SPECIFICATION CATALOG

WC Series Variable Speed Dual Screw Chiller
175 to 275 Ton

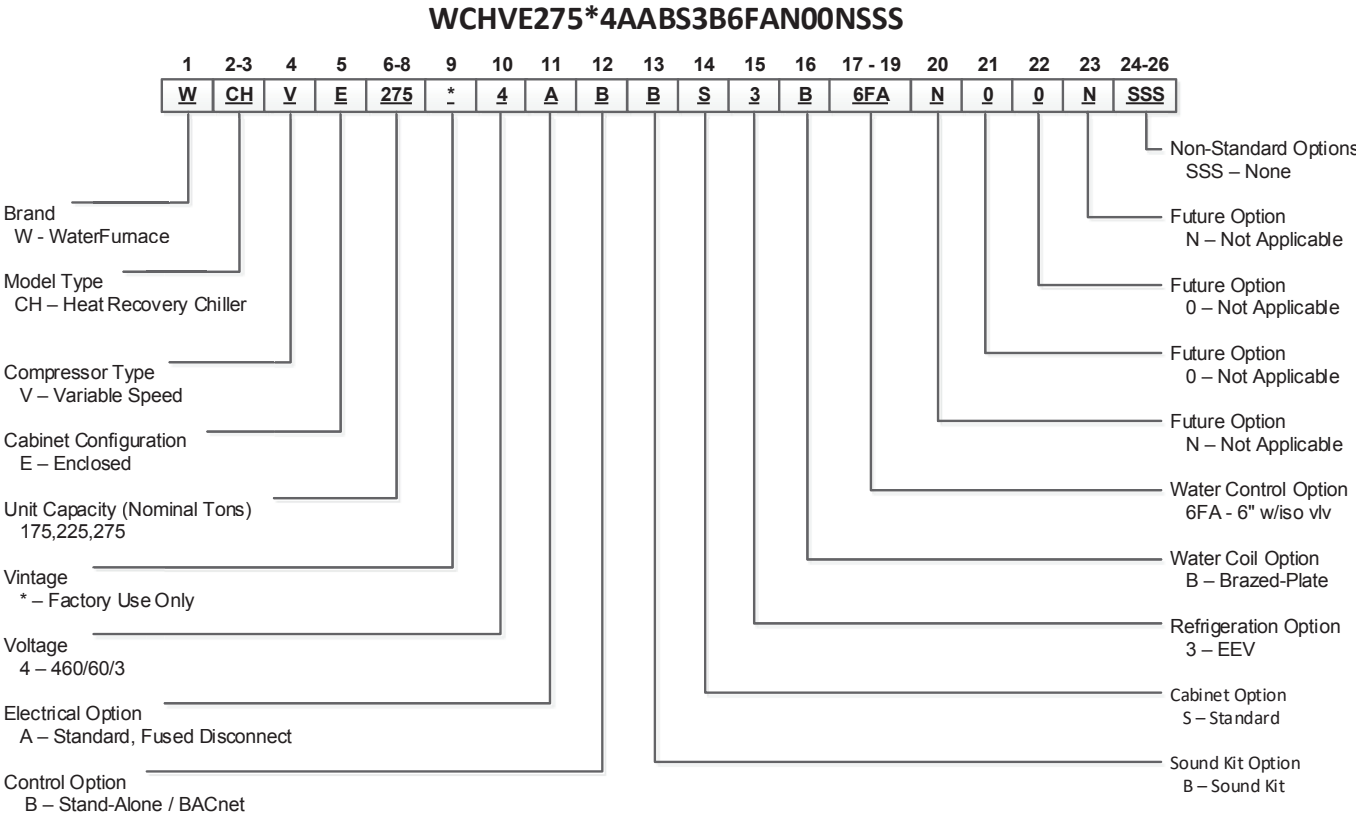
Water Cooled Screw Chiller - 60 Hz

WaterFurnace®

Commercial Solutions

Table of Contents

Model Nomenclature



Electrical Availability

Voltage	Dual Variable Speed		
208-230/60/3			
460/60/3	•	•	•
575/60/3			

7/21/19

• - "CH" only models

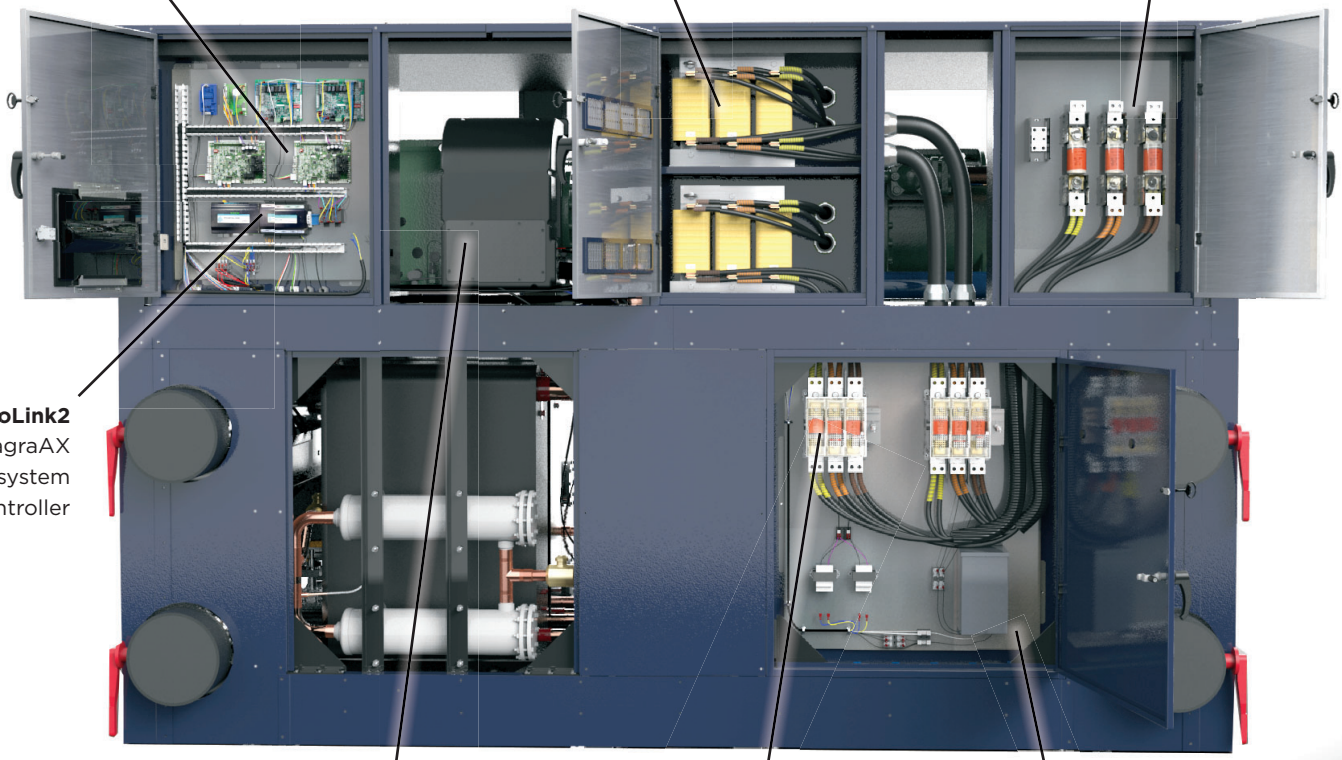
All WC Series Screw Chillers product is Safety listed under UL1995 thru ETL.

The WC Series Variable Speed Screw Chiller Features

HydroLink2 Aurora controls platform is a field proven communicating compressor management control

Low impedance line reactors reduce harmonic noise and improve power factor

Fused power supply for high short circuit current rating



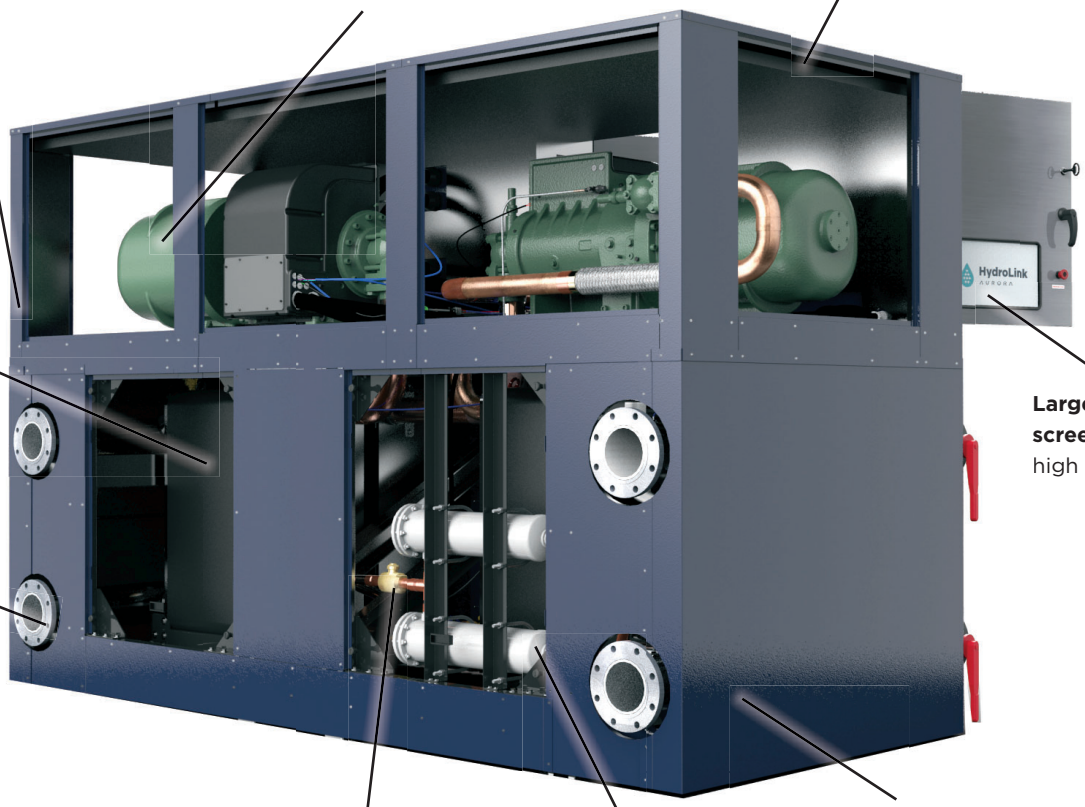
HydroLink2 is a NiagraAX based system controller

Variable speed drive integrated with compressor provides envelope control for improved reliability

Fused disconnects for each compressor

Factory installed flow switches and modulating isolation valves

The WC Series Variable Speed Screw Chiller Features cont.



