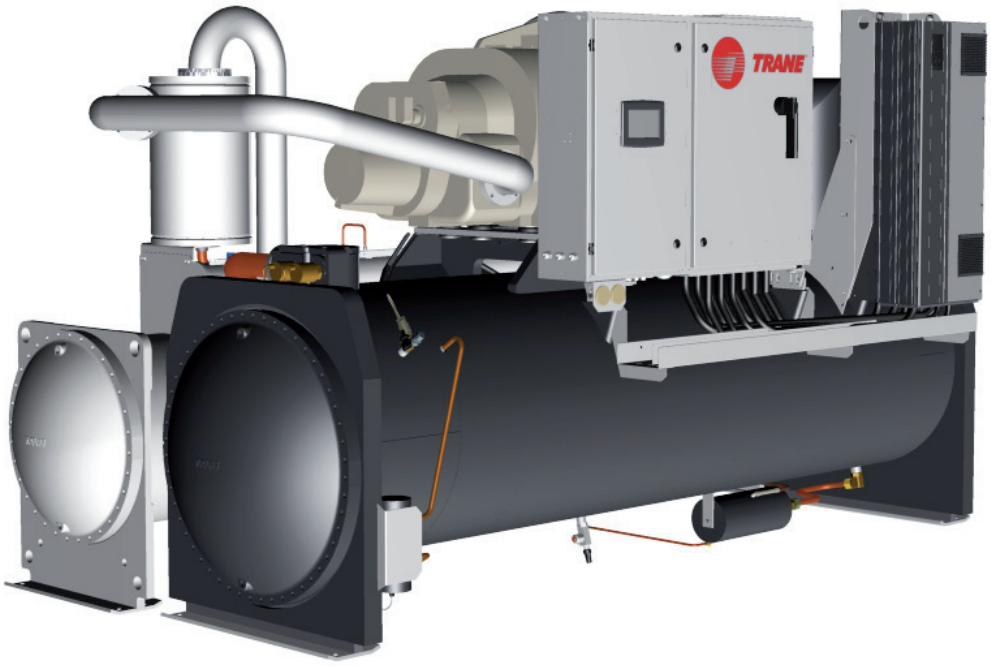
RTHD evo
SE/HE/XE/HSE

Water-cooled helical-rotary liquid chillers
500-1500 kW



RTHD evo

RLC-PRC045A-E4

Introduction

Trane offers water-cooled helical rotary compressor chillers, the model RTHD Evo.

The industrial-grade design of this helical rotary chiller is ideal for both industrial and commercial markets, in applications such as office buildings, hospitals, schools, retail buildings, and industrial facilities.

The model RTHD Evo features:

- High energy efficiency
- High reliability
- Bolt together construction
- R134a refrigerant
- "Adaptive Control™ "
- Tracer UC800 controls enable:
  - Scrolling access to inputs and operating information touch screen TD7
  - Freedom from interoperability concerns with LonMark® communications
  - Job specific communication options that allow greater reporting flexibility, through BACnet and Modbus protocols, integrated on Tracer UC800 chiller controller.
- Improved startup temperature capabilities and reduced sensitivity to condenser water temperatures alleviate the most common startup concerns
- Removed Liquid Vapor Separator, providing lighter unit weight and simplified refrigerant piping, for less expensive handling, separation, and installation

With its extensive compressor development and manufacturing experience, Trane designs and build chillers with a higher efficiency and reliability than the units available on today's market.

The linear unloading compressor, wide operating temperature range, advanced controls, electronic expansion valve, short anti-recycle timers, and industry-leading efficiencies mean that this Trane chiller is the perfect choice for tight temperature control in almost any application temperatures, and under widely varying loads.

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Features and Benefits

Application Versatility and High Performance

- Screw compressor technology and the electronic expansion valve provide reliable performance in an expanded range of operating temperatures.
- Tight water temperature control extends to operation of multiple chillers in parallel or series configurations, offering further system design flexibility for maximum efficiency.
- Advanced design enables chilled water temperature control to +/- 0.28°C for flow changes up to 10% per minute, plus handling of flow changes up to 30% per minute for comfort cooling.
- Two-minute stop-to-start and five-minute start-to-start anti-recycle timer allows tight chilled water temperature control in constant or transient low-load applications.
- LonMark communications capability provides excellent, trouble-free interoperability.
- Generic Building Automation System points are available for easy access to operation information, as well, as BACnet and Modbus communication capabilities, already integrated on Tracer UC800 chiller controller.

Industrial/Low Temperature Process Cooling

Excellent operating temperature range and precise control capabilities enable tight control with single chiller or series configuration.

Ice/Thermal Storage - Specifiers and operators benefit from dual setpoint control and industry-leading temperature, efficiency, and control capabilities, that minimize design time and energy costs.

LONMARK® SPONSOR

Simple, Economical Installation

- Compact size makes the model RTHD Evo well suited for the retrofit and replacement market.
- All units fit through standard double-width doors.
- Bolt-together construction makes for fast, easy unit disassembly.
- Small RTHD Evo footprint saves valuable equipment room space and alleviates access concerns for most retrofit jobs.
- Light weight design simplifies rigging requirements, further reducing installation time requirements and costs.
- Full factory refrigerant or nitrogen and oil charges reduce required field labor, materials, and installation cost.
- Only evaporator and condenser water piping is required; no starter water cooling (with its associated safety concerns) or field piping is necessary.
- Oil cooler and purge system connections have been eliminated.
- Simple power connection simplifies overall installation.
- SE, HE, and XE versions are supplied with unit mounted and factory tested, Star-Delta starter, eliminating additional job site installation considerations and labor requirements.
- HSE versions (Adaptive Frequency Drive) make the compressor start through the AFD, minimizing the start amp up to 25% of the inrush current.
- Trane has conducted extensive factory testing, and also offers options for in-person and/or documented system performance verification.
- Tracer UC800 controls easily interface with Tracer Summit™ building automation systems through single twisted-pair wire.

Features and Benefits: Control System

Superior Control with Tracer™ UC 800 Chiller Controls

The Adaptive Control™ microprocessor system enhances the RTHD Evo chiller by providing the very latest chiller control technology. With the Adaptive Control microprocessor, unnecessary service calls and unhappy tenants are avoided. The unit does not nuisance-trip or unnecessarily shut down. Only when the Tracer chiller controls have exhausted all possible corrective actions and the unit is still violating an operating limit, will the chiller shut down. Controls on other equipment typically shut down the chiller, usually just when it is needed the most.

UC 800 optimization software controls operation of the required equipment and accessories to easily move from one mode of operation to another. For example: even with ice-storage systems, there are numerous hours when ice is neither produced nor consumed, but saved. In this mode, the chiller is the sole source of cooling. For example, to cool the building after all ice is produced but before high electric al- demand charges take effect, UC 800 sets the chiller leaving- fluid set point to its most efficient setting and starts the chiller, chiller pump, and load pump.

When electrical demand is high, the ice pump is started and the chiller is either demand limited or shut down completely. UC 800 controls have the intelligence to optimally balance the contribution of the ice and the chiller in meeting the cooling load.

The capacity of the chiller plant is extended by operating the chiller and ice in tandem. UC 800 rations the ice, augmenting chiller capacity while reducing cooling costs. When ice is produced, UC 800 will lower the air-cooled chiller leaving-fluid set point and start the chiller, ice and chiller pumps, and other accessories. Any incidental loads that persist while producing ice can be addressed by starting the load pump and drawing spent cooling fluid from the ice storage tanks.

For specific information on ice storage applications, contact your local sales office.

Control options

BACnet™ communications interface

Allows the user to easily interface with BACnet via a single twisted pair wiring to a factory installed and tested communication board.

LonTalk™ (LCI-C) Communications Interface

Provides the LonMark chiller profile inputs/outputs for use with a generic building automation system via a single twisted pair wiring to a factory installed and tested communication board.

ModBus™ Communications Interface

Allows the user to easily interface with ModBus via a single twisted pair wiring to a factory installed and tested communication board.

External chilled water setpoint

UC800 accepts either a 2-10 VDC or a 4-20mA input signal, to adjust the chilled water setpoint from a remote location.

External current limit setpoint

UC800 accepts either a 2-10VDC or a 4-20mA input signal to adjust the current limit setpoint from a remote location.

Ice making contact

UC800 provides an output contact closure that can be used as a signal to the system that ice building is in operation. This relay will be closed when ice building is in progress and open when ice building has been terminated by either UC800 or the remote interlock. It is used to signal the system changes required to convert to and from ice making.

Tracer UC800 Controller

Today's RTHD Evo chillers offer predictive controls that anticipate and compensate for load changes. Other control strategies made possible with the Tracer UC800 controls are:

Feedforward Adaptive Control

Feedforward is an open-loop, predictive control strategy designed to anticipate and compensate for load changes. It uses evaporator entering-water temperature as an indication of load change. This allows the controller to respond faster and maintain stable leaving-water temperatures.

Soft Loading

The chiller controller uses soft loading except during manual operation. Large adjustments due to load or setpoint changes are made gradually, preventing the compressor from cycling unnecessarily. It does this by internally filtering the setpoints to avoid reaching the differential-to-stop or the demand limit. Soft loading applies to the leaving chilled-water temperature and demand limit setpoints.

Features and Benefits

Adaptive Controls

There are many objectives that the controller must meet, but it cannot satisfy more than one objective at a time. Typically, the controllers primary objective is to maintain the evaporator leaving water temperature.

Whenever the controller senses that it can no longer meet its primary objective without triggering a protective shutdown, it focuses on the most critical secondary objective. When the secondary objective is no longer critical, the controller reverts to its primary objective

Rapid Restart

The controller allows the chiller to perform a Rapid Restart. A Rapid Restart is performed after a momentary power loss if it occurs during operation. Similarly, if the chiller shuts down on a non-latching diagnostic and the diagnostic later clears itself, a Rapid Restart will be initiated.

AdaptiSpeed Control

The speed control is now optimized mathematically and controlled simultaneously. The increased performance of the UC800 controller allows the chiller to operate longer at higher efficiency, and with greater stability.

Variable-Primary Flow (VPF)

Chilled-water systems that vary the water flow through chiller evaporators have caught the attention of engineers, contractors, building owners, and operators. Varying the water flow reduces the energy consumed by pumps, while having limited effect on the chiller energy consumption. This strategy can be a significant source of energy savings, depending on the application.

TD7 Operator Interface

The standard TD7 display provided with the Trane UC800 controller features a 7" LCD touch-screen, allowing access to all operational inputs and outputs. This is an advanced interface that allows the user to access any important information concerning setpoints, active temperatures, modes, electrical data, pressure, and diagnostics.

Display Features Include:

- Factory-mounted above the control panel door
- UV Resistant touchscreen
- -40°C to 70°C Operating temperature
- IP56 rated
- CE certification
- Emissions:EN55011 (Class B)
- Immunity:EN61000 (Industrial)
- 7" diagonal
- 800x480 pixels
- TFT LCD @ 600 nits brightness
- 16 bit color graphic display

Display features:

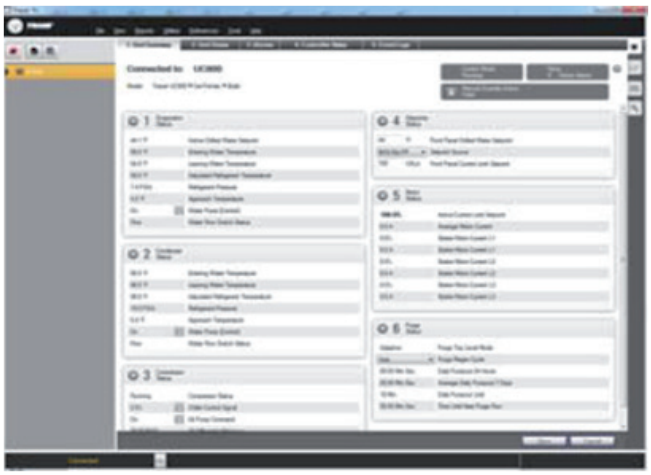
- Alarms
- Reports
- Chiller settings
- Display settings
- Graphing
- Support for 15 languages

Tracer TU Interface

Tracer TU (n on-Trane personnel, contact your local Trane office for software) adds a level of sophistication that improves service technician effectiveness and minimizes chiller downtime. The portable PC-based service-tool software, Tracer TU, supports service and maintenance tasks. Tracer TU serves as a common interface to all Trane® chillers, and will customize itself based on the properties of the chiller with which it is communicating. Thus, the service technician learns only one service interface. The panel bus is easy to troubleshoot using LED sensor verification. Only the defective device is replaced. Tracer TU can communicate with individual devices or groups of devices. All chiller status, machine configuration settings, customizable limits, and up to 100 active or historic diagnostics are displayed through the service-tool software interface. LEDs and their respective Tracer TU indicators visually confirm the availability of each connected sensor, relay, and actuator. Tracer TU is designed to run on a customer's laptop, connected to the Tracer AdaptiView control panel with a USB cable. Your laptop must meet the following hardware and software requirements: • 1 GB RAM (minimum) • 1024 x 768 screen resolution • CD-ROM drive • Ethernet 10/100 LAN card • An available USB 2.0 port • Microsoft® Windows® XP Professional operation system with Service Pack 3 (SP3) or Windows 7 Enterprise or Professional operating system (32-bit or 64-bit) • Microsoft .NET Framework 4.0 or later

Note: *Tracer TU is designed and validated for this minimum laptop configuration. Any variation from this configuration may have different results. Therefore, support for Tracer TU is limited to only those laptops with the configuration previously specified.*

Tracer TU Interface



System Integration

Stand-Alone Controls

Single chillers installed in applications without a building management system are simple to install and control: only a remote auto/stop for scheduling is required for unit operation. Signals from the chilled-water pump contactor auxiliary, or a flow switch, are wired to the chilled-water flow interlock. Signals from a time clock or some other remote device are wired to the external auto/stop input.

- Auto/Stop-A job-site provided contact closure turns the unit on and off.
- External Interlock-A job-site provided contact opening wired to this input turns the unit off and requires a manual reset of the unit microcomputer. This closure is typically triggered by a job-site provided system such as a fire alarm.

Features and Benefits

Hardwire Points

Microcomputer controls allow simple interface with other control systems, such as time clocks, building automation systems, and ice storage systems via hardwire points. This means you have the flexibility to meet job requirements while not having to learn a complicated control system. Remote devices are wired from the control panel to provide auxiliary control to a building automation system. Inputs and outputs can be communicated via a typical 4–20 mA electrical signal, an equivalent 2–10 V dc signal, or by utilizing contact closures. This setup has the same features as a stand-alone water chiller, with the possibility of having additional optional features:

- Ice making control.
- External chilled water setpoint, external demand limit setpoint
- Chilled water temperature reset.
- Programmable relays - available outputs are: alarm-latching, alarm-auto reset, general alarm-warning, chiller limit mode, compressor running, and Tracer control.

