THERMAL CARE
PiovanGroup

Product Catalog

TCFW375 Centrifugal Variable-Speed Central Chillers

Contents

Standard Features

Variable Speed Compressor
Direct-drive variable speed centrifugal compressor technology continuously adjusts speed to match load to reduce operating costs.

Magnetic Bearing
A magnetic field levitates the drive shaft and eliminates the friction of conventional bearings for higher efficiencies and an oil-free refrigeration system.

Integral Variable Speed Drive
High-efficiency brushless DC motor with built-in variable speed drive technology is refrigerant cooled, compact, and energy efficient.

Soft-Start
The variable speed drive limits soft-starts to 2 amps inrush current per compressor to reduce peak energy demand and extend compressor motor life.

Low Noise Operation
The magnetic bearings keep the drive shaft in position under high-speed operation for virtually no structural vibration and low noise.

Low Global Warming Potential (GWP)
513A Class A refrigerant, low toxicity and low flammability.

Opteon™

OFFICIAL REFRIGERANT SOLUTION OF THE NHL®

Rotary Circuit Breaker
A through-the-door rotary circuit breaker allows easy maintenance of a compressor.

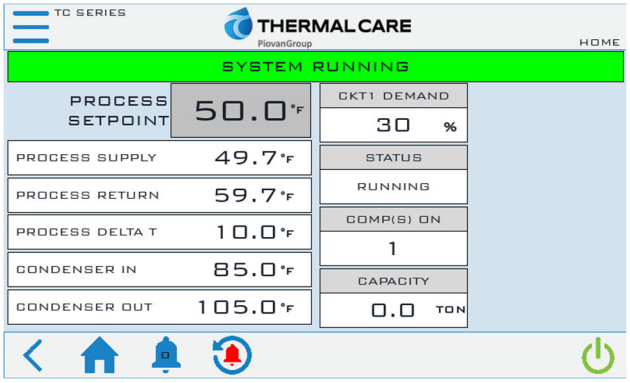
C-UL 508A Industrial Control Panel
Every chiller has a C-UL label certifying our panel design and components comply with C-UL 508A standards ensuring the panels are safe and consistent for reliable operation.

Hybrid Film Evaporator
Advanced design provides the most efficient heat transfer while minimizing the refrigerant charge requirement, which results in a compact, extremely energy-efficient unit. Standard with both ASME and CRN certifications.

Slim Footprint
Unit has a slim design and can fit through a 34" opening.

Modular Expandable System
Our modular system allows for flexible system design and provides for system expansion to over 300 tons using up to six chillers.

Advanced Controls with Color Touch-Screen
7-inch color touch-screen shows chiller operation for quick and easy monitoring and control of the system. Our advanced PLC system can control up to six chillers.



Standard PLC Home Screen

CONNEX4.0 Ready Controls
Every chiller is equipped with an Ethernet port and is fully compatible with the CONNEX4.0 plant-wide equipment control and monitoring system.

Warranty
1 year entire unit parts
1 year labor

Available Option

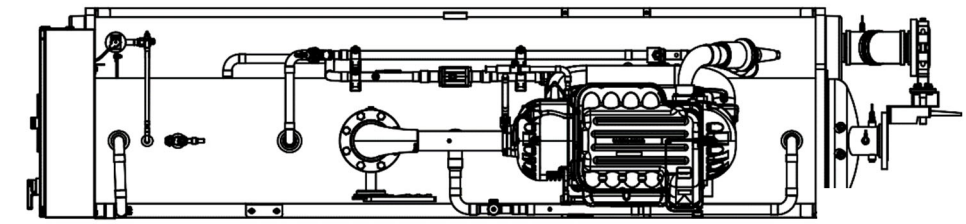
BACnet Communications Port
Adds a ModBUS to BACnet gateway wired to a RS-485 connector on the control panel.

