

E-PAK TECHNOLOGY



Patent Pending

EVAPORATIVE COOLED PACKAGED CHILLERS & CHILLED WATER PLANTS

E-PAK TECHNOLOGY

- ◆ EXTRAORDINARILY ENERGY EFFICIENT
- ◆ ENVIRONMENTALLY FRIENDLY
- ◆ EXCEPTIONALLY QUIET
- ◆ EXPERTLY ENGINEERED

E-PAK TECHNOLOGY

FEATURES

Evaporative condensing provides super energy efficiency. (System EER to 20+)

Helical rotary screw compressors with a 5 year warranty are 4 to 5 times more reliable than reciprocating compressors.

Operating sound level is cut to 50-65dB compared to an air cooled sound level of 110dB.

Greatest capacity of any packaged chiller on a single skid — shipped via truck in one piece.

APPLICATIONS

- Commercial
- Residential: Schools/Multifamily
- Educational Institutions
- Ice Rinks
- Thermal Storage
- Medium to Low Temperature Process — to 0° Leaving Fluid
- Energy Conscious Clients
- Can be Designed to Meet Virtually Any Customer Application

THE HIGH EFFICIENCY, HIGH PERFORMANCE PACKAGED CHILLER THAT PAYS FOR ITSELF 40 TO 60% LOWER ENERGY CONSUMPTION COMPARED TO AIR-COOLED CHILLERS

- 20-535 Tons on a Single Skid
- Design System EERs in Excess of 17
- Part Load System EER in Excess of 20
- Exceptionally Quiet Operation
- Compact
- Superior Reliability
- Easy to Use Controls
- Simple Field Installation
- Smaller Electrical Service
- Design Redundancies

EVAPORATIVE CONDENSER MODULE

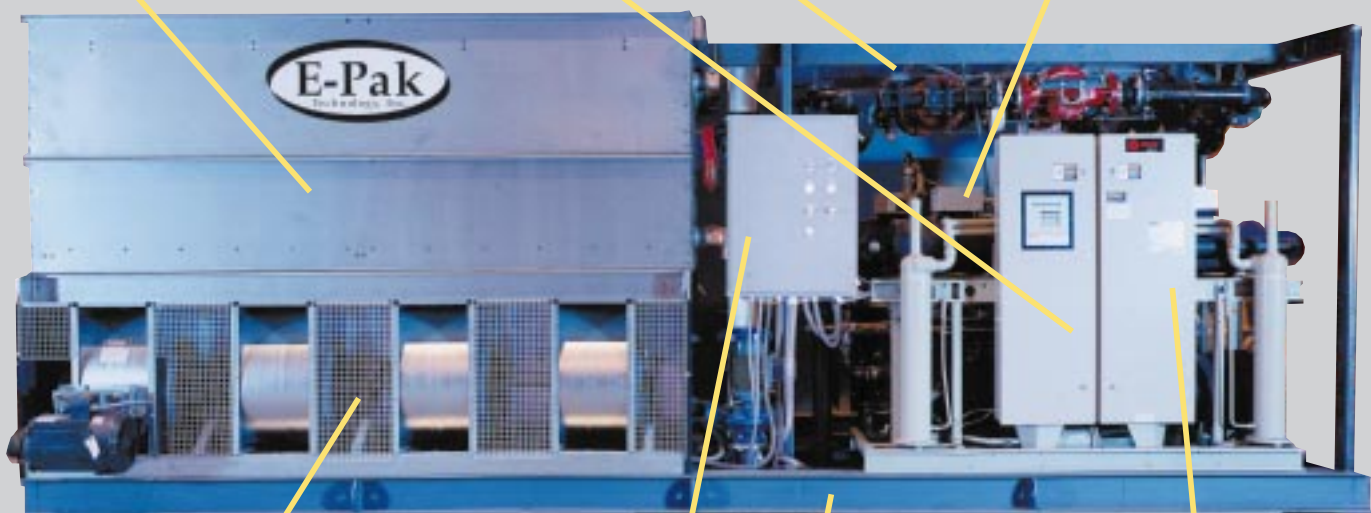
CHILLER MODULE

Available with either R-22 or chlorine free R-134A refrigerant.

WATER PLANT PIPING

HELICAL ROTARY SCREW COMPRESSOR

High reliability with low maintenance and a 5 year warranty



CENTRIFUGAL FANS

Provide exceptionally quiet operation

CONDENSER PLC INTERFACE

SELF SUPPORTING STEEL FRAME

MICROPROCESSOR CONTROL UNIT

Superior controls offer a user friendly interface and control to within $\pm 1/2^{\circ}\text{F}$

LEADER IN TECHNOLOGY

E-PAK TECHNOLOGY

About E-Pak

E-Pak Technology Inc. produces a line of high quality evaporative cooled package chillers and chilled water plants. These products are revolutionary air-conditioning systems for commercial, industrial and institutional use in the 20 to 530 ton capacity range. While innovative in its application and design, E-Pak prides itself on the use of proven, "State of the Art", high quality components throughout each of its product lines.

Custom Chillers without Custom Costs

With over seventy three (73) models from which to choose, there is an E-Pak Chiller or Chilled Water Plant to meet virtually any application. In addition, E-Pak Technology has the engineering expertise to make an E-Pak Chiller or Chilled Water Plant a perfect fit for your specific application.

Leading Edge, State of the Art Component Technology

In keeping with E-Pak's commitment to the latest technology, E-Pak offers a new multistage, variable speed, centrifugal compressor with Magnetic Levitation bearings. The use of MagLev technology eliminates the metal to metal contact of standard mechanical bearings thereby reducing compressor noise and eliminates the need for lubricating oil which can accumulate in critical refrigeration system heat transfer components reducing system performance. Whether you choose the MagLev Turban or the Helical Rotary Screw compressor each chiller module is equipped with multiple compressors.

World Class Components and World Class Service

E-Pak provides world-wide installation, warranty and maintenance service in their locality by highly trained technicians through our major component manufacturers.

EPA Energy Star Buildings Partner

E-Pak's exceptional energy savings and environmentally friendly sound levels and refrigerants have been recognized by the EPA as an "Energy Star Building Partner".



Table of Contents

Evaporative Condensing Advantages	4
Sound Performance Qualities	5
Evaporative Condenser Features	6
Scroll Compressor Features	8
Screw Compressor Features	9
E-Pak Engineering Capabilities	10
Scroll Compressor Chillers	12
DX Evaporator	
Nominal Ratings	13
General Data	15
Electrical Data	17
General Layout Footprint	17
MagLev Turbo Chillers	19
Flooded Evaporator	
Nominal Ratings	22
General Data	23
Electrical Data	27
General Layout Footprint	28
Screw Compressor Chillers	30
Flooded Evaporator	
Nominal Ratings	32
General Data	33
Electrical Data	38
General Layout Footprint	39
Chilled Water Plants	42

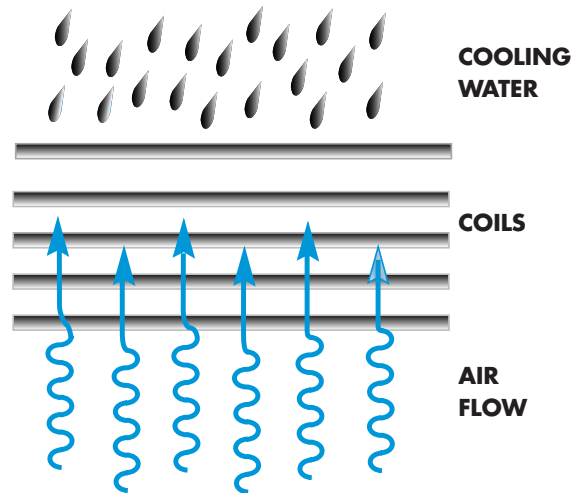
EVAPORATIVE CONDENSING — THE E-PAK ENERGY ADVANTAGE

One of the keys to E-PAK's unique advantage is evaporative condensers.

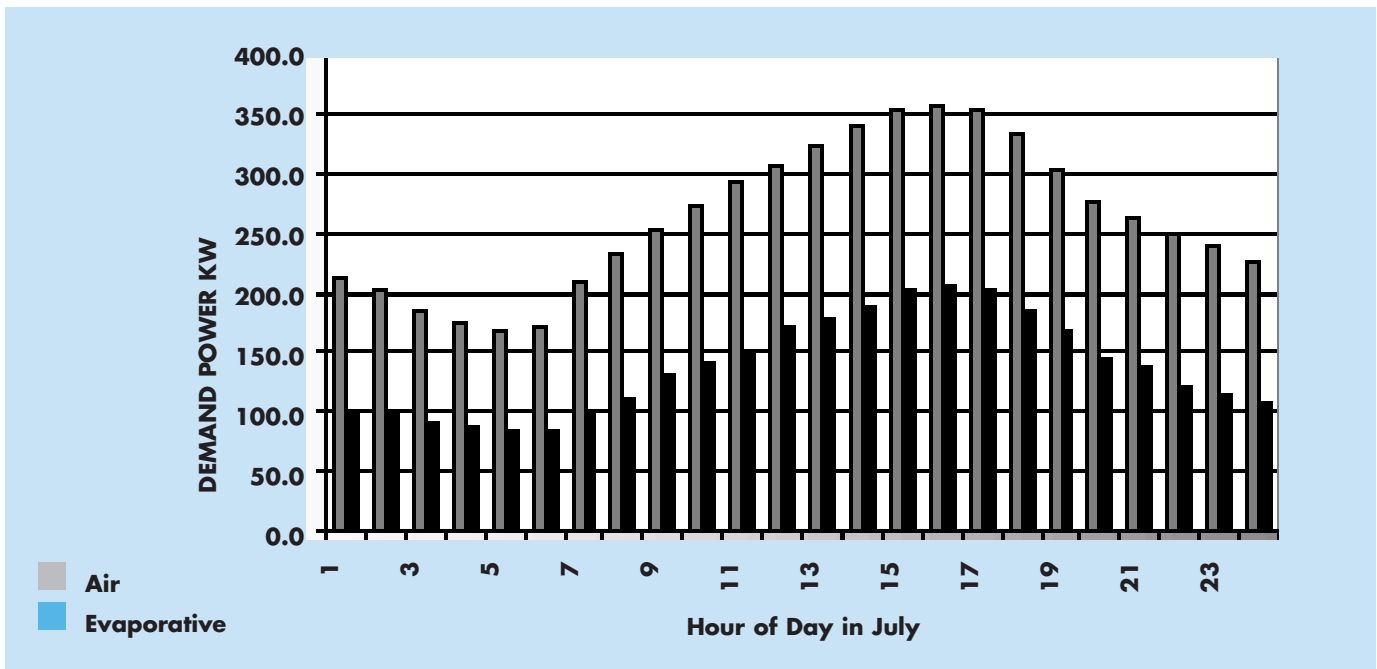
While generally applied only in large field erected industrial process, refrigeration and air-conditioning systems, evaporative condensers are widely used for condensing refrigerant vapor in mechanical refrigeration systems.

The inherent efficiency of evaporative condensing provides lower condensing temperatures (95 degrees) compared to other condensing methods, i.e. air cooled (115 degree F to 120 degrees F) or water cooled (105 degrees F) This results in significantly reduced kW per ton (.70 system kW per ton and 17+ system EER).

Now E-PAK offers the advantage of evaporative condensing on a single skid utilizing world class components.



POWER DEMAND COMPARISON

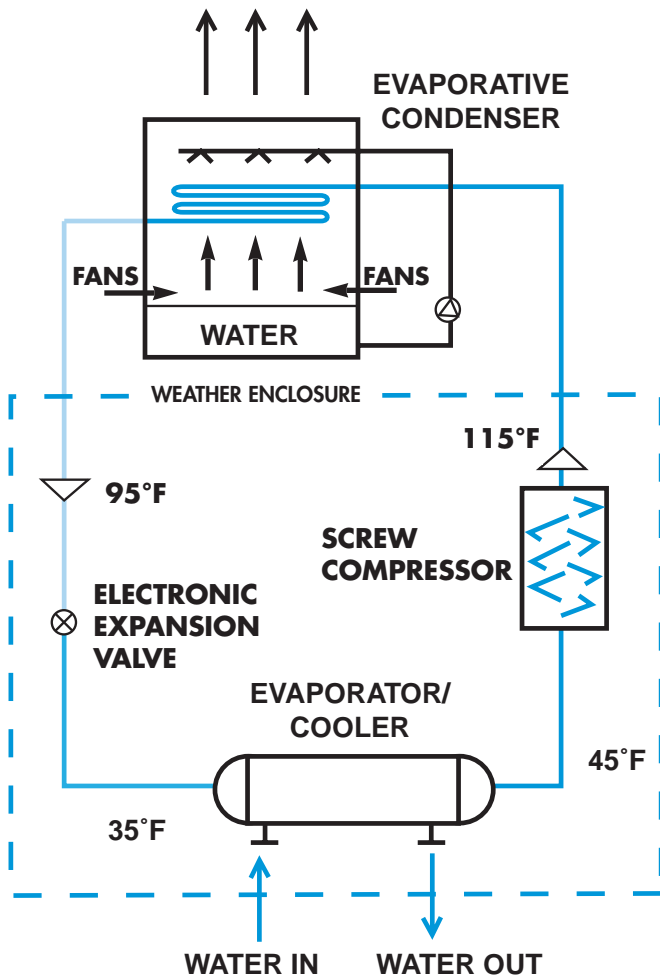


Based upon 260 ton capacity with 95°F DB and 78°F WB air entering condenser.

POWER DEMAND CONSUMPTION OF AIR COOLED VS THE E-PAK EVAPORATIVE COOLED CHILLER.

Note that the peak power demand of the E-PAK product is less than most of the air-cooled minimum demand. The variance in efficiencies will be greater in conditions where the WB is <78°F and the DB is >95°F.

Simplified Refrigeration Diagram That Illustrates How the E-Pak Units Deliver Their Unique Advantages.



EXCEPTIONALLY QUIET OPERATION

E-PAK CHILLERS OPERATE AT THE LOWEST SOUND LEVELS

From <50 dB(A) attenuated to 65 dB(A) unattenuated vs. air cooled chillers @ 100 dB(A) to 110 dB(A)

ALL E-PAK UNITS FEATURE MULTIPLE CENTRIFUGAL FANS

Centrifugal fan units operate at lower sound levels which make this design preferred for installations where noise is a concern. The sound they produce is primarily at high frequencies which is easily attenuated by building walls, windows, and natural barriers. Additionally, since the sound from the fans is directional, single sided air entry models can be turned away from critical areas avoiding a sound problem. When even quieter operation is necessary, centrifugal fan models can be equipped with optional sound attenuation packages.

OPTIONAL SOUND ATTENUATION PACKAGES

E-Pak Chillers may be attenuated to sound levels of >50 dB(A) or lower through optional packages (see appendix A)

For example, heavy acoustic foam enclosed by metal double walls can be factory installed to the chiller weatherhouse.

However, a condenser sound attenuation package may be field installed after installation and set-up, if unattenuated sound levels are determined to be objectionable.



Forward Curve Centrifugal Fan Wheel

EVAPORATIVE CONDENSERS FROM E-PAK PROVIDE QUALITY CONSTRUCTION AND DESIGN INNOVATIONS

ELLIPTICAL COIL DESIGN

Evaporative Condensers by E-Pak feature a patented coil design which assures greater operating efficiency. The elliptical tube design allows for closer tube spacing, resulting in greater surface area per plan area than round tube designs. In addition, this design has lower resistance to airflow, and also permits greater water loading, making the elliptical coil the most effective design available.

CORROSION-RESISTANT MATERIALS

The standard construction of evaporative cooling equipment for many years has been hot-dip galvanized steel. The purpose of galvanizing is to protect the base

metal from corrosion, and the thickness of the galvanized layer directly affects the equipment life.

E-Pak units feature G-235 galvanized steel construction. The G-235 designation means a minimum of 2.35 ounces of zinc per square foot of surface area. This is an increase of 12% over G-210 galvanized steel, and an increase of 160% over G-90 galvanized steel used by other manufacturers, representing the best galvanization in the industry.

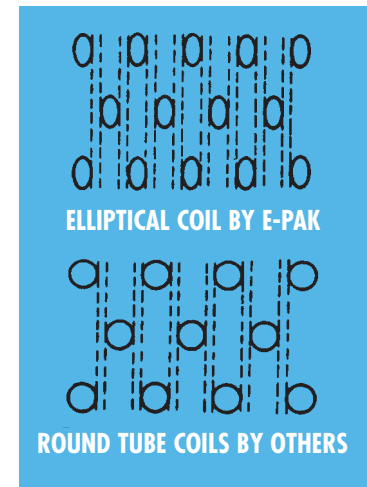
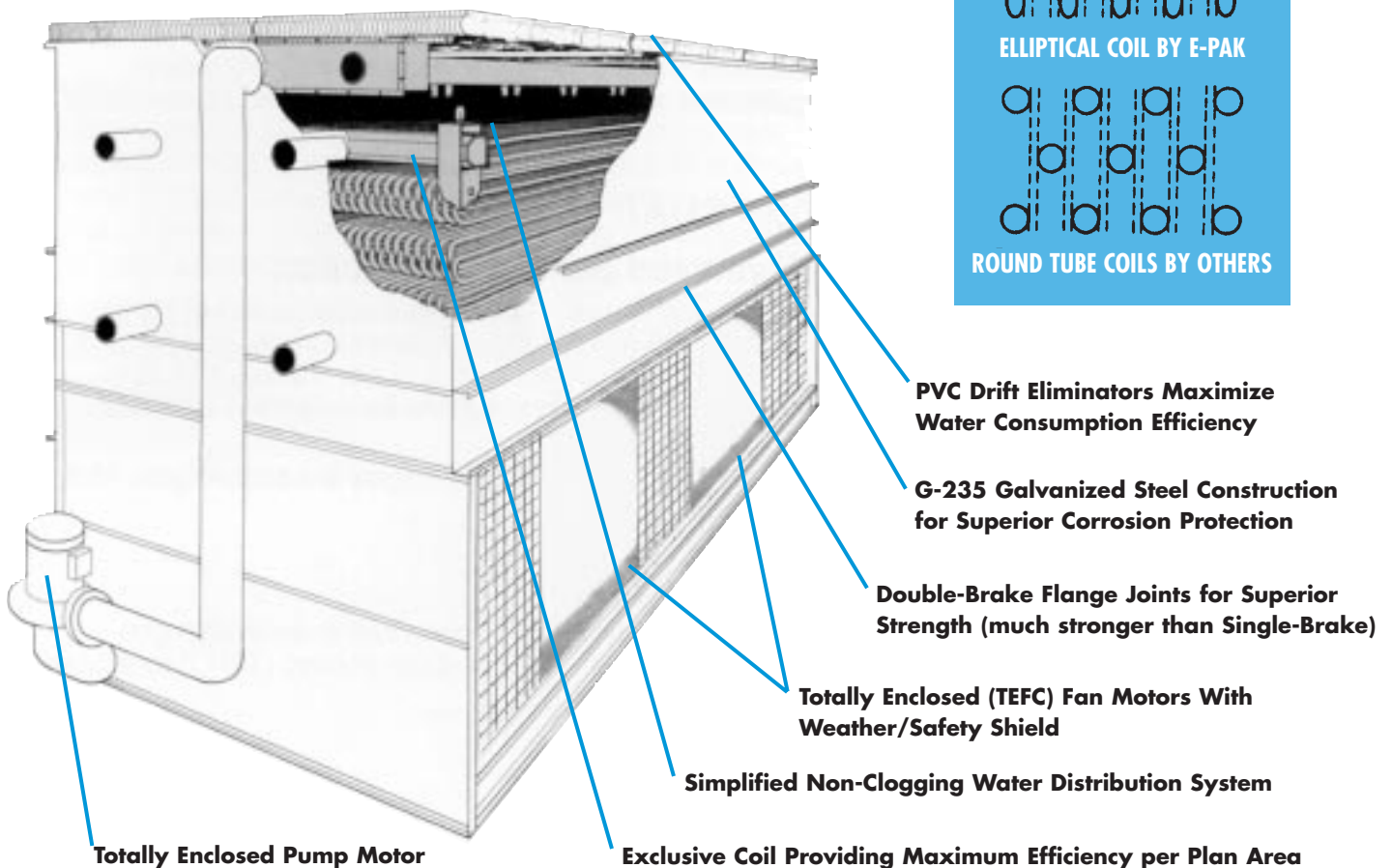
TOTALLY ENCLOSED MOTORS

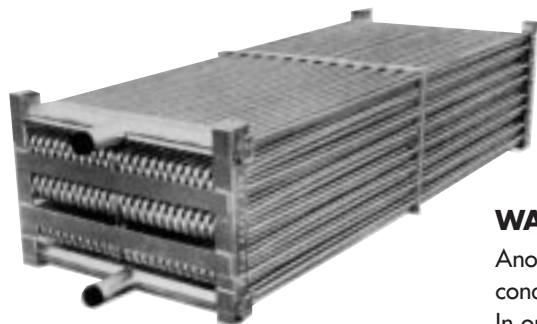
E-Pak units utilize totally enclosed, fan-cooled (TEFC) motors on all fans and pumps. These superior motors, designed to operate in outdoor environments, help

to assure longer equipment life without motor failures, which may result in costly downtime.

