RTAA 213 - 434

Packaged Air Cooled Helical Rotary Liquid Chiller High Ambient (50 & 60 Hz) 125 to 400 Tons

Quality Management System Approval

C20 CA 603 E

Packaged Air Cooled Helical Rotary Liquid Chiller for High Ambient
RTAA 213-434 (50 & 60 Hz - R22) - 125 to 400 Tons

Features and Benefits

Designed to Perform, Built to Last

Trane 125 through 400-ton air-cooled Rotary chillers are leading the marketplace into the 21st century with innovative design features that provide benefits no other chiller can match.

Unequaled Reliability

- Proven rugged Trane Helirotor™ compressor design for longer life and greater dependability.
- Fewer moving parts means less parts to fail. Typical reciprocating compressors have 15 times as many critical parts.
- Dual independent refrigerant circuit design increases overall system reliability.
- Unlike reciprocating compressors, Trane Helirotor™ compressors can handle liquid slugging.

Optimum Efficiencies

- Unsurpassed full load efficiency (EER)
- Great part-load efficiency due to an electronic expansion valve and Trane Helirotor compressors.
- PID chilled water setpoint control maintains chilled water supply within ± 1/2 °F of setpoint.

RTAA 300 series chiller.

cover photo:
Trane's air-cooled Rotary chiller 300 series.

Contents

Trouble-Free Installation, Start-Up and Operation

- Small operating footprint insures easy retro-fit capabilities.
- Factory testing insures trouble-free start-up.
- Factory-installed, fully-tested controls and options keep start-up time and expenses to minimum.
- Adaptive Control™ Microprocessor
  - optimizes efficiencies
  - prevents nuisance trip-outs
  - prevents unnecessary service calls and unhappy tenants
- Superior microprocessor control
  - over 90 diagnostic and operating conditions
  - display chiller temperatures and pressures
  - Trane Integrated Comfort system (ICS) interface

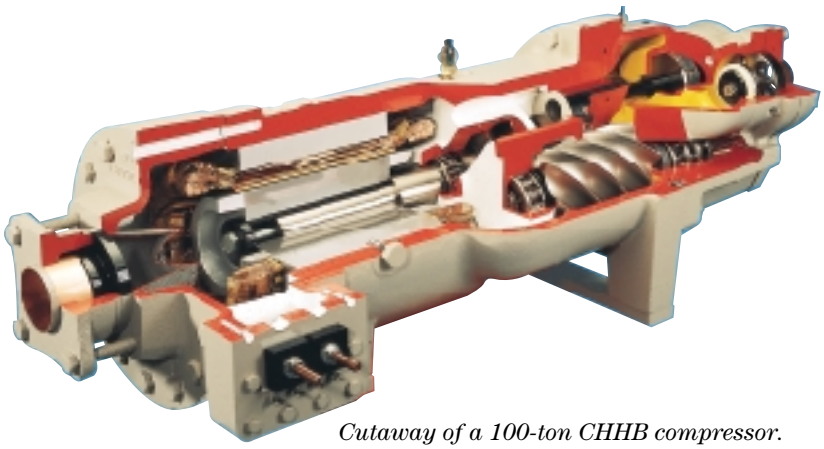
Unequaled Reliability

Proven Reliable Design

The air-cooled Rotary chiller utilizes two, three, or four Trane Helirotor compressors that operate on two refrigeration circuits. The tonnages of these compressors are 70, 85, and 100 ton, and they are grouped together in different configurations to make up the air-cooled product line from 125 to 400 tons.

Trane air-cooled Helirotor compressors were designed, tested and built to the same rugged standards as the CenTra-Vac chiller compressors. Since the introduction of Trane's Helirotor compressors to air-cooled applications, their reliability has been outstanding. This is proven by the fact that thousands of Rotary compressors have shipped and less than one-half of one percent have failed. The Helirotor compressor design and reliability is outstanding when compared to a typical reciprocating compressor design which historically has had a failure rate of two to four percent in the first year alone.

All air-cooled Rotary chillers use the highly reliable Helirotor compressor. Air-cooled Rotary chillers from 125-400 tons utilize the CHHB compressor. These compressors unload from fully loaded to the minimum capacity of the compressor utilizing a single unloading method, the slide valve. This slide valve is positioned over both the male and female rotors.



Cutaway of a 100-ton CHHB compressor.

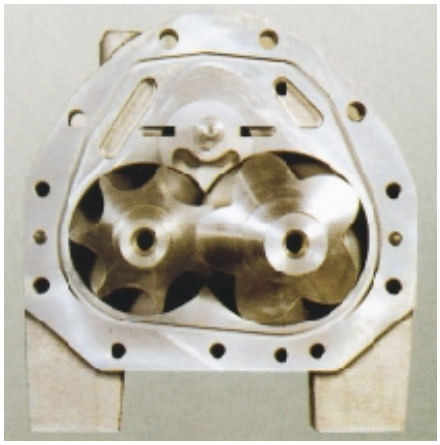
Fewer Moving Parts

The CHHB Helirotor compressor has only three moving parts: the two rotor assemblies and the capacity controlling slide valve. Unlike reciprocating compressors, the Trane Helirotor compressor has no pistons, connecting rods, rings valves or mechanical oil pump. In fact, a typical reciprocating compressor has 15 times as many critical parts as the Rotary compressor. Fewer moving parts lead to increased reliability and longer life.

Helirotor™ screw compressor parts (above) versus reciprocating compressor components (below)

Resistance To Liquid Slugging
The robust design of the Rotary compressor can ingest amounts of liquid refrigerant, wich in the case of reciprocating compressors would severely damage valves, piston rods and cylinders.

Proven Design Through Testing and Research Test To Failure
It takes a little getting used to, but we MUST fail a lot of compressors in the laboratory so they don't fail in the field. Without failures, there is no way to be certain whether the final design is conservative or potentially unreliable. The Compressor Accelerated Life Test is proven to induce failure. This test is designed to overstess all parts and quickly identify any weak elements. The test conditions are far more extreme than actual field applications. Our leadership in helical compressor technology is recognized worldwide. It is the basis for the successful introduction of the reliable Trane Helirotor compressor™ right from the start!



End view showing male and female rotors and slide valve on an 85-ton CHHB compressor.

Optimum Efficiencies

Unsurpassed Full Load Efficiency

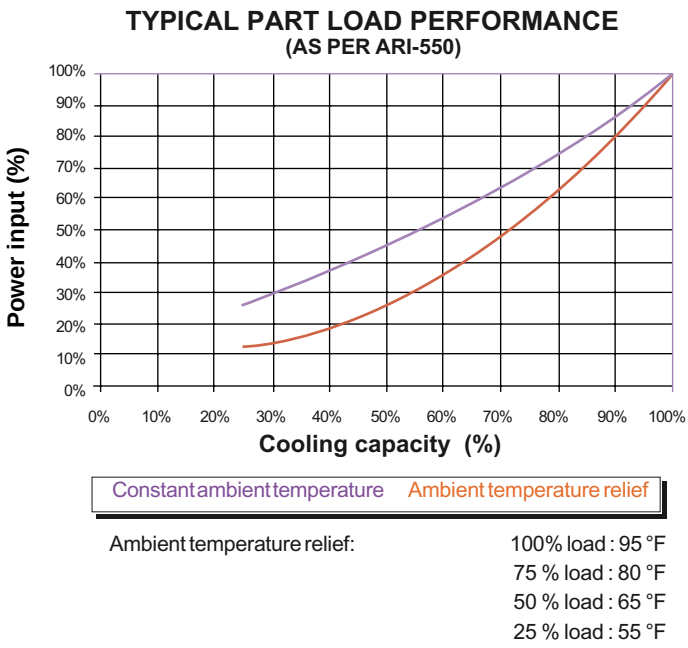
Precise Rotor Tip Clearances
Higher energy efficiency in a helical rotary compressor is obtained by reducing the rotor tip clearances.This reduces the leakage between high and low pressure cavities during compression. Precise rotor tip clearance is achieved with the latest manufacturing and machining technology. Trane is the first helical rotary compressor manufacturer to electronically check compressor parts machining accuracy as part of the standard production process.

Optimized Compressor Parts Profiles
Rotor and slide valves are unique designs, optimized for the air conditioning application. The rotors are designed for the pressure ranges in the air conditioning application.

Advanced Heat Transfer Surfaces
Condenser and evaporator tubes use the latest heat transfer technology for increased efficiency.

Great Part Load Efficiency With Trane Helirotor Compressors And Electronic Expansion Valve

Trane Helirotor Compressor Means Superior Part Load Performance
The air-cooled Rotary chiller has great part-load.The slide valve on the CHHB compressors has a Trane designed profile that resulted from computer modeling in typical part- load situations. The result is optimized part-load performance far superior to single reciprocating compressors.



Electronic Expansion Valve
When coupled with Trane's Adaptive Control™ microprocessor, our electronic expansion valve significantly improves part-load performance of the Rotary chiller by minimizing superheat in the evaporator and allowing the chiller to run at reduced condensing temperatures. Chillers which use conventional TXV's must run at higher head pressures and consume more power than necessary at part-loads. Additionally, the electronic expansion valve and its controls allow much better stability and control over dynamic load and head changes. Under these conditions, a conventional TXV may never achieve control stability.

Cutaway view of Trane's electronic expansion valve.

Capacity Control and Load Matching
Infinitely variable compressor modulation allows the compressor capacity to exactly match the building cooling load. Reciprocating chillers that rely on step capacity control must run at a capacity equal to or greater than the load. Much of this excess capacity is lost because overcooling goes toward building latent heat removal, causing the building to be dried beyond normal comfort requirements. The result is an increase in chiller energy costs, particularly at the part-load conditions at which the chiller operates most of the time.

PID Chilled Water Setpoint Control Through Slide Valve Modulation

Maintain Chilled Water Supply Temperature Within ± 1/2 °F of Setpoint
Reciprocating chillers that have step capacity control can typically maintain water temperature to approximatly ±2 °F.

Reduce Compressor Cycling
Modulating capacity control offers better compressor reliability. Compressor cycling, typical of reciprocating compressors, will decrease compressor components life.

Trouble-Free Installation, Start-Up and Operation

Adaptive Control™ Microprocessor
The air-cooled Rotary chiller employs Adaptive Control Microprocessor. This is the most advanced microprocessor control available on any packaged water chiller in the marketplace. So what is the Adaptive Control microprocessor? Adaptive Control means the Unit Control Module (UCM) directly senses the control variables that govern operation of the chiller: motor current draw, evaporator temperature, condenser temperature, etc. If any of the variables approaches a limit condition where the unit may be shut down on a safety, the UCM takes corrective action to avoid shutdown and keep the chiller operating. It does this through combined actions of compressor slide valve modulation, electronic expansion valve modulation and fan staging. Additionally, the UCM optimizes total unit power consumption during normal operating conditions. No other chiller control system in the marketplace offers this performance.

Improved chiller and motor protection
The control system integrates all the necessary functions to ensure safe operation of the chiller in all applications and duty conditions :

- System safeties, such as oil, water, refrigerant pressure and temperature faults.
- Motor safeties. By monitoring the motor current on each of the 3 phases, the control system ensures protection against :
  - Overload at start-up and in operation.
  - Phase loss/Power loss.
  - Phase unbalance or reversal.
  - Over/Undervoltage.
  - Welded contactors.

If a fault occurs, one message will be displayed directly on the control module.

The End Of Nuisance Trip-Outs And Unnecessary Service Calls?
Unnecessary service calls are avoided. The unit does not trip on nuisance or unnecessarily shuts down. Only when the UCM has exhausted all the corrective actions it can take and if the unit is still violating an operating limit, the UCM will shut down the unit.

CONTROLS ON OTHER CHILLERS WILL TYPICALLY SHUT DOWN THE CHILLER, WHEN CHILLED WATER IS MOSTLY NEEDED.

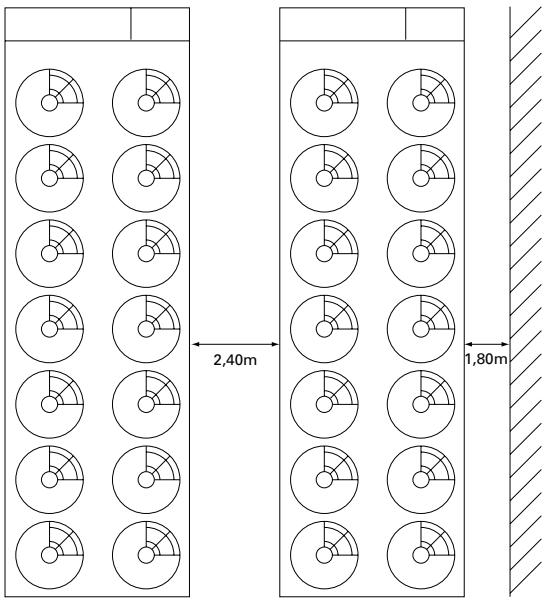
For example:
A typical five-year-old chiller with dirty coils might trip-out on high pressure cutout on a hot day in August. A hot day is just when comfort cooling is needed the most. In contrast, the air-cooled Rotary chiller with an Adaptive Control microprocessor will stage fans on, modulate electronic expansion valve, and modulate slide valve as the chiller approaches a high pressure situation. Thereby KEEPING THE CHILLER ON-LINE JUST WHEN YOU NEED IT THE MOST.

Unit mounted clear language display (UCM).

Close Spacing Of Chiller
The air-cooled Rotary chiller has the tightest recommended side clearances in the industry, 1.8 meters, but that is not all. In situations where equipment must be installed with less clearance than recommended, such as frequently occurs in retrofit and rooftop applications, restricted air flow is common. Conventional chillers may not work at all. However, the air-cooled Rotary chiller with its Adaptive Control microprocessor will simply make as much chilled water as possible given the actual conditions. It will stay on line during any unforeseen abnormal conditions and optimize its performance. Consult your Trane sales engineer for more details.

Lower Service Expense
Nuisance service calls are avoided. When there is a real problem that must be corrected, the UCM's extensive diagnostics help to assure that the problem is quickly identified. Down time and service expense are minimized. And with the ability to communicate with the Trane Integrated Comfort system or a remote display panel, service problems can be identified and diagnosed remotly from the chiller.

Factory Testing Means Trouble-Free Start-Up
All air-cooled Rotary chillers are given a complete functional test at the factory. This is over and above the unit individual components tests done prior final assembly of the machine. All the units are fully performance runtested before shipment to verify capacity and power drawn under full load conditions.



Superior Control

Unit Control Module
Trane's new Adaptive Control microprocessor control system enhances the air-cooled Rotary chiller by providing the very latest chiller control technology.

State-of-the-Art Equipment
The new 125 to 400 air-cooled chillers offer the exclusive Trane Adaptive Control logic with the Clear Language Display (UCM). The Clear Language Display has various functions that allow the operator to read unit information and adjust setpoints. The Clear Language Display panel has 16 keys. The readout screen is a two-line, 40 character liquid crystal with a backlight. The backlight allows the operator to read the display in low-light conditions.

Unit Control Module Features

Equal Compressor Sequencing
Trane maximizes both compressor and motor life by equalizing the number of starts and the operating hours. The UCM will start the compressor with the least number of starts and turn off the compressor with the most operating hours. Conventional "auto" lead-lag control will equalize starts, but running hours will typically be unequal. Equalizing starts and running hours will provide equal compressor wear.

Internal "Built-In" Chiller Flow Protection
The UCM automatically detects a no waterflow condition. An external flow switch is not a necessity for the safe operation of the chiller.

Remote Mounted
Clear Language Display

Easy Chiller System Logging
The UCM displays data required to log the chiller system. The following information is available either as standard or as an option with the Air- Cooled Rotary Chiller microprocessor:
- Entering and leaving chilled water temperatures
- Ambient air temperature
- Evaporator and condenser refrigerant temperatures and pressures
- Compressor suction temperature
- Percent RLA for each compressor
- Percent line voltage
- Compressor starts and running hours
- Active setpoints:
  chilled water setpoint
  current limit setpoint
  low ambient lockout setpoint
- Over 90 diagnostic and operating conditions
- Part failure diagnostics:
  water temperature sensors
  refrigerant temperature sensors
  compressor contactors

Remote Display Panel
Trane air-cooled Rotary chillers are available with a twisted pair connection to an optional remote display panel. Chiller operation can be controlled similarly to the control interface on the chiller itself. Through a twisted pair of wires the unit can be turned on or off, change the chilled water setpoint, and display over 90 operating and diagnostic conditions. The remote display panel can be mounted indoors, so, all can be accessed without the need to go to the chillers plant room.
Remote clear language display has the ability to control multiple units. In a multiple unit configuration, the Remote Clear Language Display Panel has the capability to communicate with up to four units. Each unit requires a separate communication link with the Remote Display Panel.

Easy Interface To The Building Management System
Interfacing the air-cooled Rotary chiller with building management systems is state-of-the-art, yet simple.
Chiller inputs include:
- Chiller enable/disable
- Circuit enable/disable
- Chilled water setpoint
- Current limit setpoint

Chiller outputs include:
- Compressor running indication
- Alarm indication (CKt 1/CKt2)
- Maximum capacity

Trane Chiller Plant Manager ICS
The Tracer Chiller Plant Manager Building Management System provides building automation and energy management functions through stand- alone control. The Chiller Plant Manager is capable of monitoring and controlling your entire chiller plant system.

Application software available:
- Time-of-day scheduling
- Duty cycle
- Demand limiting
- Chiller sequencing
- Process control language
- Boolean processing
- Zone control
- Reports and logs
- Custom messages
- Run time and maintenance
- Trend log
- Totalizing
- PID control loops

And of course, Trane's Chiller Plant Manager Panel can be used on a stand-alone basis or tied into a complete Building Automation System.

