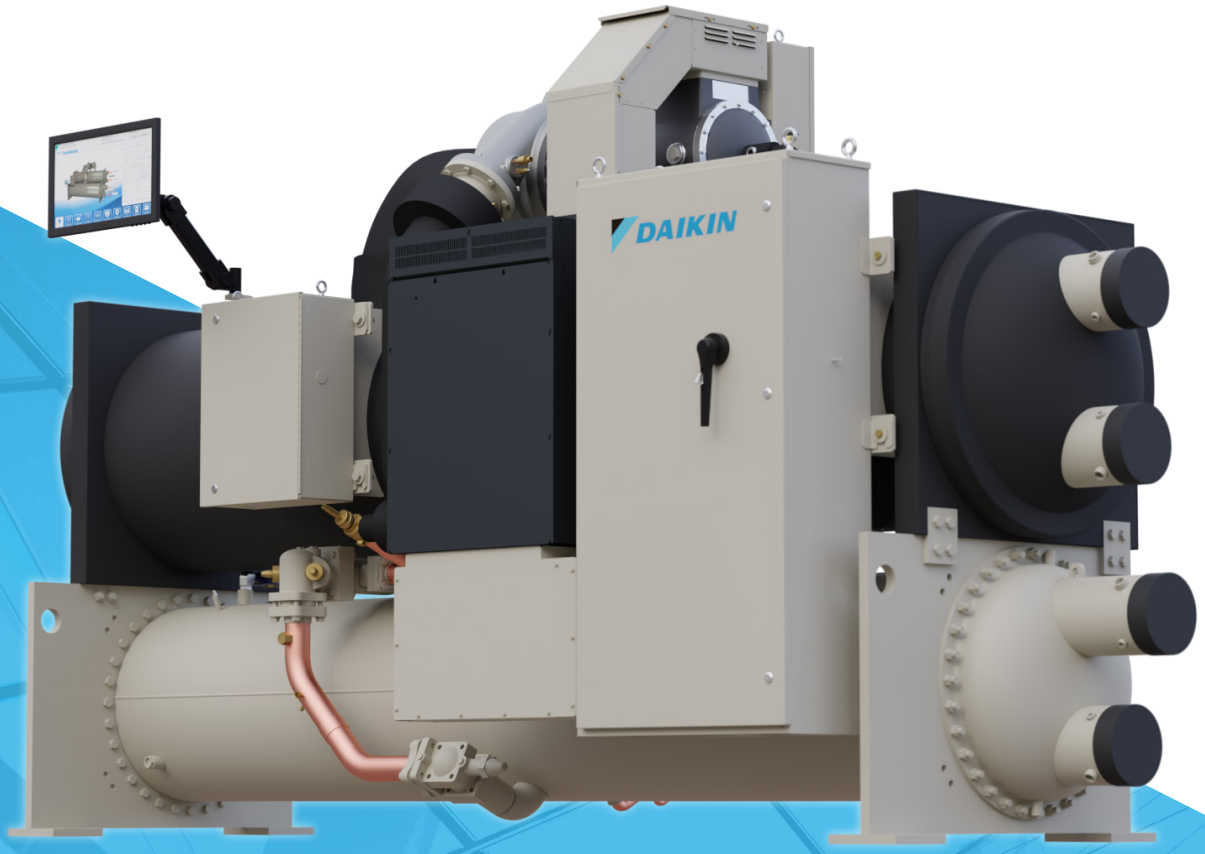
INSTALLATION, OPERATION & MAINTENANCE

IOM 1266-7

NOVEMBER 2026

# MAGNITUDE® WME-C

## MAGNETIC BEARING CENTRIFUGAL CHILLERS




- MODEL WME-C
- 250 TO 3,000 TONS COOLING
- 21,000 TO 38,000 MBH HEATING
- R-513A OR R-515B REFRIGERANT

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# Safety Information

This manual provides installation, operation,and maintenance information for Daikin Applied Magnitude WME-C Magnetic Bearing Chiller with a MicroTech® controller.

**NOTICE**

Installation and maintenance are to be performed only by licensed, if required by local codes and regulations, or qualified personnel who are familiar with local codes and regulations and are experienced with this type of equipment.

**⚠ DANGER**

**LOCKOUT/TAGOUT** all power sources prior to service, pressurizing, de-pressuring, or powering down the unit. Failure to follow this warning exactly can result in serious injury or death. Disconnect electrical power before servicing the equipment. More than one disconnect may be required to de-energize the unit. Be sure to read and understand the installation, operation, and service instructions within this manual.

**⚠ WARNING**

Electric shock hazard. Improper handling of this equipment can cause personal injury or equipment damage. This equipment must be properly grounded. Connections to and service of the MicroTech control panel must be performed only by personnel that are knowledgeable in the operation of the equipment being controlled.

**⚠ WARNING**

Polyolester Oil, commonly known as POE oil is a synthetic oil used in many refrigeration systems, and may be present in this Daikin Applied product. POE oil, if ever in contact with PVC/CPVC, will coat the inside wall of PVC/CPVC pipe causing environmental stress fractures. Although there is no PVC/CPVC piping in this product, please keep this in mind when selecting piping materials for your application, as system failure and property damage could result. Refer to the pipe manufacturer's recommendations to determine suitable applications of the pipe.

**⚠ CAUTION**

Static sensitive components. A static discharge while handling electronic circuit boards can cause damage to the components. Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug any cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

## Hazard Identification

**⚠ DANGER**

Danger indicates a hazardous situation, which will result in death or serious injury if not avoided.

**⚠ WARNING**

Warning indicates a potentially hazardous situations, which can result in property damage, personal injury, or death if not avoided.

**⚠ CAUTION**

Caution indicates a potentially hazardous situations, which can result in minor injury or equipment damage if not avoided.

**NOTICE**

Notice indicates practices not related to physical injury.

## Unit Labels

Pictogram warning and informational labels may be present on the unit. Consult the table below for reference.

| Label | Description |
|---|---|
|  | WARNING - Flammable refrigerant present |
|  Refrigerant class per ISO 817 | WARNING - Flammable refrigerant present |
|  | Read the technical manual for service instructions |
|  | WARNING - A2L low-burning velocity refrigerant present |
|  | Pressurized medium present |
|  | WARNING - Ultraviolet (UV) radiation present |
|  | Read the technical manual for instructions |
|  | WARNING - Dangerous Voltage |
|   | Per- and Poly-Fluoroalkyl substances |
|  | Read the operator's manual |

## UL Compliance Statements for Unit Work

- 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.
- Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- 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, i.e., non-sparking, adequately sealed or intrinsically safe.
- 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 $CO_2$ fire extinguisher adjacent to the charging area.
- 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. Safety checks are necessary to ensure that the risk of ignition is minimized and "No Smoking" signs shall be displayed.
- 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.
- Equipment not to be used 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.
- Children shall not be allowed to play on or with equipment.
- If unit is permanently connected to water main; hose sets are not to be used.

# Introduction

## General Description

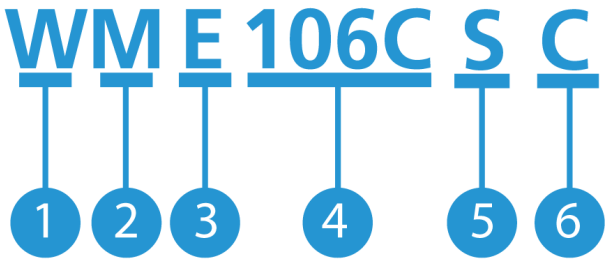
Daikin Applied Magnitude® Centrifugal Chillers are complete, self-contained, automatically controlled, liquid-chilling units featuring oil-free, magnetic bearing compressors. All Magnitude chillers are equipped with a single evaporator and a single condenser along with either one, two, or four compressors depending on the model.

Magnitude chillers are designed for indoor, non-freezing installation only. The chillers use refrigerant R-513A or R-515B that operates at a positive pressure over the entire operation range, so no purge system is required.

Only normal field connections such as water piping, relief valve piping, electric power, and control interlocks are required, thereby simplifying installation and increasing reliability. Necessary equipment protection and operating controls are included.

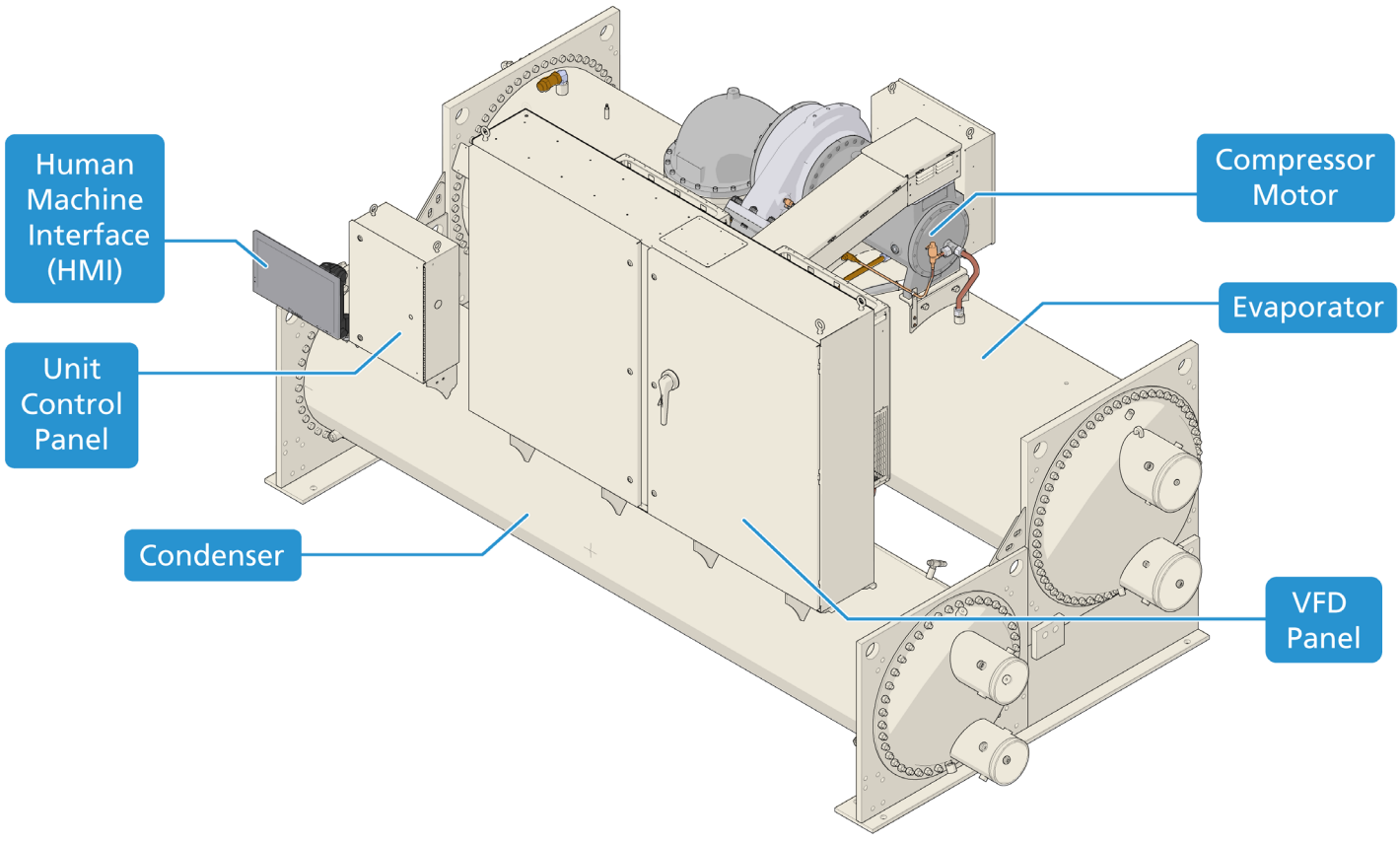
All Daikin Applied centrifugal chillers must be commissioned by a Daikin Applied service technician or an authorized service representative. Failure to follow this startup procedure can affect the equipment warranty. The standard limited warranty on this equipment covers parts that prove defective in material or workmanship. Specific details of this warranty can be found in the warranty statement furnished with the equipment.

## Nomenclature



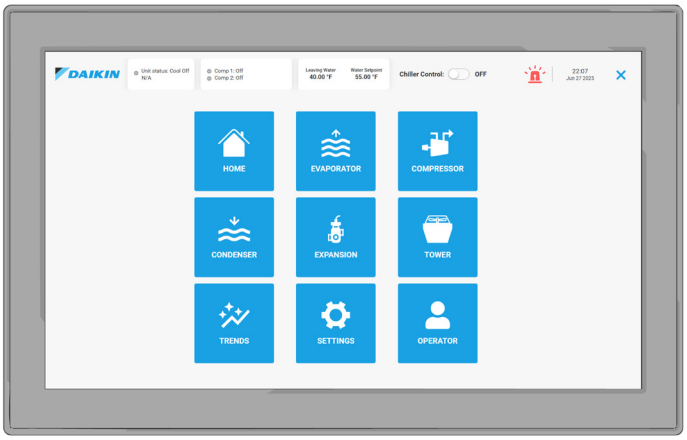

| No. | Description |
|---|---|
| 1 | W = Water-cooled |
| 2 | M = Magnetic Bearing |
| 3 | E = Centrifugal Compressor |
| 4 | Model Code |
| 5 | S = Single<br>D = Dual<br>Q = Quad |
| 6 | Design Vintage |

***Figure 1: WME-C Component Locations***



# The Control System

***Figure 2: Human Machine Interface (HMI)***




The MicroTech control system consists of a Human Machine Interface (HMI), a microprocessor-based unit controller, and compressor on-board controllers providing monitoring and control functions required for efficient chiller operation.

The MicroTech controllers acquire and process data related to chiller operation, issue instructions to various components of the chiller, and maintain controlled operation of the chiller. As a part of operating the chiller successfully, the unit controller offers necessary condenser water control.

The MicroTech unit controller also communicates with the HMI for graphic display and is located in the unit control panel. The on-board compressor controllers are located in each compressor control panel.

A single HMI is used per unit. The HMI panel is mounted on a moveable arm to allow placement in a convenient position for the operator. The HMI is the device used for viewing unit information and entering setpoints into the control system. Select information from the HMI panel can be downloaded via a USB port. For more information on the HMI, see "Human Machine Interface (HMI)" on page 36.

# Operating Limits

***Table 1: Operating/Standby Limits***

| Acceptable Temperatures (WME)[1] | | | R-515B | | R-513A | |
|---|---|---|---|---|---|---|
| **Condition** | **Component** | **Description** | **Min Temp °F (°C)** | **Max Temp °F (°C)** | **Min Temp °F (°C)** | **Max Temp °F (°C)** |
| Standby | Evaporator | Water | 38 (3.3) | 115 (46) | 38 (3.3) | 112 (44.4) |
| | | Water w/ Antifreeze[2] | 30 (-1.1) | 115 (46) | 30 (-1.1) | 112 (44.4) |
| | Equipment Room | Air w/ Water in Vessels[4] | 40 (4.4) | 104 (40) | 40 (4.4) | 104 (40) |
| | | Air w/ no Water in Vessels[4] | 0 (-17.7) | 113 (45) | 0 (-17.7) | 113 (45) |
| Startup | Evaporator | Water | 38 (3.3) | 92 (33.3) | 38 (3.3) | 85 (29.4) |
| | | Water w/ Antifreeze[2] | 30 (-1.1) | 92 (33.3) | 30 (-1.1) | 85 (29.4) |
| | Condenser | Water | 40 (4.4) | 100 (38) | 40 (4.4) | 100 (37.7) |
| | Equipment Room | Air[4] | 40 (4.4) | 104 (40) | 40 (4.4) | 104 (40) |
| Operating | Evaporator | Entering Water | 38 (3.3) | 92 (33.3) | 38 (3.3) | 90 (32.2) |
| | | Leaving Water[3] | 38 (3.3) | 72 (22.2) | 38 (3.3) | 70 (21.1) |
| | | Entering Water w/ Antifreeze[2] | 30 (-1.1) | 92 (33.3) | 30 (-1.1) | 90 (32.2) |
| | | Leaving Water w/ Antifreeze[2,3] | 30 (-1.1) | 72 (22.2) | 30 (-1.1) | 70 (21.1) |
| | Condenser | Entering Water | 40 (4.4) | 106 (41)[1] | 40 (4.4) | 106 (41) |
| | | Leaving Water[3] | 45 (7.2) | 111 (43.9)[1] | 45 (7.2) | 111 (43.9) |
| | Equipment Room | Air[4] | 40 (4.4) | 104 (40) | 40 (4.4) | 104 (40) |

NOTES:

| | |
|---|---|
| 1 | Contact a Daikin Applied representative for specific operating limits; CLWT limits up to 130°F (54.4°C) can depend on unit configuration with R-515B refrigerant. |
| 2 | Antifreeze temperature limits must have appropriate glycol concentration |
| 3 | Allowable leaving fluid temperatures depend on Saturation Temperature |
| 4 | 5%-95% relative humidity, non-condensing |

# Installation

## Nameplates

There are several identification nameplates on the chiller:

- The unit nameplate is located on the exterior of the Unit Control Panel. Both the Model No. and Serial No. are located on the unit nameplate; the Serial No. is unique to the unit. These numbers should be used to identify the unit for service, parts, or warranty questions. This plate also has the unit refrigerant charge and electrical ratings.
- Vessel nameplates are located on the evaporator and condenser. They have a National Board Number (NB) and a serial number, either of which identify the vessel (but not the entire unit).

## Receiving and Handling

Carefully check equipment against the bill of lading to ensure all items have been received. Before unloading any unit, check the nameplate to make sure the voltage complies with the power supply available.

Inspect all units for damage upon arrival. If a unit has become dirty during shipment, carefully clean it prior to completing the inspection. Daikin Applied is not responsible for physical damage after the unit leaves the factory unless the contract with Daikin Applied states otherwise.

**NOTICE**

All units should be carefully inspected for damage when received. Report all loss or shipping damage using a claim form supplied by Daikin Applied.

**VISIBLE LOSS OR DAMAGE:** Any external evidence of loss or damage must be noted on the freight bill or carrier's receipt, and signed by the carrier's agent. Failure to adequately describe such external evidence of loss or damage may result in the carrier's refusal to honor a damage claim.

**CONCEALED LOSS OR DAMAGE:** Concealed loss or damage means loss or damage which does not become apparent until the unit has been unpacked or unwrapped. The contents may be damaged in transit due to rough handling even though the exterior may not show damages. When the damage is discovered, make a written request for inspection by the carrier's agent within **five (5) days** of the delivery date and file a claim with the form provided by Daikin Applied. Refer to the Daikin Applied Freight Policy for further information.

## Transit

When the unit is being tied down for transit, the maximum allowable attachment angle from the vertical is 30 degrees in the opposite direction of lifting in Figure 4. Shimming of the unit under the lifting brackets or tie-down points must be used to ensure even contact along the length of the base rail.

## Location

WME chillers are intended only for installation in an indoor or weather protected area consistent with the NEMA 1 rating on the chiller, controls, and electrical panels. Equipment room temperature for operating and standby conditions is 40°F to 104°F (4.4°C to 40°C).

**NOTICE**

Indoor installations must be in a structure with a permanent floor and roof. The unit must be enclosed by walls for protection from weather conditions.

**NOTICE**

The maximum operating altitude for the WME-C is 3000m. Consult a Daikin Applied application engineer for derating schedule.

Excessive humidity in the mechanical room should be avoided. A limit of 95% non-condensing humidity should be met to minimize electrical components exposure to water condensing in panels. Humidity levels in the mechanical room, even if lower than 90%, can cause water to condense on/near all cool surfaces and potentially lead to premature component wear. If possible, the mechanical room should be conditioned which can extend the useful lifetime for all mechanical room equipment.

**NOTICE**

Radiant heat from boilers or piping that would adversely raise component surface temperatures beyond ambient limits must also be avoided.

**⚠ DANGER**

Prevent lint, paper fibers, dust, metallic chips, or other foreign material from getting into the inverter or accumulating on VFD cooling outlets, the heat sink, circuit boards, control panels, or other electrical devices. Failure to do so may affect operation of the VFD, void warranty, result in a fire, unit damage, property damage, severe personal injury, or death. Frequently inspect area around inverter, heatsink, and other electrical devices to ensure they are free of foreign material.

## Storage

If the unit is stored for an intermediate period before installation or moved to a different location, take these additional precautions:

1. Support the unit well along the length of the base foot plate.
2. Level the unit (no twists or uneven ground surface).
3. Provide proper drainage around the unit to prevent flooding of the equipment.
4. Provide adequate protection from vandalism, mechanical contact, etc.
5. Securely close the doors and lock the handles.

## Long Term Storage

This information applies to new units being stored waiting for startup or to existing units that may be inoperative for an extended period of time.

The chiller must be stored in a dry location indoors and protected from any damage or sources of corrosion. A Daikin Applied service representative must perform an inspection and leak test of the unit on a minimum quarterly schedule, to be paid by the owner or contractor. Daikin Applied will not be responsible for any refrigerant loss during the storage time or for repairs to the unit during the period of storage, or while moving the unit from the original location to a storage facility and back to any new installation location. If there is concern about the possibilities of damage and loss of charge during storage, the customer can have the charge removed and stored in recovery cylinders.

**⚠ CAUTION**

If the ambient temperature of the storage location is expected to exceed 140°F (60°C), then the refrigerant must be removed.

It is necessary to observe some precautions during storage:

- Do not keep the machine near a heat source and/or open flame.
- Humid environments may cause condensate corrosion on steel surfaces. Consider adding a desiccant material to alleviate corrosion concerns.
- For units previously installed, ensure water has been drained from the unit or sufficient glycol has been added if ambient temperature may be lower than 40°F (4.4°C).

For additional tasks required, contact a Daikin Applied service representative.

## Mounting

The unit must be mounted on a concrete or steel base. Make sure that the floor or structural support is adequate to support the full operating weight of the complete unit.

The neoprene vibration pads (shipped loose in the power panel) should be placed under the corners of the unit (unless the job specifications state otherwise). They must be installed so that they are flush with the edges of the unit feet.

It is not necessary to bolt the unit to the mounting slab or framework. Should this be required by local codes, 1-1/8 inch (1.125 inch, 28.5 mm) mounting holes are provided in the unit supports at the four corners. When mounted, the base pad of the unit must be level to within ± 1/2 inch (0.5 inch,12.7 mm) across the length and width of the unit.

## Lifting Guidance

Daikin Applied equipment is designed to withstand the loads of the lifting and rigging process resulting from ASME Standard P30.1 - Planning for Load Handling Activities or equivalent. Lifting guidance is intended for installations of newly delivered equipment. If moving previously installed equipment for re-location or disposal, consideration should be given to unit condition. Equipment should also be drained as unit weight and center of gravity values do not reflect the addition of water for lifting.

**⚠ DANGER**

Improper rigging, lifting, or moving of a unit can result in unit damage, property damage, severe personal injury or death. See the as-designed, certified dimensioned drawings included in the job submittal for the weights and center of gravity of the unit. If the drawings are not available, consult the local Daikin Applied sales office for assistance.

Installation is to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment. Lifting equipment and mechanisms must be determined by the Lifting Director per the current version of ASME Standard P30.1 or equivalent and must be suited for the load capacity. Daikin Applied is not a licensed nor certified rigging specialist. Therefore it is the customer's responsibility to consult a certified rigging contractor to rig, lift, and move components and subcomponents properly and safely as needed.

**⚠ CAUTION**

Forklifts may not be used to lift or move Magnitude units as the method may result in unit damage.

**⚠ CAUTION**

When around sharp edges, wear appropriate Personal Protective Equipment (PPE), such as gloves, protective clothing, foot wear, eye protection, etc. to prevent personal injury.

### *Lifting Brackets*

Lifting bracket designs vary from product to product. Rules of engagement with the lifting brackets are the same regardless of the bracket type. For Magnitude units, a typical lifting bracket with 2" (51 mm) diameter holes found on the sides of the unit base are illustrated in Figure 3. See the as-designed certified drawings for specific lifting points on this product model.

Engagement with each lifting hole is to be as close to vertical as possible. The maximum allowable lift angle from the vertical is 30° as shown in Figure 4. If the lift angle shifts beyond 30° from vertical on any of the lift points, the lift shall not proceed until a plan and rigging can be secured that will correct the angle of lift.

**⚠ WARNING**

The lifting angle must not go beyond 30 degrees from vertical or the unit can become unstable which may result in unit damage, property damage, severe personal injury, or death.

***Figure 3: Illustration of Lifting Bracket and Allowed Angle for Lifting***

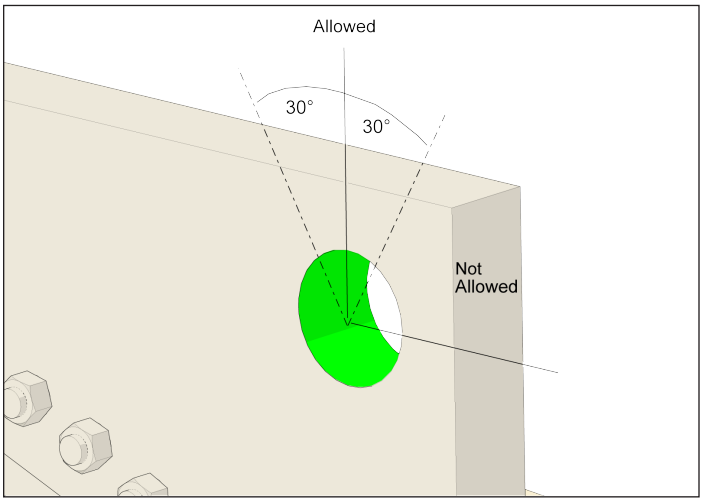
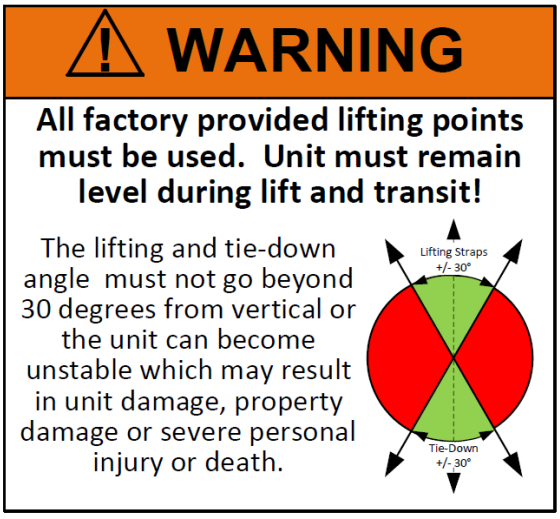



***Figure 4: Illustration of Allowed Angle Label***




## *Lifting Equipment*

Lifting equipment is supplied by the user or their designate. This is typically selected around the unit certified information of the equipment to be lifted and the available lifting equipment planned to be at the site where the lift is to take place. It is the responsibility of the Lifting Director to follow a standard practice of lift planning and equipment selection, like that found in the ASME P30 series of standards. Lifting plan and equipment must ensure that the only contact with the unit is at that lifting brackets.

**⚠ CAUTION**

Lifting mechanisms must not make contact with the unit beyond the lifting bracket. Extreme care must be used when rigging the unit to prevent damage to the control panels, unit handles, unit piping, and unit frame.

## *Lifting Points*

Lifting points are predetermined by design. When lifting, all factory installed lifting brackets must be used. Figure 5 and Figure 6 illustrate typical four point lifting configuration, with two lifting points on each side of the unit. The unit must remain level throughout the entire lifting event. Level is defined as one end being no more than 0.25” per foot of unit length to the opposite end.

**⚠ WARNING**

Be aware that the center of gravity may not necessarily be in the geometric center of the unit. No additional items can be added to a lift with the unit as it may affect the center of gravity and cause unit damage, property damage, severe personal injury or death. Refer to as-designed, certified drawings for weight, center of gravity location and details specific to unit configuration.

***Figure 5: Lifting Point Locations (Single and Dual Compressor Units)***

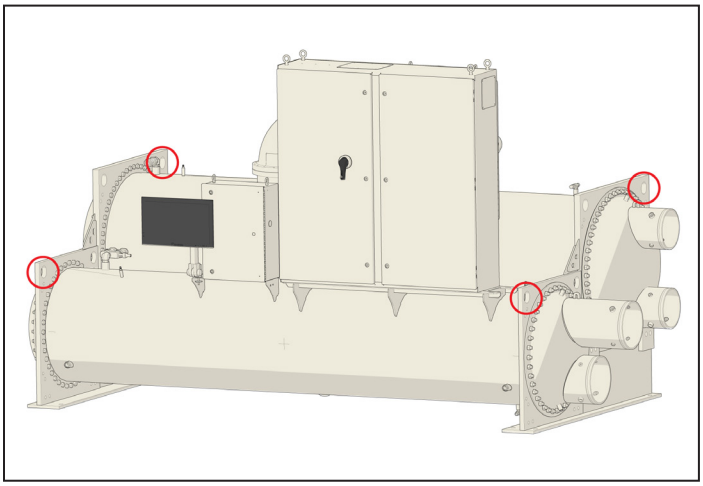


***Figure 6:* Lifting Point Locations (Quad Compressor Units)**

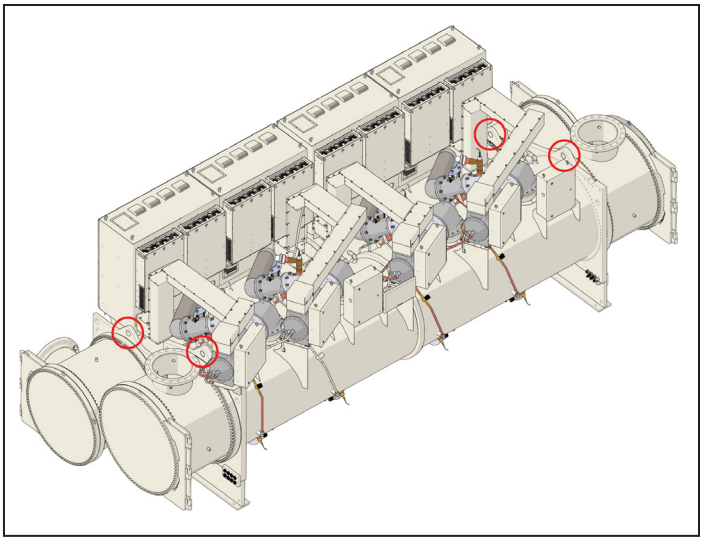
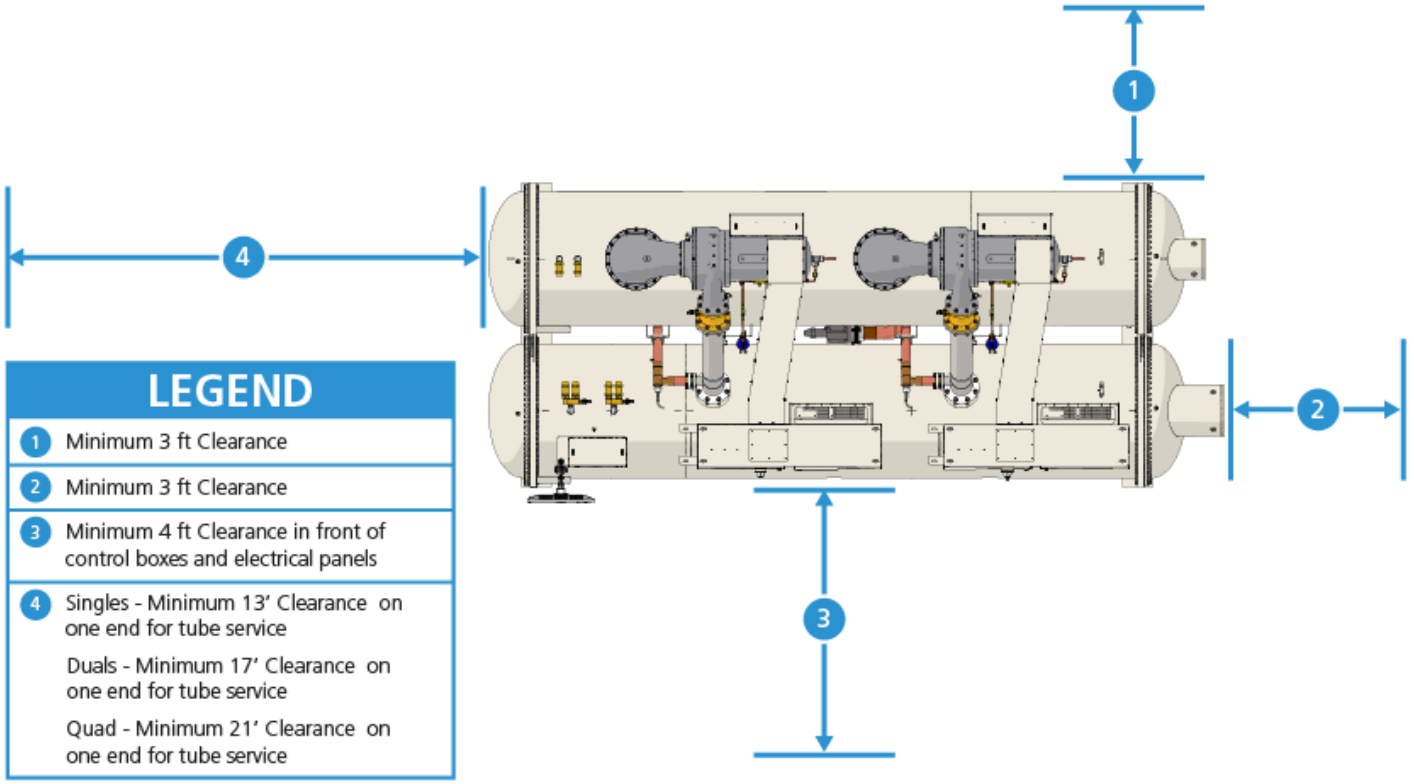


*Figure 7: Minimum Clearances Based on Standard Waterboxes*




## Clearance

The unit must be placed in an area that allows for adequate clearance around the unit. See Figure 7 for clearance requirements around the sides of the chiller. Doors and removable wall sections can be utilized to meet these clearance requirements. There must be a minimum 3-feet clearance above the top of the chiller. The U.S. National Electric Code (NEC) or local codes can require more clearance in and around electrical components and must be checked for compliance.

***NOTICE***

Hinged type waterboxes may require more clearance. Consult a Daikin Applied sales representative for details.

## Water Piping

All evaporators and condensers have OGS-type grooved water connections (adhering to Standard AWWA C606) or optional flange connections. The installing contractor must provide matching mechanical connections. Be sure that water inlet and outlet connections match certified drawings and nozzle markings. PVC/CPVC piping should not be used.

**⚠ WARNING**

Polyolester Oil, commonly known as POE oil is a synthetic oil used in many refrigeration systems, and may be present in this Daikin Applied product. POE oil, if ever in contact with PVC/CPVC, will coat the inside wall of PVC/CPVC pipe causing environmental stress fractures. Although there is no PVC/CPVC piping in this product, please keep this in mind when selecting piping materials for your application, as system failure and property damage could result.

**⚠ CAUTION**

If welding is to be performed on the mechanical or flange connections:

1. Remove the solid-state temperature sensor, thermostat bulbs, and nozzle mounted flow switches from the wells to prevent damage to those components.

2. Properly ground the unit or severe damage to the MicroTech unit controller can occur.

Modification to water side components must be done in accordance with local and national codes. Check with the local Authority Having Jurisdiction (AHJ).

**⚠ CAUTION**

When a high water pressure test is performed, or when applied pressure is above normal water-side working pressures, a re-torque of the evaporator and condenser head fasteners is required.

The water heads can be interchanged (end for end) so that the water connections can be made at either end of the unit. If this is done, use new head gaskets and relocate the control sensors.

Field installed water piping to the chiller must include:

- Air vents at the high points.
- A cleanable strainer installed at the water inlet to the evaporator to remove debris and impurities before they reach the evaporator. Install cleanable strainer within 5 feet (1500 mm) of pipe length from the evaporator inlet connection and downstream of any welded connections (no welded connections between strainer and evaporator).
- A flow proving device for both the evaporator and condenser to prevent freeze up. Flow switches, thermal dispersion switches, or Delta P switches can be used. Note that flow switches are factory installed. Additional flow switches can be used only if they are connected in series with the ones already provided. Connect additional flow switches in series between original flow switch inputs. Calibration of thermal dispersion flow switches is discussed on page 64.
- Sufficient shutoff valves to allow vessel isolation. The chiller must be capable of draining the water from the evaporator or condenser without draining the complete system.
- Water pressure gauge connection taps and gauges at the inlet and outlet connections of both vessels for measuring water pressure drop.
- Piping must be supported to eliminate weight and strain on the fittings and connections.
- Chilled water piping must be adequately insulated.

Recommended field installed chiller water piping includes:

- Thermometers at the inlet and outlet connections of both vessels.

**NOTICE**

This product, in its standard configuration, is equipped with a shell and tube evaporator with carbon steel shell and copper tubes. The water or other fluid used in contact with the wetted surfaces of the heat exchangers must be clean and non-corrosive to the standard materials of construction. Daikin Applied makes no warranty as to the compatibility of fluids and materials. Non-compatible fluids may void the equipment warranty. If the compatibility of the fluid with the standard materials of construction is in question, a professional corrosion consultant should administer the proper testing and evaluate compatibility.

