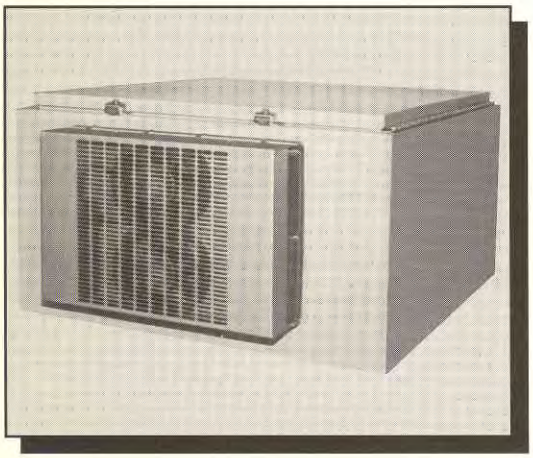
WORLD CLASS COOLING PRODUCTS

teca™

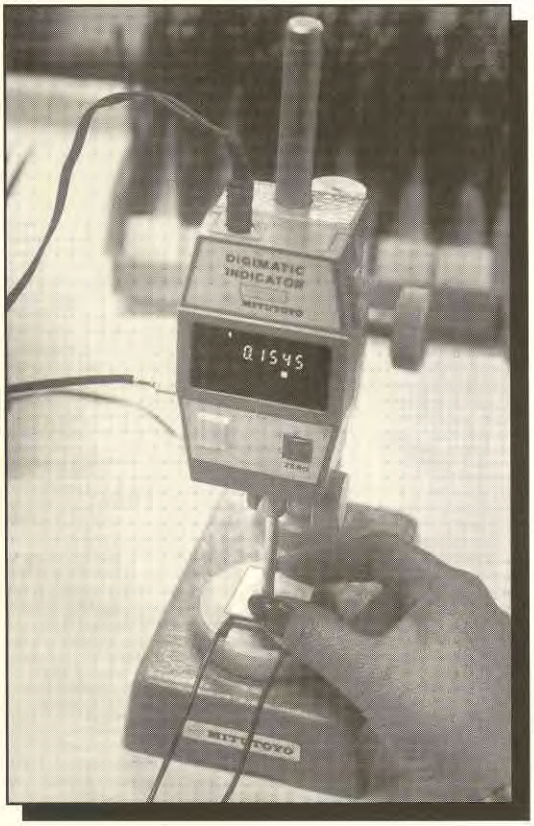


Leadership

TECA pioneered the market of solid-state air conditioners for electronic enclosures. Our applications range from harsh environments such as NEMA-4X, to demanding applications such as the space shuttle and nuclear power plants. We also offer liquid chillers and cold plates in several standard sizes.

Reliability

Since the cooling is based on solid-state technology, moving components that clog or wear out are not required. All products we build are environmentally safe, unlike conventional refrigeration methods which use CFC's (chlorofluorocarbons), corrosive liquids and gases.



Design Solutions

We have met the needs of the Original Equipment Market by offering complete engineering services, prototype development and custom built cooling equipment through an exclusive and confidential basis.

Total Quality Program

Continuous in-line and final quality assurance inspections are implemented. This insures that all components, throughout the assembly process, provide 100% compliance for trouble free operation.

Whatever your application — we can fulfill all of your cooling requirements. Our engineers may hav already developed a similar solution. We are available to work with you to discuss your specifications Together we will design and build a quality system that sets the standard in thermoelectric cooling. Call u at (312) 342-4900. We'll take it from there.

teca™

Table of Contents

Product Selection Chart

Air Cooled Air Conditioners **Model Number**	**Performance Rating BTU/h**			**Input**		Enclosure NEMA Rating	Temp. Control
	Enclosure Air @ 60°C Amb.	Cold Side Fin @ 60°C Amb.	Heaters	Voltage AC	Voltage DC		
Americool 2000	850	1025		115		12	TC-6F
Americool 3000	1100	1450		115		12	TC-6F
Americool 4000	1200	1575		115		12	TC-6F
Americool 4002	1275	1700		230		12	TC-6F
AHP-1801	1050	1400		115/230		12	TC-6F
AHP-1801X	1050	1400		115/230		4X	TC-6F
AHP-1801HC	1050	1400	1360	115/230		12	TC-3F
AHP-1801XHC	1050	1400	1360	115/230		4X	TC-3F
AHP-1700	825	1140		115		12	
AHP-1700HC	825	1140	1360	115		12	TC-3F
AHP-1200FF	500	700		115		12	TC-6F
AHP-1200FFHC	500	700	680	115		12	TC-3F
AHP-1201FF	500	700		115/230		12	TC-6F
AHP-1201FFHC	500	700	680	115/230		12	TC-3F
AHP-1200X	500	700		115		4X	TC-6F
AHP-1200XHC	500	700	680	115		4X	TC-3F
AHP-1000FF	485	635		115		12	
AHP-1000FFHC	485	635	680	115		12	TC-3F
AHP-301FF	195	230		115		12	
AHP-301FFHC	195	230	340	115		12	TC-3F
AHP-300X	210	275			12/24/48	4X	
AHP-300FF	210	275			12/24/48	12	

* All above products have power input from the interior except models: AHP-1700 and AHP-1700HC

Options: Page(s

Liquid Cooled Air Conditioners **Model Number**	**Performance Rating BTU/h**			**Input**		Temp. Control Included
	Enclosure Air @ 60°C Amb.	Cold Side Fin @ 60°C Amb.	Heaters	Voltage AC	Voltage DC	
LHP-1700FF	1225	1730		115		
LHP-1700FFHC	1225	1730	1360	115		TC-3F
LHP-1702FF	1225	1730		230		
LHP-1702FFHC	1225	1730	1360	230		TC-3F
LHP-800FF	730	900			30	
LHP-300FF	240	320			24	
Liquid Cooled Cold Plates		BTU/h 25°C				
LHP-1700CP		1500		155		
LHP-1700CPHC		1500	1360	115		
LHP-1702CP		1500		230		
LHP-1702CPHC		1500	1360	230		
LHP-800CP		750			30	
LHP-300CP		300			24	
LHP-150		135			12	
Air-Cooled Cold Plates		BTU/h 25°C				
AHP-1000CP		560		115		
AHP-1000CPHC		560	680	115		
AHP-301CP		225		115/230		
AHP-301CPHC		225	340	115/230		
AHP-300CP		265			12/24/48	
AHP-150CP		125			12/24	
Air Cooled Liquid Chillers	BTU/h 25°C	BTU/h 60°C				
ALC-750	600	800		115		
ALC-750DC	600	800		115		
ALC-1500	1500	1700		115		
TLC-750	600	675		115		
TLC-1600	1350	1550		115		

Options: Page(s)

Air Conditioner Sizing

To size an air conditioner, proceed with the following 12 steps...an air cooled example has been provided.

STEP	DETERMINE		Air Cooled ENGLISH	Air Cooled S.I.	Liquid Cooled ENGLISH	Liquid Cooled S.I.	Example [Air Cooled 1" insulation]
1	Maximum Ambient Air Temperature	(T_a)	°F	°C	°F	°C	120°F/50°C
2	Maximum Allowable Enclosure Air Temperature	(T_e)	°F	°C	°F	°C	100°F/38°C
3	Maximum Inlet Coolant Temperature	(T_L)			°F	°C	
4	Temperature Differential Air Cooled: $\Delta T=T_e-T_a$ Liquid Cooled: $\Delta T=T_e-T_L$	(ΔT)	°F	°C	°F	°C	-20°F/-12°C
5	Exposed Surface Area of Enclosure	(S_a)	ft^2	m^2	ft^2	m^2	65ft^2/5.76m^2
6	Ambient Thermal Load (Use Equation 1 or TECA cooling design slide rule)	(Q_a)	BTU/HR	W	BTU/HR	W	129.3 BTU/Hr 38.6 Watt
7	Internal Enclosure Load (Use Method 1, 2 or 3)	(Q_e)	BTU/HR	W	BTU/HR	W	413 BTU/Hr 121 Watts
8	Total Load (Use Equation 2)	(Q_t)	BTU/HR	W	BTU/HR	W	542.3 BTU/Hr 159.6 Watts

Equation 1 $Q_a = x\, S_a(T_a - T_e)^y$

EXAMPLE:

Q_a (Watts) = (.415) (5.76m^2) [(50 (°C) - 38 (°C)]$^{1.119}$ = 38.6 Watts

Q_a (BTU/hr) = (.073) (62 ft^2) [(120 (°F) - 100 (°F)]$^{1.119}$ = 129.3 BTU/Hr

To determine (x, y):

Approximation based on 1/16" carbon steel enclosure, assumes
K (Steel) = 28 BTU/Hr-Ft-°F
K (Urethane) = 0.15 BTU/Hr-Ft-°F
(1" Insulation)

INSULATION THICKNESS	y	ENGLISH UNITS X	S.I. UNITS X
0"	1.272	.151	.859
1/2" (1.27cm)	1.150	.104	.591
1" (2.54cm)	1.119	.073	.415
2" (5.08 cm)	1.083	.050	.281

Method 1 Measure the electrical power into the enclosure and subtract the electrical power out to determine the electrical power generated inside the enclosure.

EXAMPLE:

Qi = (115v) (36.3A) = 4180W
Qo = (48v) (84.5A) = 4059W
Qe = Qi - Qo = 4180-4059 = 121 W

Qi (Power in) → Qe → Qo (Power out)

Method 2 If power cannot be measured directly, add the rated operating power values of all heat generating components as specified by the manufacturer.

Method 3 Measure the steady-state temperature rise from ambient to internal with the enclosure completely sealed. Substitute this value into equation 1 to estimate Qe. (Assume Qe=Qa)

Equation 2 Qt = Qa + Qe + Qmisc; where Qmisc = radiated or solar loads

EXAMPLE:

Qt (watts) = 38.6 + 121 + 0 = 159.6 (Watts)
Qt (BTU/HR) = 129.3 + 413 + 0 = 542.3 (BTU/HR)

Using Performance Curves

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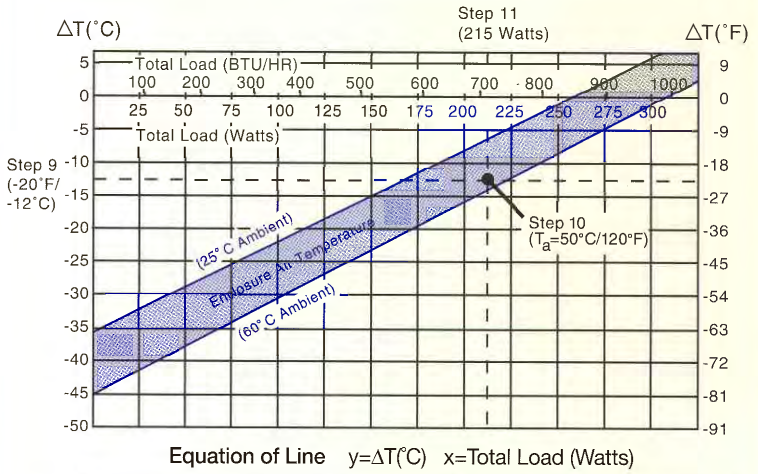
STEP	
9	Using the result from step 4, extend a horizontal line from ΔT line (vertical axis).
10	Place a point near the maximum ambient temperature determined from step1.
11	Extend a vertical line through the point, (from step 10), to intersect the ambient temperature line (horizontal axis) - This will determine the cooling capacity of this particular system, under the defined temperature constraints.
12	If the value obtained in step 11 > Qt, try the next smaller unit, if the value obtained is <Qt try the next larger unit.

Performance Curve: AHP-1801X



Equation of Line y=ΔT(˚C) x=Total Load (Watts)

	115 VAC		230 VAC	
Ambient	25˚C	60˚C	25˚C	60˚C
Enclosure	y = .137x-35.8	y = .143x-41.0	y = .136x-38.1	y = .147x-45.2
Cold Sink	y = .112x-37.4	y = .110x-43.0	y = .104x-38.9	y = .113x-46.1

Conversions

Units of Length

Unit	Inches	Feet	Centimeters	Meters
Inch	1	.08333	2.54	.0254
Foot	12	1	30.48	.3048
Cm	0.3937	.03218	1	0.01
Meter	39.37	3.2808	100	1

Units of Area

Unit	Square Inches	Square Feet	Square Centimeters	Square Meters
Sq. In.	1	.006944	6.45162	.000645
Sq. Ft.	144	1	929.034	.092903
Sq. Cm	0.155	.001076	1	.0001
Sq. M	1550	10.7639	10,000	1

Units of Temperature

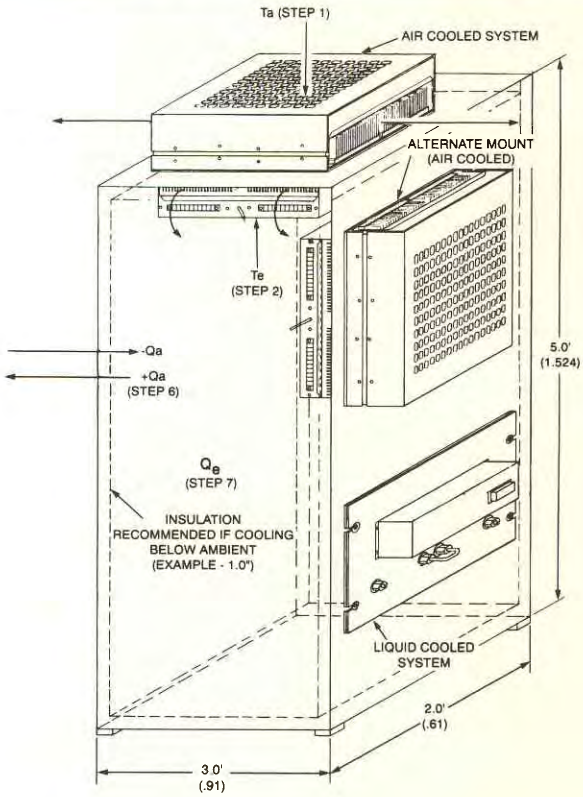
[9/5 x ˚C] + 32 = ˚F, 5/9 (˚F - 32) = ˚C

9/5 x Δ˚C = Δ˚F, 5/9 x Δ˚F = Δ˚C

Units of Power

1 Watt = 3.414 BTU/HR
1 BTU/HR = .2929 Watts
1 Horsepower = 746 Watts
WATT = Voltage x Current

Typical Mounting Configuration



Step 5 Sa= 2 [5 x 3] + 2 [3 x 2] + 2 [5 x 2] = 62 ft²
2 [1.524 x .91] + 2 [.91 x .61] + 2 [1.524 x .61] = 5.74 m²

NOTE: DIMENSIONS IN FEET (METERS)

Theory of Operation

Thermoelectric cooling, or as it is sometimes called, "The Peltier Effect," is a phenomenon discovered by a French watchmaker during the early 19th century. It is described as a solid-state method of heat transfer generated primarily through the use of dissimilar semiconductor materials. To understand the cooling method, it is first necessary to know how thermoelectric cooling systems differ from their conventional refrigeration counterparts.

Like conventional refrigeration, thermoelectrics obey the basic laws of thermodynamics. Both in result and principle, then, thermoelectric cooling has much in common with conventional refrigeration methods - only the actual system for cooling is different.

Perhaps the best way to show the differences in the two refrigeration methods is to describe the systems themselves. 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 above ambient level. The condenser helps discharge the absorbed heat into the ambient air.

In thermoelectric refrigeration, essentially nothing has changed. The refrigerant in both liquid and vapor form is replaced by two dissimilar conductors. The cold junction (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 compressor is replaced by a DC power source which pumps the electrons from one semiconductor to another. A heat sink replaces the conventional condenser fins, discharging the accumulated heat energy from the system.

The difference between the two refrigeration methods, then, is that a thermoelectric cooling system refrigerates without use of mechanical devices, except perhaps in the auxiliary sense, and without refrigerant.

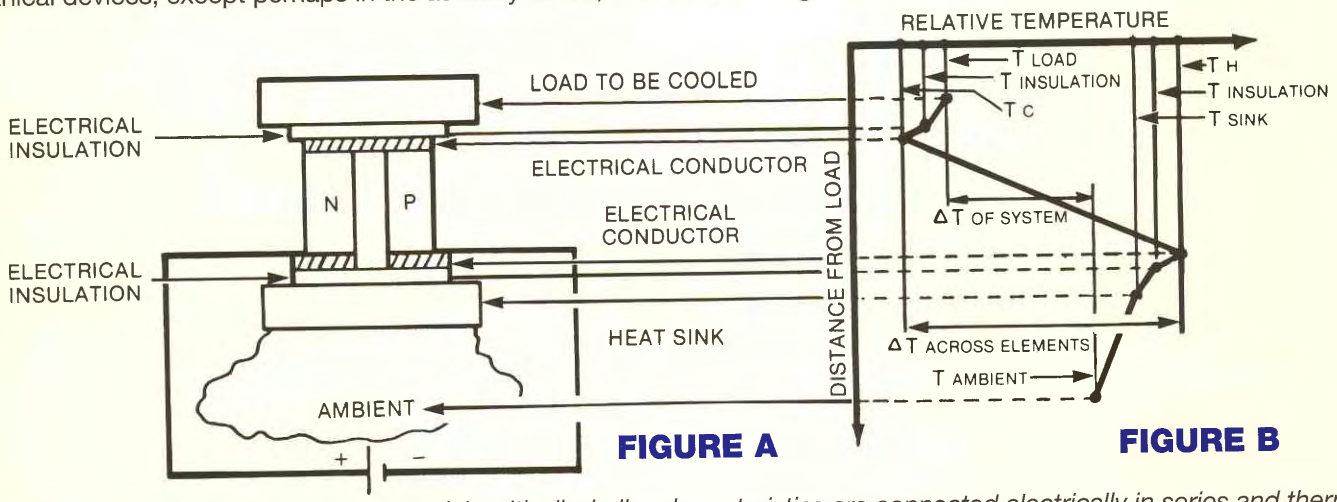


FIGURE A **FIGURE B**

Thermoelectrics (Def): Semiconductor materials with dissimilar characteristics are connected electrically in series and thermally in parallel, so that two junctions are created (Figure A).

The semiconductor materials are N and P type, and are so named because either they have more electrons than necessary to complete a perfect molecular lattice structure (N-type) or not enough electrons to complete a lattice structure (P-type). The extr electrons in the N-type material and the holes left in the P-type material are called "carriers" and they are the agents that move the heat energy from the cold to the hot junction.

Heat absorbed at the cold junction is pumped to the hot junction at a rate proportional to carrier current passing through the ci cuit and the number of couples. Good thermoelectric semiconductor materials such as bismuth telluride greatly impede conventional heat conduction from hot to cold areas, yet provide an easy flow for the carriers. In addition, these materials have car riers with a capacity for carrying more heat.

Heat Sinks:

The design of the heat exchanger is a very important aspect of a good thermoelectric system.

Figure B illustrates the steady-state temperature profile across a typical thermoelectric device from the load side to the ambien In figure B, the total steady-state heat which must be rejected by the heat sink to the ambient may be expressed as follows:

$$\text{Heat Rejected } (Q_s) = \text{Heat Absorbed From the Load } (Q_c) + \text{Power Input } (V \cdot I) + \text{Heat Leakage } (Q_1)$$

If the heat sink is not capable of rejecting the required Qs from the given system, the temperature of the entire system will rise and the cold junction temperature will increase. If the thermoelectric current is increased to maintain the load temperature, the COP (coefficient of performance) tends to decrease. Thus, a good heat sink contributes to improved COP.

Energy may be transferred to or from the thermoelectric system by three basic modes: conduction, convection, and radiation. The values of Qc and Q1 may easily be estimated; their total along with the power input gives Qs, the energy the hot-junction heat sink must dissipate.

Applications

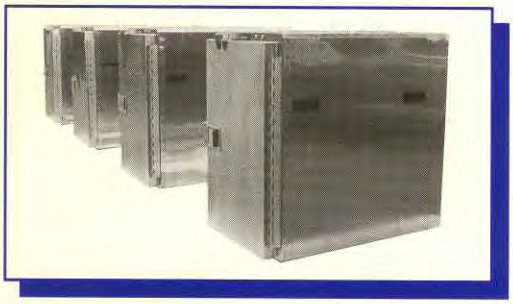
(312) 342-4900

There are many successful users of thermoelectric cooling systems.

Here are a few examples you may find helpful...

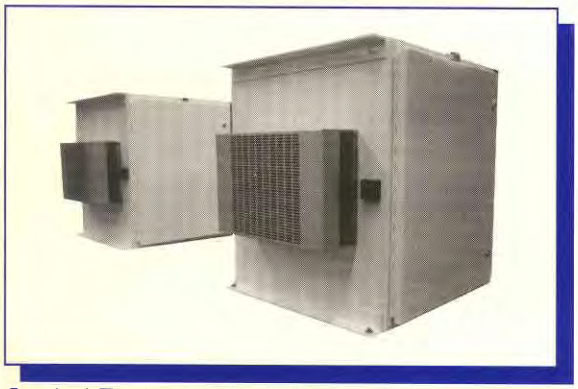
Cooled enclosure system for ADC Camera Power Supply.

(Photo courtesy of N.A.S.A.-Langley Research Center)



(Teca File Photo)

Food Service Refrigerators for Airborne Application



(Photo courtesy of Scientific Atlanta-Jet Propulsion Lab)

Cooled Enclosure System for Tower Mt. Horn/Electronics Assembly

(Photo courtesy of Veda Incorporated)

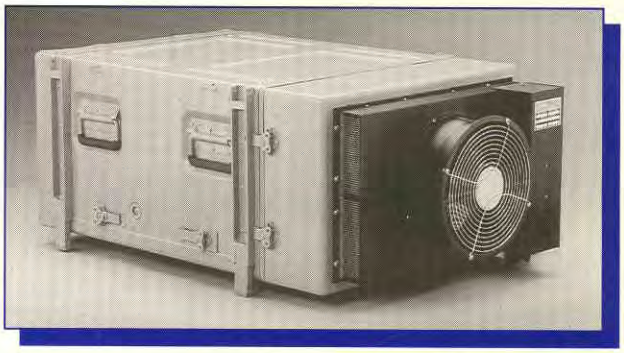
R.D.R.U. (Ruggedized Digital Recording Unit), utilizes a thermoelectric heat/cool system for reconnaissance data collection, flight test & evaluation, and automotive test and instrumentation.

(Photo courtesy of New Zealand Dairy Research Institute)

One of the world's leading centers for dairy research uses thermoelectric cold plates with temperature control for tempering fat samples prior to pulsed NMR measurement of solid fat content.

(Photo courtesy of Noah Precision)

A manufacturer in the semiconductor industry uses a solid state liquid chiller to precisely control fluid temperatures for water jacketed columns and etch baths.



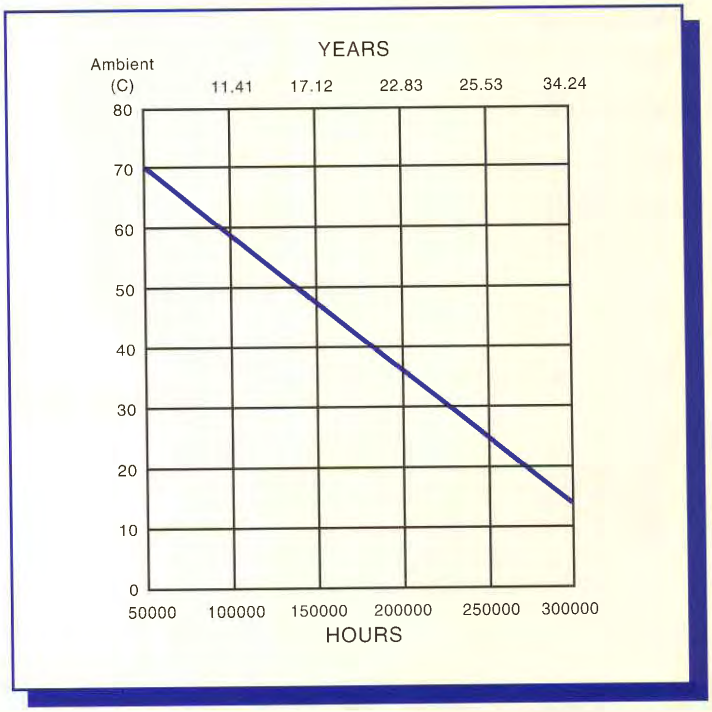
(Photo courtesy of EDAK)

A manufacturing specialist of transport equipment uses a solid state cooling system to protect electronic equipment from harsh, high stress conditions.

