Blowers and Fans
General Selection Considerations

General Specifications

All Hammond blowers and filter fans are engineered for performance and built for reliability. This versatile line includes a blower, fan tray and filter fans.

Blowers and fans use forced convection cooling, which means ambient air flows through a filter into the enclosure to cool heated components. Both blowers and fans are sized in CFM (cubic feet per minute).
It is recommended that an exhaust filter be used in combination with the blower or filter fan to act both as an exhaust point for the hot internal air plus aid in the pressurization of the enclosure, reducing the chance of unfiltered air entering the enclosure. Whenever possible, the blower or filter fan should be located in the bottom third of the enclosure and the filtered exhaust grill placed as high as possible on the opposing side. Performance levels can be further increased by adding a second exhaust filter.

Sizing Blowers and Fans

To determine the CFM (cubic feet per minute) required in any standard situation, use the following calculation,
(non-standard situations would consist of high air density - significantly more than 0.075 lbs per cubic foot.)

$$CFM = \frac{\text{Power to be dissipated (Watts) x 3.17}}{\text{Maximum Allowable Internal Temperature (°F)} - \text{Maximum Ambient Temperature (°F)}}$$

Note - The calculation above is exact, but adding an additional 25% to the CFM level is a standard safety factor.

If the air density is high (significantly more than 0.075 lbs per cubic foot), use the number calculated above in the following formula:

$$\frac{\text{CFM x (0.075)}}{\text{Non-standard Air Density (lbs per cubic foot)}}$$

Note: Ambient Temperature must be lower than maximum internal temperature for fan/blower to be effective.

Climate Control

Packaged Twin Blowers
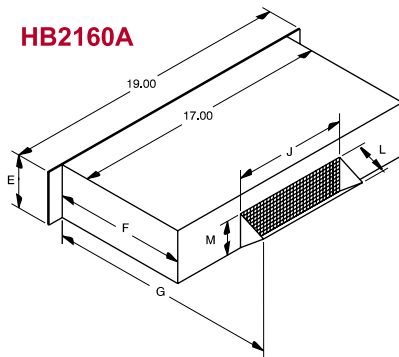### 160 to 470 CFM

Description
- Each contains a quadruplex centrifugal blower powered by a single precision ball-bearing motor.
- These widely-used Packaged Twin Blowers deliver air from more than 50% of their 17" width.
- Internal neoprene isolation mounts reduce transmission of vibration to the enclosure.
- Can be mounted on panel rails or into a cutout in an enclosure.
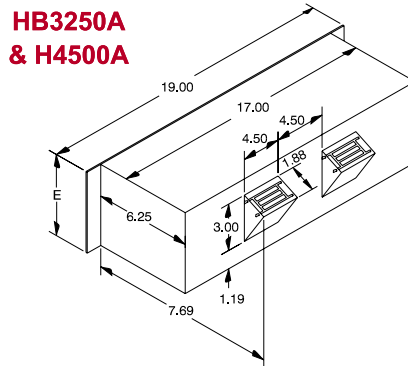
Features
- Capacities: 160 to 470 CFM.
- Heavy-gauge steel enclosures with EIA-notched flanges for rail mounting.
- Attractive 19 inch stainless steel grills.
- UR/CSA approved ball-bearing motors.
- Inlet air cools motor for longer life.
- Permanent filters.
- Exhaust guards included.
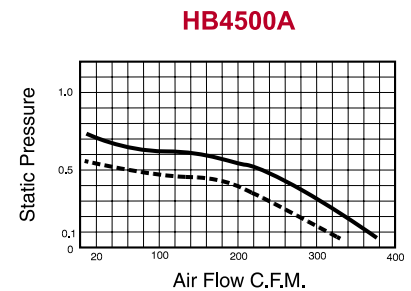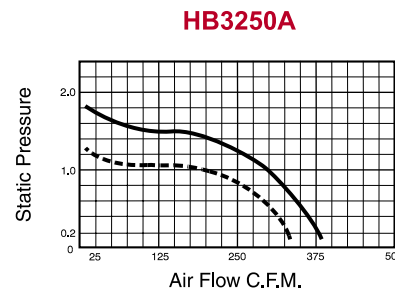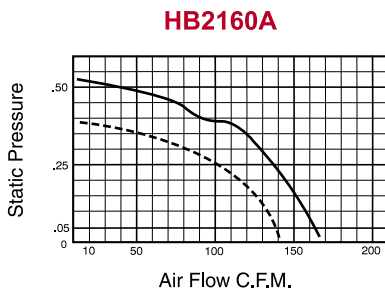- Six foot (minimum) SJTW 3-wire cord.

