THERMOELECTRIC PRODUCTS

Catalog NO.
12

Air Conditioners

Cold Plates

Liquid Chillers

Temperature Controllers

Accessories

teca

teca

www.teca-usa.com

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Hello!

Sometimes I think my interest in thermoelectric cooling and excitement about its potential for so many different applications has a genetic basis. I vividly remember back in the early '60s, my dad—an inveterate tinkerer— came home from work with an armful of thermoelectric components and a fascination with the possibilities they presented. Of course, little did I suspect at the time that I was glimpsing my future.

Thermoelectric cooling has come a long way since the early research conducted by some of the biggest names in the industry, such as Westinghouse, Borg-Warner, General Electric, and 3M. I take great pride in TECA's pioneering role in developing solid-state air conditioners for electronic enclosures. As you'll see in this catalog, today we offer a full line of cooling products from air-cooled and liquid-cooled air conditioners, to cold plates and liquid chillers, plus a wide range of accessories.

But our versatile, quality products are only part of the picture. I am also extremely proud of the dedication that the entire TECA team consistently demonstrates to you, our customers. We are committed to understanding your needs and working with you to design solutions that exceed your expectations.

Remember, when heat is your enemy—TECA is your friend. Give us a call at 888-TECA-USA (888-832-2872) and let us show you what we can do to help you.

Sincerely,

Mike Mikalauskis
President

About TECA

What We Stand On

Our mission

TECA's fundamental purpose is to provide world-class products of superior quality. Our goal is to continue setting the standard in thermoelectric cooling by monitoring and improving our operations to meet our customers' needs and exceed their expectations.

A former division of Borg-Warner, **TECA** was spun-off as an independent company in 1984.

Today the Chicago-based corporation manufactures a wide range of solid state cooling products, including air-cooled and liquid-cooled air conditioners, cold plates, and liquid chillers.

Our guiding principles

Quality is our top priority. We are "**TEAM TECA**," recognizing that our success depends upon the involvement, commitment, and performance of every team member, including suppliers.

How to use this catalog

We hope you'll view this catalog as a working guide to the possibilities of thermoelectric cooling. We've included a foundation of information designed to help you think about the applications for your company, in addition to detailed descriptions of the off-the-shelf products we offer.

TEAM TECA CUSTOM ENGINEERING

Our solutions

We can fulfill all of your cooling requirements, whatever your application. In fact, our engineers may have already developed a solution for an application similar to yours.

We offer complete engineering services, prototype development, and custom-built cooling equipment on an exclusive and confidential basis, enabling us to meet the needs of all our customers, including those in the Original Equipment Market.

We will continue to focus our efforts on the people we serve and the products we produce in order to ensure quality without sacrificing health, safety, or the environment in which we live.

TECA web site

There are numerous things you can get from the web site that you cannot get from this catalog!

- Drawings and 3D solid model of most products.
- Product Information Packets are downloadable. These are the installation and service documents and schematics which are shipped with the products when you buy them.
- This catalog is downloadable, so you can print pages or sections of interest for your own use.
- The site is often updated with news and other current items of interest ...articles, stories, links, etc.
- Teca Sizing Software is downloadable. This is a handy, easy to use program which is very helpful in choosing air conditioners of the appropriate capacity for your job.

Please keep in mind that we are always willing and available to customize existing products or to design and build new products to meet your needs.

Call us at 888-TECA-USA – we're here to help!

888-832-2872

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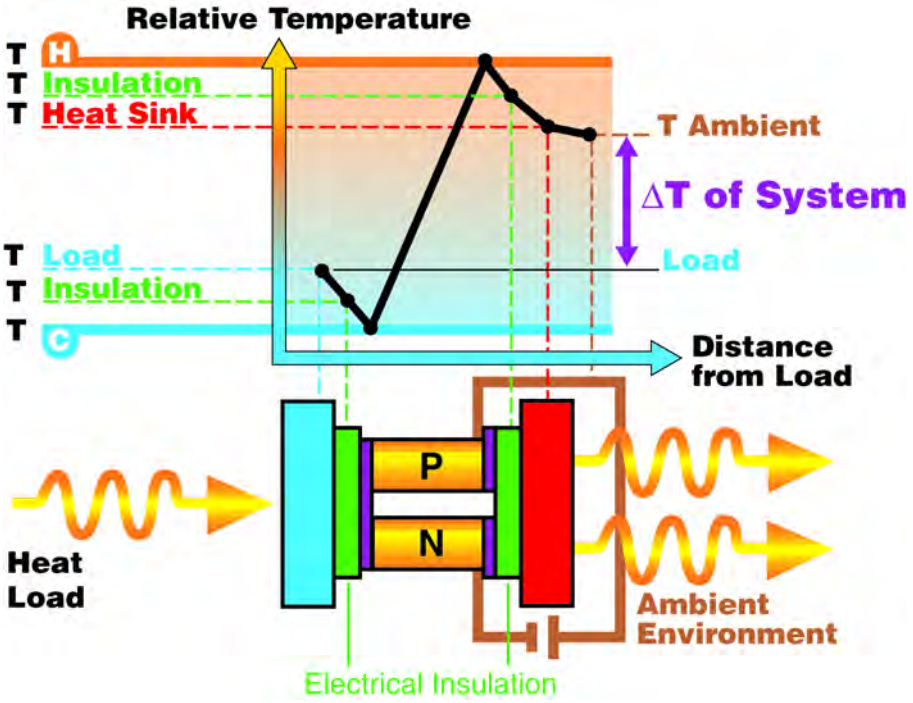
The Peltier Effect

Thermoelectric cooling, is a solid-state method of heat transfer through dissimilar semiconductor materials.
It is also called "the Peltier Effect" after the French watchmaker who discovered the phenomenon in the early 19th century. Like their conventional refrigeration counterparts, thermoelectric cooling systems obey the basic laws of thermodynamics. However, the actual system for cooling is different.

In a conventional refrigeration system, the main working parts are the evaporator, condenser, and compressor.
The evaporator surface is where the liquid refrigerant boils, changes to vapor, and absorbs heat energy. The compressor circulates the refrigerant and applies enough pressure to increase the temperature of the refrigerant above ambient level. The condenser helps discharge the absorbed heat into surrounding room air.

The three main working parts in a thermoelectric refrigeration system are a cold junction, a heat sink, and a DC power source.
Two dissimilar conductors replace the refrigerant in both liquid and vapor form. The cold sink (evaporator surface) becomes cold through absorption of energy by the electrons as they pass from one semiconductor to another, instead of energy absorption by the refrigerant as it changes from liquid to vapor. The DC power source pumps the electrons from one semiconductor to another, and the heat sink (condenser) discharges the accumulated heat energy from the system.



Therefore, the thermoelectric cooling system refrigerates without refrigerant and without the use of mechanical devices, except perhaps in the auxiliary sense.
The semiconductor materials used in thermoelectric cooling are N and P type, named because they either have more electrons than necessary to complete a perfect molecular lattice structure (N-type) or not enough electrons (P-type). The extra electrons in the N-type material and the holes left in the P-type material are called "carriers," responsible for moving the heat energy from the cold to the hot junction. Good thermoelectric semicon ductor materials such as bismuth telluride greatly impede conventional heat conduction from hot to cold areas, yet provide an easy flow for the carriers.

Product Notes

General Product Notes:

TECA builds both air cooled and liquid cooled products. The model numbers of the products (example: AHP-1200XMHC) can be very descriptive of the product. Air cooled products (prefix -AHP) use fans and finned heat sinks to transfer heat. Liquid cooled products (prefix-LHP) require a flow of water or cooling fluid to dissipate the heat. Most product families offer a selection of DC or AC voltages and temperature controllers detailed with complete part numbers on their individual catalog pages. Standard and custom air conditioners, cold plates (suffix-CP and CPV) and liquid chillers (prefix-TLC) are all made by TECA. Cooling is standard and heating can be optional or standard. Products capable of both heating and cooling typically but not always include "HC" in the suffix. The heating can be from resistive heaters or via reverse polarity (rev. pol.) input to the thermoelectrics.

Air Conditioners:

Air conditioners come in many styles to meet many needs. These styles are indicated by the prefix and the suffix in the model number. The suffixes are "AHP", air cooled heat pump, "FHP", flush mount heat pump, and "LHP", liquid cooled heat pump. "AHP" air conditioners mount through an enclosure wall with the cold side heat exchanger inside and the hot side heat exchanger outside of the enclosure. "FHP" air conditioners do not protrude into the enclosure. Products ending in "X" such as the AHP-1200X are for harsh environments. Military grade fans are used on the environment (hot) side of the units. Power supply components exposed to the environment are sealed from the environment. One step more rugged is the "XM" line of products. These products go the extra step of using military grade fans on both the hot (environment) side and the cold (enclosure) side. These products can typically handle more shock and vibration, especially along the fans axis of rotation. One step less rugged is the "XE" line of products. These are still suitable for outdoor environments and hose down applications. Rather than a military grade fan they use sealed industrial grade fans suited to the environment. Power supply components exposed to the environment are also sealed. "XP" style products are designed for hazardous (explosive) environments. They typically use military grade fans on the exposed side of the unit with other design modifications required for the environment. Most have been evaluated by a NRTL as if they were open to the environment. "CXP" style products on the other hand require a source of compressed air and are usually used on purged systems. NRTL evaluations are then performed on the entire system. Those products whose model number has no suffix or end in "FF" are for more benign factory, laboratory or office environments on NEMA 12 enclosures or similar. The products whose model numbers start with "LHP" use a liquid plate heat exchanger. By their nature these products do not have to be exposed to the environment at all. They can be mounted so they are completely inside of the enclosure. For this reason the suffixes described above are used but they are not as completely descriptive as they are for the air cooled series.

Cold Plates:

Cold plates are also offered in air and liquid cooled versions. The cold plate itself is a flat aluminum plate. The prefixes "AHP" and "LHP" and suffixes "CP", "CPHC" and "CPV" are also used as descriptive modifiers in cold plate model numbers. "CPV" style cold plates were designed to fill most laboratory and bench top needs. Features such as heating, temperature control, ramp/soak programming, remote sensors and communications are standard on "CPV" products. "CP" style products are general utility type cold plates often used as components in other products, in product assembly or testing, as prototypes for future OEM development or where simple direct contact cooling with no bells or whistles is required. They can be mounted to enclosures, walls or structures.

Liquid Chillers:

Standard liquid chillers (prefix-TLC and "RLC") are all air cooled products. They come in versions VAC or VDC, with or without temperatures controls or pumps. The TLC-1200 is a compact general purpose liquid chiller. The TLC-700 is a compact liquid chillerincluding reservoir, pump and several controller options. The TLC-900 offers the highest capacity in a benchtop unit, best control and the largest selection of pumps. The "RLC" products are rack mounted liquid chillers offering all of the features of the TLC-900, the highest capacity in 19" rack mount configuration. The "TLC" cubed products are for building into OEM applications, come in many capacities and a wide selection of input voltages.

Air Conditioner Notes

Things you need to know to start sizing an air conditioner:

Temperatures: The ambient is the air temperature around the enclosure, often the room temperature. The enclosure temperature is the temperature range you wish to maintain in the enclosure. The difference between the two is the design temperature differential (delta T). Look at these temperatures with care. What is the real maximum ambient? What is the real maximum enclosure temperature? How can I define these? Ask maintenance or those who work in the area. Look at the temperature specs of the equipment inside. You may want 72 F in your enclosure but is it really necessary? Would 95 F be just as acceptable with occasional excursions to 104 F under worst case conditions? Do not impose unrealistic demands.

Heat Loads Active and Ambient: We define an active load as any source of heat inside the enclosure. Waste electric heat or exothermic reactions are examples. This can be determined in several ways. The first is by simply adding up the amount of heat generated by each component. This sounds easy but the information is often not readily available in component spec sheets and requires direct inquiries to manufacturers. A second method is to apply a control volume approach and to measure the total electrical input and output, subtract the two and assume the remainder has been turned into heat. Another method requires knowledge of the thermal characteristics of the enclosure, how many degrees does it rise given a defined amount of internal heat generation. This can be found by monitoring internal and external temperatures and varying a known internal load while bringing the system to equilibrium between each step and recording the values. Use these numbers to determine the degrees per watt enclosure characteristic. Once this characteristic of the enclosure is known the system can be operated to steady state, the ambient and enclosure temperatures measured and a quick calculation made to estimate the amount of internal heat generated. An ambient load is that amount of heat added to the enclosure due to ambient conditions. The usual ambient load is that caused by the temperature difference between the enclosure and the ambient. It is a function of the enclosure thermal characteristics (size, insulation, seals, windows etc…). The same value determined experimentally as described above can be used to estimate the ambient load. Outdoor applications often have an additional solar component. Indoor applications can have something similar if for instance they are in close proximity to a heat source such as a furnace.

Performance Curves: The total load and temperature differential (dT) can be applied to the performance curves of the air conditioners to determine if the capacity is sufficient. Complete details on this process can be found on Page 10.

Things you should consider when selecting an air conditioner:

Purpose: What is the real need for cooling: maintaining electronics temperatures, precision temperature control, maintaining sample temperatures, cooling a process? Answering these questions will ascertain the need for an air conditioner and help in selecting the control types and methods.

Temperature Control: Several control options are available. The most widely used controls are the TC-6F cool only temperature control set to its 35 C setting and the TC-3F heat/cool control. This setting provides a comfortable temperature for the electronics, minimizes chances of condensation and an efficient duty cycle for the air conditioner. For tighter control, air conditioners set up for remote control via an umbilical cord are used in conjunction with TC-3300/3400/4300 or customer supplied controls. These units typically require a 3 to 32 VDC drive signal to turn the heating or cooling on. Buck heating control where the air conditioner is on 100% of the time and control is provided through a separate heater is another option. P, PI, PID and PWM control schemes have all been used with success. There is one caution regarding input surges when trying to get tight temperature control with AC input units. Each application should be evaluated independently to assure safe and proper control.

Environment: IP and NEMA both define the types of environments one might find. We've included those types of designations with the air conditioners to help you select the right one for your environment. In general our standard air conditioners can handle factory and office environments, "XE" style are appropriate for many wet factory environments and outdoors, "X" style can handle a bit more rugged environment, the "XM" style employ military fans throughout and have been customer tested to survive severe shock and vibration in all axes while "XP" units can handle harsh indoor/outdoor hazardous locations.

Power Input: Air conditioners requiring 110 VAC, 220 VAC, 110/220 VAC, 12 VDC, 24 VDC and 12/24/48 VDC are available. Inquiries for other inputs are welcome.

Cooling Medium: Are you looking for an air (fan) cooled air conditioner (AHP and FHP products)? Is a liquid cooled version appropriate for your application (LHP products)? Perhaps the environment rules both fan and liquid cooled out. Is compressed air available (AHP-CXP products)?

Enclosure size and characteristics: How big is it? The bigger it is the more heat it transfers in and out. Is it insulated? Does it have any features that will interfere with mounting an air conditioner? Is it appropriate for the environment? Does it have windows and access ports which will affect the amount of cooling required? Can you protect it from external loads by using solar shades or shields? Will the enclosure, its contents and the air conditioner mesh well together?

Air Conditioner Mounting: These air conditioners can be mounted in any orientation, wall mounted is usually best. There are two types of mounting styles available, through mount where the cold side of the air conditioner extends into the enclosure and flush mount where there is no or minimal protrusion into the enclosure. Regardless of which style chosen it is important to orient the air conditioner in such a way that it compliments rather than hinders internal air circulation. Internal fans (cold side fans) typically run continuously to provide a constant internal air flow. External fans cycle with demand.

Condensation Concerns: The best time to address condensation concerns is in the selection of the air conditioner. Will conditions be ripe for condensation to occur? Condensation may form on the fins when their surface temperature goes below the dew point temperature. Use the "Cold Sink" equations provided for each product with your total load value in this equation to determine the delta T and therefore the actual temperature of the cold side heat exchanger. Compare this value to the expected dew point to see if condensation might occur. The 35 C setting of the TC-6F temperature control goes a long way in minimizing moisture. Set it to the 25 C or continuous on position and you may be setting yourself up for problems because the cold side fins will get that much colder. Side, front, or back mounting is recommended if there are condensation concerns. Many flush mount units come with condensate control systems which soak up moisture and transport it away. There are drip pan accessories for through mount air conditioners to collect and remove moisture. See page 52, Air Conditioner Accessories for more details on drip pans.

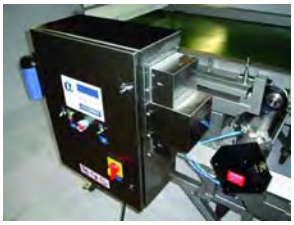
Air Conditioner Applications

FOOD PROCESSING

PROBLEM: Heat sinks collect materials in food processing plant ... if they are not washed clean.
A long standing customer with food processing plants has used dozens of TECA Model AHP1200X air conditioners over the years. The air-conditioners worked great, except for one thing..... after years of service, the units would come back to TECA with their heat sinks and fans clogged with a hardened paste which seems to be made from corn flower, water and dirt!
SOLUTION: Change from air to liquid cooling of the customer's equipment.
Working with this customer for a better solution; TECA developed a liquid cooled version of AHP1200X. This means that there is no heat sink and no fan on the outside of the customer's enclosure. This customer uses available re-cycling plant water coupled with TECA's liquid heat exchanger to remove the waste heat.

MANUFACTURING

PROBLEM: Video cameras needed to function in an environment beyond their rated temperature range.
One of our customers wanted to position cameras to observe a process from a location not safe for operators to go. The customer is a rubber manufacturer and the camera location was too hot for the cameras to work in. The customer had the cameras, but had no suitable enclosure, or cooling apparatus.
SOLUTION: TECA adapted a tiny air conditioner based on Model AHP150XE to mount to a standard commercial enclosure. The package was completed by retrofitting the cameras with insulation and special cooling units. The design satisfied our customer's needs to a "T".



FOOD PROCESSING

PROBLEM: A European manufacturer of special equipment for processing fruits and vegetables needed to cool sensitive electronics on their line of produce-processing machines, which sort products by color, size and weight.
SOLUTION: TECA Model AHP1200XE solid state air conditioners.
The equipment in use is washed down frequently, so the Model AHP1200XE is ideal because it is designed to meet NEMA4 and suitable for wash-down environments, while it also carries the CE Mark.

VIDEO PROJECTION

PROBLEM: A ruggedized enclosure for a military video projector caused excessive heat to build up from the high wattage bulb.
SOLUTION: A more rugged version of TECA's AHP-1200FF thermoelectric cooler / solid state air conditioner is used by military to cool a projector.
For detail information such as inlet and outlet air temperatures etc.... open the PDF file.
For detail information such as inlet and outlet air temperatures etc.... click on the image and open the PDF file.

OUTDOOR KIOSK APPLIANCE STATIONS

PROBLEM: An original equipment manufacturer designed a new outdoor information kiosk and required a small cooling solution, before they could start up manufacturing.
SOLUTION: TECA Model AHP300XE Solid State Air Conditioner.
We consulted with the customer's engineers and recommended TECA Model AHP300XE, to provide the necessary cooling in a compact size. The AHP300XE is an ideal choice for the application because it is a NEMA4 solid state air conditioner, designed for outdoor use.

AVIONICS MAINTENANCE

PROBLEm: Create a portable cooling system for diagnostic equipment to allow troubleshooting of avionics systems while still installed. Troubleshooting and diagnosing avionics problems is hard enough on the bench. To save valuable time, technicians would rather get it done while the electronics are still in the aircraft. Also, under harsh environments, it is difficult to keep cutting edge electronics functioning the way they should.
SOLUTION: When it came to the type of portable cooling for the diagnostic equipment required for these jobs; a navy contractor came to TECA for the solution. We helped design and build the solution shown in its prototype form around the portable enclosure. TECA completed the project on a tight schedule, which called for teamwork and attention to detail.

Cold Plate Notes

Things you need to know to start sizing a cold plate:

Temperatures: The ambient temperature is the air temperature around the cold plate, often the room temperature. The desired temperature can be at the cold plate or at a location on the item being cooled. This means that the cold plate might be colder than the item being cooled. The difference between the two is the design temperature differential (delta T). Make sure to use the cold plate temperature when working with the performance curves.

Heat Loads Active and Ambient: We define an active load as any source of heat. Waste electric heat or exothermic reactions are examples. Loads can also be related to the specific heat of a sample when cycle times are important. Ambient loads are caused by the temperature differential between the ambient and the item being cooled. An un-insulated test item will have a higher ambient load than an insulated one.

Performance Curves: The total load and temperature differential (delta T) can be applied to the performance curves of the cold plates to determine if the capacity is sufficient. Complete details on this process can be found on Page 10.

Things you should consider when selecting cold plate:

Purpose: What is the real need for cooling: maintaining electronics temperatures, precision temperature control, maintaining sample temperatures, cooling a process, temperature cycling? Answering these questions will help in selecting the correct cold plate, control types and methods.

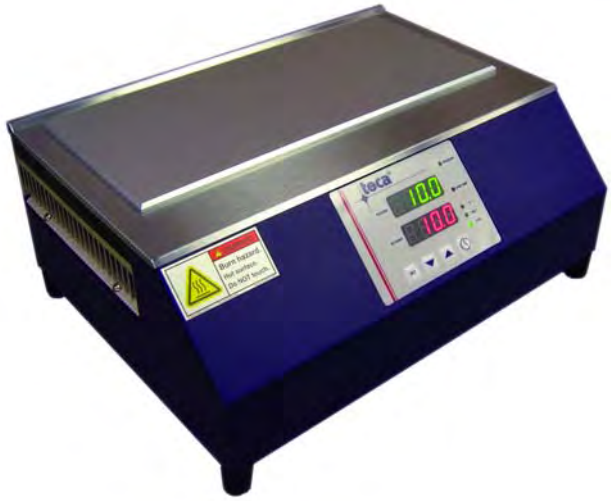
Temperature Control: Many applications simply require cooling with no fancy temperature controls. The CP style of products often best fit these needs. When better control and more control features are needed the CPV series is often the best choice . Each application should be evaluated independently to assure safe and proper control.

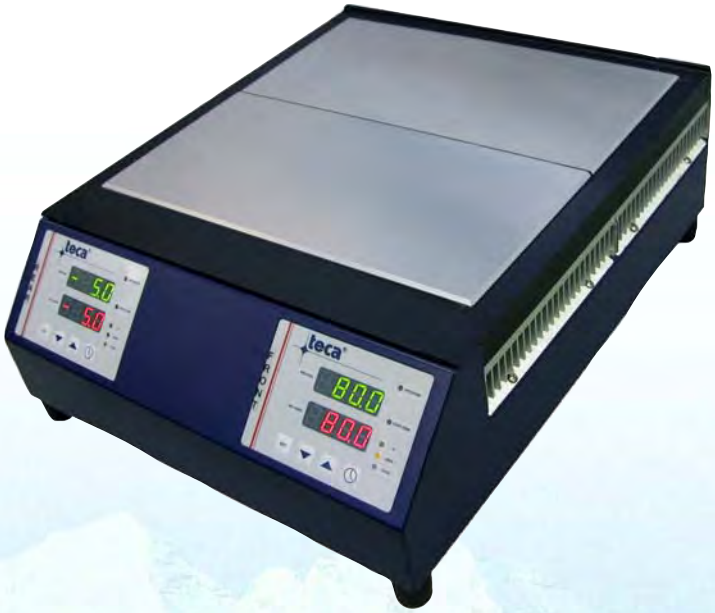
Environment: In general our standard cold plates can handle factory, lab and office environments. No standard unit is made for outdoor or washdown environments. Typical locations are bench top, under bench and installed on an enclosure. Custom versions have been made for many environments.

Power Input: Cold plates requiring 120 VAC, 240 VAC, 120/240 VAC, 12VDC, 24 VDC and 12/24/48 VDC are available.

Cooling Medium: TECA has both air cooled and liquid cooled cold plates. When using the liquid cooled versions the delta T reference temperature is the liquid temperature, when using air cooled cold plates it's the ambient air temperature. Liquid cooled cold plates require a constant flow of cooling water. This can be tap water, in house chilled water or re-circulating chillers.

Mounting: Secure thermally conductive mounting of the componenets to cold plate surface is needed. The CPV versions are bench top units and the standard cold plate comes with no provision for mounting. The cold plate is a smooth flat aluminum surface. Items can be thermally greased into place using DOW 340 heat transfer grease or similar. Many times the tackiness of the grease is enough to hold the test item in place. Side mounting clamps are used with the accessory plate and can also be used with customer plates or loads. If done with care the plate can be drilled and tapped. Refer to the owner's manual for ***locations that must not be drilled or tapped***. CPV units can also be order with "Tap Plates" installed. These plates have a standard tap pattern on them for customer use. Alternatively a custom tap plate can be ordered plain or with taps, slots grooves etc per customer requirements. CP versions have a tap pattern as a standard and have provision for mounting to enclosures.





Cold Plate Applications

THEME PARK EXHIBIT

PROBLEM: A company specializing in 3-D designs for museums, theme parks, and other attractions needed to build an "icy throne" for a museum exhibit and keep it dry at the same time.

SOLUTION: Using four TECA AHP-1200CP cold plates, one was placed in the seat, back, and in each arm rest of the throne. Raw aluminum was then screwed onto the plates, and the throne surfaces reached close to -20C!

Visitors to the museum can sit on the throne to feel the chill. The "ice" in the picture is not real. It is a "hard coat" of scenic ice. The throne manufacturers did not want museum visitors to get wet from real ice; their goal was to create a throne that felt as cold as possible. They are thrilled with the results!

To see the "icy throne" in action please visit http://www.azscience.org/narnia.php web page!

LABORATORY

PROBLEM: Investigating the changes in behavioral responses due to changes in experimental floor temperature and dermal application of heating/cooling compounds in an animal model.

SOLUTION: The TECA AHP-1200DCP dual zone cold/hot thermoelectric plate with two independently controllable temperature zones provides precise regulation of the floor temperature and change of settings as deemed experimentally necessary. The Plexyglass arena allows careful monitoring of animal activity while allowing the animal to roam free across the experimental surface.

PETROLEUM INDUSTRY RESEARCH

PROBLEM: To cool down and hold four one liter bottles filled with samples, to 0C.

SOLUTION: With its AHP1200CPV Versatile Cold Plate, Teca offers accessory Cold Well assembly with Insulation Kit as shown. The AHP1200CPV is a standard item. The Cold Well assembly is made to order. The user can specify the number of wells and the diameter of each, as long as the hole pattern fits within the footprint given.

RESEARCH

PROBLEM: Keeping tissue samples frozen for dissection has been done over an ice/dry ice combination with variable results. The problem was to find a way to get reliable consistent results.

SOLUTION: The Dept. of Psychiatry in a major U.S. university is employing the Versatile Cold Plate Model AHP1200CPV in a novel way. They are using the product to keep tissue samples frozen for dissection. The technician has placed an accessory borosilicate (Pyrex) substrate directly on the Cold Plate to provide a cut proof, frozen work area.

The apparatus provides temperature stability and control. This in turn assures uniform tissue sample consistency for excellent quality dissections.

PERFORMANCE TESTING

PROBLEM: Need to test low-temperature performance of inertial measuring devices.

In this application of low temperature thermoelectric cooling; the user is testing inertial measurement devices over a temperature range. The devices as well as the TECA cascaded cooling assembly are subjected to various rotational and acceleration stimuli while device temperature is controlled.

SOLUTION: The cascaded cooler was built up from a standard Model AHP301CP cold plate.

The finished test fixture was able to function with a maximum rotation rate of 1700 degrees per second and 50g acceleration. The rotation is evident in the photo. By using a standard product as the basis for the cooling system, higher costs associated with a custom solution were avoided.

Liquid Chiller Notes

Things you need to know to start sizing a liquid chiller:

Temperatures: The ambient temperature is the air temperature around the liquid chiller. The desired temperature is the fluid temperature at the outlet or at a location at the item being cooled. The difference between the two is the design temperature differential (delta T). Typically the fluid temperature has to be a little cooler than the item being cooled. Make sure to include any gradients from the fluid to the test item. Also include any increase or decrease in the fluid due to the hoses. While these differences are typically small large hose lengths and poor thermal coupling between the fluid and the device under test can increase them.

Heat Loads Active and Ambient: We define an active load as any source of heat. Waste electric heat or exothermic reactions are examples. Loads can also be related to the specific heat of a sample when cycle times are important. Ambient loads are caused by the temperature differential between the ambient and the fluid in the hoses and the device under test. Un-insulated hoses and test items will have higher ambient loads than insulated one. These values are often difficult to estimate but quickly measured.

Performance Curves: The total load and temperature differential (delta T) can be applied to the performance curves of the liquid chillers to determine if the capacity is sufficient. Complete details on this process can be found on Page 10.

Fluid flow requirements: What flow rate is required? What is the pressure drop at that flow rate? Will the hoses significantly affect the pressure drop? Graphs of the flow vs. pressure drop are available for each liquid chiller.

Things you should consider when selecting a liquid chiller:

Purpose: What is the real need for cooling: maintaining electronics temperatures, precision temperature control, maintaining sample temperatures, cooling a process, temperature cycling? Is this a laboratory or industrial setting? Do I need portability? Is this an OEM application where the chiller must be packaged into your product? Answering these questions will help in selecting the correct liquid for your application.

Temperature Control: Some applications simply require cooling with no fancy temperature controls. The TLC-1200 and the TLC Cubed products often best fit these needs. When better control and more control features are needed the TLC-700 and TLC-900 are used. The TLC-900 has a remote sensor feature standard allowing you to control the temperature at a point downstream or on the device under test. Each application should be evaluated independently to assure safe and proper control.

Type of Fluid: TECA recommends using distilled water. Regular tap water can be used also although "hard" water may cause mineral deposits to build up. For those applications which may go below 0 C a mixture of 25% ethylene glycol and distilled water is recommended. Algaecides are also commonly used additives. Fluids other than water must be evaluated on a case by case basis.

Cooling Medium: All standard TECA liquid chillers are air cooled products.

Environment: In general our standard liquid chillers can handle factory, lab and office environments. No standard unit is made for outdoor or wash-down environments. Typical locations are bench top, under bench and rack mount. Custom versions have been made for many environments.

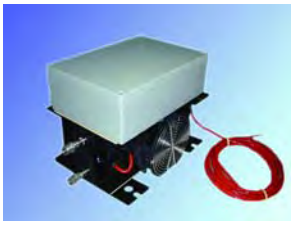
Power Input: Liquid chillers requiring 120 VAC, 240 VAC, 120/240 VAC and 24 VDC are available.

Connections: Most liquid chillers have connectors, hoses, clamps and hose insulation included as part of their standard package. What sort of connection is required at the device under test? NPT tap? Hose barb? What sizes? It's best to answer these questions up front to avoid problems down the road.

Liquid Chiller Applications

COSMETIC TREATMENT

PROBLEM: Photofacial treatments using intense pulsed light are said to remove spider veins and age spots, but are uncomfortable for the patient.
SOLUTION: The apparatus shown uses a TECA Model TLC700 recirculating liquid chiller to cool the tip of the hand piece which rests on the skin area under treatment. This enhances the comfort of the patient; allowing for a better quality treatment. The chiller is a closed loop system so no water gets on the patient or the instruments. Water temperature is closely adjustable over a wide range.

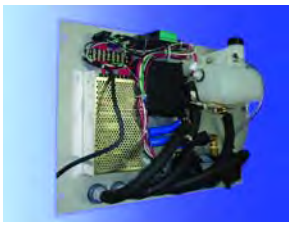


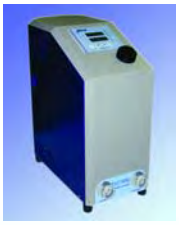
MILITARY APPLICATION

PROBLEM: The United State Navy needed a liquid chiller to circulate coolant and also meet strict military requirements.
SOLUTION: Custom thermoelectric liquid chiller using MIL rated components.
Here's another custom military application by TECA. This is a liquid chiller for circulating chilled coolant as part of a tracking system on a NAVY ship. Note that the chilled liquid circuit is effectively "sandwiched" between two heat sinks with rugged Mil 901 fans. Wiring and electrics are housed in a NEMA4X enclosure with an O-ring gasket seal. This unit is rated for shipboard use in salt-spray, shock and vibration.

AEROSPACE MANUFACTURING QC

PROBLEM: Modify a standard model chiller to meet a highly specialized requirement, including liquid cooling, 24 VDC input and wall mounting.
SOLUTION: This recirculating liquid chiller was developed for a customer who needed something similar to the TECA LHP-300CP chiller; but it had to be a liquid cooled liquid chiller - it had to be 24 VDC input - and it had to be mounted on the wall! The application is X-Ray inspection of aircraft engine parts. Temperature controlled water is circulated through a heat exchanger which is keeping photo diodes nice and cool, assuring quality X-Ray imaging.





SEMICONDUCTOR TESTING

PROBLEM: To control semiconductor test stage without introducing electromagnetic noise.
SOLUTION: Using TLC-900 recirculating liquid chiller customer was able to control semiconductor test stage where proximity of cooling device would produce electromagnetic noise. Temperature controlled fluid supplied by TLC-900 keeps test stage cooled and free of noise.

Understanding | Air Conditioner Ratings

Ratings

Thermoelectric Modules:
Traditionally thermoelectric modules have been rated at two points under two conditions. The first point is the maximum load (Qmax) at zero degrees delta T (dT=0) and the second point is the maximum delta T (dTmax) at a no load (Q=0). The load is defined as the amount of energy removed from the cold side ceramic. The delta T is defined as the temperature difference between the cold side and hot side ceramics. Extensive curves showing the performance under other conditions are often available.

Thermoelectric systems:
Reputable system manufacturers rate thermoelectric systems in watts or btu/hr under zero degree delta T conditions. In this case the load is defined as the amount of energy removed from the cooling medium. For air cooled systems the delta T is the temperature difference between the cooled medium and the ambient air. The cooled medium would be a cold plate in direct contact applications, a fluid such as water in liquid chiller applications and the enclosure air return temperature in air conditioner applications.

Air Conditioners, U.S.
Standards have not yet been created for enclosure air conditioners in the United States. The portions of the standards which deal with ratings and test conditions can still be interpreted for enclosure air conditioners. Too complex to display here, these standards define, among other parameters, the temperature conditions under which ratings are supposed to be made. These temperatures are generally defined as the room temperature and the ambient temperature. Typically the room temperature is either below of equal to the ambient temperature.

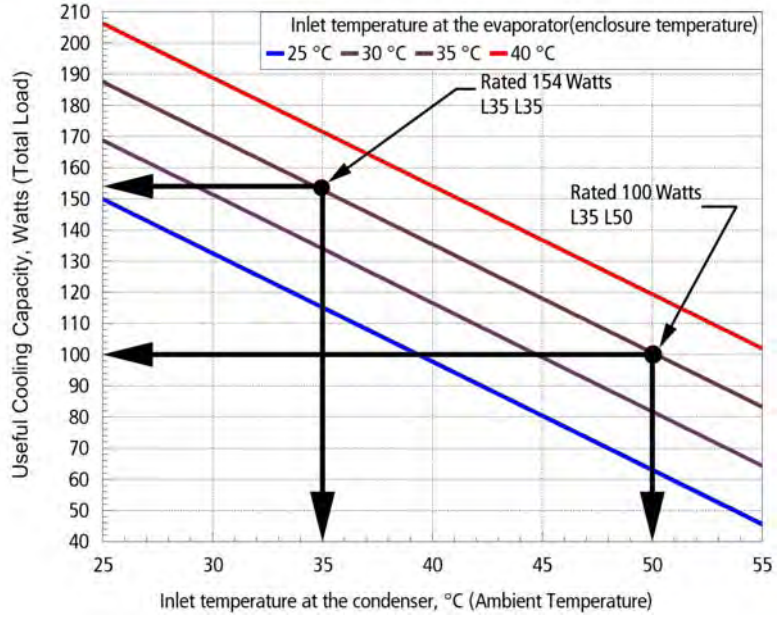
Air Conditioners, Europe:
The Europeans have developed a standard, DIN 3168, which specifically addresses enclosure air conditioners or coolers for distribution boxes. This standard does contain temperature information specific to the rating of such air conditioners. The load or the "useful cooling capacity", is only the useful sensible heat flow which is taken up by the appliance for lowering the inside temperature of the distribution box. The temperature rating conditions for DIN 3168 are for the evaporator inlet (enclosure) temperature and condenser inlet to be an equal 35 C, or for the evaporator temperature to be 35 C and the condenser temperature to be 50 C, stated L35 L50.

Performance Curves:
The two types of performance curves used throughout the industry are shown on the following page. Both of these curves represent the performance of the **TECA** model **AHP-1200**. The top curve is shown per DIN 3168. In this curve temperatures are represented as absolutes, the x axis represents the inlet temperature at the condenser (the enclosure temperature), the vertical axis represents the useful cooling capacity, and separate load lines represent various evaporator inlet temperatures (ambient temperatures). Plotting a vertical line from the condenser inlet temperature to a specific evaporator temperature line and from that intersection horizontally, provides the useful cooling capacity. The bottom curve is for the same product represented in the traditional format. Here the temperatures are presented as differentials. Plotting a horizontal line from a desired delta T to intersect with the selected performance curve and then vertically to the x axis provides the cooling capacity under that condition. Both types of curves accurately represent the performance of a thermoelectric cooling system.

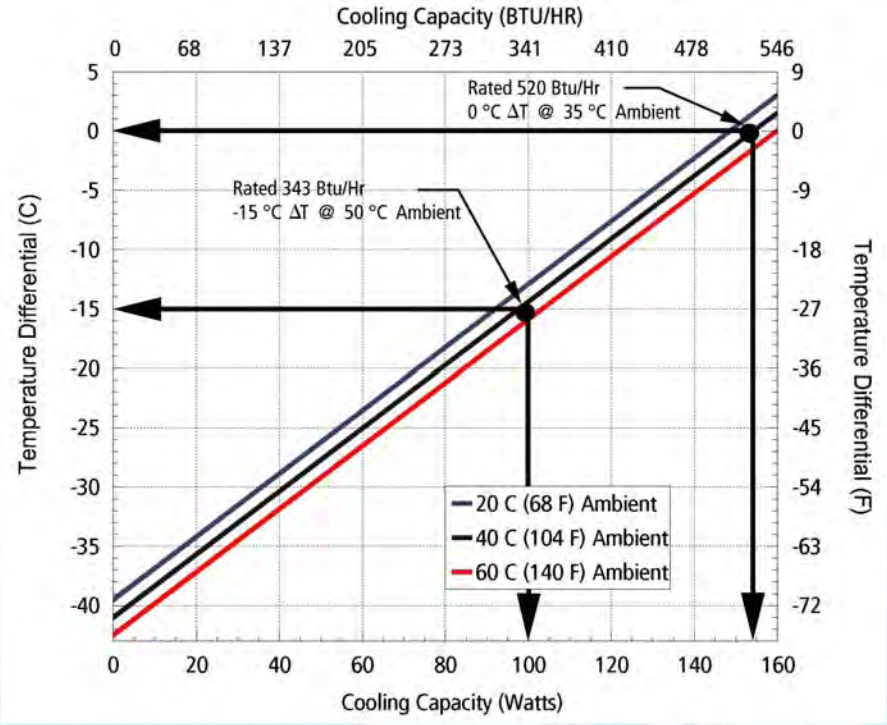
*****
*The rated performance value shown for a positive 20 degree F delta T condition is true. However, **TECA** does not consider a 20 degree F delta T to be a valid rating condition for an air conditioner. This value is only shown for purpose of competitive parity with those manufacturers who choose this condition for rating their products. A performance rating stated at the positive 20 degree F delta T condition is more appropriate for above ambient heat exchangers such as heat pipes or for specific applications where it should be clearly stated.*

Understanding | Different Performance Curves

Performance curve per Din 3168 (AHP-1200)



TECA's traditional performance curve (AHP-1200)



Air Conditioners

90-1800 BTU/hr

Air Cooled by Environment

NEMA-12

FHP-2850 page 40
1600-1800 BTU/hr rating,
120 and 240 VAC

AHP-1800 page 16
1035-1180 BTU/hr rating,
120, 240 and 120/240 VAC,

AHP-1800 DC page 18
1035-1180 BTU/hr rating
24 VDC

AHP-1501 page 22
1000-1100 BTU/hr rating,
120/240 VAC

FHP-1501 page 42
1000-1100 BTU/hr rating,
120/240 VAC

FHP-1501 DC page 44
1000-1100 BTU/hr rating,
24 VDC

NEMA-4

AHP-1800XE page 16
1035-1180 BTU/hr rating,
120, 240 VAC

AHP-1800XE DC page 18
1035-1180 BTU/hr rating
24 VDC

AHP-1501XE page 22
1000-1100 BTU/hr rating,
120/240 VAC

FHP-1501XE page 42
1000-1100 BTU/hr rating,
120/240 VAC

FHP-1501XE DC page 44
1000-1100 BTU/hr rating,
24 VDC

AHP-1200XE page 26
500-550 BTU/hr rating,
120 and 240 VAC

NEMA-4X & MIL

AHP-1800X page 16
1035-1180 BTU/hr rating,
120 and 120/ 240 VAC

AHP-1800X DC page 18
1035-1180 BTU/hr rating
24 VDC

AHP-1200X page 26
500-550 BTU/hr rating,
120 and 120/240 VAC

HAZARDOUS

AHP-1800XP page 16
1035-1180 BTU/hr rating,
120 VAC, 120/240 VAC

AHP-1802XP page 20
1035-1180 BTU/hr rating
240 VAC

AIR CONDITIONERS

Air Cooled

90-1800 BTU/hr

NEMA-12

AHP-1400 page 24
810-900 BTU/hr rating,
120 VAC

AHP-1200 page 26
500-550 BTU/hr rating,
120 and 120/240 VAC

AHP-1200 DC page 28
500-550 BTU/hr rating,
24 VDC

AHP-300FF page 36
200-220 BTU/hr rating,
12, 24, and 12/24/48 VDC,

AHP-301FF page 34
160-200 BTU/hr rating,
120/240 VAC

AHP-150FF page 38
90-105 BTU/hr rating,
12, 24, and 12/24 VDC

NEMA-4

AHP-1200XE DC page 28
500-550 BTU/hr rating,
24 VDC

FHP-750XE page 46
400-450 BTU/hr rating,
120 and 240 VAC

FHP-750XE DC page 48
400-450 BTU/hr rating,
24 VDC

AHP-300XE page 36
200-220 BTU/hr rating,
24 and 12/24/48 VDC

AHP-150XE page 38
90-105 BTU/hr rating,
12 VDC

NEMA-4X

AHP-1200X DC page 28
500-550 BTU/hr rating,
24 VDC

AHP-300X page 36
200-220 BTU/hr rating,
12, 24, and 12/24/48 VDC,

HAZARDOUS

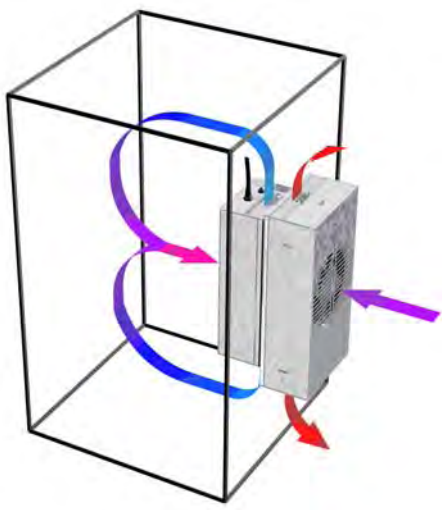
AHP-1200XP page 26
500-550 BTU/hr rating,
120 and 120/240 VAC

AHP-1200CXP page 30
500-550 BTU/hr rating,
120 VAC

90-1800 BTU/hr

Air Cooled by Style

THRU MOUNT — AHP-SERIES



Note: Top mounting orientation is not recommended.

AHP-1800XP page 16
1035-1180 BTU/hr rating,
18" x 12.35" mounting area
120 and 120/240 VAC
Class 1 Div 2, NEMA-4X, UL-1604

AHP-1800X page 16
1035-1180 BTU/hr rating,
18" x 12.35" mounting area
120 and 120/240 VAC, NEMA-4X
UL-1995/CSA 22.2, CE

AHP-1800XE page 16
1035-1180 BTU/hr rating,
18" x 12.35" mounting area
120, 240 VAC, NEMA-4
UL-1995/CSA 22.2, CE

AHP-1800 page 16
1035-1180 BTU/hr rating,
18" x 12.3" mounting area
120, 240 and 120/240 VAC,
NEMA-12, UL-1995/CSA 22.2, CE

AHP-1800 DC page 18
1100-1300 BTU/hr rating,
18" x 12.3" mounting area
24 VDC, NEMA-12, NEMA-4,
NEMA-4X

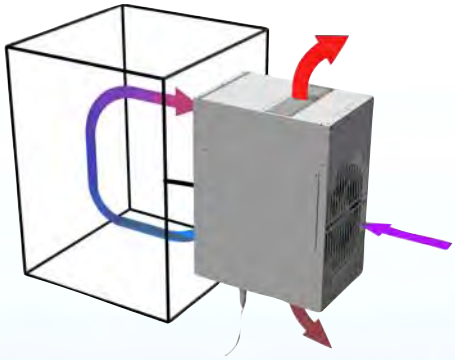
AHP-1802XP page 20
950-1100 BTU/hr rating,
24" x 12.3" mounting area
240 VAC, IP 54, Zone 1, Zone 2
Ex II 2 G; T1-T3

AHP-1501 page 22
AHP-1501XE page 22
1000-1100 BTU/hr rating,
15.2" x 12" mounting area
120/240 VAC, NEMA-12,
NEMA-4, UL-1995/CSA 22.2, CE

AHP-1400 page 24
810-900 BTU/hr rating,
12" x 12" mounting area
120 VAC, NEMA-12

AHP-1200XP page 26
500-550 BTU/hr rating,
15" x 7.3" mounting area
120 and 120/240 VAC,
Class 1 Div 2, NEMA-4X
UL-1604

FLUSH MOUNT — FHP-SERIES



Note: Top mounting orientation is not recommended.

FHP-2850 page 40
1600-1800 BTU/hr rating,
12" x 24" mounting area
120 and 240 VAC, NEMA-12

FHP-1501 page 42
1000-1100 BTU/hr rating,
15.2" x 12" mounting area
120/240 VAC
NEMA-12, UL-1995/CSA 22.2, CE

FHP-1501XE page 42
1000-1100 BTU/hr rating,
15.2" x 12" mounting area
120/240 VAC NEMA-4, UL-1995/CSA 22.2, CE

FHP-1501 DC page 44
1000-1100 BTU/hr rating,
15.2" x 12" mounting area
24 VDC, NEMA-12

THRU MOUNT

AHP-1200X page 26
500-550 BTU/hr rating,
15" x 7.35" mounting area
120 VAC
NEMA-4X, UL-995/CSA
22.2, CE

AHP-1200XE page26
500-550 BTU/hr rating,
15" x 7.35" mounting area
120 and 240 VAC
NEMA-4, UL-995/CSA
22.2, CE

AHP-1200 page 26
15" x 7.35" mounting area
120, 240 and 120/240 VAC
NEMA-12, UL-1995/CSA
22.2, CE

AHP-1200 DC page28
15" x 7.35" mounting area
24 VDC
NEMA-12, NEMA-4/4X

AHP-1200CXP (N. AM)
page 30
307-680 BTU/hr rating,
15" x 7.35" mounting area
120 VAC for systems
requiring NEMA-4X,
Class1, Div 1

AHP-1200CXP (European)
page 32
307-680 BTU/hr rating
15" x 7.35" mounting area
120 VAC; for systems
requiring IP56,
Group II, Catagory 2

AHP-301FF page 34
160-200 BTU/hr rating,
10 " x 5.52" mounting area
120/240 VAC, NEMA-12

AHP-300X page 36
200-220 BTU/hr rating,
10" x 5.37" mounting area
12, 24, and 12/24/48 VDC
NEMA-4X

AHP-300XE page 36
200-220 BTU/hr rating,
10" x 5.37" mounting area
24, and 12/24/48 VDC
NEMA-4

AHP-300FF page 36
200-220 BTU/hr rating,
10" x 5.37" mounting area
12, 24, and 12/24/48 VDC,
NEMA-12

AHP-150FF page 38
90-105 BTU/hr rating,
7" x 5" mounting area
12, 24, and 12/24 VDC
NEMA-12

AHP-150XE page 38
90-105 BTU/hr rating,
7" x 5" mounting area
12 VDC, NEMA-4

FLUSH MOUNT

FHP-1501XE DC page 44
1000-1100 BTU/hr rat ing,
15.2" x 12" mounting area
24 VDC, NEMA-4

FHP-750 page 46
400-450 BTU/hr rating,
12" x 6" mounting area
120 and 240 VAC
UL-1995/CSA 22.2, CE
NEMA-12

FHP-750 DC page 48
400-450 BTU/hr rating,
12" x 6" mounting area
NEMA-12, 24 VDC

FHP-750XE page 46
400-450 BTU/hr rating,
12" x 6" mounting area
120 and 240 VAC
UL-1995/CSA 22.2, CE
NEMA-4

FHP-750XE DC page 48
400-450 BTU/hr rating,
12" x 6" mounting area
24 VDC, NEMA-4

AHP-1800 Air Conditioner

Air Cooled
Thru Mount
NEMA-12, 4,4X, Class 1 Div 2

120 VAC, 240 VAC Input

FEATURES

- Compact, (18" L X 12.35" W X 9.69"D)
- Excels in high ambient temperatures
- Environmentally Safe
- Dual voltage versions available, consult factory.
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Versions to withstand corrosive environments, shock and vibration
- Mounts and operates in any orientation

INCLUDES

- Adjustable temperature control
- Mounting gasket and hardware
- Power input line cord

SPECIFICATIONS

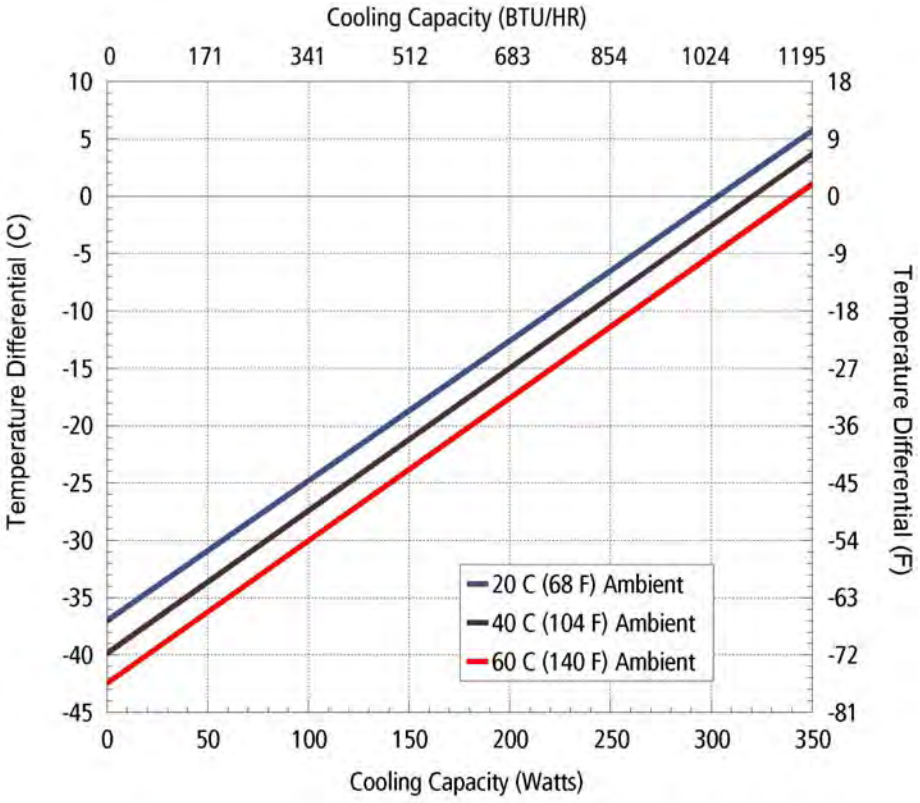
	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL *	OPERATING AMBIENT °C	AGENCY APPROVALS (ETL)
NEMA12	AHP-1800	0-0180-0-000	Cool only	1035-1180	120	8.0	46(21)	TC-6F	-10/+70	UL1995/CSA22.2, CE
	AHP-1800	0-0150-0-000	Cool only	1035-1180	120	8.0	46(21)	EXT*	-10/+70	UL1995/CSA22.2, CE
	AHP-1800HC	0-0130-1-000	Heat/Cool	1035-1180	120	8.0	46(21)	TC-3F	-10/+70	UL1995/CSA22.2, CE
	AHP-1800HC	0-0150-1-000	Heat/Cool	1035-1180	120	8.0	46(21)	EXT*	-10/+70	UL1995/CSA22.2, CE
	AHP-1802	0-0182-0-000	Cool only	1035-1180	240	5.0	46(21)	TC-6F	-10/+70	UL1995/CSA22.2, CE
	AHP-1802	0-0152-0-000	Cool only	1035-1180	240	5.0	46(21)	EXT*	-10/+70	UL1995/CSA22.2, CE
	AHP-1802HC	0-0132-1-000	Heat/Cool	1035-1180	240	5.0	46(21)	TC-3F	-10/+70	UL1995/CSA22.2, CE
	AHP-1802HC	0-0152-1-000	Heat/Cool	1035-1180	240	5.0	46(21)	EXT*	-10/+70	UL1995/CSA22.2, CE
NEMA4X	AHP-1800XE	0-0180-4-000	Cool only	1035-1180	120	8.0	47(21.4)	TC-6F	-28/+70	UL1995/CSA22.2, CE
	AHP-1800XE	0-0150-4-000	Cool only	1035-1180	120	8.0	47(21.4)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1800XEHC	0-0130-5-000	Heat/Cool	1035-1180	120	8.0	47(21.4)	TC-3F	-28/+70	UL1995/CSA22.2, CE
	AHP-1800XEHC	0-0150-5-000	Heat/Cool	1035-1180	120	8.0	47(21.4)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1802XE	0-0182-4-000	Cool only	1035-1180	240	5.0	52(23.6)	TC-6F	-28/+70	UL1995/CSA22.2, CE
	AHP-1802XE	0-0152-4-000	Cool only	1035-1180	240	5.0	52(23.6)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1802XEHC	0-0132-5-000	Heat/Cool	1035-1180	240	5.0	52(23.6)	TC-3F	-28/+70	UL1995/CSA22.2, CE
	AHP-1802XEHC	0-0152-5-000	Heat/Cool	1035-1180	240	5.0	52(23.6)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1800X	0-0180-2-000	Cool only	1035-1180	120	7.5	47(21.4)	TC-6F	-28/+70	UL1995/CSA22.2, CE
	AHP-1800X	0-0150-2-000	Cool only	1035-1180	120	7.5	47(21.4)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1800XHC	0-0130-3-000	Heat/Cool	1035-1180	120	7.5	47(21.4)	TC-3F	-28/+70	UL1995/CSA22.2, CE
	AHP-1800XHC	0-0150-3-000	Heat/Cool	1035-1180	120	7.5	47(21.4)	EXT*	-28/+70	UL1995/CSA22.2, CE
C1D2	AHP-1800XP	0-0180-2-002	Cool only	1035-1180	120	7.5	47(21.4)	TC-6F	-28/+70	UL-1604
	AHP-1800XPHC	0-0130-3-003	Heat/Cool	1035-1180	120	7.5	47(21.4)	TC-3F	-28/+70	UL-1604
	AHP-1801XP	0-0181-2-002	Cool only	1035-1180	120/240	7.5/5.0	52(23.6)	TC-6F	-28/+70	UL-1604
	AHP-1801XPHC	0-0131-3-003	Heat/Cool	1035-1180	120/240	7.5/5.0	52(23.6)	TC-3F	-28/+70	UL-1604
	AHP-1801XPHC-1	0-0171-3-004	Heat/Cool	1035-1180	120/240	7.5/5.0	52(23.6)	EXT*	-28/+70	UL-1604

Consult us for 120/240 VAC versions, model AHP-1801, with similar features.