***Table 2: Minimum and Maximum Water-Side Pressure***

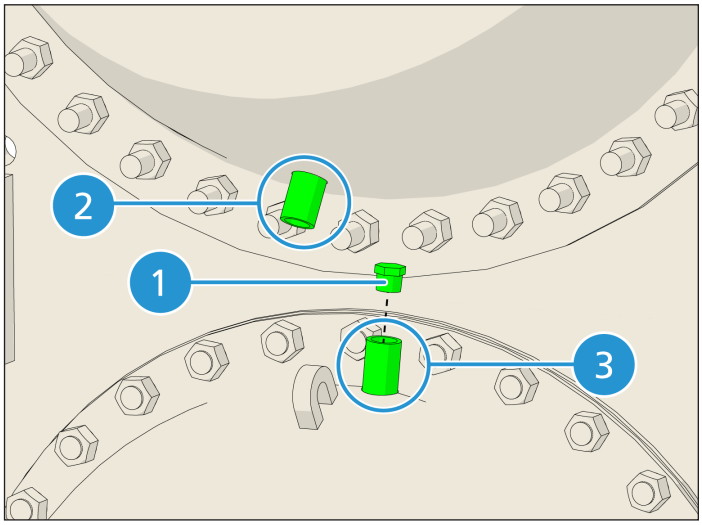
| Vessel | Minimum Water-Side Pressure | Maximum Water-Side Pressure | |
|---|---|---|---|
| | | Standard | Up to 300 Design Pressure |
| Evaporator | 0 psig (0 kPa) | 150 psig* (1034 kPa) | 300 psig* (2068 kPa) |
| Condenser | 0 psig (0 kPa) | 150 psig* (1034 kPa) | 300 psig* (2068 kPa) |

*Maximum water-side pressure depends on unit selection. See evaporator and condenser data plates for your unit.

## Vessel Drains at Startup

The unit is drained of water at the factory. Units are shipped with the drain plug in the top water box drain hole and no plug in the bottom drain hole. Drain plugs for each vessel head are shipped separately in the control box. Be sure to install the bottom drain plugs prior to filling the vessel with fluid.

***Figure 8: Drain Plug Installation***




| No. | Description |
|---|---|
| 1 | Plug |
| 2 | Drain Hole (Under Insulation) |
| 3 | Vent Hole (Air Purge) |

## Water Quality Guidelines

The water quality provided by the owner/occupant/operator/user to a chiller system should minimize corrosion, scale buildup, erosion, and biological growth for optimum efficiency of HVAC equipment without creating a hazard to operating personnel or the environment. Strainers must be used to protect the chiller systems from water-borne debris. Daikin Applied will not be responsible for any water-borne debris damage or water side damage to the chiller heat exchangers due to improperly treated water.

Water systems should be cleaned and flushed prior to chiller installation. Water testing and treatment should be verified during initial chiller installation/commissioning and maintained on a continuous basis by water treatment professionals (see Limited Product Warranty).

**⚠ WARNING**

The improper use of detergents, chemicals, and additives in the chiller system water may adversely affect chiller performance and potentially lead to repair costs not covered by warranty. Any decision to use these products is at the discretion of the owner/occupant/operator/user and as such they assume full liability/responsibility for any damage that may occur due to their use.

# Field Insulation

If the optional factory installation of thermal insulation is not ordered, insulation should be field installed to reduce heat loss and prevent condensation from forming. Insulation should cover:

- The evaporator barrel, tube sheet, and waterboxes.
- The suction line from the top of the evaporator to the compressor inlet flange.
- The compressor support brackets welded to the evaporator.
- The liquid line from the expansion valve to the evaporator inlet, including the expansion valve.
- The part load balance valve to the evaporator.

Approximate total square footage of insulation surface required for individual packaged chillers is tabulated by evaporator code and can be found in Table 3.

***Table 3: Insulation Area Required for WME Models***

| Evaporator Code | Insulation Area sq. ft. ($m^2$) |
|---|---|
| E3012 | 115 (10.6) |
| E3612 | 129 (11.9) |
| E4216 | 263 (24.4) |
| E4816 | 302 (28.1) |
| E5420 | 480 (44.6) |

# Relief Valves

As a safety precaution and to meet code requirements, each chiller is equipped with pressure relief valves located on the condenser and evaporator for the purpose of relieving excessive refrigerant pressure (caused by equipment malfunction, fire, etc.) to the atmosphere.

***Table 4: WME, C-vintage Relief Valve Data***

| | Evaporator | Condenser |
|---|---|---|
| Location | Top | Top |
| Pressure Setting (psi) | 200 | 225 |
| Discharge Capacity | 78.8 lb/min. air | 88.1 lb/min. air |
| Qty | 1 - 30 & 36 inch vessels<br>2 - 42 & 48 inch vessels<br>4 - 54 inch vessel | 2 - 26, 30, 36 inch vessels<br>4 - 42 inch vessels<br>8 - 48 inch vessel |
| Connection | 1.0-inch female NPT | |

Most codes require that relief valves be vented to the outside of a building. Relief piping connections to the relief valves must have flexible connectors.

**⚠ CAUTION**

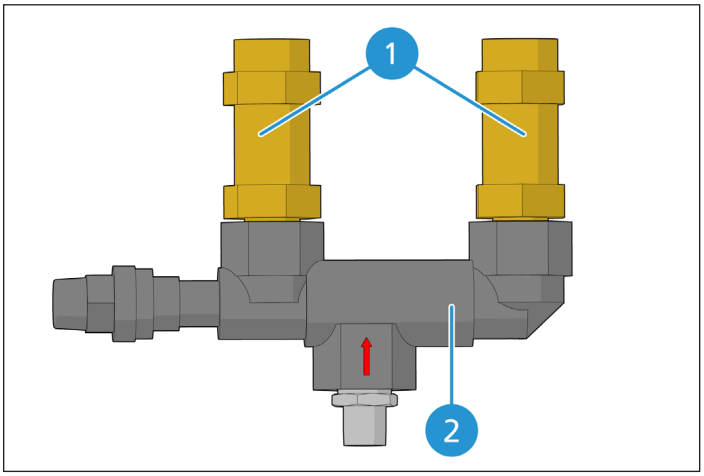
Units are shipped with refrigerant valves closed to isolate the refrigerant in the unit condenser. Valves must remain closed until startup by the factory service technician.

Remove plastic shipping plugs (if installed) from the inside of the valves prior to making pipe connections. Whenever vent piping is installed, the lines must be in accordance with local code requirements. Where local codes do not apply, the latest issue of ANSI/ASHRAE Standard 15 code recommendations must be followed.

## Condenser Relief Valves

In order to ensure proper installation, it is important to know how the three-way relief valve functions. One valve remains active at all times and the second valve acts as a standby. When the stem of the three-way valve is pushed into the valve completely, the valve is in “Front Seated Position” and all refrigerant will flow through the back outlet port, as shown in Figure 10. When the stem of the three-way valve is pulled back completely, the valve is in “Back Seated Position” and all refrigerant will flow through the front outlet port, as shown in Figure 11.

***Figure 9: Three-Way Relief Valve***




| No. | Description |
|---|---|
| 1 | Relief Valves |
| 2 | Three-Way Valve |

***Figure 10: Front Seated Position***

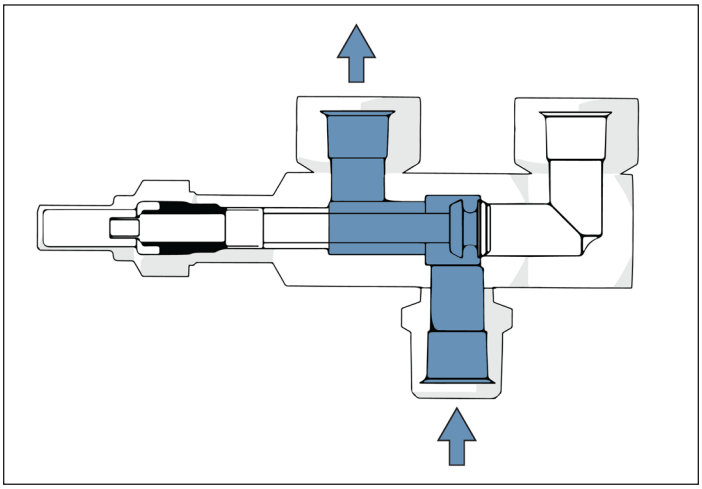
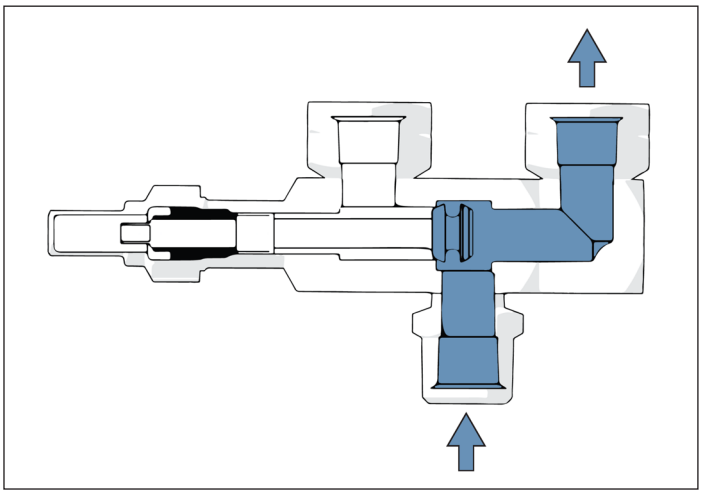


***Figure 11: Three Way Valve, Back Seated Position***

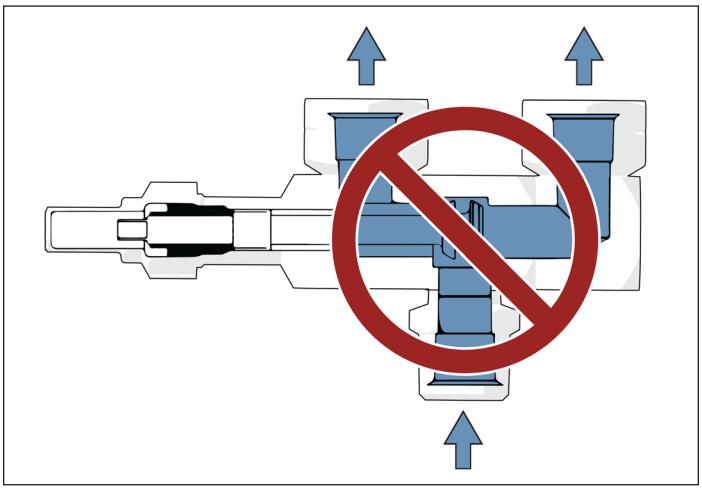


When the valve stem is not pushed forward or pulled back completely, the valve is in “Mid Position,” as shown in Figure 12.

**⚠ WARNING**

Do not operate the system with the three-way valve stem in the Mid Position.

***Figure 12: Three-Way Valve, Mid Position***



# Unit Dimensions

**NOTICE**

Drawings, dimensional values, and other information may change depending on options or configurations selected. Refer to the as-built submittal drawings provided by a Daikin Applied sales representative for configuration-specific details.

***Figure 13: Representative WME Dimensional Drawing***

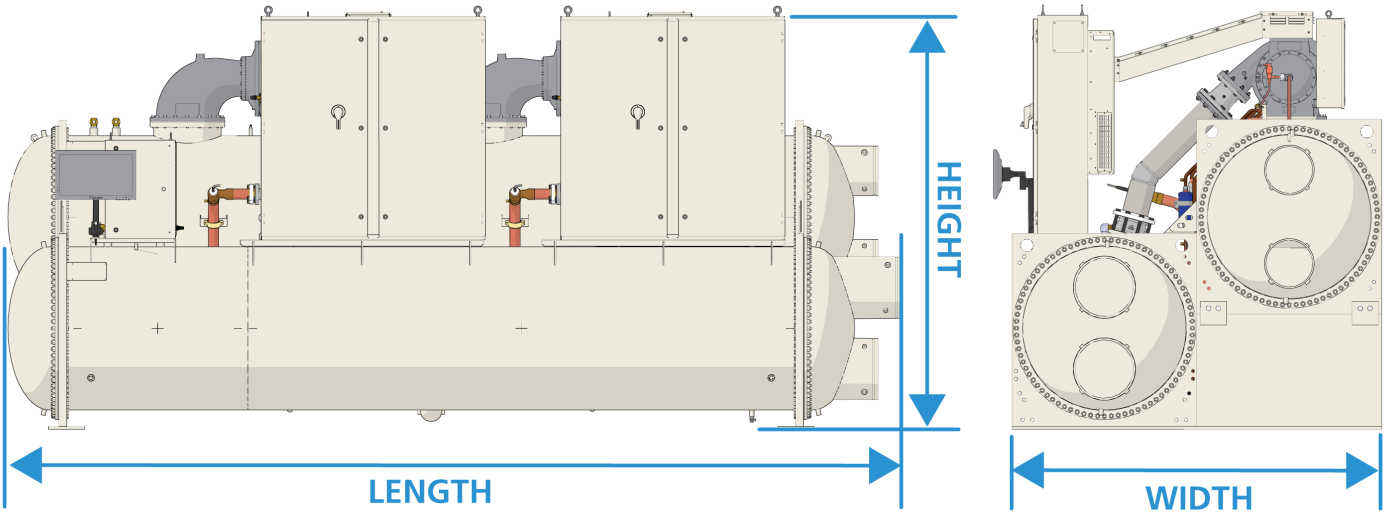



***Table 5: WME Overall Dimensions***

| Model[1] | Heat Exchanger | Dished Waterbox Heads Length[2] in. (mm) | Marine Waterbox Heads Length[2] in. (mm) | Width in. (mm) | Height[3] in. (mm) |
|---|---|---|---|---|---|
| WME092*S | E3012 / C2612 | 170.58 (4332) | 188.46 (4787) | 69.10 (1755) | 97.69 (2481) |
| WME092*S | E3012 / C3012 | 173.95 (4418) | 188.08 (4777) | 74.53 (1893) | 102.65 (2607) |
| WME092*S | E3612 / C3012 | 175.89 (4467) | 194.39 (4937) | 82.88 (2105) | |
| WME106*S | E3612 / C3012 | | | 82.97 (2107) | |
| WME106*S | E3612 / C3612 | 174.64 (4435) | 194.64 (4943) | 85.13 (2162) | 108.74 (2762) |
| WME092*D | E4216 / C3616 | 226.06 (5742) | 251.21 (6380) | 95.87 (2435) | 111.24 (2825) |
| WME092*D | E4216 / C4216 | | | 98.03 (2490) | 114.82 (2916) |
| WME106*D | E4216 / C4216 | | | | |
| WME106*D | E4816 / C4216 | 231.44 (5878) | 256.94 (6526) | 104.3 (2649) | 117.41 (2982) |
| WME106*Q | E5420 / C4820 | 289.81 (7361) | 328.31 (8339) | 113 (2870) | 114.82 (2916) |

[1] Unit configuration may be different than illustrated. Refer to certified drawings for specific configuration/dimensions.
[2] Unit length represents 2 pass, 150 psi water box configuration with grooved connections.
[3] Unit height represents largest configuration possible but does not include height of removable eye bolt.

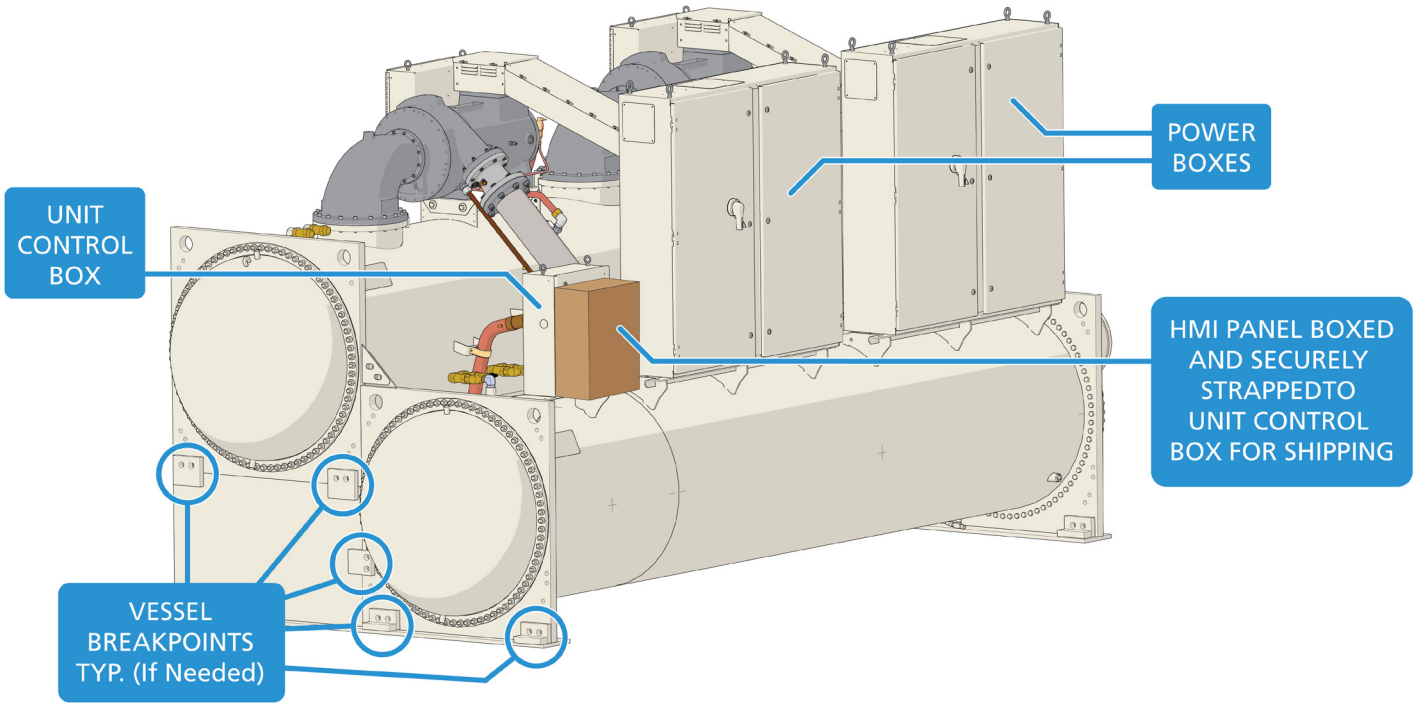
# Retrofit Knockdown

Magnitude WME chillers are relatively easy to disassemble due to the small compressor size, simplified refrigerant piping, and the absence of a lubrication system with its attendant components and piping. Various knockdown arrangements are available as options and are ideal for retrofit applications with tight installation clearances.

## Bolt-Together Construction - Type A

Chillers are built and shipped completely assembled with bolt-together construction on major components for field disassembly and reassembly on the job site.

***Figure 14: Bolt-Together Construction Option - Representative Schematic***




**Scope**:

- Site disassembly and reassembly must be supervised or completed by Daikin Applied service personnel.
- Unit is fully tested at the factory prior to shipment.
- The chiller is shipped completely assembled with the full refrigerant charge, which must be recovered before breaking any refrigerant connection.
- The refrigerant charge must be removed from the unit if the vessels are to be separated. Exert the proper precautions before attempting any disassembly, assume the condenser isolation valves may have leaked and that any component of the chiller may be pressurized with refrigerant.
- Suction and discharge lines have bolt-on flanges.
- Motor cooling line is brazed at mechanical connections.
- Blockoff plates are required to cover any refrigerant connection left open for extended periods of time. Contact Daikin Applied service to obtain these parts.
- Check that no power is being applied to the unit. Before disconnecting any wire, it is prudent to label its function and connection point to facilitate reconnection.
- Unit ships with vessel and/or head insulation, if ordered.

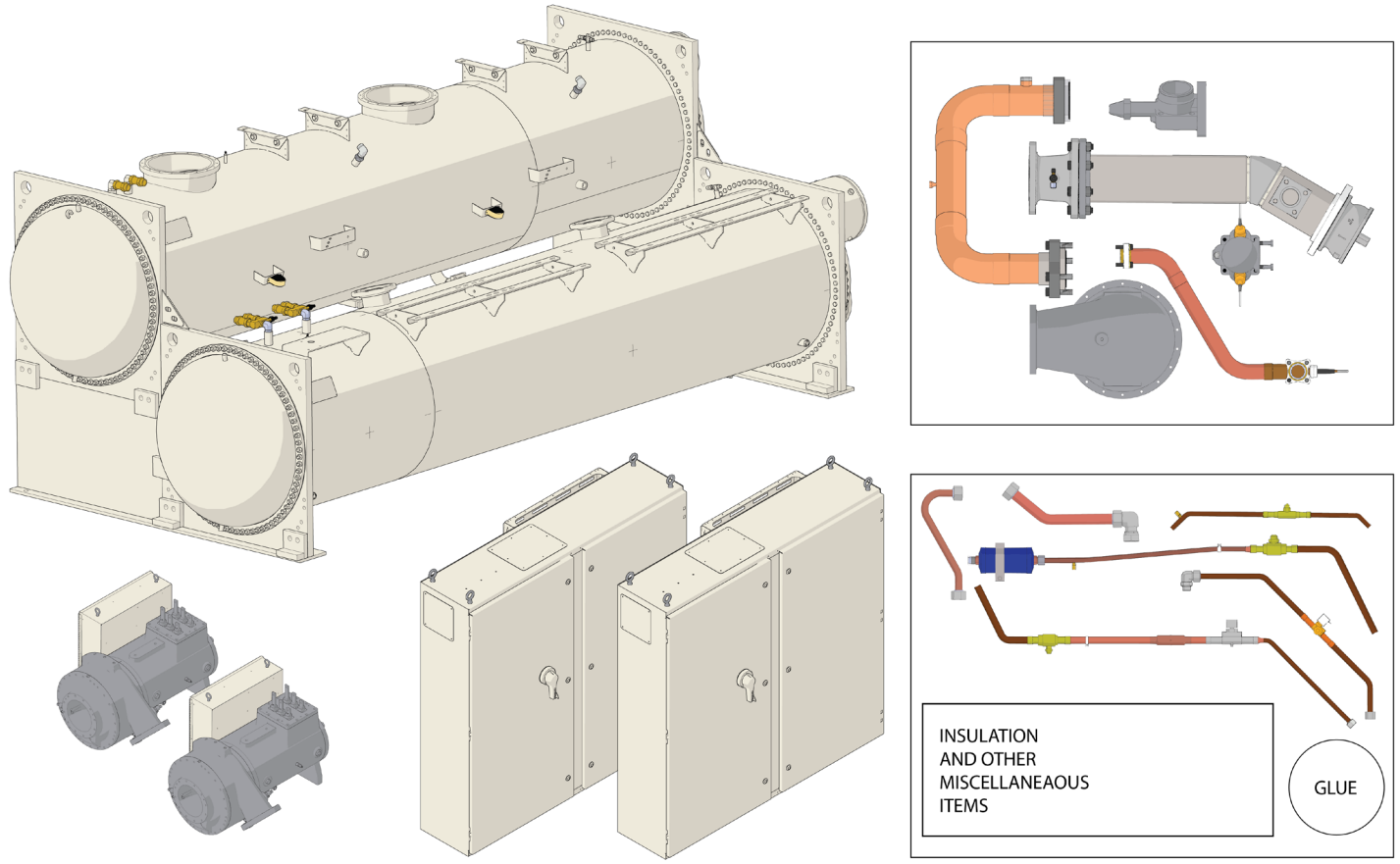
**⚠ CAUTION**

Standard torque specs must be followed when re-installing bolts. Contact Daikin Applied service for this information.

## Partial Disassembly Construction - Type B

Compressor(s), power box(es), and control box are removed at the factory and shipped on separate skids; combined vessel stack is shipped together as a sub-assembly.

***Figure 15: Partial Disassembly Construction Option - Representative Schematic***




**Scope**:

- Site reassembly must be supervised or completed by Daikin Applied service personnel. Cost for unit reassembly and supervision by Daikin Applied service is not included in the purchase price of the equipment. Contact Daikin Applied service for pricing.
- Unit is fully tested at the factory prior to disassembly and shipment.
- All associated piping and wiring remain attached, if possible. Suction and discharge lines have bolt-on flanges and, if possible, remain attached. If the stack size or weight dictates further disassembly, the vessels can be separated by disconnecting any interconnecting wiring and tubing and then unbolting them.
- Refrigerant will not be shipped with the chiller and must be procured by others. Compressor(s) and vessels receive an inert gas holding charge that must be released prior to attempting to open any connection.
- All free piping ends are capped. Blockoffs will cover all compressor and vessel openings.
- Unit ships with vessel and/or head insulation, if ordered.
- Unit ships with replacement refrigerant gaskets and O-rings, stick-on wire ties, and touch-up paint.

**⚠ CAUTION**

Standard torque specs must be followed when re-installing bolts. Contact Daikin Applied service for this information.

**⚠ WARNING**

Remove compressor, piping or vessel holding charge through the Schrader valve in the blockoff plates before attempting to loosen any fittings on them. Failure to do so can cause severe bodily injury.

# Unit Knockdown Dimensions

**NOTICE**

Drawings, dimensional values, and other information may change depending on options or configurations selected. Refer to the as-built submittal drawings provided by a Daikin Applied sales representative for configuration-specific details.

***Figure 16: Unit Dimensional Diagram for Typical WME Knockdown - Single Compressor Models***

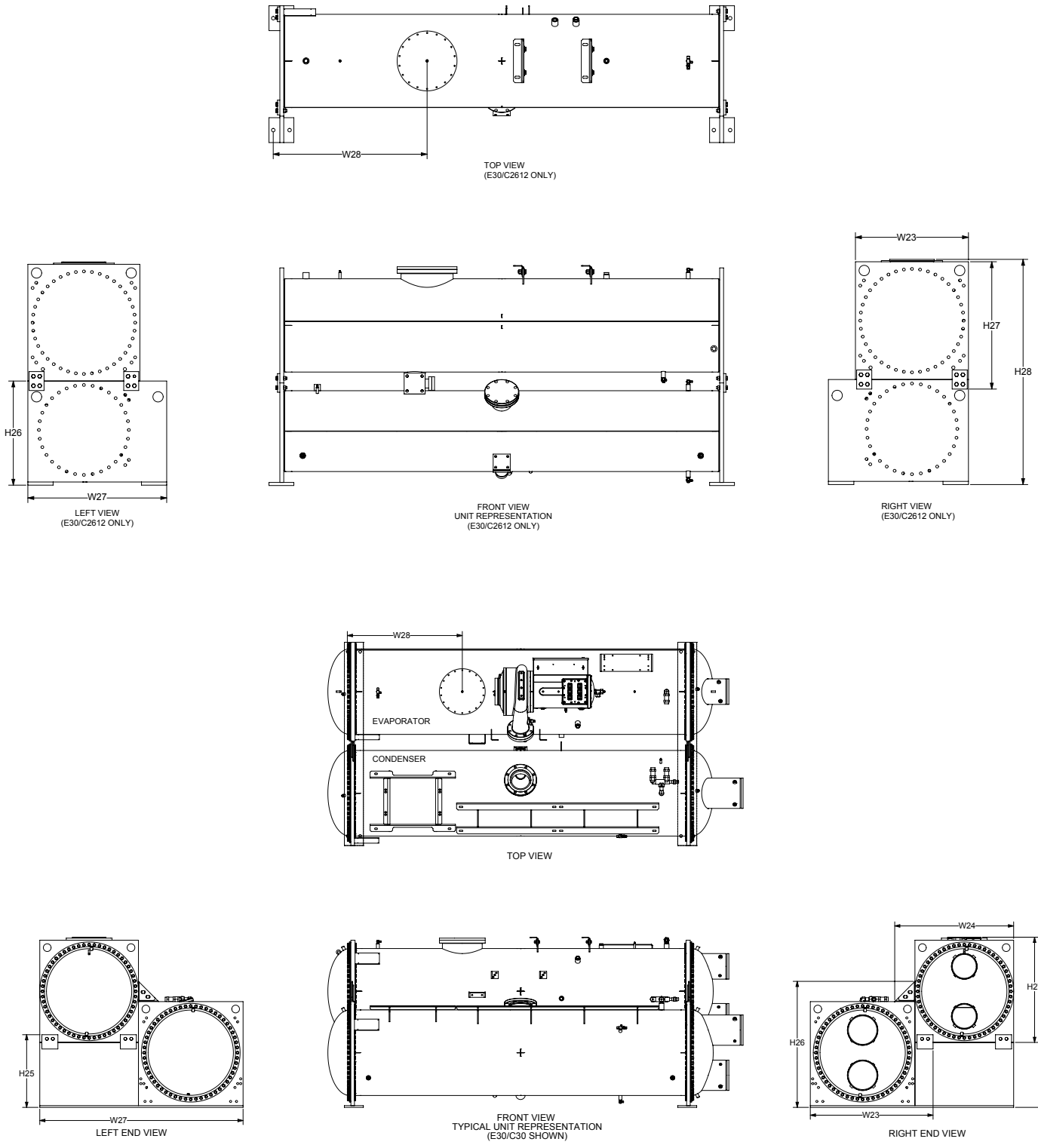
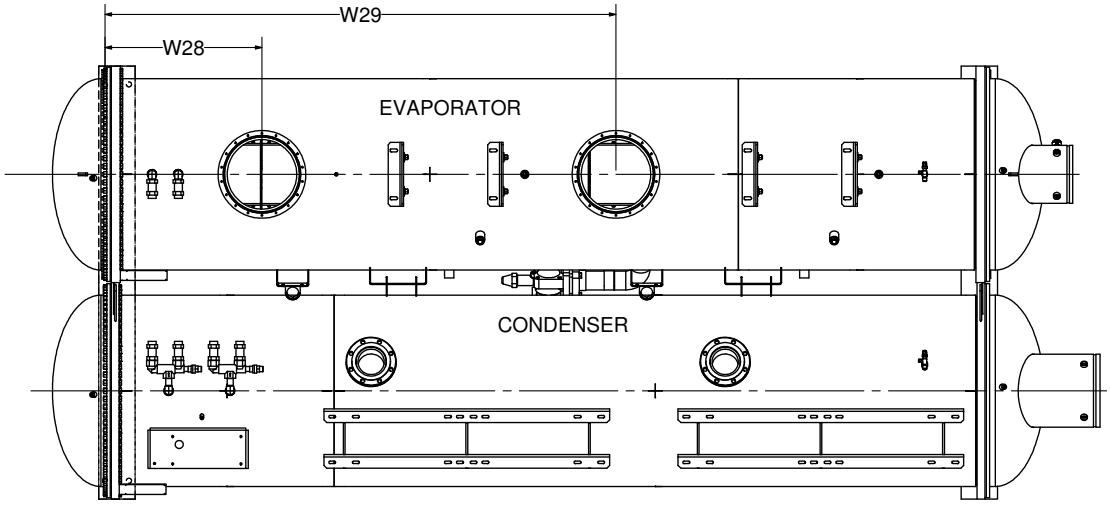
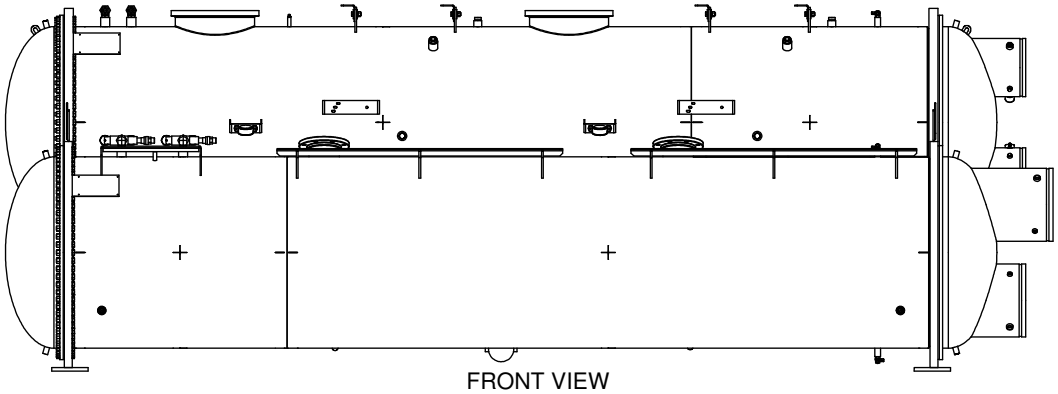


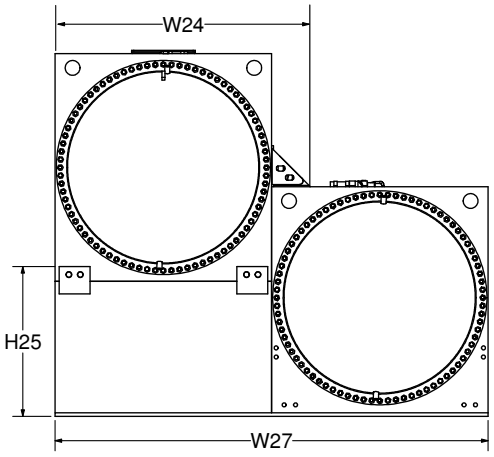
***Figure 17: Unit Dimensional Diagram for Typical WME Knockdown - Dual Compressor Models***



