Product Catalog

Air Cooled Chillers

Model RTAG

085 to 205 Nominal Tons (50 Hz)

October 2017

RTAG-PRC001A-EN

Introduction

The new Trane model RTAG chiller is the result of a search for higher reliability, higher energy efficiency, and lower sound levels for today's environment.

In an effort to reduce energy consumed by HVAC equipment and to continually produce chilled water, Trane has developed the Model RTAG chiller with higher efficiencies and a more reliable design than any other air-cooled chiller available on the market today.

The RTAG chiller uses the proven design of the Trane helical-rotary compressor, which embraces all of the design features that have made the Trane helical-rotary compressor liquid chillers such a success since 1987.

Trane RTAG chillers offers high reliability coupled with greatly improved energy efficiency, and improved acoustical performance, due to its advanced design, low-speed, direct-drive compressor, and high efficiency evaporator.

The major advantages of the RTAG chiller are:
• Lower sound levels
• Higher energy efficiency at full load & part load.
The model RTAG chiller is an industrial-grade design, built for both the industrial and commercial markets. It is ideal for schools, hotels, hospitals, retailers, office buildings, and industrial applications RTAG chillers are available in 3 sound levels and 3 efficiencies levels to answer accurately to every customer's needs.

Sound levels
- Standard Noise
- Low Noise
- Super Low Noise

Efficiency levels
- High Efficiency (H)
- Extra Efficiency (X)
- Premium seasonal efficiency (P)

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Features and Benefits

The Helical-Rotary Compressor

- Unequaled-reliability. The Trane helical-rotary compressor is designed, built, and tested to the same demanding and rugged standards as the Trane scroll compressors, the centrifugal compressors, and the previous generation helical-rotary compressors used in both air- and water-cooled chillers for more than 29 years.
- Years of research and testing. The Trane helical-rotary compressor has amassed thousands of hours of testing, much of it at severe operating conditions beyond normal commercial air-conditioning applications.
- Proven track record. The Trane Company is the world's largest manufacturer of large helical- rotary compressors used for refrigeration. Over 300,000 compressors worldwide have proven that the Trane helical- rotary compressor has a reliability rate of greater than 99.5% in the fi rst year of operation — unequalled in the industry.
- Resistance to liquid slugging. The robust design of the Series R compressor can ingest amounts of liquid refrigerant that normally would severely damage compressor.
- Fewer moving parts. The helical- rotary compressor has only two rotating parts: the male rotor and the female rotor.
- Direct-drive, low-speed, semi- hermetic compressor for high efficiency and high reliability.
- Field-serviceable compressor for easy maintenance.
- Suction-gas-cooled motor. The motor operates at lower temperatures for longer motor life.
- Five minute start-to-start and two minute stop two minute stop to start anti-recycle timer allows for closer water-loop temperature control.

Capacity Control and Load Matching

The combination patented unloading system on Trane helical- rotary compressors uses the variable unloading valve for the majority of the unloading function. This allows the compressor to modulate infi nitely, to exactly match building load and to maintain chilled-water supply temperatures within ± 0.3℃ [±0.5°F] of the set point. Helical- rotary chillers that rely on stepped capacity control must run at a capacity equal to or greater than the load, and typically can only maintain water temperature to around ± 1℃ [±2°F]. Much of this excess capacity is lost because overcooling goes toward removing building latent heat, causing the building to be dried beyond normal comfort requirements.

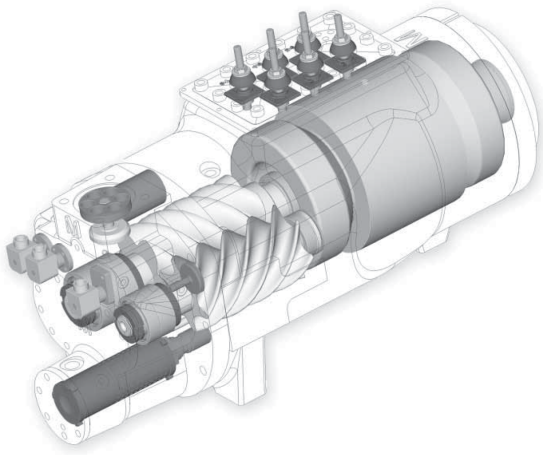


Figure 1 – Cutaway of a compressor

On RTAG P version, the combination of the variable unloading valve plus the adaptive frequency drive allow to exactly match building load and get excellent effi ciencies at full load and part load.

Close Spacing Installation

The RTAG chiller has the tightest recommended side clearance in the industry, 1 meter, but that is not all. In situations where equipment must be installed with less clearance than recommended, which frequently occurs in retrofit applications, restricted airflow is common. Conventional chillers may not work at all. However, the RTAG chiller with the Adaptive Control™ microprocessor will make as much chilled water as possible given the actual installed conditions, stay online during any unforeseen abnormal conditions, and optimize its performance. Consult your sales engineer for more details.

Factory Testing Means Trouble-Free Start-up

All RTAG chillers are given a complete functional test at the factory. This computer-based test program completely checks the sensors, wiring, electrical components, microprocessor function, communication capability, expansion valve performance, and fans. In addition, each compressor is run-tested to verify capacity and efficiency. Where applicable, each unit is factory preset to the customer's design conditions. An example would be the leaving-liquid temperature set point. The result of this test program is that the chiller arrives at the job site fully tested and ready for operation

Factory-Installed and Tested Controls and Options Speed Installation

All RTAG chiller options, including low ambient control, ambient temperature sensor, low ambient lockout, communication interface controls are factory installed and tested. Some manufacturers send accessories in pieces to be field installed. With Trane, the customer saves on installation expense and has assurance that ALL chiller controls and options have been tested and will function as expected.

CHIL evaporator

Trane developed an evaporator specially designed for RTAG chillers. CHIL evaporator optimizes the flow of the refrigerant to get an excellent heat exchange with water in every operating condition and minimize the quantity of refrigerant used.

Fans

Most of RTAG chillers use EC fans in order to reduce power consumption at full load and at part load. EC fans allow a significant reduction of sound level and a better operation of the chiller at low ambient conditions.

Superior Control with UC 800™ Chiller Controls

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

For Example:
A typical five-year-old chiller with dirty coils might trip out on high- pressure cutout on a 38℃ [100°F] day in August. A hot day is just when comfort cooling is needed the most. In contrast, the RTAG chiller with an Adaptive Control microprocessor will stage fans on, modulate the electronic expansion valve, and modulate the slide valve as it approaches a high-pressure cutout, thereby keeping the chiller on line when you need it the most, on high ambient temperatures.

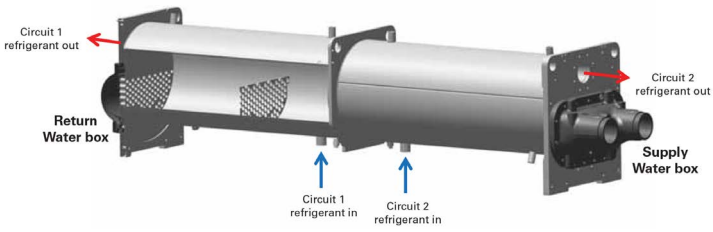


Figure 2 – CHIL Evaporator

Figure 3 – EC fan

Options

Application options

Low ambient
The low ambient option adds unit controls, EC fan to allow start and operation when the unit works with ambient temperatures down to -18℃ (-0.4°F). High side of ambient range remains at 46℃ (115°F).

High ambient
The high ambient option adds unit controls, EC fan, oil coolers and oversized electrical components to allow start and operation up to ambient temperatures of 52℃ (125°F) operation. Low side of ambient range remains at -18℃(-0.4°F).

Wide ambient
The wide ambient option adds unit controls, EC fan, oil coolers and oversized electrical components to allow start and operation up to ambient temperatures of 52℃ (125°F) operation. down to ambient temperatures of -18℃(-0.4°F).

Sound level options

Low noise
Low noise units are equipped with a jacket on the oil separators and a pre-formed 'sound box' encapsulating each compressor.

Extra low noise (H and X series with EC fan, and P series)
Night noise set back allow to reduce the sound level of the chiller by reducing the speed of EC fans controlled with an external on/off contact.

Electrical options
Under over voltage protection IP20 internal protection.
Flow switch: the flow switch is sent as an accessory and has to be installed on site.

