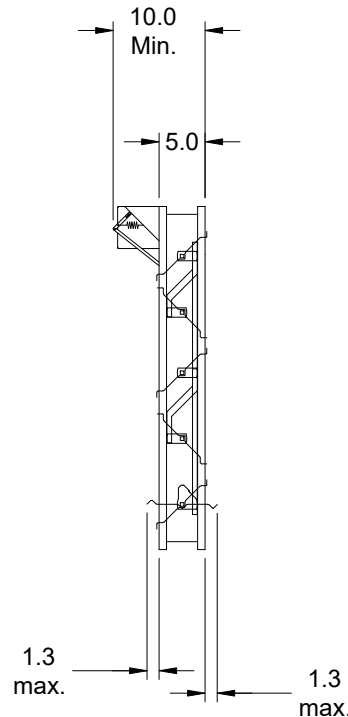
## Damper Configuration:

**Actuator Type:** 115 VAC

**End Switch:** Yes



DAMPER - INLINE  
DISCHARGE



TYP. SECTION VIEW

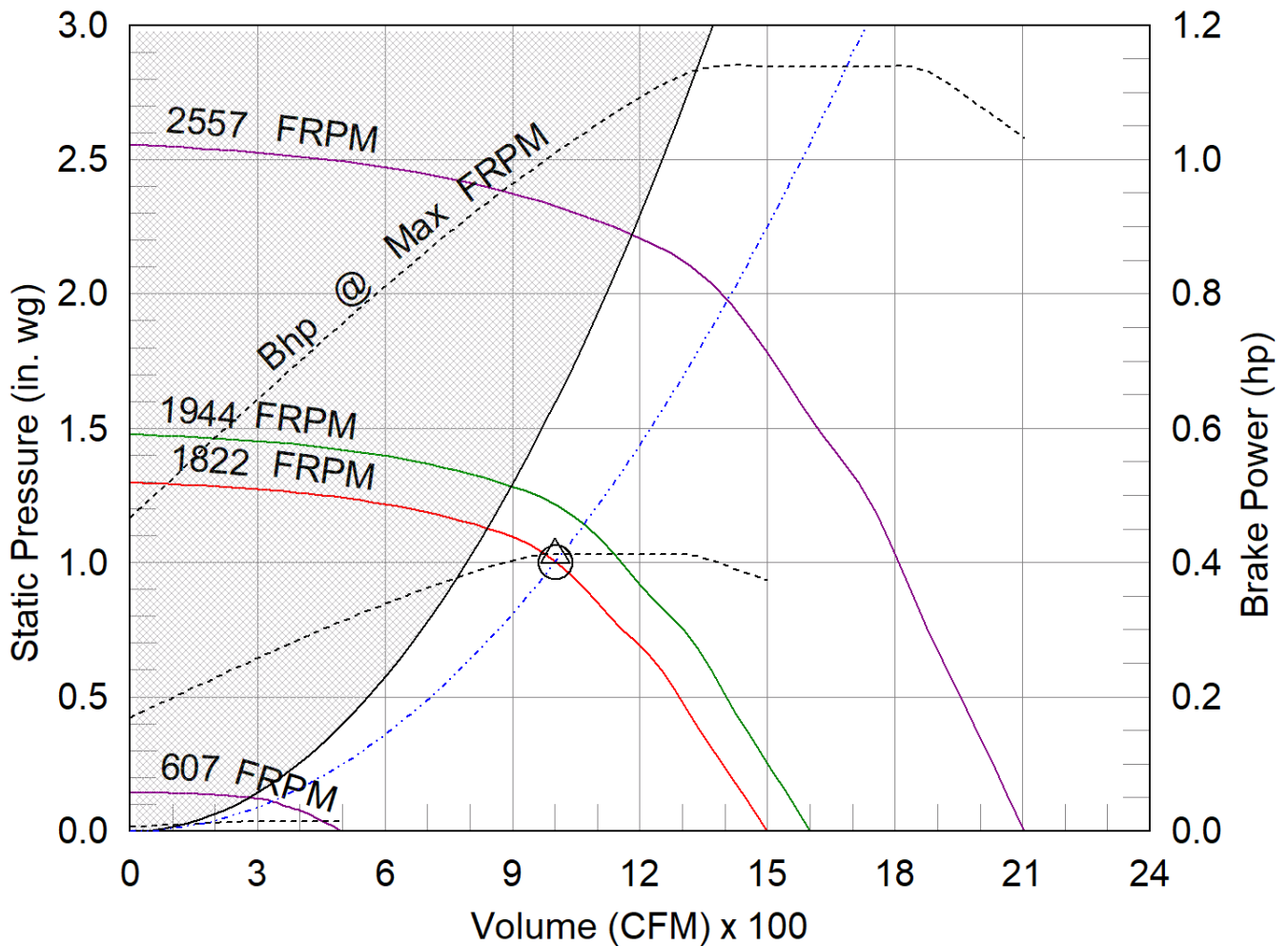
Notes: All dimensions shown are in units of in.  
Width And height furnished approximately 0.25 in. undersize