BACnet Interface

Tracer TD7 control can be configured for BACnet communications at the factory or in the field. This enables the chiller controller to communicate on a BACnet MS/TP network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled through BACnet. Tracer TD7 controls conforms to the BACnet B-ASC profile as defined by ASHRAE 135-2004.

LonTalk Communications Interface (LCI-C)

The optional LonTalk® Communications Interface for Chillers (LCI-C) is available factory or field installed. It is an integrated communication board that enables the chiller controller to communicate over a LonTalk network. The LCI-C is capable of controlling and monitoring chiller setpoints, operating modes, alarms, and status. The Trane LCI-C provides additional points beyond the standard LONMARK® defined chiller profile to extend interoperability and support a broader range of system applications. These added points are referred to as open extensions. The LCI-C is certified to the LONMARK Chiller Controller Functional Profile 8040 version 1.0, and follows LonTalk FTT-10A free topology communications.

Modbus Interface Tracer TD7 control can be configured for Modbus communications at the factory or in the field. This enables the chiller controller to communicate as a slave device on a Modbus network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled by a Modbus master device.

Tracer Summit

The chiller plant control capabilities of the Trane Tracer Summit™ building automation system are unequaled in the industry. Trane's depth of experience in chillers and controls makes us a well-qualified choice for automation of chiller plants using air-cooled chillers. Our chiller plant automation software is fully pre-engineered and tested.

Required features:

- LonTalk/Tracer Summit Interface (selectable option with chiller)
- Building Control Unit (external device required)
- Sequences starting of chillers to optimize the overall chiller plant energy efficiency
  - Individual chillers operate as base, peak, or swing based on capacity and efficiency
  - Automatically rotates individual chiller operation to equalize runtime and wear between chillers
  - Evaluates and selects the lowest energy consumption alternative from an overall system perspective.
- Regulatory Compliance Documentation
- Gathers information and generates the reports mandated in ASHRAE Guideline 3.
- Easy Operation and Maintenance
- Remote monitoring and control
- Displays both current operation conditions and scheduled automated control actions
- Concise reports assist in planning for preventative maintenance and verifying performance

Alarm notification and diagnostic messages aid in quick and accurate troubleshooting

Reliability and Ease of Maintenance

- Direct drive, low-speed compressor - a simple design with only 3 moving parts - provides maximum efficiency, high reliability, and low maintenance requirements.
- Electronic expansion valve, with fewer moving parts than alternative valve designs, offers highly reliable operation.
- Suction gas-cooled motor stays uniformly cool at lower temperatures for longer motor life.
- The Trane helical rotary compressor is a proven design resulting from years of research and thousands of test hours, including extensive testing under extraordinarily severe operating conditions.
- Trane is the world's largest manufacturer of large helical rotary compressors, with tens of thousands of commercial and industrial installations worldwide demonstrating a reliability rate of greater than 99% in the first year of operation.

Operating and Life Cycle Cost-Effectiveness

- Electronic expansion valve enables exceptionally tight temperature control and extremely low superheat, resulting in more efficient full-load and part-load operation than previously available.
- Precise compressor rotor tip clearance ensures optimal efficiency.
- Condenser and evaporator tubes use the latest heat transfer technology for increased efficiency.
- RTHD includes standard electrical demand limiting.
- Chilled water reset based on return water temperature is standard.
- High compressor lift capabilities and tight chilled water temperature control allow highly efficient system design with minimal operational concerns.

Application Considerations

Condenser Water Regulation

The Condenser and Differential pressure options provide 2-10Vdc/4-20mA (maximum range -a smaller range is adjustable) output interface to the customer's condenser water flow device. This option enables the Tracer UC800 controls to send a signal for opening and closing a 2-way or 3-way valve as necessary to maintain chiller differential pressure.

Methods other than those shown can be employed to achieve the same results. Contact your local Trane office for details.

Throttling valve

This method maintains condensing pressure and temperature by throttling water flow leaving the condenser in response to condenser pressure or system differential pressures.

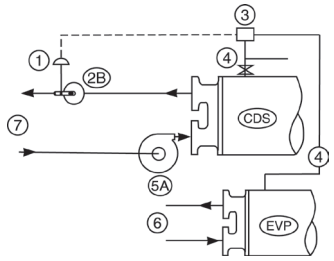
Advantages:

- Good control with proper valve sizing at relatively low cost.
- Pumping cost can be reduced.

Disadvantages:

- Increased rate of fouling due to lower condenser water velocity.
- Requires pumps that can accommodate variable flow.

Figure 1



Cooling tower bypass

Tower bypass is also a valid control method if the chiller temperature requirements can be maintained.

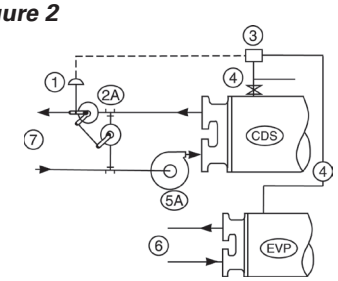
Advantage:

- Excellent control by maintaining constant water flow through the condenser.

Disadvantage:

- Higher cost because of the dedicated pump required for each chiller if condenser pressure is the control signal.

Figure 2



Condenser water pump with variable frequency drive

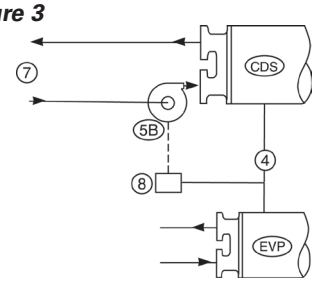
Advantages:

- Pumping cost can be reduced.
- Good tower temperature control.
- Relatively low first cost.

Disadvantage:

- Increased rate of fouling due to lower water velocity in the condenser.

Figure 3



1 = Electric or pneumatic valve actuator

2A = 3-way valve or 2 butterfly valves

2B = 2 butterfly valves

3 = RTHD Evo controller

4 = Refrigerant pressure line

5A = Condenser water pump

5B = Condenser water pump with VFD

6 = To/from cooling load

7 = To/from cooling tower

8 = Electric controller

Variable Evaporator Flow and Short Evaporator Water Loops

Variable evaporator flow is an energy-saving design strategy which has quickly gained acceptance as advances in chiller and controls technology have made it possible. With its linear unloading compressor design and advanced Tracer UC800 controls, the RTHD Evo has excellent capability to maintain leaving water temperature control within +/- 0.28°C, even for systems with variable evaporator flow and small chilled water volumes.

Some basic rules should be followed whenever using these system design and operational savings methods with the RTHD Evo. The proper location of the chilled water temperature control sensor is in the supply (outlet) water. This location allows the building to act as a buffer, and it assures a slowly changing return water temperature. If there is insufficient water volume in the system to provide an adequate buffer, temperature control can be lost, resulting in erratic system operation and excessive compressor cycling. To ensure consistent operation and tight temperature control, the chilled water loop should be at least 2 minutes. If this recommendation cannot be followed, and tight leaving water temperature control is necessary, a storage tank or larger header pipe should be installed to increase the volume of water in the system.

For variable primary flow applications, the rate of chilled water flow change should not exceed 10% of design per minute to maintain +/- 0.28°C leaving evaporator temperature control.

For applications in which system energy savings is most important and tight temperature control is classified as +/-1.1°C, up to 30% changes in flow per minute are possible. Flow rates should be maintained between the minimum and maximum allowed for any particular chiller configuration.

Series Chiller Arrangements

Another energy-saving strategy is to design the system around chillers arranged in series, on the evaporator, condenser, or both. The actual savings possible with such strategies depends on the application dynamics and should be researched by consulting your Trane Systems Solutions Representative and applying the Trane System Analyzer program. It is possible to operate a pair of chillers more efficiently in a series chiller arrangement than in a parallel arrangement. It is also possible to achieve higher entering-to-leaving chiller differentials, which may, in turn, provide the opportunity for lower chilled water design temperature, lower design flow, and resulting installation and operational cost savings. The Trane screw compressor also has excellent capabilities for «lift», which affords an opportunity for savings on the evaporator and condenser water loops.

Like series arrangements on the evaporator, series arrangements on the condenser may enable savings. This approach may allow reductions in pump and tower installation and operating costs. Maximizing system efficiency requires that the designer balance performance considerations for all system components; the best approach may or may not involve multiple chillers, or series arrangement of the evaporators and/or condensers. This ideal balance of design integrity with installation and operating cost considerations can also be obtained by consulting a Trane representative and applying the Trane System Analyzer program.

Water Treatment

The use of untreated or improperly treated water in chillers may result in scaling, erosion, corrosion, and algae or slime buildup. It is recommended that the services of a qualified water treatment specialist be engaged to determine what treatment, if any, is advisable. Trane assumes no responsibility for the results of using untreated or improperly treated water.

Application Considerations

Water Pumps

Where noise limitation and vibration-free operation are important, Trane strongly encourages the use of 1450-rpm (50 Hz) pumps. Specifying or using 3000-rpm (50 Hz) condenser water and chilled water pumps must be avoided, because such pumps may operate with objectionable levels of noise and vibration. In addition, a low frequency beat may occur due to the slight difference in operating rpm between 3000-rpm (50 Hz) water pumps and chiller motors.

Important Note: The chilled water pump must not be used to stop the chiller.

Acoustic Considerations

Refer to the Engineering Bulletin RLC-PRB006 regarding Sound Data/Installation Guide for Noise-Sensitive Applications for Trane water-cooled helical-rotary chillers. Using the information provided in this bulletin, contact a certified sound consultant to aid in proper mechanical room design and treatment

Sound data given data in accordance with ISO 3746-1996.

Performance

We strongly recommend to our customers to contact, local Trane Sales Office, to get accurate computer selection performances at the project operating conditions.

Dimensional Drawings

The dimensional drawings illustrate overall measurements of the unit. Also shown are the service clearances required to easily service the RTHD Evo chiller. All catalog dimensional drawings are subject to change. Current submittal drawings should be referred to for detailed dimensional information. Contact the sales office for submittal information.

Electrical Data Tables

Compressor motor electrical data is shown in the data section for each compressor size. Rated load amperes (RLA), locked rotor Star-Delta amperes (LRAY), the power factor for standard voltages for all 50 Hz, 3-phase motors are shown. The RLA is based on the performance of the motor developing full rated horsepower. A voltage utilization range is tabulated for each voltage listed.

Evaporator and Condenser Pressure Drop

Pressure drop data is determined by the RTHD selection program.

Unit Model Number

Digit 1-2-3-4: Chiller series RTHD

Digit 5: Factory
E = Europe

Digit 6-7: Unit size
B1-B2-C1-C2-D1-D2-D3-E3

Digit 8: Main power voltage
R: 380V/50Hz/3Ph +/-5%
T: 400V/50Hz/3Ph +/-10%
U: 415V/50Hz/3Ph +/-5%

Digit 9: Special order
X: Standard Configuration
S: Special order feature

Digit 10-11: Design Sequence
L = L0

Digit 12 : Agency listing
C = CE Listing

Digit 13: Pressure vessel approval
P: PED (Pressure equipment directive)
S: Special

Digit 14-15: Evaporator size
B1-C1-D1-D2-D3-D4-D5-D6-E1-F1-F2-G1-G2-G3

Digit 17: Evaporator water passes
2: 2 passes
3: 3 passes
4: 4 passes
6: 6 passes

Digit 18: Evaporator water connection
L: Left hand
R: Right hand

Digit 19: Evaporator connection type
A: standard grooved pipes
B: grooved pipes + coupling

Digit 20: Evaporator waterside pressure
L: EVP 10 bar
H: EVP 21 bar

Digit 21-22: Condenser size
B1-D1-E1-E2-E3-E4-E5-F1-F2-F3-G1-G2-G3

Digit 23: Condenser tube type
A: Enhanced fin - copper
B: Smooth bore - copper
C: Smooth bore - 90/10 Cu/Ni

Digit 24: Condenser water passes
2: 2 passes

Digit 25: Condenser water connection
L: Left hand
R: Right hand

Digit 26: Condenser connection type
A: Standard grooved pipes
B: Standard grooved pipes + coupling

Digit 27: Condenser waterside pressure
L: CDS 10 bar
H: CDS 21 bar

Digit 28: Condenser leaving water temperature
A: Standard T < or = 45°C
B: HI 45 <T < or = 50°C

Digit 29: Refrigerant specialties
X: Without
G: Gauges
V: Isolation valves
B: V+G

Digit 30: Oil cooler
X: Without
C: With

Digit 31: Thermal insulation
X: Without
Q: Cold parts

Digit 32: Sound Attenuator
X = Without

Digit 33: Documentation language
C: Spanish
D: German
E: English
F: French
H: Dutch
I: Italian
M: Swedish
P: Polish
R = Russian
T: Czech
U: Greek
V: Portuguese
6 = Hungarian
8 = Turkish

Digit 34: Safety devices
X: Standard
B: Dual safety valves
A: B + rupture disc

Digit 35: Refrigerant charge
A: Full factory charge (R134a)
B: Nitrogen (No oil)
C: Holding charge (R134a)

Digit 36: Shipping package
A: Domestic
E: SEI class 3
F: SEI class 4a
G: SEI class 4c

Digit 37: Flow switch
X: Without
A: Evaporator
B: Evaporator + condenser

Unit Model Number

Digit 38: Factory test
A: Functional test
B: Customer inspection
C: Witness test
D: Performance test with report
X : Without

Digit 39: Starter type
B: AFD (Adaptive Frequency Drive)
C: AFD + AHF (Adaptive Frequency Drive + Advanced Harmonic Filters)
Y: Star-delta closed transition starter

Digit 40-41-42: Motor RLA
233: Amperes
349: Amperes
455: Amperes
488: Amperes

Digit 43: Power line connection type
A: Terminal block
B: Disconnect switch (No fuses)
D: Circuit breaker
K: Disconnect switch and fuses

Digit 44: Electrical protection
B: Dead Front
D: IP20 electrical protection

Digit 45: Electrical protection
X: No accessory
U: Under/over voltage protection
G: Ground fault protection relay (SE/HE/XE versions only)
B: U+G

Digit 46: Controller Operator Interface
T: TD7 / All languages

Digit 47: Remote interface
X: Without
4: Tracer COMM 4
5: Tracer COMM 5 LCI-C (LonTalk)
6: Unit level BACnet Interface
7: Unit level Modbus Interface

Digit 48: External chilled water + current limit setpoint
X: Without
4: 4-20mA input
2: 2-10Vdc input

Digit 49: External base loading
X: Without
4: 4-20mA input
2: 2-10Vdc input

Digit 50: Ice making
X: Without
A: Ice making with relay
B: Ice making without relay