Accessories
- Filter coat...*see page 413*

HB2160A

HB3250A & H4500A

Climate Control

HB2160A

HB3250A

HB4500A

Static Pressure / Air Flow C.F.M.

——— 50 Hz
— — — 60 Hz

Part No.	Free Flow Air Delivery (CFM)	RPM Nominal	Ambient Temp. Min. F	Ambient Temp. Max. F	Panel Height Units	E	F	G	H	J	K	L	M	N	Ship Wt.lbs
HB2160A	160	1500	-20	250	2	3.50	8.75	10.50	-	7.50	-	2.25	2.25	-	10
HB3250A	300	3000	-20	250	3	5.25	6.25	7.69	4.50	4.50	0.63	1.88	3.00	1.19	18
HB4500A	470	3250	-20	250	4	7.00	8.25	10.25	4.63	4.75	1.00	2.50	4.00	1.44	23

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise

PF Filter Fans

PF3000 and PF2000

Description
• This line of fans provides innovative technology for fan cooling and pressurizing of industrial cabinets. A high quality filter fan provides an economical method of ensuring your enclosure does not overheat.
• Filtered passive ventilation can be provided by an exhaust filter for either convection cooling or in combination with a fan in forced air cooling.
• The slim-line design of this fan line is unique, when installed, the front louvered grill protrudes less than one quarter inch. The attractive grill maintains the sleek aesthetics of an enclosure system.

Standards
• UR, CUR and CE.
• Built to IP54 standards (except PF1000/PFA1000 - IP43 standards).
• Maintains NEMA 12 integrity of enclosure.
• Fan CSA Listed.

Features
• Available in 115V and 230V versions
• High performance fan motors with finger guards.
• ABS-FR grills (except PF1000 Series which is polystyrene FR).
• Durable, reusable filter mat.
• Grills are black allowing for a complementary match to all cabinet colors.
• Integral gasket to seal against enclosure. (except PF1000 - use PFG1000)

Easy Installation
• The patented "Click and Fit" system allows for rapid filter fan and exhaust filter installation without screws.
• After using the convenient cutout template (provided with every unit), the fan and/or exhaust filter just snaps into the opening.

Options
• Reverse flow (exhaust) available on 5,6,7000 models

Accessories
• Exhaust filters...see page **410**
• Replacement grills...see page **410**
• Replacement filters...see page **410**
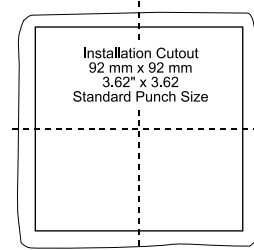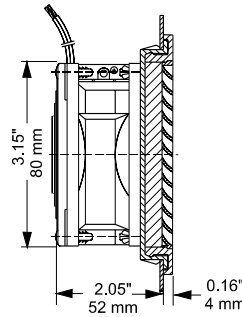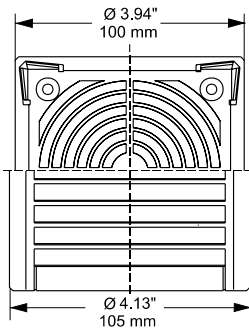
Climate Control

Part No.	Voltage	Free Flow Air Delivery (CFM)	Air Delivery w/Exhaust (CFM)	Max. Static Pressure (Pa)	Filter Density (g/m²)	Filtering Level	Sound Level (dB)	Connector Type	Ambient Temp. °F Max/Min	Comparable IP Standard	Ship Wt. lbs
PF1000	115	16	10	29	150	73%	39	2 - 12" wires	140/14	IP43	1.5
PF2000	115	38	28	69	150	73%	49	terminal strip	122/14	IP54	2
PF2500	115	89	62	57	150	73%	55	terminal strip	122/14	IP54	4
PF3000	115	169	142	89	150	73%	55	terminal strip	122/14	IP54	4
PF5000	115	324	249	205	150	73%	69	terminal strip	122/14	IP54	7
PF6000	115	410	295	225	150	73%	71	terminal strip	122/14	IP54	8
PF7000	115	506	368	158	150	73%	72	terminal strip	122/14	IP54	8
PF1000230	230	16	10	29	150	73%	39	2 - 12" wires	140/14	IP43	1.5
PF2000230	230	38	28	69	150	73%	49	terminal strip	122/14	IP54	2
PF2500230	230	89	62	57	150	73%	55	terminal strip	122/14	IP54	4
PF3000230	230	169	142	89	150	73%	55	terminal strip	122/14	IP54	4
PF5000230	230	324	249	205	150	73%	69	terminal strip	122/14	IP54	7
PF6000230	230	410	295	225	150	73%	71	terminal strip	122/14	IP54	8
PF7000230	230	506	368	158	150	73%	72	terminal strip	122/14	IP54	8