Structural Steel frame to reduce vibration

High efficiency compact R134a screw compressors for efficiency, reliability and capacity control

Acoustical sound enclosure around entire cabinet for maximum sound reduction

High efficiency brazed plate heat exchangers for efficiency and compact size

Large touch screen tablet with high quality HMI

Flange style water connections for an easier and faster connection

Electronic expansion valves for enhanced efficiency and control

Serviceable core filter driers

Water headers for integrated parallel flow

Inside the WC Series Variable Speed Screw Chiller

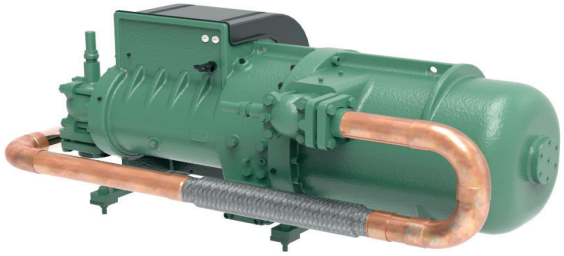
WaterFurnace proudly announces large tonnage water-cooled chiller equipment with sophisticated variable speed, permanent magnet motor, R-134a screw compressors that deliver premium efficiency with infinite capacity output. The WC Series Variable Speed Dual Screw Chiller comes with two high efficiency, variable speed screw compressors that operate on independent refrigerant circuits with oversized heat exchangers to provide low approach temperatures that result in high efficiency. Low approach temperatures are possible with electronic expansion valves that provide optimal superheat. Coupling an efficient refrigerant circuit with the HydroLink2 Aurora controls offers best-in class efficiency with advanced communicating controls that are loaded with great features. Each compressor circuit is equipped with sensors to monitor refrigerant pressure, temperature, and host of other parameters whether on the variable speed drive or monitoring superheat and subcooling. All information is easily seen through a high definition touch screen tablet with high quality HMI for diagnostics. One of the best features of this system is the operating envelope that will self-protect to prevent the compressor from running under unreliable conditions.

WC Series Chiller Highlights

- Capacities ranging from 175-275 ton output
- Commercial voltage selection of 460V/60Hz/3ph
- Brazed plate heat exchangers offer high efficiency with industry low waterside pressure drop
- Compressor suction/discharge tubes come equipped with pressure and temperature sensing to improve compressor life
- Heavy gauge steel frame supports compressors on upper deck and heat changers on lower deck.
- Fork pockets in the frame enable maneuverability for installation and shipment
- Large touchscreen display aids in serviceability and installation
- 6” flanged water connections standard
- 2-way isolation valves standard on water line connections with modulating actuators.
- 65 kA short circuit current rating
- Factory mounted, internally wired, fused disconnect
- Communicating controls with BACnet or non-communicating

Compressors

WC Series chillers use high efficiency R-134a, semi-hermetic, variable speed, compact screw compressors that are mounted on mounting pads for vibration isolation.



Water-to-Refrigerant Heat Exchanger

Stainless steel copper-brazed plate water-to-refrigerant heat exchangers provide unparalleled efficiency. All heat exchangers are pressure rated to 360 psi waterside and 450 psi refrigerant side. All heat exchangers, water lines, and suction lines are insulated to prevent condensation during low temperature inlet water operation.

Electronic Expansion Valve

Electronic expansion valves are a standard feature offered in to provide tighter superheat control along with a wider range of operation. Superheat values are reported back to the system controller which allows more diagnostic information to the technician without requiring the use of refrigerant manifold gauges.

2-Way Isolation Valves

All chillers are equipped with low pressure drop (high Cv) valves that can modulate or be used as on/off to isolate flow at each heat exchanger.

Strainers

All chillers shall have a field-installed strainer either Y-type or basket type. Strainers should be made of a suitable body such as brass with 316 stainless steel screens with a recommended minimum of 30 mesh.

Flow Switch

Stainless steel, multi-segment paddle type flow switches come standard on every unit to protect the compressor from running when low flows are encountered.

Inside the WC Series Variable Speed Screw Chiller cont.

Cabinet

Cabinet constructed of heavy gauge steel with stainless steel access panels on all control boxes. All chiller frames are constructed of heavy gauge steel and painted with corrosion resistant, polyester, power coat paint. The frame includes an area for lift truck forks to assist in maneuverability of the product during installation. All chillers come with compressor enclosure that provides additional sound attenuation, protection of the refrigeration systems, and makes the product more aesthetically pleasing.

Low Voltage Control Panel

Chiller control panel features a heavy-duty, hinged, stainless steel service door with a convenient user interface display for ease of service and installation. The keyed door features factory mounted touch screen high definition tablet and an emergency stop button that will enable the safe torque option (STO) on the compressor drive. The low voltage panel features the HydroLink2 Aurora controls system which comprises of Aurora compressor protection boards along with the HydroLink2 control for staging and chiller PID.

High Voltage Control Panel

The high voltage panel consists of fused disconnects for each compressor circuit. There is also 120 V transformer to power the low voltage panel and compressor drives. The control panel was designed with the technician in mind to provide convenient, clear wiring with plenty of working space.

NOTE: High and low voltage panels are set up independently for increased serviceability and safety.

Line Reactor Panel

The line reactor panel houses a large line reactor for each compressor drive which are then cooled by a fan. This panel should not be opened unless an experienced technician has reasonable cause to work with in this space. Please note the vent holes on the door should not be obstructed so that airflow can easily move over the reactors.

Fuse Panel

The fuse panel contains the fused power block. Power block has been isolated for service safety and has plenty of room to easily run incoming power.

Electrical Disconnect

A factory mounted, internally wired, disconnect is available to provide electrical isolation from high voltage supply at the chiller. Separate circuit protection must be field installed in the power wiring and must comply with National Electric Code (NEC) and/or local codes. Disconnect features include:

- Non-fused, rotary disconnect with “on/off” position
- Door interlocked, external pistol handle keeps door closed when disconnect is “on”
- “Lockout/Tagout” feature to keep the unit “off” during service
- Complies with NEC Article 440-14

Short Circuit Current Rating

An optional factory mounted, fused disconnect provides the same benefits as the non-fused version yet increases the short circuit current rating, SCCR to comply with buildings with a high available fault current. Adding the fused disconnect option ensures the equipment will comply with NEC Article 409. Separate circuit protection must be field installed in the power wiring and must comply with National Electric Code (NEC) and/or local codes. Disconnect features include:

- Increases SCCR to 100 kA
- Door interlocked, external pistol handle keeps door closed when disconnect is “on”
- “Lockout/Tagout” feature to keep the unit “off” during service
- Complies with NEC Article 440-14
- Complies with NEC Article 409 for Short Circuit Current Rating

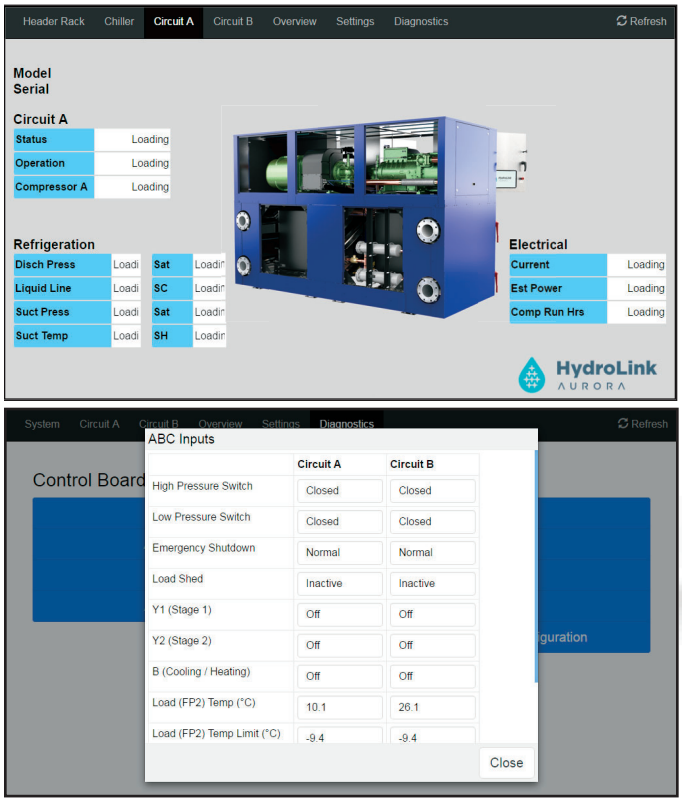
Optional Accessory - HydroLink2 Supervisory Control

The HydroLink2 Supervisory Control, a Niagara AX based control, is designed to consolidate all chiller mechanical room chillers and hydronic components into one supervisory control. By consolidating all components into one control complete plant room management can be obtained to ensure proper operation and easier servicing with a turn-key solution. It features a Niagara AX based control with its own I/O and a 10" color touchscreen tablet as a user interface. Turn-key custom programming of the Supervisory Control will be provided based upon your specific requirements for the whole chiller mechanical room to manage not only the chillers but also the pumps and other hydronics specialties. The many benefits of the HydroLink2 Supervisory control are:

- Control is based upon the powerful and flexible Niagara AX software platform.
- Customized supervisory control programming to meet your specific site specifications.
- Allows the engineer to specify graphics required for ease in monitoring and troubleshooting.
- Improves the integration of mechanical room components, such as variable speed pumps and other hydronic specialties into the site BAS.
- Guaranteed compatibility of the Supervisory Controller with the Unit Controllers.
- The sophistication of the Niagara based control allows better equipment servicing and support.
- Customer benefits from our experience in providing custom Supervisory Controllers.
- Enables tight integration to peripheral devices such as pump and valve controllers for reliable sequencing.
- Improved system visibility from the BAS.

