

Delta T Systems

2171 Highway 175 | Richfield, WI 53076
800-733-4204 | 262-628-0332 fax
www.deltatsys.com | www.deltatparts.com



Delta T Systems introduces the most efficient Industrial Process Chiller on the market

As a result of continual attention to new technologies, materials and process requirements our engineering team has designed a new, groundbreaking Chiller Series. The integration of variable speed drive technology into the control system allows Delta T Systems' chillers to adjust their output to specifically match process requirements. This technology will save you \$,000's on electricity consumption!

1. Most innovative and efficient chiller available in the market place.
 2. Proven technology from the HVAC industry applied to the process industry.
 3. Environmentally friendly, green technology with energy savings up to 50% compared to conventional chillers.
- Variable speed compressor technology
 - State of the art controls technology
 - Flexible remote communication options
 - Extensive digital data collection
 - Industry 4.0 ready
 - Adaptive control
 - Larger heat transfer surface for the evaporator
 - Stainless steel brazed plate evaporators
 - Electronic expansion valve technology
 - Variable speed condenser fans with permanent magnet motors (electric computed motor technology)
 - Microchannel aluminum condenser coils
 - Better temperature control - within 0.5 °F precision

Efficiency

- The first chiller for the process industry with variable speed compressor technology – it adjusts its speed to only use the power needed for the process requirements.
 - The controller monitors the process temperature and sends a communication signal to the drive to either speed up or slow down the compressor. This signal can be overridden by the controller which continuously monitors the suction and discharge pressures to ensure the compressor stays within its operating envelope.

- The realized energy savings between a variable speed and a fixed speed compressor are between 30% and 50% of the initial investment, or in other words the chiller pays for itself in 2 to 3 years. More detail at the end of this article.
- The evaporator (or heat exchanger) surface is larger than the competition which lowers the compressor's demand to further lower energy costs.
 - The brazed plate evaporators that are used have more plates than typical which makes the unit even more efficient. The plate material is stainless steel and copper braze.
- Electronic expansion valve technology works with the variable speed compressor and the state of the art controls to precisely tune the valve to the system needs in the most efficient way possible.
 - The electronic expansion valve is driven by a DC stepper motor valve. The motor steps typically a ¼ turn at a time moving a pin up and down to allow more or less refrigerant flow through the valve port. It is much more precise since it is controlled directly from the controller using the temperature and pressure sensors as feedback.
 - The controller uses several algorithms to control the valve at the best efficient operating point while protecting the compressor.
- Variable speed condenser fans: by using various on board sensors which continually monitor the refrigeration system, the controller varies the speed of the condenser fan to ensure it operates at the most efficient point.
 - The variable speed condenser fan motor also protects the compressor by monitoring the discharge pressure of the system which keeps the compressor in the ideal operating envelope.

Reliability

- The chillers are exclusively manufactured in the USA with high value components that will last with "quality first" in mind.
- The variable speed compressors that are used have 20 years of successful history in the residential and commercial refrigeration markets, mainly for comfort cooling which is the largest refrigeration market.
- Soft start of the compressor with little to zero cycling which increases longevity.
 - A soft start means that the motor is gradually brought up to speed. A fixed speed motor starts at full speed almost instantaneously causing high torque at start-up.
 - Cycling means that the compressor is turning on and off. This is the way a fixed speed compressor controls the temperature of the process.
- With the addition of power electronic controls, variable speed technology is able to protect itself from failure in ways traditional fixed speed compressors are not capable of.
 - Power side electronic controls basically refer to a drive that controls the speed of the motor. We are using an inverter drive that takes AC power and converts it to DC. The inverter drive has built in filters that protect the motor for power surges, phase imbalances, and amperage spikes.
 - Because the motor control drive receives power input from the utility line before sending power to the compressor, the drive acts as a shield to protect the compressor from harmful power spikes. Additionally, the drive is constantly monitoring and adjusting the power required from the compressor motor to ensure optimal compressor and system operation. For example, if the drive senses an unusual torque load on the motor because of adverse conditions that can lead to failure, it will reduce power to the compressor and proactively prevent it from damage.

