

Model YVAA Air-Cooled Screw Compressor Liquid Chillers with Variable Speed Drive Style A

150 ton to 500 ton
525 kW to 1750 kW
Two Compressor
50 Hz
R-134a or R-513A



Nomenclature

YVAA

Unit type
 YORK Chiller
 Air Cooled Screw
 Design Series A

021

**Frame
size**

3 A X X

Configuration
 Condenser code
 Evaporator code
 Compressor code
 Condenser fan
 Sound kit code

50

Voltage code
 -50 = 380 V to 415
 V-3-50

A

Development level

A

Refrigerant
 HFC-134a
 HFC-513A

Approvals

- AHRI 550/590 and 551/591 – Water Chilling Packages Using the Vapor Compression Cycle
- GB 19517 – National Safety Technical Code for Electric Equipment
- NB/T 47012 – Pressure Vessels for Refrigerant Equipment
- OSHA – Occupational Health and Safety Act
- ISO – International Organization for Standardization

Table of contents

Introduction	5
Unit overview	6
YVAA control center	9
Accessories and options	11
Refrigerant flow diagram	17
Application data	18
Physical data - Microchannel coil - English (SI)	24
Physical data - Round tube coil	28
Evaporator options	30
Dimensions	42
Isolator locations	44
Isolators	56
Electrical data	60
Power wiring	62
Customer control wiring	64
Control wiring	66
Guide specifications	68
SI metric conversion	78

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Introduction

YVAA chillers are Johnson Controls' most efficient air-cooled chillers. The design offers a lighter, smaller, and quieter package that minimizes the installed costs

For over 135 years, Johnson Controls has raised the bar of chiller design and customer expectations. We are raising the bar again with a leap forward in air-cooled chiller technology. Continuing the history of innovation in both compressor design and Variable Speed Drive (VSD) technology, Johnson Controls proudly introduces the YORK® YVAA.

In the past, the choice to use an air-cooled chiller came with the expectation of compromise, where simplicity of design and maintenance were traded for performance and efficiency. The new YVAA provides a better balance by combining the best of both - a high performance design that minimizes the total cost of ownership.

YORK YVAA model air-cooled chillers provide superior performance. Higher efficiency heat exchangers coupled with variable speed operation and smart controls elevate the system efficiency to a whole new level. The resulting benefit from YVAA chillers is much greater than the sum of its parts.

Efficiency: Reduce your consumption - YVAA chillers are Johnson Controls' most efficient air-cooled chillers. The design offers a lighter, smaller, and quieter package that minimizes the installed cost and maximizes usable building space. YVAA chillers are simpler in design with easy access to service components for reliable operation and efficient maintenance. With up to a 40% improvement in real world efficiency versus current products, YVAA sets the new standards for lowering energy use.

Sustainability: Improve your environmental footprint - YVAA lowers both direct and indirect impact on the environment. It uses a refrigerant that has zero ozone depletion potential (ODP). The design minimizes the quantity of refrigerant used in the system. Every YVAA model helps LEED projects earn the Energy and Atmosphere Credit 4. The highest portion of green house gases is carbon dioxide generated from electric power plants. HVAC systems are one of the largest consumers of electricity in commercial buildings. YVAA chillers reduce the electricity usage, which contributes to reducing greenhouse gases and helping keep the planet cool.

Low Sound: Quiet operation makes you a good neighbor - The variable speed technology on YVAA allows unparalleled low sound levels at off peak design conditions. This makes YVAA a great solution for sound sensitive zones. Several acoustic attenuation options such as smart controls SilentNight™, aerodynamic fans, and effective sound enclosures allow the chiller to meet even the most stringent sound level requirements.

Confidence: Proven performance provides peace of mind - YVAA design is proven by years of success with the previous generation of YORK VSD air-cooled screw chillers with thousands of machines operating in more than one hundred countries.

YVAA is configurable to be the perfect fit for your unique needs. YVAA has an array of options that can be tailored and tuned to match the capacity, efficiency, sound and footprint for your specific application. Several variations of condenser fans, evaporator arrangements, sound kits, protection enclosures, and controls schemes are available to meet specific requirements for your site.

Unit overview

Semi-hermetic YORK twin screw compressors

The direct-drive, semi-hermetic rotary twin-screw compressors incorporate advanced technology in a rugged design. The continuous function, microprocessor controlled VSD provides smooth capacity control from 100% down to 10% of chiller capacity. State-of-the-art technology, obtained from decades of screw compressor design and manufacturing by FRICK®, ensures optimal efficiencies at all chiller load points. With no unloading steps or slide valves in the compressors, the YVAA variable speed driven compressors have 50% fewer moving parts than fixed speed compressors with slide valves. The YVAA compressor is one of the most efficient and reliable screw compressors in the industry.

Evaporator

The evaporator is a shell and tube, hybrid falling film type heat exchanger. It contains a balance of flooded and falling film technology to optimize efficiency, minimize refrigerant charge, and maintain reliable control. A specifically designed distribution system provides uniform refrigerant flow for optimum performance.

Condenser

The YVAA introduces the microchannel coil to the YORK screw compressor chiller line. Microchannel coils are made of a single material to avoid galvanic corrosion due to dissimilar metals. Coils and headers are brazed as one piece, minimizing leaks. The inherently rugged coil construction, which includes non-overhanging fins, eliminates the possibility of fin damage. The microchannel maximizes condenser heat transfer, resulting in a smaller footprint, and reduces refrigerant charge by as much as 50%. The design working pressure of the microchannel condenser is 375 psig (25.9 bar).

The condenser fans are composed of corrosion resistant aluminum hub and glass-fiber-reinforced polypropylene composite blades molded into a low-noise airfoil section. All blades are statically and dynamically balanced for vibration-free operation. Fan motors are totally enclosed air-over (TEAO), squirrel-cage type, and current protected. The direct drive motors feature double-sealed and permanently lubricated ball bearings, cutting down on maintenance cost over the life of the unit.

Refrigerant circuit

The YVAA has one independent refrigerant circuit for each compressor. Each circuit uses copper refrigerant pipe formed on computer-controlled bending machines. By using computer-aided technology, over 60% of system piping brazed joints have been eliminated when compared to designs that use fittings, resulting in a highly reliable and leak-resistant system.

Complete factory package

Each unit is shipped as a complete factory package, completely assembled with all interconnecting refrigerant piping and internal wiring and ready for field installation. Before shipment, each individual chiller undergoes an extensive testing procedure, ensuring workmanship is the highest quality and that the initial start-up is trouble-free.

Unit overview (cont'd)

Before leaving the factory, each refrigerant circuit is factory pressure tested, evacuated and then fully charged with refrigerant and oil. An operational test is performed with water flowing through the evaporator to ensure each circuit functions correctly.

Electrical

All controls and motor starting equipment necessary for unit operation are factory wired and function tested. There are no surprises when you go to start-up, you can have confidence that the unit will start up right the first time and every time.

The chillers are available with a single point power connection and are supplied with a factory mounted and wired control transformer that powers all unit controls from the main unit power supply. The transformer utilizes scheduled line voltage on the primary side and provides 115 V/1Ø on secondary. The standard unit is equipped with terminal block electrical connections. All exposed power wiring is routed through liquid-tight, UV-stabilized, non-metallic conduit. Selection of frame 36 and larger are standard dual point, with single point option.

The VSD Power/Control Panel includes main power connections, VSD and fan motor contactors, current overloads, and factory wiring. All display and control features can be accessed through the keypad and control display access door, eliminating the need to open the main cabinet doors.

Building automation system capability

The YVAA chiller comes standard with native communication capability for BACnet® (MS/TP), Modbus®, and N2 with optional capabilities available for LON. The standard unit capabilities include built-in-scheduling, remote start-stop, remote water temperature reset and up to two steps of demand (load) limiting depending on model. The standard control panel can be directly connected to a Johnson Controls Building Automated System through the standard factory-installed RS232 communication port.

For connection with Johnson Controls Connected Services, an optional interface card (SC-EQUIP) is required and may be factory installed for easier field commissioning. Additional hardware (SC-AP access point), field provided, must be installed remotely from the chiller to interface with the Connected Services remote operations center. Contact your local Johnson Controls office to learn more about Connected Services and to schedule installation during chiller commissioning.

Unit overview (cont'd)

AHRI certification program

YORK YVAA chillers have been tested and certified by Air-Conditioning, Heating and Refrigeration Institute (AHRI) in accordance with the latest edition of AHRI Standard 550/590 and 551/591. Under this Certification Program, chillers are regularly tested in strict compliance with this standard. This provides an independent, third-party verification of chiller performance. Refer to the AHRI site at www.ahrinet.org/ for complete Program Scope, Inclusions, and Exclusions as some options listed herein fall outside the scope of the AHRI certification program. For verification of certification, go to the AHRI Directory at www.ahridirectory.org.



Rated in accordance with the latest issuance of AHRI Standard 550/590 and 551/591.

Computerized performance ratings

Each chiller is custom-matched to meet the individual building load and energy requirements. A variety of standard heat exchangers and pass arrangements are available to provide the best possible match.

It is not practical to provide tabulated performance for each combination, as the energy requirements at both full and part load vary significantly with each heat exchanger and pass arrangement. Computerized ratings are available through each Johnson Controls sales office. Each rating can be tailored to specific job requirements, and is part of the AHRI Certification Program.

Off-design performance

Because the vast majority of its operating hours are spent at off-design conditions, a chiller may be chosen not only to meet the full load design, but also for its ability to perform efficiently at lower loads. It is not uncommon for chillers with the same full load efficiency to have an operating cost difference of over 10% due to differences in off-design, part-load efficiencies.

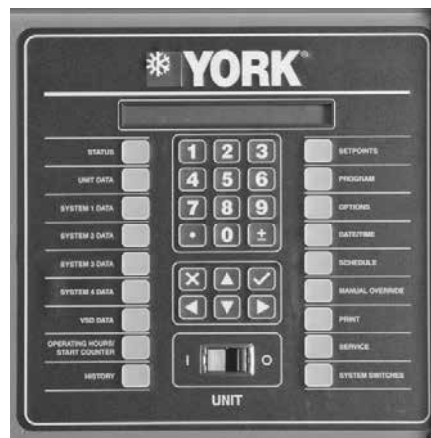
Part load information can be easily and accurately generated by use of the computer. Because it is so important to an owner's operating budget, this information has now been standardized within the AHRI Certification Program in the form of an integrated part load value (IPLV), and non-standard part load value (NPLV).

The current IPLV/NPLV rating from AHRI Standard 550/590 and 551/591 much more closely tracks actual chiller operation, and provides a more accurate indication of chiller performance than the previous IPLV/NPLV rating. A more detailed analysis must take into account actual building load profiles, and local weather data. Part load performance data must be obtained for each job using its own design criteria.

YVAA control center

Unit control center

The unit control center as shown in *Figure 1*, provides automatic control of chiller operation, including compressor start/stop and load/unload anti-recycle timers, condenser fans, chilled liquid pump, evaporator heater, unit alarm contacts and run signal contacts. The microcomputer control center comes online as soon as the main power switch on the unit is switched on. Immediately, the microcomputer control center will begin to continuously monitor all variables.



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Figure 1 - View of YVAA control center keypad and display

The microprocessor controls the unit's capacity by matching the actual leaving chilled liquid temperature (LCHLT) to the user-defined setpoint. Factors that may cause the system's actual LCHLT to fluctuate are changes in ambient temperature, load, and chilled liquid loop flow rate and volume. The controls system reacts to such changes by adjusting the number of compressors that are on and the loading of each compressor in order to keep the LCHLT at the setpoint.

The controls system logic monitors the rate at which the LCWT is approaching the setpoint to ramp up or down compressor capacity as required. The variable frequency drive allows the compressor capacity to match the load.

During extreme or unusual conditions including blocked condenser coils or ambient above scheduled maximum, the chiller control system avoids shutdown by varying capacity. By monitoring motor current and suction and discharge pressures, the chiller can maintain maximum available cooling output without shutting down.

Unit safeties are provided for the chiller to perform auto-reset shut down for the following conditions:

- Ambient temperature above or below allowable range
- Out of range leaving chilled liquid temperature
- Under voltage
- Flow switch operation

YVAA control center (cont'd)

Display data

- Leaving Chilled Liquid Temperature
- Returning Liquid Temperature
- Ambient Temperature
- Lead System
- Compressor Capacity (% of Full Load Amps)
- VSD Output Frequency / Compressor Speed
- Compressor Run Hours
- Compressor Number of Starts
- Oil Pressure and Temperature (per Compressor)
- Chilled Liquid Pump Status
- Evaporator Heater Status
- History Data for Last Twenty Normal Shutdowns
- History Data for Last Ten Shutdown Faults

Programmable setpoints

- Chiller on/Off
- Chilled Liquid (Water or Glycol)
- Local or Remote Control
- Units of Measure (Imperial or SI)
- System Lead/Lag
- Remote Temperature Reset
- Remote Current Limit
- Leaving Chilled Liquid Temperature Setpoint and Range

Accessories and options

The following options are factory-mounted unless otherwise noted.

Sound attenuation

Low noise kits – The standard chiller configuration is equipped with low sound fans. There are several sound attenuation options available to further reduce sound at its source and meet local sound level regulations.

SilentNight™ - Due to time-of-day based sound regulations in some locations, there may be a requirement to force the chiller to a lower sound level on demand. The SilentNight control option provides a control input to limit sound output of the chiller based on time of day. This feature is programmable at the chiller panel or can be controlled remotely by a signal (4 mA to 20 mA or 0 VDC to 10 VDC) from a BAS system.

Ultra quiet fans – The chiller is equipped with specially designed fans and motors to provide lower sound levels yet retain appropriate airflow. The result is reduced fan generated sound with minimal effect on the chiller capacity or efficiency at standard AHRI conditions. The fans are five-bladed for 50 Hz.

Fan options

High static fans - (400 V/50 Hz) The chiller is equipped with condenser fans with higher power motors suitable for high external static pressure, up to 100 Pa (0.4 in. water), across condenser coils. This option can be selected if additional airflow resistance may be present due to flow restrictions such as field installed ducts, filters, sound enclosures and other factors. Contact your local Johnson Controls representative for more information.

High airflow fans - (400 V/50 Hz) The chiller is equipped with condenser fans with airfoil-type polycarbonate blades and higher power motors providing extra airflow across coils. In some chiller configurations, this option can provide an increase in chiller capacity at high ambient. Contact your local Johnson Controls representative for more information.

Condenser

Coils – Fin and tube condenser coils of seamless, internally-enhanced, high-condensing-coefficient, corrosion resistant copper tubes are arranged in staggered rows. The tubes are mechanically expanded into aluminum fins. Integral subcooling is included. The design working pressure of the coils is 350 psig (24 barg).

Condenser coil protection

The aluminum alloys used in the YVAA microchannel condenser are carefully selected and tested for high corrosion resistance. However, all metals can corrode in harsh conditions. Consider protecting coils from corrosive environments such as coastal, marine, urban, and industrial.

Accessories and options (cont'd)

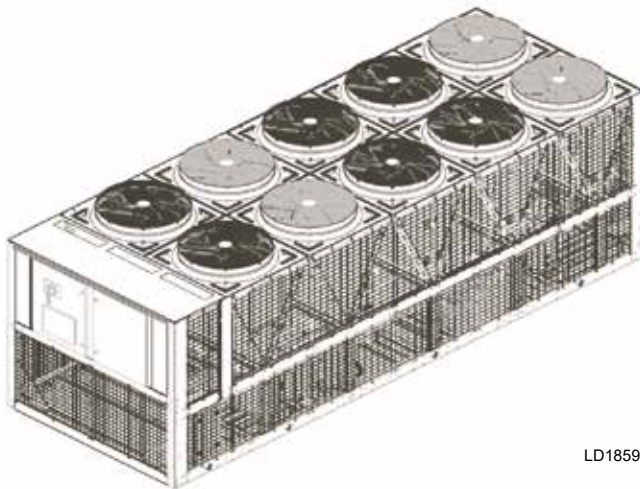
Environment guard premium – Microchannel condenser coils coated with an electrodeposited and baked flexible epoxy coating that is finished with a polyurethane UV resistant top-coat.

Environment guard basic – Microchannel condenser coils treated with immersion bath-applied chemical treatment.

Microchannel condenser must be provided with a 5-year warranty against corrosion damage.

Protective chiller panels

Wire panels – Heavy-gauge, welded-wire-mesh guards mounted on the exterior of the full unit. The guards are coated to prevent corrosion with a UV-stabilized material. This protects the condenser coil faces and prevents unauthorized access to refrigerant components including the compressors, pipes, and evaporator, yet provides free air flow. This can cut installation cost by eliminating the need for separate, expensive fencing. See the following figure.

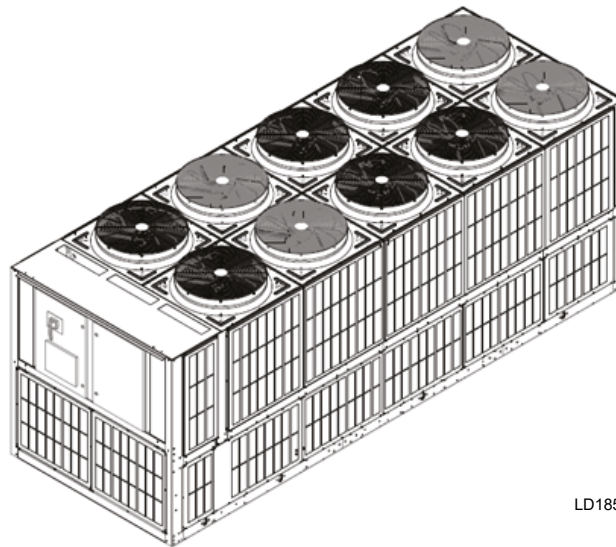


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Figure 2 - Full unit wire panels

Louvered panels – Louvered panels, painted the same color as the unit, enclose the unit to visually screen and protect the coils as well as to prevent unauthorized access to internal components. Also available as a condenser-only option. See the following figure.

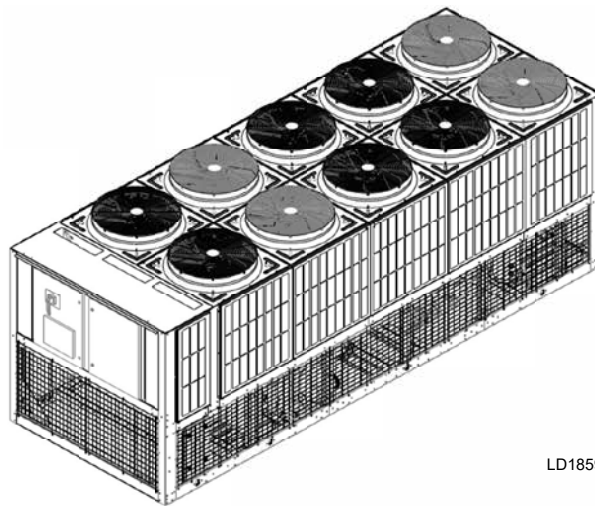
Accessories and options (cont'd)



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Figure 3 - Full unit louvered panels

Louvered, wire panels combination - Louvered panels, painted the same color as the unit, are mounted on external condenser coil faces. Heavy gauge, welded wire-mesh panels, coated to resist corrosion with a UV-stabilized material, are mounted around the base of the machine to restrict unauthorized access. See the following figure.

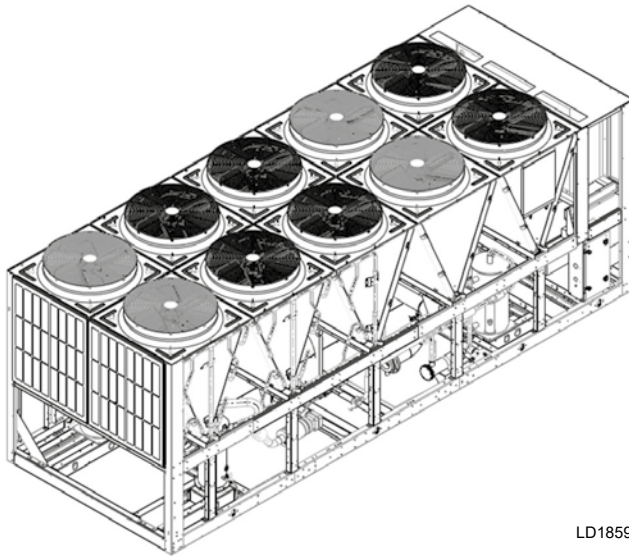


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Figure 4 - Louvered, wire panels combination

End hail guard – Louvered panels, painted the same color as the unit, are installed on the rear of the unit, at the opposite end of the control panel, to protect the exposed condenser from flying debris or hail. See *Figure 5*.

Accessories and options (cont'd)



LD18597

Figure 5 - End hail guard

V-guard panels – Solid panels, painted the same color as the unit, are installed along the sides of the units to cover exposed piping within the condenser section without impacting airflow. These guard panels can be combined with end hail guard option for additional protection from flying debris. See the following figure.

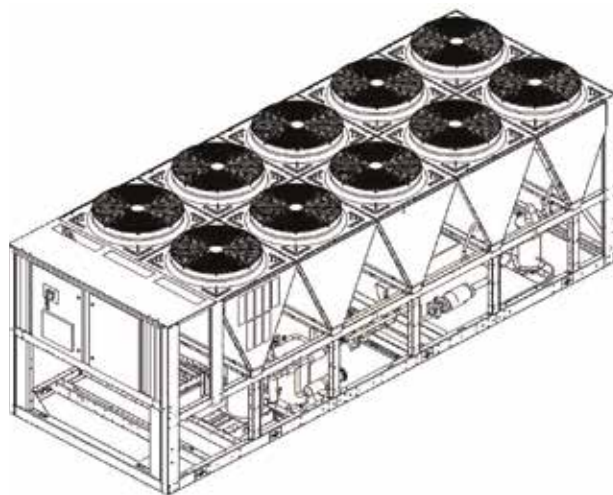


Figure 6 - V-guard option

Accessories and options (cont'd)

Evaporator options

1 1/2 in. Insulation – Double thickness insulation provided.

Cooler connections – Standard chilled liquid connections on all coolers are of the flange type. Flanges standard conform to HG20625, and for flange manufacture requirements, refer to HG20615. Optional chilled liquid connections on all coolers are of the ANSI/AWWA C-606 groove type.

Connection location – The standard unit configuration is available with liquid inlet connections at the rear of the unit, that is opposite the control panel end. Option available for front fluid inlet on select configurations.

Three-pass – The standard evaporator is constructed with two chilled water passes through the evaporator. The three-pass option is for use in brine applications or where a greater water temperature difference is required but efficiency cannot be sacrificed.

Single-pass – The single pass evaporator option offers the lowest water pressure drop and is for high flow or series chiller applications.

300 psig cooler – Standard cooler is rated 150 psig; 300 psig is available for applications such as high rise buildings.

Waterbox immersion heater - Unless an appropriate freeze protection fluid is used in the chilled fluid circuit, optional water box heaters are required if the chiller is exposed to environments that reach ambient temperatures below 0°F (-17.8°C). When the water box heaters are operated along with other required freeze protection protocols, they will assist in protecting the evaporator from freeze damage in ambient temperatures down to -20°F (-28.9°C). A separate, customer supplied 120 V/60 Hz or 230 V/50 Hz single phase power supply is required to provide power to the water box heaters. In order to control the operation of the water box heaters, provide continuous power to the chiller control panel. See the *Application Data* section for the requirements for protection against freeze damage.