The HydroLink2 Supervisory Control is the perfect match to manage your complete chiller mechanical room.

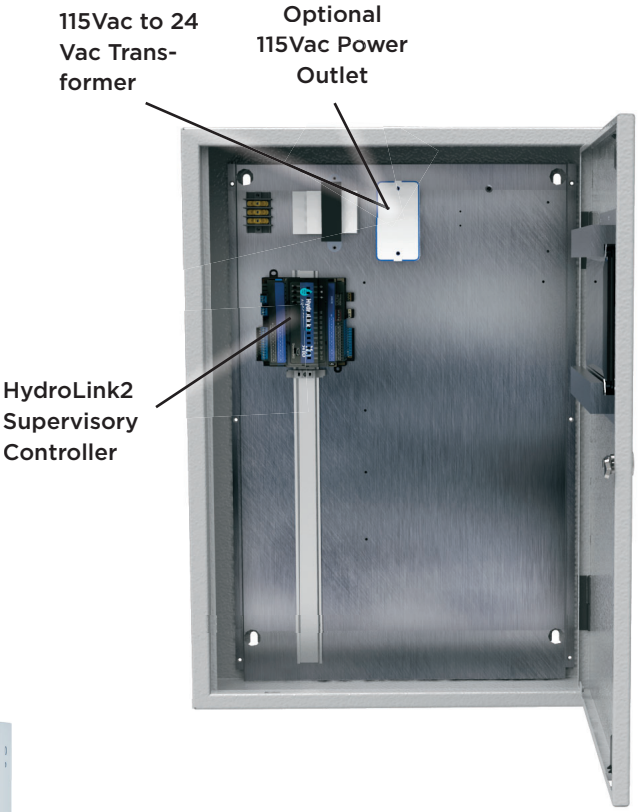
Machine Interface - 10" ColorTouch Tablet



HydroLink2 Supervisory Control

Optional Accessory - HydroLink2 Supervisory Control cont.

- HydroLink2 Control uses the powerful NIAGARA software platform.
- Internal power supply and a 120Vac convenience outlet are built into the cabinet.
- Over 2 sq. ft. [0.19 m^2] of control mounting area for custom controls such as relays or transducers.
- Provides for a customized programmed chiller plant controller.
- Internal mounted and wired 10" Touch Screen tablet for interfacing with Supervisory Controller.



HydroLink Supervisory Control

(Niagara or BACnet)

Water Quality

1.0. Minimum Fluid Volume

A. Water cooled chillers require a minimum amount of source and load side fluid volume to ensure accurate and stable temperatures during system operation. For normal air conditioning type applications, it is recommended to use at least 7 gallons/ton.
B. Applications that require more precise temperature control or low loading will occur the minimum fluid volume shall be no less than 10 gallons/ton. Installation of a buffer tank that will properly mix the fluid is recommended.

1.1. Water Cooled Chiller Sizing

A. Chillers should be adequately sized for optimal system efficiency and run time. Oversizing by more than 15% can diminish performance resulting in higher power consumption, short cycling of compressors, and unstable conditioning temperatures.
B. In applications where the minimum load is significantly less than the design condition, it is better to install 2 smaller Chillers for load matching rather than a single large Chiller.

1.2. Chiller Piping

A. Multiple Chillers can be installed in series or parallel configurations. The preferred system design is to pipe the equipment in parallel due to its simplicity and flexibility. In parallel systems, the Chiller equipment can vary in size as long as flow rate and system volume are accounted for.
B. Piping equipment in series is not desired; however, it can be done if proper guidelines are followed. Always observe proper temperature and flow rate requirements for each unit. Sometimes this method is desired to achieve larger temperature differences.

1.3. Strainers

A. All brazed-plate heat exchangers shall have a strainer within 8 ft of the water/brine inlet. It is highly recommended to use 30 mesh in order to provide maximum filtration. In any case, the strainers should never have a mesh size larger than 60 or less than 20.
B. Failure to install proper stainers and perform regular service can result in serious damage to the unit, and cause degraded performance, reduced operating life and failed compressors. Improper installation of the unit (which includes not having proper strainers to protect the heat exchangers) can also result in voiding the warranty.
C. Strainers should be selected on the basis of acceptable pressure drop, and not on pipe diameter. The strainers selected should have a pressure drop at the nominal flow rate of the units; low enough to be within the pumping capacity of the pump being used.

1.4. Flow Sensing Devices

A. A flow switch or equivalent must be installed on the evaporator for each unit to be installed. If the unit is to operate as both modes (heating/cooling), a flow switch is needed on both heat exchangers.
B. A differential pressure switch can be used in place of a flow switch. The differential switch must be capable of pressure range as indicated in the pressure drop tables.

1.5. Water Quality

A. **General:** Reversible chiller systems may be successfully applied in a wide range of commercial and industrial applications. It is the responsibility of the system designer and installing contractor to ensure that acceptable water quality is present and that all applicable codes have been met in these installations.

B. **Water Treatment:** Do not use untreated or improperly treated water. Equipment damage may occur. The use of improperly treated or untreated water in this equipment may result in scaling, erosion, corrosion, algae or slime. The services of a qualified water treatment specialist should be engaged to determine what treatment, if any, is required. The product warranty specifically excludes liability for corrosion, erosion or deterioration of equipment.

   The heat exchangers in the units are 316 stainless steel plates with copper brazing. The water piping in the heat exchanger is steel. There may be other materials in the building's piping system that the designer may need to take into consideration when deciding the parameters of the water quality.

   If an antifreeze or water treatment solution is to be used, the designer should confirm it does not have a detrimental effect on the materials in the system.

C. **Contaminated Water:** In applications where the water quality cannot be held to prescribed limits, the use of a secondary or intermediate heat exchanger is recommended to separate the unit from the contaminated water.

   The following table outlines the water quality guidelines for unit heat exchangers. If these conditions are exceeded, a secondary heat exchanger is required. Failure to supply a secondary heat exchanger where needed will result in a warranty exclusion for primary heat exchanger corrosion or failure.

WARNING: Must have intermediate heat exchanger when used in pool applications.

Water Quality Cont.

1.6. Insulation

A. Chillers are built with factory installed insulation on any surface that may be subject to temperatures below the room dew point.

Surface Condensation Chart

Room Ambient Condition	Surface Temperature		
	50°F	35°F	0°F
Normal (Max 85°F, 70% RH)	1/2"	3/4"	1"
Mild (Max 80°F, 50% RH)	1/8"	1/4"	1/2"
Severe (Max 90°F, 80% RH)	3/4"	1"	2"

1.7. Brine Applications

A. Applications where the leaving fluid temperature goes below 40°F a suitable brine solution must be used. Failure to do so can cause immediate damage to the system. The brine must be approved for use with heat exchangers. Automotive antifreeze solutions are not suitable for use in brazed plate heat exchangers.

B. The freeze detection must be adjusted appropriately for brine applications. The brine solution concentration should be at least 15°F below the lowest leaving fluid temperature.