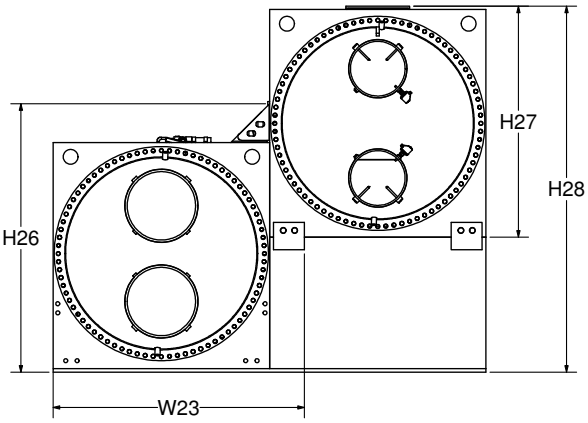

TOP VIEW



FRONT VIEW
TYPICAL UNIT REPRESENTATION



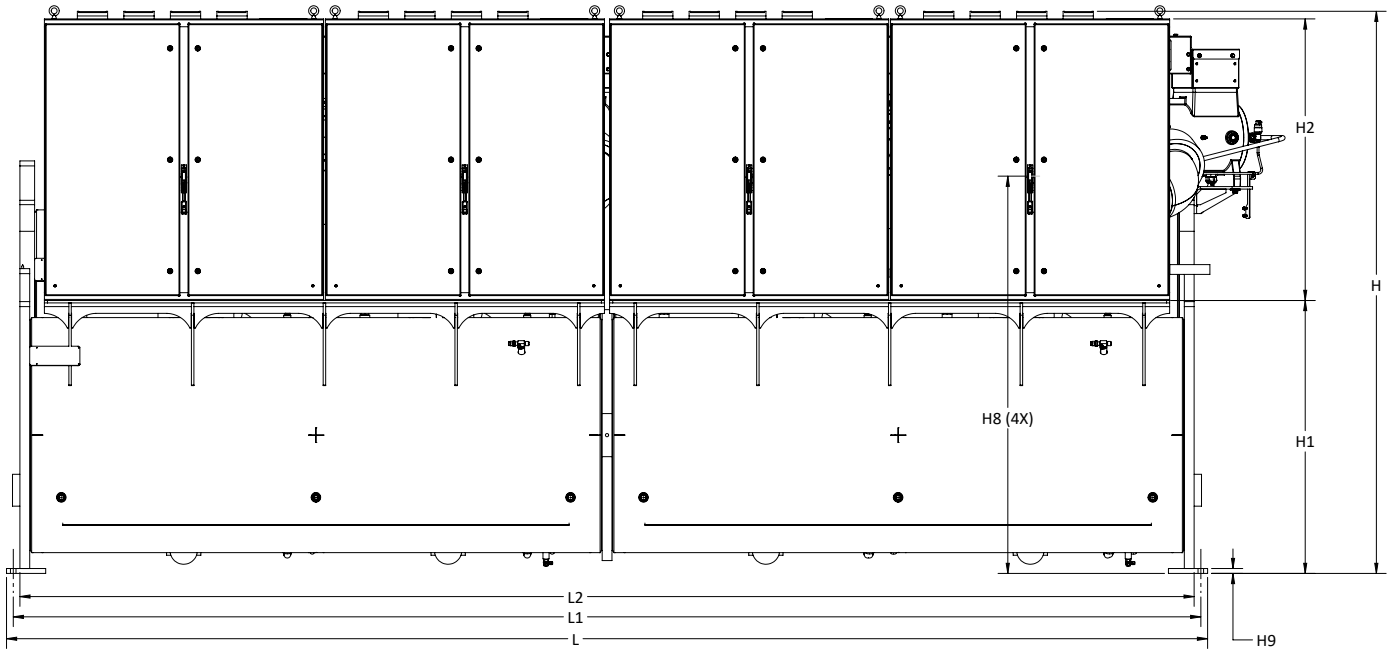

LEFT END VIEW



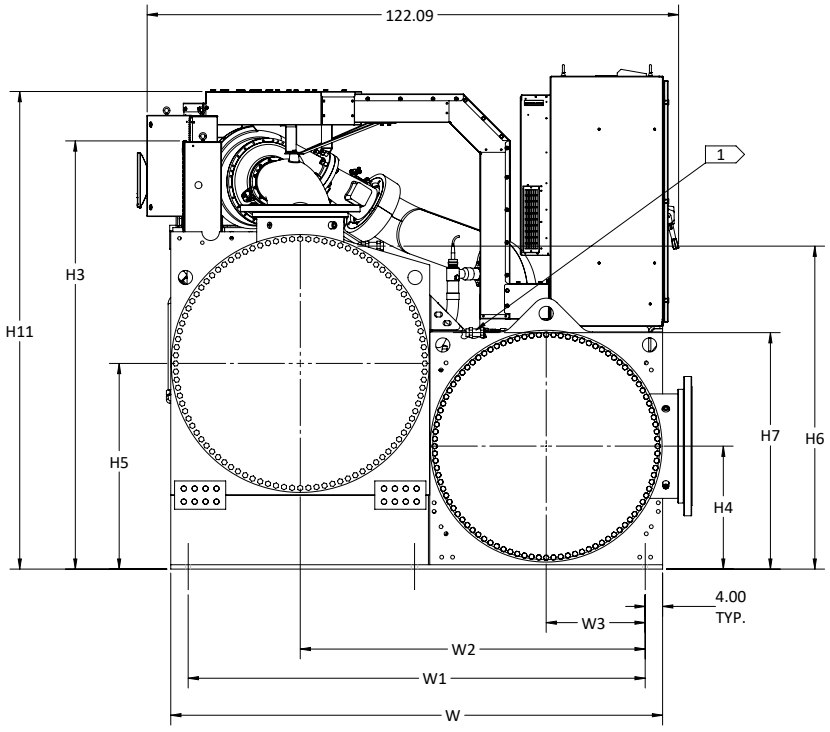

RIGHT END VIEW

**NOTE:** See page 14 for overall unit length, width, and height dimensions for WME models.

***Figure 18: Unit Dimensional Diagram for Typical WME Knockdown - Quad Compressor Models***




FRONT VIEW




SIDE VIEW

*Table 6: WME Knockdown Dimensions (Single and Dual Compressor Models)*

| Label | Dimensions - inches (mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | WME092*S | | | WME106*S | | WME092*D | | WME106*D | |
| | E3012/ C2612 | E3012/ C3012 | E3612/ C3012 | E3612/ C3012 | E3612/ C3612 | E4216/ C3616 | E4216/ C4216 | E4216/ C4216 | E4816/ C4216 |
| W23 | 35.5 (901) | 40.6 (1032) | 43.1 (1095) | 48.1 (1223) | 52.6 (1336) | 51.0 (1295) | 55.1 (1400) | 55.1 (1400) | 55.1 (1400) |
| W24 | --- | 44.0 (1117) | 50.0 (1270) | 50.0 (1270) | 50.0 (1270) | 56.0 (1422) | 56.0 (1422) | 56.0 (1422) | 62.0 (1575) |
| W27 | 44.0 (1117) | 71.0 (1803) | 77.0 (1956) | 82.0 (2084) | 85.5 (2171) | 91.5 (2324) | 95.0 (2413) | 95.0 (2413) | 101.0 (2565) |
| W28 | 50.8 (1291) | 48.7 (1237) | 48.7 (1238) | 48.2 (1224) | 48.2 (1224) | 35.8 (909) | 35.8 (909) | 35.2 (896) | 35.2 (896) |
| W29 | --- | --- | --- | --- | --- | 113.5 (2883) | 113.5 (2883) | 112. (2869) | 112.9 (2869) |
| H25 | --- | 19.9 (506) | 18.9 (480) | 21.1 (536) | 30.5 (776) | 24.1 (613) | 32.8 (834) | 32.8 (834) | 33.0 (840) |
| H26 | 33.0 (838) | 47.0 (1194) | 47.0 (1194) | 47.0 (1194) | 53.0 (1346) | 51.4 (1306) | 58.8 (1495) | 58.8 (1495) | 59.1 (1501) |
| H27 | 40.0 (1016) | 37.7 (958) | 44.2 (1123) | 44.2 (1123) | 44.2 (1123) | 50.0 (1270) | 50.0 (1270) | 50.0 (1270) | 54.5 (1384) |
| H28 | 70.2 (1784) | 54.7 (1389) | 58.6 (1489) | 62.1 (1577) | 71.5 (1817) | 71.1 (1807) | 79.5 (2021) | 79.5 (2021) | 84.3 (2141) |

*Table 7: Knockdown Dimensions (Quad Compressor Models)*

| Label | Description | Dimensions inches (mm) |
|---|---|---|
| | | WME-106Q |
| | | E5420/C4820 |
| L | Overall Length (outside of mounting foot to outside of opposite mounting foot) | 245.29 |
| L1 | Length (center of outside foot mounting hole to center of opposite outside foot mounting hole) | 242.53 |
| L2 | Length (outside of tube sheet to outside of opposite tube sheet) | 239.81 |
| L3 | Length (center of outside foot mounting hole to left side edge of VFD cabinet) | 6.36 |
| H | Overall height (highest point) | 114.82 |
| H1 | Height (bottom of foot to bottom of VFD Cabinet) | 55.75 |
| H2 | Height of VFD cabinet less eye bolt | 57.50 |
| H3 | Height (bottom of foot to top of control box) | 98.37 |
| H4 | Height (bottom of foot to center of condenser head) | 28.25 |
| H5 | Height (bottom of foot to center of evaporator head) | 47.25 |
| H6 | Height (bottom of foot to center of evaporator relief valve) | 73.59 |
| H7 | Height (bottom of foot to center of condenser relief valve) | 52.83 |
| H11 | Height (bottom of foot to top of compressor) | 109.72 |
| W | Width (outside edge of foot to outside edge of foot) | 113 |
| W1 | Width (center of outside foot mounting hole to center of outside foot mounting hole) | 105 |
| W2 | Width (center of outside foot mounting hole to center of evaporator head) | 79.25 |
| W3 | Width (center of outside foot mounting hole to center of condenser head) | 22.75 |

**NOTE:** Component weights based on largest unit with standard tube configuration.

*Table 8: Label Descriptions for Unit Dimensional Diagrams*

| Label | Description |
|---|---|
| W23 | Width (Condenser Tubesheet with Mounting Brackets) |
| W24 | Width (Evaporator Tubesheet with Mounting Brackets) |
| W27 | Width (Mounting Foot with Mounting Brackets) |
| W28 | Width (Center of Outside Foot Mounting Hole to Center of Suction #1) |
| W29 | Width (Center of Outside Foot Mounting Hole to Center of Suction #2) |
| H25 | Height (Mounting Foot with Mounting Brackets) |
| H26 | Height (Condenser Tubesheet with Mounting Brackets) |
| H27 | Height (Evaporator Tubesheet with Mounting Brackets) |
| H28 | Height (Unit Height from Bottom of Foot to Top of Suction) |

*Table 9: Component Weights (Single and Dual Models)*

| Component | Dry Weight | |
|---|---|---|
| | lbs. | kg |
| E3012 Evaporator | 4669 | 2118 |
| E3612 Evaporator | 6769 | 3070 |
| E4216 Evaporator | 11591 | 5258 |
| E4816 Evaporator | 14888 | 5790 |
| E5420 Evaporator | 28,397 | 12880 |
| C2612 Condenser | 5010 | 2272 |
| C3012 Condenser | 7210 | 3270 |
| C3612 Condenser | 9801 | 4446 |
| C3616 Condenser | 13118 | 5950 |
| C4216 Condenser | 17845 | 8094 |
| C4820 Condenser | 29,635 | 13442 |
| Power Panel | 3100 | 1406 |

**NOTE:** Component weights based on largest unit with standard tube configuration.

## Compressor Dimensions

The compressor dimensions vary by model. All dimensions and weights per compressor are listed in Table 10.

***Figure 19: Representation - WME Compressor Dimensions***

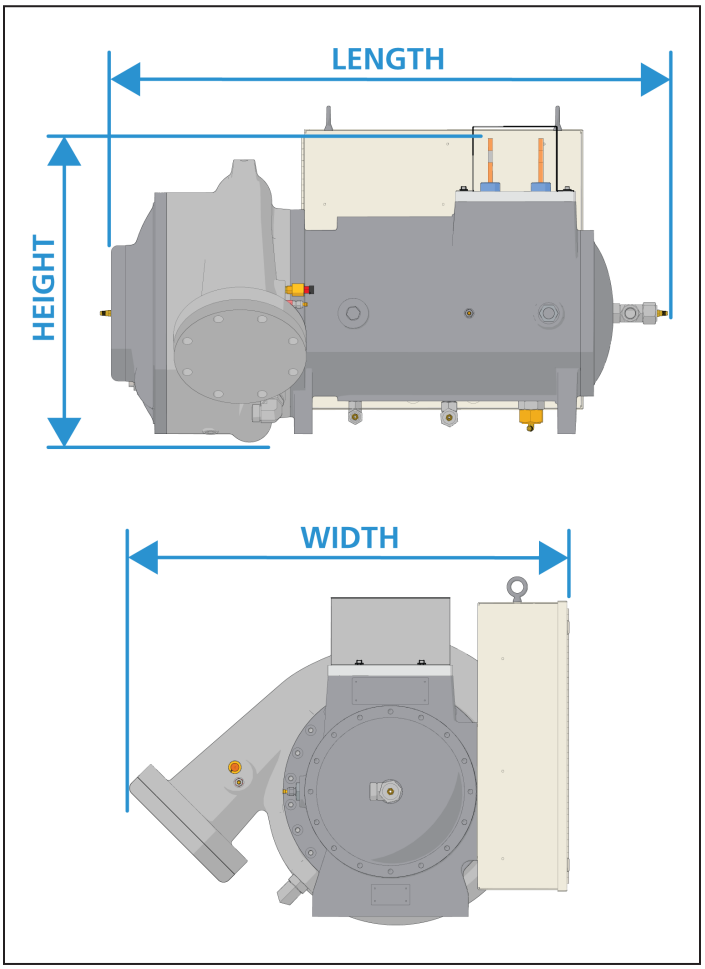



***Table 10: Dimensions for WME Compressors***

| Model | Length in. (mm) | Width in. (mm) | Height in. (mm) | Weight lb. (kg) |
|---|---|---|---|---|
| WME092 | 44.85 (1139) | 32.91 (835) | 24.50 (622) | 893 (405) |
| WME106 | 44.95 (1141) | 35.21 (894) | 25.19 (639) | 1050 (476) |

***Table 11: Compressor Usage***

| Unit Model Numbers | Compressor Models Used |
|---|---|
| WME092CS | 1 – 092X |
| WME092DS | 1 – 092Y |
| WME106CS | 1 – 106X |
| WME106DS | 1 – 106Y |
| WME092CD | 2 – 092X |
| WME092DD | 2 – 092Y |
| WME106CD | 2 – 106X |
| WME106DD | 2 – 106Y |
| WME106CQ | 4 – 106X |

## Compressor Removal and Re-Attachment Instructions (WME-C Single and DUAL Units)

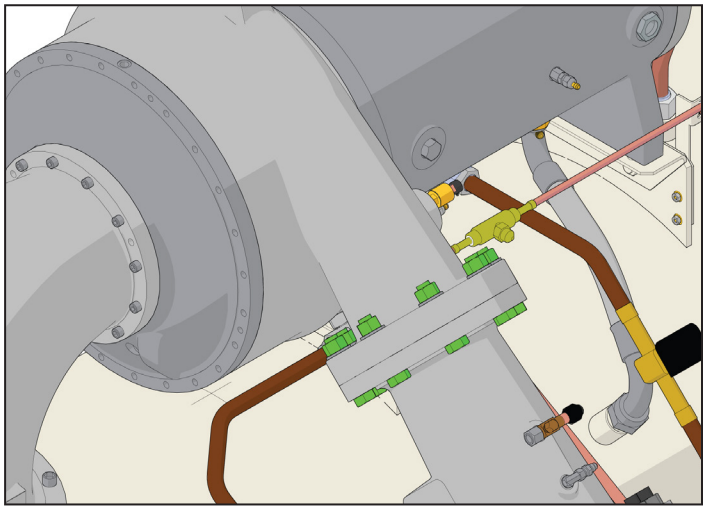
**⚠ CAUTION**

Prior to removing the compressor, follow any and all local safety guidelines and procedures for removing refrigerants. Always recover the refrigerant charge completely from the chiller to an approved refrigerant vessel.

### *Compressor Removal Preparation*

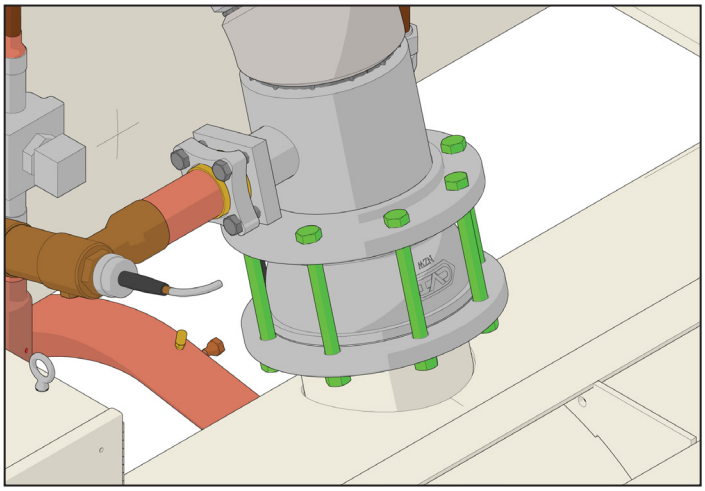
1. Close shut-off (king valve at main liquid line of condenser).
2. Close all other related shut-off valves.
3. Ensure that the charge has been removed from the unit.
4. Loosen and remove bolts at hot gas bypass flange.
5. Loosen and remove bolts on the top side of the compressor discharge nozzle (Figure 20).

***Figure 20: Compressor Discharge Nozzle Bolts***



6. Loosen and remove bolts at flange on condenser and remove discharge piping.

***Figure 21: Condenser Flange Bolts***



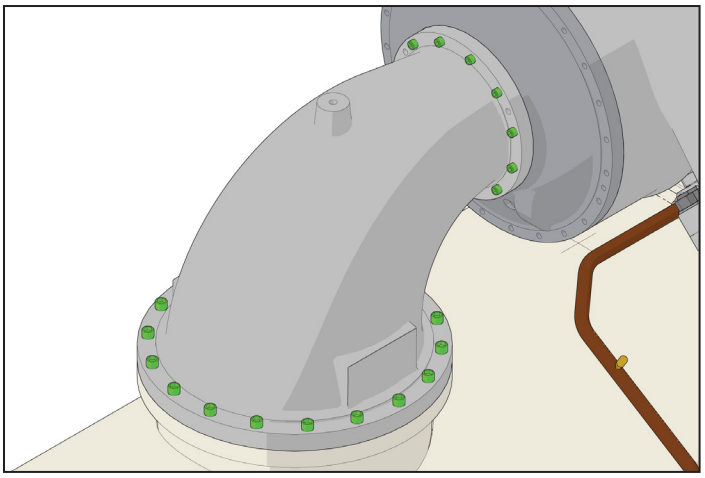
**⚠ WARNING**

Improper rigging, lifting, or moving of a unit can result in property damage, severe personal injury, or death. Follow rigging and moving instructions carefully.

## *Compressor Removal*

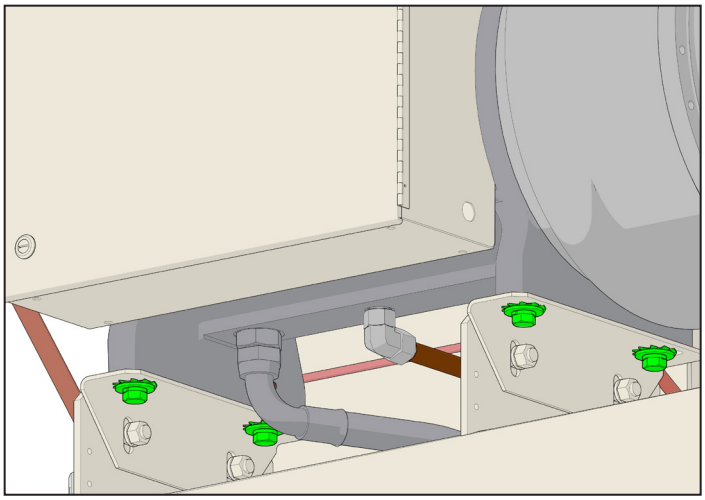
1. Loosen and remove bolts/screws on either side of the cast suction elbow.

***Figure 22: Suction Elbow Bolts/Screws***



2. Remove rotor cooling return line on the underside of the compressor motor housing along with both rotor cooling supply lines.
3. Remove the two DIN connectors from the solenoid coils along refrigerant piping.
4. Remove rotor stepping valve control wire. The wire ties will have to be cut away during this process.
5. Remove the following wires coming from the VFD:
   - 350V DC power supply (gray cable)
   - Power leads on the top of the motor housing
6. Remove the Ethernet cable coming from unit control box.
7. Remove the wireway box assembly from the compressor to the back of the starter.
8. Loosen the four bolts from the compressor's bottom mounting feet.

***Figure 23: Compressor Mounting Feet Bolts***

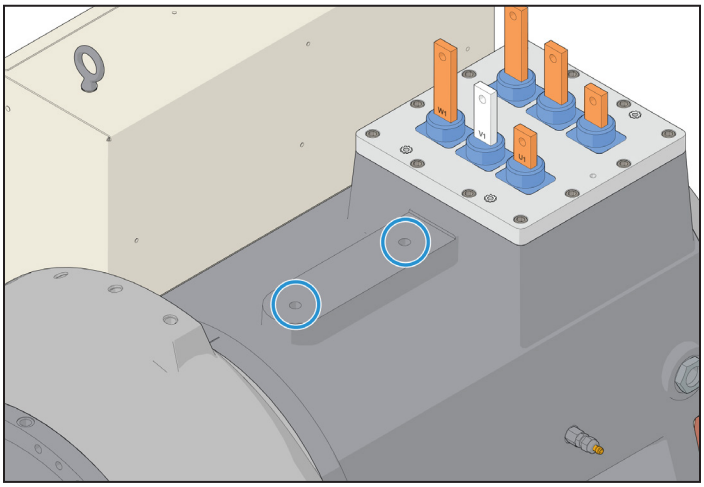


**NOTICE**

Do not loosen or remove bolts securing the compressor brackets as height is pre-set from the factory.

9. Use front tapped lifting hole on the compressor motor housing to rig compressor for removal as shown in Figure 24. Note weights and unit rigging instructions.

***Figure 24: Tapped Lifting Holes***



### *Compressor Re-Attachment*

1. Set the suction elbow back on top of the evaporator and install the bolts/screws loosely at the evaporator flange. Use new O-rings provided.
2. Set the discharge piping back on top of the condenser and install the bolts loosely at the condenser flange. Use the new gasket supplied with the unit.
3. Set compressor on mounting brackets and install the four mounting bolts loosely. Reconnect the discharge nozzle with new O-rings provided and also at the suction elbow.

**NOTICE**

For steps 4-6, all bolts need to be installed loosely first before final torque is applied.

4. Install 12 bolts/screws at suction elbow to compressor and torque to 25 ft-lbs; do not over-tighten.
5. Install 18 bolts at evaporator flange to the suction line and torque to 62 ft-lbs max; do not over-tighten.
6. Install and torque the eight bolts at the discharge nozzle to 205 ft-lbs, then torque the eight bolts at the condenser flange to the same.
7. Torque the four compressor mounting bolts to 150 ft-lbs max; do not over-tighten.
8. Re-install the four flange bolts at the hot gas bypass line.
9. Re-install the wireway between compressor and VFD.
10. Re-attach all associated power wiring and Ethernet cable.
11. Re-attach rotor cooling return line on the underside of the compressor motor housing along with both liquid injection lines.
12. Pull vacuum at evaporator and compressor to 300 microns and perform a standing hold to verify no moisture or leaks - do not allow rise of 300 microns within 1 hour.
13. After verifying that pumps are running and water flow has been established on both evaporator and condenser, add vapor refrigerant to bring the saturated temperature above freezing. Open all valves.
14. Perform refrigerant leak check to ensure all connections and fittings are securely fastened.

## Compressor Removal and Re-Attachment Instructions (WME-C QUAD)

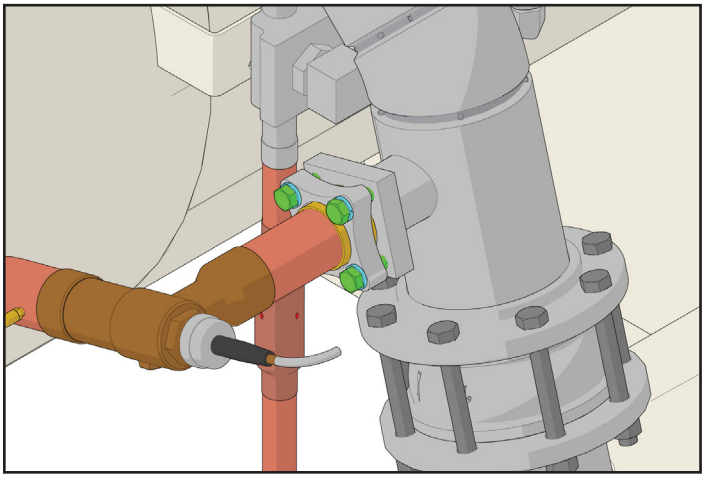
**⚠ CAUTION**

Prior to removing the compressor, follow any and all local safety guidelines and procedures for removing refrigerants. Always recover the refrigerant charge completely from the chiller to an approved refrigerant vessel.

### *Compressor Removal Preparation*

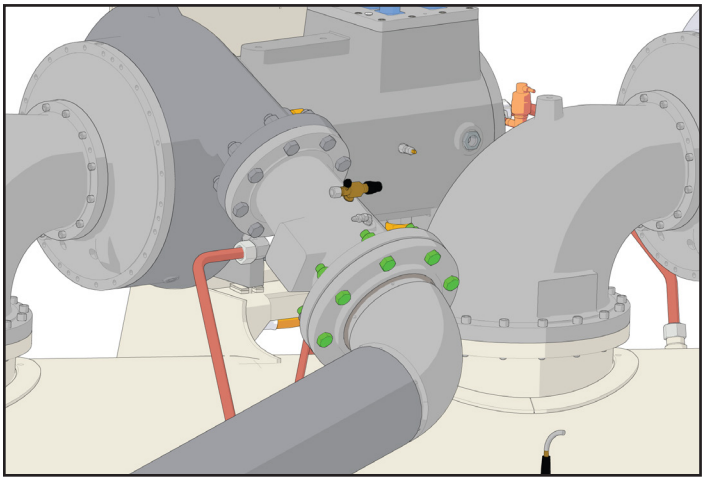
1. Ensure that the charge has been removed from the unit.
2. Close shut-off (king valve at main liquid line of condenser).
3. Close all other related shut-off valves.
4. Loosen and remove bolts at part load balacing valve.

***Figure 25: Part Load Balancing Valve Bolts***



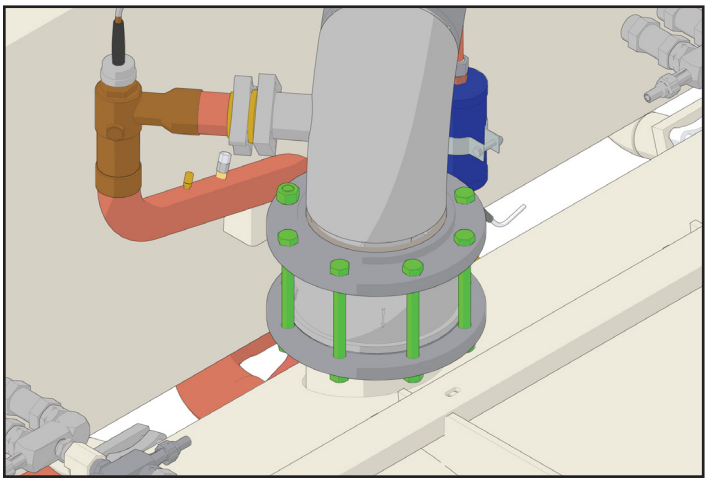
5. Loosen and remove bolts on the top side of the compressor discharge nozzle.

***Figure 26: Discharge Nozzle Bolts***



6. Loosen and removed bolts at flange on condenser and remove discharge piping.

***Figure 27: Condenser Flange Bolts***



7. Proceed to compressor removal instructions below.

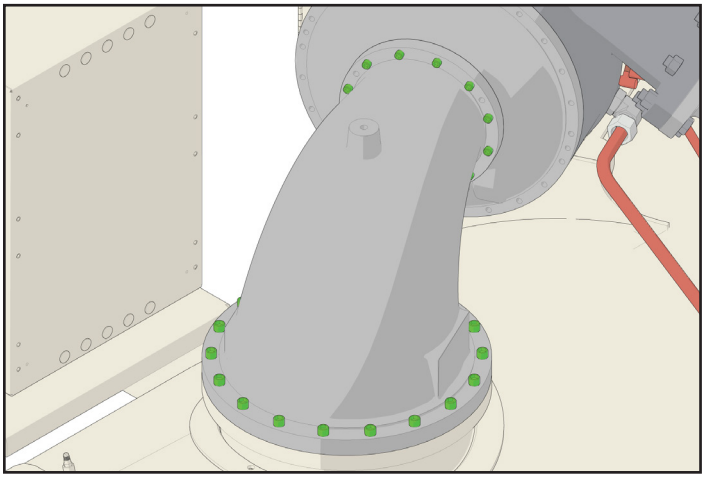
**⚠ WARNING**

Improper rigging, lifting, or moving of a unit can result in property damage, severe personal injury, or death. Follow rigging and moving instructions carefully.

## *Compressor Removal*

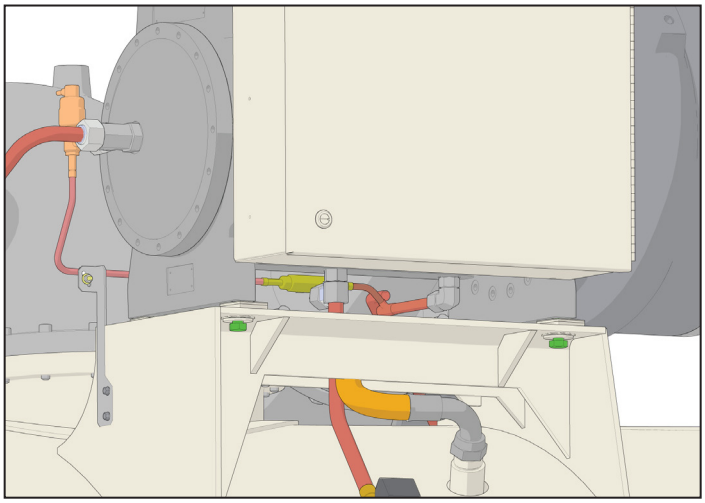
1. Loosen and remove screws on either side of the cast suction elbow. Remove rotor cooling return line on the underside of the compressor motor housing along with both rotor cooling supply lines.

***Figure 28: Suction Elbow Bolts***



2. Remove (2) din connectors from the solenoid coils.
3. Remove rotor stepping valve control wire. Note: wire ties will have to be cut away during this process.
4. The following wires coming from the vfd will need to be removed:
   - 300v dc power supply (yellow cable)
   - 25 Pin "d" shell connector
   - Power leads on the top of the motor housing remove the ethernet cable coming from unit control box.
5. The ethernet cable coming from the unit control box will need to be removed.
6. Remove the wireway box assembly from the compressor to the back of the starter.
7. Loosen the four bolts from the compressor's bottom mounting feet.

***Figure 29: Compressor Mounting Feet Bolts***



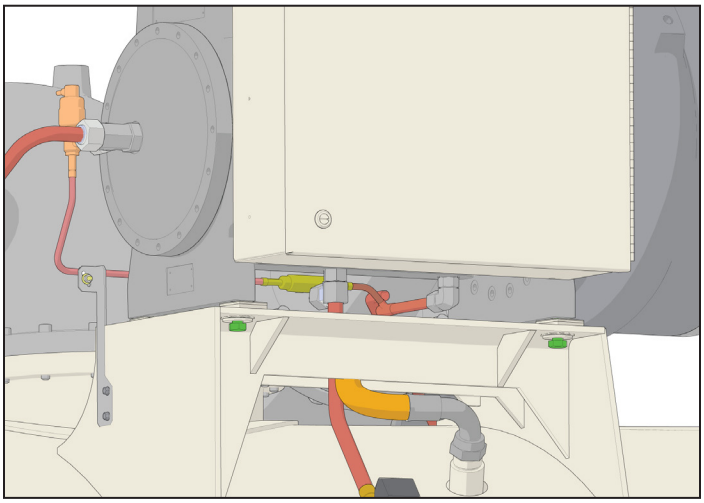
**NOTICE**

Do not loosen or remove bolts securing the compressor brackets as height is pre-set from the factory.

## *Compressor Re-Attachment*

1. Loosen the (4) bolts from the compressor's bottom mounting feet.

***Figure 30: Compressor Mounting Feet Bolts***

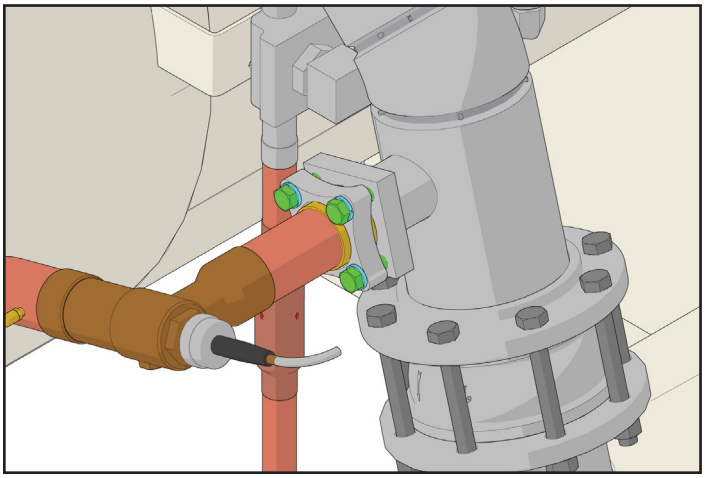


**NOTICE**

Do not loosen or remove bolts securing the compressor brackets as height is pre-set from the factory.

2. Set the discharge piping back on top of the condenser and install the bolts loosely at the condenser flange. Be sure to install the new gasket that was shipped with the unit.
3. Set compressor on mounting brackets and install the four mounting bolts loosely. During this step you will need to installl the new o-rings at discharge nozzle & the suction elbow.
4. Install the 12 screws at elbow to compressor and torque to 25 ft-lbs. Max; do not over tighten.
5. Torque the 18 screws at evap flange to 62 ft-lbs. Max; do not over tighten.
6. Install & torque the eight bolts at the discharge nozzle to 205 ft-lbs then torque the eight bolts at the condenser flange to the same.
7. Torque the four compressor mounting bolts to 150 ft-lbs; do not over tighten.
8. Re-install the four flange bolts at the part load balancing valve line.

***Figure 31: Part Load Balacing Valve Bolts***



9. Re-install the wireway between the compressor and VFD.
10. Re-attach all associated power wiring & ethernet cable.
11. Open all valves.
12. Perform refrigerant leak check to ensure all connections and fittings are securely fastened.
13. Perform refrigerant leak check with trace gas and nitrogen to ensure all connections and fittings are securely fastened, then pull vacuum at 300 microns. (Not to allow rise of 300 microns within one hour).

# Electrical

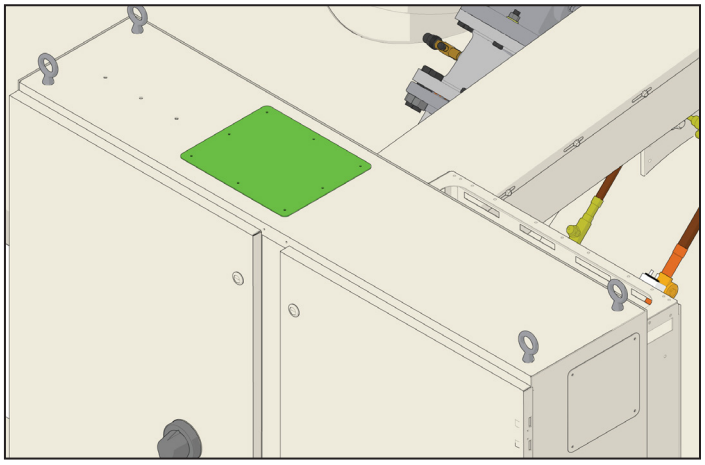
## Field Power Wiring

The standard power wiring connection to Magnitude chillers is multi-point for dual and quad compressor WME models. Power conduit entry will be at the top of the unit power panel; see Figure 32 for general reference as power entry cover plate location will vary by unit configuration. Copper wiring must be used for power wiring. Refer to the unit nameplate and the Daikin Tools selection report for the correct electrical ratings.

**⚠ DANGER**

Qualified and licensed electricians must perform wiring. An electrical shock hazard exists that can cause severe injury or death.

***Figure 32: Unit Power Connection Point***



Remove and cut a hole in the power entry cover plate for the conduit and then replace the cover plate. Factory-mounted and wired line reactors are standard. The field control wiring required varies depending on unit model. See the WME-C Field Wiring Schematic for wiring information. These wiring diagrams are also provided with the chiller.

***NOTICE***

Wiring, fuse, and wire size must be in accordance with the National Electrical Code® (NEC). The voltage to these units must be within ±10% of nameplate voltage (415V units must have voltage within -13% and +6% of nameplate voltage) and the voltage unbalance between phases must not exceed 2%. Since a 2% voltage unbalance will cause a current unbalance of 6 to 10 times the voltage unbalance per the current version of the NEMA MG-1 Standard, it is most important that the unbalance between phases be kept at a minimum.

**⚠ CAUTION**

Do not use power factor correction capacitors with WME chillers. Doing so can cause harmful electrical resonance in the system. Correction capacitors are not necessary since VFDs inherently maintain high power factors.

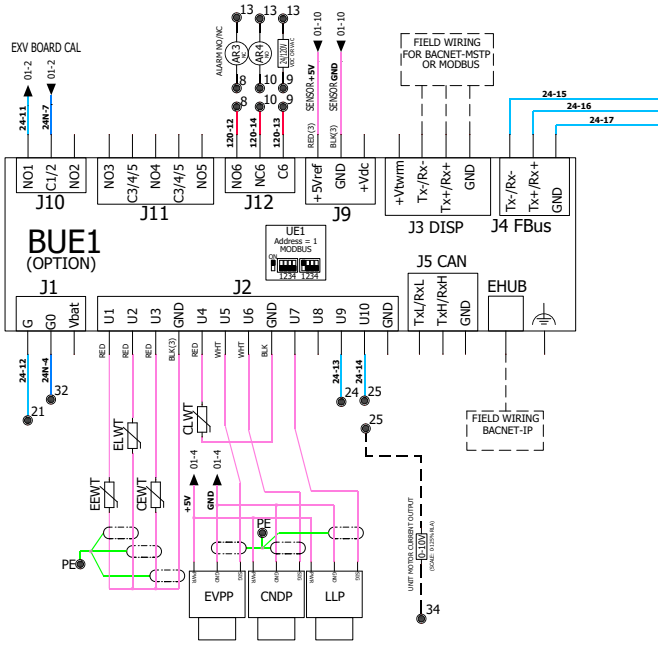
## Chiller Control Power

In all cases of power operation except when with RapidRestore®, the chiller control power must remain as factory-wired from a unit-mounted power supply.

## BAS Connection

If BAS module is needed for BACnet® or Modbus, the UE1 module will be replaced with the BUE1 module shown in Figure 33 for wiring.

***Figure 33: BAS Module Wiring Schematic***




## RapidRestore and RideThrough

WME chillers have the capability for chillers to restart and reach full load operation quickly in the event of a power loss.

**RapidRestore® –** Quickly restores cooling capacity when power is restored after a power failure.

- **Compressor Re-Start –** Amount of time required for the chiller to re-start.
- **Fast Loading –** Amount of time required for the chiller to reach a certain load condition.

**RideThrough® –** The ability to maintain operation during a momentary power loss event. When RideThrough is enabled and a power loss occurs, the compressor motor maintains rotation and the VFD catches and re-synchronizes with the spinning rotor. This permits the chiller to return to its pre-power loss capacity within seconds of power being restored.

*Table 12: RapidRestore and RideThrough Times*

| Standard Compressor Re-Start | RapidRestore Compressor Re-Start | Fast Loading to 80% Load | RideThrough |
|---|---|---|---|
| 60 sec | 20 sec after power failure[1] | 75 sec[2] | 17 sec[3] |

[1] Requires customer supplied Uninterruptible Power Supply (UPS) to the WME control panel
[2] After compressor re-start time
[3] Max power loss duration to maintain operation - condition dependent

# Generator Sizing

Natural gas and diesel generators are sensitive to the peak current loads of the chiller. Although the normal VFD start sequence does not require these peak values of current, certain dynamic conditions such as changes in water flow and temperature or momentary power interruptions can cause high peak electrical currents. Use the electrical data either on the VFD data plate or supplied with the chiller performance rating sheet – obtained from the Daikin Applied sales office – for generator sizing purposes. The referenced data will show the RLA and LRA, which is for each compressor. It is important to size the generator to handle the LRA value.