* Unit is set for 5-32 VDC external signal, relay(s) included

AHP-1800

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.122x-37.0	y=.122x-39.7	y=.122x-42.3
Cold Sink	y=.09x-37.0	y=.09x-39.7	y=.09x-42.3

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4,4X IP 56

Class 1 Div 2 and NEMA-4X IP 56

RATING (TRADITIONAL)

1100 BTU/hr @ 0 °F ΔT

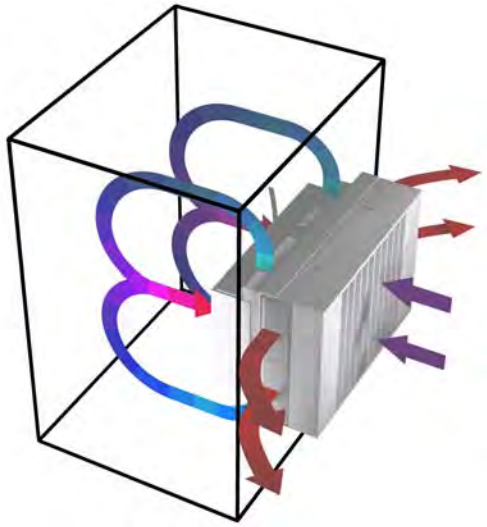
1420 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

322 Watts L35 L35

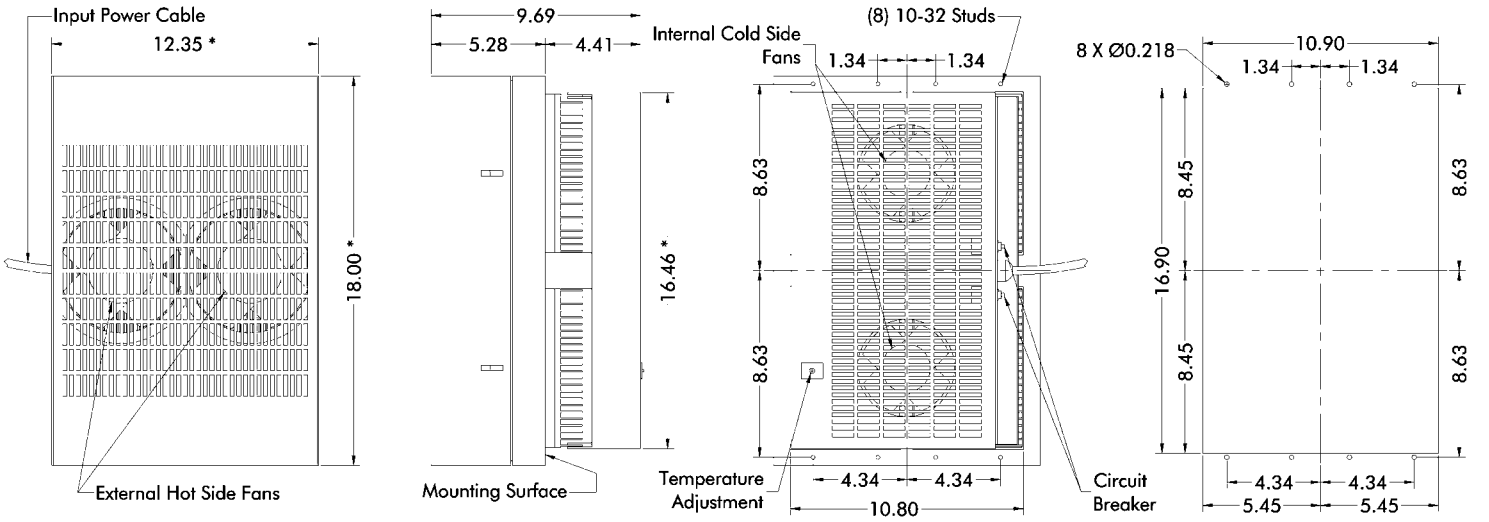
210 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware, insulation. Dimensions: Inches
Mounting hardware and gasket included but not shown.

AHP-1800 | Air Conditioner

Air Cooled
Thru Mount
NEMA-12, 4,4X

24 VDC Input

FEATURES

- Compact, (18" L X 12.35" W X 9.69"D)
- Excels in high ambient temperatures
- Environmentally Safe
- Dual efficiency versions available, consult factory
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Versions to withstand corrosive environments, shock and vibration
- Mounts and operates in any orientation

INCLUDES

- Adjustable temperature control
- Mounting gasket and hardware
- Power input leads

SPECIFICATIONS

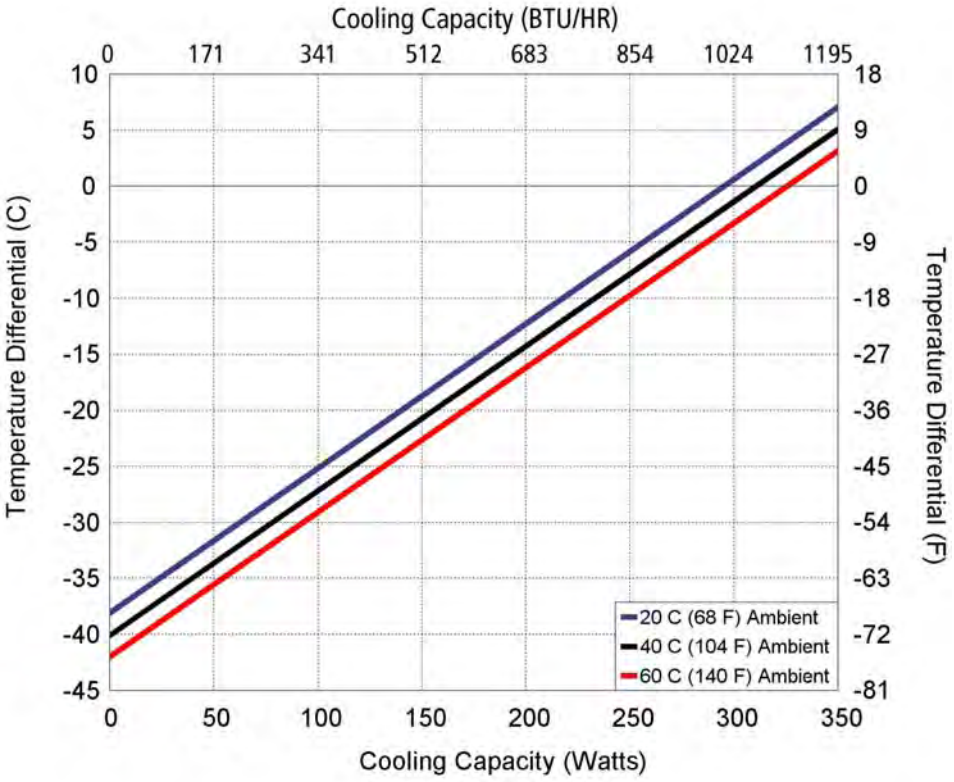
	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	RUNING CURRENT AMPS.	WEIGHT LBS.(KG) APPROX.	TEMP. CONTROL *	OPERATING AMBIENT °C	AGENCY APPROVALS (ETL)
NEMA 12	AHP-1800	0-0195-0-000	Cool only	1100-1300	24	18	40 (18)	NONE	-10/+70	PENDING
	AHP-1800	0-0185-0-000	Cool only	1100-1300	24	18	40 (18)	TC-6F	-10/+70	PENDING
	AHP-1800	0-01F5-0-000	Cool only	1100-1300	24	18	40 (18)	85°F (30°)	-10/+70	PENDING
	AHP-1800	0-0155-0-000	Cool only	1100-1300	24	18	40 (18)	EXT*	-10/+70	PENDING
	AHP-1800HC	0-0135-1-000	Heat/Cool	1100-1300	24	18	40 (18)	TC-3F	-10/+70	PENDING
	AHP-1800HC	0-0155-1-000	Heat/Cool	1100-1300	24	18	40 (18)	EXT**	-10/+70	PENDING
NEMA 4X	AHP-1800XE	0-0195-4-000	Cool only	1100-1300	24	18	40 (18)	NONE	-28/+70	PENDING
	AHP-1800XE	0-0185-4-000	Cool only	1100-1300	24	18	40 (18)	TC-6F	-28/+70	PENDING
	AHP-1800XE	0-01F5-4-000	Cool only	1100-1300	24	18	40 (18)	85°F (30°)	-28/+70	PENDING
	AHP-1800XE	0-0155-4-000	Cool only	1100-1300	24	18	40 (18)	EXT*	-28/+70	PENDING
	AHP-1800XEHC	0-0135-5-000	Heat/Cool	1100-1300	24	18	40 (18)	TC-3F	-28/+70	PENDING
	AHP-1800XEHC	0-0155-5-000	Heat/Cool	1100-1300	24	18	40 (18)	EXT**	-28/+70	PENDING
	AHP-1800X	0-0195-2-000	Cool only	1100-1300	24	18	40 (18)	NONE	-28/+70	PENDING
	AHP-1800X	0-0185-2-000	Cool only	1100-1300	24	18	40 (18)	TC-6F	-28/+70	PENDING
	AHP-1800X	0-01F5-2-000	Cool only	1100-1300	24	18	40 (18)	85°F (30°)	-28/+70	PENDING
	AHP-1800X	0-0155-2-000	Cool only	1100-1300	24	18	40 (18)	EXT*	-28/+70	PENDING
	AHP-1800XHC	0-0135-3-000	Heat/Cool	1100-1300	24	18	40 (18)	TC-3F	-28/+70	PENDING
	AHP-1800XHC	0-0155-3-000	Heat/Cool	1100-1300	24	18	40 (18)	EXT**	-28/+70	PENDING

* Unit is set for 5-32 VDC external signal, relay(s) included
** Unit is set for 5-32 VDC external signal, H-Bridge relay(s) included

For other voltages contact TECA

AHP-1800

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.129x-38.1	y=.129x-40.1	y=.129x-42.0
Cold Sink	y=.09x-38.1	y=.09x-40.1	y=.09x-42.0

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4,4X IP 56

RATING (TRADITIONAL)

1100 BTU/hr @ 0 °F ΔT

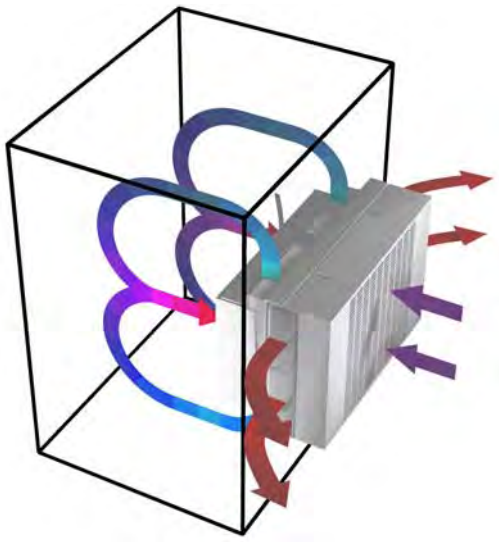
1420 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

322 Watts L35 L35

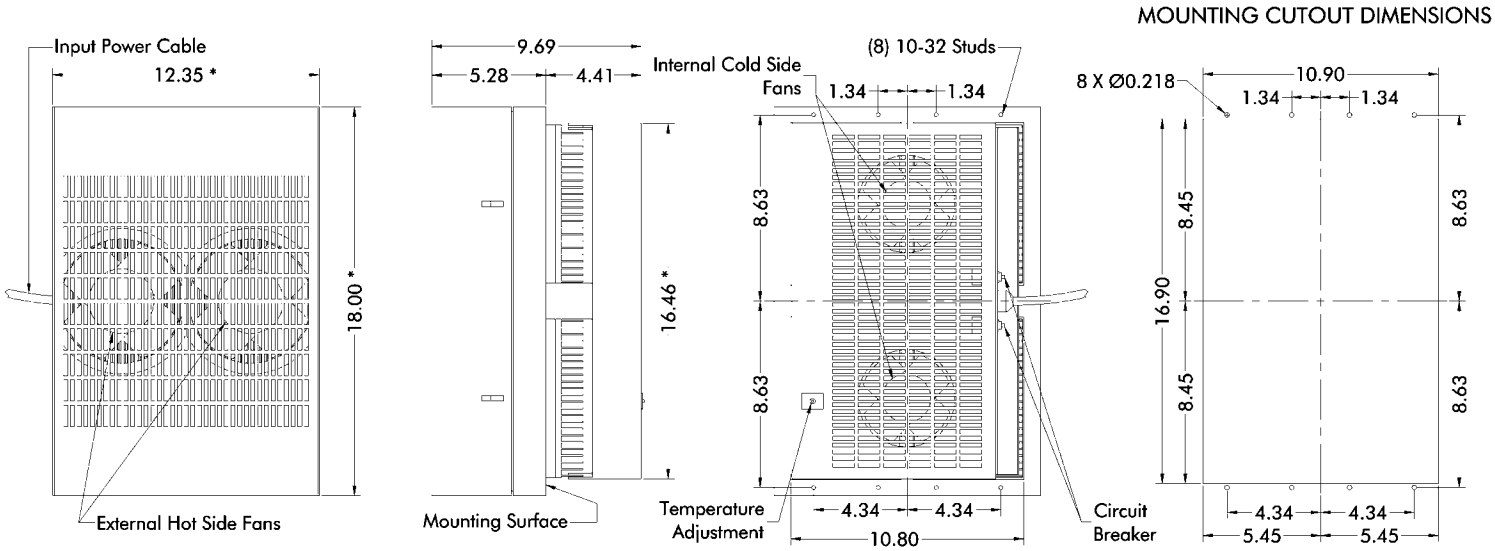
210 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware, insulation. Dimensions: Inches
Mounting hardware and gasket included but not shown.

AHP-1802XP

European

Air Cooled
Thru Mount

Hazardous Location Air Conditioner

FEATURES

- Designed for European Zone 1 and Zone 2
- Compact (24" L X 12.35" W X 19.9" D)
- Weighs approximately 100 lbs. (45 kg)
- Heavy gauge aluminum and stainless steel construction
- Ambient temperature up to +50°C
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Integral power supply
- Environmentally safe
- Mounts and operates in any orientation

INCLUDES

- Semi-Centrifugal duct fan, DN 220, AC, explosion proof, zones 1and 2
- Integral linear power supply
- TC-6F adjustable cool only controller
- TC-3F Heat/Cool controller available
- Versions for customer supplied control
- Gasket and mounting hardware included
- Power input line cord

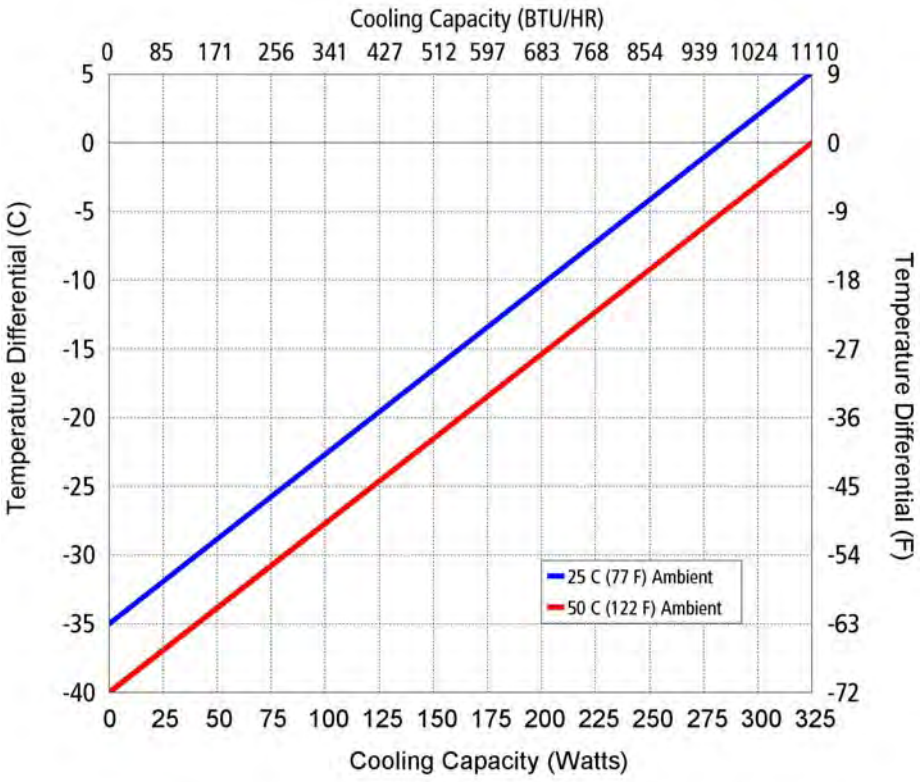
SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING (BTU/HR)	VOLTAGE (VAC) 50 Hz	CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL	MAX. OPERATING AMBIENT (°C)	APPROVALS
AHP-1802XP	0-0182-2-007	Cool only	950-1100	240	5.3	98 (44)	TC-6F	50 °C	pending
AHP-1802XPHC	0-0132-3-008	Heat/Cool	950-1100	240	5.3	98 (44)	TC-3F	50 °C	pending
AHP-1802XP	0-0172-3-009	Cool only	950-1100	240	5.3	98 (44)	EXT*	50 °C	pending
AHP-1802XPHC	0-0172-3-010	Heat/Cool	950-1100	240	5.3	98 (44)	EXT*	50 °C	pending

* Unit is set for 5-32 VDC external signal, relay(s) included

AHP-1802XP

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Ambient Temp	**25°C**	**50°C**
Enclosure Air	y=.123x-35.0	y=.123x-40.0
Cold Sink	y=.09x-35.0	y=.09x-40.0

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

IP54

Zone 1, Zone 2 (pending)

Ex II 2 G

T1 - T3

RATING (TRADITIONAL)

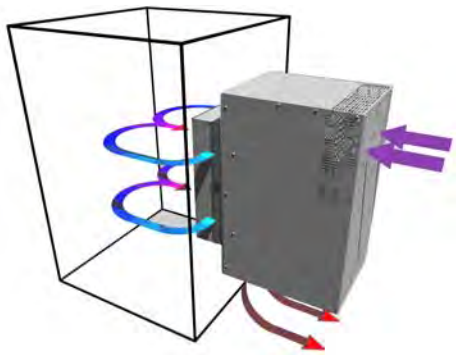
940 BTU/hr @ 0 °F ΔT

1210 BTU/hr @ +20 °F ΔT

RATING (DIN 3168)

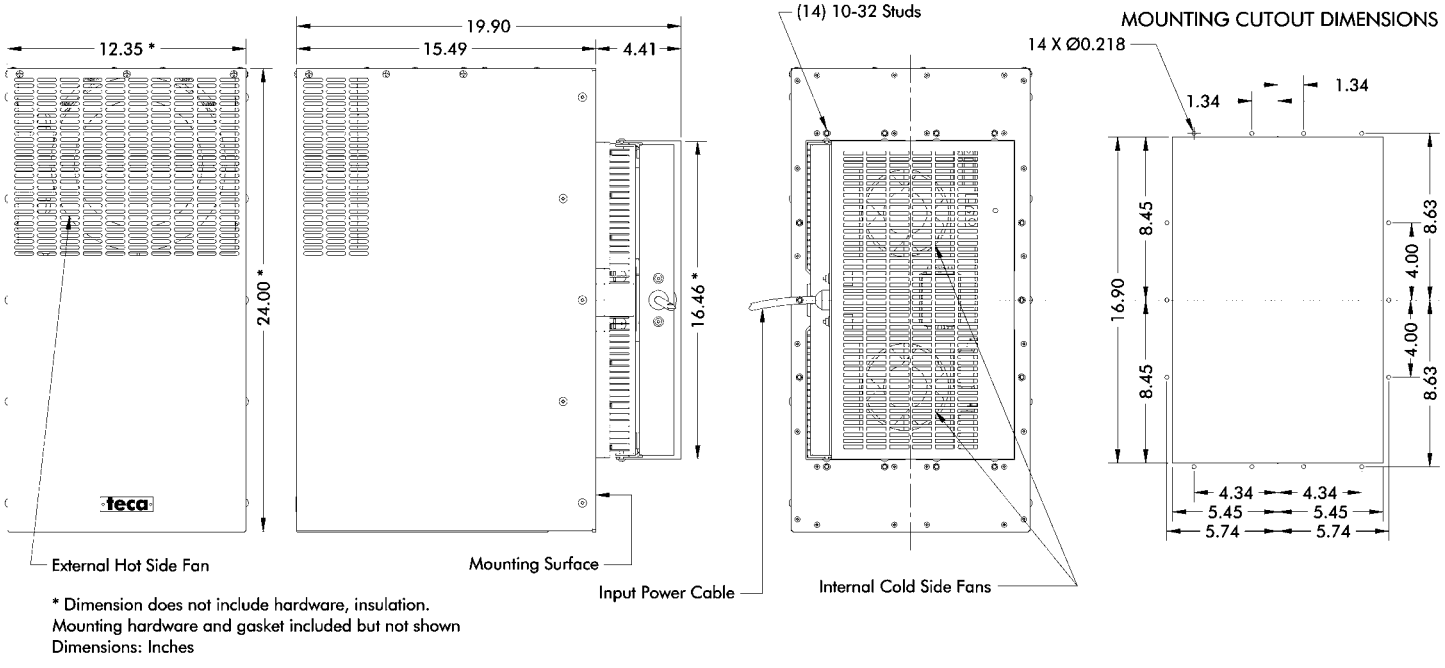
280 Watts L35 L35

160 Watts L35 L50



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware, insulation.
Mounting hardware and gasket included but not shown
Dimensions: Inches

AHP-1501 | Air Conditioner

Air Cooled
Thru Mount
NEMA-12 & NEMA-4

120/240 VAC Input

FEATURES

- Compact
- Mounts in multi-unit array for incremental capacity
- Dual voltage 120/240 VAC
- Environmentally safe
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing

INCLUDES

- Temperature control
- Mounting gasket and hardware
- Power input line cord
- Condensate removal system

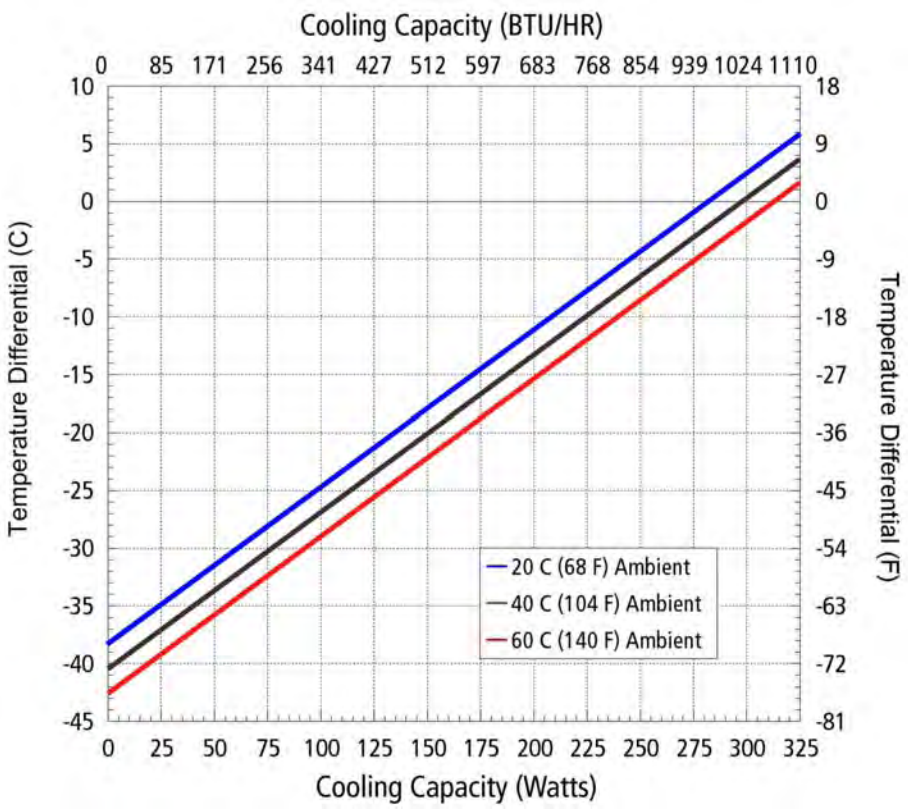
SPECIFICATIONS

	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60HZ	CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL	OPERATING AMBIENT °C	CONDENSATE REMOVAL	AGENCY APPROVALS (ETL)
NEMA 12	AHP-1501	0-2171-0-000	Cool Only	1000-1100	120/240	7.5/5.0	52(24)	30 °C	-10/+70	Wick,Drip Pan	UL1995/CSA22.2, CE
	AHP-1501	0-2181-0-000	Cool Only	1000-1100	120/240	7.5/5.0	52(24)	TC-6F	-10/+70	Wick	UL1995/CSA22.2, CE
	AHP-1501	0-2151-0-000	Cool Only	1000-1100	120/240	7.5/5.0	52(24)	EXT*	-10/+70	Wick	UL1995/CSA22.2, CE
	AHP-1501HC	0-2131-1-000	Heat/Cool	1000-1100	120/240	7.5/5.0	52(24)	TC-3F	-10/+70	Wick	UL1995/CSA22.2, CE
	AHP-1501HC	0-2151-1-000	Heat/Cool	1000-1100	120/240	7.5/5.0	52(24)	EXT*	-10/+70	Wick	UL1995/CSA22.2, CE
NEMA 4	AHP-1501XE	0-2181-4-000	Cool Only	1000-1100	120/240	7.5/5.0	52(24)	TC-6F	-10/+70	Wick	UL1995/CSA22.2, CE
	AHP-1501XE	0-2151-4-000	Cool Only	1000-1100	120/240	7.5/5.0	52(24)	EXT*	-10/+70	Wick	UL1995/CSA22.2, CE
	AHP-1501XEHC	0-2131-5-000	Heat/Cool	1000-1100	120/240	7.5/5.0	52(24)	TC-3F	-10/+70	Wick	UL1995/CSA22.2, CE
	AHP-1501XEHC	0-2151-5-000	Heat/Cool	1000-1100	120/240	7.5/5.0	52(24)	EXT*	-10/+70	Wick	UL1995/CSA22.2, CE

* Unit is set for 5-32 VDC external signal, relay(s) included

AHP-1501

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.136x-38.4	y=.136x-40.5	y=.136x-42.6
Cold Sink	y=.10x-38.4	y=.10x-40.5	y=.10x-42.6

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4 IP 56

RATING (TRADITIONAL)

1000 BTU/hr @ 0 °F ΔT

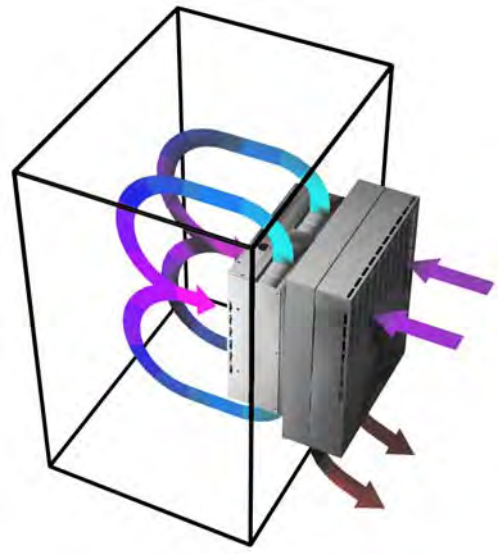
1300 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

300 Watts L35 L35

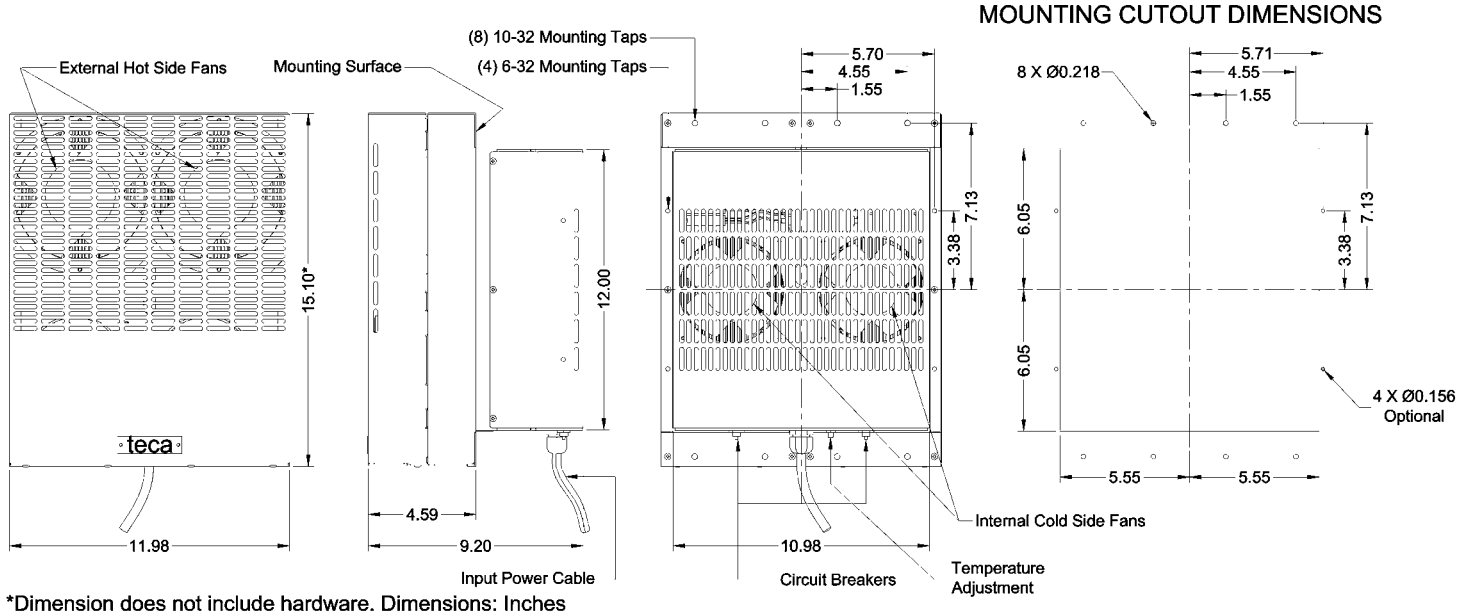
187 Watts L35 L50

* See page 10



Air Flow Pattern

AHP-1501 DIMENSIONS



*Dimension does not include hardware. Dimensions: Inches
Mounting hardware, drip pan and gasket included but not shown.

AHP-1400 | Air Conditioner

Air Cooled
Thru Mount
NEMA-12

120 VAC Input

FEATURES

- Compact
- Excels in high ambient temperatures
- Environmentally safe
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- NEMA-12 rating maintained
- Mounts in any orientation

INCLUDES

- Integral power supply (120 VAC input)
- Condensate removal system
- TC-6F thermostat

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING (BTU/HR)	VOLTAGE (VAC) 50/60 (Hz)	CURRENT AMPS.	WEIGHT LBS. (Kg)	TEMP. CONTROL	CONDENSATE REMOVAL	OPERATING AMBIENT (°C)
AHP-1400	0-B480-0-000	Cool only	810-900	120	8.5	33 (15)	TC-6F	Included	-10/+70

AHP-1400

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

RATING (TRADITIONAL)

850 BTU/hr @ 0 °F ΔT

1090 BTU/hr @ +20 °F ΔT *

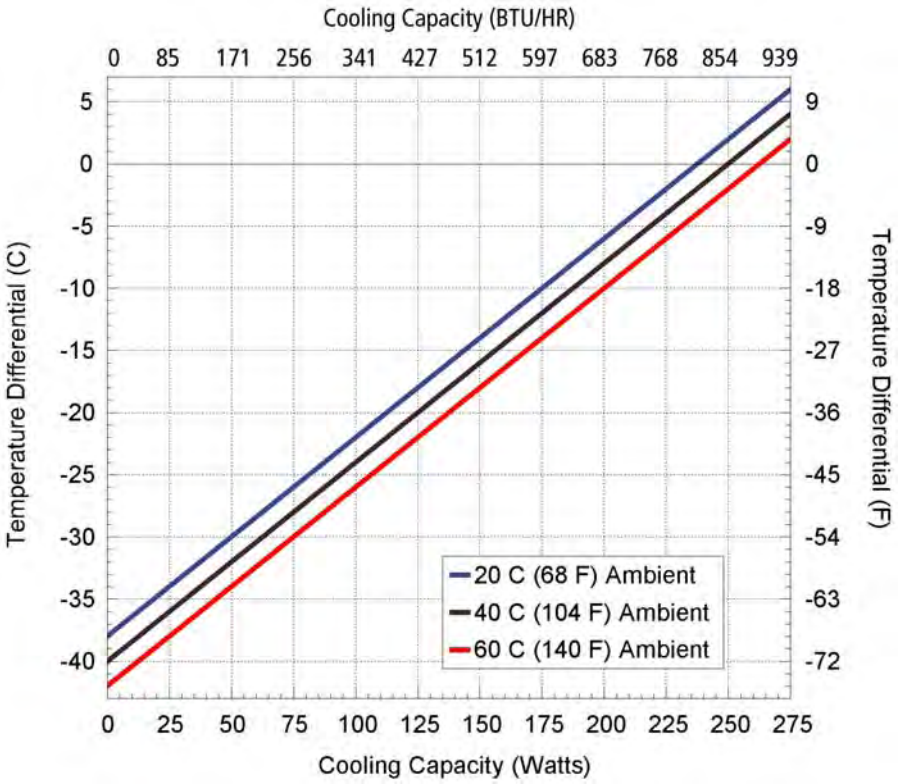
RATING (DIN 3168)

250 Watts L35 L35

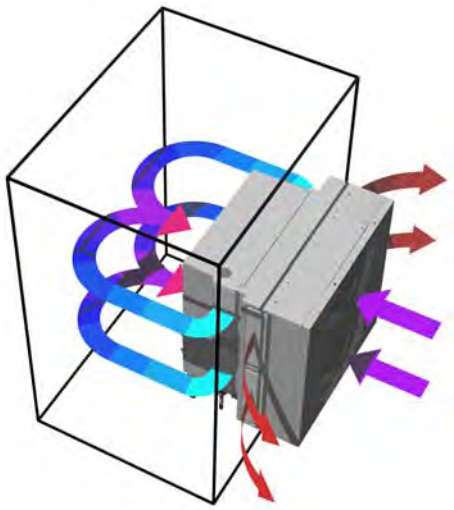
155 Watts L35 L50

* See page 10

PERFORMANCE CURVE

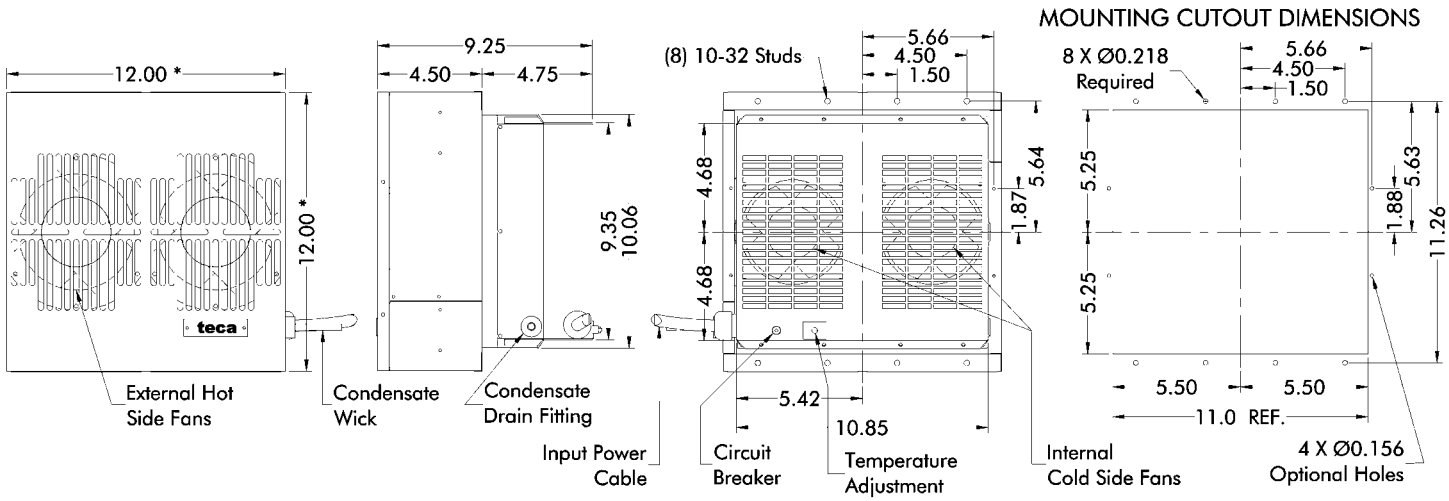


Equation of Line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.16x-38	y=.16x-40	y=.16x-42
Cold Sink	y=.12x-38	y=.12x-40	y=.12x-42



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware. Dimensions: Inches.
Mounting hardware and gasket included but not shown.

AHP-1200 | Air Conditioner

CE

Air Cooled
Thru Mount
NEMA-12, 4,4X, Class 1 Div 2

120 VAC, 240 VAC Input

FEATURES

- Compact, (only 15"L X 7.35"W X 8.17"D)
- Weighs only 21 lbs. (9.5 kg)
- Excels in high ambient temperatures
- Environmentally safe
- Dual voltage versions available
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Versions to withstand corrosive environments, shock and vibration
- Mounts and operates in any orientation

INCLUDES

- Adjustable temperature control
- Gasket and mounting hardware
- Power input line cord

SPECIFICATIONS

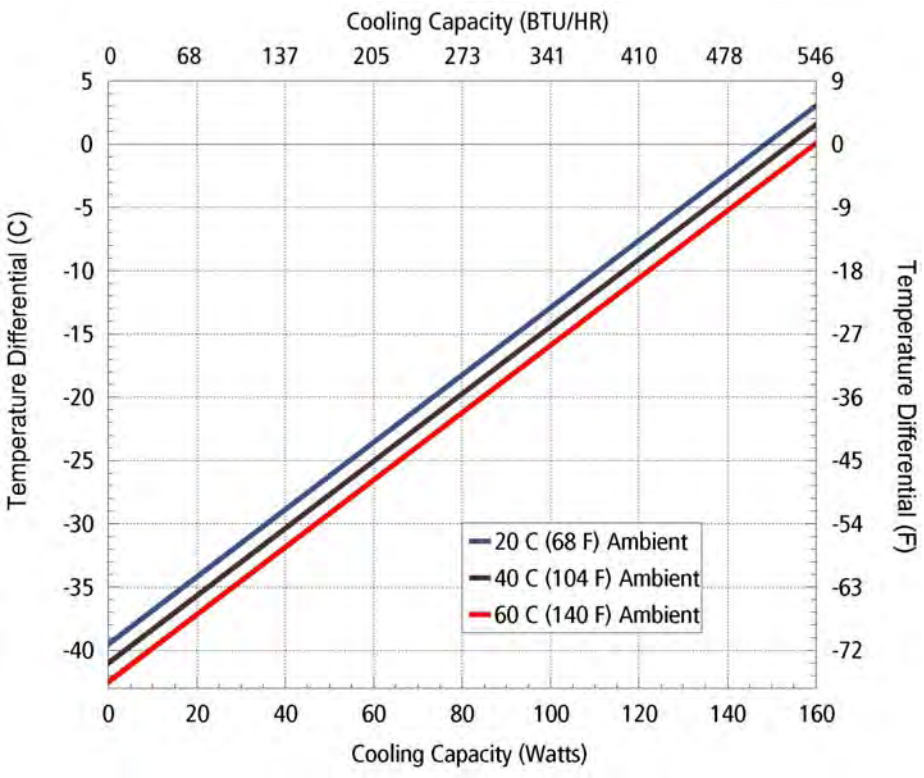
	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60HZ	CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL *	OPERATING AMBIENT °C	AGENCY APPROVALS (ETL)
NEMA12	AHP-1200	0-3080-0-000	Cool only	500-550	120	4.0	21(9.5)	TC-6F	-10/+70	UL1995/CSA22.2, CE
	AHP-1200	0-3050-0-000	Cool only	500-550	120	4.0	21(9.5)	EXT*	-10/+70	UL1995/CSA22.2, CE
	AHP-1200HC	0-3030-1-000	Heat/Cool	500-550	120	4.0	21(9.5)	TC-3F	-10/+70	UL1995/CSA22.2, CE
	AHP-1200HC	0-3050-1-000	Heat/Cool	500-550	120	4.0	21(9.5)	EXT*	-10/+70	UL1995/CSA22.2, CE
	AHP-1201	0-3081-0-000	Cool only	500-550	120/240	4.0/2.2	29(13.2)	TC-6F	-10/+70	UL1995/CSA22.2, CE
	AHP-1201	0-3051-0-000	Cool only	500-550	120/240	4.0/2.2	29(13.2)	EXT*	-10/+70	UL1995/CSA22.2, CE
	AHP-1201HC	0-3031-1-000	Heat/Cool	500-550	120/240	4.0/2.2	29(13.2)	TC-3F	-10/+70	UL1995/CSA22.2, CE
	AHP-1201HC	0-3051-1-000	Heat/Cool	500-550	120/240	4.0/2.2	29(13.2)	EXT*	-10/+70	UL1995/CSA22.2, CE
NEMA4X	AHP-1200XE	0-3080-4-000	Cool only	500-550	120	4.5	23(10.4)	TC-6F	-28/+70	UL1995/CSA22.2, CE
	AHP-1200XE	0-3050-4-000	Cool only	500-550	120	4.5	23(10.4)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1200XEHC	0-3030-5-000	Heat/Cool	500-550	120	4.5	23(10.4)	TC-3F	-28/+70	UL1995/CSA22.2, CE
	AHP-1200XEHC	0-3050-5-000	Heat/Cool	500-550	120	4.5	23(10.4)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1202XE	0-3082-4-000	Cool only	500-550	240	2.5	30(13.6)	TC-6F	-28/+70	UL1995/CSA22.2, CE
	AHP-1202XE	0-3052-4-000	Cool only	500-550	240	2.5	30(13.6)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1202XEHC	0-3032-5-000	Heat/Cool	500-550	240	2.5	30(13.6)	TC-3F	-28/+70	UL1995/CSA22.2, CE
	AHP-1202XEHC	0-3052-5-000	Heat/Cool	500-550	240	2.5	30(13.6)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1200X	0-3080-2-000	Cool only	500-550	120	4.0	23(10.4)	TC-6F	-28/+70	UL1995/CSA22.2, CE
	AHP-1200X	0-3050-2-000	Cool only	500-550	120	4.0	23(10.4)	EXT*	-28/+70	UL1995/CSA22.2, CE
	AHP-1200XHC	0-3030-3-000	Heat/Cool	500-550	120	4.0	23(10.4)	TC-3F	-28/+70	UL1995/CSA22.2, CE
	AHP-1200XHC	0-3050-3-000	Heat/Cool	500-550	120	4.0	23(10.4)	EXT*	-28/+70	UL1995/CSA22.2, CE
C1D2	AHP-1200XP	0-3080-2-003	Cool only	500-550	120	4.5	23(10.4)	TC-6F	-28/+70	UL-1604
	AHP-1200XPM	0-3080-2-004	Cool only	500-550	120	4.5	23(10.4)	TC-6F	-28/+70	UL-1604
	AHP-1200XPHC	0-3030-3-007	Heat/Cool	500-550	120	4.5	23(10.4)	TC-3F	-28/+70	UL-1604

Consult us for model AHP-1200XM, full shock and vibration version

* Unit is set for 5-32 VDC external signal, relay(s) included

AHP-1200

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.266x-39.5	y=.266x-41.0	y=.266x-42.5
Cold Sink	y=.173x-39.5	y=.173x-41.0	y=.173x-42.5

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4,4X IP 56

Class 1 Div 2 & NEMA-4X IP 56

RATING (TRADITIONAL)

530 BTU/hr @ 0 °F ΔT

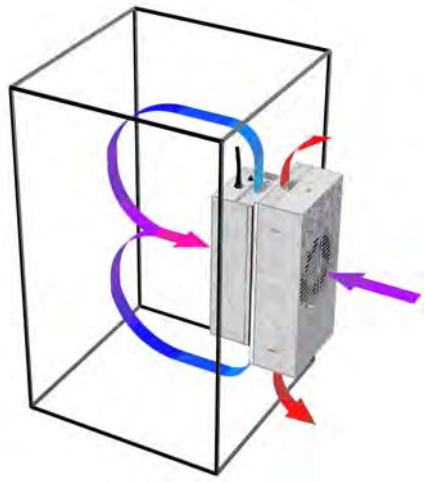
670 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

154 Watts L35 L35

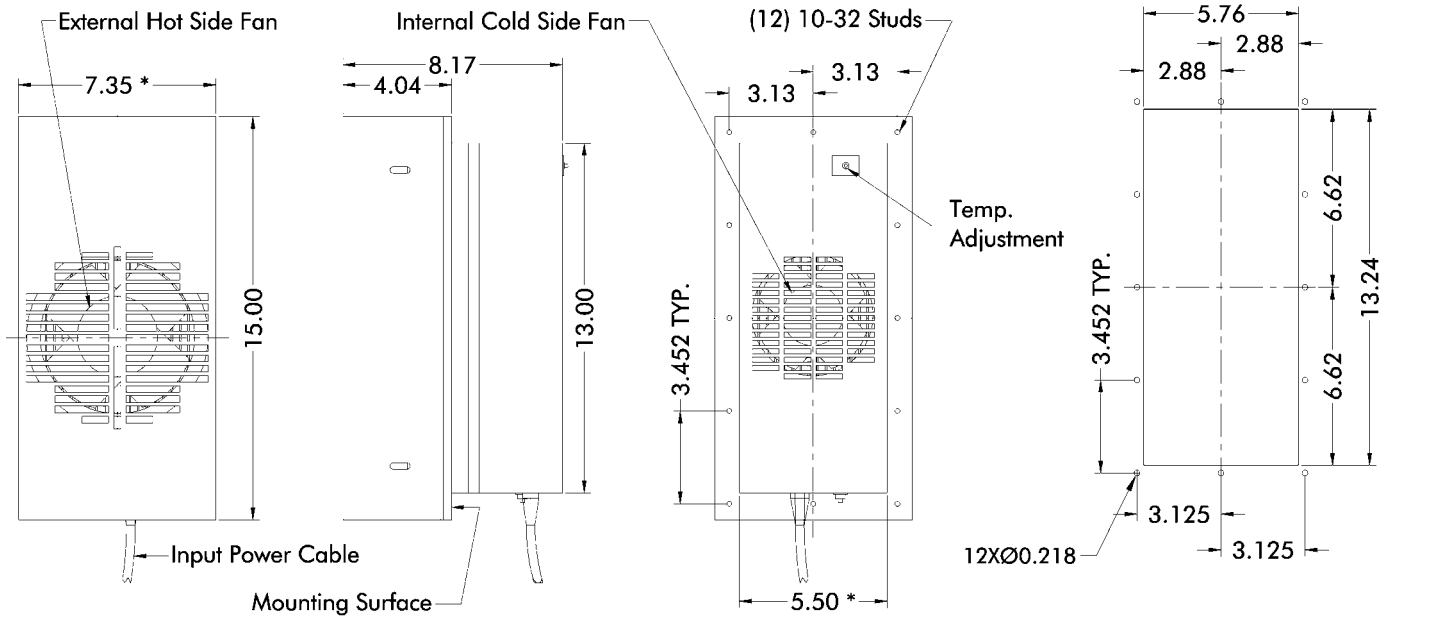
100 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware. Dimensions: Inches, Mounting hardware and gasket included but not shown.

AHP-1200 Air Conditioner

Air Cooled
Thru Mount
NEMA-12, 4,4X

24 VDC Input

FEATURES

- Compact, (only 15"L X 7.35"W X 8.17"D)
- Weighs only 18 lbs. (8.2 kg)
- Excels in high ambient temperatures
- Environmentally safe
- Dual efficiency versions available
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Versions to withstand corrosive environments, shock and vibration
- Mounts and operates in any orientation

INCLUDES

- Adjustable temperature control
- Gasket and mounting hardware
- Power input leads

SPECIFICATIONS

	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	RUNNING CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL *	OPERATING AMBIENT °C	AGENCY APPROVALS (ETL)
NEMA 12	AHP-1200	0-3095-0-000	Cool only	512-580	24	9.0	18 (8.2)	NONE	-10/+70	PENDING
	AHP-1200	0-3085-0-000	Cool only	512-580	24	9.0	18 (8.2)	TC-6F	-10/+70	PENDING
	AHP-1200	0-30F5-0-000	Cool only	512-580	24	9.0	18 (8.2)	85°F (30°)	-10/+70	PENDING
	AHP-1200	0-3055-0-000	Cool only	512-580	24	9.0	18 (8.2)	EXT*	-10/+70	PENDING
	AHP-1200HC	0-3035-1-000	Heat/Cool	512-580	24	9.0	18 (8.2)	TC-3F	-10/+70	PENDING
	AHP-1200HC	0-3055-1-000	Heat/Cool	512-580	24	9.0	18 (8.2)	EXT**	-10/+70	PENDING
NEMA 4X	AHP-1200XE	0-3095-4-000	Cool only	512-580	24	9.0	18 (8.2)	NONE	-28/+70	PENDING
	AHP-1200XE	0-3085-4-000	Cool only	512-580	24	9.0	18 (8.2)	TC-6F	-28/+70	PENDING
	AHP-1200XE	0-30F5-4-000	Cool only	512-580	24	9.0	18 (8.2)	85°F (30°)	-28/+70	PENDING
	AHP-1200XE	0-3055-4-000	Cool only	512-580	24	9.0	18 (8.2)	EXT*	-28/+70	PENDING
	AHP-1200XEHC	0-3035-5-000	Heat/Cool	512-580	24	9.0	18 (8.2)	TC-3F	-28/+70	PENDING
	AHP-1200XEHC	0-3055-5-000	Heat/Cool	512-580	24	9.0	18 (8.2)	EXT**	-28/+70	PENDING
	AHP-1200X	0-3095-2-000	Cool only	512-580	24	9.0	18 (8.2)	NONE	-28/+70	PENDING
	AHP-1200X	0-3085-2-000	Cool only	512-580	24	9.0	18 (8.2)	TC-6F	-28/+70	PENDING
	AHP-1200X	0-30F5-2-000	Cool only	512-580	24	9.0	18 (8.2)	85°F (30°)	-28/+70	PENDING
	AHP-1200X	0-3055-2-000	Cool only	512-580	24	9.0	18 (8.2)	EXT*	-28/+70	PENDING
	AHP-1200XHC	0-3035-3-000	Heat/Cool	512-580	24	9.0	18 (8.2)	TC-3F	-28/+70	PENDING
	AHP-1200XHC	0-3055-3-000	Heat/Cool	512-580	24	9.0	18 (8.2)	EXT**	-28/+70	PENDING

* Unit is set for 5-32 VDC external signal, relay(s) included

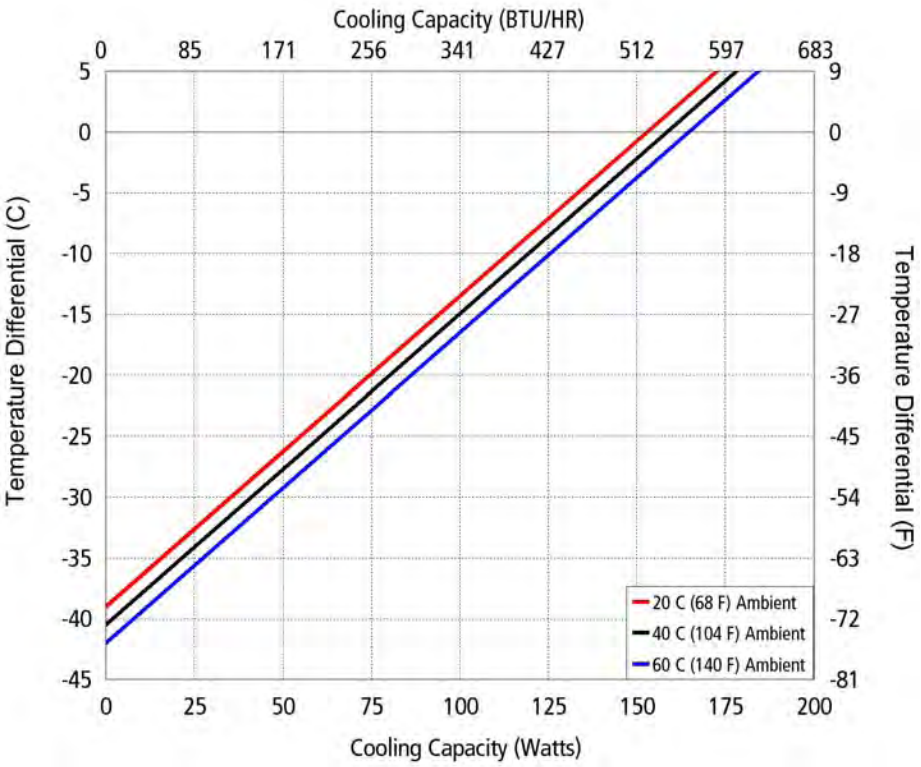
** Unit is set for 5-32 VDC external signal, H-Bridge relay(s) included

For other voltages contact TECA

For full shock and vibration model AHP-1200XM contact TECA

AHP-1200

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.255x-39.0	y=.255x-41.0	y=.255x-42.0
Cold Sink	y=.166x-39.0	y=.166x-41.0	y=.166x-42.0

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4,4X IP 56

RATING (TRADITIONAL)

530 BTU/hr @ 0 °F ΔT

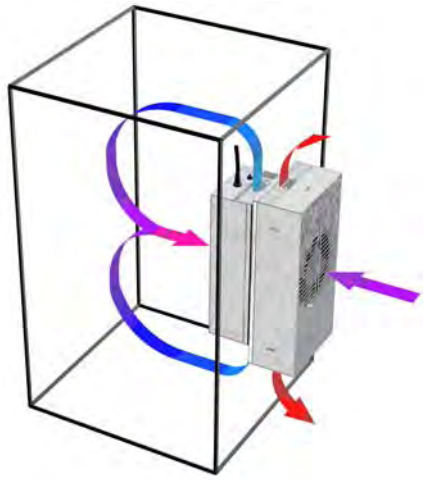
670 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

154 Watts L35 L35

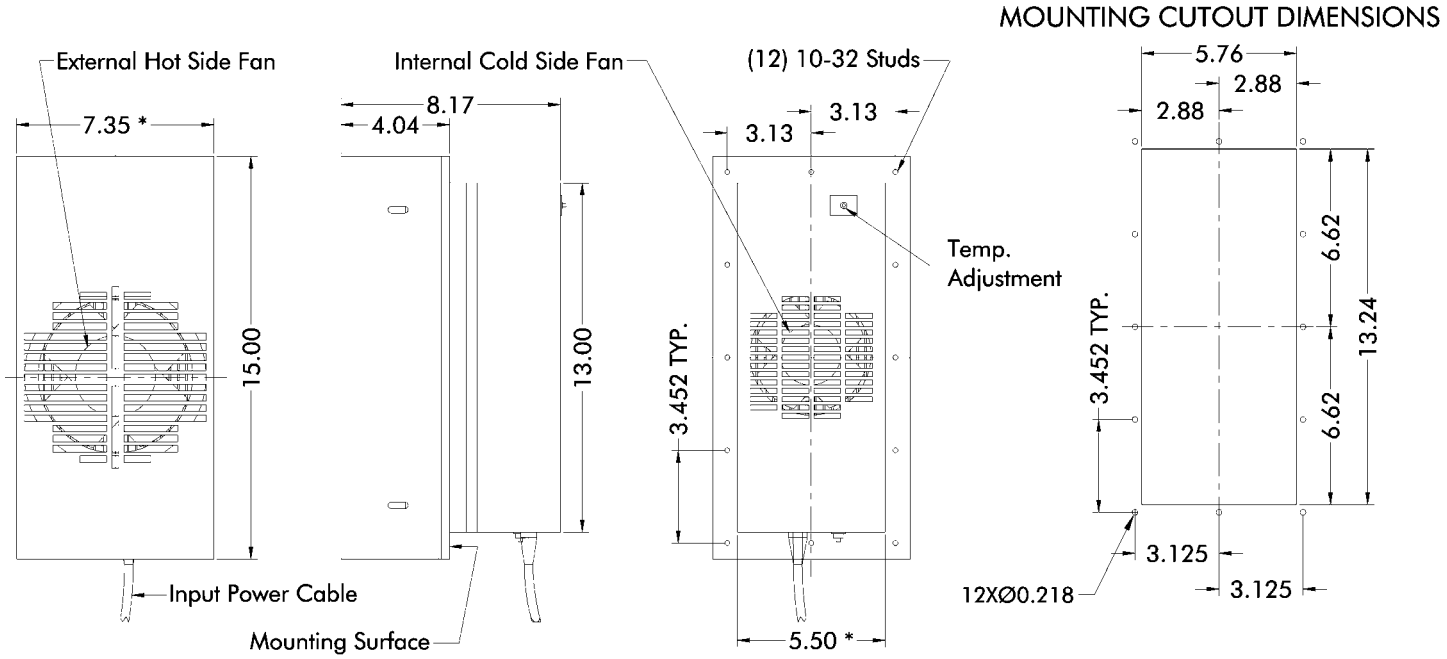
100 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware. Dimensions: Inches, Mounting hardware and gasket included but not shown.