Life Expectancy/Reliability (M.T.B.F.)

The life expectancy of thermoelectric devices are exceptionally high due to their solid state construction. For air cooled air conditioners, service life is typically in excess of five (5) years, under normal conditions.

T.E. Modules



Drip Pan, Condensate Removal

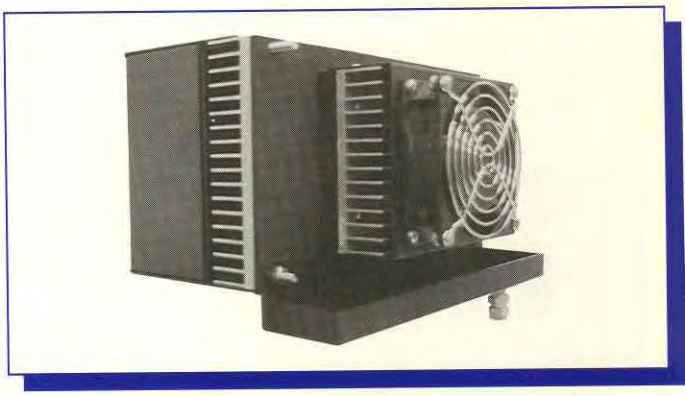
Teca offers optional drip pans for enclosures containing high humidity or incomplete cabinet seals. If moisture is present, it naturally attracts towards the cold side fins. In most instances, use of temperature control will help reduce or eliminate condensation. In situations where cooling below the dew point is necessary, drip pans will help isolate and remove moisture from the internal components. Drip pans are not available for the Americool Series, which have a built-in condensate absorbtion/removal system.

Drip Pan (Vertical Cold Side Fins)

Drip pans are positioned below the cold side fins in either a horizontal or vertical cold side fin orientation. (See photos) The pans have 1/4" NPT tap provided or a fitting for a 1/4" O.D. tubing. This enables the condensation to be drained externally.

Side Mount Only!

Drip Pan (Horizontal Cold Side Fins)



Ordering Information:

D ___ ___ – ___ ___ ___ ___

Example: DVA-301
This Drip Pan is used on model AHP-301FF

Series
A - Air Cooled, L - Liquid Cooled
V - Vert. Cold Side Fins, H - Horiz. Cold Side Fins

Plenum Assemblies (Flush Mount)

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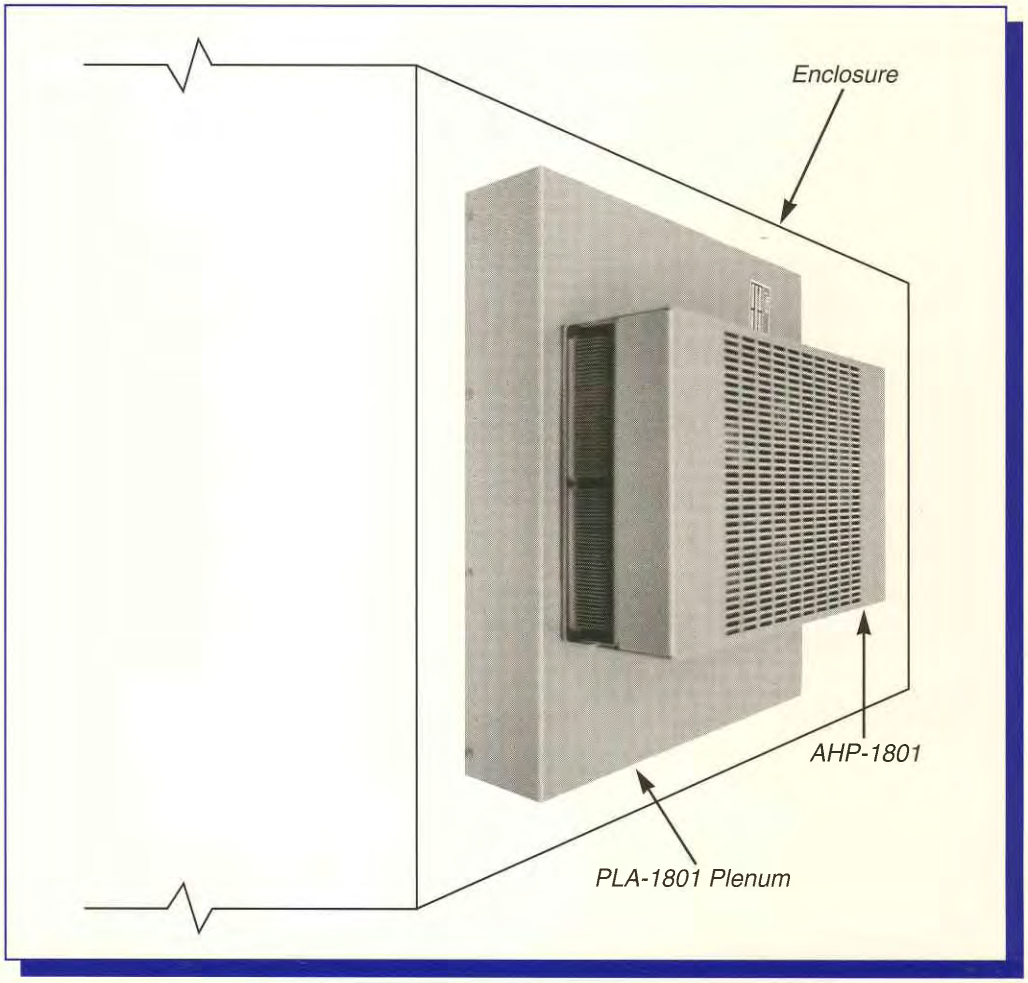
Teca offers optional plenum assemblies for applications requiring complete external mounting. Plenum assemblies are attached directly to the solid state air conditioner and are designed for side mount air conditioners only! The assemblies come complete with insulation, mounting studs, and gasket material. The enclosure air typically enters the center of the plenum and exits around opposite ends. Consult factory for availability and typical layout/mounting drawings.

Side Mount Only!



Ordering Information:

PL ___ – ___ ___ ___ ___

Series
A - Air Cooled
L - Liquid Cooled

Example: PLA-1801

Plenum Assembly for Air Cooled Models:

AHP-1801, AHP-1801X, AHP-1801HC, AHP-1801XHC

NEMA Enclosure Specifications

NEMA (National Electrical Manufacturers Association):

An enclosure is a surrounding case constructed to provide a degree of protection to the enclosed equipment against specified environmental conditions.

T.E.C.A. air conditioners are designed to maintain one or all of the following NEMA ratings:

NEMA 12: Type 12 enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt, and dripping noncorrosive liquids.

NEMA 4: Type 4 enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against wind-blown dust and rain, splashing water, and hose-directed water.

NEMA 4X: Type 4X enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, and hose-directed water.

Consult Catalog data sheets for NEMA ratings.

(Source: NEMA Publication No. 250, Part 1, Page 1)

E-1700 Cooled Enclosure System (Solid State)

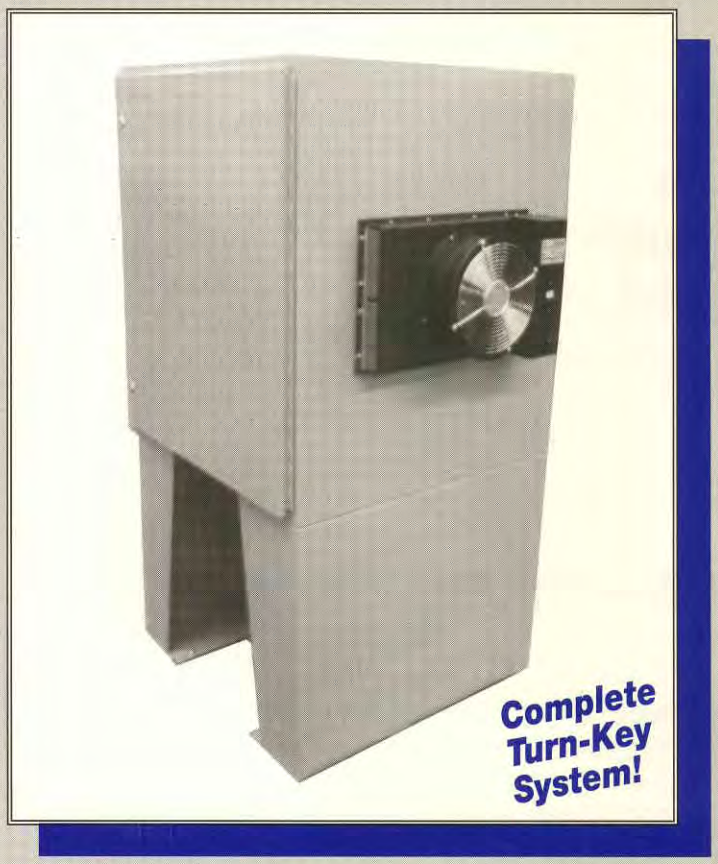
Cool Rating: 800 BTU/HR (@ 0°F ΔT Ambient/Enclosure Air)

Features:

- Model: AHP-1700 (Air Conditioner)
- 14 Gauge Construction
- Grey Prime Finish
- NEMA-12 Protection
- RA type rack (Front/Back Adjustment)
- Ambient range -30°C (-22°F) to +60°C (+140°F)
- 1/4 turn square insert latches with "Church" key
- 2 Foot Leg Stand
- 1 Inch Insulation
- Front Door Access
- Internal Wiring

Options:

- Heating
- Temperature Control
- Nema 4, 4X
- Special Sizing/Performance
- High Ambient Operation

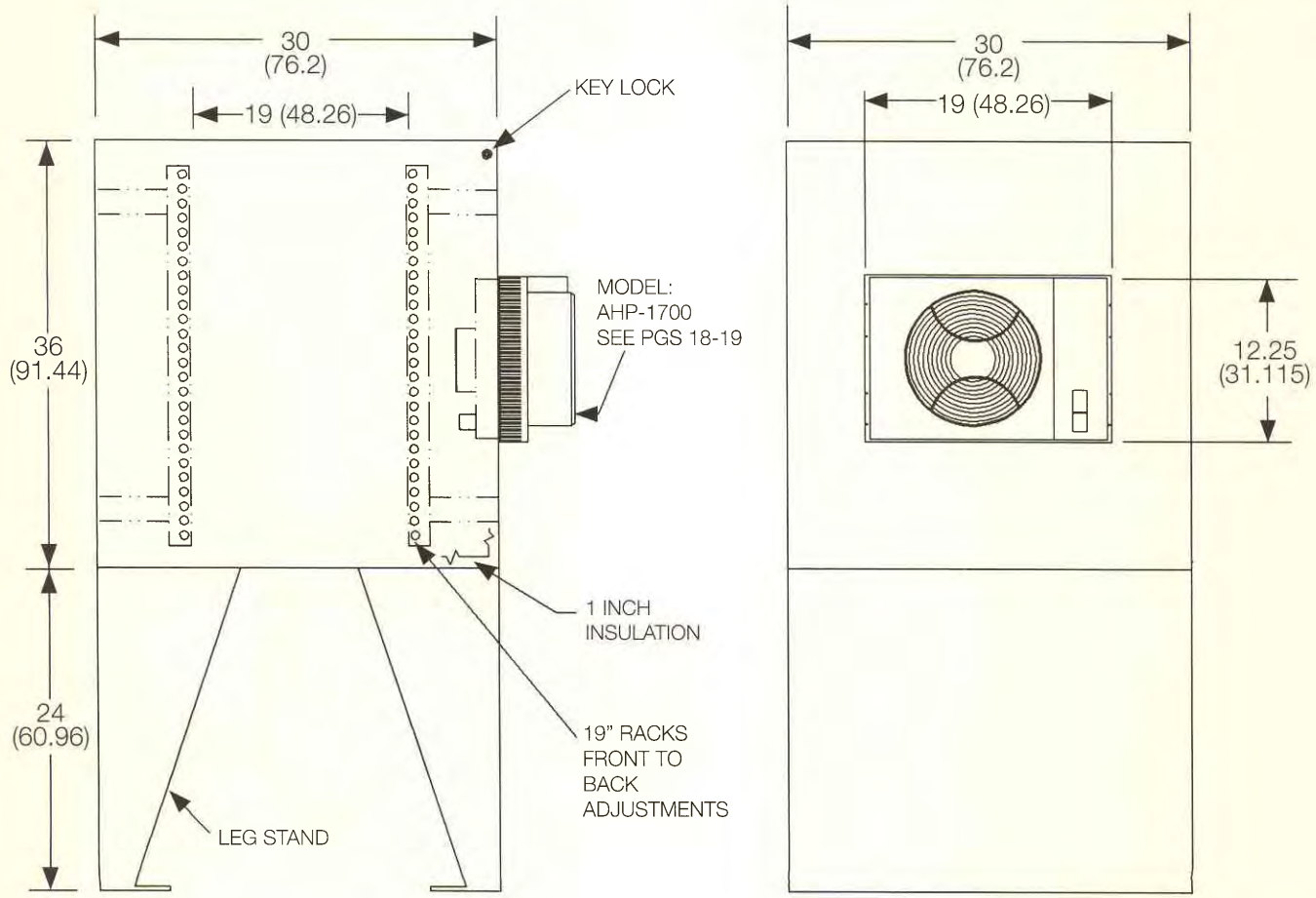


Ideal for Steel Mills, Paper Mills, and Factory Floor Environments

Get rid of the hassles in designing and packaging of complete systems. TECA's new E-1700 system comes complete, ready-to-go! Just apply 115 Volts AC. Designed to house electronic equipment from a standard 19" rack. Protect your electronic equipment from dust, dirt and other harsh contaminants.

We can customize and tailor to fit your needs. For further information, please consult factory.

Dimensions: inches (centimeters)



Specifications:

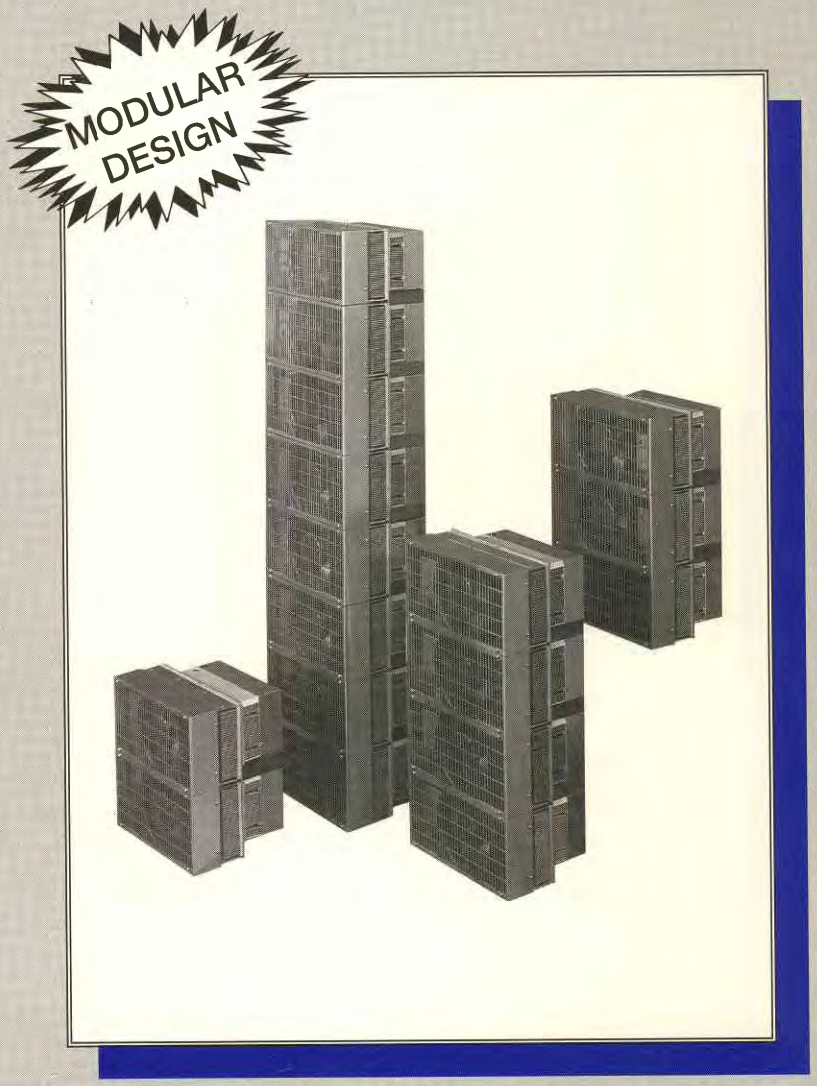
Input Voltage	115 VAC
Current	5.9 Amps
Frequency	50-60 Hz
Temperature Range	-30˚C (-22˚F) to +60˚C (+140˚F)
NEMA Rating	12
Weight	225 lbs/102 kg.
Temperature Control	Optional, Refer to pages 42-43

Americool Series 2000, 3000, 4000, 4002 Solid State Air Conditioners

Fin Rating: 950-2100 BTU/h, Air Rating 685-1600 BTU/h

Features/Benefits:

- Solid State Operation (Less Down Time)
- No Filters, Compressor, Fluorocarbons (Lower Maintenance Costs)
- High Ambient Operation (-30°C to +65°C) (Performance Increase at Higher Temperatures)
- 12" External Footprint (Mounts to Narrow Enclosures)
- Stainless Steel Housing (Durable and Attractive Exterior)
- Withstands Shock and Vibration (Can Operate in Mobile Environments)
- Nema- 12 Enclosure Rating Maintained (Internal Protection from Dust, Dirt and other Contaminants)
- Built in Condensate Removal System (Removes Moisture)
- Modular Design (Field Replaceable Subassemblies)
- Stud/Gasket Style Mounting (Fewer Mounting Restrictions)
- Temperature Controller Included (Enclosure Temperature Stability)



T.E.C.A.'s new Americool Series air conditioners are designed using a modular approach. Capacities up to 2100 BTU/h are available with a standard 115 VAC input.

Designed to excel in harsh industrial environments such as automotive, chemical, steel, and food processing industries, without the use of ozone depleting fluorocarbons.

Fans are the only moving part used to circulate air across the heat exchangers.

Easy to customize for: NEMA 4/4X, plenum, hi-efficiency mode, DC input (consult factory for details)

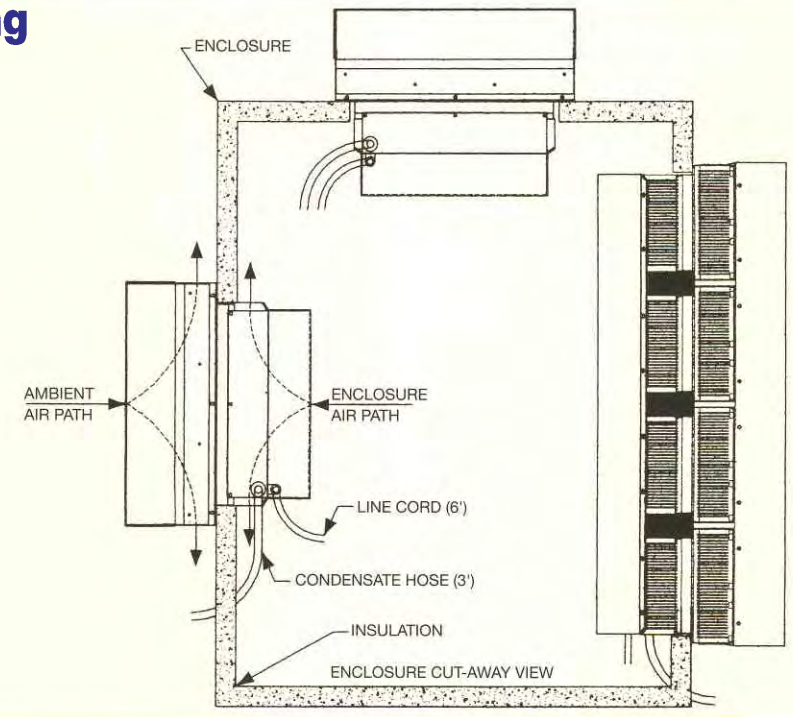
For sizing and performance please refer to page(s) 14, 15.

Americool Specifications:

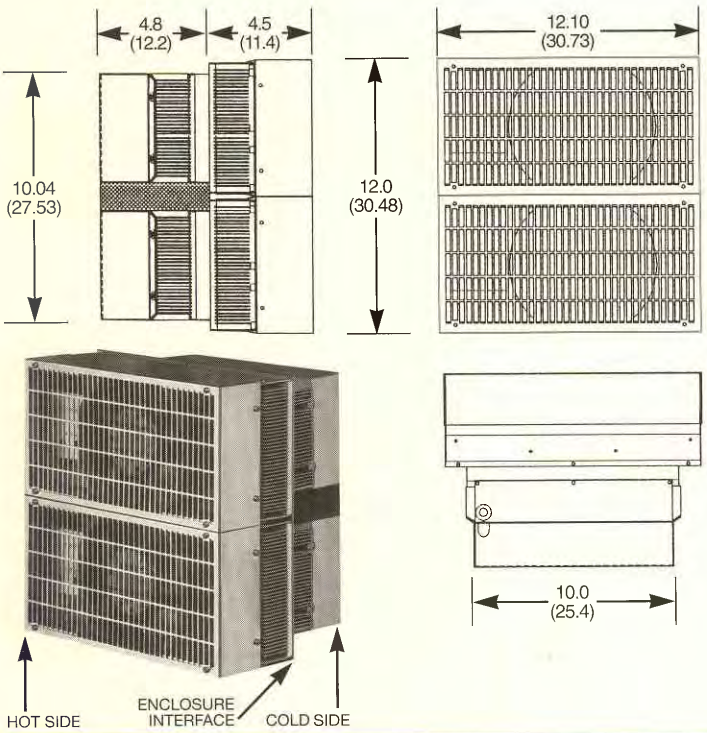
COOL ONLY				
MODELS:	**2000**	**3000**	**4000**	**4002**
Cold Side Fin Performance BTU/h (25˚-60˚C)	950-1025	1275-1450	1450-1575	1900-2100
Enclosure Air Performance BTU/h (25˚-60˚C)	685-850	1000-1100	1100-1200	1372-1600
Input Voltage (AC)	115	115	115	230
Current Average (Amps)	5.6-6.4	4.6-5.1	3.8-4.3	6.3-7.2
Current R.M.S. (Amps)	7.5-8.6	6.0-6.7	5.0-5.6	8.4-9.4
Frequency (Hz)	50/60	50/60	50/60	50/60
Minimum Ambient	-10˚C/+14˚F	-10˚C/+14˚F	-10˚C/+14˚F	-10˚C/+14˚F
Maximum Ambient	+70˚C/+158˚F	+70˚C/+158˚F	+70˚C/+158˚F	+70˚C/+158˚F
NEMA Rating	12	12	12	12
WEIGHT: (lbs./kg)	32/14.5	48/21.8	64/29	64/29
Temperature Control	TC-6F	TC-6F	TC-6F	TC-6F
Condensate Removal System	Built In	Built In	Built In	Built In
OPTIONS:				
Temperature Controllers *Refer to Pg. (s) 42, 43 For Further Control Info.*	965, 3200			

