TRANE®

Cooling and Heating Systems and Services

Product Catalog

Series R™ Helical Rotary Water-Cooled Liquid Chillers

Model RTWD

235—835 kW - Made in France

RLC-PRC035-E4

Introduction

To meet a wide range of applications in the 235-835 kW water-cooled market, Trane is proud to introduce the model RTWD 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 RTWD chiller is designed to deliver proven Series R performance, plus all the benefits of an advanced heat transfer design with two low-speed, direct-drive compressors.

Important Design Advances and New Features

- Higher full-load energy efficiency that reduces both operating and life-cycle 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.
- Dual independent refrigerant circuits.
- 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 compressors, 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 ±0.28°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/Tracer Summit 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.
- Electrical current-limiting is available as an option.

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 industry-leading 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 RTWD 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 double-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.
- Integrated forklift channels on the unit base allow for easy movement of the chiller at the job site.
- Single or dual point power connection options simplify overall installation.
- Unit-mounted starter eliminates additional job site installation considerations and labor requirements.
- Trane CH530 controls easily interface with Tracer Summit™ 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 factory-assembled and extensively tested.
- Easy interface with computers hosting LonTalk/Tracer Summit 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 ±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 RTWD chiller, condenser head pressure control is necessary only if the unit starts with entering condenser water temperatures below 12.8°C, or between 7.2°C and 12.8°C, when a temperature increase of 0.56°C per minute to 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.
- 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 1.7 bars at all load conditions in order to ensure adequate oil circulation. Condenser leaving water temperature must be 9.5°C higher than evaporator leaving water temperature within 2 minutes of startup. A 13.9°C temperature difference must be maintained thereafter [this differential requirement is lessened by 0.14°C for every 0.56°C that the condenser leaving water temperature is above 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 RTWD has excellent capability to maintain leaving water temperature control within +/-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 RTWD. 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 +/-0.28°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 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 water-flow 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 RTWD 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 RTWD 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 RTWD 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.

If a multiple-chiller building needs both heating and cooling, then a dedicated chiller such as a RTWD can be piped in side stream arrangement and thus be loaded to any capacity by varying its chilled-water setpoint. When operating, it cools the return chilled water temperature to the other chillers. An advantage of the side stream configuration is that the side stream chiller does not need to produce the design system supply-water temperature. It can produce the exact water temperature necessary to meet the required heating load. This allows the chiller to operate more efficiently because the cooling is produced at a higher chilled-water temperature.

Dry Cooler

The RTWD 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.*

Model Number Descriptions

Digits 01, 02, 03, 04 – Chiller Model

RTWD = Water Cooled Chiller Series R™

Digit 05, 06, 07 – Unit Nominal Tonnage

060 = 60 Nominal Tons
070 = 70 Nominal Tons
080 = 80 Nominal Tons
090 = 90 Nominal Tons
100 = 100 Nominal Tons
110 = 110 Nominal Tons
120 = 120 Nominal Tons
130 = 130 Nominal Tons
140 = 140 Nominal Tons
160 = 160 Nominal Tons
180 = 180 Nominal Tons
200 = 200 Nominal Tons
220 = 220 Nominal Tons
250 = 250 Nominal Tons

Digit 08 – Unit Voltage

E = 400/50/3

Digit 09 – Manufacturing Plant

1 = Epinal, France

Digit 10, 11 – Design Sequence

** = First Design, etc. increment when parts are affected for service purposes

Digits 12 – Unit Type

2 = High Efficiency/Performance
3 = Premium Efficiency/Performance

Digit 13 – Agency Listing

0 = No Agency Listing
B = CE Listing

Digit 14 – Pressure Vessel Code

2 = Australian Code
5 = PED
S = Special

Digit 15 – Unit Application

A = Std Condenser <=35°C Entering Water Temperature
B = High Temperature Condenser >35°C Entering Water Temperature
C = Water-to-Water Heat Pump

Digit 16 – Pressure Relief Valve

1 = Single Relief Valve
2 = Dual Relief Valve with 3-Way Isolation Valve

Digit 17 – Water Connection Type

A = Grooved Pipe Connection

Digit 18 – Evaporator Tubes

A = Internal and External Enhanced Evap Tube

Digit 19 – Number of Evap Passes

1 = 2 Pass Evaporator
2 = 3 Pass Evaporator

Digit 20 – Evaporator Water Side Pressure

A = 10 bar Evaporator Water Pressure

Digit 21 – Evaporator Application

1 = Standard Cooling
2 = Low Temperature
3 = Ice Making

Digit 22 – Condenser Tubes

A = Enhanced Fin - Copper

Digit 23 – Condenser Water Side Pressure

1 = 10 Bar Condenser Water Pressure

Digit 24 – Compressor Starter Type

Y = Wye-Delta Closed Transition Starter

Digit 25 – Incoming Power Line Connection

1 = Single Point Power Connection

Digit 26 – Power Line Connection Type

A = Terminal Block Connection for Incoming Lines
C = Disconnect Switch Wired to Fuses
D = Circuit Breaker

Digit 27 – Under/Over Voltage Protection

0 = No Under/Over Voltage Protection
1 = Under/Over Voltage Protection

Digit 28 – Unit Operator Interface

A = Dyna-View/English
B = Dyna-View/Spanish
C = Dyna-View/Spanish-Mexico
D = Dyna-View/French
E = Dyna-View/German
F = Dyna-View/Dutch
G = Dyna-View/Italian
H = Dyna-View/Japanese
J = Dyna-View/Portuguese-Portugal
K = Dyna-View/Portuguese-Brazil
L = Dyna-View/Korean
M = Dyna-View/Thai
N = Dyna-View/Simplified Chinese
P = Dyna-View/Traditional Chinese
R = Dyna-View/Russian
T = Dyna-View/Polish
U = Dyna-View/Czech
V = Dyna-View/Hungarian
W = Dyna-View/Greek
X = Dyna-View/Romanian
Y = Dyna-View/Swedish

Digit 29 – Remote Interface (Digital Comm)

1 = LonTalk/Tracer Summit Interface
2 = Time of Day Scheduling
3 = TCI for BACnet (Purchase BCU Separately)

Digit 30 – 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 31 – Ice Making

0 = No Ice Making
A = Ice Making with Relay
B = Ice Making without Relay

Digit 32 – Programmable Relays

0 = No Programmable Relays
A = Programmable Relays

Digit 33 – Condenser Refrigerant Pressure Output Option

0 = No Condenser Refrigerant Output
1 = Condenser Water Control Output
2 = Condenser Pressure (%HPC) Output
3 = Differential Pressure Output

Digits 34 – Outdoor Air Temp Sensor

0 = No Outdoor Air Temp Sensor
A = Outdoor Air Temp Sensor-CWR/Low Ambient

Digit 35 – Condenser Leaving Hot Water Temp Control

0 = No Condenser Leaving Hot Water Temp Control
1 = Condenser Leaving Hot Water Temp Control

Digit 36 – Power Meter

0 = No Power Meter
P = Power Meter

Digit 37 – Motor Current Analog Output (%RLA)

0 = No Motor Current Analog Output
1 = Motor Current Analog Output

Digit 40 – Installation Accessories

0 = No Installation Accessories
A = Elastomeric Isolators
B = Flanged Water Connection Kit
C = Isolators & Flanged Water Connection Kit

Digit 41 – Flow Switch

0 = No Flow Switch
5 = 10 bar IP-67; Flow Switch x 1
6 = 10 bar IP-67; Flow Switch x 2

Digit 42 – 2-Way Water Regulating Valve

0 = No 2-Way Water Regulating Valve

Digit 44 – Insulation

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

Digit 45 – Factory Charge

0 = Full Factory Refrigerant Charge (R134a)

Digit 46 – Base Rail Forklifting

B = Base Rail Forklifting

Digit 47 – Label and Literature Language

A = Bulgarian
B = Spanish
C = German
D = English
E = French
H = Dutch SI (Hollandais)
J = Italian
K = Finish
L = Danish
M = Swedish
N = Norwegian
P = Polish
R = Russian
T = Czech
U = Greek
V = Portuguese
W = Slovene
X = Romanian
Y = Turkish
2 = Hungarian