AHP-1200CXP

North American

Air Cooled
Thru Mount
Class 1, Division 1 Groups B, C, D

Hazardous Location Air Conditioner

FEATURES

- Compact, (only 15"L X 7.35"W X 14"D)
- Weighs only 36 lbs. (16.4 kg)
- Excels in high ambient temperatures
- Environmentally safe
- Vortex Air Amplifier included
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts and operates in any orientation

REQUIREMENTS

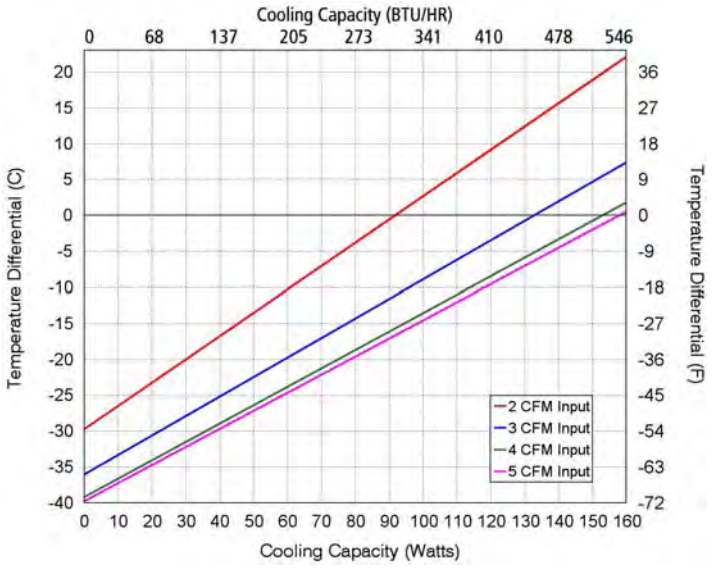
- Clean and dry compressed air supply
- Purged enclosure
- 120 VAC Input voltage
- Temperature control

INCLUDES

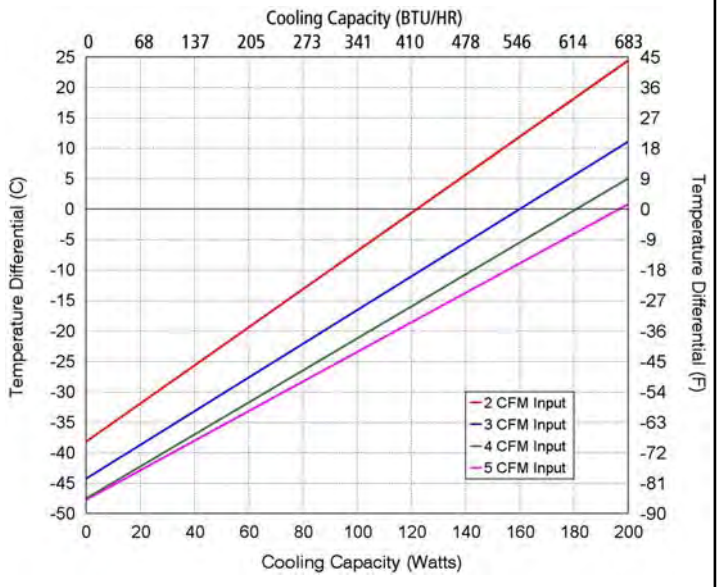
- Mounting gasket and hardware
- Power input line cord

PERFORMANCE CURVE

25°C Ambient



60°C Ambient



AHP-1200CXP

- Thru Mount
- Class 1, Division 1
- Groups B, C, D
- 307-680 BTU/hr
- NEMA-4/4X

LISTING & CLASSIFICATION:

The AHP-1200CXP by TECA is the first solid state air conditioner designed for use in Class 1 Division 1 Groups B, C and D hazardous environments in North America. The AHP-1200CXP features a unique air moving device that eliminates static discharge that traditional fans can generate. A compressed air line is required for the air moving device. The AHP-1200CXP has been used successfully in pharmaceutical plants on analyzers that monitor chemical reactions.

As an integral part of a larger system AHP-1200CXP has been investigated in accordance with UL 3111-1, First Edition, Rev. 6/94 Electrical Equipment for laboratory Use and CSA C22.2 No. 1010.1-92 Safety requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.

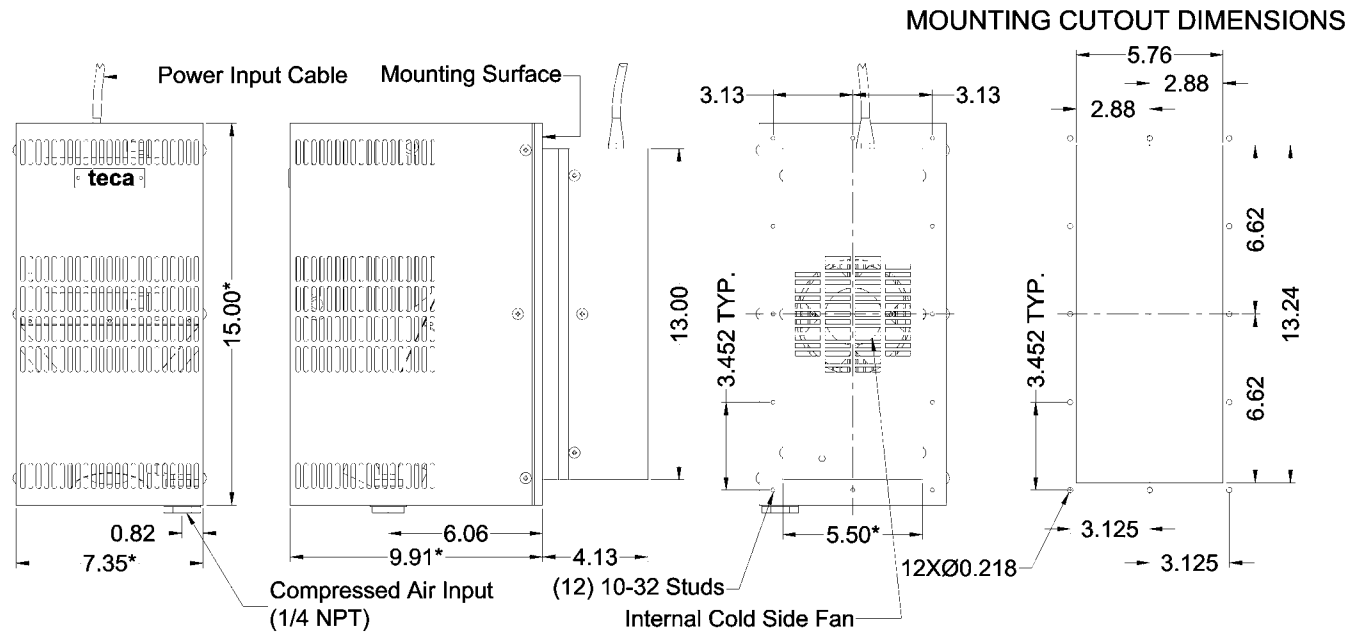
As an integral part of a larger system it has been investigated in accordance with NFPA 496 Edition Purged and pressurized Enclosure for Electrical Equipment.

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING (BTU/HR)	VOLTAGE (VAC 50/60 HZ)	CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL	OPERATING AMBIENT (°C)
AHP-1200CXP	0-3070-2-016	Cool Only	307-680	120	4.0	36 (16.4)	EXT*	-20/+40

* Unit is set for 5-32 VDC external control signal, relay(s) included

DIMENSIONS



* Dimension does not include hardware. Dimensions: Inches
Mounting hardware and gasket included but not shown.

AHP-1200CXP

European

Air Cooled
Thru Mount
Group II, Catagory 2 [1] G
EExd p d [ia] ia IIB+H2 T4

Hazardous Location Air Conditioner

FEATURES

- Compact, (only 15"L X 7.35"W X 18.4"D)
- Weighs only 39 lbs. (17.7kg)
- Excels in high ambient temperatures
- Environmentally safe
- Vortex Air Amplifier included
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts and operates in any orientation

REQUIREMENTS

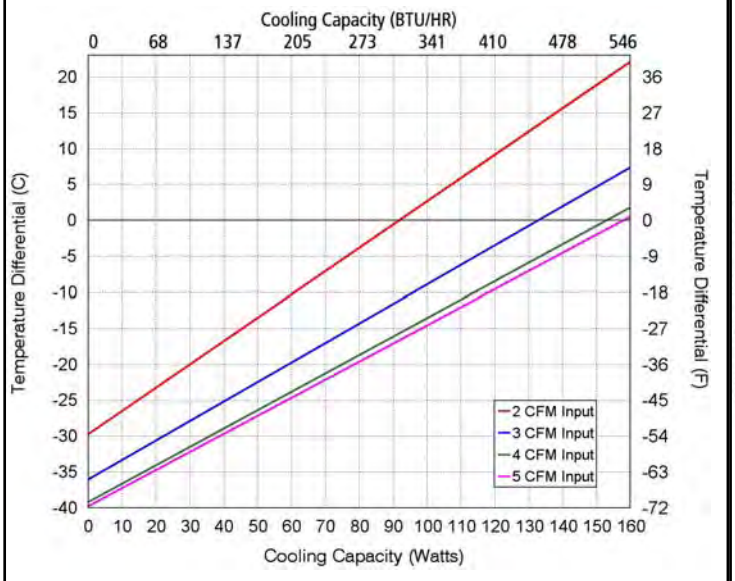
- Clean and dry compressed air supply
- Purged enclosure
- 120 VAC Input voltage

INCLUDES

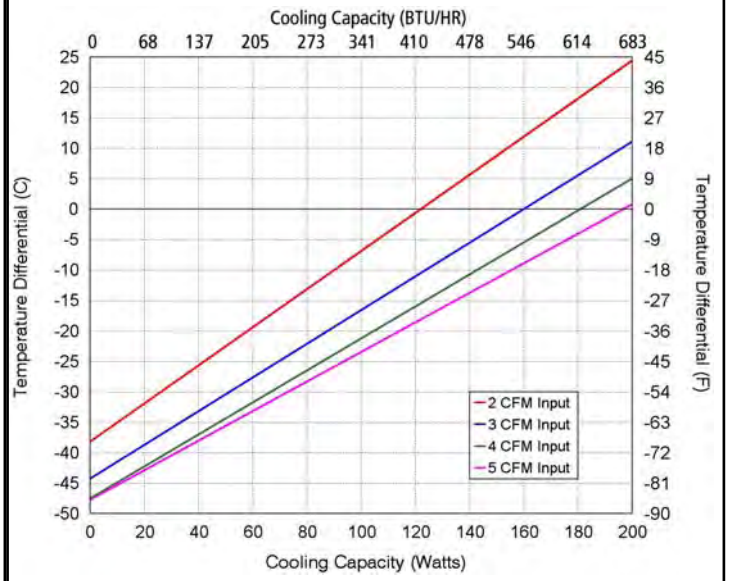
- Mounting gasket and hardware
- Power input line cord
- Temperature control

PERFORMANCE CURVE

25°C Ambient



60°C Ambient



AHP-1200CXP

Thru Mount

Group II, Catagory 2 [1] G

EEx p d [ia] ia IIB+H2 T4

307-680 BTU/hr

LISTING & CLASSIFICATION:

The AHP-1200CXP is TECA's first solid state air conditioner designed for use in hazardous environments in the United Kingdom and European Union. The AHP-1200CXP features a unique air moving device that eliminates static discharge that traditional fans can generate. A compressed air line is required for the air moving device. The AHP-1200CXP has been successfully implemented with a purged enclosure and other approved equipment in pharmaceutical, petrochemical and other similar applications.

Directive 94/9/EC with reference to EN50014:1997/A2:1999, EN50016:2002.

Procedure XF011, XF013

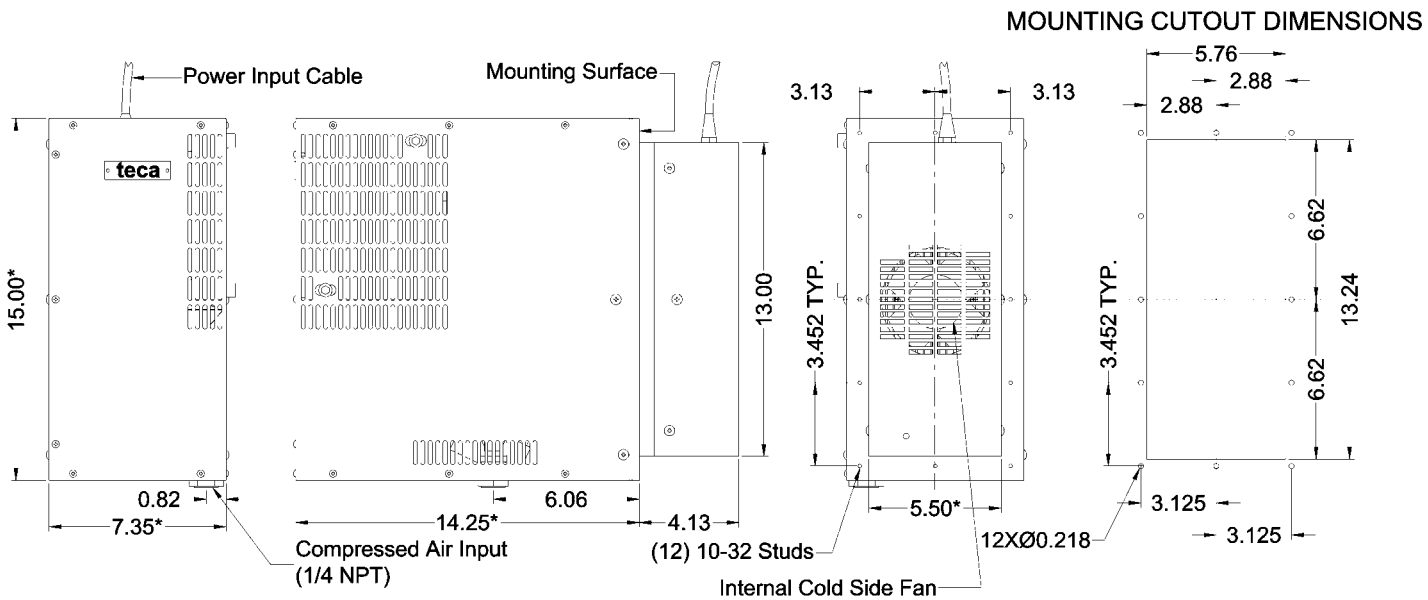
Group II, Category 2 [1] G EEx p d [ia] ia IIB+H2 T4 Ta=-20 °C to +40 °C

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING (BTU/HR)	VOLTAGE (VAC 50/60 HZ)	CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL	OPERATING AMBIENT (°C)
AHP-1200CXP	0-3070-2-018	Cool Only	307-680	120	4.0	39(17.7)	EXT*	-20/+40

* Unit is set for 5-32 VDC external extenal control signal, relay(s) included

DIMENSIONS



* Dimension does not include hardware. Dimensions: Inches
Mounting hardware and gasket included but not shown.

AHP-301FF | Air Conditioner

Air Cooled
Thru Mount
NEMA-12

120/240 VAC input

FEATURES

- Compact (only 10"L X 5.52"W X 7.83"D)
- Weighs only 12 lbs. (5.4 kg)
- Ambient range -10ºC to +70ºC
- Mounts and operates in any orientation: horizontal, vertical, etc.
- Low vibration and noise
- No moving parts except fans
- Environmentally safe
- Dual voltage
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing

INCLUDES

- Integral power supply 120/240 VAC
- Gasket and mounting hardware

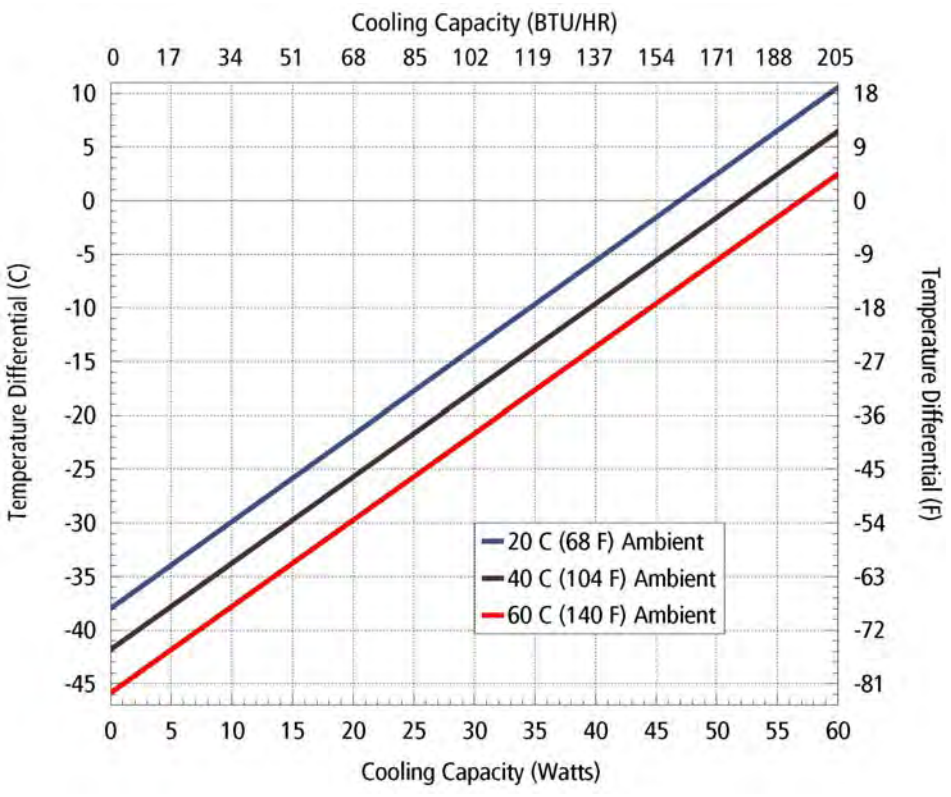
SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60HZ	CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL *	OPERATING AMBIENT °C
AHP-301FF	0-7091-0-000	Cool only	160-200	120/240	1.4/.70	12(5.4)	none	-10/+70
AHP-301FF	0-7081-0-000	Cool only	160-200	120/240	1.4/.70	12(5.4)	TC-6F	-10/+70
AHP-301FFHC	0-7031-1-000	Heat/Cool	160-200	120/240	1.4/.70	12(5.4)	TC-3F	-10/+70
AHP-301FF	0-7051-0-000	Cool only	160-200	120/240	1.4/.70	12(5.4)	EXT*	-10/+70
AHP-301FFHC	0-7051-1-000	Heat/Cool	160-200	120/240	1.4/.70	12(5.4)	EXT*	-10/+70
AHP-301FF/85	0-70F1-0-000	Cool only	160-200	120/240	1.4/.70	12(5.4)	85°F (30°C)	-10/+70

* Unit is set for 5-32 VDC external signal, relay(s) included

AHP-301FF

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.81x-38.0	y=.81x-42.0	y=.81x-46.0
Cold Sink	y=.62x-38.0	y=.62x-42.0	y=.62x-46.0

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

RATING (TRADITIONAL)

180 BTU/hr @ 0 °F ΔT

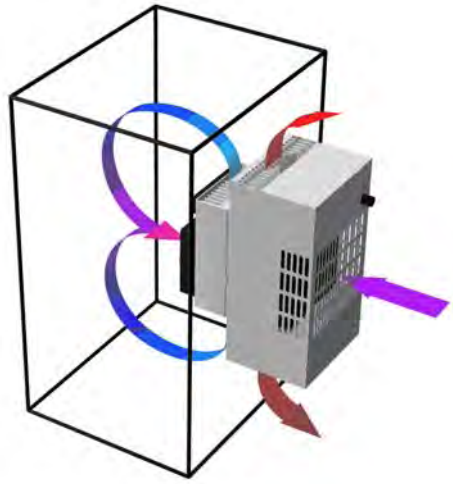
220 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

52 Watts L35 L35

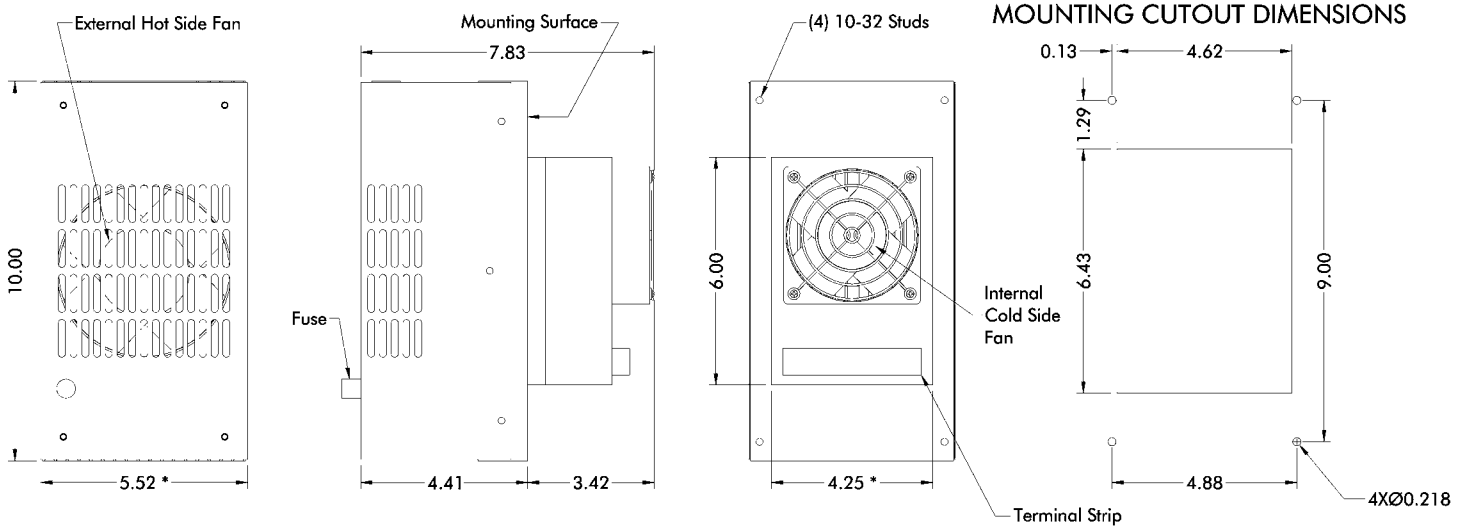
36 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware, insulation. Dimensions: Inches, Mounting hardware and gasket included but not shown.

AHP-300FF | Air Conditioner

Air Cooled
Thru Mount
NEMA-12, 4, and 4x

General Purpose VDC Input

FEATURES

- Compact (only 10"L X 5.37"W X 6.45"D)
- Weighs only 7.5 lbs. (3.4 kg)
- Ambient range -10ºC to +70ºC
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Mounts in any orientation
- X versions use mil-grade hot side fan
- XE versions use industrial grade high quality sealed fans

INCLUDES

- Gasket and mounting hardware
- Hook-up leads
- Mounting hardware

OPTIONS

- Temperature Control TC-6F DC for cool only
- Temperature Control TC-3F DC for heat/cool
- Temperature Control TC-3500 for heat/cool reverse polarity
- Adaptable for TC-3300 and TC-4300 control
- Cover for hot side

SPECIFICATIONS

	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	WEIGHT LBS.(KG)	TEMP. CONTROL	OPERATING AMBIENT °C
N 1 2	AHP-300FF	0-7097-0-000	Cool only	200-220	12/24/48	12/6/3	7.5(3.4)	none	-10/+70
	AHP-300FFHC	0-7094-1-000	Heat/Cool	200-220	12	12	7.5(3.4)	none	-10/+70
	AHP-300FFHC	0-7095-1-000	Heat/Cool	200-220	24	6	7.5(3.4)	none	-10/+70
	AHP-300FFHC	0-7097-1-001	Heat/Cool rev. pol.	200-220	12/24/48	12/6/3	7.5(3.4)	none*	-10/+70
N 4 X	AHP-300XE	0-7097-4-000	Cool only, sealed fan	200-220	12/24/48	12/6/3	7.5(3.4)	none	-10/+70
	AHP-300XEHC	0-7095-5-000	Heat/Cool, sealed fan	200-220	24	6	7.5(3.4)	none	-10/+70
	AHP-300XEHC	0-7097-5-001	Heat/Cool rev. pol.	200-220	12/24/48	12/6/3	7.5(3.4)	none*	-10/+70
	AHP-300X	0-7097-2-000	Cool only, Mil grade fan	200-220	12/24/48	12/6/3	9.2(4.2)	none	-10/+70
	AHP-300XHC	0-7094-3-000	Heat/Cool, Mil grade fan	200-220	12	12	9.2(4.2)	none	-10/+70
	AHP-300XHC	0-7095-3-000	Heat/Cool, Mil grade fan	200-220	24	6	9.2(4.2)	none	-10/+70
	AHP-300XHC	0-7097-3-001	Heat/Cool rev. pol.	200-220	12/24/48	12/6/3	9.2(4.2)	none*	-10/+70

* Reverse polarity unit can be used with external TC-3500 controller operating at 24VDC only see P. 112

See also , "Power Supplies", P. 117

AHP-300FF

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4,4X IP 56

RATING (TRADITIONAL)

210 BTU/hr @ 0 °F ΔT

250 BTU/hr @ +20 °F ΔT *

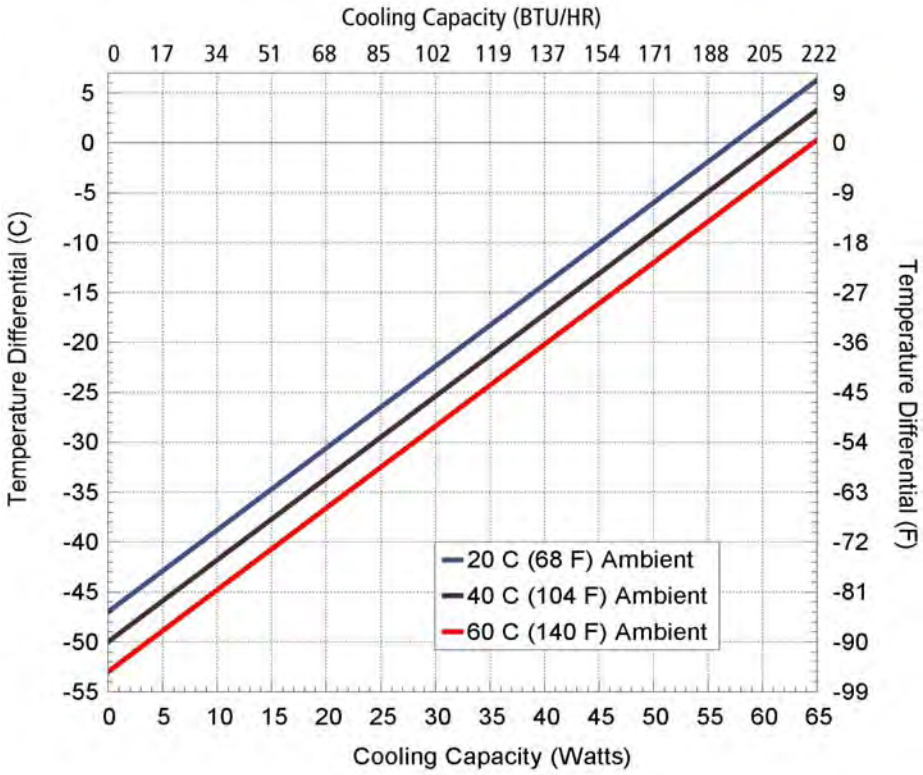
RATING (DIN 3168)

61 Watts L35 L35

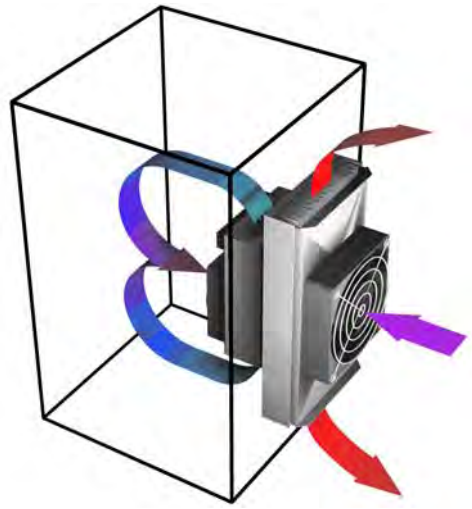
44 Watts L35 L50

* See page 10

PERFORMANCE CURVE

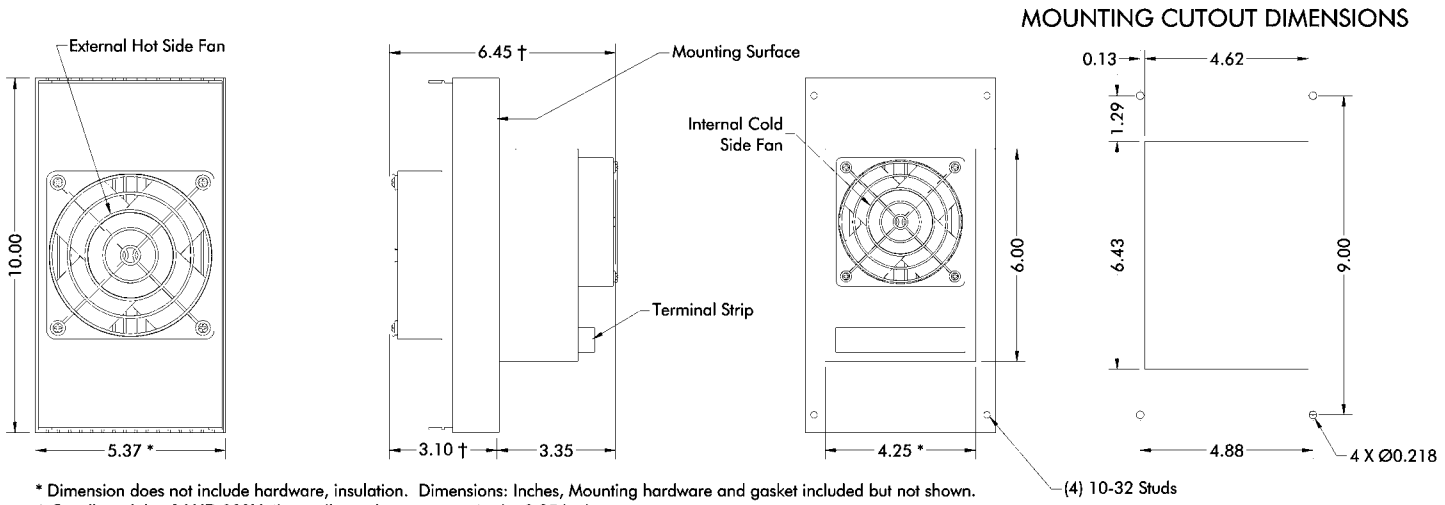


y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.82x-47.0	y=.82x-50.0	y=.82x-53.0
Cold Sink	y=.64x-47.0	y=.64x-50.0	y=.64x-53.0



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware, insulation. Dimensions: Inches, Mounting hardware and gasket included but not shown.
† On all models of AHP-300X, these dimensions are greater by 0.25 inch.

AHP-150FF | Air Conditioner

Air Cooled
Thru Mount
NEMA-12
NEMA-4

General Purpose VDC Input

FEATURES

- Compact (only 7"L X 5"W X 6.02"D)
- Weighs only 3.2 lbs. (1.5 kg)
- Ambient range -10°C to +70°C
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Mounts in any orientation

INCLUDES

- Mounting gasket
- Hook-up leads
- Mounting Hardware

OPTIONS

- Temperature control TC-6F DC for cool only
- Temperature control TC-3F DC for heat/cool
- Temperature Control TC-3500 for heat/cool reverse polarity
- Adaptable for TC-3300 and TC-4300 controller

SPECIFICATIONS

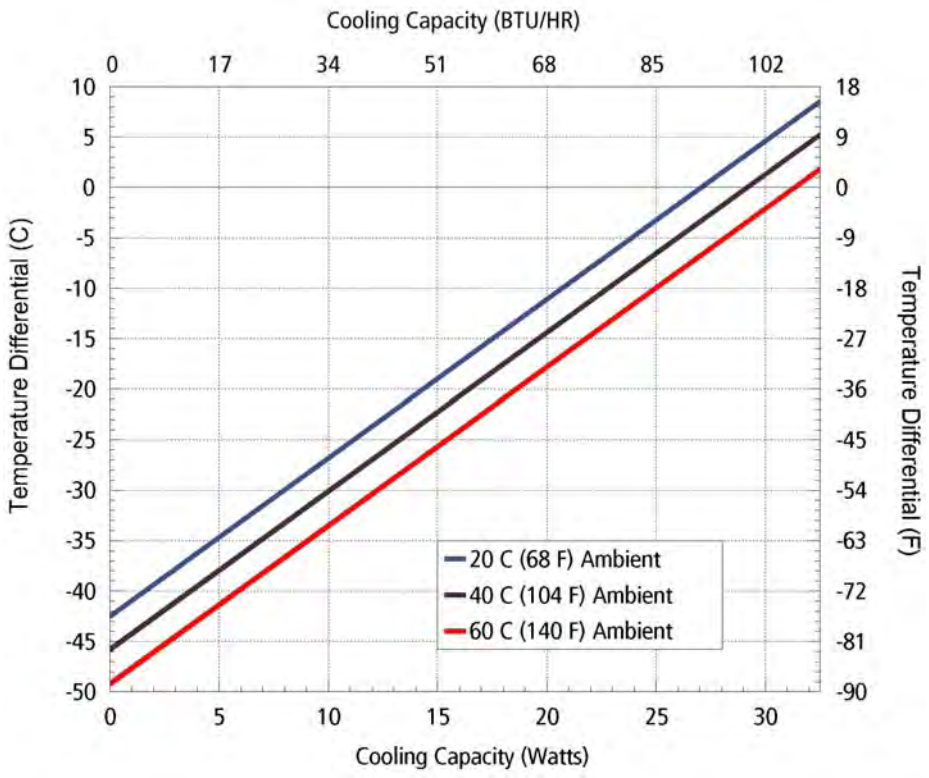
	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING	VOLTAGE VDC BTU/HR	CURRENT AMPS. *	WEIGHT LBS.(KG)	TEMP. CONTROL	OPERATING AMBIENT °C
N 12	AHP-150FF	0-8098-0-000	Cool only	90-105	12/24	6/3	3.2(1.5)	none	-10/+70
	AHP-150FFHC	0-8094-1-000	Heat/Cool	90-105	12	6	3.2(1.5)	none	-10/+70
	AHP-150FFHC	0-8095-1-000	Heat/Cool	90-105	24	3	3.2(1.5)	none	-10/+70
	AHP-150FFHC	0-8098-1-001	Heat/Cool rev. pol.	90-105	12/24	6/3	3.2(1.5)	none*	-10/+70
N 4	AHP-150XE	0-8094-4-000	Cool only	90-105	12	6	3.2(1.5)	none	-10/+70
	AHP-150XEHC	0-8094-5-000	Heat/Cool	90-105	12	6	3.2(1.5)	none	-10/+70
	AHP-150XEHC	0-8094-5-001	Heat/Cool rev. pol.	90-105	12	6	3.2(1.5)	none*	-10/+70

* Reverse polarity unit can be used with external TC-3500 controller see P. 112

See also , "Power Supplies", P. 117

AHP-150FF

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=1.57x-42.5	y=1.57x-45.8	y=1.57x-49.2
Cold Sink	y=1.24x-42.5	y=1.24x-45.8	y=1.24x-49.2

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4,4X IP 54

RATING (TRADITIONAL)

100 BTU/hr @ 0 °F ΔT

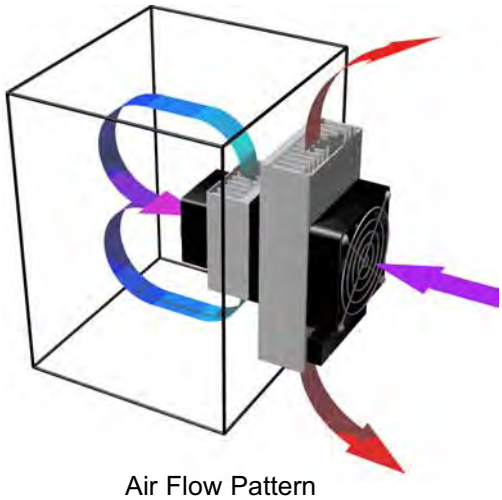
123 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

29 Watts L35 L35

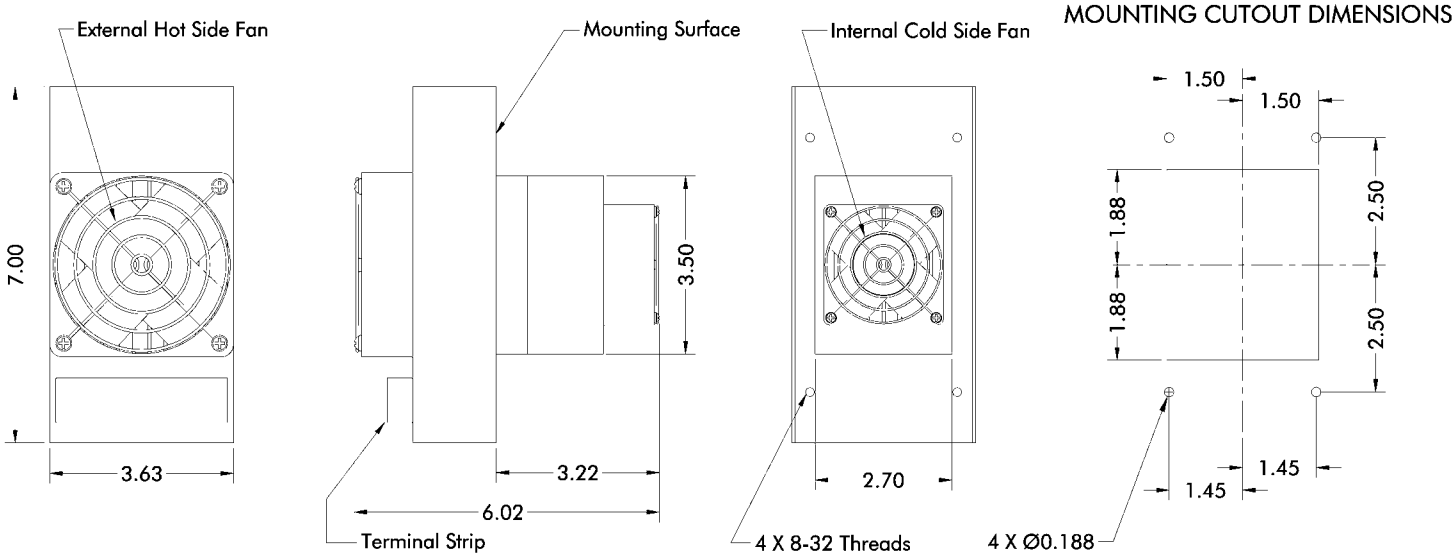
21 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware, insulation. Dimensions: Inches, Hardware and gasket included but not shown.

FHP-2850 | Air Conditioner

Air Cooled
Flush Mounted
NEMA-12

120 VAC, 240 VAC Input

FEATURES

- Externally mounted, no intrusion
- Ambient range -10ºC to +70ºC
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts in any orientation
- No moving parts except fans
- Environmentally safe

INCLUDES

- Integral power supply
- Condensate removal system
- TC-6F thermostat
- Mounting hardware
- Gasket for NEMA-12 seal

APPLICATIONS

This unit has been employed for larger cooling loads such as overhead cranes in rolling mills and in mobile applications for military camera cooling.

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (kg)	TEMP. CONTROL *	CONDENSATE REMOVAL	OPERATING AMBIENT °C
FHP-2850	7-D580-0-000	Cool only	1600-1800	120	12.5	68(31)	TC-6F	Included	-10/+70
FHP-2850	7-D550-0-000	Cool only	1600-1800	120	12.5	68(31)	EXT*	Included	-10/+70
FHP-2852	7-D582-0-000	Cool only	1600-1800	240	7.5	68(31)	TC-6F	Included	-10/+70
FHP-2852	7-D552-0-000	Cool only	1600-1800	240	7.5	68(31)	EXT*	Included	-10/+70

* Unit is set for 5-32 VDC external signal, relay(s) included

FHP-2850

MOUNTING STYLE

Flush Mounted

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

RATING (TRADITIONAL)

1700 BTU/hr @ 0 °F ΔT

2200 BTU/hr @ +20 °F ΔT *

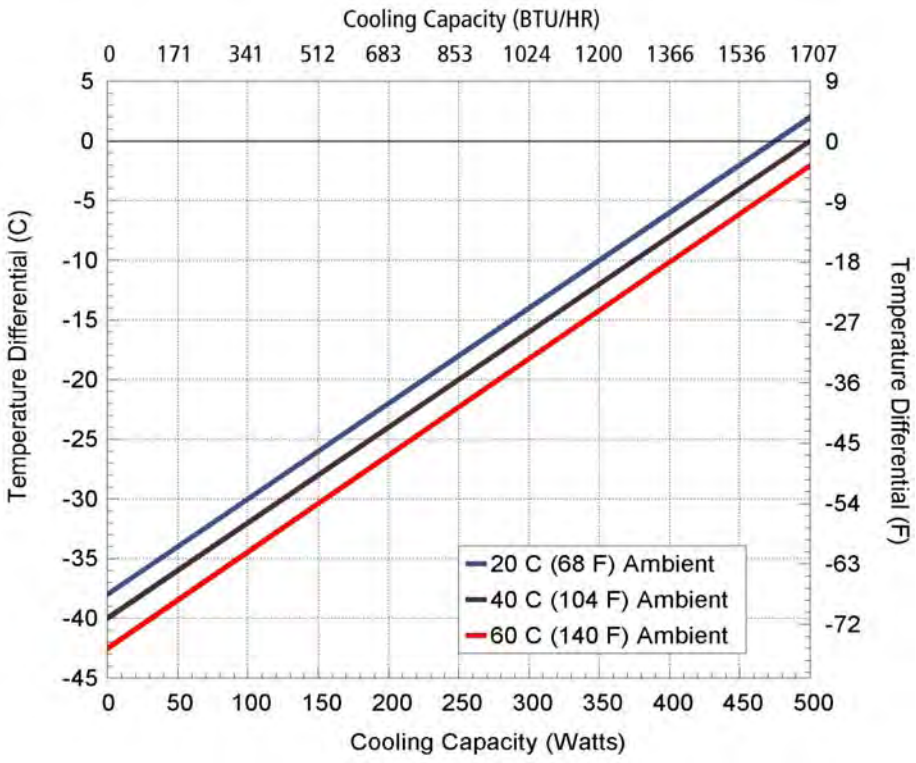
RATING (DIN 3168)

500 Watts L35 L35

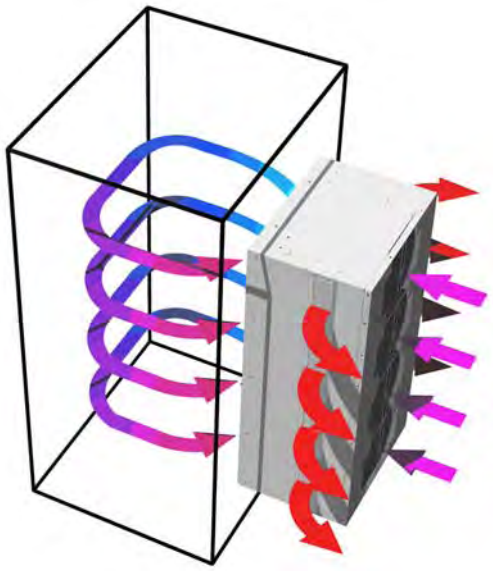
325 Watts L35 L50

* See page 10

PERFORMANCE CURVE

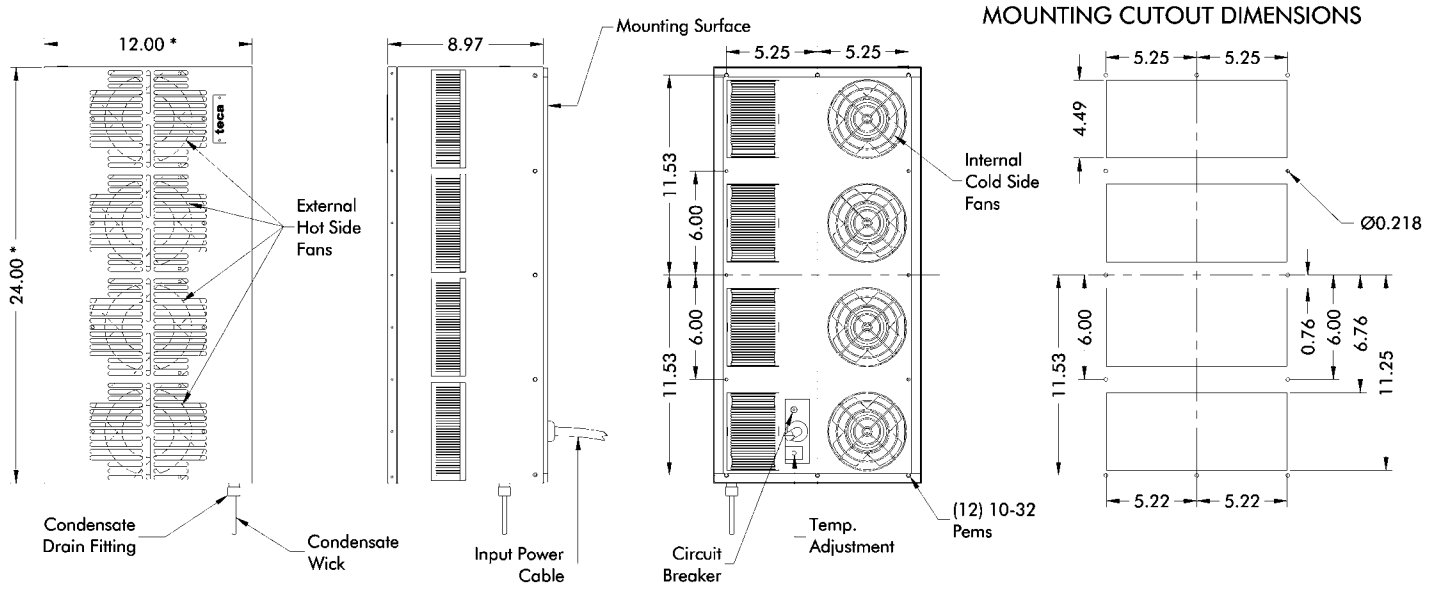


Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.08x-38.0	y=.08x-40.0	y=.08x-42.0
Cold Sink	y=.05x-38.0	y=.05x-40.0	y=.05x-42.0



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware. Dimensions: inches. Mounting hardware and gasket included but not shown.

FHP-1501 | Air Conditioner

Air Cooled
Flush Mounted
NEMA-12, NEMA-4

120/240 VAC Input

FEATURES

- Externally mounted (no intrusion)
- Mounts in multi-unit array for incremental capacity
- Compact (only 15"L X 12"W X 9"D)
- Weighs only 55 lbs. (25 kg)
- Ambient range -10ºC to +70ºC
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Dual voltage (120/240 VAC)
- No moving parts except fans
- Environmetally safe

INCLUDES

- Integral power supply
- Condensate removal system
- Adjustable temperature control
- Mounting gasket for NEMA-12, NEMA-4 seal
- Mounting hardware

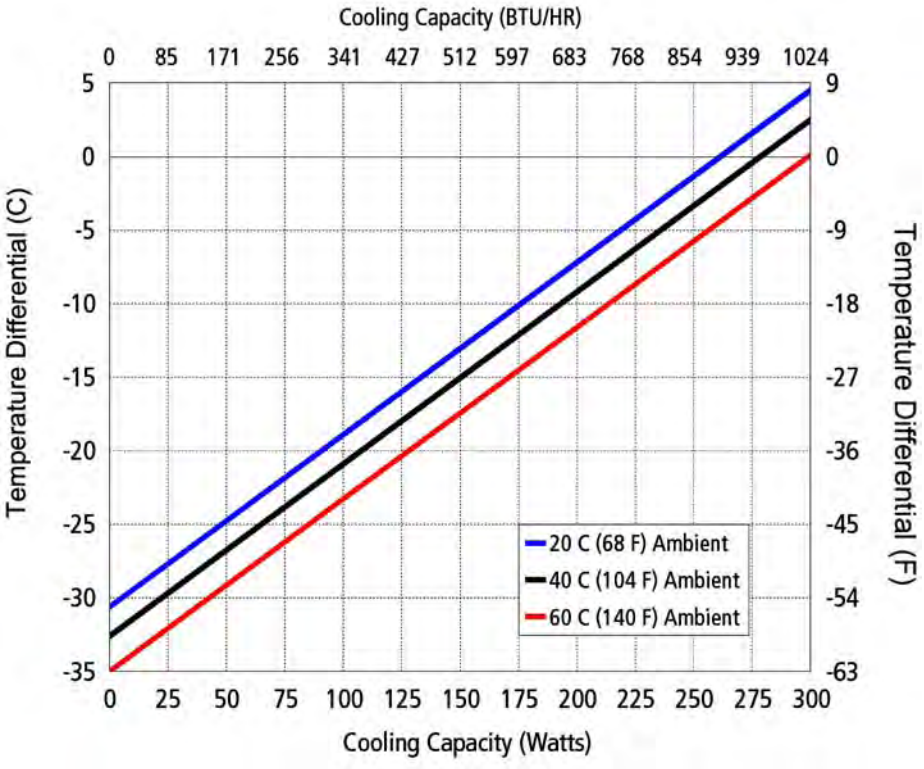
SPECIFICATIONS

	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	CONDENSATE REMOVAL	OPERATING AMBIENT °C	AGENCY APPROVALS (ETL)
NEMA 12	FHP-1501	7-2181-0-000	Cool only	1000-1100	120/240	7.5/5.0	55(25)	TC-6F	Included	-10/+70	UL1995/CSA22.2, CE
	FHP-1501	7-2151-0-000	Cool only	1000-1100	120/240	7.5/5.0	55(25)	EXT*	Included	-10/+70	UL1995/CSA22.2, CE
	FHP-1501HC	7-2131-1-000	Heat/Cool	1000-1100	120/240	7.5/5.0	55(25)	TC-3F	Included	-10/+70	UL1995/CSA22.2, CE
	FHP-1501HC	7-2151-1-000	Heat/Cool	1000-1100	120/240	7.5/5.0	55(25)	EXT*	Included	-10/+70	UL1995/CSA22.2, CE
NEMA 4	FHP-1501XE	7-2181-4-000	Cool only	1000-1100	120/240	8.0/5.5	55(25)	TC-6F	Included	-10/+60	UL1995/CSA22.2, CE
	FHP-1501XE	7-2151-4-000	Cool only	1000-1100	120/240	8.0/5.5	55(25)	EXT*	Included	-10/+60	UL1995/CSA22.2, CE
	FHP-1501XEHC	7-2131-5-000	Heat/Cool	1000-1100	120/240	7.5/5.0	55(25)	TC-3F	Included	-10/+70	UL1995/CSA22.2, CE
	FHP-1501XEHC	7-2151-5-000	Heat/Cool	1000-1100	120/240	7.5/5.0	55(25)	EXT*	Included	-10/+70	UL1995/CSA22.2, CE

* Unit is set for 5-32 VDC external signal, relay(s) included

FHP-1501

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.117x-30.6	y=.117x-32.6	y=.117x-35.0
Cold Sink	y=.093x-30.6	y=.093x-32.6	y=.093x-35.0

MOUNTING STYLE

Flush Mounted

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4 IP 56

RATING (TRADITIONAL)

950 BTU/hr @ 0 °F ΔT

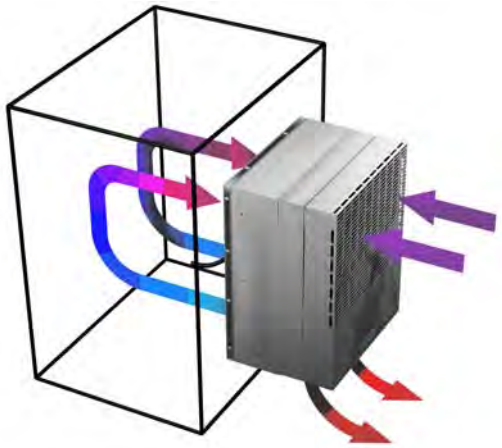
1270 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

278 Watts L35 L35

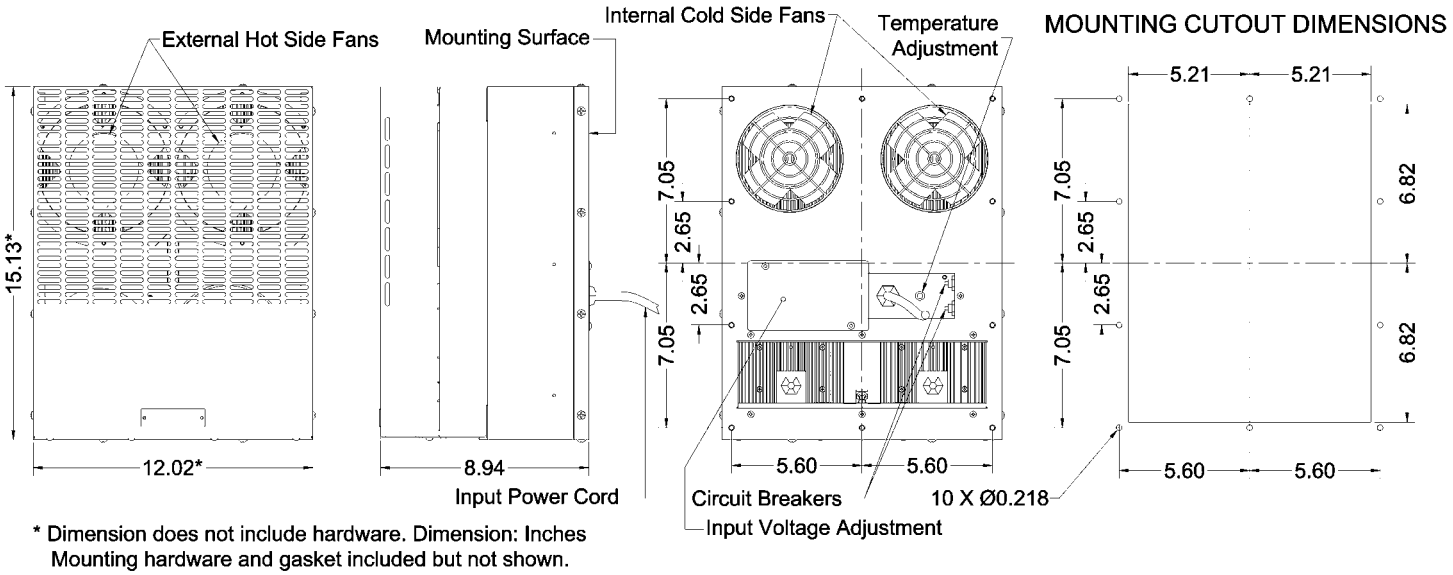
162 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware. Dimension: Inches
Mounting hardware and gasket included but not shown.

FHP-1501 | Air Conditioner

Air Cooled
Flush Mounted
NEMA-12, NEMA-4

24 VDC Input

FEATURES

- Externally mounted (no intrusion)
- Mounts in multi-unit array for incremental capacity
- Compact (only 15"L X 12"W X 9"D)
- Weighs only 55 lbs. (25 kg)
- Ambient range -10°C to +70°C
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- No moving parts except fans
- Environmetally safe

INCLUDES

- Condensate removal system
- Adjustable temperature control
- Mounting gasket for NEMA-12, NEMA-4 seal
- Mounting hardware

SPECIFICATIONS

	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	CONDENSATE REMOVAL	OPERATING AMBIENT °C	AGENCY APPROVALS (ETL)
NEMA 12	FHP-1501	7-2185-0-000	Cool only	1000-1100	24	18	46(21)	TC-6F	Included	-10/+70	Pending
	FHP-1501	7-2155-0-000	Cool only	1000-1100	24	18	46(21)	EXT*	Included	-10/+70	Pending
	FHP-1501HC	7-2135-1-000	Heat/Cool	1000-1100	24	18	46(21)	TC-3F	Included	-10/+70	Pending
	FHP-1501HC	7-2155-1-000	Heat/Cool	1000-1100	24	18	46(21)	EXT**	Included	-10/+70	Pending
NEMA 4	FHP-1501XE	7-2185-4-000	Cool only	1000-1100	24	18	46(21)	TC-6F	Included	-10/+60	Pending
	FHP-1501XE	7-2155-4-000	Cool only	1000-1100	24	18	46(21)	EXT*	Included	-10/+60	Pending
	FHP-1501XEHC	7-2135-5-000	Heat/Cool	1000-1100	24	18	46(21)	TC-3F	Included	-10/+70	Pending
	FHP-1501XEHC	7-2155-5-000	Heat/Cool	1000-1100	24	18	46(21)	EXT**	Included	-10/+70	Pending

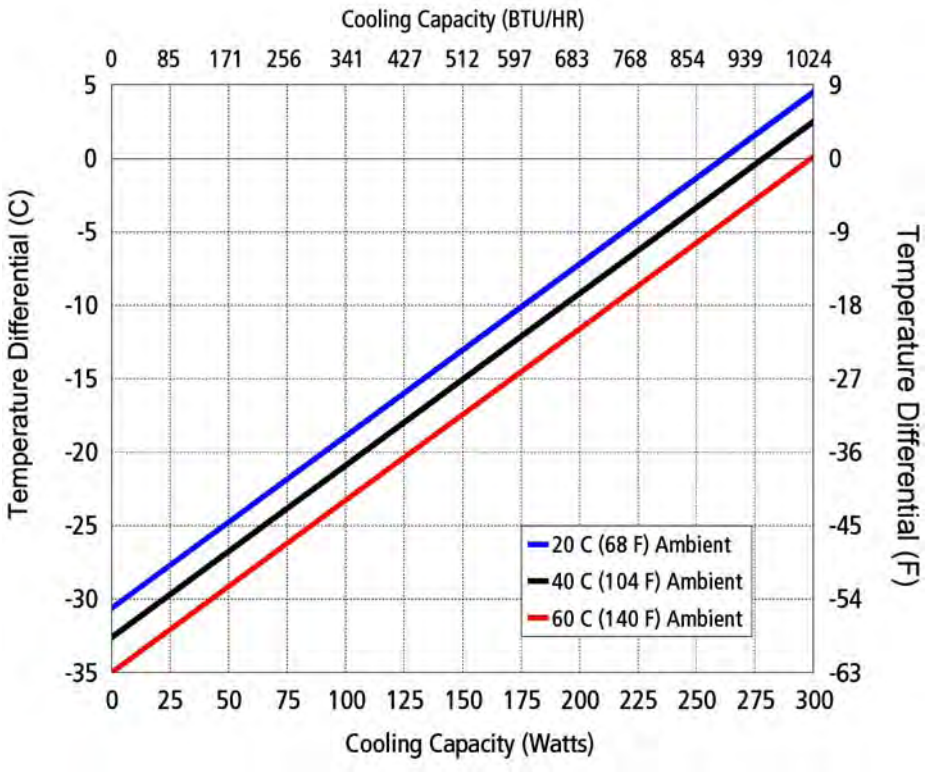
* Unit is set for 5-32 VDC external signal, relay(s) included

** Unit is set for 5-32 VDC external signal, H-Bridge relay(s) included

For other voltages contact TECA

FHP-1501

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.117x-30.6	y=.117x-32.6	y=.117x-35.0
Cold Sink	y=.093x-30.6	y=.093x-32.6	y=.093x-35.0

MOUNTING STYLE

Flush Mounted

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4 IP 56

RATING (TRADITIONAL)

950 BTU/hr @ 0 °F ΔT

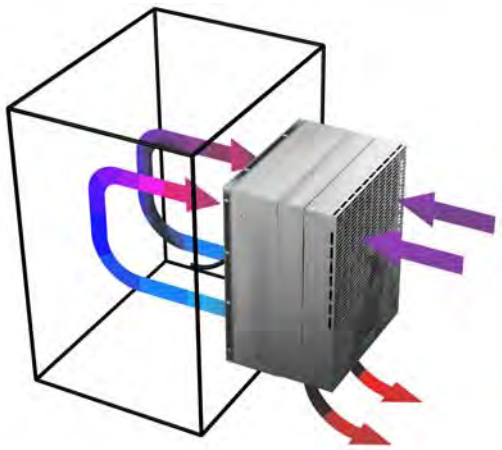
1270 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

278 Watts L35 L35

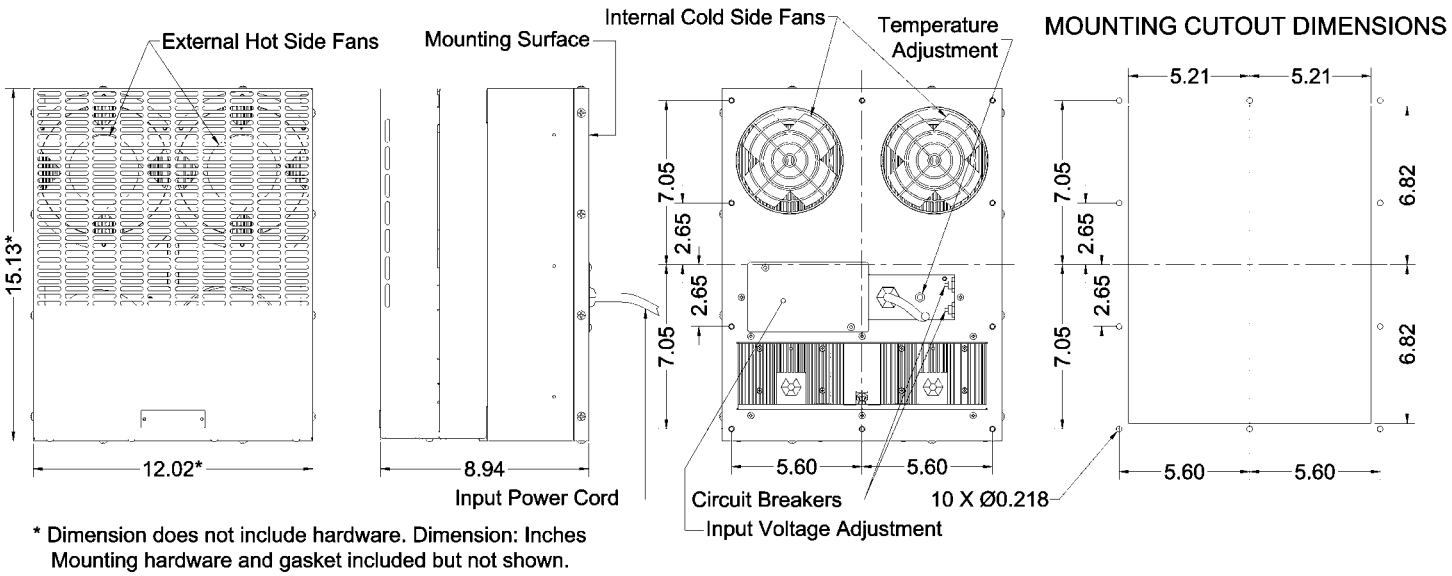
162 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware. Dimension: Inches
Mounting hardware and gasket included but not shown.

