

Because every application is unique, Hoffman engineers many kinds of thermal management solutions.

Heat exchangers work by creating air movement over an aluminum surface medium to “pull” heat out of the enclosure. Hoffman offers heat exchangers that seal out airborne contaminants and come in a range of sizes and capacities to fit many applications. Heat exchangers provide excellent thermal management when the enclosed controls can operate above the outside ambient temperature and if humidity is not a factor.





# Heat Exchangers

Heat Exchangers Sizing and Selection .....	34
XR Series Heat Exchangers.....	36





A Pentair Company

# Heat Exchangers Sizing and Selection

**B**efore 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 (page 46) 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 (page 4) 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.

## How to Read Catalog Numbers

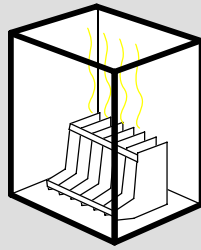
**Heat Exchangers** XR 29 18 1 6 012  
 1 2 3 4 5 6

1. Heat Exchanger Series  
XR = XR Modified Heat Pipe Core heat exchanger
2. This is the approximate height of the heat exchanger (i.e., 15 = 15" high).
3. Capacity in W/°F
4. 1 = 115V, 2 = 230V
5. 6 = 50/60 Hz
6. UL Type.

## 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

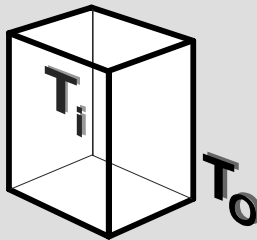


### Help Notes:

#### WATTS

1 WATT = 3.413 BTU/Hr.

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



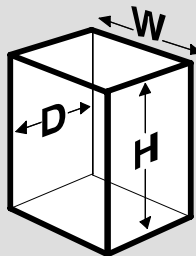
### Help Notes:

#### ΔT (Desired Temperature Difference)

1 °K ΔT = 1.8 °F ΔT   °K ΔT = °C ΔT

Determine the ΔT (°F), the temperature difference between the maximum temperature outside the enclosure (To) and the maximum desired temperature inside the enclosure (Ti), which can be calculated as:

To - Ti = ΔT for air conditioners.



### Help Notes:

#### AREA (ft<sup>2</sup>)

1 M<sup>2</sup> = 10.76 FT<sup>2</sup>

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

**AREA (ft<sup>2</sup>) =**  
 $2[(H" \times W") + (H" \times D") + (W" \times D")] \div 144$

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

## Heat Exchangers

- » Determine the required heat exchanger performance rating:

$$\frac{(\text{WATTS} + \Delta T(^{\circ}\text{F}))}{[0.22 \times \text{AREA (ft}^2\text{)]}}$$

Watts/°F

Use the above 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.

Heat exchangers are appropriate for applications in which:

- The electronic controls can operate at a temperature above the ambient temperature
- Humidity is not a factor
- Ambient air contaminants must be kept out of the enclosure

## Selection and Sizing 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: [www.hoffmanonline.com](http://www.hoffmanonline.com).**

# Heat Exchangers Sizing and Selection

**■ Compact and Mid-Size Heat Exchangers**



**XR Compact and Mid-Size**

	<b>A</b>		<b>B</b>		<b>C</b>		<b>Enclosure Air In</b>		<b>Enclosure Air Out</b>	
	in.	mm	in.	mm	in.	mm	W/°F	(W/°K)	W/°F	(W/°K)
<b>XR2004_</b>	20.00	508	7.50	191	3.00	76	4	(7)	9	(16)
<b>XR2908_</b>	29.50	749	10.00	254	3.09	79	9	(16)	30	(54)
<b>XR2918_</b>	29.66	753	10.24	260	5.92	150	18	(32)	34	(61)
<b>XR4724_</b>	47.16	1198	10.24	260	5.92	150	24	(43)	44	(79)
<b>XR4735_</b>	47.16	1198	15.24	387	5.92	150	35	(63)	77	(139)
<b>XR6055_</b>	59.66	1515	15.24	387	5.92	150	55	(99)	138	(248)
<b>XR6084_</b>	59.66	1515	15.24	387	9.92	252	84	(151)	210	(378)





A Pentair Company

HEAT EXCHANGERS

Bulletin  
**HE**

## XR Series Heat Exchangers



### Application

These high-efficiency heat exchangers have a closed-loop design that separates dirty ambient air from the clean air inside the enclosure to maintain the integrity of the enclosure and extend equipment life. Available in 7 sizes, these streamlined units were designed for limited space applications, especially on narrow or shallow enclosures.