Digit 48 – Special

0 = None
S = Special

Digit 49 – 55

0 = None

Digit 56 – Shipping Package

2 = Shrink Wrap
4 = Container 1 Unit
5 = Container 2 Units

Digit 57 – Control Panel IP 20 Protection

0 = No IP 20 Protection of Control Panel
1 = IP 20 Protection of Control Panel

Digit 58 – Pressure Gages

0 = Without Pressure Gages
1 = With Pressure Gages

Digit 59 – Performance Test Options

A = Standard Test TRANE Specifications (SES)

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General Data

Table 1. General Data- high efficiency

Size		60	70	80	90	100	110	120
Compressor								
Nominal Tons		30/30	35/35	35/40	40/40	40/50	50/50	50/60
Quantity		2	2	2	2	2	2	2
Evaporator								
Water Storage	(L)	37.0	40.2	45.2	57.9	57.9	62.3	65.4
2 Pass Arrangement								
Water Conn. Size	(mm)	100	100	100	125	125	125	125
Minimum Flow	(L/s)	4.6	5.1	5.8	7.1	7.1	7.8	8.2
Maximum Flow	(L/s)	16.6	18.3	21.2	25.8	25.8	28.2	30.0
3 Pass Arrangement								
Water Conn. Size	(mm)	80	80	80	100	100	100	100
Minimum Flow	(L/s)	3.1	3.4	3.9	4.7	4.7	5.2	5.5
Maximum Flow	(L/s)	11.0	12.2	14.1	17.1	17.1	18.8	19.9
Condenser								
Water Storage	(L)	45.1	45.1	52.2	58.1	62.7	62.7	68.3
Water Conn. Size	(mm)	125	125	125	125	125	125	125
Minimum Flow	(L/s)	5.5	5.5	6.7	7.4	8.2	8.2	9.1
Maximum Flow	(L/s)	20.0	20.0	24.4	26.9	29.8	29.8	33.3
General Unit								
Refrigerant Type		R134a	R134a	R134a	R134a	R134a	R134a	R134a
# Refrig Circuits		2	2	2	2	2	2	2
Refrigerant Charge	(kg)	45/45	45/45	44/44	55/55	55/56	55/55	54/54
Oil Charge	(L)	6.8/6.8	6.8/6.8	6.8/6.8	6.8/6.8	6.8/9.9	9.9/9.9	9.9/9.9

1. Data containing information on two circuits is shown as circuit 1/circuit 2.
2. Flow limits are for water only.

Table 2. General Data – high efficiency (continued)

Size		130	140	200	220	250
Compressor						
Quantity		2	2	2	2	2
Evaporator						
Water Storage	(L)	72.6	77.0	108.3	113.3	120.3
2 Pass Arrangement						
Water Conn. Size	(mm)	125	125	150	150	150
Minimum Flow	(L/s)	8.9	9.5	13.3	14.1	15.1
Maximum Flow	(L/s)	32.5	35.0	48.8	51.6	55.5
3 Pass Arrangement						
Water Conn. Size	(mm)	100	100	100	100	100
Minimum Flow	(L/s)	5.9	6.4	8.9	9.4	10.1
Maximum Flow	(L/s)	21.7	23.3	32.5	34.4	37.0
Condenser						
Water Storage	(L)	81.7	86.8	117.8	117.8	133.3
Water Conn. Size	(mm)	150	150	150	150	150
Minimum Flow	(L/s)	10.0	10.9	15.4	15.4	18.0
Maximum Flow	(L/s)	36.8	40.0	56.5	56.5	66.1
General Unit						
Refrigerant Type		R-134a	R-134a	R-134a	R-134a	R-134a
# Refrig Circuits		2	2	2	2	2
Refrigerant Charge	(kg)	61/61	60/62	81/81	80/83	82/82
Oil Charge	(L)	9.9/9.9	9.9/9.9	11.7/11.7	11.7/11.7	11.7/11.7

1. Data containing information on two circuits is shown as circuit 1/circuit 2.
2. Flow limits are for water only.

Table 3. General Data – premium efficiency

Size		160	180	200
Compressor				
Quantity		2	2	2
Evaporator				
Water Storage	(L)	72.6	77.0	84.5
2 Pass Arrangement				
Water Conn. Size	(mm)	125	125	125
Minimum Flow	(L/s)	8.9	9.5	10.7
Maximum Flow	(L/s)	32.5	35.0	39.2
3 Pass Arrangement				
Water Conn. Size	(mm)	100	100	100
Minimum Flow	(L/s)	5.9	6.4	7.1
Maximum Flow	(L/s)	21.7	23.3	26.2
Condenser				
Water Conn. Size	(mm)	150	150	150
Minimum Flow	(L/s)	10.0	10.9	11.9
Maximum Flow	(L/s)	36.8	40.0	43.8
General Unit				
Refrigerant Type		R-134a	R-134a	R-134a
# Refrig Circuits		2	2	2
Refrigerant Charge	(kg)	61/61	60/62	61/61
Oil Charge	(L)	9.9/9.9	9.9/9.9	9.9/9.9

1. Data containing information on two circuits is shown as circuit 1/circuit 2.
2. Flow limits are for water only.

Performance Data

Table 4. Performance Data - high efficiency units

Model	Leaving Chilled Water Temp	Leaving Condenser Water Temperature (°C)																		
		35			40			45			50			55			60			
RTWD	(°C)	CC (kW)	PI (kW)	COP	CC (kW)	PI (kW)	COP	CC (kW)	PI (kW)	COP	CC (kW)	PI (kW)	COP	CC (kW)	PI (kW)	COP	CC (kW)	PI (kW)	COP	
60	5	219	44	4.9	205	50	4.1	191	55	3.4	176	62	2.8	160	69	2.3	145	76	1.9	
	7	236	45	5.2	222	50	4.4	206	55	3.7	191	62	3.1	175	69	2.5	158	76	2.1	
	9	254	45	5.6	239	50	4.7	223	56	4.0	207	62	3.3	190	69	2.7	173	76	2.3	
70	5	259	52	4.9	243	58	4.1	226	65	3.4	208	73	2.8	190	81	2.3	172	90	1.9	
	7	278	53	5.2	261	59	4.4	243	66	3.7	225	73	3.1	206	82	2.5	187	91	2.0	
	9	298	53	5.5	280	59	4.7	262	66	3.9	243	74	3.3	223	82	2.7	203	91	2.2	
80	5	296	61	4.9	278	68	4.1	258	76	3.4	237	84	2.8	216	94	2.3	195	105	1.8	
	7	318	61	5.2	299	68	4.4	278	76	3.6	257	85	3.0	235	95	2.5	212	106	2.0	
	9	342	62	5.5	321	69	4.6	300	77	3.9	278	86	3.2	255	95	2.7	231	106	2.2	
90	5	341	69	4.9	319	77	4.1	296	86	3.4	272	96	2.8	247	107	2.3	222	119	1.8	
	7	367	70	5.2	344	78	4.4	320	87	3.7	295	97	3.0	269	108	2.5	242	120	2.0	
	9	393	71	5.5	370	78	4.7	345	87	3.9	319	97	3.3	292	109	2.7	265	121	2.2	
100	5	364	73	4.9	341	82	4.2	317	91	3.5	292	102	2.9	267	114	2.3	240	126	1.9	
	7	392	74	5.3	368	82	4.4	342	92	3.7	316	102	3.1	289	114	2.5	261	127	2.1	
	9	420	75	5.6	395	83	4.7	369	92	4.0	341	103	3.3	313	114	2.7	283	127	2.2	
110	5	390	78	5.0	366	87	4.2	340	97	3.5	314	108	2.9	287	120	2.4	260	134	1.9	
	7	420	78	5.3	394	87	4.5	367	97	3.8	339	108	3.1	310	120	2.6	281	134	2.1	
	9	451	79	5.7	424	88	4.8	395	98	4.0	366	109	3.4	335	121	2.8	303	134	2.3	
120	5	423	85	5.0	397	95	4.2	370	106	3.5	341	118	2.9	312	131	2.4	283	146	1.9	
	7	455	85	5.3	427	95	4.5	399	106	3.7	369	118	3.1	337	131	2.6	306	146	2.1	
	9	488	86	5.6	459	96	4.8	429	106	4.0	397	118	3.3	364	131	2.8	330	145	2.3	
130	5	456	92	4.9	429	103	4.2	400	115	3.5	370	128	2.9	339	143	2.4	-	-	-	
	7	490	93	5.3	461	103	4.5	431	115	3.7	399	128	3.1	366	142	2.6	-	-	-	
	9	526	93	5.6	495	104	4.8	463	115	4.0	429	128	3.3	394	142	2.8	-	-	-	
140	5	497	100	5.0	468	111	4.2	438	124	3.5	407	138	2.9	374	154	2.4	-	-	-	
	7	534	100	5.3	503	112	4.5	472	125	3.8	439	139	3.2	404	155	2.6	-	-	-	
	9	573	101	5.6	541	113	4.8	507	125	4.0	472	139	3.4	436	155	2.8	-	-	-	
220	5	717	145	4.9	676	160	4.2	634	178	3.6	591	198	3.0	547	220	2.5	-	-	-	
	7	769	146	5.2	727	162	4.5	683	179	3.8	638	199	3.2	592	221	2.7	-	-	-	
	9	824	148	5.5	780	164	4.8	735	181	4.1	688	200	3.4	639	222	2.9	-	-	-	
250	5	784	157	5.0	741	173	4.3	697	191	3.6	651	212	3.1	604	235	2.6	-	-	-	
	7	841	159	5.3	796	175	4.5	750	193	3.9	702	213	3.3	653	236	2.8	-	-	-	
	9	900	162	5.5	854	177	4.8	805	195	4.1	756	215	3.5	704	238	3.0	-	-	-	