Typical Mounting Configuration

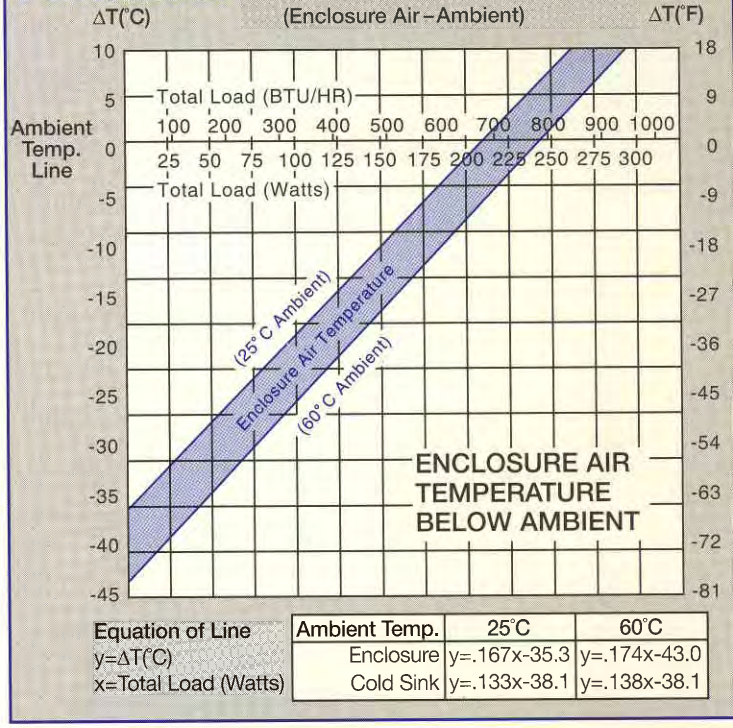
Americool 4000 Shown



Model: 2000 *inches (cm)*



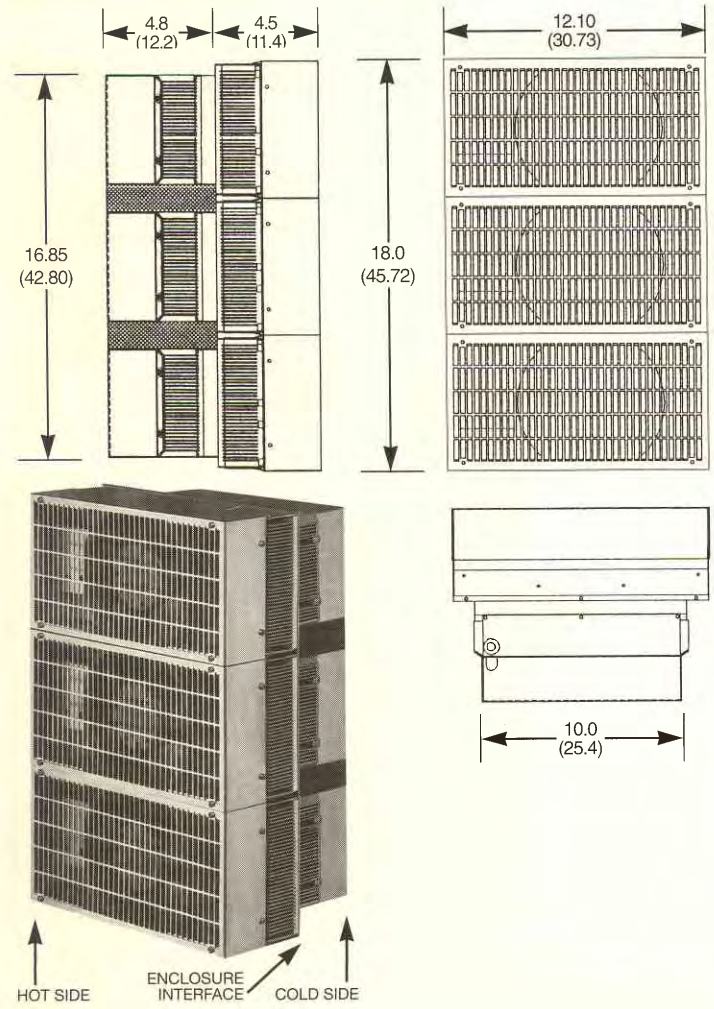
Performance Curve: Americool 2000



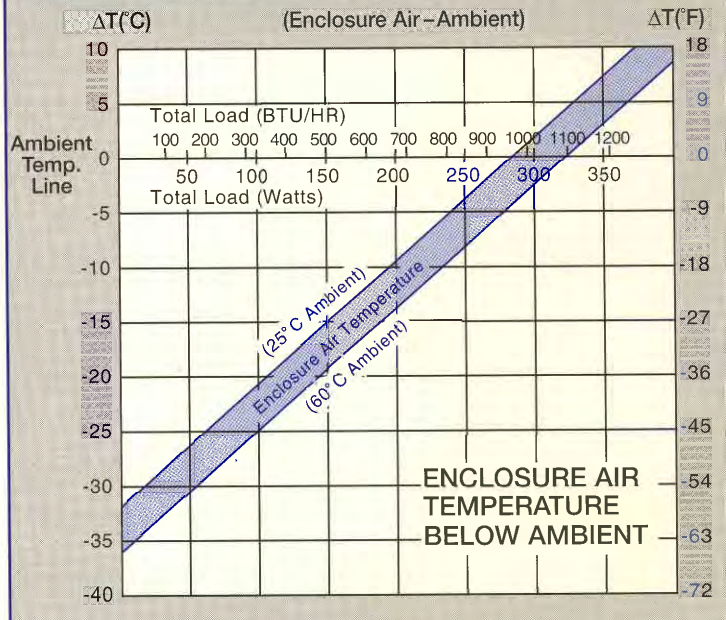
Equation of Line
y=ΔT(°C)
x=Total Load (Watts)

Ambient Temp.	25°C	60°C
Enclosure	y=.167x-35.3	y=.174x-43.0
Cold Sink	y=.133x-38.1	y=.138x-38.1

Model: 3000 *inches (cm)*



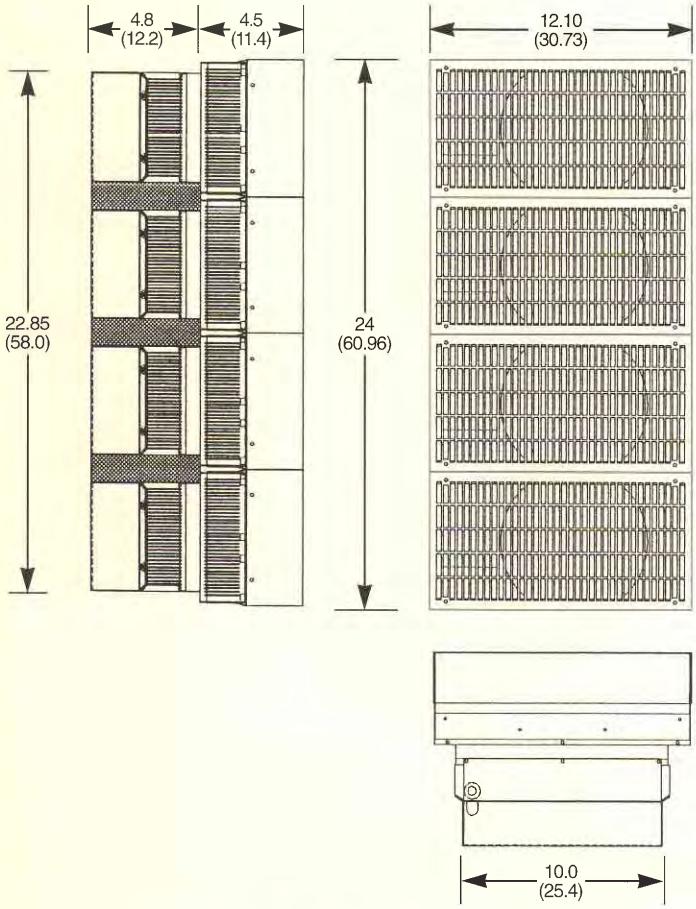
Performance Curve: Americool 3000

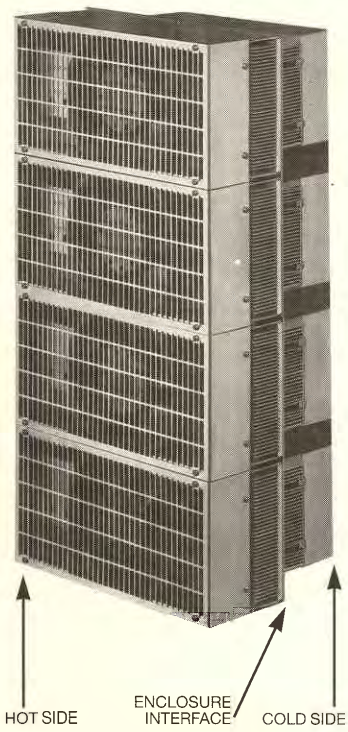


Equation of Line
y=ΔT(°C)
x=Total Load (Watts)

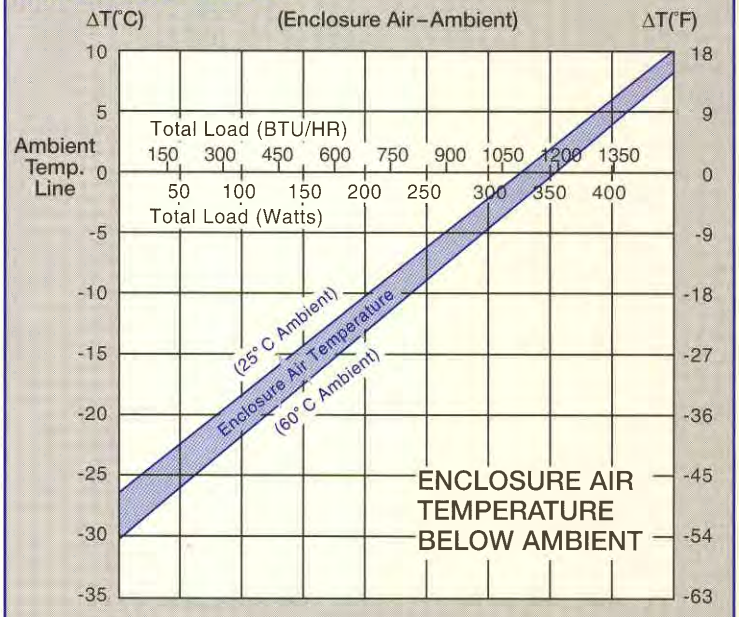
Ambient Temp.	25°C	60°C
Enclosure	y=.111x-32.2	y=.115x-36.6
Cold Sink	y=.088x-33.7	y=.092x-38.4

Model: 4000/4002 *inches (cm)*





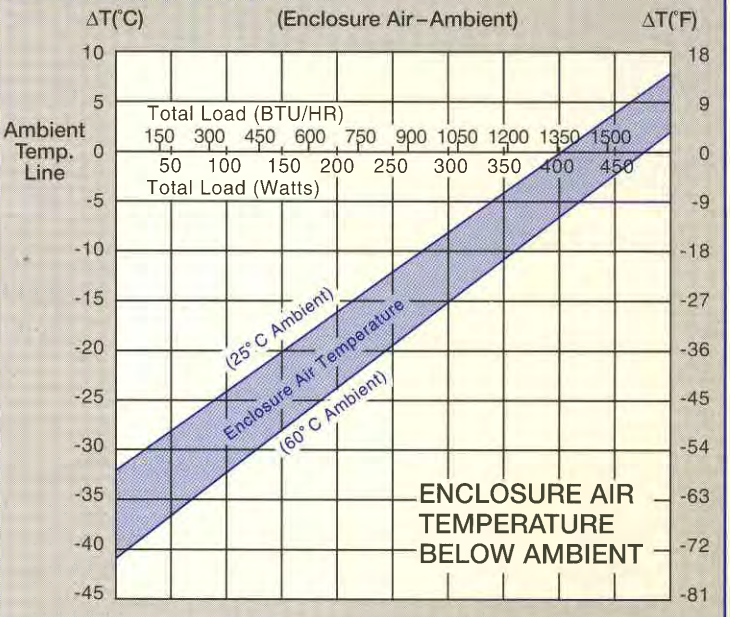
Performance Curve: Americool 4000



Equation of Line
y=ΔT(°C)
x=Total Load (Watts)

Ambient Temp.	25°C	60°C
Enclosure	y=.083x-27.0	y=.086x-30.0
Cold Sink	y=.064x-27.5	y=.066x-30.5

Performance Curve: Americool 4002



Equation of Line
y=ΔT(°C)
x=Total Load (Watts)

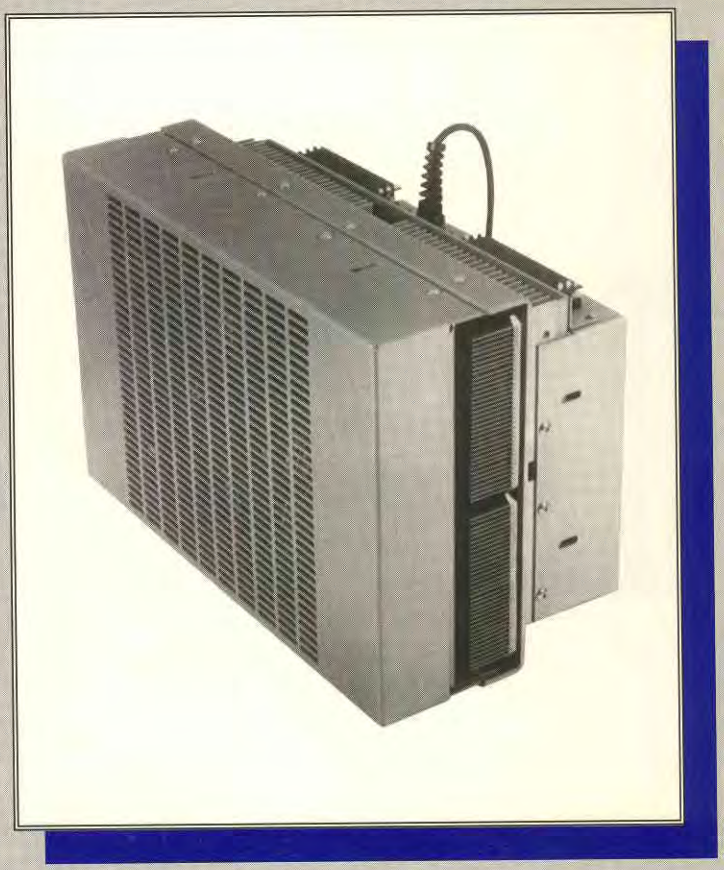
Ambient Temp.	25°C	60°C
Enclosure	y=.080x-32.4	y=.088x-41.3
Cold Sink	y=.060x-33.4	y=.068x-42.1

AHP-1801/AHP-1801X Solid State Air Conditioners

Fin Rating: 1150-1400 BTU/h; Air Rating: 900-1050 BTU/h; Heating: 1360 BTU/h (Opt.)

Features:

- Dual voltage 115/230 VAC
- Environmentally safe
- No fluorocarbons, compressor or piping
- Temperature controller included (TC-6F)
- No load cooling to -15°C (5°F) at room temperature of 20°C (68°F)
- Operates in any orientation horizontal, vertical, etc.
- Excels in high ambients -30°C (-22°F) to +80°C (176°F)
- Compact, weighs only 46 lbs. (20.9 kg.)
- Withstands corrosive environments, shock and vibration
- Sealed power supply
- Mil-spec fans
- Low vibration, noise, maintenance
- Mounting hardware and gasket material included



Please Note:

Model	NEMA
AHP-1801	12
AHP-1801X	12, 4, 4X

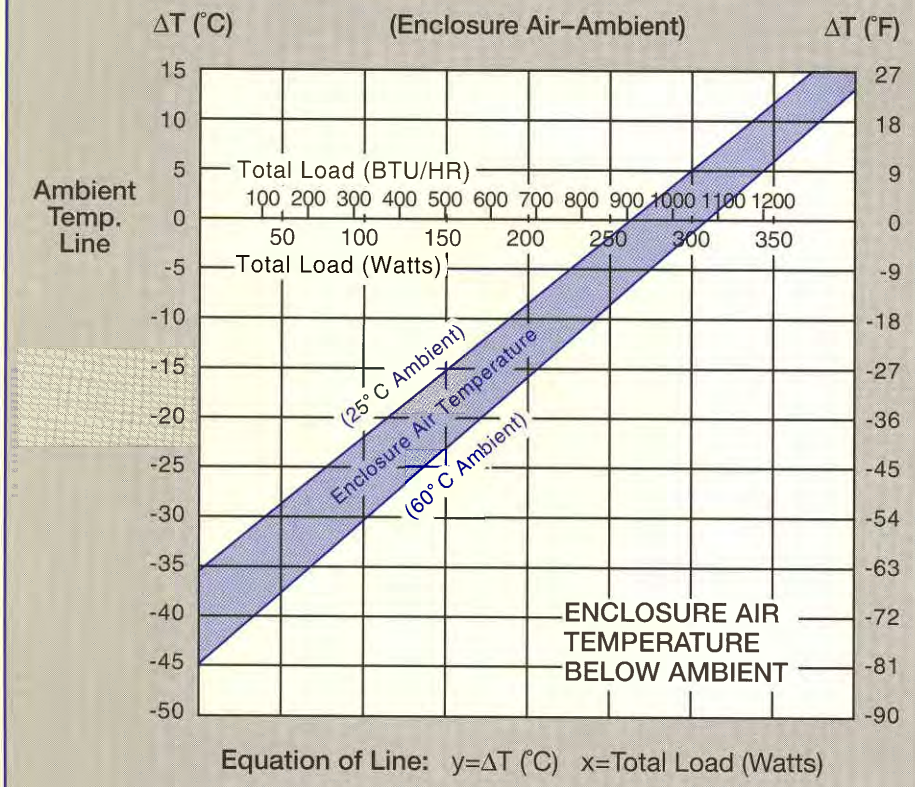
Applications in Remote Equipment Panels and Instrumentation Cooling

The AHP-1801X is a cooler designed for harsh industrial environments such as NEMA-4X. It can withstand corrosive salt spray, shock, vibration, windblown dust, rain, and water hose down in outdoor and indoor use. The AHP-1801X provides total protection from heat buildup in sealed electronic enclosures. It is used outdoors or indoors in steel mills, foundries, paper mills, communication and microwave antenna installations.

The AHP-1801 differs from the AHP-1801X in that it is designed for NEMA-12 enclosures. Both systems come complete with temperature control and mounting gaskets. A dual input of 115 or 230 VAC is standard.

Heating is offered as an option for both units, models AHP-l801XHC and AHP-1801HC. They come complete with thermostatic fixed point temperature control.

Performance Curve: AHP-1801/1801X



Equation of Line: y=ΔT (°C) x=Total Load (Watts)

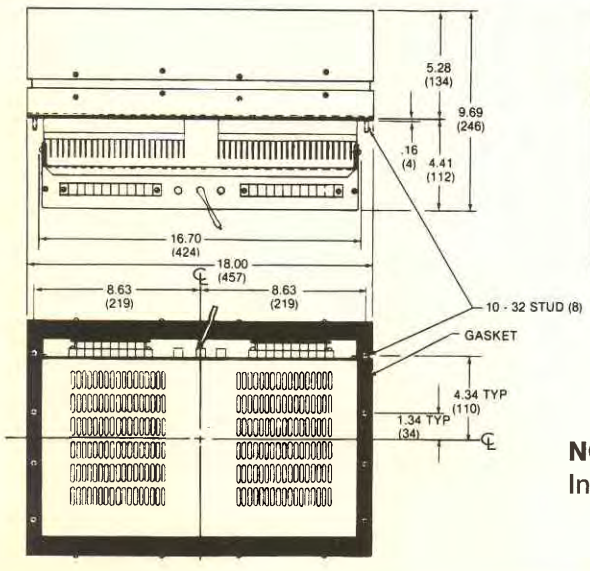
	115 VAC		230 VAC	
Ambient	25°C	60°C	25°C	60°C
Enclosure	y = .137x-35.8	y = .143x-41.0	y = .136x-38.1	y = .147x-45.2
Cold Sink	y = .112x-37.4	y = .110x-43.0	y = .104x-38.9	y = .113x-46.1

Specifications:

COOL ONLY		
Model	AHP-1801	AHP-1801X
Voltage	115/230 VAC	
Current	6.0/3.5 AMPS (Ave.)	
Frequency	50-60 HZ	
Min. Ambient	-30°C (-22°F)	-30°C (-22°F)
Max. Ambient	+60°C (+140°F)	+80°C (+176°F)
NEMA	12	4X
Weight	46 Lbs (20.9 Kg)	
Temp. Control	TC-6F	
HEAT & COOL	(Same Physical Size as Cool Only Model)	
Model	AHP-1801HC	AHP-1801XHC
Heaters	400 Watts	
Temp. Control	TC-3F	

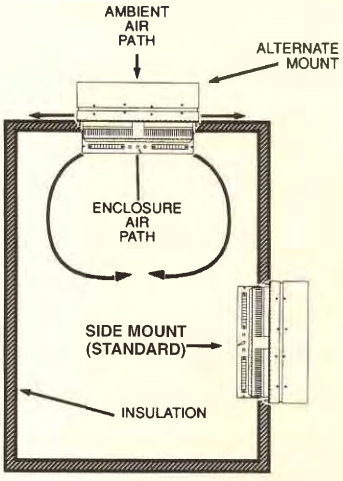
Options:

Temp. Control	965 (Heat/Cool)
	3200 (Cool only)
Refer to Pg(s). 42,43 for Further Control Info.	
Drip Pans	DVA-1801
	DHA-1801
Refer to Pg. 8 for Further Drip Pan Info.	
Plenum	PLA-1801
Refer to Pg. 9 (Flush Mount for Side Mount Only)	



NOTE Dimensions: Inches (millimeters)

Typical Mounting Method

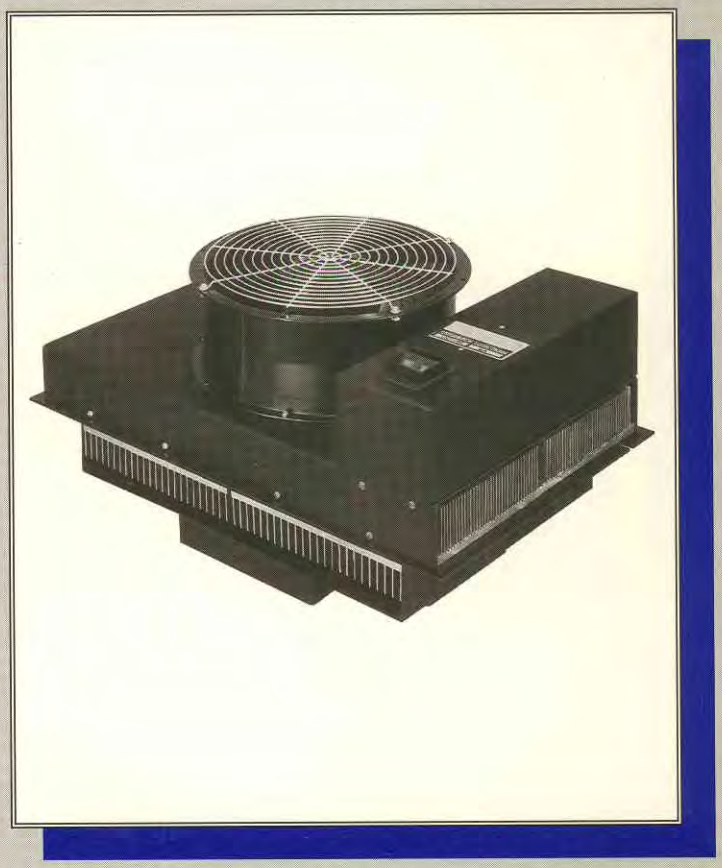


AHP-1700 Solid State Air Conditioner

Fin Rating: 975-1125 BTU/h; Air Rating: 750-825 BTU/h; Heating: 1360 BTU/h (Opt.)

