

SUBMITTAL COVER SHEET

Project: Westover Hills Baptist Hospital (R&M Job #2270)
Date: 12/22/22
Submittal #: 233416-1
Submittal Title: Centrifugal In-Line Fans - PD
Subcontractor/Manufacture: Gowan-Garrett

PROJECT TEAM

Owner: Tenet Healthcare

Design Team:

Architect: Earl Swensson Associates
Civil: Pape Dawson
Structural: Structural Design Group
MEPF & LV: SSR

Construction Team:
Robins & Morton

SUBMITTAL ITEMS

- | | |
|-----------------------------|-----------|
| 1. Centrifugal In-Line Fans | 7. _____ |
| 2. _____ | 8. _____ |
| 3. _____ | 9. _____ |
| 4. _____ | 10. _____ |
| 5. _____ | 11. _____ |
| 6. _____ | 12. _____ |

STAMPS

THESE DRAWINGS OR BROCHURES HAVE BEEN REVIEWED FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS AND CHECKED FOR COMPLETENESS AND FIELD DIMENSIONS.

THIS REVIEW DOES NOT RELIEVE THE SUBCONTRACTOR OR VENDOR OF RESPONSIBILITY FOR COMPLIANCE WITH CONTRACT DOCUMENTS.

No Exceptions Taken
 Make Corrections Noted
 Revise and Resubmit
 Rejected

ROBINS & MORTON

DATE: 12/22/22 REVIEWED BY: Andrew Anders

12/22/22 - Comments by R&M in Green.

SSR

Review is for general compliance with the design concept of the project and, unless expressly noted otherwise, does not supersede the requirements of the plans, specifications, and other contract documents.

NO EXCEPTIONS TAKEN
 MAKE CORRECTIONS NOTED
 RESUBMIT REQUESTED INFORMATION
 AMEND AND RESUBMIT
 REJECTED
 RECEIVED FOR RECORD ONLY

Reviewed By: Julianna Price
Date Received: 1/5/2023
Date Reviewed: 1/20/2023

See SSR comments in document below.

STAMPS (cont.)

SUBMITTAL DATA
WESTOVER HILLS BAPTIST HOSPITAL
SAN ANTONIO, TEXAS

SUBMITTAL # 23 34 16-1
FANS

OWNER

TENET HEALTHCARE CORPORATION
14201 DALLAS PARKWAY
DALLAS, TEXAS 75254
469-893-2000

ARCHITECT

EARL SWENSSON ASSOCIATES, INC.
1033 DEMONBRUEN ST. # 800
NASHVILLE, TN 37203
615-329-9445

MEP ENGINEER

SMITH SECKMAN REID, INC.
3700 WEST SAM HOUSTON PKWY S. STE 200
HOUSTON, TEXAS 77042
713-784-8211

GENERAL CONTRACTOR

ROBINS & MORTON.
9601 McALLISTER FREEWAY, SUITE 221
SAN ANTONIO, TEXAS 78216
210-874-4330

MECHANICAL CONTRACTOR

GOWAN GARRETT INC.
424 MARINO RD.
BRYAN, TEXAS 77808
979-778-3279



GOWAN - GARRETT
 7205 S. WW White Rd.
 San Antonio, Texas 78222
 (210) 616-0125 • Fax (210) 616-0124

WESTOVER HILLS BAPTIST HOSPITAL

SAN ANTONIO, TEXAS

SUBMITTAL DATA NO. 23 34 16-1

<u>ITEM</u>	<u>MANUFACTURER</u>	<u>SPEC NO.</u>	<u>DRWG. NO.</u>
CENTRIFUGAL INLINE FANS		23 34 16	
UTILITY FANS – BELTED VENT SETS		23 34 17	
CENTRIFUGAL EXHAUST FANS – ROOF AND WALL		23 34 18	
HVAC FANS	GREENHECK		M0.04
NOTE			

GARRETT MECHANICAL, INC.

Has reviewed only as to general design and requirements of the contract documents of this project. Subcontractor/Vendor to verify dimensions, quantities and field conditions for proper and complete installation of this work. Approval does not relieve subcontractors or supplier from responsibility for errors, omissions or deviations from the contract documents.

By: SKT Date: 12/13/2022

GMI SUBMITTAL NO: 233416-1

FANS
SUBMITTAL DATA

JOB NAME: WESTOVER HILLS BAPTIST HOSPITAL

LOCATION: SAN ANTONIO, TX

ARCHITECT: EARL SWENSSON ASSOCIATES, INC.

ENGINEER: SMITH SECKMAN REID

CONTRACTOR: GOWAN/GARRETT

DATE: DECEMBER 9, 2022

SUBMITTED BY

JOHN GILBERT

H.D. GRANT COMPANY, INC.

5417 RENWICK DRIVE
HOUSTON, TEXAS 77081
TELEPHONE: 713-668-8880
FAX: 713-668-8887

**SECTION 23 34 16
CENTRIFUGAL IN-LINE FANS**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Forward curved or backward inclined type in-line centrifugal fans.

1.02 RELATED REQUIREMENTS

- A. Section 23 05 00 - Common Work Results for HVAC
- B. Section 23 05 13 - Common Motor Requirements for HVAC Equipment
- C. Division 26: Electrical

1.03 REFERENCE STANDARDS

- A. AMCA 99 - Standards Handbook
- B. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating
- C. AMCA 211 - Certified Ratings Program - Product Rating Manual for Fan Air Performance
- D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans
- E. AMCA 301 - Methods of Calculating Fan Sound Ratings From Laboratory Test Data
- F. ANSI/ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings

1.04 SUBMITTALS

- A. Submit manufacturer's product data for review in accordance with the provisions of Division 01.
- B. Fan curves shall include entire range of RPM curves, scheduled operating point, brake horsepower, motor horsepower, and sound performance data.

1.05 QUALITY ASSURANCE

- A. Certify fans performance in accordance with AMCA Certified Air and Sound Rating Criteria, Standard 210, 211, and 301.
- B. Sound Power data: Rated in accordance with AMCA 300.
- C. All fans shall bear the AMCA Certified Ratings Program seal for Air and Sound Performance.
- D. All fans shall bear the AMCA Certified Ratings Program seal for Fan Energy Index (FEI).

1.06 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data as specified in Division 01.
- B. Include instructions for lubrication, motor, spare parts list, and wiring diagrams.

Comply



Comply

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.
- C. Protect motors, shafts, and bearings from weather and construction dust.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Acme, Twin City, Greenheck, Loren Cook, PennBarry, or Trane.
- B. Substitutions: Refer to Division 01.

2.02 IN-LINE CENTRIFUGAL FANS

- A. Wheels and Housings: Wheel diameters and outlets areas sized in accordance with AMCA Standards. Fans shall be statically and dynamically balanced. Housing shall contain two access doors or removable access panels for maintenance. Housing shall be insulated with 1" matt-faced non-eroding duct liner or fiber-free liner.
- B. Drive arrangements: Belt driven and conform with AMCA Standard 2404, and as shown on drawings. Sheave shall be adjustable, cast iron, machined, keyed, securely attached and sized for 150% of the brake horsepower at its rated maximum speed.
- C. Housing Construction: Galvanized steel with square duct mounting collars. Rivet blades to galvanized steel shroud.
- D. Painting: Factory applied, rust-resistant paint. Provide standard factory color unless noted otherwise.
- E. Shaft: Solid hot rolled steel, ground and polished mounted in permanently sealed lubricatable pillow block ball bearings. The first critical speed shall be at least 25% over the maximum operating speed.
- F. Mount relubricatable anti-friction, self-aligning pillow block ball bearings on Class I fans and spherical roller type bearings on Class II and III fans. Position bearing supports to directly oppose drive belt tensions and transmit loads to the fan base.
- G. Bearings shall be factory tested and have a minimum L-10 life in excess of 100,000 hours at maximum operating speed.
- H. Motor: Adjustable slide rail on a steel isolation base mounted out of the air stream. Provide NEMA-1 disconnect switch, factory wired to motor. Provide EC motor where scheduled, including transformer, remote dial, constant pressure control.
- I. Provide fan type, capacity, direction of rotation, discharge direction, and arrangement as shown on drawings. Provide steel fan base for Arrangement 9 and 10 fans. Provide fan base for Arrangement 3 fans under Section 23 05 48 - (DO NOT USE) Vibration and Seismic Controls for HVAC. Prime-coat paint bases.
- J. Provide spark-proof constructed fans with explosion proof motors where scheduled.
- K. Provide OSHA approved expanded metal or removable solid steel belt guards with aligned opening for checking fan shaft speed.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fans in locations shown on drawings and in accordance with manufacturer's instructions.
- B. Connect fans to inlet and outlet ductwork with flexible connections.
- C. Fans for outdoor mounting shall be completely weatherproofed, with a fan motor and drive weather cover, and receive a second factory coat of paint.

3.02 TEST AND ACCEPTANCE

- A. Start-up and checkout fan for proper motor phasing, alignment, and vibration free operation. Improperly aligned fans to be connected. Change unmatched belts.
- B. Test fans in accordance with Section 23 05 00 - Common Work Results for HVAC.
- C. Demonstrate system operation to Owner's maintenance personnel and instruct them in operational requirements.
- D. Verify that, where applicable, fans are interlocked with supply (and exhaust) fans as required by control drawings.

END OF SECTION 23 34 16



SECTION 23 34 17
UTILITY FANS--BELTED VENT SETS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Belted Vent Sets (Utility fans)

1.02 RELATED REQUIREMENTS

- A. Section 23 05 00 - Common Work Results for HVAC
- B. Section 23 05 13 - Common Motor Requirements for HVAC Equipment
- C. Section 23 31 13 - Sheetmetal Ductwork
- D. Division 26: Electrical

1.03 REFERENCE STANDARDS

- A. AMCA 99 - Standards Handbook
- B. AMCA 211 - Certified Ratings Program - Product Rating Manual for Fan Air Performance
- C. AMCA 300 - Reverberant Room Method for Sound Testing of Fans
- D. AMCA 301 - Methods of Calculating Fan Sound Ratings From Laboratory Test Data
- E. ANSI/ABMA Standard 9 - Load Ratings and Fatigue Life for Ball Bearings
- F. ANSI/ABMA Standard 11 - Load Ratings and Fatigue Life for Roller Bearings

1.04 SUBMITTALS

- A. Submit manufacturer's product data for review in accordance with the provisions of Division 01.
- B. Fan curves shall include entire range of RPM curves, scheduled operating point, brake horsepower, motor horsepower, and sound performance data.

1.05 QUALITY ASSURANCE

- A. Performance Ratings: Conform to AMCA 211 and bear the AMCA Certified Ratings Program Seal for Air Performance.
- B. Sound power ratings: Provide in 8 octave bands, based on AMCA Standard 300, test set up #1.
- C. All fans shall bear the AMCA Certified Ratings Program seal for Air and Sound Performance and Efficiency.
- D. All fans shall bear the AMCA Certified Ratings Program seal for Fan Energy Index (FEI).

1.06 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data as specified in Division 01.



- B. Include instructions for lubrication, motor, spare parts list, and wiring diagrams.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.
- C. Protect motors, shafts, and bearings from weather and construction dust.

1.08 LOCATION & SERVICE

- A. Fans used for any of the following exhaust air services shall have their discharge in a vertical direction at least 10 feet above roof level and shall be located not less than 25 feet horizontally from air intakes, openable windows/doors, or areas that are normally accessible to the public or maintenance personnel and that are higher in elevation than the exhaust discharge and be located such that they minimize the recirculation of exhaust air back into the building.
 - 1. Airborne Infectious Isolation (AII) rooms
 - 2. Bronchoscopy rooms
 - 3. Emergency department waiting rooms
 - 4. Nuclear medicine laboratories and prep rooms
 - 5. Radiology waiting rooms
 - 6. Laboratory chemical fume hoods
 - 7. Pharmacy hazardous drug prep hoods and rooms
- B. All ductwork within the building on the inlet side of the fan shall be under negative pressure and sealed in accordance with SMACNA duct leakage Seal Class A.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. ACME, Barry, Twin City, Greenheck, Loren Cook, or Trane.
- B. Substitutions: Refer to Division 01.

2.02 EQUIPMENT REQUIREMENTS

- A. Assembly: Packaged unit including fan, motor, adjustable belt drive or direct drive, and motor base. Fan shall bear the AMCA Air Performance Seal.
- B. Material: Low carbon steel.
- C. Finish: Factory applied, high quality corrosion resistant enamel paint.
- D. Wheel diameters and discharge areas: Sized in accordance with AMCA standards.
- E. Housings:

Comply

1. Air tight lock seam or welded construction using heavy gauge steel, reinforced to prevent vibration and pulsation.
 2. Field rotatable to eight standard discharge positions.
 3. Suitable for outdoor mounting with weatherproof motor and drive cover.
 4. Single width, single inlet.
- F. Fan wheels: Non-overloading backward inclined type.
- G. Shafts: Ground and polished, solid steel ASTM A-108 steel, grade 1018 or 1045.
- H. Drives: Sized for a minimum of 150% of driven horsepower. Pulleys shall be fully machined cast iron type, keyed and securely attached to the fan and motor shaft.
- I. Bearings:
1. Design for heavy duty service with a nominal L-10 life in excess of 100,000 hours based on maximum cataloged operating speed.
 2. Lubricatable anti-friction, self-aligning pillow block ball bearings.
 3. Support to directly oppose drive tension and transmit loads to the fan base.
- J. Accessories: Punched inlet and outlet flanges, quick opening access door, and drain.
- K. Discharge dampers or shutters: As noted on drawings.
- L. Balancing
1. Statically and dynamically balance at factory after assembly:
 - a. Use IRD or PMC analyzer to measure velocity. Final reading not to exceed 0.1 inches per second.
 - b. Record exact level of vibration as proof of the final dynamic balance and submit to Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fans in locations shown on drawings and in accordance with plan details and manufacturer's instructions.
- B. Provide flexible connection between ductwork and fan inlet and outlet.
- C. Support associated inlet ductwork from roof to prevent bearing on fan.

3.02 TEST AND ACCEPTANCE

- A. Start-up and checkout for proper motor phasing, alignment, and vibration free operation. Correct improperly aligned fans. Change unmatched belts.
- B. Verify control interlocks and sequence of operation. Correct any deficiencies and retest.

By Gowan

By Gowan

C. Demonstrate and instruct system operation to Owner's maintenance personnel.

END OF SECTION 23 34 17

SECTION 23 34 18
CENTRIFUGAL EXHAUST FANS - ROOF AND WALL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Roof Mounted Centrifugal Fans

1.02 RELATED REQUIREMENTS

- A. Section 23 05 00 - Common Work Results for HVAC
- B. Section 23 05 13 - Common Motor Requirements for HVAC Equipment
- C. Division 26: Electrical

1.03 REFERENCE STANDARDS

- A. AMCA 99 - Standards Handbook
- B. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating
- C. AMCA 211 - Certified Ratings Program - Product Rating Manual for Fan Air Performance
- D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans
- E. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data
- F. AMCA 311 - Certified Ratings Program - Product Rating Manual for Fan Sound Performance
- G. ANSI/ABMA Standard 9 - Load Ratings and Fatigue Life for Ball Bearings

1.04 SUBMITTALS

- A. Submit manufacturer's product data for review in accordance with the provisions of Division 01..
- B. Fan curves shall include entire range of RPM curves, scheduled operating point, brake horsepower, motor horsepower, and sound performance data.

1.05 QUALITY ASSURANCE

- A. Certify fans performance in accordance with AMCA Certified Air and Sound Rating Criteria, Standards 210, 211, and 301.
- B. Sound Power data: Rated in accordance with AMCA 300.
- C. All fans shall bear the AMCA Certified Ratings Program seal for Air and Sound Performance.
- D. All fans shall bear the AMCA Certified Ratings Program seal for Fan Energy Index (FEI).

1.06 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data as specified in Division 01.
- B. Include instructions for lubrication, motor, spare parts list, and wiring diagrams.

Comply



Comply

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.
- C. Protect motors, shafts, and bearings from weather and construction dust.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Acme, Carnes, Greenheck, Jenco, Loren Cook, or PennBarry.
- B. Substitutions: Refer to Division 01.

2.02 ROOF MOUNTED FANS

- A. Drives: Variable pitch V-belt drives or direct driven as scheduled.
- B. Housings: Hinged, heavy gauge aluminum enclosing motor outside airstream.
- C. Motor: Ball bearing type, designed for heavy duty vertical and horizontal mounting. Isolate motors and fans from base with rubber isolators. Select motor such that motor BHP does not exceed nameplate at rated conditions.
- D. Fans: Centrifugal type, statically and dynamically balanced.
- E. Provide:
 - 1. Lubricated lifetime sealed ball bearings.
 - 2. Spark proof constructions with explosion proof motor suitable for Class I, Group C, Division 33 service, where scheduled on drawings.
 - 3. Gravity dampers where not specified to be motorized.
 - 4. Motorized backdraft dampers interlocked as shown in control drawings.
 - 5. Disconnect switch on 3-phase units furnished under Division 26, unless noted as a fan accessory on fan schedule.
 - 6. Bird screen around fan discharge.
 - 7. Where required, prefabricated, 1" thick fiberglass insulated, roof curb of same material as fan housings and manufactured by the fan manufacturer. Provide minimum 18" high curb; see Mechanical Schedules on drawings.
 - 8. Refer to architectural drawings or existing conditions for roof pitch.
 - 9. Upblast housing where shown on drawings.

PART 3 - EXECUTION

3.01 ROOF MOUNTED FANS

- A. Secure fans to curbs with stainless steel screws and fasteners..
- B. Connect duct to fans to allow for straight and smooth airflow.
- C. Provide flexible connections (minimum of 4") between fan and duct.
- D. Install fan level - plus or minus 5 degrees in vertical. Final installation to be free of all leaks both from fan interior and roof-to-curb interface.

3.02 START-UP, TESTING, DEMONSTRATION

- A. Start-up fans after checkout to ensure proper alignment and phased electrical connections.
- B. Test fans individually and as part of a system, where required, in accordance with Section 23 05 00 - Common Work Results for HVAC.
- C. Where required, ensure that fans are interlocked with supply and/or return fans and with fire detection and control system.
- D. Demonstrate and instruct operation to maintenance personnel.

END OF SECTION 23 34 18

Performance	
Quantity	1
Volume (CFM)	3,600
Total External SP (in. wg)	2
Operating Power (hp)	1.8
Required Power (hp)	1.8
Fan RPM	1454
Max Fan RPM	2,099
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

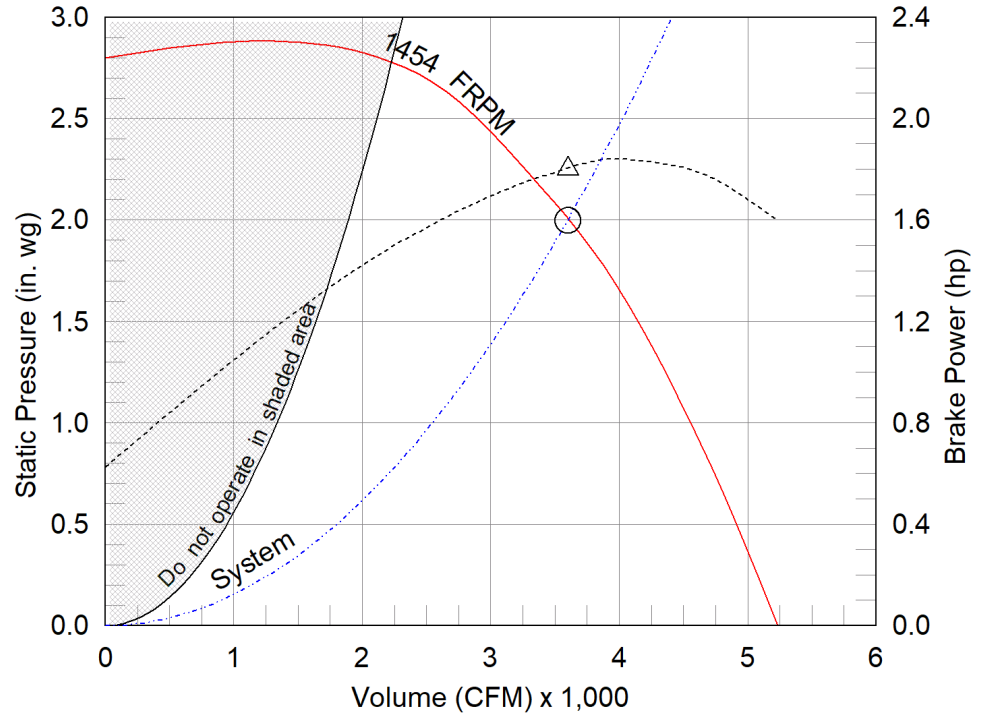
Fan Configuration	
Size	18
Wheel Type	BI
Arrangement	10
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Steel
Wheel Material	Steel
Inlet Cone Material	Steel
Pedestal Material	Steel

Equipment Weights	
Fan (LMD)(lb)	241
Motor/Drive (lb)	80
Accessories (lb)	45

Misc Fan Data	
Fan Energy Index (FEI)	1.37
Outlet Velocity (ft/min)	1,875
Static Efficiency (%)	66
Tip Speed (ft/min)	6,949

Motor and Drives	
Motor	Included
Size (hp)	3
RPM	1725
Enclosure	ODP
V/C/P	460/60/3
Frame Size	182T
Max Frame Size	215
Location	Centered
Pulley Type	Constant
Drive Loss (%)	5.0
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	4.8

Model: USF-18
Universal Single Width Fan
Operating Performance



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

Nameplate Model: USF-18-5-B1-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	89	86	87	83	78	75	69	64	85	73	22
Outlet	99	90	91	83	81	76	69	64	87	76	28

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: USF-18

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

Selected Options & Accessories:

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Motor VFD Rated

Motor with Shaft Grounding

Motor with Class B or Greater Insulation

Standard Drives

Finish - Coated

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

Switch - NEMA-3R, Toggle, For Indoor or Outdoor Use, Ship Separate

Bearings - L(10) Life of 200k Hours

Housing - PermaLock

Wheel - Backward Inclined

UL Listed for Grease Exhaust - UL/cUL-762 Outdoor - "Power Vent. for Restaurant Exhaust Appliances"

Polished Steel Shaft

Access Door - Bolted

Drain Connection - 1" Pipe Thread w/Plug

Inlet Flange, Punched

Outlet Flange, Punched

Weatherhood - Steel

Shaft Seal - High Temperature

Grease Trap with Drain Connection, Shipped Loose

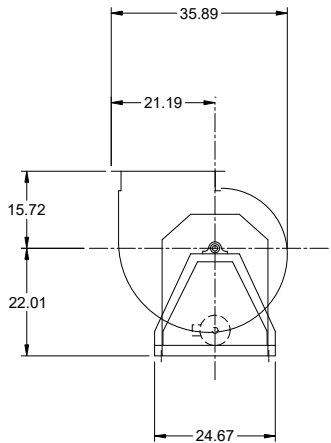
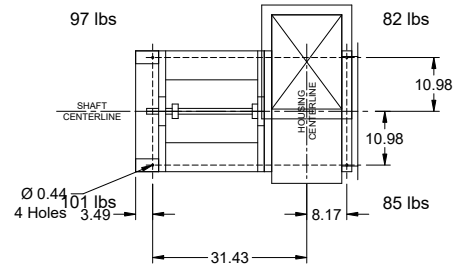
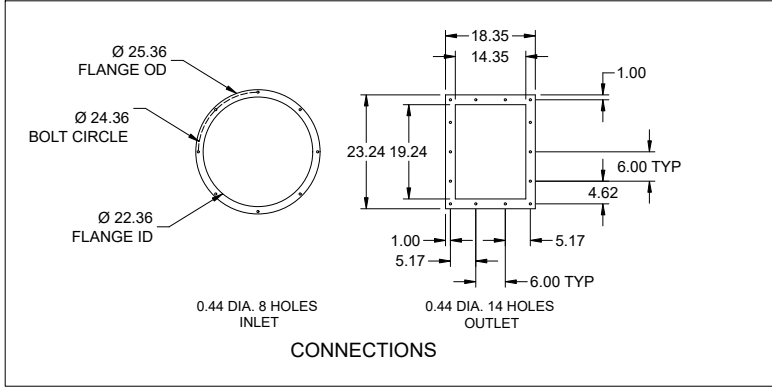
Fasteners - Standard

Unit Warranty: 1 Yr (Standard)

Provide OSHA belt guard,
motor cover, and housing
drain as scheduled on
sheet M0.04.

Model: USF-18

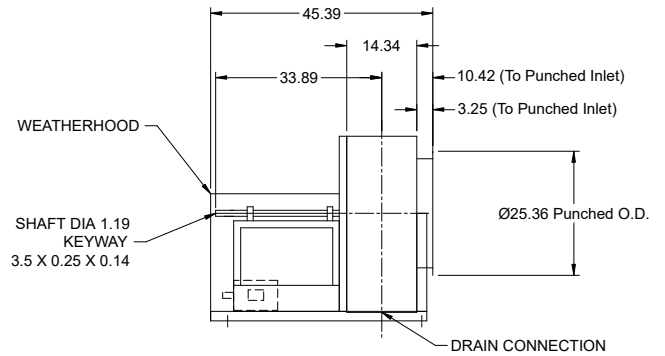
Universal Single Width Fan



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE

*FANS ARE SUBJECT TO ±.125 INCH TOLERANCE
*DUE TO CONTINUAL IMPROVEMENTS DIMENSIONS MAY CHANGE



Notes: All dimensions shown are in units of in.

Performance	
Quantity	1
Volume (CFM)	2,400
Total External SP (in. wg)	2.5
Operating Power (hp)	1.62
Required Power (hp)	1.62
Fan RPM	1691
Max Fan RPM	2,431
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

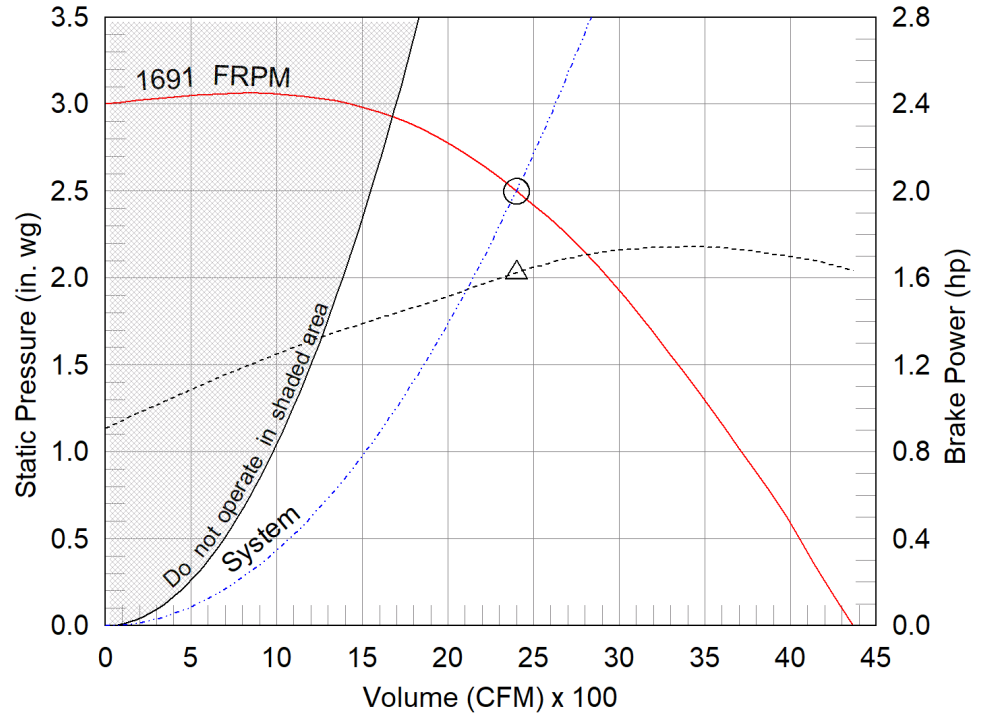
Fan Configuration	
Size	16
Wheel Type	BI
Arrangement	10
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Steel
Wheel Material	Steel
Inlet Cone Material	Steel
Pedestal Material	Steel

Equipment Weights	
Fan (LMD)(lb)	220
Motor/Drive (lb)	37
Accessories (lb)	45

Misc Fan Data	
Fan Energy Index (FEI)	1.23
Outlet Velocity (ft/min)	1,529
Static Efficiency (%)	61
Tip Speed (ft/min)	7,305

Motor and Drives	
Motor	Included
Size (hp)	2
RPM	1725
Enclosure	ODP
V/C/P	460/60/3
Frame Size	56
Max Frame Size	215
Location	Centered
Pulley Type	Constant
Drive Loss (%)	5.2
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	3.4

Model: USF-16
Universal Single Width Fan
Operating Performance



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

Nameplate Model: USF-16-5-B1-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	85	83	80	81	78	74	72	67	83	72	20
Outlet	95	90	88	85	78	75	71	67	86	75	25

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: USF-16

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

Selected Options & Accessories:

Motor with Class B or Greater Insulation

Standard Drives

Finish - Coated

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

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

Bearings - L(10) Life of 200k Hours

Housing - PermaLock

Wheel - Backward Inclined

UL Listed for Grease Exhaust - UL/cUL-762 Outdoor - "Power Vent. for Restaurant Exhaust

Appliances"

Polished Steel Shaft

Access Door - Bolted

Drain Connection - 1" Pipe Thread w/Plug

Inlet Flange, Punched

Outlet Flange, Punched

Weatherhood - Steel

Shaft Seal - High Temperature

Grease Trap with Drain Connection, Shipped Loose

Fasteners - Standard

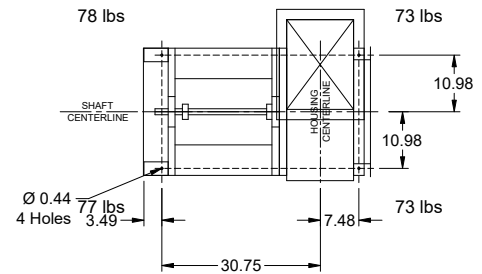
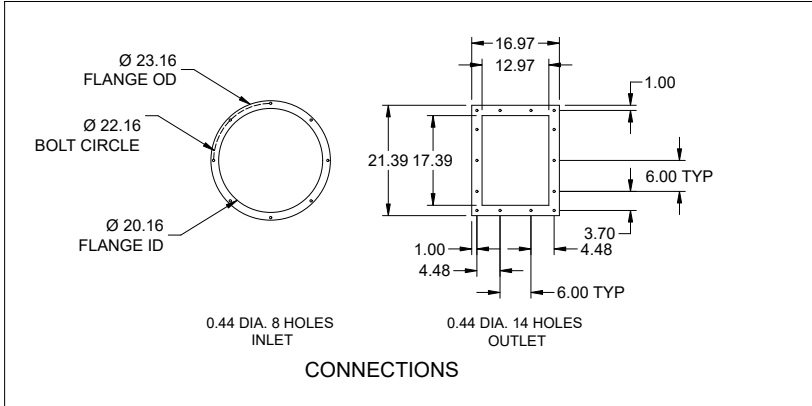
Unit Warranty: 1 Yr (Standard)

Provide OSHA belt guard, motor cover, and housing drain as scheduled on sheet M0.04.

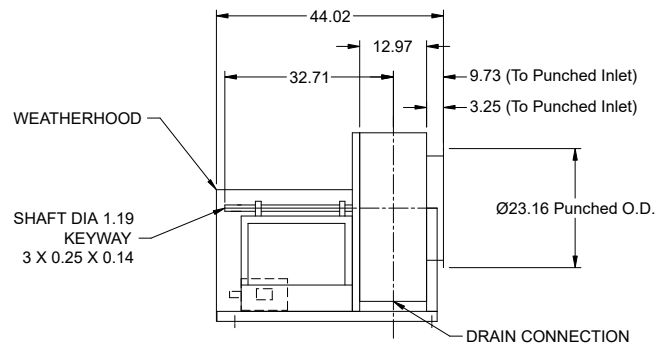
Motor starter has been revised to VFD. Provide "motor VFD rated".

Model: USF-16

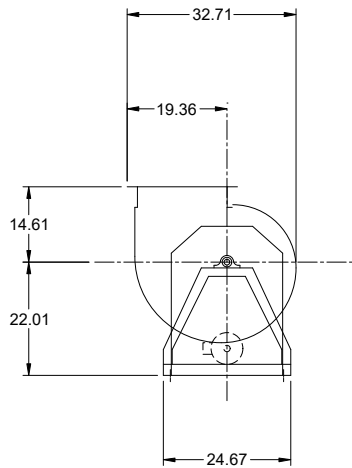
Universal Single Width Fan



FAN FOOTPRINT



END VIEW



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE

*FANS ARE SUBJECT TO ±.125 INCH TOLERANCE
*DUE TO CONTINUAL IMPROVEMENTS DIMENSIONS MAY CHANGE

Notes: All dimensions shown are in units of in.

Performance	
Quantity	1
Volume (CFM)	2,300
Total External SP (in. wg)	2.5
Operating Power (hp)	1.56
Required Power (hp)	1.56
Fan RPM	1674
Max Fan RPM	2,431
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

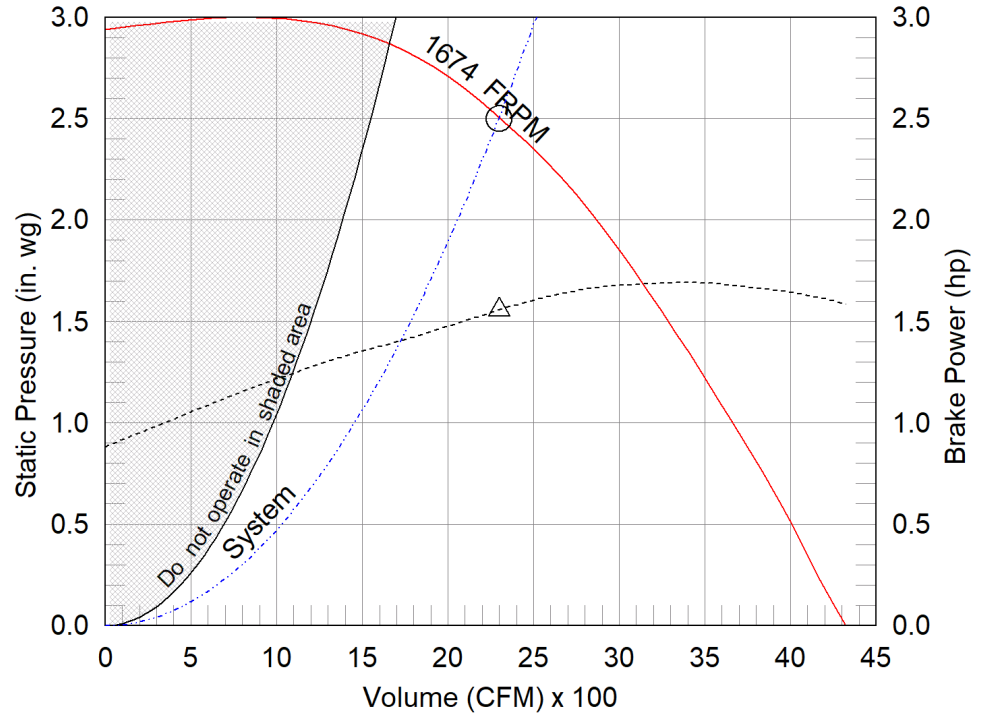
Fan Configuration	
Size	16
Wheel Type	BI
Arrangement	10
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Steel
Wheel Material	Steel
Inlet Cone Material	Steel
Pedestal Material	Steel

Equipment Weights	
Fan (LMD)(lb)	220
Motor/Drive (lb)	37
Accessories (lb)	45

Misc Fan Data	
Fan Energy Index (FEI)	1.23
Outlet Velocity (ft/min)	1,465
Static Efficiency (%)	61
Tip Speed (ft/min)	7,229

Motor and Drives	
Motor	Included
Size (hp)	2
RPM	1725
Enclosure	ODP
V/C/P	460/60/3
Frame Size	56
Max Frame Size	215
Location	Centered
Pulley Type	Constant
Drive Loss (%)	5.2
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	3.4

Model: USF-16
Universal Single Width Fan
Operating Performance



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

Nameplate Model: USF-16-5-B1-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	85	83	80	80	78	74	72	68	83	71	20
Outlet	95	90	88	84	78	75	71	67	86	74	25

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: USF-16

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

Selected Options & Accessories:

Motor with Class B or Greater Insulation

Standard Drives

Finish - Coated

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

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

Bearings - L(10) Life of 200k Hours

Housing - PermaLock

Wheel - Backward Inclined

UL Listed for Grease Exhaust - UL/cUL-762 Outdoor - "Power Vent. for Restaurant Exhaust

Appliances"

Polished Steel Shaft

Access Door - Bolted

Drain Connection - 1" Pipe Thread w/Plug

Inlet Flange, Punched

Outlet Flange, Punched

Weatherhood - Steel

Shaft Seal - High Temperature

Grease Trap with Drain Connection, Shipped Loose

Fasteners - Standard

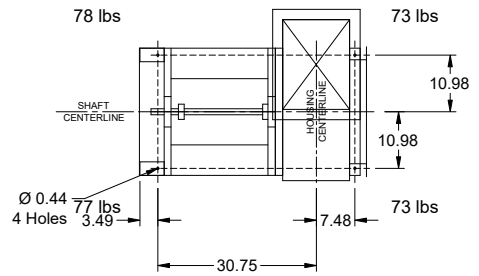
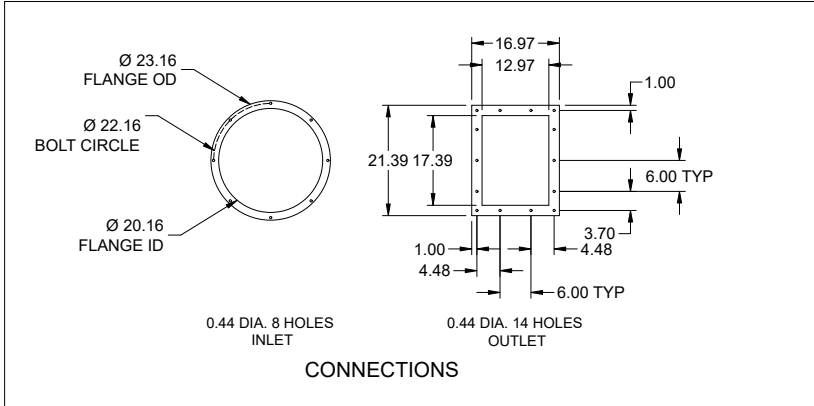
Unit Warranty: 1 Yr (Standard)

Provide OSHA belt guard, motor cover, and housing drain as scheduled on sheet M0.04.

