Filter Fan Collection

EDITION 1.2

More Than
175 New Models
for Electronics Cooling

McLean®
COOLING TECHNOLOGY

Protecting Electronics.
Exceeding Expectations.™

Pentair
Technical Products

McLean COOLING TECHNOLOGY

Quick Reference

Use this handy table to match your electronics cooling requirements with the most effective McLean® Filter Fan

	Side-Mount									Roof-Mount	
	SF04 Pages 14–17	SF05 Pages 18–21	SF09 Pages 22–25	ST10 Pages 26–29	SF10 Pages 30–33	ST13 Pages 34–37	SF13 376 CFM Pages 38–41	SF13 473 CFM Pages 42–45	SF13 571 CFM Pages 46–49	SR16 280 CFM Pages 50–51	SR16 459 CFM Pages 52–53
18 F/10 C ΔT COOLING CAPACITY *TYPE 12/IP54 60 Hz 2 Exhaust Grilles*											
133 BTUs (39 Watts) .05" Static Pressure	■										
304 BTUs (89 Watts) .10" Static Pressure		■									
646 BTUs (198 Watts) .10" Static Pressure			■								
776 BTUs (315 Watts) .10" Static Pressure				■							
1,437 BTUs (421 Watts) .15" Static Pressure					■						
2,305 BTUs (676 Watts) .20" Static Pressure						■					
2,422 BTUs (710 Watts) .20" Static Pressure							■				
3,931 BTUs (1,152 Watts) .35" Static Pressure								■			
3,945 BTUs (1,156 Watts) .45" Static Pressure									■		
1,929 BTUs (565 Watts) .55" Static Pressure										■	
4,151 BTUs (1,216 Watts) .85" Static Pressure											■
36 F/20 C ΔT COOLING CAPACITY *TYPE 12/IP54 60 Hz 2 Exhaust Grilles*											
267 BTUs (78 Watts) .05" Static Pressure	■										
609 BTUs (178 Watts) .10" Static Pressure		■									
1,292 BTUs (379 Watts) .10" Static Pressure			■								
1,552 BTUs (632 Watts) .10" Static Pressure				■							
2,874 BTUs (842 Watts) .15" Static Pressure					■						
4,606 BTUs (1,350 Watts) .20" Static Pressure						■					
4,845 BTUs (1,420 Watts) .20" Static Pressure							■				
7,862 BTUs (2,304 Watts) .35" Static Pressure								■			
7,886 BTUs (2,311 Watts) .45" Static Pressure									■		
3,859 BTUs (1,131 Watts) .55" Static Pressure										■	
8,302 BTUs (2,432 Watts) .85" Static Pressure											■
18 F/10 C ΔT COOLING CAPACITY *TYPE 12/IP55 60 Hz 2 Exhaust Grilles*											
283 BTUs (83 Watts) .10" Static Pressure		■									
545 BTUs (220 Watts) .10" Static Pressure			■								
646 BTUs (290 Watts) .10" Static Pressure				■							
1,195 BTUs (350 Watts) .15" Static Pressure					■						
2,064 BTUs (605 Watts) .20" Static Pressure						■					
2,414 BTUs (707 Watts) .20" Static Pressure							■				
3,300 BTUs (967 Watts) .35" Static Pressure								■			
3,273 BTUs (959 Watts) .45" Static Pressure									■		
36 F/20 C ΔT COOLING CAPACITY *TYPE 12/IP55 60 Hz 2 Exhaust Grilles*											
565 BTUs (165 Watts) .10" Static Pressure		■									
1,090 BTUs (442 Watts) .10" Static Pressure			■								
1,292 BTUs (580 Watts) .10" Static Pressure				■							
2,390 BTUs (940 Watts) .15" Static Pressure					■						
4,128 BTUs (1,209 Watts) .20" Static Pressure						■					
4,828 BTUs (1,415 Watts) .20" Static Pressure							■				
6,600 BTUs (1,934 Watts) .35" Static Pressure								■			
6,547 BTUs (1,918 Watts) .45" Static Pressure									■		
POWER INPUT											
115 & 230 AC Volt	■	■	■	■	■	■	■	■	■	■	■
400 / 460 AC Volt 3-Phase								■	■		
24 & 48 DC Volt	■	■	■	■	■	■	■		■		

** NOTE: Roof-mount filter fan capacities assume two air intake grille kits.*

Table of Contents

McLean® Filter Fan Collection

More than 175 new models for electronics cooling

Multiple choices where every answer is right

VERSATILE COOLING

- Free airflow from 16 CFM (28 M^3/hr.) to 571 CFM (970 M^3/hr.) to cool a variety of heat loads
- Enclosure side wall and roof-mount models
- Reverse flow models to push/pull air through higher static pressure systems

TYPES OF PROTECTION

- Standard foam-in-place gasket for a tight seal between grille and cabinet
- UL Type 12 / IP54 dust filter option
- High-density IP55 Z-filter option for added moisture protection
- EMC electromagnetic interference protection option

POWER INPUT VARIETY

- 115, 230, 400 3-phase and 400/460 3-phase 50/60 Hz AC volt
- 24 and 48 DC volt
- Optional thermostat available to save energy and extend service life

RELIABLE PERFORMANCE

- Operating temperature range:
  - AC volt models from 14 F/-10 C to 131 F/55 C
  - DC volt models from -4 F/-20 C to 149 F/65 C
- Service life:
  - AC volt models up to 40,000 hours
  - DC volt models up to 70,000 hours
- Rugged UV-resistant plastic grille

EASY TO DESIGN

- Small and shallow-depth models to fit tight spaces
- Online selection software to guide you to the right filter fan solution
- Downloadable 2D and 3D STEP CAD files

ATTRACTIVE GRILLE COLORS

- RAL 7035 light gray
- RAL 9011 black

SIMPLE INSTALLATION

- Click-fit design quickly snaps into enclosure wall
- No tools or screws required
- Similar cutout sizes as other filter fan manufacturers
- Terminal wire connections

RESPONSIVE CUSTOMER SERVICE

- Popular models in-stock, ready for immediate shipment
- Backed by a 1-year standard warranty
- Over 1,000 field repair technicians worldwide
- Secure and easy-to-use Online Spare Parts Store

McLean Filter Fan Key Advantages

1. Click-fit design for fast and easy installation
2. Widest selection of AC and DC volt power input options
3. Shallow-depth models for tight spaces
4. Reversible airflow models available from the factory; no field modification needed
5. Foam-in-place gasket for a tight seal with the cabinet
6. Simple snap-open grille for filter replacement
7. Clean attractive design available in RAL 7035 light-gray and RAL 9011 black
8. Engineered with rugged UV-resistant plastic

Type 12 IP54, IP55

c UL US LISTED CE

More Moisture Protection Than Other IP55 Filters

HIGH DENSITY Z-FILTER IS NOT A SLEEPER

If you want fresh air cooling with IP55 protection, the McLean brand provides dual-protection against water infiltration by placing a corrosion-resistant metal grille in front of the high density Z-filter. The tiny louvers in the metal grille open in the opposite direction of the louvers in the filter fan's plastic grille. Creating the extra physical path in front of the Z-filter further reduces the chance of water entering the electrical enclosure. Only Pentair Technical Products manufactures its IP55 filter fan with this additional moisture barrier.

The thin metal grille in front of the Z-filter creates an extra barrier against moisture.

Type 12, IP54, IP55

c UL us LISTED

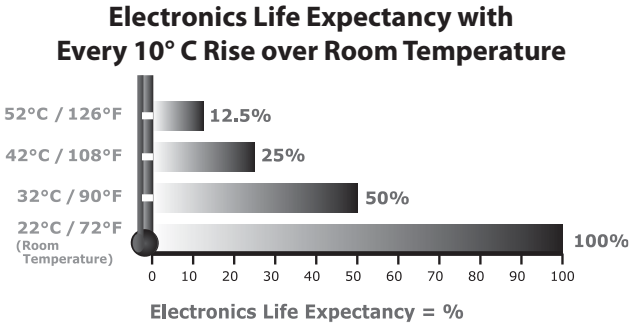
CE

Why Cool Electronics in the First Place?

Keeping your electronics cool is essential to extending their life and keeping your business running.

Heat Ruins Electronics

The life expectancy of electronics is cut in half every 10 C / 18 F they operate above room temperature. Operating electronics above certain temperatures can void manufacturers' warranties, making proper cooling essential. Cooling vital electronics increases service life and reduces capital expenses over the long-term.



Sources of Heat

Damaging heat can come from a variety of sources. Inside the cabinet, heat can come from:

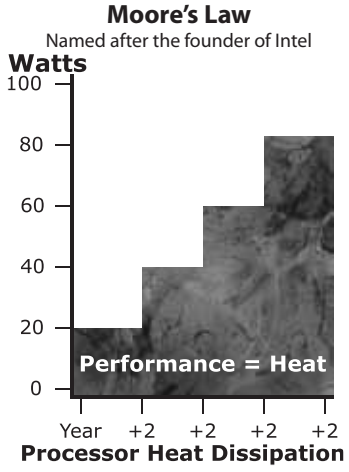
- AC power supplies
- Controllers, drives and servos
- Transformers and rectifiers
- Processors and server racks
- Radio equipment
- And other electronic components

Heat also comes from sources outside the enclosure such as:

- Solar heat gain
- Welding processes
- Paint oven
- Blast furnace
- Foundry equipment

Trend Toward More Damaging Heat

For the foreseeable future, the trend is toward increasing levels of heat in electronics, not less, because the market's thirst for more information processing capacity and speed continues to grow. This trend is known as "Moore's Law."
More powerful data-processing electronics generate extra heat with virtually every new system that is designed. There is no guarantee that an application which did not require much, if any, cooling in the past will not need cooling in the future. The new system likely has more functionality and will probably require some form of cooling as a result.



What Are the Consequences of Damaging Heat?

Heat build-up can adversely affect industrial controls and sensitive electronic systems as follows:

- De-rated drive performance
- I/C-based devices experience intermittent fluctuations
- MTBF decreases exponentially
- Catastrophic failure

The costs when a factory line or electronic system fails can include:

- Productivity losses
- Component replacement costs
- Late shipments
- Customer dissatisfaction
- Lost revenue
- Cell phone tower outage
- Breach in homeland security

Direct costs to a business can be as much as $50,000 per hour of system downtime.

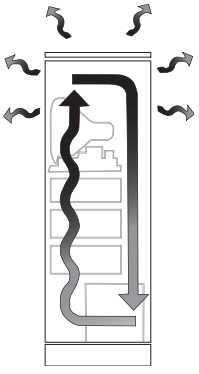
Cooling Electronics Options

Conductive Cooling

This is a passive way to cool electronics. It simply allows the heat to radiate through the cabinet walls.

Conductive cooling works well with electronics systems that have small heat loads (<50 W) and cool air around the enclosure (<78 F/25 C).

If heat is an issue, one option within this type of cooling is to increase cabinet size to create more surface area to speed the transfer of heat. However, growing cabinet size is often not a practical solution because of space limitations and the greater heat loads associated with today's high-power electronics.

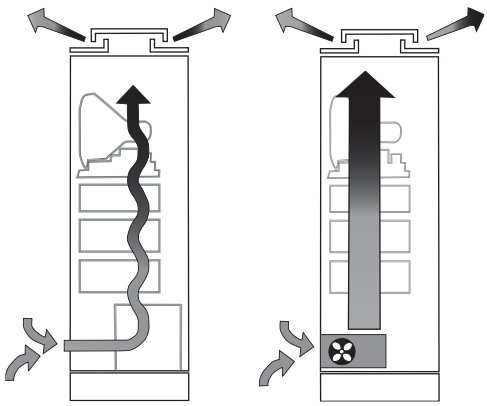


Fresh Air Cooling

This is an active way to manage heat in electronics applications. This type of cooling ventilates fresh air through the cabinet, exhausting heat away from the hot components.

Fresh air cooling may be used when the electronics system is deployed in a relatively clean and cool environment such as an office building, data networking center or light-duty factory. Options for cooling electronic enclosures with fresh air include filter fans, fan trays, motorized impellers and packaged blowers.

Fresh air cooling is known as an "open-loop system" because no significant seal is maintained to protect electronic components from harmful elements such as dirt, water, metal filings and corrosive fumes.



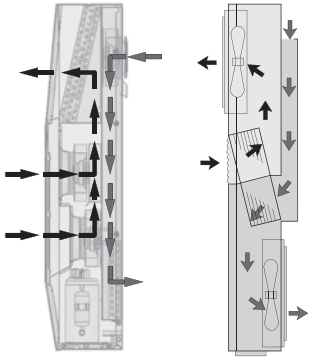
Protective Cooling

This is another active way to cool electrical components. This type of thermal management maintains the seal of the enclosure—using an air conditioner or heat exchanger as examples—to remove heat from inside the electronics cabinet.

Protective cooling is generally required when the electronics application:
(1) operates in high temperatures, typically over 95 F/35 C,
(2) is deployed in a harsh environment such as an outdoor telecom base station, wastewater treatment plant, metal working operation, oil rig platform, paper mill, foundry and/or
(3) generates a high heat load from its own components, usually more than 500 W.

Options for protective cooling include air conditioners, air-to-air heat exchangers, air-to-water heat exchangers, thermo-electric coolers and vortex coolers.

Protective cooling is known as a "closed-loop system" because the seal of the electrical cabinet is maintained, allowing no elements which can damage the electronics inside the enclosure.



Air Conditioner Heat Exchanger

Selecting the Right Cooling Solution

Cooling Solution

Since heat dissipation is often not a solution, we will limit our choices to protective vs. fresh air cooling.

Use the environmental and electronic system criteria in the table below to determine whether protective or fresh air cooling is most appropriate for your application.

Protective vs. Fresh Air Cooling

Specifying protective cooling that keeps your electronics components sealed from the outside environment versus using fresh air cooling to remove damaging heat depends on the following profile of your system application (check one side or the other for each of the six choices):

	FRESH		PROTECTIVE	
Clean Air / Some Dust / Dripping Water	☐	**SYSTEM OPERATING ENVIRONMENT**	☐	Dirty / Wet / Metal Filings / Outdoors / Corrosive Fumes
Moderate to Low (typically under 95 F / 35 C)	☐	**TEMPERATURE OUTSIDE OF THE ENCLOSURE**	☐	Hot (typically over 95 F / 35 C)
Somewhat to Well-Above Ambient Temperature	☐	**TEMPERATURE RATING OF THE ELECTRONICS**	☐	Below to Somewhat Above Ambient Temperature
Moderate to Low	☐	**HUMIDITY OUTSIDE OF THE ENCLOSURE**	☐	High Relative Humidity
Wide	☐	**TEMPERATURE RANGE FOR THE ELECTRONICS**	☐	Narrow / Precise
Moderate to Low (typically under 3000 Watts)	☐	**SYSTEM POWER DRAW / HEAT LOAD**	☐	Moderate to High (typically over 3000 Watts)

If most of your assessments fell on the fresh air side, then a filter fan, fan tray, motorized impeller or blower is probably the correct cooling solution for your application. However, if most of your assessments were on the protective side, then an air conditioner or heat exchanger found in the McLean Protective Cooling Catalog is likely the right cooling solution for your electronics system.

Fresh Air Cooling Solutions

Fresh Air Cooling Solutions Overview

There are many standard air movers for electronics cooling on the market today. Common options include:

Compact Cooling Fans

Industrial Filter Fan

Server Rack Fan Tray

Motorized Impeller

Centrifugal Blower

As one may conclude by looking at the products, each fresh air cooling solution can vary in terms of:

- General vs. concentrated airflow
- Amount of air volume (CFM or M^3/Hr.)
- Ability to overcome airflow restriction caused by electronics components (static pressure—Inches of H_2O or Pascals)
- Component price
- Power input (AC or DC volt)
- Ability to protect the electronics from dust and water

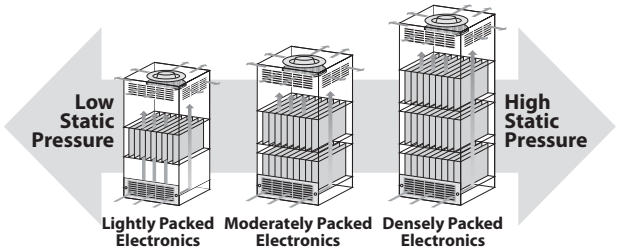
However, before we begin to briefly review the advantages and disadvantages of each air mover, we first need to understand two important concepts, airflow and static pressure, because each fresh air cooling solution can be quite different with these factors.

What Is Airflow?

Airflow is the volume of air that a fan, impeller or blower can move. In the English system, airflow is measured in cubic feet per minute or CFM. In the Metric system, airflow is defined as cubic meters per hour or M^3/Hr. Electronic systems with low heat loads (100 to 1000 Watts) require less airflow to cool the components. Cabinets with moderate to high heat loads (more than 1000 Watts) need more airflow.

What Is Static Pressure?

Static pressure is air restriction created by the components inside the enclosure. In the English system, static pressure is expressed in Inches of Water or In. H_2O. In the Metric system, static pressure is Pascals or Pa. Systems with loosely packed components have low static pressure (0.24 to 0.50 In. H_2O) and use a smaller, less powerful air mover such as a tube axial fan or filter fan for cooling. However, cabinets that are moderately to densely packed with electronics (0.75 In. H_2O or more) require a larger, more powerful air mover or multiple air movers.

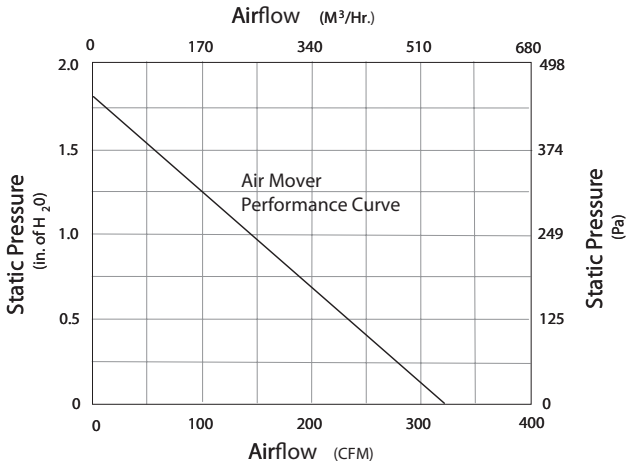


How Is the Performance of Air Movers Characterized?

Each air mover is commonly rated based on its airflow and static pressure capability known as a "performance curve."

In a 0 static pressure electronics system, the air mover provides 325 CFM of airflow. Conversely, at 1.6 In. of H_2O static pressure (a moderately packed cabinet), the air mover provides 0 airflow.

Air mover manufacturers determine the performance curve for each of their products by placing the unit in a test chamber to determine its precise airflow and static pressure.



What Are the Capabilities of Each Air Mover?

Each air mover such as a tube axial fan, filter fan, fan tray, motorized impeller and centrifugal blower performs in a different way. A summary of the characteristics and applications for each of these popular fresh air cooling products is outlined in the table below.

Tube axial fans, filter fans and fan trays generally provide low to moderate airflow in electronic systems with low static pressure. Most are used with VAC applications. Filter fans provide an extra level of enclosure protection against dust infiltration (Type 12 or IP54) and water infiltration (Type 3R or IP55). With the exception of fan trays, tube axial fans and filter fans are relatively inexpensive.

Motorized impellers offer moderate to high airflow and work well in electronics cabinets with moderate to high static pressure. They often provide general cooling throughout an enclosure. Motorized impellers are available in VAC and VDC inputs and are reasonably priced, about the cost of three axial fans. If an engineer is currently considering the use of three axial fans to generate fresh air cooling, one motorized impeller may be less costly and a better value.

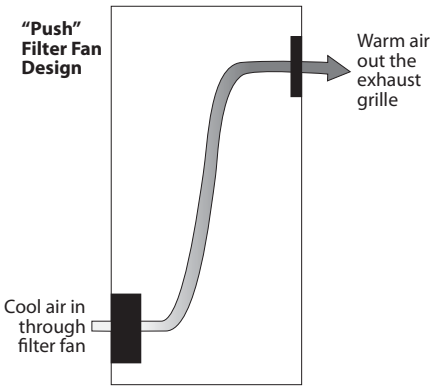
Centrifugal blowers deliver moderate to high airflow and overcome the system impedance that builds up in electronic cabinets with moderate to high static pressure. They're primarily available for VAC power input and are relatively higher priced.