### Construction

- Unique cores provide high-efficiency and high-performance heat transfer
  - Modified heat pipe core on XR20 and XR2908
  - Counterflow aluminum core on XR2918, XR47, and XR60
- Top-quality ball-bearing fans result in extended reliable service
- Streamlined aesthetics with no visible mounting rails or fasteners. The slim design allows for mounting to narrow or shallow enclosures.
- Front cover hinges open for easy access to all components
- Filterless design. The core slides out for easy cleaning.
- Mounts vertically or horizontally on front, side, or top of enclosure
- Mounts inside or outside the enclosure
- Enclosure air-return plenum is provided
- 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
- Mounting gaskets and instruction manual furnished

### Finish

Coated with RAL 7035 polyester powder paint inside and out

### Industry Standards

Maintains UL/cUL Type 12 or 3R rating when properly installed on the appropriate UL/cUL Type 12 enclosure.

Note: Maintains Type 3R rating when mounted externally and in a vertical position.

Note: XR200416012 and XR200426012 do not carry Type 3R rating.

UL/cUL Listed, UL File Number SA7402

CE

Note: Hoffman XR units are directly interchangeable with ProAir Models.

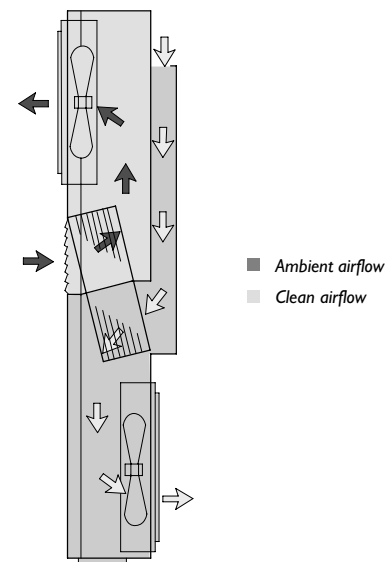
### When Should You Use a Heat Exchanger?

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

### Closed Loop Air Circulation

Within the heat exchanger, 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.



XR Series

# XR Series Heat Exchangers

## Standard Sizes and Ratings XR Compact and Mid-Size Heat Exchangers

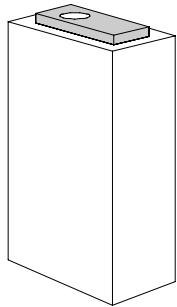
Catalog Number	A		B		C		Voltage	Hz	Phase	Full Load Amps	Max Amb. Temp °F/°C	Enclosure Air In <sup>a</sup> W/°F (W/°K)	Enclosure Air Out <sup>a</sup> W/°F (W/°K)	Shipping Weight lb/kg
	inch	mm	inch	mm	inch	mm								
XR200416012 <sup>b</sup>	20.00	508	7.50	191	3.00	76	115	50/60	1	0.6	155/68	4 (7)	9 (16)	16/7
XR200426012 <sup>b</sup>	20.00	508	7.50	191	3.00	76	230	50/60	1	0.3	155/68	4 (7)	9 (16)	16/7
XR290816012	29.50	749	10.00	254	3.09	79	115	50/60	1	0.6	155/68	9 (16)	30 (54)	27/12
XR290826012	29.50	749	10.00	254	3.09	79	230	50/60	1	0.3	155/68	9 (16)	30 (54)	27/12
XR291816012	29.66	753	10.24	260	5.92	150	115	50/60	1	1.0	155/68	18 (32)	34 (61)	34/16
XR291826012	29.66	753	10.24	260	5.92	150	230	50/60	1	0.6	155/68	18 (32)	34 (61)	34/16
XR472416012	47.16	1198	10.24	260	5.92	150	115	50/60	1	1.5	155/68	24 (43)	44 (79)	51/24
XR472426012	47.16	1198	10.24	260	5.92	150	230	50/60	1	0.8	155/68	24 (43)	44 (79)	51/24
XR473516012	47.16	1198	15.24	387	5.92	150	115	50/60	1	1.5	155/68	35 (63)	77 (139)	63/29
XR473526012	47.16	1198	15.24	387	5.92	150	230	50/60	1	0.8	155/68	35 (63)	77 (139)	63/29
XR605516012	59.66	1515	15.24	387	5.92	150	115	50/60	1	6.7	155/68	55 (99)	138 (248)	91/42
XR605526012	59.66	1515	15.24	387	5.92	150	230	50/60	1	3.4	155/68	55 (99)	138 (248)	91/42
XR608416012	59.66	1515	15.24	387	9.92	252	115	50/60	1	6.7	155/68	84 (151)	210 (378)	115/53
XR608426012	59.66	1515	15.24	387	9.92	252	230	50/60	1	3.4	155/68	84 (151)	210 (378)	115/53