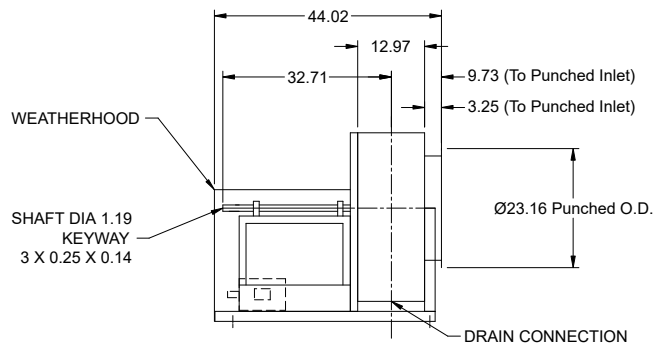
Motor starter has been revised to VFD. Provide "motor VFD rated".

Model: USF-16

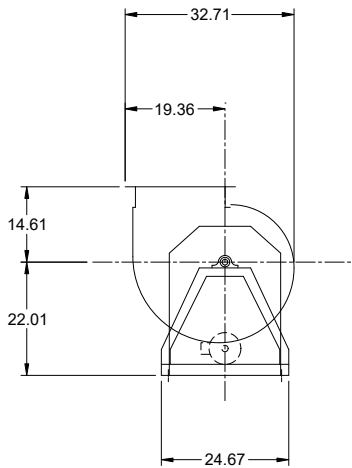
Universal Single Width Fan



FAN FOOTPRINT



END VIEW



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE

*FANS ARE SUBJECT TO ±.125 INCH TOLERANCE
*DUE TO CONTINUAL IMPROVEMENTS DIMENSIONS MAY CHANGE

Notes: All dimensions shown are in units of in.

Performance	
Quantity	1
Volume (CFM)	2,700
Total External SP (in. wg)	2
Operating Power (hp)	1.54
Required Power (hp)	1.54
Fan RPM	1634
Max Fan RPM	2,431
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

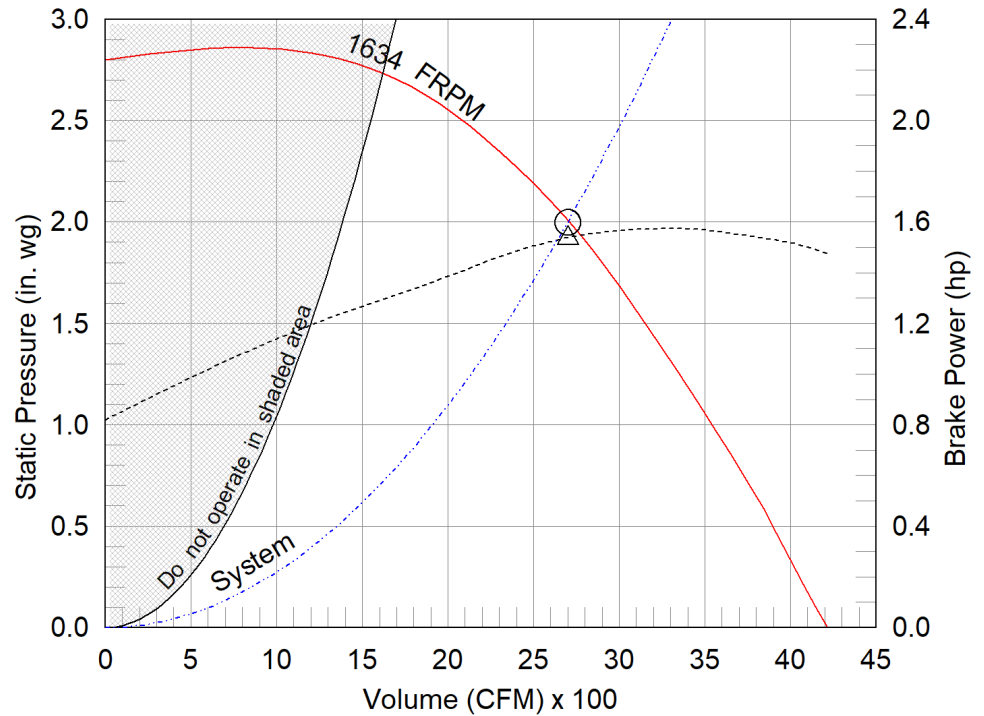
Fan Configuration	
Size	16
Wheel Type	BI
Arrangement	10
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Steel
Wheel Material	Steel
Inlet Cone Material	Steel
Pedestal Material	Steel

Equipment Weights	
Fan (LMD)(lb)	223
Motor/Drive (lb)	44
Accessories (lb)	45

Misc Fan Data	
Fan Energy Index (FEI)	1.23
Outlet Velocity (ft/min)	1,720
Static Efficiency (%)	58
Tip Speed (ft/min)	7,058

Motor and Drives	
Motor	Included
Size (hp)	2
RPM	1725
Enclosure	ODP
V/C/P	460/60/3
Frame Size	145T
Max Frame Size	215
Location	Centered
Pulley Type	Constant
Drive Loss (%)	5.3
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	3.4

Model: USF-16
Universal Single Width Fan
Operating Performance



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

Nameplate Model: USF-16-5-B1-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	84	82	80	80	77	73	70	65	82	71	19.0
Outlet	95	90	88	84	79	75	70	65	86	75	25

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: USF-16

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

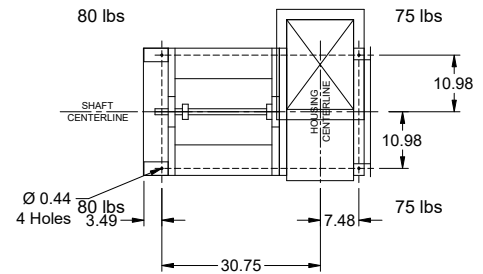
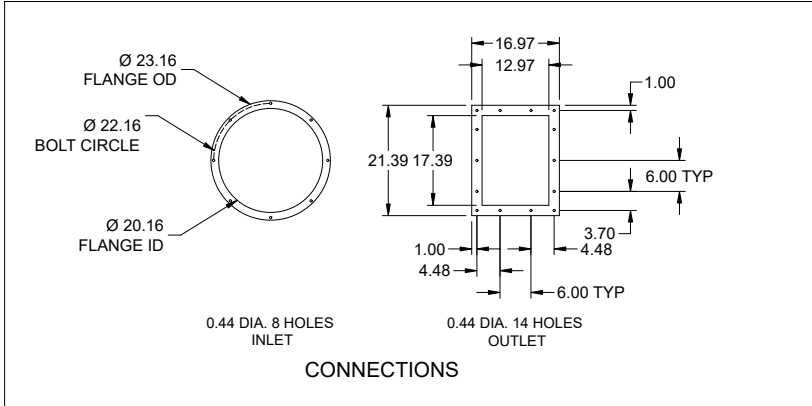
Selected Options & Accessories:

Motor VFD Rated
Motor with Shaft Grounding
Motor with Class B or Greater Insulation
Standard Drives
Finish - Coated
Coating - Permatecor, Concrete Gray-RAL 7023, Fan and Attached Accessories
Switch - NEMA-3R, Toggle, For Indoor or Outdoor Use, Ship Separate
Bearings - L(10) Life of 200k Hours
Housing - PermaLock
Wheel - Backward Inclined
UL Listed for Grease Exhaust - UL/cUL-762 Outdoor - "Power Vent. for Restaurant Exhaust Appliances"
Polished Steel Shaft
Access Door - Bolted
Drain Connection - 1" Pipe Thread w/Plug
Inlet Flange, Punched
Outlet Flange, Punched
Weatherhood - Steel
Shaft Seal - High Temperature
Grease Trap with Drain Connection, Shipped Loose
Fasteners - Standard
Unit Warranty: 1 Yr (Standard)

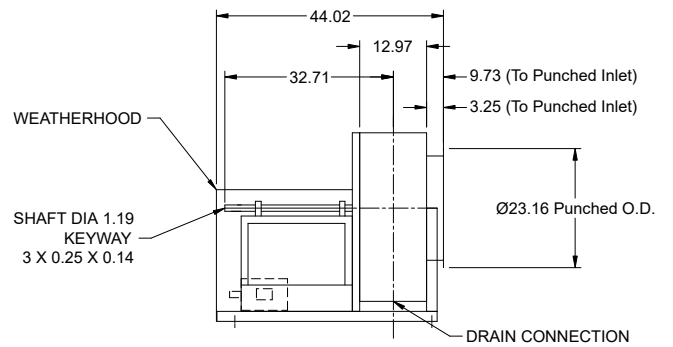
Provide OSHA belt guard,
motor cover, and housing
drain as scheduled on
sheet M0.04.

Model: USF-16

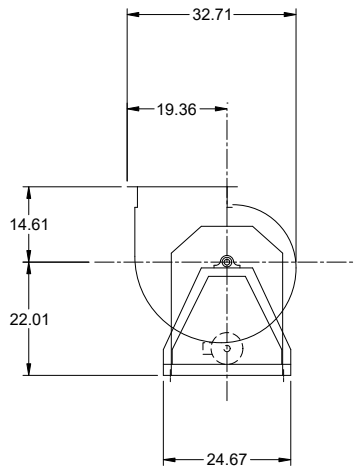
Universal Single Width Fan



FAN FOOTPRINT



END VIEW



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE

*FANS ARE SUBJECT TO ±.125 INCH TOLERANCE
*DUE TO CONTINUAL IMPROVEMENTS DIMENSIONS MAY CHANGE

Notes: All dimensions shown are in units of in.

Performance	
Quantity	1
Volume (CFM)	1,400
Total External SP (in. wg)	2.5
Operating Power (hp)	0.96
Required Power (hp)	0.96
Fan RPM	2003
Max Fan RPM	2,970
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

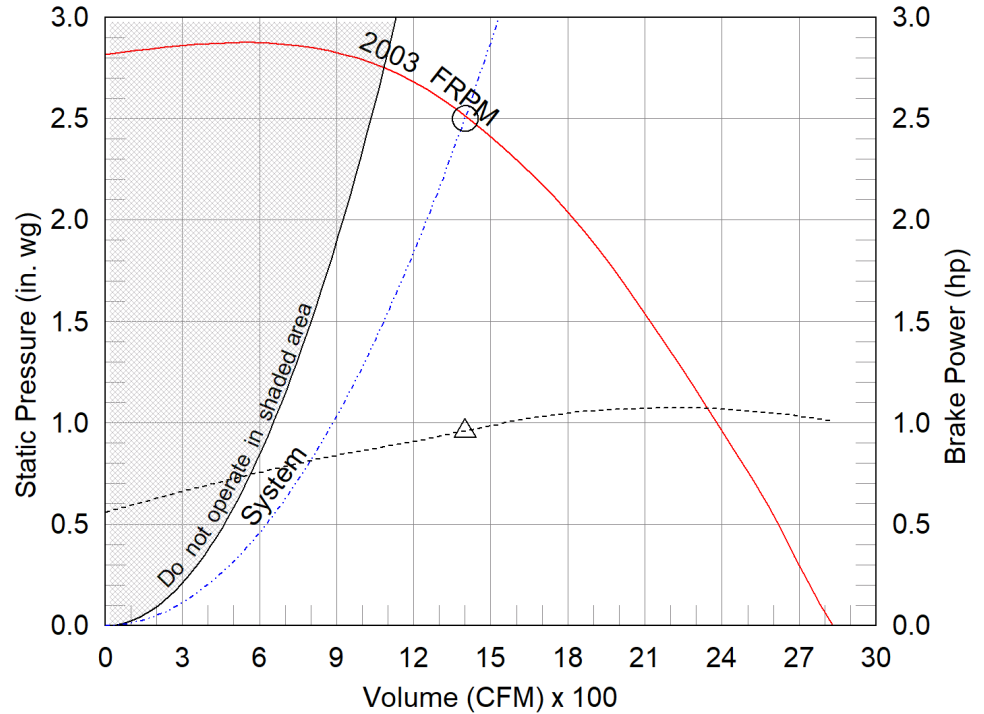
Fan Configuration	
Size	13
Wheel Type	BI
Arrangement	10
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Steel
Wheel Material	Steel
Inlet Cone Material	Steel
Pedestal Material	Steel

Equipment Weights	
Fan (LMD)(lb)	161
Motor/Drive (lb)	42
Accessories (lb)	33

Misc Fan Data	
Fan Energy Index (FEI)	1.32
Outlet Velocity (ft/min)	1,333
Static Efficiency (%)	61
Tip Speed (ft/min)	7,078

Motor and Drives	
Motor	Included
Size (hp)	1/2
RPM	1725
Enclosure	ODR
V/C/P	460/60/3
Frame Size	145T
Max Frame Size	184
Location	Centered
Pulley Type	Constant
Drive Loss (%)	6.2
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	3

Model: USF-13
Universal Single Width Fan
Operating Performance



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

EOR Please confirm these is acceptable via Schedule on M0.04

SSR has no objections.

Nameplate Model: USF-13-5-B1-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	84	82	78	79	78	73	71	67	82	70	19.0
Outlet	94	89	86	83	77	73	70	66	84	73	23

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: USF-13

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

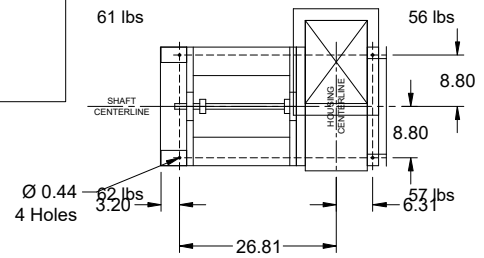
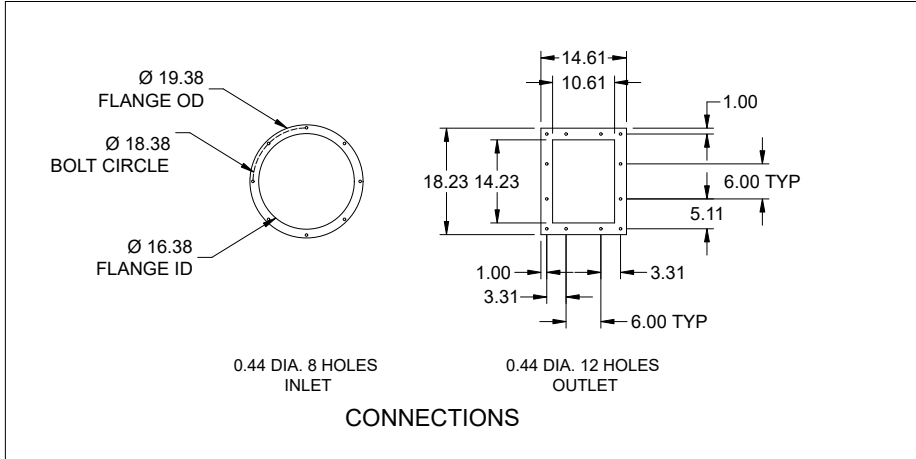
Selected Options & Accessories:

Motor VFD Rated
Motor with Shaft Grounding
Motor with Class B or Greater Insulation
Standard Drives
Finish - Coated
Coating - Permatecor, Concrete Gray-RAL 7023, Fan and Attached Accessories
Switch - NEMA-3R, Toggle, For Indoor or Outdoor Use, Ship Separate
Bearings - L(10) Life of 200k Hours
Housing - PermaLock
Wheel - Backward Inclined
UL Listed for Grease Exhaust - UL/cUL-762 Outdoor - "Power Vent. for Restaurant Exhaust Appliances"
Polished Steel Shaft
Access Door - Bolted
Drain Connection - 1" Pipe Thread w/Plug
Inlet Flange, Punched
Outlet Flange, Punched
Weatherhood - Steel
Shaft Seal - High Temperature
Grease Trap with Drain Connection, Shipped Loose
Fasteners - Standard
Unit Warranty: 1 Yr (Standard)

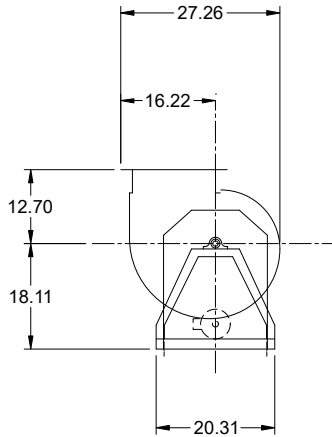
Provide OSHA belt guard,
motor cover, and housing
drain as scheduled on
sheet M0.04.

Model: USF-13

Universal Single Width Fan



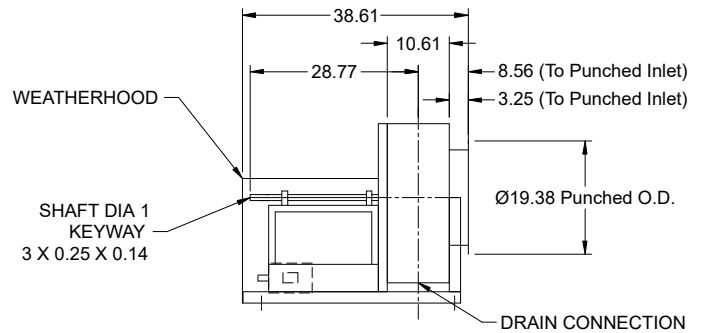
FAN FOOTPRINT



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE

*FANS ARE SUBJECT TO ±.125 INCH TOLERANCE
*DUE TO CONTINUAL IMPROVEMENTS DIMENSIONS MAY CHANGE



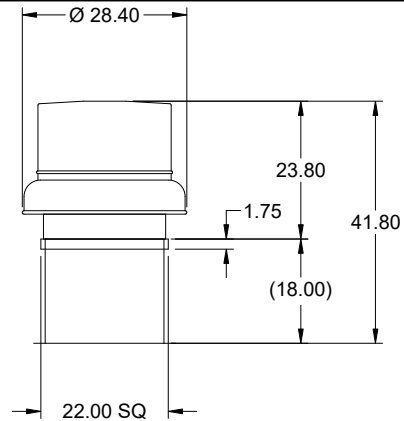
END VIEW

Notes: All dimensions shown are in units of in.

Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-163-VG



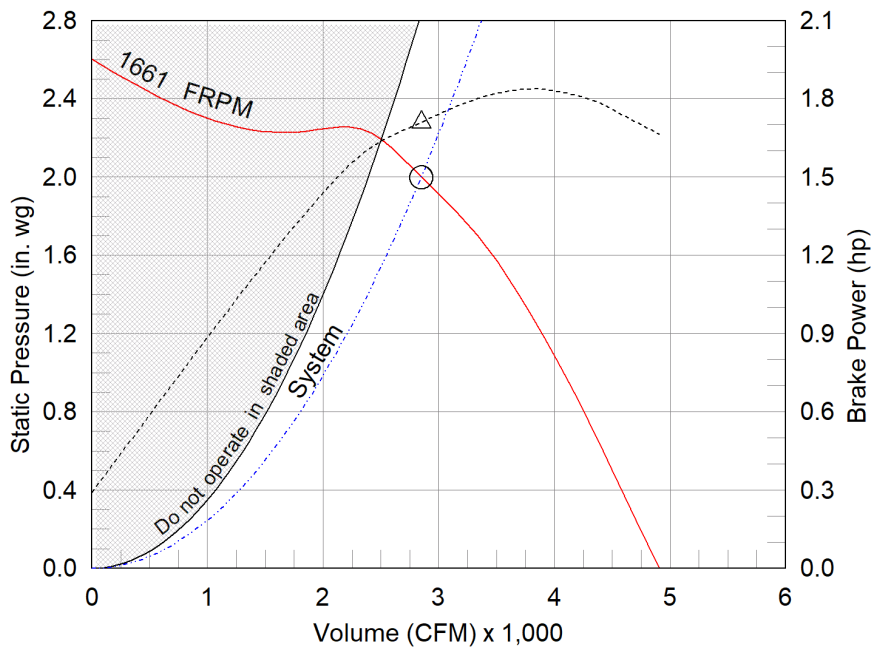
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	81
Weight w/ Acc's (lb)	101
Weight w/ Acc's and Curb (lb)	133
Standard Curb Cap Size (in.)	22 x 22
Optional Damper (in.)	16 x 16
Roof Opening (in.)	18.5 x 18.5

Performance	
Requested Volume (CFM)	2,850
Actual Volume (CFM)	2,850
Total External SP (in. wg)	2
Fan RPM	1661
Operating Power (hp)	1.71
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	7,231
Static Eff. (%)	52

Misc Fan Data	
Fan Eff. Index (FEI)	1.23
Outlet Velocity (ft/min)	1,549

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	3.2
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

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	80	85	88	83	78	74	71	67	85	73	22



Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 22 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-16X16, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See individual submittals for full details
GPI-22-16-G18

Replace 460/3 actuator
with 24VAC for control by
BAS control circuit – BMS
interface by others.

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

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.

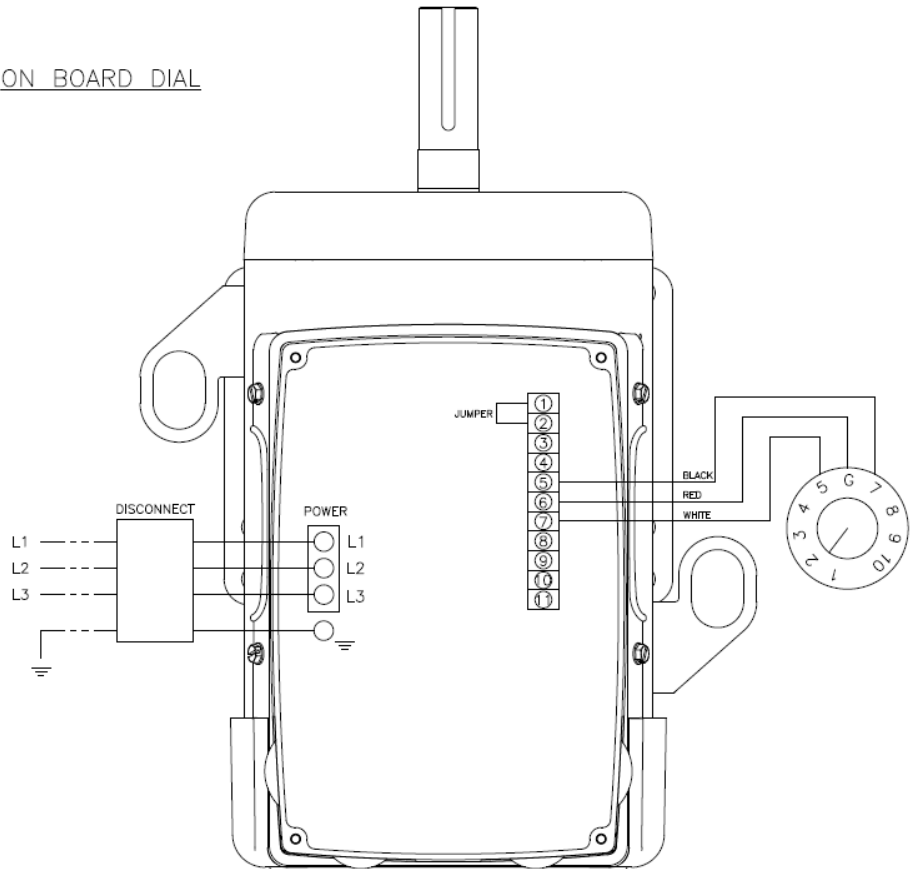
Motor Configuration

Input Voltage: 460
Speed Reference: Dial on Motor
Permanent Dial: Yes

ON BOARD DIAL

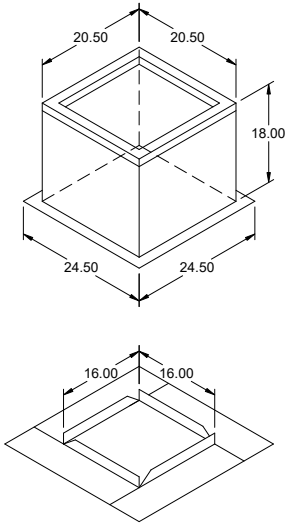
Control Configuration

Control Type: N/A
Transformer: None



DRAWING#
5.1.1.v2

----- FIELD
WIRED
FACTORY
WIRED



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-22	Nominal	1.5	32	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	22	22	20.5	20.5	17	17	24.5	24.5	21	21

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
16	16

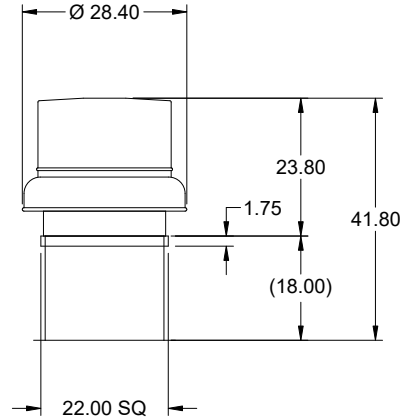
Accessories

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

Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-163-VG



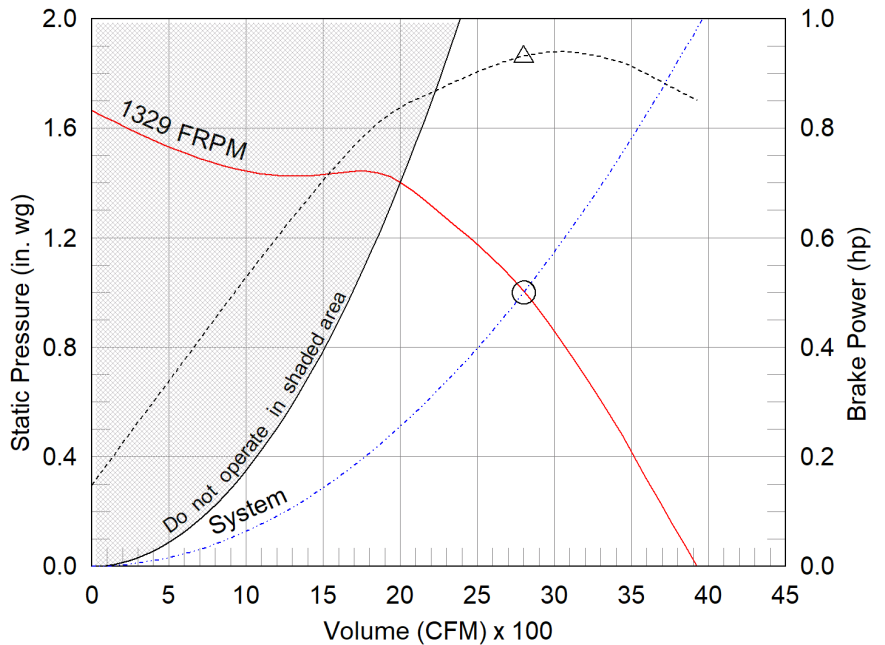
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	81
Weight w/ Acc's (lb)	101
Weight w/ Acc's and Curb (lb)	133
Standard Curb Cap Size (in.)	22 x 22
Optional Damper (in.)	16 x 16
Roof Opening (in.)	18.5 x 18.5

Performance	
Requested Volume (CFM)	2,800
Actual Volume (CFM)	2,800
Total External SP (in. wg)	1
Fan RPM	1329
Operating Power (hp)	0.93
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	5,782
Static Eff. (%)	47

Misc Fan Data	
Fan Eff. Index (FEI)	1.33
Outlet Velocity (ft/min)	1,522

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	3.2
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

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	77	79	84	76	72	68	64	59	79	68	16.3



Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - 0-10VDC Input
Control - Dial for balancing
Standard Curb Cap Size - 22 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-16X16, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See individual submittals for full details
GPI-22-16-G18

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

Replace 460/3 actuator with 24VAC for control by BAS control circuit – BMS interface by others.

Note: provided with 0-10 VDC control input for 2 speed application

Confirm minimum cfm is 1400 as scheduled on sheet M0.04.

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. Motor is operable in the 2-10VDC range and off while in the 0-1.9VDC range. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated and the motor will automatically reduce speed or turn off if overloaded or it becomes too hot.

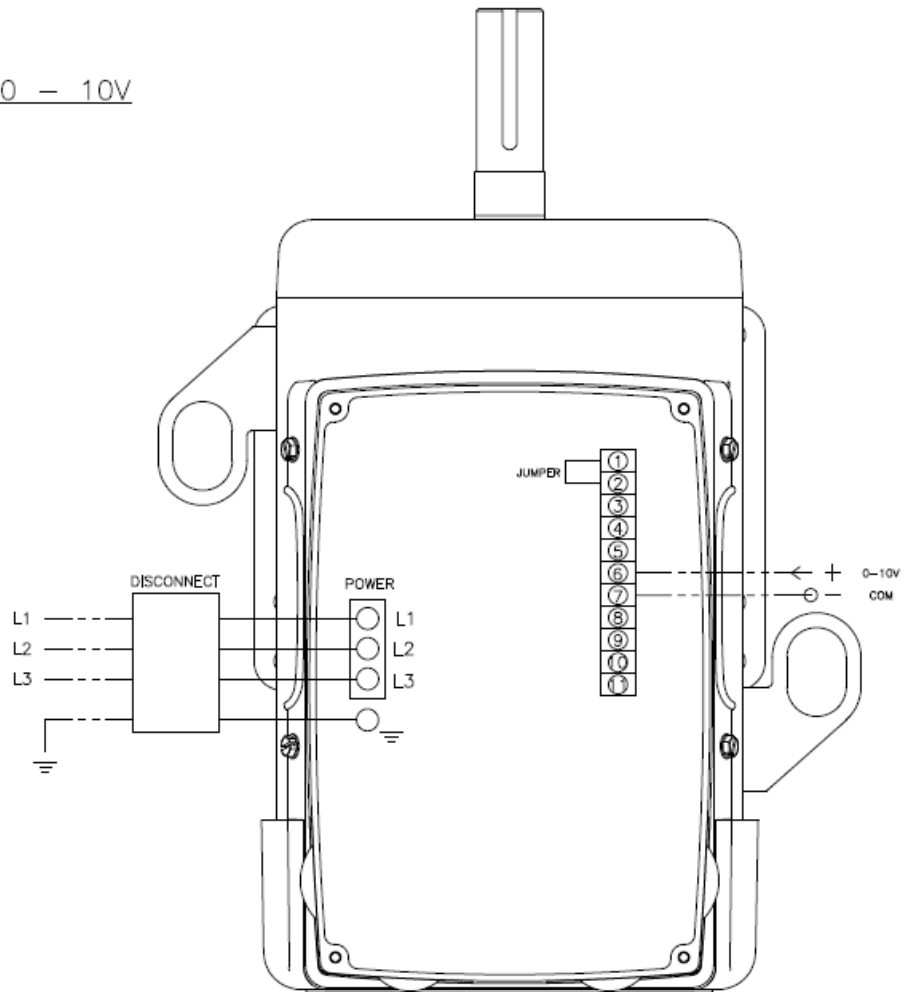
Motor Configuration

Input Voltage: 460
Speed Reference: 0-10VDC
Permanent Dial: No
Balance Dial Included: Yes

0 - 10V

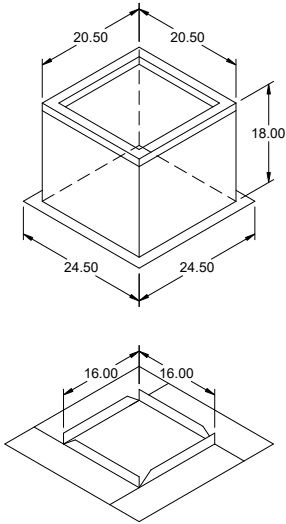
Control Configuration

Control Type: By Others
Transformer: None



DRAWING#
5.1.2.v1

----- FIELD
WIRED
----- FACTORY
WIRED



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-22	Nominal	1.5	32	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	22	22	20.5	20.5	17	17	24.5	24.5	21	21

*May not be applicable

Damper Tray

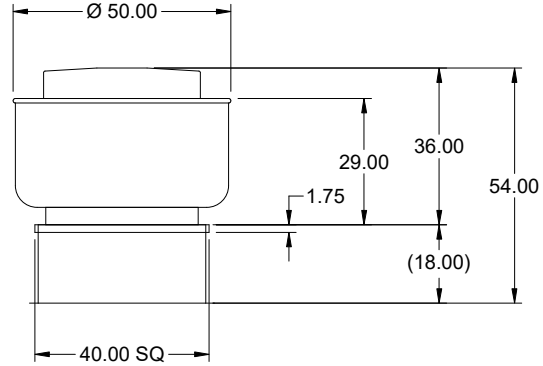
Damper Tray Width (in.)	Damper Tray Length (in.)
16	16

Accessories

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

Model: CUE-300HP-VG

Direct Drive Upblast Centrifugal Roof Exhaust Fan



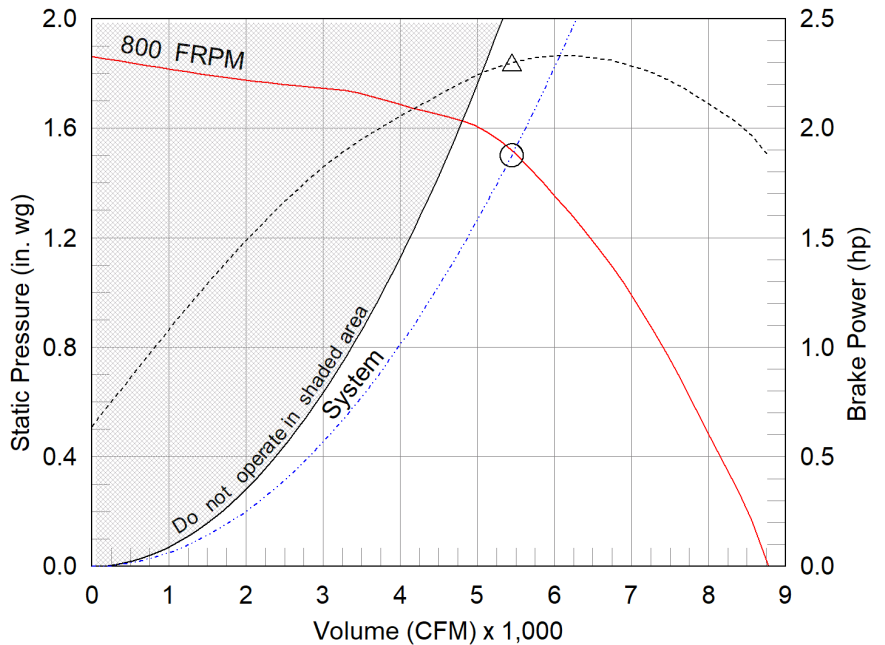
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	271
Weight w/ Acc's (lb)	286
Weight w/ Acc's and Curb (lb)	351
Standard Curb Cap Size (in.)	40 x 40
Optional Damper (in.)	34 x 34
Roof Opening (in.)	36.5 x 36.5

Performance	
Requested Volume (CFM)	5,450
Actual Volume (CFM)	5,450
Total External SP (in. wg)	1.5
Fan RPM	800
Operating Power (hp)	2.29
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	6,384
Static Eff. (%)	56

Misc Fan Data	
Fan Eff. Index (FEI)	1.38
Outlet Velocity (ft/min)	991

Motor	
Motor Mounted	Yes
Size (hp)	7 1/2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1200
Efficiency Rating	High
Windings	1
FLA (Amps)	9.3
Min. Circuit Ampacity (MCA)	12
Max. Overcurrent Protection (MOP)	20
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	80	82	83	77	72	70	68	63	80	68	17.4



Model: CUE-300HP-VG

Direct Drive Upblast Centrifugal Roof Exhaust Fan

Standard Construction Features:

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

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 40 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Stainless Steel, nom. 69% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-34X34, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See individual submittals for full details
GPI-40-34-G18

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

Replace 460/3 actuator with 24VAC for control by BAS control circuit – BMS interface by others.

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.