Characteristics of Popular Air Movers

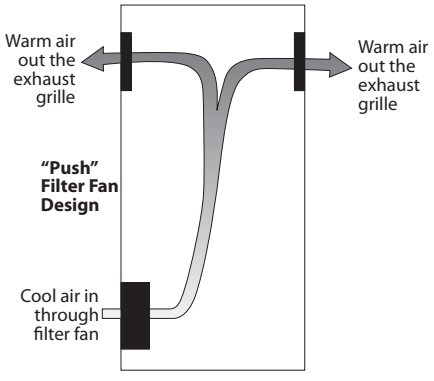
Characteristics	Tube Axial Fans	Filter Fans	Fan Trays	Motorized Impellers	Centrifugal Blowers
Airflow	Low	Low - Moderate	Low - Moderate	Moderate - High	Moderate - High
Static Pressure	Low	Low	Low	Moderate - High	Moderate - High
Voltage Input	AC (some DC)	AC	AC (some DC)	AC and DC	AC
Protection	None	Type 12 & 3R	None	None	None
Per Piece Price	Low	Moderate	High	Moderate	High
Typical Application	Spot electronics cooling	Industrial electrical cabinet cooling	Datacom card and server rack cooling	General cooling of moderate to high static pressure cabinets	Concentrated or general cooling of high static pressure systems

Filter Fan Design Options

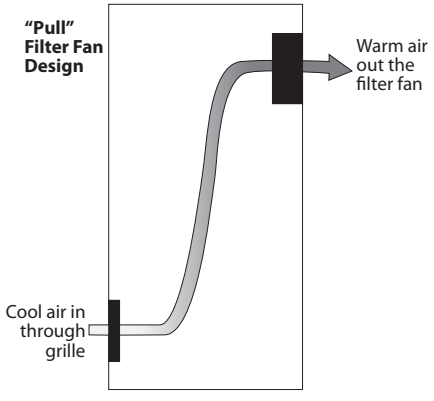
A typical filter fan system design "pushes" cool air into the bottom of the electronics cabinet and exhausts the warm air out the top



To reduce exhaust grille static pressure and improve cool airflow, some engineers use two exhaust grilles in their filter fan system design.

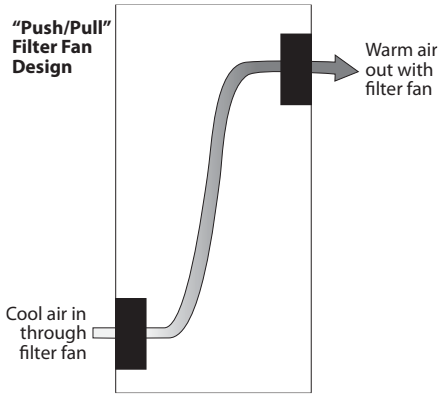


Another option is to use a reverse airflow filter fan and mount it high in the enclosure to "pull" cool air through the enclosure.

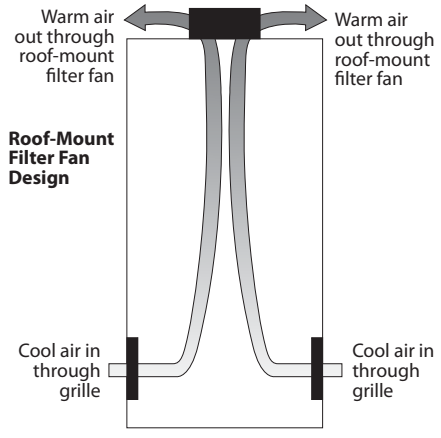


The "pull" approach is less desirable because it de-pressurizes the enclosure. If poor seals are in the cabinet at a door or modular panel, for example, damaging dust could be sucked inside and onto the electrical components. However, space constraints at the bottom of the enclosure may force the engineer to design a "pull" system.

For electrical systems with higher static pressure, filter fans are sometimes used in a "push/pull" approach. The reason is that two filter fans designed in "series" overcome twice the static pressure compared to one filter fan working alone with an exhaust grille.



Roof-mount filter fans are also available from most manufacturers. Engineers occasionally employ them due to space constraints lower in the enclosure or for other reasons. Two exhaust grilles are recommended to ensure adequate airflow through the enclosure.



Roof-mount filter fan designs also pose the risk of pulling dust into the enclosure through poor seals.

How to Choose a Filter Fan

How to Choose a Filter Fan Overview

Three overall considerations are applied when selecting a filter fan: voltage input, enclosure protection and airflow requirement.

Voltage Input

Narrowing the choice of filter fans based on voltage input is quite simple. If the voltage available in the electronics system to power the filter fan is AC, then an VAC filter fan is chosen. If the voltage for the application is DC, then a VDC filter fan is specified.

The voltage level of the filter fan's power input also needs to be taken into consideration. For example, if the voltage input is 115 VAC, then a 115 VAC filter fan should be specified. If the voltage input is 24 VDC, then a 24 VDC impeller is required. Filter fans are commonly available in 115, 230 and 460 3-phase 50/60 Hz VAC as well as 24 VDC. Some manufacturers such as Pentair Technical Products offer 48 VDC due to the trend toward using this power input in some electronic systems.

Enclosure Protection

Another important consideration is selecting a filter fan and exhaust grille that maintains the protection level of the electrical enclosure.

U.S. standards of protection generally include:

Type 1 – For indoor use to protect against contact with the enclosed equipment
Type 12 - For indoor use to protect against dust, falling dirt and dripping non-corrosive liquid such as water
Type 3R – For outdoor use to protect against rain and sleet
Type 4 – For outdoor or indoor use to protect against windblown dust and rain, splashing water and hose-directed water
Type 4X – For outdoor or indoor use to protect against corrosion, windblown dust and rain, splashing water and hose-directed water

European standards of protection include:

IP54 – Dust must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment, complete protection against contact; water splashing against the enclosure from any direction shall have no harmful effect.
IP55 – Dust must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment, complete protection against contact; and water projected by a nozzle against enclosure from any direction shall have no harmful effects.
IP65 – No ingress of dust; complete protection against contact; and water projected by a nozzle against enclosure from any direction shall have no harmful effects.

Airflow

Choosing a filter fan with the right airflow or cooling capacity is as important as voltage input and enclosure protection. However, the process is a little more involved.

Generally, smaller heat loads in the electronics system will require a filter fan with a lower airflow rate (CFM or M^3/Hr.). Moderate to high heat loads will need a larger, more powerful filter fan or multiple filter fans to move enough air to cool the electronics components.

The following 5-step process results in a filter fan specification that should generally work in your electronics system.

1. Determine Delta-T
2. Determine Internal Heat Load
3. Determine Free Airflow
4. Estimate System Impedance
5. Select Your Filter Fan

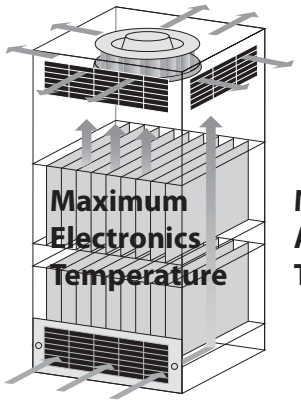
These five steps yield a ballpark result. A filter fan sample should always be tested in the actual electrical system itself to confirm that its performance provides adequate airflow.

The next section outlines the 5-step filter fan selection process in more detail.

How to Derive Filter Fan Airflow

Step 1. Determine Delta-T (ΔT)

Delta-T is the difference between **maximum desired temperature for the electronics** and **maximum temperature outside the enclosure**. It is important to determine ΔT because cooler air will usually require less filter fan airflow whereas warmer air will typically require more airflow.



Maximum desired temperature for the electronics is identified by reviewing the component manufacturer's specifications. They will often indicate that the equipment should not operate above a certain temperature such as 35 C (95 F).

Maximum temperature **outside the enclosure** is determined by forecasting the highest potential temperature of the air around the electronics cabinet. If the application is in an indoor environment such as an air conditioned factory, the maximum temperature outside the enclosure is the temperature of the facility, such as 25 C (77 F). If the electronics system is outdoors, the maximum temperature around the cabinet is the hottest weather that the application experiences, which may be 45 C (116 F) if it's deployed on a roof top for example.

ΔT =
maximum temperature desired for the electronics -
maximum expected ambient temperature

For example:

ΔT =
35 C (95 F) [maximum electronics temperature] -
25 C [maximum ambient temperature]
Delta;T = 10 C (18 F)

Step 2. Determine Internal Heat Load

Heat load stems from the amount of waste heat generated inside the enclosure by the electronic components and is expressed in Watts. There are several methods to determine internal heat load, depending on data availability.

A. Heat Load Data from Each Electronics Component Manufacturer

One way to estimate internal load is to gather heat load data from the manufacturers of the electronics components inside the cabinet. If more than one control or other components are inside the enclosure, it will be necessary to add together the multiple estimates of heat load to determine total internal heat load.

B. Component Power – Component Efficiency

A second method is to establish the Watts of power used by each electronic component. Derive Watts by multiplying the amp draw of each device with its voltage. Then subtract the efficiency of each component from its estimated power use, adding up the outcomes for total internal heat load.

INTERNAL HEAT LOAD =
COMPONENT POWER (Watts) - COMPONENT EFFICIENCY
(for each electrical device)

For example:
An electronic system uses two components that draw 115 VAC at 9.5 amps. Each has a rated efficiency of 90 percent (10 percent of each device is inefficient). Unused amounts of power become generated heat. Thus, the estimated internal heat load is:

Device Power = 115 x 9.5 = 1100 Watts
Total Power = 2 x 1100 = 2200
Less Efficiency = 2200 x (1 - .90)
Total Heat Load = 220 Watts

C. Incoming – Outgoing Power

A third approach is to estimate the power going into the enclosure and the power coming out of it. The difference is the estimated amount of internal heat load. Multiply the amps and volts of each electrical line going in to determine Watts and then add them together. Do the same for the electrical line(s) coming out of the application. The outgoing watts are subsequently subtracted from the incoming watts.

INTERNAL HEAT LOAD =
INCOMING POWER (Watts) – OUTGOING POWER (Watts)
For example:
An enclosure has three input lines of 230 VAC at 11, 6 and 4 amps. It has one output control line of 115 VAC at 9 amps.
Incoming Power = (230 x 11) + (230 x 6) + (230 x 4) = 4830 Watts
Outgoing Power = (115 x 9) = 1035 Watts
Total Heat Load = 4830 – 1035 = 3795 Watts

D. Automated Equipment Horsepower

The fourth method applies only to industrial automation equipment that operates with horsepower such as variable frequency drives (VFDs). 1 horsepower = 745.6 Watts. Thus, the internal heat load from a 3 horsepower VFD is 2237 Watts, less its efficiency which is typically 93 – 95 percent.

For example:
A cabinet has three 5 Hp VFDs with 95% efficiency.
VFD Watts = 5 Hp x 745.6 x 3 = 11184
Adjusted Watts = 11184 x (1 - .95) = 559
Total Heat Load = 559 x 1.25 = 699 Watts

Note: 1.25 is an assumed "safety" margin for other minor heat-producing components.

How to Derive Filter Fan Airflow

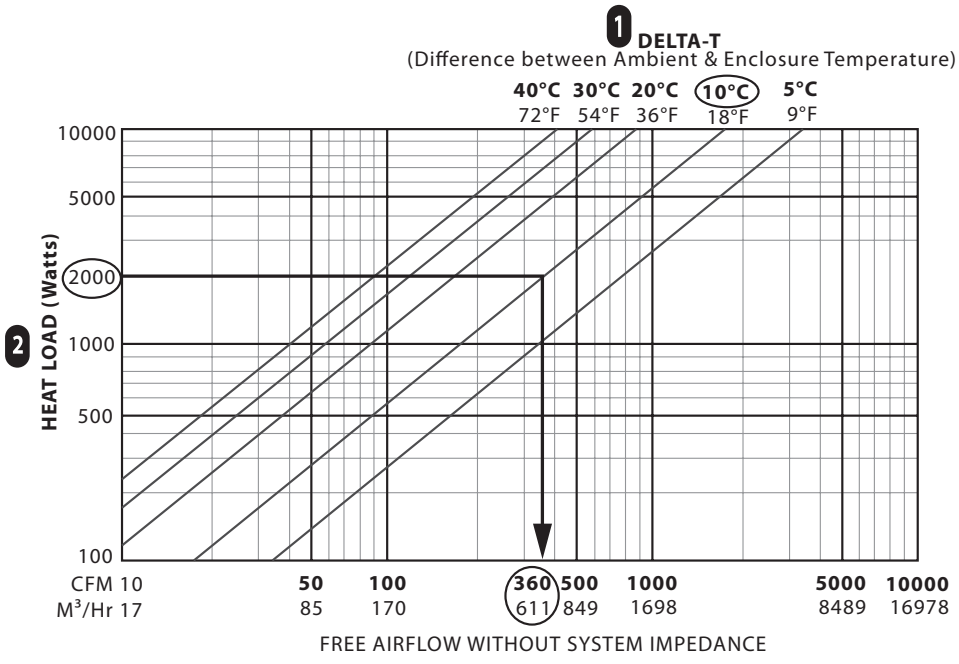
Step 3. Determine Free Airflow

Determining free airflow applies the results from steps 1 and 2 to the chart below. Recall that free airflow is the unimpeded airflow through the enclosure without any interference from electronics components or filter fan exhaust grilles.

Select the diagonal ΔT line that closely matches the ΔT of your electronics system. Using the example from step 1, ΔT is 10 C (18 F).

Then find your cabinet's heat load along the Y-axis of the chart. In the example from step 2, heat load is 2000 Watts.

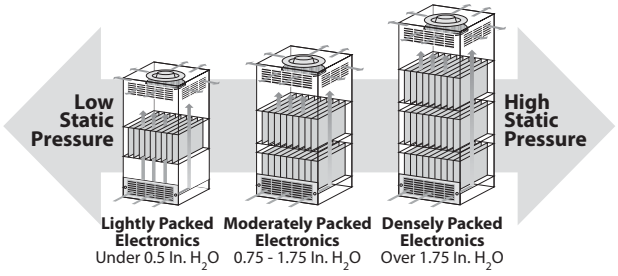
Find where heat load intersects with ΔT to determine free airflow on the X-axis. Continuing the example, free airflow in this case is 360 CFM or 611 M^3/Hr.



Now we need to account for system impedance, i.e., the amount of airflow interference created by the electronic components inside the cabinet. A filter fan with **more than** 360 CFM or 611 M^3/Hr. of free airflow will actually be needed for this system's design.

Step 4. Estimate System Impedance

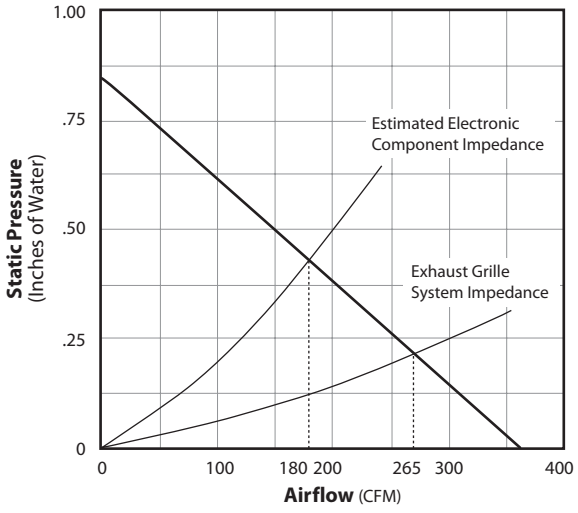
Static pressure or system impedance can impact the cooling performance of an air mover. Filter fans work well in electrical cabinets with low static pressure such as a large enclosure with a bare drive and few other components. They do not have enough force to push air through a cabinet with a moderate or high system impedance.



If your system design appears like the middle or right hand example, then a motorized impeller or blower is probably a better solution for the application than a filter fan.

Assuming a filter fan can cool your application, the exhaust grille and electrical components inside the enclosure will reduce airflow through the system. Filter fan manufacturers will show the effect of the exhaust grille on the performance curve. However, they do not indicate the impedance curve of the electronics system because filter fan makers do not know this information. Only the specifying electronics engineer or system designer can determine this. If it is not possible to measure the exact static pressure inside an electronics cabinet, you must make an estimate and draw an approximation.

Impact of System Impedance on Free Airflow of a 376 CFM (638 M³/Hr.) Filter Fan



In the example shown, the free airflow of a 376 CFM (638 M³/Hr.) filter fan decreases to 265 CFM with the exhaust grille kit and down to 180 CFM when used in an actual application. Thus, a filter fan model with a performance curve similar to the one in the next graph would be too small to keep our electrical system cool because our actual target airflow is 360 CFM.

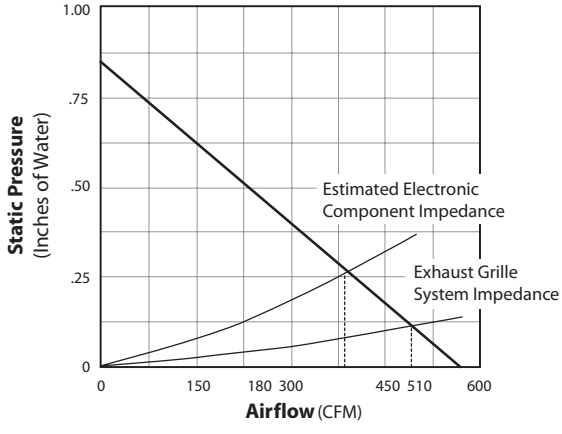
Step 5. Select Your Filter Fan

In this final step, we bring together the results of free airflow (step 3) and system impedance (step 4), using the filter fan performance charts. Applying the example, we need to select a motorized impeller that delivers a minimum of 360 CFM (611 M³/Hr.).

Identify alternative filter fan models with free airflow ratings that are greater than the step 3 outcome of 360 CFM (611 M³/Hr.) to compensate for airflow losses created by static pressure in the system. A judgmental system impedance curve is overlaid onto the performance charts of each of the optional filter fans, and then the model with the CFM or M³/Hr. closest to the target airflow is selected.

In the performance curve shown here, 571 CFM is commonly the largest filter fan in the electronics cooling industry. Based on the estimated electronic component impedance overlaid by our imaginary engineer, it should deliver the cooling performance required by the system.

Performance Curve of a 571 CFM (969 M³/Hr.) Filter Fan Exhaust Grille and Estimated System Impedance



Friendly Reminder

This 5-step process for selecting a filter fan yields a ballpark result. Be sure to test a sample of the filter fan in the electrical system prototype at maximum ambient and heat load conditions to verify adequate cool airflow.

SF04 16 CFM (28 m³/hr.) Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard

Features

- Free airflow up to 16 CFM (28 m³/hr.)
- Approximate size 4 in. (105 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Enclosure side wall mounting
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray, UV-resistant plastic standard
- RAL 9011 black, UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Filter Fan Collection

Performance Data **SF04 16 CFM (28 m³/hr.) Side-Mount Filter Fan**

ELECTRICAL DATA				
Rated Voltage	**115**	**230**	**24**	**48**
Frequency (Hz)	50 / 60	50 / 60	—	—
Nominal Current Maximum (Amps)	1.40/1.20	0.70	1.00	0.54
Power Consumption Maximum (Watts)	12 / 11	12	2.2	2.6
Power Connection	Terminal Block			
TYPE 12 / IP54 FILTER FANS				
RAL 7035 Light Gray:				
Item	19994	19996	19988	19992
Model	**SF0416414**	**SF0426414**	**SF0424414**	**SF0448414**
RAL 9011 Black:				
Item	19995	19997	19991	19993
Model	**SF0416413**	**SF0426413**	**SF0424413**	**SF0448413**
Free Airflow (CFM / m³/hr.)	16 / 28	16 / 28	16 / 28	16 / 28
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	10/17	10 / 17	10 / 17	10 / 17
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	12/21	12 / 21	12 / 21	12 / 21
FILTER FAN UNIT CONSTRUCTION				
Fan RPM	2700 / 3200	2700 / 3200	3300	3300
Sound Pressure (dBA)	30	30	36	36
Operating Temperature Range:				
Maximum (°F / °C)	131 / 55	131 / 55	149 / 65	149 / 65
Minimum (°F / °C)	14 / -10	14 / -10	-4 / -20	-4 / -20
Service Life (hours)	37,500	37,500	70,000	70,000
Unit Dimensions - H x W x D (in. / mm)	4.13 x 4.13 x 2.17 / 105 x 105 x 55			
Cut-Out Dimensions - H x W (in. / mm)	3.62 x 3.62 / 92 x 92			
Weight (lb. / kg)	.73 / .33			
TYPE 12 / IP54 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item	19976			
Model	SG0400404			
RAL 9011 Black:				
Item	19977			
Model	SG0400403			
ACCESSORIES				
Replacement Filters:				
Type 12 / IP54 Item / Model	20201 / 10100059H			
Thermostat Item	21803 / TWR60			

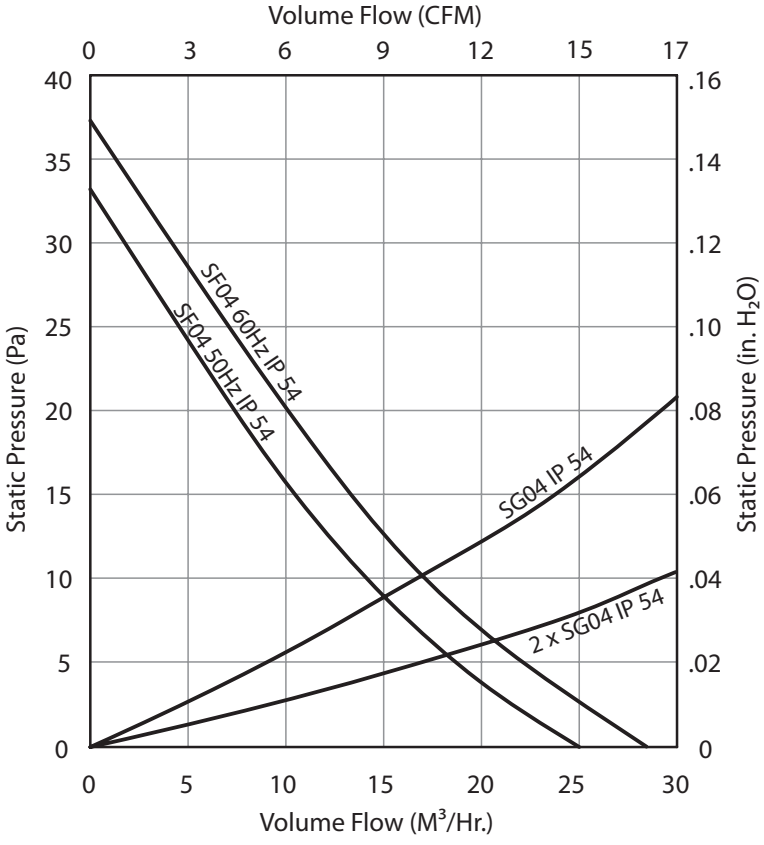
Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

Exhaust Grilles sold separately.