**⚠ WARNING**

Generator must be sized by an electrical engineer familiar with generator applications.

## Transfer Back to Grid Power

Due to the special VFD incorporated in all WME chillers and the system's inherent ride-through capabilities, transfer from grid power to stand-by generator power and back to grid power can be done at any time. The duration of power interruption during the transfer process will determine how the chiller will respond. While the compressor rotor is still spinning at adequate speed, power is generated internally to keep the bearings and all control electronics operating. Power interruptions of various durations will cause different restart scenarios as described below.

1. **Short:** Interruptions of only a few seconds will allow a running compressor to return to operating speed almost immediately. (NOTE: If the operating pressure ratio is high at the time of interruption, there may be a short delay in return to operating speed.)
2. **Medium:** For interruptions that cause the compressor to coast down below about 3500 rpm (but still generating control power), the compressor will continue coasting to a stop, and then restart.
3. **Long:** Once the compressor coasts nearly to a stop, control power is lost and the controllers must reboot normally when either grid power or emergency generator power is reinstated. (NOTE: If the RapidRestore® option is installed, the time required to restart is reduced to only a few seconds).

# Power Panel Short Circuit Current Ratings

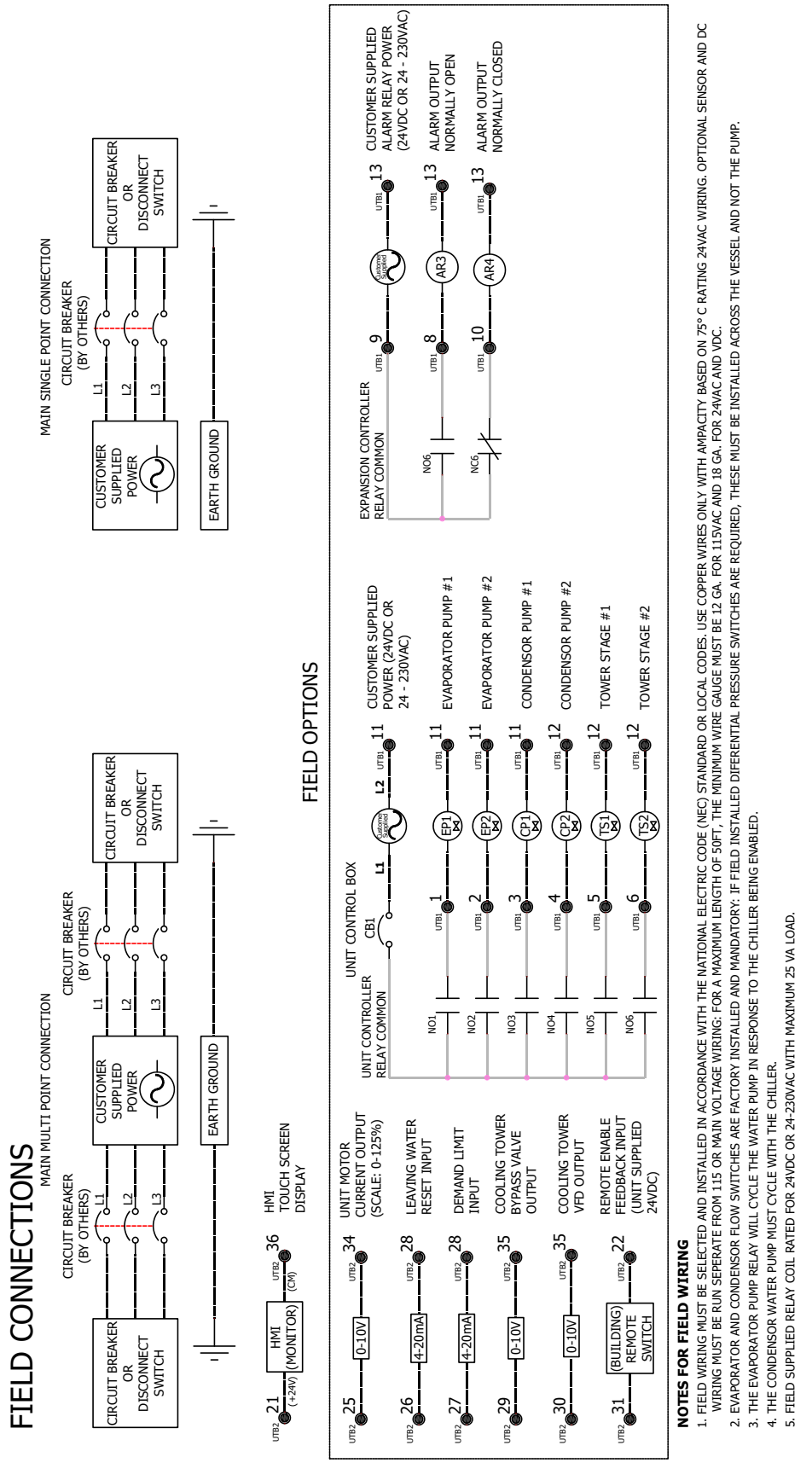
Available short circuit current ratings (SCCR) are shown in Table 13.

*Table 13: Short Circuit Current Ratings*

| Motor Code | Voltage | Standard Panel SCCR | Optional High SCCR | Optional Ultra High SCCR |
|---|---|---|---|---|
| MA, MB, AA, BB | 380V - 480V | 35 kA* / 50 kA | 65 kA | 100 kA |
| | 575V | 25 kA | 35 kA / 50 kA | N/A |
| 68 and 79 | 380V - 480V | N/A | 65 kA | 100 kA |
| | 575V | 25 kA | 35 kA / 50 kA | N/A |
| MC, MD, CC, DD | 380V - 480V | 50 kA | 65 kA | 100 kA |
| | 575V | 25 kA | 35 kA | 65 kA |

* 600 amp circuit breaker frame size has a 35 kA SCCR rating. 800 amp circuit breaker frame size has a 50 kA SCCR rating.

***Figure 34: WME Field Wiring Schematic***




**NOTES FOR FIELD WIRING**

1. FIELD WIRING MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC) STANDARD OR LOCAL CODES. USE COPPER WIRES ONLY WITH AMPACITY BASED ON 75° C RATING 24VAC WIRING. OPTIONAL SENSOR AND DC WIRING MUST BE RUN SEPERATE FROM 115 OR MAIN VOLTAGE WIRING: FOR A MAXIMUM LENGTH OF 50FT, THE MINIMUM WIRE GAUGE MUST BE 12 GA. FOR 115VAC AND 18 GA. FOR 24VAC AND VDC.
2. EVAPORATOR AND CONDENSOR FLOW SWITCHES ARE FACTORY INSTALLED AND MANDATORY: IF FIELD INSTALLED DIFERENTIAL PRESSURE SWITCHES ARE REQUIRED, THESE MUST BE INSTALLED ACROSS THE VESSEL AND NOT THE PUMP.
3. THE EVAPORATOR PUMP RELAY WILL CYCLE THE WATER PUMP IN RESPONSE TO THE CHILLER BEING ENABLED.
4. THE CONDENSOR WATER PUMP MUST CYCLE WITH THE CHILLER.
5. FIELD SUPPLIED RELAY COIL RATED FOR 24VDC OR 24-230VAC WITH MAXIMUM 25 VA LOAD.

***Figure 35: WME Unit Wiring Schematic***

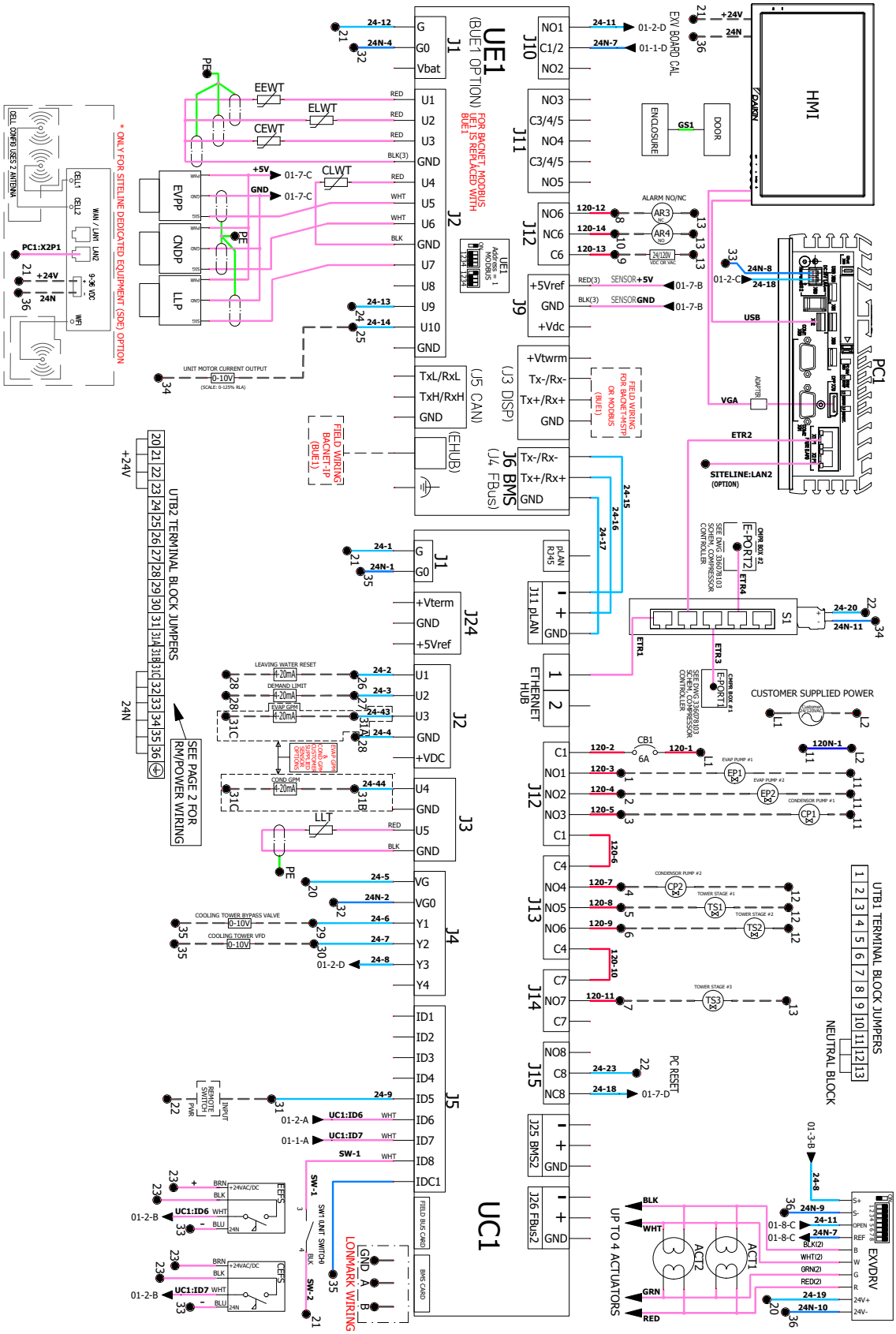


***Figure 36: WME Quad Unit Control Box Schematic***

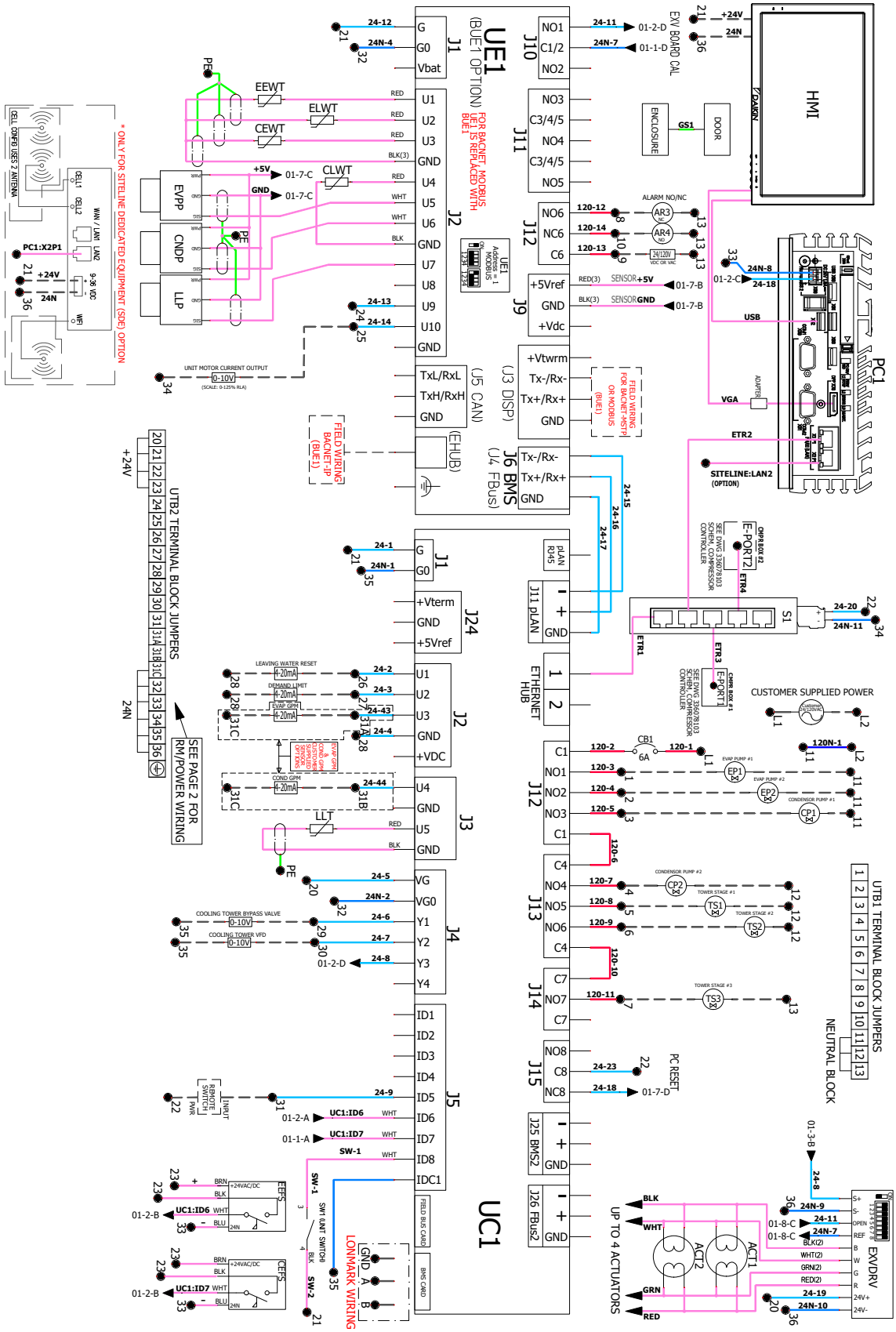
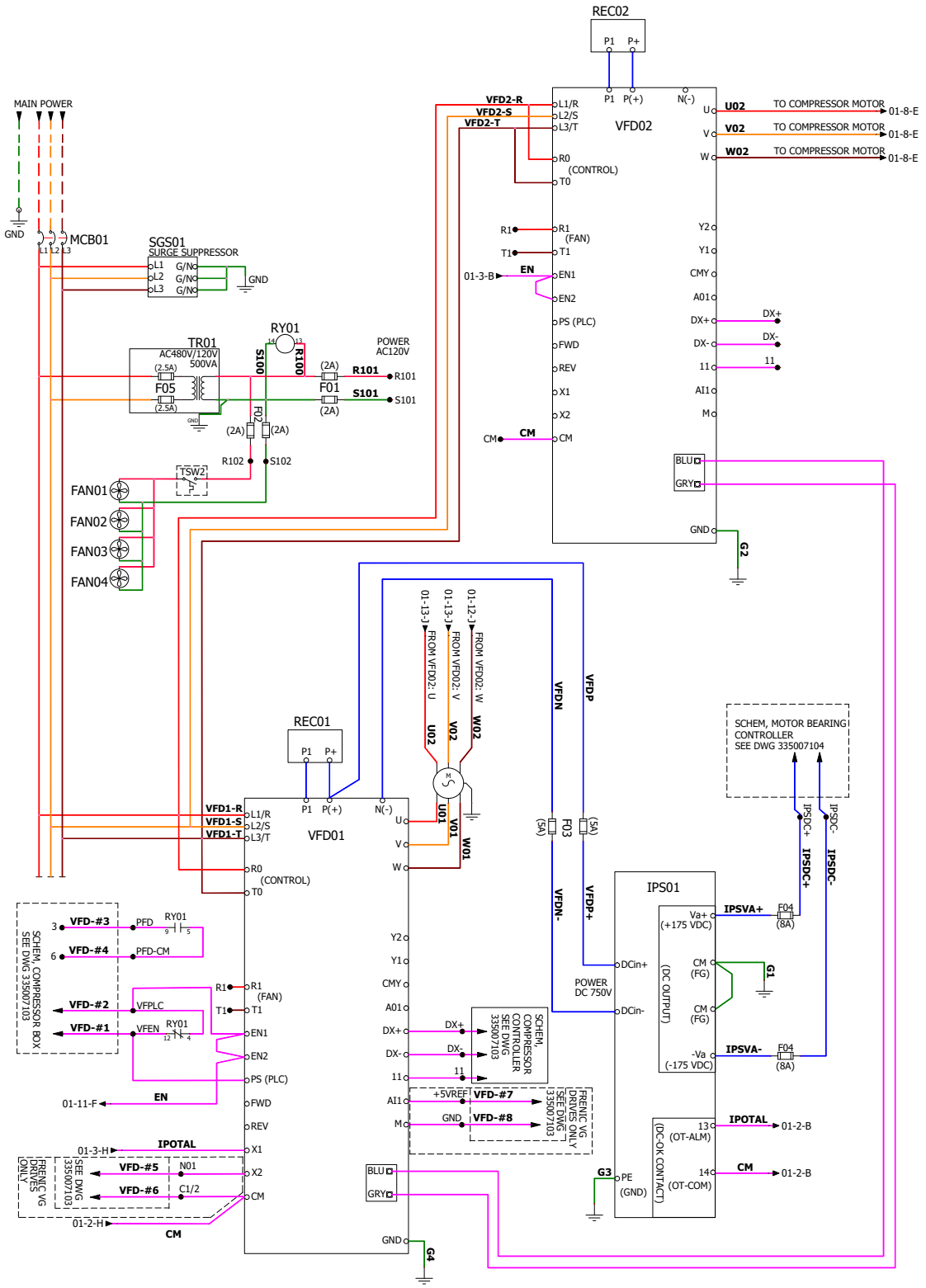


***Figure 37: WME-C QUAD Power Train Wiring Schematic***



# Operation

## Operator Responsibilities

It is important that the operator becomes familiar with the equipment and the system before attempting operation. During the initial startup of the chiller, the Daikin Applied technician will be available to answer any questions and instruct the proper operating procedures. It is recommended that the operator maintain an operating log for each individual chiller unit. In addition, a separate maintenance log should be kept of the periodic maintenance and servicing activities.

## Operator Schools

Training courses for Magnitude Centrifugal Maintenance and Operation are available online. The school curriculum includes instruction on basic refrigeration, MicroTech controllers and troubleshooting, enhancing chiller efficiency and reliability, system components, and other related subjects. For more information, visit us at www.DaikinApplied.com and click on Training or call the Training Department. Refer to the back cover of this manual for contact information.

For additional resources, Visit www.daikinapplied.com/training/our-training.

## Sequence of Unit Operation

A general chiller sequence of operation is outlined below for Magnitude Model WME chillers. A separate sequence is provided for single and dual compressor units. Certain conditions and chiller alarms may alter the sequence, but the chiller's objective is to achieve the target temperature of the leaving water.

Placing two chillers in series evaporator operation or series-counterflow configuration is possible and requires connecting an Ethernet cable between the unit control panels and reassigning a temperature sensor. Communication directly between the chillers allows better control of leaving water temperature while balancing the load. Contact a Daikin Applied representative for specific details.

## Single Compressor Units

The following sequence of operation applies to Magnitude® Model WME chillers with a single compressor.

1. **Chiller enabled**

   With the chiller enabled via its onboard interlocks and selected external control source, it will start the evaporator pump and check for flow and chiller load.

2. **Water flow and load proven**

   Once evaporator flow has been confirmed and the chiller load proven, the sequence for starting the compressor will begin.

3. **Compressor shaft levitation**

   The magnetic bearings are activated and correct shaft position is verified.

4. **Condenser pump start**

   The condenser pump is commanded to start and water flow is confirmed. Electronic Expansion Valve (EXV) must be open.

5. **Compressor start**

   The compressor is started and comes up to the calculated Start RPM and Inlet Guide Vane (IGV). From this point the vanes are opened and then speed is increased to match the cooling load.

6. **Compressor loading**

   As building load increases, the compressor will load up maximizing the IGV position and impeller speed. Maximum capacity at a given operating condition can be found when the compressor reaches its Maximum RPM, maximum allowed % RLA or power limitation.

7. **Compressor unloading**

   As load decreases, the compressor will unload to sustain the water temperature setpoint by reducing speed until the minimum speed limit has been reached. If further unloading is required, the IGV assemblies will close as required to satisfy the load. Further capacity reduction is accomplished by opening the Part Load Balance Valve (PLBV).

8. **Chiller shutdown**

   The compressor will adjust capacity to manage the chiller load and will shut off when the load reduces below the compressor's minimum capacity and the leaving water temperature goes below setpoint and reaches the stop delta temperature. Anytime the chiller is disabled, it will perform an orderly unload and shutdown of the compressor.

## Dual Compressor Units

The following sequence of operation applies to Magnitude® Model WME chillers with dual compressors.

1. **Chiller enabled**

   With the chiller enabled via its onboard interlocks and selected external control source, it will start the evaporator pump and check for flow and chiller load.

2. **Water flow and load proven**

   Once evaporator flow has been confirmed and the chiller load proven, the sequence for starting the Lead compressor will begin. Auto lead-lag logic will determine which compressor to start first based on number of starts.

3. **Compressor shaft levitation**

   The magnetic bearings are activated and correct shaft position is verified.

4. **Condenser pump start**

   The condenser pump is commanded to start and water flow is confirmed. EXV must be open.

5. **Lead compressor start**

   The compressor is started and comes up to the calculated Start RPM and IGV. From this point the vanes are opened and then speed is increased to match the cooling load. When the Lead compressor reaches an operating point where it would be more efficient to operate two compressors, it signals the Lag compressor to initiate a start sequence and may adjust its capacity to assist the Lag compressor start. In many cases the Lag will start before the Lead reaches 100% of RLA.

6. **Lag compressor start**

   Depending on the pressure ratio, the running compressor may unload before starting the lag compressor. Once started, the lag compressor will quickly ramp up to balance the chiller load between the two compressors. A Tandem start will occur on the lag request if the pressure ratio is high during a request for next compressor. During a tandem start the Lead compressor will perform a partial shut down and start again with the Lag compressor.

7. **Dual compressor loading**

   As building load increases, the compressors will load up maximizing the Inlet Guide Vane (IGV) position and impeller speed. Maximum capacity at a given operating condition can be found when the compressors reach their Maximum RPM, maximum allowed % RLA or power limitation. While maintaining the desired evaporator leaving water temperature, the two compressors will balance load.

8. **Dual compressor unloading**

   As load decreases, the compressors will unload to sustain the water temperature setpoint by reducing speed until the minimum speed limit has been reached. If further unloading is required, the IGV assemblies will close as required to satisfy the load. Further capacity reduction is accomplished by opening the PLBV.

9. **Staging down to one compressor running**

   With the chiller running two compressors on condition and the building load reducing to the point that one compressor can carry the load more efficiently than two can, one compressor will be shut down based on compressor run hours.

10. **Chiller shutdown**

    The remaining compressor will adjust capacity to manage the chiller load until the load increases to the point where another compressor is needed, or the load reduces below the minimum capacity of one compressor and the leaving water temperature goes below setpoint and reaches the stop delta temperature. Anytime the chiller is disabled, it will perform an orderly unload and shutdown both compressors.

# Quad Compressor Units

The following sequence of operation applies to Magnitude® Model WME chillers with four compressors.

1. **Chiller enabled**

   With the chiller enabled via its onboard interlocks and selected external control source, it will start the evaporator pump and check for flow and chiller load.

2. **Water flow and load proven**

   Once evaporator flow has been confirmed and the Once evaporator flow has been confirmed and the chiller load proven, circuit selection will determine which circuit should start first and the sequence for starting the compressor will begin. Auto circuit selection and lead-lag logic will determine which circuit and compressor to start first based on number of starts.

3. **Compressor shaft levitation**

   The magnetic bearings are activated and correct shaft position is verified.

4. **Condenser pump start**

   The condenser pump is commanded to start and water flow is confirmed. EXV must be open.

5. **First circuit start**

   The compressor is started and comes up to the calculated Start RPM and IGV. From this point the vanes are opened and then speed is increased to match the cooling load. When the Lead compressor reaches an operating point where it would be more efficient to operate two compressors, it signals the other circuit to start. If the other circuit is not available, the lag compressor of the running circuit will start.

6. **Other circuit start**

   The compressor is started and comes up to the calculated Start RPM and IGV. From this point the vanes are opened and then speed is increased to match the cooling load. When the compressor reaches an operating point where it would be more efficient to operate two compressors, Circuit selection determines which circuit to stage based on number of starts

7. **Lag compressor start**

   Depending on the pressure ratio, the running compressor may unload before starting the lag compressor. Once started, the lag compressor will quickly ramp up to balance the chiller load between the two compressors. A Tandem start will occur on the lag request if the pressure ratio is high during a request for next compressor. During a tandem start the Lead compressor will perform a partial shut down and start again with the Lag compressor. After staging if there is another circuit with an available compressor and there is available load, the chiller will request the other circuit to perform staging.

8. **Quad compressor loading**

   As building load increases, the compressors will load up maximizing the Inlet Guide Vane (IGV) position and impeller speed. Maximum capacity at a given operating condition can be found when the compressors reach their Maximum RPM, maximum allowed % RLA or power limitation. While maintaining the desired evaporator leaving water temperature, the two compressors will balance load.

9. **Quad compressor unloading**

   As load decreases, the compressors will unload to sustain the water temperature setpoint by reducing speed until the minimum speed limit has been reached. If further unloading is required, the IGV assemblies will close as required to satisfy the load. Further capacity reduction is accomplished by opening the PLBV.

10. **Quad Staging down**

    With the chiller running on condition and the building load reducing to the point that less compressors can carry the load more efficiently, one compressor will be shut down based on compressor run hours and circuit compressor balancing.

11. **Chiller shutdown**

    The remaining compressor will adjust capacity to manage the chiller load until the load increases to the point where another compressor is needed, or the load reduces below the minimum capacity of one compressor and the leaving water temperature goes below setpoint and reaches the stop delta temperature. Anytime the chiller is disabled, it will perform an orderly unload and shutdown both compressors.

# Unit Enabling/Disabling and Overrides

There are multiple options that will override normal operation of the chiller and its compressors:

1. Manual Button - Located on the outside front of the control panel. Button needs to be engaged for unit to run. When disengaged, unit will perform rapid stop. For a controlled shutdown sequence, use the HMI Enable Button, BAS command, or Remote Enable signal. This button is the only method to override other “Control Sources”.
2. Compressor 1 or 2 Enable Setting - Located in the Settings menu, Modes tab in the HMI.

The overrides listed above work in conjunction with the “Control Source” that is selected in the HMI via the Settings/Modes Screen, see Figure 51 and Table 21 on page 46. The three options for “Control Source” are:

1. HMI Enable Button (Local) - This is the default mode. When this mode is set, a STOP button and an AUTO button will appear at the top of the HMI screens. If the “Control Source” is set to “HMI Enable Button” and a remote switch is being used, the position of the Remote Enable switch will be ignored. In that case, only the Manual Button need to be closed. Once the Manual Button is engaged, press the AUTO button on the HMI to enable the chiller in “User” mode. It will also ignore BAS Network commands.

   To disable the chiller, press the STOP button on the HMI screen.

2. Remote Enable - This mode will ignore BAS enable and disable commands and requires a physical switch. To enable the chiller and its compressors, the Manual Button needs to be closed in the ON position. To disable the unit, this switch will initiate a normal controlled sequence and will stop each compressor that is running.
3. BAS Network - This mode allows BAS to enable or disable the chiller over a BAS network. To enable the chiller and its compressors, the Manual Button needs to be closed in the ON position. When a BAS Network command to disable is given, the chiller will shutdown the chiller in a normal controlled sequence and will stop each compressor that is running.

## Variable Fluid Flow Rates

Both excessively high and low fluid flow rates should be avoided. Extremely high fluid flow rates and high tube velocities will result in high fluid pressure drops, high pumping power, and potential tube erosion or corrosion damage. Extremely low fluid flow rates and low velocities should also be avoided as they will result in poor heat transfer, high compressor power, sedimentation and tube fouling.

If it is decided to vary the evaporator or condenser water flow rate, the flow rate should not exceed the minimum or maximum limits. Additionally, the rate of change for the evaporator flow rate should not exceed 10% of the current value per minute.

## Water Volume

All chilled water systems need adequate time to recognize a load change to avoid short cycling of the compressors or loss of control. The potential for short cycling usually exists when the building load falls below the minimum chiller plant capacity or on close-coupled systems with very small water volumes.

Assuming that there are no sudden load changes and that the chiller plant has reasonable turndown, a rule of thumb of “gallons of water volume equal to two to three times the chilled water gpm flow rate” is often used.

A properly designed storage tank should be added if the system components do not provide sufficient water volume.

# Condenser Water Temperature Control

Condenser water control is an important consideration in chiller plant design since condenser water temperature will directly impact chiller operation and efficiency. When the ambient wet bulb temperature is lower than peak design, the entering condenser water temperature from the cooling tower can be allowed to fall, improving chiller performance. However, operational issues may occur when the condenser water temperatures are either too high or too low. The WME chiller provides several options to assist the chiller plant designer in providing the optimum control of condenser water temperature.

## Cooling Tower Control

Control of the cooling tower is required to maintain stability and avoid operational issues. This can be achieved through a BAS or by using the MicroTech controller. For systems utilizing a common condenser water loop for multiple purposes, the BAS contractor must provide the control but use of the MicroTech output signal is still recommended.

The preferred cooling tower control utilizes a variable speed fan. MicroTech will provide a control signal to determine the proper fan speed. It can also control up to three stages of fan cycling. Note that fan cycling can cause cooling tower water temperature to fluctuate as fans stage on/off, potentially adding instability to the system.

Each of the following acceptable methods can be controlled by the MicroTech or through a BAS utilizing the MicroTech output signals:

1. Three-Way Bypass Valve Operation

   A traditional method for building condenser pressure at startup with colder condenser water is with the use of a three-way bypass valve. The device blends warmer water leaving the condenser with cooler water from the cooling tower at the condenser inlet. The bypass valve position will change until full flow from the tower to the condenser is obtained. The MicroTech provides only the valve position control signal. Main power to drive the valve's actuator must be provided by the installer. The three-way valve should be located close to the chiller within the equipment room to minimize the volume of water.

2. Two-Way Valve Operation

   Another condenser control method is to use a modulating two-way control valve located on the outlet connection of the condenser. The valve will be nearly closed at startup to restrict water flow, which keeps generated heat in the condenser until an acceptable minimum condenser pressure is reached. As heat builds, the valve will open slowly until a full flow condition from the cooling tower is established. A separate power source is required to provide power to the valve actuator.

**NOTICE**

To ensure proper operation, caution should be used when utilizing the two-way valve option.

3. VFD Operating with a Condenser Water Pump

   A third method of condenser control for startup is utilizing a variable frequency drive with the condenser water pump. The speed will change as directed by the MicroTech output signal until design flow is reached. Speed adjustments may be required during the initial chiller startup as determined by the service technician.

**NOTICE**

Not using the MicroTech logic to control valves and variable frequency drives may result in system instability and capacity reduction.

## Condenser Pump Sequencing

It is recommended to utilize the logic built into the MicroTech controller to start the condenser pump. MicroTech has the capability to operate a primary pump and a secondary standby pump. The condenser water flow should be stopped when the chiller shuts off. This will conserve energy and prevent refrigerant from migrating to the condenser. Moisture in the air can condense on the cooler surfaces of the un-insulated condenser barrel if flow is present when the chiller is idle.

## Water Side Economizer Cycle Operation

The WME-C vintage chiller is capable of inverted duty operation, meaning the chiller has the capability to accept entering condenser water lower than the leaving evaporator water temperature. In doing so, it extends the range of applications of the chiller and can eliminate the waterside economizer from the system.

The savings resulting on the inverted operation can be quantified with the elimination of the waterside economizer, while also retaining the ability of the chiller to address cooling needs during low ambient temperatures. ASHRAE 90.1 prescribes to include a waterside economizer; so when it is removed, a performance-based compliance path using energy modeling must be followed in order to confirm compliance to the code.

If it is confirmed that a waterside economizer is beneficial to a particular system, the BAS contractor will need to provide controls for the heat exchanger including isolation valves and temperature control. The BAS contractor will also need to control the isolation valves for the chiller. It is important to use slow-acting type valves to prevent rapid changes in system flows. Changeover from economizer cooling to mechanical cooling requires one of the methods previously mentioned to maintain suitable condenser head pressure.

Contact your local Daikin Applied representative for more information on this application.

# Human Machine Interface (HMI)

The HMI is turned on/off with a switch located at the lower right-hand edge of the display panel. Screen control buttons are located to either side of it and elicit on-screen prompts when pressed. The HMI is equipped with a screen saver (a blank, black screen). If the screen is black, touch it first to be sure it is on before using the ON/OFF button.

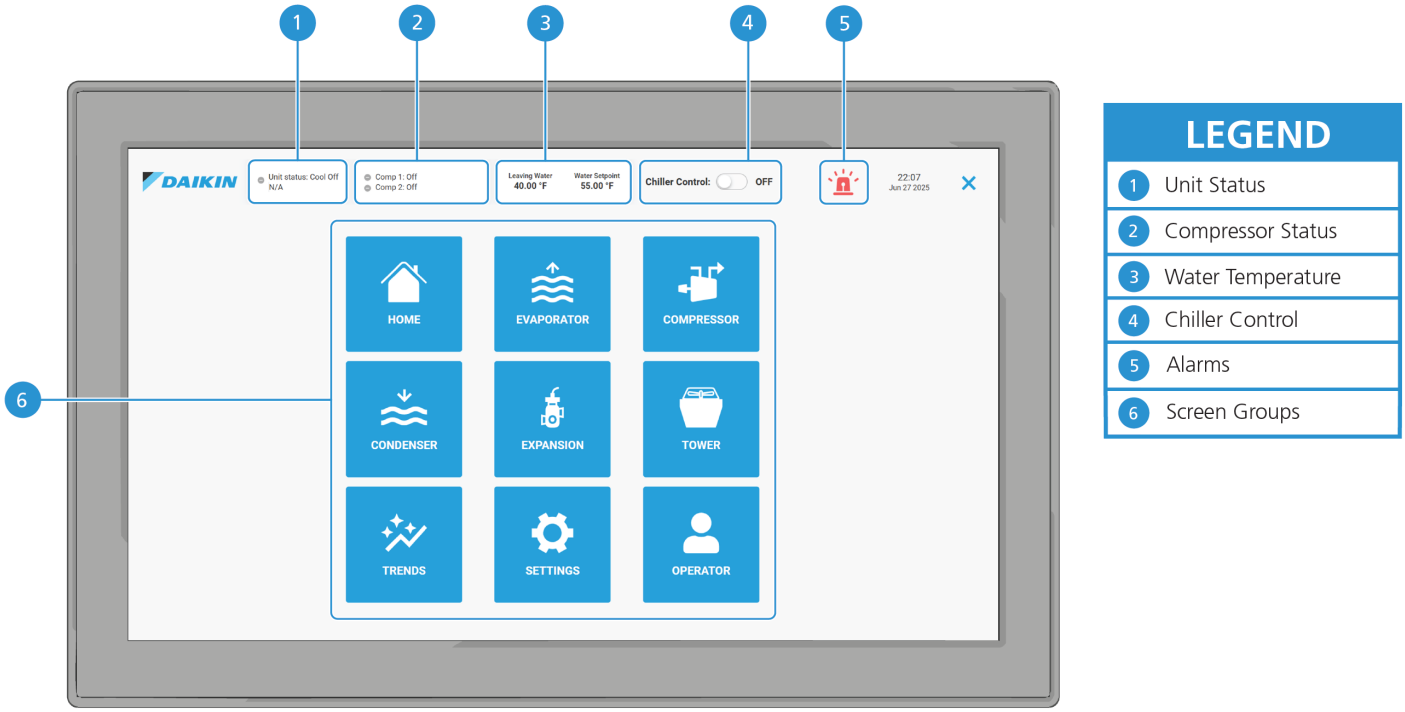
## Chiller Operation Without the HMI

The Human Machine Interface (HMI) communicates with the embedded Chiller PC, displaying data and transmitting touch screen inputs to the controllers. The HMI does no actual controlling and the chiller can operate without it. Should the Touch Screen become inoperable, no commands are necessary for continuing unit operation. All normal inputs and outputs will remain functional. A PC monitor and USB mouse can be connected to the Chiller PC via its display port and can be used to view operational data, to clear alarms, and to change setpoints, if necessary.