FHP-750 | Air Conditioner

Air Cooled
Flush Mounted
NEMA-12, NEMA-4

120 VAC, 240 VAC Input

FEATURES

- Externally mounted, no intrusion
- Compact (only 12"L X 6"W X 9"D)
- Weighs only 16 lbs. (7.2 kg)
- Ambient range -10°C to +70°C
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- NEMA-4 and NEMA-12 versions
- Both 120 VAC and 240 VAC available
- CE marked

INCLUDES

- Integral power supply
- Power input cable
- Condensate removal system
- Adjustable temperature control
- Gasket for mounting
- Mounting hardware

SPECIFICATIONS

	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	CONDENSATE REMOVAL	OPERATING AMBIENT °C	AGENCY APPROVALS (ETL)
NEMA 12	FHP-750	7-A580-0-000	Cool only, built in temperature control	400-450	120	4.5	16 (7.2)	TC-6F	Included	-10/+70	UL1995 CSA22.2, CE
	FHP-750	7-A550-0-000	Cool only, for remote temperature control	400-450	120	4.5	16 (7.2)	EXT*	Included	-10/+70	UL1995 CSA22.2, CE
	FHP-752	7-A582-0-000	Cool only, built in temperature control	400-450	240	2.5	23 (10.5)	TC-6F	Included	-10/+70	UL1995 CSA22.2, CE
	FHP-752	7-A552-0-000	Cool only, for remote temperature control	400-450	240	2.5	23 (10.5)	EXT*	Included	-10/+70	UL1995 CSA22.2, CE
NEMA 4	FHP-750XE	7-A580-4-000	Cool only, built in temperature control	400-450	120	5.0	19(8.6)	TC-6F	Included	-10/+70	UL1995 CSA22.2, CE
	FHP-750XE	7-A550-4-000	Cool only, for remote temperature control	400-450	120	5.0	19(8.6)	EXT*	Included	-10/+70	UL1995 CSA22.2, CE
	FHP-752XE	7-A582-4-000	Cool only, built in temperature control	400-450	240	2.5	25(11.5)	TC-6F	Included	-10/+70	UL1995 CSA22.2, CE
	FHP-752XE	7-A552-4-000	Cool only, for remote temperature control	400-450	240	2.5	25(11.5)	EXT*	Included	-10/+70	UL1995 CSA22.2, CE

* Unit is set for 5-32 VDC external signal, relay(s) included

FHP-750

MOUNTING STYLE

Flush Mounted

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4 IP 56

RATING (TRADITIONAL)

430 BTU/hr @ 0 °F ΔT

560 BTU/hr @ +20 °F ΔT *

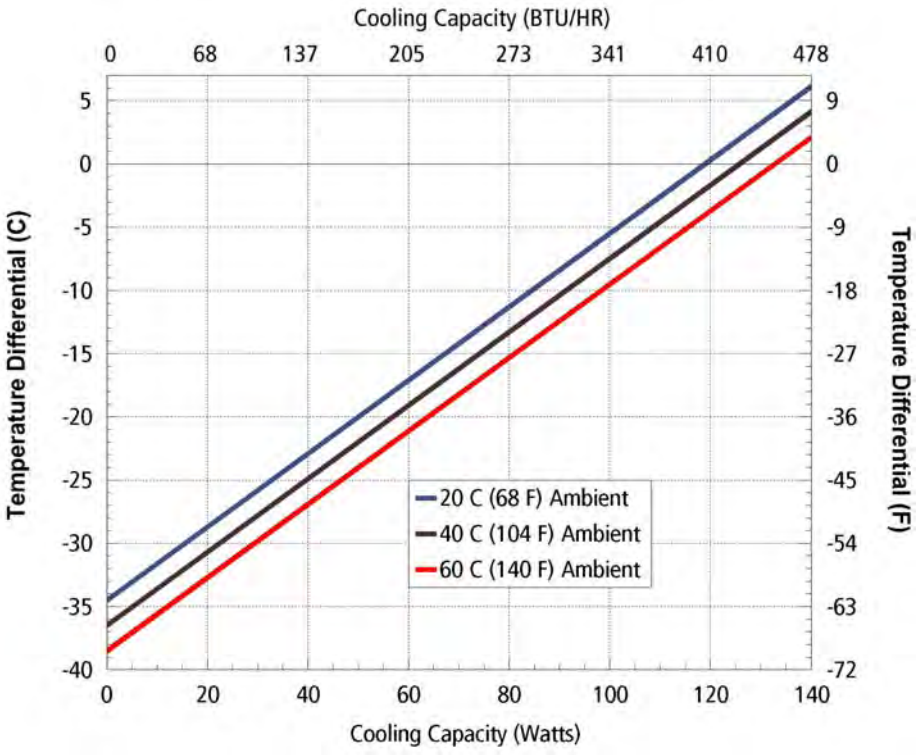
RATING (DIN 3168)

125 Watts L35 L35

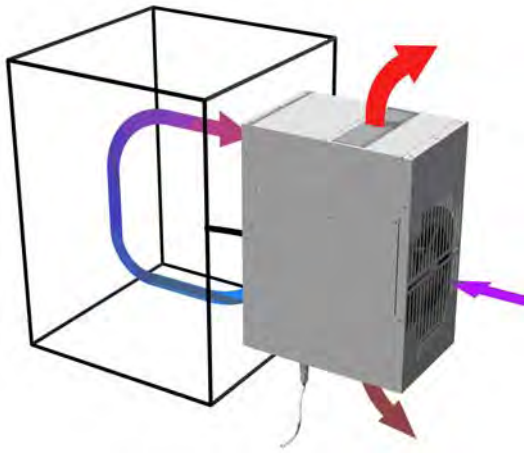
78 Watts L35 L50

* See page 10

PERFORMANCE CURVE

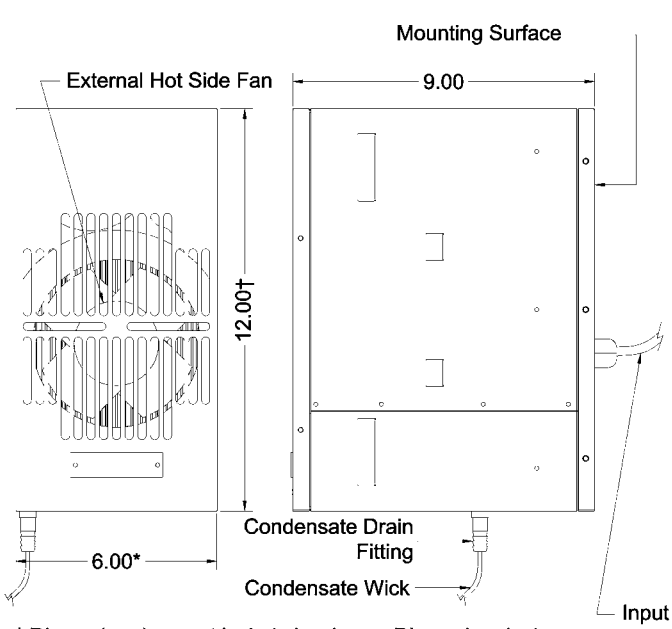


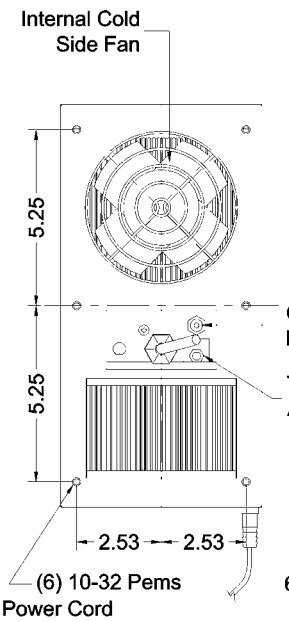
Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.29x-34.5	y=.29x-36.5	y=.29x-38.5
Cold Sink	y=.18x-34.5	y=.18x-36.5	y=.18x-38.5



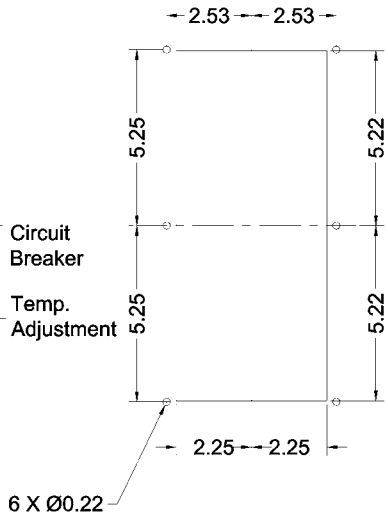
Air Flow Pattern

DIMENSIONS





MOUNTING CUTOUT DIMENSION



* Dimension does not include hardware. Dimension: Inches
† For FHP-752 this dimension is 14.55.
Mounting hardware and gasket included but not shown.

FHP-750 | Air Conditioner

Air Cooled
Flush Mounted
NEMA-12, NEMA-4

24 VDC Input

FEATURES

- Externally mounted, no intrusion
- Compact (only 12"L X 6"W X 9"D)
- Weighs only 16 lbs. (7.2 kg)
- Ambient range -10°C to +70°C
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- NEMA-4 and NEMA-12 versions

INCLUDES

- Power input leads
- Condensate removal system
- Adjustable temperature control
- Gasket for mounting
- Mounting hardware

SPECIFICATIONS

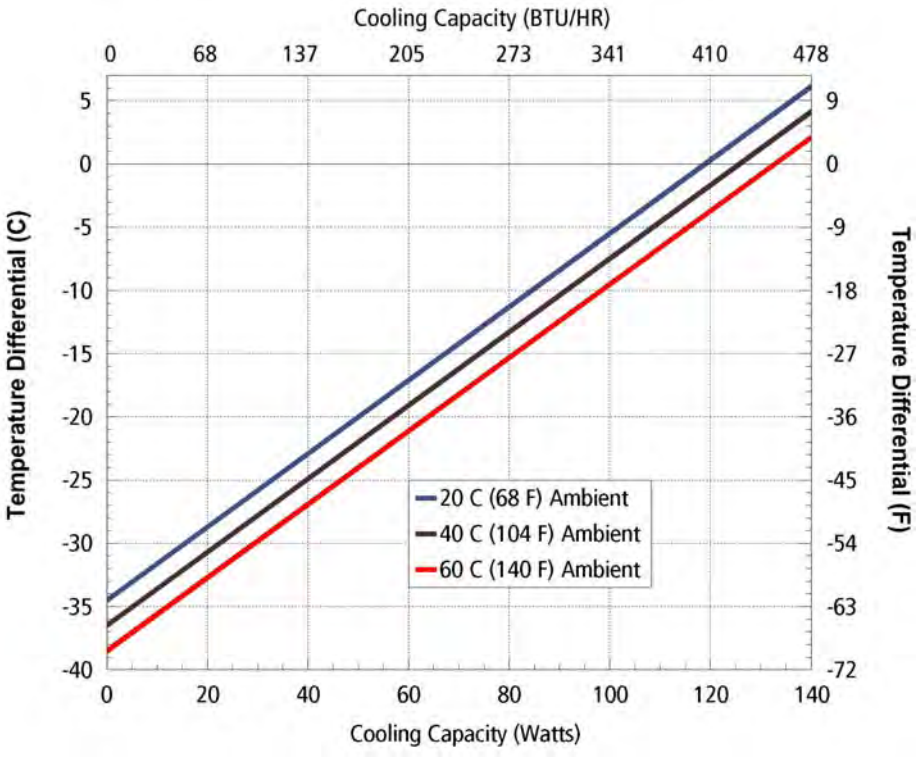
	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	CONDENSATE REMOVAL	OPERATING AMBIENT °C	AGENCY APPROVALS (ETL)
NEMA 12	FHP-750	7-A585-0-000	Cool only, built in temperature control	400-450	24	9	16 (7.2)	TC-6F	Included	-10/+70	PENDING
	FHP-750	7-A555-0-000	Cool only, for remote temperature control	400-450	24	9	16 (7.2)	EXT*	Included	-10/+70	PENDING
	FHP-750HC	7-A595-1-000	Heat/Cool without temperature control	400-450	24	9	16 (7.2)	EXT**	Included	-10/+70	PENDING
NEMA 4	FHP-750XE	7-A585-4-000	Cool only, built in temperature control	400-450	24	9	19(8.6)	TC-6F	Included	-10/+70	PENDING
	FHP-750XE	7-A555-4-000	Cool only, for remote temperature control	400-450	24	9	19(8.6)	EXT*	Included	-10/+70	PENDING
	FHP-750XEHC	7-A595-5-000	Heat/Cool without temperature control	400-450	24	9	19(8.6)	EXT**	Included	-10/+70	PENDING

* Unit is set for 5-32 VDC external signal, relay(s) included

** Unit can be used with external H-Bridge "Relay-P" see page 115

FHP-750

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.29x-34.5	y=.29x-36.5	y=.29x-38.5
Cold Sink	y=.18x-34.5	y=.18x-36.5	y=.18x-38.5

MOUNTING STYLE

Flush Mounted

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

NEMA-4 IP 56

RATING (TRADITIONAL)

430 BTU/hr @ 0 °F ΔT

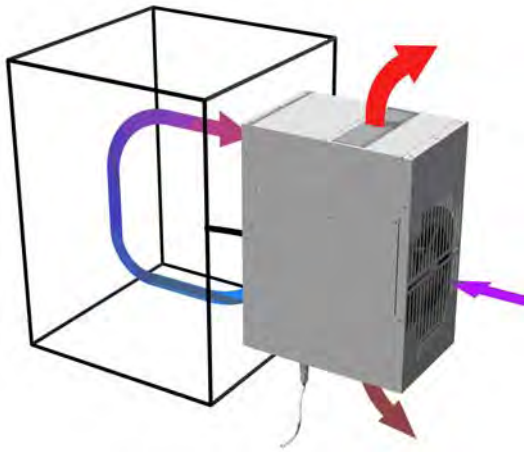
560 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

125 Watts L35 L35

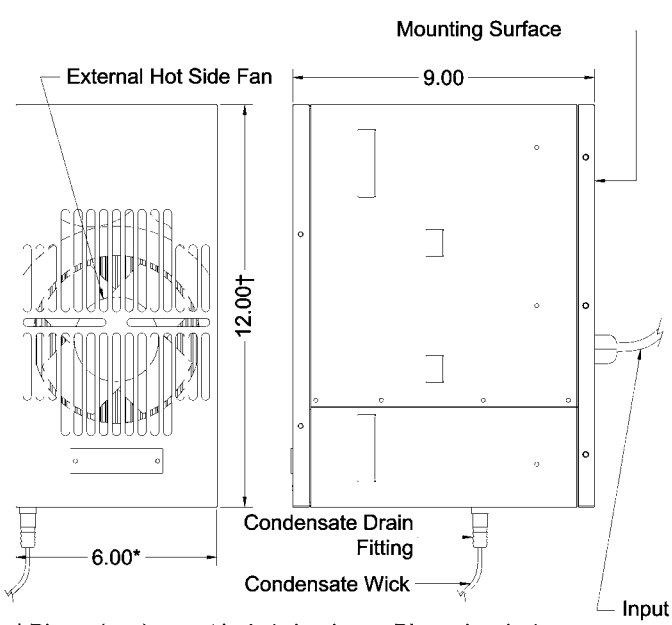
78 Watts L35 L50

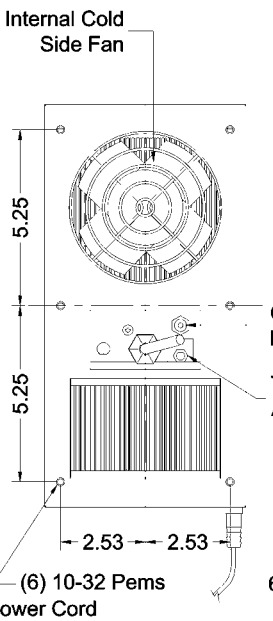
* See page 10



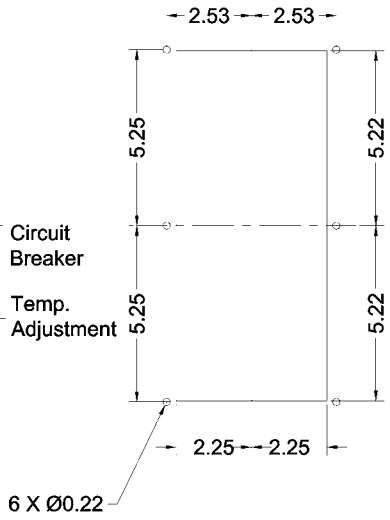
Air Flow Pattern

DIMENSIONS





MOUNTING CUTOUT DIMENSION



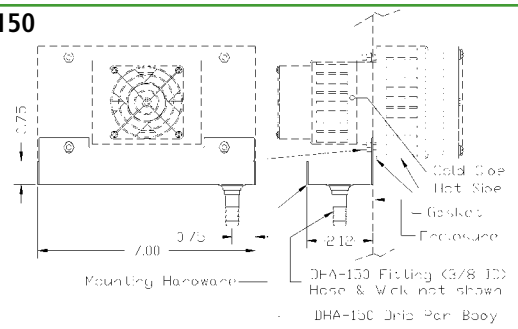
* Dimension does not include hardware. Dimension: Inches
† For FHP-752 this dimension is 14.55.
Mounting hardware and gasket included but not shown.

DRIP PANS

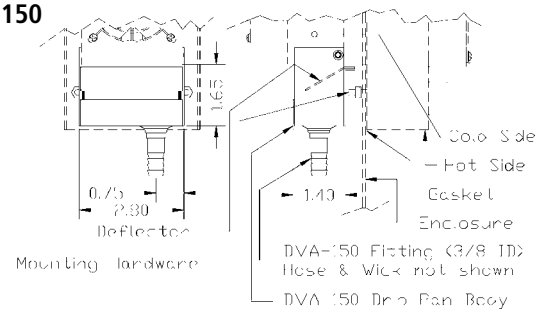
Horizontal Cold Side Fin Orientation

Vertical Cold Side Fin Orientation

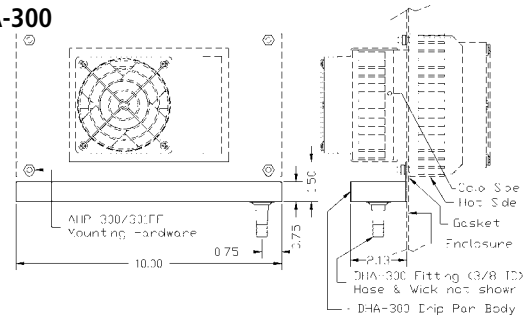
DHA-150



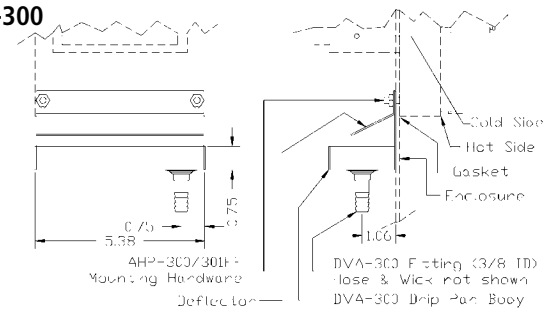
DVA-150



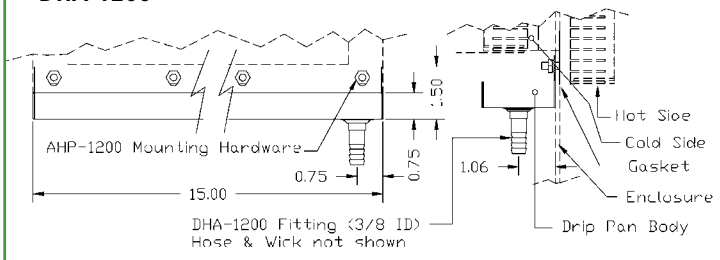
DHA-300



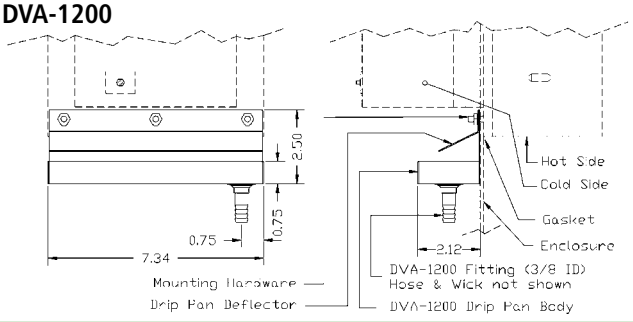
DVA-300



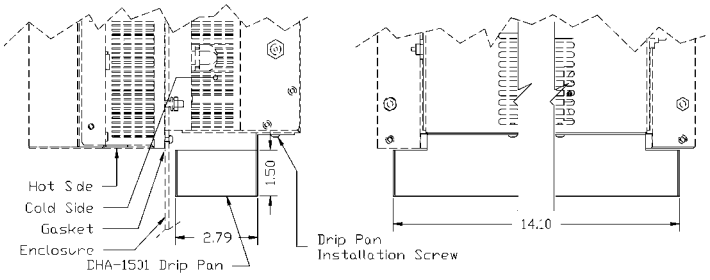
DHA-1200



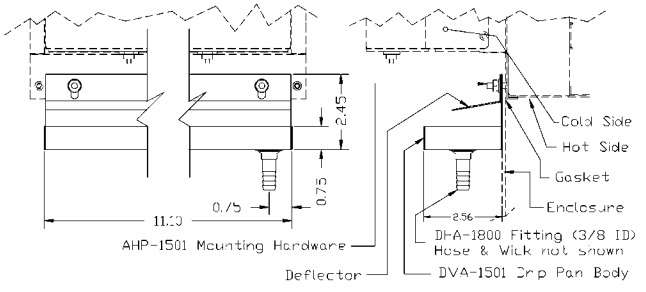
DVA-1200



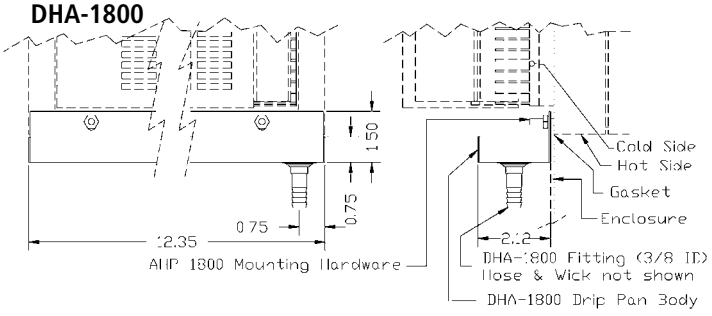
DHA-1501



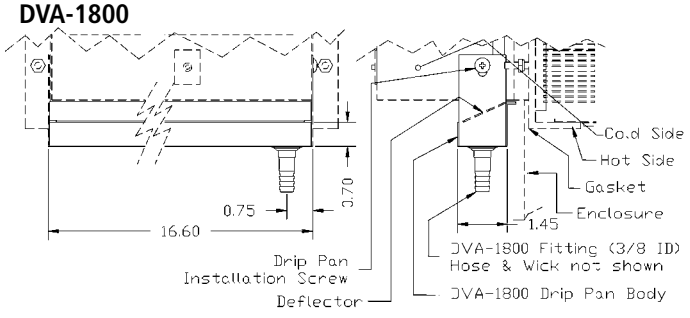
DVA-1501



DHA-1800



DVA-1800



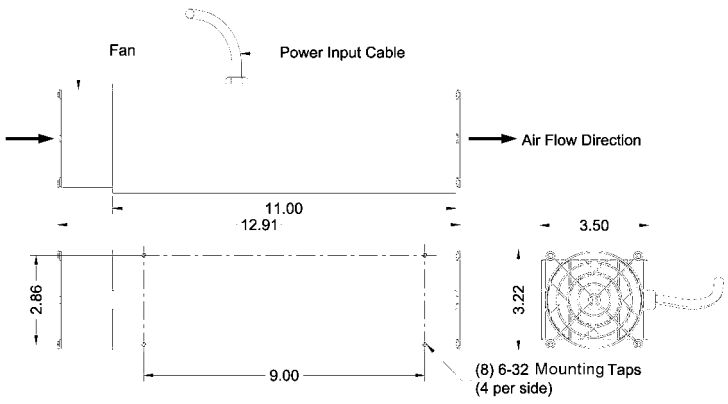
ENLCLOSURE HEATERS

TECA Enclosure heaters are the easiest and most cost effective way to add needed heat to enclosures.
These heaters come in 120 VAC and 240 VAC configurations in both 200 WATTS and 400 WATTS versions.
The integral thermostat reduces the complexity and the integral overheat safety ensures that the temperature rise is kept within safe margin.

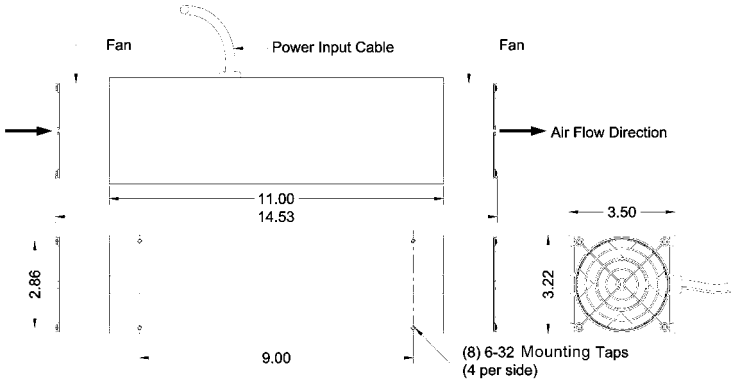
FEATURES

- Power input cord
- Integral fan(s)
- Integral thermostatic control (temperature = 15 °C)
- Overheat safety circuit (temperature = 75 °C)
- Accessory threaded holes for installation

DIMENSIONS



EH-2001, EH-2002



EH-4001, EH-4002

SPECIFICATIONS

MODEL	NOTES	POWER RATING WATTS	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (kg)	TEMP. CONTROL	OVERHEAT SAFETY
EH-2001	Single Fan	200	120	1.7	6(2.7)	15 °C	75 °C
EH-2002	Single Fan	200	240	0.83	6(2.7	15 °C	75 °C
EH-4001	Dual Fan	400	120	3.4	6.7(3	15 °C	75 °C
EH-4002	Dual Fan	400	240	1.7	6.7(3	15 °C	75 °C

Liquid Cooled
Air Conditioners

150-1180 BTU/hr

LIQUID COOLED

LHP SERIES

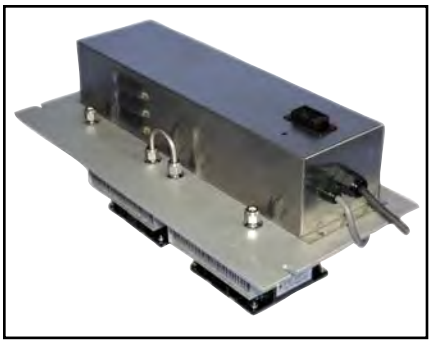
Solid-state liquid-cooled air conditioners work well in tight enclosures.

FEATURES

- No compressor, fluorocarbons or filters
- Virtually maintenance free operation
- Stainless steel exterior housing
- Mounts in any orientation
- No air exhaust

APPLICATIONS

Cools equipment racks, PCs, Drives, Amplifiers, Motor Controls and other electronic equipment.

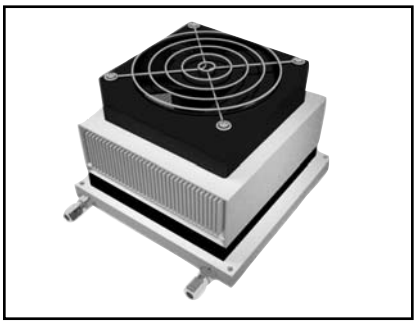


LHP-1700FF page 54

950-1180 BTU/hr rating,
19.0" x 8.7" mounting area
120 and 240 VAC input.

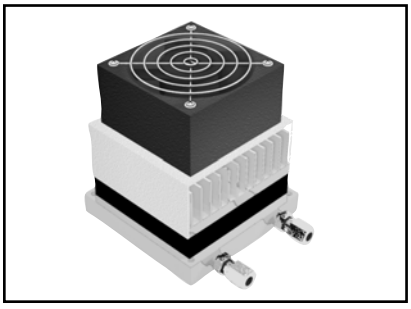
LHP-1200 page 56

590-640 BTU/hr rating,
15.0" x 7.3" mounting area
120 VAC input



LHP-800FF page 58

460-540 BTU/hr rating,
6.6" x 6.6" mounting area
24 VDC for TE, 120 VAC fan



LHP-300FF page 58

150-175 BTU/hr rating,
4" x 4" mounting area
24 VDC for TE 120 VAC fan

LHP-1700FF | Liquid Cooled Air Conditioner

Liquid Cooled
Thru Mount
NEMA-12

120 VAC, 240 VAC Input

FEATURES

- Standard 19" rack mount
- Weighs only 46 lbs. (21 kg)
- Ambient range 0ºC to +70ºC
- Available in 120 or 240 VAC
- Adaptable to NEMA-4 and explosion proof applications
- Can be mounted entirely inside purged enclosure
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts in any orientation

INCLUDES

- Integral power supply
- Compression fittings
- Power cord

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	Min Flow GPM	WEIGHT LBS. (kg)	TEMP. CONTROL *	OPERATING AMBIENT °C
LHP-1700FF	2-1090-0-000	Cool only	950-1180	120	7.0	0.3	46(21)	none	0/+70
LHP-1700FF	2-1080-0-000	Cool only	950-1180	120	7.0	0.3	46(21)	TC-6F	0/+70
LHP-1700FF	2-1050-0-000	Cool only	950-1180	120	7.0	0.3	46(21)	EXT*	0/+70
LHP-1700FFHC	2-1030-1-000	Heat/Cool	950-1180	120	7.0	0.3	46(21)	TC-3F	0/+70
LHP-1700FFHC	2-1050-1-000	Heat/Cool	950-1180	120	7.0	0.3	46(21)	EXT*	0/+70
LHP-1702FF	2-1092-0-000	Cool only	950-1180	240	4.7	0.3	46(21)	none	0/+70
LHP-1702FF	2-1082-0-000	Cool only	950-1180	240	4.7	0.3	46(21)	TC-6F	0/+70
LHP-1702FF	2-1052-0-000	Cool only	950-1180	240	4.7	0.3	46(21)	EXT*	0/+70
LHP-1702FFHC	2-1032-1-000	Heat/Cool	950-1180	240	4.7	0.3	46(21)	TC-3F	0/+70
LHP-1702FFHC	2-1052-1-000	Heat/Cool	950-1180	240	4.7	0.3	46(21)	EXT*	0/+70

* Unit is set for 5-32 VDC external signal, relay(s) included

LHP-1700FF

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-12 IP 40 (maintains IP 52)

RATING (TRADITIONAL)

1050 BTU/hr @ 0 °F ΔT

1320 BTU/hr @ +20 °F ΔT *

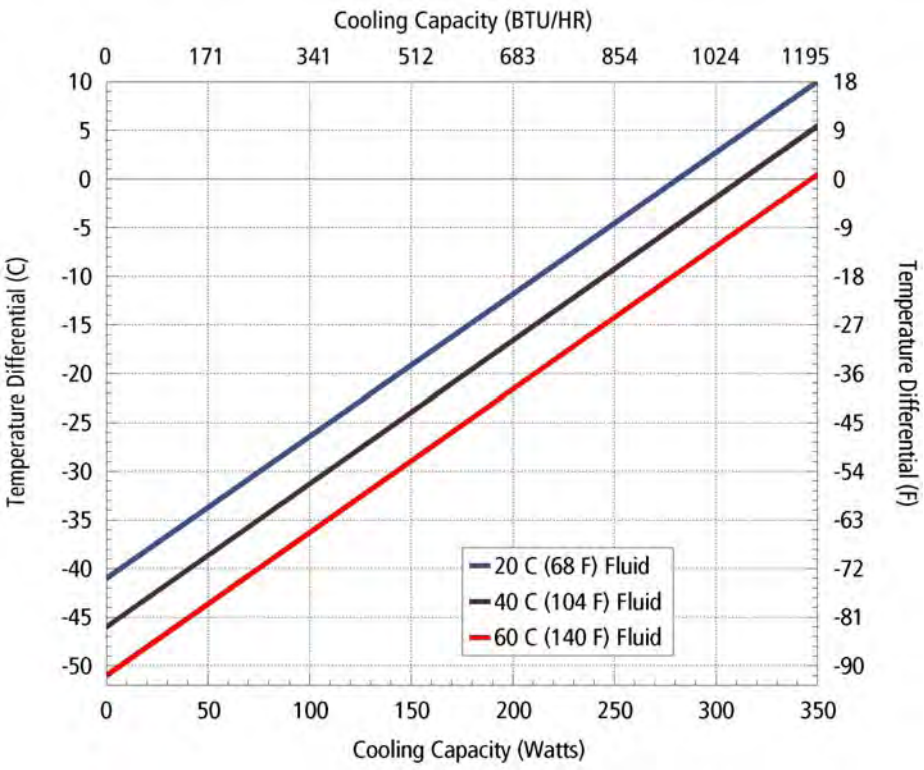
RATING (DIN 3168)

312 Watts L35 L35

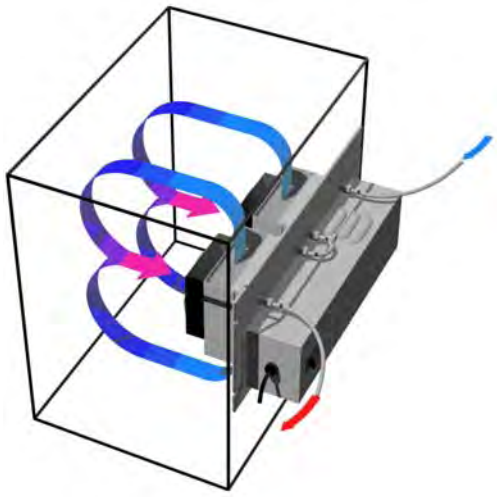
225 Watts L35 L50

* See page 10

PERFORMANCE CURVE



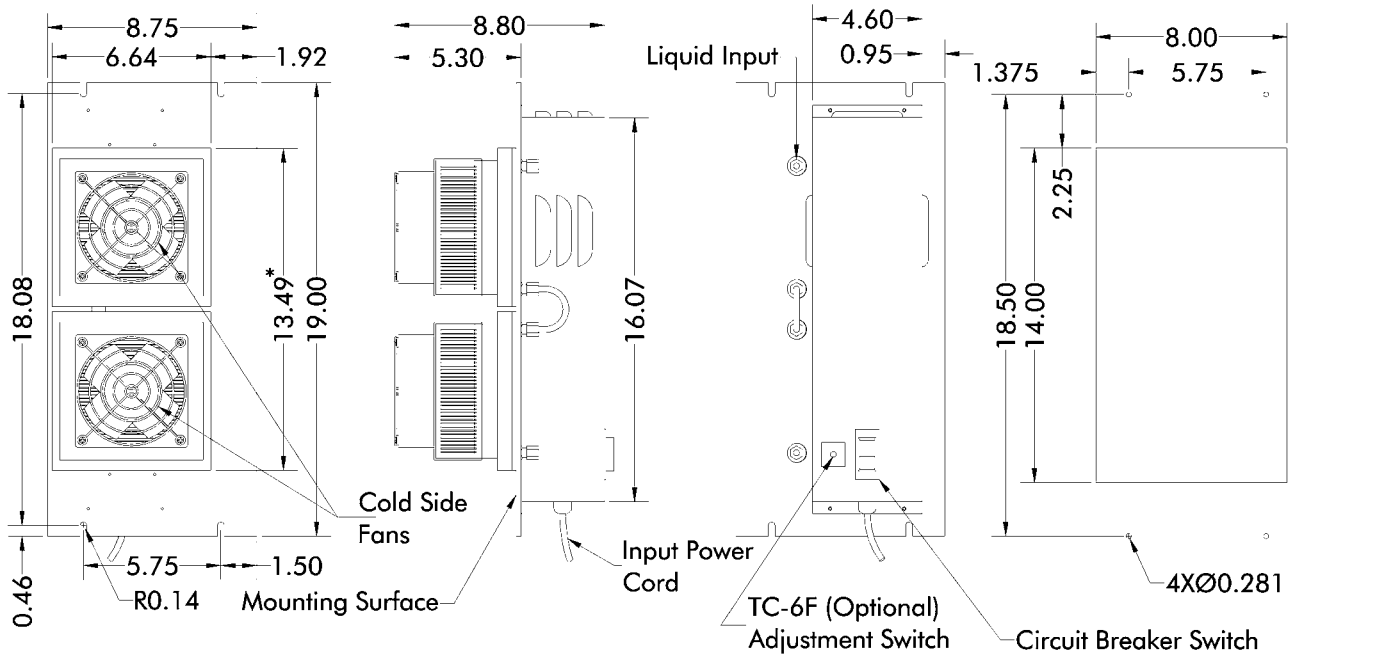
Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Fluid Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.147x-41.0	y=.147x-46.0	y=.147x-51.0
Cold Sink	y=.11x-41.0	y=.11x-46.0	y=.11x-51.0



Air Flow Pattern

DIMENSIONS

MOUNTING CUTOUT DIMENSIONS



* Dimension does not include hardware, insulation. Dimensions: inches.

LHP-1200 | Liquid Cooled Air Conditioner

Liquid Cooled
Thru Mount
NEMA-4, 4X, C1 D2, C1 D1 & ATEX Zone 1

120 VAC Input

FEATURES

- Compact, (only 15" L X 8" W X 7.3" D)
- Weighs only 21 lbs. (9.5 kg)
- Ambient range 0ºC to +70ºC
- Can be mounted entirely inside purged enclosure or maintain purge when wall mounted
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts and operates in any orientation

INCLUDES

- Integral power supply
- In/Out 1/4-18 NPT connectors for coolant
- Power cord
- Gasket and mounting hardware
- Adjustable temperature control

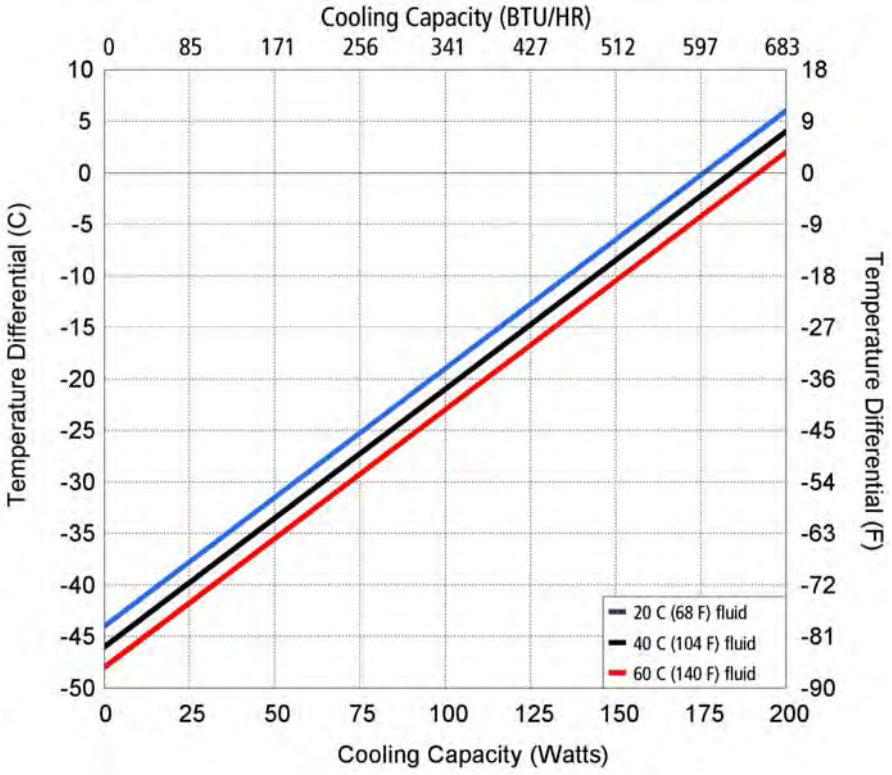
SPECIFICATIONS

	MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	Min Flow GPM	WEIGHT LBS. (kg)	TEMP. CONTROL	OPERATING AMBIENT °C	AGENCY APPROVALS
NEMA4X	LHP-1200XE	2-3090-4-000	Cool only	590-640	120	3.7	0.3	21(9.5)	none	0/+70	Pending
	LHP-1200XE	2-3080-4-000	Cool only	590-640	120	3.7	0.3	21(9.5)	TC-6F	0/+70	Pending
	LHP-1200XE	2-30F0-4-000	Cool only	590-640	120	3.7	0.3	21(9.5)	85°F (30°)	0/+70	Pending
	LHP-1200XE	2-3050-4-000	Cool only	590-640	120	3.7	0.3	21(9.5)	EXT*	0/+70	Pending
	LHP-1200XEHC	2-3030-5-000	Heat/Cool	590-640	120	3.7	0.3	21(9.5)	TC-3F	0/+70	Pending
	LHP-1200XEHC	2-3050-5-000	Heat/Cool	590-640	120	3.7	0.3	21(9.5)	EXT*	0/+70	Pending
C1D2	LHP-1200XP **	2-3090-2-027	Cool only	590-640	120	3.7	0.3	21(9.5)	none	0/+50	Pending
	LHP-1200XP **	2-3080-2-028	Cool only	590-640	120	3.7	0.3	21(9.5)	TC-6F	0/+50	Pending
	LHP-1200XP **	2-30F0-2-029	Cool only	590-640	120	3.7	0.3	21(9.5)	85°F (30°)	0/+50	Pending
	LHP-1200XP **	2-3050-2-030	Cool only	590-640	120	3.7	0.3	21(9.5)	SSR drive	0/+50	Pending
	LHP-1200XPHC **	2-3030-3-031	Heat/Cool	590-640	120	3.7	0.3	21(9.5)	TC-3F	0/+50	Pending
	LHP-1200XPHC **	2-3050-3-032	Heat/Cool	590-640	120	3.7	0.3	21(9.5)	SSR drive	0/+50	Pending
C1D1	LHP-1200XP **	2-3090-2-021	Cool only	590-640	120	3.7	0.3	30(13.6)	none	0/+50	Pending
	LHP-1200XP **	2-3080-2-022	Cool only	590-640	120	3.7	0.3	30(13.6)	TC-6F	0/+50	Pending
	LHP-1200XP **	2-30F0-2-023	Cool only	590-640	120	3.7	0.3	30(13.6)	85°F (30°)	0/+50	Pending
	LHP-1200XP **	2-3050-2-024	Cool only	590-640	120	3.7	0.3	30(13.6)	SSR drive	0/+50	Pending
	LHP-1200XPHC **	2-3030-3-025	Heat/Cool	590-640	120	3.7	0.3	30(13.6)	TC-3F	0/+50	Pending
	LHP-1200XPHC **	2-3050-3-026	Heat/Cool	590-640	120	3.7	0.3	30(13.6)	SSR drive	0/+50	Pending

* Unit is set for 5-32 VDC external signal, relay(s) included
** Agency approvals pending; ATEX certification will require full system approval; All specifications subject to change without notice

LHP-1200

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Fluid Temp	**20°C**	**40°C**	**60°C**
Enclosure Air	y=.25x-44.0	y=.25x-46.0	y=.25x-48.0
Cold Sink	y=.19x-44.0	y=.19x-46.0	y=.19x-48.0

MOUNTING STYLE

Thru Mount

ENVIRONMENTS

NEMA-4/4X IP 56

Class 1 Div 2 and NEMA-4X IP 56

Class 1 Div 1 and ATEX Zone 1

RATING (TRADITIONAL)

613 BTU/hr @ 0 °F ΔT

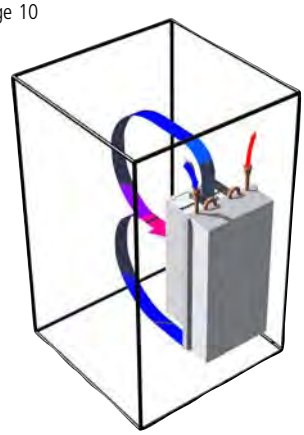
770 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

180 Watts L35 L35

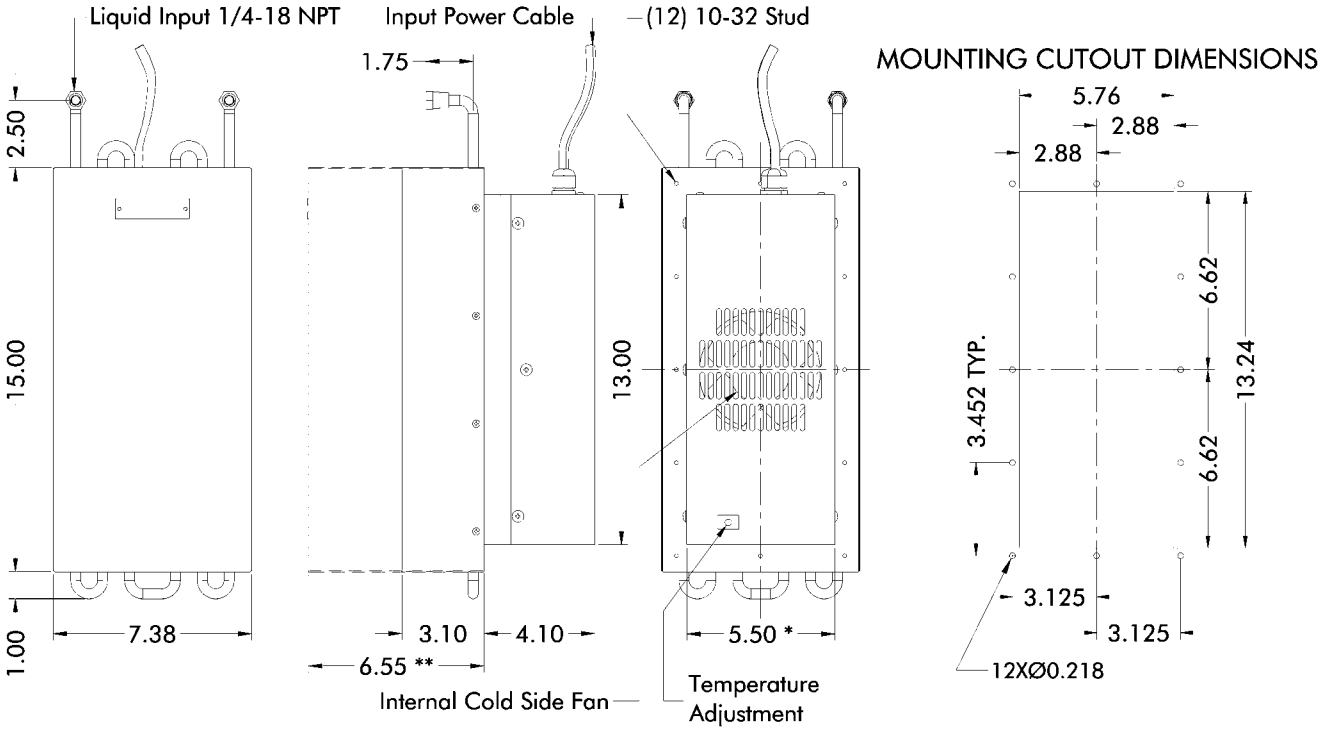
125 Watts L35 L50

* See page 10



Air Flow Pattern

DIMENSIONS



* Dimension does not include hardware. Dimension: Inches; Mounting hardware and gasket included but not shown.

** Dimension applies to XP versions.

LHP-800FF | Liquid Cooled Air Conditioner

LHP-300FF

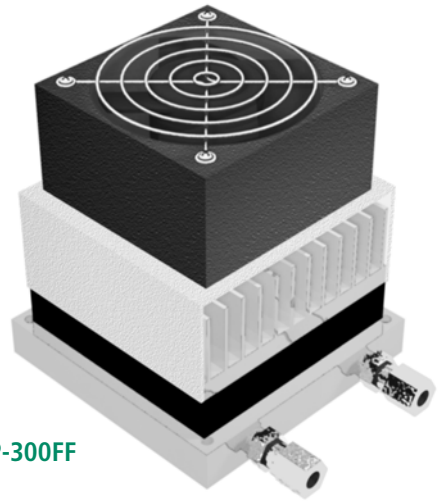
General Purpose VDC Input

Liquid Cooled
Thru Mount
NEMA-12

LHP-800FF

FEATURES

- Compact
- Light weight
- Ambient range 0°C to +70°C
- No compressor, fluorocarbons or filters
- Adaptable to NEMA-4 and explosion proof applications. Can be mounted entirely inside purged enclosure
- Virtually maintenance-free operation
- Mounts in any orientation



LHP-300FF

INCLUDES

- Compression fittings
- Terminal strip for wire hook up

SPECIFICATIONS LHP-800FF

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	FAN VOLTAGE VDC	WEIGHT LBS (kg)	MIN FLOW GPM	OPERATING AMBIENT °C
LHP-800FF	2-5095-0-000	Cool only	460-540	24	14	24	6(2.7)	0.3	0/+70
LHP-800FFHC	2-5099-1-000	Heat/Cool	460-540	24	14	24	6(2.7)	0.3	0/+70

Note: No provision for temperature control is included. Consult factory for options.

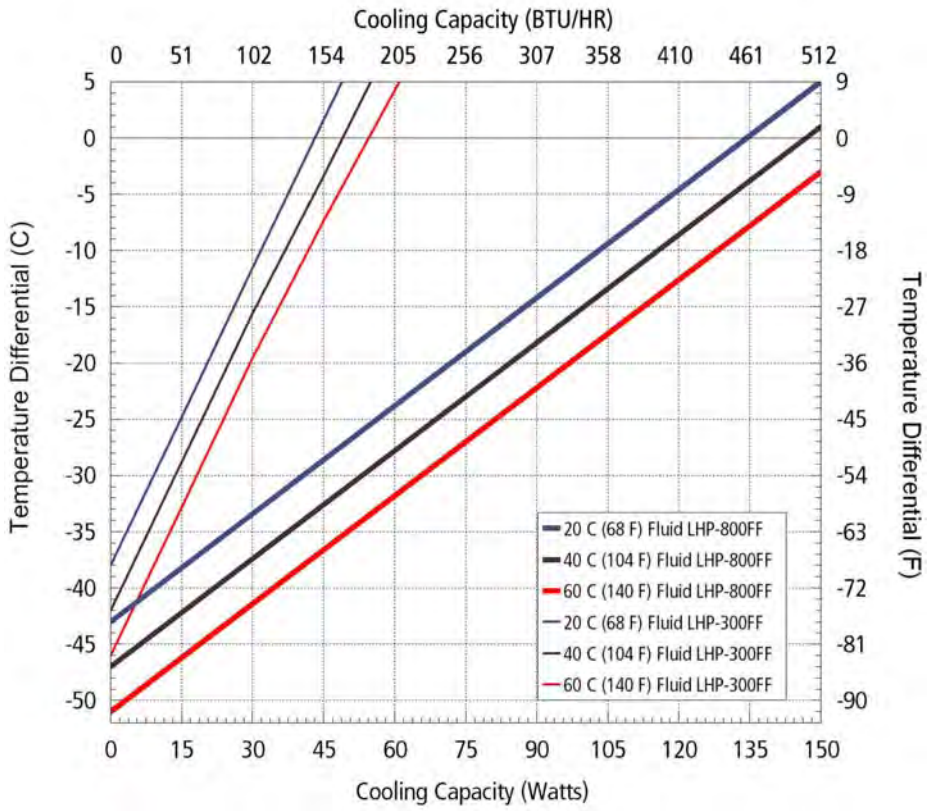
SPECIFICATIONS LHP-300FF

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	HEAT WATTS	WEIGHT LBS (kg)	MIN FLOW GPM	OPERATING AMBIENT °C
LHP-300FF	2-7098-0-000	Cool only	150-175	12/24	12/6	N/A	2.75(1.25)	0.3	0/+70
LHP-300FFHC	2-7095-1-000	Heat/Cool, 24 VDC Heat	150-175	24	6	75	2.75(1.25)	0.3	0/+70

Note: No provision for temperature control is included. Consult factory for options.

See also , "Power Supplies" , P. 117

PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)

Fluid Temp	20°C	40°C	60°C
LHP-800FF	y=.32x-43.0	y=.32x-47.0	y=.32x-51.0
LHP-300FF	y=.88x-38.0	y=.88x-42.0	y=.88x-46.0

LHP-800FF

MOUNTING STYLE

Internal

RATING (TRADITIONAL)

500 BTU/hr @ 0 °F ΔT

615 BTU/hr @ +20 °F ΔT *

RATING (DIN 3168)

146 Watts L35 L35

105 Watts L35 L50

LHP-300FF

MOUNTING STYLE

Internal

RATING (TRADITIONAL)

160 BTU/hr @ 0 °F ΔT

200 BTU/hr @ +20 °F ΔT *

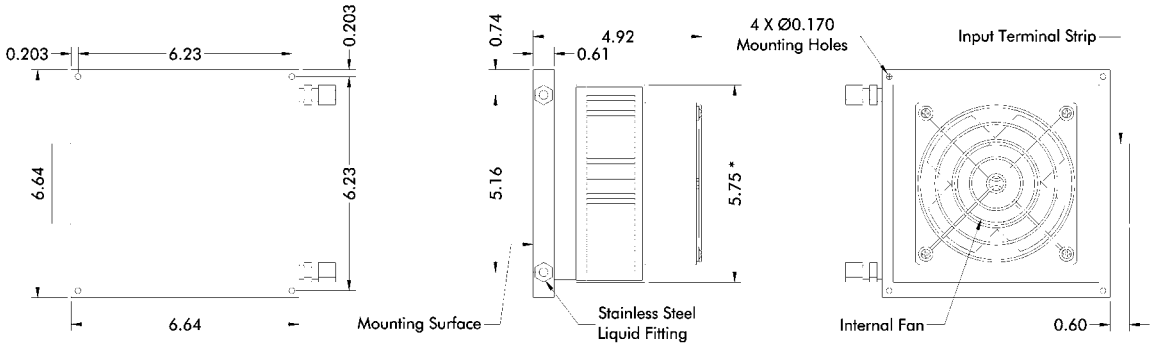
RATING (DIN 3168)

48 Watts L35 L35

34 Watts L35 L50

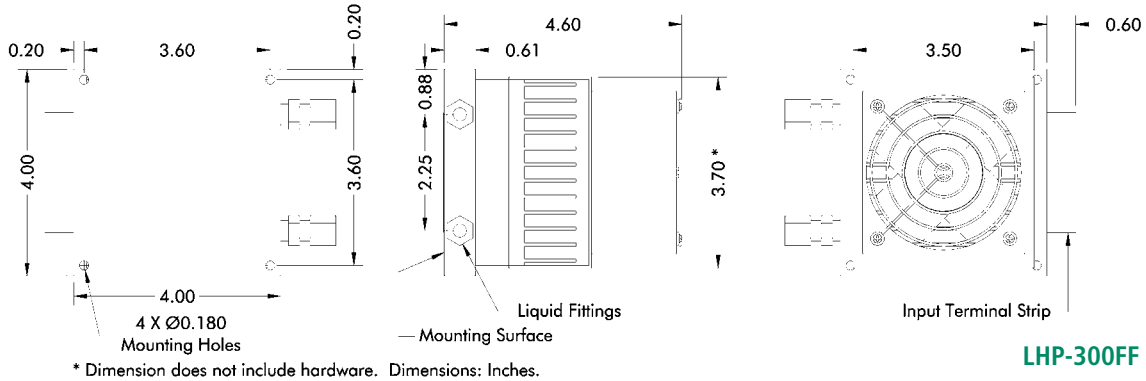
* See page 10

DIMENSIONS



* Dimension does not include hardware. Dimensions: Inches.