HEAVY DUTY CONSTRUCTION

E-Pak condensers are specially designed and built for the rugged conditions under which they must operate. The design incorporates large, heavy-duty panels with double-brake flanges and a minimum of seams to virtually eliminate water leaks. Single brake flanges used in other designs are not as rigid and may permit casing water leaks.





CONDENSING COIL

E-Pak's condensing coils feature a patented design which assures maximum condensing capacity. The airflow through the coil is counterflow to the refrigerant and water flow, providing the most efficient heat transfer process. This special coil design is utilized to reduce the air pressure drop through the unit while maximizing tube surface area and increasing its heat transfer capabilities. The uniquely shaped tubes of the coil are staggered in the direction of air flow to obtain a high film coefficient. In addition, all tubes are pitched in the direction of refrigerant flow to give good drainage of liquid refrigerant.

The coils are manufactured from high quality steel tubing following the most stringent quality control procedures. Each circuit is inspected to assure the material quality and then tested before being assembled into a coil. Finally, the assembled coil is tested at 350 P.S.I.G. air pressure under water to make sure it is leak free.

To protect the coil against corrosion, it is placed in a heavy-duty steel frame and the entire assembly is dipped in molten zinc (hot-dip galvanized) at a temperature of approximately 800°F.

FORCE DRAFT CONDENSER

E-PAK condensers are designed for forced draft air flow which locates the fan motors in the dry inlet air stream, thereby increasing motor reliability over induced draft designs used by other manufacturers which locate the fan motors in the wet discharge air stream.

WATER DISTRIBUTION SYSTEM

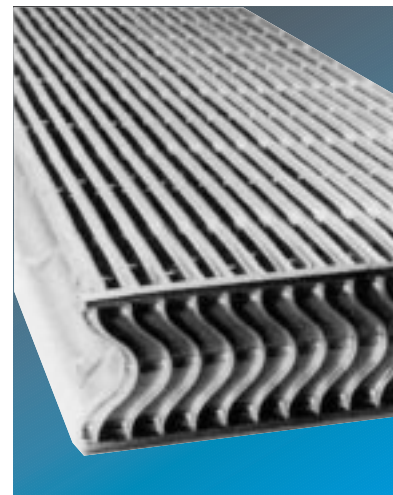
Another important part of an evaporative condenser is the water distribution system. In order to give the maximum heat transfer and minimize scaling, the coil must be drenched with water at all times. The E-Pak system does this by circulating approximately 6 gallons of water per minute over every square foot of coil face area.

The water distribution system is greatly simplified in E-Pak units, with the largest non-clog water diffusers (see below) available for evaporative condensers. The diffusers are threaded into the water distribution header to ensure correct positioning. Also, a collar on the diffuser extends into the header and acts as an anti-sludge ring to reduce the need for maintenance. Excellent flooding of the coil is maintained at all times without numerous small orifice nozzles.

For corrosion protection the diffusers are made of ABS plastic and distributor pipes are noncorrosive Polyvinyl Chloride (PVC).



Non-Clog
E-Pak Water Diffusers



PVC DRIFT ELIMINATORS

The final element in the upper part of the condenser are moisture eliminators which strip the entrained water droplets from the leaving air stream. E-Pak units feature patented eliminators that are approximately 5" deep, spaced on 1" centers. They incorporate a hooked leaving edge designed to direct the discharge air stream away from the fans to help eliminate recirculation of hot, saturated air back into the fan intake.

E-Pak eliminators are constructed entirely of inert, corrosion-free PVC. This PVC material has been specially treated to resist damaging ultraviolet light. The eliminators are assembled in easily handled sections to facilitate removal thereby exposing the upper portion of the unit and water distribution system for periodic inspection and maintenance.

E-PAK'S SCROLL COMPRESSORS

PROVIDE QUIET, EFFICIENT, AND RELIABLE OPERATION IN E-PAK CHILLERS

QUIET AND SMOOTH OPERATION

Quiet operation is due in part to journal bearings which transmit less noise from the running gear to the shell. Additionally, the fixed throw eliminates the possibility of scroll impact and the resulting noise. The check valve closes fast and seals tight for quiet shutdown at 1M.

DURABILITY/EXTENDED LIFE

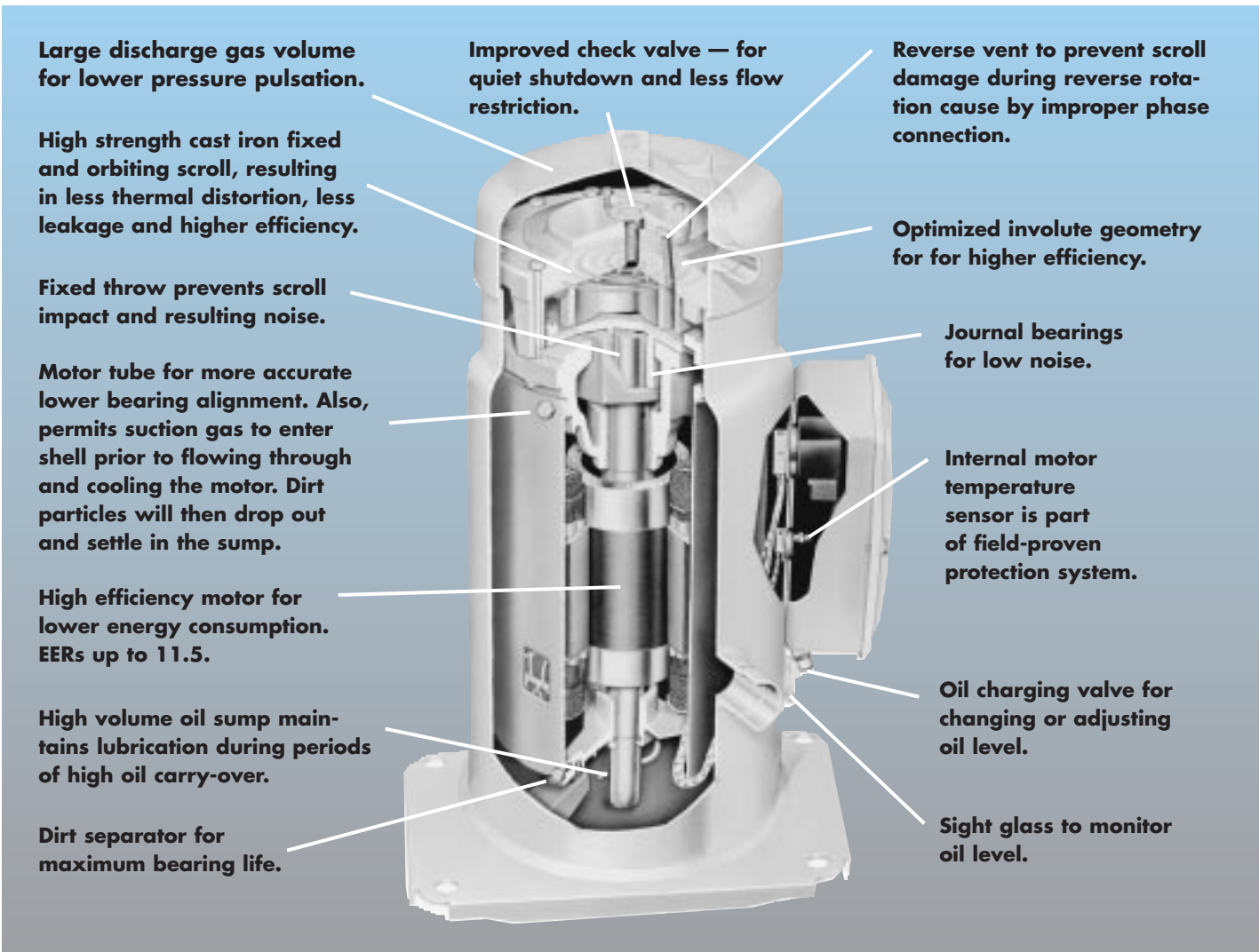
Many features contribute to durability and long life.

A motor tube design is used. The motor and lower bearing head are both located in a steel tube bolted to the housing. This arrangement provides for a more precise motor and bearing alignment and permits the suction gas to enter the shell prior to flowing through the motor. The velocity of the suction gas decreases as it enters the shell, allowing the dirt particles to drop out and settle in the sump.

The compressor has a built-in dirt separator/trap in the lower bearing head to prevent dirt from reaching the bearings.

The high-volume oil sump helps prevent excessive oil loss that can occur in systems with large refrigerant charges. This high volume oil sump and large suction volume also help minimize the oil dilution and slugging that occur during periods of flooding.

Also, the use of cast iron for both the orbiting and fixed scrolls provides greater strength and galling resistance.



Screw Compressor Technology

Revolutionary Design, Tried and Proven Performance and Reliability.

Now you can have superior Compressor efficiency, reliability *and* quality in one twin-screw compressor with high-performing design combined with vast refrigeration and cooling industry experience and manufactured with the sophisticated technology of the world's largest refrigeration company. When used in your equipment, the screw compressor gives you unparalleled operating costs, reliability *and* ease of application.

Best Full-Load and Part-Load Efficiencies.

The Screw compressor was designed to meet your most challenging needs now, and well into the future. The capacity modulation in the Carlyle compressor has been designed to provide infinitely variable capacity from 25% to 100% for perfect load matching and superior part-load efficiency. Reduced tip speeds provide lower radiated sound and improved sound quality too.



Unequaled Performance

- 40 to 250-ton sizes for R-134a air-conditioning and medium-temperature applications.
- Patented rotor profile geometry produced on state-of-the-art manufacturing processes.

Perfect Load Matching

- Continuous unloading down to 25%.
- Built-in V_i compensation at part load.
- Automatic unloaded starting.
- Simple dual-solenoid control.



- Service friendly; semi-hermetic with simple disassembly and reassembly.

E-PAK'S TECHNOLOGY... ENGINEERING CAPABILITIES TO MEET CLIENT NEEDS

With over 73 different package chiller models to choose from, there is an E-PAK Chiller for virtually any application. However, E-PAK Technology's staff of engineers can provide further assistance and engineering capabilities to provide the best possible match to your specific application. Some of the more commonly requested engineered solutions for specific applications are described in the subsequent sections below.

SPECIAL OR COMPACT SITE LIMITATIONS

E-PAK Technology can successfully accomplish installations of their Chillers when size is of critical importance. Through creative component installation, E-PAK's engineers have been able to make standard units smaller upon customer request.

For example E-PAK Technology recently completed a 265 ton package chilled water plant which was required to fit within a space 16' wide and 26' in length. E-PAK was additionally challenged to install duplex condenser water and chilled water pumps on the same unit. In line chilled water pumps were installed overhead in the unit to save space, allowing for the entire chilled water plant to be placed on a single skid measuring only 8' by 24'. By modifying a standard configuration for this type of chilled water plant, E-PAK's engineers were able to successfully satisfy the requirements of this client to produce a product that performs flawlessly.

In addition to space requirements some installations also introduce other challenging chiller placements. For example, pits or placements with high surrounding walls pose problems. These circumstances often do not permit the free flow of inlet air to the condenser, thereby creating performance problems. In these instances, E-PAK engineers have been able to include discharge hoods that inhibit the short circuiting of discharge air back to



Princeton, New Jersey — 300 ton Chilled Water Plant with sound attenuation and plume abatement coil (hot gas de-superheat coil which runs the length of the condenser).



One-piece rigging for ease of installation.

the fair intake airways, thereby maintaining the unit's efficiency.

REDUNDANT CONDENSER RECIRCULATION WATER PUMPS

These recirculation water pumps can be added to enhance the equipment's reliability.

E-PAK's engineers can locate these redundant pumps on opposite sides of the condenser or when space limitations exist inside the aluminum chiller cabinet for further versatility.

CHILLER CONDENSER SOUND ATTENUATION

While the E-PAK Chiller units and Chilled Water Plants already provide exceptionally quiet operation, E-PAK engineers can further reduce the sound levels by adding sound attenuation packages. E-PAK engineers have devised special double wall panels containing sound attenuating material that can be placed in the cabinet. In addition, special condenser intake and discharge sound traps can be applied to the units to further reduce sound levels to below 50dB(A) at 50'.

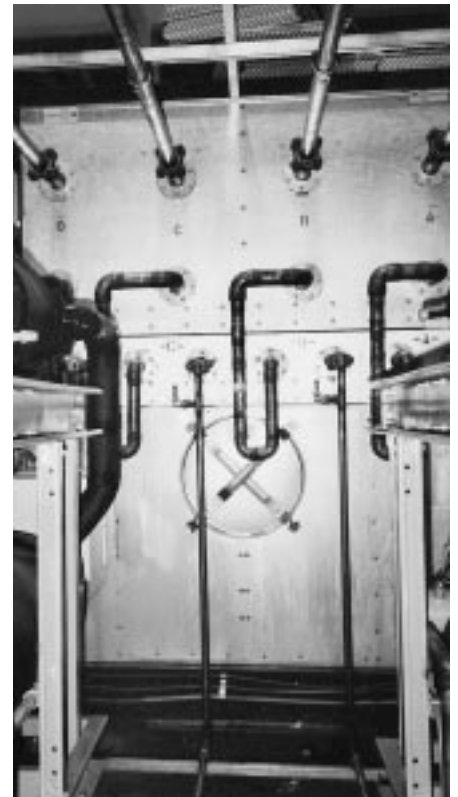
PHYSICAL SITE LIMITED ACCESS AND WEIGHT LIMITATIONS

E-PAK engineers have devised special ways to tackle almost any installation problem. When the physical arrangements of a site limit crane access, or when weight limitations do not allow the complete equipment to be rigged as one unit, E-PAK engineers have a solution.

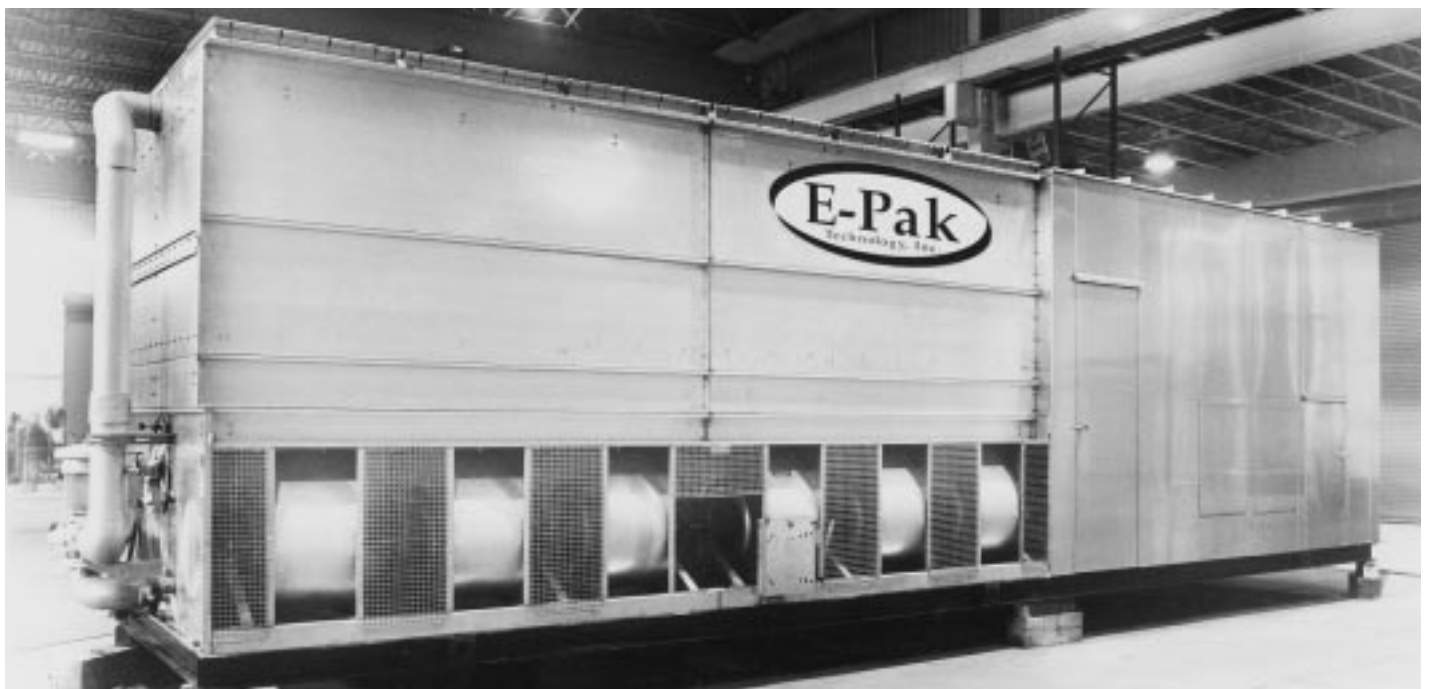
E-Pak has designed special flanged connections that permit the equipment to be separated at the site, placed in the assigned location, refrigerant lines connected, and the unit operated with little delay.

COST LIMITING FACTORS

E-PAK engineers understand that certain applications require special cost limiting factors to be applied. E-PAK engineers can modify the component designations to result in higher condensing temperatures and lower first costs. This enables owners or contractors to minimize the cost of the package chiller and chilled water plant yet still reap the rewards of the energy efficient E-PAK equipment.



Flanged connectors allow for optional 2-piece rigging to meet special installation requirements.



A completed unit ready to be shipped from E-Pak's manufacturing facility.

EVAPORATIVE COOLED DX EVAPORATOR SCROLL COMPRESSOR PACKAGED CHILLERS

CAPACITIES FROM 20 TONS TO 60 TONS

TANDUM UNITS AVAILABLE
CAPACITIES FROM 65 TONS TO 120 TONS

MULTIPLE FULLY HERMETIC SCROLL COMPRESSORS
10 HP & 15 HP EACH

LOW MCA ALLOWS MORE CAPACITY ON SMALLER ELECTRICAL SERVICE

GENERAL

The chiller is an evaporative cooled chiller completely packaged on a self-supporting structural steel frame with all refrigerant piping and interconnecting power and control wiring installed and tested by the manufacturer prior to shipment.

The chiller is suitable for outdoor installation with all chiller components enclosed in a protective aluminum weather housing and all unprotected system components suitable for outdoor operation.

The chiller has a minimum system energy efficiency ratio (EER) including compressors, condenser fan(s), condenser pump and control power and a system energy consumption rate as specified in the chiller equipment schedule.

The chiller performance is rated in accordance with ARI standard 590.

CHILLER

Each chiller module is factory assembled and equipped with a minimum of two direct drive 3600 rpm, hermetic scroll compressors suitable for operation with R-22 refrigerant. (20 to 35 tons - 2 compressors/1 circuit - 40 to 60 tons - 4 compressors/2 circuits). Tandem Chiller models are equipped with (2) chiller modules on 3 or 4 circuits with 6 to 8

compressors. No compressor is larger than 15 HP. Each compressor has: centrifugal oil pump, oil level sightglass, oil charging valve, two point lubrication for each motor bearing, flooded lubrication for the journal and thrust bearings, and a check valve on the scroll discharge port.

Motor is suction gas cooled, hermetically sealed, two-pole, squirrel cage induction type.

EVAPORATOR

Shell and tube design with seamless copper tubes roller expanded into tube sheets. Designed, tested, and stamped in accordance with ASME code for refrigerant side working pressure of 300 psig. Water side working pressure is 300 psig. One water pass with a series of internal baffles. Each shell includes drain connections, entering and leaving temperature sensors, and 3/4-inch Armaflex II (or equal) insulation ($K = 0.26$).

REFRIGERANT CIRCUIT

All refrigeration circuits are completely independent and include liquid line and discharge line service valves, filter dryer, combination moisture indicator-sightglass, charging port, insulated suction line, liquid line solenoid valve and thermal expansion valve.

Isolation valves provide means of isolating refrigerant charge in either the high or low pressure side while servicing. One refrigerant circuit on 20 to 35 tons; two refrigerant circuits on 40 to 60 tons. Each refrigerant circuit will be pressure tested, evacuated and shipped with a complete charge of compressor oil and a holding charge at 30psi of refrigerant R-22.

CONTROL PANEL

Each chiller module is furnished with a Factory-mounted microprocessor based control panel which uses 120/60/1 power. Automatic shutdown protection with manual reset is provided for low evaporator outlet refrigerant temperature and pressure, high condenser refrigerant pressure, high motor winding temperature, motor current overload, and phase reversal. Automatic shutdown protection with automatic reset after condition is corrected is provided for low line voltage and loss of chilled water flow.

SCROLL COMPRESSOR CHILLERS — DX EVAPORATOR

The unit control module (UCM) automatically takes action to prevent complete shutdown by shedding compressors one at a time. This occurs in the event of low evaporator refrigerant temperature, high condenser refrigerant pressure, or motor current overload, thus preventing the motor current from exceeding setpoint.

Solid-state chilled water temperature sensors are included for precise and accurate control. A menu driven display indicates the operating code, the last diagnostic code, chilled water setpoint, current limit setpoint, condenser water and chilled water temperature sensors. Factory-installed entering and leaving condenser water temperature sensors (optional) are available for microprocessor display or

Trane Tracer monitoring. Over 40 diagnostic checks are made and will be displayed when a problem is detected.