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise
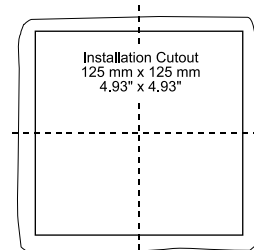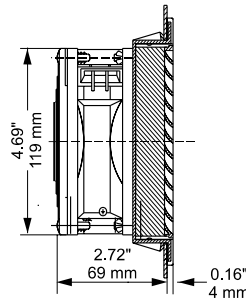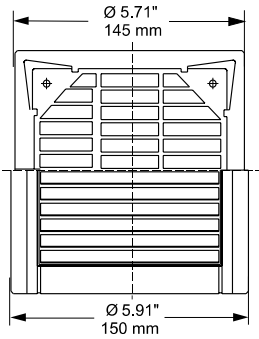
PF Filter Fans

Climate Control

Mechanical Data:
PF 1000

Ø 3.94"
100 mm

Ø 4.13"
105 mm

3.15"
80 mm

2.05"
52 mm

0.16"
4 mm

Installation Cutout
92 mm x 92 mm
3.62" x 3.62
Standard Punch Size

Installation Cutout

PF 2000

Ø 5.71"
145 mm

Ø 5.91"
150 mm

4.69"
119 mm

2.72"
69 mm

0.16"
4 mm

Installation Cutout
125 mm x 125 mm
4.93" x 4.93"

Installation Cutout

PF 2500 & 3000

Ø 9.65"
245 mm

Ø 9.84"
250 mm

PF 2500 = 127mm (5.00")
PF 3000 = 171mm (6.73")

6

PF 2500 = 111mm (4.37")
PF 3000 = 121mm (4.76")

Installation Cutout
223 mm x 223 mm
8.78" x 8.78"
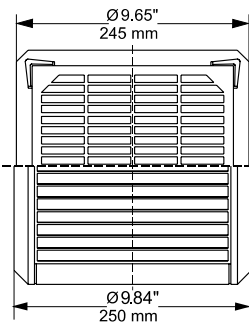
Installation Cutout

PF 5000, 6000 & 7000

Ø12.52
318 mm

Ø12.80
325 mm

PF 5000 = 202mm (7.95")
PF 6000 = 258mm (10.16")
PF 7000 = 282mm (11.10")

6

PF 5000 = 157mm (6.18")
PF 6000 = 158mm (6.22")
PF 7000 = 125mm (4.93")

Installation Cutout
291 mm x 291 mm
11.47" x 11.47"

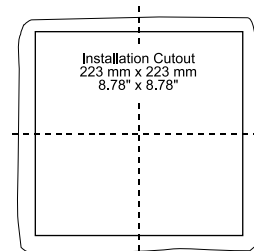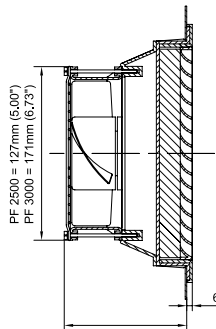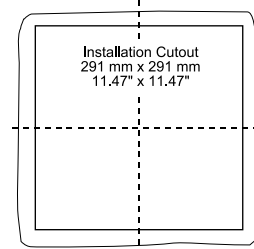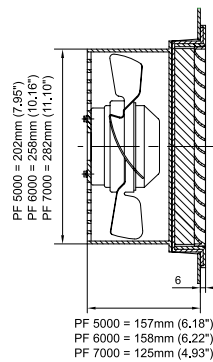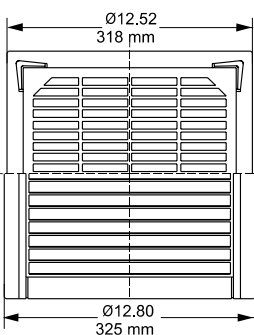Installation Cutout

Note: All cutout tolerances +1/- 0 mm

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise

Fan Accessories

Exhaust Filters

- Built to IP54 standards (except PFA1000 - IP43 standards).
- ABS-FR grills (except PF1000 Series which is polystyrene FR).
- Self-extinguishing, re-usable filter mat.
- Grills are black to complement all cabinet colors.
- Grills also available (see below)
- Integral gasket seals against enclosure.

