Pentair
Technical Products

McLean COOLING TECHNOLOGY

Marka McLean oferuje jeden z najszerszych na rynku asortyment rozwiązań do zarządzania ciepłem w szafach wewnętrznych i zewnętrznych oraz chłodzenia obudów. Pełna oferta pasywnych i aktywnych rozwiązań do chłodzenia obejmuje szeroki asortyment klimatyzatorów, wymienników ciepła, systemów wymiany powietrza.

Hoffman®

Hoffman to wiodący na świecie dostawca obudów, które w skuteczny i niezawodny sposób chronią elektroniczne układy sterowania i systemy elektryczne. Oferta Hoffman to obudowy naścienne, modułowe i wolnostojące, systemy z interfejsem człowiek-urządzenie (HMI).

Schroff®

Marka Schroff jest uznana za globalnego lidera w branży obudów elektronicznych oraz systemów dla transportu, testowania i pomiarów, przesyłania danych, telekomunikacji i automatyki.

Schroff Hoffman CALMARK Birtcher McLean COOLING TECHNOLOGY Pentair Technical Products Raritan. Know more. Manage smarter.

Certified Partner ADVANTECH AAEON VIA we connect PROTECH SYSTEMS DIAMOND SYSTEMS CORPORATION

WD Western Digital ATP SanDisk APRO Co., Ltd. NEXCOPY Infinite memory

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e-mail: schroff@csi.pl
www.csi.pl

Protective Cooling Catalog

EDITION 10.2e

Air Conditioners, Heat Exchangers & Engineered Solutions for Closed-Loop Electronic Systems

McLean® COOLING TECHNOLOGY

Protecting Electronics. Exceeding Expectations.™

Pentair
Technical Products

McLean COOLING TECHNOLOGY

Quick Reference

Use this handy table to match your electronic cooling requirements with the most effective McLean protective cooling solution.

	Air Conditioners					Heat Exchangers	
	New SPECTRACOOL™ Pages 20-39	GENESIS® Pages 76-101	PROAIR Pages 104-113	T-Series™ Pages 42-73	Water-Cooled Pages 116-123	PROAIR Pages 126-141	CLIMAGUARD™ Pages 144-157
SYSTEM APPLICATION							
For indoor industrial	■	■	■	■	■	■	
For harsh / corrosive environments	■		■				■
For wash-down applications			■				
For data networking cabinets			■				
For outdoor enclosures	■		■	■			■
For telecommunications shelters				■			■
TEMPERATURE OF THE ELECTRONICS							
Cooler than outside the enclosure	■	■	■	■	■		
Warmer than outside the enclosure						■	■
AIR CONDITIONER COOLING CAPACITY							
1000/2000 BTU/Hr. (300/700 Watts)		■	■	■			
4000/6000 BTU/Hr. (1200/1800 Watts)	■	■	■	■	■		
8000/12000 BTU/Hr. (2300/3500 Watts)	■	■	■	■	■		
20000 BTU/Hr. (5900 Watts)	■			■			
2-ton 23500 BTU/Hr. (6900 Watts)				■			
3-ton 42000 BTU/Hr. (12300 Watts)				■			
5-ton 59000 BTU/Hr. (17300 Watts)				■			
HEAT EXCHANGER COOLING CAPACITY							
Less than 20 Watts/°F (30 Watts/°C)						■	
20-60 Watts/°F (30-100 Watts/°C)						■	■
More than 60 Watts/°F (100 Watts/°C)							■
POWER INPUT							
115 & 230 AC Volt	■	■	■	■	■	■	■
400/460 AC Volt 3-phase	■	■					
24 & 48 DC Volt				■			■
MOUNTING							
Side	■	■	■	■	■	■	■
Top		■					
Rack			■		■		
CABINET PROTECTION							
Type 12	■	■	■	■	■	■	■
Type 3R	■		■	■		■	■
Type 4	■		■	■			■
Type 4X Stainless Steel	■		■	■			
CABINET DIMENSION							
Fits 8 in./203 mm				■		■	
Fits 12 in./305 mm			■	■		■	
Fits 16 in./406 mm		■	■	■	■	■	■
Fits 20 in./508 mm or larger	■	■	■	■	■	■	■

Table of Contents

McLean COOLING TECHNOLOGY

New Product Overview

SPECTRACOOL™ Indoor & Outdoor Air Conditioner

Makes electronics cooling easier, so you can go about your business

Calm, cool and collected

EARTH-FRIENDLY

- Rotary compressor delivers up to 50% greater energy efficiency
- R134a earth-friendly refrigerant
- Produces 68 dB(A), quieter than other traditional air conditioners
- RoHS compliant

EASY INSTALLATION

- 30 pounds (14 kilograms) lighter than the T50 Outdoor Air Conditioner
- UL Listed, saving customers time and money by having agency approvals
- Built-in installation hooks on the back of each unit
- Cut-out adapters for enclosures with GENESIS® and T-Series Air Conditioners, enabling users to easily transition to the new models

CLEAN APPEARANCE

- Attractive industrial design
- Minimal use of visible fasteners
- ANSI 61 gray powder-coat paint in a semi-texture finish
- Other paint colors and textures available

VERSATILE COOLING

- Indoor and outdoor models
- 4000, 6000, 8000, 12000 & 20,000 BTU/Hr. (1100, 1700, 2300, 3500 & 5900 W) of cooling
- 115, 230 and 460 3-phase AC volt power input with +/- 10% operating range
- Exterior and partially recessed mounting options

Type 12/3R/4 Type 4X *optional*

c UL us LISTED CE

RELIABLE PERFORMANCE

- Operating temperature range:
  - -40 F/-40 C to 131 F/55 C outdoor
  - 50 F/10 C to 131 F/55 C indoor
- UL Type 12/3R/4 rated and Telcordia GR-487 capable
- IP34 rated for incoming ambient air
- IP56 rated for air moving from the AC into the enclosure
- Type 4X stainless steel option available
- All-metal shroud to better withstand rugged factory and outdoor environments
- Dual condenser-side air movers for performance redundancy
- Washable metal filter to keep coil clean for maximum performance
- Made in an ISO 9001 certified facility
- Thoroughly tested during engineering development to withstand vibration and perform in virtually any environment
- Every unit functionally tested before shipping

EASY TO SPECIFY

- Standard Indoor air conditioner has:
  - Condensate management heater strip
  - Power-off relay for door switch
  - Malfunction switch
- Standard outdoor air conditioner has:
  - Telcordia GR487 capability
  - Corrosion-resistant components
  - Malfunction switch
  - Compressor heater
  - Head pressure control
  - 2000 W enclosure heater

RESPONSIVE CUSTOMER SERVICE

- Popular models in-stock, ready for immediate shipment
- Backed by a 2-year standard warranty
- Over 1000 field repair technicians worldwide
- Secure and easy-to-use online spare parts store

SPECTRACOOL's Key Advantages

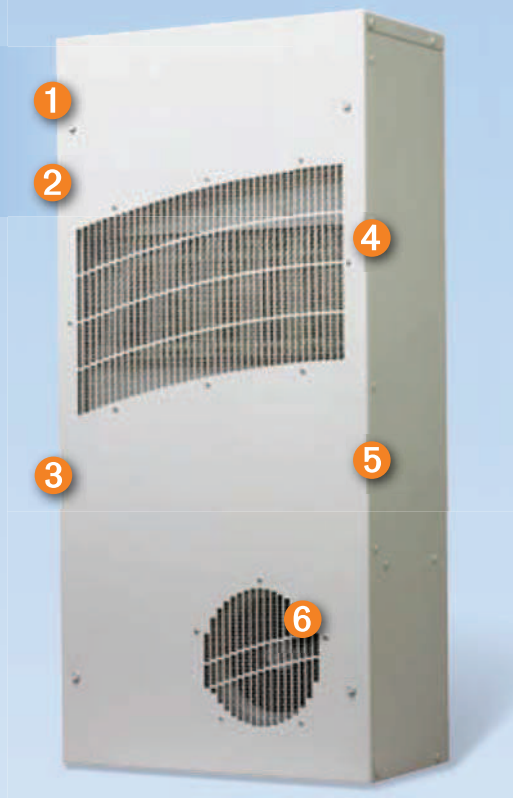
1. UL Listed, saving customers time and money by having agency approvals
2. Built-in flanges on back and 30 lb. (14 kg) lighter for easy installation

3. R134a rotary compressor for greater energy efficiency and environmental friendliness
4. Clean attractive design, adding value to the electronic system's aesthetics
5. Rugged all-metal shroud for demanding factory and outdoor environments

6. Dual condenser-side impellers for performance redundancy
7. Easy-to-access metal filter and other components for fast service and less system downtime

CLIMAGUARD™ Outdoor Heat Exchanger

Lab- and field-tested to seal out harsh environments



Stands tough against mother nature

EARTH-FRIENDLY

- Consumes less energy than traditional air conditioners
- RoHS compliant

VERSATILE COOLING

- Removes up to 3000 W of enclosure heat
- Works with 24 VDC, 48 VDC, 115 VAC and 230 VAC power input
- Surface- and recess-mount options
- Up to 2000 W heater selection on DC and AC volt models

RUGGED DESIGN

- Engineered for extreme climate conditions
  - -40 F/-40 C to 149 F/65 C operating temperature range
- UL Type 12/3R/4 rated and Telcordia GR-487 capable
- Powder-coated galvanized sheet metal shroud
- UL Type 4X stainless steel option available
- Corrosion–resistant aluminum core

RELIABLE PERFORMANCE

- Every core double-sealed for maximum weather protection
- Few moving parts
- Made in an ISO 9001 certified facility
- Every unit functionally tested

Goes easy on human nature

QUIET

- Variable-speed blowers standard on DC-powered units for quieter operation

EASY TO USE

- UL Listed, saving customers time and money by having agency approvals
- Built-in installation hooks on the back of each unit
- Filterless capable for most operating environments

RESPONSIVE CUSTOMER SERVICE

- Popular models in-stock, ready for immediate shipment
- Backed by a 2-year standard warranty
- Over 1000 field repair technicians worldwide
- Secure and easy-to-use online spare parts store

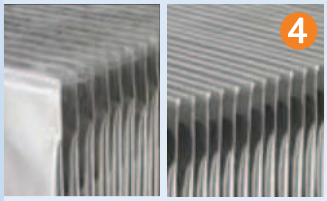
Type 12/3R/4 Type 4X *optional*

c UL US LISTED

CE

CLIMAGUARD's Key Advantages

1. UL Listed, saving customers time and money by having agency approvals
2. Built-in hooks to hang unit before fastening to cabinet for easier installation
3. DC- and AC-volt power input options to work in a variety of systems without power conversion



4. Double-sealed core for maximum protection against extreme weather
5. Powder-coated galvanized metal construction with stainless steel option that stands up to harsh environments
6. DC-volt models operate at variable speeds, producing less noise

Pentair Technical Products Awarded for Exceptional Customer Service by Northrop Grumman, A Premier U.S. Defense Contractor

Pentair Technical Products received a 2008 Customer Service Award from Northrop Grumman for exceptional performance on critical Homeland Defense contracts. The Northrop Grumman award recognized select vendors who play a critical role in helping the company successfully fulfill its US government and other major contracts.

Northrop Grumman selected the McLean brand to provide the cooling solution for the Biohazard Detection System (BDS) developed for the US Postal Service. Part of the project's challenge included managing the heat load generated from the sensitive electronics utilized in the system and from varying environmental conditions.

"The Pentair Technical Products team stepped up to the challenge with the development of an air conditioner that had the right level of cooling, service life and other key features. They also provided the post-deployment service support that was needed," said Ann Schofield, BDS programs director at Northrop Grumman. "Our entire supplier experience with Pentair Technical Products proved to be exceptional, leading us to select them for the service award."

The Northrop Grumman award affirmed the customer-focused culture at Pentair Technical Products. Some companies put customer service in their mission statements; Pentair Technical Products actually lives by it.

No company engineers and services cooling solutions for vital electronics better than

Pentair Technical Products

With more than 30 years of experience producing everything from fan assemblies to standard air conditioners and heat exchangers to engineered cooling applications for one-of-a-kind systems, the Pentair Technical Products McLean brand has the people and products to deliver the cool. The markets we serve include industrial automation, food and beverage, telecommunications, petrochemical, transportation, data networking, security and defense, and many others.

Pentair Technical Products understands your need for performance and does whatever it takes to ensure that when you make a promise to a customer, you can keep it.

PRODUCT SELECTION

Indoors or out, McLean air conditioners, heat exchangers, air movers and controls get the job done.

CUSTOM COOLING SOLUTIONS

An experienced staff with advanced software, rapid prototyping and in-house test facilities delivers custom cooling solutions quickly and to your exact specifications.

TECHNICAL EXPERTISE AND SUPPORT

With over 30 years of experience across dozens of industries, our engineers are able to assist your project design every step of the way. We also put that same cooling know-how into the standard platform solutions that we develop for the broader market.

McLean COOLING TECHNOLOGY

Why Use Pentair Technical Products McLean Brand Cooling Technology

PRODUCT RELIABILITY

Speak with McLean customers, and you'll discover a strong market reputation for product reliability. We are ISO 9001:2008 certified. Every unit is also functionally tested before shipping.

EXPERIENCED SALES STAFF

Years of cooling systems expertise, engineering knowledge and responsive problem solving help our sales staff "listen, learn, develop and deliver."

COOL CUSTOMER SUCCESSES
Thomson and McLean Are Shaken, But Not Stirred

Thomson Broadcasting is the world leader in digital video technologies. That's why top media, entertainment and communications companies turn to Thomson to get the right images to the right place at the right time – over time.

And that's why Thomson turns to the McLean brand to help keep its customers' broadcast systems up and running 24 hours/7 days.

"We recently tested a new UHF base station for one of our clients," said Don Wike, Chief Design Engineer. "We put our system, including a McLean outdoor air conditioner, through a pretty rigorous Telcordia GR487 test protocol. We shook the UHF system, dropped it from over 45 cm, and simulated years of cold winters and hot summers in a cycle chamber. After all this, the McLean unit still performed beautifully."

Don added, "Our customers count on Thomson to design a rugged digital media system. And we count on McLean to keep the electronics cool. We had over 8000 W of heat to dissipate in the new UHF base station system. The McLean 3-ton A/C unit proved it can handle the load. Pentair Technical Products also allowed us to use their thermal cycle test chamber, saving us R&D costs."

For electronics cooling that performs under extreme conditions, take a serious look at McLean. More cool customer stories are available at **McLeanCoolingTech.com**

ONLINE PARTS ORDERING

An easy-to-navigate online parts store provides fast, secure replacement part ordering 24 hours/7 days.

Pentair

FISCALLY STRONG

The Pentair Technical Products McLean brand is owned by Pentair, a US $2.7 billion diversified, publically held global operating company. We handle single-unit in-stock orders to US $5 million+ global projects.

GLOBAL REACH

McLean's growing worldwide network of sales, distribution and manufacturing delivers quality service for those who need global infrastructure.

SUPERIOR SERVICE AND REPAIR

Over 1000 certified repair technicians provide 24-hour emergency service worldwide.

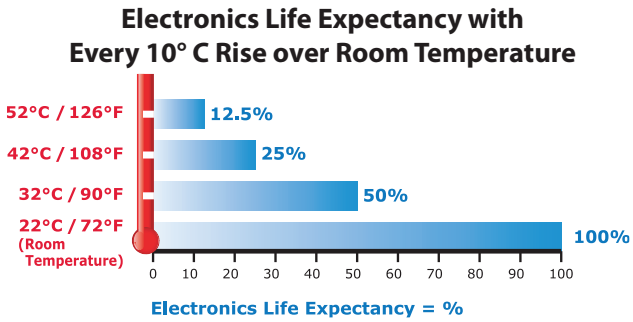
Protective Cooling Solution Overview

Why Cool Electronics in the First Place?

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

Heat Ruins Electronics

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



Sources of Heat

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

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

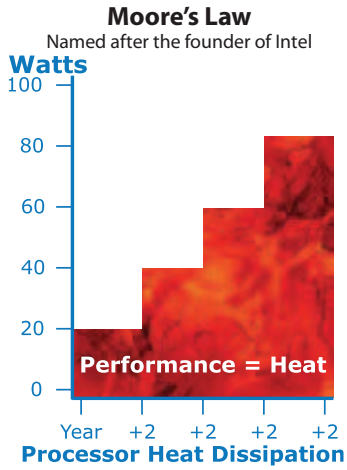
Heat also comes from sources outside the enclosure such as:

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

Trend Toward More Damaging Heat

For the foreseeable future, the trend is toward increasing levels of heat in electronics, not less, because the market's thirst for more information processing capacity and speed continues to grow. This trend is known as "Moore's Law."

More powerful data-processing electronics generate extra heat with virtually every new system that is designed. There is no guarantee that an application which did not require much, if any, cooling in the past will not need cooling in the future. The new system likely has more functionality and will probably require some form of cooling as a result.



What Are the Consequences of Damaging Heat?

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

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

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

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

Direct costs to a business can be as much as US $50000 per hour of system downtime.