1. Performance based on evaporator delta T 5°C, condenser delta T 5°C, evaporator fouling factor of 0.01761°K·m³/kW and condenser fouling of 0.044025°K·m³/kW.
2. Performance is based on 2 pass evaporator configuration.
3. CC is cooling capacity.
4. PI is kW power input is for compressors only.
5. COP is Coefficient of Performance. Power inputs include compressors and control power.
6. Consult Trane representative for additional performance information.
7. Interpolation between points is permissible. Extrapolation is not permitted.

Table 5. Performance Data - premium efficiency

Model RTWD	Leaving Chilled Water Temp (°C)	Leaving Condenser Water Temperature (°C) 35 CC (kW)	35 PI (kW)	35 COP	40 CC (kW)	40 PI (kW)	40 COP	45 CC (kW)	45 PI (kW)	45 COP	50 CC (kW)	50 PI (kW)	50 COP	55 CC (kW)	55 PI (kW)	55 COP
160	**5**	558	106	5.3	525	118	4.5	492	131	3.7	458	147	3.1	423	164	2.6
	7	601	107	5.6	567	119	4.8	531	132	4.0	495	147	3.4	458	165	2.8
	9	646	108	6.0	610	120	5.1	573	133	4.3	535	148	3.6	495	165	3.0
180	**5**	615	117	5.2	578	131	4.4	541	146	3.7	503	163	3.1	463	182	2.5
	7	662	118	5.6	624	132	4.7	585	147	4.0	544	164	3.3	503	183	2.7
	9	712	120	5.9	672	133	5.0	630	148	4.3	588	164	3.6	544	183	3.0
200	**5**	661	129	5.1	623	144	4.3	582	161	3.6	541	180	3.0	498	201	2.5
	7	711	130	5.5	671	145	4.6	629	162	3.9	585	180	3.2	541	201	2.7
	9	764	131	5.8	721	146	4.9	677	162	4.2	632	181	3.5	585	201	2.9

1. Performance based on evaporator delta T 5°C, condenser delta T 5°C, evaporator fouling factor of 0.01761°K·m³/kW and condenser fouling of 0.044025°K·m³/kW.
2. Performance is based on 2 pass evaporator configuration.
3. CC is cooling capacity.
4. PI is kW power input is for compressors only.
5. COP is Coefficient of Performance. Power inputs include compressors and control power.
6. Consult Trane representative for additional performance information.
7. Interpolation between points is permissible. Extrapolation is not permitted

Table 6. European Seasonal Energy Efficiency Ratio (ESEER) - RTWD

Model	ESEER	A 100% load EER	B 75% load EER	C 50% load EER	D 25% load EER
RTWD 060 HE	6.72	5.24	6.08	7.18	7.01
RTWD 070 HE	7.00	5.24	6.17	7.08	8.27
RTWD 080 HE	6.49	5.17	6.05	7.45	6.31
RTWD 090 HE	6.86	5.22	6.09	7.10	7.75
RTWD 100 HE	6.90	5.28	6.10	72.0	7.72
RTWD 110 HE	6.88	5.34	6.12	7.19	7.61
RTWD 120 HE	6.56	5.31	6.05	7.24	6.22
RTWD 130 HE	6.59	5.27	5.97	7.14	6.68
RTWD 140 HE	6.96	5.30	6.06	7.18	8.09
RTWD 160 PE	7.24	5.61	6.46	7.52	8.08
RTWD 180 PE	7.25	5.58	6.37	7.65	8.02
RTWD 200 PE	7.05	5.46	6.18	7.41	7.86
RTWD 220 HE	6.82	5.25	6.07	6.94	7.88
RTWD 250 HE	6.87	5.27	6.19	6.87	8.03

1. Performance based on Eurovent conditions evaporator 7/12°C, condenser 32/37°C, evaporator fouling factor of 0.01761°K·m³/kW and condenser fouling of 0.044025°K·m³/kW.
2. Performance is based on 2 pass evaporator configuration.
3. EER: Energy Efficiency Ratio.

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, Dutch, French, German, Italian, Japanese, Korean, Portuguese, Spanish, 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:
  - 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

LonTalk/Tracer Summit Interface

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

Additional options that may be used:

- Ice making
- Chilled water temperature reset - outdoor air

External devices required:

- Trane Tracer system or LonTalk 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.

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.

LonTalk Chiller Controls

LonTalk is a communications protocol developed by the Echelon™ Corporation. The LonMark™ association develops control profiles using the LonTalk communication protocol. LonTalk is a unit level communications protocol.

LonTalk Communications Interface for Chillers (LCI-C) provides a generic automation system with the LonMark chiller profile inputs/outputs. In addition to the standard points, Trane provides other commonly used network output variables for greater interoperability with any automation system. The complete reference list of Trane LonTalk points is available on the LonMark web site.

Trane controls or another vendor's system can use the predefined list of points with ease to give the operator a complete picture of how the system is running.

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 7. General Electrical Data

Model RTWD	Nominal Voltage (V/Ph/Hz)	Oil Separator Heater (W)	Compressor Heater (W)	Control Circuit	Short Circuit Intensity (kA)
60	400/3/50	2 x 125	2 x 150	Factory installed transformer	35
70	400/3/50	2 x 125	2 x 150		35
80	400/3/50	2 x 125	2 x 150		35
90	400/3/50	2 x 125	2 x 150		35
100	400/3/50	2 x 125	2 x 150		35
110	400/3/50	2 x 125	2 x 150		35
120	400/3/50	2 x 125	2 x 150		35
130 HE	400/3/50	2 x 125	2 x 150		35
140 HE	400/3/50	2 x 125	2 x 150		35
160 PE	400/3/50	2 x 125	2 x 150		35
180 PE	400/3/50	2 x 125	2 x 150		35
200 PE	400/3/50	2 x 125	2 x 150		35
220 HE	400/3/50	2 x 125	2 x 150		35
250 HE	400/3/50	2 x 125	2 x 150		35

Table 8. Compressor Motor Electrical Data

Model RTWD	Nominal Voltage (V/Ph/Hz)	Maximum Unit Current Std Cooling (A)	Maximum Unit Current High Temp Cond (A)	LRA (C1/C2)	Starting Current Std Cooling[2] (A)	Starting Current High Temp Cond[2] (A)
60	400/3/50	102	142	112/112	152	167
70	400/3/50	124	166	129/129	177	193
80	400/3/50	142	187	129/144	192	208
90	400/3/50	161	208	144/144	206	224
100	400/3/50	176	228	144/180	242	260
110	400/3/50	192	248	180/180	254	275
120	400/3/50	209	267	180/217	291	312
130 HE	400/3/50	227	287	217/217	304	327
140 HE	400/3/50	244	312	217/259	346	369
160 PE	400/3/50	261	336	259/259	359	387
180 PE	400/3/50	286	377	259/291	391	419
200 PE	400/3/50	311	418	291/291	410	451
220 HE	400/3/50	343	457	291/354	473	514
250 HE	400/3/50	374	496	354/354	497	543

(1) To take in to account for the sizing of power cables.
(2) Wye-delta start - one compressor at full load, the other starting.