BSQ-100

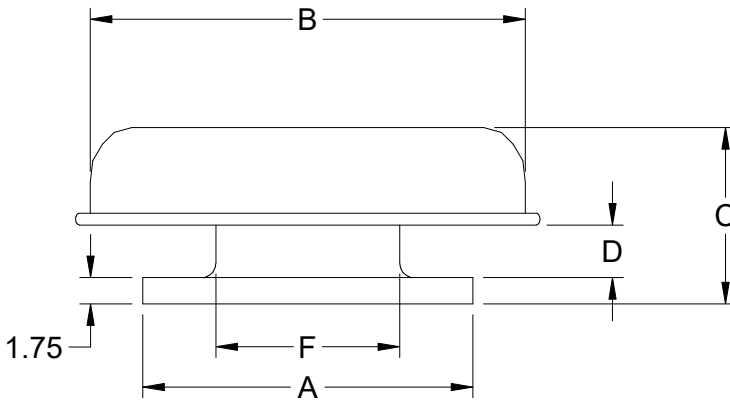
Min/Max Fan Curve

**Performance**

Requested Volume (CFM)	Actual Volume (CFM)	Total External SP (in. wg)	Fan RPM	Operating Power (hp)
1,000	1,000	1	1822	0.41



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



**Model: GRSR**

**Standard Construction Features:**

- Aluminum housing.
- Aluminum curb cap with prepunched mounting holes.
- Recommended roof opening dimension is at least 2.5 in. larger than the damper size.

**Dimensions**

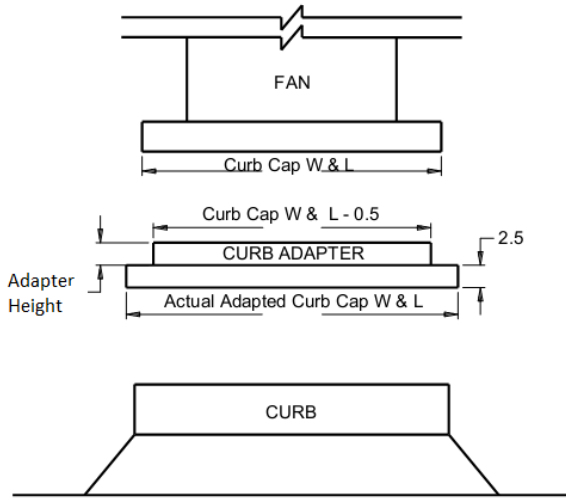
ID#	Tag	Qty	Model	Model Size (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	Curb Cap Width (in.)	Curb Cap Length (in.)	Weight (lb)
1-1	GH-01	1	GRSR-12	12	22	29	11.75	3.5	N/A	12.25	22	22	10