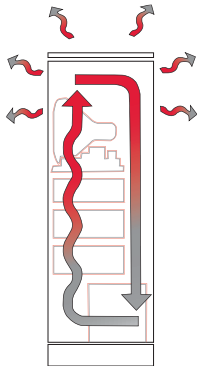
Options for Cooling Electronics

Conductive Cooling

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

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

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

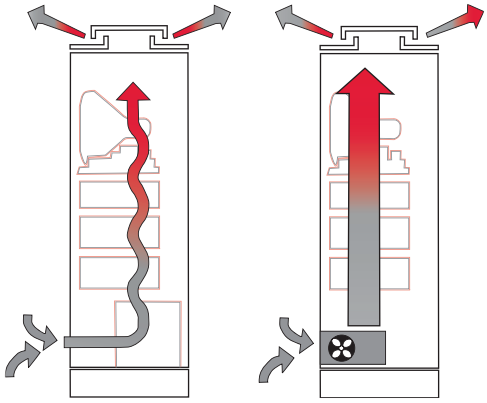


Fresh Air Cooling

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

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

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



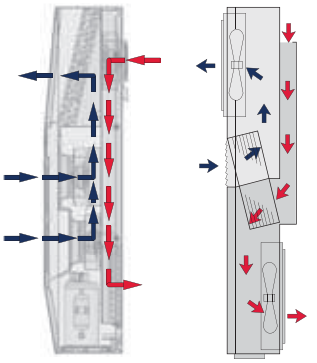
Protective Cooling

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

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

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

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



Air Conditioner Heat Exchanger

Levels of Electronic Enclosure Protection

Protection Levels

NEMA, UL and CSA Ratings **Enclosure Type Descriptions for Non-Hazardous Locations**

	Type	NEMA	UL	CSA
Indoor	Type 1	Enclosures are intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment or locations where unusual service conditions do not exist.	Indoor use primarily to provide protection against contact with the enclosed equipment and against a limited amount of falling dirt.	General purpose enclosure. Protects against accidental contact with live parts.
Indoor	Type 12	Enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt and dripping noncorrosive liquids.	Indoor use to provide a degree of protection against dust, dirt, fiber flyings, dripping water and external condensation of noncorrosive liquids.	Indoor use; provides a degree of protection against circulating dust, lint, fibers and flyings; dripping and light splashing of non-corrosive liquids; not provided with knockouts.
Indoor	Type 12K	Enclosures with knockouts are intended for indoor use primarily to provide a degree of protection against dust, falling dirt and dripping noncorrosive liquids.	Indoor use to provide a degree of protection against dust, dirt, fiber flyings, dripping water and external condensation of noncorrosive liquids.	Indoor use; provides a degree of protection against circulating dust, lint, fibers and flyings; dripping and light splashing of noncorrosive liquids; not provided with knockouts.
Indoor	Type 13	Enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying of water, oil and noncorrosive coolant.	Indoor use to provide a degree of protection against lint, dust seepage, external condensation and spraying of water, oil and noncorrosive liquids.	Indoor use; provides a degree of protection against circulating dust, lint, fibers and flyings; seepage and spraying of non-corrosive liquids, including oils and coolants.
Outdoor	Type 3	Enclosures are intended for outdoor use primarily to provide a degree of protection against windblown dust, rain and sleet; undamaged by the formation of ice on the enclosure.	Outdoor use to provide a degree of protection against windblown dust and windblown rain; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain, snow and windblown dust; undamaged by the external formation of ice on the enclosure.
Outdoor	Type 3R	Enclosures are intended for outdoor use primarily to provide a degree of protection against falling rain and sleet; undamaged by the formation of ice on the enclosure.	Outdoor use to provide a degree of protection against falling rain; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain and snow; undamaged by the external formation of ice on the enclosure.
Outdoor	Type 3RX	Enclosures are intended for outdoor use primarily to provide a degree of protection against corrosion, falling rain and sleet; undamaged by the formation of ice on the enclosure.	Not specifically defined.	Not specifically defined.
Outdoor	Type 4	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water and hose directed water; undamaged by the formation of ice on the enclosure.	Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water and hose-directed water; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure.
Outdoor	Type 4X	Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water; undamaged by the formation of ice on the enclosure.	Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water and hose-directed water; undamaged by the formation of ice on the enclosure; resists corrosion.	Indoor or outdoor use; provides a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure; resists corrosion.
Outdoor	Type 6	Enclosures are intended for use indoors or outdoors where occasional submersion is encountered; limited depth; undamaged by the formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection against entry of water during temporary submersion at a limited depth; undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use; provides a degree of protection against the entry of water during temporary submersion at a limited depth. Undamaged by the external formation of ice on the enclosure; resists corrosion.

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- Underwriters Laboratories Inc. (UL) shall not be responsible for the use of or reliance upon a UL Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon a UL Standard.
- Some enclosures may have multiple ratings. For instance: 4, 12—Outdoor use; able to be used indoors with modifications; 4X, 3RX—Outdoor use; able to be used indoors with modifications; 4, 9—Can be used in both hazardous and non-hazardous locations

Levels of Electronic Enclosure Protection

IP Rating Descriptions **Example Rating**

If 1st IP number is...	and the 2nd IP number is...	Then the IP rating is
2	3	IP23
(protection against solid objects)	(protection against liquids)	An enclosure with this designation provides protection against touch with a finger, penetration of solid objects greater than 12 mm and spraying water.

First Numeral (Solid Objects and Dust)

IP	Protection of Persons	Protection of Equipment
0	No Protection	No Protection
1	Protected against contact with large areas of the body (back of hand)	Protected against objects over 50 mm in diameter
2	Protected against contact with fingers	Protected against solid objects over 12 mm in diameter
3	Protected against tools and wires over 2.5 mm in diameter	Protected against solid objects over 2.5 mm in diameter
4	Protected against tools and wires over 1 mm in diameter	Protected against solid objects over 1 mm in diameter
5	Protected against tools and wires over 1 mm in diameter	Protected against dust (limited ingress, no harmful deposit)
6	Protected against tools and wires over 1 mm in diameter	Totally protected against dust

Second Numeral (Liquid)

IP	Protection of Equipment
0	No Protection
1	Protected against vertically falling drops of water, e.g. condensation
2	Protected against direct sprays of water up to 15 degrees from vertical
3	Protected against sprays up to 60 degrees from vertical
4	Protected against water sprayed from all directions (limited ingress permitted)
5	Protected against low-pressure jets of water from all directions (limited ingress permitted)
6	Protected against strong jets of water
7	Protected against the effects of immersion between 15 cm and 1 m
8	Protected against long periods of immersion under pressure

SCCR Requirements per UL (Condensed version)

Article 409 of the 2008 National Electric Code (NFPA 70) requires industrial control panels to be marked with a short circuit current rating. As specified in the National Electric Code, UL508A-2001 Supplement SB, the Standard of Safety for Industrial Control Equipment, provides an accepted method for determining the short-circuit current rating of the control panel.

The Short Circuit Current Rating (SCCR) rating for our air conditioners and heat exchangers has a default value of 5 kA.

You may use a 5 or 10 kVA isolation transformer between the customer's panel and our air conditioner and not have an effect on the customer's 65 kA rating.

You may use a fuse or circuit breaker with a 5 kA short circuit rating on the line side of the air conditioner unit (ACU) and its branch circuit protective device and not have an effect on the customer's 65 kA rating.

The current limiting fuse or circuit breaker used on the line side of the branch circuit protection for the ACU must have a SCCR => that of the panel rating. Additionally for a current limiting fuse the customer would need to verify using table SB4.2 of UL 508A, that the let through current (Ip * 10^3) of the fuse is <= 5 kA. If a circuit breaker is used as feeder protection, it **must** be marked Current Limiting type from the manufacturer, and the panel builder would need to verify based on the manufacturers published curves that it will let through <= 5kA. Examples of these curves are included in UL 508A supplement SB.

You can run separate circuits for the panel and the air conditioner as long as each is labeled with their individual SCCR ratings (5 kA and 65 kA).

If the customer does not implement one of the options above, then the resulting SCCR rating would be the 5 kA rating of the ACU, if that is the lowest rated component in the panel.

Testing represents another option; however, if the customer does not implement these options, then the resulting short circuit rating of the panel is based on the lowest short circuit current rating of all power circuit components installed in the panel.

Cooling Solution

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

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

Protective vs. Fresh Air Cooling

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

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

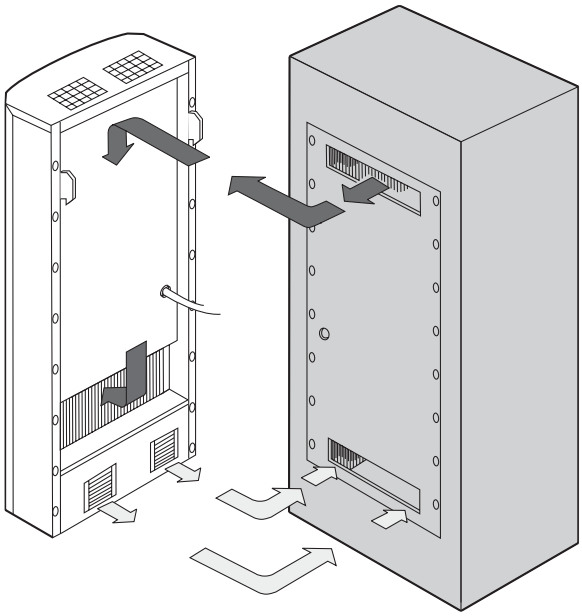
If most of your assessments fell on the fresh air side, then a filter fan, fan tray, motorized impeller or blower is probably the correct cooling solution for your application. However, if most of your assessments were on the protective side, then an air conditioner or heat exchanger found in the McLean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

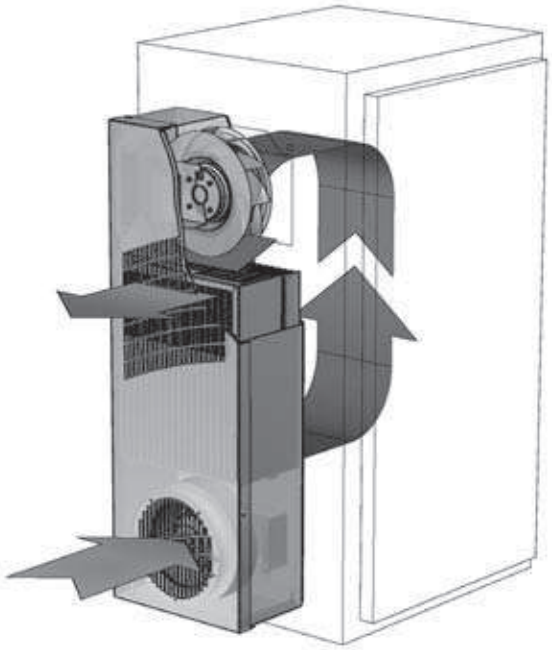
Cooling Solution Choices

Assuming that protective cooling is needed for the application, there are two basic choices—air conditioners or heat exchangers.

An air conditioner should be specified when:
- The temperature inside the enclosure must be maintained at or below the ambient temperature
- Humidity must be removed
- A moderate to high heat load is being produced by the electronic system

A heat exchanger can be used to transfer heat from inside the enclosure to the outside atmosphere when:
- The electronic components can operate at a temperature above the ambient air temperature
- Humidity is not a factor
- A low to moderate heat load is being produced by the electronic system





How to Select the Right Cooling Capacity Air Conditioner

Air Conditioner Cooling Capacity Overview

The cooling capacity of an air conditioner needs to match or exceed the amount of total heat load generated by the electronic system.

Total heat load comes from two sources:
(a) the electronic components themselves which is called "internal heat load" and
(b) the ambient heat outside the enclosure which is known as the "heat transfer load."

Most engineers and cooling suppliers determine internal heat load. However, the impact from the heat transfer load is easily overlooked. Heat transfer load can significantly add to the total heat load of the system, especially if the outside air temperature is high and/or the enclosure is located in the sun.

Thus, the **total heat load** to be removed from the electrical enclosure by the air conditioner is the sum of the **internal heat load** and the **heat transfer load.**

TOTAL HEAT LOAD = INTERNAL HEAT LOAD + HEAT TRANSFER LOAD

Part A: How to Determine Internal Heat Load

The internal heat load comes from the amount of waste heat generated inside the enclosure by the electronic components and is expressed in Watts (W).

There are several methods to determine internal heat load, depending on data availability.

Method 1. Heat Load Data from Each Electronics Component Manufacturer

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

Method 2. Component Power – Component Efficiency

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

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

Example—

An electronic system uses two components that draw 115 VAC at 15 A. Each has a rated efficiency of 90%. Put another way, 10% of each device is inefficient. Unused power becomes generated heat. Thus the estimated internal heat load is:

Device Power = 115 x 15 = 1725 W
Total Power = 2 x 1725 = 3450 W
Less Efficiency = 3450 x (1 - .90) W
Total Heat Load = 345 W

Method 3. Incoming – Outgoing Power

A third approach is to estimate the power going into the enclosure and the power coming out of it. The difference becomes the estimated amount of internal heat load. The amps and volts of each electrical line going in are multiplied to determine Watts, then they're added together. The same is done for the electrical line(s) coming out of the application. The outgoing Watts are then subtracted from the incoming Watts.

INTERNAL HEAT LOAD =
INCOMING POWER (W) – OUTGOING POWER (W)

Example—

An enclosure has three input lines of 230 VAC at 11, 6 and 4 A. It has one output control line of 115 VAC at 9 A.

Incoming Power = (230 x 11) + (230 x 6) + (230 x 4) = 4830 W
Outgoing Power = 115 x 9 = 1035 W
Total Heat Load = 4830 – 1035 = 3795 W

Method 4. Automated Equipment Horsepower

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

Example—

A cabinet has three 5-hp VFDs with 95% efficiency.

VFD Watts = 5 hp x 745.6 x 3 = 11184 W
Adjusted Watts = 11184 x (1 - .95) = 559 W
Total Heat Load = 559 x 1.25 = 699 W

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

Part B: How to Determine Heat Transfer Load Overview

Heat transfer load is the ambient heat outside the enclosure conducting itself through the cabinet walls toward the electronics (heat energy travels from the hottest to coldest location).

When an air conditioner cools the enclosure temperature lower than the ambient air outside, additional heat load is drawn into the cabinet which the air conditioner needs to remove. The higher the ambient temperature and/or the presence of solar heat gain (the "greenhouse effect") on the enclosure, the more cooling capacity is required.

Determining heat transfer load requires that you know the **total surface area** of the cabinet, less any non-conductive surface area such as the enclosure side mounted to a wall. It also requires that you determine **ΔT**, which is the difference between maximum ambient temperature and the maximum temperature rating of the electronics components.

There are two methods for determining heat transfer load—the simple chart method and the equation method.

Simple Chart Method

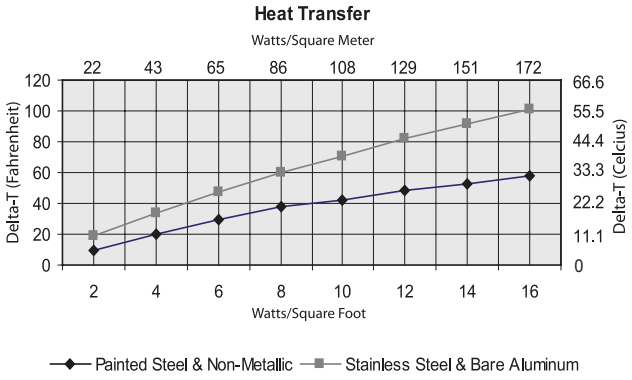
This method is reasonably accurate for most indoor industrial systems where there is no unusual air movement and insulation is not typically used inside the enclosure. The process also provides a ballpark result for outside plant and telecommunications applications, taking into account solar heat gain. However, it does not incorporate the impact of wind or cabinet insulation. If either is present, then the equation method is more precise.

Step 1. Determine ΔT in F or C.
Step 2. Find the heat transfer per ft.^{2} or m^2 on the chart below, using ΔT and the proper cabinet material curve.
Step 3. Multiply the heat transfer per ft.^{2} or m^2 by the total surface area of the enclosure that will conduct heat. (Remember to exclude surfaces such as a side mounted to a wall.)

SURFACE AREA (ft.^{2}) = [2ab (in.) + 2bc (in.) + 2ac (in.)] ÷ 144

SURFACE AREA (m^2) =
[2ab (mm) + 2bc (mm) + 2ac (mm)] ÷ 1000000
Caption: a = height, b = width, c = depth

Total Heat Transfer Load =
Heat Transfer per ft.^{2} or m^2 x Cabinet Surface Area

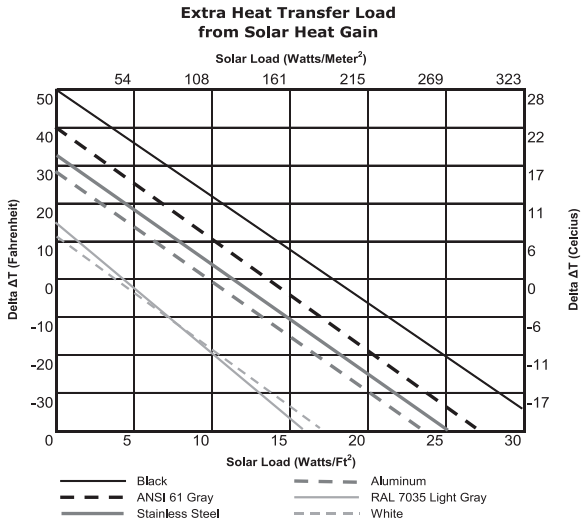


Example —
A painted steel cabinet has 7.43 m^2 of surface area and will be located in a maximum ambient temperature of 35 C. The rated temperature of the electronics is 24 C.

ΔT = 35 C - 24 C = 11 C
Heat Transfer = 43 W/m^2 (from chart)

Total Heat Transfer Load = 7.43 x 43 = 320 W

The estimate for heat transfer load ends here, unless the electronic system will be deployed outdoors. Then solar heat gain needs to be added to the total heat transfer load calculated above. Solar heat gain is determined much the same way as heat transfer per ft.^{2} or m^2, using a similar chart.



Example — The painted cabinet above is in ANSI 61 gray.
Thus, 75.4 W/m^2 need to be added to the heat transfer load which is 560 W (75.4 x 7.43). Total Heat Transfer Load consequently becomes 720 W.

The result does not include insulation which can significantly reduce heat transfer load.

Equation Method

Heat transfer load may also be determined by equation. This method should be used when at least one of the following criteria are found in the electronic system:

- Moderate to high airflow within the cabinet
- Outdoor applications that involve breezes or gusty winds
- Insulation used within the cabinet to offset the impact of solar heat gain

The governing equations for heat transfer load are:

English System (F, inches and feet):
$q = (T_o - T_i) \div [(1/h_o) + (1/h_i) + R]$

Metric System (C, millimeters and meters):
$(q = (T_o - T_i) \div [(1/h_o) + (1/h_i) + R] \times 5.67$

$q = (125 - 75) \div [(1/6) + (1/2) + 4]$
$q = (50) \div (.16 + .5 + 4)$
$q = 50 \div 4.66$
$q = 10.7$ BTU/Hr./ft.^{2}

Total Heat Transfer Load
10.7 x 72 = 770 BTU/Hr. or 770 ÷ 3.413 = 226 W

Since the cabinet is outdoors, and assuming it is painted ANSI 61 gray and located in the sun, extra solar load needs to be added to the outcome above which is 504 W (7 W per ft.^{2} x 72 ft.^{2}).

