CHAPTER 12
Thermal Management

Featured Products in this Chapter

- Outdoor Air Conditioners
  T15, T20 and T29 Series
  800-4,000 BTU/Hr.  P. 1152
- Outdoor Air Conditioners
  T43, T50 and T53 Series
  6,680-20,000 BTU/Hr.  P. 1156
Air Conditioners Sizing and Selection Overview

Before choosing a thermal management solution, you need to carefully consider the specifics of your application in addition to the following factors:

- Fan packages and blowers may introduce ambient contaminants like oil mist and dust into the enclosure
- Heat exchangers cannot cool below the ambient temperature
- Closed-loop air conditioners (this section) can cool below ambient temperature and reduce humidity without introducing contaminants
- Simple ventilation devices such as louvers or grilles and filters are appropriate if maintaining a cool, constant temperature is not a critical factor

Once you have determined the proper form of cooling equipment you need, select the required cooling capacity as outlined in this section.

How to Read Air Conditioner Catalog Numbers

CR43 - 06 - 1 - 6 - 002

CR43 = Identifies the type/family of air conditioner and the approximate height (i.e., CR43 = CR family, about 43-in. high).
06 = This is the air conditioner’s listed capacity in BTU/Hr. (i.e., 06 = 6000 BTU/Hr.)
1 = 115 Volt; 2 = 230 Volt; 4 = 460 Volt
6 = 50/60 Hz or 60 Hz (depending on unit, see Design Data); 5 = 50 Hz
002 = Unique set of numbers for each air conditioner which identifies the accessories on a model.

Thermal Management Sizing and Selection Software

Designed to assist you in determining the most suitable choices of air conditioners, heat exchangers or fans for your application. Download a free copy of our selection software by visiting our web site: hoffmanonline.com.
Click on Thermal Management chapter.
Air Conditioners Sizing and Selection

Air Conditioner Sizing

Air conditioners are appropriate for applications in which:
- The temperature inside the enclosure must be maintained at or below ambient temperature.
- Humidity must be removed from the enclosure.
- Ambient air contaminants must be kept out of the enclosure.

The following air conditioner sizing procedure applies to uninsulated, sealed and gasketed enclosures in indoor locations.

1. Determine the internal heat load in watts
Add the maximum heat output specifications for all equipment to be installed in cabinet.
Conversion: 1 Watt = 3.413 BTU/Hr.

2. Determine the desired temperature difference ($\Delta T$) between the ambient temperature and the temperature inside the cabinet
Subtract the desired maximum temperature inside the cabinet ($T_i$) from the maximum expected temperature ($T_o$) outside the cabinet.

$$T_o - T_i = \Delta T$$

Conversion: 1 K or $\Delta T = 1.8 F \Delta T$

3. Determine the exposed surface area of the cabinet in square feet.
Use the following formula to determine area when $H$, $W$ and $D$ are the cabinet dimensions in inches.

$$2[(H \times W) + (H \times D) + (W \times D)] + 144 = \text{Area (ft.}^2)$$

Conversion: If dimensions are in millimeters, substitute 1,000,000 for 144. Then multiply the result by 10.76 to convert from m$^2$ to ft.$^2$

4. Determine the air conditioner capacity required
Use the following formula:

$$(\text{Watts} \times 3.413) + [(1.25 \times \text{Area in ft.}^2) \times \Delta T \text{ in F}] = \text{BTU/Hr}$$

Required air conditioner capacity in BTU/Hr.

Use this formula to determine the required cooling capacity needed to maintain the desired operating temperature for your enclosure. This selection procedure applies to uninsulated, sealed, gasketed enclosures in indoor locations.

All industrial air conditioners are rated at their maximum operating point. Operating an air conditioner at temperatures below maximum conditions will result in reduced cooling capacity. In other words, operating 95 F ambient and 95 F enclosure temperature results in a 10 percent to 20 percent reduction in the rated capacity.

*Full cooling capacity is probably not necessary at lower ambient temperatures.*
SPECTRACOOL™ Air Conditioners

Type 4, 12, 3R T4 Line Indoor/Outdoor Air Conditioners

<table>
<thead>
<tr>
<th>Height</th>
<th>BTU/Hr.</th>
<th>Watts</th>
</tr>
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<tbody>
<tr>
<td>52 in.</td>
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Type 12 Side-Mount Subcompact Air Conditioners

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<th>BTU/Hr.</th>
<th>Watts</th>
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This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Type 12 GENESIS™ Side-Mount Compact Air Conditioners

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<tr>
<th>Series</th>
<th>Height in./mm</th>
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<th>BTU/Hr.</th>
<th>Watts</th>
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Type 12 GENESIS™ Side-Mount Mid-Size Air Conditioners

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<th>BTU/Hr.</th>
<th>Watts</th>
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<tbody>
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Air Conditioners Sizing and Selection

Type 12 GENESIS™ 3-Phase 460-Volt Side-Mount Full-Size Air Conditioners

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<th>Watts</th>
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<td>S2</td>
<td>52.63</td>
<td>17.13</td>
<td>11.33</td>
<td>3000-8000</td>
<td>1713-2344</td>
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<td>1337</td>
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Type 12 GENESIS™ Top-Mount Air Conditioners

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<th>Depth in./mm</th>
<th>BTU/Hr.</th>
<th>Watts</th>
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Subject to change without notice
Type 12, 3R CR Series Air Conditioners

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<th>Depth in./mm</th>
<th>BTU/Hr.</th>
<th>Watts</th>
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<td>15.75</td>
<td>8.63</td>
<td>2200-4000</td>
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Type 4X CR Series Air Conditioners

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<th>Depth in./mm</th>
<th>BTU/Hr.</th>
<th>Watts</th>
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</thead>
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<td>23.00</td>
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<td>CR29</td>
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<td>15.75</td>
<td>8.63</td>
<td>2200-4000</td>
<td>645-1172</td>
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<tr>
<td>CR43</td>
<td>43.31</td>
<td>15.75</td>
<td>10.25</td>
<td>6000-8000</td>
<td>1758-2490</td>
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Type 12, 4, 4X VC Vortex Cooler

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<thead>
<tr>
<th>Series</th>
<th>Cooling Capacity (BTU/Hr.)</th>
<th>Cooling Capacity (Watts)</th>
<th>Voltage</th>
<th>Frequency (Hz)</th>
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<tr>
<td>VC04</td>
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<td>117</td>
<td>115</td>
<td>50/60</td>
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<td>VC09</td>
<td>900</td>
<td>264</td>
<td>115</td>
<td>50/60</td>
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<td>VC15</td>
<td>1500</td>
<td>440</td>
<td>115</td>
<td>50/60</td>
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<td>50/60</td>
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<td>VC25</td>
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<td>733</td>
<td>115</td>
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Air Conditioners

SPECTRACOOL™ Air Conditioners - 8,000 and 12,000 BTU

Application
The SPECTRACOOL™ Air Conditioner offers models with 8,000 and 12,000 BTUs/hr. of climate control protection for factory automation, outdoor telecom and a variety of other system applications. With all-metal construction, the SPECTRACOOL can withstand rugged factory and outdoor environments while maintaining the integrity of your electronics.

Features
- Active condensate management with electric heater
- Power-off relay for door switch and other system requirements
- Mechanical thermostat on enclosure side of unit
- Digital display on ambient side
- Malfunction switch
- Earth-friendly refrigerant
- Fifty percent more efficiency
- RoHS compliant
- Models for 115, 230 and 460 3-phase AC volt power input, 50/60 Hz
- Cut-out adapter options for enclosures with Genesis Series A/C’s
- Exterior and partial recessed mounting options
- Cleanable, reusable aluminum mesh filter
- Easy-mount flanges
- Mounting hardware, gaskets, drawings, mounting template and user manual included with unit
- Every unit functionally tested before shipping

Specifications
Galvanized sheet-metal cover

Finish
RAL 7035 light-gray polyester powder-coating in a semi-texture finish

Bulletin: MCL

Industry Standards
UL/cUL Listed; File No. SA6453
NEMA Type 12/3R/4
NEMA Type 4X stainless steel option available
IP 54/55 rated

Standard Product  G52 Series

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/Hr. at Max. Ambient Temp.</th>
<th>Nominal Watts</th>
<th>BTU/Hr. at 131°F/131°C (55°C/55°C)</th>
<th>BTU/Hr. at 95°F/95°C (35°C/35°C)</th>
<th>Operating Temp. Range Max (°F/°C)</th>
<th>Operating Temp. Range Min (°F/°C)</th>
<th>Shipping Weight (lb.)</th>
<th>Shipping Weight (kg)</th>
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<td>G520816G050</td>
<td>115</td>
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<td>1</td>
<td>8,000</td>
<td>2300</td>
<td>7300/8200</td>
<td>6000/6800</td>
<td>131/55</td>
<td>50/10</td>
<td>128</td>
<td>58.1</td>
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<td>230</td>
<td>50/60</td>
<td>1</td>
<td>8,000</td>
<td>2300</td>
<td>7300/8200</td>
<td>6000/6800</td>
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<td>50/10</td>
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<td>460</td>
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<td>3</td>
<td>8,000</td>
<td>2300</td>
<td>8800/9800</td>
<td>6000/6800</td>
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<td>12000/12500</td>
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<td>9900/10700</td>
<td>131/55</td>
<td>50/10</td>
<td>141</td>
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</table>
Air Conditioners

Cleanable, reusable aluminum inlet filter behind removable panel

Access hole to 3/8 in. O.D. Drain Stub

Mounting Cutout Dimensions
Cutout Adapter

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>Material</th>
<th>Shipping Weight (lb.)</th>
<th>Shipping Weight (kg)</th>
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<tbody>
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<td>52621601</td>
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<td>18-gauge galvanized</td>
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Cutout Adapter M52 to G52 Air Conditioner
Air Conditioners

Outdoor Air Conditioners T15, T20 and T29 Series 800-4,000 BTU/Hr.

Application
Outdoor Air Conditioners provide high-efficiency positive cooling for wall-mount and stand-alone enclosures. Designed for outdoor applications requiring up to UL Type 4 rating.

Features
- Equipped with head pressure control for low ambient operation, compressor heater, coated condenser coil and thermostat
- Surface and internal recess mounting capabilities
- Equipped with a screwdriver-adjustable thermostat
- EMI/RFI noise suppressor is standard
- Reusable and washable air filter
- Broad operating range of -40 F (-40 C) to 131 F (55 C)
- All units use a CFC-free refrigerant
- Includes power cord with plug
- Built-in hanging brackets
- High performance, industrial grade and efficiency fans
- Hardware, gasket and instruction manual furnished
- Closed-loop cooling

Specifications

**Industry Standards**
Maintain UL/cUL Type 12, 3R or 4 rating when properly installed on a UL/cUL Type 12, 3R or 4 rated enclosure.

UL/cUL Listed; File No. SA6453

CE

Standard Product  **T15 Series**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/Hr. @ Max. Ambient Temp.</th>
<th>Full Load</th>
<th>50 Hz Max. Amb. Temp (°F)</th>
<th>60 Hz Max. Amb. Temp (°F)</th>
<th>60 Hz Max. Amb. Temp (°C)</th>
<th>Shipping Weight (lb.)</th>
<th>Shipping Weight (kg)</th>
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<td>115</td>
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<td>1</td>
<td>800/900</td>
<td>1.4/1.5</td>
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*Replacement Filter No. 10100091*

Standard Product  **T20 Series**

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<th>Phase</th>
<th>BTU/Hr. @ Max. Ambient Temp.</th>
<th>Full Load</th>
<th>60 Hz Max. Amb. Temp (°F)</th>
<th>60 Hz Max. Amb. Temp (°C)</th>
<th>Shipping Weight (lb.)</th>
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<td>T20022G100</td>
<td>230</td>
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<td>1</td>
<td>1800/2000</td>
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*Replacement Filter No. 10100090*

Standard Product  **T29 Series**

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<th>Phase</th>
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<th>Full Load</th>
<th>60 Hz Max. Amb. Temp (°F)</th>
<th>6 Hz Max. Amb. Temp (°C)</th>
<th>Shipping Weight (lb.)</th>
<th>Shipping Weight (kg)</th>
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<td>55</td>
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<td>49</td>
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<td>230</td>
<td>50/60</td>
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<td>6.9/6.8</td>
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<td>55</td>
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*Replacement Filter No. 10100093*

Finish
RAL 7035 smooth light-gray polyester powder coating

Bulletin: MCL

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123  www.barr-thorp.com
Air Conditioners

800 BTU

Field Changeable Power Cord Location (Opposite Side of Unit)

Ambient Air In

Ambient Air Out

Enclosure Air In

Enclosure Air Out

1/4-20 Mtg Holes (8) (4 on Back Face - 4 Behind Front Cover)

Cutout External Mounted

Cutout Internal Mounted

T15-0126-Gxxx Capacity Curves 230V 60Hz
Thermal Management: Air Conditioners

Air Conditioners

2000 BTU

REUSEABLE ALUMINUM INLET FILTER SLIDES OUT SLOT IN BOTTOM OF FRONT COVER.

FRONT

CUTOUT EXTERNAL MOUNTED

T20-0216-Gxxx Capacity Curves 115V 60Hz

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Air Conditioners

4000 BTU

REUSEABLE ALUMINUM INLET FILTER SLIDES OUT SLOT IN BOTTOM OF FRONT COVER.

CUTOUT EXTERNAL MOUNTED

CUTOUT INTERNAL MOUNTED

T29-04x6-Gxxx Capacity Curves, 60 Hz

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Air Conditioners

Outdoor Air Conditioners T43, T50 and T53 Series 6,680-20,000 BTU/Hr.

Application
Outdoor Air Conditioners provide high-efficiency positive cooling for wall-mount and stand-alone enclosures. Designed for outdoor applications requiring up to UL Type 4X rating.

Features
- Equipped with head pressure control for low ambient operation, compressor heater, coated condenser coil and thermostat
- Surface and internal recess mounting capabilities
- Equipped with a screwdriver-adjustable thermostat
- EMI/RFI noise suppressor is standard
- Reusable and washable air filter
- Broad operating range of -40 °F (-40 °C) to 131 °F (55 °C)
- Includes power cord with plug
- Built-in hanging brackets
- High performance, industrial grade and efficiency fans
- Hardware, gasket and instruction manual furnished
- In accordance with the Montreal Protocol, the T53 GENESIS™ Air Conditioners have transitioned away from R22 refrigerant. Product performance remains within nominal capacity.

Specifications
- Galvanized steel
- Stainless steel

Accessories
Replacement filter
Bulletin: MCL

Industry Standards
Galvanized versions maintain UL/cUL Type 12, 3R or 4 rating when properly installed on UL/cUL Type 12, 3R or 4 rated enclosure. Stainless steel versions maintain UL/cUL Type 12, 3R or 4X rating when properly installed on UL/cUL Type 12, 3R or 4X rated enclosure.

UL/cUL Listed, UL File Number SA6453
CE

Table: T43 Series

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>Material</th>
<th>BTU/Hr. @ Max. Ambient Temp.</th>
<th>Full Load Amps</th>
<th>60 Hz Max. Amb. Temp. (°F)</th>
<th>60 Hz Max. Amb. Temp. (°C)</th>
<th>Shipping Weight (lb.)</th>
<th>Shipping Weight (kg)</th>
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<td>Stainless Steel</td>
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<th>BTU/Hr. @ Max. Ambient Temp.</th>
<th>Full Load Amps</th>
<th>60 Hz Max. Amb. Temp. (°F)</th>
<th>60 Hz Max. Amb. Temp. (°C)</th>
<th>Shipping Weight (lb.)</th>
<th>Shipping Weight (kg)</th>
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<td>230</td>
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<td>11,000/12,000</td>
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<th>Full Load Amps</th>
<th>60 Hz Max. Amb. Temp. (°F)</th>
<th>60 Hz Max. Amb. Temp. (°C)</th>
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<th>Shipping Weight (kg)</th>
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Air Conditioners

T43

Thermal Management: Air Conditioners

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1157
Performance Curves for T53 19000 BTU/Hr (5567 Watt) Models
Side-Mount Subcompact Air Conditioner

**Industry Standards**
Maintains UL/cUL Type 12 or 3R rating when properly installed on a UL/cUL Type 12 or 3R enclosure.

UL/cUL Listed; File No. SA6453

CE

**Application**
In indoor industrial applications, the Side-Mount Subcompact Air Conditioner provides high-efficiency, positive cooling for densely-populated wall-mount and narrow enclosures that require a high degree of heat dissipation.

**Features**
- Equipped with a screwdriver-adjustable thermostat
- High-performance, industrial-grade ball-bearing fans
- Reusable and washable air filter
- Built-in hanging brackets
- EMI/RFI noise suppressor is standard
- Includes power cord with plug for standard grounded outlet
- Condensate management system with base pan side drain
- All units use a universally accepted CFC-free or environmentally safe refrigerant
- Mounting hardware, gaskets, mounting template and instruction manual furnished
- Closed-loop cooling

**Finish**
RAL 7035 light-gray polyester powder coating

Bulletin: MCL

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/Hr. @ Max. Ambient Temp.</th>
<th>Full Load Amps</th>
<th>50 Hz Max</th>
<th>50 Hz Max</th>
<th>60 Hz Max</th>
<th>60 Hz Max</th>
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<th>Shipping Weight (kg)</th>
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<td>800</td>
<td>3.8/3.6</td>
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<td>800</td>
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<td>52</td>
<td>131</td>
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<td>12.25</td>
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</tbody>
</table>

Replacement Filter No. 10100091
Air Conditioners

Notes:
1. Shaded area represents air conditioner.
2. Cutout dimensions for standard product only.
3. Full-size mounting template provided.

MOUNTING CUTOUT DIMENSIONS
GENESIS™ Side-Mount Compact Air Conditioner

Industry Standards
Maintains U/CUL Type 12 rating when properly installed on a UL/cUL Type 12 enclosure.
UL/cUL Listed; File No. SA6453
CE

Application
13 Series and 17 Series compact air conditioners cool 25- to 40-cu. ft. enclosures in indoor applications.