LHP-800FF



* Dimension does not include hardware. Dimensions: Inches.

LHP-300FF

Cold Plates

140-1630 BTU/hr

AIR COOLED

AHP-CPV SERIES

FEATURES

- No load cooling to -20°C (in 22°C Amb)
- Standard heating
- Standard RS-232 comms
- Standard remote sense
- Free software
- Temperature control
- Low maintenance
- No compressor, fluorocarbons or filters
- Compact
- Bench top use
- Ramp and Soak
- Reliable

AIR COOLED

AHP-CP SERIES

FEATURES

- No load cooling to -20°C (in 22°C Amb)
- Optional heating
- Optional temperature control
- Low maintenance
- No compressor, fluorocarbons or filters
- Compact
- Lightweight
- Durable
- Reliable
- Bentch top, through bench top and enclosure mount

LIQUID COOLED

LHP-SERIES

FEATURES

- No load cooling to -25°C (25°C Fluid)
- Optional heating
- Temperature control, optional
- Low maintenance
- No compressor, fluorocarbons or filters
- Compact
- Lightweight
- Durable
- Reliable

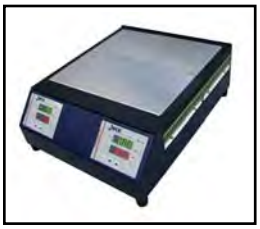
AIR COOLED CPV

AHP-1200CPV page 62

830-950 BTU/hr rating,
15" x 7.3" x 5" size,
5.38" X 13" cold plate surface,
100-240 VAC

AHP-1200DCP page 64

Dual temperature zone
cold/hot plate,
18.5" X 15.1" size
13.5" X 13" plate surface
100-240 VAC



AHP-301CPV page 66

225-265 BTU/hr rating,
10" x 9.8" x 6" size,
4.5" x 6" cold plate surface,
100-240 VAC

AHP-800MSP page 68

Variable stirring rate,
19" x 9.3" x 10" size,
1 Liter standard bottle,
100-240 VAC

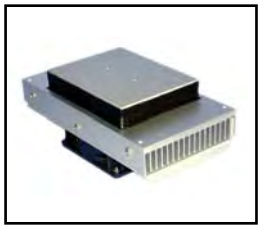
AIR COOLED CP

AHP-1200CP page 70, 72

830-950 BTU/hr rating,
15" x 7.3" x 5" size,
5.38" X 13" cold plate surface,
120, 240 VAC & 24 VDC operation

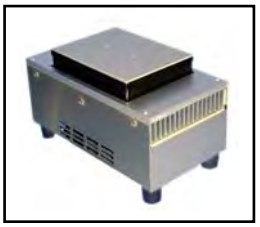
AHP-300CP page 76

290-330 BTU/hr rating,
10" X 5.4" X 4.1" size,
4.5" X 6" cold plate surface
12/24/48 VDC operation



AHP-301CP page 74

225-265 BTU/hr rating,
10" x 9.8" x 6" size,
4.5" x 6" cold plate surface,
120 or 240 VAC operation



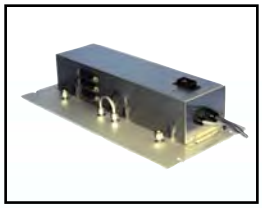
AHP-150CP page 76

140-160 BTU/hr rating,
7" X 5" X 3.9" size,
2" X 3.5" cold plate surface
12/24 VDC operation

LIQUID COOLED

LHP-1700CP page 80

1360-1630 BTU/hr rating,
19" x 8.7" x 5" size,
6.00" x 12.88" cold plate
120, 240 VAC operation

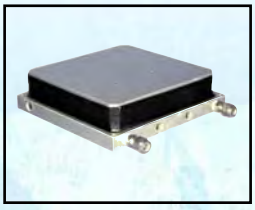


LHP-1200CP page 82

887 BTU/hr rating,
15" x 7.4" x 4" size,
13.00" x 5.38" cold plate
24 VDC operation

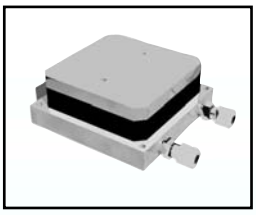
LHP-800CP page 84

700-830 BTU/hr rating,
6.6 " x 6.6" x 1.75" size,
6" x 6" cold plate surface,
24 VDC operation



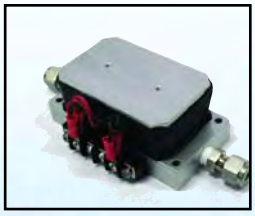
LHP-300CP page 84

280-335 BTU/hr rating,
4 " x 4" x 1.63" size,
3.5" x 3.5" cold plate surface,
12/24 VDC operation



LHP-150CP page 84

130-160 BTU/hr rating,
4 " x 2" x 1.63" size,
2" x 3.2" cold plate surface,
12 VDC operation



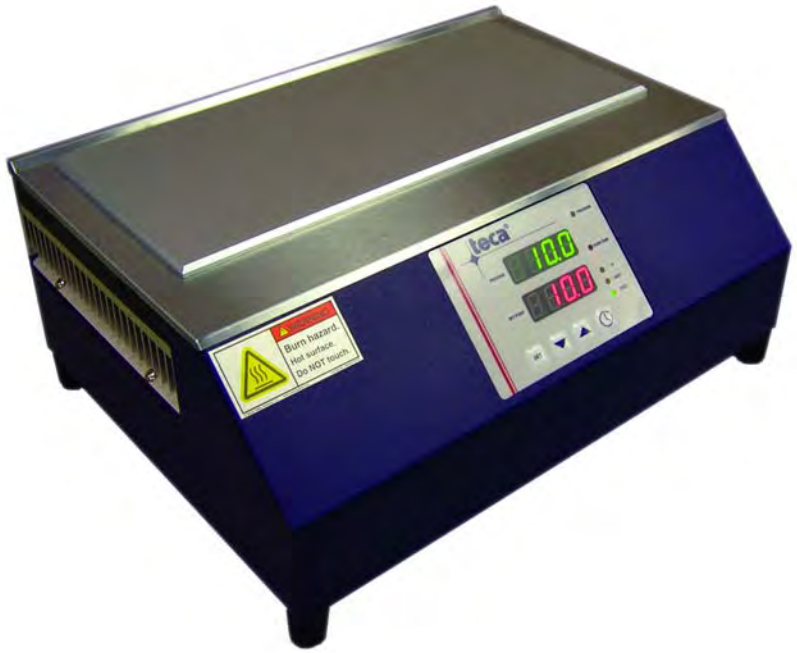
AHP-1200CPV | Versatile Cold/Hot Plate

Air Cooled
Bench Top

100-240 VAC Input

FEATURES

- Precision machined cold plate surface
- Easy clean stainless steel top surface
- Cools and heats (TYP. -20 °C to 90 °C)
- 100-240 VAC universal input
- Low-profile design with ergonomic sloped front
- Variable fan speed for quieter operation
- Weighs only 25 lbs. (11.4 kg)
- Compact bench top unit, 11.2" X 15.1" footprint
- Virtually maintenance-free operation
- Painted Enameled stainless steel exterior housing
- Accessories for glassware (beaker/test tube) cooling
- Many options and accessories available see page 80



CONTROL FEATURES

- Integral TC-4300 PID "tunable" temperature control
- One shot smart PID control tuning or Adaptive Smart Continuous Tuning
- EasyLog software for easy programming, tuning, charting and data acquisition
- Heating and Cooling
- Internal RTD sensor
- Remote Sensibility™ switchable exterior sensor
- Multi-segment ramp and soak programmable (4X8 or 2X16 or 1X32 segments)
- RS-232 communications

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	COLD PLATE	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL	OPERATING AMBIENT °C
AHP-1200CPV	9-34EB-1-0A0	Standard	Smooth Surface	680-720	100-240	2.5	25 (11.4)	TC-4300	0-50
AHP-1200CPV	9-35EB-1-0A0	High capacity	Smooth Surface	780-840	100-240	3.5	25 (11.4)	TC-4300	0-50
AHP-1200CPV	9-34E5-1-0A0	Standard	Smooth Surface	680-720	24 VDC	9.0	25 (11.4)	TC-4300	0-50
AHP-1200CPV	9-35E5-1-0A0	High capacity	Smooth Surface	780-840	24 VDC	17	25 (11.4)	TC-4300	0-50
AHP-1200CPV	9-34EB-1-TAP	Standard	Tap Pattern	680-720	100-240	2.5	25 (11.4)	TC-4300	0-50
AHP-1200CPV	9-35EB-1-TAP	High capacity	Tap Pattern	780-840	100-240	3.5	25 (11.4)	TC-4300	0-50
AHP-1200CPV	9-34E5-1-TAP	Standard	Tap Pattern	680-720	24 VDC	9.0	25 (11.4)	TC-4300	0-50
AHP-1200CPV	9-35E5-1-TAP	High capacity	Tap Pattern	780-840	24 VDC	17	25 (11.4)	TC-4300	0-50
AHP-1200CPV	9-35EB-1-CAS*	High capacity for Cascades	Tap Pattern	780-840	100-240	4.0	25 (11.4)	TC-4300	0-50

* This part number is ready for use with a low temperature cascade option and includes CH-1200 hinged cover, CC-1200 rear panel for cascade power up and control, refer to pages 80 and 81 for information on cascades and other available options.

AHP-1200CPV

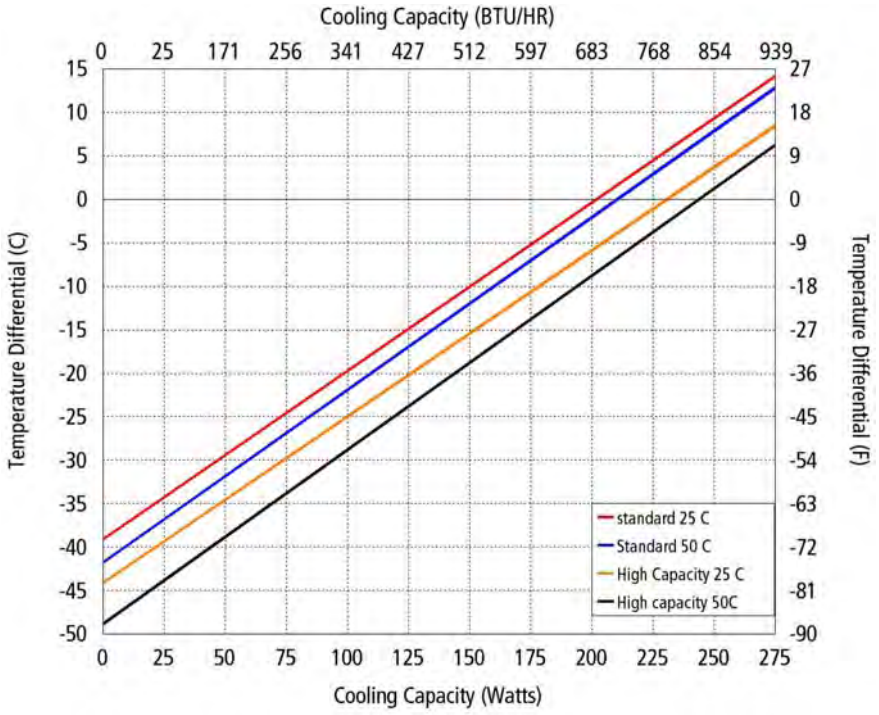
ENVIRONMENTS

Bench top
Laboratory
Industrial

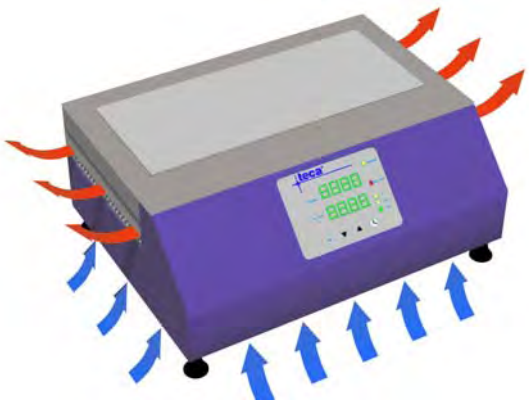
COOLING CAPACITY

200 - 250 Watts @ 0 °C ΔT

PERFORMANCE CURVE

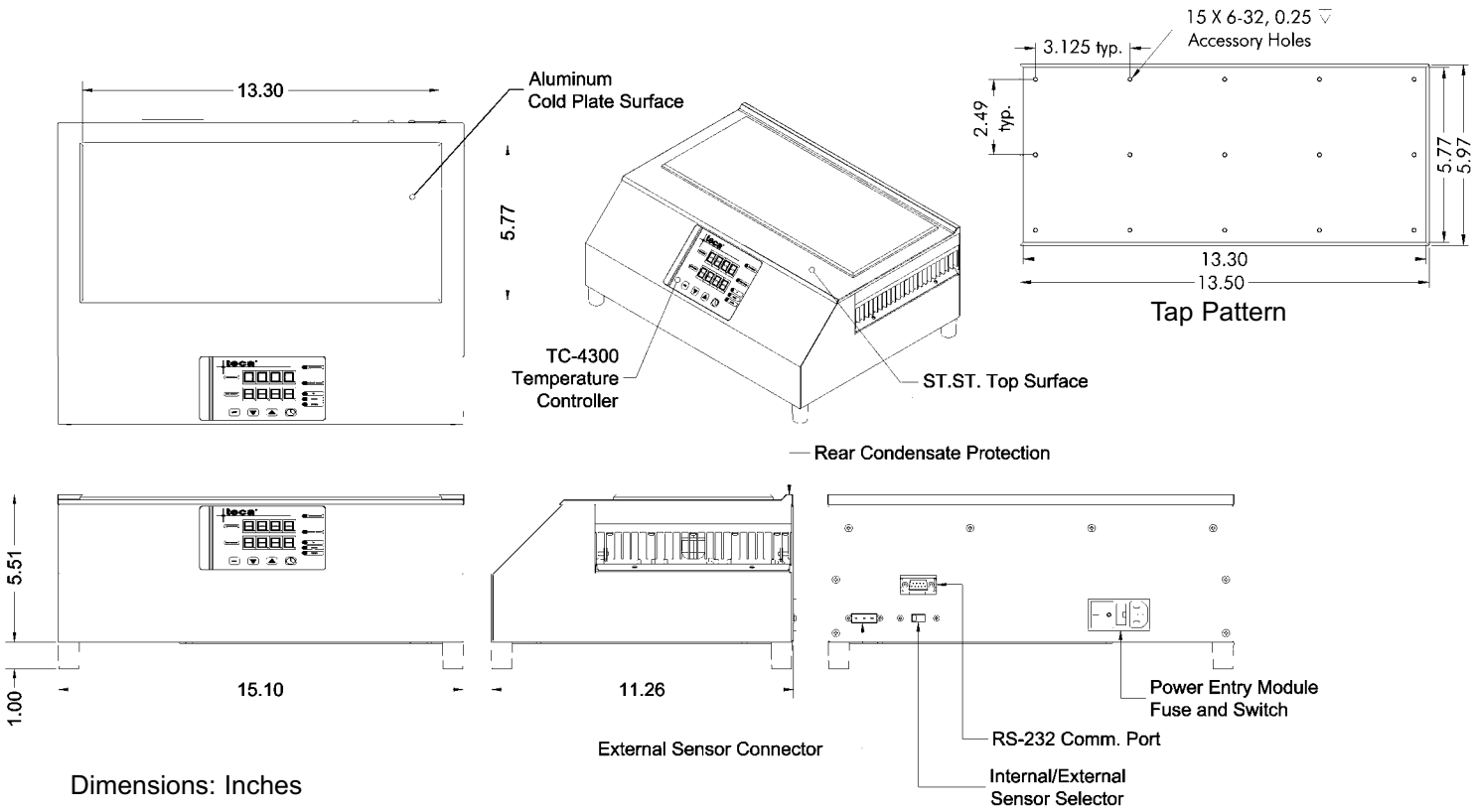


Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Ambient Temp	**25°C**	**50°C**
Standard	y=.195x-39.1	y=.195x-41.8
High capacity	y=.185x-44.9	y=.185x-48.8



Ambient Air Path

DIMENSIONS



Dimensions: Inches

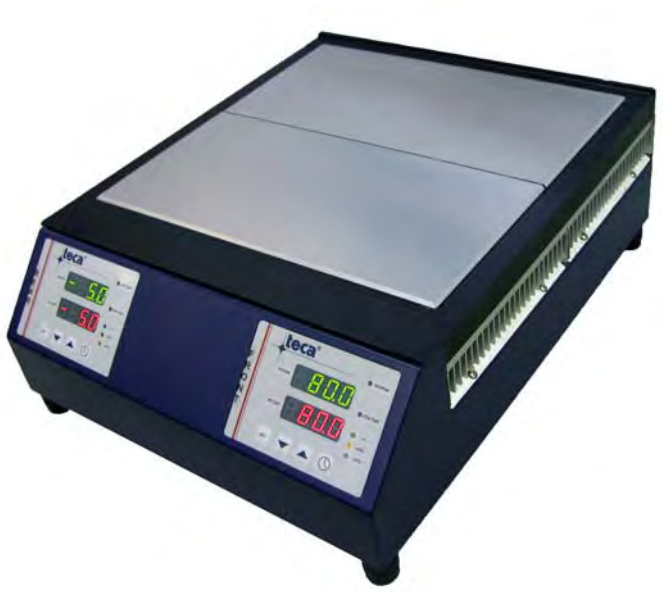
AHP-1200DCP | Dual Temperature Zone Plate

Air Cooled
Bench Top

100-240 VAC Input

FEATURES

- Cools and heats two plates independently
- 100-240 VAC universal input
- Low-profile design with ergonomic sloped front
- Quiet operation
- Compact bench top unit, 18.5" X 15.1" footprint
- No compressor, fluorocarbons or filters.
- Virtually maintenance-free operation
- Painted Enameled stainless steel exterior housing
- Rubber feet
- Precision machined cold plate surface
- Large 13.5" x 13" overall plate area
- Adaptable to various surfaces/coverings
- Use with clear plastic walls or covers



APPLICATIONS

- Behavior Studies
- Habitat studies
- Pain Threshold Studies
- Temperature Range Studies
- Heat/Cold Sensitivity
- Temperature Differential Testing
- Long Term Temperature Exposure
- Heat/Cold Discrimination
- Heat/Cold Transient Studies
- Specimen Storage/Temperature Maintenance
- Histology Sample Preparation
- General Laboratory Cold Plate Use

CONTROL FEATURES

- Independent TC-4300 PID "tunable" temperature controllers
- One shot smart PID control tuning or Adaptive Smart Continuous Tuning
- Heating and Cooling
- Internal RTD sensor
- Remote Sensibility™ switchable exterior sensor
- Multi-segment ramp and soak programmable
- RS-232 communications
- Software for programing, charting and data acquisition

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	CONFIGURATION	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	OPERATING AMBIENT °C
AHP-1200DCP	9-34EB-1-0A1	Heat/Cool	Cold Plate/Hot Plate	670-800	100-240	2.5-5.0	50 (22.7)	TC-4300	0-40

AHP-1200DCP

ENVIRONMENTS

Bench top
Laboratory
Industrial

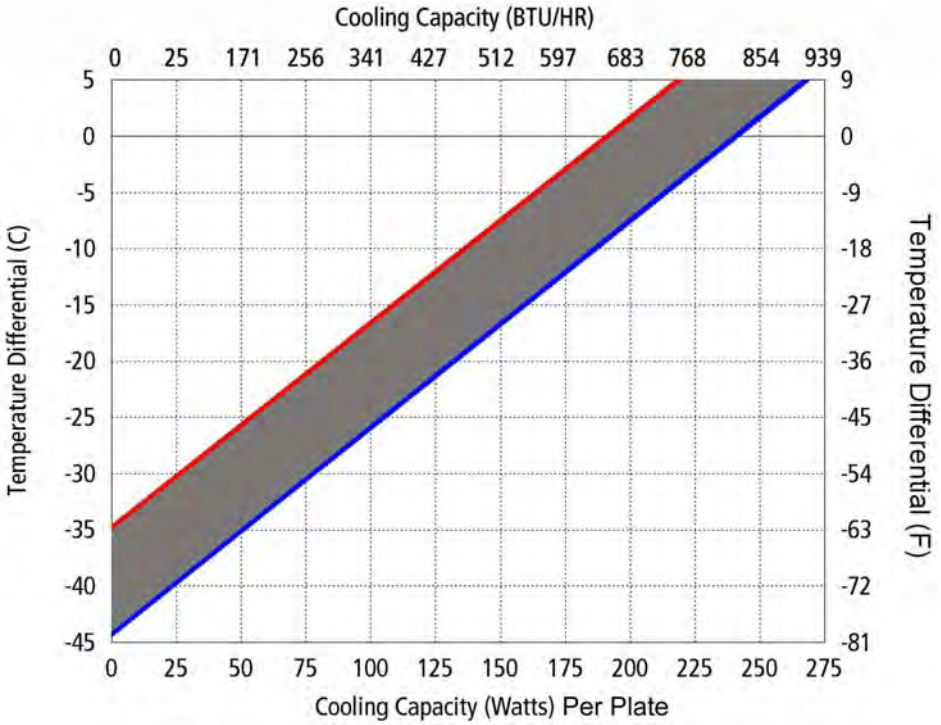
COOLING CAPACITY (individual plate)

200 - 250 Watts @ 0 °C ΔT

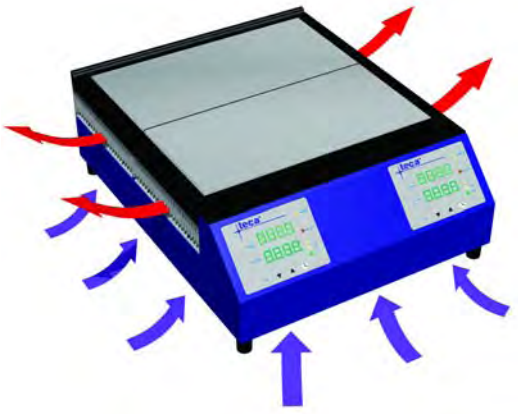
COOLING CAPACITY (combined)

400 - 500 Watts @ 0 °C ΔT

PERFORMANCE CURVE

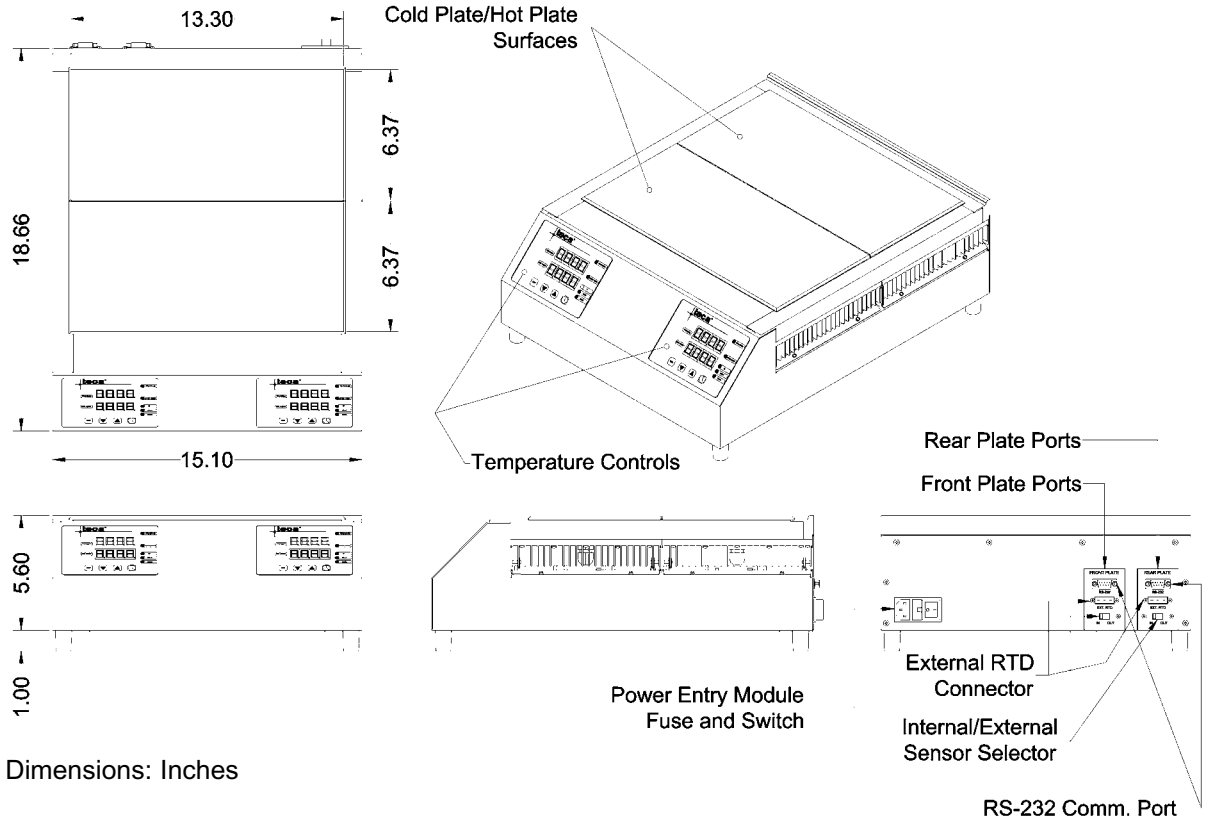


Performance varies with cold plate temperature differential. Performance curve is for one cold plate at an ambient of 25 °C. Performance of one cold plate will vary with the temperature of the other cold plate.



Ambient Air Path

DIMENSIONS



Dimensions: Inches

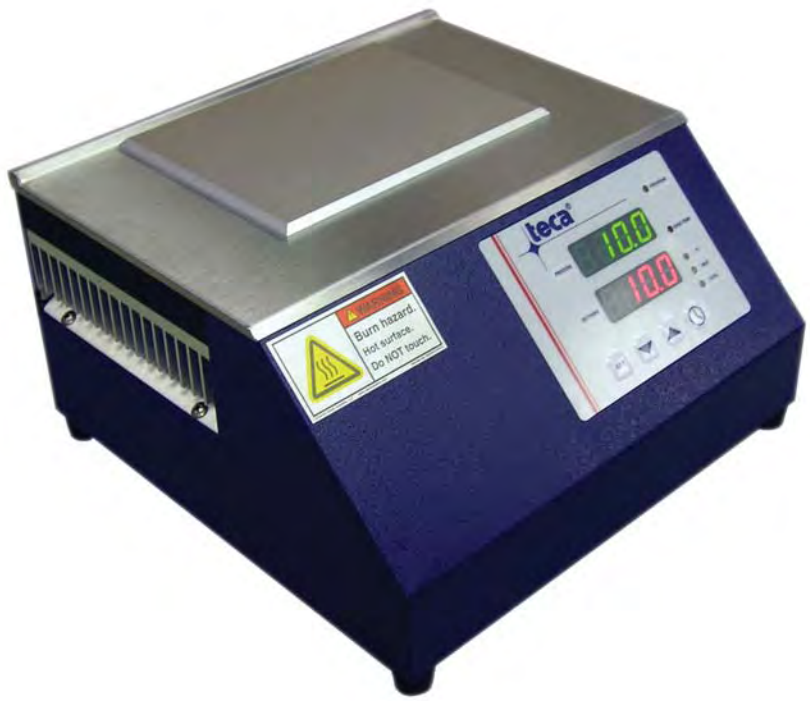
AHP-301CPV | Versatile Cold/Hot Plate

Air Cooled
Bench Top

100-240 VAC Input

FEATURES

- Precision machined cold plate surface
- Easy clean stainless steel top surface
- Cools and heats (TYP. -20 °C to 90 °C)
- 100-240 VAC universal input
- Low-profile design with ergonomic sloped front
- Variable fan speed for quieter operation
- Weighs only 13 lbs. (5.9 kg)
- Compact bench top unit, 9.8" X 10.1" footprint
- No compressor, fluorocarbons or filters.
- Virtually maintenance-free operation
- See accessory page



CONTROL FEATURES

- Integral TC-4300 PID "tunable" temperature control
- One shot smart PID control tuning or Adaptive Smart
  Continuous Tuning
- EasyLog software for easy programming, tuning, charting and data acquisition
- Heating and Cooling
- Internal RTD sensor
- Remote Sensibility™ switchable exterior sensor
- Multi-segment ramp and soak programmable (4X8 or 2X16 or 1X32 segments)
- RS-232 communications

SPECIFICATIONS

MODEL	PART NUMBER	COLD PLATE	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	OPERATING AMBIENT °C
AHP-301CPV	9-70EB-1-0A0	Smooth Surface	260-280	100-240	2.0	13 (5.9)	TC-4300	0-45
AHP-301CPV	9-70E5-1-0A0	Smooth Surface	260-280	24 VDC	7.0	13 (5.9)	TC-4300	0-45
AHP-301CPV	9-70EB-1-TAP	Tap Pattern	260-280	100-240	2.0	13 (5.9)	TC-4300	0-45
AHP-301CPV	9-70E5-1-TAP	Tap Pattern	260-280	24 VDC	7.0	13 (5.9)	TC-4300	0-45

AHP-301CPV

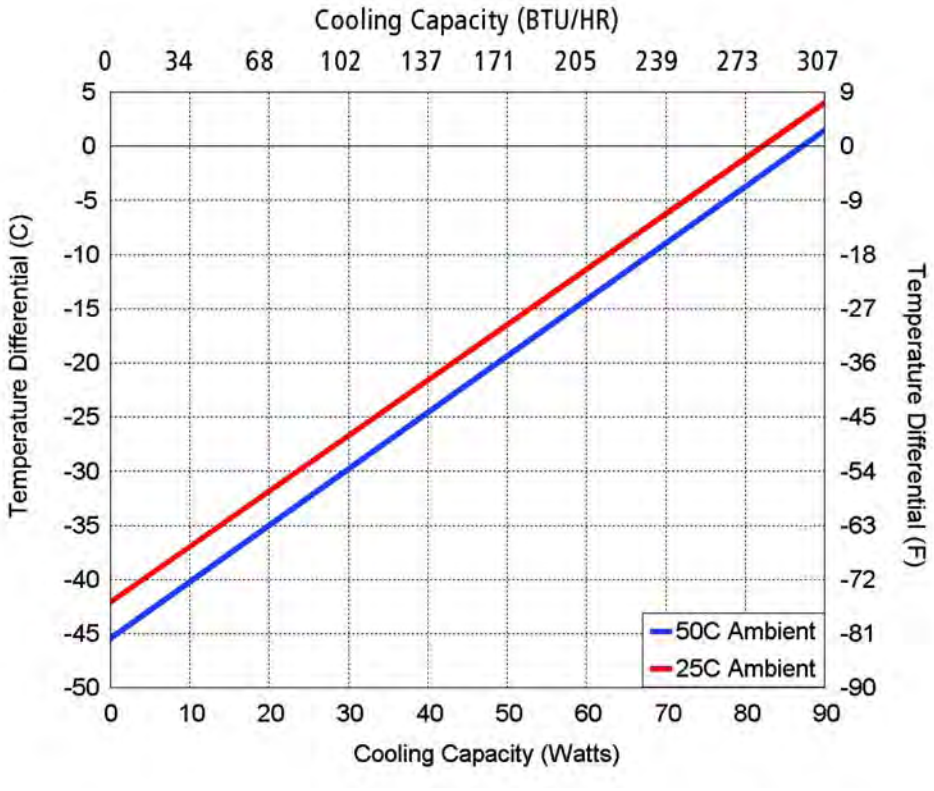
ENVIRONMENTS

Bench top
Laboratory
Industrial

COOLING CAPACITY

85 Watts @ 0 °C ΔT

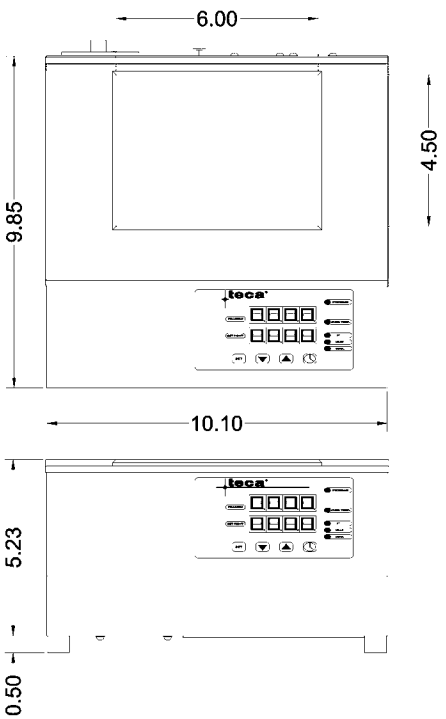
PERFORMANCE CURVE



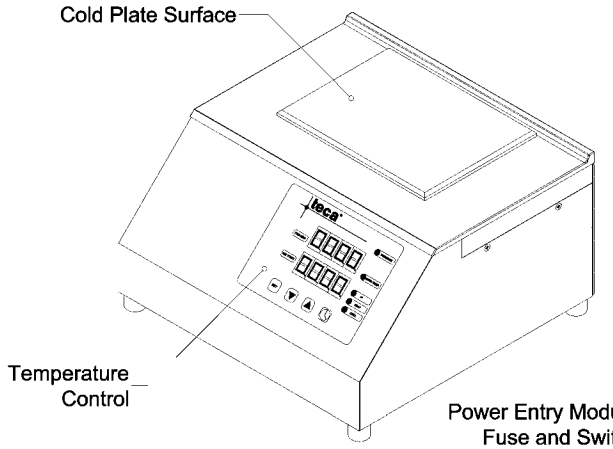
Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Ambient Temp	**25°C**	**50°C**
Cold Plate	y=.51x-42.1	y=.51x-45.4

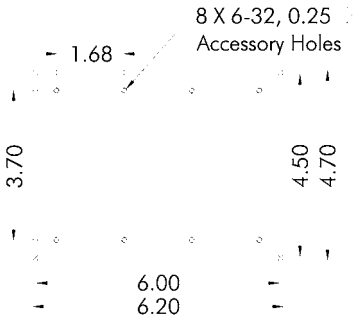
Ambient Air Path

DIMENSIONS

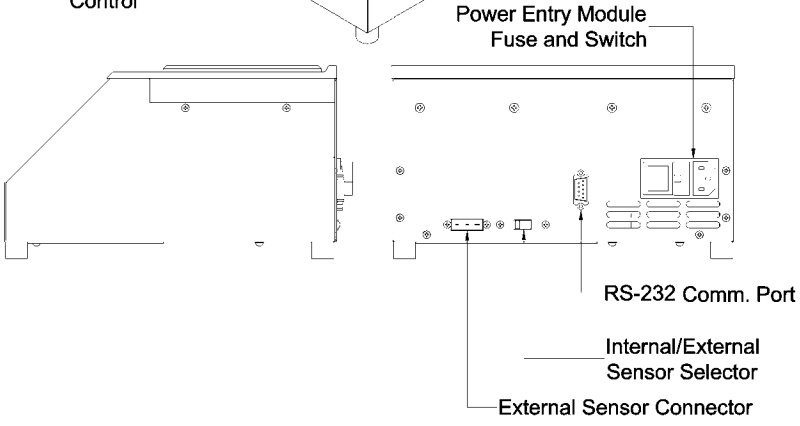


Dimensions: Inches





Tap Pattern



AHP-800MSP | Magnetic Stirring Plate

Air Cooled
Bench Top

100-240 VAC Input

FEATURES

- Heating and cooling
- Unique high-performance side mounting cold plate for added cooling and uniform temperatures
- Magnetic drive for stir bars from underneath the bottle
- Magnetic stir offers 5 speed settings
- Designed to cool a standard 1 liter filter bottle (Nalgene 4551000) to 4 °C (with visible level window)
- 100-240 VAC universal, Integral power supply
- Height adjusting rubber feet
- Power input cord set
- Weighs only 38 lbs. (17.3 kg)
- Compact bench-top design
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Painted stainless steel exterior housing
- Removable bottle block for different size bottles or beakers

INCLUDES

- Integral PID "tunable" temperature control
- One shot smart PID control tuning or Adaptive Smart Continuous Tuning
- Internal RTD sensor
- Remote Sensibility™ switchable exterior RTD sensor
- Multi-segment ramp and soak programs
- RS-232 communications
- i-tools software for easy programming and control tweaking
- Optional software for charting and data acquisition
- Stock bottle block for 3 liter beaker (6" diameter)

APPLICATIONS

Laboratory or industrial environments. Testing of specimens, drugs and industrial chemicals. Process testing. Quality control.

SPECIFICATIONS

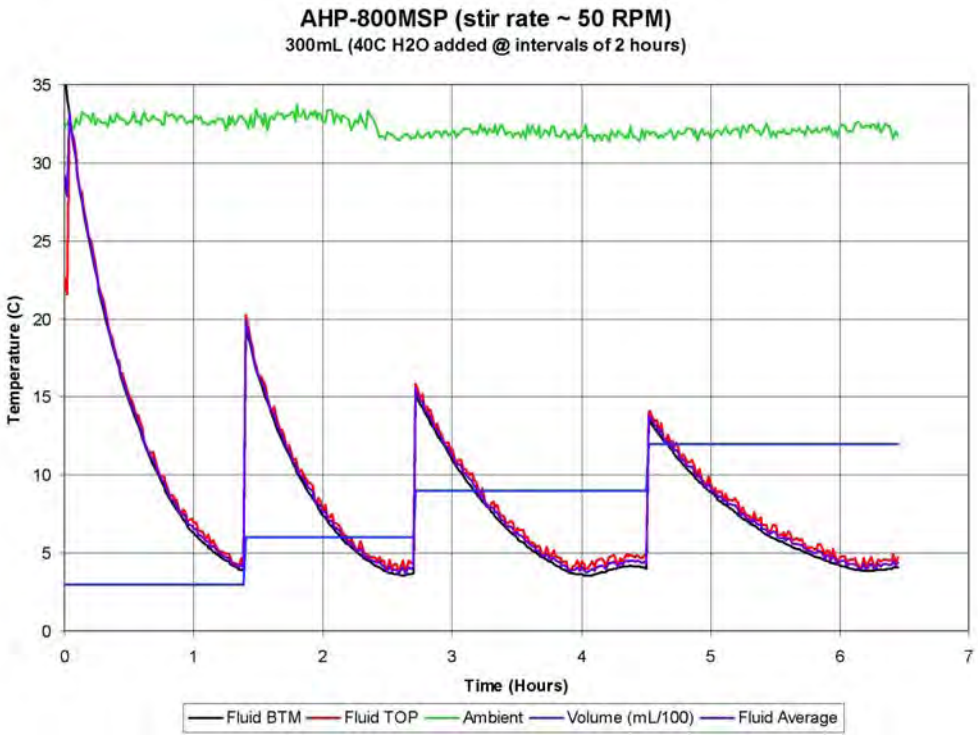
MODEL	PART NUMBER	NOTES	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG) *	TEMP. CONTROL	OPERATING AMBIENT °C
AHP-800MSP	9-50EB-1-001	Heat/Cool	100-240	4.0	38 (17.3)	TC-4300	0-45

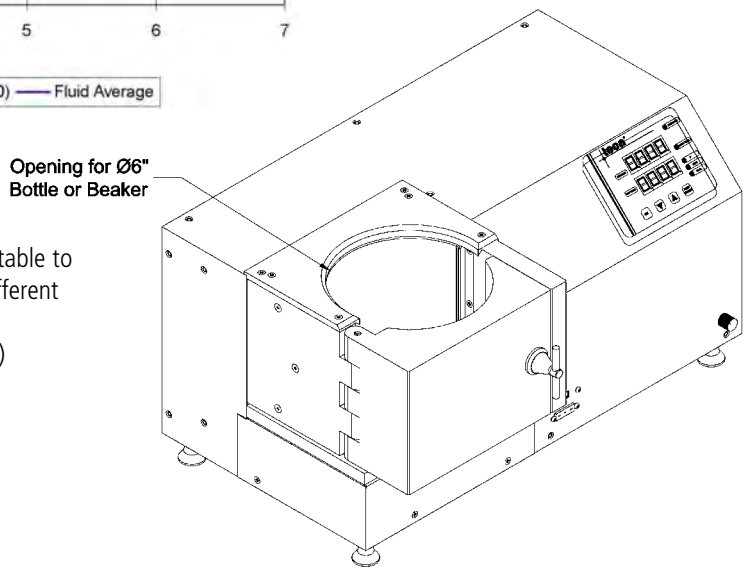
AHP-800MSP

ENVIRONMENTS

Bench top
Laboratory
Industrial

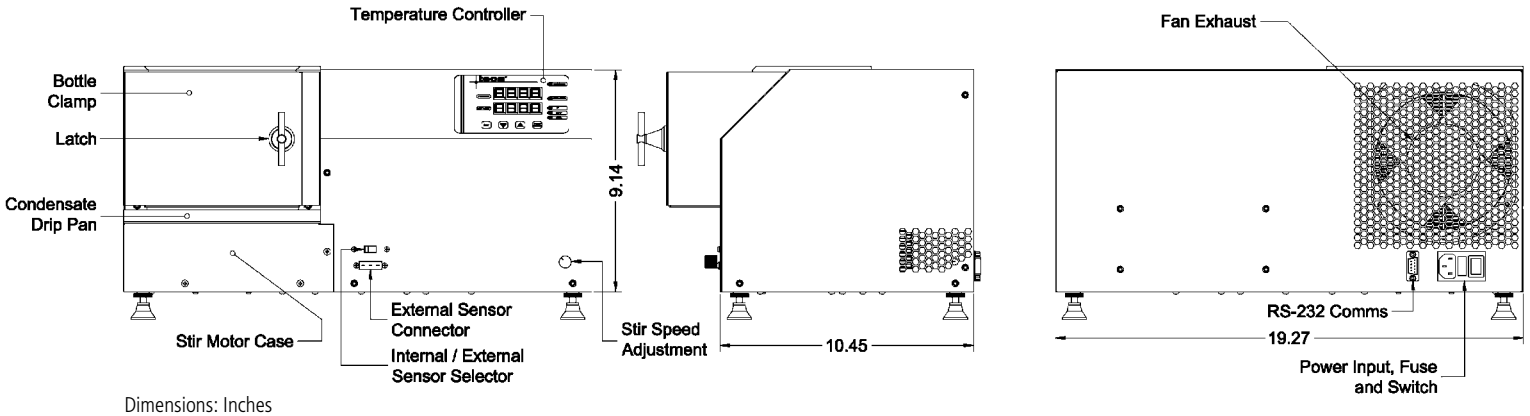
PERFORMANCE CURVE





The AHP-800MSP has a removable "bottle block" that makes it adaptable to different size bottles and beakers. Swap different bottle blocks for different diameter vessels.
The stock version holds a 3 liter beaker (reference VWR # 89090-522)
Tell us your required diameter and we will design one for you.

DIMENSIONS



Dimensions: Inches

AHP-1200CP | Cold Plate

Air Cooled
Flush Mount
NEMA-12

General Purpose 120 VAC, 240 VAC Input

FEATURES

- Direct contact cooling as much as 48 °C below room temperature
- Weighs only 19 lbs. (8.6 kg)
- Bench top or enclosure mounting
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts in any orientation

INCLUDES

- Integral power supply (120 VAC input)
- Cold plate mounting taps
- Rubber feet
- Power input cord

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	OPERATING AMBIENT °C
AHP-1200CP	1-3090-0-000	Cool only	830-950	120	4.0	18(8.2)	None	-10/+70
AHP-1200CP	1-3050-0-000	Cool only	830-950	120	4.0	18(8.2)	EXT*	-10/+70
AHP-1200CPHC	1-3050-1-000	Heat/Cool	830-950	120	4.0	18(8.2)	EXT*	-10/+70
AHP-1202CP	1-3092-0-000	Cool only	830-950	240	2.5	23(10.5)	None	-10/+70
AHP-1202CP	1-3052-0-000	Cool only	830-950	240	2.5	23(10.5)	EXT*	-10/+70
AHP-1202CPHC	1-3052-1-000	Heat/Cool	830-950	240	2.5	23(10.5)	EXT*	-10/+70

* Unit is set for 5-32 VDC external control signal

AHP-1200CP

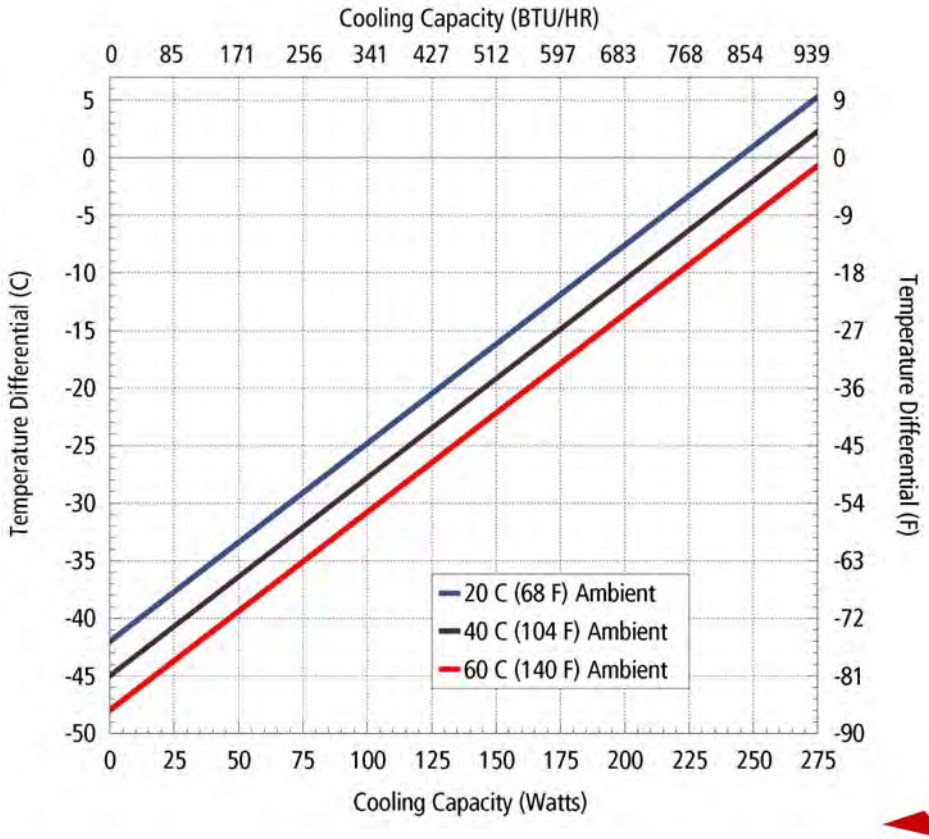
ENVIRONMENTS

Bench top
Laboratory
Industrial

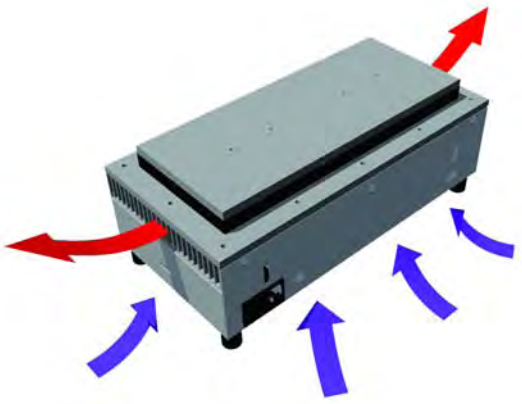
COOLING CAPACITY

260 Watts @ 0 °C ΔT

PERFORMANCE CURVE

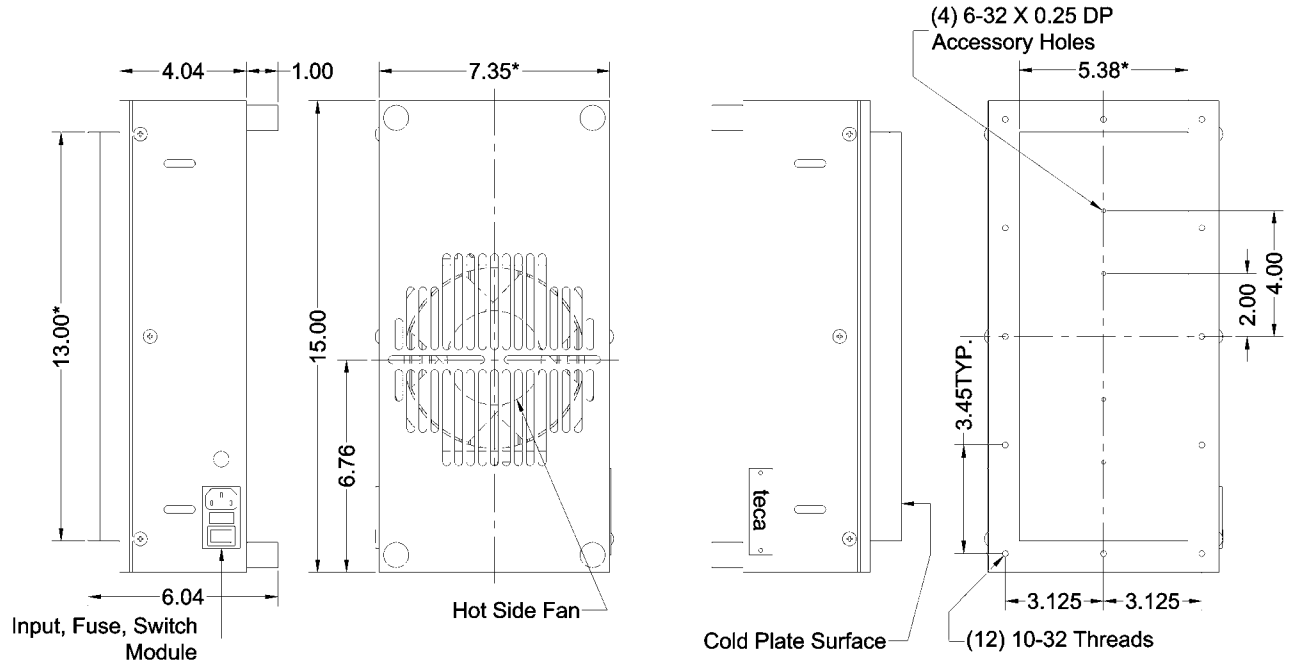


Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Cold Plate	y=.172x-44.0	y=.172x-45.0	y=.172x-48.0



Ambient Air Path

DIMENSIONS



* Dimension does not include hardware, insulation.
Dimension: Inches

AHP-1200CP | Cold Plate

Air Cooled
Flush Mount
NEMA-12

General purpose 24 VDC input

FEATURES

- Direct contact cooling as much as 48 °C below room temperature
- Weighs only 19 lbs. (8.6 kg)
- Mount thru bench top or enlcosure wall
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts in any orientation

INCLUDES

- Cold plate accessory tapped holes
- Cold plate mounting taps
- Rubber feet
- Power input cord

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	OPERATING AMBIENT °C
AHP-1200CP	1-3095-0-000	Cool only	830-950	24	9.0	18(8.2)	None	-10/+70
AHP-1200CP	1-3055-0-000	Cool only	830-950	24	9.0	18(8.2)	EXT*	-10/+70
AHP-1200CPHC	1-3055-1-000	Heat/Cool	830-950	24	9.0	19(8.6)	EXT**	-10/+70

* Unit is set for 5-32 VDC external control signal, relay included

** Unit is set for 5-32 VDC external control signal, H-Bridge relay(s) included

AHP-1200CP

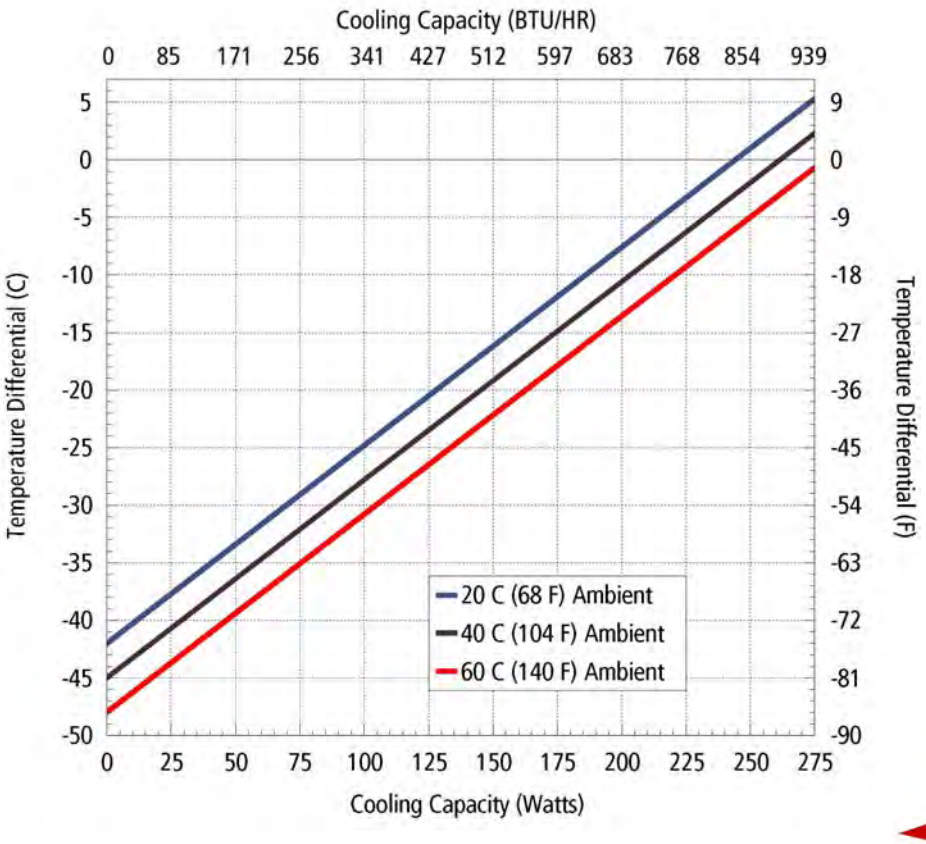
ENVIRONMENTS

Bench top
Laboratory
Industrial

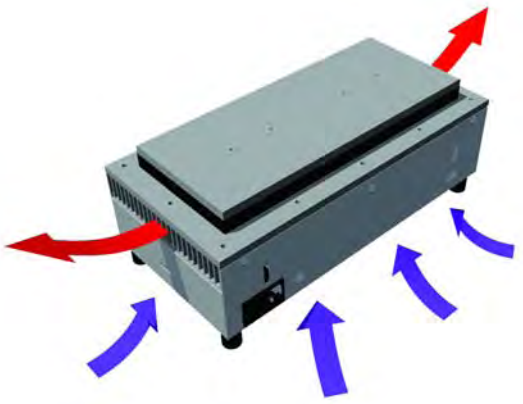
COOLING CAPACITY

260 Watts @ 0 °C ΔT

PERFORMANCE CURVE

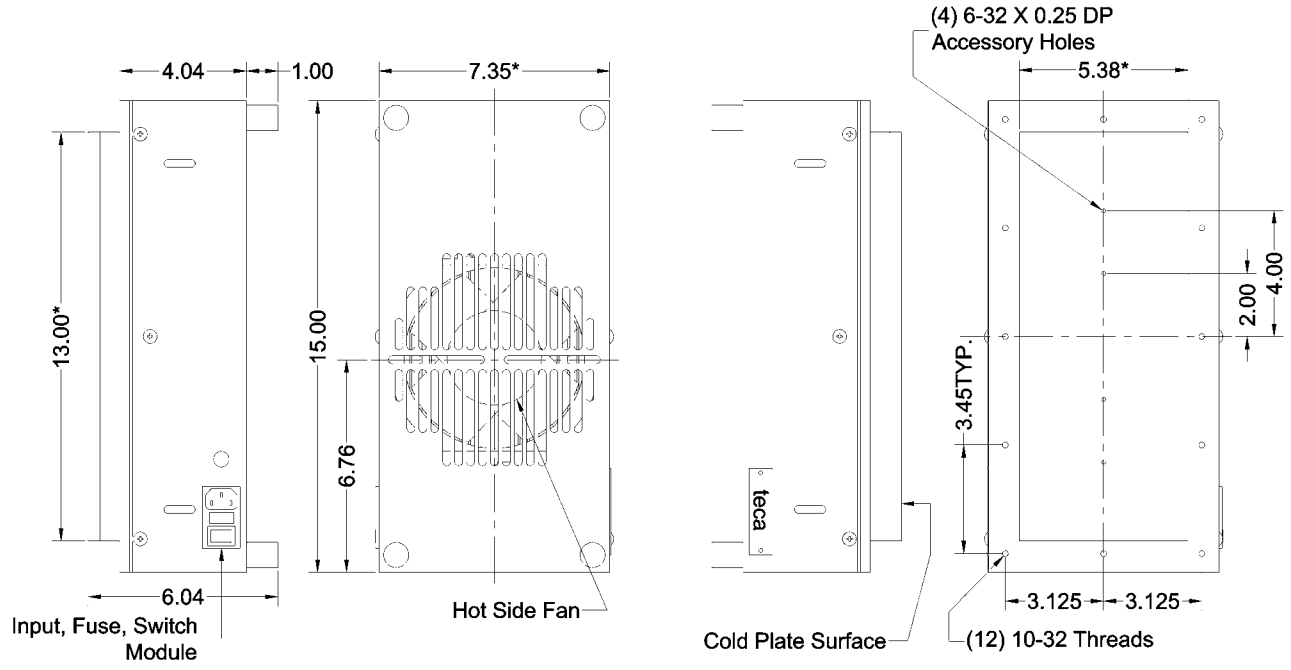


Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Cold Plate	y=.172x-44.0	y=.172x-45.0	y=.172x-48.0