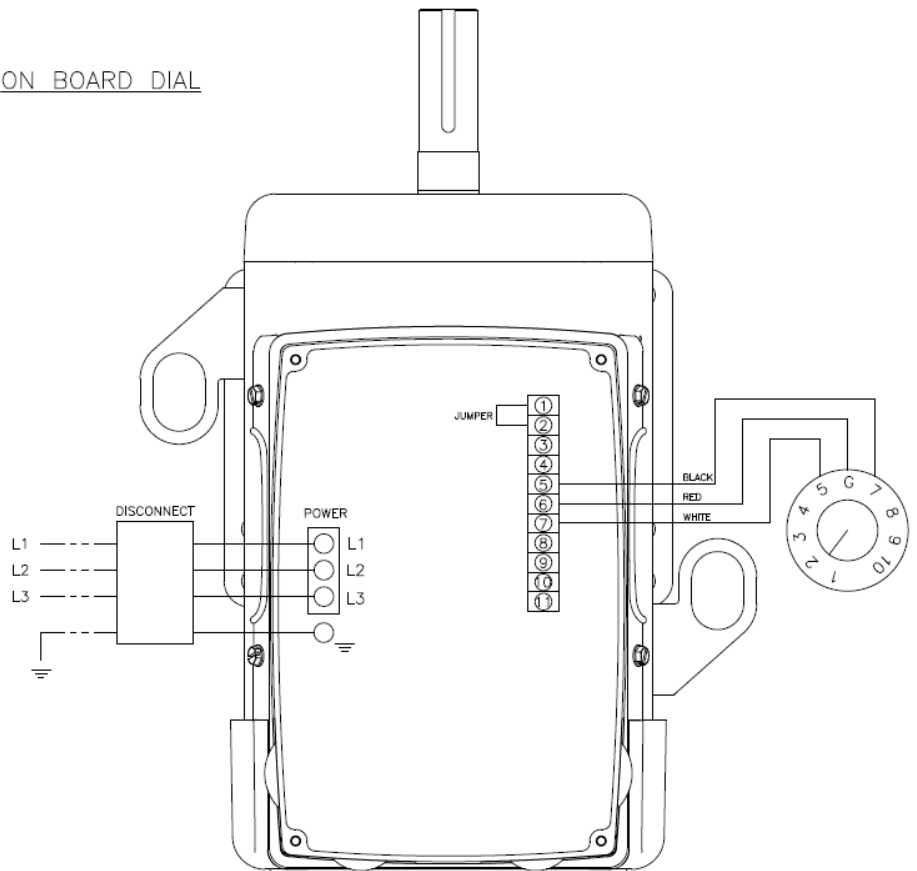
Motor Configuration

Input Voltage: 460
Speed Reference: Dial on Motor
Permanent Dial: Yes

ON BOARD DIAL

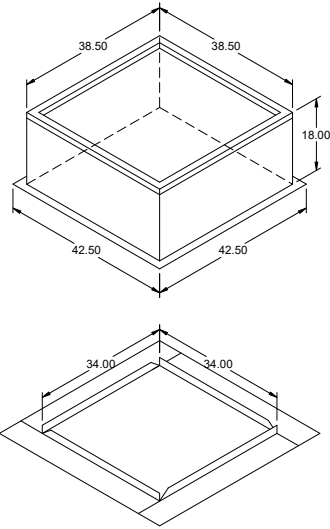
Control Configuration

Control Type: N/A
Transformer: None



DRAWING#
5.1.1.v2

----- FIELD
WIRE
----- FACTORY
WIRE



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-40	Nominal	1.5	65	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	40	40	38.5	38.5	35	35	42.5	42.5	39	39

*May not be applicable

Damper Tray

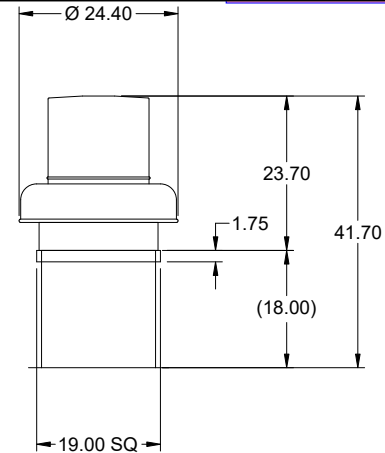
Damper Tray Width (in.)	Damper Tray Length (in.)
34	34

Accessories

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

Model: G-098-VG

Direct Drive Centrifugal Roof Exhaust Fan



Dimensional	
Quantity	1
Weight w/o Acc's (lb)	36
Weight w/ Acc's (lb)	51
Weight w/ Acc's and Curb (lb)	78
Standard Curb Cap Size (in.)	19 x 19
Optional Damper (in.)	12 x 12
Roof Opening (in.)	15.5 x 15.5

Performance	
Requested Volume (CFM)	500
Actual Volume (CFM)	500
Total External SP (in. wg)	1
Fan RPM	1703
Operating Power (hp)	0.18
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	4,987
Static Eff. (%)	44

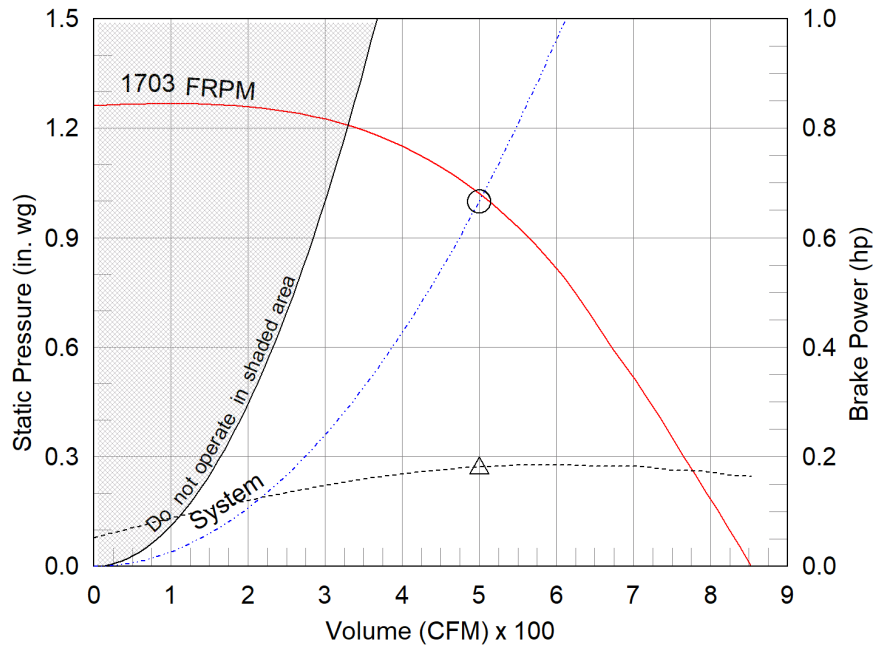
Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	521

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

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	78	76	76	68	63	60	54	51	71	60	10.4

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



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

Notes:

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



Model: G-098-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 19 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-12X12, Not Coated
Damper Actuator (MP-100A), 115 VAC Actuated

Selected Sub Marks

See individual submittals for full details
GPI-19-12-G18

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

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

Vari-Green Motor & Control Options

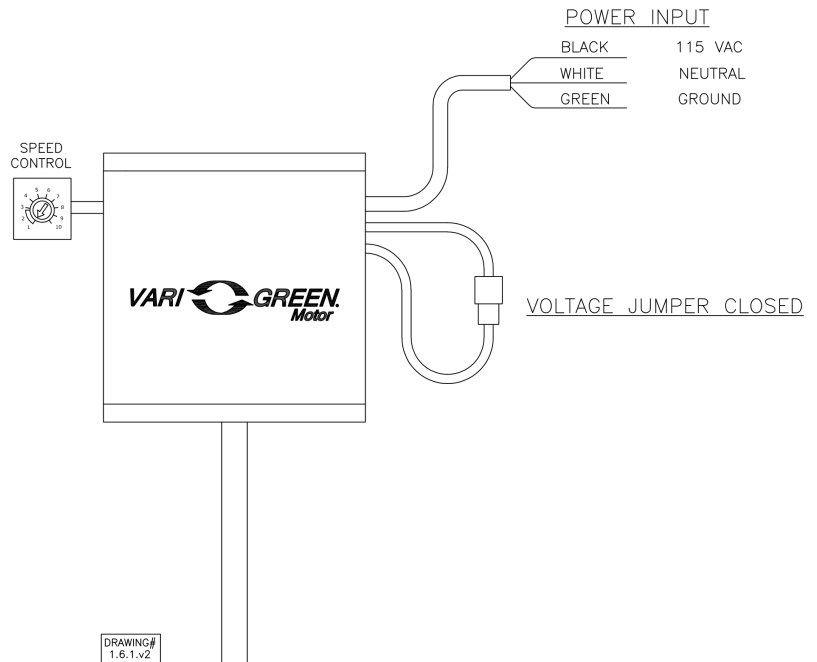
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated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

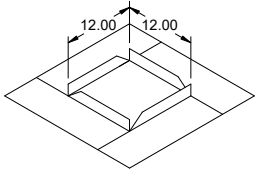
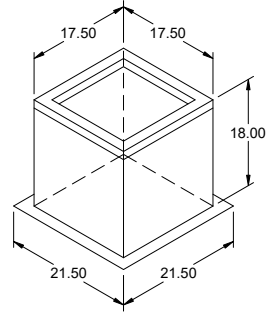
Motor Configuration

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

Control Configuration

Control Type: N/A
Transformer: None





Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-19	Nominal	1.5	27	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	19	19	17.5	17.5	14	14	21.5	21.5	18	18

*May not be applicable

Damper Tray

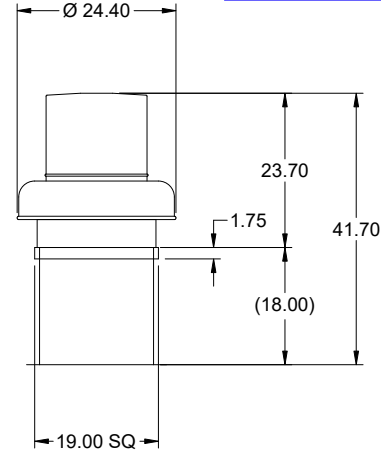
Damper Tray Width (in.)	Damper Tray Length (in.)
12	12

Accessories

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

Model: G-099-VG

Direct Drive Centrifugal Roof Exhaust Fan



Dimensional	
Quantity	1
Weight w/o Acc's (lb)	36
Weight w/ Acc's (lb)	51
Weight w/ Acc's and Curb (lb)	78
Standard Curb Cap Size (in.)	19 x 19
Optional Damper (in.)	12 x 12
Roof Opening (in.)	15.5 x 15.5

Performance	
Requested Volume (CFM)	700
Actual Volume (CFM)	700
Total External SP (in. wg)	1
Fan RPM	1652
Operating Power (hp)	0.22
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	4,838
Static Eff. (%)	50

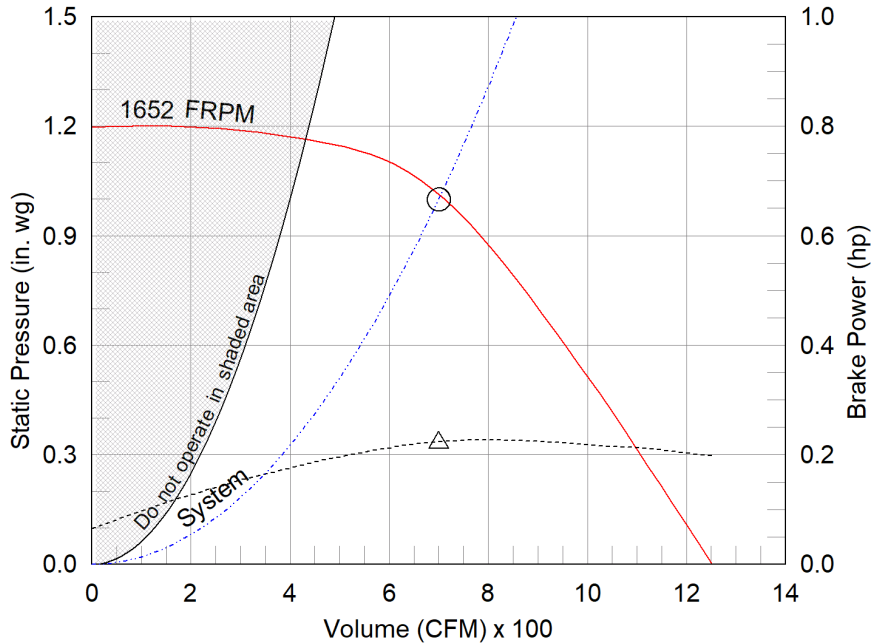
Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	729

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

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	73	77	76	69	63	63	58	53	72	61	10.9

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



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

Notes:

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



Model: G-099-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 19 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-12X12, Not Coated
Damper Actuator (MP-100A), 115 VAC Actuated

Selected Sub Marks

See individual submittals for full details
GPI-19-12-G18

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

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

Vari-Green Motor & Control Options

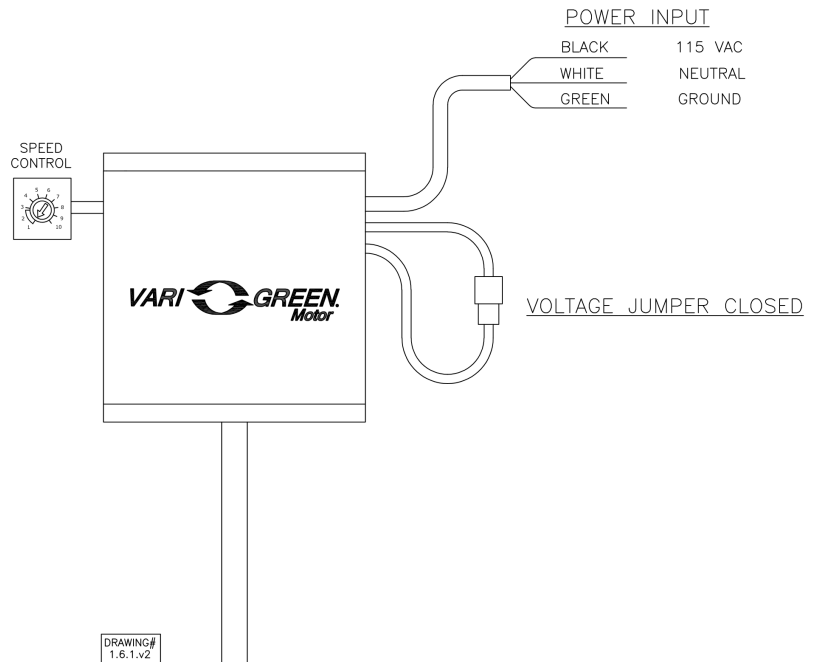
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated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

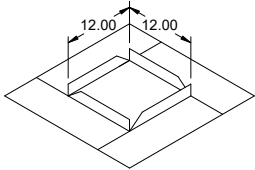
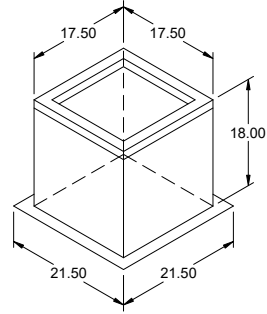
Motor Configuration

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

Control Configuration

Control Type: N/A
Transformer: None





Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-19	Nominal	1.5	27	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	19	19	17.5	17.5	14	14	21.5	21.5	18	18

*May not be applicable

Damper Tray

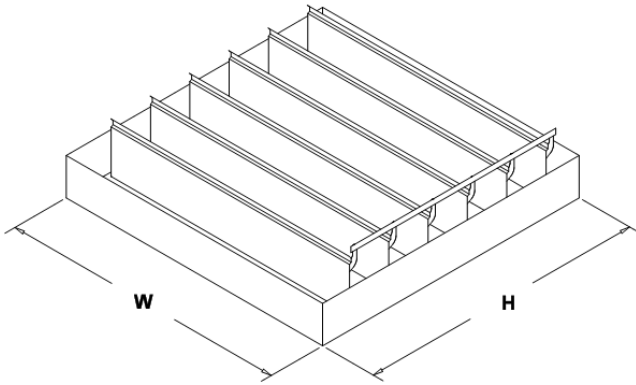
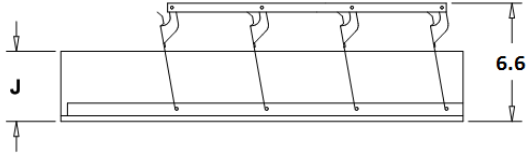
Damper Tray Width (in.)	Damper Tray Length (in.)
12	12

Accessories

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

Horizontal Mount Exhaust Damper

Model: WD-100



Standard Construction Features:

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

Damper Configuration:

ID #:	Tag:	Quantity:	W (in.):	H (in.):	J (in.):	Act Qty:	Actuator Model:
16	EF-1-3	1	24	24	2.5	1	MP-100A
64	EF-1-4A	1	16	16	2.5	1	MP-100A
70	EF-G-3	1	12	12	2.5	1	MP-100A

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

Performance	
Quantity	1
Volume (CFM)	8,600
Total External SP (in. wg)	1.5
Operating Power (hp)	3.46
Required Power (hp)	3.46
Fan RPM	1051
Max Fan RPM	1,537
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

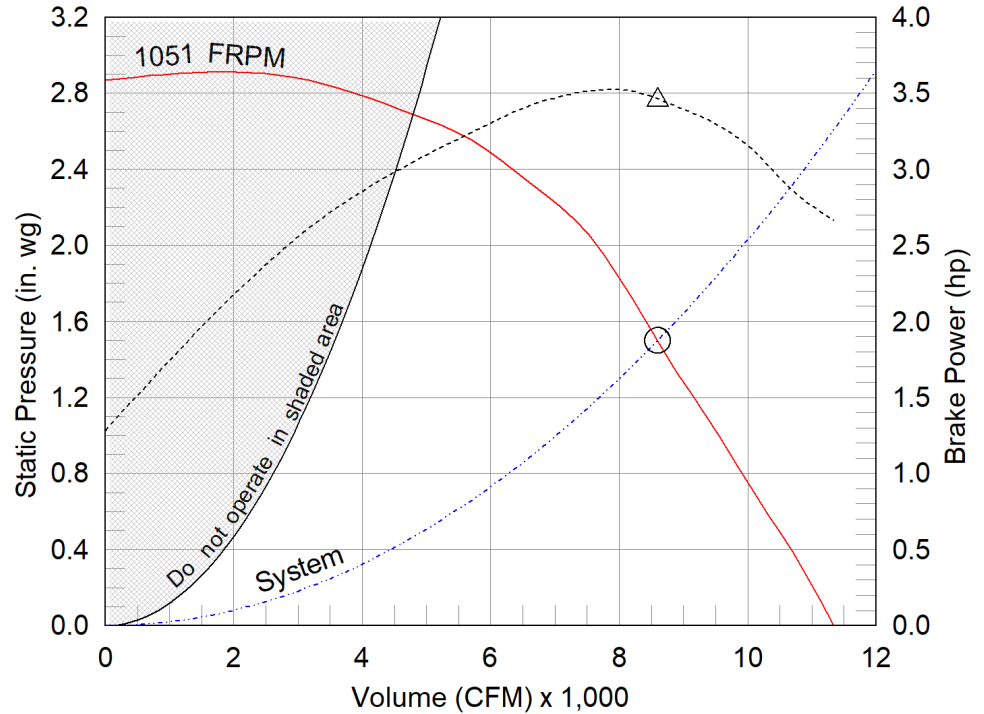
Fan Configuration	
Size	27
Wheel Type	AF
Arrangement	10
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	Welded Scroll
Spark Resistance	None
Scroll Material	Aluminum
Wheel Material	Aluminum
Inlet Cone Material	Aluminum
Pedestal Material	Aluminum

Equipment Weights	
Fan (LMD)(lb)	318
Motor/Drive (lb)	94
Accessories (lb)	40

Misc Fan Data	
Fan Energy Index (FEI)	1.37
Outlet Velocity (ft/min)	2,053
Static Efficiency (%)	61
Tip Speed (ft/min)	7,431

Motor and Drives	
Motor	Included
Size (hp)	5
RPM	1725
Enclosure	ODP
V/C/P	460/60/3
Frame Size	184T
Max Frame Size	256
Location	Centered
Pulley Type	Constant
Drive Loss (%)	4.2
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	7.6

Model: USF-27
Universal Single Width Fan
Operating Performance



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

Nameplate Model: USF-27-5-A1-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	88	86	87	78	75	71	66	62	82	71	20
Outlet	100	94	87	81	79	74	67	64	86	74	27

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: USF-27

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

Selected Options & Accessories:

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Motor with Class B or Greater Insulation

Standard Drives

Finish - Coated

Coating - Hi-Pro Polyester, Concrete Gray-RAL 7023, Fan and Attached Accessories

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

Bearings - L(10) Life of 200k Hours

Housing - Welded Scroll

Wheel - Airfoil

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

Polished Steel Shaft

Access Door - Bolted

Drain Connection - 1" Pipe Thread w/Plug

Inlet Flange, Punched

Outlet Flange, Punched

Weatherhood - Steel

Unit Warranty: 1 Yr (Standard)

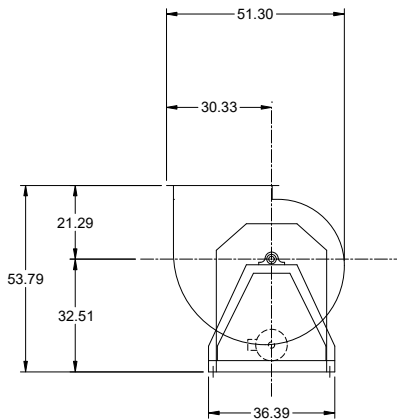
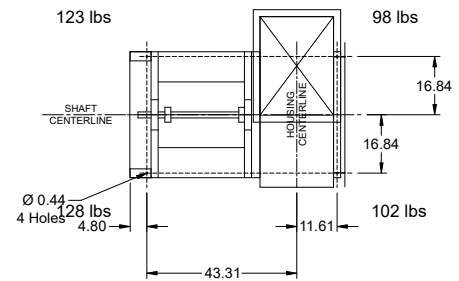
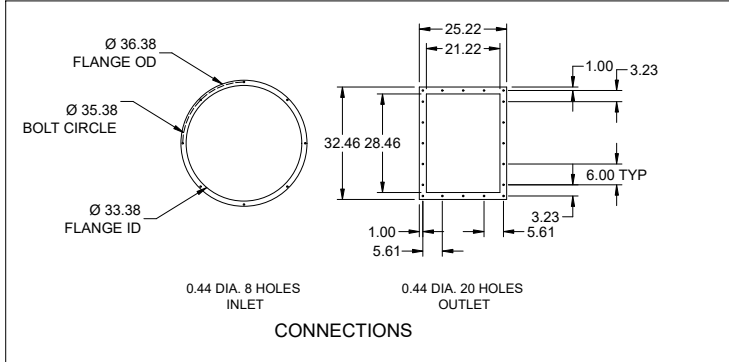
Provide OSHA belt guard,
motor cover, outlet screen,
and housing drain as
scheduled on sheet M0.04.

Notes:

Outlet Guard

Model: USF-27

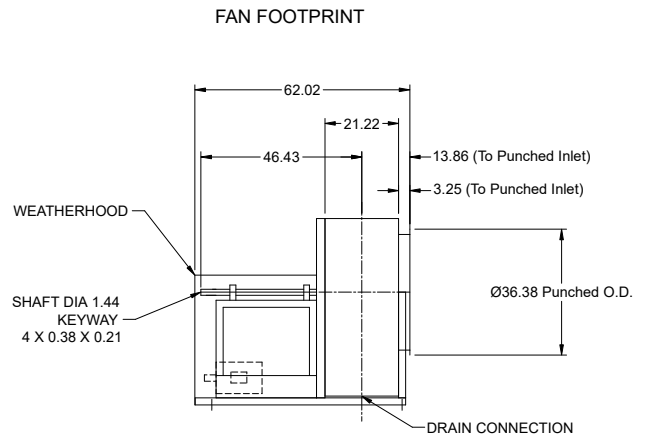
Universal Single Width Fan



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE

*FANS ARE SUBJECT TO ±.125 INCH TOLERANCE
*DUE TO CONTINUAL IMPROVEMENTS DIMENSIONS MAY CHANGE



Notes: All dimensions shown are in units of in.

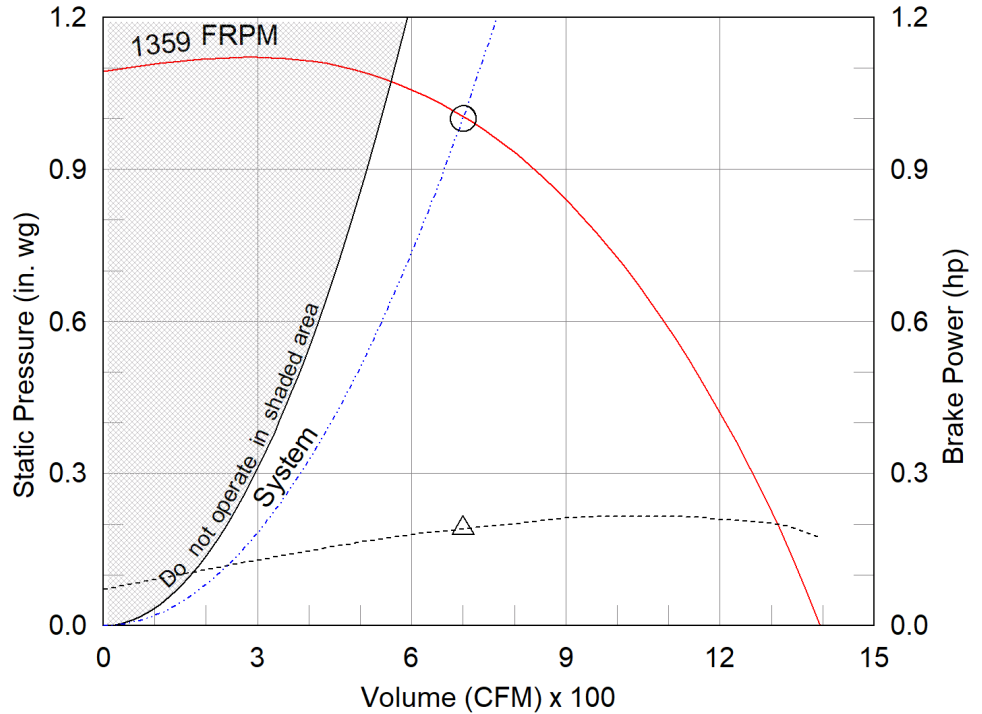
EOR please confirm that this model is acceptable via Schedule

Cut Sheet - Not for Submittal
Printed Date: 12/20/2022

Mark: EF-12A
Model: USF-12

Model: USF-12
Universal Single Width Fan
Operating Performance

SSR has no objections.



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

Performance	
Quantity	1
Volume (CFM)	700
Total External SP (in. wg)	1
Operating Power (hp)	0.19
Required Power (hp)	0.19
Fan RPM	1359
Max Fan RPM	3,151
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

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

Equipment Weights	
Fan (LMD)(lb)	107
Motor/Drive (lb)	24
Accessories (lb)	5
Fan Total (lb)	137

Misc Fan Data	
Fan Energy Index (FEI)	-
Outlet Velocity (ft/min)	811
Static Efficiency (%)	68
Tip Speed (ft/min)	4,360
Shaft Bearing Type	Standard
Bearing Life Calculation	Operating Point
L10 - Bearing Life (hrs.)	1,000,000

Motor and Drives	
Motor	Included
Size (hp)	1/2
RPM	1725
Enclosure	ODP
V/C/P	115/60/1
Frame Size	56
Max Frame Size	184
Location	Centered
Pulley Type	Constant
Drive Loss (%)	14.7
Drives	Standard
Drive Service Factor	1.5
MCA* (Amps)	12.25
MOP* (Amps)	15
SCCR* (Kiloamps)	5

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

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	66	68	71	63	59	55	52	44	66	55	7.4
Outlet	93	83	75	64	62	59	52	47	73	61	13.9

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

LwA - A weighted sound power level, based on ANSI S1.4

dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International

Sones - calculated using AMCA 301 at 5 ft



Model: USF-12

Universal Single Width Fan

Standard Construction Features:

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

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

Selected Options & Accessories:

Motor with Capacitor Start

Motor with Class B or Greater Insulation

Standard Drives

Finish - Coated

Coating - Hi-Pro Polyester, Concrete Gray-RAL 7023, Fan and Attached Accessories

Switch - NEMA-3R, Toggle, For Indoor or Outdoor Use, Ship Separate

Bearings - L10 Standard Life, 1000k hours at OperatingPoint

Housing - PermaLock

Wheel - Backward Inclined

Polished Steel Shaft

Access Door - Bolted

Drain Connection - 1 inch threaded male

Extended Lube Lines - Nylon

Inlet Flange, Punched

Outlet Flange, Punched

Weatherhood - Aluminum Construction

Unit Warranty: 1 Yr (Standard)

Provide OSHA belt guard, motor cover, and housing drain as scheduled on sheet M0.04.

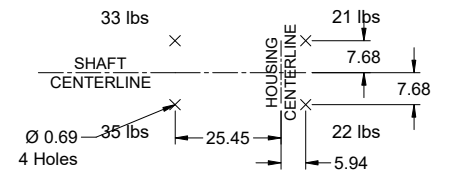
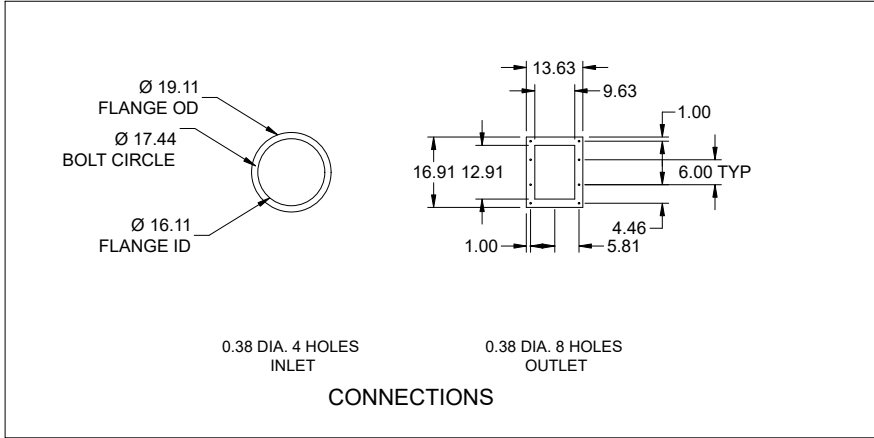
Motor starter has been revised to ECM. Provide "Motor - Vari-Green EC motor".

Notes:

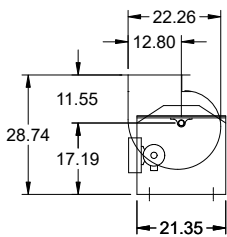
Outlet Guard

Model: USF-12

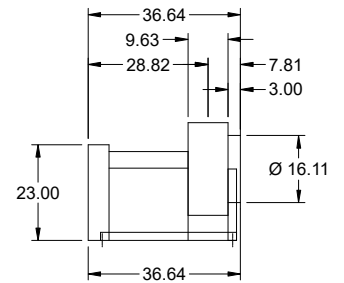
Universal Single Width Fan



FOOTPRINT VIEW



SIDE VIEW

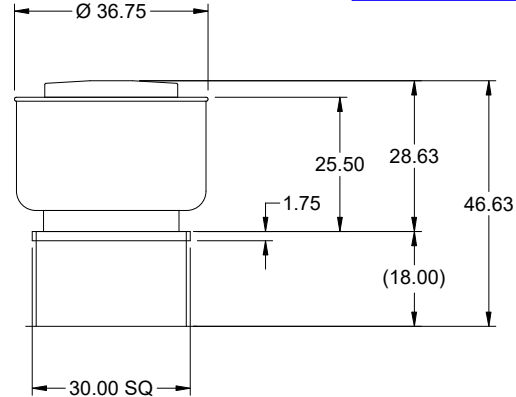


END VIEW

Notes: All dimensions shown are in units of in.

Model: CUE-200-VG

Direct Drive Upblast Centrifugal Roof Exhaust Fan



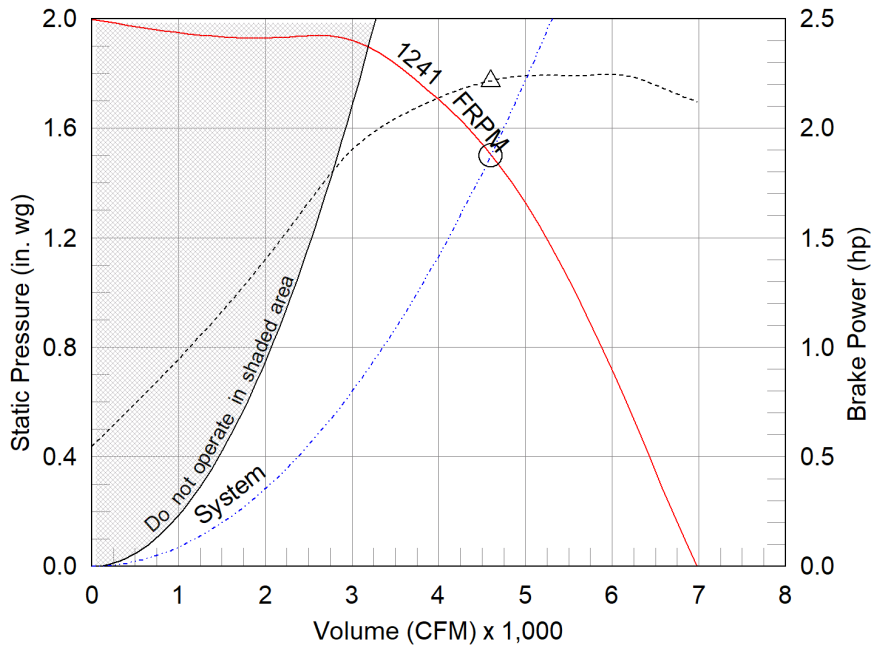
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	183
Weight w/ Acc's (lb)	207
Weight w/ Acc's and Curb (lb)	256
Standard Curb Cap Size (in.)	30 x 30
Optional Damper (in.)	24 x 24
Roof Opening (in.)	26.5 x 26.5

Performance	
Requested Volume (CFM)	4,600
Actual Volume (CFM)	4,600
Total External SP (in. wg)	1.5
Fan RPM	1241
Operating Power (hp)	2.21
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	6,943
Static Eff. (%)	49

Misc Fan Data	
Fan Eff. Index (FEI)	1.25
Outlet Velocity (ft/min)	1,575

Motor	
Motor Mounted	Yes
Size (hp)	3
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1350
Efficiency Rating	High
Windings	1
FLA (Amps)	4.3
Min. Circuit Ampacity (MCA)	5
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	86	83	86	78	72	73	69	64	81	70	19.4



Model: CUE-200-VG

Direct Drive Upblast Centrifugal Roof Exhaust Fan

Standard Construction Features:

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

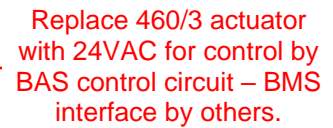
Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 30 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Stainless Steel, nom. 86% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-24X24, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See individual submittals for full details
GPI-30-24-G18

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.



Replace 460/3 actuator with 24VAC for control by BAS control circuit – BMS interface by others.

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.