Table 9. Electrical Connection

Model RTWD	Nominal Voltage (V/Ph/Hz)	Unit Application	Evaporator Application	RLA	Fuse Size (A)	Disconnect Switch Size (A)	Minimum Connecting Wire (mm^2)	Maximum Connecting Wire (mm^2)	Bus Bar Width (mm)
060	400/3/50	Std cond	Std cooling	38/38	63/63	6 x 160	2 x 35	2 x 95	20
060		Std cond	Low temp/ Ice making	38/38	63/63	6 x 160	2 x 35	2 x 95	20
060		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	53/53	80/80	6x160	2 x 35	2 x 95	32
070	400/3/50	Std cond	Std cooling	46/46	80/80	6 x 160	2 x 35	2 x 95	20
070		Std cond	Low temp/ Ice making	46/46	80/80	6 x 160	2 x 35	2 x 95	20
070		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	62/62	100/100	6x160	2 x 35	2 x 95	20
080	400/3/50	Std cond	Std cooling	46/60	80/125	6 x 160	2 x 35	2 x 95	20
080		Std cond	Low temp/ Ice making	46/60	80/125	6 x 160	2 x 35	2 x 95	20
080		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	62/78	100/125	6x160	2 x 35	2 x 95	20
090	400/3/50	Std cond	Std cooling	60/60	100/100	6x160	2 x 35	2 x 95	20
090		Std cond	Low temp/ Ice making	60/60	100/100	6x160	2 x 35	2 x 95	20
090		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	78/78	125/125	6x160	2 x 35	2 x 95	20
100	400/3/50	Std cond	Std cooling	60/72	100/125	6x160	2 x 35	2 x 95	20
100		Std cond	Low temp/ Ice making	60/72	100/125	6x160	2 x 35	2 x 95	20
100		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	78/93	125/160	6x160	2 x 35	2 x 95	20
110	400/3/50	Std cond	Std cooling	72/72	125/125	6x160	2 x 35	2 x 95	20
110		Std cond	Low temp/ Ice making	72/72	125/125	6x160	2 x 35	2 x 95	20
110		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	93/93	160/160	6x160	2 x 35	2 x 95	20
120	400/3/50	Std cond	Std cooling	72/85	125/160	6x160	2 x 35	2 x 95	20
120		Std cond	Low temp/ Ice making	72/85	125/160	6x160	2 x 35	2 x 95	20
120		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	93/108	160/160	6x250	2 x 95	2 x 150	32
130 HE	400/3/50	Std cond	Std cooling	85/85	125/125	6 x 160	2 x 50	2 x 95	20
		Std cond	Low temp/ Ice making	85/85	125/125	6 x 160	2 x 50	2 x 95	20
		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	108/108	160/160	6 x 250	2 x 95	2 x 185	32

Table 9. Electrical Connection

Model RTWD	Nominal Voltage (V/Ph/Hz)	Unit Application	Evaporator Application	RLA	Fuse Size (A)	Disconnect Switch Size (A)	Minimum Connecting Wire (mm^2)	Maximum Connecting Wire (mm^2)	Bus Bar Width (mm)
140 HE	400/3/50	Std cond	Std cooling	85/98	125/160	6 x 160	2 x 50	2 x 95	20
		Std cond	Low temp/ Ice making	85/98	125/160	6 x 160	2 x 50	2 x 95	20
		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	108/126	160/200	6 x 250	2 x 95	2 x 185	32
160 HE	400/3/50	Std cond	Std cooling	98/98	160/160	6 x 160	2 x 50	2 x 95	20
		Std cond	Low temp/ Ice making	98/98	160/160	6 x 160	2 x 50	2 x 95	20
		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	126/126	200/200	6 x 250	2 x 95	2 x 185	32
180 HE	400/3/50	Std cond	Std cooling	98/117	160/200	6 x 250	2 x 95	2 x 185	32
		Std cond	Low temp/ Ice making	98/117	160/200	6 x 250	2 x 95	2 x 185	32
		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	126/158	200/250	6 x 400	2 x 185	2 x 240	45
200 HE	400/3/50	Std cond	Std cooling	117/117	200/200	6 x 250	2 x 95	2 x 185	32
		Std cond	Low temp/ Ice making	117/117	200/200	6 x 250	2 x 95	2 x 185	32
		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	158/158	250/250	6 x 400	2 x 185	2 x 240	45
220 HE	400/3/50	Std cond	Std cooling	117/141	200/250	6 x 250	2 x 95	2 x 185	32
		Std cond	Low temp/ Ice making	117/141	200/250	6 x 250	2 x 95	2 x 185	32
		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	158/187	250/315	6 x 400	2 x 185	2 x 240	45
250 HE	400/3/50	Std cond	Std cooling	141/141	250/250	6 x 250	2 x 95	2 x 185	32
		Std cond	Low temp/ Ice making	141/141	250/250	6 x 250	2 x 95	2 x 185	32
		High cond Water-to-water heat pump	Std cooling Std evap - wwhp	187/187	315/315	6 x 400	2 x 185	2 x 240	45