Ambient Air Path

DIMENSIONS



* Dimension does not include hardware, insulation.
Dimension: Inches

AHP-301CP | Cold Plate

Air Cooled | General Purpose 120 VAC, 240 VAC Input

FEATURES

- Direct contact cooling as much as 52°C below room temperature
- Weighs only 11 lbs. (5.0 kg)
- Mounts thru bench top or enclosure wall
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts in any orientation

INCLUDES

- Cold plate accessory tapped holes
- Rubber feet
- Power input cord
- Machined cold plate surface

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 Hz	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL *	OPERATING AMBIENT °C
AHP-301CP	1-7090-0-000	Cool only	225-265	120	1.2	11(5)	none	-10/+70
AHP-301CP	1-7050-0-000	Cool only	225-265	120	1.2	11(5)	EXT*	-10/+70
AHP-301CPHC	1-7050-1-000	Heat/Cool	225-265	120	1.2	11(5)	EXT*	-10/+70
AHP-301CP	1-7092-0-000	Cool only	225-265	240	0.6	11(5)	none	-10/+70
AHP-301CP	1-7052-0-000	Cool only	225-265	240	0.6	11(5)	EXT*	-10/+70
AHP-301CPHC	1-7052-1-000	Heat/Cool	225-265	240	0.6	11(5)	EXT*	-10/+70

* Unit is set for 5-32 VDC external signal, relay(s) included

AHP-301CP

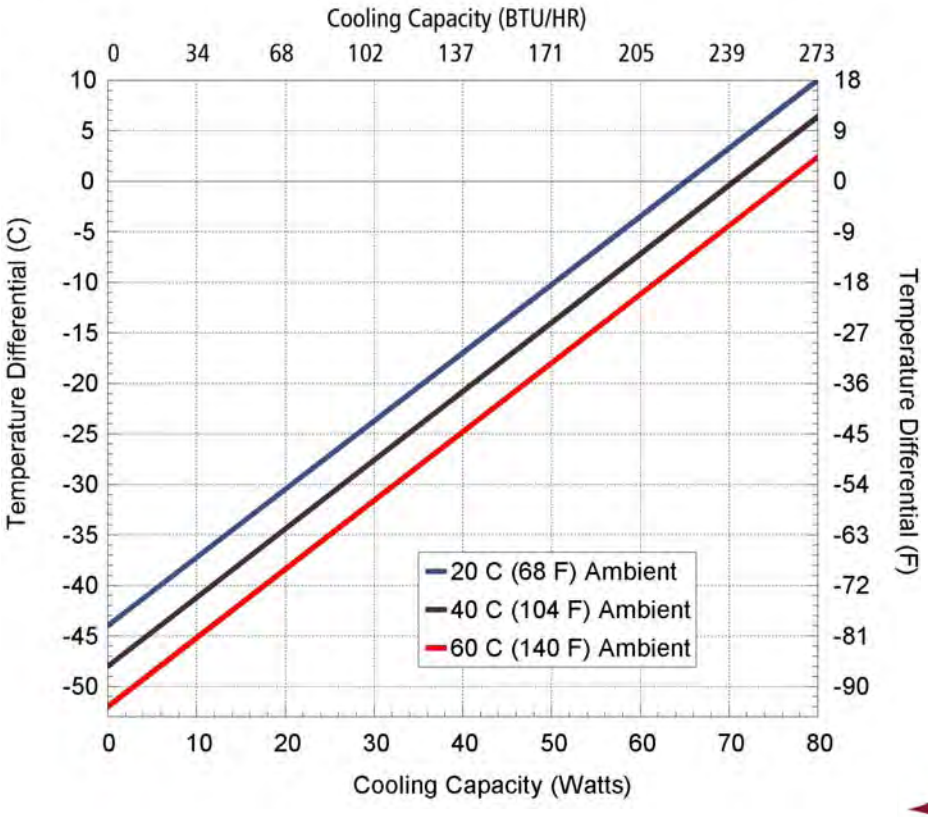
ENVIRONMENTS

Bench top
Laboratory
Industrial

COOLING CAPACITY

70 Watts @ 0 °C ΔT

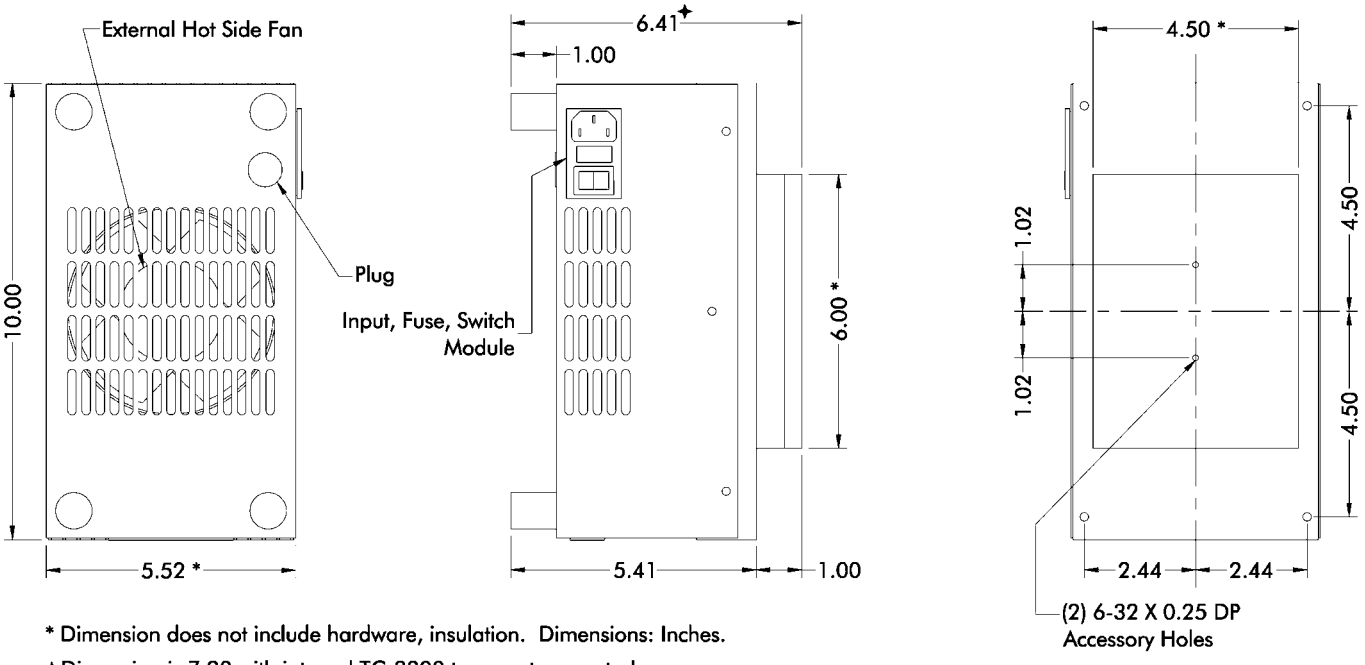
PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
Cold Plate	y=.68x-44.0	y=.68x-48.0	y=.68x-52.0

Ambient Air Path

DIMENSIONS



* Dimension does not include hardware, insulation. Dimensions: Inches.
✦Dimension is 7.20 with integral TC-3300 temperature control.

AHP-300CP Thermoelectric Cold Plate

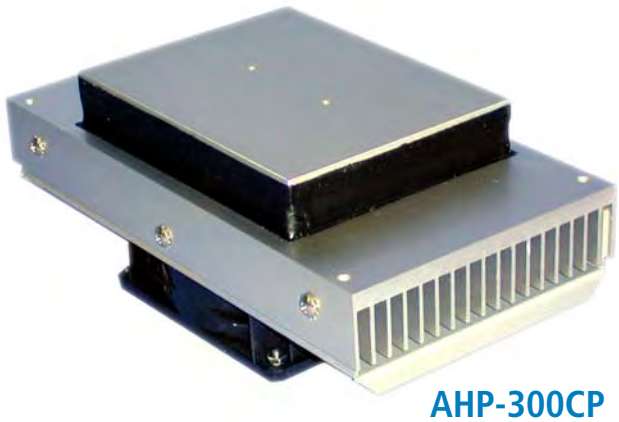
AHP-150CP

General Purpose VDC Input

Air Cooled

FEATURES

- Direct contact cooling as much as 56 °C below room temperature
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Mounts in any orientation
- Works with TC-3500



AHP-300CP

INCLUDES

- Cold plate accessory tapped holes
- Machined surface
- Terminal strip for wire hook up

AHP-150CP

SPECIFICATIONS AHP-300CP

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL	OPERATING AMBIENT °C
AHP-300CP	1-7097-0-000	Cool only	290-330	12/24/48	12/6/3	6(2.7)	none	-10/+70
AHP-300CPHC	1-7094-1-000	Heat/Cool	290-330	12	12	6(2.7)	none	-10/+70
AHP-300CPHC	1-7095-1-000	Heat/Cool	290-330	24	6	6(2.7)	none	-10/+70
AHP-300CPHC	1-7097-1-001	Heat/Cool Rev. Pol.*	290-330	12/24/48	12/6/6	6(2.7)	none*	-10/+70

SPECIFICATIONS AHP-150CP

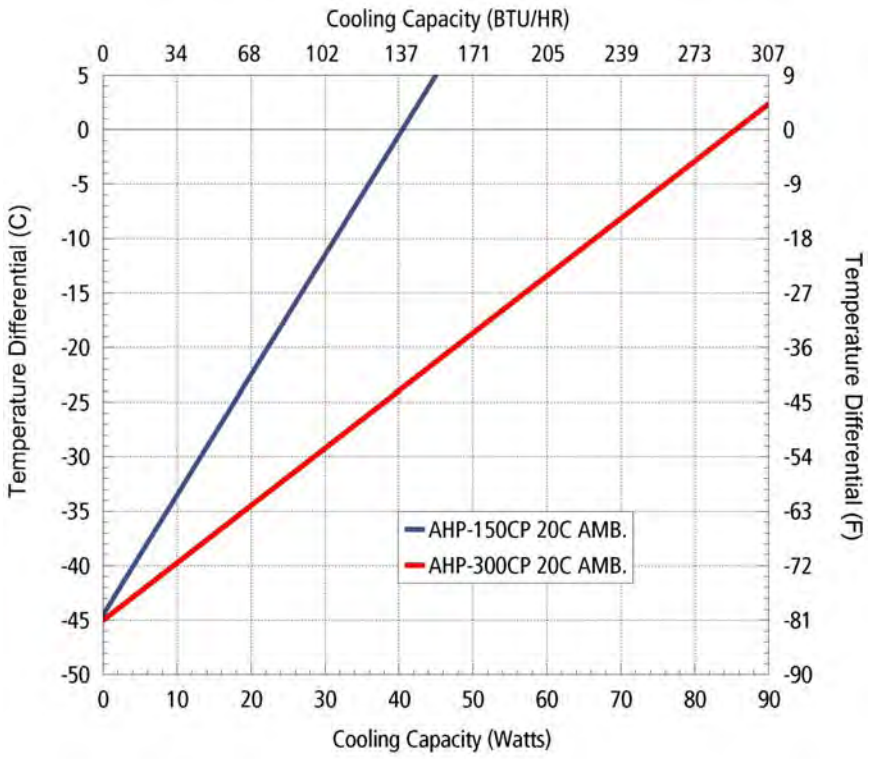
MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	WEIGHT LBS. (KG)	TEMP. CONTROL	OPERATING AMBIENT °C
AHP-150CP	1-8098-0-000	Cool only	140-160	12/24	6/3	2.5(1.2)	None	-10/+70
AHP-150CPHC	1-8094-1-000	Heat/Cool	140-160	12	6	2.5(1.2)	None	-10/+70
AHP-150CPHC	1-8095-1-000	Heat/Cool	140-160	24	3	2.5(1.2)	None	-10/+70
AHP-150CPHC	1-8098-1-001	Heat/Cool Rev. Pol*	140-160	12/24	6/3	2.5(1.2)	None*	-10/+70

Note: Options for temperature control, consult factory.

* Reverse polarity unit can be used with external TC-3500 controller see P. 112

See also , "Power Supplies" , P. 117

PERFORMANCE CURVE



AHP-300CP

ENVIRONMENTS

Bench Top, Laboratory, Industrial

COOLING CAPACITY

85 Watts @ 0 °C ΔT

AHP-150CP

ENVIRONMENTS

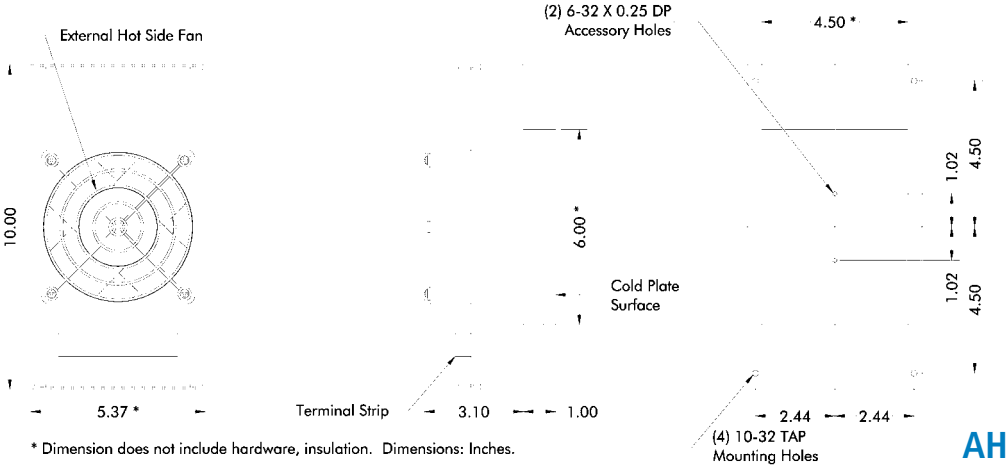
Bench Top, Laboratory, Industrial

COOLING CAPACITY

40 Watts @ 0 °C ΔT

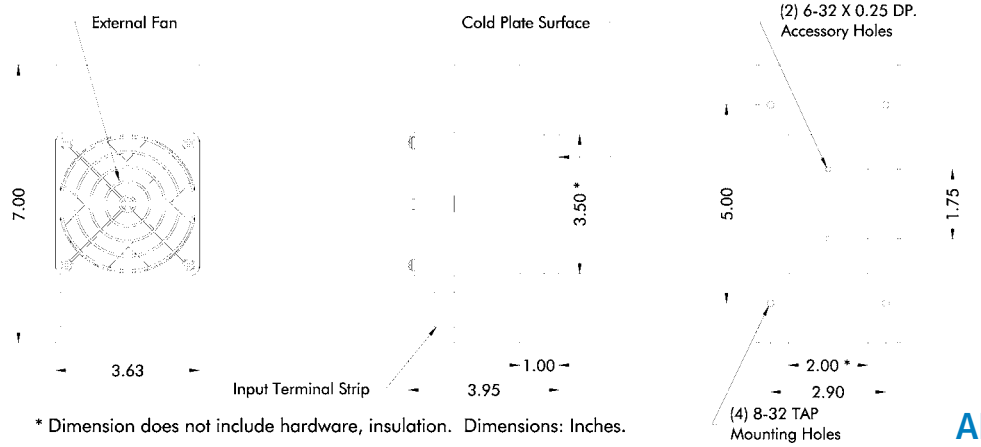
Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Ambient Temp	**20°C**	**40°C**	**60°C**
300CP Cold Plate	y=.526x-45.0	y=.526x-48.0	y=.526x-51.0
150CP Cold Plate	y=1.1x-44.5	y=1.1x-48	y=1.1x-51.5

DIMENSIONS



* Dimension does not include hardware, insulation. Dimensions: Inches.

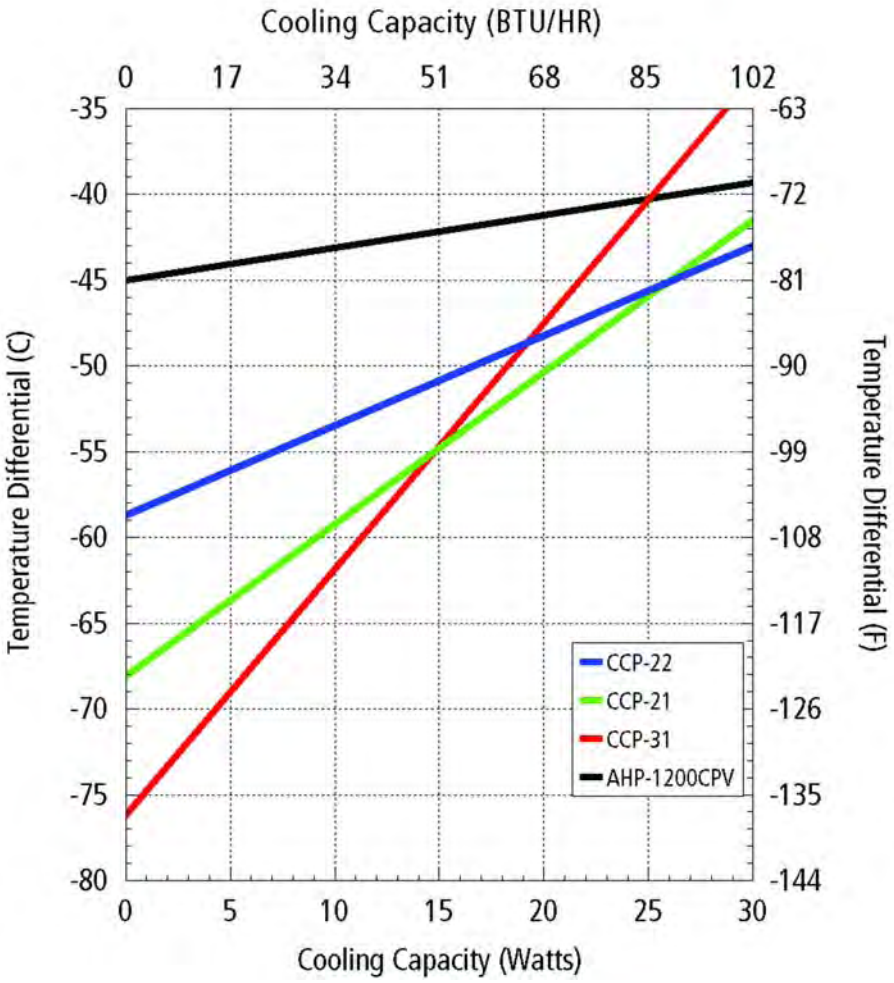
AHP-300CP



* Dimension does not include hardware, insulation. Dimensions: Inches.

AHP-150CP

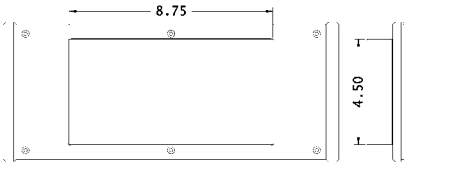
CASCADE PERFORMANCE CURVE



LOW TEMPERATURE CASCADES

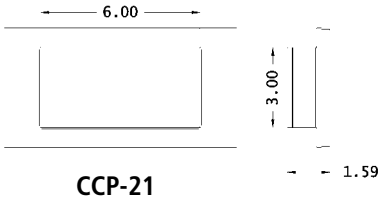
One thermoelectric stacked on top of another with the goal of increasing the maximum temperature differential is a "cascade". These assemblies are mounted to model AHP-1200CPV cold plate to create 2 and 3 stage cascades. The performance curves shown are actual tests run under very well insulated conditions and active loads.
The performance will vary with the degree of insulation, with the amount of the active load and with the ambient temperature.

TWO STAGE - LARGE PLATE



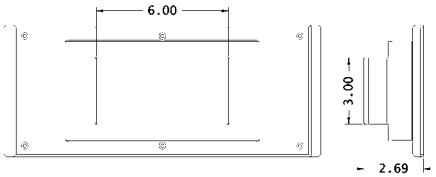
CCP-22

TWO STAGE - SMALL PLATE



CCP-21

THREE STAGE



CCP-31

CASCADE CONTROL

Cascade Control is a rear panel or complete system which provides internal power and front panel temperature control for your cascade. It becomes part of your **AHP-1200CPV** whether you add it yourself or order it as a finished product which can be used as a normal CPV or with an optional cascade.

Part Number CC-1200: A back panel used to modify your existing high capacity **AHP-1200CPV** for cascade control. You will need to remove the existing rear panel and perform some minor wiring modifications. An external 24 VDC power supply will be required.

Part Number 9-35EB-1-CAS: An **AHP-1200CPV** with all the options needed for cascade control. Those options include the back panel part # **CC-1200** and hinged cover part # **CH-1200**.

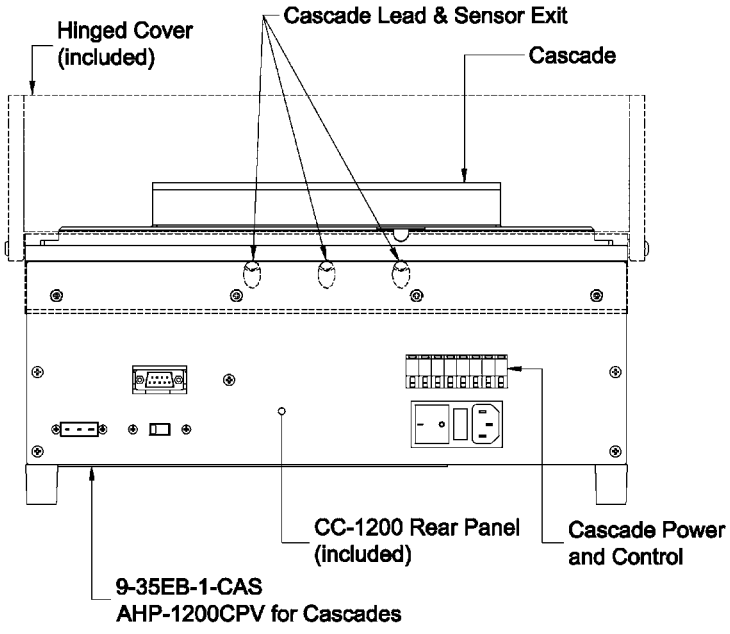
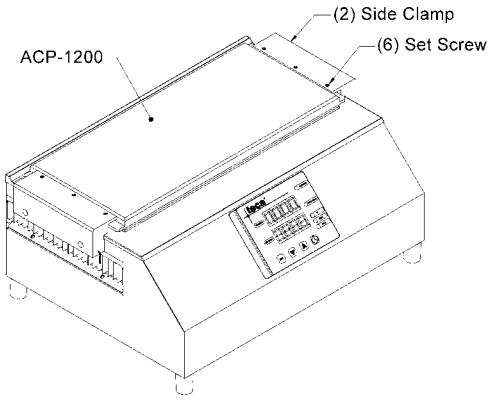


PLATE OPTIONS

ACCESSORY PLATES

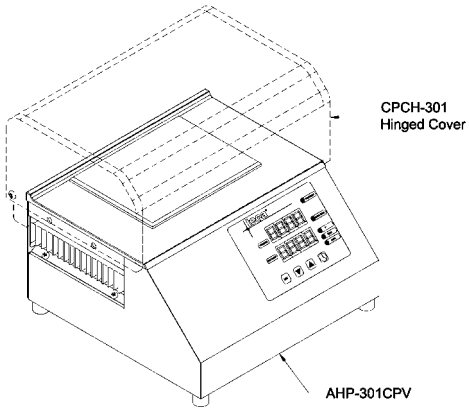
Clear anodized aluminum Feature Plates are clamped to CPV cold plates from the side. They come with the side clamps and are blank as shown below. Modify them to your needs, adding taps, grooves and other features. Swap different plates for different jobs. Use them as fixture plates.



ACP-1200 *13.3 X 5.77 Surface*
Contact TECA for more details.

ACP-301 *6.2 X 4.7 Surface*
Contact TECA for more details.

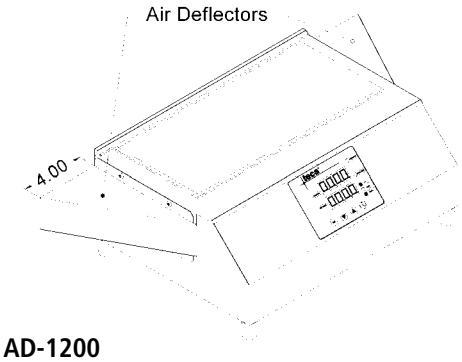
CLEAR COVERS



C-301 *10 X 6.5 X 4 cover*
CH-301 *11 X 7.4 X 4 hinged cover*
CN-301 *cover for use with ACP-301*
CHN-301 *hinged cover for used with ACP-301*

C-1200 *15 X 8 X 5 cover*
CH-1200 *16 X 9.3 X 5 hinged cover*
CN-1200 *cover for use with ACP-1200*
CHN-1200 *hinged cover for used with ACP-1200*

AIR DEFLECTOR



AD-1200
Fully reversible air deflector for AHP-1200CPV exhaust.

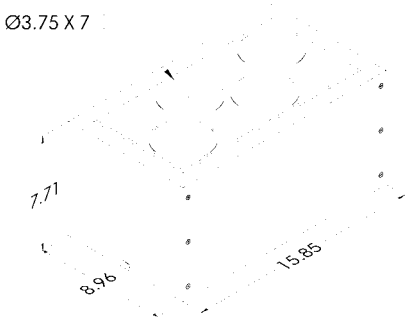
BARRIERS

Sized for a convenient fit around cold plates, tap plates and Pyrex plates combinations.

BH-301 *14.2 X 6.7 X 0.375 cover*
BH-1200 *6.8 X 5.3 X 0.375 cover*
H = height in inches (3, 6 , 9 standard)
Example: B6-1200

COLD WELL

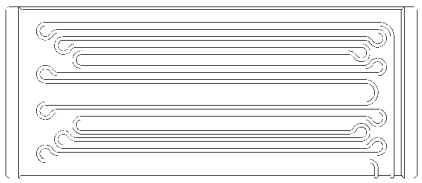
Used with 1000 mL Boston Round bottles.



CWB-01 *Layered Aluminum cold well block for four 1 Liter bottles. PVC Insulation included.*
For other configurations consult factory.

TUBE CHILLER

A Tube Chiller Plate has channels designed for specific size flexible tubing. When a fluid flows through the tubing it can be heated or cooled without introducing any type of contaminants. Temperature differentials vary with fluid flow rate and specific heat. On site evaluations recommended.



TC-1 *Accessory plate with channels for 0.125" dia tubing. Other tubing diameters available.*

TCC-1 *Hinged cover for TC-1*

PYREX PLATES

Borosilicate substrate used to protect cold plate surface from sharp instruments. these plates can be frozen in place or secured using GPC-1200 or GPC-301 clamps.

GP-1200 13.30 X 5.77 X 0.125
GP-301 6.00 X 4.50 X 0.125

INSULATION

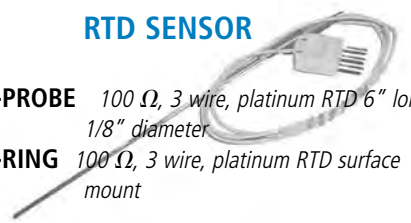
Handy sized and easily cut pieces of closed cell polyethylene insulation.

INS-03 *15" X 2" X 8" Use with AHP-1200CPV*

INS-04 *10" X 2" X 6" Use with AHP-301CPV*

MISC. ACCESSORIES

RTD SENSOR

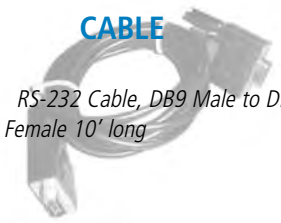


RTD-PROBE *100 Ω, 3 wire, platinum RTD 6" long, 1/8" diameter*
RTD-RING *100 Ω, 3 wire, platinum RTD surface mount*

CONVERTER

C-USB *USB to RS-232 converter "includes adapter, cable and software"*

CABLE



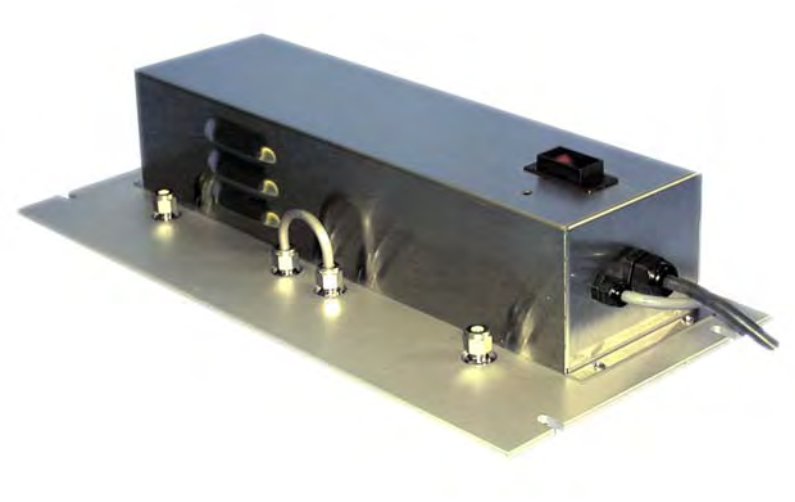
C-RS232 *RS-232 Cable, DB9 Male to DB9 Female 10' long*

LHP-1700CP | Liquid Cooled Cold Plate

Liquid Cooled | Multi Environment 120 VAC, 240 VAC Input

FEATURES

- Standard 19" Rack mounting
- No moving parts
- Weighs only 20 lbs. (9.1kg)
- Direct contact cooling as much as 62 °C below liquid temperature
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Mounts in any orientation
- Requires a constant supply of cooling fluid



INCLUDES

- Compression fittings
- Power cord
- Mounting provision

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	MIN FLOW GPM	TEMP. CONTROL *	OPERATING AMBIENT °C
LHP-1700CP	3-1090-0-000	Cool only	1360-1630	120	7.0	20(9.1)	0.3	none	0/+70
LHP-1700CP	3-1050-0-000	Cool only	1360-1630	120	7.0	20(9.1)	0.3	EXT*	0/+70
LHP-1702CP	3-1092-0-000	Cool only	1360-1630	240	5.0	20(9.1)	0.3	none	0/+70
LHP-1702CP	3-1052-0-000	Cool only	1360-1630	240	5.0	20(9.1)	0.3	EXT*	0/+70
LHP-1700CPHC	3-1050-1-000	Heat/Cool	1360-1630	120	7.0	20(9.1)	0.3	EXT*	0/+70
LHP-1702CPHC	3-1052-1-000	Heat/Cool	1360-1630	240	5.0	20(9.1)	0.3	EXT*	0/+70

* Unit is set for 5-32 VDC external signal, relay(s) included

LHP-1700CP

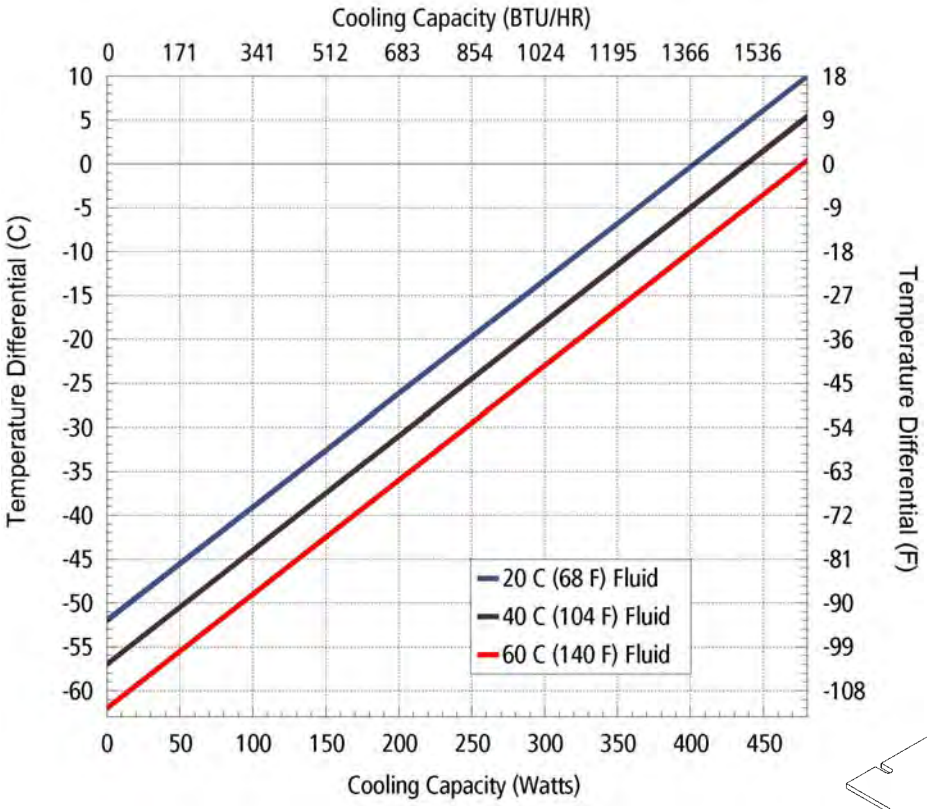
ENVIRONMENTS

Bench Top, Laboratory, Industrial, from harsh to benign environments

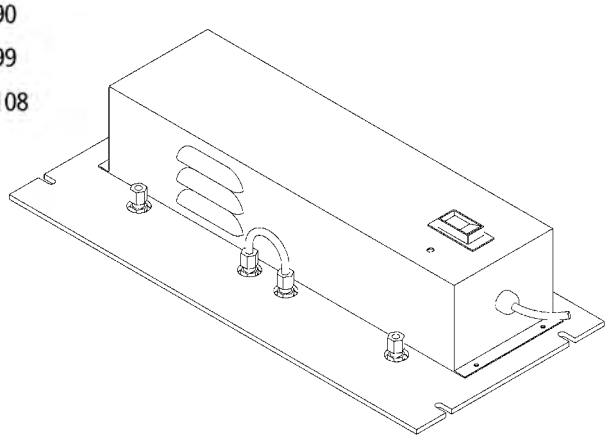
COOLING CAPACITY

440 Watts @ 0 °C ΔT

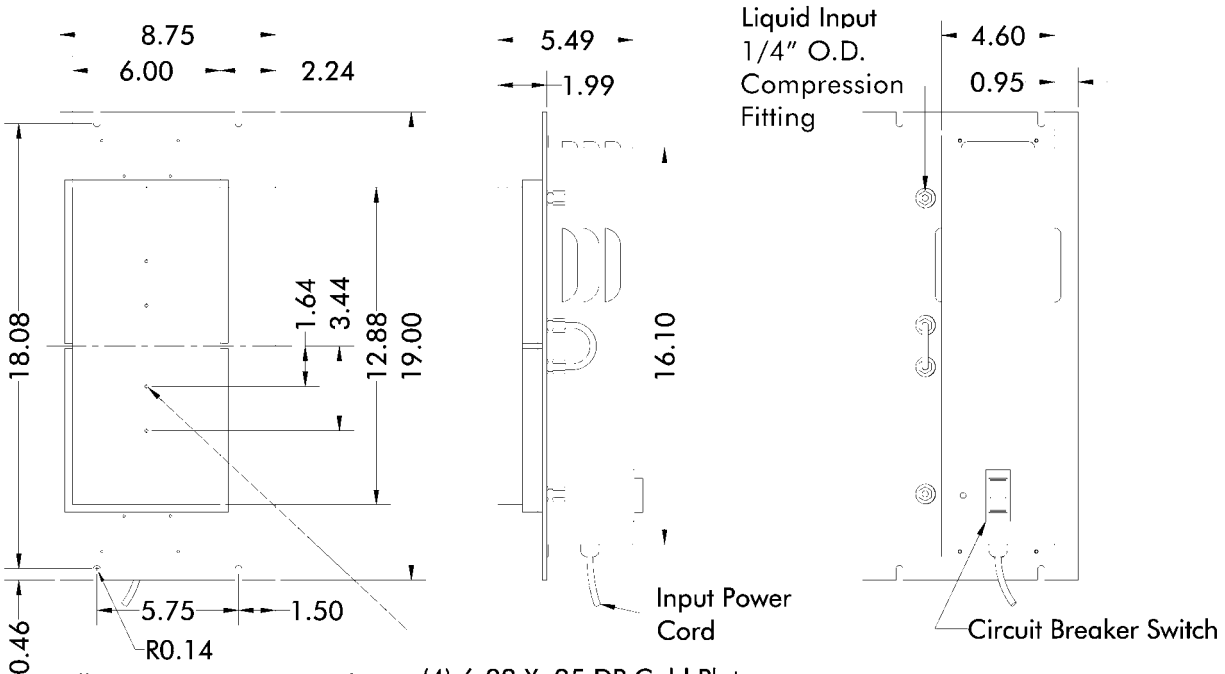
PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Fluid Temp	**20°C**	**40°C**	**60°C**
Cold Plate Temp	y=.13x-52.0	y=.13x-57.0	y=.13x-62.0



DIMENSIONS



All Dimensions are in inches.

(4) 6-32 X .25 DP Cold Plate SurfaceAccessory Holes

LHP-1200CP | Liquid Cooled Cold Plate

Liquid Cooled | General Purpose 24 VDC Input

FEATURES

- No moving parts
- Weighs only 20 lbs. (9.1kg)
- Direct contact cooling as much as 62 °C below liquid temperature
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Mounts in any orientation

INCLUDES

- Female 1/4-18 NPT fittings
- Power input leads
- Mounting provision

SPECIFICATIONS

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	WEIGHT LBS. (KG)	MIN FLOW GPM	TEMP. CONTROL *	OPERATING AMBIENT °C
LHP-1200CP	3-3095-0-000	Cool only	1360-1630	24	9.0	20(9.1)	0.3	none	0/+70
LHP-1200CP	3-3053-0-000	Cool only	1360-1630	24	9.0	20(9.1)	0.3	EXT*	0/+70
LHP-1200CPHC	3-3055-1-000	Heat/Cool	1360-1630	24	9.0	20(9.1)	0.3	EXT**	0/+70

* Unit is set for 5-32 VDC external signal, relay(s) included

** Unit is set for 5-32 VDC external signal, H-Bridge relay(s) included

LHP-1200CP

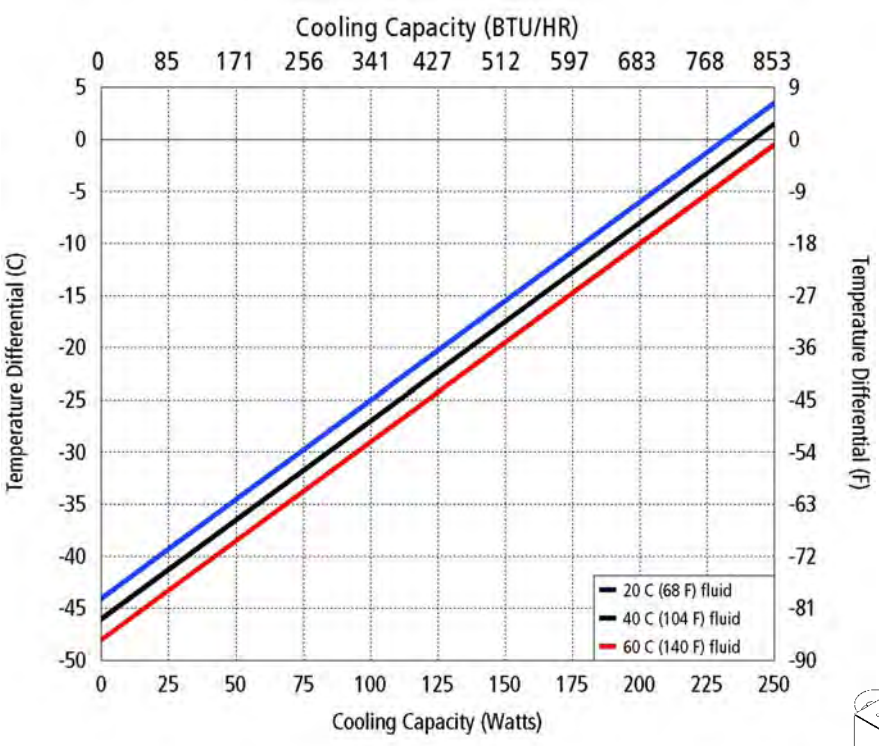
ENVIRONMENTS

Bench Top, Laboratory, Industrial, from harsh to benign environments

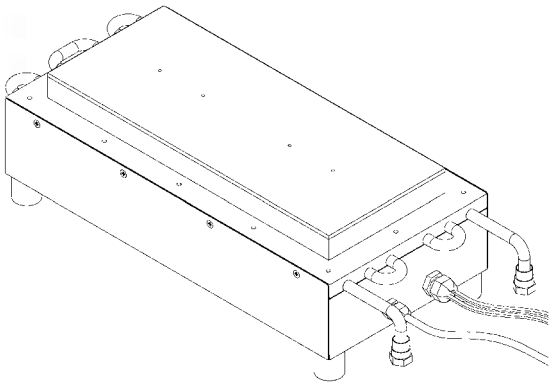
COOLING CAPACITY

260 Watts @ 0 °C ΔT

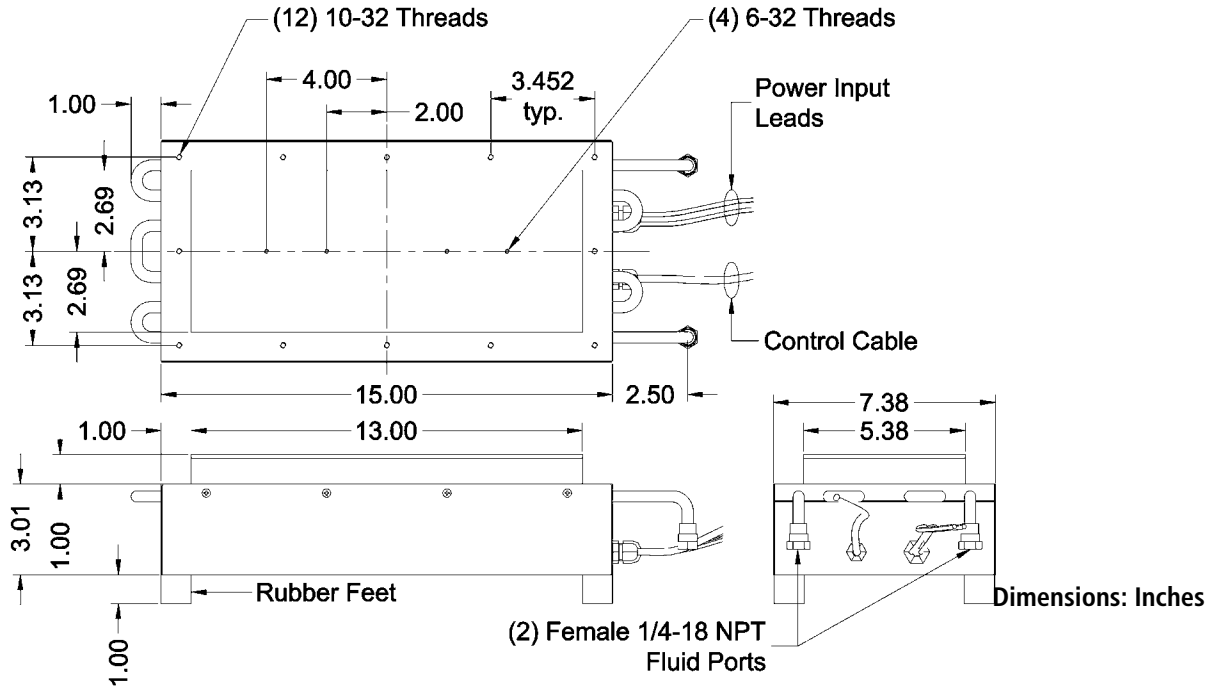
PERFORMANCE CURVE



Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Fluid Temp	**20°C**	**40°C**	**60°C**
Cold Plate Temp	y=.19x-44.0	y=.19x-46.0	y=.19x-48.0



DIMENSIONS



LHP-800CP
LHP-300CP
LHP-150CP

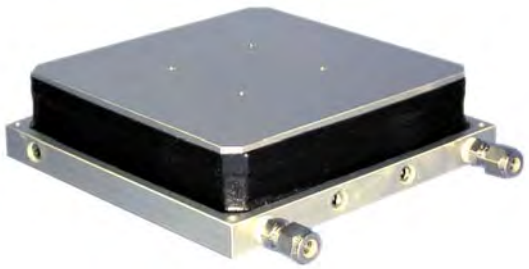
Liquid Cooled

Thermoelectric Cold Plates

General Purpose VDC Input

FEATURES

- No moving parts
- Direct contact cooling as much as 51 °C below liquid temperature
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Mounts in any orientation



LHP-800CP

LHP-300CP

INCLUDES

- Compression fittings
- Auxiliary mounting holes
- Machined cold plate surfaces

LHP-150CP

SPECIFICATIONS LHP-800CP

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	WEIGHT LBS. (KG)	MIN FLOW GPM	OPERATING AMBIENT °C	HEAT VOLTAGE
LHP-800CP	3-5095-0-000	Cool only	700-830	24	14	5.2 (2.3)	0.3	0/+70	N/A
LHP-800CPHC	3-5095-1-000	Heat/Cool	700-830	24	14	5.2 (2.3)	0.3	0/+70	120 VAC

SPECIFICATIONS LHP-300CP

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC *	CURRENT AMPS.	WEIGHT LBS. (KG)	MIN FLOW GPM	OPERATING AMBIENT °C	HEAT VOLTAGE
LHP-300CP	3-7098-0-000	Cool only	280-335	12/24	12/6	1.8 (.81)	0.2	0/+70	N/A
LHP-300CPHC	3-7095-1-000	Heat/Cool	280-335	24	6	1.8 (.81)	0.2	0/+70	24 VDC

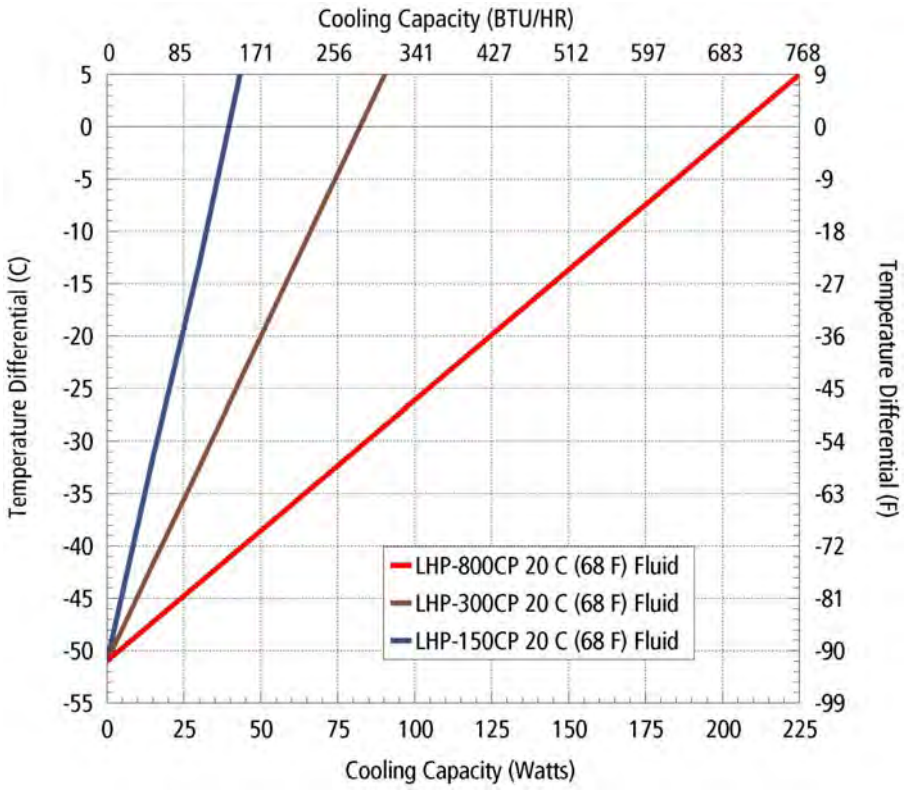
SPECIFICATIONS LHP-150CP

MODEL	PART NUMBER	NOTES	PERFORMANCE RATING BTU/HR	VOLTAGE VDC *	CURRENT AMPS.	WEIGHT LBS. (KG)	MIN FLOW GPM	OPERATING AMBIENT °C	HEAT VOLTAGE
LHP-150CP	3-8094-0-000	Cool only	130-160	12	4.5	.75(.34)	0.2	0/+70	N/A
LHP-150CPHC	3-8094-1-000	Heat/Cool	130-160	12	4.5	.75(.34)	0.2	0/+70	12 VDC
LHP-150CPHC	3-8099-1-000	Heat/Cool	130-160	12	4.5	.75(.34)	0.2	0/+70	120 VAC

Note: Option for temperature control, consult factory.

*See also , "Power Supplies", P. 117

PERFORMANCE CURVE



LHP-800CP

COOLING CAPACITY

205 Watts @ 0 °C ΔT

LHP-300CP

COOLING CAPACITY

82 Watts @ 0 °C ΔT

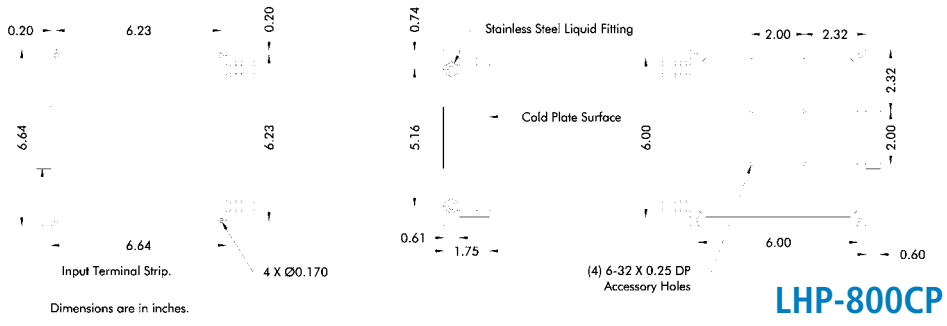
LHP-150CP

COOLING CAPACITY

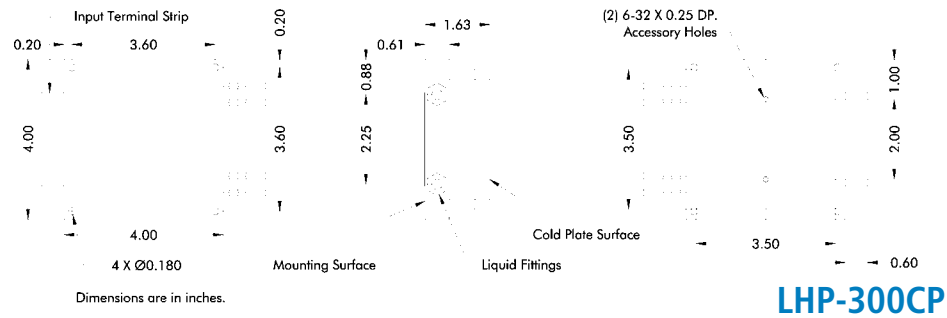
40 Watts @ 0 °C ΔT

Equation of line: y=ΔT(°C) x=Capacity (Watts)			
Fluid Temp	**20°**	**40°C**	**60°C**
LHP-800CP	y=.25x-51.0	y=.25x-56.0	y=.25-61.0
LHP-300CP	y=.62x-51.0	y=.62x-56.0	y=.62x-61.0
LHP-150CP	y=1.3x-51.0	y=1.3x-56.0	y=1.3x-61.0

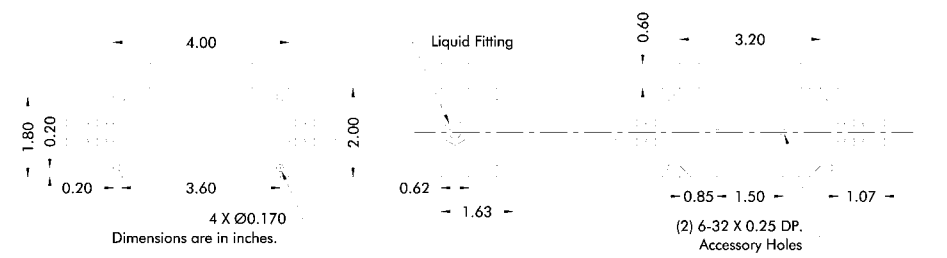
DIMENSIONS



LHP-800CP



LHP-300CP



LHP-150CP

Liquid Chillers

730-2700 BTU/hr

Teca Liquid Chillers are compact and reliable alternatives to conventional recirculating coolers. A complete integrated package is now offered in a standard configuration.

FEATURES

- Precise temperature control
- External plumbing lines with quick connectors
- 12' of tubing and insulation included
- Self priming pumps

Options Available

- Heating
- RS-232 interface
- RS-485 interface
- Computer Communications software
- Ramping and soaking

APPLICATIONS

Teca Liquid Chillers are ideal for bench-top or portable applications such as laboratory, laser, x-ray, out-patient and medical therapy as well as many others.

TEAM TECA
CUSTOM
ENGINEERING
Call us at 888-TECA-USA.
We're here to help!