STARTER

The unit control panel contains both a control section and a starter section. The panel is painted, NEMA 1 enclosure. The starter section contains: top access for power wiring, single point power hook-up, three-phase solid-state overload protection, customer wired grounding lug, and control power transformer with fused protection.

CONDENSER

The chiller unit is equipped with a forced draft multi-circuit evaporative condenser which is selected to provide the heat of rejection capacity required by the chiller at the specified condition.

PAN & CASING

The pan and casing are constructed of G-235 hot dip galvanized steel.

The pan/fan section include fan(s) with motors and drives mounted and aligned at the factory. Fan motors are totally enclosed and fan cooled. The motors and weather safety shields are removed for shipping and field installation.

Standard pan accessories include circular access doors, stainless steel strainers, waste water bleed line with adjustable valve and brass make-up valve with an unsinkable foam filled plastic float.

NOMINAL RATINGS* DX EVAPORATOR SCROLL CHILLERS

MODEL NUMBER	CAPACITY TONS	COMPRESSOR kW	SYSTEM kW	SYSTEM kW/TON	SYSTEM EER	TOTAL HEAT OF REJECTION
SINGLE PACKAGES						
ECT-20-036	21.6	14.7	18.2	0.84	14.24	309.4
ECT-25-048	26.0	19.7	23.1	0.89	13.51	379.3
ECT-30-048	30.7	23.5	27.0	0.88	13.64	448.7
ECT-40-070	43.0	29.6	37.1	0.86	13.91	617.1
ECT-50-090	50.6	38.4	43.9	0.87	13.83	738.3
ECT-60-100	61.6	47.4	55.0	0.89	13.44	901.1
TANDEM PACKAGES						
ECT-65-4870	69.0	49.3	60.30	0.87	13.73	996.4
ECT-70-4870	73.7	53.1	64.10	0.87	13.80	1,065.7
ECT-80-70T	86.0	59.2	74.20	0.86	13.91	1,234.2
ECT-90-90T	93.6	68.0	79.00	0.84	14.22	1,355.4
ECT-100-100T	101.2	76.8	87.80	0.87	13.83	1,476.7
ECT-110-100T	112.2	85.8	101.00	0.90	13.33	1,639.4
ECT-120-100T	123.2	94.8	110.00	0.89	13.44	1,802.1

*Nominal ratings based on 44°F leaving water temperature, 10°F ΔT, 78°F wet bulb temperature.

CENTRIFUGAL FANS

The fans are forward curved centrifugal type of hot dip galvanized construction. The fans are factory installed to the pan/fan section, statically and dynamically balanced. The fans are mounted on either a solid or hollow steel shaft with forged journal bearings. The fan shaft is supported by heavy duty, self-aligning bearings with cast-iron housings and lubrication fittings for maintenance.

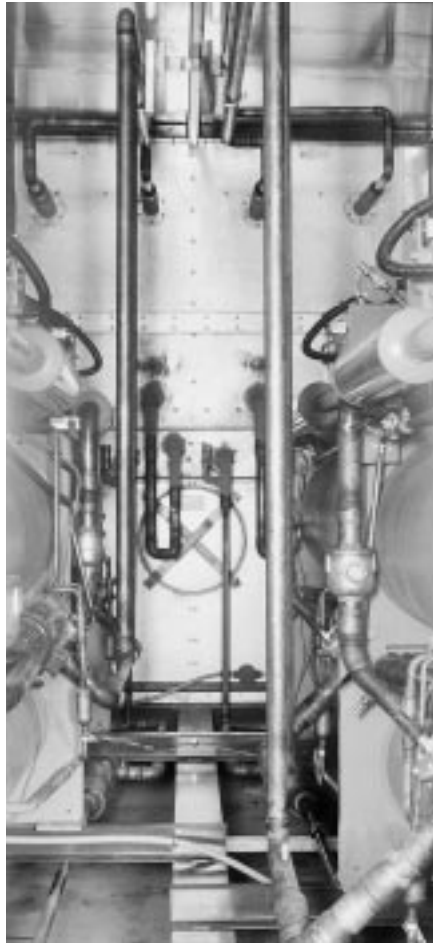
The fan drive(s) is V-Belt type with taper lock sheaves designed for 150% of the motor nameplate horsepower. The drive(s) are mounted and aligned at the factory.

FAN MOTOR

Totally enclosed fan cooled motor(s) with a 1.15 service factor (inverter duty type with a 1.25 service factor when used in conjunction with a variable frequency drive) are furnished suitable for outdoor service. Motor(s) are mounted on an adjustable base. The motors are mounted, wired and tested at the factory, then removed to comply with shipping restrictions, with all motor leads clearly tagged for ease of hook up at the installation site.

HEAT TRANSFER COIL

The coil is constructed entirely of prime surface steel, encased in steel framework with the entire assembly hot-dip galvanized after fabrication. Coil is designed with sloping tubes for free drainage of liquid refrigerant and tested to 350 psig air pressure under water. Each coil circuit is sized for the heat of rejection capacity of each individual refrigerant circuit. The coil features elliptical tube design which permits greater water loading, lower air flow resistance and higher heat transfer efficiency. Optional copper or stainless steel coils are also available.



WATER DISTRIBUTION SYSTEM

The system provides a water flow rate of not less than 6 GPM over each square foot of unit face area to ensure proper flooding of the coil. The spray header is constructed of schedule 40, PVC pipe for corrosion resistance. All spray branches are removable and include a threaded end plug for cleaning. The water is distributed over the entire coil surface by precision molded ABS spray nozzles (1" x 1/2" orifice) with internal anti-sludge rings to eliminate clogging. Nozzles are threaded into spray header to provide easy removal for maintenance.

WATER RECIRCULATION PUMP

The pump is a close-coupled, bronze fitted, centrifugal type with mechanical seal, installed vertically at the factory to allow free drainage on shut down. The totally enclosed, motor is furnished suitable for outdoor service.

ELIMINATORS

The eliminators are constructed entirely of PVC that has been specially treated to resist ultra-violet light. Assembled in easily handled sections, the eliminator blades are spaced on 1-inch centers and incorporate three changes in air direction to assure removal of entrained moisture from the discharge air stream. They have a hooked leaving edge to direct the discharge air away from the fans to minimize recirculation.

FINISH

All pan and casing materials shall be constructed of G-235 heavy gauge mill hot-dip galvanized steel for maximum protection against corrosion. During fabrication, all panel edges shall be coated with a 95% pure zinc-rich compound.

WEATHER HOUSING

The chiller weather housing is constructed of 0.080 thick mill finished aluminum and is equipped with stainless steel, piano hinged access doors and lift-off panels to provide maximum accessibility to the chiller components for service and maintenance. All access doors are double-wall construction.

The weather housing roof is sectionally constructed for removal for crane access to the compressors. The roof is sloped for water and snow runoff and capable of supporting a 35 lb./sq. foot snow load where required.

OPTIONS

See *Appendix A* for additional option specifications.

SCROLL COMPRESSOR CHILLERS — DX EVAPORATOR

GENERAL DATA ECT 20-60

NOMINAL CHILLER SIZE		20	25	30	40	50	60
CHILLER MODULES		1	1	1	1	1	1
COMPRESSORS		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
QUANTITY		2	2	2	4	4	4
NOMINAL SIZE (HP)		(2)10	(1)10/(1) 15	(2)15	(4)10	(2)10/(2)15	(4) 15
EVAPORATOR							
QUANTITY		1	1	1	1	1	1
TYPE		DX S&T	DX S&T	DX S&T	DX S&T	DX S&T	DX S&T
NO. CIRCUITS		1	1	1	2	2	2
WATER STORAGE (GAL)		12	11	16	13	21	19
WATER STORAGE (LITERS)		45	42	61	49	80	72
MINIMUM FLOW (GPM)		24	30	36	48	60	72
MINIMUM FLOW (LPS)		1.5	1.9	2.3	3.0	3.8	4.5
MAXIMUM FLOW (GPM)		72	90	108	144	180	216
MAXIMUM FLOW (LPS)		4.5	5.7	6.8	9.1	11.4	13.6
CONDENSER		36	48	48	70	90	100
QUANTITY		1	1	1	1	1	1
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. CIRCUITS		1	1	1	2	2	2
FAN TYPE		VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC
FAN QUANTITY		2	2	2	2	3	3
FAN MOTOR QUANTITY		1	1	1	1	1	1
FAN MOTOR TYPE		TEFC	TEFC	TEFC	TEFC	TEFC	TEFC
FAN MOTOR SPEED STANDARD		Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd
OPTION		2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD
FAN MOTOR (HP)		3.0	3.0	3.0	5.0	5.0	7.5
PUMP MOTOR (HP)		0.75	0.75	0.75	0.75	1	1
SUMP HEATER (kW)		2kW	2kW	2kW	2kW	3kW	3kW
WATER LEVEL CONTROL		Float valve	Float valve	Float valve	Float valve	Float valve	Float valve
SOUND LEVEL dB(A)*		52	52	52	58	55	57
LOW AMBIENT (F) Condenser		0	0	0	0	0	0
% MINIMUM SYSTEM LOAD		50	40	50	25	20	25
REFRIGERANT		R-22	R-22	R-22	R-22	R-22	R-22
REFRIGERANT CHARGE (LBS)		150	200	200	225	300	300
REFRIGERANT CHARGE (kG)		68	91	91	102	136	136
UNIT DIMENSIONS (FT)		8 x 12	8 x 12	8 x 12	8 x 12	8 x 12	8 x 12
OPERATING WEIGHT (LBS)		5,904	6,611	6,883	7,743	9,803	10,198
OPERATING WEIGHT (kG)		2,678	2,998	3,122	3,512	4,446	4,625
SHIPPING WEIGHT (LBS)		4,754	5,411	5,683	6,518	8,503	8,898
SHIPPING WEIGHT (kG)		2,156	2,454	2,577	2,956	3,856	4,035

*dB(A) = Sound Pressure level (SPL) Per ANSI S12.34-1988 @ High Speed Condenser Fan
Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

GENERAL DATA ECT 65-120

NOMINAL CHILLER SIZE		65	70	80	90	100	110	120
CHILLER MODULES		2	2	2	2	2	2	2
COMPRESSORS		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
QUANTITY		6	6	8	8	8	8	8
NOMINAL SIZE (HP)		(5)10/(1)15	(2)10/(2)15	(8)10	(6)10/(2)15	(4)10/(4)15	(2)10/(6)15	(8)15
EVAPORATOR								
QUANTITY		2	2	2	2	2	2	2
TYPE		DX S&T	DX S&T	DX S&T	DX S&T	DX S&T	DX S&T	DX S&T
NO. CIRCUITS		3	3	4	4	4	4	4
WATER STORAGE (GAL)		24	29	26	34	42	40	38
WATER STORAGE (LITERS)		91	110	98	129	160	152	144
MINIMUM FLOW (GPM)		78	84	96	108	120	132	144
MINIMUM FLOW (LPS)		4.9	5.3	6.0	6.8	7.6	8.3	9.0
MAXIMUM FLOW (GPM)		234	252	288	324	360	396	432
MAXIMUM FLOW (LPS)		14.8	15.9	18.2	20.5	22.8	25.0	27.2
CONDENSER		48 70	48 70	70T	90T	90T	100T	100T
QUANTITY		2	2	2	2	2	2	2
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. CIRCUITS		3	3	4	4	4	4	4
FAN TYPE		VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC
FAN QUANTITY		4	4	4	6	6	6	6
FAN MOTOR QUANTITY		2	2	2	2	2	2	2
FAN MOTOR TYPE		TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC
FAN MOTOR SPEED STANDARD		Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd
OPTION		2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD
FAN MOTOR (HP)		3 & 5	3 & 5	(2) 5	(2) 5	(2) 5	(2) 7.5	(2) 7.5
PUMP MOTOR (HP)		2	2	2	2	2	2	2
SUMP HEATER (kW)		(2) 2kW	(2) 2kW	(2) 2kW	(2) 3kW	(2) 3kW	(2) 3kW	(2) 3kW
WATER LEVEL CONTROL		Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve
SOUND LEVEL dB(A)*		58	58	58	55	55	57	57
LOW AMBIENT (F) Condenser		0	0	0	0	0	0	0
% MINIMUM SYSTEM LOAD		15	15	12.5	12.5	10.0	10.0	12.5
REFRIGERANT		R-22	R-22	R-22	R-22	R-22	R-22	R-22
REFRIGERANT CHARGE (LBS)		425	425	450	525	600	600	600
REFRIGERANT CHARGE (kG)		193	193	204	238	272	272	272
UNIT DIMENSIONS (FT)		8 x 12	8 x 12	8 x 12	8 x 12	8 x 12	8 x 12	8 x 12
OPERATING WEIGHT (LBS)		14,400	14,625	15,500	17,500	19,600	20,000	20,400
OPERATING WEIGHT (kG)		6,510	6,635	7,025	7,958	8,890	9,070	9,250
SHIPPING WEIGHT (LBS)		12,000	12,200	13,035	15,020	17,000	17,400	17,800
SHIPPING WEIGHT (kG)		5,410	5,530	5,910	6,810	7,710	7,890	8,070

*dB(A) = Sound Pressure level (SPL) Per ANSI S12.34-1988 @ High Speed Condenser Fan
Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

SCROLL COMPRESSOR ELECTRICAL DATA

	COMPRESSORS								FAN MOTOR(S) PUMP(S)				POWER					
	Qty.	HP	HP	HP	HP	HP	HP	HP	Qty.	HP	Qty.	HP	200/230V			460V		
													RLA	MCA	MOP	RLA	MCA	MOP
ECT-20-036	2	10	10	N/A	N/A	N/A	N/A	N/A	1	3	1	3/4	84	92	125	35	39	45
ECT-25-048	2	10	15	N/A	N/A	N/A	N/A	N/A	1	3	1	3/4	102	115	150	44	50	60
ECT-30-048	2	15	15	N/A	N/A	N/A	N/A	N/A	1	3	1	3/4	120	133	150	53	59	70
ECT-40-070	4	10	10	10	10	N/A	N/A	N/A	1	5	1	3/4	158	167	175	66	69	80
ECT-50-090	4	10	15	10	15	N/A	N/A	N/A	1	5	1	1	194	217	250	84	90	100
ECT-60-100	4	15	15	15	15	N/A	N/A	N/A	1	7.5	1	1	238	254	300	105	111	125
ECT-65-4870	6	10	10	10	10	10	15	N/A	2	3/7.5	2	3/4-3/4	265	278	300	112	118	125
ECT-70-4870	6	10	10	10	10	15	15	N/A	2	3/7.5	2	3/4-3/4	283	296	300	121	127	150
ECT-80-70T	8	10	10	10	10	10	10	10	2	7.5/7.5	2	3/4-3/4	329	337	350	137	141	150
ECT90-90T	8	10	15	10	15	10	10	10	2	5/5	2	1\1	352	365	400	149	155	175
ECT100-90T	8	10	15	10	15	10	15	10	2	5/5	2	1\1	388	401	450	167	173	175
ECT-110-100T8	8	15	15	15	15	10	15	10	2	7.5/7.5	2	1\1	439	452	500	192	198	200
ECT-120-100T8	8	15	15	15	15	15	15	15	2	7.5/7.5	2	1\1	475	488	500	210	216	225

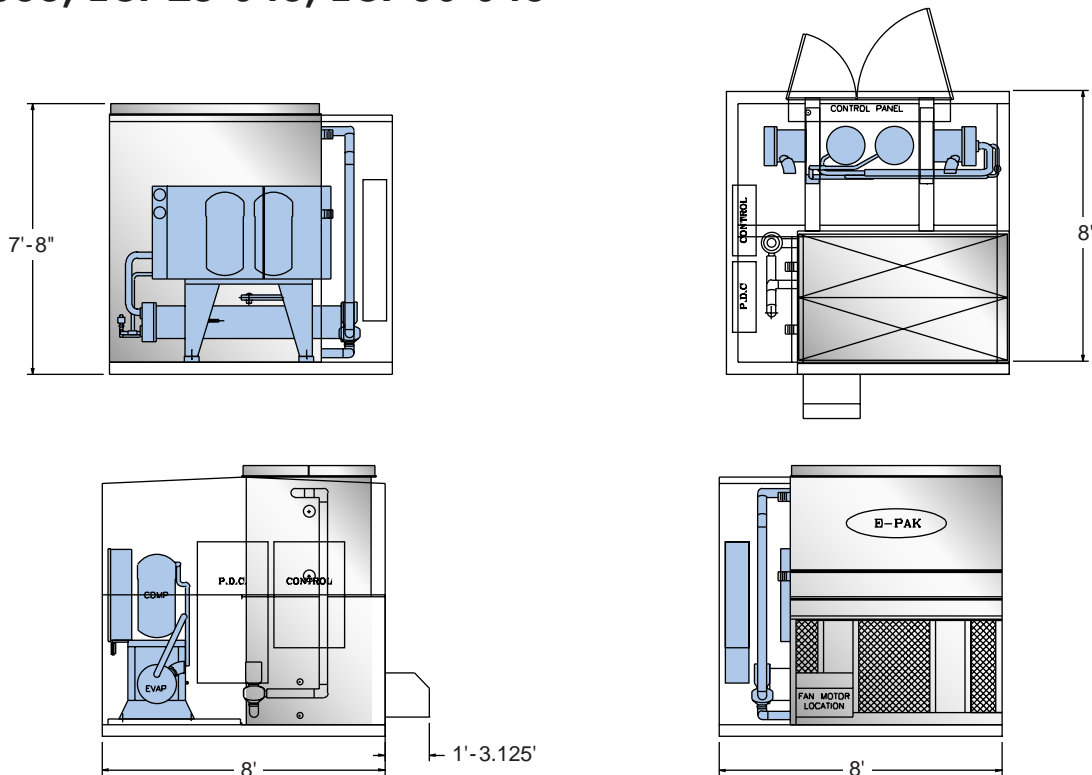
Notes: Electrical ratings are based upon nominal chiller ratings (44°F LWT, 10° ΔT, 78°F WB) with a single point power distribution center furnished by E-PAK.

RLA = System Running Load Amps, includes compressors, condenser fans and pump motor.

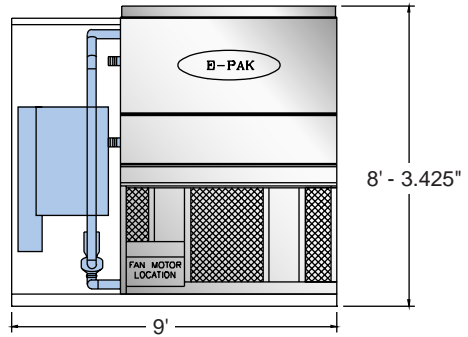
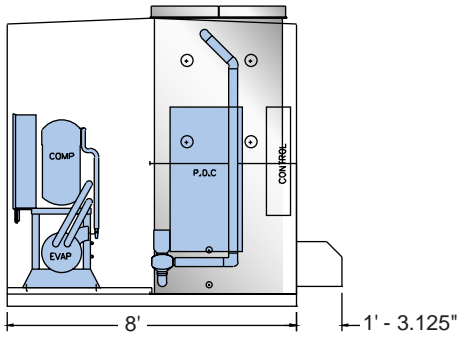
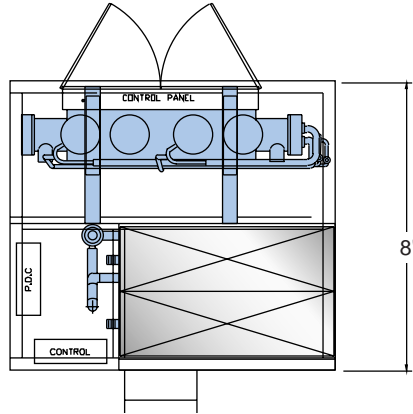
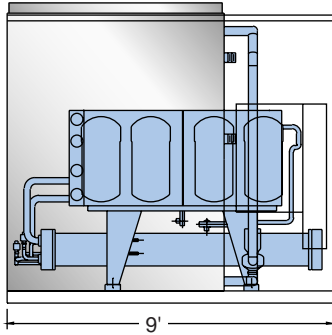
MCA = Minimum circuit ampacity, includes compressors, condenser fans and pump motor.

MOP = Maximum Overcurrent Protection, includes compressors, condenser fans and pump motor.