General Data 200 Series

Table 1 - General Data 200 series

RTAA		213		214		215		216		217	
		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Compressor											
Quantity		2	2	2	2	2	2	2	2	2	2
Model	CHHB	70/70	70/70	70/85	70/85	85/85	85/85	85/100	85/100	100/100	100/100
Nb of circuits		2	2	2	2	2	2	2	2	2	2
Evaporator											
Model	ES	120	140	140	170	140	170	170	200	170	200
Water capacity	Gallons	28	71	71	58	71	58	58	54	58	54
Min Water Flow	GPM	159	176	176	204	176	204	204	239	204	239
Max Water Flow	GPM	433	504	504	612	504	612	612	702	612	702
Condenser											
Model	CAUW	213	215	214	216	215	217	216	218	217	218
Number of Fans		8	8	8	9	8	10	9	10	10	10
Fins / Ft		168	168	168	168	168	168	168	168	168	168
N° of Rows		3	3	3	3	3	3	3	3	3	3
Condenser Fans											
Standard Low Noise											
Air Flow	CFM	84460	99360	90360	108510	90360	117650	97145	113390	103930	113390
Fan Speed	RPM	915	1130	915	1130	915	1130	915	1130	915	1130
Fan Diameter	mm	762	762	762	762	762	762	762	762	762	762
General Unit											
Refrigerant Charge	kg	47/47	56/56	56/56	56/56	56/56	58/58	58/58	67/67	58/58	67/67
Oil Charge	Liters	15/15	15/15	17/17	17/17	17/17	17/17	17/20	17/20	20/20	20/20
Min Starting/Oper Ambient											
Std Unit	(°F/C)	32/0	32/0	32/0	32/0	32/0	32/0	32/0	32/0	32/0	32/0
Shipping Weight											
With AL. Cds Fins	kg	3795	4295	4370	4500	4435	4610	4590	4910	4670	4910
With CU Cds Fins	kg	4245	4835	4910	5040	4975	5150	5130	5640	5210	5650
Operating Weight											
With AL. Cds Fins	kg	3900	4570	4640	4720	4710	4830	4810	5130	4890	5130
With CU Cds Fins	kg	4350	5110	5180	5260	5250	5370	5350	5860	5430	5870
Dimensions											
Length	mm	4930	5794	5794	5794	5794	5794	5794	5794	5794	5794
Width	mm	2107	2107	2107	2107	2107	2107	2107	2107	2107	2107
Height	mm	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
Water Connection Diam.											
	mm	139.7	168.3	168.3	168.3	168.3	168.3	168.3	168.3	168.3	168.3
Flange type		DN125 PN16	DN150 PN16	DN150 PN16	DN150 PN16	DN150 PN16	DN150 PN16	DN150 PN16	DN150 PN16	DN150 PN16	DN150 PN16

Note: Data containing information on two circuits shown as follows: Ckt1/Ckt2

General Data 300 Series

Table 2 - General Data 300 series

RTAA		322		324		328	
		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Compressor							
Quantity		3	3	3	3	3	3
Model	CHHB	70+70/85	70+70/85	85+85/100	85+85/100	100+100/100	100+100/100
Nb of circuits		2	2	2	2	2	2
Evaporator							
Model	ES	225	225	225	225	250	250
Water capacity	Gallons	117	117	117	117	110	110
Min Water Flow	GPM	275	275	275	275	307	307
Max Water Flow	GPM	780	780	780	780	875	875
Condenser							
Model	CAUW	322	322	324	324	328	328
Number of Fans		12	12	14	14	16	16
Fins / Ft		168/192	168/192	168/192	168/192	168/192	168/192
N° of Rows		3/2	3/2	3/2	3/2	3/2	3/2
Condenser Fans							
Standard Low Noise							
Air Flow	CFM	126470	145430	148700	170910	160440	184400
Fan Speed	RPM	915	1130	915	1130	915	1130
Fan Diameter	mm	762	762	762	762	762	762
General Unit							
Refrigerant Charge	kg	94/53	94/53	117/53	117/53	120/55	120/55
Oil Charge	Liters	15+15/17	15+15/17	17+17/20	17+17/20	20+20/20	20+20/20
Min Starting/Oper Ambient							
Std Unit	(°F/C)	32/0	32/0	32/0	32/0	32/0	32/0
Shipping Weight							
With AL. Cds Fins	kg	6360	6360	6885	6885	6885	6885
With CU Cds Fins	kg	6915	6915	7505	7505	7505	7505
Operating Weight							
With AL. Cds Fins	kg	6800	6800	7285	7285	7285	7285
With CU Cds Fins	kg	7355	7355	7905	7905	7905	7905
Dimensions							
Length	mm	7600	7600	8480	8480	8480	8480
Width	mm	2200	2200	2200	2200	2200	2200
Height	mm	2183	2183	2183	2183	2183	2183
Water Connection Diam.							
	mm	168.3	168.3	168.3	168.3	168.3	168.3
Connection type				VICTAULIC			

Note: Data containing information on two circuits shown as follows: Ckt1/Ckt2

General Data 400 Series

Table 3 - General Data 400 series

RTAA		430		432		434	
		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Compressor							
Quantity		4	4	4	4	4	4
Model	CHHB	85+85/85+85	85+85/85+85	85+85/100+100	85+85/100+100	100+100/100+100	100+100/100+100
Nb of circuits		2	2	2	2	2	2
Evaporator							
Model	ES	300	300	300	300	340	340
Water capacity	Gallons	176	176	176	176	162	162
Min Water Flow	GPM	360	360	360	360	400	400
Max Water Flow	GPM	950	950	950	950	1090	1090
Condenser							
Model	CAUW	430	430	432	432	434	434
Number of Fans		16	16	18	18	20	20
Fins / Ft		168	168	168	168	168	168
N° of Rows		3	3	3	3	3	3
Condenser Fans							
Standard Low Noise							
Air Flow	CFM	174300	200460	186040	213950	197780	227440
Fan Speed	RPM	915	1130	915	1130	915	1130
Fan Diameter	mm	762	762	762	762	762	762
General Unit							
Refrigerant Charge	kg	116/116	116/116	116/116	116/116	120/120	120/120
Oil Charge	Liters	17+17/17+17	17+17/17+17	17+17/20+20	17+17/20+20	20+20/20+20	20+20/20+20
Min Starting/Oper Ambient							
Std Unit	(°F/C)	32/0	32/0	32/0	32/0	32/0	32/0
Shipping Weight							
With AL. Cds Fins	kg	9110	9110	9110	9110	9110	9110
With CU Cds Fins	kg	9970	9970	9970	9970	9970	9970
Operating Weight							
With AL. Cds Fins	kg	9750	9750	9750	9750	9750	9750
With CU Cds Fins	kg	10600	10600	10600	10600	10600	10600
Dimensions							
Length	mm	10285	10285	10285	10285	10285	10285
Width	mm	2200	2200	2200	2200	2200	2200
Height	mm	2223	2223	2223	2223	2223	2223
Water Connection Diam.							
	Inch	168.3	168.3	168.3	168.3	168.3	168.3
Connection type				VICTAULIC			

Note: Data containing information on two circuits shown as follows: Ckt1/Ckt2

Selection Procedure

The chiller capacity tables presented on pages 18 to 25 cover the most frequently encountered leaving water temperatures. The tables reflect a 10°F (5,6°C) temperature drop through the evaporator. For temperature drops other than 10°F (5,6°C), refer to Table 4, and apply the appropriate Performance Data Adjustment Factors.

To select a Trane air-cooled Rotary chiller, the following information is required:

1. Design load in tons of refrigeration
2. Design chilled water temperature drop
3. Design leaving chilled water temperature
4. Design ambient temperature

Evaporator flow rates can be determined by using the following formulas:

$$GPM = \frac{\text{Tons x 24}}{\text{Temperature Drop (°F)}}$$

OR

$$L/S = \frac{\text{kW (Capacity) x .239}}{\text{Temperature Drop (°C)}}$$

NOTE: Flow rates must fall within the limits specified in Tables 1,2 and 3 (for GPM).

Selection Example

Given:
Required System Load = 140 Tons
Leaving Chilled Water Temperature (LCWT) = 45°F
Chilled Water Temperature Drop = 10°F
Design Ambient Temperature = 95°F
Evaporator Fouling Factor = 0.00025

1. From Table 5 (RTAA Performance Data) 50 Hz, RTAA-214 at the given conditions will produce 141 tons with a compressor power input of 149 kW and a unit EER of 10.3.
2. To calculate the required chilled water flow rate we use the formula given below:

$$GPM = \frac{\text{141 Tons x 24}}{\text{10°F}} = 338 \text{ GPM}$$

3. To determine the evaporator pressure drop we use the flow rate (GPM) and the evaporator water pressure drop curves, page 17. Entering the curve at 338 GPM, the pressure drop for a nominal 140 ton evaporator is 11.5 feet.
4. For selection of applications where the altitude is significantly greater than sea level or the temperature drop is different than 10°F, the performance adjustment factors from Table 4 should be applied at this point.
5. The final unit selection is:
   - QTY (1) RTAA 214
   - Cooling Capacity = 141 tons
   - Entering/Leaving Chilled Water Temperatures = 55/45°F
   - Chilled Water Flow Rate = 338GPM
   - Evaporator Water Pressure Drop = 11.5 ft. H_2O
   - Compressor Power Input = 149kW
   - Unit EER = 10.3

Minimum Leaving Chilled Water Temperature Setpoint

The minimum leaving chilled water temperature setpoint for water is 40°F. For those applications requiring lower setpoints, a glycol solution must be used. Contact the local Trane sales office for additional information.

Application Considerations

Application Considerations
Certain application constraints should be considered when sizing, selecting and installing Trane air-cooled Rotary chillers. Unit and system reliability are often dependent upon properly and completely complying with these considerations. Where the application varies from the guidelines presented, it should be reviewed with your local Trane sales office.

Unit Sizing
Unit capacities are listed in the performance data section. Intentionally oversizing a unit to assure 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.

Unit Placement

1. **Setting The Unit**
   A base or foundation is not required if the selected unit location is level and strong enough to support the unit operating weight as listed in Table 15.

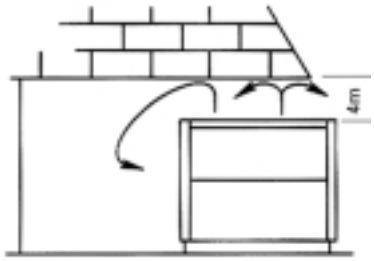
2. **Isolation and Sound Emission**
   The most effective form of isolation is to locate the unit away from any sound-sensitive area. Structurally transmitted sound can be reduced by ELASTOMERIC vibration eliminators. Spring isolators have proven to be of little additional benefit when compare to elastomeric vibration eliminators. An acoustical engineer should always be consulted in critical sound applications.
   For maximum isolation effect, water lines and electrical conduit should also be isolated. Wall sleeves and rubber isolated pipes hangers can be used to reduce the sound transmitted through water piping. To reduce the sound transmitted through electrical conduit, use flexible electrical conduit.
   State and local codes on sound emissions should always be considered. Since the environment in which a sound source is located affects sound pressure, unit placement must be carefully evaluated. Sound power levels for Trane air-cooled Rotary chillers are available on request.

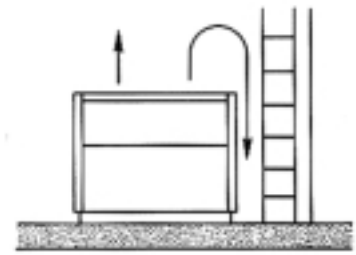
3. **Servicing**
   Adequate clearance for evaporator and compressor servicing should be provided. Recommended minimum space envelopes for servicing are located in the dimensional data section and can serve as a guideline for providing adequate clearance. The minimum space envelopes also allow for control panel swing and routine maintenance requirements. Local code requirements may take precedence.

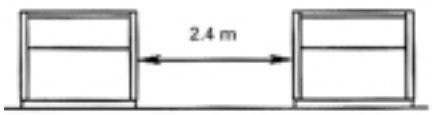
4. **Unit Location**

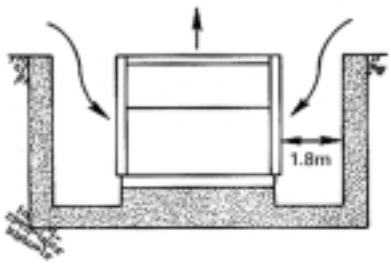
a. General
Unobstructed flow of condenser air is essential to maintain chiller capacity and operating efficiency. When determining unit placement, careful consideration must be given to assure a sufficient flow of air across the condenser heat transfer surface. Two detrimental conditions are possible and must be avoided if optimum performance is to be achieved: warm air recirculation and coil starvation.
Warm air recirculation occurs when discharge air from the condenser fans is recycled back to the condenser coil inlet. Coil starvation occurs when free airflow to the condenser is restricted. Both warm air recirculation and coil starvation cause reductions in unit efficiency and capacity because of the associated higher head pressures. The air-cooled Rotary chiller offers an advantage over competitive equipment in these situations. Performance is minimally affected in many restricted air flow situations due to its unique condensing coil geometry. Also, through its advanced Adaptive Control microprocessor logic, the chiller will stay on-line where competitive chillers would shut down.
Trane's unique Adaptive Control microprocessor has the ability to understand the operating environment of the chiller and adapt to it by first optimizing its performance and second, staying on line during abnormal conditions. For example, high ambient temperatures combined with a restricted air flow situation will generally not lead the air-cooled Rotary chiller to shut down.

Debris, trash, supplies, etc. should not be allowed to accumulate in the vicinity of the air-cooled Rotary chiller. Supply air movement may draw debris into the condenser coil, blocking spaces between coil fins and causing coil starvation.









b. Provide Vertical Clearance
Vertical condenser air discharge must be unobstructed. While it is difficult to predict the degree of warm air circulation, a unit installed as shown on the left would have its capacity and efficiency significantly reduced.
Performance data are based on free air discharge.

c. Provide Lateral Clearance
The condenser coil inlet must not be obstructed. A unit installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. Once again, the Adaptive Control microprocessor will allow the chiller to stay on line, producing the maximum available capacity, even at less than recommended lateral clearances.
The recommended lateral clearances are shown in the dimensional data section.

d. Provide Sufficient Unit-to-Unit Clearance
Units should be separated from each other by a sufficient distance to prevent warm air recirculation or coil starvation. The air-cooled Rotary chiller has the lowest recommended unit-to-unit clearance in the industry, 2.4 meters. Consult the local Trane sales office for applications concerning closer spacings and restricted airflows situations.

e. Walled Enclosure Installations
When the unit is placed in an enclosure or small depression, the top of the fans should be no lower than the top of the enclosure or depression. If they are, consideration should be given to ducting the top of the unit. Such applications should always be reviewed with the local Trane sales office.

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 waterflow. 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 air-cooled Rotary chillers. The Trane Company encourages the employment of a reputable water treatment specialist, familiar with local water conditions, to assist in establishing the proper water treatment program.
The capacities given in the performance data section of this catalog are based on water with a fouling factor of .00025. For capacities at other fouling factors, see adjustment factors in Table 4.

Effect Of Altitude On Capacity
Air-cooled Rotary chiller capacities given in the performance data tables, (Tables 5 through 12), are at sea level. For elevations substantially higher than sea level, the decreased air density will decrease condenser capacity and, therefore, unit capacity and efficiency. The adjustment factors in Table 4 can be applied directly to the catalog performance data to determine the unit's adjusted performance.

Ambient Limitations
Trane air-cooled Rotary chillers are designed for year-round applications in ambients from 32 °F to 125 °F.
The minimum ambient temperatures are based on still weather conditions (winds not exceeding five mph). Greater wind velocities will result in a drop in head pressure, therefore increasing the minimum starting and operating ambient temperature. Once again, the Adaptive Control microprocessor will keep the chiller on line when high or low ambient conditions exist, making every effort to avoid nuisance trip-outs and provide the maximum allowable tonnage.

Waterflow Limits
The minimum waterflow rates are given in Tables 1, 2 and 3. Evaporator flow rates below the tabulated values will result in laminar flow causing freeze-up problems, scaling, stratification and poor control.
The maximum evaporator waterflow rate is also given in the general data section. Flow rates exceeding those listed may result in excessive tube erosion.
The evaporator can handle variable flow down to 50 Pct as long as flow is equal or above the minimum requirement.

Temperature Limits

1. **Leaving Water Temperature Range**
Trane air-cooled Rotary chillers have a standard leaving water temperature range of 40 to 65 °F.
The maximum water temperature that can be circulated through an evaporator when the unit is not operating is 108 deg. F. The evaporator reaches its thermal stress limit at this temperature.
2. **Supply Water Temperature Drop**
The performance data for the Trane air-cooled Rotary chiller are based on a chilled water temperature drop of 10°F. Temperature drops outside this range will result in unit performance that differs from that cataloged. For performance data outside the 10°F range, see Table 4 for adjustment factors. Chilled water temperature drops from 6 to 16°F may be used as long as minimum and maximum leaving water temperature and minimum and maximum flow rates are not violated.

Temperature drops outside the 6 to 18°F range are beyond the optimum range for control and may adversely affect the microcomputer's ability to maintain an acceptable supply water temperature.

Typical Water Piping
All building water piping must be flushed prior to making final connections to the chiller. To reduce heat loss and prevent condensation, insulation should be installed. Expansion tanks are also usually required so that chilled water volume changes can be accommodated. A typical piping arrangement is shown in Figure A-1.

Short Water Loops
The proper location of the temperature control sensor is in the supply (outlet) water. 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. A short water loop (less than two gallons/nominal ton) has the same effect as attempting to control from the building return water. To prevent the effect of a short water loop, the following items 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.

Multiple Unit Operation
Whenever two or more units are used on one chilled water loop, Trane recommends that their operation be controlled from a single control device, such as a Trane Chiller Plant Manager.

1. **Series Operation**
   Some systems require large chilled water temperature drops (16 to 24°F). For those installations, two units with their evaporators in series are usually required. Control of the units should be from a common temperature controller to prevent the separate thermostats fighting one another and continually hunting. It is possible to control from the two individual unit controls, but a common temperature controller provides a positive method for preventing control overlap, more closely matches system load, and simplifies compressor lead-lag capability.

2. **Parallel Operation**
   Some systems require more capacity or standby capability than a single machine can provide. For those installations, two units with their evaporators in a parallel configuration are typical. The only effective way of controlling two units in parallel is with a single temperature controller. Two individual temperature controllers are not capable of providing reliable system control and will often result in unsatisfactory operation.