Controls options

Building Automation System Interface (Temperature) - Factory-installed option accepts a 4 mA to 20 mA or a 0 VDC to 10 VDC input to allow remote reset of the Leaving Chilled Liquid Temperature Setpoint. The setpoint can be positively offset upwards up to 40°F (4.4°C). This option is useful for ice storage, for process applications, or for periods where higher chilled liquid temperatures are adequate for low loads. Available alone or in combination with BAS Load Limit.

Building Automation System Interface (Load limit) - Factory installed option accepts a 4 mA to 20 mA or a 0 VDC to 10 VDC input to allow remote reset of the Load Limit Setpoint. The setpoint can limit system demand from 30% to 100%. Available alone or in combination with BAS Temperature Reset.

E-Link – The E-Link gateway provides full communication to Building Automation Systems, including BACnet® (MS/TP), Modbus®, LON, and N2.

Thermal storage – Provides special control logic and modifications to produce leaving chilled brine temperatures below 40°F (4.4°C) primarily at times of low ambient temperatures, including night time. This option can be used to produce ice to supplement cooling and significantly decrease energy costs. The capability of the chiller is enhanced by using both ice and chilled liquid simultaneously during times of peak cooling needs.

Accessories and options (cont'd)

General options

Flow switch accessory - Vaporproof SPDT, IP55 switch, 150 psig (10.3 barg) DWP, -20°F to 250°F (-29°C to 121°C) with 1 in. NPT (IPS) connection for upright mounting in horizontal pipe. This flow switch or equivalent must be provided with each unit. This is a field-mounted option.

Differential pressure switch – This 3 psig to 45 psig (0.2 barg to 3 barg) range switch, with 1/4 in. NPTE pressure connections, is an alternative to the paddle-type flow switch. This is a field-mounted option.

Service isolation valve – You can add a compressor suction service isolation valve to each refrigerant circuit on the unit.

Pressure vessel options – The evaporator can be provided with either GB or ASME pressure vessel codes certification.

Circuit breaker – Unit-mounted circuit breakers with external lockable handles are supplied to isolate the power voltage for servicing. The circuit breakers are sized to provide motor branch circuit protection, short circuit protection and ground fault protection for the motor branch-circuit conductors, the motor control apparatus and the motors.

Non-fused disconnect switch – Unit-mounted disconnect switches with external lockable handle can be supplied to isolate the unit power voltage for servicing. Separate external fusing must be supplied by the power wiring, which must comply with local codes.

Thermal dispersion flow switch – Solid state thermal dispersion flow switch with no moving parts for high reliability and long service life. Stainless steel probe and IP 67 housing with LED status indicator of flow and output condition. Includes 10m IP67 cable required for field installation near chiller and bronzed steel welding adapter to ensure correct insertion depth. This is a field-mounted option.

Vibration isolation

Elastomeric isolation – This option is for normal installations. It provides very good performance in most applications for the least cost. This is a field-mounted feature.

1 in. spring isolators – Spring and cage type isolators for mounting under the unit base rails are available to support unit. They are level adjustable. 1 in. (25.4 mm) nominal deflection may vary slightly by application. This is a field-mounted feature.

2 in. restrained spring isolators – Restrained spring-flex mounting isolators incorporate a rugged welded steel housing with vertical and horizontal limit stops. The housings are designed to withstand a minimum 1.0 g accelerated force in all directions up to 2 in. (51 mm). The deflection may vary slightly by application. They are level adjustable. This is a field-mounted feature.

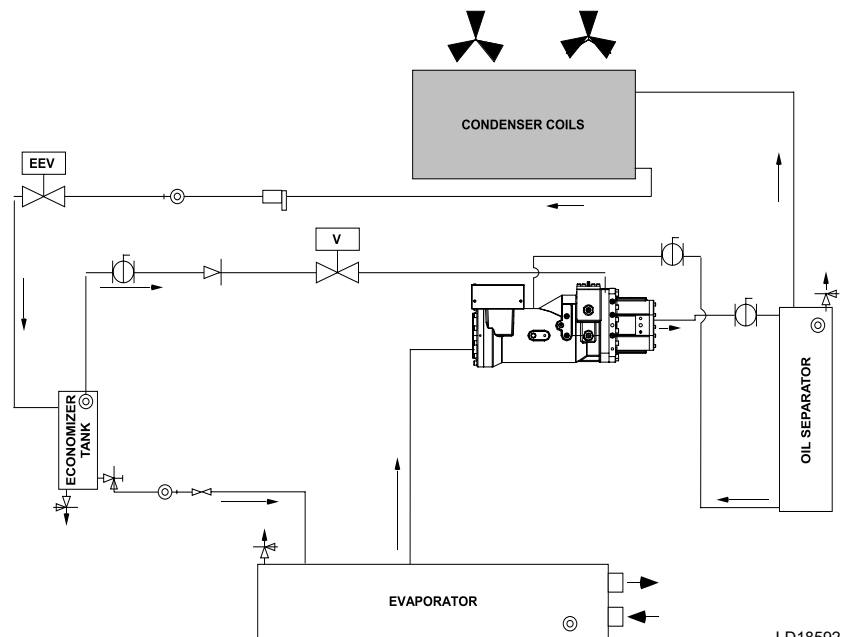
Refrigerant flow diagram

Low pressure refrigerant, liquid and gas, enters the evaporator and is sprayed across the top of the tube bundle from spray nozzles. The liquid refrigerant from the nozzles gravity drains down across the tube bundle and is evaporated and superheated by the heat energy absorbed from the chilled liquid passing through the tubes.

The low pressure refrigerant vapor leaves the top of the evaporator and enters the compressor where the refrigerant vapor is compressed and the pressure and superheat are increased. The high pressure superheated gas enters the air cooled condenser where heat is rejected through the condenser coils and fans.

The fully condensed and sub-cooled liquid leaves the air cooled condenser, flows through the filter drier and enters the economizer tank. The flow of refrigerant into the economizer is controlled by the electronic expansion valve.

Additional cooling of the refrigerant liquid may take place in the economizer tank when the economizer valve is opened. After leaving the economizer tank, liquid refrigerant flows through an orifice where pressure reduction and further cooling take place. The low pressure refrigerant, liquid and gas, then enters the evaporator.



LD18592

Symbol	YVAA system component
	Electronic Expansion Valve
	Ball Valve
	Relief Valve
	Stop Valve Angle, Access
	Replacement Core Filter/Dryer
	Sight Glass
	Orifice
	Check Valve
	Valve

Application data

Unit sizing

Avoid over-sizing a chiller. Correctly sized chillers operate stably and provide the best life cycle cost. When designing phased projects, select multiple small chillers to match demand for each phase. Use multiple small chillers when the minimum cooling demand is less than 10% of the maximum cooling demand.

Unit location

The YVAA chillers are designed for outdoor installation. To achieve optimum performance and trouble-free service provide adequate space around chillers. See the following figure.

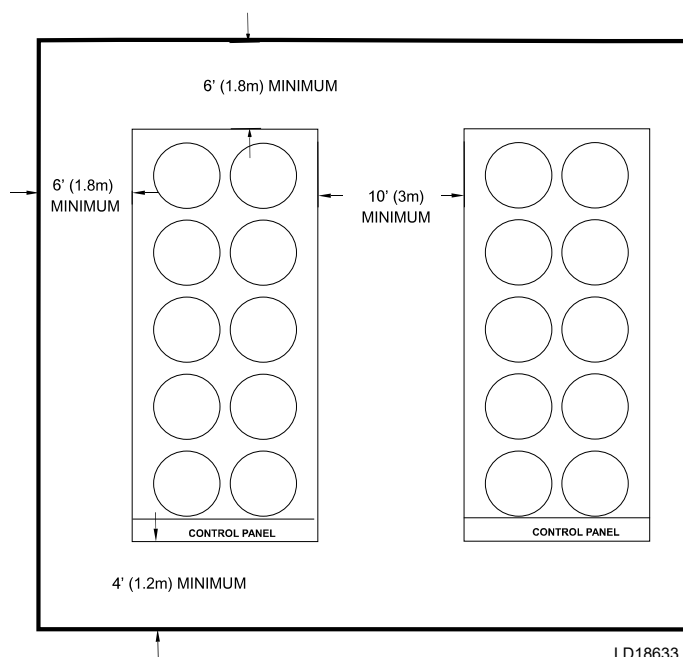


Figure 7 - Acceptable minimum clearances around and between units for correct airflow

When selecting chiller installation sites, follow these requirements:

- A. Installation sites may be either on a roof or on ground level. See *Foundation* on page 19.
- B. Provide space for air to flow into condensers as outlined in the dimensions shown on the dimension drawing in *Dimensions* on page 42. Restricted airflow or hot air recirculation diminishes performance. Johnson Controls' unit controls optimize the operation without nuisance high pressure safety cutouts; however, the system designer must consider potential performance degradation. Recommended clearances for all units are as follows:
 1. The unit must be no higher than on spring isolators to facilitate access to the control center.

Application data (cont'd)

2. Recommended minimum clearances are as follows:
 - a. Side to wall – 6 ft (1.8 m)
 - b. Rear to wall – 6 ft (1.8 m)
 - c. Control panel end to wall – 4 ft (1.2 m)
 - d. Top – no obstructions whatsoever
 - e. Distance between adjacent units – 10 ft (3 m)
3. No more than one wall around the chiller yard must be higher than the chillers.
- C. Avoid locations near windows or structures where normal operating sounds may be objectionable.
- D. The condenser fans are propeller-type. Do not use these with ductwork, filters, or other impediments to airflow in the condenser air stream.
- E. When obstructions to airflow exist, they must not add more than 0.1 in. (25.4 mm) external static pressure.
- F. Protection against corrosive environments is available by ordering the units with micro-channel condenser coils treated with an immersion bath-applied chemical treatment or coated with an electro-deposited and baked flexible epoxy coating that is finished with a polyurethane UV resistant top-coat. Chemically treated coils must be used with any units being installed near the seacoast, in high humidity environments or in desert environments where there are no additional corrosive conditions such as agricultural, construction or industrial sites. Use epoxy-coated coils with any units being installed in locations on the seacoast where direct salt water contact is expected, in corrosive environments such as agricultural, construction or industrial sites, or in an environment where there is severe corrosion damage to existing equipment.
- G. On installations where winter operation is intended and snow accumulations are expected, provide additional elevation to ensure normal condenser air flow.
- H. Provide adequate space for tubes to be removed from the evaporator. For clearances, contact your nearest Johnson Controls sales office.

Foundation

Mount units on a flat and level foundation, ground or roof, capable of supporting the entire operating weight of the equipment. Contact your nearest Johnson Controls Sales Office for shipping and operating weights.

Roof locations – Provide structure to safely support the entire weight of the unit and service personnel. Do not damage the roof during installation. If the roof is bonded, consult a building contractor or architect for special installation requirements. Use spring isolators to minimize vibration transmission into building structure. Provide additional structural support at the spring-isolator locations.

Ground locations – Units must be installed on a substantial base that does not settle and cause strain on the refrigerant lines, resulting in possible leaks. A one-piece concrete slab, with footers extending below the frost line is recommended. The slab must not be tied to the main building foundation as operational noise telegraphs. Mounting holes of 5/8 in. are provided in the base rails for bolting the unit to its foundation. See *Isolator locations on page 44* for location of the mounting holes.

Application data (cont'd)

For ground installations, precautions must be taken to protect the unit from tampering by, or injury to, unauthorized persons. Fasteners on access panels will prevent casual tampering; however, further safety precautions such as unit enclosure options, a fenced-in enclosure, or locking devices on the panels may be advisable. Check local authorities for safety regulations.

Seismic applications – Avoid installing chillers on springs or roofs where earthquakes are a risk. Springs and roofs amplify earthquake forces. Rigidly mounting chillers to ground level concrete pads is the best option for earthquake zones. Contact Johnson Controls equipment specialists for help with projects that have seismic requirements.

Chilled liquid piping

Design the chilled liquid piping system so that the circulating pump discharges into the evaporator. The inlet and outlet evaporator-liquid connections are given in *Dimensions on page 42*. Hand stop valves are recommended in all lines to facilitate servicing. Provide drain connections at low points to permit complete drainage of the evaporator and system piping.

The evaporator must be protected by a strainer, preferably of 16 mesh, fitted as close as possible to the liquid inlet connection, and provided with a means of local isolation.

The evaporator must not be exposed to flushing velocities or debris released during flushing. It is recommended that a suitably sized bypass and valve arrangement is installed to allow flushing of the piping system. The bypass can be used during maintenance to isolate the heat exchanger without disrupting flow to other units.

Pressure-gauge connections are recommended for installation in the inlet and outlet liquid lines. Gauges are not provided with the unit and must be provided by others.

A flow switch is available as an accessory on all units. A flow switch must be installed in the leaving liquid piping of the evaporator and must not be used to start and stop the unit.

Chilled liquid lines exposed to the weather must be wrapped with a supplemental heater cable and insulated, or glycol must be added to the chilled liquid to protect against freezing if low-ambient periods are expected.

Freeze damage protection



Failure to follow the required freeze protection protocols can void the factory warranty.

If the YVAA is exposed to subfreezing ambient temperatures at any time during its life, it is critical to protect against evaporator freeze damage. To prevent evaporator freeze damage, follow protocol A, B, or C:

A. Freeze protection fluid: Use an appropriate freeze protection fluid selected for the lowest possible ambient temperature in the chilled fluid circuit.

B. Drain the evaporator: To completely drain the fluid in the evaporator, complete the following steps:

1. Remove the power to the water box heaters.
2. Close the chilled fluid circuit isolation valves.

Application data (cont'd)

3. Drain the chilled fluid from the evaporator.
4. Leave the evaporator drain valves open.

C. Pumps flow fluid through the evaporator: Chilled fluid circuit valves must remain open and pumps must continuously flow fluid through the evaporator when the ambient air temperature is below 36°F (2.2°C). Fluid flow through the evaporator protects against freeze damage in ambient air temperatures down to 0°F (-17.8°C). Fluid flow through the evaporator plus the operation of the water box immersion heaters protects against freeze damage in ambient air temperatures down to -20°F (-28.9°C). After wiring the available dry contacts, the YVAA control logic can send a signal to turn on the chilled fluid circuit pumps when conditions may result in freeze damage. Ensure there is continuous power supply to the chiller control panel and the chilled fluid circuit pumps so that water flow is provided through the evaporator and that the heaters have power. If you cannot guarantee continuous power to the heaters or the minimum flow rate through the evaporator, then follow protocol A or B.

Minimum liquid volume

It is good practice to include as much liquid volume as possible in a chilled liquid loop. This increases the thermal mass and flywheel effect within the system that is, the more the better, which in turn promotes stable liquid temperature control and increases reliability by reducing compressor cycling.

For air conditioning applications, a minimum of 3 gal/ton (3.2 L/cooling kW) is recommended. It is preferred that the gallon/ton ratio be within the 5 to 8 (5.4 to 8.6 liter/cooling kW) range for constant flow rate chilled liquid systems. See *Variable primary flow on page 23* for recommendations for VPF systems. For process applications, a minimum of 6 gal/ton (6.5 L/cooling kW) ratio is recommended with preference towards a range of 7 to 11 (7.5 to 11.8). Install a tank or increase pipe sizes to provide sufficient liquid volume.

Leaving liquid temperature out of range

The YVAA chiller line has a maximum leaving liquid temperature of 70°F (21.1°C). Some process applications require a chilled liquid temperature higher than what the chiller provides. In those applications, a simple piping change can remove the problem. By using a mixture of chiller-cooled liquid and returning process liquid, the chilled liquid entering the process can be held at the required temperature. A tank can also be used to meet high leaving liquid temperature requirements. See *Fouling factor on page 78*.

Application data (cont'd)

Flow rate out of range

Each YVAA evaporator has a minimum and maximum flow rate. Some process applications require a flow rate that is out of range for the evaporator. In those applications, a piping change can remove the problem.

In applications where the required flow rate is less than the evaporator's minimum allowable, the chilled liquid can be recirculated to the chiller. See *Figure 9 on page 22*.

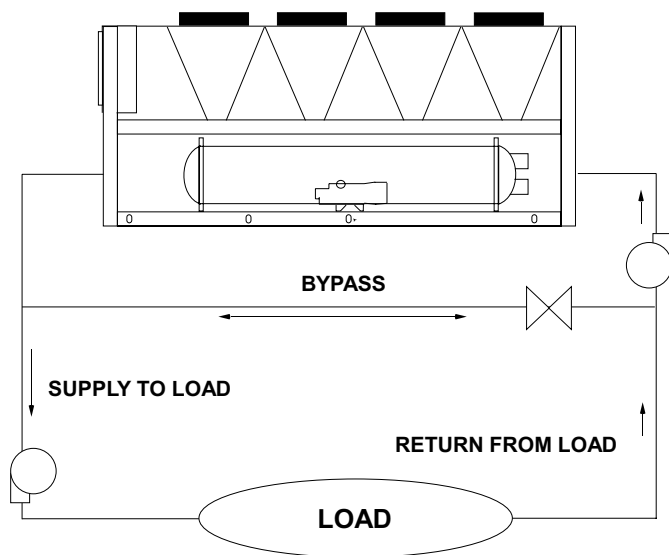
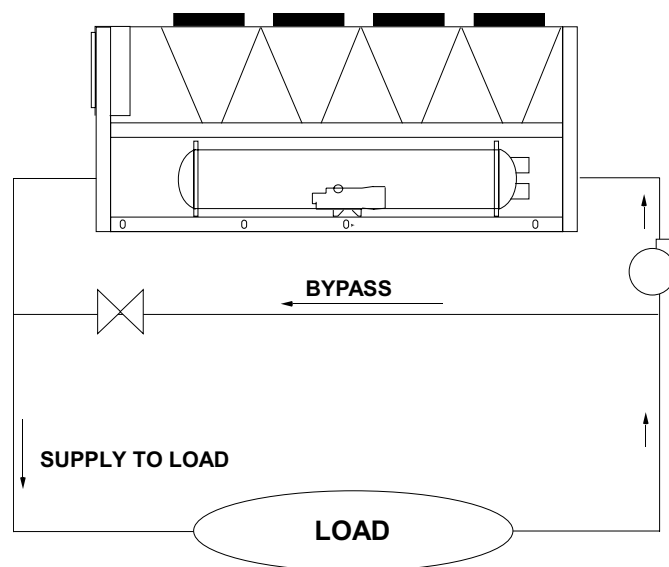


Figure 8 - Leaving liquid temperature out of range suggested layout



LD19912

LD19913

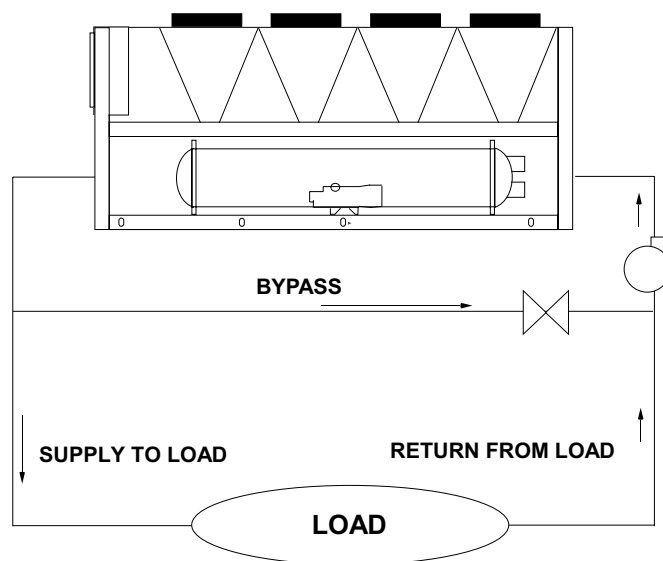
Figure 9 - Suggested layout for applications with a flow rate greater than the evaporator maximum allowable flow rate

Application data (cont'd)

In applications where the required flow rate is greater than the evaporator's maximum allowable, the chilled liquid can be recirculated to the load. See *Figure 10* on page 23.

Thermal storage

Thermal storage is the practice of storing cooling energy during a period of little or no load or low energy costs for use during periods of high load or high energy costs. Conventional cooling systems produce cooling when it is needed, which is commonly during times of peak demand. Thermal storage allows generation of cooling capacity to occur during off-peak periods and store that capacity to meet future cooling requirements. Using thermal storage can result in smaller equipment sizes, which reduces capital cost, and also can result in significant energy cost savings.



LD19914

Figure 10 - Suggested layout for applications with a flow rate less than the evaporator minimum allowable flow rate

The YVAA has special control logic to be able to produce chilled leaving brine temperatures below 40°F (4.4°C) so as to supply a storage tank with chilled liquid during times of low demand. YVAA chillers selected for thermal storage operation can also be selected to efficiently provide chilled liquid at nominal cooling loads.

Variable primary flow

Johnson Controls recommends a maximum 10% per minute flow rate of change, based on design flow, for variable primary flow applications. 8 gal to 10 gal per chiller ton (8.6 L to 10.8 L per cooling kW) is recommended for the system liquid volume. Insufficient system volume and rapid flow changes can cause control problems or can even cause chiller shutdowns. There are many other design issues to evaluate with variable primary flow systems. Consult your Johnson Controls Sales Office for more information about successfully applying YVAA chillers.

Physical data - Microchannel coil - English (SI)

The data shown in this table is applicable to selected typical configurations. Other configurations are available through our configuration and selection software. Contact your nearest Johnson Controls sales office for the chiller configuration that best matches your specific needs.

Table 2 - Physical data - Microchannel coil

Unit frame	15	16	17	18	19	19	20	21	21	21
Condenser code	3	5	8	3	5	8	0	3	5	8
Evaporator code	B	B	C	A	A	B	C	A	C	C
General unit data										
Number of independent refrigerant circuits	2									
Refrigerant charge: R-134a or R-513A Circuit.-1/Circuit.-2 lb (kg)	176/176 (80/80)	190/190 (86/86)	225/225 (102/102)	176/154 (80/70)	190/172 (86/78)	220/196 (100/89)	205/205 (93/93)	176/176 (80/80)	225/225 (102/102)	240/240 (109/109)
Oil Charge: Circuit.-1/ Circuit.-2 gal (L)	2.1/2.0 (8.0/7.7)	2.2/2.2 (8.5/8.5)	2.5/2.5 (9.3/9.3)	2.4/2.0 (9.2/7.7)	2.6/2.1 (9.7/8.0)	2.7/2.2 (10.4/8.5)	2.6/2.6 (10.0/10.0)	2.5/2.5 (9.3/9.3)	2.8/2.8 (10.5/10.5)	2.9/2.9 (10.8/10.8)
Minimum load (%)	10									
Chassis length in. (mm)	203.3 (5163)	247.2 (6280)	291.2 (7397)	247 (6274)	291.2 (7397)	335.2 (8514)	226 (5741)	291.2 (7397)	291.2 (7397)	335.2 (8514)
Chassis width in. (mm)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)
Chassis height in. (mm)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)
Compressors, semi-hermetic screw										
Quantity per chiller	2									
Condenser fans										
Number: Circuit.-1/Circuit.-2	4/4	5/5	6/6	6/4	7/5	8/6	4/4	6/6	6/6	7/7
Air on Condenser: min/max °F (°C)	-10/131 (-23.3/55)									
Evaporator, shell and tube hybrid falling film ²										
Water volume gal (L)	58 (220)	58 (220)	71 (269)	48 (182)	48 (182)	58 (220)	71 (269)	48 (182)	71 (269)	71 (269)
Leaving water temperature: min/max °F (°C) ²	40/70 (4.4/21.1)									
Maximum water side pressure psig (barg)	150 (10.3)									
Maximum refrigerant side pressure psig (barg)	235 (16.2)									
Evaporator drain connection in. (mm)	3/4 (19)									

Notes:

- Shipping and operating weights are not shown as selected options may add weight to unit. Contact your nearest Johnson Controls sales office for weight data.
- For leaving liquid temperatures below 40°F (4.4°C) or above 70°F (21.1°C), contact your nearest Johnson Controls sales office for application requirements.