Features
- High-performance, industrial-grade ball-bearing fans
- Removable air filter and grille
- Built-in hanging brackets
- All units use a universally accepted CFC-free or environmentally safe refrigerant
- Mounting hardware, gaskets, mounting template and instruction manual furnished
- Closed-loop cooling

Finish
- Body: RAL 7042 smooth gray polyester powder coating
- Grille: RAL 7035 light gray

Notes
Hoffman side-mount models are directly interchangeable with comparable Slimboy and GENESIS models.
Bulletin: MCL

Standard Product  GENESIS Side-Mount 13 Series

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/hr. @ 125° F/125° F</th>
<th>Full Load</th>
<th>Max. Ambient Temp. (°F)</th>
<th>Max. Ambient Temp. (°C)</th>
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<th>Shipping Weight (kg)</th>
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<td>M13012651008</td>
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Replacement filter No. 10100057

NOTE:
1. Gasket for mounting to enclosure included.
2. Service cord.
Number in triangle in CAD view refers to note number.
Standard Product: GENESIS Side-Mount 17 Series

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<tr>
<th>Catalog Number</th>
<th>Voltage Hz</th>
<th>Phase</th>
<th>BTU/Hr. @ 125 F/125 F</th>
<th>Full Load Amps</th>
<th>Max. Ambient Temp. (°F)</th>
<th>Max. Ambient Temp. (°C)</th>
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<th>Shipping Weight (kg)</th>
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<td>1500/1800</td>
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<td>16</td>
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<td>M170226G004</td>
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<td>1</td>
<td>1500/1800</td>
<td>4.2/3.7</td>
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<td>M170246G400</td>
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Replacement Filter No. 10100057

NOTE:
1. Gasket kit for mounting to enclosure included.
2. Service cord.
3. Condensate from enclosure drains to bottom of unit, where it is evaporated by condenser heat.

Number in triangle in CAD view refers to note number.

**Cutout Dimensions**

13 Series
- Diameter: 8 mm (4X)
- Width: 4.75 mm
- Height: 4.75 mm

17 Series
- Diameter: 8 mm (4X)
- Width: 4.75 mm
- Height: 4.75 mm

NOTE:
1. Shaded area represents air conditioner.
2. Cutout dimensions for standard products only.
3. Full-size mounting template provided.
GENESIS™ Side-Mount Mid-Size Air Conditioner

Industry Standards
Maintains UL/cUL Type 12 rating when properly installed on a UL/cUL Type 12 enclosure.
UL/cUL Listed; UL File No. SA6453
CE

Application
Less than 12 inches deep, the 28 Series, 33NSM Series and 36N Series Air Conditioners offer a broad capacity range for applications requiring narrow enclosures.

Features
- Thermostat control
- High-performance, industrial-grade ball bearing fans in the 33 NSM and high performance centrifugal blowers in the 28 and 36N
- Removable air filter
- Built-in hanging brackets
- EMI/RFI noise suppressor is standard
- Unique condensate management system
- All units use a universally accepted CFC-free or environmentally-safe refrigerant
- Mounting gaskets and instruction manual furnished
- In accordance with the Montreal Protocol, the GENESIS™36 Series Air Conditioners have transitioned away from R22 refrigerant. Product performance remains within nominal capacity.

Finish
- Body: RAL 7042 smooth gray polyester powder coating
- Grille: RAL 7035 light gray

Bulletin: MCL
Standard Product  **GENESIS Side-Mount 28 Series**

<table>
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<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/HR @ 125 F/125 F</th>
<th>Full Load Amps</th>
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<th>Max. Ambient Temp. (°C)</th>
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<th>Shipping Weight (kg)</th>
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<td>M280246G000</td>
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**Replacement Filter No. 10100056**

**28 Series**

- **TOP VIEW**
- **FRONT VIEW**
- **SIDE VIEW**
- **BACK VIEW**

**Side-Mount to Enclosure**

**CUTOUT**

**NOTE:**
1. Gasket kit for mounting to enclosure included.
2. Service cord.
3. 20.50 x 15.50 inch area is recessed 1.00 inch from rear surface, or plenum.
4. Condenser air discharge out front is optional.

Number in triangle in CAD view refers to note number.
Standard Product  GENESIS Side-Mount 33 Series

<table>
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<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/h @ 125 F/125 F</th>
<th>Full Load Amps</th>
<th>Max. Ambient Temp. (%F)</th>
<th>Max. Ambient Temp. (%C)</th>
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</table>

Replacement Filter No. 10100007

33 Series

TOP VIEW

FRONT VIEW

SIDE VIEW

BOTTOM VIEW

Side-Mount to Enclosure

33NSM Series

NOTE:
1. Gasket kit for mounting to enclosure included.
2. Service cord: 25.58 x 11.00 inch area is recessed 1.12 inches from rear surface, or plenum.
3. Condenser air discharge out front is optional.
4. Dimensions in CAD views refer to note number.
### Standard Product
**GENESIS Side-Mount 36 Series**

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<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/Hr @ 131 F/131 F</th>
<th>Full Load Amps</th>
<th>Max. Ambient Temp. °F</th>
<th>Max. Ambient Temp. °C</th>
<th>Shipping Weight (lb.)</th>
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<td>67</td>
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</table>

**36 Series**

- **TOP VIEW**
- **BOTTOM VIEW**
- **FRONT VIEW**
- **SIDE VIEW**
- **BACK VIEW**

---

**Side-Mount to Enclosure**

- Ambient airflow
- Clean airflow

**NOTE:**
1. Gasket kit for mounting to enclosure included.
2. Service cord, 14.00 x 29.13 inches, recessed 1.44 inches from rear surface or plenum.
3. Condenser air discharge out front is optional.
4. CAD views refer to note number.
Air Conditioners

GENESIS™ 3-Phase 460-Volt Side-Mount Full-Size Air Conditioner

Industry Standards
Maintains UL/cUL Type 12 rating when properly installed on a UL/cUL Type 12 enclosure.

UL/cUL Listed; File No. SA6453

CE

Application
The efficient 3-phase, 460-volt compressor in the Genesis™ Full-Size Air Conditioner eliminates the need for additional transformers to cool controls in industrial, large enclosure applications.

Features
- Thermostat control
- Digital display of enclosure temperature
- High-temperature alarm
- High-performance centrifugal blowers
- Removable air filter
- Mounting brackets
- EMI/RFI noise suppression is standard
- Unique condensate management system
- All units use a universally accepted CFC-free or environmentally safe refrigerant
- Mounting gaskets and instruction manual furnished
- Closed-loop cooling

Finish
- Body: RAL 7042 smooth gray polyester powder coating
- Grille: RAL 7035 light gray

Bulletin: MCL

Standard Product

<table>
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<th>Catalog Number</th>
<th>AxBxCin./mm</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/Hr @ 125 F/125 F</th>
<th>Full Load Amps</th>
<th>Max. Ambient Temp. (°F)</th>
<th>Max. Ambient Temp. (°C)</th>
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<th>Shipping Weight (kg)</th>
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<td>3800/4100</td>
<td>1.8/1.6</td>
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<td>74</td>
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<td>460</td>
<td>50/60</td>
<td>3</td>
<td>5700/6000</td>
<td>2.0/1.8</td>
<td>125</td>
<td>52</td>
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<tr>
<td>M520846G002</td>
<td>52.63 x 17.13 x 11.33</td>
<td>460</td>
<td>50/60</td>
<td>3</td>
<td>6500/7500</td>
<td>3.5/3.2</td>
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<td>3.7/3.4</td>
<td>125</td>
<td>52</td>
<td>165</td>
<td>75</td>
</tr>
</tbody>
</table>

Replacement Filter No. 10100056
**Thermal Management: Air Conditioners**

**Air Conditioners**

**TOP VIEW**

**BOTTOM VIEW**

**FRONT VIEW**

**SIDE VIEW**

**BACK VIEW**

**NOTE:**
1. Gasket kit for mounting to enclosure included.
2. 4 inch junction box with terminal block.
3. 42.06 x 15.63 inch area is recessed 1.44 inches from rear surface, or plenum.
4. Condenser air discharge out front is optional. Number in triangle in CAD views refers to note number.
Industry Standards
Maintains UL/cUL Type 12 rating when properly installed on a UL/cUL Type 12 enclosure.

UL/cUL Recognized; File No. SA6453

Features
- Removable air filter
- High-performance CFM ball-bearing centrifugal blowers
- Unique condensate management system
- All units use a universally accepted CFC-free or environmentally safe refrigerant
- Mounting gaskets and instruction manual furnished
- Closed-loop cooling

Application
The Top-Mount GENESIS™ Air Conditioner is ideal for applications that have little or no clearance around the sides of an enclosure.

Finish
- Body: RAL 7042 smooth gray polyester powder coating
- Grille: RAL 7035 light gray

Notes
Hoffman top-mount units are directly interchangeable with comparable GENESIS and Slimboy models.

Bulletin: MCL

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/hr (Watts) @ 125 F/125 F</th>
<th>Full Load Amps</th>
<th>Max. Ambient Temp. (°F)</th>
<th>Max. Ambient Temp. (°C)</th>
<th>Shipping Weight (lb.)</th>
<th>Shipping Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHB110216G306</td>
<td>115</td>
<td>50/60</td>
<td>1</td>
<td>2200/2200</td>
<td>9.7/9.5</td>
<td>125</td>
<td>52</td>
<td>104</td>
<td>47</td>
</tr>
<tr>
<td>MHB110226G306</td>
<td>230</td>
<td>50/60</td>
<td>1</td>
<td>2200/2200</td>
<td>5.5/4.6</td>
<td>125</td>
<td>52</td>
<td>104</td>
<td>47</td>
</tr>
<tr>
<td>MHB110246G400</td>
<td>460</td>
<td>50/60</td>
<td>1</td>
<td>2200/2200</td>
<td>3.0/2.5</td>
<td>125</td>
<td>52</td>
<td>110</td>
<td>50</td>
</tr>
<tr>
<td>MHB110416G307</td>
<td>115</td>
<td>50/60</td>
<td>1</td>
<td>3300/4000</td>
<td>14.7/13.6</td>
<td>125</td>
<td>52</td>
<td>118</td>
<td>54</td>
</tr>
<tr>
<td>MHB110426G306</td>
<td>230</td>
<td>50/60</td>
<td>1</td>
<td>3300/4000</td>
<td>8.0/7.5</td>
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<td>54</td>
</tr>
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<td>MHB110446G400</td>
<td>460</td>
<td>50/60</td>
<td>1</td>
<td>3300/4000</td>
<td>4.4/2.1</td>
<td>125</td>
<td>52</td>
<td>128</td>
<td>58</td>
</tr>
</tbody>
</table>

Replacement Filter No.10100056
**Air Conditioners**

**TOP VIEW**

**SIDE VIEW**

**FRONT VIEW**

**BOTTOM VIEW**

**CUTOUT**

**NOTE:**
1. Gasket kit for mounting to enclosure included.
2. Service cord.
3. Condensate from enclosure drains to bottom of unit, where it is evaporated by condenser heat.
4. Condensate overflow drain hose included.
Number in triangle in CAD views refers to note number.

**NOTE:**
1. Shaded area represents air conditioner.
2. Cutout dimensions for standard products only.
3. Full-size mounting template provided.
Number in triangle in CAD views refers to note number.
Air Conditioners

CR Compact, Mid-Size and Full-Size Air Conditioners and Accessories

Industry Standards
Refer to tables for specific UL/cUL Type ratings these air conditioners maintain when properly installed on a UL/cUL rated enclosure.

UL/cUL Listed; File No. SA6433

CE

Application
CR Air Conditioners are available in a variety of configurations and sizes to match indoor or outdoor application requirements. CR23 and CR29 Air Conditioners feature an invertible, washable filter for easy maintenance.

Features
- Thermostat control and EMI/RFI noise suppressor included
- Front cover hinges open for quick access to all components
- Filter can be inverted to double operating time between cleanings and or replacements (models CR23 and CR29 only)
- Filterless operation possible in many applications
- Mounting flanges facilitate installation on door, side or front of enclosure
- For a typical application, unique condensate management system evaporates moisture from enclosure
- High-performance fans and blowers are ideal for densely-packed enclosures
- All units use a CFC-free or environmentally safe refrigerant that is universally accepted
- Mounting hardware, gaskets, mounting template and instruction manual furnished
- In accordance with the Montreal Protocol, the CR43 Air Conditioners have transitioned away from R22 refrigerant. Product performance remains within nominal capacity.

Finish
Available in brushed stainless steel or RAL 7035 light-gray polyester powder coating.

Notes
Some packages are not listed. Verify package before ordering.

Bulletin: MCL

<table>
<thead>
<tr>
<th>Standard Product</th>
<th>CR23 Air Conditioner Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog Number</td>
<td>BTU/Voltage/Hz</td>
</tr>
<tr>
<td>CR230216G002</td>
<td>1600 BTU/Hz, 115V-50/60 Hz</td>
</tr>
<tr>
<td>CR230216G016</td>
<td>1600 BTU/Hz, 115V-50/60 Hz</td>
</tr>
<tr>
<td>CR230216G013</td>
<td>1600 BTU/Hz, 115V-50/60 Hz</td>
</tr>
<tr>
<td>CR230216G007</td>
<td>1600 BTU/Hz, 115V-50/60 Hz</td>
</tr>
<tr>
<td>CR230216G017</td>
<td>1600 BTU/Hz, 115V-50/60 Hz</td>
</tr>
<tr>
<td>CR230216G015</td>
<td>1600 BTU/Hz, 115V-50/60 Hz</td>
</tr>
<tr>
<td>CR230226G002</td>
<td>1600 BTU/Hz, 230V-50/60 Hz</td>
</tr>
<tr>
<td>CR230226G030</td>
<td>1600 BTU/Hz, 230V-50/60 Hz</td>
</tr>
<tr>
<td>CR230226G016</td>
<td>1600 BTU/Hz, 230V-50/60 Hz</td>
</tr>
<tr>
<td>CR230226G014</td>
<td>1600 BTU/Hz, 230V-50/60 Hz</td>
</tr>
</tbody>
</table>
Air Conditioners

CR23

TOP VIEW

BOTTOM VIEW

FRONT VIEW

SIDE VIEW

BACK VIEW

NOTE: Service cord terminated with appropriate plug cap.

NOTE:
1. Shaded area represents air conditioner.
2. Cutout dimensions for standard products only.
3. Full-size mounting template provided.
## Air Conditioners

### Standard Product CR29 Air Conditioner Packages

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>BTU/Voltage/Hz</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR290216G002</td>
<td>2200 BTU/Hr. 115V-50/60 Hz</td>
<td>1 - Basic</td>
</tr>
<tr>
<td>CR290216G030</td>
<td>2200 BTU/Hr. 115V-50/60 Hz</td>
<td>2 - Level 2 Controller</td>
</tr>
<tr>
<td>CR290216G035</td>
<td>2200 BTU/Hr. 115V-50/60 Hz</td>
<td>3 - Low Ambient Temperature</td>
</tr>
<tr>
<td>CR290216G013</td>
<td>2200 BTU/Hr. 115V-50/60 Hz</td>
<td>4 - Low Ambient/SS/Corrosion</td>
</tr>
<tr>
<td>CR290226G002</td>
<td>2200 BTU/Hr. 230V-50/60 Hz</td>
<td>5 - Outdoor/SS/Corrosion/4X</td>
</tr>
<tr>
<td>CR290226G010</td>
<td>2200 BTU/Hr. 230V-50/60 Hz</td>
<td>6 - Outdoor/SS/Corrosion/4X</td>
</tr>
</tbody>
</table>

### Diagrams

- **CR29 Side-Mount to Enclosure**
- **CR29 Standard Product**
- **Protective Shield (SS/4X only)**
- **Enclosure Air In**
- **Ambient Air Out**
- **Dimensions:**
  - Width: 15.75 mm (400 mm)
  - Height: 29.50 mm
  - Depth: 749 mm

### Notes:
1. Shaded area represents air conditioner.
2. Cutout dimensions for standard products only.
3. Full-size mounting template provided.
### Standard Product: CR43 Air Conditioner Packages

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>BTU/Voltage/Hz</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR430616G002H</td>
<td>6500 BTU/hr. 115V-50/60 Hz</td>
<td>1 - Basic</td>
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<tr>
<td>CR430616G016</td>
<td>6500 BTU/hr. 115V-50/60 Hz</td>
<td>2 - Level 2 Controller</td>
</tr>
<tr>
<td>CR430616G013</td>
<td>6500 BTU/hr. 115V-50/60 Hz</td>
<td>3 - Low Ambient Temperature</td>
</tr>
<tr>
<td>CR430616G004</td>
<td>6500 BTU/hr. 115V-50/60 Hz</td>
<td>4 - Low Ambient/SST/Corrosion</td>
</tr>
<tr>
<td>CR430616G031</td>
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<td>6 - Outdoor/SST/Corrosion/4X</td>
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<tr>
<td>CR430626G002H</td>
<td>6500 BTU/hr. 230V-50/60 Hz</td>
<td>1 - Basic</td>
</tr>
<tr>
<td>CR430626G018</td>
<td>6500 BTU/hr. 230V-50/60 Hz</td>
<td>2 - Level 2 Controller</td>
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<td>CR430626G013</td>
<td>6500 BTU/hr. 230V-50/60 Hz</td>
<td>3 - Low Ambient Temperature</td>
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<tr>
<td>CR430626G010</td>
<td>6500 BTU/hr. 230V-50/60 Hz</td>
<td>5 - Low Ambient/SST/Level 2</td>
</tr>
<tr>
<td>CR430626G034</td>
<td>6500 BTU/hr. 230V-50/60 Hz</td>
<td>6 - Outdoor/SST/Corrosion/4X</td>
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<td>8000 BTU/hr. 115V-50/60 Hz</td>
<td>1 - Basic</td>
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<tr>
<td>CR430816G021</td>
<td>8000 BTU/hr. 115V-50/60 Hz</td>
<td>2 - Level 2 Controller</td>
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<tr>
<td>CR430816G038</td>
<td>8000 BTU/hr. 115V-50/60 Hz</td>
<td>3 - Low Ambient Temperature</td>
</tr>
<tr>
<td>CR430816G010</td>
<td>8000 BTU/hr. 115V-50/60 Hz</td>
<td>4 - Low Ambient/SST/Corrosion</td>
</tr>
<tr>
<td>CR430816G023</td>
<td>8000 BTU/hr. 115V-50/60 Hz</td>
<td>5 - Low Ambient/SST/Level 2</td>
</tr>
<tr>
<td>CR430816G036</td>
<td>8000 BTU/hr. 115V-50/60 Hz</td>
<td>6 - Outdoor/SST/Corrosion/4X</td>
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<td>CR430826G002H</td>
<td>8000 BTU/hr. 230V-50/60 Hz</td>
<td>1 - Basic</td>
</tr>
<tr>
<td>CR430826G026</td>
<td>8000 BTU/hr. 230V-50/60 Hz</td>
<td>2 - Level 2 Controller</td>
</tr>
<tr>
<td>CR430826G007</td>
<td>8000 BTU/hr. 230V-50/60 Hz</td>
<td>3 - Low Ambient Temperature</td>
</tr>
<tr>
<td>CR430826G034</td>
<td>8000 BTU/hr. 230V-50/60 Hz</td>
<td>4 - Low Ambient/SST/Corrosion</td>
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<tr>
<td>CR430826G024</td>
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<td>5 - Low Ambient/SST/Level 2</td>
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<tr>
<td>CR430826G038</td>
<td>8000 BTU/hr. 230V-50/60 Hz</td>
<td>6 - Outdoor/SST/Corrosion/4X</td>
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</table>

---

**CR43**

**Protective Shield (SST 4/4X ONLY)**

**Standard Condensate Drain Location**

**NOTE:** Service cord terminated with appropriate plug cap.
## CR23 Series

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/Hr. @ 131 F/131 F</th>
<th>Amps @ 131 F/131 F</th>
<th>BTU/Hr. @ 95 F/95 F</th>
<th>Amps @ 95 F/95 F</th>
<th>Max. Amb. Temp (°F)</th>
<th>Max. Amb. Temp (°C)</th>
<th>Shipping Wt. (lb.)</th>
<th>Shipping Wt. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR230216GXXX</td>
<td>115</td>
<td>50/60</td>
<td>1</td>
<td>1400/1600</td>
<td>4.3/4.5</td>
<td>1500/1700</td>
<td>3.8/3.6</td>
<td>131</td>
<td>55</td>
<td>57</td>
<td>26</td>
</tr>
<tr>
<td>CR230226GXXX</td>
<td>230</td>
<td>50/60</td>
<td>1</td>
<td>1400/1600</td>
<td>2.2/2.2</td>
<td>1500/1700</td>
<td>2.1/1.8</td>
<td>131</td>
<td>55</td>
<td>57</td>
<td>26</td>
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</tbody>
</table>

Because air conditioners provide less cooling at lower operating temperatures, two cooling capacity ratings are provided.