Control options

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

LonTalk™ (LCI-C) Communications Interface
Provides the LonMar chiller profi le inputs/outputs for use with a generic building automation system via a single twisted pair wiring to a factory installed and tested communication board.

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

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

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

Run test report

Run test report gives the results of the performance test of the unit in the design conditions specified in the order write up with water without glycol.

The data recorded are: cooling capacity, power input, air temperature, water entering temperature, water leaving temperature and water flow.
* Components may differ depending on unit model and size. Contact your local sales office for details.

Other Options

Relief valves
Dual relief valve plus 3 way valve on low pressure side.

High performance insulation
Evaporator is insulated with 2 layers of Armaflex II or equivalent of 19 mm (3/4 inches) thickness and K factor of 0,26 W/m²°K.

Neoprene isolators
Isolators provide isolation between chiller and structure to help eliminate vibration transmission and have an efficiency of 95% minimum.

Export shipping package
Metallic clog are fixed on the base frame of the unit.
It prevents direct contact between the chiller and the container while loading and unloading from the container.

Disconnect with circuit breaker
The unit is equipped with a circuit breaker for each circuit and a centralized connecting block for the 3 phases.

Operating Map
To choose the unit configuration, refer to operating map figure below: Standard ambient, High ambient or Low ambient.
* Standard ambient units:
  -0℃ ≤ Air temperature ≤ 46℃.
* Low ambient units:
  -18℃ ≤ Air temperature ≤ 46℃
* High ambient units:
  -0℃ ≤ Air temperature ≤ 52℃
* Wide ambient units:
  -18℃ ≤ Air temperature ≤ 52℃

Application Considerations

Important

Certain application constraints should be considered when sizing, selecting, and installing Trane RTAG chillers. Unit and system reliability is often dependent on properly and completely complying with these considerations. When the application varies from the guidelines presented, it should be reviewed with your local sales engineer.

Unit Sizing

Unit capacities are listed in the performance data section. Intentionally oversizing a unit to ensure adequate capacity is not recommended. Erratic system operation and excessive compressor cycling are often a direct result of an oversized chiller. In addition, an oversized unit is usually more expensive to purchase, install, and operate. If oversizing is desired, consider using two units.

Water Treatment

Dirt, scale, products of corrosion, and other foreign material will adversely affect heat transfer between the water and system components. Foreign matter in the chilled-water system can also increase pressure drop and, consequently, reduce water flow. Proper water treatment must be determined locally, depending on the type of system and local water characteristics. Neither salt nor brackish water is recommended for use in Trane RTAG chillers. Use of either will lead to a shortened chiller life. Trane encourages the employment of a reputable water-treatment specialist, familiar with local water conditions, to assist in this determination and in the establishment of a proper water- treatment program.

Effect of Altitude on Capacity

RTAG chiller capacities given in the performance data tables are for use at sea level. At elevations substantially above sea level, the decreased air density will reduce condenser capacity and, therefore, unit capacity and efficiency.

Ambient Limitations

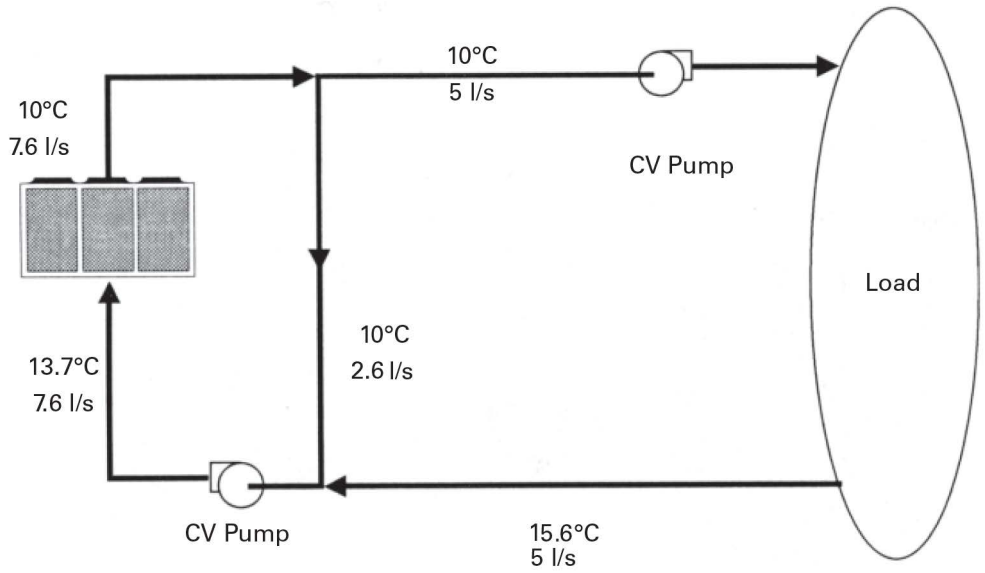


Figure 4 – Flow rate Out of Range

Trane RTAG chillers are designed for year-round operation over a range of ambient temperatures. The RTAG chiller will operate in ambient temperatures of 0 to 46°C [32 to 115°F]. Selecting the high-ambient option will allow the chiller to operate in ambient temperatures of 52°C [125°F], and selecting the low-ambient option will increase the operational capability of the water chiller to ambient temperatures as low as -18°C [-0.4°F] and selecting the wide ambient option will increase the operational capability of the water chiller to ambient temperatures as –18 to 52°C [-0.4 to 125°F].For operation outside of these ranges, contact the local sales office.

Water Flow Limits

The minimum water flow rates are given in Tables 1 to 6. Evaporator flow rates below the tabulated values will result in laminar flow and cause freeze-up problems, scaling, stratification, and poor control.
The maximum evaporator water flow rate is also given in the general data section. Flow rates exceeding those listed may result in excessive tube erosion.

Flow Rates Out of Range

Many process cooling jobs require flow rates that cannot be met with the minimum and maximum published values within the Model RTAG evaporator. A simple piping change can alleviate this problem. For example: a plastic injection molding process requires 5.0 l/s [80 gpm] of 10°C [50°F] water and returns that water at 15.6°C [60°F]. The selected chiller can operate at these temperatures, but has a minimum flow rate of 7.6 l/s [120 gpm]. The following system can satisfy the process.

Flow Control

Trane requires the chilled water flow control in conjunction with the RTAG Chiller to be done by the chiller.
This will allow the chiller to protect itself in potentially harmful conditions.

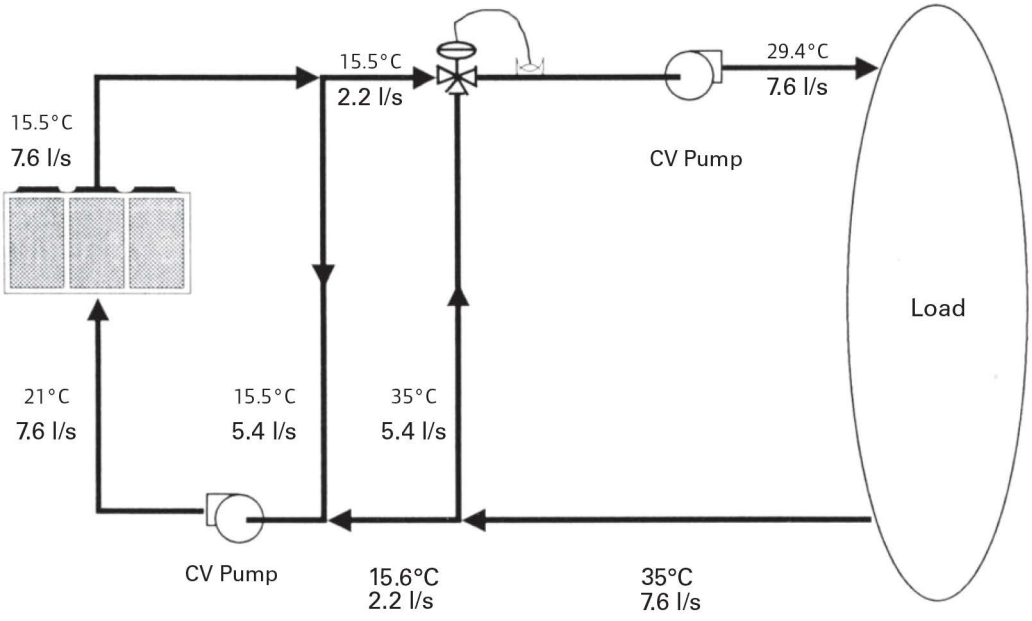


Figure 5 – Flow rate Out of Range

Leaving-Water Temperature Limits

The standard leavingsolution temperature range is 4 to 20°C [39 to 68°F]. Since liquid supply temperature set points less than 4°C [39°F] result in suction temperatures at or below the freezing point of water.