Physical data - Microchannel coil - English (SI) (cont'd)

The data shown in this table is applicable to selected typical configurations. Other configurations are available through our configuration and selection software. Contact your nearest Johnson Controls sales office for the chiller configuration that best matches your specific needs.

Table 2 - Physical data - Microchannel coil (cont'd)

Unit frame	23	24	24	26	27	27	27	27	29	30
Condenser code	3	5	8	3	0	3	5	8	5	3
Evaporator code	B	C	C	B	D	D	E	E	E	C
General unit data										
Number of independent refrigerant circuits	2									
Refrigerant charge: R-134a or R-513A Circuit.-1/Circuit.-2 lb (kg)	212/190 (96/86)	229/225 (104/102)	225/251 (102/114)	212/212 (96/96)	250/250 (114/114)	267/267 (121/121)	267/293 (121/133)	271/271 (123/123)	311/293 (141/133)	276/225 (125/102)
Oil Charge: Circuit.-1/ Circuit.-2 gal (L)	2.7/2.6 (10.1/9.7)	2.9/2.8 (11.1/10.5)	2.9/2.9 (11.1/11.1)	2.7/2.7 (10.1/10.1)	3.0/3.0 (11.4/11.4)	3.0/3.0 (11.4/11.4)	3.0/3.0 (11.4/11.4)	3.1/3.1 (11.6/11.6)	3.8/3.1 (14.4/11.7)	3.7/3.0 (14.0/11.4)
Minimum load (%)	10									
Chassis length in. (mm)	291.2 (7397)	335.2 (8514)	379.1 (9631)	335.2 (8514)	291.2 (7397)	335.2 (8514)	335.2 (8514)	379.2 (9631)	379.2 (9631)	379.2 (9631)
Chassis width in. (mm)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)
Chassis height in. (mm)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)
Compressors, semi-hermetic screw										
Quantity per chiller	2									
Condenser fans										
Number: Circuit.-1/Circuit.-2	7/5	8/6	8/8	7/7	6/6	7/7	7/7	8/8	9/7	9/7
Air on Condenser: min/max °F (°C)	-10/131 (-23.3/55)									
Evaporator, shell and tube hybrid falling film ²										
Water volume gal (L)	58 (220)	71 (269)	71 (269)	58 (220)	82 (310)	82 (310)	113 (428)	113 (428)	113 (428)	71 (269)
Leaving water temperature: min/max °F (°C) ²	40/70 (4.4/21.1)									
Maximum water side pressure psig (barg)	150 (10.3)									
Maximum refrigerant side pressure psig (barg)	235 (16.2)									
Evaporator drain connection in. (mm)	3/4 (19)									

Notes:

- Shipping and operating weights are not shown as selected options may add weight to unit. Contact your nearest Johnson Controls sales office for weight data.
- For leaving liquid temperatures below 40°F (4.4°C) or above 70°F (21.1°C), contact your nearest Johnson Controls sales office for application requirements.

Physical data - Microchannel coil - English (SI) (cont'd)

The data shown in this table is applicable to selected typical configurations. Other configurations are available through our configuration and selection software. Contact your nearest Johnson Controls sales office for the chiller configuration that best matches your specific needs.

Table 2 - Physical data - Microchannel coil (cont'd)

Unit frame	30	30	31	32	33	34	34	36	37
Condenser code	5	8	8	3	3	3	5	8	3
Evaporator code	C	E	E	E	C	E	E	J	F
General unit data									
Number of independent refrigerant circuits	2								
Refrigerant charge: R-134a or R-513A Circuit.-1/Circuit.-2 lb (kg)	295/250 (134/114)	315/275 (143/125)	315/295 (143/134)	295/295 (134/134)	269/256 (122/116)	310/310 (141/141)	315/315 (143/143)	435/320 (197/145)	331/214 (150/97)
Oil Charge: Circuit.-1/ Circuit.-2 gal (L)	3.7/3.0 (14.0/11.4)	3.9/3.2 (14.8/12.1)	3.9/3.3 (14.8/12.5)	3.7/3.7 (14.0/14.0)	3.7/3.7 (14.0/14.0)	3.8/3.8 (14.4/14.4)	3.9/3.9 (14.8/14.8)	4.1/4.0 (15.5/15.1)	4.0/2.9 (15.1/11.0)
Minimum load (%)	10								
Chassis length in. (mm)	423.1 (10748)	423.1 (10748)	467.1 (11865)	379.2 (9631)	423.1 (10748)	423.1 (10748)	467.1 (11865)	511 (12979)	467.1 (11864)
Chassis width in. (mm)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2243)	88.3 (2243)
Chassis height in. (mm)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.7 (2405)	94.7 (2405)
Compressors, semi-hermetic screw									
Quantity per chiller	2								
Condenser fans									
Number: Circuit-1/Circuit-2	10/8	10/8	8/8	8/8	9/9	9/9	10/10	14/8	13/7
Air on Condenser: min/max °F (°C)	-10/131 (-23.3/55)								
Evaporator, shell and tube hybrid falling film ²									
Water volume gal (L)	71 (269)	113 (428)	113 (428)	113 (428)	71 (269)	113 (428)	113 (428)	147 (556)	96 (363)
Leaving water temperature: min/max °F (°C) ²	40/70 (4.4/21.1)								
Maximum water side pressure psig (barg)	150 (10.3)								
Maximum refrigerant side pressure psig (barg)	235 (16.2)								
Evaporator drain connection in. (mm)	3/4 (19)								

Notes:

- Shipping and operating weights are not shown as selected options may add weight to unit. Contact your nearest Johnson Controls sales office for weight data.
- For leaving liquid temperatures below 40°F (4.4°C) or above 70°F (21.1°C), contact your nearest Johnson Controls sales office for application requirements.

Physical data - Microchannel coil - English (SI) (cont'd)

The data shown in this table is applicable to selected typical configurations. Other configurations are available through our configuration and selection software. Contact your nearest Johnson Controls sales office for the chiller configuration that best matches your specific needs.

Table 2 - Physical data - Microchannel coil (cont'd)

Unit frame	37	41	44	48	49	50	52
Condenser code	5	3	3	3	0	0	3
Evaporator code	I	H	G	G	K	J	J
General unit data							
Number of independent refrigerant circuits	2						
Refrigerant charge: R-134a or R-513A Circuit.-1/Circuit.-2 lb (kg)	430/309 (195/140)	351/309 (159/140)	284/309 (129/140)	291/320 (132/145)	309/309 (140/140)	331/331 (150/150)	342/342 (155/155)
Oil Charge: Circuit.-1/Circuit.-2 gal (L)	4.1/3.8 (15.5/14.4)	4.0/4.0 (15.1/15.1)	4.0/4.0 (15.1/15.1)	4.0/4.0 (15.1/15.1)	4.0/4.0 (15.1/15.1)	4.0/4.0 (15.1/15.1)	4.2/4.2 (15.9/15.9)
Minimum load (%)	10						
Chassis length in. (mm)	467.1 (11864)	467.1 (11864)	555.3 (14104)	599.3 (15222)	467.1 (11865)	467.1 (11865)	599.3 (15222)
Chassis width in. (mm)	88.3 (2243)	88.3 (2243)	88.3 (2243)	88.4 (2245)	88.3 (2243)	88.3 (2243)	88.3 (2243)
Chassis height in. (mm)	94.7 (2405)	94.7 (2405)	94.7 (2405)	94.7 (2405)	94.6 (2403)	94.7 (2405)	94.7 (2405)
Compressors, semi-hermetic screw							
Quantity per chiller	2						
Condenser fans							
Number: Circuit-1/Circuit-2	13/7	12/8	12/12	13/13	10/10	10/10	13/13
Air on Condenser: min/max °F (°C)	-10/131 (-23.3/55)						
Evaporator, shell and tube hybrid falling film ²							
Water volume gal (L)	147 (556)	130 (492)	96 (363)	96 (363)	130 (492)	147 (556)	147 (556)
Leaving water temperature: min/max °F (°C) ²	40/70 (4.4/21.1)						
Maximum water side pressure psig (barg)	150 (10.3)						
Maximum refrigerant side pressure psig (barg)	235 (16.2)						
Evaporator drain connection in. (mm)	3/4 (19)						

Notes:

- Shipping and operating weights are not shown as selected options may add weight to unit. Contact your nearest Johnson Controls sales office for weight data.
- For leaving liquid temperatures below 40°F (4.4°C) or above 70°F (21.1°C), contact your nearest Johnson Controls sales office for application requirements.

Physical data - Round tube coil

The data shown in this table is applicable to selected typical configurations. Other configurations are available through our configuration and selection software. Contact your nearest Johnson Controls sales office for the chiller configuration that best matches your specific needs.

Table 3 - Physical data - Round tube coil

Unit frame	15	18	20	21	23	26	27	27	30
Condenser code	3	3	0	3	3	3	0	3	3
Evaporator code	B	A	C	A	B	B	D	D	C
General unit data									
Number of independent refrigerant circuits	2								
Refrigerant charge:									
R-134a or R-513A	211/211	229/191	229/229	273/235	273/273	304/304	328/328	371/308	371/308
Circuit.-1/Circuit.-2	(96/96)	(104/87)	(104/104)	(124/107)	(124/124)	(138/138)	(149/149)	(168/140)	(168/140)
lb (kg)									
Oil Charge: Circuit.-1/Circuit.-2	2.1/2.0	2.4/2.0	2.6/2.6	2.5/2.5	2.7/2.6	2.7/2.7	3.0/3.0	3.0/3.0	3.7/3.0
gal (L)	(8.0/7.7)	(9.2/7.7)	(9.9/9.9)	(9.5/9.5)	(10.3/9.9)	(10.3/10.3)	(11.4/11.4)	(11.4/11.4)	(14.0/11.4)
Minimum load (%)	10								
Chassis length in. (mm)	203.3 (5163)	247 (6274)	226 (5740)	291.2 (7397)	291.2 (7397)	335.2 (8514)	291.2 (7397)	335.2 (8514)	379.2 (9631)
Chassis width in. (mm)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2242)
Chassis height in. (mm)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.6 (2403)
Compressors, semi-hermetic screw									
Quantity per chiller	2								
Condenser fans									
Number: Circuit.-1/Circuit.-2	4/4	6/4	4/4	6/6	7/5	7/7	6/6	7/7	9/7
Air on Condenser: min/max °F (°C)	0/125 (-17.8/51.7)								
Evaporator, shell and tube hybrid falling film ²									
Water volume gal (L)	58 (220)	48 (182)	71 (269)	48 (182)	58 (220)	58 (220)	82 (310)	82 (310)	71 (269)
Leaving water temperature: min/max °F (°C) ²	40/60 (4.4/15.6)								
Maximum water side pressure psig (barg)	150 (10.3)								
Maximum refrigerant side pressure psig (barg)	235 (16.2)								
Evaporator drain connection in. (mm)	3/4 (19)								

Notes:

- Shipping and operating weights are not shown as selected options may add weight to unit. Contact your nearest Johnson Controls sales office for weight data.
- For leaving liquid temperatures below 40°F (4.4°C) or above 70°F (21.1°C), contact your nearest Johnson Controls sales office for application requirements.

Physical data - Round tube coil (Cont'd)

The data shown in this table is applicable to selected typical configurations. Other configurations are available through our configuration and selection software. Contact your nearest Johnson Controls sales office for the chiller configuration that best matches your specific needs.

Table 3 - Physical data - Round tube coil (cont'd)

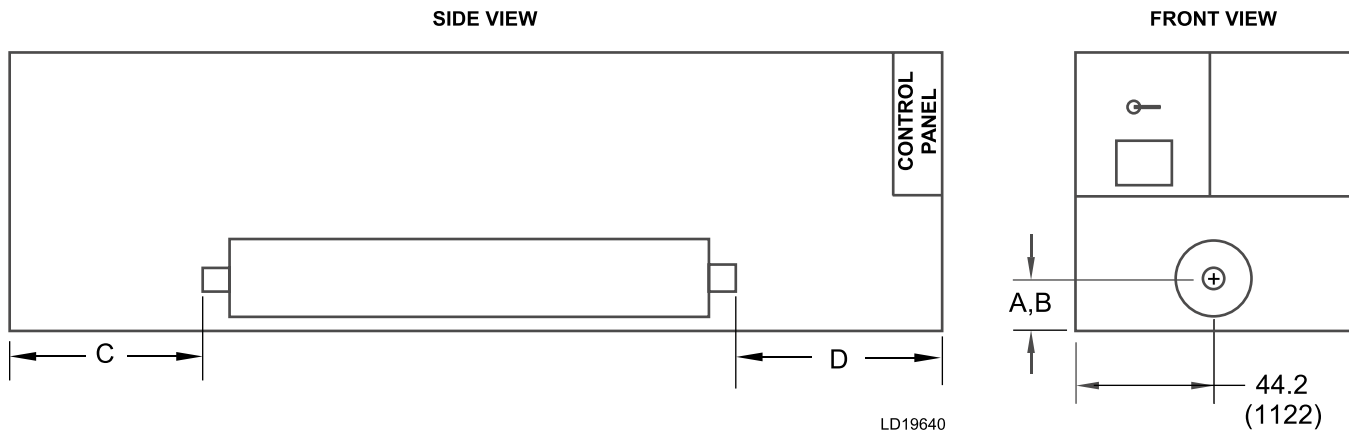
Unit frame	32	33	34	37	41	44	48	49	50	52
Condenser code	3	3	3	3	3	3	3	0	0	3
Evaporator code	E	C	E	F	H	G	G	K	J	J
General unit data										
Number of independent refrigerant circuits	2									
Refrigerant charge:										
R-134a or R-513A	367/367	371/371	437/437	537/308	568/417	478/478	502/502	480/480	562/562	562/562
Circuit.-1/Circuit.-2	(166/166)	(168/168)	(198/198)	(244/140)	(258/189)	(217/217)	(228/228)	(218/218)	(255/255)	(255/255)
lb (kg)										
Oil Charge: Circuit.-1/Circuit.-2	3.7/3.7	3.7/3.7	3.8/3.8	4.0/2.9	4.0/4.0	4.0/4.0	4.0/4.0	4.0/4.0	4.0/4.0	4.2/4.2
gal (L)	(14.0/14.0)	(14.0/14.0)	(14.4/14.4)	(15.1/11.0)	(15.1/15.1)	(15.1/15.1)	(15.1/15.1)	(15.1/15.1)	(15.1/15.1)	(15.9/15.9)
Minimum load (%)	10									
Chassis length in. (mm)	379.2 (9631)	423.1 (10748)	423.1 (10748)	467.1 (11864)	467.1 (11864)	555.3 (14104)	599.3 (15222)	467.1 (11864)	467.1 (11864)	599.3 (15222)
Chassis width in. (mm)	88.3 (2242)	88.3 (2242)	88.3 (2242)	88.3 (2243)	88.3 (2243)	88.3 (2243)	88.4 (2244)	88.3 (2242)	88.4 (2242)	88.3 (2243)
Chassis height in. (mm)	94.6 (2403)	94.6 (2403)	94.6 (2403)	94.7 (2405)	94.7 (2405)	94.7 (2405)	94.7 (2405)	94.6 (2403)	94.7 (2405)	94.7 (2405)
Compressors, semi-hermetic screw										
Quantity per chiller	2									
Condenser fans										
Number: Circuit-1/Circuit-2	8/8	9/9	9/9	13/7	12/8	12/12	13/13	10/10	10/10	13/13
Air on Condenser: min/max °F (°C)	0/125 (-17.8/51.7)									
Evaporator, shell and tube hybrid falling film ²										
Water volume gal (L)	113 (428)	71 (269)	113 (428)	96 (363)	130 (492)	96 (363)	96 (363)	130 (492)	147 (556)	147 (556)
Leaving water temperature: min/max °F (°C) ²	40/60 (4.4/15.6)									
Maximum water side pressure psig (barg)	150 (10.3)									
Maximum refrigerant side pressure psig (barg)	235 (16.2)									
Evaporator drain connection in. (mm)	3/4 (19)									

Notes:

- Shipping and operating weights are not shown as selected options may add weight to unit. Contact your nearest Johnson Controls sales office for weight data.
- For leaving liquid temperatures below 40°F (4.4°C) or above 70°F (21.1°C), contact your nearest Johnson Controls sales office for application requirements.

Evaporator options

Optional one-pass evaporator

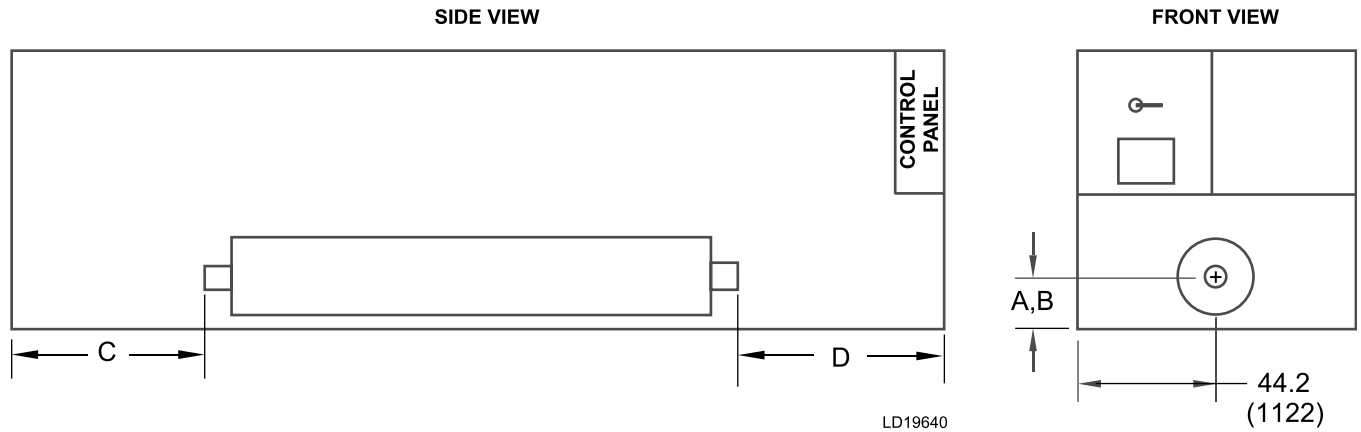


ALL DIMENSIONS, IN. (MM)								
YVAA		A,B	C	D	E NOZZLE SIZE	WATER VOLUME. GAL (L)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.							
15	3	20.8 (528)	6.8 (173)	34.5 (876)	8	58 (220)	500 (32)	1970 (124)
16	5	20.8 (528)	29.2 (742)	56.1 (1425)	8	58 (220)	500 (32)	1970 (124)
17	8	20.8 (528)	34.9 (886)	70 (1778)	8	71 (269)	590 (37)	2190 (138)
18	3	19.8 (503)	17.7 (450)	56.8 (1443)	6	48 (182)	400 (25)	1230 (77)
19	5	19.8 (503)	61.5 (1562)	56.7 (1440)	6	48 (182)	400 (25)	1230 (77)
19	8	21 (533)	117.3 (2979)	56.1 (1425)	8	58 (220)	500 (32)	1970 (124)
20	0	20.8 (528)	1.7 (43)	38.1 (968)	8	71 (269)	590 (37)	2190 (138)
21	3	19.8 (503)	61.7 (1567)	56.8 (1443)	6	48 (182)	400 (25)	1230 (77)
21	5	20.8 (528)	34.9 (886)	70 (1778)	8	71 (269)	590 (37)	2190 (138)
21	8	21 (533)	78.9 (2004)	70 (1778)	8	71 (269)	590 (37)	2190 (138)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Optional one-pass evaporator

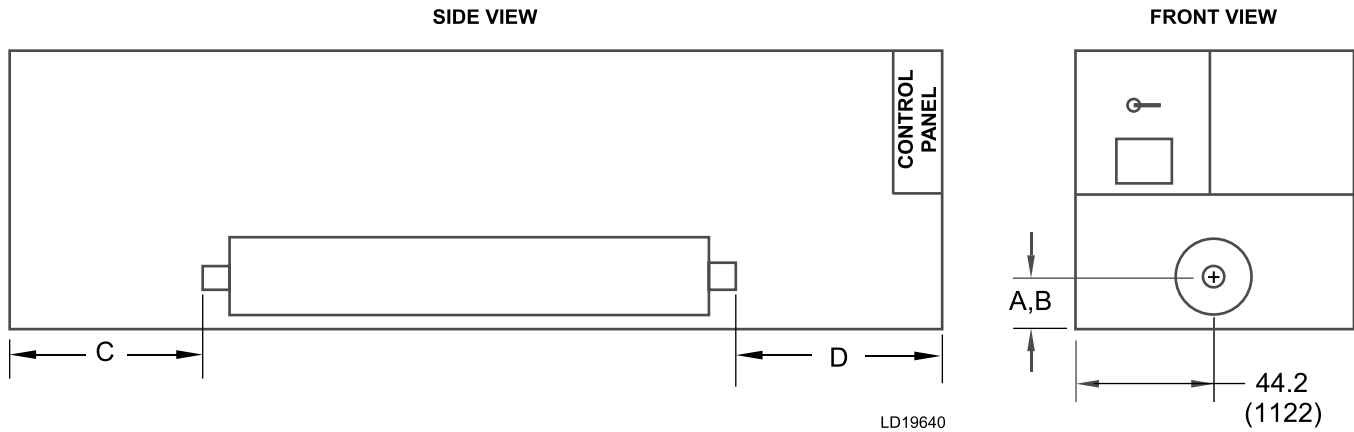


ALL DIMENSIONS, IN. (MM)								
YVAA		A,B	C	D	E NOZZLE SIZE	WATER VOLUME. GAL (L)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.							
23	3	20.8 (528)	73.2 (1859)	56.1 (1425)	8	58 (220)	500 (32)	1970 (124)
24	5	21 (533)	92.9 (2360)	56.1 (1425)	8	71 (269)	590 (37)	2190 (138)
24	8	21 (533)	122.9 (3122)	70 (1778)	8	71 (269)	590 (37)	2190 (138)
26	3	21 (533)	117.1 (2974)	56.1 (1425)	8	58 (220)	500 (32)	1970 (124)
27	0	21 (533)	16.8 (427)	51.9 (1318)	8	82 (310)	590 (37)	2190 (138)
27	3	21 (533)	42.9 (1090)	70 (1778)	8	82 (310)	590 (37)	2190 (138)
27	5	22.5 (572)	44.7 (1135)	71.8 (1824)	10	113 (428)	810 (51)	3200 (202)
27	8	22.5 (572)	88.3 (2243)	71.8 (1824)	10	113 (428)	810 (51)	3200 (202)
29	5	22.5 (572)	88.6 (2250)	71.8 (1824)	10	113 (428)	810 (51)	3200 (202)
30	3	21 (533)	122.9 (3122)	70 (1778)	8	71 (269)	590 (37)	2190 (138)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Optional one-pass evaporator