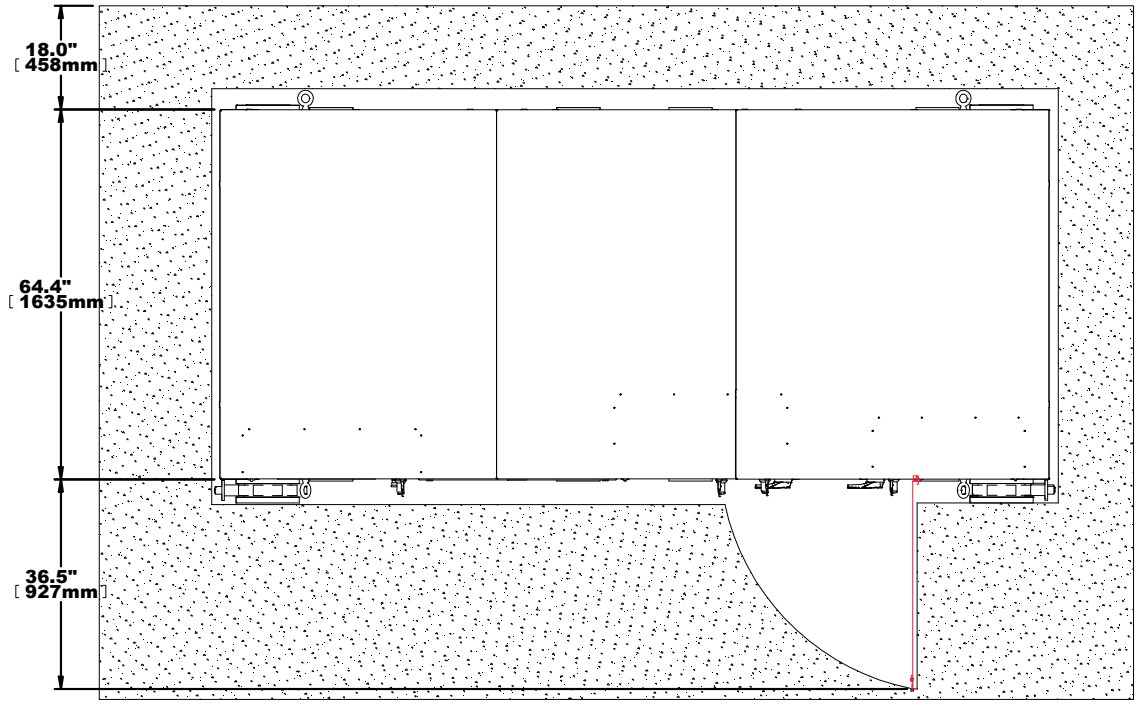
Water Quality Guidelines

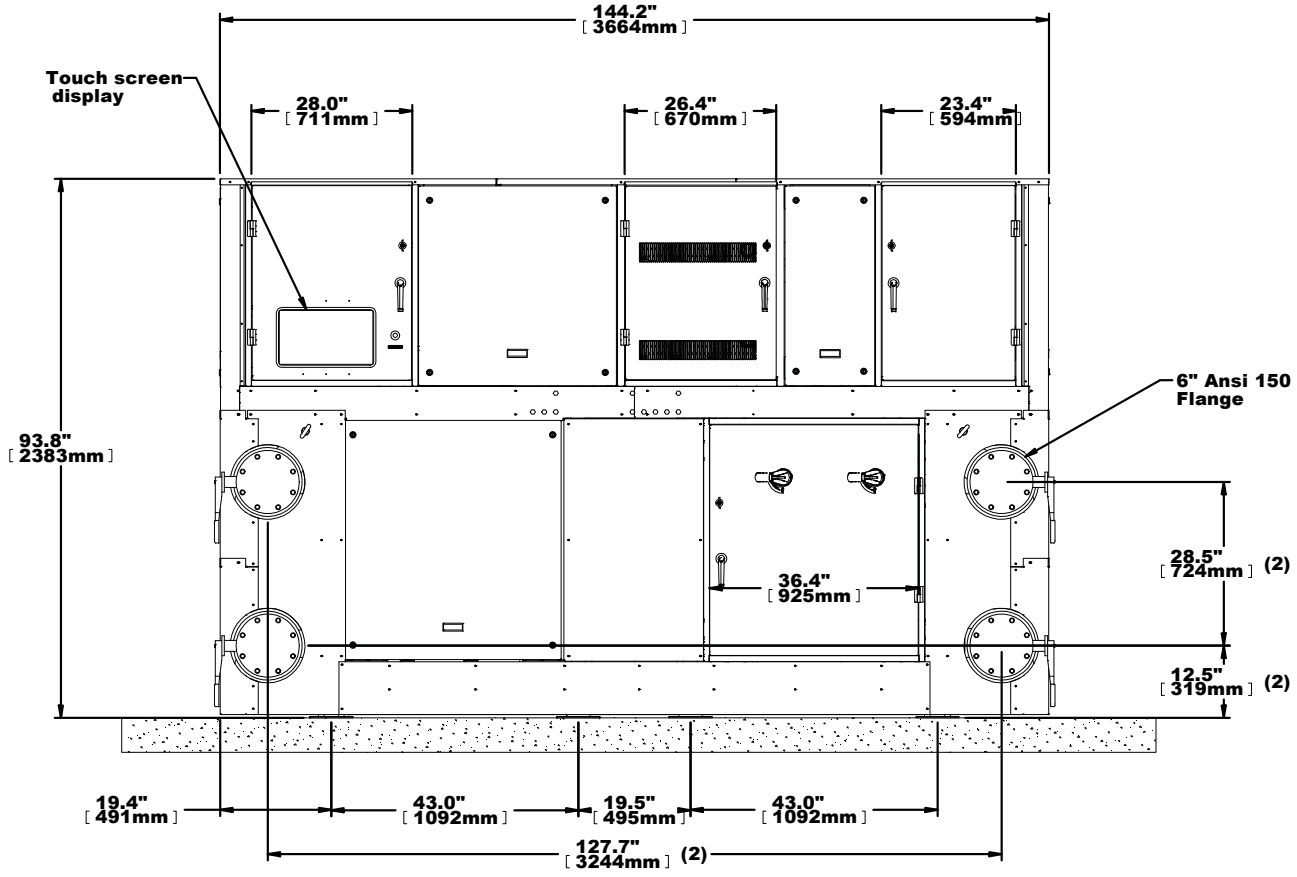
Material		Copper	90/10 Cupronickel	316 Stainless Steel
pH	Acidity/Alkalinity	7 - 9	7 - 9	7 - 9
Scaling	Calcium and Magnesium Carbonate	(Total Hardness) less than 350 ppm	(Total Hardness) less than 350 ppm	(Total Hardness) less than 350 ppm
Corrosion	Hydrogen Sulfide	Less than 0.5 ppm (rotten egg smell appears at 0.5 ppm)	10 - 50 ppm	Less than 1 ppm
	Sulfates	Less than 125 ppm	Less than 125 ppm	Less than 200 ppm
	Chlorine	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Chlorides	Less than 20 ppm	Less than 125 ppm	Less than 300 ppm
	Carbon Dioxide	Less than 50 ppm	10 - 50 ppm	10 - 50 ppm
	Ammonia	Less than 2 ppm	Less than 2 ppm	Less than 20 ppm
	Ammonia Chloride	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Nitrate	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Hydroxide	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Sulfate	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Total Dissolved Solids (TDS)	Less than 1000 ppm	1000 - 1500 ppm	1000 - 1500 ppm
	LSI Index	+0.5 to -0.5	+0.5 to -0.5	+0.5 to -0.5
Iron Fouling (Biological Growth)	Iron, FE^{2}+ (Ferrous) Bacterial Iron Potential	< 0.2 ppm	< 0.2 ppm	< 0.2 ppm
	Iron Oxide	Less than 1 ppm, above this level deposition will occur	Less than 1 ppm, above this level deposition will occur	Less than 1 ppm, above this level deposition will occur
Erosion	Suspended Solids	Less than 10 ppm and filtered for max. of 600 micron size	Less than 10 ppm and filtered for max. of 600 micron size	Less than 10 ppm and filtered for max. of 600 micron size
	Threshold Velocity (Fresh Water)	< 6 ft/sec	< 6 ft/sec	< 6 ft/sec