Total Heat Transfer Load with Extra from Solar Heat Gain
226 + 504 = 730 W

Definition of Variables—
q = Heat transfer load per unit of surface area
T_o = Maximum ambient temperature outside the enclosure
T_i = Maximum rated temperature of the electronics components
h_o = Convective heat transfer coefficient outside the cabinet
Still air: h = 1.6
Relatively calm day: h = 2.5
Windy day (approx. 24 km/h): h = 6.0

h_i = Convective heat transfer coefficient inside the cabinet
Still air: h = 1.6
Moderate air movement: h = 2.0
Blower (approx. 2.44 m/s): h = 3.0

R = Value of insulation lining the interior of the enclosure walls
No insulation: R = 0.0
1/2 in. or 12 mm: R = 2.0
1 in. or 25 mm: R = 4.0
1-1/2 in. or 38 mm: R = 6.0
2 in. or 51 mm: R = 8.0

1 in. = 25.4 mm
1 ft. = 0.3048 m
1000 BTU/Hr. = 293.06 W
1 mph = 1.6093 km/h

How to Determine Total Heat Load

Total heat load to be removed from the electrical enclosure by the air conditioner is the sum of **internal heat load** plus **heat transfer load**.

TOTAL HEAT LOAD (C) = INTERNAL HEAT LOAD (A) + HEAT TRANSFER LOAD (B)

Thus, one adds together the result from Part A to the outcome from Part B.

Example—

The internal heat load from one of the examples above was 3795 W. The heat transfer load from the other example above was 730 W. Therefore, total heat load is 3795 + 730 = 4525 W.

To convert Watts into BTU/Hr. to determine air conditioner capacity in the English system, multiply by 3.413.
4525 W is then 15444 BTU/Hr.

Power input, protection level and dimensions of the air conditioner also need to fit system requirements.

Caution! Do not simply match the nominal cooling capacity of the air conditioner model with the total heat load result above. Be sure to know the maximum ambient temperature outside the enclosure as well as the rated temperature of the electronic components. Apply these temperatures to the performance curves provided by the cooling manufacturer to select an appropriately sized air conditioner. Failure to do so may under-size your air conditioner as much as 20% - 25%, thereby under-cooling the electronics and making the application vulnerable to potential over-heating issues.

How to Select the Right Cooling Capacity Heat Exchanger

Heat Exchanger Cooling Capacity Overview

Cooling with an air-to-air heat exchanger assumes the electronic components in your system are able to operate **above** the ambient temperature outside the enclosure. If this is not the case, then an air conditioner must be used.

Selecting a heat exchanger is similar to specifying an air conditioner in that the cooling capacity of the unit must remove the **internal heat load** from the electrical enclosure.

However, since the conductive cooling nature of the cabinet itself removes some of the heat from the system, **heat transfer** should be subtracted from internal heat load (versus added in the case of air conditioners).

Because the cooling capacity of heat exchangers is expressed in terms of Watts/F or Watts/C, an extra step is necessary to convert net heat load into a result used to select the appropriate heat exchanger. Divide the net heat load by the **ΔT** which is the difference between the maximum ambient temperature outside the enclosure and the maximum temperature rating of the electronic components.

HEAT EXCHANGER CAPACITY (C) = [INTERNAL HEAT LOAD (A) – HEAT TRANSFER (B)] / ΔT

How to Determine Internal Heat Load

Internal heat load stems from the amount of waste heat generated inside the enclosure by the electronic components and is expressed in Watts.

To determine internal heat load, follow one of the four options outlined in the air conditioner "How to Determine Internal Heat Load" section on page 12.

How to Determine Heat Transfer

In air-to-air heat exchangers, heat transfer is actually cabinet heat loss because the heat inside the enclosure is conducting itself through the cabinet walls toward the cooler temperature outside the enclosure. That is why heat transfer is subtracted from internal heat load to arrive at total net heat load.

To determine heat transfer you need to know the **total surface area** of the cabinet, less any non-conductive surface area such as the enclosure side mounted to a wall. You must also determine **ΔT** which is the difference between maximum ambient temperature and the maximum temperature rating of the electronic components.

There are two methods to determine heat transfer—the **simple chart method** and the **equation method**. The simple chart method may be used for nearly all indoor heat exchanger applications. The equation method needs to be applied when air movement outside or inside the electrical enclosure is high, or for outdoor applications.

Here are the steps for the simple chart method:

Step 1. Determine ΔT in F or C.
Step 2. Find the heat transfer per $ft.^2$ or m^2 from the Heat Transfer graph on page 13, using ΔT and the proper cabinet material curve.
Step 3. Multiply the heat transfer per $ft.^2$ or m^2 by the total surface area of the enclosure that will conduct heat. (Remember to exclude surfaces such as a side mounted to a wall.)

SURFACE AREA ($ft.^2$) = [2ab (in.) + 2bc (in.) + 2ac (in.)] ÷ 144

SURFACE AREA (m^2) = [2ab (mm) + 2bc (mm) + 2ac (mm)] ÷ 1000000
Caption: a = height, b = width, c = depth

Heat Transfer (Cabinet Heat Loss) = Heat Transfer per $ft.^2$ or m^2 x Enclosure Surface Area

The estimate for heat transfer ends here, unless the electronic system will be deployed outdoors, or airflow inside or outside the enclosure is high. Then the equation method needs to be used to determine heat transfer (cabinet heat loss).

For the equation method, follow the steps on page 13 in the air conditioner selection section. The result will be a negative number; the negative sign should be ignored when deducting heat transfer from internal heat load.

Caution! If the result of the equation method is a positive number, then this means that you want the electronics temperature inside the cabinet to be lower than the temperature outside the enclosure. In this case, an air conditioner should be specified for the electronics system.

How to Select the Right Cooling Capacity Heat Exchanger

How to Determine Heat Exchanger Capacity

Air-to-air heat exchanger capacities are not provided in terms of Watts or BTUs/Hr. of cooling like air conditioners. Instead, they are expressed in terms of Watts/F or Watts/C. Thus, the final step in determining heat exchanger capacity is to divide the total net heat load by ΔT. Then select the heat exchanger with the same or higher Watts/F or Watts/C as the outcome of this process.

—Indoor Industrial Example—

An electronic system uses two components that draw 230 VAC at 7.5 A. Each has a rated efficiency of 90%. They are protected in a painted steel cabinet that is 60 in. (1524 mm) tall, 36 in. (914 mm) wide and 18 in. (457 mm) deep. The system will be located in a maximum ambient temperature of 80 F (27 C). The rated temperature of the electronics is 95 F (35 C).

HEAT EXCHANGER CAPACITY (C) =
[INTERNAL HEAT LOAD (A) – HEAT TRANSFER (B)] ÷ ΔT

Internal heat load (A) may be determined using the "Component Power – Component Efficiency" method on page 12, given the available information. In this example, the estimated heat load is:

Device Power = 230 x 7.5 = 1725 W
Total Power = 2 x 1725 = 3450 W
Less Efficiency = 3450 x (1 - .90) W
Internal Heat Load = 345 W

Heat transfer (B) is derived using the simple chart method, since this is an indoor industrial application. Both cabinet surface area and ΔT are needed to determine heat transfer. Cabinet surface area is 54 ft.^{2} or 5.02 m^2 (from surface area formula on page 13). ΔT is 15 F (8 C)—the difference between ambient temperature and the rated temperature of the electronics.

Heat Transfer (Cabinet Heat Loss) =
Heat Transfer per ft.^{2} or m^2 x Enclosure Surface Area

Using the painted steel curve on the Heat Transfer chart on page 13, heat transfer per ft.^{2} or m^2 is 3 W/ft.^{2} or 32.5 W/m^2.
Heat Transfer = 3 W/ft.^{2} x 54 ft.^{2} = 162 W

Now that we know internal heat load, heat transfer and ΔT, we can determine heat exchanger capacity as follows:

HEAT EXCHANGER CAPACITY (C) =
[345 W (A) – 162 W (B)] ÷ 15 F (or 8 C)

HEAT EXCHANGER CAPACITY (C) = 12 W/F or 22 W/C

The result is **minimum** heat exchanger capacity. If no heat exchanger model is similar to the result, choose the next largest size to ensure adequate electronics cooling.

Power input, protection level and dimensions of the heat exchanger also need to fit the system.

—Outdoor Example—

A telecom system draws a total of 5000 W; its efficiency is 85%. It is protected in a steel cabinet that is 72 ft.^{2} (6.69 m^2) and painted with ANSI 61 gray paint. The enclosure walls are lined inside with 1 in. (25 mm) of insulation. The application will be deployed in a maximum ambient outdoor temperature of 104 F (40 C) with occasional winds reaching 24 km/h. The rated temperature of the electronics is 114 F (46 C). Air circulation inside the cabinet is moderate.

HEAT EXCHANGER CAPACITY (C) =
[INTERNAL HEAT LOAD (A) – HEAT TRANSFER (B)] ÷ DELTA ΔT

Internal heat load (A) is determined using the "Component Power – Component Efficiency" method on page 12. In this example, the estimated heat load is as follows:

Total System Power = 5000 W
Less Efficiency = 5000 x (1 - .85 W)
Internal Heat Load = 750 W

Heat transfer (B) is derived using the equation method, since this is an outdoor application.

$q = (T_o - T_i) \div [(1/h_o) + (1/h_i) + R]$

"q" is heat transfer per surface area. For an explanation of the other variables, see "Equation Method" on page 14.

Example for metric system:
$T_o = 40$ C
$T_i = 46$ C
$h_o = 6$
$h_i = 2$
$R = 4$
Surface area = 6.69 m^2

$q = (104 - 114) \div [(1/6) + (1/2) + 4]$

$q = -23$ W/m^2

Total Heat Transfer = 23 x 6.69 m^2 = 154 W
(negative sign is ignored)

ΔT is 10 F — the difference between ambient temperature and the rated temperature of the electronics.

HEAT EXCHANGER CAPACITY (C) =
[750 W (A) – 154 W (B)] ÷ [50/9] C

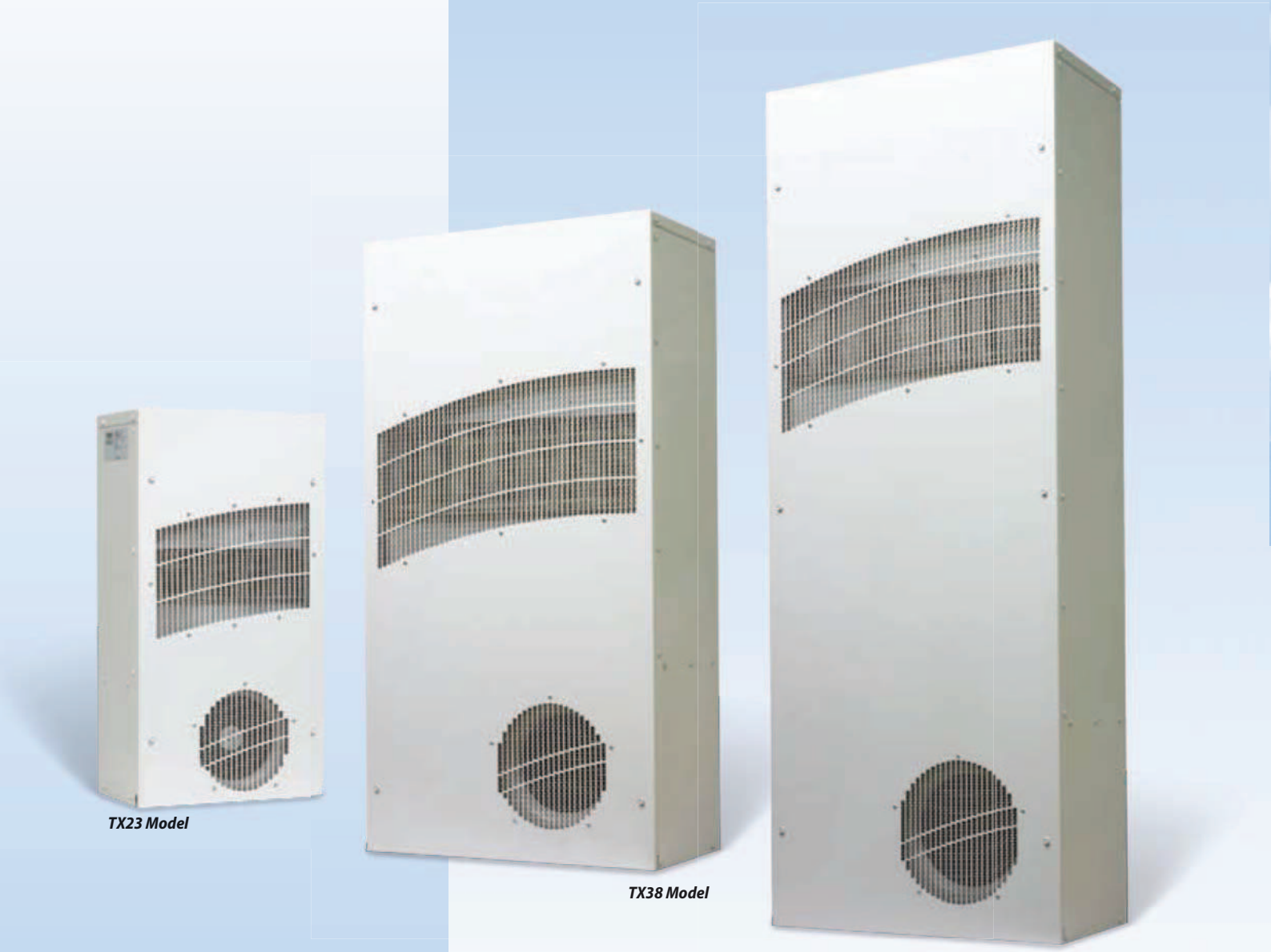
HEAT EXCHANGER CAPACITY (C) = 107 W/K

As in the indoor industrial example, the above result is **minimum** heat exchanger capacity. If no heat exchanger model is similar to the result, choose the next largest size to ensure adequate electronics cooling.

Power input, protection level and dimensions of the heat exchanger also need to fit the system.

Notes

CLIMAGUARD™ Outdoor Heat Exchangers



TX23 Model

TX38 Model

TX52 Model

Lab- and field-tested
to seal out extreme weather

CLIMAGUARD™ Outdoor Heat Exchangers

PRODUCT OVERVIEW

Put this Type 4 / Telcordia GR-487-capable heat exchanger to the test. You'll find that every unit keeps your outdoor enclosure sealed tight for reliable closed-loop cooling. Works on AC or DC voltage power input.

APPLICATIONS

- Telecommunications cabinets
- Alternative energy
- Outside plant applications
- Other outdoor electronic systems

CLIMAGUARD Outdoor Heat Exchangers Chapter Contents

CLIMAGUARD™ Outdoor Heat Exchangers

Outdoor Heat Exchangers

TX23
Models
14 W/°F (25 W/°C)

TX33
Models
28 W/°F (50 W/°C)

TX38
Models
56 W/°F (100 W/°C)

TX52
Models
83 W/°F (150 W/°C)

Industry Standards

UL/cUL Listed or UR/cUR Recognized

- CE
- Telcordia GR-487 capable
- Type 12/3R/4 Standard
- Type 4X stainless steel option available

Application

- Telecom shelters
- Outdoor cabinets
- Equipment buildings
- Instrument enclosures
- And more

Features

- Unique counterflow aluminum core for high efficiency and high performance heat transfer
- Models for 24 VDC, 48 VDC, 115 VAC and 230 VAC power supplies
- UL Listed or Recognized to save customers time and money with agency approvals
- Operating temperature range from -40 F/-40 C to 149 F/65 C
- Variable speed blowers standard on DC powered units for quiet running
- Surface or recessed mount capable
- Low-carbon mild-steel sheet-metal cover for rugged factory environments
- Easy-mount flanges for simple installation
- Mounting hardware, gaskets and user manual furnished with the unit
- Every unit functionally tested before shipping
- Filterless design for low maintenance and easy cleaning
- Engineered for temperature extremes, corrosive environments and wind driven rain

Finish

- RAL 7035 light-gray, semi-textured powder-coat paint standard
- Stainless steel Type 304 or 316 finishes available on Type 4X models
- Other colors and textures available

Options

- Thermostat Package
- Special Voltage Package
- Outdoor Package
- Harsh Environment Package*
- Stainless Steel Package*
- Heater Package*

* Consult the factory for availability and catalog number.