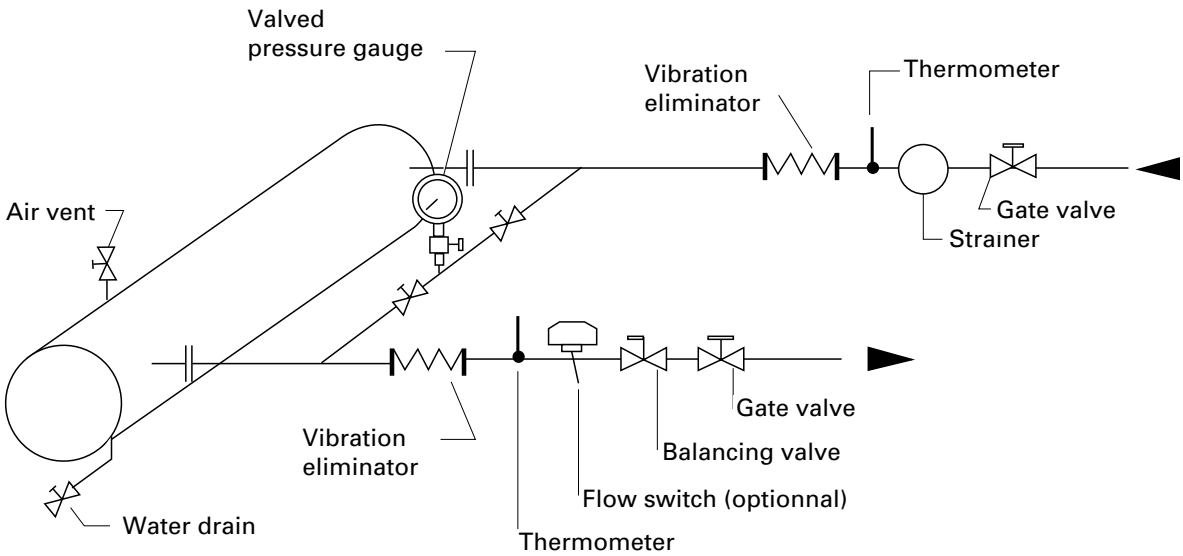


Figure A-1 M Recommended Piping Components For Typical Evaporator Installation

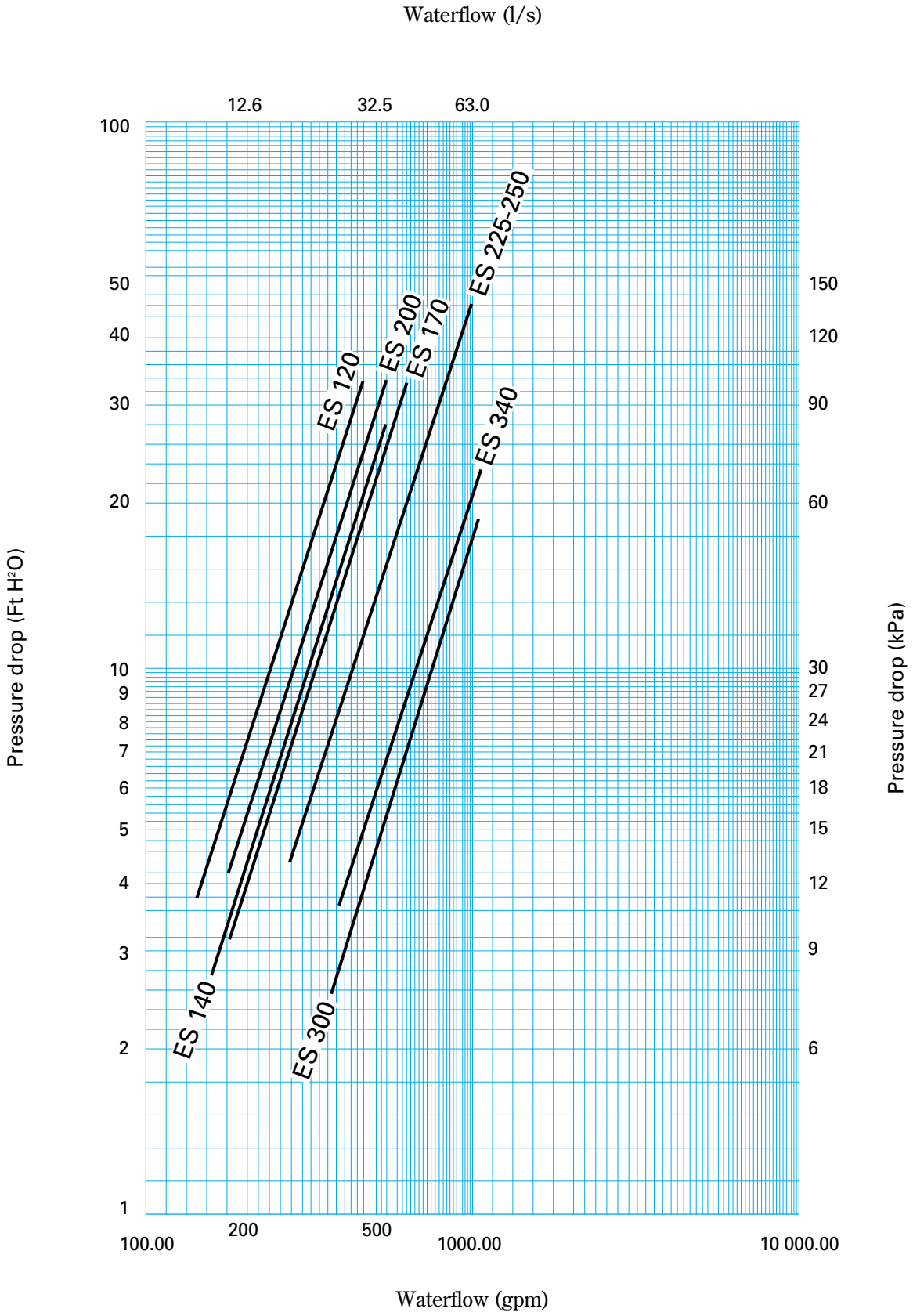
Performance Adjustment Factors

Table 4 - Performance Data Adjustment Factors

Fouling Factor	Chilled Water Δ T (°F/°C)	Altitude SEA LEVEL CAP	SEA LEVEL kW	2000 FT (610 m) CAP	2000 FT (610 m) kW	4000 FT (1220 m) CAP	4000 FT (1220 m) kW	6000 FT (1830 m) CAP	6000 FT (1830 m) kW
0.00025 (0.044)	6 (3.3)	0.987	0.993	0.967	1.003	0.952	1.019	0.932	1.029
	8 (4.4)	0.993	0.997	0.973	1.007	0.956	1.025	0.935	1.035
	10 (5.6)	1.000	1.000	0.980	1.010	0.960	1.030	0.940	1.040
	12 (6.7)	1.007	1.003	0.987	1.013	0.966	1.035	0.945	1.045
	14 (7.8)	1.013	1.007	0.993	1.017	0.972	1.038	0.952	1.048
	16 (8.9)	1.020	1.010	1.000	1.020	0.980	1.040	0.960	1.050
0.00075 (0.132)	6 (3.3)	0.967	0.983	0.958	0.993	0.938	1.002	0.918	1.012
	8 (4.4)	0.973	0.987	0.964	0.997	0.944	1.005	0.925	1.016
	10 (5.6)	0.980	0.990	0.970	1.000	0.950	1.010	0.930	1.020
	12 (6.7)	0.987	0.993	0.975	1.003	0.955	1.015	0.934	1.026
	14 (7.8)	0.993	0.997	0.978	1.007	0.958	1.022	0.937	1.032
	16 (8.9)	1.000	1.000	0.980	1.010	0.960	1.030	0.940	1.040

Performance Data

Figure 1 : Evaporator water pressure drop



Performance Data 50 Hz

Table 5 - Performance Data 200 Series

English units

Model	LWT (°F)	AMBIENT TEMPERATURE (°F)																	
		95			100			105			110			115			120		
		CAP	INP		CAP	INP		CAP	INP		CAP	INP		CAP	INP		CAP	INP	
		Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
RTAA 213	40	118	134	9.4	114	141	8.7	110	148	8.0	106	156	7.4	102	164	6.8	98	173	6.2
	42	122	136	9.6	118	143	8.9	114	150	8.2	110	158	7.6	106	166	7.0	101	175	6.4
	44	126	138	9.8	122	145	9.1	118	152	8.4	114	160	7.7	109	168	7.1	105	177	6.5
	45	128	139	9.9	124	146	9.2	120	153	8.5	116	161	7.8	111	169	7.2	107	178	6.6
	46	130	140	10.0	126	147	9.3	122	154	8.6	117	162	7.9	113	170	7.3	108	179	6.7
	48	134	142	10.2	130	149	9.4	126	156	8.7	121	164	8.1	117	172	7.4	112	181	6.8
	50	139	144	10.4	134	151	9.6	130	159	8.9	125	166	8.2	121	175	7.6	116	183	7.0
RTAA 214	40	129	144	9.6	125	150	9.0	121	159	8.3	116	167	7.6	112	175	7.0	108	184	6.5
	42	133	146	9.9	129	153	9.2	125	161	8.5	121	169	7.8	116	177	7.2	112	186	6.6
	44	138	148	10.1	134	155	9.4	129	163	8.7	125	171	8.0	120	180	7.4	116	189	6.8
	45	141	149	10.2	136	156	9.5	132	164	8.8	127	172	8.1	123	181	7.5	117	187	6.9
	46	143	150	10.3	139	158	9.6	134	165	8.9	129	173	8.2	125	182	7.6	118	188	7.0
	48	148	152	10.5	143	160	9.8	139	168	9.1	134	176	8.4	129	184	7.7	124	193	7.1
	50	153	155	10.7	148	162	10.0	143	170	9.2	138	178	8.6	133	187	7.9	128	196	7.3
RTAA 215	40	134	155	9.4	130	163	8.7	126	171	8.1	122	180	7.5	118	188	6.9	113	198	6.4
	42	139	157	9.6	135	165	9.0	131	173	8.3	127	182	7.7	122	191	7.1	117	200	6.5
	44	145	159	9.9	140	167	9.2	136	176	8.5	131	184	7.9	127	193	7.2	122	202	6.7
	45	147	161	10.0	143	168	9.3	138	177	8.6	134	185	7.9	129	194	7.3	122	197	6.9
	46	150	162	10.1	145	170	9.4	141	178	8.7	136	187	8.0	131	195	7.4	122	197	6.9
	48	155	164	10.3	150	172	9.6	146	180	8.9	141	189	8.2	136	198	7.6	124	195	7.1
	50	160	166	10.5	156	174	9.8	151	183	9.1	146	191	8.4	140	200	7.8	125	190	7.3
RTAA 216	40	149	170	9.5	144	178	8.8	140	187	8.2	136	196	7.6	131	206	7.0	123	209	6.5
	42	154	173	9.7	149	181	9.0	145	190	8.4	140	199	7.8	136	209	7.2	125	208	6.7
	44	159	176	9.9	155	184	9.2	150	193	8.5	145	202	7.9	141	211	7.4	126	202	6.8
	45	162	177	10.0	157	185	9.3	153	194	8.6	148	203	8.0	143	213	7.4	127	203	6.9
	46	165	178	10.1	160	187	9.4	155	195	8.7	150	204	8.1	145	214	7.5	128	199	7.1
	48	170	181	10.3	165	189	9.6	160	198	8.9	155	207	8.3	150	217	7.7	130	198	7.2
	50	176	184	10.4	171	192	9.7	166	201	9.1	161	210	8.4	155	220	7.8	131	193	7.4
RTAA 217	40	161	185	9.4	157	194	8.8	152	203	8.2	148	213	7.6	143	222	7.1	131	219	6.6
	42	167	188	9.6	162	197	9.0	158	206	8.4	153	215	7.8	148	226	7.2	132	215	6.8
	44	172	191	9.8	168	200	9.2	163	209	8.5	158	219	7.9	153	229	7.4	133	210	6.9
	45	175	192	9.9	170	201	9.2	165	210	8.6	161	220	8.0	156	230	7.5	134	212	7.0
	46	178	194	10.0	173	203	9.3	168	212	8.7	163	222	8.1	158	232	7.5	136	206	7.2
	48	184	197	10.1	179	206	9.5	174	215	8.9	169	225	8.3	164	235	7.7	136	204	7.3
	50	189	200	10.3	184	209	9.6	179	219	9.0	174	228	8.4	169	239	7.8	137	199	7.5

1. Ratings based on seal level altitude and evaporator fouling factor of .00025 per ARI 550-90
2. Interpolation is permissible
3. Extrapolation is not permissible
4. kW input is for compressors only
5. Ratings are based on an evaporator drop of 10 °F
6. EER = Energy Efficiency Ratio (Btu/watt-hour).Power inputs include compressors, condenser fans and control power.

Performance Data 50 Hz

Table 6 - Performance Data 300 & 400 Series

English units

Model	LWT (°F)	AMBIENT TEMPERATURE (°F)																	
		95			100			105			110			115			120		
		CAP	INP		CAP	INP		CAP	INP		CAP	INP		CAP	INP		CAP	INP	
		Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
	40	182	217	9.0	176	228	8.4	170	240	7.7	164	252	7.1	158	265	6.5	148	270	6.0
	42	188	220	9.2	182	231	8.6	176	243	7.9	170	255	7.3	163	268	6.7	151	269	6.2
RTAA	44	195	223	9.4	189	235	8.7	182	246	8.1	176	258	7.4	169	271	6.9	152	261	6.4
322	45	198	225	9.5	192	236	8.8	185	248	8.2	179	260	7.5	172	273	6.9	153	261	6.4
	46	202	227	9.6	195	238	8.9	188	250	8.3	182	262	7.6	175	275	7.0	155	261	6.5
	48	208	230	9.8	202	241	9.1	195	253	8.4	188	265	7.8	181	276	7.2	156	255	6.7
	50	215	234	10.0	208	245	9.3	201	257	8.6	194	269	7.9	187	282	7.3	157	249	6.9
	40	209	249	9.0	203	262	8.4	197	275	7.8	191	288	7.2	184	302	6.7	175	311	6.2
	42	217	253	9.2	210	265	8.6	204	278	8.0	198	292	7.4	191	306	6.8	175	303	6.4
RTAA	44	224	257	9.4	218	269	8.8	211	282	8.2	205	296	7.6	198	310	7.0	176	295	6.5
324	45	228	259	9.5	222	271	8.9	215	284	8.3	208	298	7.7	201	312	7.1	177	293	6.6
	46	232	260	9.7	226	273	9.0	219	286	8.3	212	300	7.7	205	314	7.2	178	288	6.7
	48	240	265	9.8	233	277	9.2	226	290	8.5	219	304	7.9	212	318	7.3	180	285	6.9
	50	248	269	10.0	241	281	9.4	234	294	8.7	227	308	8.1	219	323	7.5	181	278	7.1
	40	236	280	9.1	229	294	8.5	223	308	7.9	217	322	7.3	210	338	6.8	185	319	6.3
	42	244	285	9.2	237	298	8.6	231	312	8.0	224	327	7.5	217	343	7.0	186	312	6.5
RTAA	44	252	289	9.4	245	303	8.8	238	317	8.2	232	332	7.6	225	348	7.1	187	305	6.7
328	45	256	292	9.5	249	305	8.9	242	319	8.3	235	334	7.7	228	350	7.2	188	303	6.7
	46	260	294	9.6	253	308	9.0	246	322	8.4	239	337	7.8	229	342	7.4	188	298	6.8
	48	269	299	9.7	262	312	9.1	254	327	8.5	247	342	7.9	230	339	7.4	190	294	7.0
	50	277	304	9.9	270	317	9.3	263	332	8.7	255	347	8.1	231	328	7.7	191	286	7.2
	40	259	313	9.0	251	329	8.3	243	346	7.7	235	363	7.1	227	381	6.6	214	391	6.1
	42	268	318	9.2	261	334	8.5	252	350	7.9	244	368	7.3	235	386	6.7	217	382	6.3
RTAA	44	279	322	9.4	270	338	8.7	262	355	8.1	253	373	7.5	244	391	6.9	220	378	6.4
430	45	284	325	9.5	275	341	8.8	266	357	8.2	258	375	7.6	248	393	7.0	221	374	6.5
	46	289	327	9.6	280	343	8.9	271	360	8.3	262	377	7.7	253	396	7.1	222	370	6.6
	48	299	332	9.8	290	348	9.2	281	365	8.5	271	382	7.8	262	401	7.2	225	365	6.8
	50	310	337	10.1	300	353	9.3	291	370	8.7	281	388	8.0	271	406	7.4	226	356	7.0
	40	283	342	9.0	274	359	8.3	266	377	7.7	258	395	7.2	250	415	6.6	227	406	6.2
	42	293	347	9.2	284	364	8.5	276	382	7.9	267	401	7.3	259	420	6.8	228	396	6.3
RTAA	44	303	353	9.3	294	370	8.7	286	388	8.1	277	406	7.5	268	426	6.9	229	387	6.5
432	45	308	355	9.4	300	372	8.8	291	390	8.2	282	409	7.6	272	429	7.0	232	386	6.6
	46	314	358	9.5	305	375	8.9	296	393	8.3	286	412	7.7	277	432	7.1	233	382	6.7
	48	324	364	9.7	315	381	9.1	306	399	8.4	296	418	7.8	281	427	7.3	234	372	6.9
	50	335	370	9.9	326	387	9.2	316	405	8.6	306	424	8.0	289	429	7.4	237	368	7.0
	40	312	374	9.0	303	392	8.4	295	411	7.8	286	431	7.3	277	452	6.8	236	410	6.3
	42	322	380	9.2	314	398	8.6	305	417	8.0	296	437	7.4	287	458	6.9	237	400	6.5
RTAA	44	333	387	9.4	324	405	8.7	315	424	8.2	306	444	7.6	297	465	7.1	242	398	6.6
434	45	339	390	9.5	330	408	8.8	320	427	8.2	311	447	7.7	300	468	7.1	242	393	6.7
	46	344	393	9.5	335	411	8.9	326	430	8.3	316	450	7.7	301	457	7.3	246	395	6.8
	48	356	400	9.7	346	418	9.1	336	437	8.5	327	457	7.9	302	449	7.4	247	385	7.0
	50	367	406	9.9	357	424	9.2	347	444	8.6	337	464	8.0	303	439	7.6	248	374	7.2

1. Ratings based on seal level altitude and evaporator fouling factor of .00025 per ARI 550-90
2. Interpolation is permissible
3. Extrapolation is not permissible
4. kW input is for compressors only
5. Ratings are based on an evaporator drop of 10 °F
6. EER = Energy Efficiency Ratio (Btu/watt-hour).Power inputs include compressors, condenser fans and control power.