<sup>a</sup> The "enclosure air in" efficiency rating is based on air entering the heat exchanger from the enclosure. The "enclosure air out" efficiency rating is based on air exiting the heat exchanger into the enclosure.

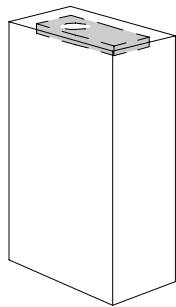
All XR exchanger units are rated at 100°F/38°C ambient temperatures with 1500W internal heat load. Heat exchanger efficiency will decrease as ambient temperature and/or internal heat load decreases.

<sup>b</sup> XR200416012 and XR200426012 do not carry Type 3R rating

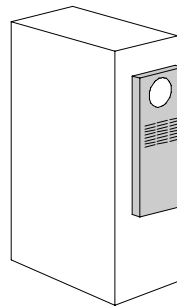
### Mounting Options



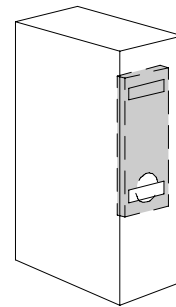
External Top-Mount



Internal Top-Mount



External Vertical-Mount



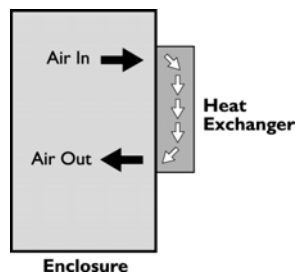
Internal Vertical-Mount

Note: Internal mounting requires inverting the heat exchanger as shown.

87569532

### Application Tip

Locate heat-sensitive components in line with the "Air Out" opening of the heat exchanger.