Features:

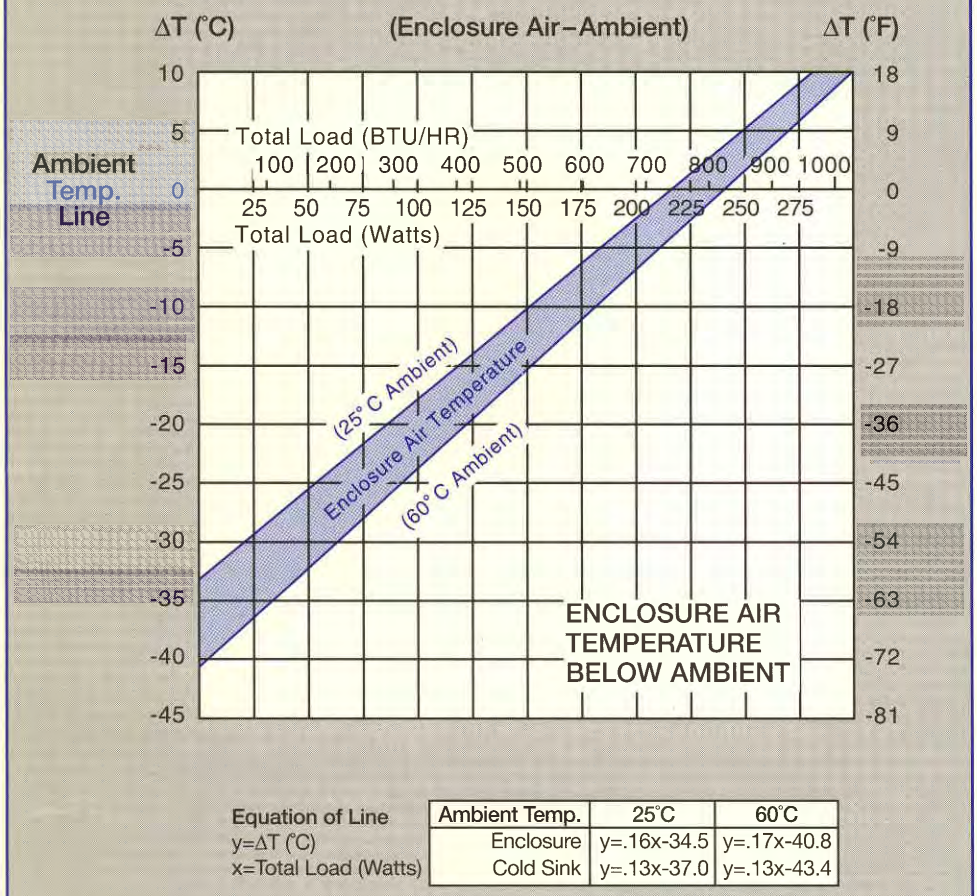
- Standard 19" rack mount
- Weighs under 18.2 kg. (40 lbs.)
- No fluorocarbons, compressor or piping
- No load cooling to -10°C (14°F) at room temperature of 25°C (77°F)
- Operates in any orientation horizontal, vertical, etc.
- Operates in -30°C (-22°F) to +60°C (+140°F)
- Low vibration, noise, maintenance
- Runs direct from 115 VAC input
- Environmentally safe



Applications in Computers, Machine Tools, Electronic Control Systems

Thousands of TECA's AHP-1700 NEMA-12 enclosure coolers are in use today in environments ranging from steel mills and assembly lines to computer rooms and robotics. The AHP-1700 is capable of cooling to temperatures below ambient without the use of a compressor, refrigerant or piping. This makes the AHP-1700 a rugged, dependable air conditioner. Because the AHP-1700 does not exchange air between the outside and the inside of the enclosure, clean air environment is maintained in the electronic enclosure. This is accomplished by using solid state thermoelectric modules to remove heat energy from any enclosure. Reliable fans are used to circulate cooling air.

Performance Curve: AHP-1700



Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

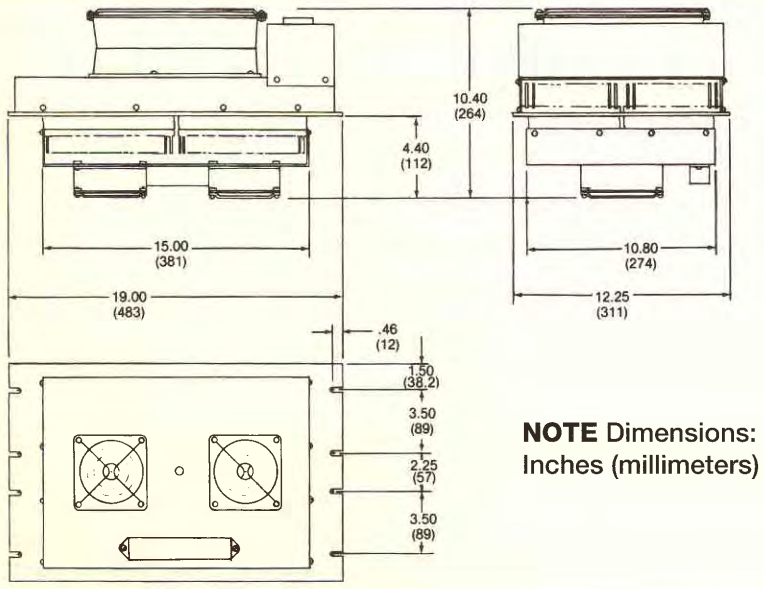
Ambient Temp.	25°C	60°C
Enclosure	y=.16x-34.5	y=.17x-40.8
Cold Sink	y=.13x-37.0	y=.13x-43.4

Specifications:

COOL ONLY	
Model	AHP-1700
Voltage	115 VAC
Current	5.9 AMPS (Ave.)
Frequency	50-60 HZ
Min. Ambient	-30°C (-22°F)
Max. Ambient	+60°C (+140°F)
NEMA	12
Weight	40 Lbs (18.2 Kg)
HEAT & COOL	(Same Physical Size as Cool Only Model)
Model	AHP-1700HC
Heaters	400 Watts
Temp. Control	TC-3F

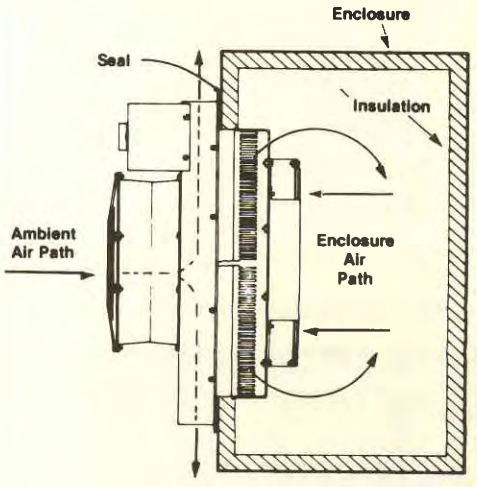
Options:

Temp. Control	965 (Heat/Cool)
	3200 (Cool only)
	TC-6F (Cool only)
Refer to Pg(s). 42,43 for Further Control Info.	
Drip Pans	DVA-1700
	DHA-1700
Refer to Pg. 8 for Further Drip Pan Info.	
Plenum	PLA-1700
Refer to Pg. 9 (Flush Mount for Side Mount Only)	



NOTE Dimensions: Inches (millimeters)

Typical Mounting Method

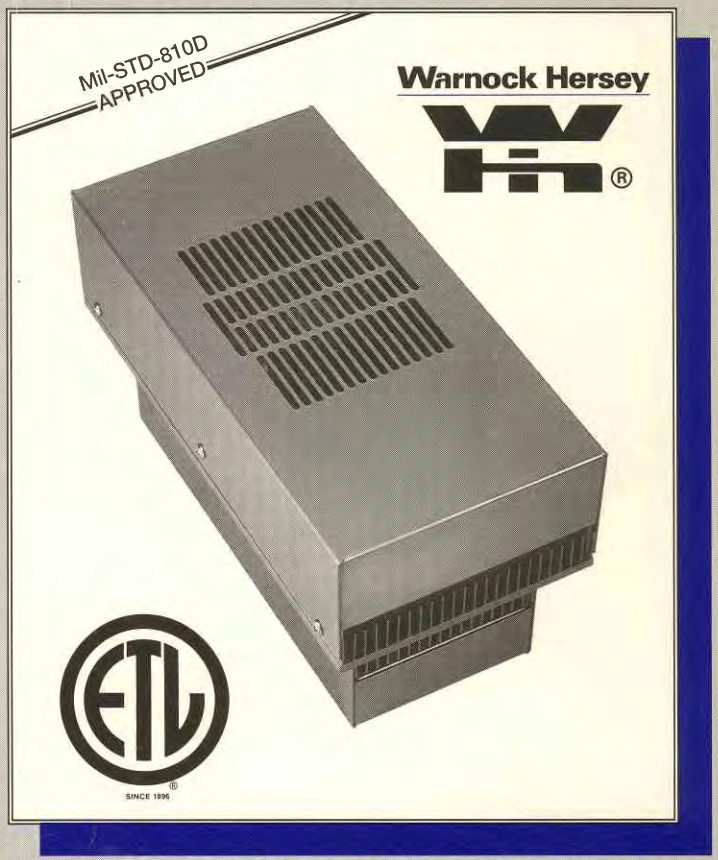


AHP-1200FF
AHP-1201FF/AHP-1200X Solid State Air Conditioners

Fin Rating: 625-700 BTU/h; Air Rating: 450-500 BTU/h; Heating: 680 BTU/h (Opt.)

Features:

- No fluorocarbons, compressor, or piping
- Temperature control included (TC-6F)
- Compact - only 15.0" x 7.4" x 8.0", weighs only 21 lbs. (9.5 kg)
- Operates in -30°C (-22°F) to +60°C (+140°F) (NEMA-12) -30°C (-22°F) to +80°C (+176°F) (NEMA 4,4X)
- No moving parts except fans, military grade fan on exterior hot side (NEMA 4X)
- Operates in any orientation horizontal, vertical, etc.
- Gasket and mounting hardware included
- Environmentally safe.
- Low vibration, noise, maintenance



Please Note:

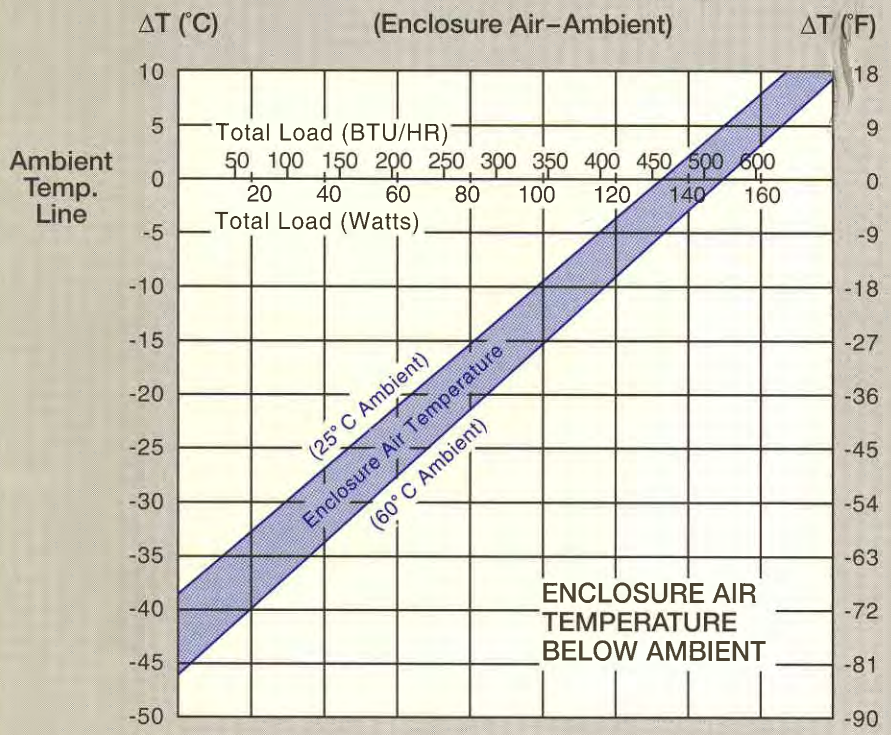
Model	AC Input	NEMA	Mil-STD-810D
AHP-1200FF	115	12	-
AHP-1201FF	115/230	12	-
AHP-1200X	115	12, 4, 4X	Salt Fog
AHP-1200XM	115	12, 4, 4X	Salt Fog, Shock & Vibration

Applications for outdoor instrumentation, mills, foundries, remote communications

The AHP-1200X is a cooler designed to excel in harsh industrial environments such as NEMA 4X. It can withstand corrosive salt spray, shock, vibration, wind blown dust, rain, and water hose down in outdoor and indoor use. The AHP-1200X provides total protection from heat buildup in sealed electronic enclosures. Used outdoors or indoors in steel mills, foundries, paper mills, shipboard, offshore, food processing plants, remote telephone communication and microwave antenna installations.

A combination of compact size, weight, and top quality components makes the AHP-1200X easy to use with the expectation of a long, service-free life. It is the most rugged fractional ton air conditioner ever offered. The AHP-1200FF is designed for NEMA-12 enclosures and accepts 115 VAC. The AHP-1201FF is also designed for NEMA 12 enclosures but has a dual primary input of 115/230 VAC. All systems are supplied with mounting hardware and a neoprene gasket, for snug, trim mounting.

Performance Curve: AHP-1200FF/1201FF/1200X



Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

Ambient Temp.	25°C	60°C
Enclosure	y=.30x-38.9	y=.31x-45.6
Cold Sink	y=.22x-40.3	y=.23x-47.0

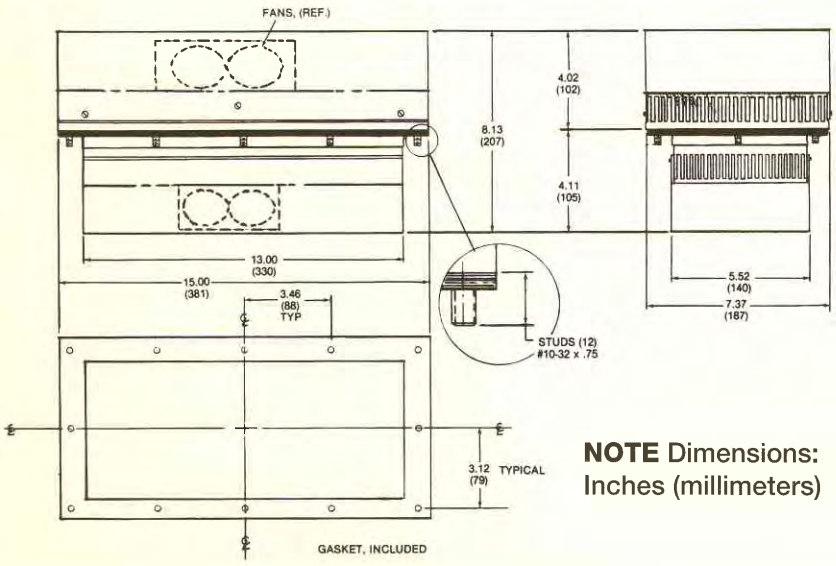
Specifications:

COOL ONLY			
Model	AHP-1200FF	AHP-1201FF	AHP-1200X
Voltage (AC)	115	115/230	115
Current Amps (AVE.)	3.1	3.1/2.0	3.1
Frequency (HZ)	50-60		
Min. Ambient	-10°C	-10°C	-30°C
Max. Ambient	+60°C	+60°C	+80°C
NEMA	12	12	4X
Weight	21 Lbs		
Temp. Control	TC-6F		

HEAT & COOL	(Same Physical Size as Cool Only Model)		
Model	AHP-1200FFHC	AHP-1201FFHC	AHP-1200XHC
Heaters	200 Watts		
Temp. Control	TC-3F		

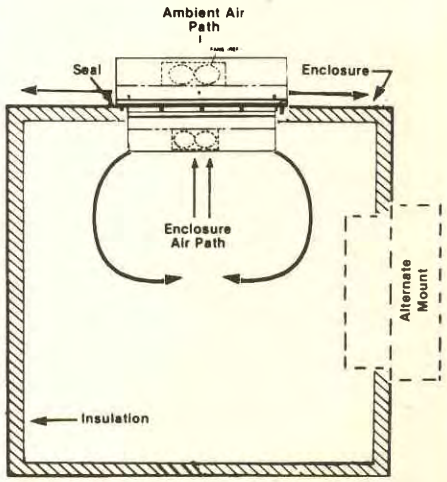
Options:

Temp. Control	965 (Heat/Cool)
	3200 (Cool only)
Refer to Pg(s). 42,43 for Further Drip Pan Info.	
Drip Pans	DVA-1200
	DHA-1200
Refer to Pg. 8 for Further Control Info.	
Plenum	PLA-1200
Refer to Pg. 9 (Flush Mount for Side Mount Only)	



NOTE Dimensions: Inches (millimeters)

Typical Mounting Method

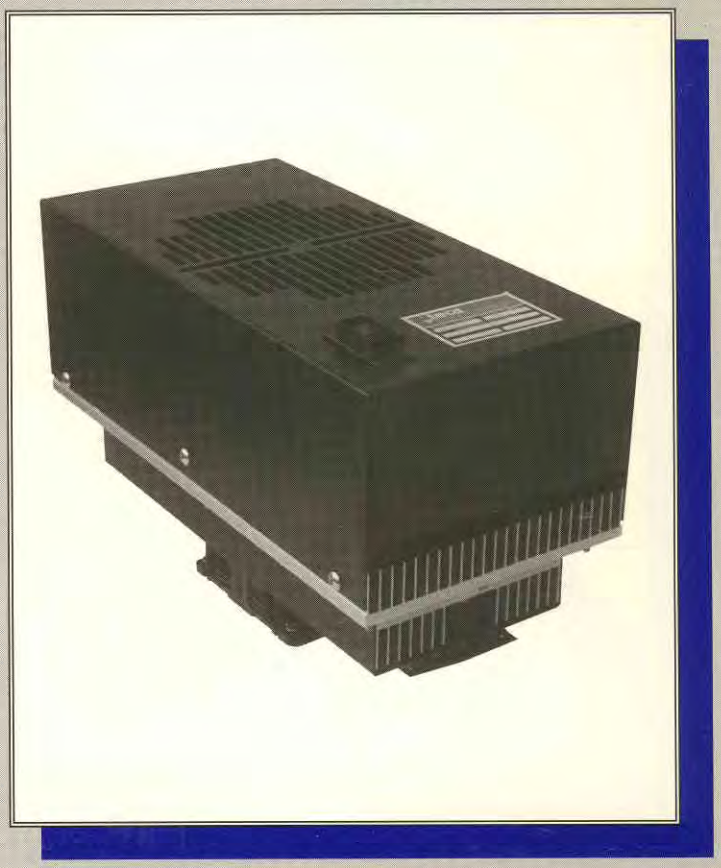


AHP-1000FF Solid State Air Conditioner

Fin Rating: 550-625 BTU/h; Air Rating: 425-485 BTU/h; Heating: 680 BTU/h (Opt.)

Features:

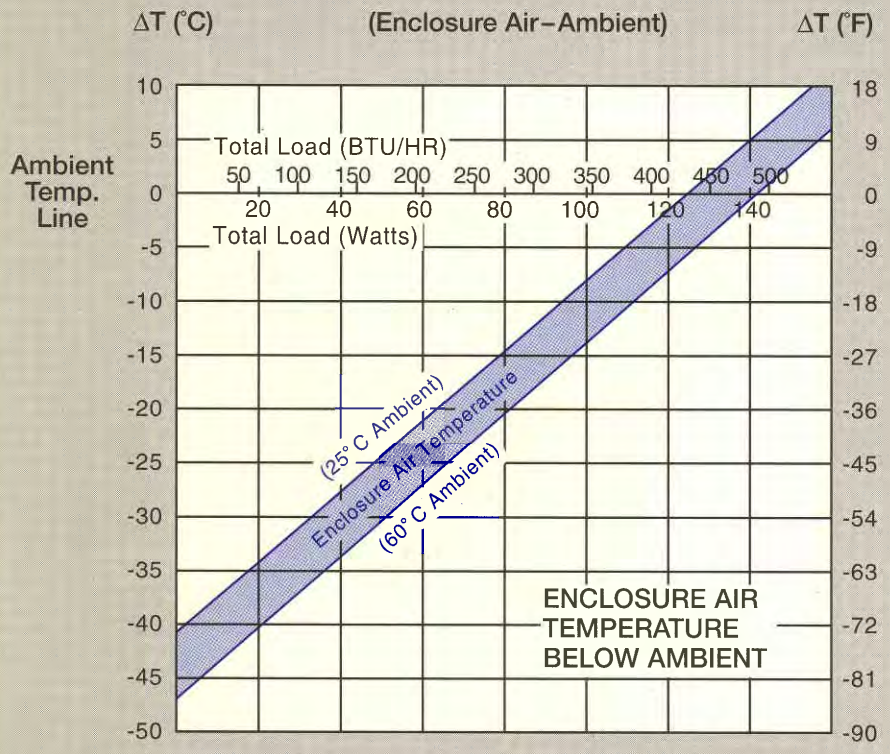
- No load cooling to -16°C (3°F) at room temperature of +25°C (+77°F)
- Weighs 24 lbs (10.9 kg)
- Closed system protection from dust, chips, moisture
- No fluorocarbons, compressor or piping
- Operates in any orientation, horizontal, vertical, etc.
- Low vibration, noise, maintenance
- Operates in -30°C (-22°F) to +65°C (+149°F)
- Gasket and mounting hardware included
- Environmentally safe



Applications in computers, machine tools, instrumentation or package cooling.

A combination of convenient size, light weight, and an integral power supply make the AHP-1000FF one of TECA's most versatile units. Applications of the AHP-1000FF range from the factory to the laboratory. Used as a NEMA-12 cabinet cooler, the AHP-1000FF removes heat energy without exchanging air between the outside and the inside of the cabinet. Heat removal and temperatures below ambient are accomplished by an efficient combination of solid state thermoelectric modules, heat sinks and fans.

Performance Curve: AHP-1000FF



Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

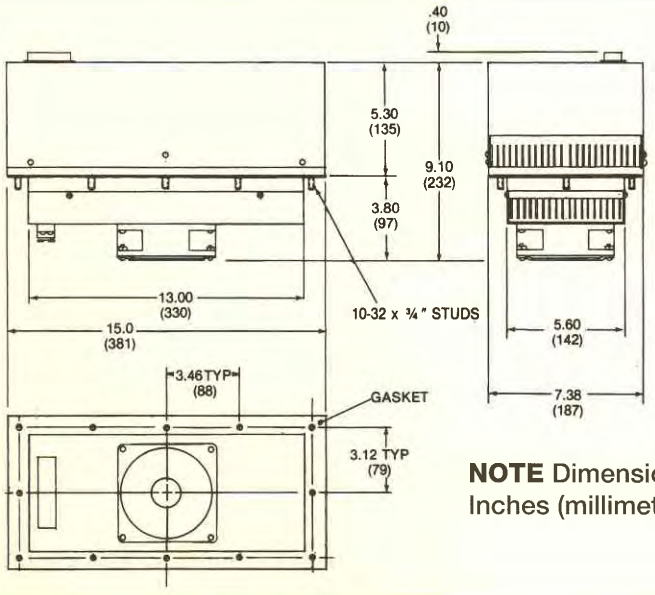
Ambient Temp.	25°C	60°C
Enclosure	y=.33x-41.1	y=.33x-46.9
Cold Sink	y=.26x-42.6	y=.26x-48.3

Specifications:

COOL ONLY	
Model	AHP-1000FF
Voltage	115 VAC
Current	2.9 AMPS (Ave.)
Frequency	50-60 HZ
Min. Ambient	-10°C (+14°F)
Max. Ambient	+65°C (+149°F)
NEMA	12
Weight	24 Lbs (10.9 Kg)
HEAT & COOL	(Same Physical Size as Cool Only Model)
Model	AHP-1000FFHC
Heaters	200 Watts
Temp. Control	TC-3F

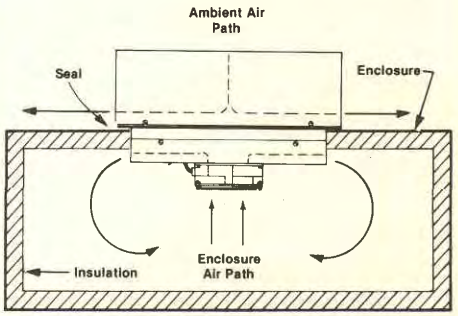
Options:

Temp. Control	965 (Heat/Cool)
	3200 (Cool only)
Refer to Pg(s). 42,43 for Further Control Info.	
Drip Pans	DVA-1000
	DHA-1000
Refer to Pg. 8 for Further Drip Pan Info.	
Plenum	PLA-1000
Refer to Pg. 9 (Flush Mount for Side Mount Only)	



NOTE Dimensions: Inches (millimeters)

Typical Mounting Method

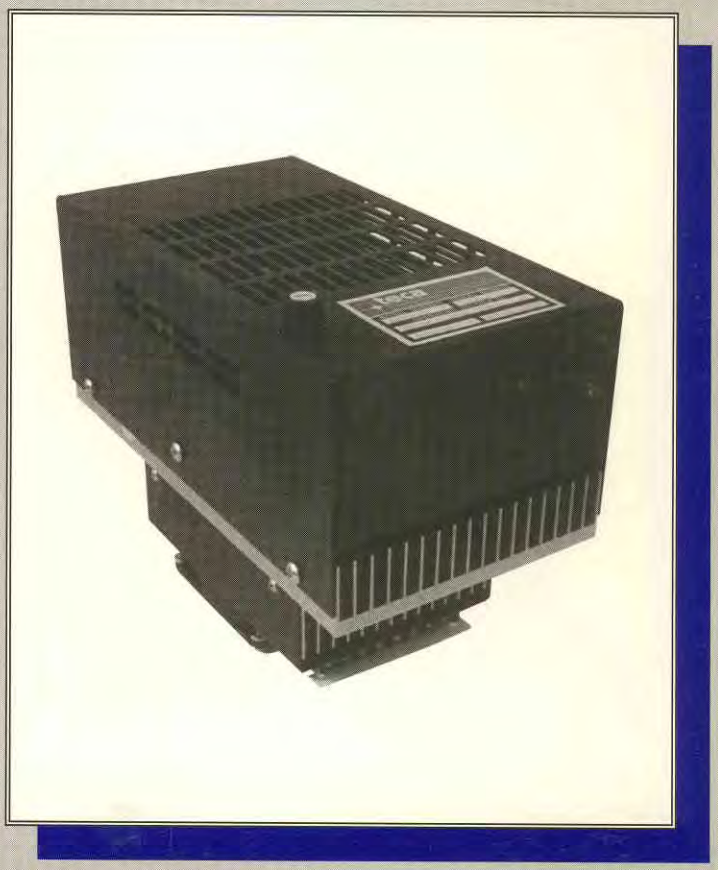


AHP-301FF Solid State Air Conditioner

Fin Rating: 210-230 BTU/h; Air Rating: 160-200 BTU/h; Heating: 340 BTU/h (Opt.)