For Stainless Steel UL Type 4X models, add approximately 10 lbs. to shipping weight.

Replacement Filter No. 23200400

## CR29 Series

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/Hr. @ 131 F/131 F</th>
<th>Amps @ 131 F/131 F</th>
<th>BTU/Hr. @ 95 F/95 F</th>
<th>Amps @ 95 F/95 F</th>
<th>Max. Amb. Temp. (ºF)</th>
<th>Max. Amb. Temp. (ºC)</th>
<th>Shipping Wt. (lb.)</th>
<th>Shipping Wt. (kg)</th>
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<tbody>
<tr>
<td>CR290216GXXX</td>
<td>115</td>
<td>50/60</td>
<td>1</td>
<td>2000/2200</td>
<td>7.4/7.4</td>
<td>1700/2000</td>
<td>7.0/6.0</td>
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<td>55</td>
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<td>44</td>
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<tr>
<td>CR290226GXXX</td>
<td>230</td>
<td>50/60</td>
<td>1</td>
<td>2500/2700</td>
<td>4.6/3.9</td>
<td>1900/2300</td>
<td>4.4/3.3</td>
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<td>44</td>
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<tr>
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<td>3500/4000</td>
<td>13.5/15.5</td>
<td>2400/2800</td>
<td>10.7/9.06</td>
<td>131</td>
<td>55</td>
<td>118</td>
<td>54</td>
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<td>CR290426GXXX</td>
<td>230</td>
<td>50/60</td>
<td>1</td>
<td>3500/4000</td>
<td>6.7/6.7</td>
<td>2400/2800</td>
<td>5.9/5.3</td>
<td>131</td>
<td>55</td>
<td>118</td>
<td>54</td>
</tr>
</tbody>
</table>

Because air conditioners provide less cooling at lower operating temperatures, two cooling capacity ratings are provided.

For Stainless Steel UL Type 4X models, add approximately 10 lbs. to shipping weight.

Replacement Filter No. 10100032

## CR43 Series

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>BTU/Hr. @ 131 F/131 F</th>
<th>Amps @ 131 F/131 F</th>
<th>BTU/Hr. @ 95 F/95 F</th>
<th>Amps @ 95 F/95 F</th>
<th>Max. Amb. Temp. (ºF)</th>
<th>Max. Amb. Temp. (ºC)</th>
<th>Shipping Wt. (lb.)</th>
<th>Shipping Wt. (kg)</th>
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<tbody>
<tr>
<td>CR430616GXXX</td>
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<td>60</td>
<td>1</td>
<td>6500</td>
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<td>1</td>
<td>8000</td>
<td>14.0</td>
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<td>CR430826GXXX</td>
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<td>60</td>
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<td>55</td>
<td>140</td>
<td>64</td>
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</table>

Because air conditioners provide less cooling at lower operating temperatures, two cooling capacity ratings are provided.

For Stainless Steel UL Type 4X models, add approximately 10 lbs. to shipping weight.

Replacement Filter No. 10100044
Closed Loop Cooling

Within the air conditioner, the recirculated clean air is kept separate from the ambient airflow system. This protects the electronic controls and prevents shutdowns caused by heat, humidity, dust and other contaminants.
Industry Standards

**NEMA Type 4 Models:**
Maintains UL/cUL Type 4 when properly installed on a UL/cUL Type 4 enclosure.

UL508 Listed; Type 4; File No. E187045

**NEMA Type 4X Models:**
Maintains UL/cUL Type 4X when properly installed on a UL/cUL Type 4X enclosure.

UL508 Listed; Type 4X; File No. E187045

**NEMA Type 12 Models:**
Maintains UL/cUL Type 12 when properly installed on a UL/cUL Type 12 enclosure.

UL508 Listed; Type 12; File No. E187045

Application

Powered by compressed air, Vortex Cooling Systems generate chilled air to cool small enclosures without refrigerants or moving parts. These systems are exceptionally reliable and low maintenance, even in the harshest and dirtiest environments.

Features

- Five-micron airline filter, 115 V solenoid
- Thermostat
- Ducting kit
- Cooling capacities to 2500 Btu/Hr. (733 W)

Finish

Brushed satin aluminum or stainless steel

Accessories

(for the enclosure)
Can be installed on all enclosure product families. Separate VCool accessories include an in-line oil filter.

Notes

Manufactured for Hoffman by ITW Vortec.
Bulletin: MCL, MCLY

---

**Standard Product  VC Series NEMA Type 12**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Cooling Capacity (BTU/Hr.)</th>
<th>Cooling Capacity (W)</th>
<th>Compressed Air Consumption (SCFM)</th>
<th>Compressed Air Consumption (l³/m)</th>
<th>Noise Level (dB)</th>
<th>Voltage</th>
<th>Frequency (Hz)</th>
<th>Material</th>
<th>Weight (lb.)</th>
<th>Weight (kg)</th>
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<td>400</td>
<td>117</td>
<td>8</td>
<td>227</td>
<td>69</td>
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<td>50/60</td>
<td>Aluminum</td>
<td>5</td>
<td>2.27</td>
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<tr>
<td>VC0916012</td>
<td>900</td>
<td>264</td>
<td>13</td>
<td>425</td>
<td>80</td>
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<td>440</td>
<td>23</td>
<td>708</td>
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<td>115</td>
<td>50/60</td>
<td>Aluminum</td>
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<td>2.72</td>
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<td>2500</td>
<td>733</td>
<td>35</td>
<td>991</td>
<td>90</td>
<td>115</td>
<td>50/60</td>
<td>Aluminum</td>
<td>6</td>
<td>2.72</td>
</tr>
</tbody>
</table>
Vortex Cooling Systems and Accessories

NEMA Type 12 - 400 BTU/Hr.

NEMA Type 12 -
900, 1500, 2500 BTU/Hr.

NEMA Type 4X
900, 1700, 2500 BTU/Hr.

HOT EXHAUST AND VENT AIR PORTS
1/4-18 NPT COMPRESSED AIR INLET

HOT EXHAUST PORT
1/4-18 NPT (F) INLET

MOUNTS IN 1.94 (49mm) HOLE IN ENCLOSURE
(3/4 ELECTRICAL KNOCKOUT)

ENCLOSURE COOLER MUST REMAIN IN A VERTICAL ORIENTATION TO MAINTAIN NEMA 4/4X RATINGS.

Typical Installation

Vortex Cooler

Solenoid Valve
1/4" NPT Normally Closed
NEMA 12 or 4/4X Rated
120V/60 Hz or 110V/50 Hz

5 Micron Filter
(Supplied)

Airflow

Cold Air Ducting Kit

Thermostat

Subject to change without notice

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### Vortex Cooling Systems and Accessories

**VC Series NEMA Type 4, 4X**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Cooling Capacity (BTU/Hr.)</th>
<th>Cooling Capacity (W)</th>
<th>Compressed Air Consumption (SCFM)</th>
<th>Compressed Air Consumption (l³/m)</th>
<th>Noise Level (dB)</th>
<th>Voltage</th>
<th>Frequency (Hz)</th>
<th>Material</th>
<th>Weight (lb.)</th>
<th>Weight (kg)</th>
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</thead>
<tbody>
<tr>
<td>VC0916004</td>
<td>900</td>
<td>264</td>
<td>15</td>
<td>425</td>
<td>83</td>
<td>115</td>
<td>50/60</td>
<td>Aluminum</td>
<td>6</td>
<td>2.72</td>
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<tr>
<td>VC1716004</td>
<td>1700</td>
<td>498</td>
<td>25</td>
<td>708</td>
<td>86</td>
<td>115</td>
<td>50/60</td>
<td>Aluminum</td>
<td>6</td>
<td>2.72</td>
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<td>VC2516004</td>
<td>2500</td>
<td>733</td>
<td>35</td>
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<td>50/60</td>
<td>Aluminum</td>
<td>6</td>
<td>2.72</td>
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<tr>
<td>VC0916004X</td>
<td>900</td>
<td>264</td>
<td>15</td>
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<td>83</td>
<td>115</td>
<td>50/60</td>
<td>Stainless Steel</td>
<td>6</td>
<td>2.72</td>
</tr>
<tr>
<td>VC1716004X</td>
<td>1700</td>
<td>498</td>
<td>25</td>
<td>708</td>
<td>86</td>
<td>115</td>
<td>50/60</td>
<td>Stainless Steel</td>
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<td>733</td>
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<td>991</td>
<td>90</td>
<td>115</td>
<td>50/60</td>
<td>Stainless Steel</td>
<td>6</td>
<td>2.72</td>
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</table>

### Vortex Cooling System Accessories

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>Use with VCool Model Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCOF17</td>
<td>Oil Filter</td>
<td>Up to 1700 BTU/Hr.</td>
</tr>
<tr>
<td>VCOF25</td>
<td>Oil Filter</td>
<td>2500 BTU/Hr.</td>
</tr>
</tbody>
</table>
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Thermal Management Design Guide Overview

Incorporating thermal cooling within an enclosure can lengthen system life and increase control line reliability. The accumulation of heat in an enclosure is potentially damaging to electrical and electronic devices. Overheating will shorten the life expectancy of costly electrical components and can lead to catastrophic failure. It is, therefore, important that system designers be aware of the temperature implications of their designs prior to implementation and, where necessary, take steps to reduce heat build-up inside the enclosure.

Extreme temperatures can have the following effects on industrial control equipment:
- Catastrophic failures can occur
- Silicone material properties can change
- Drive performance is de-rated
- I/C-based devices may experience intermittent fluctuations in output and voltage migration
- Mean Time Between Failure (MTBF) decreases exponentially

The costs when a line goes down due to temperature extremes are:
- Productivity losses
- Increased labor costs
- Increased scrap
- Opportunity losses
- Component costs
- Missed ship dates
- Decreased customer satisfaction

Types of Cooling

Open Loop: Utilizes the ambient or outside air, filtered or unfiltered, to cool the electronics
Closed Loop: Maintains the sealed integrity of the cabinet while utilizing the internal cabinet air to cool the electronics
Active Cooling: An external device enhances the cooling process
Passive Cooling: Cooling occurs via natural convection and heat dissipation

Air Conditioner

Closed Loop System: Can maintain a Type 3R, 12, 4 or 4X rating and can create an environment cooler than ambient. This is an ideal type of cooling which creates a more reliable system and improves equipment life cycle. A typical internal temperature design point is 85-95 F. Hoffman air conditioners are designed for continuous operation in ambient environments up to 125 F or 131 F, depending on the model.

For sizing and selecting an air conditioner, refer to the Hoffman Thermal Management Catalog, or go to hoffmanonline.com to use the Thermal Management Sizing and Selection Software.

When an electrical enclosure wall is penetrated with an opening it must be covered by a rated part. All of the above cooling systems have been designed and certified to be used on electrical enclosures and maintain the product Type Rating identified on the corresponding product specification sheet.

Vortex Cooler

Closed Loop System: Can maintain a Type 12, 4 or 4X rating and can create an environment cooler than ambient. This is an ideal type of cooling for smaller enclosure applications where compressed air is available.

Heat Exchanger

Closed Loop System: Maintains a sealed system that will match the Type rating of the heat exchanger. Temperature will always be greater than ambient. Equipment inside the enclosure must be evaluated to sustain a worst-case temperature rise above ambient. For sizing and selecting heat exchangers, refer to Heat Exchangers Sizing and Selection.

Filter Fan and Exhaust

Open Loop Systems: Usually only used in relatively clean Type 1 or Type 3R environments where the temperature inside the enclosure will always be greater than outside the enclosure. Equipment inside the enclosure must be evaluated to sustain a worst-case temperature rise above ambient.

For sizing and selecting filter fan packages, refer to Fans, Blowers, Louvers and Vents Sizing and Selection.
Finding the Right Thermal Management Solution

To determine the best thermal management products for the application, the user needs to define information about the environment, enclosure and the equipment inside. Use the form below in conjunction with Hoffman’s online Thermal Management Sizing and Selection Software.

Project Environment/Thermal Evaluation Data Form

Environment
System Location: Indoors, outdoors shaded or outdoors direct sunlight

Environment: Corrosive, dust, grit, dirt, oily-cutting fluids, washdown, dripping water, freezing rain or other

Open Loop ______ or Closed Loop ______ System

Enclosure
Size: ______ H x ______ W x ______ D = ______

Determine the area that allows heat transfer and identify any dimensional limits of thermal system.

Type Rating: ______ (Typically Type 1, 3R, 12, 4, or 4X)

Enclosure finish/color: ______________
(external color will effect solar load if in direct sunlight; if internal finish is metallic, the passive cooling of the enclosure is less)

Equipment
Internal Heat Load: ______ (determine the full-load heat produced by the major power-consuming components; then add an additional 25 percent for passive components and connections)

Determine the level of protection the equipment needs based on the environment.

Identify the most sensitive components relative to temperature or humidity and determine the upper and lower temperature extremes.

Available Power: ______ Volts

Temperature Limits

Cooling Extremes

___________ Maximum temperature outside the enclosure

___________ Maximum allowable temperature inside the enclosure (85–95°F is a typical value used to provide a reliable system and maximize the system’s life)

Heating Extremes

___________ Minimum temperature outside the enclosure

___________ Minimum allowable temperature inside the enclosure (heaters are frequently required to maintain temperatures above minimum start-up and to remove condensation)
Internal Circulating Fans

The use of circulating fans in an enclosure will improve heat dissipation by as much as 10 percent. Circulating fans are most commonly employed to eliminate hot spots inside an enclosure.

Multiple Air Movers for Open Loop Systems

Air movers can be combined in series or parallel, as this may provide the optimum solution. In addition, a degree of redundancy in the event of fan failure can be a benefit. The graph illustrates how airflow performance changes when air movers are placed in series or parallel with one another in a system.

Multiple Exhausts for Open Loop Systems

This performance curve shows that adding a second 10-in. exhaust package provides an increase in airflow from 215 CFM to 290 CFM. The intersection point of the fan curve and the system curve approximates the CFM performance.

The graph below illustrates the temperature rise of two identical enclosures except one has an internal circulating fan. Each enclosure has two temperature sensors, one located near the top and the other near the bottom. The top and bottom black curves reflect the temperature in the enclosure without an internal fan. Adding a circulating fan removed the heat stratification.

Performance Curve for a 10” Cooling Fan Package and System Curve With Exhaust Grills

- 10 in. Cooling Fan Package
- 10 in. Exhaust Package System Curve 1
- Two 10 in. Exhaust Packages System Curve 2
Acoustical Noise

Acoustical noise is typically measured by the Sound Pressure Level (Lp), expressed in decibels and is dependent upon the distance from the source as well as its surroundings.

The Sound Pressure Level is defined as:
\[ L_p = 10 \log (\rho / \rho_o) \]

Where:
- \( L_p \) = Sound pressure level (dB)
- \( \rho \) = Measured sound pressure (Pascals)
- \( \rho_o \) = Sound reference level 20 \( \mu \)N/m\(^2\)

Noise Generated by Air Movers

There are many different ways to reduce the noise generated by an air mover. Some of the more common are:
- Avoid obstructions to air flow
- Run larger fans at lower speeds
- Lower the system impedance
- Minimize inlet losses and obstructions

The most significant factor influencing the noise from a given air mover is the speed of rotation. This is given by the following equation:
\[ dB_2 = dB_1 - 50 \log (rpm_1 / rpm_2) \]

Where:
- \( dB_1 \) = Sound pressure of the air mover operating at \( rpm_1 \)
- \( dB_2 \) = Sound pressure of the air mover operating at \( rpm_2 \)
- \( rpm_1 \) = Operating speed of impeller at condition 1
- \( rpm_2 \) = Operating speed of impeller at condition 2

Therefore, a blower at half speed will be 15 dB quieter than at full speed. Air flow will also be half and, since static pressure is a squared function of speed, it is reduced by a factor of four.

Decibel Loudness Comparisons

<table>
<thead>
<tr>
<th>Decibels (dBA)</th>
<th>Loudness Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Grand Canyon at night</td>
</tr>
<tr>
<td>20</td>
<td>Quiet basement</td>
</tr>
<tr>
<td>30</td>
<td>Quiet bedroom (at night)</td>
</tr>
<tr>
<td>40</td>
<td>Typical living room</td>
</tr>
<tr>
<td>50</td>
<td>Background music</td>
</tr>
<tr>
<td>60</td>
<td>Average human voice</td>
</tr>
<tr>
<td>70</td>
<td>Airplane interior noise</td>
</tr>
<tr>
<td>80</td>
<td>EPA recommends protection for 8-hour exposure</td>
</tr>
<tr>
<td>90</td>
<td>Kitchen garbage disposal</td>
</tr>
<tr>
<td>100</td>
<td>Lawn mower</td>
</tr>
<tr>
<td>110</td>
<td>Leaf blower</td>
</tr>
<tr>
<td>115</td>
<td>OSHA forbids unprotected exposure</td>
</tr>
</tbody>
</table>

Sound and Distance  When the distance from a Point source doubles, the sound level decreases six decibels.

<table>
<thead>
<tr>
<th>Sound Level</th>
<th>Distance</th>
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<tbody>
<tr>
<td>93 decibels</td>
<td>50 feet</td>
</tr>
<tr>
<td>89 decibels</td>
<td>100 feet</td>
</tr>
<tr>
<td>83 decibels</td>
<td>200 feet</td>
</tr>
</tbody>
</table>

Addition and Subtraction of Decibel Levels  Doubling sound energy yields an increase of three decibels. In this example, each source is 50dBA. Note the characteristics of logarithmic addition or subtraction of decibel levels.