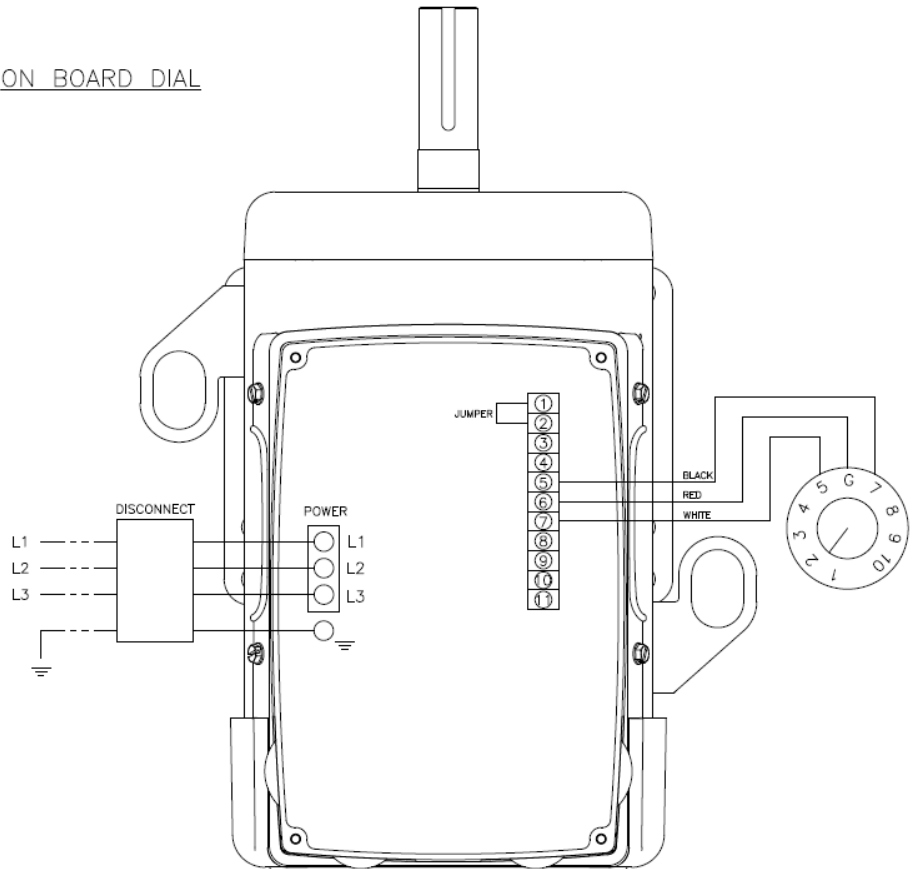
Motor Configuration

Input Voltage: 460
 Speed Reference: Dial on Motor
 Permanent Dial: Yes

ON BOARD DIAL

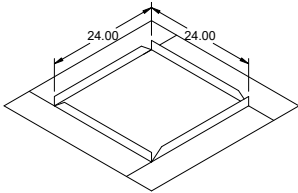
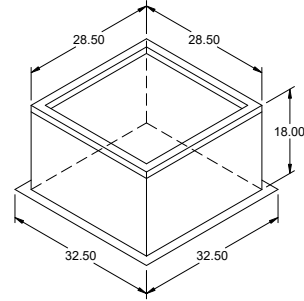
Control Configuration

Control Type: N/A
 Transformer: None



DRAWING#
5.1.1.v2

----- FIELD
WIRED
————— FACTORY
WIRED



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-30	Nominal	1.5	49	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	30	30	28.5	28.5	25	25	32.5	32.5	29	29

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
24	24

Accessories

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

Performance	
Quantity	1
Volume (CFM)	9,100
Total External SP (in. wg)	1.5
Operating Power (hp)	3.4
Required Power (hp)	3.4
Fan RPM	794
Max Fan RPM	1,279
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

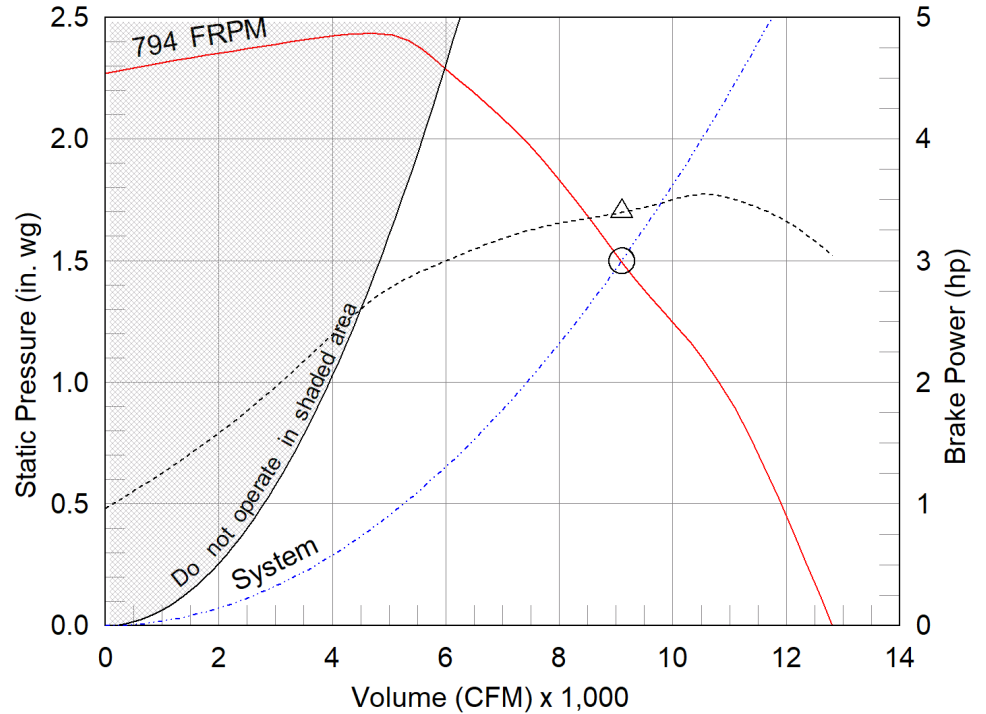
Fan Configuration	
Size	30
Wheel Type	BI
Arrangement	10
Class	I
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Steel
Wheel Material	Steel
Inlet Cone Material	Steel
Pedestal Material	Steel

Equipment Weights	
Fan (LMD)(lb)	705
Motor/Drive (lb)	103
Accessories (lb)	166

Misc Fan Data	
Fan Energy Index (FEI)	1.42
Outlet Velocity (ft/min)	1,760
Static Efficiency (%)	66
Tip Speed (ft/min)	6,233

Motor and Drives	
Motor	Included
Size (hp)	5
RPM	1725
Enclosure	TEFC
V/C/P	460/60/3
Frame Size	184T
Max Frame Size	256
Location	Centered
Pulley Type	Constant
Drive Loss (%)	4.2
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	7.6

Model: USF-30
Universal Single Width Fan
Operating Performance



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

Nameplate Model: USF-30-3-B4-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	82	84	83	76	76	73	66	60	81	69	17.6
Outlet	89	91	83	80	78	73	67	59	83	72	22

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: USF-30

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

Selected Options & Accessories:

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Motor with Class B or Greater Insulation

Standard Drives

Finish - Coated

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

Switch - NEMA-3R, Toggle, For Indoor or Outdoor Use, Ship Separate

Rotation - CW

Bearings - L(10) Life of 80k Hours

Discharge Position - UB

UL/cUL-705 - Power Ventilators

Polished Steel Shaft

Access Door - Bolted

Drain Connection - 1" Pipe Thread w/Plug

Inlet Connection, Punched

Outlet Flange, Punched

Weatherhood - Steel

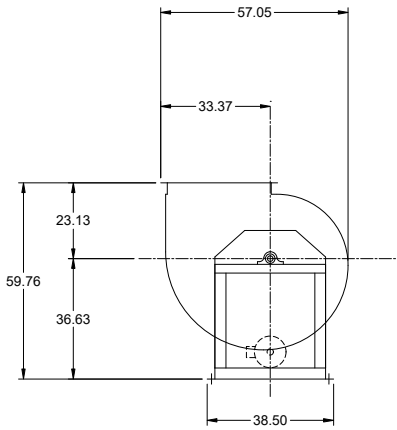
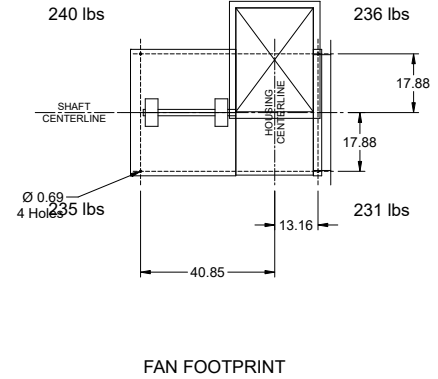
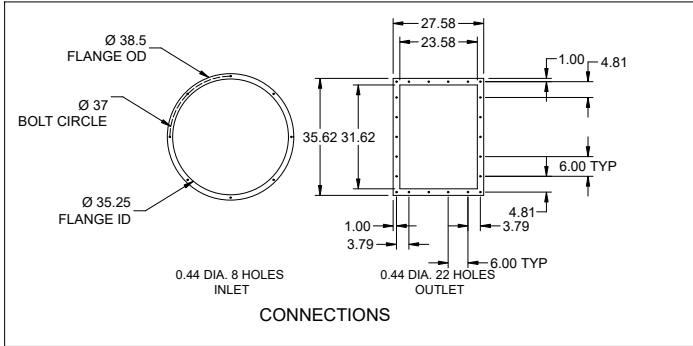
Outlet Guard, steel, coated w/Safety yellow finish

Unit Warranty: 1 Yr (Standard)

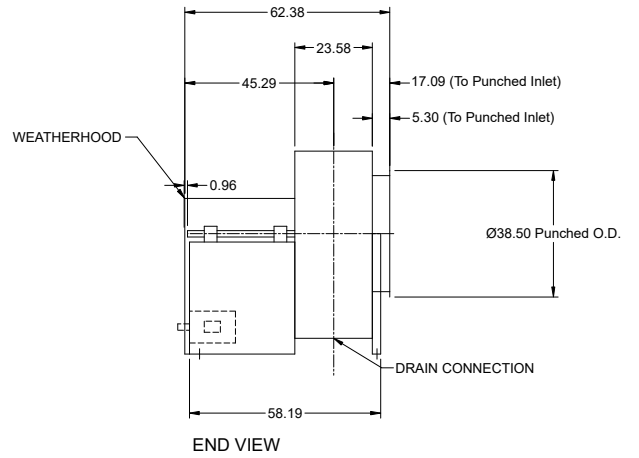


Model: USF-30

Universal Single Width Fan



*SIDE VIEW IS VIEWED FROM DRIVE SIDE

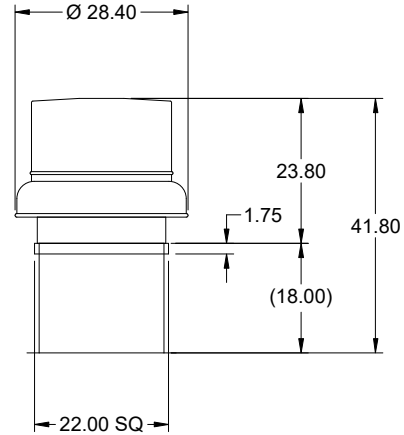


Notes: All dimensions shown are in units of in.

Model: G-140HP-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-143HP-VG



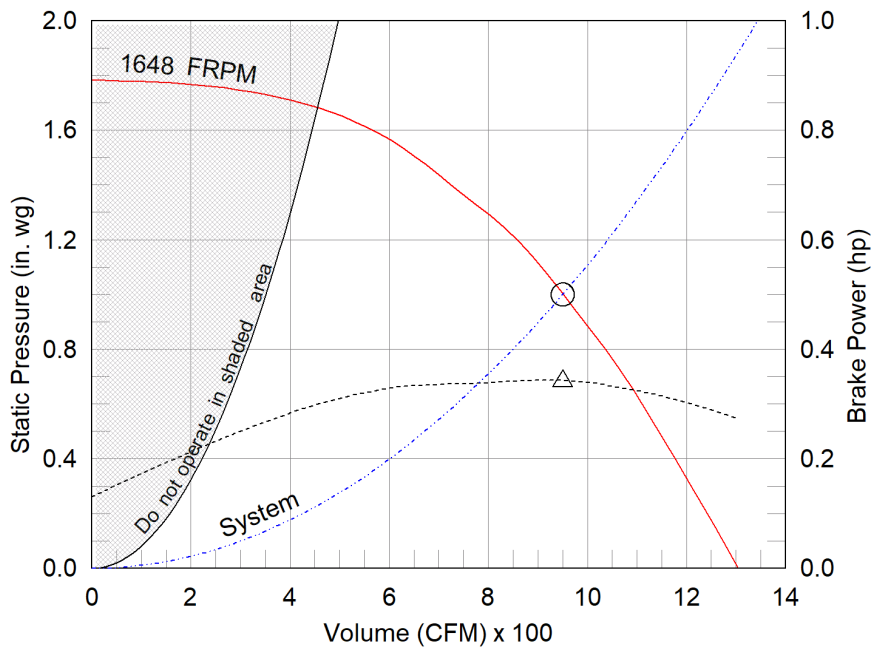
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	49
Weight w/ Acc's (lb)	67
Weight w/ Acc's and Curb (lb)	99
Standard Curb Cap Size (in.)	22 x 22
Optional Damper (in.)	16 x 16
Roof Opening (in.)	18.5 x 18.5

Performance	
Requested Volume (CFM)	950
Actual Volume (CFM)	950
Total External SP (in. wg)	1
Fan RPM	1648
Operating Power (hp)	0.34
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	6,310
Static Eff. (%)	44

Misc Fan Data	
Fan Eff. Index (FEI)	-
Outlet Velocity (ft/min)	720

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
Min. Circuit Ampacity (MCA)	8
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	77	80	75	70	70	67	64	63	75	63	13.4



Model: G-140HP-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 22 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-16X16, Not Coated
Damper Actuator (MP-100A), 115 VAC Actuated

Selected Sub Marks

See individual submittals for full details
GPI-22-16-G18

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

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

Vari-Green

Motor & Control Options

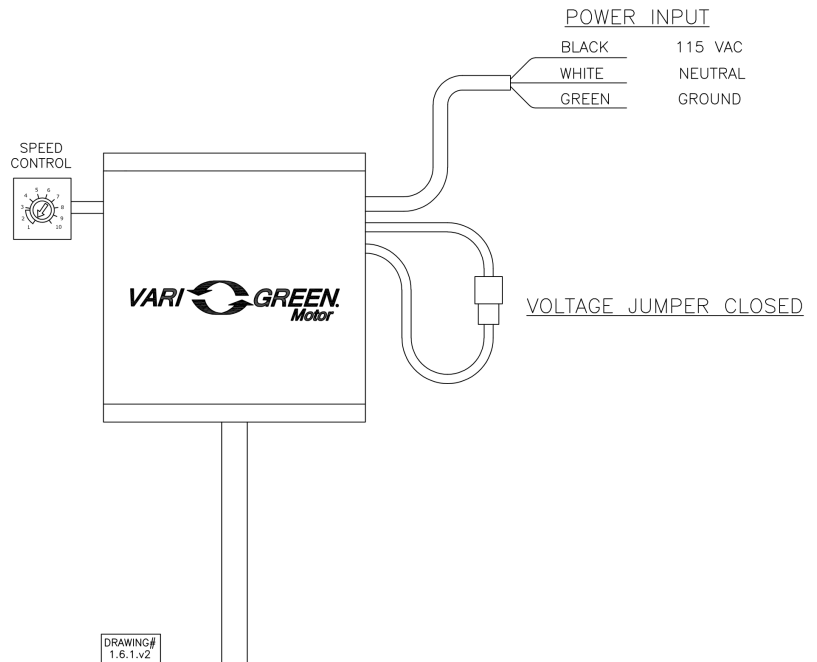
An EC motor that uses AC input power and internally converts it to DC power. Potentiometer (dial) mounted on the motor enclosure adjusts the speed (RPM) down 80%. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated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

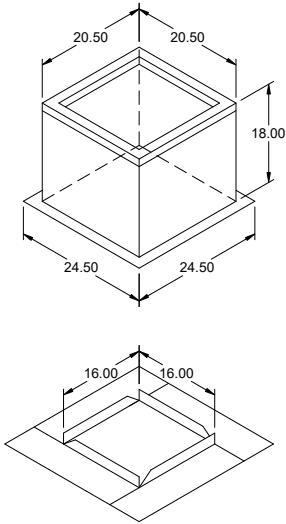
Motor Configuration

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

Control Configuration

Control Type: N/A
Transformer: None





Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-22	Nominal	1.5	32	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	22	22	20.5	20.5	17	17	24.5	24.5	21	21

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
16	16

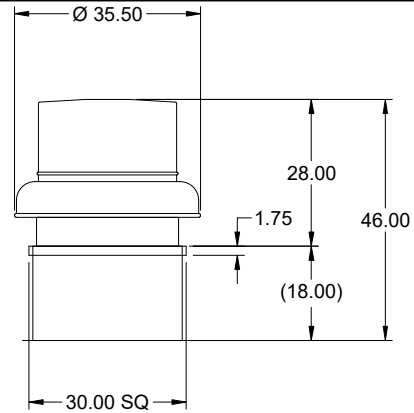
Accessories

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

Model: G-200HP-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-203HP-VG



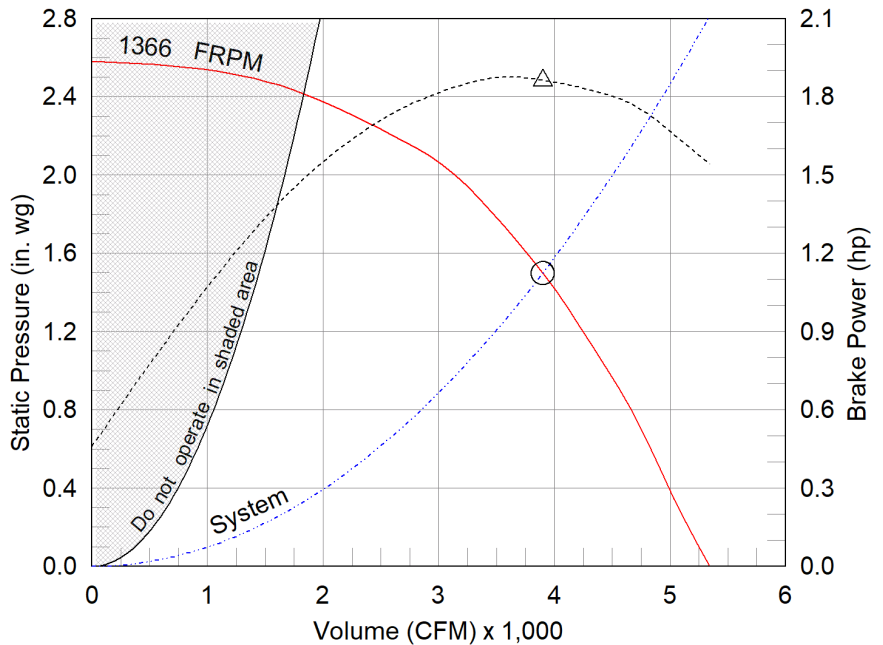
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	168
Weight w/ Acc's (lb)	192
Weight w/ Acc's and Curb (lb)	241
Standard Curb Cap Size (in.)	30 x 30
Optional Damper (in.)	24 x 24
Roof Opening (in.)	26.5 x 26.5

Performance	
Requested Volume (CFM)	3,900
Actual Volume (CFM)	3,900
Total External SP (in. wg)	1.5
Fan RPM	1366
Operating Power (hp)	1.86
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	7,646
Static Eff. (%)	49

Misc Fan Data	
Fan Eff. Index (FEI)	1.28
Outlet Velocity (ft/min)	1,632

Motor	
Motor Mounted	Yes
Size (hp)	3
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1560
Efficiency Rating	High
Windings	1
FLA (Amps)	4.3
Min. Circuit Ampacity (MCA)	5
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	81	78	85	81	77	73	70	66	83	71	19.6



Model: G-200HP-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 30 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-24X24, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See *individual submittals* for full details
GPI-30-24-G18

Replace 460/3 actuator
with 24VAC for control by
BAS control circuit – BMS
interface by others.

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

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.

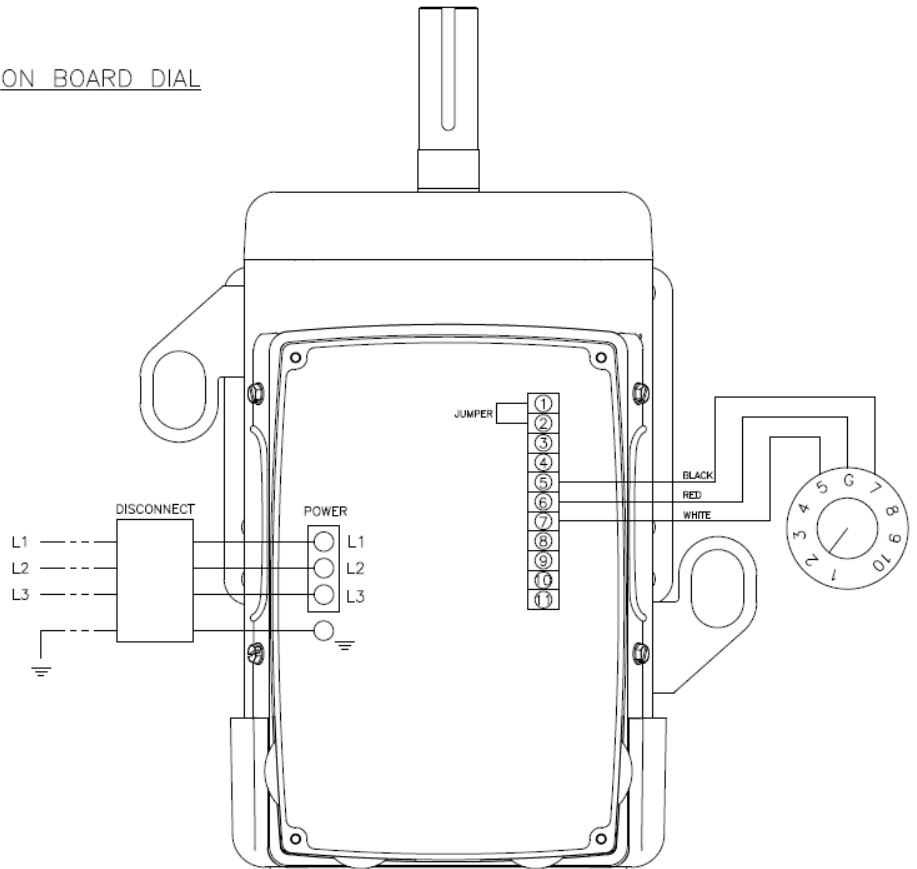
Motor Configuration

Input Voltage: 460
Speed Reference: Dial on Motor
Permanent Dial: Yes

ON BOARD DIAL

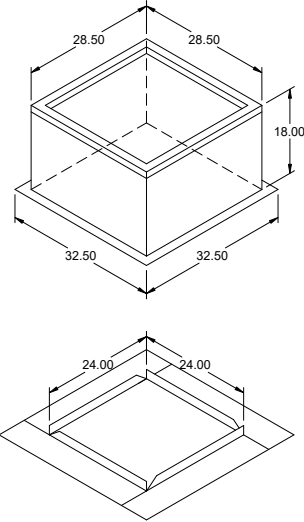
Control Configuration

Control Type: N/A
Transformer: None



DRAWING#
5.1.1.v2

----- FIELD
WIRE
----- FACTORY
WIRE



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-30	Nominal	1.5	49	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	30	30	28.5	28.5	25	25	32.5	32.5	29	29

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
24	24

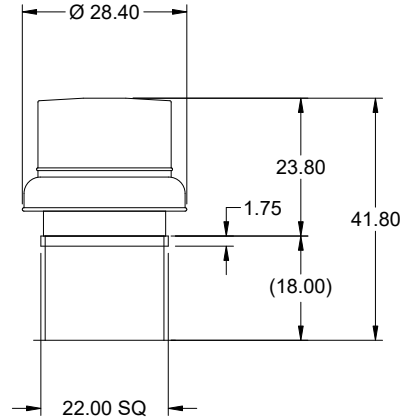
Accessories

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

Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-163-VG



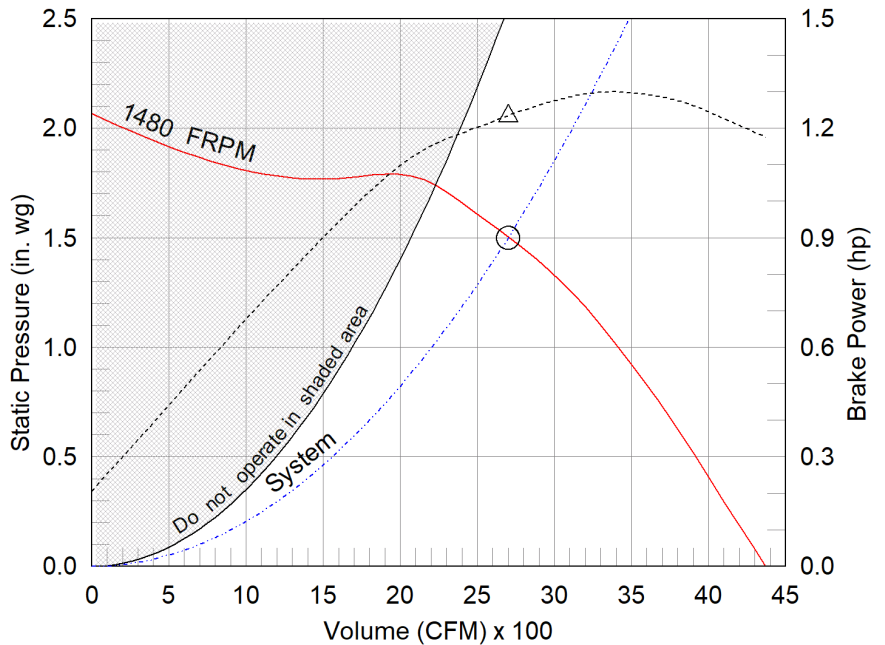
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	81
Weight w/ Acc's (lb)	101
Weight w/ Acc's and Curb (lb)	133
Standard Curb Cap Size (in.)	22 x 22
Optional Damper (in.)	16 x 16
Roof Opening (in.)	18.5 x 18.5

Performance	
Requested Volume (CFM)	2,700
Actual Volume (CFM)	2,700
Total External SP (in. wg)	1.5
Fan RPM	1480
Operating Power (hp)	1.23
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	6,441
Static Eff. (%)	52

Misc Fan Data	
Fan Eff. Index (FEI)	1.31
Outlet Velocity (ft/min)	1,467

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	3.2
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

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	78	82	86	79	74	71	67	63	82	70	18.8



Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 22 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-16X16, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See *individual submittals* for full details
GPI-22-16-G18

Replace 460/3 actuator
with 24VAC for control by
BAS control circuit – BMS
interface by others.

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

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.

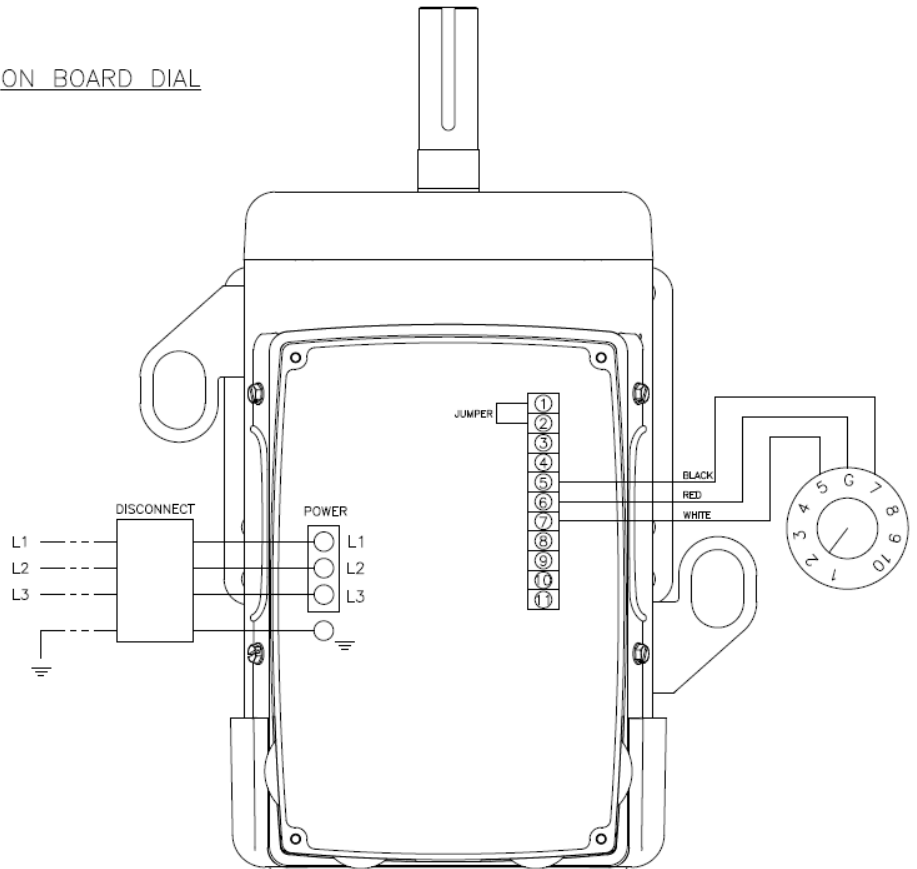
Motor Configuration

Input Voltage: 460
Speed Reference: Dial on Motor
Permanent Dial: Yes

ON BOARD DIAL

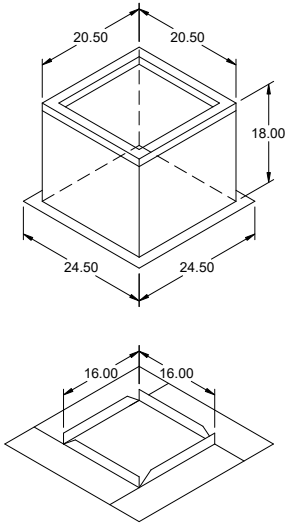
Control Configuration

Control Type: N/A
Transformer: None



DRAWING#
5.1.1.v2

----- FIELD
WIRED
————— FACTORY
WIRED



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-22	Nominal	1.5	32	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	22	22	20.5	20.5	17	17	24.5	24.5	21	21

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
16	16

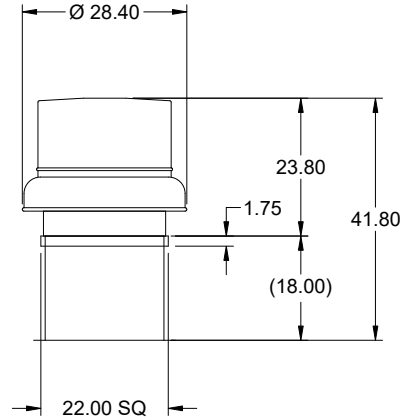
Accessories

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

Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-163-VG



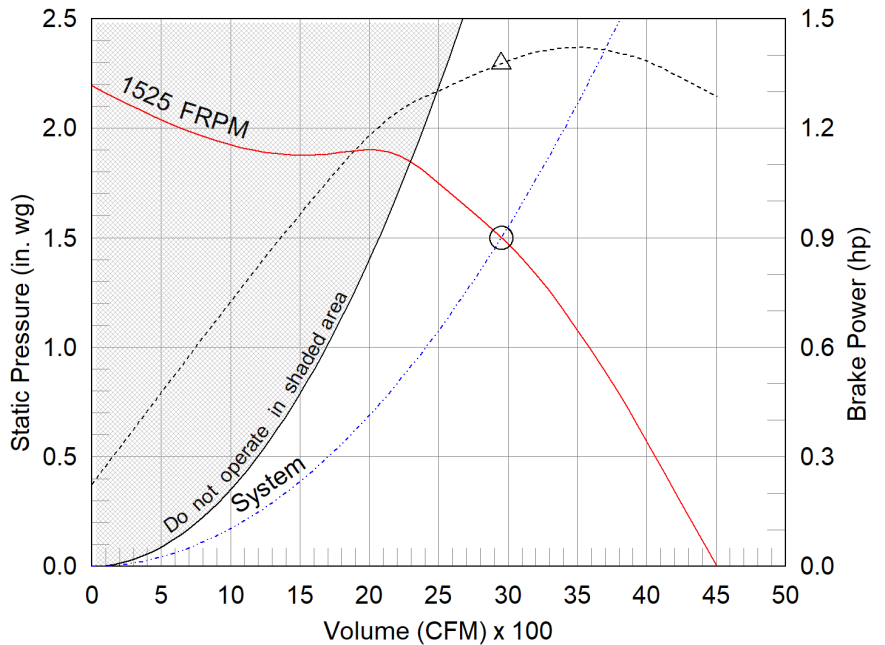
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	81
Weight w/ Acc's (lb)	101
Weight w/ Acc's and Curb (lb)	133
Standard Curb Cap Size (in.)	22 x 22
Optional Damper (in.)	16 x 16
Roof Opening (in.)	18.5 x 18.5

Performance	
Requested Volume (CFM)	2,950
Actual Volume (CFM)	2,950
Total External SP (in. wg)	1.5
Fan RPM	1525
Operating Power (hp)	1.38
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	6,637
Static Eff. (%)	51

Misc Fan Data	
Fan Eff. Index (FEI)	1.27
Outlet Velocity (ft/min)	1,603

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	3.2
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

Notes:

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

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	79	83	87	80	75	72	68	63	83	71	19.8



Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 22 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-16X16, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See individual submittals for full details
GPI-22-16-G18

Replace 460/3 actuator
with 24VAC for control by
BAS control circuit – BMS
interface by others.

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

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.

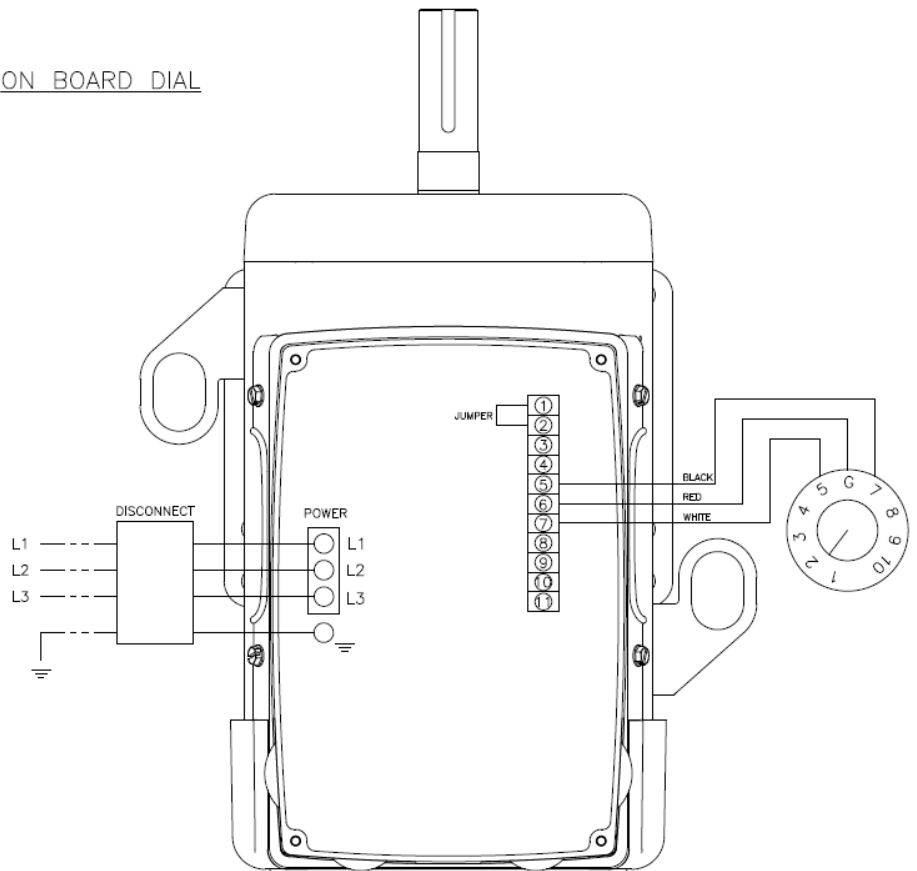
Motor Configuration

Input Voltage: 460
 Speed Reference: Dial on Motor
 Permanent Dial: Yes

ON BOARD DIAL

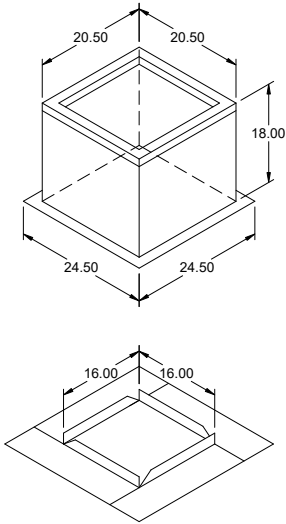
Control Configuration

Control Type: N/A
 Transformer: None



DRAWING#
5.1.1.v2

----- FIELD WIRED
 _____ FACTORY WIRED



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-22	Nominal	1.5	32	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	22	22	20.5	20.5	17	17	24.5	24.5	21	21

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
16	16

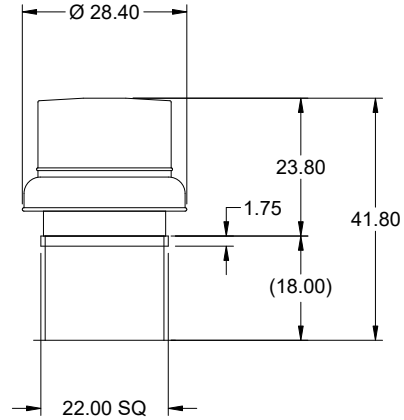
Accessories

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

Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-163-VG



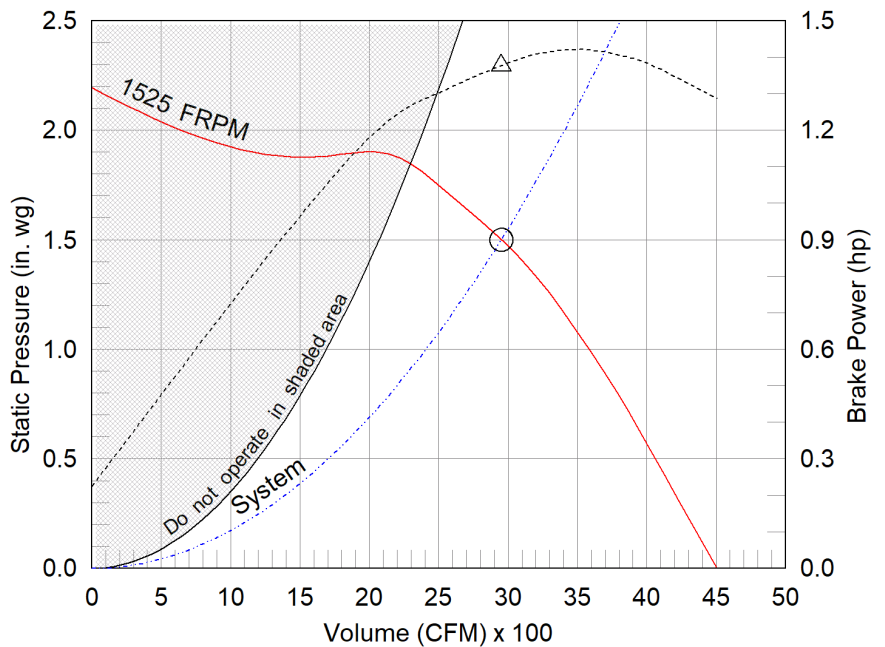
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	81
Weight w/ Acc's (lb)	101
Weight w/ Acc's and Curb (lb)	133
Standard Curb Cap Size (in.)	22 x 22
Optional Damper (in.)	16 x 16
Roof Opening (in.)	18.5 x 18.5

Performance	
Requested Volume (CFM)	2,950
Actual Volume (CFM)	2,950
Total External SP (in. wg)	1.5
Fan RPM	1525
Operating Power (hp)	1.38
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	6,637
Static Eff. (%)	51

Misc Fan Data	
Fan Eff. Index (FEI)	1.27
Outlet Velocity (ft/min)	1,603

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	3.2
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

Notes:

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

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	79	83	87	80	75	72	68	63	83	71	19.8



Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

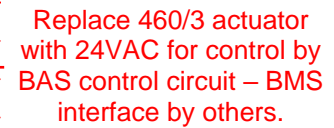
- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 22 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-16X16, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See *individual submittals* for full details
GPI-22-16-G18



Replace 460/3 actuator
with 24VAC for control by
BAS control circuit – BMS
interface by others.

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

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.