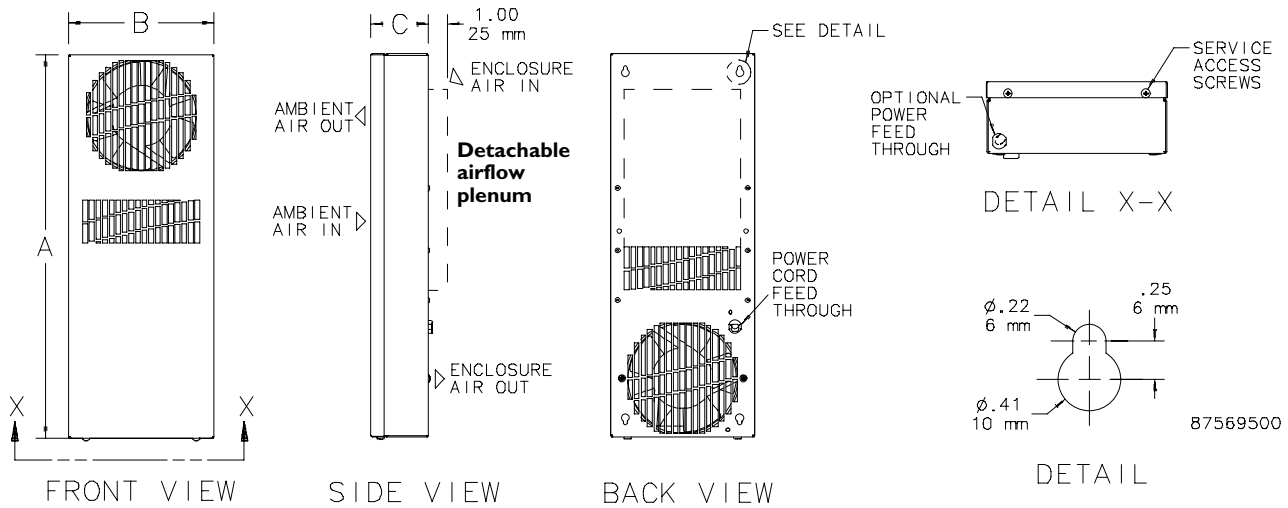




A Pentair Company

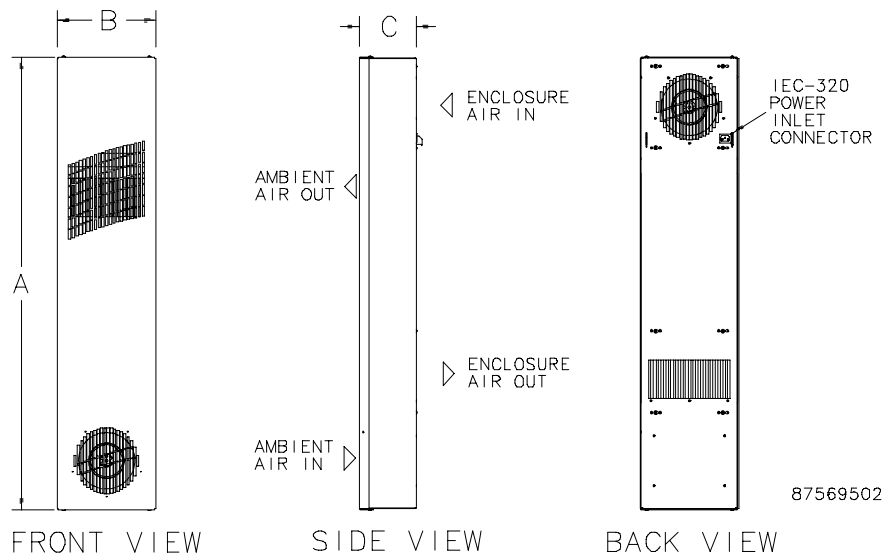
# XR Series Heat Exchangers

## ■ XR20, XR2908 Heat Exchangers

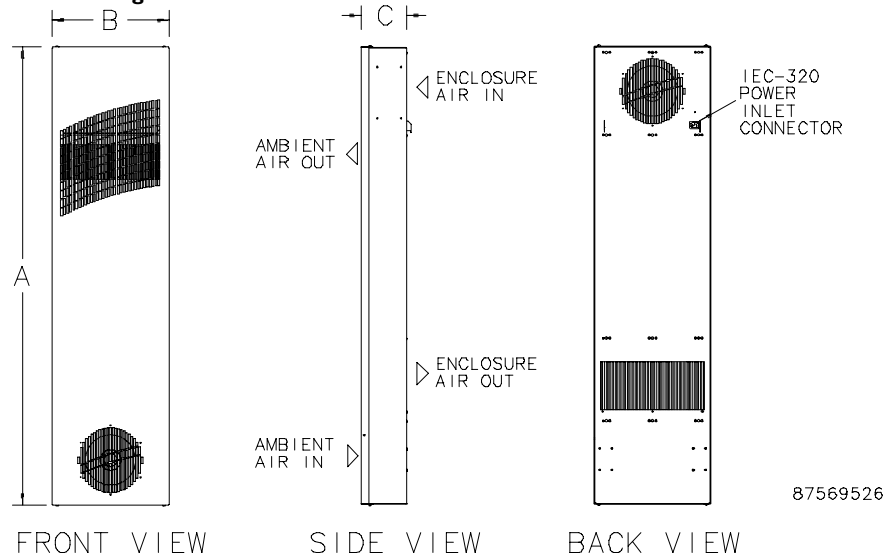


Note: Detachable airflow plenum can be used when mounting the heat exchanger either inside or outside the enclosure.