Leaving-Water Temperature

Out of Range

Many process cooling jobs require temperature ranges that cannot be met with the minimum and maximum published values. A simple piping change can alleviate this problem. For example: a laboratory load requires 7.6 l/s [120 gpm] of water entering the process at 29.4°C [85°F] and returning at 35°C [95°F]. The accuracy required is higher than the cooling tower can give. The selected chiller has adequate capacity, but has a maximum leaving-chilled- water temperature of 20°C [68°F]. In the example shown, both the chiller and process flow rates are equal. This is not necessary. For example, if the chiller had a higher flow rate, there would be more water bypassing and mixing with warm water.

Supply-Water Temperature Drop

The performance data for the Trane RTAG chiller is based on a chilled-water temperature drop of 5.6°C [10°F]. Chilled-water temperature drops from 3.3 to 10°C [38 to 50°F] may be used as long as minimum and maximum water temperature, and minimum and maximum flow rates, is not violated. Temperature drops outside this range are beyond the optimum range for control, and may adversely affect the microcomputer's ability to maintain an acceptable supply-water temperature range. When temperature drops are less than 3.3°C [38°F], an evaporator runaround loop may be required.

Short Water Loops

The proper location of the temperature control sensor is in the supply (outlet) water connection or pipe. This location allows the building to act as a buffer and assures a slowly-changing return- water temperature. If there is not a sufficient volume of water in the system to provide an adequate buffer, temperature control can be lost, resulting in erratic system operation and excessive compressor cycling. A short water loop has the same effect as attempting to control using the building return water. Typically, a two-minute water loop is sufficient to prevent a short water loop. Therefore, as a guideline, ensure that the volume of water in the evaporator loop equals or exceeds two times the evaporator flow rate per minute. For a rapidly changing load profile, the amount of volume should be increased. To prevent the effect of a short water loop, the following item should be given careful consideration: a storage tank or larger header pipe to increase the volume of water in the system and, therefore, reduce the rate of change of the return water temperature.

Application Types

- Comfort cooling
- Industrial process cooling
- Low-temperature process cooling

Model Number Descriptions

R	T	A	G	1	9	0	C	C	A	0	P	0	C	S	N	D	X	F	N	L	2	S	T	X	X	X	C	X	0	X	F	R	V	0	D	1	N	N	1
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Digit 1-4 - Unit Model
RTAG = Air Cooled Series chiller

Digit 5-7 - Unit Nominal Tons
085 = 85 Nominal Tons
100 = 100 Nominal Tons
125 = 125 Nominal Tons
145 = 145 Nominal Tons
155 = 155 Nominal Tons
170 = 170 Nominal Tons
190 = 190 Nominal Tons
205 = 205 Nominal Tons

Digit 08 - Unit Voltage
C= 380V/50Hz/3Ph
D= 400V/50Hz/3Ph
6= 415V/50Hz/3Ph

Digit 09 - Manufacturing Location
C=Taicang, China

Digit 10, 11 - Design Sequence
XX-Factory/ABU Assigned

Digit 12 - Unit Type
H= High Efficiency
X= Extra Efficiency
P=Premium seasonnal efficiency

Digit 13 - Safty Agency Listing
N= No Safty Agency Listing

Digit 14 - Pressure Vessel Code
A= ASME Pressure Vessel Code
C= Chinese Pressure Vessel Code

Digit 15 - Sound Treatment
S = Standard
L = Low noise
M = Extra low noise

Digit 16 - Unit Application
N= Standard Ambient 32-114.8°F (0-46°C)
H= High Ambient 32-125°F (0-52°C)
L= Low Ambient 0-114.8°F (-18-46°C)
W= Wide Ambient 0-125°F (-18-52°C)

Digit 17 - Relief Valve Option
S = Single Relief Valve
D = Dual Relief Valve With 3 Way Valve

Digit 18 - Flow Switch
X = No Flow Switch
F = Field Installed Flow Switch

Digit 19 - Water Connection
F= Flange

Digit 20 - Evaporator Application
N = Standard Cooling (4 To 20°C)

Digit21 - Evaporator Water Pressure
L= 150psi
H= 300psi

Digit 22 - Evaporator Configurations
2= 2 Pass Evaporator

Digit23 - Thermal Insulation
S= Standard Thermal Insulation

Digit24 - Condenser Options
T= Normal Tube Fin Coil

Digit25 - Heat Recovery
X= No Heat Recovery

Digit26 - Pump Package
X= Pump Signal On/Off

Digit27 - Free Cooling
X= None

Digit28 - Unit Operator Interface
Langage
C= Chinese
E= English

Digit 29 - Remote Communications
Options
X= None
M = LonTalk LCI-C w/modbus
B= Bacnet Interface

Digit 30 - Easy Remote Controller
0 = Without

Digit31 - External Set Points &
Capacity Outputs
X= None
A= External Set Points & Capacity Outputs

Digit 32 - Refrigerant Charge
F = Full Charge
N= Nitrogen
P = 12kg Charge

Digit 33 - Factory Tests
R= Standard Functional Test
P= Non-witnessed Performance Test, With Report
W= Customer-witnessed Performance Test, With Report

Digit 34 - Compressor Motor Starter Type
V = VFD
Y= Wye-delta closed transition

Digit 35 - Harmonic Filter
0 = None

Digit 36 - Power Line Connection Type
T=Terminal Block Connection
C= Circuit Breaker
D= Mech Disconnect Swith

Digit 37 - Incoming Power Line
1= Single Point Power Connection

Digit 38 - Control Output Accessories Options
N= No Output Options
A=Alarm Relay Outputs

Digit 39 - Appearance Options
N= No Appearance Options

Digit40 - Unit Isolation Installation Accessory
N= None
R= Neoprene Isolators

General Data

General Data -50hz - High efficiency

Model		RTAG-H	100	125	145	155	170	190	205
compressor	type		screw compressor						
	starter type		Wye-Delta Closed Transition Starter						
	circuit no.		1	2	2	2	2	2	2
	min load %		30%	15%	15%	15%	15%	15%	15%
Evaporator	type		Flooded (CHIL)						
	flow rate	gpm	229.5	288.0	333.6	359.1	388.8	427.1	460.6
	Pressure drop (WPD)	psid	4.9	4.5	6.0	5.9	4.5	5.4	4.9
	Connection	inch	4	5	5	5	6	6	6
Condenser	fan type		Direct drive propeller						
	fan no.		6	8	8	8	8	10	10
	fan input power	kW/fan	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Fan speed	RPM	950	950	950	950	950	950	950
	Air flow / fan	CFM	10584	10584	10584	10584	10584	10584	10584
RLA	comp1	A	203	140	140	170	170	203	203
	comp2	A	NA	98	140	140	170	170	203
LRA	comp1	A	406	273	273	373	373	406	406
	comp2	A	NA	190	273	273	373	373	406
Inrush		A	406	371	413	513	543	576	609
Max. RLA			244	286	336	372	408	448	487
Power type			380V/50Hz/3Ph						
Refrigerant			R134a						
Refrigerant Charge	ckt1	lb	207	176	167	167	167	179	181
	ckt2	lb	NA	137	167	167	167	179	181
Oil Charge	ckt1	gal	2.1	1.6	1.6	1.8	2.1	2.1	2.1
	ckt2	gal	NA	1.6	1.6	1.6	2.1	2.1	2.1
Dimension	Length	inch	151	198	198	198	198	244	244
	Width	inch	88	88	88	88	88	88	88
	Height	inch	98	98	98	98	98	98	98
Unit shipping weight		lb	6184	8426	9105	9202	9570	10360	10578
Operating weight		lb	6527	8920	9621	9746	10147	10958	11211

Note:

1. Cooling condition: evaporating water temperature 54F/44F, ambient temperature 95F, fouling factor 0.0001 ft^{2}·°F·h/Btu.
2. EC fans will be applicated when Super Low Noise or Wide ambient temperature or Low ambient temperature chosen.