Performance Data 50 Hz

Table 7 - Performance Data 200 Series

Metric units

Model	LWT (°C)	AMBIENT TEMPERATURE (°C)											
		35			40			43			46		
		CAP	INP		CAP	INP		CAP	INP		CAP	INP	
		kW	kW	COP	kW	kW	COP	kW	kW	COP	kW	kW	COP
RTAA 213	5	421	135	2.8	396	148	2.4	381	156	2.2	366	165	2.0
	6	434	137	2.8	408	149	2.5	393	158	2.3	377	167	2.1
	7	449	139	2.9	423	152	2.5	406	160	2.3	390	169	2.1
	8	460	140	2.9	434	153	2.6	417	162	2.3	401	171	2.1
	9	474	142	3.0	447	155	2.6	430	164	2.4	413	173	2.2
	10	488	144	3.0	460	157	2.7	442	166	2.4	424	175	2.2
RTAA 214	5	461	145	2.9	435	158	2.5	419	167	2.3	402	175	2.1
	6	477	147	2.9	449	160	2.5	440	168	2.4	431	176	2.2
	7	490	149	3.0	465	162	2.6	451	171	2.4	438	179	2.2
	8	499	150	3.0	478	164	2.6	460	173	2.4	442	181	2.2
	9	511	151	3.1	493	166	2.7	474	174	2.5	456	182	2.3
	10	538	155	3.1	508	168	2.8	489	176	2.5	470	184	2.3
RTAA 215	5	481	156	2.8	455	170	2.4	439	178	2.3	422	186	2.1
	6	499	158	2.9	470	172	2.5	453	180	2.3	436	187	2.1
	7	513	160	2.9	488	175	2.6	470	183	2.4	452	190	2.2
	8	522	161	2.9	501	177	2.6	483	185	2.4	465	194	2.2
	9	536	163	3.0	517	179	2.7	498	187	2.5	479	195	2.3
	10	564	166	3.1	533	181	2.7	514	188	2.5	494	196	2.3
RTAA 216	5	532	172	2.8	504	187	2.5	487	192	2.3	470	197	2.2
	6	551	174	2.9	520	189	2.5	503	194	2.4	485	199	2.2
	7	565	176	2.9	538	192	2.6	520	198	2.4	502	204	2.3
	8	574	178	2.9	553	194	2.6	534	202	2.4	516	209	2.3
	9	589	180	3.0	570	197	2.6	550	204	2.5	531	212	2.3
	10	619	184	3.1	587	199	2.7	567	206	2.5	547	213	2.4
RTAA 217	5	577	186	2.8	548	202	2.5	531	208	2.3	513	214	2.2
	6	596	189	2.8	565	205	2.5	547	210	2.4	529	215	2.2
	7	611	192	2.9	584	208	2.6	565	214	2.4	547	220	2.3
	8	621	193	2.9	599	211	2.6	580	217	2.4	561	223	2.3
	9	636	196	2.9	616	214	2.6	597	220	2.5	578	226	2.3
	10	666	200	3.0	633	217	2.7	614	223	2.5	594	229	2.4

1. Ratings based on seal level altitude and evaporator fouling factor of .0440 per ARI 550-90
2. Interpolation is permissible
3. Extrapolation is not permissible
4. Kw input is for compressors only
5. Ratings are based on an evaporator drop of 5.6 °C
6. COP = Coefficient of performance (kW cooling/kW input).Power inputs include compressors, condenser fans and control power.

Performance Data 50 Hz

Table 8 - Performance Data 300 & 400 Series

Metric units

Model	LWT (°C)	AMBIENT TEMPERATURE (°C)											
		35			40			43			46		
		CAP	INP		CAP	INP		CAP	INP		CAP	INP	
		kW	kW	COP	kW	kW	COP	kW	kW	COP	kW	kW	COP
RTAA 322	5	650	219	2.8	612	239	2.4	589	252	2.2	565	266	2.0
	6	671	221	2.8	632	242	2.4	608	255	2.2	583	269	2.0
	7	695	225	2.9	654	245	2.5	629	258	2.3	604	272	2.1
	8	714	227	2.9	672	248	2.5	646	261	2.3	620	275	2.1
	9	735	231	3.0	692	251	2.6	665	264	2.4	639	276	2.2
	10	757	234	3.0	713	254	2.6	685	268	2.4	658	281	2.2
RTAA 324	5	748	251	2.8	709	274	2.4	685	289	2.2	660	304	2.1
	6	775	255	2.9	732	277	2.5	707	292	2.3	682	307	2.1
	7	796	258	2.9	758	281	2.5	732	296	2.3	706	311	2.2
	8	810	260	2.9	779	284	2.6	753	299	2.4	726	314	2.2
	9	831	262	3.0	803	288	2.6	776	303	2.4	748	318	2.2
	10	873	269	3.1	828	292	2.7	799	307	2.5	771	322	2.3
RTAA 328	5	843	283	2.8	802	307	2.5	777	323	2.3	752	340	2.1
	6	872	287	2.9	827	311	2.5	801	328	2.3	775	344	2.2
	7	894	291	2.9	854	316	2.6	828	332	2.4	801	349	2.2
	8	908	293	2.9	877	320	2.6	844	331	2.4	812	342	2.3
	9	931	297	3.0	903	324	2.6	858	332	2.5	813	339	2.3
	10	975	304	3.0	929	329	2.7	872	329	2.5	816	329	2.4
RTAA 430	5	927	315	2.8	877	345	2.4	845	364	2.2	814	383	2.0
	6	962	320	2.8	907	349	2.5	874	368	2.3	841	387	2.1
	7	988	323	2.9	940	354	2.5	906	373	2.3	872	392	2.1
	8	1006	326	2.9	967	357	2.6	932	377	2.4	896	396	2.2
	9	1034	329	3.0	998	362	2.6	962	381	2.4	925	401	2.2
	10	1089	337	3.1	1029	367	2.7	992	386	2.5	954	405	2.3
RTAA 432	5	1011	345	2.8	959	376	2.4	927	396	2.2	895	417	2.0
	6	1047	350	2.8	990	381	2.5	957	401	2.3	924	422	2.1
	7	1075	354	2.9	1025	386	2.5	991	407	2.3	957	428	2.1
	8	1093	357	2.9	1053	391	2.6	1018	411	2.4	982	432	2.2
	9	1121	361	2.9	1085	396	2.6	1040	411	2.4	994	427	2.2
	10	1178	370	3.0	1118	401	2.7	1067	415	2.5	1017	428	2.3
RTAA 434	5	1115	377	2.8	1060	410	2.5	1027	432	2.3	993	454	2.1
	6	1153	384	2.9	1092	416	2.5	1058	438	2.3	1024	460	2.1
	7	1181	388	2.9	1129	422	2.6	1094	445	2.4	1059	467	2.2
	8	1201	392	2.9	1159	428	2.6	1113	443	2.4	1067	458	2.2
	9	1230	396	3.0	1193	434	2.6	1131	441	2.4	1068	449	2.3
	10	1290	406	3.0	1227	440	2.7	1149	440	2.5	1070	440	2.3

1. Ratings based on seal level altitude and evaporator fouling factor of .0440 per ARI 550-90
2. Interpolation is permissible
3. Extrapolation is not permissible
4. Kw input is for compressors only
5. Ratings are based on an evaporator drop of 5.6 °C
6. COP = Coefficient of performance (kW cooling/kW input).Power inputs include compressors, condenser fans and control power.

Performance Data 60 Hz

Table 9 - Performance Data 200 Series

English units

Model	LWT (°F)	AMBIENT TEMPERATURE (°F)																	
		95			100			105			110			115			120		
		CAP	INP		CAP	INP		CAP	INP		CAP	INP		CAP	INP		CAP	INP	
		Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
	40	143	165	8.8	138	174	8.2	133	183	7.5	128	193	6.9	123	203	6.4	111	199	5.9
	42	147	167	9.0	143	176	8.3	138	185	7.7	132	195	7.1	127	206	6.5	113	197	6.0
RTAA	44	153	170	9.2	147	179	8.5	142	188	7.9	137	198	7.2	131	208	6.6	112	188	6.2
213	45	155	171	9.3	150	180	8.6	144	189	7.9	139	199	7.3	134	210	6.7	114	189	6.3
	46	158	173	9.4	152	182	8.7	147	191	8.0	141	201	7.4	136	211	6.8	114	187	6.4
	48	163	175	9.6	157	185	8.8	152	194	8.2	146	204	7.5	140	214	6.9	119	189	6.5
	50	168	178	9.7	162	187	9.0	156	197	8.3	150	207	7.7	144	217	7.1	119	184	6.7
	40	152	176	8.8	147	186	8.1	142	195	7.5	137	205	6.9	132	216	6.4	123	219	5.9
	42	158	179	9.0	153	188	8.3	147	198	7.7	142	208	7.1	137	219	6.5	124	213	6.0
RTAA	44	163	182	9.2	158	190	8.5	153	201	7.9	147	211	7.3	141	211	7.0	125	209	6.2
214	45	166	183	9.3	161	192	8.6	155	202	8.0	150	212	7.3	144	212	7.1	126	208	6.3
	46	169	185	9.4	163	194	8.7	158	204	8.0	152	214	7.4	146	214	7.1	125	203	6.4
	48	175	187	9.6	169	197	8.9	163	207	8.2	157	217	7.6	151	228	7.0	127	201	6.5
	50	180	190	9.7	175	200	9.0	169	210	8.4	162	220	7.7	155	228	7.1	128	196	6.7
	40	160	187	8.7	155	196	8.0	150	207	7.4	145	217	6.9	140	228	6.4	131	232	5.9
	42	166	190	8.9	161	199	8.2	156	209	7.6	150	220	7.1	145	231	6.5	132	227	6.0
RTAA	44	172	192	9.1	167	202	8.4	161	212	7.8	156	223	7.2	150	234	6.7	133	223	6.2
215	45	175	194	9.2	170	204	8.5	164	214	7.9	158	225	7.3	153	236	6.8	134	220	6.3
	46	179	195	9.3	173	205	8.6	167	215	8.0	161	226	7.4	155	237	6.8	134	218	6.4
	48	185	198	9.5	179	208	8.8	173	218	8.2	167	229	7.6	161	240	7.0	137	217	6.5
	50	191	201	9.7	185	211	9.0	179	221	8.4	173	232	7.7	166	243	7.1	138	211	6.7
	40	175	203	8.8	170	213	8.2	165	224	7.6	160	235	7.1	154	247	6.6	139	240	6.1
	42	182	206	9.0	176	216	8.4	171	227	7.8	165	238	7.2	160	250	6.7	142	238	6.2
RTAA	44	188	209	9.2	182	220	8.6	177	231	8.0	171	242	7.4	163	249	6.9	145	237	6.4
216	45	191	211	9.3	186	221	8.7	180	232	8.1	174	244	7.5	166	251	7.0	144	232	6.5
	46	194	213	9.4	189	223	8.8	183	234	8.1	177	245	7.6	169	253	7.0	146	232	6.6
	48	201	216	9.6	195	227	8.9	189	238	8.3	183	249	7.7	171	250	7.2	147	226	6.7
	50	207	220	9.8	201	230	9.1	195	241	8.5	189	253	7.9	174	248	7.4	150	225	6.9
	40	189	223	8.8	184	234	8.2	178	246	7.6	173	258	7.1	167	271	6.6	143	245	6.1
	42	195	227	8.9	190	238	8.3	184	249	7.8	179	262	7.2	173	275	6.7	146	244	6.3
RTAA	44	202	231	9.1	196	242	8.5	190	253	7.9	185	266	7.4	177	274	6.8	146	238	6.4
217	45	205	233	9.2	199	244	8.6	193	256	8.0	188	268	7.4	177	272	6.9	147	235	6.5
	46	208	235	9.2	202	246	8.6	197	258	8.0	191	270	7.5	178	269	7.0	147	232	6.6
	48	215	239	9.4	209	250	8.8	203	262	8.2	197	274	7.6	179	264	7.2	150	230	6.8
	50	222	243	9.6	215	254	8.9	209	266	8.3	203	279	7.8	182	263	7.3	150	224	6.9

1. Ratings based on seal level altitude and evaporator fouling factor of .00025 per ARI 550-90
2. Interpolation is permissible
3. Extrapolation is not permissible
4. kW input is for compressors only
5. Ratings are based on an evaporator drop of 10 °F
6. EER = Energy Efficiency Ratio (Btu/watt-hour).Power inputs include compressors, condenser fans and control power.

Performance Data 60 Hz

Table 10 - Performance Data 300 & 400 Series

English units

Model	LWT (°F)	AMBIENT TEMPERATURE (°F)																	
		95			100			105			110			115			120		
		CAP	INP		CAP	INP		CAP	INP		CAP	INP		CAP	INP		CAP	INP	
		Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER	Tons	kW	EER
	40	214	259	8.5	207	275	7.8	200	289	7.2	193	304	6.7	185	319	6.1	176	311	6.0
	42	221	266	8.6	214	279	8.0	207	293	7.4	199	308	6.8	192	323	6.3	175	299	6.2
RTAA	44	229	270	8.8	221	283	8.2	214	297	7.5	206	312	7.0	198	327	6.4	180	301	6.3
322	45	233	272	8.9	225	285	8.2	217	299	7.6	210	314	7.0	202	329	6.5	183	301	6.4
	46	236	274	8.9	229	287	8.3	221	301	7.7	213	316	7.1	213	327	6.9	184	292	6.6
	48	244	278	9.1	236	291	8.5	228	305	7.9	220	320	7.3	219	328	7.1	185	285	6.8
	50	252	282	9.3	244	296	8.7	236	310	8.0	227	325	7.4	224	329	7.2	186	282	6.9
	40	245	300	8.4	238	315	7.8	230	330	7.3	223	347	6.8	216	364	6.3	203	350	6.1
	42	253	304	8.6	246	319	8.0	239	335	7.4	231	351	6.9	223	368	6.4	205	342	6.3
RTAA	44	262	309	8.8	255	324	8.2	247	340	7.6	239	356	7.1	231	373	6.6	205	332	6.4
324	45	267	311	8.9	259	326	8.3	251	342	7.7	243	358	7.1	235	376	6.6	207	331	6.5
	46	271	314	9.0	263	329	8.3	255	344	7.8	247	361	7.2	239	378	6.7	209	329	6.6
	48	280	319	9.1	272	334	8.5	264	349	7.9	256	366	7.4	253	371	7.2	211	323	6.8
	50	290	323	9.3	282	339	8.7	273	354	8.1	264	371	7.5	257	367	7.4	212	318	6.9
	40	276	337	8.4	268	353	7.9	261	370	7.3	253	388	6.8	245	407	6.4	217	363	6.2
	42	285	343	8.6	277	359	8.0	269	376	7.5	262	394	7.0	254	412	6.5	218	354	6.4
RTAA	44	294	348	8.7	286	364	8.2	278	381	7.6	270	399	7.1	269	405	7.0	219	346	6.5
328	45	299	351	8.8	291	367	8.2	283	384	7.7	275	402	7.2	273	408	7.1	222	348	6.6
	46	304	354	8.9	296	370	8.3	287	387	7.8	279	405	7.3	274	398	7.2	223	336	6.8
	48	314	360	9.0	305	376	8.5	297	393	7.9	288	412	7.4	275	388	7.4	225	338	6.8
	50	324	366	9.2	315	382	8.6	306	399	8.1	297	418	7.5	276	384	7.5	226	328	7.1
	40	303	377	8.4	294	396	7.8	285	416	7.2	276	437	6.7	266	459	6.2	239	438	5.8
	42	315	382	8.6	305	401	8.0	296	421	7.4	286	442	6.9	276	464	6.3	243	432	5.9
RTAA	44	326	388	8.8	316	407	8.2	306	427	7.6	296	448	7.0	286	470	6.5	244	423	6.1
430	45	332	391	8.9	322	410	8.3	312	430	7.7	301	451	7.1	291	473	6.6	245	419	6.2
	46	338	393	9.0	328	413	8.4	317	433	7.8	307	454	7.2	296	476	6.7	246	414	6.3
	48	350	399	9.2	339	419	8.6	328	439	7.9	317	460	7.4	306	482	6.8	249	408	6.4
	50	362	405	9.4	351	425	8.7	340	445	8.1	328	466	7.5	307	469	7.0	253	400	6.6
	40	330	411	8.3	321	431	7.8	311	453	7.2	302	475	6.7	292	499	6.2	254	462	5.8
	42	342	417	8.5	332	438	7.9	322	459	7.4	312	482	6.9	302	505	6.4	257	453	6.0
RTAA	44	354	424	8.7	344	444	8.1	334	466	7.6	323	488	7.0	313	512	6.5	258	443	6.1
432	45	360	427	8.8	350	448	8.2	339	469	7.6	329	492	7.1	314	507	6.6	261	442	6.2
	46	366	431	8.9	356	451	8.3	345	473	7.7	334	495	7.2	315	502	6.7	261	434	6.3
	48	378	437	9.1	367	458	8.4	356	480	7.9	345	502	7.3	320	496	6.8	262	423	6.4
	50	391	444	9.2	380	465	8.6	368	487	8.0	357	510	7.5	324	490	7.0	266	417	6.6
	40	365	450	8.4	355	472	7.8	345	494	7.3	335	518	6.8	325	543	6.3	269	476	5.9
	42	377	458	8.6	367	479	8.0	357	502	7.5	346	526	7.0	327	534	6.5	270	465	6.0
RTAA	44	390	465	8.7	379	487	8.2	368	510	7.6	358	534	7.1	334	533	6.6	271	453	6.2
434	45	396	469	8.8	385	491	8.2	374	514	7.7	364	538	7.2	335	528	6.7	271	447	6.3
	46	402	473	8.9	391	495	8.3	381	518	7.8	369	542	7.2	336	523	6.8	271	441	6.4
	48	415	481	9.0	404	503	8.4	393	526	7.9	381	550	7.4	339	512	7.0	281	446	6.5
	50	428	489	9.2	417	511	8.6	405	534	8.0	394	558	7.5	341	501	7.1	282	432	6.7

1. Ratings based on seal level altitude and evaporator fouling factor of .00025 per ARI 550-90
2. Interpolation is permissible
3. Extrapolation is not permissible
4. Kw input is for compressors only
5. Ratings are based on an evaporator drop of 10 °F
6. EER = Energy Efficiency Ratio (Btu/watt-hour).Power inputs include compressors, condenser fans and control power.