NOTES: Grains = ppm divided by 17
mg/L is equivalent to ppm

2/22/12

Dimensional Data





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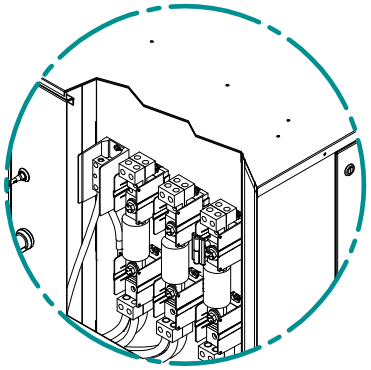
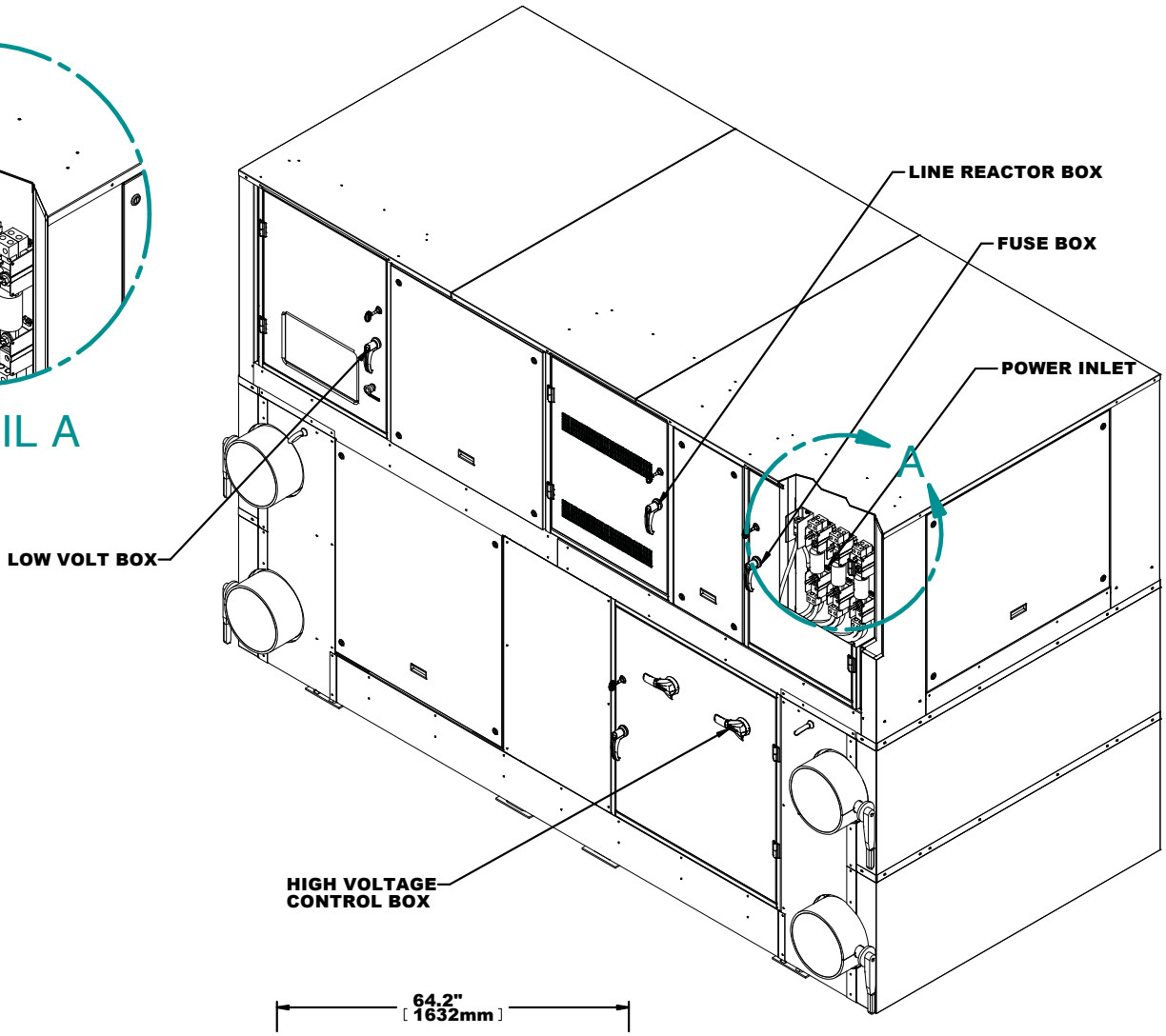
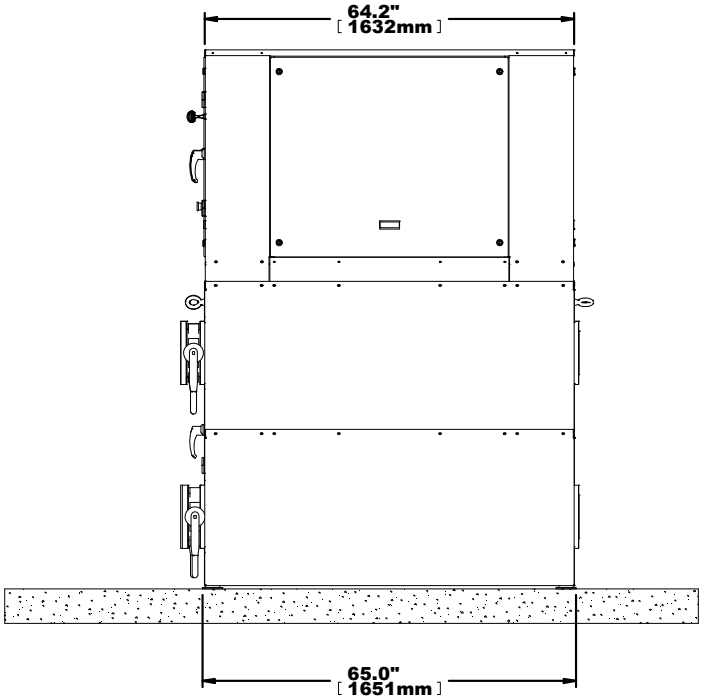


DETAIL A





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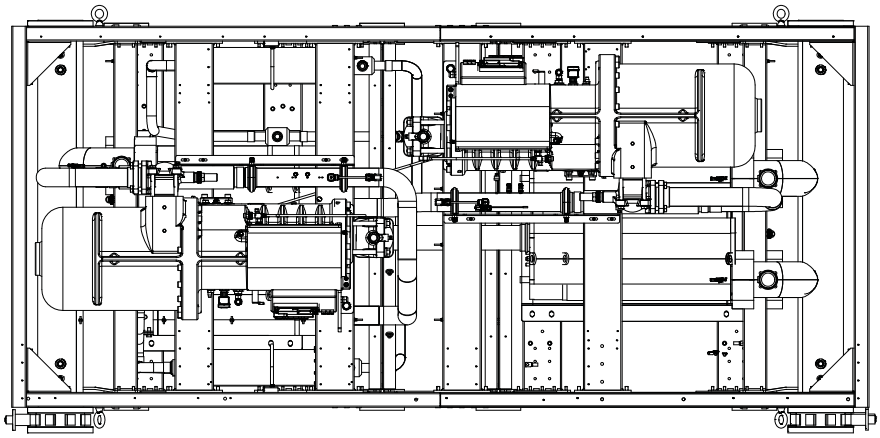

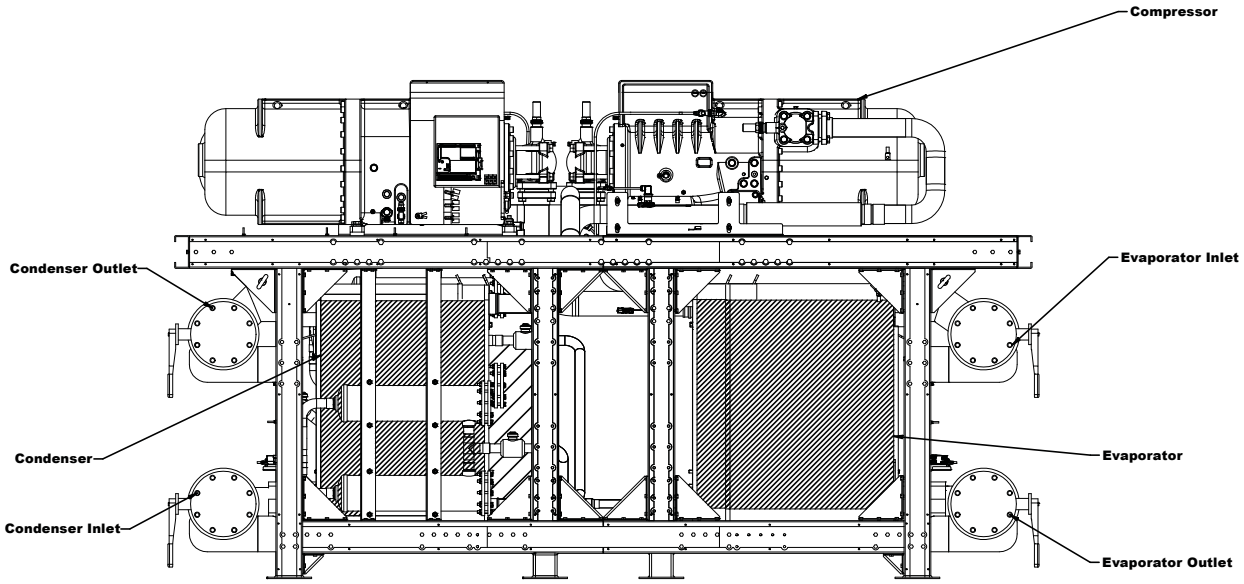

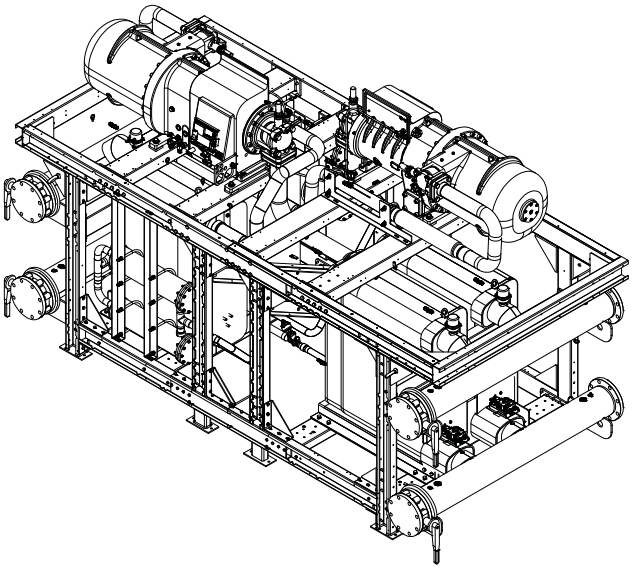

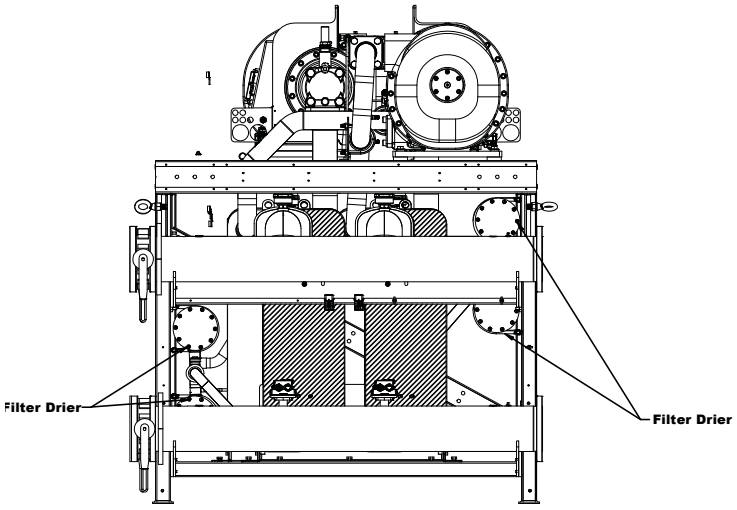

Physical Data

Model	Dual Variable Speed Screw		
	175	225	275
Refrigerant	R-134a		
Number of Circuits	2	2	2
Factory Charge, lbs [kg] (per circuit)	134.5 [61]	173 [78.5]	211.5 [96]
Compressor	Variable Speed Screw		
Compressor Quantity [tons]	2 [87]	2 [112]	2 [137]
Compressor Weight, lbs [kg] (each)	1621 [735]	1632 [740]	1648 [747]
Oil Charge, fl oz [L]	634 [18.75]	634 [18.75]	634 [18.75]
Evaporator	Brazed Plate		
Quantity	2	2	2
Weight, lbs [kg]	562 [255]	703 [319]	844 [382]
Water Volume, gal [L]	51.1 [193.3]	60.2 [227.8]	69.2 [261.8]
Circuit Configuration	Stainless Steel Single Circuit		
Condenser	Brazed Plate		
Quantity	2	2	2
Weight, lbs [kg]	423 [192]	529 [240]	635 [288]
Water Volume, gal [L]	44.9 [170.0]	52.6 [198.9]	60.2 [227.8]
Circuit Configuration	Stainless Steel Single Circuit		
Chiller			
Shipping Weight, lbs [kg]	11,959 [5245]	12,474 [5658]	13,000 [5897]