Features:

- Operates from 115 or 230 VAC, 50 or 60 Hz
- No load cooling to -15°C (5°F), at room temperature of +25°C(+77°F)
- Weighs only 5.4 kg. (12 lbs.)
- No compressor
- Closed system protection from dust, chips, moisture
- No moving parts except fans
- Low vibration, noise, maintenance
- Anodized aluminum finish
- Operates in any orientation-horizontal, vertical, etc.
- Operates in -30°C (-22°F) to +60°C (+140°F) ambients
- Mounting Hardware and Gasket included
- Environmentally safe

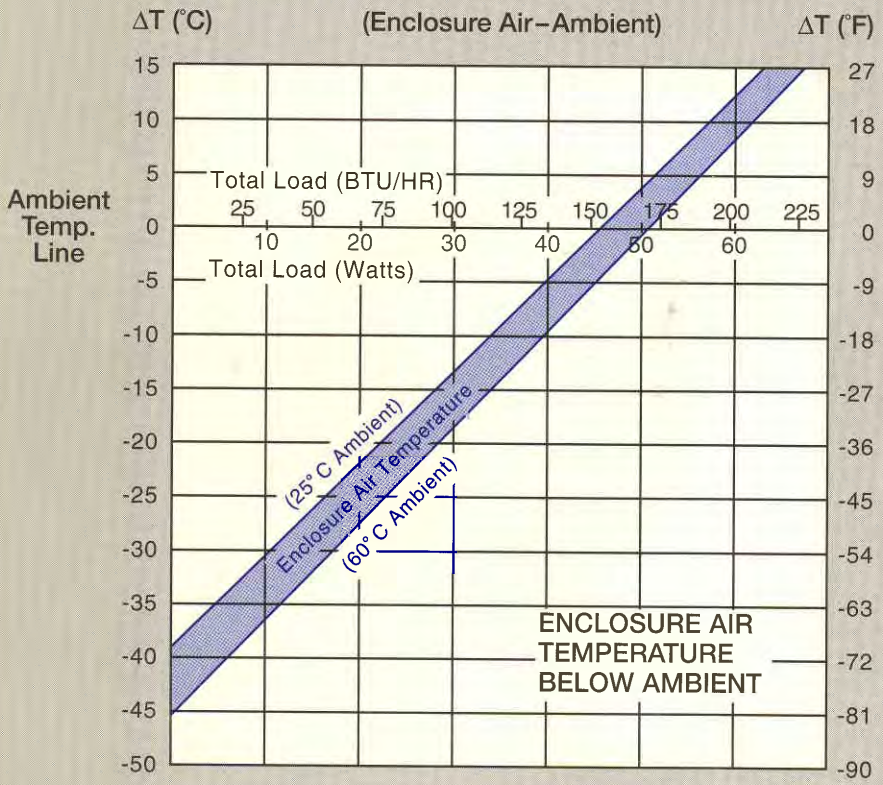


Applications in Computers and Control Instrumentation Cooling

TECA's AHP-301 FF is a solid-state enclosure cooler designed for compact enclosure cooling. It is the smallest air conditioner in the world to operate directly from either 115 or 230 VAC input power. Ideal for computers, disk drives, camera housings, and control instrumentation.

Heating is offered as an option, model AHP-301 FFHC. It comes complete with a TC-3F temperature controller. Plenum housings are also offered for applications where internal enclosure space is limited and flush mounting with no intrusion is required, consult the factory for further details.

Performance Curve: AHP-301FF



Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

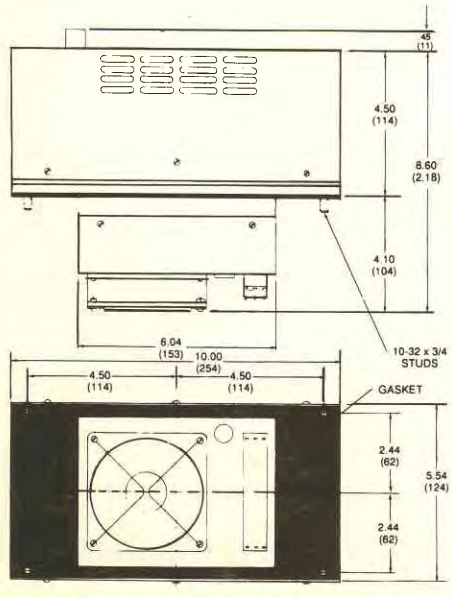
Ambient Temp.	25°C	60°C
Enclosure	y=.84x-39.7	y=.81x-45.8
Cold Sink	y=.64x-39.4	y=.68x-45.7

Specifications:

COOL ONLY	
Model	AHP-301FF
Voltage	115/230 VAC
Current	1.2/0.6 AMPS (Ave.)
Frequency	50-60 HZ
Min. Ambient	-30°C (-22°F)
Max. Ambient	+70°C (+158°F)
NEMA	12
Weight	12 Lbs (5.4 Kg)
HEAT & COOL	(Same Physical Size as Cool Only Model)
Model	AHP-301FFHC
Heaters	100 Watts
Temp. Control	TC-3F

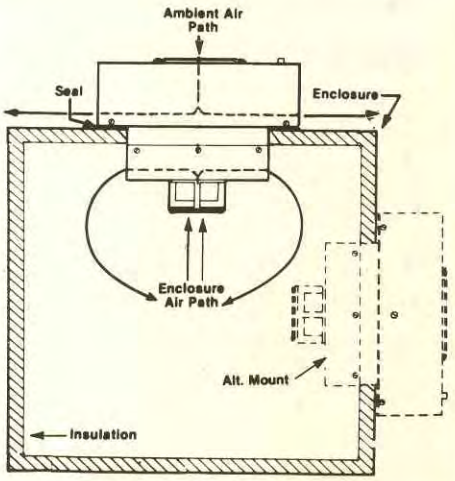
Options:

Temp. Control	965 (Heat/Cool)
	3200 (Cool only)
	TC-6F (Cool only)
Refer to Pg(s). 42,43 for Further Control Info.	
Drip Pans	DVA-301
	DHA-301
Refer to Pg. 8 for Further Drip Pan Info.	
Plenum	PLA-301
Refer to Pg. 9 (Flush Mount for Side Mount Only)	



NOTE Dimensions: Inches (millimeters)

Typical Mounting Method



AHP-300FF Solid State Air Conditioner

Fin Rating: 235-275 BTU/h; Air Rating: 185-210 BTU/h; Heating: 250 BTU/h (Opt.)

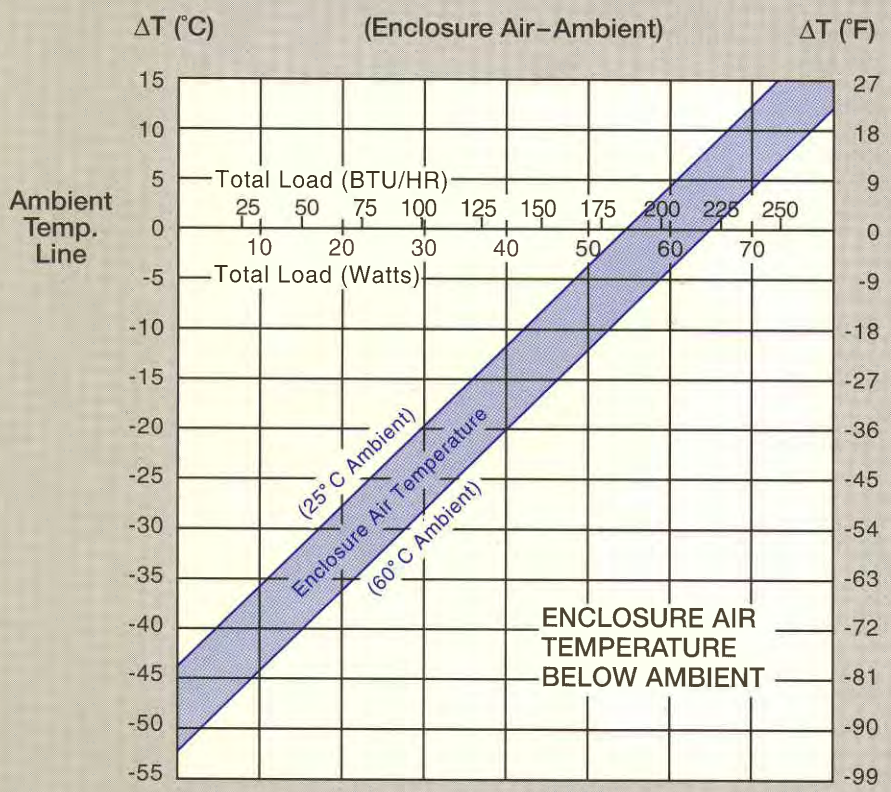
Features:

- No load cooling to -20°C (-4°F), at room temperature of +24°C (+75°F)
- Weighs only 3.4 kg. (7.5 lbs.)
- No compressor
- Closed system protection from dust, chips, moisture
- No moving parts except fans
- Low vibration, noise, maintenance
- Anodized aluminum finish
- Operates in any orientation - horizontal, vertical, etc.
- Operates in -30°C (-22°F) to +60°C (+140°F)
- Brushless DC Fans
- Input voltage 12/24/48 VDC
- Available in NEMA -4/4x version (option)

Applications in Motor Vehicles and Control Instrumentation Cooling

TECA's model AHP-300FF is an air cooled heat pump which comes in the fin and fan style. Thermoelectric modules are utilized to transfer the heat from the cold side to the hot side. This makes the AHP-300FF ideal for cooling small enclosures where it will provide both cooling and a clean environment for sensitive electronics. A gasket and mounting hardware are provided to maintain NEMA-12 integrity. For harsh, corrosive environments, TECA offers model AHP-300X, it is designed with Mil-spec components capable of withstanding NEMA-4X environments. Consult the factory for further information.

Performance Curve: AHP-300FF



Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

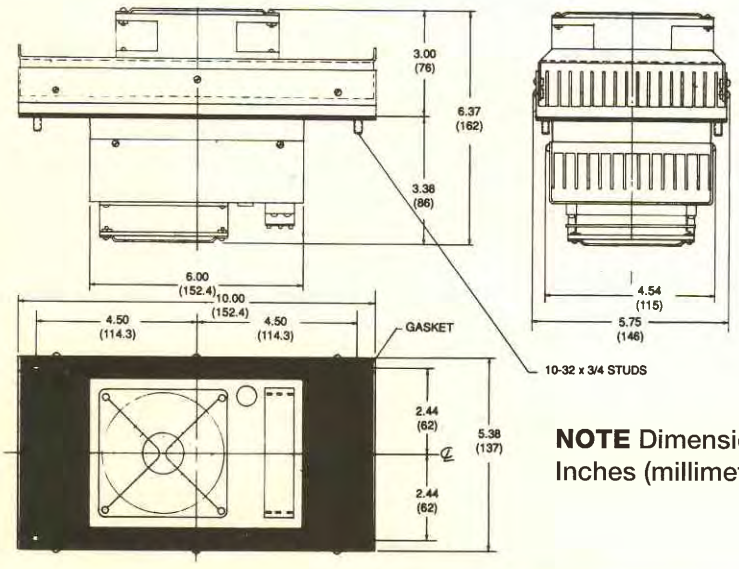
Ambient Temp.	25°C	60°C
Enclosure	y=.82x-44.3	y=.86x-53.3
Cold Sink	y=.64x-44.3	y=.68x-53.3

Specifications:

COOL ONLY		
Model	AHP-300FF	AHP-300X
Voltage	12/24/48 VDC	
Current	12.5/6.3/3.1 AMPS	
Min. Ambient	-30°C (-22°F)	
Max. Ambient	+70°C (+158°F)	+80°C (+176°F)
NEMA	12	4X
Weight	7.5 Lbs (3.4 Kg)	
HEAT & COOL	(Same Physical Size as Cool Only Model)	
Model	AHP-300FFHC	AHP-300XFFHC
Voltage	24 VDC Only	
Heaters	72 Watts	
Temp. Control	TC-3FDC	

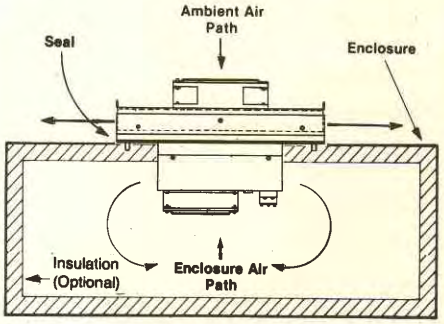
Options:

Temp. Control	965DC (Heat/Cool)
	3200DC (Cool only)
	TC-6FDC (Cool only)
Refer to Pg(s). 42,43 for Further Control Info.	
Drip Pans	DVA-300
	DHA-300
Refer to Pg. 8 for Further Drip Pan Info.	
Plenum	PLA-300
Refer to Pg. 9 (Flush Mount for Side Mount Only)	



NOTE Dimensions: Inches (millimeters)

Typical Mounting Method

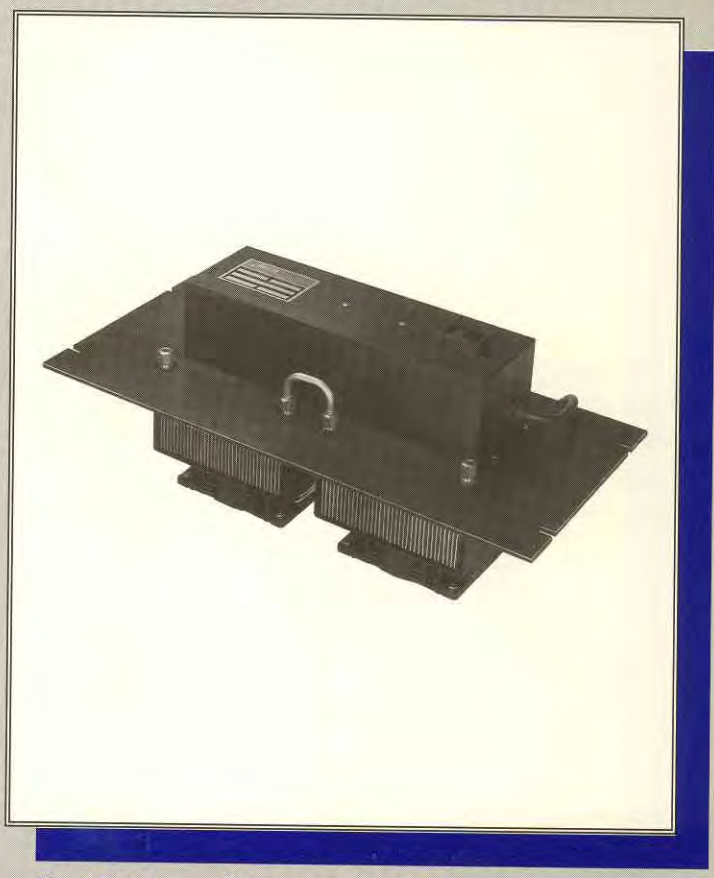


LHP-1700FF/LHP-1702FF Solid State Air Conditioner

Fin Rating: 1475-1725 BTU/h; Air Rating: 1000-1200 BTU/h; Heating: 1360 BTU/h (Opt

Features:

- No load cooling to -22°C (-7°F) at 25°C coolant temperature
- Standard 19" rack mount
- No fluorocarbons or compressor required
- Operates in -30°C (22°F) to +80°C (+176°F) ambients
- Less than 1-1/4 sq. ft. panel space
- No exposed fans
- Integral DC power supply
- Operates in any orientation horizontal, vertical, etc.
- Weighs under 21 lbs (9.5 kg)
- Adaptable to NEMA-4 and explosion proof applications
- Available in 115 or 230 VAC
- Environmentally safe



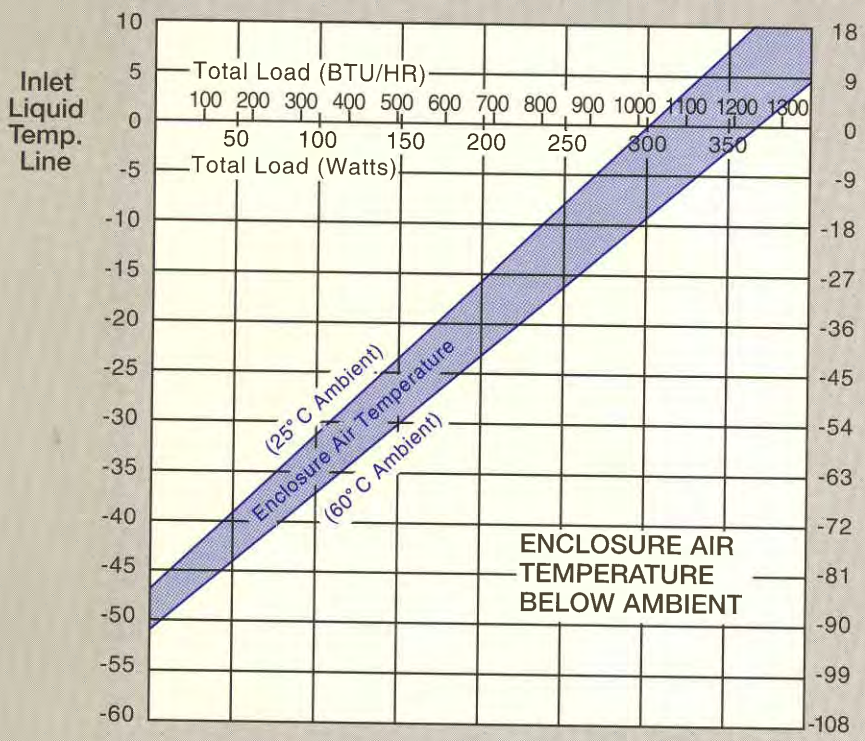
Please Note:

Model	AC Input
LHP-1700FF	115
LHP-1702FF	230

Applications in Paper Mills, Machine Tools, Electronics

The LHP-1700FF is the largest liquid cooled air conditioner we make. It is constructed of anodized aluminum with stainless steel fittings. You provide a constant flow of liquid as a heat removal source. Combining these features with thermoelectric modules make the LHP-1700FF capable of both high capacity and high temperature differentials. The unit comes complete with its own integral power supply, 19" rack panel for mounting, and easy to access liquid fittings. The LHP-1700 is becoming TECA's fastest selling liquid cooled air-conditioner, popular in paper mills, steel mills, refineries, and explosion-proof applications. For alternate liquid jacket materials, please consult factory.

Performance Curve: LHP-1700FF/LHP-1702FF



Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

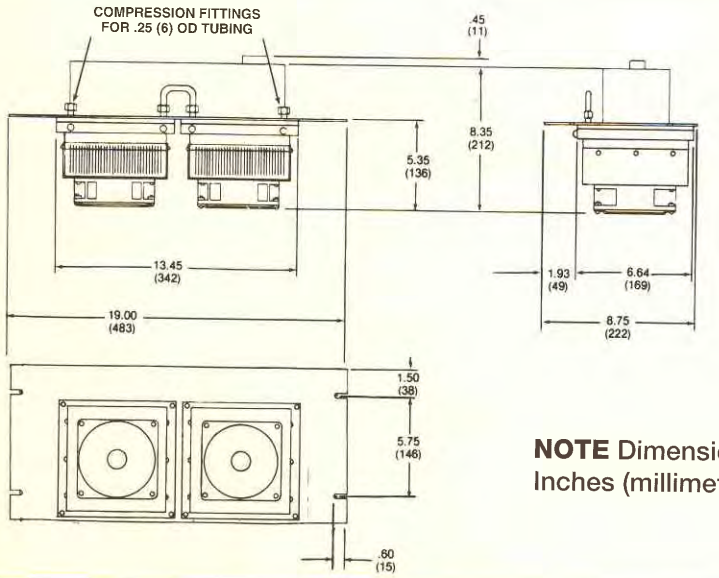
Ambient Temp.	25°C	60°C
Enclosure	y=.16x-47.0	y=.14x-51.0
Cold Sink	y=.12x-52.0	y=.11x-56.0

Specifications:

COOL ONLY		
Model	LHP-1700FF	LHP-1702FF
Voltage	115 VAC	230 VAC
Current (Ave.)	6.1 AMPS	4.5 AMPS
Frequency	50-60 HZ	
Min. Ambient	-30°C (-22°F)	
Max. Ambient	+80°C (+176°F)	
NEMA	12	
Min. Flow	.5 Gal/Min (2 L/Min)	
Weight	21 Lbs (9.8 Kg)	
HEAT & COOL	(Same Physical Size as Cool Only Model)	
Model	LHP-1700FFHC	LHP-1702FFHC
Heaters	400 Watts	
Temp. Control	TC-3F	

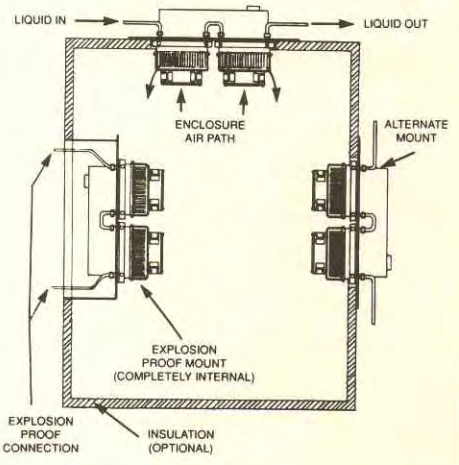
Options:

Temp. Control	965 (Heat/Cool)
	3200 (Cool only)
	TC-6F (Cool only)
Refer to Pg(s). 42,43 for Further Control Info.	
Drip Pans	DVL-1700
	DHL-1700
Refer to Pg. 8 for Further Drip Pan Info.	
Plenum	PLL-1700
Refer to Pg. 9 (Flush Mount for Side Mount Only)	



NOTE Dimensions: Inches (millimeters)

Typical Mounting Method

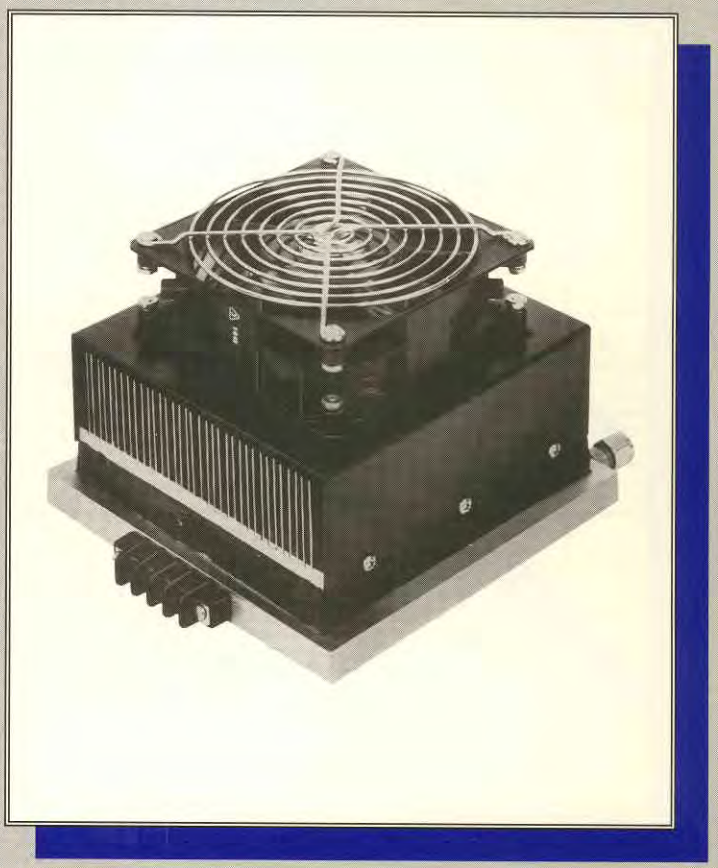


LHP-800FF Solid State Air Conditioner

Fin Rating: 775-900 BTU/h; Air Rating: 600-725 BTU/h

Features:

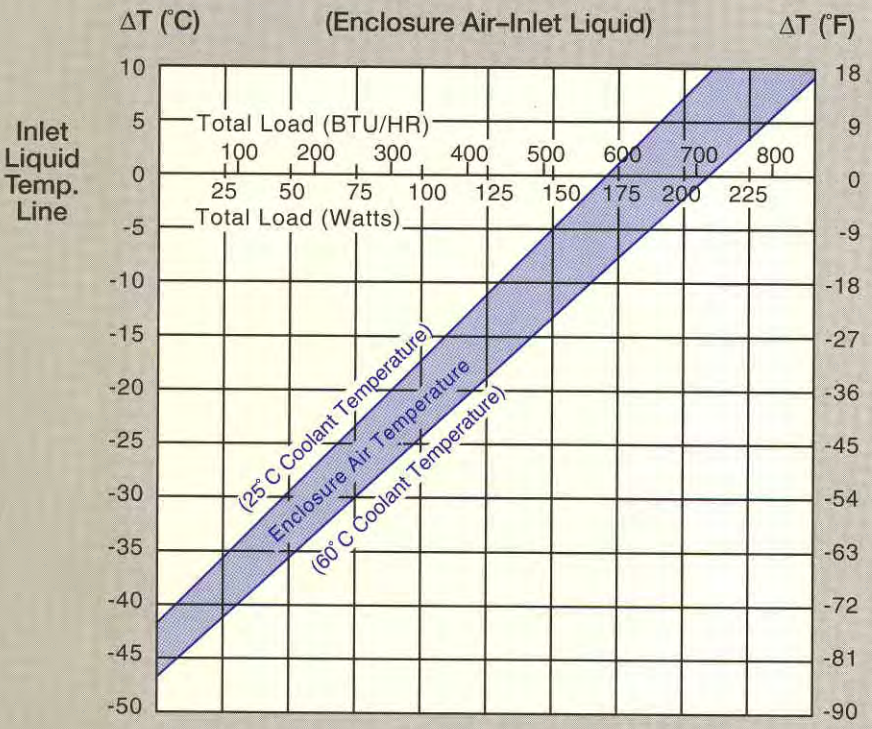
- Operates in any orientation horizontal, vertical, etc.
- Low vibration, noise, maintenance
- Closed system protection from dust, chips, moisture
- No moving parts except internal circulation fan
- Operation in -30°C (-22°F) to +80°C (+176°F) ambients
- No fluorocarbons or compressor required
- Adaptable to NEMA 4 and explosion proof applications
- Environmentally safe
- No load cooling to -17°C (1.4°F) at 25°C coolant temperature



Applications in Electronics, Instrumentation and Control Panels

The LHP-800FF can be mounted entirely inside an enclosure or through an enclosure wall, leaving the liquid jacket outside the enclosure. Mounted inside of an enclosure the unit becomes an ideal cooler for pressurized cabinets or explosion proof applications. The only intrusion to the cabinet would be the input and output liquid lines. The high density cold side heat sink provides the necessary surface area to handle the capacity and temperature differential generated by the thermoelectric modules.