Performance Data 60 Hz

Table 11 - Performance Data 200 Series

Metric units

Model	LWT (°C)	AMBIENT TEMPERATURE (°C)											
		35			40			45			50		
		CAP	INP		CAP	INP		CAP	INP		CAP	INP	
		kW	kW	COP	kW	kW	COP	kW	kW	COP	kW	kW	COP
RTAA 213	5	509	166	2.6	479	182	2.3	447	200	2.0	367	189	1.7
	6	525	169	2.7	494	185	2.3	460	203	2.0	367	183	1.7
	7	544	171	2.7	510	187	2.4	476	205	2.0	367	177	1.8
	8	558	173	2.8	523	190	2.4	488	208	2.1	373	175	1.8
	9	574	176	2.8	539	192	2.4	502	210	2.1	378	174	1.9
	10	590	178	2.9	554	195	2.5	516	213	2.1	384	171	1.9
RTAA 214	5	545	178	2.6	513	195	2.3	480	213	2.0	391	202	1.7
	6	565	180	2.7	530	197	2.3	495	216	2.0	394	195	1.7
	7	579	182	2.7	548	200	2.4	512	212	2.1	396	190	1.8
	8	589	184	2.7	563	202	2.4	526	215	2.1	402	189	1.8
	9	604	186	2.8	580	205	2.4	542	224	2.1	408	186	1.9
	10	635	190	2.9	597	208	2.5	555	225	2.2	409	181	1.9
RTAA 215	5	574	188	2.6	542	206	2.2	508	225	1.9	418	211	1.7
	6	595	191	2.6	560	208	2.3	524	228	2.0	426	210	1.7
	7	611	193	2.7	580	211	2.3	543	231	2.0	430	207	1.8
	8	622	194	2.7	596	214	2.4	558	233	2.1	434	203	1.8
	9	638	197	2.8	614	216	2.4	575	236	2.1	438	199	1.9
	10	672	201	2.8	633	219	2.5	593	239	2.2	442	195	1.9
RTAA 216	5	628	204	2.6	594	223	2.3	560	244	2.0	459	227	1.7
	6	650	208	2.7	613	226	2.3	578	247	2.0	461	223	1.8
	7	666	210	2.7	634	230	2.4	593	248	2.1	472	222	1.8
	8	678	212	2.7	652	232	2.4	609	251	2.1	474	217	1.9
	9	695	214	2.8	671	236	2.5	620	250	2.2	473	211	1.9
	10	729	220	2.9	691	239	2.5	634	250	2.2	485	211	2.0
RTAA 217	5	676	225	2.6	641	245	2.3	606	267	2.0	457	226	1.8
	6	698	229	2.6	661	249	2.3	625	271	2.0	464	224	1.8
	7	715	232	2.7	682	253	2.4	641	273	2.1	463	217	1.8
	8	727	234	2.7	700	256	2.4	647	270	2.1	470	215	1.9
	9	744	237	2.7	719	260	2.4	657	269	2.2	477	212	1.9
	10	779	243	2.8	740	264	2.5	670	269	2.2	484	210	2.0

1. Ratings based on seal level altitude and evaporator fouling factor of .0440 per ARI 550-90
2. Interpolation is permissible
3. Extrapolation is not permissible
4. Kw input is for compressors only
5. Ratings are based on an evaporator drop of 5.6 °C
6. COP = Coefficient of performance (kW cooling/kW input).Power inputs include compressors, condenser fans and control power.

Performance Data 60 Hz

Table 12 - Performance Data 300 & 400 Series

Metric units

Model	LWT (°C)	AMBIENT TEMPERATURE (°C)											
		35			40			45			50		
		CAP	INP		CAP	INP		CAP	INP		CAP	INP	
		kW	kW	COP	kW	kW	COP	kW	kW	COP	kW	kW	COP
RTAA 322	5	764	262	2.5	719	288	2.2	673	315	1.9	516	274	1.6
	6	788	267	2.5	742	292	2.2	694	318	1.9	519	267	1.7
	7	815	271	2.6	767	296	2.3	718	323	2.0	521	260	1.7
	8	837	275	2.6	788	299	2.3	754	323	2.1	522	253	1.8
	9	862	278	2.7	811	303	2.3	773	325	2.1	529	249	1.8
	10	887	282	2.7	835	307	2.4	792	327	2.1	530	242	1.9
RTAA 324	5	875	302	2.5	829	329	2.2	782	359	1.9	590	306	1.7
	6	906	307	2.5	856	334	2.2	807	363	2.0	591	298	1.7
	7	930	310	2.6	886	338	2.3	835	368	2.0	605	297	1.7
	8	946	313	2.6	910	342	2.3	858	372	2.0	605	288	1.8
	9	970	316	2.7	938	347	2.4	897	369	2.1	615	285	1.8
	10	1019	323	2.7	966	351	2.4	914	369	2.2	621	279	1.9
RTAA 328	5	986	340	2.5	937	370	2.2	889	402	1.9	638	325	1.7
	6	1019	345	2.5	966	375	2.2	916	407	2.0	636	316	1.7
	7	1043	350	2.6	997	380	2.3	959	405	2.1	646	312	1.8
	8	1060	353	2.6	1023	385	2.3	977	402	2.1	655	308	1.8
	9	1086	357	2.6	1053	390	2.4	988	398	2.2	652	297	1.8
	10	1137	366	2.7	1083	396	2.4	1001	397	2.2	661	293	1.9
RTAA 430	5	1086	379	2.5	1027	414	2.2	966	453	1.9	743	393	1.6
	6	1126	385	2.5	1062	419	2.2	998	458	1.9	758	391	1.7
	7	1157	389	2.6	1100	426	2.3	1034	464	2.0	761	380	1.7
	8	1178	392	2.6	1131	430	2.3	1062	468	2.0	775	376	1.8
	9	1209	396	2.7	1167	435	2.4	1095	474	2.1	782	368	1.8
	10	1273	405	2.8	1203	441	2.4	1110	468	2.1	789	359	1.9
RTAA 432	5	1182	414	2.5	1121	452	2.2	1059	492	1.9	784	411	1.6
	6	1223	421	2.5	1157	457	2.2	1092	498	1.9	802	410	1.7
	7	1255	425	2.6	1197	464	2.3	1130	505	2.0	806	400	1.7
	8	1276	429	2.6	1229	470	2.3	1142	500	2.0	808	389	1.8
	9	1308	434	2.6	1265	476	2.3	1164	499	2.1	826	387	1.8
	10	1373	444	2.7	1303	482	2.4	1185	498	2.1	831	378	1.9
RTAA 434	5	1304	454	2.5	1240	494	2.2	1167	532	1.9	837	431	1.7
	6	1348	461	2.5	1278	500	2.2	1193	534	2.0	850	426	1.7
	7	1381	467	2.6	1320	508	2.3	1224	537	2.0	863	422	1.8
	8	1404	471	2.6	1354	515	2.3	1238	532	2.1	860	408	1.8
	9	1437	477	2.6	1393	522	2.3	1255	528	2.1	872	403	1.8
	10	1506	489	2.7	1433	529	2.4	1272	524	2.1	868	388	1.9

1. Ratings based on seal level altitude and evaporator fouling factor of .0440 per ARI 550-90
2. Interpolation is permissible
3. Extrapolation is not permissible
4. kW input is for compressors only
5. Ratings are based on an evaporator drop of 5.6 °C
6. COP = Coefficient of performance (kW cooling/kW input).Power inputs include compressors, condenser fans and control power.

Performance Data

Table 13 - ARI Part-Load Values 50 Hz (English units)

Unit Size	% Load	Capacity Tons	Power Input (kW) ARI Temp. Relief	Power Input (kW) Constant Amb. Temp.	EER With Temp. Relief	IPLV
	100	126	138	138	9.8	14.1
RTAA213	75	95	75	97	12.5	
	50	63	40	63	15.5	
	25	32	17	47	14.9	
	100	138	148	148	10.1	14.9
RTAA214	75	104	77	101	13.3	
	50	69	41	68	16.5	
	25	35	19	47	14.8	
	100	145	159	159	9.9	14.7
RTAA215	75	108	83	108	13.1	
	50	72	45	73	16.3	
	25	36	21	51	14.7	
	100	159	176	176	9.8	14.8
RTAA216	75	119	92	120	13.1	
	50	80	49	81	16.5	
	25	40	23	56	15.1	
	100	172	191	191	9.8	15.0
RTAA217	75	129	94	126	13.6	
	50	86	52	88	16.6	
	25	43	25	53	14.5	
	100	195	223	223	9.4	14.4
RTAA322	75	146	123	158	11.9	
	50	97	56	105	16.1	
	25	49	25	58	17.2	
	100	224	257	257	9.4	14.6
RTAA324	75	168	139	177	12.1	
	50	112	64	121	16.6	
	25	56	28	67	16.2	
	100	252	289	289	9.4	14.6
RTAA328	75	189	153	194	12.2	
	50	126	72	136	16.3	
	25	63	32	72	16.8	
	100	279	322	322	9.4	12.7
RTAA430	75	209	174	222	12.2	
	50	139	109	158	13.2	
	25	70	48	71	12.7	
	100	303	353	353	9.3	13.2
RTAA432	75	227	187	240	12.2	
	50	152	109	169	14.1	
	25	76	49	74	13.2	
	100	331	387	387	9.3	14.1
RTAA434	75	248	201	259	12.4	
	50	166	104	178	15.8	
	25	83	50	77	13.9	

60 Hz

Unit Size	% Load	Capacity Tons	Power Input (kW) ARI Temp. Relief	Power Input (kW) Constant Amb. Temp.	EER With Temp. Relief	IPLV
	100	153	170	170	9.2	12.4
RTAA213	75	115	92	119	11.4	
	50	77	53	78	13.6	
	25	38	24	39	11.8	
	100	163	182	182	9.1	12.7
RTAA214	75	122	95	124	11.6	
	50	82	55	84	14.1	
	25	41	27	42	11.6	
	100	172	192	192	9.1	12.3
RTAA215	75	129	100	131	11.4	
	50	86	58	88	13.6	
	25	43	29	44	10.9	
	100	188	209	209	9.2	12.6
RTAA216	75	141	109	142	11.7	
	50	94	63	96	13.9	
	25	47	31	48	11.3	
	100	202	231	231	9.1	13.1
RTAA217	75	152	116	152	12.0	
	50	101	65	106	14.6	
	25	51	35	53	11.4	
	100	229	270	270	8.8	12.2
RTAA322	75	172	143	184	11.1	
	50	115	73	124	13.4	
	25	57	43	73	11.7	
	100	262	309	309	8.8	12.7
RTAA324	75	197	158	207	11.4	
	50	131	80	142	14.3	
	25	66	46	80	11.4	
	100	294	348	348	8.7	12.8
RTAA328	75	221	174	230	11.5	
	50	147	87	160	14.3	
	25	74	49	90	12.4	
	100	326	388	388	8.8	12.5
RTAA430	75	245	206	264	11.2	
	50	163	109	171	14.1	
	25	82	54	93	11.6	
	100	354	424	424	8.7	12.4
RTAA432	75	266	233	284	10.7	
	50	177	114	182	14.4	
	25	89	59	93	11.5	
	100	390	465	465	8.7	13.1
RTAA434	75	293	233	307	11.6	
	50	195	121	191	14.9	
	25	98	60	93	12.1	

- ARI part load data:
  - 95 °F Ambient Temperature.
  - 44 °F Leaving water temperature
- ARI Ambient temperature relief:
  - 100 % load : 95 °F
  - 75% load : 80 °F
  - 50% load : 65 °F
  - 25% load : 55 °F
- Power kW is for compressors only.

Performance Data

Table 14 - ARI Part-Load Values 50 Hz (Metric units)

Unit Size	% Load	Capacity Kw	Power Input (kW) ARI Temp. Relief	Power Input (kW) Constant Amb. Temp.	COP With Temp. Relief	IPLV
	100	443	138	138	2.9	4.4
RTAA213	75	332	75	97	3.7	
	50	222	40	63	4.5	
	25	111	17	47	4.4	
	100	486	148	148	3.0	4.6
RTAA214	75	364	77	101	3.9	
	50	243	41	68	4.8	
	25	121	19	47	4.3	
	100	508	159	159	2.9	4.6
RTAA215	75	381	83	108	3.9	
	50	254	45	73	4.8	
	25	127	21	51	4.3	
	100	560	176	176	2.9	4.6
RTAA216	75	420	92	120	3.8	
	50	280	49	81	4.8	
	25	140	23	56	4.4	
	100	606	191	191	2.9	4.7
RTAA217	75	454	94	126	4.0	
	50	303	52	88	4.9	
	25	151	25	53	4.3	
	100	685	223	223	2.8	4.5
RTAA322	75	514	123	158	3.5	
	50	343	56	105	4.7	
	25	171	25	58	5.0	
	100	789	257	257	2.8	4.5
RTAA324	75	592	139	177	3.5	
	50	394	64	121	4.9	
	25	197	28	67	4.7	
	100	886	289	289	2.8	4.5
RTAA328	75	665	153	194	3.6	
	50	443	72	136	4.8	
	25	222	32	72	4.9	
	100	980	322	322	2.8	4.0
RTAA430	75	735	174	222	3.6	
	50	490	109	158	3.9	
	25	245	48	71	3.7	
	100	1065	353	353	2.7	4.1
RTAA432	75	799	187	240	3.6	
	50	533	109	169	4.1	
	25	266	49	74	3.9	
	100	1164	387	387	2.7	4.4
RTAA434	75	873	201	259	3.6	
	50	582	104	178	4.6	
	25	291	50	77	4.1	

60 Hz

Unit Size	% Load	Capacity Kw	Power Input (kW) ARI Temp. Relief	Power Input (kW) Constant Amb. Temp.	COP With Temp. Relief	IPLV
	100	538	170	170	2.7	3.9
RTAA213	75	403	92	119	3.3	
	50	269	53	78	4.0	
	25	134	24	39	3.5	
	100	573	182	182	2.7	4.0
RTAA214	75	430	95	124	3.4	
	50	287	55	84	4.1	
	25	143	27	42	3.4	
	100	605	192	192	2.7	3.8
RTAA215	75	454	100	131	3.4	
	50	302	58	88	4.0	
	25	151	29	44	3.2	
	100	661	209	209	2.7	3.9
RTAA216	75	496	109	142	3.4	
	50	331	63	96	4.1	
	25	165	31	48	3.3	
	100	710	231	231	2.7	4.1
RTAA217	75	533	116	152	3.5	
	50	355	65	106	4.3	
	25	178	35	53	3.3	
	100	805	270	270	2.6	3.8
RTAA322	75	604	143	184	3.2	
	50	403	73	124	3.9	
	25	201	43	73	3.4	
	100	921	309	309	2.6	3.9
RTAA324	75	691	158	207	3.3	
	50	461	80	142	4.2	
	25	230	46	80	3.3	
	100	1034	348	348	2.6	4.0
RTAA328	75	775	174	230	3.4	
	50	517	87	160	4.2	
	25	258	49	90	3.6	
	100	1146	388	388	2.6	3.9
RTAA430	75	860	206	264	3.3	
	50	573	109	171	4.1	
	25	287	54	93	3.4	
	100	1245	424	424	2.6	3.9
RTAA432	75	933	233	284	3.1	
	50	622	114	182	4.2	
	25	311	59	93	3.4	
	100	1371	465	465	2.6	4.1
RTAA434	75	1028	233	307	3.4	
	50	686	121	191	4.4	
	25	343	60	93	3.5	

- ARI part load data:
  - 35 °C Ambient Temperature.
  - 6.7 °C Leaving water temperature
- ARI Ambient temperature relief:
  - 100 % load : 35 °C
  - 75% load : 26.7 °C
  - 50% load : 18.3 °C
  - 25% load : 12.7 °C
- Power kW is for compressors only.

Electrical Data 50 Hz

Table 15 - Electrical Data

	RTAA	213	214	215	216	217
Compressor Quantity		2	2	2	2	2
Model (Circuit 1+2)	CHHB	70/70	70/85	85/85	85/100	100/100
RLA (1)						
Power Supply (3)	220/3/50	243/243	243/278	278/278	278/325	325/325
	380/3/50	140/140	140/161	161/161	161/188	188/188
	415/3/50	129/129	129/149	149/149	149/175	175/175
Recommended	220/3/50	800	800	800	800	1000
Fuse size (A)	380/3/50	400	400	500	500	500
	415/3/50	400	400	500	500	500
Unit inrush Current (2)						
Power Supply (3)	220/3/50	1112	1293	1328	1436	1487
Starting Mode:	380/3/50	609	705	726	784	815
Part Winding	415/3/50	639	743	763	826	856
Control Power Required (110V)						
	VA	1300	1300	1300	1300	1300
Evaporator Heater	W	200	200	200	200	200
Oil Heater	W	2 x 150	2 x 150	2 x 150	2 x 150	2 x 150
Number Of Fans		8	8	8	9	10
FLA 380/415 V , Each	A	4.2	4.2	4.2	4.2	4.2
Starting Amps 380/415	A	14.7	14.7	14.7	14.7	14.7
Fan Motor Shaft Power	kW	1.3	1.3	1.3	1.3	1.3
Fan Motor Rated KW	kW	1.88	1.88	1.88	1.88	1.88

	RTAA	322	324	328	430	432	434
Compressor Quantity		3	3	3	4	4	4
Model (Circuit 1)	CHHB	70+70	85+85	100+100	85+85	85+85	100+100
Model (Circuit 2)	CHHB	85	100	100	85+85	100+100	100+100
RLA (1)							
Power Supply (3)	220/3/50	243/243	278/278	325/325	278/278	278/278	325/325
		278	325	325	278/278	325/325	325/325
	380/3/50	140/140	161/161	188/188	161/161	161/161	188/188
		161	188	188	161/161	188/188	188/188
	415/3/50	129/129	147/147	172/172	147/147	147/147	172/172
		147	172	172	147/147	172/172	172/172
Recommended	220/3/50	1000	1250	1600	1600	1600	2000
Fuse size (A)	380/3/50	630	800	800	1000	1000	1000
	415/3/50	630	800	800	1000	1000	1000
Unit inrush Current (2)							
Power Supply (3)	220/3/50	1552	1735	1837	1917	2077	2179
Starting Mode:	380/3/50	861	966	1028	1081	1171	1233
Part Winding	415/3/50	888	996	1056	1094	1188	1248
Control Power Required (110V)							
	VA	2000	2000	2000	2600	2600	2600
Evaporator Heater	W	400	400	400	400	400	400
Oil Heater	W	3 x 150	3 x 150	3 x 150	4 x 150	4 x 150	4 x 150
Number Of Fans		12	14	16	16	18	20
FLA 380/415 V , Each	A	4.2	4.2	4.2	4.2	4.2	4.2
Starting Amps 380/415	A	14.7	14.7	14.7	14.7	14.7	14.7
Fan Motor Shaft Power	kW	1.3	1.3	1.3	1.3	1.3	1.3
Fan Motor Rated KW	kW	1.88	1.88	1.88	1.88	1.88	1.88

NOTES:
(1) Rated Load Amperes - RLA
50 Hz - Rated at 5 Bar suction Pressure and 25 Bar discharge pressure.
(2) Unit Inrush Current = Starting amps of the circuit with the larger compressor circuit including fans.
plus RLA of the second circuit including fans
(3) Voltage Utilisation Range : 220/3/50 (198-242), 400/3/50 (360-440).