Notes

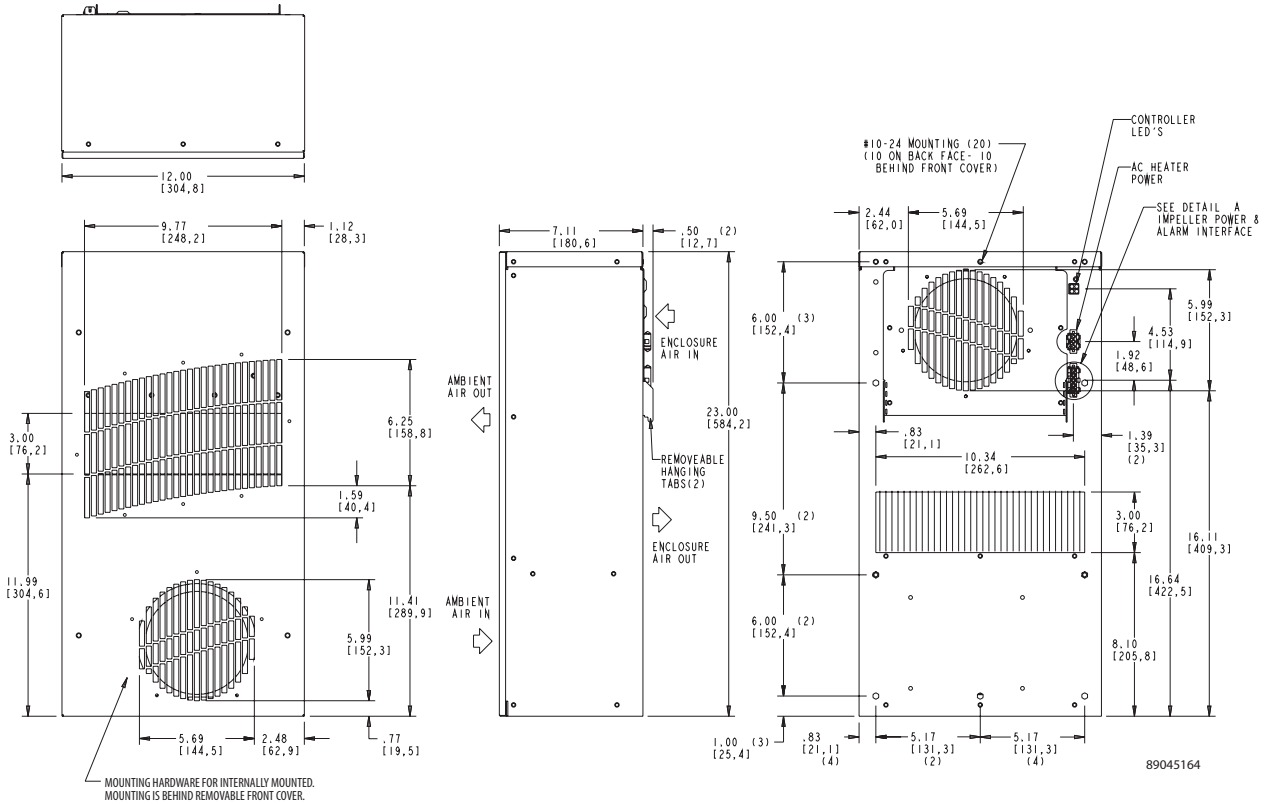
Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system

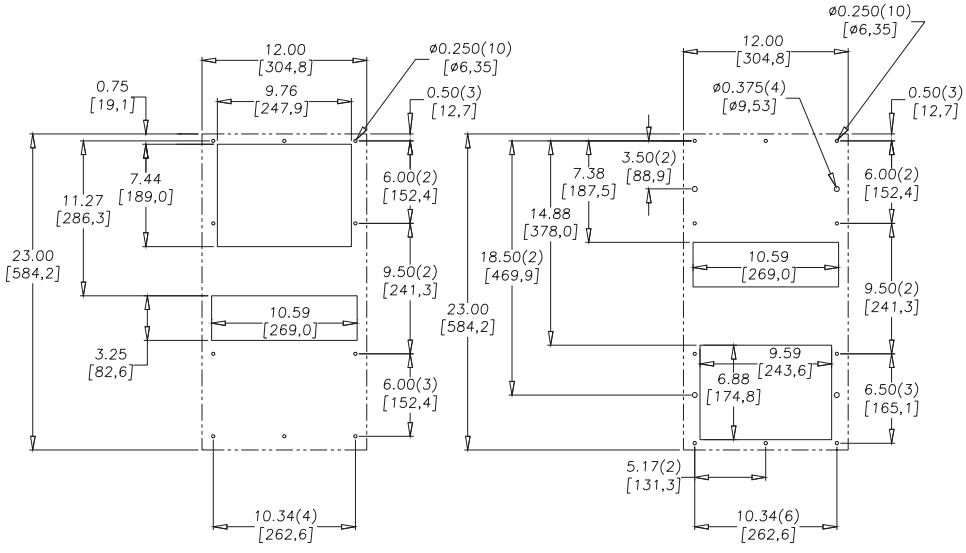
CLIMAGUARD™ Outdoor Heat Exchangers

Performance Data **TX23 Models 14 W/°F (25 W/°C)**

CATALOG NUMBER	TX231416100	TX231426100	TX231424100	TX231448100
COOLING PERFORMANCE				
Nominal:				
W per °F	**14**	**14**	**14**	**14**
W per °C	**25**	**25**	**25**	**25**
Refrigerant	N/A	N/A	N/A	N/A
Refrigerant Charge (ounces/grams)	N/A	N/A	N/A	N/A
Operating Temperature Range				
Maximum (°F/°C)	149/65	149/65	149/65	149/65
Minimum (°F/°C)	-40/-40	-40/-40	-40/-40	-40/-40
Airflow at 0 Static Pressure:				
Internal loop 50 Hz (CFM / m^3/hr.)	69/117	69/117	N/A	N/A
External loop 50 Hz (CFM / m^3/hr.)	58/98	58/98	N/A	N/A
Internal loop 60 Hz (CFM / m^3/hr.)	84/142	84/142	175/268	175/268
External loop 60 Hz (CFM / m^3/hr.)	69/117	69/117	158/297	158/297
ELECTRICAL DATA				
Rated Voltage	**115 VAC**	**230 VAC**	**24 VDC**	**48 VDC**
Frequency (Hz)	50/60	50/60	50/60	50/60
Operating Range	+/- 10%	+/- 10%	+/- 10%	+/- 10%
Max. Power Consumption (W at 50/60 Hz)	69	23	82	87
Max. Nominal Current (A at 50/60 Hz)	0.6	0.1	3.4	1.8
Agency Approvals	cUL Listed CE		cUL Listed CE	
Power Input Description	6-ft. cord with NEMA 5-15 plug	6-ft. cord with NEMA 6-15 plug	Terminal block	Terminal block
ENCLOSURE PROTECTION				
UL Type	Type 12/3R/4 standard 4X optional		Type 12/3R/4 standard 4X optional	
SOUND LEVEL				
At 1.5 M	56 dBA		56 dBA	
UNIT CONSTRUCTION				
Material	Mild steel sheet metal standard Stainless steel optional		Mild steel sheet metal standard Stainless steel optional	
Finish	RAL 7035 light-gray, semi-textured powder-coat paint standard		RAL 7035 light-gray, semi-textured powder-coat paint standard	
UNIT DIMENSIONS				
Height (in./mm)	23/584.2	23/584.2	23/584.2	23/584.2
Width (in./mm)	12/304.8	12/304.8	12/304.8	12/304.8
Depth (in./mm)	7.1/180.3	7.1/180.3	7.1/180.3	7.1/180.3
Weight (lb./kg)	30/13.6	30/13.6	30/13.6	30/13.6

TX23 DC Models 14 W/°F (25 W/°C)



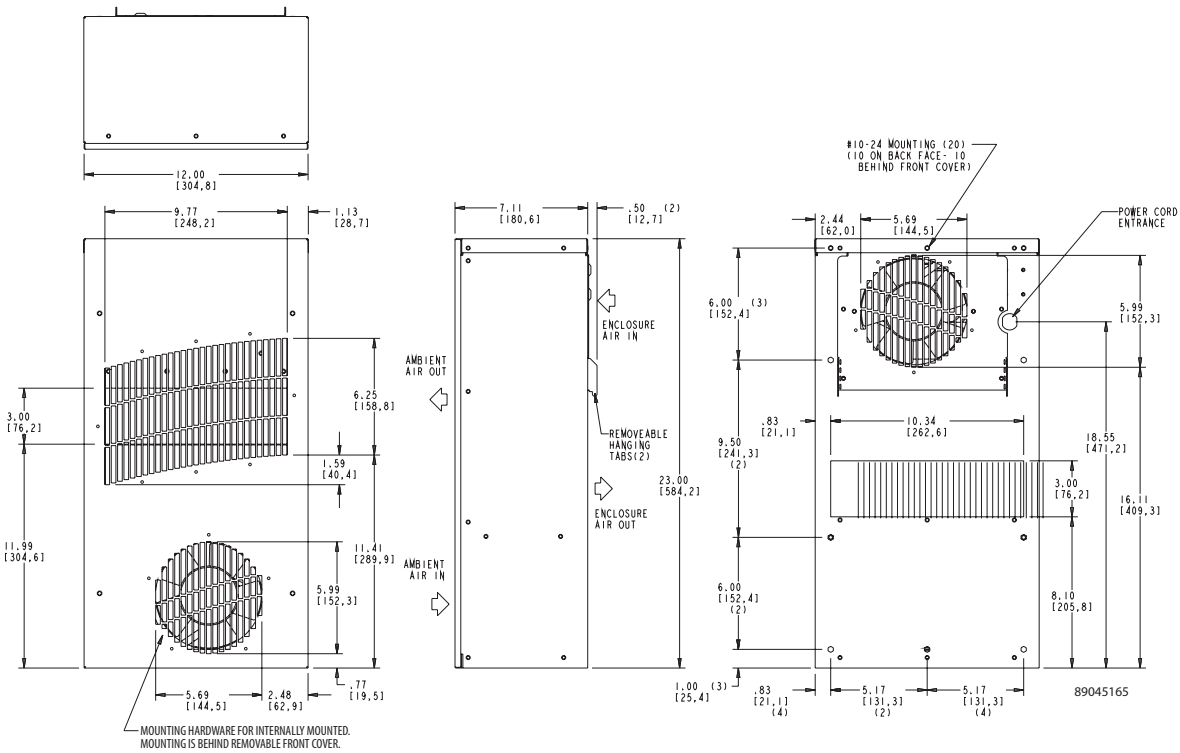


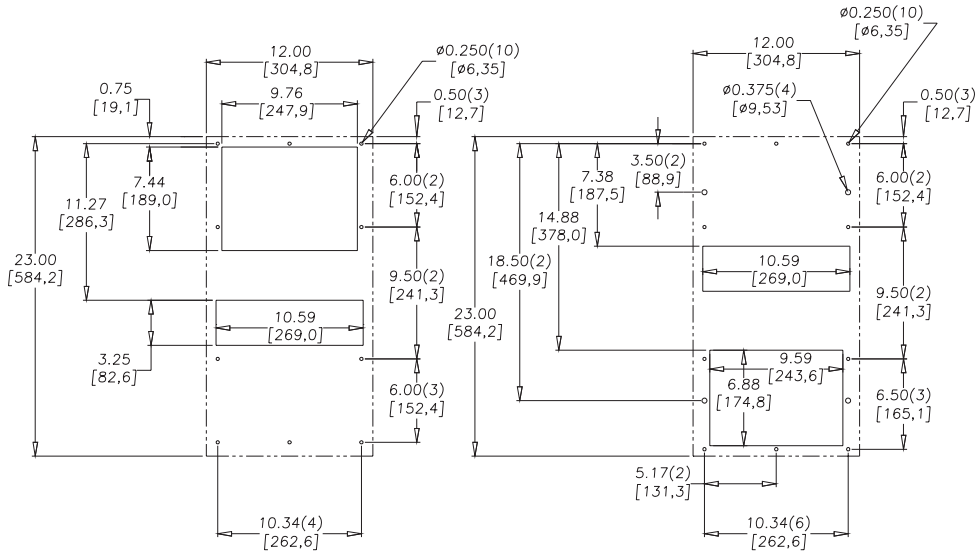
CUTOUT INSTRUCTIONS
(AS VIEWED FROM OUTSIDE OF ENCLOSURE)

NOTES:
1. DASHED LINES REPRESENT HEAT EXCHANGER.

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

TX23 AC Models 14 W/°F (25 W/°C)





CUTOUT INSTRUCTIONS
(AS VIEWED FROM OUTSIDE OF ENCLOSURE)

NOTES:
1. DASHED LINES REPRESENT HEAT EXCHANGER.

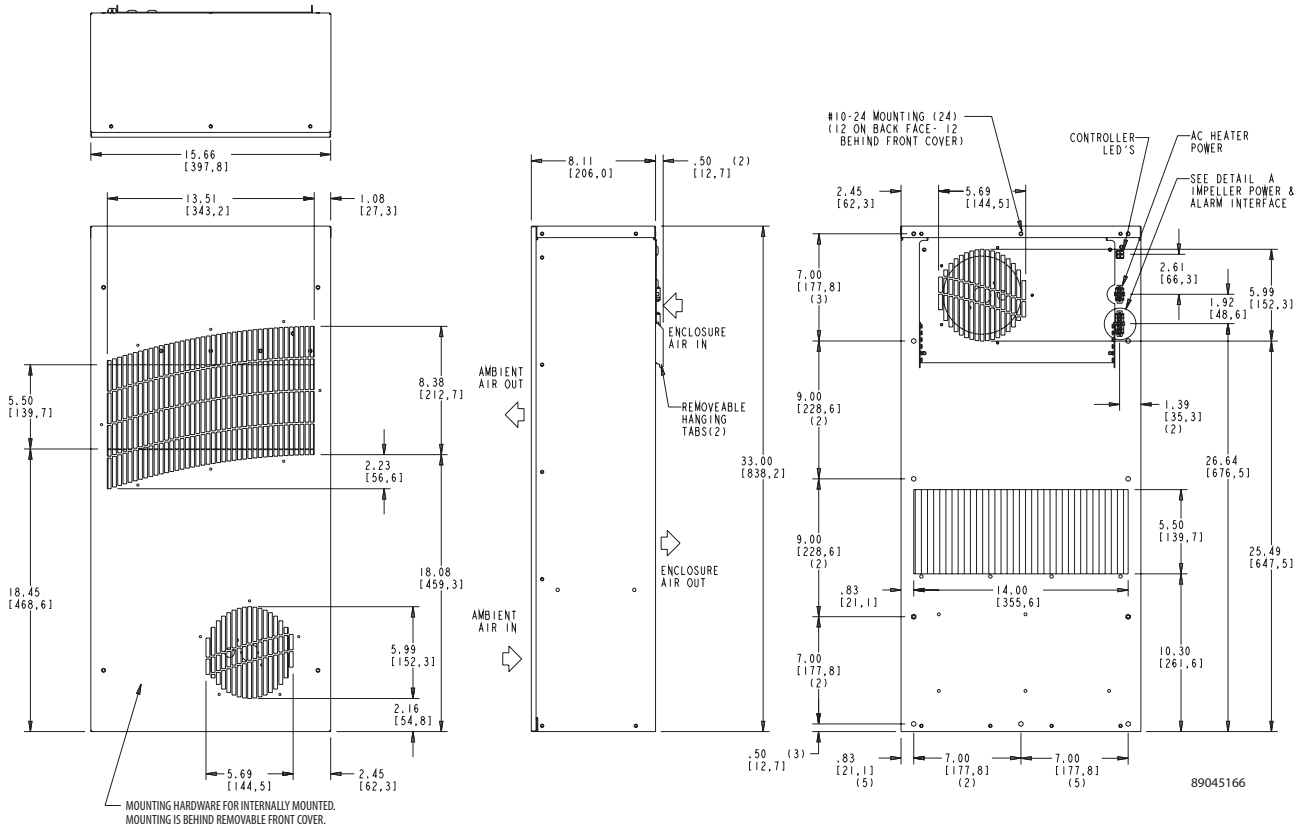
Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

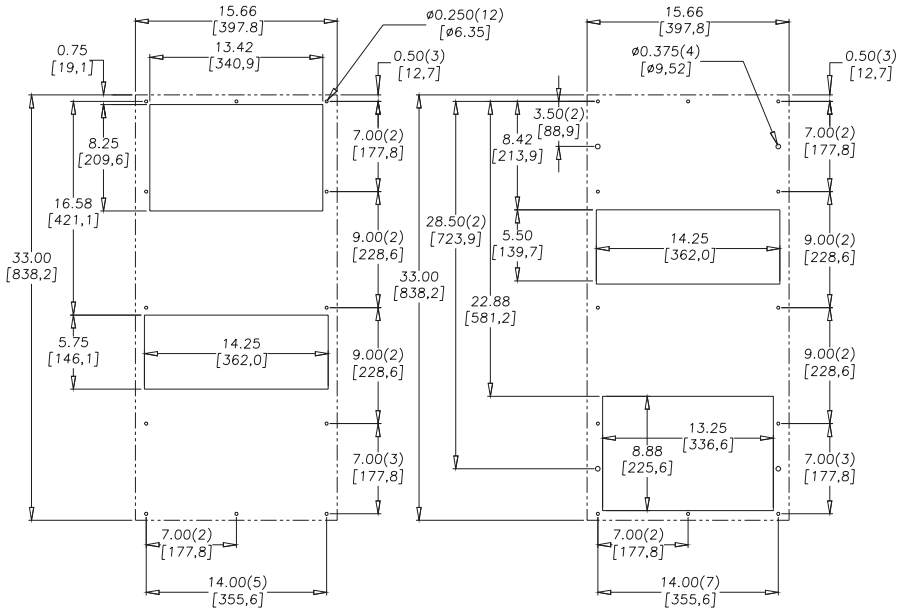
CLIMAGUARD™ Outdoor Heat Exchangers

Performance Data **TX33 Models 28 W/°F (50 W/°C)**

CATALOG NUMBER	TX332816100	TX332826100	TX332824100	TX332848100
COOLING PERFORMANCE				
Nominal:				
W per °F	**28**	**28**	**28**	**28**
W per °C	**50**	**50**	**50**	**50**
Refrigerant	N/A	N/A	N/A	N/A
Refrigerant Charge (ounces/grams)	N/A	N/A	N/A	N/A
Operating Temperature Range:				
Maximum (°F/°C)	149/65	149/65	149/65	149/65
Minimum (°F/°C)	-40/-40	-40/-40	-40/-40	-40/-40
Airflow at 0 Static Pressure:				
Internal loop 50 Hz (CFM / m^3/hr.)	212/360	212/360	N/A	N/A
External loop 50 Hz (CFM / m^3/hr.)	238/404	238/404	N/A	N/A
Internal loop 60 Hz (CFM / m^3/hr.)	228/387	228/387	228/387	228/387
External loop 60 Hz (CFM / m^3/hr.)	263/447	263/447	166/282	166/282
ELECTRICAL DATA				
Rated Voltage	**115 VAC**	**230 VAC**	**24 VDC**	**48 VDC**
Frequency (Hz)	50/60	50/60	50/60	50/60
Operating Range	+/- 10%	+/- 10%	+/- 10%	+/- 10%
Max. Power Consumption (W at 50/60 Hz)	161	92	82	87
Max. Nominal Current (A at 50/60 Hz)	1.4	0.4	3.4	1.8
Agency Approvals	cUL Listed CE		cUL Listed CE	
Power Input Description	6-ft. cord with NEMA 5-15 plug	6-ft. cord with NEMA 6-15 plug	Terminal block	Terminal block
ENCLOSURE PROTECTION				
UL Type	Type 12/3R/4 standard 4X optional		Type 12/3R/4 standard 4X optional	
SOUND LEVEL				
At 1.5 M	56 dBA		56 dBA	
UNIT CONSTRUCTION				
Material	Mild steel sheet metal standard Stainless steel optional		Mild steel sheet metal standard Stainless steel optional	
Finish	RAL 7035 light-gray, semi-textured powder-coat paint standard		RAL 7035 light-gray, semi-textured powder-coat paint standard	
UNIT DIMENSIONS				
Height (in./mm)	33/838.2	33/838.2	33/838.2	33/838.2
Width (in./mm)	15.7/398.8	15.7/398.8	15.7/398.8	15.7/398.8
Depth (in./mm)	8.1/205.7	8.1/205.7	8.1/205.7	8.1/205.7
Weight (lb./kg)	45/20.4	45/20.4	45/20.4	45/20.4

TX33 DC Models 28 W/°F (50 W/°C)





CUTOUT INSTRUCTIONS
(AS VIEWED FROM OUTSIDE OF ENCLOSURE)