If the HMI and the chiller both appear to be inoperable, the embedded Chiller PC should be checked since it is required for the chiller to run.

# Navigation Summary

***Figure 38: Navigation Summary Screen***




# Human Machine Interface (HMI)

The HMI is turned on/off with a switch located at the lower front of the display panel. Screen control buttons are located to either side of it and elicit on-screen prompts when pressed. If the screen is black, touch it first to be sure it is on before using the ON/OFF button.

The HMI will display the Navigation Summary screen at startup. The Navigation Summary screen shows the unit status, compressor status, the Chiller Control toggle switch, and the alarms indicator icon.

From the Navigation Summary screen you can access the other screen groups by selecting the button that corresponds to that screen.

**NOTICE**

An initial startup step may be to select the Operator icon on the bottom right of the HMI to access the Operator screen to set display language and unit of measure preferences as well as input the appropriate level of password for making unit adjustments going forward. Should the touch screen cursor not respond to where the screen is being pressed, use the Calibrate button to recalibrate the screen. The Calibrate button is oversized to make it easier for the non-calibrated cursor to select.

## *Unit Status*

The Unit Status is defined by Mode followed by State. If the unit is stopped, the Source would be listed after State.

***Figure 39:*** **Chiller Control**

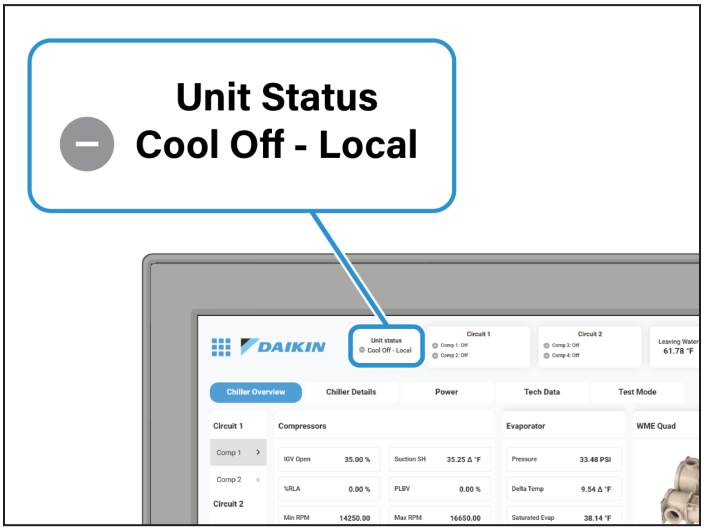


*Table 14: UNIT STATUS Possibilities*

| MODE | STATE | SOURCE |
|---|---|---|
| COOL | OFF | Mechanical Switch |
| | SHUTDOWN | Remote Switch |
| | AUTO | Local |
| | | BAS Network |

## Compressor Status

The Compressor Status is shown for each compressor. The available status possibilities are shown in the table below.

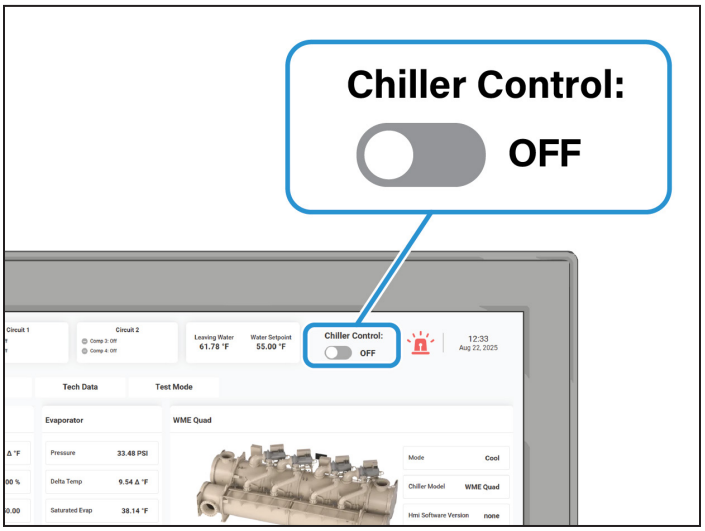
*Table 15: Compressor Status Possibilities*

| Priority Sequence | Complete STATUS Text |
|---|---|
| 1 | Off |
| 2 | Pre-Start |
| 3 | Starting |
| 4 | Running |
| 5 | Run IGV |
| 6 | Run Speed |
| 7 | Run Hold |
| 8 | Lead Staging |
| 9 | Run IGV/Speed |
| 10 | Tandem Staging |
| 11 | Power Fail Detection |
| 12 | Pre-Shutdown |
| 13 | Shutting Down |

## Chiller Control

The chiller control toggle switch allows you to switch the chiller control from Off to Auto.

*Figure 40:* **Chiller Control**




## Alarm

The ALARM icon will turn red and begin flashing should an alarm occur. This red ALARM button will appear on all screens in case of an alarm. See Figure 41 for an example of an active alarm alert. For more information on alarms, see page 55.

*Figure 41:* **Active Alarm Icon**

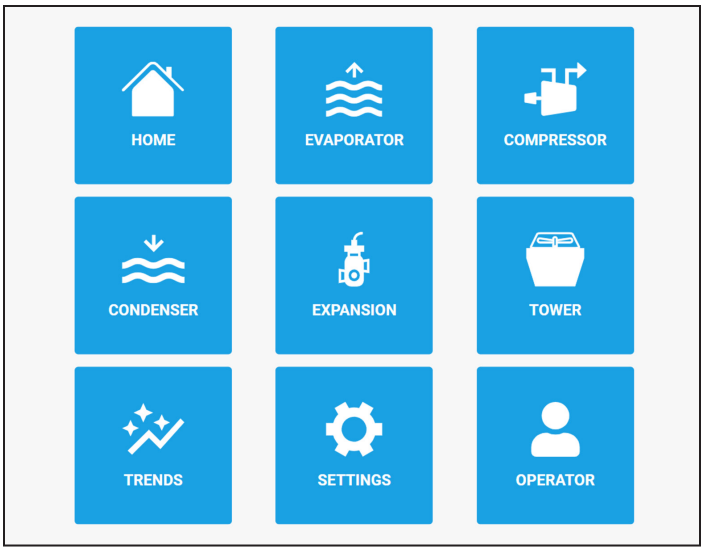



## Screen Groups

Selecting one of the available screen groups will take to a screen with additional information about the specific group you selected.

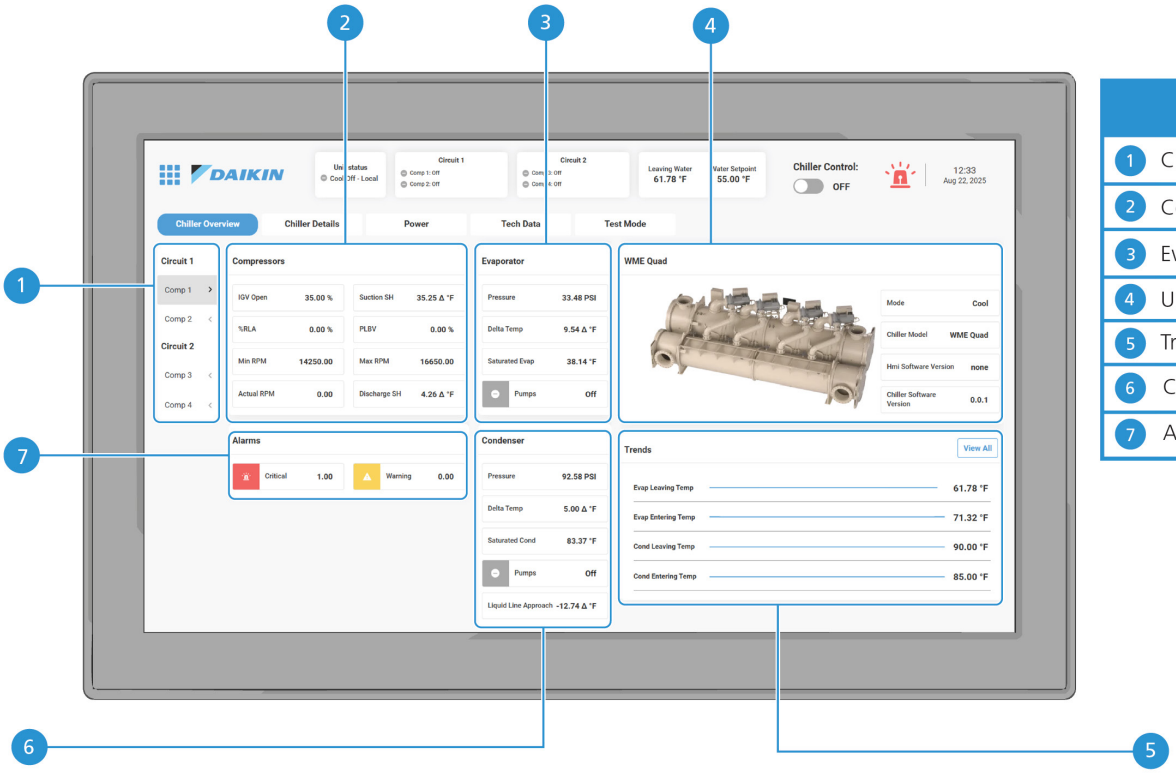
Selecting the HOME button will take you to the Chiller Overview page. For more information see "Chiller Overview" on page 39.

*Figure 42: Screen Groups*



# Chiller Overview

***Figure 43: Chiller Overview Screen***




**LEGEND**

| | |
|---|---|
| 1 | Circuit Selection |
| 2 | Compressor Overview |
| 3 | Evaporator Overview |
| 4 | Unit Overview |
| 5 | Trends Overview |
| 6 | Condenser Overview |
| 7 | Alarms Overview |

The Chiller Overview screen shows the basic operating condition of the chiller. From the Chiller Overview screen you can view the following:

***Table 16: Chiller Overview Screen***

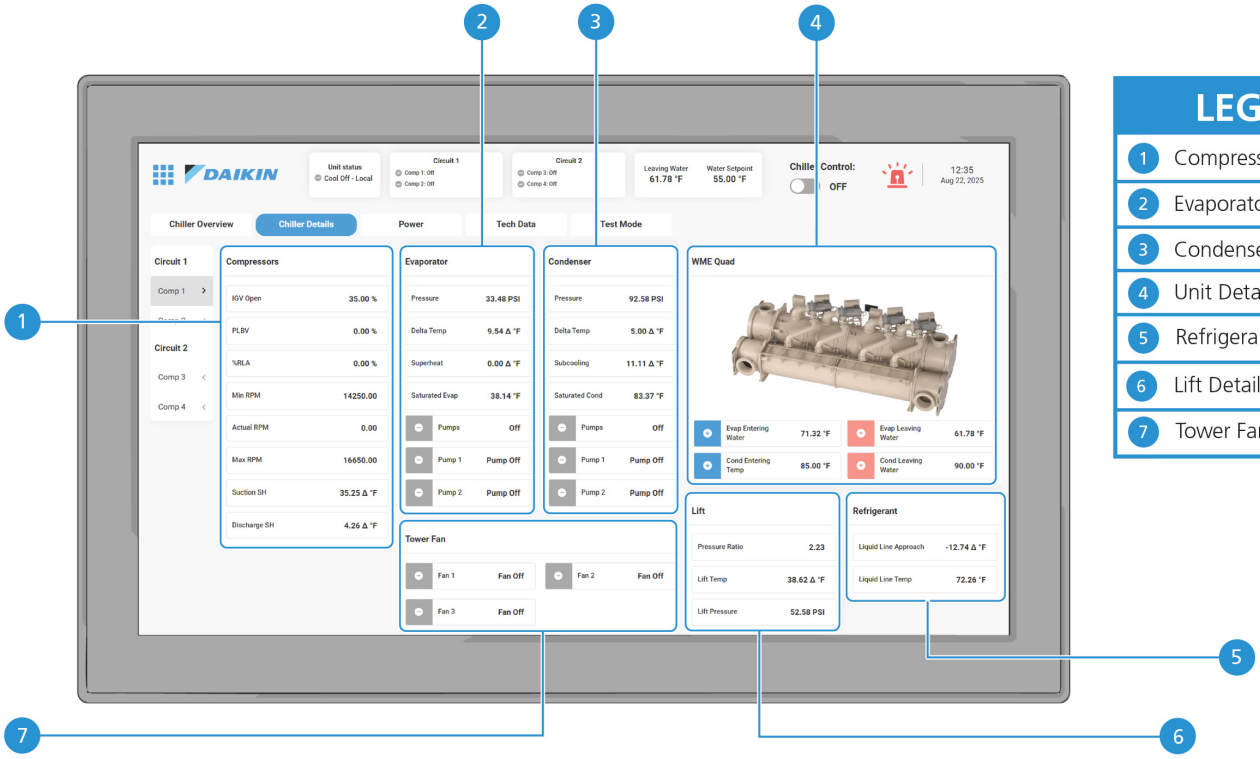
| |
|---|
| Evaporator |
| Pressure |
| Saturated Evap |
| Pumps |
| Compressor 1-4 |
| IGV Open |
| %RLA |
| Min RPM |
| Actual RPM |
| Suction SH |
| PLBV |
| Max RPM Discharge SH |
| Unit |
| Mode |
| Chiller Model |
| HMI Software Version |
| Chiller Software Version |
| Trends |
| Evap Leaving Temp |
| Evap Entering Temp |
| Con Leaving Temp |
| Cond Entering Temp |
| Alarms |
| Critical |
| Warning |
| Condenser |
| Pressure |
| Saturated Cond |
| Pumps |

**NOTICE**

The chiller displayed on all screens will be representative of the actual chiller, showing either one or two compressors depending on the chiller model. Other unit options and order details are not specific to the HMI image.

# Chiller Details

***Figure 44: Chiller Details Screen***



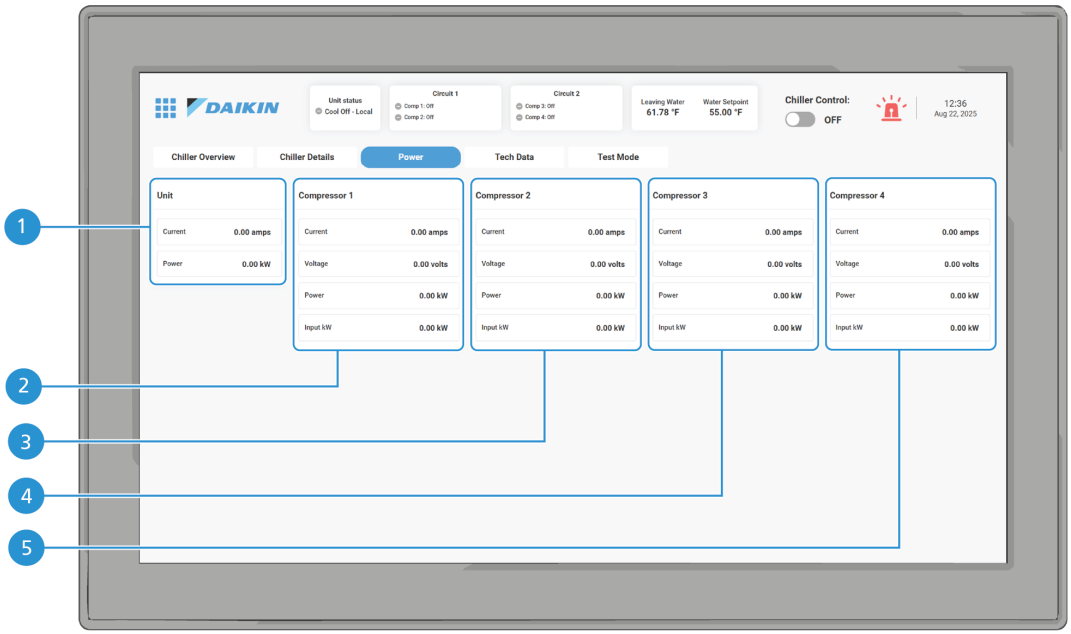

The Chiller Details screen displays information for each of the chiller's main components, as well as the cooling tower, and highlights the relevant information pertaiing to chiller operation.

***Table 17: Chiller Detail Screen***

| |
|---|
| Compressors 1-4 |
| IGV Open |
| PLBV |
| %RLA |
| Min RPM |
| Actual RPM |
| Suction SH |
| Evaporator |
| Pressure |
| Superheat |
| Saturated Evap |
| Pumps |
| Pump 1 |
| Pump 2 |
| Condenser |
| Pressure |
| Saturated Cond |
| Pumps |
| Pump 1 |
| Pump 2 |
| Unit |
| Evap Leaving Water |
| Evap Entering Temp |
| Cond Leaving Water |
| Cond Entering Temp |
| Refrigerant |
| Liquid Line Approach |
| Liquid Line Temp |
| Lift (Compressor 1-4) |
| Pressure Ratio |
| Tower Fan |
| Fan 1 |
| Fan 2 |
| Fan 3 |

# Power Screen

***Figure 45: Power Screen***




**LEGEND**

| | |
|---|---|
| 1 | Unit Power |
| 2 | Compressor 1 Power |
| 3 | Compressor 2 Power |
| 4 | Compressor 3 Power |
| 5 | Compressor 4 Power |

The Power screen shows power usage information for the chiller. From the Power screen you can view the following:

***Table 18: Power Screen***

| |
|---|
| Unit |
| Current |
| Power |
| Compressor 1-4 |
| Current |
| Voltage |
| Power |
| Input kW |

## Settings Screens

The Settings screen is used to input the many setpoints associated with equipment of this type. MicroTech provides a simple method for accomplishing this. Appropriate setpoints are factory set and checked a Daikin Applied service representative during commissioning; however, adjustments and changes are often required to meet job conditions. Certain settings involving pumps and tower operation are field set.

A typical setpoint screen is displayed in Figure 46. The various setpoints are grouped together by similar content. The WATER tab, for example, contains various setpoints relating to water temperature setpoints. The possible range of input values for a particular setpoint, as well as the required password level, will appear in the box at the top of the screen. Setpoints that have a technician level password can only be changed by a Daikin Applied technician. Contact a Daikin Applied service representative for more information.

**NOTICE**

Some setpoints that do not apply to a particular unit application may still be listed on the screen but will be grayed out. They will be inactive and can be ignored.

**NOTICE**

Many setpoints are interactive. Changes may have an adverse effect on chiller operation. Only trained operators should be allowed to change chiller setpoints.

***Figure 46: A Typical Setpoint Screen***

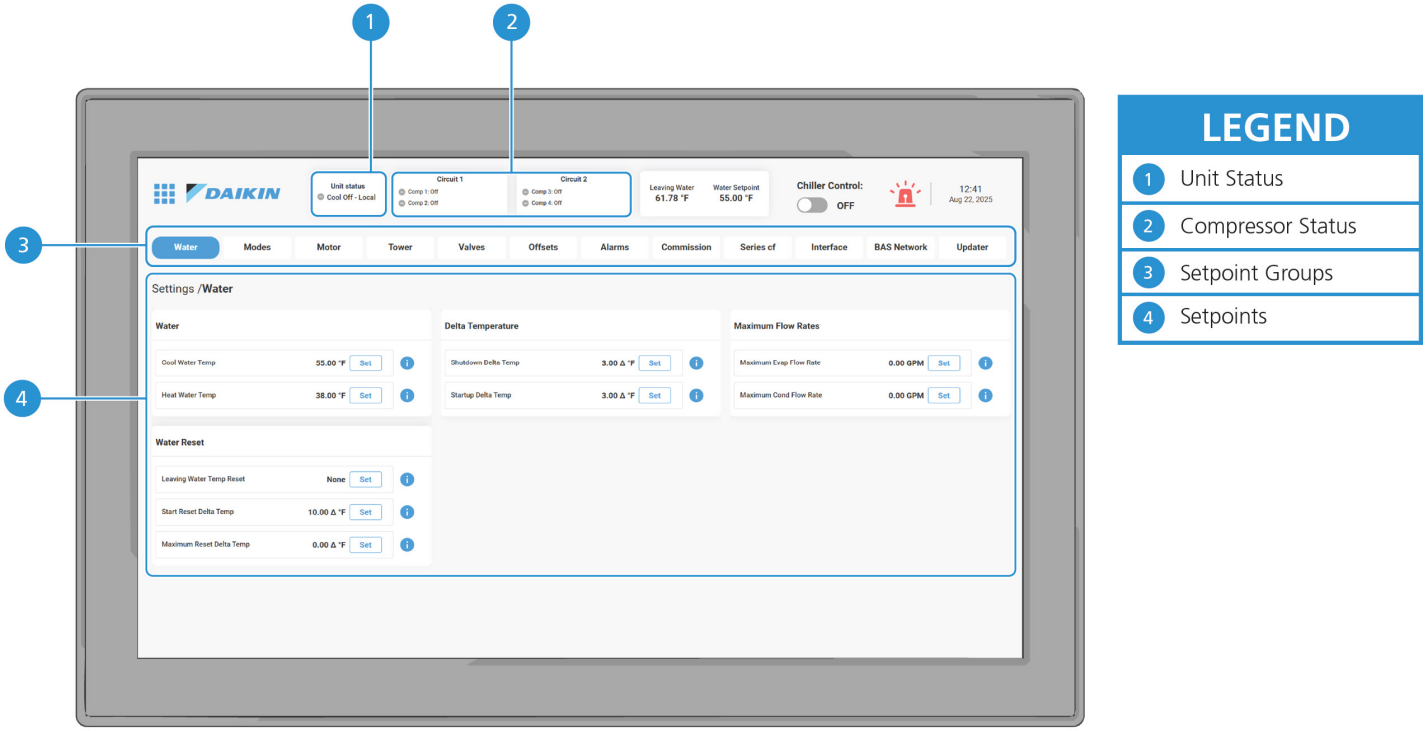



***Table 19: Set Point Group Descriptions***

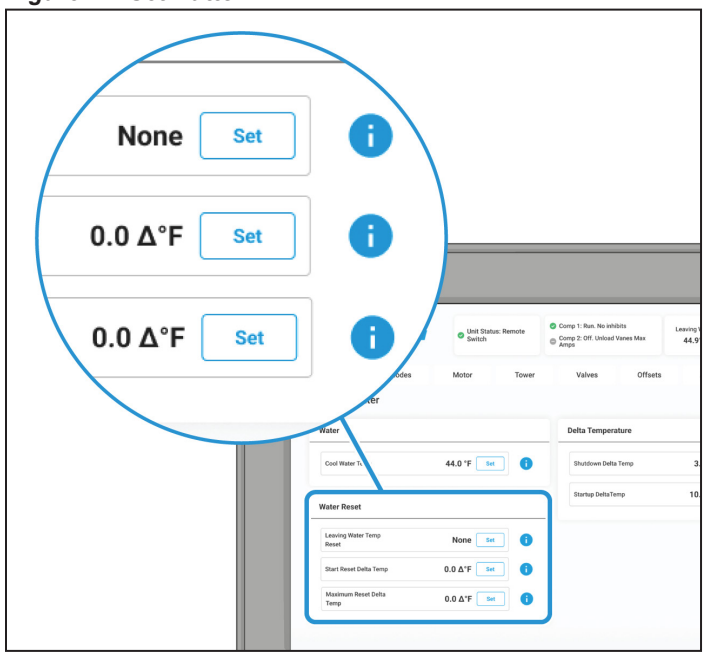
| Setpoint Group | Description |
|---|---|
| Water | Set leaving water temperature setpoint, start and stop delta-T, resets, Heat Mode settings, etc. |
| Modes | Select various modes of operation such as control source, multiple compressor staging, pump staging, BAS protocol, etc. |
| Motor | Select motor related setpoints such as amp limits. |
| Tower | Select the method of controlling the cooling tower and sets the parameters for fan staging/VFD. |
| Valves | Set EXV capacity control setpoints, such as EXV gain, EXV evaporator weight, EXV control ratio, etc. |
| Offsets | Select offsets setpoints for pressure and temperature offsets. |
| Alarms | Select alarms setpoints for pressure, water flow, and freeze protection. |
| Commission | Set commission setpoints, such as PC sound IP, PC source Port, refrigerant type,IGV maximum position, etc. |
| Series cf | Set series counterflow setup. |
| Interface | Set the network protocol and associated options. |
| BAS Network | Set BAS network settings, such as BAS network protocol, BAS remote enable, baud rate, etc. |
| Updater | Allow upload of software file updates. |

## How to Change a Setpoint

To change a setpoint, perform the following steps:

1. Press the applicable Setpoint Group tab.
2. Press the “Set” button located to the right of the setpoint you wish to edit.

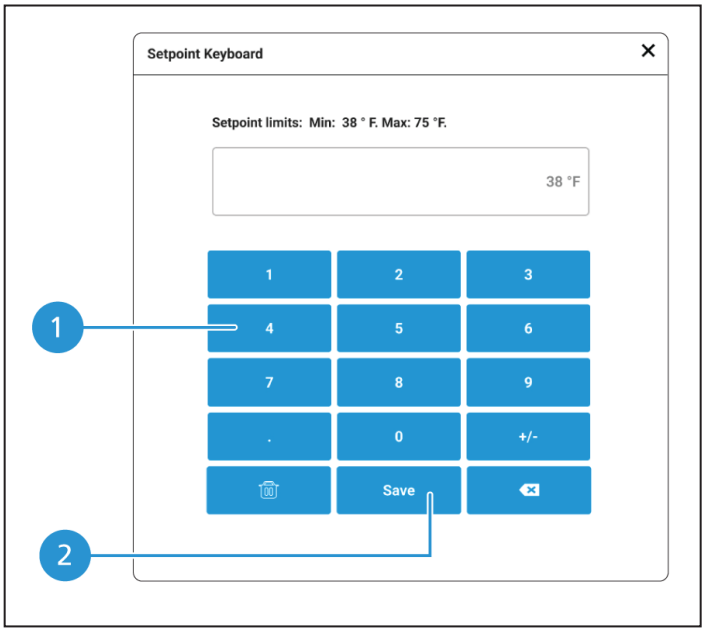
***Figure 47: Set Button***




3. A password must be entered before changing any setpoint value. A keypad prompt will appear automatically to enter the password. Input the appropriate password number. There is a small delay between pressing the keypad and recording the entry. Be sure that an asterisk appears in the window before pressing the next number.

   After inputting the password on the Keyboard Screen, press ENTER to return to the Setpoint Screen. The password will remain active for 15 minutes after initiation and does not need to be re-entered during this period.

***Figure 48: Keypad Prompt***




| No. | Description |
|---|---|
| 1 | Numeric Keypad |
| 2 | Action/Save Button |

4. Setpoints with numeric values can be changed in two ways:
   - Select the desired value by pressing the numbered buttons on the Numeric Keypad. Press ENTER to enter the value or CANCEL to cancel the change.
   - Press the UP or DOWN button to increase or decrease the value displayed. Press ENTER to enter the value or CANCEL to cancel the transaction.

   Some setpoints are selectable text rather than numeric values. Select the desired option using the dropdown menu that appears for that particular setpoint. The selection can be made by toggling between choices using the UP or DOWN button. If dashed lines appear in the setpoint window it means that toggling in that direction can go no further, so reverse direction. Press ENTER to enter the choice or CANCEL to cancel the change.

   Once CHANGE is selected, the CANCEL or ENTER buttons must be pressed before another setpoint can be selected.Additional setpoints can be changed by selecting another setpoint field or by selecting an entirely new group of setpoints using the Setpoint Group tabs.

***Figure 49: Settings - Water***

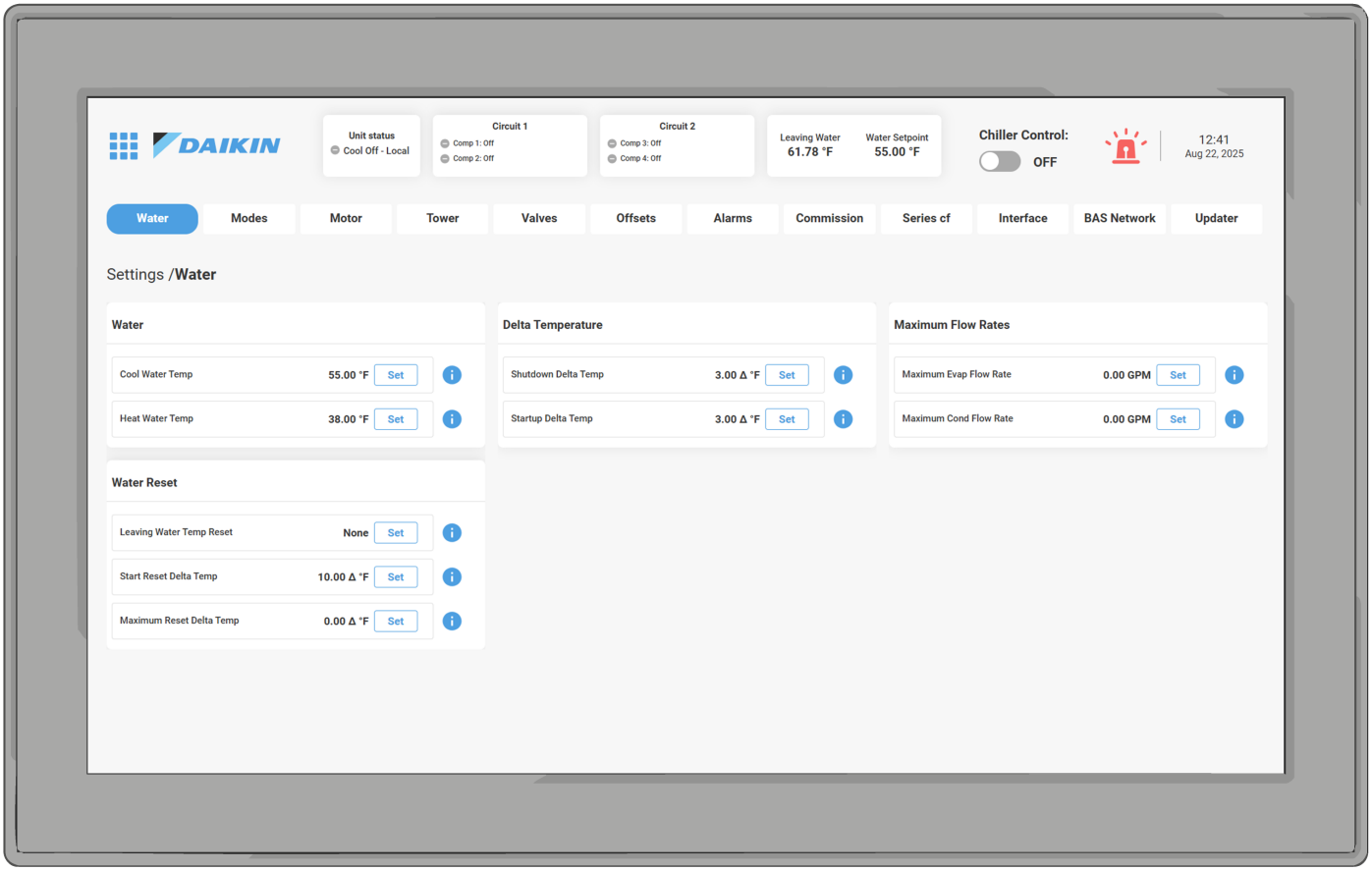



***Table 20: Water Setpoint Settings***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Water | | | | |
| Cool Water Temp | 44.0°F | 35.0 to 75.0°F | O | Sets control target for evaporator leaving water temperature in COOL mode. 35°F is lowest setpoint for shutdown. |
| Heat Water Temp | 110.0°F | 38.0 to 130.0°F | O | Sets control target for evaporator leaving water temperature in HEAT mode. 130°F is highest setpoint for shutdown. |
| Water Reset- | | | | |
| LWT Reset Type | NONE | NONE, RETURN, 4-20 mA | O | Select reset type, NONE for none, RETURN for resetting chilled water based on the entering water, or 4-20 mA for external analog signal. |
| Start Reset Delta T | 10.0°F | 0.0 to 20.0 °F | O | Sets the evap delta-T above which Return reset begins. |
| Maximum Reset Delta T | 0.0°F | 0.0 to 20.0 °F | O | Set the maximum reset that can occur, in degrees F if LWT reset is selected or max reset at 20 mA input if 4-20 mA is selected in for LWT Reset Type. |
| Delta Temperature | | | | |
| Shutdown Delta Temp | 3.0°F | 0.0 to 6.0 °F | O | Degrees below setpoint for chiller to stop. |
| Startup Delta Temp | 3.0°F | 0.0 to 10.0 °F | O | Degrees above setpoint for chiller to start. |
| Maximum Flow Rates | | | | |
| Maximum Evap Flow Rate | 0.00 Flow | - | O | Sets maximum evaporator flow rate. |
| Maximum Cond Flow Rate | 0.00 Flow | - | O | Sets maximum condenser flow rate. |

## Leaving Water Temperature (LWT) Reset

The Active Leaving Water variable shall be set to the current Leaving Water Temperature (LWT) setpoint unless modified by one of the reset methods below. (The current LWT setpoint is Cool LWT as determined by the chiller mode.) The type of reset in effect is determined by the LWT Reset Type setpoint (Setpoint 7 of the WATER Setpoint Screen). It is important to note that all reset functions are designed with a filter to prevent chiller shutdown in the case of a sudden delta change.

### *Reset Type – NONE*

The Active Leaving Water variable is set equal to the current LWT setpoint, determined by the Unit mode.

### *Reset Type – RETURN (Cool Mode)*

The Active Leaving Water variable is adjusted by the return water temperature.

When the chiller mode = COOL, the Active Leaving Water variable is reset using the following parameters:

1. Cool LWT setpoint
2. Max Reset Delta T setpoint
3. Start Reset Delta T setpoint

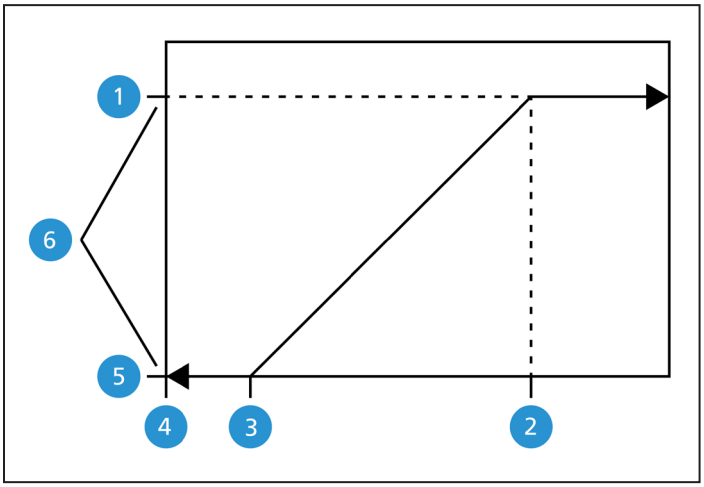
For example, a reset is accomplished by changing the Active Leaving Water variable from the (Cool LWT setpoint) to the (Cool LWT setpoint + Max Reset Delta T setpoint) when the evaporator (return – leaving) water temperature delta varies from the (Start Reset Delta T setpoint) to 0.

To prevent a possible surge at startup, the compressor will not start if the evaporator LWT is lower than Heat Mode No Start set point.

### *Reset Type – 4-20 mA (Cool Mode)*

The Active Leaving Water variable is set equal to the Cool LWT setpoint if the reset signal is less than or equal to 4 mA. It is set equal to (Cool LWT setpoint + Max Reset Delta T setpoint) if the reset signal equals or exceeds 20 mA. The Active Leaving Water variable will vary linearly between these extremes if the reset signal is between 4 mA and 20 mA. An example of this action is shown in the figure below.

*Figure 50: LWT Reset - Cool Mode*




| No. | Description |
|---|---|
| 1 | 54.0°F |
| 2 | 20 ma |
| 3 | 4 ma |
| 4 | 0 ma |
| 5 | Cool LWT Setpoint (44.0°F) |
| 6 | Max Reset Delta T (10.0°F) |

**NOTICE**

Temperatures in above figures are examples only.