<table>
<thead>
<tr>
<th>Number of Sources</th>
<th>Decibel Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50 dBA</td>
</tr>
<tr>
<td>2</td>
<td>55 dBA</td>
</tr>
<tr>
<td>4</td>
<td>56 dBA</td>
</tr>
<tr>
<td>8</td>
<td>59 dBA</td>
</tr>
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</table>
Heat Exchangers Sizing and Selection Overview

Before choosing a thermal management solution, you need to carefully consider the specifics of your application in addition to the following factors:

- Fan packages and blowers may introduce ambient contaminants like oil mist and dust into the enclosure
- Heat exchangers (this section) cannot cool below the ambient temperature
- Closed-loop air conditioners can cool below ambient temperature and reduce humidity without introducing contaminants
- Simple ventilation devices such as louvers or grilles and filters are appropriate if maintaining a cool, constant temperature is not a critical factor

Once you have determined the proper form of cooling equipment you need, selecting the required cooling capacity is outlined in this section.

When Should You Use a Heat Exchanger?

A heat exchanger is recommended when:

- ambient air contaminants must be kept out of the enclosure
- the integrity of the enclosure must be maintained
- temperature slightly above ambient inside the cabinet is acceptable
- humidity is not a factor

How to Read Heat Exchanger Catalog Numbers

XR - 29 - 18 - 1 - 6 - 012

XR = Heat Exchanger Series; XR Modified Heat Pipe Core heat exchanger
29 = Approximate height of the heat exchanger (i.e., 29 = 29-in. high)
18 = Capacity in W/F
1 = 115 V, 2 = 230 V
6 = 50/60 Hz
012 = UL Type

Heat Exchanger Sizing

1. **Determine internal heat load in Watts.**

1 Watt = 3.413 BTU/Hr.

Determine the internal heat load produced by equipment as total operating Watts.

2. **Determine desired temperature difference in degrees F.**

\[1K \Delta T = 1.8 F \Delta T \quad K \Delta T = ^\circ C \Delta T\]

Determine the \(\Delta T(\text{°F})\), the temperature difference between the maximum temperature outside the enclosure \(T_i\) and the maximum desired temperature inside the enclosure \(T_o\), which can be calculated as:

\[T_i - T_o = \Delta T\] for heat exchangers.

3. **Determine exposed surface area of the enclosure in square feet.**

\[1 M^2 = 10.76 \text{ ft}^2\]

Calculate the exposed surface area of the enclosure in Square Feet:

\[\text{AREA (ft}^2\) = 2[(H x W) + (H x D) + (W x D)] + 144\]

where “H”, “W”, and “D” are the dimensions of the enclosure.

4. **Determine required heat exchanger performance rating.**

\[\text{Watts} + \Delta T(\text{°F}) \cdot (0.22 \times \text{AREA (ft}^2\) = Watts/°F}\]

Use this formula to determine the required cooling capacity needed to maintain the desired operating temperature for your enclosure. This selection procedure applies to uninsulated, sealed, gasketed enclosures in indoor locations.

It is recommended that the average “Air In” rating be used when sizing an application. However, it may be possible to use a lower-rated heat exchanger by locating the most heat-sensitive components in line with the “Air Out” opening of the heat exchanger. The actual performance rating of any heat exchanger may vary slightly because of the airflow impedance of the specific electronics configurations.
Thermal Management Sizing and Selection Software

Thermal Management: Heat Exchangers

Heat Exchangers Sizing and Selection

Designed to assist you in determining the most suitable choices of air conditioners, heat exchangers or fans for your application. Download a free copy of our selection software by visiting our website: hoffmanonline.com. Click on Thermal Management chapter.

Compact and Mid-Size Heat Exchangers

XR Compact and Mid-Size

<table>
<thead>
<tr>
<th>Series</th>
<th>A (in.)</th>
<th>A (mm)</th>
<th>B (in.)</th>
<th>B (mm)</th>
<th>C (in.)</th>
<th>C (mm)</th>
<th>Enclosure Air In (W/°F)</th>
<th>Enclosure Air In (W/K)</th>
<th>Enclosure Air Out (W/°F)</th>
<th>Enclosure Air Out (W/K)</th>
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</thead>
<tbody>
<tr>
<td>XR2004_</td>
<td>20.00</td>
<td>508</td>
<td>7.50</td>
<td>191</td>
<td>3.00</td>
<td>76</td>
<td>4</td>
<td>7</td>
<td>9</td>
<td>16</td>
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<tr>
<td>XR2908_</td>
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<td>749</td>
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<td>3.09</td>
<td>79</td>
<td>8</td>
<td>14</td>
<td>30</td>
<td>54</td>
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<tr>
<td>XR2918_</td>
<td>29.66</td>
<td>753</td>
<td>10.24</td>
<td>260</td>
<td>5.92</td>
<td>150</td>
<td>18</td>
<td>32</td>
<td>34</td>
<td>61</td>
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<tr>
<td>XR4724_</td>
<td>47.16</td>
<td>1198</td>
<td>10.24</td>
<td>260</td>
<td>5.92</td>
<td>150</td>
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<td>79</td>
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<td>47.16</td>
<td>1198</td>
<td>15.24</td>
<td>387</td>
<td>5.92</td>
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<td>34</td>
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<td>15.24</td>
<td>387</td>
<td>5.92</td>
<td>150</td>
<td>55</td>
<td>99</td>
<td>138</td>
<td>248</td>
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<td>1515</td>
<td>15.24</td>
<td>387</td>
<td>9.92</td>
<td>252</td>
<td>84</td>
<td>151</td>
<td>210</td>
<td>378</td>
</tr>
</tbody>
</table>
CLIMAGUARD™ Outdoor Heat Exchangers

Application
The CLIMAGUARD™ Outdoor Heat Exchanger is a rugged and reliable unit engineered for temperature extremes, corrosive environments and wind-driven rain. Its design keeps enclosures sealed tight for reliable closed-loop cooling while ensuring vital electronics stay protected.

Features
- Removes up to 3000 watts of enclosure heat
- Available in DC and AC power supply
- Cooling capacities ranging from 25 W/°C (14 W/°F) and 150 W/°C (83 W/°F)
- Variable-speed blowers standard on DC-powered units
- Surface- and recess-mount capable
- Gasket and hardware included
- Few moving parts
- Double-sealed core ends
- Closed-loop cooling

Specifications
- Powder-coated galvanized sheet metal shroud
- Corrosion-resistant aluminum core
- Finish: RAL 7035 smooth light-gray polyester powder coating

Accessories
- Ambient-side insect screen
- Up to 2000 Watt heater for DC and AC models

Bulletin: MCLHE

| TX231416100 | 23.00 x 12.00 x 7.10 | 584 x 305 x 180 | AC | 115 | 50/60 | 1 | 1.8 | -40 – 149 | -40 – 65 | 14 | 25 | 32 | 14.5 |
| TX231448100 | 23.00 x 12.00 x 7.10 | 584 x 305 x 180 | DC | 48 | — | — | 1.8 | -40 – 149 | -40 – 65 | 28 | 50 | 52 | 23.6 |
| TX332816100 | 33.00 x 15.70 x 8.10 | 838 x 399 x 206 | AC | 115 | 50/60 | 1 | 1.4 | -40 – 149 | -40 – 65 | 28 | 50 | 52 | 23.6 |
| TX332848100 | 33.00 x 15.70 x 8.10 | 838 x 399 x 206 | DC | 48 | — | — | 1.8 | -40 – 149 | -40 – 65 | 28 | 50 | 52 | 23.6 |
| TX385616100 | 38.00 x 19.70 x 10.10 | 965 x 500 x 257 | AC | 115 | 50/60 | 1 | 2.3 | -40 – 149 | -40 – 65 | 56 | 100 | 69 | 31.3 |
| TX385648100 | 38.00 x 19.70 x 10.10 | 965 x 500 x 257 | DC | 48 | — | — | 2.3 | -40 – 149 | -40 – 65 | 56 | 100 | 69 | 31.3 |
| TX528316100 | 52.00 x 19.70 x 10.10 | 1321 x 500 x 257 | AC | 115 | 50/60 | 1 | 4.3 | -40 – 149 | -40 – 65 | 83 | 150 | 103 | 46.7 |
| TX528348100 | 52.00 x 19.70 x 10.10 | 1321 x 500 x 257 | DC | 48 | — | — | 4.3 | -40 – 149 | -40 – 65 | 83 | 150 | 103 | 46.7 |

TX23 Models
For AC Power Supply
Thermal Management: Heat Exchangers

Heat Exchangers

TX23 Models
For DC Power Supply

Ambient Air In

Enclosure Air In

Removable Hanging Tabs (2)

Ambient Air Out

Enclosure Air Out

#10-24 Mounting (20)
(10 on Back Face, 10 behind Front Cover)

24VDC UNIT
+24VDC (RED)
0 VDC (BLK)
GRND (GRN)
ALARM (WHT)
ALARM (BRN)

48VDC UNIT
+48VDC (RED)
+48VDC (BLK)
GRND (GRN)
ALARM (WHT)
ALARM (BRN)

Controller LED’s
AC Heater Power
See DETAIL A
Impeller Power & Alarm Interface

Detail A

Externally Mounted Cutout

Internally Mounted Cutout

Subject to change without notice

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1187
TX33 Models
For AC Power Supply

Mounting hardware for fully recessed mounting is behind removable front cover.
Thermal Management: Heat Exchangers

TX33 Models
For DC Power Supply

Heat Exchangers

DETAIL A

Externally Mounted Cutout

Internally Mounted Cutout
TX38 Models
For AC Power Supply

Mounting hardware for fully recessed mounting is behind removable front cover.

#10-24 Mounting (28)
(14 on Back Face, 14 behind Front Cover)

Power Cord Entrance

Ambient Air In

Enclosure Air In

Removable Hanging Tabs (2)

Ambient Air Out

Enclosure Air Out

- 10.00
- 254 mm
- 3.08
- 78 mm
- 7.05
- 22 mm
- 1.58
- 40 mm

- 38.00
- 965 mm
- 9.25 (2)
- 235 mm
- 2.94
- 75 mm

- 20.95
- 532 mm
- 7.05
- 179 mm
- 0.39
- 13 mm

- 7.05
- 179 mm
- 2.03
- 52 mm

- 8.38
- 213 mm
- 20.57
- 522 mm
- 7.50
- 191 mm

- 20.95
- 532 mm
- 7.05
- 179 mm
- 2.03
- 52 mm

- 8.38
- 213 mm
- 0.39
- 13 mm

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Heat Exchangers

TX38 Models
For DC Power Supply

Ambient Air In

Enclosure Air In

Removable hanging tabs (2)

Enclosure Air Out

Ambient Air Out

24VDC UNIT
+24VDC (RED)
0 VDC (BK)
GRND (GRN)
ALARM (+T)
ALARM (BRN)

48VDC UNIT
0 VDC (RED)
+48VDC (BK)
GRND (GRN)
ALARM (+H)
ALARM (BRN)

#10-24 Mounting (28)
(14 on Back Face, 14 behind Front Cover)

Controller LED's
AC Heater Power
See DETAIL A
Impeller Power &
Alarms Interface

DETAIL A

Externally Mounted Cutout

Internally Mounted Cutout

Subject to change without notice

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TX52 Models
For AC Power Supply

Ambient Air In

Ambient Air Out

5.50
140 mm

5.50
140 mm

2.94
75 mm

8.50
216 mm

8.50
216 mm

7.73
196 mm

2.75
70 mm

19.66
499 mm

17.59
447 mm

1.26
26 mm

52.00
1321 mm

10.20 (4)
259 mm

2.40
61 mm

8.41
214 mm

50.00
1270 mm

10.20 (2)
259 mm

4.75
121 mm

4.23
107 mm

8349730

Power Cord Entrance

#10-24 Mounting (22)
(16 on Back Face, 16 behind Front Cover)

1.50
38 mm

8.50
216 mm

10.20 (2)
259 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

5.50
140 mm

5.50
140 mm

2.94
75 mm

8.50
216 mm

8.50
216 mm

7.73
196 mm

2.75
70 mm

19.66
499 mm

17.59
447 mm

1.26
26 mm

52.00
1321 mm

10.20 (4)
259 mm

2.40
61 mm

8.41
214 mm

50.00
1270 mm

10.20 (2)
259 mm

4.75
121 mm

4.23
107 mm

8349730

Power Cord Entrance

#10-24 Mounting (22)
(16 on Back Face, 16 behind Front Cover)

1.50
38 mm

8.50
216 mm

10.20 (2)
259 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

5.50
140 mm

5.50
140 mm

2.94
75 mm

8.50
216 mm

8.50
216 mm

7.73
196 mm

2.75
70 mm

19.66
499 mm

17.59
447 mm

1.26
26 mm

52.00
1321 mm

10.20 (4)
259 mm

2.40
61 mm

8.41
214 mm

50.00
1270 mm

10.20 (2)
259 mm

4.75
121 mm

4.23
107 mm

8349730

Power Cord Entrance

#10-24 Mounting (22)
(16 on Back Face, 16 behind Front Cover)

1.50
38 mm

8.50
216 mm

10.20 (2)
259 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

5.50
140 mm

5.50
140 mm

2.94
75 mm

8.50
216 mm

8.50
216 mm

7.73
196 mm

2.75
70 mm

19.66
499 mm

17.59
447 mm

1.26
26 mm

52.00
1321 mm

10.20 (4)
259 mm

2.40
61 mm

8.41
214 mm

50.00
1270 mm

10.20 (2)
259 mm

4.75
121 mm

4.23
107 mm

8349730

Power Cord Entrance

#10-24 Mounting (22)
(16 on Back Face, 16 behind Front Cover)

1.50
38 mm

8.50
216 mm

10.20 (2)
259 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

5.50
140 mm

5.50
140 mm

2.94
75 mm

8.50
216 mm

8.50
216 mm

7.73
196 mm

2.75
70 mm

19.66
499 mm

17.59
447 mm

1.26
26 mm

52.00
1321 mm

10.20 (4)
259 mm

2.40
61 mm

8.41
214 mm

50.00
1270 mm

10.20 (2)
259 mm

4.75
121 mm

4.23
107 mm

8349730

Power Cord Entrance

#10-24 Mounting (22)
(16 on Back Face, 16 behind Front Cover)

1.50
38 mm

8.50
216 mm

10.20 (2)
259 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

6.00 (2)
152 mm

6.00 (6)
152 mm

5.50
140 mm

5.50
140 mm

2.94
75 mm

8.50
216 mm

8.50
216 mm

7.73
196 mm

2.75
70 mm

19.66
499 mm

17.59
447 mm

1.26
26 mm

52.00
1321 mm

10.20 (4)
259 mm

2.40
61 mm

8.41
214 mm

50.00
1270 mm

10.20 (2)
259 mm

4.75
121 mm

4.23
107 mm

8349730

Power Cord Entrance

#10-24 Mounting (22)
(16 on Back Face, 16 behind Front Cover)

1.50
38 mm

8.50
216 mm

10.20 (2)
### XR Series Compact and Mid-Size Heat Exchanger

**Industry Standards**
Maintains UL/cUL Type 12 rating when properly installed on a UL/cUL Type 12 enclosure.
Maintains Type 3R rating when mounted externally and in a vertical position on a UL/cUL Type 3R enclosure.
XR200416012 and XR200426012 do not carry Type 3R rating.

**UL/cUL Listed; File No. SA7402**

**CE**

**Application**
Available in several sizes, these high-efficiency, streamlined heat exchangers are designed for use on narrow or shallow enclosures.

**Application Tip**
Locate heat-sensitive components in line with the “Air Out” opening of the heat exchanger.

**Features**
- Unique cores include modified heat pipe core on XR20 and XR2908 and counterflow aluminum core on XR2918, XR47 and XR60
- Top-quality ball-bearing fans
- Streamlined aesthetics with no visible mounting rails or fasteners
- Front cover hinges
- Filterless design; the core slides out for easy cleaning
- Mounts vertically or horizontally on front, side or top of enclosure, inside or outside of enclosure
- Mounting gaskets and instruction manual furnished
- DC voltage available if required. Please contact Hoffman.
- Service cord provided includes appropriate plug:
  - NEMA 5-15P for 115V units
  - NEMA 6-15P for 230V units

**Finish**
Coated with RAL 7035 polyester powder paint inside and out

**Notes**
*Hoffman XR units are directly interchangeable with ProAir models.*

**Bulletin:** MCLHE

---

### Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>AxByC in.</th>
<th>AxByC mm</th>
<th>Voltage</th>
<th>Hz</th>
<th>Phase</th>
<th>Full Load Amps</th>
<th>Max Amb. Temp. (°F)</th>
<th>Max Amb. Temp. (°C)</th>
<th>Enclosure Air In (W/F)</th>
<th>Enclosure Air In (W/K)</th>
<th>Enclosure Air Out (W/F)</th>
<th>Enclosure Air Out (W/K)</th>
<th>Shipping Weight (lb.)</th>
<th>Shipping Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>XR200416012</td>
<td>20.00 x 7.50 x 3.00</td>
<td>508 x 191 x 76</td>
<td>115</td>
<td>50/60</td>
<td>1</td>
<td>0.6</td>
<td>140</td>
<td>60</td>
<td>7</td>
<td>9</td>
<td>16</td>
<td>16</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>XR200426012</td>
<td>20.00 x 7.50 x 3.00</td>
<td>508 x 191 x 76</td>
<td>230</td>
<td>50/60</td>
<td>1</td>
<td>0.3</td>
<td>140</td>
<td>60</td>
<td>4</td>
<td>7</td>
<td>9</td>
<td>16</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>XR29186012</td>
<td>29.50 x 10.24 x 5.92</td>
<td>753 x 260 x 150</td>
<td>115</td>
<td>50/60</td>
<td>1</td>
<td>0.6</td>
<td>140</td>
<td>60</td>
<td>8</td>
<td>14</td>
<td>38</td>
<td>54</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>XR29186012</td>
<td>29.50 x 10.24 x 5.92</td>
<td>753 x 260 x 150</td>
<td>230</td>
<td>50/60</td>
<td>1</td>
<td>0.3</td>
<td>140</td>
<td>60</td>
<td>8</td>
<td>14</td>
<td>38</td>
<td>54</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>XR29186012</td>
<td>29.50 x 10.24 x 5.92</td>
<td>753 x 260 x 150</td>
<td>340</td>
<td>50/60</td>
<td>1</td>
<td>1.0</td>
<td>140</td>
<td>60</td>
<td>18</td>
<td>32</td>
<td>64</td>
<td>91</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>XR29186012</td>
<td>29.50 x 10.24 x 5.92</td>
<td>753 x 260 x 150</td>
<td>500</td>
<td>50/60</td>
<td>1</td>
<td>1.0</td>
<td>140</td>
<td>60</td>
<td>18</td>
<td>32</td>
<td>64</td>
<td>91</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

*The “enclosure air in” efficiency rating is based on airflow entering the heat exchanger from the enclosure. The “enclosure air out” efficiency rating is based on airflow exiting the heat exchanger into the enclosure. All XR exchanger units are rated at 100°F/38°C ambient temperatures with 1500 W internal heat load. Heat exchanger efficiency will decrease as ambient temperature and/or internal heat load decreases.*
Heat Exchangers

Mounting Options

External Top-Mount

Internal Top-Mount

External Vertical-Mount

Internal Vertical-Mount

Note: Detachable airflow plenum can be used when mounting the heat exchanger either inside or outside the enclosure.
Heat Exchangers

XR2918 and XR4724 Heat Exchangers

Front View
Side View
Back View

XR4735 and XR60 Heat Exchangers

Front View
Side View
Back View
CUTOUTS

XR20

XR29-08

XR2918

XR4724

XR4735

XR60

Notes:
1. Cutouts shown are for external mounting only. For internal mounting, except XR2908, rotate cutout 180 degrees. XR2908 internal mount cutout is not shown.
Fans, Blowers, Louvers and Vents Overview

Before choosing a thermal management solution, you need to carefully consider the specifics of your application in addition to the following factors:

- Fan packages and blowers may introduce ambient contaminants like oil mist and dust into the enclosure
- Heat exchangers (this section) cannot cool below the ambient temperature
- Closed-loop air conditioners can cool below ambient temperature and reduce humidity without introducing contaminants
- Simple ventilation devices such as louvers or grilles and filters are appropriate if maintaining a cool, constant temperature is not a critical factor

Once you have determined the proper form of cooling equipment you need, selecting the required cooling capacity is outlined in this section.