Electrical Connections

Table 10. Field Wiring Diagram

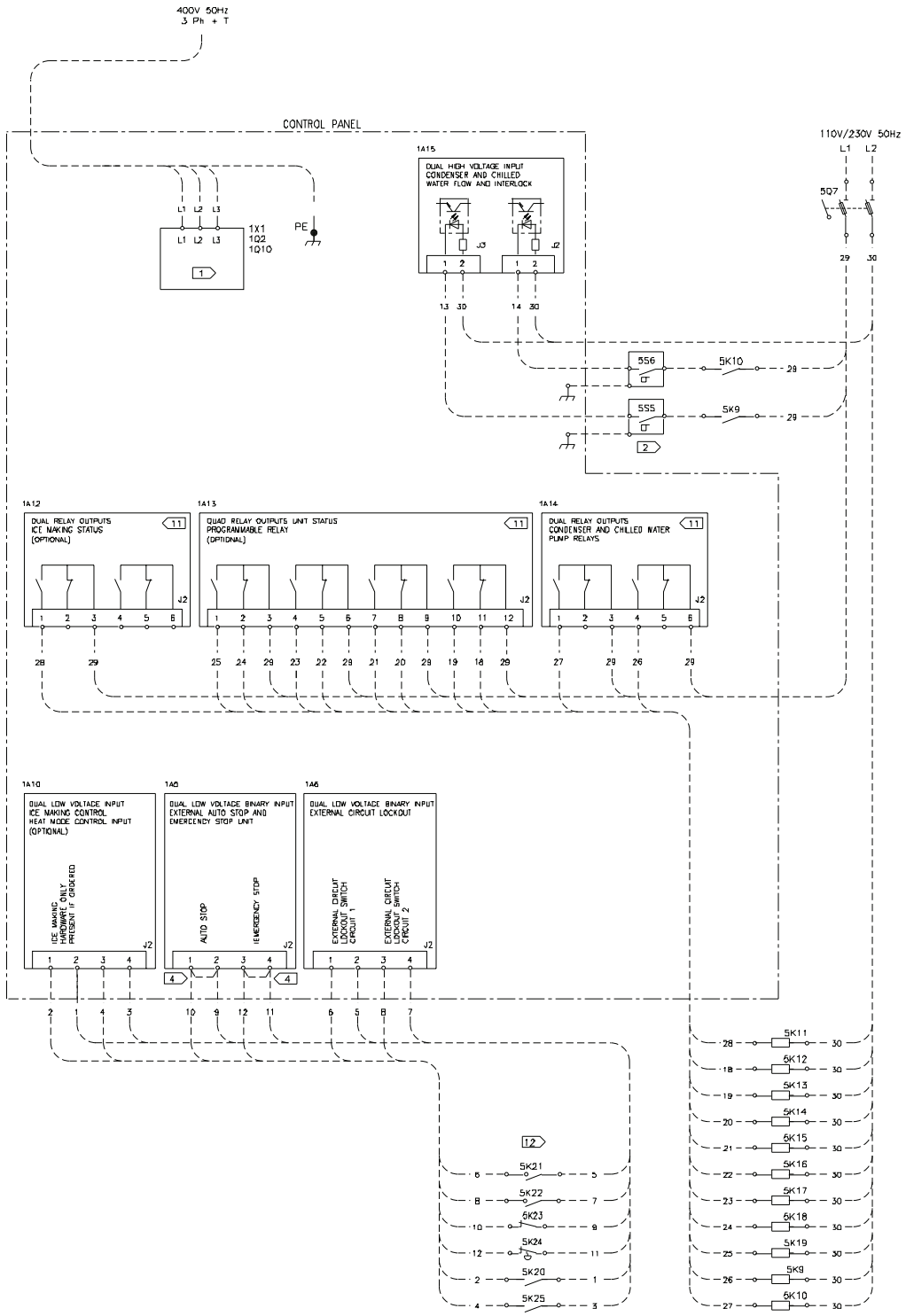


Table 11. Field Wiring Diagram (continued)

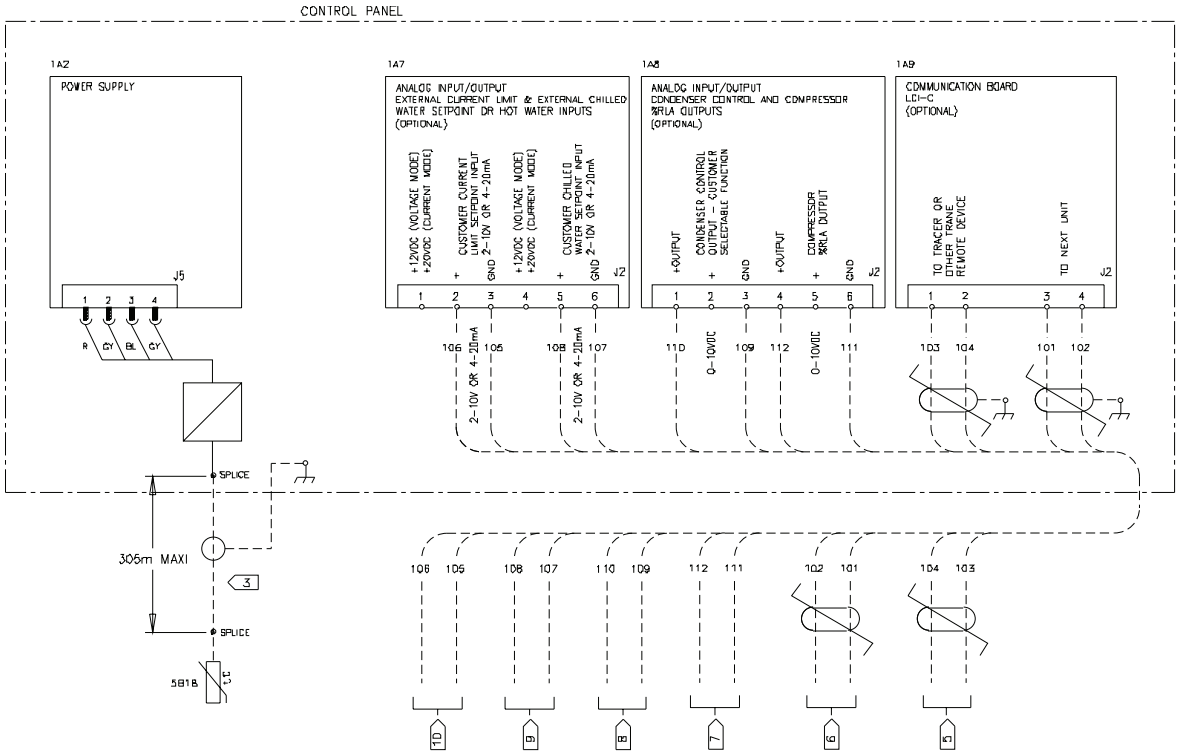


Table 12. Field Wiring Diagram Notes

#	General Notes
1	Refer to RTWD electrical schematic for specific electrical connection information and notes pertaining to wiring installation.
2	All field wiring must be in accordance with local codes.
3	All customer control circuit wiring must be copper conductors only. All customer wiring connections are made to circuit board mounted box lugs with a wire until 1.5 mm².
#	**Flag Notes**
1	Single source power is provided as standard on these products.
2	Flow switch and interlock contacts must be acceptable for use in a 120 V 1mA or 220 V 2 mA circuit.
3	Factory installed outdoor air temperature sensor lead length to be spliced and extended by customer.
4	The terminals for auto stop and emergency stop switches are jumpered at factory by jumpers to enable unit operatino if remove control is desired, remove the jumbers and connect to the desired control circuit.
5	Wired to Tracer or other Trane remove device. Use the product installation documentation inside of panel to determine cable section needed.
6	Wired to next unit, use the product installation documentaiton inside of panel to determine cable section needed.
7	Wired to compressor %RLA.
8	Wired to condenser control customer selectable function.
9	Wired to customer chilled water setpoint 2-10 V or 4-20 mA.
10	Wired to customer current-limit setpoint 2-10 V or 4-20 mA.
11	Unit provided dry contacts. Relays are rated for 7.2 amps resistive, 2.88 amps pilot duty or 1/3 HP, 7.2 FLA at 120 volts, contacts are rated for 5 amps general purpose duty 240 volts.
12	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.