***Figure 51: Settings - Modes***

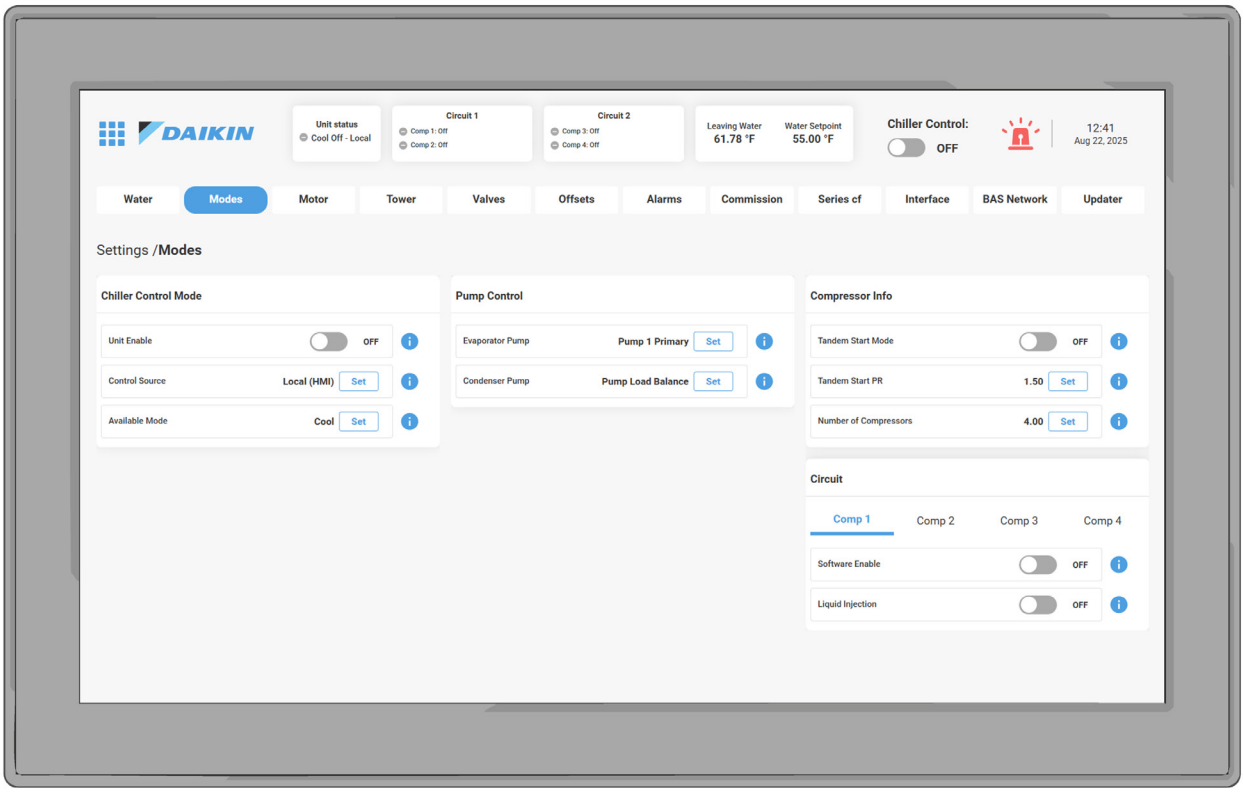



***Table 21: Modes Setpoint***

| **Description** | Default | Range | PW | **Comments** |
|---|---|---|---|---|
| Chiller Control Mode | | | | |
| Unit Enable | OFF | OFF, AUTO | O | OFF: everything is off. AUTO: Evap pump on, comp, cond pump and tower on as required to meet LWT. |
| Control Source | Local (HMI) | Remote Switch, Local (HMI), BAS | O | Sets control source. |
| Available Mode | COOL | COOL, HEAT | O | COOL or HEAT mode |
| Pump Control | | | | |
| Evaporator Pump | Pump Load Balance | None, Pump Load Balance, Pump #1 Only, Pump #2 Only, Pump #1 Primary, Pump #2 Primary | M | Pump Load Balance - balances hours between #1 and #2 pumps, Pump #1 Only, Pump #2 Only - use only specified pump<br>Pump #1 Primary and Pump #2 Primary - if primary pump fails, other pump is used. |
| Condenser Pump | Pump Load Balance | None, Pump Load Balance, Pump #1 Only, Pump #2 Only, Pump #1 Primary, Pump #2 Primary | M | Pump Load Balance - balances hours between #1 and #2 pumps, Pump #1 Only, Pump #2 Only - use only specified pump<br>Pump #1 Primary and Pump #2 Primary - if primary pump fails, other pump is used. |
| Compressor | | | | |
| Tandem Start Pressure Ratio | 1.5 | 1 - 3.5 | O | Max pressure ratio for which a lead-lag start will be performed.<br>A higher pressure ratio will trigger a tandem start. |
| No. of Compressors | 1 | 1, 2, 4 | O | Set number of compresser. |
| Software Enable | Enabled | Enabled, Disabled | O | Enable or disbale software. |

**NOTE:** If both compressors have the same sequence number, they will automatically balance starts and run-hours.

***Figure 52: Settings - Motor***

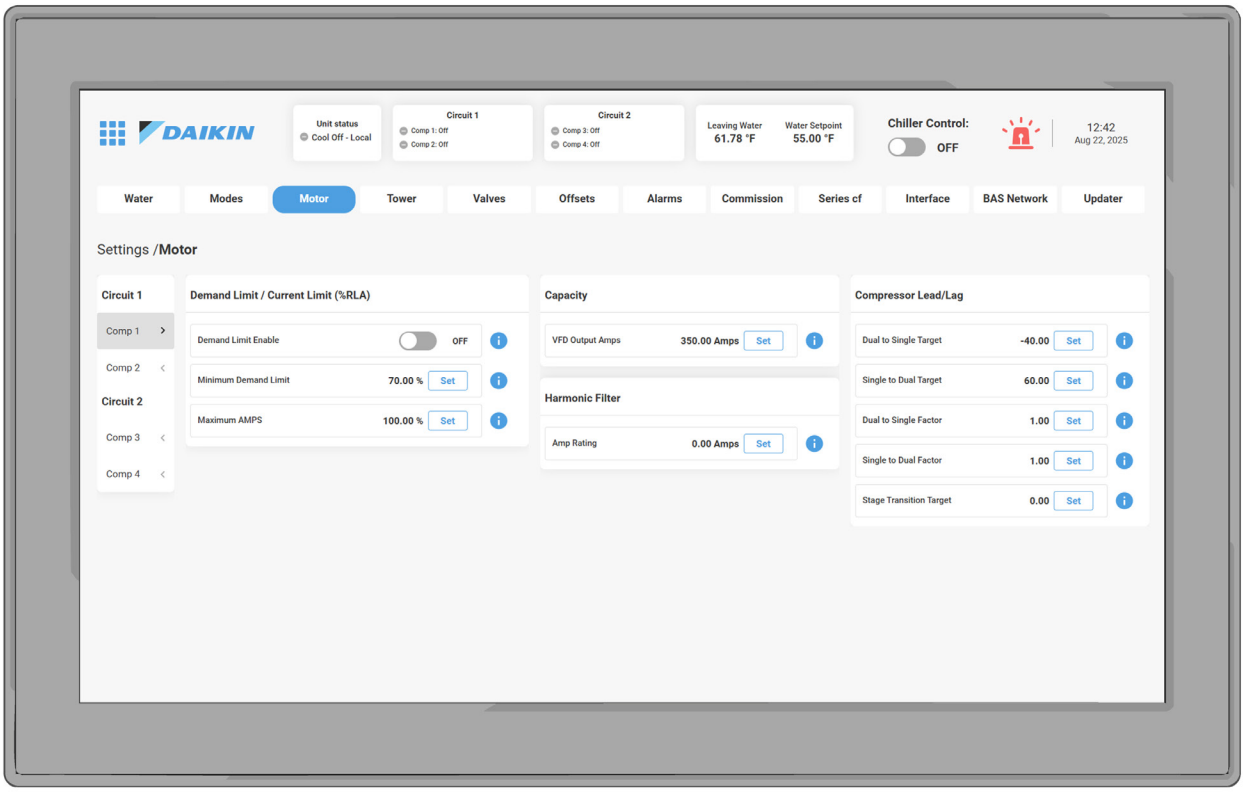



***Table 22: Motor Setpoints***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Demand Limit/Current Limit (%RLA) | | | | |
| Demand Limit Enable | OFF | ON, OFF | O | ON: Limits % RLA to a value set by the Demand Limit analog input.<br><br>Where:<br>4 mA = 100% RLA<br>20 mA = Minimum Demand Limit Setpoint<br><br>OFF: The Demand Limit input is ignored. |
| Minimum Demand Limit | 100% | 40 to 100% | O | Set Minimum Demand Limit |
| Maximum Amps | 100% | 60 to 100% | O | Inhibits capacity increase above %RLA. Unloading forced at 5% above value. |
| Capacity | | | | |
| VFD Output Amps | Factory set | Model dependent | T | Sets the Rated Load Amps (RLA) per compressor phase as given on the chiller nameplate - Load Side Phase Data. |
| Harmonic Filter | | | | |
| Amp Rating | Factory set | Model dependent | T | Based on model of harmonic filter. |

**NOTE:** * Chiller Nameplate RLA **MUST** match chiller dataplate per compressor.

***Figure 53: Settings - Tower***

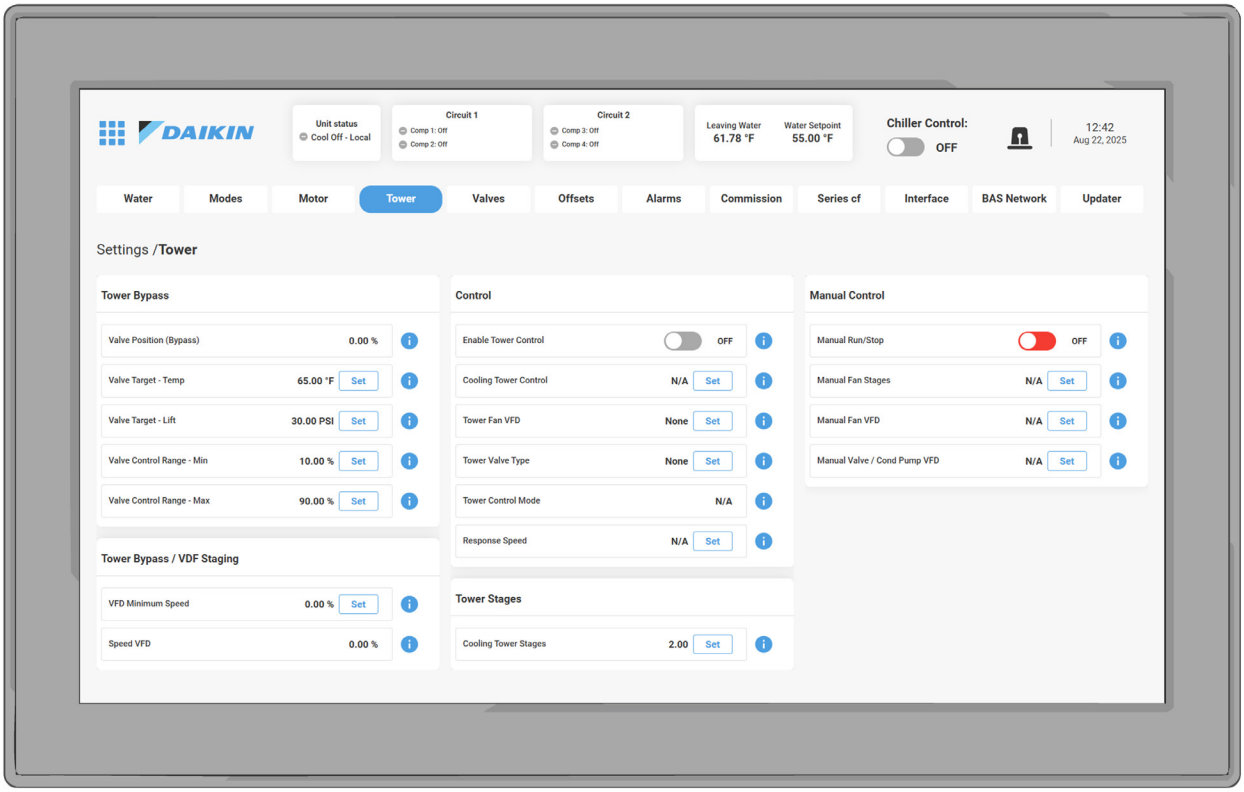



***Table 23: Tower Setpoints***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Tower Bypass | | | | |
| Valve Target -Temp | 65 | 40 – 120 | O | Target value for entering condenser water temperature |
| Valve Target - Lift | 30 | 10 – 100 | O | Target value for lift pressure |
| Valve Control Range - Min | 10 | 0 – 100% | O | Minimum bypass valve position |
| Valve Control Range - Max | 90 | 0 – 100% | O | Maximum bypass valve position |
| Tower Bypass/VFD Staging | | | | |
| VFD Minimum Speed | 0 | 0 – 70% | O | Minimum tower fan VFD speed |
| Condenser Speed VFD | | | | |
| Control | | | | |
| Enable Tower Control | Disabled | Disabled, Enabled | O | |
| Cooling Tower Control | Temp | None, Temp, Lift | O | Selects target for tower bypass and fan control |
| Tower Fan VFD | None | None, VFD Stage 0, VFD Stage 1, VFD all stages | O | None: No VFD Control<br>VFD Stage 0: VFD independent of fan stage outputs<br>VFD Stage 1: VFD on stage 1 only<br>VFD all stages: VFD on all fan stages |
| Tower Valve Type | None | None, Normally Closed (NC), Normally Open (NO), VFD | O | None: No bypass valve<br>NC: Valve is normally closed to tower<br>NO: Valve is normally open to tower<br>VFD: bypass valve output controls condenser pump VFD |

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Tower Control Mode | Auto Efficiency | Manual, Auto, Auto Efficiency | O | Manual: Activate manual control of tower control outputs<br>Auto: Set tower control outputs to reach set point<br>Auto Efficiency: When set point can not be reached, reduce fan output if possible |
| Response Speed | Slow | None, Slow, Medium, Fast | | Tower control output rate of change when not on set point |
| Tower Stages | | | | |
| Cooling Tower Stages | 2 | 1 – 3 | O | Number of available tower fan stages |
| Manual Control | | | | |
| Manual Run/Stop | | | | |
| Manual Fan Stages | 1 | 0 – 3 | O | Set the number of running fan stages when Manual Control is enabled |
| Manual Fan VFD | 50 | 0 – 100 | O | Set fan VFD speed when Manual Control is enabled |
| Manual Valve / Cond Pump VFD | 90 | 0 – 100 | O | Set bypass valve / cond pump VFD when Manual Control is enabled |

# Cooling Tower Control

There are five possible tower control strategies: (I) **NONE**, (II) **VALVE SP**, (III) **VALVE STAGE**, (IV) **VFD STAGE**, and (V) **VALVE SP / VFD STAGE**. These control strategies are selected from the TOWER Setpoint Screen (see Figure 53). An explanation of each control strategy is given along with a diagram and graph to help illustrate the control strategy. Note that these graphs illustrate the default conditions for each strategy.

## *Setting Tower Control Using the HMI Panel*

MicroTech may assist in the head control either directly or through inputs to a BAS to optimize performance and efficiency. Using the MicroTech, up to three digital outputs of Tower Staging along with three analog outputs (0-10 VDC) are available. The three analog outputs are as follows:

1. Bypass Valve signal
2. Tower Fan VFD signal
3. Tower Reset signal: Defined by a voltage to offset the tower control setting. If the MicroTech is controlling the tower, this signal is not used.

Setup for any tower control will be accomplished on the HMI using the TOWER Setpoint Screen (see Figure 53 on page 48). Select options for the following:

- **Cooling Tower Control** - NONE is selected as default. Choose TEMP for entering condenser water control or LIFT to define the lift pressure between the Suction pressure and the Discharge pressure.
- **Cooling Tower Stages** - sets the number of tower stages that the tower has.
- **Tower Bypass Valve / Fan VFD** - defines if and how the first two MicroTech analog outputs (Bypass Valve signal and Tower Fan VFD signal) will be used with the Staging selected for the tower. A BAS or other control may monitor these outputs to understand when or how much the MicroTech would recommend for proper head control on the WME unit. The third Analog Output (Tower Reset) is only configurable from the MicroTech controller. Commissioning setup of this 0-10 VDC signal, that will represent the MicroTech recommending increased head pressure by a reset voltage, is typically done by the Daikin Applied startup technician. Setup instructions for each of the five tower control strategies are provided next.

### (I) NONE: Tower Fan Staging Only

This control strategy is tower fan staging only. ***This is not a recommended strategy.*** In this mode the tower fan staging (up to three stages) is controlled by either the condenser Entering Water Temperature (EWT) or LIFT pressure (difference between the condenser and suction pressure). Tower bypass or fan speed are not controlled. See Figure 54 and Figure 55.

***Figure 54: TOWER Setpoint - (I) NONE***

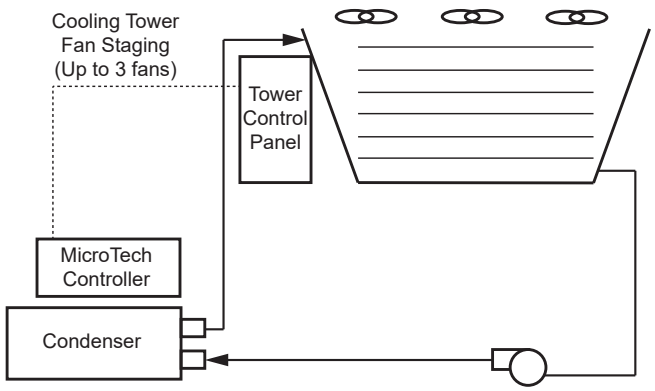
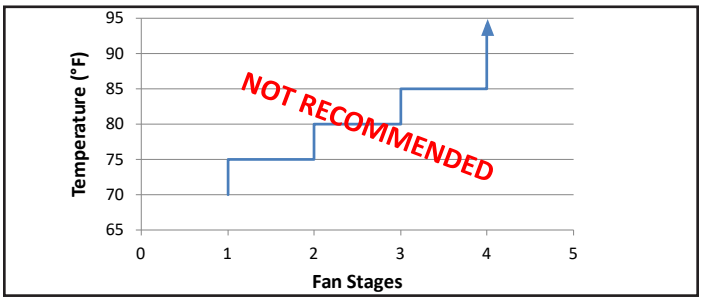


***Figure 55: Temperature vs. Fan Stages***




The setpoints should be selected as follows:

1. Cooling Tower Control = TEMP if control is based on condenser EWT or LIFT if based on compressor lift expressed in pressure.
2. Tower Bypass Valve/Fan VFD = NONE for no bypass valve or fan VFD control.
3. Select one to three fan outputs depending on the number of fan stages. More than one fan can be used per stage through the use of relays.
4. Select FAN STAGE UP TIME. The default value is 2 minutes. The value may need to be adjusted depending on actual system operation.
5. Select FAN STAGE DOWN Time. The default value is 5 minutes and may need to be adjusted later depending on actual system operation.
6. If TEMP is selected for Cooling Tower Control, use:
   a. STAGE DIFFERENTIAL in TEMP. Start with default of 3°F.
   b. Set the STAGE ON (Temp) consistent with the temperature range over which the condenser EWT is desired to operate. The default values of 70°F, 75°F, 80°F and 85°F are a good place to start in climates with moderate wet bulb temperatures. The number of STAGE ON setpoints used must be the same as the number of tower stages.
7. If LIFT is selected for Cooling Tower Control, use:
   a. STAGE DIFFERENTIAL in Lift. Start with default of 6.0 PSI.
   b. Set the STAGE ON (Lift) and start with default setpoints. The number of STAGE ON setpoints used must be the same as the number of tower stages.

**(II) VALVE SP: Tower Fan Staging With Bypass Valve Controlling Minimum EWT**

This control strategy is tower staging with a low-limit controlled bypass valve. The tower fans are controlled as in (I), plus a tower bypass valve is controlled to provide a minimum condenser EWT. There is no interconnection between the fan control and the valve control. See Figure 56 and Figure 57.

***Figure 56: TOWER Setpoint (II) VALVE SP***

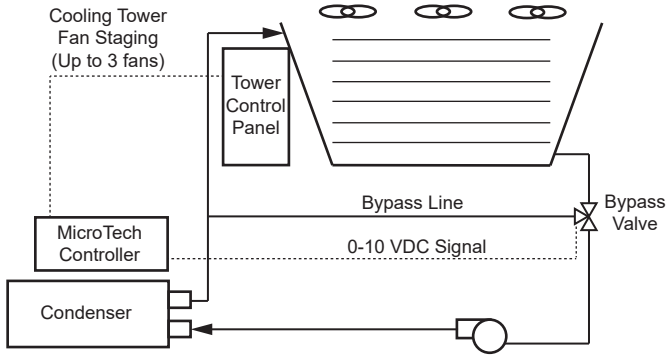
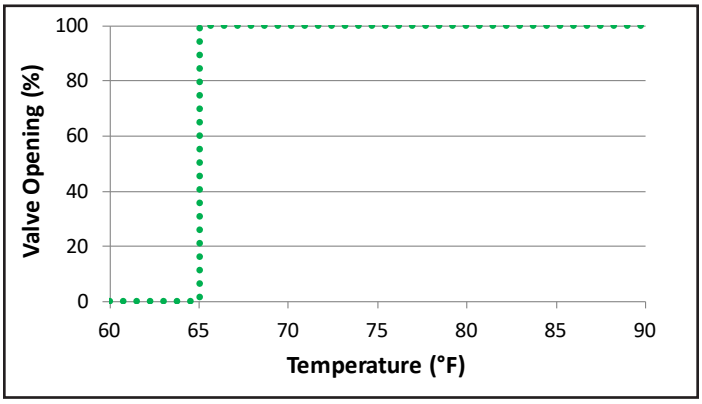



***Figure 57: VALVE SP - Valve Opening vs. Temperature***




As shown in Figure 57, the default temperature at which the valve opens completely is 65°F. This temperature is the Valve Target and is adjustable.

Use all of the same setpoint settings as those outlined in section (I) except select VALVE SP for control of the bypass valve based on temperature or lift.

1. Select open or closed for the valve position when there is no control power.
2. If TEMP was selected for Cooling Tower Control:
   a. Set the VALVE TARGET (Temp). This setpoint is usually 5°F below the minimum fan stage setpoint established by Minimum Start Position. This keeps full flow through the tower until the last fan is staged off. The default for Valve Target (Temp) is 65°F.
   b. Set VALVE DEADBAND. The default is 1.0°F is a recommended initial setting.

3. If LIFT was selected for fan control, use:
   a. Set the VALVE TARGET. This setpoint is usually 5 psi below the minimum fan stage setpoint established in by Minimum Start Position. This keeps full flow through the tower until the last fan is staged off. The default for Valve Target (Lift)is 30 psi.
   b. Set VALVE DEADBAND, the default of 1.0 psi is a recommended initial setting.
4. Set the remaining values:
   a. Set the Minimum Position to which the valve can go. The default is 10%.
   b. Set the Maximum Position to which the valve can go. The default is 100%.
   c. Set the Valve Control Gain Error. The default is 20.
   d. Set the Valve Control Gain Slope. The default is 1.

**⚠ CAUTION**

Valve Control Gain for Error and Slope are site specific, dealing with system fluid mass, component size, and other factors affecting the reaction of the system to control inputs. To avoid possible equipment damage, these setpoints should be set by personnel experienced with setting up this type of control.

**(III) VALVE STAGE: Tower staging with bypass valve controlled by fan stage**

This control strategy is tower staging with a stage-controlled bypass valve. In this mode, the bypass valve controls between fan stages to smooth the control and reduce fan cycling. See Figure 58 and Figure 59.

***Figure 58: TOWER Setpoint - (III) VALVE STAGE***

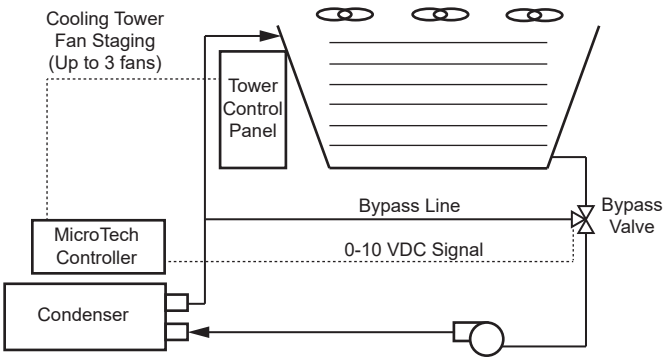
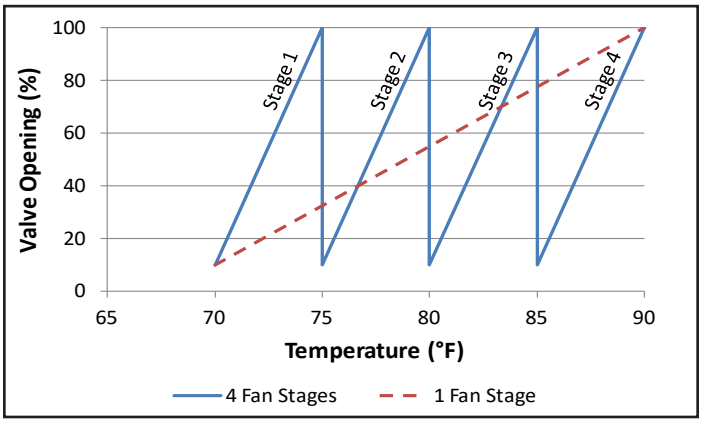



***Figure 59: (III) VALVE STAGE - Valve Opening vs. Temperature***




As shown in Figure 59, the default minimum and maximum valve opening positions are 10% and 100%, respectively. These minimum and maximum positions are adjustable anywhere between 0% and 100%. Additional fans stage on when the valve opening position reaches the maximum value that was set.

Use all of the same setpoint settings as those outlined in section (II) except select VALVE STAGE for Tower Bypass Valve/Fan VFD and then continue settings based on temperature or lift for Cooling Tower Control. In addition, set the following:

a. Set Stage Up (valve position % open) above which the first fan can stage on. Fan Stage #X On (Temp) and Fan Stage Up Time must also be met. The default for Stage Up is 80%.
b. Set Stage Down (valve position % closed) below which the first fan can stage off. Fan Stage #X On (Temp) and Fan Stage Down Time must also be met. The default for Stage Down is 20%.

**(IV) VFD STAGE: Fan VFD, no bypass valve**

In this mode, a VFD controls the first fan. Up to two more fans are staged on and off and there is no bypass valve. See Figure 60 and Figure 61.

***Figure 60: TOWER Setpoint - (IV) VFD STAGE***

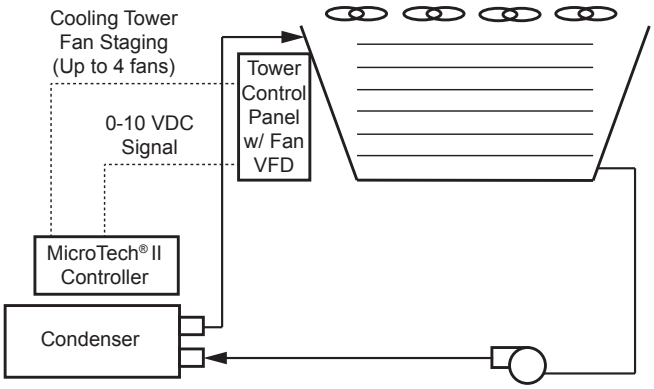
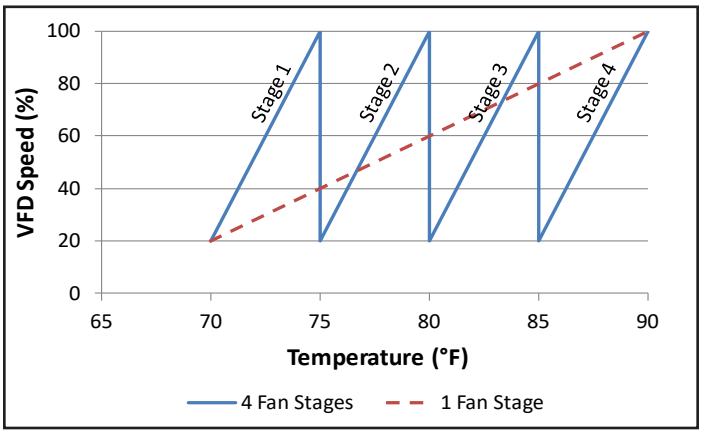


*Figure 61: (IV) VFD STAGE - VFD Speed vs. Temperature*




As shown in Figure 61, the default minimum and maximum VFD speeds are 20% and 100%, respectively. These minimum and maximum values are adjustable anywhere between 0% and 100%. Additional fans stage on when the VFD speed reaches the maximum value that was set.

Use all of the same setpoint settings as those outlined in section (I) except select VFD STAGE for control of the VFD speed based on temperature or lift.

**(V) VALVE/VFD STAGE: Fan VFD, no bypass valve**

This control strategy is tower fan control with a VFD and bypass valve control. See Figure 62 and Figure 63.

*Figure 62: TOWER Setpoint - (V) VALVE / VFD STAGE*

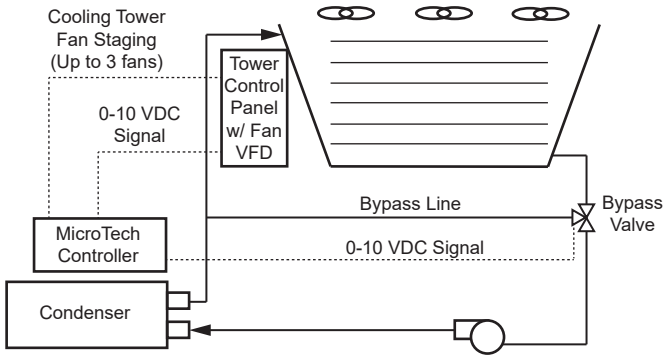
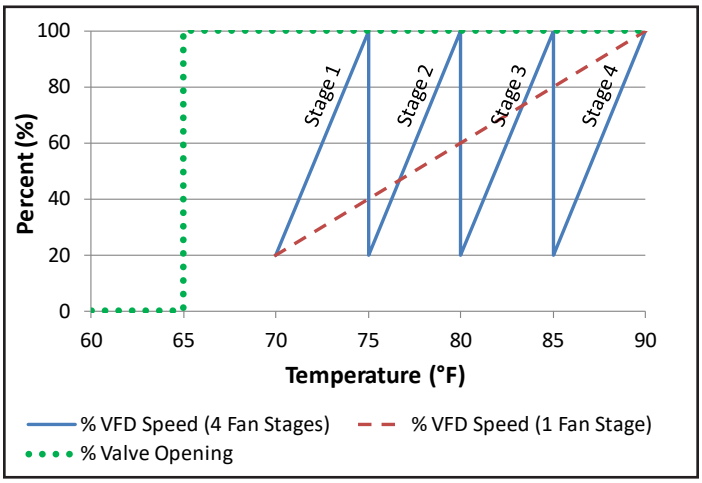



*Figure 63: (V) VALVE / VFD STAGE - % vs. Temperature*




As shown in Figure 63, the default minimum and maximum VFD speeds are 20% and 100%, respectively. These minimum and maximum values are adjustable anywhere between 0% and 100%. Additional fans stage on when the VFD speed reaches the maximum value that was set. In addition, Figure 63 shows that the default temperature at which the valve opens completely is 65°F. This temperature is the Valve SP (also called Valve Target) and is adjustable.

Use all of the same setpoint settings as those outlined in section (I) except select VALVE SP/VFD STAGE.

**BAS Alternate**

In control strategies (I) through (V), the chiller MicroTech is directly controlling the cooling tower fan staging, variable frequency drives, and bypass valves. As an alternative, a BAS can control these components based on a signal from the MicroTech controller. See Figure 64.

*Figure 64: BAS Alternate*

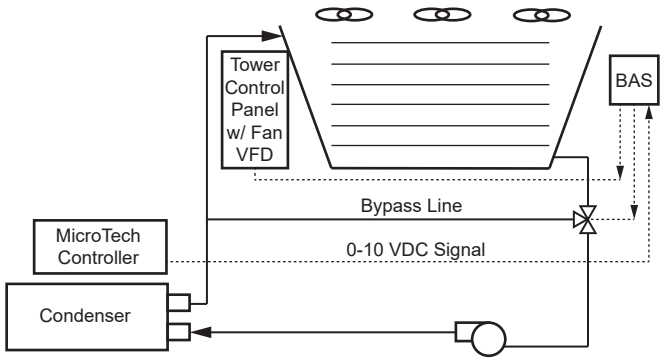


***Figure 65: Settings - Valves***

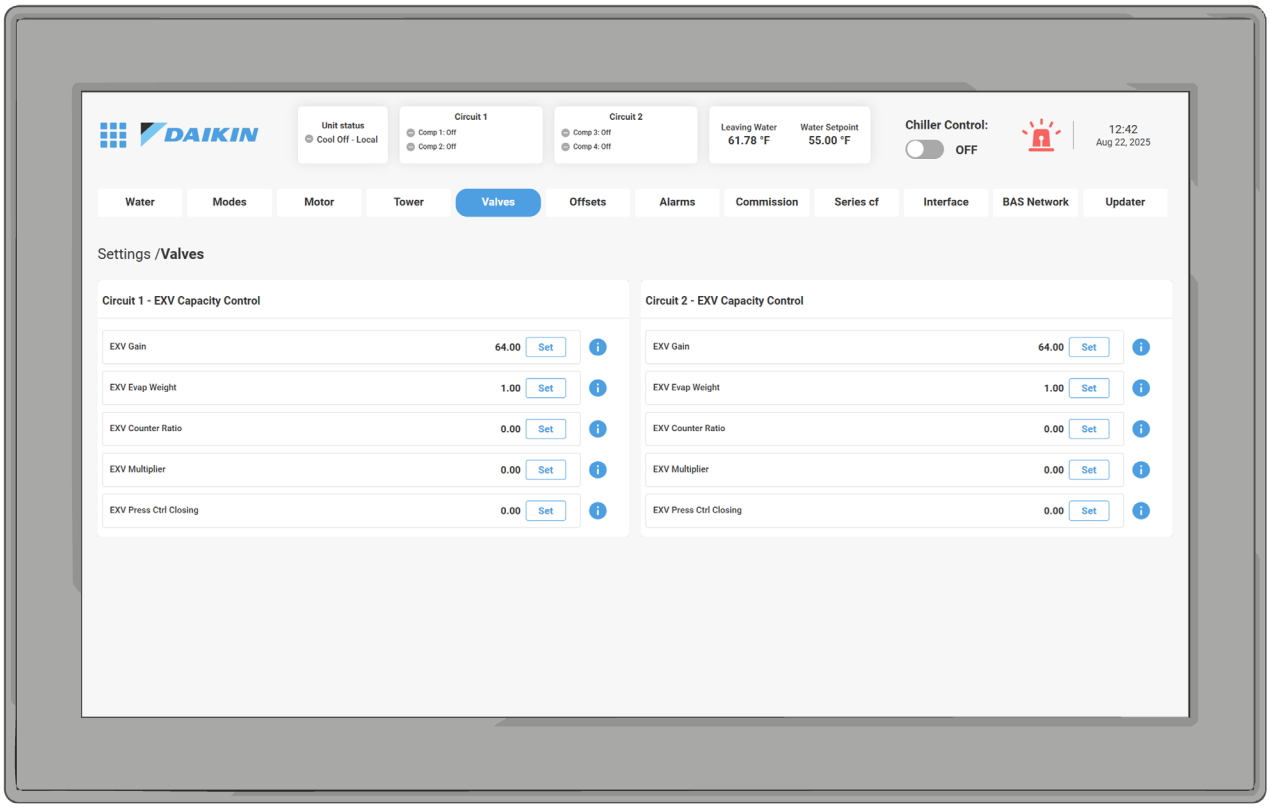



***Table 24: Valves Setpoints***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| EXV Capacity Control | | | | |
| EXV Gain | 0 | 0-400 | T | Gain selection based on chiller size and valve type. |
| EXV Evap Weight | 0 | -10 to 10 | T | Weight selection based on chiller size and valve type. |
| EXV Counter Ratio | 0.0 | -9.0 to 10.0 | T | Setpoint used to increase or decrease the amount of time it takes the valve to move. |
| EXV Multiplier | 0.0 | -1.9 to 2.0 | T | Setpoint used to increase or decrease the amount of balance error applied to the exv position. |
| EXV Press Ctrl Closing | 0.0 | -0.9 to 2.0 | T | Setpoint used to increase or decrease the amount of closing under pressure control. |