NOTES:
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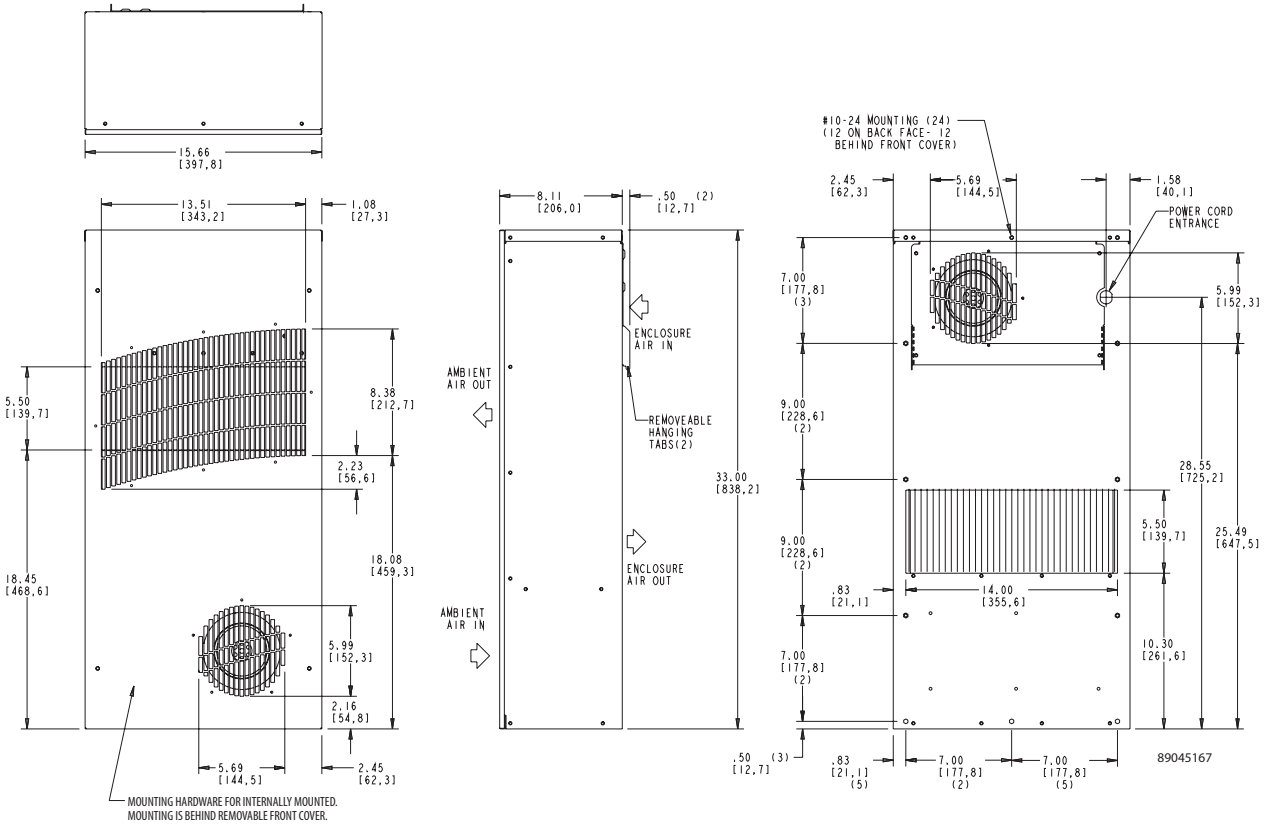
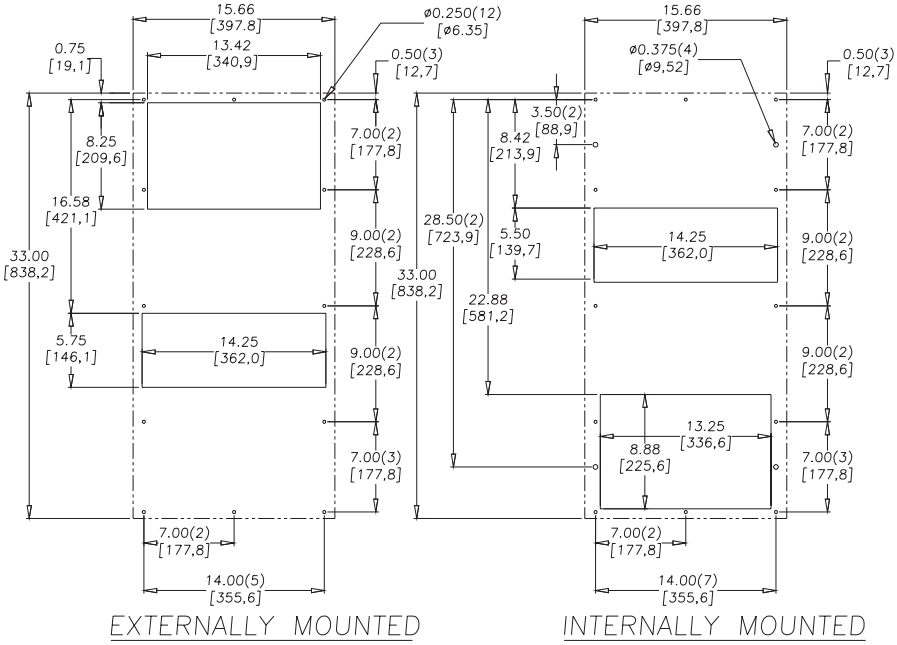
TX33 AC Models 28 W/°F (50 W/°C)





CUTOUT INSTRUCTIONS
(AS VIEWED FROM OUTSIDE OF ENCLOSURE)

NOTES:
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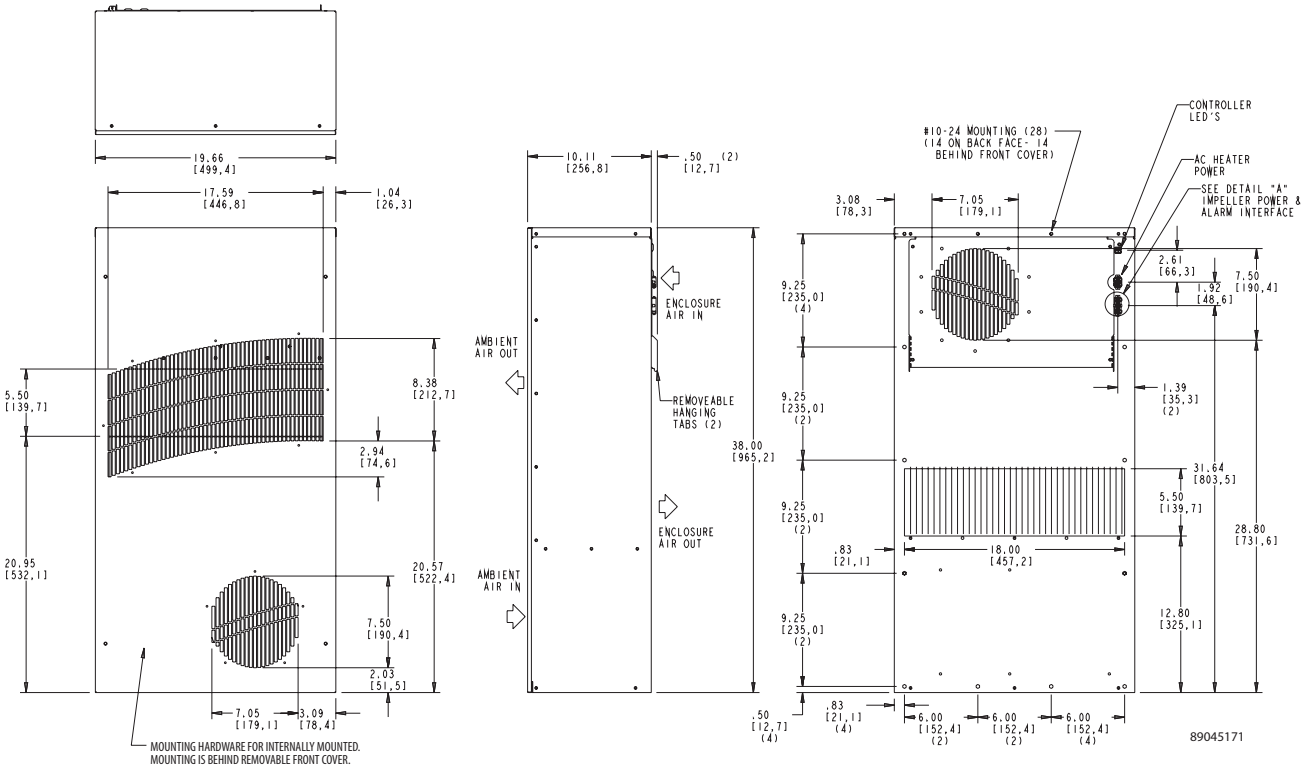
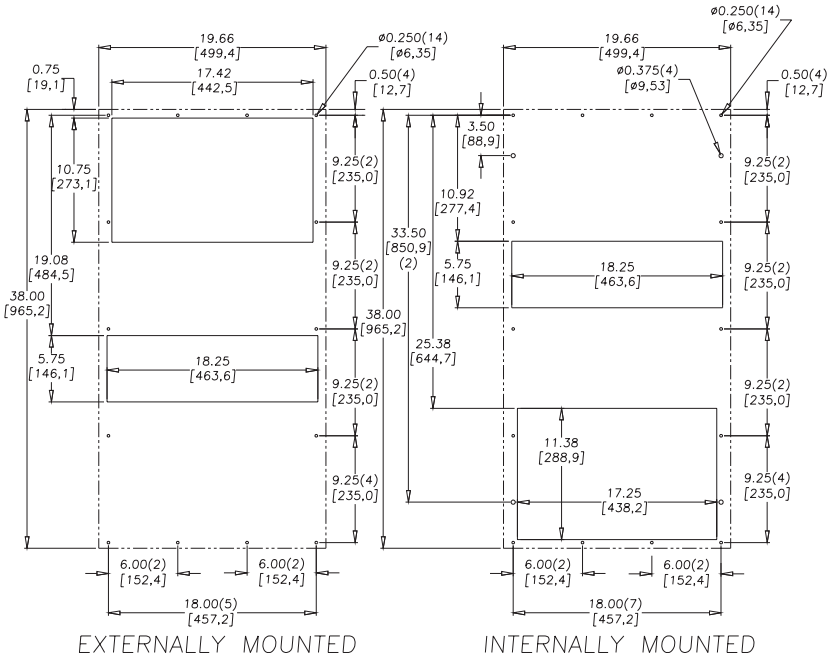
CLIMAGUARD™ Outdoor Heat Exchangers

Performance Data **TX38 Models 56 W/°F (100 W/°C)**

CATALOG NUMBER	TX385616100	TX385626100	TX385624-00	TX385648100
COOLING PERFORMANCE				
Nominal:				
W per °F	**56**	**56**	**56**	**56**
W per °C	**100**	**100**	**100**	**100**
Refrigerant	N/A	N/A	N/A	N/A
Refrigerant Charge (ounces/grams)	N/A	N/A	N/A	N/A
Operating Temperature Range:				
Maximum (°F/°C)	149/65	149/65	149/65	149/65
Minimum (°F/°C)	-40/-40	-40/-40	-40/-40	-40/-40
Airflow at 0 Static Pressure:				
Internal loop 50 Hz (CFM / m^3/hr.)	425/722	425/722	N/A	N/A
External loop 50 Hz (CFM / m^3/hr.)	461/738	461/738	N/A	N/A
Internal loop 60 Hz (CFM / m^3/hr.)	477/810	477/810	368/625	368/625
External loop 60 Hz (CFM / m^3/hr.)	517/878	517/878	422/717	422/717
ELECTRICAL DATA				
Rated Voltage	**115 VAC**	**230 VAC**	**24 VDC**	**48 VDC**
Frequency (Hz)	50/60	50/60	50/60	50/60
Operating Range	+/- 10%	+/- 10%	+/- 10%	+/- 10%
Max. Power Consumption (W at 50/60 Hz)	368	276	207	279
Max. Nominal Current (A at 50/60 Hz)	2.3/3.2	0.7/1.2	8.6	5.8
Agency Approvals	cUL Listed CE		cUL Listed CE	
Power Input Description	6-ft. cord with NEMA 5-15 plug	6-ft. cord with NEMA 6-15 plug	Terminal block	Terminal block
ENCLOSURE PROTECTION				
UL Type	Type 12/3R/4 standard 4X optional		Type 12/3R/4 standard 4X optional	
SOUND LEVEL				
At 1.5 M	64 dBA		64 dBA	
UNIT CONSTRUCTION				
Material	Mild Mild steel sheet metal standard		Mild Mild steel sheet metal standard	
Finish	RAL 7035 light-gray, semi-textured powder-coat paint standard		RAL 7035 light-gray, semi-textured powder-coat paint standard	
UNIT DIMENSIONS				
Height (in./mm)	38/965.2	38/965.2	38/965.2	38/965.2
Width (in./mm)	19.7/500.4	19.7/500.4	19.7/500.4	19.7/500.4
Depth (in./mm)	10.1/256.5	10.1/256.5	10.1/256.5	10.1/256.5
Weight (lb./kg)	66/30	66/30	66/30	66/30

TX38 DC Models 56 W/°F (100 W/°C)





NOTES:
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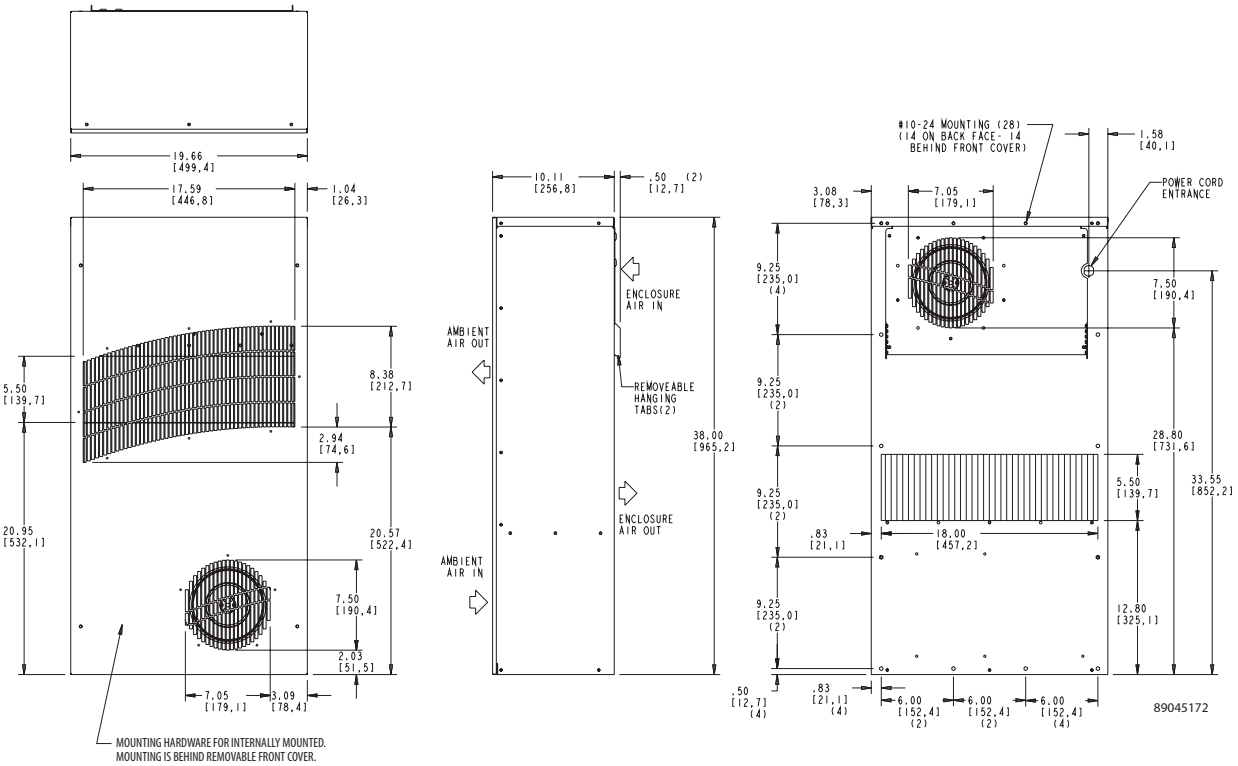
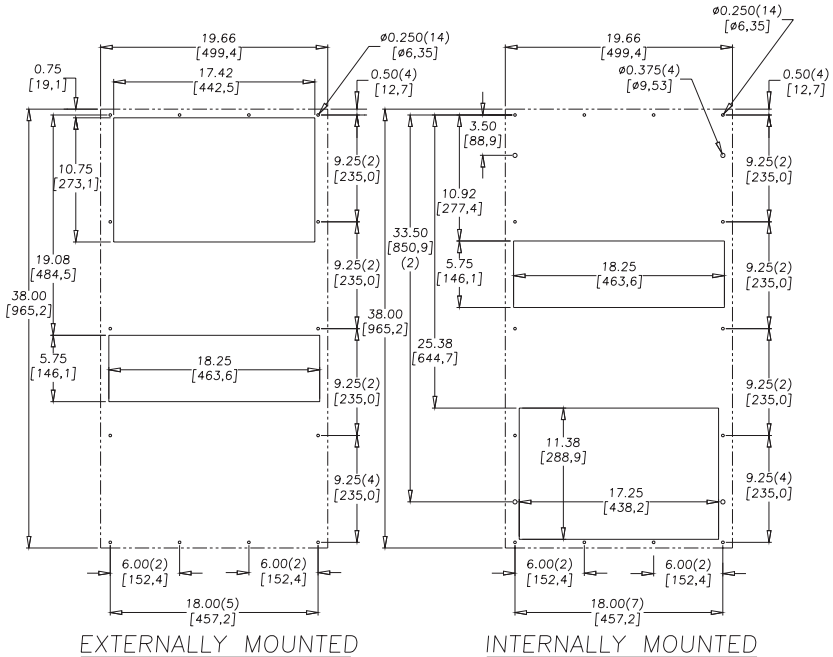
TX38 AC Models 56 W/°F (100 W/°C)





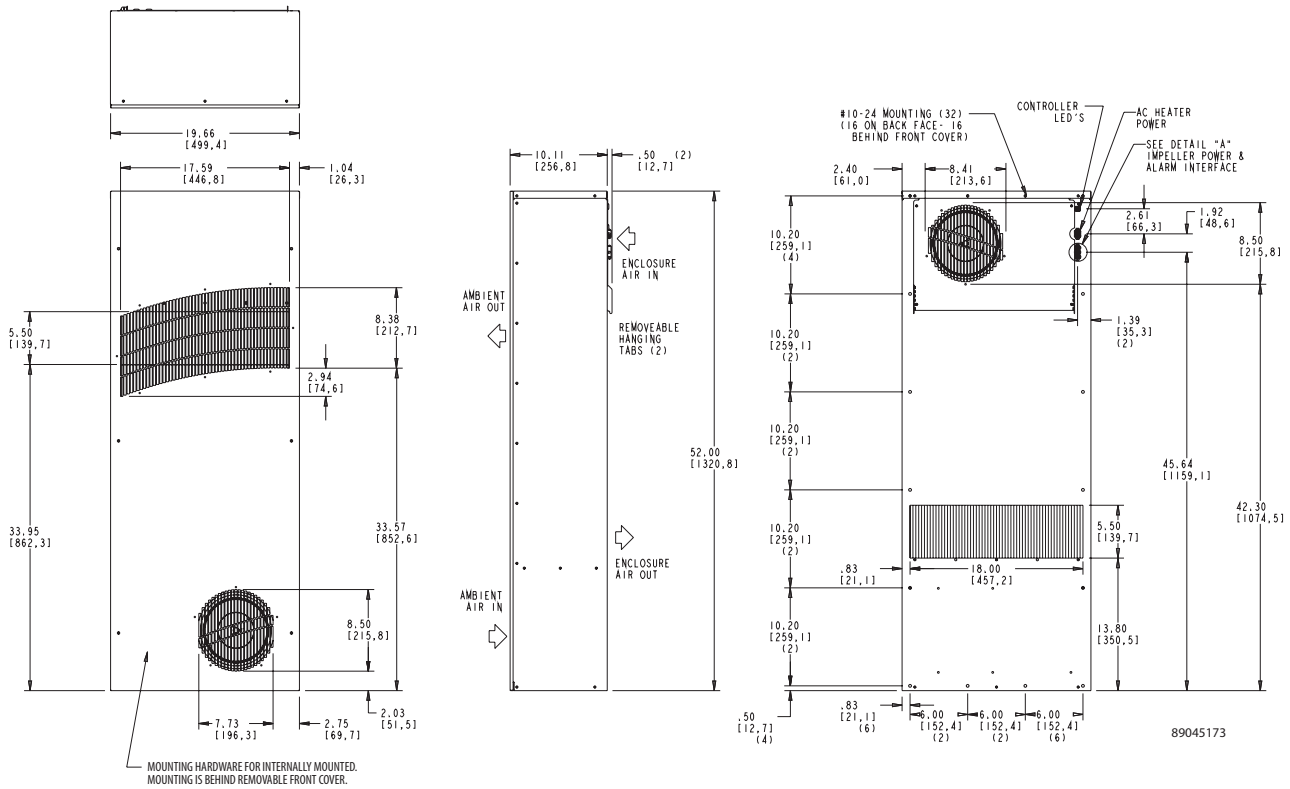
Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the overall design of your electronic system.