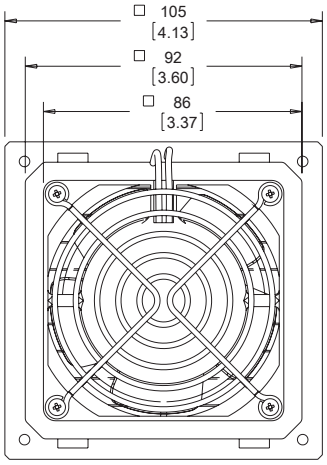
Filter Fan Collection

SF04 16 CFM (28 M^3/Hr.) Side-Mount Filter Fan Performance Curve

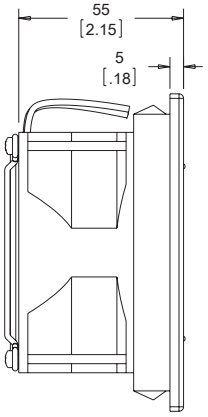


Filter Fan Collection

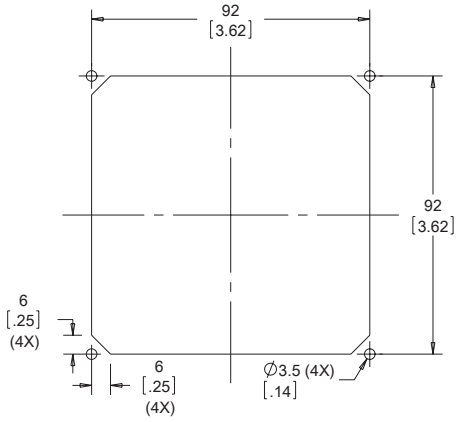
FILTER FAN



BACK VIEW

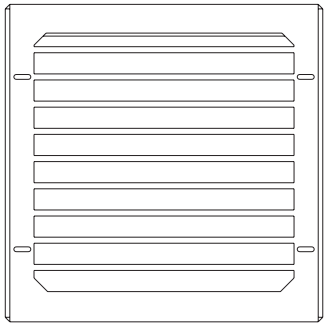


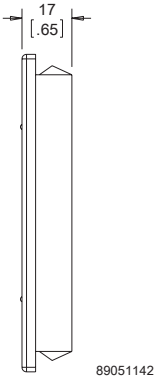
SIDE VIEW



CUTOUT

EXHAUST GRILLE





Order Exhaust Grille Kits separately

Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

SF05 39 CFM (66 m³/hr.) Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard
Type 12, IP55 optional

Features

- Free airflow up to 39 CFM (66 m³/hr.)
- Approximate size 5 in. (148 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Enclosure side wall mounting
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Filter Fan Collection

Performance Data **SF05 39 CFM (66 m³/hr.) Side-Mount Filter Fan**

ELECTRICAL DATA				
Rated Voltage	**115**	**230**	**24**	**48**
Frequency (Hz)	50 / 60	50 / 60	—	—
Nominal Current Maximum (Amps)	0.23	0.11	0.17	0.08
Power Consumption Maximum (Watts)	20	20	4.1	3.5
Power Connection		Terminal Block		
TYPE 12 / IP54 FILTER FANS				
RAL 7035 Light Gray:				
Item	20004	20006	19998	20002
Model	**SF0516414**	**SF0526414**	**SF0524414**	**SF0548414**
RAL 9011 Black:				
Item	20005	20007	20001	20003
Model	**SF0516413**	**SF0526413**	**SF0524413**	**SF0548413**
Free Airflow (CFM / m³/hr.)	39 / 66	39 / 66	39 / 66	39 / 66
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	26 / 44	26 / 44	26 / 44	26 / 44
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	30 / 51	30 / 51	30 / 51	30 / 51
TYPE 12 / IP55 FILTER FANS				
RAL 7035 Light Gray:				
Item	20097	20102	20093	20095
Model	**SF0516514**	**SF0526514**	**SF0524514**	**SF0548514**
RAL 9011 Black:				
Item	20098	20103	20094	20096
Model	**SF0516513**	**SF0526513**	**SF0524513**	**SF0548513**
Free Airflow (CFM / m³/hr.)	36 / 61	36 / 61	36 / 61	36 / 61
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	24 / 40	24 / 40	24 / 40	24 / 40
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	28 / 47	28 / 47	28 / 47	28 / 47
FILTER FAN UNIT CONSTRUCTION				
Fan RPM	2650 / 3100	2650 / 3100	3050	3050
Sound Pressure (dBA)	42	42	42	42
Operating Temperature Range:				
Maximum (°F / °C)	131 / 55	131 / 55	149 / 65	149 / 65
Minimum (°F / °C)	14 / -10	14 / -10	-4 / -20	-4 / -20
Service Life (hours)	27,500	27,500	50,000	50,000
Unit Dimensions - H x W x D (in. / mm)		5.83 x 5.83 x 2.56 / 148 x 148 x 65		
Cut-Out Dimensions - H x W (in. / mm)		4.92 x 4.92 / 125 x 125		
Weight (lb. / kg)		1.19 / .54		
TYPE 12 / IP54 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model		19978 / SG0500404		
RAL 9011 Black:				
Item / Model		19981 / SG0500403		
TYPE 12 / IP55 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model		20082 / SG0500504		
RAL 9011 Black:				
Item / Model		20083 / SG0500503		
ACCESSORIES				
Replacement Filters:				
Type 12 / IP54 Item		33569		
Type 12 / IP55 Item / Model		20195 / 10100064H		
Thermostat Item		21803 / TWR60		
Stainless Steel Washdown Shroud Item / Model		20177 / SH0500005		

Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

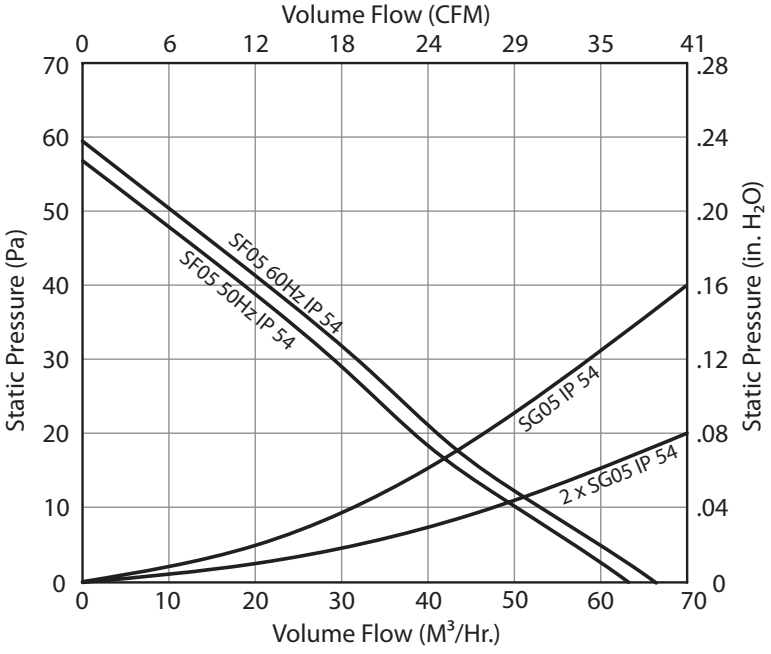
Unit depth is from the back edge of the grille to the back of the fan.

Exhaust Grilles sold separately.

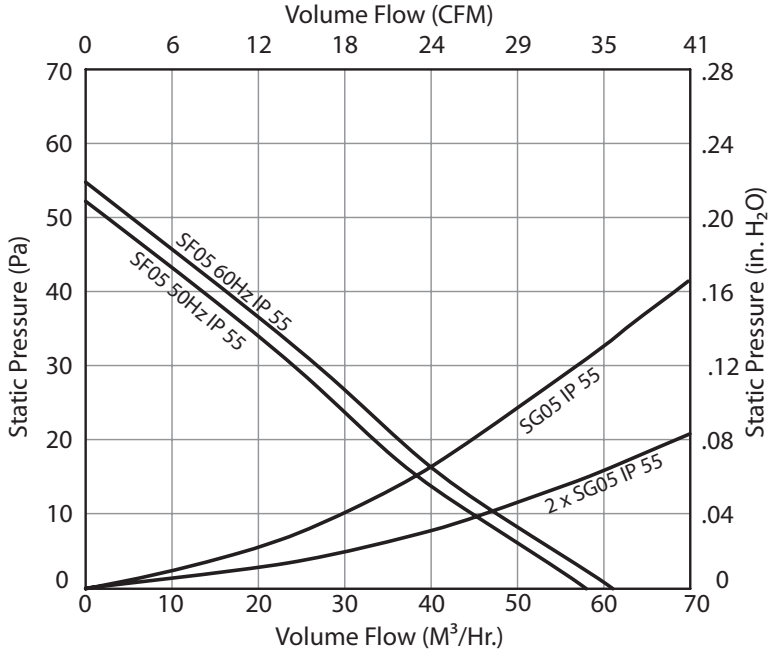
Filter Fan Collection

SF05 39 CFM (66 M^3/Hr.) Side-Mount Filter Fan Performance Curve

TYPE 12 / IP 54 Filter Fan

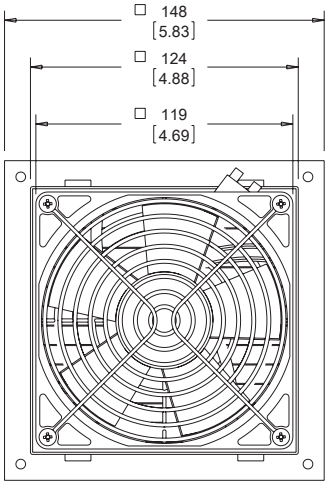


TYPE 12 / IP 55 Filter Fan

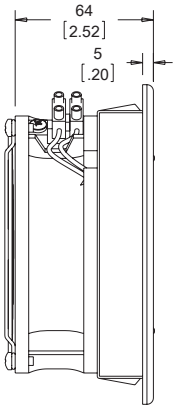


Filter Fan Collection

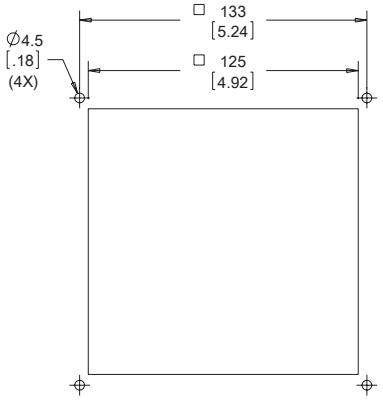
FILTER FAN



BACK VIEW

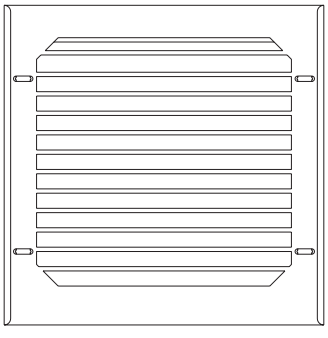


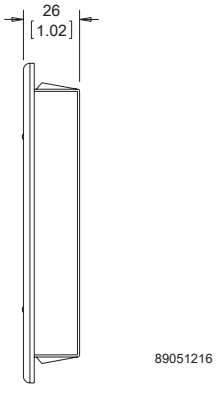
SIDE VIEW



CUTOUT

EXHAUST GRILLE





Order Exhause Grille Kits separately

Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

SF09 75 CFM (127 m³/hr.) Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard
Type 12, IP55 optional

Features

- Free airflow up to 75 CFM (127 m³/hr.)
- Approximate size 9 in. (200 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Enclosure side wall mounting
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Filter Fan Collection

Performance Data **SF09 75 CFM (127 m³/hr.) Side-Mount Filter Fan**

ELECTRICAL DATA				
Rated Voltage	**115**	**230**	**24**	**48**
Frequency (Hz)	50 / 60	50 / 60	—	—
Nominal Current Maximum (Amps)	0.23	0.11	0.17	0.08
Power Consumption Maximum (Watts)	20	20	4.1	3.5
Power Connection	Terminal Block			
TYPE 12 / IP54 FILTER FANS				
RAL 7035 Light Gray:				
Item	20015	20017	20011	20013
Model	**SF0916414**	**SF0926414**	**SF0924414**	**SF0948414**
RAL 9011 Black:				
Item	20016	20018	20012	20014
Model	**SF0916413**	**SF0926413**	**SF0924413**	**SF0948413**
Free Airflow (CFM / m³/hr.)	75 / 127	75 / 127	75 / 127	75 / 127
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	59 / 100	59 / 100	59 / 100	59 / 100
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	67 / 114	67 / 114	67 / 114	67 / 114
TYPE 12 / IP55 FILTER FANS				
RAL 7035 Light Gray:				
Item	20108	20115	20104	20106
Model	**SF0916514**	**SF0926514**	**SF0924514**	**SF0948514**
RAL 9011 Black:				
Item	20114	20116	20105	20107
Model	**SF0916513**	**SF0926513**	**SF0924513**	**SF0948513**
Free Airflow (CFM / m³/hr.)	70 / 118	70 / 118	70 / 118	70 / 118
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	54 / 92	54 / 92	54 / 92	54 / 92
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	62 / 106	62 / 106	62 / 106	62 / 106
FILTER FAN UNIT CONSTRUCTION				
Fan RPM	2650 / 3100	2650 / 3100	3050	3050
Sound Pressure (dBA)	51	51	51	51
Operating Temperature Range:				
Maximum (°F / °C)	131 / 55	131 / 55	149 / 65	149 / 65
Minimum (°F / °C)	14 / -10	14 / -10	-4 / -20	-4 / -20
Service Life (hours)	27,500	27,500	50,000	50,000
Unit Dimensions - H x W x D (in. / mm)	8.03 x 8.03 x 3.54 / 204 x 204 x 90			
Cut-Out Dimensions - H x W (in. / mm)	6.97 x 6.97 / 177 x 177			
Weight (lb. / kg)	1.74 / .79			
TYPE 12 / IP54 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model	19982 / SG0900404			
RAL 9011 Black:				
Item / Model	19983 / SG0900403			
TYPE 12 / IP55 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model	20084 / SG0900504			
RAL 9011 Black:				
Item / Model	20085 / SG0900503			
ACCESSORIES				
Replacement Filters:				
Type 12 / IP54 Item	33579			
Type 12 / IP55 Item / Model	20196 / 10100065H			
Thermostat Item	21803 / TWR60			
Stainless Steel Washdown Shroud Item / Model	20178 / SH0900005			

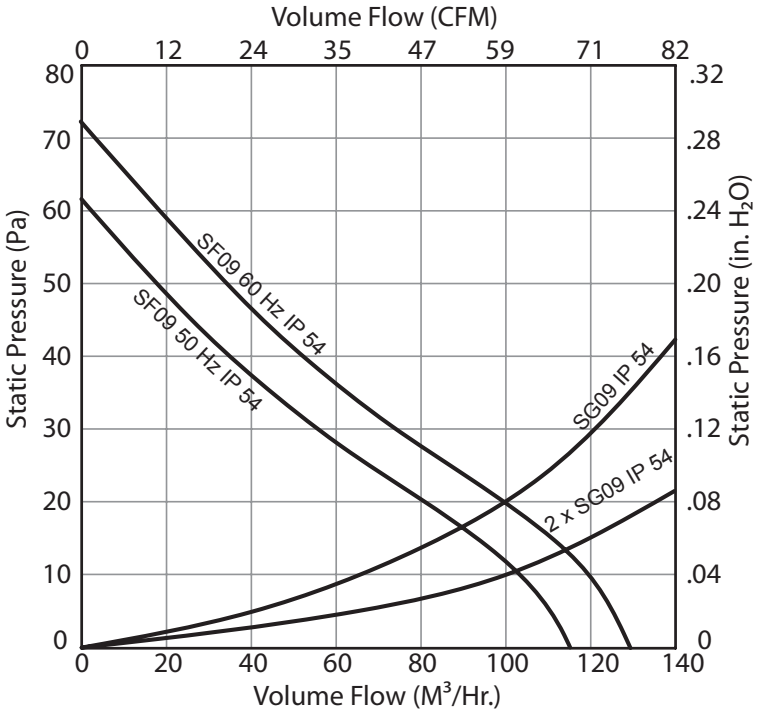
Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

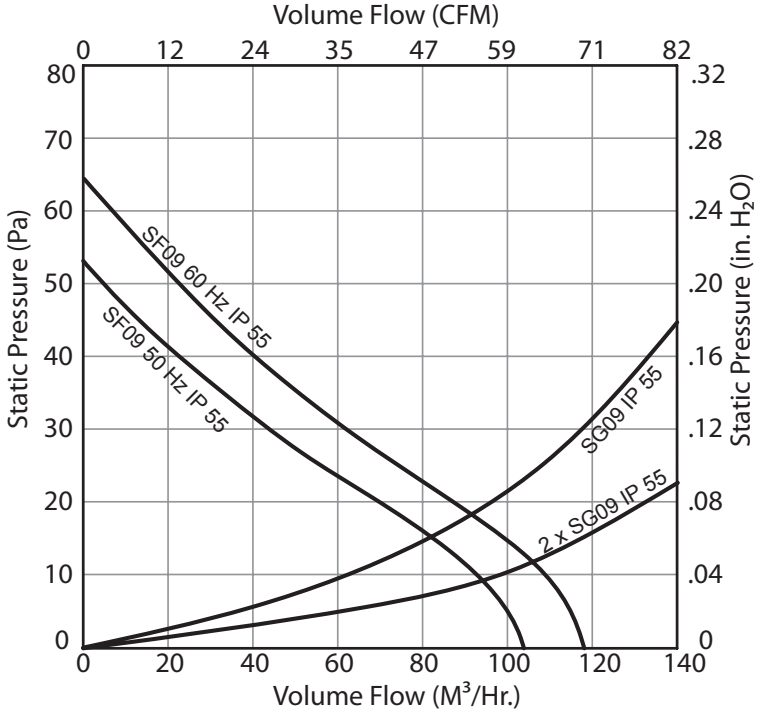
Exhaust Grilles sold separately.