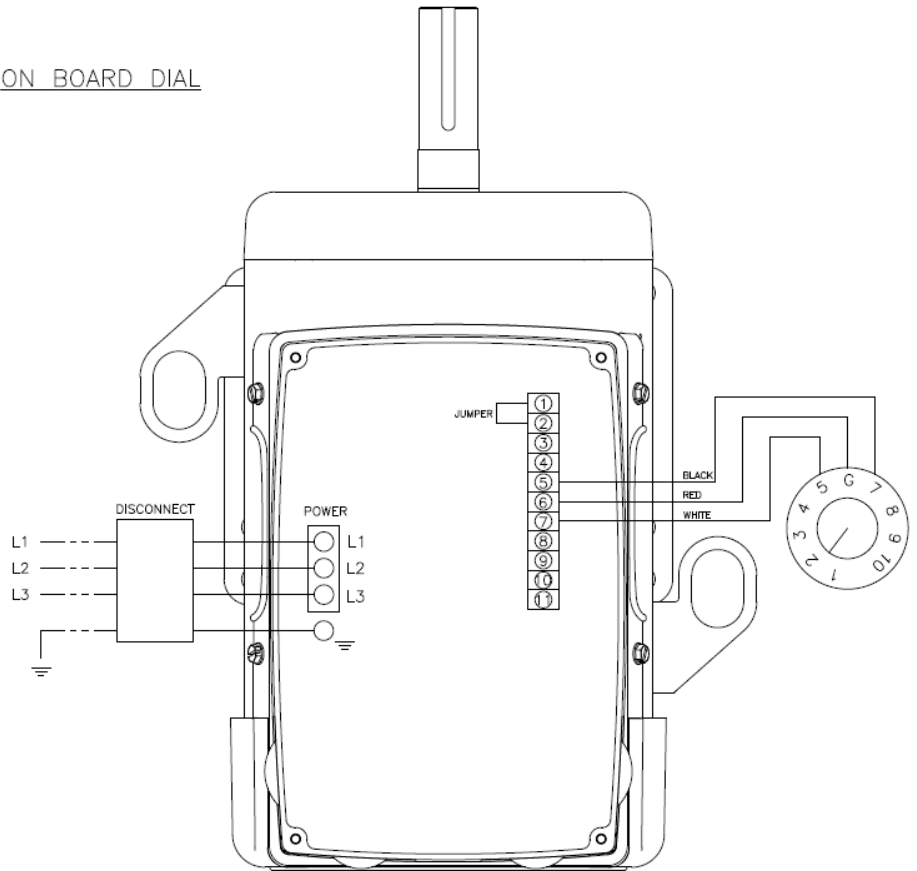
Motor Configuration

Input Voltage: 460
 Speed Reference: Dial on Motor
 Permanent Dial: Yes

ON BOARD DIAL

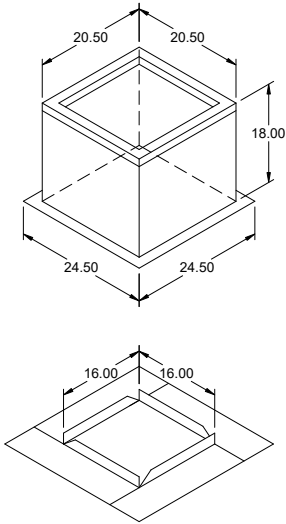
Control Configuration

Control Type: N/A
 Transformer: None



DRAWING#
5.1.1.v2

----- FIELD WIRED
 _____ FACTORY WIRED



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-22	Nominal	1.5	32	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	22	22	20.5	20.5	17	17	24.5	24.5	21	21

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
16	16

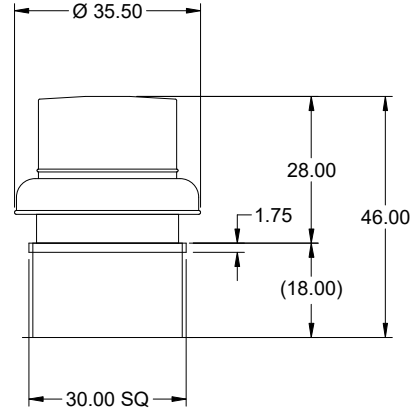
Accessories

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

Model: G-200HP-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-203HP-VG



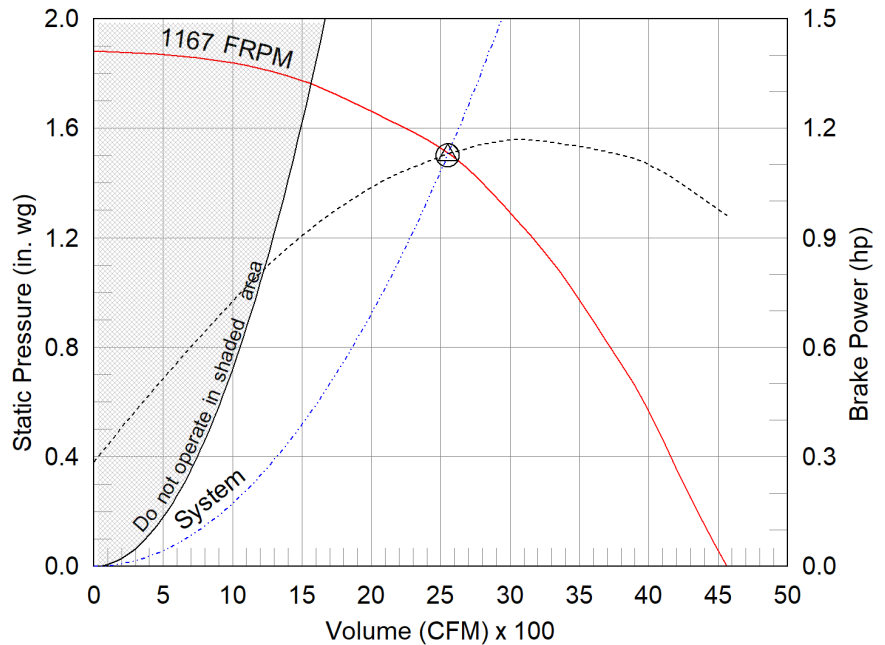
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	158
Weight w/ Acc's (lb)	182
Weight w/ Acc's and Curb (lb)	231
Standard Curb Cap Size (in.)	30 x 30
Optional Damper (in.)	24 x 24
Roof Opening (in.)	26.5 x 26.5

Performance	
Requested Volume (CFM)	2,550
Actual Volume (CFM)	2,550
Total External SP (in. wg)	1.5
Fan RPM	1167
Operating Power (hp)	1.13
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	6,528
Static Eff. (%)	53

Misc Fan Data	
Fan Eff. Index (FEI)	1.44
Outlet Velocity (ft/min)	1,067

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1350
Efficiency Rating	High
Windings	1
FLA (Amps)	4.7
Min. Circuit Ampacity (MCA)	6
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	83	80	79	78	72	68	66	63	79	67	15.8



Model: G-200HP-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 30 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-24X24, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See *individual submittals* for full details
GPI-30-24-G18

Replace 460/3 actuator
with 24VAC for control by
BAS control circuit – BMS
interface by others.

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

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.

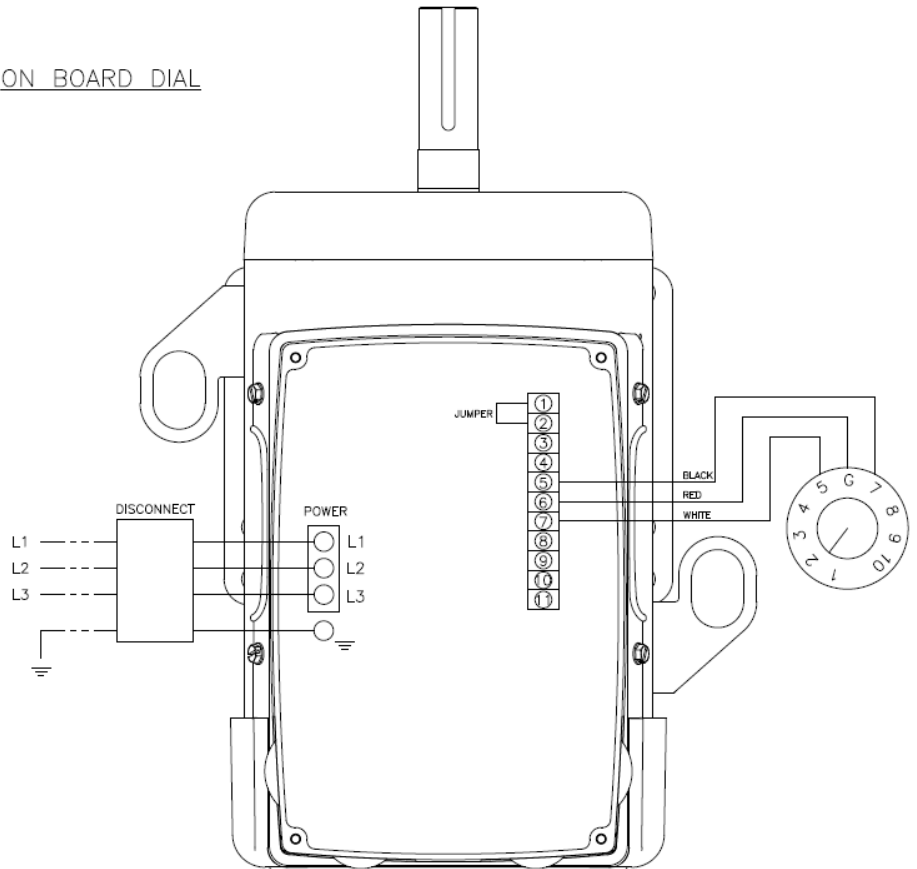
Motor Configuration

Input Voltage: 460
Speed Reference: Dial on Motor
Permanent Dial: Yes

ON BOARD DIAL

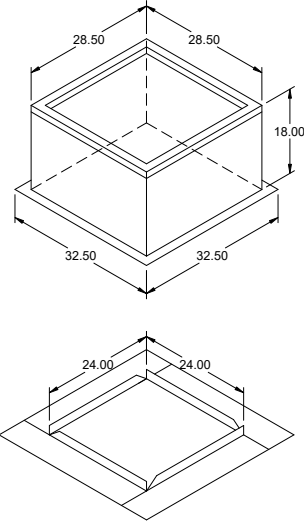
Control Configuration

Control Type: N/A
Transformer: None



DRAWING#
5.1.1.v2

----- FIELD
WIRE
————— FACTORY
WIRE



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-30	Nominal	1.5	49	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	30	30	28.5	28.5	25	25	32.5	32.5	29	29

*May not be applicable

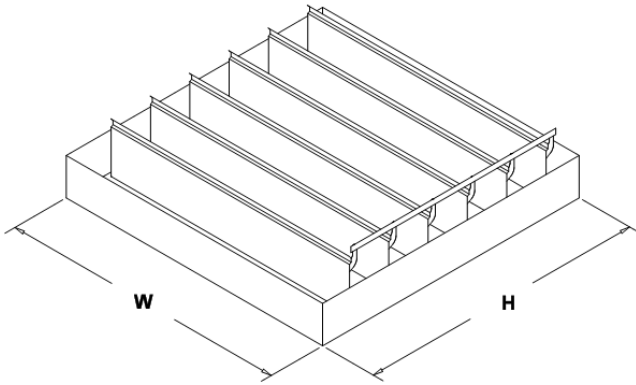
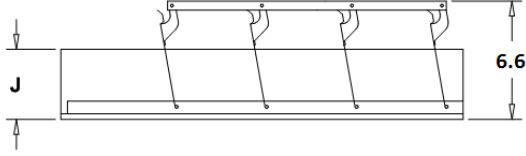
Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
24	24

Accessories

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

Horizontal Mount Exhaust Damper
Model: WD-100



Standard Construction Features:

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

Damper Configuration:

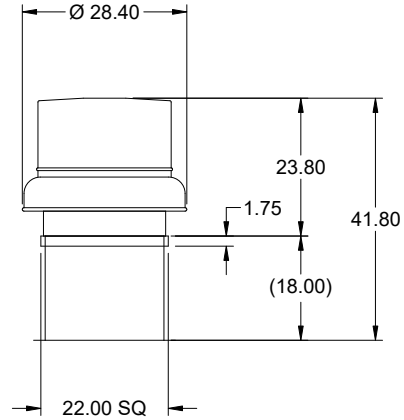
ID #:	Tag:	Quantity:	W (in.):	H (in.):	J (in.):	Act Qty:	Actuator Model:
34	EF-4-1A	1	24	24	2.5	1	MP-100A

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

Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Previously: G-163-VG



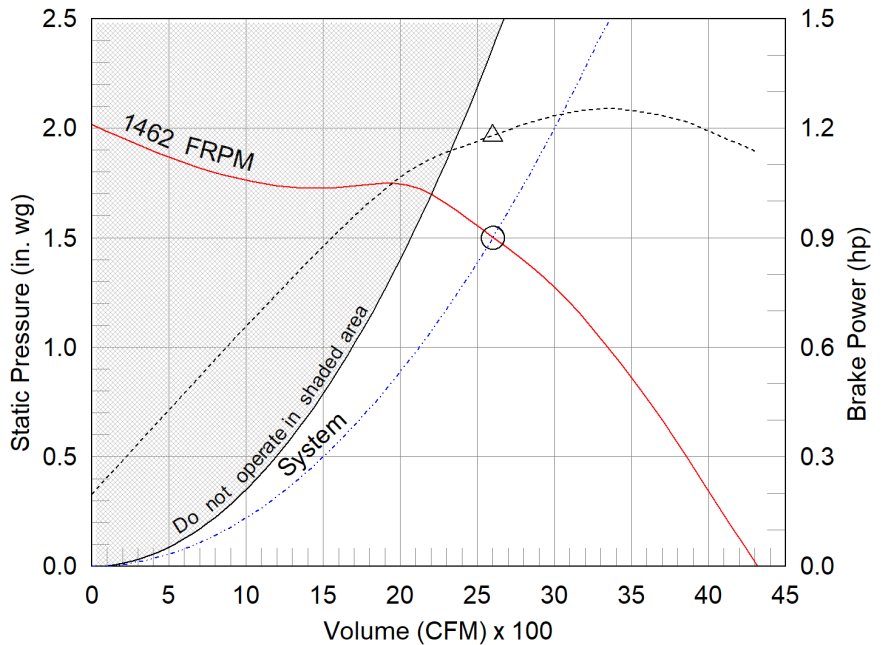
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	81
Weight w/ Acc's (lb)	101
Weight w/ Acc's and Curb (lb)	133
Standard Curb Cap Size (in.)	22 x 22
Optional Damper (in.)	16 x 16
Roof Opening (in.)	18.5 x 18.5

Performance	
Requested Volume (CFM)	2,600
Actual Volume (CFM)	2,600
Total External SP (in. wg)	1.5
Fan RPM	1462
Operating Power (hp)	1.18
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	6,364
Static Eff. (%)	52

Misc Fan Data	
Fan Eff. Index (FEI)	1.32
Outlet Velocity (ft/min)	1,413

Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	3.2
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

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	78	82	85	78	74	70	67	62	81	70	18.1



Model: G-160-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined composite (sizes 60-95) or aluminum (sizes 97-300) wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-300 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor
Control - Dial for balancing
Standard Curb Cap Size - 22 Square
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Birdscreen: Galvanized, nom. 84% Free Area
Unit Warranty: 1 Yr (Standard)
Damper Shipped Loose, WD-100-PB-16X16, Not Coated
Damper Actuator (MP-100A), 460 VAC Actuated

Selected Sub Marks

See *individual submittals* for full details
GPI-22-16-G18

Replace 460/3 actuator
with 24VAC for control by
BAS control circuit – BMS
interface by others.

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

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.

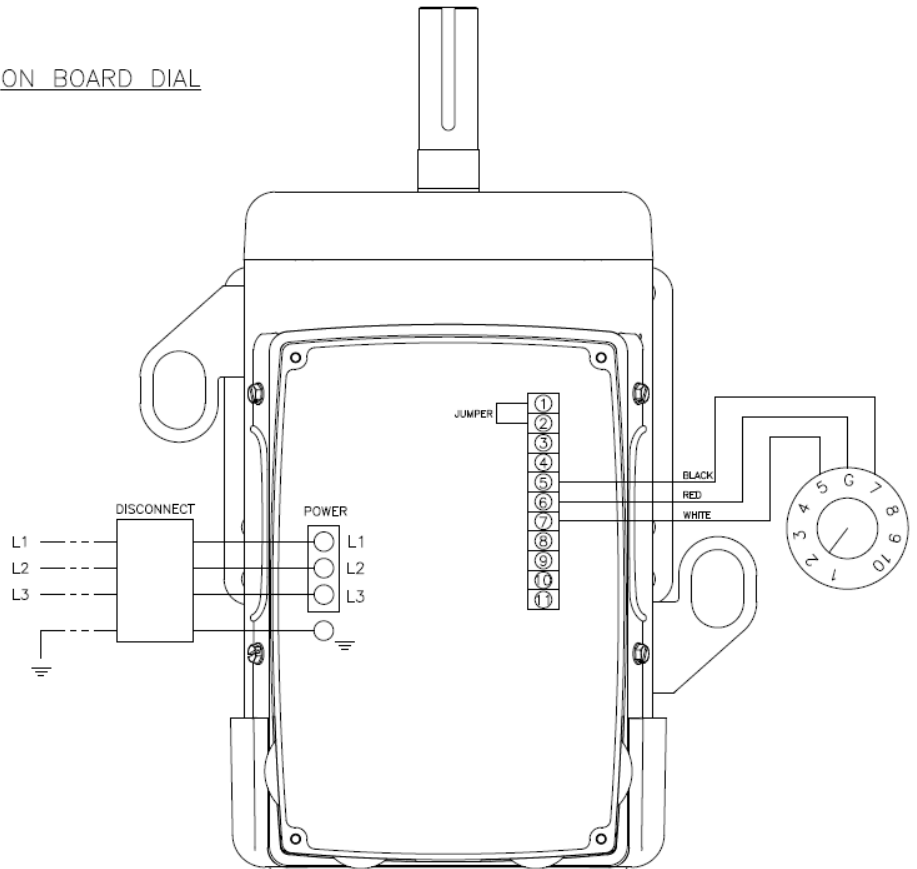
Motor Configuration

Input Voltage: 460
Speed Reference: Dial on Motor
Permanent Dial: Yes

ON BOARD DIAL

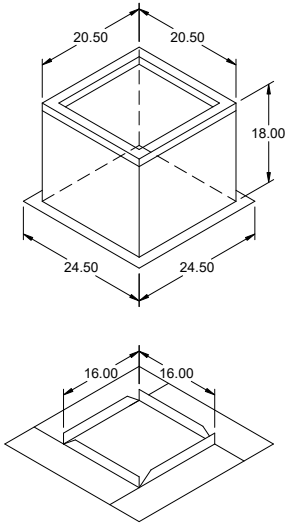
Control Configuration

Control Type: N/A
Transformer: None



DRAWING#
5.1.1.v2

----- FIELD
WIRED
————— FACTORY
WIRED



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-22	Nominal	1.5	32	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	22	22	20.5	20.5	17	17	24.5	24.5	21	21

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
16	16

Accessories

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

Model: VEKTOR-H-30
Fume Exhaust System

No minimum.
Exhaust fan to be
constant volume.

Design Condition	
Number of Systems	1
Fans per System	2
Redundancy	N+1
System Type	Variable Volume
Lab Exh. Vol. (CFM)	9,050
Min Lab Exh. Vol. (CFM)	4,525
Add. BAP Air (CFM)	0
Wind Speed (MPH)	10.0

Selection Criteria - Normal [N] Oper.	
Volume (CFM)	9,050
Total External SP (in. wg)	2.537
Air Stream Temp (F)	70
Elevation (ft)	105
Drive Loss (%)	7.9

N Operating Fan Performance	
Fan RPM	1126
Max Fan RPM	1279
Operating Power (hp)	9.85
Required Power (hp)	9.85
Oper. Frequency (Hz)	60
Fan Energy Index (FEI)	0.90

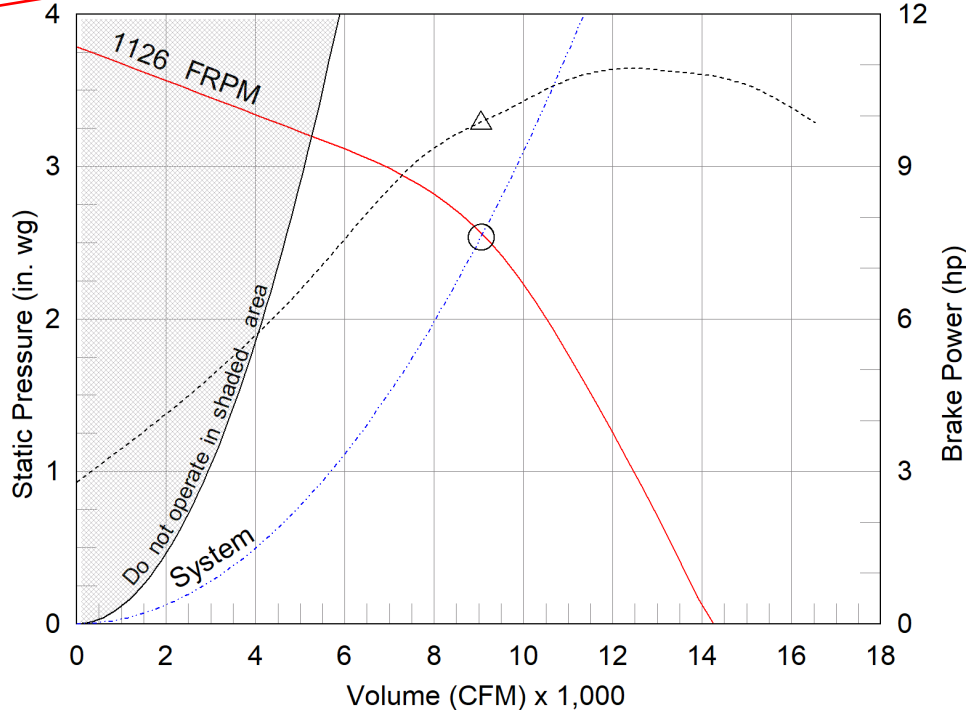
N Operating Discharge Performance	
Nozzle OV (ft/min)	3,428
Effective Plume Ht. (ft)	35.2
Calculation Method	Momentum Flux

Fan Construction	
Spark Resistance	Spark B
Drive Type	Belt
Arrangement	9
Nozzle Size (in.)	22

Plenum Configuration	
Bypass Air Plenum	Yes
Plenum Arrangement	Inline

Motor Specs	
Motor Size (hp)	15
RPM	1725
V/C/P	460/60/3
Enclosure	TEFC
Drives	Standard
Drive Service Factor	2

Weight Totals	
Fan Assembly (lb)	2,382
Plenum Assembly (lb)	886
Roof Curb (lb)	257
System Total (lb)	3,525



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

Static Pressure Calculations

External SP	2.5 in. wg
Isolation Damper	0.037 in. wg
Total External SP	2.537 in. wg

Nameplate Model: VEKTOR-H-30-150-X

AMCA tested and certified performance data includes pressure losses from discharge nozzles. Additional losses internal to the system are for selected optional accessories.



Sound Power by Octave Band (Individual Fan Normal [N] Operating Condition)

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA
Inlet Sound	87	87	89	81	81	78	71	64	86	75

LwA - A weighted sound power level, based on ANSI S1.4. The AMCA Certified Ratings Seal applies to LwA values only.
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

Selected Options & Accessories:

Motor PN - 302133, Baldor Motor Model Number - EM2333T

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Motor with Class B or Greater Insulation

Standard Drives

Bypass Air Plenum - Single Wall, Steel, Bottom Exhaust Intake

Coated with LabCoat, RAL7023, Entire Unit

Switch - NEMA-3R, Heavy Duty, For Indoor or Outdoor Use, Mounted and Wired

UL/cUL-705 - "Power Ventilators"

Shaft Material - Turned and Polished Steel with Protective Coating

~~Bypass Damper - VGD-23, Galvaneal, Coated, 22 in. x 22 in., Qty: 1~~

~~Bypass Damper Act. - Electric, Modulating, w/o Transformer, 24 VAC, Model: MS7103A1021, Qty: 1~~

Isolation Damper - VCD-23, Galvaneal, Coated, 48 in. x 48 in., Parallel Blades, mounted in BAP, one per fan

Isolation Damper Act. - Electric, 24 VAC, 2 pos., SR, w/End Switch, w/Transformer, Model: MS8120F1200, Qty: 2

Factory Vibration Test, 0.15 in/sec, peak, filter-in as measured at the fan RPM

Extended Lube Lines - Nylon

Motor Cover

Weatherhood over bypass damper with inlet screen

Unit Warranty: 1 Yr (Standard)

Omit bypass damper

Provide osha belt guard and outlet screen as scheduled on sheet M0.04

Motor starter has been revised to VFD. Provide "motor VFD rated".

Standard Construction: Vektor-H High Plume Fans

Fan Housing and Conical Nozzle

Aerodynamically designed housing constructed of welded steel.
Interior and exterior surfaces of steel fan housings are coated with 4-6 mils dft LabCoat.
High velocity conical discharge nozzle, steel construction, coated with 4-6 mils dft LabCoat.
Integral housing drain system with threaded connection.
Fasteners are stainless steel.
Integral stainless steel lifting lugs on fan housing.
Integral lifting lugs on bypass plenums (bypass plenums are available as a Vektor fan option).
Access panel for inspection or removal of impeller, shaft, and bearings without removal of fan housing.
Standard coating color is Concrete Gray-RAL 7023.

Impeller

Fan impeller is non-overloading centrifugal backward inclined with laminar blade geometry. Standard construction is aluminum material.
Aluminum centrifugal impellers are coated with Hi Pro Polyester Resin.

Belt Drive Components

Air handling quality bearings selected with and L(10) life in excess of 100,000 hours (equivalent to an average or L(50) life of 500,000 hours).
Extended lube lines for fan bearing lubrication.
Fan bearings and extended lube lines are pre-filled with synthetic grease.
Shafts are polished and turned steel.
Fan and motor pulleys are constant speed and sized for 200% of motor horsepower.
Motor, belts, pulleys, and bearings are sealed from contaminated airstream.

Pre-Shipment Testing

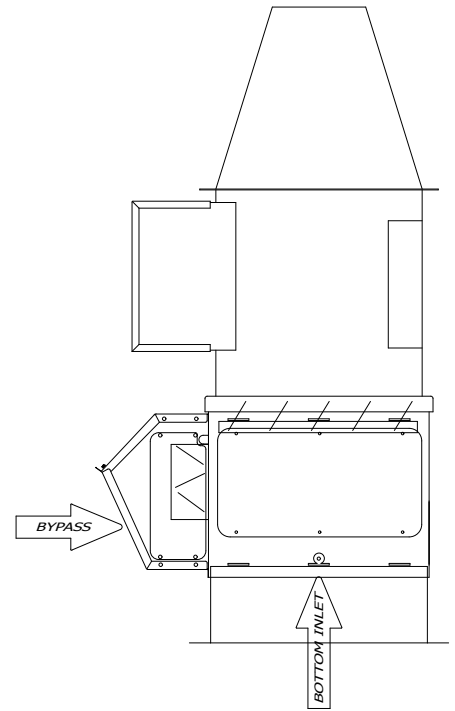
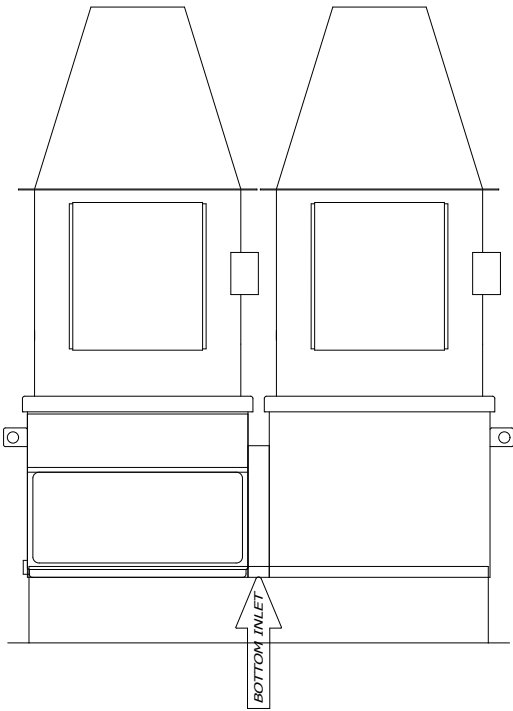
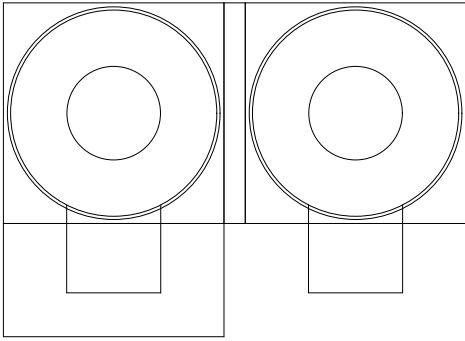
Fans and motors are factory tested to ensure proper operation.
Belt drive fans and motors are vibration balanced to below 0.15 in/sec-pk filter in(per AMCA 204).

Certifications and Listings

Vektor-H sizes 9-36 are licensed to bear the AMCA 210 label for Air Performance.
Vektor-H sizes 9-36 are licensed to bear the AMCA 300 label for Sound Performance.
Vektor-H fans with motors UL 705 Power Ventilator listed.

Model: VEKTOR-H-30

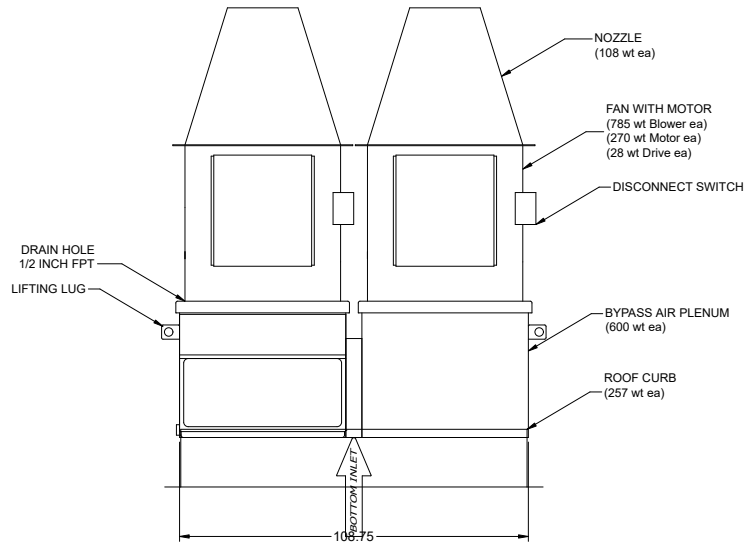
Fume Exhaust System



Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

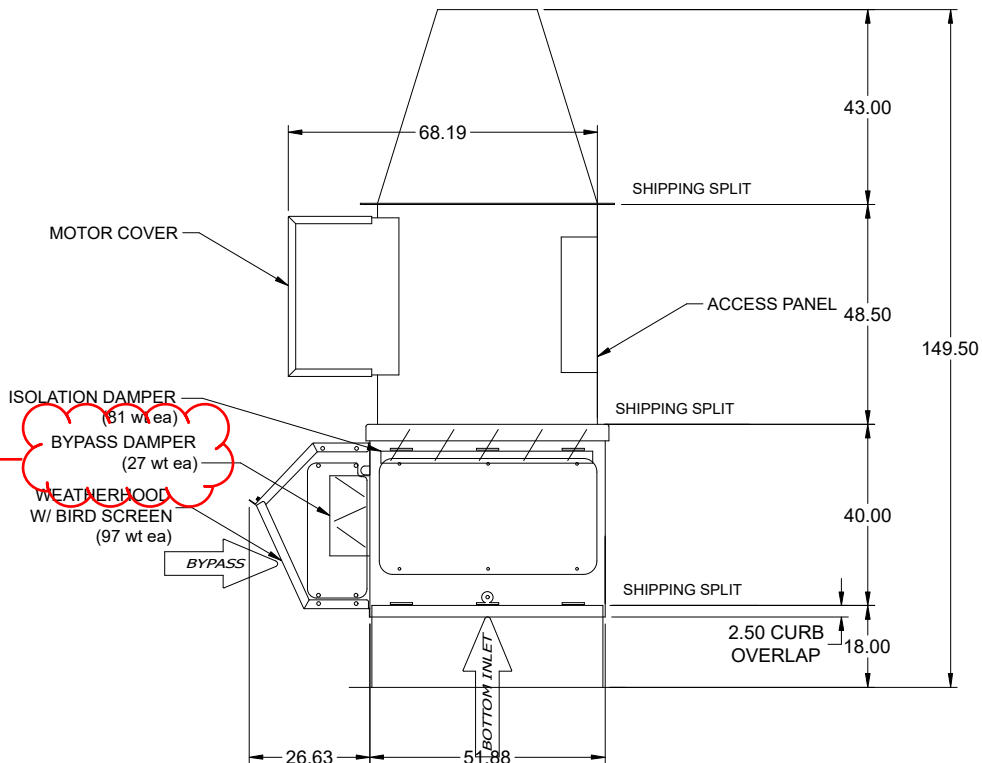
Model: VEKTOR-H-30

Fume Exhaust System



WEIGHT TOTALS	
FAN ASSEMBLY	1,191
FAN QTY	x2
PLENUM ASSEMBLY	886
ROOF CURB	257
SYSTEM TOTAL	3,525

WEIGHTS REFERENCED FROM ALL VIEWS

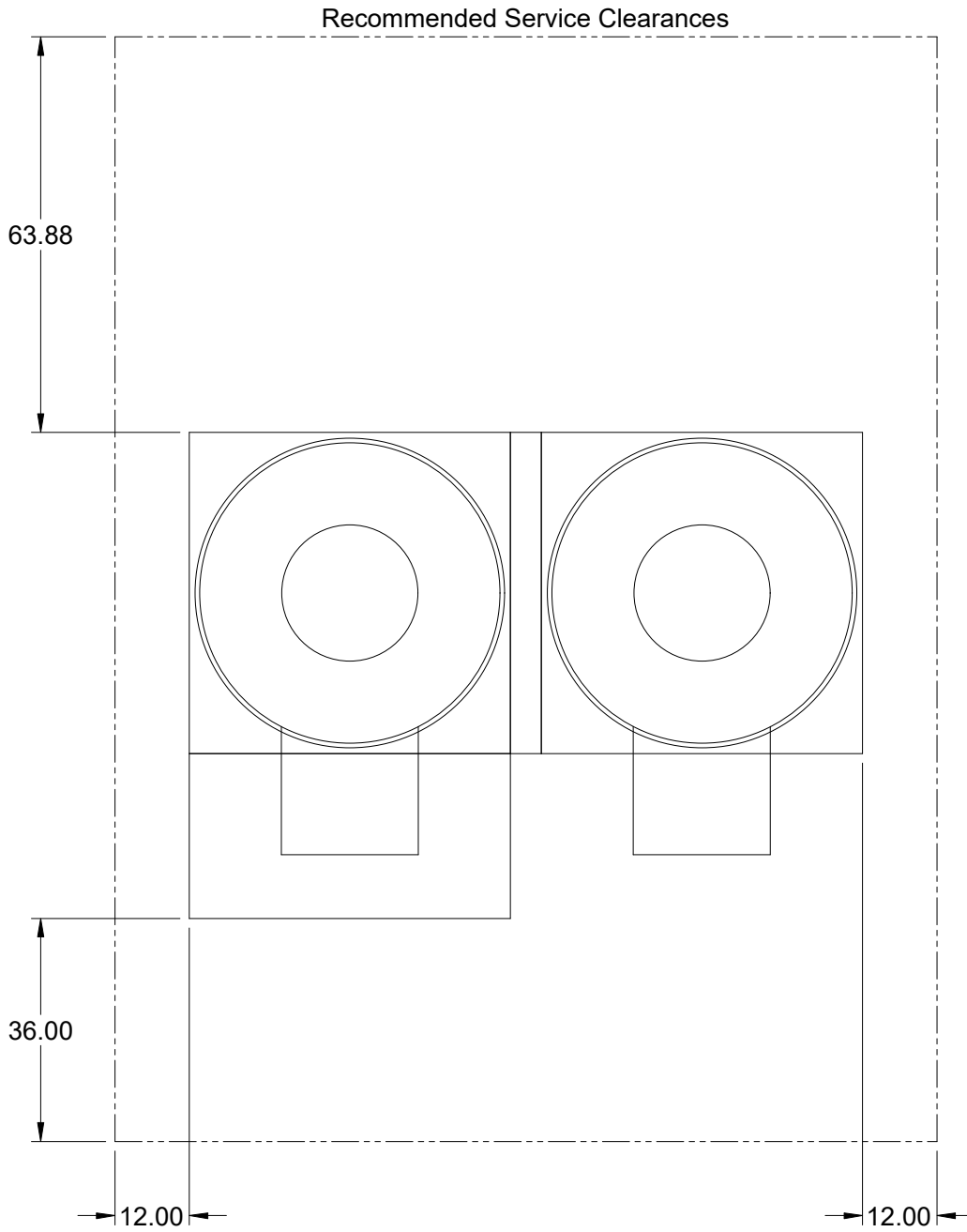


Notes: All dimensions shown are in units of in. and weights are shown in units of lb.

Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

Model: VEKTOR-H-30

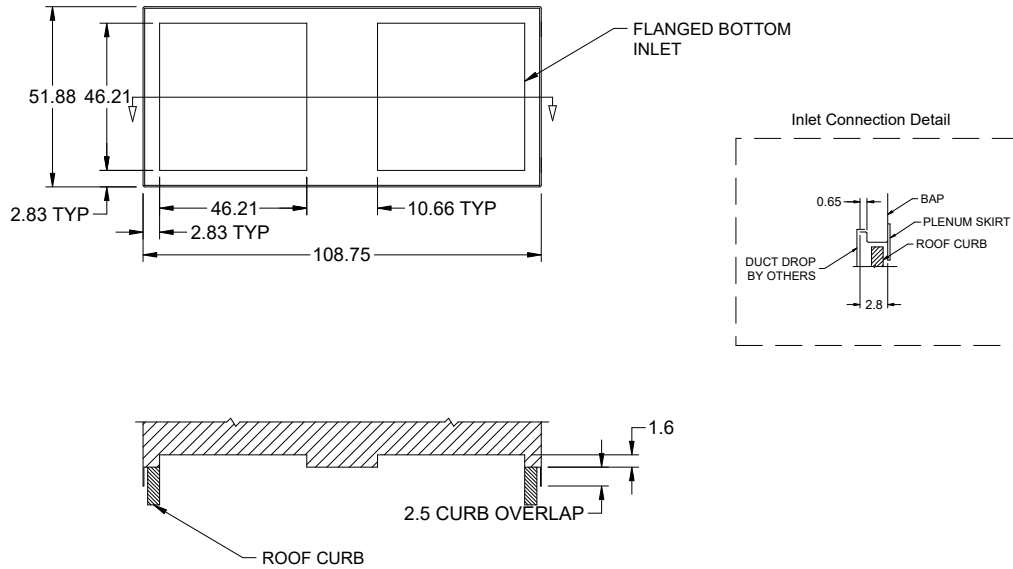
Fume Exhaust System



Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

Model: VEKTOR-H-30

Fume Exhaust System



A MAXIMUM INLET VELOCITY OF 1500 FPM IS RECOMMENDED

Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

Fan Motor Report and Wiring Diagram

Motor Size (hp): 15

Motor RPM: 1725

Windings: 1

Cycle: 60 Cycle

Phase: 3

Voltage: 460

Motor Design: NEMA

Motor Duty:

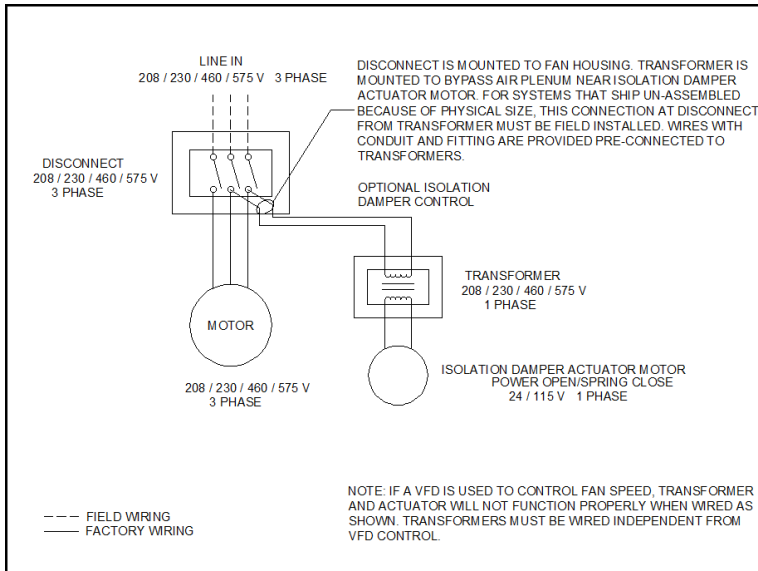
Insulation Class: B

Motor Base Type: Rigid

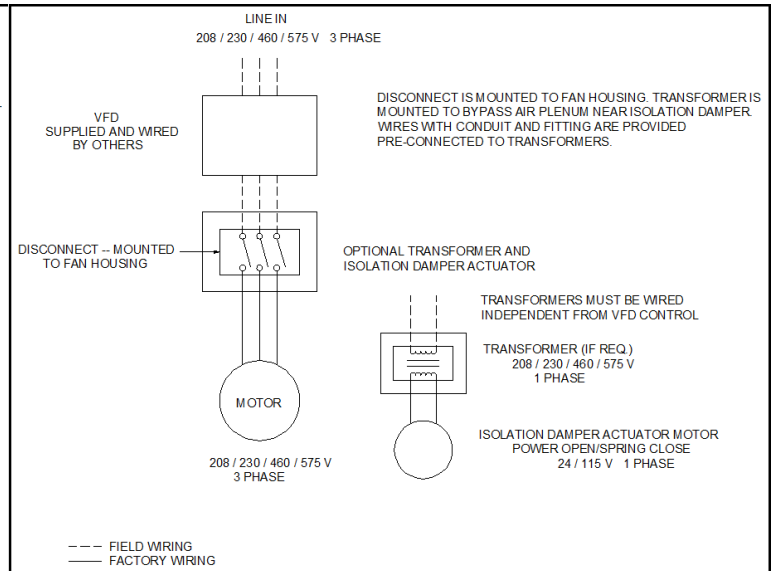
Motor Frame Size: 254T

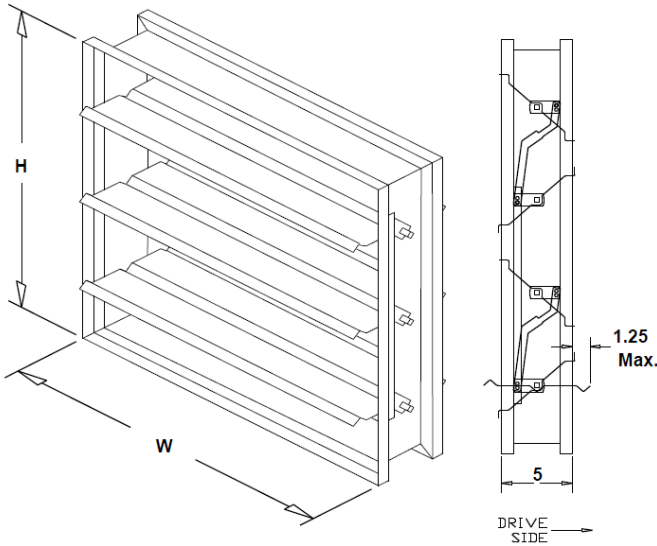
VFD Rated: No

No VFD (3 phase)



System with VFD (3 phase)





VCD-23 Low Leakage Control Damper-Bypass

Application and Design

The model VCD-23 is a low leakage control for application as an automatic control or manual balancing damper. This model is intended for applications in low to medium pressure and velocity systems. A wide range of electric and pneumatic actuators are available.

Non-jackshafted dampers will be supplied with a blade drive lever for internal actuator mounting. When external actuator mounting is specified in which case an extension pin with clip kit will be provided.

Note: The extension pin with clip kit includes the extension pin and clip.

RATINGS

Leakage: Class 1A @ 1 in. wg, Class 1 @ 4 in. wg

Temperature: 200.0 F - 250.0 F Consult factory for higher temperatures.

Installation instructions available at www.greenheck.com

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

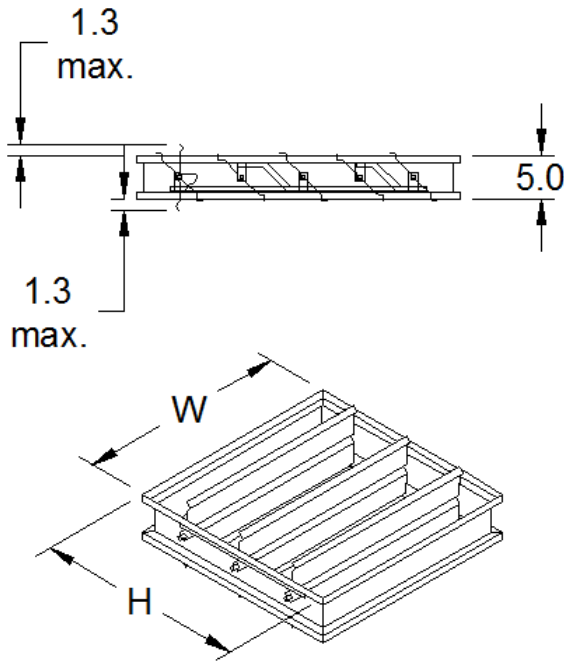
W and H furnished approximately 0.25 in. undersized and only refer to damper dimensions (sleeve thickness is not included).

Electrical accessory wiring terminates at the accessory.
Field wiring is required to individual components.

Construction Features

Temperature:	180	Frame Thickness (ga):	16	Coating Type:	Hi-Pro Polyester
Frame Material:	Galvaneal	Blade Thickness (ga):	16	Coating Thickness:	2-3 mils
Blade Action:	Opposed	Blade Seal:	Vinyl		
Jamb Seal Mat.:	304 SS	Actuator Mount:	External		
Axle Material:	Plated Steel				
Axle Bearings:	Synthetic				
Linkage Material:	Plated Steel				

Damper Qty	Damper Width in.	Damper Height in.	Total Actuator Qty	Actuator Model	Actuator Mfg.
1	22	22	1	MS7103A1021	Honeywell



VCD-23 Low Leakage Control Damper-Isolation

Application and Design

The model VCD-23 is a low leakage control for application as an automatic control or manual balancing damper. This model is intended for applications in low to medium pressure and velocity systems. A wide range of electric and pneumatic actuators are available.

Non-jackshafted dampers will be supplied with a blade drive lever for internal actuator mounting. When external actuator mounting is specified in which case an extension pin with clip kit will be provided. Note: The extension pin with clip kit includes the extension pin and clip.

RATINGS

Leakage: Class 1A @ 1 in. wg, Class 1 @ 4 in. wg

Temperature: 200.0 F - 250.0 F Consult factory for higher temperatures.

Installation instructions available at www.greenheck.com

Notes: All dimensions shown are in units of in.

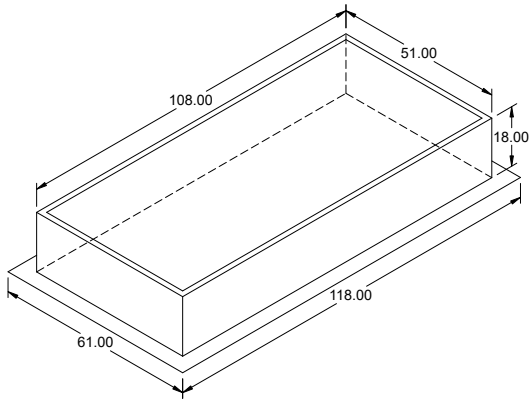
W and H furnished approximately 0.25 in. undersized and only refer to damper dimensions (sleeve thickness is not included).

Electrical accessory wiring terminates at the accessory.
Field wiring is required to individual components.

Construction Features

Temperature:	180 F	Frame Thickness (ga):	14	Coating Type:	Hi-Pro Polyester
Frame Material:	Galvaneal	Blade Thickness (ga):	16	Coating Thickness:	2-3 mils
Blade Action:	Parallel	Blade Seal:	Vinyl		
Jamb Seal Mat.:	304 SS	Actuator Mount:	External		
Axle Material:	Plated Steel				
Axle Bearings:	Synthetic				
Linkage Material:	Plated Steel				

Damper Qty	Damper Width in.	Damper Height in.	Total Actuator Qty	Actuator Model	Actuator Mfg.
2	48	48	2	MS8120F1200	Honeywell



Model: GPFHL

Heavy Load Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of galvanized steel (14 ga) - Straight Sided - Single roof flashing flange (5 in. width) - Insulated (1 in. thick, 3 lb density).
 NOTES: - Curb actual dimension is 0.5 in. smaller than cap dimension. - The maximum allowable roof opening dimension is actual minus 4 in.. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPFHL-51.5 x 108.5	Nominal	0.5	257	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Flange Width (in.)	Flange Length (in.)
18	51.5	108.5	51	108	61	118

*May not be applicable

Accessories

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

Model: VEKTOR-H-24
Fume Exhaust System

No minimum.
Exhaust fan to be
constant volume.

Design Condition	
Number of Systems	1
Fans per System	2
Redundancy	N+1
System Type	Variable Volume
Lab Exh. Vol. (CFM)	7,050
Min Lab Exh. Vol. (CFM)	3,525
Add. BAP Air (CFM)	0
Wind Speed (MPH)	10.0

Selection Criteria - Normal [N] Oper.	
Volume (CFM)	7,050
Total External SP (in. wg)	2.539
Air Stream Temp (F)	70
Elevation (ft)	105
Drive Loss (%)	8.3

N Operating Fan Performance	
Fan RPM	1232
Max Fan RPM	1425
Operating Power (hp)	7.29
Required Power (hp)	7.29
Oper. Frequency (Hz)	60
Fan Energy Index (FEI)	0.94

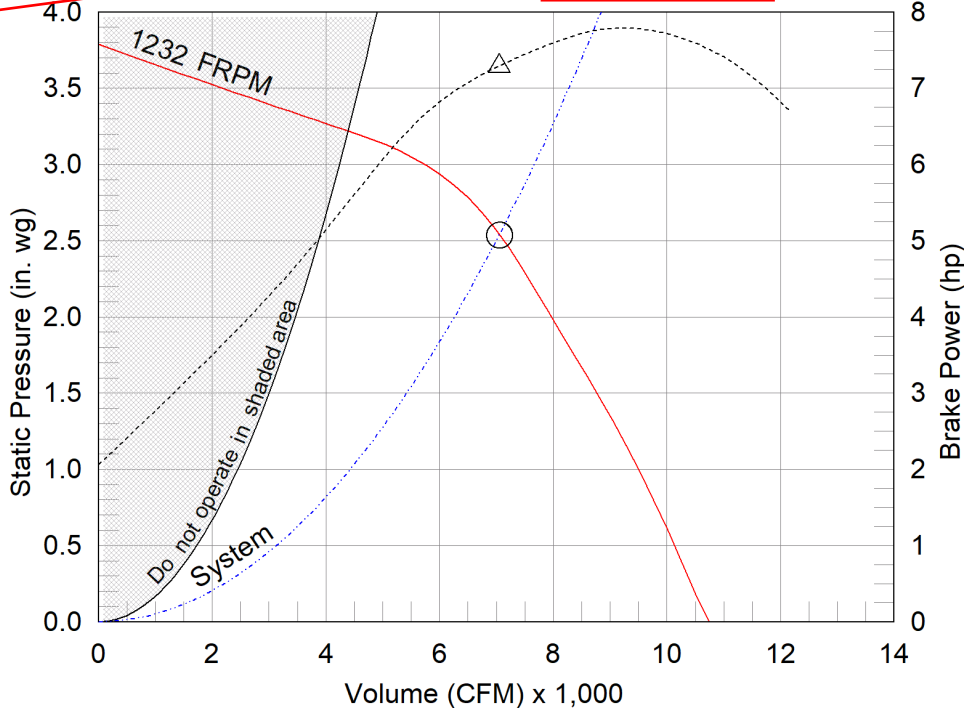
N Operating Discharge Performance	
Nozzle OV (ft/min)	3,234
Effective Plume Ht. (ft)	30.67
Calculation Method	Momentum Flux

Fan Construction	
Spark Resistance	Spark B
Drive Type	Belt
Arrangement	9
Nozzle Size (in.)	20

Plenum Configuration	
Bypass Air Plenum	Yes
Plenum Arrangement	Inline

Motor Specs	
Motor Size (hp)	10
RPM	1725
V/C/P	460/60/3
Enclosure	TEFC
Drives	Standard
Drive Service Factor	2

Weight Totals	
Fan Assembly (lb)	1,844
Plenum Assembly (lb)	769
Roof Curb (lb)	231
System Total (lb)	2,844



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

Static Pressure Calculations

External SP	2.5 in. wg
Isolation Damper	0.039 in. wg
Total External SP	2.539 in. wg

Nameplate Model: VEKTOR-H-24-100-X

AMCA tested and certified performance data includes pressure losses from discharge nozzles. Additional losses internal to the system are for selected optional accessories.



Sound Power by Octave Band (Individual Fan Normal [N] Operating Condition)

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA
Inlet Sound	86	86	88	80	79	77	72	65	85	73

LwA - A weighted sound power level, based on ANSI S1.4. The AMCA Certified Ratings Seal applies to LwA values only.
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.

Selected Options & Accessories:

Motor PN - 356452, Baldor Motor Model Number - EM3774T-G

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Motor VFD Rated

Motor with Shaft Grounding

Motor with Class B or Greater Insulation

Standard Drives

Bypass Air Plenum - Single Wall, Steel, Bottom Exhaust Intake

Coated with LabCoat, RAL7023, Entire Unit

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

UL/cUL-705 - "Power Ventilators"

Shaft Material - Turned and Polished Steel with Protective Coating

~~Bypass Damper - VCD-23, Galvaneal, Coated, 20 in. x 20 in., Qty: 1~~

~~Bypass Damper Act. - Electric, Modulating, w/o Transformer, 24 VAC, Model: MS7103A1021, Qty: 1~~

Isolation Damper - VCD-23, Galvaneal, Coated, 42 in. x 42 in., Parallel Blades, mounted in BAP, one per fan

Isolation Damper Act. - Electric, 24 VAC, 2 pos., SR, w/End Switch, w/Transformer, Model: MS8120F1200, Qty: 2

Factory Vibration Test, 0.15 in/sec, peak, filter-in as measured at the fan RPM

Extended Lube Lines - Nylon

Motor Cover

Weatherhood over bypass damper with inlet screen

Unit Warranty: 1 Yr (Standard)

Omit bypass damper

Provide osha belt guard
and outlet screen as
scheduled on sheet M0.04

Standard Construction: Vektor-H High Plume Fans

Fan Housing and Conical Nozzle

Aerodynamically designed housing constructed of welded steel.
Interior and exterior surfaces of steel fan housings are coated with 4-6 mils dft LabCoat.
High velocity conical discharge nozzle, steel construction, coated with 4-6 mils dft LabCoat.
Integral housing drain system with threaded connection.
Fasteners are stainless steel.
Integral stainless steel lifting lugs on fan housing.
Integral lifting lugs on bypass plenums (bypass plenums are available as a Vektor fan option).
Access panel for inspection or removal of impeller, shaft, and bearings without removal of fan housing.
Standard coating color is Concrete Gray-RAL 7023.

Impeller

Fan impeller is non-overloading centrifugal backward inclined with laminar blade geometry. Standard construction is aluminum material.
Aluminum centrifugal impellers are coated with Hi Pro Polyester Resin.

Belt Drive Components

Air handling quality bearings selected with and L(10) life in excess of 100,000 hours (equivalent to an average or L(50) life of 500,000 hours).
Extended lube lines for fan bearing lubrication.
Fan bearings and extended lube lines are pre-filled with synthetic grease.
Shafts are polished and turned steel.
Fan and motor pulleys are constant speed and sized for 200% of motor horsepower.
Motor, belts, pulleys, and bearings are sealed from contaminated airstream.

Pre-Shipment Testing

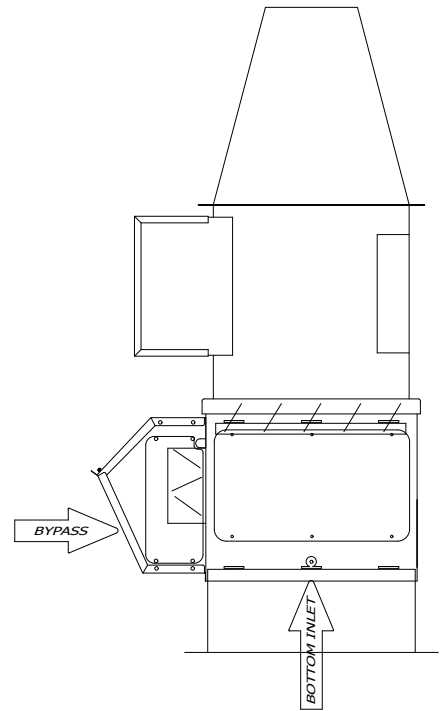
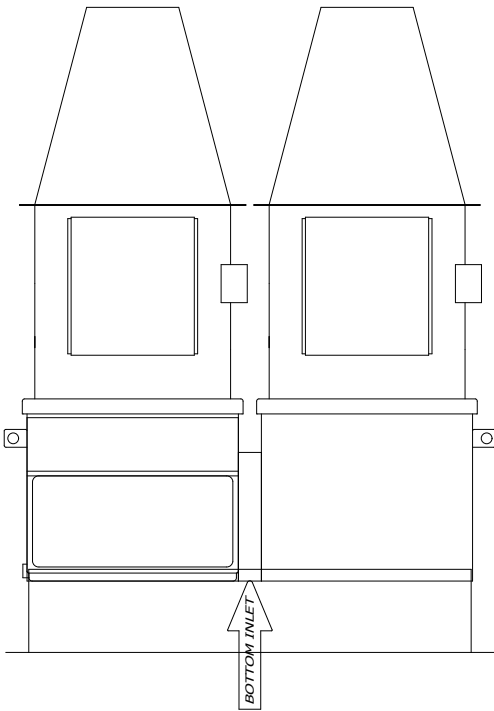
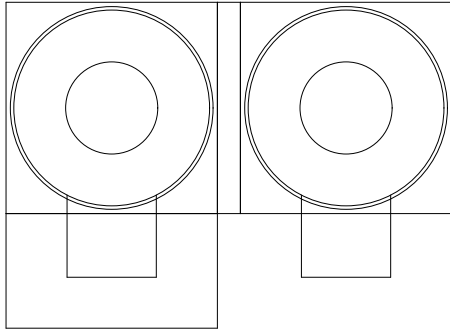
Fans and motors are factory tested to ensure proper operation.
Belt drive fans and motors are vibration balanced to below 0.15 in/sec-pk filter in(per AMCA 204).

Certifications and Listings

Vektor-H sizes 9-36 are licensed to bear the AMCA 210 label for Air Performance.
Vektor-H sizes 9-36 are licensed to bear the AMCA 300 label for Sound Performance.
Vektor-H fans with motors UL 705 Power Ventilator listed.

Model: VEKTOR-H-24

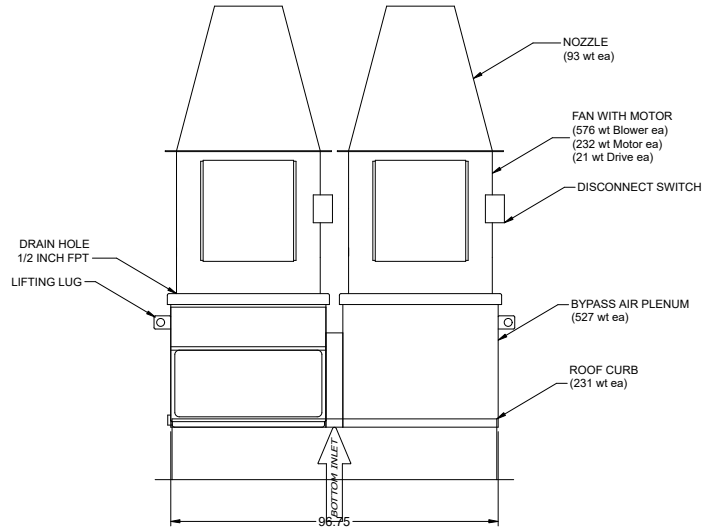
Fume Exhaust System



Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

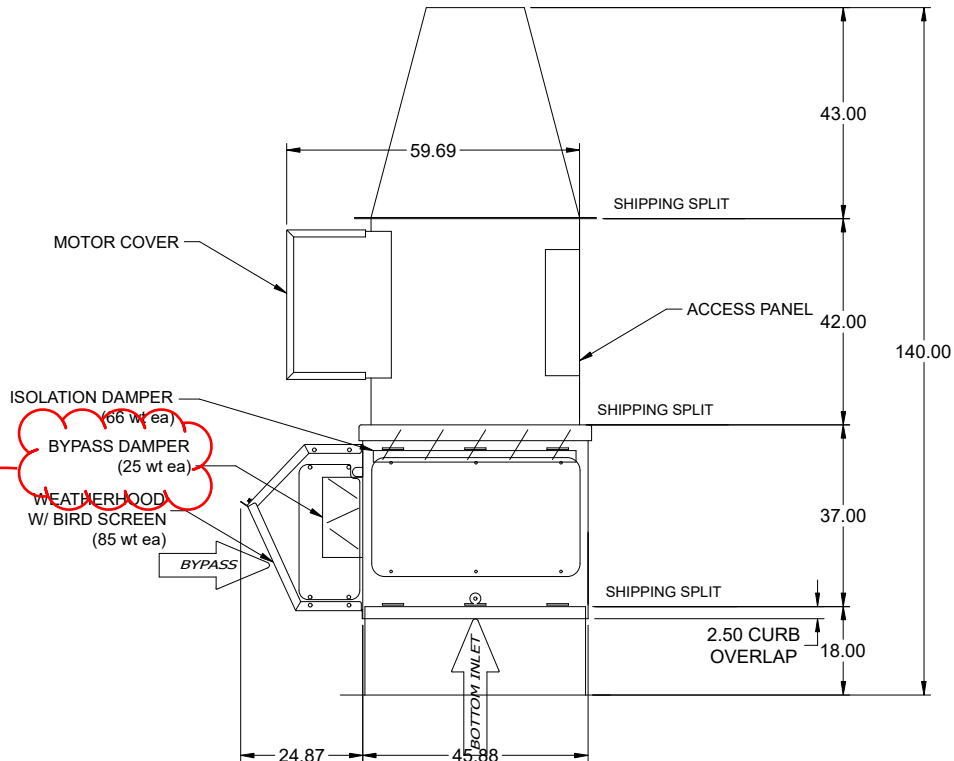
Model: VEKTOR-H-24

Fume Exhaust System



WEIGHT TOTALS	
FAN ASSEMBLY	922
FAN QTY	x2
PLENUM ASSEMBLY	769
ROOF CURB	231
SYSTEM TOTAL	2,844

WEIGHTS REFERENCED FROM ALL VIEWS

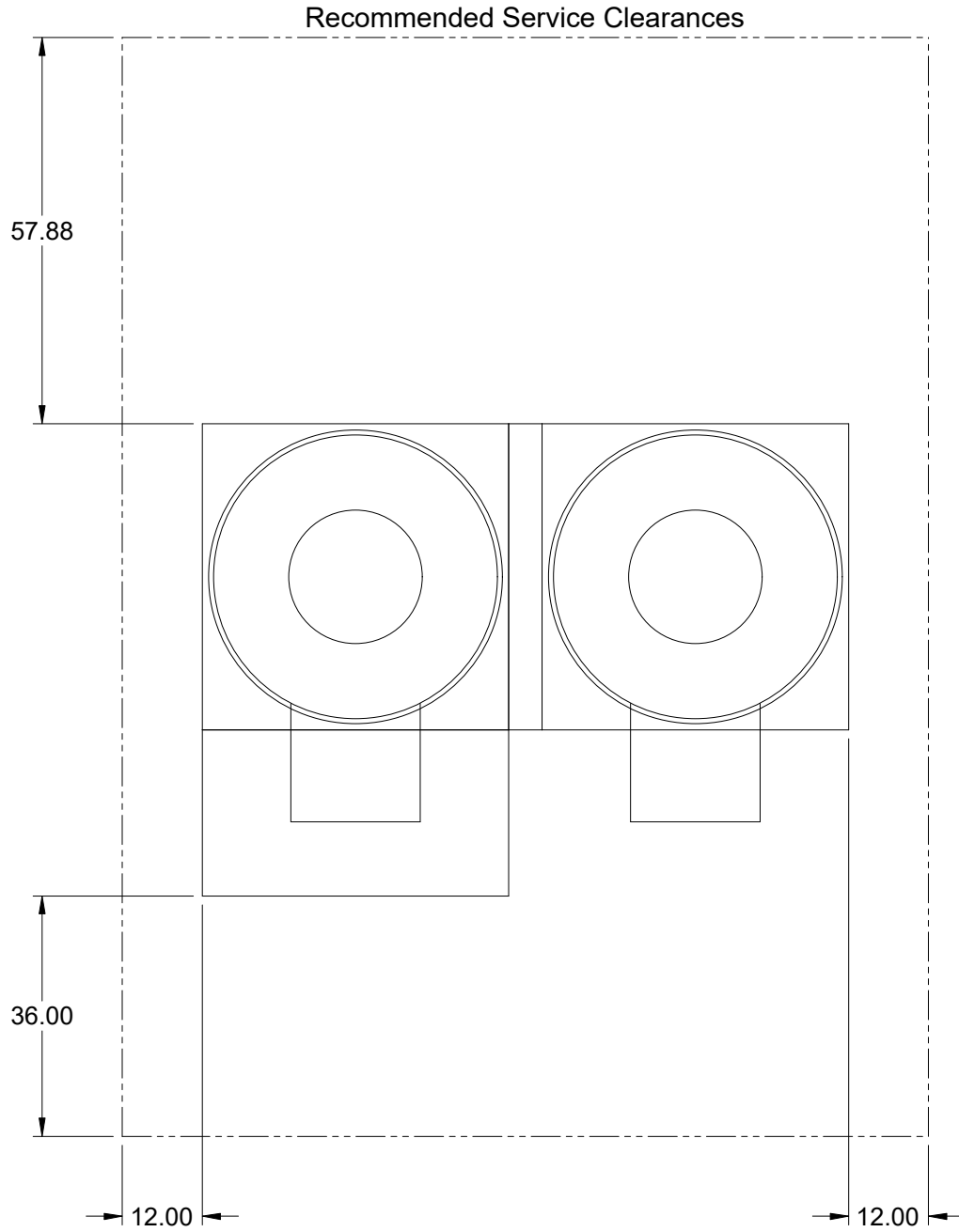


Notes: All dimensions shown are in units of in. and weights are shown in units of lb.

Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

Model: VEKTOR-H-24

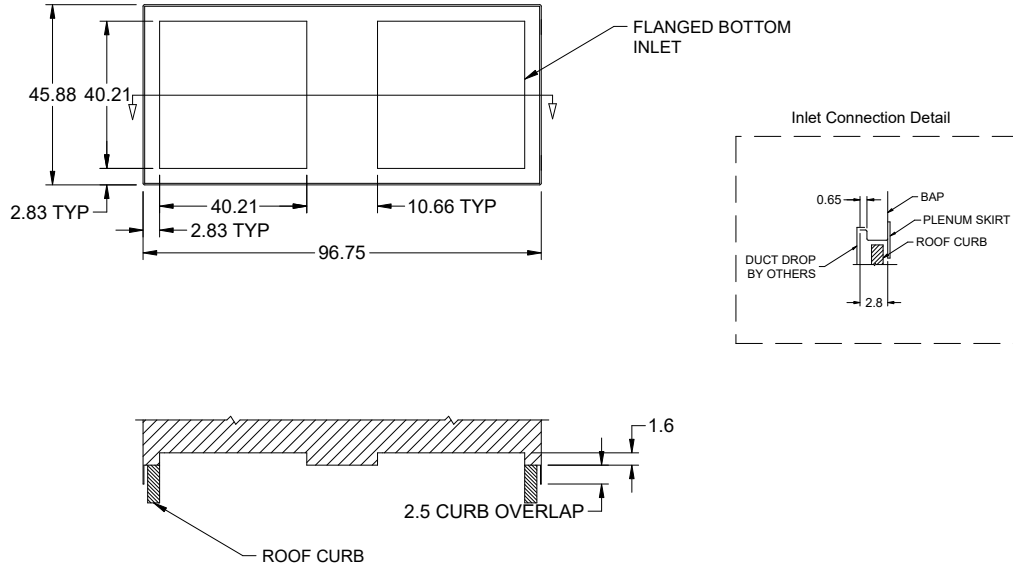
Fume Exhaust System



Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

Model: VEKTOR-H-24

Fume Exhaust System



A MAXIMUM INLET VELOCITY OF 1500 FPM IS RECOMMENDED

Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

Fan Motor Report and Wiring Diagram

Motor Size (hp): 10

Motor RPM: 1725

Windings: 1

Cycle: 60 Cycle

Phase: 3

Voltage: 460

Motor Design: NEMA

Motor Duty:

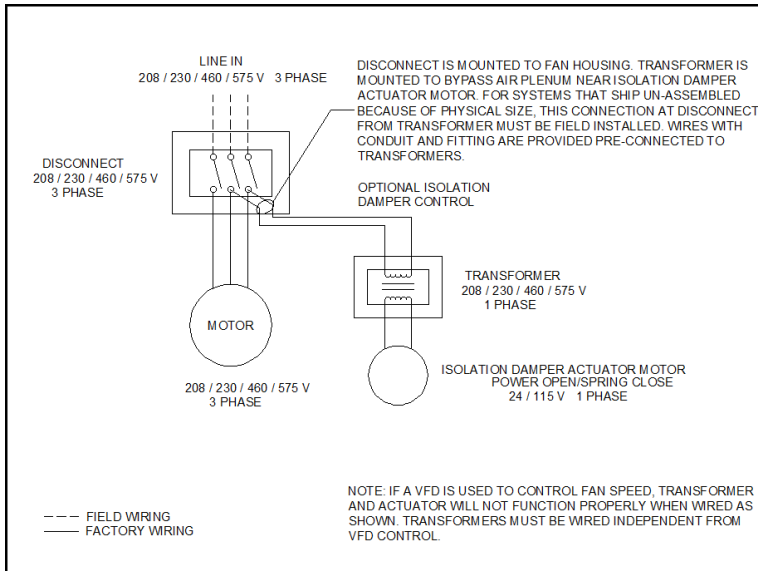
Insulation Class: B

Motor Base Type: Rigid

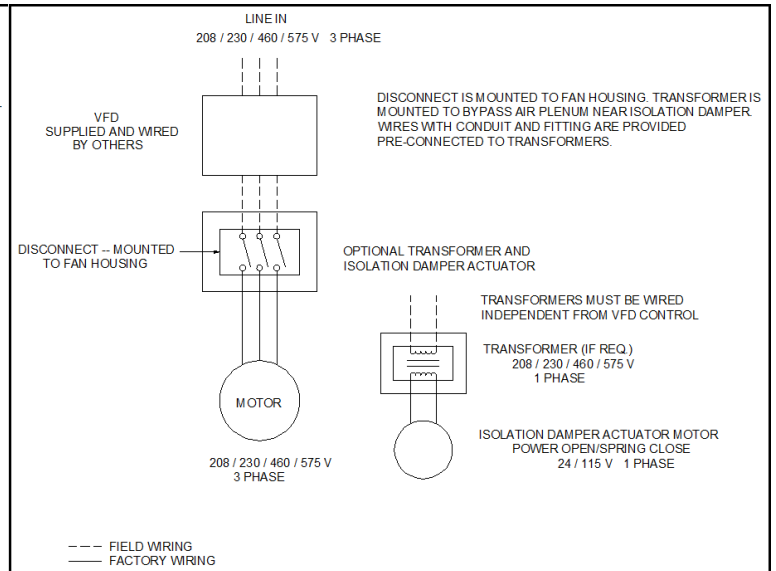
Motor Frame Size: 215T

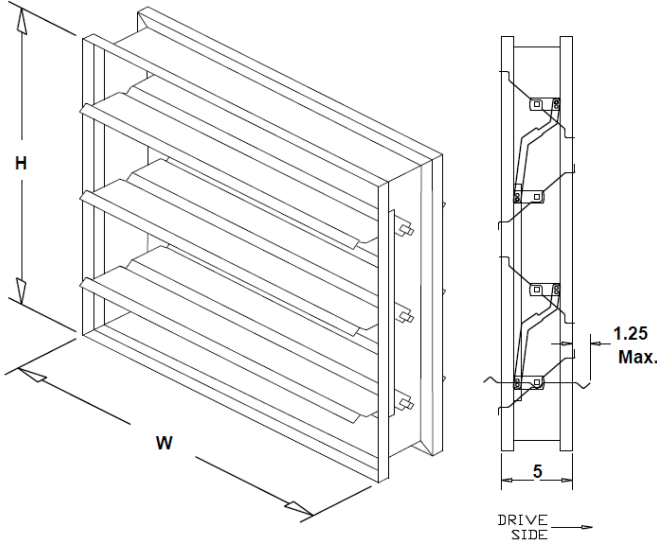
VFD Rated: Yes

No VFD (3 phase)



System with VFD (3 phase)





VCD-23 Low Leakage Control Damper-Bypass

Application and Design

The model VCD-23 is a low leakage control for application as an automatic control or manual balancing damper. This model is intended for applications in low to medium pressure and velocity systems. A wide range of electric and pneumatic actuators are available.

Non-jackshafted dampers will be supplied with a blade drive lever for internal actuator mounting. When external actuator mounting is specified in which case an extension pin with clip kit will be provided.

Note: The extension pin with clip kit includes the extension pin and clip.

RATINGS

Leakage: Class 1A @ 1 in. wg, Class 1 @ 4 in. wg

Temperature: 200.0 F - 250.0 F Consult factory for higher temperatures.

Installation instructions available at www.greenheck.com

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

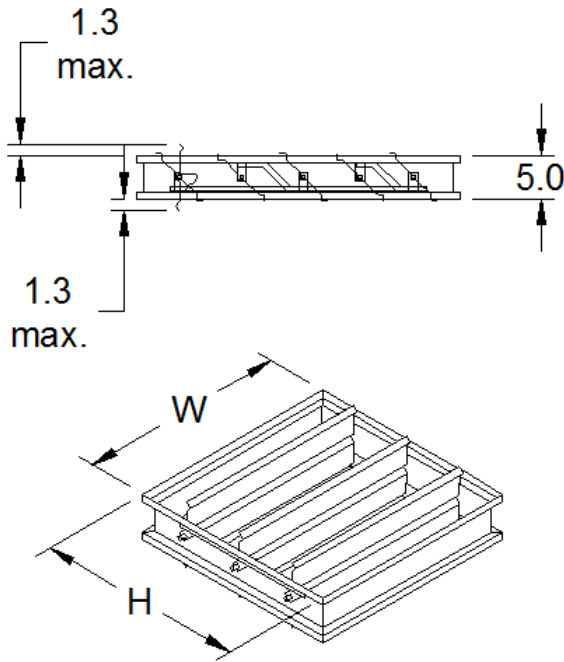
W and H furnished approximately 0.25 in. undersized and only refer to damper dimensions (sleeve thickness is not included).

Electrical accessory wiring terminates at the accessory.
Field wiring is required to individual components.

Construction Features

Temperature:	180	Frame Thickness (ga):	16	Coating Type:	Hi-Pro Polyester
Frame Material:	Galvaneal	Blade Thickness (ga):	16	Coating Thickness:	2-3 mils
Blade Action:	Opposed	Blade Seal:	Vinyl		
Jamb Seal Mat.:	304 SS	Actuator Mount:	External		
Axle Material:	Plated Steel				
Axle Bearings:	Synthetic				
Linkage Material:	Plated Steel				

Damper Qty	Damper Width in.	Damper Height in.	Total Actuator Qty	Actuator Model	Actuator Mfg.
1	20	20	1	MS7103A1021	Honeywell



VCD-23 Low Leakage Control Damper-Isolation

Application and Design

The model VCD-23 is a low leakage control for application as an automatic control or manual balancing damper. This model is intended for applications in low to medium pressure and velocity systems. A wide range of electric and pneumatic actuators are available.

Non-jackshafted dampers will be supplied with a blade drive lever for internal actuator mounting. When external actuator mounting is specified in which case an extension pin with clip kit will be provided. Note: The extension pin with clip kit includes the extension pin and clip.

RATINGS

Leakage: Class 1A @ 1 in. wg, Class 1 @ 4 in. wg

Temperature: 200.0 F - 250.0 F Consult factory for higher temperatures.

Installation instructions available at www.greenheck.com

Notes: All dimensions shown are in units of in.

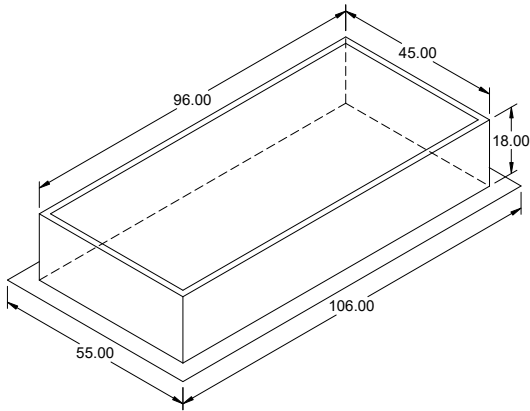
W and H furnished approximately 0.25 in. undersized and only refer to damper dimensions (sleeve thickness is not included).

Electrical accessory wiring terminates at the accessory.
Field wiring is required to individual components.