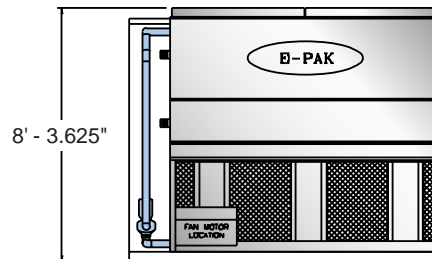
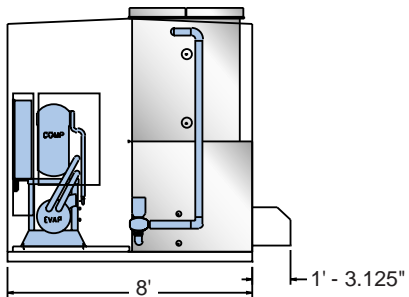
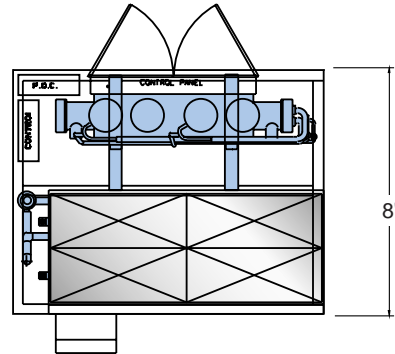
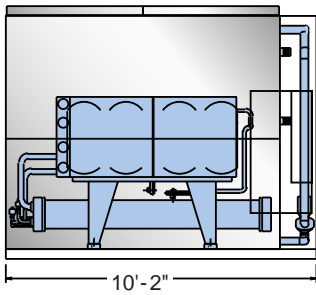
ECT 20-036, ECT 25-048, ECT 30-048



ECT 40-070



ECT 50-90, 60-100



REVOLUTIONARY REFRIGERATION COMPRESSOR TECHNOLOGY



Magnetic Levitation Bearing Technology

Prevents metal to metal contact of bearing parts

Dramatically reduces sound generated by standard bearings

Eliminates need for lubricating oil which can accumulate in critical refrigeration system heat transfer components and reduce system performance

Refrigeration Compressor Technology has evolved from the open drive reciprocating compressor of the past, to the hermetic, reciprocating, scroll, screw and centrifugal compressors of today.

Now, the convergence of aerospace and industrially proven magnetic bearing,

variable-speed centrifugal compression and digital electronic technologies, has produced the world's first totally oil-free, multistage centrifugal compressors, specifically designed for the Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) industry.

E-Pak is pleased to offer this "Advanced Technology" in conjunction with the efficiency of Evaporative Condensing to its customers.

EVAPORATIVE COOLED OIL-FREE CENTRIFUGAL COMPRESSOR PACKAGED CHILLERS

CAPACITIES FROM 60 TONS TO 550 TONS

General:

The chiller shall be an evaporative cooled chiller completely packaged on a self-supporting structural steel frame with all refrigerant piping and interconnecting power and control wiring installed and tested by the manufacturer prior to shipment. The chiller shall be suitable for outdoor installation with all chiller components enclosed in a protective aluminum weather housing and all unprotected system components shall be suitable for outdoor operation.

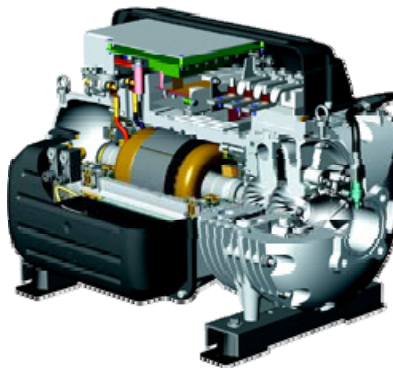
The chiller has a minimum system energy efficiency ratio (EER) including compressors, condenser fan(s), condenser pump and control power and a system energy consumption rate as specified in the chiller equipment schedule.

The chiller performance shall be rated in accordance with ARI standard 590.

Chiller:

Each chiller module is factory assembled and equipped with a totally oil free direct-drive variable speed centrifugal compressor suitable for operation with R-134A refrigerant, with the following features:

- Integral variable-speed motor control provides continuous adjustments in compressor speed, providing optimum energy efficiency throughout varying load conditions, while maintaining close temperature control.



- Soft Start limits initial inrush current to 2 amps reducing energy demand and extending the life of the motor windings.
- Magnetic “friction free” bearings eliminate the inefficiencies of friction heat of mechanical bearings and eliminates the need for oil in the refrigerant.
- Oil free operation eliminates inefficiencies and a need for oil management system.
- Low operating noise level of 71 dBA @ 1 M.
- Integrated computer control providing 79 points of

diagnostic and operational control.

Evaporator:

Each chiller module will be equipped with a Stainless Steel Brazed Plate Evaporator designed, tested and stamped in accordance with ASME pressure vessel code rated for a maximum working pressure of 450 psig.

Sub-Cooler:

Each refrigerant circuit shall be equipped with a patented suction to liquid heat-exchanger which shall provide the necessary sub-cooling of the liquid refrigerant and superheating of the suction refrigerant gas while enhancing the effectiveness of the evaporator.

Refrigerant circuit:

Each circuit liquid & suction line service valves, filter drier, combination moisture indicator/sightglass, electronic expansion valve, charging valve and insulated suction lines. Low side relief valves are provided for each circuit (300psi). Each refrigerant circuit will be pressure tested, evacuated and shipped with a complete operating charge of refrigerant R-134A

Oil-Free Centrifugal Chillers - Flooded Evaporator

CAPACITIES FROM 60 TONS TO 550 TONS

Control Panel:

Each chiller module control panel will be equipped with:

- Rotary circuit breaker for each compressor provides compressor protection and isolation for easy maintenance.
- 24 VDC control circuit.
- C-UL 508A panel construction
- Control panel ventilation fan to extend component life and provide reliable operation.
- All sensors mounted, wired and tested.

PLC Control System:

- The PLC will monitor, control and maintain stable chiller operation through an array of sensors, actuators, relays, switches and control algorithms.
- Multiple Proportional Integral Derivative (PID) temperature control loops ensure reliable, stable and efficient operation by instantaneous response to fluctuating system loads.
- Predictive control loop to maintain stable operation under low load and batch loading conditions typical of industrial process cooling conditions.
- Durable 6 inch TFT color touch-screen Human Machine Interface (HMI) provides extensive diagnostic and operational information, safeties, alarms and faults.
- Clear language text display.

Condenser:

The chiller unit shall be equipped with a forced draft multi-circuit evaporative condenser which is selected to provide the heat of rejection capacity required by the chiller at the specified condition.

Pan & Casing: The pan and casing shall be constructed of G-235 hot dip galvanized steel.

The pan/fan section shall include fan(s) with motors and drives mounted and aligned at the factory. The motors and weather safety shields will be removed for shipping to be reinstalled in the field.

Standard pan accessories shall include circular access doors, stainless steel strainers, waste water bleed line with adjustable valve and brass make-up valve with an unsinkable foam filled plastic float.

Centrifugal Fans: The fans will be forward curved centrifugal type of hot dip galvanized construction. The fans will be factory installed to the pan/fan section, statically and dynamically balanced. The fans shall be mounted on either a solid or hollow steel shaft with forged journal bearings. The fan shaft shall be supported by heavy duty, self-aligning bearings with cast-iron housings and lubrication fittings for maintenance.

The fan drive(s) shall be V-Belt type with taper lock sheaves designed for 150% of the motor nameplate horsepower. The drive(s) are to be mounted and aligned at the factory.

Fan Motor: Totally enclosed fan cooled motor(s) with a 1.15 service factor (inverter duty type motor with a 1-25 service factor when used in conjunction with a variable frequency drive) shall be furnished suitable for outdoor service. Motor(s) shall be mounted on an adjustable base. The fan motor shall be mounted, wired and tested at the factory then removed for shipment and shipped with the unit for remounting by the installer. All wiring will be clearly tagged for ease of hookup.

Heat Transfer Coil: The coil shall be all prime surface steel, encased in steel framework with the entire assembly hot-dip galvanized after fabrication. Coil shall be designed with sloping tubes for free drainage of liquid refrigerant and tested to 350 psig air pressure under water. Each coil circuit will be sized for the heat of rejection capacity of each individual refrigerant circuit. The coil will feature elliptical tube design which permits greater water loading, lower air flow

Oil-Free Centrifugal Chillers - Flooded Evaporator

CAPACITIES FROM 60 TONS TO 550 TONS

resistance and higher heat transfer efficiency.

Water Distribution System:

The system shall provide a water flow rate of not less than 6 GPM over each square foot of unit face area to ensure proper flooding of the coil. The spray header shall be constructed of schedule 40, PVC pipe for corrosion resistance. All spray branches shall be movable and include a threaded end plug for cleaning. The water shall be distributed over the entire coil surface by precision molded ABS spray nozzles (1" x 1/2" orifice) with internal anti-sludge rings to eliminate clogging. Nozzles shall be threaded into spray header to provide easy removal for maintenance.

Water Recirculation Pump:

The pump shall be a close-coupled, bronze fitted, centrifugal type with mechanical seal, installed vertically at the factory to allow free drainage on shut down. The totally enclosed, motor shall be furnished suitable for outdoor service.

Eliminators:

The eliminators shall be constructed entirely of PVC that has been specially treated to resist ultra-violet light. Assembled in easily handled sections, the eliminator blades shall be spaced on 1-inch centers and shall incorporate three changes in air direction to assure removal of entrained moisture from the discharge air stream. They shall have a hooked leaving edge to direct the discharge air away from the fans to minimize recirculation.

Finish: All pan and casing materials shall be constructed of G-235 heavy gauge mill hot-dip galvanized steel for maximum protection against corrosion. During fabrication, all panel edges shall be coated with a 95% pure zinc-rich compound.

Weather Housing:

The chiller weather housing shall be constructed of 0.080 thick mill finished aluminum and shall be equipped with piano hinged access doors and lift-off panels to provide maximum accessibility to the chiller components for service and maintenance.

The weather housing roof shall be sectionally constructed for removal for crane access to the compressors, The roof shall be slopped for water and snow runoff and capable of supporting a 35 lb./sq. foot snow load.

NOMINAL RATINGS* MAGLEV CHILLER

MOD NUMBER	TONS	kW	kW	kW/TON	EER	HR
SINGLE PACKAGES						
TEC 60-90	60	36	41.5	0.69	17.35	843
TEC 70-112	70	43.3	50.9	0.73	16.5	988
TEC 80-135	80	49.9	60.1	0.75	15.97	1130.4
TEC 90-144S	90	55.3	63.4	0.70	17.03	1268.8
TEC 100-155L	100	60.9	71.1	0.71	16.88	1408
TEC 110-170L	110	66.9	81.3	0.74	16.24	1548.5
TEC 120-190LS	120	73.4	84.1	0.70	17.12	1690.7
TEC 130-210L	130	80.5	95.4	0.73	16.35	1835
TEC 140-212LS	140	88.4	99.1	0.71	16.95	1981.9
TEC 150-235L	150	97.5	112.4	0.75	16.01	2133
TANDEM PACKAGES						
TEC 160-261LS	160	99.8	111.7	0.70	17.19	2260.8
TEC 170-261LS	170	105.2	117.1	0.69	17.42	2399.3
TEC 180-288LS	180	110.6	126.8	0.70	17.95	2537.7
TEC 190-310L	190	116.2	136.5	0.72	16.7	2676.8
TEC 200-310L	200	121.8	142.1	0.71	16.89	2815.9

MOD NUMBER	TONS	kW	kW	kW/TON	EER	HR
TEC 210-340L	210	127.8	156.6	0.75	16.09	2956.4
TEC 220-340L	220	133.8	162.6	0.74	16.24	3096.9
TEC 240-380LS	240	146.8	168.9	0.70	17.05	3381.3
TEC 260-380LS	260	161	183.1	0.70	17.04	3669.8
TEC 280-425L	280	176.8	198.9	0.71	16.89	3963.8
TEC 300-500L	300	195	233.7	0.78	15.4	4265.9
TEC 320-500L	320	198.6	237.3	0.74	16.18	4518.2
TEC 340-535L	340	218.2	265.1	0.78	15.39	4825.1
TEC360-535L	360	240.6	287.5	0.80	15.03	5141.6
TEC 380-535L	380	231.4	278.3	0.73	16.39	5350.2
TEC 400-535L	400	261	307.9	0.77	15.59	5691.3
TEC 425-535L	425	280.1	327	0.77	15.60	6056.7
TEC 450-535L	450	299.8	346.7	0.77	15.58	6423.6
TEC 475-535L	475	316.8	363.7	0.77	15.67	6782
TEC 500-535L	500	331.1	378	0.76	15.87	7144
TEC 550-535L	550	376	422.9	0.77	15.62	7884

GENERAL DATA TEC 60 - 130

NOMINAL CHILLER SIZE	(Tons)	60	70	80	90	100	110	120	130
CHILLER MODULES		1	1	1	1	1	1	1	1
COMPRESSORS		Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
QUANTITY		2	2	2	2	2	2	2	2
NOMINAL SIZE	(HP)	60	70	80	90	100	110	60/60	60/70
EVAPORATOR									
QUANTITY		1	1	1	1	1	1	1	1
TYPE		Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T
NO. CIRCUITS		1	1	1	1	1	1	1	1
WATER STORAGE	(GAL)	15	15	15	15	15	15	15	15
WATER STORAGE	(LITERS)	56.8	56.8	56.8	56.8	56.8	56.8	56.8	56.8
MINIMUM FLOW	(GPM)	80	80	80	80	80	80	80	80
MINIMUM FLOW	(LPS)	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05
MAXIMUM FLOW	(GPM)	365	365	365	365	365	365	365	365
MAXIMUM FLOW	(LPS)	23.03	23.03	23.03	23.03	23.03	23.03	23.03	23.03
CONDENSER		90	112S	135L	144S	155L	170L	190LS	210L
QUANTITY		1	1	1	1	1	1	1	1
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. COIL CIRCUITS		1	1	1	1	1	1	1	1
FAN TYPE		FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif
FAN QUANTITY		1	1	1	1	1	1	1	1
FAN MOTOR QUANTITY	(HP)	5	7.5	10	7.5	10	15	10	15
MOTOR TYPE		TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD
MOTOR SPEED		Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty
PUMP MOTOR QUANTITY		1	1	1	1	1	1	1	1
PUMP MOTOR	(HP)	1	1	1.5	1.5	1.5	1.5	2	2
SUMP HEATER	(kW)	3	3	3	3	3	3	5	5
WATER LEVEL CONTROL		Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve
SOUND LEVEL*	Db(A)	54	57	60	59	60	62	59	61
LOW AMBIENT	(°F)	0	0	0	0	0	0	0	0
% MIN SYSTEM LOAD	Variable Speed Compressor for Continuously Variable Capacity Adjustment								
REFRIGERENT TYPE		R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a
SYSTEM CHARGE	(LBS)	450	490	510	640	650	650	725	725
SYSTEM CHARGE	(kg)	204	222	231	290	295	295	329	329
UNIT DIMENSIONS	(L x W)	12 x 8'-4"	12 x 8'-4"	15 x 8'-4"	15 x 8'-4"	15 x 8'-4"	15 x 8'-4"	21' x 8'-4"	21' x 8'-4"
OPERATING WEIGHT	LBS	13480	14194	15720	16664	16690	16840	21427	21485
OPERATING WEIGHT	(kg)	6115	6438	7131	7559	7571	7639	9719	9746
SHIPPING WEIGHT	LBS	12035	12729	13735	14629	14655	14805	17695	17750
SHIPPING WEIGHT	(kg)	5459	5774	6230	6636	6648	6716	8026	8051

*dB(A) = Sound Pressure Level (SPL) Per ANSI S12.34-1988@ High Speed

Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

GENERAL DATA TEC 140 - 210

NOMINAL CHILLER SIZE		140	150	160	170	180	190	200	210
CHILLER MODULES		1	1	2	2	2	2	2	2
COMPRESSORS		Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
QUANTITY		2	2	4	4	4	4	4	4
NOMINAL SIZE	(HP)	70/70	60/60	60/70	70/70	90/90	90/100	100/100	100/110
EVAPORATOR									
QUANTITY		1	1	2	2	2	2	2	2
TYPE		Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T
NO. CIRCUITS		1	1	2	2	2	2	2	2
WATER STORAGE	(GAL)	15	15	30	30	30	30	30	30
WATER STORAGE	(LITERS)	56.8	56.8	113.6	113.6	113.6	113.6	113.6	113.6
MINIMUM FLOW	(GPM)	80	80	160	160	160	160	160	160
MINIMUM FLOW	(LPS)	5.05	5.05	10.09	10.09	10.09	10.09	10.09	10.09
MAXIMUM FLOW	(GPM)	365	365	730	730	730	730	730	730
MAXIMUM FLOW	(LPS)	23.03	23.03	46.05	46.05	46.05	46.05	46.05	46.05
CONDENSER		212LS	235L	261LS	261LS	288LS	310L	310L	340L
QUANTITY CELLS		1	1	2	2	2	2	2	2
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. COIL CIRCUITS		1	1	1	1	2	2	2	2
FAN TYPE		FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif
FAN QUANTITY		1	1	1	1	2	2	2	2
FAN MOTOR SIZE	(HP)	10	10	15	10	7.5/7.5	10/10	10/10	15/15
MOTOR TYPE		TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD
MOTOR SPEED		Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty
PUMP MOTOR QUANTITY		1	1	1	1	1	1	1	1
PUMP MOTOR	(HP)	2	2	2	2	3	3	3	3
SUMP HEATER	(kW)	5	5	5	5	5	5	5	5
WATER LEVEL CONTROL		Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve
SOUND LEVEL*	Db(A)	61	59	61	61	59	61	61	61
LOW AMBIENT	(°F)	0	0	0	0	0	0	0	0
% MIN SYSTEM LOAD		Variable Speed Compressor for Continuously Variable Capacity Adjustment							
REFRIGERENT TYPE		R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a
SYSTEM CHARGE	(LBS)	860	860	1270	1270	1270	1270	1270	1270
SYSTEM CHARGE	(kg)	390	390	576	576	576	576	576	576
UNIT DIMENSIONS	(L x W)	21' x 8"-4"	21' x 8"-4"	21' x 8"-4"	21' x 8"-4"	27' x 8"-4"	27' x 8"-4"	27' x 8"-4"	27' x 8"-4"
OPERATING WEIGHT	LBS	23113	23171	33236	33236	33418	33450	33450	33600
OPERATING WEIGHT	(kg)	10484	10510	15076	15076	15158	15173	15173	15241
SHIPPING WEIGHT	LBS	18908	17695	17750	18908	27548	27580	27580	27730
SHIPPING WEIGHT	(kg)	8577	8026	8051	8577	12496	12510	12510	12578

*dB(A) = Sound Pressure Level (SPL) Per ANSI S12.34-1988@ High Speed

Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

GENERAL DATA TEC 220 - 360

NOMINAL CHILLER SIZE		220	240	260	280	300	320	340	360
CHILLER MODULES		2	2	2	2	2	2	2	2
COMPRESSORS		Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
QUANTITY		4	4	4	4	4	4	4	4
NOMINAL SIZE	(HP)	110/110	120/120	90/90	90/100	100/100	100/110	110/110	120/120
EVAPORATOR									
QUANTITY		2	2	2	2	2	2	2	2
TYPE		Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T
NO. CIRCUITS		2	2	2	2	2	2	2	2
WATER STORAGE	(GAL)	30	30	30	30	30	30	30	30
WATER STORAGE	(LITERS)	113.6	113.6	113.6	113.6	113.6	113.6	113.6	113.6
MINIMUM FLOW	(GPM)	160	160	160	160	160	160	160	160
MINIMUM FLOW	(LPS)	10.09	10.09	10.09	10.09	10.09	10.09	10.09	10.09
MAXIMUM FLOW	(GPM)	730	730	730	730	730	730	730	730
MAXIMUM FLOW	(LPS)	46.05	46.05	46.05	46.05	46.05	46.05	46.05	46.05
CONDENSER		340L	380LS	288LS	310L	310L	340L	340L	380LS
QUANTITY CELLS		2	2	2	2	2	2	2	2
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. COIL CIRCUITS		2	2	2	2	2	2	2	2
FAN TYPE		FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif
FAN QUANTITY		2	2	2	2	2	2	2	2
FAN MOTOR SIZE	(HP)	10/10	10/10	7.5/7.5	10/10	10/10	15/15	10/10	10/10
MOTOR TYPE		TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD
MOTOR SPEED		Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty
PUMP MOTOR QUANTITY		1	1	1	1	1	1	1	1
PUMP MOTOR	(HP)	5	5	3	3	3	3	5	5
SUMP HEATER	(kW)	5	(2) 4 kW	(2) 4 kW	(2) 4 kW	(2) 4 kW	(2) 4 kW	(2) 4 kW	(2) 4 kW
WATER LEVEL CONTROL		Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve
SOUND LEVEL*	Db(A)	60	60	59	61	61	61	60	60
LOW AMBIENT	(°F)	0	0	0	0	0	0	0	0
% MIN SYSTEM LOAD		Variable Speed Compressor for Continuously Variable Capacity Adjustment							
REFRIGERENT TYPE		R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a
SYSTEM CHARGE	(LBS)	1270	1442	1270	1270	1270	1270	1270	1442
SYSTEM CHARGE	(kg)	576	654	576	576	576	576	576	654
UNIT DIMENSIONS	(L x W)	34' x 8'-4"	34' x 8'-4"	27' x 8'-4"	27' x 8'-4"	27' x 8'-4"	27' x 8'-4"	34' x 8'-4"	34' x 8'-4"
OPERATING WEIGHT	LBS	33600	39786	46722	46722	47810	47810	49354	49477
OPERATING WEIGHT	(kg)	15241	18047	21193	21193	21687	21687	22387	22443
SHIPPING WEIGHT	LBS	27730	32186	38296	38296	39267	39267	40764	40834
SHIPPING WEIGHT	(kg)	12578	14600	17371	17371	17812	17812	18491	18522