General Data - 50hz - Extra efficiency model

Model		RTAG-X	85	100	125	145	155	170	190	205
compressor	type		screw compressor							
	starter type		Wye-Delta Closed Transition Starter							
	circuit no.		1	1	2	2	2	2	2	2
	min load %		30%	30%	15%	15%	15%	15%	15%	15%
Evaporator	type		Flooded (CHIL)							
	flow rate	gpm	197.7	237.9	298.1	345.4	372.1	403.1	438.4	476.4
	Pressure drop (WPD)	psid	4.4	5.3	3.6	5.4	5.6	4.9	5.7	4.4
	Connection	inch	4	4	5	5	5	6	6	6
Condenser	fan type		Direct drive propeller							
	fan no.		6	6	10	10	10	10	12	12
	fan input power	kW/fan	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Fan speed	RPM	950	950	950	950	950	950	950	950
	Air flow / fan	CFM	10584	10584	10584	10584	10584	10584	10584	10584
RLA	comp1	A	170	203	140	140	170	170	203	203
	comp2	A	NA	NA	98	140	140	170	170	203
LRA	comp1	A	373	406	273	273	373	373	406	406
	comp2	A	NA	NA	190	273	273	373	373	406
Inrush		A	373	406	371	413	513	543	576	609
Max. RLA			204	243.6	285.6	336	372	408	447.6	487.2
Power type			380V/50Hz/3Ph							
Refrigerant			R134a							
Refrigerant Charge	ckt1	lb	207	220	196	187	187	187	198	201
	ckt2	lb	NA	NA	157	187	187	187	198	201
Oil Charge	ckt1	gal	1.6	1.6	1.6	1.6	1.8	2.1	2.1	2.1
	ckt2	gal	NA	NA	1.6	1.6	1.6	2.1	2.1	2.1
Dimension	Length	inch	151	151	244	244	244	244	291	291
	Width	inch	88	88	88	88	88	88	88	88
	Height	inch	98	98	98	98	98	98	98	98
Unit shipping weight		lb	6041	6415	9405	10161	10245	10613	11114	11354
Operating weight		lb	6367	6767	9953	10731	10829	11229	11752	12051

Note:

1. Cooling condition: evaporating water temperature 54F/44F, ambient temperature 95F, fouling factor 0.0001 $ft^2 \cdot °F \cdot h/Btu$.
2. EC fans will be applicated when Super Low Noise or Wide ambient temperature or Low ambient temperature chosen.

General Data - 50hz - Premium seasonal efficiency

Model		RTAG-P	85	100	125	145	155	170	190	205
compressor	type		screw compressor							
	starter type		Adaptive Frequency Driver							
	circuit no.		1	1	2	2	2	2	2	2
	min load %		36%	36%	18%	18%	18%	18%	18%	18%
Evaporator	type		Flooded (CHIL)							
	flow rate	gpm	194.2	232.1	298.2	345.7	368.5	395.0	430.4	466.8
	Pressure drop (WPD)	psid	4.2	5.0	4.1	5.4	5.5	4.7	5.5	4.2
	Connection	inch	4	4	5	5	5	6	6	6
Condenser	fan type		Direct drive propeller (EC Fan)							
	fan no.		6	6	10	10	10	10	12	12
	fan input power	kW/fan	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Fan speed	RPM	Max:910 Min:200	Max:910 Min:200	Max:910 Min:200	Max:910 Min:200	Max:910 Min:200	Max:910 Min:200	Max:910 Min:200	Max:910 Min:200
	Air flow / fan	CFM	10036	10036	10036	10036	10036	10036	10036	10036
RLA	comp1	A	170	203	140	140	170	170	203	203
	comp2	A	NA	NA	98	140	140	170	170	203
LRA	comp1	A	170	203	140	140	170	170	203	203
	comp2	A	NA	NA	98	140	140	170	170	203
Inrush		A	195	228	285	327	357	387	420	453
Max. RLA			204	244	286	336	372	408	448	487
Power type			380V/50Hz/3Ph							
Refrigerant			R134a							
Refrigerant Charge	ckt1	lb	207	220	196	187	187	187	198	201
	ckt2	lb	NA	NA	157	187	187	187	198	201
Oil Charge	ckt1	gal	2.1	2.1	1.6	1.6	1.8	2.1	2.1	2.1
	ckt2	gal	NA	NA	1.6	1.6	1.6	2.1	2.1	2.1
Dimension	Length	inch	156	156	249	249	249	249	296	296
	Width	inch	88	88	88	88	88	88	88	88
	Height	inch	98	98	98	98	98	98	98	98
Unit shipping weight		lb	6658	7033	10243	10999	11083	11451	11951	12192
Operating weight		lb	6989	7388	10791	11569	11666	12067	12590	12889

Note:

1. Cooling condition: evaporating water temperature 54F/44F, ambient temperature 95F, fouling factor 0.0001 $ft^2 \cdot °F \cdot h/Btu$.

Controls System

Tracer UC800 Controller

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

Feedforward Adaptive Control

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

Soft Loading

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

Adaptive Controls

There are many objectives that the controller must meet, but it cannot satisfy more than one objective at a time. Typically, the controllers primary objective is to maintain the evaporator leaving water temperature. Whenever the controller senses that it can no longer meet its primary objective without triggering a protective shutdown, it focuses on the most critical secondary objective. When the secondary objective is no longer critical, the controller reverts to its primary objective

Rapid Restart

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

AdaptiSpeed Control

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

Variable-Primary Flow (VPF)

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

TD7 Operator Interface

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

Display Features Include:

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

Figure 6 – TD7 operator interface

TracerTU Interface

TracerTU (n on-Trane personnel, contact your local Trane offi ce for software) adds a level of sophistication that improves service technician effectiveness and minimizes chiller downtime. The portable PC-based service-tool software, TracerTU, supports service and maintenance tasks. TracerTU serves as a common interface to all Trane® chillers, and will customize itself based on the properties of the chiller with which it is communicating. Thus, the service technician learns only one service interface. The panel bus is easy to troubleshoot using LED sensor verification. Only the defective device is replaced. TracerTU can communicate with individual devices or groups of devices. All chiller status, machine configuration settings, customizable limits, and up to 100 active or historic diagnostics are displayed through the service-tool software interface. LEDs and their respective TracerTU indicators visually confi rm the availability of each connected sensor, relay, and actuator.

TracerTU is designed to run on a customer's laptop, connected to the Tracer TD7 control panel with a USB cable. Your laptop must meet the following hardware and software requirements:

- 1 GB RAM (minimum)
- 1024 x 768 screen resolution
- CD-ROM drive
- Ethernet 10/100 LAN card
- An available USB 2.0 port
- Microsoft® Windows® XP Professional operation system with Service Pack 3 (SP3) or Windows 7 Enterprise or Professional operating system (32-bit or 64-bit)
- Microsoft .NET Framework 4.0 or later