Determine the Required Fan/Blower Size (Volume Airflow)

1. Select the product family which best fits your application:
   - Compact Cooling Fans (economical fan with no filter)
   - Cooling Fan Packages (economical fan package with low-density filter)
   - Type 12 Cooling Fan Package
   - Filter Fan Packages (high-tech fan package with high-density filter, for IP54 rating)
   - Blower Package (centrifugal blower package with filter for densely packed enclosures)

2. Determine the internal heat load in Watts.
   \( 1 \text{ Watt} = 3.413 \text{ BTU/Hr.} \)

3. Determine desired temperature difference in degrees \( ^\circ \text{F} \).
   Determine the \( \Delta T \) (\( ^\circ \text{F} \)), the temperature difference between the maximum temperature outside the enclosure \( (T_o) \) and the maximum desired temperature inside the enclosure \( (T_i) \).
   \[ T_o - T_i = \Delta T \]
   for heat exchangers and fans
   \[ \text{NOTE: } 1 \text{ BTU/Hr} = 1.8 \text{ F} \degree \Delta T \]

4. Plot your application using the selection graph to the right.
   - Find Watts (internal heat load) on the vertical scale
   - Draw a horizontal line across to the intersection point with the diagonal line representing your \( \Delta T \)
   - Extend a vertical line down to the horizontal scale to determine your CFM requirement
   - Continue the vertical line to identify applicable fan or blower
   A sample line is shown in red for a 400 Watt heat load and a \( \Delta T \) of 20 \( ^\circ \text{F} \), which indicates a 63 CFM airflow requirement.

5. Make sure the line intersects the bar which includes the exhaust grille kit(s) from the product family chosen in Step 1.
   Remember, actual air flow going through your enclosure may be less depending on how densely packed your enclosure is.
   Fan output (CFM) is reduced by 10-15% when operated at 50 Hz.

Or calculate using the formula:

\[
\text{CFM} = \frac{(3.16 \times \text{Watts})}{\Delta T \,(^\circ \text{F})}
\]

Where:
- Watts = Internal Heat Load in Watts
- \( \Delta T \) = Internal Temperature minus Ambient Temperature in \( ^\circ \text{F} \)
- CFM = Required airflow in ft.\(^3\)/min.

Example:
An internal heat load of 400 Watts requires airflow of about 63 CFM to maintain the enclosure at a \( \Delta T \) of 20 \( ^\circ \text{F} \) above the ambient temperature.

\[
\text{CFM} = \frac{(3.16 \times \text{Watts})}{\Delta T \,(^\circ \text{F})} \approx 63 \text{ CFM}
\]
How to Read Filter Fan Package Catalog Numbers

Filter Fans
SF - 05 - 1 - 6 - 001
  SF = Filter fan
  05 = Approximate size of fan frame (i.e., 05 = 5")
  1 = 115 Volt, or 2 = 230 Volt
  6 = 50/60 Hz
  001 = Standard model

Exhaust Grille Kit
SG - 0500 - 001
  SG = Exhaust grille kit
  0500 = Approximate size of fan frame (i.e., 05 = 5")
  001 = Standard model

Thermal Management Sizing and Selection Software

Designed to assist you in determining the most suitable choices of air conditioners, heat exchangers or fans for your application. Download a free copy of our selection software by visiting our web site: hoffmanonline.com. Click on Thermal Management chapter.

Cooling Fan and Blower Selection

Cooling Fan Packages

<table>
<thead>
<tr>
<th>CFM</th>
<th>Cooling Fan Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>TFP41, TFP42</td>
</tr>
<tr>
<td>140</td>
<td>TFP61, TFP62</td>
</tr>
<tr>
<td>215</td>
<td>TFP101, TFP102</td>
</tr>
</tbody>
</table>

CFM is with one exhaust grille @ 60 Hz.

Filter Fan Packages

<table>
<thead>
<tr>
<th>CFM</th>
<th>Filter Fan Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>SF05</td>
</tr>
<tr>
<td>57</td>
<td>SF09</td>
</tr>
<tr>
<td>126</td>
<td>SF10</td>
</tr>
<tr>
<td>250</td>
<td>SF13</td>
</tr>
</tbody>
</table>

CFM is with one exhaust grille @ 60 Hz.

Blower Package

<table>
<thead>
<tr>
<th>CFM</th>
<th>Blower Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>260</td>
<td>ADB275</td>
</tr>
</tbody>
</table>

CFM is with one exhaust grille @ 60 Hz.
## Compact Cooling Fans

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Diameter in./mm</th>
<th>Square in./mm</th>
<th>Depth in./mm</th>
<th>CFM@60 Hz (M³/Hr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4AXFN</td>
<td>—</td>
<td>4.69</td>
<td>1.52</td>
<td>100 (170)</td>
</tr>
<tr>
<td>A6AXFN</td>
<td>6.72</td>
<td>119</td>
<td>2.00</td>
<td>240 (408)</td>
</tr>
<tr>
<td>A10AXFN</td>
<td>10.00</td>
<td>—</td>
<td>3.50</td>
<td>560 (951)</td>
</tr>
</tbody>
</table>

## Cooling Fan Packages

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Diameter in./mm</th>
<th>Square in./mm</th>
<th>Depth in./mm</th>
<th>CFM@60 Hz (M³/Hr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFP41</td>
<td>6.29</td>
<td>7.37</td>
<td>2.65</td>
<td>55 (95)</td>
</tr>
<tr>
<td>TFP61</td>
<td>7.80</td>
<td>8.87</td>
<td>3.75</td>
<td>140 (238)</td>
</tr>
<tr>
<td>TFP101</td>
<td>11.81</td>
<td>12.99</td>
<td>5.25</td>
<td>215 (370)</td>
</tr>
</tbody>
</table>

CFMs with single exhaust grille installed.

## Filter Fan Packages

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Diameter in./mm</th>
<th>Square in./mm</th>
<th>Depth in./mm</th>
<th>CFM@60 Hz (M³/Hr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF05XXXXXXX</td>
<td>5.83</td>
<td>5.83</td>
<td>2.76</td>
<td>29 (49)</td>
</tr>
<tr>
<td>SF09XXXXXXX</td>
<td>8.03</td>
<td>8.03</td>
<td>3.76</td>
<td>57 (97)</td>
</tr>
<tr>
<td>SF10XXXXXXX</td>
<td>9.84</td>
<td>9.84</td>
<td>5.20</td>
<td>126 (214)</td>
</tr>
<tr>
<td>SF13XXXXXXX</td>
<td>12.72</td>
<td>12.72</td>
<td>6.09</td>
<td>250 (425)</td>
</tr>
</tbody>
</table>

CFMs with single exhaust grille installed.
Thermal Management: Fans, Blowers, Louvers and Vents

**Fans, Blowers, Louvers and Vents Sizing and Selection**

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Diameter in./mm</th>
<th>Square in./mm</th>
<th>Depth in./mm</th>
<th>CFM@60 Hz (M³/Hr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB275</td>
<td>5.75</td>
<td>14.60</td>
<td>7.25</td>
<td>230/275 (135/162)</td>
</tr>
<tr>
<td>146</td>
<td>4.83</td>
<td>1.84</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Three styles of louvers and vents provide passive cooling.
Compact Cooling Fans

Standard Product and Cutout Dimensions

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Nominal Size</th>
<th>Power Connection</th>
<th>Voltage</th>
<th>A in./mm</th>
<th>D in./mm</th>
<th>E in./mm</th>
<th>J in./mm</th>
<th>K in./mm</th>
<th>L in./mm</th>
<th>M in./mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2AXFN24</td>
<td>2</td>
<td>Lead wires</td>
<td>24 VDC</td>
<td>1.97</td>
<td>.98</td>
<td>1.97</td>
<td>.98</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>A3AXFN</td>
<td>3</td>
<td>Lead wires</td>
<td>115 VAC</td>
<td>—</td>
<td>50</td>
<td>25</td>
<td>50</td>
<td>25</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>A3AXFN24</td>
<td>3</td>
<td>Lead wires</td>
<td>24 VDC</td>
<td>—</td>
<td>2.81</td>
<td>1.40</td>
<td>2.81</td>
<td>1.40</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>A4AXFN2</td>
<td>4</td>
<td>Power cord/quiet</td>
<td>115 VAC</td>
<td>6.62</td>
<td>4.12</td>
<td>2.06</td>
<td>4.12</td>
<td>2.06</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>A4AXFN24</td>
<td>4</td>
<td>Lead wires</td>
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<td>A6AXFN</td>
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<td>6.88</td>
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<td>3.44</td>
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</tbody>
</table>

Industry Standards

- UL Component Recognized
- CSA certified

Application

Compact Cooling Fans are ideal for applications where enclosure space is limited and quiet, reliable cooling is required. Engineered for 50,000 hours of continuous operation without lubrication or service.

Installation

Can be installed on any surface of an enclosure. With the addition of accessory fan brackets, Compact Cooling Fans can also be installed in any position inside the enclosure for spot cooling or air circulation.

Features

- Maximum operating temperature is 158 °F (70 °C)
- 4-in. fan is thermally protected and uses permanently lubricated ball bearings
- 6- and 10-in. fans have ball-bearing construction and split-capacitor motors
- Split-capacitor motors are thermally protected to avoid premature failure
- Dynamically balanced impellers molded from polycarbonate material
- One finger guard is furnished (additional finger guards are available)
- All mounting hardware is provided

Fan bracket and additional finger guards must be purchased separately

- 240 and 560 CFM fans have ball bearing construction and split capacitor motors
- Fans have leadwires with ends stripped 1/2-in. (12-mm) or 6-ft. (1.8-m) cord with polarized plug for power connections

Consult your local Hoffman sales office for information on modifications to this product

Finish

Fan housing is black.

Accessories

- Fan Brackets
- Finger Guards
- Temperature Control Switch
- Bulletin: DB5

CFM without exhaust grille

1202 Subject to change without notice PH 763 422 2211 • FX 763 422 2600 • hoffmanonline.com © 2010 Pentair Technical Products
### Technical/Performance Data for Compact Cooling Fans

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Nominal Size</th>
<th>Power Connection</th>
<th>Voltage</th>
<th>Amps @ 50/60 Hz</th>
<th>Watts @ 50/60 Hz</th>
<th>CFM @ 50/60 Hz</th>
<th>Fan Size (in²)</th>
<th>Fan Depth</th>
<th>Max. Motor Operating RPM @ 50/60 Hz</th>
<th>Noise SIL (dB)</th>
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</table>

### Performance Curves:

- **4-in. Fans**
- **6-in. Fans**
- **10-in. Fans**

**Curves represent fan performance only.**
Fan Cords

Used to power Compact Cooling Fans when positive ground of the cabinet case is required. Available with connectors for one or two fans. Five-foot (1.52-meter) cord with grounded three-prong plug. Fits A4AXFNPG, A6AXFNPG, A10AXFNPG, A4AXFNGQ and A10AXFNGQ.

Bulletin: DTHRM

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<tr>
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<tr>
<td>ACORD2</td>
<td>Two connectors</td>
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Fan Filter and Finger Guard Kit

Low-density filter kit for 4-in. (102-mm) and 6-in. (152-mm) fans. Can also be used as vent. Filter is removable and can be cleaned and reused. Mounting hardware included.

Bulletin: DTHRM, DWS1

<table>
<thead>
<tr>
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<td>Fan Filter and Finger Guard Kit</td>
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<td>AFLTR6LD</td>
<td>Fan Filter and Finger Guard Kit</td>
<td>6-in. fans</td>
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**Fan Brackets**

Fan Brackets are designed to provide easy mounting of Hoffman cooling fans on enclosure panels. Brackets can be used for general air circulation or to direct air at problem areas. All sizes are .100-in. aluminum. Package quantity of 1 bracket. Fans must be ordered separately.

**Bulletin: D85**

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<tr>
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<th>$A \times B \times C$ in./mm</th>
<th>Used with Fan Catalog Number</th>
<th>$D$ in./mm</th>
<th>$E$ in./mm</th>
<th>$F$ in./mm</th>
<th>$G$ in./mm</th>
<th>$H$ in./mm</th>
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<td>.50</td>
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<td>.62</td>
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<td>—</td>
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<td>1.00</td>
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<td></td>
<td>152 x 127 x 38</td>
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<td>89</td>
<td>—</td>
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<td>.38</td>
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<td>102</td>
<td>102</td>
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<td>16</td>
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**Finger Guards**

One finger guard is included with each Compact Cooling Fan and Cooling Fan Package. Additional Finger Guards can be mounted on either side of the fan for maximum safety. All guards are chrome-plated and meet UL 507 .25-in. plug gauge test.

**Bulletin: D85**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Use on Compact Cooling Fan Catalog Numbers</th>
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<tbody>
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<td>AGARD2</td>
<td>A2AXFN24</td>
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<tr>
<td>AGARD3</td>
<td>A3AXFN, A3AXFN24</td>
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<td>AGARD4</td>
<td>A4AXFNPG, A4AXFNGQ, A4AXFN, A4AXFN2</td>
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<td>AGARD6</td>
<td>A6AXFNPG, A6AXFNGQ, A6AXFN, A6AXFN2</td>
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<td>AGARD10</td>
<td>A10AXFNPG, A10AXFNGQ, A10AXFN, A10AXFN2</td>
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Cooling Fan and Exhaust Packages

**Industry Standards**

<table>
<thead>
<tr>
<th>UL 508A Component Recognized, File Number E61997</th>
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<tbody>
<tr>
<td>TFP# Models: Type 1</td>
</tr>
<tr>
<td>TFP# UL 12 Models: Type 12</td>
</tr>
<tr>
<td>CSA certified (fan only)</td>
</tr>
<tr>
<td>CE</td>
</tr>
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</table>

**Application**

Cooling Fan and Exhaust Packages are designed for limited-space enclosures that require a reliable and filtered airflow. Where positive airflow is not required, Exhaust Packages can be used on both the inlet and outlet. Engineered for 50,000 hours of continuous operation without lubrication or service. For both Type 1 and Type 12 systems a monthly maintenance schedule is recommended to ensure optimal cooling performance.

**Features**

- Cooling Fan Package includes fan, air filter, composite air plenum, finger guard and grille
- Exhaust Package includes air filter, filter retainer with integral finger guard and grille
- EMC Upgrade Kit includes a grille standoff collar and a special EMC shielding grille
- Washable foam (Type 1) or disposable (Type 12) filter in fan. Optional washable aluminum air filter is available for Type 1 applications.
- Dynamically-balanced fan impellers molded from polycarbonate material
- 4-in. fan is thermally protected and uses permanently-lubricated ball bearings
- 6- and 10-in. fans have ball bearing construction and split-capacitor motors that are thermally protected to avoid premature failure
- Fans have leadwires for power connection with ends stripped 1/2 in. (12 mm)
- All mounting hardware and installation instructions are furnished

**Filters**

- Standard Type 1 air filters are washable foam.
- Type 12 air filters are not washable.

**Installation**

Fan and exhaust packages can be installed on any surface of an enclosure. They are most effective when the fan assembly is located on a lower panel of the enclosure and the exhaust grille is positioned near the top of the opposite side. This installation assists heat transfer by causing slightly more turbulence and also prolongs the working life of the fan since it is located in the path of the cooler air entering the enclosure.

The height and width of the cooling fans and exhaust grilles can be rotated 90 degrees for mounting on narrow enclosures. Allow adequate clearance for servicing the fan when equipment is installed inside the enclosure and for replacing filters on both the fan and the exhaust. Cutout dimensions for both the fan and the exhaust are shown in the order table. Order the fan and exhaust packages separately.

**Finish**

- Stainless steel grilles have brushed finish.
- ABS composite grille is black.

**Accessories**

- Aluminum Type 1 and Hi-Density Type 12 Filters
- EMC Upgrade Kit
- Grille Options:
  - Stainless Steel
  - Black ABS Plastic
- Bulletin: DB5
Thermal Management: Fans, Blowers, Louvers and Vents

Cooling Fan and Exhaust Packages and Accessories

<table>
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<th>F in./mm</th>
<th>H in./mm</th>
<th>T in./mm</th>
<th>W in./mm</th>
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<td>Stainless Steel Grille UL 508 Type 1</td>
<td>TEP10SS</td>
<td>10</td>
<td>0.55</td>
<td>11.16</td>
<td>2.34</td>
<td>6.88</td>
<td>11.89</td>
</tr>
<tr>
<td>TFP101UL12</td>
<td>11.81 x 12.99 x 5.25</td>
<td>Composite Grille UL 508 Type 12</td>
<td>TEP10UL12</td>
<td>10</td>
<td>0.55</td>
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<td>2.34</td>
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<td>11.89</td>
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<tr>
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<td>Composite Grille UL 508 Type 1</td>
<td>TEP10</td>
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<td>11.16</td>
<td>2.34</td>
<td>6.88</td>
<td>11.89</td>
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<tr>
<td>TFP102SS</td>
<td>11.81 x 12.99 x 5.25</td>
<td>Stainless Steel Grille UL 508 Type 1</td>
<td>TEP10SS</td>
<td>10</td>
<td>0.55</td>
<td>11.16</td>
<td>2.34</td>
<td>6.88</td>
<td>11.89</td>
</tr>
</tbody>
</table>

An intake grille and filter are included with each Cooling Fan Package. Order at least one Exhaust Package separately for each installation.

Order optional Exhaust Grilles as a separate accessory.