Construction Features

Temperature:	180 F	Frame Thickness (ga):	14	Coating Type:	Hi-Pro Polyester
Frame Material:	Galvaneal	Blade Thickness (ga):	16	Coating Thickness:	2-3 mils
Blade Action:	Parallel	Blade Seal:	Vinyl		
Jamb Seal Mat.:	304 SS	Actuator Mount:	External		
Axle Material:	Plated Steel				
Axle Bearings:	Synthetic				
Linkage Material:	Plated Steel				

Damper Qty	Damper Width in.	Damper Height in.	Total Actuator Qty	Actuator Model	Actuator Mfg.
2	42	42	2	MS8120F1200	Honeywell



Model: GPFHL

Heavy Load Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of galvanized steel (14 ga) - Straight Sided - Single roof flashing flange (5 in. width) - Insulated (1 in. thick, 3 lb density).
 NOTES: - Curb actual dimension is 0.5 in. smaller than cap dimension. - The maximum allowable roof opening dimension is actual minus 4 in.. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPFHL-45.5 x 96.5	Nominal	0.5	231	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Flange Width (in.)	Flange Length (in.)
18	45.5	96.5	45	96	55	106

*May not be applicable

Accessories

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

Performance	
Quantity	1
Volume (CFM)	5,550
Total External SP (in. wg)	1.5
Operating Power (hp)	2.4
Required Power (hp)	2.4
Fan RPM	960
Max Fan RPM	1,202
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

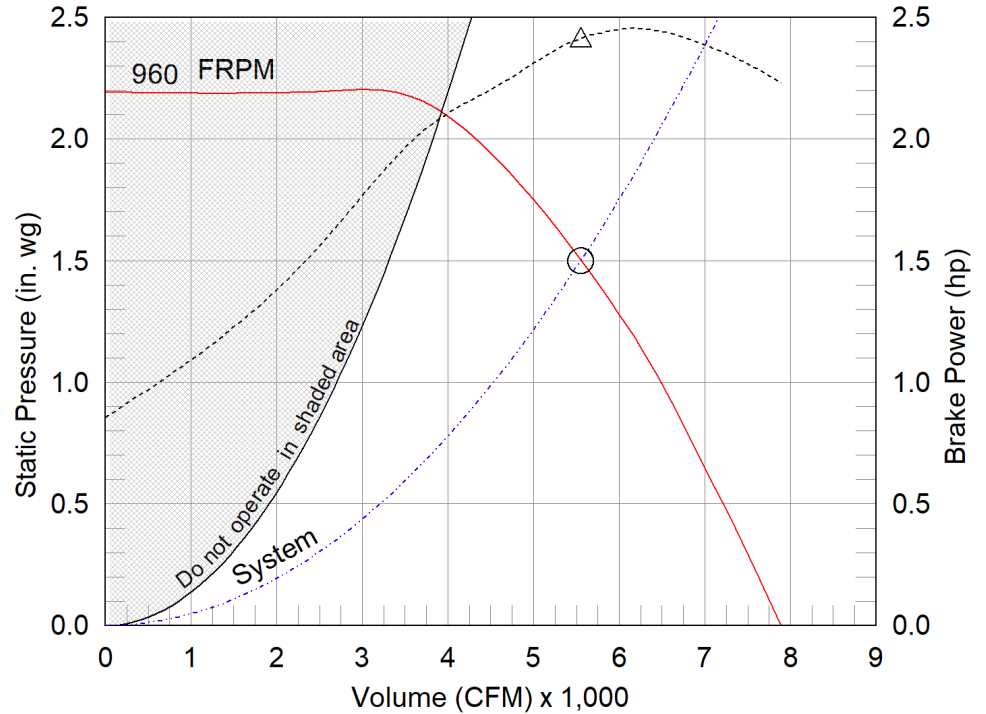
Fan Configuration	
Size	24
Wheel Type	BI
Arrangement	10
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Galvanized
Wheel Material	Aluminum
Inlet Cone Material	Galvanized
Pedestal Material	Galvanized

Equipment Weights	
Fan (LMD)(lb)	244
Motor/Drive (lb)	87
Accessories (lb)	10

Misc Fan Data	
Fan Energy Index (FEI)	1.25
Outlet Velocity (ft/min)	1,607
Static Efficiency (%)	57
Tip Speed (ft/min)	6,220

Motor and Drives	
Motor	Included
Size (hp)	3
RPM	1725
Enclosure	ODP
V/C/P	460/60/3
Frame Size	182T
Max Frame Size	215
Location	Centered
Pulley Type	Constant
Drive Loss (%)	4.6
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	4.8

Model: USF-24
Universal Single Width Fan
Operating Performance



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

Nameplate Model: USF-24-1-B2-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA
Inlet	85	85	87	76	74	71	71	67	82	71
Outlet	94	87	88	78	74	70	68	62	83	71

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.

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

Model: USF-24

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

Selected Options & Accessories:

NEMA Premium Efficient Motor - meets NEMA Table 12-12

Motor with Class B or Greater Insulation

Standard Drives

Finish - Galvanized

Galvanized Finish on Steel Components

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

Discharge Position - UB

Bearings - L(10) Life of 80k Hours

UL/cUL-705 - "Power Ventilators"

Polished Steel Shaft

Access Door - Bolted

Drain Connection - 1" Drain Hole, Unthreaded

Inlet Connection, Slip Fit

Outlet Flange, Punched

Weatherhood - Galvanized Construction

Extended Lube Lines - Nylon

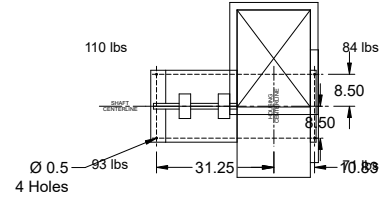
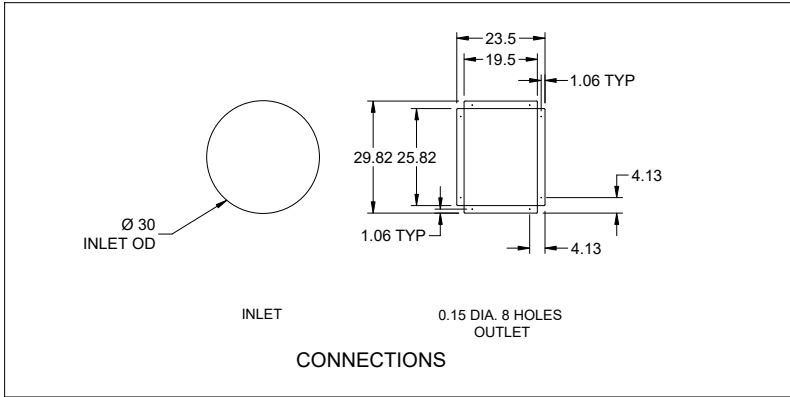
Unit Warranty: 1 Yr (Standard)

Provide osha belt guard and outlet screen as scheduled on sheet M0.04

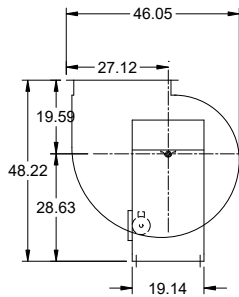
Motor starter has been revised to VFD. Provide "motor VFD rated".

Model: USF-24

Universal Single Width Fan



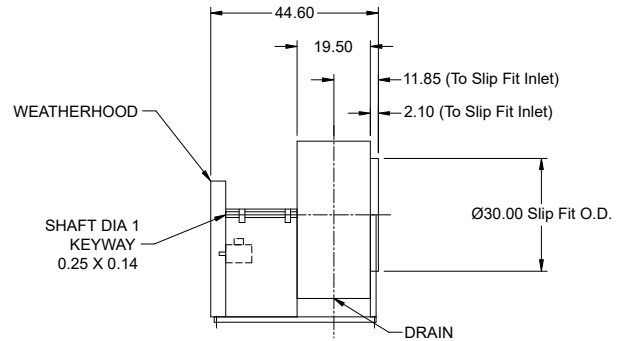
FAN FOOTPRINT



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE

*FANS ARE SUBJECT TO $\pm .125$ INCH TOLERANCE
*DUE TO CONTINUAL IMPROVEMENTS DIMENSIONS MAY CHANGE

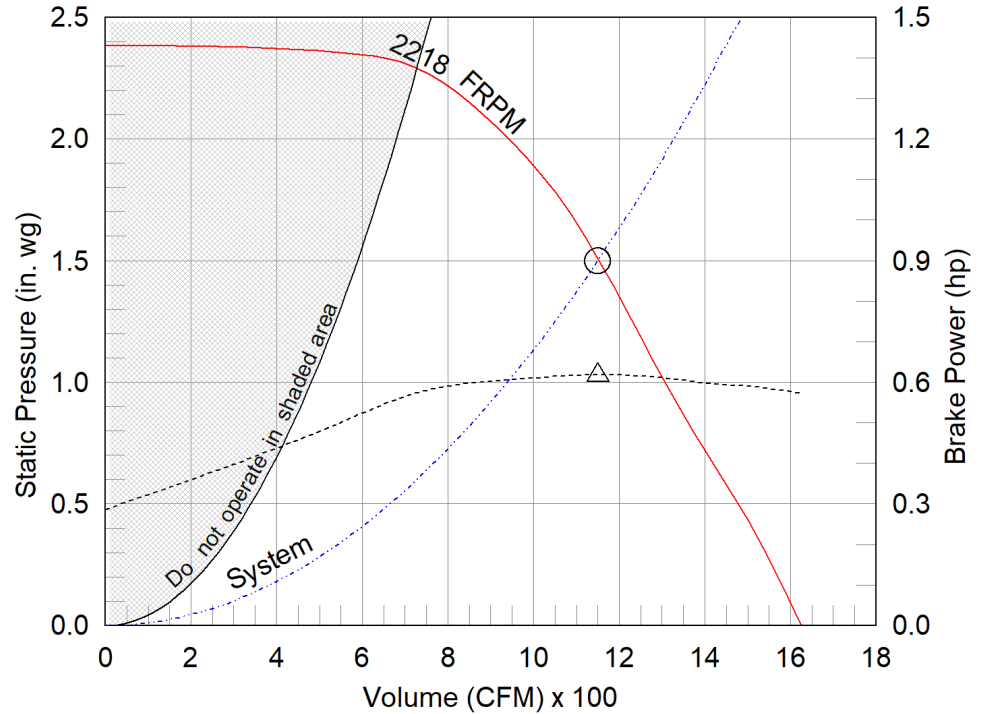


END VIEW

Notes: All dimensions shown are in units of in.

Performance	
Quantity	1
Volume (CFM)	1,150
Total External SP (in. wg)	1.5
Operating Power (hp)	0.62
Required Power (hp)	0.62
Fan RPM	2218
Max Fan RPM	2,615
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

Model: USF-10
Universal Single Width Fan
Operating Performance



Fan Configuration	
Size	10
Wheel Type	BI
Arrangement	10
Rotation	CW
Discharge Position	UB
Construction Type	PermaLock
Spark Resistance	None
Scroll Material	Galvanized
Wheel Material	Aluminum
Inlet Cone Material	Galvanized
Pedestal Material	Galvanized

Equipment Weights	
Fan (LMD)(lb)	93
Motor/Drive (lb)	37
Accessories (lb)	7

Misc Fan Data	
Fan Energy Index (FEI)	-
Outlet Velocity (ft/min)	1,814
Static Efficiency (%)	48
Tip Speed (ft/min)	6,601

Motor and Drives	
Motor	Included
Size (hp)	3/4
RPM	1725
Enclosure	ADP
V/C/P	460/60/3
Frame Size	56
Max Frame Size	145
Location	Centered
Pulley Type	Constant
Drive Loss (%)	7.6
Drives	Standard
Drive Service Factor	1.5
NEC FLA* (Amps)	1.6

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

EOR please confirm this is acceptable via schedule

SSR has no objections.

Nameplate Model: USF-10-1-B2-00-01-01



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA
Inlet	83	83	79	79	74	69	67	60	80	69
Outlet	91	101	85	83	75	73	69	61	87	76

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.
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

Model: USF-10

Universal Single Width Fan

Standard Construction Features:

HOUSING: Class 0, I, and II feature Perma-Lock construction on sizes 4 - 49 and continuously welded on sizes 54 - 73 and all class III fans - Unit support angles with pre-punched mounting holes - Adjustable motor plate - Corrosion resistant fasteners - Inlet collars - Punched outlet flange standard (except for downblast - DB) on class 0, I, and II sizes 33 - 73 and all class III fans - all steel parts are processed through a multi-stage cleaning and pre-treatment and then finished with a high performance powder coating.

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

Selected Options & Accessories:

Motor with Class B or Greater Insulation

Standard Drives

Finish - Galvanized

Galvanized Finish on Steel Components

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

Discharge Position - UB

Bearings - L(10) Life of 80k Hours

UL/cUL-705 - "Power Ventilators"

Polished Steel Shaft

Access Door - Bolted

Drain Connection - 1" Drain Hole, Unthreaded

Inlet Connection, Slip Fit

Outlet Flange, Punched

Weatherhood - Galvanized Construction

Outlet Guard, steel, coated w/Safety yellow finish

Extended Lube Lines - Nylon

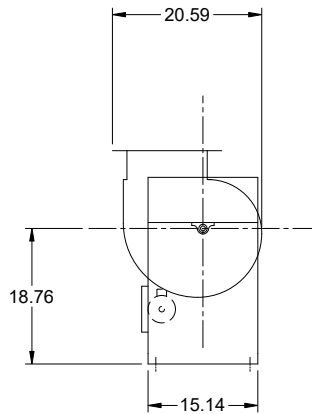
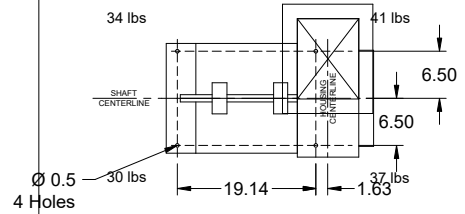
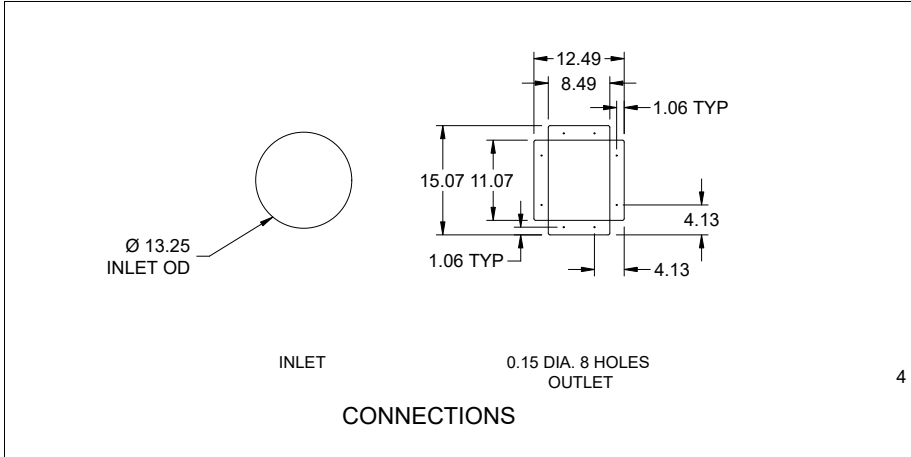
Unit Warranty: 1 Yr (Standard)

Provide osha belt guard,
motor cover, and outlet
screen as scheduled on
sheet M0.04.

Motor starter has been
revised to VFD. Provide
"motor VFD rated".

Model: USF-10

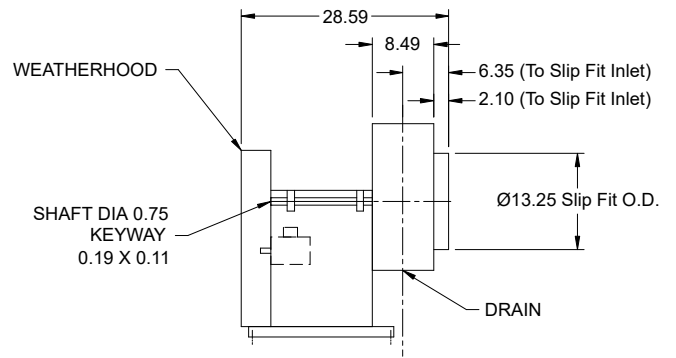
Universal Single Width Fan



SIDE VIEW

*SIDE VIEW IS VIEWED FROM DRIVE SIDE

*FANS ARE SUBJECT TO ±.125 INCH TOLERANCE
*DUE TO CONTINUAL IMPROVEMENTS DIMENSIONS MAY CHANGE



END VIEW

Notes: All dimensions shown are in units of in.

Design Condition	
Number of Systems	1
Fans per System	2
Redundancy	N+1
System Type	Variable Volume
Lab Exh. Vol. (CFM)	450
Min Lab Exh. Vol. (CFM)	225
Add. BAP Air (CFM)	0
Wind Speed (MPH)	10.0

Selection Criteria - Normal [N] Oper.	
Volume (CFM)	450
Total External SP (in. wg)	1.508
Air Stream Temp (F)	70
Elevation (ft)	105
Drive Loss (%)	18.8

N Operating Fan Performance	
Fan RPM	2661
Max Fan RPM	3995
Operating Power (hp)	0.6
Required Power (hp)	0.6
Oper. Frequency (Hz)	60
Fan Energy Index (FEI)	-

N Operating Discharge Performance	
Nozzle OV (ft/min)	3,214
Effective Plume Ht. (ft)	16.27
Calculation Method	Momentum Flux

Fan Construction	
Spark Resistance	Spark B
Drive Type	Belt
Arrangement	9
Nozzle Size (in.)	5

Plenum Configuration	
Bypass Air Plenum	Yes
Plenum Arrangement	Inline

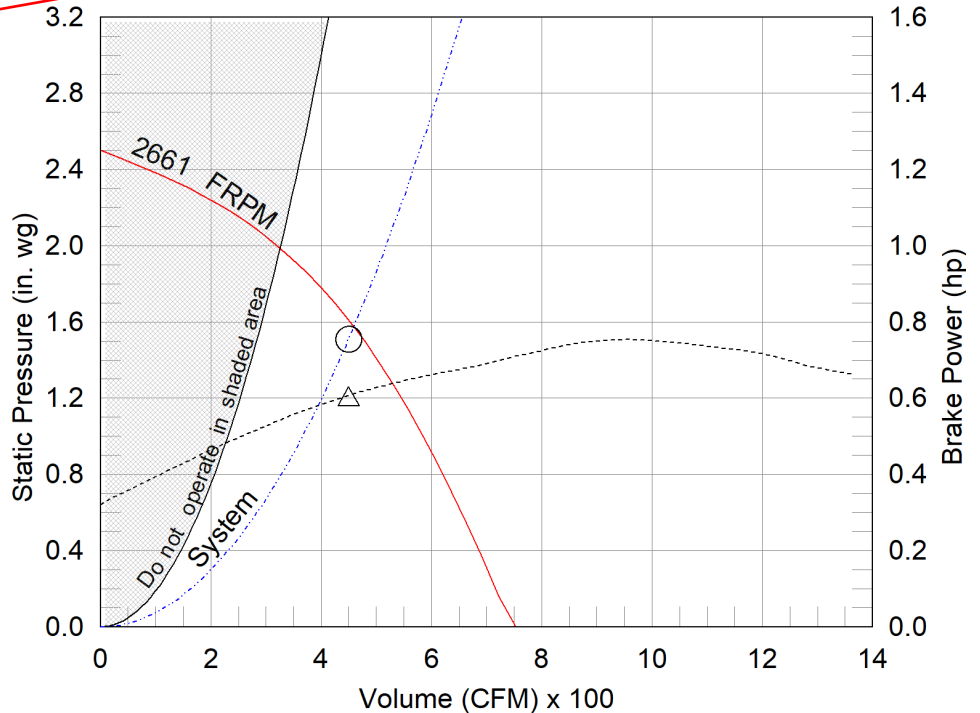
Motor Specs	
Motor Size (hp)	3/4
RPM	1725
V/C/P	460/60/3
Enclosure	TEFC
Drives	Standard
Drive Service Factor	2

Weight Totals	
Fan Assembly (lb)	447
Plenum Assembly (lb)	290
Roof Curb (lb)	114
System Total (lb)	851

Model: VEKTOR-H-10

Fume Exhaust System

No minimum.
Exhaust fan to be
constant volume.



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

Static Pressure Calculations

External SP	1.5 in. wg
Isolation Damper	0.008 in. wg
Total External SP	1.508 in. wg

EOR please confirm
this is acceptable via
schedule

SSR has no objections.

Nameplate Model: VEKTOR-H-10-7-X

AMCA tested and certified performance data includes pressure losses from discharge nozzles. Additional losses internal to the system are for selected optional accessories.



Sound Power by Octave Band (Individual Fan Normal [N] Operating Condition)

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA
Inlet Sound	87	85	83	77	74	69	67	63	80	69

LwA - A weighted sound power level, based on ANSI S1.4. The AMCA Certified Ratings Seal applies to LwA values only.
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

Selected Options & Accessories:

Motor PN - 310110, Baldor Motor Model Number - M3542

Motor with Class B or Greater Insulation

Standard Drives

Bypass Air Plenum - Single Wall, Steel, Bottom Exhaust Intake

Coated with LabCoat, RAL7023, Entire Unit

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

UL/cUL-705 - "Power Ventilators"

Shaft Material - Turned and Polished Steel with Protective Coating

~~Bypass Damper - VCD-23, Galvaneal, Coated, 6 in. x 6 in., Qty: 1~~

~~Bypass Damper Act. - Electric, Modulating, w/o Transformer, 24 VAC, Model: MS7103A1021, Qty: 1~~

Isolation Damper - VCD-23, Galvaneal, Coated, 18 in. x 18 in., Parallel Blades, mounted in BAP, one per fan

Isolation Damper Act. - Electric, 24 VAC, 2 pos., SR, w/End Switch, w/Transformer, Model: MS8103F1225, Qty: 2

Factory Vibration Test, 0.15 in/sec, peak, filter-in as measured at the fan RPM

Extended Lube Lines - Nylon

Motor Cover

Weatherhood over bypass damper with inlet screen

Unit Warranty: 1 Yr (Standard)

Omit bypass damper

Motor starter has been revised to VFD. Provide "motor VFD rated".

Standard Construction: Vektor-H High Plume Fans

Fan Housing and Conical Nozzle

Aerodynamically designed housing constructed of welded steel.
Interior and exterior surfaces of steel fan housings are coated with 4-6 mils dft LabCoat.
High velocity conical discharge nozzle constructed of Medium Density Polyethylene with UV protectant.
Integral housing drain system with threaded connection.
Fasteners are stainless steel.
Integral stainless steel lifting lugs on fan housing.
Integral lifting lugs on bypass plenums (bypass plenums are available as a Vektor fan option).
Access panel for inspection or removal of impeller, shaft, and bearings without removal of fan housing.
Standard coating color is Concrete Gray-RAL 7023.

Impeller

Fan impeller is non-overloading centrifugal backward inclined with laminar blade geometry. Standard construction is aluminum material.
Aluminum centrifugal impellers are coated with Hi Pro Polyester Resin.

Belt Drive Components

Air handling quality bearings selected with and L(10) life in excess of 100,000 hours (equivalent to an average or L(50) life of 500,000 hours).
Extended lube lines for fan bearing lubrication.
Fan bearings and extended lube lines are pre-filled with synthetic grease.
Shafts are polished and turned steel.
Fan and motor pulleys are constant speed and sized for 200% of motor horsepower.
Motor, belts, pulleys, and bearings are sealed from contaminated airstream.

Pre-Shipment Testing

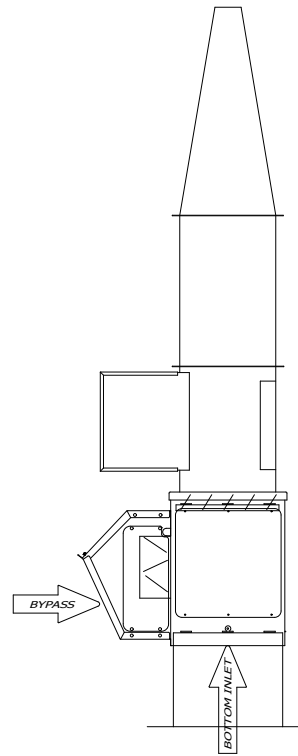
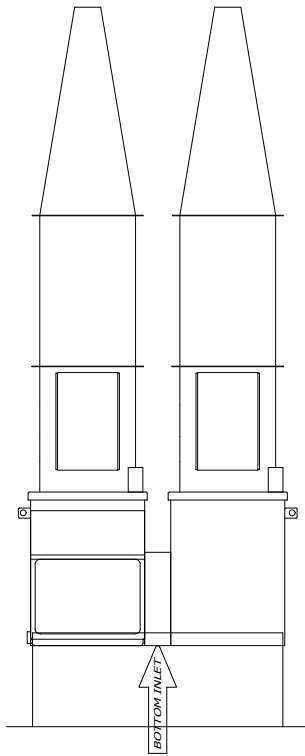
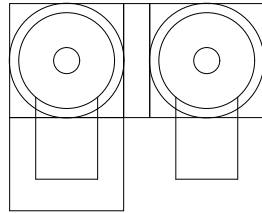
Fans and motors are factory tested to ensure proper operation.
Belt drive fans and motors are vibration balanced to below 0.15 in/sec-pk filter in(per AMCA 204).

Certifications and Listings

Vektor-H sizes 9-36 are licensed to bear the AMCA 210 label for Air Performance.
Vektor-H sizes 9-36 are licensed to bear the AMCA 300 label for Sound Performance.
Vektor-H fans with motors UL 705 Power Ventilator listed.

Model: VEKTOR-H-10

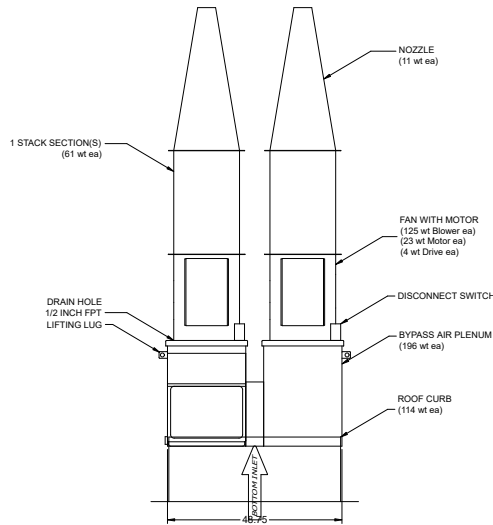
Fume Exhaust System



Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

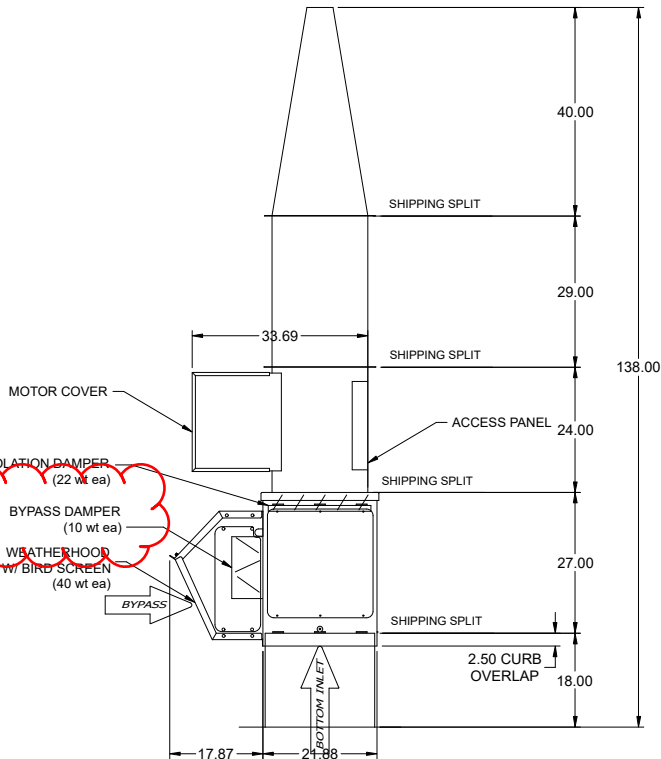
Model: VEKTOR-H-10

Fume Exhaust System



WEIGHT TOTALS	
FAN ASSEMBLY	224
FAN QTY	x2
PLENUM ASSEMBLY	290
ROOF CURB	114
SYSTEM TOTAL	851

WEIGHTS REFERENCED FROM ALL VIEWS



Omit bypass damper

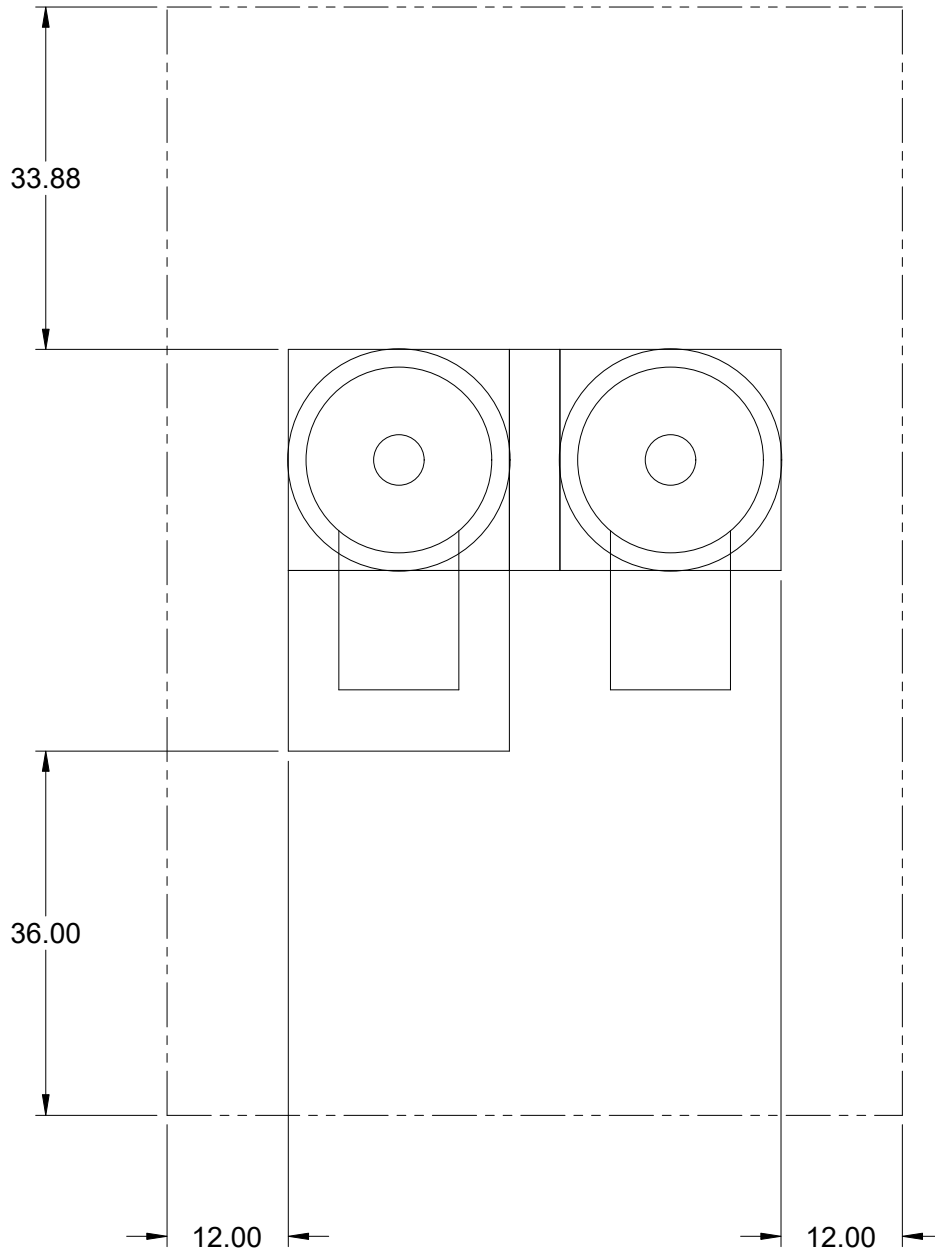
Notes: All dimensions shown are in units of in. and weights are shown in units of lb.

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Model: VEKTOR-H-10

Fume Exhaust System

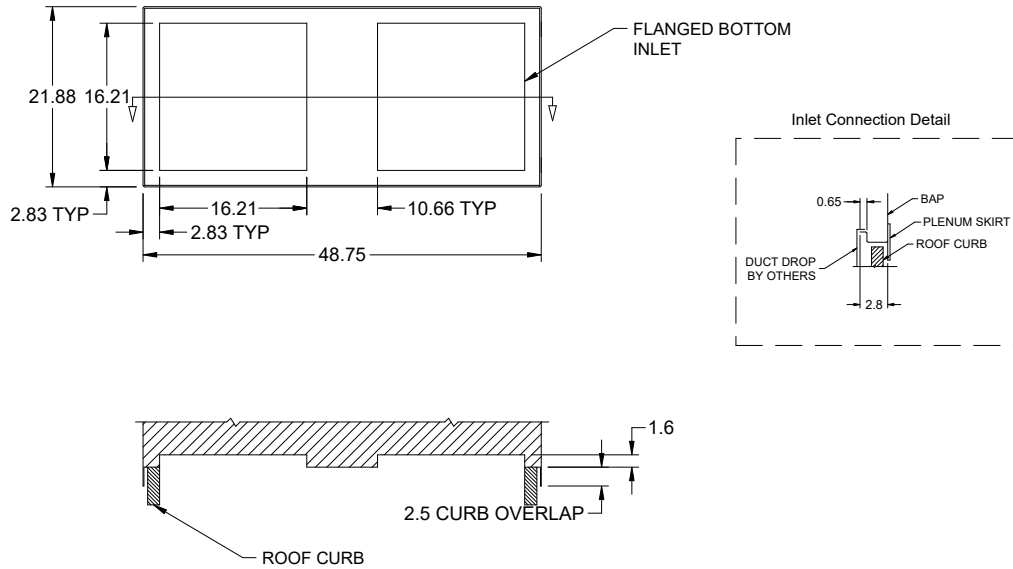
Recommended Service Clearances



Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

Model: VEKTOR-H-10

Fume Exhaust System



A MAXIMUM INLET VELOCITY OF 1500 FPM IS RECOMMENDED

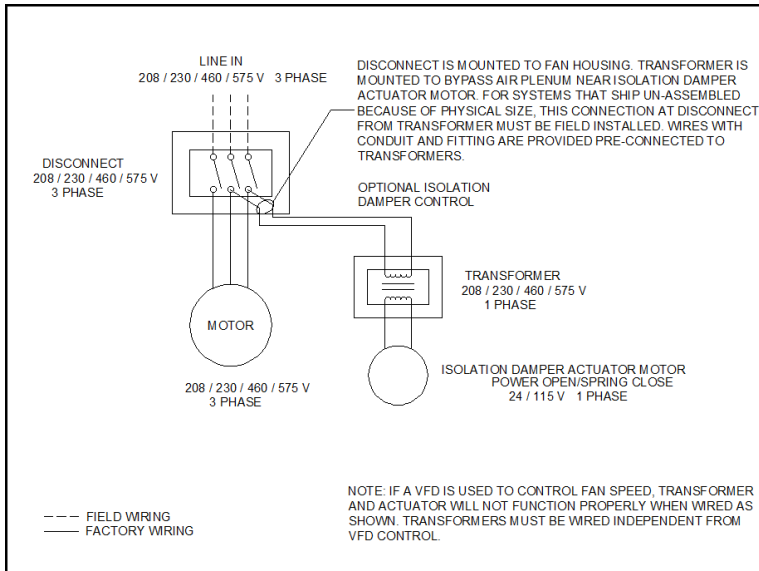
Notes: All dimensions shown are in units of in. and weights are shown in units of lb.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.

Fan Motor Report and Wiring Diagram

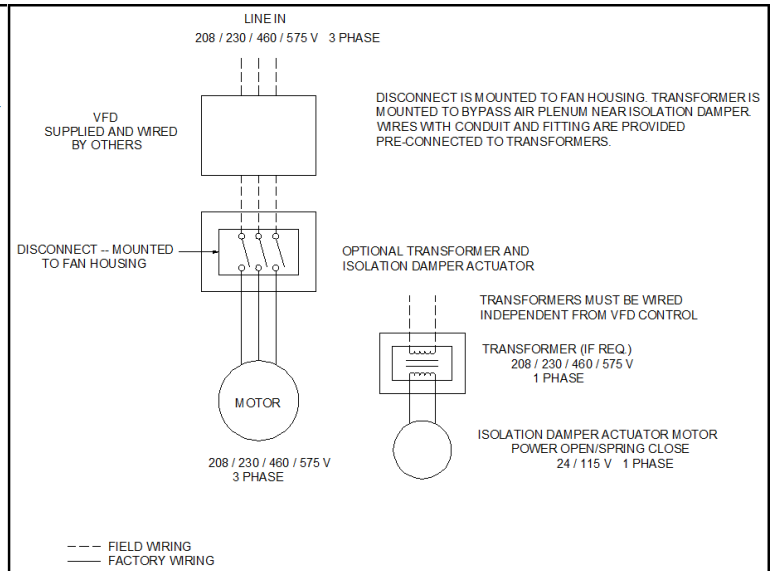
Motor Size (hp): 3/4
Motor RPM: 1725
Windings: 1
Cycle: 60 Cycle
Phase: 3
Voltage: 460

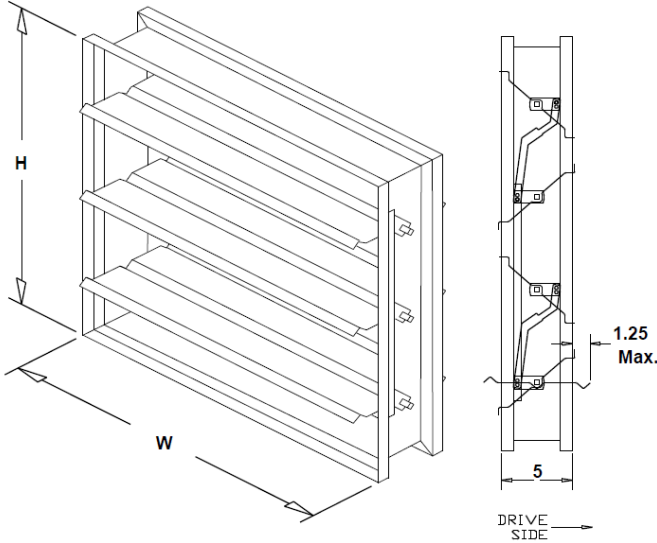
Motor Design: NEMA
Motor Duty:
Insulation Class: B
Motor Base Type: Rigid
Motor Frame Size: 56
VFD Rated: No

No VFD (3 phase)



System with VFD (3 phase)





VCD-23

Low Leakage Control Damper-Bypass

Application and Design

The model VCD-23 is a low leakage control for application as an automatic control or manual balancing damper. This model is intended for applications in low to medium pressure and velocity systems. A wide range of electric and pneumatic actuators are available.