SF09 75 CFM (127 M^3/Hr.) Side-Mount Filter Fan Performance Curve

TYPE 12 / IP 54 Filter Fan

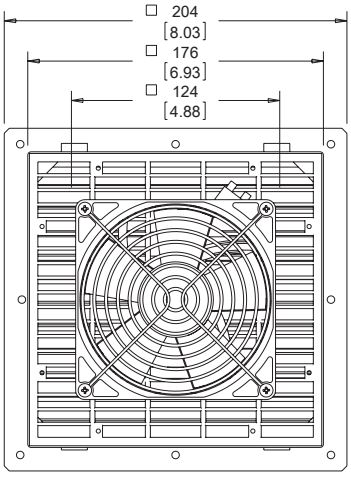


TYPE 12 / IP 55 Filter Fan

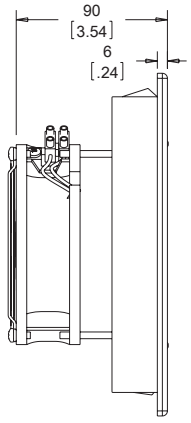


Filter Fan Collection

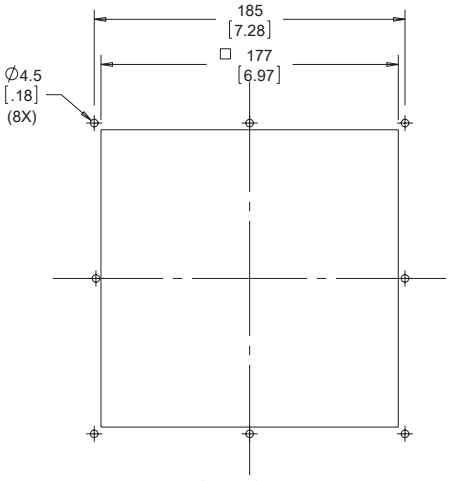
FILTER FAN



BACK VIEW

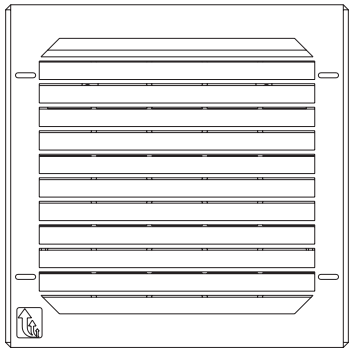


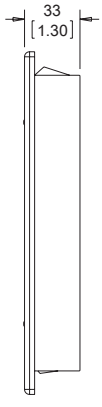
SIDE VIEW



CUTOUT

EXHAUST GRILLE





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Order Exhaust Grille Kits separately

Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

ST10 100 CFM (170 m³/hr.) Thin Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard
Type 12, IP55 optional

Features

- Free airflow up to 100 CFM (170 m³/hr.)
- Approximate size 10 in. (250 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Thin depth to minimize cabinet intrusion
- Enclosure side wall mounting
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Filter Fan Collection

Performance Data **ST10 100 CFM (170 m³/hr.) Thin Side-Mount Filter Fan**

ELECTRICAL DATA				
Rated Voltage	**115**	**230**	**24**	**48**
Frequency (Hz)	50 / 60	50 / 60	—	—
Nominal Current Maximum (Amps)	0.2	0.10	0.27	0.14
Power Consumption Maximum (Watts)	18	18	6.5	6.5
Power Connection	Terminal Block			
TYPE 12 / IP54 FILTER FANS				
RAL 7035 Light Gray:				
Item	20025	20027	20021	20023
Model	**ST1016414**	**ST1026414**	**ST1024414**	**ST1048414**
RAL 9011 Black:				
Item	20026	20028	20022	20024
Model	**ST1016413**	**ST1026413**	**ST1024413**	**ST1048413**
Free Airflow (CFM / m³/hr.)	100 / 170	100 / 170	100 / 170	100 / 170
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	74 / 125	74 / 125	74 / 125	74 / 125
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	84 / 143	84 / 143	84 / 143	84 / 143
TYPE 12 / IP55 FILTER FANS				
RAL 7035 Light Gray:				
Item	20124	20126	20117	20122
Model	**ST1016514**	**ST1026514**	**ST1024514**	**ST1048514**
RAL 9011 Black:				
Item	20125	20127	20018	200123
Model	**ST1016513**	**ST1026513**	**ST1024513**	**ST1048513**
Free Airflow (CFM / m³/hr.)	92 / 156	92 / 156	92 / 156	92 / 156
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	67 / 114	67 / 114	67 / 114	67 / 114
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	77 / 130	77 / 130	77 / 130	77 / 130
FILTER FAN UNIT CONSTRUCTION				
Fan RPM	2750 / 3100	2750 / 3100	3150	3150
Sound Pressure (dBA)	44	44	46	46
Operating Temperature Range:				
Maximum (°F / °C)	131 / 55	131 / 55	149 / 65	149 / 65
Minimum (°F / °C)	14 / -10	14 / -10	-4 / -20	-4 / -20
Service Life (hours)	40,000	40,000	57,500	57,500
Unit Dimensions - H x W x D (in. / mm)	9.84 x 9.84 x 4.02 / 250 x 250 x 102			
Cut-Out Dimensions - H x W (in. / mm)	8.78 x 8.78 / 223 x 223			
Weight (lb. / kg)	2.54 / 1.15			
TYPE 12 / IP54 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model	19984 / SG1000404			
RAL 9011 Black:				
Item / Model	19985 / SG1000403			
TYPE 12 / IP55 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model	20086 / SG1000504			
RAL 9011 Black:				
Item / Model	20087 / SG1000503			
ACCESSORIES				
Replacement Filters:				
Type 12 / IP54 Item	33589			
Type 12 / IP55 Item / Model	20197 / 10100066H			
Thermostat Item	21803 / TWR60			
Stainless Steel Washdown Shroud Item / Model	20182 / SH1000005			

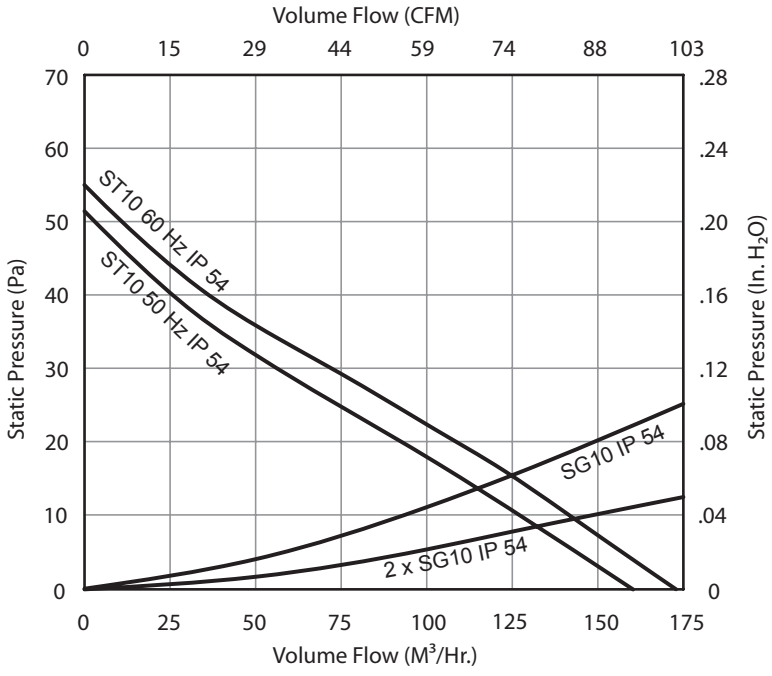
Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

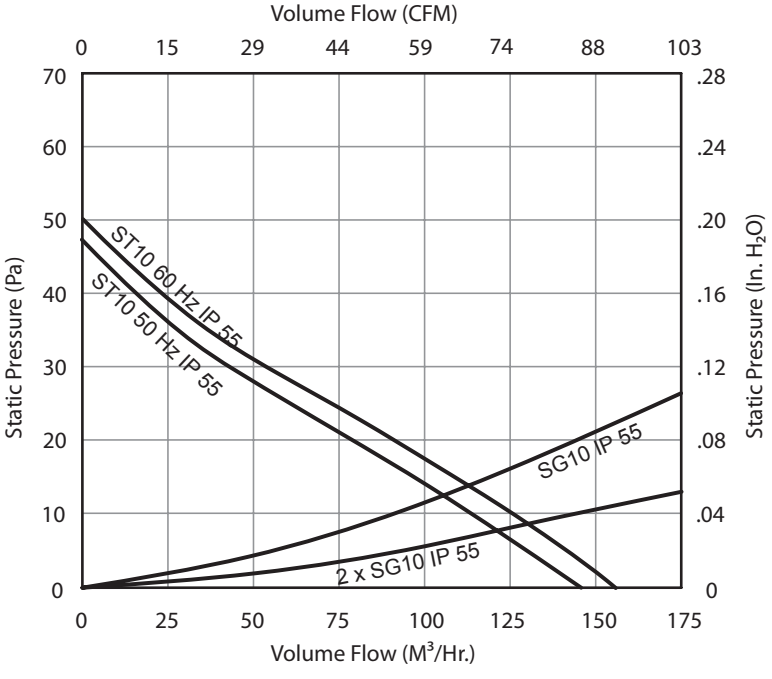
Exhaust Grilles sold separately.

ST10 100 CFM (170 M^3/Hr.) Thin Side-Mount Filter Fan Performance Curve

TYPE 12 / IP 54 Filter Fan

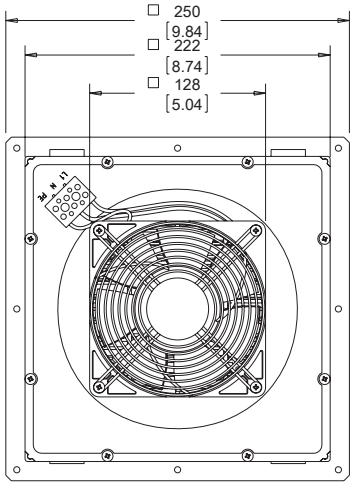


TYPE 12 / IP 55 Filter Fan

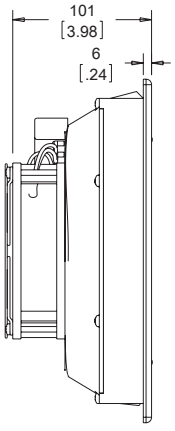


Filter Fan Collection

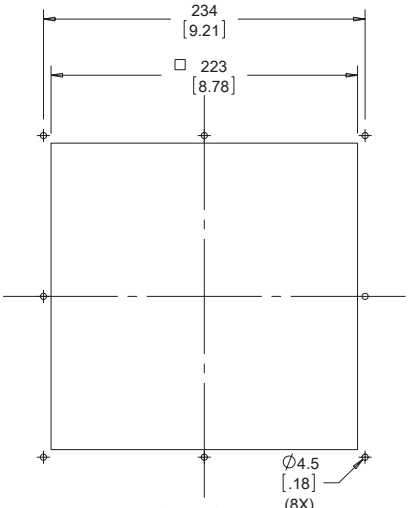
FILTER FAN



BACK VIEW

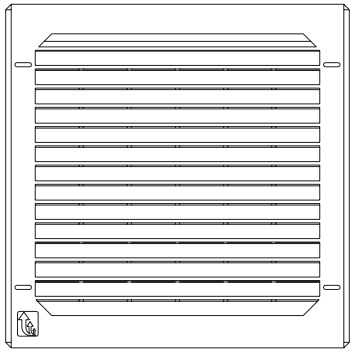


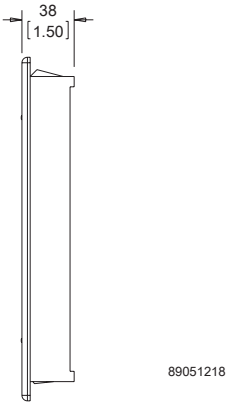
SIDE VIEW



CUTOUT

EXHAUST GRILLE





89051218

Order Exhaust Grille Kits separately

Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

SF10 162 CFM (275 m³/hr.) Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard
Type 12, IP55 optional

Features

- Free airflow up to 162 CFM (275 m³/hr.)
- Approximate size 10 in. (250 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Enclosure side wall mounting
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Filter Fan Collection

Performance Data **SF10 162 CFM (275 M³/Hr.) Side-Mount Filter Fan**

ELECTRICAL DATA				
Rated Voltage	**115**	**230**	**24**	**48**
Frequency (Hz)	50 / 60	50 / 60	—	—
Nominal Current Maximum (Amps)	.53 / .50	.30 / .25	0.66	0.33
Power Consumption Maximum (Watts)	43 / 40	45 / 39	16	16
Power Connection	Terminal Block			
TYPE 12 / IP54 FILTER FANS				
RAL 7035 Light Gray:				
Item	20035	20037	20031	20033
Model	**SF1016414**	**SF1026414**	**SF1024414**	**SF1048414**
RAL 9011 Black:				
Item	20036	20038	20032	20034
Model	**SF1016413**	**SF1026413**	**SF1024413**	**SF1048413**
Free Airflow (CFM / m³/hr.)	162 / 275	162 / 275	162 / 275	162 / 275
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	133 / 226	133 / 226	133 / 226	133 / 226
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	149 / 253	149 / 253	149 / 253	149 / 253
TYPE 12 / IP55 FILTER FANS				
RAL 7035 Light Gray:				
Item	20135	20137	20128	20133
Model	**SF1016514**	**SF1026514**	**SF1024514**	**SF1048514**
RAL 9011 Black:				
Item	20136	20138	20132	20134
Model	**SF1016513**	**SF1026513**	**SF1024513**	**SF1048513**
Free Airflow (CFM / m³/hr.)	149 / 253	149 / 253	149 / 253	149 / 253
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	122 / 207	122 / 207	122 / 207	122 / 207
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	137 / 233	137 / 233	137 / 233	137 / 233
FILTER FAN UNIT CONSTRUCTION				
Fan RPM	2760 / 3030	2760 / 3030	2950	2950
Sound Pressure (dBA)	52	52	52	52
Operating Temperature Range:				
Maximum (°F / °C)	131 / 55	131 / 55	131 / 55	131 / 55
Minimum (°F / °C)	14 / -10	14 / -10	14 / -10	14 / -10
Service Life (hours)	40,000	40,000	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)	9.84 x 9.84 x 4.72 / 250 x 250 x 120			
Cut-Out Dimensions - H x W (in. / mm)	8.78 x 8.78 / 223 x 223			
Weight (lb. / kg)	4.19 / 1.9			
TYPE 12 / IP54 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model	19984 / SG1000404			
RAL 9011 Black:				
Item / Model	19985 / SG1000403			
TYPE 12 / IP55 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model	20086 / SG1000504			
RAL 9011 Black:				
Item / Model	20087 / SG1000503			
ACCESSORIES				
Replacement Filters:				
Type 12 / IP54 Item	33589			
Type 12 / IP55 Item / Model	20197 / 10100066H			
Thermostat Item	21803 / TWR60			
Stainless Steel Washdown Shroud Item / Model	20182 / SH1000005			

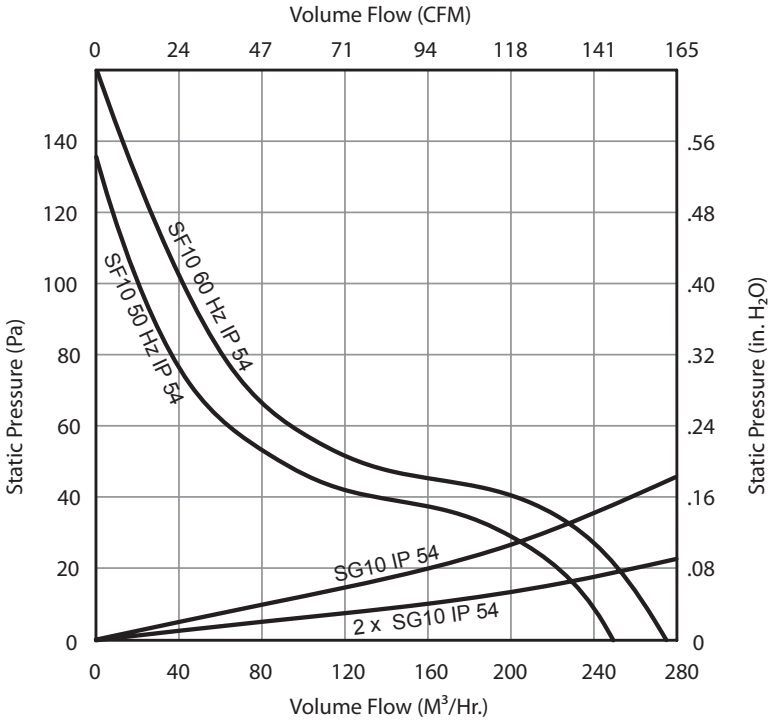
Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

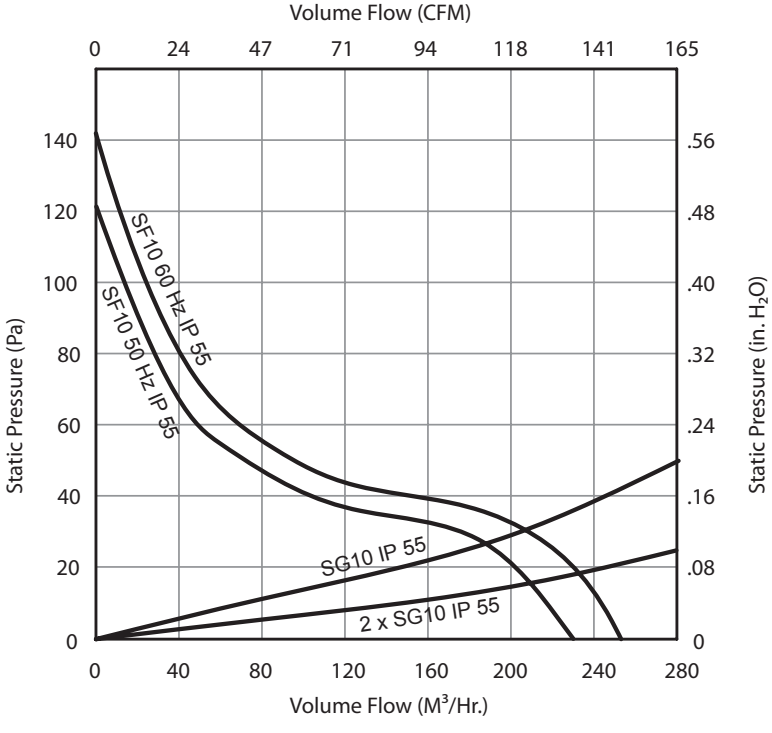
Exhaust Grilles sold separately.

SF10 162 CFM (275 M^3/Hr.) Side-Mount Filter Fan Performance Curve

TYPE 12 / IP 54 Filter Fan

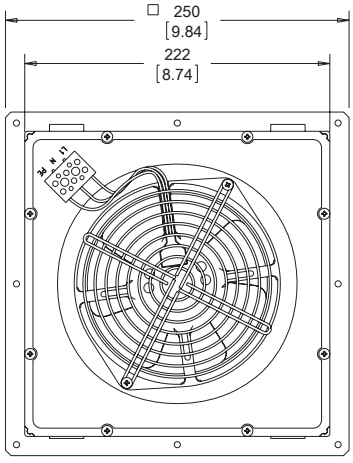


TYPE 12 / IP 55 Filter Fan

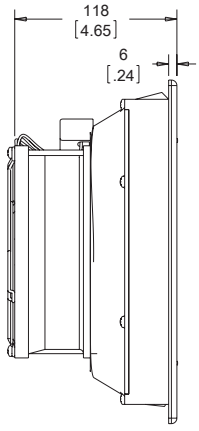


Filter Fan Collection

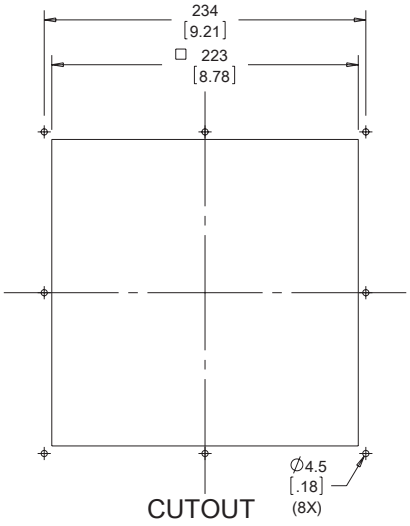
FILTER FAN



BACK VIEW

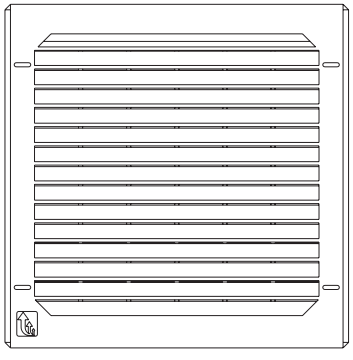


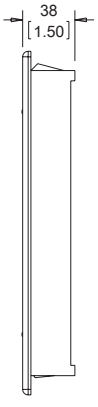
SIDE VIEW



CUTOUT

EXHAUST GRILLE





89051219

Order Exhaust Grille Kit separately

Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

ST13 303 CFM (515 m³/hr.) Thin Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard
Type 12, IP55 optional

Features

- Free airflow up to 303 CFM (515 m³/hr.)
- Approximate size 13 in. (325 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Thin depth to minimize cabinet intrusion
- Enclosure side wall mounting
- Reverse airflow option to increase static pressure
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Filter Fan Collection

Performance Data **ST13 303 CFM (515 m³/hr.) Thin Side-Mount Filter Fan - Standard and Reverse**