Digit 51: Programmable relays
R: Programmable relays

Digit 52: Chilled water reset
X: Standard
T: Chilled water reset - outdoor air temperature

Digit 53 : Regulation valve & RLA
X : Without
D: Chiller differential pressure & RLA out
P: condenser pressure (%HPC) & RLA out
V: With

Digit 54: Refrigerant Monitor Input
X: without
A: 100 ppm/4-20 mA
B: 1000 ppm/4-20mA
C: 100 ppm/2-10Vdc
D: 1000 ppm/2-10Vdc

General Data

Table 1 – General data

RTHD Standard Efficiency (SE)		**RTHD C1 D6 E5**	**RTHD C2 D6 E5**	**RTHD D1 D4 E4**	**RTHD D2 D1 E1**	**RTHD D3 D1 E1**	**RTHD E3 D2 E2**
		RTHD	RTHD	RTHD	RTHD	RTHD	RTHD
		225	250	300	325	350	375
Eurovent Performances (1)		SE	SE	SE	SE	SE	SE
Net Cooling Capacity	(kW)	769	886	1050	1145	1216	1342
Total Power input in cooling	(kW)	149	176	209	221	240	279
EER		5.16	5.03	5.03	5.18	5.06	4.81
ESEER		5.41	5.36	5.09	5.31	5.31	4.93
Main Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level env.	(dBA)	80	80	78	78	78	82
Cooling application data (1)							
Gross cooling capacity	(kW)	772	891	1055	1150	1221	1348
Gross power input	(kW)	142	166	196	209	226	264
Gross EER		5.46	5.37	5.37	5.49	5.40	5.11
Gross ESEER		6.18	6.32	5.92	6.20	6.16	5.67
Unit amps							
Unit rated amps (2)	(A)	349	349	455	455	455	488
Unit start up amps (2)	(A)	480	480	748	748	748	748
Power factor		0.87	0.87	0.89	0.89	0.89	0.89
Fuse size (3)	(A)	400	400	630	630	630	630
Disconnect switch size (3)	(A)	400	400	630	630	630	630
Short Circuit Unit Capacity	(kA)	35	35	35	35	35	35
Compressor							
Compressor code		C1	C2	D1	D2	D3	E3
Oil sump Heater	(W)	300	300	300	300	300	300
Evaporator							
Evaporator code		D6	D6	D4	D1	D1	D2
Evaporator Water Content	(l)	193	193	220	248	248	265
Two pass evaporator							
Evap. Water Flow rate - Minimum	(l/s)	23	23	27	32	32	35
Evap. Water Flow rate - Maximum	(l/s)	81	81	97	114	114	124
Nominal water connection size (Grooved coupling)	(mm)	200	200	200	200	200	200
Three pass evaporator							
Evap. Water Flow rate - Minimum	(l/s)	15	15	18	21	21	23
Evap. Water Flow rate - Maximum	(l/s)	54	54	64	76	76	83
Nominal water connection size (Grooved coupling)	(mm)	200	200	200	200	200	200
Four pass evaporator							
Evap. Water Flow rate - Minimum	(l/s)	12	12	14	16	16	18
Evap. Water Flow rate - Maximum	(l/s)	40	40	48	57	57	62
Nominal water connection size (Grooved coupling)	(mm)	150	150	150	150	150	150
Six pass evaporator							
Evap. Water Flow rate - Minimum	(l/s)	-	-	-	-	-	-
Evap. Water Flow rate - Maximum	(l/s)	-	-	-	-	-	-
Nominal water connection size (Grooved coupling)	(mm)	-	-	-	-	-	-
Condenser							
Condenser code		E5	E5	E4	E1	E1	E2
Condenser Water Content	(l)	132	135	148	167	167	178
Condenser Water Flow rate - Minimum	(l/s)	16	16	19	22	22	24
Condenser Water Flow rate - Maximum	(l/s)	57	57	67	80	80	87
Nominal water connection size (Grooved coupling)	(mm)	200	200	200	200	200	200
Dimensions							
Width	(mm)	1600	1600	1600	1600	1600	1600
Length	(mm)	3290	3290	3290	3290	3290	3290
Height	(mm)	1940	1940	1940	1940	1940	1940
Shipping weight	(kg)	5570	6300	5970	6110	6140	6250
Operating weight	(kg)	5891	6833	6335	6522	6553	6655
System data							
Refrigerant circuit		1	1	1	1	1	1
R134a refrigerant charge	(kg)	217	217	211	211	211	211
Oil charge	(l)	23.0	23.0	23.0	23.0	23.0	23.0
POE Oil type				OIL048E or OIL023E			

(1) At Evaporator water temperature : 12°C / 7°C - Condenser water temperature 30 / 35°C according to EN14511:2013
(2) under 400V/3/50Hz
(3) Option fuse + disconnect switch
Electrical & system data are subject to change without notice. Please refer to unit nameplate data.

General Data

Table 2 – General data

RTHD High Efficiency unit (HE)		RTHD B1 B1 B1	RTHD B2 B1 B1	RTHD C1 D5 E4	RTHD C2 D5 E4	RTHD D1 D3 E3	RTHD D2 F1 F2	RTHD D3 F1 F2	RTHD E3 F2 F3
		RTHD	RTHD	RTHD	RTHD	RTHD	RTHD	RTHD	RTHD
		150	175	225	250	300	350	375	400
Eurovent Performances (1)		HE	HE	HE	HE	HE	HE	HE	HE
Net Cooling Capacity	(kW)	545	595	778	896	1074	1195	1278	1411
Total Power input in cooling	(kW)	99	109	145	170	198	212	228	266
EER		5.49	5.44	5.37	5.26	5.42	5.65	5.60	5.31
ESEER		5.79	5.88	5.68	5.66	5.63	5.88	5.78	5.38
Main Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level env.	(dBA)	80	80	80	80	78	78	78	82
Cooling application data (1)									
Gross cooling capacity	(kW)	547	597	781	899	1077	1199	1283	1416
Gross power input	(kW)	96	105	139	162	190	202	217	252
Gross EER		5.73	5.69	5.61	5.55	5.66	5.95	5.92	5.61
Gross ESEER		6.39	6.61	6.34	6.49	6.22	6.63	6.59	6.10
Unit amps									
Unit rated amps (2)	(A)	233	233	349	349	455	455	455	488
Unit start up amps (2)	(A)	412	412	480	480	748	748	748	748
Power factor		0.90	0.90	0.87	0.87	0.89	0.89	0.89	0.89
Fuse size (3)	(A)	315	315	400	400	630	630	630	630
Disconnect switch size (3)	(A)	315	315	400	400	630	630	630	630
Short Circuit Unit Capacity	(kA)	35	35	35	35	35	35	35	35
Compressor									
Compressor code		B1	B2	C1	C2	D1	D2	D3	E3
Oil sump Heater	(W)	300	300	300	300	300	300	300	300
Evaporator									
Evaporator code		B1	B1	D5	D5	D3	F1	F1	F2
Evaporator Water Content	(l)	168	168	220	220	281	394	394	417
Two pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	19	19	27	27	37	43	43	46
Evap. Water Flow rate - Maximum	(l/s)	69	69	97	97	134	156	156	168
Nominal water connection size (Grooved coupling)	(mm)	200	200	200	200	200	250	250	250
Three pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	13	13	18	18	25	29	29	31
Evap. Water Flow rate - Maximum	(l/s)	46	46	64	64	89	104	104	112
Nominal water connection size (Grooved coupling)	(mm)	150	150	200	200	200	200	200	200
Four pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	10	10	14	14	18	22	22	23
Evap. Water Flow rate - Maximum	(l/s)	34	34	48	48	67	78	78	84
Nominal water connection size (Grooved coupling)	(mm)	100	100	150	150	150	150	150	150
Six pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	-	-	-	-	-	-	-	-
Evap. Water Flow rate - Maximum	(l/s)	-	-	-	-	-	-	-	-
Nominal water connection size (Grooved coupling)	(mm)	-	-	-	-	-	-	-	-
Condenser									
Condenser code		B1	B1	E4	E4	E3	F2	F2	F3
Condenser Water Content	(l)	106	106	148	148	181	224	224	240
Condenser Water Flow rate - Minimum	(l/s)	15	15	19	19	25	27	27	30
Condenser Water Flow rate - Maximum	(l/s)	53	53	67	67	89	97	97	106
Nominal water connection size (Grooved coupling)	(mm)	150	150	200	200	200	200	200	200
Dimensions									
Width	(mm)	1600	1600	1600	1600	1600	1600	1600	1600
Length	(mm)	3170	3170	3290	3290	3290	3690	3690	3690
Height	(mm)	1850	1850	1940	1940	1940	1940	1940	1940
Shipping weight	(kg)	4090	4090	5670	5670	6150	6940	6980	7120
Operating weight	(kg)	4361	4361	6030	6030	6612	7558	7589	7767
System data									
Refrigerant circuit		1	1	1	1	1	1	1	1
R134a refrigerant charge	(kg)	182	182	217	217	211	278	278	278
Oil charge	(l)	17.0	17.0	23.0	23.0	23.0	38.0	38.0	38.0
POE Oil type					OIL048E or OIL023E				

(1) At Evaporator water temperature : 12°C / 7°C - Condenser water temperature 30 / 35°C according to EN14511:2013
(2) under 400V/3/50Hz
(3) Option fuse + disconnect switch
Electrical & system data are subject to change without notice. Please refer to unit nameplate data.

General Data

Table 3 – General data

RTHD Extra High Efficiency unit (XE)		RTHD B1 C1 D1	RTHD B2 C1 D1	RTHD C1 D3 E3	RTHD C2 E1 F1	RTHD D1 G1 G1	RTHD D2 G1 G1	RTHD D3 G2 G2	RTHD E3 G3 G3
		RTHD	RTHD	RTHD	RTHD	RTHD	RTHD	RTHD	RTHD
		150	175	225	275	325	350	375	425
Eurovent Performances (1)		XE	XE	XE	XE	XE	XE	XE	XE
Net Cooling Capacity	(kW)	559	614	797	937	1119	1203	1294	1453
Total Power input in cooling	(kW)	98	108	140	160	188	205	218	253
EER		5.69	5.69	5.68	5.86	5.94	5.88	5.94	5.74
ESEER		5.95	6.09	6.09	6.27	6.16	6.21	6.21	5.91
Main Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level env.	(dBA)	80	80	80	80	78	78	78	82
Cooling application data (1)									
Gross cooling capacity	(kW)	561	616	798	940	1121	1206	1297	1456
Gross power input	(kW)	94	103	137	154	183	198	211	246
Gross EER		5.94	5.97	5.85	6.11	6.14	6.09	6.15	5.93
Gross ESEER		6.58	6.88	6.55	6.93	6.65	6.75	6.73	6.36
Unit amps									
Unit rated amps (2)	(A)	233	233	349	349	455	455	455	488
Unit start up amps (2)	(A)	412	412	480	480	748	748	748	748
Power factor		0.90	0.90	0.87	0.87	0.89	0.89	0.89	0.89
Fuse size (3)	(A)	315	315	400	400	630	630	630	630
Disconnect switch size (3)	(A)	315	315	400	400	630	630	630	630
Short Circuit Unit Capacity	(kA)	35	35	35	35	35	35	35	35
Compressor									
Compressor code		B1	B2	C1	C2	D1	D2	D3	E3
Oil sump Heater	(W)	300	300	300	300	300	300	300	300
Evaporator									
Evaporator code		C1	C1	D3	E1	G1	G2	G2	G3
Evaporator Water Content	(l)	225	225	281	300	563	597	597	656
Two pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	25	25	37	35	-	-	-	-
Evap. Water Flow rate - Maximum	(l/s)	88	88	134	124	-	-	-	-
Nominal water connection size (Grooved coupling)	(mm)	200	200	200	200	-	-	-	-
Three pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	17	17	25	23	39	42	42	47
Evap. Water Flow rate - Maximum	(l/s)	59	59	89	83	140	152	152	172
Nominal water connection size (Grooved coupling)	(mm)	150	150	200	200	250	250	250	250
Four pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	13	13	18	18	29	32	32	36
Evap. Water Flow rate - Maximum	(l/s)	44	44	67	62	105	114	114	129
Nominal water connection size (Grooved coupling)	(mm)	100	100	150	150	200	200	200	200
Six pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	-	-	-	-	20	21	21	24
Evap. Water Flow rate - Maximum	(l/s)	-	-	-	-	70	76	76	86
Nominal water connection size (Grooved coupling)	(mm)	-	-	-	-	150	150	150	150
Condenser									
Condenser code		D1	D1	E3	F1	G1	G1	G2	G3
Condenser Water Content	(l)	125	125	181	235	321	321	370	400
Condenser Water Flow rate - Minimum	(l/s)	15	15	25	29	34	34	41	45
Condenser Water Flow rate - Maximum	(l/s)	53	53	89	104	123	123	148	163
Nominal water connection size (Grooved coupling)	(mm)	150	150	200	200	200	200	200	200
Dimensions									
Width	(mm)	1600	1600	1600	1600	1800	1800	1800	1800
Length	(mm)	3640	3640	3290	3670	3850	3850	3850	3850
Height	(mm)	1850	1850	1940	1940	2035	2040	2040	2040
Shipping weight	(kg)	4410	4410	5900	6300	8070	8280	8420	8690
Operating weight	(kg)	4756	4756	6355	6833	8951	9196	9384	9741
System data									
Refrigerant circuit		1	1	1	1	1	1	1	1
R134a refrigerant charge	(kg)	217	217	217	233	311	311	311	319
Oil charge	(l)	17.0	17.0	23.0	38.0	42.0	42.0	42.0	42.0
POE Oil type					OIL048E or OIL023E				

(1) At Evaporator water temperature : 12°C / 7°C - Condenser water temperature 30 / 35°C according to EN14511:2013
(2) under 400V/3/50Hz
(3) Option fuse + disconnect switch
Electrical & system data are subject to change without notice. Please refer to unit nameplate data.