Performance Curve: LHP-800FF



Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

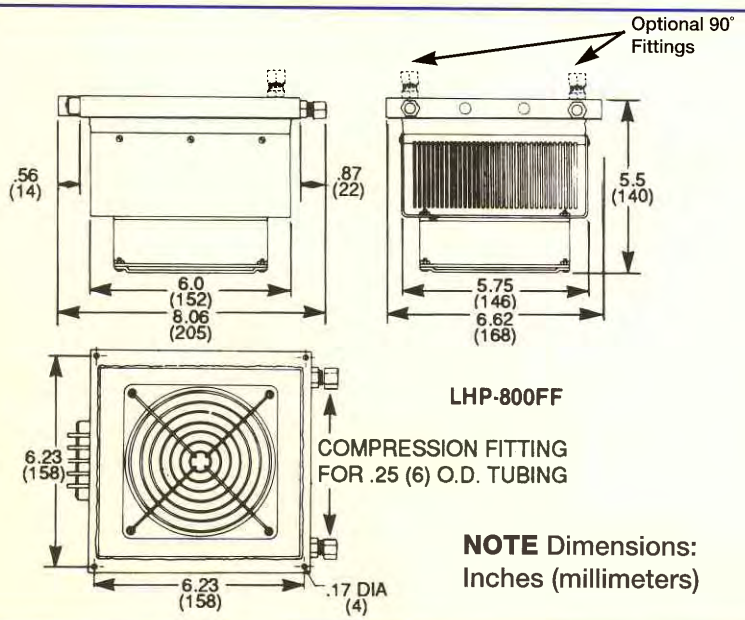
Ambient Temp.	25°C	60°C
Enclosure	y=.24x-42.5	y=.22x-47.0
Cold Sink	y=.21x-48.0	y=.20x-52.5

Specifications:

COOL ONLY		
Model	LHP-800FF	LHP-810FF
T.E. Voltage	30 VDC	130VDC
T.E. Current	10 AMPS	2.3 AMPS
Fan Voltage	115 VAC	
Min. Ambient	-30°C (-22°F)	
Max. Ambient	+80°C (+176°F)	
NEMA	12	
Min. Flow	.5 Gal/Min (2 L/Min)	
Weight	7 Lbs (3.2 Kg)	

Options:

Power Supply	PS400-30	PS-130
Voltage	115 VAC	
Temp. Control	965 (Heat/Cool)	
	3200 (Cool only)	
	TC-6F (Cool only)	
Refer to Pg(s). 42,43 for Further Control Info.		
Drip Pans	DVL-800	
	DHL-800	
Refer to Pg. 8 for Further Drip Pan Info.		
Plenum	PLL-800	
Refer to Pg. 9 (Flush Mount for Side Mount Only)		

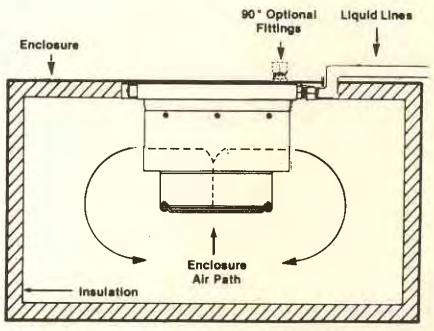


LHP-800FF

COMPRESSION FITTING FOR .25 (6) O.D. TUBING

NOTE Dimensions: Inches (millimeters)

Typical Mounting Method



LHP-300FF Solid State Air Conditioner

Fin Rating: 290-325 BTU/h; Air Rating: 200-240 BTU/h

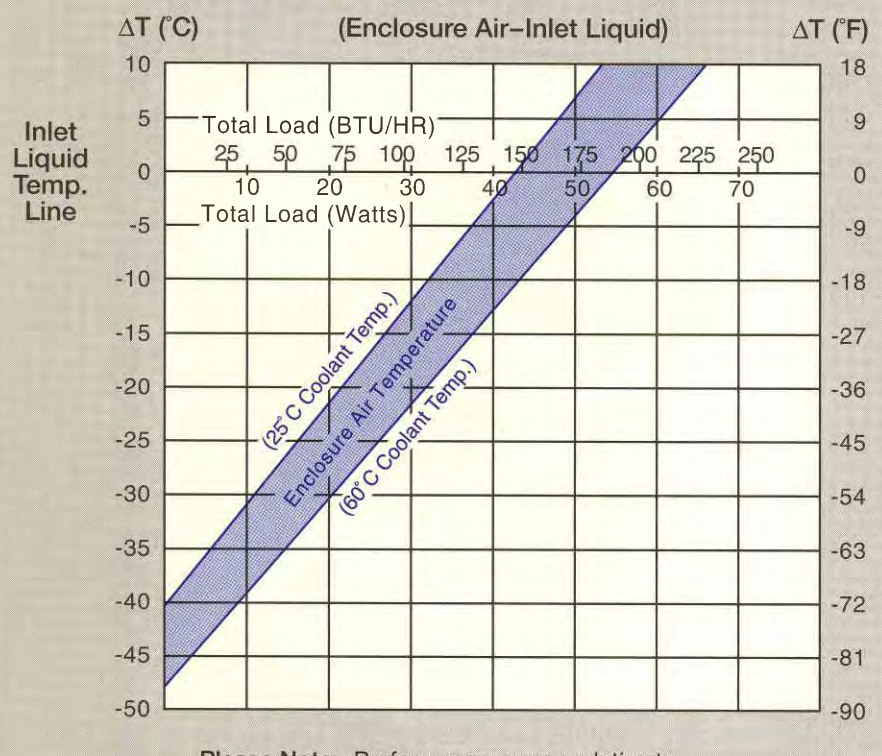
Features:

- No load cooling to -10°C, (14°F) at 25°C coolant temperature
- Weighs only 2.75 lbs (1.25 kg)
- Low vibration, noise, maintenance
- Closed system protection from dust, chips, moisture
- No fluorocarbons, compressor required
- Operates in -30°C (22°F) to +80°C (+176°F) ambients
- Operates in any orientation horizontal, vertical, etc.
- Adaptable to NEMA-4 and explosion proof applications
- Environmentally safe

Applications in Electronics, Instrumentation and Control Panels

Possibly the smallest stock air conditioner made today, the LHP-300FF provides cooling while maintaining a clean environment for delicate electronics. The combination of fluid heat transfer and thermoelectric cooling allows for small size and high capacity. Temperature differentials are determined from the cooling liquid temperature, which typically yields large temperature differentials from ambient.

Performance Curve: LHP-300FF



Please Note: Performance curves relative to flow rate of 0.6 L/Min

Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

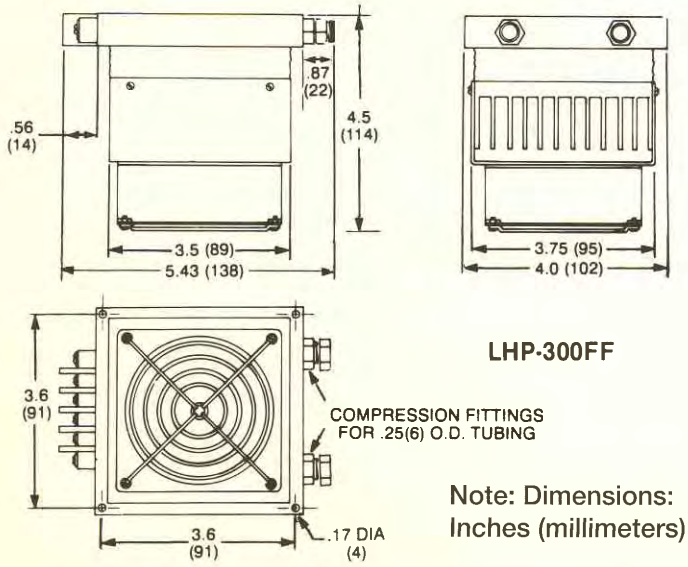
Ambient Temp.	25°C	60°C
Enclosure	y=.59x-35.5	y=.59x-41.5
Cold Sink	y=.51x-43.0	y=.52x-49.0

Specifications:

COOL ONLY	
Model	LHP-300FF
T.E. Voltage	24 VDC
T.E. Current	4.5 AMPS
Fan Voltage	115 VAC
Min. Ambient	-30°C (-22°F)
Max. Ambient	+80°C (+176°F)
NEMA	12
Min. Flow	.05 Gal/Min (.2 L/Min)
Weight	2.75 Lbs (1.25 Kg)

Options:

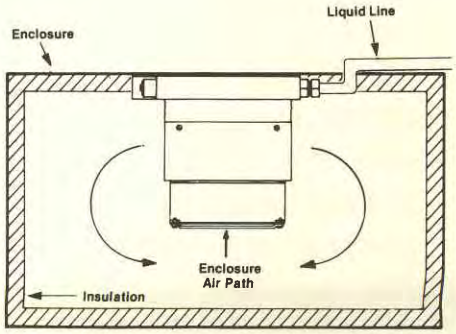
Power Supply	PS160-24
Voltage	115 VAC
Temp. Control	965 (Heat/Cool)
	3200 (Cool only)
	TC-6F (Cool only)
Refer to Pg(s). 42,43 for Further Control Info.	
Drip Pans	DVL-300
	DHL-300
Refer to Pg. 8 for Further Drip Pan Info.	
Plenum	PLL-300
Refer to Pg. 9 (Flush Mount for Side Mount Only)	



LHP-300FF

Note: Dimensions: Inches (millimeters)

Typical Mounting Method



Solid State Cold Plates (Air Cooled)

Model Number	AHP-150	AHP-300CP	AHP-301CP	AHP-1000CP
Cooling Capacity	125 BTU/h	265 BTU/h	225 BTU/h	560 BTU/h
Heating Capacity (Opt.)			340 BTU/h	680 BTU/h

Features:

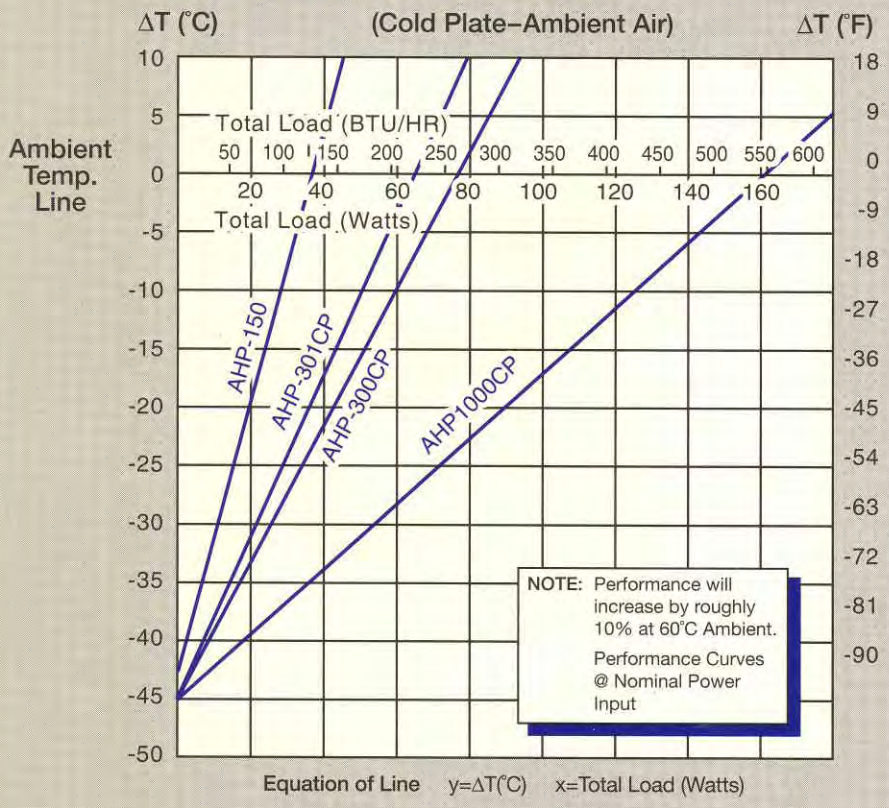
- No load cooling to -20°C (-4°F) at room temperature of 25°C (+77°F)
- Compact
- No fluorocarbons, compressors, or piping required
- No moving parts except fan
- Operates in -30°C (-22°F) to -60°C (+140°F)
- Low vibration, noise, maintenance
- Adaptable to benchtop laboratory use
- Environmentally safe
- Operates in any position—horizontally, vertical, etc.

Please Note: If optional heating is required add "HC" suffix, example: AHP-301 CPHC

Applications in Instrumentation, Laboratory and Component Cooling

TECA's smallest air cooled heat pump, the AHP-150 comes only in the cold plate style. Its small size and D.C. voltage requirements make it ideal for mobile and laboratory applications. Heat is transferred from the cold plate via thermoelectric modules to the heat sink where it is dissipated into the ambient air. The AHP-300CP is designed to operate from a DC voltage range of 6-56 volts. The AHP-301CP is our smallest cold plate designed to operate directly from either 115 or 230 VAC input power. The AHP-1000CP also operates directly from 115 VAC. It is ideal for benchtop applications, as a sample cooler or a laboratory cold plate.

Performance Curve: AHP-150/AHP-300CP/ AHP-301CP/AHP-1000CP



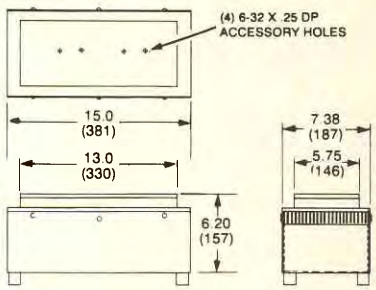
Equation of Line y=ΔT(°C) x=Total Load (Watts)

COLD PLATE PERFORMANCE @ 25°C AMBIENT TEMPERATURE				
MODEL	AHP-150	AHP-300CP	AHP-301CP	AHP-100CP
EQUATION	y=1.2x-44.0	y=.60x-46.4	y=.69x-45.2	y=.28x-45.0

Model Number	Nominal Input	Input Range	Weight lbs. (kg)
AHP-150	*12 VDC @ 6A 24 VDC @ 3A	6-14 V @ 3.5-7A 13.5-28 V @ 1.7-3.5A	3.5 (1.6)
AHP-300CP	12 VDC @ 12.5A *24 VDC @ 5.3A 48 VDC @ 3.1A	6-14 V @ 6.5-14.3A 13.5-28 V @ 3.6-6.9A 28-56 V @ 1.8-3.6A	6.0 (2.7)
AHP-301CP	*115 VAC @ 1.1A 230 VAC @ 0.5A (50-60 Hz)	—	10.5 (4.8)
AHP-1000CP	115 V @ 2.7A (50-60 Hz)	—	25.7 (11.7)

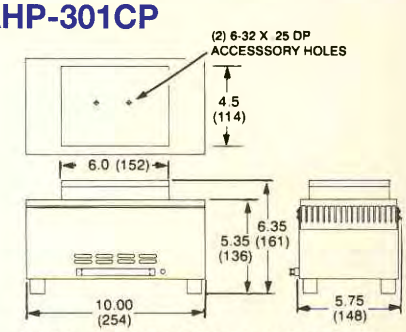
Standard Factory Wiring
(For higher capacity models, consult factory.)

AHP-1000CP



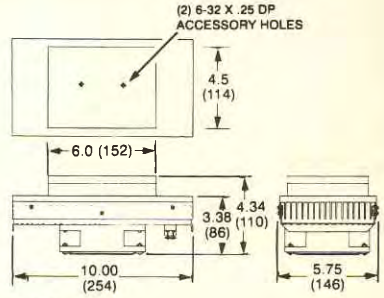
NOTE: 10-32 X 3/4 STUDS AND GASKET NOT SHOWN

AHP-301CP



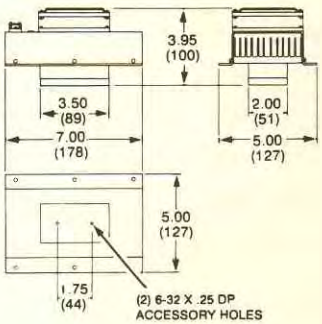
NOTE: 10-32 X 3/4 STUDS AND GASKET NOT SHOWN

AHP-300CP



NOTE: 10-32 X 3/4 STUDS AND GASKET NOT SHOWN

AHP-150CP



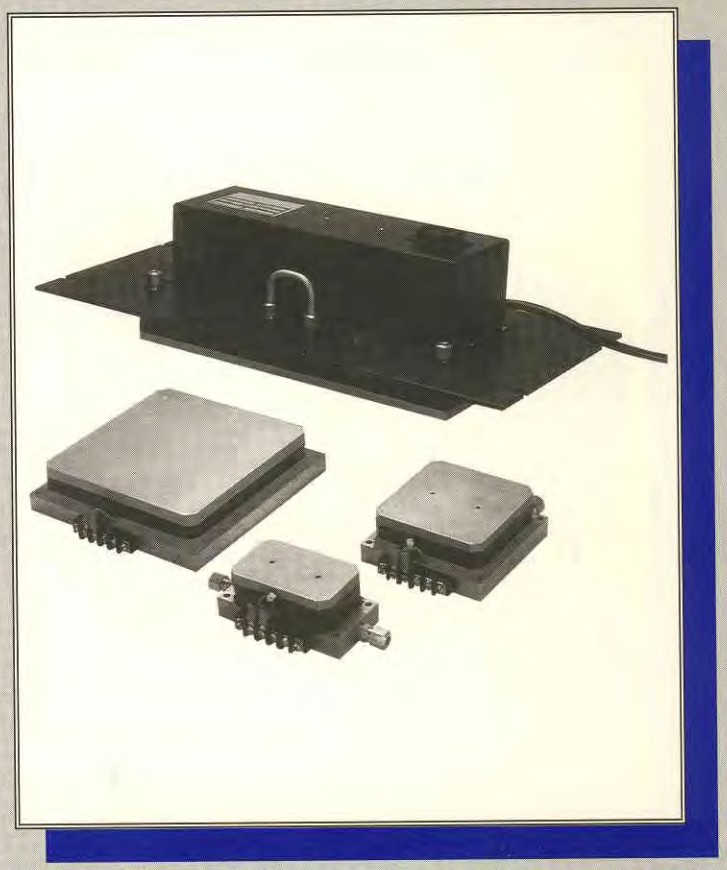
Dimensions: Inches (millimeters)

Solid State Cold Plates (Liquid Cooled)

Model Number	LHP-150	LHP-300CP	LHP-800CP	LHP-1700CP, LHP-1702CP
Cooling Capacity	135 BTU/h	300 BTU/h	750 BTU/h	1500 BTU/h
Heating Capacity (Opt.)	170 BTU/h	340 BTU/h	680 BTU/h	1360 BTU/h

Features:

- No load cooling to -25°C (-13°F) at 25°C coolant temperature
- High efficiency
- No moving parts
- Operates in -30°C (-22°F) to +80°C (+175°F)
- Low vibration, noise, maintenance
- Compact, low profile
- Adaptable to NEMA type explosion proof applications (consult factory)
- Environmentally safe
- Operates in any position horizontal, vertical etc.

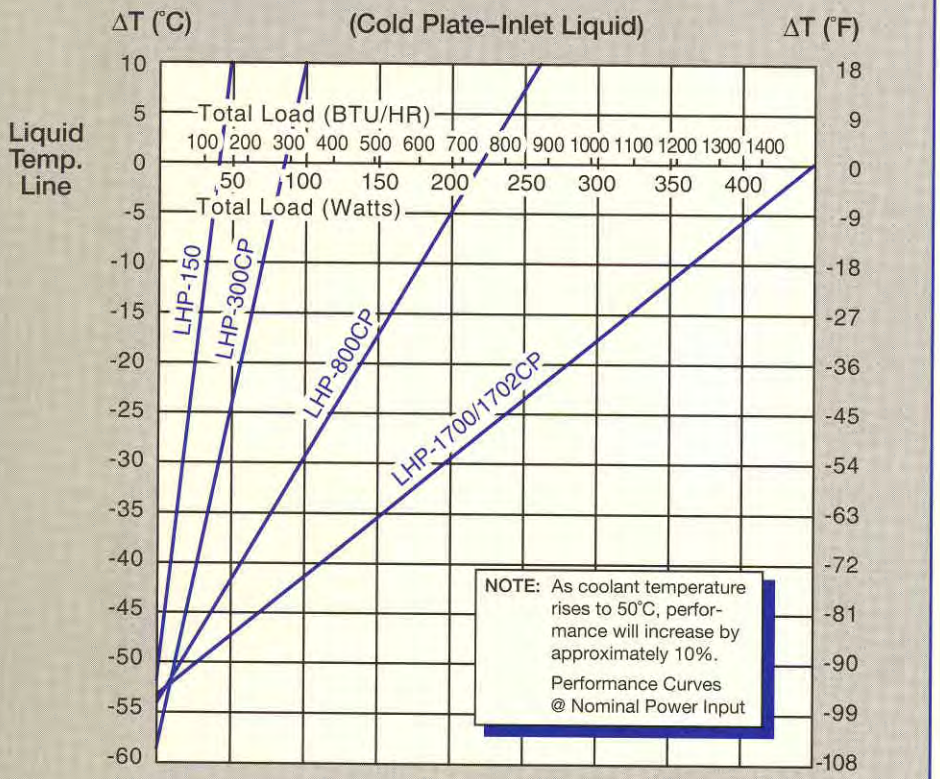


Please Note: If optional heating is required add "HC" suffix. Example: LHP-800CPHC

Applications in Instrumentation, Laboratory and Component Cooling.