ELECTRICAL DATA				
Rated Voltage	**115**	**230**	**115 Rvrs**	**230 Rvrs**
Frequency (Hz)	50 / 60	50 / 60	50 / 60	50 / 60
Nominal Current Maximum (Amps)	.58 / .70	.29 / .35	.58 / .70	.29 / .35
Power Consumption Maximum (Watts)	64 / 80	64 / 80	64 / 80	64 / 80
Power Connection	Terminal Block			
TYPE 12 / IP54 FILTER FANS				
RAL 7035 Light Gray:				
Item	20056	20058	20062	20064
Model	**ST1316414**	**ST1326414**	**ST1316414R**	**ST1326414R**
RAL 9011 Black:				
Item	20057	20061	20063	20065
Model	**ST1316413**	**ST1326413**	**ST1316413R**	**ST1326413R**
Free Airflow (CFM / m³/hr.)	303 / 515	303 / 515	303 / 515	303 / 515
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	209 / 355	209 / 355	209 / 355	209 / 355
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	249 / 422	249 / 422	249 / 422	249 / 422
TYPE 12 / IP55 FILTER FANS				
RAL 7035 Light Gray:				
Item	20184	20186	20188	20193
Model	**ST1316514**	**ST1326514**	**ST1316514R**	**ST1326514R**
RAL 9011 Black:				
Item	20185	20187	20192	20194
Model	**ST1316513**	**ST1326513**	**ST1316513R**	**ST1326513R**
Free Airflow (CFM / m³/hr.)	277 / 470	277 / 470	277 / 470	277 / 470
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	191 / 325	191 / 325	191 / 325	191 / 325
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	219 / 372	219 / 372	219 / 372	219 / 372
FILTER FAN UNIT CONSTRUCTION				
Fan RPM	2550 / 2800	2550 / 2800	2550 / 2800	2550 / 2800
Sound Pressure (dBA)	60	60	60	60
Operating Temperature Range:				
Maximum (°F / °C)	131 / 55	131 / 55	131 / 55	131 / 55
Minimum (°F / °C)	14 / -10	14 / -10	14 / -10	14 / -10
Service Life (hours)	40,000	40,000	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)	12.72 x 12.72 x 4.8 / 323 x 323 x 122			
Cut-Out Dimensions - H x W (in. / mm)	11.50 x 11.50 / 292 x 292			
Weight (lb. / kg)	7.5 / 3.4			
TYPE 12 / IP54 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model	19986 / SG1300404			
RAL 9011 Black:				
Item / Model	19987 / SG1300403			
TYPE 12 / IP55 EXHAUST GRILLES				
RAL 7035 Light Gray:				
Item / Model	20088 / SG1300504			
RAL 9011 Black:				
Item / Model	20092 / SG1300503			
ACCESSORIES				
Replacement Filters:				
Type 12 / IP54 Item	33599			
Type 12 / IP55 Item	20198 / 10100067H			
Thermostat Item	21803 / TWR60			
Stainless Steel Washdown Shroud Item / Model	20183 / SH1300005			

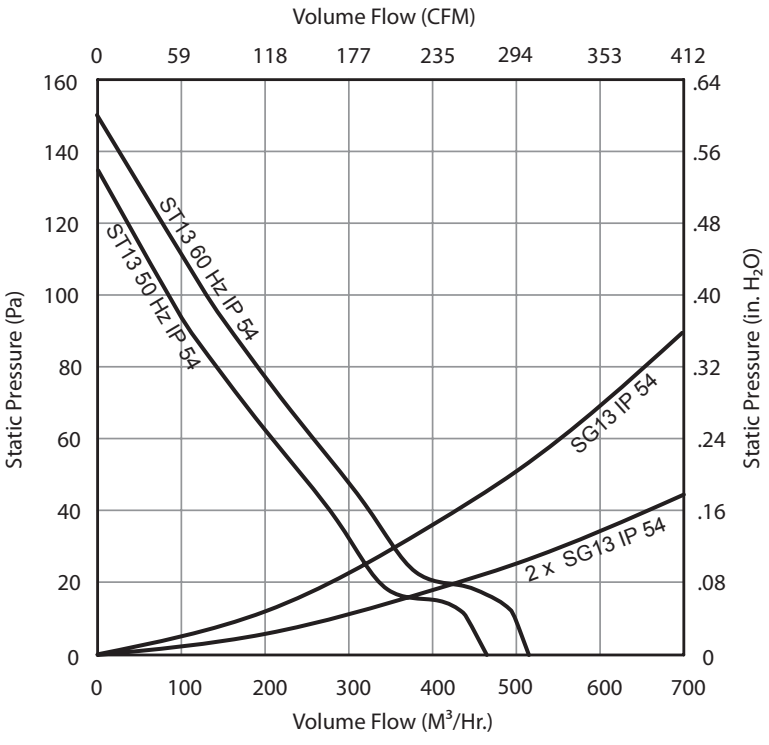
Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

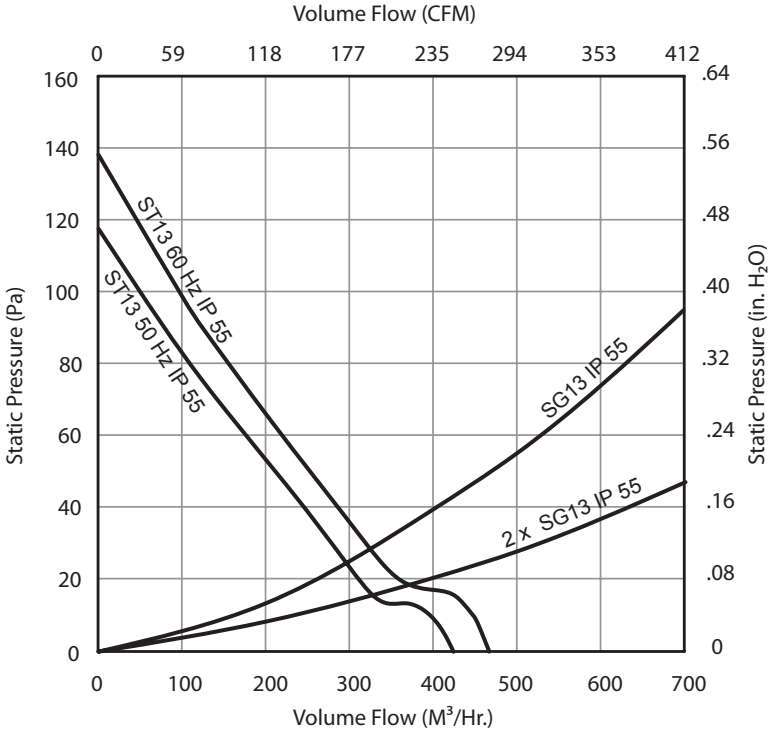
Exhaust Grilles sold separately.

ST13 303 CFM (515 M^3/Hr.) Thin Side-Mount Filter Fan Performance Curve

TYPE 12 / IP 54 Filter Fan

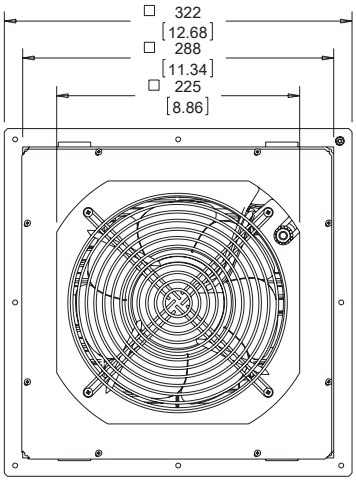


TYPE 12 / IP 55 Filter Fan

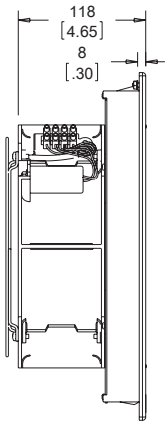


Filter Fan Collection

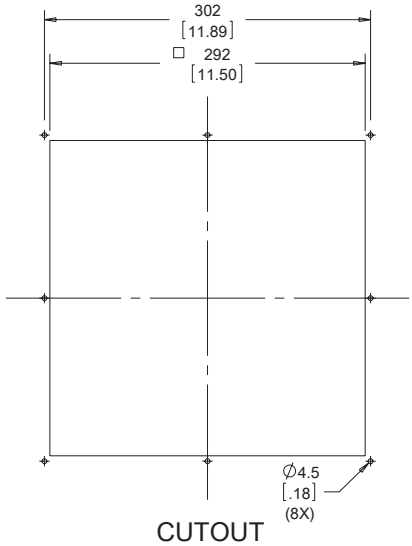
FILTER FAN



BACK VIEW

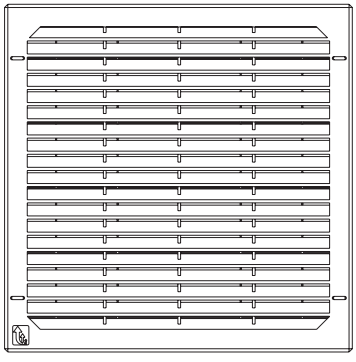


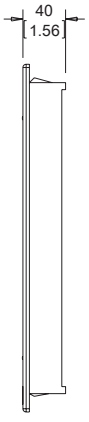
SIDE VIEW



CUTOUT

EXHAUST GRILLE





89051222

Order Exhaust Grille Kit separately

Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

SF13 376 CFM (638 m³/hr.) Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard
Type 12, IP55 optional

Features

- Free airflow up to 376 CFM (638 m³/hr.)
- Approximate size 13 in. (325 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Enclosure side wall mounting
- Reverse airflow option to increase static pressure
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Filter Fan Collection

Performance Data **SF13 376 CFM (638 m³/hr.) Side-Mount Filter Fan - Standard and Reverse**

ELECTRICAL DATA						
Rated Voltage	**115**	**230**	**24**	**48**	**115 Rvrs**	**230 Rvrs**
Frequency (Hz)	50 / 60	50 / 60	—	—	50 / 60	50 / 60
Nominal Current Maximum (Amps)	.58 / .70	.29 / .35	2.60	1.30	.58 / .70	.29 / .35
Power Consumption Maximum (Watts)	64 / 80	64 / 80	55	55	64 / 80	64 / 80
Power Connection			Terminal Block			
TYPE 12 / IP54 FILTER FANS						
RAL 7035 Light Gray:						
Item	20045	20047	20041	20043	20051	20054
Model	**SF1316414**	**SF1326414**	**SF1324414**	**SF1348414**	**SF1316414R**	**SF1326414R**
RAL 9011 Black:						
Item	20046	20048	20042	20044	20052	20055
Model	**SF1316413**	**SF1326413**	**SF1324413**	**SF1348413**	**SF1316413R**	**SF1326413R**
Free Airflow (CFM / m³/hr.)	375 / 638	375 / 638	375 / 638	375 / 638	375 / 638	375 / 638
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	249 / 423	249 / 423	249 / 423	249 / 423	249 / 423	249 / 423
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	333 / 565	333 / 565	333 / 565	333 / 565	333 / 565	333 / 565
TYPE 12 / IP55 FILTER FANS						
RAL 7035 Light Gray:						
Item	20146	20148	20142	20144	—	—
Model	**SF1316514**	**SF1326514**	**SF1324514**	**SF1348514**	—	—
RAL 9011 Black:						
Item	20147	20152	20143	20145	—	—
Model	**SF1316513**	**SF1326513**	**SF1324513**	**SF1348513**	—	—
Free Airflow (CFM / m³/hr.)	346 / 587	346 / 587	346 / 587	346 / 587	—	—
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	228 / 387	228 / 387	228 / 387	228 / 387	—	—
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	301 / 511	301 / 511	301 / 511	301 / 511	—	—
FILTER FAN UNIT CONSTRUCTION						
Fan RPM	2550 / 2800	2550 / 2800	2950	2950	2550 / 2800	2550 / 2800
Sound Pressure (dBA)	60	60	60	60	60	60
Operating Temperature Range:						
Maximum (°F / °C)	131 / 55	131 / 55	140 / 60	140 / 60	131 / 55	131 / 55
Minimum (°F / °C)	14 / -10	14 / -10	-13 / -25	-13 / -25	14 / -10	14 / -10
Service Life (hours)	40,000	40,000	40,000	40,000	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)			12.72 x 12.72 x 5.83 / 323 x 323 x 148			
Cut-Out Dimensions - H x W (in. / mm)			11.5 x 11.5 / 292 x 292			
Weight (lb. / kg)			7.5 / 3.4			
TYPE 12 / IP54 EXHAUST GRILLES						
RAL 7035 Light Gray:						
Item / Model			19986 / SG1300404			
RAL 9011 Black:						
Item / Model			19987 / SG1300403			
TYPE 12 / IP55 EXHAUST GRILLES						
RAL 7035 Light Gray:						
Item / Model			20088 / SG1300504			
RAL 9011 Black:						
Item / Model			20092 / SG1300503			
ACCESSORIES						
Replacement Filters:						
Type 12 / IP54 Item			33599			
Type 12 / IP55 Item			20198 / 10100067H			
Thermostat Item			21803 / TWR60			
Stainless Steel Washdown Shroud Item / Model			20183 / SH1300005			

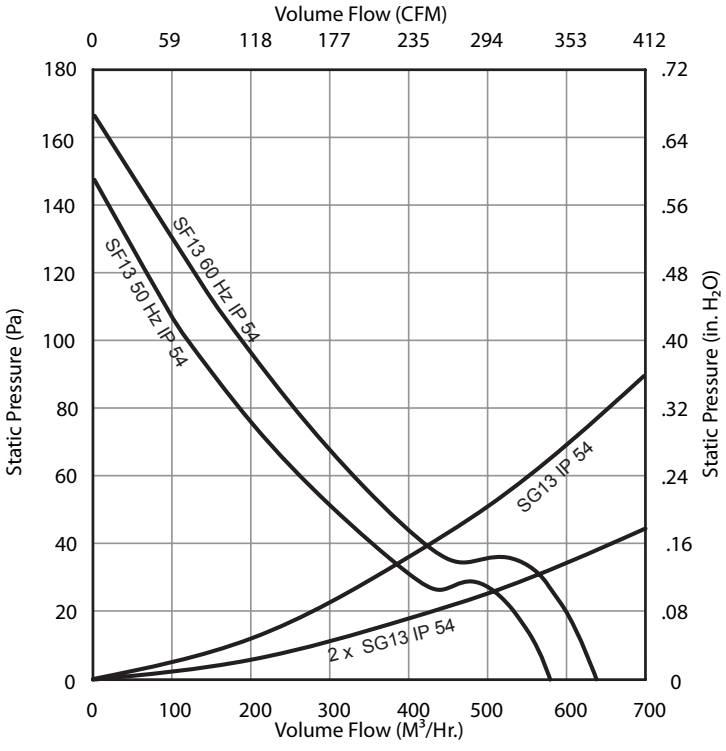
Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

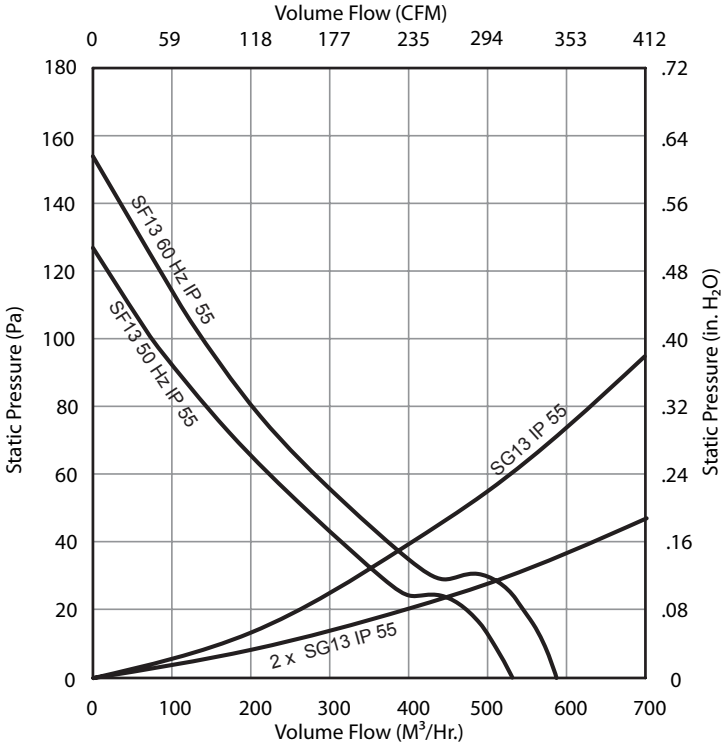
Exhaust Grilles sold separately.

SF13 376 CFM (638 M^3/Hr.) Side-Mount Filter Fan Performance Curve

TYPE 12 / IP 54 Filter Fan

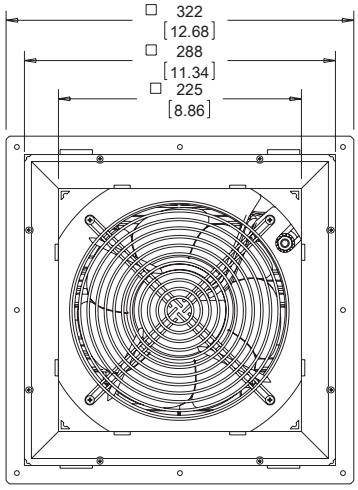


TYPE 12 / IP 55 Filter Fan

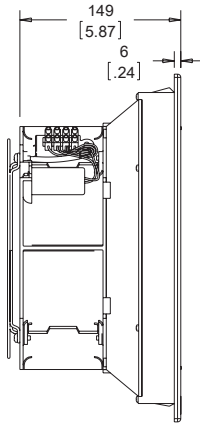


Filter Fan Collection

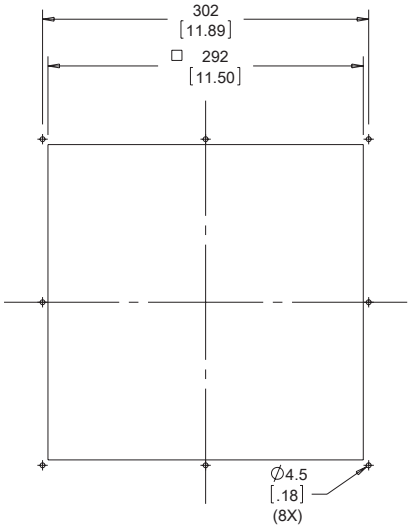
FILTER FAN



BACK VIEW

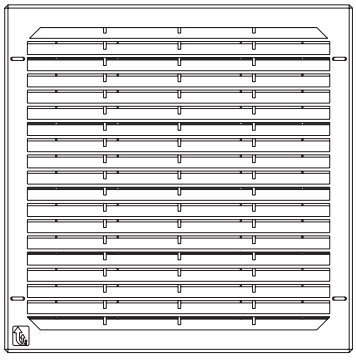


SIDE VIEW

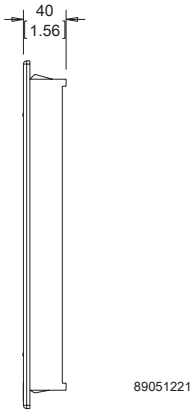


CUTOUT

EXHAUST GRILLE



Order Exhaust Grille Kit separately



Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

SF13 473 CFM (803 m³/hr.) Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard
Type 12, IP55 optional

Features

- Free airflow up to 473 CFM (803 m³/hr.)
- Approximate size 13 in. (325 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Enclosure side wall mounting
- Reverse airflow option to increase static pressure
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Filter Fan Collection

Performance Data **SF13 473 CFM (803 m³/hr.) Side-Mount Filter Fan - Standard**

ELECTRICAL DATA			
Rated Voltage	**115**	**230**	**400**
Frequency (Hz)	50 / 60	50 / 60	50 / 60
Nominal Current Maximum (Amps)	1.02 / 1.4	.51 / .74	.22 /. 26
Power Consumption Maximum (Watts)	115 / 166	115 / 175	110 / 150
Power Connection		Terminal Block	
TYPE 12 / IP54 FILTER FANS			
RAL 7035 Light Gray:			
Item	20066	20068	20072
Model	**SF1316424**	**SF1326424**	**SF1340424**
RAL 9011 Black:			
Item	20067	20071	20073
Model	**SF1316423**	**SF1326423**	**SF1340423**
Free Airflow (CFM / m³/hr.)	473 / 803	473 / 803	473 / 803
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	343 / 583	343 / 583	343 / 583
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	399 / 677	399 / 677	399 / 677
[[5,y]]**TYPE 12 / IP55 FILTER FANS**			
RAL 7035 Light Gray:			
Item	20153	20155	20157
Model	**SF1316524**	**SF1326524**	**SF1340524**
RAL 9011 Black:			
Item	20154	20156	20158
Model	**SF1316523**	**SF1326523**	**SF1340523**
Free Airflow (CFM / m³/hr.)	436 / 740	436 / 740	436 / 740
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	314 / 533	314 / 533	314 / 533
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	369 / 627	369 / 627	369 / 627
FILTER FAN UNIT CONSTRUCTION			
Fan RPM	2450 / 2650	2550 / 2750	2650 / 2900
Sound Pressure (dBA)	70	70	70
Operating Temperature Range:			
Maximum (°F / °C)	131 / 55	131 / 55	131 / 55
Minimum (°F / °C)	14 / -10	14 / -10	14 / -10
Service Life (hours)	40,000	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)		12.72 x 12.72 x 6.38 / 323 x 323 x 162	
Cut-Out Dimensions - H x W (in. / mm)		11.50 x 11.50 / 292 x 292	
Weight (lb. / kg)		7.72 / 3.5	
TYPE 12 / IP54 EXHAUST GRILLES			
RAL 7035 Light Gray:			
Item / Model		19986 / SG1300404	
RAL 9011 Black:			
Item / Model		19987 / SG1300403	
TYPE 12 / IP55 EXHAUST GRILLES			
RAL 7035 Light Gray:			
Item / Model		20088 / SG1300504	
RAL 9011 Black:			
Item / Model		20092 / SG1300503	
ACCESSORIES			
Replacement Filters:			
Type 12 / IP54 Item		33599	
Type 12 / IP55 Item		20198 / 10100067H	
Thermostat Item		21803 / TWR60	
Stainless Steel Washdown Shroud Item / Model		20183 / SH1300005	

Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

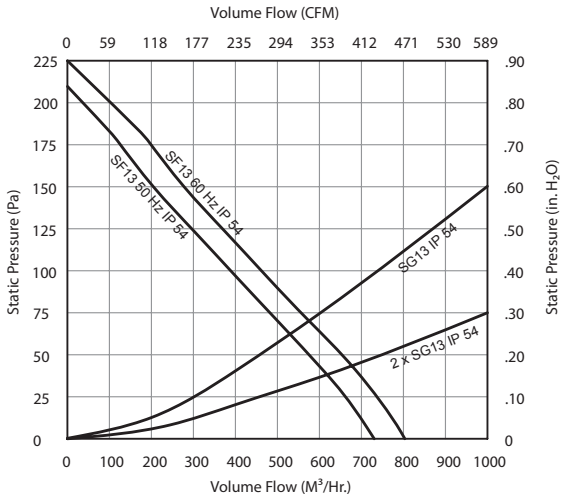
Unit depth is from the back edge of the grille to the back of the fan.