Electrical Data 60 Hz

Table 16 - Electrical Data

	RTAA	213	214	215	216	217
Compressor Quantity		2	2	2	2	2
Model (Circuit 1+2)	CHHB	70/70	70/85	85/85	85/100	100/100
RLA (1)						
Power Supply (3)	220/3/60	291/291	291/333	333/333	333/391	391/391
	380/3/60	168/168	168/193	193/193	193/226	226/226
	460/3/60	139/139	139/159	159/159	159/187	187/187
Recommended	220/3/60	800	1000	1000	1000	1250
Fuse size (A)	380/3/60	500	500	500	630	630
	460/3/60	400	400	500	500	500
Unit inrush Current (2)						
Power Supply (3)	220/3/60	1301	1517	1565	1683	1741
Starting Mode:	380/3/60	772	901	932	1000	1033
Part Winding	460/3/60	647	754	780	836	864
Control Power Required (110V)						
	VA	1300	1300	1300	1300	1300
Evaporator Heater	W	200	200	200	200	200
Oil Heater	W	2 x 150	2 x 150	2 x 150	2 x 150	2 x 150
Number of Fans		8	9	10	10	10
FLA 380/3/60 , Each	A	6.2	6.2	6.2	6.2	6.2
Starting Amps 380/3/60	A	34	34	34	34	34
Fan Motor Shaft Power	kW	2.6	2.6	2.6	2.6	2.6
Fan Motor Rated KW	kW	3.42	3.42	3.42	3.42	3.42

	RTAA	322	324	328	430	432	434
Compressor Quantity		3	3	3	4	4	4
Model (Circuit 1)	CHHB	70/70	85/85	100/100	85/85	85/85	100/100
Model (Circuit 2)	CHHB	85	100	100	85/85	100/100	100/100
RLA (1)							
Power Supply (3)	220/3/60	291/291	333/333	391/391	333/333	333/333	391/391
		333	391	391	333/333	391/391	391/391
	380/3/60	168/168	193/193	226/226	193/193	193/193	226/226
		193	226	226	193/193	226/226	226/226
	460/3/60	139/139	159/159	187/187	159/159	159/159	187/187
		159	187	187	159/159	187/187	187/187
Recommended	220/3/60	1250	1600	1600	2000	2000	2000
Fuse size (A)	380/3/60	800	800	1000	1000	1250	1250
	460/3/60	630	800	800	1000	1000	1000
Unit inrush Current (2)							
Power Supply (3)	220/3/60	1826	2041	2169	2268	2457	2585
Starting Mode:	380/3/60	1087	1218	1296	1355	1436	1547
Part Winding	460/3/60	911	1020	1088	1135	1232	1300
Control Power Required (110V)							
	VA	2000	2000	2000	2600	2600	2600
Evaporator Heater	W	400	400	400	400	400	400
Oil Heater	W	3 x 150	3 x 150	3 x 150	4 x 150	4 x 150	4 x 150
Number Of Fans		12	14	16	16	18	20
FLA 380/3/60 , Each	A	6.2	6.2	6.2	6.2	6.2	6.2
Starting Amps 380/3/60	A	34	34	34	34	34	34
Fan Motor Shaft Power	kW	2.6	2.6	2.6	2.6	2.6	2.6
Fan Motor Rated KW	kW	3.42	3.42	3.42	3.42	3.42	3.42

NOTES:
(1) Rated Load Amperes - RLA
60 Hz - Rated in accordance to UL Standard 465
(2) Unit Inrush Current = Starting amps of the circuit with the larger compressor circuit including fans plus RLA of the second circuit including fans
(3) Voltage Utilisation Range : 200-230/3/60 (180-253), 380/3/60 (342-418), 460/3/60 (414-506)

Microprocessor control module : “Adaptive Control™” protection and communication capabilities

“Adaptive Control™” :

Trouble free operation

The air cooled series RTAA utilizes the most advanced microprocessor control issued from the latest development in micro-electronics. Control and protection of chiller were the two functions of previous chiller control design. «Adaptive Control» means the system takes corrective action when any of the control variables approaches a limit condition at which the protection function of previous control schemes would normally shut down the chiller. Corrective action is achieved through combined actions of compressor unloader mechanism, and fan staging. Only when the control system has exhausted the corrective actions it can take and the unit is still violating an operating limit, the unit will be shut down.
The control logic of the P.I.D. type based on the leaving chilled water temperature integrates the control of variables (current draw by the motor, evaporating and condensing temperature) maintains accurate control, minimizes the drift from the setpoint and provides better building comfort.

Improved chiller and motor protection

The control system integrates all the functions necessary to ensure safe operation of the chiller in all applications and duty conditions :

- System safeties, such as oil, water, refrigerant pressure and temperature faults.
- Motor safeties. By monitoring the motor current on each of the 3 phases, the control system ensures protection against :
  - Overload at start-up and in operation.
  - Phase loss/Power loss.
  - Phase unbalance or reversal.
  - Over/Undervoltage.
  - Welded contactors.

“Adaptive Control™”, features summary

- Ensures safe operation of the chiller.
- Keeps chiller on line.
- Optimizes total chiller power consumption.
- Ensures total chiller reliability.
- Allows easy interface.
- Minimizes service expense.

Optional features

- Tracer communication interface.
- Hardware interface with BMS system.(External chilled water setpoint).
- External current limit setpoint.
- Chilled water temperature reset.

If a fault occurs, one of 90 individual diagnostic and operating codes will display directly on the control module.

Unit mounted clear language display (UCM).

Communication

The Unit Control Module (UCM-CLD) of the RTAA offers several communication levels which considerably simplify the implementation of a telemonitoring of the chiller or its integration in a Building Management System (BMS).

Operator interface

With easy front panel programmability of daily, service start-up and machine configuration settings and setpoints, the building manager and service technician can customize the use of the UCM-CLD microcontroller to the unique conditions of the chiller plant whether the purpose of the chilled water is comfort cooling or process cooling.
All the data that is necessary for the improved operation and easy serviceability of the chiller is called up by simple keypad instructions and presented on a highly readable screen.

Convenience

Enunciation of all information is at the front panel display (including power, voltage, amps, temperatures, pressures, number of starts and operating hours). Messages are displayed using clear language.

Readability

LCD, super twist, double line 40 character display is easy to read.
It is backlit so that the diplay can be read in a variety of equipment room lighting conditions.

Application flexibility

The UCM-CLD is available with the output in six languages and in either English or metric (SI) units.

Telemonitoring through a parallel link

Analog input and output ports allow chiller operation optimization or easy chiller monitoring when the machine is not integrated in a BMS.

Remote running and alarm contacts

The unit provides three single pole/double-throw contact closures to indicate whether :

- a failure has occured.
- the compressor is running.
- the compressor is running at maximum capacity. This information may be used to authorize the start of an additional chiller.

External chilled water setpoint and current limit setpoint

The UCM allows the external setting independant of the front panel setpoint by one of the following three means :

- a remote resistor (fixed or adjustable)
- 2-10 VDC input
- a 4-20 mA input.

In the same way, the motor current can be limited to optimize the total energy efficiency of the installation.

Integration into a Trane Building Management System through the Serial link

The unit can be equipped upon request with a serial link communication card.
All the data and functions available at the UCM front panel can be transmitted or accessed through the serial link. The integration in a Building Management or the chiller operation optimization in order to reduce the overal energy consumption are thus considerably simplified.

Data which can be read

Following parameters can be read by the Trane BMS through the serial link :

- Entering and leaving evaporator water temperature
- Entering and leaving condenser water temperature
- Motor current
- Operating status : compressor stopped or running, compressor running at full load or auto-limitation.

More than 100 data can be accessed or transmitted.

Orders which can be sent to the chiller

The BMS can send following orders :

- Compressor start and stop
- Motor current limit
- Chilled water setpoint reset.

Tracer Summit
Chiller Plant Control

Tracer Summit's Chiller Plant Control (CPC) application provides automation and energy optimisation of chiller plant through factory tested sequencing software.

As a manufacturer of chillers for over 60 years, Trane has gained tremendous experience in chiller plant applications. The Tracer Summit Chiller Plant Control application is designed to take advantage of this expertise. This factory tested software is powerful enough to handle such sophisticated applications as decoupled, dual fuel, series, or even swing chiller systems yet is designed to allow even the novice operators to understand its set-up and operation.

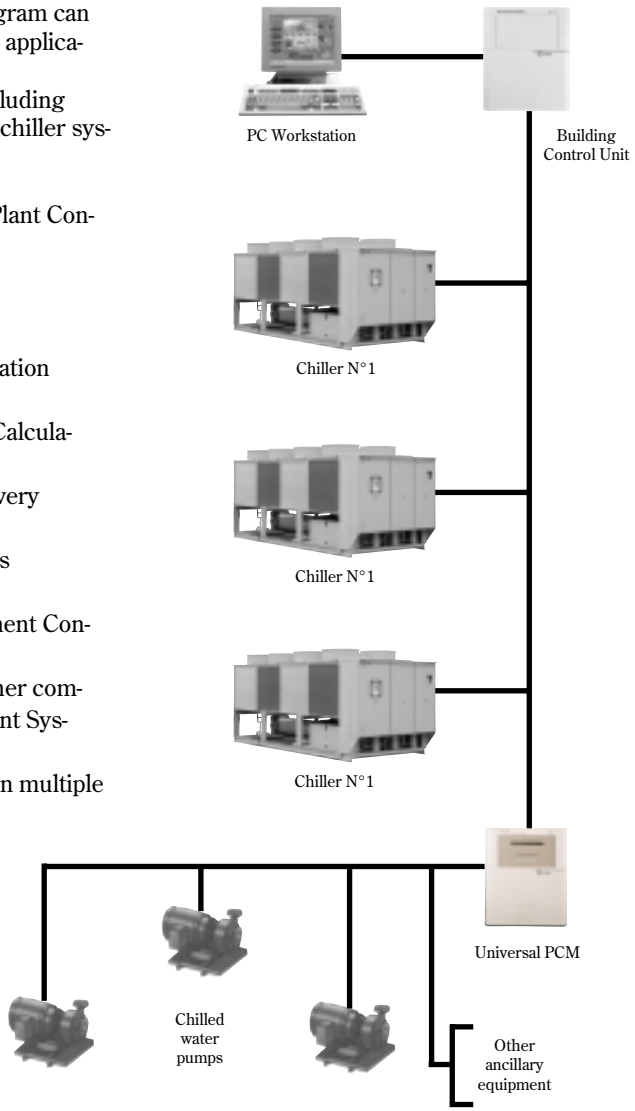
Chiller Plant Control monitors and controls multiple chillers and their related pumps and valves to balance system efficiency and equipment runtime to optimise system performance.

In addition to control and monitoring, the Chiller Plant Control program provides important status information that tells the user what is happening in the chiller plant and what will happen next, based on current operating conditions. This status information is important for troubleshooting purposes.

The Chiller Plant Control program can control comfort and industrial applications as well as
special control sequences, including thermal storage and dual fuel chiller systems.

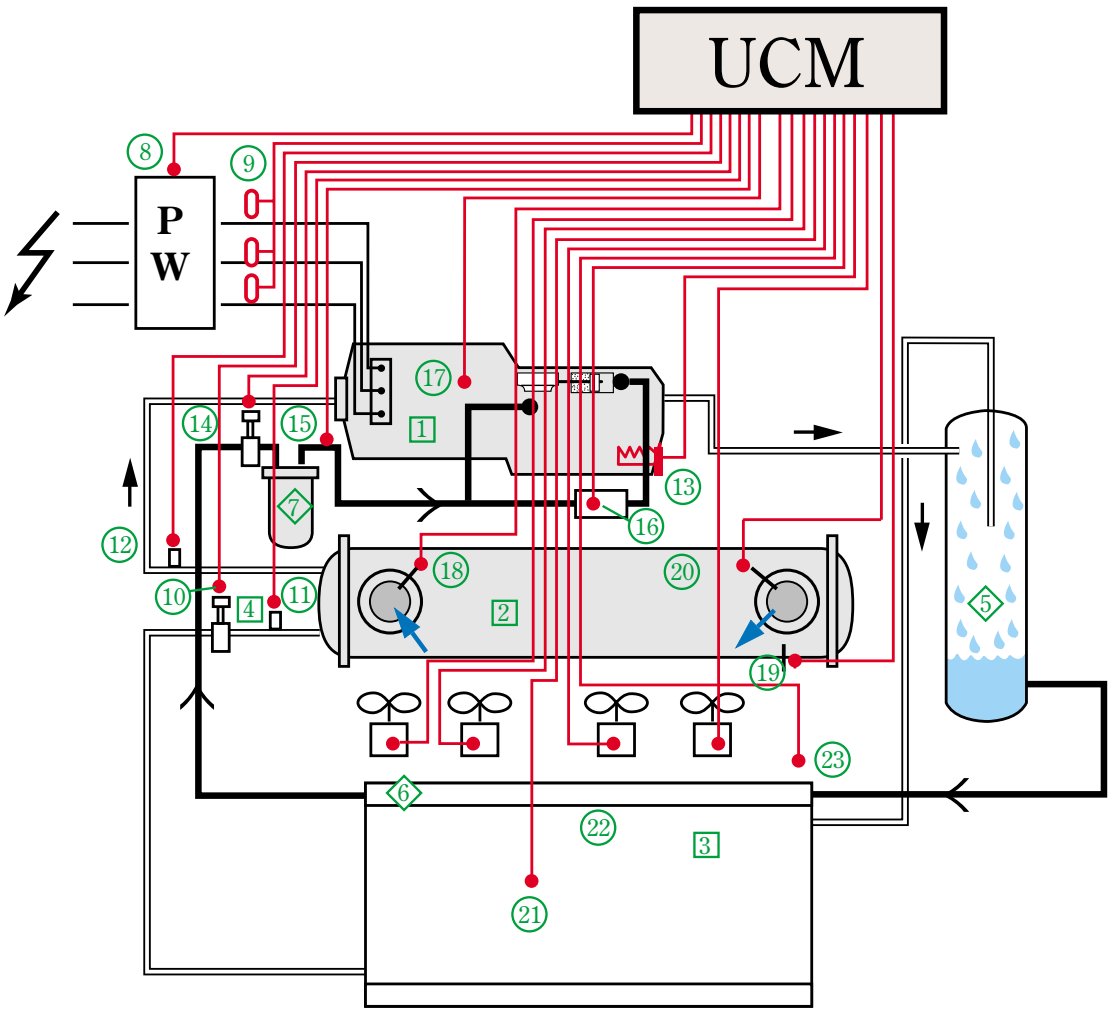
The main features of Chiller Plant Control are:

- Chiller Sequencing
- Rotation Changes
- Base, Peak and Swing Operation
- Soft Loading
- Individual Chiller Setpoint Calculations
- Failure Detection and Recovery
- Manual Override
- Chiller Performance Reports
- Remote Communications
- Pump and Ancillary Equipment Control
- Interoperatorability with other compatible Building Management Systems
- Control of up to 25 chillers in multiple plants.



Superior control

The diagram indicates the numerous control variables that are centralised by the unit control module in order to ensure trouble free operation.



Refrigeration circuit

1 Compressor
2 Evaporator
3 Condenser (with integral subcooler)
4 Electronic expansion valve

Lubrication circuit

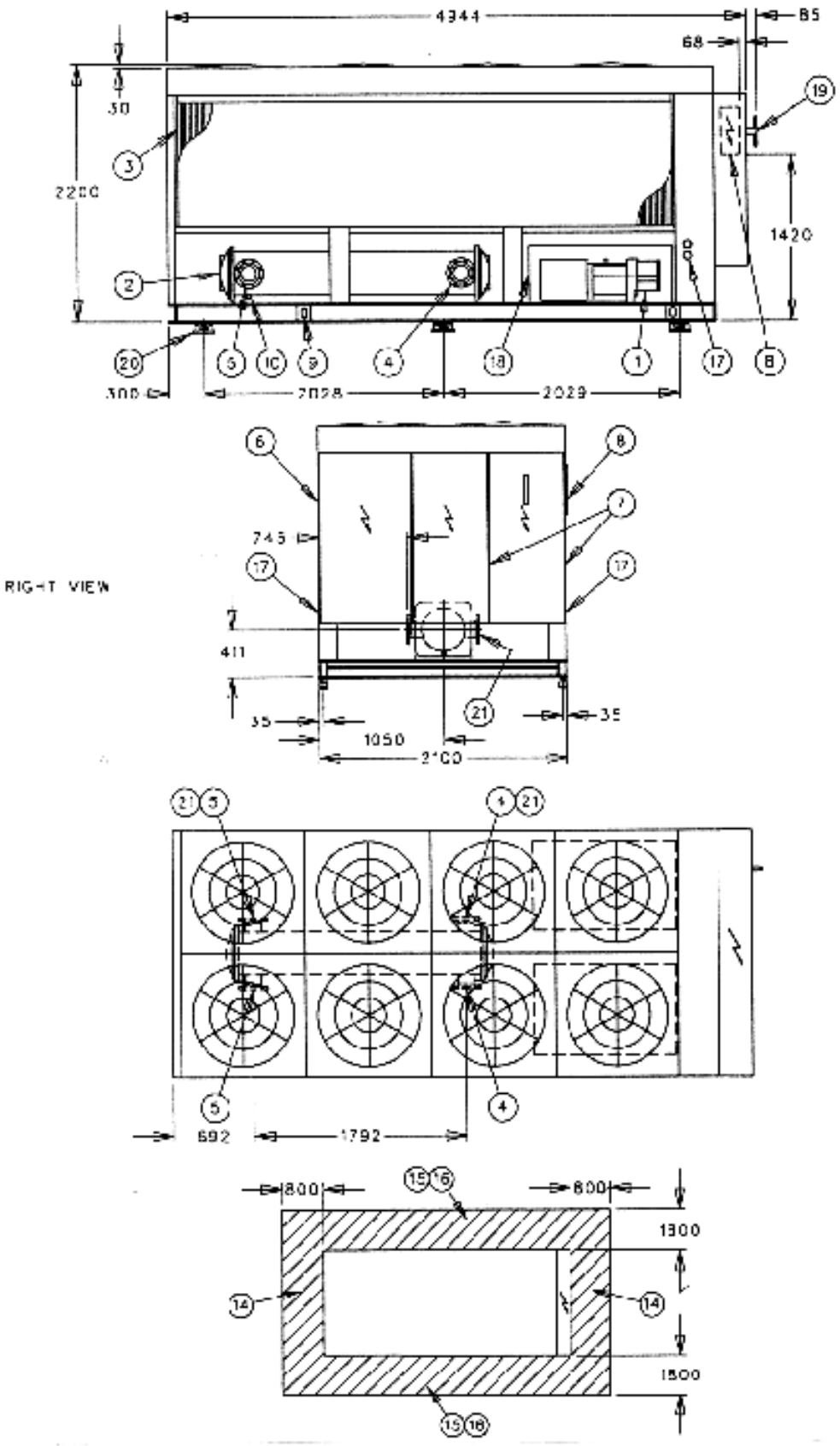
5 Oil separator
6 Oil cooler
7 Oil filter.

Control circuit

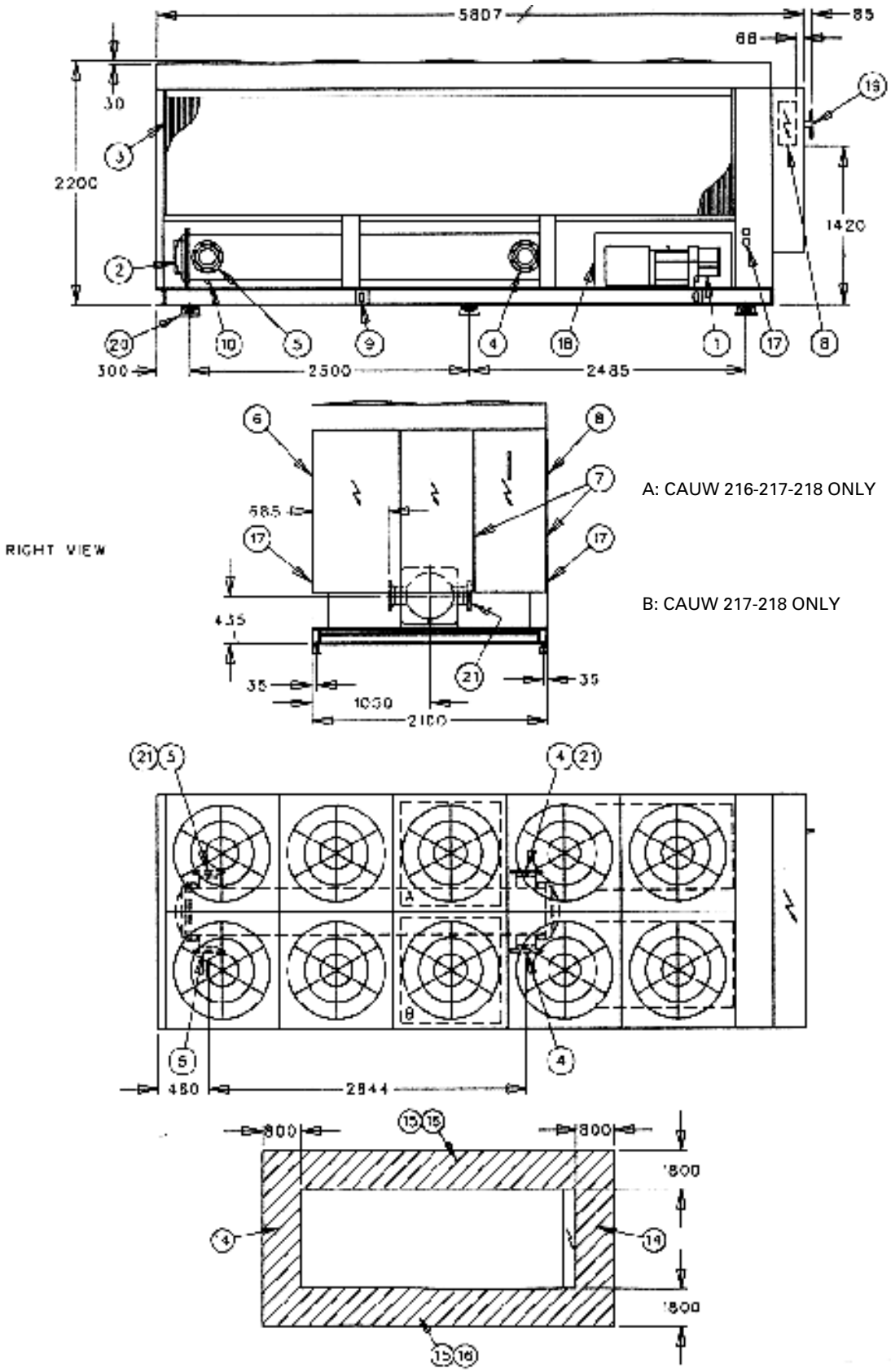
8 Part-winding starter
9 Phase loss/imbalance, under/over voltage pro tection
10 Electronic expansion valve self diagnostic and prepositionning, refrigerant flow metering
11 Evaporator entering refrigerant temperature
12 Evaporator leaving refrigerant temperature
13 Oil tank heating
14 Oil circuit solenoid valve
15 Oil pressure
16 Compressor capacity control
17 Motor windings temperature
18 Evaporato entering water temperature
19 Evaporator leaving water temperature
20 Chilled water circuit flow switch (option, field wired)
21 Condenser refrigerant temperature
22 Condenser entering water temperature
23 Condenser leaving water temperature

Dimensional Data

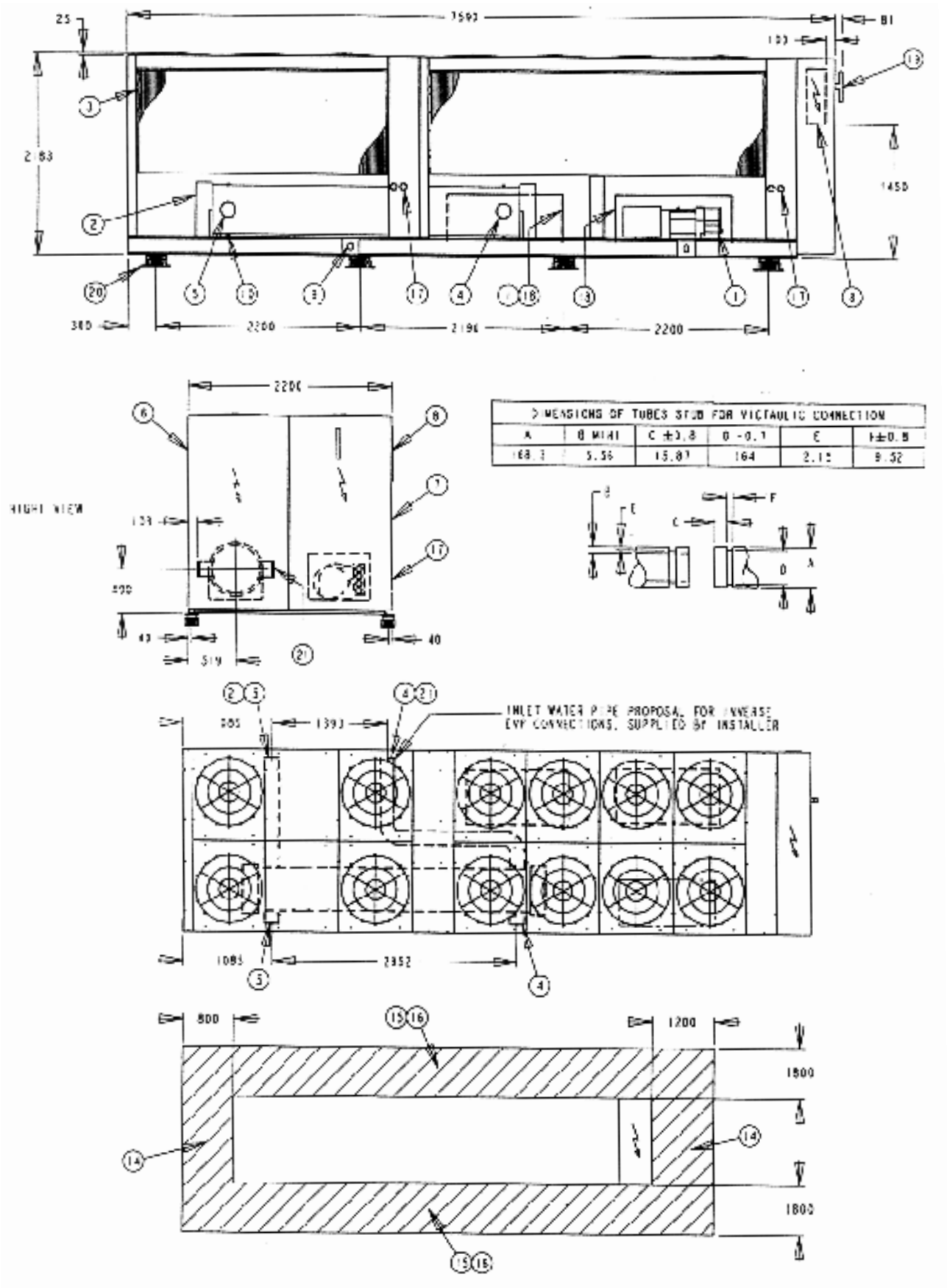
RTAA 213 50 Hz Unit Dimensions



RTAA 213 60 Hz / RTAA 214 - 217 50 & 60 Hz Unit Dimensions



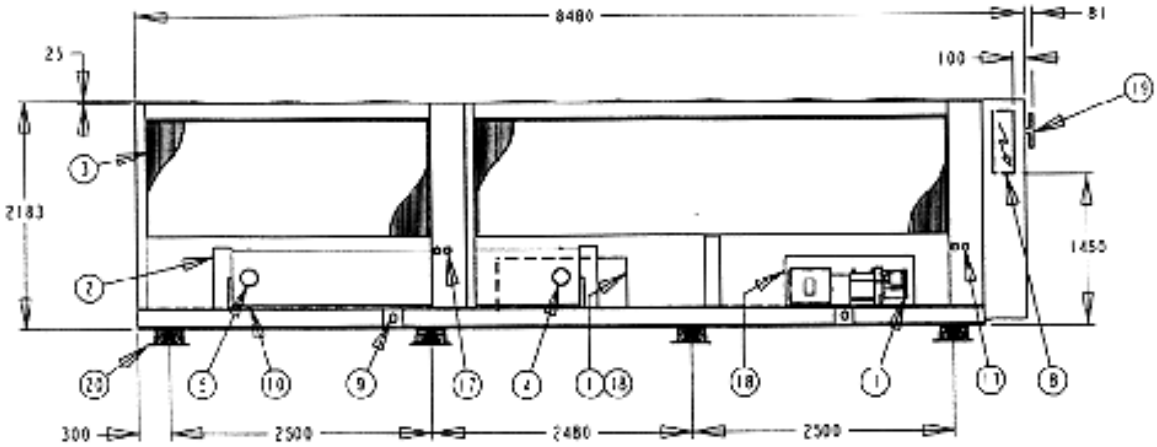
RTAA 322 50 & 60 Hz Unit Dimensions

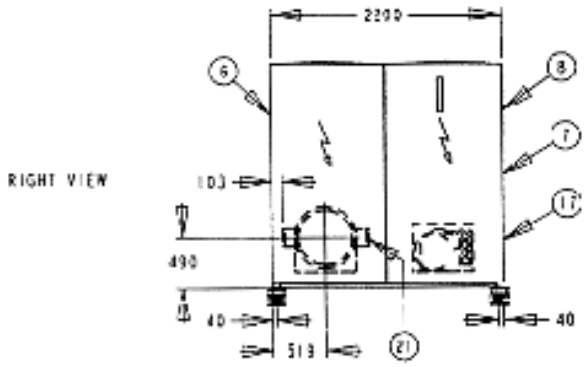


DIMENSIONS OF TUBES STUB FOR VICTAULIC CONNECTION

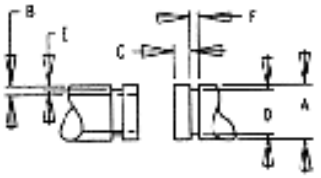
A	B M14	C ±0.8	D -0.1	E	F±0.8
168.3	5.56	15.87	164	2.11	9.52

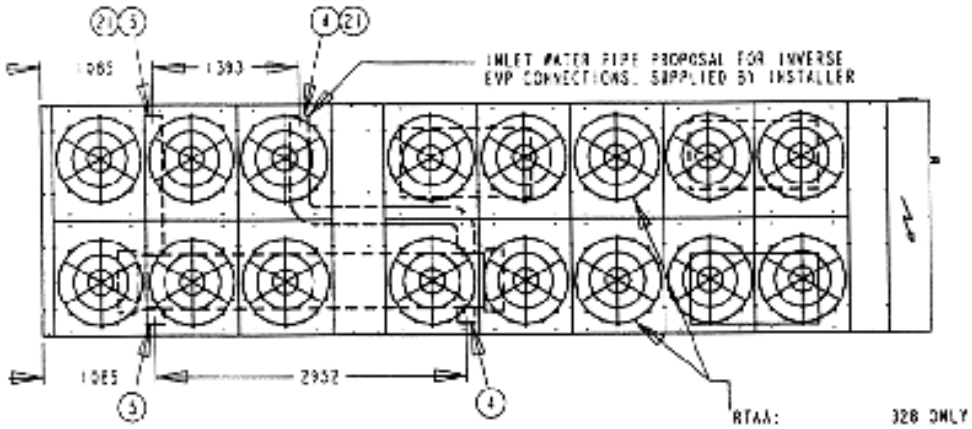
RTAA 324-328 50 & 60 Hz Unit Dimensions

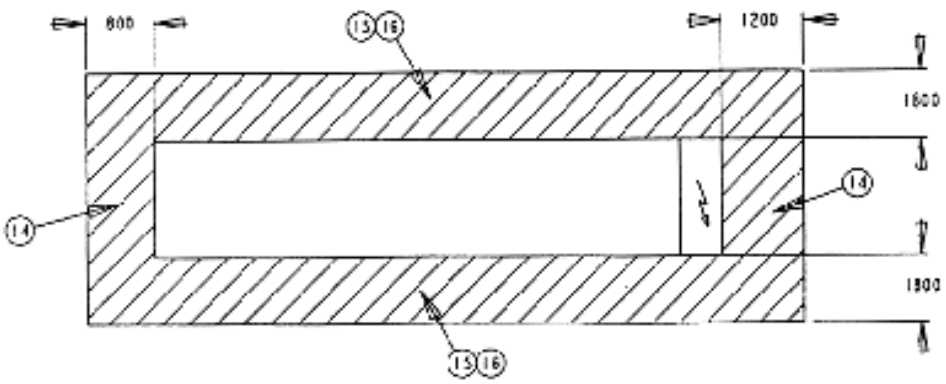




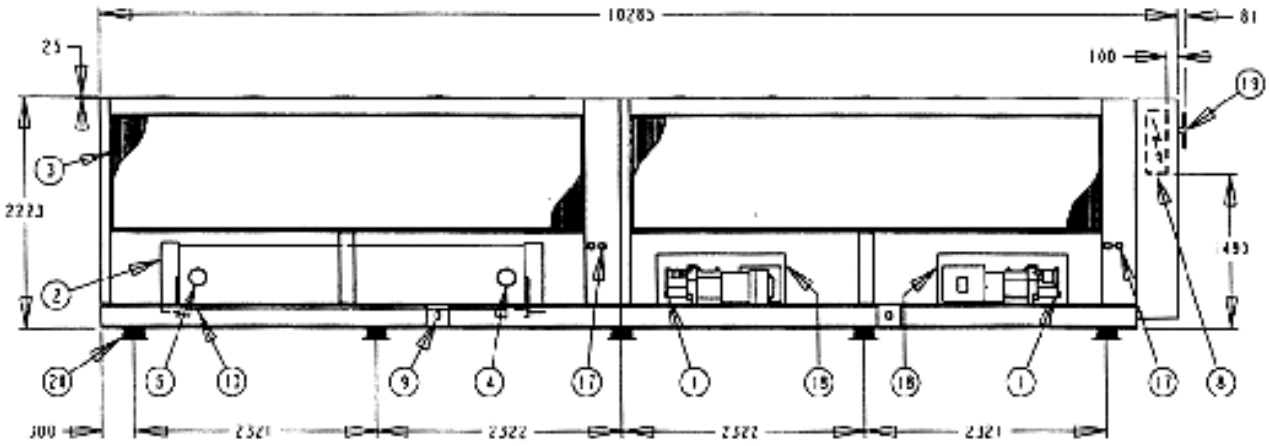
DIMENSIONS OF TUBES STUB FOR VICTAULIC CONNECTION					
A	B MINI	C ±0.8	D -0.7	E	F±0.8
168.3	5.56	15.81	164	2.15	9.52