*dB(A) = Sound Pressure Level (SPL) Per ANSI S12.34-1988@ High Speed

Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

GENERAL DATA TEC 380 - 550

NOMINAL CHILLER SIZE	(Tons)	380	400	425	450	475	500	550
CHILLER MODULES		2	2	2	2	2	2	2
COMPRESSORS		Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
QUANTITY		4	4	4	4	4	4	4
NOMINAL SIZE	(HP)	90/90	90/100	(3)100/(1)125	(2)100/(2)125	(3)125/(1)100	(4) 125	(3)125/(1)175
EVAPORATOR								
QUANTITY		2	2	2	2	2	2	2
TYPE		Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T	Flooded S/T
NO. CIRCUITS		2	2	2	2	2	2	2
WATER STORAGE	(GAL)	58	58	64	70	80	90	90
WATER STORAGE	(LITERS)	219.6	219.6	242.4	265.1	303.0	340.8	340.8
MINIMUM FLOW	(GPM)	320	320	340	360	405	450	450
MINIMUM FLOW	(LPS)	20.19	20.19	21.45	22.71	25.55	28.39	28.39
MAXIMUM FLOW	(GPM)	1330	1330	1445	1560	1770	1980	1980
MAXIMUM FLOW	(LPS)	83.90	83.90	91.16	98.41	111.66	124.91	124.91
CONDENSER		535L	535L	535L	535L	535L	535L	535L
QUANTITY CELLS		2	2	2	2	2	2	2
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. COIL CIRCUITS		2	2	2	2	2	2	2
FAN TYPE		FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif	FC Centrif
FAN QUANTITY		2	2	2	2	2	2	2
FAN MOTOR SIZE	(HP)	25/25	25/25	25/25	25/25	25/25	25/25	25/25
MOTOR TYPE		TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD	TEFC/VBD
MOTOR SPEED		Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty	Inverter Duty
PUMP MOTOR QUANTITY		1	1	1	1	1	1	1
PUMP MOTOR	(HP)	5	5	5	5	5	5	5
SUMP HEATER	(kW)	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW
WATER LEVEL CONTROL		Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve	Float Valve
SOUND LEVEL*	Db(A)	66	66	66	66	66	66	66
LOW AMBIENT	(°F)	0	0	0	0	0	0	0
% MIN SYSTEM LOAD		Variable Speed Compressor for Continuously Variable Capacity Adjustment						
REFRIGERENT TYPE		R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a
SYSTEM CHARGE	(LBS)	2275	2275	2345	2415	2525	2635	2635
SYSTEM CHARGE	(kg)	1032	1032	1064	1095	1145	1195	1195
UNIT DIMENSIONS	(L x W)	34' x 8'-4"	34' x 8'-4"	34' x 8'-4"	34' x 8'-4"	34' x 8'-4"	34' x 8'-4"	34' x 8'-4"
OPERATING WEIGHT	LBS	47810	47810	49354	49477	51096	51291	51374
OPERATING WEIGHT	(kg)	21687	21687	22387	22443	23177	23266	23303
SHIPPING WEIGHT	LBS	39267	39267	40764	40834	42371	42481	42481
SHIPPING WEIGHT	(kg)	17812	17812	18491	18522	19219	19269	19269

*dB(A) = Sound Pressure Level (SPL) Per ANSI S12.34-1988@ High Speed

Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

Centrifugal Compressor Chiller Electrical Data

MODEL	COMPRESSOR			FAN	MOTOR	PUMP MOTOR		460-3-60		
	Qty	HP	HP	Qty	HP	Qty	HP	RLA	MCA	MOP
SINGLE CHILLER										
TEC 60-90	2	30	30	1	5	1	1	61	66.7	90
TEC 70-112	2	35	35	1	7.5	1	1.5	74	80.5	100
TEC 80-135	2	40	40	1	10	1	1.5	86	93.6	125
TEC 90-144S	2	45	45	1	7.5	1	1.5	90	98.3	125
TEC 100-155L	2	50	50	1	10	1	1.5	100	109.2	150
TEC 110-170L	2	60	50	1	15	1	1.5	114	124.7	150
TEC 120-190LS	2	60	60	1	10	1	2	116	127.3	175
TEC 130-210L	2	70	60	1	15	1	2	130	142.9	200
TEC 140-212LS	2	70	70	1	10	1	2	135	148.5	200
TEC 150-235L	2	75	75	1	15	1	2	153	168.3	225
TANDEM PACKAGES										
TEC 160-261LS	4	40/40	40/40	2	10/10	1	3	151	159	200
TEC 170-261LS	4	50/40	40/40	2	10/10	1	3	155	163.5	200
TEC 180-288LS	4	50/40	50/40	2	15/15	1	3	165	173.5	200
TEC 190-310L	4	50/50	50/40	2	10/10	1	3	185	194.4	225
TEC 200-310L	4	50/50	50/50	2	10/10/	1	3	192	201.4	225
TEC 210-340L	4	60/50	50/50	2	15/15	1	3	214	223.9	250
TEC 220-340L	4	60/50	60/50	2	15/15	1	3	221	231.5	250
TEC 240-380LS	4	60/60	60/60	2	10/10	1	5	219	230.1	250
TEC 260-380LS	4	70/60	70/60	2	10/10	1	5	219	230.1	250
TEC 280-425L	4	70/70	70/70	2	10/10	1	5	256	270.1	300
TEC 300-500L	4	75/75	75/75	2	20/20	1	5	261	275.9	300
TEC 320-500L	4	80/80	80/80	2	20/20	1	5	310	325	350
TEC 340-535L	4	90/80	90/80	2	25/25	1	5	340	365.3	400
TEC360-535L	4	90/90	90/90	2	25/25	1	5	376	395.1	450
TEC 380-535L	4	100/90	100/90	2	25/25	1	5	364	382.3	450
TEC 400-535L	4	100/100	100/100	2	25/25	1	5	402	422.3	500
TEC 425-535L	4	110/100	110/100	2	25/25	1	5	426	477.8	500
TEC 450-535L	4	120/110	110/110	2	25/25	1	5	449	472	600
TEC 475-535L	4	120/120	120/110	2	25/25	1	5	472	497.2	600
TEC 500-535L	4	130/120	130/120	2	25/25	1	5	490	515.8	600
TEC 550-535L	4	140/140	140/130	2	25/25	1	5	546	578.3	700

- Electrical ratings are based upon Nominal Chiller Ratings (44° F LWT, 10° F ΔT, 78° F WB)

- Single point Power Distribution Center furnished by E-Pak.

RLA = System Running Load Amps, includes Compressors, Condenser Fans and Pump motor

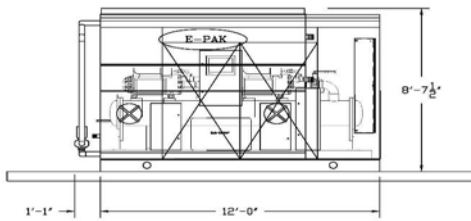
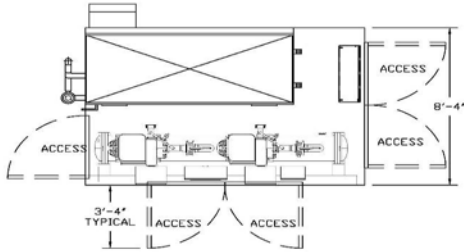
MCA = Minimum Circuit Ampacity, includes Compressors, Condenser Fans and Pump motor

MOP = Maximum Overcurrent Protection, includes Compressors, Condenser Fans and Pump motor

208/230 volt systems are shipped with Wye Delta Start as standard

E-PAK

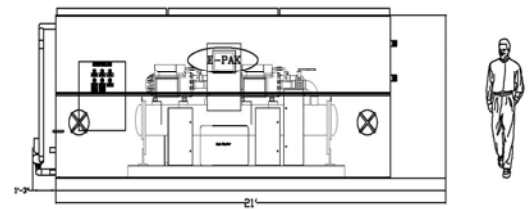
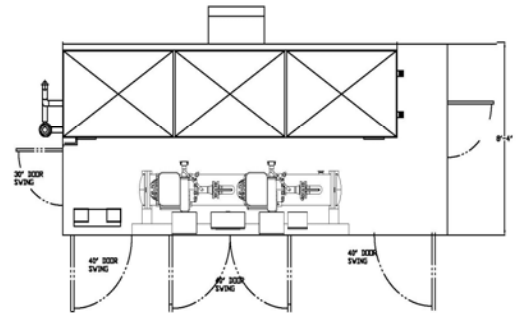
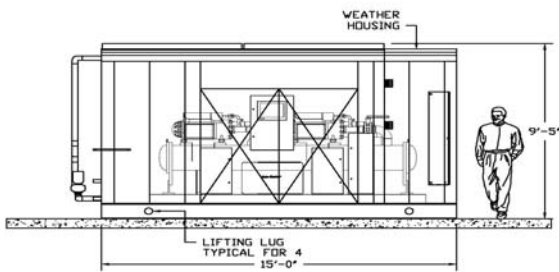
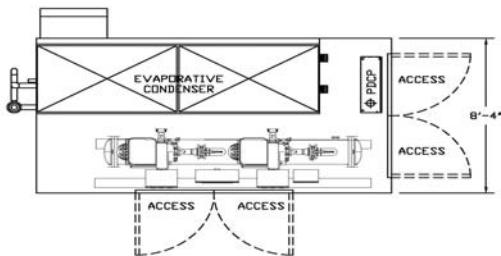
TEC 60-90L TEC 70-112L



Single Chiller Module General Arrangement Footprint

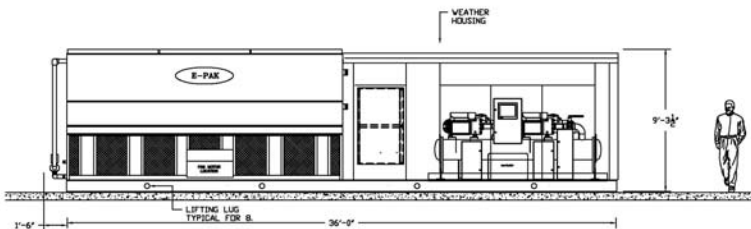
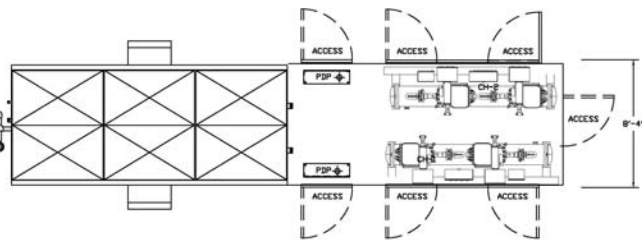
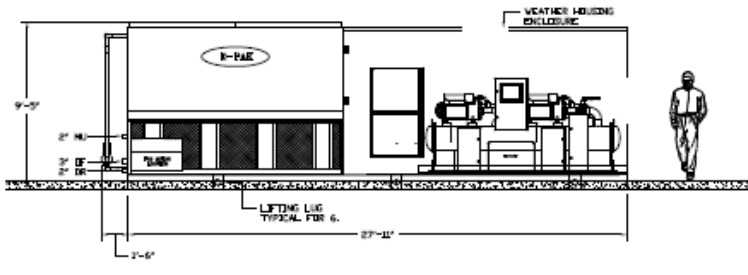
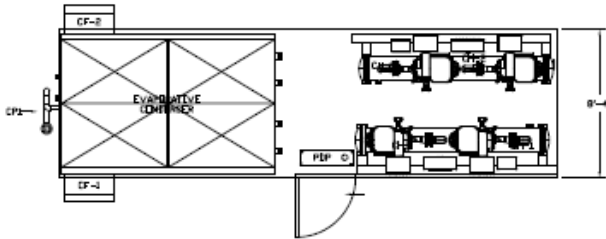
TEC 120-190LS TEC 130-210L TEC 140-212LS TEC 150-235L

TEC 80- 135L TEC 90-144S TEC 100-155L TEC 110-170L



E-PAK

Tandem Chiller Modules General Arrangement Footprint



TEC 160-261LS

To

TEC 220-340L

TEC 240-380LS

To

TEC 550-535L

EVAPORATIVE COOLED FLOODED EVAPORATOR SCREW COMPRESSOR PACKAGED CHILLERS

CAPACITIES FROM 80 TONS TO 535 TONS

FLOODED EVAPORATOR CLEANABLE WATER SIDE COOLER TUBES

LOW MCA ALLOWS MORE CAPACITY ON SMALLER ELECTRICAL SERVICE

GENERAL

The chiller is an evaporative cooled chiller completely packaged on a self-supporting steel frame with all refrigerant piping and interconnecting power and control wiring installed and tested by the manufacturer prior to shipment.

The chiller is suitable for outdoor installation with all chiller components enclosed in a protective aluminum weather housing and all unprotected system components are suitable for outdoor operation.

The chiller has a minimum system energy efficiency ratio (EER) including compressors, condenser fan(s), condenser pump and control power and a system energy consumption rate as specified in the chiller equipment schedule.

The chiller performance is rated in accordance with ARI standard 590.

COMPRESSOR MOTOR

The chiller is equipped with multiple semihermetic, gear driven helical rotary screw compressors with each compressor installed in an independent refrigerant circuit.

Each compressor has liquid and discharge service stop valve (suction stop valve optional); internal and external oil filters; internal pressure relief; low oil flow protection; double mesh suction inlet strainers; electrically actuated step unloaders; rubber-in-shear isolation mountings and shall operate with HFC-134a refrigerant.



EVAPORATOR (R-134A) FLOODED:

Each evaporator is dual circuited shell & tube design with seamless internally enhanced copper tubes roller expanded into the tubesheets. Designed, tested and stamped in accordance with ASME pressure vessel code for refrigerant side working pressure of 220 psig and a maximum fluid side pressure of 320 psig.

The water side heads are removable for alternating left hand or right hand water connection and tubes are mechanically cleanable. Each evaporator contains temperature sensors to control leaving fluid temperature, low refrigerant temperature freeze protection, and is equipped with vent and drain connections and insulated with 3/4-inch closed cell insulation with a .28 K valve.

Low ambient applications (optional) are equipped with heat tracing system to protect against evaporator freeze up.

REFRIGERANT CIRCUITS

The chiller has multiple independent refrigeration circuits. Each circuit includes an oil separator which is tested and stamped in accordance with ASME code for a working pressure of 320 psig, discharge service valves, replaceable core filter driers, combination moisture indicator sight glass, electronic expansion valve, charging valves and insulated suction lines and low side relief valves are provided for each circuit (300 psi). Each refrigerant circuit is pressure tested, evacuated and shipped with a complete charge of compressor oil and a holding charge at 30 psi of refrigerant HFC-134a.

CONDENSER

The chiller unit is equipped with a forced draft multi-circuit evaporative condenser which is selected to provide the heat of rejection capacity required by the chiller at the specified condition.

PAN & CASING

The pan and casing is constructed of G-235 hot dip galvanized steel.

The pan/fan section includes fan(s) with motors and drives mounted and aligned at the factory. The motors and weather safety shields are removed for shipping to be reinstalled in the field.

Standard pan accessories include circular access doors, stainless steel strainers, waste water bleed line with adjustable valve and brass make-up valve with an unsinkable foam filled plastic float.

CENTRIFUGAL FANS

The fans are forward curved centrifugal type of hot dip galvanized construction. The fans are factory installed to the pan/fan section, statically and dynamically balanced. The fans are mounted on either a solid or hollow steel shaft with forged journal bearings. The fan shaft is supported by heavy duty, self-aligning bearings with cast-iron housings and lubrication fittings for maintenance.

The fan drive(s) are V-Belt type with taper lock sheaves designed for 150% of the motor nameplate horsepower. The drive(s) are mounted and aligned at the factory.

FAN MOTOR

Totally enclosed fan cooled motor(s) with a 1.15 service factor (inverter duty type motor with a 1.25 service factor when used in conjunction with a variable frequency drive) is furnished suitable for outdoor service. Motor(s) are mounted on an adjustable base. (See *Fan Motor*, page 20.)

HEAT TRANSFER COIL

The coil(s) are constructed entirely of prime surface steel, encased in steel framework with the entire assembly hot-dip galvanized after fabrication. Coil(s) are designed with sloping tubes for free drainage of liquid refrigerant and tested to 350 psig air pressure under water. Each coil circuit is sized for the heat of rejection capacity of each individual refrigerant circuit. The coil features elliptical tube design which permits greater water loading, lower air flow resistance and higher heat transfer efficiency.

SUBCOOLING COIL

The subcooling coil, when required, is also prime surface steel, encased in a steel framework with the entire assembly hot dip galvanized after fabrication. The refrigerant Inlet line to the subcooler is trapped to maintain a liquid seal to the subcooler, which trap is also furnished with a liquid indicator sight glass. These coils are designed with sloping tubes for free drainage of refrigerant and tested to 350

psig air pressure under water. Each coil circuit is sized to provide the necessary sub-cooling required at each expansion valve.

WATER DISTRIBUTION SYSTEM

The system provides a water flow rate of not less than 6 GPM over each square foot of unit face area to ensure proper flooding of the coil. The spray header is constructed of schedule 40, PVC pipe for corrosion resistance. All spray branches are removable and include a threaded end plug for cleaning. The water is distributed over the entire coil surface by precision molded ABS spray nozzles (1" x 1/2" orifice) with internal anti-sludge rings to eliminate clogging. Nozzles are threaded into spray header to provide easy removal for maintenance.

WATER RECIRCULATION PUMP

The pump is a close-coupled, bronze fitted, centrifugal type with mechanical seal, installed vertically at the factory to allow free drainage on shut down. The totally enclosed motor is furnished suitable for outdoor service.

ELIMINATORS

The eliminators are constructed entirely of PVC that has been specially treated to resist ultra-violet light. Assembled in easily handled sections, the eliminator blades are spaced on 1-inch centers and incorporate three changes in air direction to assure removal of entrained moisture from the discharge air stream. They have a hooked leaving edge to direct the discharge air away from the fans to minimize recirculation.

FINISH

All pan and casing materials are constructed of G-235 heavy gauge mill hot-dip galvanized steel for maximum protection against corrosion. During fabrication, all panel edges are coated with a 95% pure zinc-rich compound.

CHILLER CONTROL SYSTEM

The chiller is equipped with a fully integrated microprocessor control system which includes all controls and sensors factory mounted and tested prior to shipment. The standard microprocessor is equipped with a 2-Line 14 character per line diagnostic display with data entry control key pad. (A 16 line, 40 character per line expanded display is an available option).

The microprocessor control system provides all control functions including start up and shut down, anti-recycle logic, automatic lead/lag compressor starting/leaving chilled fluid temperature control with return fluid sensing and evaporator freeze protection. The microprocessor is capable of limiting the chilled fluid pull down rate at start up to an adjustable range of 0.2°F to 2.0°F per minute to prevent demand spikes at start up and provide seven day time scheduling of condenser pumps, chilled water pumps and chillers.

DIAGNOSTICS

The microprocessor display module is capable of displaying set points, time, system status including temperatures, pressures, percent loading and daily alarm or alert conditions.

The control module is capable of displaying the output of a run test to verify operation of every switch, sensor, potentiometer and compressor before chiller is started.

SAFETIES

The control systems provides the chiller unit with protection against the following:

- Loss of Refrigerant Charge
- Ground Current
- Reverse Rotation
- Thermal Overload
- Low Chilled Fluid Temperature
- High Pressure
- Low Oil Pressure
- Electrical Overload
- Voltage Imbalance
- Loss of Phase

NOMINAL RATINGS FLOODED EVAPORATOR

WEATHER HOUSING

The chiller weather housing is constructed of 0.080 thick mill finished aluminum and is equipped with piano hinged access doors and lift-off panels to provide maximum accessibility to the chiller components for service and maintenance.

The weather housing roof is sectionally constructed for removal for crane access to the compressors. The roof is sloped for water and snow runoff and capable of supporting a 35 lb./sq. foot snow load. All access doors are double-wall construction.

OPERATING CHARACTERISTICS

The chiller is capable of start up with 95°F entering fluid temperature to the cooler. The standard unit power supply is 460V-3 phase - 60 Hz with across the line compressor starters (Wye-Delta Start Optional)

208/230V - 3 Phase - 60 Hz units are provided with Wye-Delta starters as standard.

The chiller module(s) and all system electrical components are rated in accordance with Underwriters Laboratories (UL), U.S.A.

OPTIONS

See Appendix A for additional option specifications.