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Electrical Data

Model	Rated Voltage	Voltage Min/Max	Compressor[1]			Total Unit FLA	Min Circ Amp	Min Fuse/ HACR	Max Fuse/ HACR
			MOA	RLA	LRA[2]				
175	460/60/3	414/506	190.0	156.0	20.0	312.0	351.0	400	500
225	460/60/3	414/506	225.0	185.0	20.0	370.0	416.0	450	600
275	460/60/3	414/506	290.0	240.0	20.0	480.0	540.0	600	800

HACR circuit breaker in USA only 7/22/19
1 - MCC, RLA, & LRA rating per compressor. Breaker & FLA sized for both compressors.
2 - LRA is compressor motor starting current

Operating Limits

	Condenser		Evaporator	
Fluid Limit	˚F	˚C	˚F	˚C
Min Entering Water	40	4.4	45	7.2
Min Entering Brine	50	10.0	30	-1.1
Min Leaving Brine	70	21.1	25	-3.9
Min Leaving Water	70	21.1	40	4.4
Max Entering Water/Brine	133	56.1	80	26.7
Max Leaving Water/Brine	140	60.0	70	21.1
Min Differential Temperature	7	3.9	5	2.8
Max Differential Temperature	30	16.7	20	11.1
Flow Rate Limit	gpm/ton	L/min-kW	gpm/ton	L/s-kW
Minimum flow rate	1	3.8	1	3.8
Maximum flow rate	4.5	17.0	4.5	17.0
Ambient Temperature	**˚F**		**˚C**	
Minimum Ambient	55		12.8	
Maximum Ambient	95		35.0	

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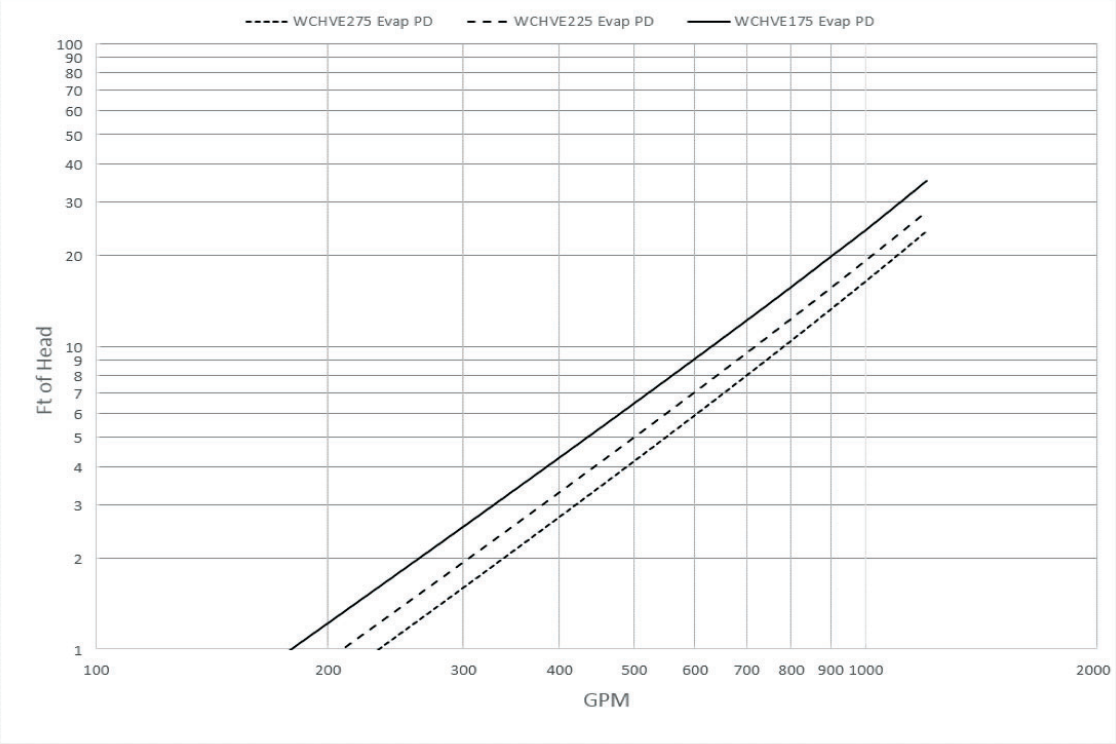
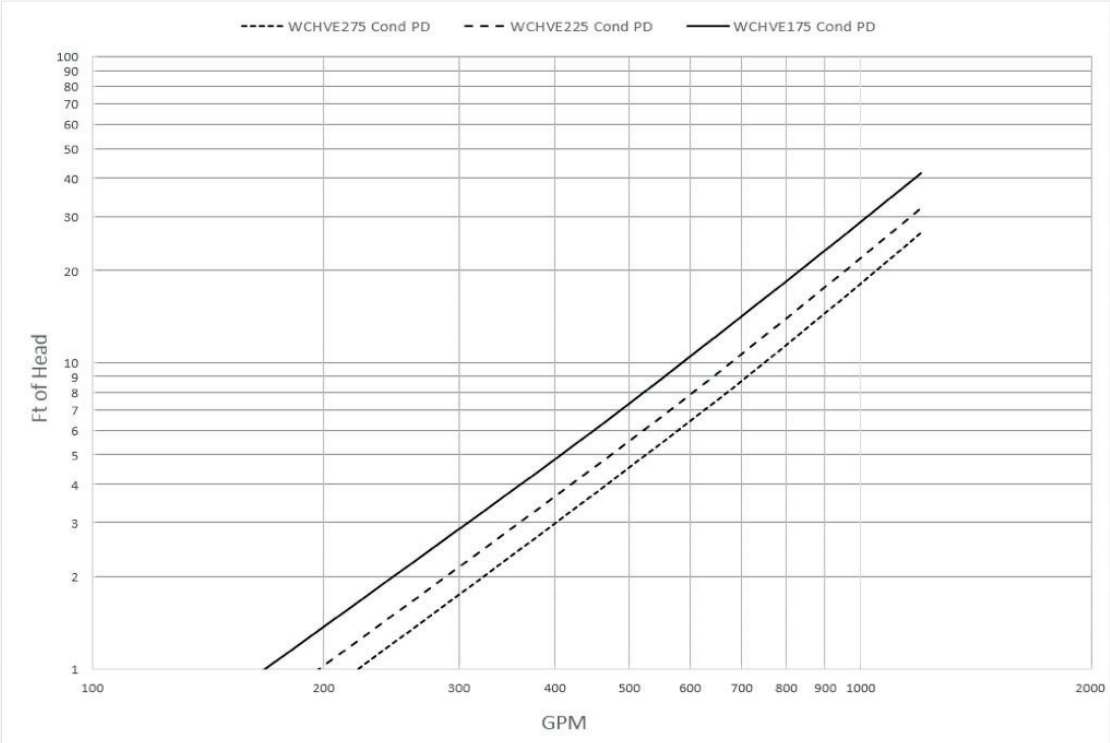
Evaporator Pressure Drop