Figure 1. Connection Diagram

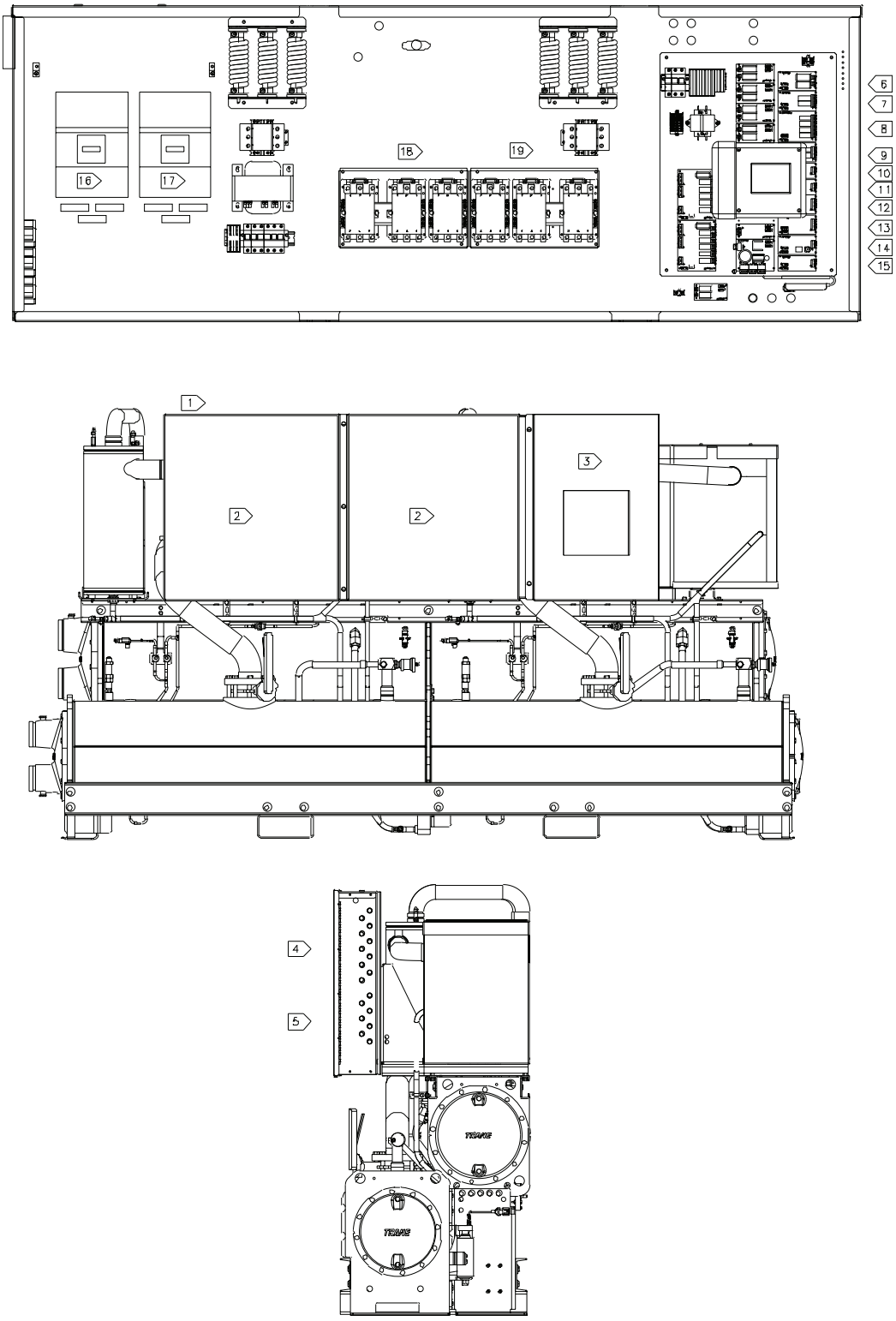


Table 13. Connection Diagram Notes

#	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 110/50/1or 230/50/1 customer power is required.	optional	1A14, (5K10 and 5K9)
8	Unit status programmable relay outputs. Separate 110/50/1or 230/50/1 customer power is required.	optional	1A13, (5K12–5K19)
9	Ice making status relay output. Separate 110/50/1or 230/50/1 customer power is required.	optional	1A12, (5K11)
10	External auto stop and emergency stop inputs.	standard	1A5, (5K23 and 5K24)
11	External circuit lockout inputs circuit 1 and circuit 2.	standard	1A6, (5K21 and 5K22)
12	External current-limit and chilled water setpoint or hot water inputs.	optional	1A7, (4-20 mA or 2-10 V)
13	Condenser control and compressor % RLA input.	optional	1A8, (4-20 mA or 0-10 V)
14	Tracer Communications	optional	1A9
15	Ice machine control and heat mode control.	optional	1A10, (5K20 and 5K25)
16	Circuit 1 disconnect	optional	1A6
17	Circuit 2 disconnect	optional	1A6
18	Wye-delta closed transition starter or across-the-line starter circuit 1A	location	
19	Wye-delta closed transition starter or across-the-line starter circuit 2A	location	
20	Refer to RTWD electrical schematic for specific electrical connection information and notes pertaining to wiring installation.		

Figure 2. Layout Diagram

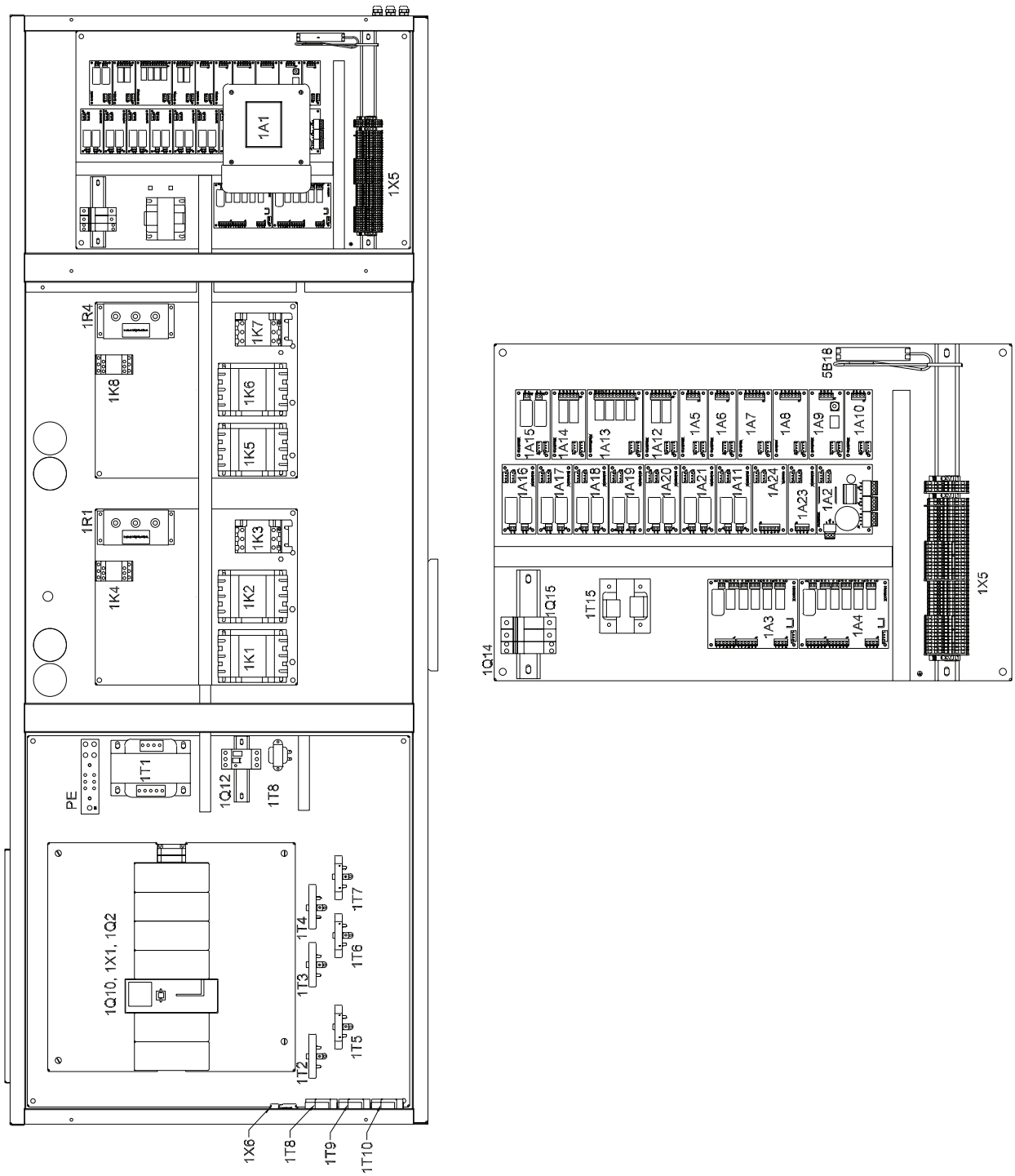
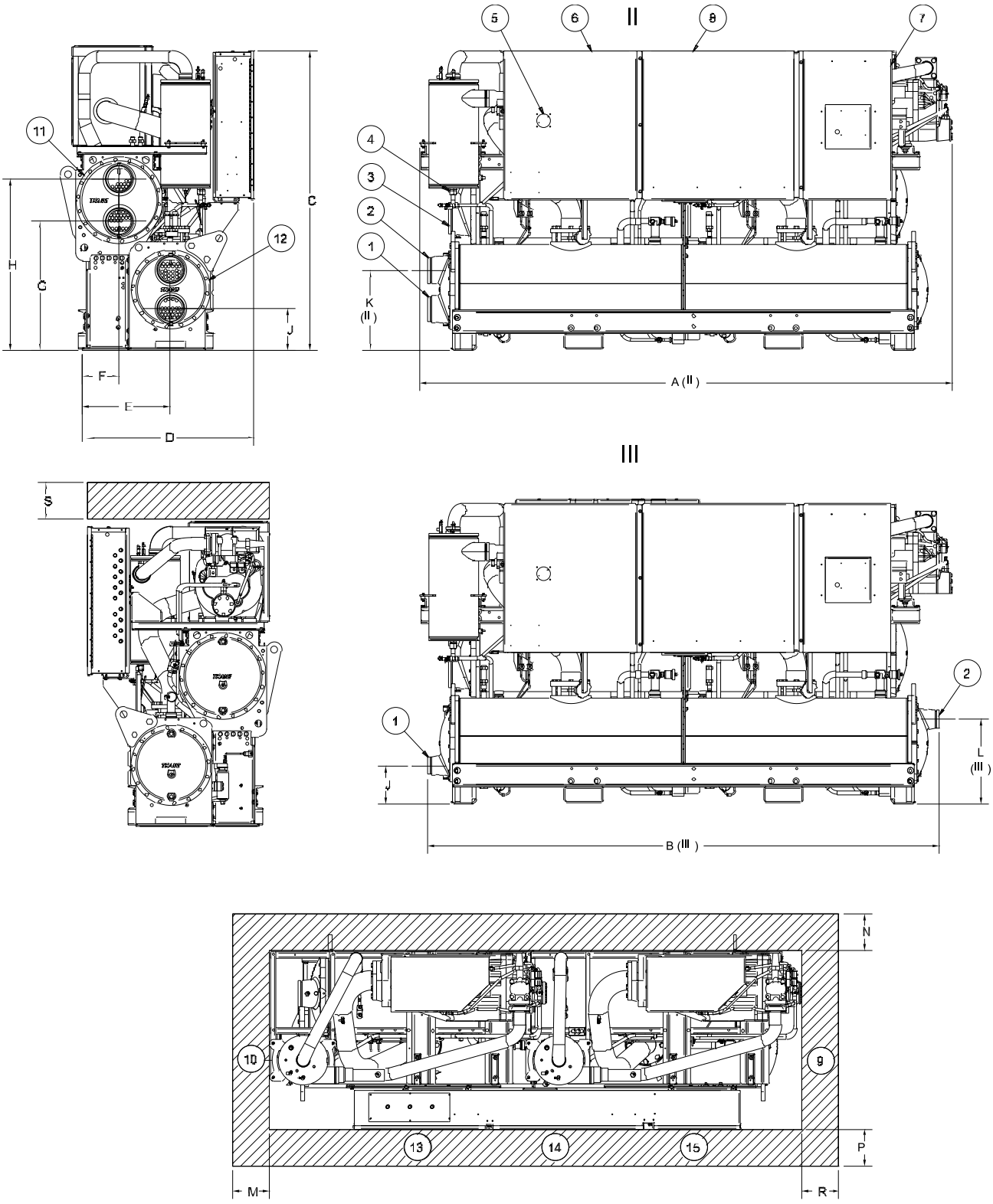