**Construction**

ID#	Flashing Flange	Installation Type	Insect Screen	Birdscreen Material	Unit Material
1-1	No	Ducted	No	Galvanized	Aluminum

**Accessories**

ID#	Hinged Curb Cap	Curb Seal	Hood Insulation (in.)	Tie Down Points
1-1	No	Foam - Applied	None	No



## Model: ADAPTER

### Roof Curb Adapter / Reducer

Nameplate Model: ADP 21.5X21.5-26X26

#### Standard Construction Features:

Curb adapters are designed to adapt standard curb cap dimensions to non-standard curb sizes. Adapters may be constructed of either aluminum or galvanized steel. Curb reducers may reduce by a maximum of 10 inches and curb adapters may extend up to 20 inches beyond the standard curb cap size.

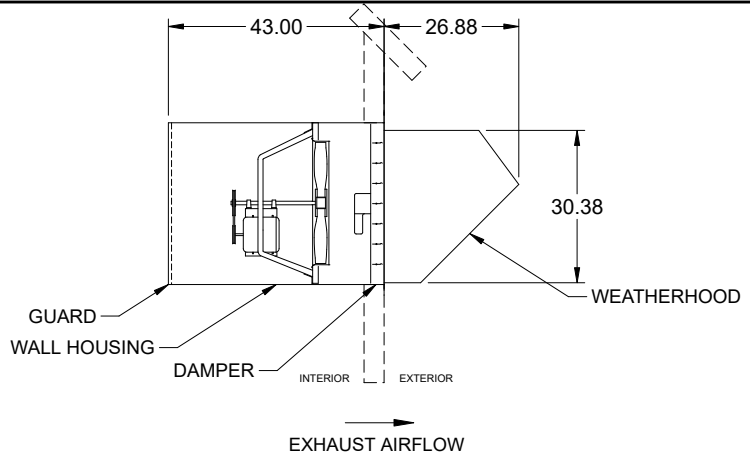
#### Dimensions

ID#	Tag	Qty	Type	Cap Width (in.)	Cap Length (in.)	Actual Adapted Curb Cap Width (in.)	Actual Adapted Curb Cap Length (in.)	For Model	Size	Adapter Height (in.)
2-1	GH-01 Adapt	1	Adapter	21.5	21.5	26	26	Other	N/A	2.5