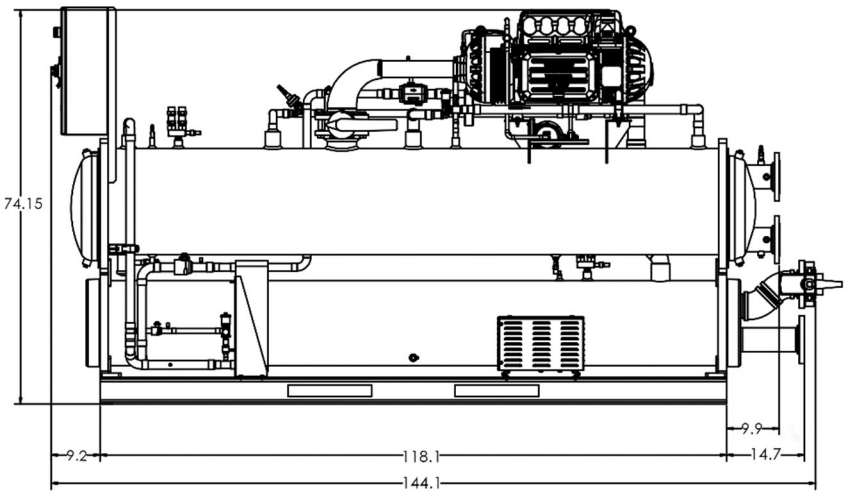
Physical and Electrical Data

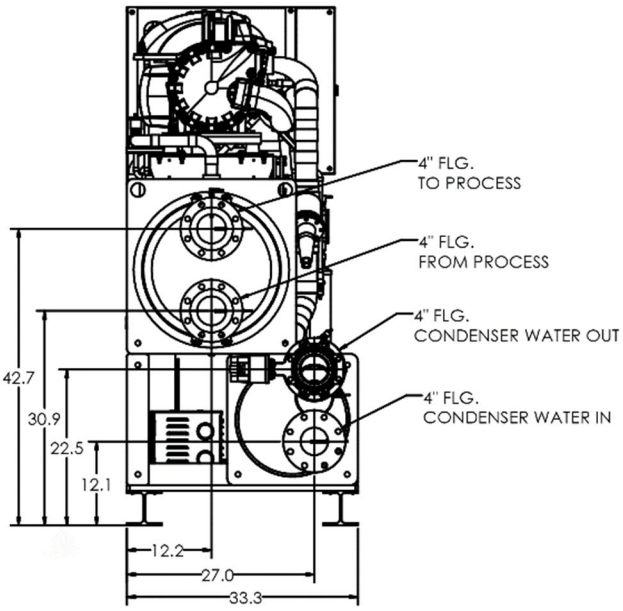
Water Cooled Condenser Single-Circuit Chillers Physical Data

	TCFW375S
Cooling Capacity Range (ton)	45 to 55
Nominal Capacity (ton)[1]	50
Set Point Range (°F)	10 to 55
Intended Operating Range (°F)	10 to 15
Compressor (qty)	1
Process Fluid	40% ethylene glycol
Evaporator Flow @ 10°F / 15°F	467 gpm / 427 gpm
Shipping Weight (lbs)	6,000
Operating Weight (lbs)	5,600
MCA @ 460/3/60 (amps)[2]	230
MOP @ 460/3/60 (amps)[3]	400

[1]Cooling capacity when cooling water with 13°F set point, 16°F return, 85°F condenser water, R513A refrigerant.
[2]MCA is Minimum Circuit Amps under full load, used for minimum wire size requirement.
[3]MOP is Maximum Overcurrent Protection, used for sizing main power protection device.







Application Considerations

When designing a chilled water system it is important all aspects of the system are considered to ensure steps are taken to provide stable and reliable operation. The following provides some general guidelines for designing a system.

Foundation

Install the unit on a rigid, non-warping mounting pad, concrete foundation, or floor suitable to support the operating weight of the chiller. Level the chiller within ¼ inch over its length and width.

Chiller Unit Location

In general, locate the unit in an area that will not rise above 95°F.

To ensure proper airflow and clearance space for proper operation and maintenance allow a minimum of 36 inches of clearance between the sides of the equipment and any walls or obstructions. Avoid locating piping or conduit over the unit to ensure easy access with an overhead crane or lift to lift out heavier components during replacement or service. In addition, ensure the condenser and evaporator refrigerant pressure relief valves can vent in accordance with all local and national codes.

Process Fluid Piping

Proper insulation of chilled process fluid piping is crucial to prevent condensation. The formation of condensation adds a substantial heat load to the chiller.

The importance of properly sized piping cannot be overemphasized. See the ASHRAE Fundamentals Handbook or other suitable design guide for proper pipe sizing. Avoid long lengths of hoses, quick disconnect fittings, and manifolds wherever possible as they offer high resistance to water flow. When manifolds are required, install them as close to the use point as possible. Provide flow-balancing valves at each machine to assure adequate water distribution in the entire system.

Process Fluid Temperature

The chiller has an intended operating range of 10°F to 15°F and a set point range of 10°F to 55°F. Under normal operation, the entering water temperature should not exceed 80°F; however, the chiller can start and operate short-term with entering fluid temperatures up to 90°F to allow the chiller to pull down the temperature of a reservoir or process fluid loop on start-up.

Process Fluid Flow

The nominal flow rates of the chiller are 467 gpm of 40% ethylene glycol @ 10°F setpoint with a 16 psi pressure drop and 427 gpm of 40% ethylene glycol @ 15°F set point with a 12 psi pressure drop.

Condenser Water Temperature and Flow

The chiller includes a factory mounted condenser water-regulating valve to regulate condenser water flow to maintain the proper refrigerant pressures. The nominal design is for 220 gpm of 40% ethylene glycol or water @ 85°F entering the condenser with a 10 psi pressure drop. The chiller will start and operate with inlet water temperatures between 55°F and 95°F. The actual flow requirements will vary.

System Fluid Chemistry Requirements

Chillers at their simplest have two main heat exchangers: one absorbs the heat from the process (evaporator) and one removes the heat from the chiller (condenser). These, as are all heat exchangers, are susceptible to fouling of heat transfer surfaces due to scale or debris. Fouling of these surfaces reduces the heat-transfer surface area while increasing the fluid velocities and pressure drop through the heat exchanger. All of these effects reduce the heat transfer and affect the efficiency of the chiller.

The complex nature of fluid chemistry requires a specialist to evaluate and implement appropriate sensing, measurement and treatment needed for satisfactory performance and life. Recommendations may include filtration, monitoring, treatment and control devices. With the ever-changing regulations on usage and treatment chemicals, the information is usually up-to-date when a specialist in the industry is involved.

CAUTION: When your application requires the use of glycol, use industrial grade glycol specifically designed for heat transfer systems and equipment. Never use glycol designed for automotive applications. Automotive glycols typically have additives engineered to benefit the materials and conditions found in an automotive engine; however, these additives can gel and foul heat exchange surfaces and result in loss of performance or even failure of the chiller. In addition, these additives can react with the materials of the pump shaft seals resulting in leaks or premature pump failures.

WARNING: Ethylene Glycol is flammable at higher temperatures in a vapor state. Carefully handle this material and keep away from open flames or other possible ignition sources.