Table 14. Layout Notes

	1A1	Dyna View main processor interface		1K1	Contactor, compressor 1A start.
	1A2	Power supply module.		1K2	Contactor, compressor 1A run.
	1A3	Starter module, compressor 1A.		1K3	Contactor, compressor 1A short.
	1A4	Starter module, compressor 2A.		1K4	Contactor, compressor 1A transition.
	1A5	Dual low voltage input, external auto stop and emergency stop inputs.		1K5	Contactor, compressor 2A start.
	1A6	Dual low voltage input, external circuit lockout, refrigerant circuit 1 and 2.		1K6	Contactor, compressor 2A run.
*	1A7	Analog input/output, external current-limit and external chilled water or hot water setpoint inputs.		1K7	Contactor, compressor 2A short.
*	1A8	Analog input/output, condenser control and compressor % RLA output.		1K8	Contactor, compressor 2A transition.
*	1A9	Dual low voltage input, LCI-C communications (Echelon).	*	1Q2	Circuit breaker, power distribution.
*	1A10	Dual low voltage input, ice machine control and heat mode control.		1R1	Resistor, transition, compressor 1A, line A.
*	1A11	Dual high voltage input, motor thermostats compressor 2A and 1A.		1R2	Resistor, transition, compressor 1A, line B.
*	1A12	Dual relay output, ice making status.		1R3	Resistor, transition, compressor 1A, line C.
*	1A13	Quad relay outputs, unit status programmable relays.		1R4	Resistor, transition, compressor 2A, line A.
	1A14	Dual relay output, condenser and chilled water pump relays.		1R5	Resistor, transition, compressor 2A, line B.
*	1A15	Dual high voltage input, condenser and chilled water flow and interlock.		1R6	Resistor, transition, compressor 2A, line C.
	1A16	Dual triac output, modulating unload and load compressor 2A.		1T1	Transformer, control power.
	1A17	Dual triac output, step load control compressor 2A and 1A.		1T2	Transformer, current, compressor 1A, line A.
	1A18	Dual triac output, modulating unload and load compressor 1A.		1T3	Transformer, current, compressor 1A, line B.
	1A19	Dual high voltage input, high pressure cutout compressor 2A and 1A.		1T4	Transformer, current, compressor 1A, line C.
	1A20	Dual triac output, oil return gas pump drain and fill, circuit 2.		1T5	Transformer, current, compressor 2A, line A.
	1A21	Dual triac output, oil return gas pump drain and fill, circuit 1.		1T6	Transformer, current, compressor 2A, line B.
	1A23	Dual low voltage input, oil loss level.		1T7	Transformer, current, compressor 2A, line C.
*	1A24	Dual low voltage input, water flow sensor.		1T8	Transformer, potential, under/over voltage - power meter, line A to B.
	1Q10	Fused disconnect switch.	*	1T9	Transformer, potential, power meter, line B to C.
	1Q12	Circuit breaker, potential transformer primary, compressor 1A, line A, under/over voltage - power meter - control power transformer.	*	1T10	Transformer, potential, power meter, line A to C.
	1Q14	Circuit breaker, control power transformer secondary, 110 V.	*	1T15	Transformer, pic module.
	1Q15	Circuit breaker, control power transformer secondary, 27 V.		1X1	Power distribution block.
	5B18	Temperature sensor, outdoor air temperature.		1X5	Terminal strip, factory control wiring.
			*	1X6	Terminal strip, factory power meter wiring.

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

Dimensions


II
III
11
12
C
H
G
J
F
E
D
5
6
8
7
4
3
2
1
K
(II)
A (II)
S
2
1
L
(III)
J
B (III)
N
10
9
13
14
15
P
M
R

Dimensions

Dimensions

RTWD	60,70,80 (mm)	90,100,110,120 (mm)	130, 140 (mm)	160, 180 (mm)	200 (mm)	220, 250 (mm)
A (2 pass evap)	3210	3225	3360	3755	3456	3456
B (3 pass evap)	3320	3320	3360	3831	3456	3456
C	1933	1955	1920	1950	1955	1955
D*	890	890	1087	1120	1130	1130
E	600	600	547	547	547	547
F	231	231	265	265	265	265
G	709	709	830	860	840	840
H	929	929	1078	1108	1115	1115
J (2 pass evap)	273	259	256	270	270	270
J (3 pass evap)	258	247	241	247	247	247
K (2 pass evap)	472	479	490	524	524	524
L (3 pass evap)	488	487	505	550	549	549
M	914	914	914	914	914	914
N	914	914	914	914	914	914
P**	1016	1016	1016	1016	1016	1016
R	2921	2921	2916	3416	3416	2916
S	914	914	914	914	914	914

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 Return Waterbox End - Minimum Clearance (for tube removal)
10	Condenser Supply Waterbox End - Minimum Clearance (for maintenance)
11	Condenser
12	Evaporator
13	Panel Power Section (door swing 796.9 mm)
14	Panel Power Section (door swing 790.1 mm)
15	Panel Control Section (door swing 568.14 mm)
II	2 Pass Evaporator Unit
III	3 Pass Evaporator Unit
*	Width does not include lifting lugs.
**	Control panel clearance 914 or 1016 mm depending on voltages, starter type, unit application and local code; 1067 mm clearance required to other grounded parts; two units with panels facing each other or other live parts require a clearance of 1220 mm.