Part No.	Filter Density (g/m²)	Filtering Level	Comparable IP Standard
PFA1000	150	73%	IP43
PFA2000	150	73%	IP54
PFA3000	150	73%	IP54
PFA5000	150	73%	IP54

Replacement Grill

- Packaged individually.
- Consists of replacement grill only.

Black Part No.	RAL7032 Beige Part No.	Use With Filter Fan	Use With Exhaust Filter
PG1BK	**PG1RAL**	PF1000	PFA1000
PG2BK	**PG2RAL**	PF2000	PFA2000
PG3BK	**PG3RAL**	PF2500/PF3000	PFA3000
PG5BK	**PG5RAL**	PF5000/PF6000/PF7000	PFA5000

Replacement Filters

- Packaged in quantities of 5.
- Made of self-extinguishing synthetic fibers.

Part No.		Dimensions A	B	Use With Filter Fan	Filter Density (g/m²)
PFF1000	inch	3.40	3.40	PF1000	150
	mm	85	85		
PFF2000	inch	4.50	4.50	PF2000	350
	mm	115	115		
PFF3000	inch	8.30	8.30	PF2500/PF3000	350
	mm	210	210		
PFF5000	inch	11.00	11.00	PF5000/PF6000/PF7000	350
	mm	280	280		

Call Hammond for other Cooling Solutions….

- Intergral Door Air Conditioners
- Air/Water Heat Exchangers
- Custom Air/Air Heat Exchangers
- EMC Filter Fans
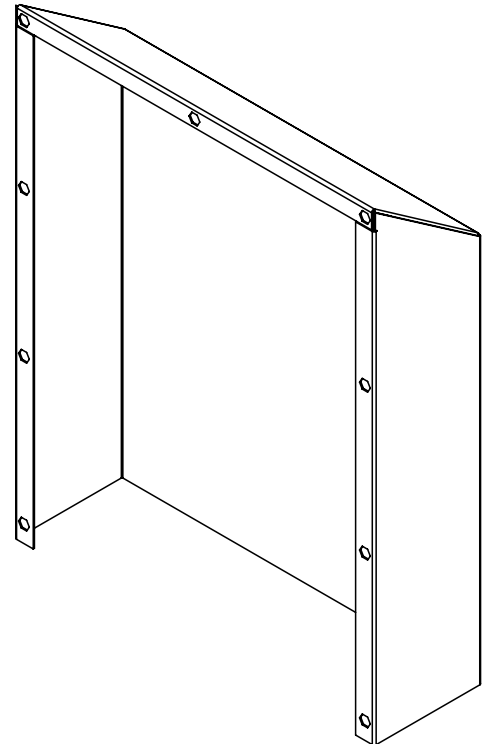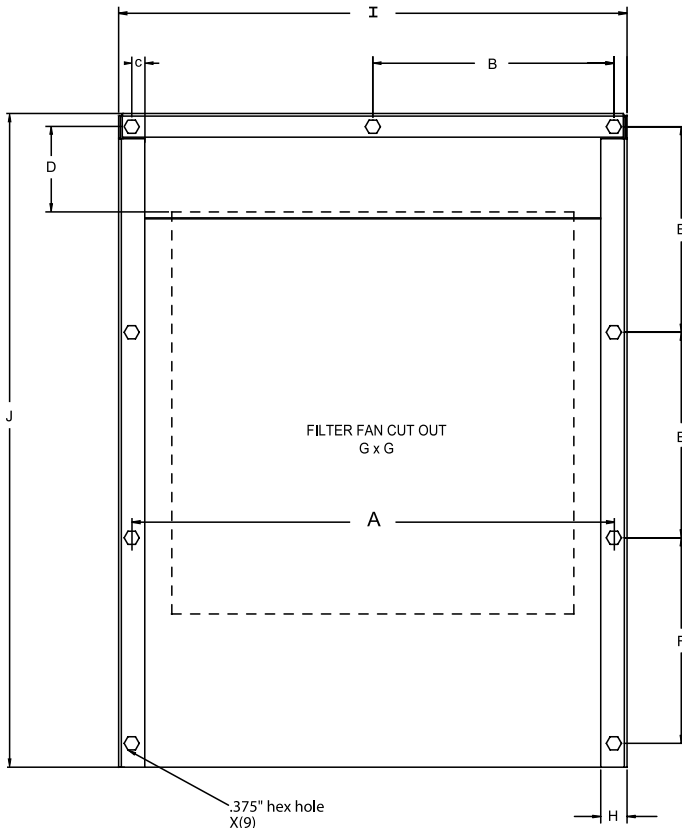- other customer cooling solutions through our knowlegeable Pfannenberg experts