Fan and Exhaust Grille

(Fan Mounted to Back of Plenum)

4" Fan

6" and 10" Fan

(Box Style Plenum)

Fan and Exhaust Package

Mounting Cutout

Subject to change without notice

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## Technical Performance Data for Cooling Fan Packages

<table>
<thead>
<tr>
<th>Composite Grille UL Type 1</th>
<th>Stainless Grille UL Type 1</th>
<th>Type 1 CFM Watts @ 50/60 Hz Voltage</th>
<th>Max. Operating Temperature (°F)</th>
<th>Type 12 CFM Watts @ 50/60 Hz Voltage</th>
<th>Max. Operating Temperature (°C)</th>
<th>Noise SIL (dB) @ 50/60 Hz</th>
<th>Weight (lb.)</th>
<th>Weight (kg)</th>
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<tbody>
<tr>
<td>TFP424</td>
<td>—</td>
<td>55</td>
<td>8.4</td>
<td>24 VDC</td>
<td>70</td>
<td>158</td>
<td>70</td>
<td>65</td>
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<tr>
<td>TFP41</td>
<td>TFP41SS</td>
<td>46/55</td>
<td>17/15</td>
<td>115 VAC</td>
<td>70</td>
<td>37/41</td>
<td>70</td>
<td>37/41</td>
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<tr>
<td>TFP42</td>
<td>TFP42SS</td>
<td>46/55</td>
<td>16/14</td>
<td>230 VAC</td>
<td>70</td>
<td>37/41</td>
<td>70</td>
<td>37/41</td>
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<tr>
<td>TFP62</td>
<td>—</td>
<td>140</td>
<td>10</td>
<td>480 VDC</td>
<td>70</td>
<td>37/41</td>
<td>70</td>
<td>37/41</td>
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<tr>
<td>TFP101</td>
<td>TFP101SS</td>
<td>180/215</td>
<td>63/75</td>
<td>480 VDC</td>
<td>70</td>
<td>37/41</td>
<td>70</td>
<td>37/41</td>
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<tr>
<td>TFP102</td>
<td>TFP102SS</td>
<td>180/215</td>
<td>63/75</td>
<td>480 VDC</td>
<td>70</td>
<td>37/41</td>
<td>70</td>
<td>37/41</td>
</tr>
</tbody>
</table>

CFM with single exhaust grille installed.

---

### Performance Curve for a 4" Cooling Fan Package @ 60 Hz

![Graph of Performance Curve for a 4" Cooling Fan Package @ 60 Hz](image)

- 4 in. Cooling Fan Package
- 6 in. Exhaust Package
- Two 4 in. Exhaust Packages
- 4 in. Type 12 Cooling Fan Package

### Performance Curve for a 6" Cooling Fan Package @ 60 Hz

![Graph of Performance Curve for a 6" Cooling Fan Package @ 60 Hz](image)

- 6 in. Cooling Fan Package
- 6 in. Exhaust Package
- Two 6 in. Exhaust Packages
- 6 in. Type 12 Cooling Fan Package

### Performance Curve for a 10" Cooling Fan Package @ 60 Hz

![Graph of Performance Curve for a 10" Cooling Fan Package @ 60 Hz](image)

- 10 in. Cooling Fan Package
- 10 in. Exhaust Package
- Two 10 in. Exhaust Packages
- 10 in. Type 12 Cooling Fan Package

---

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Exhaust Grilles

Optional Grilles and Replacement Filters

Optional grilles offer the choice of stainless steel or black ABS plastic. These grilles replace the standard RAL 7035 gray composite or stainless steel grilles on both fan and exhaust packages. Standard replacement filters are washable foam (Type 1) or disposable (Type 12). To maintain UL Type 12 rating on the enclosure, UL Type 12 filters must be used on the fan package inlet. Washable aluminum filters are also available. Aluminum filters are compatible with Type 1 systems only. Type 12 air filters are not washable.

Bulletin: D85

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>Fits Fan and Exhaust Nominal Size</th>
<th>Fits Fan and Exhaust Grill Size (in.)</th>
<th>Fits Fan and Exhaust Grill Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG4SS</td>
<td>Brushed stainless steel grille</td>
<td>4</td>
<td>6.29 x 7.31 x .81</td>
<td>(160 x 186 x 21)</td>
</tr>
<tr>
<td>TG4B</td>
<td>Black ABS plastic grille</td>
<td>4</td>
<td>6.29 x 7.37 x .81</td>
<td>(160 x 187 x 21)</td>
</tr>
<tr>
<td>AFLTR4</td>
<td>Type 1 filter replacement (5/package)</td>
<td>4</td>
<td>—</td>
<td>—</td>
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<tr>
<td>AFLTR4AL</td>
<td>Aluminum filter replacement (5/package)</td>
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<td>—</td>
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<tr>
<td>YFLT4UL12</td>
<td>Type 12 filter replacement (5/package)</td>
<td>4</td>
<td>7.80 x 8.81 x .75</td>
<td>(198 x 224 x 19)</td>
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<tr>
<td>TG6SS</td>
<td>Brushed stainless steel grille</td>
<td>6</td>
<td>7.80 x 8.87 x .49</td>
<td>(198 x 225 x 12)</td>
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<tr>
<td>TG6B</td>
<td>Black ABS plastic grille</td>
<td>6</td>
<td>—</td>
<td>—</td>
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<tr>
<td>AFLTR6</td>
<td>Foam filter replacement (5/package)</td>
<td>6</td>
<td>—</td>
<td>—</td>
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<tr>
<td>AFLTR6AL</td>
<td>Aluminum filter replacement (5/package)</td>
<td>6</td>
<td>—</td>
<td>—</td>
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<td>YFLT6UL12</td>
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<td>6</td>
<td>11.81 x 12.12 x .75</td>
<td>(300 x 310 x 19)</td>
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<tr>
<td>TG10SS</td>
<td>Brushed stainless steel grille</td>
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<td>11.81 x 12.19 x .75</td>
<td>(300 x 310 x 19)</td>
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<tr>
<td>TG10B</td>
<td>Black ABS plastic grille</td>
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<td>11.81 x 12.19 x .75</td>
<td>(300 x 310 x 19)</td>
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<tr>
<td>AFLTR10</td>
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<td>10</td>
<td>—</td>
<td>—</td>
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<tr>
<td>AFLTR10AL</td>
<td>Aluminum filter replacement (5/package)</td>
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<td>—</td>
<td>—</td>
</tr>
<tr>
<td>YFLT10UL12</td>
<td>UL 12 filter replacement (5/package)</td>
<td>10</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Replacement filter for Type 12 fan package only (models TFF__UL12). For Type 12 exhaust package use replacement filter AFLTRX.

Filters fit all fan and exhaust packages according to their size.

EMC Fan/Grille Upgrade Kit

With the addition of this kit, the cooling fan and exhaust packages are upgraded to provide EMC (electromagnetic compatibility) protection. Consult Hoffman for shielding effectiveness (dB attenuation vs. frequency).

Separate kits must be installed on both the inlet and outlet. Cooling fan and exhaust package must be ordered separately. EMC upgrade kit will not work with stainless steel grille option.

Bulletin: D85

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Fits Cooling Fan Package</th>
<th>Fits Exhaust Grill</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4EEMC</td>
<td>TFP41/TFP42</td>
<td>TEP4</td>
</tr>
<tr>
<td>T6EEMC</td>
<td>TFP61/TFP62</td>
<td>TEP6</td>
</tr>
<tr>
<td>T10EEMC</td>
<td>TFP101/TFP102</td>
<td>TEP10</td>
</tr>
</tbody>
</table>
Filter Fan Packages

Application
Ideal for clean environments, Filter Fan Packages use densely filtered, ambient air to pressurize enclosures so air cannot be drawn-in through poorly sealed doors, panels and wireway. This protects electronics from both heat and condensation. Filter Fan Package includes the fan with grille, filter and filter sealing gasket. Exhaust Grille Kits are offered for each Filter Fan Package and must be ordered separately. Filter sealing gaskets are supplied with both Filter Fan Package and Exhaust Grille Kit to achieve an IP54 rating.

Features
• Simple, snap-in mounting
• Slim fan grille protrudes only .25 in. or less from enclosure mount
• Fan is completely installed inside plastic housing
• Removable grille cover
• Mounting hardware, full-size mounting template, drawings and installation instructions furnished

Specifications
• Housings are made of heat resistant, self-extinguishing ABS; color RAL 7042 gray (grille only)

Bulletin: MCL, MCLY

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>AsBxC in./mm</th>
<th>Replacement</th>
<th>Volt. Hz</th>
<th>Full Load Amps</th>
<th>Service Temp. Low (°F)</th>
<th>Service Temp. Low (°C)</th>
<th>Service Temp. High (°F)</th>
<th>Service Temp. High (°C)</th>
<th>Noise (dB) (A)</th>
<th>Shipping Weight (lb. / kg)</th>
<th>Exhaust Grille Kit</th>
<th>Air Flow, Free Air, (CFM)</th>
<th>Air Flow, With 1 Exhaust Grill Kit, (CFM)</th>
<th>Air Flow, With 2 Exhaust Grill Kits (CFM)</th>
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<tbody>
<tr>
<td>SF0516002</td>
<td>5.83 x 5.83 x 2.76</td>
<td>10100060</td>
<td>115 50/60</td>
<td>.22 2650/3100</td>
<td>14 -10</td>
<td>131 55</td>
<td>42</td>
<td>1.87 / .85</td>
<td>5G0500002</td>
<td>39 29</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF0526002</td>
<td>5.83 x 5.83 x 2.76</td>
<td>10100060</td>
<td>230 50/60</td>
<td>.22 2650/3100</td>
<td>14 -10</td>
<td>131 55</td>
<td>42</td>
<td>1.87 / .85</td>
<td>5G0500002</td>
<td>39 29</td>
<td></td>
<td></td>
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<tr>
<td>SF0916002</td>
<td>8.03 x 8.03 x 3.78</td>
<td>204 x 204 x 96</td>
<td>10100061</td>
<td>115 50/60</td>
<td>.22 2650/3100</td>
<td>14 -10</td>
<td>131 55</td>
<td>51</td>
<td>2.56 / 1.16</td>
<td>5G0900002</td>
<td>75 57</td>
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<td></td>
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<tr>
<td>SF0926002</td>
<td>8.03 x 8.03 x 3.78</td>
<td>204 x 204 x 96</td>
<td>10100061</td>
<td>115 50/60</td>
<td>.22 2650/3100</td>
<td>14 -10</td>
<td>131 55</td>
<td>51</td>
<td>2.56 / 1.16</td>
<td>5G0900002</td>
<td>75 57</td>
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<tr>
<td>SF1016002</td>
<td>9.84 x 9.84 x 5.20</td>
<td>250 x 250 x 132</td>
<td>10100062</td>
<td>115 50/60</td>
<td>.33 2760/3030</td>
<td>14 -10</td>
<td>131 55</td>
<td>52</td>
<td>4.39 / 1.99</td>
<td>5G1000002</td>
<td>162 126</td>
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<tr>
<td>SF1026002</td>
<td>9.84 x 9.84 x 5.20</td>
<td>250 x 250 x 132</td>
<td>10100062</td>
<td>230 50/60</td>
<td>.30 2760/3030</td>
<td>14 -10</td>
<td>131 55</td>
<td>52</td>
<td>4.39 / 1.99</td>
<td>5G1000002</td>
<td>162 126</td>
<td></td>
<td></td>
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<tr>
<td>SF1316002</td>
<td>12.72 x 12.72 x 6.09</td>
<td>323 x 323 x 155</td>
<td>10100063</td>
<td>115 50/60</td>
<td>.89 2550/2800</td>
<td>14 -10</td>
<td>131 55</td>
<td>61</td>
<td>8.38 / 3.80</td>
<td>5G1300002</td>
<td>376 250</td>
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<tr>
<td>SF1326002</td>
<td>12.72 x 12.72 x 6.09</td>
<td>323 x 323 x 155</td>
<td>10100063</td>
<td>230 50/60</td>
<td>.95 2550/2800</td>
<td>14 -10</td>
<td>131 55</td>
<td>61</td>
<td>8.38 / 3.80</td>
<td>5G1300002</td>
<td>376 250</td>
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</tr>
</tbody>
</table>

Order exhaust grille kit separately.
Actual airflow may vary depending on system impedance.

Series SF-05 Filter Fan Package

<table>
<thead>
<tr>
<th>REAR VIEW</th>
<th>SIDE VIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.83 SQ</td>
<td>4.88 SQ</td>
</tr>
<tr>
<td>148 mm</td>
<td>124 mm</td>
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<tr>
<td>1.71 mm</td>
<td>22 mm</td>
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<tr>
<td>4.3 mm</td>
<td>5 mm</td>
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<tr>
<td>21 mm</td>
<td>8.3 mm</td>
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<tr>
<td>2.54 mm</td>
<td>125 mm</td>
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<td>64 mm</td>
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<tr>
<td>4.69 SQ</td>
<td>4.88 SQ</td>
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</table>

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Filter Fan Packages

Replacement Fan Sealing Gasket and Filters

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>AxBxC in./mm</th>
<th>Replacement Filter</th>
<th>To Fit Fan Packages and Exhaust Grille Kits</th>
</tr>
</thead>
<tbody>
<tr>
<td>G050000</td>
<td>0.00</td>
<td>1000060</td>
<td>SF0516002, SF0526002, SG0500002</td>
</tr>
<tr>
<td>G090000</td>
<td>0.00</td>
<td>1000061</td>
<td>SF0916002, SF0926002, SG0900002</td>
</tr>
<tr>
<td>G100000</td>
<td>0.00</td>
<td>1000062</td>
<td>SF1016002, SF1026002, SG1000002</td>
</tr>
<tr>
<td>G130000</td>
<td>0.00</td>
<td>1000063</td>
<td>SF1316002, SF1326002, SG1300002</td>
</tr>
</tbody>
</table>

Exhaust Grille Kits

Purchase Exhaust Grille Kits separately.

Bulletin: MCLY
Outdoor Filter Fan and Exhaust Package

Features
- Ball bearing axial fan, service life minimum 50,000 hours at 77 F (25 C) and 65 percent RH
- Airflow 11.8 CFM (20 cubic meters/hour) free blowing
- High-impact plastic is highly weatherproof and resistant to UV light
- Removable F5 filter
- Lockable door in hood
- Two-sided tape provided
- Filter hood permanently fixed to enclosure from inside
- 2 lead wires, 3.94-in. (100-mm) long, with pressure clamps, 14 gauge max. (2.5 mm)
- Synthetic filter material, temperature resistant to 212 F (100 C), self-extinguishing class F1, moisture resistant to 100 percent RH
- Filter mat: Fine grade F5 to DIN EN779 filtering degree: 98 percent of particles larger than 10 µm (10 microns)

Specifications
- Aluminum fan body, plastic impeller

Finish
Light gray plastic, UL94H-B
Bulletin: DB5

Application
This fan package meets basic requirements for outdoor or indoor applications that require warm air dissipation.

Industry Standards
CE
CURus File No. E234324
NEMA Type 3R
IEC/EN60529, IP55

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Enclosure Cutout in./mm</th>
<th>Description</th>
<th>External Mounting Depth in./mm</th>
<th>Internal Mounting Depth in./mm</th>
<th>Voltage</th>
<th>Full Load Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOFF118</td>
<td>4.92 x 4.92</td>
<td>Filter Fan</td>
<td>2.56</td>
<td>2.44</td>
<td>120 VAC, 60 Hz</td>
<td>0.3</td>
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<tr>
<td>AOFF118</td>
<td>125 x 125 (+ .4)</td>
<td></td>
<td>65</td>
<td>62</td>
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<tr>
<td>AOFF118</td>
<td>4.92 x 4.92</td>
<td>Exhaust Filter</td>
<td>2.56</td>
<td>0.71</td>
<td>—</td>
<td>—</td>
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<tr>
<td>AOFF118</td>
<td>125 x 125 (+ .4)</td>
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<td>65</td>
<td>18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AOFG118 does not include a fan.

Replacement Filter

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Filter Mat 122 x 122 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOFILTER</td>
<td>F5 (5 per package)</td>
</tr>
</tbody>
</table>
Filter Fan Packages

FILTER FAN

EXHAUST FILTER

MOUNTING FRAME

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Blower Fan Package

Industry Standards
UL Component Recognized; File No. E61997
EIA RS-310-D
CSA certified
(blower motor only)

Application
For enclosure or 19-in. rack applications, the Blower Fan Package provides the maximum amount of cooling air in the least amount of space by utilizing 115 volt AC, 60/50 hertz, single-phase input power. Engineered for 20,000 hours of continuous operation when properly powered.

Features
- Intake grille is easily removed with two captive thumbnuts
- Washable aluminum filter
- Single phase motor powers the statically balanced blower
- Motor is thermally protected and cooled by incoming forced air
- Direct drive induction motor contains permanently lubricated ball bearings
- Lubricant protects from -20 F to 298 F (-29 C to 148 C)
- Rotating components are suspended on neoprene shock-mounts
- Three-conductor power cord (five feet long)

Installation
Can be mounted as shown below or installed on standard 19-in. (483-mm) racks. The unit is self-supporting with 16 gauge steel flanges notched per EIA RS-310-D. Two openings are required in the enclosure for air to flow in and out. Refer to drawings for size and location of openings. An exhaust grille and filter package (catalog number AEXGR275) is required and must be ordered separately. Consult your local Hoffman sales office for information on modifications to this product.

Specifications
- 16 gauge steel housing

Finish
Blower housing is black enamel.
Grille is brushed stainless steel.

Accessories
Exhaust Grille and Filter, page 1215
Filter Adhesive, page 1217
Temperature Control Switch, page 1231
Bulletin: DB5

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>AxBxC in./mm</th>
<th>Free Air (CFM)</th>
<th>Watts</th>
<th>Voltage</th>
<th>Hz</th>
<th>Amps</th>
<th>Motor RPM</th>
<th>Noise SIL (dB)</th>
<th>Weight (lb.)</th>
<th>Weight (kg)</th>
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</thead>
<tbody>
<tr>
<td>ADB275</td>
<td>5.75 x 19.00 x 7.25</td>
<td>230 / 275</td>
<td>84</td>
<td>115</td>
<td>50 / 60</td>
<td>1.2</td>
<td>2580 / 3100</td>
<td>56</td>
<td>15.00</td>
<td>7.00</td>
</tr>
</tbody>
</table>

Mounting Cutout Dimensions

Blower Cutout

Exhaust Grille Cutout

Performance Curve For A-0B275 BLOWER
Exhaust Grille and Filter for Blower Package

Located at air discharge side of an enclosure using Blower Package ADB275. Polished stainless steel grille is 65 percent open and offers low resistance to airflow. Expanded aluminum filter (included with each grille) is easily removed for cleaning from outside the enclosure. Mounting hardware is furnished.