Non-jackshafted dampers will be supplied with a blade drive lever for internal actuator mounting. When external actuator mounting is specified in which case an extension pin with clip kit will be provided.

Note: The extension pin with clip kit includes the extension pin and clip.

RATINGS

Leakage: Class 1A @ 1 in. wg, Class 1 @ 4 in. wg

Temperature: 200.0 F - 250.0 F Consult factory for higher temperatures.

Installation instructions available at www.greenheck.com

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

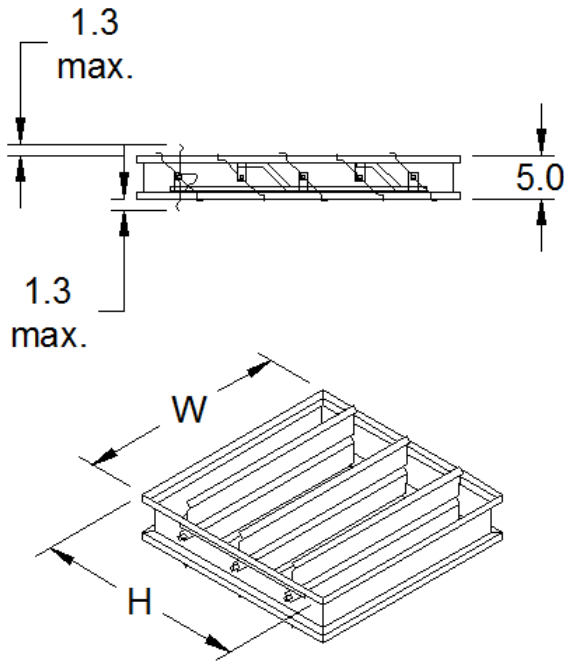
W and H furnished approximately 0.25 in. undersized and only refer to damper dimensions (sleeve thickness is not included).

Electrical accessory wiring terminates at the accessory.
Field wiring is required to individual components.

Construction Features

Temperature:	180	Frame Thickness (ga):	16	Coating Type:	Hi-Pro Polyester
Frame Material:	Galvaneal	Blade Thickness (ga):	16	Coating Thickness:	2-3 mils
Blade Action:	Opposed	Blade Seal:	Vinyl		
Jamb Seal Mat.:	304 SS	Actuator Mount:	External		
Axle Material:	Plated Steel				
Axle Bearings:	Synthetic				
Linkage Material:	Plated Steel				

Damper Qty	Damper Width in.	Damper Height in.	Total Actuator Qty	Actuator Model	Actuator Mfg.
1	6	6	1	MS7103A1021	Honeywell



VCD-23 Low Leakage Control Damper-Isolation

Application and Design

The model VCD-23 is a low leakage control for application as an automatic control or manual balancing damper. This model is intended for applications in low to medium pressure and velocity systems. A wide range of electric and pneumatic actuators are available.

Non-jackshafted dampers will be supplied with a blade drive lever for internal actuator mounting. When external actuator mounting is specified in which case an extension pin with clip kit will be provided. Note: The extension pin with clip kit includes the extension pin and clip.

RATINGS

Leakage: Class 1A @ 1 in. wg, Class 1 @ 4 in. wg

Temperature: 200.0 F - 250.0 F Consult factory for higher temperatures.

Installation instructions available at www.greenheck.com

Notes: All dimensions shown are in units of in.

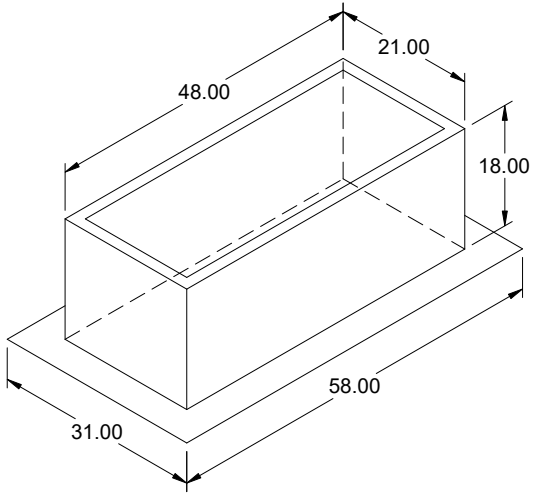
W and H furnished approximately 0.25 in. undersized and only refer to damper dimensions (sleeve thickness is not included).

Electrical accessory wiring terminates at the accessory.
Field wiring is required to individual components.

Construction Features

Temperature:	180 F	Frame Thickness (ga):	14	Coating Type:	Hi-Pro Polyester
Frame Material:	Galvaneal	Blade Thickness (ga):	16	Coating Thickness:	2-3 mils
Blade Action:	Parallel	Blade Seal:	Vinyl		
Jamb Seal Mat.:	304 SS	Actuator Mount:	External		
Axle Material:	Plated Steel				
Axle Bearings:	Synthetic				
Linkage Material:	Plated Steel				

Damper Qty	Damper Width in.	Damper Height in.	Total Actuator Qty	Actuator Model	Actuator Mfg.
2	18	18	2	MS8103F1225	Honeywell



Model: GPFHL

Heavy Load Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of galvanized steel (14 ga) - Straight Sided - Single roof flashing flange (5 in. width) - Insulated (1 in. thick, 3 lb density).
 NOTES: - Curb actual dimension is 0.5 in. smaller than cap dimension. - The maximum allowable roof opening dimension is actual minus 4 in.. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPFHL-21.5 x 48.5	Nominal	0.5	114	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Flange Width (in.)	Flange Length (in.)
18	21.5	48.5	21	48	31	58

*May not be applicable

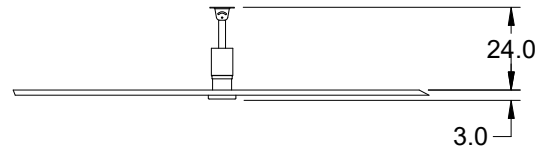
Accessories

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

Coatings

Coating Type	Coating Color	Match Color Name	Match Color Code	Coating Area
Hi-Pro Polyester	Concrete Gray-RAL 7023			Entire Unit

Model: DC-5-10-13LV
High Volume, Low Speed Ceiling Fan



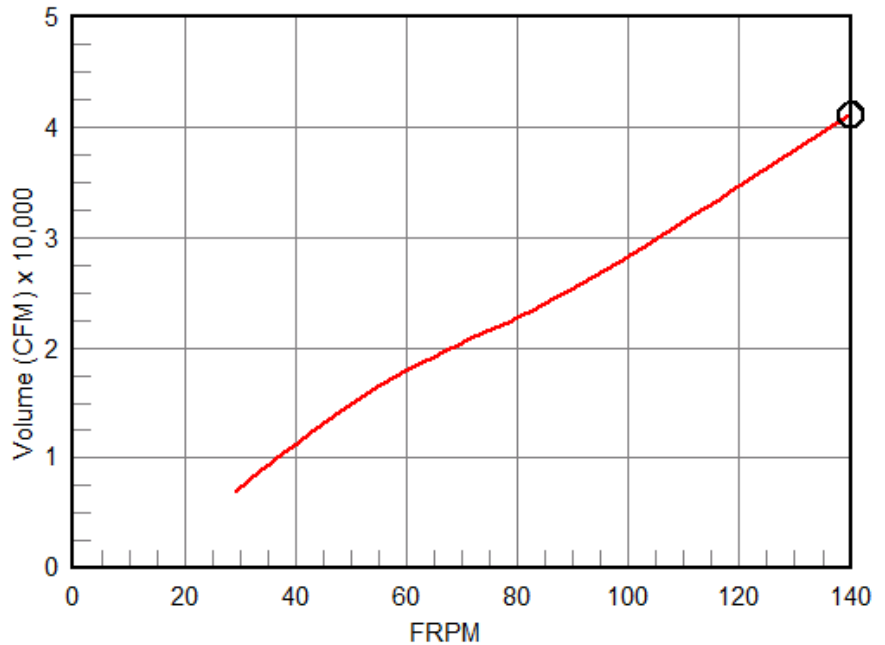
Dimensional	
Impeller Diameter (ft)	10
Impeller Diameter (in.)	120
Quantity	3
Weight w/o Acc's (lb)	44
Weight w/ Acc's (lb)	95

Installation Clearances	
Minimum Fan Spacing (ft)	30
Clearance to Wall (ft)	15
Blade Tip Clearance (ft)	3
Vertical Blade Clearance (ft)	3
Standby Blade Deflection (in.)	0.6

Performance Per Fan	
*Tested Direction of Operation	Forward
Actual Volume (CFM)	41,200
Coverage Area (ft ²)	11,300
Max Coverage Area (ft ²)	11,300
Avg. Air Speed (ft/min)	258
Max Avg. Air Speed (ft/min)	258
Fan RPM	140
Max Fan RPM	140
**CFEI at 40% Speed	4.38
**CFEI at 100% Speed	1.70
***Integrated Efficiency (CFM/W)	-
Total Sound Pressure (dBA)	55

Fan Operation	
Direction of Operation Capability	Forward or Reverse
Communication Protocol	Modbus RTU

Motor	
Size (W)	175
Voltage/Cycle/Phase	115/60/1
Enclosure	IP54
Max Motor RPM	140
***System FLA (Amps)	5.0
**Standby Power (W)	5
**Input Power (W)	315



○ Operating point
 — Fan curve

Notes:

All dimensions shown are in units of in. (unless specified otherwise)

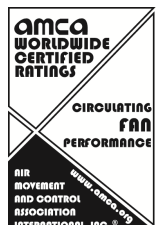
Dimensions shown may vary with fan speed. Consult installation manual for clearance requirements.

dBA – A weighted sound pressure level measured 5 ft off the ground at 20 ft from the center of the fan – dBA levels are not licensed by AMCA International

*Cataloged performance data tested using forward direction of operation per 10 CFR Part 430.

**Based on 115/60/1 testing per 10 CFR 430

***FLA is based on worst case system voltage and phase combination



EOR Please confirm
this is acceptable

Model: DC-5-10-13LV

High Volume, Low Speed Ceiling Fan

Tags: VF-1 VF-2 VF-3

Standard Construction Features:

Heavy duty frame with protective finish - Extruded aluminum airfoils - High efficiency direct drive motor designed for either forward or reverse operation - Factory mounted and wired variable frequency drive - Factory installed plug and play wiring - Universal ceiling mount - Heavy duty safety restraint cable - Airfoil and fan hub retaining systems - AMCA certified for Circulating Fan Performance

Selected Options & Accessories:

5 Blade, Extruded Aluminum Airfoil Kit

Mill Finish, No Color

Aluminum Winglet; Hi-Pro Polyester Finish, Flat Black (044) Color

Steel Truss Mounting Kit; Hi-Pro Polyester Finish, Flat Black (044) Color

2 ft Drop Length; Hi-Pro Polyester Finish, Flat Black (044) Color

Hub Plate and Impeller Hub; Hi-Pro Polyester Finish, Flat Black (044) Color

Power Wiring Pigtail, Internal, General, 3 ft of Flexible Power Cord from Unit, Unstripped Wire

Plug-and-Play Network Communication Wiring Pigtail, Internal, Terminated with Shielded CAT-5e Splitter (RJ45 Ports)

100 ft of Shielded, Twisted Pair (STP) CAT-5e Control Cable

Fire Alarm Wiring Pigtail, Internal, 4 ft from Unit, Terminated with Crimp Connector

Low-Voltage (24VDC/VAC or 115VAC), Normally Closed Electromechanical Fire Alarm Relay

Braided Galvanized Steel Safety Cable, 18 ft from Unit

Cable Clamp Hardware for Safety Cable

Switch, NEMA-1, Toggle, Shipped with Unit

UL/cUL-507 Listed for Damp Locations

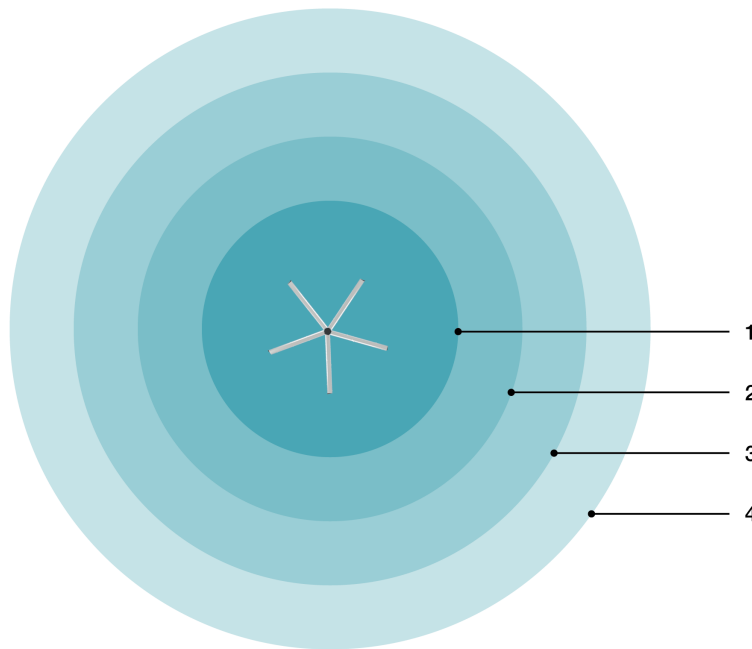
Electrical Warranty: 1 Yr (Standard)

Mechanical Warranty: 10 Yrs (Standard)

SSR has no objections.

Model: DC-5-10-13LV
High Volume, Low Speed Ceiling Fan

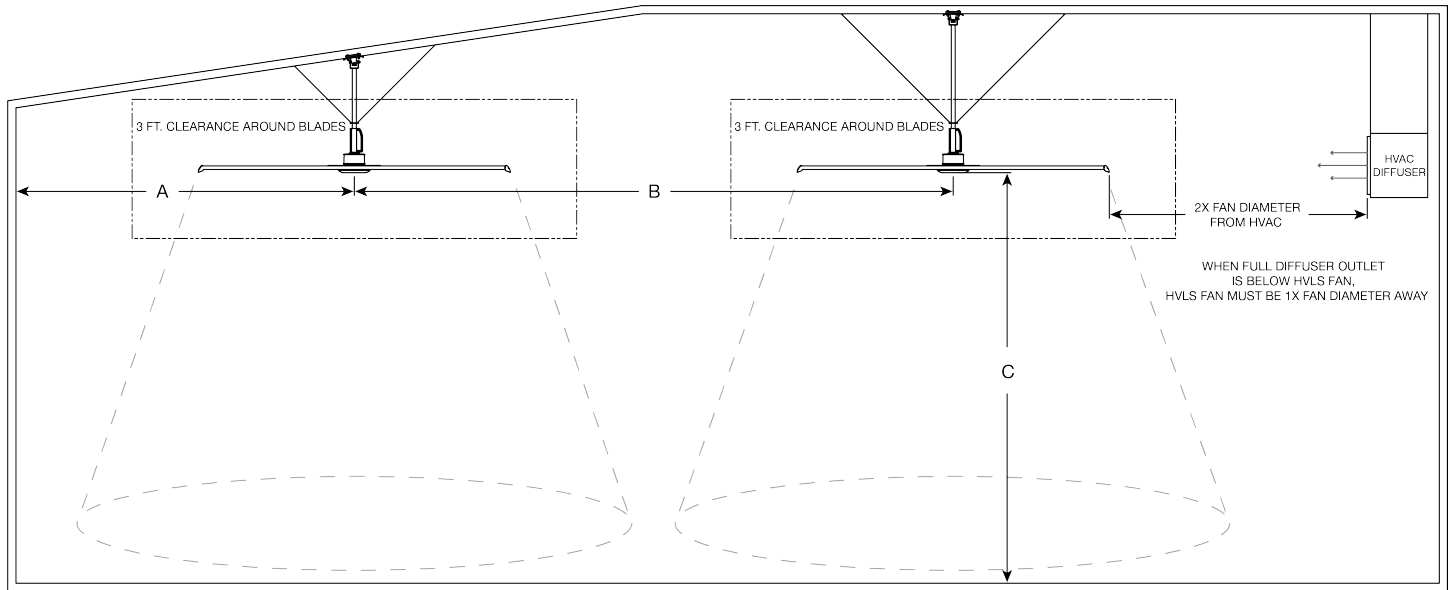
Fan Coverage Data



	Fan Speed (RPM)	Zone 1 375+ FPM Air Speed Radius (ft)	Zone 2 230+ FPM Air Speed Radius (ft)	Zone 3 105+ FPM Air Speed Radius (ft)	Zone 4 <105 FPM Air Speed Radius (ft)	Recommended Coverage Radius Per Fan (ft)
Selected	140	0	18	47	72	60
Maximum	140	0	18	47	72	60

Model: DC-5-10-13LV
High Volume, Low Speed Ceiling Fan

Fan Spacing & Clearances

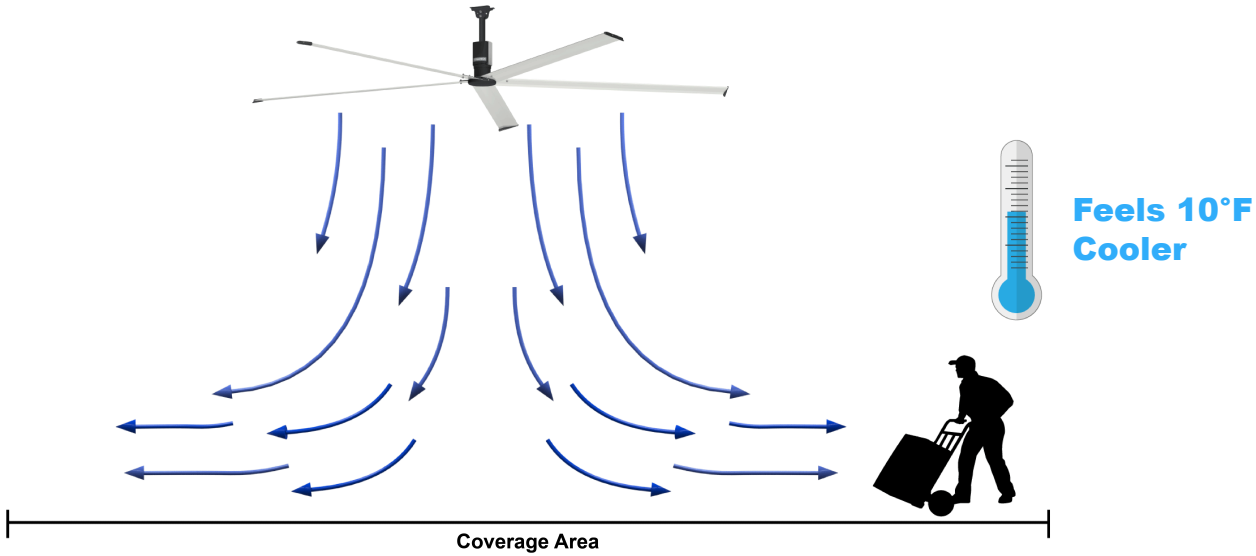


	A - Clearance to Wall (ft)	B - Fan Spacing (ft)	C - Clearance to Floor (ft)
Minimum	15	30	10

Additional Requirements

- For NFPA 13 compliance in buildings equipped with sprinklers:
 - Fan must be centered approximately between four adjacent sprinklers
 - Vertical clearance from fan to sprinkler deflector must be a minimum of 3 ft (36 in.)
 - Fan must be interlocked to shut down immediately upon a waterflow alarm from the building's fire alarm system
 - Interlock with building's fire alarm system shall be in accordance with the requirements of NFPA 72
- Avoid installing fan directly below a light source to prevent a strobing effect that can be caused by fan rotation

Perceived Cooling Effect



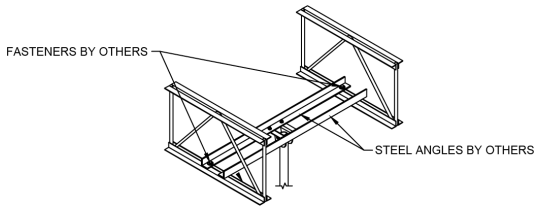
Perceived Cooling Effect Based on ASHRAE 55-2017

Coverage Area Per Fan (ft ²)	Operative Temp. (F)	Relative Humidity (%)	Metabolic Rate	Clothing Level	Avg. Air Speed (ft/min)	Perceived Cooling Effect (F)
11,300	77	60	1.7 Walking	0.57 Pants, Short Sleeves	258	10

Model: DC-5-10-13LV
 High Volume, Low Speed Ceiling Fan

Mechanical Installation Requirements

Selected Mounting Kit: Steel Truss



⚠ IMPORTANT: HVLS fans must be mounted to building structure as shown in one of the mounting details on this page. Other mounting methods are not acceptable unless approved by Structural Engineer of Record (SEOR). For complete installation instructions, refer to the installation, operation and maintenance manual (IOM).

⚠ IMPORTANT: Failure to install the fan's safety retention cable and guy wires (if provided) will result in voiding of the fan warranty.

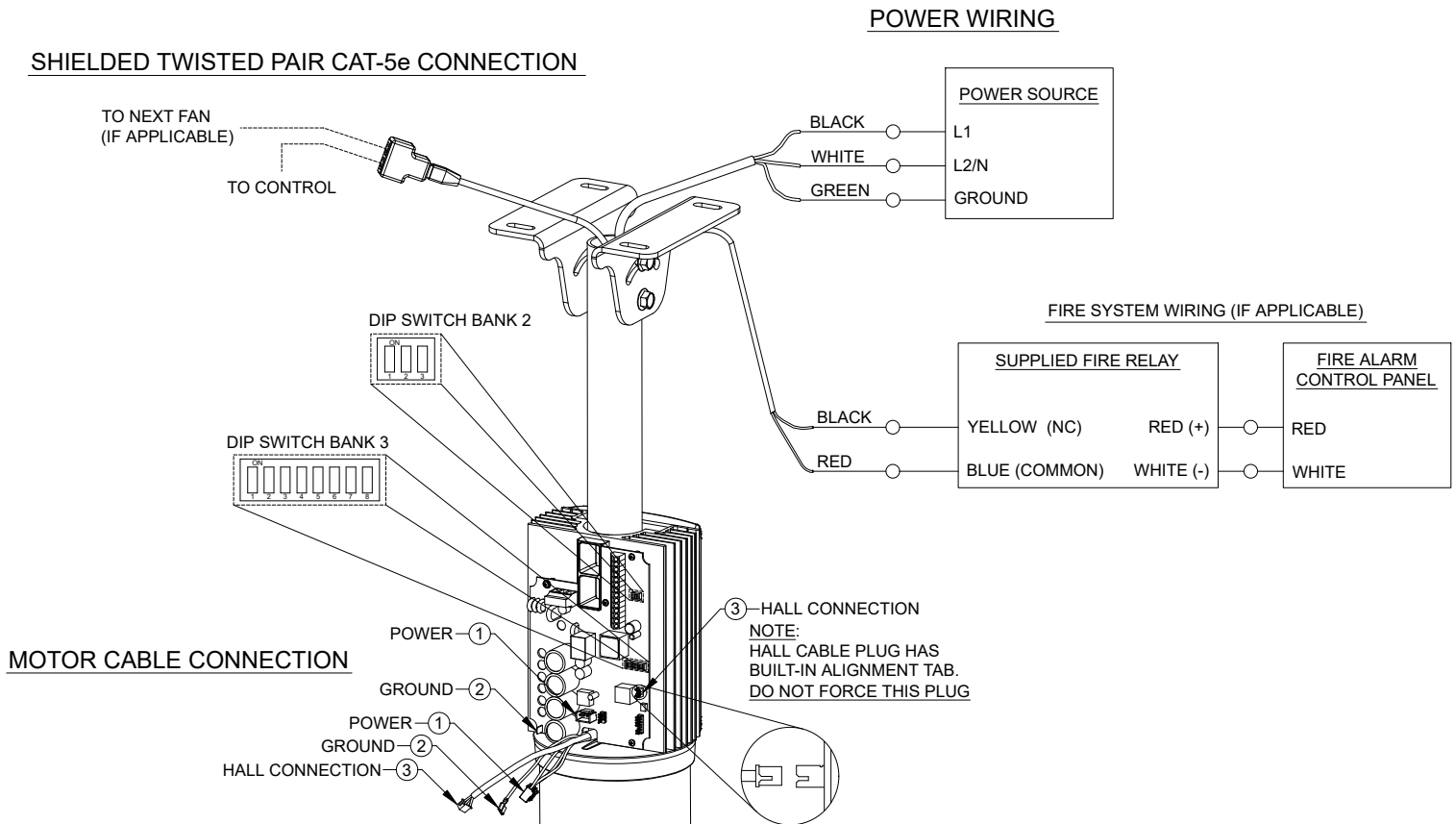
Available Mounting Kits (Additional Charges May Apply):

<p>Z-PURLIN</p>	<p>WOOD BEAM</p>
<p>UNISTRUT</p>	<p>I-BEAM</p>

Model: DC-5-10-13LV
High Volume, Low Speed Ceiling Fan

Electrical Installation Requirements

⚠ IMPORTANT: HVLS fans must be installed with the supplied CAT-5e communication cable or shielded, twisted pair (STP) CAT-5e (by others) that complies with the following specifications. Cable must be twisted pair, shielded 26 ga. CAT-5e cable with a drain wire and must be compliant with ISO 11801. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout. Individual CAT-5e cable lengths must not exceed 200 ft. in order to prevent network communication issues.



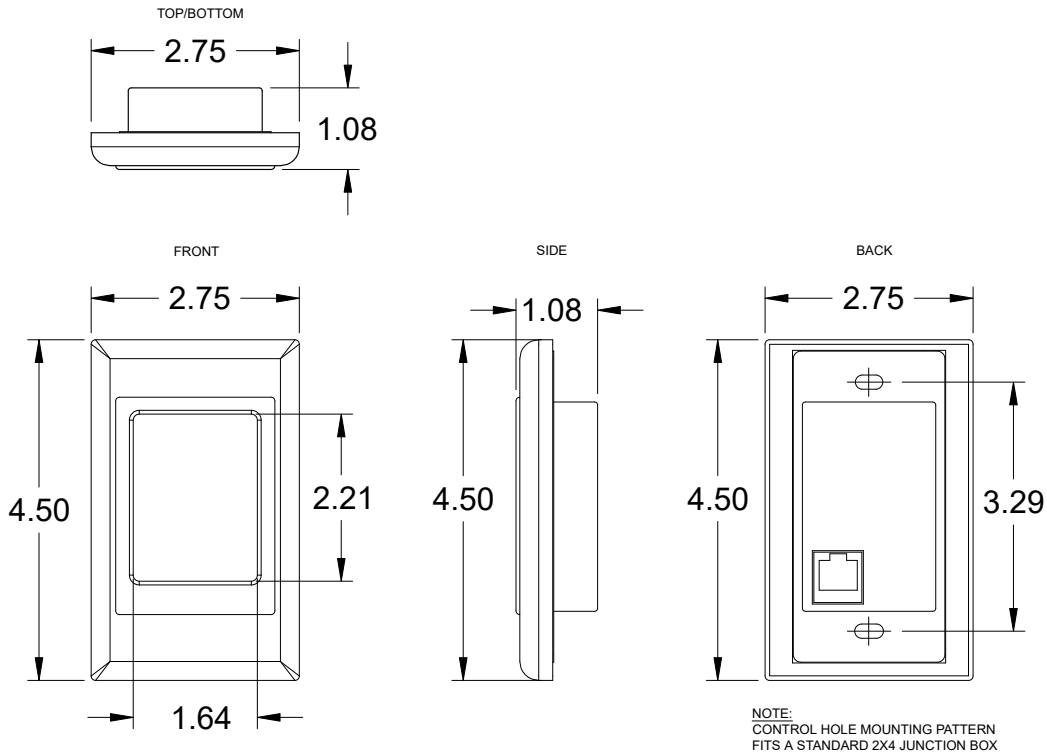
NOTE: If networking multiple HVLS fans to run using a single control source, additional wiring and network modification may be required. Please refer to the fans's installation, operation and maintenance manual (IOM)

HVLS Fan Controls

Standard Construction Features:

HVLS fan controls are designed for use with Greenheck's high volume, low speed (HVLS) ceiling fan products. Each control is configured for communication with one or multiple HVLS fans via the included RJ45 connector.

- Control Type: Std. Touchscreen
- Control Quantity: 1
- Fans Per Control: 3
- Installation Kit: N/A
- Control Enclosure: Touchscreen interface with IP40 Front enclosure
- Power Supply: Requires 24V power from fan via shielded, twisted pair (STP) CAT-5e cable
- Communications: Configured for Modbus RTU Communication with HVLS Fan(s)
Included RJ45 Receptacle for Plug-and-Play Communication Wiring to HVLS Fans via Shielded CAT-5e Cable (CAT-5e Cable Provided with HVLS Fans)
- Fan Operation: Capable of Operating Up to 3 HVLS Fans with Any Combination of Models and Sizes
Fans Operate Individually with Unique Speed Settings and Directions of Rotation



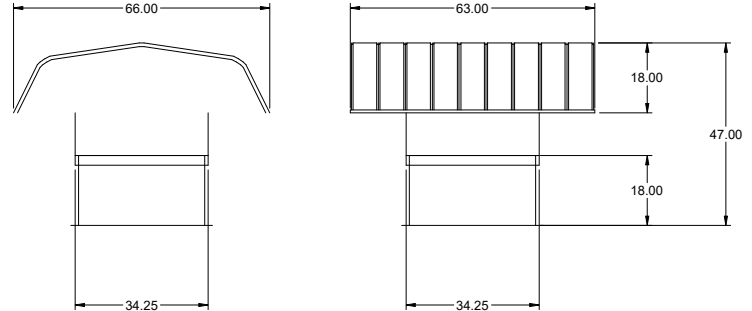
Notes: All dimensions shown are in units of in.

SF-CEP-1 will be reselected to include filters in an upcoming revision. This will eliminate the separate duct mounted filter housing. This fan should not be included in the purchasing package.

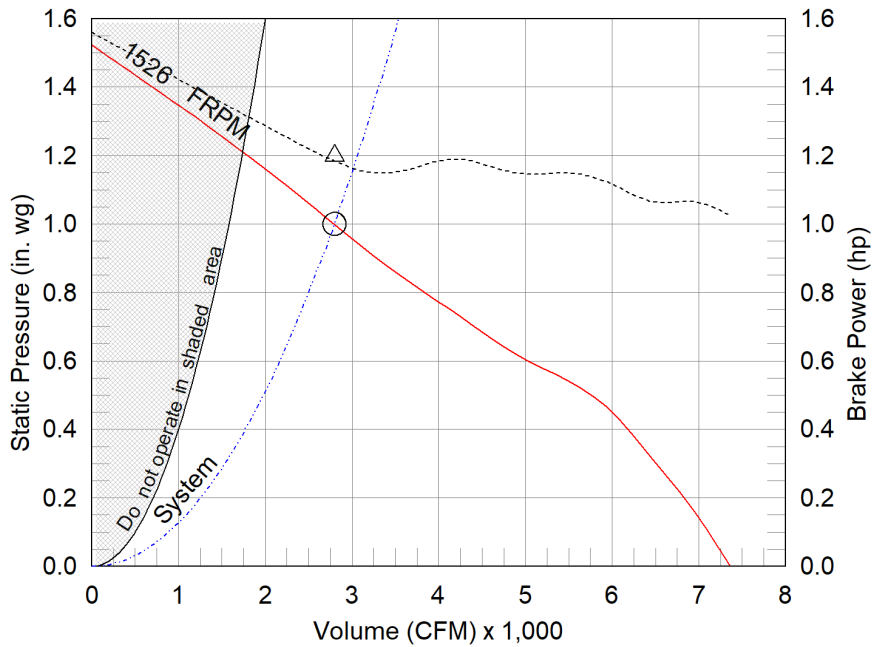
Model: RS2-24-612-VG

Propeller Hooded Roof Direct Drive Supply Fan

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	292
Weight w/ Acc's (lb)	296
Weight w/ Acc's and Curb (lb)	350
Roof Opening (in.)	26.5 x 26.5



Performance	
Requested Volume (CFM)	2,800
Actual Volume (CFM)	2,800
Total External SP (in. wg)	1
Fan RPM	1526
Operating Power (hp)	1.2
Elevation (ft)	105
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.075
Tip Speed (ft/min)	9,585
Static Eff. (%)	37



Motor	
Motor Mounted	Yes
Size (hp)	2
Voltage/Cycle/Phase	460/60/3
Enclosure	TEFC
Motor RPM	1725
Efficiency Rating	High
Windings	1
FLA (Amps)	3.2

- △ 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	84	90	92	91	89	85	80	76	93	82	35



Model: RS2-24-612-VG

Propeller Hooded Roof Direct Drive Supply Fan

Standard Construction Features:

- Base and hoods of galvanized steel - Drive frames and fan panels of fabricated steel - Wire mesh birdscreens - Ball bearing motors - Fabricated steel propeller - Corrosion resistant fasteners - Due to shipping size limitations, hoods will be shipped knocked down. Hood assembly requires no special tools or training. Complete illustrated assembly and installation instructions are packed with each fan.

Selected Options & Accessories:

Hood
Motor - Vari-Green EC motor
Control - 0-10VDC Input
Control - Dial for balancing
Switch, NEMA-1, Toggle, Shipped with Unit
Junction Box Mounted & Wired
Steel Propeller
Galvanized Construction
Unit Warranty: 1 Yr (Standard)

Selected Sub Marks

See individual submittals for full details
GPI-34-24-G18

The Vari-Green Motor included in this order can operate on any three phase voltage between 380V and 480V.

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. Motor is operable in the 2-10VDC range and off while in the 0-1.9VDC range. Vari-Green motors feature a soft-start and inherent thermal and current protection built into each unit. Inrush current at start up is eliminated and the motor will automatically reduce speed or turn off if overloaded or it becomes too hot.

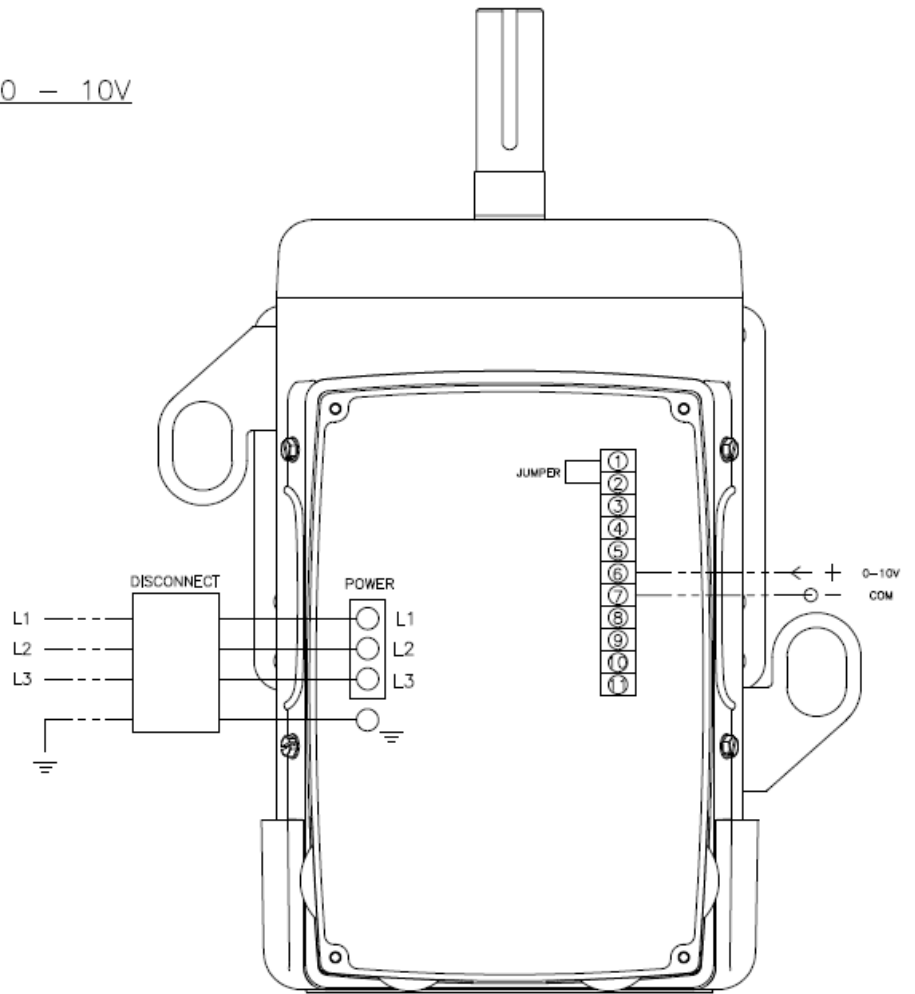
Motor Configuration

Input Voltage: 460
Speed Reference: 0-10VDC
Permanent Dial: No
Balance Dial Included: Yes

0 - 10V

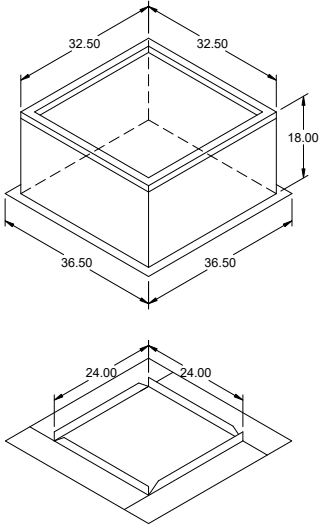
Control Configuration

Control Type: By Others
Transformer: None



DRAWING#
5.1.2.v1

----- FIELD WIRED
_____ FACTORY WIRED



Model: GPI

Roof Curb

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel. Gridwork is welded to the frame and the frame is welded to the curb.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	1	GPI-34	Nominal	1.5	54	Yes	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Actual Inside Width (in.)	Actual Inside Length (in.)	Flange Width (in.)	Flange Length (in.)	Hinge Base Width* (in.)	Hinge Base Length* (in.)
18	34	34	32.5	32.5	29	29	36.5	36.5	33	33

*May not be applicable

Damper Tray

Damper Tray Width (in.)	Damper Tray Length (in.)
24	24

Accessories

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