Condenser Pressure Drop



Wiring Schematics

DUAL SCREW WCHVE 275/225/175

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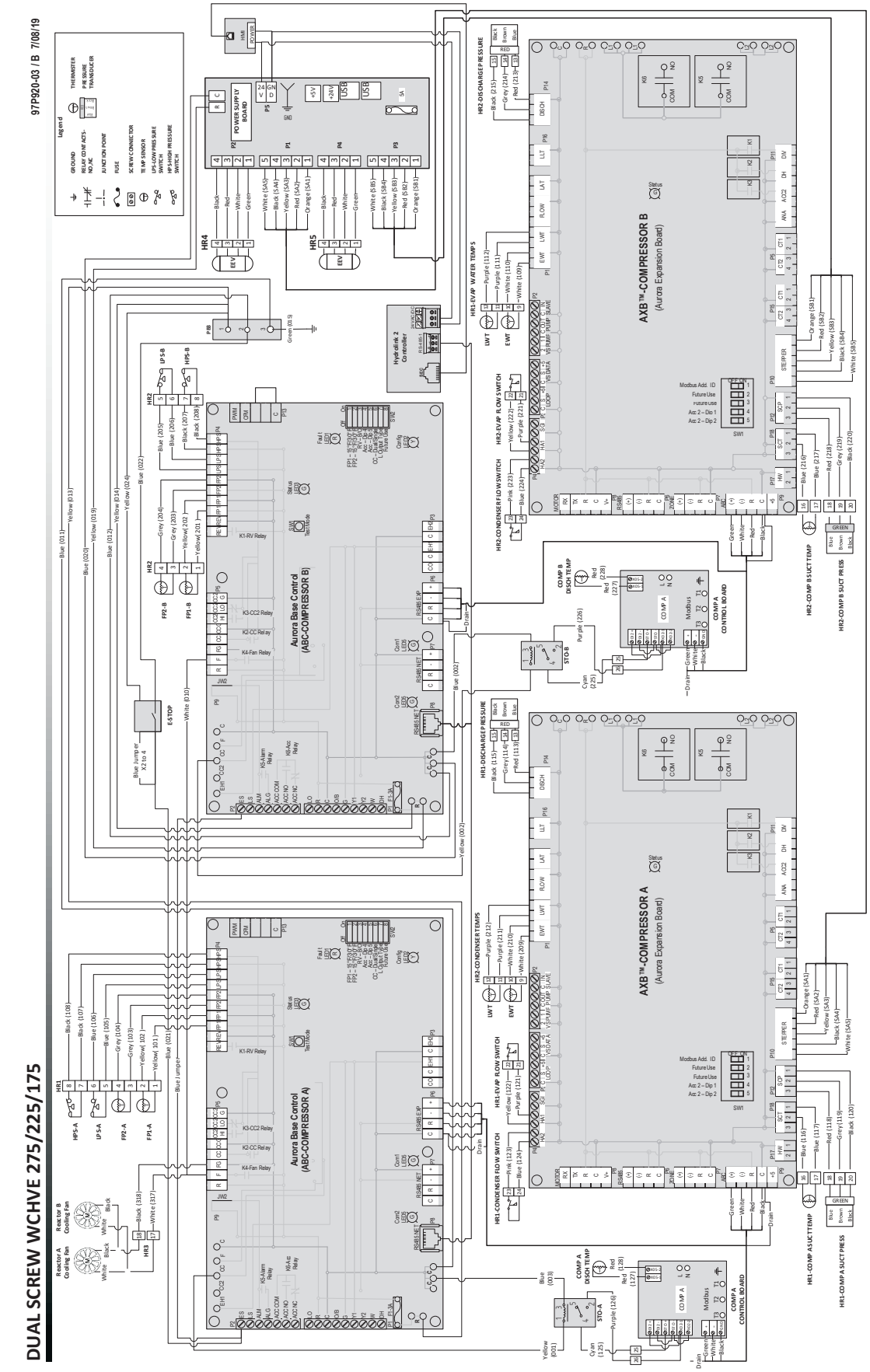

Wiring Schematics cont.

DUAL SCREW WCHVE 275/225/175

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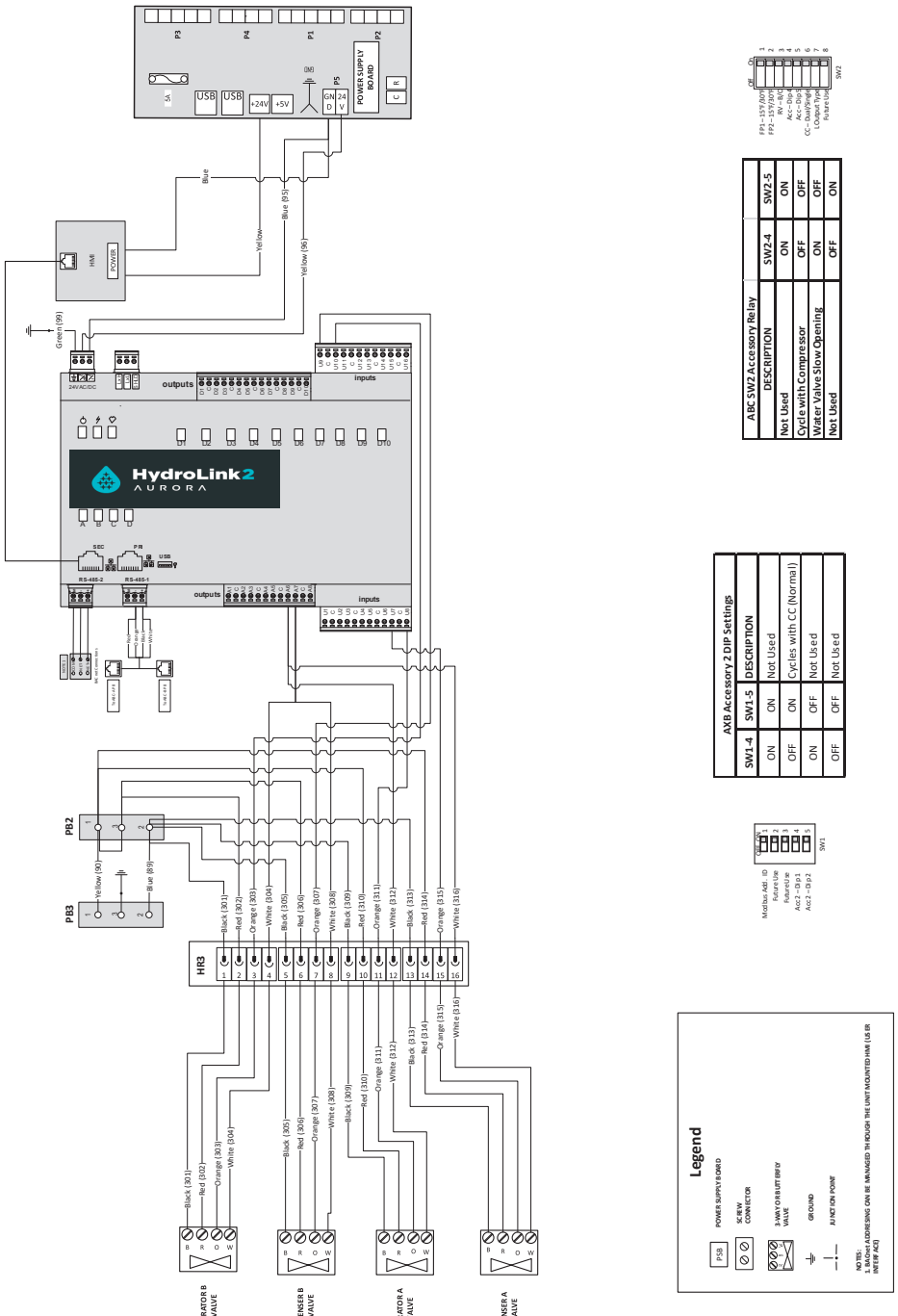

AXB Accessory 2 DIP Settings		
SW1-4	SW1-5	DESCRIPTION
ON	ON	Not Used
OFF	ON	Cycles with CC (Normal)
ON	OFF	Not Used
OFF	OFF	Not Used

ABC SW2 Accessory Relay		
DESCRIPTION	SW2-4	SW2-5
Not Used	ON	ON
Cycle with Compressor	OFF	OFF
Water Valve Slow Opening	ON	OFF
Not Used	OFF	ON

Wiring Schematics cont.

DUAL SCREW WCHVE 275/225/175

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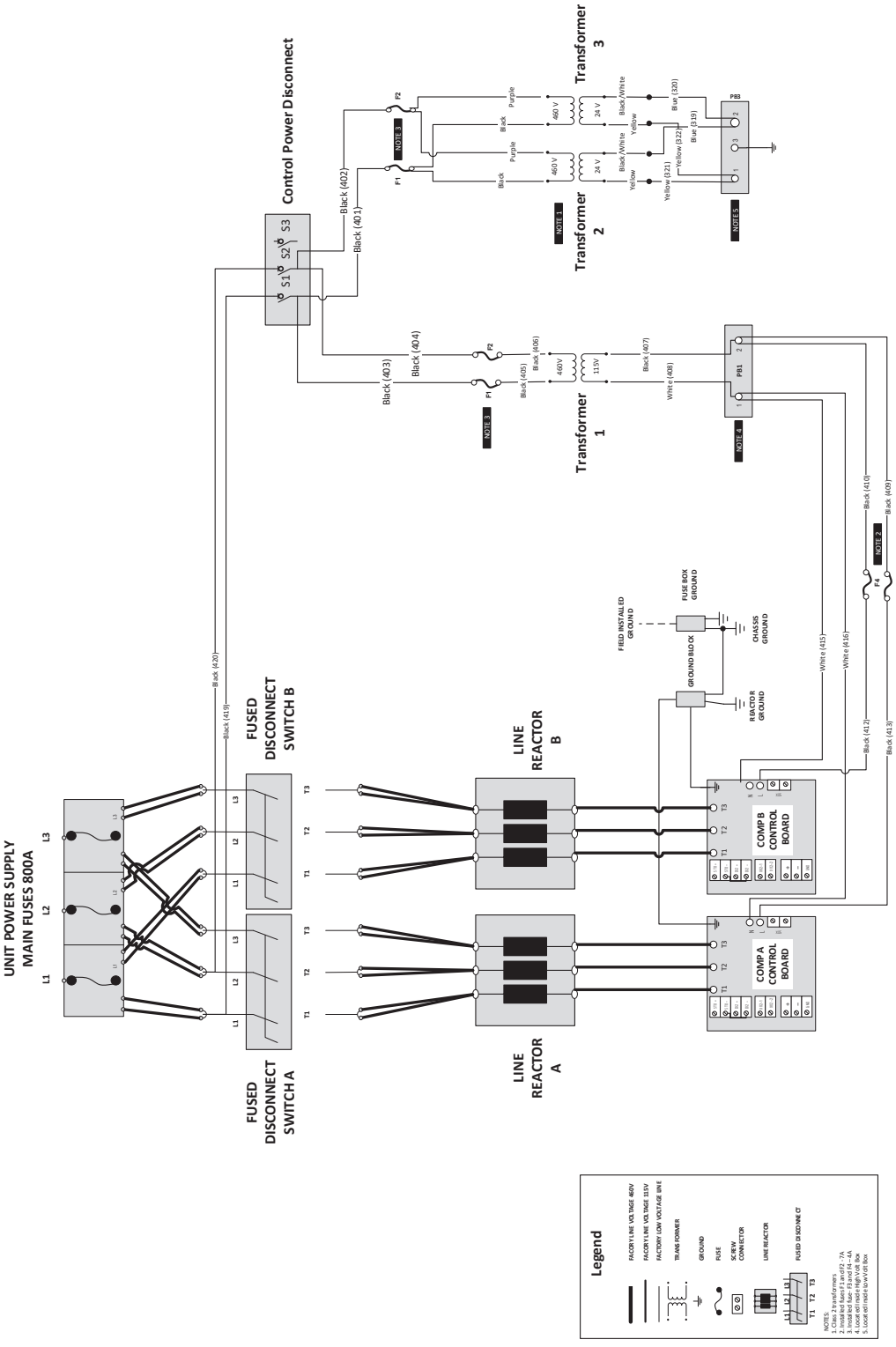

Engineering Guide Specifications

PART 1 - GENERAL
SUMMARY
Section Includes:
Packaged, water cooled variable speed screw compressor with individual compressor refrigeration circuits.