General Data

Table 4 – General data

RTHD High Seasonal Efficiency unit (HSE)		RTHD B1 C1 D1 w/ AFD	RTHD B2 C1 D1 w/ AFD	RTHD C1 D3 E3 w/ AFD	RTHD C2 E1 F1 w/ AFD	RTHD D1 G1 G1 w/ AFD	RTHD D2 G1 G1 w/ AFD	RTHD D3 G2 G2 w/ AFD	RTHD E3 G3 G3 w/ AFD
		RTHD	RTHD	RTHD	RTHD	RTHD	RTHD	RTHD	RTHD
		150	175	225	275	325	350	375	425
Eurovent Performances (1)		HSE	HSE	HSE	HSE	HSE	HSE	HSE	HSE
Net Cooling Capacity	(kW)	559	614	797	937	1119	1203	1294	1453
Total Power input in cooling	(kW)	102	111	145	165	195	211	225	261
EER		5.51	5.51	5.50	5.68	5.75	5.69	5.75	5.56
ESEER		7.14	7.20	7.32	7.61	7.71	7.52	7.94	7.83
Main Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level env.	(dBA)	80	80	80	80	78	78	78	82
Cooling application data (1)									
Gross cooling capacity	(kW)	561	616	798	940	1121	1206	1297	1456
Gross power input	(kW)	98	107	141	159	189	205	218	254
Gross EER		5.75	5.77	5.65	5.90	5.94	5.89	5.95	5.73
Gross ESEER		8.10	8.32	8.03	8.66	8.59	8.43	8.89	8.74
Unit amps									
Unit rated amps (2)	(A)	218	218	314	314	421	421	421	452
Unit start up amps (2)	(A)	< I Max.	< I Max.	< I Max.	< I Max.	< I Max.	< I Max.	< I Max.	< I Max.
Power factor		0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Fuse size (3)	(A)	250T2	250T2	400T2	400T2	500T3	500T3	500T3	500T3
Disconnect switch size (3)	(A)	315	315	500	500	630	630	630	630
Short Circuit Unit Capacity	(kA)	35	35	35	35	35	35	35	35
Compressor									
Compressor code		B1	B2	C1	C2	D1	D2	D3	E3
Oil sump Heater	(W)	300	300	300	300	300	300	300	300
Variable frequency drive size	(kVA)	132	132	200	200	250	250	250	315
Harmonic filter (option)									
Harmonic filter size	(A)	-	-	-	-	-	-	-	-
Harmonic filter weight	(kg)	-	-	-	-	-	-	-	-
Harmonic filter dimension (H x L x W)	(mm)	-	-	-	-	-	-	-	-
Evaporator									
Evaporator code		C1	C1	D3	E1	G1	G2	G2	G3
Evaporator Water Content	(l)	225	225	281	300	563	597	597	656
Two pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	25	25	37	35	-	-	-	-
Evap. Water Flow rate - Maximum	(l/s)	88	88	134	124	-	-	-	-
Nominal water connection size (Grooved coupling)	(mm)	200	200	200	200	-	-	-	-
Three pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	17	17	25	23	39	42	42	47
Evap. Water Flow rate - Maximum	(l/s)	59	59	89	83	140	152	152	172
Nominal water connection size (Grooved coupling)	(mm)	150	150	200	200	250	250	250	250
Four pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	13	13	18	18	29	32	32	36
Evap. Water Flow rate - Maximum	(l/s)	44	44	67	62	105	114	114	129
Nominal water connection size (Grooved coupling)	(mm)	100	100	150	150	200	200	200	200
Six pass evaporator									
Evap. Water Flow rate - Minimum	(l/s)	-	-	-	-	20	21	21	24
Evap. Water Flow rate - Maximum	(l/s)	-	-	-	-	70	76	76	86
Nominal water connection size (Grooved coupling)	(mm)	-	-	-	-	150	150	150	150
Condenser									
Condenser code		D1	D1	E3	F1	G1	G1	G2	G3
Width	(l)	125	125	181	235	321	321	370	400
Length	(l/s)	15	15	25	29	34	34	41	45
Height	(l/s)	53	53	89	104	123	123	148	163
Nominal water connection size (Grooved coupling)	(mm)	150	150	200	200	200	200	200	200
Dimensions (4)									
Height	(mm)	1690	1690	1810	1810	2000	2000	2000	2000
Length	(mm)	3640	3640	3290	3670	3850	3850	3850	3850
Width	(mm)	1850	1850	1970	1970	2040	2040	2040	2040
Shipping weight	(kg)	4520	4520	6080	6480	8260	8470	8610	8880
Operating weight	(kg)	4860	4860	6534	7012	9139	9384	9572	9929
System data									
Refrigerant circuit		1	1	1	1	1	1	1	1
R134a refrigerant charge	(kg)	217	217	217	233	311	311	311	319
Oil charge	(l)	18.0	18.0	27.0	42.0	46.0	46.0	46.0	46.0
POE Oil type					OIL00317				

(1) At Evaporator water temperature : 12°C / 7°C - Condenser water temperature 30 / 35°C according to EN14511:2013
(2) under 400V/3/50Hz
(3) For standard unit without harmonic filter
(4) Option fuse + disconnect switch
Electrical & system data are subject to change without notice. Please refer to unit nameplate data.

General Data

Table 5 – General Data

	Compressor Code	Evaporator Code	Condenser Code	Evaporator Water storage (l)	Condenser Water storage (l)	R134a Refrigerant Charge (kg)	Oil Charge (l)
150 HE	B1	B1	B1	168	106	182	17
150 XE/HSE	B1	C1	D1	225	125	217	17
175 HE	B2	B1	B1	168	106	182	17
175 XE/HSE	B2	C1	D1	225	125	217	17
225 SE	C1	D6	E5	193	132	217	23
225 HE	C1	D5	E4	220	148	217	23
225 SE/HSE	C1	D3	E3	281	181	217	23
250 SE	C2	D6	E5	193	135	217	23
250 HE	C2	D5	E4	220	148	217	23
275 XE	C2	E1	F1	300	235	233	38
300 SE	D1	D4	E4	220	148	211	23
300 HE	D1	D3	E3	281	181	211	23
325 SE	D1	G1	G1	563	321	311	42
350 HE	D2	D1	E1	248	167	211	23
350 XE/HSE	D2	F1	F2	394	224	278	38
350 SE	D2	G2	G1	597	321	311	42
375 HE	D3	D1	E1	248	167	211	23
375 XE/HSE	D3	F1	F2	394	224	278	38
375 SE	D3	G2	G2	597	370	311	42
400 HE	E3	D2	E2	265	178	211	23
425 XE/HSE	E3	F2	F3	417	240	278	38
	E3	G3	G3	656	400	319	42

Table 6 – Minimum/Maximum Evaporator Flow Rates (l/s)

	Two pass			Three pass			Four pass			Six pass		
Evaporator Code	Min	Max	Nominal Conn. Size (mm)	Min	Max	Nominal Conn. Size (mm)	Min	Max	Nominal Conn. Size (mm)	Min	Max	Nominal Conn. Size (mm)
B1	19	69	200	13	46	150	10	34	100	-	-	-
C1	25	88	200	17	59	150	13	44	100	-	-	-
D1	32	114	200	21	76	200	16	57	150	-	-	-
D2	35	124	200	23	83	200	18	62	150	-	-	-
D3	37	134	200	25	89	200	18	67	150	-	-	-
D4	27	97	200	18	64	200	14	48	150	-	-	-
D5	27	97	200	18	64	200	14	48	150	-	-	-
D6	23	81	200	15	54	200	12	40	150	-	-	-
E1	35	124	200	23	83	200	18	62	150	-	-	-
F1	43	156	250	29	104	200	22	78	150	-	-	-
F2	46	168	250	31	112	200	23	84	150	-	-	-
G1	-	-	-	39	140	250	29	105	200	20	70	150
G2	-	-	-	42	152	250	32	114	200	21	76	150
G3	-	-	-	47	172	250	36	129	200	24	86	150

Table 7 – Minimum/Maximum Condenser Flow Rates (l/s)

	Two pass		
Condenser Code	Min.	Max	Nominal Conn. Size (mm)
B1	15	53	150
D1	15	53	150
E1	22	80	200
E2	24	87	200
E3	25	89	200
E4	19	67	200
E5	16	57	200
F1	29	104	200
F2	27	97	200
F3	30	106	200
G1	34	123	200
G2	41	148	200
G3	45	163	200

General Data

Table 8 – Evaporator Water Pressure Drop (kPa)

				Water flow rates (l/s) for water only																														
Evap	Passes	Min	Max	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
B1	2	19	69			8	13	18	23	30	37	44	53	62	71																			
B1	3	13	46		15	26	39	55	72	91	113																							
B1	4	10	34	17	37	62	92	129																										
C1	2	25	88				9	13	18	23	28	34	40	47	54	62	70	78	88															
C1	3	17	59			20	30	41	55	69	86	104	123																					
C1	4	13	44		28	48	71	99	131	168																								
D1	2	32	114						12	15	19	23	27	32	37	42	48	54	60	67	74	81	89	97										
D1	3	21	76				16	23	31	39	48	58	69	81	94	108	122																	
D1	4	16	57			25	38	53	70	89	111	134	160																					
D2	2	35	124						10	13	16	20	24	28	33	38	43	48	54	60	66	72	79	87	94	102								
D2	3	23	83				14	20	26	34	42	51	60	71	82	94	106	119																
D2	4	18	62			22	33	46	61	78	96	117	139	164																				
D3	2	37	134							10	13	16	19	22	26	30	34	38	42	47	52	57	62	68	73	79	85	92						
D3	3	25	89				12	17	22	29	36	43	51	60	69	79	89	100	112															
D3	4	19	67			18	28	39	51	65	81	98	116	136	158																			
D4	2	27	97					10	13	17	21	25	30	35	41	47	53	60	66	74	81													
D4	3	18	64			15	23	32	42	53	66	80	95	112																				
D4	4	14	48		21	36	55	76	101	129	161																							
D5	2	27	97					10	13	17	21	26	30	35	41	47	53	60	67	74	82													
D5	3	18	64			15	23	32	42	54	66	80	95	112																				
D5	4	14	48		21	36	55	77	102	130	161																							
D6	2	23	81				10	13	18	23	28	34	40	47	55	62	71	80																
D6	3	15	54		12	20	30	42	55	70	87	105																						
D6	4	12	40		28	48	72	100	133	170																								
E1	2	35	124						10	13	16	20	24	28	32	37	42	47	53	58	64	71	77	84	91	99								
E1	3	23	83				16	22	29	37	46	56	66	77	89	102	115	130																
E1	4	18	62			24	36	50	66	84	104	126	149	175																				
F1	2	43	156								10	13	15	18	21	24	27	30	34	37	41	45	49	54	58	63	67	72	78	83	88	94	100	
F1	3	29	104					15	20	26	32	39	46	54	62	71	80	90	101	112	123	136												
F1	4	22	78				25	35	46	59	73	89	105	123	143	163	185																	
F2	2	46	168									11	13	16	18	21	24	27	30	33	37	40	44	48	52	56	60	65	69	74	79	84	89	95
F2	3	31	112						23	28	34	41	48	55	63	72	81	90	100	110	121	132	144											
F2	4	23	84				22	31	41	53	65	79	94	110	127	146	166	186																
G1	3	39	140							14	18	22	26	30	35	40	46	51	57	63	70	76	83	91	98	106	114	123	131	140				
G1	4	29	105					19	25	33	41	49	58	68	79	90	102	115	128	142	156	171	187											
G1	6	20	70			28	43	60	79	101	125	151	179	210	243	278																		
G2	3	42	152								15	19	23	26	31	35	40	45	50	55	61	67	73	79	86	93	100	107	115	122	130	139		
G2	4	32	114						22	28	35	43	51	60	69	79	89	100	112	124	136	150	163	178										
G2	6	21	76				37	52	69	88	109	132	156	183	212	242	275																	
G3	3	47	172									15	18	21	25	28	32	36	41	45	50	54	59	65	70	76	81	87	93	100	106	113	120	127
G3	4	36	129							23	29	35	41	48	56	64	73	82	91	101	111	122	133	145	157	170	183							
G3	6	24	86				30	42	56	71	89	107	127	149	172	197	223	251	280															

Table 9 – Condenser Pressure Drop (kPa)

				Water flow rates (l/s) for water only																														
Cond	Passes	Min	Max	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
B1	2	15	53		10	16	24	34	44	56	70	85																						
D1	2	15	53		11	19	28	39	52	66	81	98																						
E1	2	22	80				12	17	22	28	34	41	49	57	66	76	86	97																
E2	2	24	87				10	15	19	24	30	36	43	50	58	66	75	84	94															
E3	2	25	89				10	13	18	22	28	33	40	46	53	61	69	78	87															
E4	2	19	67			11	17	23	31	39	48	58	69	81	94																			
E5	2	16	57			15	22	31	40	51	63	77	91																					
F1	2	29	104					12	16	20	25	30	36	42	49	55	63	70	79	87	96	106												
F2	2	27	97					14	18	23	29	35	41	48	56	64	72	81	90	100	111													
F3	2	30	106					12	16	20	25	31	36	42	49	56	63	71	79	88	97	106	116											
G1	2	34	123						13	17	21	25	30	35	40	46	52	58	65	72	79	87	95	103	112	121								
G2	2	41	148								16	19	22	26	30	34	39	44	49	54	59	65	71	77	84	90	97	105	112	120	128			
G3	2	45	163								13	16	19	23	26	30	34	38	42	47	51	56	62	67	73	78	85	91	97	104	111	118	125	133

Electrical Data

Table 10 – Compressor motor electrical data 50 Hz

	Nominal voltage (operating range)											
	380 V		(361V - 399V)		400 V	(380V - 420V)			415 V	(394V - 436V)		
Unit type	Max Power input (kW)	Max Amps (A)	Start up amp (A)	Power Factor	Max Power input (kW)	Max Amps (A)	Start up amp (A)	Power Factor	Max Power input (kW)	Max Amps (A)	Start up amp (A)	Power Factor
225 SE	201	349	456	0.88	209	349	480	0.87	213	349	498	0.85
250 SE	201	349	456	0.88	209	349	480	0.87	213	349	498	0.85
300 SE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
325 SE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
350 SE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
375 SE	288	488	711	0.90	301	488	748	0.89	306	488	776	0.87
150 HE	139	233	391	0.91	145	233	412	0.90	148	233	428	0.88
175 HE	139	233	391	0.91	145	233	412	0.90	148	233	428	0.88
225 HE	201	349	456	0.88	209	349	480	0.87	213	349	498	0.85
250 HE	201	349	456	0.88	209	349	480	0.87	213	349	498	0.85
300 HE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
350 HE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
375 HE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
400 HE	288	488	711	0.90	301	488	748	0.89	306	488	776	0.87
150 XE	139	233	391	0.91	145	233	412	0.90	148	233	428	0.88
175 XE	139	233	391	0.91	145	233	412	0.90	148	233	428	0.88
225 XE	201	349	456	0.88	209	349	480	0.87	213	349	498	0.85
275 XE	201	349	456	0.88	209	349	480	0.87	213	349	498	0.85
325 XE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
350 XE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
375 XE	271	455	711	0.91	280	455	748	0.89	284	455	776	0.87
425 XE	288	488	711	0.90	301	488	748	0.89	306	488	776	0.87
150 HSE	142	221	< I Max.	0.98	148	218	< I Max.	0.98	150	213	< I Max.	0.98
175 HSE	142	221	< I Max.	0.98	148	218	< I Max.	0.98	150	213	< I Max.	0.98
225 HSE	205	318	< I Max.	0.98	213	314	< I Max.	0.98	217	309	< I Max.	0.98
275 HSE	205	318	< I Max.	0.98	213	314	< I Max.	0.98	217	309	< I Max.	0.98
325 HSE	276	429	< I Max.	0.98	286	421	< I Max.	0.98	290	412	< I Max.	0.98
350 HSE	276	429	< I Max.	0.98	286	421	< I Max.	0.98	290	412	< I Max.	0.98
375 HSE	276	429	< I Max.	0.98	286	421	< I Max.	0.98	290	412	< I Max.	0.98
425 HSE	295	457	< I Max.	0.98	307	452	< I Max.	0.98	311	442	< I Max.	0.98

Data are subject to change without notice. Please refer to unit nameplate data.

