

The Energy Revolution

Advanced Technology Water Chilling Utilising the award winning TURBOCOR oil free compressor

Models 210kW to 1500kw both Air and Water Cooled

- EXCEPTIONAL ENERGY EFFICIENCY
- LOW NOISE LEVELS
- FULL CAPACITY CONTROL
- OIL FREE OPERATION
- SOFT START
LOW INRUSH CURRENT
- WEB ENABLED
INTELLIGENT ELECTRONICS
- CONDITION MONITORING
SERVICE DIAGNOSTICS
- FLOODED COOLER
HIGHER EFFICIENCY
- TWO STAGE COMPRESSION
WITH INTERCOOLER

Features

It's 30% More Efficient: The compressor is up to 30% more efficient than other compressors in its size range. And this exceptional performance can be monitored, either on site or remotely, via a state-of-the-art web-based monitoring and diagnostics system.

It's Oil-Free: This is something the industry has worked decades to achieve. An *Oil-Free* design which eliminates not only the potential for efficiency-robbing oil contamination of the refrigerant but also all of the oil management accessories: oil heaters, oil pumps, oil separators, oil filters, etc.

It's Extremely Lightweight: A 315 kW TURBOCOR compressor weighs only 120 kg, approximately 1/5th the weight of many conventional compressors.

It's Extraordinarily Quiet: At an operating sound level of less than 70 dBa, the compressor is so quiet that, given typical equipment background noise, you literally cannot hear it run.

It Redefines Soft-Start: The TURBOCOR compressor redefines soft-start, drawing only 2 amps compared to 500-600 amps required by conventional compressors.



Remote air cooled chillers 800 kW

EASE OF CONTROL

PowerPax chillers are easily interfaced to building management systems and provide easy connectivity with most industry standard protocols.



Air Cooled chiller installation

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SERVICEABILITY

The lightweight compressor is compact and easy to handle, featuring electronic diagnostics and the potential for web based monitoring of critical compressor and system parameters.

The compressor has only one moving part assembly and has no wearing surfaces subject to lubrication problems. By eliminating the need for oil to lubricate and provide compression sealing, the PowerPax chiller avoids all of the problems associated with oil systems typical of other chillers. Chilled water temperatures are monitored as standard with outputs to the front panel user interface. PowerPax chillers feature full valving for isolation during service. They use HFC-134a refrigerant which is not subject to phase out, is readily available and easy to handle.

CENTRIFUGAL COMPRESSOR

Centrifugal compressors have long been regarded as the last word in compressor efficiency.

Until now only available in larger capacities, the PowerPax chiller breaks new ground, bringing the inherent efficiencies of an advanced two stage centrifugal compressor to chillers below 1000 kW.

TOTALLY OIL FREE SYSTEM

High friction losses and the maintenance intensive oil management hardware that characterise conventional oil lubricated systems, are totally eliminated by using modern magnetic bearing technology. The compressor operates without the need for a lubrication system, thus avoiding the problems and complication inherent in other systems.

. no oil circulation problems

. no oil separators

. no oil cooling problems

. no bearing or gear wear

The compressor rotor shaft is levitated during rotation by a digitally controlled magnetic bearing system

VARIABLE SPEED DRIVE

The established energy saving and performance benefits commonly available in large centrifugal plant are brought to the Powerpax chillers through the use of a high speed two stage centrifugal compressor with integral variable speed drive.

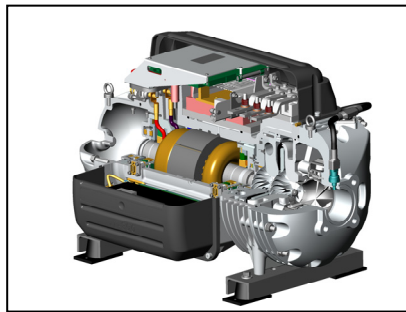
By using a close coupled electronically commutated motor the inevitable gearbox losses and associated noise, wear and lubrication problems are totally eliminated.

CAPACITY MODULATION

The on board electronics control the motor speed and position the inlet guide vanes to match performance to load conditions. This provides a close match to cooling requirements and maintains exceptional efficiency at part load conditions

FLOODED COOLER

A cleanable shell and tube flooded evaporator built to ASME standard which can be custom built to suit site conditions or with special materials eg stainless steel. Shell and plate evaporators are also available.



The Revolutionary Turbocor TT300 Compressor

ON BOARD ELECTRONICS

The world's first smart compressor utilises digital electronics to proactively manage the compressor operation while providing external control and web enabled monitoring.

The electronics also provide for monitoring and reporting of water temperatures, power input and flow (optional).

An optional package is available to connect the controller to a PC to monitor compressor and system parameters, with the potential to do this remotely over a web connection.