***Figure 66: Settings - Offsets***

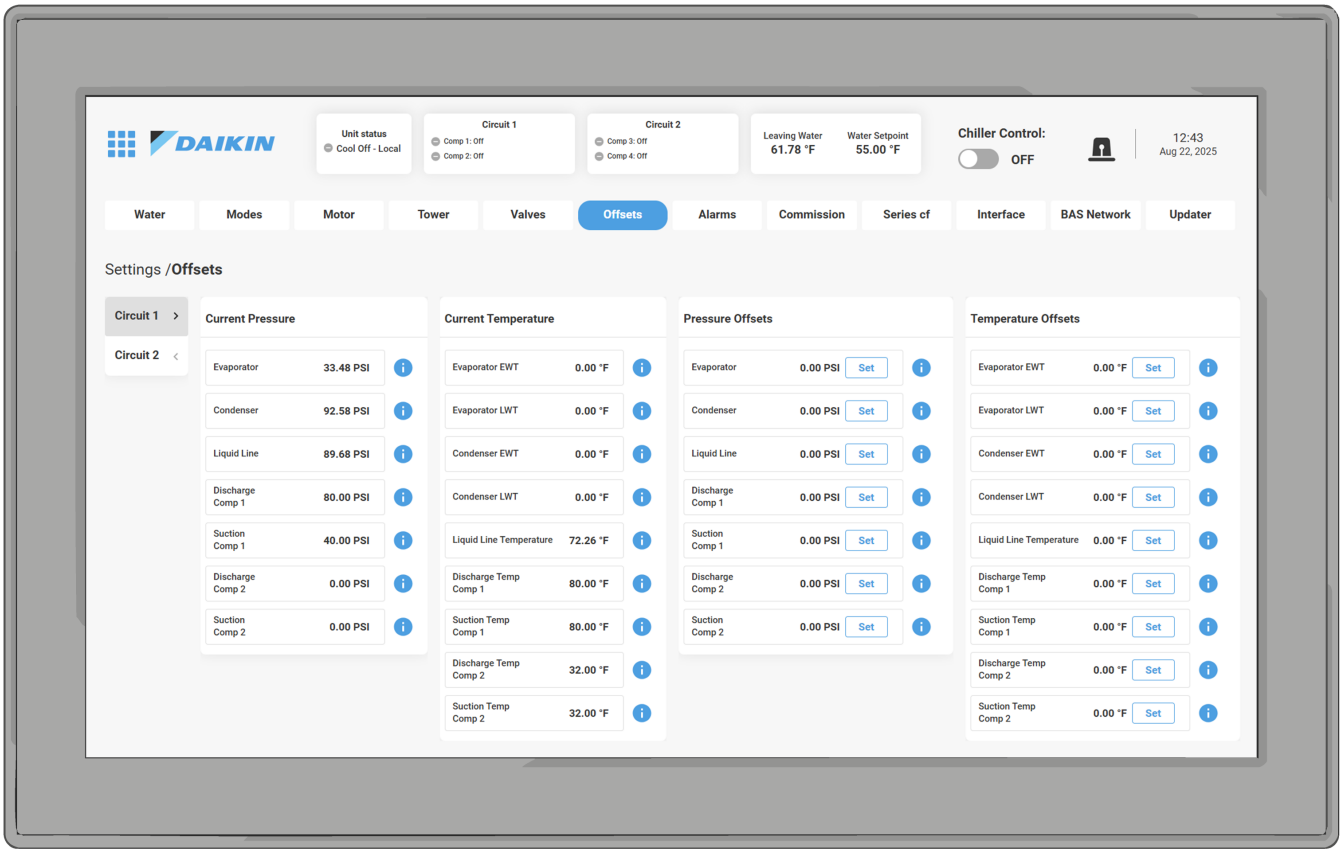



***Table 25: Offsets Setpoints***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Pressure Offsets | | | | |
| Evaporator | 0.0 | -2 to 2 | T | Sets the offset for the sensor listed based upon jobsite calibrations. |
| Condenser | 0.0 | -2 to 2 | T | |
| Liquid Line | 0.0 | -2 to 2 | T | |
| Compressor Discharge | 0.0 | -2 to 2 | T | |
| Compressor Suction | 0.0 | -2 to 2 | T | |
| Temperature Offsets | | | | |
| Evaporator EWT | 0.0 | -1.5 to 1.5 | T | Sets the offset for the sensor listed based upon jobsite calibrations. |
| Evaporator LWT | 0.0 | -1.5 to 1.5 | T | |
| Condenser EWT | 0.0 | -1.5 to 1.5 | T | |
| Condenser LWT | 0.0 | -1.5 to 1.5 | T | |
| Liquid Line Temp | 0.0 | -1.5 to 1.5 | T | |
| Compressor Discharge Temp | 0.0 | -1.5 to 1.5 | T | |
| Compressor Suction Temp | 0.0 | -1.5 to 1.5 | T | |

***Figure 67: Settings - Alarms***

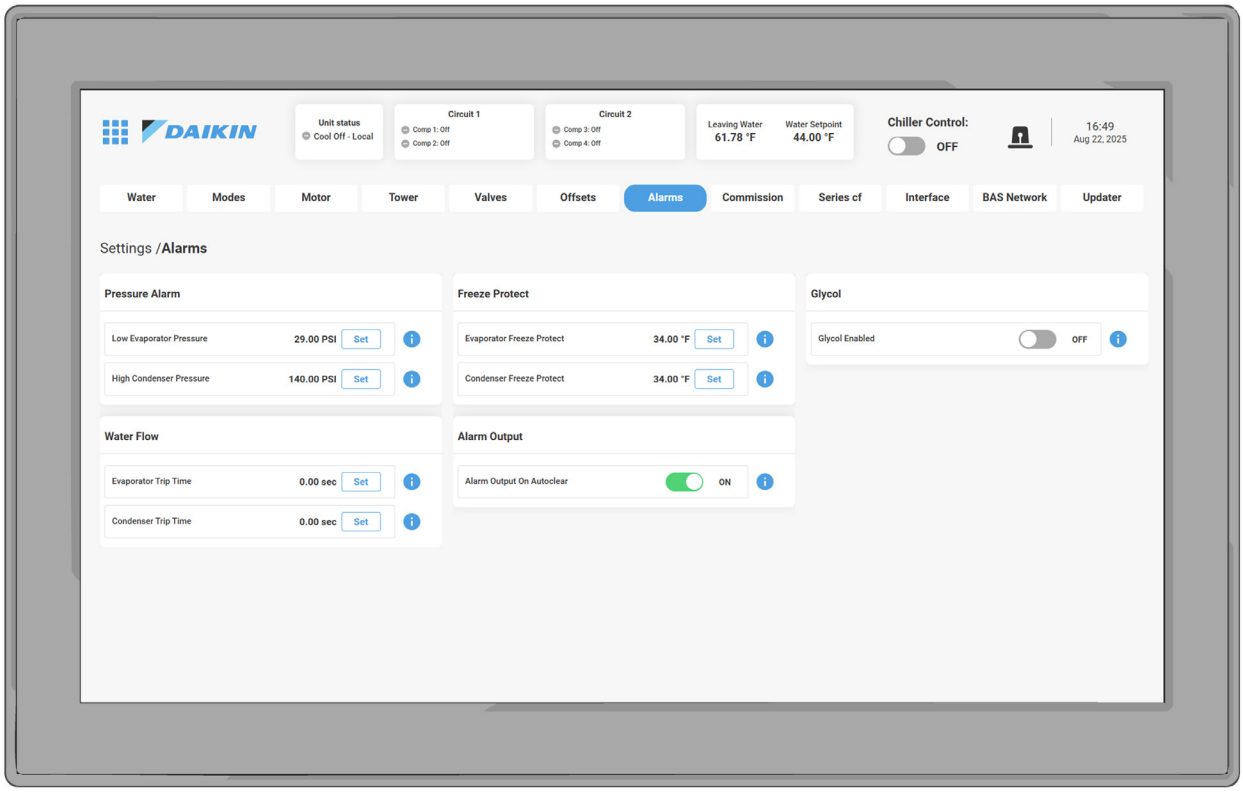



***Table 26: ALARMS Setpoint***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Pressure Alarm | | | | |
| Low Evaporator Pressure | 29.0 psi | 16.7 to 29.4 psi | T | Sets the evaporator pressure value below which the compressor is shut down - may need to be lowered if glycol is added to the system. If Glycol Enabled is selected, minimum may be set as low as 10.7 psi. |
| High Condenser Pressure | Refrigerant dependent | 120 to 200 psi | T | Sets the condenser pressure limit. |
| Water Flow | | | | |
| Evaporator Trip Time | 1 sec | 0 to 5 sec | T | Sets evaporator trip time |
| Condenser Trip Time | 10 sec | 0-10 seconds | T | Sets condenser trip time |
| Freeze Protect | | | | |
| Evaporator Freeze Protect | 34.0°F | 34.0 to 45.0°F | T | Sets the value of evaporator saturated temperature below which the evaporator pump is forced ON - occurs when unit is off and chiller senses need to provide flow to address a chiller limit alarm. |
| Evaporator Freeze Protect (Glycol Enabled) | 34.0°F | 34.0 to 45.0°F | T | Sets the value of evaporator saturated temperature below which the evaporator pump is forced ON - occurs when unit is off and chiller senses need to provide flow to address a chiller limit alarm. |
| Condenser Freeze Protect | 34.0°F | 34.0 to 45.0°F | T | Sets the value of condenser saturated temperature below which the condenser pump is forced ON - occurs when unit is off and chiller senses need to provide flow to address a chiller limit alarm. |
| Condenser Freeze Protect (Glycol Enabled) | 34.0°F | 34.0 to 45.0°F | T | Sets the value of condenser saturated temperature below which the condenser pump is forced ON - occurs when unit is off and chiller senses need to provide flow to address a chiller limit alarm. |

**NOTE:** The setpoints listed in Table 26 should only be changed by a Daikin Applied technician. Contact a Daikin Applied service representative for more information.

***Figure 68: Settings - Commission***

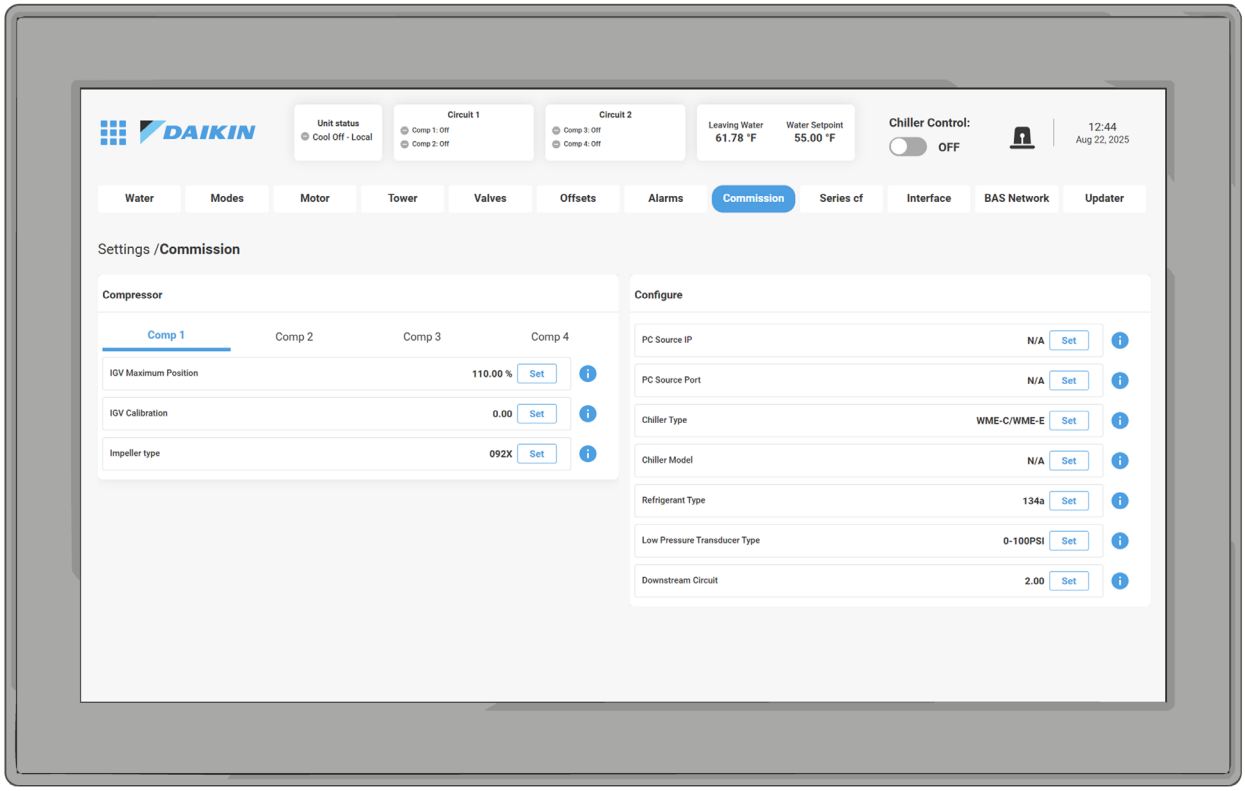



***Table 27: Commission Setpoints***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Compressor | | | | |
| Impeller Type | Factory set | 045 | T | Size of compressor and impeller type |
| | | | | |
| | | | | |
| Configure | | | | |
| Impeller Type | Factory set | 045 | T | Size of compressor and impeller type |
| PC Source IP | 127.0.0.1 | - | T | PC local source IP |
| PC Source Port | 80 | - | T | PC local source port |
| Chiller Model | WME-C | - | T | Unit model and vintage |
| Refrigerant Type | Refrigerant dependent | R-134a R-513a R515b | T | Unit refrigerant type |
| Low Pressure Tranducer Type | 0-100 | 0-100, 0-132PSI | T | Set low pressure tranducer type |
| Downstream Circuit | 2 | 1, 2 | T | Quad models only |

***Figure 69: Settings - Series Counterflow***

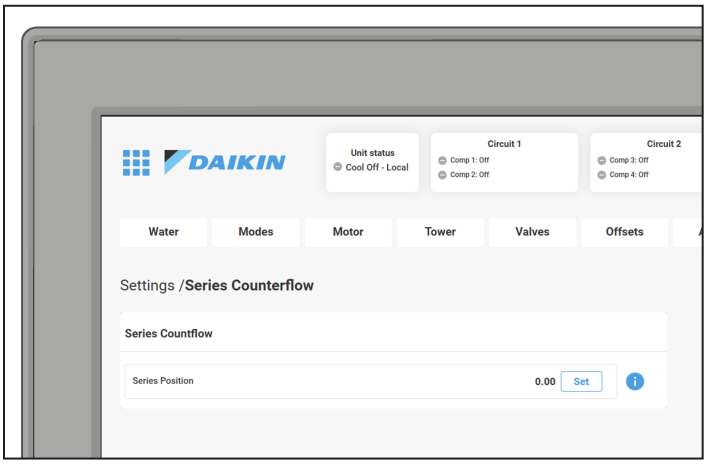



***Table 28: Series Counterflow Setpoints***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Series Counterflow | | | | |
| Series Position | - | - | T | Set series position |

***Figure 70: Settings - Interface***

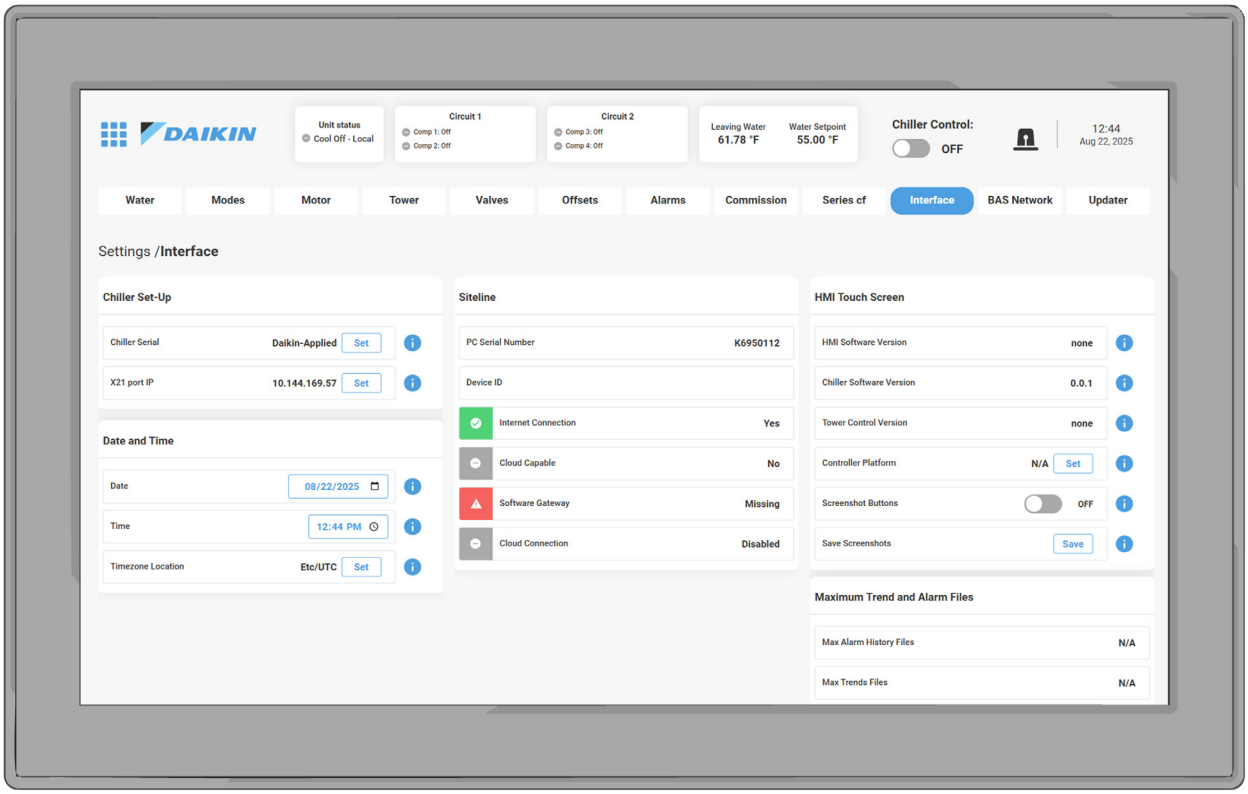



***Table 29: Interface Setpoints***

| Description | Default | Range | PW | Comments |
|---|---|---|---|---|
| Chiller Set-Up | | | | |
| Chiller Serial | - | - | O | Chiller serial number will be shown here |
| Display Cursor | - | - | O | To select if the display curson should be ON or OFF |
| X2P1 port IP | - | - | O | The IP address of X2P1 port |
| Date and Time | | | | |
| Date | - | - | O | Sets/Shows current date |
| Time | - | - | O | Sets/Shows current Time |
| Timezone Location | - | - | O | Sets/Shows Timezone location |
| HMI Touch Screen | | | | |
| HMI Software Version | - | - | O | Shows installed HMI software version |
| Chiller Software Version | - | - | O | Shows installed Chiller software version |
| Tower Control Version | - | - | O | Shows installed tower control software version |
| Controller Platform | - | - | O | Shows/Sets controller platfrom |
| Screenshot Buttons | - | - | O | Enables/Disables screenshot buttons on the screen |
| Save Screenshots | - | - | O | Saves the screenshots taken |

***Figure 71: Settings - BAS Network***

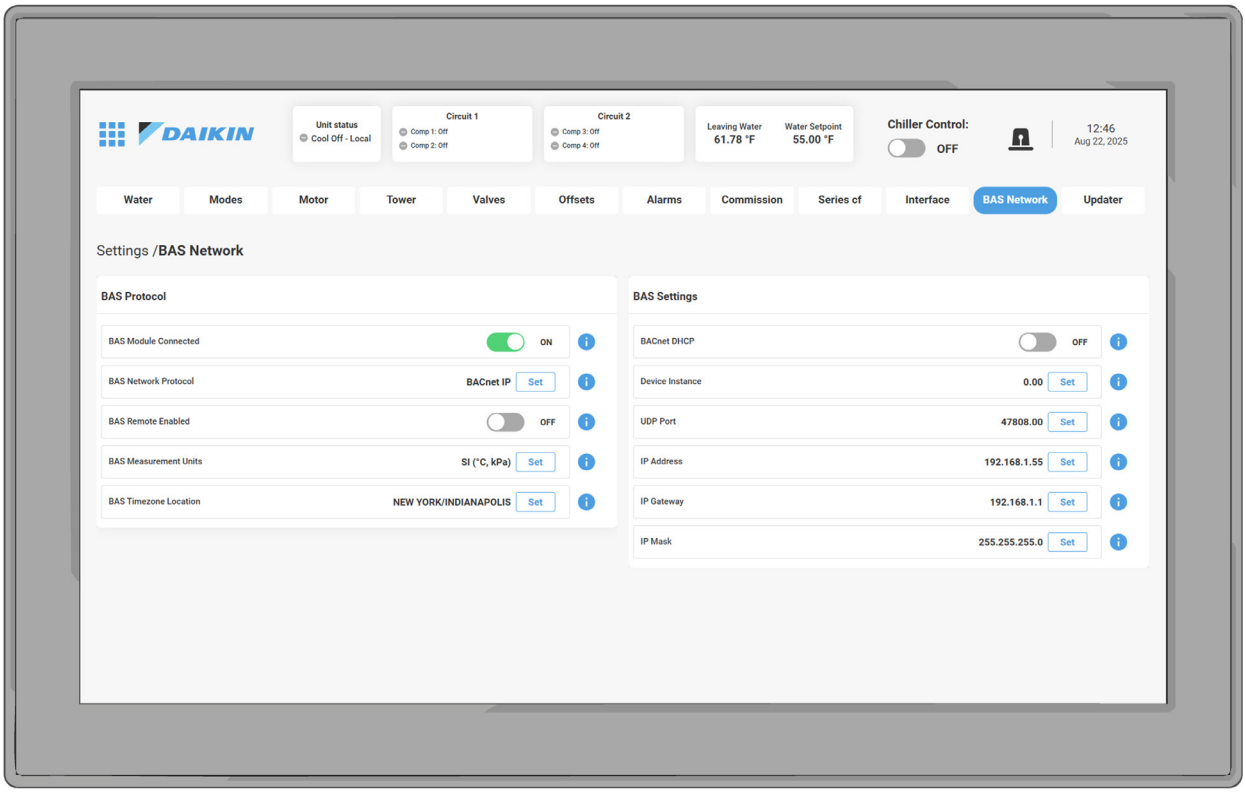
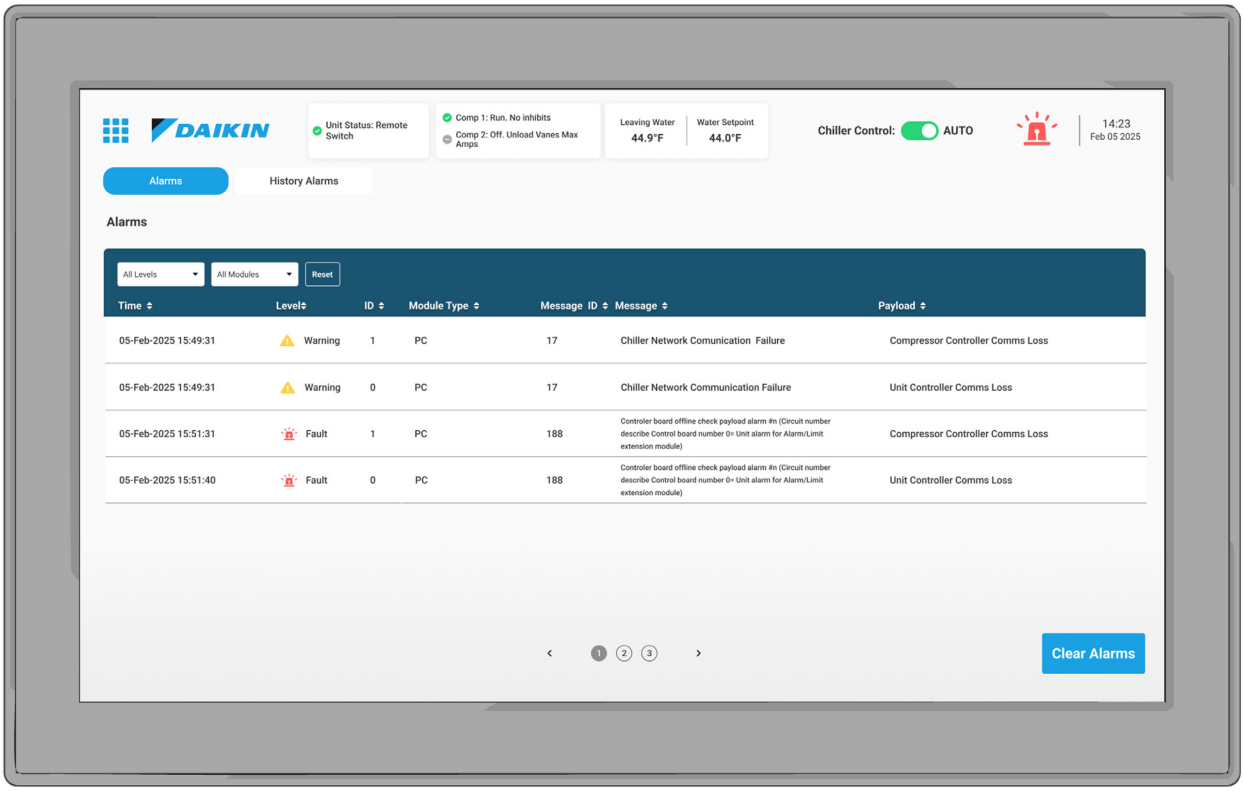



***Table 30: BAS Network Setpoint***

| Description | Default | Range | Comments |
|---|---|---|---|
| BAS Settings | | | |
| Address | FC RS485 | 0-127 | This value must be unique throughout the MSTP trunk. |
| Device Instance | 1 | 0-4194304 | This value must be unique throughout the entire BACnet network. |
| Baud Rate | 9600 baud | 9600/19, 200/38, 400/76, 800 baud; | All devices on the MSTP trunk must be set to the same baud rate. |
| Max Info Frames | 1 | 1-65534 | Defines how many info/data frames the device is allowed to send while holding the token. |
| Max Master= | 127 | 1-127 | Dependent on the Number of Masters in the system. |

# Alarms

***Figure 72: Alarm Screen***




The Alarms Screen is only accessible when an active alarm exists on the unit. Pressing the ALARM button on any screen will access the Alarms Screen.

The current active alarms (there may be more than one) will be displayed on the Active Alarms Screen. Alarms are arranged in order of occurrence, with the most recent on top. The date/time and cause of the alarm are displayed. See the "Possible Alarms and Events" for specifics on alarms that may occur.

After eliminating the cause of the alarm, clear the alarm by pressing the CLEAR button. This will clear the alarm from the register and allow the unit to restart after going through the start sequence. The alarm notice will be deleted from the screen.

If the cause of the alarm is not remedied, the alarm is still active and the alarm message will remain open. The unit will not begin its starting sequence.

The Alarm History Screen is accessed from the Alarm button, then by pressing the HISTORY tab as shown.

Use the date button to choose the desired date. Use the Copy button to extract the desired alarm log to a USB stick. An example of the date and copy buttons is shown in the adjacent figure. There are three types of alarms:

1. **Shutdown Alarms / Fault (Red text)** - This is an equipment protection alarm that shuts a unit or compressor off.
2. **Warnings / Problem (Yellow text)** - This is a limit alarm that limits compressor loading in response to an out-of-normal condition. If the condition that caused a limit alarm is corrected, the alarm light will be cleared automatically.
3. **Event (Black text)** - This is a notification only. The controller takes no action in response to this alarm.

Each alarm displays the date stamp, action taken, and the cause of the alarm. Clicking on a listed alarm will bring up more details about that particular alarm at the top of the screen.

Although the Alarm History Screen only displays the most current alarms, a record of ALL alarms is stored in the HMI PC. Note that this record may include alarms that occurred when the chiller was in the factory. This record is maintained even if the HMI PC is powered off.

When the HMI is powered back on, the last eight alarms will show back up on the Alarm History Screen and all alarm history will still be available for download. (The download process is described next.) If an alarm both occurs and is cleared when the HMI PC is powered off, it will not be recorded in the alarm history.

The Alarm History Screen can be used to download the alarm history via USB. In order to download the trend or alarm history, first insert a USB drive into the HMI PC.

**NOTICE**

In order to prevent viruses from being transferred from the USB drive to the HMI PC, it is important that a clean USB drive is used. Do NOT use a USB drive that contains any auto-executable files.

**To Download Trend History:**

- Make sure that the "History File" text field on the right side of the Alarm History Screen shows a date. If it shows "ALARMS" rather than a date, press either the PREV or NEXT button. (Pressing the PREV button when the "History File" text field shows "ALARMS" will bring up yesterday's date. Pressing the NEXT button when the "History File" text field shows "ALARMS" will bring up today's date.)
- Use the PREV or NEXT button to change the date in the "History File" text field to the desired date. The dates will stop scrolling when the last file in that direction has been reached. (The HMI PC will store 30 days of history at a minimum. More days might be stored depending on the trend history file sizes. The HMI PC will automatically delete old trend history files as needed to make room for new trend history files.)
- Take note of the file size of that date's history by viewing the "Size" text field. Press the COPY to USB button and watch the file size in the "Size" text field count up to the noted file size. Once this text field has stopped counting and has reached its actual file size, the download of that file to the USB is complete.
- Repeat this process for each desired day of trend history. Each day must be downloaded individually. It is not possible to download multiple days of trend history at once.

**To Download Alarm History:**

- Make sure that the "History File" text field on the right side of the Alarm History Screen shows "ALARMS." If it shows a date instead, press the ALARMS button.
- Take note of the file size of the alarm history by viewing the "Size" text field. Press the COPY to USB button and watch the file size in the "Size" text field count up to the noted file size. Once this text field has stopped counting and has reached its actual file size, the download of the alarm history to the USB is complete. (Note that unlike the trend history files, alarm history only has one file.)

**Viewing/Using Trend History and Alarm History Files:**

- To download trends press the Trends button and then "Copy Customer Trends". There will be a folder created called "Trend_Files". Trend history file names will be displayed as "TrendXXXXXX", where the first two X's will be numbers to indicate the year, the second two X's will be numbers to indicate the month, and the last two X's will be numbers to indicate the day. For example, if there is a file called Trend140510, it indicates that the file contains trend history from 5/10/2014.
- To download alarms, click "Copy". The alarm history file name will be displayed as "AlarmXXXXXXXX."
- All trend history and alarm history files are saved from the HMI PC as .csv files. These files can be opened on a normal PC and manipulated using Microsoft Excel for personal use.

**Requesting Tech Support:**

- If tech support is requested, the original unmanipulated files (Trend.csv and Alarm.csv) must be sent together to Daikin Applied. Any other file formats are NOT accepted.

## Possible Alarms and Events

There are three types of alarms: faults, problems, and warnings. In addition to these three alarms, there are also “events.” See the following tables for examples of faults, problems, warnings, and events that can occur. Separate tables are shown based on whether the alarm source is the unit or the compressor.

In the “Alarm Reset” column of the following tables, italics indicate special alarm conditions or severity. If the “Alarm Reset” says “Auto-clears,” it indicates that the alarm will auto-clear after the condition is resolved and the normal condition returns.

### *Fault Alarms*

Equipment protection faults cause rapid compressor shutdown. The compressor is stopped immediately (if the compressor was running).

***Table 31: Unit Faults***

| Name | Trigger Condition |
|---|---|
| Condenser Pump Fault | Condenser flow switch not satisfied for 60+ seconds after enabling condenser pump (dependent on pump mode) |
| Evaporator Pump Fault | Evaporator flow switch not satisfied for 60+ seconds after enabling evaporator pump (dependent on pump mode) |
| Evaporator Leaving Water Temperature Sensor | Evaporator leaving water temperature sensor indicates bad sensor status |
| Condenser Leaving Water Temperature Sensor | Condenser leaving water temperature sensor indicates bad sensor status |
| Evaporator Flow Loss | Evaporator flow switch indicates no flow while the chiller is running or an alarm occurs |
| Condenser Flow Loss | Condenser flow switch indicates no flow while the chiller is running or an alarm occurs |
| cpcOe Configuration Fault | UE1 module indicates a fault |
| cpCOe Offline Fault | UE1 module indicates no communications |
| BAS Module Offline | BUE1 module indicates no communications |
| Comm Loss | PC lost ethernet communication with controller for extended period of time |

***Table 32: Compressor Faults***

| Name | Trigger Condition |
|---|---|
| cpcOe Configuration Fault | CE1 module indicates a fault |
| cpCOe Offline Fault | CE1 module indicates no communications |
| MBC Communication Fault | Controller indicates no communication with MBC |
| VFD Communication Fault | Controller indicates no communication with VFD |
| Low Suction Pressure Fault | Suction pressure below low pressure setpoint and suction pressure sensor is valid |
| High Discharge Pressure | Discharge pressure above high pressure setpoint and discharge pressure sensor is valid |
| High Motor Winding Temperature | Motor winding temperature sensor exceeded 298°F |
| High Motor Gap Temperature | Motor gap temperature sensor exceeded 130°F |
| Max RLA Exceeded | VFD RLA exceeded 115% of the nameplate RLA |
| Motor Winding Temperature Sensor | All motor winding temperature sensor statuses indicates bad sensor statuses |
| Motor Gap Temperature Sensor | Motor gap temperature sensor indicates bad sensor status |
| Rotor Pump Temperature Sensor | Rotor pump temperature sensor indicates bad sensor status |
| High Suction Temperature | Suction temperature exceeded 125°F |
| High Discharge Temperature | Discharge temperature exceeded 150°F |
| VFD IPS HI Temp | VFD indicates IPS High Temperature |
| VG Security Authentication | Security authentication failed by controller after boot |
| VFD Enable Signal | The compressor enable circuit is interrupted while the compressor is running or the VFD stops without indicating a fault from the MBC or VFD |
| VFD Speed Deviation | VFD speed is outside of 500RPMs of compressor setting for 30 seconds during shutdown |
| Comm Loss | PC lost ethernet communication with controller for extended period of time |
| MBC Fault | Fault originating from the MBC |
| VFD Fault | Fault originating from the VFD |

***Table 33: Compressor Warnings***

| Name | Trigger Condition |
|---|---|
| Motor Winding Sensor | Any motor winding temperature sensor indicates bad sensor status |
| Motor Case Temperature Sensor | Motor case temperature sensor indicates bad sensor status |
| Suction Temperature Sensor | Suction temperature sensor indicates bad sensor status |
| Discharge Temperature Sensor | Discharge temperature sensor indicates bad sensor status |
| Suction Pressure Sensor | Suction pressure sensor indicates bad sensor status |
| Discharge Pressure Sensor | Discharge pressure sensor indicates bad sensor status |
| Comm Loss | PC loses ethernet communications with controller |
| MBC Warning | Warning originating from MBC |

-

*Table 34: Circuits Faults*

| Name | Trigger Condition |
|---|---|
| Evaporator Freeze Protection | Saturated evaporator temperature is below freeze protection setpoint |
| Condenser Freeze Protection | Saturated condenser temperature is below freeze protection setpoint |
| Evaporator Pressure Sensor | Evaporator pressure sensor indicates bad sensor status and there are no valid suction pressure sensors available |
| Condenser Pressure Sensor | Condenser pressure sensor indicates bad sensor status and there are no valid discharge pressure sensors available |
| Low Evaporator Pressure | Evaporator pressure below low pressure setpoint |
| High Condenser Pressure | Condenser pressure above high pressure setpoint |
| cpcOe Configuration Fault | UE1 module indicates a fault (Quad Only: Downstream Circuit) |
| cpCOe Offline Fault | UE1 module indicates no communications (Quad Only: Downstream Circuit) |
| Comm Loss | PC lost ethernet communication with controller for extended period of time (Quad Only: Downstream Circuit) |

*Table 35: Circuit Warnings*

| Name | Trigger Condition |
|---|---|
| Evaporator Pressure Sensor | Evaporator pressure sensor indicates bad sensor status |
| Condenser Pressure Sensor | Condenser pressure sensor indicates bad sensor status |
| Comm Loss | PC lost ethernet communication with controller (Quad Only: Downstream Circuit) |

## Controller Inputs and Outputs

The following tables list the controller inputs and outputs, both analog and digital.

*Table 36: Controller, Analog Inputs*

| # | Description | Signal Source | Sensor Range |
|---|---|---|---|
| 1 | Reset of Leaving Water Temperature | 4-20 mA Current | 0 to 20°F |
| 2 | Entering Evaporator Water Temperature | NTC Thermistor (10k@25°C) | -58 to 212°F |
| 3 | Entering Condenser Water Temperature | NTC Thermistor (10k@25°C) | -58 to 212°F |
| 4 | Leaving Condenser Water Temperature | NTC Thermistor (10k@25°C) | -58 to 212°F |
| 5 | Liquid Line Refrigerant Temperature | NTC Thermistor (10k@25°C) | -58 to 212°F |
| 6 | Demand Limit | 4-20 mA Current | 0-100 %RLA |
| 7 | Evaporator Water Flow | 4 to 20 mA Current | 0 to 10,000 gpm |
| 8 | Condenser Water Flow | 4 to 20 mA Current | 0 to 10,000 gpm |
| 9 | Optional Tower Sump Temperature | NTC Thermistor (10k@25°C) | -58 to 212°F |
| 10 | Leaving Evaporator Water Temperature | NTC Thermistor (10k@25°C) | -58 to 212°F |

**NOTE:** "Sensor Range" in Table 36 indicates the range of the input, NOT the operating range of the chiller.

*Table 37: Controller, Digital Inputs*

| # | Description | Signal | Signal |
|---|---|---|---|
| 1 | Unit OFF Switch | 0 VAC (Stop) | 24 VAC (Auto) |
| 2 | Remote Off/ Enable | 0 VAC (Stop) | 24 VAC (Enable) |
| 3 | Mode Switch | 0 VAC (Normal) | 24 VAC (Alternate) |
| 4 | Manual Off | 0 VAC (Off) | 24 VAC (Enable) |
| 5 | Manual Off2 | 0 VAC (Off) | 24 VAC (Enable) |
| 6 | Manual Off3 | 0 VAC (Off) | 24 VAC (Enable) |
| 7 | Manual Off4 | 0 VAC (Off) | 24 VAC (Enable) |
| 8 | Quick Off (All Off) | 0 VAC (Quick Stop) | 24 VAC (Enable) |
| 9 | Ground Fault | 0 VAC (Alarm) | 24 VAC (Off) |
| 10 | Ground Fault2 | 0 VAC (Alarm) | 24 VAC (Off) |
| 12 | HATS Switch | 0 VAC (Off) | 24 VAC (Enable) |
| 13 | External Fault | Configurable | Configurable |

| # | Description | Signal | Signal |
|---|---|---|---|
| 17 | Evaporator Water Flow Switch | 0 VAC (No Flow) | 24 VAC (Flow) |
| 18 | Condenser Water Flow Switch | 0 VAC (No Flow) | 24 VAC (Flow) |

***Table 38: Controller, Analog Outputs***

| # | Description | Output Signal | Sensor Range |
|---|---|---|---|
| 1 | Cooling Tower By-pass Valve Position | 0 to 10 VDC | 0 to 100% Open |
| 2 | Cooling Tower VFD Speed | 0 to 10 VDC | 0 to 100% |
| 3 | EXV signal to IB Valve Control Bd. | 0 to 10 VDC | 0 to 100% |
| 4 | Tower Control Reset | 0 to 10 VDC | 0 to 100% Mask Reset |
| 5 | % Unit Load | 0 to 10 VDC | 0 to 125% (8V = 100%) |

**NOTE:** "Sensor Range" in Table 38 indicates the range of the output, NOT the operating range of the chiller.

***Table 39: Controller, Digital Outputs***

| # | Description | Load | Output OFF | Output ON |
|---|---|---|---|---|
| 1 | Evaporator Water Pump #1 | Pump Contactor | Pump OFF | Pump ON |
| 2 | Evaporator Water Pump #2 | Pump Contactor | Pump OFF | Pump ON |
| 3 | Condenser Water Pump #1 | Pump Contactor | Pump OFF | Pump ON |
| 4 | Condenser Water Pump #2 | Pump Contactor | Pump OFF | Pump ON |
| 5 | Tower Fan #1 | Fan Contactor | Fan OFF | Fan ON |
| 6 | Tower Fan #2 | Fan Contactor | Fan OFF | Fan ON |
| 7 | Expansion Valve Calibration | Digital Input (50K Ohms) | Normal | Calibration |
| 8 | Alarm | Alarm Indicator | Alarm OFF | Alarm ON |
| 9 | Tower Fan #3 | Fan Contactor | Fan OFF | Fan ON |
| 10 | Tower Fan #4 | Fan Contactor | Fan OFF | Fan ON |
| 11 | Alarm Output | User Defined | Alarm OFF | Alarm ON |

# Startup and Maintenance

## Pre-Startup

Inspect the chiller to ensure no components became loose or damaged during shipping or installation including leak test and wiring check. Complete the pre-start checklist in the appendix of this manual and return to Daikin Applied prior to startup date.