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

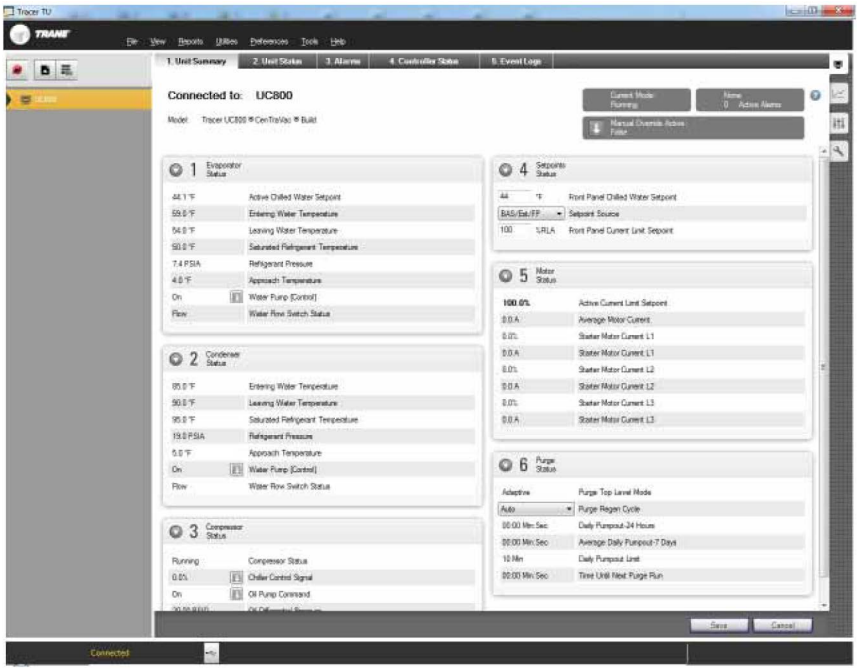


Figure 7 – Screen TD7 interface

System Integration

Stand-Alone Controls

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

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

Hardwire Points

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

- Ice making control.
- External chilled water setpoint, external demand limit setpoint
- Chilled water temperature reset.
- Programmable relays - available outputs are: alarm latching, alarm-auto reset, general alarm-warning, chiller limit mode, compressor running, and Tracer control.
- BACnet Interface
- Tracer TD7 control can be configured for BACnet communications at the factory or in the field. This enables the chiller controller to communicate on a BACnet MS/TP network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled through BACnet. Tracer TD7 controls conforms to the BACnet B-ASC profile as defined by ASHRAE 135-2004.
- Lon Talk Communications Interface (LCI-C)

• The optional Lon Talk® Communications Interface for Chillers (LCI-C) is available factory or field installed. It is an integrated communication board that enables the chiller controller to communicate over a LonTalk network. The LCI-C is capable of controlling and monitoring chiller setpoints, operating modes, alarms, and status. The Trane LCI-C provides additional points beyond the standard LONMARK® defi ned chiller profi le to extend interoperability and support a broader range of system applications. These added points are referred to as open extensions. The LCI-C is certified to the LONMARK Chiller Controller Functional Profile 8040 version 1.0, and follows LonTalk FTT-10A free topology communications.
Modbus Interface Tracer TD7 control can be confi gured for Modbus communications at the factory or in the field. This enables the chiller controller to communicate as a slave device on a Modbus network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled by a Modbus master device.

Tracer Summit

The chiller plant control capabilities of the Trane Tracer Summit™ building automation system are unequaled in the industry. Trane's depth of experience in chillers and controls makes us a well-qualifi ed choice for automation of chiller plants using air-cooled RTAG chillers. Our chiller plant automation software is fully pre-engineered and tested.
Required features:
• LonTalk/Tracer Summit Interface (selectable option with chiller)
• Building Control Unit (external device required)
• Sequences starting of chillers to optimize the overall chiller plant energy efficiency
– Individual chillers operate as base, peak, or swing based on capacity and efficiency
– Automatically rotates individual chiller operation to equalize runtime and wear between chillers
– Evaluates and selects the lowest energy consumption alternative from an overall system perspective.
• Regulatory Compliance Documentation
• Gathers information and generates the reports mandated in ASHRAE Guideline 3.
• Easy Operation and Maintenance
• Remote monitoring and control
• Displays both current operation conditions and scheduled automated control actions
• Concise reports assist in planning for preventative maintenance and verifying performance
Alarm notification and diagnostic messages aid in quick and accurate troubleshooting.

Tracer SC

The Tracer SC™ system controller acts as the central coordinator for all individual equipment devices on a Tracer building automation system. The Tracer SC scans all unit controllers to update information and coordinate building control, including building subsystems such as VAV and chiller water systems. With this system option, the full breadth of Trane's HVAC and controls experience are applied to offer solutions to many facility issues. The LAN allows building operators to manage these varied components as one system from any personal computer with web access.
The benefi ts of this system are:
• Improved usability with automatic data collection, enhanced data logging, easier to create graphics, simpler navigation, pre-programmed scheduling, reporting, and alarm logs.
• Flexible technology allows for system sizes from 30-120 unit controllers with any combination of LonTalk or BACnet unit controllers.
• LEED certification through site commissioning report, energy data collection measurement, optimizing energy performance, and maintaining indoor air quality.
Energy savings programs include: fan pressure optimization, ventilation reset, and chiller plant control (adds and subtracts chillers to meet cooling loads).

Building Automation and Chiller Plant Control

The UC800 controller can communicate with Trane Tracer Summit, Tracer SC and Tracer ES building automation systems, which include pre-engineered and fl exible control for chiller plants. These building automation systems can control the operation of the complete installation: chillers, pumps, isolating valves, air handlers, and terminal units.
Trane can undertake full responsibility for optimized automation and energy management for the entire chiller plant.

The main functions are:
• **Chiller sequencing:** equalizes the number of running hours of the chillers. Different control strategies are available depending on the configuration of the installation.
• **Control of the auxiliaries:** includes input/output modules to control the operation of the various auxiliary equipment (water pumps, valves, etc.).
• **Time-of-day scheduling:** allows the end user to defi ne the occupancy period, for example: time of the day, holiday periods and exception schedules.
• **Optimization of the installation start/stop time:** based on the programmed schedule of occupancy and the historical temperature records. Tracer Summit and Tracer SC calculate the optimal start/stop time of the installation to get the best compromise between energy savings and comfort of the occupants.
• **Soft loading:** the soft loading function minimizes the number of chillers that are operated to satisfy a large chilled-water-loop pull down, thus preventing an overshoot of the actual capacity required. Unnecessary starts are avoided and the peak current demand is lowered.
• **Communication capabilities:** local, through a PC workstation keyboard. Tracer Summit and Tracer SC can be programmed to send messages to other local or remote workstations and or a pager in the following cases:
– Analog parameter exceeding a programmed value
– Maintenance warning
– Component failure alarm
– Critical alarm messages. In this latter case, the message is displayed until the operator acknowledges the receipt of the information. From the remote station it is also possible to access and modify the chiller plants control parameters.

Remote communication through a modem: as an option, a modem can be connected to communicate the plant operation parameters through voice grade phone lines. A remote terminal is a PC workstation equipped with a modem and software to display the remote plant parameters.

Integrated Comfort System (ICS)
The onboard Tracer chiller controller is designed to be able to communicate with a wide range of building automation systems. In order to take full advantage of chiller's capabilities, incorporate your chiller into a Tracer Summit or Tracer SC building automation system. But the benefi ts do not stop at the chiller plant. At Trane, we realize that all the energy used in your cooling system is important. That is why we worked closely with other equipment manufacturers to predict the energy required by the entire system. We used this information to create patented control logic for optimizing HVAC system effi ciency. The building owners challenge is to tie components and applications expertise into a single reliable system that provides maximum comfort, control, and effi ciency. Trane Integrated Comfort systems (ICS) are a concept that combines system components, controls, and engineering applications expertise into a single, logical, and effi cient system. These advanced controls are fully commissioned and available on every piece of Trane® equipment, from the largest chiller to the smallest VAV box. As a manufacturer, only Trane offers this universe of equipment, controls, and factory installation and verification.

Electrical Data

Electrical data - High efficiency

Unit Size	Rated Voltage	Unit Power In				Motor Data						
						Compressor (Each)				Fan(Each)		
		Power Conns	MCA	Max. Fuse, HACR breaker or MOP	Rec. time delay or RDE	Qty	RLA Ckt1/ Ckt2	XLRA Ckt1/ Ckt2	YLRA Ckt1/ Ckt2	Qty. Ckt1/ Ckt2	kW	FLA
100	380/50/3	1	336	500	450	1	203	1161	385	6	1.5	3
125	380/50/3	1	366	500	450	2	140/98	796/589	259/180	8	1.5	3
145	380/50/3	1	417	550	500	2	140/140	796/796	259/259	8	1.5	3
155	380/50/3	1	463	650	550	2	170/140	1089/796	354/259	8	1.5	3
170	380/50/3	1	500	700	600	2	170/170	1089/1089	354/354	8	1.5	3
190	380/50/3	1	557	800	650	2	203/170	1161/1089	385/354	10	1.5	3
205	380/50/3	1	598	850	700	2	203/203	1161/1161	385/385	10	1.5	3