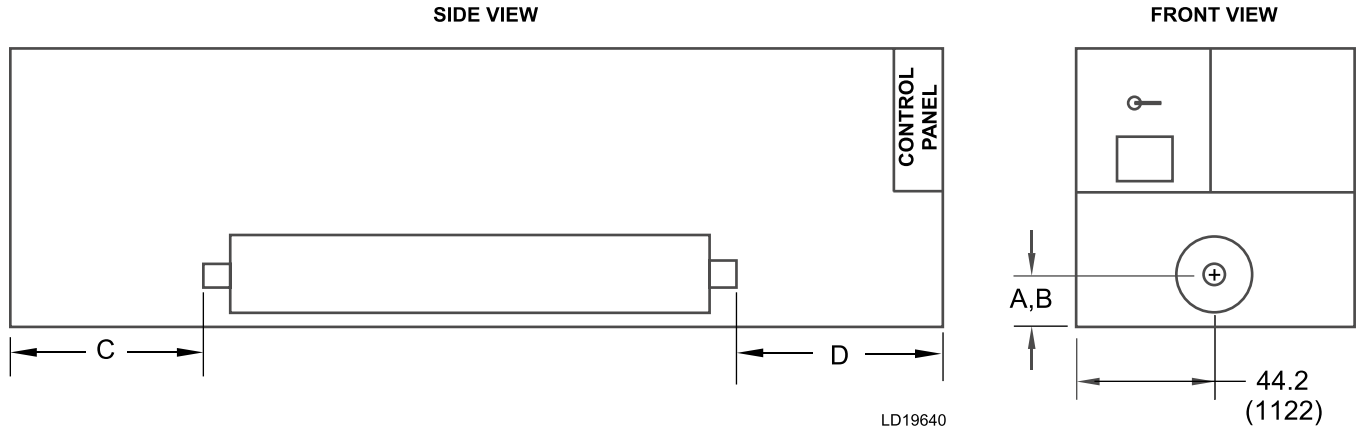


ALL DIMENSIONS, IN. (MM)								
YVAA		A,B	C	D	E NOZZLE SIZE	WATER VOLUME. GAL (L)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.							
30	5	21 (533)	166.9 (4239)	70 (1778)	8	71 (269)	590 (37)	2190 (138)
30	8	22.5 (572)	132.2 (3358)	71.8 (1824)	10	113 (428)	810 (51)	3200 (202)
31	8	22.5 (572)	176.6 (4486)	71.8 (1824)	10	113 (428)	810 (51)	3200 (202)
32	3	22.5 (572)	88.6 (2250)	71.8 (1824)	10	113 (428)	810 (51)	3200 (202)
33	3	21 (533)	166.9 (4239)	70 (1778)	8	71 (269)	590 (37)	2190 (138)
34	3	22.5 (572)	132.6 (3368)	71.8 (1824)	10	113 (428)	810 (51)	3200 (202)
34	5	22.5 (572)	176.21 (4476)	71.8 (1824)	10	113 (428)	810 (51)	3200 (202)
36	8	23.3 (592)	208.6 (5298)	83.5 (2121)	10	147 (556)	1090 (69)	3420 (215)
37	3	22.3 (566)	180.9 (4595)	112.2 (2850)	10	96 (363)	840 (53)	3320 (209)
37	5	23.3 (592)	164.3 (4173)	83.4 (2118)	10	147 (556)	1090 (69)	3420 (215)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Optional one-pass evaporator



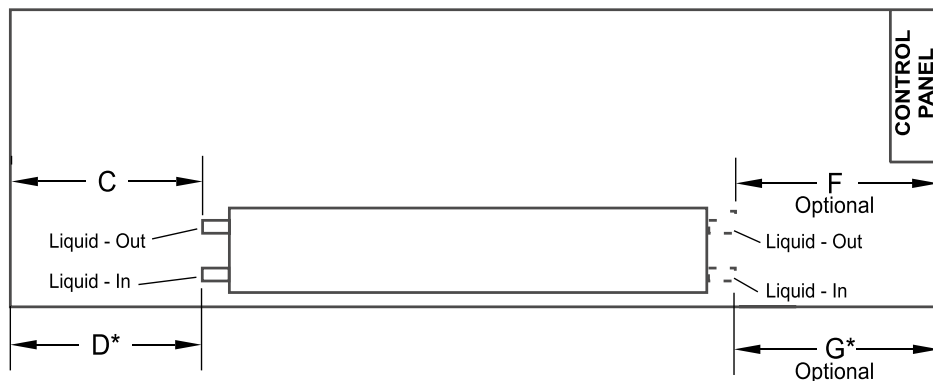
ALL DIMENSIONS, IN. (MM)								
YVAA		A,B	C	D	E NOZZLE SIZE	WATER VOLUME. GAL (L)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.							
41	3	22.5 (572)	164.6 (4181)	83.8 (2129)	10	130 (492)	940 (59)	3420 (215)
44	3	22.3 (566)	287.1 (7292)	94.2 (2393)	10	96 (363)	840 (53)	3320 (209)
48	3	22.3 (566)	331.2 (8412)	94.2 (2393)	10	96 (363)	840 (53)	3320 (209)
49	0	22.5 (571)	176.5 (4482)	71.7 (1820)	10	130 (492)	940 (59)	3420 (215)
50	0	23.3 (592)	176.2 (4475)	71.5 (1816)	10	147 (556)	1090 (69)	3420 (215)
52	3	23.3 (592)	308.4 (7833)	71.5 (1816)	10	147 (556)	1090 (69)	3420 (215)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Standard two-pass, rear inlet/outlet evaporator

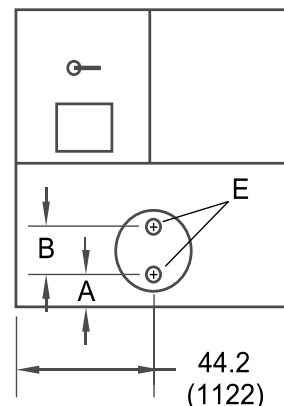
SIDE VIEW



*Only where indicated with a different length

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FRONT VIEW

44.2
(1122)

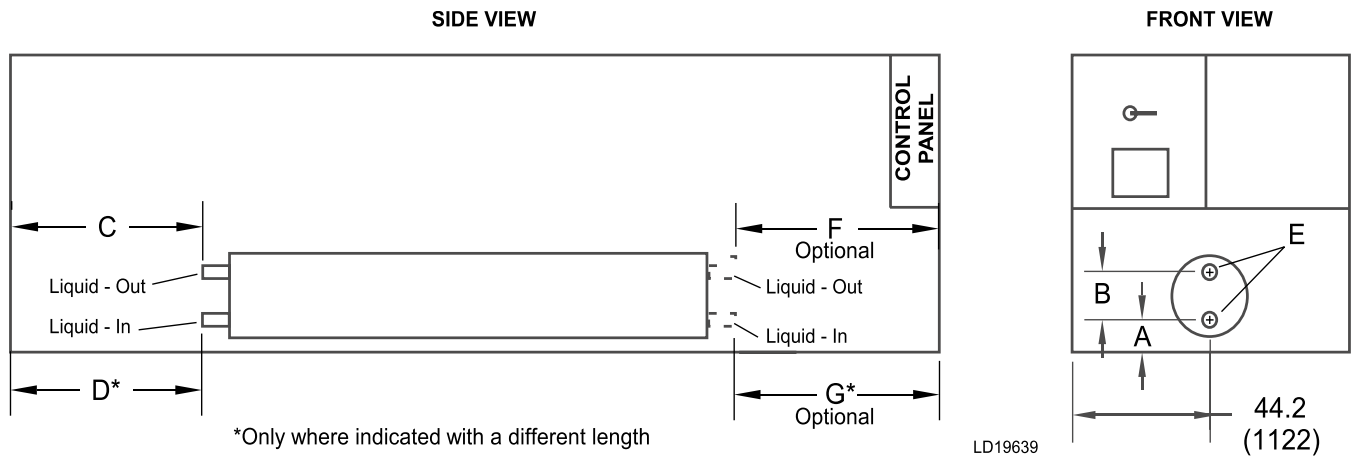
ALL DIMENSIONS - IN. (MM)

YVAA		A	B	C	D	E NOZZLE SIZE	F	G	WATER VOLUME GAL (L)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.										
15	3	15.1 (384)	11.4 (290)	6.8 (173)	—	6	34.5 (876)	—	58 (220)	250 (16)	980 (62)
16	5	15.1 (384)	11.4 (290)	29.4 (747)	—	6	56.1 (1425)	—	58 (220)	250 (16)	980 (62)
17	8	15.1 (384)	11.4 (290)	34.9 (886)	—	6	70 (1778)	—	71 (269)	300 (19)	1170 (74)
18	3	14.1 (358)	11.4 (290)	17.7 (450)	—	6	56.8 (1443)	—	48 (182)	200 (13)	790 (50)
19	5	14.1 (358)	11.4 (290)	61.5 (1562)	—	6	56.7 (1440)	—	48 (182)	200 (13)	790 (50)
19	8	15.3 (389)	11.4 (290)	117.3 (2979)	—	6	56.1 (1425)	—	58 (220)	250 (16)	980 (62)
20	0	15.1 (384)	11.4 (290)	1.7 (43)	—	6	38.1 (968)	—	71 (269)	300 (19)	1170 (74)
21	3	14.1 (358)	11.4 (290)	61.7 (1567)	—	6	58.8 (1494)	—	48 (182)	200 (13)	790 (50)
21	5	15.1 (384)	11.4 (290)	29.9 (759)	—	6	70 (1778)	—	71 (269)	300 (19)	1170 (74)
21	8	15.3 (389)	11.4 (290)	78.9 (2004)	—	6	70.3 (1786)	—	71 (269)	300 (19)	1170 (74)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Standard two-pass, rear inlet and outlet evaporator



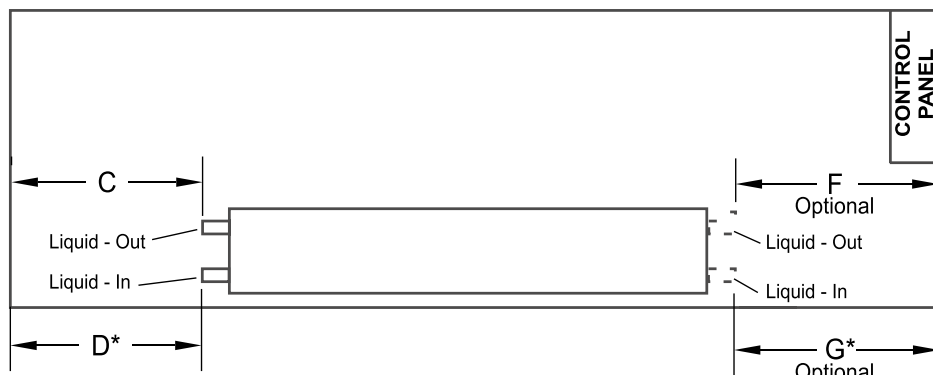
ALL DIMENSIONS - IN. (MM)											
YVAA		A	B	C	D	E NOZZLE SIZE	F	G	WATER VOLUME GAL (L)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.										
23	3	15.1 (384)	11.4 (290)	73.3 (1862)	—	6	56.1 (1425)	—	58 (220)	250 (16)	980 (62)
24	5	15.3 (389)	11.4 (290)	29.9 (759)	—	6	56.1 (1425)	—	71 (269)	300 (19)	1170 (74)
24	8	15.3 (389)	11.4 (290)	122.9 (3122)	—	6	70 (1778)	—	71 (269)	300 (19)	1170 (74)
26	3	15.3 (389)	11.4 (290)	117.3 (2979)	—	6	56.1 (1425)	—	58 (220)	250 (16)	980 (62)
27	0	15.3 (388)	11.4 (290)	16.8 (427)	—	6	51.9 (1318)	—	82 (310)	300 (19)	1170 (74)
27	3	15.3 (389)	11.4 (290)	42.9 (1090)	—	6	70 (1778)	—	82 (310)	300 (19)	1170 (74)
27	5	15.5 (394)	14 (356)	44.3 (1125)	—	8	71.8 (1824)	—	113 (428)	410 (26)	1600 (101)
27	8	15 (381)	14 (356)	88.3 (2243)	—	8	71.8 (1824)	—	113 (428)	410 (26)	1600 (101)
29	5	15.5 (394)	14 (356)	88.3 (2243)	—	8	71.8 (1824)	—	113 (428)	410 (26)	1600 (101)
30	3	15.3 (389)	11.4 (290)	122.9 (3122)	—	6	70 (1778)	—	71 (269)	300 (19)	1170 (74)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Standard two-pass, rear inlet and outlet evaporator

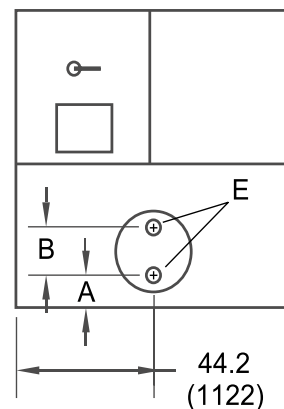
SIDE VIEW



*Only where indicated with a different length

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FRONT VIEW

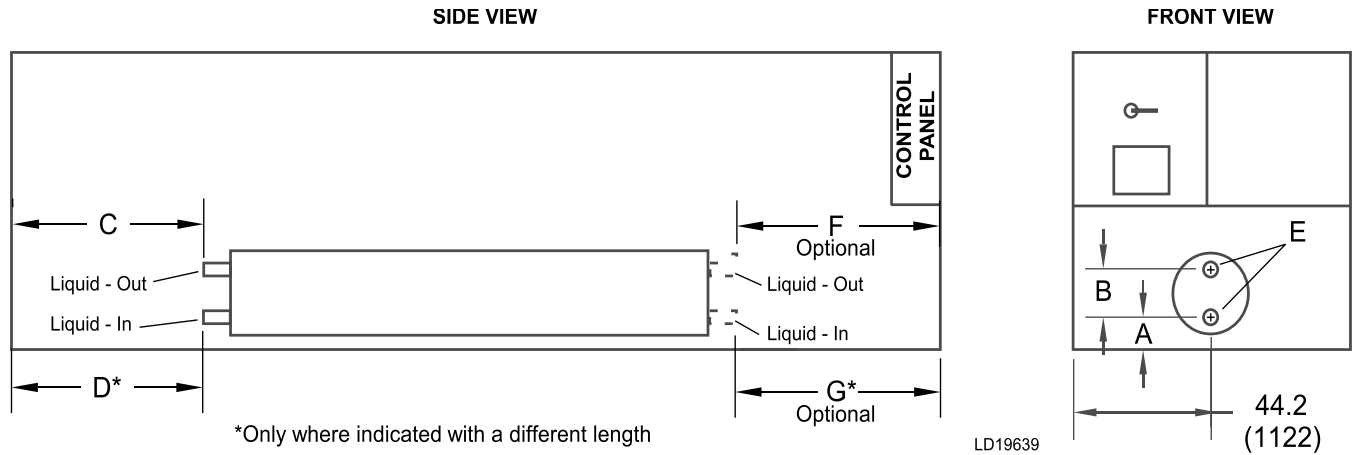


ALL DIMENSIONS - IN. (MM)											
YVAA		A	B	C	D	E NOZZLE SIZE	F	G	WATER VOLUME GAL (L)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.										
30	5	15.3 (389)	11.4 (290)	166.8 (4237)	—	6	70 (1778)	—	71 (269)	300 (19)	1170 (74)
30	8	15.5 (394)	14 (356)	132.2 (3358)	—	8	83.4 (2118)	—	113 (428)	410 (26)	1600 (101)
31	8	15.5 (394)	14 (356)	176.21 (4476)	—	8	83.4 (2118)	—	113 (428)	410 (26)	1600 (101)
32	3	15.5 (394)	14 (356)	88.6 (2250)	—	8	83.4 (2118)	—	113 (428)	410 (26)	1600 (101)
33	3	15.3 (389)	11.4 (290)	166.9 (4239)	—	6	83.4 (2118)	—	71 (269)	300 (19)	1170 (74)
34	3	15.5 (394)	14 (356)	132.2 (3358)	—	8	83.4 (2118)	—	113 (428)	410 (26)	1600 (101)
34	5	15.5 (394)	14 (356)	176.2 (4475)	—	8	83.4 (2118)	—	113 (428)	410 (26)	1600 (101)
36	8	16.3 (414)	14 (356)	208.5 (5296)	—	8	83.4 (2118)	—	147 (556)	550 (35)	2160 (136)
37	3	15.8 (401)	13 (330)	180.9 (4595)	176.4 (4480)	8	112.2 (2850)	107.7 (2735)	96 (363)	420 (26)	1660 (105)
37	5	16.3 (414)	14 (356)	164.4 (4176)	—	8	83.4 (2118)	—	147 (556)	550 (35)	2160 (136)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Standard two-pass, rear inlet and outlet evaporator

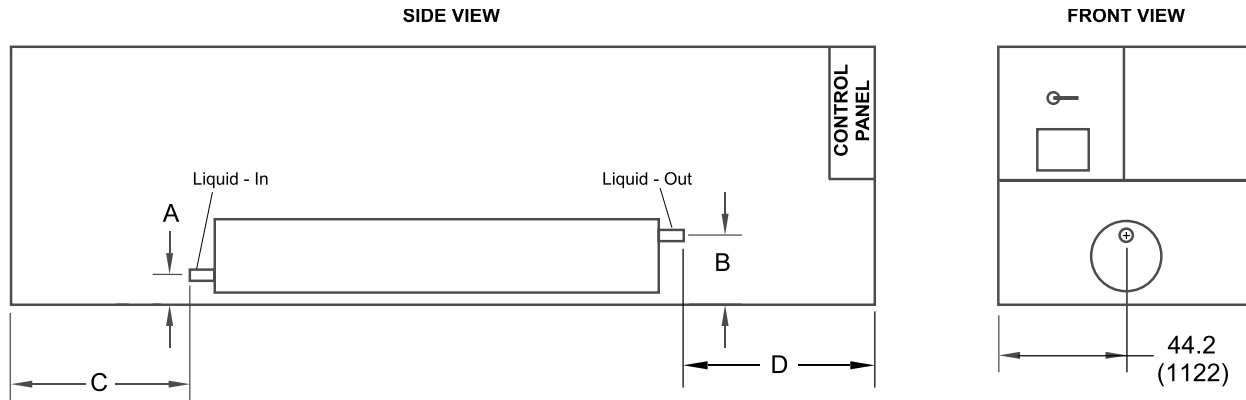


ALL DIMENSIONS - IN. (MM)											
YVAA		A	B	C	D	E NOZZLE SIZE	F	G	WATER VOLUME GAL (L)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.										
41	3	15.5 (394)	14 (356)	164.6 (4181)	—	8	83.8 (2129)	—	130 (492)	470 (30)	1870 (118)
44	3	15.8 (401)	13 (330)	287.1 (7292)	282.5 (7177)	8	94.2 (2393)	89.7 (2278)	96 (363)	420 (26)	1660 (105)
48	3	15.8 (401)	13 (330)	331.2 (8412)	326.6 (8296)	8	94.2 (2393)	89.7 (2278)	96 (363)	420 (26)	1660 (105)
49	0	15.5 (394)	14 (355)	176.5 (4482)	—	8	71.7 (1820)	—	130 (492)	470 (30)	1870 (118)
50	0	16.3 (414)	14 (356)	176.2 (4475)	—	8	71.5 (1816)	—	147 (556)	550 (35)	2160 (136)
52	3	16.3 (414)	14 (356)	308.4 (7833)	—	8	71.5 (1816)	—	147 (556)	550 (35)	2160 (136)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Optional three-pass rear inlet and front outlet evaporator



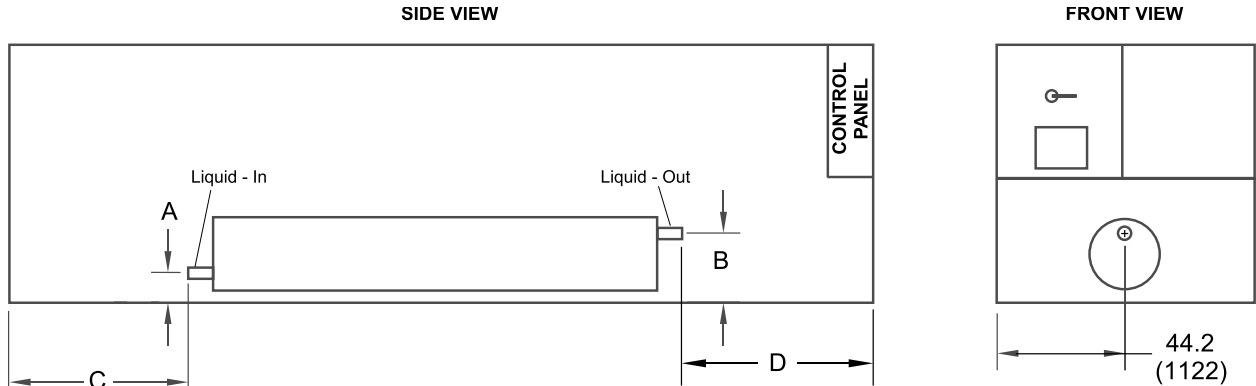
LD19641

ALL DIMENSIONS, IN. (MM)									
YVAA		A	B	C	D	E NOZZLE SIZE	WATER VOLUME GALLONS (LITERS)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.								
15	3	15.1 (384)	26.5 (673)	6.8 (173)	34.5 (876)	5	58 (220)	170 (11)	650 (41)
16	5	15.1 (384)	26.5 (673)	29.2 (742)	56.1 (1425)	5	58 (220)	170 (11)	650 (41)
17	8	15.1 (384)	26.5 (673)	34.9 (886)	70 (1778)	6	71 (269)	200 (13)	780 (49)
18	3	25.5 (648)	25.5 (648)	17.7 (450)	56.8 (1443)	5	48 (182)	130 (8)	520 (33)
19	5	14.1 (358)	25.5 (648)	61.5 (1562)	56.7 (1440)	5	48 (182)	130 (8)	520 (33)
19	8	15.3 (389)	26.7 (678)	117.3 (2979)	56.1 (1425)	5	58 (220)	170 (11)	650 (41)
20	0	15.1 (384)	26.53 (674)	1.7 (43)	38.1 (968)	6	71 (269)	200 (13)	780 (49)
21	3	14.1 (358)	25.5 (648)	61.6 (1565)	58.8 (1494)	5	48 (182)	130 (8)	520 (33)
21	5	15.1 (384)	26.5 (673)	34.9 (886)	70 (1778)	6	71 (269)	200 (13)	780 (49)
21	8	15.3 (389)	26.7 (678)	78.9 (2004)	70.3 (1786)	6	71 (269)	200 (13)	780 (49)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Optional three-pass rear inlet and front outlet evaporator