#### Accessories

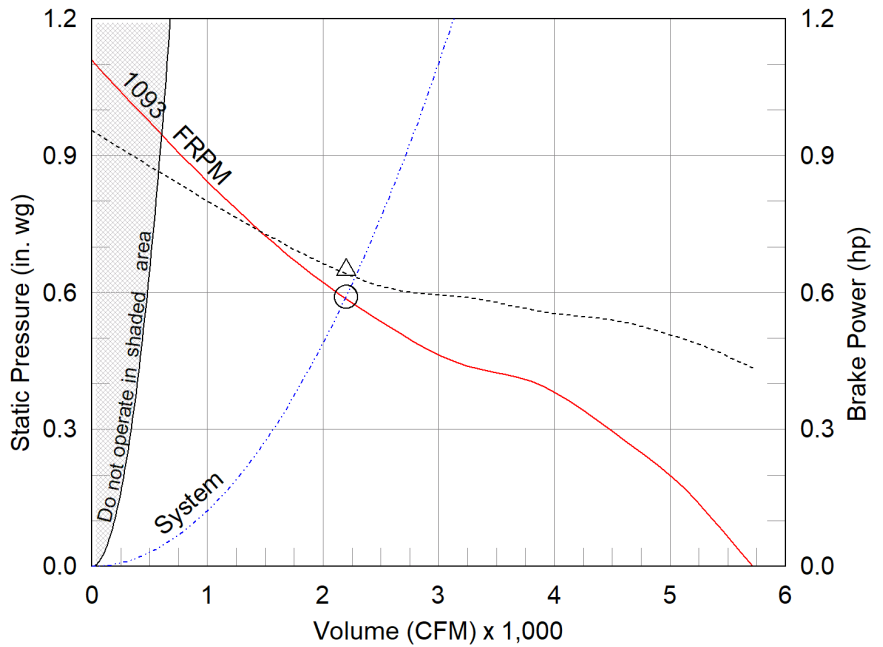
ID#	Material
2-1	Aluminum

**Model: SBE-2H24-7**  
Sidewall Belt Drive Fan  
Motor Access From Int. of Bldg.



Dimensional	
Quantity	1
Weight w/o Acc's (lb)	87
Weight w/ Acc's (lb)	275
Max T Motor Frame Size	145
Optional Damper (in.)	26 x 26
Wall Opening (in.)	33.75 x 33.75

Performance	
Requested Volume (CFM)	2,200
Actual Volume (CFM)	2,200
Total External SP (in. wg)	0.591
Fan RPM	1093
Operating Power (hp)	0.65
Elevation (ft)	436
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Drive Loss (%)	7.4
Tip Speed (ft/min)	6,870
Static Eff. (%)	34



Motor	
Motor Mounted	Yes
Size (hp)	3/4
Voltage/Cycle/Phase	460/60/3
Enclosure	ODP
Motor RPM	1725
Efficiency Rating	Standard
Windings	1
NEC FLA* (Amps)	1.6

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

**Static Pressure Calculations**

External SP	0.5 in. wg
Damper	0.091 in. wg
<b>Total External SP</b>	<b>0.591 in. wg</b>

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	84	85	85	81	78	75	70	67	84	72	21

**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: SBE-2H24-7

### Sidewall Belt Drive Fan

#### Standard Construction Features:

- Galvanized steel fan panel - Die formed, galvanized steel drive frame assembly
- Fabricated steel propeller for Levels 1 and 2, welded and painted steel for Level 3
- Adjustable motor pulley - Ball bearing motors - Fan shaft mounted in ball bearing pillow blocks - Static resistant belts - Corrosion resistant fasteners

#### Selected Options & Accessories:

- Motor with Thermal Overload
- Automatic Belt Tensioner
- Spare Belt(s) - 1 Set (Attached)
- UL/cUL 705 Listed - "Power Ventilators"
- Airflow Direction: Exhaust
- Long Wall Hsg, Flush Exterior, w/OSHA Grd., Factory Installed
- Motor Access: From Int. of Bldg.
- Switch, NEMA-1, Toggle, Shipped with Unit
- Junction Box Mounted & Wired
- Weatherhood, Galvanized 45 deg. with Bird Screen, Shipped Loose From Factory
- Unit Warranty: 1 Yr (Standard)
- Damper Mounted, WD-320-PB-26X26, Not Coated
- Damper Actuator (MP-310), 115 VAC Actuated
- End Switch

# Disconnect Switch

## Enclosure Rating: NEMA-1

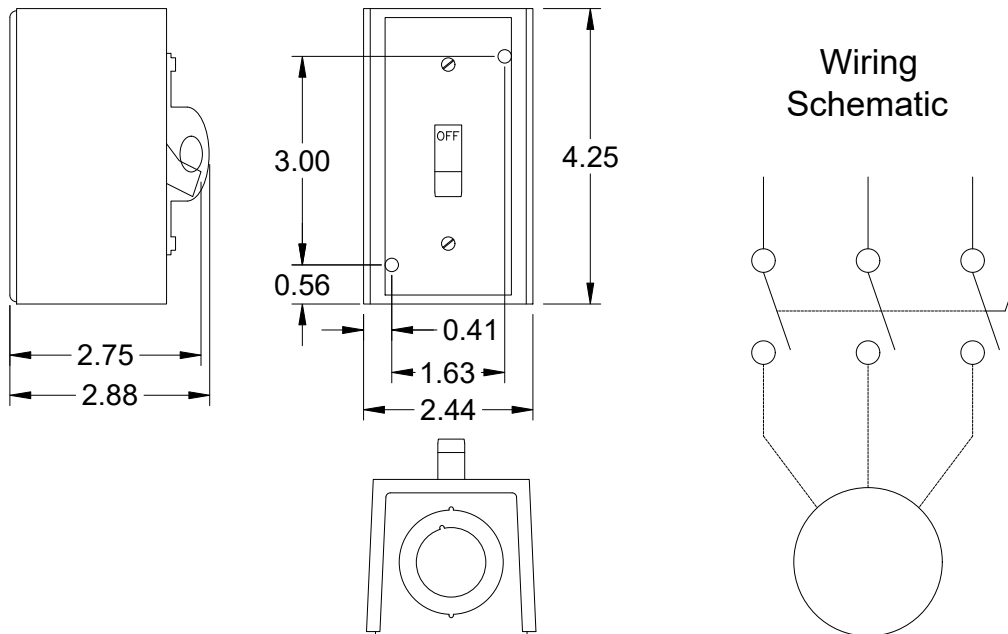
### Standard Construction Features:

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:	3/4 hp	Voltage:	460	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:	1725	Exp. Resist. Wiring:	None		
Switch Mounting:	Shipped With Unit						

### Electrical Drawing Details



Notes: All dimensions shown are in units of in.

# Vertical Mount Exhaust Damper

Model: WD-320

## Standard Construction Features:

- Model WD-320 is a vertical mount exhaust damper and is constructed of 18 ga galvanized steel with pre-punched mounting holes and a flanged frame - 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 mounted steel in nylon bushings - Synthetic axle bearings

## Damper Configuration:

Actuator Type: 115 VAC

End Switch: Yes

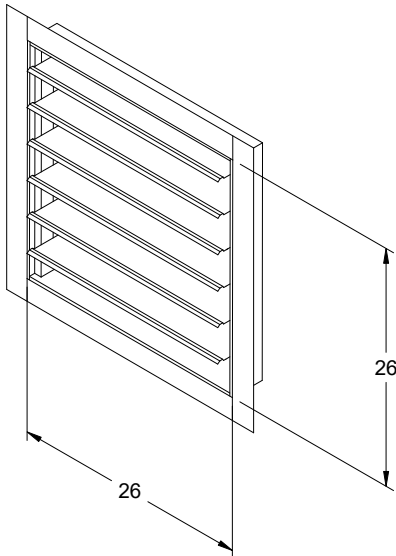
## Actuator Configuration:

Manufacturer: Greenheck Jackshaft Quantity: 0

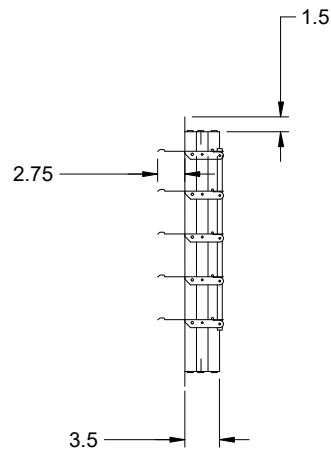
Model: MP-310

Mounting: Internal

Quantity: 1



DAMPER



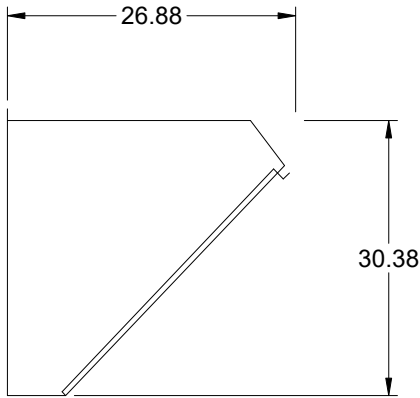
TYP. SECTION VIEW

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

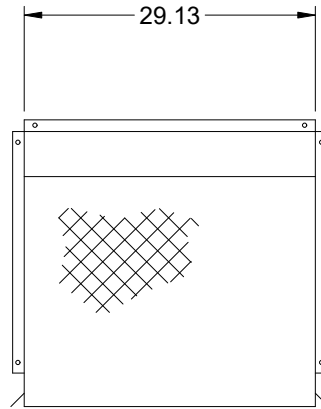
# 45 Degree Weatherhood

**Standard Construction Features:**

Galvanized Steel or aluminum construction. 0.5 welded wire birdscreen. Prepunched mounting holes. Field assembled.