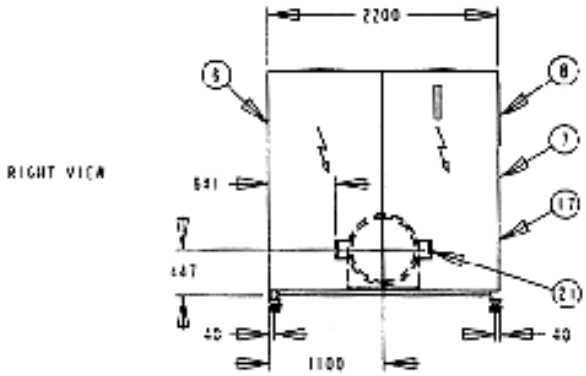




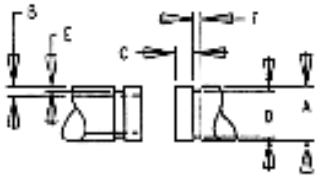


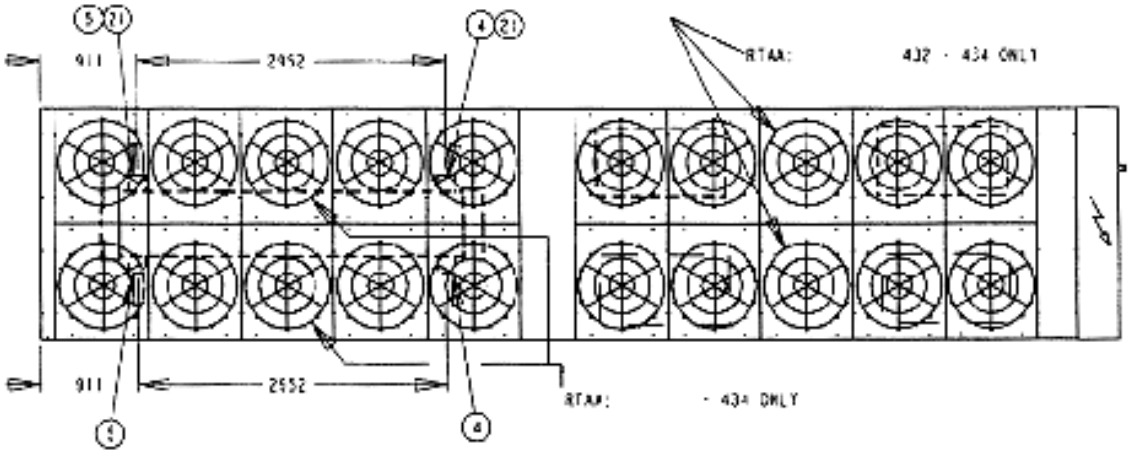
RTAA 430-432-434 50 & 60 Hz Unit Dimensions

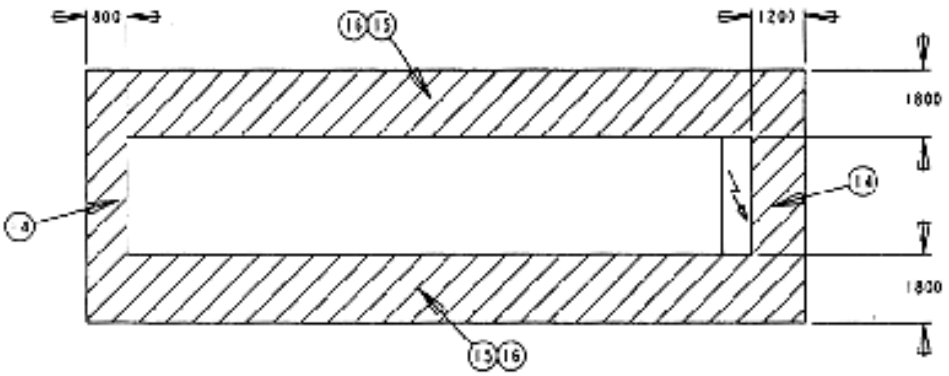




DIMENSIONS OF TUBES STUB FOR VICTAULIC CONNECTION					
A	B MINI	C ±0.8	D -0.7	E	F±0.8
168.3	5.56	15.87	164	2.15	9.52







SIZE	1	2	3		4 - 5	11	12	13
213-50 Hz	2 X CHHB070	ES 120	CAUW213	AL	FLANGED CONNECTION	3900	2 x 47	2 x 15
				CU	DN 125 PN 16	4350		
213-60 Hz	2 X CHHB070	ES 140	CAUW215	AL		4570	2 x 56	2 x 15
				CU		5110		
214-50 Hz	CHHB085	ES 140	CAUW214	AL		4640	2 x 56	2 x 17
	+CHHB070			CU		5180		
214-60 Hz	CHHB085	ES 170	CAUW216	AL		4720	2 x 56	2 x 17
	+CHHB070			CU		5260		
215-50 Hz	2 X CHHB085	ES 140	CAUW215	AL		4710	2 x 56	2 x 17
				CU		5250		
215-60 Hz	2 X CHHB085	ES 170	CAUW217	AL	FLANGED CONNECTION	4830	2 x 58	2 x 17
				CU	DN 150 PN 16	5370		
216-50 Hz	CHHB085	ES 170	CAUW216	AL		4810	2 x 58	20 + 17
	+CHHB100			CU		5350		
216-60 Hz	CHHB085	ES 200	CAUW218	AL		5130	2 x 67	20 + 17
	+CHHB100			CU		5860		
217-50 Hz	2 X CHHB100	ES 170	CAUW217	AL		4890	2 x 58	2 x 20
				CU		5430		
217-60 Hz	2 X CHHB100	ES 200	CAUW218	AL		5130	2 x 67	2 x 20
				CU		5870		
322-50/60 Hz	2 X CHHB070	ES 225	CAUW322	AL		6800	94 + 53	2 x 15
	+ 1 X CHHB085			CU		7355		1 x 17
324-50/60 Hz	2 X CHHB085	ES 225	CAUW324	AL		7285	117 + 53	2 x 17
	+ 1 X CHHB100			CU		7905		1 x 20
328-50/60 Hz	3 X CHHB100	ES 250	CAUW328	AL	VICTAULIC	7285	120 + 55	3 x 20
				CU	CONNECTION	7905		
430-50/60 Hz	4 X CHHB085	ES 300	CAUW430	AL	DIA 168.3 MM	9750	2 x 116	4 x 17
				CU		10600		
432-50/60 Hz	2 X CHHB085	ES 300	CAUW432	AL		9750	2 x 116	2 x 20
	+ 2 X CHHB100			CU		10600		2 x 17
434-50/60 Hz	4 X CHHB100	ES 340	CAUW434	AL		9750	2 x 120	4 x 20
				CU		10600		

1 Compressor
2 Evaporator
3 Condenser
4 Evaporator water inlet connection
5 Evaporator water outlet connection
6 Control panel
7 Starter panel
8 Power supply inlet : (155 x 400) on 200 serie , (230 x 750) on 300 and 400 series
9 Rigging eyes 80 x 50
10 Drain evaporator (3 / 4")
11 Operating weight (kg)
12 Refrigerant charge (kg)
13 Oil charge (liters)
14 Minimum recommended clearance (for maintenance)
15 Recommended clearance (evaporator tubes removal and air entering)

Options

17 Pressure gauges
18 Compressor sound attenuator
19 Power disconnect switch
20 Vibration isolators locations

Weights

Table 15 - Weights

Unit Size			Units	Isolators Location 1	2	3	4	5	6	7	8	9	10	Operating Weight (kg)
RTAA213	50 Hz	AL	kg	410	430	640	680	845	895	-	-	-	-	3900
	50 Hz	CU	kg	490	505	730	755	910	960	-	-	-	-	4350
	60 Hz	AL	kg	564	598	731	781	918	978	-	-	-	-	4570
	60 Hz	CU	kg	694	739	844	884	907	1042	-	-	-	-	5110
RTAA214	50 Hz	AL	kg	564	598	748	798	936	996	-	-	-	-	4640
	50 Hz	CU	kg	674	709	841	891	1005	1060	-	-	-	-	5180
	60 Hz	AL	kg	572	602	769	814	956	1007	-	-	-	-	4720
	60 Hz	CU	kg	679	710	854	900	1033	1084	-	-	-	-	5260
RTAA215	50 Hz	AL	kg	571	600	767	812	955	1005	-	-	-	-	4710
	50 Hz	CU	kg	678	708	852	898	1032	1082	-	-	-	-	5250
	60 Hz	AL	kg	591	620	789	834	973	1023	-	-	-	-	4830
	60 Hz	CU	kg	698	728	874	920	1050	1100	-	-	-	-	5370
RTAA216	50 Hz	AL	kg	594	628	784	824	965	1015	-	-	-	-	4810
	50 Hz	CU	kg	694	728	870	914	1044	1100	-	-	-	-	5350
	60 Hz	AL	kg	648	682	836	876	1018	1070	-	-	-	-	5130
	60 Hz	CU	kg	786	820	965	1005	1117	1167	-	-	-	-	5860
RTAA217	50 Hz	AL	kg	608	642	796	836	978	1030	-	-	-	-	4890
	50 Hz	CU	kg	706	740	885	925	1062	1112	-	-	-	-	5430
	60 Hz	AL	kg	641	670	840	885	1022	1072	-	-	-	-	5130
	60 Hz	CU	kg	783	813	961	1007	1128	1178	-	-	-	-	5870
RTAA322	50 Hz	AL	kg	695	615	835	735	970	860	1110	980	-	-	6800
	50 Hz	CU	kg	753	673	898	803	1043	933	1189	1063	-	-	7355
	60 Hz	AL	kg	695	615	835	735	970	860	1110	980	-	-	6800
	60 Hz	CU	kg	753	673	898	803	1043	933	1189	1063	-	-	7355
RTAA324	50 Hz	AL	kg	775	695	900	805	1020	915	1145	1025	-	-	7280
	50 Hz	CU	kg	843	760	974	878	1104	995	1255	1114	-	-	7923
	60 Hz	AL	kg	775	695	900	805	1020	915	1145	1025	-	-	7280
	60 Hz	CU	kg	843	760	974	878	1104	995	1255	1114	-	-	7923
RTAA328	50 Hz	AL	kg	775	695	900	805	1020	915	1145	1025	-	-	7280
	50 Hz	CU	kg	843	760	974	878	1104	995	1255	1114	-	-	7923
	60 Hz	AL	kg	775	695	900	805	1020	915	1145	1025	-	-	7280
	60 Hz	CU	kg	843	760	974	878	1104	995	1255	1114	-	-	7923
RTAA430	50 Hz	AL	kg	900	900	940	940	975	975	1010	1010	1050	1050	9750
	50 Hz	CU	kg	985	985	1020	1020	1060	1060	1100	1100	1135	1135	10600
	60 Hz	AL	kg	900	900	940	940	975	975	1010	1010	1050	1050	9750
	60 Hz	CU	kg	985	985	1020	1020	1060	1060	1100	1100	1135	1135	10600
RTAA432	50 Hz	AL	kg	900	900	940	940	975	975	1010	1010	1050	1050	9750
	50 Hz	CU	kg	985	985	1020	1020	1060	1060	1100	1100	1135	1135	10600
	60 Hz	AL	kg	900	900	940	940	975	975	1010	1010	1050	1050	9750
	60 Hz	CU	kg	985	985	1020	1020	1060	1060	1100	1100	1135	1135	10600
RTAA434	50 Hz	AL	kg	900	900	940	940	975	975	1010	1010	1050	1050	9750
	50 Hz	CU	kg	985	985	1020	1020	1060	1060	1100	1100	1135	1135	10600
	60 Hz	AL	kg	900	900	940	940	975	975	1010	1010	1050	1050	9750
	60 Hz	CU	kg	985	985	1020	1020	1060	1060	1100	1100	1135	1135	10600

Notes:
1. Operating weight includes refrigerant and water.
2. 200 serie have 6 isolator locations. 300 Serie have 8 isolator location, 400 Series have 10 isolator locations.

RTAA 200 SERIES

2	4	6
	Starter Panel	
1	3	5

RTAA 300 SERIES

2	4	6	8
		Starter Panel	
1	3	5	7

RTAA 400 SERIES

2	4	6	8	10
				Starter Panel
1	3	5	7	9

Options

Communication Card
Permits either bi-directional communication to the Trane Integrated Comfort system or permits remote chilled water setpoint reset or demand limiting (mutually exclusive) by accepting a 4-20 mA or 2-10 Vdc analog signal.

Remote Clear Language Display
In addition to controlling chiller operation from a location within the building, the remote clear language display can provide the capability to monitor unit alarms and messages. Only one twisted pair is required between the chiller and the remote display (requires Communication Package on 130-400 ton only).

Chilled Water Reset
This option provides the control logic and field installed sensors for either load based (return water temperature) or temperature based (ambient or zone) reset of leaving chilled water temperature (requires Communication Card).

Protection grids evaporator and compressor section
Grids to cover the service area beneath the coils.

Coil Protection
Grids which protect the condenser coils only.

Power Disconnect Switch
A fused disconnect switch with through the door handle is provided to disconnect main power.

Discharge Service Valves
Factory installed valves to isolate refrigerant charge.

Vibration Isolators
Spring or rubber isolators help isolate the chiller from the building structure.

Compressor sound attenuating enclosure

Copper fins condenser coils

Pressure gauges

Features summary

Trane RTAA Air-Cooled Rotary Chiller Designed To Perform, Built To Last

Reliability

Proven Helirotor compressor design for longer life and greater dependability.

Fewer moving parts means less parts to fail. Typical reciprocating compressors have 4 times as many total parts and 15 times as many critical parts.

Adaptive Control protects the chiller when any of the system variables approaches a limit condition that may damage the unit or cause a shutdown. The Unit Control Module takes corrective action to keep the unit running.

Dual circuit design increases overall system reliability.

Unlike reciprocating designs, this compressor can handle liquid slugging.

Suction gas cooling allows the motor to operate at lower temperatures for longer life.

Performance

Superior full load efficiency.

Excellent part load performance.

Use of an electronic expansion valve significantly improves part load performance by minimizing superheat in the evaporator and allowing the chiller to run at reduced condensing temperatures.

Unique compressor sequencing equalizes not only starts, but operating hours as well.

Trouble-free Operation and Start-up

Adaptive Control microprocessor keeps the Rotary chiller on-line when others would shut down.

Fewer nuisance trips means less expense from unnecessary service calls.

Factory installed and tested options keep start-up time and expenses minimized.

Easy interface capability with the Trane Integrated Comfort system via a single twisted pair of wires.

Optional remote display panel simplifies chiller monitoring/ control.

Mechanical specification

TRANE Series RTAA packaged air cooled liquid chiller consisting of accessible hermetic, direct-drive screw compressors, with two independant circuits evaporator, condenser, microprocessor-based controls and a unit-mounted motor starter, refrigerant charged, factory runtested and ready for operation. Unit are rated in accordance with ARI 550-90.

Compressor motor assembly
TRANE screw compressors, accessible-hermetic, direct-drive, 2950/3600 rpm (50/60 Hz). Separately housed, pressure-lubricated rolling element bearing groups at each end of both rotors. Fully modulating capacity control by use of a slide valve in the rotor section of the compressors positioned by hydraulic action.
Squirrel-cage two-pole induction motor, suction gas cooled.
Oil separator and filtration devices provided separate from the compressor.

Evaporator
Shell-and-tube heat exchanger with internally finned copper tubes, roller expanded into the tubes sheets. Refrigerant inside the tubes and water circulating in the shell. Maximum operating pressure refrigerant side 16 Bar (232 psig), water side 14 Bar (203) psig.
19 mm thermal insulation of flexible closed cell foam. Water flanged connections on 200 serie and victaulic grooved on 300 and 400 series. Heater cable for freeze protection.

Condenser
W-configuration air cooled condenser coils of seamless copper tubes, expanded into aluminium fins. Integral oil cooler and subcooler circuits. Direct drive discharge fans with totally enclosed air over motors, having class "F" insulation and IP 55 protections. Fan guards. Leak tested at 21 Bar (304 psig), pressure rated at 35 Bar (500 psig).

Two refrigerant circuits
Each circuit including removable core filter dryer, liquid line shut-off valve, high pressure relief valve. Electronic expansion valve minimizing superheat in the evaporator and allowing chiller to run at reduced condensing temperature.

Control panel
Microprocessor-based unit control module UCM utilizing the «Adaptive Control» concept. The UCM provides all control and safety functions including start-up and shut down, leaving chilled water control, compressor and electronic expansion valve modulation, fans sequencing, anti-recycle logic, automatic lead/lag compressor starting and load limiting. Unit protective functions include loss of chilled water flow, evaporator freezing, loss of refrigerant, low and high refrigerant pressure, reverse rotation, compressor starting and running overcurrent, phase loss, phase unbalance, phase reversal and loss of oil flow.
Clear language display (2 lines, 40 characters), door mounted, indicates over 20 operating data points including chilled water setpoint, current limit setpoint,, leaving chilled water temperature, evaporator and condenser refrigerant pressures and temperatures.
Over 60 messages are displayed when a problem is detected.

Starter panel
Unit mounted starter panel, protection class IP 55.
Panel contains part winding type motor starter, single source power supply, 3-phase current transformer for motor overload protection.

Unit structure
Welded steel base frame, structural steel profiles and panels, made of galvanized sheet steel, protected with a primary coating and finished with an acrylic paint. The paint can withstand 650 hours of salt spray test

Accessories and options
- Compressor sound attenuating enclosure
- Condenser copper fins
- Communication card
- Vibration isolators
- Disconnect switch
- Reversed water connections
- Remote clear language display.
- Pressure gauges
- Flow switch
- Communication card + load based chilled water reset
- Communication card
- Plexiglass door (starter and control panel)
- Under , over voltage protection
- Condenser protection grids
- Compressor, evaporator grids
- Discharge service valve

Factory testing
All RTAA chilers are fully run tested under load before shipment. Unit operation and all control functions are factory checked and set.

Shipment
Units ship fully assembled and single point wired ready for operation after field connection of power supply, electric interlocks and chilled water piping. Units ship on a wooden skid with refrigerant and oil operating charges.

Quality assurance
The Quality Management System applied by TRANE has been subject to independant third party assesment and approval to ISO 9001: 1994, EN ISO 9001 : 1994, BS EN ISO 9001 :1994. The products described in this catalogue are designed, manufactured and tested in accordance with the approved system requirements as defined in the TRANE Quality Manual.

Notes

Notes

Trane reserves the right to alter any information without prior notice.

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