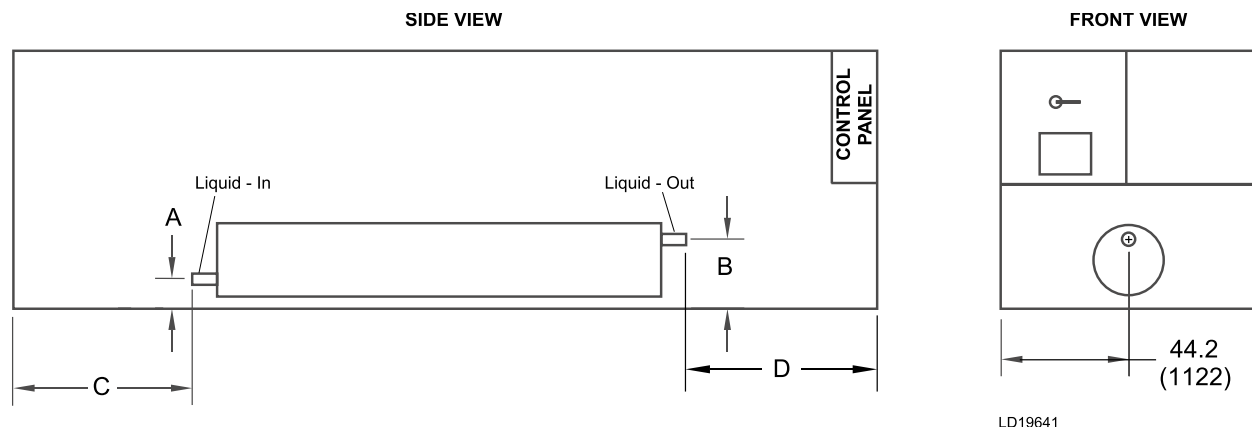
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ALL DIMENSIONS, IN. (MM)									
YVAA		A	B	C	D	E NOZZLE SIZE	WATER VOLUME GALLONS (LITERS)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.								
23	3	14.1 (358)	25.5 (648)	73.2 (1859)	56.1 (1425)	5	58 (220)	170 (11)	650 (41)
24	5	15.3 (389)	26.7 (678)	29.9 (759)	56.1 (1425)	6	71 (269)	200 (13)	780 (49)
24	8	15.3 (389)	26.7 (678)	122.9 (3122)	70 (1778)	6	71 (269)	200 (13)	780 (49)
26	3	15.3 (389)	26.7 (678)	117.1 (2974)	56.1 (1425)	5	58 (220)	170 (11)	650 (41)
27	0	15.3 (388)	26.7 (678)	16.8 (427)	51.9 (1318)	6	82 (310)	200 (13)	780 (49)
27	3	15.3 (389)	26.7 (678)	42.9 (1090)	70 (1778)	6	82 (310)	200 (13)	780 (49)
27	5	15.5 (394)	29.5 (749)	88.6 (2250)	71.8 (1824)	6	113 (428)	270 (17)	1060 (67)
27	8	15.5 (394)	29.5 (749)	88.3 (2243)	71.8 (1824)	6	113 (428)	270 (17)	1060 (67)
29	5	15.5 (394)	29.5 (749)	88.6 (2250)	71.8 (1824)	6	113 (428)	270 (17)	1060 (67)
30	3	15.3 (389)	26.7 (678)	122.9 (3122)	70 (1778)	6	71 (269)	200 (13)	780 (49)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Optional three-pass rear inlet and front outlet evaporator

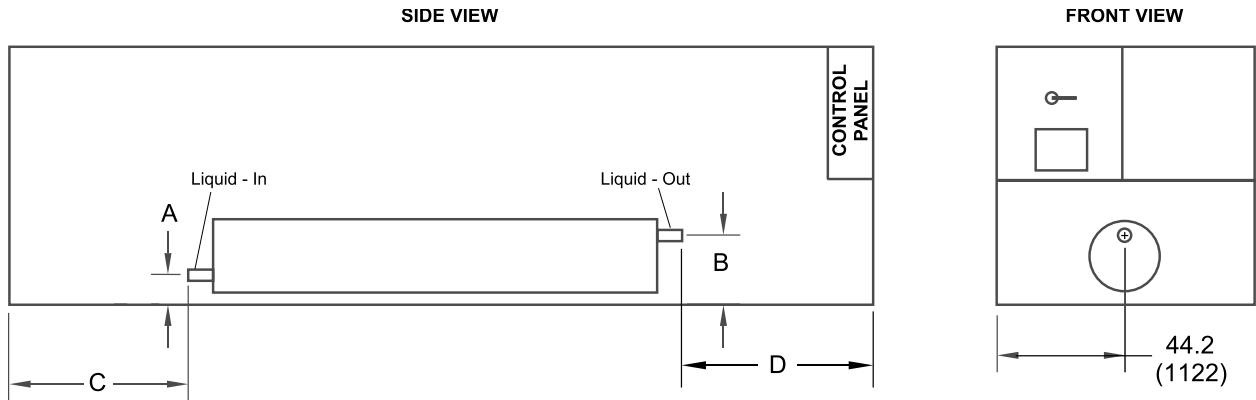


ALL DIMENSIONS, IN. (MM)									
YVAA		A	B	C	D	E NOZZLE SIZE	WATER VOLUME GALLONS (LITERS)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.								
30	5	15.3 (389)	26.7 (678)	166.9 (4239)	70 (1778)	6	71 (269)	200 (13)	780 (49)
30	8	15 (381)	30.3 (770)	132.2 (3358)	71.8 (1824)	6	113 (428)	270 (17)	1060 (67)
31	8	15 (381)	29.5 (749)	176.6 (4486)	71.8 (1824)	6	113 (428)	270 (17)	1060 (67)
32	3	15.5 (394)	29.5 (749)	88.6 (2250)	71.8 (1824)	6	113 (428)	270 (17)	1060 (67)
33	3	15.3 (389)	26.7 (678)	166.9 (4239)	70 (1778)	6	71 (269)	200 (13)	780 (49)
34	3	15.5 (394)	29.5 (749)	132.6 (3368)	71.8 (1824)	6	113 (428)	270 (17)	1060 (67)
34	5	15.5 (394)	29.5 (749)	176.2 (4475)	71.8 (1824)	6	113 (428)	270 (17)	1060 (67)
36	8	16.3 (414)	30.3 (770)	208.6 (5298)	83.5 (2121)	8	147 (556)	370 (23)	1440 (91)
37	3	15.8 (401)	28.8 (732)	180.9 (4595)	112.2 (2850)	6	94 (356)	280 (18)	1100 (69)
37	5	16.3 (414)	30.3 (770)	164.3 (4173)	83.4 (2118)	8	147 (556)	370 (23)	1440 (91)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Evaporator options (cont'd)

Optional three-pass rear inlet and front outlet evaporator



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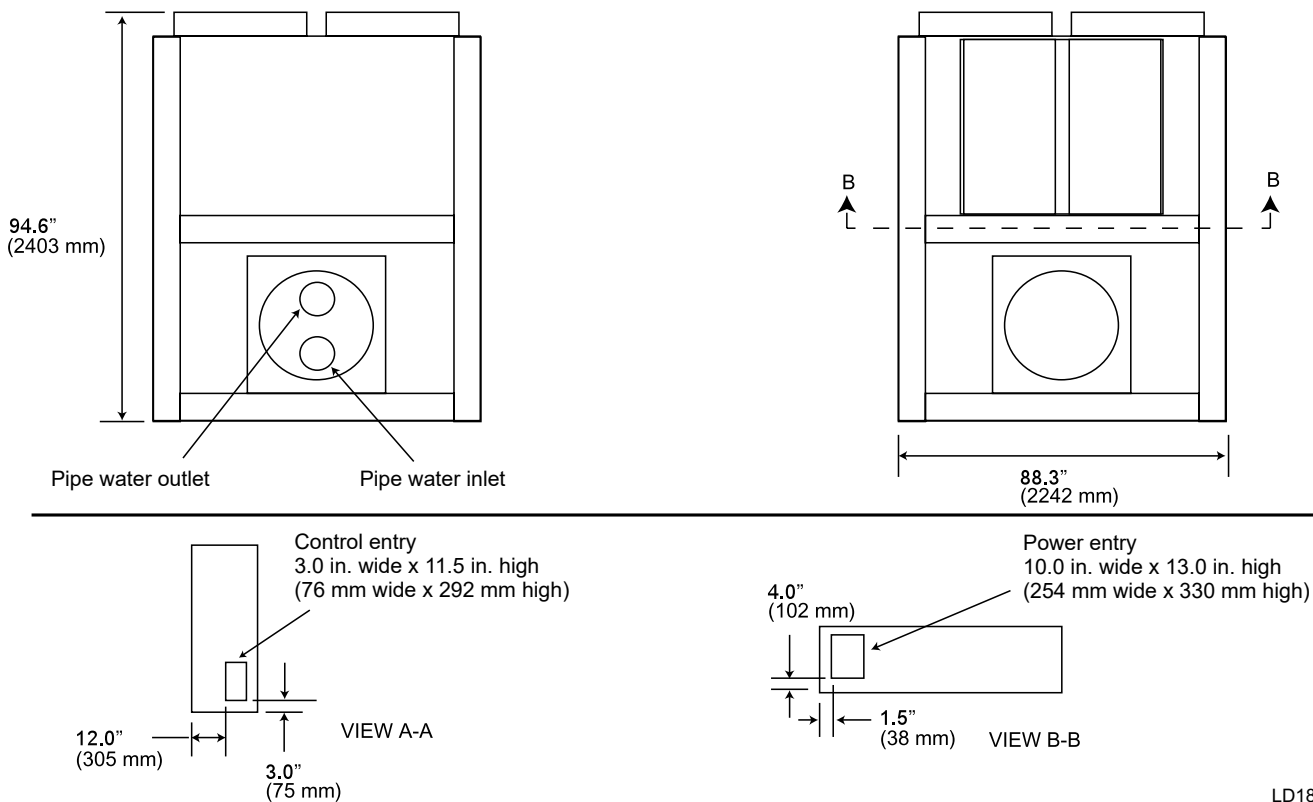
ALL DIMENSIONS, IN. (MM)									
YVAA		A	B	C	D	E NOZZLE SIZE	WATER VOLUME GALLONS (LITERS)	MINIMUM CHILLED WATER FLOW RATE GPM (L/S)	MAXIMUM CHILLED WATER FLOW RATE GPM (L/S)
FRAME	COND.								
41	3	15.5 (394)	29.5 (749)	164.6 (4181)	83.8 (2129)	6	128 (485)	320 (20)	1230 (77)
44	3	15.8 (401)	28.8 (732)	287.1 (7292)	94.2 (2393)	6	94 (356)	280 (18)	1100 (69)
48	3	15.8 (401)	28.8 (732)	331.2 (8412)	94.2 (2393)	6	94 (356)	280 (18)	1100 (69)
49	0	15.5 (394)	29.5 (749)	176.2 (4476)	71.5 (1817)	6	130 (492)	320 (20)	1230 (77)
50	0	16.3 (414)	30.3 (770)	176.2 (4475)	71.5 (1816)	8	147 (556)	370 (23)	1440 (91)
52	3	16.3 (414)	30.3 (770)	308.4 (7833)	71.5 (1816)	8	147 (556)	370 (23)	1440 (91)

Note: Minimum Chilled Water Flow Rate is for full load selections; Variable Primary Flow ratings as low as 50% of the minimum are permitted. Glycol limits are higher. Contact your JCI Sales Office for ratings and further information.

Dimensions

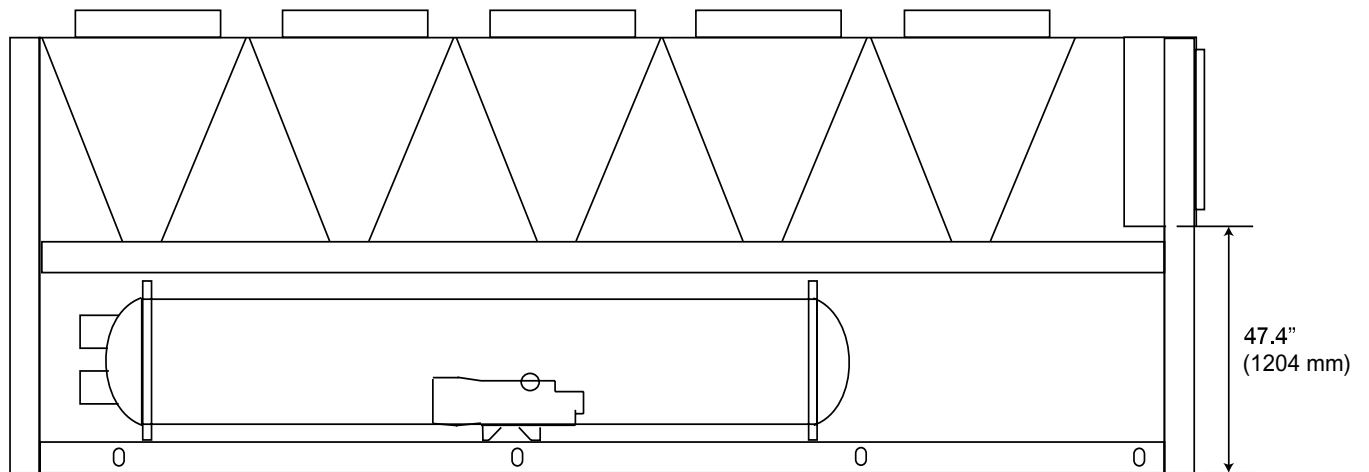
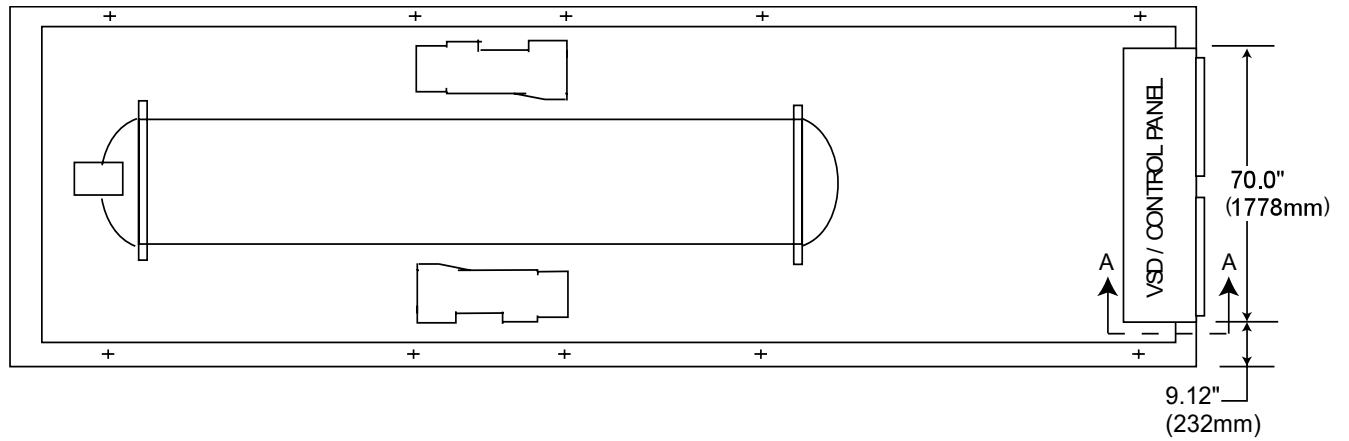
The data shown in this figure is applicable to selected typical configurations. Other configurations are available through our configuration and selection software. Contact your nearest Johnson Controls Sales Office for the chiller configuration that best matches your specific needs.

English and SI dimensions



LD18586

Dimensions (cont'd)



LD18587

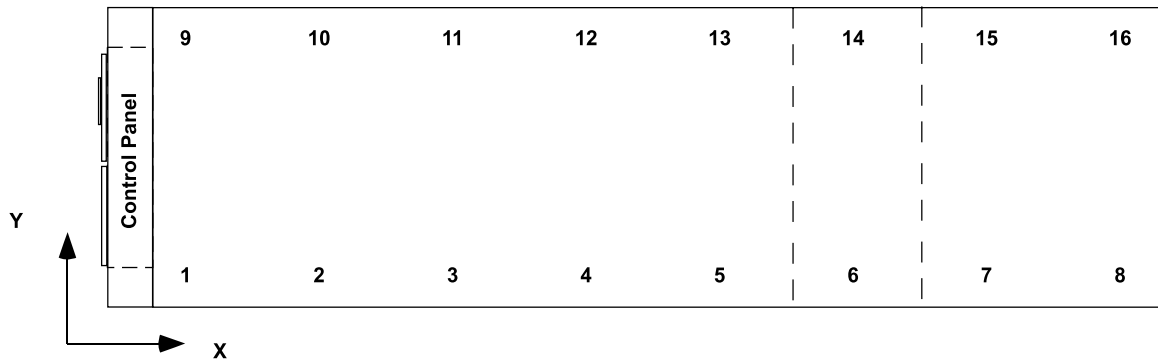
Isolator locations



LD18587

YVAA MODEL			DESCRIPTION	1	2	3	4	5	6	7	8
FRAME	COND	EVAP									
15	3	B	Isolator X-Dimension, in. (mm)	10 (254)	73 (1,854)	144 (3,658)	193 (4,902)				
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
16	5	B	Isolator X-Dimension, in. (mm)	10 (254)	77 (1,956)	118 (2,997)	157 (3,988)	220 (5,588)			
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
17	8	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	149 (3,785)	187 (4,750)	251 (6,375)			
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
18	3	A	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	124 (3,150)	163 (4,140)	210 (5,334)			
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
19	5	A	Isolator X-Dimension, in. (mm)	10 (259)	76 (1,930)	118 (2,997)	157 (3,988)	208 (5,283)	281 (7,134)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
19	8	B	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	118 (2,997)	157 (3,988)	209 (5,309)	308 (7,823)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							

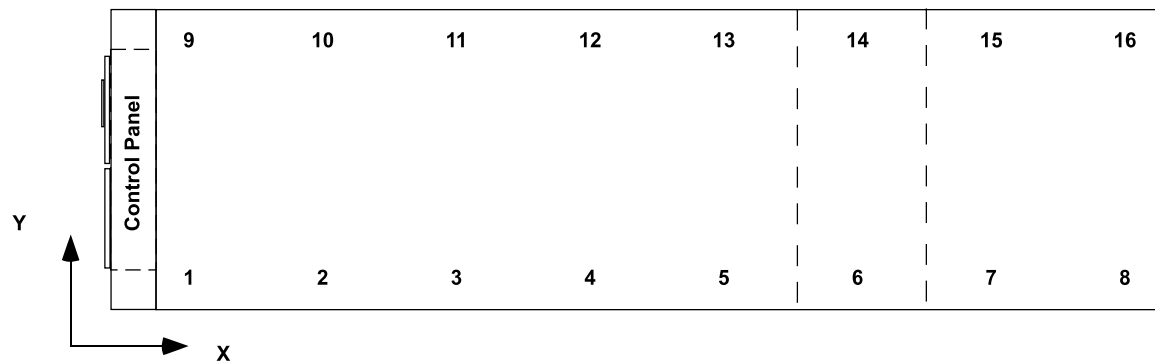
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	9	10	11	12	13	14	15	16
FRAME	COND	EVAP									
15	3	B	Isolator X-Dimension, in. (mm)	10 (254)	73 (1,854)	144 (3,658)	193 (4,902)				
			Isolator Y-Dimension, in. (mm)	87 (2210)							
16	5	B	Isolator X-Dimension, in. (mm)	10 (254)	77 (1,956)	118 (2,997)	157 (3,988)	220 (5,588)			
			Isolator Y-Dimension, in. (mm)	87 (2210)							
17	8	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	149 (3,785)	187 (4,750)	251 (6,375)			
			Isolator Y-Dimension, in. (mm)	87 (2210)							
18	3	A	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	124 (3,150)	163 (4,140)	210 (5,334)			
			Isolator Y-Dimension, in. (mm)	87 (2210)							
19	5	A	Isolator X-Dimension, in. (mm)	10 (259)	76 (1,930)	118 (2,997)	157 (3,988)	208 (5,283)	281 (7,134)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
19	8	B	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	118 (2,997)	157 (3,988)	209 (5,309)	308 (7,823)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							

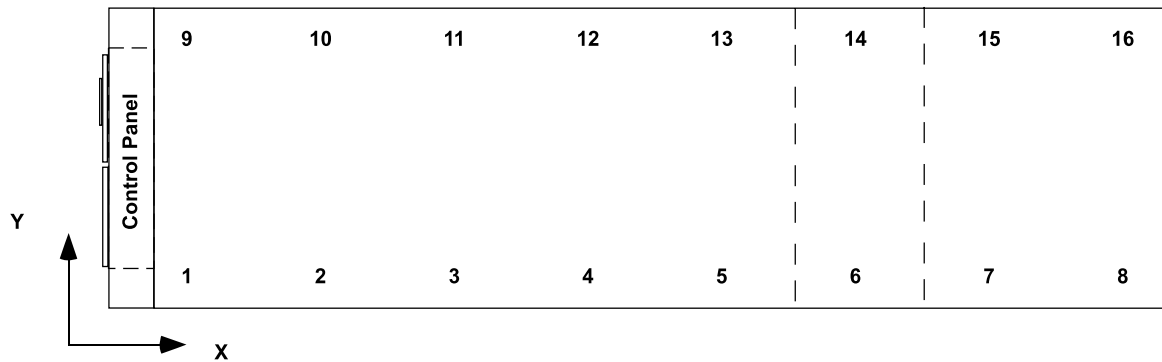
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	1	2	3	4	5	6	7	8
FRAME	COND	EVAP									
20	0	C	Isolator X-Dimension, in. (mm)	10 (254)	46 (1,168)	107 (2,718)	154 (3,912)	217 (5,512)			
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
21	3	A	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	118 (2,997)	157 (3,988)	209 (5,309)	281 (7,134)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
21	5	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	149 (3,785)	187 (4,750)	251 (6,375)			
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
21	8	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	149 (3,785)	187 (4,750)	235 (5,969)	301 (7,645)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
23	3	B	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	118 (2,997)	157 (3,988)	209 (5,309)	281 (7,134)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
24	5	C	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	128 (3,251)	173 (4,394)	220 (5,588)	301 (7,645)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							

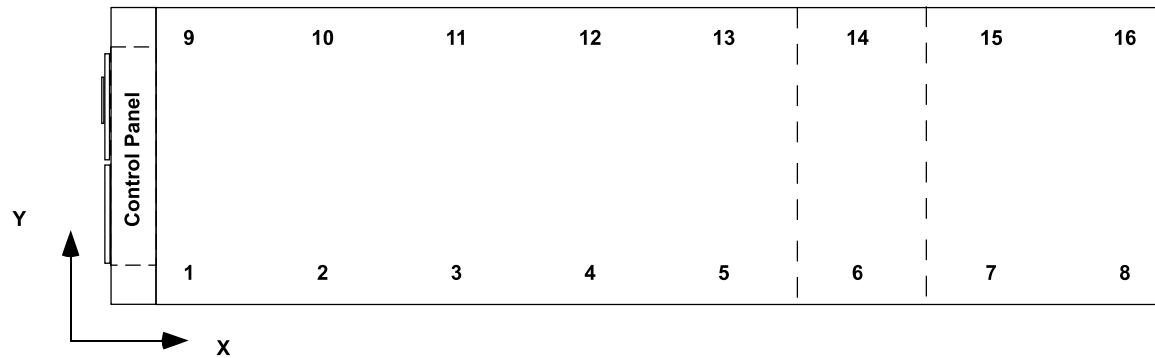
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	9	10	11	12	13	14	15	16
FRAME	COND	EVAP									
20	0	C	Isolator X-Dimension, in. (mm)	10 (254)	46 (1,168)	107 (2,718)	154 (3,912)	217 (5,512)			
			Isolator Y-Dimension, in. (mm)	87 (2210)							
21	3	A	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	118 (2,997)	157 (3,988)	209 (5,309)	281 (7,134)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
21	5	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	149 (3,785)	187 (4,750)	251 (6,375)			
			Isolator Y-Dimension, in. (mm)	87 (2210)							
21	8	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	149 (3,785)	187 (4,750)	235 (5,969)	301 (7,645)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
23	3	B	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	118 (2,997)	157 (3,988)	209 (5,309)	281 (7,134)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
24	5	C	Isolator X-Dimension, in. (mm)	10 (254)	76 (1,930)	128 (3,251)	173 (4,394)	220 (5,588)	301 (7,645)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							