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise

Applications

- NEMA 3R / Outdoor Rainhoods Standard Filterfans
- Fits sizes PF 2000, PF 25/3000 & PF 5/6/7000 Units
- 304 Stainless Steel Design for use on Washdown NEMA 4X enclosures
- Due to dust protection regulations, NEMA 4/4X rating on these systems is not possible.
- Gasket and sealing washers included.

Part No.	Goes With	Color
PFRH2000LG	PF/PFA2000	RAL7035
PFRH2000GY	PF/PFA2000	ANSI 61 Grey
PFRH2000SS	PF/PFA2000	304 Stainless Steel
PFRH3000LG	PF/PFA2500/3000	RAL7035
PFRH3000GY	PF/PFA2500/3000	ANSI 61 Grey
PFRH3000SS	PF/PFA2500/3000	304 Stainless Steel
PFRH5000LG	PF/PFA5000/6000/7000	RAL7035
PFRH5000GY	PF/PFA5000/6000/7000	ANSI 61 Grey
PFRH5000SS	PF/PFA5000/6000/7000	304 Stainless Steel

Climate Control

Series No.	A	B	C	D	E	F	G	H	I	J
PFRH2000	6.85	N/A	0.97	1.48	4.75	N/A	4.92	0.75	7.60	10.56
PFRH3000	10.79	5.39	1.00	2.50	6.82	N/A	8.78	0.75	11.54	14.69
PFRH5000	13.74	6.87	1.14	2.15	5.86	5.86	11.45	0.75	14.49	18.63

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise

Filtered Fan Boxes and Filter Grills

Filtered Fan Box

Filter Grill

Description
• In a typical cooling arrangement, the filtered fan box pulls air into the enclosures and the filter grill is used as an air outlet.
• The washable aluminum filter grill and the air filter are easily accessible and can be removed for cleaning.
• The filtered fan boxes are available in either 115 VAC or 230 VAC, 50/60 Hz.
• Filtered passive ventilation can be provided by an exhaust filter for either convection cooling or in combination with a fan in forced air cooling.

Standards
• UR/CUR/CE approved fan motors.
• CSA listed on fan only.

Features
• 115 VAC or 230 VAC, 50/60 Hz.
• 12" lead wires.
• Exceptionally quiet operation.
• Versatile mounting and adaptability.
• Heavy-gauge steel construction.
• Attractive stainless steel grills.
• Shipped with air flow to pressurize. Can be user modified to exhaust.
• Aluminum filter is coated with adhesive baffle surfaces for dust and dirt collection. Can be recoated after cleaning for optimum performance.
• Drilling template included.
• NOTE: One grill and filter are included with each fan package. Normally, an additional exhaust grill and filter are required for each installation and must be ordered separately.

Accessories
• Filter coat...see page **413**
• Replacement Filter...see page **413**