Table 11 – Electrical connections

	Option non-fused disconnect switch			Option fused disconnect switch				Option circuit breaker			Option terminal block
	Discon-nect switch	Power cable cross section		Discon-nect switch	Fuse size	Power cable cross section		Circuit breaker size	Power cable cross section		Power cable cross sec-tion
Unit type	(A)	Min (mm²)	Max (mm²)	(A)	(A)	Min (mm²)	Max (mm²)	(A)	Min (mm²)	Max (mm²)	Max (mm²)
225 SE	400	185	240	500	400T2	240	240	630	2x70	2x240	2x300
250 SE	400	185	240	500	400T2	240	240	630	2x70	2x240	2x300
300 SE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
325 SE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
350 SE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
375 SE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
150 HE	315	150	240	315	250T2	150	240	400	2x70	2x240	2x300
175 HE	315	150	240	315	250T2	150	240	400	2x70	2x240	2x300
225 HE	400	185	240	500	400T2	240	240	630	2x70	2x240	2x300
250 HE	400	185	240	500	400T2	240	240	630	2x70	2x240	2x300
300 HE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
350 HE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
375 HE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
400 HE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
150 XE	315	150	240	315	250T2	150	240	400	2x70	2x240	2x300
175 XE	315	150	240	315	250T2	150	240	400	2x70	2x240	2x300
225 XE	400	185	240	500	400T2	240	240	630	2x70	2x240	2x300
275 XE	400	185	240	500	400T2	240	240	630	2x70	2x240	2x300
325 XE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
350 XE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
375 XE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
425 XE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
150 HSE	315	150	240	315	250T2	150	240	400	2x70	2x240	2x300
175 HSE	315	150	240	315	250T2	150	240	400	2x70	2x240	2x300
225 HSE	400	185	240	500	400T2	240	240	630	2x70	2x240	2x300
275 HSE	400	185	240	500	400T2	240	240	630	2x70	2x240	2x300
325 HSE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
350 HSE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
375 HSE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300
425 HSE	630	2x150	2x300	630	500T3	2x150	2x300	630	2x70	2x240	2x300

Dimensions

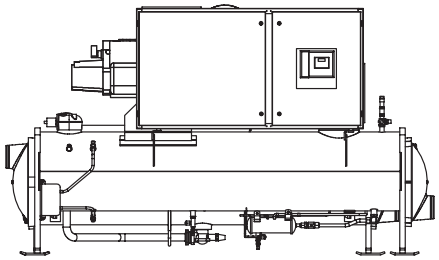
Table 12 – Dimensions

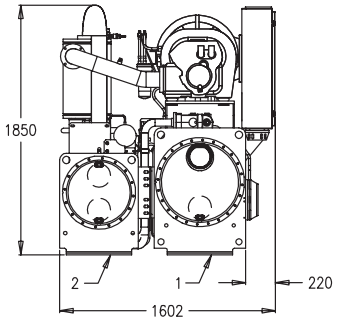
	Unit Dimensions (mm)		
Unit type	**Width**	**Length**	**Height**
RTHD 225 SE	1600	3290	1940
RTHD 250 SE	1600	3290	1940
RTHD 300 SE	1600	3290	1940
RTHD 325 SE	1600	3290	1940
RTHD 350 SE	1600	3290	1940
RTHD 375 SE	1600	3290	1940
RTHD 150 HE	1600	3170	1850
RTHD 175 HE	1600	3170	1850
RTHD 225 HE	1600	3290	1940
RTHD 250 HE	1600	3290	1940
RTHD 300 HE	1600	3290	1940
RTHD 350 HE	1600	3690	1940
RTHD 375 HE	1600	3690	1940
RTHD 400 HE	1600	3690	1940
RTHD 150 XE	1600	3640	1850
RTHD 175 XE	1600	3640	1850
RTHD 225 XE	1600	3290	1940
RTHD 275 XE	1600	3670	1940
RTHD 325 XE	1800	3850	2035
RTHD 350 XE	1800	3850	2040
RTHD 375 XE	1800	3850	2040
RTHD 425 XE	1800	3850	2040
RTHD 150 HSE	1690	3640	1850
RTHD 175 HSE	1690	3640	1850
RTHD 225 HSE	1810	3290	1970
RTHD 275 HSE	1810	3670	1970
RTHD 325 HSE	2000	3850	2040
RTHD 350 HSE	2000	3850	2040
RTHD 375 HSE	2000	3850	2040
RTHD 425 HSE	2000	3850	2040

Dimensions and Weights

RTHD 150 HE
RTHD 175 HE

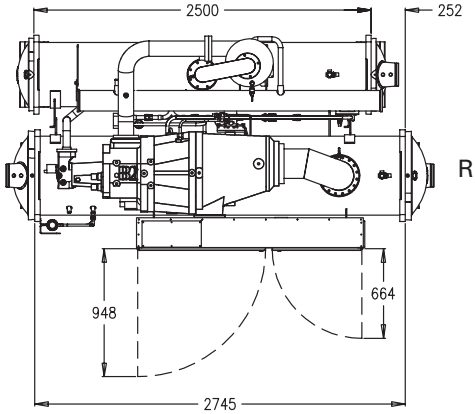
Note: Connection configuration is available left or right hand.





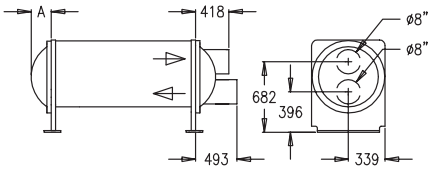
1 = Evaporator
2 = Condenser

Left hand

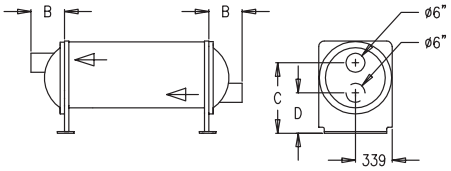


Right hand

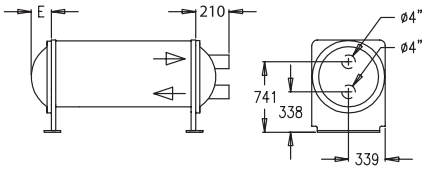
Evaporator 2 passes (option)
Right hand



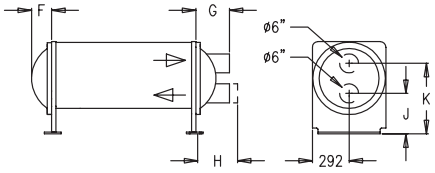
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand

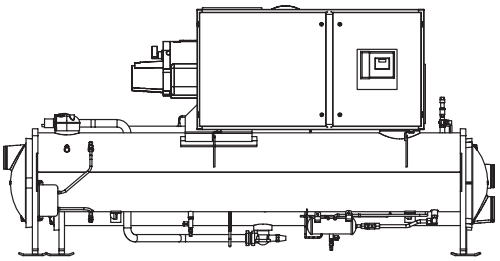


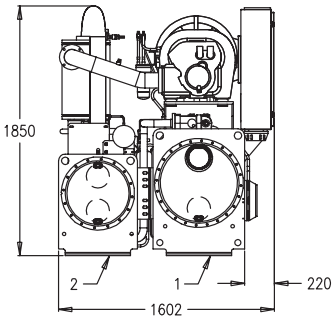
WATER BOX TYPE	A	B	C	D	E	F	G	H	J	K
10 bar	168	213	726	352	163	123	203	203	334	588
21 bar	183	418	711	367	183	148	283	358	348	575

Dimensions and Weights

RTHD 150 XE
RTHD 175 XE

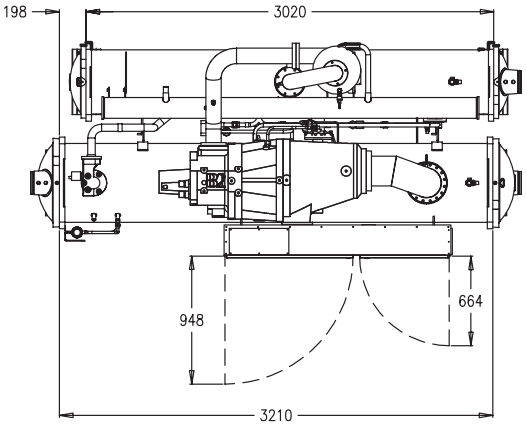
Note: Connection configuration is available left or right hand.





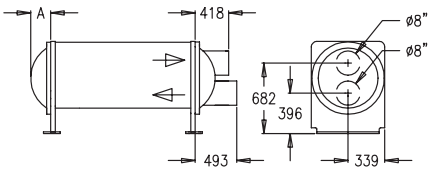
1 = Evaporator
2 = Condenser

Left hand

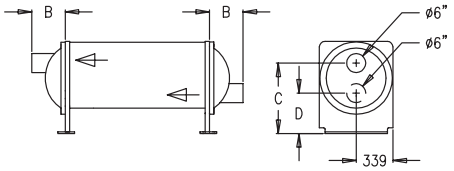


Right hand

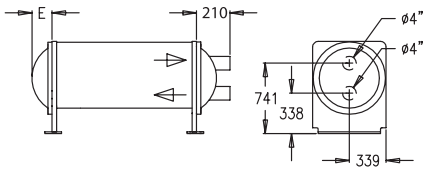
Evaporator 2 passes (option)
Right hand



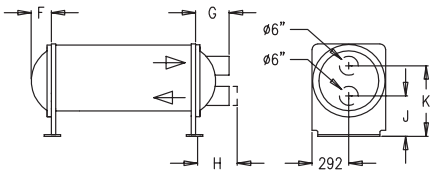
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand

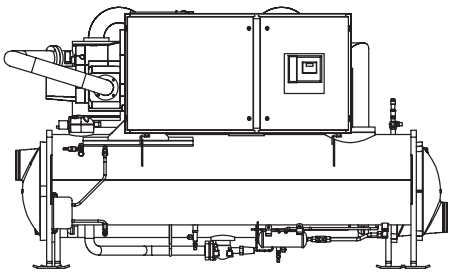


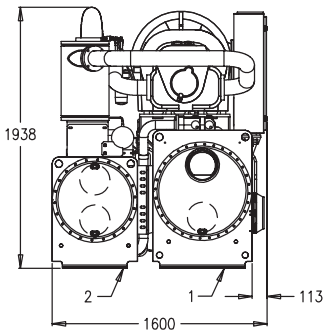
WATER BOX TYPE	A	B	C	D	E	F	G	H	J	K
10 bar	168	213	726	352	163	123	203	203	334	588
21 bar	183	418	711	367	183	148	283	358	348	575

Dimensions and Weights

RTHD 225 SE / RTHD 225 HE / RTHD 225 XE
RTHD 250 SE / RTHD 250 HE / RTHD 300 SE
RTHD 300 HE / RTHD 325 SE / RTHD 350 SE
RTHD 375 SE

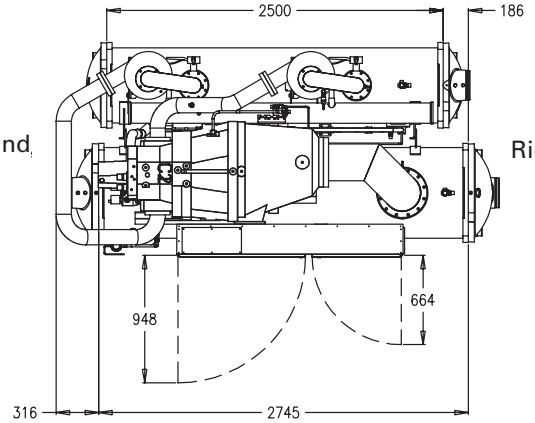
Note: Connection configuration is available left or right hand.





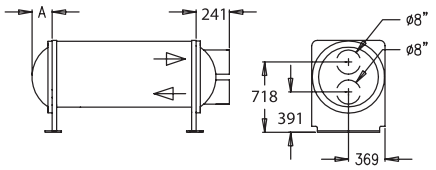
1 = Evaporator
2 = Condenser

Left hand

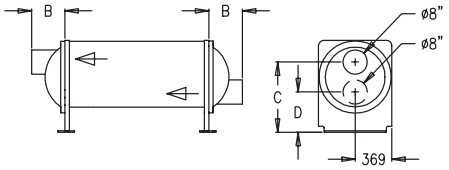


Right hand

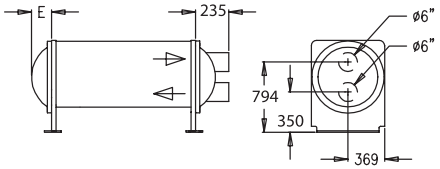
Evaporator 2 passes (option)
Right hand



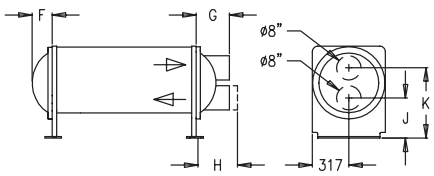
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand

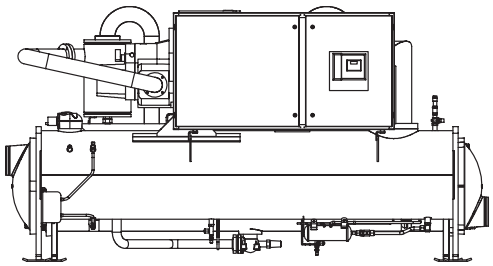


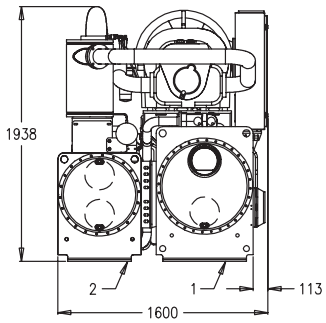
WATER BOX TYPE	A	B	C	D	E	F	G	H	J	K
10 bar	201	230	766	378	181	150	199	199	359	657
21 bar	183	418	750	395	183	178	323	398	373	643

Dimensions and Weights

RTHD 275 XE

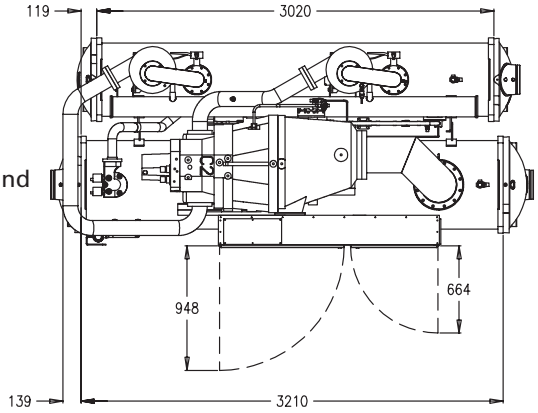
Note: Connection configuration is available left or right hand.