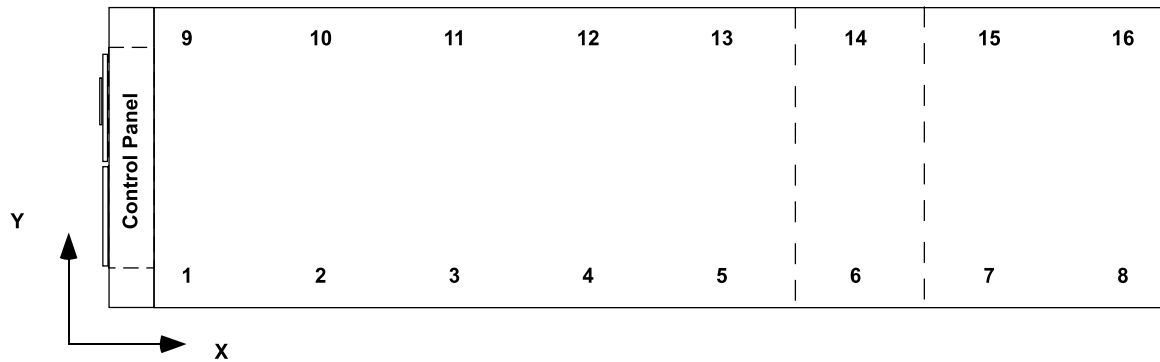
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	1	2	3	4	5	6	7	8
FRAME	COND	EVAP									
24	8	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	143 (3,632)	187 (4,750)	245 (6,223)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
26	3	B	Isolator X-Dimension, in. (mm)	10 (254)	77 (1,956)	118 (2,997)	157 (3,988)	209 (5,309)	308 (7,823)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
27	0	D	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	149 (3,785)	187 (4,750)	264 (6,706)			
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
27	3	D	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	301 (7,645)			
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
27	5	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	301 (7,645)			
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
27	8	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							

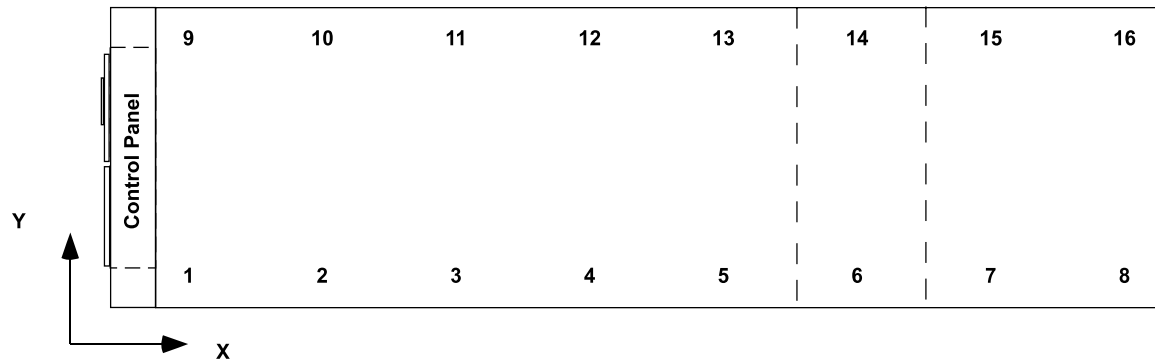
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	9	10	11	12	13	14	15	16
FRAME	COND	EVAP									
24	8	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	143 (3,632)	187 (4,750)	245 (6,223)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
26	3	B	Isolator X-Dimension, in. (mm)	10 (254)	77 (1,956)	118 (2,997)	157 (3,988)	209 (5,309)	308 (7,823)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
27	0	D	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	149 (3,785)	187 (4,750)	264 (6,706)			
			Isolator Y-Dimension, in. (mm)	87 (2210)							
27	3	D	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	301 (7,645)			
			Isolator Y-Dimension, in. (mm)	87 (2210)							
27	5	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	301 (7,645)			
			Isolator Y-Dimension, in. (mm)	87 (2210)							
27	8	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							

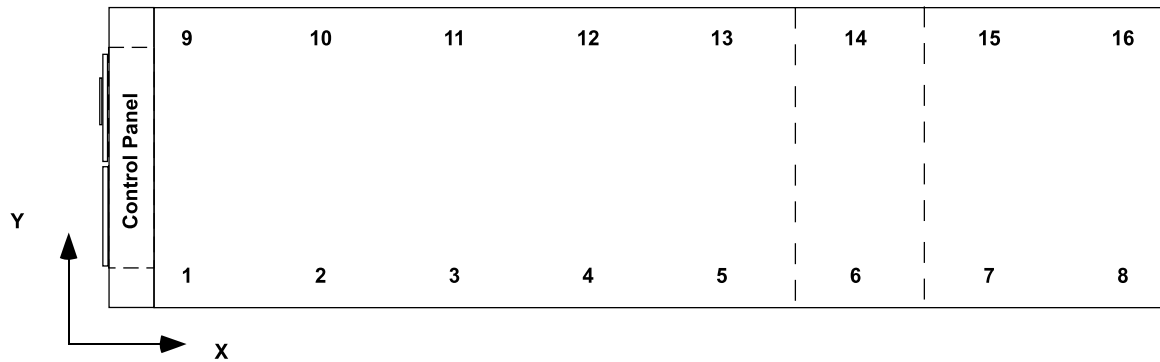
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	1	2	3	4	5	6	7	8
FRAME	COND	EVAP									
29	5	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	296 (7,518)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
30	3	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	143 (3,632)	187 (4,750)	245 (6,223)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
30	5	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	144 (3,658)	187 (4,750)	277 (7,036)	383 (9,728)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
30	8	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2054)	161 (4,089)	201 (5,105)	298 (7,569)	383 (9723)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
31	8	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
32	3	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							

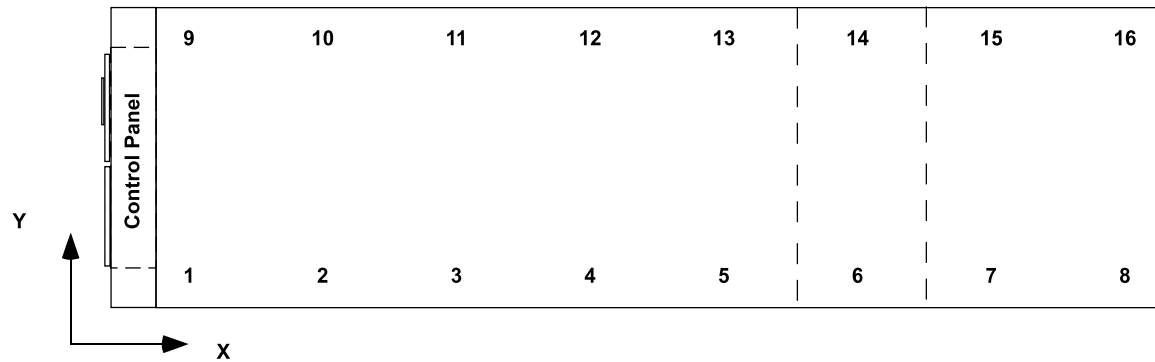
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	9	10	11	12	13	14	15	16
FRAME	COND	EVAP									
29	5	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	296 (7,518)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
30	3	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	143 (3,632)	187 (4,750)	245 (6,223)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
30	5	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	144 (3,658)	187 (4,750)	277 (7,036)	383 (9,728)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
30	8	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2054)	161 (4,089)	201 (5,105)	298 (7,569)	383 (9723)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
31	8	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
32	3	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	339 (8,611)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							

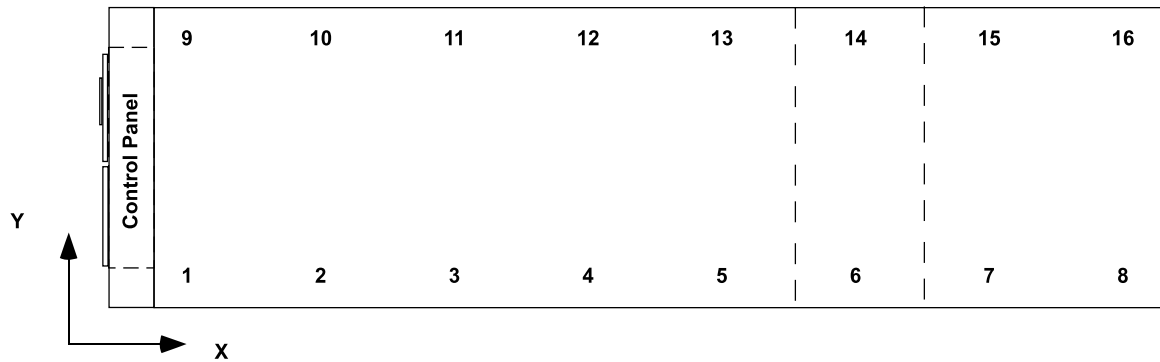
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	1	2	3	4	5	6	7	8
FRAME	COND	EVAP									
33	3	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	143 (3,632)	188 (4,775)	245 (6,223)	383 (9,728)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
34	3	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	383 (9,728)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
34	5	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
36	8	J	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	145 (3,683)	205 (5,207)	284 (7,214)	383 (9,728)	439 (11,151)	495 (12,573)
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
37	3	F	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	145 (3,683)	206 (5,232)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
37	5	J	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	145 (3,683)	206 (5,232)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							

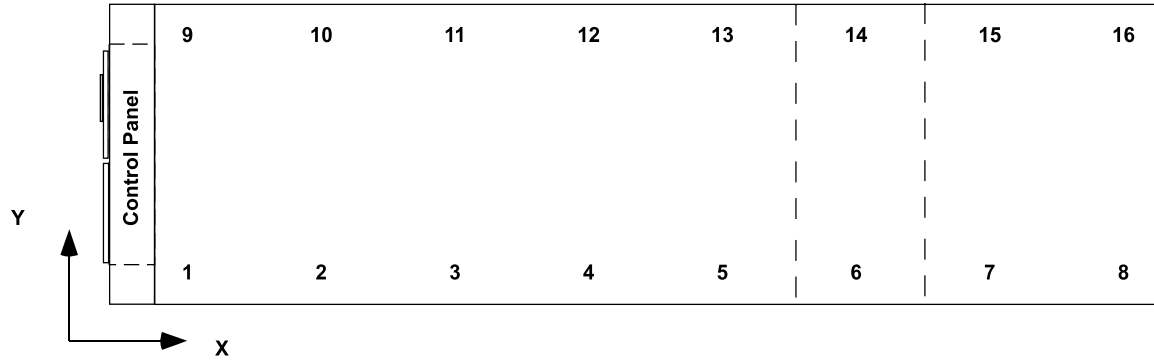
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	9	10	11	12	13	14	15	16
FRAME	COND	EVAP									
33	3	C	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	143 (3,632)	188 (4,775)	245 (6,223)	383 (9,728)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
34	3	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	383 (9,728)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
34	5	E	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	161 (4,089)	201 (5,105)	298 (7,569)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
36	8	J	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	145 (3,683)	205 (5,207)	284 (7,214)	383 (9,728)	439 (11,151)	495 (12,573)
			Isolator Y-Dimension, in. (mm)	87 (2210)							
37	3	F	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	145 (3,683)	206 (5,232)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
37	5	J	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	145 (3,683)	206 (5,232)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							

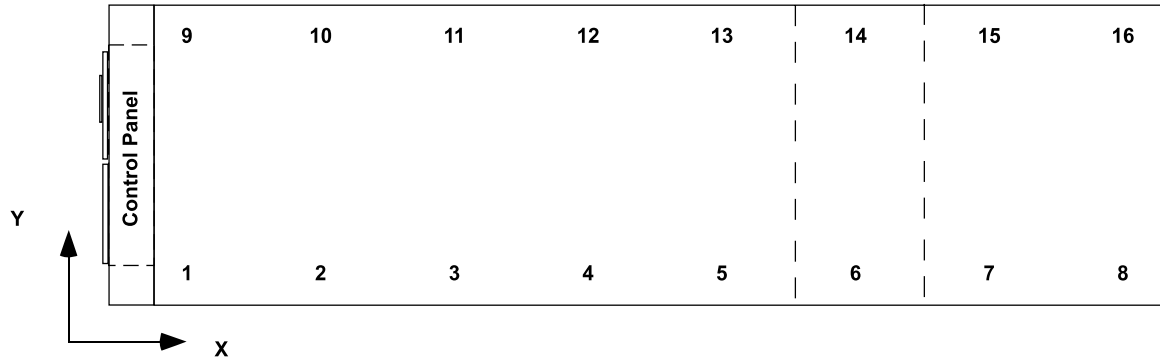
Isolator locations (cont'd)



LD18587

YVAA MODEL			DESCRIPTION	1	2	3	4	5	6	7	8
FRAME	COND	EVAP									
41	3	H	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	145 (3,683)	205 (5,207)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
44	3	G	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	206 (5,232)	284 (7,214)	427 (10,846)	483 (12,268)	539 (13,691)
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
48	3	G	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	206 (5,232)	284 (7,214)	427 (10,846)	505 (12,827)	562 (14,275)
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
49	0	K	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	205 (5,207)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
50	0	J	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	205 (5,207)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	1 (25.4)							
52	3	J	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	206 (5,232)	284 (7,214)	427 (10,846)	505 (12,827)	562 (14,275)
			Isolator Y-Dimension, in. (mm)	1 (25.4)							

Isolator locations (cont'd)

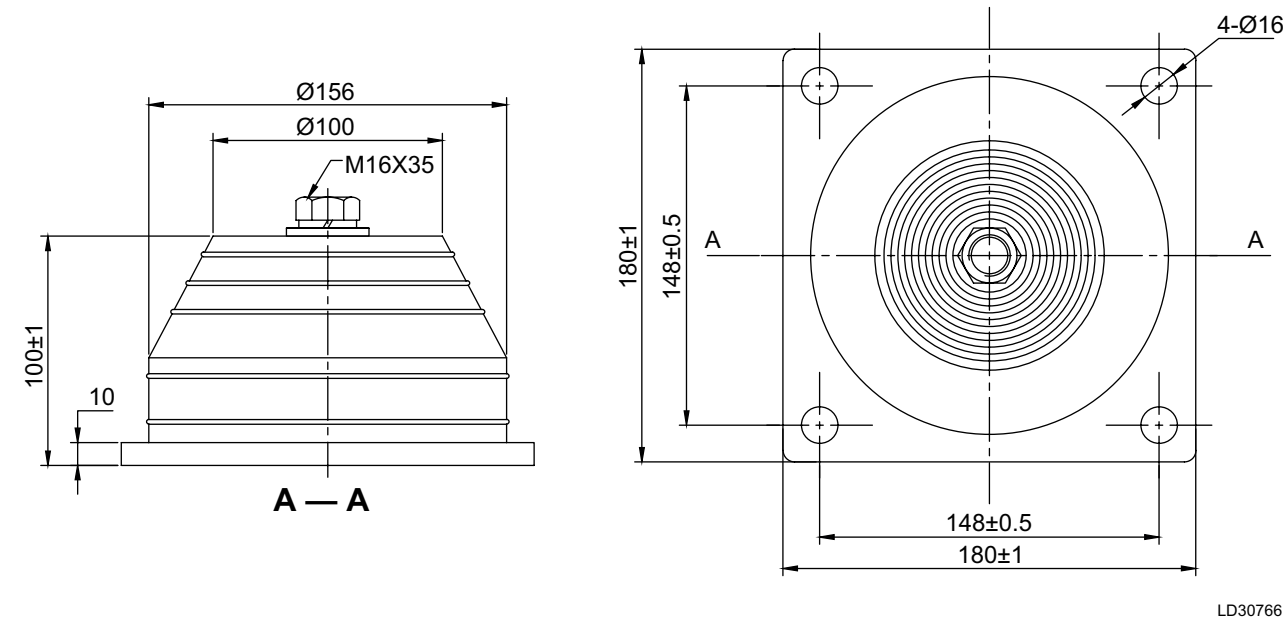


LD18587

YVAA MODEL			DESCRIPTION	9	10	11	12	13	14	15	16
FRAME	COND	EVAP									
41	3	H	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	145 (3,683)	205 (5,207)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
44	3	G	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	206 (5,232)	284 (7,214)	427 (10,846)	483 (12,268)	539 (13,691)
			Isolator Y-Dimension, in. (mm)	87 (2210)							
48	3	G	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	206 (5,232)	284 (7,214)	427 (10,846)	505 (12,827)	562 (14,275)
			Isolator Y-Dimension, in. (mm)	87 (2210)							
49	0	K	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	205 (5,207)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
50	0	J	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	205 (5,207)	284 (7,214)	427 (10,846)		
			Isolator Y-Dimension, in. (mm)	87 (2210)							
52	3	J	Isolator X-Dimension, in. (mm)	10 (254)	81 (2,057)	154 (3,912)	206 (5,232)	284 (7,214)	427 (10,846)	505 (12,827)	562 (14,275)
			Isolator Y-Dimension, in. (mm)	87 (2210)							

Isolators

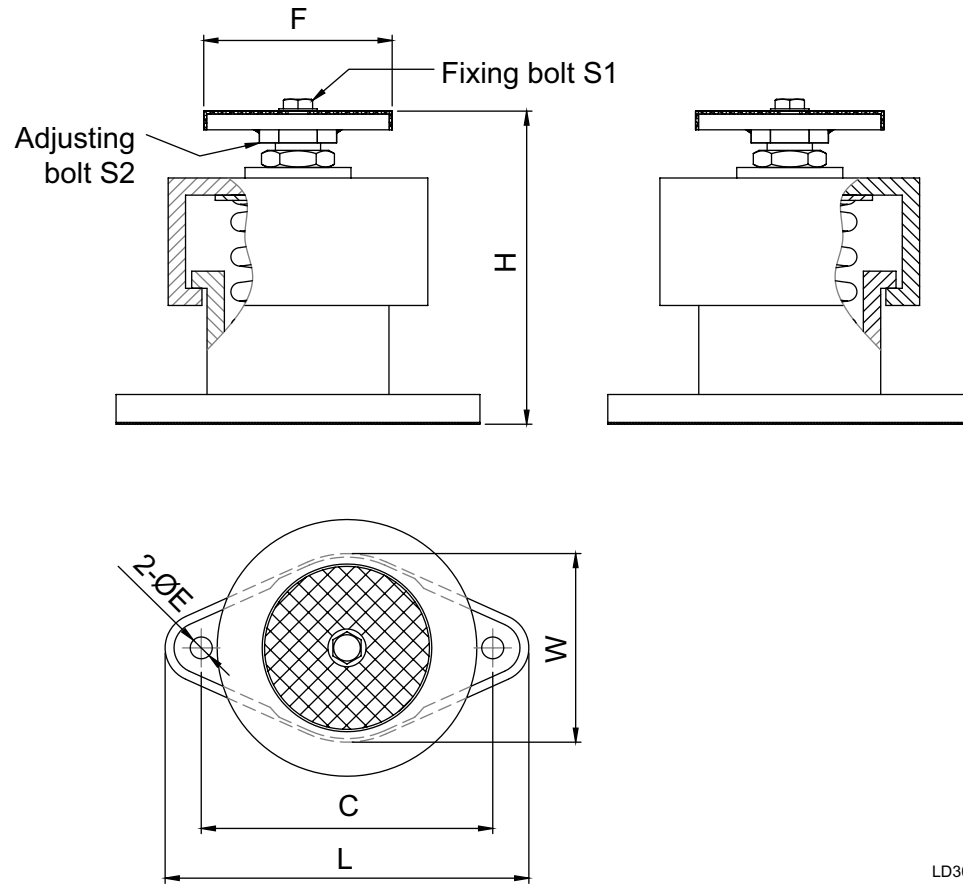
Elastomeric isolator



MODEL NUMBER	RATED CAPACITY		
	WEIGHT RANGE		PART NUMBER
	(LB)	(KG)	
JGS3-2	0 through 6600	0 through 3000	028W18490-000 (5771287)

Isolators (cont'd)

1 in. deflection spring isolator



LD30767

MOUNT TYPE	DIMENSION DATA (mm)							
	L	C	W	ΦE	F	H	S1	S2
MHD-C	206	165	108	12.5	100	181	M16x40	M24x80

MODEL NUMBER	RATED CAPACITY		
	WEIGHT RANGE		PART NUMBER
	(LB)	(KG)	
MHD-C-320	0 through 603	0 through 274	028W17891-007 (6020059)
MHD-C-450	604 through 849	275 through 386	028W17891-006 (6020060)
MHD-C-650	850 through 1226	387 through 557	028W17891-002 (5591892)
MHD-C-850	1227 through 1603	558 through 729	028W17891-005 (6020061)
MHD-C-1200	1604 through 2263	730 through 1029	028W17891-003 (5591891)
MHD-C-1650	2264 through 3111	1030 through 1414	028W17891-000 (5587457)
MHD-C-2000	3112 through 3771	1415 through 1714	028W17891-001 (5587456)
MHD-C-3000	3772 through 5657	1715 through 2571	028W17891-004 (5750707)

Notes:

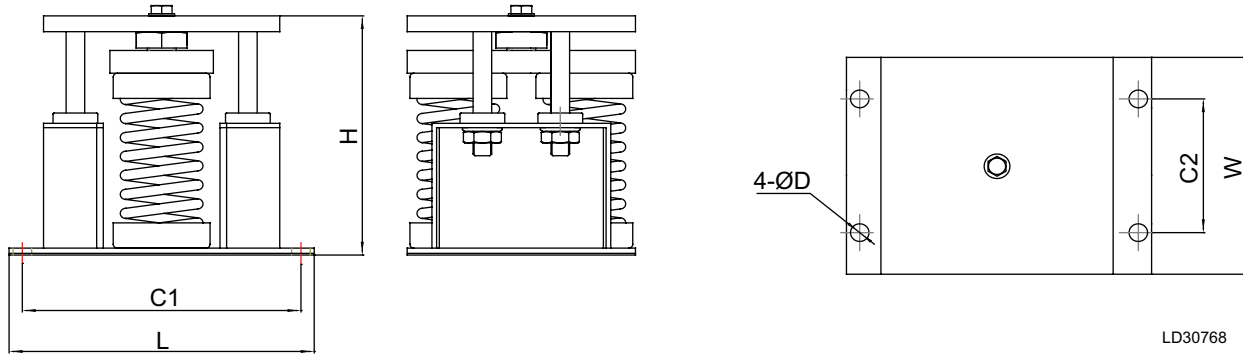
1. All dimensions are in millimeters.
2. Installation requires a bolting or anchoring mount to support the structure with 2 in. x 0.625 in. (2 mm x 16 mm) diameter bolts or 2 in. x 0.5 in. (2 mm x 12.7 mm) diameter concrete anchors.