PERFORMANCE REQUIREMENTS
Fluid Temperature Performance:
Minimum Operating source-Fluid Temperature in Summer Operation: Chiller shall be capable of continuous operation over the entire capacity range indicated in the operating limits table.

Maximum Operating Load Side Fluid Temperature in Winter Operation: Chiller shall be capable of continuous operation over the entire capacity range indicated in the operating limits table.

Make factory modifications to standard chiller design if necessary to comply with performance indicated.

SUBMITTALS
Submit manufacturer's specifications for chillers showing dimensions, weights, capacities, performance ratings, electrical characteristics, gauges and finishes of materials and installation instructions. This information should also include:
- Wiring diagrams
- Control diagrams and specifications
- Warranty information.

QUALITY ASSURANCE
ASHRAE Compliance:
- ASHRAE 15 for safety code for mechanical refrigeration.
- ASHRAE 147 for refrigerant leaks, recovery, and handling and storage requirements.
- ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1
- Comply with NFPA 70.
- Comply with requirements of UL and UL Canada and include label by a qualified testing agency showing compliance.
- Comply with ETL requirements and have proper certification

WARRANTY
Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of chillers that fails in materials or workmanship within specified warranty period.

Extended warranties include, but are not limited to, the following:
- Complete Chiller including refrigerant and oil charge.
- Complete compressor and drive assembly.
- Parts only.

Warranty Period: 1 year from date of Substantial Completion.

PART 2 - PRODUCTS

PACKAGED WATER COOLED CHILLERS
Manufacturers: Subject to compliance with requirements, provide products by WaterFurnace.

Description: Factory-assembled with compressor, compressor motor, compressor motor controller, evaporator, condenser, controls, driers (on each circuit), receivers, interconnecting unit piping and wiring, indicated accessories, replaceable core driers, and electronic expansion valve.

Fabricate chiller mounting base with reinforcement strong enough to resist chiller movement during a seismic event when Chiller is anchored to field support structure.

Compressor:
1. Description: (1-2) Semi-hermetic screw compressors utilizing R-134a refrigerant.
2. Casing: Cast iron, precision machined for minimum clearance about periphery of rotors.
3. Capacity Control: Infinite speed 25-100% per compressor.
4. Oil Management: Built in oil management and three stage oil separation system.
5. Accessories: Compressor shall have oil separator, sight glass, oil filter, oil heater, built-in suction strainer, internal relief valve, suction and discharge service valves, and discharge check valve.

Compressor Motor:
1. Maximum speed of 8000 rpm suction gas cooled oversized motor with energy efficiency required to suit chiller energy efficiency indicated.
2. Factory mounted, and balanced as part of compressor assembly before shipping.
3. Provide solid state overload protection, with alarm communication to BAS system.
4. Phase loss/reversal protection shall be provided, with alarm.

Capacity Control: Compressor staging sequence
1. Maintain stable operation throughout range of operation. Configure to achieve most energy-efficient operation possible at design temperatures.
2. Operating Range: 25-100% infinite speed per compressor.
3. Unit shall load and unload to match load requirement and be fully automatic.
4. Unit shall have automatic start-unloading to reduce starting torque and acceleration times.
5. Unit shall provide displayed running capacity percentage.

Engineering Guide Specifications cont.

Refrigerant Circuit:

1. Refrigerant Type: Unit shall utilize refrigerant type R-134a.
2. Refrigerant Compatibility: Chiller parts exposed to refrigerants shall be fully compatible with refrigerants, and pressure components shall be rated for refrigerant pressures.
3. Refrigerant Flow Control: Manufacturer's standard refrigerant flow-control device satisfying performance requirements indicated.
4. Unit shall be provided with factory installed electronic expansion valve on each circuit.
5. Factory installed service port and manual isolation valve.
6. Unit shall have check valve in discharge gas outlet to prevent refrigerant back flow during shutdown.
7. Unit shall have suction gas filter to protect compressor.
8. Unit shall have refrigeration filter drier that is adequately sized for the circuit charge requirements..

Heat Exchangers:

1. Description: Brazed plate and frame.
2. Plate Material: 316 stainless steel plates
3. Two refrigeration circuits.
4. Designed to separate liquid refrigerant from fluid.
5. Pressure tested to 450 PSIG.
6. Unit shall be UL listed.

Electrical:

1. Factory installed and wired, and functionally tested at factory before shipment.
2. Single-point power connection to terminal block in a NEMA 1 control panel.
3. High voltage cabinet separate from low voltage, no 480V allowed in 120V cabinet.
4. Control transformer factory provided and mounted for 120VAC requirements.
5. High pressure cut outs set at 320 PSIG with manual reset.
6. Low pressure cut outs set at 14 PSIG with auto reset
7. Unit shall have phase loss/reversal for compressor protection.
8. Each compressor should have: Fuse protection, Contactor, thermal overload, along with motor phase and temperature protection.

Controls:

1. Standalone and microprocessor based with all memory stored in nonvolatile memory so that reprogramming is not required on loss of electrical power.
2. Enclosure: Unit mounted, NEMA 1, factory wired with a single-point, field-power connection and a separate control circuit.
3. Unit shall communicate via BACnet protocol to building automation system and give full control of unit to BAS front end.
4. Control Inputs/Outputs:
   - Start/Stop
   - Status: Cooling/Heating/On/Off
   - Unit runtime
   - Load Side Supply and Return Temperatures
   - Source Side Supply and Return Temperatures
   - Refrigeration Parameters for each unit/module
   - Suction Saturation temperature
   - Discharge Saturation temperature
   - Suction Pressure
   - Discharge Pressure
   - Condenser Refrigerant Liquid Temperatures
   - Suction Gas Temperature
   - Superheat and subcooling of each unit/module with a display for servicing.
5. Machine touch screen and remote access allowing for trending and parameter monitoring to be seen on site as well as from a remote location.
6. Unit should have mechanical room control as well as off-site monitoring & control capabilities, including;
   - Machine status
   - Building temperatures
   - Parameter conditions trending
   - Software override capabilities
   - Email alarm reporting
7. Communication Port: Shall be PC/Modem PTP port or Network EIA-485 Port as required by project.
8. BAS Interface: Factory-installed hardware and software to enable the BAS to monitor, control, and display Chiller status and alarms.
   - ASHRAE 135 (BACnet) communication interface with the BAS shall enable the BAS operator to remotely control and monitor the Chiller from an operator workstation. Control features and monitoring points displayed locally at Chiller control panel shall be available through the BAS.

Accessories:

Additional Items Not Listed Previously:

1. Flow switch to monitor the units presence of flow.
2. Reduced flow control kits, integrated isolation valve for reduced unit flow when machine is <50% loaded while keeping constant flow on each compressor circuit.

Engineering Guide Specifications cont.

PART 3 - EXECUTION

CHILLER INSTALLATION
Install chillers on support structure indicated.

Equipment Mounting: Install chiller on concrete bases using elastomeric pads. Comply with requirements for vibration isolation devices specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- Minimum Deflection: 1/4 inch.
- Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
- For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
- Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
- Install anchor bolts to elevations required for proper attachment to supported equipment.

Equipment Mounting: Install chiller using elastomeric pads. Comply with requirements for vibration isolation devices specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

Equipment Mounting: Install chiller on concrete bases. Comply with requirements for concrete base specified by contractor.
- Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
- For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
- Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
- Install anchor bolts to elevations required for proper attachment to supported equipment.

Maintain manufacturer's recommended clearances for service and maintenance. Charge chiller with refrigerant and fill with oil if not factory installed. Install separate devices furnished by manufacturer and not factory installed.

CONNECTIONS
Comply with requirements for piping specified in Division 23 Section "Hydronic Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

Install piping adjacent to chiller to allow service and maintenance.

Evaporator Fluid Connections: Connect to evaporator inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to evaporator outlet with shutoff valve, balancing valve, flexible connector, flow switch, thermometer, plugged tee with shutoff valve and pressure gage, flow meter, and drain connection with valve. Make connections to chiller with a flange.

Condenser Fluid Connections: Connect to condenser inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to condenser outlet with shutoff valve, balancing valve, flexible connector, flow switch, thermometer, plugged tee with shutoff valve and pressure gage, flow meter, and drain connection with valve. Make connections to chiller with a flange.

Connect each chiller drain connection with a union and drain pipe, and extend pipe, full size of connection, to floor drain. Provide a shutoff valve at each connection.

Revision Guide

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Misc.	Various updates to copy, HMI control section	5 Aug 2019	MA
All	First Published	22 July 2019	MA

Manufactured by
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