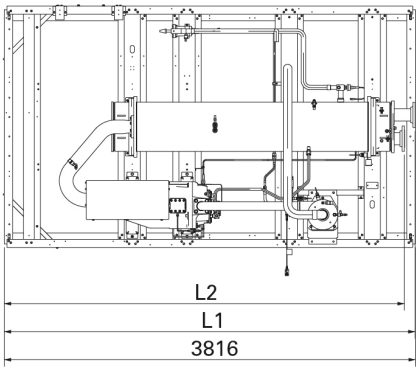
Electrical Data - Extra efficiency and premium seasonal efficiency

Unit Size	Rated Voltage	Unit Power In				Motor Data						
						Compressor (Each)				Fan(Each)		
		Power Conns	MCA	Max. Fuse, HACR breaker or MOP	Rec. time delay or RDE	Qty	RLA Ckt1/ Ckt2	XLRA Ckt1/ Ckt2	YLRA Ckt1/ Ckt2	Qty. Ckt1/ Ckt2	kW	FLA
85	380/50/3	1	285	450	400	1	170	1089	354	6	1.5	3
100	380/50/3	1	336	500	450	1	203	1161	385	6	1.5	3
125	380/50/3	1	372	500	450	2	140/98	796/589	259/180	10	1.5	3
145	380/50/3	1	423	550	500	2	140/140	796/796	259/259	10	1.5	3
155	380/50/3	1	469	650	550	2	170/140	1089/796	354/259	10	1.5	3
170	380/50/3	1	506	700	600	2	170/170	1089/1089	354/354	10	1.5	3
190	380/50/3	1	563	800	650	2	203/170	1161/1089	385/354	12	1.5	3
205	380/50/3	1	604	850	700	2	203/203	1161/1161	385/385	12	1.5	3

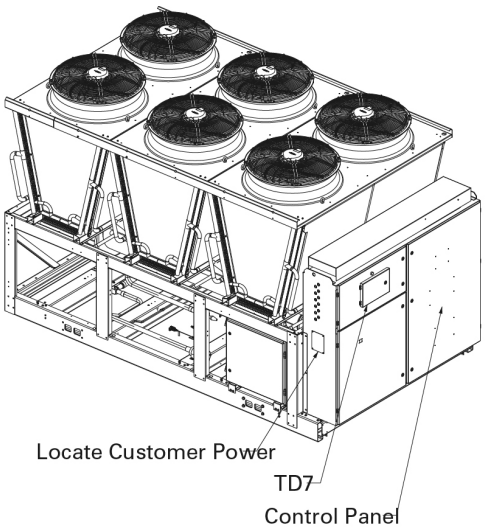
Notes:
1. MCA-Minimum circuit ampacity
2. MOP-Maximum over current protection
3. RDE-Recommend time delay fuse size
4. RLA-Rated load amps
5. XLRA-Locked rotor amps are based on full winding starts
6. YLRA-Locked rotor amps in Wye configuration

Dimensional Data

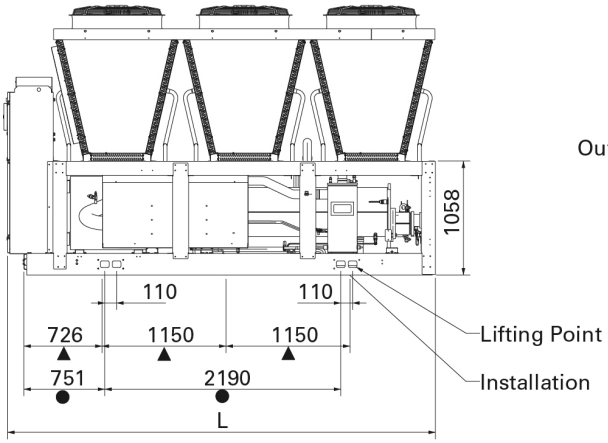
RTAG 100 High, 085/100 Extra/ Premium efficiency unit



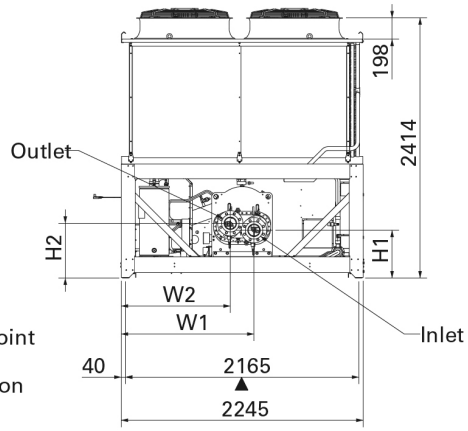
Top View(With fan /coil removed)



ISO View



Side View

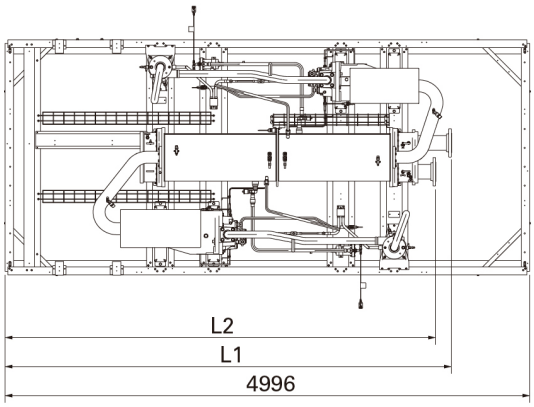


Back View

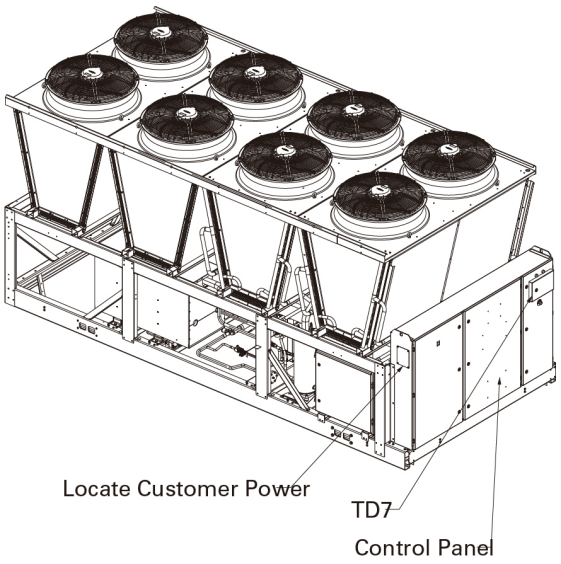
▲ Installation Point
● Lifting Point

		H1	H2	W1	W2	L1	L2	Water pipe	L (High and Extra eff)	L (Premium seasonal eff)
RTAG085 X RTAG085 P	150PSI	468	478	1252	992	3619	3619	4"	3840	3970
	300PSI	443	508	1233	1013	3813	3713	4"	3840	3970
RTAG100 H	150PSI	468	478	1252	992	3619	3619	4"	3840	-
	300PSI	443	508	1233	1013	3813	3713	4"	3840	-
RTAG100 X RTAG100 P	150PSI	468	478	1252	992	3619	3619	4"	3840	3970
	300PSI	443	508	1233	1013	3813	3713	4"	3840	3970

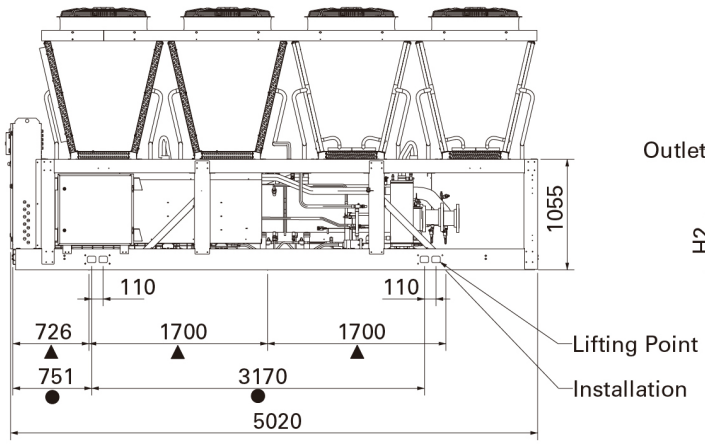
RTAG 125/145/155/170 High efficiency unit