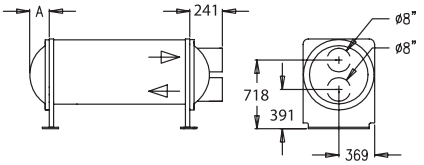
1 = Evaporator
2 = Condenser

Left hand

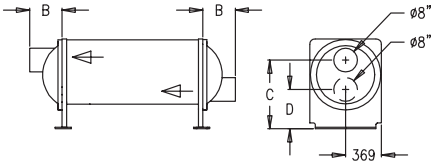


Right hand

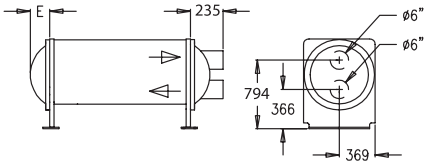
Evaporator 2 passes (option)
Right hand



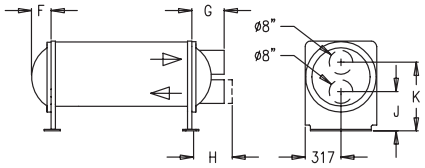
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand

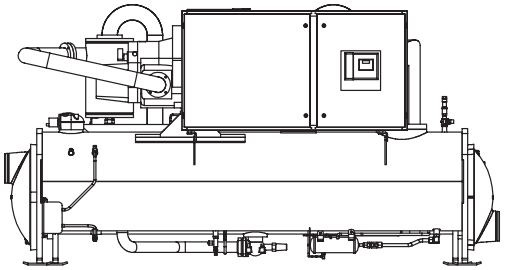


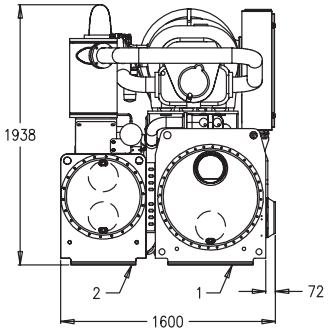
WATER BOX TYPE	A	B	C	D	E	F	G	H	J	K
10 bar	201	230	766	378	181	150	199	199	359	657
21 bar	183	418	750	395	183	178	323	398	373	643

Dimensions and Weights

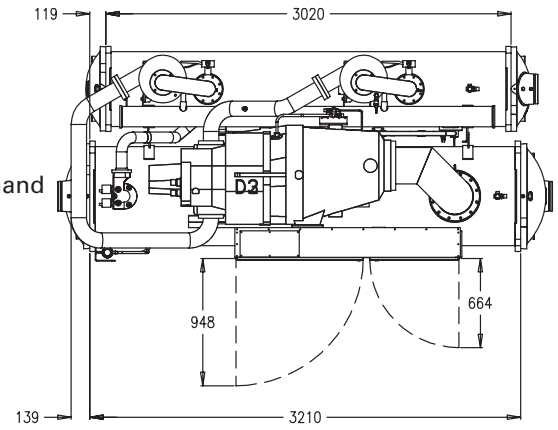
RTHD 350 HE
RTHD 375 HE
RTHD 400 HE

Note: Connection configuration is available left or right hand.

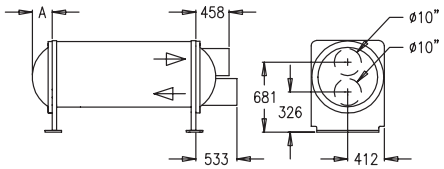




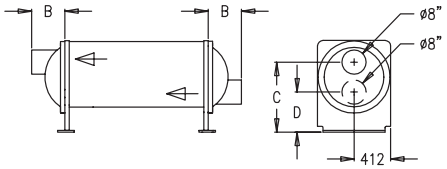
1 = Evaporator
2 = Condenser



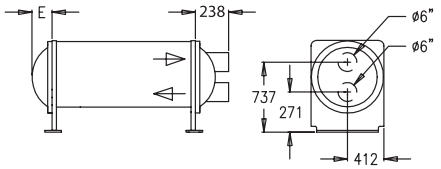
Evaporator 2 passes (option)
Right hand



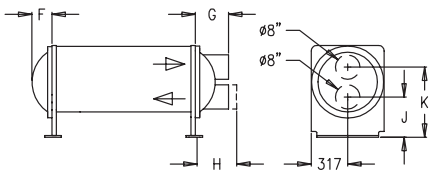
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand

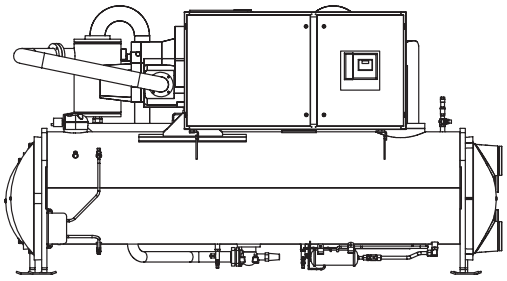


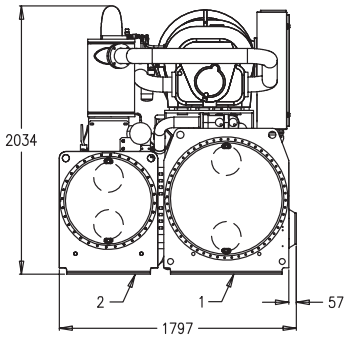
WATER BOX TYPE	A	B	C	D	E	F	G	H	J	K
10 bar	218	238	720	288	189	150	199	199	359	657
21 bar	228	458	708	299	228	178	323	398	373	643

Dimensions and Weights

RTHD 325 XE
RTHD 350 XE
RTHD 375 XE
RTHD 425 XE

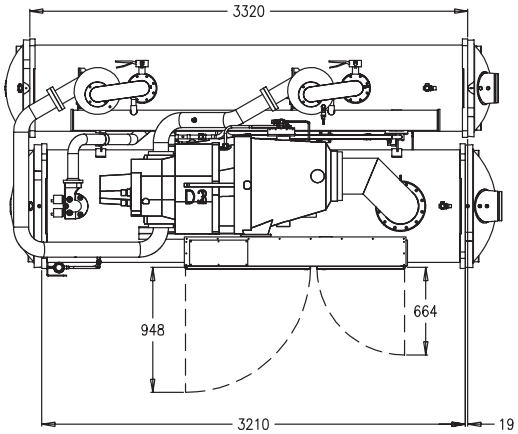
Note: Connection configuration is available left or right hand.





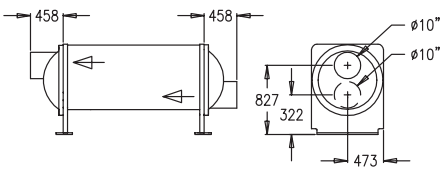
1 = Evaporator
2 = Condenser

Left hand

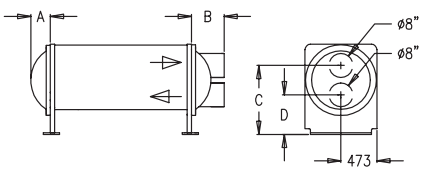


Right hand

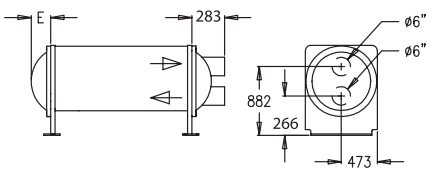
Evaporator 2 passes (option)
Right hand



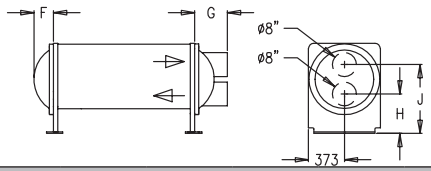
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand

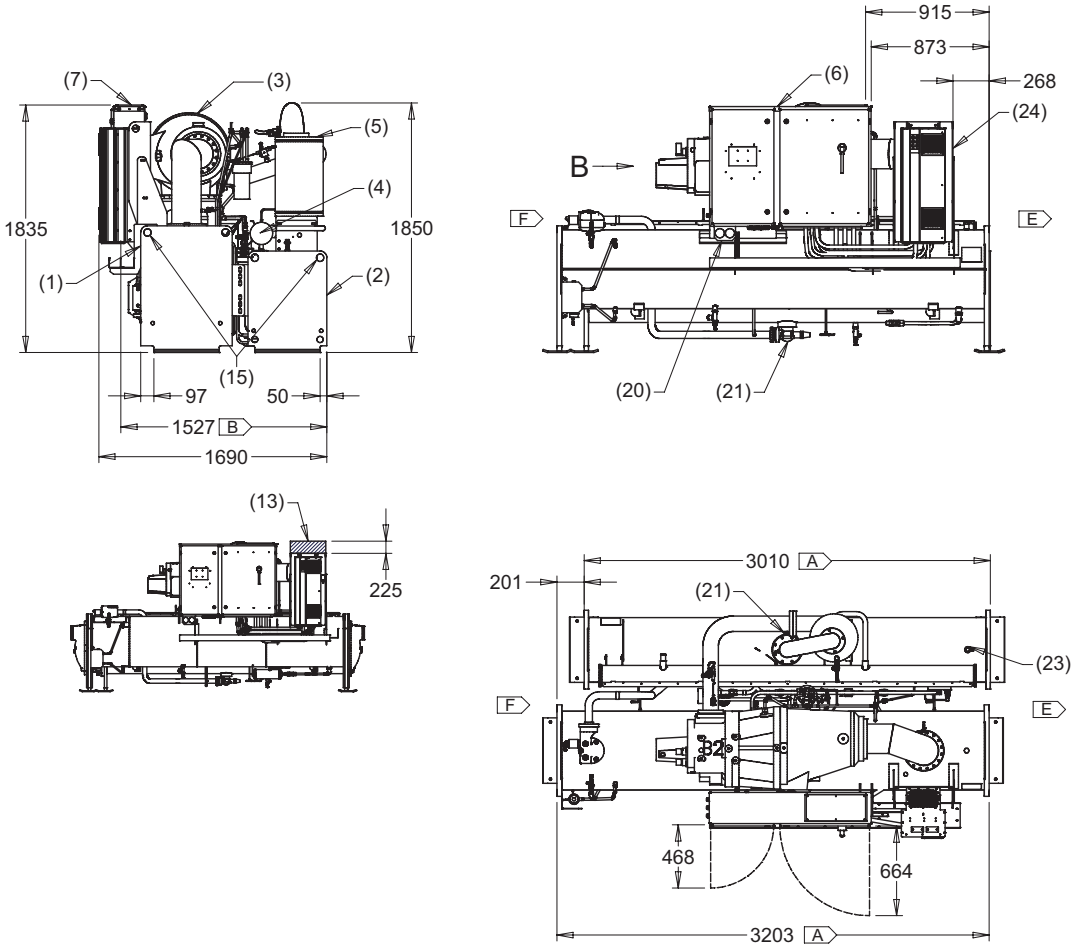


WATER BOX TYPE	A	B	C	D	E	F	G	H	J
10 bar	238	276	860	289	235	184	232	378	734
21 bar	248	458	854	295	248	188	323	375	736

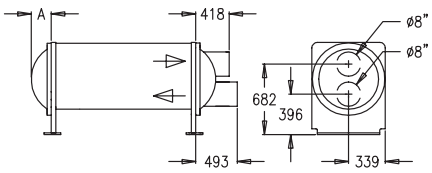
RTHD 150 HSE

RTHD 175 HSE

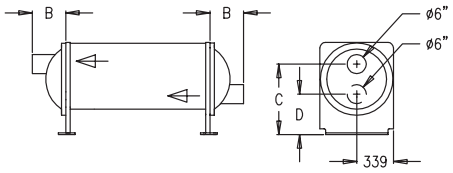
Note: Connection configuration is available left or right hand.



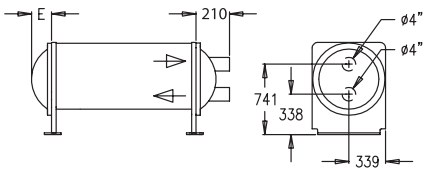
Evaporator 2 passes (option)
Right hand



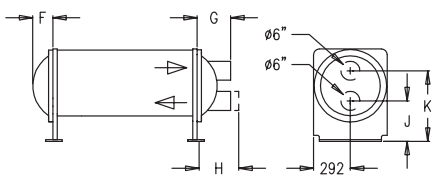
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand

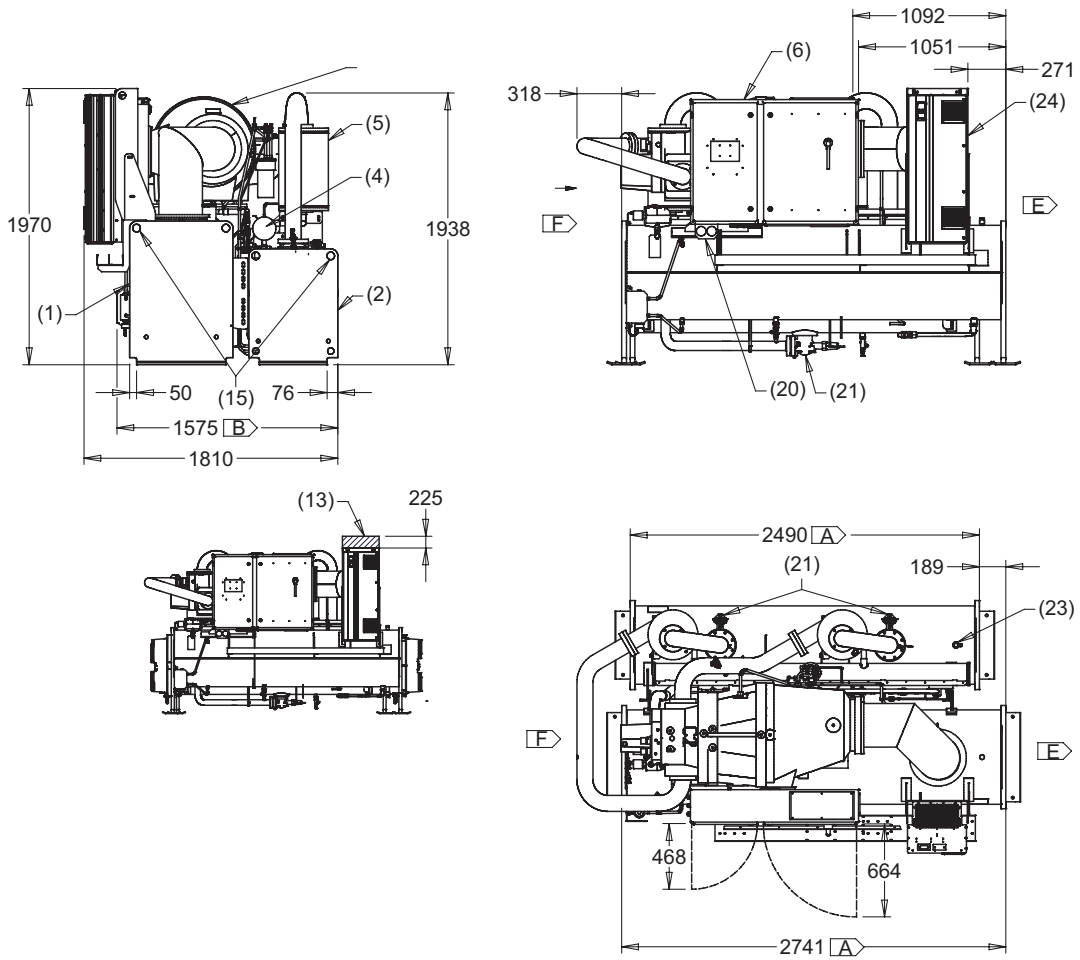


WATER BOX TYPE	A	B	C	D	E	F	G	H	J	K
10 bar	168	213	726	352	163	123	203	203	334	588
21 bar	183	418	711	367	183	148	283	358	348	575