The LHP-series of cold plates are used in environments where space and large temperature differentials are of high concern. The LHP-150 is currently the smallest cold plate manufactured by TECA. It combines the use of thermoelectric cooling and liquid heat transfer to maximize the performance and efficiency. Greater C.O.P.'s can be achieved by operating at lower power levels. The LHP-1700CP is our largest liquid cooled cold plate designed to operate direct from 115 VAC input, model LHP-1702CP operates at 230 VAC.

Performance Curves: LHP-150/LHP-300CP/ LHP-800CP/LHP-1700CP/LHP-1702CP

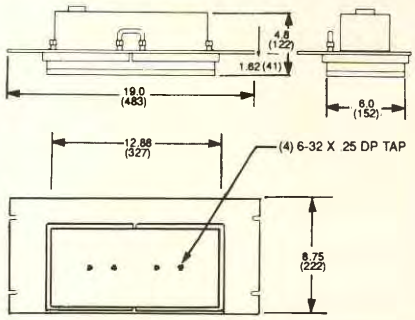


COLD PLATE PERFORMANCE @ 25°C AMBIENT TEMPERATURE				
MODEL	LHP-150	LHP-300CP	LHP-800CP	LHP-1700CP/LHP1702CP
EQUATION	y=1.31x-52.0	y=.66x-58.0	y=.25x-54.0	y=.12x-54.0

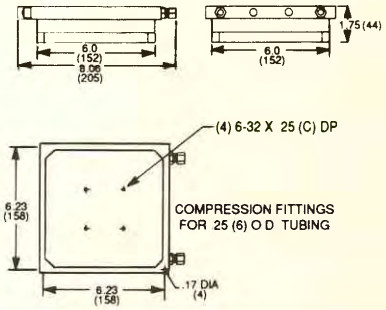
Equation of Line: y=ΔT (°C), x=Total Load (Watts)

MODEL NUMBER	NOMINAL INPUT	RANGE INPUT	WEIGHT LBS. (KG)	MINIMUM RECOMMENDED FLOW RATE Gal/Min (L/Min)
LHP-150	12 VDC @ 4.5A	0-16 VDC	0.75 (.34)	.05 (.2)
LHP-300CP	24 VDC @ 4.5A	0-32 VDC	1.75 (0.8)	.05 (.2)
LHP-800CP	30 VDC @ 10A	0-35 VDC	5.2 (2.4)	0.5 (2.0)
LHP-1700CP	115 VAC @ 6A	0-135 VAC	19.75 (9.0)	0.5 (2.0)
LHP-1702CP	230 VAC @ 3A	0-270 VAC	19.75 (9.0)	0.5 (2.0)

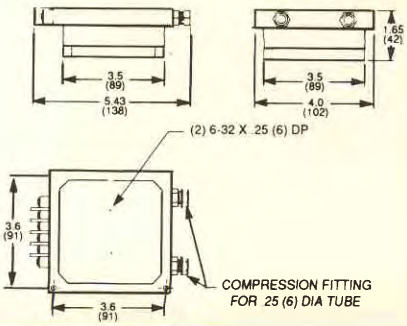
LHP-1700CP/LHP-1702CP



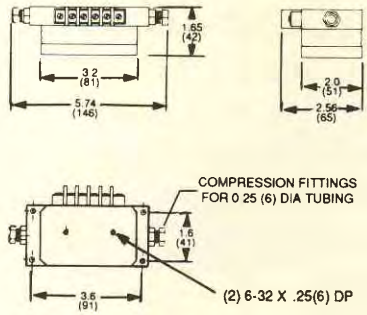
LHP-800CP



LHP-300CP



LHP-150



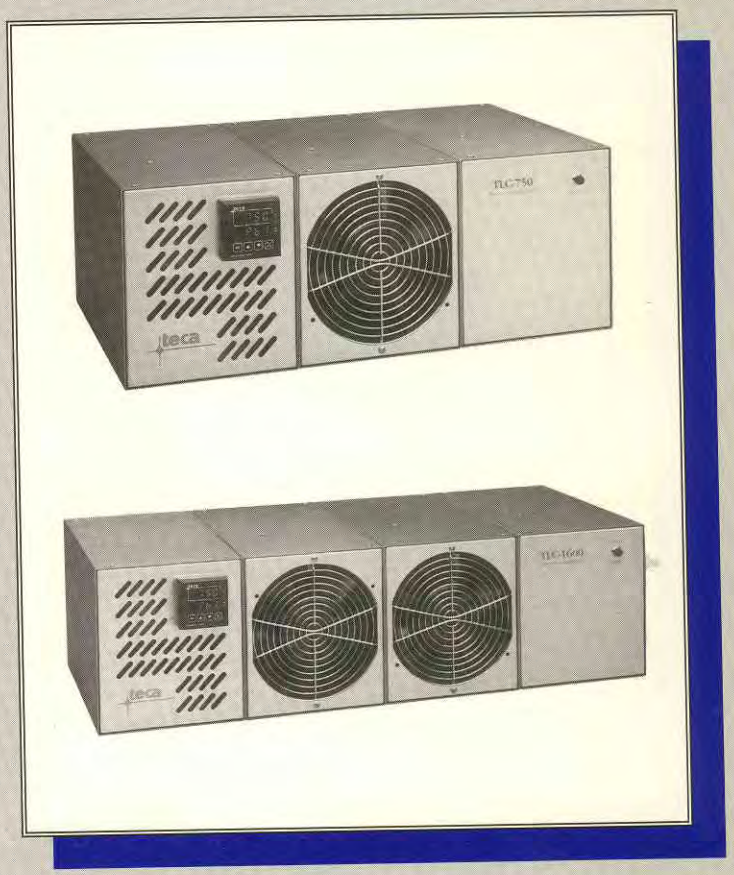
Dimensions: Inches (millimeters)

TLC-750/TLC-1600 Solid State Liquid Chillers

COMPLETE SYSTEM — RATING: 600-1400 BTU/h

Features:

- High Efficiency/ Compact Design
- No CFC's or HCFC's Required
- Thermoelectric (Peltier) Style Cooling
- Durable and Modular Design
- No load cooling 21-37°C from ambient
- TLC-750 (600-675 BTU/h)
- TLC-1600 (1350-1550 BTU/h)
- Optional Low Noise Version
- Optional Heating
- Attractive Anodize Finish
- One Pass Airflow (Front to Back)
- Quick Coupling, Shut Off Valve Fittings



Designed for in-line process cooling, instrumentation, lasers

Teca's TLC-series liquid chillers differ from the ALC-series in that they are designed as complete packaged units. The TLC-series includes a seal-less magnetic drive pump and a 1 liter reservoir with low level indicator. Optional temperature control (Model 965 or 3200), can be offered as an integral package to the TLC-series. With today's growing concerns about the adverse effect that CFC's (chloro-fluorocarbons) have on the environment, thermoelectric cooling technology is an environmentally friendly solution to tomorrow's problems.

Specifications:

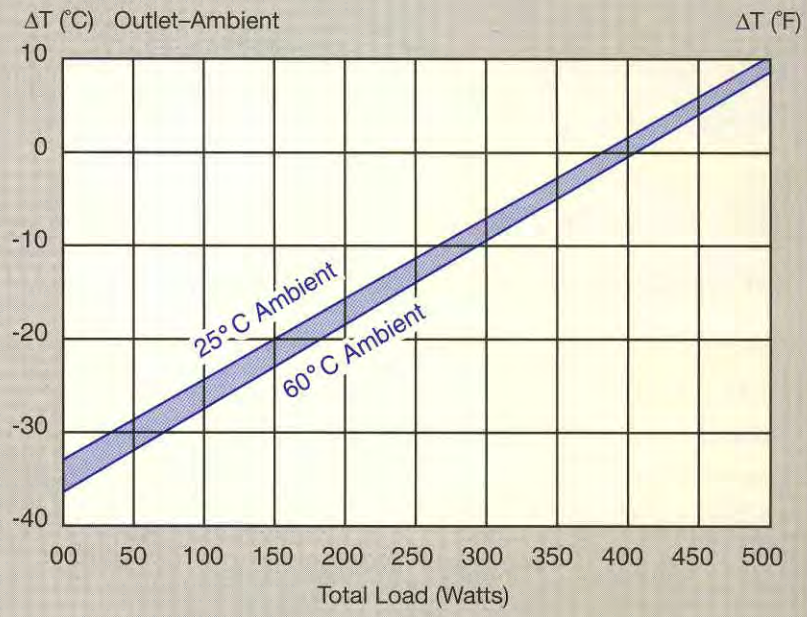
MODELS	TLC-750	TLC-1600
CAPACITY		
Cooling (Btu/Hr) (Watts)	600-635 175-200	1350-1400 375-400
Heating (Optional)		
INPUT		
Voltage	115 VAC	115 VAC
Current–RMS (35°C)	3.9 Amps AC	5.3 Amps AC
Current–RMS (50°C)	3.6 Amps AC	5.1 Amps AC
Frequency (Hz)	50/60	50/60
TEMPERATURE CONTROL		
Digital (Opt.)	3200 (Cool only)	
See Pgs. 42,43	965 (Heat/Cool)	
FLUID		
Max Liquid Temp. (°C/°F)	55/130	55/130
Max Ambient Temp. (°C/°F)	70/158	70/158
Liquid Jacket Material: Aluminum Pump Material: Polypropylene, Ceramic, Viton, 316 Stainless Steel		
RESERVOIR		
Capacity (Ltr/Gal.)	1/.45	1/.45
Pressure Relief (PSI)	25	25
FAN		
Number of Fans	1	2
DB (Noise Rating) Single Fan, Not in System	47/49 PSIL	47/49 PSIL
Optional Quiet Fans: Consult Factory		
DIMENSIONS/WEIGHT		
Height in. (cm)	7 (17.8)	7 (17.8)
Width in. (cm)	18.75 (47.63)	25 (63.5)
Depth in. (cm)	10.12 (25.70)	10.12 (25.70)
KG (LBS)	16.8 (37)	23.4 (51.5)

Performance: TLC-750

Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

Ambient Temp.	25°C	60°C
Cooling Performance	y=.166x-28.7	y=.168x-31.3

Performance: TLC-1600



Equation of Line
y=ΔT (°C)
x=Total Load (Watts)

Ambient Temp.	25°C	60°C
Cooling Performance	y=.088x-33.6	y=.092x-37.0

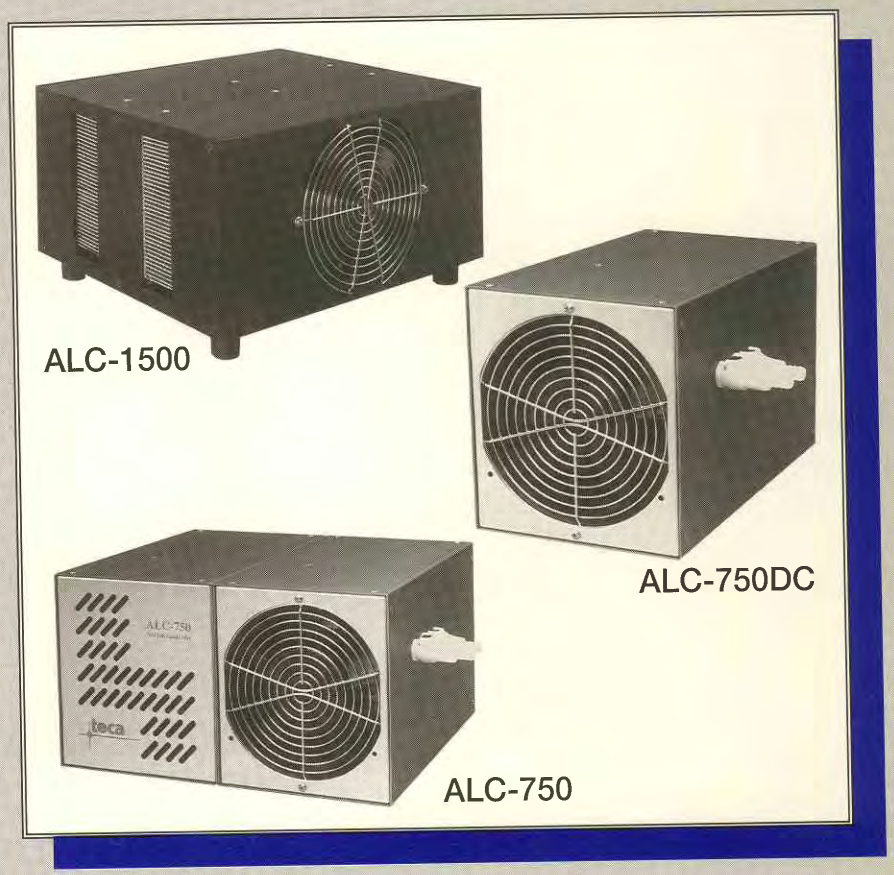
ALC-750
ALC-750DC/ALC-1500

Solid State Liquid Chillers

SUB-SYSTEM — RATING: 600-1700 BTU/h

Features:

- High Efficiency/Compact Design
- No CFC's or HCFC's Required
- Thermoelectric (Peltier) Style Cooling
- Durable and Modular Design
- No load cooling 22-45°C from ambient
- ALC-750 or ALC750DC (600-800 BTU/h)
- ALC-1500 (1500-1700 BTU/h)
- Optional Low Noise Versions
- Optional Heating
- Attractive Anodize Finish



Designed for in-line process cooling, instrumentation, lasers

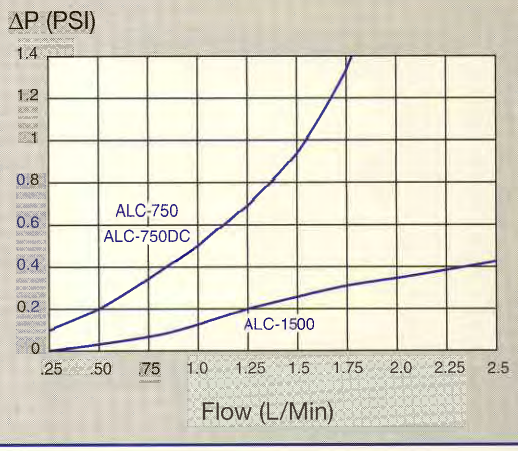
Teca's ALC-series liquid chillers feature high capacity in a compact design. Models (ALC-750, ALC-750DC, ALC-1500) are designed to maximize liquid cooling without the use of ozone depleting fluorocarbons. A combination of thermoelectric cooling modules and an efficient heat exchanger design give the ALC-series chillers the edge in liquid cooling. Traditional conventional based systems are usually expensive to maintain, bulky, hard to control, and inconvienent to operate. With solid-state cooling, temperature control within one degree along with maintenance-free operation are just some of the benefits that will be experienced.

Power supplies are included for models ALC-750 and ALC-1500. Model ALC-750DC is offered with a standard 24 VDC input.

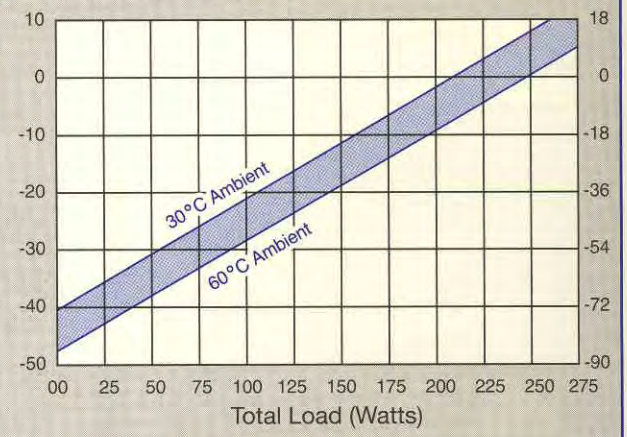
Specifications:

MODELS	ALC-750	ALC-750DC	ALC-1500
CAPACITY			
Cooling (BtU/h)	715-785	785-850	1535-1700
(Watts)	210-230	230-250	450-500
Heating (Consult Factory)			
INPUT			
Voltage	115 VAC	24 VDC	115 VAC
Current–RMS (30˚C)	3.5 Amps	17.5 Amps	7.7 Amps
Current–RMS (50˚C)	3.2 Amps	16.5 Amps	6.9 Amps
Frequency (Hz)	50/60	n/a	50/60
TEMPERATURE CONTROL			
Digital (Opt.) See Pgs. 42,43	965 3200	965DC 3200DC	965 3200
FLUID			
Max Liquid Temp.	80˚C/176˚F		
Max Ambient Temp.	70˚C/158˚F		
Liquid Jacket Material: Aluminum			
FAN			
Number of Fans	1 Fan	1 Fan	2 Fans
DB (Noise Rating) Single Fan, Not in System	47/49 PSIL		
Optional Quiet Fans: Consult Factory			
DIMENSIONS/WEIGHT			
Height in. (cm)	7.03 (17.9)	7.03 (17.9)	6.8 (17.3)
Width in. (cm)	12.62 (32.1)	6.31 (16.0)	11.25 (28.6)
Depth in. (cm)	10.12 (25.7)	10.12 (25.7)	13.3 (33.8)
KG (LBS)	12.3 (27)	6.6 (14.5)	13.2 (29)

Pressure vs. Flow



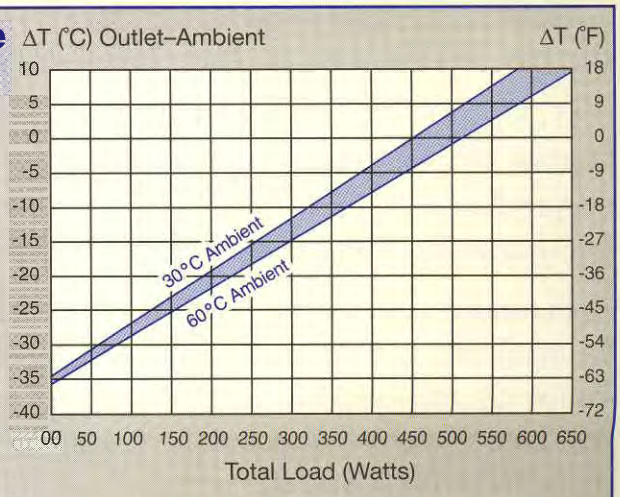
Performance ALC-750/ ALC-750DC



Equation of Line
y=ΔT (˚C)
x=Total Load (Watts)

MODEL	30˚C Ambient	50˚C Ambient
ALC-750	y=.193x-40.4	y=.189x-43.3
ALC-750DC	y=.202x-45.8	y=.195x-48.4

Performance ALC-1500

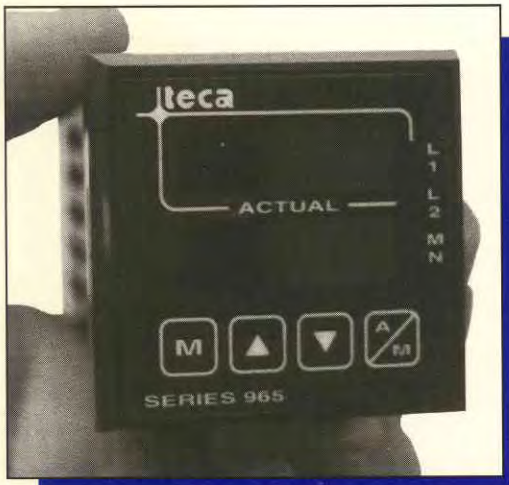


Equation of Line
y=ΔT (˚C)
x=Total Load (Watts)

30˚C Ambient	50˚C Ambient
y=.076x-34.3	y=.072x-36.4

Temperature Controls Models: 965, 3200, TC-6F, TC-3F

Model: 965

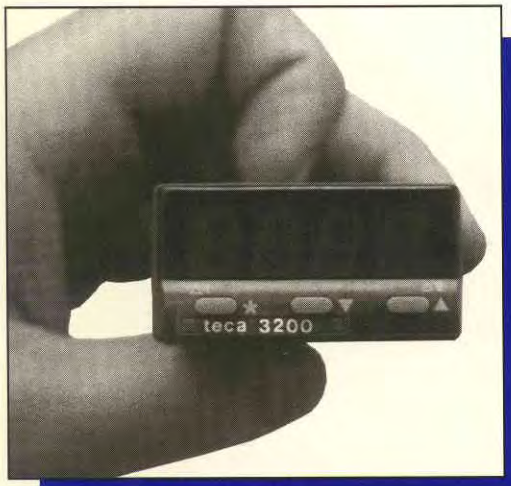


Features:

- 1/16 DIN
- Cool/Heat
- Dual Display
- Single Set Point

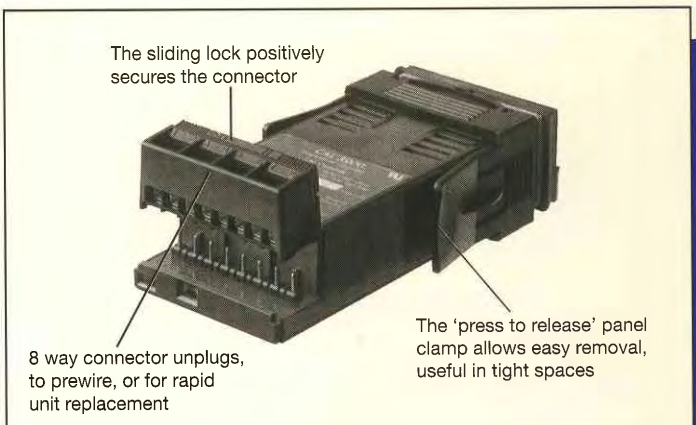
Dimensions: 2.1 (53) x 2.1 (53) x 4.7 (119) in (mm) overall

Model: 3200



Features:

- 1/32 DIN
- Cool Only
- Single Display
- Single Set Point



Dimensions: 1.89 (48) x .95 (24) x 4.29 (109) in (mm) overall

Models 965 and 3200 are digital microprocessor based temperature controllers designed to be used in conjunction with T.E.C.A. heat pumps. When ordered as a complete package, simply plug the unit into the heat pump with the supplied connector.

Both models are designed with a NEMA 4X front panel for corrosion and water resistance. This is idea for applications such as food processing and food packaging, where equipment needs to be cleaned frequently. Features such as auto-tuning, dual output, and single input are available from these microprocessor based controllers. Each unit comes with factory default programming, but can be user modified through a setup menu.

Temperature Control Specifications

	965	3200
FEATURES/OPTIONS		
FRONT PANEL DISPLAY	DUAL	SINGLE
OPERATOR LOCKOUT	YES, 4 LEVEL	YES, 4 LEVEL
RAMPING TO SET POINT	YES	NO
MICROPROCESSOR BASED	YES	YES
TYPE	P.I.D.	P.I.D.
AUTO TUNING	Yes	Yes
DATA RETENTION	Yes	Yes
OPTIONAL DC INPUT	12/24	12/24
PHYSICAL		
SIZE	1/16 DIN (2.1 " x 2.1 " x 4.7")	1/32 DIN (1 .89" x .95" x 4.29")
WEIGHT	8 oz	3.5 oz
OPERATION		
POWER INPUT	100-240 VAC	90-264 VAC
POWER CONSUMPTION	5VA	2.5 VA
SENSOR PROVIDED	T-type Thermocouple 6'	T-type Thermocouple 6'
OUTPUT 1	COOL	COOL
OUTPUT 2	HEAT or ALARM	
ACCURACY	+/- 0.1% Span +/- 1 LSD	+/- 0.25% Span +/- 1 LSD
AMBIENT RANGE	0-65°C	0-50°C
GENERAL		
NEMA RATING	4X	4X
AGENCY RATING	UL/CSA	UL/CSA/VDE

TC-6F, TC-3F Fixed Point Thermostat Control

Model TC-6F (Cool Only) thermostat is designed using a magnetic reed sensing switch in conjunction with a solid state relay.

3 Adjustable set points are available with the following settings:

Position	Control Temperature	Tolerance	Reset Differential
1	35°C	+/- 5°C	10°C Maximum
2	25°C	+/- 5°C	10°C Maximum
3	Constant Cool		

See controller manual for switch location.

Model TC-3F (Heat/Cool) thermostat is designed with the following technology.