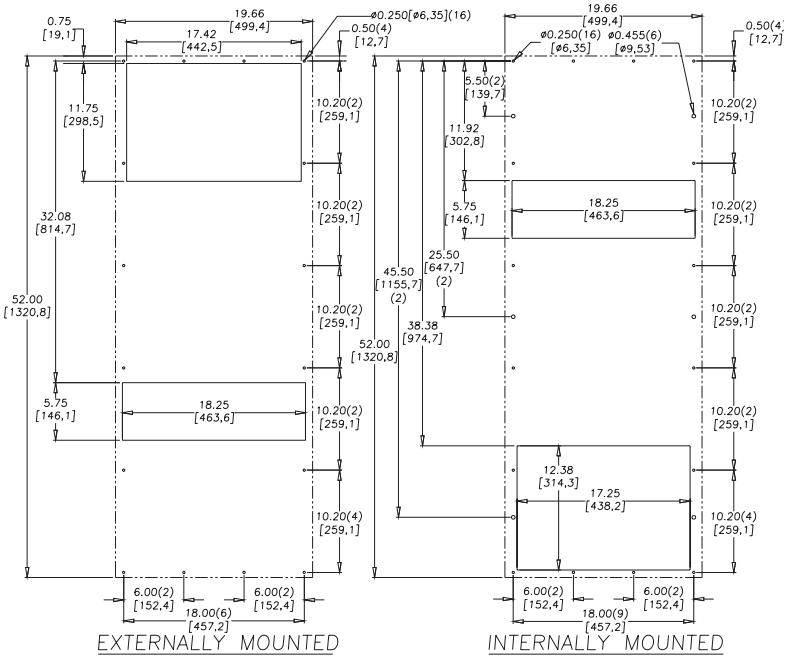
CLIMAGUARD™ Outdoor Heat Exchangers

Performance Data **TX52 Models 83 W/°F (150 W/°C)**

CATALOG NUMBER	TX528316100	TX528326100	TX528324100	TX528348100
COOLING PERFORMANCE				
Nominal:				
W per °F	**83**	**83**	**83**	**83**
W per °C	**150**	**150**	**150**	**150**
Refrigerant	N/A	N/A	N/A	N/A
Refrigerant Charge (ounces/grams)	N/A	N/A	N/A	N/A
Operating Temperature Range:				
Maximum (°F/°C)	149/65	149/65	149/65	149/65
Minimum (°F/°C)	-40/-40	-40/-40	-40/-40	-40/-40
Airflow at 0 Static Pressure:				
Internal loop 50 Hz (CFM / m^3/hr.)	495/841	495/841	N/A	N/A
External loop 50 Hz (CFM / m^3/hr.)	540/917	540/917	N/A	N/A
Internal loop 60 Hz (CFM / m^3/hr.)	533/905	533/905	466/792	466/792
External loop 60 Hz (CFM / m^3/hr.)	605/1028	605/1028	547/929	547/929
ELECTRICAL DATA				
Rated Voltage	**115 VAC**	**230 VAC**	**24 VDC**	**48 VDC**
Frequency (Hz)	50/60	50/60	50/60	50/60
Operating Range	+/- 10%	+/- 10%	+/- 10%	+/- 10%
Max. Power Consumption (W at 50/60 Hz)	782	771	507	375
Max. Nominal Current (A at 50/60 Hz)	4.3/6.7	2.2/3.4	21.1	7.8
Agency Approvals	cUL Listed CE		cUL Listed CE	
Power Input Description	6-ft. cord with NEMA 5-15 plug	6-ft. cord with NEMA 6-15 plug	Terminal block	Terminal block
ENCLOSURE PROTECTION				
UL Type	Type 12/3R/4 standard 4X optional		Type 12/3R/4 standard 4X optional	
SOUND LEVEL				
At 1.5 M	68 dBA		68 dBA	
UNIT CONSTRUCTION				
Material	Mild steel sheet metal standard Stainless steel optional		Mild steel sheet metal standard Stainless steel optional	
Finish	RAL 7035 light-gray, semi-textured powder-coat paint standard		RAL 7035 light-gray, semi-textured powder-coat paint standard	
UNIT DIMENSIONS				
Height (in./mm)	52/1320.8	52/1320.8	52/1320.8	52/1320.8
Width (in./mm)	19.7/500.4	19.7/500.4	19.7/500.4	19.7/500.4
Depth (in./mm)	10.1/256.5	10.1/256.5	10.1/256.5	10.1/256.5
Weight (lb./kg)	100/45.3	100/45.3	100/45.3	100/45.3

TX52 DC Models 83 W/°F (150 W/°C)





CUTOUT INSTRUCTIONS
(AS VIEWED FROM OUTSIDE OF ENCLOSURE)

NOTES:
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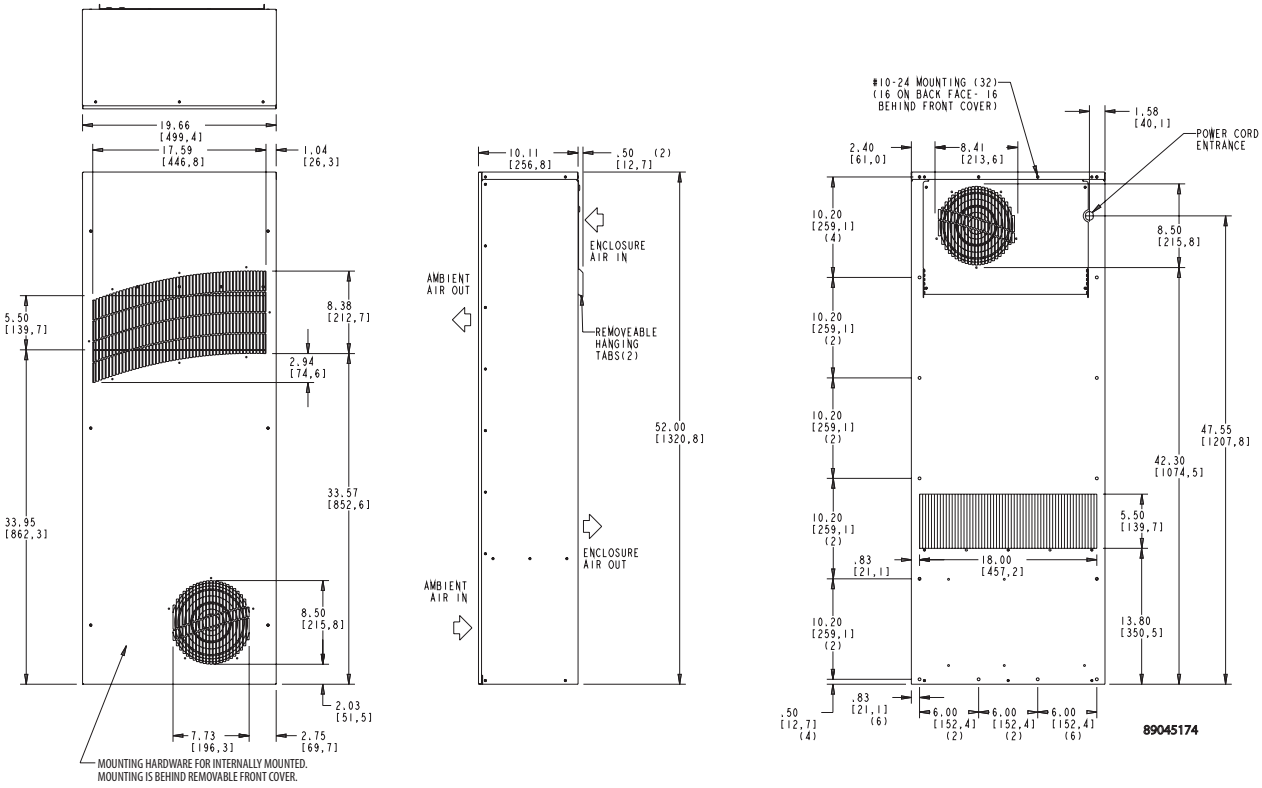
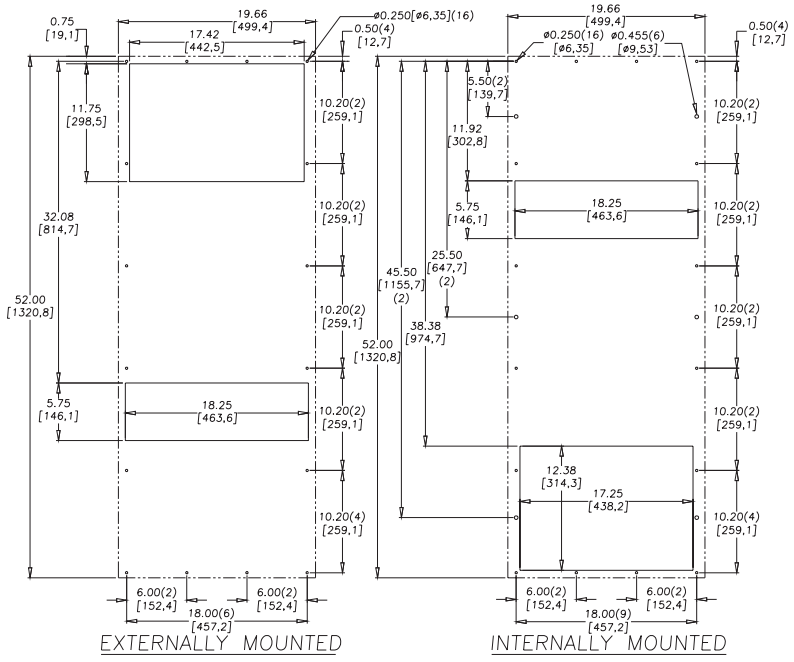
TX52 AC Models 83 W/°F (150 W/°C)





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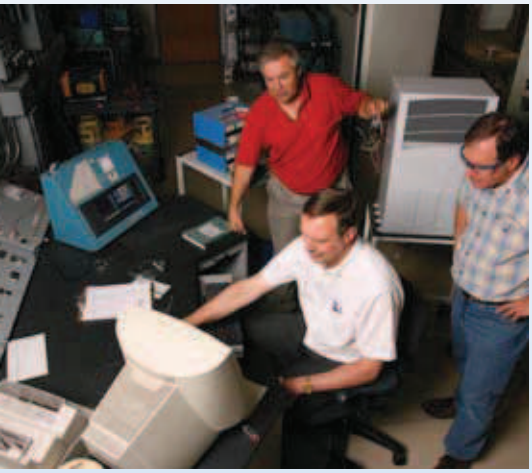
Notes

Engineered Protective Cooling Solutions



From simple blowers to packaged heat exchanger cores and sophisticated water-cooling devices, Pentair Technical Products designs and manufactures McLean engineered thermal management systems for virtually any electronics cooling application.

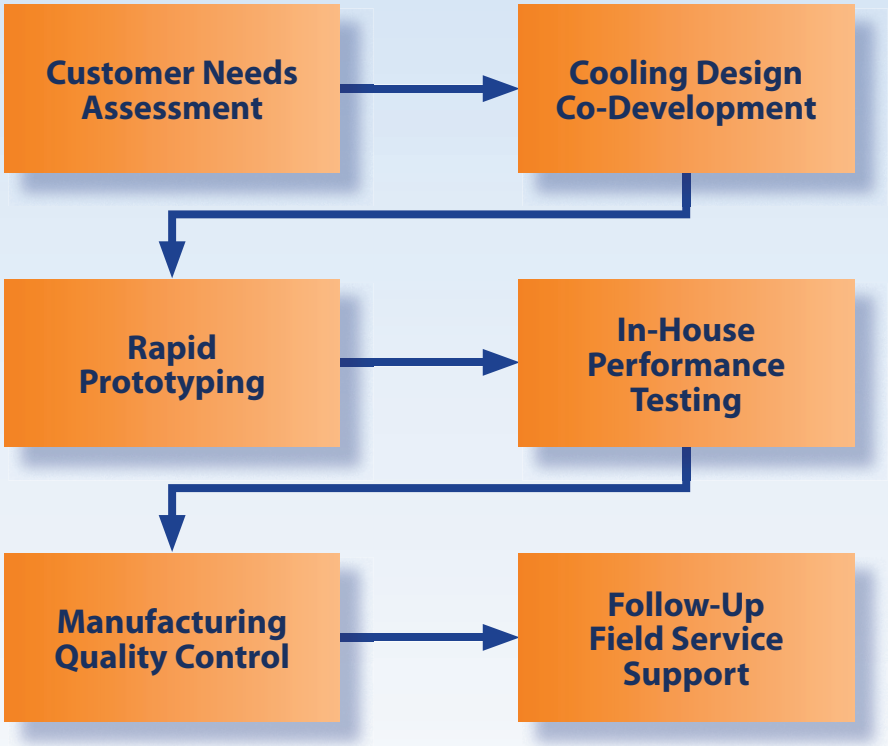
No one matches our flexibility, engineering experience and speed-to-market, thanks to these custom solution capabilities:

- 100+ combined years of thermal management engineering experience
- Rapid component prototyping
- Extensive in-house test facilities—CFD modeling, thermal cycling, salt fog, sound chamber and airflow
- UL client test data program for fast agency approvals

ENGINEERED SOLUTION PROCESS

Each design-to-spec cooling project is assigned a lead thermal engineer and supported by a dedicated cross-functional team. We then follow a proven development process from start to finish with every customer, ensuring timely and successful delivery of the engineered thermal solution.

MCLEAN ENGINEERED SOLUTION DEVELOPMENT PROCESS



Delivered with unparalleled flexibility, engineering experience and speed-to-market

ENGINEERED AIR CONDITIONERS

McLean engineered air conditioner solutions are designed and built by some of the most knowledgeable engineers in the industry. Using proven, environmentally friendly components, our experts can develop an energy-efficient, low-noise, reliable cooling system that fits your unique cooling requirements.

Pentair Technical Products also offers McLean engineered electronic controls to enhance performance and protect your electronics. These intelligent control systems range from low-cost airflow sensors to complex configurations with multiple sensors monitoring and reporting cooling status, faults and remote communications.

Your engineered unit will undergo our in-house "severe conditions" test to ensure it meets your exacting performance parameters. We will ensure each air conditioner meets UL, cUL, CSA, Bellcore, NEMA, IEC, European Safety and FCC compliances and standards. On-site UL certification is also available.

ENGINEERED HEAT EXCHANGER SOLUTIONS

Pentair Technical Products cooling experts work closely with your project team to design, develop and manufacture engineered heat exchanger solutions to your exact specifications. Engineered units are available with AC and DC high-efficiency air movers or DC-only with a battery backup.

We offer corrosion-resistant designs and finishes such as conversion coating, powder paint and chromate. Intelligent controls can be added with functions you specify, including speed control, fault indication, diagnostics, power conditioning, filtering and RS232 and I2C communications.

Using proprietary software to develop custom heat exchanger prototypes, we can test several unit dimensions and predict performance prior to build. And if your lead time is short, prototypes can often be manufactured in less than two weeks.

Model Number Index

Model Number Index

Model Number Index

Abbreviations

"	Inch (1" = 2,54 cm)
AC	Alternating current
Amps	Ampere, electric current unit (A)
ANSI	American National Standards Institute
ANSI 61	Gray (RAL 7042)
ANSI 70	Light gray (RAL 7035)
BTU, Btu, BTUs	British Thermal Unit
C, °C	Degree Celsius (= 1/1,8 × [°F - 32] = K –273,15 °C)
CE	Conformité Européenne, corresponds to EU guidelines
CFM, cfm	Cubic feet per minute (airflow volume)
CSA	Canadian Standards Association
cUL	Underwriters Laboratories Inc. (USA safety regulations), c - Canada
cUR	UL Recognized to Canadian (cUR) safety requirements
dB(A)	Decibels, volume level
DC	Direct current (unidirectional flow of electric charge)
F, °F	Degree Fahrenheit (= 1,8 × °C + 32)
Ft., ft.	Foot (1 ft = 30,48 cm)
Hr., hr.	Hour (h)
Hz	Hertz, frequency unit
IP	Ingress Protection
IEC	International Electrotechnical Commission
in.	Inch (1 in. = 2,54 cm)
K	Kelvin (= °C + 273,15 °C)
lb.	Pound (1 lb. = 453,59237 g)
M, m	Meter
m^3/h	Cubic meters per hour (airflow volume)
NEMA	National Electrical Manufacturers Association
square ft., sq ft.	Square foot (1 f^2 = 929,0304 cm^2)
Telcordia GR-487	Generic Requirements for Electronic Equipment Cabinets
ton	The unit ton is used in refrigeration and air conditioning to measure heat absorption; 1 ton = 12000 BTU/Hr = 3,5 kW
UL	Underwriters Laboratories Inc. (USA safety regulations)
V, Voltage	Volt, electric current unit
W, Watt, Watts	Watt, unit of electric power

Spare Parts Store
Safe, secure and easy to use

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

BY PHONE

Please see back cover.