E-Pak Control Panel

MODEL NUMBER	CAPACITY TONS	COMPRESSORS KW	SYSTEM KW	SYSTEM KW/TON	SYSTEM EER	TOTAL HEAT OF REJECTION
SINGLE PACKAGES						
ECC-80-126LS	80.3	50.2	58.3	0.73	16.53	1,135.00
ECC-90-135L	88.4	56.2	66.4	0.75	15.98	1,252.70
ECC-90-144LS	88.6	56	64.1	0.72	16.59	1,254.40
ECC-100-155L	99.9	62.7	72.9	0.73	16.44	1,412.90
ECC-110-170L	111	70	84.4	0.76	15.78	1,571.10
ECC-110-190LS	111.8	69.3	80	0.72	16.77	1,578.30
ECC-120-190LS	120.5	74.2	84.8	0.7	17.05	1,699.40
ECC-130-210L	130.4	80.8	95.7	0.73	16.35	1,840.70
ECC-145-235L	144.5	91.7	106.6	0.74	16.27	2,047.20
ECC-155-235L	154.5	98.6	113.5	0.73	16.33	2,190.70
ECC-161-250L	159.1	100.7	119.6	0.75	15.96	2,253.10
ECC-171-250L	168	110	128.9	0.77	15.64	2,391.70
ECC-181-250L	178.7	120.4	139.3	0.78	15.39	2,555.60
TANDEM PACKAGES						
ECC-160-251LS	160.6	100.4	116.5	0.73	16.54	2,270.10
ECC-170-270L	168.7	106.4	126.7	0.75	15.98	2,387.80
ECC-180-270L	176.8	112.4	132.7	0.75	15.99	2,505.40
ECC-185-288LS	188.3	118.9	135	0.72	16.74	2,665.60
ECC-200-310L	199.8	125.4	145.7	0.73	16.46	2,825.80
ECC-210-340L	211	132	160.8	0.76	15.75	2,982.80
ECC-220-340L	222	140	168.8	0.76	15.78	3,142.10
ECC-235-380LS	232	144	166.1	0.72	16.76	3,275.80
ECC-245-380LS	241	148.4	170.5	0.71	16.96	3,398.80
ECC-255-420L	251	153.5	184	0.73	16.37	3,536.20
ECC-265-425LS	261	161.6	183.7	0.7	17.05	3,683.90
ECC-275-425LS	274.5	173	195.1	0.71	16.88	3,884.80
ECC-290-470L	289	183.4	213.9	0.74	16.21	4,094.30
ECC-300-470L	299	190.3	220.8	0.74	16.25	4,237.90
ECC-310-470L	308	198.2	228.7	0.74	16.16	4,372.90
ECC-315-500L	313.6	199.3	238	0.76	15.81	4,443.80
ECC-320-500L	318.2	201.4	240.1	0.75	15.9	4,506.20
ECC-330-535L	327.3	207.7	246.4	0.75	15.94	4,636.90
ECC-340-535L	336.4	214	260.9	0.78	15.47	4,767.60
ECC-350-535L	348	223	269.9	0.78	15.47	4,937.50
ECC-360-535L	357.8	239	285.9	0.8	15.02	5,109.80
ECC-400-535L	393.8	257	303.9	0.77	15.55	5,603.20
ECC-430-535L	429	283.8	330.7	0.77	15.57	6,117.20
ECC-460-535L	463.1	313	359.9	0.78	15.44	6,626.60
ECC-490-535L	496.6	349.1	396	0.8	15.05	7,139.40
ECC-500-535L	504.2	356.9	403.8	0.8	14.98	7,269.30
ECC-515-535L	511.2	370.6	417.5	0.82	14.7	7,400.00
ECC-520-535L	520.8	379.8	426.7	0.82	14.6	7,546.40
ECC-530-535L	529.6	396.6	443.5	0.84	14.33	7,709.60

*Nominal ratings based on 44°F leaving water temperature, 10°F ΔT, 78°F wet bulb temperature.

SCREW COMPRESSOR CHILLERS — FLOODED EVAPORATOR

GENERAL DATA ECC 80-145

NOMINAL CHILLER SIZE		80	90	90	100	110	120	130	145
CHILLER MODULES		1	1	1	1	1	1	1	1
COMPRESSORS		Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw
QUANTITY		2	2	2	2	2	2	2	2
NOMINAL SIZE	(HP)	40/40	45/40	45/40	55/40	65/40	65/45	65/55	80/55
EVAPORATOR									
QUANTITY		1	1	1	1	1	1	1	1
TYPE		Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded
NO. CIRCUITS		2	2	2	2	2	2	2	2
WATER STORAGE	(GAL)	17	17	17	19	22.6	21.4	21.4	24
WATER STORAGE	(LITERS)	64.3	64.3	64.3	71.9	85.6	81	81	90.9
MINIMUM FLOW	(GPM)	105	125	125	125	155	155	155	200
MINIMUM FLOW	(LPS)	6.6	7.9	7.9	7.9	9.8	9.8	9.8	12.6
MAXIMUM FLOW	(GPM)	300	300	300	300	400	400	400	700
MAXIMUM FLOW	(LPS)	18.9	18.9	18.9	18.9	25.2	25.2	25.2	44.2
CONDENSER		126S	135	144S	155	170	190LS	210L	235L
QUANTITY		1	1	1	1	1	1	1	1
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. CIRCUITS		2	2	2	2	2	2	2	2
FAN TYPE		VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC
FAN QUANTITY		4	4	4	4	4	6	6	6
FAN MOTOR QUANTITY		1	1	1	1	1	1	1	1
FAN MOTOR TYPE		TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC
SPEED CONTROL		Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd
OPTION		2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD
FAN MOTOR	(HP)	7.5	10	7.5	10	15	10	15	15
PUMP MOTOR	(HP)	1.5	1.5	1.5	1.5	1.5	2	2	2
SUMP HEATER	(kW)	3kW	3kW	3kW	3kW	3kW	5kW	5kW	5kW
WATER LEVEL CONTROL		Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve
SOUND LEVEL	dB(A)*	59/52	60/52	59/52	60/54	62/54	59/52	61/54	61/54
LOW AMBIENT	(F) Condenser	-10	-10	-10	-10	-10	-10	-10	-10
% MINIMUM SYSTEM LOAD		20	20	20	20	20	20	20	20
REFRIGERANT		134a	134a	134a	134a	134a	134a	134a	134a
REFRIGERANT CHARGE	(LBS)	472	488	643	661	677	855	865	1058
REFRIGERANT CHARGE	(kg)	214	220	290	300	307	387	390	480
UNIT DIMENSIONS	(FT)	8 x 12	8 x 12	8 x 12	8 x 12	8 x 12	8 x 12	8 x 18	8 x 18
OPERATING WEIGHT	(LBS)	15,185	15,232	16,046	16,153	16,619	21,061	21,162	22,815
OPERATING WEIGHT	(kg)	6,889	6,909	7,279	7,327	7,538	9,553	9,599	10,384
SHIPPING WEIGHT	(LBS)	12,857	12,884	13,491	13,582	14,032	16,499	15,687	17,673
SHIPPING WEIGHT	(kg)	5,831	5,844	6,119	6,160	6,364	7,483	7,115	8,016

*dB(A) = Sound Pressure level (SPL) Per ANSI S12.34-1988 @ High Speed/Low Speed noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

GENERAL DATA ECC 155-200

NOMINAL CHILLER SIZE		155	161	171	181	160	170	180	185	200
CHILLER MODULES		1	1	1	1	2	2	2	2	2
COMPRESSORS		Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw
QUANTITY		2	2	2	2	4	4	4	4	4
NOMINAL SIZE	(HP)	80/65	80/55	65/80	80/80	40/40-40/40	45/40-40/40	45/40-45/40	55/40-45/40	55/40-55/40
EVAPORATOR										
QUANTITY		1	1	1	1	2	2	2	2	2
TYPE		Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded
NO. CIRCUITS		2	2	2	2	4	4	4	4	4
WATER STORAGE	(GAL)	24	28.5	28.5	33.4	17/17	17/17	17/17	17/19	19/19
WATER STORAGE	(LITERS)	90.9	107.9	107.9	126.4	64.3/64.3	64.3/64.3	64.3/64.3	64.3/71.9	71.9/71.9
MINIMUM FLOW	(GPM)	210	240	240	270	105/105	105/125	125/125	125/125	125/125
MINIMUM FLOW	(LPS)	13.2	15.1	15.1	17	6.6/6.6	6.6/7.9	7.9/7.9	7.9/7.9	7.9/7.9
MAXIMUM FLOW	(GPM)	700	700	700	700	300/300	300/300	300/300	300/300	300/300
MAXIMUM FLOW	(LPS)	44.2	44.2	44.2	44.2	18.9/18.9	18.9/18.9	18.9/18.9	18.9/18.9	18.9/18.9
CONDENSER		235L	250L	250L	250L	251LS	270L	270L	288LS	310L
QUANTITY		1	1	1	1	1	1	1	1	1
TYPE		evaporative	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative
NO. CIRCUITS		2	2	2	2	4	4	4	4	4
FAN TYPE		VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC
FAN QUANTITY		6	6	6	6	8	8	8	8	8
FAN MOTOR QUANTITY		1	1	1	1	2	2	2	2	2
FAN MOTOR TYPE		TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC
FAN MOTOR SPEED STANDARD		Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd
OPTION		2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD
FAN MOTOR	HP	15	20	20	20	(2)7.5	(2)10	(2)10	(2)7.5	(2)10
PUMP MOTOR	HP	2	2	2	2	3	3	3	3	3
SUMP HEATER	kW	5kW	5kW	5kW	5kW	5kW	5kW	5kW	5kW	5kW
WATER LEVEL CONTROL		Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve
SOUND LEVEL	dB(A)*	61/54	61/54	61/54	61/54	62/55	63/56	63/56	62/55	64/57
LOW AMBIENT	(F) Condenser	-10	-10	-10	-10	-10	-10	-10	-10	-10
% MINIMUM SYSTEM LOAD		20	20	20	20	10	10	10	10	10
REFRIGERANT		134a	134a	134a	134a	134a	134a	134a	134a	134a
REFRIGERANT CHARGE	(LBS)	1054	1085	809	804	1142	1158	1158	1448	1448
REFRIGERANT CHARGE	(kG)	478	492	366	364	518	525	525	656	656
UNIT DIMENSIONS	(FT)	8 x 18	8 x 18	8 x 18	8 x 18	8 x 22	8 x 22	8 x 22	8 x 22	8 x 22
OPERATING WEIGHT	(LBS)	22,686	22,724	22,887	23,056	29,622	29,681	29,708	33,060	34,103
OPERATING WEIGHT	(kG)	10,290	10,307	10,381	10,458	13,436	13,463	13,475	14,996	15,469
SHIPPING WEIGHT	(LBS)	17,677	17,560	12,998	18,182	22,208	27,235	22,762	25,661	26,501
SHIPPING WEIGHT	(kG)	8,018	7,965	8,163	8,242	10,073	10,085	10,324	11,639	12,020

*dB(A)= Sound Pressure level (SPL) Per ANSI S12.34-1988 @ High Speed/Low Speed noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

SCREW COMPRESSOR CHILLERS — FLOODED EVAPORATOR

GENERAL DATA ECC 210-300

NOMINAL CHILLER SIZE		210	220	235	245	255	265	275	290	300
CHILLER MODULES		2	2	2	2	2	2	2	2	2
COMPRESSORS		Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw
QUANTITY		4	4	4	4	4	4	4	4	4
NOMINAL SIZE	(HP)	65/40-55/40	65/40-65/40	65/40-65/45	65/45-65/45	65/45-65/55	65/55-65/55	65/55-80/55	80/55-80/55	80/55-80/65
EVAPORATOR										
QUANTITY		2	2	2	2	2	2	2	2	2
TYPE		Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded
NO. CIRCUITS		4	4	4	4	4	4	4	4	4
WATER STORAGE	(GAL)	19/22.6	22.6/22.6	22.6/21.4	21.4/21.4	21.4/21.4	21.4/21.4	21.4/24.0	24.0/24.0	24.0/24.0
WATER STORAGE	(LITERS)	71.9/85.6	85.6/85.6	85.6/81.0	81.0/81.0	81.0/81.0	81.0/81.0	81.0/90.9	90.9/90.9	90.9/90.9
MINIMUM FLOW	(GPM)	125/155	155/155	155/155	155/155	155/155	155/155	155/200	200/200	200/210
MINIMUM FLOW	(LPS)	7.9/9.8	9.8/9.8	9.8/9.8	9.8/9.8	9.8/9.8	9.8/9.8	9.8/12.6	12.6/12.6	12.6/13.2
MAXIMUM FLOW	(GPM)	300/400	400/400	400/400	400/400	400/400	400/500	500/600	600/600	600/600
MAXIMUM FLOW	(LPS)	18.9/25.2	25.2/25.2	25.2/25.2	25.2/25.2	25.2/25.2	25.2/25.2	25.2/44.2	44.2/44.2	44.2/44.2
CONDENSER	340L	340L	380LS	380LS	420L	425LS	425LS	470L	470L	
QUANTITY		1	1	1	1	1	1	1	1	1
TYPE		evaporative	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative
NO. CIRCUITS		4	4	4	4	4	4	4	4	4
FAN TYPE		VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC
FAN QUANTITY		8	8	12	12	12	12	12	12	12
FAN MOTOR QUANTITY		2	2	2	2	2	2	2	2	2
FAN MOTOR TYPE		TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC
FAN MOTOR SPEED STANDARD		Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd
OPTION		2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD
FAN MOTOR HP		15/15	10/10	10/10	10/10	10/10	10/10	10/10	15/15	15/15
PUMP MOTOR HP		3	5	5	5	5	5	5	5	5
SUMP HEATER kW		5kW	5kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW
WATER LEVEL CONTROL		Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve
SOUND LEVEL	dB(A)*	64/57	64/57	61/54	61/54	62/55	61/54	61/54	63/56	63/56
LOW AMBIENT	(F) Condenser	-10	-10	-10	-10	-10	-10	-10	-10	-10
% MINIMUM SYSTEM LOAD		10	10	10	10	10	10	10	10	10
REFRIGERANT		134a	134a	134a	134a	134a	134a	134a	134a	134a
REFRIGERANT CHARGE	(LBS)	1464	1464	1169	1164	1171	1432	1444	1444	1444
REFRIGERANT CHARGE	(kg)	664	664	530	528	531	650	655	655	655
UNIT DIMENSIONS	(FT)	8 x22	8 x22	8 x31	8 x35	8 x35	8 x35	8 x35	8 x35	8 x35
OPERATING WEIGHT	(LBS)	33,649	33,965	40,605	40,616	40,775	43,742	43,845	42,978	40,617
OPERATING WEIGHT	(kg)	15,263	15,406	18,418	18,423	18,495	14,886	19,888	19,494	18,423
SHIPPING WEIGHT	(LBS)	25,869	26,007	30,922	30,938	30,829	32,818	32,909	33,116	33,146
SHIPPING WEIGHT	(kg)	11,731	11,796	14,026	14,033	13,984	14,886	14,925	15,021	15,035

*dB(A) = Sound Pressure level (SPL) Per ANSI S12.34-1988 @ High Speed/Low Speed
Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

GENERAL DATA ECC 310-430

NOMINAL CHILLER SIZE		310	315	320	330	340	350	360	400	430
CHILLER MODULES		2	2	2	2	2	2	2	2	2
COMPRESSORS		Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw
QUANTITY		4	4	4	4	4	4	4	5	6
NOMINAL SIZE (HP)		80/65-80/65	80/65-80/65	(2) 80/55	80/55-80/65	(2) 80/65	80/65-80/80	(2) 80/80	80/80-65/40/80	(2) 65/40/80
EVAPORATOR										
QUANTITY		2	2	2	2	2	2	2	2	2
TYPE		Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded
NO. CIRCUITS		4	4	4	4	4	4	4	4	4
WATER STORAGE (GAL)		24.0/24.0	24.0/28.5	28.5/28.5	28.5/28.5	28.5/28.5	28.5/33.4	33.4/33.4	33.4/43.1	43.1/43.1
WATER STORAGE (LITERS)		90.9/90.9	90.9/107.9	107.9/107.9	107.9/107.9	107.9/107.9	107.9/126.4	126.4/126.4	126.4/163.2	163.2/163.2
MINIMUM FLOW (GPM)		210/210	210/240	240/240	240/240	240/240	240/270	270/270	270/324	324/324
MINIMUM FLOW (LPS)		13.2/13.2	13.2/15.1	15.1/15.1	15.1/15.1	15.1/15.1	15.1/17	17/17	17/20.4	20.4/20.4
MAXIMUM FLOW (GPM)		600/600	600/700	700/700	700/700	700/700	700/700	700/700	700/800	800/800
MAXIMUM FLOW (LPS)		44.2/44.2	44.2/44.2	44.2/44.2	44.2/44.2	44.2/44.2	44.2/44.2	44.2/44.2	44.2/50.5	50.5/50.5
CONDENSER		470L	500L	500L	535L	535L	535L	535L	535L	535L
QUANTITY		1	1	1	1	1	1	1	1	1
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. CIRCUITS		4	4	4	4	4	4	4	4	4
FAN TYPE		VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC
FAN QUANTITY		12	12	12	12	12	12	12	12	12
FAN MOTOR QUANTITY		2	2	2	2	2	2	2	2	2
FAN MOTOR TYPE		TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC	TEFC
FAN MOTOR SPEED STANDARD		Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd
OPTION		2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD
FAN MOTOR (HP)		15/15	20/20	20/20	25/25	25/25	25/25	25/25	25/25	25/25
PUMP MOTOR (HP)		5	5	5	5	5	5	5	5	5
SUMP HEATER (kW)		(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW
WATER LEVEL CONTROL		Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve	Float valve
SOUND LEVEL dB(A)*		63/56	64/50	64/50	66/54	66/54	66/54	66/54	66/54	66/54
LOW AMBIENT (F) Condenser		-10	-10	-10	-10	-10	-10	-10	-10	-10
% MINIMUM SYSTEM LOAD		10	10	10	10	10	10	10	10	10
REFRIGERANT		134a	134a	134a	134a	134a	134a	134a	134a	134a
REFRIGERANT CHARGE (LBS)		1439	1470	1470	1721	1721	1716	1716	1801	1801
REFRIGERANT CHARGE (kG)		653	667	667	781	781	777	778	817	817
UNIT DIMENSIONS (FT)		8 x 35	8 x 35	8 x 35	8 x 27	8 x 35	8 x 35	8 x 29	8 x 29	8 x 29
OPERATING WEIGHT (LBS)		44,115	43,333	43,752	46,022	46,022	46,171	46,340	50,975	55,610
OPERATING WEIGHT (kG)		20,010	19,655	19,845	20,875	20,875	20,943	21,019	23,122	25,224
SHIPPING WEIGHT (LBS)		33,176	32,333	32,752	34,500	34,500	34,679	34,848	39,313	43,948
SHIPPING WEIGHT (kG)		15,048	14,666	14,856	15,649	15,649	15,730	15,807	17,832	19,934

*dB(A) = Sound Pressure level (SPL) Per ANSI S12.34-1988 @ High Speed/Low Speed
Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

SCREW COMPRESSOR CHILLERS — FLOODED EVAPORATOR

GENERAL DATA ECC 460-530

NOMINAL CHILLER SIZE		460	490	500	515	520	530
CHILLER MODULES		2	2	2	2	2	2
COMPRESSORS		Screw	Screw	Screw	Screw	Screw	Screw
QUANTITY		6	6	6	6	6	6
NOMINAL SIZE	(HP)	65/40/80-80/55/80	(2) 80/55/80	80/55/80-80/65/80	(2) 80/65/80	80/65/80-80/80/80	(2) 80/80/80
EVAPORATOR							
QUANTITY		2	2	2	2	2	2
TYPE		Flooded	Flooded	Flooded	Flooded	Flooded	Flooded
NO. CIRCUITS		4	4	4	4	4	4
WATER STORAGE	(GAL)	43.1/47.2	47.2/47.2	47.2/47.2	47.2/47.2	47.2/47.2	47.2/47.2
WATER STORAGE	(LITERS)	163.2/178.7	178.7/178.7	178.7/178.8	178.8/178.8	178.8/178.8	178.8/178.8
MINIMUM FLOW	(GPM)	324/358	358/358	358/358	358/358	358/358	358/358
MINIMUM FLOW	(LPS)	20.4/22.6	22.6/22.6	22.6/22.6	22.6/22.6	22.6/22.6	22.6/22.6
MAXIMUM FLOW	(GPM)	800/900	900/900	900/900	900/900	900/900	900/900
MAXIMUM FLOW	(LPS)	50.5/56.8	56.8/56.8	56.8/56.8	56.8/56.8	56.8/56.8	56.8/56.8
CONDENSER		535L	535L	535L	535L	535L	535L
QUANTITY		1	1	1	1	1	1
TYPE		Evaporative	Evaporative	Evaporative	Evaporative	Evaporative	Evaporative
NO. CIRCUITS		4	4	4	4	4	4
FAN TYPE		VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC	VBD/FC
FAN QUANTITY		12	12	12	12	12	12
FAN MOTOR QUANTITY		2	2	2	2	2	2
FAN MOTOR TYPE		TEFC	TEFC	TEFC	TEFC	TEFC	TEFC
FAN MOTOR SPEED STANDARD		Single Spd	Single Spd	Single Spd	Single Spd	Single Spd	Single Spd
OPTION		2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD	2Spd/VFD
FAN MOTOR	(HP)	25/25	25/25	25/25	25/25	25/25	25/25
PUMP MOTOR	(HP)	5	5	5	5	5	5
SUMP HEATER	(kW)	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW	(2) 4kW
WATER LEVEL CONTROL		Float valve	Float valve	Float valve	Float valve	Float valve	Float valve
SOUND LEVEL	dB(A)*	66/54	66/54	66/54	66/54	66/54	66/54
LOW AMBIENT	(F) Condenser	-10	-10	-10	-10	-10	-10
% MINIMUM SYSTEM LOAD		10	10	10	10	10	10
REFRIGERANT		134a	134a	134a	134a	134a	134a
REFRIGERANT CHARGE	(LBS)	1801	1801	1801	1801	1801	1801
REFRIGERANT CHARGE	(kg)	817	817	817	817	817	817
UNIT DIMENSIONS (FT)							
OPERATING WEIGHT	(LBS)	55,998	56,386	56,409	56,432	56,469	56,506
OPERATING WEIGHT	(kg)	25,400	25,576	25,576	25,579	25,610	25,631
SHIPPING WEIGHT	(LBS)	44,336	44,724	44,747	44,770	44,807	44,844
SHIPPING WEIGHT	(kg)	20,110	20,286	20,209	20,307	20,324	20,341

*dB(A) = Sound Pressure level (SPL) Per ANSI S12.34-1988 @ High Speed/Low Speed
Noise sources are recorded under free field conditions over a reflecting plane @ 50 ft.