Filtered Fan Boxes and Filter Grills

0.19 DIA 4 PLACES
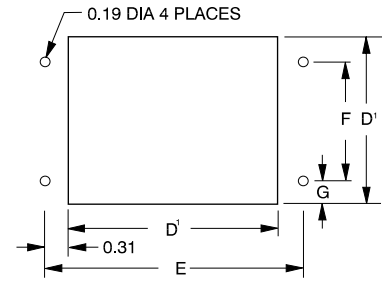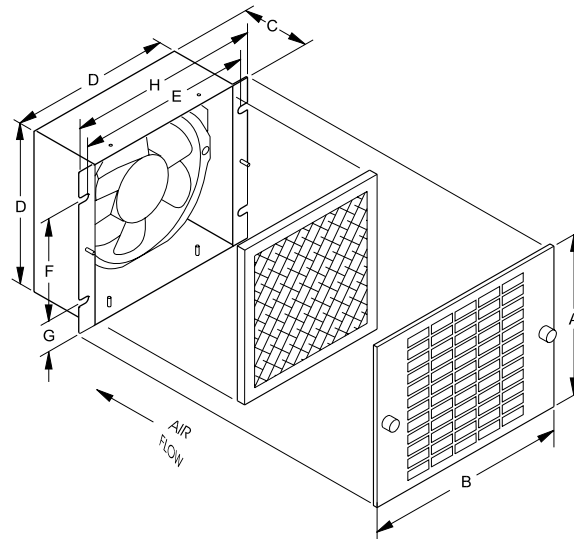
Cutout Detail

Filtered Fan Boxes

Part No.	Free Flow Air Delivery CFM	Volts	RPM Nominal	Running Amps	Watts	A	B	C	D	D¹	E	F	G	H	Ship Wt. lbs
XF4115	105	115	3000	0.18	15	6.13	7.38	2.38	5.63	5.75	6.38	4.13	0.78	7.0	5
XF4230	105	230	3000	0.09	15	6.13	7.38	2.38	5.63	5.75	6.38	4.13	0.78	7.0	5
XF6115	220	115	3300	0.29	33	7.63	8.88	3.00	7.13	7.25	7.88	4.50	1.34	8.5	6
XF6230	220	230	3300	0.15	33	7.63	8.88	3.00	7.13	7.25	7.88	4.50	1.34	8.5	6
XF10115	560	115	1600	0.87	60	11.63	13.00	4.56	11.13	11.25	11.88	6.88	2.16	12.5	12
XF10230	560	230	1600	0.45	60	11.63	13.00	4.56	11.13	11.25	11.88	6.88	2.16	12.5	12

Exhaust Grill and Filters

Part No	A	B	D	E¹	F¹	H¹
XFG4	6.13	7.38	5.63	6.38	4.13	7.00
XFG6	7.63	8.88	7.13	7.88	4.50	8.50
XFG10	11.63	13.00	11.13	11.88	6.88	12.50

Replacement Filters

Part No	Pkg. Qty.
XFF4	3
XFF6	3
XFF10	3

¹ Dimension for mounting and cabinet cutout. Secure sheet metal with #8 hardware.

Filter Coat

- Provides a filter adhesive with a grease-like consistency which absorbs and traps dust particles.
- 10 oz. bottle with environmentally friendly trigger spray.

Part No.	1475Q

Climate Control

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise

Fan Kits

Filter Fan Grills

- Mounts easily with 4 screws using the template provided.
- All mounting hardware included.
- Standard 80mm/3.15" and 120mm/4.00" fans can be attached with hardware provided to make a filter fan.
- Can be used alone as an enclosure exhaust.
- Moulded in flame retardant ABS.
- Flame retardant synthetic filter supplied.
- Integral gasket on reverse of grill seals against enclosure surface.
- Available in black, RAL7032 beige and ASA61/RAL7011 gray to match enclosures.

Accessories

- Spare hardware kit, Part No. **1421F4**

Black Part No.	Beige Part No.	Gray Part No.	H	W	Optional Compatible Fan Part No.	Size	CFM	Repl. Filter (pkg. 5)
XPFA80BK	**XPFA80CG**	**XPFA80GY**	4.13	4.13	**FAN80AC115**	80mm/3.15"	32	PFF1000
XPFA120BK	**XPFA120CG**	**XPFA120GY**	5.91	5.91	**DNMF100AC115**	120mm/4.70"	102	PFF2000

AC Fans and Guards

Fan Cords and Daisy Chains (10 amp, 115V)

Part No.	Description	Lead Length (In)	Connector	Fan End Termination
DNMFC	Fan Cord	24"	Straight	none
DNFC48P	Fan Cord	48"	45°	2 pin 115V plug
DNFC72P	Fan Cord	72"	45°	2 pin 115V plug
DNFCDC2P	Daisy Chain	24"	2x45°, 24" apart	2 pin 115V plug
DNFCDC3P	Daisy Chain	24"	3x45°, 24" apart	2 pin 115V plug

Part No.	Size(mm)	Size (In.)	CFM	AC Voltage	Use Fan Guard	Use Filter Fan Grill
FAN80AC115	80	3.15	32	115	FAN80FG	XPFA80...[1]
FAN80AC230	80	3.15	32	230	FAN80FG	XPFA80...[1]
DNMF100AC115	120	4.70	100	115	DNFG	XPFA120...[1]
DNMF100AC230	120	4.70	100	230	DNFG	XPFA120...[1]
FAN150AC115	150	6.00	210	115	FAN150FG	n/a
FAN150AC230	150	6.00	210	230	FAN150FG	n/a
FAN10A115	255	10.00	550	115	FAN10FG	n/a
FAN10A220	255	10.00	550	230	FAN10FG	n/a