ONLINE

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

MCLEAN ONLINE SPARE PARTS STORE

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

V-Series

INDOOR AIR CONDITIONERS

Reliable, easy-care cooling for industrial systems

McLean™
COOLING TECHNOLOGY

Protecting Electronics. Exceeding Expectations.™

Pentair
Technical Products

V-SERIES Indoor Air Conditioners

Reliable easy-care cooling

Engineered for cooling industrial systems in Europe and Asia

RELIABLE PERFORMANCE

- Indoor operating temperature range from 20 °C to 55 °C
- Exceptional IP 56 protection against dust and water infiltration
- Reliable mechanical thermostat to reduce the chance of failure
- All-metal shroud for rugged factory conditions
- Rigorously tested to withstand shipping vibration, high temperatures and other operating challenges
- Every unit functionally tested prior to leaving the factory

EARTH-FRIENDLY

- Rotary compressor* for energy efficiency
- R134A earth-friendly refrigerant
- RoHS compliant

V-SERIES Key Advantages

1. *Coated coils for filterless operation in most environments*
2. *Built-in hooks to hang unit on cabinet before fastening, making installation easier*
3. *T3 class rotary compressor* for energy efficiency, reliability and high ambient air temperatures*
4. *Rugged all-metal shroud for demanding factory conditions*
5. *Easy access to optional aluminum filter and other components for fast service and less system downtime*

**1200, 1500 & 2000 watt models*

VERSATILE COOLING

- 300, 600, 1200, 1500 and 2000 watt models
- 230 VAC 50 Hz power input with +/- 10% operating range
- CE and GOST certifications

ATTRACTIVE APPEARANCE

- RAL7035 light grey semi-textured paint standard
- Custom colors and textures available upon request
- Exterior surface mounting standard

EASY TO USE

- Coated coils for filterless operation in most manufacturing environments
- Convenient quick-fastening terminal block for easy power connections
- Built-in installation hooks on the back of the unit
- Unique passive condensate management system
- Full-size cut-out print included with every unit
- Easy access to the optional aluminum filter and other components

RESPONSIVE CUSTOMER SERVICE

- Popular models and spare parts in-stock, ready for immediate shipment
- Over 1,000 field repair technicians worldwide

McLean™ Global Cooling Solutions

High-performance cooling for virtually any environment

Designed to cool industrial, telecom and other electronic systems anywhere in the world

INDUSTRIAL / OUTSIDE PLANT

- SPECTRACOOL indoor / outdoor air conditioners
- PROAIR indoor heat exchangers
- Industrial filter fan collection
- Enclosure heaters
- Thermostats and other accessories

HARSH ENVIRONMENT

- PROAIR Type 4X stainless air conditioners
- Water-cooled air conditioners

TELECOMMUNICATIONS / SECURITY & DEFENSE

- T-Series outdoor air conditioners
- CLIMAGUARD outdoor heat exchangers
- Custom-sized heat exchanger cores
- Thermoelectric coolers
- Direct air cooling systems

McLean Cooling Technology makes electronics cooling easier, so you can go about your business. Be sure to ask us for more details about our global cooling solutions. Or visit our web site at ***www.McLeanCoolingTech.com***

V-Series Compact Air Conditioners

VA06 Indoor Model
300 and 600 Watts

Industry Standards

IP 56 Internal Air Loop
IP 34 External Air Loop
CE
GOST

Application

- Industrial drive enclosures
- Automotive assembly systems
- Packaging equipment
- Material handling
- Other process control systems

Features

- Coated coils for filterless operation in most manufacturing environments
- Convenient quick-fastening terminal block for easy power connections
- Built-in installation hooks on the back of the unit
- Unique passive condensate management system
- Indoor operating temperature range from 20°C to 55°C
- IP 56 protection against dust and water infiltration
- Reliable mechanical thermostat to reduce the chance of failure
- All-metal shroud for rugged factory conditions
- Exterior surface mounting standard
- Full-size cutout print included with every unit
- Easy access to the optional aluminum filter and other components
- Rigorously tested to withstand shipping vibration, high temperatures and other operating challenges
- Every unit functionally tested prior to leaving the factory
- R134A earth-friendly refrigerant and RoHS compliant

Specifications

- 300 and 600 nominal watts
- 230 VAC 50 Hz power input with +/-10 percent operating range
- CE and GOST certifications

Finish

- RAL 7035 light-gray, semi-textured powder-coat paint standard
- Other colors and textures available upon request

Model Number Structure

VA	06	06	25	G	052	S
1	2	3	4	5	6	7

1. Identifies the of air conditioner type, VA=V Series Air Conditioner.
2. Identifies the approximate height, 06=501mm to 600mm.
3. This is the air conditioner's nominal capacity in Watt, 06=600 W.
4. Identifies the input power of air conditioner, 2=220V/230V, 5=50Hz.
5. Identifies the construction material and refrigerant of air conditioner, G=Galvanized sheet metal and R134a.
6. Unique set of numbers for each air conditioner which identifies the accessories on a model, 052=Teminal block and finger guard.
7. S=Standard product.

Notes

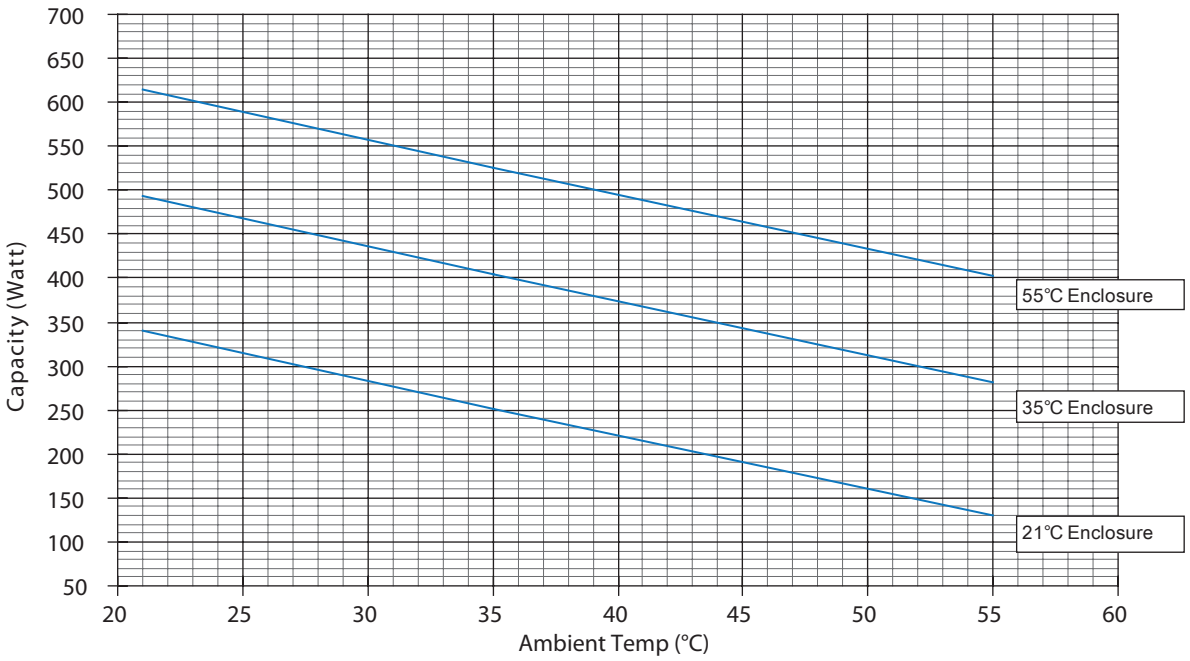
Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the design of your electronics system.

Performance Data **300 W, 600 W**

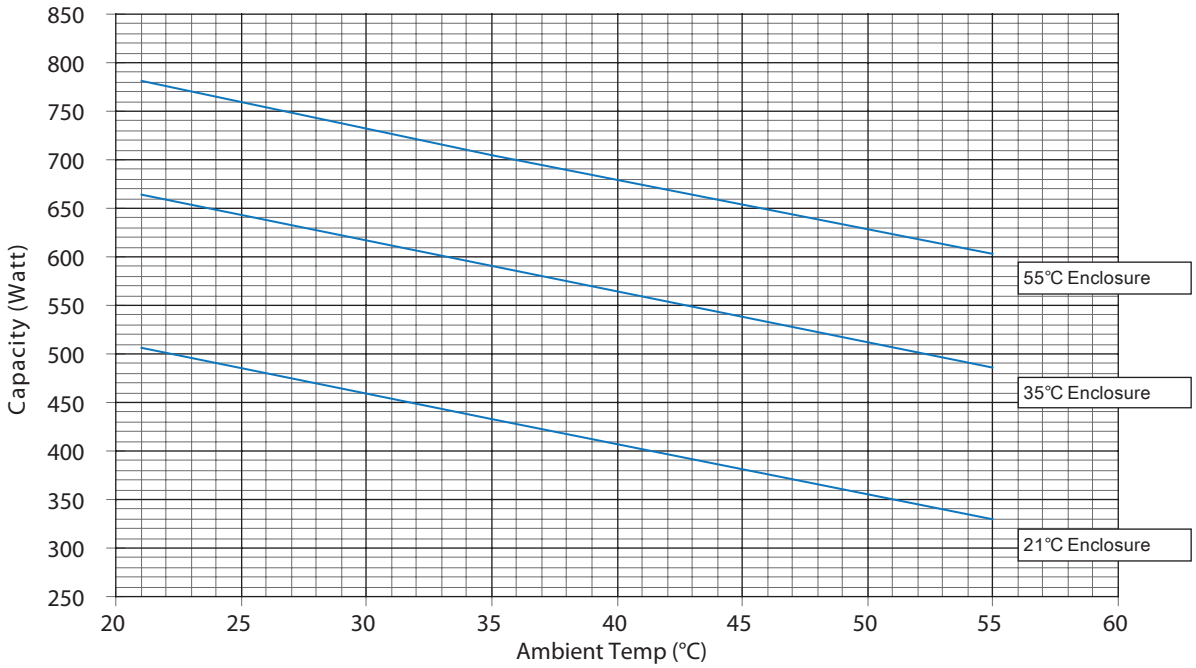
MODEL NUMBER		
	VA060325G052S	VA060625G052S
COOLING PERFORMANCE:		
Nominal:		
L35 L35		
Watt	400	590
L35 L50		
Watt	310	510
Refrigerant	R134a	R134a
Refrigerant Charge (g)	100	150
Operating Temperature Range:		
Maximum (°C)	55	55
Minimum (°C)	20	20
Airflow at 0 Static Pressure:		
Internal loop (m^3/h)	115	180
External loop (m^3/h)	325	270
Duty Cycle	100%	100%
ELECTRICAL DATA		
Rated Voltage	**230**	**230**
Frequency (Hz)	50	50
Operating Range	+/-10%	+/-10%
Power Consumption L35 L35 (Watt)	225	420
Max. Nominal Current (Amp)	1.5	2.8
Starting Current (Amp)	7	16
Pre-fuse T (Amp)	10	10
Agency Approvals	CE GOST	CE GOST
Power Input Description	Terminal Block	Terminal Block
PERFORMANCE FACTOR L35 L35		
Cooling Performance (Watt)/ Power Consumption (Watt)	1.8	1.4
ENCLOSURE PROTECTION		
IP Code	IP 56 Internal loop IP34 External loop	IP 56 Internal loop IP34 External loop
CONTROLLER		
Description	Basic Mechanical Thermostat	Basic Mechanical Thermostat
Thermostat Location	Enclosure Side	Enclosure Side
Factory Thermostat Setting (°C)	35	35
SOUND LEVEL		
At 1 M	64 dBA	72 dBA
UNIT CONSTRUCTION		
Material	Galvanized Sheet Metal Standard	Galvanized Sheet Metal Standard
Finish	RAL 7035 light-gray, semi-textured powder-coat paint standard	RAL 7035 light-gray, semi-textured powder-coat paint standard
UNIT DIMENSIONS		
Height (mm)	508	508
Width (mm)	270	270
Depth (mm)	252	252
Weight (kg)	23	25

Performance Curves for 300 and 600 Watt Models

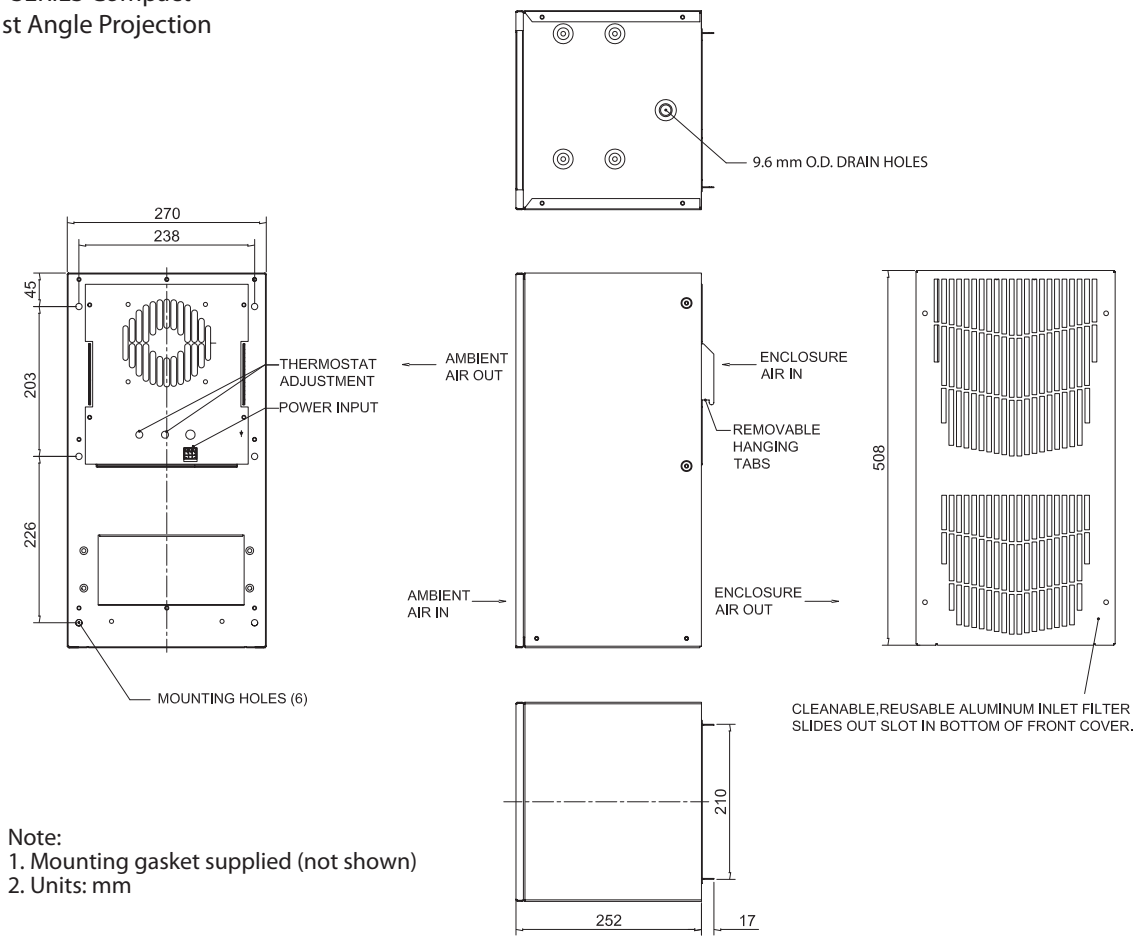
VA060325GXXXS 300 Watt Capacity Curves 230V/50Hz



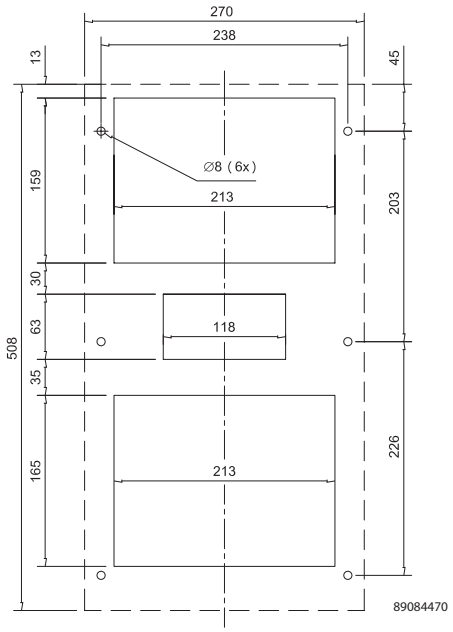
VA060625GXXXS 600 Watt Capacity Curves 230V/50Hz



V-SERIES Compact
1st Angle Projection



Note:
1. Mounting gasket supplied (not shown)
2. Units: mm



CUTOUT DIMENSIONS
EXTERNAL SURFACE MOUNTING

V-Series Mid-Size Air Conditioners

VA08 Indoor Model
1200, 1500 and 2000 Watts

Industry Standards

IP 56 Internal Air Loop
IP 34 External Air Loop
CE
GOST

Application

- Industrial drive enclosures
- Automotive assembly systems
- Packaging equipment
- Material handling
- Other process control systems

Features

- Coated coils for filterless operation in most manufacturing environments
- Convenient quick-fastening terminal block for easy power connections
- Built-in installation hooks on the back of the unit
- Unique passive condensate management system
- Indoor operating temperature range from 20 °C to 55 °C
- IP 56 protection against dust and water infiltration
- Reliable mechanical thermostat to reduce the chance of failure
- All-metal shroud for rugged factory conditions
- Exterior surface mounting standard
- Full-size cutout print included with every unit
- Easy access to the optional aluminum filter and other components
- Rigorously tested to withstand shipping vibration, high temperatures and other operating challenges
- Every unit functionally tested prior to leaving the factory
- Rotary compressor for energy efficiency
- R134A earth-friendly refrigerant and RoHS compliant

Specifications

- 1200, 1500 and 2000 nominal watts
- 230 VAC 50 Hz power input with +/-10 percent operating range
- CE and GOST certifications

Finish

- RAL 7035 light-gray, semi-textured powder-coat paint standard
- Other colors and textures available upon request

Model Number Structure

VA	06	06	25	G	052	S
1	2	3	4	5	6	7

1. Identifies the of air conditioner type, VA=V Series Air Conditioner.
2. Identifies the approximate height, 06=501mm to 600mm.
3. This is the air conditioner's nominal capacity in Watt, 06=600 W.
4. Identifies the input power of air conditioner, 2=220V/230V, 5=50Hz.
5. Identifies the construction material and refrigerant of air conditioner, G=Galvanized sheet metal and R134a.
6. Unique set of numbers for each air conditioner which identifies the accessories on a model, 052=Teminal block and finger guard.
7. S=Standard product.