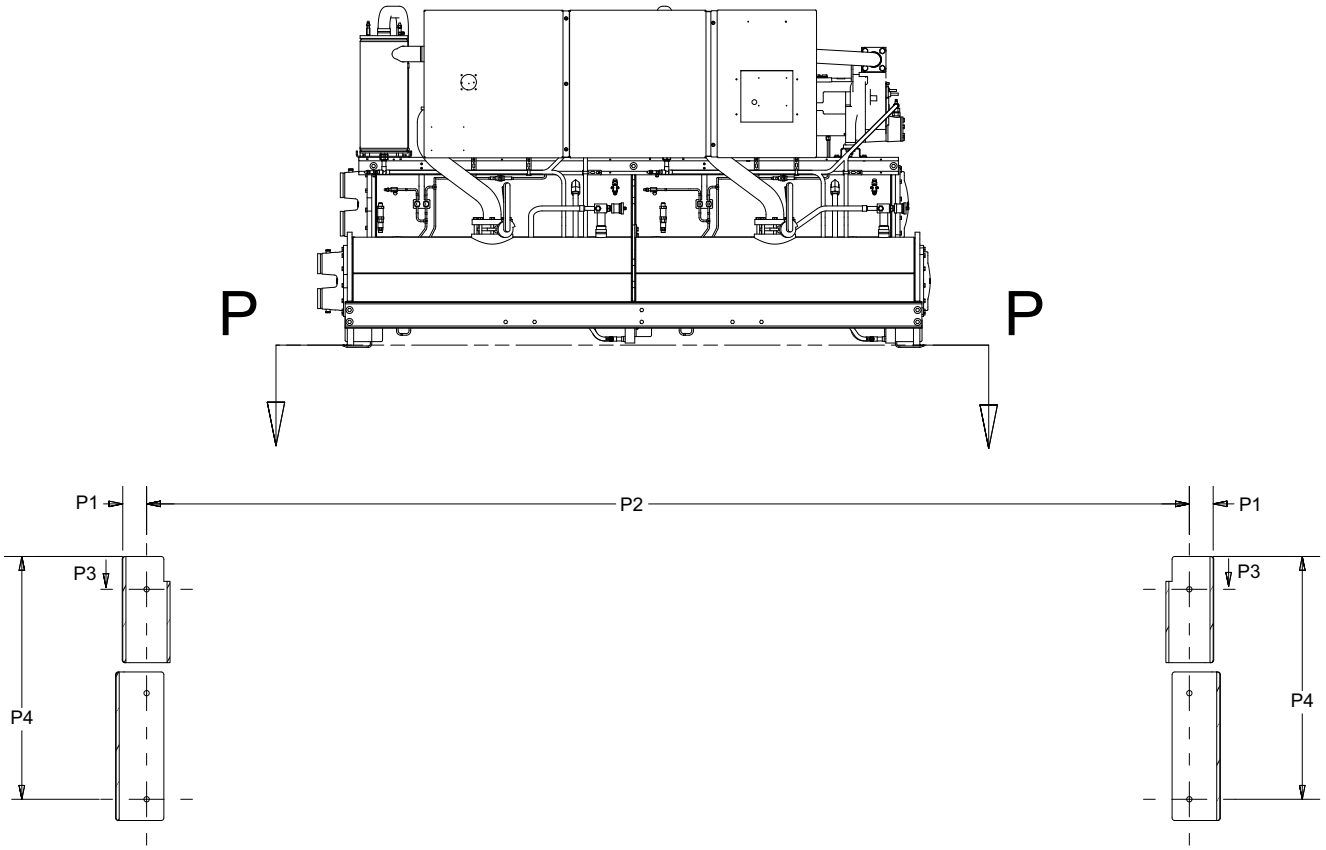


Table 15. RTWD unit footprint - all sizes

mm	High efficiency 60-120 tons	High efficiency 130-140 tons	Premium efficiency 160-180 tons	Premium efficiency 200 tons	High efficiency 220-250 tons
P1	76	76	76	76	76
P2	2845	2845	3353	2845	2845
P3	61	109	109	109	109
P4	671	744	744	744	744

Table 16. Weights

RTWD Model	Operating Weight (kg)	Shipping Weight (kg)
60 HE	2588	2506
70 HE	2596	2510
80 HE	2673	2576
90 HE	2866	2750
100 HE	2908	2787
110 HE	2946	2821
120 HE	3136	3002
130 HE	3714	3560
140 HE	3745	3581
160 PE	4115	3890
180 PE	4345	4096
200 PE	4555	4287
220 HE	4435	4204
250 HE	4510	4256

Note: All weights +/-3%.

Mechanical Specifications

General

Exposed metal surfaces are painted with air-dry white, direct-to-metal, single-component paint. Each unit ships with full operating charges of refrigerant and oil.

Compressor and Motor

The unit is equipped with two semi-hermetic, direct-drive, 3000 rpm 50 Hz rotary compressors 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 and a solenoid valve in the lube system are also provided.

Unit-Mounted Starter

The unit is supplied with a IP-55 type enclosure with top power-wiring access and three-phase, overload protection. The starter is available in a wye-delta configuration, factory-mounted and fully pre-wired to the compressor motor and control panel. A factory-installed, factory-wired control power transformer provides all unit control power (110 V secondary) and Trane CH530 module power (24 V secondary). Optional starter features include circuit breaker or disconnect switch wired to fuses.

Evaporator

Dual circuited, 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 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 PED code. The evaporator is designed for refrigerant-side/working-side pressure of 14 bars.

All water pass arrangements are available with grooved connections with 10 bars waterside working pressure. Waterside shall be hydrostatically tested at 14.5 bars.

Condenser

Dual circuited, shell and tube condenser designed with seamless internally/externally finned tubes expanded into tubesheets and mechanically fastened to tube supports. Condenser tubes are 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 PED code. The condenser is designed for refrigerant-side/working-side pressure of 21 bars.

Water side has single inlet and outlet piping connection. All water pass arrangements are available with grooved connections with 10 bars waterside working pressure. Waterside shall be hydrostatically tested at 14.5 bars.

Standard temperature condenser allow for leaving condenser water temperature up to 40.6°C and for entering condenser water temperatures up to 35°C.

Refrigerant Circuit

Each unit has two refrigerant circuits, with one rotary screw compressor per circuit. Each 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 RTWD 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, 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 (interface optional; control source not supplied)
- Trane Tracer Summit™ 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

Dual Relief Valve

Unit comes with dual relief valves on high pressure side of each refrigerant circuit (for Australian Code some units may have dual relief valve on both high pressure and low pressure side - please contact yourl local Trane representative for more details). Each dual relief valve configuration includes an isolation valve. Single relief valves are standard.

Flanged Water Connection Kit

Kit to convert all four water connections from grooved pipe to flanged connections. This includes: grooved couplings and pipe offsets.

High-Temperature Condenser

Optimized compressors, oil cooler and high condenser temperature control panel allows for leaving condenser water temperatures up to 60°C. This option is required for entering condenser water temperatures above 35°C.

Insulation

The evaporator, water boxes, and motor housing are covered with factory installed 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 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 -12.2°C.

Pressure Gauges

A set of two pressure gauges per refrigerant circuit are installed, one for low pressure and one for high pressure.

Water-to-Water Heat Pump

Optimized compressors, oil cooler and high condenser temperature control panel allows for leaving condenser water temperatures up to 60°C. This option allows for entering condenser water temperatures above 35°C Condenser leaving water temperature control option is required; the setpoint range is 60°C.

Electrical Options:

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.

Disconnect Switch Wired to Fuses

A fused molded case disconnect switch, factory pre-wired with fuses and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

IP 20 Protection of Control Panel

Provides protection of all live contacts including the ones which are energized after the disconnect switch is in the "ON" position and the unit is operating with the electrical panel opened. Electrical panel is built in accordance with NF EN 60529 standard.

Under/Over-Voltage Protection

Unit receives protection against variations in voltage (current lag and spike protection is standard).

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 26.7°C to 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 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) or Tracer Summit communications capabilities are 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.

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Date	0510
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