Exhaust Grilles sold separately.

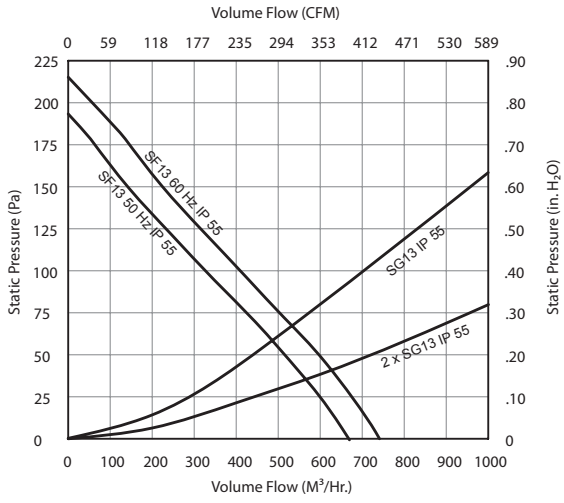
Filter Fan Collection

SF13 473 CFM (803 M^3/Hr.) Side-Mount Filter Fan
Performance Curve

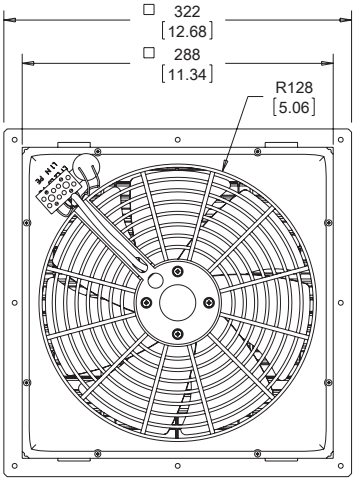
TYPE 12 / IP 54 Filter Fan



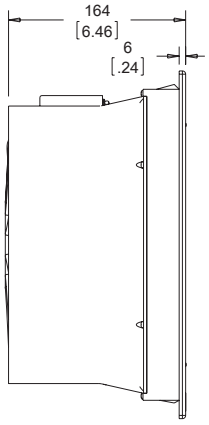
TYPE 12 / IP 55 Filter Fan



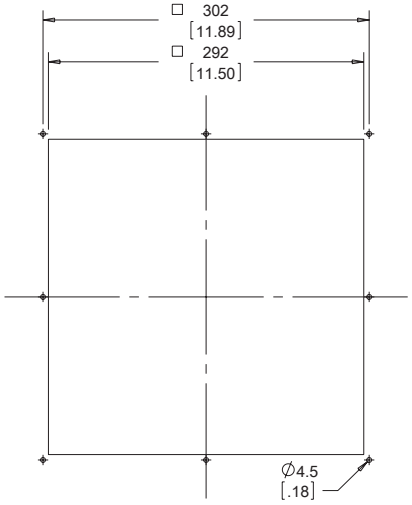
FILTER FAN



BACK VIEW

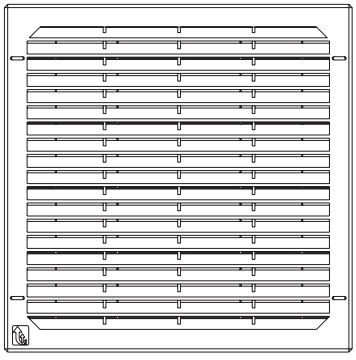


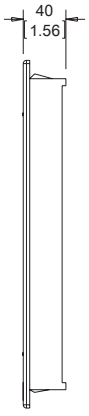
SIDE VIEW



CUTOUT

EXHAUST GRILLE





89051223

Order Exhaust Grille Kit separately

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Filter Fan Collection

Performance Data **SF13 473 CFM (803 m³/hr.) Side-Mount Filter Fan - Reverse**

ELECTRICAL DATA			
Rated Voltage	**115 Rvrs**	**230 Rvrs**	**400 Rvrs**
Frequency (Hz)	50 / 60	50 / 60	50 / 60
Nominal Current Maximum (Amps)	1.05 / 1.5	.51 / .70	.22 / .26
Power Consumption Maximum (Watts)	120 / 175	115 / 165	110 /1 50
Power Connection		Terminal Block	
TYPE 12 / IP54 FILTER FANS			
RAL 7035 Light Gray:			
Item	20076	20078	20081
Model	**SF1316424R**	**SF1326424R**	**SF1340424R**
RAL 9011 Black:			
Item	20077	20080	20202
Model	**SF1316423R**	**SF1326423R**	**SF1340423R**
Free Airflow (CFM / m³/hr.)	473 / 803	473 / 803	473 / 803
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	343 / 583	343 / 583	343 / 583
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	399 / 677	399 / 677	399 / 677
FILTER FAN UNIT CONSTRUCTION			
Fan RPM	2450 / 2650	2550 / 2750	2650 / 2900
Sound Pressure (dBA)	70	70	70
Operating Temperature Range:			
Maximum (°F / °C)	131 / 55	131 / 55	131 / 55
Minimum (°F / °C)	14 / -10	14 / -10	14 / -10
Service Life (hours)	40,000	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)		12.72 x 12.72 x 6.38 / 323 x 323 x 162)	
Cut-Out Dimensions - H x W (in. / mm)		11.50 x 11.50 / 292 x 292)	
Weight (lb. / kg)		7.72 / 3.5	
TYPE 12 / IP54 EXHAUST GRILLES			
RAL 7035 Light Gray:			
Item / Model		19986 / SG1300404	
RAL 9011 Black:			
Item / Model		19987 / SG1300403	
TYPE 12 / IP55 EXHAUST GRILLES			
RAL 7035 Light Gray:			
Item / Model		20088 / SG1300504	
RAL 9011 Black:			
Item / Model		20092 / SG1300503	
ACCESSORIES			
Replacement Filters:			
Type 12 / IP54 Item		33599	
Type 12 / IP55 Item		20198 / 10100067H	
Thermostat Item		21803 / TWR60	
Stainless Steel Washdown Shroud Item / Model		20183 / SH1300005	

Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

Exhaust Grilles sold separately.

SF13 571 CFM (970 m³/hr.) Side-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard
Type 12, IP55 optional

Features

- Free airflow up to 571 CFM (970 m³/hr.)
- Approximate size 13 in. (325 mm)
- Click-fit design quickly installs into enclosure wall; no tools or screws required
- Enclosure side wall mounting
- Reverse airflow option to increase static pressure
- Standard foam-in-place gasket
- Similar cut-out sizes as other filter fan manufacturers
- Terminal wire connections
- Simple snap-open grille for easy filter replacement

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

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Filter Fan Collection

Performance Data **SF13 571 CFM (970 m³/hr.) Side-Mount Filter Fan - Standard**

ELECTRICAL DATA					
Rated Voltage	**115**	**230**	**24**	**48**	**400/460**
Frequency (Hz)	50 / 60	50 / 60	—	—	50 / 60
Nominal Current Maximum (Amps)	1.02/1.47	.6 / .92	5.00	2.60	.25 / .27
Power Consumption Maximum (Watts)	115/175	135 / 215	105	105	113 / 172
Power Connection			Terminal Block		
TYPE 12 / IP54 FILTER FANS					
RAL 7035 Light Gray:					
Item	20211	20213	20205	20207	20215
Model	**SF1316434**	**SF1326434**	**SF1324434**	**SF1348434**	**SF1346434**
RAL 9011 Black:					
Item	20212	20214	20206	20208	20216
Model	**SF1316433**	**SF1326433**	**SF1324433**	**SF1348433**	**SF1346433**
Free Airflow (CFM / m³/hr.)	571 / 970	571 / 970	571 / 970	571 / 970	571 / 970
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	377 / 640	377 / 640	377 / 640	377 / 640	377 / 640
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	454 / 770	454 / 770	454 / 770	454 / 770	454 / 770
TYPE 12 / IP55 FILTER FANS					
RAL 7035 Light Gray:					
Item	20168	20173	20164	20166	20175
Model	**SF1316534**	**SF1326534**	**SF1324534**	**SF1348534**	**SF1346534**
RAL 9011 Black:					
Item	20172	20174	20165	20167	20176
Model	**SF1316533**	**SF1326533**	**SF1324533**	**SF1348533**	**SF1346533**
Free Airflow (CFM / m³/hr.)	526 / 893	526 / 893	526 / 893	526 / 893	526 / 893
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	345 / 586	345 / 586	345 / 586	345 / 586	345 / 586
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	415 / 705	415 / 705	415 / 705	415 / 705	415 / 705
FILTER FAN UNIT CONSTRUCTION					
Fan RPM	2600 / 2850	2650 / 2950	2750	2750	2650 / 3050
Sound Pressure (dBA)	70	69	70	70	73
Operating Temperature Range:					
Maximum (°F / °C)	140 / 60	140 / 60	140 / 60	140 / 60	140 / 60
Minimum (°F / °C)	5 / -15	5 / -15	5 / -15	5 / -15	5 / -15
Service Life (hours)	40,000	40,000	40,000	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)			12.72 x 12.72 x 5.51 / 323 x 323 x 140		
Cut-Out Dimensions - H x W (in. / mm)			11.50 x 11.50 / 292 x 292		
Weight (lb. / kg)			10.14 / 4.6		
TYPE 12 / IP54 EXHAUST GRILLES					
RAL 7035 Light Gray:					
Item / Model			19986 / SG1300404		
RAL 9011 Black:					
Item / Model			19987 / SG1300403		
TYPE 12 / IP55 EXHAUST GRILLES					
RAL 7035 Light Gray:					
Item / Model			20088 / SG1300504		
RAL 9011 Black:					
Item / Model			20092 / SG1300503		
ACCESSORIES					
Replacement Filters:					
Type 12 / IP54 Item			33599		
Type 12 / IP55 Item			20198 / 10100067H		
Thermostat Item			21803 / TWR60		
Stainless Steel Washdown Shroud Item / Model			20183 / SH1300005		

Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

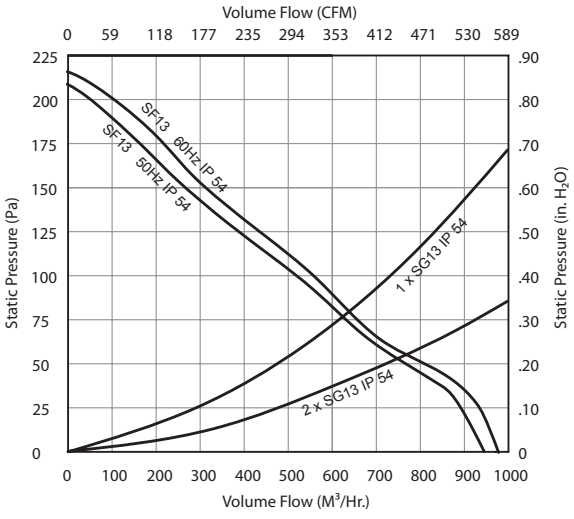
Unit depth is from the back edge of the grille to the back of the fan.

Exhaust Grilles sold separately.

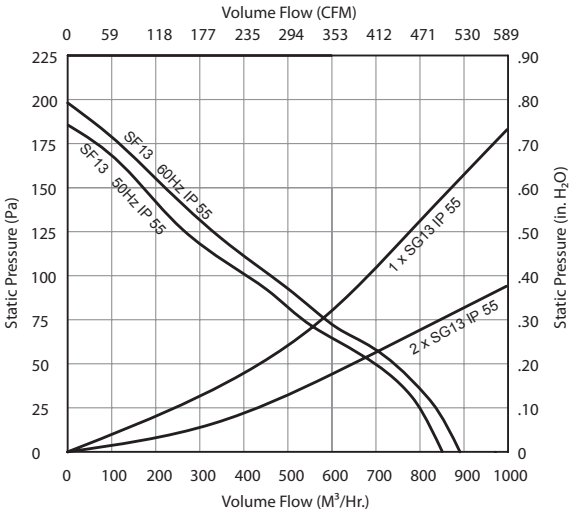
Filter Fan Collection

SF13 571 CFM (970 M³/Hr.) Side-Mount Filter Fan Performance Curve

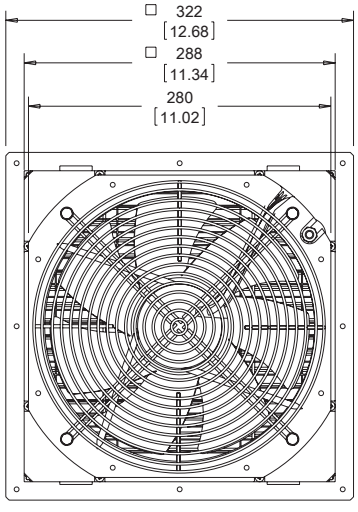
TYPE 12 / IP 54 Filter Fan



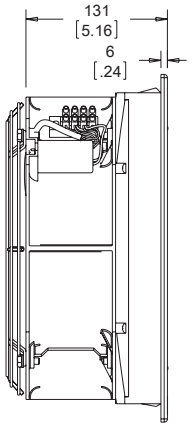
TYPE 12 / IP 55 Filter Fan



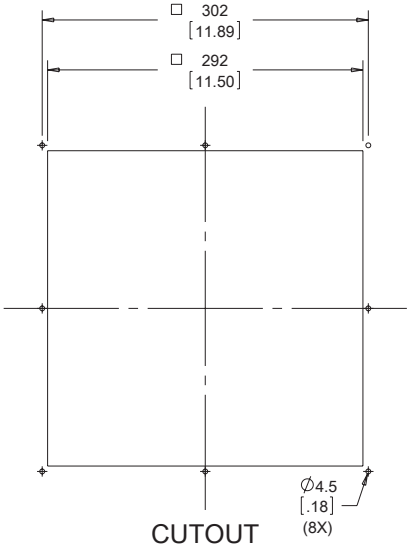
FILTER FAN



BACK VIEW

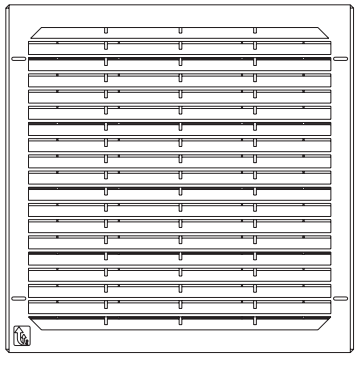


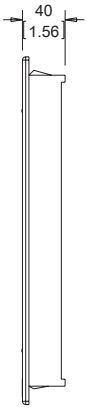
SIDE VIEW



CUTOUT

EXHAUST GRILLE





89051224

Order Exhaust Grille Kits separately

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Filter Fan Collection

Performance Data **SF13 571 CFM (970 m³/hr.) Side-Mount Filter Fan - Reverse**

ELECTRICAL DATA			
Rated Voltage	**115R**	**230R**	**400/460R**
Frequency (Hz)	50 / 60	50 / 60	50 / 60
Nominal Current Maximum (Amps)	1.02 / 1.47	.6 / .92	.25 / .27
Power Consumption Maximum (Watts)	115 / 175	135 / 215	113 / 160
Power Connection		Terminal Block	
TYPE 12 / IP54 FILTER FANS			
RAL 7035 Light Gray:			
Item	20217	20221	20223
Model	**SF1316434R**	**SF1326434R**	**SF1340434R**
RAL 9011 Black:			
Item	20218	20222	20224
Model	**SF1316433R**	**SF1326433R**	**SF1346433R**
Free Airflow (CFM / m³/hr.)	571 / 970	571 / 970	571 / 970
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	377 / 640	377 / 640	377 / 640
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	454 / 770	454 / 770	454 / 770
FILTER FAN UNIT CONSTRUCTION			
Fan RPM	2600 / 2850	2650 / 2950	2650 / 3050
Sound Pressure (dBA)	70	69	73
Operating Temperature Range:			
Maximum (°F / °C)	140 / 60	140 / 60	140 / 60
Minimum (°F / °C)	5 / -15	5 / -15	5 / -15
Service Life (hours)	40,000	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)		12.72 x 12.72 x 5.51 / 323 x 323 x 140	
Cut-Out Dimensions - H x W (in. / mm)		11.50 x 11.50 / 292 x 292	
Weight (lb. / kg)		10.14 / 4.6	
TYPE 12 / IP54 EXHAUST GRILLES			
RAL 7035 Light Gray:			
Item /Model		19986 / SG1300404	
RAL 9011 Black:			
Item / Model		19987 / SG1300403	
TYPE 12 / IP55 EXHAUST GRILLES			
RAL 7035 Light Gray:			
Item / Model		20088 / SG1300504	
RAL 9011 Black:			
Item / Model		20092 / SG1300503	
ACCESSORIES			
Replacement Filters:			
Type 12 / IP54 Item		33599	
Type 12 / IP55 Item		20198 / 10100067H	
Thermostat Item		21803 / TWR60	
Stainless Steel Washdown Shroud Item / Model		20183 / SH1300005	

Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

Exhaust Grilles sold separately.