Isolators (cont'd)

2 in. deflection spring isolator

LAT2-EM

type LAT2-EM spring avm outline drawing



MOUNT TYPE	DIMENSION DATA (mm)						
	L	W	H	C1	C2	D	S
LAT2-EM	230	177	200	210	110	14	M16

MODEL NUMBER	RATED CAPACITY		
	WEIGHT RANGE		PART NUMBER
	(LB)	(KG)	
LAT2-400EM	0 through 754	0 through 343	028W17892-007 (6020055)
LAT2-600EM	755 through 1131	344 through 514	028W17892-001 (5591890)
LAT2-800EM	1132 through 1509	515 through 686	028W17892-006 (6020056)
LAT2-1000EM	1510 through 1886	687 through 857	028W17892-005 (6020057)
LAT2-1200EM	1887 through 2263	858 through 1029	028W17892-002 (5591889)
LAT2-1500EM	2264 through 2829	1030 through 1286	028W17892-004 (6020058)
LAT2-1700EM	2830 through 3206	1287 through 1457	028W17892-000 (5587599)
LAT2-3000EM	3207 through 5657	1458 through 2571	028W17892-003 (5750706)

Notes

1. All dimensions are in millimeters.
2. Equipment must be bolted or welded to the top plate to meet allowable seismic ratings.
3. Consult Johnson Controls for concrete installation.

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Electrical data

FIELD WIRING LUGS					STANDARD AND ULTRA QUIET CONDENSER FANS					
					TERMINAL BLOCK		CIRCUIT BREAKER		NON-FUSED DISCONNECT SWITCH	
YVAA MODEL			INPUT VOLTS	INPUT FREQ	WIRES PER PHASE	LUG WIRE RANGE	WIRES PER PHASE	LUG WIRE RANGE	WIRES PER PHASE	LUG WIRE RANGE
FRAME	COND	EVAP								
SINGLE POINT WIRING										
15	3	B	400	50	2	#2/0-600 kcmil	2	#2/0-500 kcmil	2	#1/0-500 kcmil
16	5	B	400	50	2	#2/0-600 kcmil	2	#2/0-500 kcmil	2	#1/0-500 kcmil
17	8	C	400	50	2	#2/0-600 kcmil	2	#2/0-500 kcmil	2	#1/0-500 kcmil
18	3	A	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
19	5	A	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
19	8	B	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
20	0	C	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
21	3	A	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
21	5	C	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
21	8	C	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
23	3	B	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
24	5	C	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
24	8	C	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
26	3	B	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
27	0	D	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
27	3	D	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
27	5	E	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
27	8	E	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
29	5	E	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
30	3	C	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
30	5	C	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
30	8	E	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
31	8	E	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
32	3	E	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
33	3	C	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
34	3	E	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
34	5	E	400	50	3	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
DUAL POINT WIRING*										
36	8	J	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
37	3	F	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
37	5	J	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
41	3	H	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
44	3	G	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
48	3	G	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
49	0	K	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
50	0	J	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
52	3	J	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil

Note: Use copper conductors only.

Electrical data (cont'd)

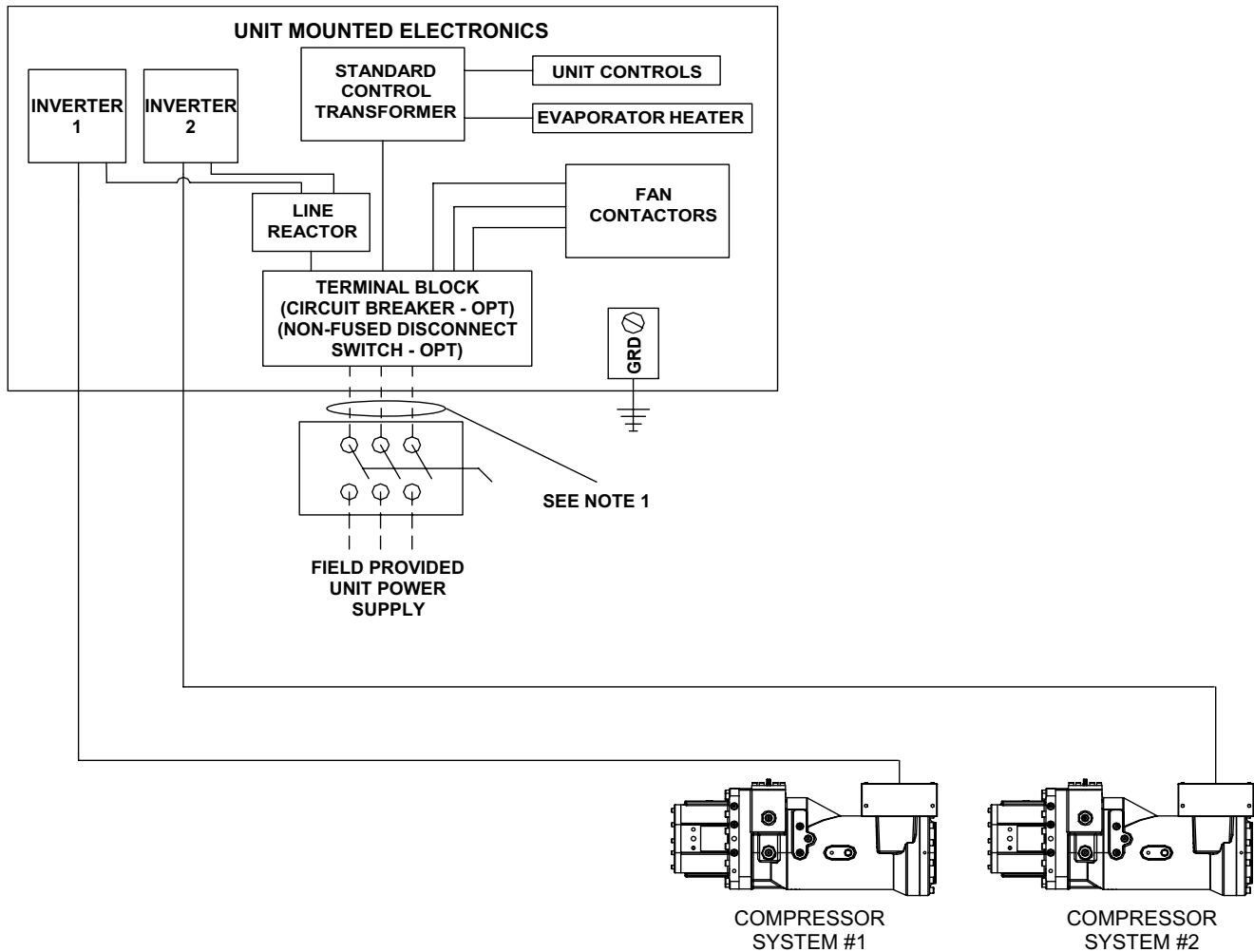
FIELD WIRING LUGS					HIGH AIRFLOW/HIGH STATIC CONDENSER FANS					
					TERMINAL BLOCK		CIRCUIT BREAKER		NON-FUSED DISCONNECT SWITCH	
YVAA MODEL			INPUT VOLTS	INPUT FREQ	WIRE PER PHASE	LUG WIRE RANGE	WIRES PER PHASE	LUG WIRE RANGE	WIRES PER PHASE	LUG WIRE RANGE
FRAME	COND	EVAP								
SINGLE POINT WIRING										
15	3	B	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
16	5	B	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
17	8	C	400	50	2	#2/0-600 kcmil	2	#1/0-500 kcmil	4	#1/0-500 kcmil
18	3	A	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
19	5	A	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
19	8	B	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
20	0	C	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
21	3	A	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
21	5	C	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
21	8	C	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
23	3	B	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
24	5	C	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
24	8	C	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
26	3	B	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
27	0	D	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
27	3	D	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
27	5	E	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
27	8	E	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
29	5	E	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
30	3	C	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
30	5	C	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
30	8	E	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
31	8	E	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
32	3	E	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
33	3	C	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
34	3	E	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
34	5	E	400	50	4	#2/0-600 kcmil	4	#4/0-500 kcmil	4	#1/0-500 kcmil
DUAL POINT WIRING*										
36	8	J	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
37	3	F	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
37	5	J	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
41	3	H	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
44	3	G	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
48	3	G	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
49	0	K	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
50	0	J	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil
52	3	J	400	50	3	#2/0-600 kcmil	3	#3/0-400 kcmil	4	#1/0-500 kcmil

Note: Use copper conductors only.

FIELD WIRING LUGS				TERMINAL BLOCK		TERMINAL BLOCK WITH INDEPENDENT SYSTEM CIRCUIT BREAKERS		TERMINAL BLOCK WITH INDEPENDENT SYSTEM NON-FUSED DISCONNECT SWITCHES		
SINGLE POINT WIRING										
YVAA			INPUT VOLTS	INPUT FREQ	WIRES PER PHASE	LUG WIRE RANGE	WIRES PER PHASE	LUG WIRE RANGE	WIRES PER PHASE	LUG WIRE RANGE
FRAME	COND	EVAP								
Models 0368 to 0523			400	50	4	#1/0-500 kcmil	4	#1/0-500 kcmil	4	#1/0-500 kcmil

Power wiring

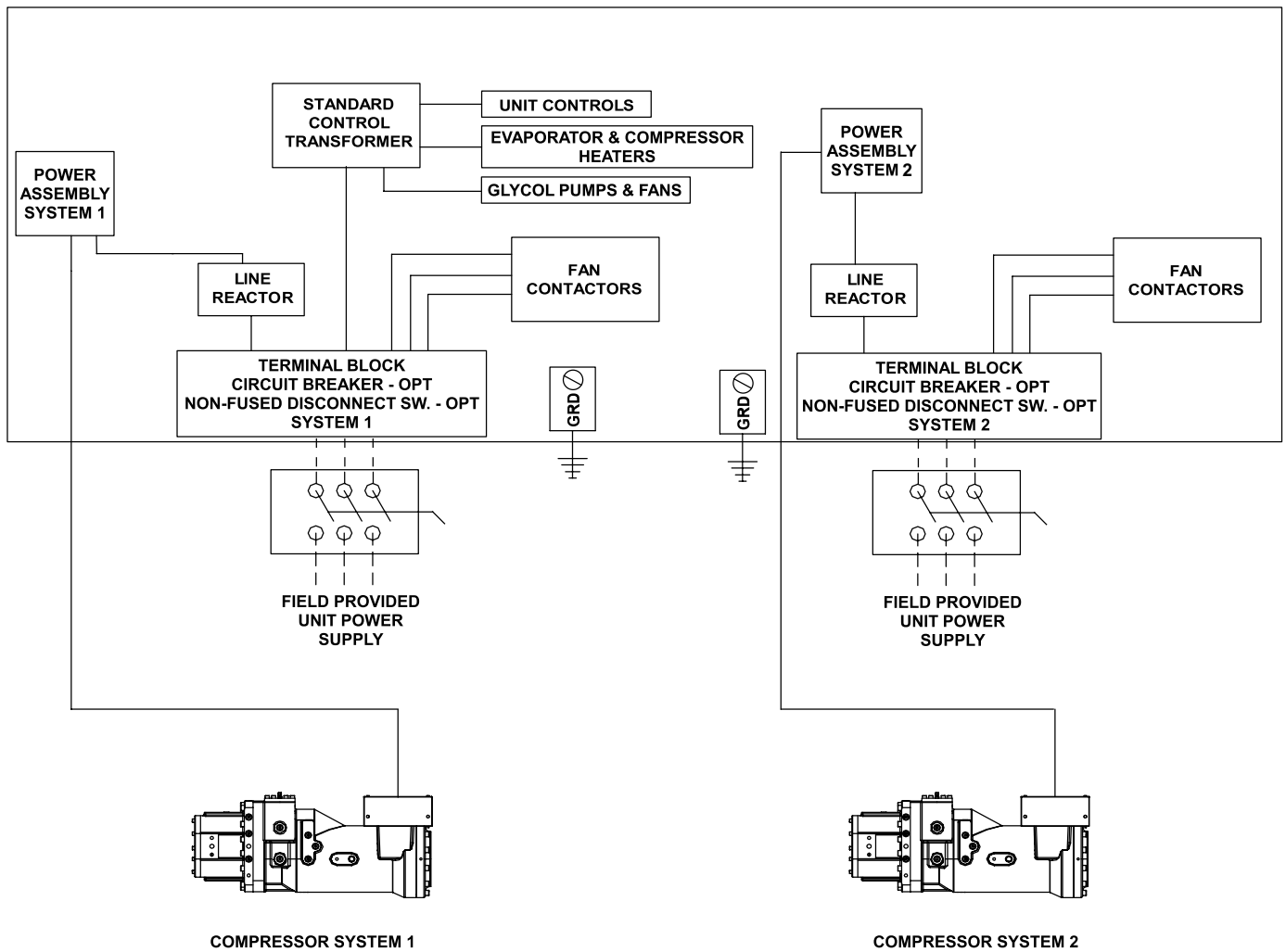
Single point wiring



LD18588

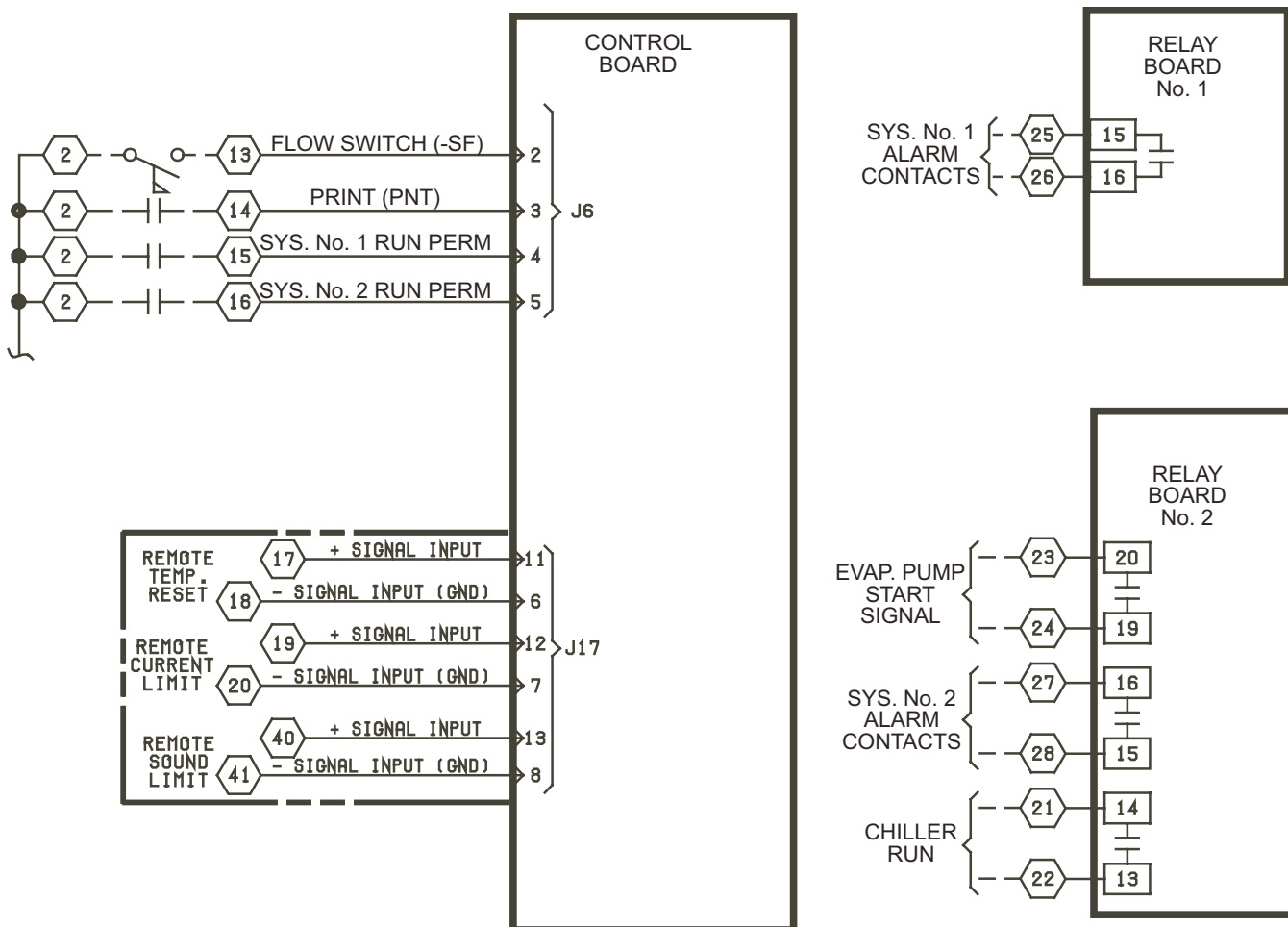
Power wiring (cont'd)

Dual point wiring



LD18589

Customer control wiring

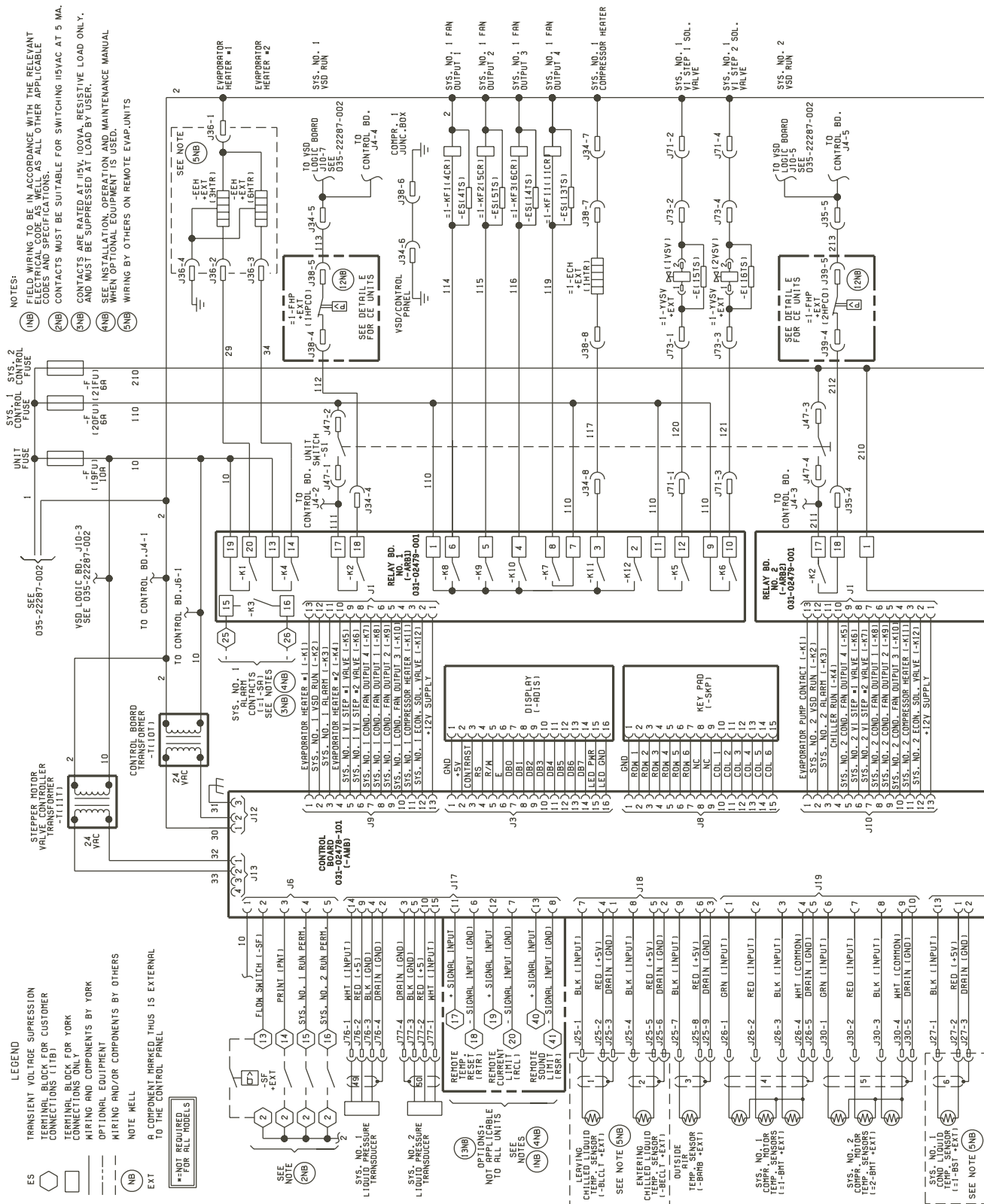


LEGEND

-  TERMINAL BLOCK FOR CUSTOMER CONNECTIONS
-  TERMINAL BLOCK FOR YORK CONNECTIONS
-  WIRING AND COMPONENTS BY YORK
-  OPTIONAL EQUIPMENT
-  WIRING AND/OR COMPONENTS BY OTHERS

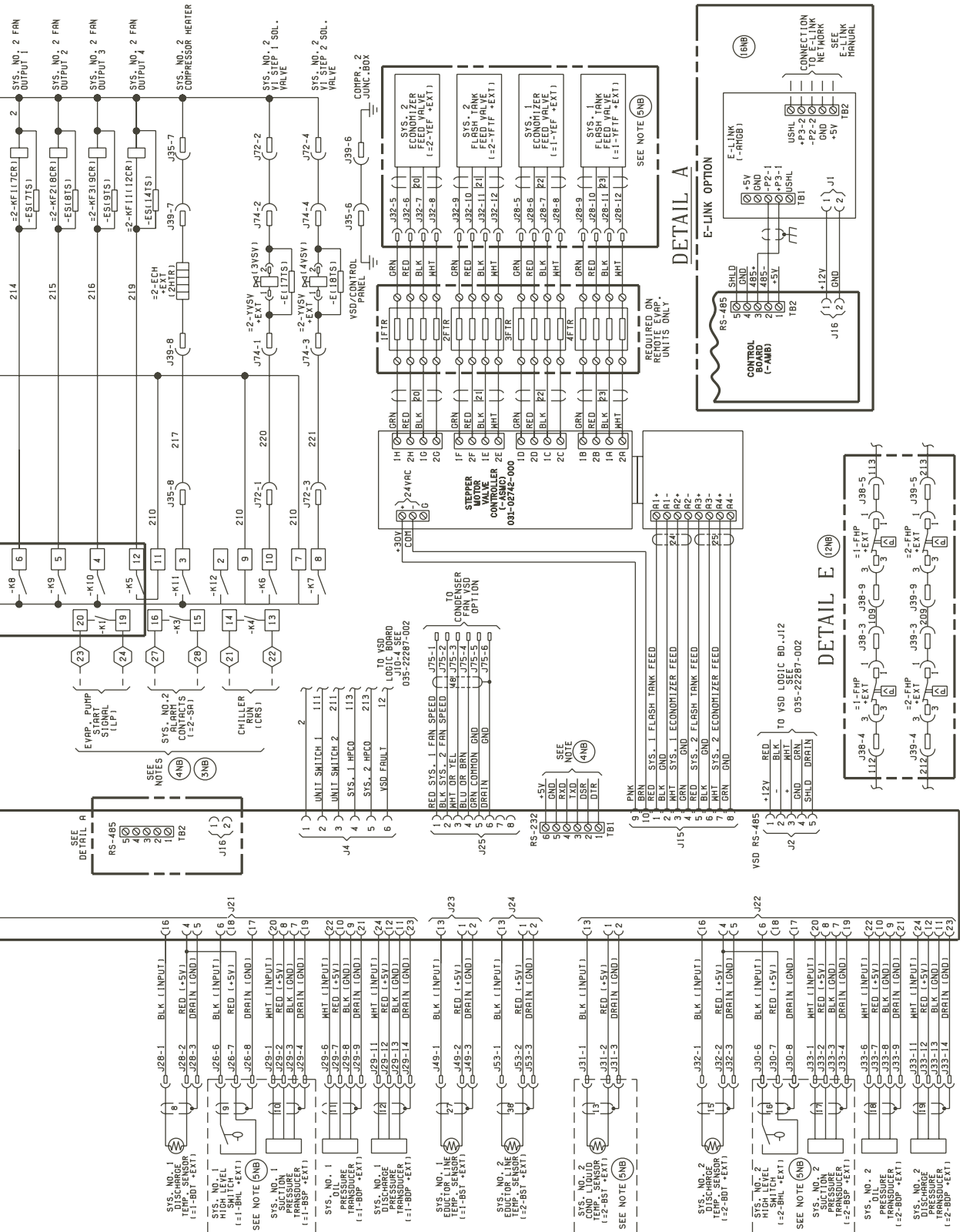
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Control wiring



LD19417

Control wiring (cont'd)



Guide specifications

Part 1 - General

1.01 General requirements

The requirements of this section conform to the general provisions of the contract, including general and supplementary conditions, conditions of the contract, and contract drawings.