An interface is provided for authorised service access to operating parameters and service diagnostics.

USER FRIENDLY CONTROLS

An industry standard controller looks after chiller functions such as chilled water temperature control, load demand, external interlocks and fan controls (air-cooled models).

The controller also provides a user interface and a Building Management System interface.

A backup battery ensures that an event log can be stored in flash memory as a vital aid to service and energy management.

Communication protocols available are Carel, Delta and Modbus (standard), while compatibility to Lonworks, Bacnet and TCP-IP are available via an optional gateway device.

CONDENSER (Water-cooled)

A cleanable shell and tube condenser uses enhanced surface copper tubing to provide optimum heat transfer.

Design and construction complies with ASME VIII (div. 1)

Water and refrigerant side design pressures are 1000kpa. and 1300 kpa.

ACCESSORIES / OPTIONS

Stainless Steel Condenser Tubeplates - 321 SS is available on request for special applications.

PC Interface (compressor) - Allows connection to a PC to monitor compressor and system parameters.

Gateway Interface – provides for easy interfacing of the chiller to a building management system. (Specify Lonworks, TCP-IP, Bacnet)

SPECIFICATION GUIDE

DESCRIPTION

Microprocessor controlled, water chiller using HFC-134a refrigerant, two stage centrifugal variable speed compressor and electronic expansion devices.

QUALITY ASSURANCE

The unit shall be rated in accordance with ARI Standard 550/590 and construction shall comply with relevant Australian codes, vessels shall be manufactured in accordance with ASME codes.
Selected units can be run tested at the factory prior to shipment (optional).

EQUIPMENT

General:

Factory assembled, packaged liquid chiller fitted with all factory wiring, piping and controls.

Compressors:

The compressor shall be a semi-hermetic two stage direct driven variable speed centrifugal.
Compressor shall be equipped with discharge and suction shutoff (isolating) valves.
Capacity control shall be provided by variable speed drive and inlet guide vanes, capable of reducing unit capacity to 25% of full load (at ARI standard part load conditions).
Compressor shall start unloaded and current inrush shall be limited by control to less than 75% of full load amps.
Motor cooling shall be provided by an integrated liquid refrigerant injection system controlled by the compressor.
The compressor shall require no oil system

Cooler:

Cooler shall be tested and stamped in accordance with ASME code for a refrigerant working-side pressure of 1300 kPa and shall be tested for a maximum water-side pressure of 1000 kPa
Shell shall be insulated with 19 mm closed-cell, foam (max K factor of 0.28) and fitted with a vapour barrier.
Shall have a cooler drain and vent.
Shall incorporate a refrigerant level sensing device.

Refrigeration Components:

Refrigerant circuit components shall include high and low side pressure relief device, discharge and suction line shutoff valves, filter drier, sight glass, electronic expansion valves, and complete operating charge of refrigerant HFC-134a.

Controls, Safeties and Diagnostics:

Controls:

Unit controls shall include the following minimum components:

- 1) Microprocessor control with non-volatile memory.
- 2) Power and control circuit terminal blocks.
- 3) ON/OFF control switch.
- 4) Temperature sensors installed to measure cooler entering and leaving fluid temperatures.
- 5) Sensors for suction and discharge pressures.
- 6) Sensors for suction and discharge temperatures.

Unit controls shall include the following functions as standard:

- 1) Capacity control based on leaving or entering chilled water temperature with set point offset load compensation.
- 2) Rate of change control at startup to prevent overshoot.
- 3) Interlock connections for system flow, pumps etc.
- 4) Auto-restart after power failure.

The control panel shall include a clear backlit LCD and keypad for setting of user set points and options and providing alarm descriptions.

The controller shall include ports for communicating with the building management system.

The control system shall allow software upgrade without the need for new hardware modules.

Safeties:

Unit shall be equipped to provide the following protection:

- 1) Loss of refrigerant charge.
- 2) Low chilled water temperature.
- 3) Power supply error.
- 4) Motor thermal overload.
- 5) High pressure.
- 6) Loss of chilled water flow.

Operating Characteristics:

- 1. Unit shall be capable of starting and running when supplied with condenser water temperatures 10 to 40°C.
- 2. Unit shall be capable of starting up with 35°C entering fluid temperature to the cooler.

Electrical

- 1. Unit primary electrical power supply shall enter the unit at a single location
- 2. Unit will be provided with a main power disconnect switch.
- 3. Unit shall operate on 3-phase power at the $415 \pm 10\%$ volts 50 Hz.
- 4. Control voltage shall be 24 vac.
- 5. Unit shall be shipped with factory control and power wiring installed.
- 6. Power factor shall be greater than 0.9. at full design load.

Agent: