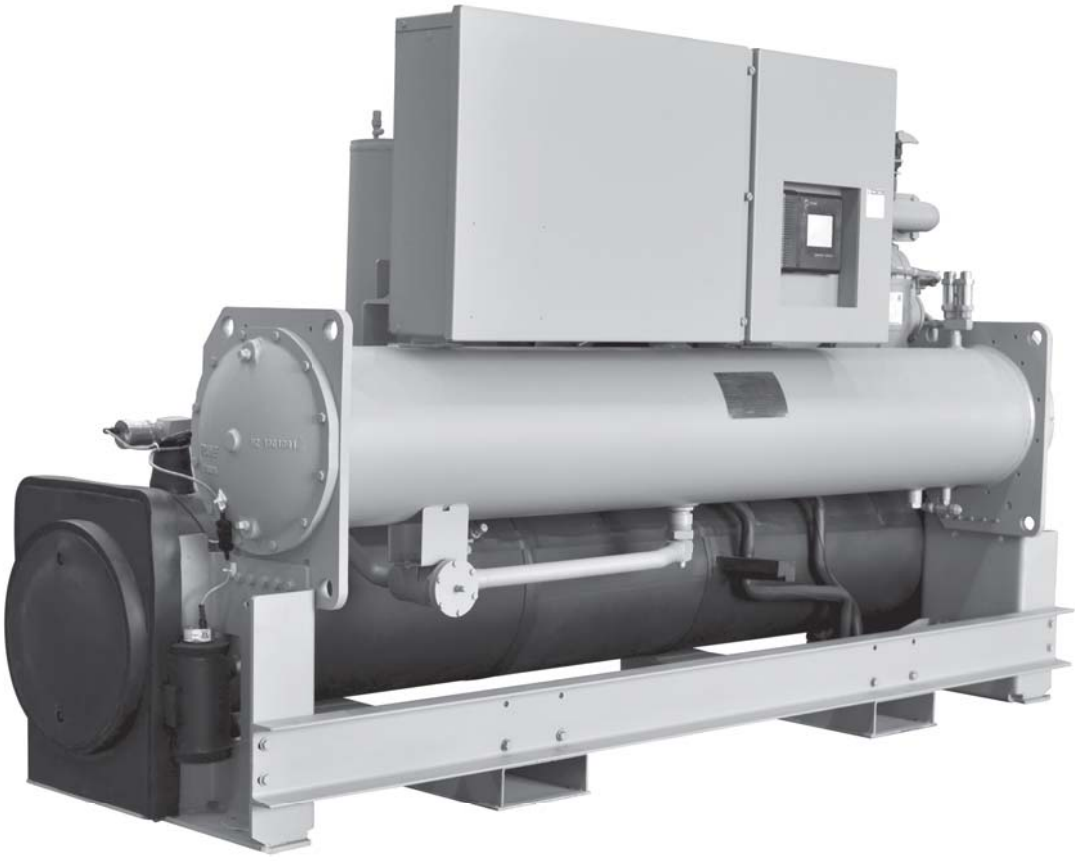
Product Catalog

Series R™ Helical Rotary Water-Cooled Liquid Chillers

Model RTWS 60-125 Tons

50 Hz



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Introduction

To meet a wide range of applications in the 65–125 ton water-cooled market, Trane is proud to introduce the model RTWS helical-rotary liquid chiller. The introduction of this next-generation chiller is an exciting step forward in application versatility, ease of installation, control precision, reliability, energy-efficiency, and operational cost-effectiveness. The new RTWS chiller is designed to deliver proven Series R performance, plus all the benefits of an advanced heat transfer design with a single compressor.

Important Design Advances and New Features

- Higher full-load energy efficiency that meets ASHRAE 90.1 and reduces both operating and lifecycle costs.
- Variable evaporator flow compensation for improved control stability with energy saving variable flow applications.
- Single chiller time of day scheduling communication option for easier control of small jobs.
- HFC-134a optimized design.

The industrial-grade design of the Series R 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 reliable compressor, wide operating temperature range, advanced controls, electronic expansion valve, short anti-recycle timers, and industry-leading efficiencies mean that this latest Trane Series R 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

Reliability

- 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 more than 240,000 compressors installed worldwide.
- Direct drive, low-speed compressors—a simple design with only four moving parts—provides maximum efficiency, high reliability, and low maintenance requirements.
- Suction gas-cooled motor stays at a uniformly low temperature for long motor life.
- Electronic expansion valve, with fewer moving parts than alternative valve designs, provides highly reliable operation.

High Performance

- Advanced design enables chilled water temperature control to ±0.5°F (0.28°C) for flow changes up to 10 percent per minute, plus handling of flow changes up to 30 percent per minute for variable flow applications.
- 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.
- High compressor lift capabilities for use with heat recovery and waterside heat pump applications allows highly efficient system design with minimal operational concerns.
- Tight water temperature control extends to operation of multiple chillers in parallel or series configurations, offering further system design flexibility for maximum efficiency.
- Optional LonTalk/Trace Summit or Modbus communications interface provides excellent, trouble-free inter operability.

Life Cycle Cost-Effectiveness

- Precise compressor rotor tip clearance ensures optimal efficiency.
- Condenser and evaporator tubes use the latest heat transfer technology for increased efficiency.
- 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.
- Chilled water reset based on return water temperature is standard.
- External and BAS current-limiting are available as options.

Application Versatility

- **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 industryleading temperature, efficiency, and control capabilities, plus outstanding support through partnership with Calmac, a strong Trane partner providing proven installation examples, templates, and references that minimize design time and energy costs.

- **Heat recovery** – Maximum condenser temperature exceeds those of previous technologies, providing hot water and tight control that minimizes operating costs for the chilled water plant and boiler/hot water heater, while also providing consistent dehumidification.

- **Water to water heat pump** – For multi-chiller systems where there is a base or year-round heating load the RTWS can be used as a water side heat pump by utilizing ground or surface water as a heat source. Leaving condenser temperature control option allows for the chiller to be used and controlled primarily for the heat produced in the condenser.

- **Dry Cooler** – Allows for use with a closed condenser loop system that minimizes the potential for cross-contamination of the condenser loop.

- **Variable primary flow** – Variable evaporator flow compensation allows multi-chiller systems to vary the flow of water throughout the entire system (from the evaporator through the cooling coils). This feature also provides additional system efficiency as the number of pumps and the flow rate in the system are reduced. Standard 2 pass or optional 3 pass evaporator allows for a wider range of flow capabilities.

- **Series chiller configuration** – For two-chiller systems all the system water passes through the evaporators and/or condensers of both chillers to take advantage of system efficiency gains due to thermodynamic staging as well as downsizing the upstream chiller.

- **EarthWise system** – Low flow and high temperature differential installations allow for reduced pump and cooling-tower energy by decreasing the amount of water flow pumped through the system. This results in downsizing of all HVAC and ancillary equipment which provides installation and operational savings.

Simple, Economical Installation

- All units fit through standard single-width doors. Units are designed with bolt-together construction for disassembly to fit through smaller openings.
- Small footprint saves valuable equipment room space and alleviates access concerns for most retrofit jobs.
- Lightweight design simplifies rigging requirements, further reducing installation time requirements and costs.
- Full factory refrigerant and oil charges reduce required field labor, materials, and installation cost. An optional nitrogen charge can reduce the time and labor for projects expecting disassembly.
- Optional integrated forklift channels on the unit base allow for easy movement of the chiller at the job site.
- Unit-mounted starter eliminates additional job site installation considerations and labor requirements.
- Trane CH530 controls easily interface with Tracer Smmit ™ , Modbus™ or LonTalk™ building automation systems through single twisted-pair wire.
- Trane has conducted extensive factory testing during manufacturing, and also offers options for in-person and/or documented system performance verification.

Precision Control

- Microprocessor-based Trane CH530 controls monitor and maintain optimal operation of the chiller and its associated sensors, actuators, relays, and switches, all of which are factoryassembled and extensively tested.
- Easy interface with computers hosting LonTalk/Trancer Summit or Modbus building automation/ energy management systems allows the operator to efficiently optimize comfort system performance and minimize operating costs.
- Proportional Integral Derivative (PID) control strategy ensures stable, efficient chilled water temperature, maintaining ±1°F (0.56°C) by reacting to instantaneous load changes.
- Adaptive Control™attempts to maintain chiller operation under adverse conditions, when many other chillers might simply shut down. This is accomplished by unloading the compressor due to high condensing pressure, low suction pressure and/or overcurrent.
- Easy-to-use operator interface displays all operating and safety messages, with complete diagnostics information, on a easily readable panel with a scrolling touch-screen display.
- New variable evaporator flow compensation maintains improved control stability of the leaving water temperature.

Application Considerations

Condenser Water Temperatures

With the model RTWS chiller, condenser head pressure control is necessary only if the unit starts with entering condenser water temperatures below 55°F (12.8°C), or between 45°F (7.2°C) and 55°F (12.8°C), when a temperature increase of 1°F (0.56°C) per minute to 55°F (12.8°C) is not possible. When the application requires startup temperatures below the prescribed minimums, a variety of system implementation options are available including the use of a 2- or 3-way valve or tower bypass to maintain the required system refrigerant differential pressure.

- To control a 2-way or 3-way valve, select the Condenser Regulating Valve Control option for the Trane CH530 controls. This option enables the CH530 controls to send a signal for opening and closing the valve as necessary to maintain chiller differential refrigerant pressure. The 2-way valves are available as a ship-with option.

- Tower bypass may also be a valid control method if the chiller temperature requirements can be maintained and the loop is small.
  The minimum acceptable refrigerant pressure differential between condenser and evaporator is 25 psid (1.7 bars) at all load conditions in order to ensure adequate oil circulation. Condenser leaving water temperature must be 17°F (9.5°C) higher than evaporator leaving water emperature within 2 minutes of startup. A 25°F (13.9°C) temperature difference must be maintained hereafter [this differential requirement is lessened by 0.25°F (0.14°C) for every 1°F (0.56°C) that the condenser leaving water temperature is above 55°F (12.8°C)].

Trane Series R chillers start and operate successfully and reliably over a range of load conditions with controlled condenser pressure. Reducing the condenser water temperature is an effective method of lowering chiller power input required, but the ideal temperature for optimizing total system power consumption will depend on the overall system dynamics. From a system perspective, some improvements in chiller efficiency may be offset by the increased tower fan and pumping costs required to achieve the lower tower temperatures. Contact your local Trane systems solution provider for more information on optimizing system performance.

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 superior unloading compressor design and advanced Trane CH530 controls, the RTWS has excellent capability to maintain leaving water temperature control within +/-0.5°F (0.28°C), even for systems with variable evaporator flow.

Some basic rules should be followed whenever using these system design and operational savings methods with the RTWS. 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 two 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 percent of design per minute to maintain +/-0.5°F (0.28°C) leaving evaporator temperature control. For applications in which system energy savings is most important, up to 30 percent change in flow per minute are possible. Flow rates should be maintained between the minimum and maximum allowed for any particular chiller configuration.

For applications designed to operate with changes in the water flow rate, the new evaporator waterflow compensation improves the ability of the chiller to respond to increasing or decreasing water flow. This new standard control feature works by varying the leaving evaporator temperature control gains in response to changes in evaporator water flow. By measuring the refrigerant flow in each circuit and using this value to calculate the resulting waterside temperature drop, the CH530 can estimate the water flow rate through the evaporator.

Series Chiller Arrangements

Another energy-saving strategy is to design the system around chillers arranged in series, on the evaporator, condenser, or both. 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 (including downsizing a chiller).

The Trane screw compressor also has excellent "lift" capabilities which afford 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 should be researched by consulting a Trane systems solutions provider and applying the Trace™ building energy and economic analysis program.

Heat Recovery

At a time when energy costs are high and continue to rise, reducing energy usage has become increasingly important. By using a RTWS chiller with heat recovery, utilization of energy can be improved by using heat from the condenser that would otherwise be wasted.

The use of heat recovery should be considered in any building with simultaneous heating and cooling requirements or in facilities where heat can be stored and used at a later time. Buildings with high year-round internal cooling loads are excellent opportunities for heat recovery. Heat recovery can be accomplished with the RTWS by recovering heat from the water leaving the standard condenser and using it in conjunction with a third party heat exchanger.

Water-to-Water Heat Pump

The RTWS can be used as a water side heat pump by using ground or surface water as a heat source. Leaving condenser water control option provides the ability to control the heating setpoint. Local regulation concerning limitation on minimum/maximum rejected water temperature needs to be checked before using this method.

Dry Cooler

The RTWS can be used with dry coolers. Generally this application is selected to minimize the spread of airborne contaminates associated with open tower systems. In addition, other drawbacks of cooling towers are avoided: water consumption, production of vapor, need of water treatment, etc. Another benefit of dry coolers is the ability to operate in low ambient conditions. With the use of a third party heat exchanger this design can also be used to provide free cooling to the chilled water loop during cold weather.

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.

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 Series R chiller motors.

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

Acoustic Considerations

- For chiller sound ratings, installation tips, and considerations on chiller location, pipe isolation, etc., refer to the *Water-Cooled Series R Chillers Sound Ratings and Installation Guide.*

Model Number Descriptions

Digit 01, 02, 03, 04 – Chiller Model
RTWS=Water Cooled Chiller Series R™ Simplex

Digit 05, 06, 07 – Unit Nominal Tonnage
065=65 Nominal Tons
085=85 Nominal Tons
105=105 Nominal Tons
125=125 Nominal Tons

Digit 08 – Unit Voltage/Unit Hertz
C=380/50/3
E=400/50/3
S=Special

Digit 09 – Manufacturing Plant
3=Taicang, China

Digit 10, 11 – Design Sequence
A0=First design **
**=First Design, etc. increment when parts are affected for service purposes

Digits 12 – Unit Type
2=High Efficiency/Performance

Digit 13 – Agency Listing
0=No Agency Listing
C=Manufactured to GB Standards

Digit 14 – Pressure Vessel Code
1=ASME Pressure Vessel Code
3=Chinese Code Pressure Vessel

Digit 15 – Unit Application
A=Standard Cond <=45°C(113°F) Leaving Water Temp
B=High Temperature Cond >45°C(113°F) Leaving Water Temperature
C=Water-to-Water Heat Pump
S=Special

Digit 16 – Pressure Relief Valve
2=Dual Relief Valve with 3-Way Isolation Valve

Digit 17 – Water Connection Type
B=Flanged Connection
S=Special

Digit 18 – Evap Application
1=Standard Cooling
2=Low Temperature
3=Ice Making

Digit 19 – Evap Tubes
A=Internal and External Enhanced Evap Tube

Digit 20 – Number of Evap Passes
2=2 Pass Evap
3=3 Pass Evap

Digit 21 – Evap Waterbox Connection Direction
1=Right In Right Out
2=Right In Left Out

Digit 22– Evap Water Side Pressure
A=10.4 Bar (150 psi) Evap Water Pressure
S=Special

Digit 23 – Cond Tubes
A=Enhanced Fin - Copper
S=Special

Digit 24 – Cond Waterbox Connection Direction
1=Right In Right Out
2=Left In Left Out

Digit 25 – Cond Water Side Pressure
1=10.4 Bar(150 psi) Cond Water Pressure
S=Special

Digit 26 – Compressor Starter Type
Y=Wye-Delta Closed Transition Starter
X=Across the Line Starter

Digit 27 – Power Line Connection Type
A=Terminal Block Connection for Incoming Lines
B=Mechanical Disconnect Switch
D=Circuit Breaker

Digit 28 – Under/Over Voltage Protection
0=No Under/Over Voltage Protection
1=Under/Over Voltage Protection

Digit 29 – Unit Operator Interface
A=Dyna-View/English
M=Dyna-View/Thai
N=Dyna-View/Simplified Chinese

Digit 30 – Remote Interface (Digital Communication)
0=No Remote Digital Communication
1=LonTalk/Tracer Summit Interface
2=Time of Day Scheduling
3=Unit Level BACnet
4=LonTalk LCI-C Interface w/ Modbus interface

Digit 31 – External Water & Current Limit Setpoint
0=No External Water & Current-Limit Setpoint
A=External Water & Current-Limit Setpoint - 4–20 mA
B=External Water & Current-Limit Setpoint - 2–10 Vdc

Digit 32 – Ice Making
0=No Ice Making
A=Ice Making with Relay
B=Ice Making without Relay

Digit 33 – Programmable Relays
0=No Programmable Relays
A=Programmable Relays

Digit 34 – Cond Refrigerant Pressure Output Option
0=No Cond Pressure Output
1=Cond Pressure Output
2=Cond Pressure (%HPC) Output
3=Differential Pressure Output

Digit 35 – Outdoor Air Temp Sensor
0=No Outdoor Air Temp Sensor
A=Outdoor Air Temp Sensor-CWR

Digit 36 – Cond Leaving Hot Water Temp Control
0=No Cond Leaving Hot Water Temperature Control
1=Cond Leaving Hot Water Temperature Control

Digit 37 – Power Meter
0=No Power Meter
P=Power Meter

Digit 38 – Motor Current Analog Output (%RLA)
0=No Motor Current Analog Output
1=Motor Current Analog Output

Digit 39 – Installation Accessories
0=No Installation Accessories
A=Elastomeric Isolators

Digit 40 – Flow Switch
1=150 psi NEMA 1; Flow Switch x1
2=150 psi NEMA 1; Flow Switch x2
3=150 psi NEMA 4; Flow Switch x1
4=150 psi NEMA 4; Flow Switch x2
7=Factory Installed Proof of Flow Evap & Cond
S=Special

Digit 41 – 2-Way Water Regulating Valve
0=No 2-Way Water Regulating Valve
A=3" 150 psi/88.9 mm 10.4 bar 115V
B=3" 150 psi/88.9 mm 10.4 bar 220V
C=4" 150 psi/114.3 mm 10.4 bar 115V
D=4" 150 psi/114.3 mm 10.4 bar 220V
S=Special

Digit 42 – Sound Reduction Package
0=No Sound Reduction Package

Digit 43 – Insulation
0=No Insulation
1=Factory Insulation - All Cold Parts
2=Insulation for High Humidity

Digit 44 – Factory Charge
0=Full Factory Refrigerant Charge (R134a)
1=Nitrogen Charge

Digit 45 – Base Rail Fork Lifting
0=No Base Rail Fork Lifting
B=Base Rail Fork Lifting

Digit 46 – Label and Literature Language
D=English
F=Chinese – Simple

Digit 47 – Special
0=None
S=Special

Digit 48 – Shipping Package
0=No skid (Standard)
1=Skid

Digit 49 – Performance Test Options
0=No Performance Test
C=1 Point Test with Report
D=2 Point Test with Report
G=Witness 1 Point Test With Report
H=Witness 2 Point Test With Report

General Data

Table 1 General Data - 50 Hz- High Efficiency

Size		065	085	105	125
Compressor					
Quantity		1	1	1	1
Evaporator					
Water Storage	(L)	29.8	35.7	48.5	55.6
	(gal)	7.9	9.4	12.8	14.7
2 Pass Arrangement					
Water Conn. Size	(mm)	100	100	125	125
	NPS	4	4	5	5
Minimum Flow	(L/s)	3.8	4.7	6.1	7.2
	(gpm)	60	75	96	115
Maximum Flow	(L/s)	13.8	17.3	22.3	26.5
	(gpm)	218	274	353	420
3 Pass Arrangement					
Water Conn. Size	(mm)	75	75	100	100
	NPS	3	3	4	4
Minimum Flow	(L/s)	2.5	3.1	4.0	4.0
	(gpm)	40	50	64	76
Maximum Flow	(L/s)	9.2	11.5	14.8	17.7
	(gpm)	146	183	235	280
Condenser					
Water Storage	(L)	35.3	43.6	61.3	67.8
	(gal)	9.3	11.5	16.2	17.9
Water Conn. Size	(mm)	100	100	125	125
	NPS	4	4	5	5
Minimum Flow	(L/s)	4.2	5.4	7.0	8.0
	(gpm)	66	85	111	126
Maximum Flow	(L/s)	15.2	19.7	25.7	29.2
	(gpm)	242	312	408	463
General Unit					
Refrigerant Type		R134a	R134a	R134a	R134a
# Refrig Circuit		1	1	1	1
Refrigerant Charge	(kg)	84.8	81.0	103.0	100.0
	(lb)	186.9	178.6	226.9	221.4
Oil Charge	(L)	9.3	9.3	10.7	10.7
	(quarts)	8.4	8.4	9.7	9.7

1. Flow limits are for water only

Performance Data

Table 2. Performance Data - 50 Hz - high efficiency - I-P units

Eavorator Leaving Water Temperature (°F)	Unit Size	Condenser Entering Water Temperature(°F)											
		75				85				95			
		Tons	kW Input	EER	kW/Ton	Tons	kW Input	EER	kW/Ton	Tons	kW Input	EER	kW/Ton
40	65	58.4	34.3	20.4	0.588	54.8	38.6	17.1	0.703	51.1	43.4	14.1	0.851
	85	80.5	47.4	20.4	0.589	75.8	53.1	17.1	0.700	71.0	59.7	14.3	0.840
	105	98.4	57.7	20.5	0.586	92.5	64.8	17.1	0.700	86.5	73.0	14.2	0.840
	125	117.8	70.4	20.1	0.597	111.3	77.7	17.2	0.699	104.4	86.4	14.5	0.827
42	65	60.8	34.7	21.1	0.570	57.1	38.9	17.6	0.681	53.2	43.7	14.6	0.822
	85	83.7	47.9	21.0	0.573	79.0	53.6	17.7	0.679	74.0	60.2	14.8	0.813
	105	102.4	58.3	21.1	0.569	96.4	65.3	17.7	0.678	90.2	73.5	14.7	0.815
	125	122.6	71.4	20.6	0.582	115.8	78.7	17.7	0.679	108.8	87.3	15.0	0.802
44	65	63.3	35.0	21.7	0.553	59.4	39.2	18.2	0.660	55.4	44.0	15.1	0.794
	85	87.0	48.5	21.6	0.557	82.1	54.1	18.2	0.658	77.1	60.6	15.2	0.787
	105	106.6	58.9	21.7	0.552	100.4	65.9	18.3	0.657	94.0	74.0	15.2	0.788
	125	127.5	72.5	21.1	0.568	120.5	79.7	18.1	0.661	113.2	88.2	15.4	0.779
46	65	65.8	35.4	22.3	0.538	61.8	39.6	18.8	0.640	57.7	44.4	15.6	0.769
	85	90.5	49.0	22.1	0.542	85.4	54.6	18.8	0.639	80.2	61.2	15.7	0.763
	105	110.8	59.5	22.3	0.537	104.5	66.5	18.9	0.637	97.8	74.6	15.7	0.762
	125	132.5	73.6	21.6	0.555	125.3	80.7	18.6	0.644	117.8	89.2	15.9	0.757
48	65	68.3	35.7	22.9	0.523	64.3	39.9	19.3	0.621	60.0	44.7	16.1	0.745
	85	93.9	49.6	22.7	0.528	88.8	55.2	19.3	0.621	83.4	61.7	16.2	0.740
	105	115.2	60.2	23.0	0.522	108.7	67.1	19.4	0.618	101.8	75.1	16.3	0.738
	125	137.6	74.7	22.1	0.543	130.2	81.8	19.1	0.628	122.5	90.2	16.3	0.736
50	65	70.9	36.1	23.6	0.509	66.8	40.3	19.9	0.603	62.4	45.1	16.6	0.722
	85	71.0	35.0	24.4	0.492	67.0	39.0	20.6	0.582	62.7	43.6	17.2	0.696
	105	119.7	60.9	23.6	0.508	112.9	67.8	20.0	0.600	105.9	75.8	16.8	0.715
	125	142.9	75.9	22.6	0.531	135.2	83.0	19.6	0.613	127.4	91.3	16.7	0.717

1. Rated in accordance with ARI Standard 550/590-2003, based on a flow defined by rating condition: leaving evaporator water temperature is 44oF, 2.4 gpm/ton on the evaporator, fouling factor is 0.0001 h • ft² • °F/Btu (0.0176 °K • m³/kW); entering condensor water temperature is 85°F, 3 gpm/ton on the condensor, fouling factor is 0.00025 ft² • °F/Btu (0.044 °K • m³/kW).
2. Performance is based on 2 pass evaporator configuration.
3. Consult Trane representative for additional performance information.
4. kW input include compressors and control power
5. COP-Coefficient of Performance (watt/watt). EER - Energy Efficiency Ratio, Btu/(W • h)
6. Interpolation between points is permissable. Extrapolation is not permitted.

Performance Data

Table 3. Performance Data - 50 Hz - high efficiency - S-I units

Eavorator Leaving Water Temperature (°C)	Unit Size	Condenser Entering Water Temperature(°C)								
		25			30			35		
		kW Cooling	kW Input	COP	kW Cooling	kW Input	COP	kW Cooling	kW Input	COP
5	65	207.1	35.3	5.87	195.5	39.2	4.99	183.4	43.6	4.21
	85	285.4	48.7	5.86	270.5	53.9	5.01	255.0	59.9	4.26
	105	348.9	59.3	5.88	330.1	65.8	5.01	310.6	73.2	4.24
	125	418.1	72.3	5.79	396.8	79.0	5.02	374.8	86.8	4.32
7	65	222.4	35.9	6.20	210.2	39.8	5.29	197.3	44.1	4.47
	85	306.3	49.7	6.17	290.5	54.8	5.30	274.2	60.8	4.51
	105	375.0	60.4	6.21	355.1	66.8	5.31	334.5	74.2	4.51
	125	448.6	74.1	6.05	426.2	80.8	5.28	403.0	88.5	4.56
9	65	238.4	36.6	6.52	225.5	40.4	5.58	212.0	44.7	4.73
	85	328.0	50.7	6.47	311.5	55.8	5.58	294.3	61.7	4.77
	105	402.2	61.5	6.54	381.3	67.9	5.61	359.6	75.2	4.78
	125	480.6	76.2	6.31	457.0	82.7	5.53	432.6	90.3	4.79

1. Rated in accordance with ARI Standard 550/590-2003, based on a flow defined by rating condition: leaving evaporator water temperature is 44oF, 2.4 gpm/ton on the evaporator, fouling factor is 0.0001 h • ft^2 • °F/Btu (0.0176 °K • m^3/kW); entering condensor water temperature is 85°F, 3 gpm/ton on the condensor, fouling factor is 0.00025 ft^2 • °F/Btu (0.044 °K • m^3/kW).
2. Performance is based on 2 pass evaporator configuration.
3. Consult Trane representative for additional performance information.
4. kW input include compressors and control power.
5. COP-Coefficient of Performance (watt/watt). EER - Energy Efficiency Ratio, Btu/(W • h).
6. Interpolation between points is permissable. Extrapolation is not permitted.

Table 4. Part Load Performance - 50 Hz - high efficiency - I-P units

						IPLV	
Unit Size	% Load	Tons	kW	EER	kW/Ton	EER	kW/Ton
65	100	59.5	39.2	18.2	0.660	20.7	0.579
	75	44.6	24.3	22.0	0.545		
	50	29.7	16.3	21.9	0.549		
	25	14.9	14.6	12.0	0.998		
85	100	82.1	54.1	18.2	0.658	20.4	0.588
	75	61.6	33.4	22.1	0.543		
	50	41.1	23.2	21.2	0.566		
	25	20.5	21.2	11.6	1.030		
105	100	100.4	65.9	18.3	0.657	20.7	0.581
	75	75.3	41.5	21.8	0.551		
	50	50.2	28.1	21.4	0.560		
	25	25.1	21.3	14.1	0.849		
125	100	120.5	79.7	18.1	0.661	21.0	0.572
	75	90.4	48.4	22.4	0.536		
	50	60.2	33.1	21.8	0.550		
	25	30.1	27.6	13.1	0.917		

1. Rated in accordance with ARI Standard 550/590-2003, based on a flow defined by rating condition: leaving evaporator water temperature is 44oF, 2.4 gpm/ton on the evaporator, fouling factor is 0.0001 h • ft² • °F/Btu (0.0176 °K • m³/kW); entering condensor water temperature is 85°F, 3 gpm/ton on the condensor, fouling factor is 0.00025 ft² • °F/Btu (0.044 °K • m³/kW).
2. Performance is based on 2 pass evaporator configuration.
3. Consult Trane representative for additional performance information.
4. kW input include compressors and control power.
5. COP-Coefficient of Performance (watt/watt). EER - Energy Efficiency Ratio, Btu/(W • h).
6. Interpolation between points is permissable. Extrapolation is not permitted.

Table 5. Part Load Performance - 50 Hz - high efficiency - SI units

					IPLV
Unit Size	% Load	Cooling kW	kW Input	COP	IPLV COP
65	100	209.1	39.2	5.33	6.07
	75	156.8	24.3	6.45	
	50	104.5	16.3	6.41	
	25	52.3	14.6	3.52	
85	100	288.9	54.1	5.34	5.98
	75	216.7	33.4	6.48	
	50	144.4	23.7	6.22	
	25	72.2	20.2	3.41	
105	100	353.1	65.9	5.36	6.06
	75	264.8	41.5	6.38	
	50	176.5	29.6	6.28	
	25	88.3	23.9	4.14	
125	100	423.7	79.7	5.32	6.15
	75	317.8	48.4	6.57	
	50	211.9	34.5	6.39	
	25	105.9	27.3	3.84	

1. Rated in accordance with ARI Standard 550/590-2003, based on a flow defined by rating condition: leaving evaporator water temperature is 44°F, 2.4 gpm/ton on the evaporator, fouling factor is 0.0001 h • ft².°F/Btu (0.0176 °K • m³/kW); entering condensor water temperature is 85°F, 3 gpm/ton on the condensor, fouling factor is 0.00025 ft² • °F/Btu (0.044 °K·m³/kW).
2. Performance is based on 2 pass evaporator configuration.
3. Consult Trane representative for additional performance information.
4. kW input include compressors and control power.
5. COP-Coefficient of Performance (watt/watt). EER - Energy Efficiency Ratio, Btu/(W·h)
6. Interpolation between points is permissable. Extrapolation is not permitted.

Controls

LCD Touch-Screen Display with Multi-Language Support

The standard DynaView display provided with the Trane CH530 control panel features an LCD touch-screen, allowing access to all operational inputs and outputs. This display supports many languages including: English, Chinese and Thai.

Display Features Include:

- LCD touch-screen with LED backlighting, for scrolling access to input and output operating information
- Single-screen, folder/tab-style display of all available information on individual components (evaporator, condenser, compressor, etc.)
- Manual override indication
- Password entry/lockout system to enable or disable display
- Automatic and immediate stop capabilities for standard or immediate manual shutdown
- Fast, easy access to available chiller data in tabbed format, including:
  - Modes of operation, including normal cooling and ice making
  - Water temperatures and setpoints
  - Loading and limiting status and setpoints
  - Average line current
  - Start/stop differential timers
  - Auto/Manual mode for EXV, slide valve, and head pressure control
  - Pump status and override
  - Chilled water reset settings
  - Optional external setpoints, including:
    i. Chilled water
    ii. Current-limit
    iii. Condenser leaving hot water temperature setpoint
    iv. Ice building
- Reports, listed on a single tabbed screen for easy access, including:
  - ASHRAE, containing all guideline 3 report information
  - Evaporator
  - Condenser
  - Compressor
- Evaporator, condenser, and compressor reports containing all operational information on individual components, including:
  - Water temperatures
  - Refrigerant pressures, temperatures, and approach
  - Oil pressure
  - Flow switch status
  - EXV position
  - Head pressure control command
  - Compressor starts and run-time

- Line phase percent RLA, amps, and volts
- Alarm and diagnostic information, including:
- Flashing alarms with touch-screen button of alarm condition
- Scrollable list of last ten active diagnostics
- Specific information on applicable diagnostic from list of over one-hundred
- Automatic or manual resetting diagnostic types

Control Interface

BAC Net, Mod Bus, LonTalk (LCI-C) or Tracer Summit communications capabilities are available, with communication link via single twisted-pair wiring to factory-installed, tested communication board.

Required features:
- LonTalk/Tracer Summit Interface
- BAC Net
- Mod Bus

Additional options that may be used:
- Ice making
- Chilled water temperature reset - outdoor air

External devices required:
- LonTalk/Trace Summit or Modbus compatible system level interface.

Tracer Summit

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

Energy Efficiency
- 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

When integrated with a Tracer Summit building management system the total building operation can be optimized. With this system option, the full breadth of Trane's HVAC and controls experience are applied to offer solutions to many facility issues.

Time of Day Scheduling

Time of day scheduling allows the customer to perform simple chiller scheduling without the need for a building automation system.

This feature allows the user to set 10 events in a 7 day time period. For each event the user can specify an activation time and the days of the week the event is active. Any setpoints available can be specified for each event, such as the leaving chilled water temperature (standard) and the current-limit setpoint (optional if ordered).

Required features:

- Time of day scheduling

Additional options that if ordered may be incorporated into the scheduling:

- External chilled water setpoint
- External current-limit setpoint
- Condenser leaving hot water temperature setpoint
- Ice making initiation

Hardwire Points

Remote devices wired from the control panel are another reliable method of providing 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 Vdc signal, or by utilizing contact closures.

Selectable options:

- External chilled water setpoint
- External current-limit setpoint
- Ice making control
- Condenser leaving hot water temperature control
- Chilled water temperature reset
- Condenser pressure output
- Motor current analog output
- Programmable relays - available outputs are: alarm-latching, alarm-auto reset, general alarm, warning, chiller limit mode, compressor running, head pressure relief request, and Tracer control

Electrical Data

Table 6 Electrical data – 50Hz - standard condensing temperature

		Unit Wiring(Amps)		Motor Data(Amps)		
Unit ID	**Rated Voltage**	**MCA**	**Wire Size (mm²)**	**RLA**	**LRA YD**	**LRA XL**
RTWS 065	380/50/3	95	25	74	180	589
	400/50/3	90	25	70	180	589
RTWS 085	380/50/3	127	50	100	259	796
	400/50/3	121	35	95	259	796
RTWS 105	380/50/3	153	50	121	291	896
	400/50/3	146	50	115	291	896
RTWS 125	380/50/3	183	70	145	354	1089
	400/50/3	173	70	137	354	1089

1. MCA–minimum circuit ampacity.
2. MOP–maximum over current protection.
3. RLA–rated load amps.
4. LRA –locked rotor amps are based on full winding starts.
5. LRA YD–Locked Rotor Amps in Wye configuration.
6. LRA XL–Locked Rotor Amps in the Delta configuration.
7. Standard condensing temperature refers to leaving condenser water temperatures not higher than 45℃(113°F).

Table 7 Electrical data – 50Hz - high condensing temperature

		Unit Wiring(Amps)		Motor Data(Amps)		
Unit ID	**Rated Voltage**	**MCA**	**Wire Size (mm²)**	**RLA**	**LRA YD**	**LRA XL**
RTWS 065	380/50/3	121	35	95	180	589
	400/50/3	115	35	90	180	589
RTWS 085	380/50/3	165	70	130	259	796
	400/50/3	157	70	124	259	796
RTWS 105	380/50/3	198	95	157	291	896
	400/50/3	188	70	149	291	896
RTWS 125	380/50/3	235	95	186	354	1089
	400/50/3	223	95	177	354	1089

1. MCA–minimum circuit ampacity.
2. MOP–maximum over current protection.
3. RLA–rated load amps.
4. LRA –locked rotor amps are based on full winding starts.
5. LRA YD–Locked Rotor Amps in Wye configuration.
6. LRA XL–Locked Rotor Amps in the Delta configuration.
7. High condensing temperature refers to leaving condenser water temperatures higher than 45℃(113°F).
8. RLA% displayed on the control panel might be lower than 100% under full load comfort cooling conditions.

Electrical Connections

Figure 1. Field Wiring Diagram

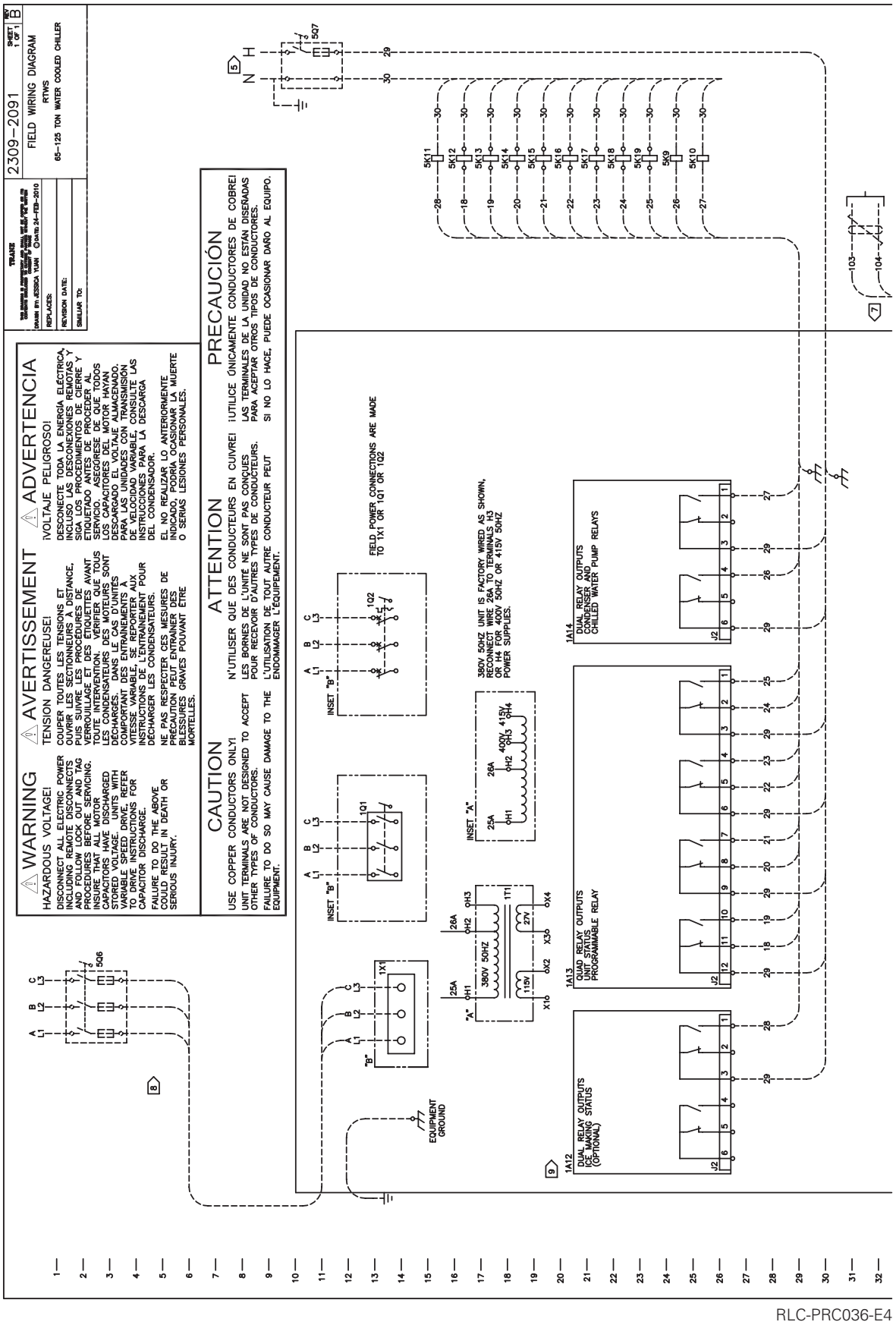


Figure 2. Field Wiring Diagram

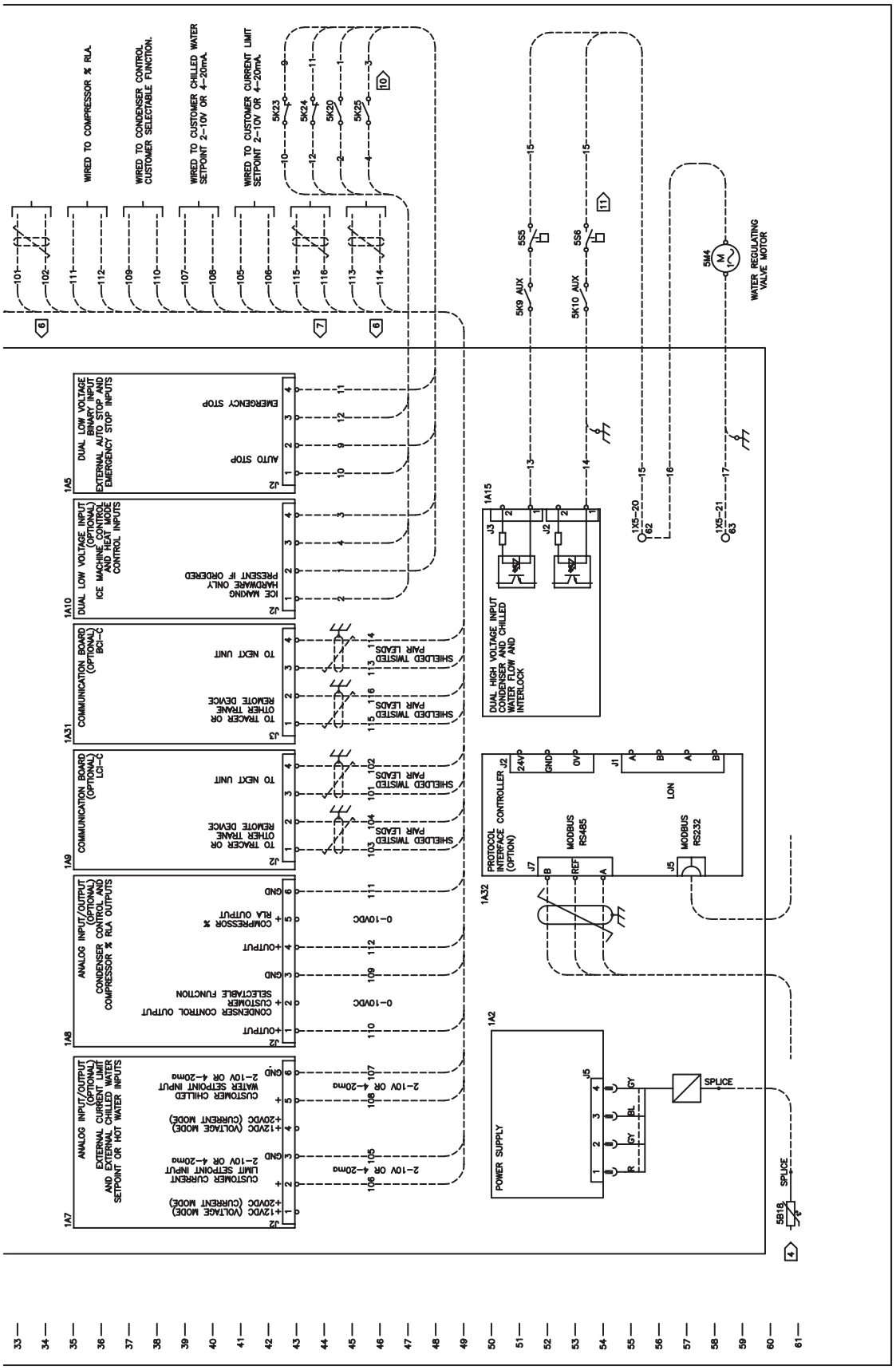


Table 8. Field Wiring Diagram Notes

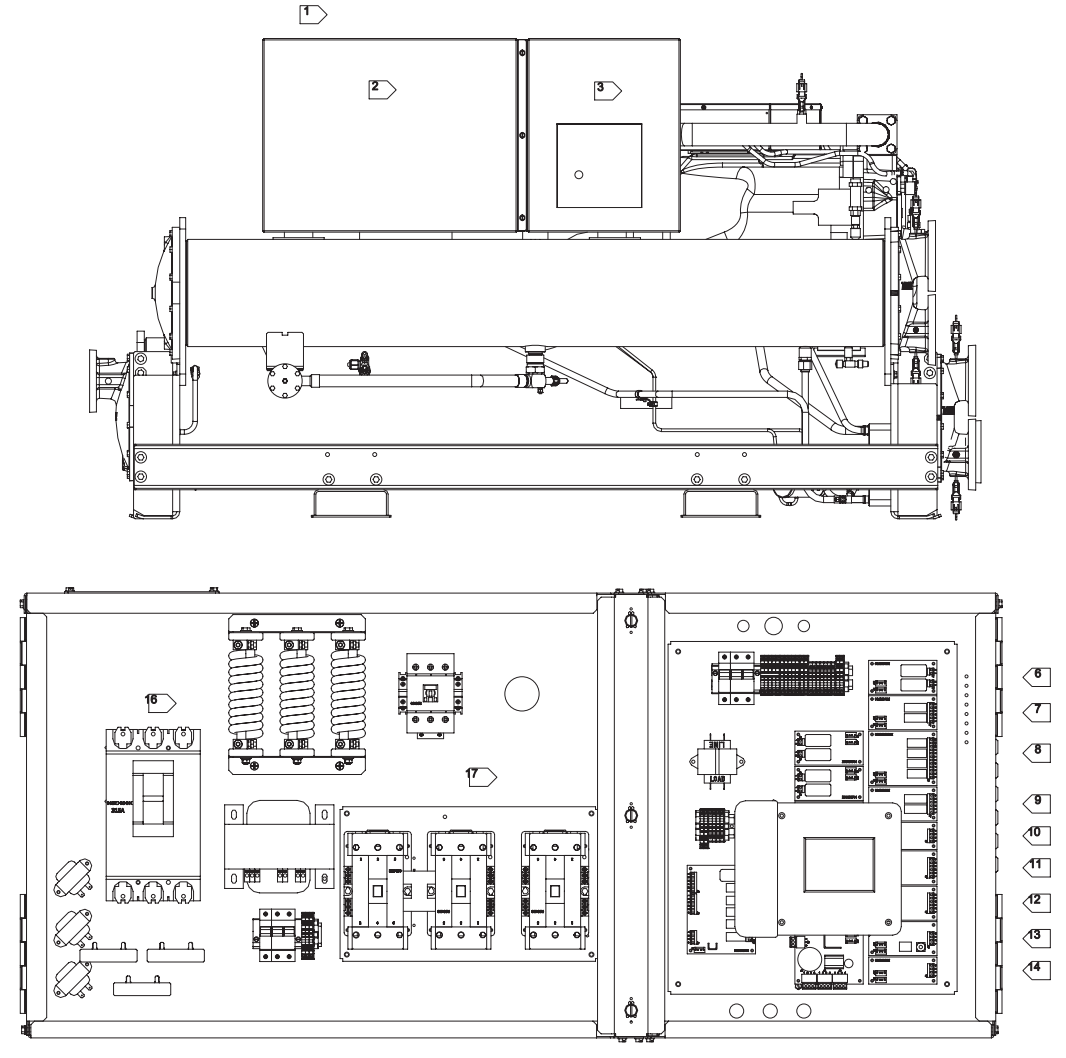
#	Description
1	Refer to RTWS electrical schematic for specific electrical connection information and notes pertaining to wiring installation.
2	All field wiring must be in accordance with local requirements.
3	All customer control circuit wiring must be copper conductors only and have a minimum insulation rating of 300 volts. Except as noted, all customer wiring connections are made to circuit board mounted box lugs with a wire range of 14 to 18 AWG.
4	Factory installed outdoor air temperature sensor lead length to be spliced and extended by customer.
5	Customer supplied power 115/60/1 or 220/50/1 to power relays. Max. Fuse size is 15 amps. Ground all customer supplied power supplies as required by applicable codes. Green ground screws are provided in unit control panel.
6	Wired to next unit. 22 AWG shielded communication wire equivalent to helix lf22p0014216 recommended. The sum total of all interconnected cable segments not to exceed 4500 feet. Connection topology should be daisy chain. Refer to building automation system (bas) communication installation literature for end of line termination resistor requirements.
7	Wired to tracer or other Trane remote device. 22 AWG shielded communication wire equivalent to helix lf22p0014216 recommended. The sum total of all interconnected cable segments not to exceed 4500 feet. Connection topology should be daisy chain. Refer to building automation system (bas) communication installation literature for end of line termination resistor requirements.
8	All unit power wiring must be 600 volt copper conductors only and have a minimum temperature insulation rating of 75 degree c. Refer to unit nameplate for minimum circuit ampacity and maximum overcurrent protection device. Provide an equipment ground in accordance with applicable electric codes.
9	Unit provided dry contacts for customer connection control. Relays are rated for 7.2 amps resistive, 2.88 amps pilot duty, or 1#3 hp, 7.2 FLA at 120 volts 60 HZ, contacts are rated for 5 amps general purpose duty 240 volts.
10	Customer supplied contacts for all low voltage connections must be compatible with dry circuit 24 volts dc for a 12 ma resistive load. Silver or gold plated contacts recommended.
11	Flow switch and interlock contacts must be acceptable for use in a 120 volt 1 ma circuit or a 220 volt 2 ma circuit.
1A2	Power supply.
1A5	External auto stop and emergency stop inputs, dual low voltage binary input.
1A7	External current limit and external chilled water setpoint or hot water inputs, analog input/output (optional).
1A8	Condenser control and compressor % RLA output, analog input/output (optional).
1A9	LCI-C or Tracer communications, communication board (optional).
1A10	Ice machine control and heat mode control inputs, dual low voltage (optional).
1A12	Ice making status, dual relay outputs (optional).
11A13	Unit status, programmable relay, quad relay outputs.
1A14	Condenser and chilled water pump relays, dual relay outputs.
1A15	Condenser and chilled water flow and interlock, dual high voltage input.
1A31	BCI-C communication board (optional)
1A32	Protocol interface controller; Modbus solution for Trane chillers(optional).

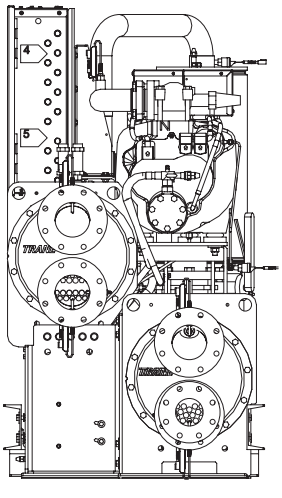
Electrical Connections

Replaceable Fuse Table

Volts	Hertz	Designation	Class	Quantity	Size (A)
380	50	1F13, 14	gG	2	6
		1F18	gG	1	6
		1F16, 17	gG	2	10
		1F15	gG	1	16
400	50	1F13, 14	gG	2	6
		1F18	gG	1	6
		1F16, 17	gG	2	10
		1F15	gG	1	16

Figure 3. Connection Diagram





CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.

PRECAUCIÓN

¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!

LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.

FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.

NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

⚠ ADVERTENCIA

¡VOLTAJE PELIGROSO!

DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON TRANSMISIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.

EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

Electrical Connections

Table 9. Connection Diagram Notes

#	Description		Additional Information
1	Line voltage entrance (see unit nameplate)	location	
2	Power section	location	
3	Controls section	location	
4	Customer control power high voltage entrance	location	
5	Customer control power low voltage entrance	location	
6	Condenser and chilled water flow inputs.	optional	1A15, (5K10 and 5K9)
7	Condenser and chilled water pump relay outputs. Separate 115V/60HZ/1PH or 220V/50HZ/1PH customer power is required.	optional	1A14, (5K10 and 5K9)
8	Unit status programmable relay outputs.Separate 115V/60HZ/1PH or 220V/50HZ/1PH customer power is required.	standard	1A13, (5K12–5K19)
9	Ice making status relay output.Separate 220/50/1 customer power is required.	standard	1A12, (5K11)
10	External auto stop and emergency stop inputs.	optional	1A5, (5K23 and 5K24)
11	Condenser control and compressor % RLA input.	optional	1A8, (4-20 mA or 0-10 V)
12	External current-limit and chilled water setpoint or hot water inputs.	optional	1A7, (4-20 mA or 2-10 V)
13	Tracer Communications	optional	1A9
14	Ice machine control and heat mode control.	optional	1A10, (5K20 and 5K25)
15	Circuit 1 disconnect	optional	
16	Wye-delta closed transition starter or across-the-line starter circuit 1A	location	
17	Refer to RTWS electrical schematic for specific electrical connection information and notes pertaining to wiring installation.		

Figure 4. Layout Diagram

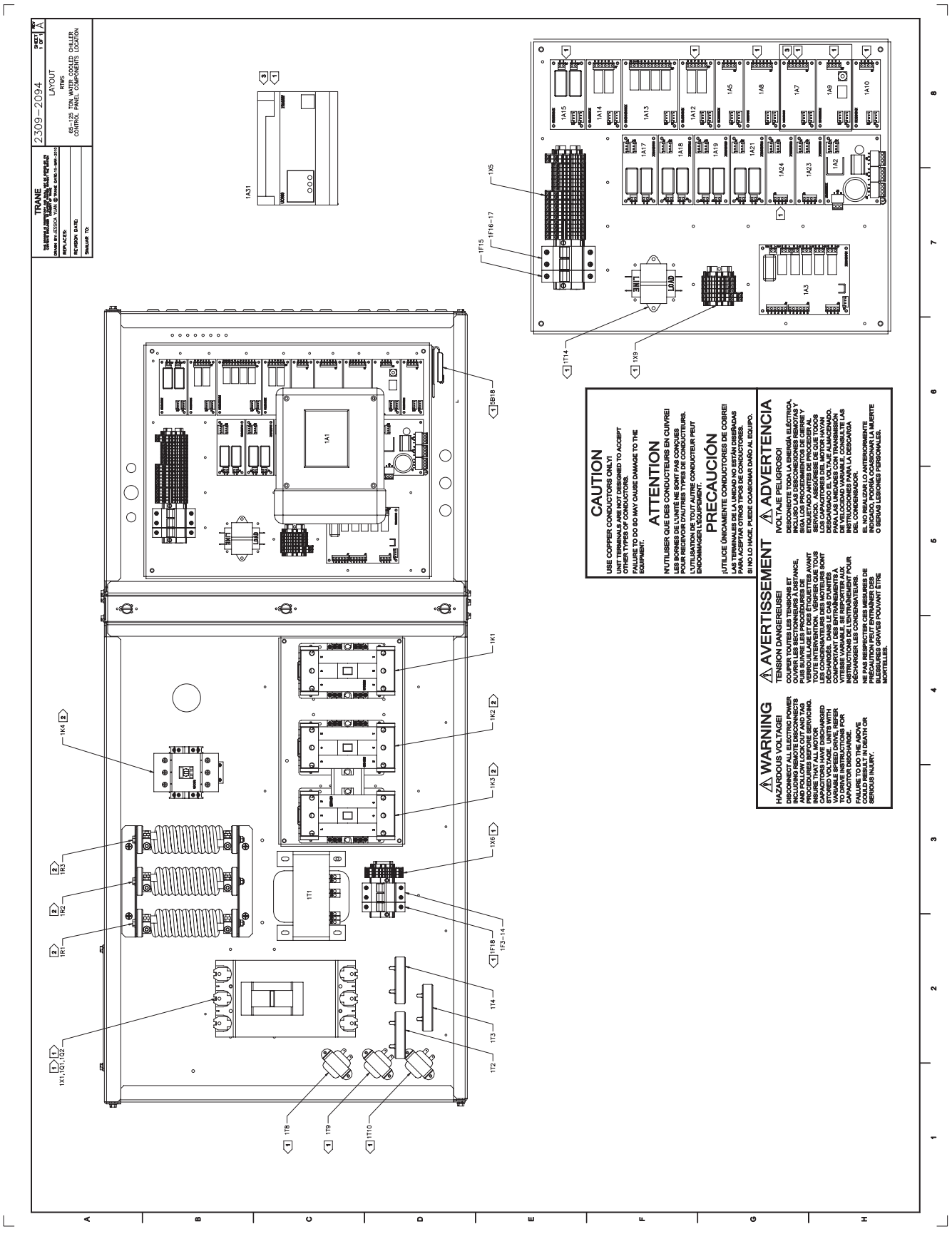


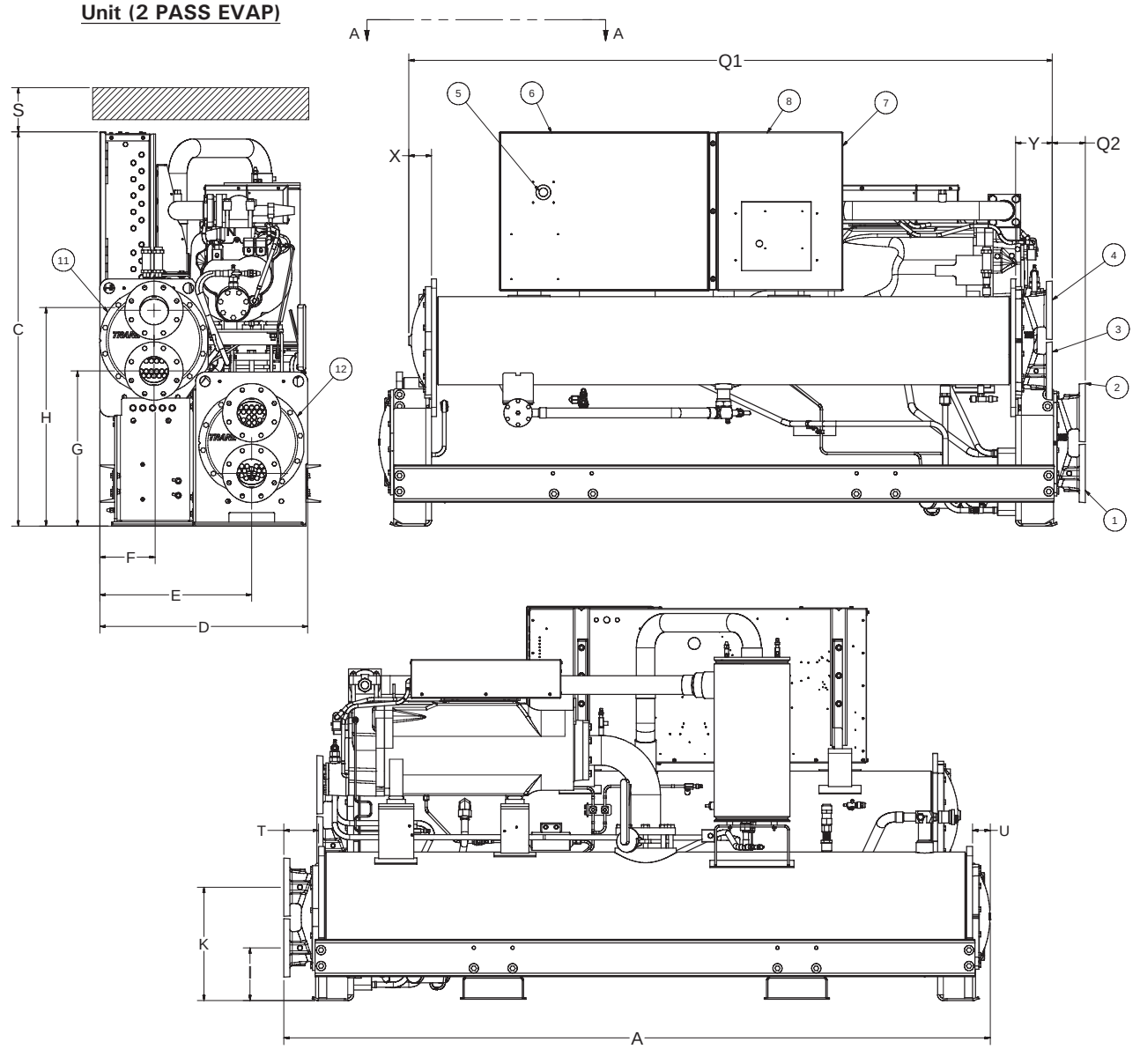
Table 10. Layout Notes

	1A1	Dyna view main processor interface
	1A2	Power supply module
	1A3	Starter module, compressor 1A
	1A5	Dual low voltage input, external auto stop and emergency stop inputs
	1A6	
*	1A7	Analog input/output, external current limit and external chilled water or hot water setpoint inputs
*	1A8	Analog input/output, condenser control and compressor % rla output
*	1A9	Dual low voltage input, lci-c communications (echelon)
*	1A10	Dual low voltage input, ice machine control and heat mode control
*	1A12	Dual relay output, ice making status
	1A13	Quad relay outputs, unit status programmable relays
	1A14	Dual relay outputs, condenser and chilled water pump relays
*	1A15	Dual high voltage input, condenser and chilled water flow and interlock
	1A17	Dual triac output, step load control compressor 1A
	1A18	Dual triac output, modulating unload and load compressor 1A
	1A19	Dual high voltage input, high pressure cutout and motor thermostat
	1A21	Dual triac output, oil return gas pump drain and fill, circuit 1
	1A23	Dual low voltage input, oil loss level
*	1A24	Dual low voltage input, water flow sensor
*	1A31	Uc400, tracer, bci-c communications
	1F13	Fuse, potential transformer primary, compressor 1A, lineA , under/over voltage - power meter
	1F14	Fuse, potential transformer primary, compressor 1A, line B, under/over voltage - power meter
	1F15	Fuse, control power transformer secondary, 115V
	1F16	Fuse, control power transformer secondary, 27V
	1F17	Fuse, control power transformer secondary, 27V
*	1F18	Fuse, potential transformer primary, compressor 1A, line C, power meter
	1K1	Contactor, compressor 1A start
**	1K2	Contactor, compressor 1A run
**	1K3	Contactor, compressor 1A short
**	1K4	Contactor, compressor 1A transition
*	1Q1	Disconnect switch, power distribution
*	1Q2	Circuit breaker, power distribution
**	1R1	Resistor, transition, compressor 1A, line A
**	1R2	Resistor, transition, compressor 1A, line B
**	1R3	Resistor, transition, compressor 1A, line C
	1T1	Transformer, control power
	1T2	Transformer, current, compressor 1A, line A
	1T3	Transformer, current, compressor 1A, line B
	1T4	Transformer, current, compressor 1A, line C
*	1T8	Transformer, potential, under/over voltage - power meter, line A to B
*	1T9	Transformer, potential, power meter, line B to C
*	1T10	Transformer, potential, power meter, line A to B
*	1T14	Transformer, potential, control power, water flow sensor
	1X1	Power distribution block
	1X5	Terminal strip, factory control wiring
*	1X6	Terminal strip, factory power meter wiring
*	1X9	Terminal strip, factory control wiring
*	5B18	Temperature sensor, outdoor air temperature

Notes:
* - Optional components; may not be present on all units.
** - Wye-delta components; may not be present on all units.
Refer to RTWS electrical schematic for specific electrical connection information and notes pertaining to wiring installation

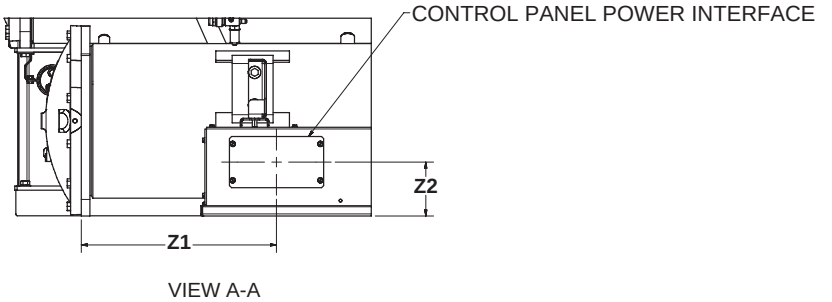
Dimensions

Figure 5. Unit Dimension



NOTES:

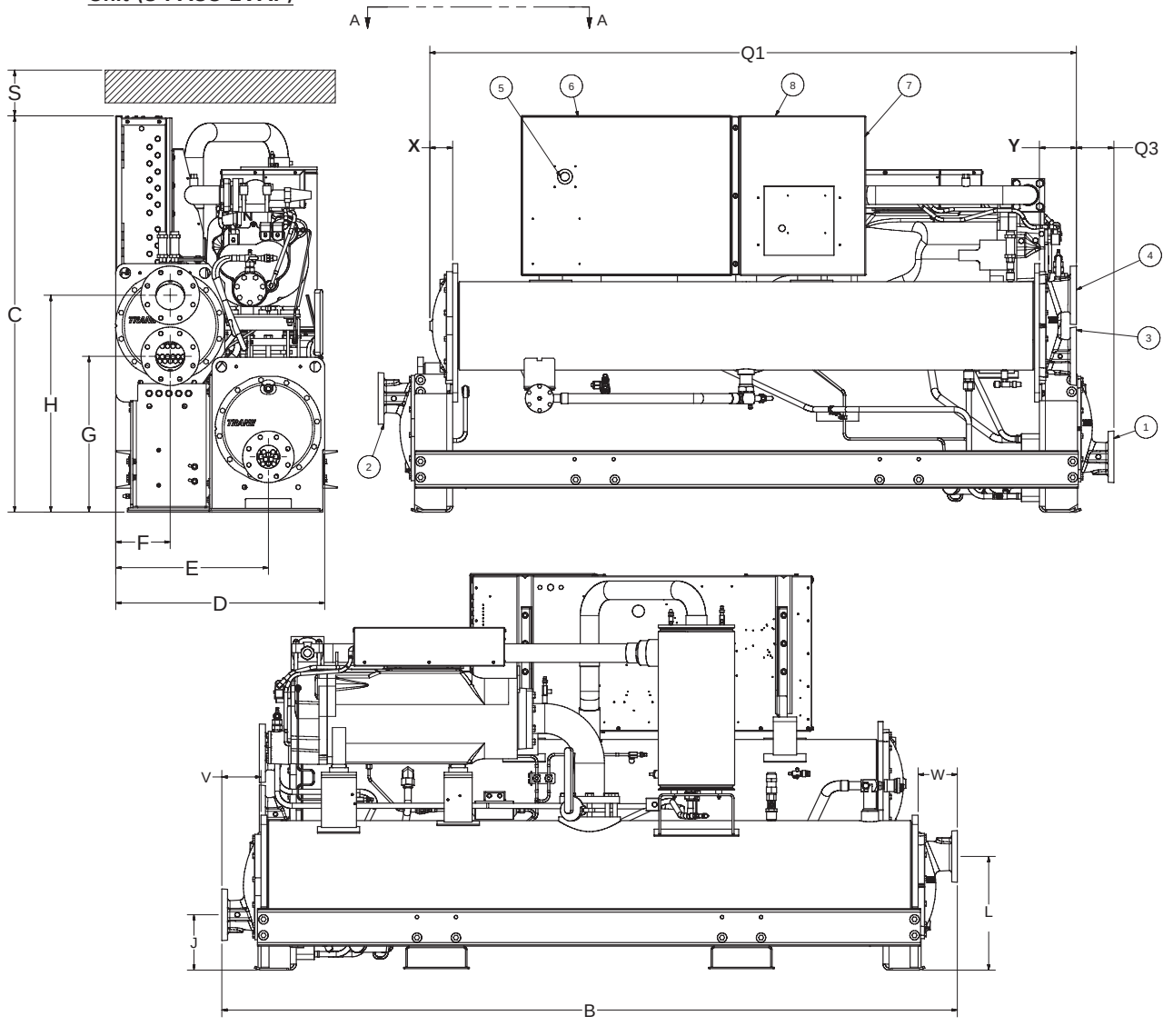
1.X,Y - length of condenser waterbox at the direction of axis.



VIEW A-A

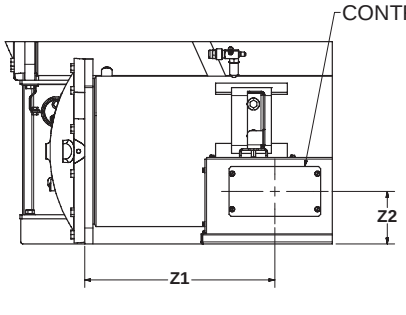
Figure 6. Unit Dimension (Continued)

Unit (3 PASS EVAP)



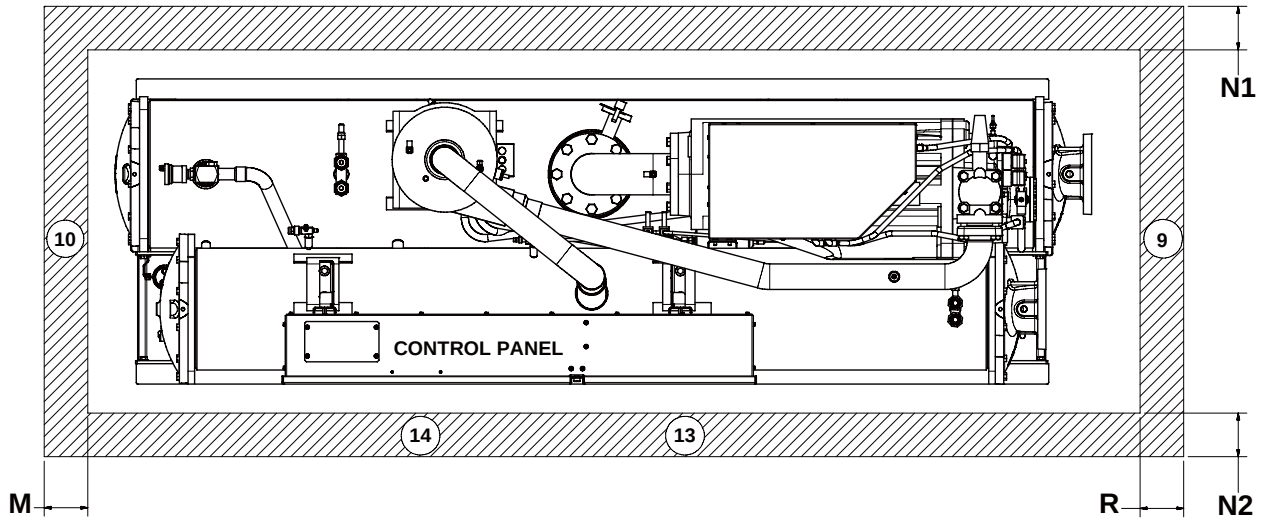
NOTES:

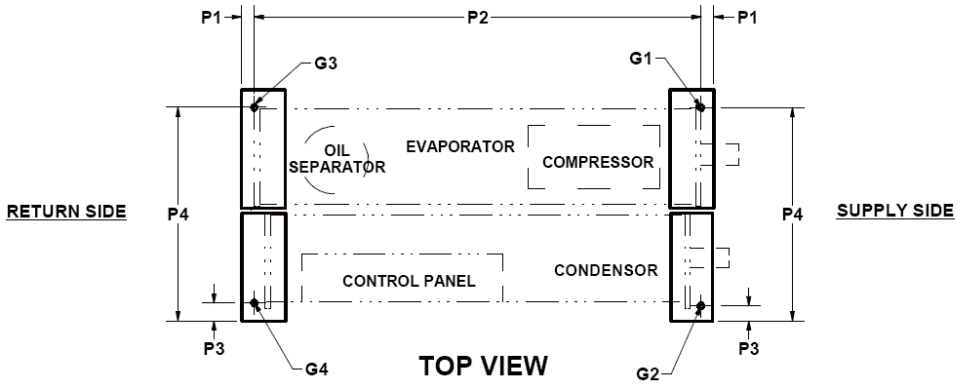
1. T,U - length of evaporator (II pass) waterbox at the direction of axis.
2. V,W - length of evaporator (III pass) waterbox at the direction of axis.



VIEW A-A

Figure 7. Unit Service Dimension





NOTES:SOME OF PARTS AND SUBASSEMBLYS HAVE BEEN HIDDEN.

RTWS Standard Unit Footprint mm(in)

P1	94(3.7)
P2	2668(105.0)
P3	104(4.1)
P4	737(29.0)
M	915(36.0) or 3217(126.7)
N1*	1033*(40.7*)
N2*	795*(31.3*)
R	915(36.0) or 3217(126.7)

NOTES:

1. If balloon 9 is designated as return waterbox for condenser, M=915mm (36 in) R=3217mm (127 in). If balloon 10 is designated as return waterbox for condenser, M=3217mm (3127 in) R=915mm (36 in).
2. Base hole diameters all 16 mm (0.6 in).
3. Two units with panels facing each other or other live parts require a clearance of 1220 mm (48 in).
4. The Value of Dimensions which are marked with the sign " * " must be replaced by 1067 mm (42 in) clearance required if any other ground parts are beside unit.

Dimensions

Table 11. 50Hz Dimensions - 65-125 ton.

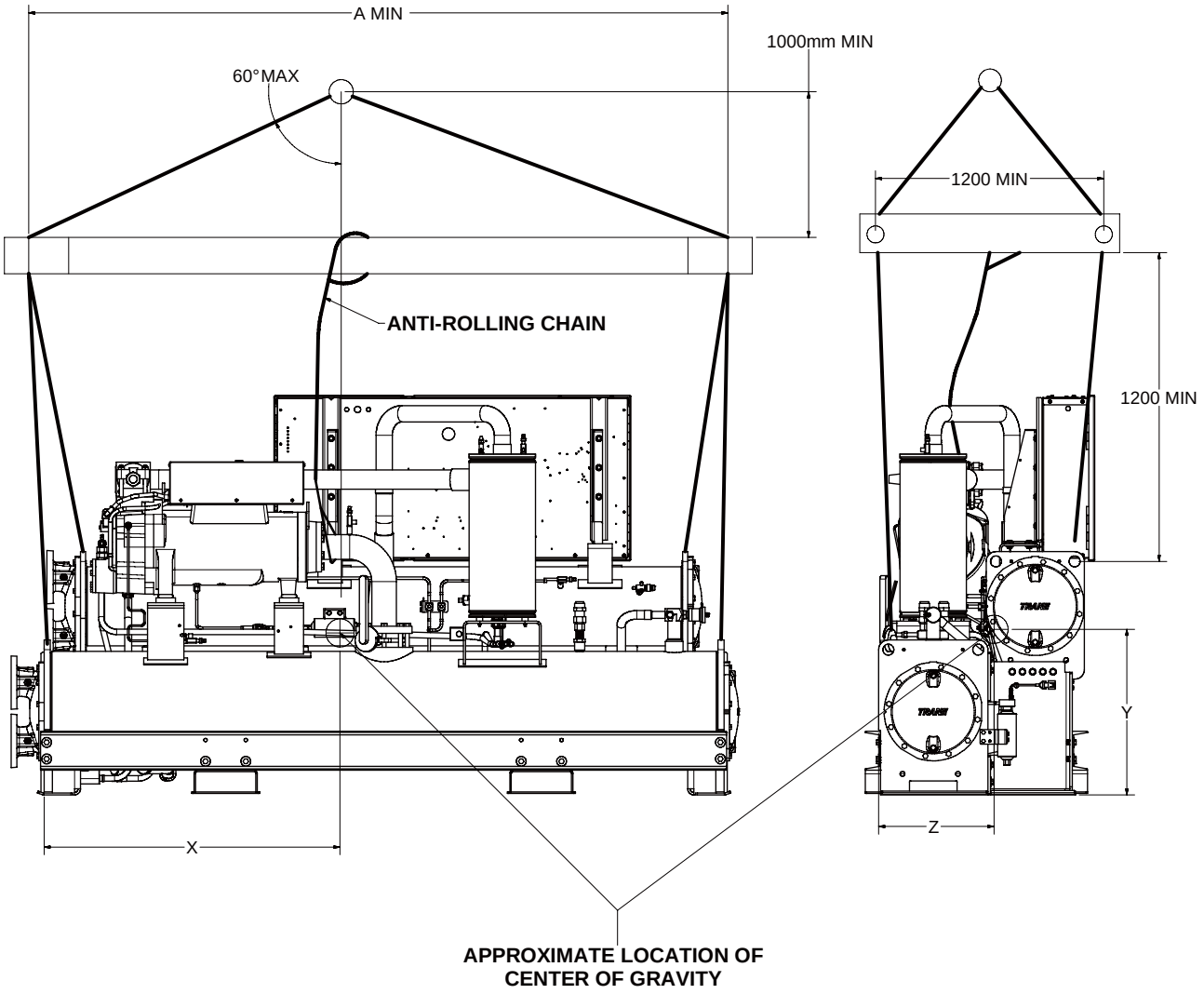
RTWS	65,85 Ton mm(in)	105,125 Ton mm(in)
A (II PASS)	2996(118)	3024(119.1)
B (III PASS)	3087(121.6)	3134(123.4)
C	1645(64.8)	1690(66.5)
D	890(35.1)	890(35.1)
E	665(26.2)	650(25.6)
F	245(9.6)	232(9.1)
G	656(25.9)	665(26.2)
H	896(35.3)	925(36.4)
I (II PASS)	223(8.8)	226(8.9)
J (III PASS)	232(9.2)	236(9.3)
K (II PASS)	463(18.3)	486(19.1)
L (III PASS)	454(17.9)	485(19.1)
Q1	2699(106.3)	2755(108.5)
Q2	148(5.8)	142(5.6)
Q3	156(6.1)	160(6.3)
S	915(36.1)	915(36.1)
T	915(36.1)	149(5.9)
U	61(2.4)	76(3)
V	144(5.7)	167(6.6)
W	144(5.7)	167(6.6)
X	61(2.4)	98(3.9)
Y	139(5.5)	158(6.2)
Z1	399(15.7)	456(18)
Z2	132(5.2)	132(5.2)

Balloon Numbers Reference

1 Evaporator Water Inlet
2 Evaporator Water Outlet
3 Condenser Water Inlet
4 Condenser Water Outlet
5 Power Disconnect
6 Power Wire
7 Control Wire
8 Control Panel
9 Condenser Supply Waterbox(for maintenance) or Return Waterbox(for tube removal and cleaning) End - Minimum Clearance (Following the Interchangeability of Condenser Waterbox)
10 Condenser Supply Waterbox(for maintenance) or Return Waterbox(for tube removal and cleaning) End - Minimum Clearance (Following the Interchangeability of Condenser Waterbox)
11 Condenser
12 Evaporator
13 Panel Power Section (door swing 587.3 mm[23.1 in])
14 Panel Power Section (door swing 940.8 mm [37.0 in])

NOTES:
1. Balloon numbers 1 to 8 can be found on the figure 1&2, and balloon numbers 9 to 14 can be found on the figure 1&3.
2. Two units with panels facing each other or other live parts require a clearance of 1220 mm(48 in).

Unit Weights



Model	Efficiency	Shipping Weight	Operating Weight	Length(A)	X	Y	Z
		kg(lb)	kg(lb)	mm(inch)	mm(inch)	mm(inch)	mm(inch)
65	HE	1949(4288)	2011(4432)	3087(121.5)	1234(48.6)	696(27.4)	385(15.2)
85	HE	2144(4727)	2217(4887)	3087(121.5)	1234(48.6)	724(28.5)	377(14.8)
105	HE	2532(5582)	2634(5807)	3134(123.4)	1144(45.0)	753(29.6)	403(15.9)
125	HE	2556(5635)	2670(5887	3134(123.4)	1144(45.0)	753(29.6)	403(15.9)

NOTES:

1.Installing anti-rolling chaine when lifting unit

2.Oil and refrigerant are included in the operating weight

3.All weights +/-3%.Weights include optional base rail forlifting, subtrace 159 kg(350lbs) if this option is not selected.