SIDE VIEW

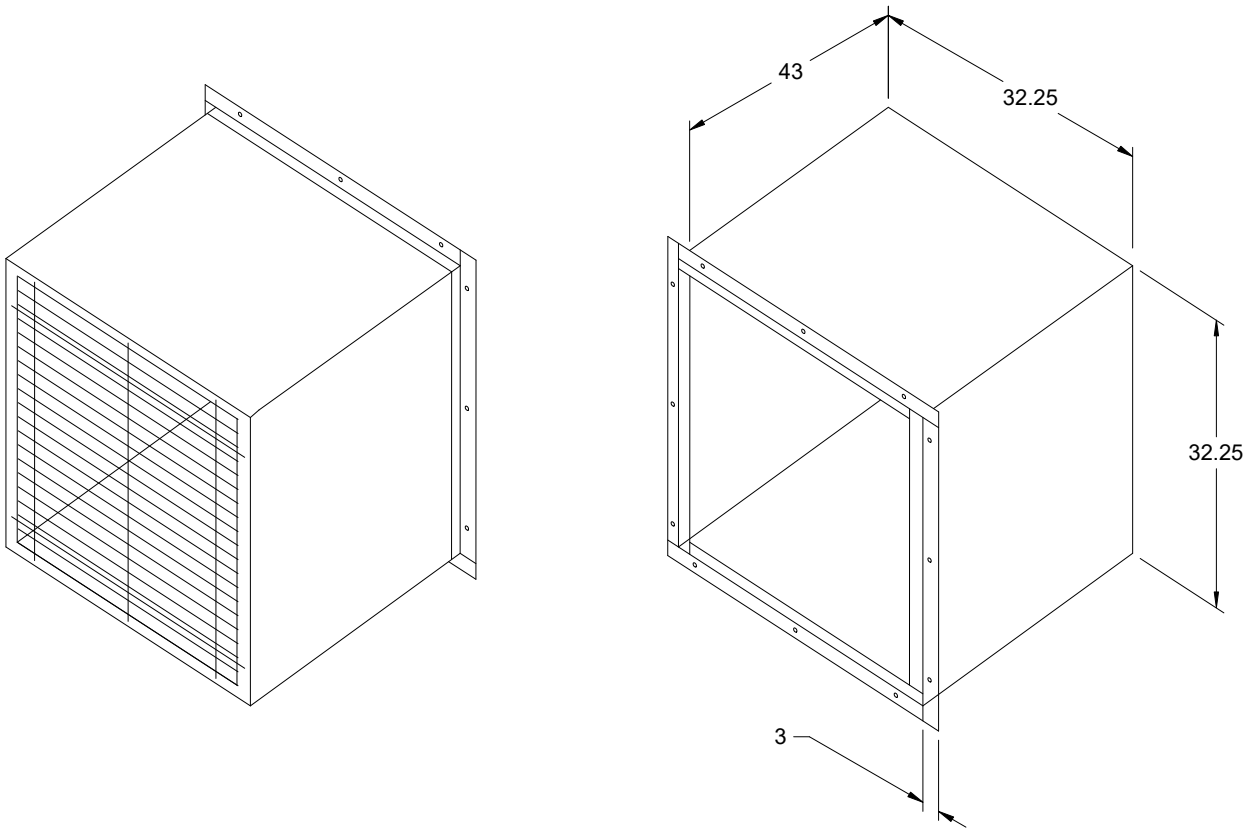


ELEVATION VIEW

## 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.



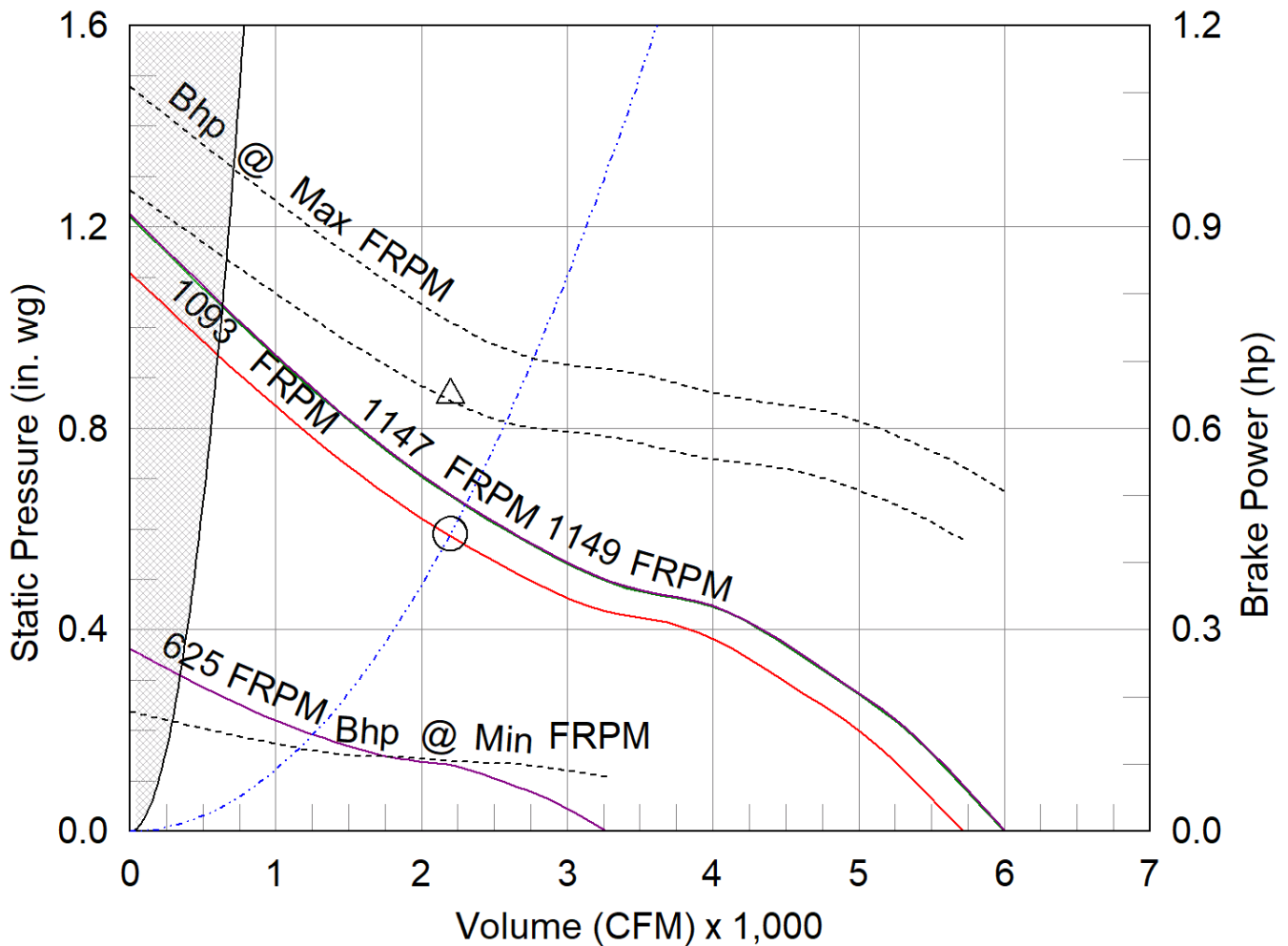
Notes: All dimensions shown are in units of in.

SBE-2H24-7

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	0.591	1093	0.65



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