[1]"..." specify color - BK (black), CG (RAL 7032) or GY (ASA61 gray)   UL recognized, CSA listed, CE certified

---

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise
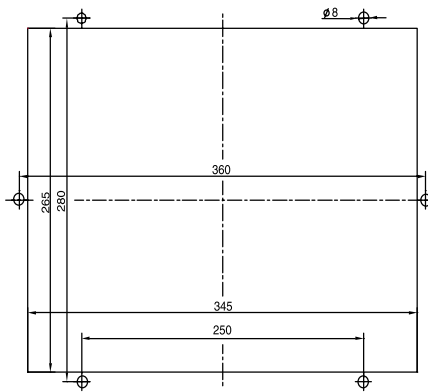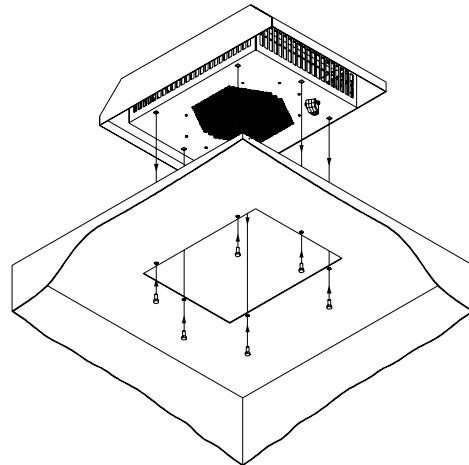
Top Mount Fan

- Mounts to top of enclosure.
- Ideal for use with IME Series (not compatible with 400mm deep IMET cabinets).
- 470 CFM free flow, 375 CFM using PFA6000 as inlet.
- 115V 50/60Hz
- Terminal block connection.
- 20.9" x 13.8" x 4.3"H
- UL/cUL Approved.
- Gasket seal- IP33 ingress protection level.
- Finished in RAL7032 beige.

Part No.	PTF8000

c(UL)us   CE

Cutout Template
(dimensions in mm)

ø8
360
265
280
345
250

Fan Panels

- Create your own rack mount fan or filter fan from these panels.
- Black powder coated steel.
- Also available in 24" and other widths or custom configurations.
- Fans sold separately

19" Grill Panel Shown

Punched 19" Fan Panels

Part No.	Panel Size	Cutouts for Stnd. Fans	# Holes	Optional Fan Part No. (115V)	Optional Fan Guard Grill	Optional Filter Grill (Black)	Optional Replacement Filter (pkg. 5)
PPFP190802BK1	3U	80mm/3.15"	2	FAN80AC115	FAN80FG	XPFA80BK	PFF1000
PPFP190803BK1	3U	80mm/3.15"	3	FAN80AC115	FAN80FG	XPFA80BK	PFF1000
PPFP191202BK1	4U	120mm/4.70"	2	DNMF100AC115	DNFG	XPFA120BK	PFF2000

Punched 19" Grill Panels (with integral front finger guard)

Part No.	Panel Size	Cutouts for Stnd. Fans	# Holes	Optional Fan Part No. (115V)	Optional Fan Guard Grill		
PPGP191202BK1	3U	120mm/4.70"	2	DNMF100AC115	DNFG	-	-

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise

Climate Control

Fan Tray
300, 600 and 900 CFM

Standards
• UR/CUR listed

Features
• 300, 600 and 900 CFM sizes.
• 115VAC, 50/60Hz.
• 19" panel width mounting.
• Low profile 1.75" (1U) height.
• 600 and 900 CFM units include removable rear support brackets.
• Circuit breaker protected.
• 6 foot 14/3 SJTW cord with molded 3 prong plug.
• Thermally protected, ball bearing fans.
• Integral finger guards above and below fans.
• Shipped fully assembled.
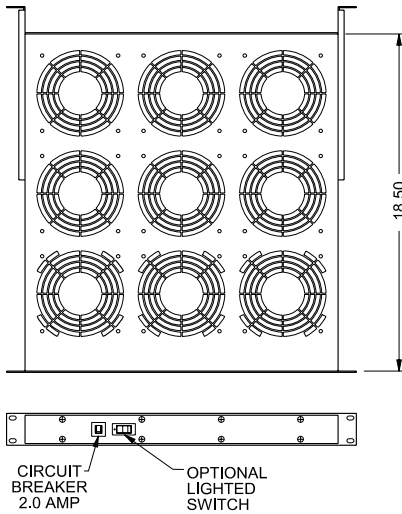• Available with or without ON/OFF switch.