## ■ XR2918 and XR4724 Heat Exchangers

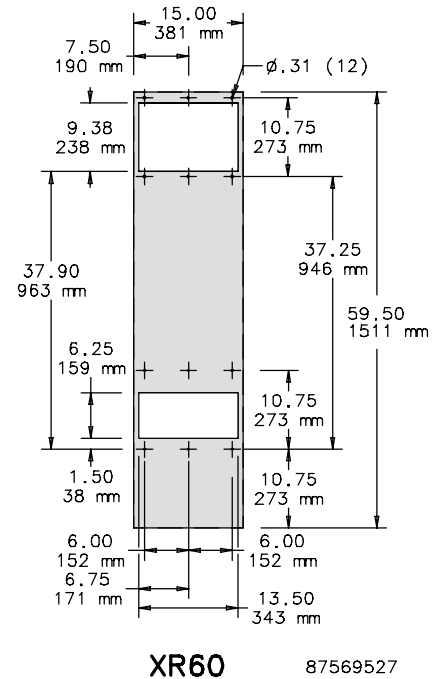
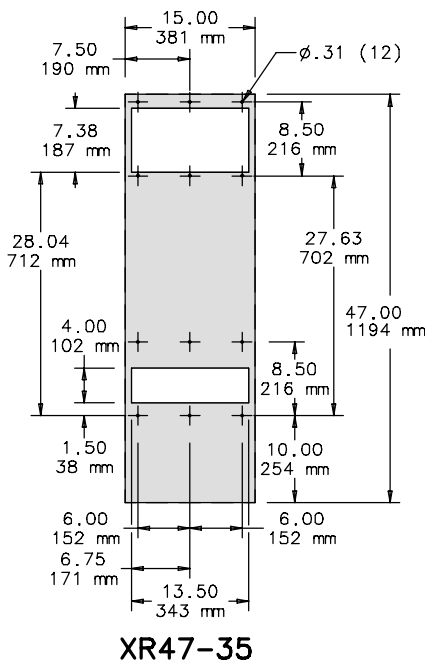
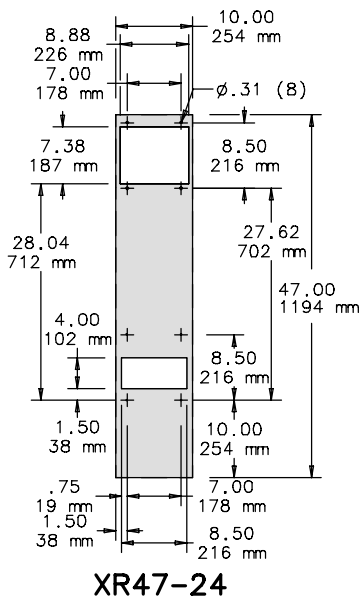
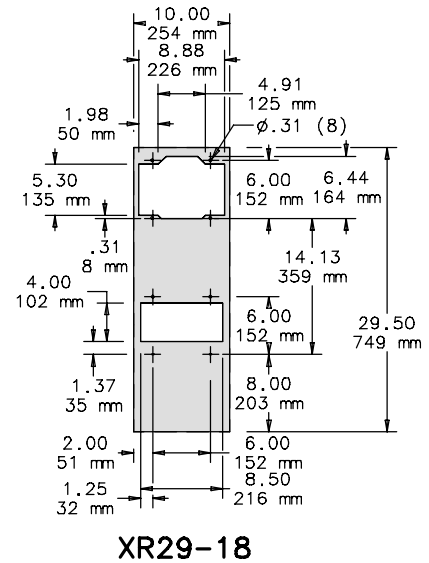
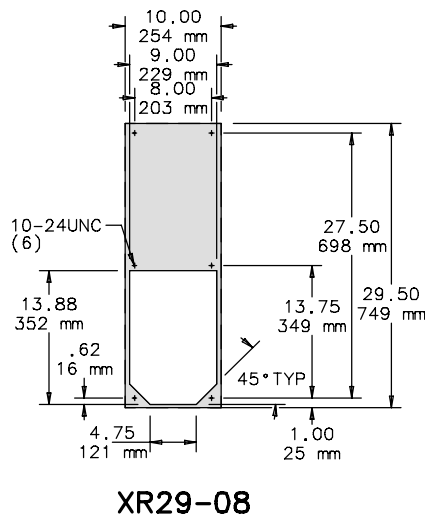
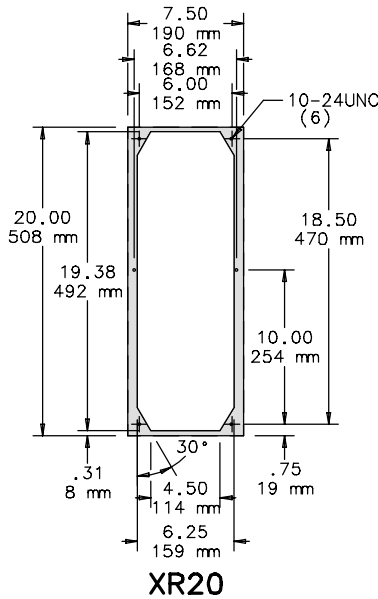


## ■ XR4735 and XR60 Heat Exchangers



# XR Series Heat Exchangers

## Enclosure Cutouts



**Notes:**

1. Cutouts shown are for external mounting only. For internal mounting, except XR29-08, rotate cutout 180 degrees. XR29-08 internal mount cutout is not shown.
2. Shaded area represents heat exchanger.