Mode	Control Temperature	Tolerance	Reset Differential
Cooling	35°C	+/- 5°C	10°C Maximum
Heating	10°C	+/- 5°C	10°C Maximum

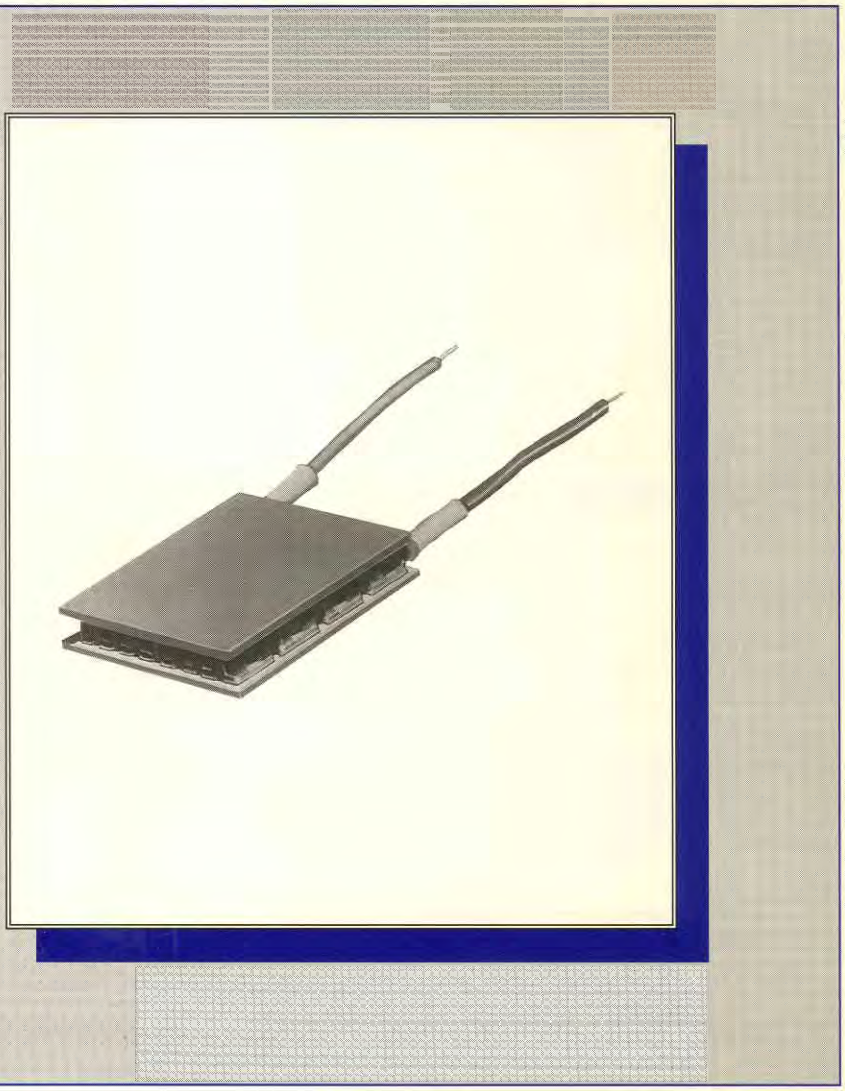
Both models are designed for AC input and control. For DC input models, Consult Factory

Single Stage ThermoElectric Modules

Rating: 0-235 BTU/h Cooling

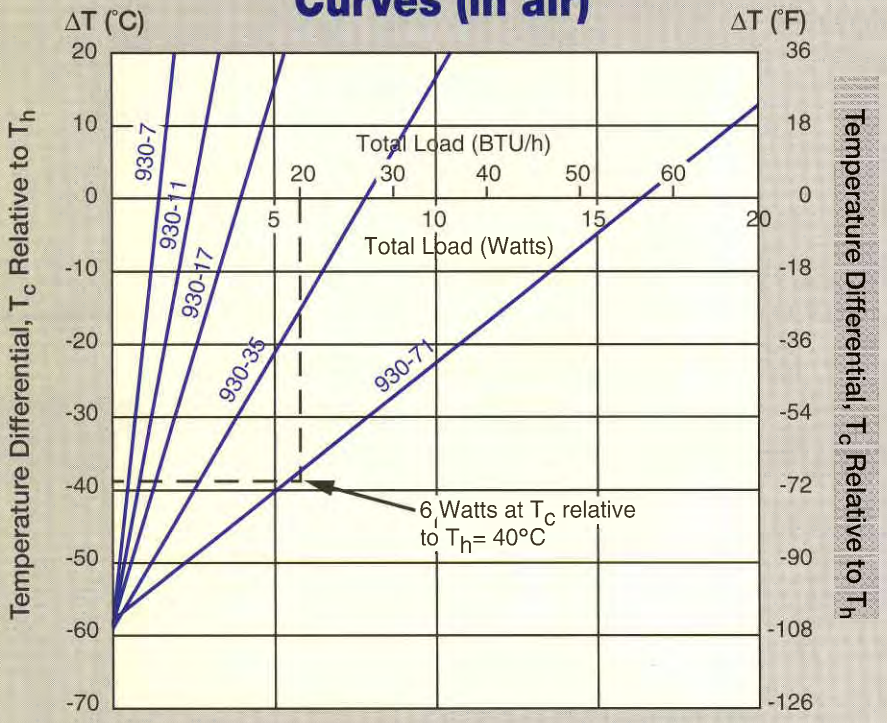
Features:

- Operates in -150°C (-238°F) to 80°C (+176°F) Temperature Range
- No vibration, noise
- Operates in any orientation, horizontal, vertical, etc.
- Can operate in cooling or heating mode
- No moving parts, compressor, or piping required.
- No load cooling to -41°C (-42°F) With Hot side at +25°C (+77°F)

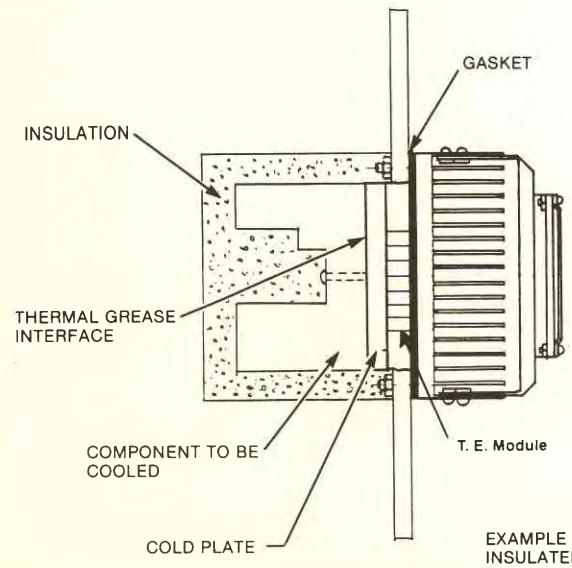


Solid state thermoelectric modules are a silent, compact, and reliable method of heat removal. Applications ranging from missile guidance systems to portable refrigerators, are only limited by the imagination of the designer. System simplicity assures ease of adapting to thermoelectric heat pumping. Thermoelectrics have no compressor or piping, eliminating compressor maintenance and coolant leakage. Modules can be converted from cooling to heating by a reversal of polarity of the power input.

Series 930 Actual Performance Curves (in air)



Temperature differentials are relative to 27°C (80°F hot side temperature (Th).
Note: As hot side temperature rises to 50°C (122°F temperature differential and load capacity will improve by approximately 10%. For improved efficiency and smaller heat sink dimensions the performance curves shown have been operated at 75% of the maximum rated current and voltage.



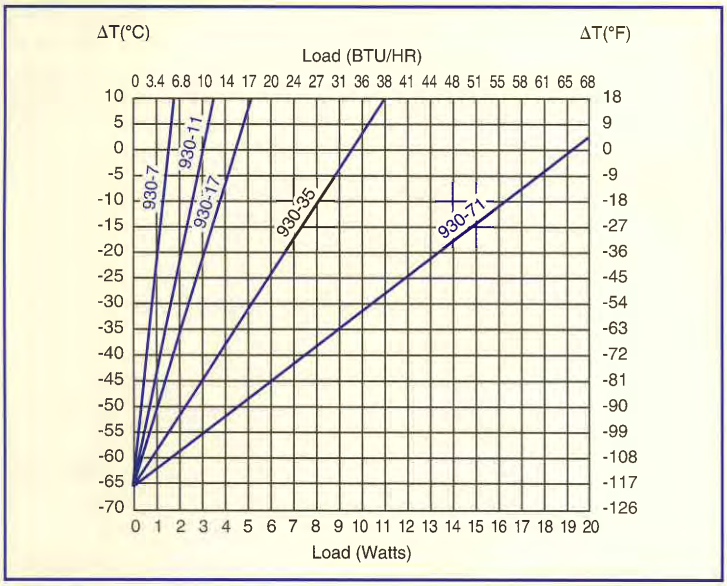
4 Easy Steps To Design Of ThermoElectrics

1. The designer must know three essential values; required cooling temperature of the load, ambient temperature and useful thermal load.
2. Determine actual requirements of TE module. Find the TE module cold side temperature (Tc), hot side temperature (Th), and heat pumped by TE module (Q). Note that a temperature difference (Th-Tc) in excess of 50°C generally requires a multi-stage design.
3. Select a TE module which operates in the current range you are willing to supply and supplies the heat pumping at the required temperature differential. (Single stage module specification chart, pg 46, 47)
4. With the module type, find module voltage and calculate electrical input power and hot side output to determine power supply and heat sink requirements.

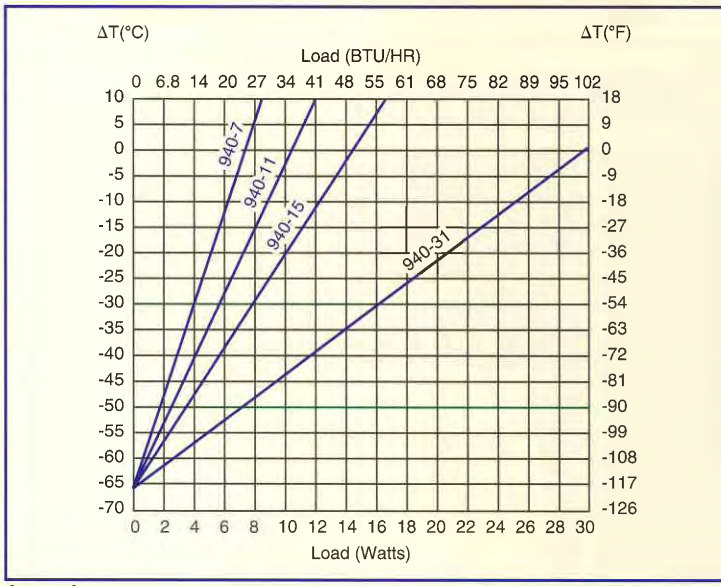
Example

1. Assume the load temperature is +5°C (+41°F) ambient air temperature is +25°C (+77°F) and useful load is 4 watts (14 BTU/h).
2. In this practical case with well designed heat transfer and isolation, expect a 5°C temperature drop on the cold side to the load and a 15°C rise on the hot side to ambient with a forced convection heat exchanger. Leakage losses should not exceed 10% of the load. Thus, you have a 0°C (+32°F) cold side, +40°C (+104°F) hot side and 4.4 watt (15 BTU/h) module load.
3. A single stage 930-35 module operating at Th = 40°C was found to provide 3.5 watts (12 BTU/h) of cooling. This unit is undersized. A 930-71 module operating at Th = 40°C provides 6 watts (20 BTU/h) cooling. This module has amble capacity. (See curve on left.)
4. Module voltage is 6 volts, current is 2.8 amps. The heat load of the hot side heat exchanger is 4.4 walls, +6 volts x 2.8 amps = 21 watts.

930 Series



940 Series

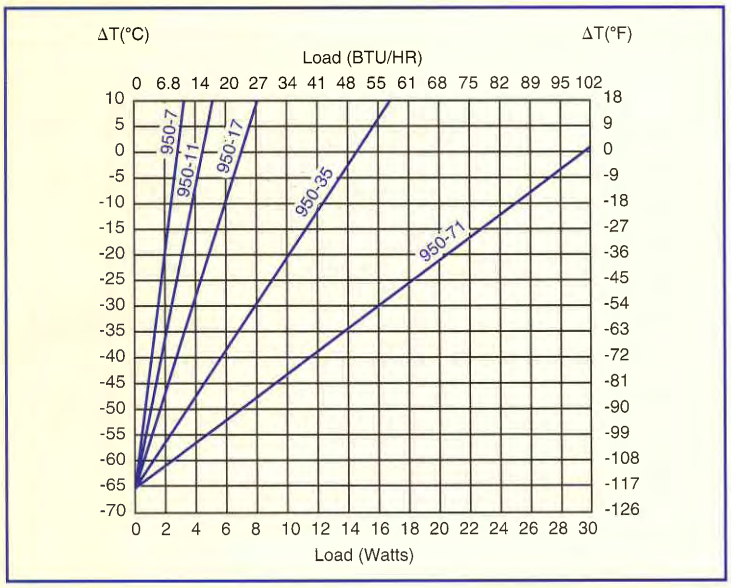


Temperature differentials relative to +27°C (80°F) hot side temperature (Th).

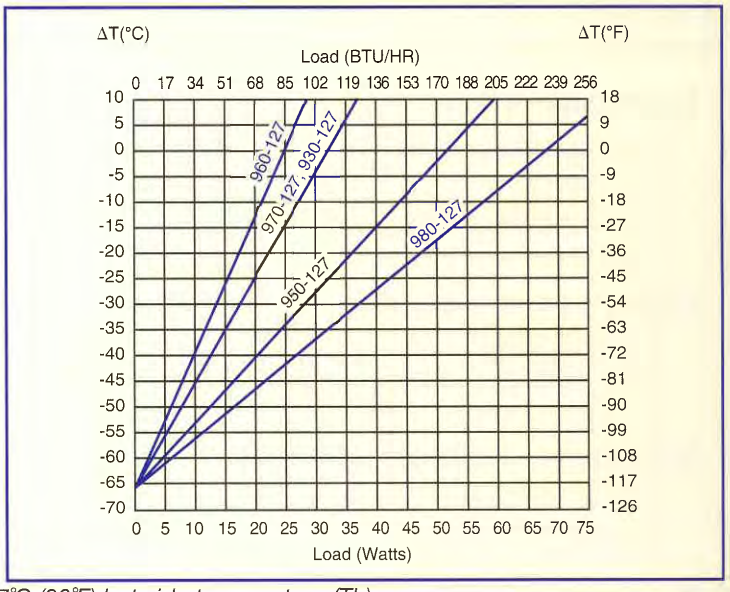
Single Stage Module Specification Chart

Module Series/ Couple	Performance								
	Th=27°C			Th=35°C			Th=50°C		
	MaxΔT @Qc=0 (ΔT°C)	Max Qc @ΔT=0 (Qc watts)	Equation of Line	MaxΔT @Qc=0 (ΔT°C)	Max Qc @ΔT=0 (Qc watts)	Equation of Line	MaxΔT @Qc=0 (ΔT°C)	Max Qc @ΔT=0 (Qc watts)	Equation of Line
930-7	66	1.8	ΔT=36.7Qc-66	73.6	1.9	ΔT=38.7Qc-73.6	78.1	2.0	ΔT=39.1Qc-
930-11	66	2.9	ΔT=22.76Qc-66	73.6	3.1	ΔT=23.7Qc-73.6	78.1	3.2	ΔT=24.4Qc-
930-17	66	4.5	ΔT=14.67Qc-66	73.6	4.7	ΔT=15.7Qc-73.6	78.1	5.0	ΔT=15.6Qc-
930-35	66	9.4	ΔT=7.02Qc-66	73.6	9.9	ΔT=7.43Qc-73.6	78.1	10.4	ΔT=7.51Qc-
930-71	66	19.0	ΔT=3.7Qc-66	73.6	20.0	ΔT=3.65Qc-73.6	78.1	21.0	ΔT=3.68Qc-
940-7	66	6.8	ΔT=9.70Qc-66	70.0	7.0	ΔT=10Qc-70	75.4	7.5	ΔT=10.1Qc-
940-11	66	10.6	ΔT=6.23Qc-66	70.0	11.0	ΔT=6.4Qc-70	75.4	11.7	ΔT=6.4Qc-7
940-15	66	14.5	ΔT=4.55Qc-66	70.0	15.0	ΔT=4.67Qc-70	75.4	16.0	ΔT=4.71Qc-
940-31	66	30.0	ΔT=2.23Qc-66	70.0	31.0	ΔT=2.25Qc-70	75.4	33.0	ΔT=2.27Qc-
950-7	66	3.0	ΔT=22Qc-66	70.0	3.1	ΔT=2.2Qc-70	75.0	3.3	ΔT=22.7Qc
950-11	66	4.6	ΔT=14.35Qc-66	70.0	4.8	ΔT=14.6Qc-70	75.0	5.1	ΔT=14.7Qc
950-17	66	7.2	ΔT=9.17Qc-66	70.0	7.4	ΔT=9.46Qc-70	75.0	7.9	ΔT=9.50Qc
950-35	66	14.8	ΔT=4.46Qc-66	70.0	15.3	ΔT=4.58Qc-70	75.0	16.3	ΔT=4.60Qc
950-71	66	30.0	ΔT=2.3Qc-66	70.0	31.0	ΔT=2.26Qc-70	75.0	33.0	ΔT=2.23Qc
930-127	70	33.4	ΔT=2.1 0Qc-70	75.0	38.1	ΔT=1 .97Qc-75	80.0	38.6	ΔT=2.07Qc
950-127	66	51.4	ΔT=1.28Qc-66	71.0	54.4	ΔT=1.30Qc-71	74.4	60.0	ΔT=1.24Qc-
960-127	66	26.0	ΔT=2.54Qc-66	75.0	29.4	ΔT=2.55Qc-75	80.0	30.0	ΔT=2.67Qc
970-127	66	33.4	ΔT=1.98Qc-66	75.0	37.8	ΔT=1.98Qc-75	80.0	38.6	ΔT=2.07Qc
980-127	65	68.8	ΔT=.94Qc-65	72.2	83.2	ΔT=.87Qc-72.2	77.2	84.9	ΔT=.91Qc-7

950 Series

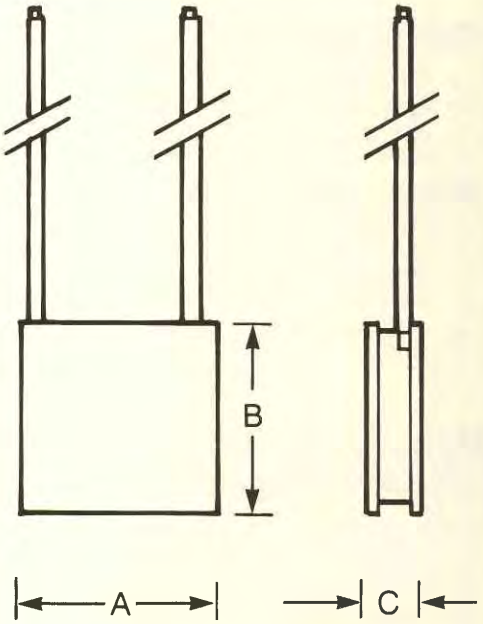


127 Couple Modules

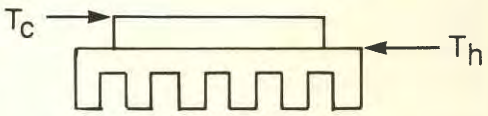


Temperature differentials relative to +27°C (80°F) hot side temperature (Th).

Module Series/ Couple	Electrical			Dimensions		
	Max Current (amps)	Max DC Voltage (volts)	Nominal Resistance (Ω)	A in (cm)	B in (cm)	C in (cm)
930-7	3.7	0.8	0.22	0.38 (.965)	0.38 (.97)	0.19 (.48)
930-11	3.7	1.2	0.32	0.38 (.965)	0.57 (1.46)	0.19 (.48)
930-17	3.7	1.9	0.49	0.57 (1.46)	0.57 (1.46)	0.19 (.48)
930-35	3.7	3.9	0.93	0.57 (1.46)	1.20 (3.05)	0.19 (.48)
930-71	3.7	8.0	2.00	1.2 (3.05)	1.2 (3.05)	0.19 (.48)
940-7	14.0	0.8	0.06	0.57 (1.46)	0.57 (1.46)	0.18 (.45)
940-11	14.0	1.2	0.08	0.57 (1.46)	0.85 (2.16)	0.18 (.46)
940-15	14.0	1.7	0.11	0.57 (1.46)	1.20 (3.05)	0.18 (.46)
940-31	14.0	3.5	0.20	1.2 (3.05)	1.2 (3.05)	0.18 (.46)
950-7	6.0	0.8	0.15	0.38 (.97)	0.38 (.97)	0.15 (.38)
950-11	6.0	1.2	0.18	0.38 (.97)	0.57 (1.46)	0.15 (.38)
950-17	6.0	1.9	0.29	0.57 (1.46)	0.57 (1.46)	0.15 (.38)
950-35	6.0	3.9	0.61	0.57 (1.46)	1.20 (3.05)	0.15 (.38)
950-71	6.0	8.0	1.20	1.2 (3.05)	1.2 (3.05)	0.15 (.38)
930-127	3.9	15.4	3.24	1.57 (3.99)	1.57 (3.99)	0.185 (.47)
950-127	6.0	15.4	2.11	1.57 (3.99)	1.57 (3.99)	0.15 (.38)
960-127	3.0	15.4	4.08	1.18 (3.00)	1.18 (3.00)	0.142 (.38)
970-127	3.9	15.4	3.14	1.18 (3.00)	1.18 (3.00)	0.126 (.32)
960-127	8.5	15.4	1.49	1.57 (3.99)	1.57 (3.99)	0.130 (.33)



NOTE: For improved efficiency and smaller heat sink dimensions, operate T.E. modules at 75% of the maximum rated current and voltage.



For Equations:
Max ΔT = temperature differential (T_c-T_h) (°C)
Max Qc = heat pumped by module (watts)

Terms and Conditions

Ordering Information

- You may order by telephone, during business hours, or
- By fax 24 hours a day, or
- By mail on your purchase order form or company letterhead.
- Orders are subject to acceptance, depending upon quantity, price, availability of parts and other considerations.

Prices

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

Terms

- Terms of payment are net 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, C.O.D. or L.O.C. may be required. All published prices unless otherwise stated are F.O.B. Chicago, U.S.A.

Same Day Shipment

- Upon request, we will ship the same day on approved, in stock orders received before noon, Chicago time.

Cancellation, Schedule Changes

- A charge of 15% of net price will be assessed for cancellation of formally acknowledged orders. On special equipment and custom modified equipment orders, additional incremental cancellation charges may be made.
- 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 damage may also be made.
- All returned goods must be sent freight prepaid. A restocking charge of 15% will apply.

Warranty and Service Information

TECA's products are warranted for a period of one (1) year, from date of shipment from the factory, to be free from defects in material and workmanship with correct use, normal operating conditions, and proper application. TECA's obligation under this warranty shall be limited to the repair or exchange (at TECA's option) of any TECA product or part which proves to be defective as provided herein. TECA reserves the right to either inspect the product at buyer's location or require it to be returned to the factory for inspection. Buyer is responsible for freight to the factory on all warranty claims. The above warranty does not extend to goods damaged or subjected to accident, abuse, or misuse after shipment from the factory, nor to goods altered or repaired by anyone other than specifically authorized by TECA. TECA shall not in any way be responsible for the consequences of any alteration, modification, or misuse unless previously approved in writing by an officer of TECA.

TECA makes no express warranties other than those which are described herein. Any description of goods sold hereunder, including any reference to buyer's specifications and any descriptions in catalogs, circulars, and other written material published by TECA, is for the sole purpose of identifying such goods and shall not create an express warranty that the goods shall conform to such description.

This warranty is expressly in lieu of all other warranties, expressed or implied. There are no implied warranties of merchantability of fitness for a particular application. This warranty states TECA's entire and exclusive liability and buyer's exclusive remedy for any claim for damages in connection with TECA's products. TECA will in no event be liable for incidental or consequential damages whatsoever, nor for any sum in excess of the purchase price.

TECA reserves the right to change prices and discontinue catalog items without notice. We reserve the right to make changes in specifications, terms and conditions at any time without notice. Our catalog information and specification are believed to be accurate and reliable. TECA, however, assumes no responsibility or liability for their use, nor for the effect of design or specification changes not yet conceived or made.

Quality Mission Statement

The fundamental purpose of TECA is to provide world-class products of superior quality. It is our goal to continually monitor and improve our operations to meet and exceed our customer needs.

Guiding Values and Principals

Quality is top priority- Suppliers are a direct link and partner in the total quality team. Their contribution will be measured and controlled to ensure on time deliveries and first time acceptance.

We are "TEAM TECA." We recognize that our success depends upon the involvement and individual commitment and performance of each team member.

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, and the environment we live in.

the experts in solid-state cooling.