R-134A SCREW COMPRESSOR ELECTRICAL DATA

	COMPRESSORS						FAN MOTOR		PUMPS		POWER						
	Qty.	HP	HP	HP	HP	HP	Qty.	HP	Qty.	HP	208/230V			460V			
											RLA	MCA	MOP	RLA	MCA	MOP	
ECC80-125LS	2	40	40				1	7.5	1	1.5	198	219	300	90	100	125	
ECC90-135L	2	45	40				1	10	1	1.5	217	243	300	102	114	150	
ECC90-144LS	2	45	40				1	7.5	1	1.5	212	238	300	99	111	150	
ECC100-155L	2	55	40				1	10	1	1.5	245	276	350	111	125	175	
ECC110-170L	2	65	40				1	15	1	1.5	285	322	450	130	147	200	
ECC110-190LS	2	65	40				1	10	1	2	270	307	450	124	141	200	
ECC120-190LS	2	65	45				1	10	1	2	290	328	450	132	149	200	
ECC130-210L	2	65	55				1	15	1	2	326	364	500	149	166	225	
ECC145-235L	2	80	55				1	15	1	2	356	401	500	162	182	250	
ECC155-235L	2	80	65				1	15	1	2	382	427	500	174	194	250	
ECC161-250L	2	80	55				1	20	1	2	412	463	600	185	207	250	
ECC171-250L	2	80	65				1	20	1	2	437	488	600	196	218	300	
ECC181-250L	2	80	80				1	20	1	2	475	526	700	211	233	300	
ECC160-251LS	4	40	40	40	40		2	7.5	1	3	394	415	450	179	189	225	
ECC170-270L	4	40	40	45	40		2	10	1	3	425	451	500	194	206	250	
ECC180-270L	4	45	40	45	40		2	10	1	3	444	470	500	205	215	250	
ECC185-288LS	4	55	40	45	40		2	7.5	1	3	472	486	600	211	220	250	
ECC200-310L	4	55	40	55	40		2	10	1	3	488	520	600	221	235	250	
ECC210-340L	4	65	40	55	40		2	15	1	3	543	581	700	247	264	300	
ECC220-340L	4	65	40	65	40		2	15	1	3	568	606	700	259	276	300	
ECC235-380LS	4	65	40	65	45		2	10	1	5	564	601	700	256	273	300	
ECC245-380LS	4	65	45	65	45		2	10	1	5	583	620	700	264	281	300	
ECC255-420L	4	65	45	65	55		2	10	1	5	634	671	800	288	305	350	
ECC265-425LS	4	65	55	65	55		2	10	1	5	625	662	800	284	301	350	
ECC275-425LS	4	65	55	80	55		2	10	1	5	655	700	800	297	317	350	
ECC290-470L	4	80	55	80	55		2	15	1	5	715	760	900	324	349	400	
ECC300-470L	4	80	55	80	65		2	15	1	5	741	786	900	339	360	400	
ECC310-470L	4	80	65	80	65		2	15	1	5	767	812	900	351	372	450	
ECC315-500L	4	80	65	80	65		2	20	1	5	812	863	1000	361	383	450	
ECC320-500L	4	80	55	80	55		2	20	1	5	827	878	1000	366	388	450	
ECC330-535L	4	80	55	80	65		2	25	1	5	882	933	1000	395	418	500	
ECC340-535L	4	80	65	80	65		2	25	1	5	907	958	1100	406	429	500	
ECC350-535L	4	80	65	80	80		2	25	1	5	945	996	1200	421	444	500	
ECC360-535L	4	80	80	80	80		2	25	1	5	983	1034	1200	436	459	500	
ECC400-535L	5	80	80	65	40	80	2	25	1	5	Note #1			501	526	600	
ECC430-535L	6	65	40	80	65	40	80	2	25	1	5	Note #1			526	551	600
ECC460-535L	6	65	40	80	80	55	80	2	25	1	5	Note #1			571	596	600
ECC490-535L	6	80	55	80	80	55	80	2	25	1	5	Note #1			628	654	700
ECC500-535L	6	80	55	80	80	65	80	2	25	1	5	Note #1			643	669	700
ECC515-535L	6	80	65	80	80	65	80	2	25	1	5	Note #1			658	684	700
ECC520-535L	6	80	65	80	80	80	80	2	25	1	5	Note #1			676	702	800
ECC530-535L	6	80	80	80	80	80	80	2	25	1	5	Note #1			694	720	800

Note #1: Consult E-PAK for 208/230V applications at this capacity.

Notes: Electrical ratings are based upon nominal chiller ratings (44°F LWT, 10° ΔT 78° F WB) with a single point power distribution center furnished by E-PAK.

RLA = System Running Load Amps, includes compressors, condenser fans and pump motor.

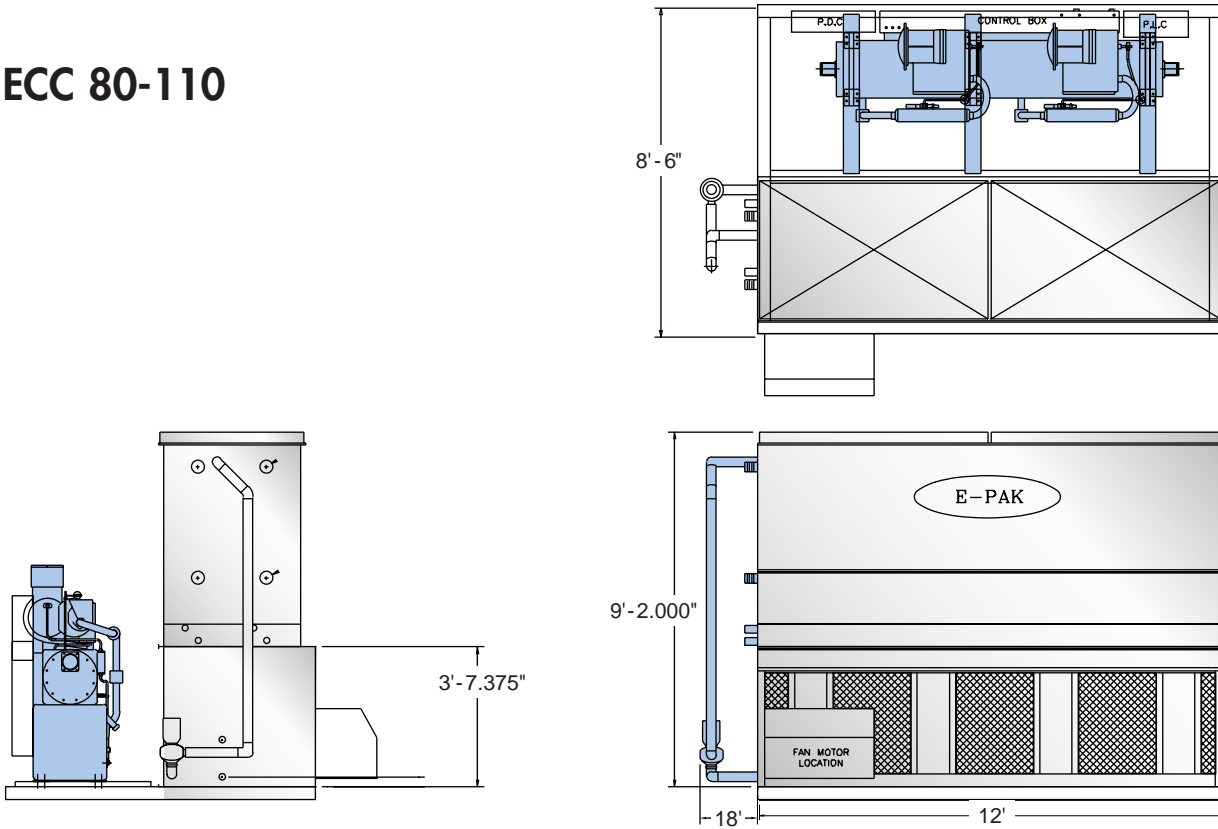
MCA = Minimum circuit ampacity, includes compressors, condenser fans and pump motor.

MOP = Maximum Overcurrent Protection, includes compressors, condenser fans and pump motor.

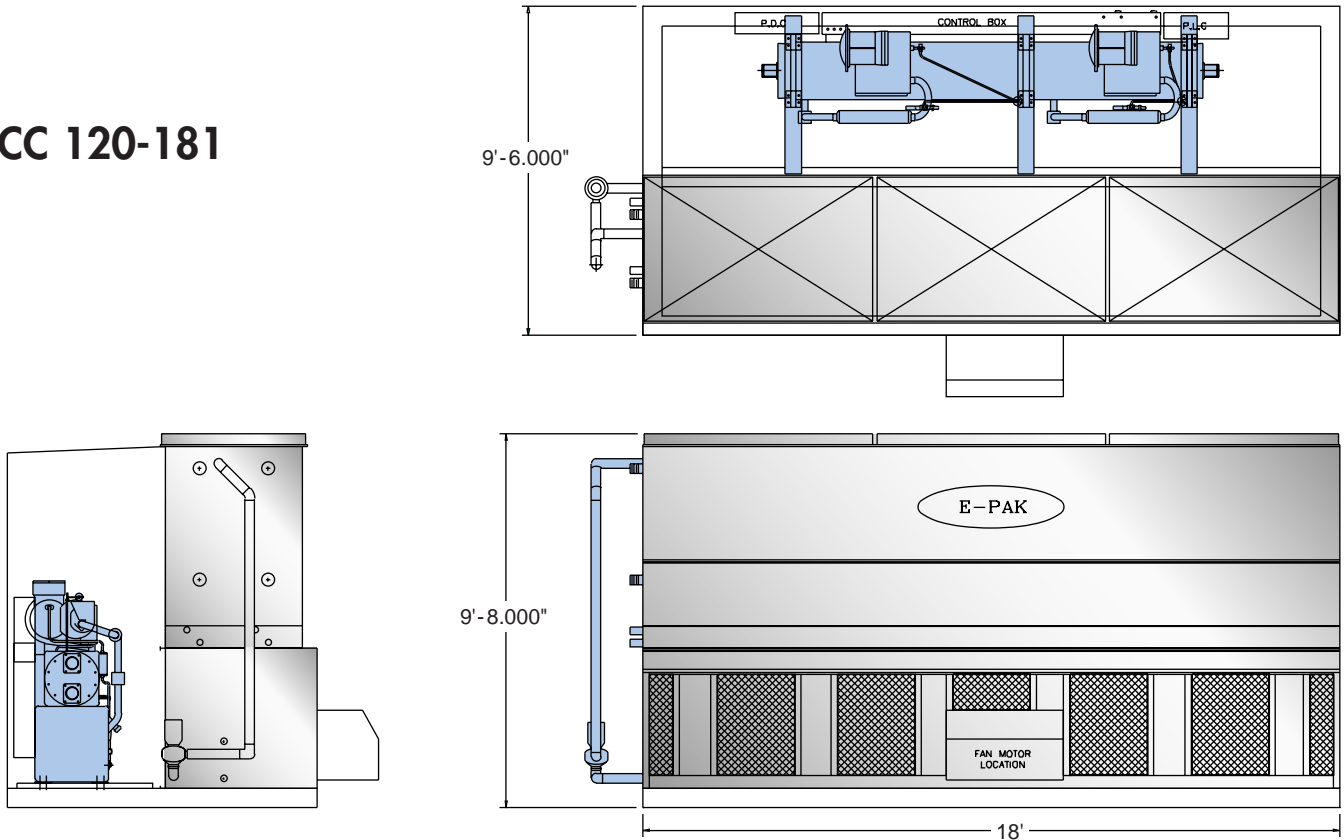
*For applications other than nominal conditions, please consult E-PAK. 208/230 volt are shipped with Wye Delta start as standard. Across the line start is not available.

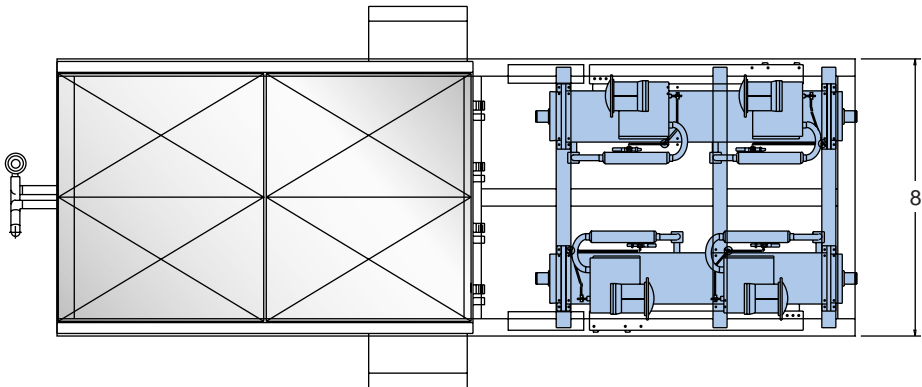
SCREW COMPRESSOR CHILLERS — FLOODED EVAPORATOR

ECC 80-110

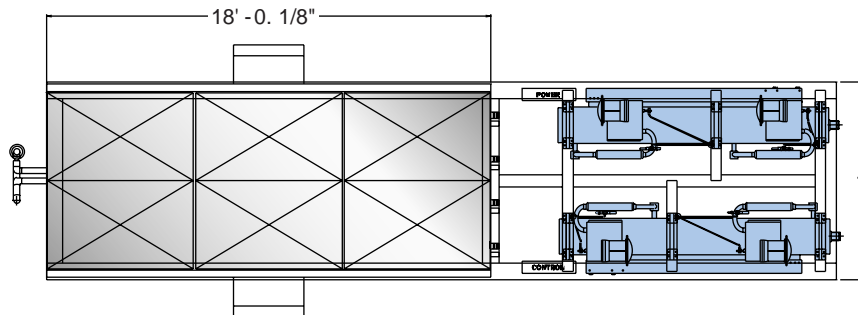
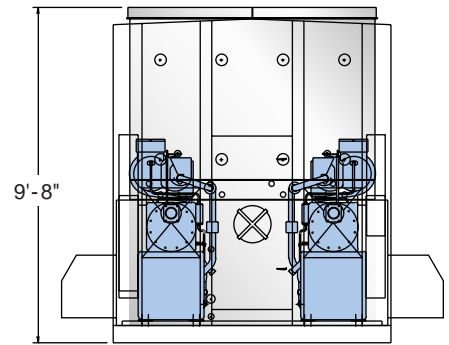
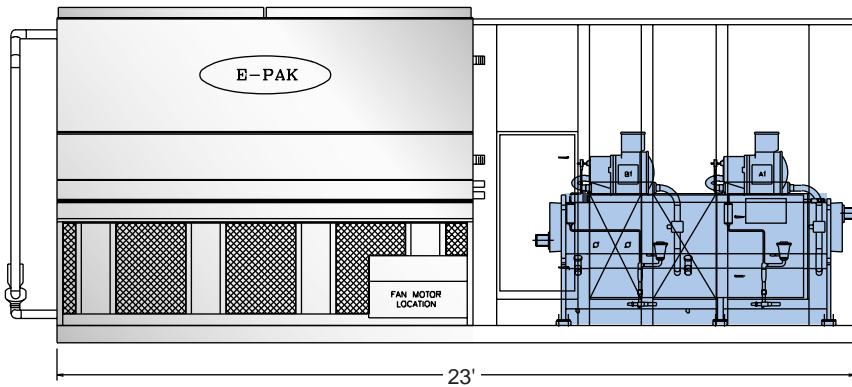


ECC 120-181

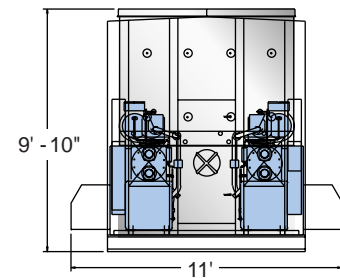
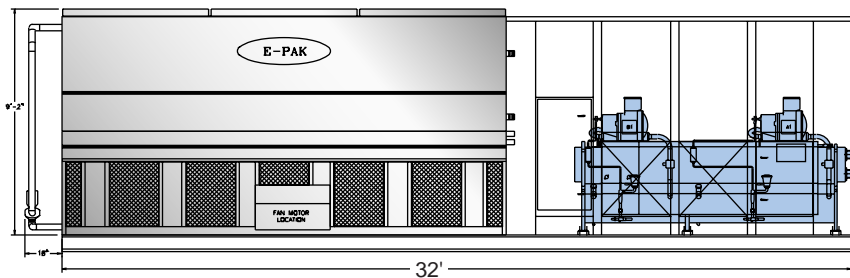




ECC 160-220

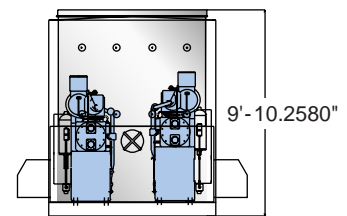
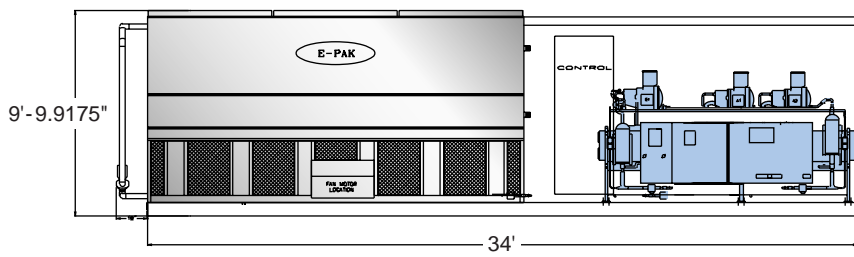
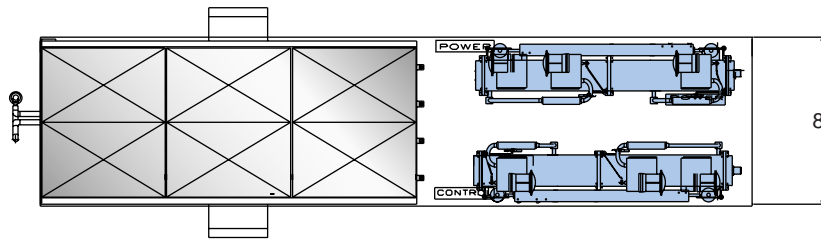


ECC 235-360



SCREW COMPRESSOR CHILLERS — FLOODED EVAPORATOR

ECC 430-535



E-PAK CHILLED WATER PLANTS

- ADD WATER AND POWER — INSTANT CHILLED WATER PLANT
- QUICK AND EASY INSTALLATION
- SAVES VALUABLE INTERIOR MECHANICAL SPACE
- FACTORY WIRED, TESTED, AND PROGRAMMED
- ROOFTOP OR CONCRETE PAD INSTALLATION

DUPLEX CHILLED WATER PUMP PACKAGE OPTION

The chiller unit can be equipped with a duplex chilled water pump package consisting of (2) bronze fitted, close coupled, end suction, centrifugal pumps, manufactured by Bell & Gossett, Aurora or equal.

Each pump is furnished with a mechanical seal and is equipped with key-locked shaft sleeve that extends the length of the seal box. The pumps have a case wearing ring, the impellers are vacuum cast, dynamically balanced, and key locked to the shaft.