LIQUID CHILLERS

Air Cooled

730-2700 BTH/hr

TLC-SERIES

TLC-1400 page 88

1400-1450 BTU/hr Rating,
12" x 14" footprint
120, 240 VAC operation

TLC-700 page 94

730-800 BTU/hr Rating,
12" x 7" footprint
120 VAC and 24 VDC operation

TLC-1200 page 92

830-950 BTU/hr Rating,
15.4" x 7.6" footprint
24 VDC input

TLC-702 page 94

730-800 BTU/hr Rating,
12" x 7" footprint
240 VAC operation

TLC-900 page 90

1050-1350 BTU/hr Rating,
15.4" x 7.6" footprint
120/240 VAC and 24 VDC operation

TLC³ page 100

330-1250 BTU/hr Rating,
various size and voltages

RLC-SERIES

RLC-900 page 96

1050-1350 BTU/hr Rating,
19" X 25" X 9" Size
100-240 VAC input

RLC-1800 page 96

2000-2700 BTU/hr Rating,
19" X 25" X 11" Size
100-240 VAC input

RLC-1400 page 98

1400-1450 BTU/hr Rating,
19" X 25" X 9" Size
120,240 VAC input

TLC-1400 | Liquid Chiller

Air Cooled | 120 VAC, 240 VAC Input

FEATURES

- Compact (only 12" X 14" bench top footprint)
- Weighs approximately 59 lbs. (27 kg)
- Integral PID "tunable" temperature control (two styles)
- Ambient temperature up to +50°C
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Remote Sensibility™
- Un-cooled, 500mL reservoir
- Front to back air-flow system
- Stainless steel exterior housing
- Low fluid level and low flow warning
- Integral power supply
- Self priming pump/reservoir
- Low pressure drop fluid quick connects
- Tubing and insulation
- 3/8" CPC low pressure drop shut off fittings

TC-4300 FEATURES

- One shot smart PID control tuning or Adaptive Smart Continuous Tuning
- Internal RTD sensor
- Remote Sensibility™ switchable exterior sensor
- Multi-segment ramp and soak programs
- RS-232 communications
- i-tools software for easy programming and control tweaking
- Process fluid "out of temperature range" warning
- Easy prime/pump reset feature
- No flow system shut down

SPECIFICATIONS

MODEL	PART NUMBER	PERFORMANCE RATING	VOLTAGE VAC BTU/HR	CURRENT AMPS. 50/60 HZ	WEIGHT LBS. (KG)	MAX OPERATING TEMP °C	TEMP. CONTROL	HEATING OPTION (HC SUFFIX) AMBIENT	FLUID TEMP RANGE °C
TLC-1400	6-B0E0-0-0B0	1400-1450	120 VAC	7.0	59(26.7)	50 °C(+122 F)	TC-4300		-5/65
TLC-1400HC	6-B0E0-1-0B0	1400-1450	120 VAC	7.0	59(26.7)	50 °C(+122 F)	TC-4300	400 Watt	-5/65
TLC-1402	6-B0E2-0-0B0	1400-1450	240 VAC	4.0	59(26.7)	50 °C(+122 F)	TC-4300		-5/65
TLC-1402HC	6-B0E2-1-0B0	1400-1450	240 VAC	4.0	59(26.7)	50 °C(+122 F)	TC-4300	400 Watt	-5/65

TLC-1400

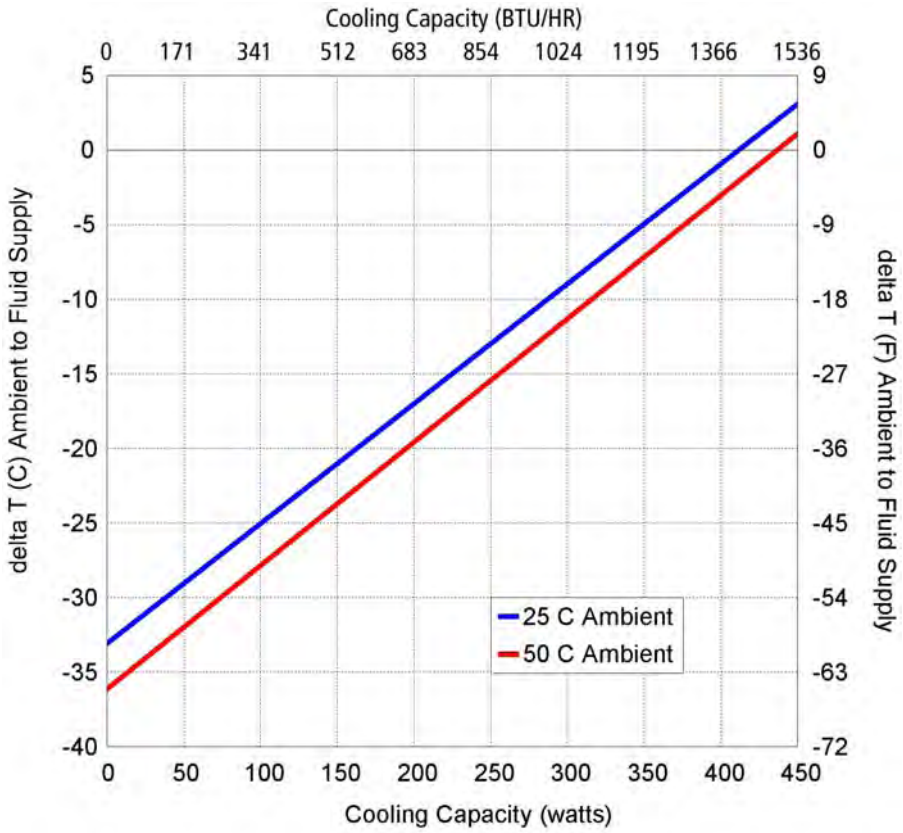
ENVIRONMENTS

Bench top
Laboratory
Industrial

COOLING CAPACITY

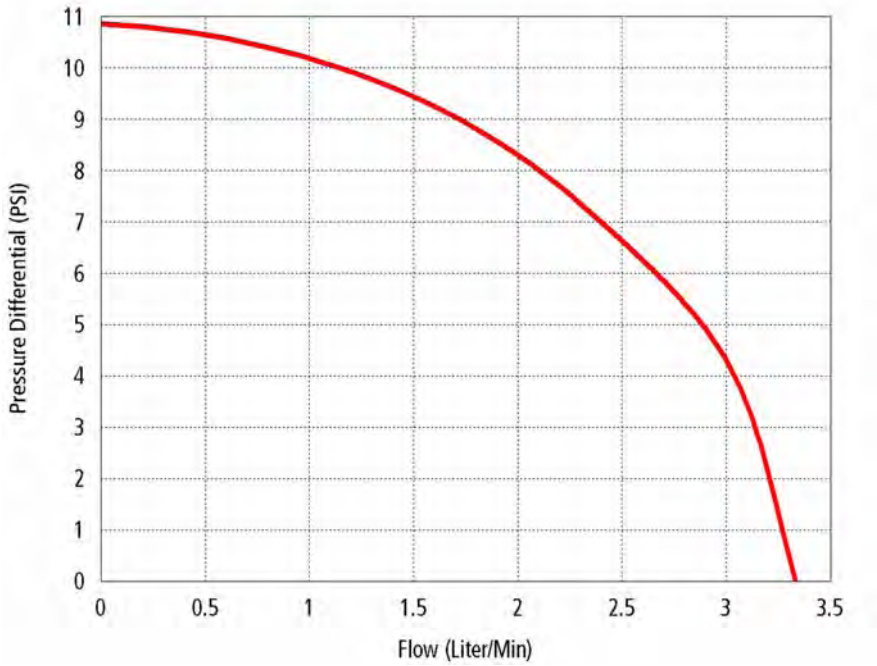
410 Watts @ 0 °C ΔT (standard)

PERFORMANCE CURVE

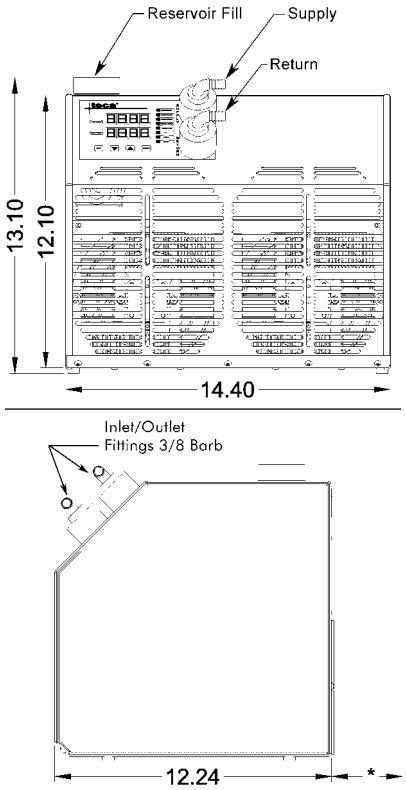


Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Ambient Temp	**25°C**	**50°C**
Fluid Supply	y=.08x-33.1	y=.08x-36.1

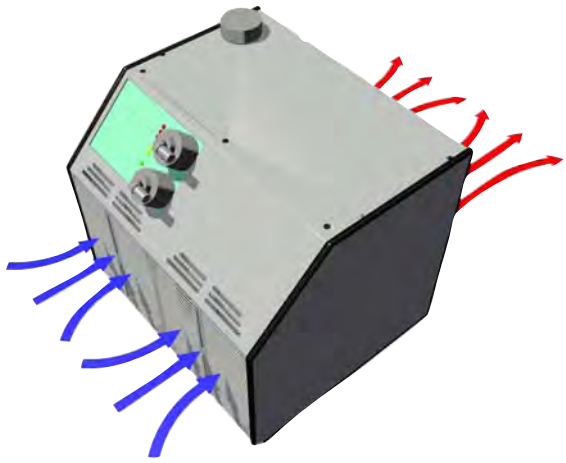
PUMP CURVE



DIMENSIONS



Dimensions : Inches
* Minimum recommended clearance 3".



Ambient Air Path

TLC-900 | Liquid Chiller

Air Cooled
Bench Top

120/240 VAC and 24 VDC Input

STANDARD FEATURES

- 90-265 VAC universal integrated power supply
- Heats and cools
- 1 Liter un-cooled reservoir
- Low pressure drop 3/8 I.D. fluid quick connects
- Variable fan speed for quieter operation
- User-friendly front-fill design
- Easy prime/pump reset feature
- Wide process fluid temperature range
- Multiport bottom to top air-flow for easier bench use
- Hardwired over-temperature protection
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation

CONTROL FEATURES

- Integral PID "tunable" temperature control
- One shot smart PID control tuning or Adaptive Smart Continuous Tuning
- Internal RTD sensor
- Remote Sensibility™ switch selectable exterior sensor
- Multi-segment ramp and soak programs
- RS-232 communications standard includes EzLog® software for easy programming, tuning and charting
- Low fluid level and low flow warning
- Process fluid "out of temperature range" warning
- No flow system shut down
- Optional software iTools®, OPC Server

PUMP OPTIONS

- Option #1 - Standard Magnetic Drive, Can Pump, 0 to 50 °C process temperature
- Option #2 - Low Temperature Magnetic Drive, Impeller Pump, -20 to 90 °C process temperature
- Option #3 - Gear pump, 3.75 Liter/Min, -20 to 90 °C process temperature
- Option #4 - High Flow Magnetic Drive, Can Pump, 0 to 50 °C process temperature

SPECIFICATIONS

MODEL	PART NUMBER	PUMP OPTION	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	MAX OPERATING AMBIENT	FLUID TEMP. RANGE °C
TLC-900	6-E4EB-1-0A1	1	1050-1100	100-240	3.5	42 (19)	50 °C (+122 F)	0 to 50
TLC-900	6-E5EB-1-0A1	1	1260-1330	100-240	4.0	42 (19)	50 °C (+122 F)	0 to 50
TLC-900	6-E4EB-1-0A2	2	1050-1100	100-240	3.5	42 (19)	50 °C (+122 F)	-20 to 90
TLC-900	6-E5EB-1-0A2	2	1260-1330	100-240	4.0	42 (19)	50 °C (+122 F)	-20 to 90
TLC-900	6-E4EB-1-0A3	3	1050-1100	100-240	3.5	42 (19)	50 °C (+122 F)	-20 to 90
TLC-900	6-E5EB-1-0A3	3	1260-1330	100-240	4.0	42 (19)	50 °C (+122 F)	-20 to 90
TLC-900	6-E4EB-1-0A4	4	1050-1100	100-240	3.5	42 (19)	50 °C (+122 F)	0 to 50
TLC-900	6-E5EB-1-0A4	4	1260-1330	100-240	4.0	42 (19)	50 °C (+122 F)	0 to 50
TLC-900	6-E4E5-1-0A1	1	1050-1100	24 VDC	22	42 (19)	50 °C (+122 F)	0 to 50
TLC-900	6-E4E5-1-0A2	2	1050-1100	24 VDC	22	42 (19)	50 °C (+122 F)	-20 to 90
TLC-900	6-E4E5-1-0A3	3	1050-1100	24 VDC	22	42 (19)	50 °C (+122 F)	-20 to 9
TLC-900	6-E4E5-1-0A4	4	1050-1100	24 VDC	22	42 (19)	50 °C (+122 F)	0 to 50

TLC-900

ENVIRONMENTS

Bench top

Laboratory

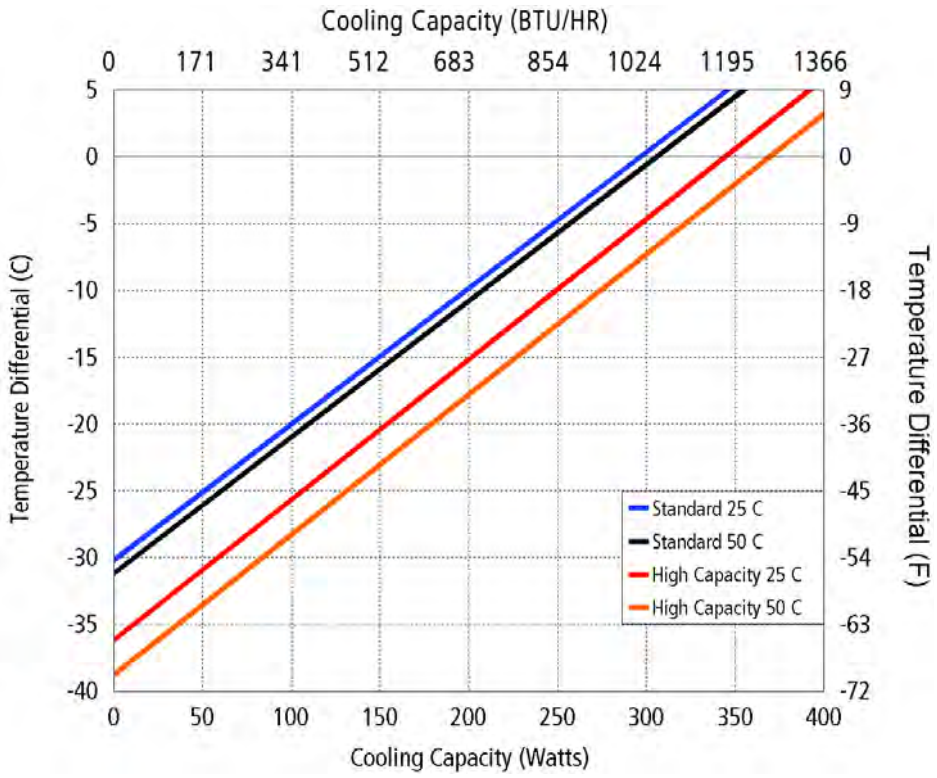
Industrial

COOLING CAPACITY

310 Watts @ 0 °C ΔT (standard)

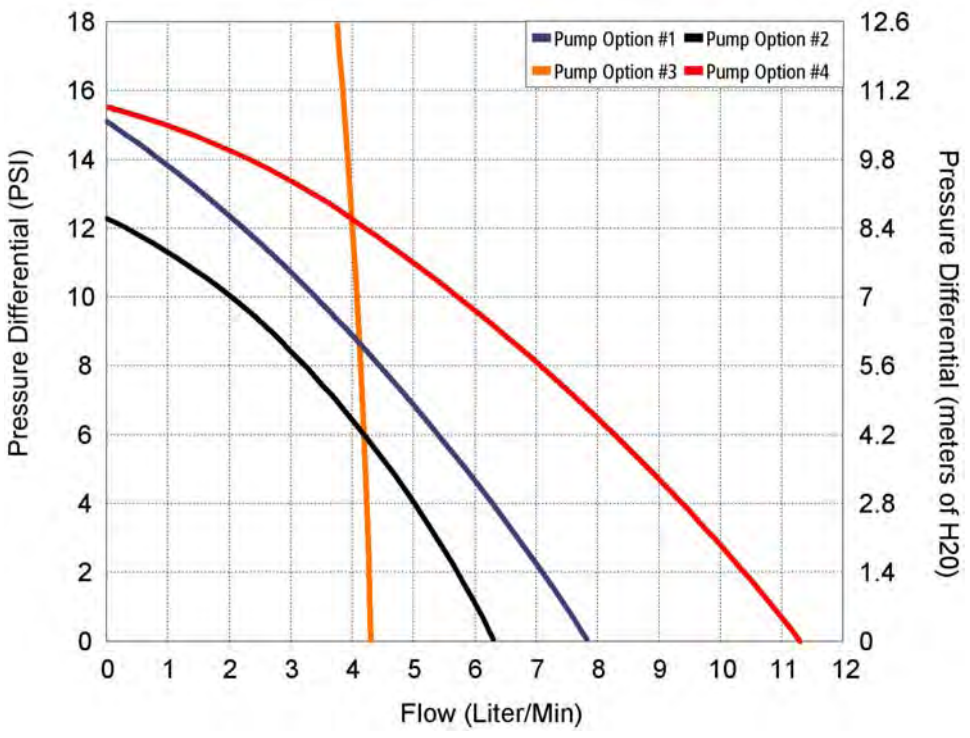
360 Watts @ 0 °C ΔT (high capacity)

PERFORMANCE CURVE

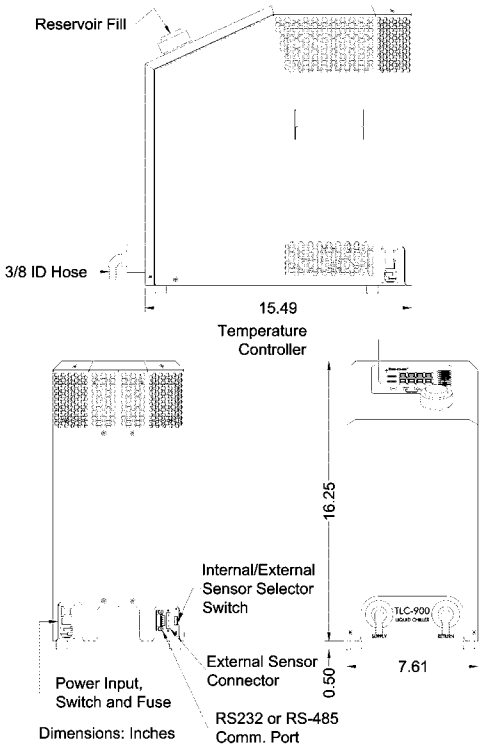


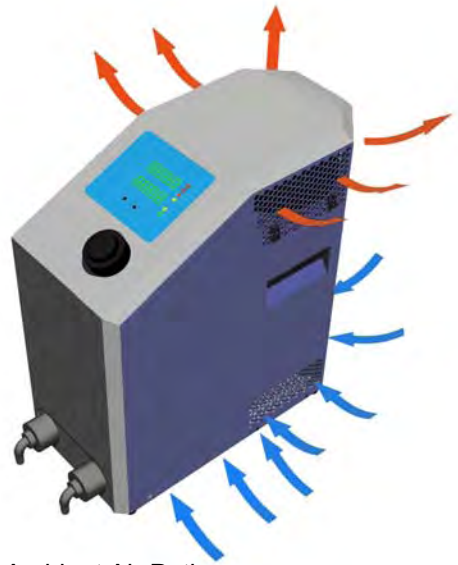
Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Ambient Temp	**25°C**	**50°C**
Standard	y=.102x-30.3	y=.102x-31.2
High Capacity	y=.105x-36.2	y=.105x-38.7

PUMP CURVE



DIMENSIONS





Ambient Air Path

TLC-1200 | Air Cooled Liquid Chiller

Air Cooled | General Purpose 24 VDC input

FEATURES

- Two separate fluid cooling circuit
- Weighs only 20 lbs. (9.1 kg)
- Mount thru bench top or enlcosure wall
- No compressor, fluorocarbons or filters
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Mounts in any orientation

INCLUDES

- 3/8" OD Stainless steel tubing
- Internal H-Bridge for reverse polarity operation on HC versions
- Rubber feet
- Power input leads

SPECIFICATIONS

MODEL	PART NUMBER	PERFORMANCE RATING BTU/HR	VOLTAGE VDC	CURRENT AMPS.	WEIGHT LBS. (KG)	MAX OPERATING AMBIENT	HEATING OPTION	TEMP. CONTROL	FLUID TEMP RANGE °C
TLC-1200	6-3095-0-000	830-950	24	9.0	20 (9.1)	50 °C(+122 F)	Cool Only	None	-5/65
TLC-1200	6-3055-0-000	830-950	24	9.0	20 (9.1)	50 °C(+122 F)	Cool Only	EXT*	-5/65
TLC-1200HC	6-3055-1-000	830-950	24	9.0	20 (9.1)	50 °C(+122 F)	Heat/Cool	EXT**	-5/65

* Unit is set for 5-32 VDC external control signal, relay included

** Unit is set for 5-32 VDC external control signal, H-Bridge relay(s) included

TLC-1200

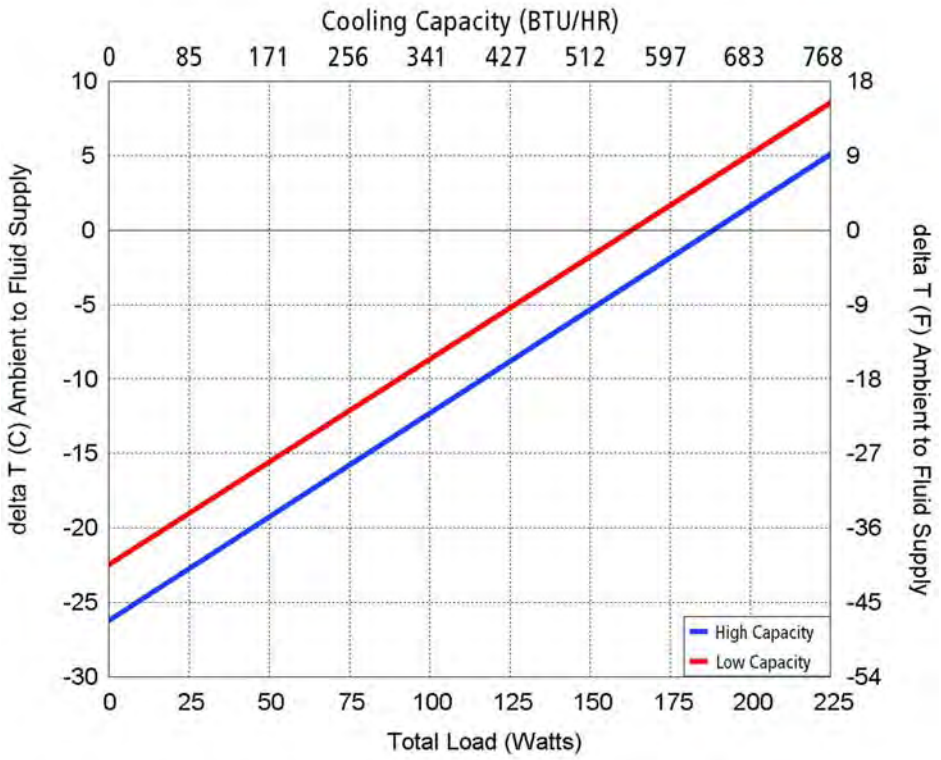
ENVIRONMENTS

Bench top
Laboratory
Industrial

COOLING CAPACITY

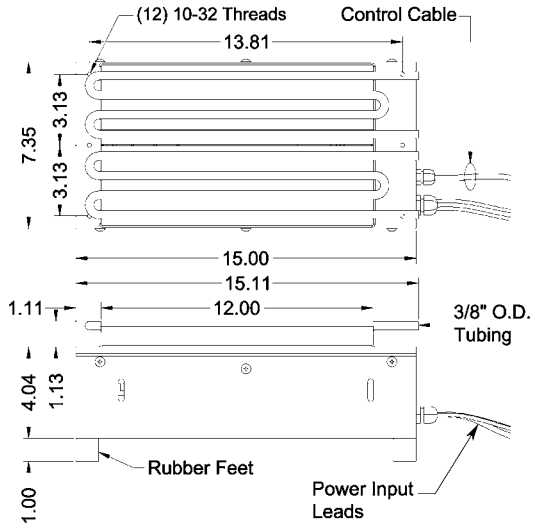
215 Watts @ 0 °C ΔT

PERFORMANCE CURVE



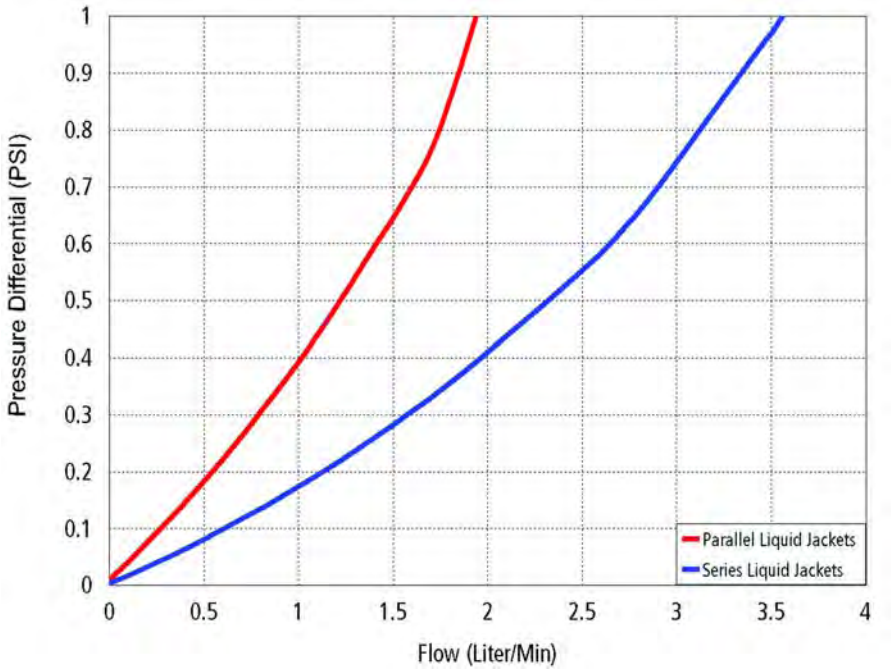
Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Capacity	**Standard**	**High**
Fluid Supply	y=.138x-26.2	y=.138x-22.4

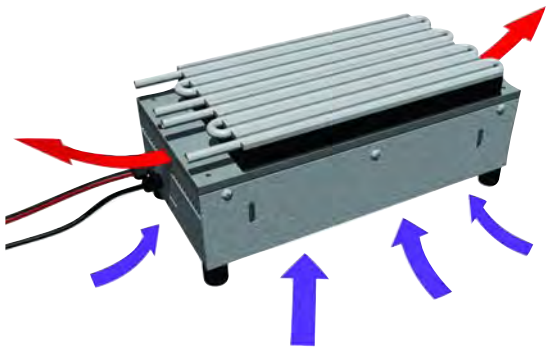
DIMENSIONS



Dimensions: Inches

FLOW CHARACTERISTICS





Ambient Air Path

TLC-700 | Air Cooled Liquid Chiller

Air Cooled | 120 VDC, 240 VAC and 24 VDC Input

FEATURES

- Compact (only 15.5" X 7.6" bench top footprint)
- Easy prime pump design
- Integral PID "tunable" temperature control (two styles)
- No compressor, fluorocarbons or filters
- Remote Sensibility™ remote temperature sensing
- Un-cooled, 500mL reservoir
- Front to back air-flow system
- Stainless steel exterior housing
- Ergonomic sloping front design
- Low fluid level and low flow warning
- Integral power supply
- Self priming pump/reservoir
- Low pressure drop fluid quick connects

TLC-700 with TC-4300

TC-3300 FEATURES

- Cool and Heat/Cool versions
- RS-232 communications (optional)
- Communications Software (optional)

TC-4300 FEATURES

- Heating and Cooling
- Integral PID "tunable" temperature control
- One shot smart PID control tuning or Adaptive Smart Continuous Tuning
- Multi-segment ramp and soak programs
- RS-232 communications standard, includes EzLog® software for easy programming and control logging
- Process fluid "out of temperature range" warning
- Variable fan speed for quietest operation
- Easy prime/pump reset feature
- No flow system shut down
- Optional software iTools® and OPC Server

TLC-700 with TC-3300

SPECIFICATIONS

MODEL	PART NUMBER	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	MAX OPERATING AMBIENT	HEATING OPTION (HC SUFFIX)	TEMP. CONTROL	FLUID TEMP RANGE °C	AGENCY APPROVALS (ETL)
TLC-700	6-A0D0-0-000	730-800	120 VAC	4.2	32(14.5)	50 °C(+122 F)		TC-3300	-5/65	UL3101-1/CSA22.2, CE
TLC-700HC	6-A0D0-1-000	730-800	120 VAC	4.2	32(14.5)	50 °C(+122 F)	200 Watt	TC-3300	-5/65	UL3101-1/CSA22.2, CE
TLC-702	6-A0D2-0-000	730-800	240 VAC	2.9	42(19)	50 °C(+122 F)		TC-3300	-5/65	UL3101-1/CSA22.2, CE
TLC-702HC	6-A0D2-1-000	730-800	240 VAC	2.9	42(19)	50 °C(+122 F)	200 Watt	TC-3300	-5/65	UL3101-1/CSA22.2, CE
TLC-700	6-A0E0-0-0B0	730-800	120 VAC	4.2	32(14.5)	50 °C(+122 F)		TC-4300	-5/65	PENDING
TLC-700HC	6-A0E0-1-0B0	730-800	120 VAC	4.2	32(14.5)	50 °C(+122 F)	200 Watt	TC-4300	-5/65	PENDING
TLC-702	6-A0E2-0-0B0	730-800	240 VAC	2.9	42(19)	50 °C(+122 F)		TC-4300	-5/65	PENDING
TLC-702HC	6-A0E2-1-0B0	730-800	240 VAC	2.9	42(19)	50 °C(+122 F)	200 Watt	TC-4300	-5/65	PENDING
TLC-700	6-A0E5-0-0B0	730-800	24 VDC	10.0	32(14.5)	50 °C(+122 F)		TC-4300	-5/65	PENDING
TLC-700HC	6-A0E5-1-0B0	730-800	24 VDC	10.0	32(14.5)	50 °C(+122 F)	200 Watt	TC-4300	-5/65	PENDING

TLC-700

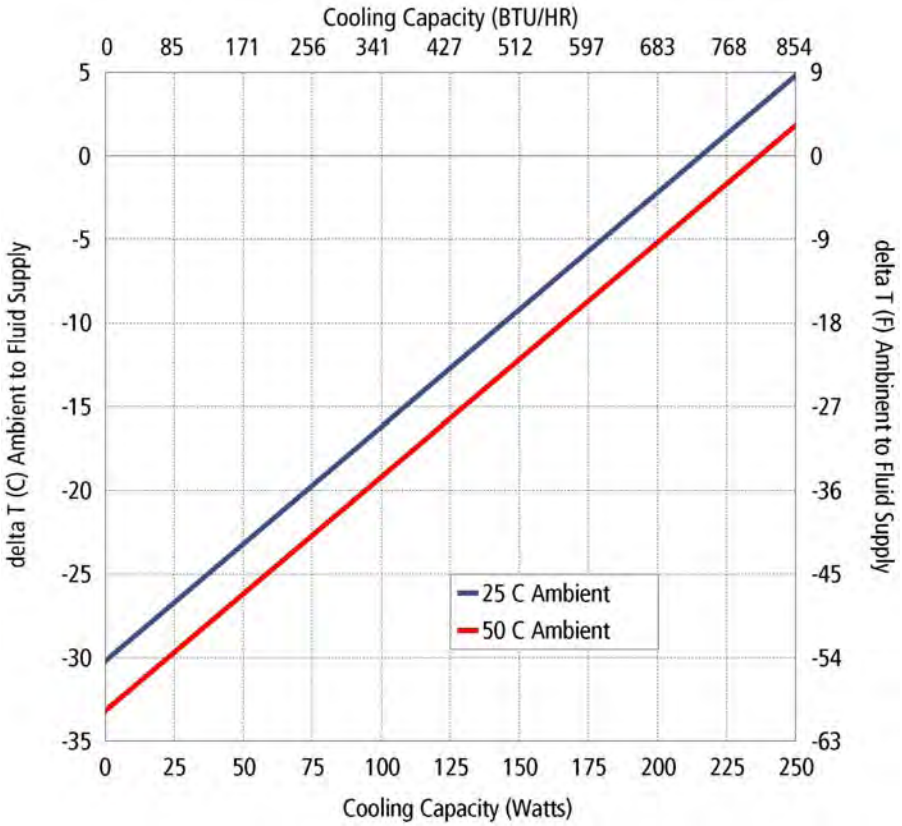
ENVIRONMENTS

Bench top
Laboratory
Industrial

COOLING CAPACITY

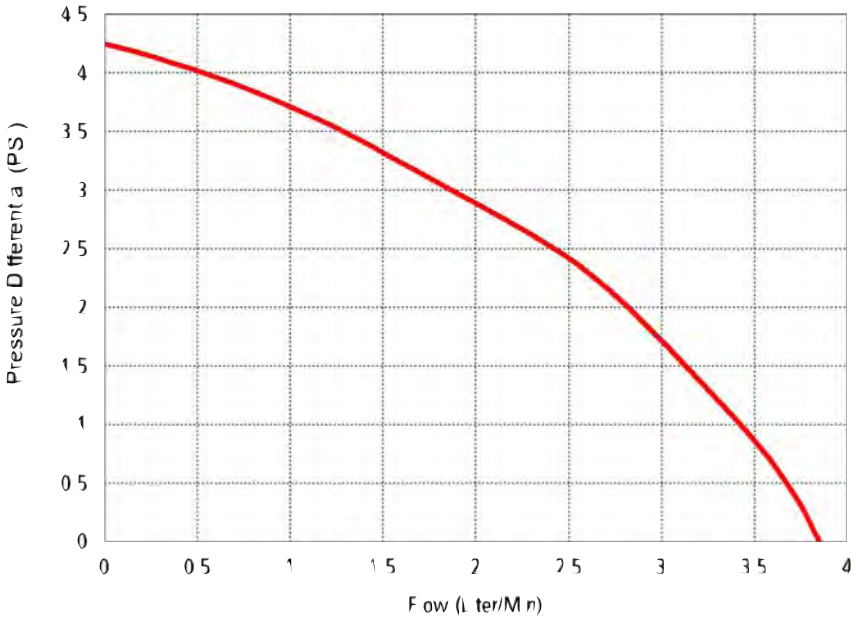
215 Watts @ 0 °C ΔT

PERFORMANCE CURVE

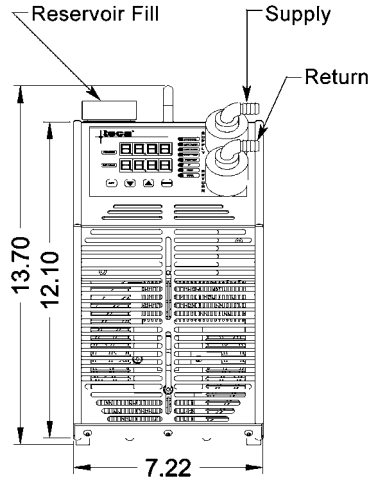


Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Ambient Temp	**25°C**	**50°C**
Fluid Supply	y=.14x-30.2	y=.14x-33.2

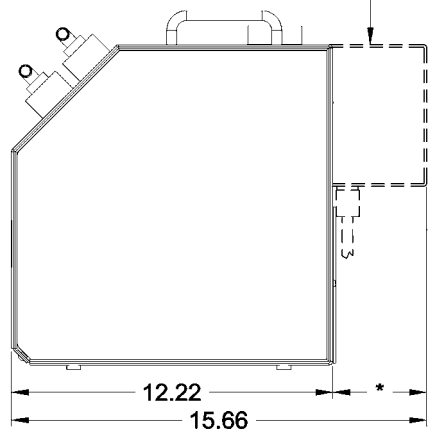
PUMP CURVE



DIMENSIONS



Power Housing (TLC-702)



Dimensions: Inches
* Minimum recommended clearance 3".

Ambient Air Path

RLC-900 | Rack Mount Liquid Chiller

RLC-1800

Air Cooled
Rack Mount

FEATURES

- Compact only 19" x 25" x 9"
- Standard 19" rack mounting
- Integral PID "Tuneable" temperature control
- Remote sensibility™
- Ambient to +50ºC
- No compressor, fluorocarbons
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Low fluid/flow warning

INCLUDES

- Integral power supply
- Self priming pump/reservoir
- TC-4300 temperature Control
- Low pressure drop fluid quick connects

OPTIONS

- Heating
- RS-232 interface
- Computer communication software

PUMP OPTIONS

- Option #1 - Standard Magnetic Drive, Can Pump, 0 to 50 °C process temperature
- Option #2 - Low Temperature Magnetic Drive, Impeller Pump, -20 to 90 °C process temperature
- Option #3 - Gear pump, 3.75 Liter/Min, -20 to 90 °C process temperature
- Option #4 - High Flow Magnetic Drive, Can Pump, 0 to 50 °C process temperature

SPECIFICATIONS

MODEL	PART NUMBER	PUMP OPTION	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	MAX OPERATING AMBIENT	FLUID TEMP. RANGE °C
RLC-900	8-E4EB-1-0A1	1	1050-1100	100-240	3.5	42 (19)	50 °C (+122 F)	0 to 50
RLC-900	8-E4EB-1-0A2	2	1050-1100	100-240	3.5	42 (19)	50 °C (+122 F)	-20 to 90
RLC-900	8-E4EB-1-0A3	3	1050-1100	100-240	3.5	42 (19)	50 °C (+122 F)	-20 to 90
RLC-900	8-E4E2-1-0A4	4	1050-1100	100-240	3.5	42 (19)	50 °C (+122 F)	0 to 50
RLC-1800	8-04EB-1-0A1	1	2000-2200	100-240	7.0	50 (23)	50 °C (+122 F)	-0 to 50
RLC-1800	8-04EB-1-0A2	2	2000-2200	100-240	7.0	50 (23)	50 °C (+122 F)	-20 to 90
RLC-1800	8-04EB-1-0A3	3	2000-2200	100-240	7.0	50 (23)	50 °C (+122 F)	-20 to 90
RLC-1800	8-04EB-1-0A4	4	2000-2200	100-240	7.0	50 (23)	50 °C (+122 F)	-0 to 50

RLC-900/RLC-1800

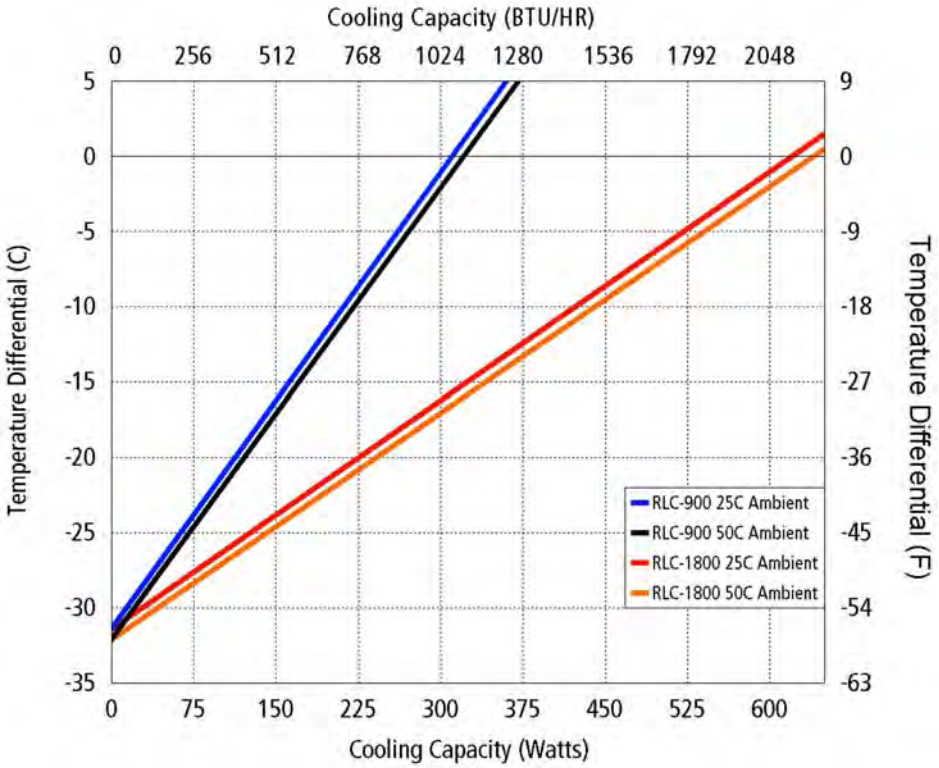
ENVIRONMENTS

19" rack mount
Laboratory
Industrial

COOLING CAPACITY

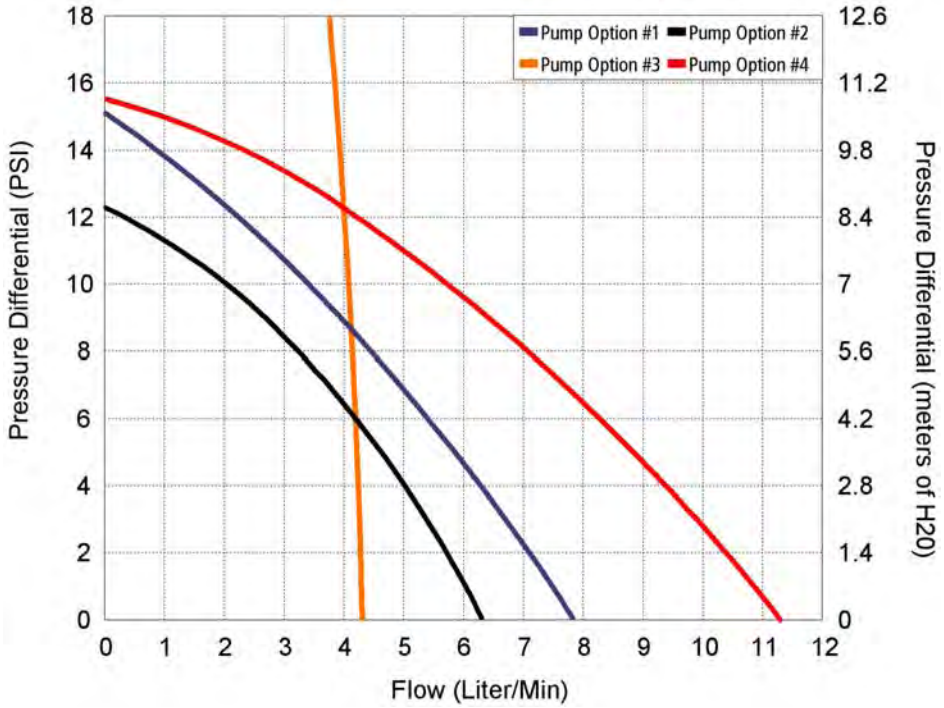
310 Watts @ 0 °C ΔT (RLC-900)
620 Watts @ 0 °C ΔT (RLC-1800)

PERFORMANCE CURVE

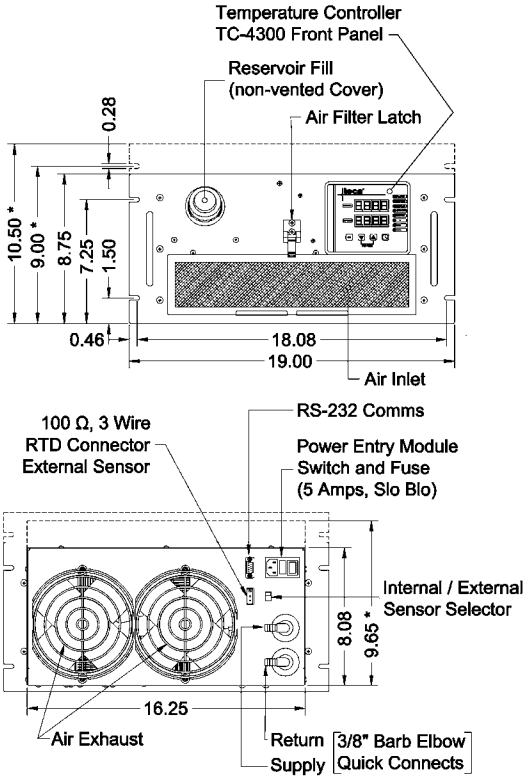


Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Ambient Temp	25°C	50°C
RLC-900	y=.101x-31.4	y=.100x-32.1
RLC-1800	y=.05x-31.4	y=.05x-32.1

PUMP CURVE



DIMENSIONS



* Indicates RLC-1800 dimensions
Dimensions: Inches

Ambient Air Path

RLC-1400 | Rack Mount Liquid Chiller

Air Cooled
Rack Mount

FEATURES

- Compact only 19" x 25" x 9"
- Standard 19" rack mounting
- Integral PID "Tuneable" temperature control
- Remote sensibility™
- Ambients to +50°C
- No compressor, fluorocarbons
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Low fluid/flow warning

INCLUDES

- Integral power supply
- Self priming pump/reservoir
- TC-3400 temperature Control
- Low pressure drop fluid quick connects

OPTIONS

- Heating
- RS-485 interface, RS-232 interface (with external adapter)
- Computer communication software

SPECIFICATIONS

MODEL	PART NUMBER	PERFORMANCE RATING BTU/HR	VOLTAGE VAC 50/60 HZ	CURRENT AMPS.	WEIGHT LBS. (KG)	MAX OPERATING AMBIENT	HEATING OPTION (HC SUFFIX)	FLUID TEMP RANGE °C
RLC-1400	8-B0G0-0-000	1400-1450	120 VAC	7.0	59(26.7)	50 °C(+122 F)		-5/65
RLC-1400HC	8-B0G0-1-000	1400-1450	120 VAC	7.0	59(26.7)	50 °C(+122 F)	400 Watt	-5/65
RLC-1402	8-B0G2-0-000	1400-1450	240 VAC	7.0	59(26.7)	50 °C(+122 F)		-5/65
RLC-1402HC	8-B0G2-1-000	1400-1450	240 VAC	7.0	59(26.7)	50 °C(+122 F)	400 Watt	-5/65

RLC-1400

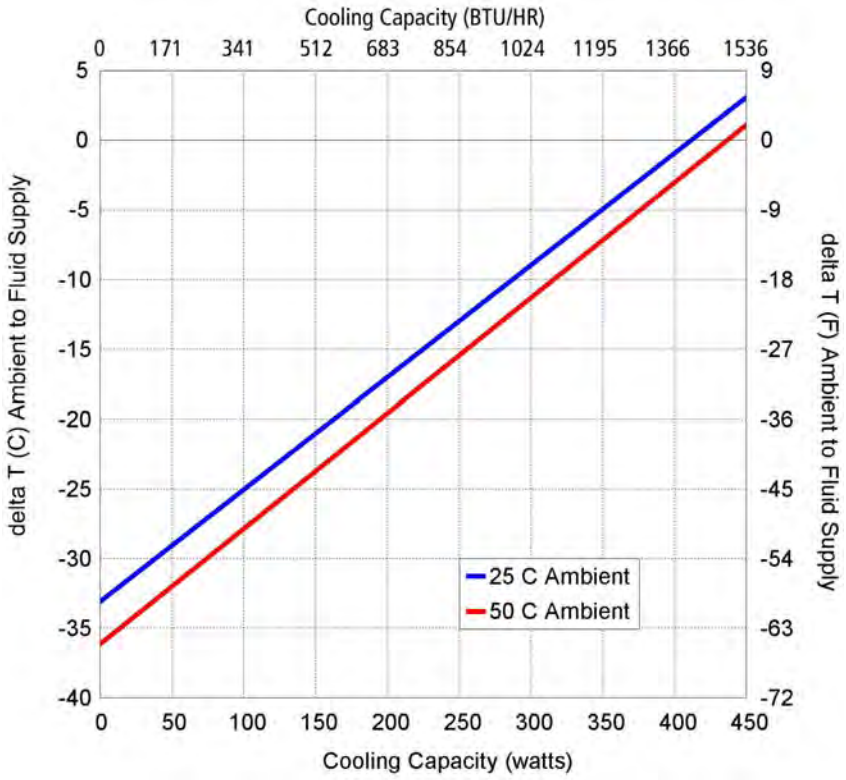
ENVIRONMENTS

19" rack mount
Laboratory
Industrial

COOLING CAPACITY

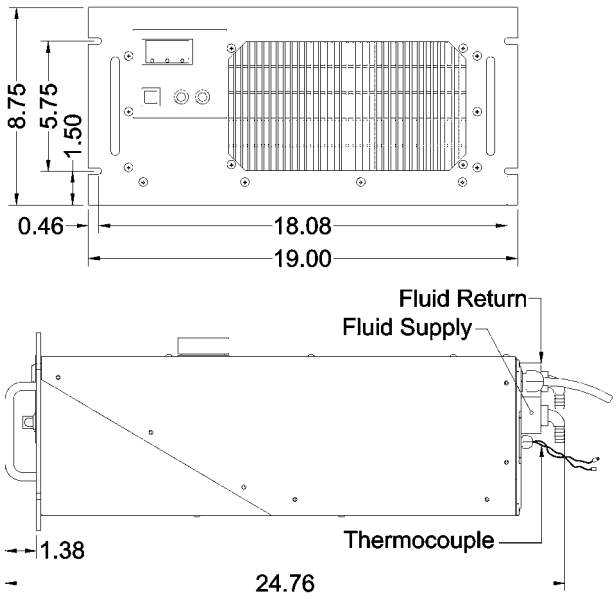
410 Watts @ 0 °C ΔT

PERFORMANCE CURVE



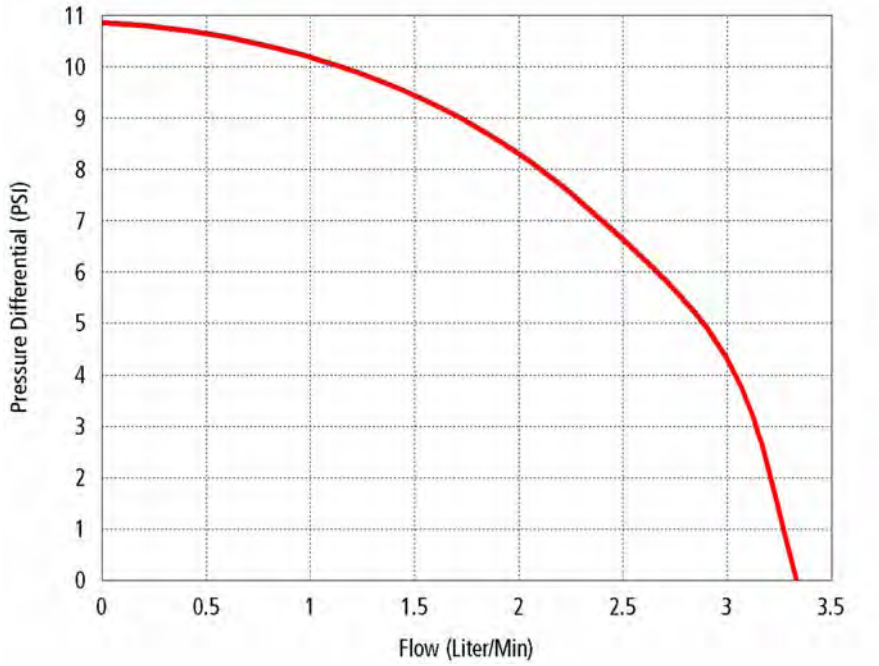
Equation of line: y=ΔT(°C) x=Capacity (Watts)		
Ambient Temp	**25°C**	**50°C**
Fluid Supply	y=.08x-33.1	y=.08x-36.1

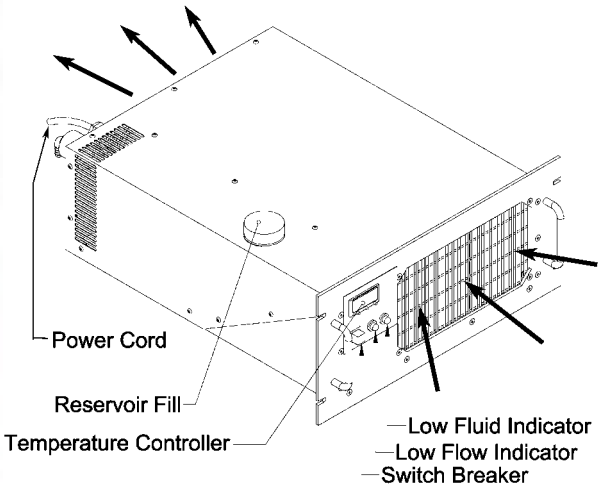
DIMENSIONS



Dimensions: Inches

PUMP CURVE





Ambient Air Path

TLC³ | Thermoelectric Cooling Cube

Air Cooled

FEATURES

- Customized to fit your application
- In process fluid cooling
- Gas cooling/drying
- Aluminum hot side heat exchanger
- Aluminum cold side heat exchanger
- Various DC inputs and efficiencies
- Special finishes and materials on request
- Many fan options
- 4 and 6 pass heat exchanger
- Input/output fitting options
- Heating options

REQUIRED (NOT INCLUDED)

- Pump
- Power supply
- Tubing
- Fan
- Housing

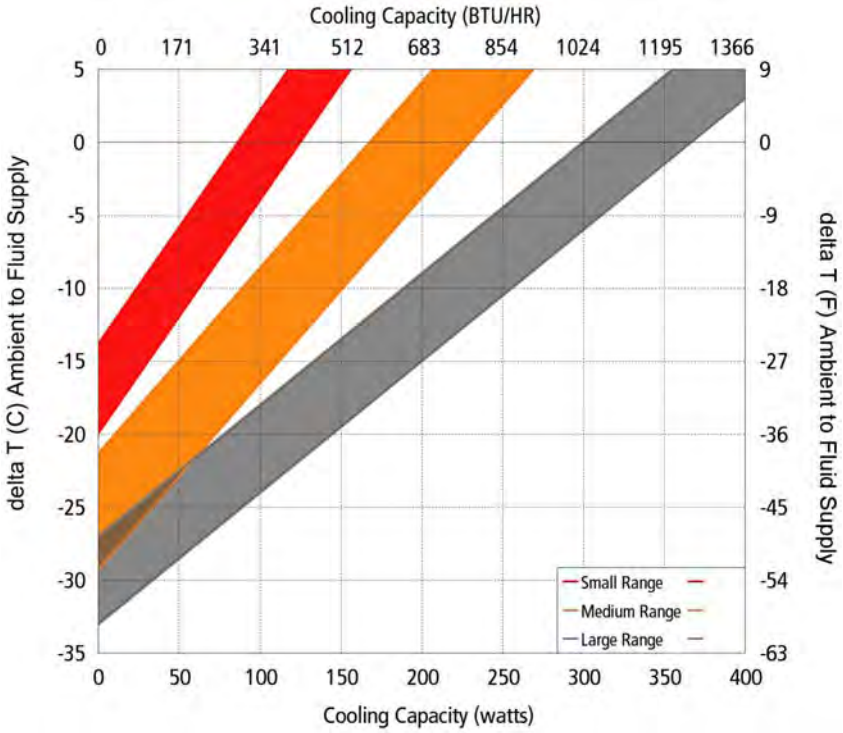
NOTES

TECA model TLC³ cooling cubes are thermoelectric cooling "engines" that the engineer or designer can use in OEM systems. Generally these are made in 100, 200 and 300 Watts capacity range, they work with a variety of fans. Small or large quantities available.

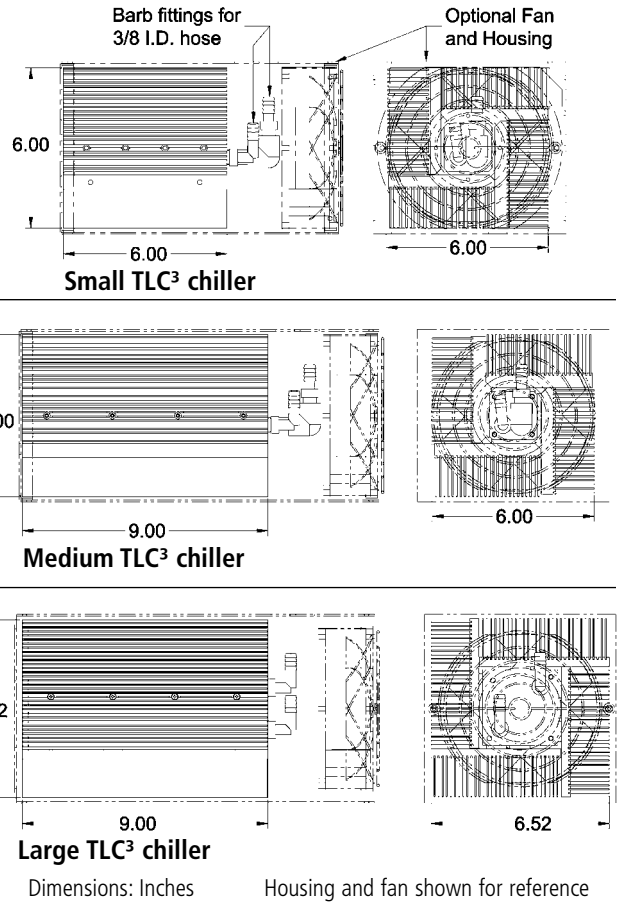
TLC³

330-1250 BTU/hr

PERFORMANCE CURVE



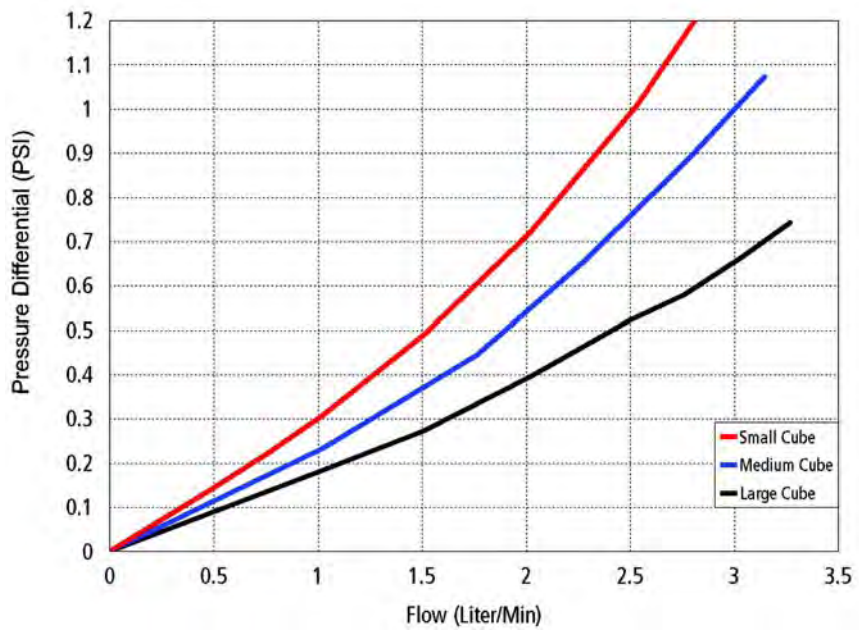
DIMENSIONS

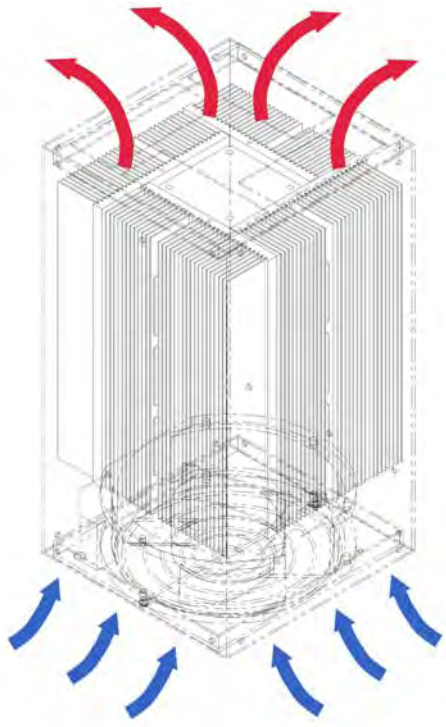


Dimensions: Inches

Housing and fan shown for reference

FLOW CHARACTERISTICS



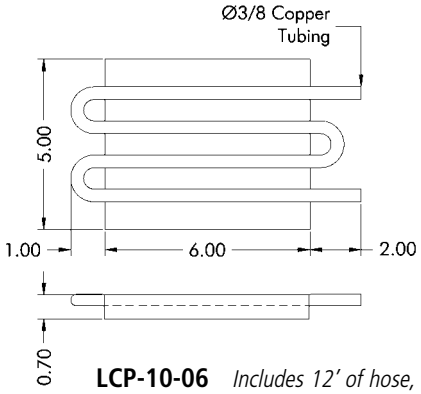


Ambient Air Path

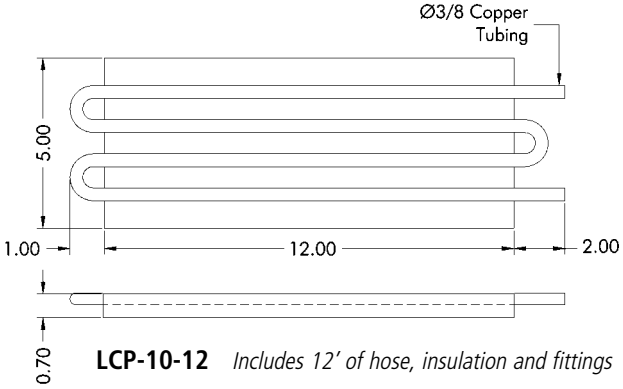
HEAT EXCHANGERS

COLD PLATES

Turn your TLC water chiller into a direct contact cooler using these cold plates. Modify them with your required taps and machining, mount your components, run the flexible hose to the chiller and turn it on. With care the remote sensor feature can be used to control the temperature of the plate or the item being cooled.