Finish
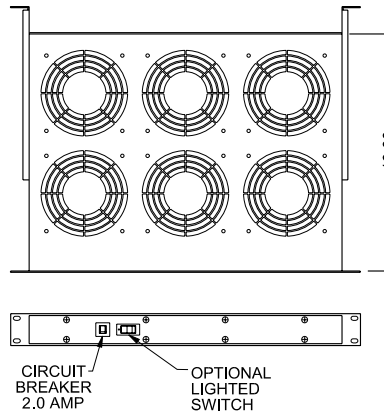• Stocked in textured, black body finish.
• Textured black face panel.

Options
• Contact Hammond for information on:
  • 24" panel width mounting.
  • 230 V version (without plug).
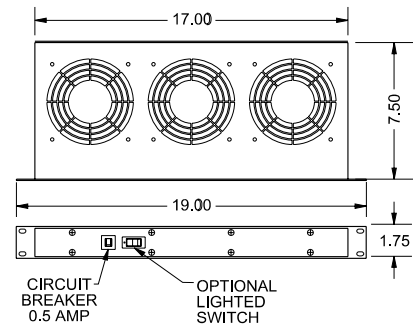 • 15 foot cord
  • Optional colors

Application
• Rack mount fan trays provide a compact, economical solution for cooling in electronic cabinets.
• Fan trays can be positioned at the bottom of an enclosure to force air through the cabinet, at the top to exhaust air out of the cabinet or below specific pieces of equipment for spot cooling.

FT900HA1BK

FT600HA1BK

FT300HA1BK

Note: All cad drawings are shown with optional lighted switch. All units are also available without switch - see chart below.

Without Switch Part No.	With Lighted Switch Part No.	CFM	Running Amps	Watts	Panel Width	Case Width	Case Depth	Rear Bracket Depth Min.	Max.
FT300TA1BK	FT300HA1BK	300	0.5	40	19	17.00	7.50	n/a	n/a
FT600TA1BK	FT600HA1BK	600	1.0	80	19	17.00	13.00	2.40	19.20
FT900TA1BK	FT900HA1BK	900	1.5	120	19	17.00	18.50	7.90	24.70

Technical references and DXF downloads available at www.hammfg.com   All dimensions in inches unless specified otherwise

General Information
Heating products protect electronic and electrical components from temperature problems that are below acceptable tolerances. There are obvious circumstances when extremely low ambient (outside cabinet) temperatures would require a heater, but there are also less apparent times that a heater should be considered. For example, a system may run all day having its components generate heat, but once the system shuts down for the night, the quick drop in temperature could cause condensation and possibly corrosion - a heater could maintain a safe, constant temperature.

Combined Cooling and Heating
Some components today are sensitive enough that both cooling and heating could be required in the same enclosure. When designing your system, be aware of the need to maintain a relatively constant temperature inside the enclosure as ambient temperatures swing from cool to very hot. Hammond thermostats (one for heaters and one for cooling products) can control both systems automatically.

Heater Sizing Information

P_H = Total power required for this application (W)
P_V = Existing power from components (W)
DT = Temperature differential (Kelvin) ambient to cabinet interior (1°Kelvin = 1°C = 1.8°F)
A = Free-standing cabinet surface area (ft^2)
k = Heat transmission coefficient (W/ft^2 K) convection in quiet air:

Painted steel	approx.	0.51 W/ft^2 K
Aluminum	approx.	1.115 W/ft^2 K
Plastic	approx.	0.325 W/ft^2
Stainless Steel	approx.	.344 W/ft^2 K

Formula
P_H = (DT x k x A) - P_V
If enclosure located **outside**, use **x2 (**DT x k x A)

Sample with solution:
DT = 5K
k = Painted steel = 0.51 W/ft^2
A = 50 ft^2
P_V = 50 W
P_H = (5 x 0.51 x 50) - 50
= 127.5 - 50
= 77.5 W

Recommend: SHP045039, 80W Heater

Climate Control