The chilled water pumps are installed inside the chiller unit weather housing and fitted with a flexible connection, check valve and butterfly valve off the discharge of each pump and a suction diffuser/strainer, flexible connection and butterfly



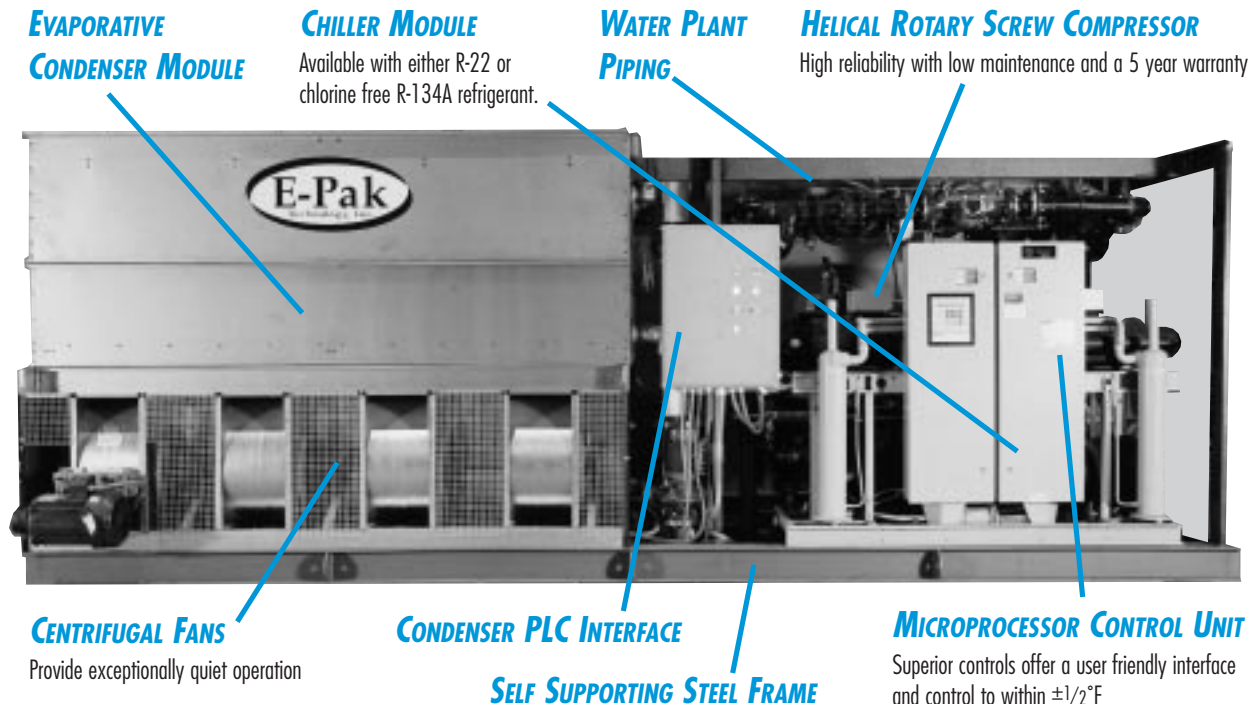
Princeton, New Jersey — 300 ton Chilled Water Plant with sound attenuation and plume abatement coil (hot gas de-superheat coil which runs the length of the condenser).

valve off the suction inlet of each pump. Suction & discharge pressure gauges are installed at the chilled water pumps. The chillers are piped in a parallel arrangement.

The chilled water pumps are arranged for alternate/standby service through interconnecting pipe headers and piped through the (2) evaporator/chiller heat exchangers providing (1) chilled water supply and (1) chilled water return victaulic ground connection for field hook up.

All chilled water piping provided within the chiller unit is schedule 40 steel pipe and can be insulated or uninsulated, so that insulation may be field applied after all flange bolts are checked and tightened after transportation.

The chilled water pump motors are factory wired for automatic change over or manual pump selection with all power wiring and controls installed and tested prior to shipment.



EVAPORATIVE CONDENSER MODULE

CHILLER MODULE
Available with either R-22 or chlorine free R-134A refrigerant.

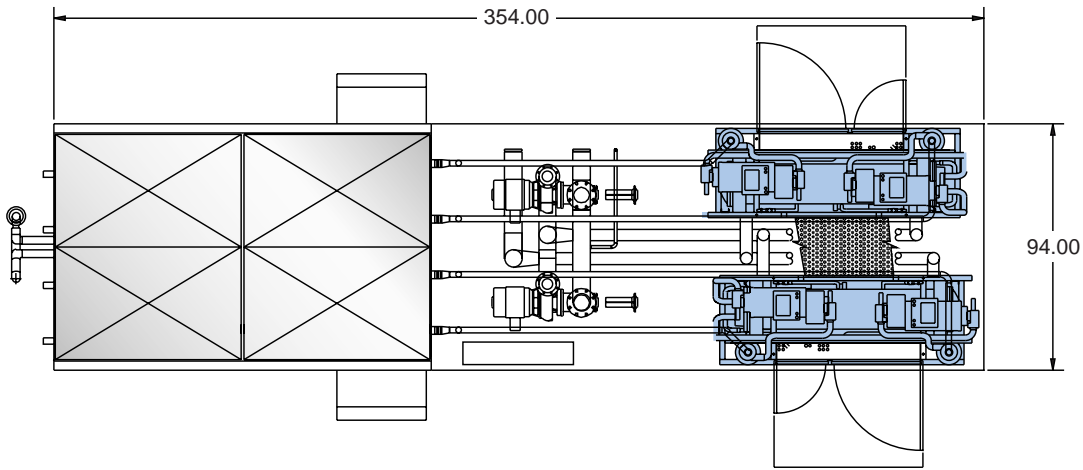
WATER PLANT PIPING

HELICAL ROTARY SCREW COMPRESSOR
High reliability with low maintenance and a 5 year warranty

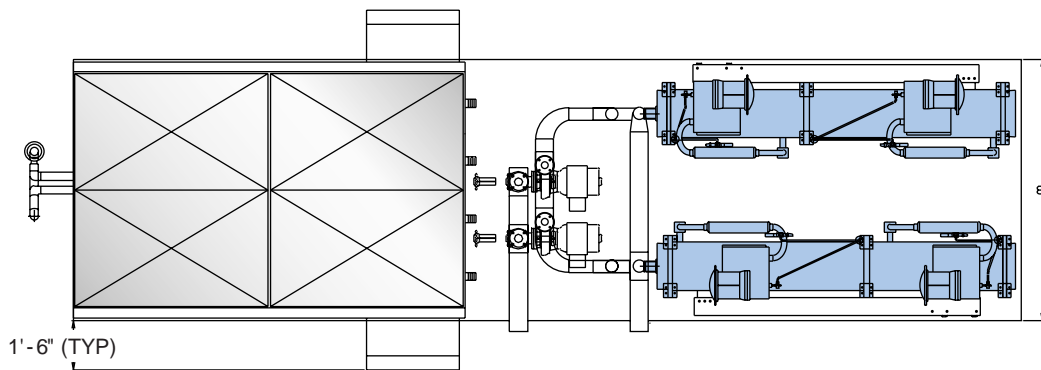
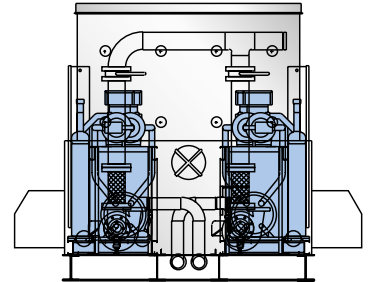
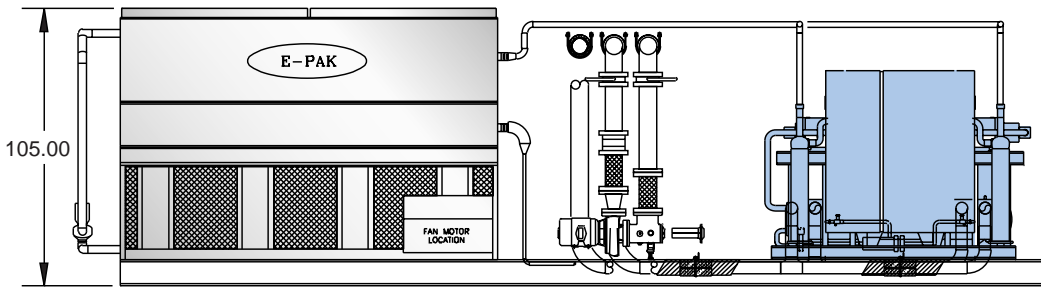
CENTRIFUGAL FANS
Provide exceptionally quiet operation

CONDENSER PLC INTERFACE
SELF SUPPORTING STEEL FRAME

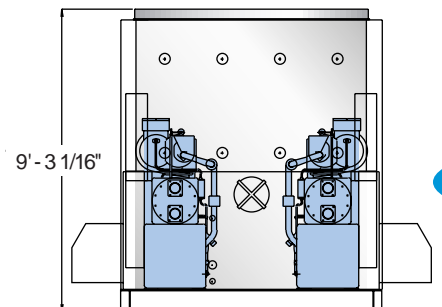
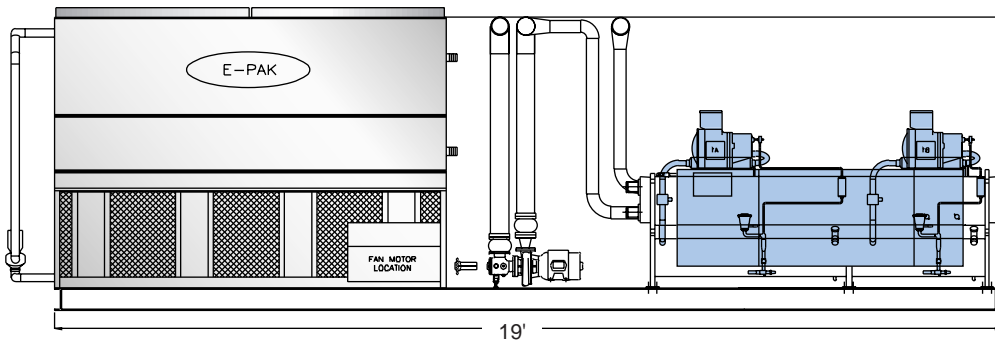
MICROPROCESSOR CONTROL UNIT
Superior controls offer a user friendly interface and control to within $\pm 1/2^\circ\text{F}$



DX Evaporator



Flooded Evaporator



APPENDIX A OPTIONS SPECIFICATIONS

EXTENDED 5 YEAR COMPRESSOR WARRANTY

The semi hermetic compressors are furnished with The Compressor Manufacturer's Extended 5 Year Warranty which extends the standard first year warranty to the 2nd through 5th year of operation.

START-UP AND FIRST YEAR WARRANTY LABOR

The chiller manufacturer furnishes Factory trained service technician(s) to check out, charge with refrigerant (refrigerant furnished by others), start-up and adjust the chiller system equipment to assure optimum chiller performance, and instruct the owner in the proper operation and maintenance of the equipment.

The chiller manufacturer provides qualified labor during normal work hours to install replacement parts or make repairs covered under the first year standard warranty.

WYE-DELTA COMPRESSOR STARTERS

The chiller module(s) are equipped with Wye-Delta compressor motor starters which are factory mounted and tested by the chiller manufacturer.

NON-FUSED DISCONNECT

The chiller module control/starter panel(s) are equipped with a non-fused disconnect switch mounted in the control/starter panel door.

BAS COMMUNICATION INTERFACE

The chiller system is furnished with a Building Automation System Communication interface which provides bi-direction communication to permit remote chilled water set point and demand limiting by accepting a 4-20 mA or 2-10VDC analog signal.

SINGLE POINT POWER DISTRIBUTION SYSTEM OPTION

The chiller unit is furnished with a Single Point Power Distribution Center, 460Volt, 3-phase, 60-Hertz. The PDC is furnished with a Main circuit breaker/disconnect rated for the total overcurrent protection of the entire system and branch circuit breaker/disconnects are provided for each component of the chiller system; one for each chiller module, one for each condenser fan motor, one for the condenser circulator motor(s), and one for the accessory power transformer and other options if provided with the unit. All circuit breakers are HACR type suitable for air conditioning and refrigeration duty and UL rated and the complete unit shall be ETL listed. All electrical system components are manufactured by Square "D".

REDUNDANT CONDENSER RECIRCULATION WATER SPRAY PUMPS

The chiller system's condenser is furnished with a redundant spray pump assembly mounted on opposite ends of the evaporative condenser and piped from a common chilled water plant sump to a common water distribution spray header.

Each assembly is equipped with a butterfly valve, check valve and a flow switch to allow automatic change over and repair services in the event of one pump system failure.

CONDENSER INTAKE & DISCHARGE SOUND ATTENUATION OPTION

The chiller is furnished with intake and discharge sound traps for field installation by the installation site contractor. The sound traps are G-235 galvanized steel with interior walls and baffles acoustically lined with high-density fiberglass. Both intake and discharge sound traps are supported from the condenser and require no external supporting structure. The intake and discharge sound attenuation plenums enable the condenser to operate at a maximum overall sound pressure level of 55dB or less at 50 FT when operating at high speed.

When intake sound traps are furnished, the condenser fan bearings are fitted with a remote lubrication package consisting of (2) grease fittings and (1) oil reservoir located at each corner of the condenser endwall to provide proper fan bearing lubrication maintenance without having to enter the intake sound traps.

TAPERED DISCHARGE HOOD

The condenser is furnished with a tapered discharge hood to prevent short-circuiting of the condenser discharge air in space-restricted installations. The hood is constructed of G-235 galvanized sheet steel panels and equipped with access doors on both sides to provide access to the drift eliminators. The hood is shipped separate from the chiller unit for field installation.

CHILLER ENCLOSURE SOUND ATTENUATION

The chiller enclosure is constructed of double wall sandwich panels consisting of a mill finished aluminum exterior panel, 3/8" acoustical sound control matting of acoustic foam with a mass loaded vinyl barrier and a galvanized steel interior panel. The composite panel has a mass of 5 lb./sq. ft.. All service access doors and access panels will be similarly constructed and equipped with stainless steel piano hinges

LOW AMBIENT PACKAGE

The chiller is furnished with Electric heaters at the chiller barrel(s), oil separators and condenser sump pan as required to prevent freezing of the coolant water when the chiller is not operating and outdoor dry bulb temperatures are below 40°F. All electrical controls are factory wired and tested.

SERVICE CONVENIENCE PACKAGE

The chiller housing is furnished with interior lights and a GFI electrical receptacle for the operation of small electrical service tools.

110V POWER SUPPLY

The chiller is furnished with a 3KVA 460V/110V transformer for control and accessory power in lieu of a separate field supplied 110V source.

ELECTRONIC WATER LEVEL CONTROL

The condenser is equipped with an electronic water level control in lieu of the standard unsinkable float/valve control. The electronic water level consists of a water level conductivity sensor, with stainless steel probes mounted in a cleanable PVC external stand pipe and equipped with a slow operating solenoid valve. The electronic water level control is factory mounted, wired and tested.

2 SPEED CONDENSER FAN CONTROL

The chiller is furnished with 2 speed single winding TEFC condenser fan motor(s) and 2 speed consequent pole motor starter(s). The starters are controlled by pressure transducers thru a PLC which will provide decelerating time delay and selection of proper fan speed to optimize chiller system performance.

All internal electrical power and control wiring and programming of the PLC is completed and tested prior to shipment.

VARIABLE FREQUENCY DRIVE CONDENSER FAN CONTROL

The chiller is furnished with Inverter Duty TEFC condenser fan motor(s) for operation with Altivar VFD fan controls manufactured by Square D. The VFD controller(s) is controlled by pressure transducers thru a PLC which modulates the condenser fan speed to optimize chiller system performance. All internal electrical power and control wiring and programming of the PLC is completed and tested prior to shipment.

304 STAINLESS STEEL SUMP

The condenser is furnished with a stainless steel sump. All sheet metal panels in the sump section of the condenser, which come in contact with the cooling water, including the discharge fan cowls, are constructed of TYPE 304 stainless steel.

The centrifugal fan wheels are epoxy coated and the fan shaft(s) is coated with a rust inhibitor. The remainder of the unit is constructed of G-235 galvanized steel.

304 STAINLESS STEEL WATER TOUCH CONDENSER

All sheet metal panels which come in contact with the cooling water including the sump, discharge fan cowls and upper casing panels are constructed of TYPE 304 stainless steel.

The centrifugal fan wheels are epoxy coated and the fan shaft(s) is coated with a rust inhibitor. The remainder of the unit is constructed of G-235 galvanized steel.

304 STAINLESS STEEL CONDENSER

The condenser is constructed of TYPE 304 stainless steel including the sump, discharge fan cowls, fan housings, upper sheet metal panels and condenser supports. The centrifugal fan wheels are epoxy coated and the fan shaft(s) is coated with a rust inhibitor.

COPPER CONDENSER COIL

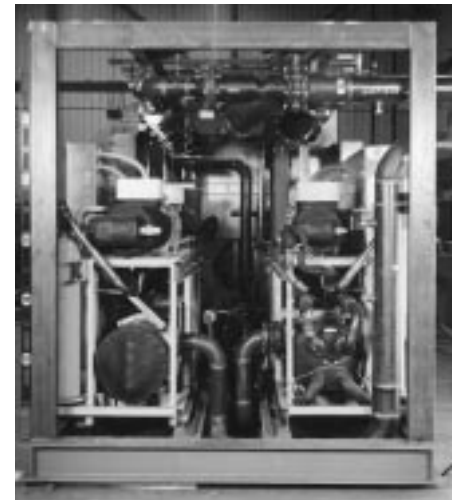
The condenser is equipped with a copper condenser coil. The coil is constructed of 5/8" seamless copper tubing. The headers and connections are constructed of Type "L" copper tubing with stainless steel tube sheets. The entire assembly is pressure tested to 400 psig.

CONDENSER SUMP SWEEPER

The condenser is equipped with sump sweeper piping consisting of (2) lengths of 2" schedule 40 PVC pipe. The supply pipe will be furnished with 1/4" holes on 6" centers and the return pipe is furnished with 3/8" holes on 6" centers and both the supply and return pipe outlets are equipped with 2" ball valves.

REMOTE CONDENSER LUBRICATION PACKAGE

The condenser fan bearings are fitted with a remote lubrication package consisting of (2) grease fittings and (1) oil reservoir located at each corner of the condenser endwall and PVC tubing piped to the bearing.



New Product Developments

E-Pak consistently strives to be on the cutting edge of product development. The Products listed below have been development in large part to E-Pak's responsiveness to customer needs.

EVAPORATIVE COOLED ROOFTOP UNITS

Developed as an alternative to air cooled rooftop HVAC units which have the highest energy costs, E-Pak has designed a series of rooftop units which take advantage of the energy efficiency and low sound levels of "evaporative" condensing.

REMOTE EVAPORATIVE CONDENSERS.

E-Pak can provide evaporative condensers and power/control panels which can be field applied to split chiller systems where the chiller units typically reside in interior mechanical rooms.

E-PAK CRITI-COOL CHILLERS

E-Pak CritiCool systems are designed with redundant compressor circuits and condenser cells for mission critical applications. Each independent condenser cell can be equipped with dual water recirculation pumps.

MAGNETIC LEVITATION CENTRIFUGAL CHILLER

Refrigeration Compressor Technology has evolved from the open drive reciprocating compressor of the past, to the hermetic, reciprocating, scroll, screw and centrifugal compressors of today.

Now, the convergence of aerospace and industrially tried and proven technological advances, has produced the world's first totally oil-free, multistage, centrifugal compressor with magnetic levitation bearings specifically designed for the Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) industry.

The MagLev bearing prevents metal to metal contact of bearing parts thereby reducing bearing noise produced by standard mechanical bearings and, eliminating the need for lubricating oil which can accumulate in critical refrigeration system heat transfer components and reducing system performance.



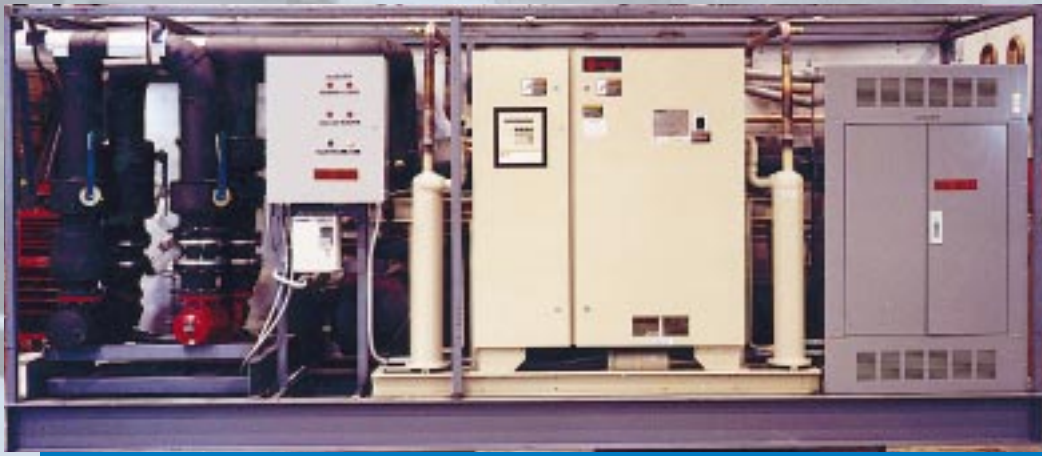
E-Pak is constantly listening to our customers for feedback to make our unique product line even better in the future. We would appreciate hearing from you.

E-PAK TECHNOLOGY

20 HAWS LANE Suite F-20
FLOURTOWN, PA 19031
Phone: 215-233-0608



65 Unit Condominium Building, Phila, Pa
Capacity 145 Tons with 44 degrees LWT @ 78 degrees F WB Air on the condenser



Single Chiller Model with Chilled Water Pumps



E-Pak unit loaded on the back of a flatbed. All E-PAK equipment is designed to be shipped standard,



A Publishing Company - Phila., Pa.

Capacity 202.8 Tons with 44 degrees F LWT @ 78 degrees F WB Air on the Condenser

E-PAK TECHNOLOGY

330 S. Warminster Road

Hatboro, PA 19040

Phone: 215-914-0700 Fax: 215-914-0799

www.epaktechnology.com