1.02 Scope

Provide microprocessor controlled air-cooled twin-screw compressor liquid chillers of the scheduled capacities as shown and indicated on the drawings, including but not limited to the following items:

1. Chiller package
2. Charge of refrigerant and oil
3. Electrical power and control connections
4. Chilled liquid connections
5. Manufacturer start-up

1.03 Quality assurance

A. Products are designed, tested, rated, and certified in accordance with, and installed in compliance with applicable sections of the following standards and codes:

1. AHRI 550/590 and 551/591 – Water Chilling Packages Using the Vapor Compression Cycle
2. GB18430.1 – Water chilling (heat pump) package using the vapor compression cycle Part 1: Water chilling (heat pump) package for industrial and commercial and similar application
3. AHRI 370 – Sound Rating of Large Outdoor Refrigerating and Air-Conditioning Equipment
4. GB9237 – Mechanical refrigerating systems used for cooling and heating – Safety Requirements
5. JB86 54 – Safety requirements of Positive Displacement and Centrifugal Water – Chilling Packages
6. GB5226 .1 – Electrical safety of machinery Electrical equipment of machines Part 1: General requirements
7. NB/T 47012 – Pressure Vessels for Refrigerant Equipment
8. OSHA – Occupational Safety and Health Act

Guide specifications (cont'd)

- 9. Manufactured in a facility registered to ISO 9001
- B. Factory run test: Chiller are pressure-tested, evacuated, and fully charged with refrigerant and oil, and are factory operational run tested with water flowing through the evaporator vessel.
- C. The chiller manufacturer must have a factory-trained and supported service organization.
- D. Warranty: The manufacturer must warrant all equipment and material of its manufacture against defects in workmanship and material for a period of 18 months from date of shipment or 12 months from date of start-up, whichever occurs first.

1.04 Delivery and handling

- A. The unit must be delivered to job site fully assembled with all interconnecting refrigerant piping and internal wiring ready for field installation and charged with refrigerant and oil by the manufacturer.
- B. Provide protective covering over vulnerable components for unit protection during shipment. Fit nozzles and open ends with plastic enclosures.
- C. The unit must be stored and handled in accordance with the manufacturer's instructions.

Part 2 - Products

2.01 Manufacturers

- A. The design shown in the drawings is based on YORK model YVAA chiller manufactured by Johnson Controls. Alternate equipment is acceptable if the manufacturer's equipment meets the scheduled performance and complies with these specifications. If the equipment manufactured by a manufacturer other than that scheduled is utilized, then the mechanical contractor is responsible for coordinating with the general contractor and all affected subcontractors to ensure correct provisions for the installation of the designated unit. This coordination includes, but is not limited to, the following factors:
 - 1. Structural supports for units.
 - 2. Piping size and connection/header locations.
 - 3. Electrical power requirements and wire/conduit and overcurrent protection sizes.
 - 4. Chiller physical size on plant layout.
 - 5. Site noise considerations.
- B. The mechanical contractor is responsible for all costs incurred by the general contractor, subcontractors, and consultants to modify the building provisions to accept the provided alternate equipment.

Guide specifications (cont'd)

2.02 General

- A. Description: Provide, install, and commission factory assembled, charged, and operational run tested air-cooled screw compressor chiller as specified herein and shown in the drawings. The chiller includes, but is not limited to: a complete system with multiple independent refrigerant circuits, semi hermetic twin screw compressors, shell and tube hybrid falling-film evaporator, air-cooled condenser, refrigerant, lubrication system, interconnecting wiring, safety and operating controls including capacity controller, control center, motor starting components, and special features as specified herein or required for safe, automatic operation.
- B. Operating characteristics:
1. Provide low and high ambient temperature control options as required to ensure unit is capable of operation from -10°F to 131°F (-23°C to 55°C) ambient temperature.
 2. Provide capacity control system capable of reducing unit capacity to 10% of full load for two compressor units. The compressor starts in an unloaded condition. Application of factory installed hot gas bypass is acceptable as required to meet specified minimum load.
- C. Cabinet: Unit panels, structural elements, control boxes, and heavy gauge structural base are constructed of painted, galvanized steel. Many external structural parts are coated with baked on enamel powder paint in Champagne color ((RAL 7006), (Munsel No. 9.8YR4.36/1.2)) and must meet the 1000-hour salt spray test in accordance with the ASTM B117 standard.
- D. Shipping: The unit ships in one piece and requires the installer to provide only a single evaporator inlet and outlet pipe connection. If providing a chiller model that ships in multiple pieces, the bid must include all the material and field labor costs for factory authorized personnel to install a trim kit to connect the pieces as well as all interconnecting piping and wiring.

2.03 Compressors

- A. Compressors: Must be direct drive, semi hermetic, rotary twin-screw type, including: muffler, temperature actuated 'off-cycle' heater, rain-tight terminal box, discharge shut-off service valve, and precision machined cast iron housing. Design working pressure of entire compressor, suction to discharge, is 350 psig (24 barg) or higher. Compressor must be UL Recognized.
- Optional:** A suction shut-off service valve for each compressor.
- B. Compressor motors: Refrigerant suction-gas-cooled accessible hermetic compressor motor, full suction gas flow through 0.006 in. (0.1524 mm) maximum mesh screen, with inherent internal thermal overload protection and external current overload on all three phases.
- C. Balancing requirements: All rotating parts must be statically and dynamically balanced.
- D. Lubrication system: External oil separators with no moving parts, 450 psig (31 barg) design working pressure. Refrigerant system differential pressure provides oil flow through service replaceable, 0.5 micron, full-flow, cartridge-type oil filter internal to compressor. Filter bypass, less restrictive media, or oil pump not acceptable.
- E. Capacity control: Compressors start at minimum load. Microprocessor control is provided to match compressor capacity with cooling load.

Guide specifications (cont'd)

2.04 Refrigerant circuit components

- A. Refrigerant is classified as Safety Group A1 according to ASHRAE 34
- B. Equipment supplied must comply with LEED Energy & Atmosphere Credit 4, Enhanced Refrigerant Management.
- C. Each independent refrigerant circuit incorporates all components necessary for the designed operation including: liquid line shut-off valve with charging port, low side pressure relief device, removable core filter-drier, and sight glass with moisture indicator.
- D. The chiller manufacturer provides an independent circuit for each compressor to provide maximum redundancy during chiller operation. If equipment does not have independent circuits for each compressor, the manufacturer provides the owner with one spare compressor of each unique size.
- E. Discharge lines are provided with manually-operated compressor shut-off service valves.

2.05 Heat exchangers

A. Evaporator:

1. The evaporator must be shell and tube, hybrid falling film type to optimize efficiency and refrigerant charge. Tubes must be high-efficiency, internally-and externally-enhanced copper tubes with 0.035 in. (0.89 mm) minimum wall thickness at all intermediate tube supports to provide maximum tube wall thickness at the support area. Each tube must be roller expanded into the tube sheets providing a leak proof seal, and must be individually replaceable. Independent refrigerant circuits are provided for each compressor.

Optional: 3-pass arrangement.

2. Constructed, tested, and stamped in accordance with applicable sections of the GB pressure vessel code for minimum 235 psig (16 barg) refrigerant-side design working pressure and 150 psig (10 barg) liquid-side design working pressure.
3. Water boxes must be removable to permit tube cleaning and replacement. Water boxes must include liquid nozzle connections suitable for HG20615 flanges.

Optional: 150 psig (10.3 barg) ANSI raised-face weldable flanges. Flanges are field-welded by the contractor. Companion flanges, bolts, nuts, and gaskets are not included.

Optional: 150 psig (10.3 barg) ANSI raised-face flanges with ANSI/AWWA C-606 couplings. Flanges are field-mounted by the contractor. Companion flanges, bolts, nuts, and gaskets are not included.

Optional: 150 psig (10.3 barg) ANSI raised-face weldable flanges with companion flanges. Flanges are field-welded by the contractor. Bolts, nuts, and gaskets are not included.

Optional: 150 psig (10.3 barg) ANSI raised-face flanges with ANSI/AWWA C-606 couplings with companion flanges. Flanges are field-mounted by the contractor. Bolts, nuts, and gaskets are not included.

Guide specifications (cont'd)

4. Provide vent and drain fittings, and thermostatically controlled shell heaters to assist in preventing freeze damage.

Optional: A separate power connection for evaporator waterbox heaters is required to assist in freeze damage protection down to -20°F (-28.9°C) ambient temperature and must be provided by the contractor.

5. Connection location: Chilled liquid inlet and outlet nozzle connections are located at rear, opposite the control panel, end of unit for the standard two-pass arrangement.

Optional: Inlet and outlet nozzle connections located at front end of unit. These are available for select configurations.

B. Air-cooled condenser:

1. Condenser coils must be microchannel type, parallel flow aluminum alloy tubes brazed as one piece to enhanced aluminum alloy fins. Condenser coils must be made of a single material to avoid galvanic corrosion due to dissimilar metals. Tube-and-fin-type condenser coils are an acceptable alternate when tubes and fins are fabricated of the same metal material to avoid galvanic corrosion due to dissimilar metals. Coils must be designed for 350 psig (24 barg) or higher working pressure.

Optional: Coils, internally enhanced, seamless copper tubes, mechanically expanded into aluminum alloy fins with full height collars. Subcooling coil an integral part of condenser. Design working pressure is 350 psig (24 barg).

Optional: Post-coated, epoxy-dipped condenser microchannel: The unit is built with microchannel sections that have been applied with an electro-deposited and baked flexible epoxy coating that is finished with a polyurethane UV resistant top-coat suitable for highly corrosive applications.

Optional: Wire panels: Heavy gauge, welded wire mesh coated to resist corrosion, to protect condenser coils from incidental damage and also restrict unauthorized access to internal components.

Optional: Louvered panels and condenser coils: Painted steel to match unit panels, over external condenser coil faces.

Optional: Louvered panels for full unit: Painted steel to match unit panels, over internal components.

Optional: Louvered, wire panels: Louvered steel panels on external condenser coil faces, painted to match unit panels. Heavy gauge, welded wire mesh, coated to resist corrosion, around the base of the machine to restrict unauthorized access.

Optional: End hail guard: Louvered steel panels on the rear of the unit, located at the opposite end of the control panel, are painted to match unit panels.

Optional: V-guard panels: Steel panels installed over exposed condenser piping to protect from damage.

2. Low sound fans: These provide vertical air discharge from extended orifices. Fans must be composed of corrosion resistant aluminum hub and glass-fiber-reinforced polypropylene composite blades molded into a low-noise airfoil section. The fan must be dynamically balanced for vibration-free operation. Fan guards of heavy gauge, PVC coated, or galvanized steel.

Optional: Ultra-quiet fans

Guide specifications (cont'd)

Optional: High airflow fans

Optional: High static fans

3. Fan Motors: High-efficiency, direct-drive, three-phase, insulation class F, current protected, totally enclosed air-over (TEAO) motors, with double sealed, permanently-lubricated ball bearings must be used. Open drip proof (ODP) fan motors are not acceptable.

2.06 Insulation

- A. Material: Closed-cell, flexible, UV protected, thermal insulation complying with ASTM C 534 Type 2 (Sheet) for preformed flexible elastomeric cellular thermal insulation in sheet and tubular form. The thickness must be 3/4 in. (19 mm.)

Optional: 1 1/2 in. (38 mm.)

- B. Thermal conductivity: 0.26 (BTU/HR-Ft²-°F/in) maximum at 75°F mean temperature.
- C. Factory-applied insulation over cold surfaces of liquid chiller components including evaporator shell, water boxes, and suction line. Liquid nozzles must be insulated by the contractor after pipe installation.
- D. Adhesive: As recommended by insulation manufacturer and applied to 100% of insulation contact surface including all seams and joints.

2.07 Acoustical data

- A. Provide acoustical sound power or sound pressure level data in decibels (dB) at the scheduled 8 octave band center frequencies. A-weighted sound data alone is not acceptable.
- B. Provide all sound power or sound pressure level data at 100%, 75%, 50%, and 25% load.
- C. Supplied equipment must not exceed scheduled sound power or sound pressure level data at any load point. The mechanical contractor is responsible for any additional costs associated with equipment deviation.
- D. Acoustical performance ratings must be in accordance with AHRI Standard 370

Optional: Provide factory-installed sound reduction enclosures and ultra-quiet fans to meet chiller sound levels scheduled at all load points.

Optional: Provide optional control input to limit sound output of the chiller based on time of day. Must be programmable at the chiller panel or controlled remotely by a signal (4 mA to 20 mA or 0 VDC to 10 VDC) from the BAS system. Chillers without this feature must be provided with the necessary sound attenuation to meet the scheduled sound performance data at all load points.

2.08 Power and electrical requirements

- A. Power or control panel:

1. Factory installed and wired IP55, powder painted steel cabinets with tool lockable, hinged, latched, and gasket-sealed outer doors equipped with wind struts for safer servicing. Provide main power connections, compressor starters and fan motor contactors, current overloads, and factory wiring.

Guide specifications (cont'd)

2. The panel includes a control display access door.
 3. The control cabinet must be a closed design, without requirement for external air-flow for component cooling.
- B. Single point power:
1. Provide single point power connection to chiller. The power must be three-phase of scheduled voltage.
 2. Terminal block connections must be provided at the point of incoming single point connection for field connection and interconnecting wiring to the compressors. Separate external protection must be supplied in the incoming power wiring, which must comply with local codes. Johnson Controls does not supply the separate external protection.
- Optional:** Single point disconnect: A non-fused disconnect and lockable external handle must be supplied to isolate the unit power voltage for servicing. Separate external fusing must be supplied, in the incoming power wiring which must comply with local codes. This is not supplied by Johnson Controls.
- Optional:** Single point circuit breaker: A unit-mounted circuit breaker with external lockable handle is supplied to isolate power voltage for servicing. Incoming power wiring must comply with local codes. The circuit breaker must be sized to provide the motor branch circuit protection, short circuit protection, and ground fault protection for the motor branch-circuit conductors, the motor control apparatus and the motors.
- C. Control transformer: Power panel must be supplied with a factory-mounted and wired control transformer that supplies all unit control voltage from the main unit power supply. The transformer utilizes scheduled line voltage on the primary side and provide 115 V/1Ø on secondary.
- D. Short circuit withstand rating of the chiller electrical enclosure must be 380 V, 400 V, and 460 V: minimum of 30,000 A or 65,000 A for single point circuit breaker.
- E. Motor starters: Motor starters must be zero electrical inrush current for Variable Frequency Drives or reduced inrush type for closed transition Wye-Delta or Solid State for minimum electrical inrush. Open transition Wye-Delta and across the line type starters are not acceptable.
- F. Power factor:
1. Provide equipment with power factor correction capacitors as required to maintain a displacement power factor of 95% at all load conditions.
 2. The installing contractor is responsible for any additional cost to provide and install power factor correction capacitors if they are not factory-mounted and wired.
- G. All exposed power wiring must be routed through liquid-tight, UV-stabilized, non-metallic conduit.
- H. Supplied equipment must not exceed scheduled minimum circuit ampacity (MCA). The mechanical contractor must be responsible for any additional costs associated with equipment deviation.

Guide specifications (cont'd)

2.09 Controls

A. General:

1. Provide automatic control of chiller operation including compressor start/stop and load/unload, anti-recycle timers, condenser fans, evaporator pump, evaporator heater, unit alarm contacts and run signal contacts.
2. Provide evaporator pump start signal from chiller control panel to enable operation of chilled fluid pumps. The contractor wires the chilled fluid circuit pumps run signal from the chiller control panel's evaporator start relay to allow the chiller to enable chilled fluid flow through the evaporator to prevent freeze damage.
3. The chiller automatically resets to normal chiller operation after power failure.
4. Unit operating software must be stored in non-volatile memory. Field programmed set points are retained in lithium-battery-backed regulated time clock (RTC) memory for minimum five years.
5. Alarm contacts must be provided to provide a remote alert for any unit or system safety fault.

B. Display and keypad:

1. Provide minimum 80 character liquid crystal display that is both viewable in direct sunlight and has LED backlighting for nighttime viewing. Provide one keypad and display panel for each chiller.
2. Display and keypad must be accessible through display access door without opening main control or electrical cabinet doors.
3. The display provides a minimum of unit setpoints, status, electrical data, temperature data, pressures, safety lockouts and diagnostics without the use of a coded display.
4. Descriptions in English, or available language options, numeric data in English, or Metric units.
5. The sealed keypad includes the unit On/Off switch.

C. Programmable setpoints within manufacturer limits: Display language, chilled liquid cooling mode, local/remote control mode, display units mode, system lead/lag control mode, remote temperature reset, remote current limit, remote sound limit, low ambient temperature cutout enable/disable, leaving chilled liquid setpoint and range, maximum remote temperature reset.

D. Display data: Chilled liquid leaving and entering temperatures; outside ambient air temperature; lead system; evaporator pump status; active remote control; compressor suction, discharge, and oil pressures per refrigerant circuit; compressor discharge, motor, and oil temperatures for each refrigerant circuit; saturation temperatures for each refrigerant circuit; compressor speed; condenser fan status; condenser subcooling temperature; condenser drain valve percentage open; compressor capacity in percentage of full load amps; compressor number of starts; run time; operating hours; evaporator heater status; history data for last ten shutdown faults; history data for last 20 normal, non-fault, shutdowns.

Guide specifications (cont'd)

- E. Predictive control points: Unit controls avoid safety shutdown when operating outside design conditions by optimizing the chiller controls and cooling load output to stay online and avoid safety limits being reached. The system monitors the following parameters and maintain the maximum cooling output possible without shutdown of the equipment: motor current, suction pressure, discharge pressure, starter internal ambient temperature, and starter baseplate temperature.
- F. System safeties: These cause individual compressor systems to perform auto-reset shut down if: high discharge pressure or temperature, low suction pressure, low motor current, high/low differential oil pressure, low discharge superheat, high motor temperature, system control voltage.
- G. Unit safeties: Must be automatic reset and cause compressors to shut down if: high or low ambient temperature, low leaving chilled liquid temperature, under voltage, flow switch operation. The contractor provides flow switch and wiring to comply with the chiller manufacturer requirements.
- H. The manufacturer provides any controls not listed above, necessary for automatic chiller operation. The mechanical contractor provides field control wiring necessary to interface sensors to the chiller control system.

2.10 Accessories and options

Some accessories and options supersede standard product features. All options are factory-mounted unless otherwise noted.

A. Controls options:

1. Building automation system (BAS) Interface: Chiller to accept 4 mA to 20 mA or 0 VDC to 10 VDC input from BAS to reset the leaving chilled liquid temperature or load limit setpoint or both.
2. Gateway: Provides communication for BAS, including BACnet (MS/TP), Modbus, N2, and LON. This is field-commissioned by the BAS manufacturer.
3. Thermal storage: Provide special control logic and modifications to produce leaving chilled brine temperatures below 40°F (4.4°C.)

B. General options:

1. Flow switch: Vapor proof SPDT, IP55 switch, 150 psig (10.3 barg), -20°F to 250°F (-28.9°C to 121.1°C.) This is field-mounted by the contractor.
2. Differential pressure switch: 3 psig to 45 psig (0.2 barg to 3.0 barg) range with 1/4 in. NPTE pressure connections. This is field-mounted by the contractor.
3. Vibration isolation. All options are field-mounted by the contractor:
 - a. Elastomeric isolators.
 - b. 1 in. deflection spring isolators: Level adjustable, spring and cage type isolators for mounting under the unit base rails.
 - c. 2 in. deflection restrained spring isolators: Level adjustable, restrained mounts in rugged welded steel housing with vertical and horizontal limit stops. Housings are designed to withstand a minimum 1.0 g accelerated force in all directions to 2 in. (50.8 mm).

Guide specifications (cont'd)

Part 3 - Executions

3.01 Installation

- A. General: Rig and install in full accordance with manufacturer's requirements, project drawings, and contract documents.
- B. Location: Locate the chiller as indicated in the drawings, including cleaning and service maintenance clearance in accordance with the manufacturer instructions. Adjust and level the chiller on support structure.
- C. Components: The installing contractor provides and installs all auxiliary devices and accessories for fully operational chiller.
- D. Electrical: Coordinate electrical requirements and connections for all power feeds with the electrical contractor.
- E. Controls: Coordinate all control requirements and connections with the controls contractor.
- F. Finish: The installing contractor paints damaged and abraded factory finish with touch-up paint matching factory finish.

SI metric conversion

Values provided in this manual are in the English inch-pound (I-P) system.

The following factors can be used to convert from English to the most common SI metric values.

Measurement	Multiply this English value	By	To obtain this metric value
Capacity	Tons refrigerant effect (ton)	3.516	Kilowatts (kW)
Power	Kilowatts (kW)	No change	Kilowatts (kW)
	Horsepower (hp)	0.7457	Kilowatts (kW)
Flow rate	Gallons / minute (gpm)	0.0631	Liters / second (L/s)
Length	Feet (ft)	304.8	Millimeters (mm)
	Inches (in.)	25.4	Millimeters (mm)
Weight	Pounds (lb)	0.4536	Kilograms (kg)
Velocity	Feet / second (fps)	0.3048	Meters / second (m/s)
Pressure drop	Feet of water (ft)	2.989	Kilopascals (kPa)
	Pounds / sq. inch (psi)	6.895	Kilopascals (kPa)

Temperature

To convert degrees Fahrenheit (°F) to degrees Celsius (°C), subtract 32° and multiply by 5/9 or 0.5556.

To convert a temperature range (for example, 10°F or 12°F chilled water range) from Fahrenheit to Celsius, multiply by 5/9 or 0.5556.

Fouling factor

English I-P (ft ² °F hr/Btu)	Equivalent SI metric (m ² k/kW)
0.0001	0.018
0.00025	0.044
0.0005	0.088
0.00075	0.132

Efficiency

In the English I-P system, chiller efficiency is measured in kW / ton:

$$\text{kW/ton} = \frac{\text{kW input}}{\text{tons refrigeration effect}}$$

In the SI Metric system, chiller efficiency is measured in Coefficient of Performance (COP).

$$\text{kW/ton} = \frac{\text{kW input}}{\text{kW refrigeration effect}}$$

kW / ton and COP are related as follows:

$$\text{kW/ton} = \frac{3.516}{\text{COP}}$$

$$\text{COP} = \frac{3.516}{\text{kW/ton}}$$

Notes