Notes

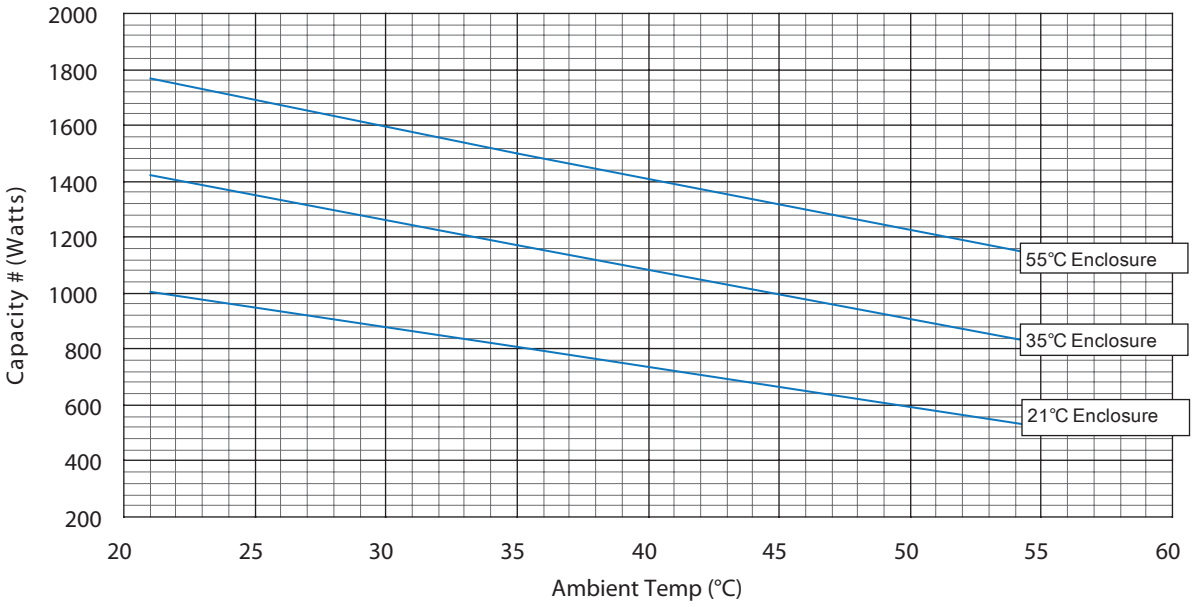
Visit www.McLeanCoolingTech.com to download 2D and 3D CAD drawings into the design of your electronics system.

Performance Data **1200 W, 1500 W, 2000 W**

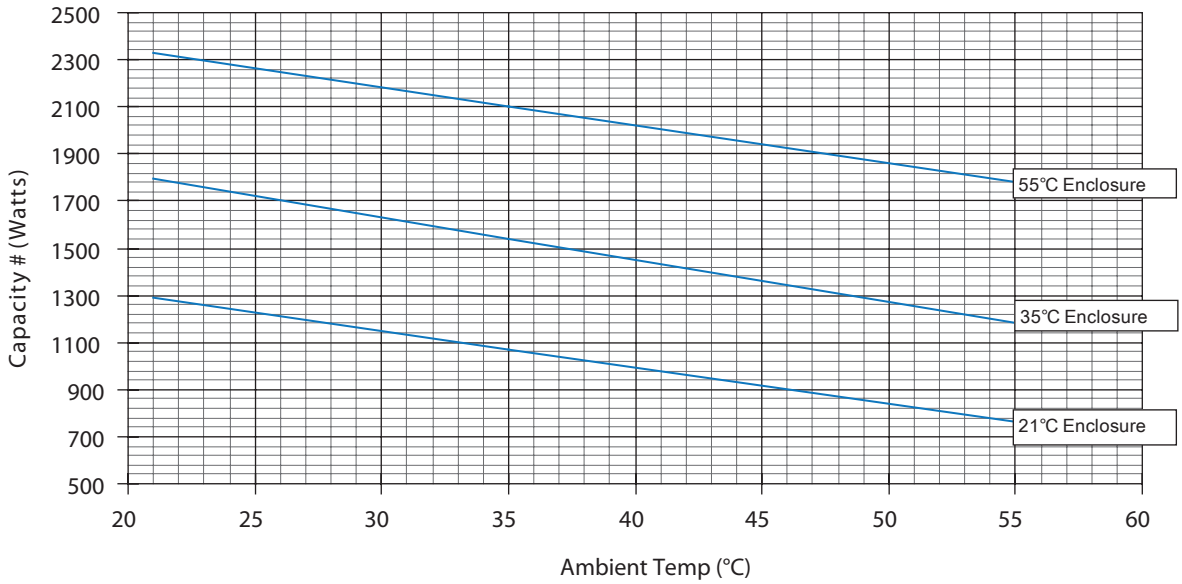
MODEL NUMBER			
Indoor Model	VA081225G052S	VA081525G052S	VA082025G052S
COOLING PERFORMANCE			
Nominal:			
L35 L35			
Watt	**1200**	**1550**	**1950**
L35 L50			
Watt	**930**	**1280**	**1700**
Refrigerant	R134a	R134a	R134a
Refrigerant Charge (g)	462	652	765
Operating Temperature Range:			
Maximum (°C)	55	55	55
Minimum (°C)	20	20	20
Airflow at 0 Static Pressure:			
Internal loop (m^3/h)	345	530	530
External loop (m^3/h)	275	545	565
Duty Cycle	100%	100%	100%
ELECTRICAL DATA			
Rated Voltage	230	230	230
Frequency (Hz)	50	50	50
Operating Range	+/-10%	+/-10%	+/-10%
Power Consumption L35 L35 (Watts)	565	610	855
Max. Nominal Current (Amps)	3.4	3.7	5.6
Starting Current (Amps)	16.2	16.3	22.7
Pre-fuse T (Amps)	10	10	10
Agency Approvals	CE GOST	CE GOST	CE GOST
Power Input Description	Terminal Block	Terminal Block	Terminal Block
PERFORMANCE FACTOR L35 L35			
Cooling Performance (Watt)/ Power Consumption (Watt)	2.1	2.5	2.3
ENCLOSURE PROTECTION			
IP Code	IP 56 Internal loop IP34 External loop	IP 56 Internal loop IP34 External loop	IP 56 Internal loop IP34 External loop
CONTROLLER			
Description	Basic Mechanical Thermostat	Basic Mechanical Thermostat	Basic Mechanical Thermostat
Thermostat Location	Enclosure Side	Enclosure Side	Enclosure Side
Factory Thermostat Setting (°C)	35	35	35
SOUND LEVEL			
At 1 M	68 dBA	71 dBA	73 dBA
UNIT CONSTRUCTION			
Material	Galvanized Sheet Metal Standard	Galvanized Sheet Metal Standard	Galvanized Sheet Metal Standard
Finish	RAL 7035 light-gray, semi-textured powder-coat paint standard	RAL 7035 light-gray, semi-textured powder-coat paint standard	RAL 7035 light-gray, semi-textured powder-coat paint standard
UNIT DIMENSIONS			
Height (mm)	725	725	725
Width (mm)	431	431	431
Depth (mm)	237	237	237
Weight (kg)	37	38	42

Performance Curves for 1200 and 1500 Watt Models

VA081225GXXXS Capacity Curves 230V/50Hz

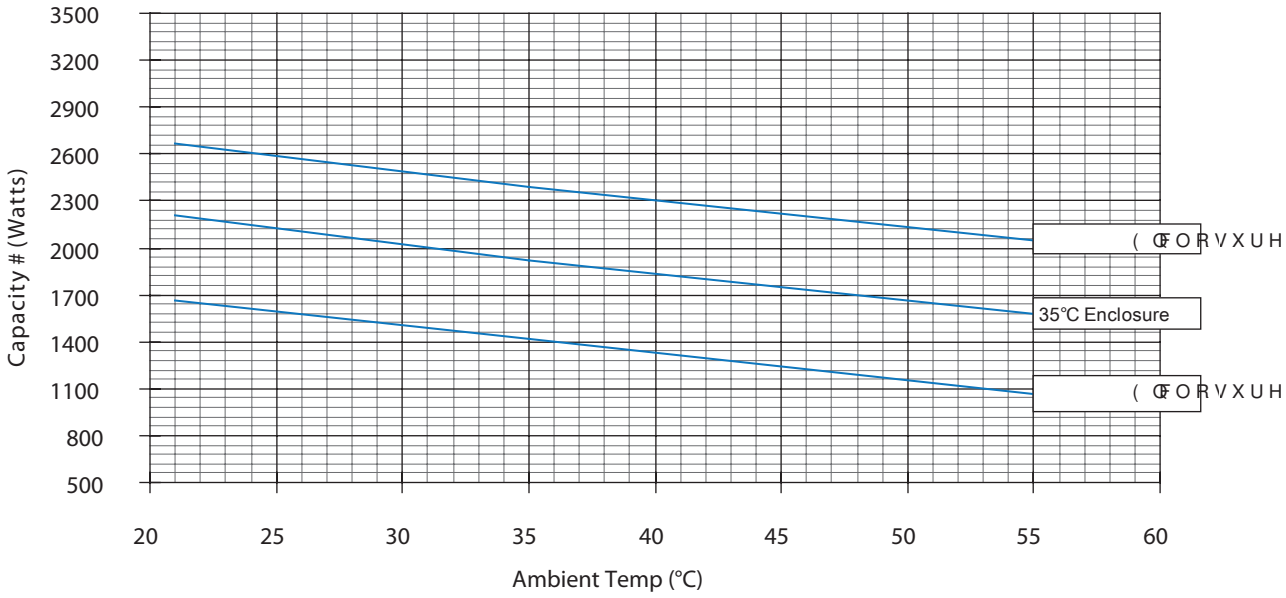


VA081525GXXXS Capacity Curves 230V/50Hz

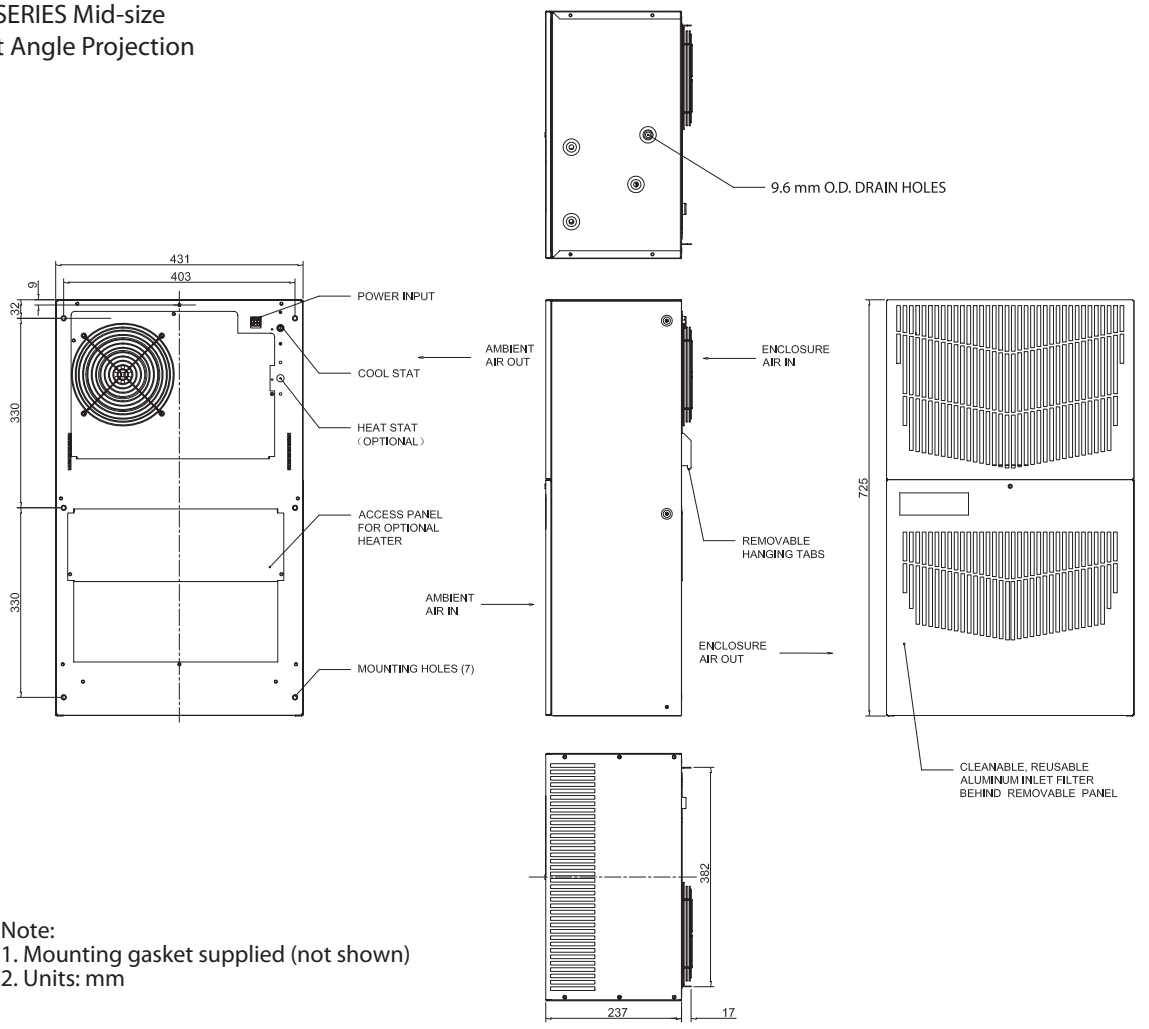


Performance Curves for 2000 Watt Model

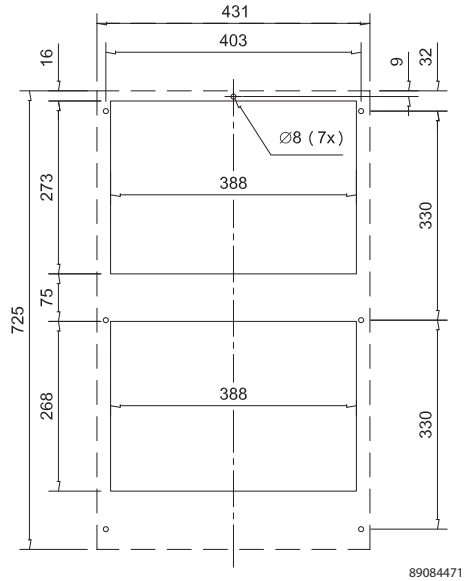
VA082025GXXXS Capacity Curves 230V/50Hz



V-SERIES Mid-size
1st Angle Projection



Note:
1. Mounting gasket supplied (not shown)
2. Units: mm



Cutout Dimensions
External Surface Mount

No company engineers and services cooling solutions for vital electronics better than

Pentair Technical Products

With more than 30 years of experience producing everything from fan assemblies to standard air conditioners and heat exchangers to engineered cooling applications for one-of-a-kind systems, Pentair Technical Products' McLean has the people and products to deliver the cool. The markets we serve include industrial automation, food and beverage, telecommunications, petrochemical, transportation, data networking, security and defense, and many others.

Pentair Technical Products understands your need for performance and does whatever it takes to ensure that when you make a promise to a customer, you can keep it.

PRODUCT SELECTION

Indoors or outdoors, McLean air conditioners, heat exchangers, air movers and controls get the job done.

CUSTOM COOLING SOLUTIONS

An experienced staff with advanced software, rapid prototyping and in-house test facilities delivers custom cooling solutions quickly and to your exact specifications.

TECHNICAL EXPERTISE AND SUPPORT

With over 30 years of experience across dozens of industries, our engineers are able to assist your project design every step of the way. We also put that same cooling know-how into the standard platform solutions that we develop for the broader market.

PRODUCT RELIABILITY

Speak with McLean customers, and you'll discover a strong market reputation for product reliability. We are ISO 9001:2008 certified. Every unit is also functionally tested before shipping.

EXPERIENCED SALES STAFF

Years of cooling systems expertise, engineering knowledge and responsive problem solving help our sales staff "listen, learn, develop and deliver."

ONLINE PARTS ORDERING

An easy-to-navigate online parts store provides fast, secure replacement part ordering 24/7.

FISCALLY STRONG

The Pentair Technical Products' McLean brand is owned by Pentair, a $3.5 billion diversified, publicly held global operating company. We handle single-unit in-stock orders to $5 million+ global projects.

GLOBAL REACH

McLean's growing worldwide network of sales, distribution and manufacturing delivers quality service for those who need global infrastructure.

SUPERIOR SERVICE AND REPAIR

Over 1,000 certified repair technicians provide 24-hour emergency service worldwide.

COOL CUSTOMER SUCCESSES Thomson and McLean Are Shaken, But Not Stirred

Thomson Broadcasting is the world leader in digital video technologies. That's why top media, entertainment and communications companies turn to Thomson to get the right images to the right place at the right time – over time.

And that's why Thomson turns to the McLean brand to help keep its customers' broadcast systems up and running 24/7.

"We recently tested a new UHF base station for one of our clients," said Don Wike, Chief Design Engineer. "We put our system, including a McLean outdoor air conditioner, through a pretty rigorous Telcordia GR487 test protocol. We shook the UHF system, dropped it from over 18 inches, and simulated years of cold winters and hot summers in a cycle chamber. After all this, the McLean unit still performed beautifully."

Don added, "Our customers count on Thomson to design a rugged digital media system. And we count on McLean to keep the electronics cool. We had over 8,000 watts of heat to dissipate in the new UHF base station system. The McLean 3-ton A/C unit proved it can handle the load. Pentair Technical Products also allowed us to use their thermal cycle test chamber, saving us R&D costs."

For electronics cooling that performs under extreme conditions, take a serious look at McLean. More cool customer stories are available at **McLeanCoolingTech.com**