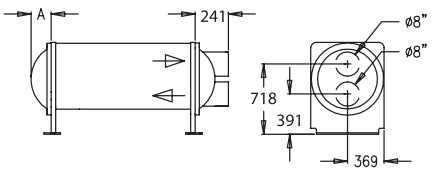
Dimensions and Weights

RTHD 225 HSE

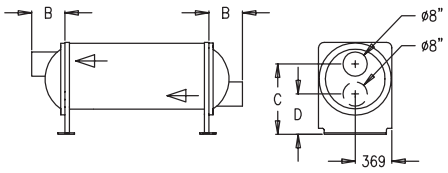
Note: Connection configuration is available left or right hand.



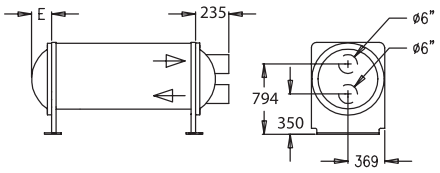
Evaporator 2 passes (option)
Right hand



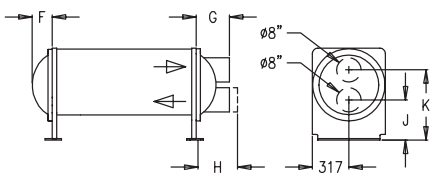
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



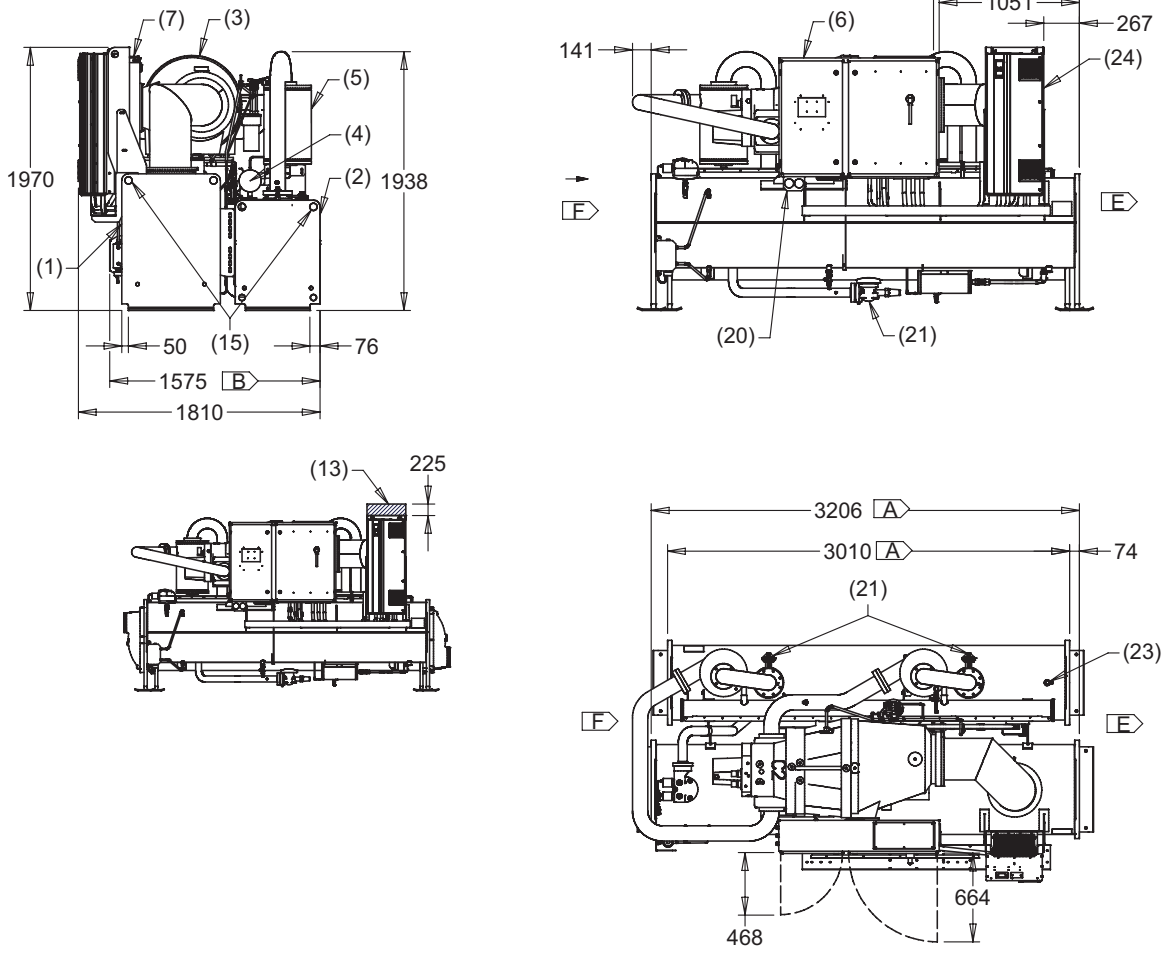
Condenser 2 passes (standard)
Right hand



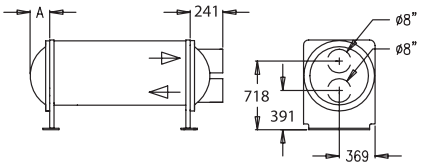
WATER BOX TYPE	A	B	C	D	E	F	G	H	J	K
10 bar	201	230	766	378	181	150	199	199	359	657
21 bar	183	418	750	395	183	178	323	398	373	643

RTHD 275 HSE

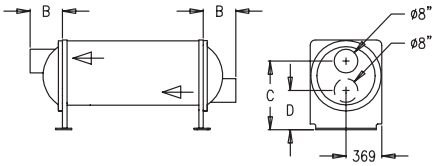
Note: Connection configuration is available left or right hand.



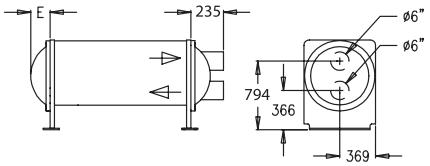
Evaporator 2 passes (option)
Right hand



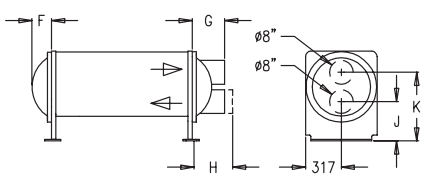
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand

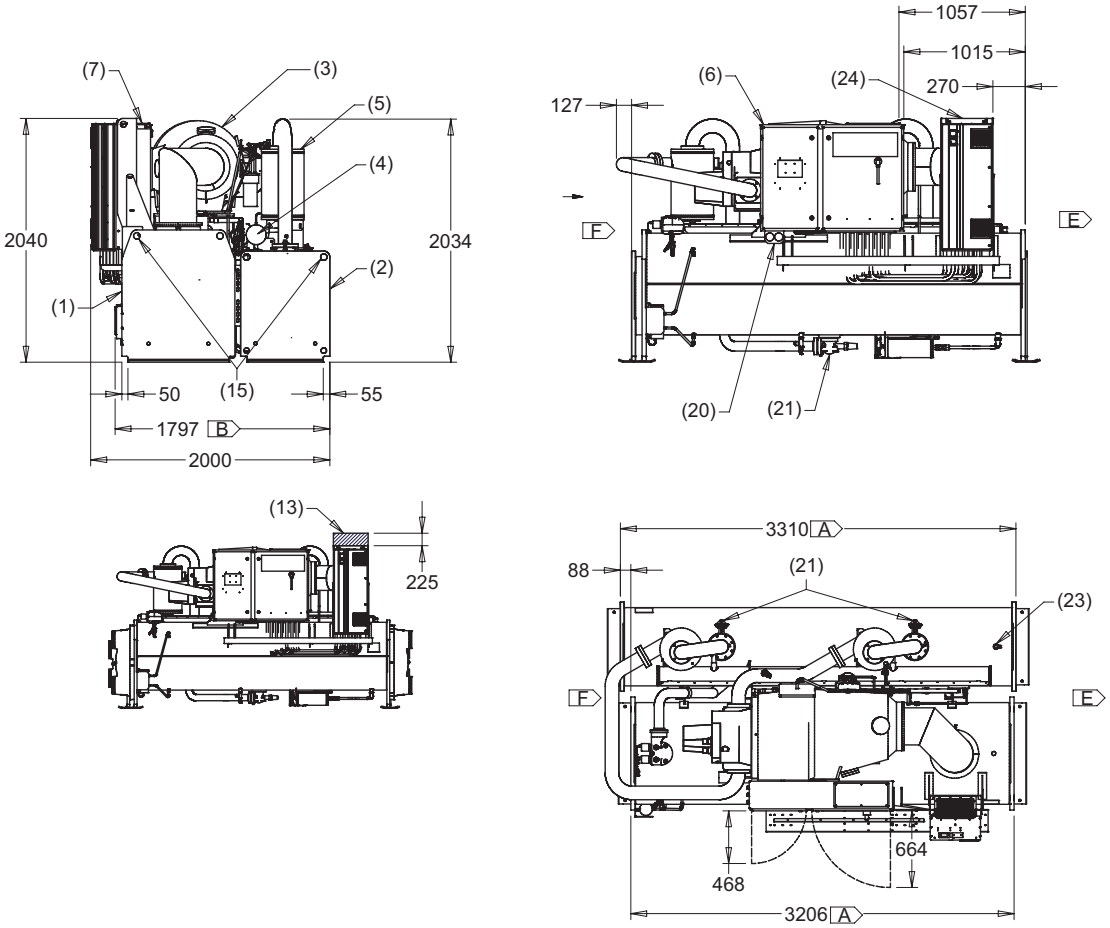


WATER BOX TYPE	A	B	C	D	E	F	G	H	J	K
10 bar	201	230	766	378	181	150	199	199	359	657
21 bar	183	418	750	395	183	178	323	398	373	643

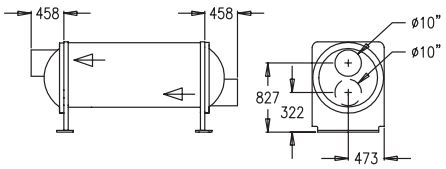
Dimensions and Weights

RTHD 325 HSE
RTHD 350 HSE
RTHD 375 HSE

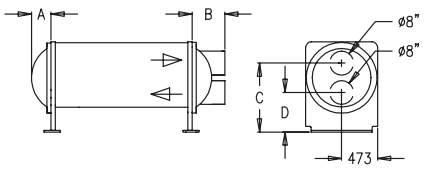
Note: Connection configuration is available left or right hand.



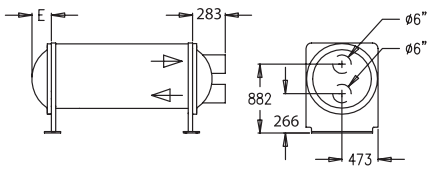
Evaporator 2 passes (option)
Right hand



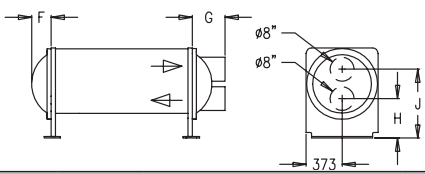
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



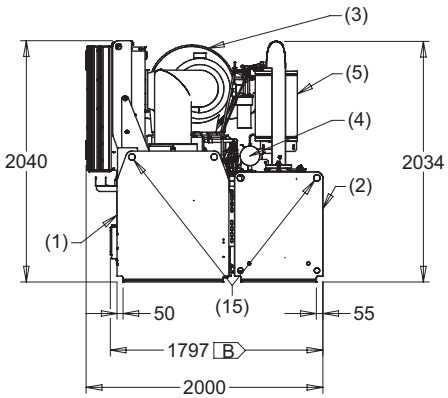
Condenser 2 passes (standard)
Right hand

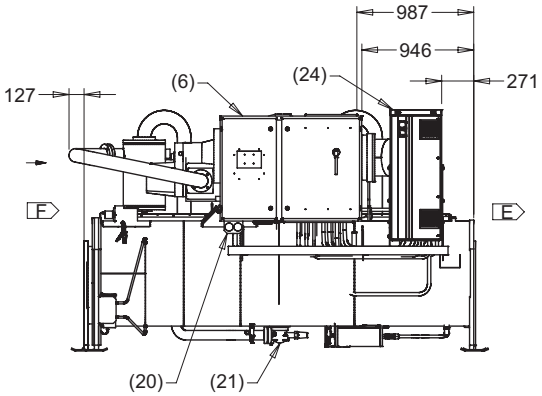


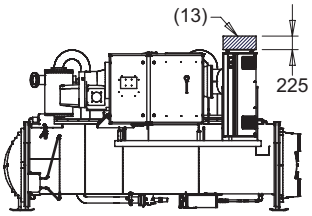
WATER BOX TYPE	A	B	C	D	E	F	G	H	J
10 bar	238	276	860	289	235	184	232	378	734
21 bar	248	458	854	295	248	188	323	375	736

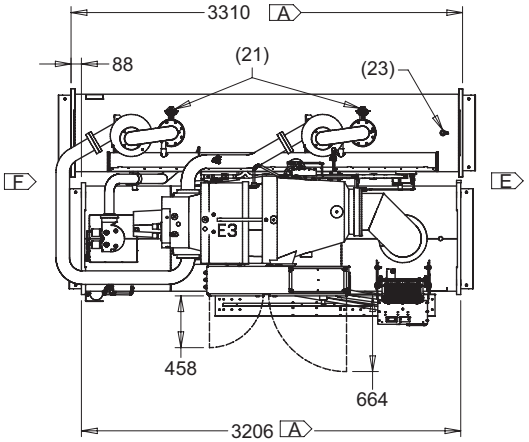
RTHD 425 HSE

Note: Connection configuration is available left or right hand.

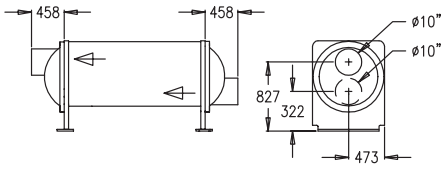




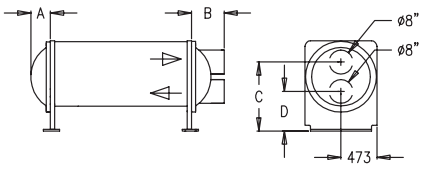




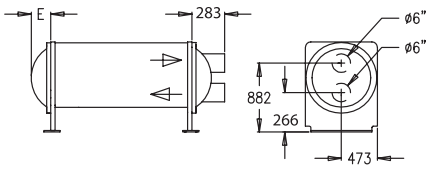
Evaporator 2 passes (option)
Right hand



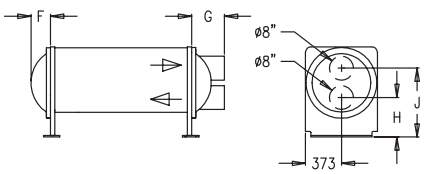
Evaporator 3 passes (standard)
Right hand



Evaporator 4 passes (option)
Right hand



Condenser 2 passes (standard)
Right hand



WATER BOX TYPE	A	B	C	D	E	F	G	H	J
10 bar	238	276	860	289	235	184	232	378	734
21 bar	248	458	854	295	248	188	323	375	736

Mechanical Specifications

General

Exposed steel surfaces shall be painted with an air-dry white paint RAL 9002 prior to shipment. Each unit shall ship with a full operating charge of refrigerant and oil. Molded neoprene isolation pads shall be supplied for placement under all support points. Startup and operator instructions by factory-trained service personnel are included.

Compressor and Motor

The unit shall have a semi-hermetic direct- drive, 3000 rpm, rotary compressor with capacity control slide valve, oil sump heater and differential pressure refrigerant oil flow system. Four pressure lubricated rolling element bearing groups shall support the rotating assembly. Motor shall be a suction gas cooled, hermetically sealed, two pole, squirrel cage induction type.

HSE version will fit an Adaptive Frequency Drive (AFD) to regulate the compressor motor speed at partial load.

Evaporator-Condenser

All tube sheets shall be carbon steel plate. Evaporator and condenser tubes should be individually replaceable. Standard tubes shall be externally finned, internally enhanced seamless copper with lands at all tube sheets. Evaporator tubes shall be 25.4 mm diameter. Condenser tubes shall be 19.05 mm diameter. Tubes shall be mechanically expanded into tube sheets. Condenser and evaporator tubes shall be mechanically fastened to tube supports. The water boxes shall be cast iron or fabricated steel available with Victaulic connections.

Refrigerant Circuit

An electronically controlled expansion valve shall be provided to maintain proper refrigerant flow.

Tracer UC800 Controller

Today's Sintesis chillers offer predictive controls that anticipate and compensate for load changes. Other control strategies made possible with the Tracer UC800 controls are:

Feedforward Adaptive Control

Feedforward is an open-loop, predictive control strategy designed to anticipate and compensate for load changes. It uses evaporator entering-water temperature as an indication of load change.

This allows the controller to respond faster and maintain stable leaving-water temperatures.

Soft Loading

The chiller controller uses soft loading except during manual operation. Large adjustments due to load or setpoint changes are made gradually, preventing the compressor from cycling unnecessarily. It does this by internally filtering the setpoints to avoid reaching the differential-to-stop or the demand limit. Soft loading applies to the leaving chilled-water temperature and demand limit setpoints.

Adaptive Controls

There are many objectives that the controller must meet, but it cannot satisfy more than one objective at a time. Typically, the controllers primary objective is to maintain the evaporator leaving water temperature.

Whenever the controller senses that it can no longer meet its primary objective without triggering a protective shutdown, it focuses on the most critical secondary objective. When the secondary objective is no longer critical, the controller reverts to its primary objective

Rapid Restart

The controller allows the Sintesis chiller to perform a Rapid Restart. A Rapid Restart is performed after a momentary power loss if it occurs during operation. Similarly, if the chiller shuts down on a non-latching diagnostic and the diagnostic later clears itself, a Rapid Restart will be initiated

AdaptiSpeed Control

The speed control is now optimized mathematically and controlled simultaneously. The increased performance of the UC800 Controller allows the chiller to operate longer at higher efficiency, and with greater stability.

Variable-Primary Flow (VPF)

Chilled-water systems that vary the water flow through chiller evaporators have caught the attention of engineers, contractors, building owners, and operators. Varying the water flow reduces the energy consumed by pumps, while having limited effect on the chiller energy consumption. This strategy can be a significant source of energy savings, depending on the application.

TD7 Operator Interface

The standard TD7 display provided with the Trane UC800 controller features a 7" LCD touch-screen, allowing access to all operational inputs and outputs. This is an advanced interface that allows the user to access any important information concerning setpoints, active temperatures, modes, electrical data, pressure, and diagnostics.

Display Features Include:

- Factory-mounted above the control panel door
- UV Resistant touchscreen
- -40°C to 70°C Operating temperature
- IP56 rated
- CE certification
- Emissions:EN55011(Class B)
- Immunity:EN61000(Industrial)
- 7″ diagonal
- 800x480 pixels
- TFT LCD @ 600 nits brightness
- 16 bit color graphic display
- Display features:
- Alarms
- Reports
- Chiller settings
- Display settings
- Graphing
- Support for 15 languages

Figure 4 – Picture TD7

System Integration

Stand-Alone Controls

Single chillers installed in applications without a building management system are simple to install and control: only a remote auto/stop for scheduling is required for unit operation. Signals from the chilled-water pump contactor auxiliary, or a flow switch, are wired to the chilled-water flow interlock. Signals from a time clock or some other remote device are wired to the external auto/stop input.

- Auto/Stop-A job-site provided contact closure turns the unit on and off.
- External Interlock-A job-site provided contact opening wired to this input turns the unit off and requires a manual reset of the unit microcomputer. This closure is typically triggered by a job-site provided system such as a fire alarm.

Hardwire Points

Microcomputer controls allow simple interface with other control systems, such as time clocks, building automation systems, and ice storage systems via hardwire points. This means you have the flexibility to meet job requirements while not having to learn a complicated control system. Remote devices are wired from the control panel to provide auxiliary control to a building automation system. Inputs and outputs can be communicated via a typical 4–20 mA electrical signal, an equivalent 2–10 V dc signal, or by utilizing contact closures. This setup has the same features as a stand-alone water chiller, with the possibility of having additional optional features:

- Ice making control.
- External chilled water setpoint, external demand limit setpoint.
- Chilled water temperature reset.
- Programmable relays - available outputs are: alarm-latching, alarm-auto reset, general alarm-warning, chiller limit mode, compressor running, and Tracer control.

BACnet Interface

- Tracer TD7 control can be configured for BACnet communications at the factory or in the field. This enables the chiller controller to communicate on a BACnet MS/TP network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled through BACnet. Tracer TD7 controls conforms to the BACnet B-ASC profile as defined by ASHRAE 135-2004.
- LonTalk Communications Interface (LCI-C)
- The optional LonTalk® Communications Interface for Chillers (LCI-C) is available factory or field installed. It is an integrated communication board that enables the chiller controller to communicate over a LonTalk network. The LCI-C is capable of controlling and monitoring chiller setpoints, operating modes, alarms, and status. The Trane LCI-C provides additional points beyond the standard LONMARK® defined chiller profile to extend interoperability and support a broader range of system applications. These added points are referred to as open extensions. The LCI-C is certified to the LONMARK Chiller Controller Functional Profile 8040 version 1.0, and follows LonTalk FTT-10A free topology communications.

Modbus Interface Tracer TD7 control can be configured for Modbus communications at the factory or in the field. This enables the chiller controller to communicate as a slave device on a Modbus network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled by a Modbus master device.

Mechanical Specifications

Tracer Summit

The chiller plant control capabilities of the Trane Tracer Summit™ building automation system are unequaled in the industry. Trane's depth of experience in chillers and controls makes us a well-qualified choice for automation of chiller plants using air-cooled RTAF chillers. Our chiller plant automation software is fully pre-engineered and tested.

Required features:

- LonTalk/Tracer Summit Interface (selectable option with chiller)
- Building Control Unit (external device required)
- Sequences starting of chillers to optimize the overall chiller plant energy efficiency
  - Individual chillers operate as base, peak, or swing based on capacity and efficiency
  - Automatically rotates individual chiller operation to equalize runtime and wear between chillers
  - Evaluates and selects the lowest energy consumption alternative from an overall system perspective.
- Regulatory Compliance Documentation
- Gathers information and generates the reports mandated in ASHRAE Guideline 3.
- Easy Operation and Maintenance
- Remote monitoring and control
- Displays both current operation conditions and scheduled automated control actions
- Concise reports assist in planning for preventative maintenance and verifying performance

Alarm notification and diagnostic messages aid in quick and accurate troubleshooting

Unit-Mounted Start-Delta Starter (RTHD SE, HE, XE)

The starter is available in a Star-Delta configuration closed transition, factory-mounted and fully pre-wired to the compressor motor and control panel. Starter will reduce 33% the RLA inrush current.

A factory-installed, factory-wired 600VA control power transformer provides all unit control power (120 VAC secondary) and UC800 module power (24 VAC secondary). Optional starter features include circuit breaker, fused disconnect switch, non-fused disconnect switch. All the starter elements will be enclosed in a IP54 panel, with hinged door to allow customer power input connection

Adaptive Frequency Drive (RTHD HSE)

RTHD HSE will fit an Adaptive Frequency Drive, factory mounted, tested and wired. Frequency converter will be chosen by the manufacturer basis on the present motor current at maximum loading of the unit, and will drive the chiller start and ramp up, as long as the partial load operation.

AFD enclosure will be IP54 as standard, with integrated air cooling system, consisting in a fan below the AFD frame, without no obstacle to the air circulation

Harmonic Filter (optional)

AFD could be equipped with an Harmonic Filter, sized by the manufacturer in accordance with the compressor size, with a minimum capability of 5% THiD (Total harmonic Distortion). Filter frame will have a minimum protection rate of IP23, and could built-in on the AFD frame.

Filter must be compliance with EMC standards EN 55011-1A.

The purpose of harmonic filter will be to avoid incremental heat losses in the installation (transformers, cables), keeping harmonic currents at low level so as to avoid transformer overload and high cable temperature.

Options

Disconnect switch

Optional starter features include circuit breaker, fused disconnect switch, non fused disconnect switch.

The disconnect switch is also mechanically interlocked to disconnect line power from the starter before the starter door is open.

Nitrogen Charge

Unit is shipped with a nitrogen holding charge in lieu of refrigerant (No oil charge).

Holding charge

Unit is shipped with a holding R134a charge and full oil charge.

Insulation

All low temperature surfaces are covered with 19 mm of armaflex (K=0.28), including the evaporator and water boxes, suction line and motor housing .

Cupronickel condenser tubes

Cupronickel condenser tubes are available for special applications. 90/10 cupronickel tubes are ¾" diameter and 0.035" wall thickness.

Programmable Relays (Alarm and Status)

Tracer UC800 provides a flexible alarm or chiller status indication to a remote location through a hard wired interface to a dry contact closure. Four relays are available for this function, and they are provided (generally with a Quad Relay Output LLID) as part of the Alarm Relay Output Option. The events/states that can be assigned to the programmable relays are listed in the installation manual RLC-SVX018.

External Base Loading

Primarily for process control requirements, base loading provides for immediate start and loading of a chiller up to an externally or remotely adjustable current limit setpoint without regard to differential to start or stop, or to leaving water temperature control. This allows the flexibility to prestart or preload a chiller in anticipation of a large load application. It also allows you to keep a chiller on line between processes when leaving water temperature control would normally cycle the unit.

Summit Interface

Tracer UC800 provides an optional interface between the chiller and a Trane Summit BAS. A Communications interface LLID shall be used to provide «gateway» functionality between the Chiller and Summit.

LonTalk Communication Interface

Tracer UC800 provides an optional LonTalk Communication Interface (LCI-C) between the chiller and a Building Automation System (BAS). An LCI-C LLID shall be used to provide «gateway» functionality between the LonTalk protocol and the Chiller.

Modbus Communication Interface

UC800 provides an optional Modbus Communication Interface, fully integrated that shall be used to provide "gateway" functionality between the Modbus protocol and the Chiller.

BACnet Communication Interface

UC800 provides an optional Modbus Communication Interface , fully integrated that shall be used to provide "gateway" functionality between the BACnet protocol and the Chiller.

Ice Making Control

Tracer UC800 accepts a contact closure input to initiate Ice Building. When in the ice building mode, the compressor will be fully loaded (not given a low setpoint) and will continue to operate until the ice contacts open or the return water temperature reaches the Ice Termination Setpoint. If terminated on return setpoint, Tracer UC800 will not allow the chiller to restart until the ice making contact is opened.

Ice Machine Contact

Tracer UC800 provides an output contact closure that can be used as a signal to the system that ice building is in operation. This relay will be closed when ice building is in progress and open when ice building has been terminated by either Tracer UC800 or the remote interlock. It is used to signal the system changes required to convert to and from ice making.

External Chilled Water Setpoint

Tracer UC800 will accept either a 2-10 VDC or a 4-20mA input signal, to adjust the chilled water setpoint from a remote location.

External Current Limit Setpoint

Tracer UC800 will accept either a 2-10VDC or a 4-20mA input signal to adjust the current limit setpoint from a remote location.

Percent Condenser Pressure Output

Tracer UC800 provides a 2-10 VDC analog output to indicate percent High Pressure Cutout (HPC) condenser pressure.

Percent HPC = (Condenser Pressure/High Pressure Cutout Setpoint)*100

Compressor Percent RLA Output

Tracer UC800 provides a 0-10 Vdc analog output to indicate %RLA of compressor starter average phase current. 2 to 10 Vdc corresponds to 0 to 120%RLA.

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