**Catalog Number**

<table>
<thead>
<tr>
<th>Dimensions A x B in./mm</th>
<th>Filter Size in./mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEXGR275</td>
<td>5.75 x 19.00</td>
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<tr>
<td></td>
<td>4.98 x 16.56</td>
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<td></td>
<td>146 x 483</td>
</tr>
<tr>
<td></td>
<td>126 x 421</td>
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</table>

**Replacement Filter**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFLTR275AL</td>
<td>Aluminum Filter Replacement</td>
<td>5/pkg.</td>
</tr>
</tbody>
</table>
Louvers and Vents

Designed to provide ventilation in enclosures where excessive internal heat or excessive moisture is a problem. Although louvers cannot keep all moisture out of an enclosure, gasketing or sealing the perimeter of the louver plate reduces problems associated with moisture intrusion. These kits may be easily installed in the field by making a cutout of the proper size and attaching the louver plate in place. Louver plates are made from 14 gauge steel with an ANSI 61 gray polyester powder finish over phosphatized surfaces or 316 stainless steel. Hardware is furnished for mounting. Custom sizes, materials, finishes, etc., can be provided on special order.

Bulletin: D85

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Dimensions A x B (in.)</th>
<th>Dimensions A x B (mm)</th>
<th>Number of Louvers</th>
<th>Depth D (in.)</th>
<th>Depth D (mm)</th>
<th>Length L (in.)</th>
<th>Length L (mm)</th>
<th>Opening Area (in²)</th>
<th>Opening Area (cm²)</th>
<th>Cutout Size, F (in.)</th>
<th>Cutout Size, F (mm)</th>
<th>Cutout Size, G (in.)</th>
<th>Cutout Size, G (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVK32</td>
<td>3.25 x 3.25</td>
<td>83 x 83</td>
<td>3</td>
<td>0.19</td>
<td>5</td>
<td>2.00</td>
<td>51</td>
<td>0.86</td>
<td>3.54</td>
<td>2.00</td>
<td>51</td>
<td>3.75</td>
<td>94</td>
</tr>
<tr>
<td>AVK33SS6</td>
<td>3.25 x 3.25</td>
<td>83 x 83</td>
<td>3</td>
<td>0.19</td>
<td>5</td>
<td>2.00</td>
<td>51</td>
<td>0.86</td>
<td>3.54</td>
<td>2.00</td>
<td>51</td>
<td>3.75</td>
<td>94</td>
</tr>
<tr>
<td>AVK34</td>
<td>3.84 x 3.62</td>
<td>98 x 94</td>
<td>3</td>
<td>0.25</td>
<td>6</td>
<td>3.00</td>
<td>76</td>
<td>1.32</td>
<td>8.52</td>
<td>2.62</td>
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<td>76</td>
<td>1.32</td>
<td>8.52</td>
<td>2.62</td>
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</tr>
<tr>
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<td>11.35</td>
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<td>121 x 114</td>
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<td>0.25</td>
<td>6</td>
<td>3.00</td>
<td>76</td>
<td>1.76</td>
<td>11.35</td>
<td>3.50</td>
<td>89</td>
<td>3.00</td>
<td>76</td>
</tr>
<tr>
<td>AVK44</td>
<td>5.62 x 5.50</td>
<td>143 x 140</td>
<td>4</td>
<td>0.25</td>
<td>6</td>
<td>4.00</td>
<td>102</td>
<td>1.88</td>
<td>12.10</td>
<td>3.25</td>
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<tr>
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<td>0.25</td>
<td>6</td>
<td>4.00</td>
<td>102</td>
<td>1.88</td>
<td>12.10</td>
<td>3.25</td>
<td>83</td>
<td>4.00</td>
<td>102</td>
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<tr>
<td>AVK45</td>
<td>5.62 x 7.50</td>
<td>143 x 191</td>
<td>4</td>
<td>0.31</td>
<td>8</td>
<td>6.00</td>
<td>152</td>
<td>5.21</td>
<td>33.61</td>
<td>4.38</td>
<td>111</td>
<td>6.00</td>
<td>152</td>
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<tr>
<td>AVK46SS6</td>
<td>5.62 x 7.50</td>
<td>143 x 191</td>
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<td>8</td>
<td>6.00</td>
<td>152</td>
<td>5.21</td>
<td>33.61</td>
<td>4.38</td>
<td>111</td>
<td>6.00</td>
<td>152</td>
</tr>
<tr>
<td>AVK66</td>
<td>7.88 x 7.50</td>
<td>200 x 191</td>
<td>6</td>
<td>0.31</td>
<td>8</td>
<td>6.00</td>
<td>152</td>
<td>7.82</td>
<td>50.45</td>
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<td>168</td>
<td>6.00</td>
<td>152</td>
</tr>
<tr>
<td>AVK66SS6</td>
<td>7.88 x 7.50</td>
<td>200 x 191</td>
<td>6</td>
<td>0.31</td>
<td>8</td>
<td>6.00</td>
<td>152</td>
<td>7.82</td>
<td>50.45</td>
<td>6.62</td>
<td>168</td>
<td>6.00</td>
<td>152</td>
</tr>
<tr>
<td>AVK88</td>
<td>10.56 x 9.50</td>
<td>268 x 210</td>
<td>8</td>
<td>0.31</td>
<td>8</td>
<td>8.00</td>
<td>203</td>
<td>12.11</td>
<td>78.13</td>
<td>6.94</td>
<td>176</td>
<td>8.00</td>
<td>203</td>
</tr>
<tr>
<td>AVK88SS6</td>
<td>10.56 x 9.50</td>
<td>268 x 210</td>
<td>8</td>
<td>0.31</td>
<td>8</td>
<td>8.00</td>
<td>203</td>
<td>12.11</td>
<td>78.13</td>
<td>6.94</td>
<td>176</td>
<td>8.00</td>
<td>203</td>
</tr>
<tr>
<td>AVK89</td>
<td>15.31 x 9.50</td>
<td>389 x 241</td>
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<td>8</td>
<td>12.00</td>
<td>303</td>
<td>24.22</td>
<td>156.26</td>
<td>14.06</td>
<td>357</td>
<td>8.00</td>
<td>203</td>
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<tr>
<td>AVK89SS6</td>
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<td>389 x 241</td>
<td>12</td>
<td>0.31</td>
<td>8</td>
<td>12.00</td>
<td>303</td>
<td>24.22</td>
<td>156.26</td>
<td>14.06</td>
<td>357</td>
<td>8.00</td>
<td>203</td>
</tr>
</tbody>
</table>

5S6 in catalog number indicates louver plate is Type 316L stainless steel.

Filters for Louver Plate Kits

Filter media
Filter media is composed of layers of slilt and expanded aluminum providing hundreds of adhesive coated baffle surfaces for trapping impurities. Impurities are held throughout the depth of the filter. Washing with warm water will keep the filter clean. To achieve best results, Hoffman Filter Adhesive is recommended.

Bulletin: D85

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Dimensions A x B (in.)</th>
<th>Dimensions A x B (mm)</th>
<th>Use with Steel Louver</th>
<th>Use with Stainless Steel Louver</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFL23</td>
<td>3.25 x 3.25</td>
<td>83 x 83</td>
<td>AVK33</td>
<td>AVK33SS6</td>
</tr>
<tr>
<td>AFL234</td>
<td>3.84 x 3.62</td>
<td>98 x 94</td>
<td>AVK34</td>
<td>AVK34SS6</td>
</tr>
<tr>
<td>AFL236</td>
<td>3.84 x 4.50</td>
<td>98 x 114</td>
<td>AVK36</td>
<td>AVK36SS6</td>
</tr>
<tr>
<td>AFL240</td>
<td>4.95 x 4.25</td>
<td>126 x 108</td>
<td>AVK44</td>
<td>AVK44SS6</td>
</tr>
<tr>
<td>AFL264</td>
<td>4.45 x 6.25</td>
<td>113 x 159</td>
<td>AVK64</td>
<td>AVK64SS6</td>
</tr>
<tr>
<td>AFL266</td>
<td>6.72 x 6.25</td>
<td>171 x 159</td>
<td>AVK66</td>
<td>AVK66SS6</td>
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<tr>
<td>AFL340</td>
<td>4.6 x 8.25</td>
<td>119 x 210</td>
<td>AVK84</td>
<td>AVK84SS6</td>
</tr>
<tr>
<td>AFL366</td>
<td>7.02 x 8.25</td>
<td>178 x 210</td>
<td>AVK86</td>
<td>AVK86SS6</td>
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<tr>
<td>AFL388</td>
<td>9.39 x 8.25</td>
<td>239 x 210</td>
<td>AVK88</td>
<td>AVK88SS6</td>
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<tr>
<td>AFL312</td>
<td>14.34 x 8.25</td>
<td>359 x 210</td>
<td>AVK812</td>
<td>AVK812SS6</td>
</tr>
</tbody>
</table>

Design
Designed for use with Louver Plate Kit. Mounting holes on filter bracket align with louver mounting holes. Hardware supplied with louvers also secures filter brackets in place. Aluminum air filters provide good arrestment of airborne dust and dirt.
Vent Kit

Includes a stylized louvered cover and filter package. Use as an air inlet when a cooling fan is mounted in an enclosure or use two vent kits to allow passive airflow. Mounting hardware included. Vent Kit requires cutout shown in diagram. Available in gray (RAL 7042) or black.

Bulletin: D85, P20

Ventilators

Designed to fit most metallic and non-metallic enclosures. Proper installation will provide rainproof ventilation but will not meet Type 4 or 12 requirements. Kit includes a ventilator made of fire-retardant thermoplastic material, mounting hardware, and instructions.

Supplied screws are 13-mm (.515-inch) long. Some applications may require longer screws.

Bulletin: D85

Filter Adhesive

Designed to maximize the efficiency of all expanded aluminum air filters. Use of Filter Adhesive doubles the dust-retention capacity of the filter. Adhesive contains a low-viscosity water-soluble oil which absorbs dirt particles trapped on the surface of the filter. Through the circulation of the oil, a renewed impurity-absorbing surface is constantly established. Washing with water will remove dust, dirt and other impurities. Once the filter is dry, re-coat with adhesive.

Bulletin: D85

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANMV6</td>
<td>Large nonmetallic vent</td>
</tr>
<tr>
<td>ANMV3</td>
<td>Small nonmetallic vent</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFLTAD</td>
<td>Spray Adhesive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XPV32</td>
<td>H x W x D (in.) 11.81 x 7.88 x 1.03</td>
</tr>
<tr>
<td></td>
<td>H x W x D (mm) 300 x 200 x 26</td>
</tr>
<tr>
<td></td>
<td>Color        Gray</td>
</tr>
<tr>
<td>PPV128</td>
<td>H x W x D (in.) 11.81 x 7.88 x 1.03</td>
</tr>
<tr>
<td></td>
<td>H x W x D (mm) 300 x 200 x 26</td>
</tr>
<tr>
<td></td>
<td>Color        Black</td>
</tr>
</tbody>
</table>
Filter and Fan Airflow Monitor

Features
- Service life is greater than 100,000 cycles
- Bi-directional switch activates an electrical contact if the airflow of the fan falls below 8.2 ft./sec.
- Monitors airflow to 164 ft./sec. (50 m/s) max.
- Reed/magnet contact
- Switching threshold of airflow speed > 8.2 ft./sec. (2.5 m/s)
- Maximum switching:
  - capacity = 10 W (resistive load)
  - voltage = NC: DC 240 V; NO: DC 60 V
  - current = NC: DC 500 mA; NO: DC 170 mA
- Hysteresis 3.3 ft./sec. (1 m/s) fixed
- Contact resistance, including wire, 370 mO
- 2 x single strand AWG 26 connection, 19.69-in. (500-mm) long: 0.20-in. (5-mm) tip of stranded wire stripped/tinned
- Mount with attachment clamp and/or clip or integrated in protective grille (see drawing)
- Mount airflow monitor opening perpendicular to airflow in dust-free and contamination-free environment
- AAFMNCN can be attached directly to cooling and exhaust package grilles
- AAFM120NO can be attached to any 4-in. standard fan

Finish
Black plastic, UL94H-B
Bulletin: D85

Industry Standards
CE
cURus; File No. E250507
IEC EN60529, IP20

Application
The simple, reliable mechanical operation of the Filter and Fan Airflow Monitor makes it a viable alternative to electronic monitoring systems.

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>AxBxC in.</th>
<th>AxBxC mm</th>
<th>Description</th>
<th>Operating/Storage Temperature (°F)</th>
<th>Operating/Storage Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAFMNCN</td>
<td>1.34 x 0.71 x 0.31</td>
<td>34 x 18 x 8</td>
<td>Airflow Monitor Normally Closed</td>
<td>-4.0 to 122</td>
<td>-20 to 50</td>
</tr>
</tbody>
</table>

Maximum Voltage and switching current must not exceed 10 watts. The resulting voltage and current peaks of inductive or capacitive loads must be restricted by a contact protection circuit.

Description
- NC - Normally Closed - Contact opens when airflow greater than 8.2 ft./sec.
  - Use to turn an alarm or signaling device ON to indicate loss of airflow (less than or = 8.2 ft./sec.)
- NO - Normally Open - Contact closes when airflow greater than 8.2 ft./sec.
  - Use to turn a signaling device ON to indicate sufficient airflow (greater than 8.2 ft./sec.)

Flap Position

<table>
<thead>
<tr>
<th>Flap Position</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
<td>≤ 8.2 ft./sec</td>
</tr>
<tr>
<td>Open</td>
<td>&gt; 8.2 ft./sec</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flap Position</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
<td>≤ 8.2 ft./sec</td>
</tr>
<tr>
<td>Open</td>
<td>&gt; 8.2 ft./sec</td>
</tr>
</tbody>
</table>

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Fan Speed Controls

Industry Standards
(both controls)

UL 508 Listed; File No. E249700
cUL Listed per CSA C22.2 No. 14; File No. E249700

Application
Perfect for offices, classrooms and other noise-sensitive areas, Fan Speed Controls optimize airflow in a cabinet or rack, balancing air volume requirements with noise level and power use.

Features
AFANTSC Panel-Mount Fan Speed Control
- Automatically adjusts fan speed depending on remote temperature sensor input
- Temperature set point is field adjustable; preset at 35 C (95 F)
- Idle speed and temperature slope are field-adjustable
- Push-to-reset thermal circuit breaker inside control housing
- Compact polycarbonate control housing can be mounted in any position
- NEMA 5-15R outlet provides power to fan
- Six-foot (1.83-m) power cord plugs into standard 120 V, 50 or 60 Hz outlet
- Remote temperature sensor with 10-ft. (3.05-m) lead mounts in airflow
- Mounting brackets included

A19FANSC 19-in. Rack-Mount Fan Speed Control
- Continuously variable fan speed control knob with minimum speed adjustment
- Uses 1 RU rack space
- Steel construction
- Two NEMA 5-15R outlets provide power to fan
- Six-foot (1.83-m) power cord plugs into standard 120 V 60 Hz outlet

Finish
- AFANTSC: Light-gray polycarbonate control housing
- A19FANSC: RAL 9005 black polyester powder paint

Bulletin: DTHRNM

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>Application</th>
<th>Voltage and Frequency</th>
<th>Current Draw</th>
<th>Temperature Settings (ºC)</th>
<th>Temperature Settings (ºF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFANTSC</td>
<td>Panel-Mount Fan Speed Control</td>
<td>Fan speed controlled automatically with remote temperature sensor</td>
<td>120 VAC 50/60 Hz</td>
<td>2 A max.</td>
<td>30, 35, 40, 45</td>
<td>86, 95, 104, 113</td>
</tr>
<tr>
<td>A19FANSC</td>
<td>19-in. Rack-Mount Fan Speed Control</td>
<td>Fan speed adjusted manually</td>
<td>120 VAC 60 Hz</td>
<td>4 A max.</td>
<td>Continuously variable</td>
<td>Continuously variable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel Mount Fan Speed Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.72 mm</td>
</tr>
<tr>
<td>120 mm</td>
</tr>
<tr>
<td>3.15 mm</td>
</tr>
<tr>
<td>80 mm</td>
</tr>
<tr>
<td>2.16 mm</td>
</tr>
<tr>
<td>55 mm</td>
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<table>
<thead>
<tr>
<th>19 inch Rack Mount Fan Speed Control</th>
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</thead>
<tbody>
<tr>
<td>1.25 mm</td>
</tr>
<tr>
<td>32 mm</td>
</tr>
<tr>
<td>19.00 mm</td>
</tr>
<tr>
<td>48.3 mm</td>
</tr>
<tr>
<td>18.31 mm</td>
</tr>
<tr>
<td>465 mm</td>
</tr>
<tr>
<td>41 X SLOT (TYP 4)</td>
</tr>
<tr>
<td>6 mm</td>
</tr>
<tr>
<td>10 mm</td>
</tr>
<tr>
<td>3.00 mm</td>
</tr>
<tr>
<td>76 mm</td>
</tr>
<tr>
<td>1.72 mm</td>
</tr>
<tr>
<td>44 mm</td>
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<tr>
<td>397.35 mm</td>
</tr>
<tr>
<td>B397357.35</td>
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</tbody>
</table>
19-in. Rack-Mount Fan Tray

Application
Fan trays enhance the natural convection airflow within a cabinet when installed with other 19-in. rack-mount equipment.

Features
- Fan trays available with either three or six 4-in. fans
- Includes 72-in. (1829-mm) power cord with IEC 320 standard power socket
- Power cord plugs into standard 115 VAC outlet
- Lighted rocker switch provides on-off control and indicates when fans are on

Finish
RAL 9005 black, lightly textured polyester powder paint

Accessories
Rack mounting hardware
Bulletin: DTHRM

Standard Products

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Number of Fans</th>
<th>Power (W)</th>
<th>Max Airflow (CFM)</th>
<th>C (in.)</th>
<th>C (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19F13B</td>
<td>3</td>
<td>45</td>
<td>253</td>
<td>8.10</td>
<td>206</td>
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<tr>
<td>A19F16B</td>
<td>6</td>
<td>90</td>
<td>506</td>
<td>12.96</td>
<td>329</td>
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</tbody>
</table>

Technical Performance per 4-Inch Fan

<table>
<thead>
<tr>
<th>Operating Voltage (VAC)</th>
<th>Operating Frequency (Hz)</th>
<th>Nominal Airflow Capacity (CFM)</th>
<th>Noise Level (dBA)</th>
<th>Max. Static Pressure (in. WC)</th>
<th>Max. Operating Temperature (°F)</th>
<th>Max. Operating Temperature (°C)</th>
<th>Power Consumption (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>60</td>
<td>102</td>
<td>41</td>
<td>0.27</td>
<td>128</td>
<td>70</td>
<td>15</td>
</tr>
</tbody>
</table>

Nominal Airflow capacity rating applies to fans before installation in fan tray.
Fan Shroud Kit, Type 3R

Features
- Two fan shrouds per package
- Perforated ventilation screen
- Pressure-sensitive adhesive-backed gasket and mounting hardware

Specifications
- 16 gauge mild steel or Type 304 stainless steel

Finish
ANSI 61 gray polyester powder coating over mild steel; smooth #4 brushed finish on stainless steel

Bulletin: D85

Industry Standards
Maintains UL/cUL Type 3R rating when properly installed on a UL/cUL Type 3R enclosure.