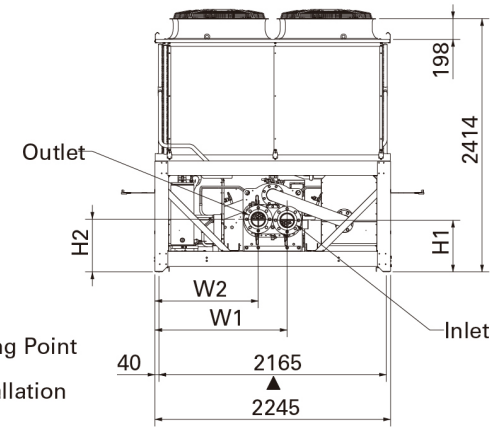
Top View(With fan /coil removed)



ISO View



Side View

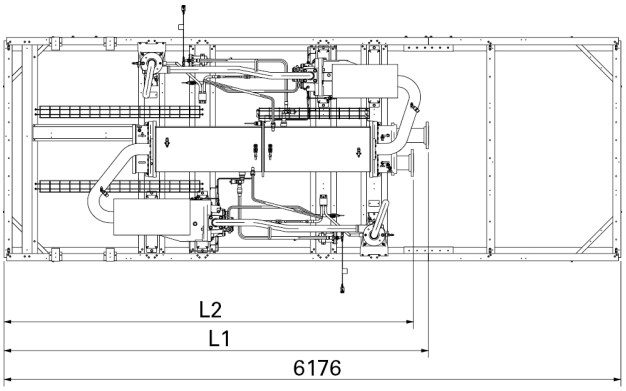


Back View

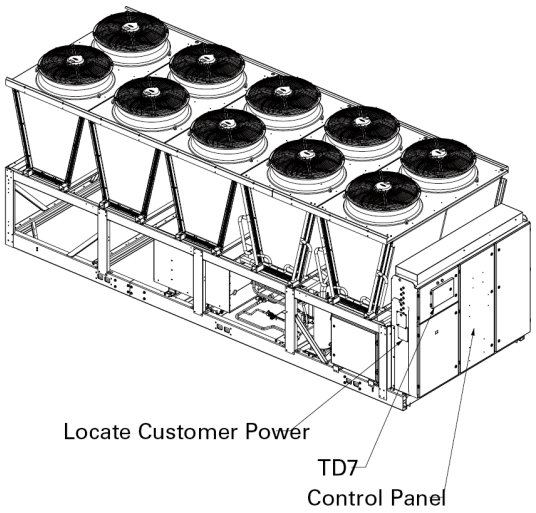
▲ Installation Point
● Lifting Point

		H1	H2	W1	W2	L1	L2	Water pipe
RTAG125 H	150PSI	491	501	1260	985	3905	3905	5"
	300PSI	492	502	1260	985	4249	4099	5"
RTAG145 H	150PSI	491	501	1260	985	3905	3905	5"
	300PSI	492	502	1260	985	4249	4099	5"
RTAG155 H	150PSI	491	501	1260	985	3905	3905	5"
	300PSI	492	502	1260	985	4249	4099	5"
RTAG170 H	150PSI	491	501	1275	969	3938	3938	6"
	300PSI	492	502	1275	969	4250	4100	6"

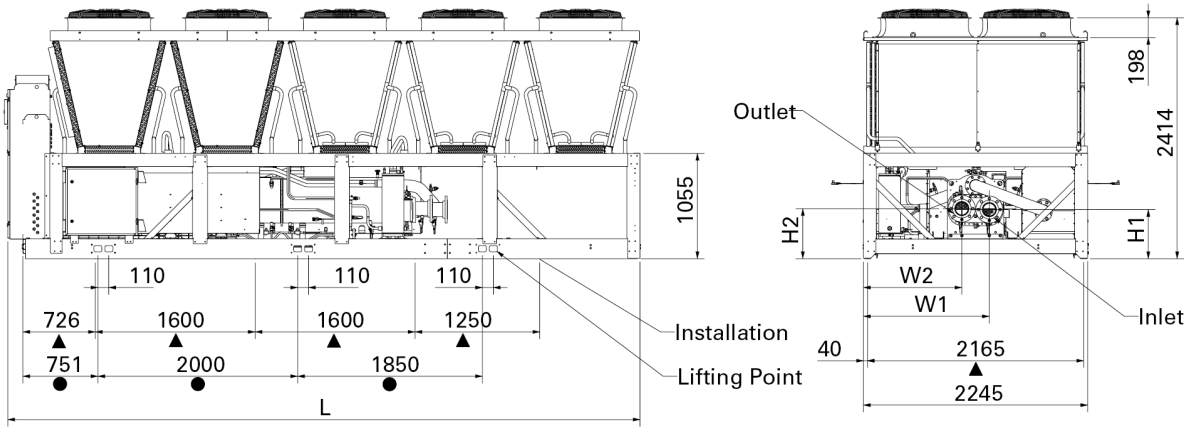
RTAG 125/145/155/170 Extra/ Premium efficiency unit, 190/205 High efficiency unit



Top View(With fan /coil removed)



ISO View



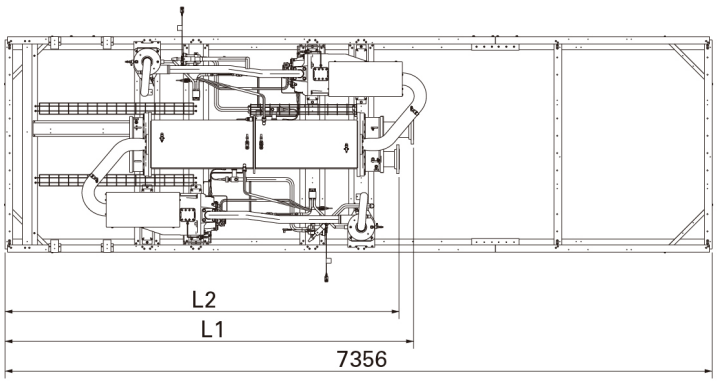
Side View

▲ Installation Point
● Lifting Point

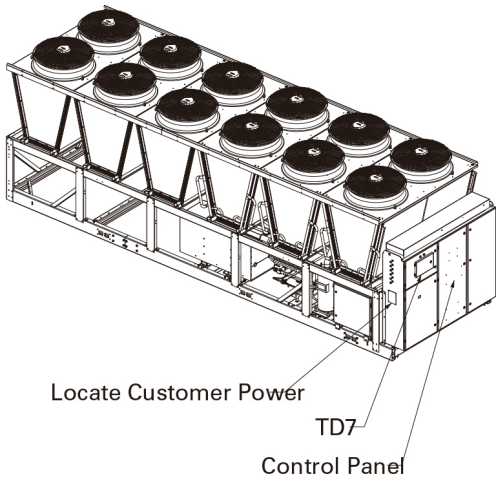
Back View

		H1	H2	W1	W2	L1	L2	Water pipe	L (High and Extra eff)	L (Premium seasonal eff)
RTAG125 X RTAG125 P	150PSI	491	501	1260	3905	3905	3905	5"	6200	6330
	300PSI	492	502	1260	4249	4099	4099	5"	6200	6330
RTAG145 X RTAG145 P	150PSI	491	501	1260	3905	3905	3905	5"	6200	6330
	300PSI	492	502	1260	4249	4099	4099	5"	6200	6330
RTAG155 X RTAG155 P	150PSI	491	501	1260	3905	3905	3905	5"	6200	6330
	300PSI	492	502	1260	4249	4099	4099	5"	6200	6330
RTAG170 X RTAG170 P	150PSI	449	464	1275	3938	3938	3938	6"	6200	6330
	300PSI	450	465	1275	4250	4100	4100	6"	6200	6330
RTAG190 H	150PSI	449	464	1275	3938	3938	3938	6"	6200	-
	300PSI	450	465	1275	4250	4100	4100	6"	6200	-
RTAG205 H	150PSI	449	464	1275	3938	3938	3938	6"	6200	-
	300PSI	450	465	1275	4250	4100	4100	6"	6200	-