Mechanical Specifications

General

Exposed metal surfaces are painted with air-dry beige, direct-to-metal, single-component paint. Each unit ships with full operating charges of refrigerant and oil. Molded elastomeric isolation pads are supplied for placement under all support points.

Compressor and Motor

The unit is equipped with one semi-hermetic, direct-drive, 3000 rpm 50 Hz rotary compressor that include a load/unload valve, rolling element bearings, oil filtration device and heater. The motor is a suction gas-cooled, hermetically sealed, two-pole squirrel cage induction motor. Oil separator device is provided separate from the compressor. Check valves in the compressor discharge and lube oil system are also provided.

Unit-Mounted Starter

The unit is supplied with an IP-22 type enclosure with top power-wiring access and three-phase, overload protection. The starter is available in a wye-delta or across-the-line configuration, factory mounted and fully pre-wired to the compressor motor and control panel. A factory-installed, factory-wired 820 VA control power transformer provides all unit control power (120 Vac secondary) and Trane CH530 module power (24 Vac secondary). Optional starter features include circuit breaker or mechanical, non-fused disconnect.

Evaporator

Shell and tube falling film evaporator design is used. Seamless internally finned, copper tubes are mechanically expanded into tube sheets and mechanically fastened to tube supports. Evaporator tubes are 0.75 inch (19.05 mm) diameter. All tubes can be individually replaced.

Shells and tube sheets are made of carbon steel. Designed, tested, and stamped in accordance with GB and ASME code. The evaporator is designed for refrigerant-side/working-side pressure of 200 psig (13.8 bars).

All water pass arrangements are available with flanged connections with 150 psig (10.4 bars) waterside working pressure. Waterside for GB evaporator shall be hydrostatically tested at 187.5 psig (13.0 bars). Waterside for ASME evaporator shall be hydrostatically tested at 225 psig (15.6 bars).

Condenser

Shell and tube condenser designed with seamless internally/externally finned tubes expanded into tubesheets and mechanically fastened to tube supports. Condenser tubes are 0.75 inch (19.05 mm) diameter. All tubes can be individually replaced.

Shells and tube sheets are made of carbon steel. Designed, tested, and stamped in accordance with GB and ASME code. The condenser is designed for refrigerant-side/working-side pressure of 300 psig (20.7 bars).

Water side has single inlet and outlet piping connection. All water pass arrangements are available with flanged connections with 150 psig (10.5 bars) waterside working pressure. Waterside for GB condenser shall be hydrostatically tested at 187.5 psig (13.0 bars). Waterside for ASME condenser shall be hydrostatically tested at 225 psig (15.6 bars).

Standard temperature condenser allow for leaving condenser water temperature up to 113°F (45.0° C) and for entering condenser water temperatures up to 104°F (40°C).

Refrigerant Circuit

Each unit has one refrigerant circuit, with one rotary screw compressor the refrigerant circuit includes compressor suction and discharge service valves, liquid line shut off valve, removable core filter, charging port and an electronic expansion valve. Modulating compressors and electronic expansion valves provide variable capacity modulation over the entire building load and maintain proper refrigerant flow.

Oil Management

The RTWS is configured with an oil management system that ensures proper oil circulation throughout the unit. The key components of the system include an oil separator, oil filter and gas pump. An optional oil cooler is installed when the unit is used for high condensing temperature or low evaporator temperature conditions. For example, heat recovery, water-to-water heat pump, ice making and low temperature process applications.

Unit Controls (Trane CH530)

The microprocessor-based control panel is factory-installed and factory-tested. The control system is powered by a pre-wired control power transformer, and will load and unload the chiller through adjustment of the compressor slide valve. Microprocessor-based chilled water reset based on return water is standard.

The Trane CH530 microprocessor automatically acts to prevent unit shutdown due to abnormal operating conditions associated with low evaporator refrigerant temperature, high condensing temperature, and/or motor current overload. If an abnormal operating condition continues and the protective limit is reached, the machine will shut down.

The panel includes machine protection shutdown requiring manual reset for the following conditions:
- Low evaporator refrigerant temperature and pressure
- High condenser refrigerant pressure
- Low oil flow
- Critical sensor or detection circuit faults
- Motor current overload
- High compressor discharge temperature
- Lost communication between modules
- Electrical distribution faults: phase loss, phase imbalance, or phase reversal
- External and local emergency stop
- Starter transition failure

The panel also includes machine protection shutdown with automatic reset for the following correctable conditions:
- Momentary power loss
- Under/over voltage
- Loss of evaporator or condenser water flow

When a fault is detected, the control system conducts more than 100 diagnostic checks and displays results. The display will identify the fault, indicate date, time, and operating mode at time of occurrence, and provide type of reset required and a help message.

Clear Language Display Panel

Factory-mounted to the control panel door, the operator interface has an LCD touch-screen display for operator input and information output. This interface provides access to the following information: evaporator report, condenser report, compressor report, ASHRAE Guideline 3 report, operator settings, service settings, service tests, and diagnostics. All diagnostics and messages are displayed in clear un-coded language.
Data contained in available reports includes:
- Water and air temperatures
- Refrigerant levels and temperatures
- Oil pressure
- Flow switch status
- EXV position
- Head pressure control command
- Compressor starts and run-time
- Line phase percent RLA, amps, and volts

All necessary settings and setpoints are programmed into the microprocessor-based controller via the operator interface. The controller is capable of receiving signals simultaneously from a variety of control sources, in any combination, and priority order of control sources can be programmed.

The control source with priority determines active setpoints via the signal it sends to the control panel. Control sources may be:
- Local operator interface (standard)
- Time of day scheduling (optional capability available from local operator interface)
- Hard-wired 4-20 mA or 2-10 Vdc signal from an external source (interface optional; control source not supplied)
- LonTalk™ LCI-C, BAC Net and Mod Bus (interface optional; control source not supplied)
- Trane Tracer Summit™ system (interface optional; control source not supplied)
- Modbus™ system(interface optional; control source not supplied)

Quality Assurance

The quality management system applied by Trane has been subject to independent third-party assessment and approval to ISO 9001. The products described in this catalog are designed, manufactured and tested in accordance with the approved system requirements described in the Trane Quality Manual.

Options

Base Rail Forklifting
Channels built into the base frame allow for easy movement using a forklift

Unit comes with dual relief valves on both the high pressure side and low pressure side of each refrigerant circuit. Each dual relief valve configuration includes an isolation valve.

High-Temperature Condenser
Optimized compressors, oil cooler and high condenser temperature control panel allows for leaving condenser water temperatures up to 140°F (60°C).

Insulation
The evaporator, water boxes, and motor housing are covered with factory installed 0.75 inch (19.05 mm) insulation. Factory installed foam insulation is used on the suction line, liquid level sensor, oil return system assembly (with its associated piping).

Insulation for High Humidity
The evaporator and water boxes are covered with factory installed 1.5 inch (38.1 mm) insulation. Factory installed foam insulation is used on the motor housing, suction line, liquid level sensor, and oil return system assembly (with its associated piping).

Isolators
Molded elastomeric isolators ship with the unit.

Low-Temperature Evaporator
Optimized compressors and oil cooler enable evaporator operation down to minimum leaving water temperature of 10°F (-12.2°C).

Nitrogen Charge
Unit is shipped with a nitrogen holding charge in lieu of refrigerant.

Performance Tests
Performance tests are available to certify chiller performance before shipment.

Two-Way Condenser Water Regulating Valve
For water regulation, a field-installed, 2-way butterfly-type (lug-style) valve, with integral electrical operator and factory-mounted valve actuator, is available. The single-phase, dual frequency, motor can be selected with 115 V (can be powered directly from control power transformer at unit) or 220 V power. The 2-way valve is field-wired and controlled by the chiller regulating valve control output. Valves are available in 3 and 4 inch (88.9 mm and 114.3 mm) sizes.

Water-to-Water Heat Pump
Optimized compressor, oil cooler and high condenser temperature control panel allows for leaving condenser water temperatures up to 140°F (60°C). This option allows for entering condenser water temperatures above 95°F (35°C) Condenser leaving water temperature control option is required; the setpoint range is 80°F (26.7°C) to 140°F (60°C).

Electrical Options:

Across-the-Line Starter
Across-the-line starter is unit mounted with a IP-22 gasketed enclosure.

Circuit Breaker
A molded case standard interrupting capacity circuit breaker, factory pre-wired with terminal block power connections and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

Non-Fused Disconnect
A non-fused molded case disconnect switch, factory pre-wired with terminal block power connections and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

Control Options:

Chilled Water Reset – Outdoor Air Temperature
Controls, sensors, and safeties allow reset of chilled water temperature, based on temperature signal, during periods of low outdoor air temperature (chilled water reset based on return chilled water temperature is standard).

Condenser Leaving Water Temperature Control
Enables the unit to use the leaving condenser water temperature to load and unload the chiller relative to the leaving condenser water setpoint. The control system allows for a condenser leaving temperature range of 80°F (26.7°C) to 140°F (60°C) with a water to water heat pump.

Condenser Differential Pressure Output
Provides a 2–10 Vdc signal based on the system refrigerant differential pressure and time at the differential with customer defined endpoints.

Condenser Pressure (%HPC) Output
Provides a 2—10 Vdc output that is a function of percent high pressure cutout for condenser pressure. The percent high pressure cutout for condenser pressure indication output is based on the condenser refrigerant pressure transducer(s).

Condenser Water Control Output
Provides a highly configured signal designed to control a Trane supplied condenser water regulating valve.

External Chilled Water or Hot Water Setpoint
External chilled or hot water setpoint signal can be field wired to a factory-installed, tested interface board through a 2–10 Vdc or 4–20 mA signal.

External Current-Limiting
External current-limit setpoint is communicated to a factory-installed, tested communication board through a 2–10 Vdc or 4–20 mA signal.

LonTalk/Tracer Summit Interface
LonTalk (LCI-C), BAC Net, Mod Bus or Tracer Summit communications capabilities are available, with communication link via single twisted-pair wiring to factory-installed, tested communication board.

LonTalk(LCI-C) with Modbus Interface
LonTalk(LCI-C) with Modbus communication capabilities is available,with communication link via single twisted-pair wiring to factory-installed, tested communication board

Motor Current Analog Output
Control system indicates the active chiller percent of full run load amps, based on a 0–10 Vdc.

Power Meter
Tracks energy consumption (compressors only) with kWh meter.

Programmable Relays
Predefined, factory-installed, programmable relays allow the operator to select four relay outputs. Available outputs are: Alarm-Latching, Alarm-Auto Reset, General Alarm, Warning, Chiller Limit Mode, Compressor Running, Head Pressure Relief Request, and Tracer Control.

Time of Day Scheduling
Time of day scheduling capabilities are available for scheduling single chiller applications through Trance CH530 panel (without the need for building automation system-BAS). This feature allows the user to set up to 10 events in a 7 day time period.

Trane optimizes the performance of homes and buildings around the world. A business of Ingersoll Rand, the leader in creating and sustaining safe, comfortable and energy efficient environments, Trane offers a broad portfolio of advanced controls and HVAC systems, comprehensive building services, and parts.
For more information, visit www.Trane.com.

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.

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