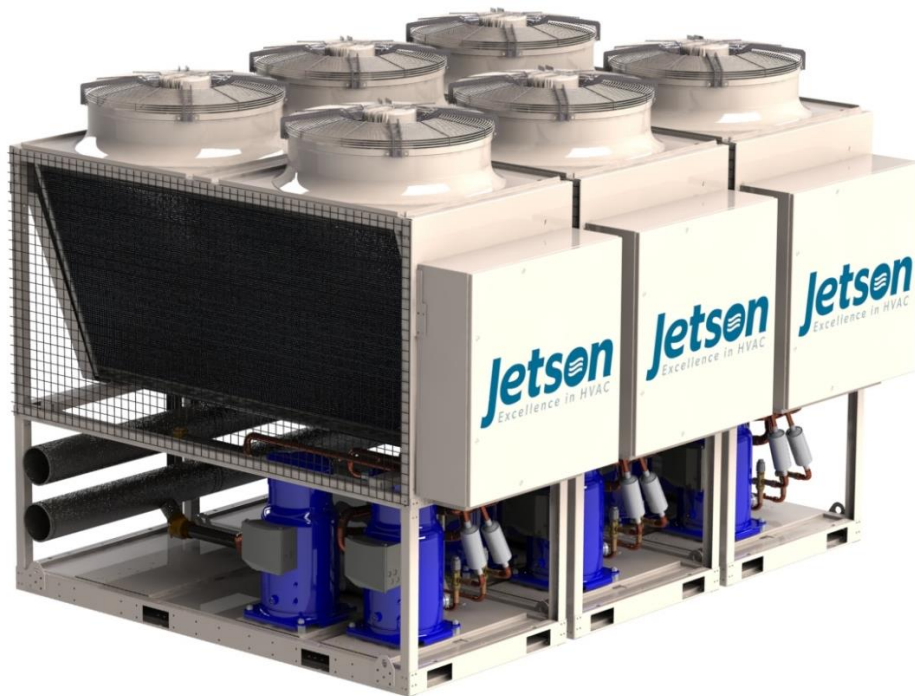


# ACC Series Chillers

## Installation, Operation, & Maintenance



**Jetson**  
by **MODINE**<sup>®</sup>

JET17-500

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## SAFETY

Attention should be paid to the following statements:

**NOTE** - Notes are intended to clarify the unit installation, operation, and maintenance.

**⚠ CAUTION** - Caution statements are given to prevent actions that may result in equipment damage, property damage, or personal injury.

**⚠ WARNING** - Warning statements are given to prevent actions that could result in equipment damage, property damage, personal injury or death.

**⚠ DANGER** - Danger statements are given to prevent actions that will result in equipment damage, property damage, severe personal injury or death.

**IMPORTANT** – Indicates a situation which, if not avoided, MAY result in a potential safety concern



### WARNING

#### ELECTRIC SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in dangerous operation, serious injury, death or property damage.

Improper servicing could result in dangerous operation, serious injury, death, or property damage.

- Before servicing, disconnect all electrical power to the furnace. More than one disconnect may be provided.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing. Secure all doors with key-lock or nut and bolt.



### ADVERTENCIA

#### RIESGO DE DESCARGA ELÉCTRICA, INCENDIO O EXPLOSIÓN

No seguir exactamente las advertencias de seguridad puede provocar un funcionamiento peligroso, lesiones graves, la muerte o daños materiales.

El mantenimiento incorrecto puede provocar un funcionamiento peligroso, lesiones graves, la muerte o daños materiales.

- Antes de dar mantenimiento, desconecte todas las fuentes de energía eléctrica del calentador. Es posible que haya más de un interruptor de desconexión
- Cuando dé mantenimiento a los controles, etiquete todos los cables antes de desconectarlos. Vuelva a conectar los cables correctamente.
- Después del mantenimiento, verifique el correcto funcionamiento de la unidad. Cierre todas las puertas con llave o con tuerca y perno.

## **AVERTISSEMENT**

**DANGER DE CHOC ÉLECTRIQUE,  
D'INCENDIE OU D'EXPLOSION**

Le non-respect des avertissements de sécurité pourrait causer un fonctionnement dangereux, des blessures graves, la mort ou des dommages matériels.

Tout entretien inapproprié pourrait causer un fonctionnement dangereux, des blessures graves, la mort ou des dommages matériels.

- Débranchez l'alimentation électrique vers la fournaise avant de procéder à tout entretien. Il pourrait y avoir plus d'un débranchement à effectuer.
- Étiquetez tous les fils avant de les débrancher pour effectuer l'entretien. Rebranchez les fils correctement.
- Vérifiez le bon fonctionnement après tout entretien. Sécurisez toutes les portes avec un verrou à clé ou un écrou et un boulon

## **WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death, and could cause exposure to substances which have been determined by various state agencies to cause cancer, birth defects or other reproductive harm. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

## **ADVERTENCIA**

Instalación, ajuste, alteración, servicio o mantenimiento inadecuados pueden causar daños materiales, lesiones o muerte, y podrían exponer a sustancias que han sido determinadas por diversas agencias estatales como causantes de cáncer, defectos de nacimiento u otros daños reproductivos. Lea detenidamente las instrucciones de instalación, operación y mantenimiento antes de instalar o dar servicio a este equipo.

## **AVERTISSEMENT**

Une installation, un réglage, une altération, une réparation ou une maintenance impropre risque de causer des dommages, des blessures ou la mort, et d'engendrer une exposition à des substances dont certains États ont déterminé qu'elles étaient cancérigènes ou pouvaient causer des malformations à la naissance et des problèmes de reproduction. Lisez bien les instructions d'installation, d'utilisation et de maintenance avant d'installer ou de réparer cet appareil.

## **WARNING**

**ELECTRIC SHOCK HAZARD**

Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

## **ADVERTENCIA**

**RIESGO DE DESCARGA ELÉCTRICA**  
Desconecte todas las fuentes de energía eléctrica de la unidad para evitar el riesgo de descargas eléctricas o de sufrir lesiones debido a las piezas giratorias.

**! AVERTISSEMENT**

**RISQUE D'ÉLECTROCUTION**

Coupez l'alimentation électrique vers l'unité pour éviter tout risque de choc électrique ou toute blessure en raison des pièces rotatives.

**! CAUTION**

PVC (Polyvinyl Chloride) and CPVC (Chlorinated Polyvinyl Chloride) are vulnerable to attack by certain chemicals. Polyolester (POE) oils used with R-454B and other refrigerants, even in trace amounts, in a PVC or CPVC piping system will result in stress cracking of the piping and fittings and complete piping system failure.

**! PRECAUCIÓN**

El PVC (cloruro de polivinilo) y el CPVC (cloruro de polivinilo clorado) son vulnerables a la reacción de determinadas sustancias químicas. Los aceites de poliéster (POE) utilizados con R-454B y otros refrigerantes, incluso en pequeñas cantidades, en un sistema de tuberías de PVC o CPVC provocan grietas por tensión en las tuberías y las conexiones y la falla completa del sistema de tuberías.

**! ATTENTION**

Le PVC (chlorure de polyvinyle) et le CPVC (chlorure de polyvinyle surchloré) sont vulnérables aux attaques de certains produits chimiques. Les huiles d'ester à base de polyol (POE) utilisées avec le R-454B et d'autres fluides frigorigènes, même en quantité infime, dans un système de canalisation en PVC ou CPVC pourraient causer des fissures de contrainte dans les canalisations et les raccords et la défaillance complète du système de canalisation.

**! WARNING**

**VARIABLE FREQUENCY DRIVES**

Do not leave VFDs unattended in hand mode or manual bypass. Damage to personnel or equipment can occur if left unattended. When in hand mode or manual bypass mode VFDs will not respond to controls or Alarms.

**! ADVERTENCIA**

**VARIADOR DE FRECUENCIA**

No deje el variador de frecuencia desatendido mientras está en modo manual o en derivación manual. Pueden producirse daños al personal o al equipo si se deja desatendido. Cuando se encuentre en modo manual o en derivación manual, el variador de frecuencia no responderá a los controles ni a las alarmas.

**! AVERTISSEMENT**

**MÉCANISMES D'ENTRAÎNEMENT À FRÉQUENCE VARIABLE**

Ne laissez pas les VFD sans surveillance en mode manuel ou en mode de dérivation manuelle. Des blessures ou des dommages matériels peuvent se produire si les mécanismes sont laissés sans surveillance. Les VFD ne réagissent pas aux commandes ou aux alarmes lorsqu'ils sont en mode manuel ou en mode de dérivation manuelle.



## WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odour.



## AVERTISSEMENT

N'utilisez pas des moyens d'accélérer le processus de dégivrage ou de nettoyage, autres que ceux recommandés par le fabricant.

L'appareil doit être rangé dans une pièce sans sources d'allumage à fonctionnement continu (comme par exemple : des flammes nues, un appareil au gaz ou un radiateur électrique qui fonctionne).

Ne percez pas et ne brûlez pas l'appareil.

Soyez conscient que les fluides frigorigènes peuvent ne pas avoir d'odeur.



## ADVERTENCIA

No use medios para acelerar el proceso de descongelación o para limpiar que no sean los recomendados por el fabricante.

El aparato debe almacenarse en una habitación sin fuentes de ignición de funcionamiento continuo (por ejemplo: llamas expuestas, aparatos de gas en funcionamiento o calentadores eléctricos en funcionamiento).

No perforar ni quemar.

Tenga presente que los refrigerantes pueden ser inodoros.



## IMPORTANT

1. Appliances shall be installed in locations not accessible to the general public.

2. This appliance is not intended to be operated or serviced by persons (including children) with reduced physical sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction this appliance concerning use of the appliance by a person responsible for their safety.

3. Appliance shall be installed in accordance with national wiring regulations.

4. Startup and service must be performed by a trained service technician.

5. The unit is for outdoor use only.

6. Every unit has a unique equipment nameplate with electrical, operational and unit clearance specifications. Always refer to the unit nameplate for specific ratings unique to the model you have purchased.

7. Read the entire installation, operation and maintenance manual. Other important safety precautions are provided throughout this manual.

8. Keep this manual and all literature safeguarded near or on the unit.

## IMPORTANTE

1. Los aparatos deben instalarse en ubicaciones que no sean accesibles al público general.

2. Este aparato no está diseñado para ser utilizado ni reparado por personas (incluidos niños) con capacidades físicas, sensoriales o mentales reducidas, o con falta de experiencia y conocimientos, a menos que cuenten con supervisión o hayan sido instruidos sobre el uso del aparato por parte de una persona responsable de su seguridad.

3. El aparato debe instalarse de acuerdo con las normativas nacionales de cableado.

4. La puesta en marcha y el mantenimiento deben ser realizados por un técnico de servicio capacitado.

5. La unidad debe usarse solo en exteriores.

6. Cada unidad tiene una placa de identificación exclusiva del equipo con las especificaciones eléctricas, operativas y de espacio libre de la unidad. Consulte siempre la placa de identificación de la unidad para ver las clasificaciones específicas del modelo que adquirió.

7. Lea completamente el manual de instalación, operación y mantenimiento. Este manual contiene otras precauciones

8. Mantenga este manual y todos los documentos guardados de manera segura en la unidad o cerca de la misma.

## IMPORTANT

1. Les appareils doivent être installés dans des endroits qui ne sont pas accessibles au grand public.
2. Cet appareil n'est pas conçu pour être utilisé ou entretenu par des personnes (y compris des enfants) dont les capacités sensorielles ou mentales sont réduites, ou qui n'ont pas l'expérience et les connaissances suffisantes, à moins d'être supervisées ou d'avoir obtenu des directives concernant l'utilisation de l'appareil par une personne responsable de leur sécurité.
3. L'appareil doit être installé conformément aux règlements nationaux sur le câblage.
4. La mise en service et l'entretien doivent être effectués par un technicien de service qualifié.
5. L'unité est destinée à un usage extérieur seulement.
6. Chaque unité possède une plaque signalétique unique sur laquelle se trouvent les spécifications électriques, de fonctionnement et de dégagement. Reportez-vous toujours à la plaque signalétique de l'unité pour connaître les notations spécifiques et uniques au modèle que vous avez acheté.
7. Lisez le manuel d'installation, d'utilisation et d'entretien au complet. D'importantes précautions de sécurité additionnelles sont fournies tout au long du présent manuel.
8. Gardez ce manuel et tous les documents en sécurité près de l'unité ou sur cette dernière. segura en la unidad o cerca de la misma.



# Model Number Description

## Digits 1 to 3— Model

ACC = Air-Cooled Chiller

## Digit 4 — Chiller Type

S = Single Chiller

M = Modular Chiller in Array System

## Digits 5 to 7 — Nominal Capacity

010 = 10 Tons

015 = 15 Tons

020 = 20 Tons

025 = 25 Tons

030 = 30 Tons

040 = 40 Tons

050 = 50 Tons

060 = 60 Tons

070 = 70 Tons

080 = 80 Tons

090 = 90 Tons

## Digit 8 — Unit Voltage

A = 208 V/60 Hz/3 Phase

B = 230 V/60 Hz/3 Phase

F = 460 V/60 Hz/3 Phase

G = 575 V/60 Hz/3 Phase

## Digits 9 — Unit Application

A = Air-Cooled Chiller

B = Air-Cooled Chiller (Low Ambient)

C = Air-Cooled Chiller (High Ambient)

D = Heat Pump

## Digit 10 - Steps of Capacity

A = Single Circuit - On/Off Compressor

B = Single Circuit - Tandem Compressors

C = Single Circuit - Variable Speed Compressor

D = Circuit 1 - On/Off Compressor; Circuit 2 - On/Off Compressor

E = Circuit 1 - Tandem Compressors; Circuit 2 - On/Off Compressor

F = Circuit 1 - Tandem Compressors; Circuit 2 - Tandem Compressors

G = Circuit 1 - Variable Speed; Circuit 2 - On/Off Compressor

H = Circuit 1 - Variable Speed; Circuit 2 - Tandem Compressors

J = Circuit 1 - Variable Speed; Circuit 2 - Variable Speed

## Digit 11 - Refrigerant Type

2 = R-454B

## Digit 12 - Unit Efficiency

0 = Standard Efficiency

1 = High Efficiency

## Digit 13 — Design Sequence

0 = Factory Assigned

## Digit 14 - Evaporator Heat Exchanger Type

0 = Brazed Plate

1 = Shell and Tube

2 = High-Capacity Brazed Plate

## Digit 15 — Evaporator Temp Range

0 = Standard Cooling 40 to 65°F [4.4 to 18.3°C]

1 = Standard Cooling/Ice Making 15 to 65°F [-9.4 to 18.3°C]

## Digit 16 - Evaporator Valves

0 = No Valve

1 = Constant Flow Array - Manual Balancing/Isolating Valve

2 = Variable Flow Array - Motorized Isolating valve

## Digit 17 - Air-Cooled Condenser Heat Exchanger Type

0 = Microchannel Heat Exchanger (MCHE)

C = E-Coat Microchannel Heat Exchanger (MCHE)

## Digit 18 - Condenser Fan Control

0 = Fixed Speed

1 = Variable Speed

## Digit 19 - Condenser Water Heat Recovery

0 = No Heat Recovery

1 = Full Heat Recovery

## Digit 20 — Heat Recovery Condenser Control Valves

0 = None (Two-pipe\_

1 = Four-Pipe Heat Recovery

2 = Four-Pipe Heating/Cooling Optimized, Heat Pump

3 = Four-Pipe, Heat Recovery + Heating/Cooling Optimized Heat Pump

## Digit 21 — Power Connection

0 = Terminal Block

A = Non-Fused Disconnect Switch

B = Fused Disconnect Switch

C = High SCCR Fuse Block

D = Distribution Panel for Array

## Digit 22 - Power Feed

D = 5 kA Rating

E = 5 kA Rating + Phase and Voltage Monitor

F = 100 kA Rating

G = 100 kA Rating + Phase and Voltage Monitor

## Digit 23 - Service Options

0 = None

A = LED Lighted Control Cabinet

B = Factory Wired 115V Outlet

C = Field Wired 115V Outlet

D = LED Lighted Control Cabinet + Factory Wired 115V Outlet

E = LED Lighted Control Cabinet + Field Wired 115V Outlet

## Digit 24 - Control Style

0 = Non-Array, Single Unit Controller

A = Master Controller w/ Single Controller per Array

B = Supervisor Array Controller w/ Controller per Module

C = Secondary Expansion Board Module

## Digit 25 — Local Unit Controller Interface

0 = Keypad with Dot Pixel Display

B = 15.4" Color Touchscreen

## Digit 26 — Remote BMS Interface (Digital Comm)

0 = None

2 = Lon Talk®

4 = BACnet® MS/TP

5 = BACnet IP

6 = MODBUS®

## Digit 27 - Blank

0 = Blank

## Digit 28 - Refrigeration Options

0 = None

1 = Active Freeze Protection All Circuits

2 = Hot Gas Bypass All Circuits

**Digit 29 - Refrigeration Accessories**

0 = None  
 A = Compressor Isolation Valves  
 B = Replaceable Core Filter Driers  
 C = Replaceable Core Filter Driers + Compressor Isolation Valves

**Digit 30 - Water Connection**

0 = No Header Piping (Single Unit)  
 1 = Grooved Pipe Connection, Units Connected Side-to-Side

**Digit 31 - Water Side Pressure**

0 = 150 psi  
 A = 300 psi

**Digit 32 - Water Strainer(s)**

0 = None  
 A = Chilled Water Wye Strainer  
 B = Chilled Water Wye Strainer with installation kit  
 C = Heat Recovery Water Wye Strainer  
 D = Condenser Water Wye Strainer with installation kit  
 E = Chilled & Heat Recovery Water Wye Strainer  
 F = Chilled & Heat Recovery Water Wye Strainer with installation kit

**Digit 33 - Water Accessories**

0 = Chilled Water Flow Switch

**Digit 34 - Free Cooling**

0 = No Free Cooling Coil  
 1 = With Free Cooling Coil(s)

**Digit 35 — Sound Attenuator**

0 = None  
 A = Neoprene Pads  
 B = Compressor Sound Blanket(s)  
 C = Factory Sound Enclosure Cabinet(s)  
 D = Both sound blanket and enclosure  
 E = Compressor Sound Blanket(s) + Neoprene Pads  
 F = Factory Sound Enclosure Cabinet(s) + Neoprene Pads  
 G = Both sound blanket and enclosure + Neoprene Pads

**Digit 36 - Guards**

0 = None  
 A = Wire Mesh Coil Guards  
 B = Base + Coil Wire Mesh Guards  
 C = Coil Louvers  
 D = Base + Coil Louvers

**Digit 37 - Exterior Finish & Shipping Splits**

0 = Standard Paint, Each Module Packaged Separately  
 B = Custom Paint, Each Module Packaged Separately

**Digit 38 - Warranty**

0 = Standard Warranty  
 A = Five Year Compressor Only Parts Warranty (AC)  
 B = Factory Startup + Owner Training + Two Year Parts & Labor Warranty  
 C = Factory Startup + Owner Training + Three Year Parts & Labor Warranty  
 D = Factory Startup + Owner Training + Four Year Parts & Labor Warranty  
 E = Factory Startup + Owner Training + Five Year Parts & Labor Warranty  
 F = Factory Startup + Two Year Parts & Labor Warranty  
 G = Factory Startup + Three Year Parts & Labor Warranty  
 H = Factory Startup + Four Year Parts & Labor Warranty  
 J = Factory Startup + Five Year Parts & Labor Warranty  
 K = Factory Startup + First Year Labor Only Warranty  
 L = Factory Startup + Owner Training + First Year Labor Only Warranty  
 M = Factory Startup + Owner Training + Two Year Parts Only Warranty  
 N = Factory Startup + Owner Training + Three Year Parts Only Warranty  
 P = Factory Startup + Owner Training + Five Year Parts Only Warranty  
 Q = Factory Startup + Two Year Parts Only Warranty  
 R = Factory Startup + Three Year Parts Only Warranty  
 S = Factory Startup + Five Year Parts Only Warranty  
 T = Factory Startup + Five Year Compressor Only Parts Warranty (AC)  
 U = Factory Startup + Owner Training + Five Year Compressor Only Parts Warranty (AC)  
 V = Factory Startup Service + 1 Year Parts Only Warranty  
 W = Factory Startup Service w/Owner Training + 1 Year Parts Only Warranty  
 X = Two Year Parts Only Warranty  
 Y = Three Year Parts Only Warranty  
 Z = Five Year Parts Only Warranty

**Digit 39 — Special Options**

0 = None  
 X = With Specials

## Digits 4 — Chiller Type

ACC chillers can be applied as both single and modular chillers.

**S = Single Chiller** - ACC chillers can be applied in standalone applications needing between 10 to 80 tons of cooling. In standalone applications, a single unit controller is selected in digit 24 and chiller headers are not required and the “no header” option can be selected in Digit 30.

**M = Modular Chiller in Array System** - More than one ACC modular chiller may be piped together (to form an array of chillers) for higher capacity and/or redundant chiller applications, an array controller package must be provided from the factory.

## Digits 5 to 7 — Nominal Capacity

The first numbers of the model string designate nominal tons cooling. Actual capacities will vary with conditions.

**010 = 10 Tons**

**015 = 15 Tons**

**020 = 20 Tons**

**025 = 25 Tons**

**030 = 30 Tons**

**040 = 40 Tons**

**050 = 50 Tons**

**060 = 60 Tons**

**070 = 70 Tons**

**080 = 80 Tons**

**090 = 90 Tons**

*\*Note: The nominal capacities reflect the use of R-454B refrigerant and a standard heat exchanger*

## Digit 8 — Unit Voltage

All units have single point power blocks with grounding lugs and 12V control circuits.

**A = 208 V/60 Hz/3 Phase**

**B = 230 V/60 Hz/3 Phase**

**F = 460 V/60 Hz/3 Phase**

**G = 575 V/60 Hz/3 Phase**

## Digit 9 — Unit Application

**A = Air-Cooled Chiller** – Standard air-cooled chiller with optional shell and tube or brazed plate evaporator.

**B = Air-Cooled Chiller (Low Ambient)** – Air-Cooled chiller with special considerations for operation down to -20°F

**C = Air-Cooled Chiller (High Ambient)** – Air-Cooled chiller with high capacity condensers for operation up to 115°F

**D = Heat Pump** – Chiller can produce hot or chilled water via reversing valve in refrigeration system.

## Digit 10 — Steps of Capacity

**A = Single Circuit - On/Off Compressor** – One fixed speed compressor on one refrigeration circuit

**B = Single Circuit - Tandem Compressors**– Two fixed speed compressors on one refrigeration circuit

**C = Single Circuit - Variable Speed Compressor** – One variable speed compressor on one refrigeration circuit

**D = Circuit 1 - On/Off Compressor; Circuit 2 - On/Off Compressor** – One fixed speed compressor on first refrigeration circuit; One fixed speed compressor on second refrigeration circuit

**E = Circuit 1 - Tandem Compressors; Circuit 2 - On/Off Compressor** – Two fixed speed compressors on first refrigeration circuit; One fixed speed compressor on second refrigeration circuit

**F = Circuit 1 - Tandem Compressors; Circuit 2 - Tandem Compressors** – Two fixed speed compressors on first refrigeration circuit; Two fixed speed compressors on second refrigeration circuit

**G = Circuit 1 - Variable Speed; Circuit 2 - On/Off Compressor**– One variable speed compressor on first refrigeration circuit; One fixed speed compressor on second refrigeration circuit

**H = Circuit 1 - Variable Speed; Circuit 2 - Tandem Compressors**– One variable speed compressor on first refrigeration circuit, Two fixed speed compressors on second refrigeration circuit

**J = Circuit 1 - Variable Speed; Circuit 2 - Variable Speed** - One variable speed compressor on first refrigeration circuit; One variable speed compressor on second refrigeration circuit

## Digit 11 — Refrigerant Type

2 = R-454B

## Digit 12 — Efficiency

1 = Standard Efficiency

2 = **High Efficiency** – Additional heat transfer surface area include to increase capacity and/or reduce power consumption

## Digit 13 — Design Sequence

0 = Factory Assigned

## Digit 14 — Evaporator Heat Exchanger Type

**0 = Brazed Plate** - Brazed plate heat exchangers are one of the most efficient ways to transfer heat. They are designed to provide unparalleled performance with the lowest life-cycle cost.

**1 = Shell and Tube** – Shell and tube heat exchanger with grooved water connection and 3/4” closed-cell rubberized insulation. (only available on single chillers)

**2 = High Capacity Brazed Plate** – Oversized brazed plate for 40°F leaving water applications.

**3 = High Capacity Shell and Tube** – Oversized shell and tube heat exchanger for glycol applications. (only available on single chillers)

**6 = Remote Brazed Plate** = Option 1 for remote field mounting

**7 = Remote Shell and Tube** = Option 2 for remote field mounting

**8 = Remote High Capacity Brazed Plate** = Option 3 for remote field mounting

**9 = Remote High Capacity Shell and Tube** = Option 4 for remote field mounting

## Digit 15 — Evaporator Temperature Range

**0 = Standard Cooling 40 to 65°F [4.4 to 18.3°C]** – The chiller with *standard* evaporator must not be operated with a leaving water temperature of less than 42°F for a plain water application. The chiller with *high capacity* evaporator must not be operated with a leaving water temperature of less than 40°F for a plain water application.

**1 = Standard Cooling/Ice Making 15 to 65°F [-6.7 to 18.3°C]** - The dual roles of an ice-making chiller can substantially reduce the installed cost of the system. An ice-making chiller is NOT a conventional chiller with two different leaving-fluid temperature setpoints. An ice-making chiller operates at maximum capacity when in ice-making mode. It continues to operate at maximum capacity until the leaving-fluid temperature reaches the target setpoint. At a 10°F delta across the evaporator, this limit indicates that all of the water inside the ice storage tanks has been frozen. An external signal can be sent to the chiller to reset the chilled water setpoint back to conventional chilled water leaving fluid temperature and the chiller will return to traditional chiller operation.



## Digit 16 — Evaporator Flow and Valves

**0 = Standalone Unit – No Valves**

**1 = Constant Flow Array / Manual Balancing Isolating Valve** - For a proper hydronic balance in a constant flow system, manual balancing valves are factory installed in array headers. These valves can also be used to isolate a module in an array for service or cleaning. Constant flow pumping systems utilize a staged cooling system and a constant flow water pumping system. No modules are isolated at part load. Flow from “off” chillers mixes with the flow from active chillers in creating the leaving array temperature. The load may not be less than 25% of the full load in constant flow applications.

**2 = Variable Flow Primary / Motorized Isolating Valve** - Variable flow systems isolate modules not needed to meet current cooling or heating capacity by isolating modules with a factory installed motorized on-off valve. Variable flow systems utilize compressor staging and motorized isolation valves with a variable flow water pumping system to modulate cooling and water flow to meet chilled water needs and save operating energy costs. Cooling capacity is modulated by staging compressors and isolating modules based on the desired leaving water temperature. Water flow control is field provided and is usually modulated with VFD controlled variable flow primary pumps based on the differential pressure across the water system. The rate of change in flow rate must not exceed 10% of design flow gpm per minute.

## Digit 17 — Condenser Heat Exchanger Type

**0 = Microchannel Heat Exchanger (MCHE)** – Aluminum coil with aluminum fins

**C = E-Coat Microchannel Heat Exchanger (MCHE)** – Polymer e-coating applied to the condenser coils. Coating surpasses a 6000-hour salt spray test per ASTM B117-90, yet is only 0.8-1.2 mils this and has excellent flexibility. Option is intended for use in coastal saltwater conditions under the stress of heat, salt, sand and wind and is applicable to all corrosive environments where a polymer coating is acceptable.

## Digit 18 — Condenser Fan Control

**0 = Fixed Speed** – Air-cooled units can operate down to 35°F by cycling condenser fans.

**1 = Variable Speed** – Air-cooled units can operate down to 0°F by slowing or stopping condenser fans.

## **Digit 19 — Condenser Heat Recovery**

**0 = No Heat Recovery** – Chiller operates to maintain chilled water temperature. No secondary condenser heat exchanger is installed.

**1 = Heat Recovery** – A full capacity brazed plate condenser is provided. Instead of rejecting heat to the air-cooled condenser, heat is recovered from the brazed plate heat exchanger and condenser water and can be used in many commercial facilities for preheating incoming air, reheat in dehumidification applications, washing, showering, and other everyday usage. Such facilities include:

- Office Buildings: reheat coils, boiler preheat, general usage
- Hospitals, laundry, showers, and sterilization (often separate from other systems)
- Dormitories: laundry, showers, and general usage
- Hotels: laundry, showers, pool heat, and general usage

All of these facilities require large quantities of makeup water that must be heated.

## **Digit 20 — Condenser Heat Recover Control Valves**

**0 = None**

**1= Four-Pipe Heat Recovery**

**2= Four-Pipe Heating/Cooling Optimized, Heat Pump**

**3= Four-Pipe, Heat Recovery + Heating/Cooling Optimized Heat Pump**

## Digit 21 — Power Connection

**0 = Terminal Block** - Terminal Block to land incoming power wiring.

**A = Non-Fused Disconnect Switch** - Non-fusible disconnect switches do not incorporate fuses into their enclosure and provide no circuit protection capability. The purpose of a non-fusible safety switch is to provide an easy means to open and close a circuit.

**B = Fused Disconnect Switch** - Fusible disconnect switches combine fuses with the switch in a single enclosure, providing an easy means to manually open and close the circuit while the fuses protect against overcurrent.

**C = High SCCR Fuse Block** - Short-circuit current ratings provide the level of fault current that a component or piece of equipment can safely withstand (based on a fire and shock hazard external to the enclosure). A 100kA SCCR can have significant impact in meeting safety and insurance requirements.

**D = Distribution Panel Connection = Terminal Block; Module Power Connection = Circuit Breaker** – This feature is used for the single point power options in Digit 25. Factory provided panelboard serves as a power distribution panelboard for chiller array.

## Digit 22 — Power Feed

**D = Power Feed to Each Unit (5 kA Rating)** – Power is field provided to each chiller module in the array. This is beneficial in applications where redundancy or dual point power is desirable or to allow for smaller electrical feeds instead of a large single electrical feed.

**E = Power Feed to Each Unit (5 kA Rating) + Phase and Voltage Monitor** - This option includes field provided power and an additional factory-installed phase/power monitor designed to protect the chiller from premature failure and damage due to common voltage faults such as voltage unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling.

**F = Power Feed to Each Unit (100 kA Rating)** - Short-circuit current ratings provide the level of fault current that a component or piece of equipment can safely withstand (based on a fire and shock hazard external to the enclosure). A 100kA SCCR can have significant impact in meeting safety and insurance requirements.

**G = Power Feed to Each Unit (100 kA Rating) + Phase and Voltage Monitor** - This option includes field provided power and an additional factory-installed phase/power monitor designed to protect the chiller from premature failure and damage due to common voltage faults such as voltage unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling.

## Digit 23 — Service Options

**0 = None**

**A = LED Lighted Control Cabinet** - LED lights provide bright lighting inside enclosure offer with long service life and can provide improve safety and visibility when service inside the enclosure is needed.

**B = Factory Wired 115V Outlet** – Factory wired electrical box with ground fault interrupter receptacle located within the control panel. The circuit is rated at 10 amps maximum and is factory wired to a step-down transformer and fuse block. The circuit is wired to the line side of the unit power block or power switch permitting use of the outlet while power to the unit is shut off.

**Caution: When the power to the unit is disconnected with the factory installed unit power switch, the convenience outlet will remain live.**

**C = Field Wired 115V Outlet** – Field wired electrical box with ground fault interrupter receptacle, located with the control panel. Receptacle is rated for 20 amps. The outlet must be field wired to a 115 VAC power supply.

**D = LED Lighted Control Cabinet + Factory Wired 115V Outlet**

**E = LED Lighted Control Cabinet + Field Wired 115V Outlet**

## Digit 24 — Control Style

**0 = Non-Array, Single Unit Controller** – Standalone Controller has control board with twelve 0-5vdc sensor inputs, four 5vdc digital inputs, ten 230vac 6.3amp relay outputs, four 0-10vdc analog outputs, keypad, 128 x 64 dot pixel STN monochrome graphics LCD with 2.8" diagonal viewing area, real time clock, MCS-I/O, RS-232, RS-485 and Ethernet communication ports.

**A = Master Secondary Controller w/ Single Controller per Array** - This option allows up to six (6) ACC modular chillers to be controlled and operated. The Master-Secondary Array Controller requires only a single controller for the array. This option is beneficial in replacement applications where a single larger chiller, with one controller, is replaced by modular chillers controlled with one controller.

**B = Supervisory Array Controller w/ Controller per Module** - This option allows up to ten (10) ACC modular chillers to be controlled and operated. The Supervisory Array Controller requires each module have an individual unit controller. This option is beneficial in applications requiring seven (7) or more modules to be controlled and in applications where chiller uptime is critical. If communication between the individual ACC modular chiller unit controller(s) and the Supervisory Array Controller is lost, or the Supervisory Array Controller fails, the individual ACC modular chillers can be shifted into manual mode to operate independent from the Supervisory Array Controller and will maintain a “manual mode” default chilled leaving water temperature set point.

**C = Secondary/Expansion Board** – Secondary modules in the array have expansion boards to communicate inputs from the given module to the Master controller. The Master-Secondary Array Controller requires only a single controller for the array. This option is beneficial in replacement applications where a single larger chiller, with one controller, is replaced by modular chillers controlled with one controller.

## Digit 25 — Local Unit Controller Interface

**0 = Keypad with Dot Pixel Display** - keypad, 128 x 64 dot pixel STN monochrome graphics LCD with 2.8" diagonal viewing area

**B = 15.4-in. Color Touchscreen** - Information and graphics are shown on high resolution (1280x800) LCD display with LED back lighting. The high-resolution screen makes it easy for the user to manage complex installations without losing the overall view or requiring a separate laptop. Pages can be navigated in a fast and straightforward manner.

## Digit 26 — Remote BMS Interface (Digital Comm)

0 = None

2 = Lon Talk®

4 = BACnet® MS/TP

5 = BACnet® IP

6 = MODBUS®

## Digit 27 — Blank

0 = Blank

## Digit 28 — Refrigeration Options

0 = None

**1 = Active Freeze Protection (All Circuits)** – Active freeze protection is a suction pressure-based freeze protection. Active Freeze Protection is standard on all ACC Series chillers. The chiller's unit controller continually monitors the saturated suction pressure and will open (energize) the Active Freeze Protection solenoid if the suction pressure falls to approximately 101 psig (32°F). The solenoid closes (de-energizes) when the pressure climbs to approximately 105 psig (34°F) and the freezing potential no longer exists.

**2 = Hot Gas Bypass (All Circuits)** - Hot gas bypass can stabilize the system balance point by diverting hot, high- pressure refrigerant vapor from the discharge line directly to the low-pressure side of the system. This tactic keeps the compressor more fully loaded while the evaporator satisfies the part-load condition. The Jetson Active Freeze Protection can be configured to function as Hot Gas Bypass by configuring the controller to monitor both the leaving water temperature and the suction temperature. In Hot Gas Bypass operating mode, the Active Freeze Protection provides an additional step of capacity.

## Digit 29 — Refrigeration Accessories

**0 = Moisture Indicating Sight Glass** - The sight glass shows if the liquid line has a full line of liquid or if it has bubbles which shows it's a liquid/vapor mix. It should not be used to determine proper charge. The moisture indicator shows if the system is dry or if it has harmful moisture content.

**A = Moisture Indicating Sight Glass + Compressor Isolation Valves** – In addition to the Moisture Indicating Sight Glass, ball type Compressor Isolation Valves are mounted on the cooling circuit discharge and liquid lines permitting isolation of the compressors and filter driers for service or replacement. The valves are located close to the compressors. The valve works through a quarter turn from open to closed. Teflon seals and gaskets are used with a nylon cap gasket to prevent accidental loss. This option reduces the amount of refrigerant that must be recovered during compressor service or replacement.

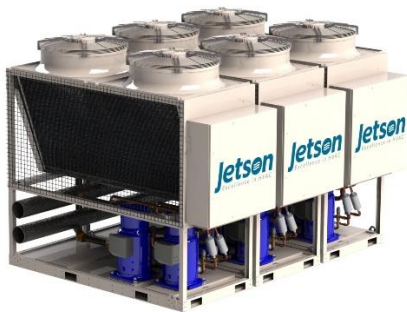
**B = Moisture Indicating Sight Glass + Replaceable Core Filter Driers** - In addition to the Moisture Indicating Sight Glass, Replaceable Core Filter Driers allow for easy changeout of the filter-drier element.

**C = Moisture Indicating Sight Glass + Replaceable Core Filter Driers + Compressor Isolation Valves**

## Digit 30 — Water Connection

**0 = No Header Piping (Heat Exchangers Only)** used in single chiller applications

**1 = Grooved Pipe Connection, Units Connected Side-to-Side** – Chillers are set alongside other chillers along the long dimension. A common header is connected between chillers on the short dimension.



## Digit 31 — Water Side Pressure

**0 = 150 psi**

**A = 300 psi**

## Digit 32 — Water Strainer(s)

**0 = None**

**A = Chilled Water Flow Wye Strainer** – Factory provided, field installed wye strainer can be placed in a horizontal or vertical pipeline as long as the screen is in a downward position. Straining is accomplished via a 20-mesh lined straining element.

**B = Chilled Water Wye Strainer with Installation Kit** - Wye strainer installation kits provide piping transitions need to easily attach the wye strainer to the chiller.

**C = Heat Recovery Water Flow Wye Strainer** – Factory provided, field installed wye strainer can be placed in a horizontal or vertical pipeline as long as the screen is in a downward position. Straining is accomplished via a 20-mesh lined straining element.

**D = Heat Recovery Water Wye Strainer with Installation Kit** - Wye strainer installation kits provide the piping transitions needed to easily attach the wye strainer to the chiller.

**E = Chilled and Heat Recovery Water Nominal Flow Wye Strainer**

**F = Chilled and Heat Recovery Water Wye Strainer with Installation Kit**

## Digit 33 — Water Accessories

**0 = Chilled Water Flow Switch** - An evaporator flow-proving device is required for all ACC Series chiller applications. A paddle style liquid flow switch is available with a NEMA Type 4X enclosure for field-installation.

## Digit 34 — Free Cooling

**0 = None**

**1 = With Free Cooling** - Free cooling is an economical method of using low external air temperatures to assist in chilling water. When outdoor temperatures are lower relative to indoor temperatures, this system utilizes the cool outdoor air as a free cooling source.

## Digit 35 — Sound Attenuator

**0 = None**

**A = Neoprene Pads** - In applications that are sensitive to noise and vibration, optional neoprene isolator pads can be provided for load bearing points on ACC chillers.

**B = Compressor Sound Blankets** - Factory installed Compressor Sound Blankets provide insulated sound covers on each compressor. These blankets dampen compressor generated sound. The blankets can be used alone or in combination with a sound cabinet.

**C = Factory Sound Enclosure Cabinet** - The sound enclosure is a factory installed option. The panels completely encase the chiller module. The panels, lined with sound absorbing insulation, can be removed for access in case of service and provide a streamlined appearance to the product while in place.

**D = Compressor Sound Blankets + Factory Sound Enclosure Cabinet**

**E = Compressor Sound Blanket(s) + Neoprene Pads**

**F = Factory Sound Enclosure Cabinet(s) + Neoprene Pads**

**G = Compressor Sound Blankets + Factory Sound Enclosure Cabinet + Neoprene Pads**

## Digit 36 — Guards

**0 = None**

**A = Wire Mesh Coil Guards** - Optional factory-installed, vinyl-coated, welded-wire guards provide protection for the condenser coils.

**B = Base + Coil Wire Mesh Guards** - Optional factory-installed, vinyl-coated, welded-wire guards provide protection for the condenser coils and lower portion of the unit.

**B = Coil Louvers** - Optional factory-installed, louvered panels provide protection for the condenser coils.

**C = Base + Coil Louvers** - Optional factory-installed, louvered panels provide protection for the condenser coils and lower portion of the unit.

## Digit 37 — Exterior Finish and Shipping Splits

**0 = Standard Paint, Each Module Packaged Separately** – Standard Jetson paint process uses primer wash then spray coated with a two-part polyurethane exterior paint.

**B = Custom Paint, Each Module Packaged Separately** – Custom colors are available for applications requiring ACC Series chiller to match existing color palettes.

## Digit 38 — Warranty

**0 = Standard Warranty** – Warranty period is a period of twelve (12) months from date of start-up or eighteen (18) months from date of original shipment, whichever may occur first.

**A = Five Year Compressor Only Parts Warranty** - Additional parts only warranty covering compressor(s) through sixty (60) months from date of shipment.

**B= Factory Startup + Owner Training + Two Year Parts & Labor Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is twenty-four (24) months from date of startup or thirty (30) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction.

**C= Factory Startup + Owner Training + Three Year Parts & Labor Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is thirty-six (36) months from date of startup or forty-two (42) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction.

**D= Factory Startup + Owner Training + Four Year Parts & Labor Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is forty-eight (48) months from date of startup or fifty-four (54) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction.

**E= Factory Startup + Owner Training + Five Year Parts & Labor Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is sixty (60) months from date of startup or sixty-six (66) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction.

**F= Factory Startup + Two Year Parts & Labor Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is twenty-four (24) months from date of startup or thirty (30) months from date of original shipment, whichever may occur first.

**G= Factory Startup + Three Year Parts & Labor Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is thirty-six (36) months from date of startup or forty-two (42) months from date of original shipment, whichever may occur first.

**H= Factory Startup + Four Year Parts & Labor Warranty**- Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is forty-eight (48) months from date of startup or fifty-four (54) months from date of original shipment, whichever may occur first.

**J= Factory Startup + Five Year Parts & Labor Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is sixty (60) months from date of startup or sixty-six (66) months from date of original shipment, whichever may occur first.



**K= Factory Startup + First Year Labor Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is twelve (12) months from date of startup or eighteen (18) months from date of original shipment, whichever may occur first.

**L= Factory Startup + Owner Training + First Year Labor Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts and labor warranty period is twelve (12) months from date of startup or eighteen (18) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction.

**M= Factory Startup + Owner Training + Two Year Parts Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts warranty period is twenty-four (24) months from date of startup or thirty (30) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction.

**N= Factory Startup + Owner Training + Three Year Parts Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts warranty period is thirty-six (36) months from date of startup or forty-two (42) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction.

**P= Factory Startup + Owner Training + Five Year Parts Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts warranty period is sixty (60) months from date of startup or sixty-six (66) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction.

**Q= Factory Startup + Two Year Parts Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts warranty period is twenty-four (24) months from date of startup or thirty (30) months from date of original shipment, whichever may occur first.

**R= Factory Startup + Three Year Parts Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts warranty period is thirty-six (36) months from date of startup or forty-two (42) months from date of original shipment, whichever may occur first.

**S= Factory Startup + Five Year Parts Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Parts warranty period is sixty (60) months from date of startup or sixty-six (66) months from date of original shipment, whichever may occur first.

**T= Factory Startup + Five Year Compressor Only Parts Warranty (AC)** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Additional parts only warranty covering compressor(s) through sixty (60) months from date of shipment.

**U= Factory Startup + Owner Training + Five Year Compressor Only Parts Warranty (AC)** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. Additional parts only warranty covering compressor(s) through sixty (60) months from date of shipment. Training includes standard operation and routine maintenance instruction.

**V= Factory Startup Service + 1 Year Parts Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. All parts warranty period is twelve (12) months from date of startup or eighteen (18) months from date of original shipment, whichever may occur first.

**W= Factory Startup Service w/Owner Training + 1 Year Parts Only Warranty** - Pre-startup unit inspection, startup, and immediate part repair/replacement at the time of startup (if needed) by Modine Service Technicians. All parts warranty period is twelve (12) months from date of startup or eighteen (18) months from date of original shipment, whichever may occur first. Training includes standard operation and routine maintenance instruction. Training includes standard operation and routine maintenance instruction.

**X= Two Year Parts Only Warranty** - Additional parts only warranty covering all parts through twenty-four (24) months from date of shipment.

**Y= Three Year Parts Only Warranty** - Additional parts only warranty covering all parts through thirty-six (36) months from date of shipment.

**Z= Five Year Parts Only Warranty** - Additional parts only warranty covering all parts through sixty (60) months from date of shipment.

## **Digit 39 — Special Options**

**0 = None**

**X = With Specials**

## **Requirements for operation, service and installation of appliances using flammable refrigerants**

Pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

### **Split systems with flammable refrigerant**

For split systems installation the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements.

The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

- 1) field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected.
- 2) If additional charge is required to complete installation, charging a system in the field must be based on determination of liquid sub-cooling

and evaporator superheat and considering industry standards.

**When connecting to a condenser and condensing units (ACCR and ACCU), the maximum operating pressure must be considered.**

### **Qualification of workers**

Work procedures impacting safety must be performed exclusively by **competent** individuals. Service personnel should demonstrate proficiency in key areas, including electrical safety, refrigerant handling, and mechanical repairs. It is crucial for them to comprehend the associated risks and take necessary precautions. Competent service personnel diligently adhere to safety guidelines to prevent accidents and safeguard themselves and others. Proper utilization of personal protective equipment (PPE) remains essential. Additionally, workers must hold licenses as HVAC technicians and be EPA-certified.

### **Information on servicing flammable refrigerant systems**

For maintenance, repair or start up to the refrigerating system the following should be completed prior to conducting work on the system:

- **Work procedure** :Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

- **General work area** :All maintenance staff and others working in the local area shall be instructed on the nature of work being

carried out. Work in confined spaces shall be avoided.

**- Checking for presence of refrigerant :**

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants.

**- Presence of fire extinguisher:** If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

**- No ignition sources :** No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

**-Ventilated area :** Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

**- Checks to the refrigerating equipment :**

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

- The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant; - marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

**Checks to electrical devices :**

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so

all parties are advised. Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

### **Repairs to sealed components :**

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that the apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

### **Repair to intrinsically safe components :**

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe

components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

### **Cabling :**

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

### **Detection of flammable refrigerants :**

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the

refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak

### **Removal and evacuation :**

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations; -evacuate; - purge the circuit with inert gas (optional for A2L); -Evacuate (optional for A2L); - continuously flush or purge with inert gas when using flame to open circuit; and - open the circuit. The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free

nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

### **Decommissioning**

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- a) Become familiar with the equipment and its operation.
- b) Isolate system electrically.
- c) Before attempting the procedure, ensure that:
  - Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - All personal protective equipment is available and being used correctly;
  - The recovery process is supervised at all times by a competent person;
  - Recovery equipment and cylinders conform to the appropriate standards.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with instructions.
- h) Do not overfill cylinders (no more than 80 % volume liquid charge).

- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k) Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

**Labeling**

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerants.

**Recovery**

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.


The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the

flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

**Wiring Diagram**

A unit specific wiring diagrams in point-to-point form is laminated in plastic and located inside the control compartment door.

**Note:** Startup technician must check motor amperage to ensure that the amperage listed on the motor nameplate is not exceeded.

	<p><b>WARNING</b></p> <p><b>ELECTRIC SHOCK</b></p>
<p>Disconnect power supply before making wiring connections or working on this equipment. Follow all applicable safety procedures to prevent accidental power up. Failure to do so can result in injury or death from electrical shock or moving parts and may cause equipment damage.</p>	



## ADVERTENCIA

### RIESGO DE DESCARGA ELÉCTRICA

Desconecte todas las fuentes de energía eléctrica de la unidad para evitar el riesgo de descargas eléctricas o de sufrir lesiones debido a las piezas giratorias.



## AVERTISSEMENT

### RISQUE D'ÉLECTROCUTION

Coupez l'alimentation électrique vers l'unité pour éviter tout risque de choc électrique ou toute blessure en raison des pièces rotatives.



## CAUTION

### FIELD WIRED CONNECTIONS

Some units may require field wired connections. Refer to the wiring diagrams contained within the unit to identify any components or controls requiring additional wiring in the field before placing the unit into service. All additional field wiring should be performed by a trained service technician.



## PRECAUCIÓN

### CONEXIONES DE CABLES EN EL LUGAR DE FUNCIONAMIENTO

Algunas unidades pueden requerir que se realicen conexiones de cables en el lugar de funcionamiento. Consulte los diagramas de cableado incluidos dentro de la unidad para identificar los componentes o controles que necesiten conectar cables adicionales en el lugar de funcionamiento antes de poner la unidad en marcha. Todas las conexiones de cables adicionales que se deban hacer en el lugar de funcionamiento deben ser realizadas por un técnico de servicio capacitado.



## ATTENTION

### CONNEXIONS FILAIRES EFFECTUÉES SUR LES LIEUX

Certaines unités pourraient nécessiter que des connexions filaires soient effectuées sur les lieux. Reportez-vous aux schémas de câblage se trouvant dans l'unité pour identifier les composants ou les commandes qui nécessitent un câblage supplémentaire sur les lieux avant de mettre l'unité en service. Toutes les connexions filaires supplémentaires doivent être effectuées par un technicien de service qualifié.



## WARNING

### CONVENIENCE OUTLETS AND SERVICE LIGHTS

Convenience outlet and service light circuits are wired to the incoming power side of the disconnect. These circuits will remain powered even when unit disconnect is off.



## ADVERTENCIA

### TOMACORRIENTES AUXILIARES Y LUCES DE SERVICIO

Los circuitos de los tomacorrientes auxiliares y de las luces de servicio están conectados al lado de la alimentación eléctrica entrante del interruptor de desconexión. Estos circuitos permanecerán energizados incluso cuando el interruptor de desconexión de la unidad se encuentre en la posición de apagado





## **AVERTISSEMENT**

### **PRISES DE COMMODITÉ ET FEUX DE SERVICE**

Les circuits des prises de commodité et des feux de service sont reliés du côté de l'alimentation entrante de la déconnexion. Ces circuits demeurent sous tension, même lorsque la déconnexion de l'unité est désactivée

Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.



## **CAUTION**

### **SEALING ELECTRICAL ENTRIES**

Installing Contractor is responsible for proper sealing of the electrical entries into the unit. Failure to seal the entries may result in damage to the unit and property.



## **PRECAUCIÓN**

### **SELLADO DE LAS ENTRADAS ELÉCTRICAS**

El contratista de instalación es responsable del correcto sellado de las entradas eléctricas de la unidad. No sellar las entradas puede provocar daños en la unidad y daños materiales.



## **ATTENTION**

### **SCELLEMENT DES ENTRÉES ÉLECTRIQUES**

L'entrepreneur effectuant l'installation doit sceller adéquatement les entrées électriques vers l'unité. Ne pas sceller les entrées pourrait endommager l'unité et causer des dommages matériels.

# Wiring Diagram

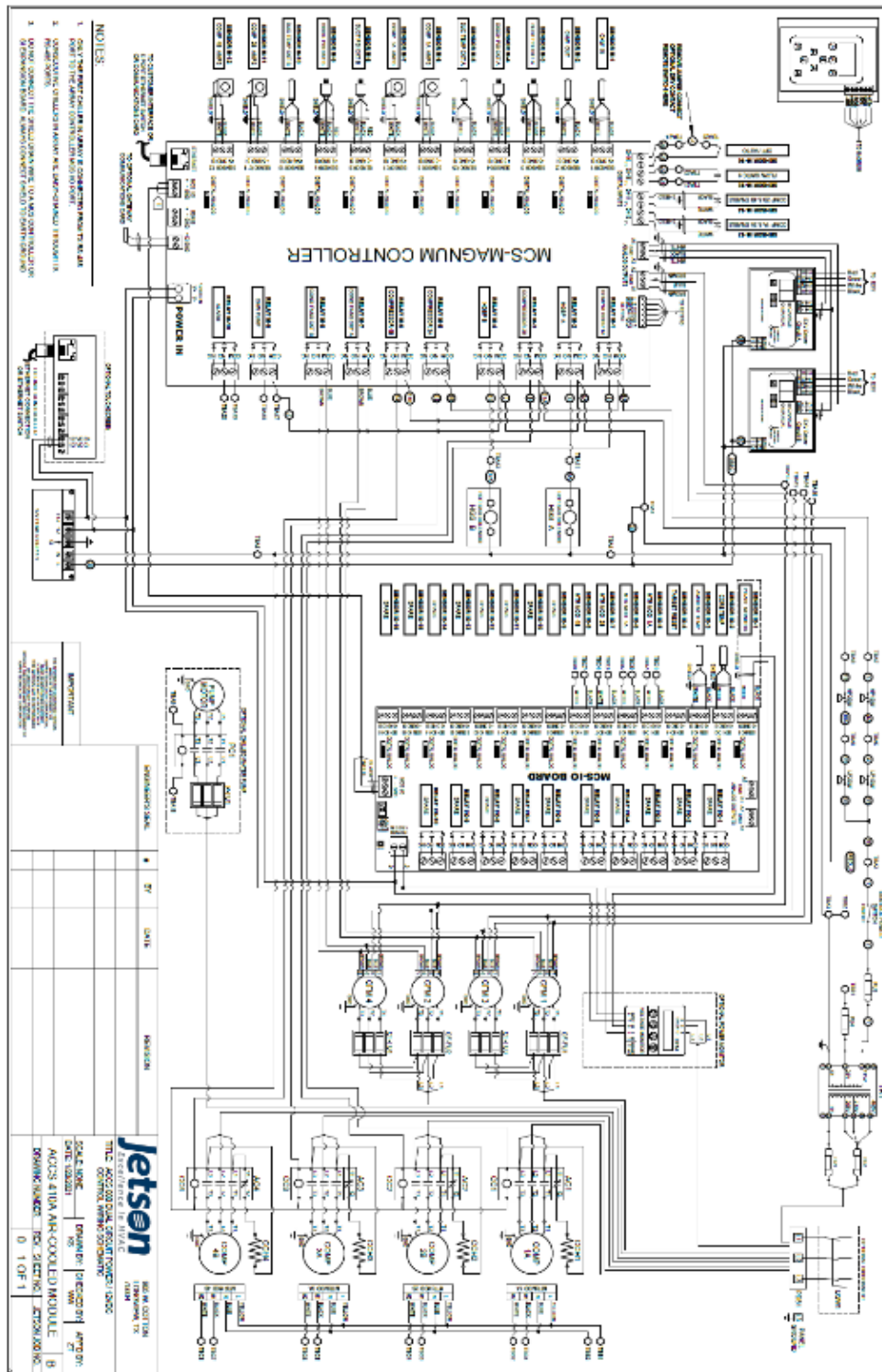


Figure 4: Sample Electrical Diagram. Contact Factory for specific wiring diagram needs.

# Field Wiring Diagram

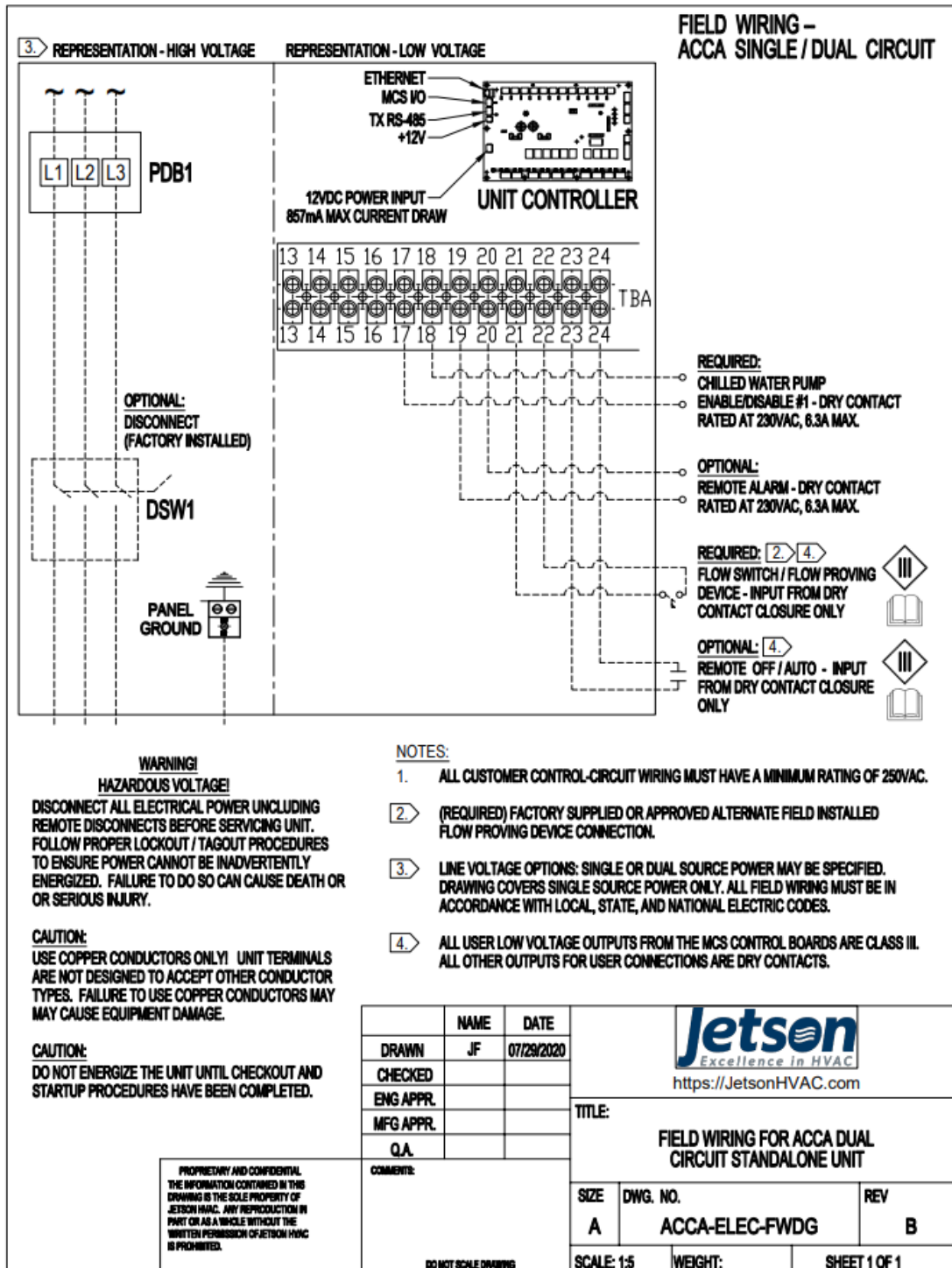


Figure 5: Sample Electrical Diagram. Contact Factory for specific wiring diagram needs.

## INSTALLATION

Jetson ACC series air-cooled chillers are complete self-contained liquid chilling units. They are factory assembled, wired, charged and run tested. Within the ACC series, there are partial unit air conditioner options available, which are the ACCR (air-cooled condenser) and ACCU (air-cooled condensing unit).


 <b>WARNING</b> QUALIFIED INSTALLER
Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Startup and service must be performed by a Factory Trained Service Technician.


 <b>ADVERTENCIA</b> INSTALADOR CAPACITADO
La instalación, ajuste, modificación, mantenimiento o reparación incorrectos pueden provocar daños materiales, lesiones personales o la muerte. La puesta en marcha y el mantenimiento deben ser realizados por un técnico de servicio capacitado de la fábrica.

 <b>AVERTISSEMENT</b> INSTALLATEUR QUALIFIÉ
Une installation, un ajustement, une modification, un service ou un entretien non appropriés pourraient causer des dommages matériels, des blessures ou la mort. La mise en service et les réparations doivent être effectuées par un technicien de service formé en usine.

System should be sized in accordance with the American Society of Heating, Refrigeration and Air Conditioning Engineers Handbook.

Installation of ACC chillers units must conform to the ICC standards of the International Mechanical Code, the International Building Code, National Wiring Regulations and local building, plumbing and waste water codes. All appliances must be electrically grounded in accordance with local codes, or in the absence of local codes, the current National Electric Code, ANSI/NFPA 70 or the current Canadian Electrical Code CSA C22.1.

 <b>CAUTION</b>
The Clean Air Act of 1990 bans the intentional venting of refrigerant as of July 1, 1992. Approved methods of recovery, recycling, or reclaiming must be followed.

 <b>PRECAUCIÓN</b>
La Ley de Aire Limpio (Clean Air Act) de 1990 prohíbe la ventilación intencional de refrigerantes desde el 1 de julio de 1992. Se deben usar métodos de recuperación, reciclaje o reutilización aprobados

 <b>ATTENTION</b>
La Loi Clean Air de 1990 interdit la ventilation délibérée de fluides frigorigènes depuis le 1 <sup>er</sup> juillet 1992. Les méthodes de récupération, de recyclage ou de recouvrement approuvées doivent être respectées



## WARNING

This unit ACCS can be a PARTIAL UNIT AIR CONDITIONER (ACCR and ACCU), complying with PARTIAL UNIT requirements of this Standard, and must only be connected to other units that have been confirmed as complying to corresponding PARTIAL UNIT requirements of this Standard, UL 60335-2-40/CSA C22.2 No. 60335-2-40



## ADVERTENCIA

Esta unidad ACCS puede ser un AIRE ACONDICIONADO DE UNIDAD PARCIAL (ACCR y ACCU), cumpliendo con los requisitos de UNIDAD PARCIAL de esta Norma, y solo debe estar conectada a otras unidades que hayan sido confirmadas como cumpliendo con los requisitos correspondientes de UNIDAD PARCIAL de esta Norma, UL 60335-2-40/CSA C22.2 No. 60335-2-40.



## AVERTISSEMENT

Cette unité ACCS peut être un CLIMATISEUR UNITAIRE PARTIEL (ACCR et ACCU), se conformant aux exigences UNITAIRE PARTIELLE de cette norme, et ne doit être connectée qu'à d'autres unités ayant été confirmées comme conformes aux exigences correspondantes de l'UNITAIRE PARTIEL de cette norme, UL 60335-2-40/CSA C22.2 No. 60335-2-40.



## WARNING

Coils and sheet metal surfaces present sharp edges and care must be taken when working with equipment.



## ADVERTENCIA

Las bobinas y las superficies de chapa metálica tienen bordes filosos, por lo que se debe tener cuidado al utilizar el equipo.



## AVERTISSEMENT

Faites attention lorsque vous travaillez avec l'appareil puisque les serpentins et les surfaces en tôle présentent des rebords tranchants.



## WARNING

Failure to observe the following instructions will result in premature failure of your system and possible voiding of the warranty.



## ADVERTENCIA

No seguir las instrucciones que se indican a continuación puede provocar una falla prematura del sistema y una posible anulación de la garantía.



## AVERTISSEMENT

Le non-respect des directives suivantes entraînera une défaillance prématurée de votre système et risque d'annuler la garantie

## Locating the Unit



### **DANGER**

Appliances must not be installed where they may be exposed to potentially explosive or flammable atmosphere.



### **PELIGRO**

Los aparatos no deben instalarse en lugares donde puedan quedar expuestos a una atmósfera potencialmente explosiva o inflamable.



### **DANGER**

Les appareils ne doivent pas être installés à un endroit où ils risquent d'être exposés à une atmosphère potentiellement explosive ou inflammable.



### **WARNING**

Units are heavy and care must be taken in the handling and moving of this unit to prevent it from becoming unstable and tipping over. Do not lean a ladder against the unit or put weight on or against it prior to completing the installation to prevent the unit from tipping.



### **ADVERTENCIA**

Las unidades son pesadas y se debe tener cuidado al manipularlas y moverlas para evitar que se vuelvan inestables y se vuelquen. No apoye una escalera contra la unidad ni coloque peso sobre ella o contra ella antes de completar la instalación para evitar que la unidad se vuelque.



### **AVERTISSEMENT**

Les unités sont lourdes, par conséquent il faut faire attention lors de leur manipulation et déplacement pour éviter toute instabilité et les empêcher de basculer. N'appuyez pas une échelle contre l'unité et ne mettez pas du poids sur celle-ci ou contre celle-ci avant d'avoir terminé l'installation pour l'empêcher de basculer.

### **IMPORTANT**

Start up and adjustment procedures, installation, and service of these appliances must be performed by a qualified installation and service agency.

### **IMPORTANTE**

Los procedimientos de puesta en marcha y ajuste, instalación y mantenimiento de estos aparatos deben ser realizados por una empresa de instalación y servicio calificada.

### **IMPORTANT**

Les procédures de démarrage et de réglage, l'installation et le service de ces appareils doivent être confiés à un centre d'installation et de service qualifié.

The ACC chiller and its components are designed for outdoor applications and mounting at ground level or on a rooftop. It must be placed on a level and solid foundation that has been prepared to support its weight. When installed at ground level, a one-piece concrete slab should be used with footings that extend below the frost line. ACC chillers need to be supported around their entire perimeter and also between modules (array application). With ground level installation, care must be taken to protect the coil from damage due to vandalism or other causes. See below figure 1 and figure 2 to refer to the mounting holes according to the frame size of the ACC chillers.

Figure 1: Small size frame

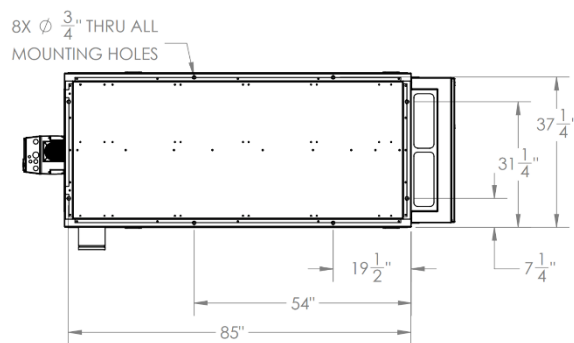
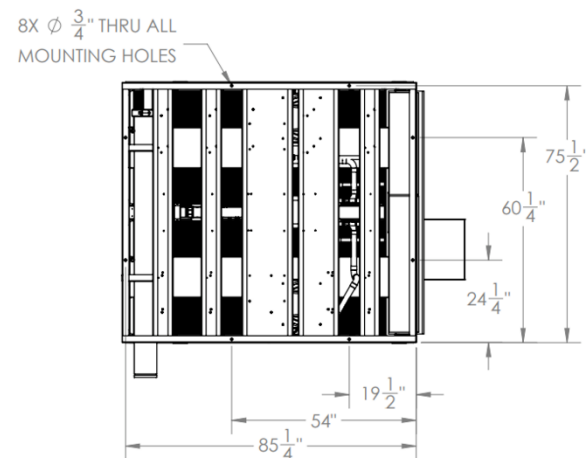


Figure 2: Large size frame



### Clearance distances

The installation position must provide at least sufficient clearance for proper airflow to the condenser coils. See Table 1 for individual unit clearances. When units are mounted adjacent to each other (unit-to-unit placement), as in a modular array, the minimum clearance required between the units is 1/2".

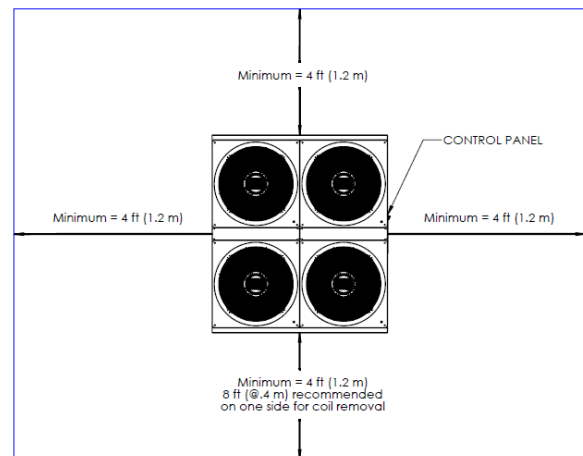
Table 1 - Service Clearance

Location	Required**	Recommended
Back	0"	96" for coil removal
Front*	42"	48"
Left	0"	48"
Right	0"	48"
Top	unobstructed	unobstructed

\*Front = facing controls enclosure

\*\* Local code may take precedence

Figure 3: Service Clearance



Units should not be installed in an enclosure or pit that is deeper than the height of the unit. When recessed installation is necessary, the clearance to maintain proper airflow is at least 6 feet.

ACC chillers have a vertical air discharge. There must be no obstruction above the

equipment. Do not place the unit under an overhang.

Unobstructed flow of condenser air is essential to maintain chiller capacity and operating efficiency. When determining unit placement, careful consideration must be given to assure a sufficient flow of air across the condenser heat transfer surface. Two detrimental conditions are possible and must be avoided: warm air recirculation and coil starvation. Air recirculation occurs when discharge air from the condenser fans is recycled back to the condenser coil inlet. Coil starvation occurs when free airflow to the condenser is restricted. Condenser coils and fan discharge must be kept free of snow or other obstructions to permit adequate airflow for satisfactory unit operation. Debris, trash, supplies, etc., should not be allowed to accumulate in the vicinity of the air-cooled chiller. Supply air movement may draw debris into the condenser coil, blocking spaces between coil fins and causing coil starvation. Both warm air recirculation and coil starvation cause reductions in unit efficiency and capacity because of the higher head pressures associated with them.

For proper unit operation, the immediate area around condenser must remain free of debris that may be drawn in and obstruct airflow in the condensing section.

Consideration must be given to obstruction caused by snow accumulation when placing the unit.

When the unit is placed in an enclosure or small depression, the top of the surrounding walls should be no higher than the top of the fans. The chiller should be completely open above the condenser fans. There should be no roof or structure covering the top of the

chiller. Ducting individual fans is not recommended.

## **Field Wiring Method**

### **Terminal Strip Connections**

The terminal strip connections are designed to clamp down on the wires. To properly connect the wires to the terminal strip:

1. Use small flat-head screwdriver into the square hole on the terminal. Press firmly until the screwdriver hits the back stop and opens the terminal (see Figure 5).
2. Remove approximately 3/8" (9.5mm) of insulation from the end of the wire and push the stripped wire into the oval hole in the terminal.
3. Remove the screwdriver. Pull on the wire to make sure that it is securely clamped in the terminal.
4. Make sure that the terminal clamp is in contact with bare wire (insulation removed).

### **Electrical**

The single point electrical power connections are made in the electrical control compartment. The microprocessor control furnished with the unit is supplied with its own power supply factory wired to the main power of the chiller.

Check the unit nameplate voltage to make sure it agrees with the power supply. Connect power to the unit according to the wiring diagram provided with the unit.



Table 2 - Nameplate Voltage Markings

Voltage Feature	Nameplate Voltage Marking	Min/Max VAC
208V/3Φ/60Hz	208	197/228
230V/3Φ/60Hz	230	197/252
460V/3Φ/60Hz	460	456/504
575V/3Φ/60Hz	575	570/630

Note: Units are factory wired for 208V, 230V, 460V, or 575V. The transformer configuration must be checked by a qualified technician prior to startup.

**!** **CAUTION**  
3-PHASE ROTATION

Rotation must be checked on all MOTORS AND COMPRESSORS of three phase units. Condenser fan motors should be checked by a qualified service technician at startup and any wiring alteration should only be made at the unit power connection. Variable frequency drives are programmed to automatically rotate the fan in the correct rotation. Do not rely on fans with variable frequency drives for compressor rotation.

**!** **PRECAUCIÓN**  
ROTACIÓN TRIFÁSICA

Se debe revisar la rotación de todos LOS MOTORES Y COMPRESORES de las unidades trifásicas. Los motores del ventilador del condensador deben ser revisados por un técnico de servicio calificado en el

momento de la puesta en marcha y todas las modificaciones del cableado deben realizarse solamente en la conexión de energía eléctrica de la unidad. Los variadores de frecuencia están programados para hacer girar el ventilador automáticamente en el sentido correcto. No dependa de ventiladores con variadores de frecuencia diseñados para la rotación de los compresores.

**!** **ATTENTION**  
3-PHASE ROTATION

La rotation doit être vérifiée sur tous les MOTEURS ET COMPRESSEURS des unités triphasées. Les moteurs du ventilateur du condensateur doivent être examinés par un technicien de service qualifié au moment de la mise en service et toute modification au câblage doit être effectuée uniquement au point de raccordement électrique de l'unité. Les mécanismes d'entraînement à fréquence variable sont programmés pour faire tourner le ventilateur automatiquement dans la direction appropriée. Ne vous fiez pas à des ventilateurs avec des mécanismes d'entraînement à fréquence variable pour la rotation du compresseur

Route power and control wiring, separately, through the utility entry. Do not run power and signal wires in the same conduit.

Protect the branch circuit in accordance with code requirements. The unit must be electrically grounded in accordance with local codes, or in the absence of local codes, the current National Electric Code,

ANSI/NFPA 70 or the current Canadian Electrical Code CSA C22.1.

Power wiring is to the unit terminal block or main disconnect. All wiring beyond this point has been done by the manufacturer and cannot be modified without effecting the unit's agency/safety certification.

Three phase voltage imbalances will cause motor overheating and premature failure. The maximum allowable imbalance is 5%.

Voltage imbalance is defined as 100 times the maximum deviation from the average voltage divided by the average voltage.

Example:  
 $(218V+237V+235V)/3 = 230V$ , then  
 $100*(230V-218V)/230V = 5.2\%$ , which exceeds the allowable imbalance.

Check voltage imbalance at the unit disconnect switch and at the compressor terminal. Contact your local power company for line voltage corrections.

To size a field supplied distribution panel for an array of chillers, use the following steps.

**1.The Max Fuse or Maximum Overcurrent Protection Device (MOCP) of the electrical distribution panel is as follows:**

a. A Sum the Max Fuse size for the individual chillers from the preceding table. This sum is the Max Fuse Size, or MOCP, of the electrical distribution panel associated with this bank of chillers. If this total is not a standard fuse size, select the next size down standard fuse from this value. If the MOCP is less than the MCA then select the fuse rating equal to or greater than the MCA.

**b. Standard Ampere Ratings for Fuses (From NEC Handbook, 240-6)**

The standard ratings for fuses shall be considered 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000, 1200, 1600, 2000, 2500, 3000 and 4000 amperes

**2. The recommended fuse size in amps (RFA) is calculated as follows:**

a.  $RFA = 1.75 * (\text{largest RLA}) + (\text{Smallest RLA})$  for the given bank of chillers.

**3. The MCA of the electrical distribution panel is calculated as follows:**

a. Sum the MCAs of each individual chiller from the preceding table. This is the MCA of the electrical distribution panel associated with this bank of chillers.

**4.The MCA of the electrical distribution panel is calculated as follows:**

### Electrical Service Sizing Data

Use the following table to correctly size the electrical service wiring for the unit(s).

Table 3 -ACC Electrical Data

Unit Size	# of Circuit	Eff.	Voltage	Comp #1 MCC	Comp #2 MCC	Comp #1 RLA	Comp #2 RLA	Fan Qty	Fan #1 FLA	Unit MCA	Unit Max Fuse	Unit Rec Fuse
10	1	Std.	200-230/3/60	61		39		1	5.2	54	90	70
			460/3/60	29		19			5.2	28	45	40
			575/3/60	24		15			5.2	24	35	30
15	1	Std.	200-230/3/60	75		48		1	5.2	65	110	90
			460/3/60	39		25			5.2	36	60	50
			575/3/60	35		22			5.2	33	50	45
15	2	Std.	200-230/3/60	43	43	28	28	1	5.2	67	90	80
			460/3/60	22	22	14	14		5.2	37	50	45
			575/3/60	18	18	12	12		5.2	31	40	35
20	1	Std.	200-230/3/60	105		67		1	5.2	89	150	125
			460/3/60	51		33			5.2	46	70	60
			575/3/60	41		26			5.2	38	60	50
20	2	Std.	200-230/3/60	61	61	39	39	1	5.2	93	125	110
			460/3/60	29	29	19	19		5.2	47	60	60
			575/3/60	24	24	15	15		5.2	40	50	45
25	2	Std.	200-230/3/60	64	64	41	41	1	5.2	97	125	125
			460/3/60	30	30	19	19		5.2	48	60	60
			575/3/60	26	26	17	17		5.2	43	50	50
30	2	Std.	200-230/3/60	75	75	48	48	1	5.2	113	150	125
			460/3/60	39	39	25	25		5.2	61	80	70
			575/3/60	35	35	22	22		5.2	56	70	70
30	2	High	200-230/3/60	75	75	48	48	2	5.2	119	150	150
			460/3/60	39	39	25	25		5.2	66	90	80
			575/3/60	35	35	22	22		5.2	61	80	70
40	2	Std.	200-230/3/60	105	105	67	67	2	5.2	162	225	200
			460/3/60	51	51	33	33		5.2	84	110	100
			575/3/60	41	41	26	26		5.2	69	90	80
50	2	Std.	200-230/3/60	128	128	82	82	2	5.2	195	250	225
			460/3/60	62	62	40	40		5.2	100	125	125
			575/3/60	45	45	29	29		5.2	75	100	90
50	2	High	200-230/3/60	128	128	82	82	2	5.2	195	250	225
			460/3/60	62	62	40	40		5.2	100	125	125
			575/3/60	45	45	29	29		5.2	75	100	90

60	2	Std.	200-230/3/60	170	170	109	109	2	5.2	256	350	300
			460/3/60	79	79	51	51		5.2	124	150	150
			575/3/60	60	60	38	38		5.2	97	125	110
60	2	High	200-230/3/60	170	170	109	109	4	5.2	266	350	300
			460/3/60	79	79	51	51		5.2	135	175	150
			575/3/60	60	60	38	38		5.2	107	125	125
70	2	Std.	200-230/3/60	170	190	109	122	4	5.2	282	400	350
			460/3/60	79	106	51	68		5.2	156	200	200
			575/3/60	60	71	38	46		5.2	116	150	150
80	2	Std.	200-230/3/60	190	190	122	122	4	5.2	295	400	350
			460/3/60	106	106	68	68		5.2	174	225	200
			575/3/60	71	71	46	46		5.2	123	150	150

Table 4 -ACC Fuse Data for Transformers and condenser fans

Class CC Fuse Table			Transformer Size				Fan Fuse	
			150 VA	250 VA	350 VA	500 VA	Variable	Fixed
Line Voltage (Unit and control power)	200-230 V	Primary Fuse	1.5 A	2.5 A	3.5 A	5 A	6.5 A	9.5 A
	460 V		.6 A	1.5 A	2.5 A	3 A	7 A	5.5 A
	575 V		.6 A	1 A	1.4 A	2 A	6.5 A	9.5 A
	120 V	Secondary Fuse	2 A	3 A	5 A	7 A		
	24 V		10 A	15 A	20 A	30 A		

### General Information

Table 5 - ACC basic unit weights,dimensions and refrigerant charge (R-454B)

Nominal Capacity	Cabinet	Number of Circuit	Efficiency	Weight - lbs.	Weight - kg.	Refrigerant Charge (lbs)
10	Small	1	Std.	1297	588	18
15		1	Std.	1364	619	21
20		1	Std.	1484	673	15
25	Medium	2	Std.	1900	862	28
30		2	Std.	1950	885	20
30		2	High	2030	921	26
40		2	Std.	2128	965	26
50		2	Std.	2223	1008	26
50	Large	2	High	2583	1172	26
60		2	Std.	2896	1314	26.6
60		2	High	3056	1386	26.6
70		2	Std.	3115	1413	35.4

80		2	Std.	3178	1442	35.4
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1 Refrigerant charge based on standard set of single compressors per circuit according to the tonnage.

Table 4 - General Unit Information ACC Cooling Only

	Unit Size (Nominal Tons)				
	10	15	15	20	20
<b>Compressors</b>					
Number of Circuits	1	1	2	1	2
Compressor - Quantity/Nominal Size (Tons)	1 / 10 Ton	1 / 15 Ton	2 / 7.5 Ton	1 / 20 Ton	2 / 10 Ton
Capacity Steps	1	1	2	1	2
<b>Evaporator</b>					
<i>Brazed Plate</i>	1				
Connection Size (Inch)	2 ½				
Max GPM*	35	53	53	70	70
Min GPM*	12	17	17	23	23
Max Water Pressure (psig)	300				
<i>Optional - Oversize Brazed Plate</i>					
<i>Connection Size (Inch)</i>	2 ½				
Max GPM*	53	70	70	88	88
Min GPM*	17	23	23	29	29
Max Water Pressure (psig)	300				
<b>Condenser</b>					
Microchannel Coil Quantity	1	2	2	2	2
Fan Quantity	1	1	1	1	1
<b>Sound Power</b>					
dBA – no attenuation	85.0	85.8	85.2	86.1	85.8
dBA – with compressor blankets	84.3	84.5	84.3	84.6	84.5

\* Minimum and maximum flow rates apply to constant-flow chilled water system running at AHRI conditions, without freeze inhibitors added to the water loop.

Table 5 - General Unit Information ACC Cooling Only

	Unit Size (Nominal Tons)				
	25	30	30HE	40	50
<b>Compressors</b>					
Number of Circuits	2	2	2	2	2
Compressor - Quantity/Nominal Size (Tons)	2 / 12.5 Ton	2 / 15 Ton	2 / 15 Ton	2 / 20 Ton	2 / 25 Ton
Capacity Steps	2	2	2	2	2
<b>Evaporator</b>					
<i>Brazed Plate</i>	1				
Connection Size (Inch)	2 ½				
Max GPM*	88	105	105	140	175
Min GPM*	29	35	35	46	58
Max Water Pressure (psig)	300				
<i>Optional - Oversize Brazed Plate</i>					
<i>Brazed Plate</i>	1				
Connection Size (Inch)	2 ½				
Max GPM*	105	105	140	175	210
Min GPM*	35	35	46	58	70
Max Water Pressure (psig)	300				
<b>Condenser</b>					
Microchannel Coil Quantity	2	2	2	2	2
Fan Quantity	1	1	2	2	2
<b>Sound Power</b>					
dBA – no attenuation	85.2	87.0	88.0	86.1	91.1
dBA – with compressor blankets	84.3	85.0	87.5	84.6	89.1

\* Minimum and maximum flow rates apply to constant-flow chilled water system running at AHRI conditions, without freeze inhibitors added to the water loop.

Table 6 - General Unit Information ACC Cooling Only

	Unit Size (Nominal Tons)				
	50HE	60	60HE	70	80
<b>Compressors</b>					
Number of Circuits	2	2	2	2	2
Compressor - Quantity/Nominal Size (Tons)	2 / 25 Ton	2 / 30 Ton	2 / 30 Ton	1 / 30 Ton 1 / 40 Ton	2 / 40 Ton
Capacity Steps	1	1	2	1	2
<b>Evaporator</b>					
<i>Brazed Plate</i>	1				
Connection Size (Inch)	2 ½				
Max GPM*	175	210	210	245	280
Min GPM*	58	70	70	81	93
Max Water Pressure (psig)	300				
<i>Optional - Oversize Brazed Plate</i>					
<i>Connection Size (Inch)</i>	2 ½				
Max GPM*	210	245	245	280	NA
Min GPM*	70	81	81	93	NA
Max Water Pressure (psig)	300				
<b>Condenser</b>					
Microchannel Coil Quantity	4	4	4	4	4
Fan Quantity	2	2	4	4	4
<b>Sound Power</b>					
dBA – no attenuation	91.1	93.2	94.1	94.9	95.5
dBA – with compressor blankets	89.1	90.5	92.1	92.6	93.0

\* Minimum and maximum flow rates apply to constant-flow chilled water system running at AHRI conditions, without freeze inhibitors added to the water loop.

## Brine Operating Temperatures and Pressures

Use the following tables to refer to the low suction temperature and pressure for different glycol levels.

Table 9- Brine Operating Temperatures and Pressures (Propylene Glycol)

Propylene Glycol / Water				
Glycol % (By Mass)	Solution Freeze Point (°F)	Low Suction (psig) <sup>1</sup>	Unsafe Suction (psig) <sup>2</sup>	Freeze (°F) <sup>3</sup> Core Freeze (°F) <sup>4</sup>
0	32.0	101.1	71.6	38.0
5	29.1	95.3	66.9	35.1
10	26.1	89.5	62.3	32.1
15	22.9	83.5	57.6	28.9
20	19.2	77.0	52.4	25.2
25	14.6	69.3	46.4	20.6
30	9.2	61.0	39.9	15.2
35**	2.5	51.5	32.6	8.5
40**	-6.0	40.8	24.4	0.0
45**	-16.1	29.9	16.1	-10.1
50**	-28.3	19.0	8.0	-22.3

1 "Low Suction" refers to the low suction pressure cutout.

2 "Unsafe Suction" refers to the unsafe suction pressure cutout and is at a pressure 16°F below solution freeze point.

3 "Freeze" refers to the low leaving fluid temperature cutout and is 6°F above the solution freeze point.

4 "Core Freeze" refers to the evaporator core fluid temperature cutout and is 6°F above the solution freeze point.

\* The minimum leaving fluid temperature set point "CW OUT TRGT", should not be less than 5°F above the low fluid temperature cutout, "FREEZE" and the core fluid temperature cutout, "CORE FREEZE".

\*\* Any applications with leaving fluid lower than 10°F must have special factory approval.

Table 10- Brine Operating Temperatures and Pressures (Ethylene Glycol)

Ethylene Glycol / Water				
Glycol % (By Mass)	Solution Freeze Point (°F)	Low Suction (psig) <sup>1</sup>	Unsafe Suction (psig) <sup>2</sup>	Freeze (°F) <sup>3</sup> Core Freeze (°F) <sup>4</sup>
0	32.0	101.1	71.6	38.0
5	29.4	95.8	67.4	35.4
10	26.2	89.6	62.4	32.2
15	22.2	82.2	56.6	28.2
20	17.9	74.8	50.7	23.9
25	12.7	66.3	44.1	18.7
30	6.7	57.3	37.1	12.7
35**	-0.2	47.6	30.0	5.8



40**	-8.1	38.4	22.5	-2.1
45**	-17.6	28.5	15.0	-11.6
50**	-28.9	18.6	7.7	-22.9

1 "Low Suction" refers to the low suction pressure cutout.

2 "Unsafe Suction" refers to the unsafe suction pressure cutout and is at a pressure 16°F below solution freeze point.

3 "Freeze" refers to the low leaving fluid temperature cutout and is 6°F above the solution freeze point.

4 "Core Freeze" refers to the evaporator core fluid temperature cutout and is 6°F above the solution freeze point.

\* The minimum leaving fluid temperature set point "CW OUT TRGT", should not be less than 5°F above the low fluid temperature cutout, "FREEZE" and the core fluid temperature cutout, "CORE FREEZE".

\*\* Any applications with leaving fluid lower than 10°F must have special factory approval

### **Additional refrigerant charge**

All ACC chillers are shipped with a full factory charge. Periodically additional charge may be required for completing the refrigerating system.

Charging a system in the field must be based on determination of liquid sub-cooling and evaporator superheat and considering industry standards.

## Receiving Unit

When received, the unit should be checked for damage that might have occurred in transit. If damage is found it should be noted on the carrier's freight bill. A request for inspection by carrier's agent should be made in writing at once. Nameplate should be checked to ensure the correct model sizes and voltages have been received to match the job requirements.

If repairs must be made to damaged goods, then the factory should be notified before any repair action is taken in order to protect the warranty. Certain equipment alteration, repair, and manipulation of equipment without the manufacturer's consent may void the product warranty. Contact Jetson shipping department for assistance with handling damaged goods, repairs, and freight claims: (903) 758-2900.


NOTE: Upon receipt check shipment for items that ship loose, such as sensors. Consult order and shipment documentation to identify potential loose-shipped items. Loose-shipped items may have been placed inside the unit cabinet for security. Installers and owners should secure all doors with locks or nuts and bolts to prevent unauthorized access.

## Storage

If installation will not occur immediately following delivery, store equipment dry protected area away from construction traffic and in the proper orientation as marked on the packaging with all internal packaging in place. Secure all loose-shipped items.

The appliance shall be stored in a room without continuously operating ignition sources (for example:  
open flames, an operating gas appliance or an operating electric heater

Failure to observe the following instructions may result in premature failure of your system, and possible voiding of the warranty.

 **CAUTION**

**CRANKCASE HEATER OPERATION**

Units are equipped with compressor crankcase heaters, which should be energized at least 24 hours prior to cooling operation, to clear any liquid refrigerant from the compressors.

 **PRECAUCIÓN**

**FUNCIONAMIENTO DEL CALENTADOR DEL CÁRTER**

Las unidades están equipadas con calentadores de cárter en el compresor, los cuales deben energizarse al menos 24 horas antes del funcionamiento de la refrigeración para limpiar todo rastro de líquido refrigerante en los compresores.


 **ATTENTION**

**FONCTIONNEMENT DES APPAREILS DE CHAUFFAGE DU CARTER**


Les unités sont munies d'appareils de chauffage du carter pour compresseur, qui doivent être énergisés au moins 24 heures avant l'opération de refroidissement, pour éliminer tout fluide frigorigène des compresseurs

Never turn off the main power supply to the unit, except for complete shutdown. When power is cut off from the unit, any compressors using crankcase heaters cannot prevent refrigerant migration. This means the compressor will cool down, and liquid

refrigerant may accumulate in the compressor. The compressor is designed to pump refrigerant gas and damage may occur when power is restored if liquid enters the compressor.

 **CAUTION**

Rotation must be checked on all **MOTORS AND COMPRESSORS** of three phase units. All motors, to include and not be limited to pump motors and condenser fan motors, should all be checked by a qualified service technician at startup and any wiring alteration should only be made at the unit power connection.


 **PRECAUCIÓN**

Rotation must be checked on all **MOTORS AND COMPRESSORS** of three phase units. All motors, to include and not be limited to pump motors and condenser fan motors, should all be checked by a qualified service technician at startup and any wiring alteration should only be made at the unit power connection

 **ATTENTION**

La rotation doit être vérifiée sur tous les **MOTEURS ET COMPRESSEURS** des unités triphasées. Tous les moteurs, y compris, sans s'y limiter, les moteurs des pompes et des ventilateurs de compresseur, doivent être vérifiés par un technicien de service qualifié au moment de la mise en service et toute modification apportée au câblage ne doit être faite qu'au raccordement électrique de l'unité.

Before unit operation, the main power switch must be turned on for at least 24 hours for units with compressor crankcase heaters. This will give the crankcase heater time to clear any liquid accumulation out of the compressor before it is required to run.

 **CAUTION**

Scroll compressors are directional and will be damaged by operation in the wrong direction. Low pressure switches on compressors have been disconnected after factory testing. Rotation should be checked by a qualified service technician at startup using suction and discharge pressure gauges and any wiring alteration should only be made at the unit power connection.

 **PRECAUCIÓN**

Los compresores de espiral son direccionales y se dañarán si giran en el sentido incorrecto. Los interruptores de baja presión de los compresores se desconectan después de probarlos en la fábrica. La rotación debe ser revisada por un técnico de servicio calificado en el momento de la puesta en marcha utilizando manómetros de aspiración y descarga, y todas las modificaciones del cableado deben realizarse solamente en la conexión de energía eléctrica de la unidad.

 **ATTENTION**

Les compresseurs Scroll sont directionnels et seront endommagés s'ils sont utilisés dans la mauvaise direction. Les commutateurs basse pression qui se trouvent sur les compresseurs sont débranchés après l'essai en usine. La rotation doit être vérifiée par un technicien de service qualifié au moment de la mise en

service au moyen d'une aspiration et de jauges de pression de décharge, et toute modification au câblage ne doit être effectuée qu'au raccordement électrique de l'unité.should only be made at the unit power connection.

### Forklifting the unit

Units can be lifted using a forklift. Lifting the unit with forks perpendicular to the long dimension may use forks 48" in length. Lifting of units with forks parallel to the unit's long dimension must have forks 72" in length or the forks must have 72" fork extensions. Standard units can be lifted from all sides except the evaporator end. Forks must be perpendicular to the unit and they must be in far enough that the back of the forks are no more than 6" away from the edge of the unit.

### Lifting the Unit

Do not lift unit from above unless spreader bars are used. Each module should be lifted using lift straps threaded through the steel base cutouts and a spreader bar.

If cables or chains are used to hoist the unit, they must be the same length. Care should be taken to prevent damage to the cabinet, coils, and condenser fans. Before lifting unit, be sure that all shipping material has been removed from unit. Secure hooks and cables at all lifting points / lugs provided on the unit.

Hoist unit to a point directly above the curb or concrete pad. Be sure that the gasket material has been applied to curb.

Carefully lower and align the unit with utility openings. Make sure the unit is level and properly seated on the curb or pad.

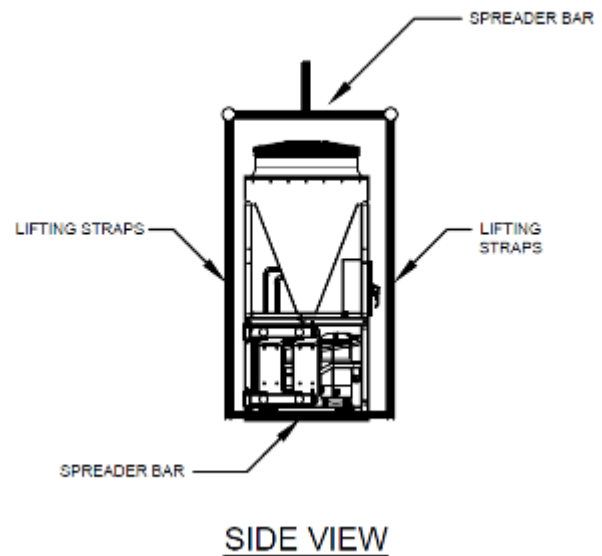
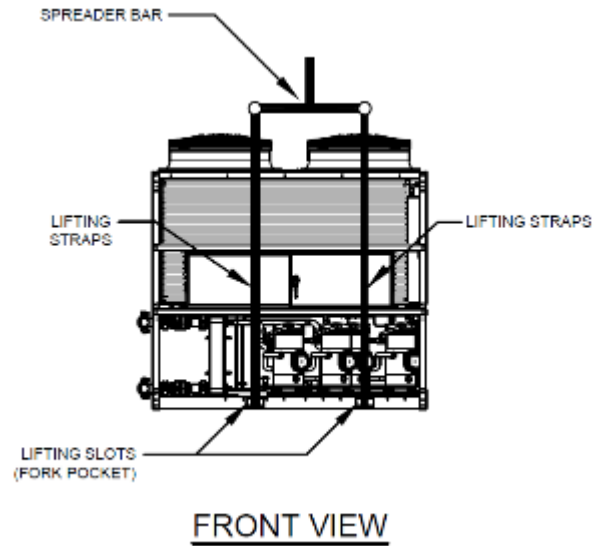


Figure 6 : Rigging and forklift pockets

	<b>WARNING</b>
	<b>HEAVY OBJECTS</b>
Failure to follow instructions or properly lift unit could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and equipment or property-only damage. Ensure that all the lifting equipment	

used is properly rated for the weight of the unit being lifted. Each of the cables (chains or slings), hooks, and shackles used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables (chains or slings) may not be of the same length. Adjust as necessary for even unit lift.

adéquat pour le poids de l'unité qui doit être soulevée. Chacun des câbles (chaînes ou courroies), crochets et manilles utilisés pour soulever l'unité doit pouvoir soutenir le poids total de l'unité. Les câbles de levage (chaînes ou courroies) peuvent ne pas être de la même longueur. Ajustez-les au besoin pour soulever l'unité uniformément.

 **ADVERTENCIA**  
OBJETOS PESADOS

No seguir las instrucciones o no elevar correctamente la unidad podría provocar la caída de la misma y el posible aplastamiento del operario/técnico, lo que podría causar la muerte o lesiones graves, así como daños materiales o al equipo. Asegúrese de que todos los equipos de elevación utilizados tengan la capacidad nominal adecuada para soportar el peso de la unidad que se va a elevar. Cada uno de los cables (cadenas o eslingas), ganchos y grilletes que se utilicen para elevar la unidad debe ser capaz de soportar todo el peso de la unidad. Es posible que los cables de elevación (cadenas o eslingas) no tengan la misma longitud. Ajuste su longitud según sea necesario para elevar la unidad

 **WARNING**  
IMPROPER UNIT LIFT

Failure to properly lift unit could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and equipment or property-only damage. Test lift unit approximately 2 to 4 inches to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level.

 **AVERTISSEMENT**  
OBJETS LOURDS

Le non-respect des directives ou le levage inapproprié de l'unité pourrait entraîner sa chute et le risque d'écraser l'opérateur/le technicien, causant sa mort ou des blessures graves et des dommages matériels ainsi qu'à l'appareil. Vérifiez que l'équipement de levage utilisé est

 **ADVERTENCIA**  
ELEVACIÓN INCORRECTA DE LA UNIDAD

No elevar correctamente la unidad podría provocar la caída de la misma y el posible aplastamiento del operario/técnico, lo que podría causar la muerte o lesiones graves, así como daños materiales o al equipo. Realice una prueba de elevación de la unidad elevándola aproximadamente 2 a 4 pulgadas (5 a 10 cm) para verificar que el punto de elevación del centro de gravedad sea el adecuado. Para evitar la caída de la unidad, reposicione el punto de elevación si la unidad no está nivelada.

**! AVERTISSEMENT**  
**LEVAGE INAPPROPRIÉ DE L'UNITÉ**

Le levage inapproprié de l'unité pourrait entraîner sa chute et le risque d'écraser l'opérateur/le technicien, causant sa mort ou des blessures graves et des dommages matériels ainsi qu'à l'appareil. Essayez de soulever l'unité de 5 à 10 cm du sol pour vérifier le centre de gravité du point de levage. Pour éviter d'échapper l'unité, repositionnez le point de levage si l'unité n'est pas de niveau.

**! CAUTION**  
**IMPROPER UNIT LIFT**

If no, or improperly sized, spreader bar is used, damage to the unit may occur.

**! PRECAUCIÓN**  
**ELEVACIÓN INCORRECTA DE LA UNIDAD**

No usar una barra espaciadora o usar una de tamaño incorrecto puede dañar la unidad

**! ATTENTION**  
**LEVAGE INAPPROPRIÉ DE L'UNITÉ**

L'unité pourrait être endommagée si vous n'utilisez pas une barre d'écartement ou si vous utilisez une barre d'écartement de taille inadéquate.

### Primary Pumping Package

Primary pumping uses a pump, or pumps, to move water or glycol through the evaporator and back to the building. This pumping package provides the necessary flow of water to the system. The pump is activated whenever the chiller is given a run signal.

Water enters the unit through the return water piping, and then the water flows through a suction guide with strainer. Some units will not include a suction guide if there is enough straight piping before the pump. The end of the suction guide is removable for strainer access. The strainer assembly is composed of two parts, the operational strainer, and the startup strainer, (located inside the operational strainer) which is to be removed 24 hours after startup.

The pump is installed after the strainer, and before a combination valve (Flo-Trex). This combination valve acts as isolation valve, check valve, and flow balancing valve. The shell and tube or brazed plate evaporator is placed after the combination valve in the water circuit with a differential pressure switch installed across its inlet and outlet. This pressure switch closes when the differential pressure increases above the setpoint, which should be set 1-2 psig below the pressure drop across the heat exchanger at design flow rate. The closing differential pressure switch signals the control system to indicate flow through the heat exchanger and allow cooling to activate as required to maintain the setpoint. The water exiting the shell and tube or brazed plate evaporator, leaves the unit through the water out connection.

### Glycol

Glycol units require a glycol feeder field installed to replace fluid that is lost in the system. Water should not be directly added to glycol applications as this would dilute the

glycol concentration and thereby increase the freezing temperature of the fluid.

### Compression Tank

As the water temperature in the system increases, the volume that water displaces increases. In order to compensate for these forces, a field provided pre-pressurized diaphragm compression tank that is preset for 12 psig is recommended.

### Pressure Relief Valve

Required pressure relief valve is installed on shell and tube evaporator.

### Dual Pumps

When redundant pumping is required, a factory installed duty-standby pump may be ordered, depending on unit size and options. A duty-standby pump is a pump with two independent motors and pumps in a single casing. This pump has a swing split-flapper valve in the discharge port to prevent liquid recirculation when only one pump is operating. Isolation valves in the casing allow one pump to be isolated and removed for service while the other pump is still operating.

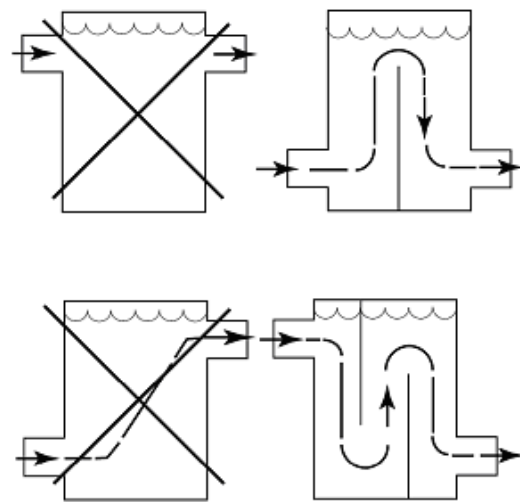
The controls package will activate the pump when the unit is given a run command. If the controls do not recognize flow in 60 seconds, the second pump will be activated and an alarm signal will be generated. If the second pump does not activate, the cooling will be locked out

### Pipe Insulation

The evaporator in the ACC chiller is factory insulated. The water piping, pumps, and other components on units with pumping packages are not insulated at the factory. Insulation should be installed on the water piping after the system has been checked for leaks.

### Typical Water Piping

All building water piping must be flushed prior to making final connections to the chiller. To reduce heat loss and prevent condensation, insulation should be applied. Expansion tanks are also usually required so that chilled water volume changes can be accommodated. A volume buffer tank should be located in the return water piping. *Figure 7: Expansion Tank Usage* illustrates a proper volume buffer tank usage.



*Figure 7: Expansion Tank Usage*

### Variable Flow

ACC Series chillers can be applied in variable flow applications where the flow is varied and controlled by others. The flow being delivered to the chiller must not go outside the stated minimum and maximum flow rates in the product catalog. Also, the chilled water system volume should be calculated using the highest evaporator flow rate to be delivered to the chiller, and the rate of change in flow rate must not exceed 10% of design flow gpm per minute.

In ACC Series chiller arrays, the chillers are piped with a common header. Notice in **Error! Reference source not found.** this common header arrangement allows the ability

to operate the system in several ways depending on the load and/or current situation. For instance, the system can be operated with two pumps and one chiller so that flow out into the system can be increased, without needing to stage on an additional chiller.

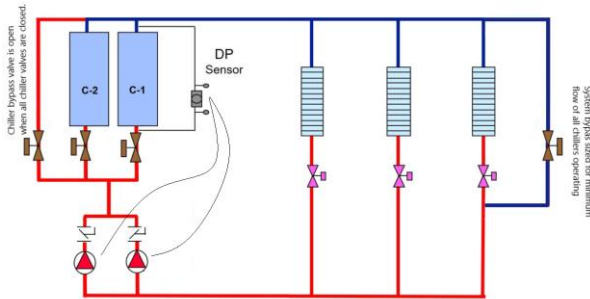


Figure 8: Variable Flow with Parallel Pumps

This configuration also allows flexible redundancy with commonly headered pumps and chillers. If a pump becomes inoperable, the remaining pump can serve one or both chillers and still meet the required load. If a chiller needs service or is turned off, the system can compensate for some of the loss in capacity by increasing flow through the remaining chiller while operating both pumps. However, the flow being delivered to any chiller must not go outside the stated minimum and maximum flow rates.

By maintaining the flow between the minimum and maximum flow rates, the chiller is able to provide proper heat transfer and stable operation at lower flows and avoid eroding the pipes at higher flows.

### Variable Flow Bypass Valves

A bypass valve is required at the chillers and the load (air handlers, terminal devices, etc.) in systems with variable flow pumping. The bypass must be piped so the temperature and differential pressure sensors are always sensing active flow.

### Load Bypass Valve

If a single load side bypass valve is used, it should be sized to bypass the minimum water flow at maximum chiller load. This size is required because there can be a lag between the load measured at the system load and at the ACC Series chiller bank. This lag can create different flow requirements at the load versus the chiller(s).

An example of this lag is when a building becomes occupied in the morning and the chillers are in a pull-down situation. The air handlers serving the occupied space reach the desired occupied temperature and simultaneously drive their control valves closed. At the same time, the chillers are still in a pull-down mode and running at full capacity to reach the desired leaving water temperature. As a result, the chiller(s) require more flow than the rest of the system until the chiller controls unload the chiller to match the new system load condition. Without a system/load bypass valve, the system pump(s) will either provide too much flow to the load (air handlers, terminal devices, etc.) or not enough flow the chiller array. The bypass valve also ensures that there is an adequate minimum flow thru the pump if all the valves in the load system are closed, otherwise the pumps can deadhead.

Bypass valves at the end of the loop/system, as shown in **Error! Reference source not found.**, promotes keeping the overall active loop volume high. Some systems may not allow for an end-of-loop bypass. In these situations, the bypass valve may be installed closer to the chiller, provided the minimum system volume equaling a minimum of a 2-3 minute loop time is maintained to ensure proper operation. (See section on “Loop



Time” in this document for more information.)

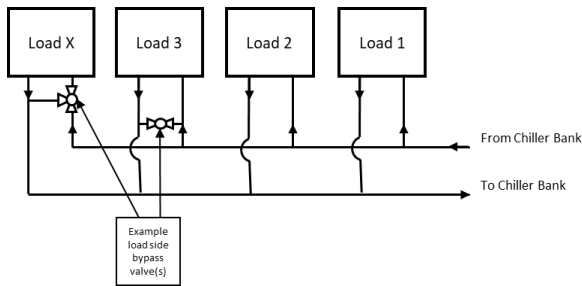


Figure 9: Example Load Bypass Valve Arrangements

### External Chiller Array Bypass Valve

A bypass valve for the chiller array is required so that when the chiller array has reached the desired leaving water temperature, and the motorized valves for each module have closed, system flow remains through the external chiller array bypass valve. The chiller bypass should be sized for the minimum flow of one chiller module or the minimum flow of the system’s pumping system, whichever is greater. This bypass is only required to be open when all motorized valves in the chiller array are closed. After the first module is active and the motorized valves are the open, the external chiller array bypass valve can be closed because the active module now provides the water flow path.

### Avoidance of Short Water Loops

Adequate water volume is an important system design parameter because it provides for stable chilled water temperature control and helps limit unacceptable short cycling of chiller compressors.

The chiller’s temperature control sensor is located in the supply (outlet) water connection or pipe. This location allows the building to act as a buffer to slow the rate of change of the system water temperature. If there is not sufficient water volume in the

system to provide an adequate buffer, temperature control can suffer, resulting in erratic system operation and excessive compressor cycling.

Typically, a three-minute water loop circulation time is sufficient to prevent short water loop issues. Therefore, as a guideline, ensure the volume of water in the chilled water loop is greater than or equal to three times the evaporator flow rate. For systems with a rapidly changing load profile the volume should be increased.


If the installed system volume does not meet the above recommendations, the following items should be given careful consideration to increase the volume of water in the system and, therefore, reduce the rate of change of the return water temperature.


- A volume buffer tank located in the return water piping.
- Larger system supply and return header piping (which also reduces system pressure drop and pump energy use).

### Minimum Water Volume for a Process Application

If a chiller is attached to an on/off load such as a process load, it may be difficult for the controller to respond quickly enough to the very rapid change in return solution temperature if the system has only the minimum water volume recommended. Such systems may cause chiller low temperature safety trips or in the extreme case evaporator freezing. In this case, it may be necessary to add or increase the size of the mixing tank in the return line.

## Flow Sensing Devices

 **CAUTION**  
Unexpected Chiller Start!  
Failure to follow instructions could cause the chiller to start unexpectedly which could result in equipment or property damage. An external source (EMS, time clock or any other means) should not be allowed to bring on a pump that would trigger the flow switch to start the chiller. The flow switch is meant to act as a safety switch and not a start/stop mechanism.

 **PRECAUCIÓN**  
¡Puesta en marcha inesperada del enfriador!  
Si no se siguen las instrucciones, el enfriador puede ponerse en marcha de manera inesperada, lo que puede provocar daños materiales o al equipo. No se debe permitir el uso de una fuente externa (sistema de gestión de energía, reloj programador o cualquier otro medio) para poner en marcha una bomba con la finalidad de activar el interruptor de flujo para arrancar el enfriador. El interruptor de flujo está diseñado para funcionar como un interruptor de seguridad y no como un mecanismo de puesta en marcha/detención.

 **ATTENTION**  
Démarrage inattendu du refroidisseur!  
Le non-respect des instructions pourrait entraîner le démarrage inattendu du refroidisseur, ce qui pourrait causer des dommages matériels ou à l'équipement. Une source externe (un SGM, une horloge ou tout autre moyen) ne doit pas introduire une pompe qui déclencherait le commutateur de débit à mettre le

refroidisseur en marche. Le commutateur de débit est conçu pour servir d'interrupteur de sécurité et non pas comme mécanisme de mise en marche ou d'arrêt.

Chilled water flow switch, or other factory approved flow proving device is mandatory; field installation by contractor is required. Flow switch is to be installed and maintained per manufacturer's recommendations and interconnected to the control panel as described on the wiring diagram. To provide additional chiller protection, install and wire the flow switch in series with chilled water pump interlock for the chilled water circuits. Specific connection and schematic wiring diagrams ship with the unit inside the control box

### Water Connection

Connect the chiller supply and return water lines. The water connections are schedule 40 grooved black pipe. The maximum operating pressure for the ACC chiller is 150 psi.

Make sure water piping connections to the evaporator are isolated, and confirm that all piping to unit is supported independently to prevent any load being transferred to the unit. Use unions, flanges or grooved lock type fittings to facilitate service procedures. Use a pipe sealant such as Teflon® tape on all threaded water connections. Use vibration eliminators to prevent transmitting vibrations through the water lines. Construct and install piping in accordance with all local, state and national codes.

Supply and insulate the chilled water piping as required, to prevent sweating and minimize heat gain under normal operating conditions. Chilled water piping must rise above the chiller to ensure the evaporator is

full of water and void of air at all times. Install thermometers in the lines to monitor evaporator entering and leaving water temperatures.

ACC modular chillers have manual balancing ball-valves in the entering water lines. They may be used to establish a balanced water flow. Both the entering and leaving water lines have valves that can be used to shutoff/isolate the evaporator for service.

### Filtration

Particulate fouling is caused by suspended solids (foulants) such as mud, silt, sand or other particles in the heat transfer medium. The best way to avoid particulate fouling is to have good water treatment and keep all system water clean and with open loop system water, maintain proper bleed rates and make up water. A strainer with a 20-mesh screen (or screen with 0.5 mm sized openings or less) is required to be installed at the individual compact chiller (or compact chiller array) inlet to protect the brazed plate heat exchangers. Wye-strainers are available as a factory-provided, field-installed option. If an application is highly susceptible to foulant contamination, additional filtration methods should be investigated.

### Water quality

Poor water quality can cause another type of fouling called scaling. Scaling is caused by inorganic salts in the water circuit of the heat exchangers. Scaling increases pressure drop and reduces heat transfer efficiency. The likelihood of scaling increases with increased temperature, concentration and pH. In addition to scaling, poor water quality can cause other issues like biological growths and corrosion. Therefore, water quality and water quality control need to be an application consideration. Please review the water quality requirements for use with the brazed plate

heat exchangers on the ACC Series modular chiller. If a potable water source is used for the equipment's water supply, the source water supply shall be protected against back siphonage by the equipment.

*Table 11- Water Property Limits*

<b>Water Property</b>	<b>Concentration Limits</b>
Alkalinity (HCO <sub>3</sub> <sup>-</sup> )	70-300 ppm
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	Less than 70 ppm
HCO <sub>3</sub> <sup>-</sup> / SO <sub>4</sub> <sup>2-</sup>	Greater than 1.0
Electrical Conductivity	10 - 500 µS/cm
pH	7.5 – 9.0
Ammonia (NH <sub>3</sub> )	Less than 2 ppm
Chlorides (Cl <sup>-</sup> )	Less than 300 ppm
Free Chlorine (Cl <sub>2</sub> )	Less than 1 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	Less than 0.05 ppm
Free (aggressive) Carbon Dioxide (CO <sub>2</sub> )	Less than 5 ppm
Total Hardness (°dH)	4.0 - 8.5
Nitrate (NO <sub>3</sub> )	Less than 100 ppm
Iron (Fe)	Less than 0.2 ppm
Aluminum (Al)	Less than 0.2 ppm
Manganese (Mn)	Less than 0.1 ppm

### Mounting Isolation

For roof mounted applications or anytime vibration transmission is a factor, full perimeter vibration isolators may be used.

## Pressure Drop Curves

Figure 10 : Evaporator Flow (heat exchanger only) vs. Pressure Drop

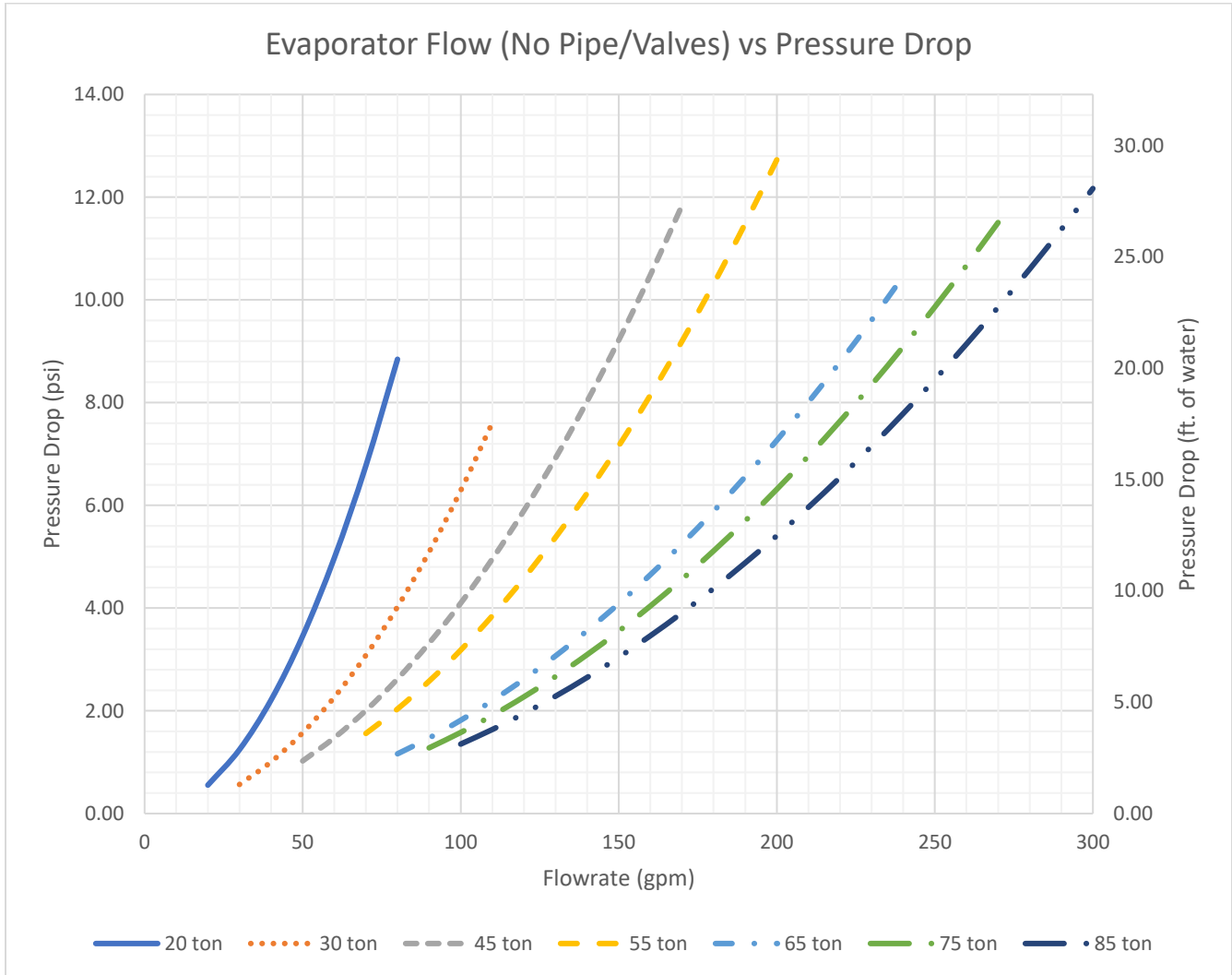


Figure 11: Evaporator Flow (including header and valves) vs. Approximate Pressure Drop

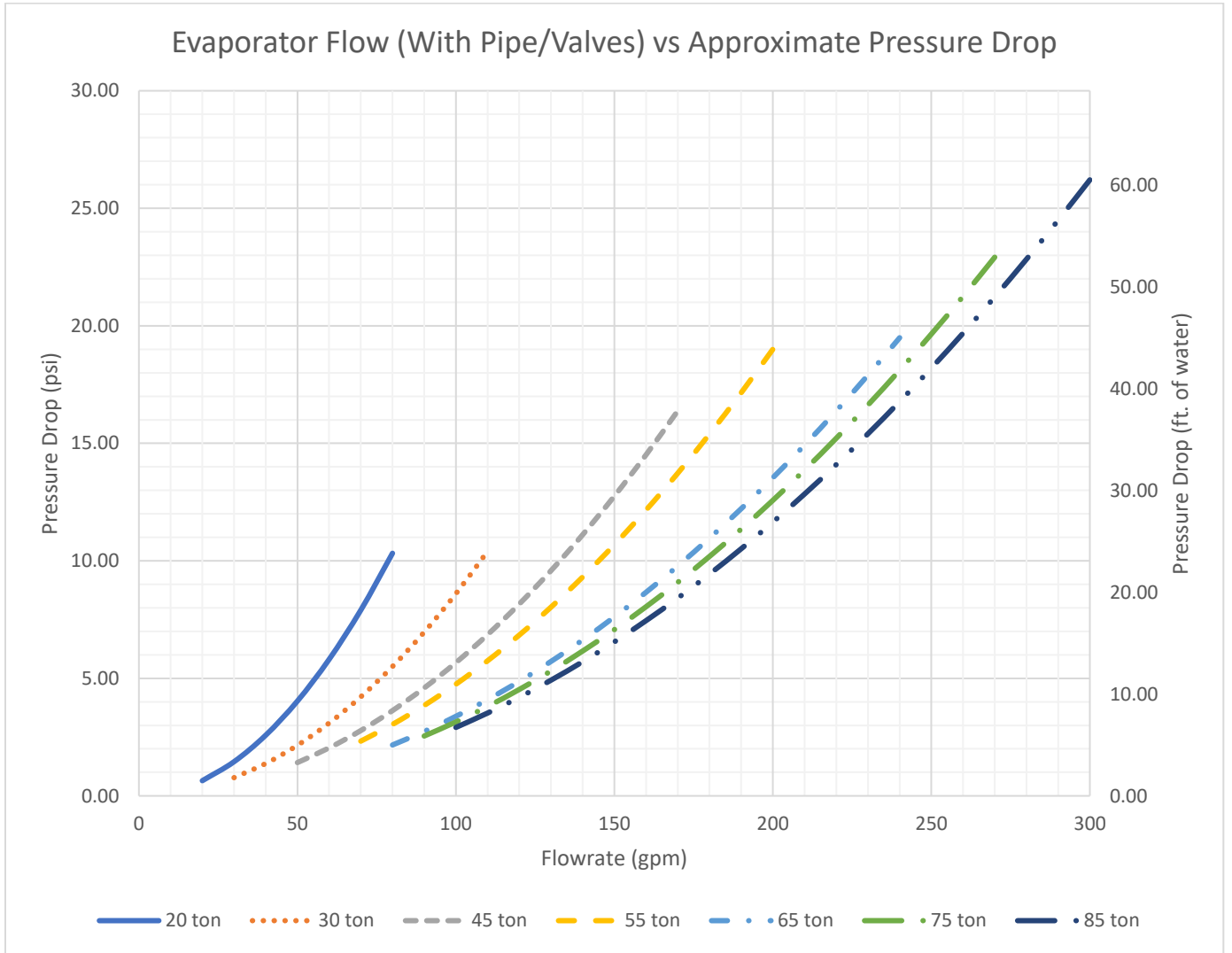


Figure 12: Brazed Plate Reheat Condenser Flow (heat exchanger only) vs. pressure Drop

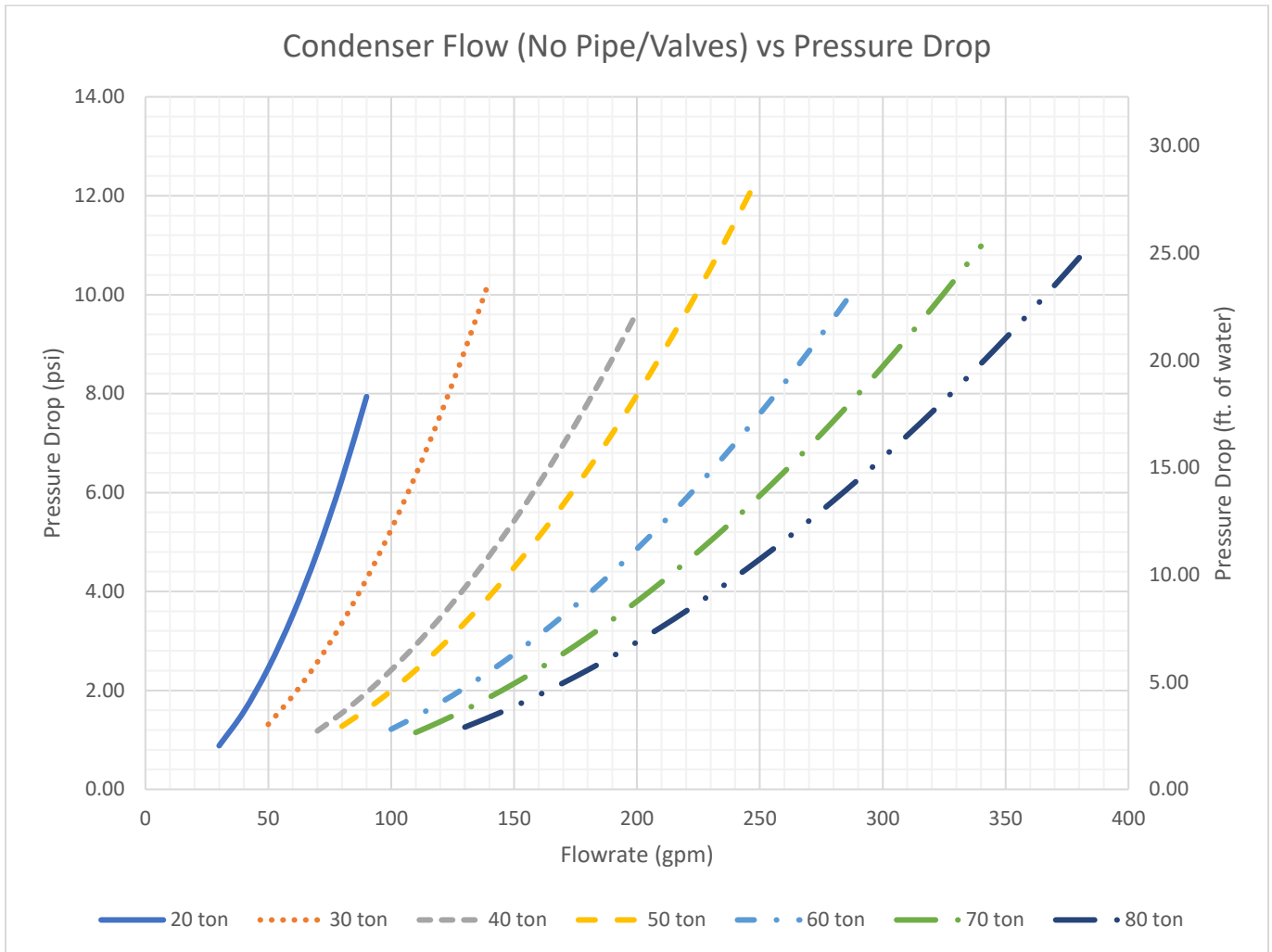
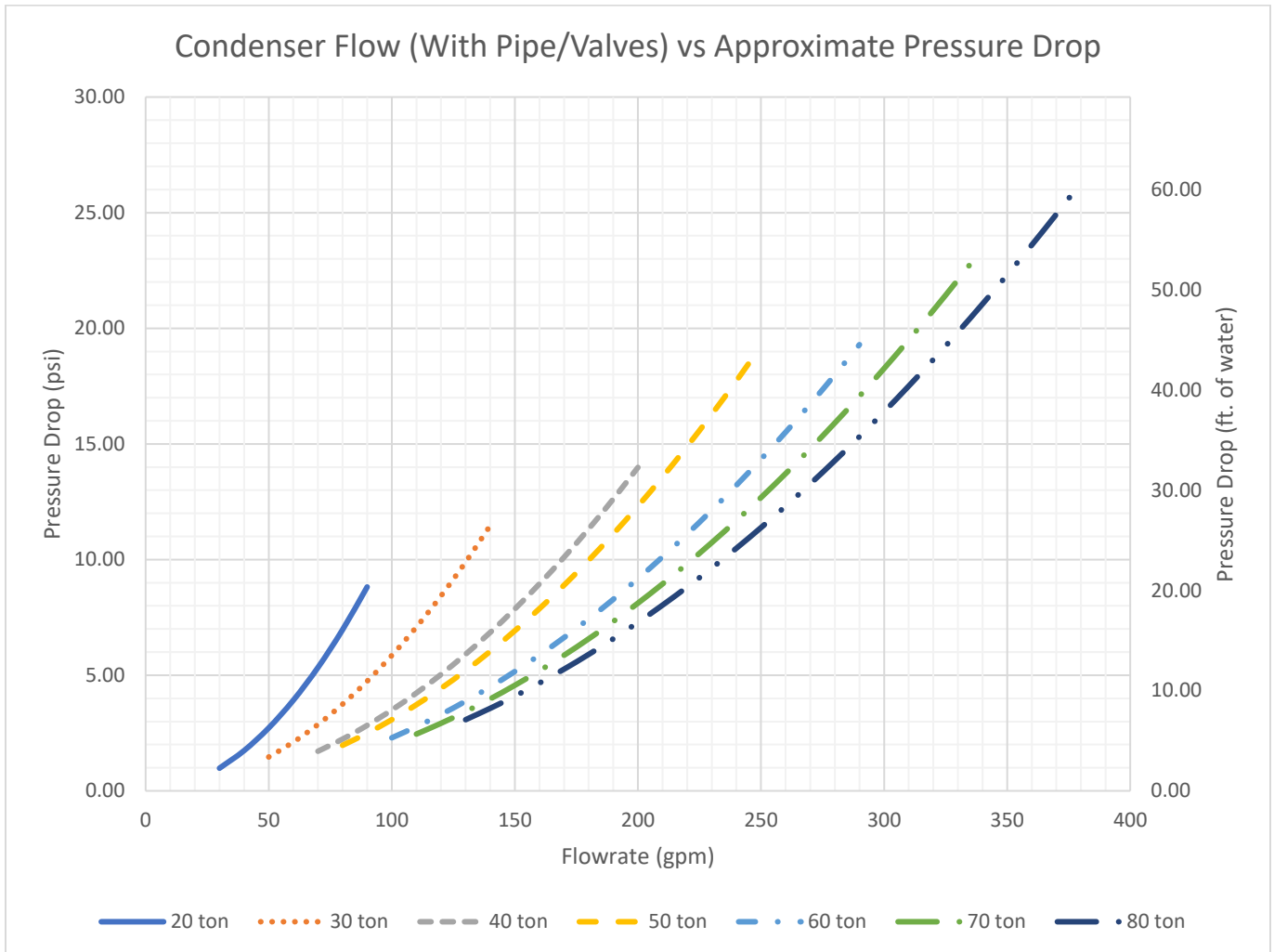
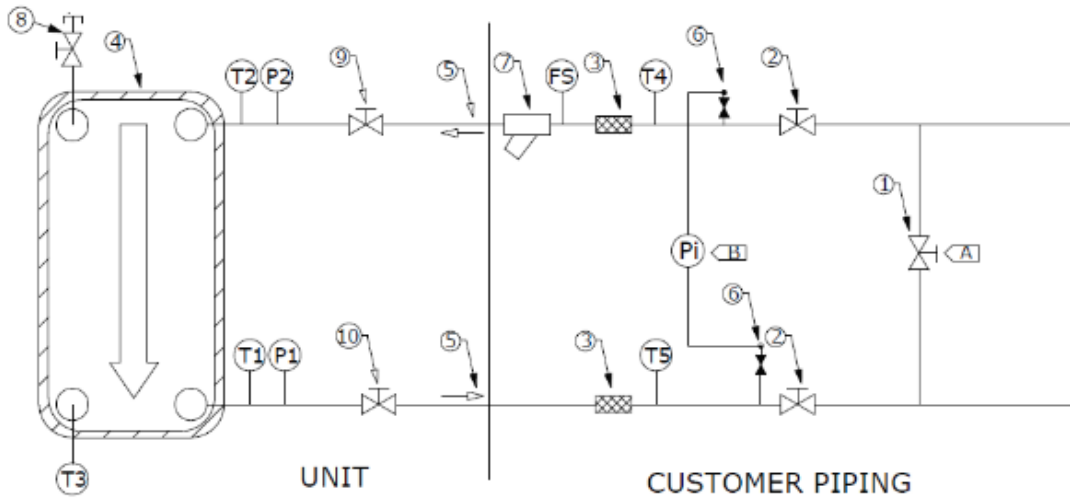


Figure 1: Brazed Plate Reheat Condenser Flow (including header and valves) vs. Approximate Pressure Drop



## Chilled water piping components



Chilled water piping components

Item	Description	Item	Description
1	Bypass Valve	A	Isolator Unit for initial water loop cleaning
2	Isolation Valves	g <sup>(a)</sup>	Arrangement for Measuring Differential Pressure
3	Vibration Eliminators	FS <sup>(b)</sup>	Water Flow Switch
4	Evaporator Heat Exchanger	Pi	Pressure Gauge
5	Inlet & Outlet Chilled Water Lines	T1	Evaporator Outlet Temperature Sensor
6	Valves for Pressure Measurement	T2	Evaporator Inlet Temperature Sensor
7 <sup>(c)</sup>	Strainer with 20 Mesh Screen	T3	Evaporator Core Temperature Sensor
8	Evaporator Manual Air Vent Valve w/ Plug	T4	Chiller Inlet Temperature Gauge
9	Evaporator Manual Ball Valve	T5	Chiller Outlet Temperature Gauge
10	Evaporator Manual Ball Valve (Motorized On/Off Valve, optional)	P1	Evaporator Outlet Pressure Sensor
		P2	Evaporator Inlet Pressure Sensor

(a) Must account for water head difference when calculating total unit pressure differential.  
 (b) Chilled water flow-proving device is required.  
 (c) Strainer is factory supplied and field installed.

Figure 14: Chilled water piping components

**! WARNING**  
 The chiller must only be operated only with adequate volume and type of fluid flowing through the evaporators.

**! AVERTISSEMENT**  
 Le refroidisseur ne doit être utilisé qu'avec le volume et le type adéquats de fluide circulant à travers les évaporateurs

**! ADVERTENCIA**  
 El enfriador debe operarse únicamente con el volumen y tipo adecuados de fluido fluyendo a través de los evaporadores




## STARTUP


Before startup of the chiller make sure that the following items have been checked.

1. If this a flammable refrigerant system, follow the **information on servicing flammable refrigerant systems on page 21 of this IOM** , before completing the following items.
2. Verify that electrical power is available to the unit.
3. Verify that any remote stop/start device connected to the chiller controller is requesting the chiller to start.
4. Verify that liquid flow is present through the chiller from the building.
5. There should be a building load of at least 25% of the chiller capacity in order to properly check operation.
6. Using controller set the leaving water temperature setpoint.
7. Use the general check list at the top of the startup form to make a last check that all the components are in place, water flow is present, and the power supply is energized.
8. Cycle through all the compressors to confirm that all are operating within tolerance.
9. While performing the check, use the startup form to record observations of amps and refrigerant pressures.


10. When all is running properly, use controller to place the controller in the run mode and observe the system until it reaches a steady state of operation.

 **CAUTION**

Rotation must be checked on all **MOTORS AND COMPRESSORS** of three phase units. All motors, to include and not be limited to pump motors and condenser fan motors, should all be checked by a qualified service technician at startup and any wiring alteration should only be made at the unit power connection.

 **PRECAUCIÓN**

Se debe revisar la rotación de todos **LOS MOTORES Y COMPRESORES** de las unidades trifásicas. Todos los motores, incluidos, entre otros, los motores de las bombas y los motores del ventilador del condensador deben ser revisados por un técnico de servicio calificado en el momento de la puesta en marcha y todas las modificaciones del cableado deben realizarse solamente en la conexión de energía eléctrica de la unidad

 **ATTENTION**

La rotation doit être vérifiée sur tous les **MOTEURS ET COMPRESSEURS** des unités triphasées. Tous les moteurs, y compris, sans s'y limiter, les moteurs des pompes et des ventilateurs de compresseur, doivent être vérifiés par un technicien de service qualifié au moment de la mise en service et toute modification apportée au câblage ne doit être faite qu'au raccordement électrique de l'unité



## CAUTION

Before completing installation, a complete operating cycle should be observed to verify that all components are functioning properly.



## PRECAUCIÓN

Antes de finalizar la instalación, se debe realizar un ciclo de funcionamiento completo para verificar que todos los componentes funcionen correctamente.



## ATTENTION

Avant de terminer l'installation, observez un cycle de fonctionnement complet pour vérifier que tous les composants fonctionnent correctement.



## WARNING

### QUALIFIED SERVICE AGENCY

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Startup and service must be performed by a Factory Trained Service Technician.



## ADVERTENCIA

### INSTALADOR CALIFICADO

La instalación, ajuste, modificación, mantenimiento o reparación incorrectos pueden provocar daños materiales, lesiones personales o la muerte. La puesta en marcha y el mantenimiento deben ser realizados

por un técnico de servicio capacitado de la fábrica.



## AVERTISSEMENT

### INSTALLATEUR QUALIFIÉ

Une installation, un ajustement, une modification, un service ou un entretien non appropriés pourraient causer des dommages matériels, des blessures ou la mort. La mise en service et les réparations doivent être effectuées par un technicien de service formé en usine

## START -UP SHEET - EXAMPLE

### ACC Chillers/Heat Pumps Startup Form

Job Name: _____	Date: _____
Address: _____ _____	
Model Number: _____	
Serial Number: _____	Tag: _____
Startup Contractor: _____	
Address: _____ _____	
_____	Phone: _____

Installing contractor should verify the following items.

- |  |                              |                             |
|--|------------------------------|-----------------------------|
| 1. Is there any visible shipping damage?   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Is the unit level?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Are the unit clearances adequate for service and operation?                                 | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Do all access doors open freely and are the handles operational?                            | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5. Have all shipping braces been removed?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 6. Have all electrical connections been tested for tightness?                                  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 7. Does the electrical service correspond to the unit nameplate?                               | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 8. On 208/230V units, has transformer tap been checked?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 9. Has overcurrent protection been installed to match the unit nameplate requirement?          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 10. Do all fans rotate freely?   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 11. Does the field water piping to the unit appear to be correct per design parameters?        | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 12. 20 mesh, or finer, wye strainer is installed upstream of all brazed plate heat exchangers. | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

## Startup Conditions

### Ambient Temperature

Ambient Dry Bulb Temperature _____°F    Ambient Wet Bulb Temperature _____°F
--

### Fluid Flow

Flow of fluid being heated or cooled by machine _____ gallons per minute
--

### Water/Glycol System

- |  |                              |                             |
|--|------------------------------|-----------------------------|
| 1. Has the entire system been flushed and pressure checked?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Have isolation/balancing valves to the machine been installed and balanced for equal flow to each module? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Has the entire system been filled with fluid?   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Has air been bled from the heat exchangers and piping?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5. Is there a minimum load of 25% of the design load?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 6. Has the water piping been insulated?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 7. Is the glycol the proper type and concentration? (N/A if water)   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 8. What is the freeze point of the glycol concentration? (N/A if water)                                      | _____                        |                             |

### Compressors/DX Cooling

<input type="checkbox"/> Check Rotation							
Number	Model #	L1	L2	L3	Head Pressure <b>psig</b>	Suction Pressure <b>psig</b>	Crankcase Heater <b>amps</b>
1							
2							
3							
4							

### Chiller Operation

Chilled Water In Temperature _____°F	Chilled Water Out Temperature _____°F
--------------------------------------	---------------------------------------

### Refrigeration System 1 - Cooling Mode

	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A

### Refrigeration System 2 - Cooling Mode

	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A

### Heat Pump Operation

Hot Water In Temperature _____°F	Hot Water Out Temperature _____°F
----------------------------------	-----------------------------------

### Refrigeration System 1 - Heating Mode

	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A

### Refrigeration System 2 - Heating Mode

	Pressure	Saturated Temperature	Line Temperature	Sub-cooling	Superheat
Discharge				N/A	N/A
Suction				N/A	
Liquid					N/A

**Condenser Fans**

<input type="checkbox"/> Alignment <input type="checkbox"/> Check Rotation      Nameplate Amps _____				
Number	hp	L1	L2	L3
1				
2				
3				
4				

**Integrated Pumping Package**

Number	hp	L1	L2	L3	Flow (gpm)
1					
2					

## MAINTENANCE



### WARNING

1. Disconnect power supply before making wiring connections or working on this equipment. Follow all applicable safety procedures to prevent accidental power up. Failure to do so can result in injury or death from electrical shock or moving parts and may cause equipment damage.

2. When servicing or repairing this equipment, use only factory-approved service replacement parts. A complete replacement parts list may be obtained by contacting the factory. Refer to the rating plate on the appliance for complete appliance model number, serial number, and company address. Any substitution of parts or controls not approved by the factory will be at the owner's risk.

3. Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Startup and service must be performed by a Factory Trained Service Technician.



### ADVERTENCIA

1. Desconecte el suministro de energía eléctrica antes de conectar los cables o realizar trabajos en este equipo. Siga todos los procedimientos de seguridad aplicables para evitar un encendido accidental. No hacerlo puede provocar lesiones o la muerte debido a una descarga eléctrica o a las piezas móviles, así como daños al equipo.

2. Cuando dé mantenimiento o repare este equipo, use solamente piezas de repuesto aprobadas por el fabricante. Puede ponerse en contacto con el fabricante para obtener una lista completa de piezas de repuesto. Consulte la placa de especificaciones del aparato para ver el número de modelo, el número de serie y la dirección de la compañía que fabricó el aparato. Todo reemplazo de piezas o controles que no cuente con aprobación del fabricante correrá por cuenta y riesgo del propietario.

3. La instalación, ajuste, modificación, mantenimiento o reparación incorrectos pueden provocar daños materiales, lesiones personales o la muerte. La puesta en marcha y el mantenimiento deben ser realizados por un técnico de servicio capacitado de la fábrica.

## **AVERTISSEMENT**

1. Débranchez l'alimentation électrique avant d'effectuer des connexions ou de travailler sur l'appareil. Respectez toutes les procédures de sécurité qui s'appliquent pour éviter toute mise en marche accidentelle. Le non-respect de cette directive peut entraîner des blessures ou la mort causées par un choc électrique ou des pièces mobiles, en plus d'endommager l'appareil.

2. Lors de l'entretien et de la réparation de cet appareil, n'utilisez que des pièces de rechange approuvées par le fabricant. Pour la liste complète des pièces de rechange, adressez-vous au fabricant. Le numéro de modèle complet, le numéro de série et l'adresse du fabricant figurent sur la plaque signalétique fixée à l'appareil. Toute substitution de pièce ou de commande non approuvée par le fabricant sera aux risques du propriétaire.

3. Une installation, un ajustement, une modification, un service ou un entretien non appropriés pourraient causer des dommages matériels, des blessures ou la mort. La mise en service et les réparations doivent être effectuées par un technicien de service formé en usine

## **CAUTION**

When servicing the unit, some components may be hot enough to cause pain or injury. Allow time for cooling of hot components before servicing.

## **PRECAUCIÓN**

Al dar mantenimiento a la unidad, es posible que algunos componentes estén lo suficientemente calientes como para causar dolor o lesiones. Espere a que los componentes calientes se enfríen antes de dar mantenimiento.

## **ATTENTION**

Durant l'entretien de l'unité, certains composants peuvent être assez chauds pour causer de la douleur ou une blessure. Laissez les composants chauds se refroidir avant de procéder à tout entretien.

### **General**

When the initial startup is made and on a periodic schedule during operation, it is necessary to perform routine service checks on the performance of the chillers. This includes reading and recording suction pressures and checking for normal subcooling and superheat.

Qualified technicians must perform routine service checks and maintenance. This includes reading and recording the condensing and suction pressures and checking for normal sub-cooling and superheat.



**If the unit to be serviced contains flammable refrigerant, refer to page 21 of this IOM ,Information on servicing flammable refrigerant systems, to complete previous steps before conducting work on the system.**

**Compressors**

The scroll compressors are fully hermetic and require no maintenance except keeping the shell clean.

*Table 9 – circuit loading and pressure drop*

Circuit Loading	Max. Pressure Drop
100%	10 psig
50%	5 psig

**Refrigerant Filter Driers**

Each refrigerant circuit contains a filter drier. Replacement is recommended when there is excessive pressure drop across the assembly or moisture is indicated in a liquid line sight glass.

**Evaporator**

The evaporators are direct expansion type with an electronic expansion valve to regulate refrigerant. Normally no maintenance or service work will be required.

**Adjusting Refrigerant Charge**

All ACC chillers are shipped with a full factory charge. Periodically additional charge may be required.

Charging a system in the field must be based on determination of liquid sub-cooling and evaporator superheat and according to Industry Standard. On a system with an electronic expansion valve, liquid subcooling is more representative of the charge than

evaporator superheat but both measurements must be taken.

Before Charging

Refer to the Unit Nameplate as a reference when determining the proper refrigerant charge.

Unit being charged must be at or near full load conditions before adjusting the charge.

After adding or removing charge the system must be allowed to stabilize, typically 10-15 minutes, before making any other adjustments.

The type of unit and options determine the ranges for liquid sub-cooling and evaporator superheat. Refer to Table 12 - Acceptable Refrigeration Circuit Values when determining the proper sub-cooling.

The type of unit and options determine the ranges for liquid sub-cooling and evaporator superheat. Refer to Table 12 - Acceptable Refrigeration Circuit Values when determining the proper sub-cooling.

Checking Liquid Sub-cooling

Measure the temperature of the liquid line as it leaves the condenser coil.

Read the gauge pressure at the liquid line close to the point where the temperature was taken. You must use liquid line pressure as it will vary from discharge pressure due to condenser coil pressure drop.

Convert the pressure obtained to a saturated temperature using the appropriate refrigerant temperature-pressure chart. Subtract the measured liquid line temperature from the saturated temperature to determine the liquid sub-cooling.

Compare calculated sub-cooling to **Error! Reference source not found.** for the appropriate unit type and options.

#### Checking Evaporator Superheat

Measure the temperature of the suction line close to the compressor.

Read gauge pressure at the suction line close to the compressor.

Convert the pressure obtained to a saturated temperature using the appropriate refrigerant temperature-pressure chart.

Subtract the saturated temperature from the measured suction line temperature to determine the evaporator superheat.

For refrigeration systems with tandem scroll compressors, it is critical that the suction superheat setpoint on the expansion valve is set with one compressor running. The suction superheat should be 8-10°F with one compressor running. The suction superheat will increase with both compressors in a tandem running. Inadequate suction superheat can allow liquid refrigerant to return to the compressors which will wash the oil out of the compressor. Lack of oil lubrication will destroy a compressor. Liquid sub-cooling should be measured with both compressors in a refrigeration system running.

Compare calculated superheat to the acceptable cooling mode superheat values of 10-15°F for all system types and subcooling to range of 8-12°F.

In addition to conventional charging procedures, the following requirements shall be followed when working with flammable refrigerants:

- Ensure that contamination of different refrigerants does not occur when using

charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.


- Cylinders shall be kept in an appropriate position according to the instructions.

- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.

- Label the system when charging is complete (if not already).

- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site

 <b>CAUTION</b>
<b>EXPANSION VALVE ADJUSTMENT</b>
Expansion valves must be adjusted to approximately 10-15°F of suction superheat. Failure to have sufficient superheat will damage the compressor and void the warranty.

 <b>PRECAUCIÓN</b>
<b>AJUSTE DE LA VÁLVULA DE</b>
Las válvulas de expansión deben ajustarse a aproximadamente 10 a 15 °F (-12.2 a -9.4 °C) de sobrecalentamiento de aspiración. Un sobrecalentamiento insuficiente dañará el compresor y anulará la

**! ATTENTION**  
**AJUSTEMENT DE LA SOUPEPE DE DÉTENTE**  
 Les soupapes de détente doivent être ajustées entre environ 10 et 15 °F (-12,2 et -9,4 °C) de surchauffe d'aspiration. Le fait de ne pas avoir suffisamment de surchauffe endommagera le compresseur et annulera la garantie.

*Table 12 - Acceptable Refrigeration Circuit Values*

Air-Cooled Condenser	
Sub-Cooling	8-12 °F
Superheat	10-15 °F

*Adjusting Sub-cooling and Superheat Temperatures*

The system is overcharged if the sub-cooling temperature is too high and the evaporator is fully loaded (low loads on the evaporator result in increased sub-cooling) and the evaporator superheat is within the temperature range shown in Table 12 - Acceptable Refrigeration Circuit Values (high superheat results in increased sub-cooling).

Correct an overcharged system by reducing the amount of refrigerant in the system to lower the sub-cooling.

**! CAUTION**  
**DO NOT OVERCHARGE**  
 Refrigerant overcharging leads to excess refrigerant in the condenser coils resulting in elevated compressor discharge pressure

**! PRECAUCIÓN**  
**NO CARGUE EN EXCESO**  
 Cargar refrigerante en exceso genera un exceso de refrigerante en las bobinas del condensador, lo que aumenta la presión de descarga del compresor.

**! ATTENTION**  
**NE PAS SURCHARGER**  
 Toute surcharge du fluide frigorigène entraîne un excédent de fluide frigorigène dans les serpentins du condensateur et augmente la pression de décharge dans ce dernier.

The system is undercharged if the superheat is too high, and the sub-cooling is too low.

Correct an undercharged system by adding refrigerant to the system to reduce superheat and raise sub-cooling.

If the sub-cooling is correct and the superheat is too high, the expansion valve may need adjustment to correct the superheat.

Table 13- R-454B Refrigerant Temperature- Pressure Chart

°F	PSIG	°F	PSIG	°F	PSIG	°F	PSIG
<b>20</b>	70.9	<b>47</b>	123.1	<b>74</b>	196.4	<b>105</b>	313.6
<b>21</b>	72.5	<b>48</b>	125.4	<b>75</b>	199.6	<b>110</b>	336.4
<b>22</b>	74.2	<b>49</b>	127.7	<b>76</b>	202.8	<b>115</b>	360.5
<b>23</b>	75.8	<b>50</b>	130.1	<b>77</b>	206	<b>120</b>	385.8
<b>24</b>	77.5	<b>51</b>	132.5	<b>78</b>	209.3	<b>125</b>	412.4
<b>25</b>	79.2	<b>52</b>	134.9	<b>79</b>	212.7	<b>130</b>	440.5
<b>26</b>	80.9	<b>53</b>	137.3	<b>80</b>	216.1	<b>135</b>	470
<b>27</b>	82.7	<b>54</b>	139.8	<b>81</b>	219.5	<b>140</b>	501
<b>28</b>	84.4	<b>55</b>	142.3	<b>82</b>	222.9	<b>145</b>	533.7
<b>29</b>	86.2	<b>56</b>	144.9	<b>83</b>	226.4	<b>150</b>	568.2
<b>30</b>	88.1	<b>57</b>	147.5	<b>84</b>	229.9		
<b>31</b>	89.9	<b>58</b>	150.1	<b>85</b>	233.5		
<b>32</b>	91.8	<b>59</b>	152.7	<b>86</b>	237.1		
<b>33</b>	93.7	<b>60</b>	155.4	<b>87</b>	240.8		
<b>34</b>	95.6	<b>61</b>	158.1	<b>88</b>	244.4		
<b>35</b>	97.6	<b>62</b>	160.8	<b>89</b>	248.2		
<b>36</b>	99.5	<b>63</b>	163.6	<b>90</b>	251.9		
<b>37</b>	101.5	<b>64</b>	166.4	<b>91</b>	255.7		
<b>38</b>	103.6	<b>65</b>	169.3	<b>92</b>	259.6		
<b>39</b>	105.6	<b>66</b>	172.1	<b>93</b>	263.5		
<b>40</b>	107.7	<b>67</b>	175.1	<b>94</b>	267.4		
<b>41</b>	109.8	<b>68</b>	178	<b>95</b>	271.4		
<b>42</b>	112	<b>69</b>	181	<b>96</b>	275.4		
<b>43</b>	114.1	<b>70</b>	184	<b>97</b>	279.5		
<b>44</b>	116.3	<b>71</b>	187	<b>98</b>	283.6		
<b>45</b>	118.5	<b>72</b>	190.1	<b>99</b>	287.8		
<b>46</b>	120.8	<b>73</b>	193.2	<b>100</b>	291.6		

### **Lubrication**

All original motors and bearings are furnished with an original factory charge of lubrication.

### **Service**

If the unit will not operate correctly and a service company is required, only a trained service technician qualified and experienced in both refrigerant chillers and air conditioning is permitted to service the system to keep warranties in effect. If assistance is required, the service technician must contact Jetson.

**Note: Service technician will need the model and serial number of the unit in all correspondence with Jetson factory.**

### **Warranties**

Please refer to the limitation of warranties in effect at the time of purchase.

### **Pump Operation**

Before initial start of the pump, check as follows:

1. Be sure that pump operates in the direction indicated by the arrow on the pump casing. Check rotation each time motor leads have been disconnected.
2. Check all connections of motor and starting device with wiring diagram. Check voltage, phase and frequency of line circuit with motor name plate.
3. Check suction and discharge piping and pressure gauges for proper operation.
4. Turn rotating element by hand to assure that it rotates freely.

### **Running:**

Periodically inspect pump while running, but especially after initial start-up and after repairs.

1. Check pump and piping for leaks. Repair immediately.
2. Record pressure gauge readings for future reference.
3. Record voltage, amperage per phase, and kW.

### **Maintenance Recommendations**

#### **Pump/Fan Motor Maintenance**

Cleaning - Remove oil, dust, water, and chemicals from exterior of motor and pump. Keep motor air inlet and outlet open. Blow out interior of open motors with clean compressed air at low pressure.

#### **Pump Bearings - Lubrication**

Every 6 months or after a prolonged shut down, use waterproof, lithium-based grease. Below 32°F, use Esso Exxon or Beacon 325. Above 32°F, use Mobil Mobilox EP2, Shell Alvania EP2 or Texaco RB2.

#### **Air Inlet**

Inspect the air inlet into the condenser section on a monthly basis to remove any paper, leaves or other debris that may block the airflow.

#### **Propeller Fans and Motors**

The fans are directly mounted on the motor shafts and the assemblies require minimal maintenance except to assure they are clear of dirt or debris that would impede the airflow.

### Recommended Annual Inspection

In addition to the above maintenance activities, a general inspection of the unit surface should be completed at least once a year.

### Air-Cooled Condenser

The air-cooled condenser section rejects heat by passing outdoor air over the microchannel coils for cooling of the hot refrigerant gas from the compressors. The heated air will discharge from the top of the section through the axial flow fans.

The condenser coils should be inspected yearly to ensure unrestricted airflow. If the installation has a large amount of airborne dust or other material, the condenser coils should be cleaned with a water spray in a direction opposite to airflow. Care must be taken to prevent damage to the microchannel coil.

### Microchannel Coil Cleaning

Documented routine cleaning of microchannel coils with factory provided E-coating is required to maintain coating warranty coverage. See E-Coated Coil Cleaning section.

Air-cooled heat exchangers include microchannel coils.

Cleaning microchannel coils is necessary in all locations. In some locations it may be necessary to clean the coils more or less often than recommended. In general, a condenser coil should be cleaned at a minimum of once a year. In locations where there is commonly debris or a condition that causes dirt/grease build up it may be necessary to clean the coils more often.

Proper procedure should be followed at every cleaning interval. Using improper cleaning technique or incorrect chemicals will result in coil damage, system performance degradation, and potentially leaks requiring coil replacement.


Documented routine cleaning of microchannel coils with factory provided E-coating is required to maintain coating warranty coverage. Use the E-Coated Coil Cleaning section for details on cleaning E-coated coils.

Field applied coil coatings are not recommended with microchannel coils.

### *Allowed Chemical Cleaners and Procedures*


Jetson recommends certain chemicals that can be used to remove buildup of grime and debris on the surface of microchannel coils. These are the only chemicals that Jetson will warrant as correct for cleaning microchannel coils.

There are three procedures that are outlined following that will clean the coils effectively without damage to the coils. Use of any other procedure or chemical may void the warranty to the unit where the coil is installed. **With all procedures make sure the unit is off before beginning procedure.**

	<b>WARNING</b>
Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.	

	<b>ADVERTENCIA</b>
Riesgo de descarga eléctrica. Desconecte todas las fuentes de	

energía eléctrica de la unidad para evitar el riesgo de descargas eléctricas o de sufrir lesiones debido a las piezas giratorias.

 **AVERTISSEMENT**  
Risque d'électrocution. Coupez l'alimentation électrique vers l'unité pour éviter tout risque de choc électrique ou toute blessure en raison des pièces rotatives

The water pressure used to clean should not exceed 100 psi, from no closer than 6 inches from the coils, and with the water aimed perpendicular to the coils.

### #1 Simple Green

Simple Green is biodegradable with a neutral 6.5 pH. Recommendation is to use it at a 4 to 1 mix. Use the following procedure.

1. Rinse the coil completely with water. Use a hard spray but be careful not to bend or damage the fins. A spray that is too hard will bend the fins. Spray from the fan side of the coil.
2. With a pump sprayer filled with a mix of 4 parts water to one-part Simple Green spray the air inlet face of the coil. Be sure to cover all areas of the face of the coil.
3. Allow the coil to soak for 10-15 minutes.
4. Rinse the coil with water as in step one.
5. Repeat as necessary.

### #2 Vinegar


This is standard white vinegar available in gallons from most grocery stores. It has a pH of 2-3, so it is slightly acidic. Use the following procedure.

1. Rinse the coil completely with water. Use a hard spray but be careful not to bend or damage the fins. A spray that is too hard will bend the fins. Spray from the fan side of the coil.
2. Use a pump sprayer filled with vinegar (100%). Spray from the face of the coil in the same direction as the airflow. Be sure to cover all areas of the face of the coil.
3. Allow the coil to soak for 10-15 minutes.
4. Rinse the coil with water as in step one.
5. Repeat as necessary.

### #3 Water Flush

This procedure can be used when the only material to cause the coil to need cleaning is debris from plant material that has impinged the coil face.

1. Rinse the coil completely with water. Use a hard spray but be careful not to bend or damage the fins. A spray that is too hard will bend the fins. Spray from the fan side of the coil.
2. Spray and rinse the coil from the face

 **CAUTION**  
**PRESSURE CLEANING**  
Use pressurized clean water, with pressure not to exceed 100 psi. Nozzle should be 6" and 80° to 90° from coil face. Failure to do so could result in coil damage.



## PRECAUCIÓN

### LIMPIEZA A PRESIÓN

Use agua presurizada limpia, con una presión que no supere los 100 psi. La boquilla debe estar a una distancia de 6" (15 cm) y a un ángulo de 80° a 90° de la cara de la bobina. De lo contrario, la bobina puede dañarse



## ATTENTION

### NETTOYAGE HAUTE PRESSION

Utilisez de l'eau propre sous pression en ne dépassant pas une pression de 6,9 bars. La buse doit se trouver à une distance de 15 cm et à un angle de 80 à 90° de la face du serpentin. Le non-respect de cette directive pourrait causer des dommages au serpentin.

## Microchannel Coil Cleaning Considerations

The three procedures can be used to clean microchannel coils. The proper application will depend on the equipment's installation environment.

In areas where the spring/summer has a heavy bloom (i.e., cottonwood), method #3 may be the preferred cleaning method if the unit is installed on an office building and no other environmental factors apply.

If the unit is installed where a sprinkler system sprays onto the condenser, coil cleaning method #2 may provide best results. Vinegar is slightly acidic and may help with calcium build up. This also works well when grease is part of the inlet air to a condenser coil.

Generally, the broadest based method is #1. The grease cutting effect of the Simple Green is good for restaurant applications.

### Other Coil Cleaners

There are many cleaners on the market for condenser coils. Before using any cleaner that is not covered in this section you must get written approval from the Jetson warranty and service department. Use of unapproved chemicals will void the warranty.

Unless a chemical has a neutral pH (6-8) it should not be used.

Beware of any product that claims to be a foaming cleaner. The foam that is generated is caused by a chemical reaction to the





aluminum fin, tube, and coating material on microchannel coils.


Microchannel coils are robust in many ways, but like any component they must be treated correctly. This includes cleaning the coils correctly to give optimal performance over many years.

### E-Coated Coil Cleaning

Documented quarterly cleaning of e-coated coils is required to maintain coating warranty coverage.

 <b>WARNING</b>
Electric shock hazard. Shut off all electrical power to the unit to avoid shock hazard or injury from rotating parts.

 <b>ADVERTENCIA</b>
Riesgo de descarga eléctrica. Desconecte todas las fuentes de energía eléctrica de la unidad para evitar el riesgo de descargas eléctricas o de sufrir lesiones debido a las piezas giratorias.

 <b>AVERTISSEMENT</b>
Risque d'électrocution. Coupez l'alimentation électrique vers l'unité pour éviter tout risque de choc électrique ou toute blessure en raison des pièces rotatives

Surface loaded fibers or dirt should be removed prior to water rinse to prevent restriction of airflow. If unable to back wash the side of the coil opposite of the coils entering air side, then surface loaded fibers or dirt should be removed with a vacuum

cleaner. If a vacuum cleaner is not available, a *soft non-metallic* bristle brush may be used. In either case, the tool should be applied in the direction of the fins. Coil surfaces can be easily damaged (fin edges bent over) if the tool is applied across the fins.

Use of a water stream, such as a garden hose, against a surface loaded coil will drive the fibers, dirt and salts into the coil. This will make cleaning efforts more difficult. Surface loaded fibers must be completely removed prior to using low velocity clean water rinse.

*Quarterly* cleaning is required to maintain warranty coverage and is essential to maintain the life of an E-coated coil. Coil cleaning shall be part of the unit's regularly scheduled maintenance procedures.

Failure to clean an E-coated coil on the prescribed quarterly cycle will void the warranty and may result in reduced efficiency and durability in the environment.

A routine two-step quarterly coil cleaning is required to maintain warranty.

*Step one* is to clean the coil with an approved coil cleaner listed in Microchannel Coil Cleaning.

*Step two* is to use the approved salt/chloride remover in the following section to dissolve soluble salts and revitalize the unit. It is very important when cleaning and/or rinsing not to exceed 130°F and potable water pressure is less than 100 psig to avoid damaging the unit and coil fin edges.



## CAUTION

### PRESSURE CLEANING

Si va a usar una lavadora a presión o un dispositivo de aire comprimido para rociar agua a alta velocidad, deberá hacerlo a una presión muy baja para no dañar las aletas o las bobinas. La fuerza del chorro de agua o aire puede doblar los bordes de las aletas y aumentar la caída de presión en el lado del aire. También es posible que se reduzca el rendimiento de la unidad o que se produzcan detenciones molestas.



## CAUTION

### CHEMICAL CLEANING

Harsh chemicals, household bleach, or acid cleaners should not be used to clean e-coated coils. These cleaners can be very difficult to rinse out of the coil and can accelerate corrosion and attack the e-coating. If there is dirt below the surface of the coil, use the recommended coil cleaners.



## PRECAUCIÓN

### LIMPIEZA A PRESIÓN

High velocity water from a pressure washer or compressed air should only be used at a very low pressure to prevent fin and/or coil damages. The force of the water or air jet may bend the fin edges and increase airside pressure drop. Reduced unit performance or nuisance unit shutdowns may occur.



## PRECAUCIÓN

### LIMPIEZA QUÍMICA

No se deben usar productos químicos agresivos, blanqueador doméstico o limpiadores ácidos para limpiar las bobinas con revestimiento electroforético. Estos productos de limpieza pueden ser muy difíciles de limpiar de la bobina y pueden acelerar la corrosión y deteriorar el revestimiento electroforético. Si hay suciedad debajo de la superficie de la bobina, use los productos de limpieza



## ATTENTION

### NETTOYAGE HAUTE PRESSION

Utilisez de l'eau à grande vitesse sortant d'un nettoyeur à pression ou de l'air comprimé uniquement à une pression très basse pour éviter d'endommager la pale ou le serpentín. La force de l'eau ou de l'air pourrait faire fléchir les rebords de la pale et causer une chute de pression du côté de l'air. La performance de l'unité



## ATTENTION

### NETTOYAGE CHIMIQUE

N'utilisez pas de produits chimiques agressifs, du javellisant ménager ou de nettoyeurs acides pour nettoyer les serpentins enduits d'un revêtement électrique. Ces nettoyeurs peuvent être très difficiles à rincer du serpentín

et peuvent accélérer la corrosion et attaquer le revêtement électrique. S'il y a de la saleté sous la surface du serpentin, utilisez les nettoyeurs à serpentin recommandés

For routine quarterly cleaning, first clean the coil with the approved coil cleaner. After cleaning the coils with the approved cleaning agent, use the approved chloride remover to remove soluble salts and revitalize the unit.

*Recommended Coil Cleaner – Step 1*

**GulfCoat™ Coil Cleaner**, when used in accordance with the manufacturer's directions on the container for proper mixing and cleaning, this cleaner has been approved for use on E-coated coils to remove mold, mildew, dust, soot, greasy residue, lint and other particulate. Never use any cleaners that are not approved.

*Recommended Chloride Remover – Step 2*

**CHLOR\*RID® Concentrate**, when used in accordance with the manufacturer's directions on the container for proper mixing, has been approved for use on E-coated coils to remove chlorides/salts & sulfates. Never use any chloride removers that are not approved.

*Warranty Protection – Step 1* Complete the coil cleaning following these steps:

1. Ensure that the power to the unit is off and locked out.
2. Clean the area around the unit if needed to ensure leaves, grass or loose debris will not be blown into the coil.

3. Remove panels or tops as required gaining access to the coil(s) to be cleaned.
4. Using a pump-up sprayer, fill to the appropriate level with potable water and add the correct amount of approved cleaner as per manufacture instructions leaving room for the pump plunger to be reinserted.

**NOTE:** Coils should always be cleaned / back flushed, opposite of airflow to prevent impacting the dirt into the coil.

5. If the coils have heavy dirt, fibers, grass, leaves etc. on the interior or exterior face areas, a vacuum and brush should be used to remove those surface contaminants prior to applying cleaner. The interior floor, drain tray or pan areas should also be vacuumed.
6. Apply the mixed cleaner to coil surfaces using a pressurized pump-up sprayer maintaining a good rate of pressure and at a medium size nozzle spray, (not a solid stream and not a wide fan but somewhere in the middle). Work in sections/panels ensuring that all areas are covered and kept wetted.
7. Apply the cleaner to unit interior air exiting side coil surfaces first. Work in sections/panels moving side to side and from top to bottom.
8. Generously soak coils by spraying cleaner directly on and into the fin pack section to be cleaned and allow the cleaning solution to soak for 5 to 10 minutes.
9. Using pressurized potable water, (<100 psi), rinse the coils and continue to always work in

sections/panels. Start at the top of the coil and slowly move vertically downward to the bottom. Then, staying in the same vertical area, slowly move back up to the top where you started. Now move over slightly overlapping the area just completed and repeat above. Continue until all coil areas on the inside of the unit have been rinsed.

10. Complete steps 5-9 for the exterior air entering side of the coils.
11. Final rinse – Now complete a quick rinse of both sides of the coil including the headers and piping.
12. If the coil has a drain pan or unit floor that is holding rinse water or cleaner, extra time and attention will need to be taken in those areas to ensure a proper rinse has been completed.

*Warranty Protection – Step 2* Complete the coil chloride (salt) removal following these steps:

1. CHLOR\*RID® is a concentrate to be used for both normal inland applications at a 100:1 mix ratio OR for severe coastal applications 50:1 mix ratio with potable water, (2.56 ounces of Chlor\*rid to 1 gal of water). Using a pump-up sprayer, fill to the appropriate level with potable water and add the correct amount of CHLOR\*RID® salt remover leaving room for the pump plunger to be reinserted.
2. Apply CHLOR\*RID® to all external coil surfaces using a pressurized pump-up sprayer maintaining a good rate of pressure and at a medium size nozzle spray, (not a solid stream and not a wide fan but somewhere in the middle). Work in sections/panels

ensuring that all areas are covered and kept wetted.

3. Generously soak coils by spraying CHLOR\*RID® directly on and into the fin pack section. Let stand for 5 to 10 minutes keeping the area wetted. Do not allow to dry before rinsing.
4. Using pressurized potable water, (<100 psi), rinse the CHLOR\*RID® and dissolved chlorides/salts off of the coils continuing to always work in sections/panels.
5. Starting at the top of the coil, begin rinsing the coil from side to side until you reach the bottom. Repeat as many times as is necessary to ensure all coil sections/panels have been completed and are thoroughly rinsed.
6. Reinstall all panels and tops that were removed.

## MAINTENANCE LOG - EXAMPLE

### Maintenance Log

This log must be kept with the unit. It is the responsibility of the owner and/or maintenance/service contractor to document any service, repair or adjustments. Jetson Service and Warranty Department is available to advise and provide phone support for proper operation and replacement parts. The responsibility for proper start-up, maintenance and servicing of the equipment falls to the owner and qualified licensed technician.

Entry Date	Action Taken	Name	Telephone

# Limited Product Warranty

## General Conditions

Jetson Innovations (hereinafter referred to as “Jetson”) warrants this equipment to be free of defects in material and workmanship under normal use, service, and maintenance. Our obligations under this warranty shall be limited to repairing or replacing the defective part, or parts, which in our judgment show evidence of such defects. Jetson is not liable for labor charges and other costs incurred for removing, shipping, handling or transporting defective part, or parts, or for shipping, handling, transporting, or installing repaired or replacement part, or parts.

The limited warranty is effective one (1) year from date of original installation, or eighteen (18) months from date of original shipment from the factory, whichever occurs first and covers all parts and components in this Jetson equipment excluding refrigerant moisture driers and lost refrigerant, which are not included in any part of this limited warranty. The replacement part, or parts, assume only the unused portion of the original limited warranty and are shipped f.o.b. from the factory and freight prepaid by the factory.

The limited warranty is effective for products manufactured at the Longview, Texas facility.

THIS LIMITED WARRANTY ONLY APPLIES WHEN THE ORIGINAL MODEL NUMBER AND SERIAL NUMBER OF THE JETSON UNIT ARE GIVEN AT TIME OF REQUEST FOR REPLACEMENT PART, OR PARTS. DEFECTIVE PART, OR PARTS, MUST BE RETURNED PREPAID, WITH ITS ASSIGNED RETURN MATERIAL TAG, WITHIN FOURTEEN (14) DAYS OF RECEIPT OF THE REPLACEMENT PART, OR PARTS.

This warranty does not cover and does not apply to:

1. Fuses, refrigerant, fluids, oil;
2. Products relocated after initial installation;
3. Any portion or component of the system that is not supplied by Jetson, regardless of the cause of the failure of such portion or component;
4. Products on which the unit’s identification tags or labels have been removed or defaced;
5. Products on which payment to Jetson is or has been in default;
6. Products which have defects or damage which result from improper installation, wiring, electrical imbalance characteristics or maintenance (including, without limitation, defects or damages caused by voltage surges, inadequate voltage conditions, phase imbalance, any form of electrical disturbances, inadequate or improper electrical circuit installation or protection, failure to perform common maintenance, etc.); or are caused by accident, misuse or abuse, fire, the elements, shock, vibration, flood, alteration, misapplication of the product or to any other service, range or environment of greater severity than that for which the products were designed;
7. Products which have defects or damage which result from a contaminated or corrosive air or liquid supply, operation at abnormal temperatures, or unauthorized opening of refrigerant circuit;
8. Products subjected to corrosion or abrasion or chemicals;
9. Mold, fungus or bacteria damage;
10. Products manufactured or supplied by others;
11. Products which have been subjected to misuse, negligence, vandalism or accidents;

12. Products which have been operated in a manner contrary to Jetson written instructions;
13. Products which have defects, damage or insufficient performance as a result of insufficient or incorrect system design or the improper application of Jetson products;
14. Products which have defects or damages due to freezing of the water supply, an inadequate or interrupted water supply, corrosives or abrasives in the water supply, or improper or inadequate filtration or treatment of the water or air supply.
15. Water-to-refrigerant heat exchanger for any damage resulting from freezing, fouling, corrosion or clogging.
16. A unit which has been installed outside of the Continental United States or Canada.

Jetson shall not be liable for any default or delay in performance hereunder, caused by a contingency beyond its control, including governmental restrictions or restraint, strikes, short or reduced supply of raw materials or parts, floods, winds, fire, lightning strikes, or any other acts of God.

#### **DISCLAIMERS OF WARRANTIES**

THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHER WARRANTY OF QUALITY, WHETHER EXPRESS OR IMPLIED, EXCEPT OF TITLE AND AGAINST PATENT INFRINGEMENT, CORRECTION OF NON-CONFORMITIES ARE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PART OR PARTS, AT SELLER'S OPTION, WHICH SHALL CONSTITUTE FULFILLMENT OF ALL TORT OR OTHERWISE IT IS EXPRESSLY UNDERSTOOD THAT JETSON SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES. JETSON SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, SUCH AS, BUT NOT LIMITED TO DAMAGES OR LOSS OF OTHER PROPERTY OR EQUIPMENT, LOSS OF PROFITS OR REVENUE, COST OF CAPITAL, COST OF PURCHASED OR REPLACEMENT GOODS, OR CLAIMS OF BUYER OR USER FOR SERVICE INTERRUPTIONS. THE REMEDIES OF THE BUYER SET FORTH HEREIN ARE EXCLUSIVE, AND THE LIABILITY OF JETSON WITH RESPECT TO ANY CONTRACT, OR ANYTHING DONE IN CONNECTION THEREWITH SUCH AS THE PERFORMANCE OR BREACH THEREFORE, OR FROM THE MANUFACTURE, SALE, DELIVERY, RESALE, INSTALLATION, OR USE OF ANY GOODS COVERED BY OR FURNISHED UNDER THIS CONTRACT WHETHER ARISING OUT OF CONTRACT, NEGLIGENCE, STRICT TORT, OR UNDER ANY WARRANTY, OR OTHERWISE, SHALL NOT EXCEPT AS EXPRESSLY PROVIDED HEREIN, EXCEED THE PRICE OF THE GOODS UPON WHICH SUCH LIABILITY IS BASED.

WITH RESPECT TO THE GOODS SOLD, THE BUYER HEREBY WAIVES ALL LIABILITY ARISING FROM STATUTE, LAW, STRICT LIABILITY IN TORT, OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY OBLIGATION OF JETSON WITH RESPECT TO CONSEQUENTIAL OR INCIDENTAL DAMAGES AND WHETHER OR NOT OCCASIONED BY JETSON NEGLIGENCE. TIME LIMIT ON COMMENCING LEGAL ACTIONS: AN ACTION FOR BREACH OF THIS CONTRACT FOR GOOD SOLD OR ANY OTHER ACTION OTHERWISE ARISING OUT OF THIS CONTRACT, MUST BE COMMENCED WITHIN ONE (1) YEAR FROM THE DATE, THE RIGHT, CLAIM, DEMAND OR CAUSE OF ACTION SHALL FIRST OCCUR, OR BE BARRED FOREVER.

**SEVERABILITY**

IF ANY PROVISION OR CAUSE OF THIS CONTRACT OR APPLICATION THEREOF TO ANY PERSON OR CIRCUMSTANCES IS HELD INVALID OR UNCONSCIONABLE SUCH INVALIDITY OR UNCONSCIONABILITY SHALL NOT AFFECT OTHER PROVISIONS OR APPLICATIONS OF THE CONTRACT WHICH CAN BE GIVEN EFFECT WITHOUT THE INVALID OR UNCONSCIONABLE PROVISIONS OF THE CONTRACT ARE DECLARED BE SEVERABLE.



## **Literature Change History**

07/01/20 – Initial version of document.

03/01/21 – Update electrical diagram and service clearances.

08/01/21 – Added warranty text.

10/11/21 – Updated product images and model string to match catalog

01/03/22 – Updated digit 29 isolation valve description to move second valve from suction line to liquid line. Added variable flow bypass text. Removed “labeled motors” paragraph.

11/26/22 – Updated broken link in “Adjusting Refrigerant Charge” section

02/10/23 – Added heat pump startup conditions

02/28/23 – Reduced maximum operating ambient from 125F to 115F. Updated unit clearance text.

01/28/24- Added notes from UL60335-1, Clause 7.12 and instructions per UL60335-2-40 clause 7.12.9DV.1

04/18/24- Added notes from clauses 7.12 and revised notes from annex DD.

05/01/24 -Added transformer ,condenser fuse information, and refrigerant charge per circuit.

05/12/24 –Danger,warning,caution and important labels included in Spanish and French.

05/05/24- Filed wiring diagram updated according to ISO 7000-0790 (2004-01) and IEC 60417-5180 (2003-02). Updated nomenclatura digits 5-7,11,22 and 38.

06/05/24- Added translated warning, caution, attention and notice labels in Spanish and French.





**905 W. Cotton Street  
Longview, TX 75604  
Phone: 903-758-2900  
www.JetsonHVAC.com**

**ACC chillers  
Installation, Operation, &  
Maintenance  
Revision 240605**

**JET17-500**

**Factory Technical Support: 903-758-2900**

**Note:** Before calling Technical Support, please have the model and serial number of the unit available.

**Parts:** For replacement parts, please contact your local Jetson Representative.

It is the intent of Jetson to provide accurate and current product information. However, in the interest of product improvement, Jetson reserves the right to change pricing, specifications, and/or design of its product without notice, obligation, or liability.

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