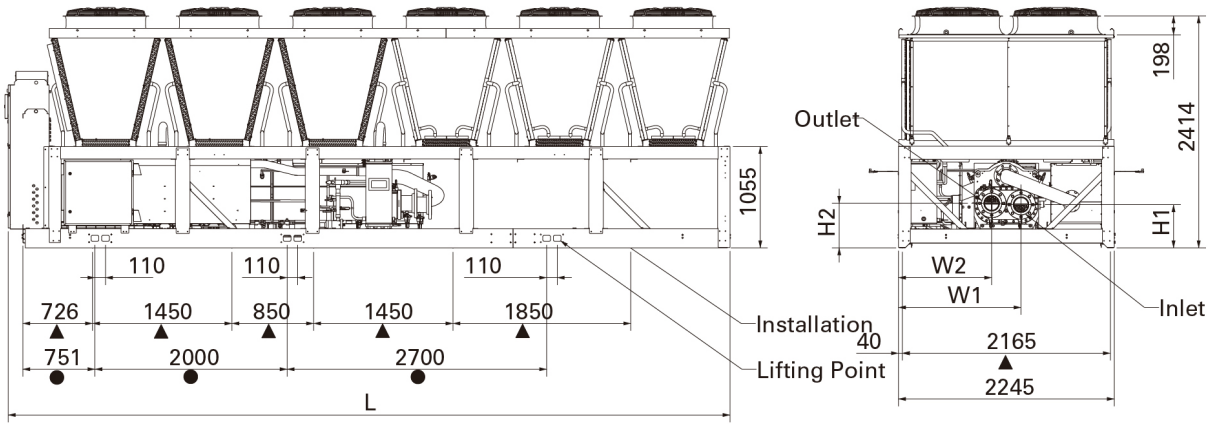
RTAG 190/205 Extra/ Premium efficiency unit



Top View(With fan /coil removed)



ISO View



Side View

▲ Installation Point
● Lifting Point

Back View

		H1	H2	W1	W2	L1	L2	Water pipe	L (High and Extra eff)	L (Premium seasonal eff)
RTAG190 X RTAG190 P	150PSI	448	463	1275	969	3938	3938	6"	7380	7510
	300PSI	449	464	1275	969	4250	4100	6"	7380	7510
RTAG205 X RTAG205 P	150PSI	448	463	1276	970	3938	3938	6"	7380	7510
	300PSI	449	464	1276	970	4250	4100	6"	7380	7510

Mechanical Specifications

General

Chilled water production will be made by a factoryassembled and tested, air-cooled liquid chiller, Trane type RTAG H/X/P. Chiller will have one/two refrigerant circuits with one compressor per circuit, will be shipped with a full operating charge of R134a refrigerant and lubrication oil, screw compressors and electronic expansion valve.

Documentation including installation-operationmaintenance manual, user guide, wiring diagram and submittal is placed in the control panel.

Compressors and Motors

The helical-rotary compressor is semi-hermetic, direct drive, 3000 rpm, differential refrigerant pressure oil circulation system without oil pump, and with oil heater.
On Trane RTAG H Capacity control is done through the VFD to optimize performances at partial load allowing reduction of capacity down to 36 or 18% (one or two refrigerant circuits) of the maximum value.

On Trane RTAG H and X capacity control will be made through a slide valve allowing reduction of capacity down to 30 or 15% (one or two refrigerant circuits) of the maximum value. Compressor will start always unloaded.

Motor is suction gas cooled, hermetically sealed, two poles, squirrel cage induction type, with four pressure lubricated rolling elements, bearing groups shall support the rotating assembly. Motor bearings will be designed for the whole life of the chiller.

Oil Management

The chiller is equipped with an oil management system without oil pump that ensures proper oil circulation throughout the unit. The key components of the system include an oil separator, oil fi lter with particles retention capacity of at least 5µm.
An oil heater is installed to avoid startup with low oil temperature.

An optional oil cooler is installed when the unit is used for high condensing temperature or low evaporator temperature conditions.

Unit-Mounted Wye-Delta Starter (RTAG H and X)

The compressor starters shall be Star-Delta configuration closed transition, factory-mounted and fully pre-wired to the compressor motor and control panel. Starter will reduce by 33% the inrush current.

Adaptive Frequency Drive (AFD) mounted on RTAG P

Compressors of RTAG P shall be equipped with an adaptive frequency drive, factory mounted, tested and wired. Frequency converter will drive the chiller start and ramp up, and the partial load operation.

AFD enclosure is IP55 as standard, with integrated air cooling system, consisting of a fan below the VFD frame.

Evaporator

The evaporator is a tube-in-shell heat exchanger design with internally and externally finned copper tubes roller expanded into the tube sheet. The evaporator is designed, tested and stamped in accordance with ASME for a refrigerant side working pressure of 200 psig. The evaporator is designed for a water side working pressure of 150 /300 psig. Water connections are flange. Each shell includes a vent, a drain and fittings for temperature control sensors and is insulated with 3/4 inch equal insulation (K=0.26). Evaporator heaters with thermostat are provided to help protect the evaporator from freezing at ambient temperatures down to -20°F (-29°C). Factory installed flow switch is installed on a pipe stub in the evaporator inlet.

Condenser and Fans

Air-cooled condenser coils have aluminum fins mechanically bonded to internally finned seamless copper tubing. The condenser coil has an integral subcooling circuit. Condensers are factory proof and leak tested at 506 psig.

Direct-drive vertical-discharge airfoil condenser fans are dynamically balanced.
Standard units will start and operate from 0°C to 46°C (32°F to115°F) ambient.
Standard ambient or high ambient, standard noise or low noise are equipped with three-phase condenser fan motors. Low ambient or wide ambient, ultra low noise and premium seasonal efficiency units are equipped with EC condenser fan motors.

Refrigerant Circuit

Each unit has one or two refrigerant circuits, with one rotary screw compressor per circuit.
Each refrigerant circuit includes compressor discharge service valves, liquid line shut off valve, removable core filter, charging port, high pressure and low pressure safety valves and electronic expansion valve.

Electrical Panel

Single point connection with disconnect switch and fuses.
The disconnect switch is mechanically interlocked to disconnect line power from the starter before the starter doors are open.
All components and control cables are numbered in accordance with CEI 60750.
A factory-installed, factory-wired control power transformer provides all unit control power and UC800 module power. All the starter elements are enclosed in an IP54 panel, with hinged door.

Unit Controls (Tracer UC800)

The microprocessor-based control panel is factoryinstalled and factory-tested. The control system is powered by a control power transformer. It loads and unloads the chiller through adjustment of the compressor slide valve on models RTAG H/X and through a Adaptive Frequency Drive on the model RTAG P.
Microprocessor-based chilled water reset based on return water is standard. The UC800 utilizing the "Adaptive Control™" microprocessor automatically takes action to prevent unit shutdown due to abnormal operating conditions associated with low evaporator refrigerant temperature, high condensing temperature, and motor current overload. If abnormal operating condition continues and protective limit is reached, the refrigerant circuit will be shut down. Controller includes machine protection shutdown requiring manual reset for:

- Low evaporator refrigerant temperature and pressure
- High condenser refrigerant pressure
- Low oil flow
- Critical sensor or detection circuit fault
- Motor current overload
- High compressor discharge temperature
- Communications lost between modules
- Electrical distribution faults: phase loss, phase imbalance, phase reversal
- External and local emergency stop
- Starter transition failure.

The panel includes machine protection shutdown with automatic reset when the condition is corrected for:
- Momentary power loss
- Over / under voltage
- Loss of evaporator water flow.

Over 100 diagnostic checks is made and are displayed when a fault is detected. The display indicates the fault, the type of reset required, the time and date the diagnostic occurred, the mode in which the machine was operating at the time of the diagnostic, and a help message. A diagnostic history displays the last 20 diagnostics with the time and date of their occurrence. Alarms and diagnostics are displayed in chronological order, with a color/symbol code: red octagon for immediate shutdown, yellow triangle for normal shutdown and blue circle for warning.

Human interface with Touchable Display Trane TD7
- Factory-mounted above the control panel door
- UV Resistant touchscreen
- -40°C to 70°C operating temperature
- IP56 rated
- CE certifi cation
- Emissions: EN55011(Class B)
- Immunity: EN61000 (Industrial)
- 7" diagonal
- 800x480 pixels
- TFT LCD @ 600 nits brightness
- 16 bit color graphic display

Display features:
- Alarms
- Reports
- Chiller settings
- Display settings
- Graphing

Dry contacts
UC800 provides a flexible alarm or chiller status indication to a remote location through a hard wired interface to a dry contact closure. Four relays are available for this function.

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