**⚠ CAUTION**

Dyes used for refrigerant leak detection are not tested or recommended for use in Daikin Applied chillers. Use of these products may damage and/or degrade the performance of the equipment and will void the manufacturer warranty.

**NOTICE**

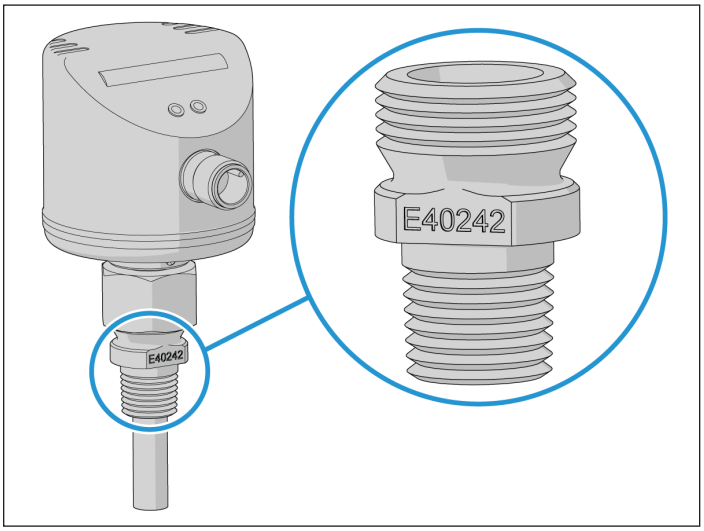
Daikin Applied service personnel or factory authorized service agency must perform initial startup in order to activate warranty. They must return the "WME Centrifugal Equipment Warranty Form" within 10 working days to Daikin Applied as instructed on the form to obtain full warranty benefits.

## Flow Switch Installation and Calibration

A thermal dispersion flow switch uses heat to determine flow and therefore must be calibrated during system startup. A thermal dispersion flow switch can be an acceptable replacement for paddle type flow switches and differential pressure switches, but care must be taken regarding wiring.

The thermal dispersion flow switch supplied by Daikin Applied, shown in Figure 1, comes as a two part unit consisting of a flow switch and an adapter labeled E40242 by the supplier.

***Figure 73: Thermal Dispersion Flow Switch and Adapter***



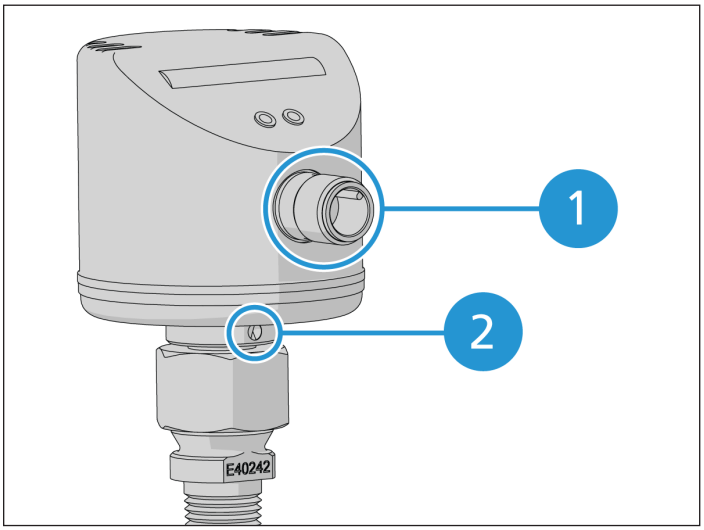

**NOTICE**

Flow switch MUST be calibrated before chiller operation. Failure to properly calibrate the switch may result in severe chiller damage and/or void warranty.

## Mounting

Figure 74 highlights the position of the electrical connector and indentation 'mark' on flow switch.

***Figure 74: Flow Switch Details***

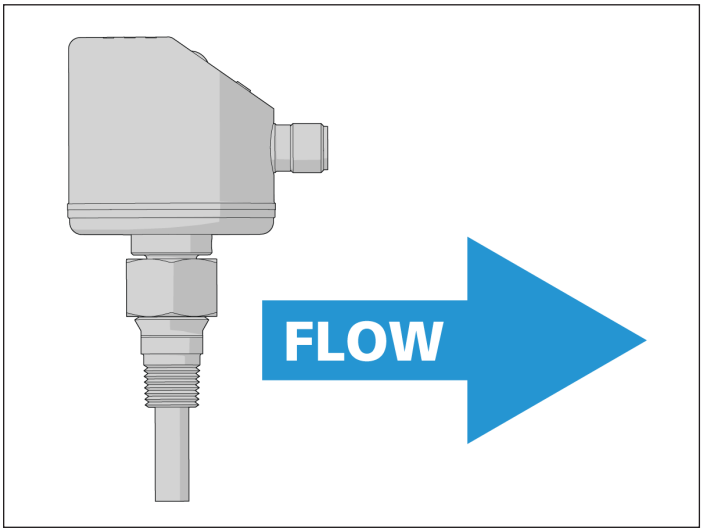



| No. | Descriptions |
|---|---|
| 1 | Electrical Connector |
| 2 | Indentation |

It is required that the flow switch be mounted such that the electrical connection and indentation 'mark' are pointed in the direction of flow as shown in Figure 75.

If the flow sensor is to be mounted away from the unit, the sensor should be mounted on the wall of the **inlet** pipe of evaporator and condenser, or in a run of straight pipe that allows 5 to 10 pipe diameters prior to the sensor and 3 to 5 pipe diameters of straight pipe after the sensor. Flow switch is placed in inlet pipe to reflect flow leaving the barrel. If installation on the **outlet** pipe is necessary, contact Chiller Technical Response at TechResponse@DaikinApplied.com to review the job site details.

*Figure 75: Mount in Direction of Flow*

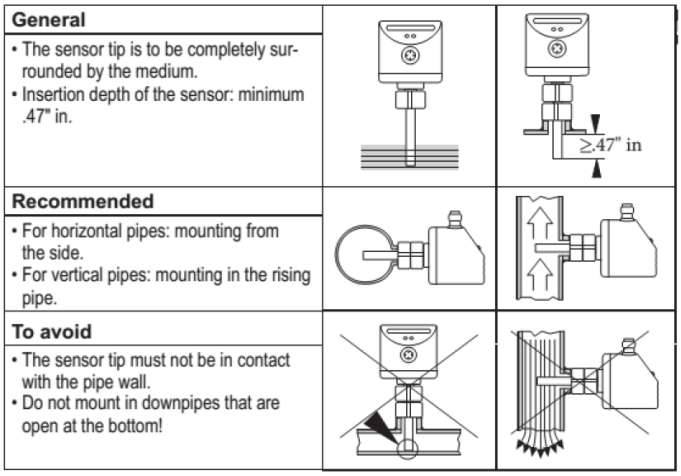



It is important that the flow switch be mounted so that the probe is sufficiently inserted into the fluid stream. Figure 76 illustrates the recommended orientation of the sensor. It may not be mounted directly on top or directly on the bottom of a horizontal pipe.

**NOTICE**

DO NOT alter or relocate factory installed flow switch. If issues exist, contact Chiller Technical Response at TechResponse@DaikinApplied.com.

*Figure 76: Remote Mounting Guidelines for Flow Switch*




If needed, the adapter is threaded into the pipe using pipe sealant appropriate for the application. The flow sensor is mounted onto the adapter using silicone grease. Carefully apply lubricant to the inside threads and O-ring so temperature probe does not become coated with lubricant. Torque the adapter/sensor connection to 18.5 ft/lbs.

## Wiring

Refer to wiring diagram in the unit control panel.

Either AC or DC is used to power the flow switch. The unit controller's digital input is a DC signal which is supplied through the switch output of the flow switch for flow indication. It is required that the AC and DC commons of power be separated. Contact Chiller Technical Response for alternate wiring scenarios.

## Flow Switch Setup

The flow switch comes from the factory set at a default velocity of 20 cm/s. This value is typically well below the minimum water flow specified for the unit evaporator and condenser so field adjustment is required for adequate low flow protection. Table 40 shows the calculated gallons per minute (gpm) for Schedule 40 steel pipe for various fluid velocities from 20 cm/s to 300 cm/s. The flow switch has an overall range of adjustment from 3 cm/s to 300 cm/s.

**Step 1:** Adjust flow through the evaporator to the minimum desired operating gpm. Maintain this flow throughout the setup procedure.

**Step 2:** Once steady state minimum desired operating flow is obtained, perform the 'Teach' function on the flow switch. The 'Teach' function is initiated by holding down the minus '-' button on the face of the flow switch for 15 seconds. During this 15 second period, LEDs '0' and '9' will be lit green. Once the 'Teach' function is completed, the outer LEDs will flash green as shown in Figure 77.

*Figure 77: Automatic Teach of Setpoint*

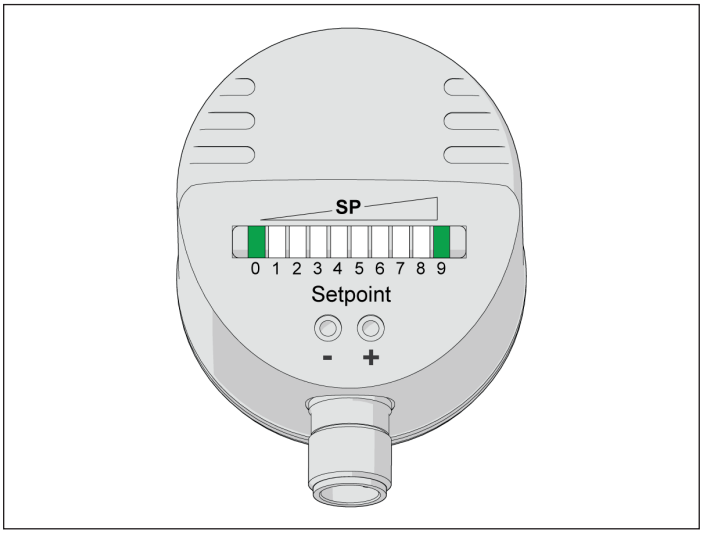
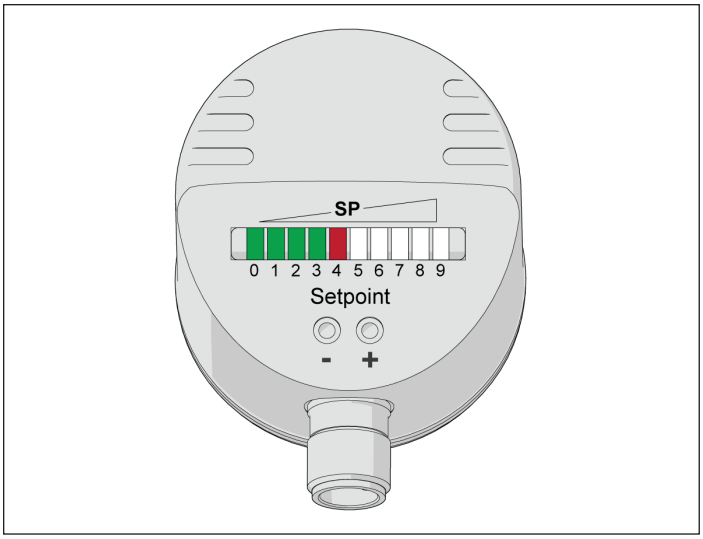


*Table 40: Flow Volume Calculation*

| Pipe Size (inch) | Inside Pipe Diameter (inch) | US GPM at the velocities indicated below | | | | | | | | | GPM adjustment per '+' or '-' key input |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Default 20 cm/sec | 30 cm/sec | 50 cm/sec | 75 cm/sec | 100 cm/sec | 150 cm/sec | 200 cm/sec | 250 cm/sec | 300cm/sec | |
| 2 | 2.06 | 6.86 | 10.3 | 17.2 | 25.7 | 34.3 | 51.5 | 68.6 | 85.8 | 102.9 | 1.72 |
| 2.5 | 2.46 | 9.79 | 14.7 | 24.5 | 36.7 | 49.0 | 73.4 | 97.9 | 122.4 | 146.9 | 2.42 |
| 3 | 3.07 | 15.1 | 22.7 | 37.8 | 56.7 | 75.6 | 113.4 | 151.2 | 189.0 | 226.8 | 3.78 |
| 3.5 | 3.55 | 20.2 | 30.3 | 50.6 | 75.8 | 101.1 | 151.7 | 202.2 | 252.8 | 303.3 | 5.06 |
| 4 | 4.03 | 26.0 | 39.1 | 65.1 | 97.7 | 130.2 | 195.3 | 260.4 | 325.5 | 390.5 | 6.51 |
| 5 | 5.05 | 40.9 | 61.4 | 102.3 | 153.5 | 204.6 | 306.9 | 409.2 | 511.5 | 613.7 | 10.2 |
| 6 | 6.07 | 59.1 | 88.6 | 147.7 | 221.6 | 295.5 | 443.2 | 590.9 | 738.7 | 886.3 | 14.8 |
| 8 | 7.98 | 102.3 | 153.5 | 255.8 | 383.7 | 511.6 | 767.5 | 1023.3 | 1279.1 | 1534.7 | 25.6 |
| 10 | 10.02 | 161.3 | 241.9 | 403.2 | 604.8 | 806.5 | 1209.7 | 1612.9 | 2016.2 | 2419.1 | 39.0 |
| 12 | 11.94 | 229.0 | 343.4 | 572.4 | 858.6 | 1144.7 | 1717.1 | 2289.5 | 2861.9 | 3433.8 | 57.2 |
| 14 | 13.13 | 276.8 | 415.2 | 692.0 | 1037.9 | 1383.9 | 2075.9 | 2767.8 | 3459.8 | 4151.3 | 69.2 |
| 16 | 15.00 | 361.5 | 542.2 | 903.6 | 1355.5 | 1807.3 | 2710.9 | 3614.6 | 4518.2 | 5421.2 | 90.4 |
| 18 | 16.88 | 457.5 | 686.3 | 1143.8 | 1715.7 | 2287.6 | 3431.4 | 4575.2 | 5719.0 | 6862.1 | 114.4 |
| 20 | 18.81 | 572.4 | 853.0 | 1421.6 | 2132.4 | 2843.2 | 4264.8 | 5686.4 | 7108.0 | 8528.6 | 142.2 |

**Step 3**: After the 'Teach' function is completed and the outer LEDs have flashed, the flow switch will indicate a new setpoint based upon the current flow which should still be at the steady state minimum desired operating flow. Figure 78 shows a typical display for this condition. All LEDs to the left of the SP LED are lit green. The SP LED is lit RED (or may toggle amber) which indicates that the flow switch is OPEN. Typically, an increase in fluid flow between 15% to 30% above the 'Teach' function flow is required for the SP LED to turn AMBER and the flow switch to CLOSE indicating acceptable flow.

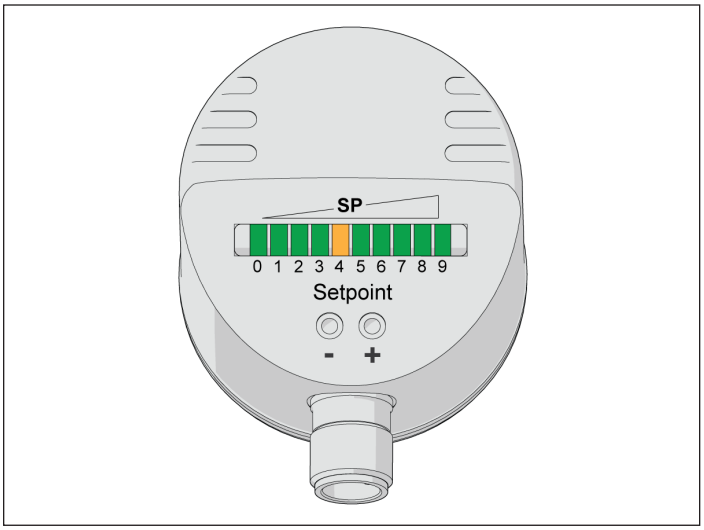
*Figure 78: Teach Adjustment Complete*




In Step 3, the 'Teach' function re-adjusted the flow switch SP while flow was at the minimum desired operating flow. The chiller will not operate at this flow because the flow switch is OPEN after performing the 'Teach' function. The benefit of the 'Teach' function is to quickly set the setpoint within the desired operating range. Additional 'manual' adjustment of setpoint is required in order to allow for chiller operation at this minimum flow. The '+' and '-' buttons on the face of the flow switch allow for the manual adjustment of the SP. Pressing the '+' button reduces the flow setpoint while pressing the '-' button increases the flow setpoint. Each button press, '+' or '-', changes the flow setpoint by 2.5 cm/s.

**Step 4:** Press the '+' button until LED '9' begins to flash, as shown in Figure 79. Opening of flow switch should now occur at approximately 80% to 90% of minimum flow.

*Figure 79: Upper Range of Minimum Flow*



**Step 5:** Once the SP is set, it is recommended that the sensor be locked to avoid inadvertent readjustment. This can be performed by pressing both the '+' and '-' buttons simultaneously for 10 seconds. The indication goes out momentarily indicating the unit is locked. To unlock, the same procedure is performed to toggle to unlocked.

**NOTICE**

The LED window display on flow switch represents a velocity range of 50 cm/s. The window centers on the SP. For example, if the SP was set to 200 cm/s, then the LED labeled '0' would represent a velocity of 180 cm/s when lit and the LED labeled 9 would represent a velocity of 230 cm/s when lit.

Each LED represents 5 cm/s, or two presses of the '+' or '-' buttons.

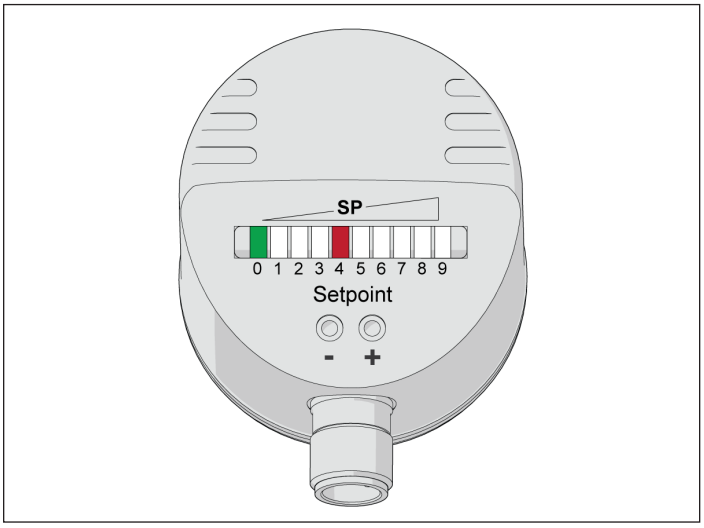
**NOTICE**

When power is initially applied to the flow switch, all green LEDs light and go out step by step. During this time, the output is closed. The unit is in the operating mode.

When making manual adjustments to the SP, if no button is pressed for two seconds, the unit returns to the operating mode with the newly set value.

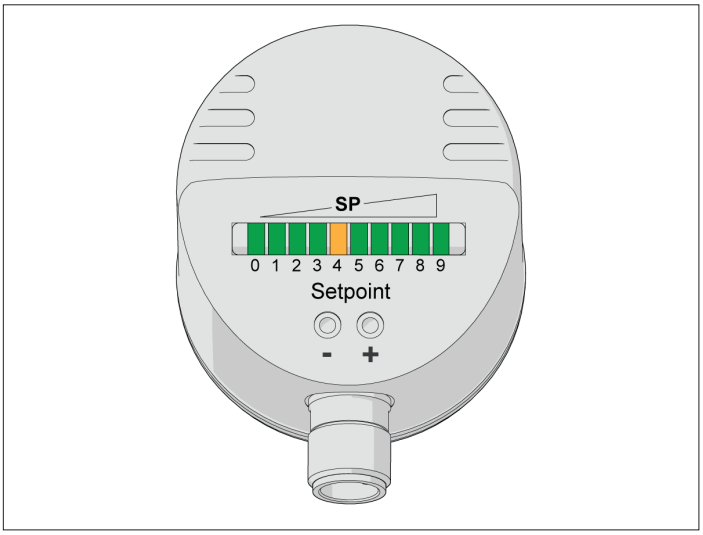
**Flow below display range:** The SP LED will be lit red and the leftmost LED will be flashing green. For example, if the SP was set to 200 cm/s, the flashing labeled '0' would indicate that the flow was below 180 cm/s. This would be shown if no flow through chiller or lowered than desired flow.

***Figure 80: Display for Flow Below Range***




**Flow above display range:** The SP LED will be lit amber, all LEDs to the left and right of the SP LED will be green with the rightmost LED flashing green. For example, if the SP was set to 200 cm/s, the flashing LED labeled '9' would indicate that the flow was above 230 cm/s. This may be a normal display depending on range by which flow varies through chiller.

***Figure 81: Display for Flow Above Range***



# Chiller Maintenance

**⚠ DANGER**

Use approved Lock Out/Tag Out procedures to disconnect power from the unit. Wait 20 minutes after disconnecting power from the unit before opening any compressor access covers. The DC link capacitors store enough energy to cause electrocution.

## Electrical System

Maintenance of the electrical system involves the general requirement of keeping connections clean and tight. Pump interlocks and flow switches should be checked to be sure they interrupt the control circuit when tripped.

## Cleaning and Preserving

A common cause of service calls and equipment malfunction is dirt. This can be prevented with normal maintenance. The system components most subject to dirt are:

1. Strainers: Remove and clean strainers in the chilled water system and condenser water system at every inspection.
2. Condenser Tubes: Inspect the condenser tubes annually for fouling and clean if required. The standard heads should be removed with care due to their weight. One method for handling standard heads follows (only qualified service personnel should perform these tasks):
   - After draining water, remove all but two head bolts at roughly 10 o'clock and 2 o'clock.
   - Loosen the remaining two bolts to enable the head to be separated from the tube sheet sufficiently for a clevis pin or hook to be inserted into an open bolt hole at the top of the head.
   - Attach a hoist to the pin or hook, lift the head to remove weight from the two remaining bolts, remove the bolts, and carefully remove the head.
   - Do not try to install a machine thread eyebolt into the head vent fitting, which has pipe threads.
   - Reverse this procedure to mount the head, using a new gasket.
3. Condenser Flow Sensor: The condenser sensor should be cleaned anytime the condenser is opened. This should typically be performed at the annual inspection; however, more frequent cleaning may be required depending on the conditions of the jobsite. Recommended maintenance includes the following:
   - Check the sensor tip for buildup.
   - Clean the tip using a soft cloth. Stubborn buildup, such as lime, can be removed using a common vinegar cleaning agent.
4. Electrical Panels: Excessive accumulation of dirt within panels can damage components, inhibit good air circulation, and make visual inspections difficult.

## Water Treatment

Special care must be taken when utilizing open system water that is usually not treated (such as lakes, rivers, and ponds). The use of untreated water will result in corrosion, erosion, slime buildup, scaling, or algae formation. Water treatment service must be used. Special tube and water head material may be required to reduce damage from corrosion. Daikin Applied is not responsible for damage or faulty operation from untreated or improperly treated water. "Water Quality Guidelines" on page 11 for caution statement on water quality.

# Seasonal Shutdown

**⚠ WARNING**

The condenser and evaporator are not self-draining. Where the chiller can be subject to freezing temperatures, the condenser and evaporator must be drained of all water. Water permitted to remain in the piping and vessels can rupture these parts if subjected to freezing temperatures. Dry air blown through the vessels will aid in forcing all water out.

Except for freezing conditions, it is desirable to leave water in the vessels to avoid long term exposure to air.

**Continuous forced circulation of antifreeze through the vessels is one method of avoiding freeze up.**

## Seasonal Startup

Seasonal startup procedures are as follows:

1. Leak test the unit.
2. Check and tighten all electrical connections.
3. Replace the drain plugs (including cooling tower pump and tower drain) if they were removed at shutdown the previous season.

# Harmonic Filter Evaluation

If the optional harmonic filter is provided with the chiller, measuring the current in each of the three phases of the capacitor circuit may help determine the condition of the capacitors. If the input phase currents are within a 5% match to each other and approximately 30% of filter current rating, the capacitors can be assumed to be in good working condition. Phase currents that are imbalanced, may indicate a capacitor failure. Testing should be done whenever the unit appears to be operating in an abnormal state.

When the unit is off, the harmonic filter may be checked for resistance levels. Using a multi-meter (set to read 100K ohms) to check the phase-to-phase isolation, the reading should be about 40K (total equivalent bleeder resistance value) and should be the same for each phase. Open circuit or very low readings indicate an issue. Also check phase-to-chassis resistance as low readings indicate a ground fault problem.

# Maintenance Schedule

Table 41 provides an overview of recommended maintenance procedures along with how frequently these procedures should be performed.

***Table 41: Recommended Maintenance Schedule***

| | Monthly | Quarterly | Semi-Annually | Annually | As Required By Performance | During Seasonal Shutdown | During Seasonal Startup |
|---|---|---|---|---|---|---|---|
| **I. Compressor** | | | | | | | |
| A. Analyze Compressor Fault Log | | X | | | | | |
| B. Check IGV operation | | X | | | | | |
| C. Check and tighten compressor electrical connections | | | | X | | | |
| D. Inspect rotor grounding rod every (5 year interval) | | | | *X | | | |
| **II. MicroTech Controls** | | | | | | | |
| A. Check for proper settings | | X | | | | | |
| B. Verify transducers and sensors for accuracy | | X | | | | | |
| C. Retrieve and archive HMI Trend Logs | O | | | | | | |
| D. Perform MicroTech check, log, and last fault analysis | | X | | | | | |
| **III. Condenser** | | | | | | | |
| A. Confirm correct water flow and pressure drop | O | X | | | | | |
| B. Confirm appropriate water treatment | O | | | | | | |
| C. Clean and Leak Test condenser tubes | | | | X | X | X | |
| D. Eddy Current Test - tube wall thickness | | | | | X | | |
| E. Seasonal Protection | | | | | X | | |
| F. Clean Flow Sensor | | | | X | X | | |
| **IV. Evaporator** | | | | | | | |
| A. Confirm correct water flow and pressure drop | O | X | | | | | |
| B. Confirm appropriate water treatment | O | | | | | | |
| C. Clean and Leak Test evaporator tubes | | | | | X | | |
| D. Eddy Current Test - tube wall thickness | | | | | X | | |
| E. Seasonal Protection | | | | | X | | |
| F. Clean Flow Sensor | | | | X | | | |
| **V. Chiller Unit** | | | | | | | |
| A. Run Test/Performance Evaluation | | X | | | | | |
| B. Leak Test entire unit | | X | | | | X | X |
| C. General Appearance: | | | | | | | |
| ....1. Paint/Corrosion | | | | | X | | |
| 2. Insulation | | | | | X | | |
| **VI. Electrical** | | | | | | | |
| A. Check and record line voltage | | X | | | | | |
| B. Inspect power components for signs of overheating | | X | | | | | |
| C. Check and tighten unit electrical components | | | | X | | | X |
| D. Check all panels for cleanliness - remove dust and debris from electrical boards and connections | | | | | X | | |

**Key:** O = Performed by owner personnel X = Performed by qualified service personnel

* = 5 year recommendation

# Appendix

## Pre-Start Checklist

### Pre-Start Checklist - Magnetic Bearing Chillers

Must be completed, signed, and returned to Daikin Applied service dept. two weeks prior to requested start date.

**JOB INFORMATION**

Job Name: _____ Model Number(s): _____

Installation Location: _____ G.O. Number(s): _____

Customer Order Number: _____

| | | | | |
|---|---|---|---|---|
| **CHILLED WATER** | | | | |
| Piping complete? | Yes | No | N/A | Initials |
| Water system – flushed, filled, vented; water treatment in place | Yes | No | N/A | Initials |
| Pumps installed and operational (rotation checked, strainers installed and cleaned) | Yes | No | N/A | Initials |
| Controls operational (3-way valves, face/bypass dampers, bypass valves, etc.) | Yes | No | N/A | Initials |
| Water system operated and tested; flow meets unit design requirement | Yes | No | N/A | Initials |
| Flow switch installed, wired, and calibrated | Yes | No | N/A | Initials |
| **CONDENSER WATER** | | | | |
| Cooling tower flushed, filled, vented; Water treatment in place | Yes | No | N/A | Initials |
| Pumps installed and operational (rotation checked, strainers installed and cleaned) | Yes | No | N/A | Initials |
| Controls (3-way valves, bypass valves, etc.) operable per IM/IOM | Yes | No | N/A | Initials |
| Water system operated and flow balance to meet unit design requirement | Yes | No | N/A | Initials |
| Flow switch installed, wired, and calibrated | Yes | No | N/A | Initials |
| **ELECTRICAL** | | | | |
| All interlock wiring complete and compliant with Daikin Applied specifications | Yes | No | N/A | Initials |
| Pump starter and interlocks wired | Yes | No | N/A | Initials |
| Cooling tower fans and controls wired | Yes | No | N/A | Initials |
| Wiring complies with National Electrical Code and local codes; Refer to NEC Article 430-22 (a) | Yes | No | N/A | Initials |
| Condenser pump starting relay (CP1,2) installed and wired | Yes | No | N/A | Initials |
| **MISCELLANEOUS** | | | | |
| Relief valve piping complete (per local codes)? | Yes | No | N/A | Initials |
| Thermometers, wells, gauges, control, etc., installed? | Yes | No | N/A | Initials |
| Minimum system load of 80% capacity available for testing/adjusting controls? | Yes | No | N/A | Initials |
| Cloud-connected controls included and needs to be commissioned? | Yes | No | N/A | Initials |
| **Document Attached:** Technical Breakdown from Daikin Tools? | Yes | No | N/A | Initials |
| **Document Attached:** Final Order Acknowledgement? | Yes | No | N/A | Initials |

**SIGNATURES**

| | Contractor Representative | | Daikin Applied Sales Representative |
|---|---|---|---|
| Signed: | | Signed: | |
| Name: | | Name: | |
| Company: | | Company: | |
| Date: | | Date: | |
| Phone/Email: | | Phone/Email: | |

**NOTE:** The most common problem delaying start-up and affecting unit reliability is the field-installed compressor motor power supply leads being too small. Questions: Contact the local Daikin Applied sales representative. State the size, number, and type of conductors and conduits installed (from power supply to starter, and from starter to chiller unit if remote-mounted.

**NOTE**: A 115-volt field-supplied relay (CP1,2) must be used to start/stop condenser water pump on most applications. Cold condenser water must not flow through condenser during compressor off cycle. Provisions have been made in control center for connecting CP relay, but must not have a rating in excess of 100 VA.

# Limited Product Warranty

DAIKIN APPLIED AMERICAS INC.
LIMITED PRODUCT WARRANTY
(**United States and Canada**)

**WARRANTY**

Daikin Applied Americas Inc. dba Daikin Applied ("Company") warrants to contractor, purchaser and any owner of the product (collectively "Owner") that, subject to the exclusions set forth below Company, at its option, will repair or replace defective parts in the event any product manufactured by Company, including products sold under the brand name Daikin and used in the United States or Canada, proves defective in material or workmanship within twelve (12) months from initial startup or eighteen (18) months from the date shipped by Company, whichever occurs first. Authorized replacement parts are warranted for the remainder of the original warranty. All shipments of such parts will be made FOB factory, freight prepaid and allowed. Company reserves the right to select carrier and method of shipment. In addition, Company provides labor to repair or replace warranty parts during Company normal working hours on products with rotary screw compressors or centrifugal compressors. Warranty labor is not provided for any other products.

Company must receive the Registration and Startup Forms for products containing motor compressors and/or furnaces within ten (10) days of original product startup, or the ship date and the startup date will be deemed the same for determining the commencement of the warranty period and this warranty shall expire twelve (12) months from that date. For additional consideration, Company will provide an extended warranty(ies) on certain products or components thereof. The terms of the extended warranty(ies) are shown on a separate extended warranty statement.

No person (including any agent, sales representative, dealer or distributor) has the authority to expand the Company's obligation beyond the terms of this express warranty or to state that the performance of the product is other than that published by Company.

**EXCLUSIONS**

1. If free warranty labor is available as set forth above, such free labor does not include diagnostic visits, inspections, travel time and related expenses, or unusual access time or costs required by product location.
2. Refrigerants, fluids, oils and expendable items such as filters are not covered by this warranty.
3. This warranty shall not apply to products or parts : (a) that have been opened, disassembled, repaired, or altered, in each case by anyone other than Company or its authorized service representative; (b) that have been subjected to misuse, abuse, negligence, accidents, damage, or abnormal use or service; (c) that have not been properly maintained; (d) that have been operated or installed, or have had startup performed, in each case in a manner contrary to Company's printed instructions; (e) that have been exposed, directly or indirectly, to a corrosive atmosphere or material such as, but not limited to, chlorine, fluorine, fertilizers, waste water, urine, rust, salt, sulfur, ozone, or other chemicals, contaminants, minerals, or corrosive agents; (f) that were manufactured or furnished by others and/or are not an integral part of a product manufactured by Company; or (g) for which Company has not been paid in full.
4. This warranty shall not apply to products with rotary screw compressors or centrifugal compressors if such products have not been started, or if such startup has not been performed, by a Daikin Applied or Company authorized service representative.

**SOLE REMEDY AND LIMITATION OF LIABILITY**

THIS WARRANTY CONSTITUTES THE SOLE WARRANTY MADE BY COMPANY. COMPANY'S LIABILITY TO OWNER AND OWNER'S SOLE REMEDY UNDER THIS WARRANTY SHALL NOT EXCEED THE LESSER OF: (i) THE COST OF REPAIRING OR REPLACING DEFECTIVE PRODUCTS; AND (ii) THE ORIGINAL PURCHASE PRICE ACTUALLY PAID FOR THE PRODUCTS. COMPANY MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, REGARDING PREVENTION OF MOLD/MOULD, FUNGUS, BACTERIA, MICROBIAL GROWTH, OR ANY OTHER CONTAMINATES. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT AND UNDER NO CIRCUMSTANCE SHALL COMPANY BE LIABLE TO OWNER OR ANY THIRD PARTY FOR INCIDENTAL, INDIRECT, SPECIAL, CONTINGENT, CONSEQUENTIAL, DELAY OR LIQUIDATED DAMAGES FOR ANY REASON, ARISING FROM ANY CAUSE WHATSOEVER, WHETHER THE THEORY FOR RECOVERY IS BASED IN LAW OR IN EQUITY, OR IS UNDER A THEORY OF BREACH CONTRACT OR WARRANTY, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE. THE TERM "CONSEQUENTIAL DAMAGE" INCLUDES, WITHOUT LIMITATION, THOSE DAMAGES ARISING FROM BUSINESS INTERRUPTION OR ECONOMIC LOSS, SUCH AS LOSS OF ANTICIPATED PROFITS, REVENUE, PRODUCTION, USE, REPUTATION, DATA OR CROPS.

**ASSISTANCE**

To obtain assistance or information regarding this warranty, please contact your local sales representative or a Daikin Applied office.

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