SR16 280 CFM (475 m³/hr.) Roof-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard

Features

- Free airflow up to 280 CFM (475 m³/hr.)
- Approximate size 16 in. (420 mm)
- Enclosure roof mounting
- Bolt in place to ensure a tight seal
- Terminal wire connections

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Performance Data **SR16 280 CFM (475 m³/hr.) Roof-Mount Filter Fan**

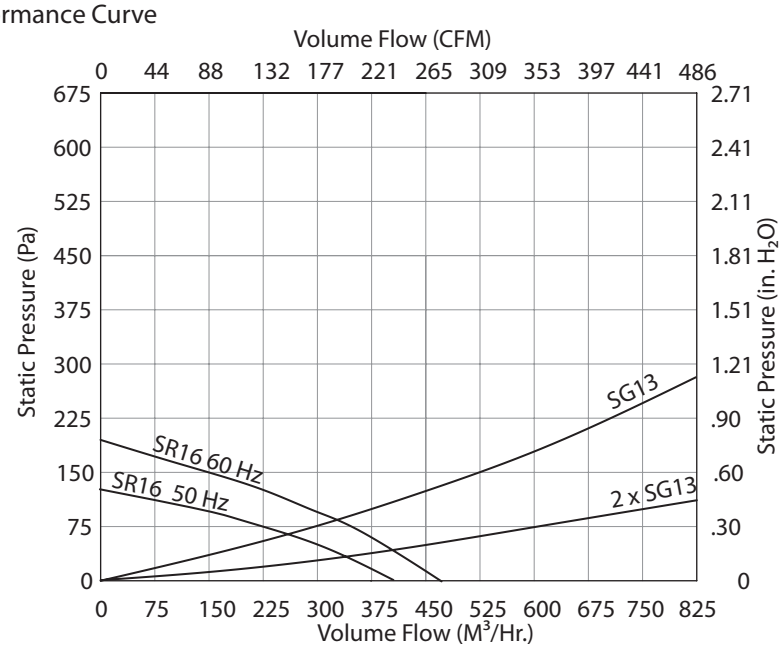
ELECTRICAL DATA		
Rated Voltage	**115**	**230**
Frequency (Hz)	50 / 60	50 / 60
Nominal Current Maximum (Amps)	.35 / .40	.20 / .21
Power Consumption Maximum (Watts)	40 / 45	40 / 45
Power Connection	Terminal Block	
TYPE 12 / IP54 FILTER FANS		
RAL 7035 Light Gray:		
Item	19972	19973
Model	**SR1616414**	**SR1626414**
Free Airflow (CFM / m³/hr.)	227 / 386	227 / 386
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	151 / 257	151 / 257
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	183 / 311	183 / 311
FILTER FAN UNIT CONSTRUCTION		
Fan RPM	1430 / 1700	1430 / 1700
Sound Pressure (dBA)	58 / 62	58 / 62
Operating Temperature Range:		
Maximum (°F / °C)	140 / 60	140 / 60
Minimum (°F / °C)	14 / -10	14 / -10
Service Life (hours)	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)	16.54 x 16.54 x 1.97 / 420 x 420 x 50	
Cut-Out Dimensions - H x W (in. / mm)	13.58 x 13.58 / 345 x 345	
Weight (lb. / kg)	17.20 / 7.8	
TYPE 12 / IP54 EXHAUST GRILLES		
RAL 7035 Light Gray:		
Item	19986	
Model	SG1300404	
ACCESSORIES		
Replacement Filters:		
Type 12 / IP54 Item	33599	
Thermostat Item	21803 / TWR60	

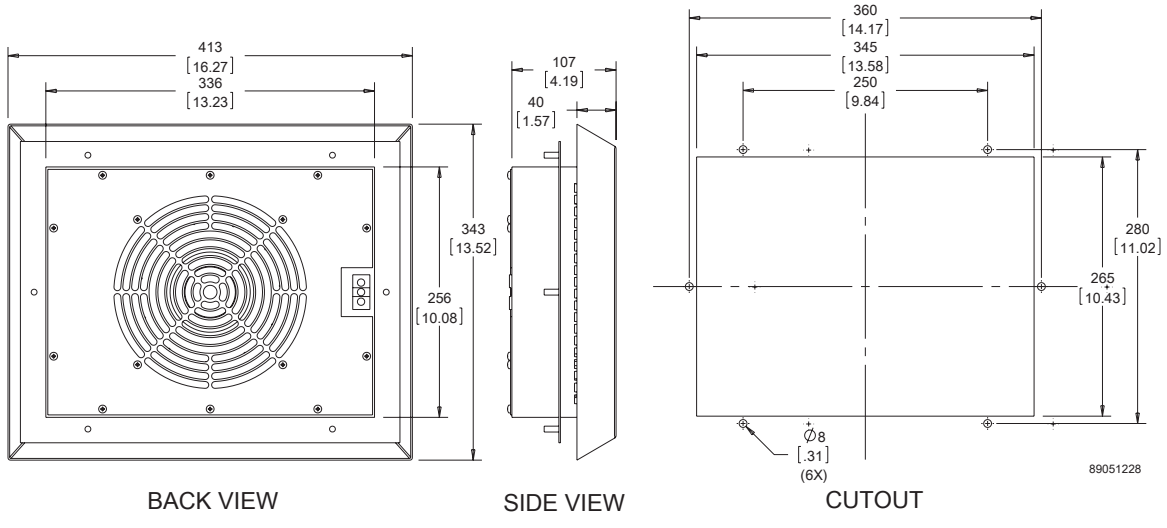
Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

Filter Fan Collection

SR16 280 CFM (475 M^3/Hr.) Roof-Mount Filter Fan
Performance Curve





Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

SR16 459 CFM (780 m³/hr.) Roof-Mount Filter Fan

Industry Standards

UL/cUL recognized; File no. 235470

CE, CSA (fan motor only)
Type 12, IP54 standard

Features

- Free airflow up to 459 CFM (780 m³/hr.)
- Enclosure roof mounting
- Bolt in place to ensure a tight seal
- Terminal wire connections

Finish

- RAL 7035 light-gray UV-resistant plastic standard
- RAL 9011 black UV-resistant plastic optional

Notes

Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

Performance Data **SR16 459 CFM (780 m³/hr.) Roof-Mount Filter Fan**

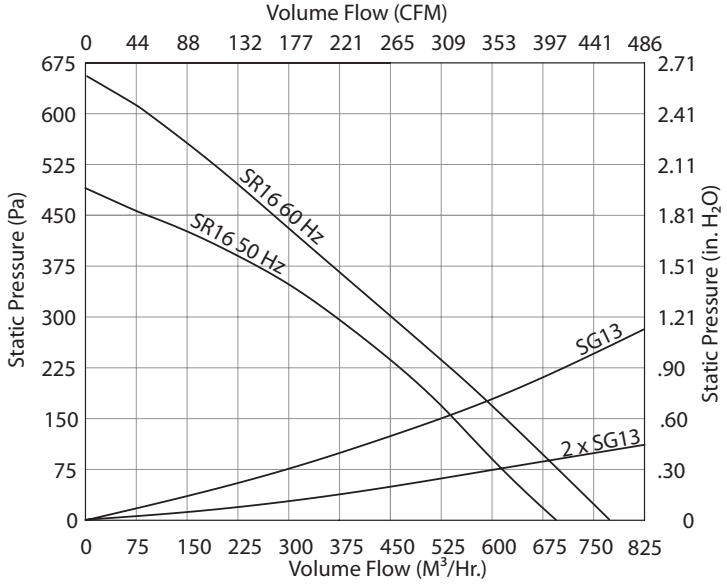
ELECTRICAL DATA		
Rated Voltage	**115**	**230**
Frequency (Hz)	50 / 60	50 / 60
Nominal Current Maximum (Amps)	.60 / .80	.55 / .73
Power Consumption Maximum (Watts)	100 / 130	110 / 150
Power Connection	Terminal Block	
TYPE 12 / IP54 FILTER FANS		
RAL 7035 Light Gray:		
Item	19974	19975
Model	**SR1616424**	**SR1626424**
Free Airflow (CFM / m³/hr.)	375 / 636	375 / 636
Airflow with 1 Exhaust Grille (CFM / m³/hr.)	302 / 513	302 / 513
Airflow with 2 Exhaust Grilles (CFM / m³/hr.)	337 / 572	337 / 572
FILTER FAN UNIT CONSTRUCTION		
Fan RPM	2650 / 2950	2650 / 2950
Sound Pressure (dBA)	73 / 76	73 / 76
Operating Temperature Range:		
Maximum (°F / °C)	140 / 60	140 / 60
Minimum (°F / °C)	14 / -10	14 / -10
Service Life (hours)	40,000	40,000
Unit Dimensions - H x W x D (in. / mm)	16.54 x 16.54 x 1.97 / 420 x 420 x 50	
Cut-Out Dimensions - H x W (in. / mm)	13.58 x 13.58 / 345 x 345	
Weight (lb. / kg)	17.20 / 7.8	
TYPE 12 / IP54 EXHAUST GRILLES		
RAL 7035 Light Gray:		
Item	19986	
Model	SG1300404	
ACCESSORIES		
Replacement Filters:		
Type 12 / IP54 Item	33599	
Thermostat Item	21803 / TWR60	

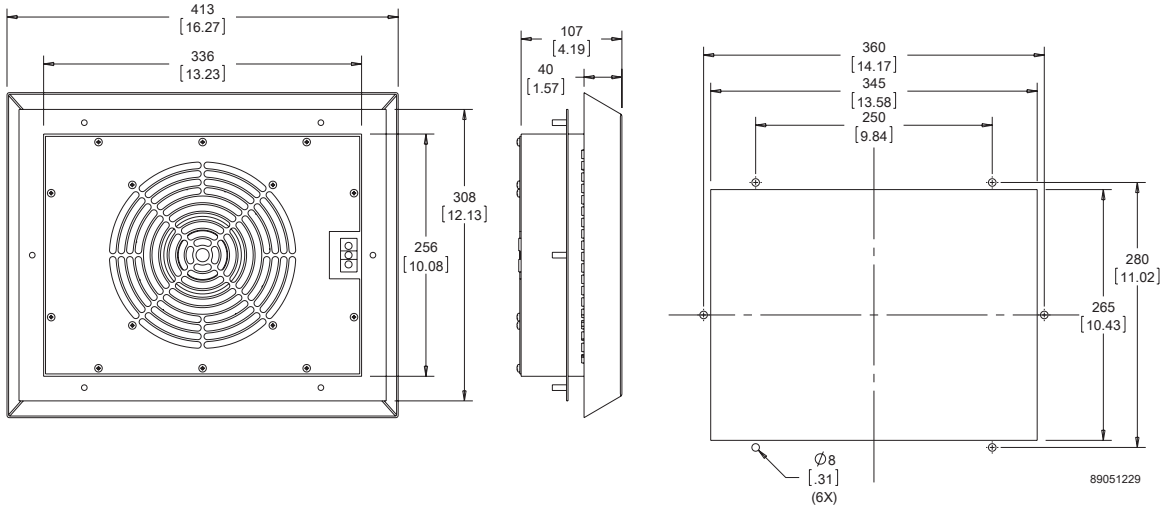
Above airflow rates at 60 Hz; see performance curves for airflow at 50 Hz and more details.

Unit depth is from the back edge of the grille to the back of the fan.

Filter Fan Collection

SR16 459 CFM (780 M^3/Hr.) Roof-Mount Filter Fan Performance Curve





Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

Fan Accessories

Filter Fan Accessory Selection Guide

Match the right accessory to your filter fan.

Exhaust Grille		
Model	**Item**	**Fits Fan Packages**
SG0400404	19976	All SF04 RAL 7035 Models
SG0400403	19977	All SF04 RAL 9011 Models
SG0500404	19978	All SF05 IP54 RAL 7035 Models
SG0500403	19981	All SF05 IP54 RAL 9011 Models
SG0500504	20082	All SF05 IP55 RAL 7035 Models
SG0500503	20083	All SF05 IP55 RAL 9011 Models
SG0900404	19982	All SF09 IP54 RAL 7035 Models
SG0900403	19983	All SF09 IP54 RAL 9011 Models
SG0900504	20084	All SF09 IP55 RAL 7035 Models
SG0900503	20085	All SF09 IP55 RAL 9011 Models
SG1000404	19984	All SF10 IP54 RAL 7035 Models
SG1000403	19985	All SF10 IP54 RAL 9011 Models
SG1000504	20086	All SF10 IP55 RAL 7035 Models
SG1000503	20087	All SF10 IP55 RAL 9011 Models
SG1300404	19986	All SF13 IP54 RAL 7035 Models
SG1300403	19987	All SF13 IP54 RAL 9011 Models
SG1300504	20088	All SF13 IP55 RAL 7035 Models
SG1300503	20092	All SF13 IP55 RAL 9011 Models

Replacement Filter		
Model	**Item**	**Fits Fan Packages**
10100059H	20201	All SF04 Models
10100060	33569	All SF05 IP54 Models
10100064H	20195	All SF05 IP55 Models
10100061	33579	All SF09 IP54 Models
10100065H	20196	All SF09 IP55 Models
10100062	33589	All SF10 IP54 Models
10100066H	20197	All SF10 IP55 Models
10100063	33599	All SF13 IP54 Models
10100067H	20198	All SF13 IP55 Models

Wash-Down Shroud		
Model	**Item**	**Fits Fan Packages**
SH0500005	20177	All SF05 Models
SH0900005	20178	All SF09 Models
SH1000005	20182	All SF10 Models
SH1300005	20183	All SF13 Models

Wind-Driven Rain & Wash-Down Shroud

Features

- Protects filter fan and exhaust grille from wind-driven rain and high-pressure hose water
- Significantly reduces the possibility of enclosure water infiltration when used in combination with high-density IP55 Z-filter
- Sizes to cover SF05, SF09, SF10 and SF13 filter fans and SG05, SG09, SG10 and SFG3 exhaust grilles
- Mounts separately over filter fan and exhaust grille

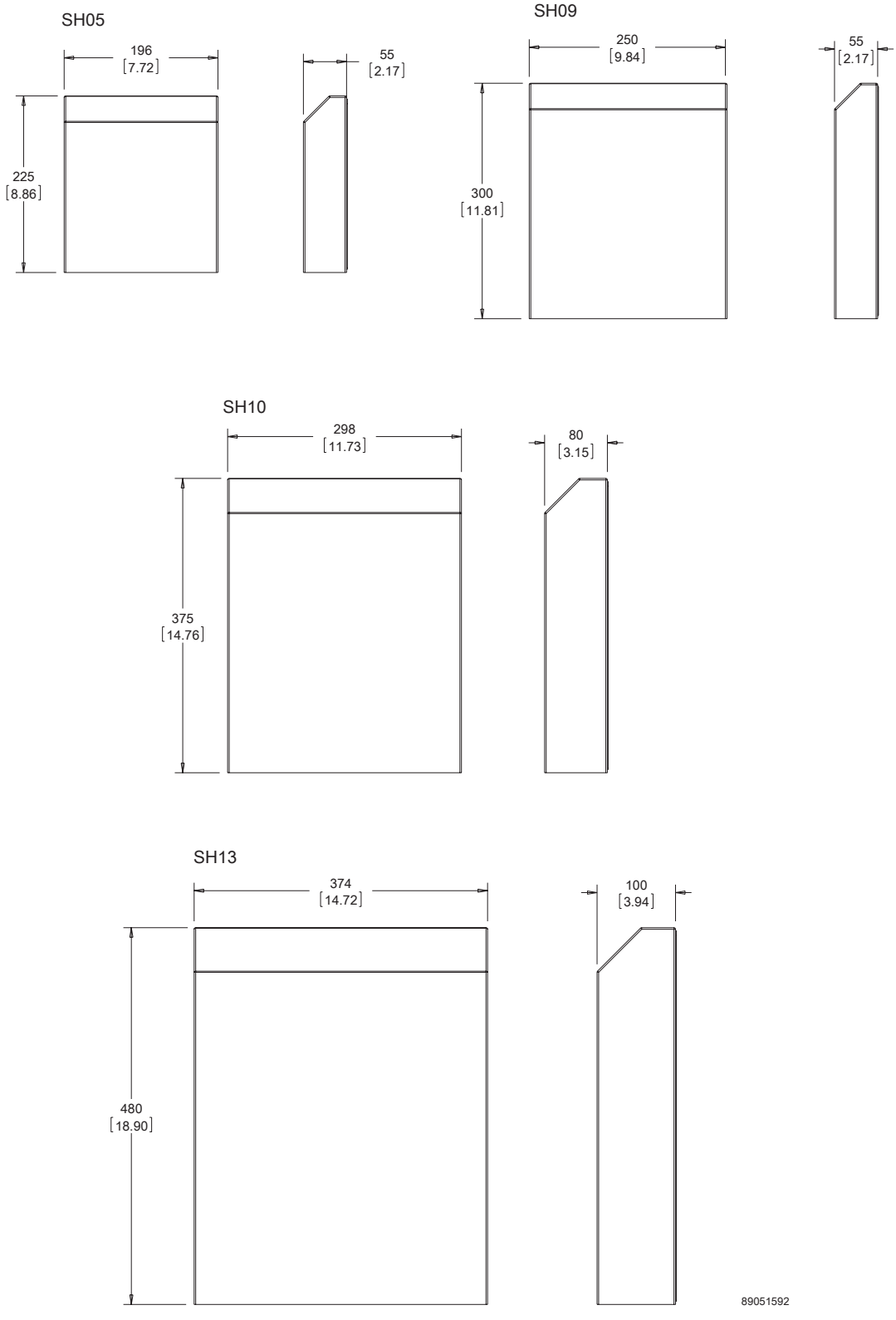
Finish

- Stainless steel standard
- RAL 7035 light-gray on galvanized metal optional
- RAL 9011 black on galvanized metal optional

Performance Data

FILTER FAN / EXHAUST GRILLE SHROUD				
Provides protection for:				
Filter Fan	SF05	SF09	SF10 / ST10	SF13 / ST13
Exhaust Grille	SG05	SG09	SG10	SG13
Stainless Steel Shroud:				
Item	20177	20178	20182	20183
Model	**SH0500005**	**SH0900005**	**SH1000005**	**SH1300005**
RAL 7035 Light Gray	Available as special order upon request			
RAL 9011 Black	Available as special order upon request			
SHROUD CONSTRUCTION				
Stainless Steel	304 stainless steel			
Painted	Powder coated painted galvanized sheet metal			

Fan Accessories



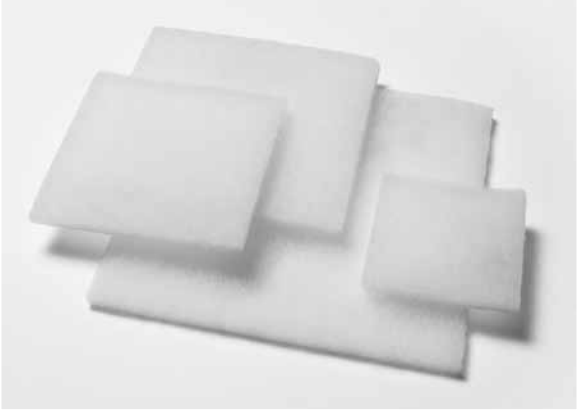
Visit **www.McLeanCoolingTech.com** to download 2D and 3D CAD drawings into the overall design of your electronic system.

Electromagnetic (EMI/RFI) Shielding

Fan Accessories

- Protects against electromagnetic (EMI/RFI) interference
- Available as an option on SF04, SF05, SF09, SF10 and SF13 filter fans and SG04, SG05, SG09, SG10 and SG13 exhaust grilles
- Order as an option with filter fan and exhaust grille
- Contact your customer service representative for part numbers and prices

Replacement Filter Mats



- Type 12 / IP54 filter option provides protection against dust infiltration
- IP55 filter adds additional protection against moisture
- See individual product pages for catalog and item numbers to order

Replacement Filter		
Model	**Item**	**Fits Fan Packages**
10100059H	20201	All SF04 Models
10100060	33569	All SF05 IP54 Models
10100064H	20195	All SF05 IP55 Models
10100061	33579	All SF09 IP54 Models
10100065H	20196	All SF09 IP55 Models
10100062	33589	All SF10 IP54 Models
10100066H	20197	All SF10 IP55 Models
10100063	33599	All SF13 IP54 Models
10100067H	20198	All SF13 IP55 Models

Fan Accessories

Thermostat Controller TH100

Features

- Saves energy, reduces filter replacement frequency and extends filter fan life
- Terminal block connection
- Controls SF04, SF05, ST/SF10 and ST/SF13 Filter Fans
- 38-mm DIN rail mounting bracket (according to EN 60715) and screws included

Finish

- RAL7035 light gray
- Plastic housing UL94 V-0

Notes

Caution: When setting the temperature of the break contact (NC) and the changeover contact (CO) to use it as a break contact, care must be taken to add the maximum hysteresis (that consists of the switching difference and the operating tolerance) to the required minimum temperature. For instance, if the temperature in the enclosure may not fall below 5 C, the controller must be set to 5+7+3=15 C (with a switching) difference of 4-7 k and tolerance of +/- 3 k.

TEMPERATURE CONTROLLER	
Item / Model	**21803 / TWR60**
Control Range (°F / °C)	-4 / -20 to 104 / 40 or 32 / 0 to 140 / 60 or 68 / 20 to 176 / 80 (see type plate)
Switching Differences:	
Bimetal controllers	Approx. 1 k, approx. 3 k, 4-7 k (see type plate)
Capillary controllers	less than 7 k
Contact	Snap contact as break contact = NC Make contact = NO Changeover contact = CO (see type plate)
Switching Capacity:	
Break contact/make contact	100V…250V / 10(2)A, at 4 max. 30 W
Changeover contact - heating	100V…250V / 10(2)A, at 4 max. 30 W
Changeover contact - cooling	100V…250V / 15(2)A, at 4 max. 30 W
Supply Voltage	**Controller (CO) requires 230V**
Protection	IP20
Switchpoint Tolerance	+/- 3k
Sensor	Bimetal
Power Connection	Terminal screws 0.5 to 2.5 mm^2
Bimetal Controller Ambient Temperature:	
T40	-4 / -20 to 104 / 40
T60	32 / 0 to 140 / 60
T80	68 / 20 to 176 / 80
Storage Temperature (°F / °C)	-4 / -20 to 140 / 60
Unit Dimensions - H x W x D (in. / mm)	2.52 x 1.46 x 1.81 / 64 x 37 x 46
Weight (ounces / grams)	1.8 / 50

Terms and Conditions

Order Acceptance and Payment Terms
All purchase orders must be in writing and are subject to Pentair Technical Products credit approval. Minimum order amount is $50 but subject to minimum buys of purchased parts. Payment terms are net thirty (30) days from invoice date, with a 1.5% per month (eighteen (18%) per annum) finance charge on overdue amounts. All freight will be prepaid and added to the invoice, unless otherwise specified by the Buyer. If the price includes transportation or other shipping charges, any increase in transportation rates or other shipping charges from date of quotation or purchase order shall be paid by Buyer.

Prices
Notwithstanding, Pentair Technical Products reserves the right to adjust prices at any time in order to reflect increases in the cost to Pentair Technical Products of any of the raw materials, component parts, or freight or transportation expenses necessary to produce and deliver the Products. In addition, Pentair Technical Products reserves the right to adjust the prices at any time in order to reflect fluctuations in currency valuation or exchange rates.