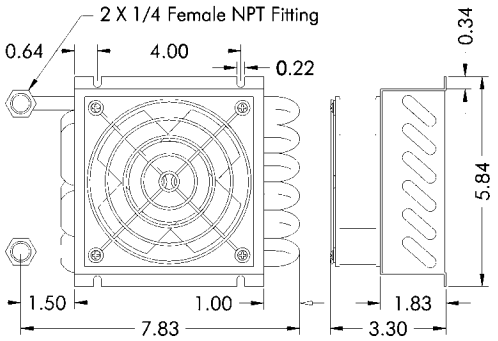
LCP-10-06 *Includes 12' of hose, insulation and fittings*



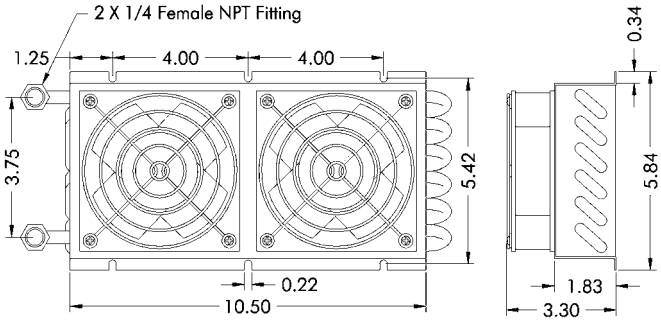
LCP-10-12 *Includes 12' of hose, insulation and fittings*

FAN COILS

Use your liquid chiller to cool an enclosure or a flow of air. Cool the inside of your glove box with little vibration and no big holes or air conditioner on the back. Mount the fan coils in your glove box, run the flexible tubing through a port or bulkhead fitting on your glove box to the TLC-900 and begin cooling.



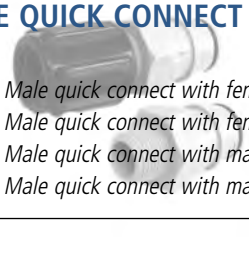
FC10-01 *Includes fan, guard, 12' of hose, insulation and fittings*



FC20-01 *Includes fan, guard, 12' of hose, insulation and fittings*

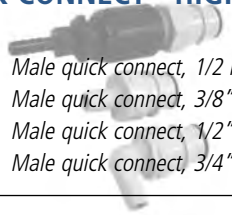
FITTINGS AND QUICK CONNECTS

MALE QUICK CONNECT WITH NPT



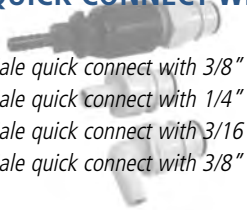
QCM-F3/8NPT	*Male quick connect with female 3/8 NPT*
QCM-F1/4NPT	*Male quick connect with female 1/4 NPT*
QCM-M1/2NPT	*Male quick connect with male 1/2 NPT*
QCM-M3/8NPT	*Male quick connect with male 3/8 NPT*

MALE QUICK CONNECT - HIGH TEMPERATURE



QCHM-M1/2NPT	*Male quick connect, 1/2 MNPT*
QCHM-3/8B	*Male quick connect, 3/8" barb*
QCHM-1/2B	*Male quick connect, 1/2" barb*
QCHM-3/4B	*Male quick connect, 3/4" barb*

MALE QUICK CONNECT WITH BARB



QCM-3/8B	*Male quick connect with 3/8" barb*
QCM-1/4B	*Male quick connect with 1/4" barb*
QCM-3/16B	*Male quick connect with 3/16" barb*
QCM-3/8BE	*Male quick connect with 3/8" barb elbow*

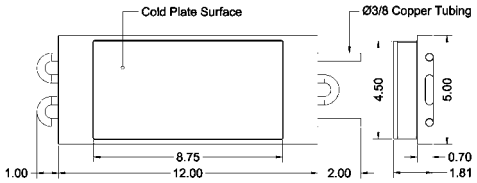
MISC. QUICK CONNECTS

QCM-FPLCD	*Male quick connect with female PLCD*
QCF-M3/8NPT	*Female quick connect with male 3/8 NPT*

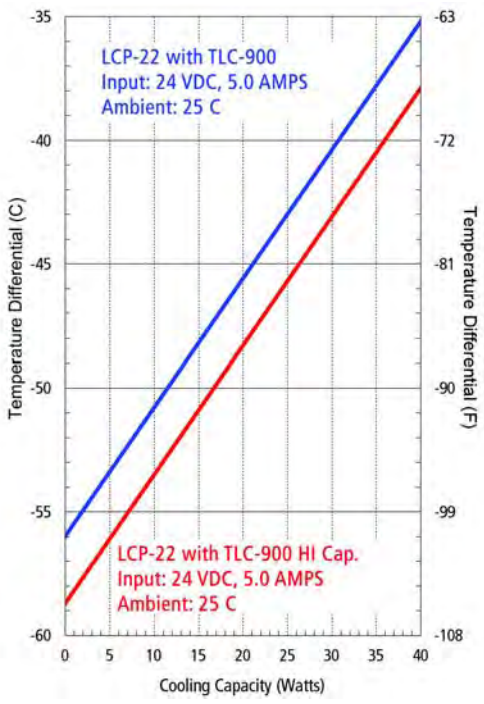
LOW TEMPERATURE CASCADES

One thermoelectric stacked on top of another with the goal of increasing the maximum temperature differential is a "cascade". Use these assemblies with the TLC-900 to create 2 and 3 stage cascades. The performance will vary with the degree of insulation, with the amount of the active load and with the ambient temperature.

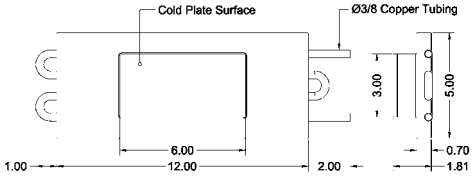
TWO STAGE - LARGE PLATE



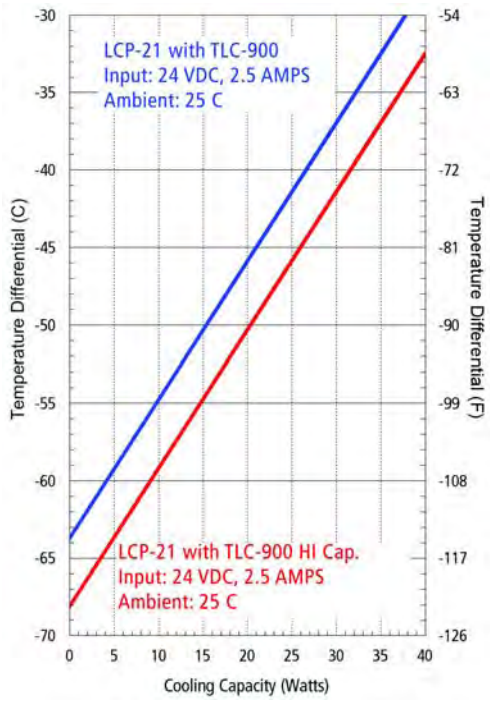
LCP-22



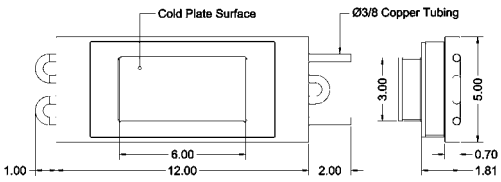
TWO STAGE - SMALL PLATE



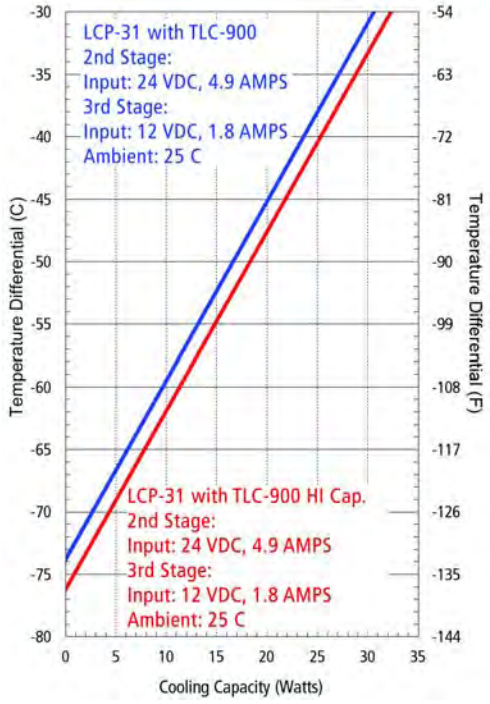
LCP-21



THREE STAGE

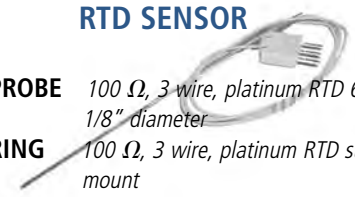


LCP-31



MISC. ACCESSORIES

RTD SENSOR



RTD-PROBE *100 Ω, 3 wire, platinum RTD 6" long, 1/8" diameter*

RTD-RING *100 Ω, 3 wire, platinum RTD surface mount*

CONVERTER

C-USB *USB-RS-232 converter "includes adapter, cable and software"*

CABLE

C-RS232 *RS-232 Cable, DB9 Male to DB9 Female 10' long*

HOSE

HOSE-01 *Standard hose, 3/8" ID, per foot*

HOSE-02 *High temperature hose, 3/8" ID, per foot*

Purchase by the foot

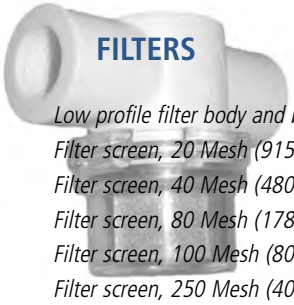
INSULATION

INS-01 *Single hose insulation, 5/8" ID*

INS-02 *Dual hose insulation, 5/8" ID*

6' Lengths

FILTERS



FBL-100 *Low profile filter body and bowl*
FML-20 *Filter screen, 20 Mesh (915 Micron)*
FML-40 *Filter screen, 40 Mesh (480 Micron)*
FML-80 *Filter screen, 80 Mesh (178 Micron)*
FML-100 *Filter screen, 100 Mesh (80 Micron)*
FML-250 *Filter screen, 250 Mesh (40 Micron)*

Temperature Controls
Power Supplies

CONTROLS — BEHIND PANEL

TC-4300 page 106
PID Controller

CONTROLLERS — THROUGH PANEL, 1/32 DIN

TC-3400 page 108
PID Controller

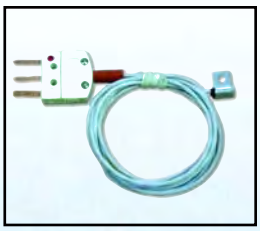
SWITCHES — TEMPERATURE SWITCHES AND RELAYS

TC-1F page 112
For cool and heat/cool
air conditioners
single set point
120/240 VAC; 12/24/48 VDC

TC-3F page 112
For heat/cool air conditioners
two preset setting 35C and 15C
120/240 VAC; 12/24/48 VDC

ACCESSORIES — TC ACCESSORIES, POWER SUPPLIES

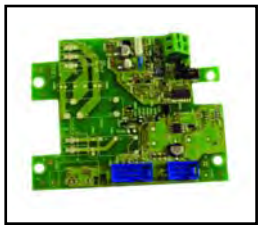
Thermocouple



RTD-Surface

CIRCUIT BOARD

Fan Speed Control page 106
for TC-4300 controller



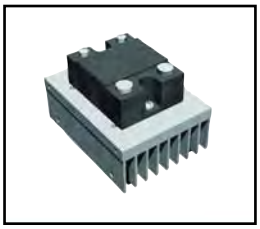
RS-232 Comms page 114
for TC-4300
PID Controller

1/32 DIN

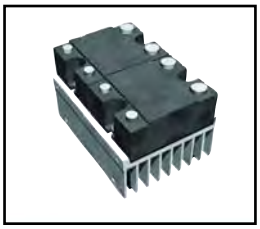
TC-3500 page 110
PID Controller

RELAYS

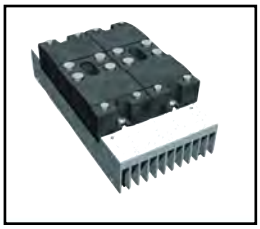
TC-6F page 112
For cool only air conditioners
three preset setting
120/240 VAC, 12/24/48 VDC



Single Relay

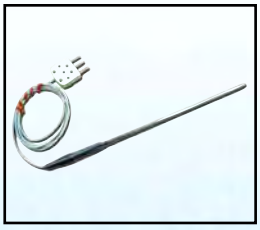


Dual Relay



Quad Relay

POWER SUPPLIES



RTD-Probe

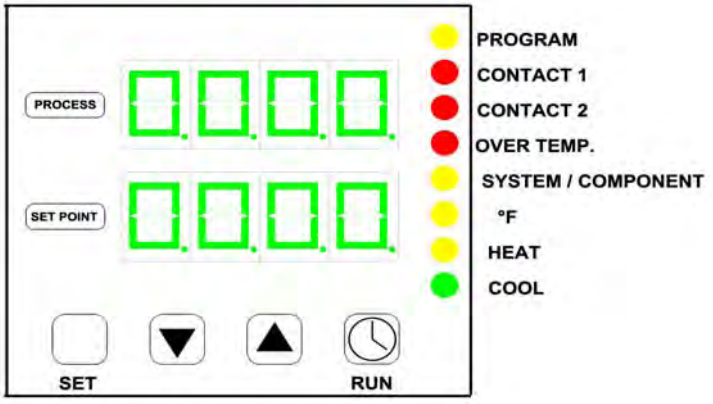
C-USB

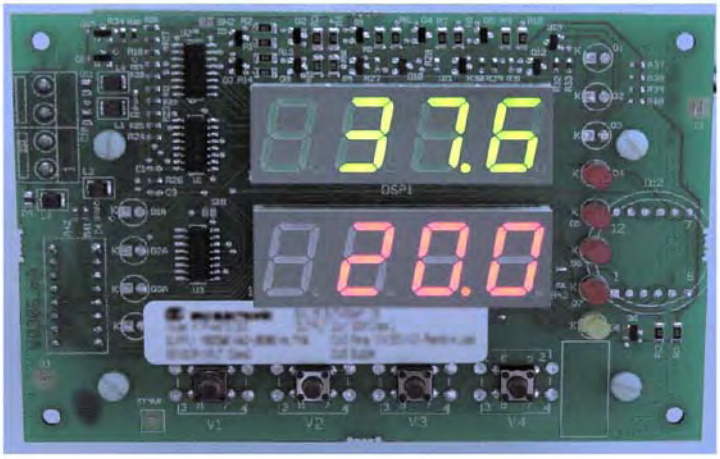
TC-4300 | Temperature Controller and EzLog® Software

PID Temperature Control
RS-232 Comms.
Speed Control

MAIN FEATURES

- Dual printed circuit board design fitted behind the equipment panel
- Dual four digits display, set point and proccess
- Thermocouple and RTD input
- On-Off, Proportional-Integral-Derivative (PID)
- Smart automatic tuning algorithm
- Two Solid Sate Relay (SSR) drive output for heating and cooling or alarm
- One 10 A relay output for system/component shut down and reset
- One dry contact input for system/component shut down and reset
- Two dry contact inputs for warning lights
- 85-264 Vac or 24V +/- 10 % ac/dc power supply
- Ramp and soak programmable
- Programmer configurable as 4 programs with eight segments, 1 program with 32 segments or 2 programs with 16 segments
- Program execution repetitions: from 0 (one execution only) to 9999 and endless executions
- Configurable ramp tracking and guaranteed soak functions
- Configurable servo to PV function for smooth recovery from hold or power down
- RS232 communication available with EzLog® software
- 0-10 VDC analog or 5-20 mA speed control output (typically for fans)
- Use stock or custom Front Panel Overlay





SPECIFICATIONS

Ambient temperature: From 0 °C to 50 °C

Storage temperature: From -30 °C to 70 °C

Humidity: From 20% to 85% RH non condensing

Power supply: 4 W 7 VA maximum

Construction: Self-extinguishing dgree V0 rated PCB assembly according to UL-94

Installation: Behind panel mounted

Dimension: 120 X 80 X 52 mm depth

Weight: Maximum 200 g

Sampling time: 500 ms typical

Accuracy: +0.3% fsv +1 digit @ 25 °C and nominal power supply voltage range

Temperature drift: < 200 ppm/°C of full scale for L, J, K, N thermocouple type (reference junction excluded)
< 400 ppm/°C of full scale for RTD and T thermocouple type (reference junction excluded)
< 500 ppm/°C of full scale for R and S thermocouple type (reference junction excluded)

Reference junction drift: 0.1°C/°C
Common mode rejection ratio: ⩾120 dB @50/60 Hz

Normal mode rejection ratio: ⩾60 dB @50/60 Hz

PV input: Thermocouple J, L, K, N, T, R, S or Resistance Temperature Detector (RTD) Pt100
The input type is keyboard selectable
The line must be not longer than 30 meters or leave the building

Resolution: One decimal figure is available for temperature display and setting from 199.9 to 999.9 °C or °F. This auto-ranging feature can be disabled to remove the presentation of the decimal digit in the whole operating range.

Operating mode: ON/OFF or PID; Automatic operation; Self-tuning function

Out 1: Logic output for SSR (Typically Heat function), 30 meter line
Logic level 0: < 0.5 V dc
Logic level 1: 8 V dc +20% @ 12mA max

Out 2: Relay (form A) 10 A @ 250 Vac resistive load System/Component shut down

Out 3: Logic output for SSR
Logic level 0: < 0.5 V dc
Logic level 1: 14 V dc +20% @ 20ma max
24 V dc +20% @ 1ma The line must be not longer than 30 meters or leave the building

Serial interface: Optional, RS-232 standard, opto-isolated
Protocol type: Modbus (RTU mode)
Device address: From 1 to 254
Baud rate: 600 up to 19200 baud
Format: 1 start bit; 8 bit with/without parity; 1 stop bit
Parity: Even/Odd
Watch-dog: Hardware / software watch-dog is provided for automatic restart

TC-4300

PART NUMBER AND ORDERING

43	-	x	x	x	-	x	x	-	x	x	x

Input voltage
0: Universal AC - 85 to 264Vac, 47 to 63 Hz
2: 24 Vdc

Functions
2: Heat/Cool -No relay
3: Cool only, with relay
4: Heat/Cool, with relays

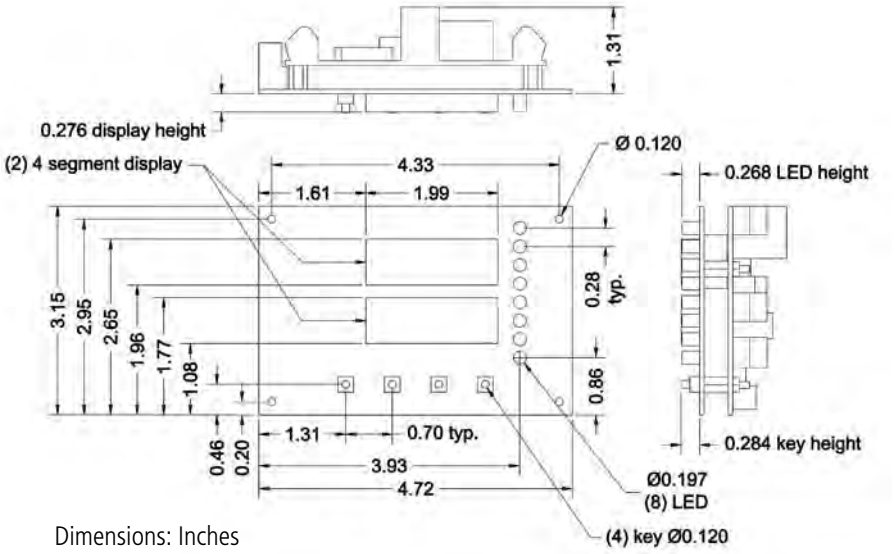
Switching Volts & Amps
A: None, drive signal only - no relays
B: Cool only, VAC switching, 120/240Vac, 10 Amps
C: Cool Only, VDC switching, 0-100 VDC, 12 Amps
D: Cool Only, VDC switching, 0-100 VDC, 20 Amps
E: Cool Only, VDC switching, 0-100 VDC, 40 Amps
F: Heat/Cool, VDC switching, 0-100 VDC, 12 Amps
G: Heat/Cool, VDC switching, 0-100 VDC, 20 Amps
H: Heat/Cool, VDC switching, 0-100 VDC, 40 Amps
I: Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 12 Amps
J: Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 20 Amps
K: Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 40 Amps
L: Heat/Cool, Heat: 0-100 VDC, 12 Amps Cool: VAC switching, 120/240 VAC, 10 amps
M: Heat/Cool, Heat: 0-100 VDC, 20 Amps Cool: VAC switching, 120/240 VAC, 10 amps
N: Heat/Cool, Heat: 0-100 VDC, 40 Amps Cool: VAC switching, 120/240 VAC, 10 amps
O: Heat/Cool, Reverse Polarity, 0-100 VDC, 12 Amps
P: Heat/Cool, Reverse Polarity, 0-100 VDC, 20 Amps
Q: Heat/Cool, Reverse Polarity, 0-100 VDC, 40 Amps
R: Heat/Cool, VAC switching, 120/240 VAC, 10 amps

Options

Communications
0: No communications
1: RS-232 external option

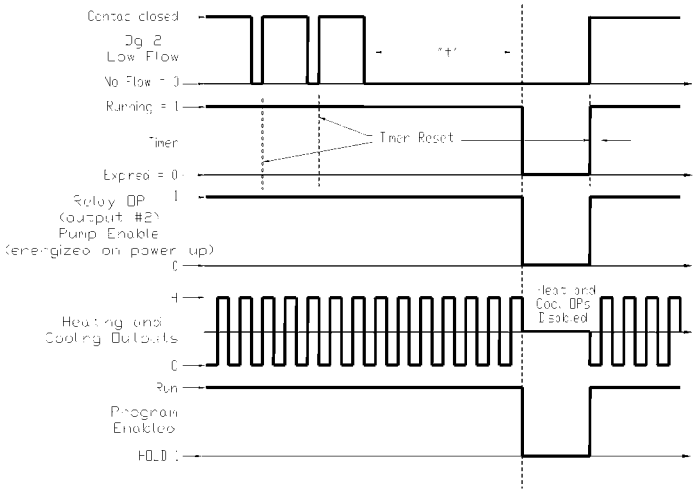
Sensor
0: None
1: 3- Wire RTD - RTD-Probe
2: T type thermocouple
(ring mount) - RTD-Ring

DIMENSIONS



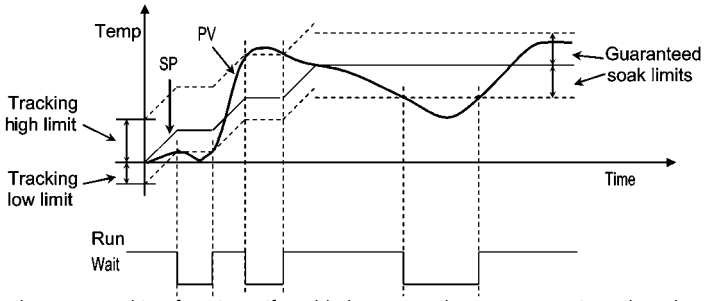
Dimensions: Inches

SYSTEM / COMPONENT SHUT DOWN



The Out 2 is used in association with a timer to control the system or specific component function as shown below. This function will disable the system or component if a dry contact is open and has has existed for more than "t" time. Otherwise, Out 2 will remain energized. Once the timer has expired and the component or system is OFF, the Out 1(Heat) and Out 3(Cool) are also OFF The program will be forced in "HOLD 1" if it is "RUN" status The component or system is reset by pressing " + "pushbutton at the same time (the program will revert in "RUN" mode). The diagram shown in the left is made for pump shut down and reset based on flow or no flow conditions.

TRACKING & SOAK LIMITS



The ramp tracking function - if enabled - pauses the ramp execution when the control error (difference between the process variable and the operative set point) is larger than a specific threshold. The ramp restarts when the control error falls below the prefixed value. Two different thresholds for ramp tracking can be specified: a tracking low limit (when the process variable is lower than the operative set point) and a tracking high limit (when the process variable is greater than the operative set point).
When a fault is detected on measure and tracking is configured the ramp is always stopped, independently of configured value.
The guaranteed soak function is similar to the ramp tracking one, but it works during dwell segments. It can be separately enabled by means of a proper threshold that specifies the maximum absolute control error.
When a fault is detected on measure and guaranteed soak is configured the time is always stopped, independently of configured value.

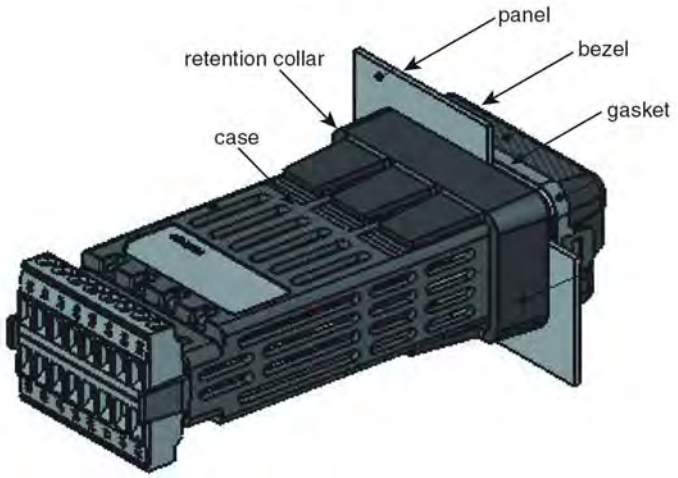
TC-3400 | Temperature Controller

PID Temperature Control

OVERVIEW

The TC-3400 temperature controller series simplifies your temperature control requirements.

The controller options reduce system complexity and the cost of control loop ownership. The TC-3400 is a high performance PID temperature controller in space-saving, panel-mount 1/32 DIN size EIA 485 communications and standard NEMA-4X IP66 sealing make the TC-3400 versatile and suitable for wide range of environments.



FEATURES

Advanced PID Control Algorithm

- Offers TRU-Tune™ + adaptive control to provide tighter control for demanding applications
- Provides auto-tune for fast, efficient start up

Configuration

- Systems come preconfigured for PID cooling application
- "Canned" configuration for different applications available

Parameter Save and Restore Memory

- Reduce service requirment and down time

Heat-Cool Operation

- Provides application flexibility with accurate temperature and process control

P3T Armor Sealing System

- NEMA-4X and IP66 offers water and dust resistance that can be cleaned and washed down
- Backed up by UL 50 independent certification to NEMA-4X specification

SPECIFICATIONS

Line Voltage/Power:
- 85 to 264V~(ac), 47 to 63Hz
- 12 to 40Vdc OR 20 to 28V~(ac), +10/-15 percent; 50/60Hz, ±5 percent
- 10VA maximum power consumption
- Data retention upon power failure via nonvolatile memory
- Compliant with SEMI F47-0200, Figure R1-1 voltage sag requirments @ 24V~(ac) or higher

Environment:
- -18 to 65°C (0-149°F) operating temperature
- -40 to 85°C (-40-185°F) storage temperature
- 0 to 90 percent RH, non-condensing

Accuracy:
- Calibration accuracy and sensor conformity ±0.1 percent of span, ±1°C @ the calibrated ambient temperature and rated line voltage
- Types R, S B; 0.2 percent
- Type T below -50°C; 0.2 percent
- Calibration ambient temperature @ 25°C ±3°C (77°F±5°F)
- Accuracy span 540°C (1000°F) minimum
- Temperature stability ±0.1°C/°C (±0.1°F/°F) rise in ambient maximum

Agency Approvals:
- UL®/EN 61010 Listed
- UL® 1604 Class 1 div. 2
- UL® 50, NEMA 4X, EN 60529 IP66
- CSA 610110 CE
- RoHS, W.E.E.E.

Controller:
- Auto-tune with TRU-TUNE™ + adaptive control algorithm
- Control sampling rates: input 10Hz, outputs 10Hz

Wiring Termination:
- Input, power and controller ouput terminals are touch safe removable 12 to 22 AWG

Universal Input:
- Thermocouple, grounded or ungrounded sensors
  >20MΩ input impedance
  3µA open sensor detection
  Maximum of 200Ω source resistance
- RTD 2- or 3-wire, platinum, 100Ω and 1000Ω @ 0°C calibration to DIN curve (0.00385Ω /Ω/°C)

Serial Communications:
- Isolated communications
  EIA 485, Modbus® RTU

TC-3400

PART NUMBER AND ORDERING

34	-	x	x	x	-	x	x	-	x	x	x

Input voltage
0: Universal AC - 85 to 264Vac, 47 to 63 Hz
4: 12/24Vdc - 12 to 40Vdc, 20 to 28Vac

Functions
2: Heat/Cool -No relay
3: Cooling with relay (package defined below)
4: Heating/Cooling with relays (package defined below)

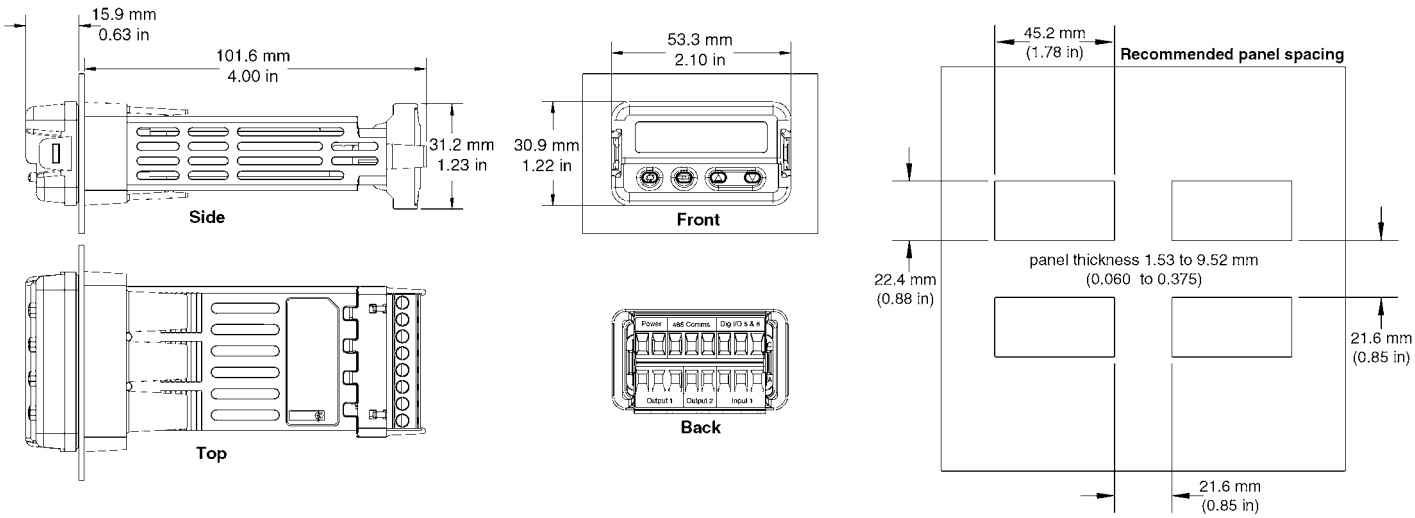
Switching Volts & Amps
A: None, drive signal only - no relays
B: Cool only, VAC switching, 120/240Vac, 10 Amps
C: Cool Only, VDC switching, 0-100 VDC, 12 Amps
D: Cool Only, VDC switching, 0-100 VDC, 20 Amps
E: Cool Only, VDC switching, 0-100 VDC, 40 Amps
F: Heat/Cool, VDC switching, 0-100 VDC, 12 Amps
G: Heat/Cool, VDC switching, 0-100 VDC, 20 Amps
H: Heat/Cool, VDC switching, 0-100 VDC, 40 Amps
I: Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 12 Amps
J: Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 20 Amps
K: Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 40 Amps
L: Heat/Cool, Heat: 0-100 VDC, 12 Amps Cool: VAC switching, 120/240 VAC, 10 amps
M: Heat/Cool, Heat: 0-100 VDC, 20 Amps Cool: VAC switching, 120/240 VAC, 10 amps
N: Heat/Cool, Heat: 0-100 VDC, 40 Amps Cool: VAC switching, 120/240 VAC, 10 amps
O: Heat/Cool, Reverse Polarity, 0-100 VDC, 12 Amps
P: Heat/Cool, Reverse Polarity, 0-100 VDC, 20 Amps
Q: Heat/Cool, Reverse Polarity, 0-100 VDC, 40 Amps
R: Heat/Cool, VAC switching, 120/240 VAC, 10 amps

Sensor
0: None
1: 3- Wire RTD - RTD-Probe
2: T type thermocouple (ring mount) - RTD-Ring

Communications
0: Basic communications used with standard **EZ Zone Configurator** allows the user to configure all the set up parameters including the ability to change set point, monitor the process temperature and initiate an Auto Tune
1: RS-232 complete communication for use with standard EZ Zone Configurator and optional **SpecView** or third party software, includes RS-232/RS-485 adapter
2: RS-485 complete communication for use with standard EZ Zone Configurator and optional **SpecView** or third party software

Options

DIMENSIONS AND CUTOUT



TC-3500 | Temperature Controller

PID Temperature Control

OVERVIEW

The TC-3500 temperature controller series simplifies your temperature control requirements.

This controller reduces system complexity and set up cost. The TC-3500 is a high performance PID temperature controller in space-saving, panel-mount size. RS485 with MODBUS-RTU (JBUS) protocol and IP 65 mounted in panel with gasket suitable for wide range of environments.

For use with reverse polarity AHP-300FFHC, AHP-300XEHC, AHP-300XHC (page 36), AHP-150FFHC, AHP-150XEHC (page 38) air conditioners and AHP-300CPHC, AHP-150CPHC (page 78) cold plates.

SPECIFICATIONS

Mechanical Data:
- Housing Self-extinguishing plastic, UL 94 V0
- Dimensions 35x78 mm - depth 75,5 mm
- Weight 130 g approx
- Connections 2,5 mm2 screw terminal block
- Mounting Flush in panel in 29x71 mm hole
- Front panel protection IP 65 mounted in panel with gasket

Electrical Data:
- Power supply 12…24 VDC +/- 10
- Power consumption 4 VA approx.

Input Data:
- Thermocouples J, K, S – According to IEC 584-2, accuracy class 1 or 2

Functional Data:
- Control PID double action
- PID functions AUTO TUNING FAST, SELF TUNING, FUZZY OVERSHOOT CONTROL
- Multi Set Point Up to 4 programmable Set Points
- Overall accuracy +/-0,5% full scale (TC S :+/- 1% fs)
- Unit of measurement °C / °F, programmable
- Max. cold junction compensation drift 0,1°C/°C with operating temperature 0…50°C after warm-up time of 20 min.
- Sampling rate 8 sample per second
- Serial communication RS485 with MODBUS-RTU (JBUS) protocol
- Communication rate 1200…38400 baud, programmable
- Display 4 red digit h=12 mm
- Parameters access Protected by password
- Operating temperature 0…50°C
- Operating humidity 30…95 RH% without condensation

TC-3500

PART NUMBER AND ORDERING

35	-	X	X	X	-	X	X	-	X	X	X

Input voltage
4: 12/24 VDC

Functions
4: Heat/Cool, reverse polarity

Switching Volts & Amps
S: Heat/Cool, VDC switching, 12/24 VDC, 7 amps

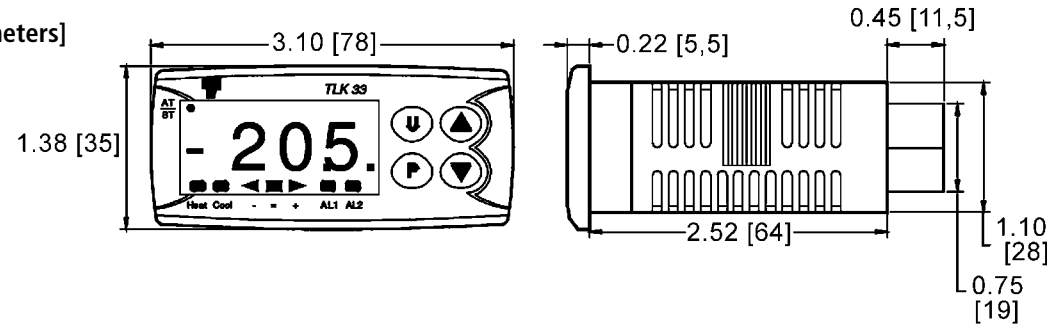
Sensor
0: None
3: PTC thermistor

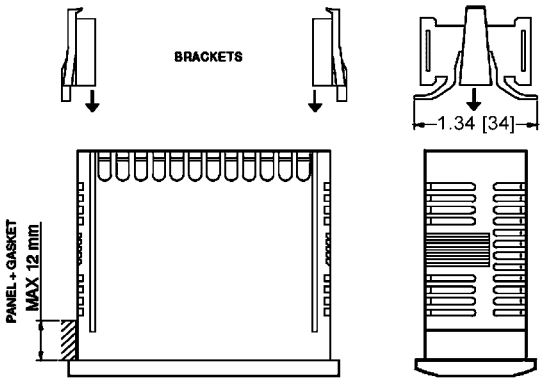
Communications
2: RS-485 internal option

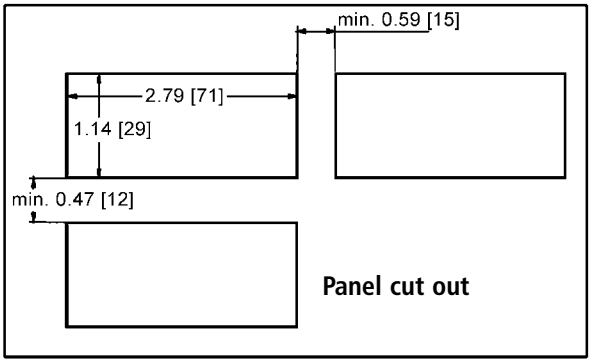
Options

DIMENSIONS AND CUTOUT

Dimensions: Inches [Millimeters]

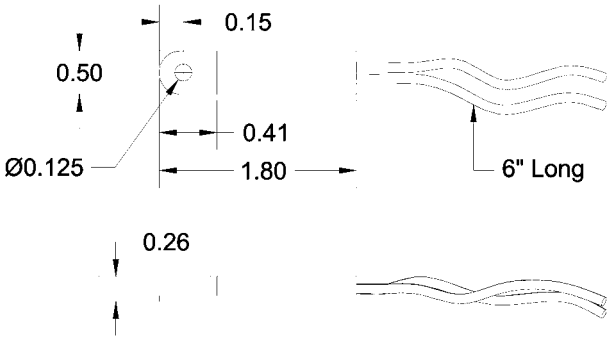






TC-1C AND TC-1H POWER TEMPERATURE SWITCHES

Model TC-1C and TC-1H power temperature controllers with its small tolerance and reset differential is the simplest and most cost effective way to control a cooling or heating device (VAC or VDC) without a need for a relay. For circuits that have higher current draw simply use them in conjunction with a solid state relay.



Part Numbers:

Mode	Part Number	Note
Cool	TC-1C-**XX**	switch closes on temperature rise
Heat	TC-1H-**XX**	switch closes on temperature drop

XX: Specify temperatures 20 °C, 25 °C, 30 °C, 35 °C for cool mode and 10°C, 15 °C for heat mode

Example: TC-1C-20 and TC-1H-10

TC-1F SPECIFICATION

VOLTAGE	CURRENT amps	SET POINT TOLERANCE °C	RESET DIFFERENTIAL °C
125 VAC	2	+/- 3	3 - 6
250 VAC	1.3	+/- 3	3 - 6
12 VDC	2	+/- 3	3 - 6
24 VDC	1.3	+/- 3	3 - 6

TC-6F COOL ONLY

TC-6F

Model TC-6F (Cool Only) thermostat is designed using two temperature power switches in conjunction with a solid state relay. A three position switch is provided to adjust temperature settings.

TC-6F SPECIFICATION

MODEL NUMBER	PART NUMBER	NOTES	TEMP @ T1 °C	TEMP @ T2 °C	T1-T2 (MAX) °C	RESET (TYP) °C	RESET °C	TEMP @ T3	OPERATING VOLTAGE	SWITCHING VOLTAGE	SWITCHING CURRENT
TC-6F	6-5211-000	No Relay	35 +/- 5	25 +/- 5	10 +/- 3	6.5	3	Continuous On	NA	NA	NA
TC-6F-AC	6-5232-000	VAC Version	35 +/- 5	25 +/- 5	10 +/- 3	6.5	3	Continuous On	85-250 VAC	24-280 VAC	10
TC-6F-DC	6-5242-000	12/24 VDC	35 +/- 5	25 +/- 5	10 +/- 3	6.5	3	Continuous On	3.5-32 VDC	0-100 VDC	.02-20 ADC
TC-6F-DC	6-5252-000	48 VDC	35 +/- 5	25 +/- 5	10 +/- 3	6.5	3	Continuous On	3.5-32 VDC	0-100 VDC	.02-20 ADC

TC-3F HEAT AND COOL

TC-3F

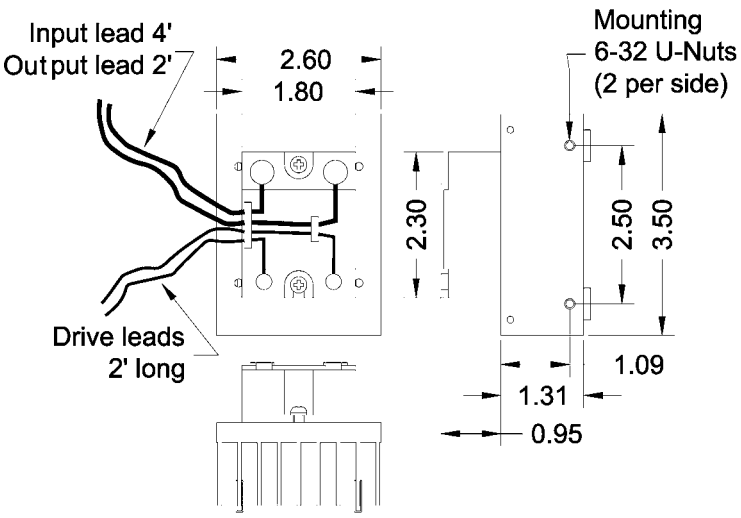
Model TC-3F (Heat/Cool) thermostat incorporates the same technology as the TC-6F. It contains a single setting each for both heating and cooling as referenced below:

TC-3F SPECIFICATION

MODEL NUMBER	PART NUMBER	NOTES	COOL TEMP. °C	HEAT TEMP. °C	RESET (MAX) °C	RESET (TYP) °C	OPERATING VOLTAGE	SWITCHING VOLTAGE	SWITCHING CURRENT
TC-3F-AC	3-5232-000	VAC Version	35 +/- 5	15 +/- 5	6.5	3	85-250 VAC	24-280 VAC	10 AMPS
TC-3F-DC	3-5242-000	12/24 VDC	35 +/- 5	15 +/- 5	6.5	3	3.5-32 VDC	0-100 VDC	.02-20 ADC

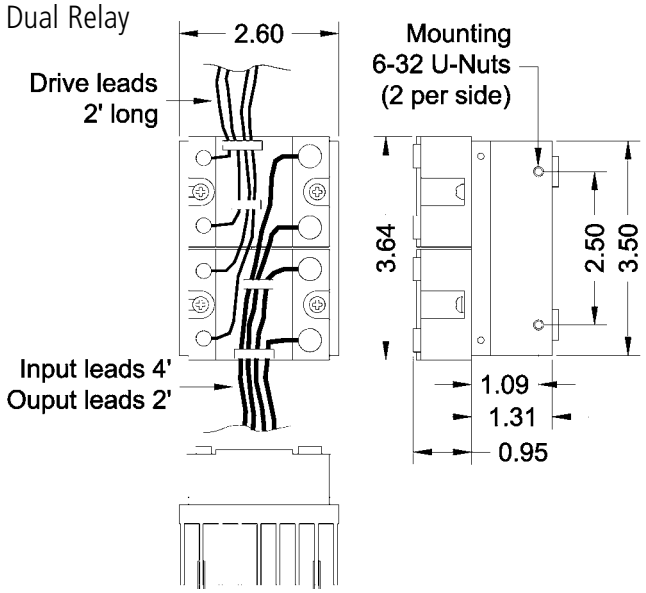
SINGLE RELAY

Single Relay



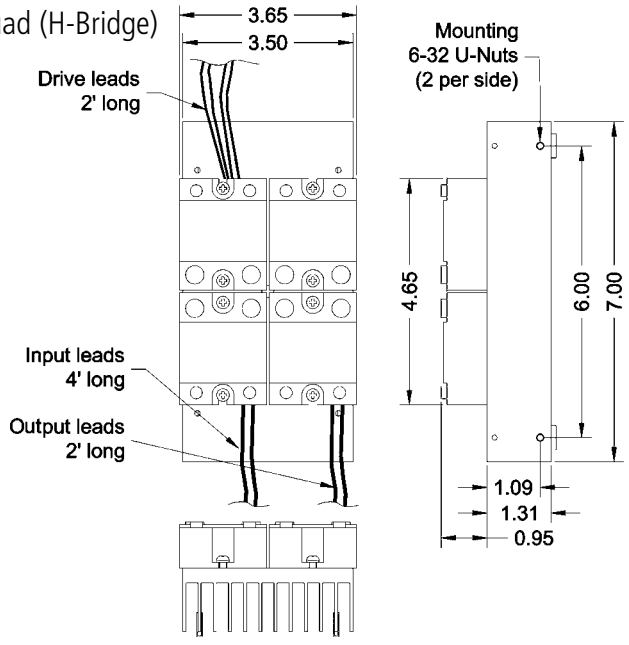
DESCRIPTION	PART #
Cool only, VAC switching, 120/240 VAC, 10 AMPS	**RELAY - B**
Cool only, VDC switching, 0-100 VDC, 12 AMPS	**RELAY - C**
Cool only, VDC switching, 0-100 VDC, 20 AMPS	**RELAY - D**
Cool only, VDC switching, 0-100 VDC, 40 AMPS	**RELAY - E**

Dual Relay



DESCRIPTION	PART #
Heat/Cool, VDC switching, 0-100 VDC, 12 AMPS	**RELAY - F**
Heat/Cool, VDC switching, 0-100 VDC, 20 AMPS	**RELAY - G**
Heat/Cool, VDC switching, 0-100 VDC, 40 AMPS	**RELAY - H**
Heat/Cool, Heat: 120/240 VAC, 10 AMPS Cool: 0-100 VDC, 12 AMPS	**RELAY - I**
Heat/Cool, Heat: 120/240 VAC, 10 AMPS Cool: 0-100 VDC, 20 AMPS	**RELAY - J**
Heat/Cool, Heat: 120/240 VAC, 10 AMPS Cool: 0-100 VDC, 40 AMPS	**RELAY - K**
Heat/Cool, Heat: 0-100 VDC, 12 AMPS Cool: 120/240 VAC, 10 AMPS	**RELAY - L**
Heat/Cool, Heat: 0-100 VDC, 20 AMPS Cool: 120/240 VAC, 10 AMPS	**RELAY - M**
Heat/Cool, Heat: 0-100 VDC, 40 AMPS Cool: 120/240 VAC, 10 AMPS	**RELAY - N**
Heat/Cool, VAC switching, 120/240 VAC, 10 AMPS	**RELAY - R**

Quad (H-Bridge)



DESCRIPTION	PART #
Heat/Cool, reverse polarity, 0-100 VDC, 12 AMPS	**RELAY - O**
Heat/Cool, reverse polarity, 0-100 VDC, 20 AMPS	**RELAY - P**
Heat/Cool, reverse polarity, 0-100 VDC, 40 AMPS	**RELAY - Q**

Accessories

SENSORS, CABLES, ADAPTERS

RTD-Surface Surface mounting 3 wire RTD with connector

RTD-Probe 6" long, 1/8 DIA, 3 wire RTD with connector

Probe-1/4NPT RTD-Probe with male 1/4 NPT compression fitting

Probe-3/8NPT RTD-Probe with male 3/8 NPT compression fitting

Thermocouple Wire (specify length in feet)
"T" type **WIRE-T-XXX**
"J" type **WIRE-J-XXX**

RTD Wire (specify length in feet)
3 conductor cable **WIRE-RTD-XXX**

C-USB RS-232 to USB converter

C-485/232 RS-232 to RS-485 converter

C-RS232 RS-232 cable

TC-4300 Comms

POWER SUPPLIES

150, 300, 500, 800 WATTS

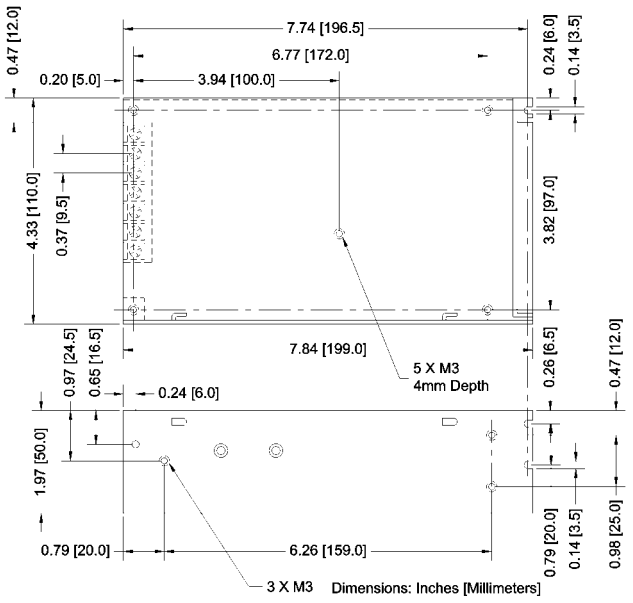
SPECIFICATION

MODEL	INPUT VOLTAGE VAC 47-63 HZ	OUTPUT VOLTAGE VDC	DC OUTPUT POWER WATTS	OUTPUT CURRENT AMPS.	WEIGHT LBS.	WORKING TEMPERATURE °C 20-90%RH	DIMENSIONS L X W X H INCHES
AS150F-12	88-132 OR 176-264*	12	150	12.5	1.76	-10 - 60	7.96X4.4X2
AS150F-24	88-132 OR 176-264*	24	150	6.5	1.76	-10 - 60	7.96X4.4X2
SP300-12	90-264	12	300	24	2.6	-10 - 50	8.6X4.6X2
SP300-24	90-264	24	300	12.5	2.6	-10 - 50	8.6X4.6X2
SP500-24	90-264	24	500	20.8	3.3	0 - 70	9.2X4.25X2.5
SP800-24	90-264	24	800	33	3.3	0 - 70	9.2X4.25X2.5

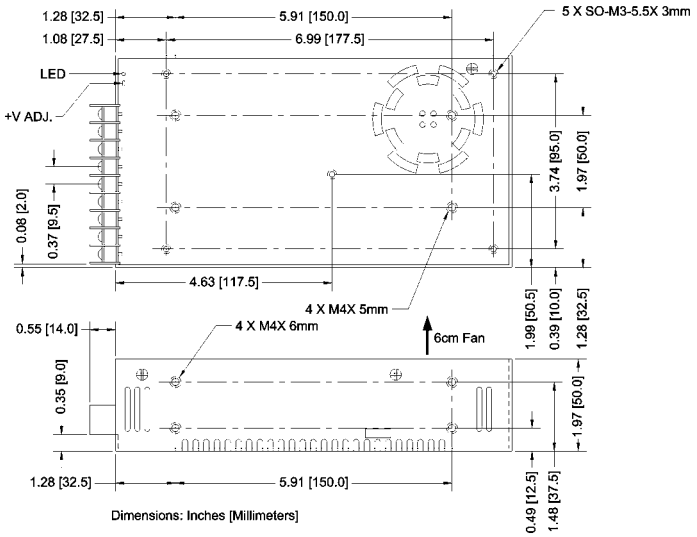
* Input voltage range is switch selectable.

DIMENSIONS

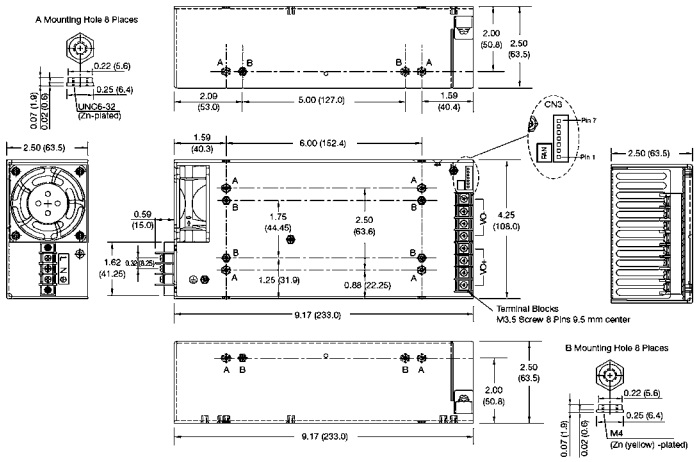
AS-150F



SP-300



SP-500, SP-800



Helpful Information

Ordering information:

- By telephone during business hours, **773-342-4900** and **888-832-2872.**
  Monday – Friday 8 AM to 4:30 PM, Central Time.
- By fax or email 24 hours a day.
  Fax: **773-342-0191**
  email: **sales@thermoelectric.com**
- By mail on your purchase order or company letterhead.
  Thermoelectric Cooling America Corporation
  4048 West Schubert, Chicago, Illinois 60639

All orders are subject to written acceptance on our form "Acceptance of Order" with our required terms and conditions, depending upon quantity, price, availability of parts and other considerations.

Prices:

- Prices are quoted F.O.B. Chicago and do not include sales or other taxes. Applicable taxes will be shown as a separate item on the invoice, as will charges for freight.
- Prices are in US Dollars and are subject to change without notice.

Terms:

- Terms of payment are 30 days after shipment, subject to approved credit. New accounts must furnish necessary credit references. Until credit has been established, payment in full with order or C.O.D. may be requested. American Express, Visa and Mastercard are accepted.

Cancellation, Schedule Changes:

- A charge of 15% of net price will be assessed for cancellation of formally accepted orders. Special part numbers containing a (CD or P) prefix are non-cancelable, non-returnable (NCNR). A 100% cancellation charge applies.
- Requests for schedule changes which defer delivery may be subject to price adjustments or other charges.

Returned Goods, Restocking Charges:

- In order to return merchandise for any reason (repair, replacement or credit), a return authorization number must be issued by TECA.
- New merchandise may not be returned for credit beyond 60 days from shipment. Charges for incidental or other damages may also be made.
- All returned goods must be sent freight prepaid. A restocking charge of 15% will apply.

Limited Warranty

In the event a claimed defect in material or workmanship is discovered in any of TECA's products within one year after the date they are delivered to Buyer, and if TECA is notified of the defect in writing by certified mail within 14 days of the date of discovery, then TECA may either, at its sole discretion; a) inspect the product at the Buyer's location, or; b) require that the product be made available at Buyer's expense at TECA's premises for TECA's inspection within 14 days of notification. If after such inspection TECA deems that the products are defective and the defects result from faulty materials and/or workmanship and not in any way from accident, misuse, misapplication, mishandling, modification or alteration by the Buyer or the shipper, then TECA shall, at its sole option, repair or exchange defective products free of charge to Buyer, and return same to Buyer at Buyer's expense, or credit the Buyer the net price of the defective products. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL TECA BE LIABLE FOR ANY CLAIM BASED ON BREACH OF EXPRESS OR IMPLIED WARRANTY OR OTHER DAMAGES WHETHER SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, LOST PROFITS, BUSINESS INTERRUPTION, OR LOSS OF BUSINESS OR CUSTOMER RELATIONSHIPS.

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