UL 508A Listed; Type 3R; File No. E61997

cUL Listed per CSA C22.2 No. 94; Type 3R; File No. E61997

NEMA/EEMAC Type 3R

IEC 60529, IP22

Application
Fan Shroud Kits protect outdoor enclosure openings from rain, sleet and snow.

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Material</th>
<th>A (in.)</th>
<th>A (mm)</th>
<th>B (in.)</th>
<th>B (mm)</th>
<th>C1 (in.)</th>
<th>C1 (mm)</th>
<th>C2 (in.)</th>
<th>C2 (mm)</th>
<th>G (in.)</th>
<th>G (mm)</th>
<th>H (in.)</th>
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<tr>
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<td>Steel</td>
<td>6.00</td>
<td>152</td>
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<td>4.69</td>
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<td>152</td>
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Usage Chart

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Compact Cooling (muffin) Fans (4 in.)</th>
<th>Compact Cooling (muffin) Fans (6 in.)</th>
<th>Compact Cooling (muffin) Fans (10 in.)</th>
<th>Cooling and Exhaust Fan Packages (TFP4)</th>
<th>Cooling and Exhaust Fan Packages (TFP6)</th>
<th>Filter Fan Packages (SF05)</th>
<th>Filter Fan Packages (SF09)</th>
<th>Filter Fan Packages (SF10)</th>
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<td>T6S3R</td>
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</table>

Subject to change without notice
Heaters Sizing and Selection Overview

When temperatures dip below the minimally acceptable ranges for electronics, our electric heaters can raise the temperature inside enclosures to appropriate levels. Heaters are designed to protect sensitive mechanical, electrical and electronic equipment from the harmful effects of condensation and corrosion. Two styles offer heating powers from 10 Watts to 800 Watts.

The graph in “Semiconductor Control Panel Heaters (for 10-60 Watt Heating Applications)” represents a painted-steel enclosure mounted in a calm-air building interior. The lowest temperature differential between room temperature and enclosure interior must be 10 F+ to prevent humidity and condensation. For outdoor applications, double the heating power requirement.

Semiconductor Control Panel Heaters (for 10-60 Watt Heating Applications)

Step 1:
Plot your application using the graph.
• Find surface area (for example, 4 ft.²) on the vertical scale
• Draw a horizontal line across to the intersection point with the diagonal line representing ΔT = 40 F
• Extend a vertical line down to the horizontal scale to determine your total heating power required (W = 45 Watts)

Step 2:
From the total Watts required, subtract the 20 Watts from pre-existing components to arrive at the minimum heater power of 25 Watts. The 30 Watt DAH301 heater should be selected in this case since it is the nearest size that exceeds the requirement.
Heaters Sizing and Selection

**Example:**
Which electric heater would most-efficiently maintain a 60°F temperature in an uninsulated 24 x 24 x 10 enclosure that is exposed to a temperature not less than 30°F?

**Step 1:**
Calculate the total enclosure surface area.

Area (ft.) = \(2[(AxB)+(AxC)+(BxC)] \div 144\) where "A", "B" and "C" are the dimensions of the enclosure.

Area (ft.²) = \(2[(AxB)+(AxC)+(BxC)] \div 144\) where "A", "B" and "C" are the dimensions of the enclosure.

In our example,

Area = \(2[(24x24)+(24x10)+(24x10)] \div 144 = 14.7\) ft.²

**Step 2:**
Using the graphs, draw a vertical line through the enclosure surface area and determine the temperature rise given by each heater. For enclosures exposed to windy conditions, heaters should be oversized by approximately 50 percent.

**Step 3:**
Select the electric heater that achieves the desired temperature rise. In our example, the desired temperature rise is 30°F (60°F - 30°F). The 200 Watt heater should be selected since its temperature rise (35°F) exceeds the requirement.

---

**Semiconductor Control Panel Heaters**

- **Catalog No.** DAH101
- **Watts** 10
- **Catalog No.** DAH301
- **Watts** 30
- **Catalog No.** DAH601
- **Watts** 60

---

**Electric Heaters**

- **Catalog No.** DAH1001A
  - **Watts** 100
- **Catalog No.** DAH1002A
  - **Watts** 100
- **Catalog No.** DAH2001A
  - **Watts** 200
- **Catalog No.** DAH2002A
  - **Watts** 200
- **Catalog No.** DAH4001B
  - **Watts** 400
- **Catalog No.** DAH4002B
  - **Watts** 400
- **Catalog No.** DAH8001B
  - **Watts** 800
- **Catalog No.** DAH8002B
  - **Watts** 800
Semiconductor Control Panel Heater

Industry Standards

UL Component Recognized
CSA Component Recognized
IEC IP54
CE

Application
Protect electronic, pneumatic, hydraulic and mechanical equipment from low temperatures, condensation and corrosion with this heater, which maintains a stable enclosure temperature.

Specifications

• PTC (Positive Temperature Coefficient) heating element
• Mounting clip for 35-mm DIN rails EN 50022

Finish
Black anodized, extruded aluminum.
Bulletin: DB5

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Watts</th>
<th>Voltage</th>
<th>Amps Starting Current</th>
<th>L (in.)</th>
<th>L (mm)</th>
<th>Weight (lb.)</th>
<th>Weight (kg)</th>
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<tbody>
<tr>
<td>DAH101</td>
<td>10</td>
<td>AC/DC 110/120</td>
<td>.8</td>
<td>1.97</td>
<td>50</td>
<td>.45</td>
<td>.20</td>
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<tr>
<td>DAH301</td>
<td>30</td>
<td>AC/DC 110/120</td>
<td>1.2</td>
<td>3.93</td>
<td>100</td>
<td>.66</td>
<td>.30</td>
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<tr>
<td>DAH601</td>
<td>60</td>
<td>AC/DC 110/250</td>
<td>2.5</td>
<td>5.5</td>
<td>140</td>
<td>1.10</td>
<td>.50</td>
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</table>
Clearance Range for DAH101 and DAH301

Clearance Range for DAH601
**Electric Heater**

**CAUTION**

These electric heaters are not designed for use in dusty, dirty, corrosive, or hazardous locations. Portions of the heater can get hot. Adequate protection must be taken to protect people from potential burns, and to protect other components from this heat. Hoffman recommends this heater only be installed in a totally-enclosed metal enclosure.

DO NOT INSTALL HEATERS ON WOOD PANELS.

Heat sensitive components should not be placed near the heater discharge area since this air can be quite warm. The clearance range defines the space that must be kept free of these components for proper and safe operation of the heater.

**Industry Standards**

UL 508A Component Recognized; File No. E61997

CSA Certified, CSA File No. LR42186

CE

**Application**

Protect mechanical, electrical and electronic equipment from low temperatures, condensation and corrosion with this thermostatically controlled, fan-driven heater that maintains a stable enclosure temperature. Fan draws cool air from the bottom of the enclosure and passes this air across the thermostat and heating elements before being released into enclosure cavity. Heated air is discharged through the top of the heater unit.

**Specifications**

- Aluminum housing
- Thermostat range adjustable from 0°F to 100°F (-18°C to 38°C)
- Four 10-32 x self-tapping screws are included with each heater
- Ball bearing fan
- Terminal strip with clamp connector that accepts both solid and stranded wire

**Finish**

Brushed aluminum

**Bulletin:** D85

**Standard Product**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Watts</th>
<th>Voltage</th>
<th>Hz</th>
<th>Amps</th>
<th>X in./mm</th>
<th>Weight (lbs.)</th>
<th>Weight (kg)</th>
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<tr>
<td>DAH1001A</td>
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<td>115</td>
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<td>230</td>
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<td>0.94</td>
<td>4.00</td>
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<td>DAH2001A</td>
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<td>8.00</td>
<td>8.00</td>
<td>2.72</td>
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<tr>
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<td>230</td>
<td>50/60</td>
<td>2.69</td>
<td>8.00</td>
<td>8.00</td>
<td>2.72</td>
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Heaters

Dimensions and Clearance Range Drawing for DAH1001A, -2A and DAH2001A, -2A

Dimensions and Clearance Range Drawing for DAH4001B, -2B and DAH8001B, -2B
Electronic Hygrotherm

Application
The Electronic Hygrotherm senses ambient temperature and relative air humidity and adjusts a connected device to maintain temperature and humidity set points.

Features
- Temperature (32-140°F) and humidity (50%-90% RH) adjustment
- High switching capacity
- Optical function displays (LED) in each control
- Long service life (100,000 cycles NO) (50,000 cycles, NC)
- Mounting clip for 35-mm DIN rail
- Change-over contact (relay)
- Connection: 5-pole terminal for AWG 14 max (2.5-mm square)
- Plastic housing UL94V-0
- Vertical mounting
- Maximum switching capacity:
  - 120 VAC 8A (Resistive Load)
  - 240 VAC 8A (Resistive Load)
  - 120 VAC 3A (Inductive Load)
  - 240 VAC 3A (Inductive Load)
  - 24 VDC 4A

Finish
Light-gray plastic UL94V-0
Bulletin: D85

Industry Standards
CE
cURus; File No. E164102

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>AxBxC in.</th>
<th>AxBxC mm</th>
<th>Hysteresis</th>
<th>Humidity Set Point (adjustable)</th>
<th>Temperature Set Point (°F)</th>
<th>Operating Temperature Range (°C)</th>
<th>Storage Temperature °F</th>
<th>Storage Temperature °C</th>
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<tr>
<td>ATEMHUM</td>
<td>3.03 x 2.36 x 1.69</td>
<td>77 x 60 x 43</td>
<td>3.6°F (2K) ± 1.8°F (1K) tolerance</td>
<td>50-90% RH</td>
<td>32 to 140</td>
<td>0 to 60</td>
<td>-4 to 176</td>
<td>-20 to 80</td>
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Relay Output

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<th>Close at...</th>
<th>Open at...</th>
<th>Use for</th>
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<td>humidity rise or temperature drop</td>
<td>humidity drop or temperature rise</td>
<td>heaters, dehumidifiers, low-temp alarms</td>
</tr>
<tr>
<td>4 and 5</td>
<td>humidity drop or temperature rise</td>
<td>humidity rise or temperature drop</td>
<td>cooling, humidifiers, high-temp alarms</td>
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</tbody>
</table>

Example of Connection

Connection Diagram
**Mechanical Hygrostat**

**Application**
The Mechanical Hygrostat controls relative air humidity inside an enclosure to prevent condensation and corrosion that can damage components. It can also be connected to an enclosure heater, cooling fans, warning lights or other devices.

*The critical relative humidity (RH) level for most components is 65 percent. Above 65 percent RH, condensation can form and cause electronic equipment to malfunction.*

**Features**
- Adjustable relative humidity range
- High switching capacity
- Long service life (>100,000 cycles)
- Maximum permissible air velocity of 50 ft./sec. (15 m/s)
- Maximum switching voltage = 250 VAC
  250 V should be switched only in a non-condensing environment
- Change-over contact
- Mounting clip for 35-mm DIN rail
- Connection: 3-pole terminal for AWG 14 max. (2.5-mm squared)
- Contact resistance less than 10 mΩ

**Finish**
Light-gray plastic, UL94V-0
Bulletin: D85

**Industry Standards**
CE

**Standard Product**

<table>
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<tr>
<th>Catalog Number</th>
<th>AxByC</th>
<th>AxByC</th>
<th>Switching Capacity (Minimum)</th>
<th>Switching Capacity (Maximum)</th>
<th>Operating Temperature (Adjustable) (°F)</th>
<th>Operating Temperature (Adjustable) (°C)</th>
<th>Storage Temperature (°F)</th>
<th>Storage Temperature (°C)</th>
<th>Setting Range</th>
</tr>
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<tbody>
<tr>
<td>AMHUM</td>
<td>2.64 x 1.97 x 1.50</td>
<td>67 x 50 x 38</td>
<td>100mA @ AC/DC 20 V</td>
<td>5A @ AC 250 V (resistive load) 0.2A @ AC 250 V (inductive load at cos θ = 0.8) DC20V</td>
<td>32 to 140</td>
<td>0 to 60</td>
<td>-4 to 176</td>
<td>-20 to 80</td>
<td>35 to 95% RH</td>
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</tbody>
</table>

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123    www.barr-thorp.com
Dual Thermostat

**Industry Standards**
- CE
- CSA File No. 215952
- cURus; File No. E164102

**Application**
Two thermostats in one, the Dual Thermostat independently controls equipment heating and cooling systems.

**Features**
- Two thermostats; one normally closed (NC), red, and one normally open (NO), blue, in one casing
- Wide adjustable temperature range (32 - 140 F)
- Thermostatic bimetallic sensor element
- Connection: 4-pole terminal for AWG 14 max (2.5 mm²)
- Mounting clip for 35-mm DIN rail

**Finish**
Light-gray plastic, UL94V-0

**Bulletin:** DB5

### Standard Product

<table>
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<th>Catalog Number</th>
<th>AxBxC in.</th>
<th>AxBxC mm</th>
<th>Switching Capacity (Normally Closed)</th>
<th>Switching Capacity (Normally Open)</th>
<th>Setting Range ( Normally Closed)</th>
<th>Setting Range ( Normally Open)</th>
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<tbody>
<tr>
<td>ADLTEMP</td>
<td>2.64 x 1.97 x 1.81</td>
<td>67 x 50 x 46</td>
<td>10 A resistive/2 A inductive @250 VAC, DC 30 W</td>
<td>5 A resistive/2 A inductive @250 VAC, DC 30 W</td>
<td>32-140 F</td>
<td>32-140 F</td>
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</tbody>
</table>
Temperature Control Switches

Industry Standards

- cURus; File No. E164102
- UL94-VO
- Protection rating IEC IP30
- CSA Certified; File Number 215952
- CE

Application

These easy-to-install thermostats regulate and monitor air temperature in enclosures that contain heat-emitting equipment. Thermostats prolong heater and fan life expectancy by controlling operation time and increase electrical component working efficiency by exposing them to fewer environmental contaminants.

Features

- Additional label for conversion to Celsius scale and blank label to cover set point range label when adjustment after initial setting is not desired are included
- Bimetal temperature sensor
- Plastic housing
- Connections consist of tubular screw terminals for AWG 14 (.04 sq. in.)
- Provision for both panel mounting and DIN rail mounting

Finish

Molded plastic housing is black
Bulletin: D85

Data Table

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Contact Type</th>
<th>Control Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATENMC</td>
<td>NC (normally closed), quick acting</td>
<td>Heater</td>
</tr>
<tr>
<td>ATENMO</td>
<td>NO (normally open), quick acting</td>
<td>Fan</td>
</tr>
</tbody>
</table>

Switching Capacity

<table>
<thead>
<tr>
<th>Load</th>
<th>Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum load</td>
<td>15 A resistive / 2 A inductive @ 120 VAC</td>
</tr>
<tr>
<td></td>
<td>10 A resistive / 2 A inductive @ 250 VAC</td>
</tr>
<tr>
<td></td>
<td>DC 30 W</td>
</tr>
<tr>
<td>Minimum load</td>
<td>20 mA (all voltages)</td>
</tr>
</tbody>
</table>
Condensation Devices

H2OMIT® Vent Drains, Type 4X

Industry Standards
Maintains UL/UL Type 4, 4X rating when properly installed on a UL/cUL Type 4 or 4X enclosure.

UL 508A Listed; Type 4, 4X; File No. E61997
cUL Listed per CSA C22.2 No 94; Type 4, 4X; File No. E61997

NEMA/EEMAC Type 4, 4X

Application
H2OMIT® Vent Drains allow accumulated water to drain out the bottom of an enclosure. The UL-approved vent drains also function as an air pressure equalizer, reducing the harmful effects of temperature-induced vacuums that could pull water and moisture into the enclosure.

Features
- Uses gravity to remove collected liquids
- One-way mechanical shut-off when pressure is equalized prevents water and contaminants from entering the enclosure
- Helps reduce corrosion that can limit the life of internal electrical and electronic components
- Installs in a 7/8-in. hole in the bottom of enclosure with provided nut or in a 1/2-in. NPT/NPS threaded conduit hub
- Installs in the bottom of mild steel, aluminum, stainless steel or non-metallic enclosures
- Maintains enclosure’s UL Type rating when properly installed

Specifications
Stainless Steel Vent Drain
- Corrosion-resistant polyester material with a Type 304 stainless steel sleeve
- 2.00-in. long x 1.38-in outside diameter

Non-Metallic Drain Vent
- Corrosion-resistant polyester material
- 2.00-in. long x 1.25-in. outside diameter

Bulletin: H2O

Standard Product

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>D (in.)</th>
<th>D (mm)</th>
<th>Quantity</th>
</tr>
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<tr>
<td>AVDRANM</td>
<td>Non-metallic Vent Drain</td>
<td>1.25</td>
<td>32</td>
<td>1</td>
</tr>
<tr>
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<td>Stainless Steel Vent Drain</td>
<td>1.38</td>
<td>35</td>
<td>1</td>
</tr>
</tbody>
</table>
H2OMIT® Thermoelectric Dehumidifier

**Application**
The H2OMIT® Thermoelectric Dehumidifier removes moisture from the air within an enclosure, providing an inexpensive yet highly effective way to protect electronic and electrical components from condensation.

**Features**
- Reduces corrosion that can limit the life of internal electrical and electronic components
- Condenses moisture from internal enclosure air and standing liquids
- Built-in drain provision with plastic hose directs collected moisture to the Vent Drain (sold separately)
- Rotating side air vents direct recirculating air away from critical controls
- Mounts via DIN rail on internal panel or mounts directly onto the inside bottom of enclosure above the Vent Drain (sold separately)
- Can be used in mild steel, aluminum, stainless steel and non-metallic enclosures

**Specifications**
- High-impact ABS shell
- Operates on 24-Volt DC power
- 4.5 amps max (84 watts)
- Runs continuously above 32°F (power supply not included)
- Removes 8 oz. of moisture in 24 hours
- Compact 6.00-in. x 5.50-in. x 5.75-in. design
- One Thermoelectric Dehumidifier includes:
  - Four feet of plastic hose
  - Two hose retainers
  - One double-ended hose retainer
  - Six inches of Velcro®
  - Seven-inch strip of DIN rail
  - Two mounting screws

*Must be used with UL-certified drain to remove pooled liquid from enclosure.*

*If continual operation is not desired, a Mechanical Hygrostat (AMHUM) can be wired to the thermoelectric dehumidifier and then set to turn the dehumidifier on at the desired relative humidity.*

VELCRO is a trademark of Velcro Industries B.V.
Bulletin: H2O

**Industry Standards**

<table>
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**Standard Product**

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**Definition:** Dew Point is the temperature at which condensation forms. If the temperature of the enclosure is 85°F and the relative humidity is 80 percent, Dew Point is reached at a temperature of 78°F or below. This means that moisture vapor will condense on any surface that is below the Dew Point temperature of 78°F.
# Air Conditioner Replacement Parts and Accessories

**Bulletin:** MCLY, VM2

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