Shipment
Shipment is F.O.B. Pentair Technical Products plant or other place of manufacture, unless otherwise specified. The risk of loss of the Goods (including damage or destruction thereto) passes to customer upon shipment. Unless shipping arrangements are specified by customer, Pentair Technical Products will make reasonable arrangements for shipment.

Shipment Damage and Claims
All shipping claims resulting from damage incurred during transit or loss of goods are the direct responsibility of the Buyer. Pentair Technical Products will provide necessary documentation, to support Buyer's direct claim with Carrier.

Buyer must notify Pentair Technical Products and the carrier within seven (7) days of the receipt of Goods of any damage to, or partial loss of, the Goods during transit. Buyer must also notify Pentair Technical Products and the carrier within fourteen (14) days from shipment of any non-delivery of the Goods. Failure to give such timely notice relieves Pentair Technical Products of the responsibility of supporting Buyer's claim.

Delivery
Pentair Technical Products will use reasonable commercial efforts to fill orders within the time stated, but the stated delivery date is approximate only, and Pentair Technical Products reserves the right to re-adjust delivery dates. Under no circumstances will Pentair Technical Products be responsible for or incur any liability for damages, costs or expenses of any nature (whether general, consequential, as a penalty or as liquidated damages or otherwise) due to any delays in delivery, or failure to make delivery at an agreed or specified time due to circumstances beyond Pentair Technical Products' reasonable control. Acceptance by Buyer of the Goods when received waives any claim for loss or damage resulting from a delay, regardless of the cause of the delay. If shipment is delayed or suspended by Buyer, Buyer shall pay the invoice price for the Goods as per payment terms, together with Pentair Technical Products' handling and storage charges in effect and demurrage charges if loaded on rail cars.

Order Changes, Push Outs and Expedites
All change order requests must be submitted in writing. Requests will be reviewed for viability and approval is at the discretion of Pentair Technical Products. Change orders are not valid until acknowledged by Pentair Technical Products. Orders may not be placed on indefinite hold. Order push-out requests must be accompanied with firm rescheduled ship dates and may be subject to an additional Pentair Technical Products carrying charge of 1.67% per month for handling and storage. Expedited delivery requests will be reviewed case by case. Expedite fees are 20% of order premium plus all vendor expedite charges.

Specifications
Pentair Technical Products may, at its option, make changes in the design, construction, arrangement or components of the Goods if, in Pentair Technical Products' judgment, such changes will be beneficial to the operation of the Goods. Buyer may not make any changes in the specifications for the Goods unless Pentair Technical Products approves of such changes by a signed writing, in which event Pentair Technical Products may make additional charges for such changes.

Cancellation
Buyer may not cancel orders placed with Pentair Technical Products, except with Pentair Technical Products' written consent and then only if Buyer makes payment to Pentair Technical Products to indemnify it against loss, including but not limited to expenses incurred and commitments made by Pentair Technical Products. In addition to such charges previously mentioned, any cancellations approved by Pentair Technical Products shall be subject to a cancellation charge of fifteen percent (15%) of the net price. If modifications, specifically ordered by the Buyer, are being made to the cancelled merchandise, the cancellation charge will also include the cost for such modifications made up to the date of cancellation.

Warranty

Pentair Technical Products warrants that the Goods manufactured by Pentair Technical Products will be free from defects in material and workmanship for a period of one (1) year from the date of shipment by Pentair Technical Products, subject to the following conditions and exclusions:

A. Conditions

All Goods must be installed and operated according to the following specifications:

1. Maximum voltage variation no greater than plus or minus 10% of nameplate nominal rating
2. Maximum frequency variation no greater than plus or minus 3 Hz of nameplate nominal rating
3. Must not exceed minimum and maximum stated temperatures on the nameplate
4. Must not exceed (BTU/Hr) rating, including any heat sink as indicated on the nameplate
5. Refrigerant bearing Goods must not be restarted for a period of one (1) minute after intentional or accidental shut-off
6. The filters (if applicable) must be cleaned regularly
7. The Goods and any parts thereof must not be modified, unless prior written authorization is received from Pentair Technical Products
8. All Goods must be installed and grounded in accordance with all relevant electrical and safety codes, as well as the National Electric Code and OSHA rules and regulations
9. All Goods must be installed in a stationery application, free of vibration

A violation of any one of these conditions shall render the warranty hereunder void and of no effect.

B. Exclusions

This warranty shall be void if product is misapplied in any way or:

1. Buyer specified product is inappropriate for system or environment in which it is operating
2. Pentair Technical Products product modified in any way without prior written authorization from Pentair Technical Products
3. Removal or modification of Pentair Technical Products label affixed to product without written Pentair Technical Products approval

Pentair Technical Products must be notified of a claim in writing not later than fourteen (14) days from the date when Buyer has become aware of such occurrence, or where the defect is such that it may cause damage immediately. Such notice must contain a description of how the defect manifests itself. Failure to provide such prompt notice to Pentair Technical Products shall result in forfeiture of Buyer's rights under this warranty.

In the event of a warranty claim, Buyer is to return defective goods to Pentair Technical Products in accordance with the Pentair Technical Products Return Policy. Warranty period for repaired goods remains at one (1) year from shipment of original goods. Pentair Technical Products' sole obligation to Buyer under this warranty will be, at Pentair Technical Products' option:

A. Repair or replace Pentair Technical Products McLean brand products or parts found to be defective in material or workmanship
B. Issue credit for the purchase price paid by Buyer relating to such defective Goods or part

THIS WARRANTY CONSTITUTES THE ENTIRE WARRANTY WITH RESPECT TO THE GOODS AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY AND IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Terms and Conditions - Warranty

Return and Repair Policy

McLean brand products that: (i) are made to order, (ii) have been modified by Buyer, (iii) have special finishes, or (iv) are determined by Pentair Technical Products to constitute "custom" products that cannot be returned to stock or resold to other Buyers, will not be accepted for return by Pentair Technical Products.

All returns require a Return Material Authorization number (RMA #), regardless of reason for return, whether it be for warranty or out of warranty repair. Returns without an RMA # will be refused by our Receiving Department. An RMA # is valid for 60 days.

A. An RMA number will be issued by our Repair Department in Anoka, MN at 763-422-2277 or 800-896-2665 (toll free in the US). After hours call 888-632-0092. Buyer should have the following information available at time of RMA request:
   1. Complete Model Number, Serial Number and description of damaged unit being returned
   2. Original Buyer Purchase Order number and date product was received by Buyer
   3. Quantity to be returned and a brief description of failure for each unit, if different
   4. Contact information of Buyer that must include: name of company, billing and shipping address, phone number, fax number, freight carrier, and the name and phone number of a Buyer contact who can elaborate on the claimed defect in detail
   5. Buyer must provide a Repair Purchase Order number for both warranty and out of warranty repairs. The PO will not exceed 50% of a new unit. Buyer will be notified of repair charges that exceed approved PO amount.

B. All returns to Pentair Technical Products must be securely packed, using original cartons if possible. All returns must have the RMA number visible on the outside of the carton. Pentair Technical Products is not responsible for material damaged in transit. Any refrigerant-bearing Goods must be shipped upright for return.

C. Shipping cost for all non-warranty repairs is the responsibility of the sender and must be shipped prepaid. Shipping costs for all warranty related repairs will be covered by Pentair Technical Products provided the goods are returned using a Pentair Technical Products approved carrier. If after diagnosis the product is determined by Pentair Technical Products not to be covered under warranty, Buyer will be responsible for all shipping charges and will be billed accordingly.

D. Non-warranty repairs are subject to a $75 minimum analysis fee. Analysis fee will be waived if Buyer approves repair work. If approval is not received within 30 days, material will be scrapped and all shipping expenses and corresponding analysis fees will be billed to Buyer.

E. At Buyer's request, Failure Analysis can be provided by Pentair Technical Products for warrantable goods at no charge. Failure analysis for non-warranty repairs are subject to a $100 per hour engineering charge plus any other incurred testing costs.

F. All returned merchandise must be sent to the following address: Pentair Technical Products, 2100 Hoffman Way, Anoka, MN 55303-1745

G. Credit for accepted returns shall be at the original selling price or the current selling price, whichever is lower, less the restocking charge indicated as follows:
   1. Within 60 days of invoice date - 20% of applicable selling price
   2. Within 61-120 days of invoice date - 30% of applicable selling price
   3. Within 121-180 days of invoice date - 40% of applicable selling price
   4. Beyond 180 days - subject to individual review by Pentair Technical Products

If product being returned for credit requires repair or modification, the cost of any labor or material necessary to bring product into saleable condition will be deducted from credit. Buyer may not take credit against returns without prior written Pentair Technical Products approval.

LIMITATION OF LIABILITY. PENTAIR TECHNICAL PRODUCTS WILL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION, ANY LOST PROFITS OR LABOR COSTS ARISING FROM THE SALE, USE OR INSTALLATION OF THE GOODS, FROM THE GOODS BEING INCORPORATED INTO OR BECOMING A COMPONENT OF ANOTHER PRODUCT, FROM ANY BREACH OF THIS AGREEMENT OR FROM ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON WARRANTY (EXPRESSED OR IMPLIED) OR OTHERWISE BASED ON CONTRACT, OR ON TORT OR OTHER THEORY OF LIABILITY, AND REGARDLESS OF ANY ADVICE OR REPRESENTATIONS THAT MAY HAVE BEEN RENDERED BY PENTAIR TECHNICAL PRODUCTS CONCERNING THE SALE, USE OR INSTALLATION OF THE GOODS.

Terms and Conditions - Warranty

Notes

Model Number Index

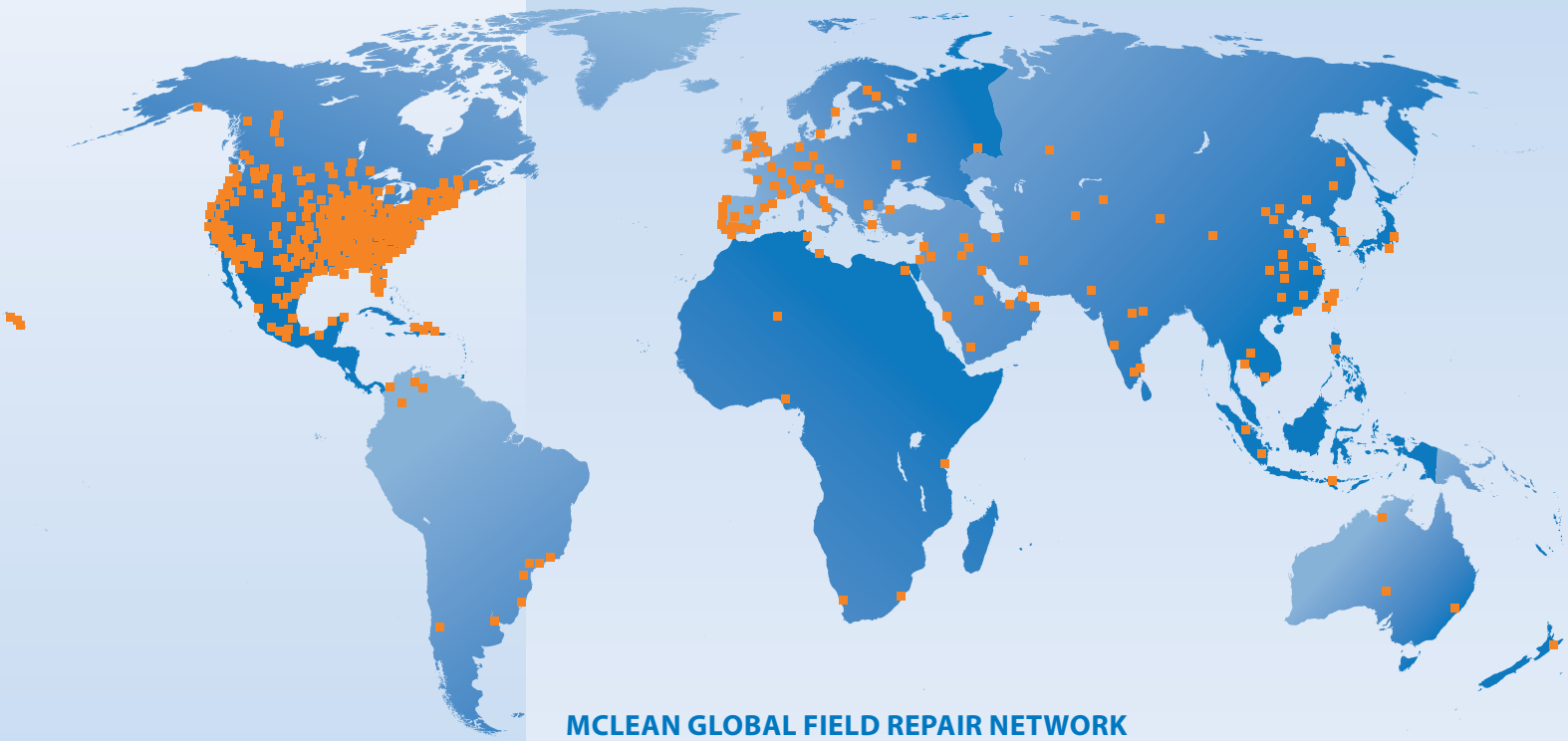
Model Number Index

Global Field Repair Network

Over 1,000 field repair technicians worldwide

Unlike some electronics cooling companies, Pentair Technical Products comes to you or wherever your system is deployed worldwide for repair services, eliminating the hassle and wait of sending your cooling unit back to headquarters.

We have over 1,000 certified field repair technicians worldwide who have been carefully screened to conduct warranty and non-warranty work on your McLean air conditioner, heat exchanger or air mover.



24/7 emergency repair services, extended warranties and preventative maintenance programs are also available. Check with McLean aftermarket services for details.

MCLEAN GLOBAL FIELD REPAIR NETWORK

Scheduling a McLean service repair technician is easy any day and time of the week.

BY PHONE

Monday-Friday from 7:00 a.m. to 5:30 p.m. US Central time
Call McLean aftermarket services at Pentair Technical Products
866-5455252 (toll-free in the US)
+1 763-422-2171 (outside the US)

After business hours, call:
Johnson-Northwest (McLean Service Partner)
1-888-632-0092

ONLINE

McLeanCoolingTech.com/Service---Repair/Repair-Service-Request.aspx

Spare Parts Store
Safe, secure and easy to use

If you wish to repair a McLean cooling unit yourself, we have two ways to order spare parts—by phone and online.

BY PHONE

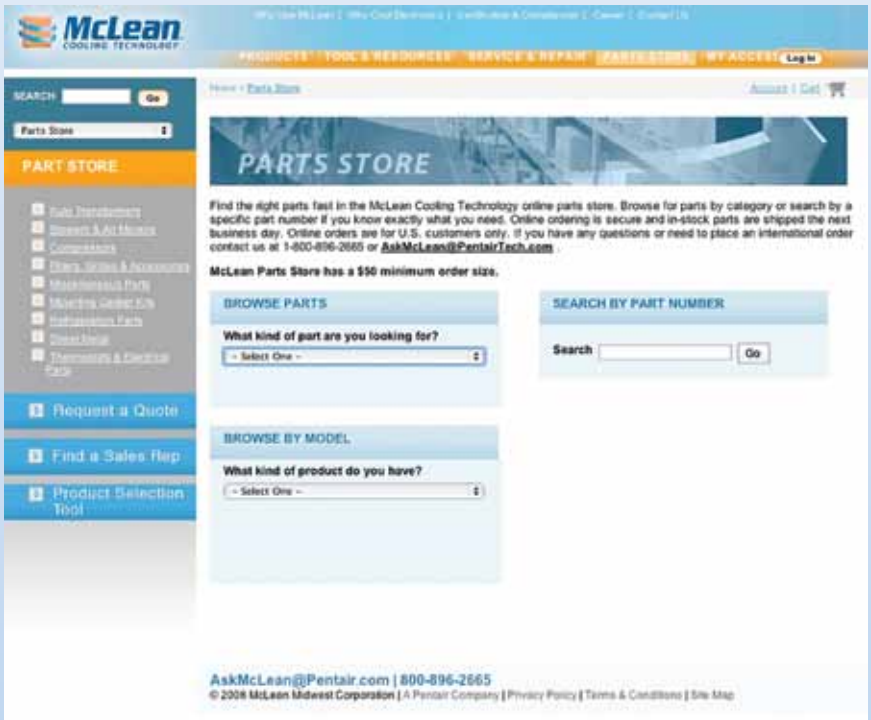
Call McLean customer service at Pentair Technical Products.

800-896-2665 (toll-free in the US)
+1 763-422-2277 (outside the US)

Monday-Friday from 7:00 a.m. to 5:30 p.m.
US Central time

ONLINE

The McLean online spare parts store is completely safe, secure and easy to use. Simply visit **McLeanCoolingTech.com** then click on "Parts Store" in the main menu.

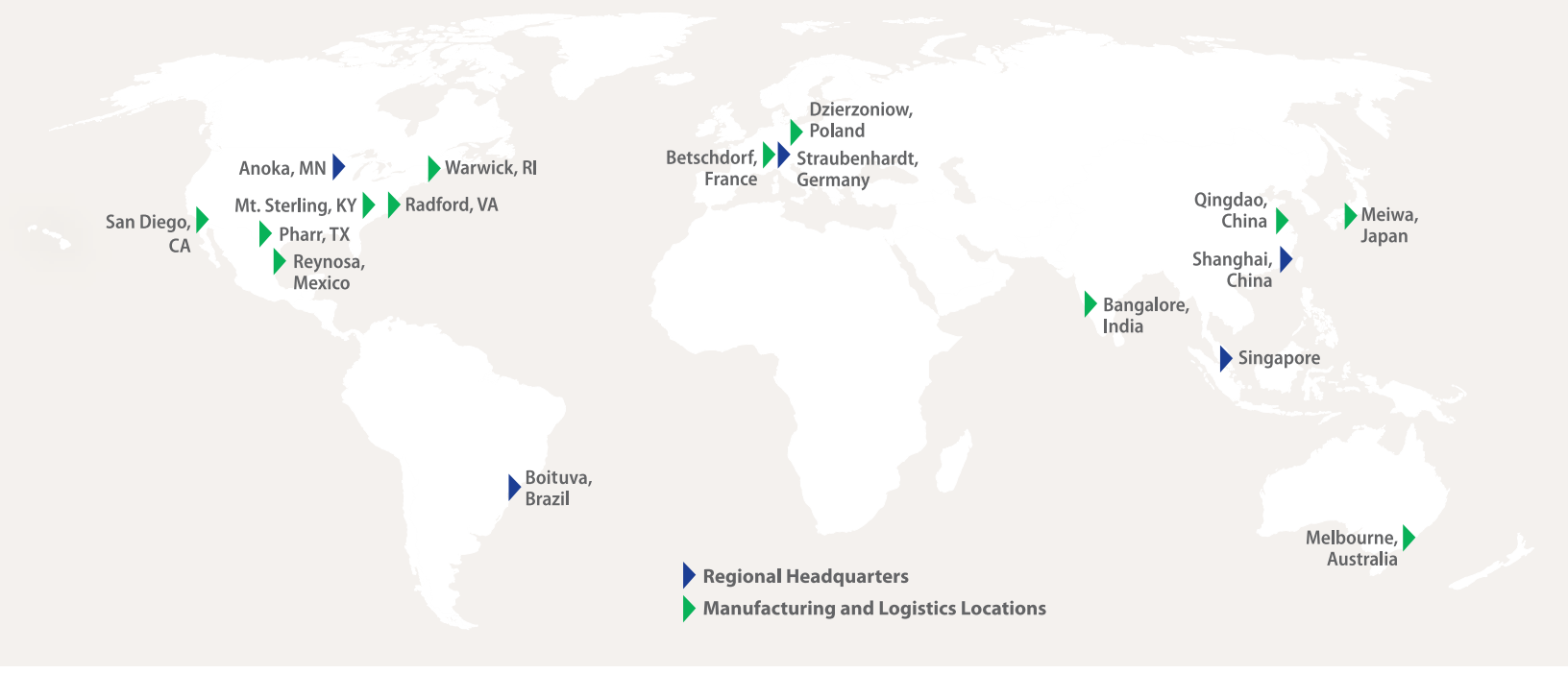


MCLEAN ONLINE SPARE PARTS STORE

You can search for your McLean spare parts by part number, model number or part category. The entire online shopping experience is user friendly. And at the end of the process, you may pay by credit card, or we can send you an invoice.

About Pentair Technical Products

Pentair Technical Products, a Pentair global business unit, is the leading provider of worldwide product and service solutions for enclosing, protecting and cooling electrical and electronic systems. Its industry-leading brands—Hoffman®, Schroff®, McLean® Cooling Technology, Calmark®, Birtcher®, Aspen Motion Technologies™ and Taunus™—provide a broad variety of standard, modified and engineered solutions to the commercial, communications, energy, general electronics, industrial, infrastructure, medical, and security and defense markets.



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