- ECM (Electronic Computed Motor) - the latest development in the industry for condenser fan motors. This is the quietest, most efficient, and most reliable motor technology in the industry.
- Elimination of small copper refrigerant capillary tubes from a mechanical expansion valve or pressure controls that can fail over time from vibration.
 - Mechanical pressure controls, switches, and valves need a pressure to actuate a mechanical diaphragm. A capillary tube brazed into the line measuring this pressure running back to the device is needed to actuate the diaphragm. With the solid state electrical switches, transducers and valves, this is not needed anymore.
- Stainless steel brazed plate evaporators that will not rust and have less chance of fouling due to its inherent small channels producing high velocities keeping the channels clear.
- Microchannel aluminum condenser coils – the latest technology in the industry that eliminates the galvanic corrosion due to dissimilar metals typically seen with copper tube and aluminum fins coils.
- Cleanable condenser air inlet filters to protect the condensers from dust and debris.
- Cleanable evaporator strainer to protect the evaporator channels from clogging due to larger particulate from the process.
- Refrigerant filter/drier.
- All non-ferrous chilled water piping that will not rust.

Features

- Better temperature control - within 0.5 °F precision
 - Better temperature control is achieved since we are using a variable speed compressor, electronic expansion valve, and variable speed condenser fan that work together to precisely tune the system to the process load.
- Adaptive control - the compressor speed will be adjusted to prevent a shutdown should it approach an alarm condition
 - Adaptive control is very important because the system continues to operate at reduced capacity but will not shut down. Any customer would prefer the chiller stays running so his process can continue and doesn't suffer downtime and lost production. The status would be reported as a warning on the screen and potentially an e-mail notification or text message that the system needs service. The issue would be indicated on the screen with a short troubleshooting message.
- Data Collection: the system collects a vast set of data points through digital sensors which includes but is not limited to: suction and discharge pressures and temperatures, entering and leaving water temperatures, tank level, pump pressure, drive output, fan output, pump status, compressor amps, volts, phase monitoring, and all alarms.
- Remote communication option
 - Communicate to the chiller through Modbus back to a building management system or PLC.
 - Communicate via the internet (Cloud) all information from the chiller back to a remote PC, tablet, or phone.
 - Receive text messages or e-mail alerts for alarm faults or warnings.
 - Capture and receive logged data of all of the temperature and pressure diagnostics.
 - Capture and receive all active alarms and alarm history.
- Interface
 - Standard 8 line x 20 character LCD display that displays Chiller in and out temperatures, pump pressure, tank level, refrigerant pressures and temperatures, and alarms.
 - Status indication of compressor, expansion valve, pump, and fan.
 - Chiller capacity and power usage.

- Alarm light indication.
- Alarm silence button.
- Set point adjustment.
- Optional touch screen display.
- Solid sheet metal design with tool-less cabinet access through lift-off side panels.

Energy Savings

A chiller equipped with a fixed speed compressor controls the temperature of the water traditionally with simple on/off of the compressor. This means that when the compressor runs, it runs at the designed load regardless of the process needs. A more advanced option is a hot gas bypass which technically keeps the chiller running but bypasses the hot gas if no cooling load is needed. This avoids the on/off of the compressor but results in a waste of energy since no cooling is required from the process.

The Delta T Systems chiller with the variable speed compressor operates effectively between 10% and 100% of the capacity which means a 10ton chiller can operate efficiently as a 1 ton as well as up to a 10ton chiller.

The Air Conditioning, Heating, and Refrigeration Institute (AHRI) conducted several studies to identify the true amount of time a chiller runs at full vs. partial load. The outcome is an integrated part load value (IPLV). The national average cost for electricity is \$0.14/kw-hr. If you assume a 2 shift operation, 5 days a week for one year, the energy savings for a 10 ton chiller are \$2,900 or 46% less than a chiller with a fixed speed compressor. These energy cost savings can pay for a chiller in less than 3 years.

These conservatively calculated energy savings can be much higher because most chillers are selected based on the peak usage time of the year which means the chiller is oversized for the average usage.

The chiller will go into production early July and will be available in 7 models from 1 ton to up to 15 tons of cooling capacity. The new design for larger systems will follow shortly.

About Delta T Systems

Delta T Systems, located in Richfield, WI, has dedicated itself to one single discipline, process temperature control. Since 1990, Delta T Systems has helped production systems run more efficiently, thanks to our 160 years of combined experience, knowledge, and engineering know-how.

Delta T Systems manufactures Water and Oil Temperature Control Equipment, as well as, portable air and water-cooled Chillers. Our full line of system solutions are available in many sizes to fit all process needs, with temperature control ranges from 20°F (7°C) up to 650°F (343°C). Incorporating sound fundamental engineering principles ensures that customers receive accurate and reliable temperature control and years of unmatched performance. Delta T Systems, American made, high quality units are competitively priced and will perform to spec for a wide variety of industries and applications.

To better serve our extensive customer base, Delta T Systems has launched a secure, mobile responsive and user friendly e-commerce website for our replacement parts business. Visit www.deltatparts.com

For more information about Delta T Systems please visit our corporate website at www.deltatsys.com